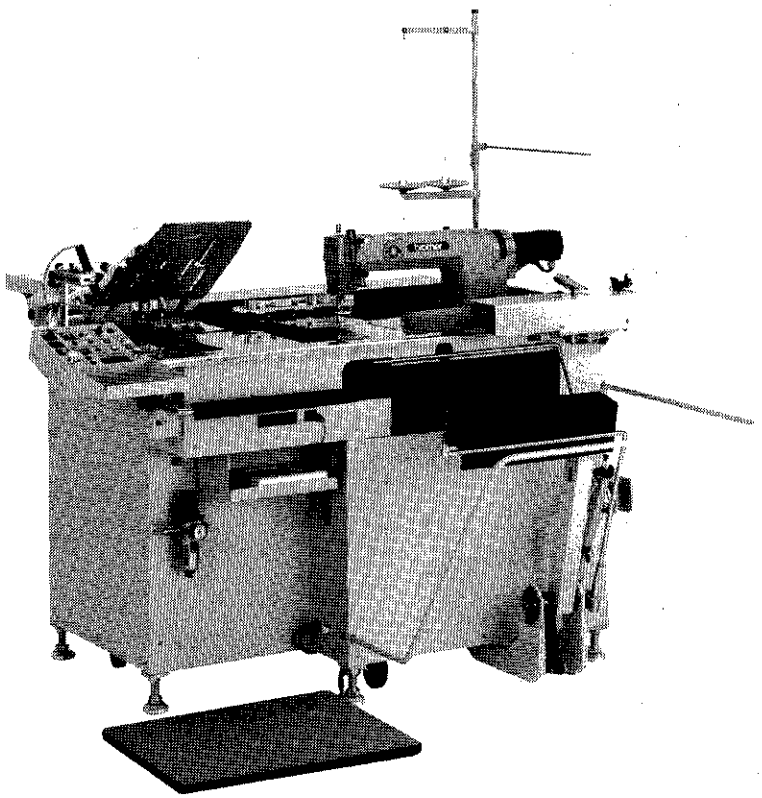
brother

SERVICE MANUAL FOR BAS-750

AUTOMATIC POCKET SETTER



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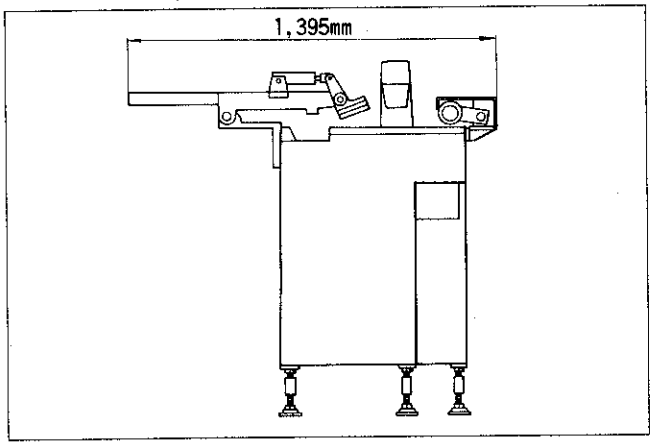
1. SETTING SEWING MACHINE

Disassembling and Assembling for Transfer through Narrow Doors

1 Stitch length and RPM

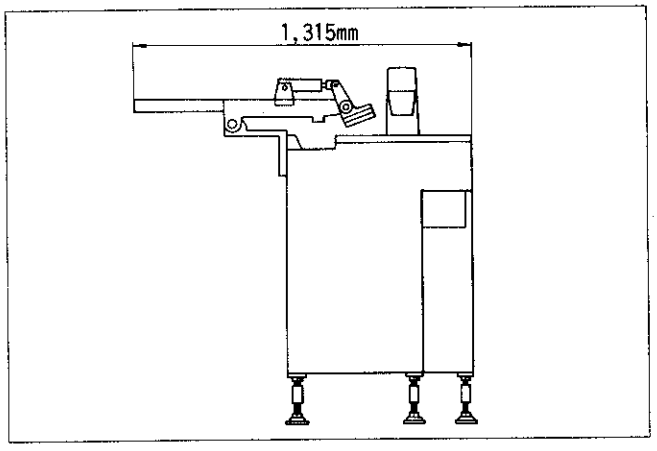
Since this machine is 1,500 mm wide, 1,520mm long and 1,300 mm high, compare the machine dimensions and the entrance dimensions before attempting to go through a narrow entrance. Disassemble the machine to an appropriate level for transfer as follows (the dimensions show the condition in which the stacker cover is removed with the stacker table and cylinder rod fully pushed inward after loosening the setscrews on the stacker lever):

Level A (Disassembled machine width : 1,395 mm)



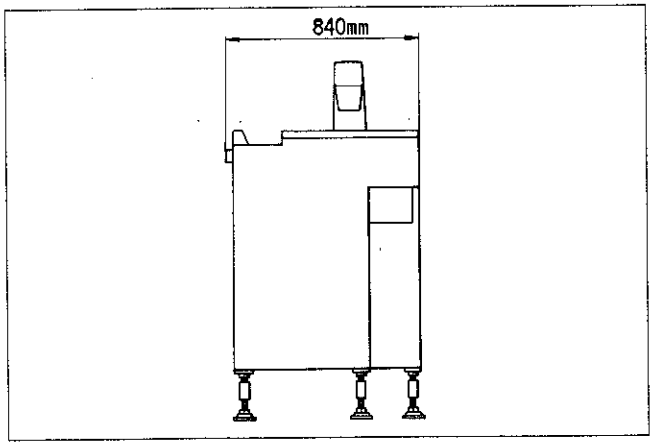
Carry out Items (1) to (5) in order as described in 1 Removing and Installing Stacker. The dimension illustrated on the right will be 1,395 mm.

Level B (Disassembled machine width : 1,315 mm)



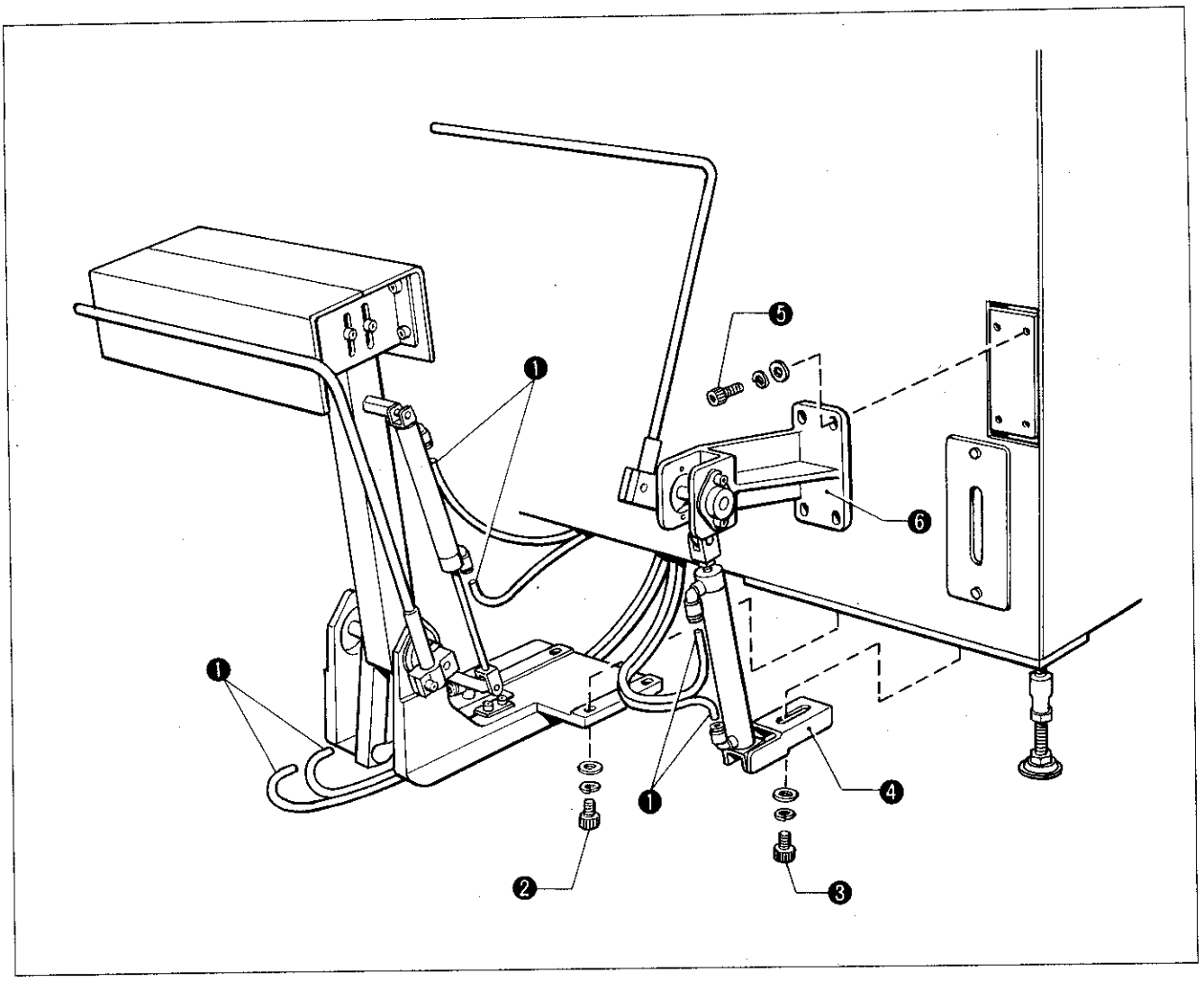
Carry out Items (1) to (5) in order as described in 2 Removing and Installing Stacker Rollers. The dimension illustrate on the right will be 1,315mm.

Level C (Disassembled machine width : 840 mm)



Carry out Items (1) to (4) in order as described in 3 Removing and Installing Folding Base. The dimension illustrated on the right will be 840mm.

2 Removing and Installing Stacker



(1) Disconnect six air tubes ❶ at joints.

※ Mark air tubes ❶ to prevent misconnection.

(2) Remove four bolts ❷ and then remove stacker table assembly.

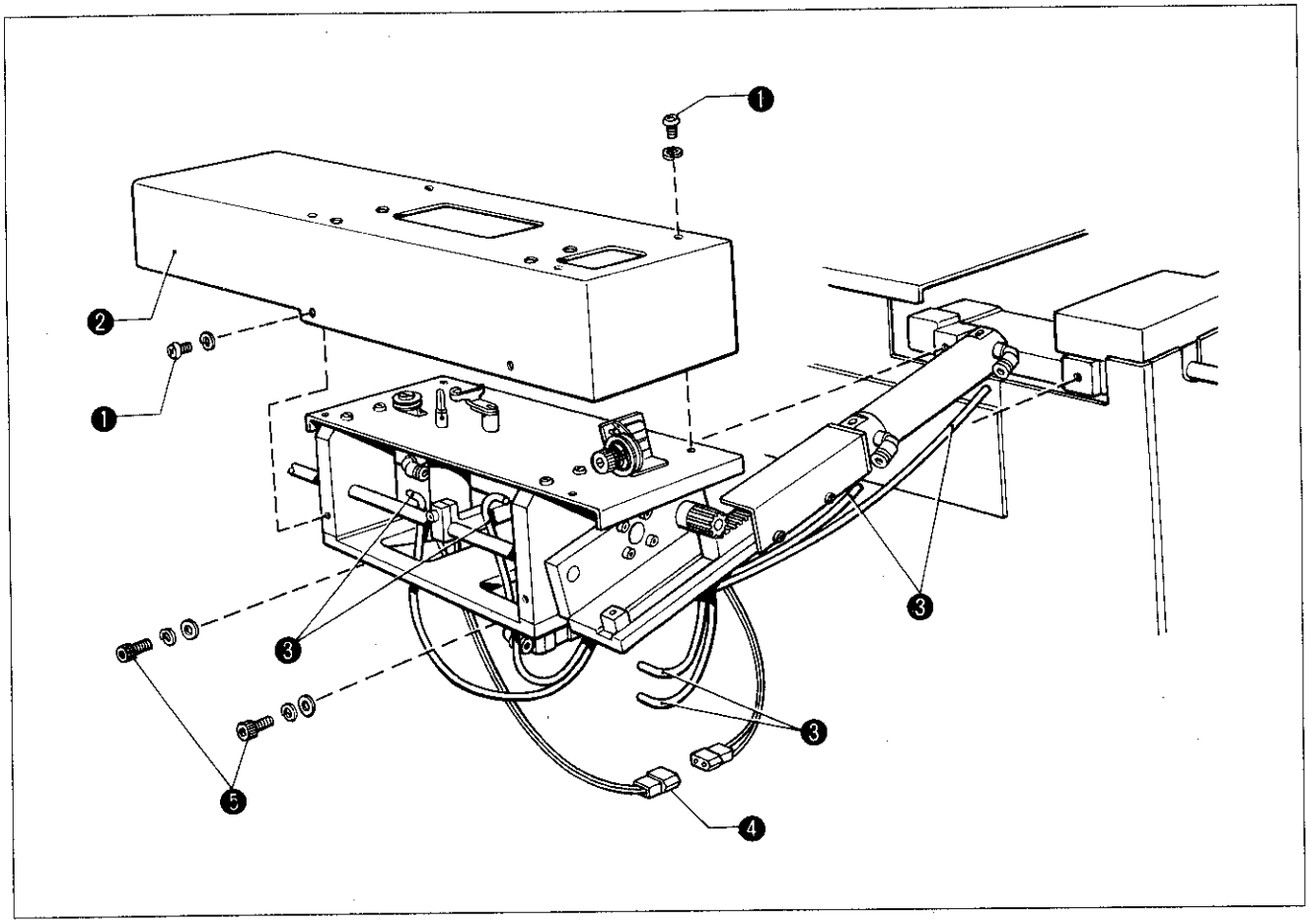
(3) Remove two bolts ❸ and then remove stacker bearing metal fitting ❹.

(4) Remove four bolts ❺ and then remove base ❻.

(5) Reverse above procedures to re-assemble.

※ See sections "Adjusting Stacker Wiper" and "Adjusting Stacker Table" for individual adjustments.

3 Removing and Installing Stacker Roller



(1) Remove six screws ❶ and then remove roller cover B ❷.

(2) Disconnect six air tubes ❸ at joints.

※ Mark air tubes ❸ to prevent misconnection.

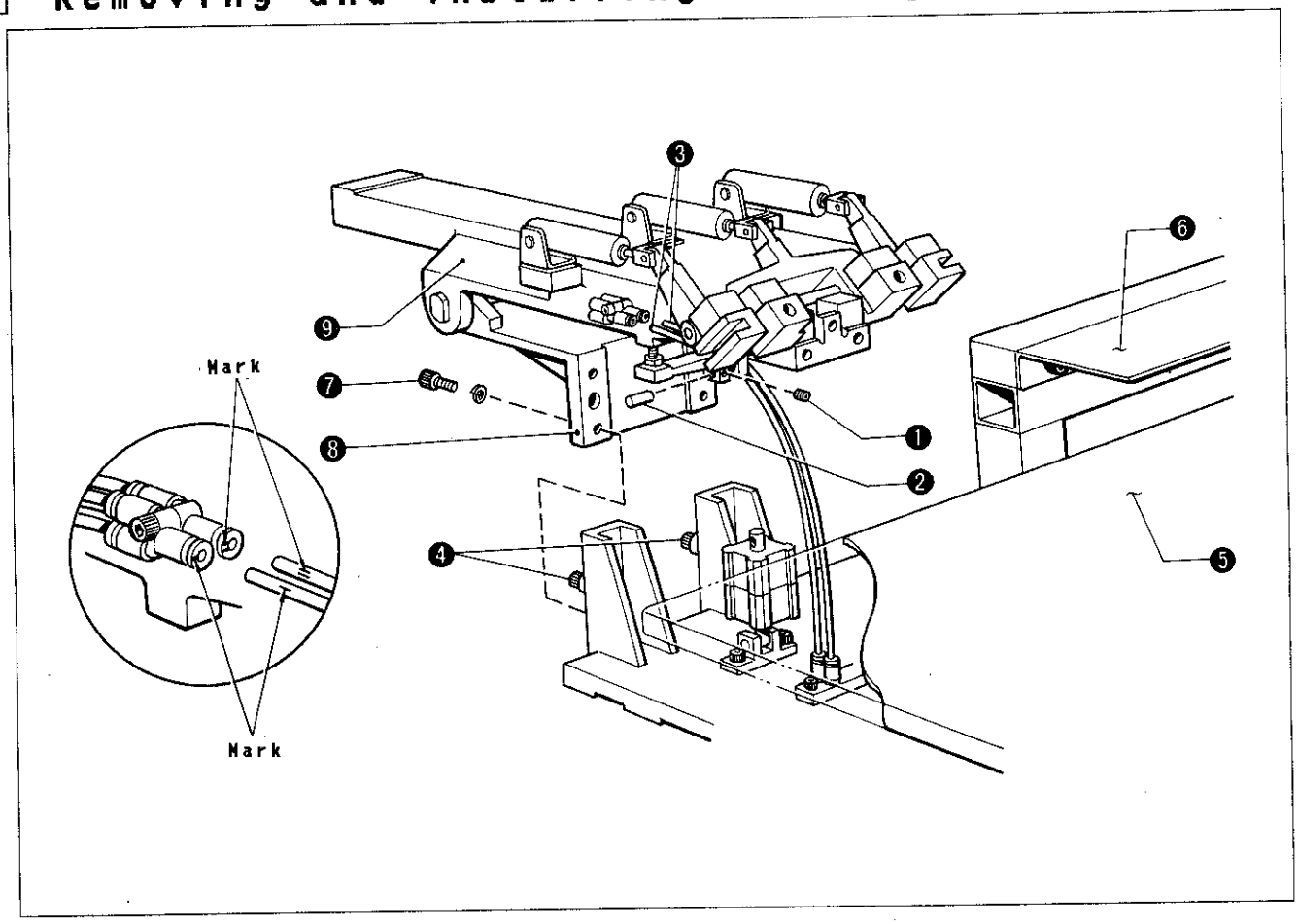
(3) Pull out connector ❹ of bobbin winder.

(4) Remove two bolts ❺ and then remove stacker roller ❻.

(5) Reverse above procedures to re-assemble.

※ See section "Adjusting Stacker Roller" for adjustment after re-assembling.

4 Removing and Installing Folding Base



Carry this out only at the last and final operation.

Carry out the operation carefully and correctly with two personnel or more.

★ Remove folding margin mechanism parts, release air pressure and turn power switch to OFF.

(1) Loosen setscrew ❶ and remove folding base ❷.

(2) Disconnect two air tubes ❸ at joints.

※ Mark air tubes❸ to prevent misconnection.

※ Never loosen two bolts❹ during this operation, or reproducibility will be lost.

※ Protect needle plate ❺ and table cover ❻ with cloth or the like.

(3) Remove four bolts ❼, remove hinge base ❽ and folding base ❾ as an assembled unit, place this on needle plate ❺ and support with hands.

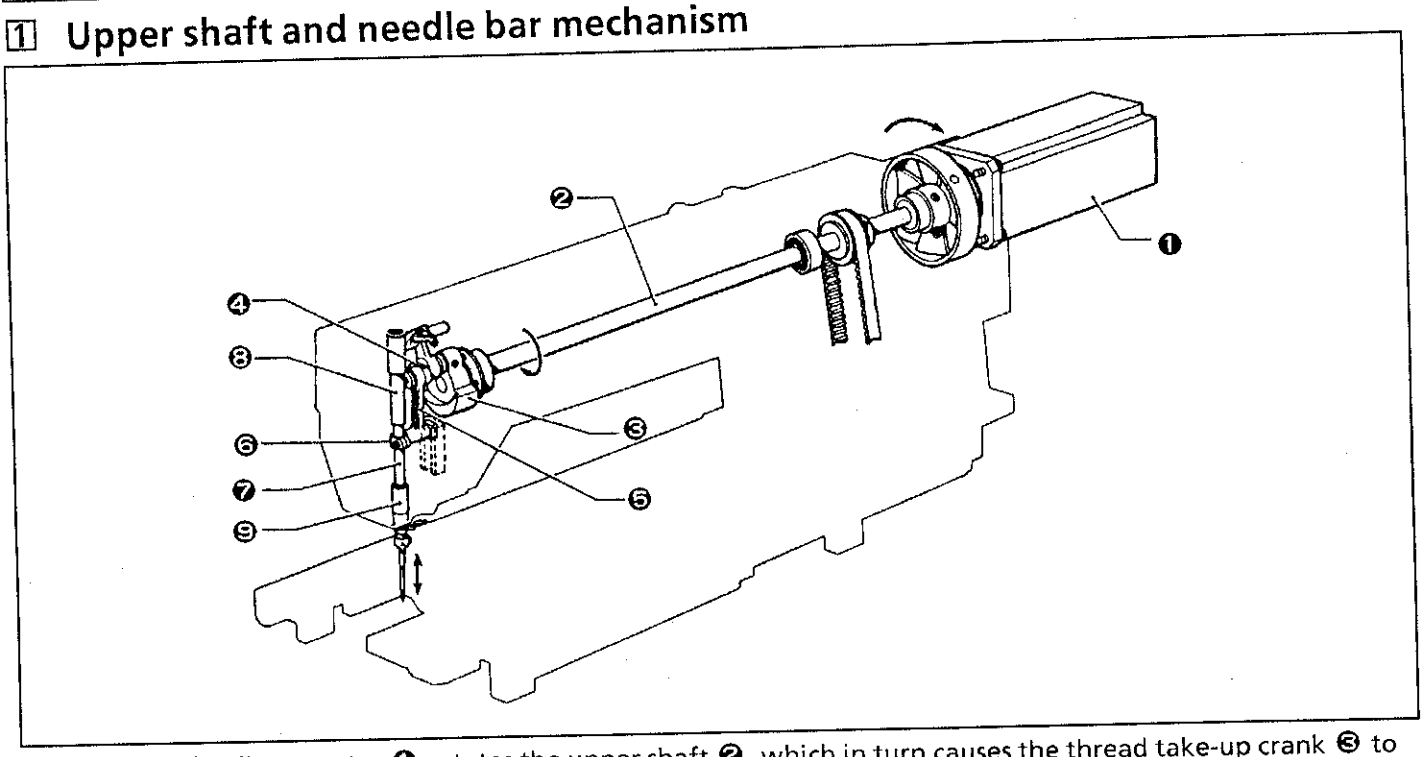
※ Be careful not to pull cylinder tubes and sensor cables during this operation.

(4) Reverse above procedures to re-assemble.

2. MACHINE HEAD

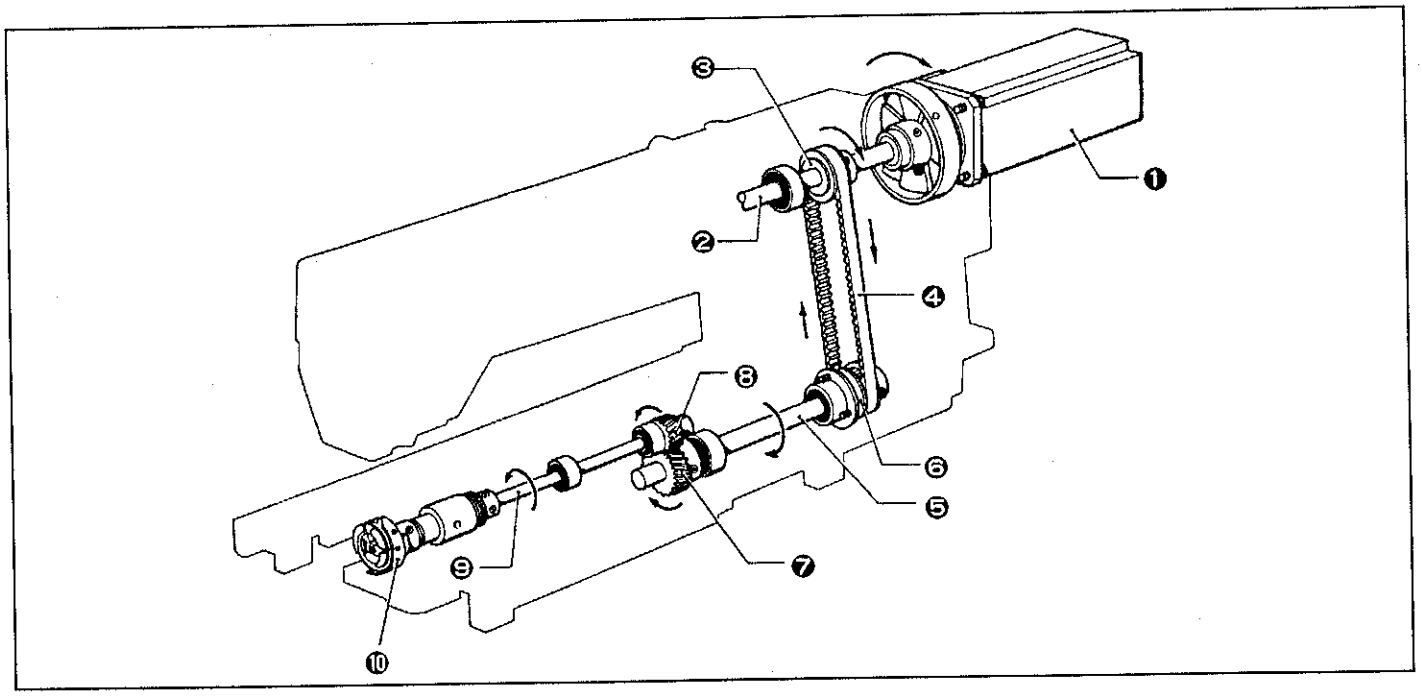
MECHANICAL DESCRIPTIONS

1 Upper shaft and needle bar mechanism



1) Turning the direct motor ❶ rotates the upper shaft ❷, which in turn causes the thread take-up crank ❸ to rotate.
2) The thread take-up lever assembly ❺ is driven via the needle bar crank ❹ attached to the thread take-up crank ❸.
3) The needle bar ❼, attached to the needle bar clamp ❻, moves up and down.
4) The needle bar is guided by the needle bar bushings (upper) ❽ and (lower) ❾.

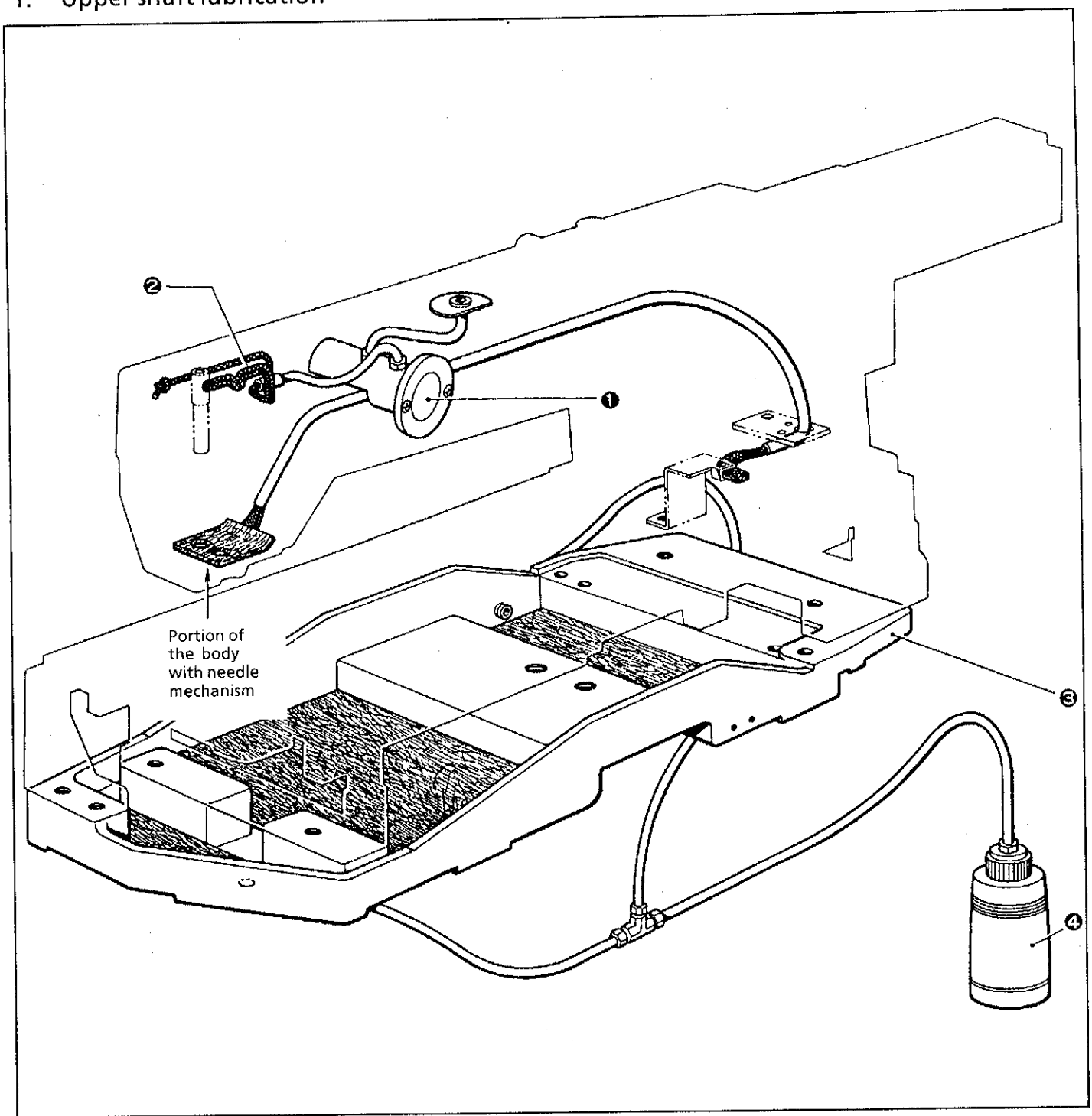
2 Lower shaft and rotary hook mechanism



1) Rotation of the motor ❶ is transferred from the timing pulley (upper) ❸ mounted on the upper shaft ❷ to the timing pulley (lower) ❻ mounted on the lower shaft ❺ via the timing belt ❹.
2) The motion is relayed from the spiral gear ❼ mounted the lower shaft ❺ to the rotary hook shaft ❾ via the pinion ❽.
3) The rotary hook assembly ❿ is driven in full revolutions by the rotary hook shaft ❾.

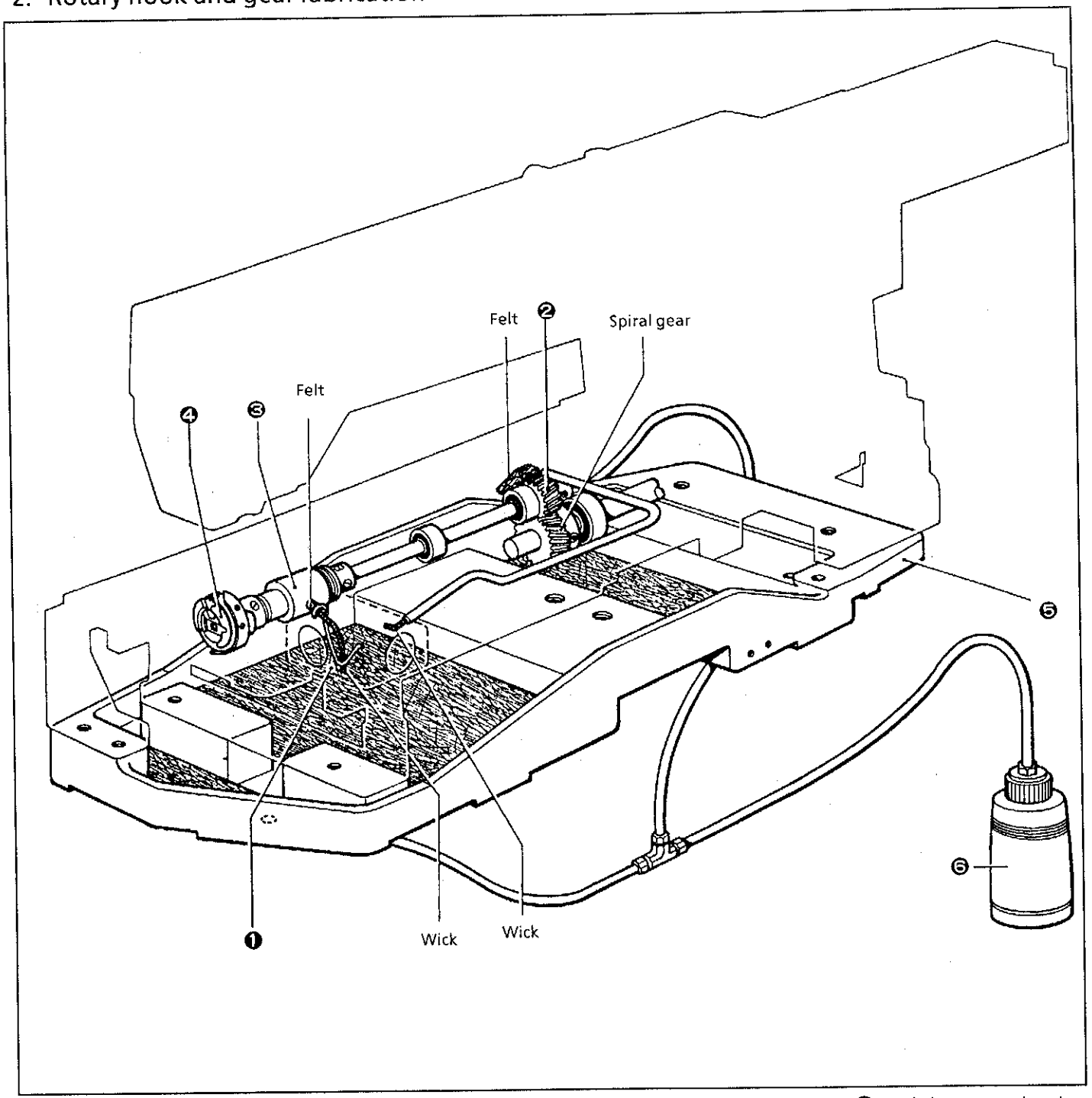
3 Lubrication mechanism

1. Upper shaft lubrication



1) Oil is fed to the thread take-up body, the needle bar and the thread take-up lever hinge pin from the arm oil tank ❶ through the wick ❷.
2) The oil which is collected in the portion of the body with the needle mechanism is transported to the sewing machine holder ❸ via the felt and the wick.
3) The oil in the sewing machine holder ❸ is absorbed by the poly oiler ❹ via the vinyl tube.

2. Rotary hook and gear lubrication

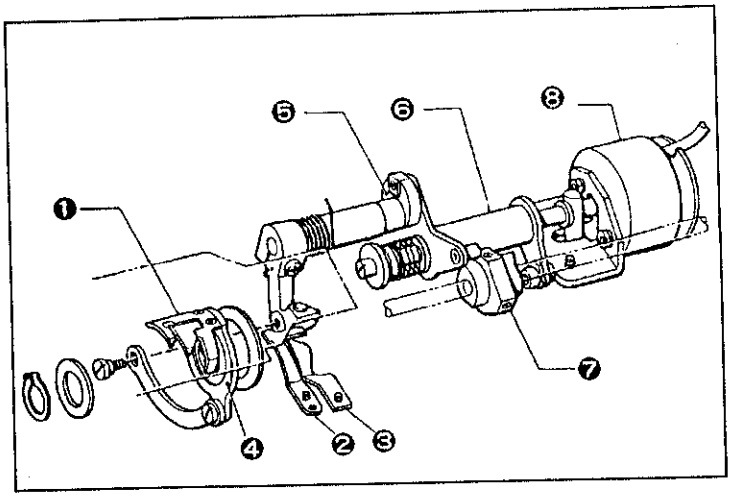


1) Oil fed by the bed oil tank ❶ lubricates the pinion ❷, the rotary hook shaft bearing ❸ and the rotary hook ❹ via the wick and the felt.
2) The oil shed from the rotary hook ❹ and the pinion ❷ collects in the sewing machine holder ❺.
3) The oil in the sewing machine holder ❺ is absorbed by the poly oiler ❻ via the vinyl tube.

