JUKI®

SC-350

ENGINEER'S MANUAL

29315306
No.00

PREFACE

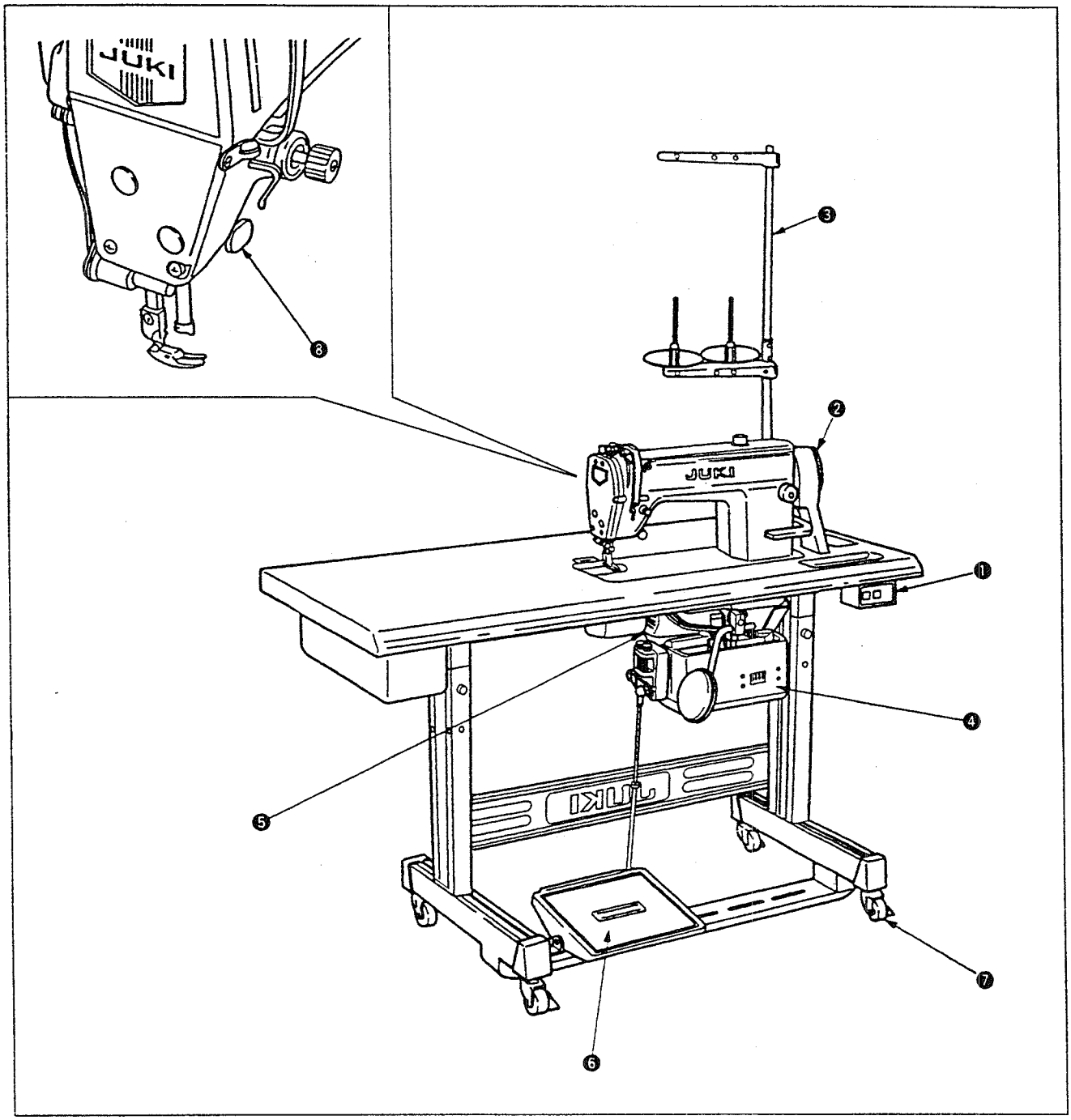
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines.

The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And, this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual.

It is advisable to use the relevant Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these units.

CONTENTS

1. CONFIGURATION



❶ Power switch
❷ Synchronizer
❸ L-shaped thread stand
❹ PSC box
❺ Motor
❻ Operation pedal
❼ Screw or caster for level adjustment of table / stand
❽ Manual touch-back switch

❶ Power switch

Power switch for motor, PSC, operation panel, etc.

❷ Synchronizer

Built inside the sewing machine pulley, detects up / down position of the needle and the rotating speed of sewing machine, and sends out input command to the MAIN circuit board in the PSC box.

❸ L-shaped thread stand

❹ PSC box

Consists of the circuit to control the sewing machine and motor, the output circuit to actuate various outputs (thread trimmer solenoid, back solenoid, etc.), pedal sensor to detect operation of the pedal, and power circuit to actuate respective functions.

❺ Motor

Drives the sewing machine at high speed ⟷ medium speed ⟷ low speed by the output command sent from the PSC box.

❻ Operation pedal

Speed control of the sewing machine, thread trimmer operation and presser lifting operation can be performed by the operation of depressing front part or back part of the pedal.

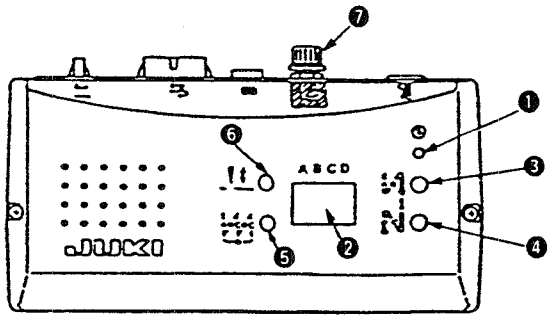
❼ Screw or caster for level adjustment of table / stand

Adjust the screws or casters so as to install the table and stand on a flat and vibration-free floor of workshop.

❽ Touch-back switch

Operation switch to perform the reverse feed stitch by the manual switch.

(1) Explanation of switches located on the front box cover



1) Power indicator lamp (LED)

Lights up when the power switch is turned ON.

Immediately goes out when the power is turned OFF. However, there are some places in the PSC box where the high-tension voltage remains. Perform the work after five minutes or more have passed.

2) Switch for setting the number of stitches

Used for setting number of stitches of the reverse feed stitching in processes A through D, number of stitches of the overlapped stitching from process A to process B, and number of repetitions in process D. Number of stitches can be set in the range of 0 to 9 stitches by using the push-button switch.

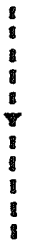
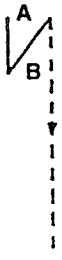
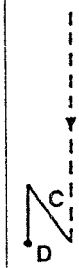
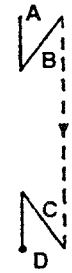
Switch with [+] mark : Switch to increase number of stitches

Switch with [−] mark : Switch to decrease number of stitches

3) Switch for automatic reverse feed stitching at sewing start and indicator lamp (LED)

Lights up when the switch for reverse feed stitching at sewing start is turned ON.

LED lights up when the overlapped stitching is selected. However, the function of overlapped stitching has priority, and the reverse feed stitching is not performed.

Switch for automatic reverse feed stitching at sewing start ❸	OFF	ON	OFF	ON
Stitching pattern				
Switch for automatic reverse feed stitching at sewing end ❹	OFF	OFF	ON	ON

① Four stitching patterns can be performed by combination of ON and OFF of switch for reverse feed stitching at sewing start❸ and switch for reverse feed stitching at sewing end ❹.

② For automatic reverse feed stitching at sewing start, the number of stitches in the respective processes can be set by "A" and "B" of the switches for setting number of stitches ❷. And, for automatic reverse feed stitching at sewing end, the number of stitches in the respective processes can be set by "C" and "D" of the switches for setting number of stitches ❷.

4) Switch for automatic reverse feed stitching at sewing end and indicator lamp (LED)

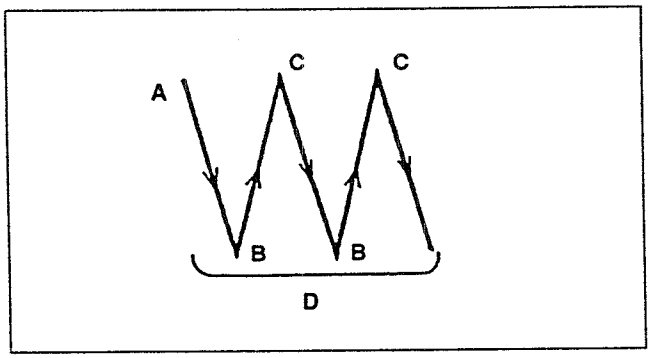
Lights up when the switch for automatic reverse feed stitching at sewing end is turned ON.

When the overlapped stitching is selected, LED lights up. However, the function of overlapped stitching has priority, and the function of reverse feed stitching is not performed.

5) Switch for overlapped stitching and indicator lamp (LED)

LED lights up when the switch for overlapped stitching is turned ON.

When the switch for overlapped stitching is turned ON (LED lights up.)the functions of reverse feed stitching at sewing start and automatic reverse feed stitching at sewing end are ineffective while the switches are ON and LED lights up.



Stitching processes are as shown in the figure on the left.
Number of stitches to be sewn in processes "A" to "C" is set by "A" to "C" of switches for setting number of stitches ❷.

Also, "D" of switch for setting number of stitches ❷ is used for setting the number of total processes.

Example :
A → B → C → B ⇨ Number of total processes D = 4
A → B → C → B → C ⇨ Number of total processes D = 5

(Caution)

When the set value of "D" is "0", the function is ineffective regardless of the set values of "A" to "C".

6) Switch for selecting up / down stop and indicator lamp (LED)

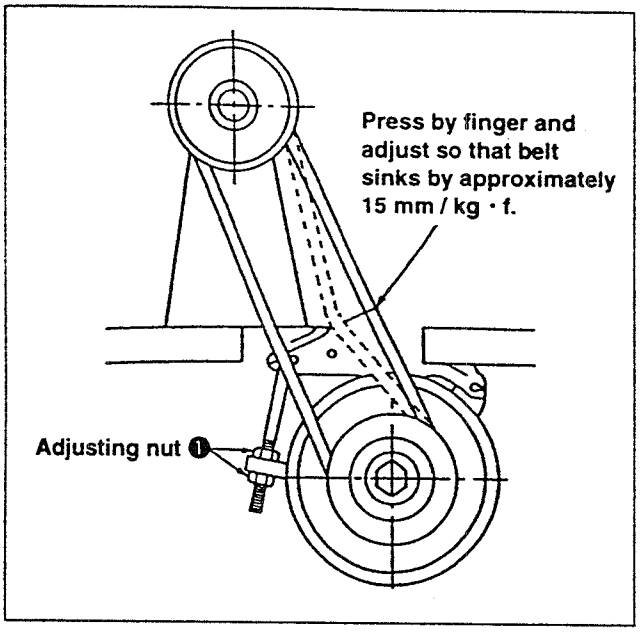
When the pedal is in its neutral position after depressing the front part of the pedal, and "OFF" is selected (LED goes off.), the stop is "down" and when "ON" (LED lights up.) "up".

7) Variable resistor for limiting number of rotations of sewing machine

Variable resistor to limit the number of maximum rotations of sewing machine when the pedal is fully depressed.

