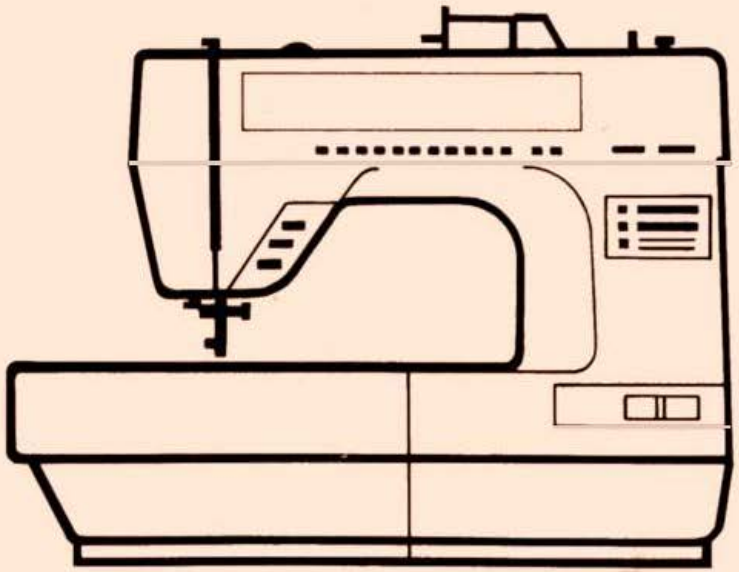
SERVICE MANUAL FOR COMPUTERIZED SEWING MACHINE

"COMPAL GALAXIE"



GENERAL INFORMATION

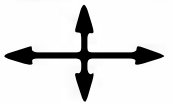
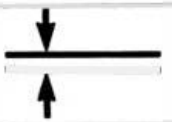
This service manual is compiled for repairing service of COMPUTERIZED SEWING MACHINE "COMPAL GALAXIE" (Factory code #114-870).

Use this manual with Parts Catalogue (H3030294) for fault findings when you make a repair.

This machine is manufactured based on the up-to-dated product specifications at the time of this issue. but there may be changes of specifications for improvements. Contact manufacturer or local sales company for such changes.

Brother industries. Ltd.
Nagoya. Japan

SYMBOLS USED ARE:

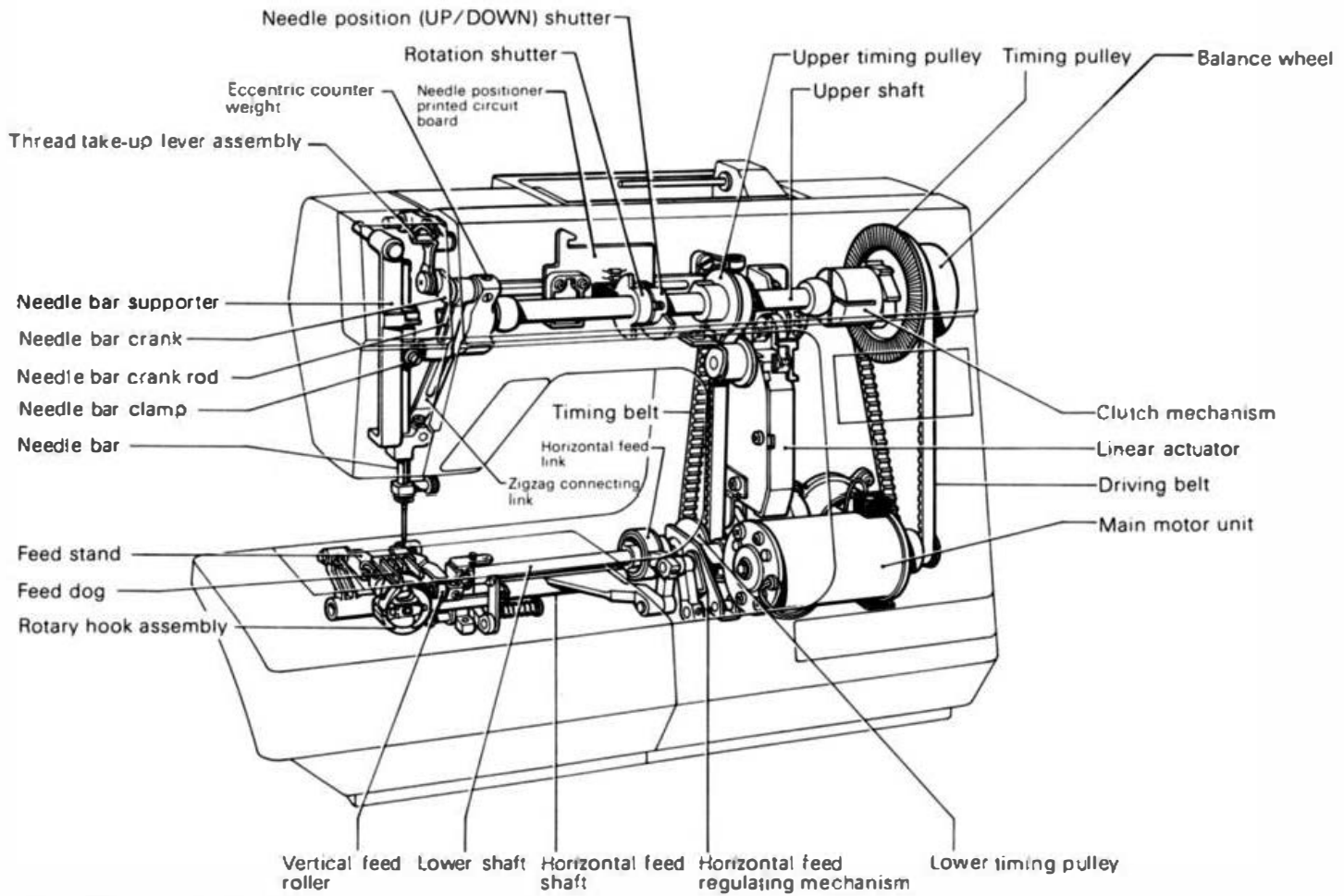
	Move the part as this way (one way)
	Move the part as this way (both way)
	Move the part to its highest or lowest position
	Set the clearance as indicated

CAUTION

1. Always use rubber glove when handling printed circuit board and do not touch the metal portion of printed circuit board with bare hands.
2. Keep the human body earthed in order to avoid generating static electricity.
3. Pack printed circuit board with aluminium foil and avoid impact on it when keeping or transporting.
4. Do not touch or damage on the metal portion of printed circuit board with screw driver or any other tools even during repairing.

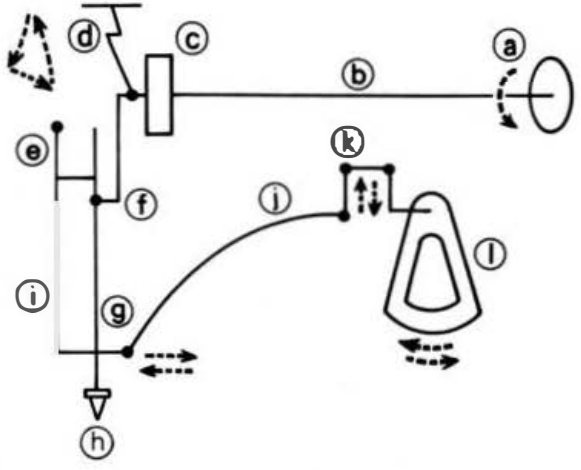
I. PRINCIPAL MECHANISMS

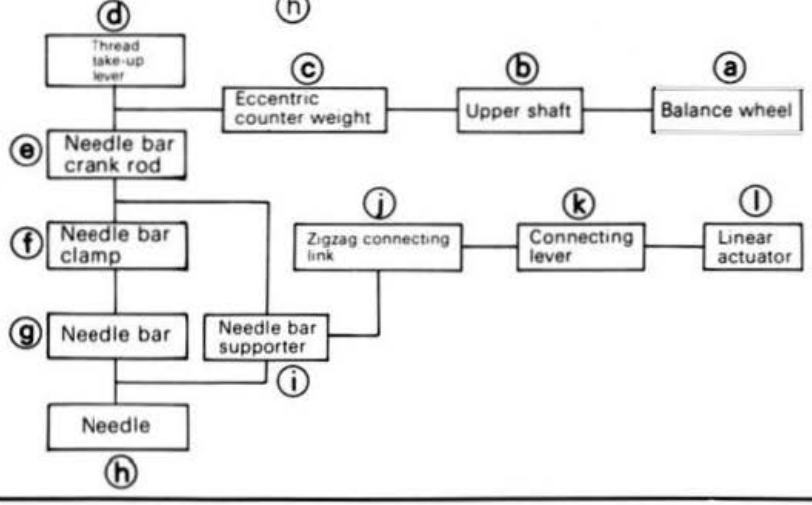
1. MECHANICAL CHART



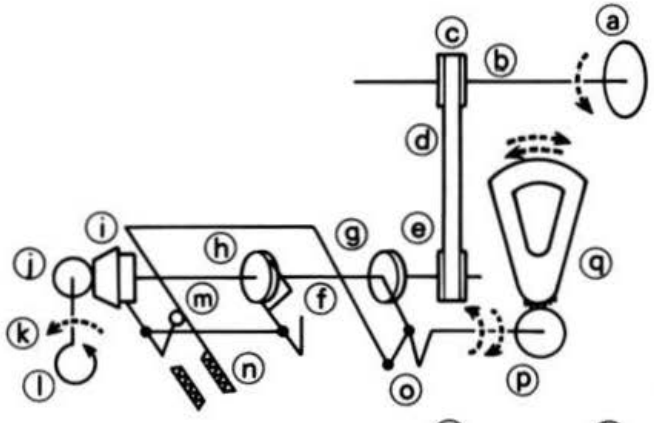
2. POWER TRANSMISSION CHART

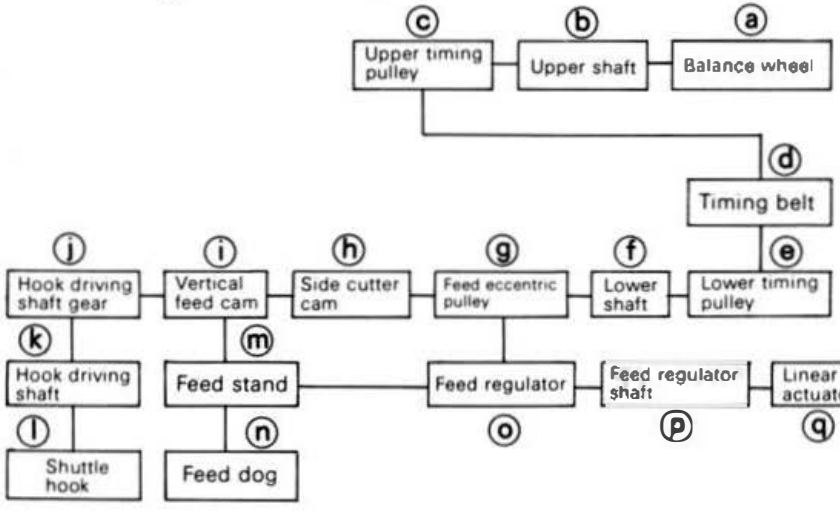
(A) Generating mechanism of needle bar, thread take-up lever and zigzag movements



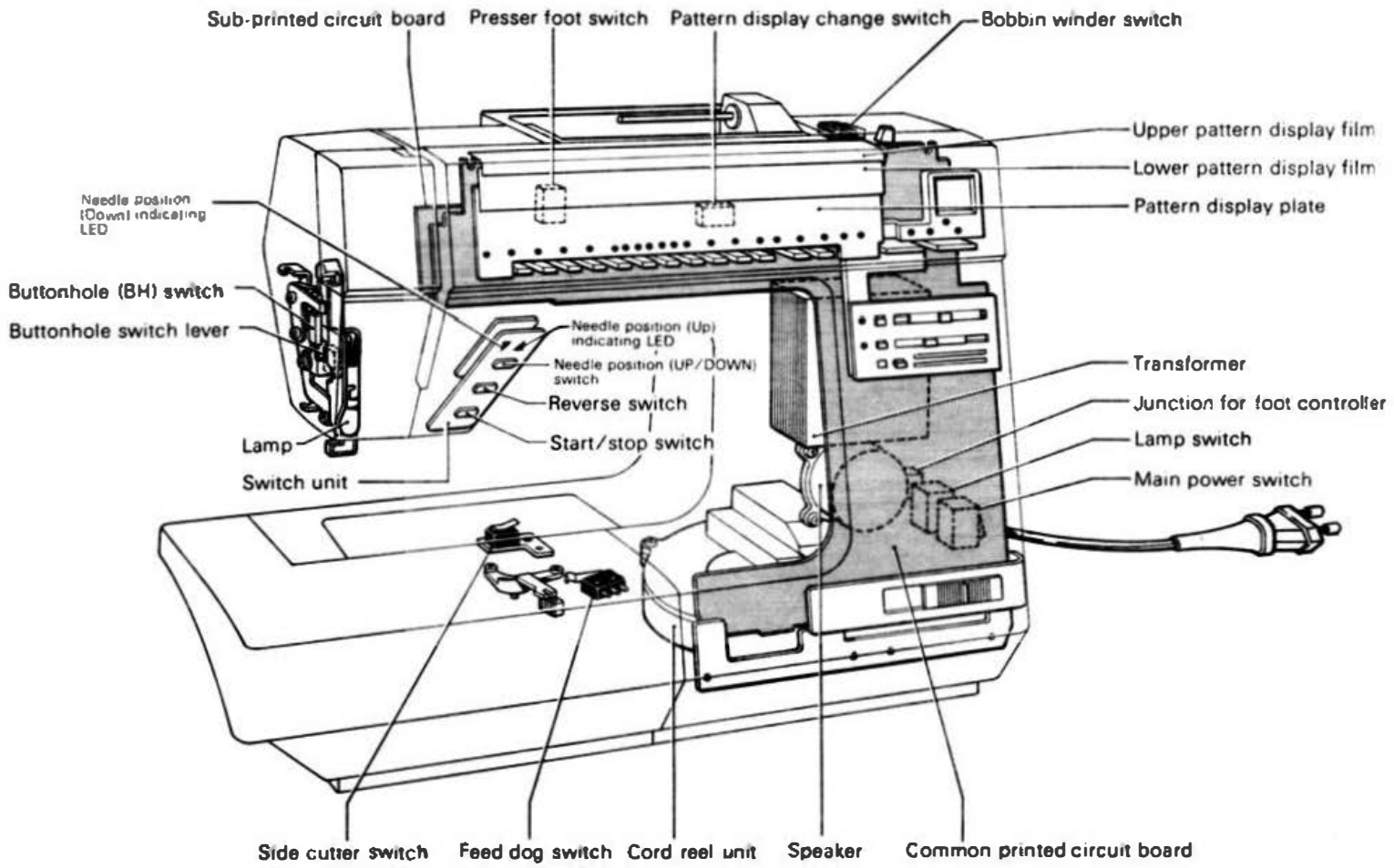


(B) Movements of feed dog and shuttle hook





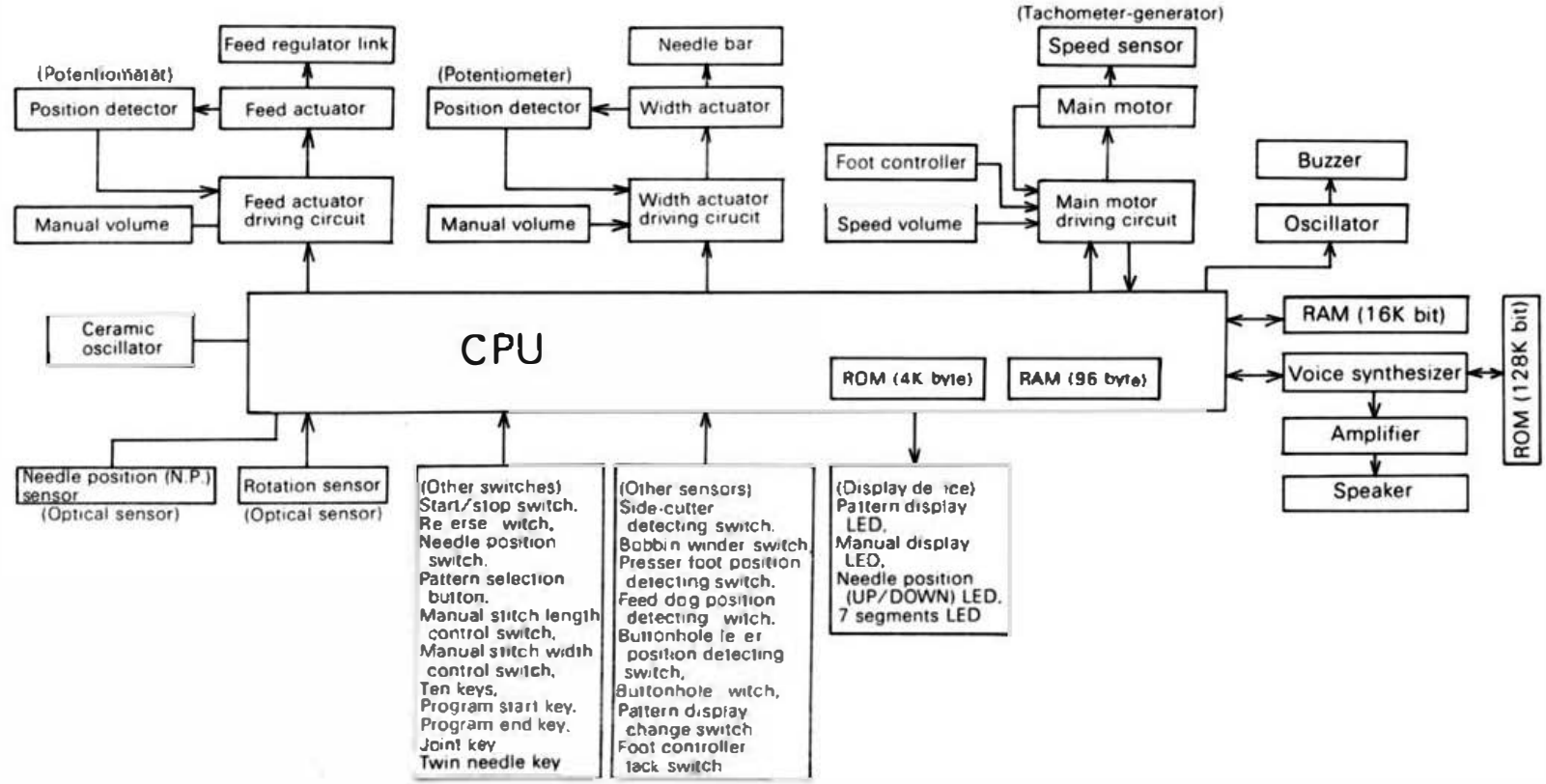
3. ELECTRONIC PARTS ARRANGEMENT CHART



4. CONTROL SYSTEM BY MICRO-COMPUTER

The micro-computer being used in Compal Galaxie is 8-bit computer fabricated on a single chip using N-MOS (N-channel silicon gate MOS process) in 40 pins dual-in-line package with built in 4K byte mask ROM. 96 byte RAM, oscillator. timer and I/O port. Moreover 128K bit mask ROM and 16K bit RAM are expanded on external CPU. All function of this machine are fully controlled by this micro-computer.

<CONTROL SYSTEM CHART>



5. THE FUNCTION OF MICRO-COMPUTER (MAL-WARNING VOICE)

CPU being used in this machine is supervising the kind of selected pattern, position of presser foot, feed dog and buttonhole lever, state of bobbin-winding, Start/stop switch, reverse switch, etc. If the customer operates the machine erroneously, the error is pointed out by mal-warning voice.
The output of voice made by voice synthetic system is PARCOR way which consists of 2 pcs. of P-MOS LSI. One is mask ROM which stores information digitally analysed for the output voice, of which memory capacity is 128K bit. The other is acting synthesis of the voice according to the information from former ROM and CPU output. The mal-warning voice contains 10 messages in total which are as follows;

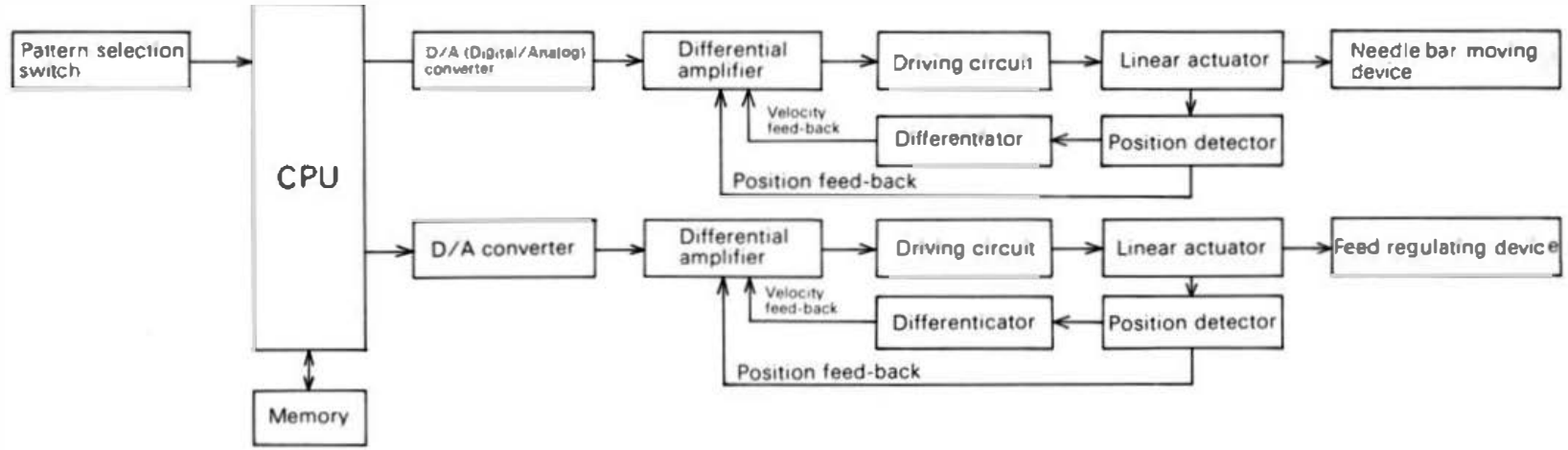
1. Please lower presser foot lever.
2. Please change position of red knob to right to raise feed dog.
3. Please change position of red knob to left to lower feed dog.
4. Please lower blue lever.
5. Please raise blue lever.
6. Reverse stitch cannot be obtained using this pattern.
7. Memory capacity full. Please check instruction book.
8. Please check instruction book.
9. This pattern combination is not acceptable. Refer to instruction book.
10. Please use a foot controller.

6. MAIN MOTOR CONTROL

A main motor for sewing machine is required to have stable revolution from low speed to high speed against load fluctuation and temperature change. To fully comply with this requirement, this Compal Galaxie is adopting low-voltage D.C. motor and PWM (Pulse Width Modulation) by transistors.

7. LINEAR ACTUATOR CONTROL (PATTERN GENERATING DEVICE)

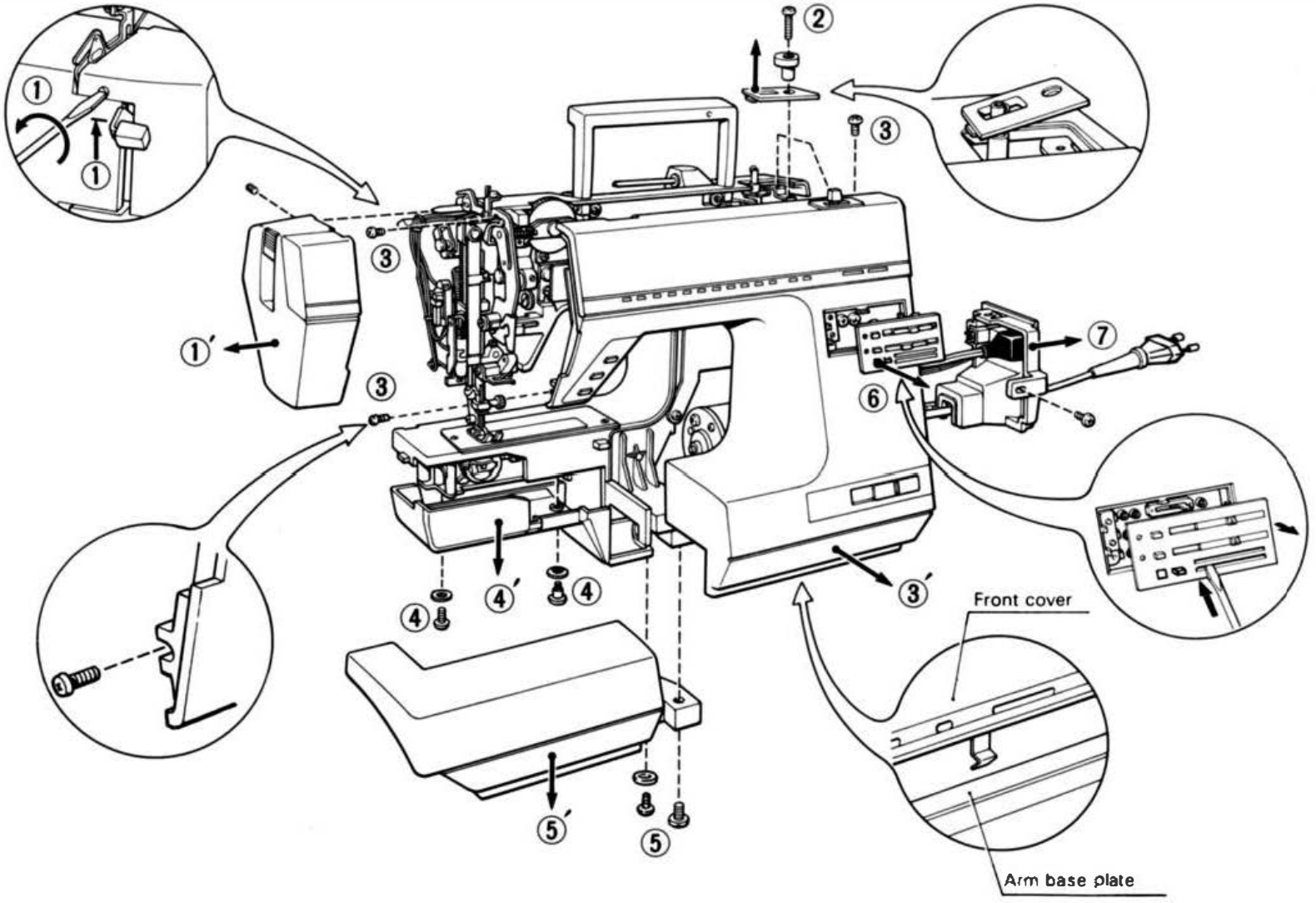
(LINEAR ACTUATOR CONTROL BLOCK CHART)