4 Thread trimmer

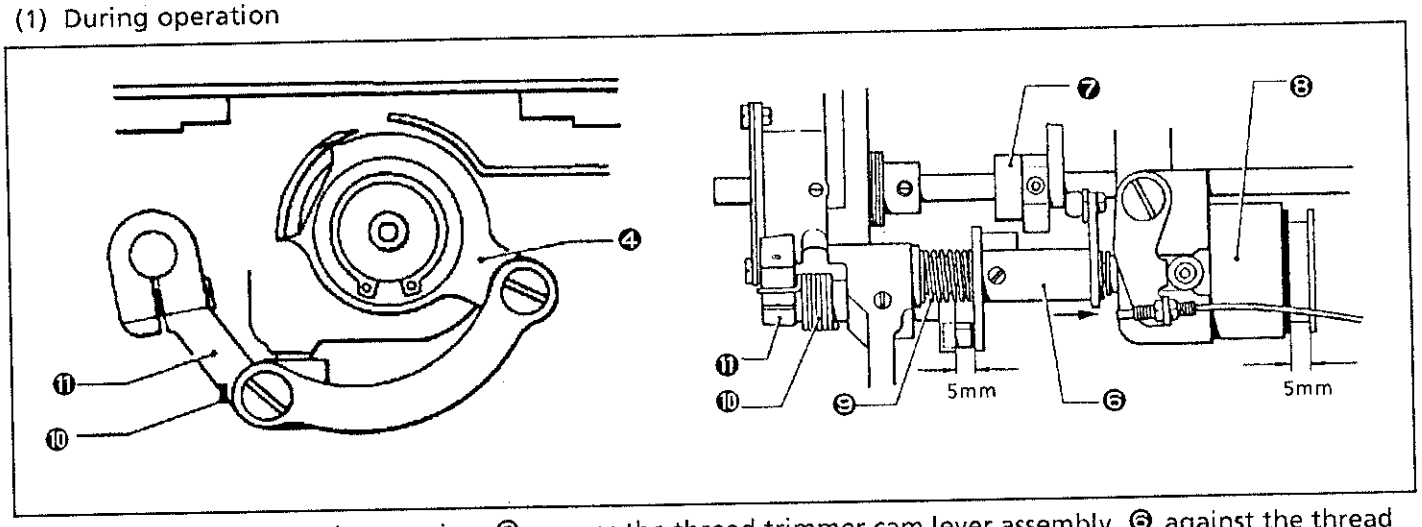
1. Thread trimmer

The thread trimmer consists of the movable knife ❶, fixed knife ❷, lower thread finger ❸, movable knife holder ❹, forked shaft ❺, thread trimmer cam lever assembly ❻, thread trimmer clutch❼ and thread trimmer solenoid ❽.



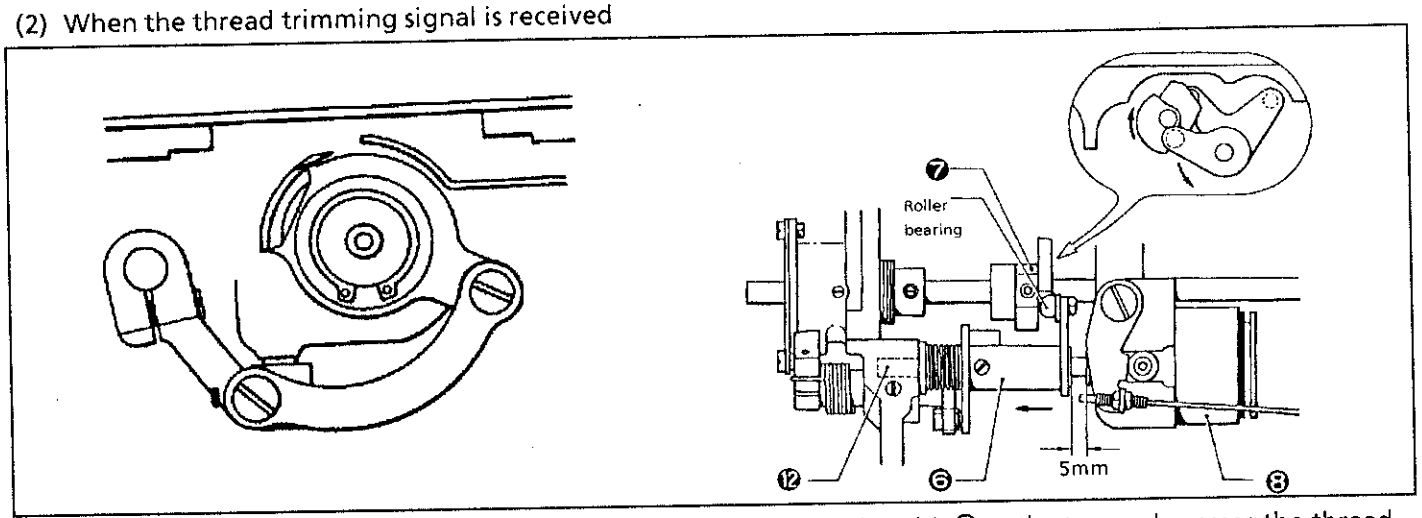
2. Thread trimmer operation (The five figures below and on the next page show the thread trimmer without the rotary hook assembly.)

(1) During operation



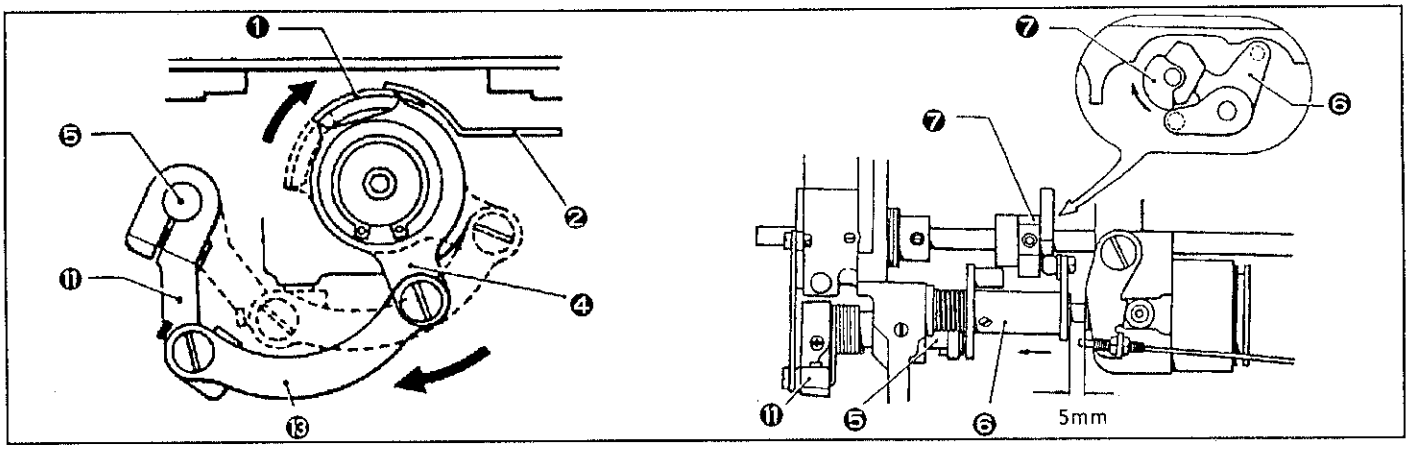
The thread trimmer cam lever spring ❾ presses the thread trimmer cam lever assembly ❻ against the thread trimmer solenoid ❽. Because the thread trimmer cam lever assembly ❻ does not engage with the thread trimmer clutch ❼, the movable knife holder ❹ does not function.
The thread trimmer lever spring ⓫ presses the thread trimmer lever ⓫ to prevent the movable knife holder ❹ from shifting.

(2) When the thread trimming signal is received



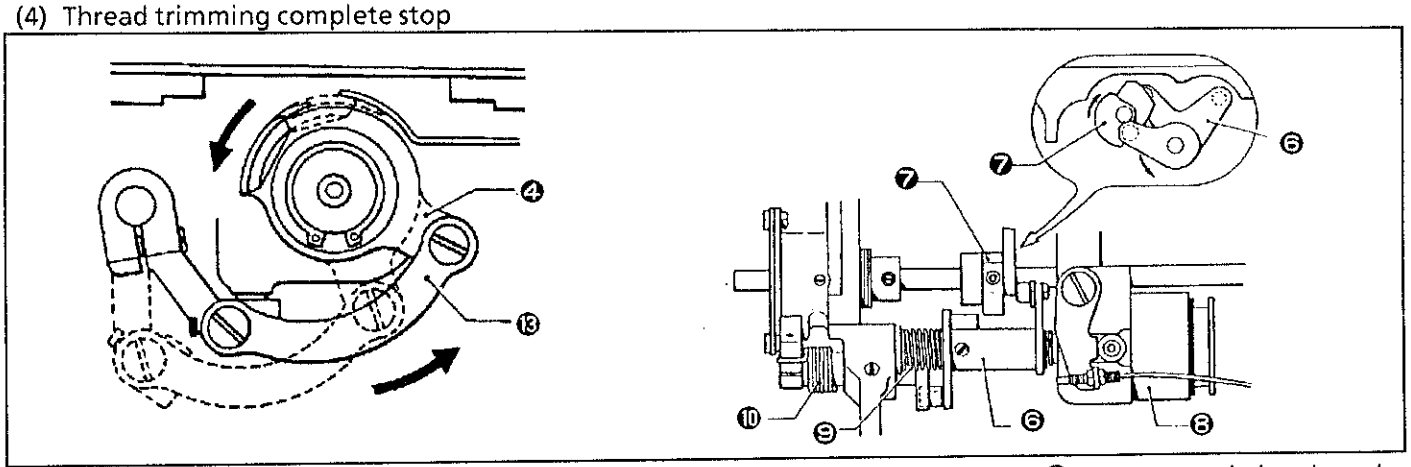
When the thread trimmer signal is received, the thread trimmer solenoid ❽ activates, and presses the thread trimmer cam lever stud ⓬. The roller bearing of the thread trimmer cam lever assembly ❻, secured by the thread trimmer cam lever stud⓬, is pushed above the circumference of the thread trimmer clutch ❼.

(3) Movable knife holder action



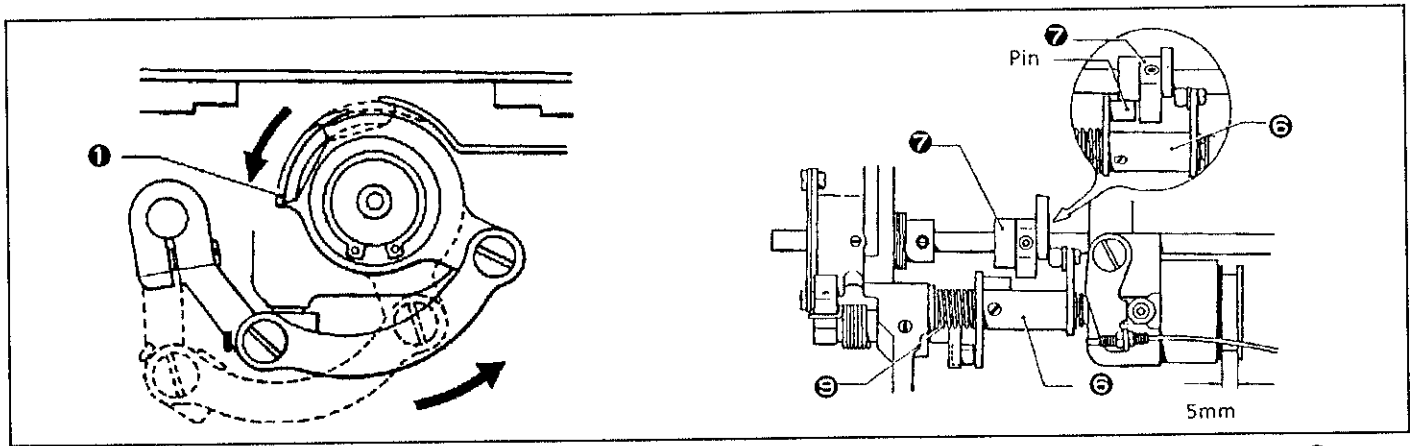
By the rotation of the rotary hook shaft, the thread trimmer clutch ❼ pushes the roller bearing up. The motion of the slide block is transmitted to the forked shaft ❺ via the thread trimmer cam lever assembly ❻.
The motion is then relayed to the thread trimmer rod ⓭ and the movable knife holder ❹ via the thread trimmer lever ⓫ connected to the forked shaft ❺.
The movable knife ❶ attached to the movable knife holder ❹ moves in the direction of the arrow and overlaps the fixed knife ❷.

(4) Thread trimming complete stop



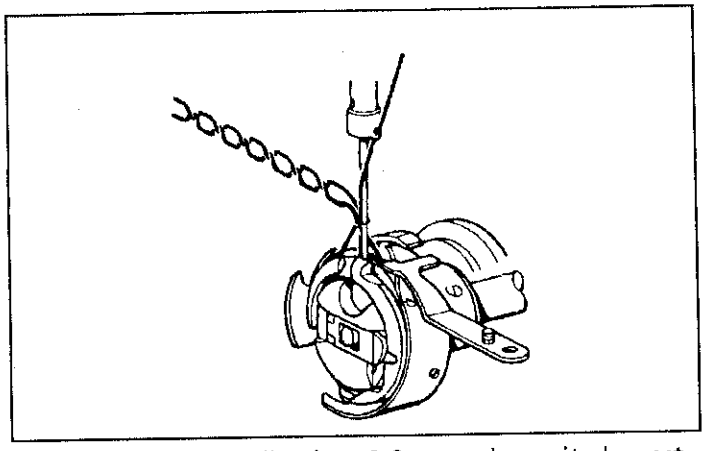
When the thread trimmer signal is not received, the thread trimmer solenoid ❽ retracts and the thread trimmer cam lever spring ❾ pushes the thread trimmer cam lever assembly ❻. Then the roller bearing of the thread trimmer cam lever assembly ❻ moves away from the thread trimmer clutch ❼ and returns to its original position.
The thread trimmer lever spring ⓫ returns the thread trimmer rod ⓭ and the movable knife holder ❹ to their original positions (in the direction of the arrow).

(5) Thread trimmer safety device

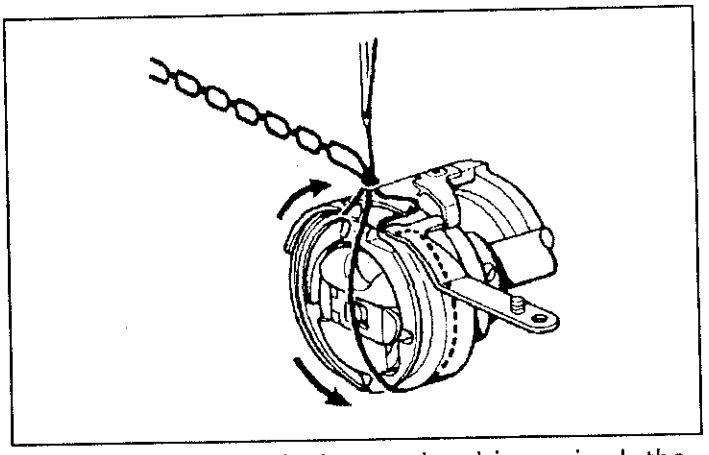


If the movable knife ❶ does not completely retract, the pin of the thread trimmer cam lever assembly ❻ and the thread trimmer clutch ❼ automatically carry the movable knife ❶ to a position where it will not strike the needle.

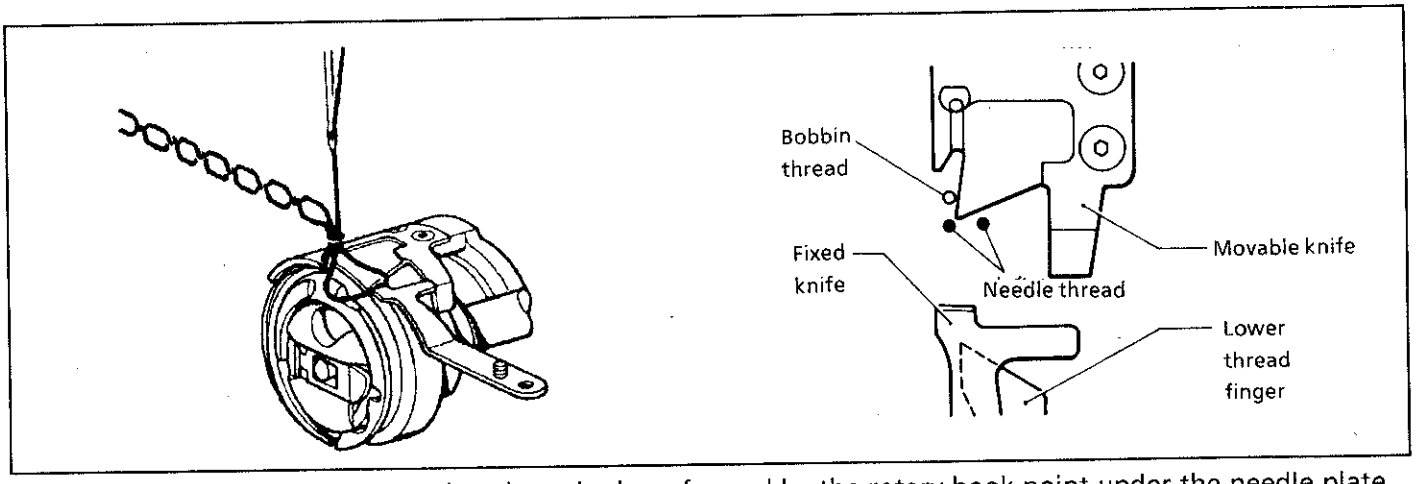
3. Needle and bobbin threads trimming



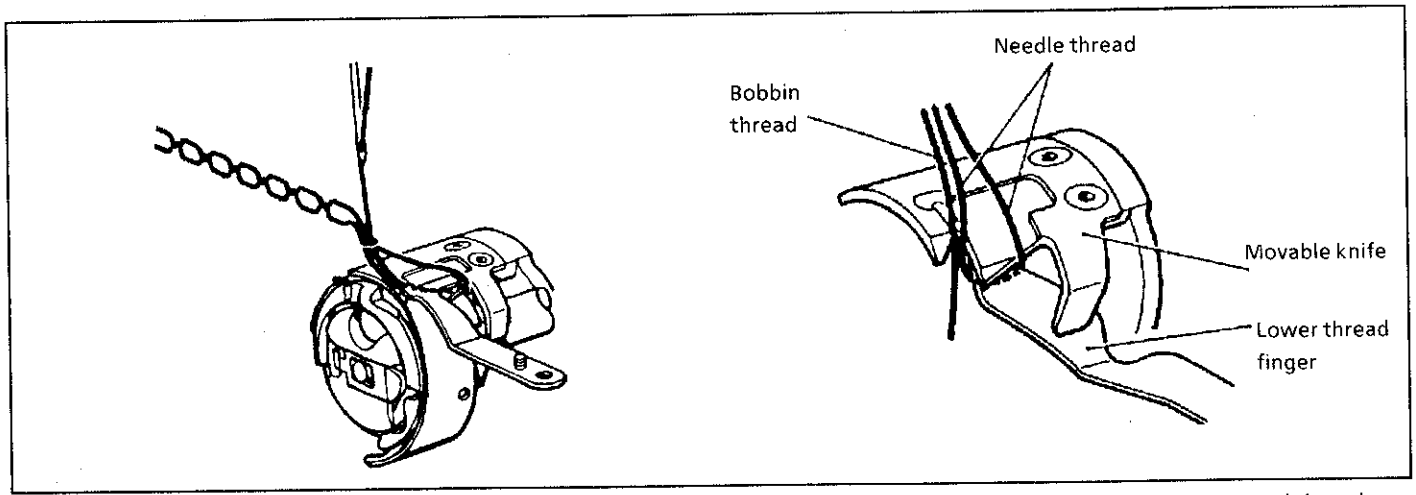
(1) When the needle rises 2.2 mm above its lowest position, the rotary hook point catches the loop formed by the needle.



(2) When the thread trimmer signal is received, the thread trimmer clutch drives the movable knife. The needle thread is caught by the rotary hook and fed around the shuttle body.

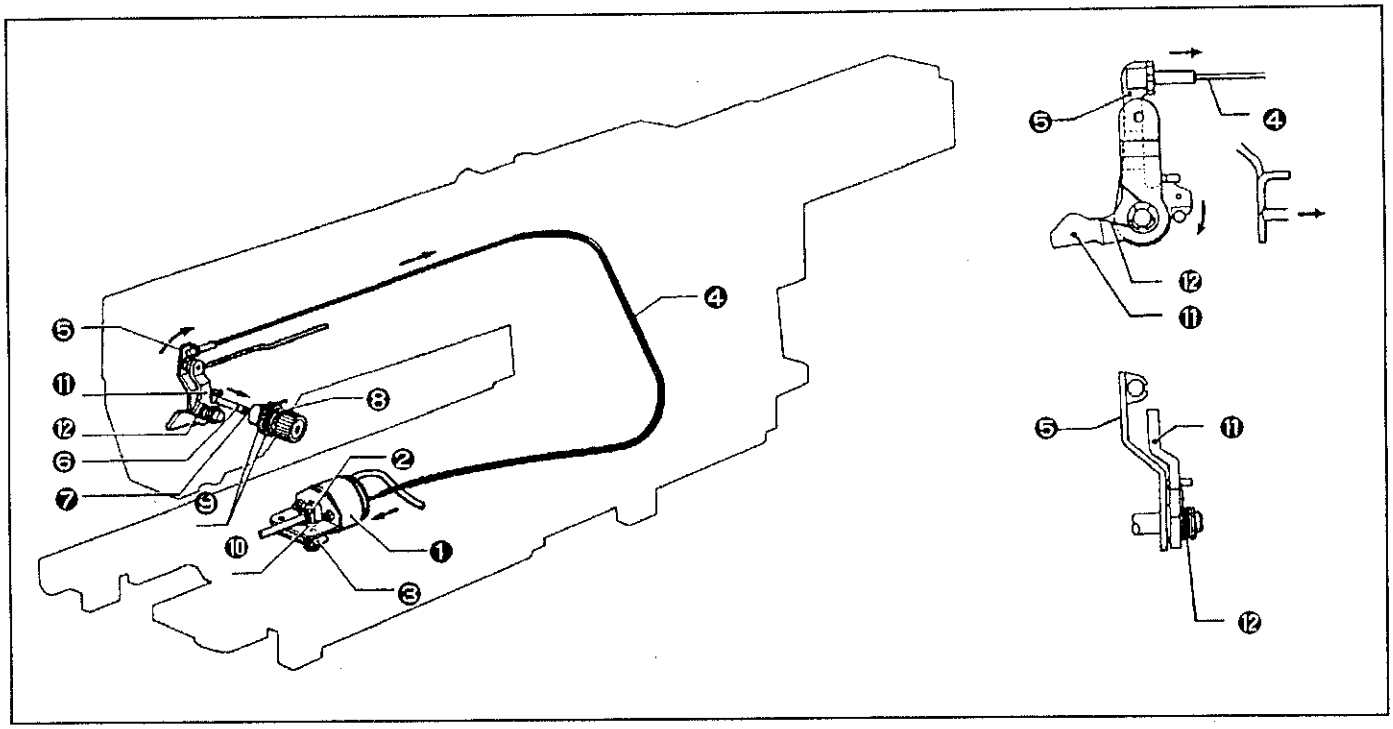


(3) The movable knife tip enters the triangular loop formed by the rotary hook point under the needle plate, and the loop spreading occurs. At this point the needle thread take-up is raised slightly above its lowest position (the upper shaft has turned approximately 330°), and the needle thread is spread by the movable knife as shown in the figure above.
If the timing of the movement is too early, loop spreading is not performed properly which results in thread trimming errors.



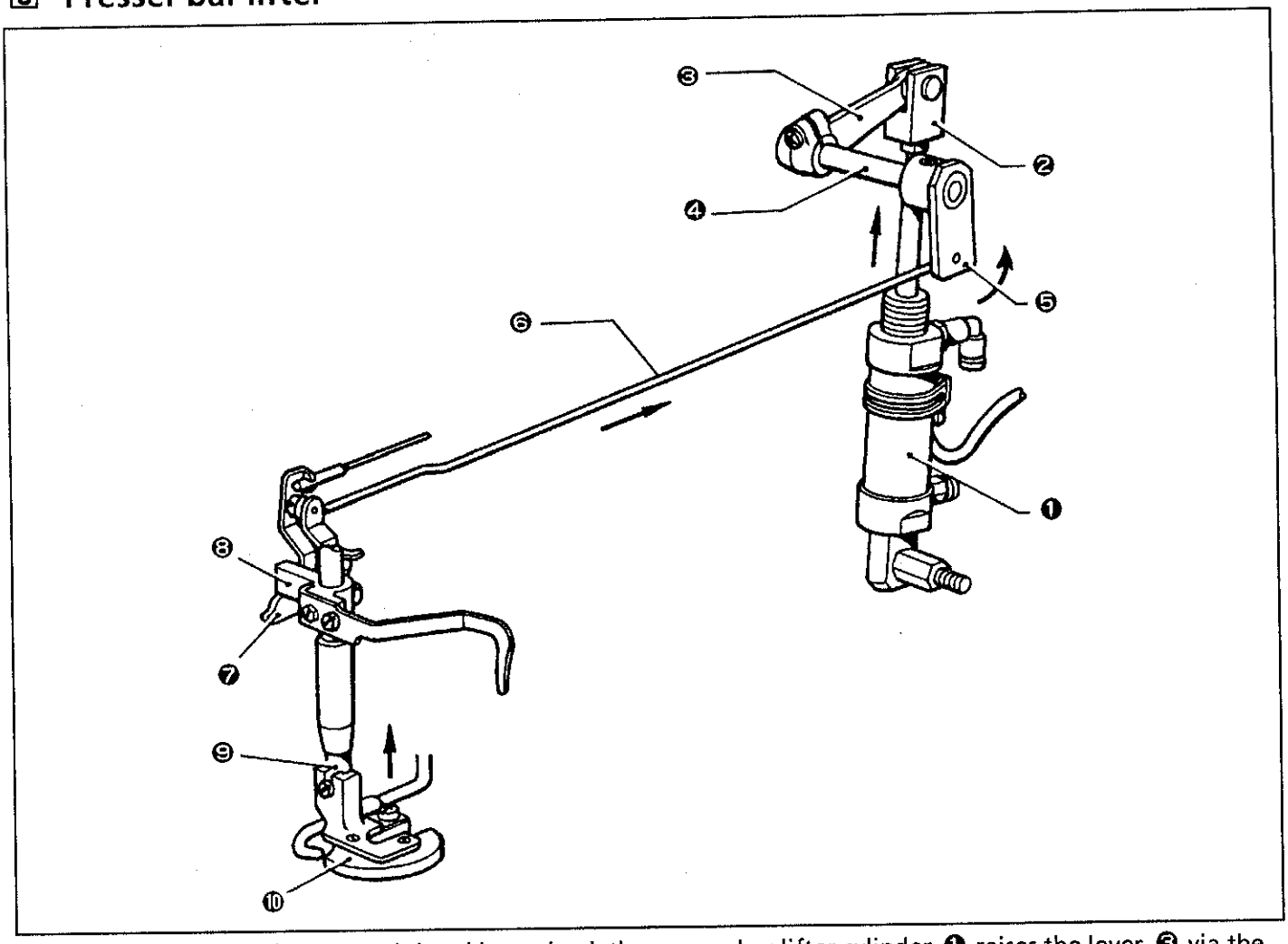
(4) The needle and bobbin threads caught by the movable knife in step (3) are gradually spread by the movable knife and lower thread finger to be cut by the fixed knife tip. At this time, the needle thread take-up approaches the top of its stroke.
When the movable knife is spreading the needle thread, the tension release relieves the needle thread tension to prevent excessive tension and to enable the needle thread to be extended smoothly.

5 Tension release



1) The thread trimmer solenoid ❶ operates when the thread trimmer signal is received.
2) The solenoid lever ❷, attached to the end of the thread trimmer solenoid ❶, pushes the tension release lever ❸.
3) The tension release wire ❹ relays the motion of the tension release lever ❸ to the thread tension release plate ❺.
4) The thread tension release plate ❺ presses the tension release stud ❻.
5) The tension release stud ❻ presses up the tension release pin ❼ and the tension disc presser ❽.
6) The tension disc presser ❽ presses up the tension discs ❾.
7) When the thread trimmer signal is not received, the solenoid lever ❷, the tension release lever ❸ and the tension release wire return to their original positions.
   (The tension release spring ⓫ forces the tension release lever ❸ all the way back.)
   NOTE: When the presser foot is raised, the presser bar lifter lever ⓫ presses the thread tension release plate ❺. The subsequent action is the same as steps 4 through 7 above.
   When the presser foot is lowered, the presser lifter lever spring ⓬ returns the thread tension release plate ❺ to its original position.

6 Presser bar lifter



1) When the presser foot ascend signal is received, the presser bar lifter cylinder ❶ raises the lever ❸ via the cylinder joint ❷.
2) The lever ❸ raises the presser bar guide bracket ❽ via the rocking connector shaft ❹, the presser bar lifter arm ❺, the presser bar lifter connector ❻ and the knee lifter lifting lever ❼.
3) The presser bar ❾ and the presser foot ❿, attached to the presser bar guide bracket ❽, are lifted.

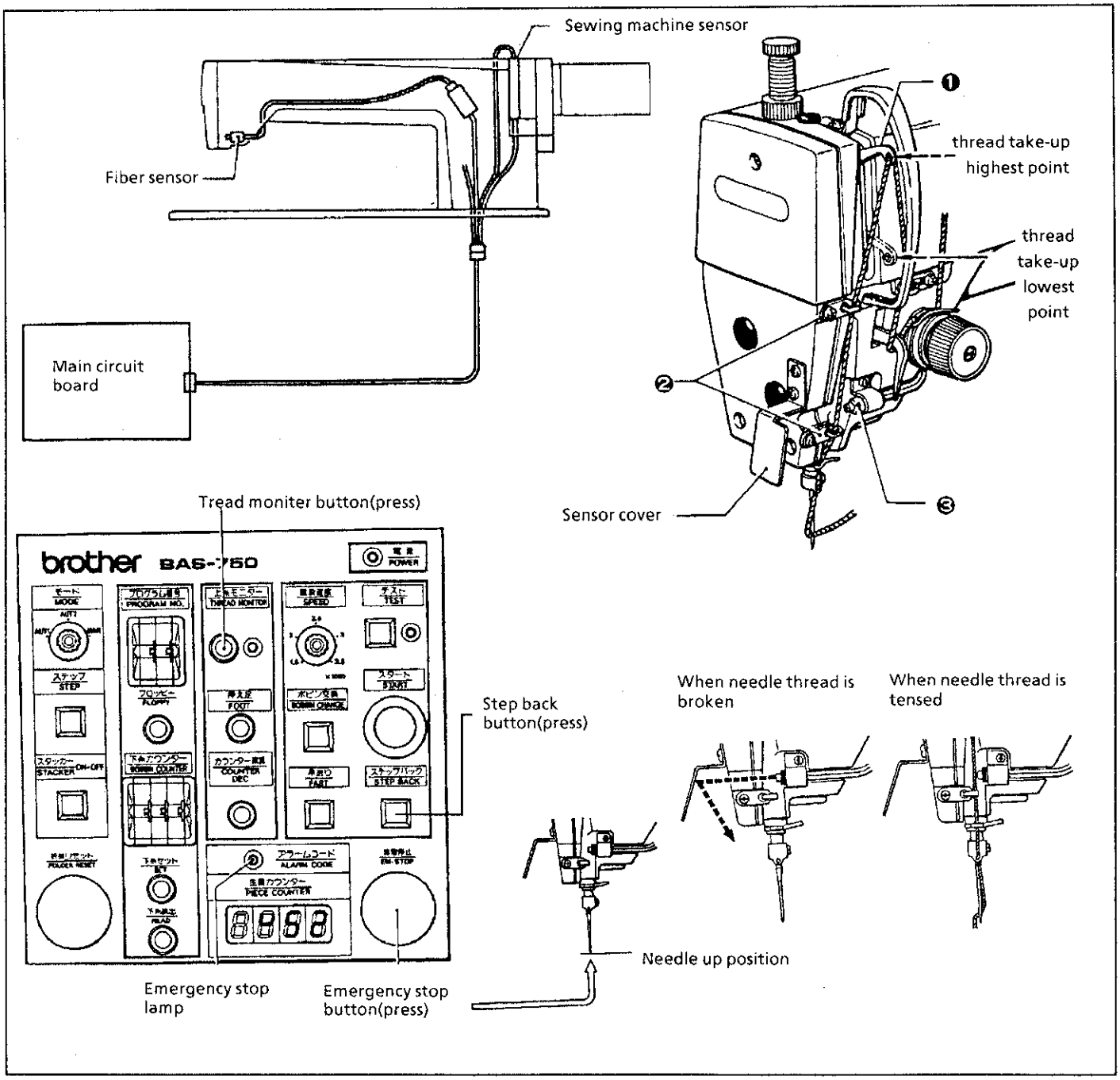
7 Thread breakage detector

Operation

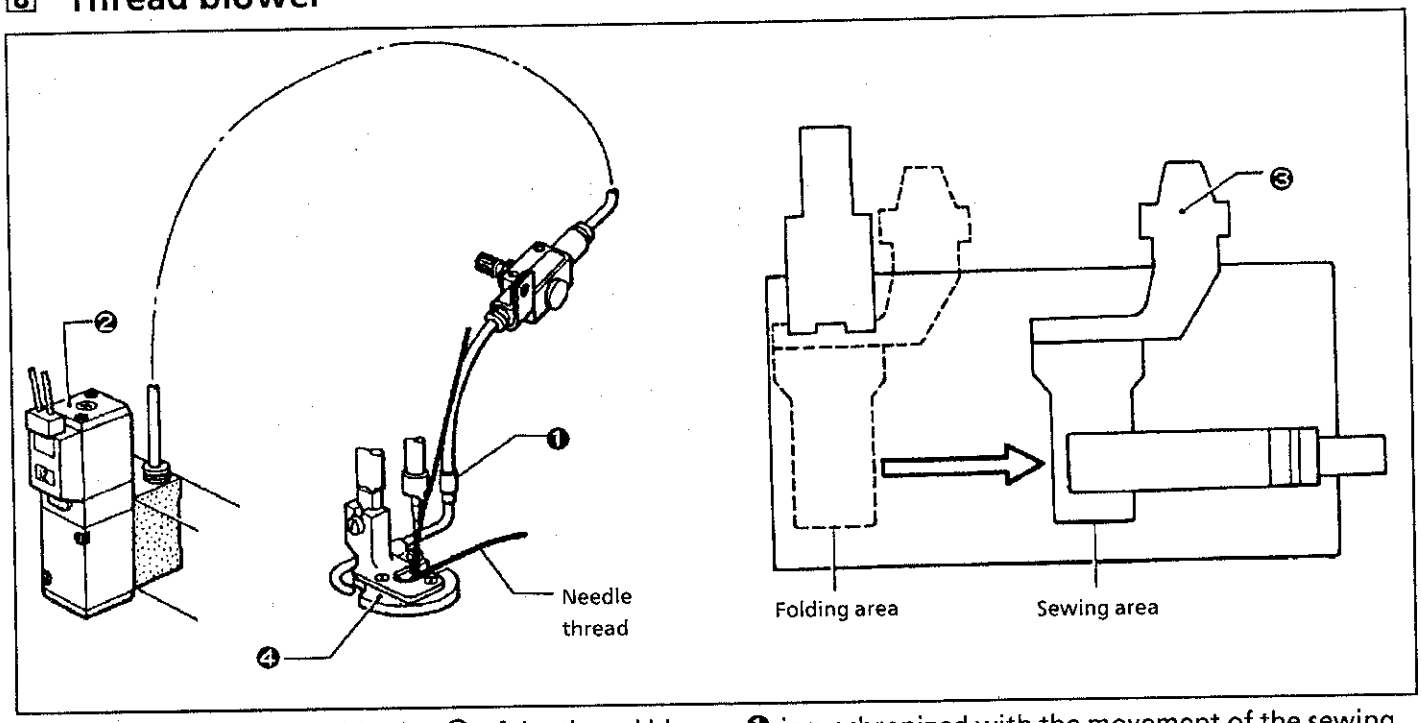
1) The thread breakage detector monitors the thread breakage signal four times in one stitch during sewing.
2) If the signal is not detected during a stitch, the detector senses that the thread breakage has happened, which stops the machine, lights the emergency stop lamp and displays "U52".
3) To release the emergency stop, press the EMERGENCY STOP button. Then the thread is cut and the needle moves above the needle plate and stops.
4) After threading, pressing STEP BACK can restart the sewing.
5) To operate the thread breakage detector, turn on the THREAD MONITOR lamp.
   NOTE: When not using the detector, press the THREAD MONITOR button to turn off its lamp.