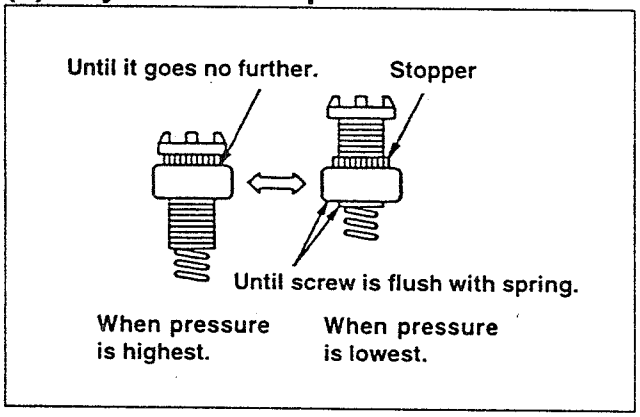
2. ADJUSTMENT

(1) Explanation of belt tension



If the belt is excessively tensed, it will damage the main shaft or motor bearing. On the contrary, if it is excessively loose, it will slip or its service life is shortened. In addition, it will be the cause of malfunction such as overrunning after thrad trimming, uneven stop position after thread trimming, etc.
Accordingly, use a belt with proper length as shown in the Instruction Manual. Adjust the tension with adjusting nut ❶ so that the belt sinks by 15 mm (by a force of 1kg) when the center of belt is pressed by a finger.

(2) Adjustment of pedal



1) Adjusting the depressing pressure

Pressure is increased when pedal pressure adjusting spring ❶ is hooked on the right side, and decreased on the left side.

2) Adjusting the force of depressing back

The force is increased when screwing adjusting screw ❷ for force of depressing back, and is decreased when loosening the screw.
However, the range of adjustment is as shown in the figure on the left.

(Caution) After the adjustment, lightly tighten the stopper with fingers.

(3) Adjustment of the variable resistor

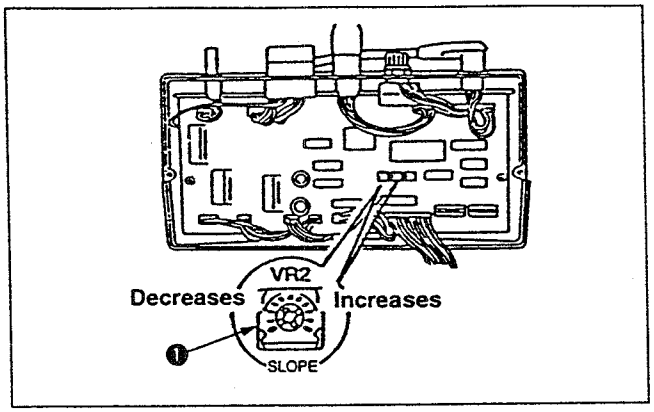
1) List of the VR (variable resistor) for adjustment and adjusting range

VR for adjustment, adjusting range and outline of functions are shown in the following list.

VR symbol	Outline of function	Standard value	Control range	Remarks
SLOPE	Variable resistor for maximum speed of sewing machine controls the range from thread trimming speed (200 rpm) to the maximum speed.	Maximum speed of specification	200 rpm to number of maximum rotations.	When diameter of pulley is ø120, turn ON DIPSW 1-6. 200 to 4,800 rpm When diameter of pulley is ø100, turn OFF DIPSW. 200 to 4,000 rpm
MS	Controls the speed of sewing start, sewing end and reverse feed stitching.	1,900 rpm	1,400 to 1,900 rpm	
LSP	Variable resistor for adjusting minimum speed by depressing front part of pedal and thread trimming speed.	200 rpm	170 to 240 rpm	

Turn VR (variable resistor) counterclockwise to decrease the speed, and clockwise to increase the speed.

(4) Adjusting the maximum speed



It is possible to adjust the speed from low speed of approximately 200 rpm to the maximum speed by the semi-fixed variable resistor on the PSC box without replacing the motor pulley.

Open the cover of PSC box, and turn SLOPE ❶ on the circuit board counterclockwise to decrease the maximum speed.

(Caution) Adjust so that the speed does not exceed the number of maximum rotations of machine head used.

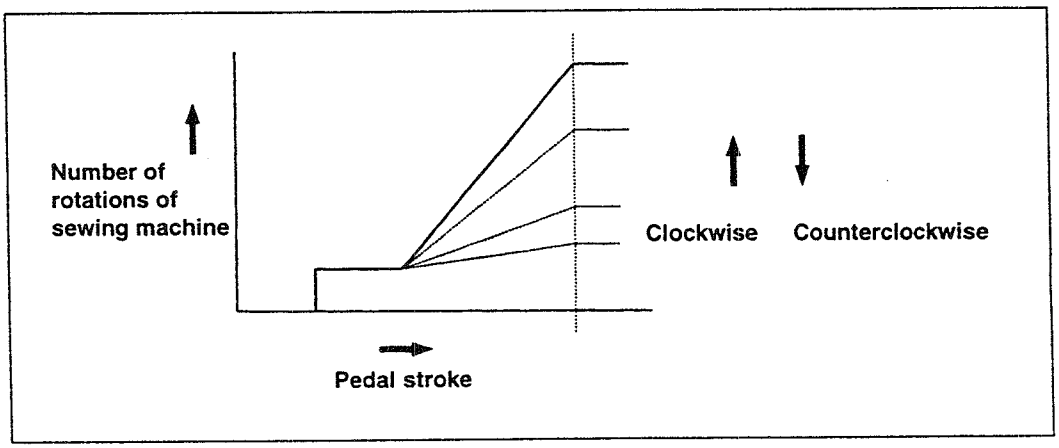
1) Variable resistor for limiting the maximum speed (SLOPE) [MAIN circuit board]

Turn the knob clockwise to increase the rotation of sewing machine, and turn counterclockwise to decrease it.

The adjusting range : When DIPSW 1-6 (OFF) and pulley with ø100 : 200 to 4,000 rpm

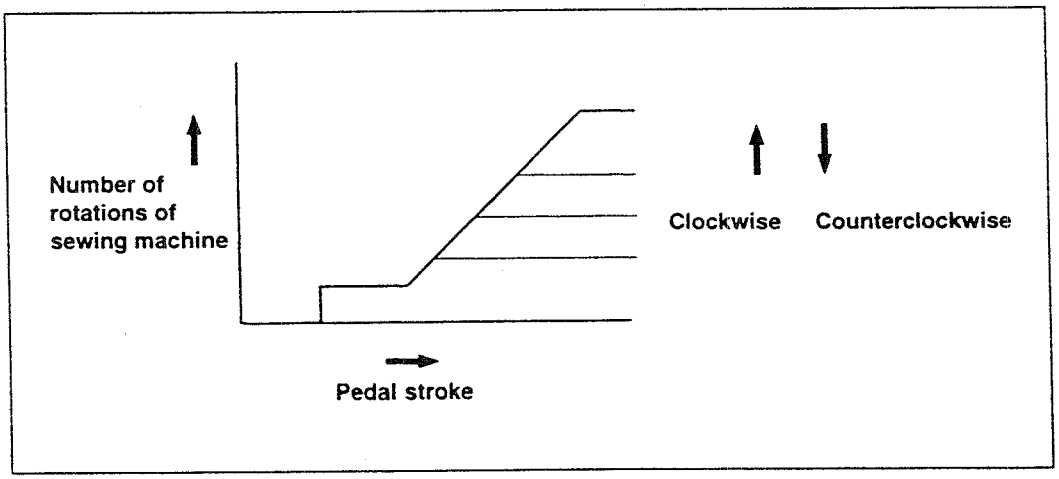
When DIPSW 1-6 (ON) and pulley with ø120 : 200 to 4,800 rpm

Variation of speed is as shown in the following figure.

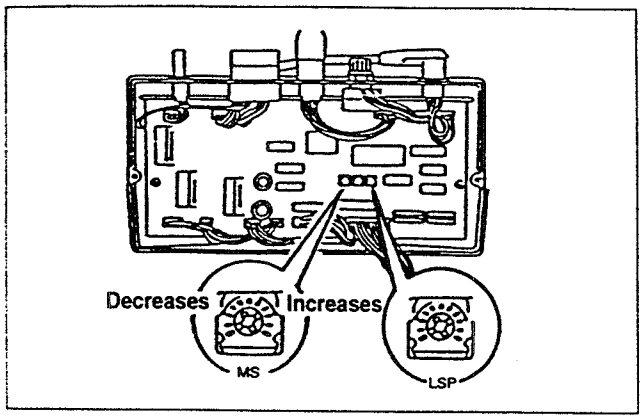


2) Variable resistor for external maximum speed limitation

This variable resistor for limitation limits up / down of the maximum speed only without changing the start-up speed. The desired speed can be reached soon even when the speed is set to a low speed.



(5) Adjusting the speed of automatic reverse feed stitching



Adjust by turning variable resistor (MS) attached to the center of MAIN circuit board. 1,400 to 2,000 rpm can be adjusted with this variable resistor. However, when the speed is changed, overlapped section is likely to slip.

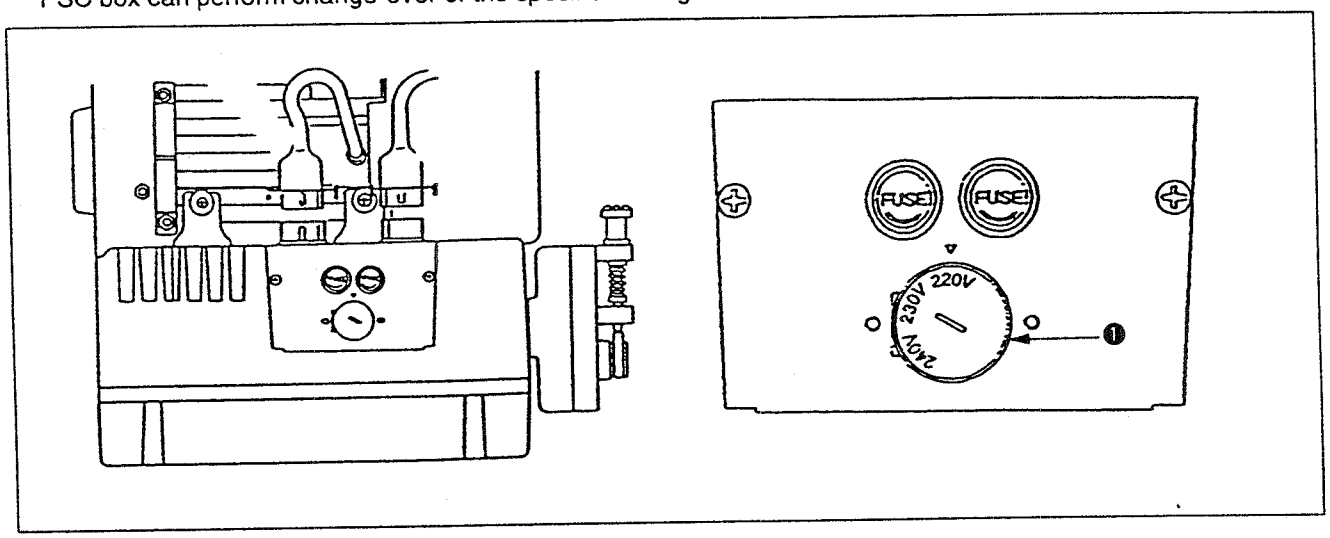
(6) Adjusting the minimum speed and thread trimming speed

Adjust using bariable resistor (LSP) attached to the center of MAIN circuit board.
Adjust with this (LSP) when the speed is different from the standard value (200 rpm).