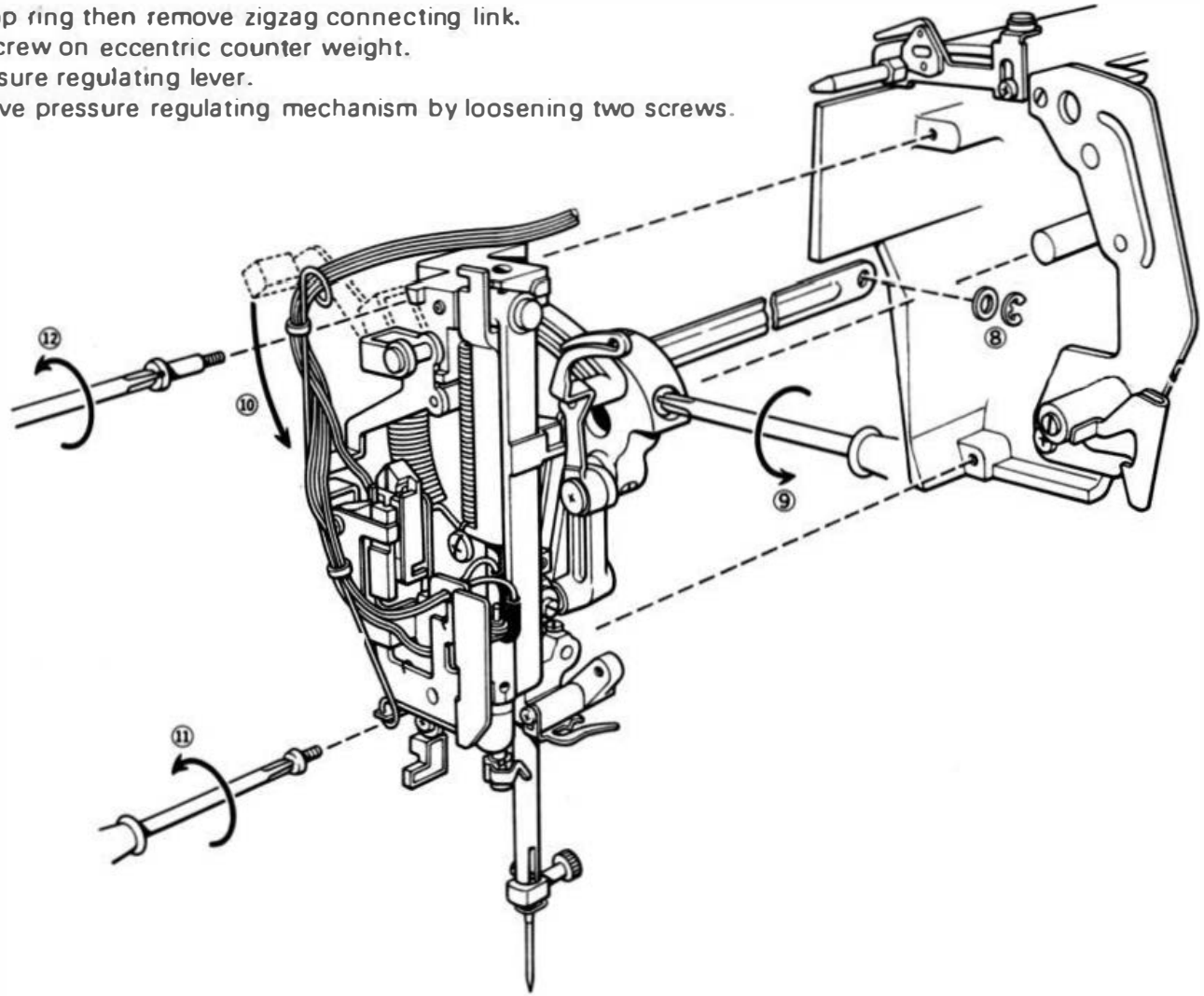
II. DISASSEMBLING & REASSEMBLING

1. OUTER PARTS

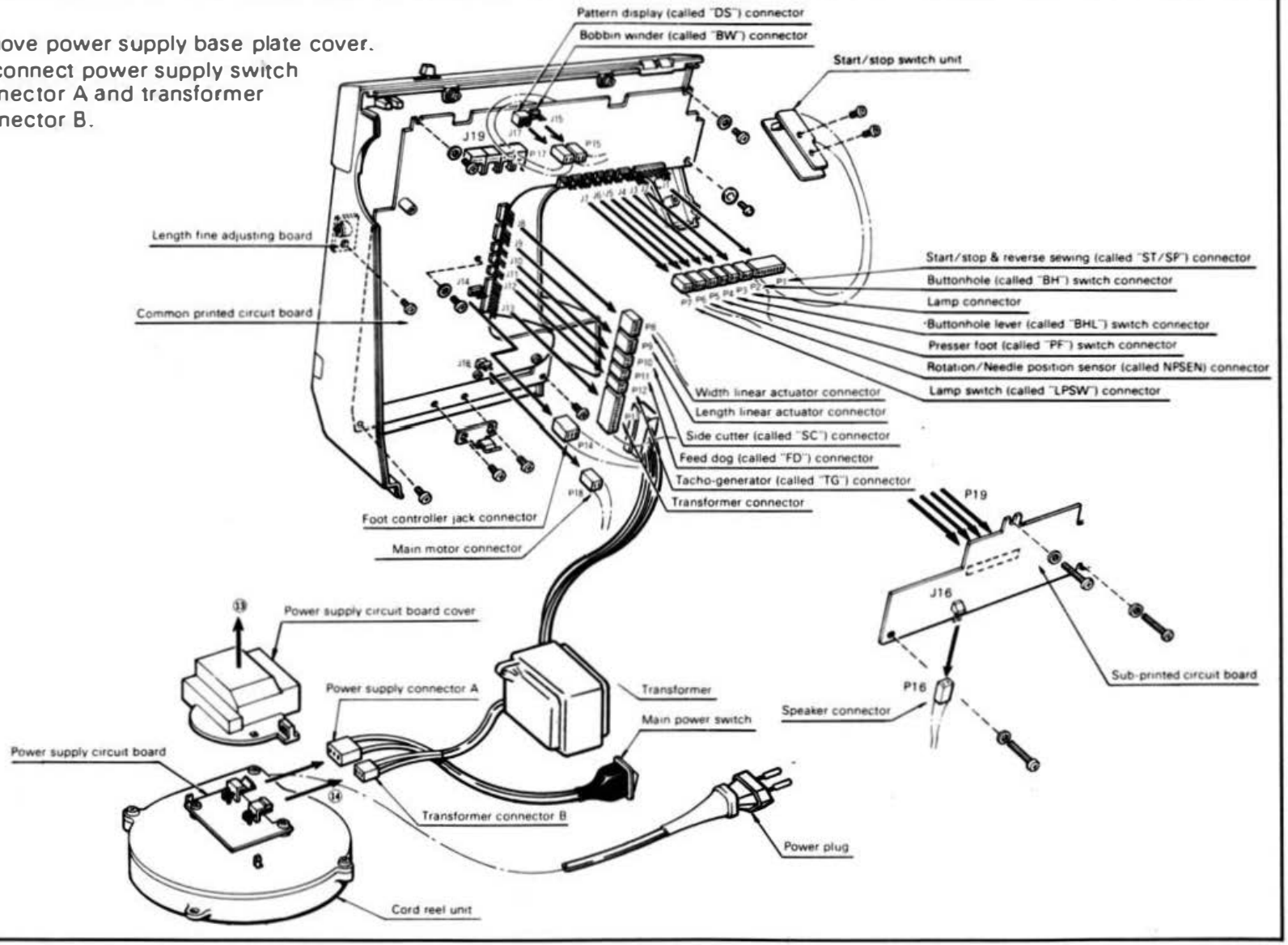
1. Raise pressure regulating lever and remove face plate by loosening a screw.
2. Remove bobbin winder cover by loosening a screw.
3. Remove front cover by loosening three screws.
4. Remove bed cover by loosening two screws.
5. Remove extension plate by loosening two screws.
6. Remove manual regulator cover by using screw driver.
7. Remove plug case by loosening a screw.


①
①
②
③
③
①′
③
⑦
⑥
④
④′
④
③′
Front cover
⑤′
⑤
Arm base plate

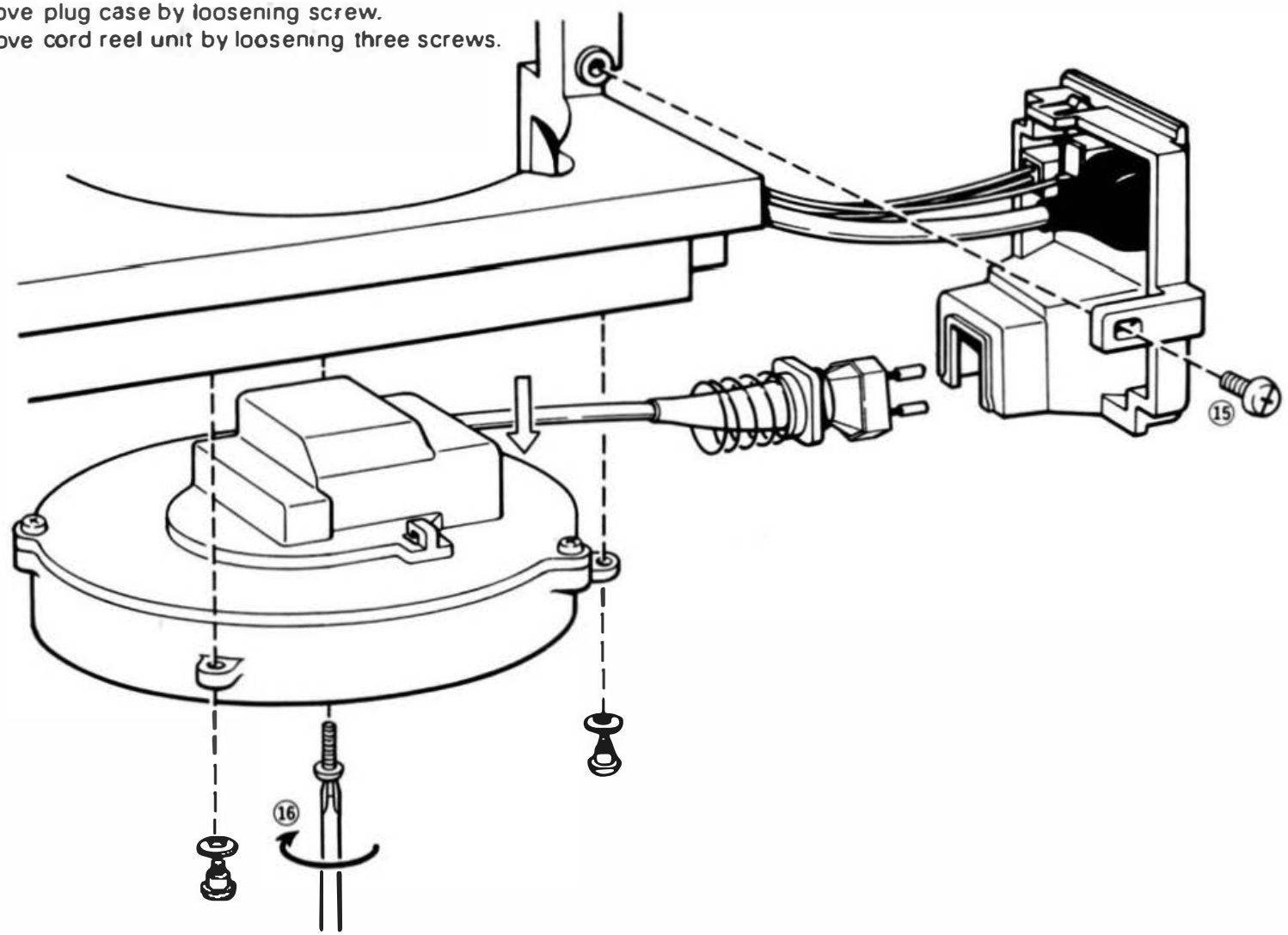
8. Remove stop ring then remove zigzag connecting link.
9. Loosen a screw on eccentric counter weight.
10. Lower pressure regulating lever.
11. & 12. Remove pressure regulating mechanism by loosening two screws.



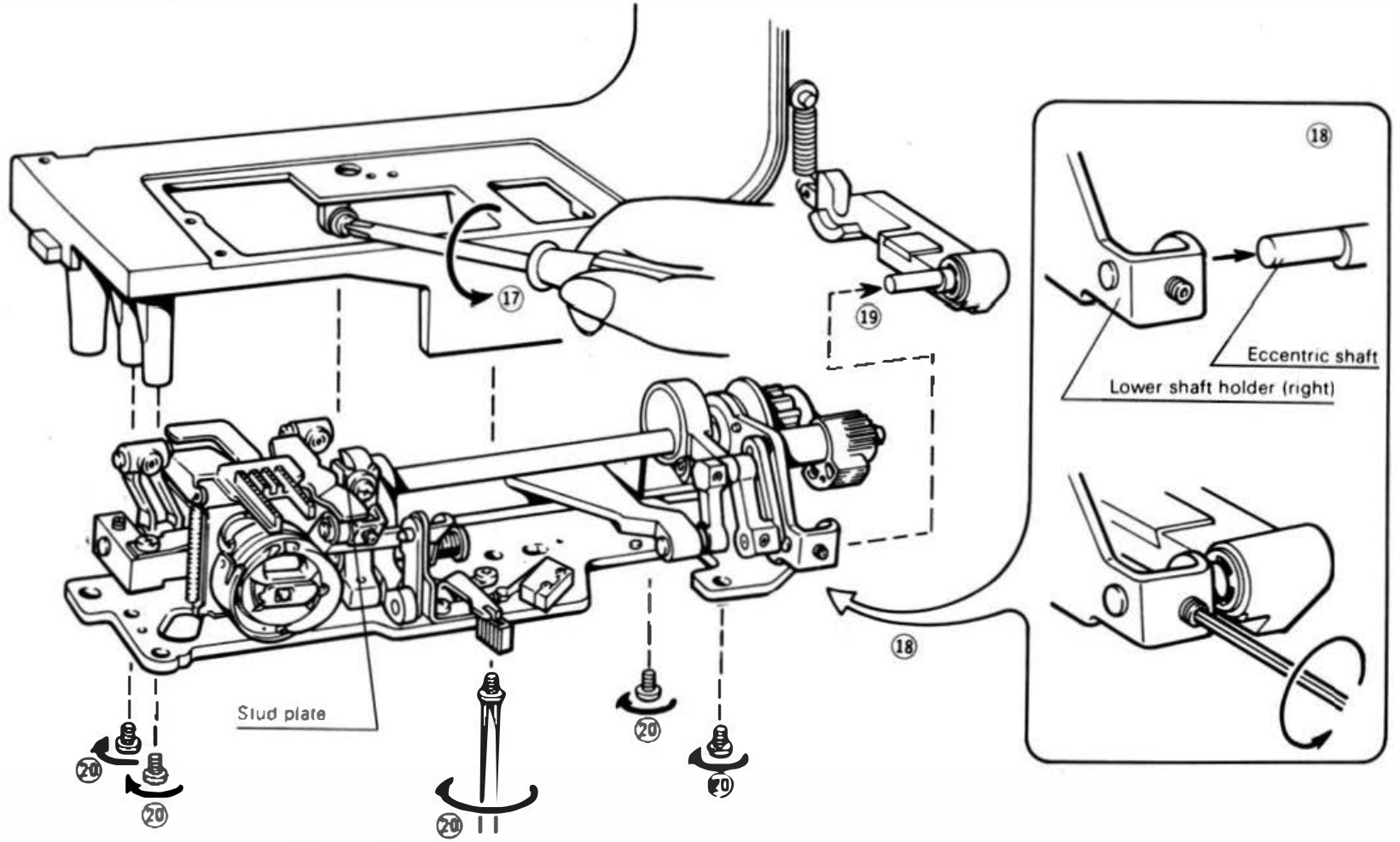
13. Remove power supply base plate cover.
14. Disconnect power supply switch connector A and transformer connector B.



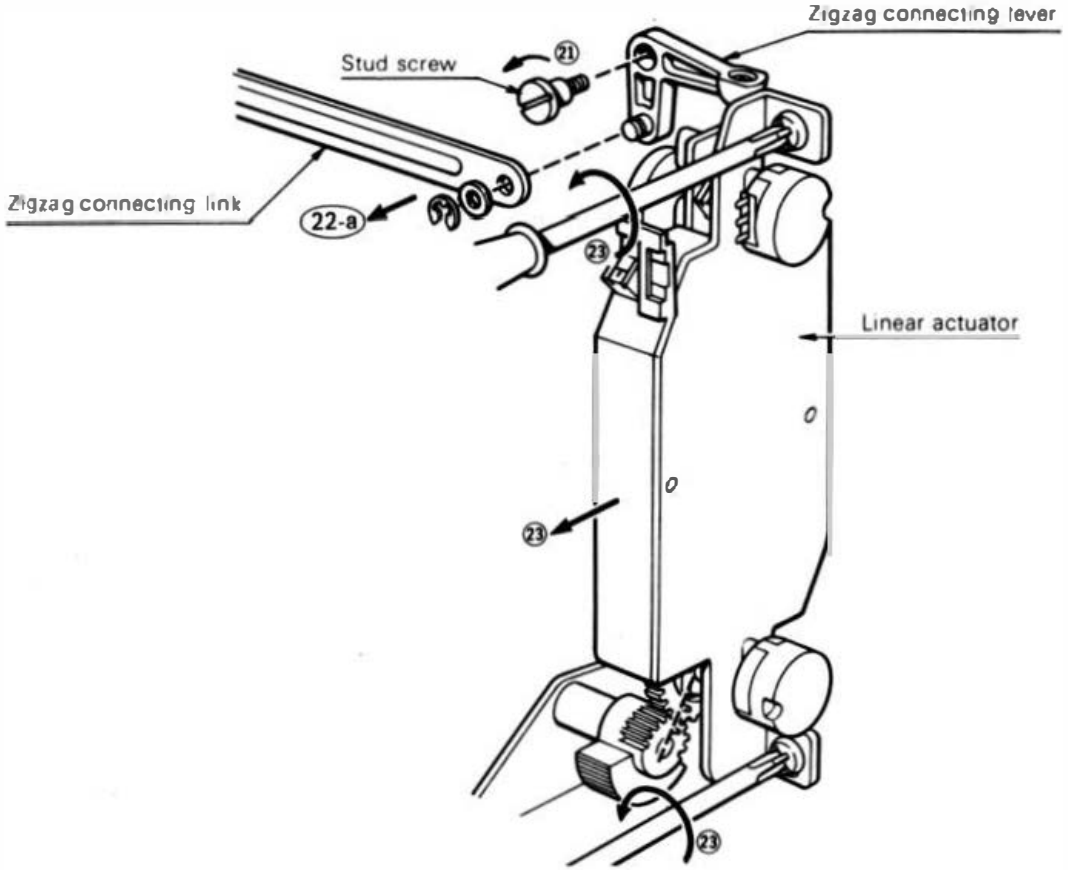
15. Remove plug case by loosening screw.
16. Remove cord reel unit by loosening three screws.

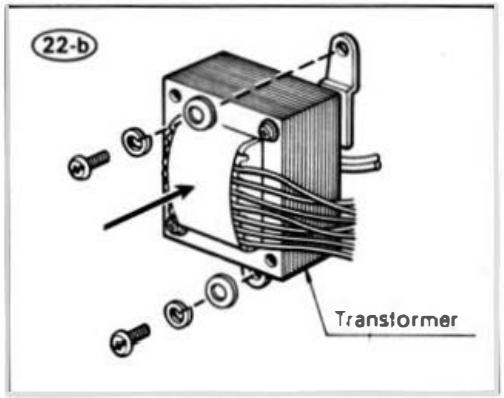


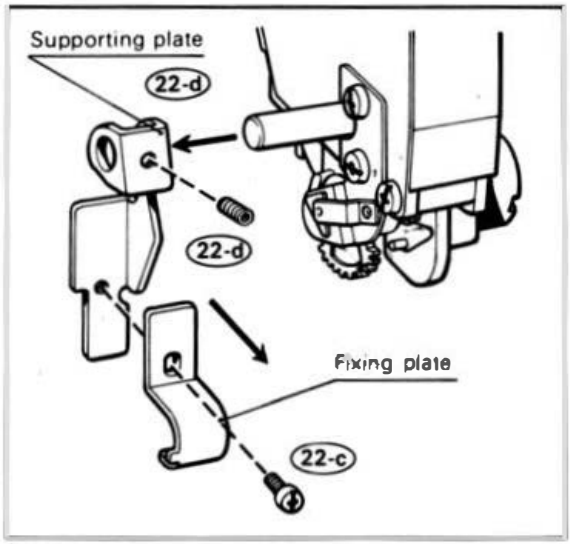
17. Loosen a screw.
18. Loosen a screw.
19. Remove a eccentric shaft from lower shaft holder (Right).
20. Remove feed mechanism unit by loosening five screws.



21. Remove zigzag connecting lever by loosening a stud screw.
22.-a Remove stop ring then remove zigzag connecting link. as done at step 8.
-b Remove transformer by loosening two screws.
-c Remove fixing plate by loosening a screw.
-d Remove supporting plate by loosening a screw.
23 Remove linear actuator by loosening two screws.

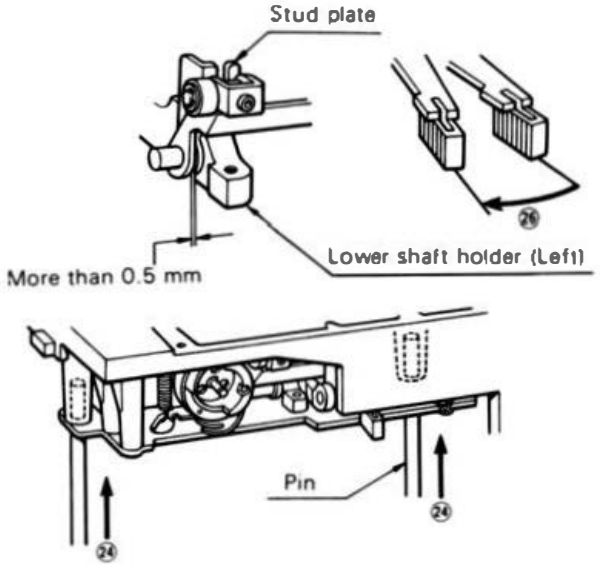


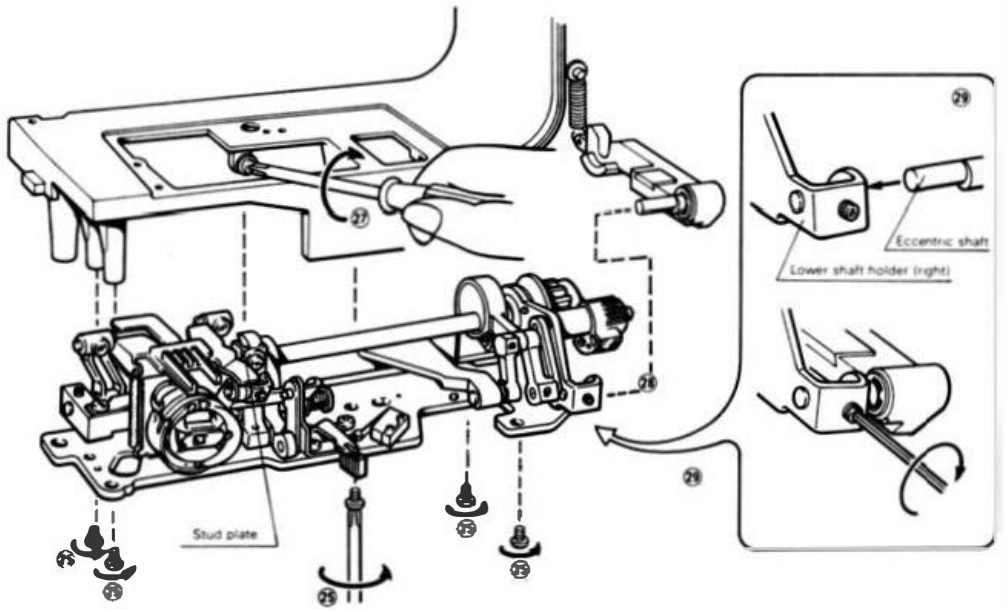




Reassembling

24. Determine the position to fit feed mechanism unit by a pin, of which diameter is 6 mm.
25. Fit feed mechanism unit by using five screws.
26. Change the position of red knob to left to lower feed dog and make sure the clearance between stud plate and vertical arm is more than 0.5 mm.
27. Tighten the stud plate by a screw.
28. Insert the eccentric shaft into lower shaft holder (Right).
29. Tighten tentatively.





30. Meet the convex portions of linear actuator gear and feed regulator gear to face each other then tighten in two screws making sure the clearance between both gears is 0.03 ~ 0.04 mm.

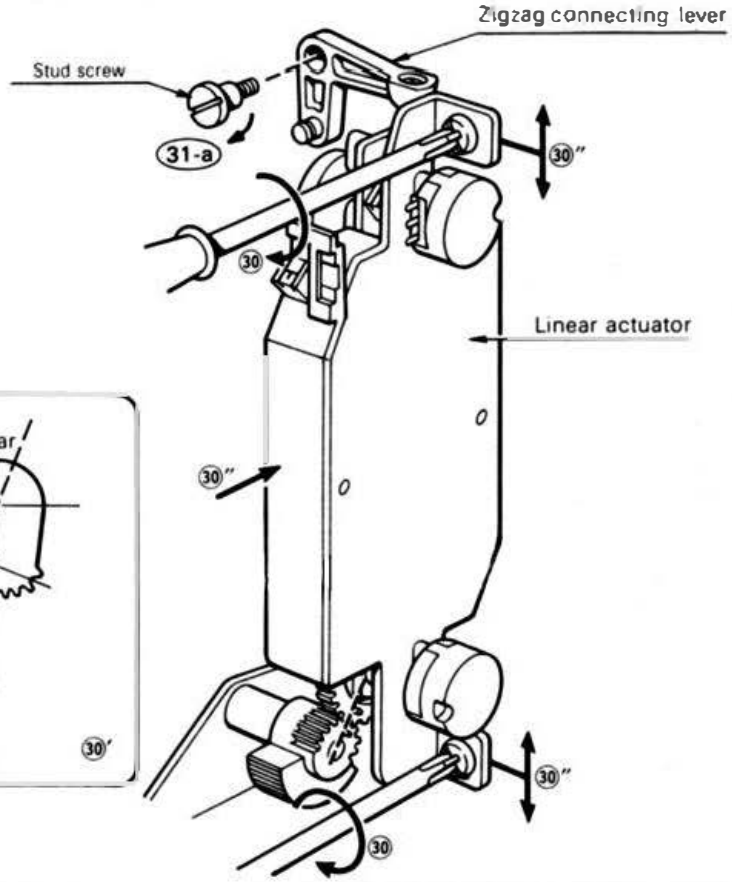
31.-a Fit the zigzag connecting link to vertical arm by a stud screw.

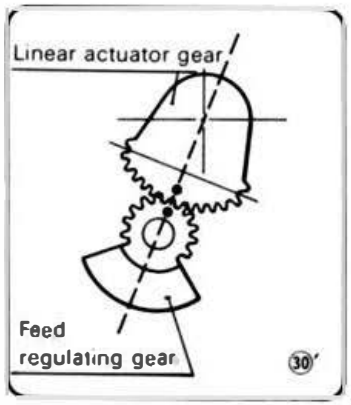
-b Attach supporting plate to the linear actuator.

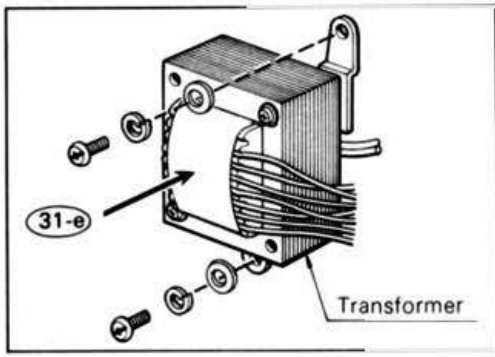
-c Attach fixing plate onto supporting plate in a screw making the lower part of the fixing plate hold the right bushing of lower shaft holder.

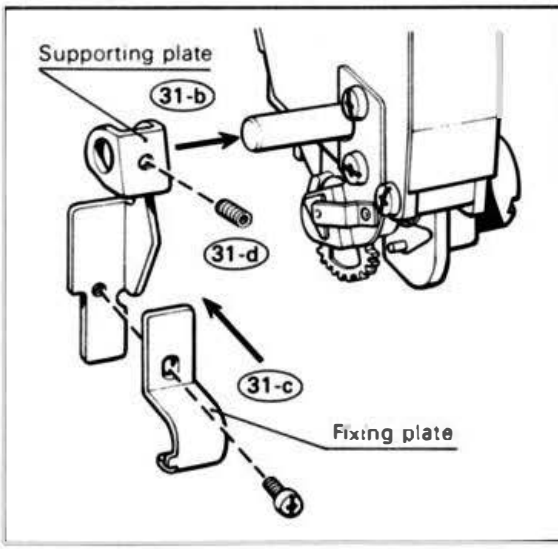
-d Tighten the supporting plate by a screw.

-e Fix transformer.