Mechanism

1) During sewing, the needle thread is tensed by the thread guide ❷ while the thread take-up ❶ rises from its down position to up position.
2) The thread breakage detector ❸, which is a reflex type non-contact fiber sensor, monitors the thread in tension to send the signal to the logic control circuit board.
3) Because the broken thread is not tensed during the the thread take-up operation, the detector does not monitor the thread to detect the thread breakage.



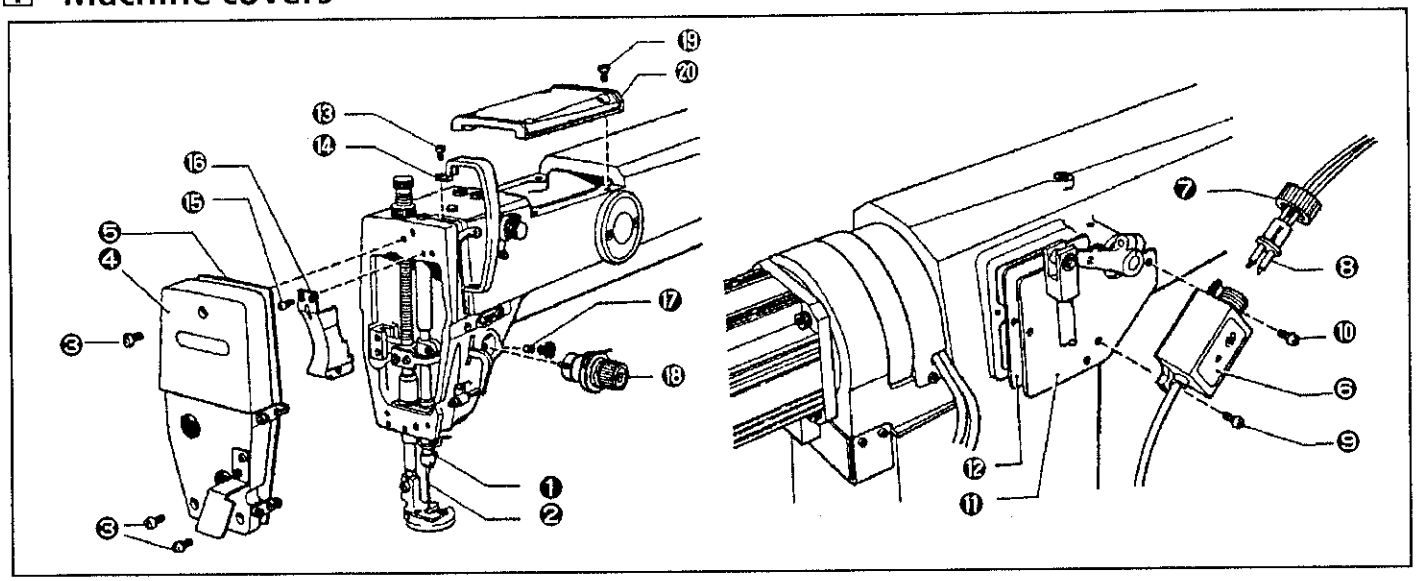
8 Thread blower



The ON/OFF of the solenoid valve ❷ of the thread blower ❶ is synchronized with the movement of the sewing clamp supporter ❸.
The thread blower functions to prevent the needle thread from being pressed by the presser plate ❹ while the sewing clamp supporter ❸ moves from the folding area to the sewing area.

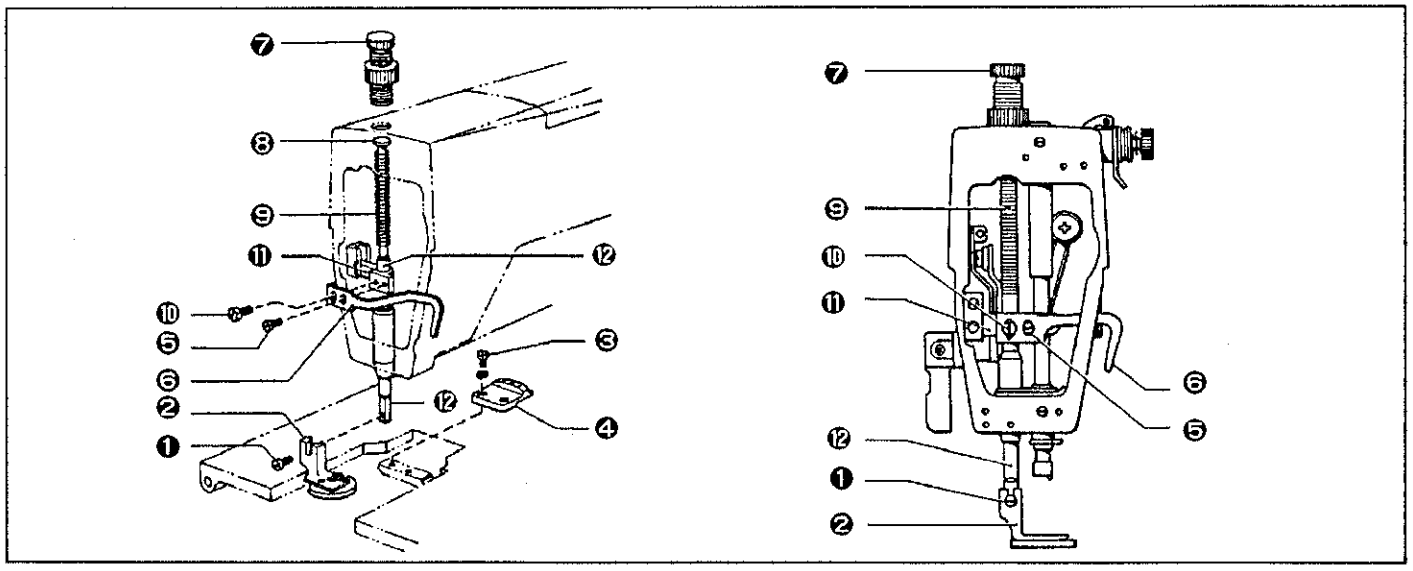
DISASSEMBLY

1 Machine covers



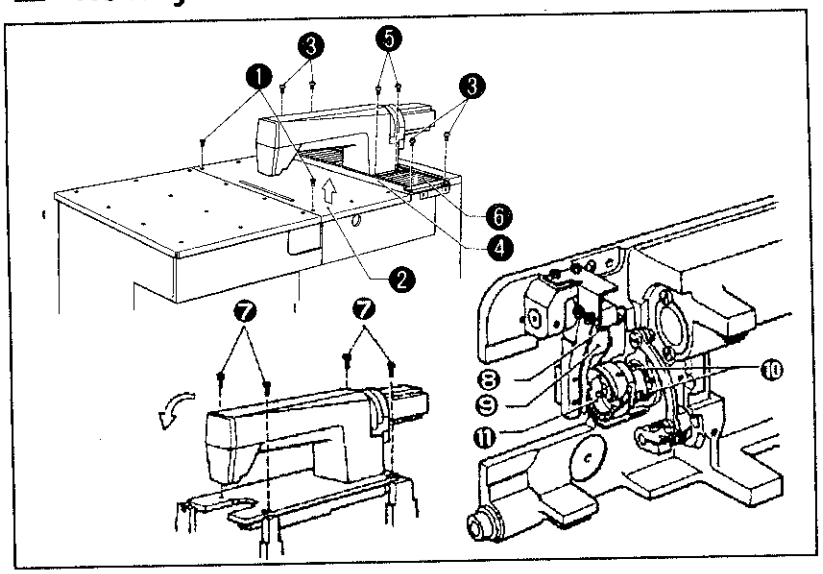
1) Loosen the screw ❶ and remove the needle ❷.
2) Remove the three screws ③, then remove the face plate ④ and the face plate packing ⑤.
3) Rotate the fixing ring ⑦ of the amplifier unit ⑥, then remove the fiber unit ⑧.
4) Remove the screw ⑨ and the amplifier unit ⑥.
5) Remove the four screws ⑩, then remove the rear cover ⑪ and the rear cover packing ⑫.
6) Remove the screw ⑬ and the thread take-up cover ⑭.
7) Remove the two screws ⑮ and the oil stopper plate ⑯.
8) Loosen the screw ⑰ and remove the tension regulator assembly ⑱.
9) Remove the four screws ⑲ and the upper lid ⑳.

2 Presser foot mechanism



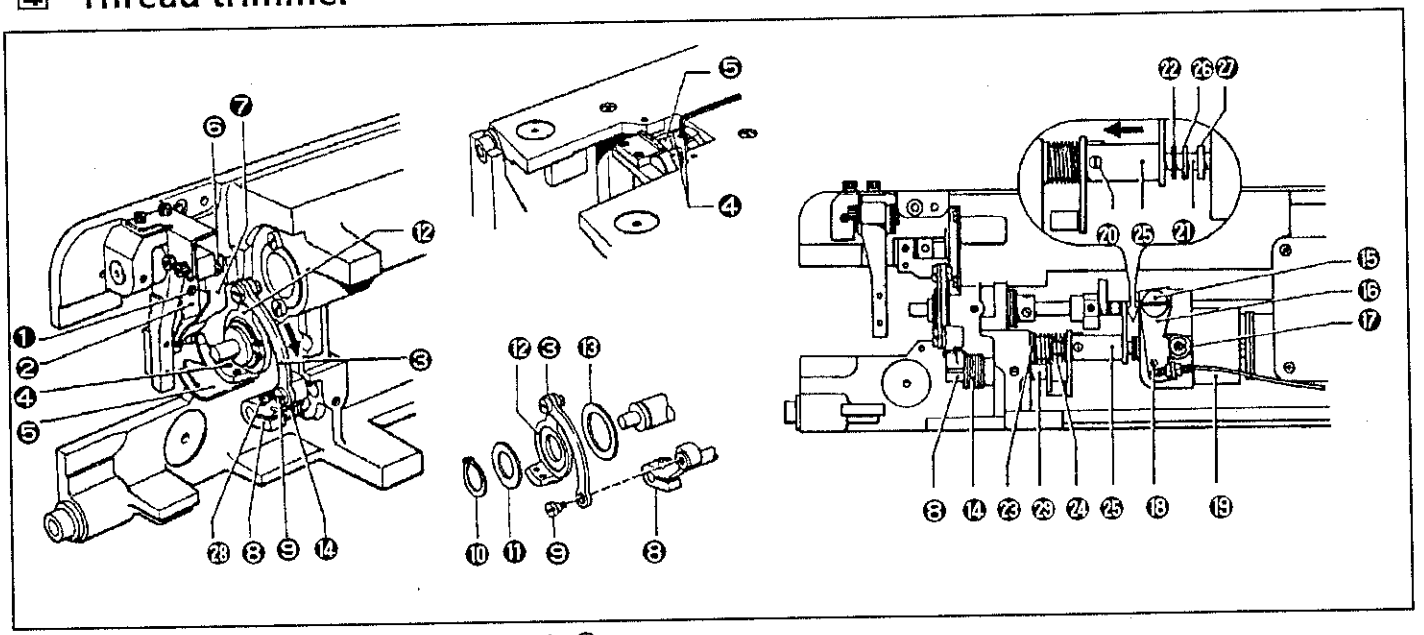
1) Remove the screw ❶ and the presser foot ❷.
2) Remove the two screws ③ and the bottom plunger ④.
3) Remove the screw ⑤ and the presser bar clamp thread guide ⑥.
4) Remove the presser adjusting screw ⑦, then remove the presser spring guide ⑧ and the presser spring ⑨.
5) Loosen the screw ⑩ and remove the presser bar guide clamp ⑪ and the presser bar ⑫.
(Remove the presser bar ⑫ from the arm top.)

3 Rotary hook mechanism



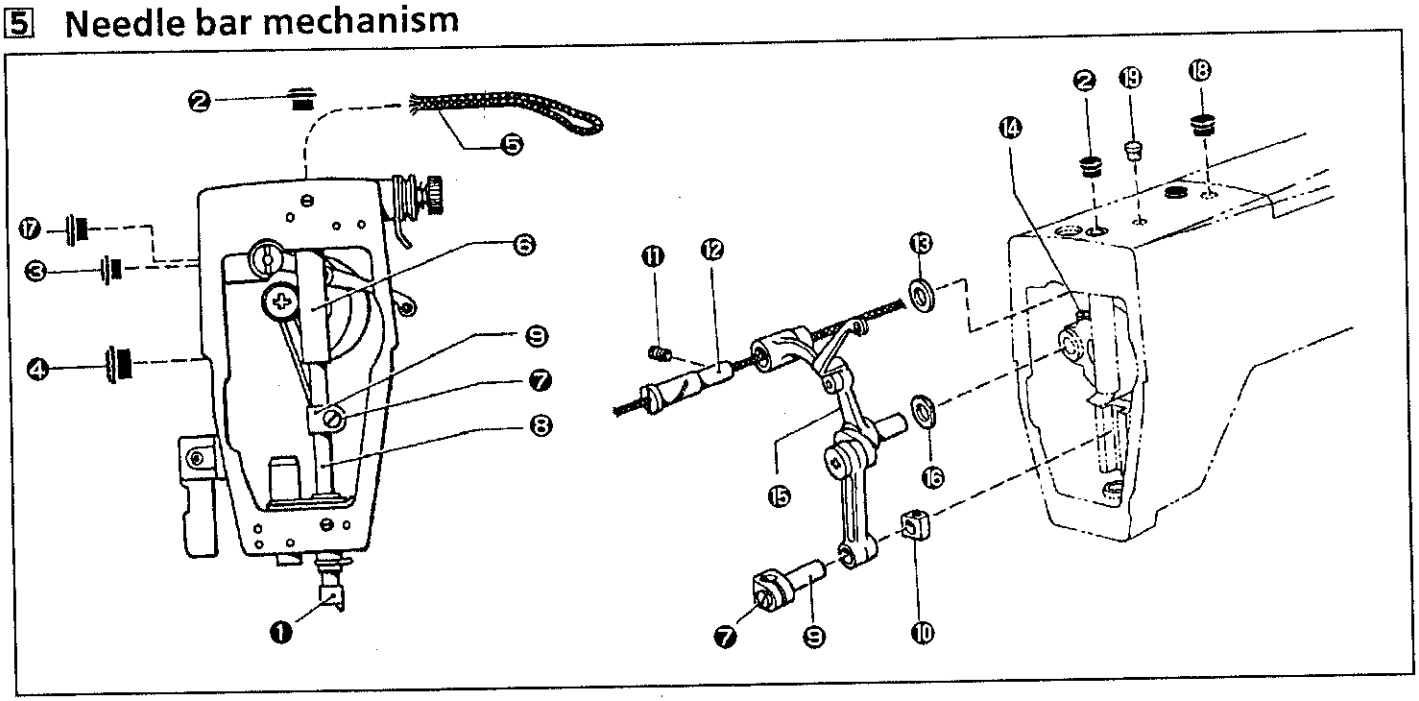
1) Remove the screw ❶ and the needle plate ❷.
2) Remove the screw ❸ and the rail ❹.
3) Remove the screw ❺ and bellows ❻.
4) Remove the four screws ❼, then tilt the machine head until it stops.
5) Remove the screw ❽ and the bobbin case holder position bracket ❾.
6) Loosen the three screws ❿ and remove the rotary hook assembly ⓫.

4 Thread trimmer



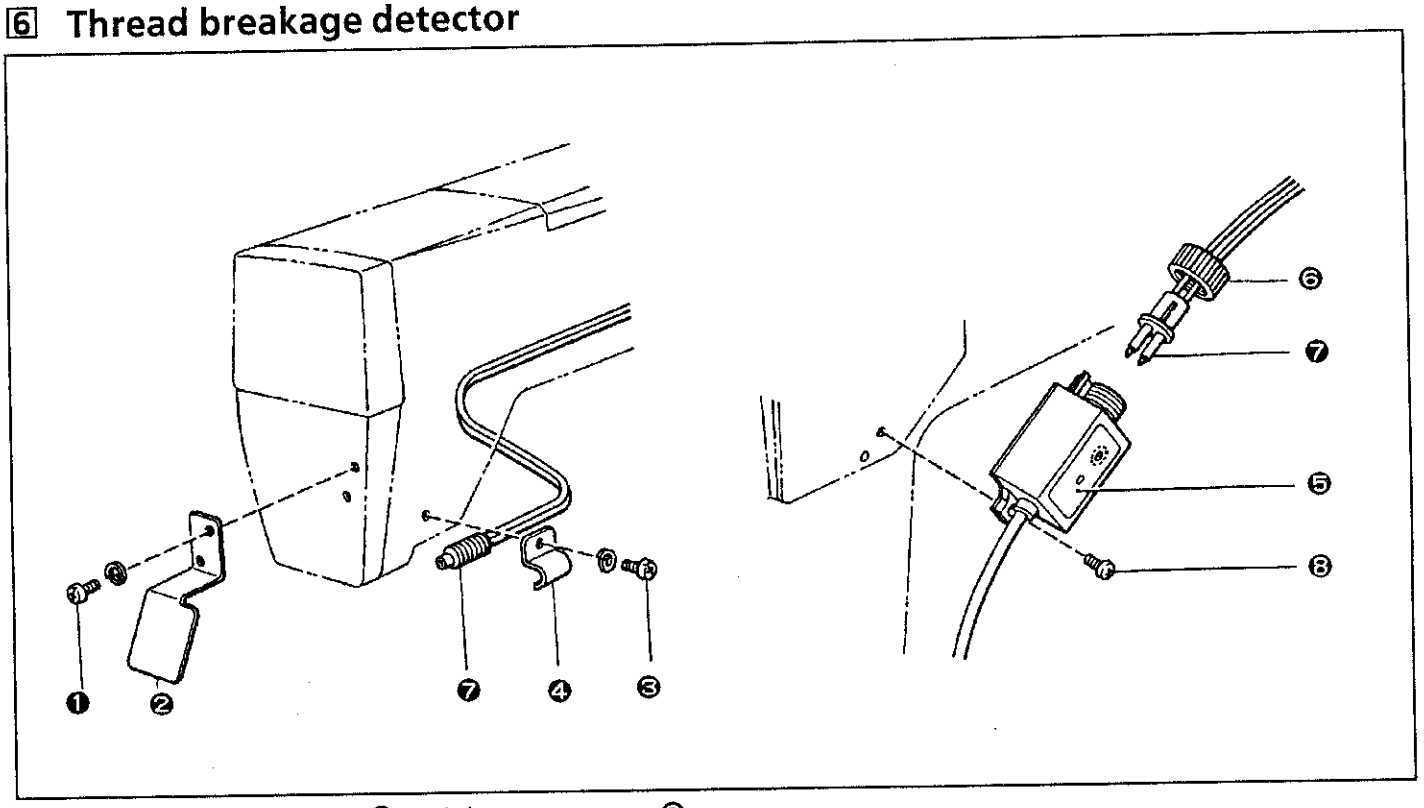
1) Remove the screw ❶ and the fixed knife ❷.
2) Press the thread trimmer rod ❸ in the direction of the arrow until the two screws ❹ are visible.
3) Remove the screws ❹ and the movable knife ❺.
4) Remove the screw❻ and the lower thread finger❼.
5) Remove the stud screw ❾ securing both the thread trimmer lever ❽ and the thread trimmer rod ❸.
6) Remove the stop ring ❿, the thrust washer ⓫, the movable knife holder ⓬ and the washer ⓭ and the thread trimmer rod ❸.
7) Remove the thread trimmer lever spring ⓮ from the thread trimmer lever ❽.
8) Remove the stud screw ⓯, the tension release lever ⓰ and the tension release spring ⓱.
9) Remove the screw ⓲ and the thread trimmer solenoid ⓳.
   NOTE: If the thread trimmer solenoid is not to be removed, lightly tighten the screws ⓯ and ⓲.
10) Loosen the screw ⓴ then remove the stop ring ㉒ by moving the thread trimmer cam lever stud ㉑ in the direction of the arrow.
11) Remove the thread trimmer cam lever stud㉑ to the right (in the direction of the thread trimmer solenoid).
12) Remove the collar ㉖, the thread trimmer cam lever spring ㉗, the thread trimmer cam lever assembly ㉕, the washer ㉓and the cushion ㉙.
13) Loosen the screw ㉘then remove the thread trimmer lever ❽, the thread trimmer lever spring ⓮ and the forked shaft ㉘.
    (To remove the thread trimmer solenoid, refer to page 30.)

5 Needle bar mechanism



1) Raise the machine head.
2) Remove the needle bar thread guide ❶.
3) Remove the oil caps ❷, ❸ and ❹.
4) Remove the wick ❺ from the top of the needle bar bushing (upper) ❻.
5) Loosen the screw ❼ then remove the needle bar ❽ and the needle bar clamp ❾. (The slide block ❿ will come off.)
6) Loosen the screw ⓫, then remove the thread take-up lever hinge pin ⓬ and the washer ⓭.
7) Loosen the two screws ⓮, then remove the thread take-up lever assembly ⓯. (The washer ⓰ will come off.)
8) Remove the oil caps ⓱, ⓲ and ⓳. (These caps must be removed to replace the wick.)

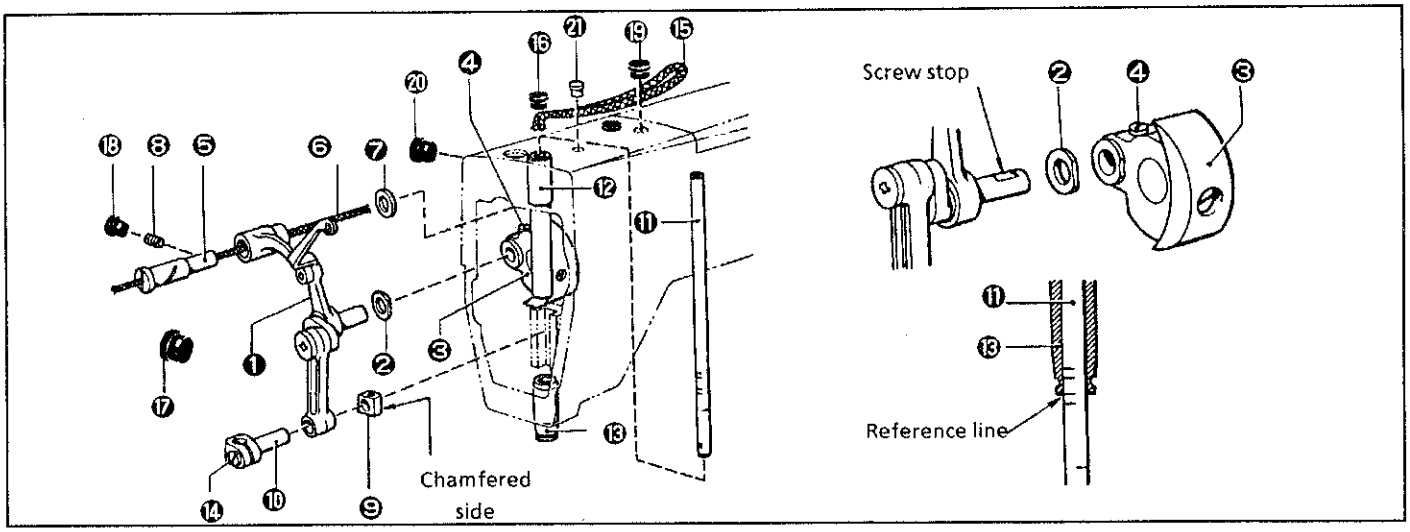
6 Thread breakage detector



1) Remove the two screws ❶ and the sensor cover ❷.
2) Remove the screw ❸ and the sensor holder ❹.
3) Rotate the fixing ring ❻ of the amplifier unit assembly ❺ then remove the fiber unit ❼.
4) Remove the screw ❽ and the amplifier unit assembly ❺.

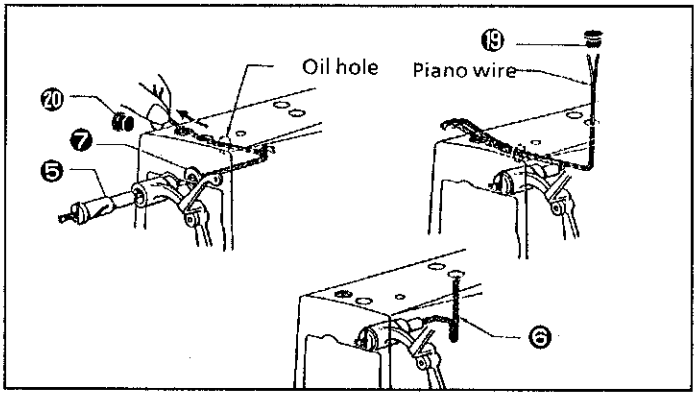
ASSEMBLY

1 Needle bar mechanism

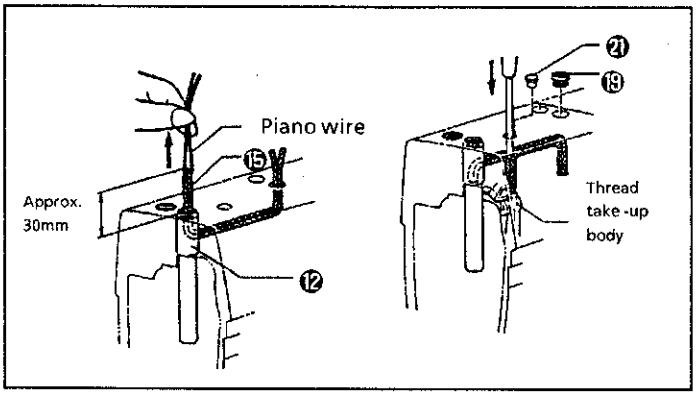


1) Secure the thread take-up lever assembly ❶ and the washer ❷ to the thread take-up crank ❸ with the screw ❹.
   NOTE: See the figure above for the correct position of the thread take-up crank screw stop.
2) Pass the wick ❻ through the thread take-up lever hinge pin ❺. (Refer to the figure below.)
3) While inserting the thread take-up lever hinge pin ❺ into the thread take-up body and the washer ❼, put all of them into the arm. Then secure them with the screw ❽.
4) Slide the slide block ❾ into the channel, then slide the needle bar guide clamp ❿ into the thread take-up lever and the slide block ❾.
   (Be sure the chamfered side of the slide block ❾ is facing the inside.)
5) Pass the needle bar ⓫ from the top of the needle bar bushing U ⓬ through the needle bar clamp ❿.
6) Turn the pulley to lower the needle bar to its down position.
7) Align the needle bar ⓫ reference line with the bottom edge of the needle bar bushing D ⓭, then tighten the screw ⓮.
8) Pass the wick ⓯ from the arm top. (See the bottom figure.)
9) Set the oil caps ⓰, ⓱, ⓲, ⓳, ⓴ and ㉑ in place.

Wick insertion

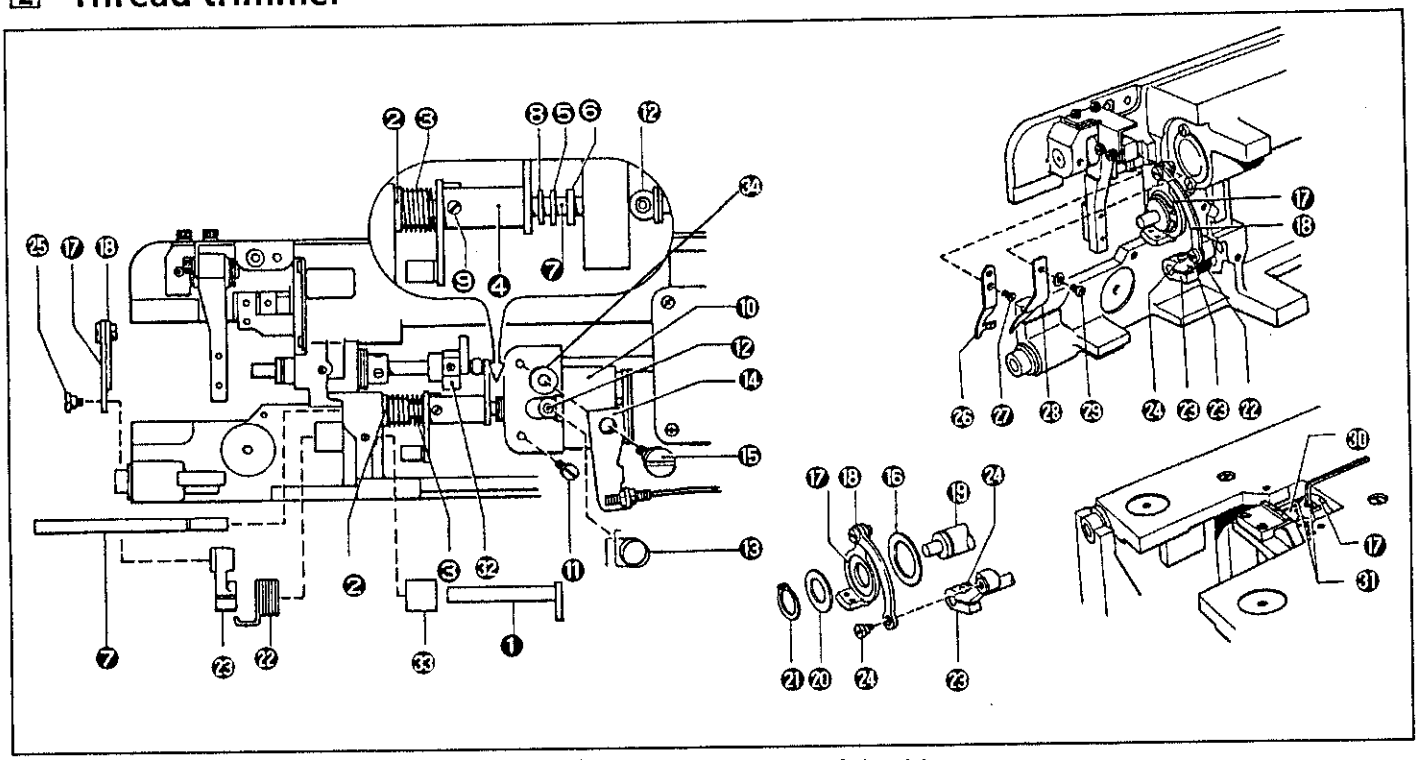


1) Pass the wick ❻ through the thread take-up lever hinge pin ❺.
2) Pass a piano wire through the oil hole on the arm side, then pull the wick ❻ out.
3) Pass a piano wire through the oil hole on the arm top, then pull the wick ❻ out.
4) Pass the wick ❻ until it reaches to the thread take-up lever hinge pin ❺, then push the other side of the wick ❻ in the oil hole.
   NOTE: The wick length: approx. 110 mm



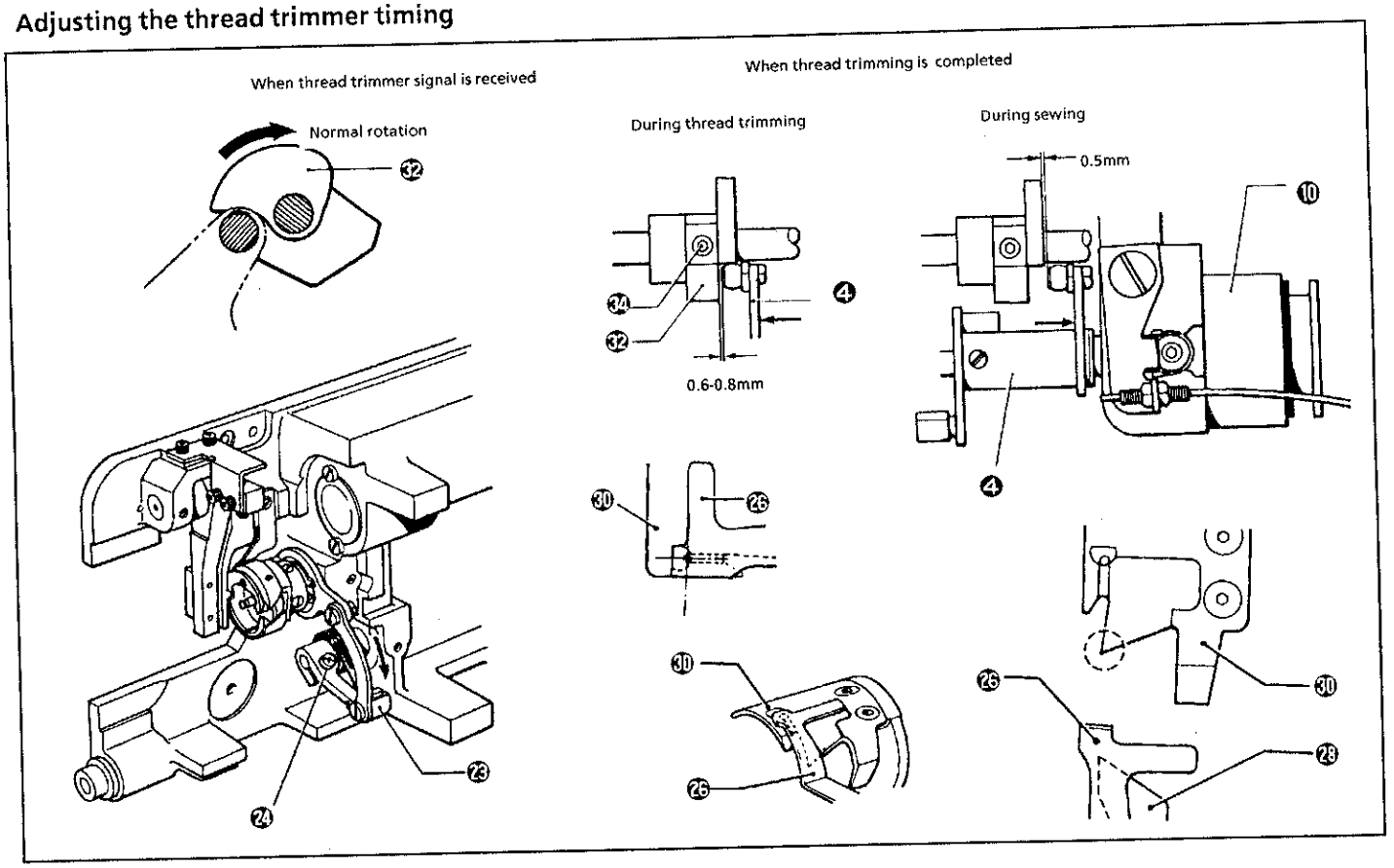
1) Pass the wick ⓯ from the arm top.
2) Extend approximately 30 mm of the wick from the side of the needle bar bushing ⓬.
3) Turn the machine pulley by hand to raise the thread take-up to its highest position.
4) As shown in the figure on the left, push in the wick ⓯ until it contacts the top of the thread take-up body.
5) Push both ends of the wick ⓯ in the holes.
   NOTE: The wick length: approx. 300 mm

2 Thread trimmer



1) Insert the forked shaft ❶ into the collar ㉝ and the forked shaft bushing.
2) Place the collar ❷, the thread trimmer cam lever spring ❸, the thread trimmer cam lever assembly ❹, the washer ❺, and the cushion ❻ on the thread trimmer cam lever stud ❼.
3) Place the stop ring ❽ on the thread trimmer cam lever stud ❼.
4) Tighten the screw ❾ in the thread trimmer cam lever assembly ❹.
   Be careful of the screw stop on the thread trimmer cam lever stud ❼.
5) Secure the thread trimmer solenoid ❿ with the screw ⓫.
   Be sure the solenoid lever ⓬ lightly touches the stud ❼.
6) Place the tension release spring ⓭ on the solenoid lever ⓬.
7) Secure the tension release lever ⓮ with the stud screw ⓯ and washer ⓴.
8) Place the washer ⓰ and the movable knife holder ⓱ (the thread trimmer rod ⓲) on the rotary hook shaft bearing ⓳. Then secure it with the thrust washer ⓴ and stop ring ㉑.
9) Place the thread trimmer lever spring ㉒ and the thread trimmer lever ㉓ on the forked shaft ❶, and tighten the screw ㉔
10) Secure the thread trimmer rod ⓲ and the thread trimmer lever ㉓ with the stud screw ㉕.
11) Secure the fixed knife ㉖ in the arm bed with the screw ㉗.
12) Secure the lower thread finger ㉘ in the arm bed with the screw ㉙.
13) Secure the movable knife ㉚ to the movable knife holder ⓱ with the screw ㉛. Hook the thread trimmer lever spring ㉒ on the thread trimmer lever ㉓.
    NOTE: Make sure the lower thread finger ㉘ does not strike the movable knife ㉚.
    NOTE: Check the thread trimmer clutch ㉜ position.