3. FUNCTION

(1) Change-over of the specified voltage and replacing the fuse

PSC box can perform change-over of the specified voltage in the same box.



1) Change-over of the power voltage

① Be sure to turn OFF the power before carrying out the work.

② Fit voltage change-over switch ❶ shown in the above figure to the voltage to be used.

2) Replacement of the fuse

Voltage used	Fuse
110V to 120V	15A, 250V
220V to 240V	10A, 250V

Same as the aforementioned change-over of the power voltage, be sure to turn OFF the power, remove the cap of fuse holder, take out the fuse, and replace it with a new one.

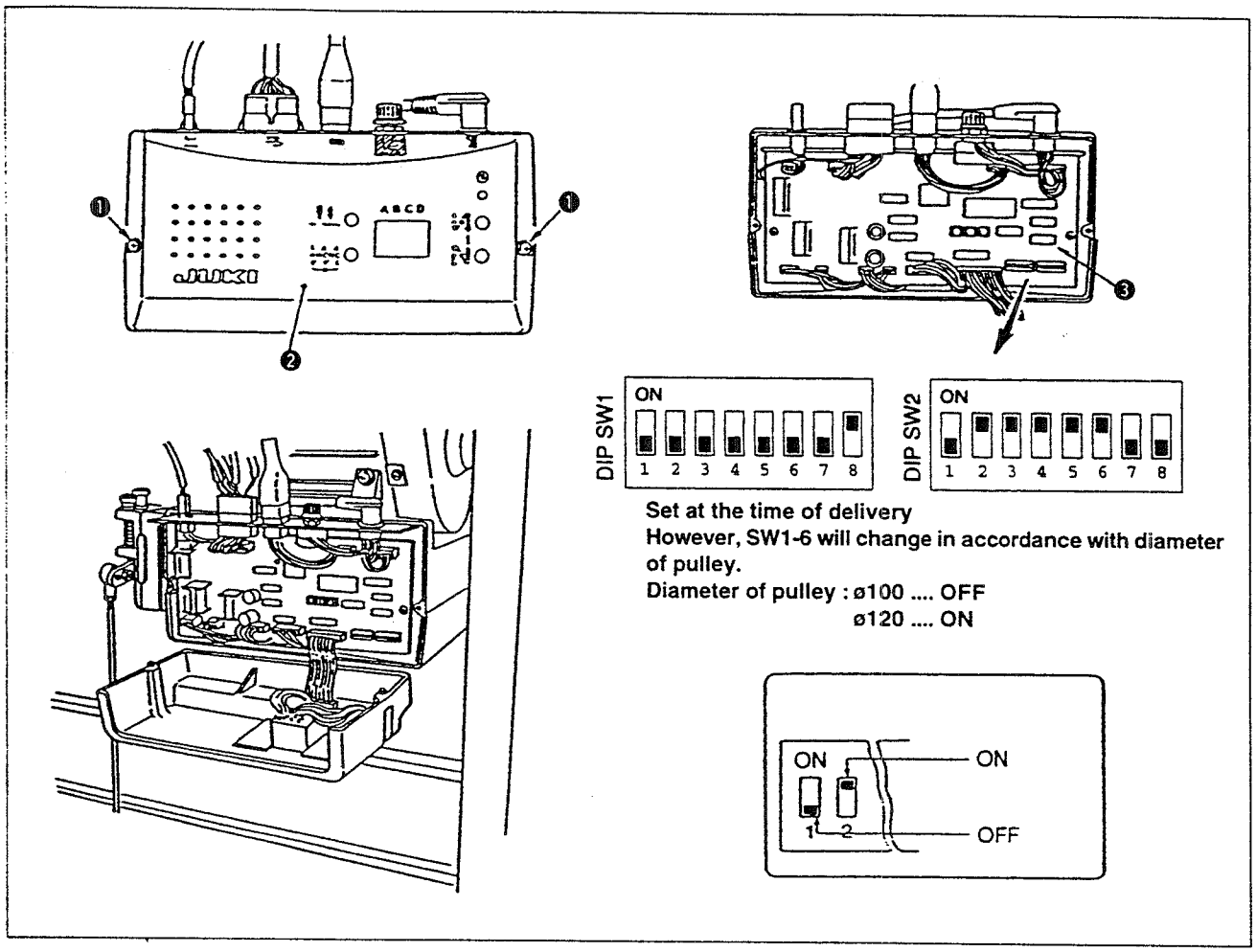
Purchase the commercially-available fuse of ø5.2 x 20 mm of which capacity is proper, and replace. (Part No. has not been set in particular.)

(2) Functions of various switches

1) DIP switches on MAIN circuit board

DIP switches, SW1 and SW2, are in the right bottom section of MAIN circuit board ❸ when removing front cover setscrews ❶ in the PSC box and opening front cover ❷.

(Be sure to turn OFF the power as it is dangerous when opening front cover ❷. In addition, perform change-over of the switch after turning OFF the power. The function does not change when the power is kept ON.)



2) List of DIP switches and the functions of selection

Outline of the functions of DIP switches are shown as follows.

	Switch No.	Set at the time of delivery	Function
①	SW1-1	OFF	Selection of rotating direction of motor OFF : CCW, ON : CW
②	SW1-2	OFF	Used always at "OFF".
③	SW1-3	OFF	Selection for speed test
②	SW1-4	OFF	Used always at "OFF".
④	SW1-5	OFF	Selection of soft-start
⑤	SW1-6	OFF / ON	Selection of pulley OFF : Ø100, ON : Ø120
⑥	SW1-7	OFF	Selection of automatic presser foot lifter
⑦	SW1-8	ON	Selection of wiper program
⑧	SW2-1	OFF	┐ ON-timing of SBT back solenoid
	SW2-2	ON	┘ Compensation ———
	SW2-3	ON	┐ ON-timing of SBT back solenoid
	SW2-4	ON	┘ Compensation ———
	SW2-5	ON	┐ ON-timing of EBT back solenoid
	SW2-6	ON	┘ Compensation ———
②	SW2-7	OFF	Used always at "OFF".
	SW2-8	OFF	Used always at "OFF".

① Change-over of the rotating direction of the sewing machine (SW1-1)

Set the switch to the rotating direction of the sewing machine.

Turn the handwheel by hand to lower the needle position, and turn ON the power switch watching the handwheel. Confirm the rorating direction of the handwheel at that time.

OFF : Handwheel turns in the front direction on the operator side. (Normal rotation)

ON : Handwheel turns in the rear direction on the operator side. (Reverse rotation)

② Not set yet. (SW-1-2 and-4, SW-2-7 and -8)

Use always these switches at "OFF".

(Caution) If they are used at "ON", there may be in danger of damaging the sewing machine. So, never set them to "ON".

③ Speed test program (SW1-3)

When turning ON the power after setting SW1-3 to ON, the speed test program can be selected.

As for the adjustment of the number of rotations, refer to "(3) Adjustment of the variable resistor on page 5".

<Adjustment procedures>

Tools necessary for adjustment
1. Tachometer
2. Slit screwdriver (Small-size)
3. Slit screwdriver (Large-size)

1. Turn OFF the power switch to motor, and paste a piece of reflecting tape on the handwheel to measure the number of rotations.
2. Remove two setscrews in the cover of PSC box with a slit screwdriver (large-size), and open the box.
3. Turn ON DIP switch SW1-3 located on MAIN circuit board.
4. Keep the presser foot of sewing machine head held pressed at the "up" position using the lifting lever.
5. Turn ON the power switch. (At this time, the sewing machine does not run even if the stop position is other than "up" stop position. This is because the sewing machine is under the speed test program mode. Note that the machine is not in trouble.)
6. Repeat depressing the front part and back part of the pedal, and the sewing machine runs as shown in the following list.

Pedal depressing	1st time	2nd time
Output signal	LSL	BT
Number of rotations	200 ± 20	1900 ± 100
Adjusting place	LSP	MS

Confirm the model name since the number of rotations will change in accordance with the sewing machine used.

7. Turn OFF the power when each adjustment of the number of rotations has been completed.
8. Turn OFF DIP switch SW1-3 located on MAIN circuit board.
9. Close the cover of PSC box while paying attention so as the cord not to be caught, and fix the box with the setscrews. Peel off the reflecting tape to measure the speed pasted on the handwheel.
10. Then, turn ON the power again to return the mode to the normal one. Check whether the sewing machine works properly.

④ Selection of the soft-start function (SW1-5)

When the stitch length is small, or the needle is thick, if the needle thread fails to interlace with the bobbin thread at the start of sewing, this function improves the stability of sewing by limiting the sewing speed between the first stitch and the second stitch. (The speed of soft-start up to the second stitch is approximately 600 rpm.)

⑤ Selection of the pulley (SW1-6)

Selection is made by the diameter of pulley. If the selection is not fit to the diameter of pulley, the proper value of the number of rotations of thread trimming and number of rotations of reverse feed stitching cannot be obtained. Be sure to set the speed to the diameter of pulley.

OFF : 4,000 revolution specification (4,000 rpm or less specification)
Diameter of pulley : ø100

ON : 4,800 revolution specification and 4,500 revolution specification (4,000 rpm or more specification)
Diameter of pulley : ø120

⑥ Selection of automatic presser foot lifting function (in case AK device is attached.) (SW1-7)

Presser foot is not lifted by the presser lifting lever, but automatically lifted by the solenoid. Function of automatically lifting presser foot can be selected.

ON : Automatic lifting presser foot function is provided. (Presser foot automatically goes up 60 seconds after thread trimming.)

OFF : Control of automatic lifting presser foot is not performed.

⑦ Selection of wiper control (SW1-8)

Whether the wiper control is executed or not can be selected. (However, perform the control with the switch located on the machine head in case the wiper control is temporarily not executed.)

ON : Wiper action is performed while the wiper solenoid is ON in the period of time of approximately 45 ms after thread trimming. In addition, when the function of automatic presser foot lifting device is selected, the step moves to the control of presser foot lifting after the period of time of approximately 30 ms is delayed. (To secure the returning time of wiper.)

OFF : Wiper control is not performed. (Therefore, in case the automatic presser foot lifting device is attached, the presser foot automatically goes up 75 ms, the total of 45 ms of drawing time and 30 ms of returning time, faster.

⑧ Compensation of timing of the solenoid for back-tuck (SW2-1 to -6)

When the normal and reverse feed stitches are not uniform under the automatic reverse feed stitching action, this function can change the ON / OFF timing of the solenoid for back tuck and compensate the timing. (However, this function is effective only when the number of stitches is three stitches or more in each process.)

Adjust with this function when sewing slippage occurs due to the change of sewing speed of automatic reverse feed stitching, change of of sewing machine head, etc.

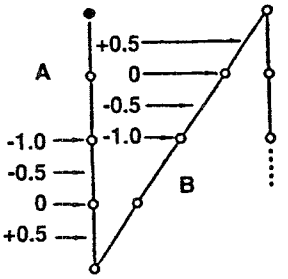
★ Compensation of on-timing of solenoid for reverse feed stitching at the start of sewing.
Compensation can be performed by the combination of SW2-1, SW2-2, SW2-3 and SW2-4.

★ Compensation of on-timing of solenoid for reverse feed stitching at the end of sewing.
Compensation can be performed by the combination of SW2-5 and SW2-6.