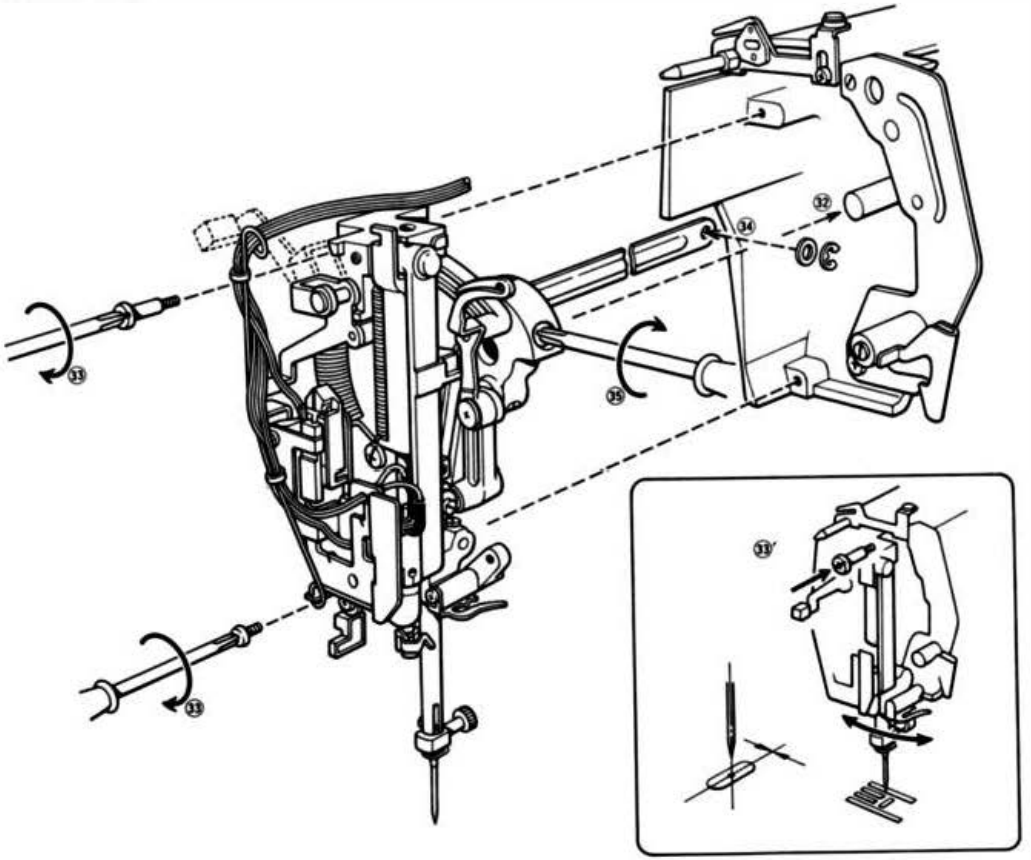




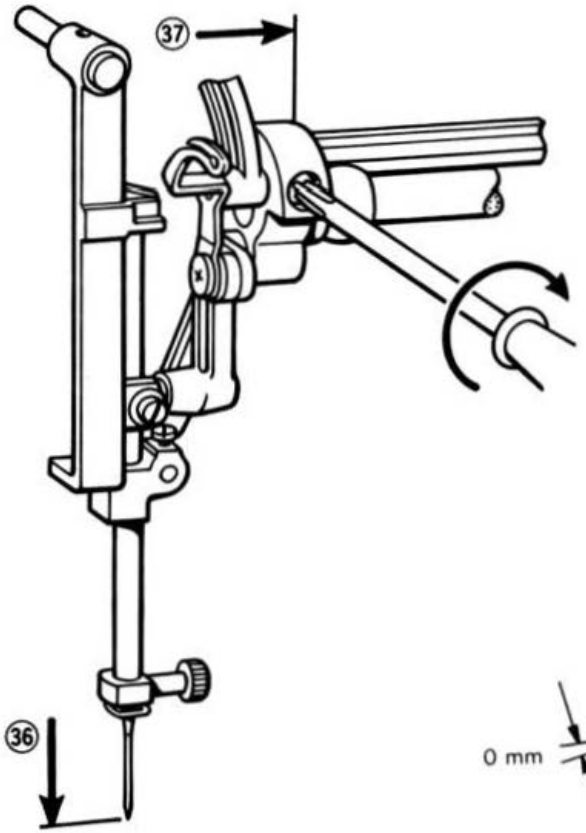


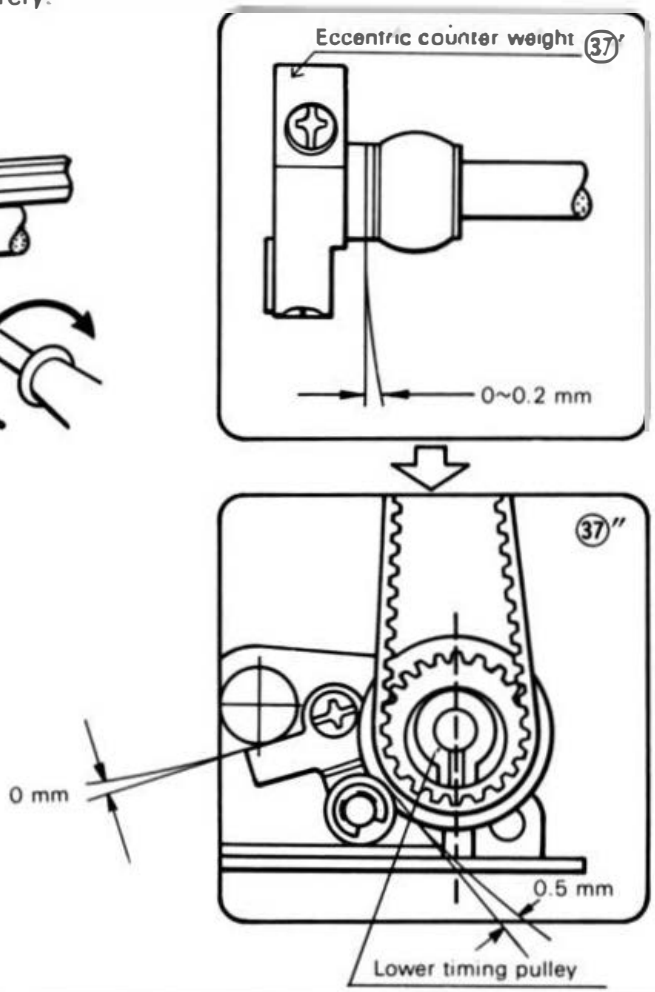


32. Fit the pressure mechanism unit to vertical arm incerting eccentric counter weight into upper shaft.
33. Tighten pressure mechanism unit in two screws. At that time tighten upper screw slightly and after adjusting the top of needle drop to the center of needle hole. tighten two screws securely.
34. Assemble zigzag connecting link to zigzag connecting lever and attach stop ring together with thermoplastic washer.
35. Tighten a screw tentatively.

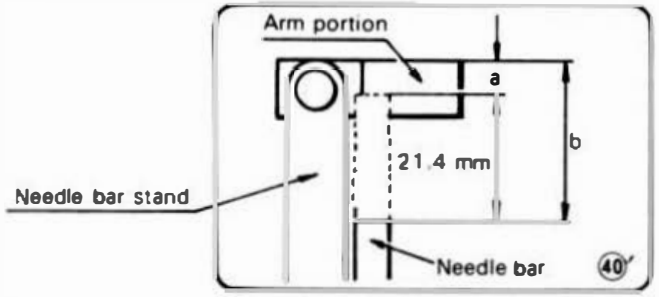


36. Lower the needle until its lowest position by turning balance wheel.
37. Turn the balance wheel so that the base line of lower timing pulley is right under then make sure the clearance between eccentric counter weight and upper shaft bushing is 0 ~ 0.02 mm.
38. Tighten the screw of eccentric counter weight securely.



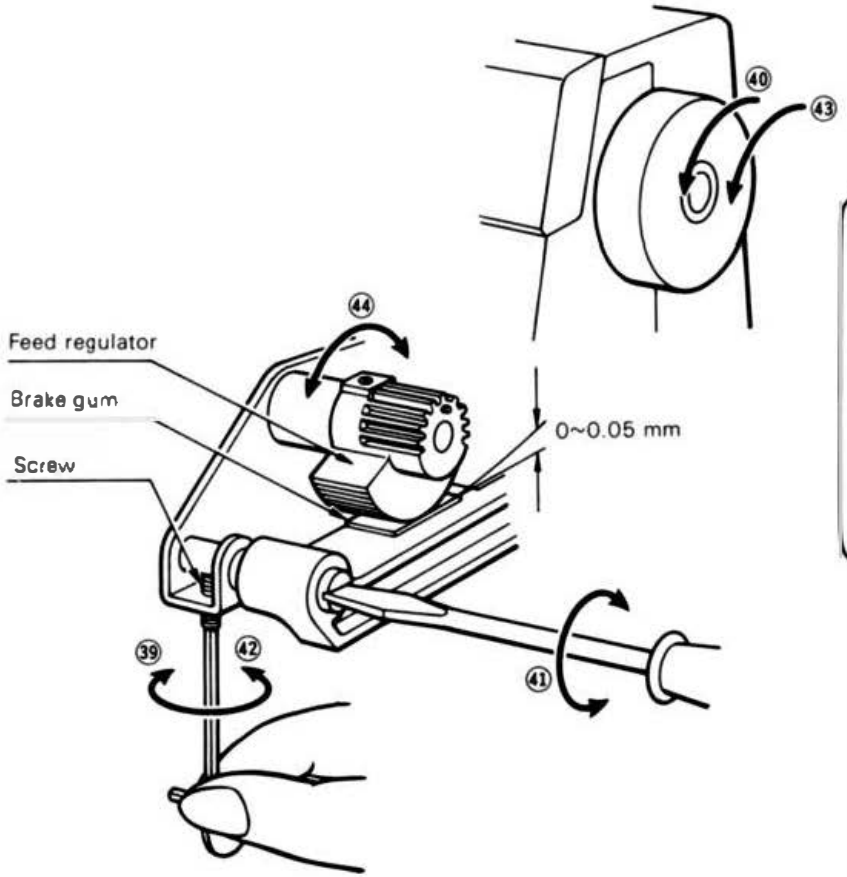


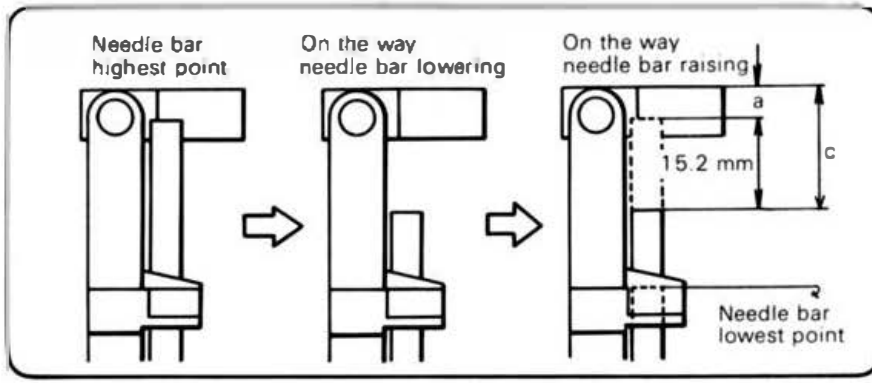
39. Loosen a screw.
40. Lower the needle from its highest position by 21.4 mm turning balance wheel forward.



a : The highest position of needle bar
b : The time that brake is released
(The brake is released at this point)
b = a + 21.4 mm

41. Make sure the clearance between feed regulator and brake gum is 0 ~ 0.05 mm by turning eccentric shaft.
42. Tighten the screw.
43. Raise the needle from its lowest position by 15.2 mm turning balance wheel forward. (Brake operation starting point)
44. Make sure the brake is properly operated to feed regulator.

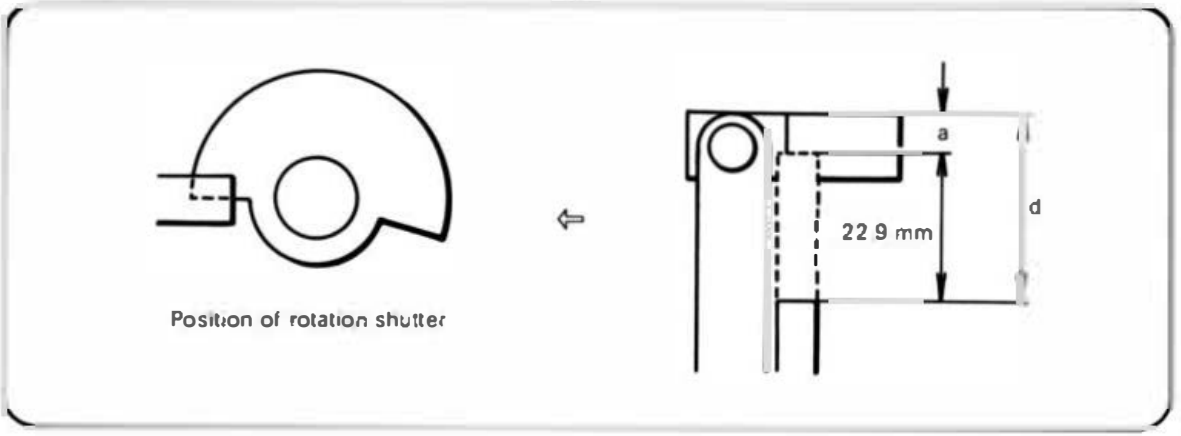




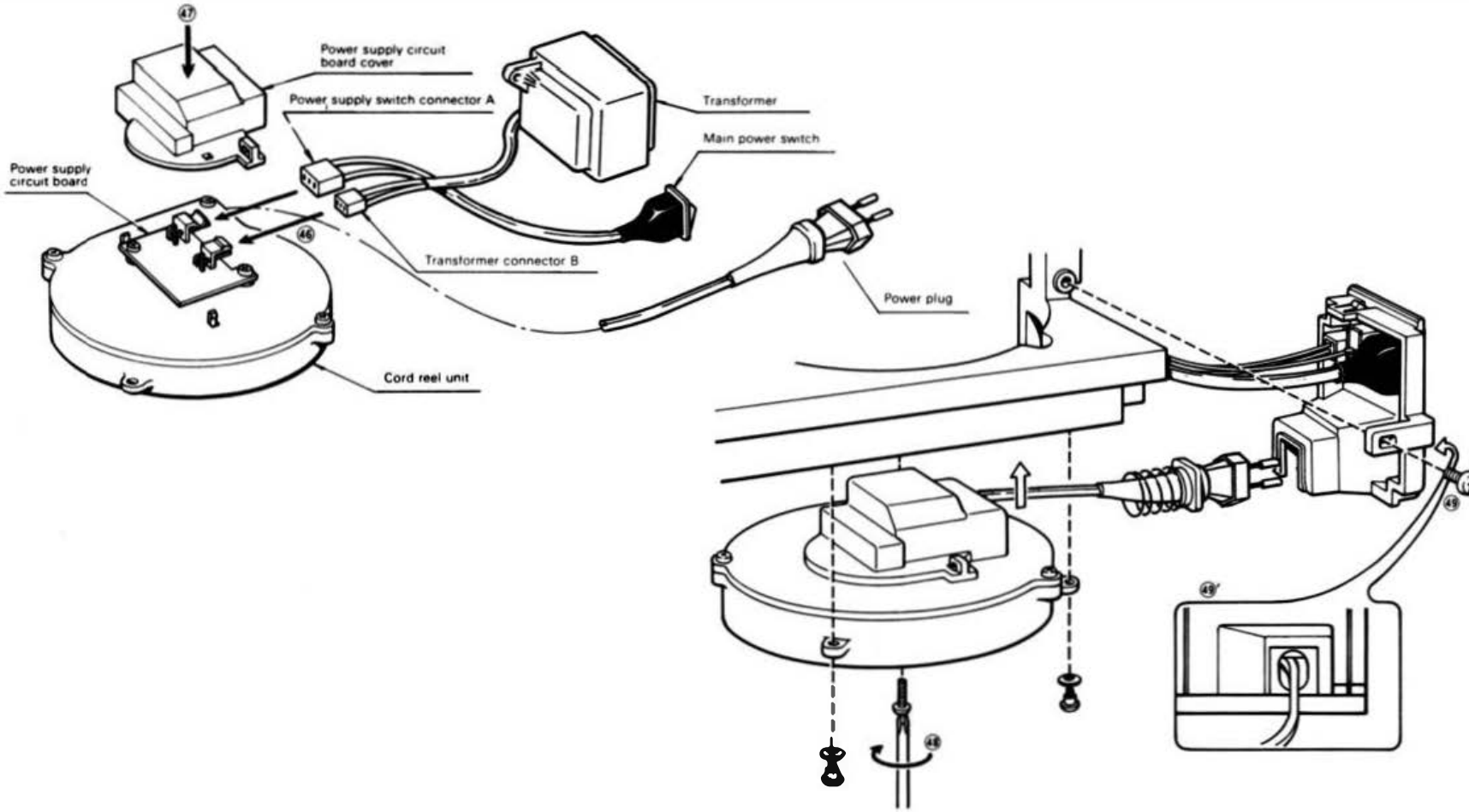
a : Measurement on the needle bar highest point
c = a + 15.2 mm

45. Position rotation shutter so that it can cross rotation sensor when needle is positioned at 22.9 mm lower than its highest position. Then position N.P. shutter so that it can cross N.P. sensor when the clearance between thread take-up lever and the rib of thread guard is about 0 mm. (This is temporary adjustment and make final adjustment later. Refer to page 34.)

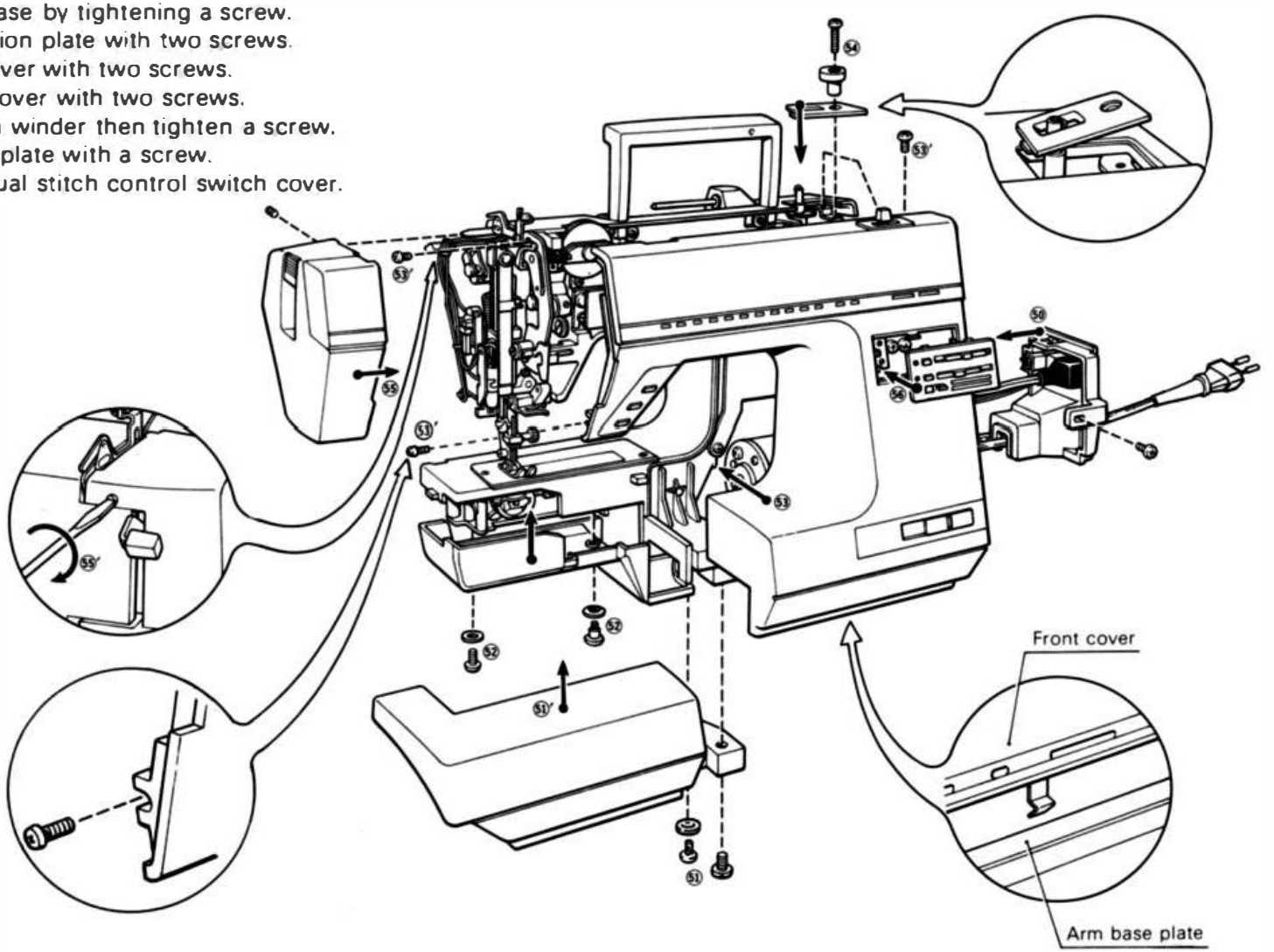
(45)



46. Connect main power switch connector A and transformer connector B.
47. Fit the power supply circuit board.
48. Fit cord reel unit by tightening three screws.
49. Fit plug case by tightening a screw.



50. Fit plug case by tightening a screw.
51. Fit extension plate with two screws.
52. Fit bed cover with two screws.
53. Fit front cover with two screws.
54. Fit bobbin winder then tighten a screw.
55. Fit a face plate with a screw.
56. Fit a manual stitch control switch cover.



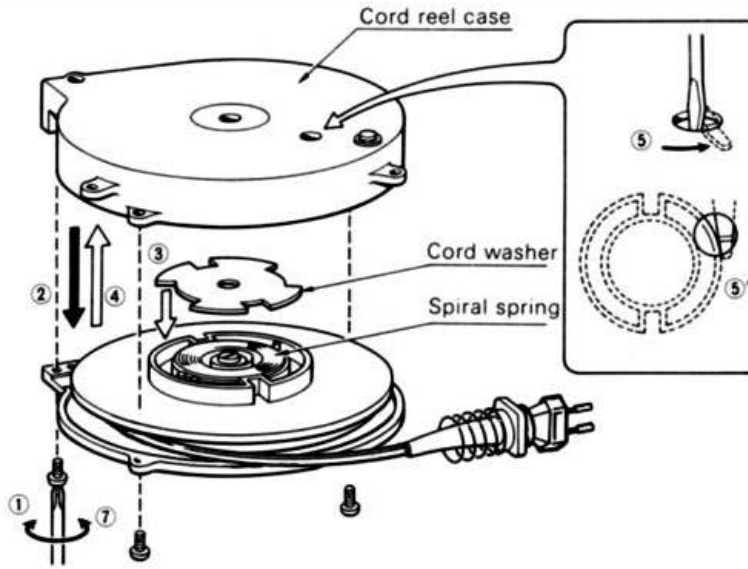
2. CORD REEL UNIT

(How to remove)

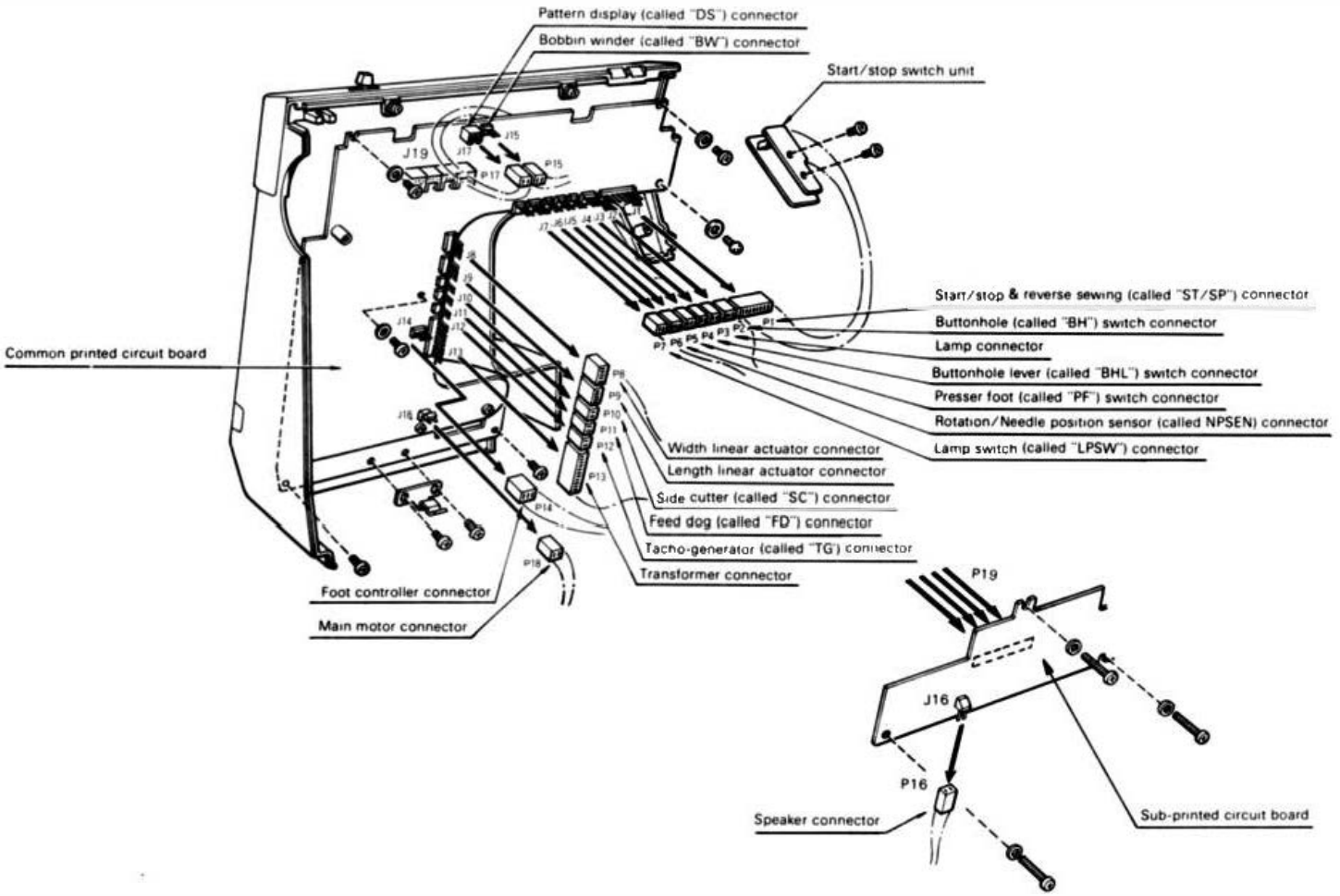
1. Loosen 3 screws and remove those screws holding cord reel base so that it does not turn. Turn cord reel base counterclockwise about 4 ~ 5 times until it is free from the tension of spiral spring.
2. Remove cord reel wheel from cord reel cover.

(How to fit)

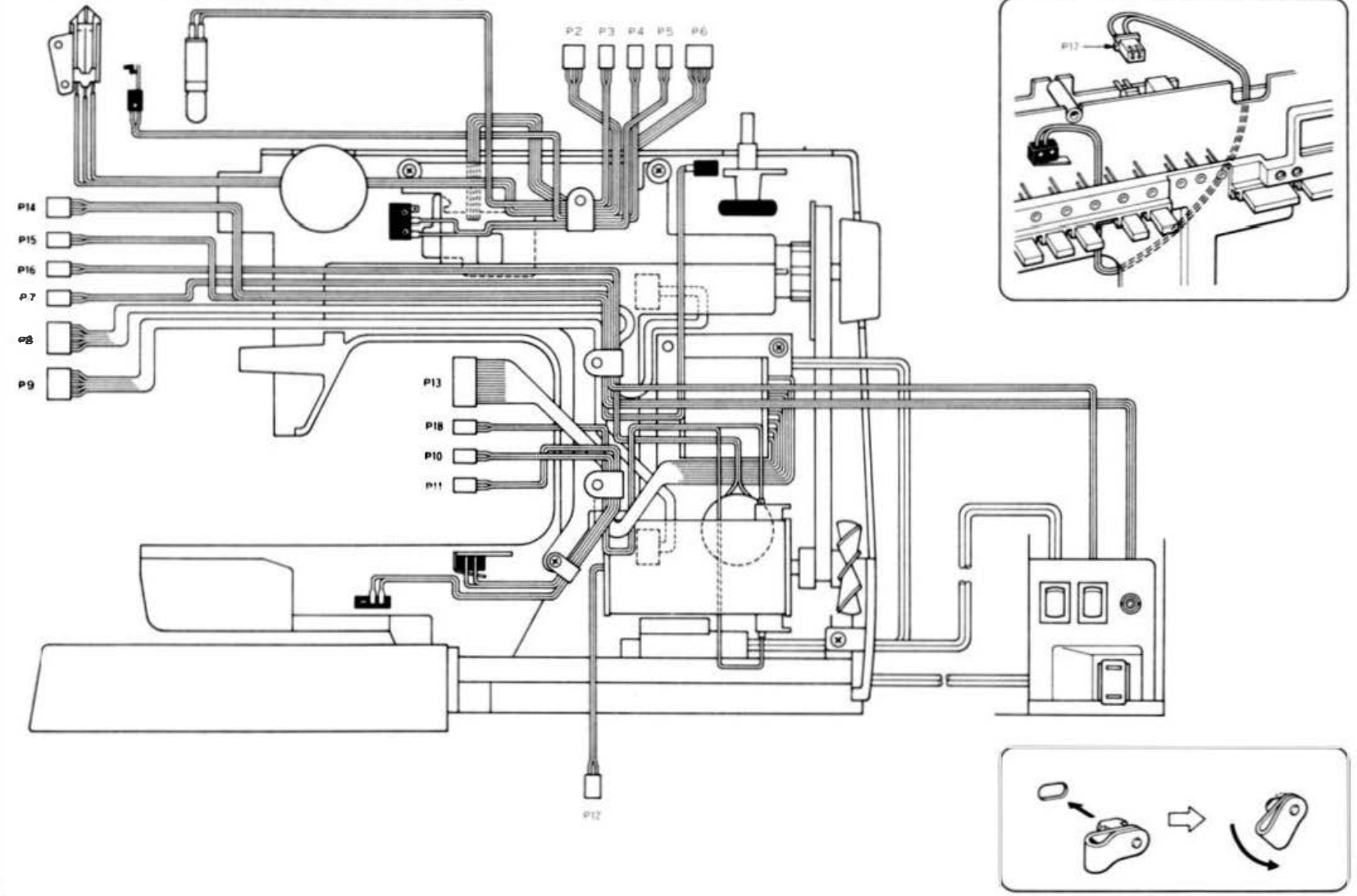
3. Put cord reel washer on cord reel wheel.
4. Put cord reel wheel in cord reel case.
5. Make sure that cord goes as far as possible by moving the notching lever toward outside using screw driver.
6. Turn cord reel base counterclockwise about 4 ~ 5 times and hold it not to turn clockwise in the tension of spiral spring.
7. Fit cord reel base with 3 screws.