Adjusting the thread trimmer timing



1. Adjusting the thread trimmer clutch position

Turn the machine pulley until the needle bar is raised 5 mm above its lowest position. At this time, press the thread trimmer solenoid ⑩ by hand so that the slide block contacts the indent of the thread trimmer clutch ㉜, and then lightly tighten the screw ㉞. When the thread trimmer solenoid ⑩ is returned to its original position (released), adjust the thread trimmer clutch ㉜ by loosening the screw ㉞ so that the spacing of the side faces between the thread trimmer clutch ㉜ and the slide block is 0.6-0.8 mm. (Tighten the screw ㉞ at approximately 40 kg/cm.)

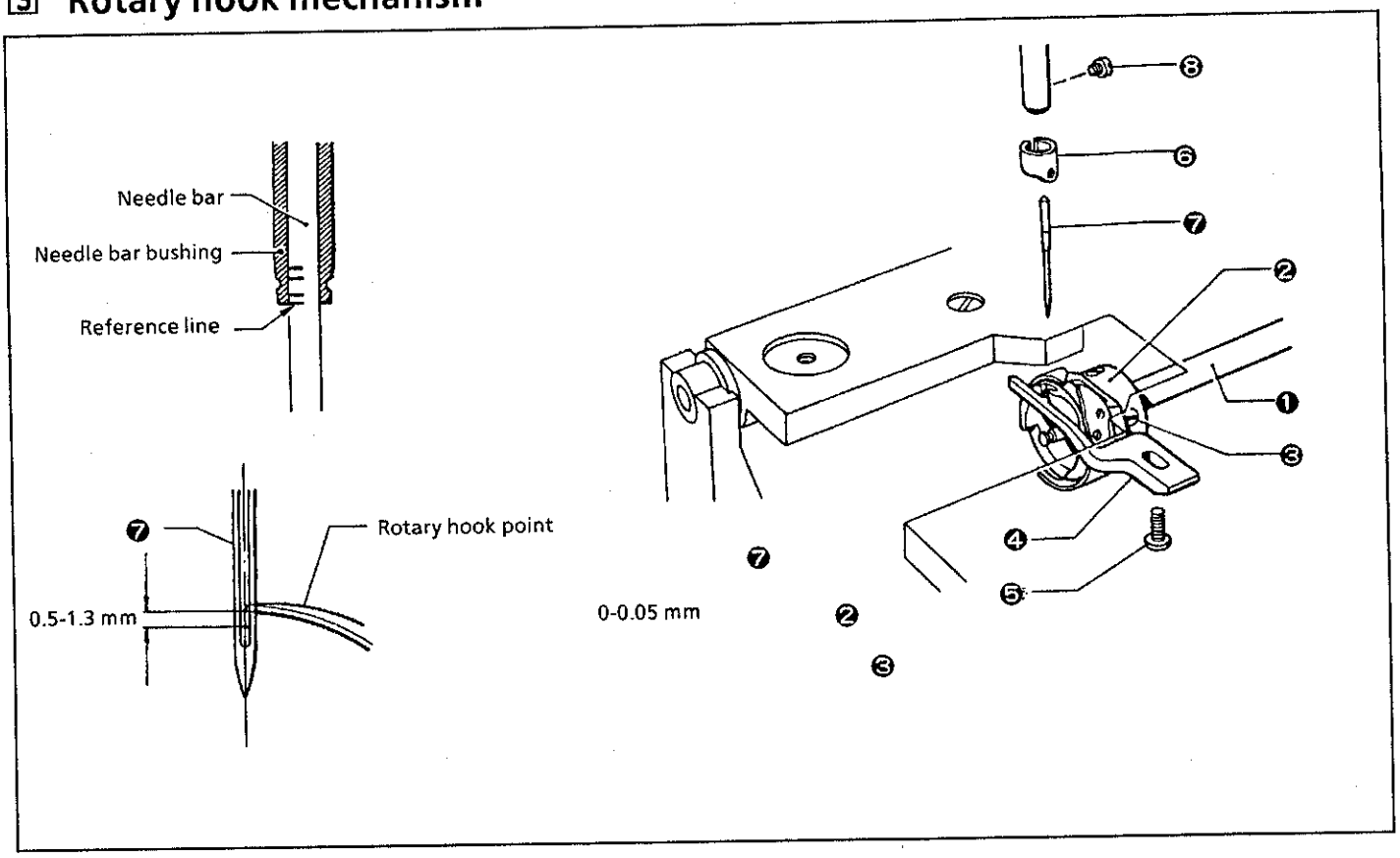
2. Adjusting the movable knife, fixed knife position

The fixed knife ㉕ and the movable knife ㉚ must overlap when the slide block of the thread trimmer cam lever ❹ is lifted to the top of the thread trimmer clutch ㉜.

If they do not, shift the thread trimmer lever ㉔ so that the knives ㉕ and ㉚ overlap when the slide block of the thread trimmer cam lever ❹ is lifted to the top of the thread trimmer clutch ㉜. Then tighten the screw ㉔.

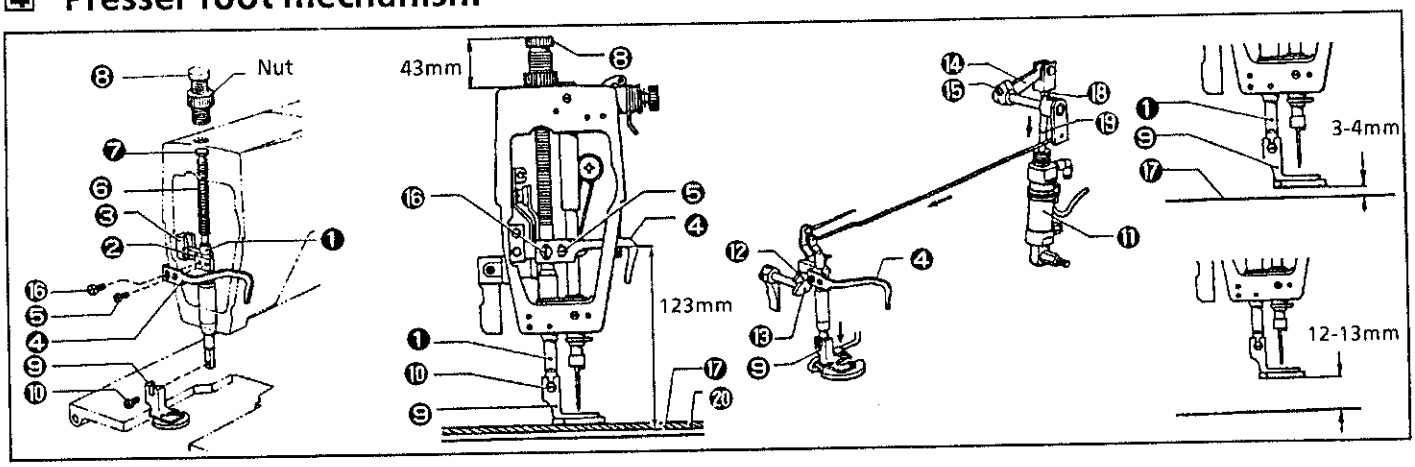
NOTE: Set the lower thread finger ㉘ under the movable knife ㉚.

3 Rotary hook mechanism



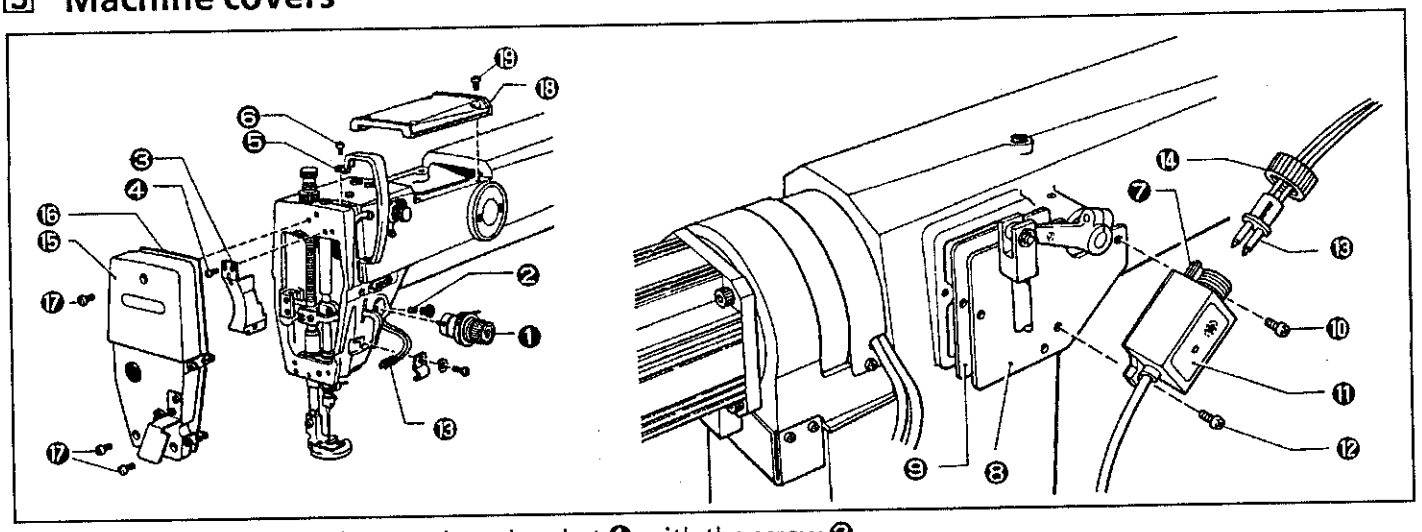
1) Place the rotary hook ❷ on the rotary hook shaft ❶ and secure it with the screw ❸.
2) Secure the bobbin case holder position bracket ❹ with the screw ❺.
3) Place the needle bar thread guide ❻ on the needle bar then secure the needle ❼ with the screw ❽.
4) Adjust the timing between the needle ❼ and the rotary hook ❷ in the following procedure:
   Raise the needle bar 2.2 mm above its lowest position by turning the machine pulley. At this time, align the rotary hook point with the needle center (see the reference line in the figure above). Spacing between the rotary hook point and the needle hole top is 0.5-1.3 mm. Adjust the gap between the needle ❼ and the rotary hook point to 0-0.05 mm.
   NOTE: Make sure the gap between the bobbin case holder position bracket ❹ and the rotary hook ❷ is sufficient to allow the thread to pass easily.
   NOTE: When securing the rotary hook ❷, make sure it does not strike the lower thread finger.

4 Presser foot mechanism



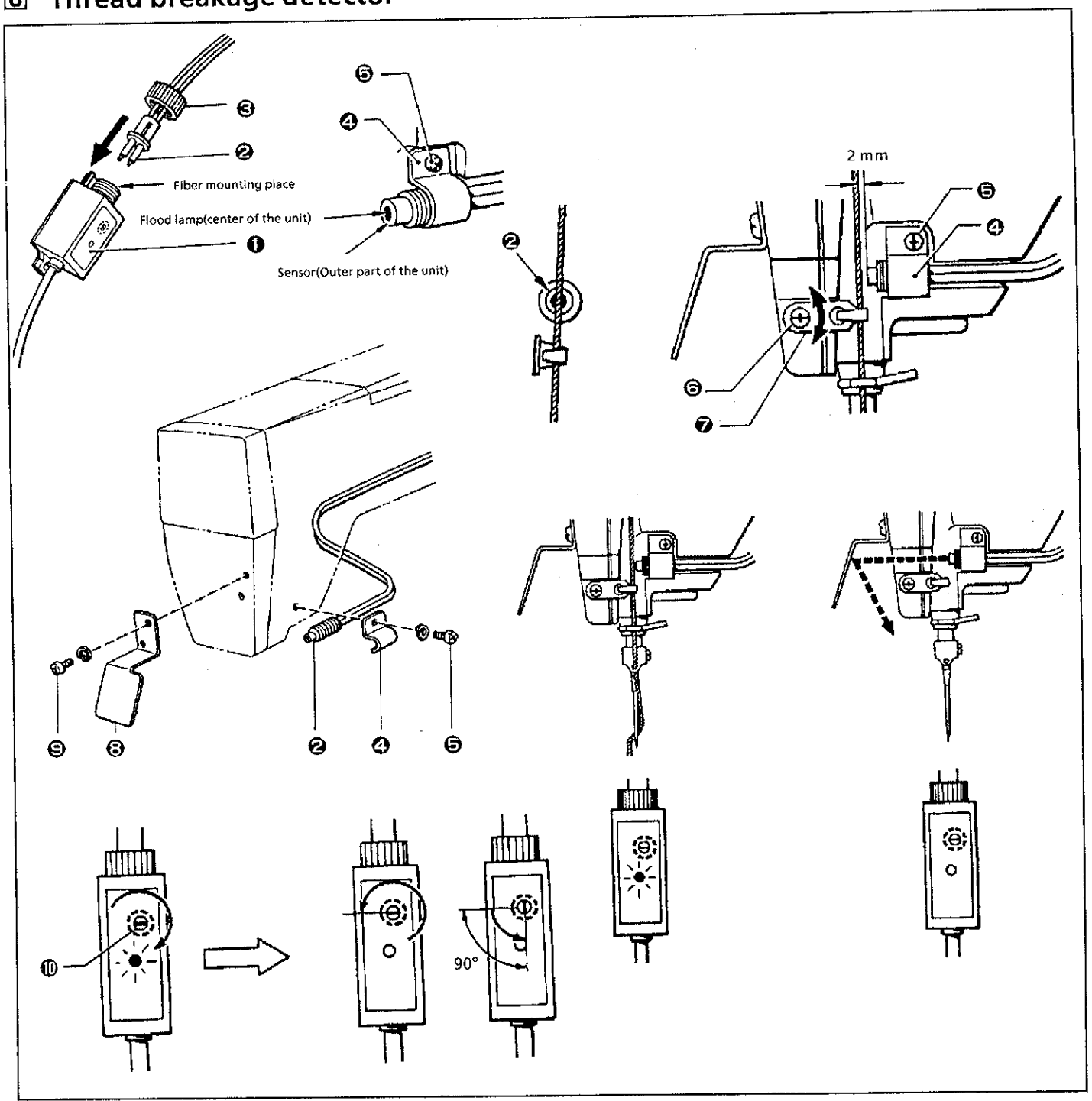
1) Insert the presser bar ❶ from the arm top.
2) After putting the presser bar guide clamp ❷ in the presser bar clamp bearing ❸, insert the presser bar ❶ into the presser bar guide clamp ❷.
3) Temporarily secure the presser bar clamp thread guide ❹ to the presser bar guide clamp ❷ with the screw ❺.
4) After putting the presser spring ❻ and the presser spring guide ❼ in the arm, secure them with the presser adjusting screw ❽ until the screw ❽ extends 43 mm. (Firmly tighten the nut.)
5) Attach the presser foot ❾ to the presser bar ❶ with the screw ❿.
6) When the cylinder ⓫ retracts and the presser foot ❾ is lowered, fasten the screw ⓯ of the lever ⓮ when the presser bar lifter lever ⓬ is on the presser bar lifter crank ⓭.
7) Loosen the bolt ⓰ of the presser bar guide clamp ❷, then move the presser bar ❶ vertically so that the gap between the needle plate ⓱ top surface and the presser foot ❾ bottom edge is 3-4 mm. Finally, fasten the bolt ⓰.
8) When the cylinder ⓫ extends and the presser foot ❾ is raised, loosen the nut ⓲ of the cylinder ⓫ then turn the rod ⓳ so that the gap between the needle plate ⓱ top surface and the presser foot ❾ bottom edge is 12-13 mm. Finally, fasten the nut ⓲.
9) Adjust the presser bar clamp thread guide ❹ so that its bottom edge is 123 mm above the needle plate when the presser foot ❾ is lowered above the sewing clamp ⓴.

5 Machine covers



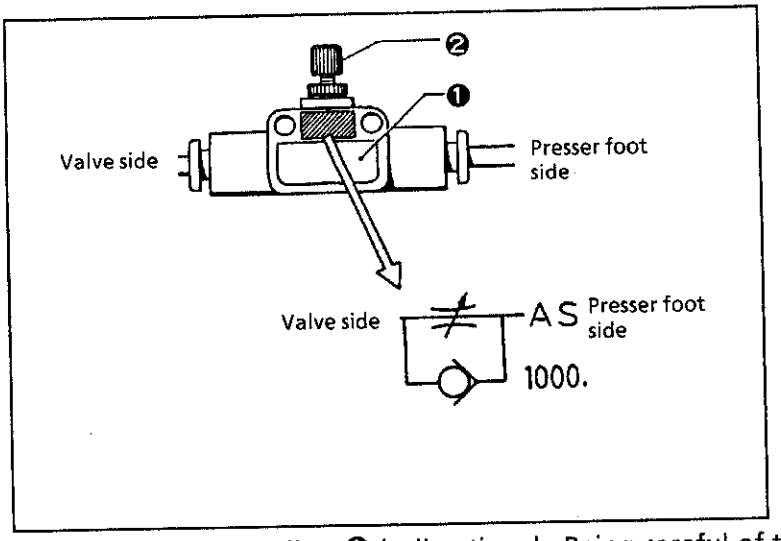
1) Secure the upper tension regulator bracket ❶ with the screw ❷.
2) Secure the oil stopper plate ❸ with the screw ❹.
3) Secure the thread take-up cover ❺ with the screw ❻.
4) Secure the amplifier holder ❼, the rear cover ❽ and the rear cover packing ❾ with the screw ❿.
5) Secure the amplifier ⓫ with the screw ⓬.
6) Plug the fiber unit ⓭ into the amplifier unit ⓫, then secure it with the fixing ring ⓮.
7) Secure the face plate ⓯ and the face plate packing ⓰ with the three screws ⓱.
8) Secure the upper lid ⓲ with the screw ⓳.

6 Thread breakage detector



1) Plug the fiber unit ❶ into the fiber mounting place of the amplifier unit ❷ until it stops.
2) While pressing the fiber unit ❷ against the amplifier unit ❶ lightly, tighten the fixing ring ❸.
   NOTE: When the power is ON, the center of the fiber unit ❷ should function as the floodlamp and the outer part of the unit should function as the sensor. If they do not, invert and insert it again.
3) Secure the fiber unit ❷ with the sensor holder ❹ and the screw ❺ so that the fiber unit ❷ is vertical against the thread and so that the fiber unit ❷ end is 2 mm away from the needle.
4) When the thread take-up is at its highest position and the thread is tensed, secure the face plate thread guide (down) ❼ with the screw ❻ so that the thread passes through the center of the fiber unit ❷.
5) Secure the sensor cover ❽ with the screw ❾.
6) To adjust the sensitivity, when the sensor cover ❽ is attached but the thread is not threaded, turn the sensitivity adjusting trimmer ❿ clockwise until the lamp goes on.
   Then, turn the trimmer counterclockwise until the lamp goes off, and turn it 90° more counterclockwise.
   NOTE: Check that the lamp goes on when the thread is threaded and off when the thread is not threaded.

7 Thread blower



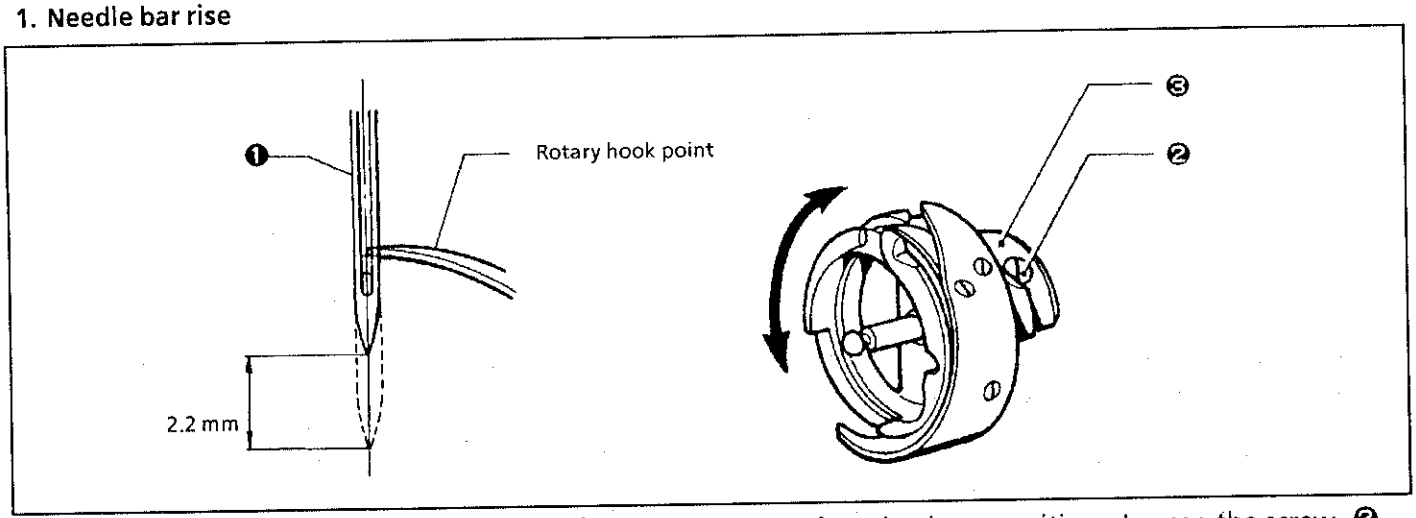
1) The speed controller ❶ is directional. Being careful of the marking and the direction of the attachment, attach it as shown in the figure above.
2) Keep the knob ❷ of the speed controller ❶ unfastened when attaching the thread blower.
   NOTE: When using the thread blower with the needle cooler, draw the controller ❶ so that it does not effect the needle thread.

ADJUSTMENT

1 The timing between needle and rotary hook

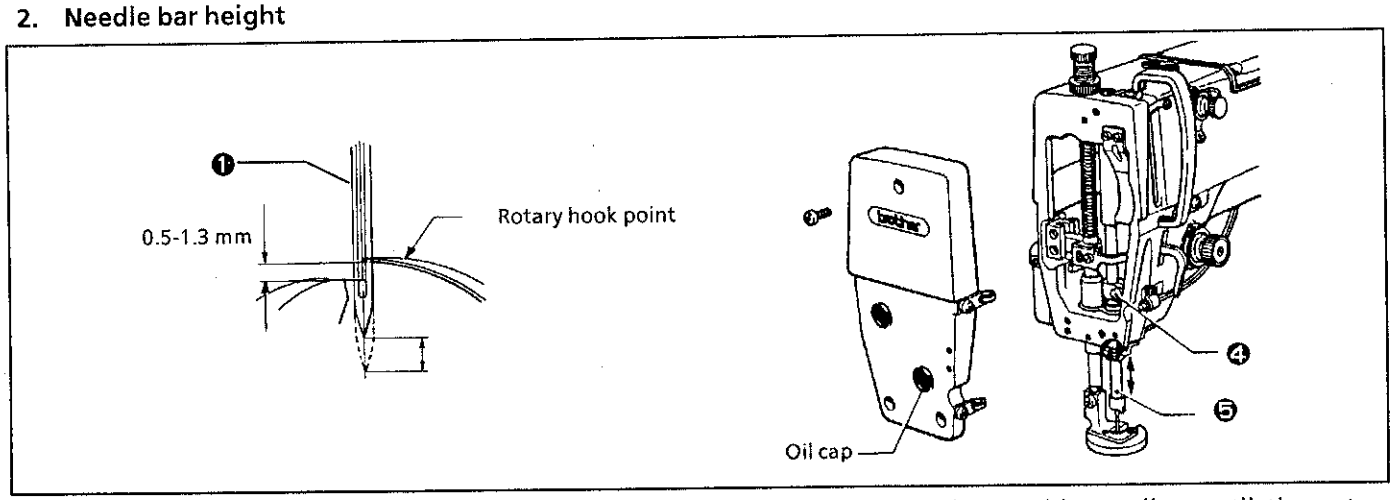
Proper timing between the needle and the rotary hook is required for the needle to rise from its lowest position, then to form a loop which is caught by the rotary hook point.

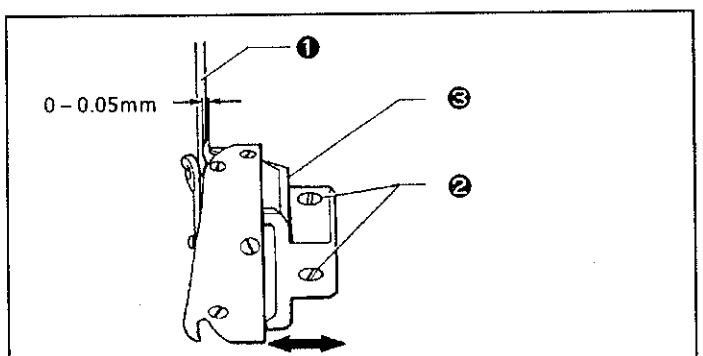
1. Needle bar rise

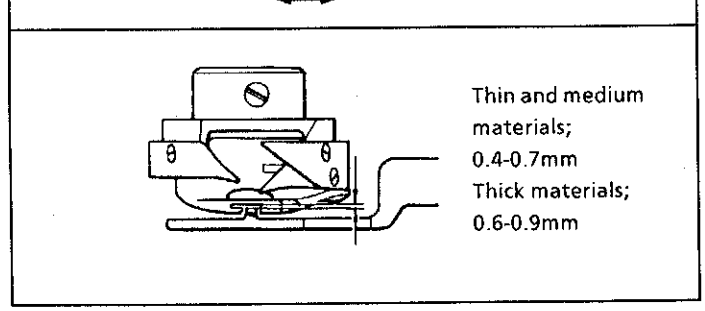


Rotate the machine pulley until the needle ❶ is raised 2.2 mm from its down position. Loosen the screw ❷, then turn the rotary hook ❸ to adjust it so that the rotary hook point is aligned with the needle center.

2. Needle bar height







After rotating the machine pulley until the rotary hook point is aligned with the needle ❶ center, remove the oil cap, loosen the screw ❹, then vertically adjust the needle bar height so that the gap between the rotary hook point and the needle hole top edge is 0.5-1.3 mm.

3. The space between the needle and the rotary hook point

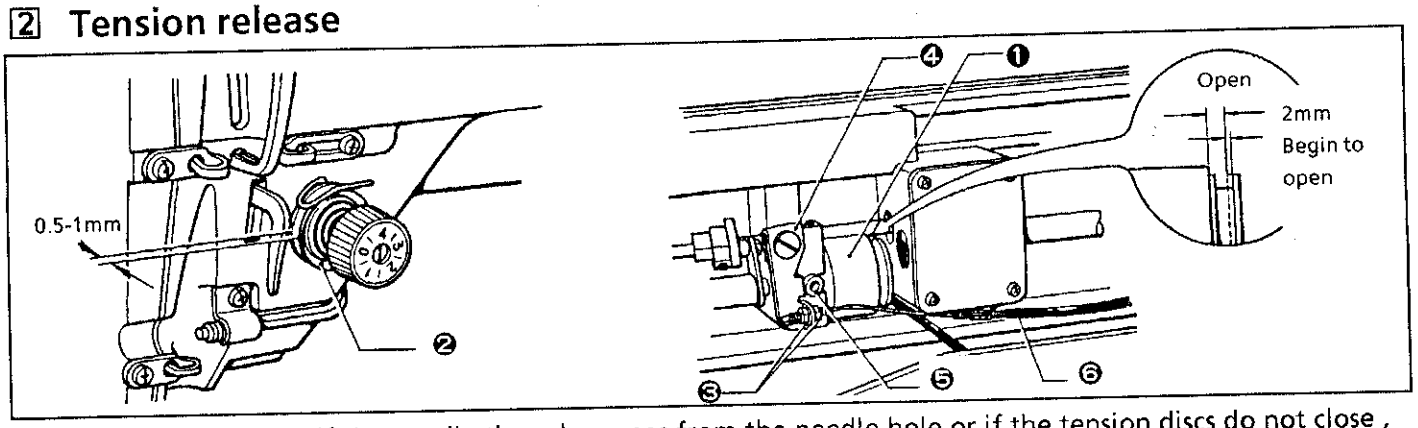
Loosen the screw ❷, then move the rotary hook ❸ right or left so that the space is 0-0.05 mm.

4. The gap between the rotary hook and the bobbin case holder position bracket.

Check that the gap allows the thread to pass smoothly.

With thin and medium materials the gap should be 0.4-0.7 mm. With thick materials the gap should be 0.6-0.9 mm.

2 Tension release



After thread trimming, if the needle thread escapes from the needle hole or if the tension discs do not close , make the following adjustment.

A. If the thread escapes from the needle hole

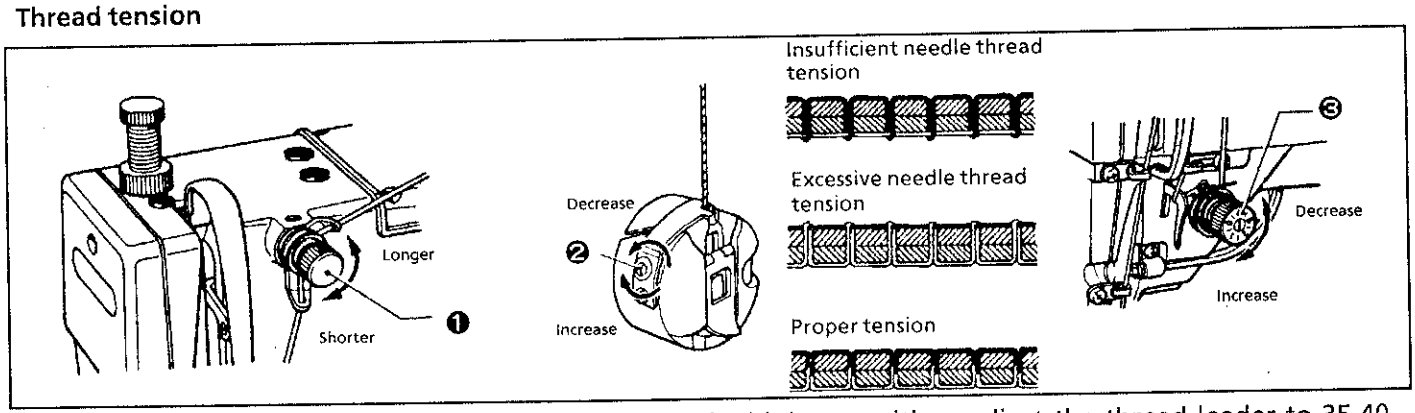
1) There should be some play between the two tension discs ❷ (tension release disc washers) when the thread trimmer solenoid ❶ is extended approximately 2 mm, and the discs should open completely when the solenoid is fully extended.
2) When the thread trimmer solenoid ❶ is released, the tension discs ❷ should close.
3) Loosen the nut ❸, then extend the thread trimmer solenoid ❶ approximately 2 mm.
4) Tighten the nut ❸ (left side) at the point where the tension discs ❷ begin to open. Check that the tension discs ❷ open when the thread trimmer solenoid ❶ is fully extended, and that the discs ❷ close when the solenoid ❶ is released.

B. If the tension discs do not close

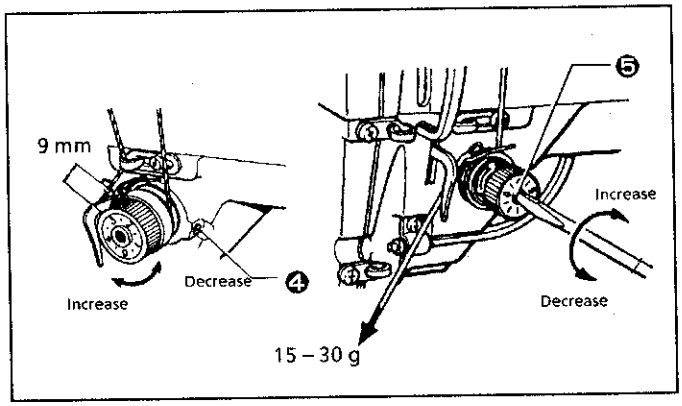
The three check points below can be adjusted with the nut ❸. If the adjustment cannot be made with the nut ❸, replace the wire ❻.

1) Check if the tension release lever ❹ is retracted.
2) Check if the tension release spring ❺ is out of place.
3) Check if the tension release wire ❻ is stretched.