	A		B		C	
	SW2 1	SW2 2	SW2 3	SW2 4	SW2 5	SW2 6
-1.0	×	×	×	×	×	×
-0.5	○	×	○	×	○	×
0	×	○	×	○	×	○
+0.5	○	○	○	○	○	○

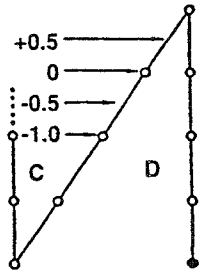
(Caution) The values shown in the thick frame ☐ are standard adjustment values.

Reverse feed stitching at the start of sewing



In case of A = B = 4 stitches

Reverse feed stitching at the end of sewing



In case of C = D = 4 stitches

<Compensation method>

For the reverse feed stitching at the start of sewing, first compensate process A, and compensate process B.

a Process A

ⓐ In case the number of stitches in process A is sewn, but the stitch length of first stitch in process B is not right, or the needle enters twice. Or, in case the number of stitches in process A is more by one stitch.
Set the compensation value to the minus "-" value.

ⓑ In case the number of stitches in process A is not sewn.
Set the compensation value to the plus "+" value.

b Process B

ⓐ In case the stitch length of the last stitch in process B is not right, needle enters twice, or the number of stitches in process B is less than that in process A.
Set the compensation value to the plus "+" value.

ⓑ In case the number of stitches in process B is sewn, but the stitch length of the first stitch of the free sewing is not right, or needle enters twice. Or, in case the number of stitches in process B is more by one stitch.
Set the compensation value to the minus "-" value.

c Process D

ⓐ In case the stitch length of the first stitch in process D is not right, or the needle enters twice. Or, in case the mumber of stitches in process D is less.
Set the compensation value to the minus "-" value.

ⓑ In case the number of stitches in process D is sewn, but the stitch length of the last stitch in process C is not right, or needle enters twice. Or, in case the number of stitches in process D is more by one stitch.
Set the compensation value to the plus "+" value.

(3) Safety circuit

SC-350 is provided with following safety circuits. Explanation of the function, state of circuit action and method of returning is given below.

1) Safety circuit of the machine lock

<Object> In case the sewing machine is locked during operation due to some mechanical or electrical malfunction, or the machine runs idle two seconds or more when the belt has come off, this circuit stops energizing to the motor and prohibits the pedal input to prevent the motor from burning and minimizes the damage to the sewing machine.

<Circuit action> Puts all inputs and outputs in a state of prohibition. After this action, the sewing machine does not run even when the pedal is operated. In addition, the solenoid for back-tuck does not work since the switch for manual reverse feed stitching is ineffective.

<Method of returning> Turn OFF the power switch, and remove the cause that the sewing machine stopped running. Then, turn ON the power switch.

2) Safety circuit of the detector trouble

<Object> When the detector to detect the needle position (up or down) of the sewing machine is in trouble, the sewing machine cannot be used since the needle stop position becomes unstable (needle stops in any position.), the sewing machine continues running without stopping, or the thread trimmer components are damaged. To prevent the sewing machine from such troubles, the micro-computer always checks the up/down signal sent from the detector. If there is a trouble in the detection signal, the detector will change to the controller of the clutch motor without thread trimming.

<Circuit action> If this kind of trouble is detected during running of the sewing machine, the sewing machine stops even when the front part of the pedal is being depressed. Then, return the pedal to its neutral position, and depress the front part again. From this time, the detector changes to the controller of the clutch motor, and the sewing operation is possible with the function of the clutch motor without thread trimming and automatic reverse feed stitching. (Reverse feed stitching by the manual switch is possible.)

<Method of returning> Turn OFF the power switch, and replace or repair the detector. Then, turn ON the power switch.

3) Safety circuit during thread trimming or after thread trimming

The sewing machine continues stopping after performing thread trimming even when depressing the front part of the pedal during reverse feed stitching after thread trimming or thread trimming. This circuit prevents needle or knife from breakage.

<Method of returning> Return once the pedal to its neutral position and depress the front part to return to the normal operation.

4) Turning ON the power while keeping the front part of the pedal held depressed.

If turning ON the power switch while keeping the front part of the pedal held depressed, the sewing machine moves up to the "up" position when the needle is in "down" position. And, the machine does not move when the needle is in "up" position. ... Same action as when the pedal is in its neutral position.

<Method of returning> Return once the pedal to its neutral position and depress the front part to return to the normal operation.

5) Safety circuit of the solenoid for back-tuck

In case the switch for manual reverse feed stitching has been in a state of "ON" for more than 12 seconds continuously, energizing to the solenoid for back-tuck is stopped. However, even if this safety circuit is acting, automatic reverse feed stitching at the sewing start or at the sewing end will work.

In addition, in case the thread trimmer is actuated while the switch has been ON continuously, enerziging to the solenoid for back-tuck is stopped at that time.

<Method of returning> The circuit will be released by turning OFF once the switch for manual reverse feed stitching.

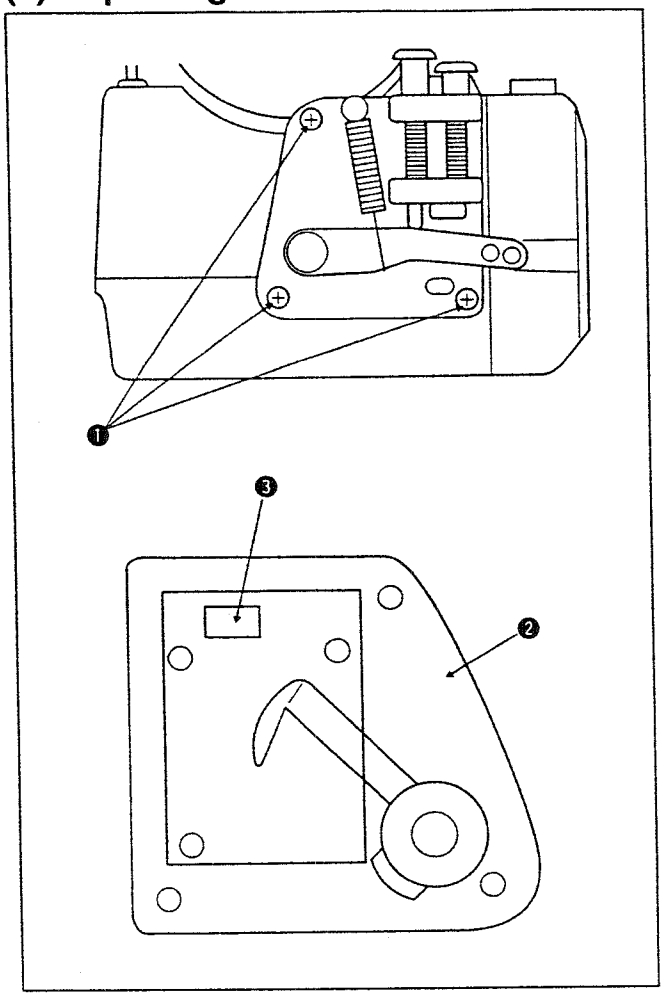
6) Safety circuit of automatic presser foot lifting device

The presser foot goes up after thread trimming by the function of automatic presser foot lifting. In case the presser foot has gone up for one minute, energizing to the solenoid for presser foot lifting is automatically stopped, and the presser foot comes down.

<Method of returning> After coming down, the presser foot returns to the initial state, and goes up whenever the thread trimming is performed again.

4. MAINTENANCE AND INSPECTION

(1) Replacing the sensor variable resistor asm.



1) Remove pedal sensor setscrews ❶ on the left side of the PSC box.
2) Pull out the connector of CN1 ❸ from pedal sensor unit ❷.
3) Replace it with a new pedal sensor unit.
4) Insert the connector to CN1 ❸, and attach to the Box.

(2) Adjusting procedure of the pedal sensor

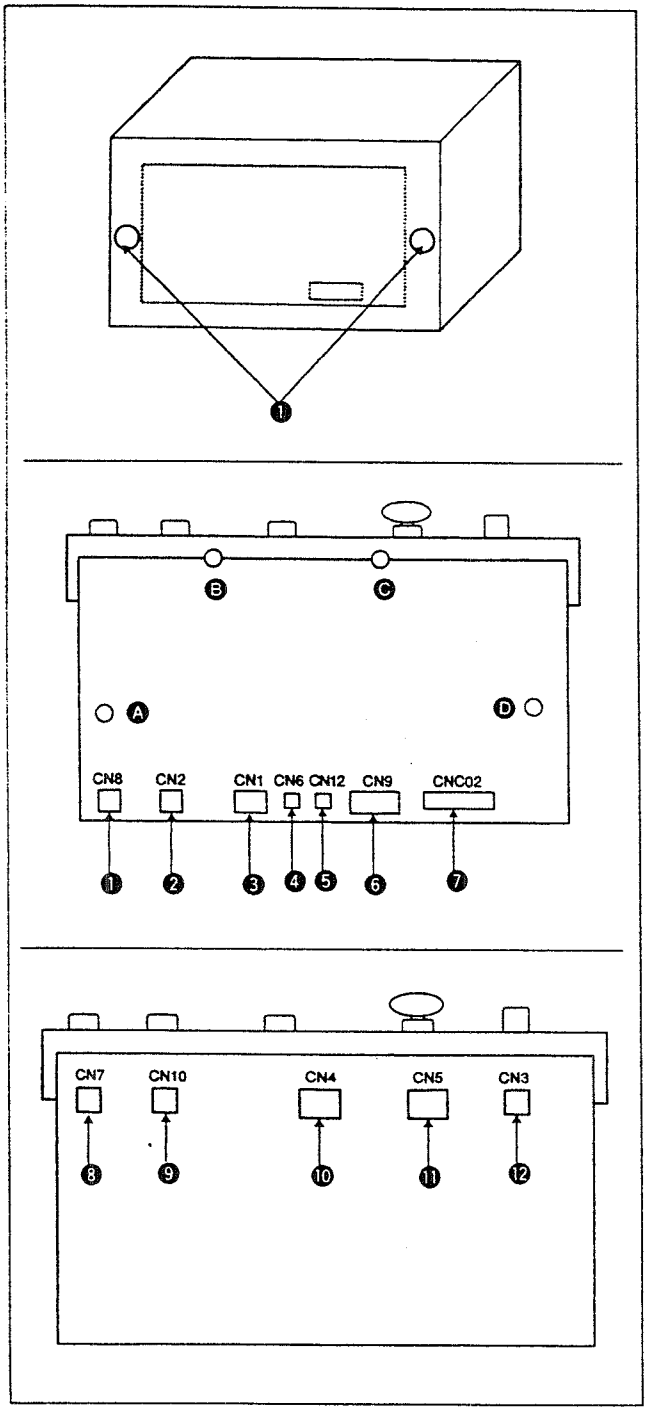
1) Set VR1 and VR2 to the position of center of the pedal sensor (PCB plate).
2) Send the power of 5VDC to the connector of CN1, and measure the detected voltage of Vrhs using "MULTI METER".
3) Set the Vrhs value of the ring to 320mV after setting the lever to its neutral position, and fix the lever. (30kg cm) (Position to stop the lever)
4) Depress the front part of the lever up to the maximum voltage, and adjust so that the Vrhs value of VR1 is more than 3.1V. (Depressing the front part of the lever ... maximum depressing position)
5) Depress the back part of the lever up to the first step to make the Vrhs value of VR2 approximately 50mV to 60mV. (Position where the lever comes in contact with the spring of the second step.)
6) Depress the back part of the lever up to the second step, and adjust so that the Vrhs value of VR2 is smaller than approximately 10mV. (Position where the back part of the lever is fully depressed.)
7) Re-confirm whether the respective actions are made as follows.