3. REMOVING PRINTED CIRCUIT BOARDS



4. LEAD WIRES ARRANGEMENT



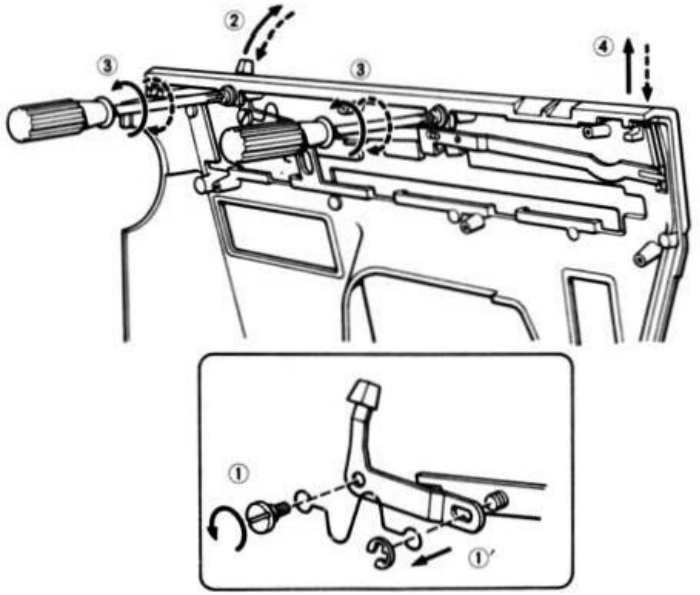
5. REMOVING TRANSPARENCY DISPLAY PLATE

(The order of disassembling)

1. Loosen a screw then remove a stop ring and a spring.
2. Remove pattern change lever.
3. Loosen 2 screws.
4. Remove transparency display plate.

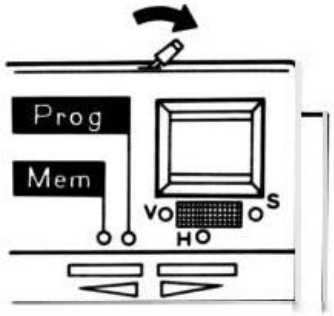
(The order of reassembling)

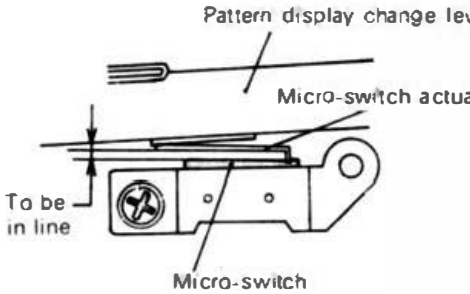
Proceed in reverse order of disassembling. Make sure to fit spring as illustrated.

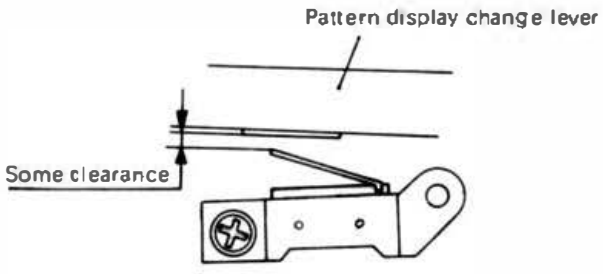


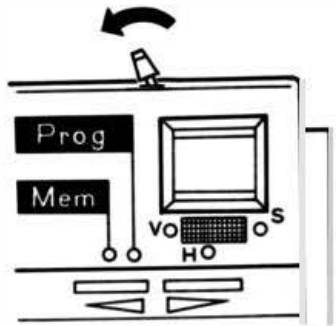
Fitting position of micro-switch

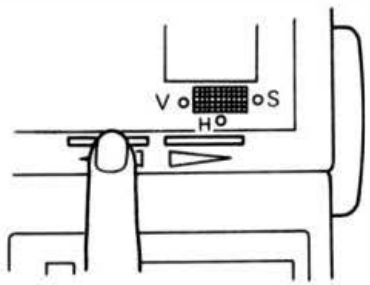
1. Make sure the micro-switch actuator is in line with micro-switch body. Make sure LED is lighted when micro-switch lead wire is connected to printed circuit board and pattern change lever is moved to right.
2. Make sure micro-switch actuator is not contacted with pattern change lever when pattern change lever is moved to left. Make sure LED continues to light to left direction when micro-switch is connected to printed circuit board and pattern change lever is moved to left then the pattern selection switch (Left) is keeping depressed.











III. HOW TO ADJUST THE MECHANICAL ELEMENTS

1. POSITION OF SHUTTLE HOOK

STANDARD

When zigzag stitch is selected and the width is set at its maximum position.

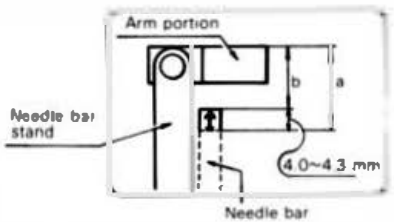
1. When needle raises from its lowest position by 4.0 ~ 4.3 mm. the hook point should meet with the side of the needle at left needle movement.
2. The clearance between the hook and needle is less than 0.1 mm and never touch each other.

ADJUSTMENT

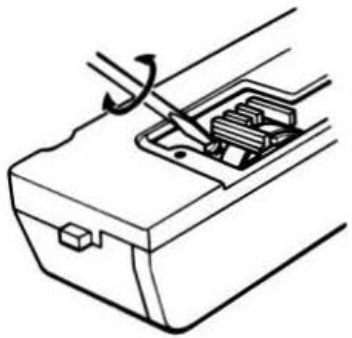
1. Set the machine at zigzag pattern.
2. Set zigzag width at its maximum position.
3. Loosen three screws.
4. Adjust the hook to achieve above two standard.
5. Tighten the screws.

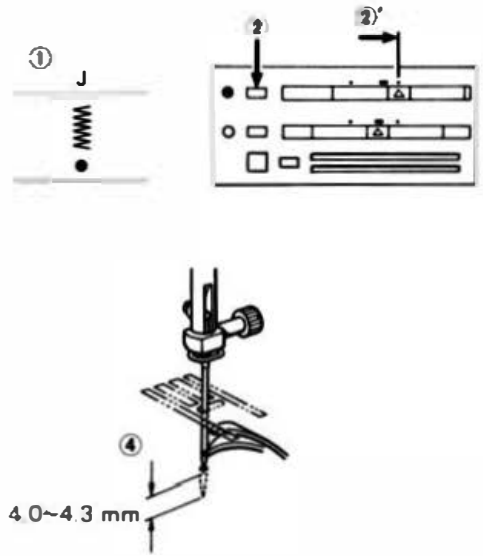
NOTE

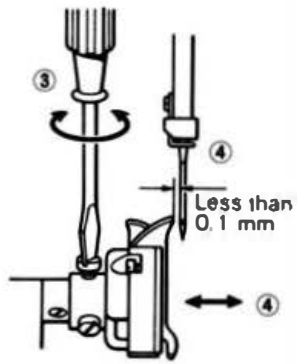
Make sure two standard are achieved if you loosen the screws.



a : The lowest position of needle bar
b : The measurement when hook point meet with the side of needle (a—4.0~a—4.3)







2. HEIGHT OF NEEDLE BAR

STANDARD

When the zigzag stitch is selected and the width is set at its maximum position.

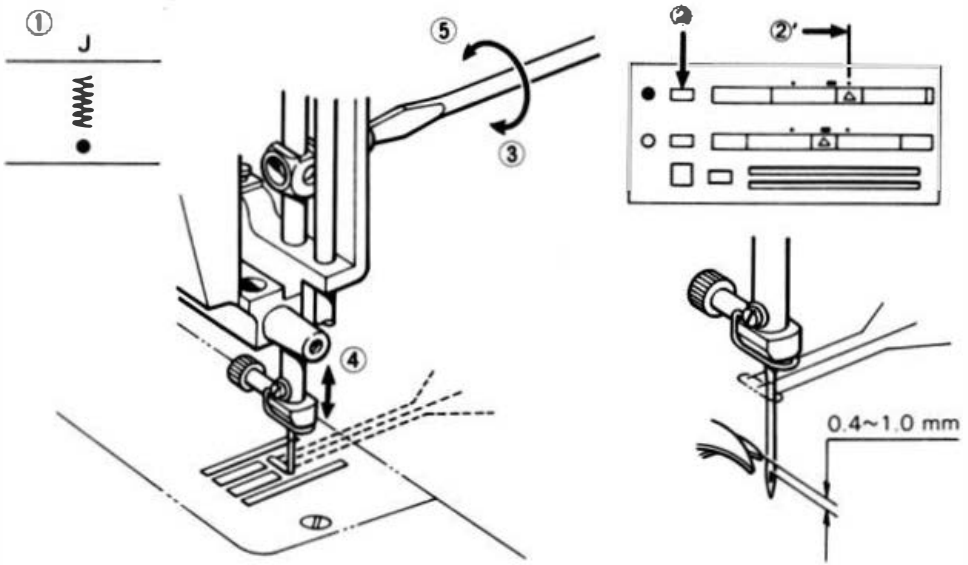
1. The clearance between the upper top of needle eye and bottom top of hook is 0.4 ~ 1.0 mm when needle and hook meet at left needle position.

ADJUSTMENT

1. Set the machine at zigzag pattern.
2. Set the zigzag width at its maximum position and seek the position that needle meets with hook point by turning the balance wheel.
3. Loosen the screw.
4. Move the needle bar up or down to obtain correct position.
5. Tighten the screw.

NOTE

Care should be taken when you adjust the needle bar. the needle bar easily turns and if tightened incorrectly. it might be caused the trouble of twin needle sewing.



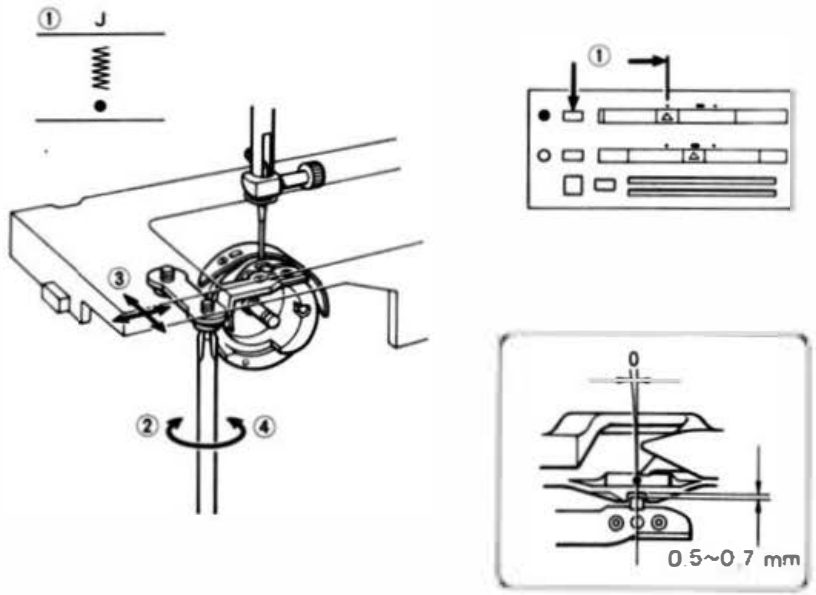
3. BOBBIN CASE HOLDER BRACKET

STANDARD

1. The clearance between the bracket and hook is 0.5 ~ 0.7 mm.

ADJUSTMENT

1. Select zigzag pattern and set zigzag width at "0".
2. Loosen two screws.
3. Adjust the position of bracket (right to left or back and forth).
4. Tighten screws.



4. HEIGHT OF PRESSER BAR

STANDARD

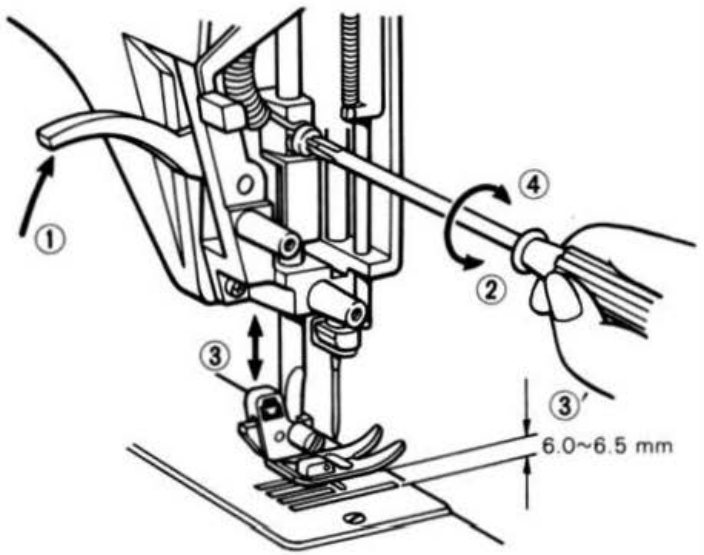
1. The clearance between presser foot and needle plate is 6.0 ~ 6.5 mm.

ADJUSTMENT

1. Raise presser foot lever.
2. Loosen screw.
3. Adjust the height of presser bar.
4. Tighten the screw.

NOTE

Make sure the presser foot and feed dog are in line.



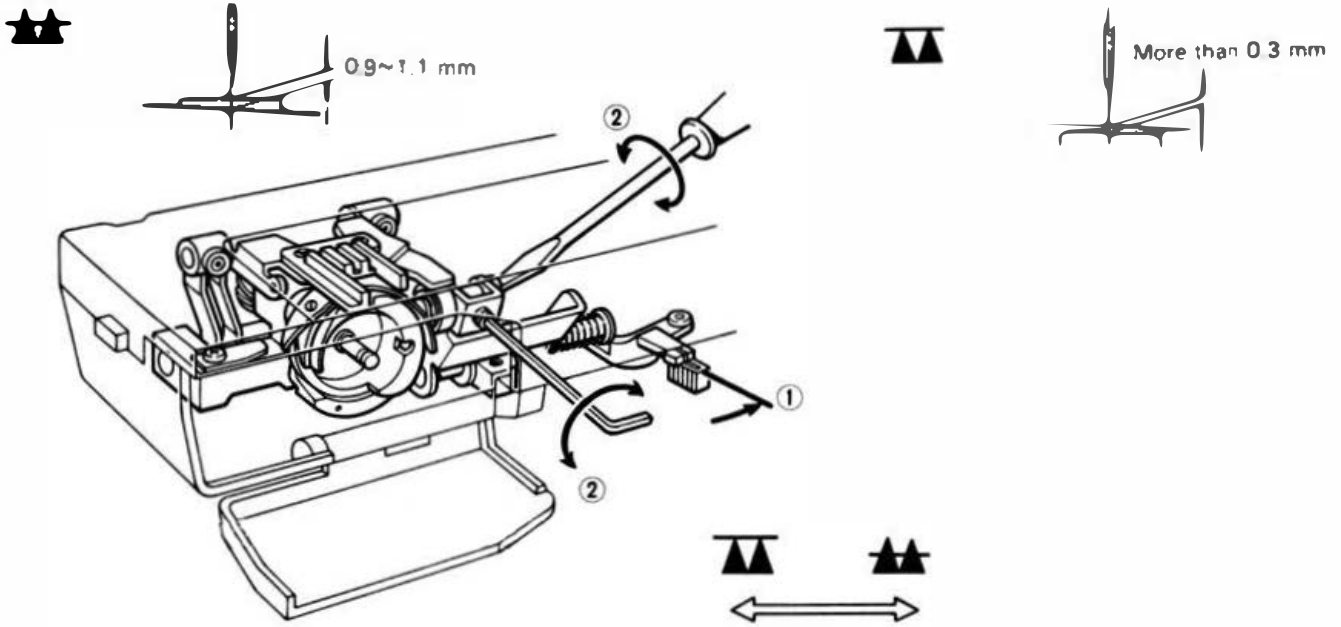
5. HEIGHT OF FEED DOG

STANDARD

1. The feed dog is higher than needle plate by 0.9 ~ 1.1 mm when drop feed is set at up position and it reaches its highest position.
2. The clearance between the feed dog and needle plate is more than 0.3 mm (below) when drop feed is set at down position and feed dog reaches its highest position.

ADJUSTMENT

1. Set the drop feed at up position.
2. Turn the balance wheel and seek the position that feed dog reaches its highest position. Loosen the set screw and turn the stud. Tighten the set screw.



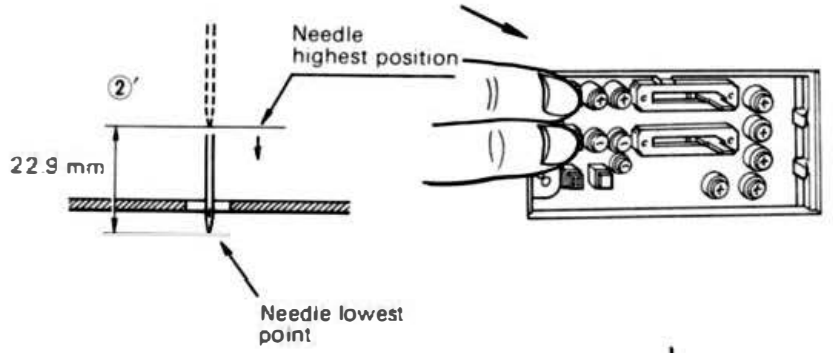
6. POSITION OF ROTATION SHUTTER & N.P. (NEEDLE POSITION) SHUTTER

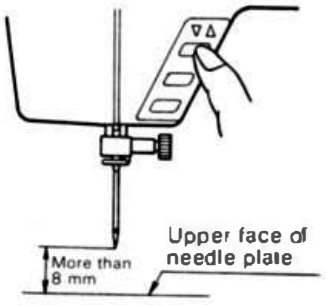
STANDARD

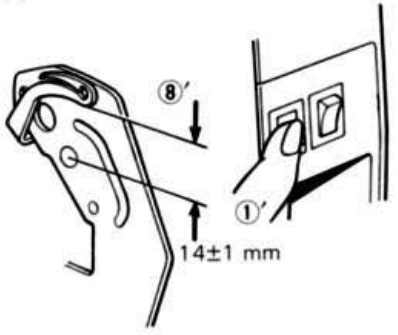
1. Disappear the LED indicating "H" (horizontal) when needle is reached at the position of 22.9 mm lower than its highest position by turning balance wheel at test mode.
2. In case that needle is set at its up position. the top of needle is stopped at the position of 8 mm upper than needle plate also thread take-up lever is stopped at the position of 14 ± 1 mm upper than thread tension bar.

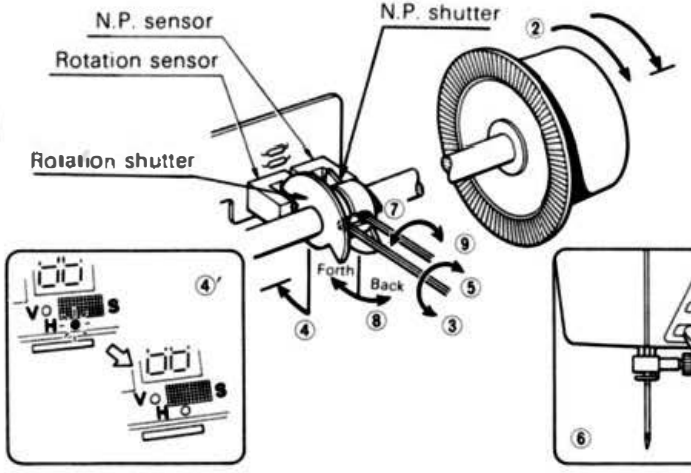
ADJUSTMENT

1. Turn the power supply switch on with keeping both manual stitch length/ width control switches depressed to be set a test mode.
2. Set the needle at the position of 22.9 mm lower than its highest position by turning balance wheel.
3. Loosen a hexagon socket screw of rotation shutter.
4. Turn the rotation shutter forth slowly and seek the position that the LED "H" disappears.
5. Tighten the screw.
6. Start sewing and stop it by using start/stop switch.
7. Loosen a hexagon socket screw of N. P shutter.
8. Seek the correct stop position (highest position) of thread take-up lever to meet with above standard by turning N.P. shutter forth or back.
   * In case that the shutter turns too soon. thread take-up lever stops before it reaches to its highest position.
   In case that the shutter turns too late. thread take-up lever stops after it is over at its highest position.
9. Tighten the screw.
10. Check if the adjustment meets with above standard when the needle stops at its up position.


Needle highest position
②′
22.9 mm
Needle lowest point


More than 8 mm
Upper face of needle plate


⑧′
①′
14±1 mm


N.P. sensor
Rotation sensor
Rotation shutter
N.P. shutter
②
⑦
⑨
Forth
Back
⑤
④
⑧
③
④′
⑥

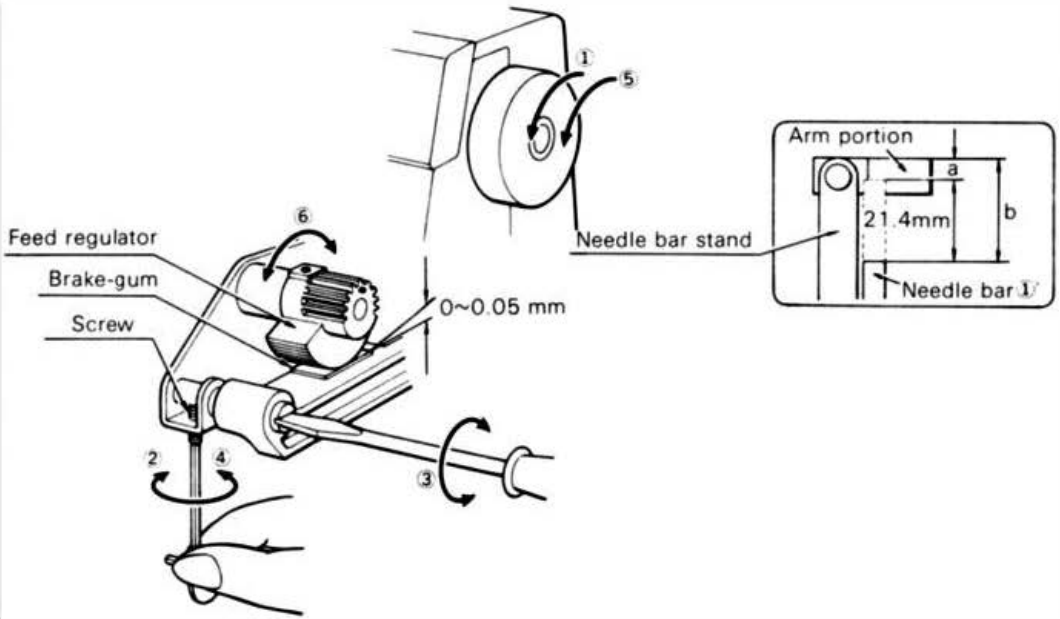
7. BRAKE TIMING FOR FEED REGULATOR

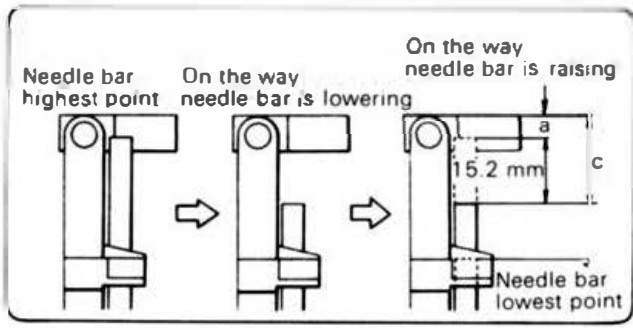
STANDARD

When balance wheel is turned forward, feed regulator is released from the brake at the position that needle is lowered by 21.4 mm from its highest position and brake operates again from the position that the needle is raised at 15.2 mm until its highest position through its lowest position.

ADJUSTMENT

1. Lower the needle by 21.4 mm from its highest position by turning balance wheel.
2. Loosen a screw.
3. Adjust the clearance between feed regulator and brake-gum to be 0 ~ 0.05 mm by turning eccentric shaft.
4. Tighten the screw.
5. Raise the needle by 15.2 mm from its lowest position through its lowest position .
6. Make sure that the brake is properly operated on feed regulator.





a : Needle bar highest point
c = a + 15.2 mm

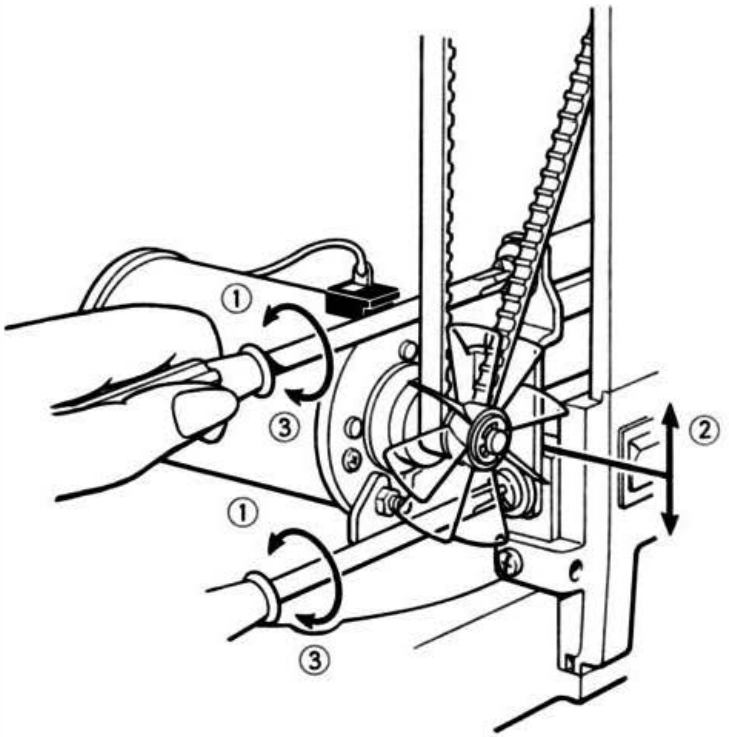
8. TENSION OF MOTOR BELT

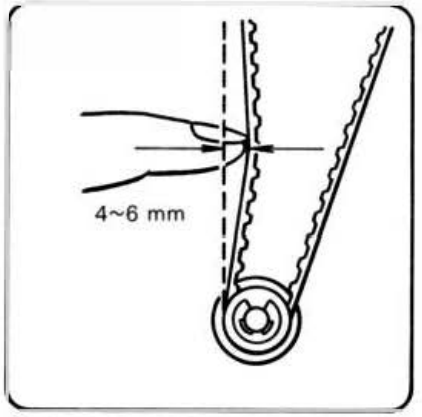
STANDARD

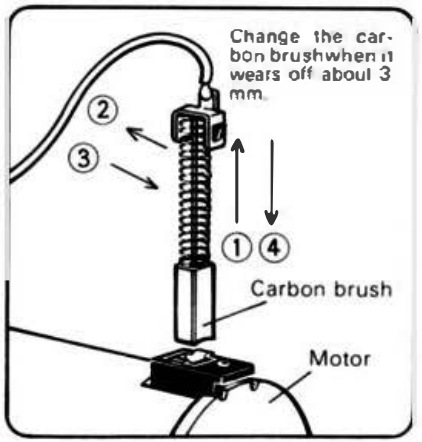
There should be some slacks (4 ~ 6 mm) when the motor belt is just pushed (about 200 g pressure.)