Thread tension



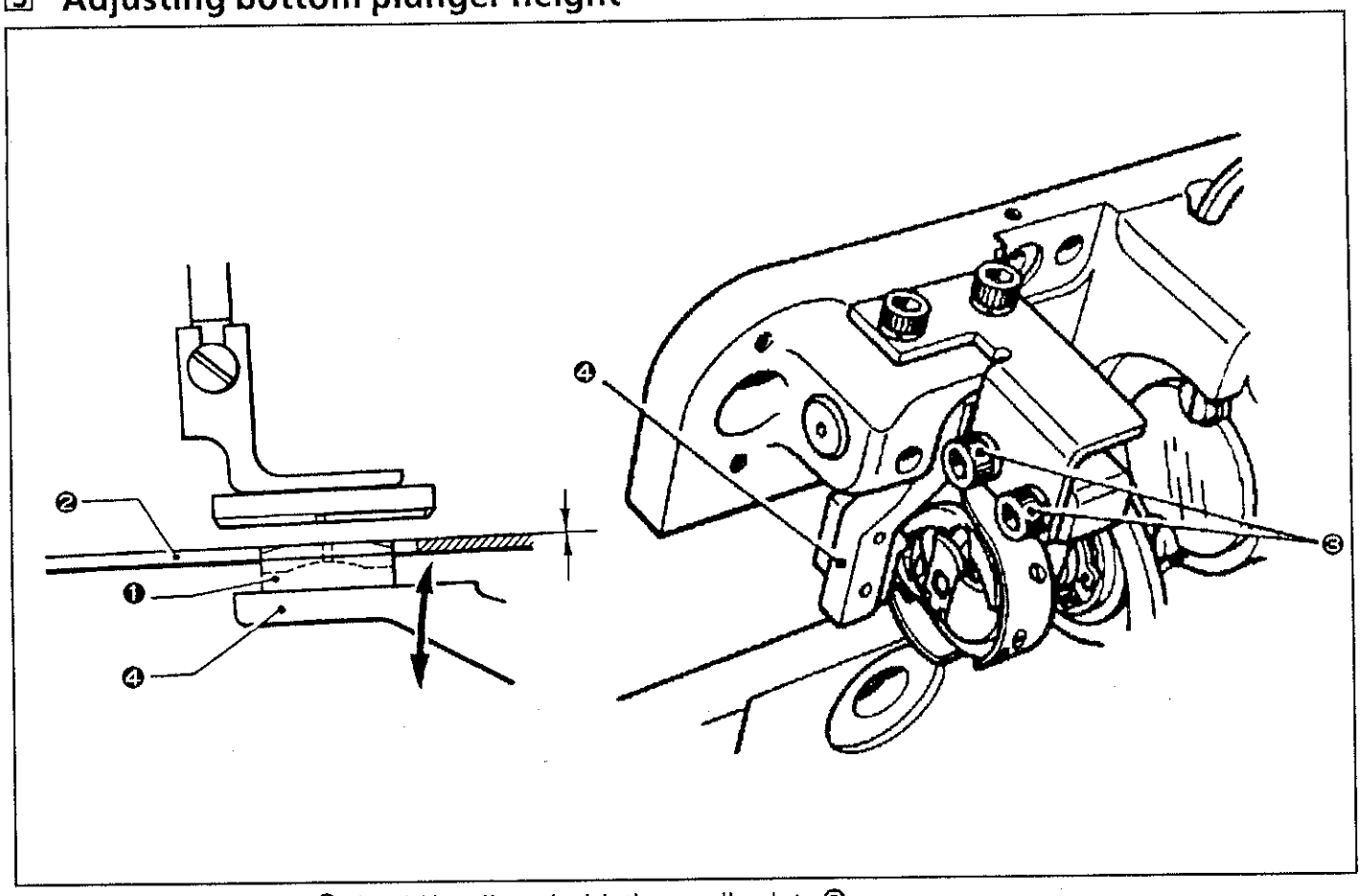
After thread trimming, when the thread take-up is at its highest position, adjust the thread leader to 35-40 mm by turning the screw ❶.
Adjust the bobbin thread tension by turning the spring adjusting screw ❷ so that the bobbin case slips down of its own weight from the bobbin thread when it is suspended by the bobbin thread.
After lowering the presser foot, adjust the needle thread tension by turning the knob ❸.



Thread take-up spring

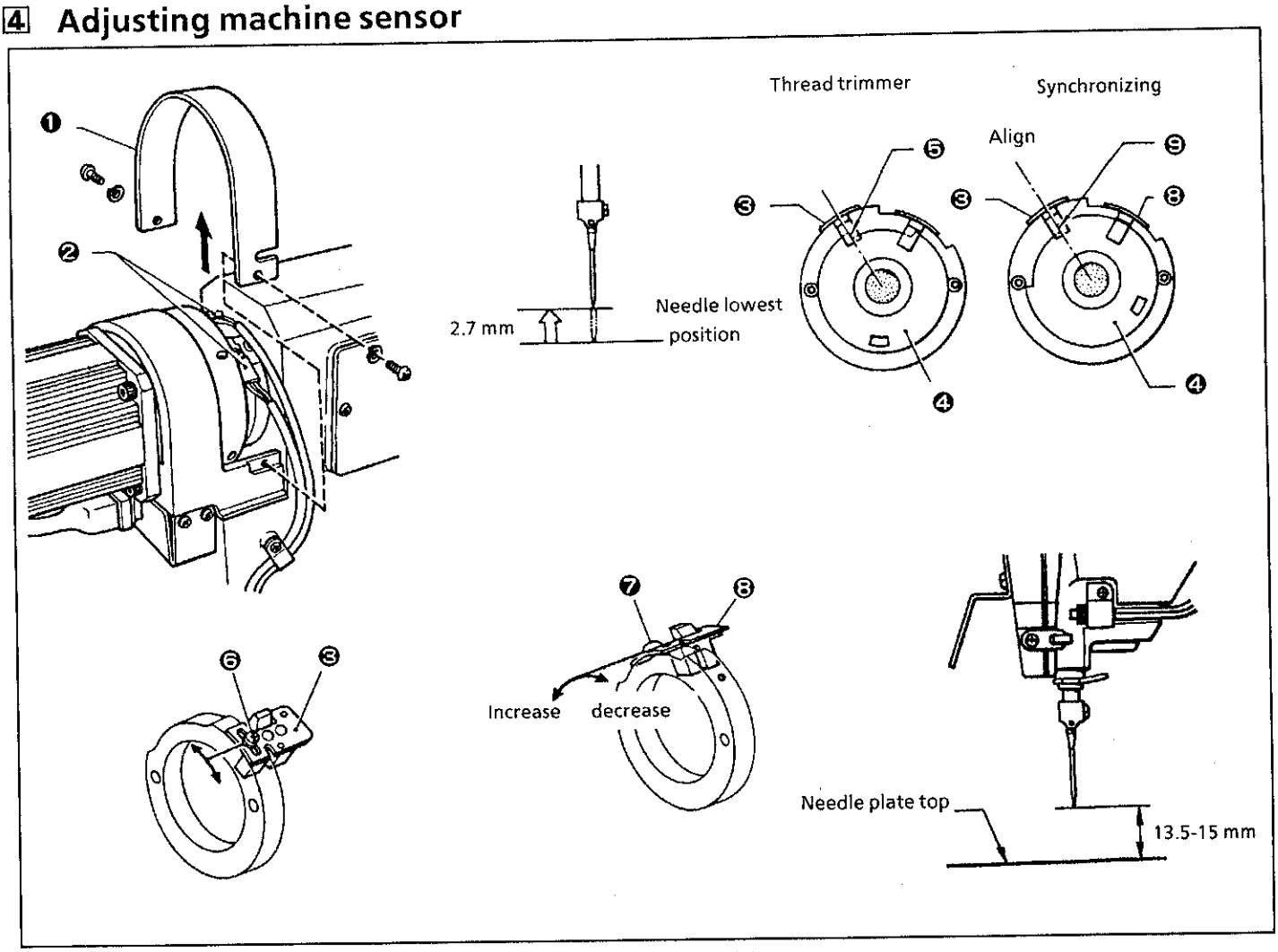
When the presser foot is lowered above the sewing clamp, the standard operation height of the thread take-up spring is 9 mm above the top edge of the presser bar clamp thread guide. To adjust the height, loosen the screw ❹ then turn the upper tension regulator bracket assembly.
When the presser foot is lowered above the sewing clamp, the standard tension of the thread take-up spring is 15-30 g. To adjust the tension, rotate the tension stud ❺ using a screwdriver.

3 Adjusting bottom plunger height



1) The bottom plunger ❶ should be aligned with the needle plate ❷.
2) If not, loosen the bolt ❸, then adjust the bottom plunger height by vertically moving the bottom plunger lever ❹.

4 Adjusting machine sensor



The two elements in the machine sensor monitor the needle position.

1. Adjusting the sensor position to send the thread trimmer signal properly
   1) Remove the pulley cover ❶.
   2) Turn the machine pulley ❷ until the needle rises 2.7 mm from its down position. At this time, the center of the machine sensor on the left ❸ should be aligned with the slit ❺ of the sensor dog ❹.
   3) If it does not, loosen the screw ❻, then move the machine sensor ❸ for alignment.

2. Adjusting the sensor position to send the up needle stop position signal properly
   1) When the needle is at its top position, it should stop 13.5-15 mm above the needle plate surface.
   2) If the needle does not stop, loosen the screw ❼, then shift the machine sensor on the right ❽ to adjust its position.

   NOTE: Shifting the sensor clockwise increases the needle height. Shifting it counterclockwise decreases the height.

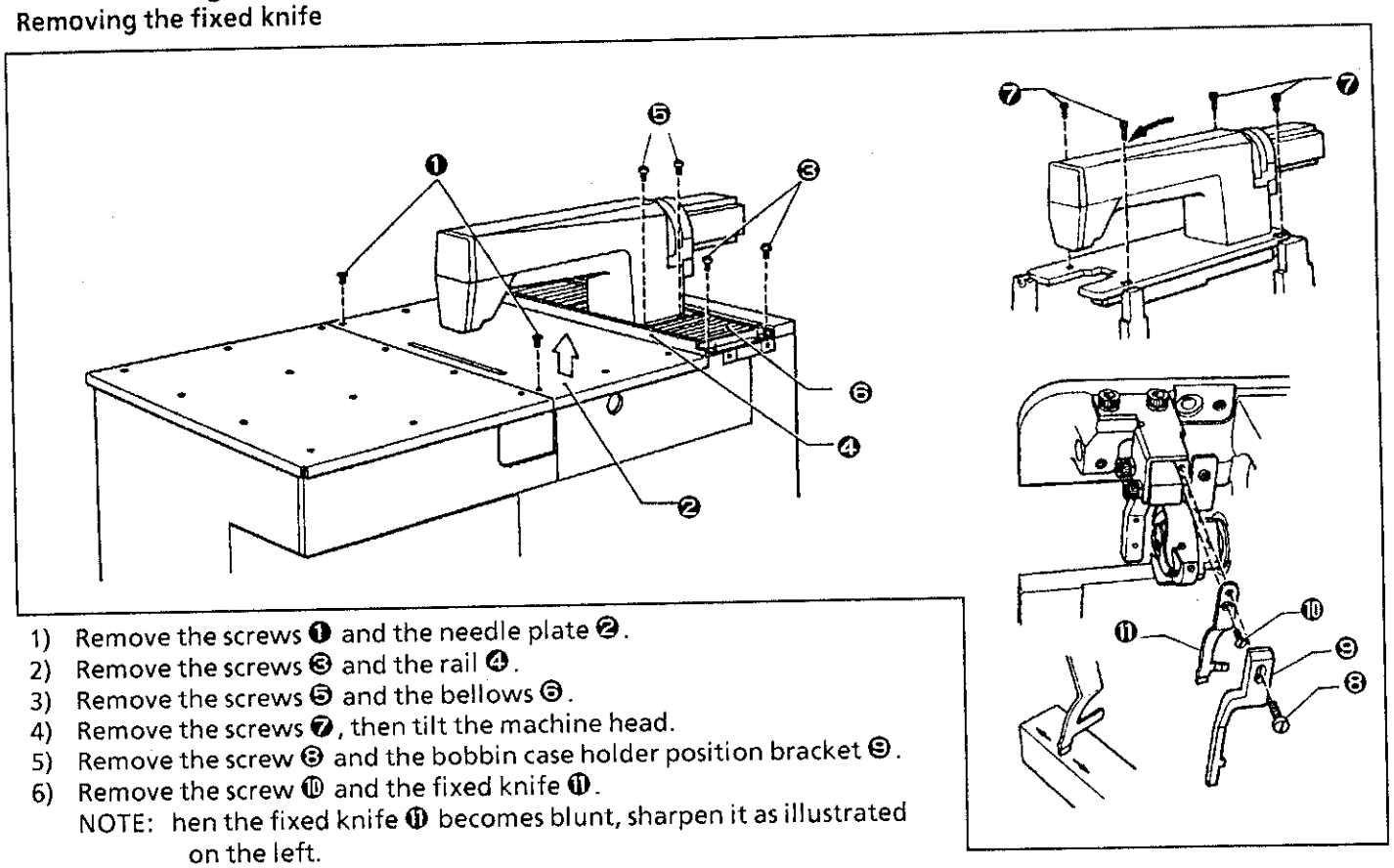
3. Adjusting the sensor position to send the synchronizing signal properly
   1) When the needle rises from its lowest position and the needle top is aligned with the needle plate surface, the center of the machine sensor on the left ❸ should be aligned with the slit ❾ of the sensor dog ❹.
   2) If the sensor is not aligned properly, loosen the screw ❻ then move the machine sensor ❸ for alignment.

5 Adjusting thread trimmer

Turn off the power.

1. Removing the fixed knife and the movable knife

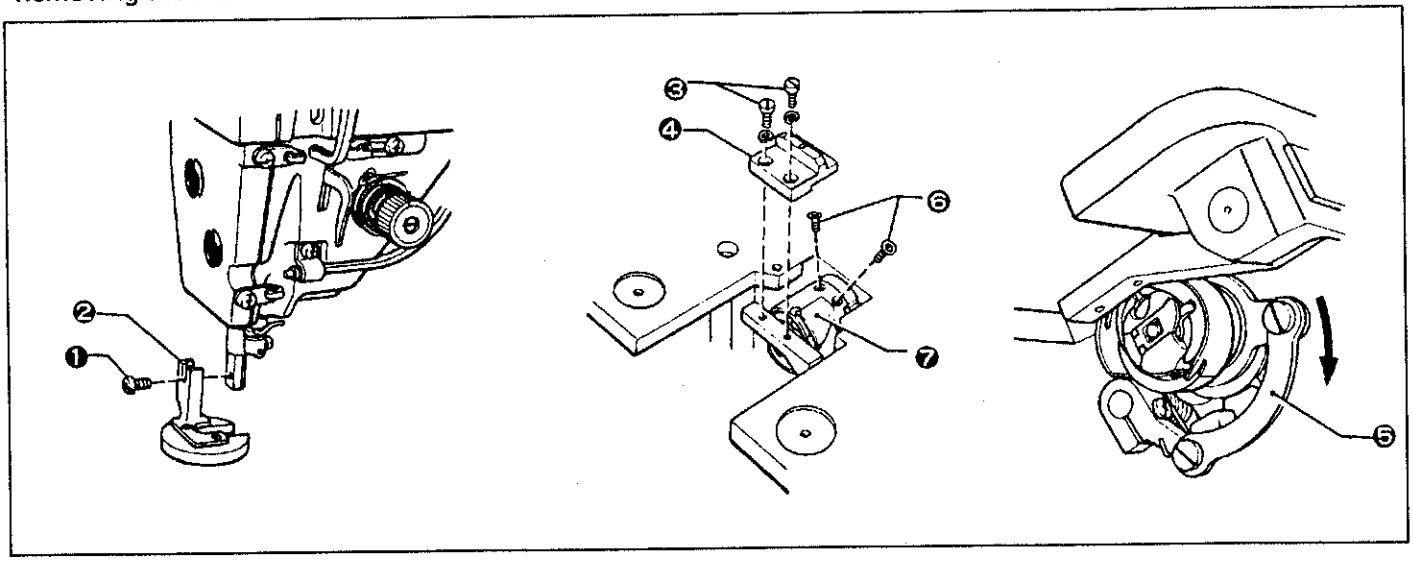
Removing the fixed knife



1) Remove the screws ❶ and the needle plate ❷.
2) Remove the screws ❸ and the rail ❹.
3) Remove the screws ❺ and the bellows ❻.
4) Remove the screws ❼, then tilt the machine head.
5) Remove the screw ❽ and the bobbin case holder position bracket ❾.
6) Remove the screw ❿ and the fixed knife ⓫.

NOTE: hen the fixed knife ⓫ becomes blunt, sharpen it as illustrated on the left.

Removing the movable knife

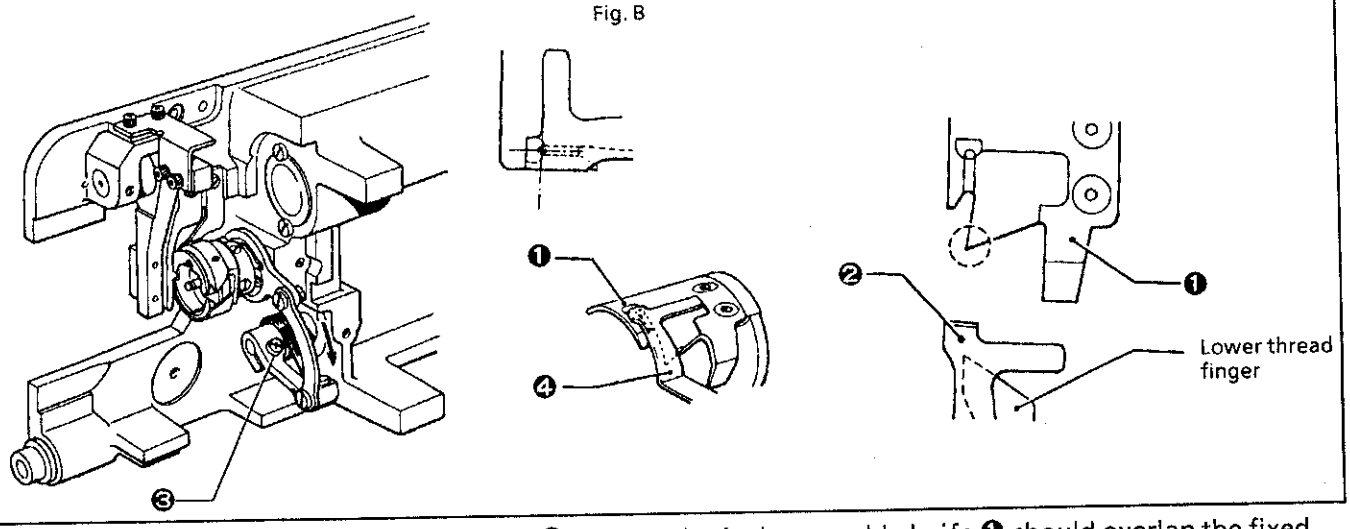


1) Remove the screws ❶ and the presser foot ❷.
2) Turn the machine pulley until the needle bar is at its highest position.
3) Remove the screw ❸ and the bottom plunger ❹.
4) Press the thread trimmer rod ❺ by hand in the direction of the arrow until the screws ❻ can be seen.
5) Remove the screws ❻ and the movable knife ❼.

Note 1: Before removing the bottom plunger ❹ and the movable knife ❼, remove the needle.
Note 2: Reassembly is performed by reversing the above procedures.

2. Adjusting the fixed knife, movable knife, and lower thread finger

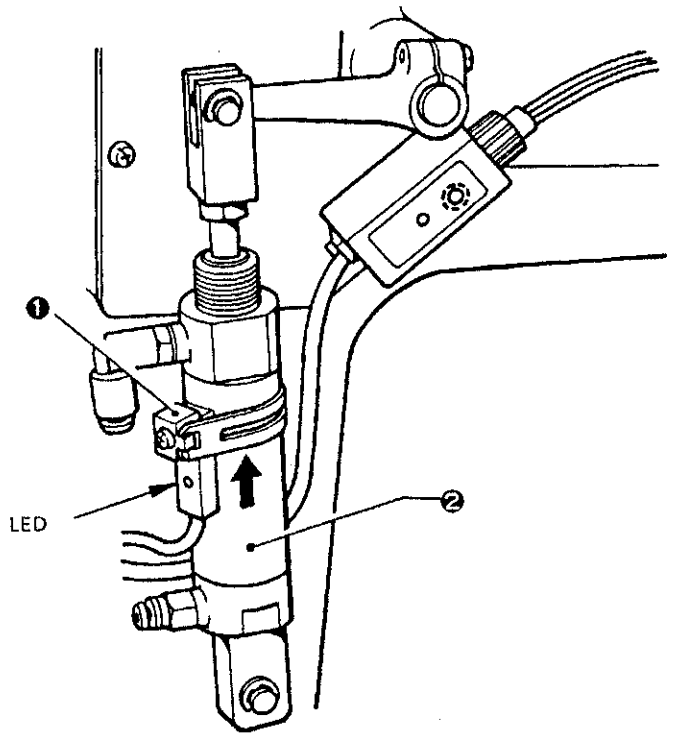
Fig. B



When the movable knife ❶ and the fixed knife ❷ are attached, the movable knife ❶ should overlap the fixed knife ❷ tip when the movable knife is driven to the end of its stroke by the thread trimming clutch, as shown in Fig. B.
If the knives do not overlap, loosen the screw ❸ and the thread trimmer lever ❹.
NOTE: Check that the lower thread finger does not strike the rotary hook and the movable knife ❶.

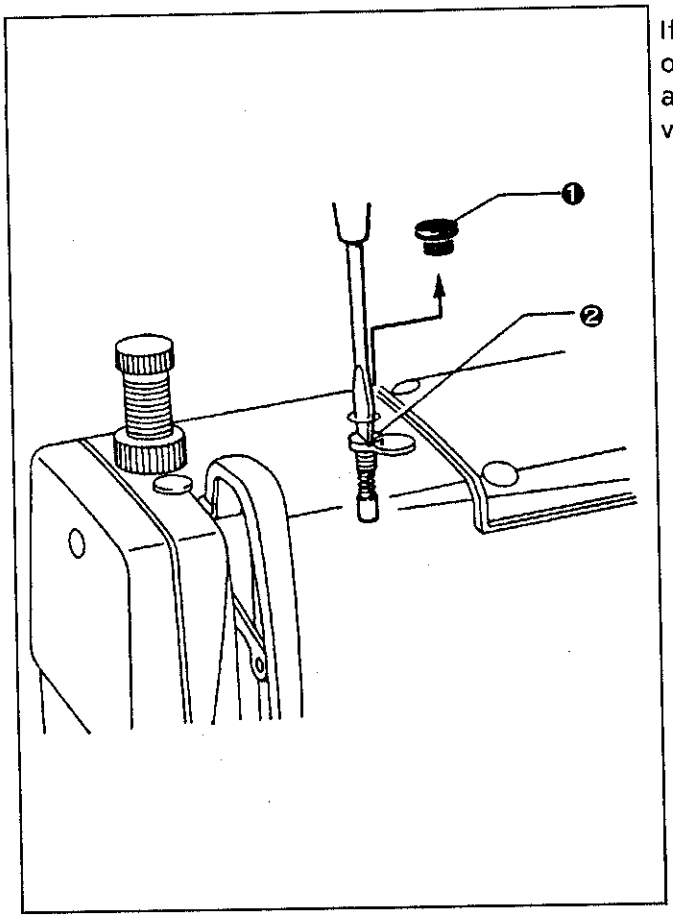
6 Adjusting cylinder sensor

When the power is ON and the presser foot is up, the indicator on the cylinder sensor lights within a certain range when slowly raising the sensor ❶ along the cylinder ❷ from bottom to top. Secure the sensor ❶ in the middle of that range.



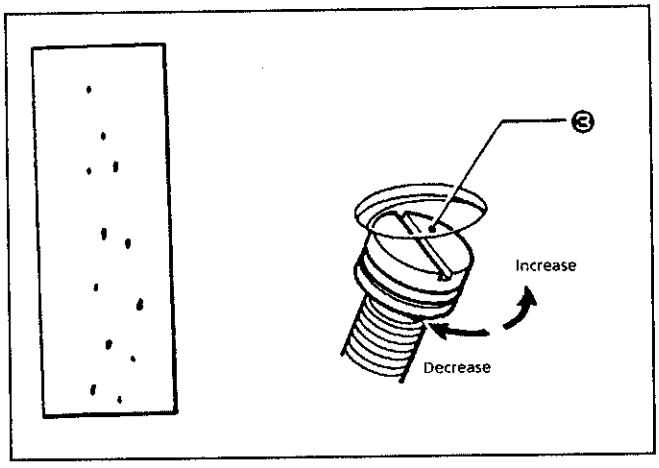
7 Lubrication

1. Oil absorption in the arm



If there is too much oil absorption in the arm, remove the oil cap ❶, then fasten the screw ❷ to reduce the oil absorption. Be careful not to fasten it too tightly or burn will occur.

2. Oil absorption in the rotary hook



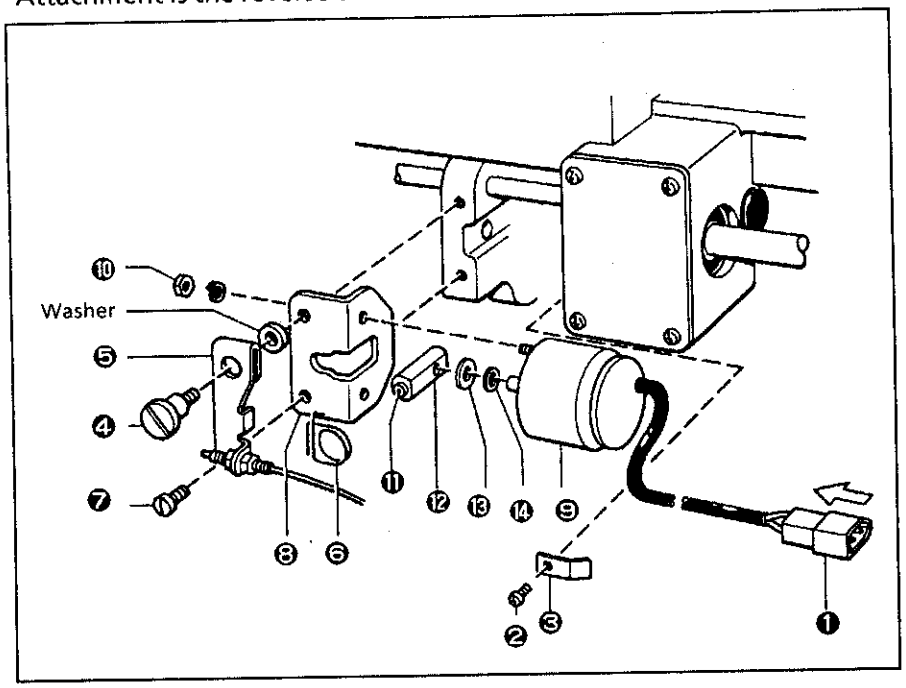
The proper oil absorption scattered from the rotary hook is a few drops at 3,000 spm. Turn the screw ❸ to adjust the absorption.

NOTE: Check the absorption when the machine is stable, because the absorption temporarily increases soon after the machine head is righted.

REPLACEMENTS

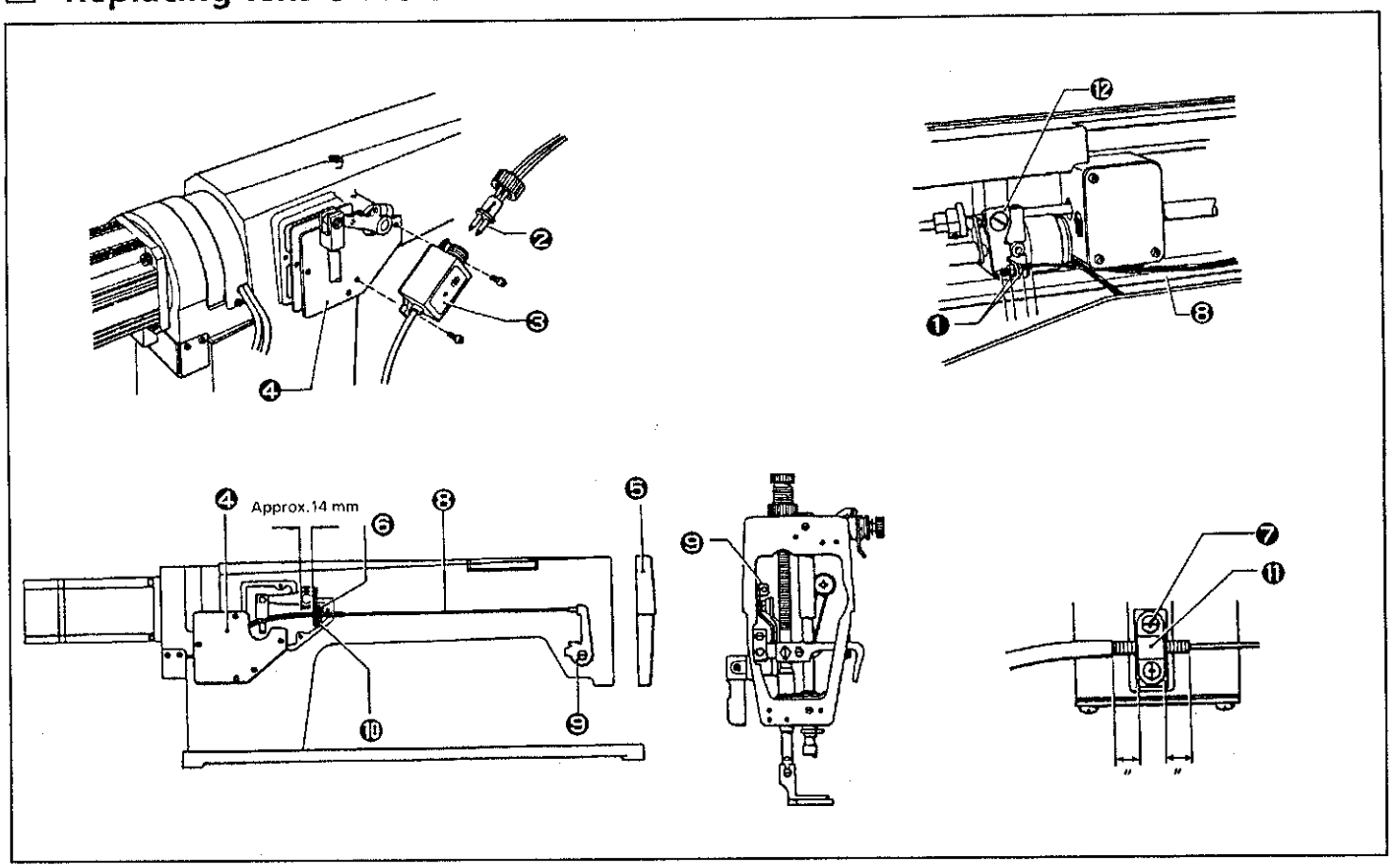
1 Replacing thread trimmer solenoid

When disconnecting the solenoid cords, remember where they are attached.
Attachment is the reverse of removal.



1) Tilt the machine head until it stops.
2) Disconnect the connector ❶.
3) Loosen the screw ❷. Disconnect the cord from the cord holder ❸.
4) Remove the stud screw ❹, the tension release lever ❺ and the tension release spring ❻.
5) Remove the screw ❼to remove the thread trimmer solenoid bracket ❽ along with the thread trimmer solenoid ❾.
6) Remove the two nuts ❿ and the thread trimmer solenoid❾.
7) Loosen the screw ⓫, then remove the solenoid lever ⓬, the washer ⓭ and the cushion ⓮.
8) Replace the thread trimmer solenoid assembly (code: S11927-001).

2 Replacing tension release wire



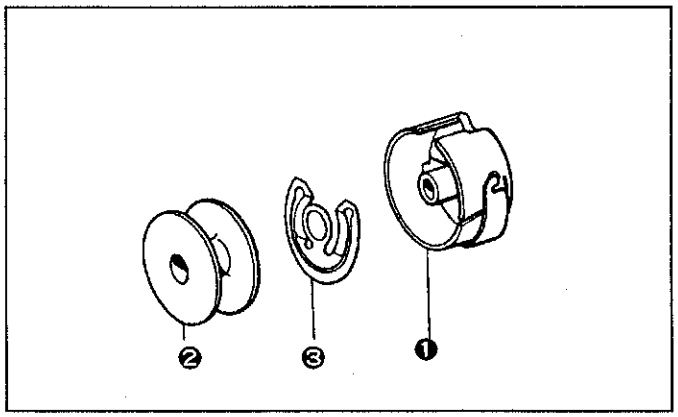
Removal

1) Remove the nut ❶.
2) Remove the fiber unit ❷ from the amplifier unit ❸.
3) Remove the amplifier unit ❸.
4) Remove the rear cover ❹.
5) Remove the face plate ❺.
6) Loosen the screws ❻ and ❼.
7) Remove the tension release wire ❽ from the thread tension release plate ❾, and the tension release wire pressers (upper) ❿ and (lower) ⓫.
8) Remove the nut ❶ and the tension release wire ❽.

Attachment

1) Thread the tension release wire.
2) Insert the wire end into the thread tension release plate ❾.
3) Secure the wire with the tension release wire presser (upper) ❿. (Refer to the figure above.)
4) Secure the wire with the tension release wire presser (lower) ⓫. (Refer to the figure above.)
5) Pass the wire through the tension release lever ⓬, then secure it with the nut ❶. (Adjust the wire, as described on the previous page.)

Replacing the bobbin tension spring

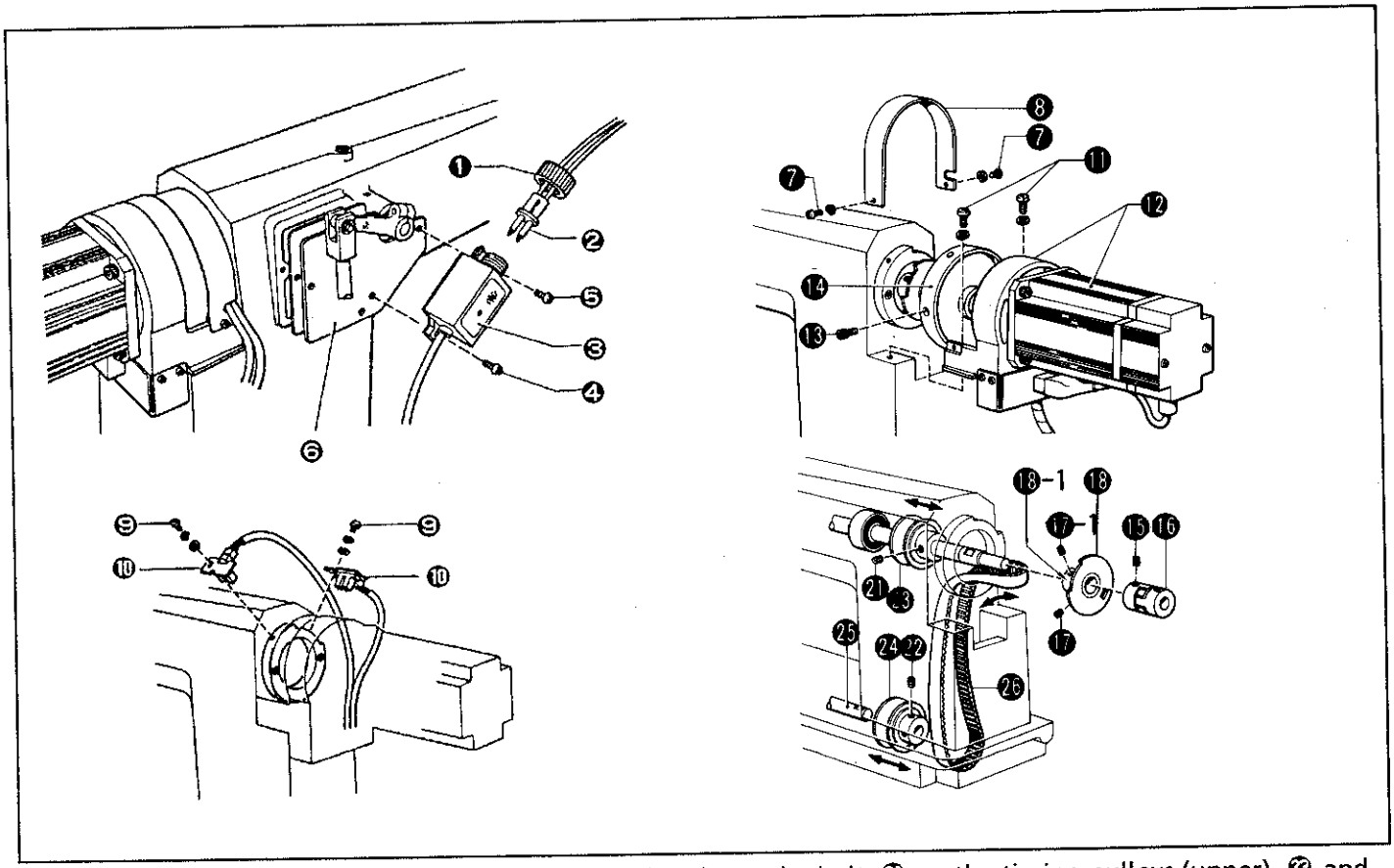


1) Remove the bobbin case ❶ from the machine.
2) Remove the bobbin ❷ from the bobbin case ❶.
3) Remove the bobbin tension spring ❸ from the bobbin case ❶ using a screwdriver.