Repeat steps 4), 5) and 6) to enter the proper values. (Repeat until the adjusted values enter near to the center of the specified range

Adjustment value	
* Neutral voltage	: 300mV > Vrhs > 340mV
Max. voltage when the front part of the lever is depressed (MAX. SPEED)	: Vrhs > 3.0V
1st step of depressing the back part of the lever (FL)	: 125mV > Vrhs < 20mV
2nd step of depressing the back part of the lever (Wiper)	: Vrhs < 20mV

(2) Replacing each circuit board

1) Replacing CONTROL circuit board



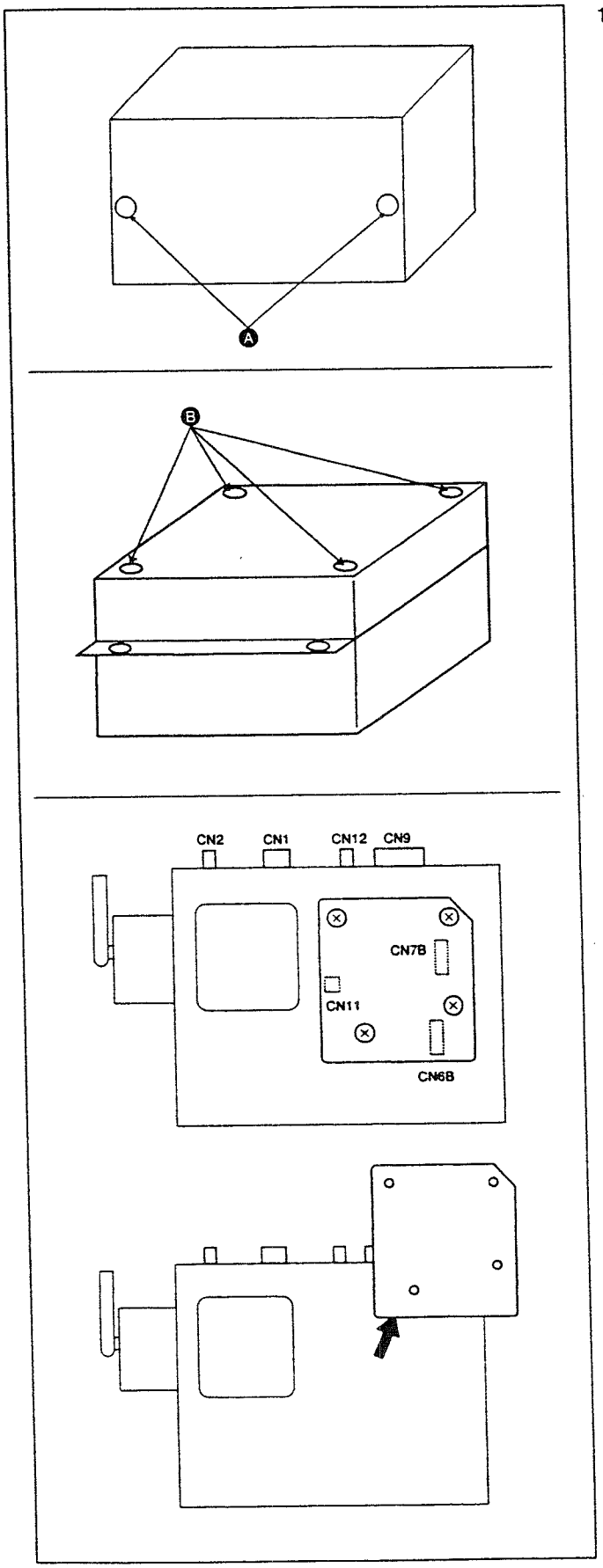
1) Loosen two screws Ⓐ located in front of the PSC box (take out the connector of CNC02 located on CONTROL circuit board.), and remove the front cover.

2) Then, remove following connectors attached to the CONTROL circuit board.
(Connectors ❶ through ❼ in the left figure)
3) Remove four setscrews Ⓐ through Ⓓ of the circuit board, then the CONTROL panel can be removed together with the CONNECTOR PANEL A asm.

4) Remove connectors ❽ through ⓬ in the left figure, the CONNECTOR PANEL A asm. and the CONTROL circuit board can be separated.
5) Replace the CONTROL circuit board with a new one by reversing the above disassembly order
6) Finally, perform the adjustment of number of rotations described in the preceding clause to finish the replacement.

(3) Replacing POWER circuit boards (1) and (2)

(Remove POWER circuit board (2) first, then remove (1).)



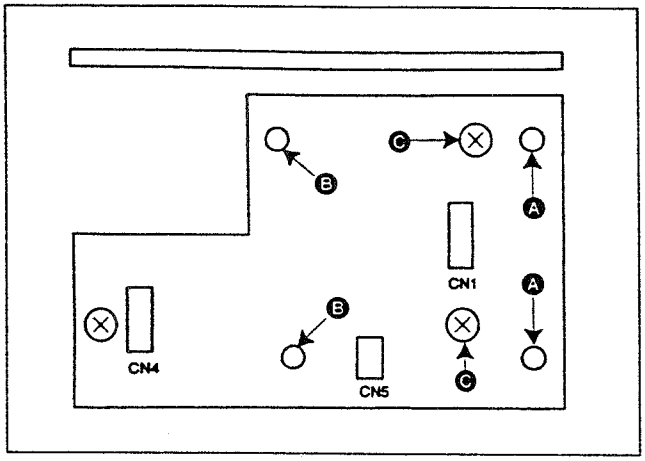
1) Loosen two screws Ⓐ in the front face of the PSC box (take out the connector of CNC02 located on the CONTROL circuit board.), and remove the front cover.

2) Turn down the PSC box to make the bottom up, loosen four screws Ⓑ, and remove the bottom cover.

3) Pull out CN1, CN2 and CN12 located on the CONTROL circuit board.
4) Loosen four setscrews in the POWER circuit board (2).
5) Slightly lifting up the POWER circuit board (2), remove CN11, CN6B and CN7B located on the reverse side.
6) Lifting up the POWER circuit board as shown in the left figure, remove CN8B.

(4) Replacing POWER circuit board (1)

(Perform after having removed POWER circuit board (2).)



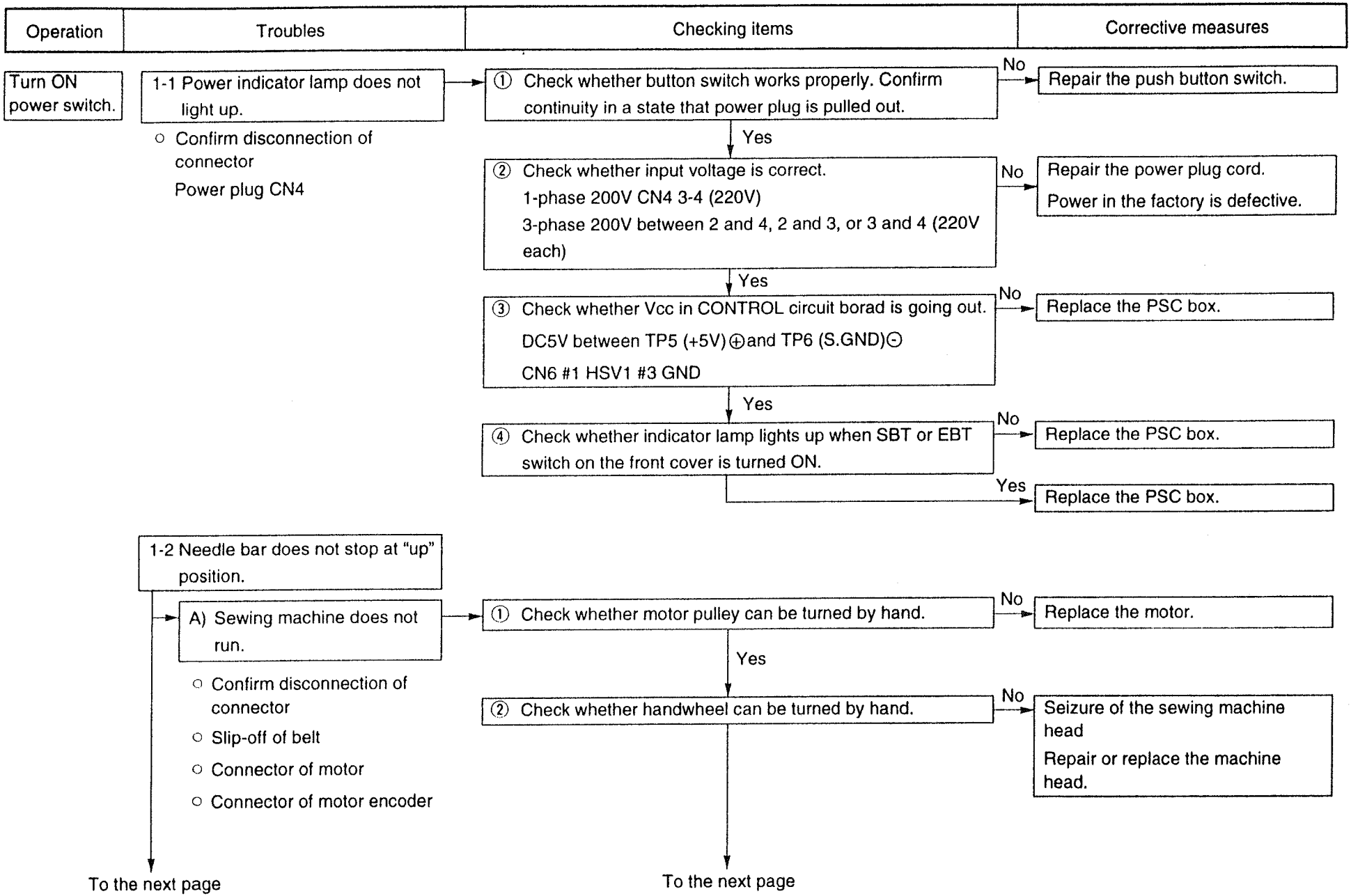
1) Remove CN4, CN5 and CN1 located on the POWER circuit board (1).
2) Remove CN9 located on the CONTROL circuit board.
3) Remove two hexagon studs Ⓐ and two studs Ⓑ.
4) Remove three screws Ⓒ.

5. TROUBLES AND CORRECTIVE MEASURES

(1) Take following actions when a trouble has occurred.

1) Pull out the plug from the connector on the control unit, insert it again, and securely fix it.
2) Check the power voltage. Confirm that the voltage corresponds with the voltage described in rating plate.
3) Check the fuse in the control unit. When it is necessary to replace the fuse, replace the fuse with a new one supplied as accessory after confirming the capacity.
   200V specification : 10A
   100V specification : 15A
4) The sewing machine with thread trimmer works in the following order.
   In case of the trouble, check up to which step of following order the sewing machine normally worked, and inspect the defective step. Then, the defective place narrows so as to discover the trouble with ease.