ADJUSTMENT

1. Loosen two screws.
2. Adjust belt tension by moving motor holder to meet with above standard.
3. Tighten the screws.







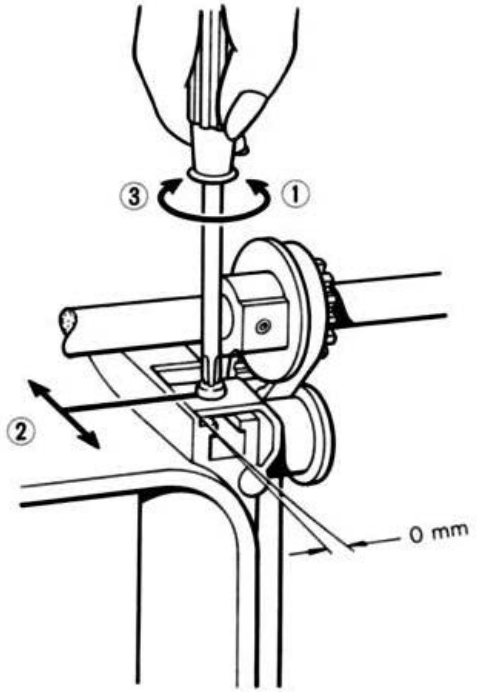
9. TENSION OF TIMING BELT

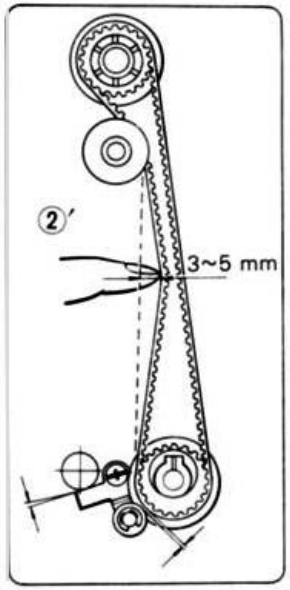
STANDARD

There should be some slacks (3 ~ 5 mm) when the timing belt is just pushed (abotu 200 g pressure.)

ADJUSTMENT

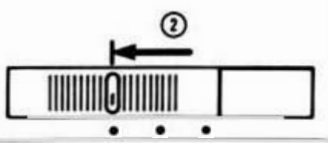
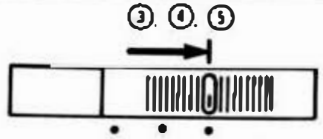
1. Loosen a screw.
2. Adjust the position of idle pulley to meet with above standard.
3. Tighten the screw.





10. R.P.M. OF MAIN MOTOR

STANDARD

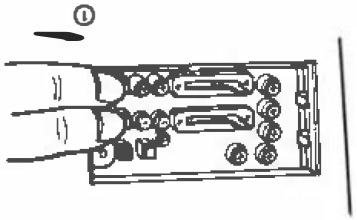
Speed Control Lever		
R.P.M.	100~120R.P.M.	800~850R.P.M. (STRAIGHT) 700~750 R.P.M. (ZIGZAG) 380~420R.P.M. (MEMORY & PROGRAM PATTERNS)

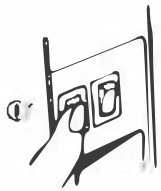
CAUTION

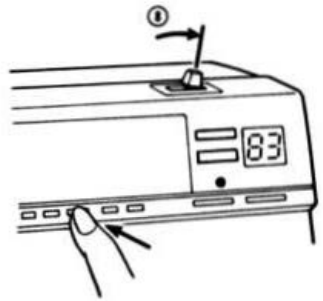
As each volumes are locked by paint. turn them slightly to the direction of rotation and not give any pressure to the direction of thrust. After adjustment. make sure to be again locked by paint.

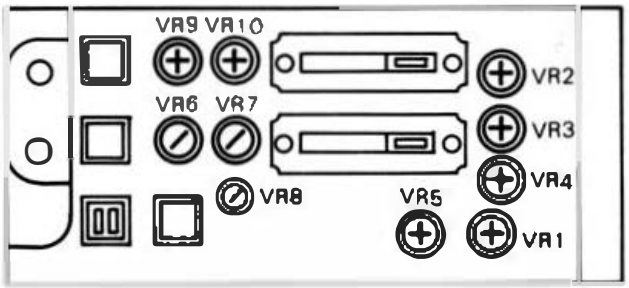
ADJUSTMENT

1. Set a machine at test mode.
2. Set the speed control lever at its leftest position (lowest speed position).
3. Start the machine and turn the volume of VR1 clockwise or counterclockwise so that number of rotation should be 100~120R.P.M.
4. Set the speed control lever at its rightest position (highest speed position) and select the straight stitch.
5. Start the machine and turn the volume VR2 clockwise or counterclockwise so that numbers of rotation should be 800~850R.P.M.
6. Select zigzag stitch.
7. Start the machine and turn the volume VR3 clockwise or counterclockwise so that numbers of rotation should be 700~750R.P.M.
8. Change to the memory mode and select one of memory patterns. (No. 47~67).
9. Start the machine and turn the volume VR4 clockwise or counterclockwise so that numbers of rotation should be 380~420R.P.M.









NOTE

1. Each speeds never exceed to the standard.
2. The sewing speed is indicated by 2 digits in digital display window.
   Ex. "12" means "120R.P.M.".

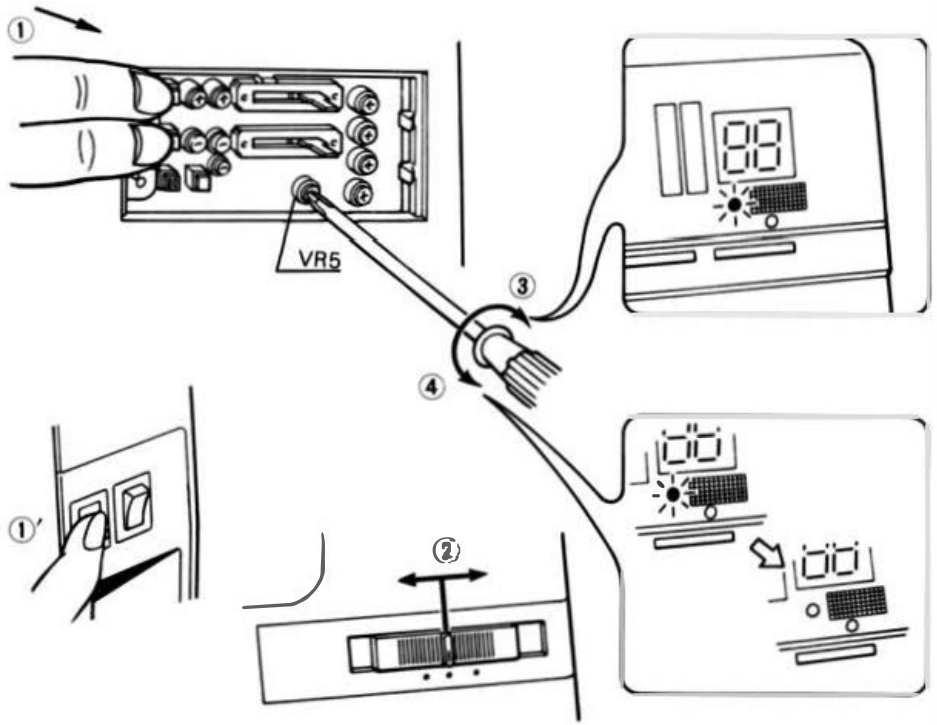
11. NEEDLE STOPPING SPEED

STANDARD

When needle stops at its up position, needle threader can be usable and pass the thread to thread take-up lever easily.

ADJUSTMENT

1. Set the machine at test mode.
2. Set the sewing speed at 140R.P.M. by moving speed control lever.
3. Turn the volume VR5 clockwise until LED indicating (vertical) will be lighted.
4. Turn the volume VR5 counterclockwise until the LED will disappear.



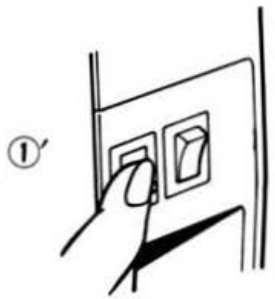
12. CENTERING OF THE NEEDLE

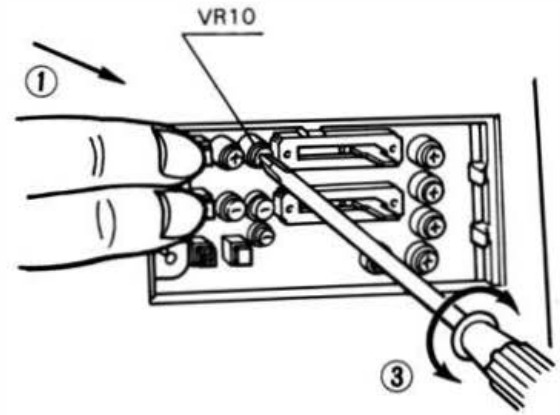
STANDARD

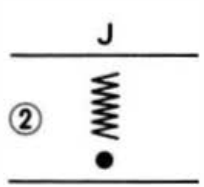
1. Needle should drop at the center of needle hole when zigzag pattern is selected with its minimum stitch width.

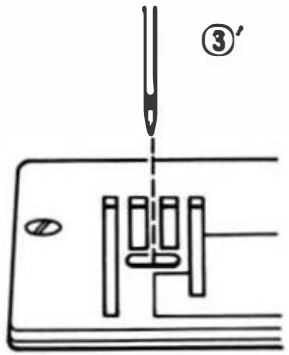
ADJUSTMENT

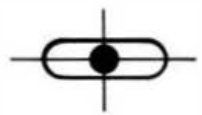
1. Set a machine at test mode.
2. Select the zigzag stitch.
3. Turn the volume VR10 clockwise or counterclockwise so that needle should drop at the center of needle hole.











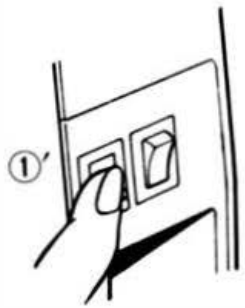
13. SETTING OF THE MAXIMUM NEEDLE SWING

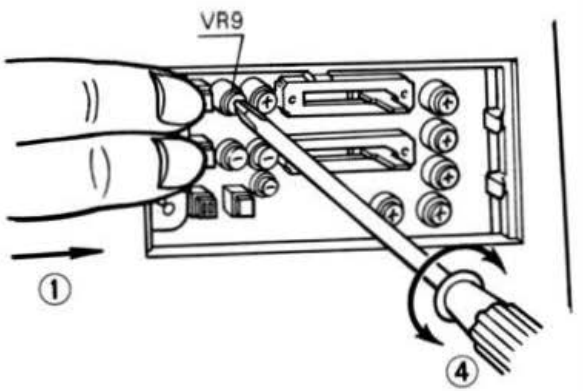
STANDARD

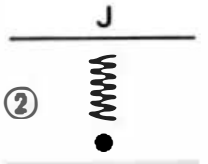
1. Needle enters the needle hole balanced when zigzag stitch is selected with its maximum stitch width.

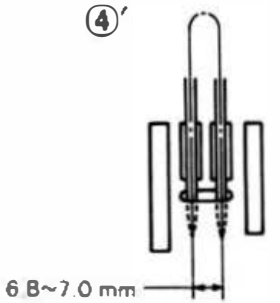
ADJUSTMENT

1. Set a machine at test mode.
2. Select zigzag stitch.
3. Set the zigzag width at its maximum position.
4. Turn the volume VR9 clockwise or counterclockwise so that maximum zigzag width should be 6.8 ~ 7.0 mm.









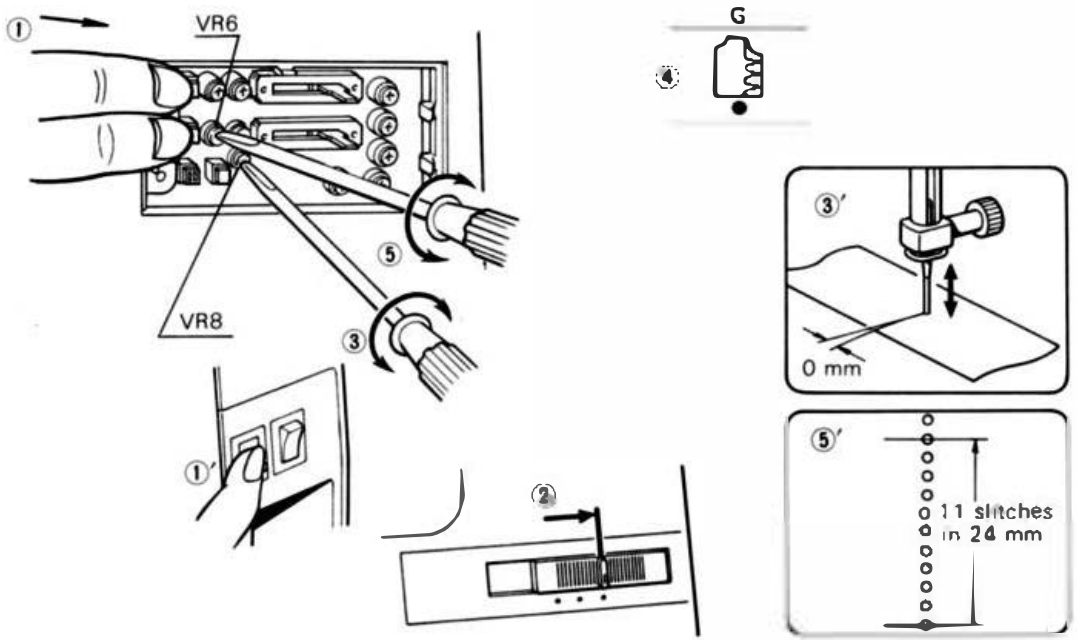
14. FORWARD FEEDING AT STRAIGHT STITCHES

STANDARD

1. There should be no feeding when stitch length is set at its minimum position.
2. When setting at straight stitch, 11 stitches are sewn in 24 mm.

ADJUSTMENT

1. Set a machine at test mode.
2. Set the speed control lever at its maximum position.
3. Turn the volume VR-8 clockwise or counterclockwise so that no feeding is obtainable in sewing on paper when stitch length is set at its minimum position. (The paper is not fed at least 5 seconds.)
4. Set the machine at pattern .
5. Start this pattern on paper until it is finished and adjust to meet with above standard 2 by turning volume VR6. Maximum stitch length should be more than 4.5 mm.



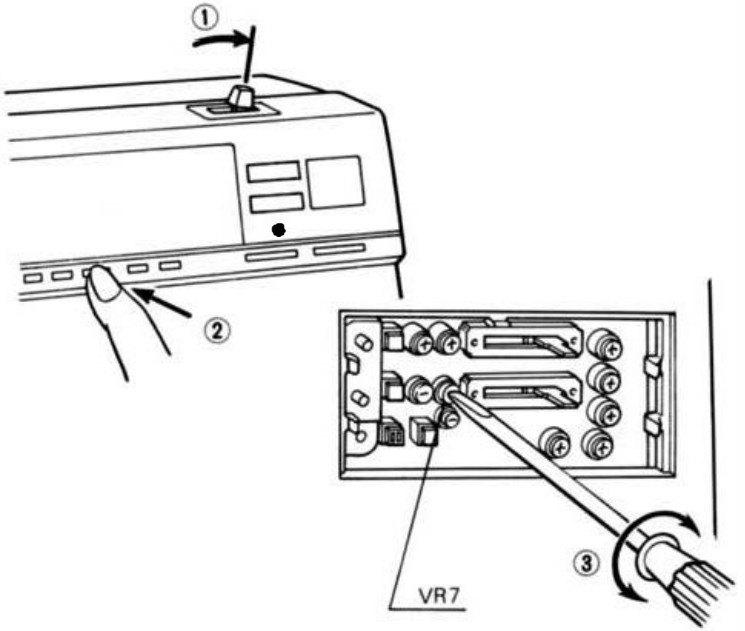
15. LENGTH OF FORWARD AND REVERSE STITCHES FOR SUPER AUTOMATIC PATTERNS

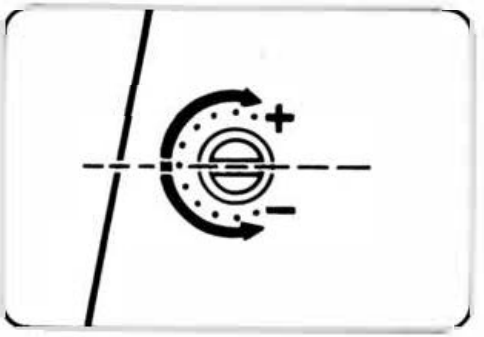
STANDARD

Make sure to obtain proper length of both forward and reverse stitches to make fine pattern.

ADJUSTMENT

1. Change to memory mode by moving pattern change lever to right.
2. Input following pattern numbers to sew as "EPS" No. 04 + No. 15 + No. 18.
3. Set the length fine adjusting volume on the right side of machine to be horizontal direction.
4. Depress the start/stop button to sew sample.
5. Turn the volume VR7 clockwise or counterclockwise so that reverse stitch meets with forward stitch.
   - In case that longer reverse stitch is required ····· Turn the volume clockwise.
     In case that shorter reverse stitch is required ····· Turn the volume counterclockwise.





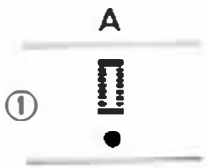
16. POSITION OF BUTTONHOLE SWITCH LEVER

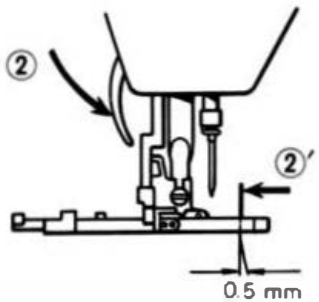
STANDARD

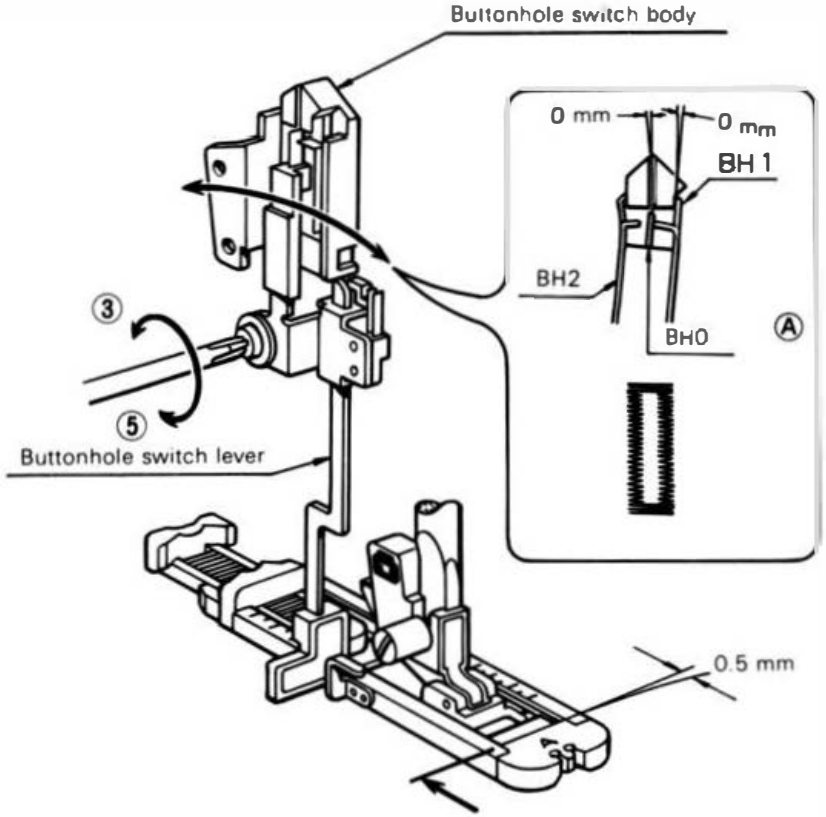
1. When buttonhole lever (Blue lever) and presser foot lever are lowered. BH0 touches with BH1.
2. The legs of buttonhole should be diameter of button plus 2.5 mm.

ADJUSTMENT

1. Select buttonhole pattern.
2. Fit the buttonhole foot and push the top portion of it backward as far as it will go.
3. Loosen a screw.
4. In case that the legs are shorter than the standard, bend the BH1 to be far from BH0.
   In case that the legs are longer than the standard, bend the BH2 to be near BH0.
5. Tighten the screw.



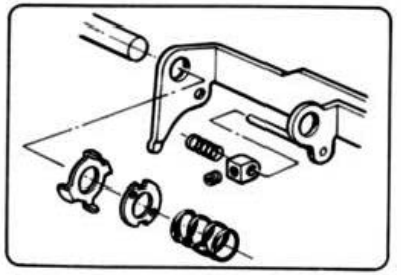




17. UPPER TENSION DIAL

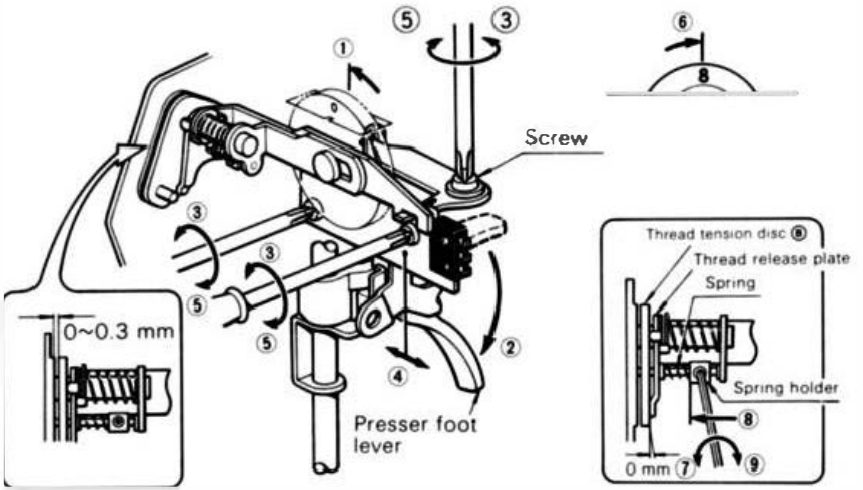
STANDARD

1. The clearance between two discs should be 0 ~ 0.3 mm when presser foot is lowered and tension dial is set at 0.
2. Spring is touched with spring holder and the top of thread release plate begins to depress on the tension disc B. when presser foot is lowered and tension dial is set at 8.



ADJUSTMENT

1. Set upper tension dial at 0.
2. Lower the presser foot lever.
3. Loosen two screws.
4. Adjust the position of thread tension bracket to meet with above standard 1.
5. Tighten the screws.
6. Set upper tension dial at 8.
7. Loosen a hexagon socket screw.
8. Adjust the position of spring holder to meet with above standard 2.
9. Tighten the screw.



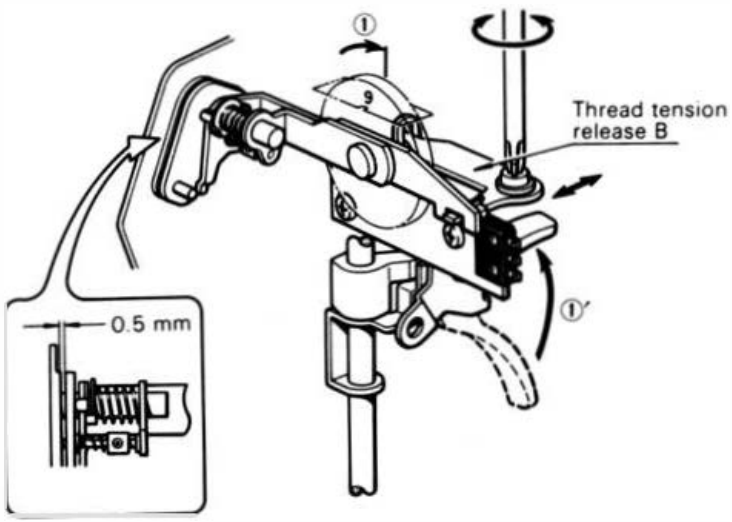
18. THREAD TENSION RELEASE

STANDARD

The clearance between two discs should be more than 0.5 mm when presser foot is raised and tension dial is set at 9.

ADJUSTMENT

1. Set upper tension dial at 9 and raise the presser foot lever.
2. Adjust the position of thread tension release B to meet with above standard.
3. Tighten the screw and check if the clearance between two discs is more than 0.5 mm by moving presser foot lever up and down.



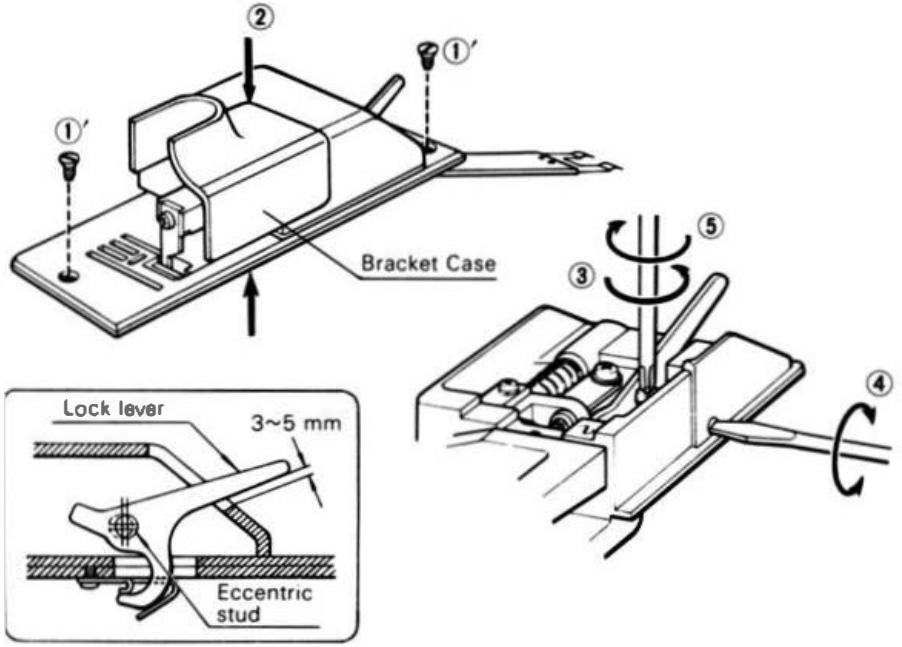
19. SIDE-CUTTER ADJUSTMENT (LOCK LEVER POSITION)

STANDARD

When the lock lever is fully pushed down (2.5 ~ 3.0 kgs), the lower part of lock lever should be positioned within the red mark.

ADJUSTMENT

1. Loosen two screws and take out the upper plate.
2. Take out bracket case and attach the side-cutter on the tubular arm.
3. Loosen a screw.
4. Turn the eccentric stud with screw driver and adjust the clearance between the lower side of lock lever and side-cutter to be 3 ~ 5 mm.
5. Tighten the screw.
6. Attach the bracket cover and check again.