3 Replacing timing belt

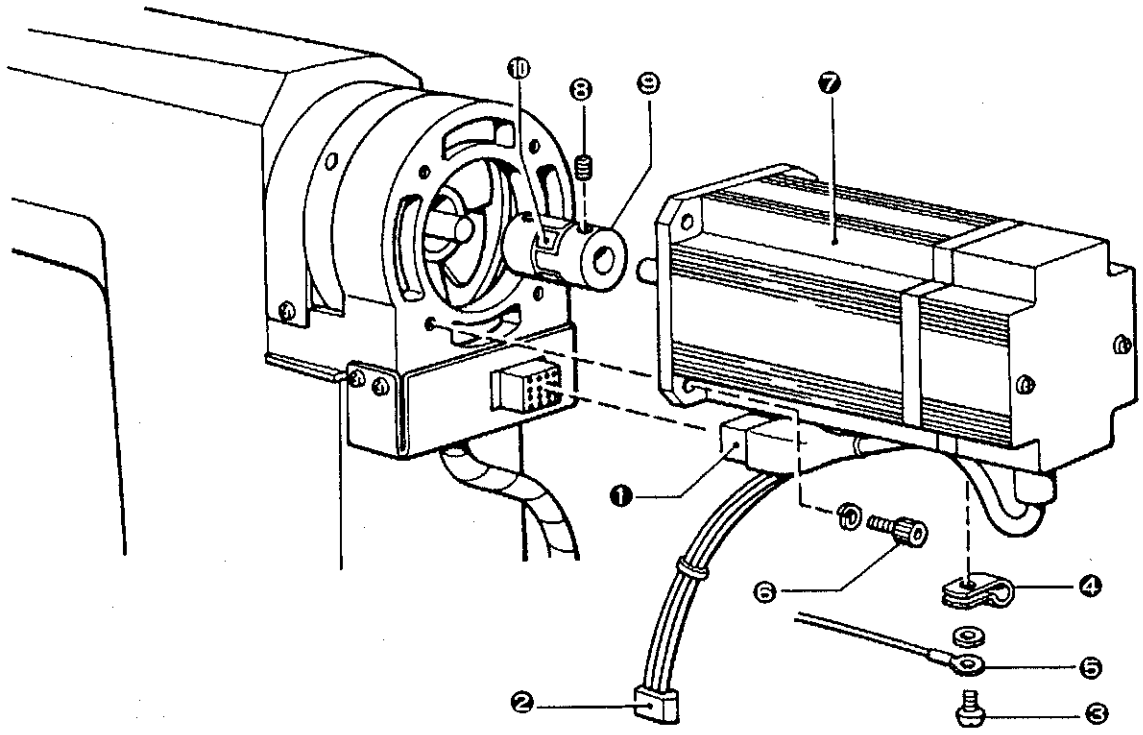
1. Removal

1) Remove the fixed ring ❶, then remove the fiber unit ❷ from the amplifier unit ❸.
2) Remove the screw ❹ and the amplifier unit ❸.
3) Remove the screw ❺ and the rear cover ❻.
4) Remove the screw ❼ and the pulley cover ❽.
5) Remove the screw ❾ and sensor circuit board assembly 1 ❿.
6) Remove the screw ⓫, then remove the DD motor bracket ⓬ with the motor.
7) Loosen the screw ⓭ and the pulley ⓮.
8) Loosen the screw ⓯ and the coupling ⓰.
9) Loosen the screw ⓱ and the sensor dog assembly ⓲.
10) Loosen the bolt ⓳ and remove the sensor stop collar ⓴.
11) Loosen the screws ㉑ and ㉒, then shift the timing pulleys (upper) ㉓ and (lower) ㉔ to the pulley. Next, remove the timing pulley (lower) ㉔ from the lower shaft ㉕. Finally, remove the timing belt ㉖ from the arm.



1) Insert the timing belt ㉖ from the arm hole, then hang the belt ㉖ on the timing pulleys (upper) ㉓ and (lower) ㉔.
2) Place the timing pulley (lower) ㉔ on the lower shaft ㉕. Then, shift the timing pulleys (upper) ㉓ and (lower) ㉔ to the needle bar, and secure all of them with the screws ㉑ and ㉒.
3) Secure the sensor stop collar ⓴ with the bolt ⓳.
4) Place the sensor dog assembly ⓲ on the upper shaft, then tighten the screw ⓱.
   NOTE: The boss ⓲-1 of the sensor dog assembly ⓲ should be on the needle bar side and the screw ⓱-1 of the slit should fit into the screw stop in the upper shaft.
5) Place the coupling ⓰ on the upper shaft, then secure it with the screw ⓯.
6) Place the pulley ⓮ on the coupling ⓰, then secure it with the screw ⓭.
7) Secure the DD motor bracket ⓬ with the screw ⓫.
8) Secure sensor circuit board assembly 1 ❿ with the screw ❾.
9) Secure the pulley cover ❽ with the screw ❼.
10) Secure the rear cover ❻ with the screw ❺.
11) Secure the amplifier unit ❸ with the screw ❹.
12) Put the fiber unit ❷ into the amplifier unit ❸, then fasten the fixing ring ❶.

4 Replacing machine motor



1) Disconnect the connectors 15P ❶ and 3P ❷.
2) Remove the screw ❸, then the cord holder ❹ and the earth wire ❺.
3) Remove the bolt ❻ and machine motor assembly ❼.
4) Loosen the screw ❽, then remove the coupling ❾.
5) Replace the machine motor assembly (code: S11737-000).
   NOTE: Attachment is the reverse of removal.
   NOTE: Make sure not to damage the clutch rubber (C) ❿ during attachment.

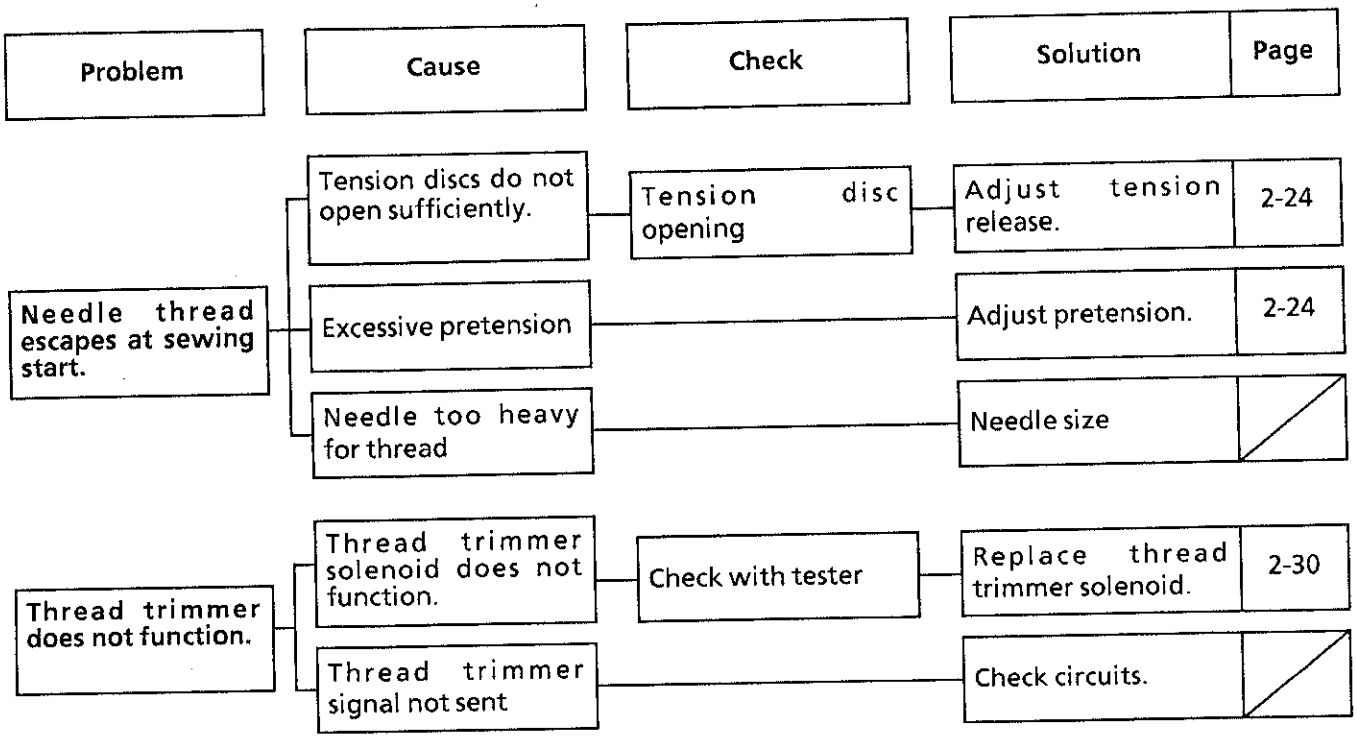
TROUBLESHOOTING GUIDE

1 Machine head

Problem	Cause	Check	Solution	Page
Needle breakage	Improper needle attachment	Needle facing, height	Reattach needle.	
	Bent needle. Blunt needle tip, jammed eye.	Needle	Replace needle.	
	Improper needle to rotary hook timing	Needle bar rise	Adjust needle to rotary hook timing.	2-23
		Needle bar height	Adjust needle to rotary hook timing.	2-23
		Needle to rotary hook gap	Adjust needle to rotary hook timing.	2-23
Thread breakage	Improper threading	threading	Rethread.	
	Bent needle. Blunt needle tip, jammed eye.	Needle	Replace needle.	
	Improper needle attachment	Needle facing, height	Reattach needle.	
	Excessive needle thread tension	Needle thread tension	Adjust needle thread tension.	2-24
	Excessive bobbin thread tension	Bobbin thread tension	Adjust bobbin thread tension.	2-24
	Loose needle thread	Thread take-up spring operation	Adjust thread take-up spring.	2-24
	Insufficient rotary hook lubrication	Oil supply	Adjust oil supply.	

Problem	Cause	Check	Solution	Page
Thread frays, breaks	Burr in thread path		Remove with sandpaper.	
	Blunt needle tip		Replace needle.	
Skipped stitches	Improper needle attachment	Needle facing, height	Reattach needle.	
	Wrong needle for application	Needle size, length	Replace needle with larger count needle.	
	Bent needle , blunt tip	Needle	Replace needle.	
	Blunt rotary hook point	Rotary hook point	Replace rotary hook.	
	Improper threading	Threading	Rethread.	
	Poor presser foot contact	Presser bar pressure	Tighten presser foot adjustment screw.	
		Presser bar height	Adjust presser bar height.	
	Improper needle to rotary hook timing	Needle bar rise	Adjust needle to rotary hook timing.	2-23
		Needle bar height	Adjust needle to rotary hook timing.	2-23
		Needle to rotary hook timing	Tighten presser foot adjustment screw.	2-23
	Needle thread remainder too short; does not remain in material.		Adjust pretension.	2-24
	Bobbin spins during thread trimming and bobbin thread remainder gets too short; won't rise.	Bobbin tension spring	Replace bobbin tension spring.	2-31
	Thread take-up spring tension too weak, won't raise bobbin thread.	Thread take-up spring tension	Adjust take-up spring tension.	2-24

Problem	Cause	Check	Solution	Page
Needle thread does not tighten.	Insufficient needle thread tension		Increase needle thread tension.	2-24
	Excessive needle thread tension		Decrease bobbin thread tension.	2-24
Bobbin thread does not tighten.	Excessive needle thread tension		Decrease needle thread tension.	2-24
	Insufficient needle thread tension		Increase bobbin thread tension.	2-24
Improper looping stitch tightening	Rough thread path	Thread path	Polish with fine sandpaper.	
	Poor bobbin spinning	Tension of bobbin thread leader	Replace bobbin, rotary hook.	
	Rotary hook to rotary hook stop gap too small	Gap	Adjust needle to rotary hook timing.	2-23
Improper thread trimming				
a. Needle, bobbin threads not trimmed	Movable knife, fixed knife do not overlap		Adjust knives.	2-28
	Worn, rough movable, fixed knife edges	Knives	Replace knives.	2-28
	Movable knife does not move	Thread trimmer signal sent?	Check electrical circuits; replace thread trimmer solenoid.	
	Improper needle attachment	Needle facing	Reattach needle.	
b. Needle thread not trimmed	Movable knife, fixed knife do not overlap		Adjust knives.	2-28
	Poor movable knife, fixed knife cutting.	Knives	Replace knifes.	2-28
c. Bobbin thread not trimmed	Movable knife, fixed knife do not overlap		Adjust knives.	2-28


Problem
Cause
Check
Solution
Page
Needle thread escapes at sewing start.
Tension discs do not open sufficiently.
Tension disc opening
Adjust tension release.
2-24
Excessive pretension
Adjust pretension.
2-24
Needle too heavy for thread
Needle size
Thread trimmer does not function.
Thread trimmer solenoid does not function.
Check with tester
Replace thread trimmer solenoid.
2-30
Thread trimmer signal not sent
Check circuits.

BAS750 standard adjustment

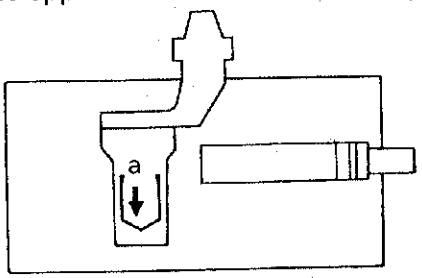
Adjustment	Dacron yarn	Spun yarn	Remarks
1. Needle height when rotary hook point is aligned with needle cetner	2.2	←	
2. Space between rotary hook point and needle	0-0.05	←	
3. Needle bar height (mm) (distance between top edge of needle hole and bottom edge of rotary hook point)	0.6	0.6-1.3 (Note 1)	(Reference line is drawn by 0.6 mm)
4. Mounting position of bobbin case holder position bracket	Move the bracket all the way to the direction of rotary hook rotation, and attach it	←	(Note 2)
5. Gap between bobbin case holder position bracket and rotary hook	0.4-0.7	←	
6. Height of presser bar clamp thread guide (mm) (distance between needle plate surface and presser bar clamp thread guide when presser foot is lowered above sewing clamp)	123	←	

Thread tension for reference (#80)

	Dacron yarn	Spun yarn
1. Needle thread tension (g)	20	40
2. Bobbin thread tension (g)	10	15
3. Thread take-up spring height (mm) (distance between presser bar clamp thread guide top and thread take-up spring when presser foot is lowered above sewing clamp)	9	←
4. Thread take-up spring tension (g)	15	25

Note 1: If stitches skip or if the thread breaks because of the stitch skip when spun yarn is used, raise the needle bar slightly.

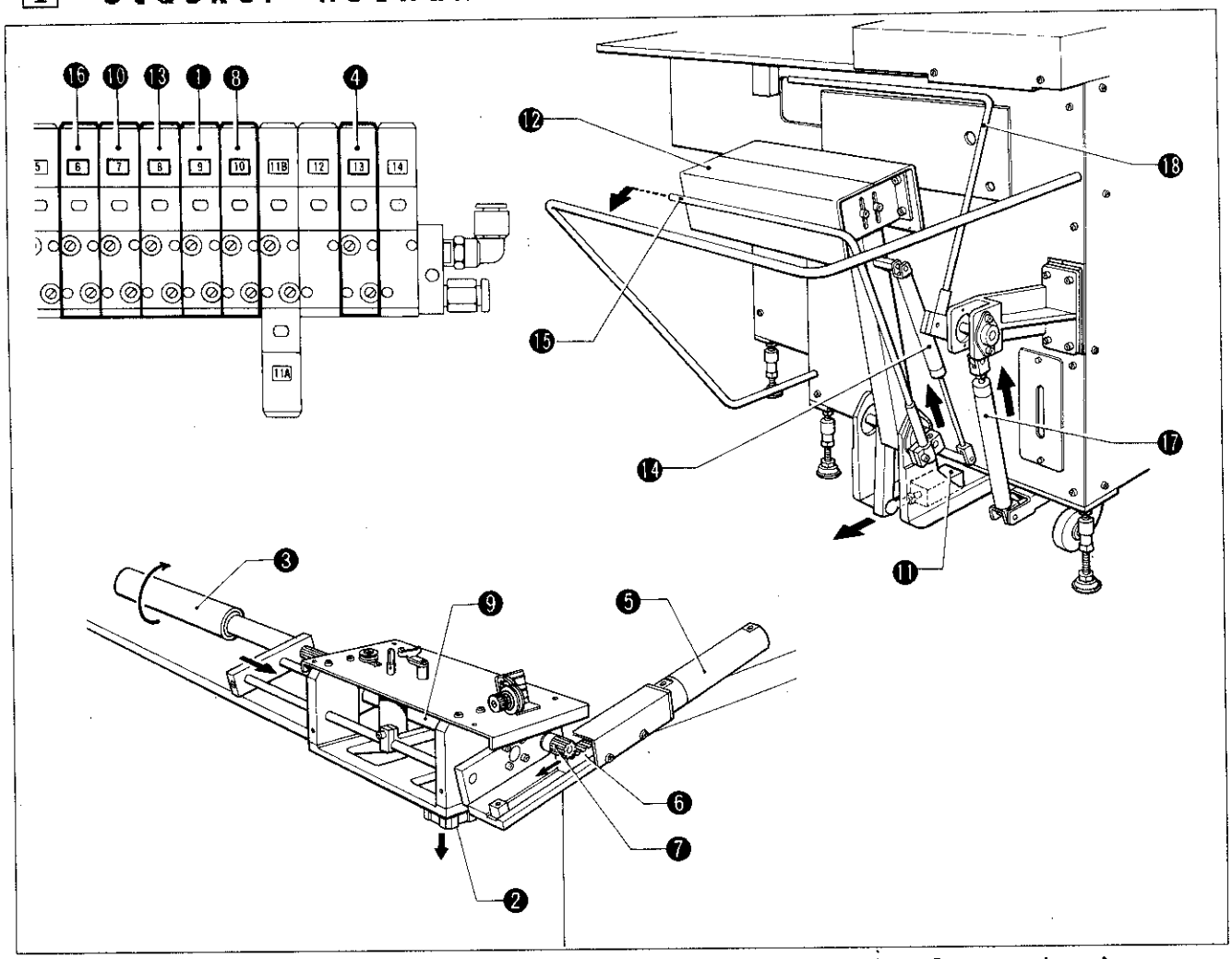
Note 2: If only the forward stitch (direction a) is loose, and as a result, looping happens, move the presser bar clamp thread guide in the opposite direction of the rotary hook, and attach it, in order to avoid these problems.



3. POWER UNIT

MECHANISMS

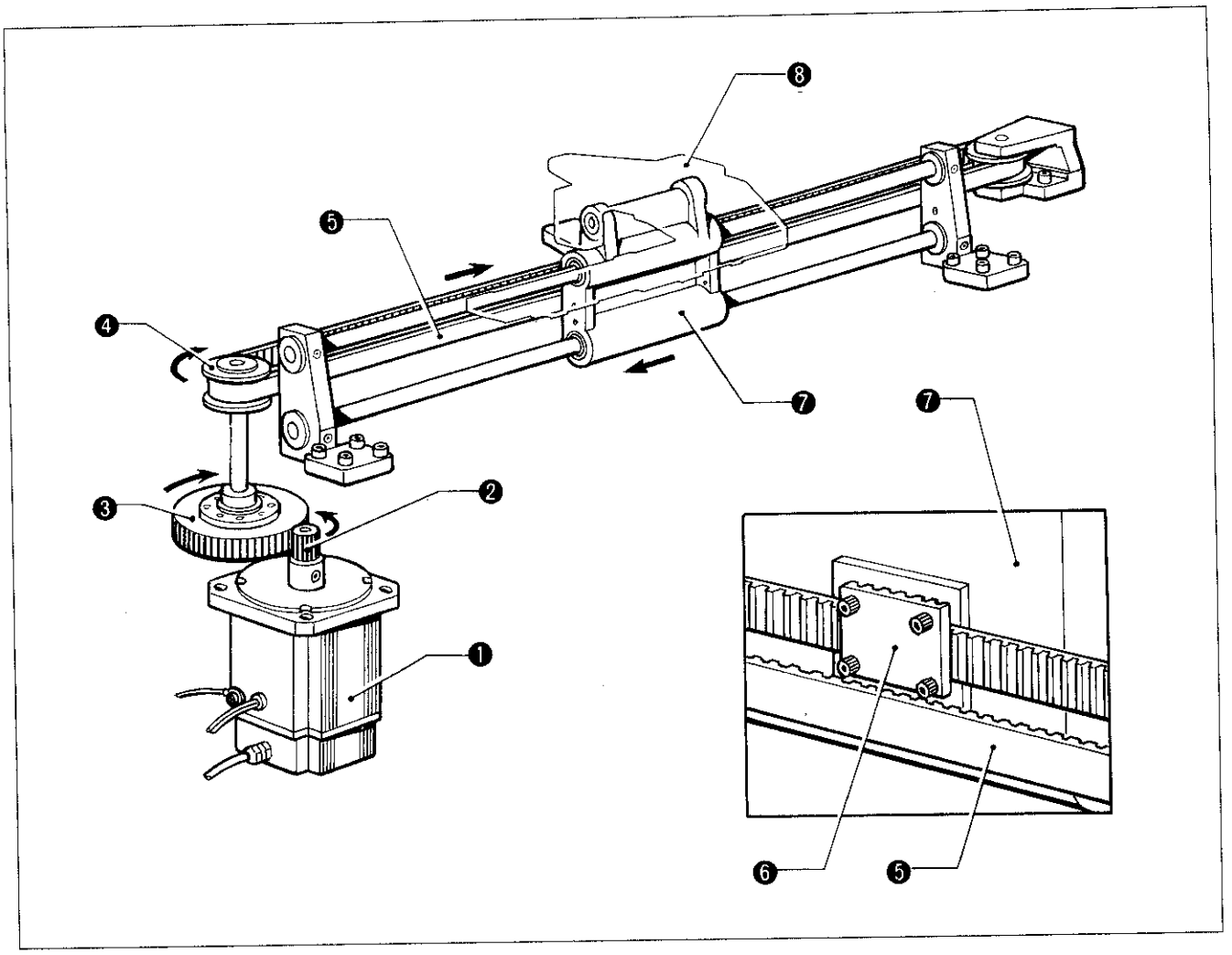
1 Stacker Mechanism



1. On completing sewing, valve #9 ❶ is turned on, cylinder ❷ operates in arrowed direction and stacker roller ❸ holds front cloth.
2. Valve #13 ❹ is turned on, cylinder ❺ operates in arrowed direction and rack ❻ moves toward you. Pinion ❼ revolves simultaneously and this movement is transmitted to roller ❸ ; the front will then be fed out.
3. Valve #10 ❽ is turned on, cylinder ❾ operates in arrowed direction and roller ❸ moves right.
4. On completing front cloth feed and right movement, valve #7 ❿ is turned on, cylinder ⓫ operates in arrowed direction and stacker table ⓬ holds the front cloth.
5. Valve #8 ⓭ is turned on, cylinder ⓮ operates in arrowed direction and presser bar ⓯ swings toward you.
6. Valve #9 ❶ is turned off, cylinder ❷ operates opposite to arrowed direction and stacker roller ❸ moves up.
   When valves #10 ❽ and #13 ❹ are turned off, roller ❸ will return to original position.
7. At the same time, valve #6 ⓰ is turned on, cylinder ⓱ operates in arrowed direction and wiper ⓲ wipes off the front cloth.
8. Valves #6 ⓰, #8 ⓭ and #7 ❿ are turned off in this order and wiper ⓲, presser bar ⓯ and stacker table ⓬ return to their original positions.

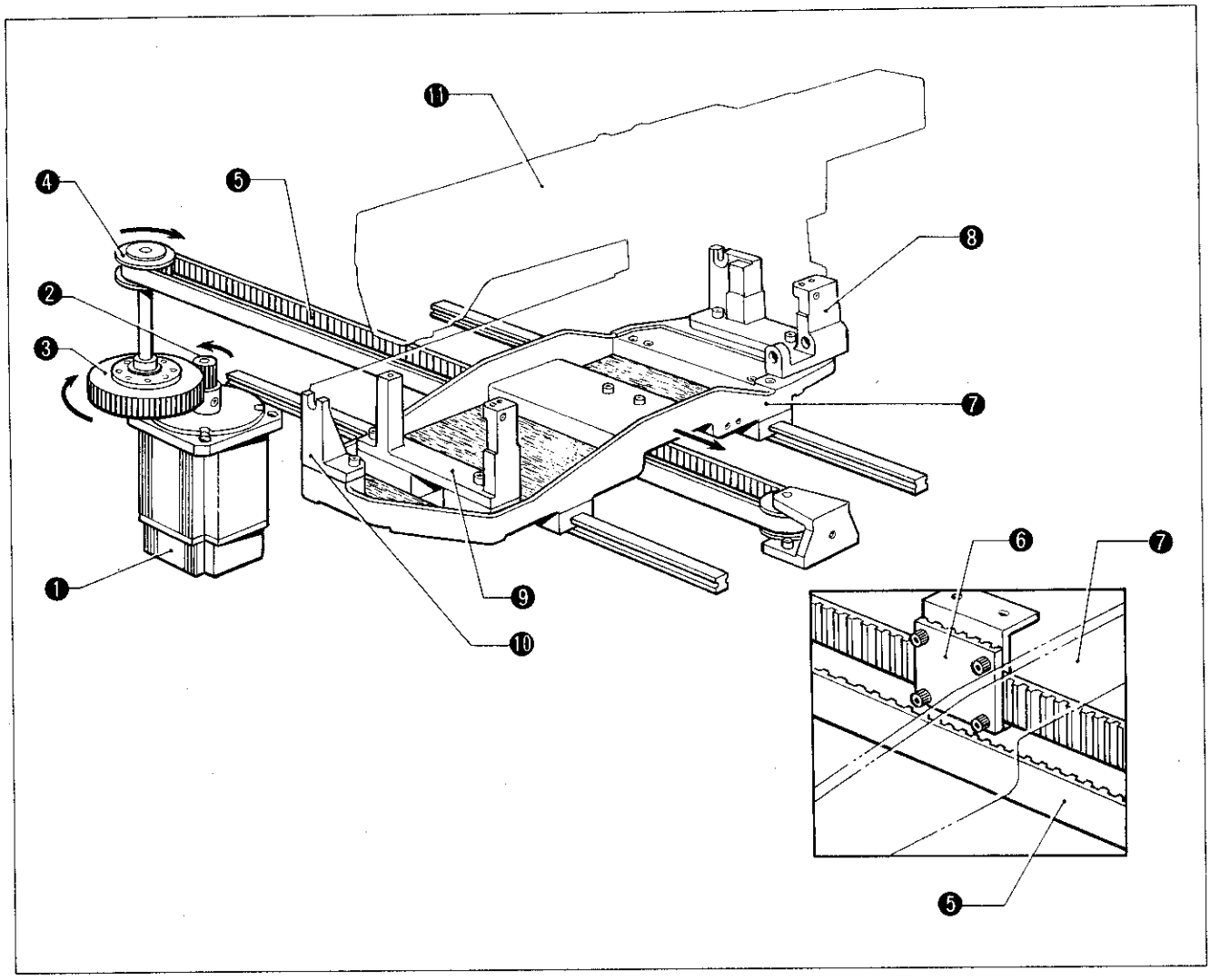
2 Feed Guide Mechanism (Driving side)

(X-direction)



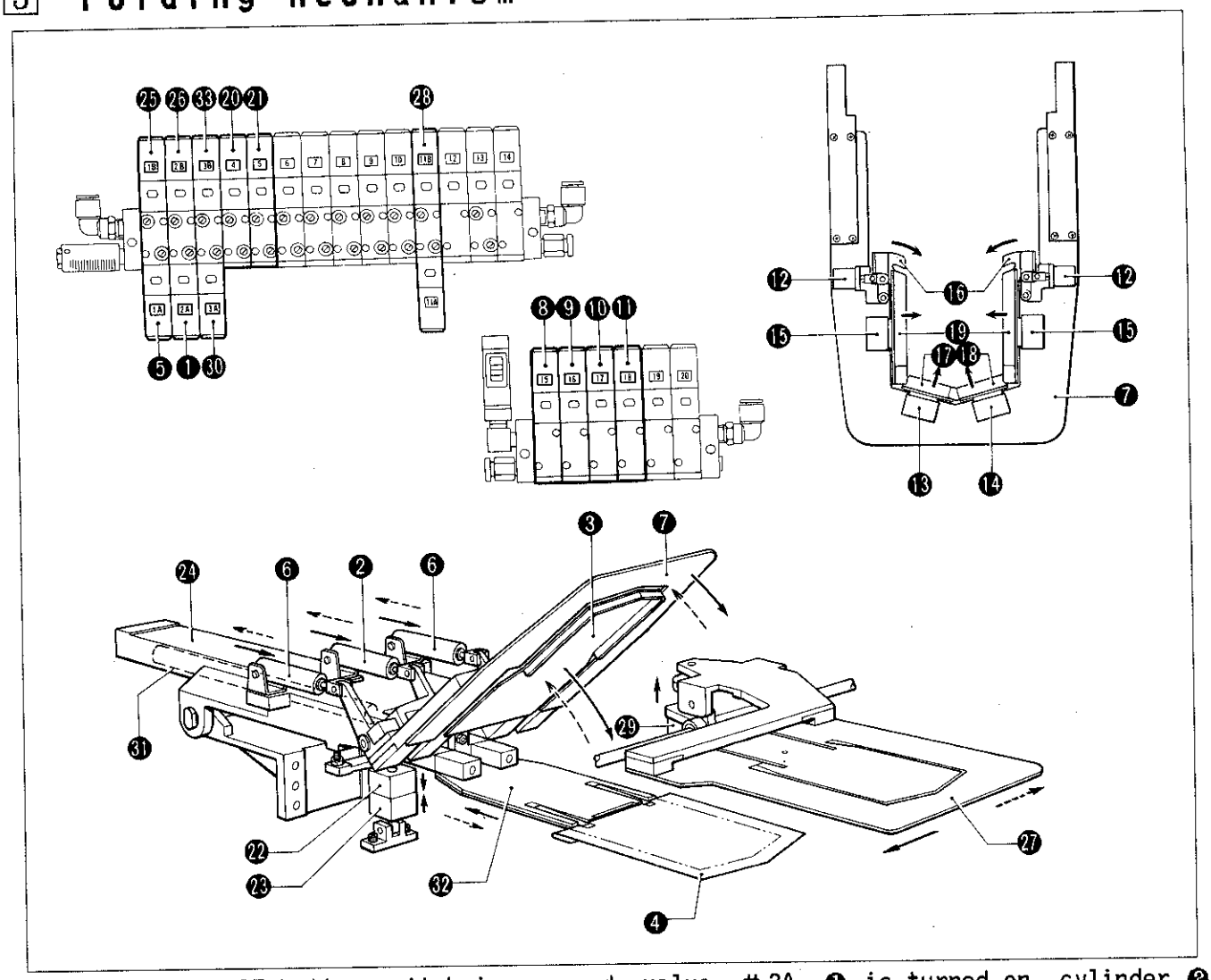
1. When servomotor ❶ revolves, timing pulley B ❹ is turned by gear ❷ and nylon gear ❸ to drive timing belt ❺.
2. Timing belt ❺ is secured on presser supporter ❼ by belt holding plate B ❻.
3. Sewing clamp supporter ❽ is attached to presser supporter ❼ and transmits movement of servomotor ❶ correctly to sewing clamp supporter ❽.

(Y-direction)



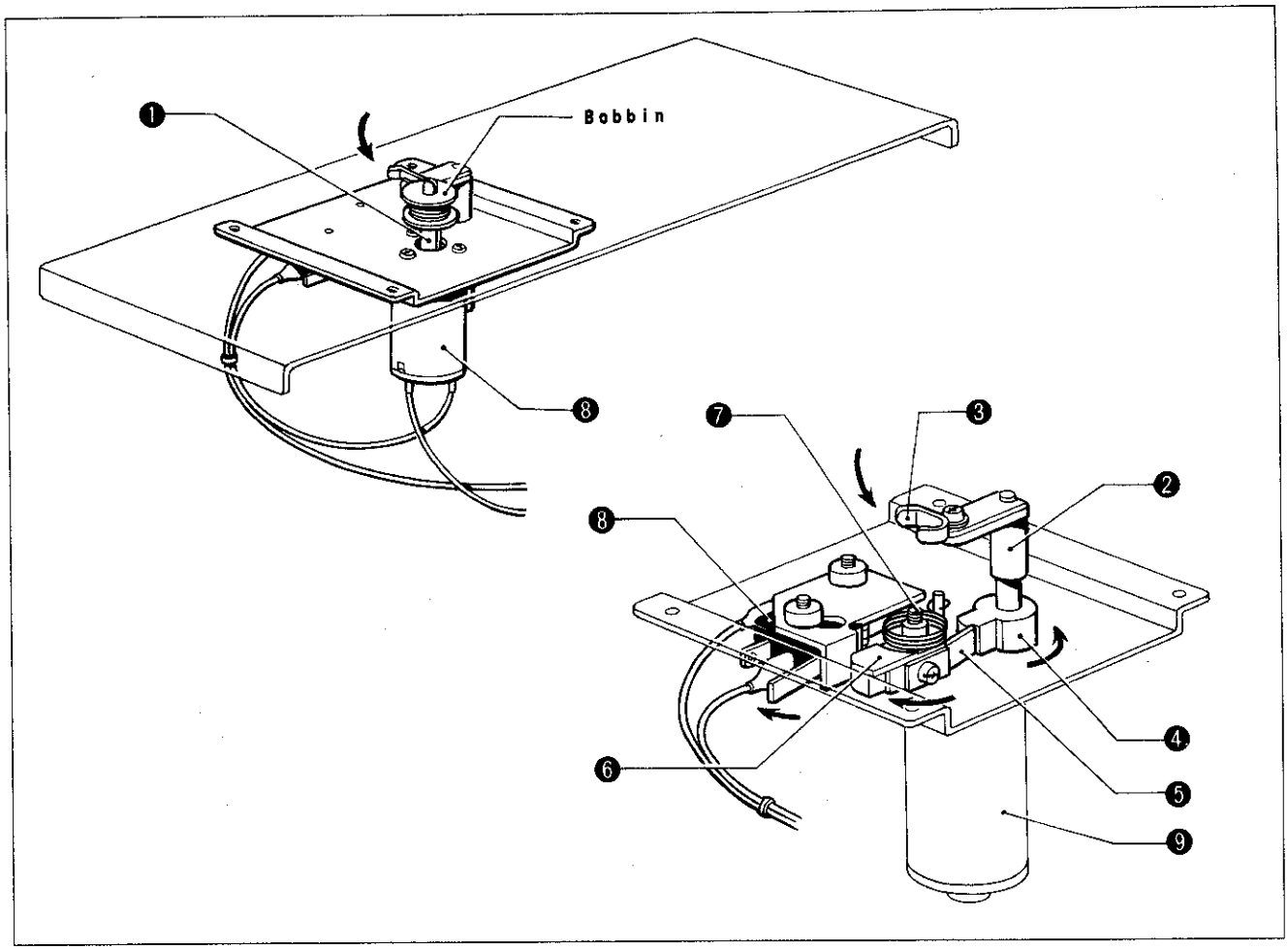
1. When servomotor ❶ revolves, timing pulley B ❹ is turned by gear ❷ and nylon gear ❸ to drive timing belt ❺.
2. Timing belt ❺ is secured on sewing machine holder ❼ by belt holding plate A ❻.
3. Sewing machine holding stud R ❽, sewing machine holding stud L ❾ and head holder ❿ are installed on sewing machine holder ❼, and sewing machine ⓫ is secured on these.
4. Movement of servomotor ❶ is transmitted correctly to sewing machine ⓫.