① Power switch ON	1-1)	Power lamp lights up.
	1-2)	Needle bar stops.
② Depressing front part of pedal	2-1)	Rotation of sewing machine (low speed → high speed)
③ Neutral position of pedal	3-1)	Needle bar "down" stop
④ Depressing back part of pedal	4-1)	Thread trimming
	4-2)	Needle bar "up" stop
	4-3)	Wiper works.
	4-4)	Presser foot lifting
⑤ Reverse feed stitching components	5-1)	Automatic reverse feed stitching
	5-2)	Touch-back


Operation
Troubles
Checking items
Corrective measures
Turn ON power switch.
1-1 Power indicator lamp does not light up.
○ Confirm disconnection of connector
Power plug CN4
① Check whether button switch works properly. Confirm continuity in a state that power plug is pulled out.
No
Repair the push button switch.
Yes
② Check whether input voltage is correct.
1-phase 200V CN4 3-4 (220V)
3-phase 200V between 2 and 4, 2 and 3, or 3 and 4 (220V each)
No
Repair the power plug cord.
Power in the factory is defective.
Yes
③ Check whether Vcc in CONTROL circuit borad is going out.
DC5V between TP5 (+5V)⊕and TP6 (S.GND)⊖
CN6 #1 HSV1 #3 GND
No
Replace the PSC box.
Yes
④ Check whether indicator lamp lights up when SBT or EBT switch on the front cover is turned ON.
No
Replace the PSC box.
Yes
Replace the PSC box.
1-2 Needle bar does not stop at "up" position.
A) Sewing machine does not run.
○ Confirm disconnection of connector
○ Slip-off of belt
○ Connector of motor
○ Connector of motor encoder
① Check whether motor pulley can be turned by hand.
No
Replace the motor.
Yes
② Check whether handwheel can be turned by hand.
No
Seizure of the sewing machine head
Repair or replace the machine head.
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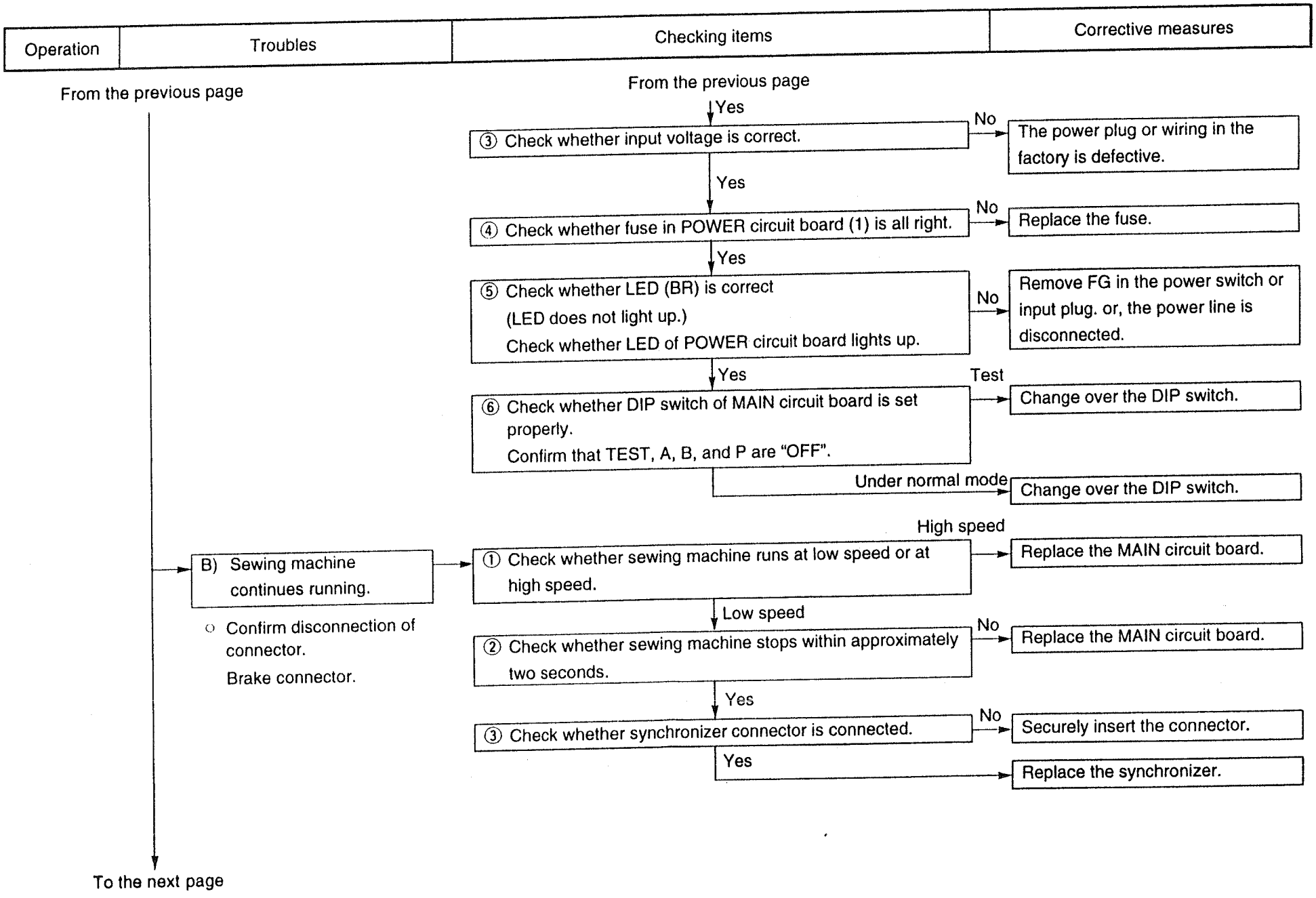
To the next page


Operation
Troubles
Checking items
Corrective measures
From the previous page
From the previous page
Yes
③ Check whether input voltage is correct.
No
The power plug or wiring in the factory is defective.
Yes
④ Check whether fuse in POWER circuit board (1) is all right.
No
Replace the fuse.
Yes
⑤ Check whether LED (BR) is correct
(LED does not light up.)
Check whether LED of POWER circuit board lights up.
No
Remove FG in the power switch or input plug. or, the power line is disconnected.
Yes
Test
⑥ Check whether DIP switch of MAIN circuit board is set properly.
Confirm that TEST, A, B, and P are "OFF".
Change over the DIP switch.
Under normal mode
Change over the DIP switch.
High speed
B) Sewing machine continues running.
① Check whether sewing machine runs at low speed or at high speed.
Replace the MAIN circuit board.
○ Confirm disconnection of connector.
Brake connector.
Low speed
② Check whether sewing machine stops within approximately two seconds.
No
Replace the MAIN circuit board.
Yes
③ Check whether synchronizer connector is connected.
No
Securely insert the connector.
Yes
Replace the synchronizer.
To the next page

Operation	Troubles	Checking items	Corrective measures

From the previous page

C) Sewing machine stops at section other than "up" stop section.

① Check whether sewing machine runs at low speed.

No → Replace the motor (encoder).

Yes → Safety circuit of detector to detect needle up / down position is working as the detector is defective. Replace the detector.

Depressing front part of pedal

2-1) Sewing machine does not run.

○ Confirm disconnection of connector
CN6 on MAIN circuit board

② Sewing machine runs when depressing once back part of pedal.

No → Replace the MAIN circuit board. Replace the pedal sensor.

Yes → Adjust depressing pressure of the spring, angle of the pedal sensor, VR1 or VR2.

2-2) High speed cannot be obtained.

○ Confirm disconnection of connector.
CN5 on MAIN circuit board

① Check whether variable resistor for maximum speed limit in PSC box is set properly.

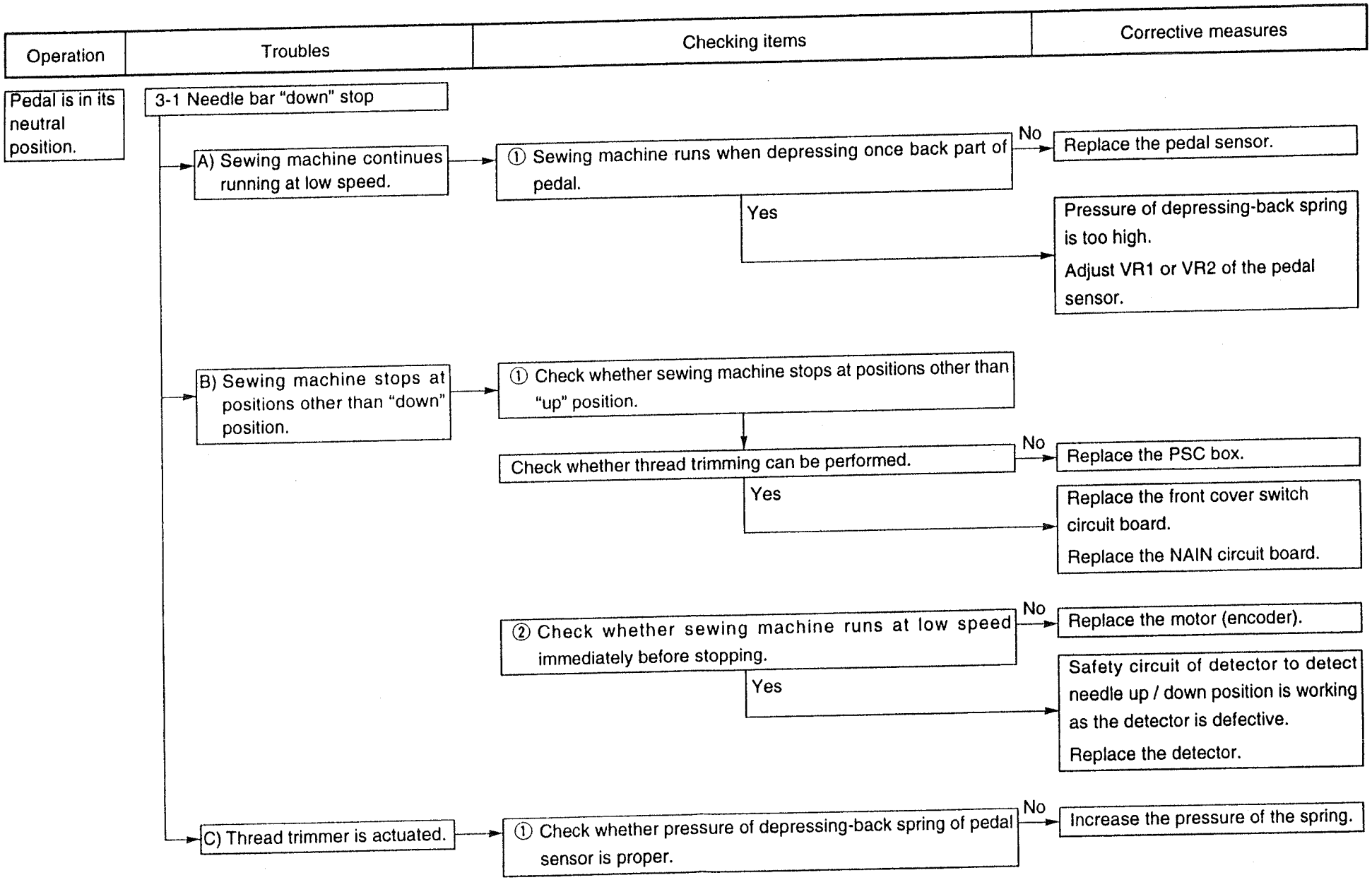
No → Turn clockwise the variable resistor.