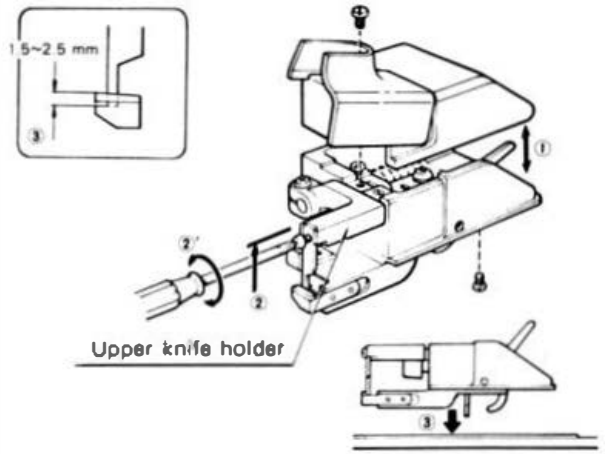
20. SIDE-CUTTER ADJSUTMENT (LOWER & UPPER KNIVES)

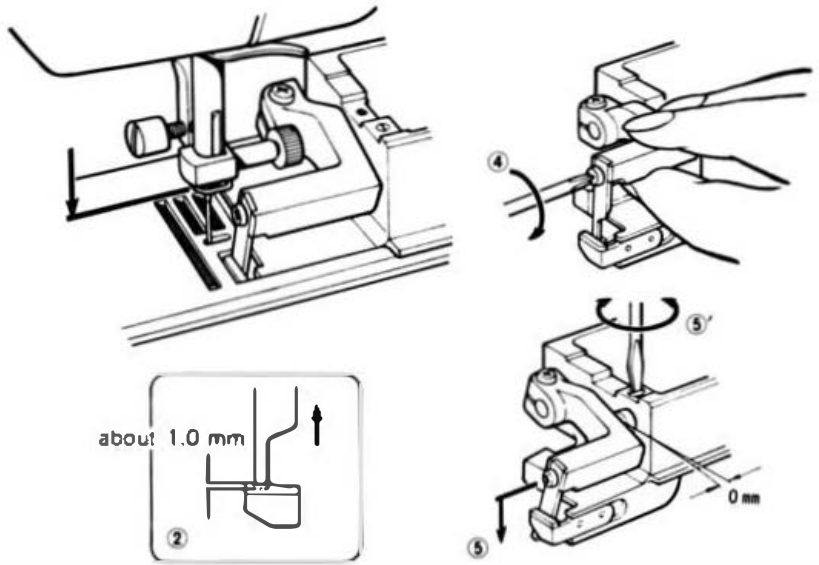
STANDARD

1. When side-cutter is out of machine and upper knife holder is at highest position. both knives meet each other by 0.7 ~ 1.2 mm.
2. Lower and upper knives bite each other by 1.5 ~ 2.5 mm when needle bar moves to its lowest position.

ADJUSTMENT

1. Remove bracket case by loosening two screws.
2. Keeping holder at highest position. adjust lower and upper knives to meet each other by about 1.0 mm and set upper knife temporarily.
3. Attach the side-cutter to tubular arm and set needle bar at its lowest position making sure they meet each other by 1.5 ~ 2.5 mm.
4. Remove side-cutter from machine and firmly tighten the upper knife with securing holder.
5. Move the holder downward and loosen a set screw. Adjust the clearance between guide axis and holder be 0 mm and then tighten the set screw.





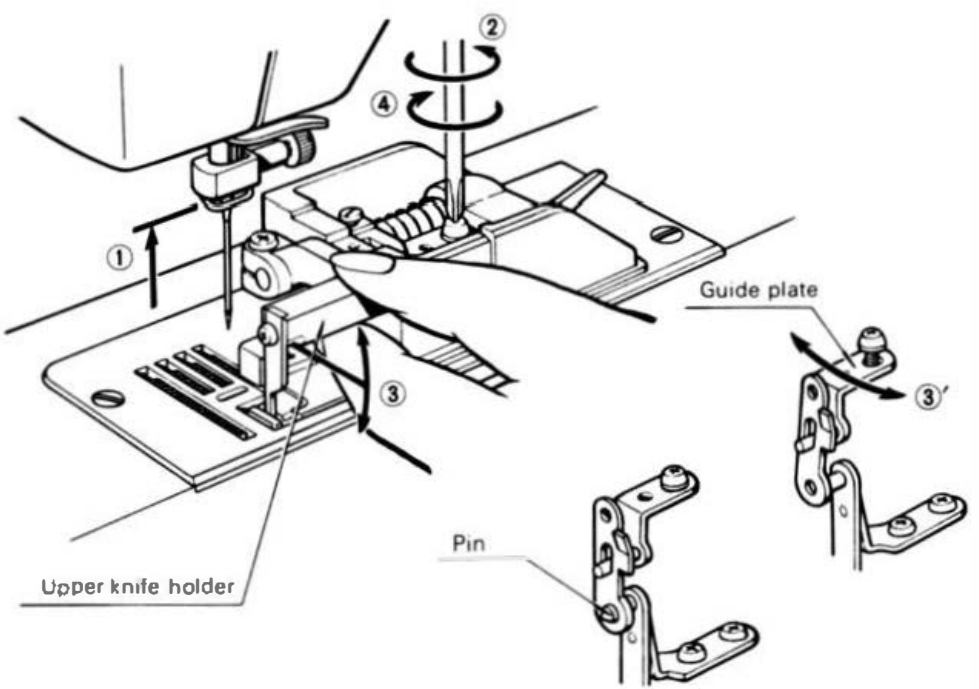
21. SIDE-CUTTER ADJUSTMENT (UPPER KNIFE DOES NOT WORK)

STANDARD

Upper knife should work when it is set to machine.

ADJUSTMENT

1. Attach the side-cutter to tubular arm and set the needle bar at its highest position.
2. Loosen a screw.
3. By moving the holder up and down, seek the position that the pin is fitted into guide plate.
4. Tighten the screw.



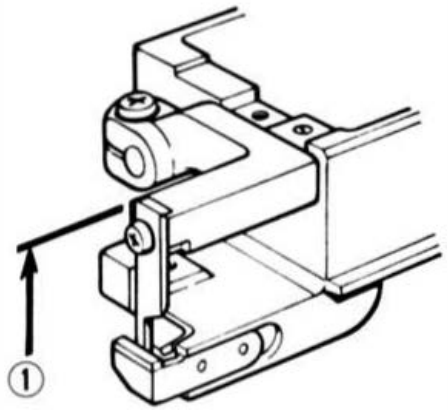
22. SIDE-CUTTER ADJUSTMETN (ATTACHING GUIDE PLATE A & B)

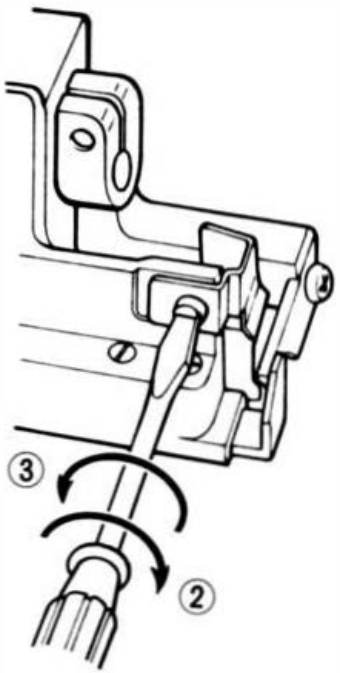
STANDARD

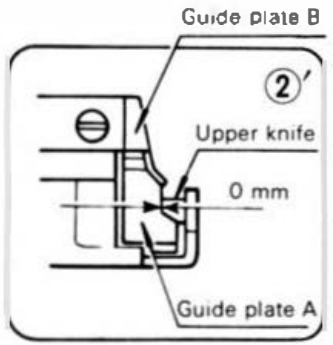
The clearance between guide plate A and upper knife should be 0 mm.

ADJUSTMENT

1. Set the holder at its highest position.
2. Loosen the screws on guide plate A & B and adjust the clearance between the guide plate A and upper knife to be 0.
3. Tighten the screw A & B.







23. NEEDLE THREADER

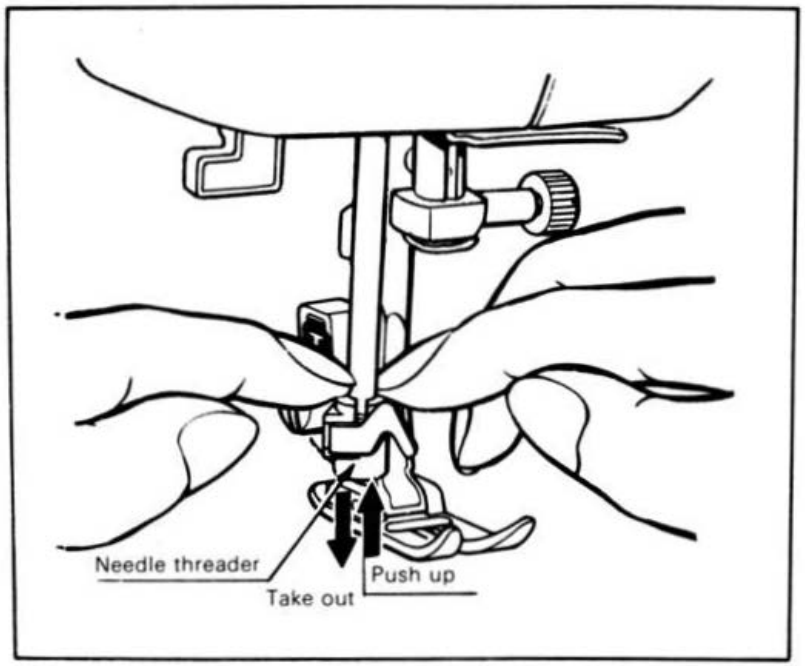
1. Needle threader accept only circle marked needle and thread combinations.
2. * marked combination is not recommended since it might lead to the breakage of needle threader imperfect performance.
3. Lower the presser foot when you use needle threader.
4. Do not use needle threader when you use twin needle.
5. Nylon transparent thread is applicable in needle #14 ~ 16.
6. Do not turn the balance wheel when you use needle threader.
7. Do not touch needle threader when machine is running.
8. Needle should be located above needle plate for more than 8 mm for threading.
9. Needle threader does not work when you use the side-cutter.

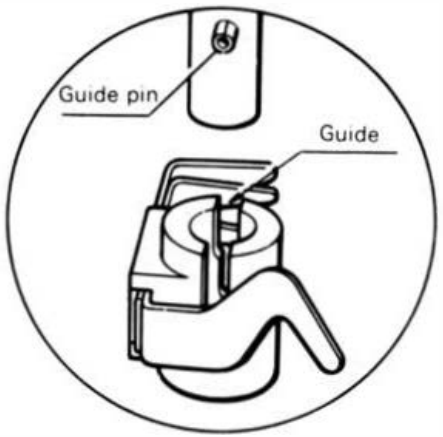
Needle \ Thread	#30	#50	#60	#80	#100	#120
#9	X	X	X	O	O	O
#11	X	X	O	O	O	•
#14	X	O	O	O	•	•
#16	•	O	O	•	•	•
#18	•	•	•	•	•	•

24. NEEDLE THREADER (EXCHANGE)

How to exchange needle threader

1. Remove needle and lower the presser foot.
2. Push down needle threader to take out.
3. Place new one so that guide is immediately under the guide pin.
4. Push needle threader all the way up so that guide is placed in the pin.





25. NEEDLE THREADER (CHECKING THE HOOK POSITION)

STANDARD

1. The clearance between the top of hook and the top of needle eye is 0.
2. Threading is capable when needle is located higher than 8 mm from the needle plate.

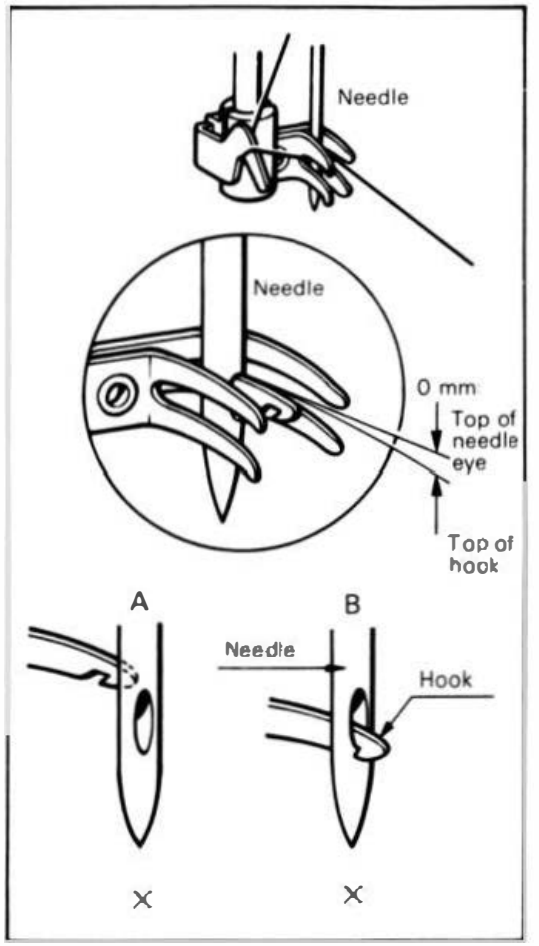
CHECK

Case A

Hook position is too high.

Case B

Hook position is too low. (Hook enters needle eye but it catches bottom part of needle eye.)



26. NEEDLE THREADER (ADJUSTMENT OF HOOK POSITION)

ADJUSTMENT

Case A (Hook point is too high)

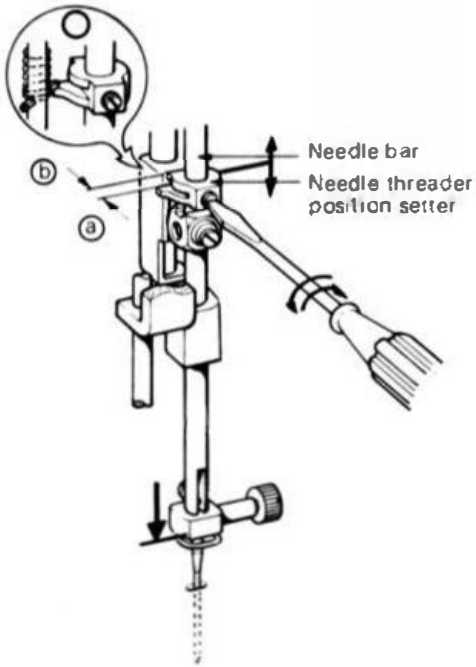
1. Remove face plate and loosen the screw.
2. Adjust needle threader slightly down and check the clearance between the top of hook and top of needle eye is zero.
3. Check if part ⓐ and part ⓑ is in line.

Case B (Hook point is too low)

Adjust needle threader slightly up and check the clearance between the top of hook and top of needle eye is zero.

Note

In case part ⓐ and part ⓑ is not in line. hook does not work. Adjust needle threader by loosening the screw.



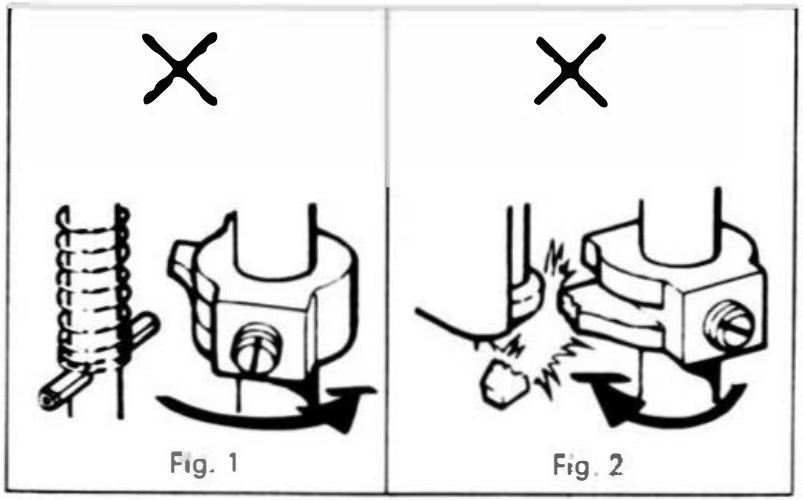
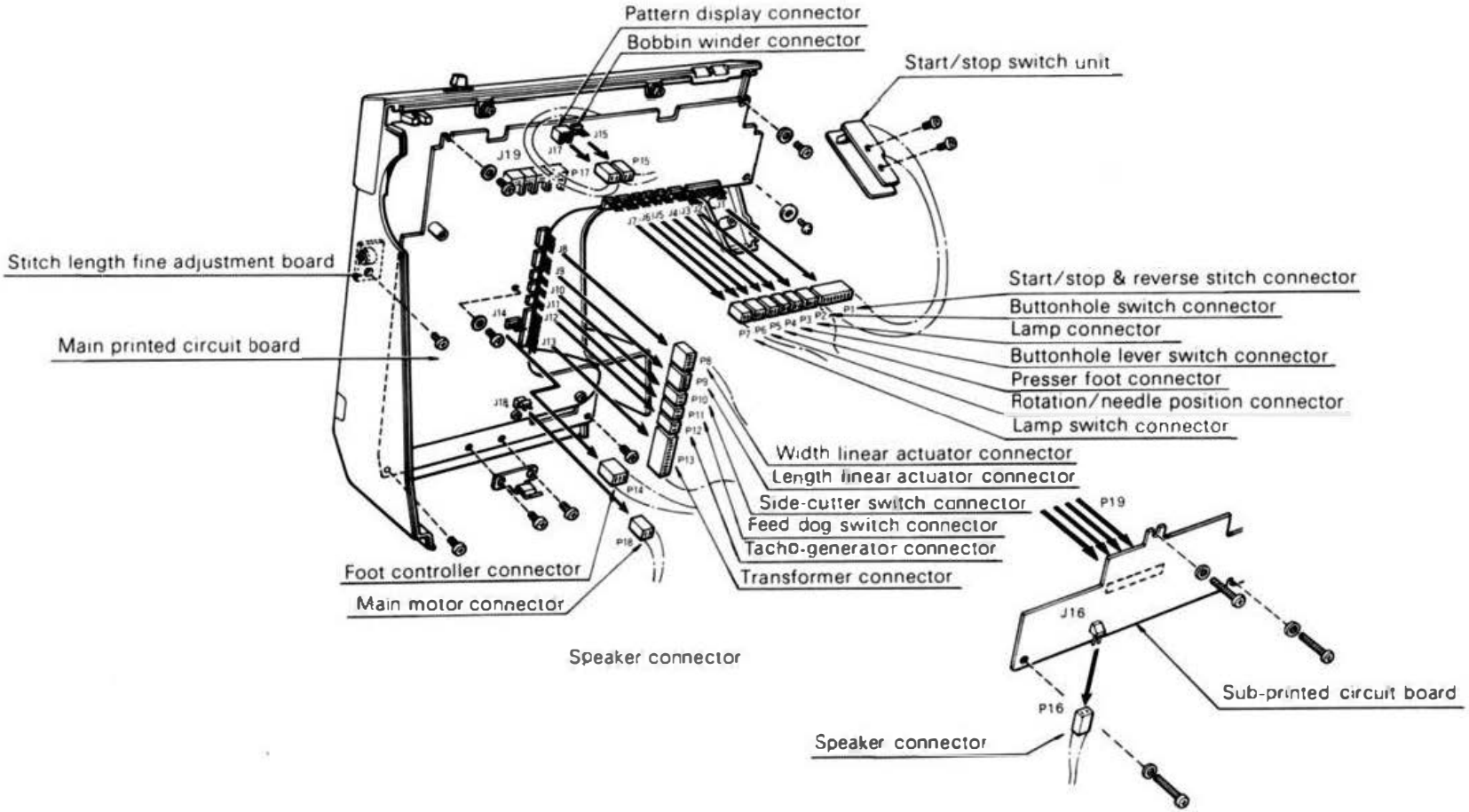


Fig. 1

Fig. 2

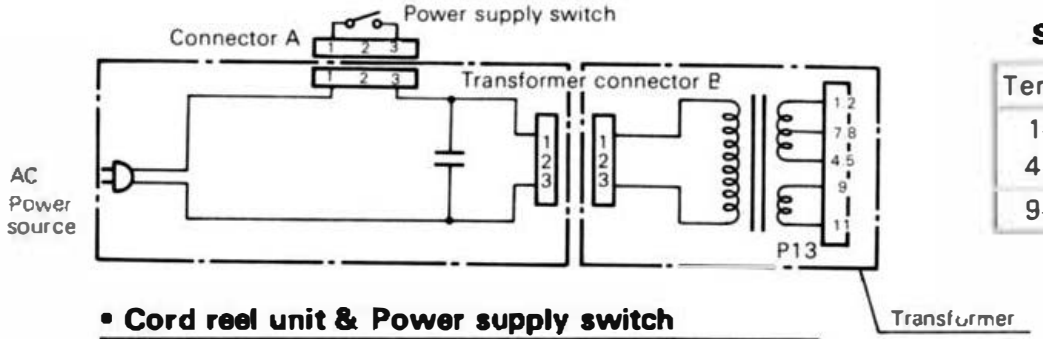
IV. HOW TO ADJUST ELECTRONIC ELEMENTS

CONNECTORS TABLE



☆How to adjust electric elements

1. POWER SUPPLY



Secondary voltage of transformer (P13)

Terminals	AC Voltage	Notes
1—7	about 15.5V	for circuit &
4—7	15.5V	main motor
9—11	about 13.0V	for lamp

• Cord reel unit & Power supply switch

1. Take out cord reel unit from machine.
2. Take out power supply switch connector A and transformer connector B.
3. Turn the power supply switch on.
4. Measure the resistance between terminal 1 & 3 on connector A.

↓

R (Resistance) ≦ 1Ω? — No → Exchange power supply switch

↓ Yes

1. Insert power supply plug to outlet.
2. Measure the voltage between terminal 1 & 3 on connector B.

↓

AC = Power supply voltage — No → Exchange cord reel unit

↓ Yes

• Transformer (Secondary Voltage)

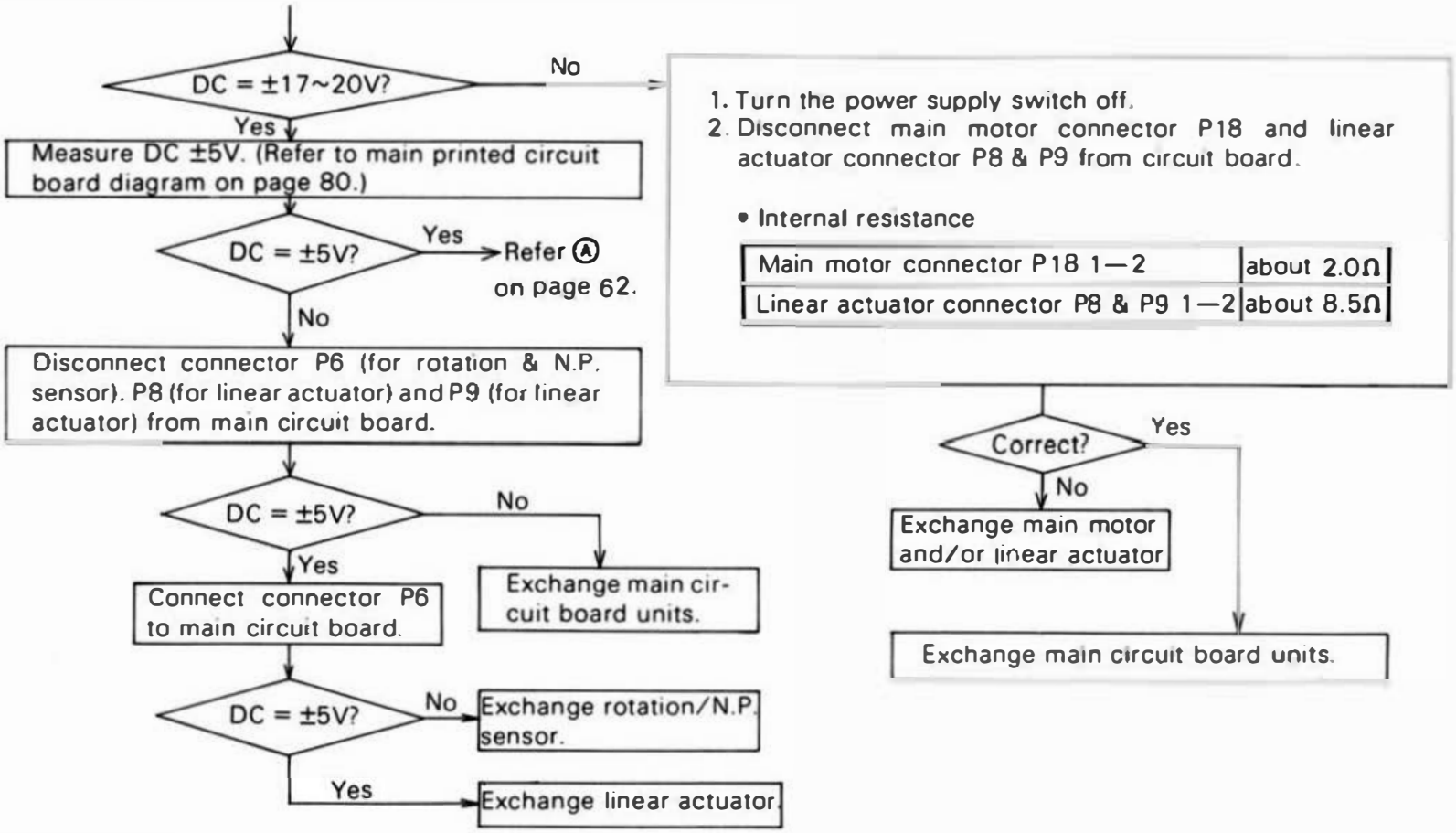
1. Connect transformer connector B and take out circuit board cover.
   Fit cord reel unit to the machine.
2. Take out face plate and front cover.
3. Disconnect transformer connector P13 from common circuit board.
4. Insert power supply plug to outlet and turn the power supply switch on.
5. Measure the AC voltage between terminal 1 & 7. 4 & 7 and 9 & 11 on the connector 13.

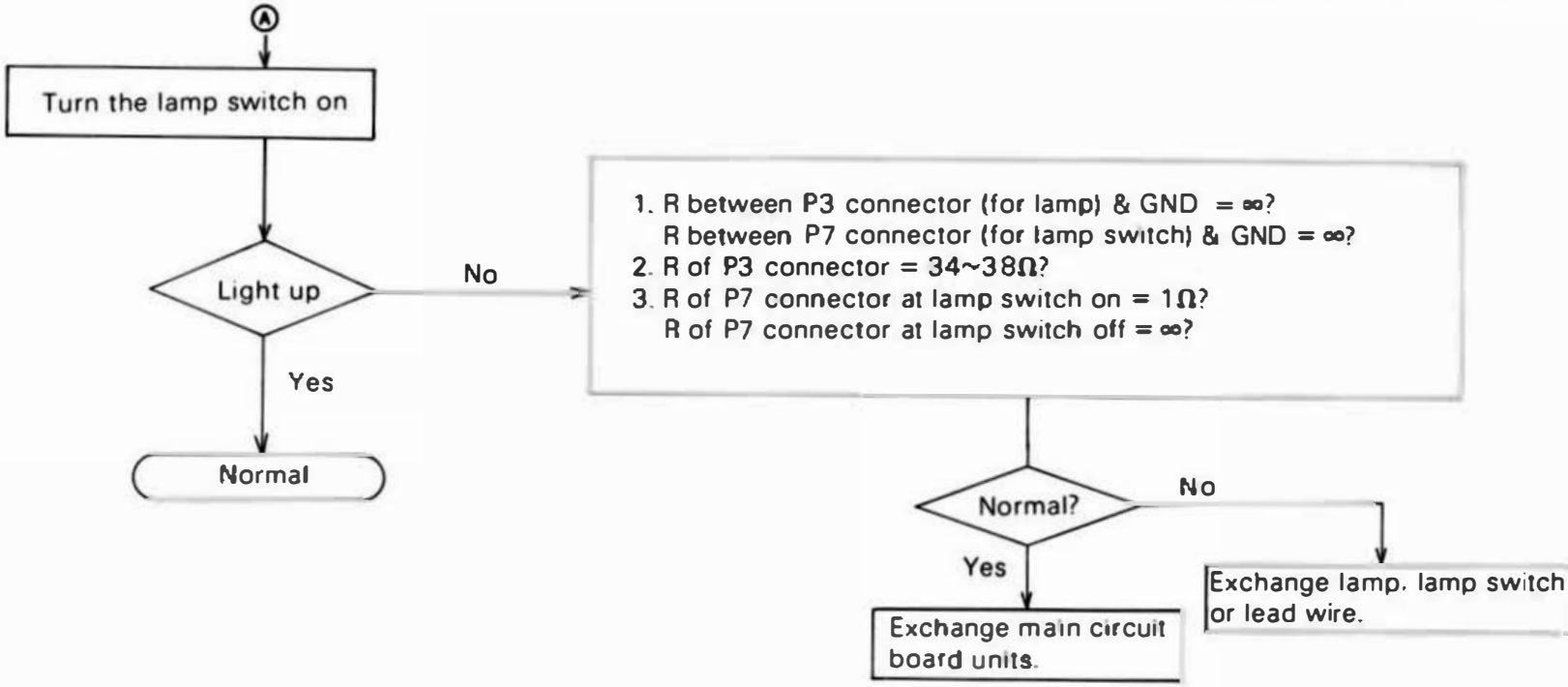
ACV between terminal 1 & 7 and 4 & 7 = 15.5V?
ACV between terminal 9 & 11= 13V?