3 Folding Mechanism



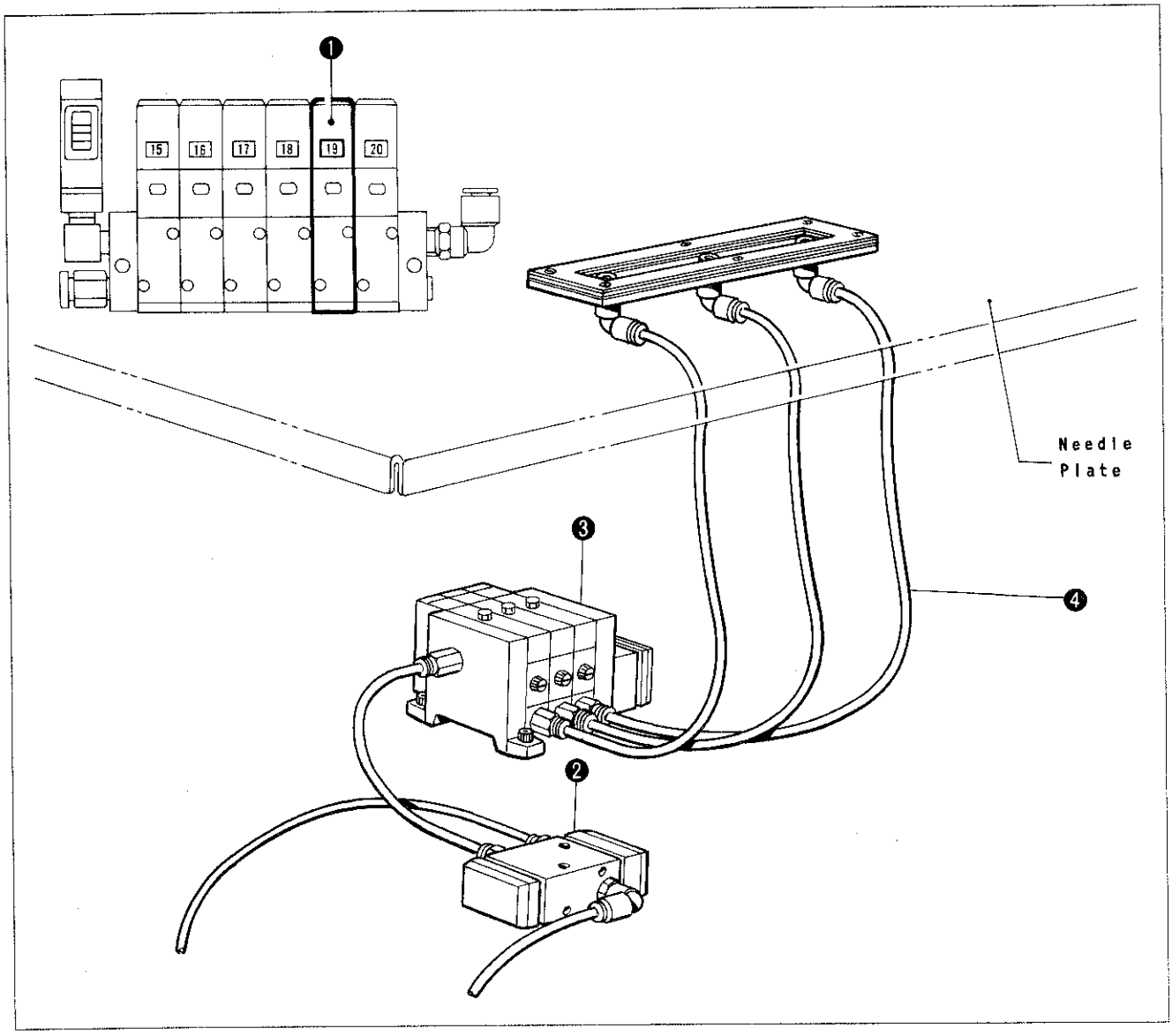
1. When the START button switch is pressed, valve #2A ❶ is turned on, cylinder ❷ operates in arrowed direction and inner clamp ❸ holds pocket cloth ❹ and folds margine squarely.
2. When valve #1A ❺ is turned on, cylinder ❻ operates in arrowed direction and foldingclamp ❼ moves down.
3. When valves #15 to #18 ❽, ❾, ❿ and ⓫ are turned on in this order, cylinders ⓬, ⓭, ⓮ and ⓯ operate in arrowed directions in this order and tucking plates ⓰, ⓱, ⓲ and ⓳ fold pocket cloth ❹ margine.
4. When valves #4 ⓴ and #5 ㉑ are turned off simultaneously, cylinders ㉒ and ㉓ operate in arrowed directions and folding base ㉔ goes down to lowest point.
5. When valves #18 to #15 ⓫, ❿, ❾ and ❽ are turned off in this order, cylinders ⓯, ⓮, ⓭ and ⓬ operate opposite to arrowed directions in this order and tucking plates ⓳, ⓲, ⓱ and ⓰ return to their original positions.
6. When valves #1B ㉕ and #2B ㉖ are turned on simultaneously, cylinders ❻ and ❷ operate opposite to arrowed directions and inner clamp ❸ and folding clamp ❼ move up.
7. Sewing clamp ㉗ moves to home position and, when valve #11B ㉘ is turned on, cylinder ㉙ operates in arrowed direction and sewing clamp ㉗ moves down.
8. Valve #3A ㉚ is turned on, cylinder ㉛ operates in arrowed direction and center blade ㉜ moves away from you.
9. When valves #4 and #5 ⓴ and ㉑ are turned on simultaneously, cylinders ㉒ and ㉓ operate opposite to arrowed directions and folding base ㉔ moves up to the highest point.
10. When sewing clamp ㉗ moves to right, valve #3B ㉝ is turned on, cylinder ㉛ operates opposite to arrowed direction and center blade ㉜ moves toward you.

4 Bobbin Winder Mechanism



1. Insert bobbin winder shaft ❶ into bobbin, move bobbin holder arm ❷ toward bobbin winder shaft ❶ ; and bobbin winder claw ❹ which is secured by bobbin presser plate ❸ will press spring plate ❺.
2. When spring plate ❺, secured on bobbin winder lever ❻, revolves with bobbin winder stud screw ❼ as its axis, limit switch ❽ of bobbin winder motor assembly will trip to start motor ❾ of bobbin winder motor assembly and the thread will be wound around bobbin while bobbin winder shaft ❶ is revolving.
3. When a certain amount of thread has been wound around bobbin, bobbin presser plate❸ turns around and separates bobbin winder lever ❻ from limit switch ❽ to stop motor ❾ and bobbin winder shaft ❶.

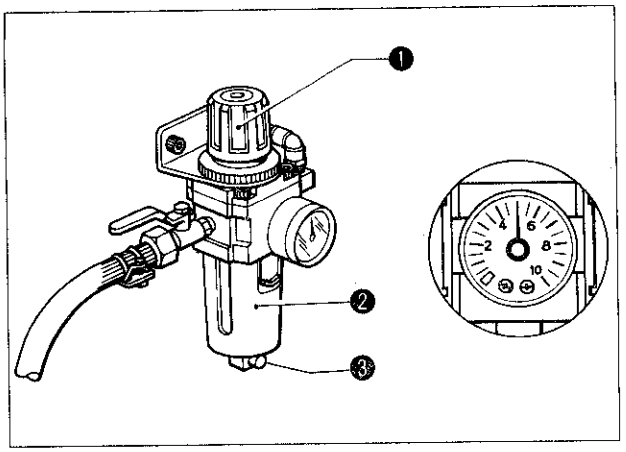
5 Vacuum Mechanism



1. On/off movement of valve #19 ❶ opens/shuts off constant air supply from mechanical valve ❷ to vacuum ejector ❸.
2. When valve #19 ❶ is turned on, air is supplied to vacuum ejector ❸ to generate back pressure which will effect back pressure on upper surface of needle plate through air tubes ❹.
3. When valve #19 ❶ is turned off, air supply to vacuum ejector ❸ is stopped so as not to generate back pressure.

STANDARD ADJUSTMENT OF COMPONENTS AND DEVICES

1 Adjusting Air Pressure

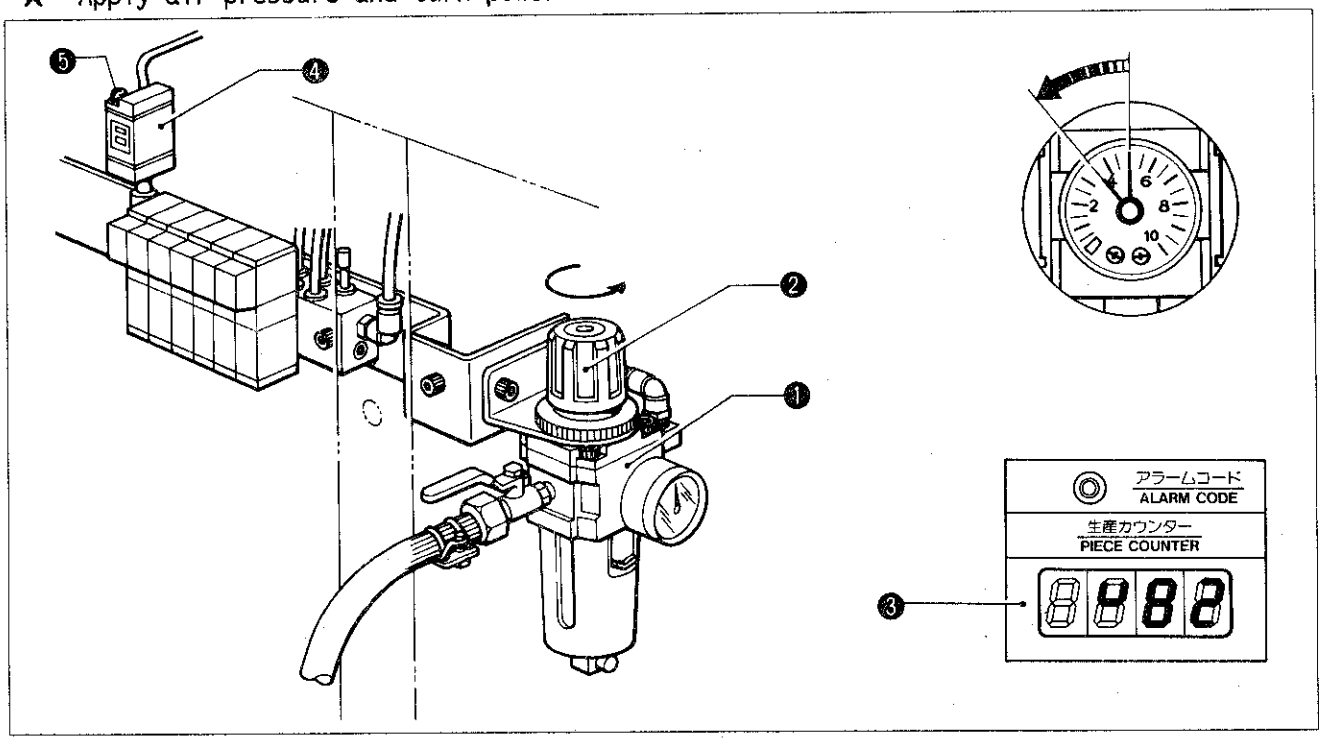


(1) Use 5 kgf/㎠ compressed air.
Pull cap ❶ up and adjust air pressure by turning cap ❶.
After adjustment, push cap ❶ down and lock it.

(2) When water is collected in bottle ❷, press button ❸ to drain water.

2 Adjusting Pressure Switch

Adjust the pressure switch accurately so as to operate with 3.5 kgf/㎠ pressure.
★ Apply air pressure and turn power switch on.



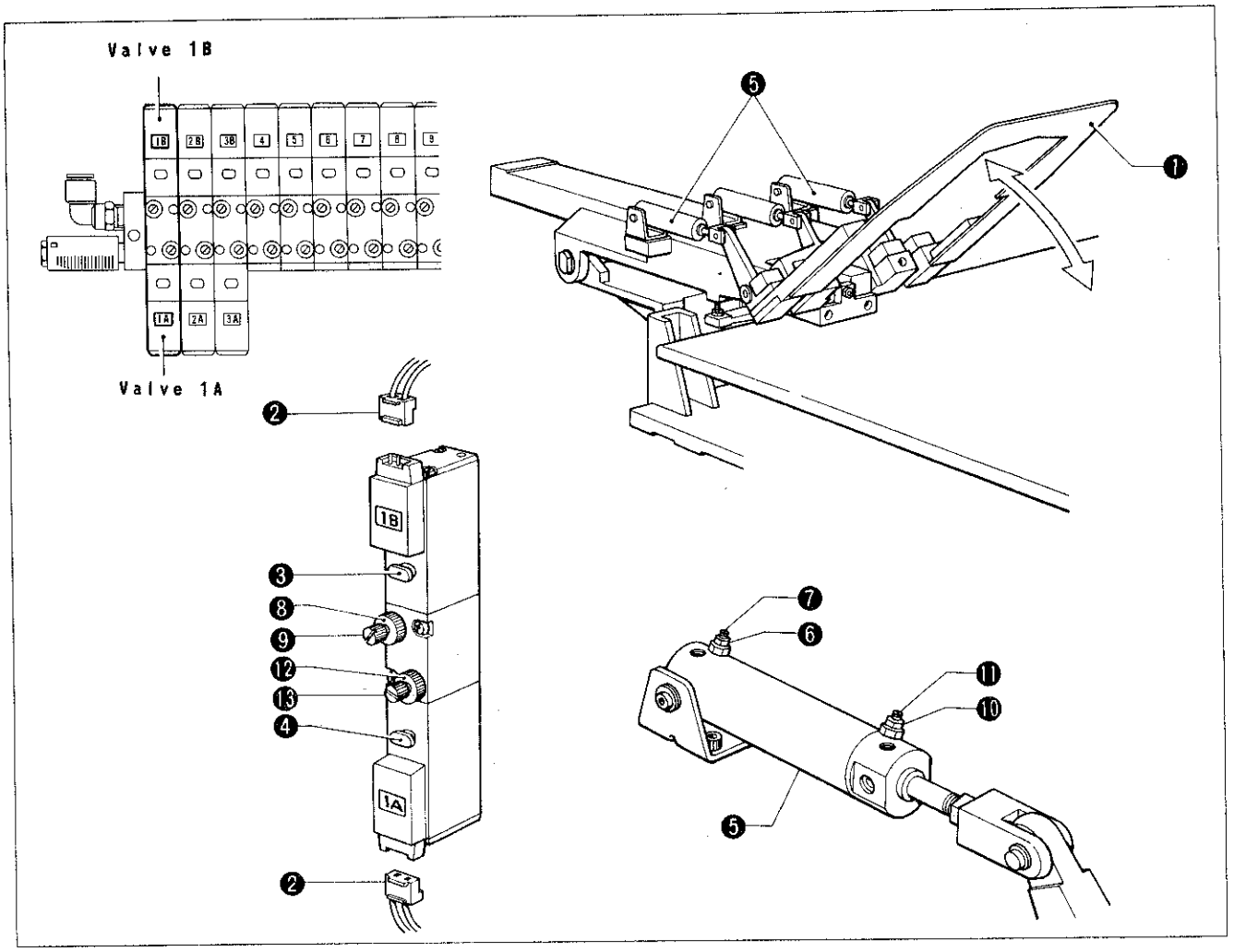
(1) Pull cap ❷ of regulator ❶ up and turn it counterclock-wise when viewed from top. Reduce setup pressure gradually from 5 kgf/㎠ to 3.5 kgf/㎠.
If error display on control panel ❸ indicates ⊔82, turn screw ❺ on pressure switch ❹ to decrease setup pressure to 1 to 2 kgf/㎠ for cancellation of the error display; and then turn screw ❺ slowly in reverse way and stop turning the instant the error is displayed.
※ Air pressure of 4.1 kgf/㎠ or more is required to cancel this error display (due to pressure switch hysteresis.)
※ After setting pressure at regulator ❶ to 5 kgf/㎠, reduce it gradually and confirm that error display indicates ⊔82 for the first time at 3.5kgf/㎠.

(2) After adjustment, increase setup pressure at regulator ❶ to 5 kgf/㎠, push cap ❷ down and lock it.

3 Adjusting Folding Clamp Speed

Adjust the speed to allow movement at the highest possible speed without jolting.

★ Apply air pressure and turn power switch on.



(1) Install folding clamp ❶ and lock it.

(2) Draw out connectors ❷ for valve #1B and #1A. Folding clamp ❶ will move up and down by manual operation when manual buttons ❸ and ❹ are pressed.
It will go up with 1B manual button ❸ and down with 1A manual button ❹.

Ascending speed adjustment

(3) Adjust air cushion of two cylinders ❺ on right and left. Loosen nut ❻, fully but lightly tighten screw ❼, loosen screw by 1 turn, and then lock it with nut ❻.

(4) Loosen nut ❽ for valve #1B and adjust speed by turning speed controller ❾.

Descending speed adjustment

(5) Loosen nut ❿ of two cylinders ❺ and fully but lightly tighten screw ❼, loosen screw by 1.5 turns, and then lock with nut ❿.

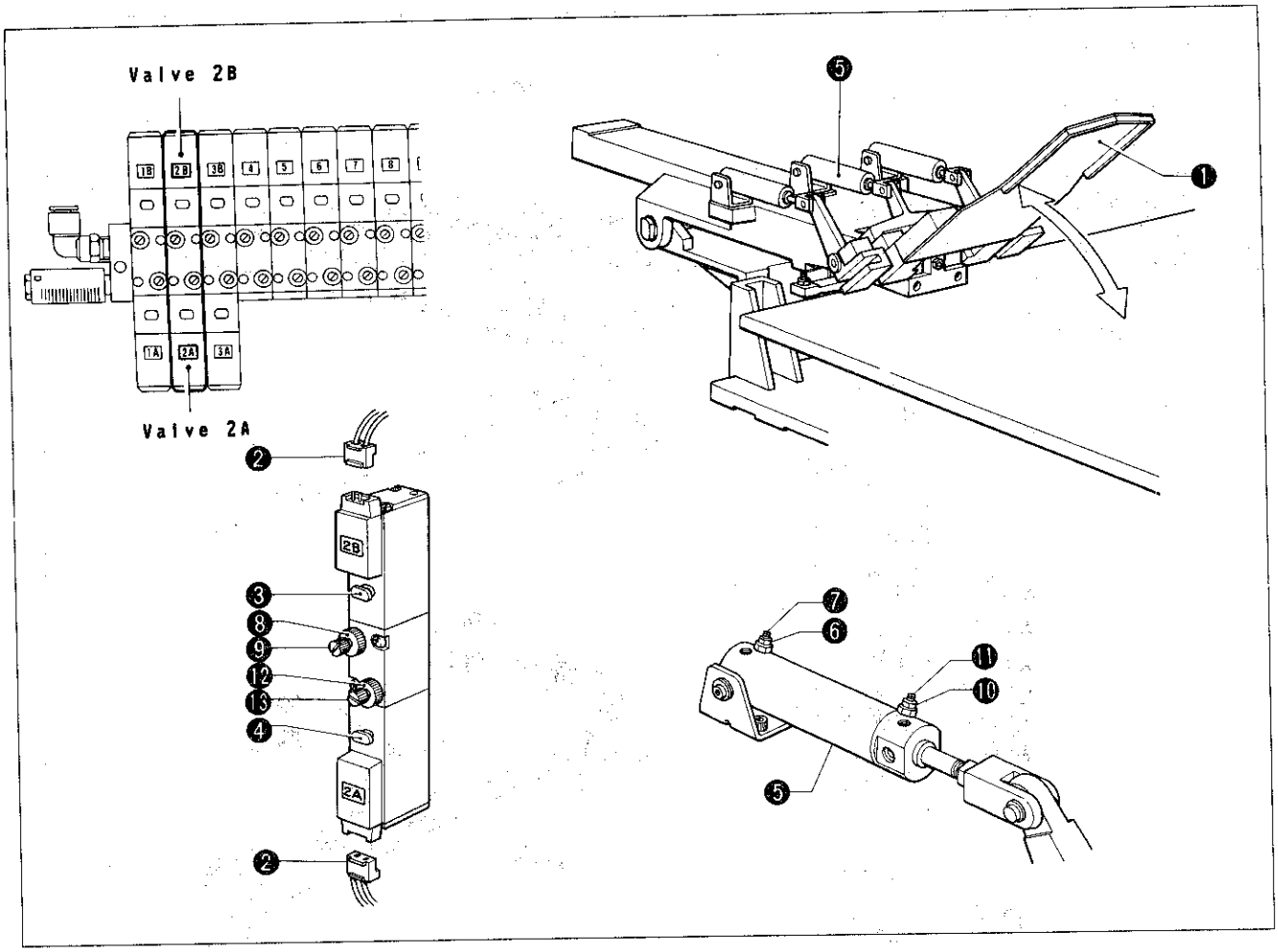
(6) Loosen nut ⓬ for valve #1A and adjust speed by turning speed controller ⓭.

(7) Insert connector ❷ after adjustment.

4 Inner Clamp Speed Adjustment

Adjust the speed to allow movement at the highest possible speed without jolting.

★ Apply air pressure and turn power switch on.



(1) Install inner clamp ❶ and lock it.

(2) Draw out connectors ❷ for valves #2B and #2A. Inner clamp ❶ will move up and down by manual operation when manual buttons ❸ and ❹ are pressed. It will go up with 2B manual button ❸ and down with 2A manual button ❹.

Ascending speed adjustment

(3) Adjust air cushion of cylinder ❺. Loosen nut ❻, fully but lightly tighten screw ❼, loosen screw by 1 turn and then lock with nut ❻.

(4) Loosen nut ❽ for valve #2B and adjust speed by turning speed controller ❾.

Descending speed adjustment

(5) Loosen nut ❿ of cylinder ❺ and fully but lightly tighten screw ⓫, loosen screw by 2.5 turns, and then lock with nut ❿.

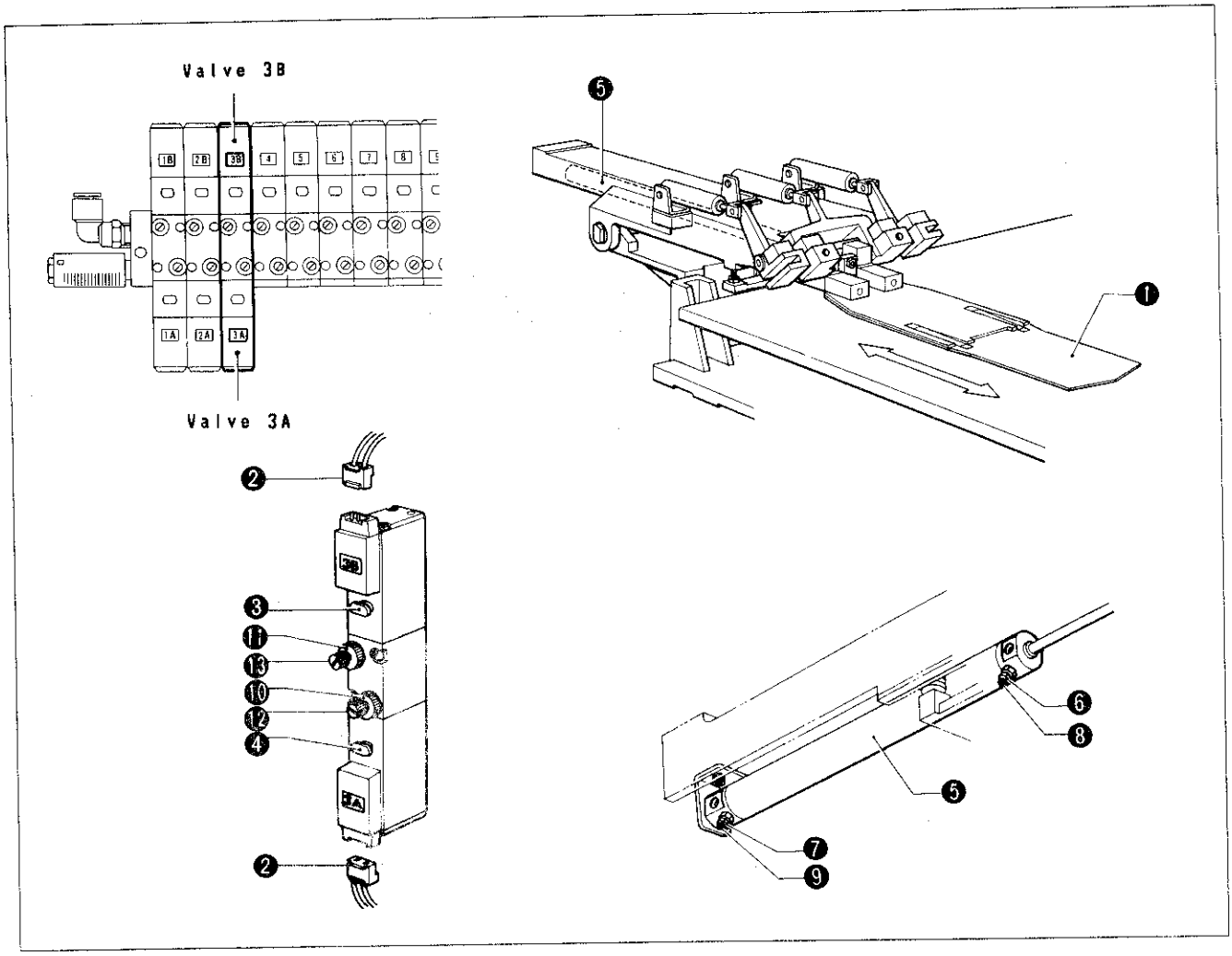
(6) Loosen nut ⓬ for valve #2A and adjust speed by turning speed controller ⓭.

(7) Insert connector ❷ after adjustment.

5 Adjusting Center Blade Speed

Adjust the speed to allow movement at the highest possible speed without jolting. Adjust air cushion so that abnormal sound will not be generated at either end.

★ Apply air pressure and turn power switch on.



(1) Remove center blade ❶.

(2) Draw out connectors ❷ for valve #3B and #3A. Center blade holder ❺ will move back and forth by manual operation when manual buttons ❸ and ❹ are pressed. It will move to you with 3B manual button ❸ and move away from you with 3A manual button ❹.

(3) Adjust air cushion of cylinder ❻. Loosen nuts ❼ and ❽, fully but lightly tighten screws ❾ and ❿, loosen screws by 3 turns and then lock with nuts ❼ and ❽.

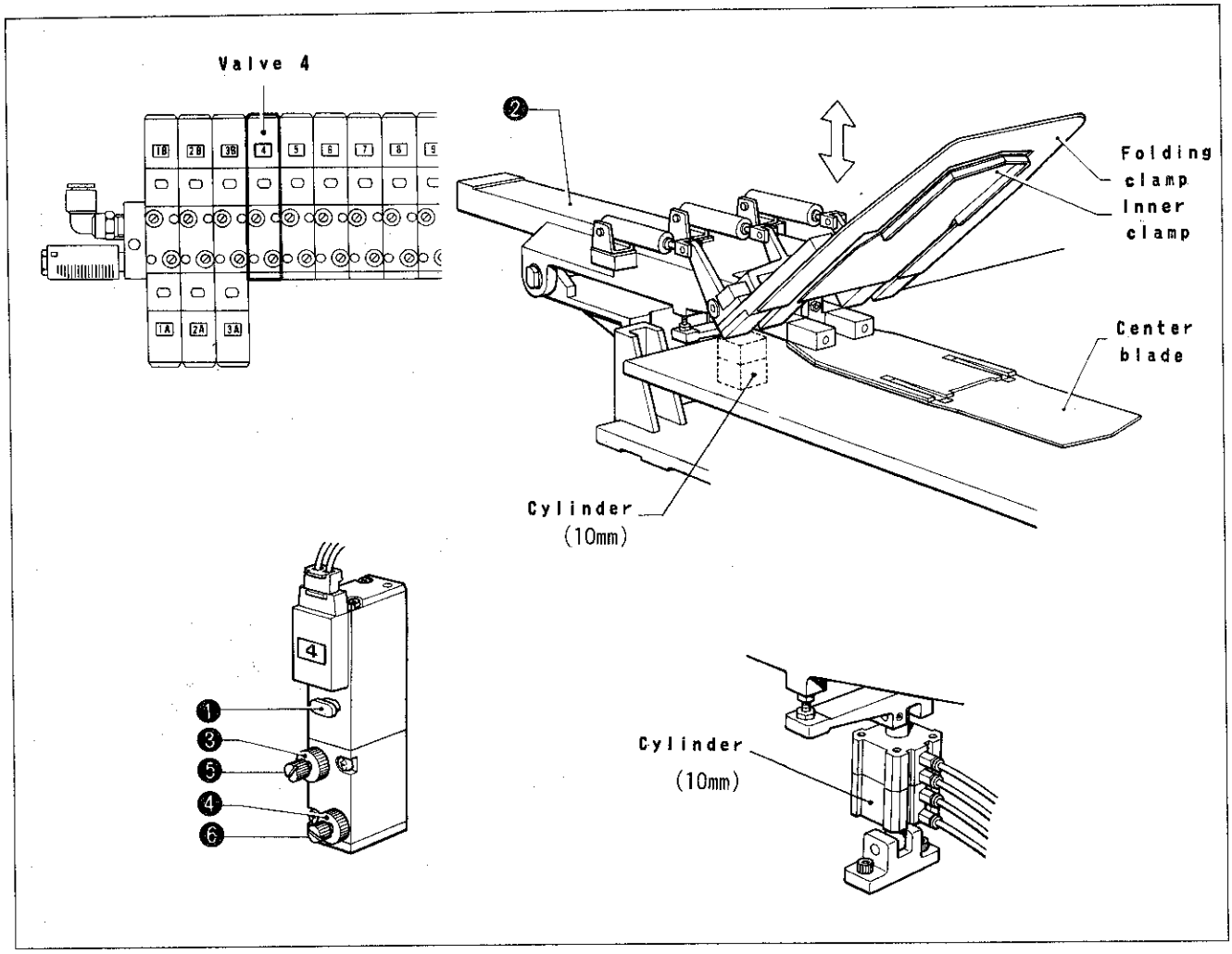
(4) Loosen nuts ⓫ and ⓬ for valves 3B and 3A and adjust speed to allow movement at the highest possible speed by turning speed controllers ⓮ and ⓭.

(5) Insert connector ❷ after adjustment.

6 Adjusting Folding Base(10mm-stroke)Speed

Adjust the base speed to allow movement at the highest possible speed without vibration at either end. The vibration will cause mismatching of cloth.

★ Apply air pressure and turn power switch off.



(1) Install folding clamp, inner clamp and center blade and lock them.

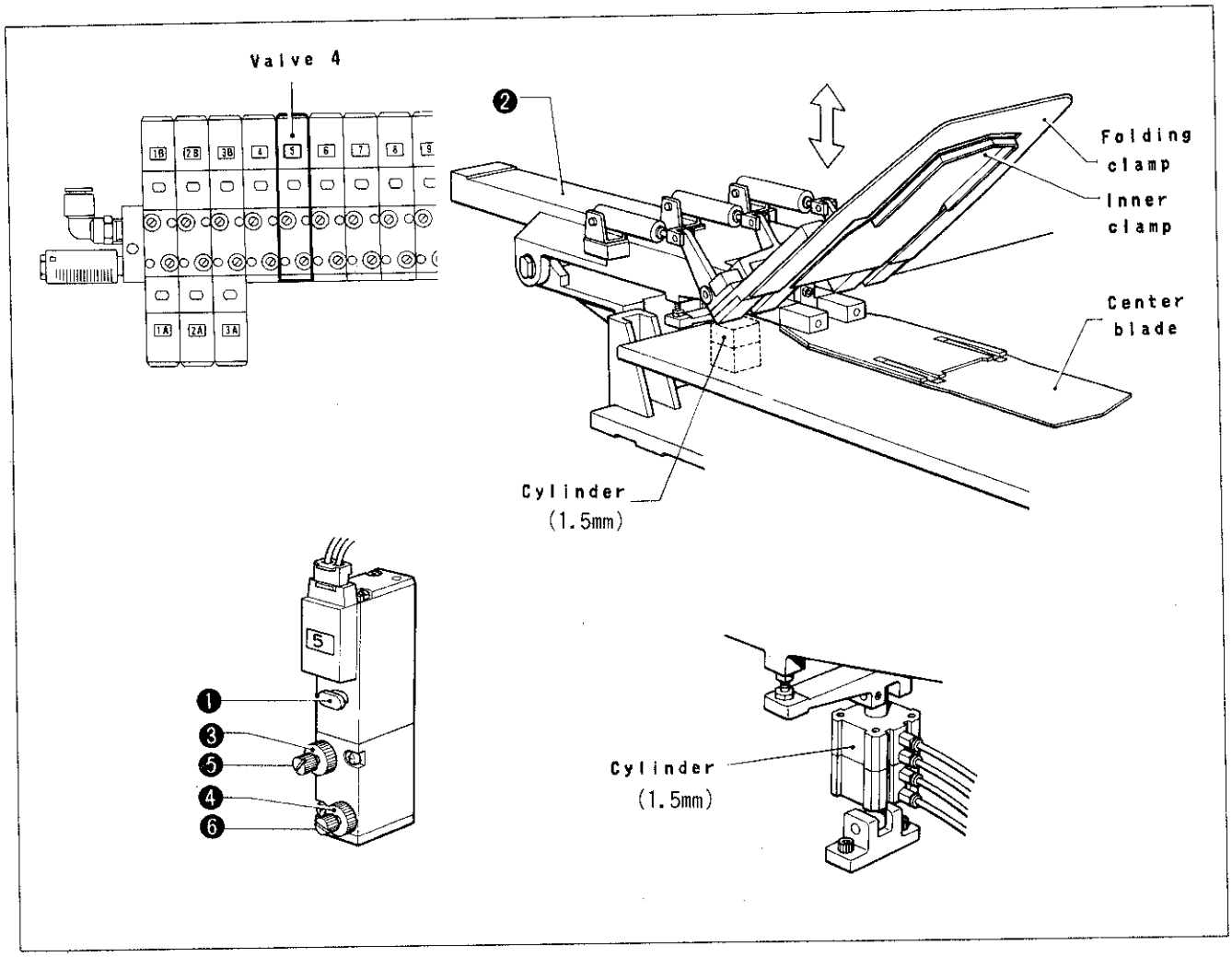
(2) Folding base ❷ will move up and down when manual button ❶ for valve #4 is pressed.