Yes

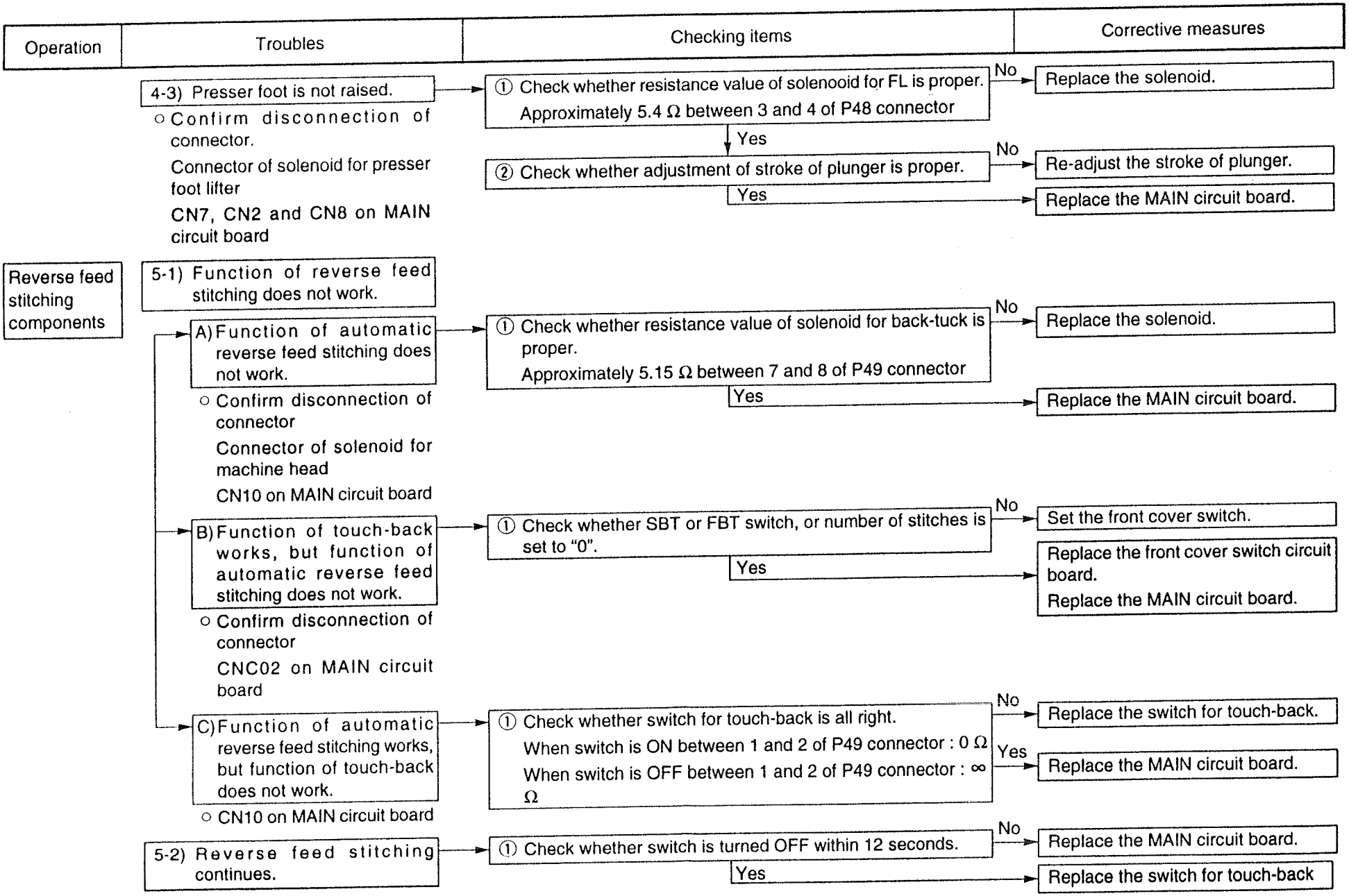
② Check variable resistor (SLOPE) in CONTROL circuit board.

No → Adjust the variable resistor (SLOPE) in the CONTROL circuit board.

Yes → Replace the MAIN circuit board. Replace the pedal sensor.

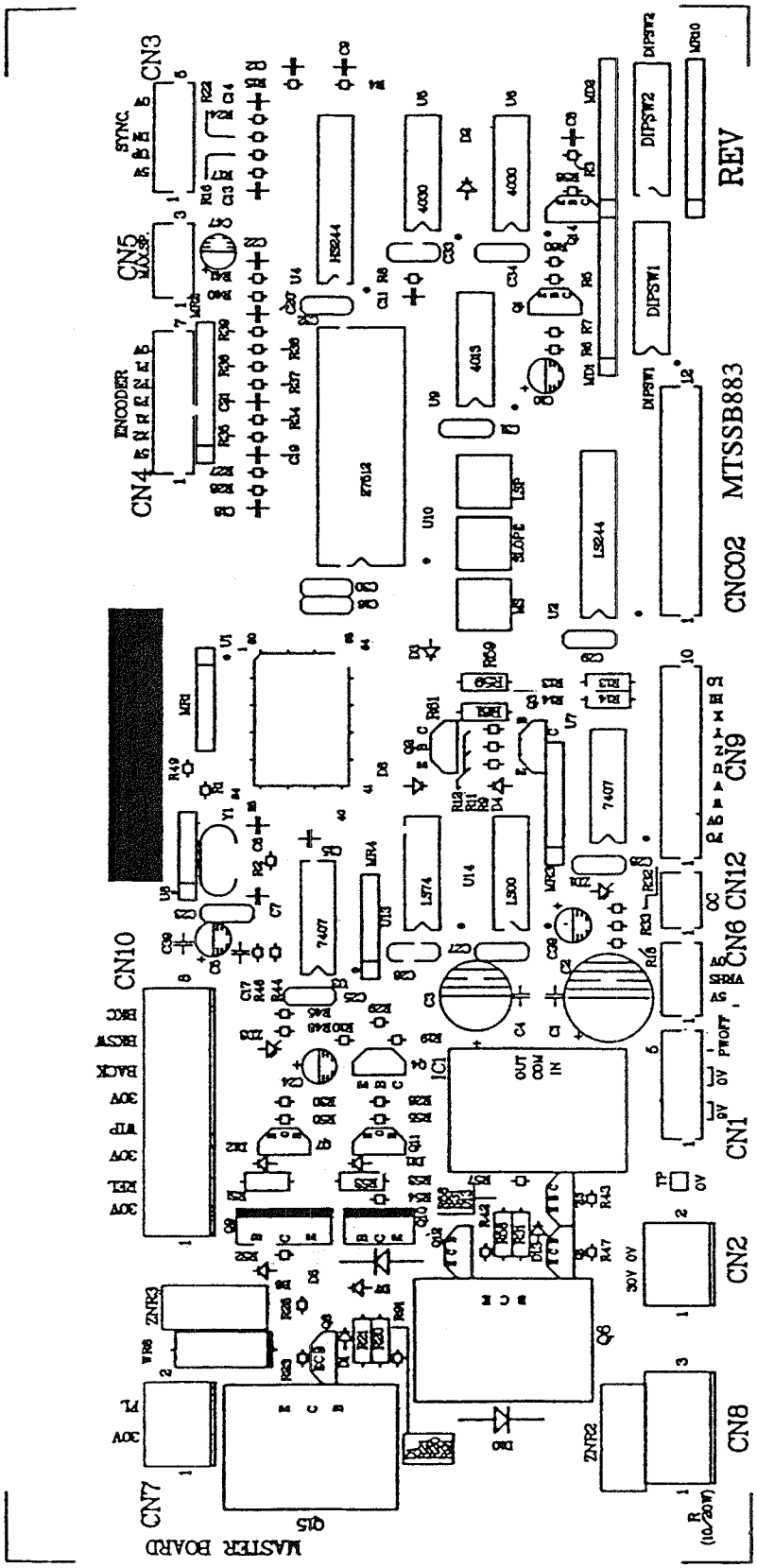

Operation
Troubles
Checking items
Corrective measures
Pedal is in its neutral position.
3-1 Needle bar "down" stop
A) Sewing machine continues running at low speed.
① Sewing machine runs when depressing once back part of pedal.
No
Replace the pedal sensor.
Yes
Pressure of depressing-back spring is too high.
Adjust VR1 or VR2 of the pedal sensor.
B) Sewing machine stops at positions other than "down" position.
① Check whether sewing machine stops at positions other than "up" position.
Check whether thread trimming can be performed.
No
Replace the PSC box.
Yes
Replace the front cover switch circuit board.
Replace the NAIN circuit board.
② Check whether sewing machine runs at low speed immediately before stopping.
No
Replace the motor (encoder).
Yes
Safety circuit of detector to detect needle up / down position is working as the detector is defective.
Replace the detector.
C) Thread trimmer is actuated.
① Check whether pressure of depressing-back spring of pedal sensor is proper.
No
Increase the pressure of the spring.

Operation	Troubles	Checking items	Corrective measures
Depressing back part of pedal	4-1) Thread is not trimmed. ○ Confirm disconnection of connector. Connector of solenoid for machine head CN2 and CN10 on MAIN circuit board	① Solenoid for thread trimer does not work.	No → Adjust or replace the knife for thread trimming or counter knife.
		② Check whether sewing machine stops at "up" position. (Yes)	→ Pressure of depressing back spring is too high. Adjust VR1 or VR2 of the pedal sensor.
		③ Check whether resistance value of solenoid for thread trimming is proper. Approximately 7.5 Ω between 10 and 11 of P49 (12P)	No → Replace the solenoid.
			Yes → Replace the PSC box.
	4-2) Wiper does not work. ○ Confirm disconnection of connector. Connector of solenoid for machine head CN2 and CN10 on MAIN circuit board	① Check whether switch for change-over of wiper function (DIP switch on MAIN circuit board) is set correctly.	No → Refer to the item "Functions of various switches", and re-set the switch properly.
		② Check whether wiper switch is turned ON. (Yes)	→ Turn ON the switch.
		③ Check whether resistance value of solenoid for wiper is proper. Approximately 8.5 Ω between 6 to 9 of P49 connector	No → Replace the wiper switch or replace the solenoid.
			Yes → Replace the MAIN circuit board.