No → Exchange transformer

Yes
Check other portions

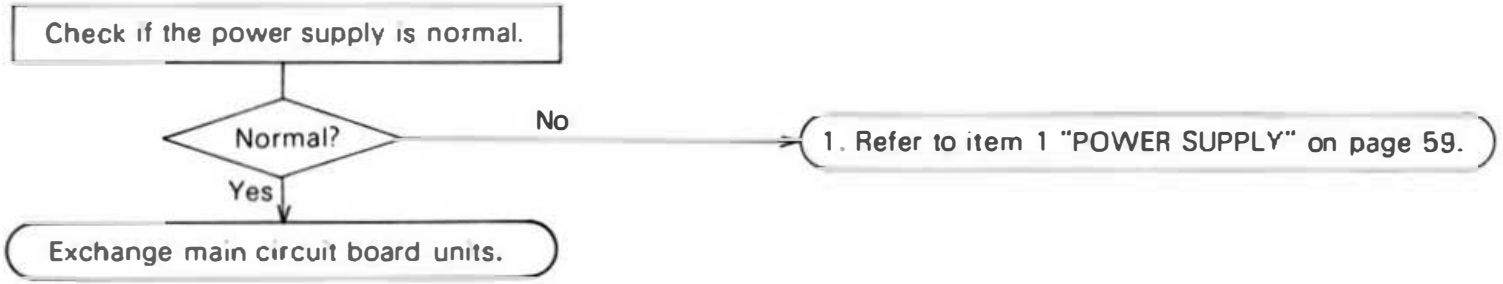
1. Turn the power supply switch off and connect connector P13.
2. Turn the power supply switch on.
3. Measure DC+17.5V and DC—17.5V. (Refer to printed circuit board diagram on page 80.)


DC = ±17~20V?
No
Yes
Measure DC ±5V. (Refer to main printed circuit board diagram on page 80.)
DC = ±5V?
Yes
Refer Ⓐ on page 62.
No
Disconnect connector P6 (for rotation & N.P. sensor). P8 (for linear actuator) and P9 (for linear actuator) from main circuit board.
DC = ±5V?
No
Exchange main circuit board units.
Yes
Connect connector P6 to main circuit board.
DC = ±5V?
No
Exchange rotation/N.P. sensor.
Yes
Exchange linear actuator.
1. Turn the power supply switch off.
2. Disconnect main motor connector P18 and linear actuator connector P8 & P9 from circuit board.
• Internal resistance
Main motor connector P18 1—2
about 2.0Ω
Linear actuator connector P8 & P9 1—2
about 8.5Ω
Correct?
Yes
No
Exchange main motor and/or linear actuator
Exchange main circuit board units.



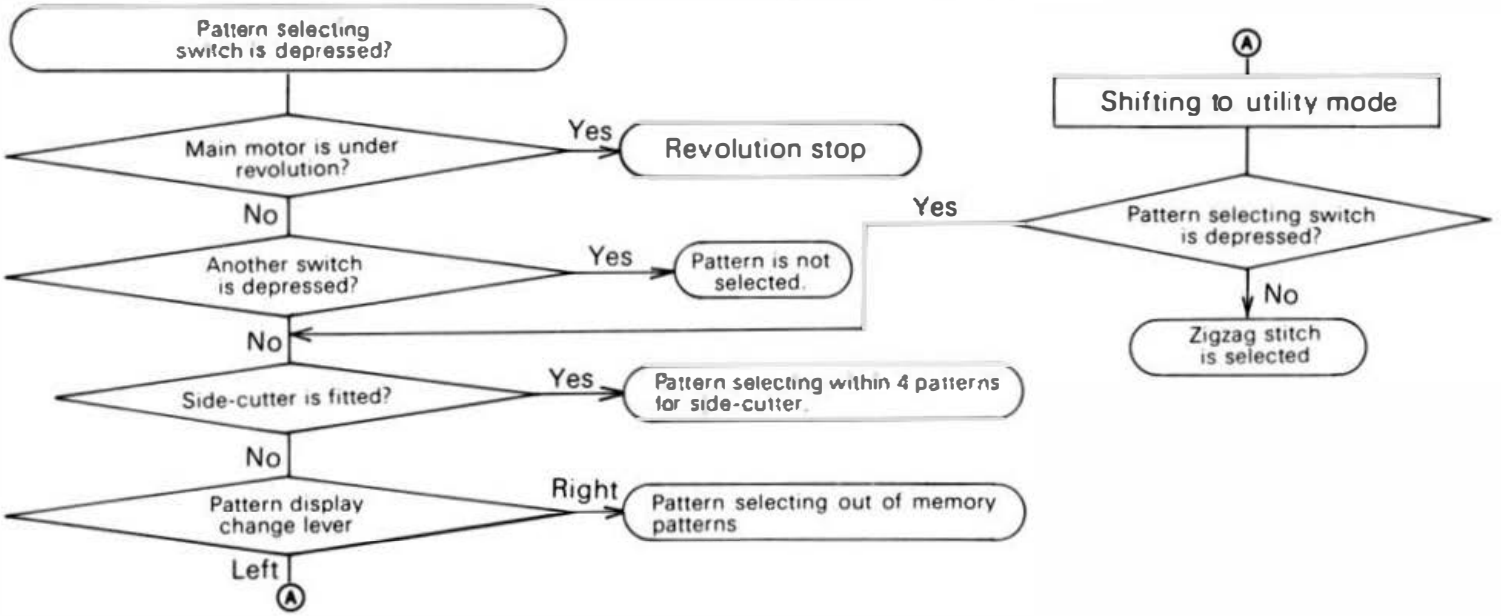
Note: "R" stands for resistance.
"GND" stands for frame ground (It is connected to "0"V).
"∞" stands for infinite resistance.

2. WHEN POWER SUPPLY IS ON, ZIGZAG STITCH IS NOT INDICATED BY LED

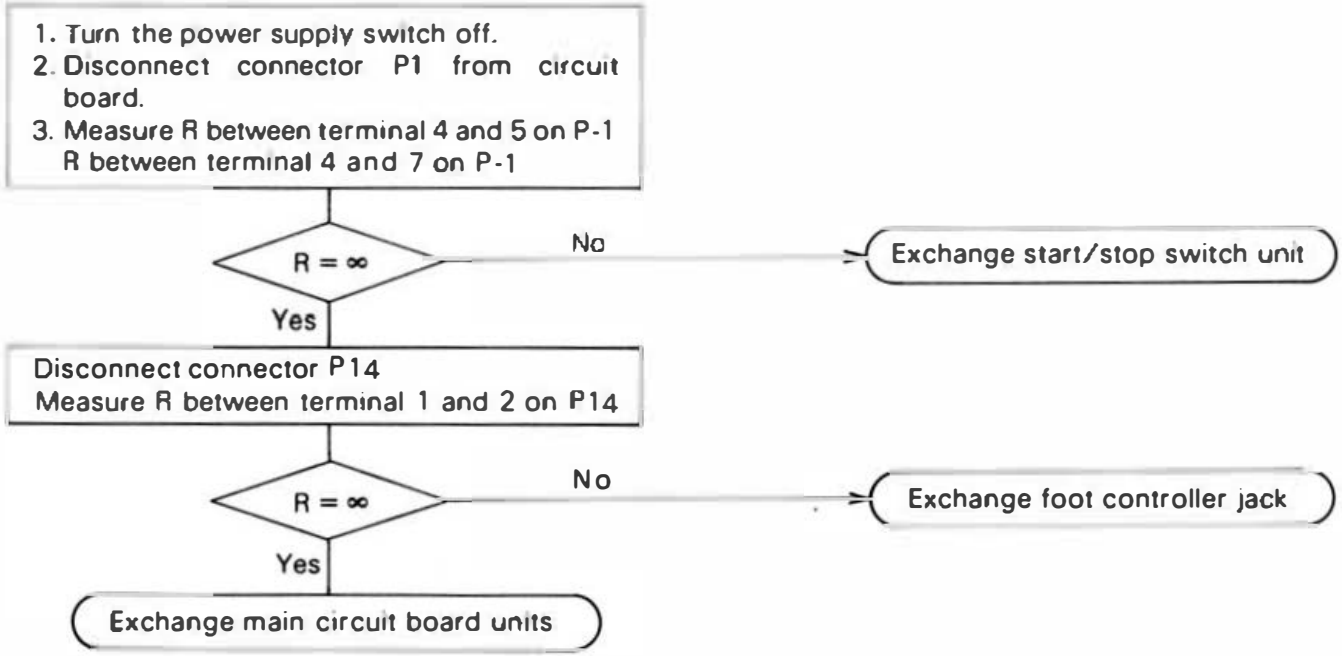


3. PATTERN SELECTION

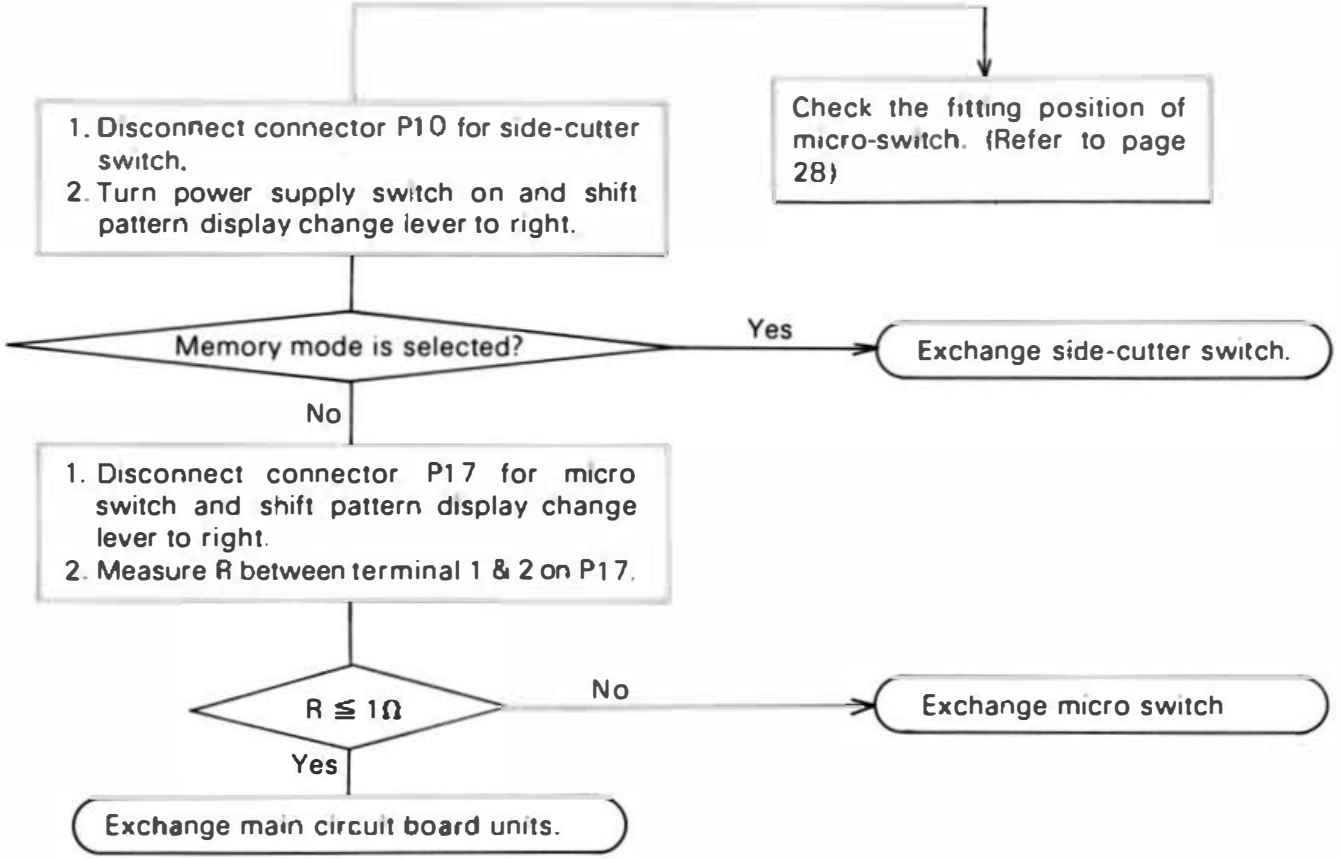
O Flow chart 1 (Movement of machine when pattern selecting switch is depressed)



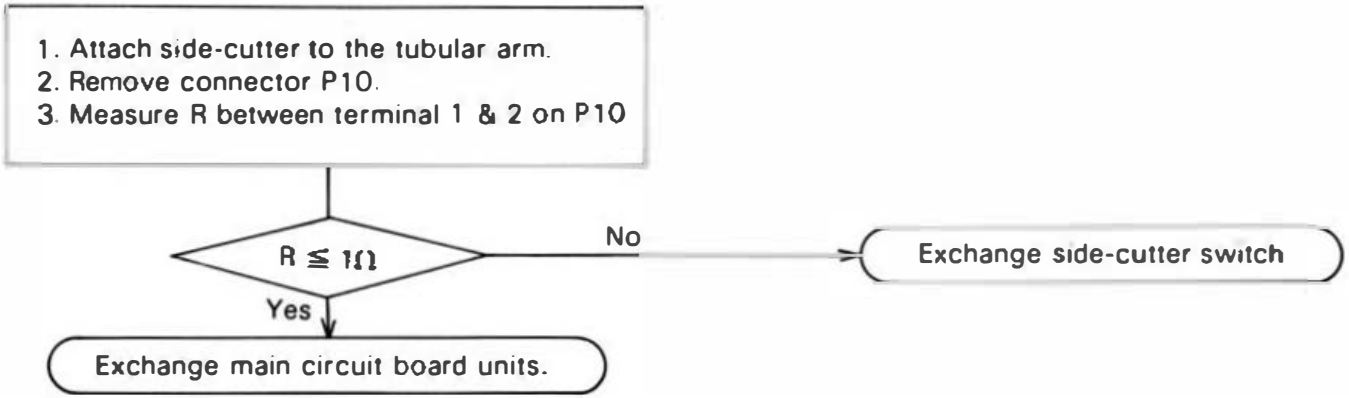
3-1. Pattern display is not moved when pattern selection switch is depressed



3-2. Memory mode is not selected when pattern display change lever is moved to right

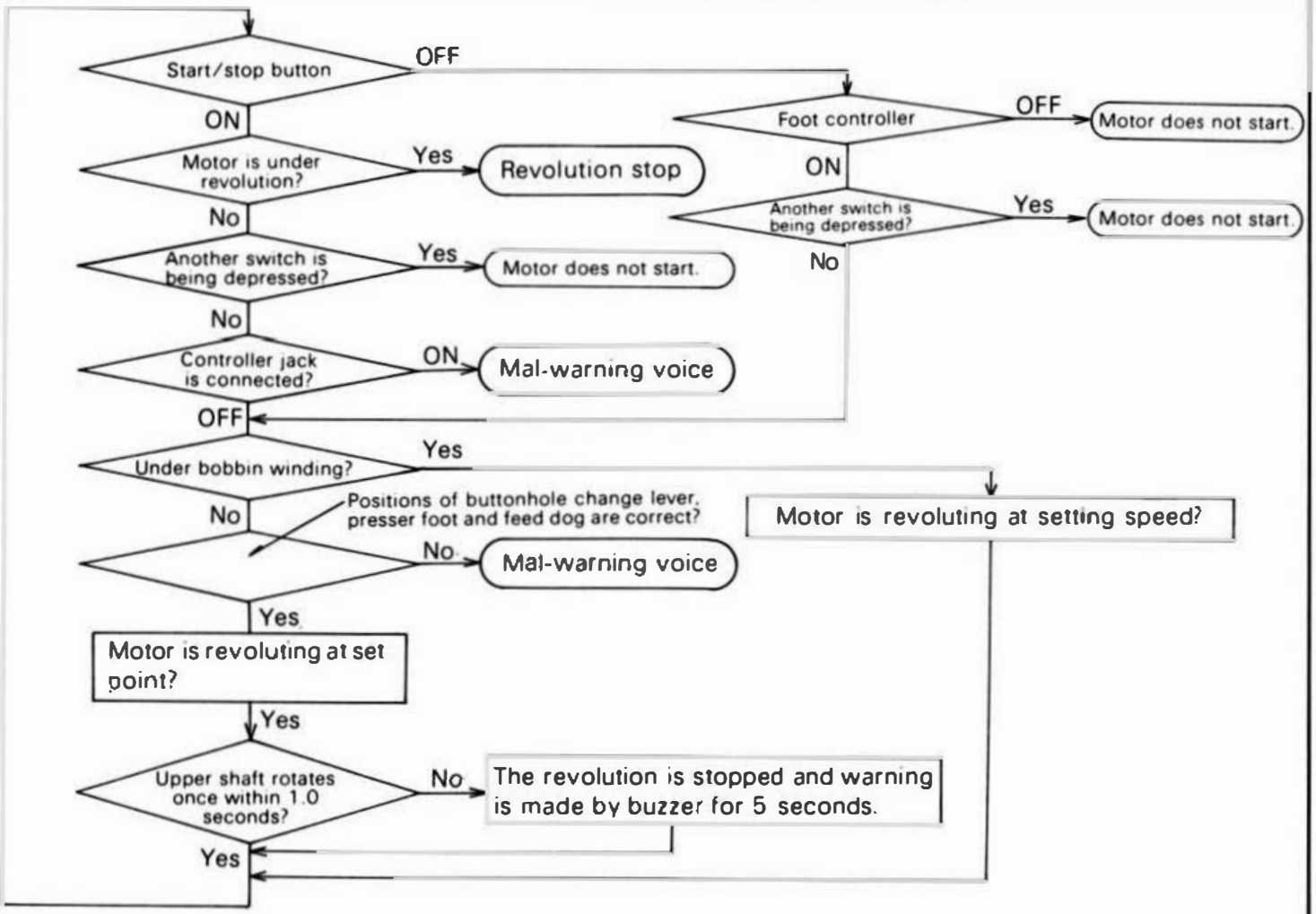


3-3. Other patterns than the ones for side-cutter are selected when side-cutter is attached

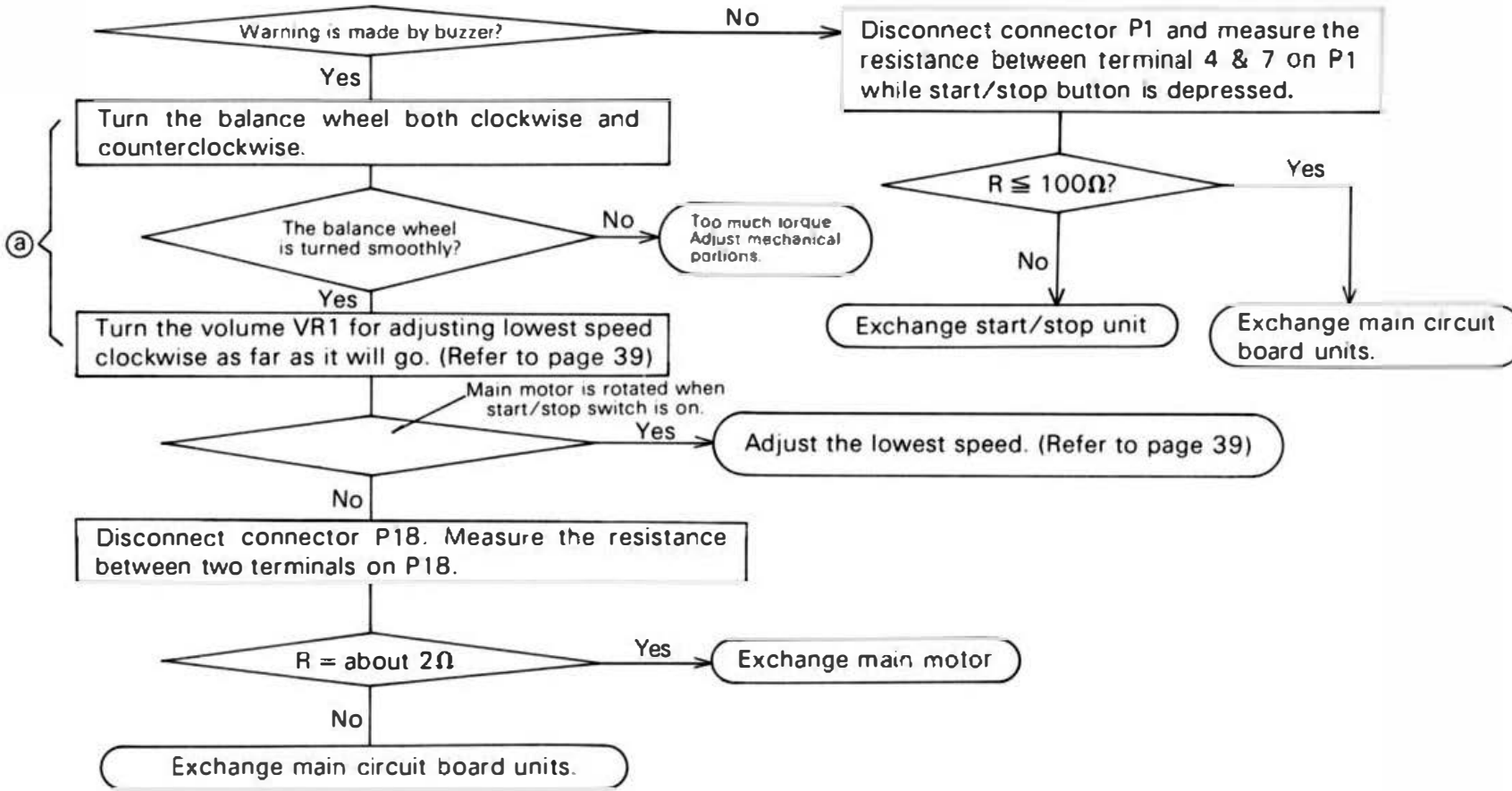


4. MAIN MOTOR

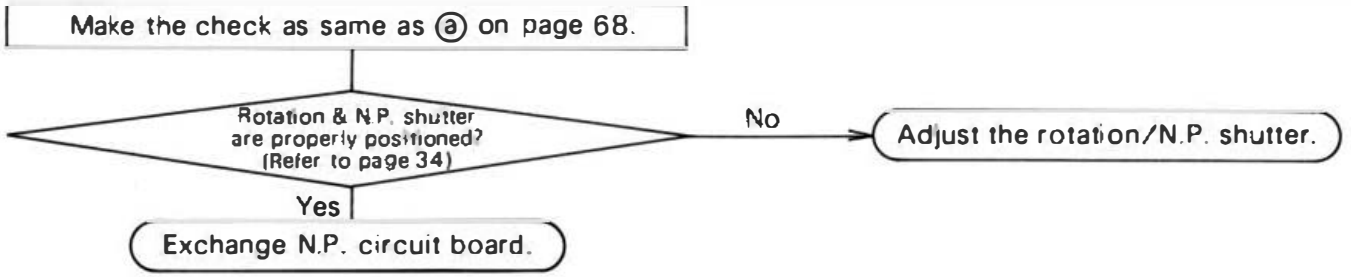
Flow chart 2 (Movement of machine when start/stop button or foot controller is depressed)



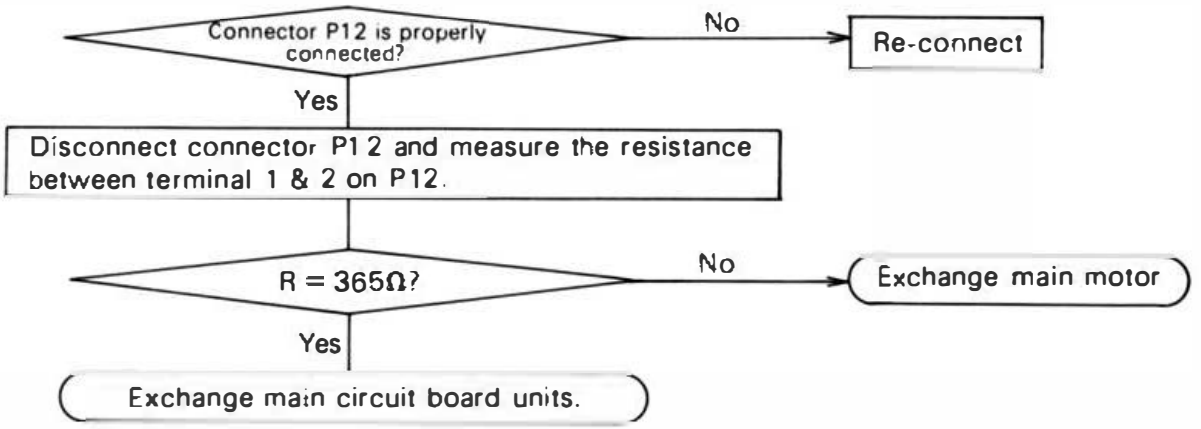
4-1. Main motor does not rotate when start/stop switch is depressed



4-2. Machine stops with warning buzzer in a second after it runs

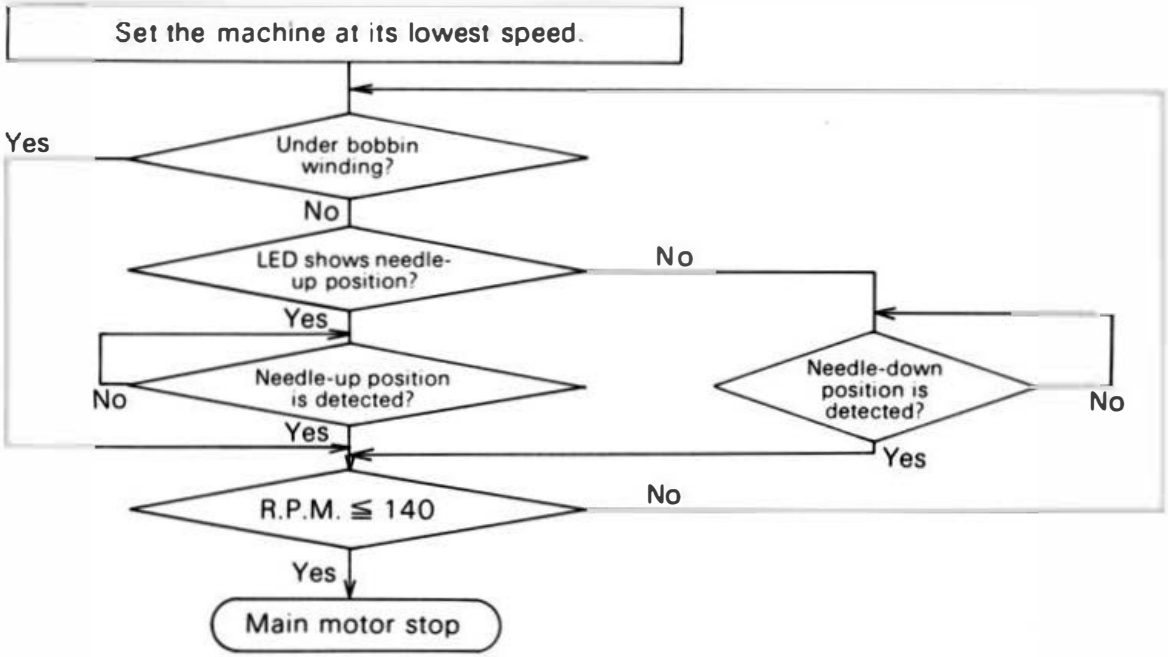


4-3. Out of speed control



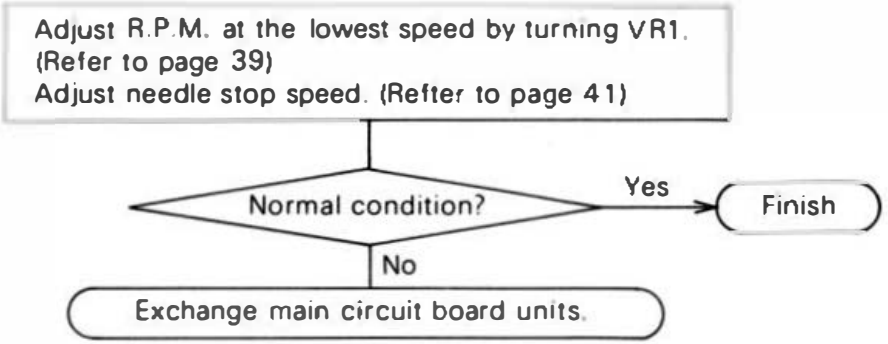
5. MAIN MOTOR STOP

O Flow chart 3 (movement when stopping machine)

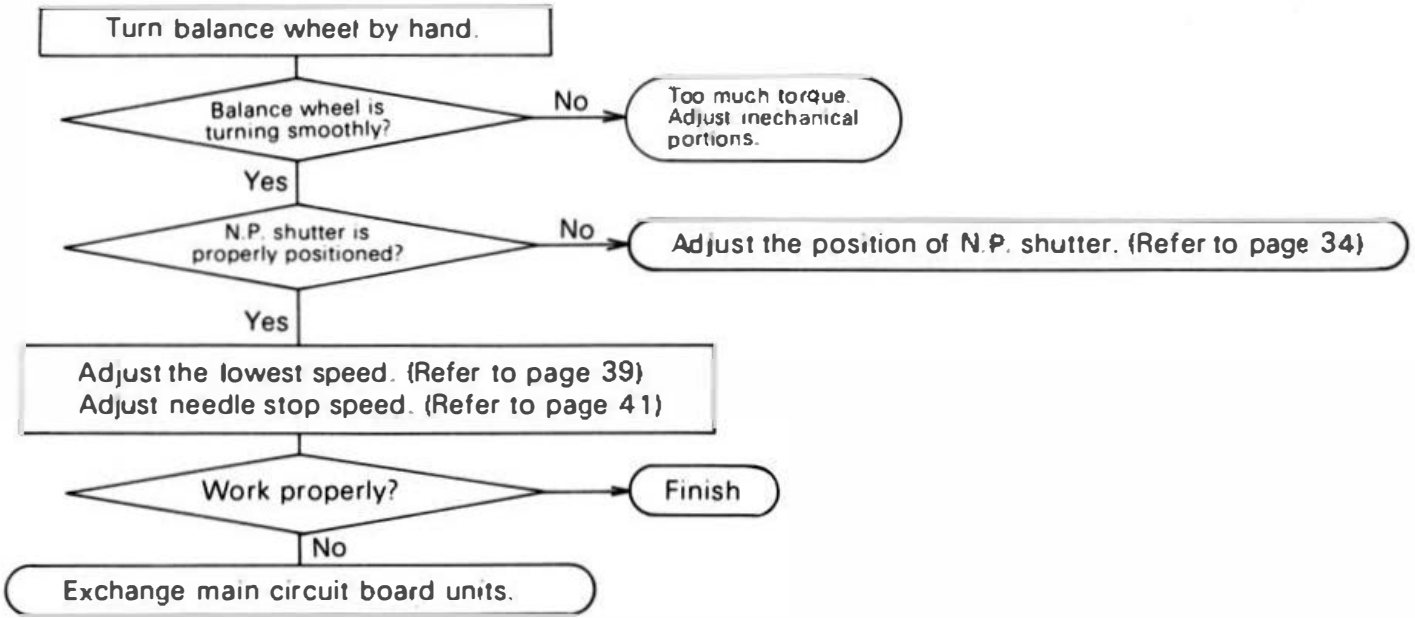


O The relation of position between N.P. sensor & N.P. shutter. (Refer to page 34)
When N.P. sensor is blocked by N.P. shutter ····· Needle-up position
When N.P. sensor is opened from N.P. shutter ··· Needle-down position

5-1. Main motor does not stop

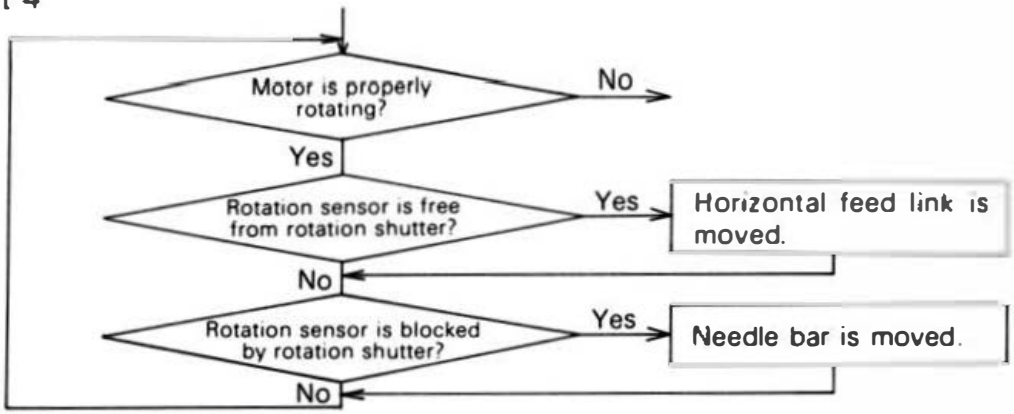


5-2. Needle stop position (UP/DOWN) is incorrect

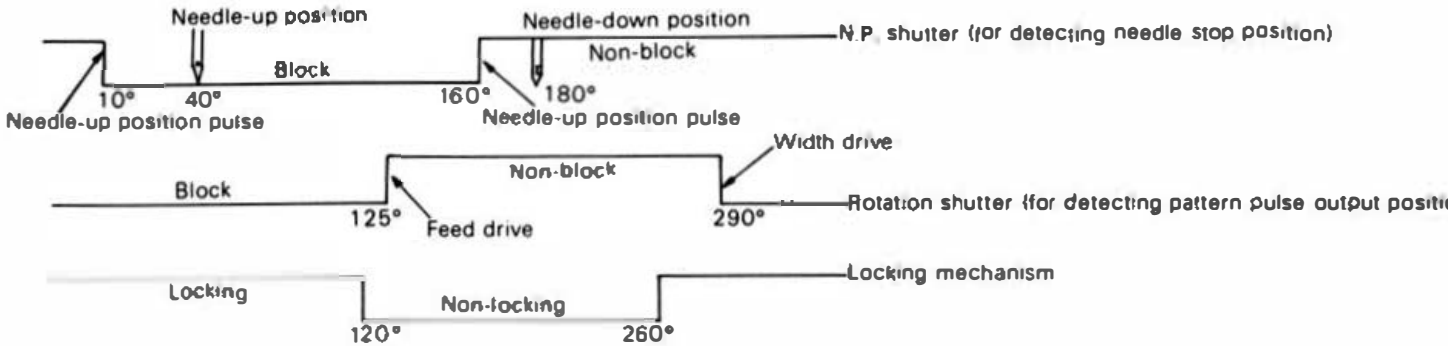


6. PATTERN GENERATION

O Flow chart 4



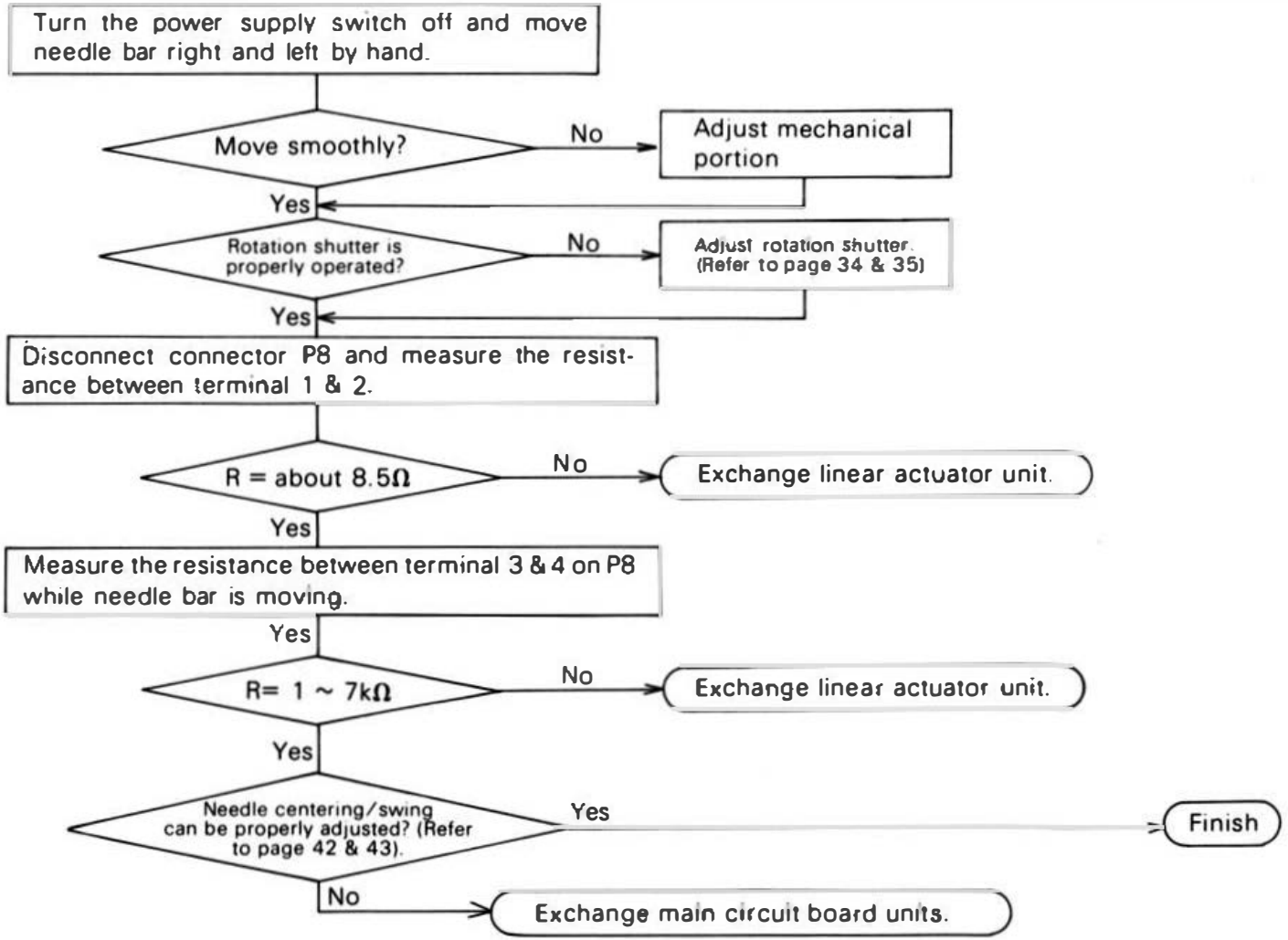
O Timing chart (Needle highest position = 0°)



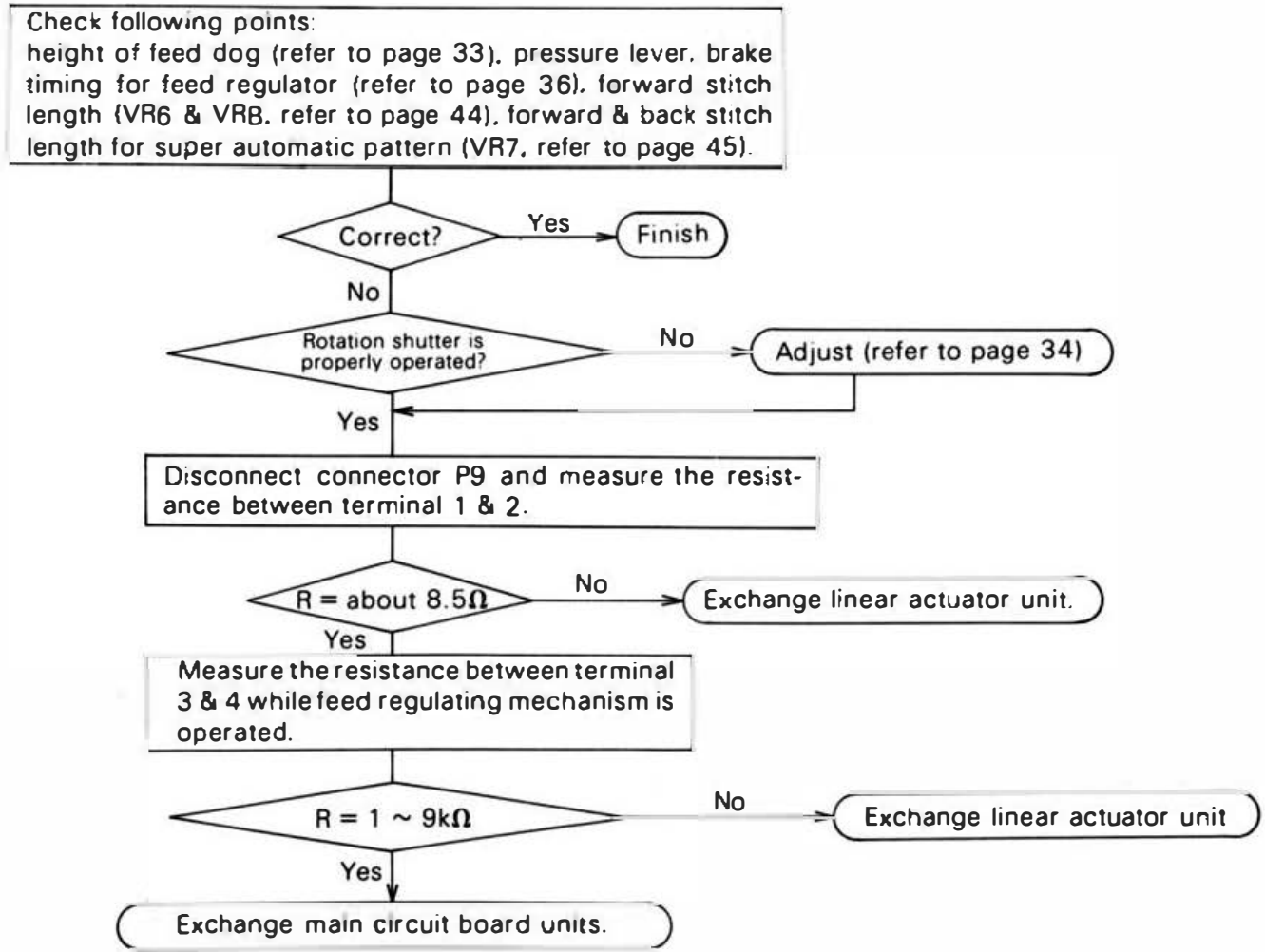
"LOCK MECHANISM" is operated to hold horizontal feed link mechanically during fabric is fed.

1. Horizontal feed link is hold at locked position.
2. Horizontal feed link is free at non-locked position and position of horizontal feed link can be moved by linear actuator. which means feed volume can be changed.

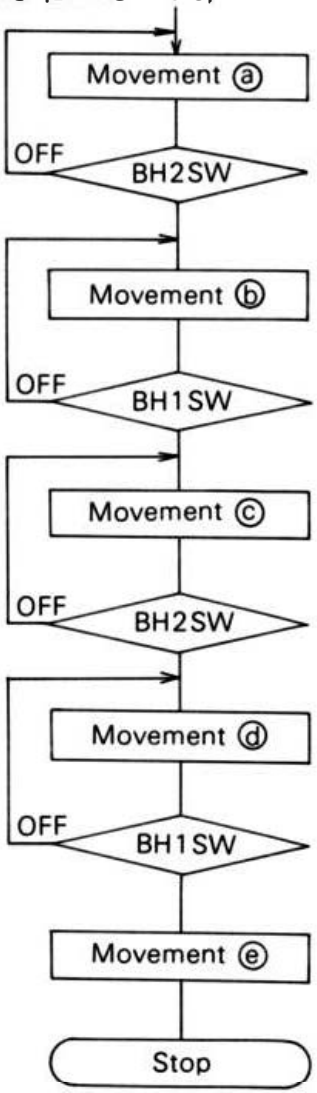
6-1. Zigzag width is not correct

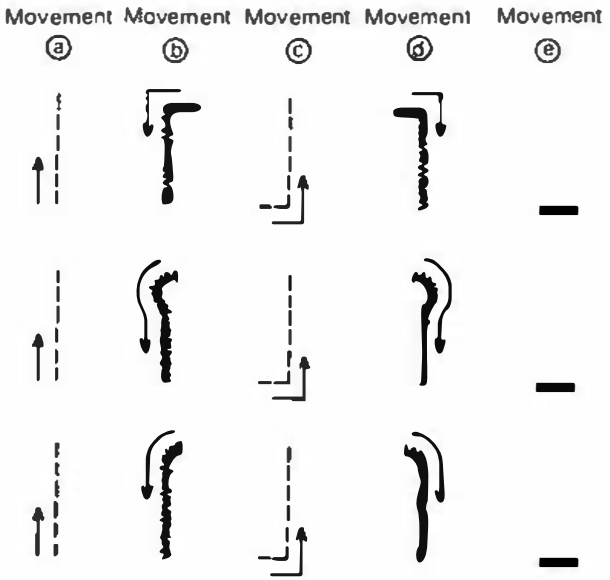


6-2. Stitch length is not correct



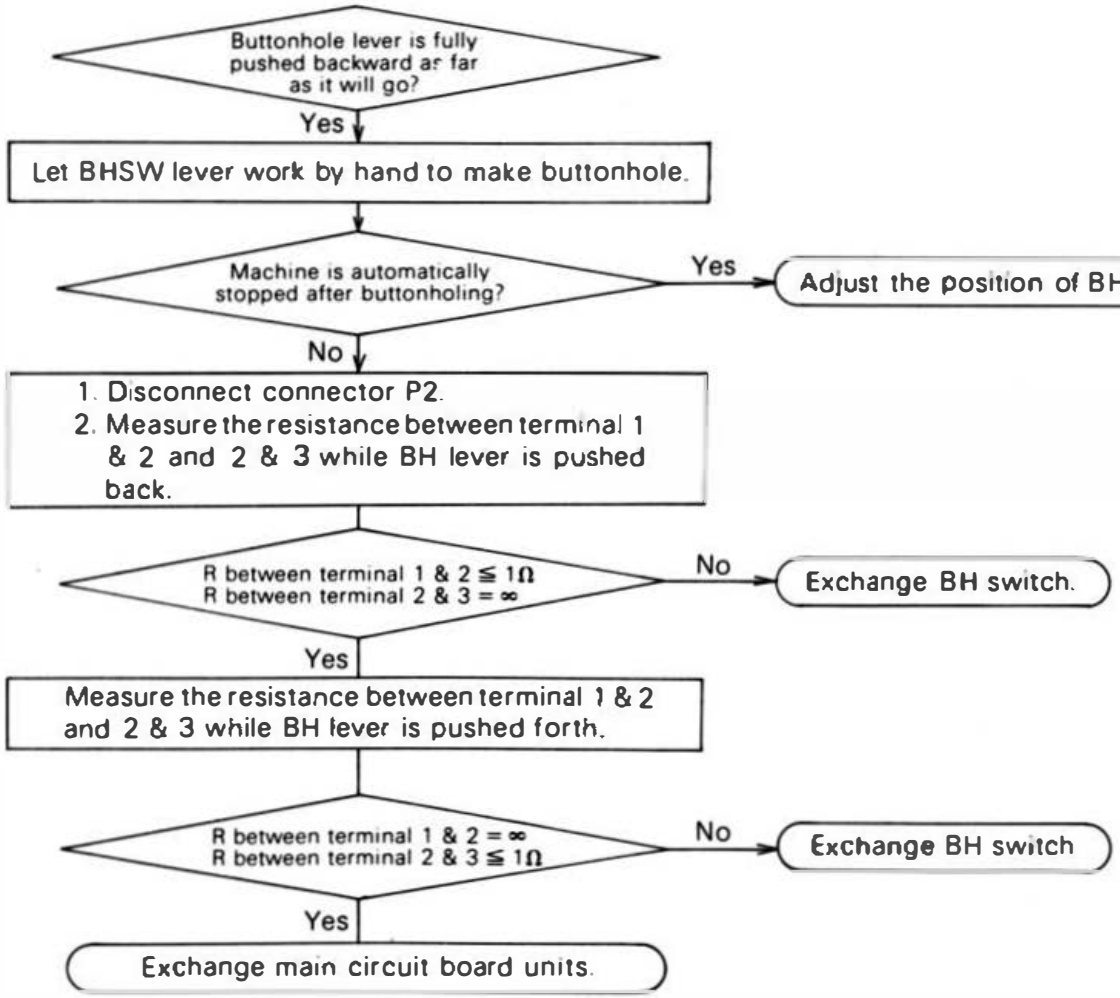
○ Flow chart 5 (Buttonhole)



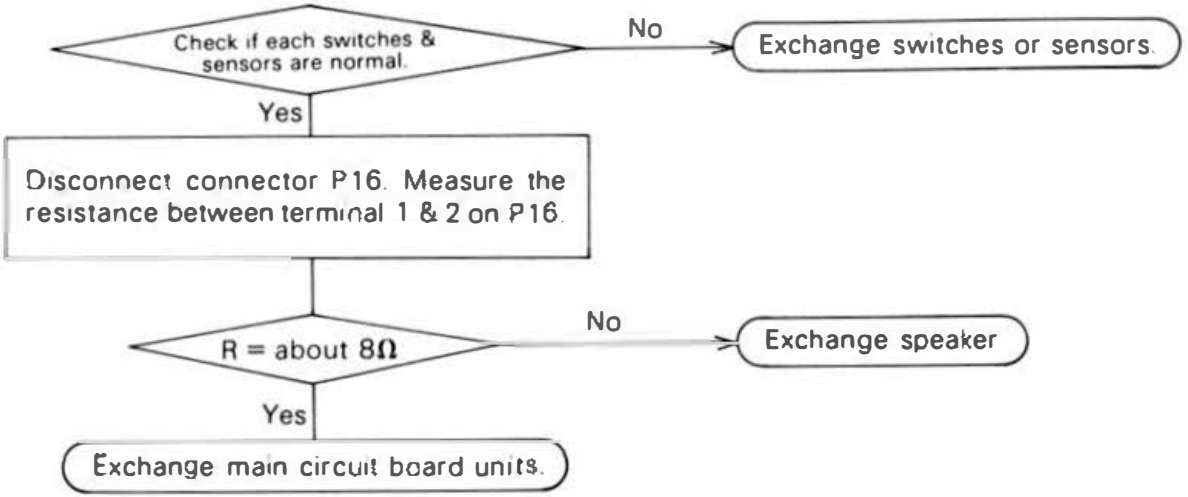


6-3. Buttonhole is not obtained

(Different length of right and left leg)

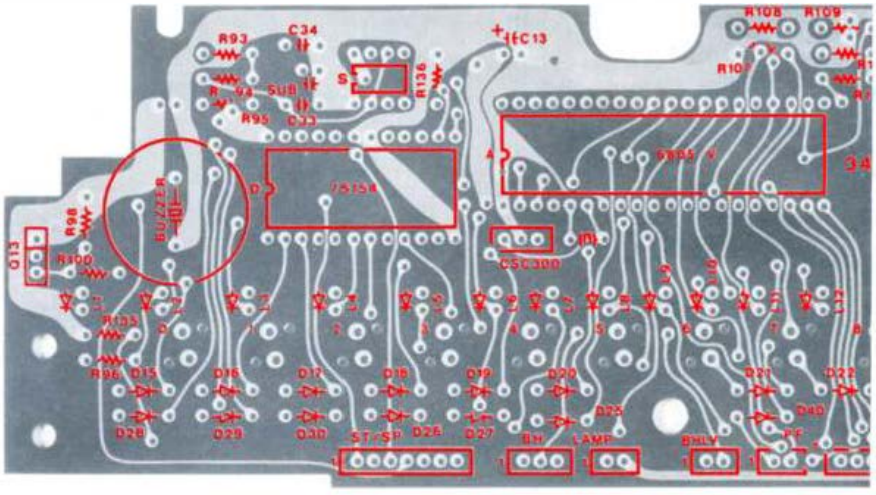


7. MAL-WARNING VOICE IS NOT MADE



<Printed Circuit Board>

Common Printed Circuit Board

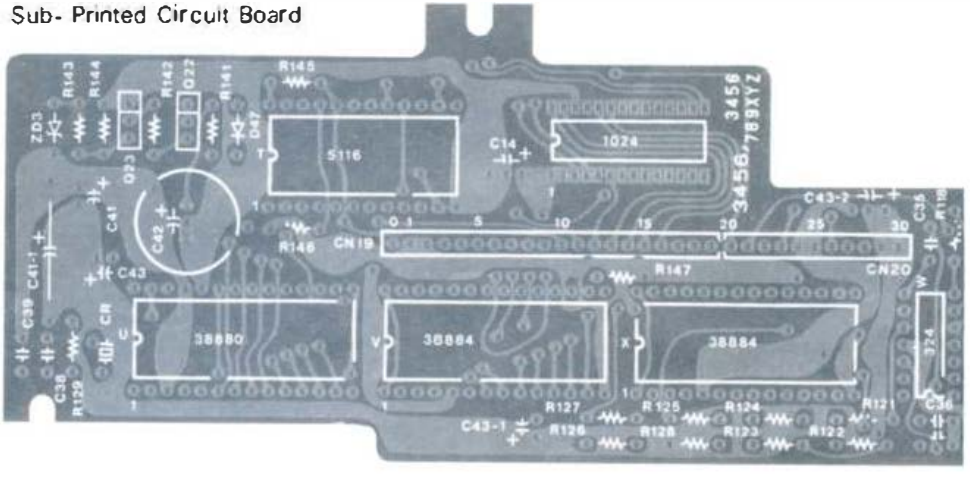


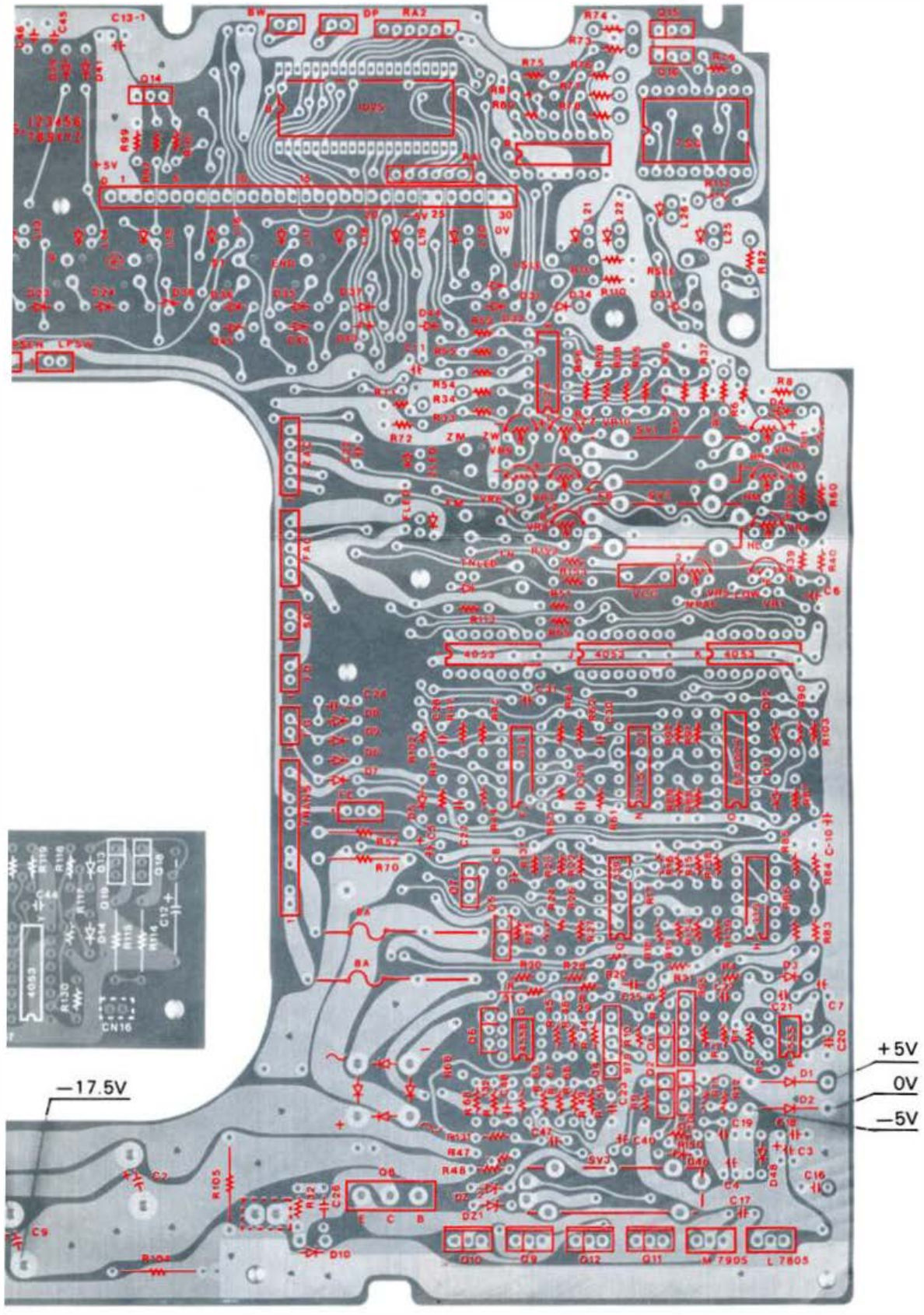
☆CAUTION

Take care following points when handling printed circuit board:

1. Do not touch the connecting portion of theconnector. especially the pin for the plug with bare hands. for example. could be generated. causing bad connection.
2. If the surface of the connecting portion is dirty, polish it with alcohol

Sub- Printed Circuit Board




+5V
0V
−5V
−17.5V