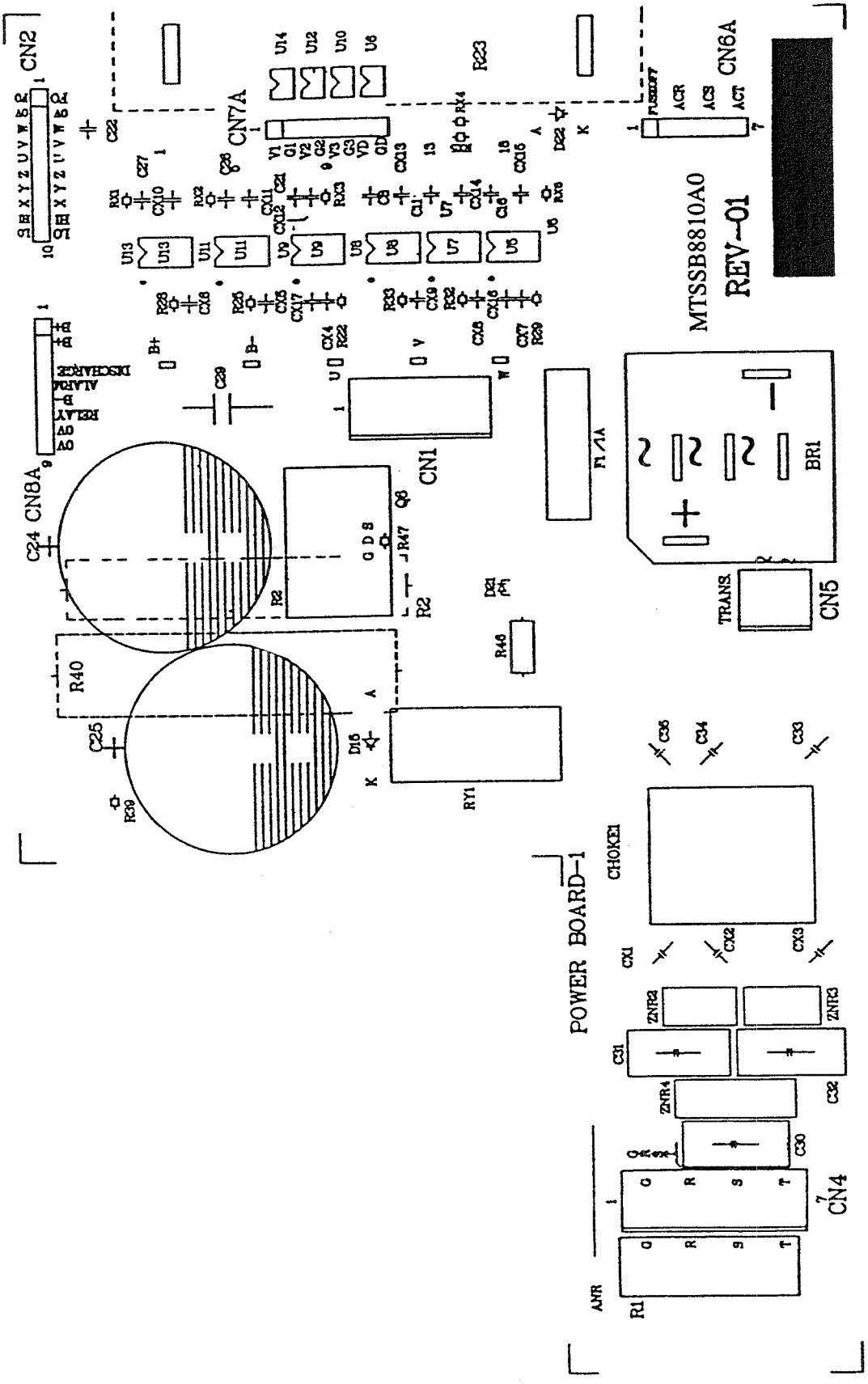

Operation
Troubles
Checking items
Corrective measures
4-3) Presser foot is not raised.
○ Confirm disconnection of connector.
Connector of solenoid for presser foot lifter
CN7, CN2 and CN8 on MAIN circuit board
① Check whether resistance value of solenooid for FL is proper.
Approximately 5.4 Ω between 3 and 4 of P48 connector
No
Replace the solenoid.
Yes
② Check whether adjustment of stroke of plunger is proper.
No
Re-adjust the stroke of plunger.
Yes
Replace the MAIN circuit board.
Reverse feed stitching components
5-1) Function of reverse feed stitching does not work.
A) Function of automatic reverse feed stitching does not work.
○ Confirm disconnection of connector
Connector of solenoid for machine head
CN10 on MAIN circuit board
① Check whether resistance value of solenoid for back-tuck is proper.
Approximately 5.15 Ω between 7 and 8 of P49 connector
No
Replace the solenoid.
Yes
Replace the MAIN circuit board.
B) Function of touch-back works, but function of automatic reverse feed stitching does not work.
○ Confirm disconnection of connector
CNC02 on MAIN circuit board
① Check whether SBT or FBT switch, or number of stitches is set to "0".
No
Set the front cover switch.
Yes
Replace the front cover switch circuit board.
Replace the MAIN circuit board.
C) Function of automatic reverse feed stitching works, but function of touch-back does not work.
○ CN10 on MAIN circuit board
① Check whether switch for touch-back is all right.
When switch is ON between 1 and 2 of P49 connector : 0 Ω
When switch is OFF between 1 and 2 of P49 connector : ∞ Ω
No
Replace the switch for touch-back.
Yes
Replace the MAIN circuit board.
5-2) Reverse feed stitching continues.
① Check whether switch is turned OFF within 12 seconds.
No
Replace the MAIN circuit board.
Yes
Replace the switch for touch-back

6. CIRCUIT BOARD MOUNTING DIAGRAM

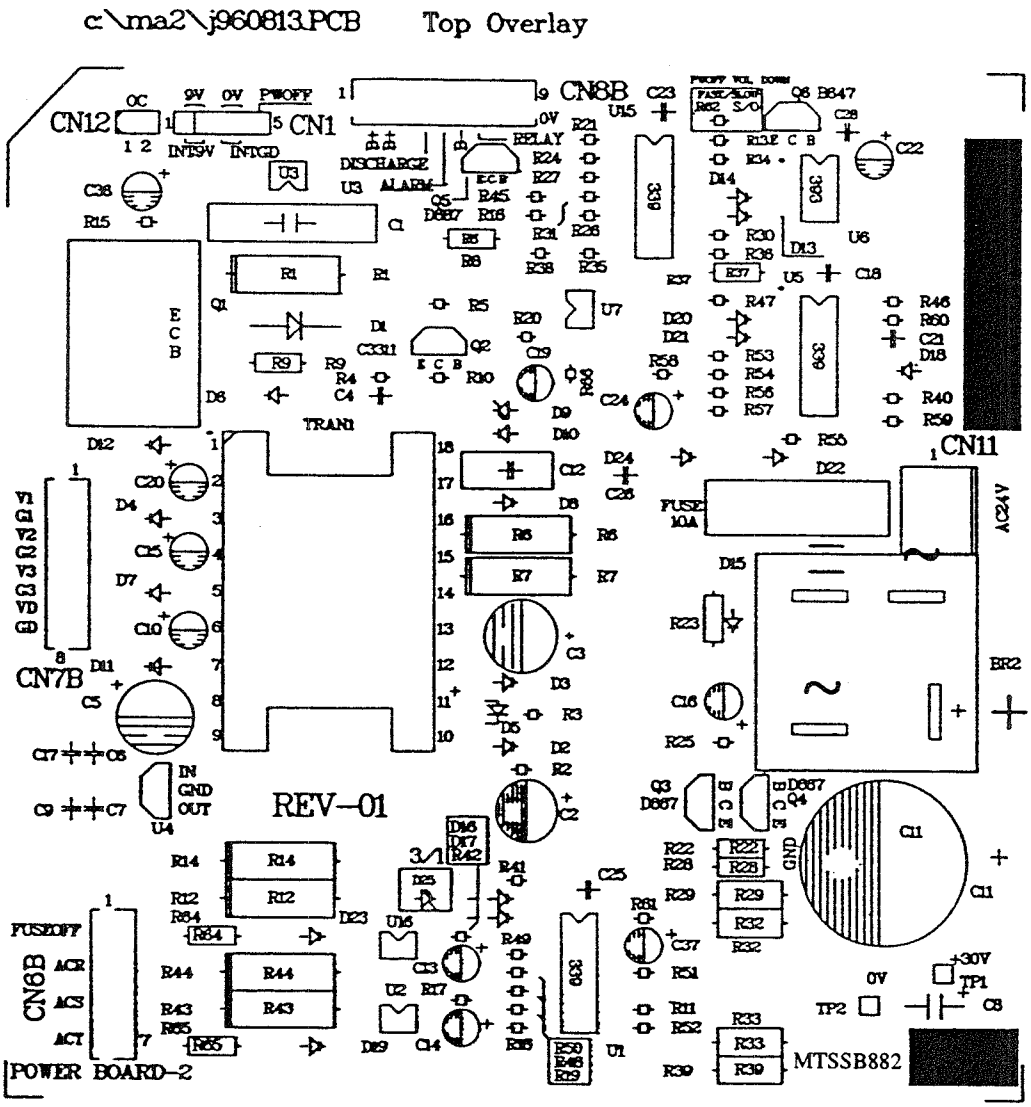
(1) MAIN circuit board



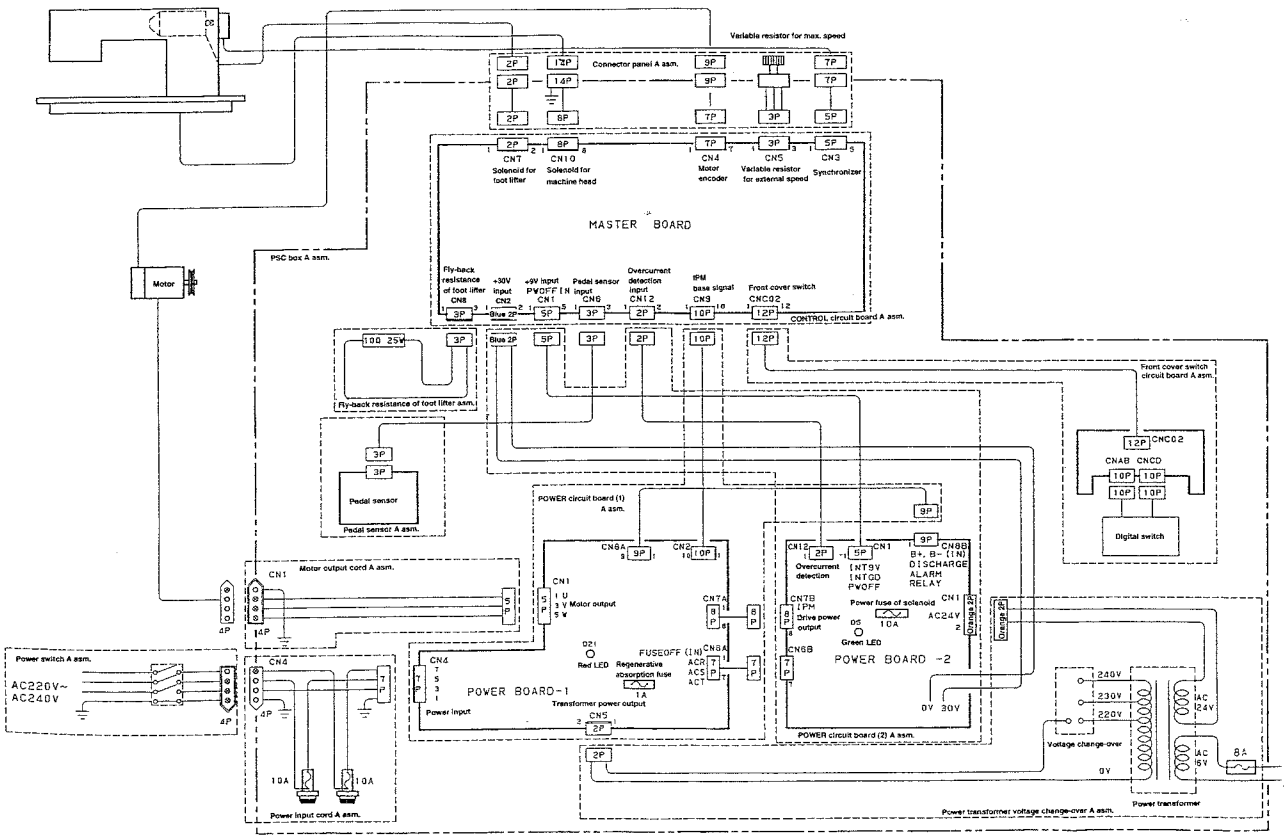
(2) POWER circuit board (1)



(3) POWER circuit board (2)



7. BLOCK DIAGRAM



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