(3) Loosen nuts ❸ and ❹ for valve #4 and adjust speed by turning speed controllers ❺ and ❻. Speed controller ❺ is for ascending and speed controller ❻ for descending.

7 Adjusting Folding Base(1.5mm-stroke)Speed

Adjust the base speed to allow movement at the highest possible speed without vibration at either end.

★ Apply air pressure and turn power switch off.



(1) Install folding clamp, inner clamp and center blade and lock them.

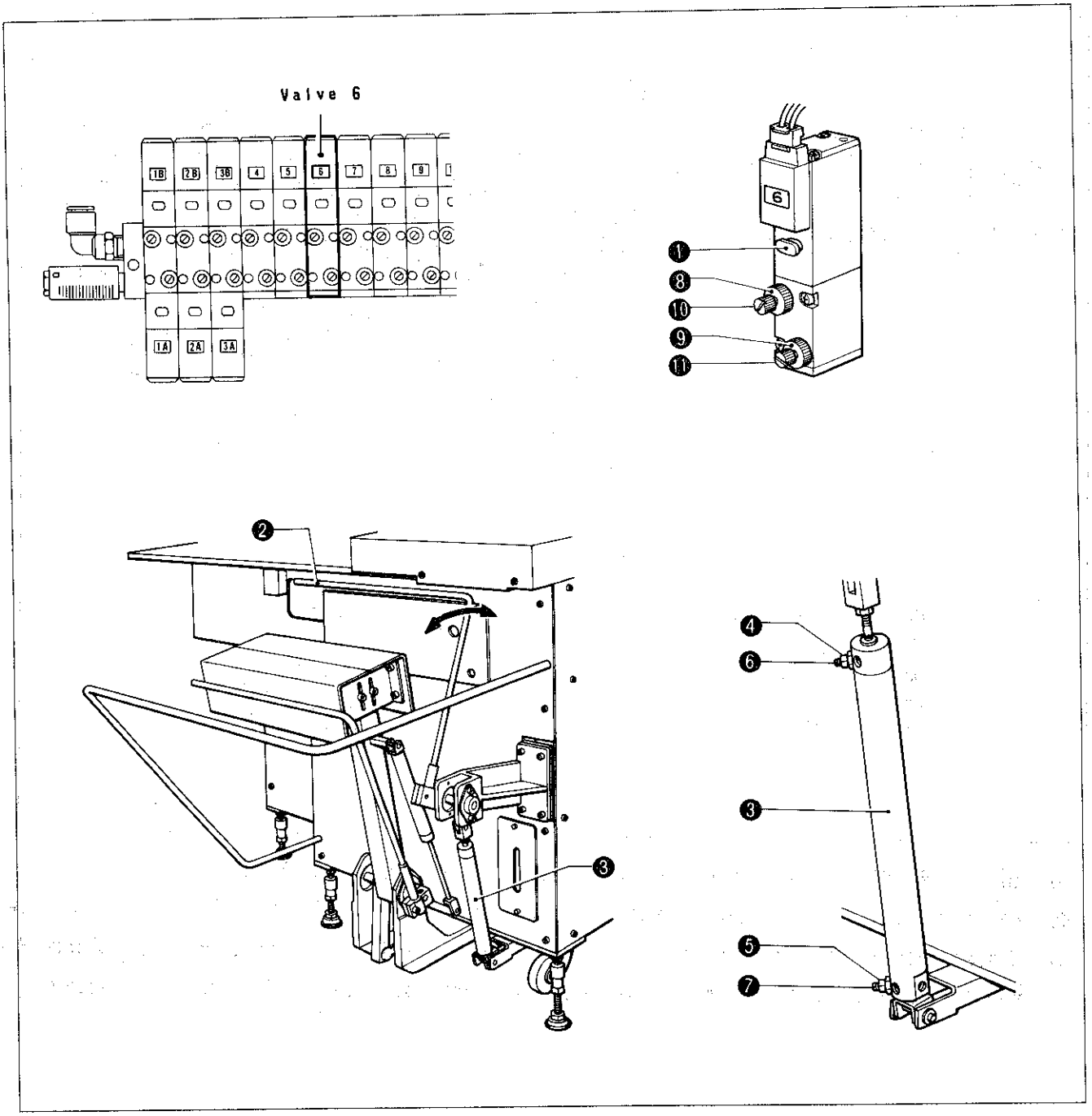
(2) Folding base ❷ will move up and down when manual button ❶ for valve #5 is pressed.

(3) Loosen nuts ❸ and ❹ for valve #5 and adjust speed by turning speed controllers ❺ and ❻. Speed controller ❺ is for ascending and speed controller ❻ for descending.

8 Adjusting Stacker Wiper Speed

Adjust the speed to allow return at a high speed without jolting when moving toward the main body, and to allow movement at the highest possible speed when wiping off.

★ Apply air pressure and turn power switch off.



(1) Wiper ❷ will move when manual button ❶ for valve #6 is pressed.

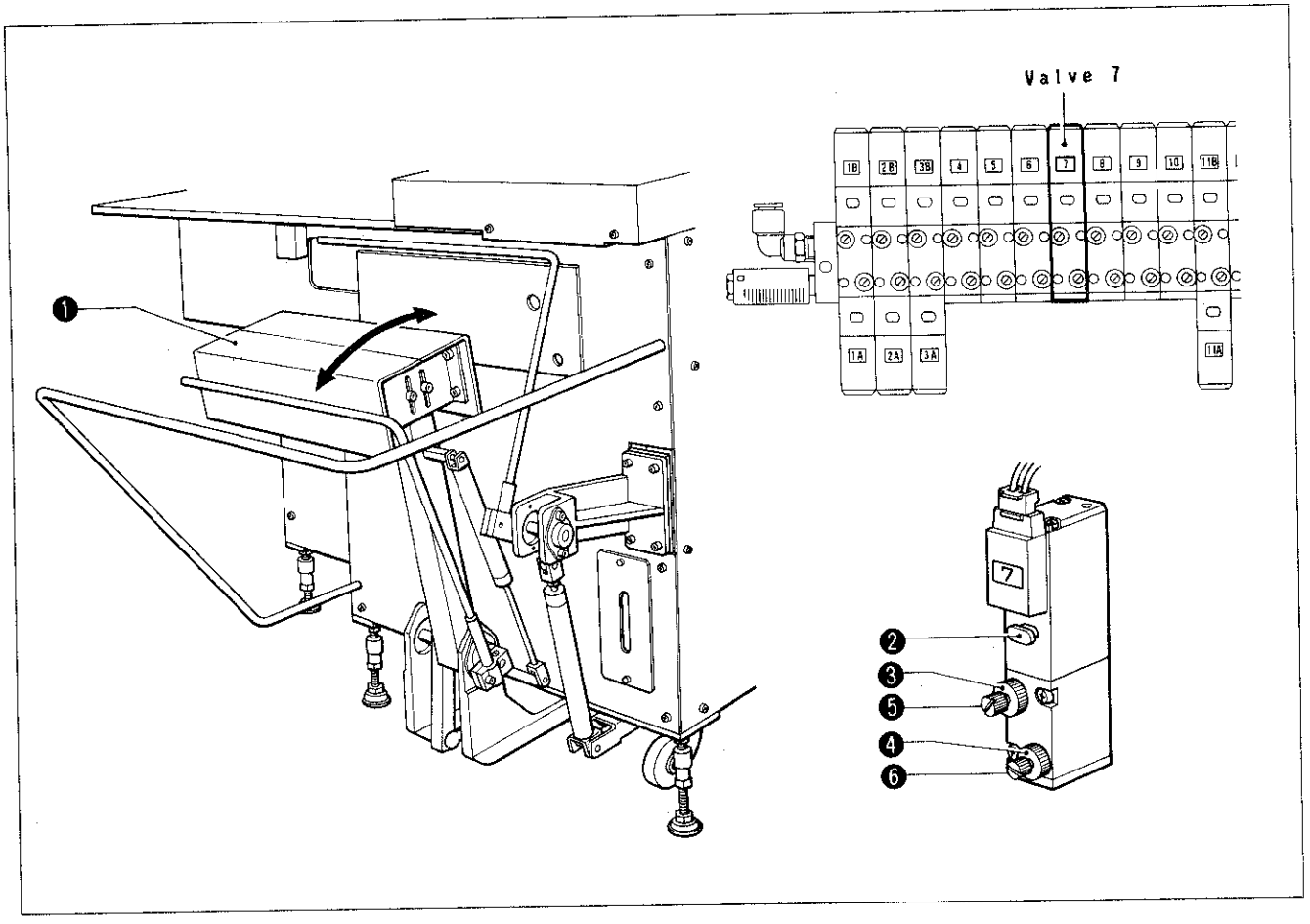
(2) Adjust air cushion of cylinder ❸.
Loosen two nuts ❹ and ❺, fully but lightly tighten two screws ❻ and ❼, loosen them by 3 turns, and lock with nuts ❹ and ❺.

(3) Loosen nuts ❽ and ❾ for valve #6 and adjust speed by turning speed controllers ❿ and ⓫. Speed controller ❿ is for wiping and speed controller ⓫ is for returning to main body.

9 Adjusting Stacker Table Speed

Adjust the speed to follow the stacker wiper without jolting when moving toward the main body. Adjust the return speed low enough so as not to interfere with the cloth to be sewn next.

★ Apply air pressure and turn power switch off.



(1) Remove cloth from stacker table ❶.

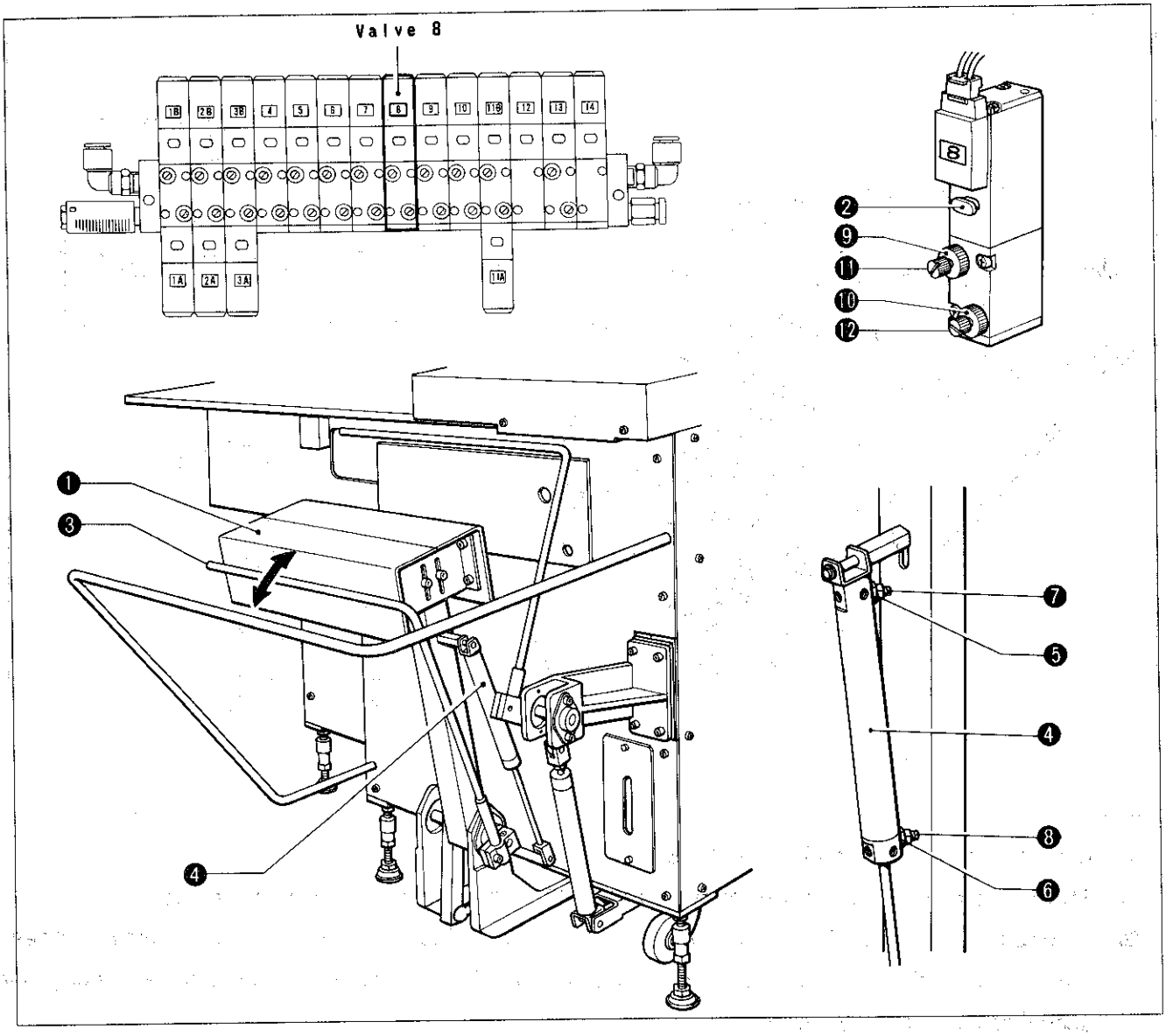
(2) Stacker table ❶ will move when manual button ❷ for valve #7 is pressed.

(3) Loosen nuts ❸ and ❹ for valve #7 and adjust table speed by turning speed controllers ❺ and ❻. Speed controller ❺ is for movement toward main body and speed controller ❻ is for returning.

10 Adjusting Presser Bar Speed

Adjust the bar speed to allow movement at the highest possible speed without jolting when moving outward and to allow movement at a speed where no abnormal sounds will be generated when moving toward the stacker table.

★ Apply air pressure and turn power switch off.



(1) Remove cloth from stacker table ❶.

(2) Presser bar ❸ will move when manual button ❷ for valve #8 is pressed.

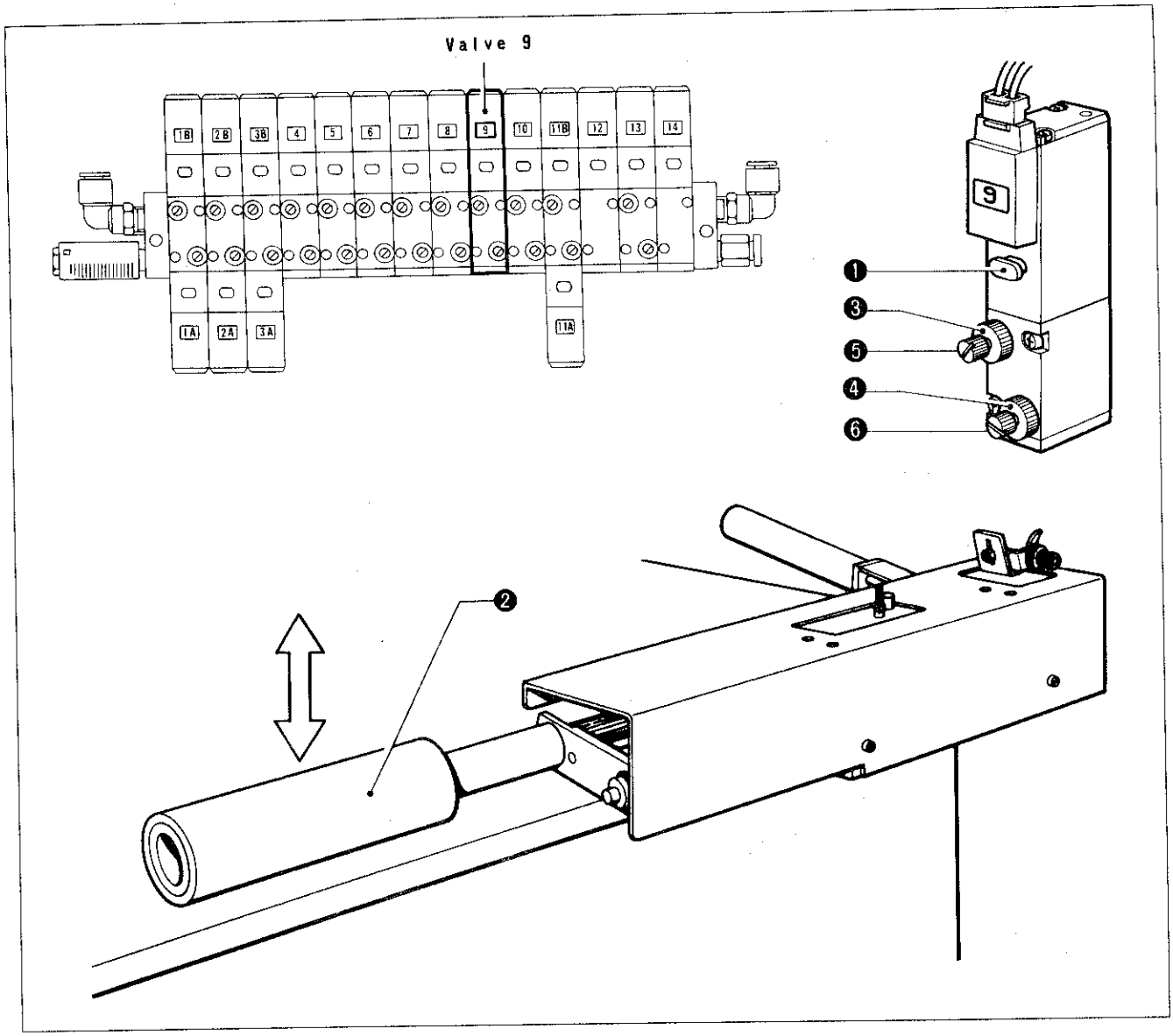
(3) Adjust air cushion of cylinder ❹.
Loosen two nuts ❺ and ❻, fully but lightly tighten two screws ❼ and ❽, loosen by 3 turns, and lock with nuts ❺ and ❻.

(4) Loosen nuts ❾ and ❿ for valve #8 and adjust bar speed by turning speed controllers ⓫ and ⓬. Speed controller ⓫ is for outward movement and speed controller ⓬ is for movement toward stacker table ❶ side.

11 Adjusting Vertical Roller Speed

Adjust the roller speed to allow movement at the highest possible speed without jolting.

★ Apply air pressure and turn power switch off.



(1) Roller ❷ will move up and down when manual button ❶ for valve #9 is pressed.

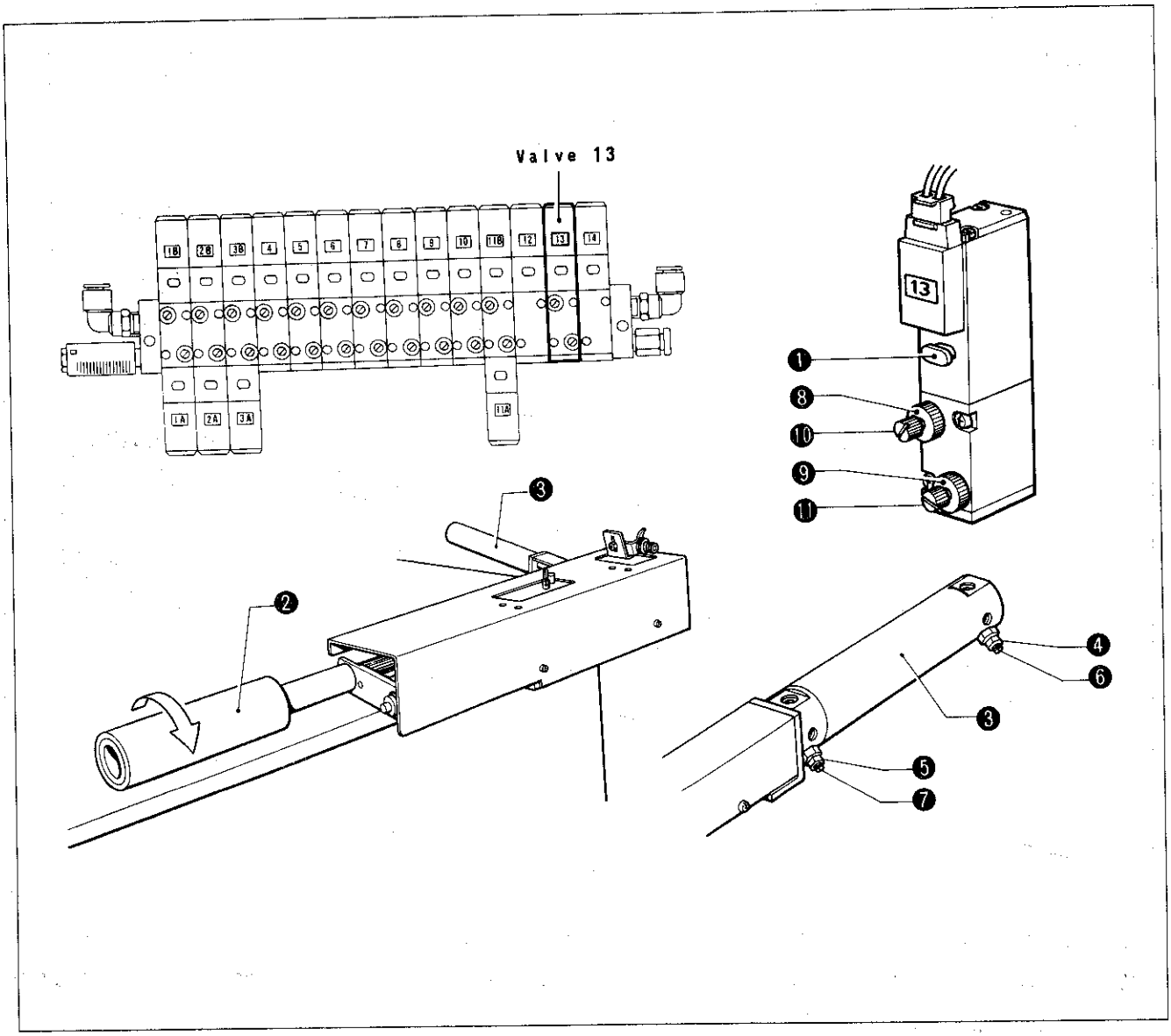
(2) Loosen nuts ❸ and ❹ for valve #9 and adjust roller speed by turning speed controllers ❺ and ❻.
Speed controller ❺ is for downward movement and speed controller ❻ for upward movement.

12 Adjusting Roller Speed

If the front cloth feeding speed is too high, the front cloth will wrinkle and abnormal sounds will be generated at the end. If it is too low, the roller will fail to follow the stacker table and the stacker wiper.

Adjust the return speed high enough so as no sounds will be generated at the end.

★ Apply air pressure and turn power switch off.



(1) Roller ❷ will move sideways when manual button ❶ for valve #13 is pressed.

(2) Adjust air cushion of cylinder ❸.
Loosen two nuts ❹ and ❺, fully but lightly tighten two screws ❻ and ❼, loosen by 3 turns and lock with nuts❹ and ❺.

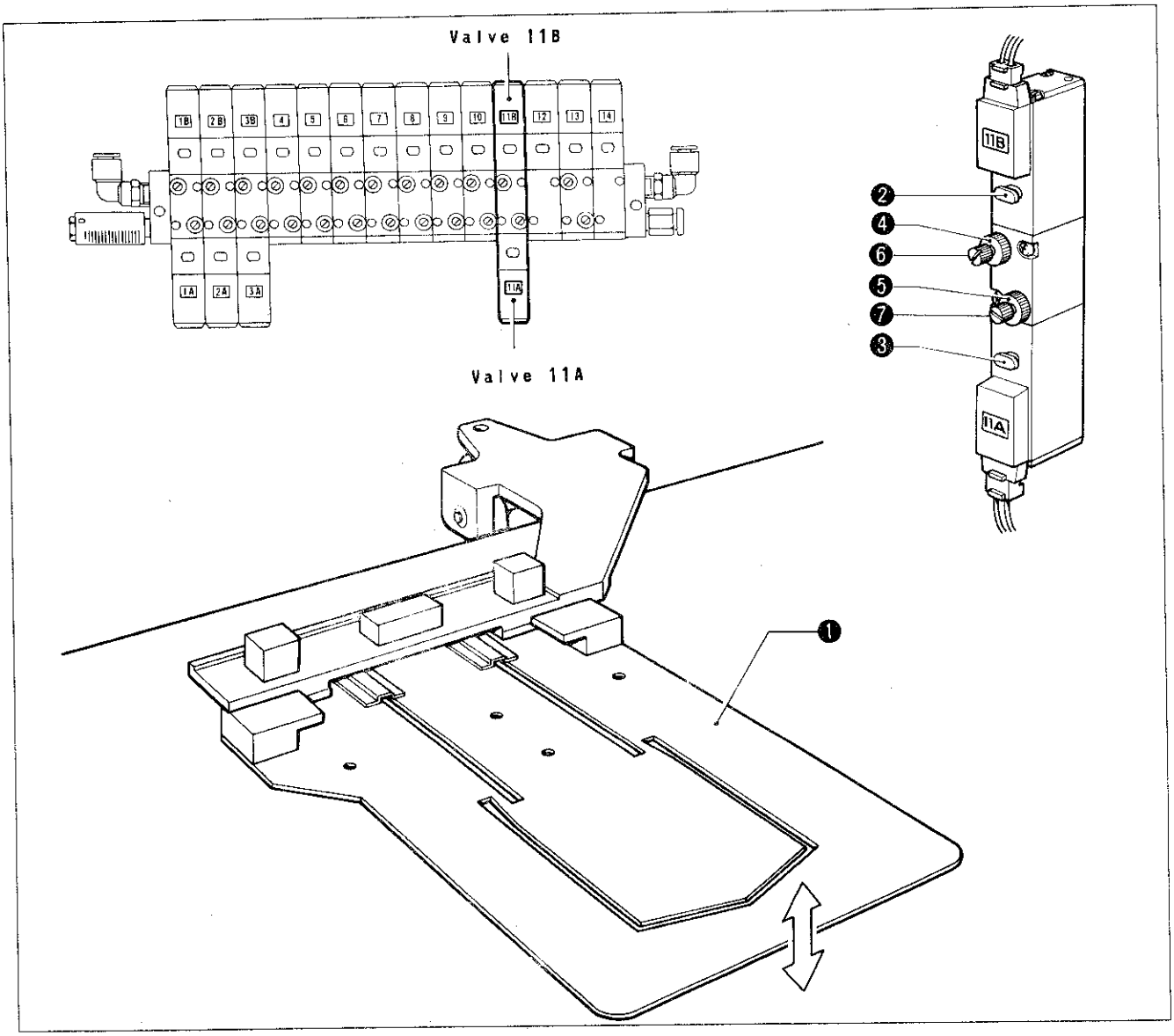
(3) Loosen nuts ❽ and ❾ for valve #13 and adjust roller speed by turning speed controllers ❿ and ⓫. Speed controller ❿ is for the right and speed controller ⓫ for the left.

13 Adjusting Sewing Clamp Speed

Adjust the clamp speed to allow movement at the highest possible speed without bounding when ascending. Ensure good control for descending since the speed will influence the folding accuracy.

If the speed is too high, the pocket cloth will swell. If it is too low, the cloth will mismatch on being carried by the center blade.

★ Apply air pressure and turn power switch off.



(1) Install clamp ❶ and lock it.

(2) Clamp ❶ will open and close when manual buttons ❷ and ❸ for valves #11 are pressed. It will come down with manual button ❷ for valve #11B and go up with manual button ❸ for valve #11A.

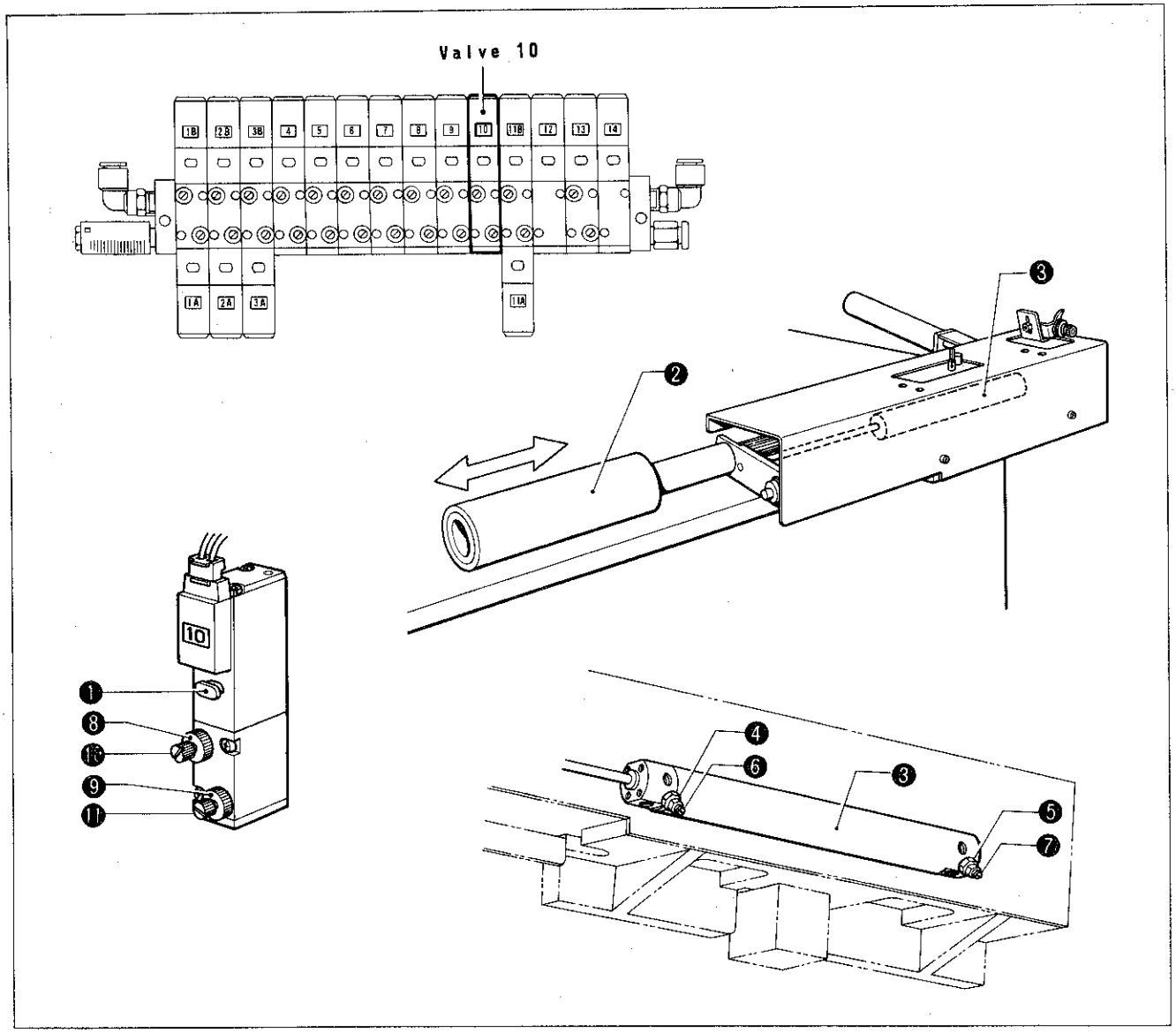
(3) Loosen nuts ❹ and ❺ for valves #11B and 11A and adjust clamp speed by turning speed controllers ❻ and ❼.

14 Adjusting Longitudinal Roller Speed

If the roller's longitudinal speed is too high, the front cloth will wrinkle and an abnormal sound will be generated at the end. If it is too low, the roller will fail to follow the stacker table and the stacker wiper.

Adjust the longitudinal speed high enough so as no sound will be generated at the end.

★ Apply air pressure and turn power switch off.



(1) Roller ❷ will rotates when manual button ❶ for valve #10 is pressed.

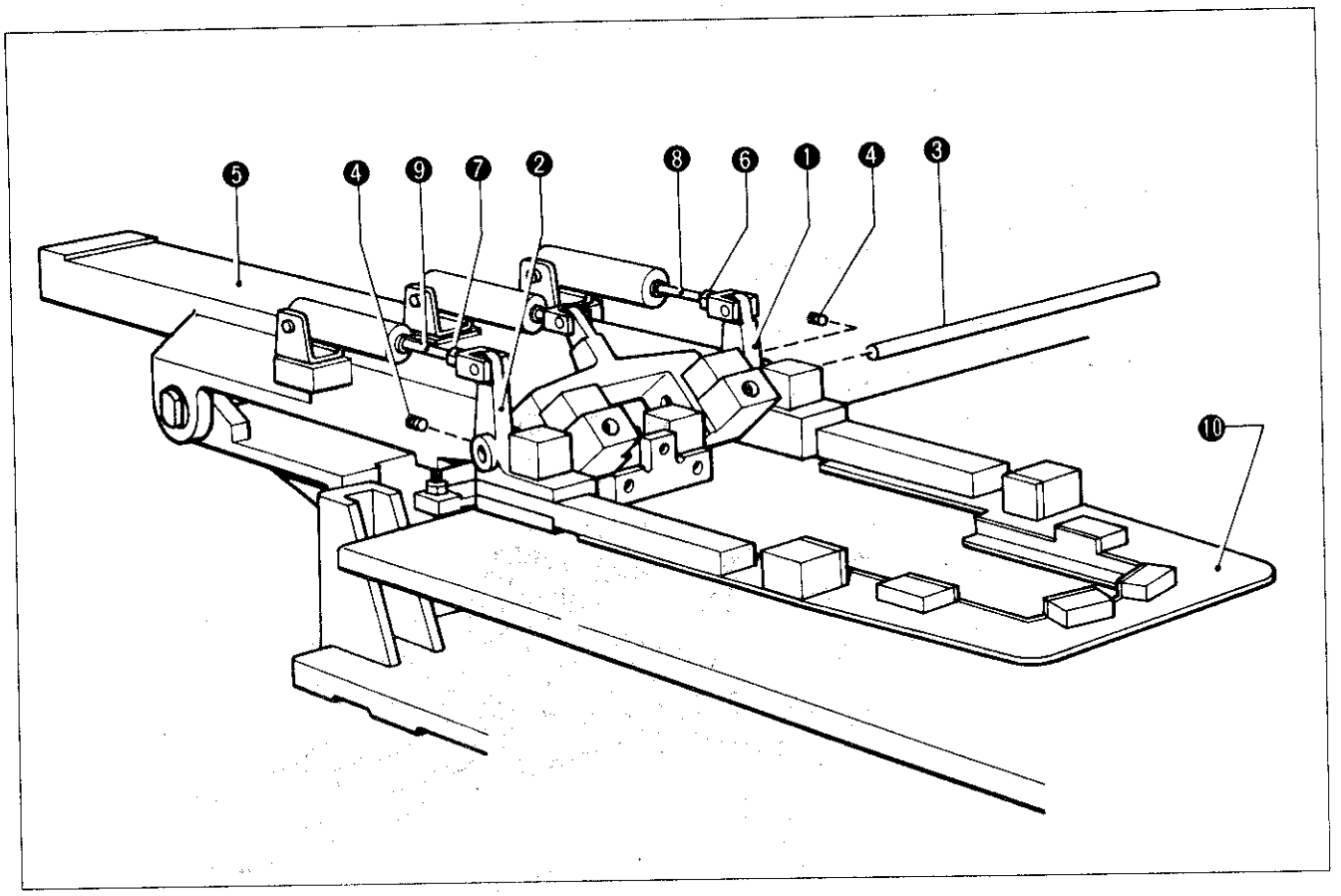
(2) Adjust air cushion of cylinder ❸.
Loosen two nuts ❹ and ❺, fully but lightly tighten two screws ❻ and ❼, loosen by 3 turns and lock with nuts ❹ and ❺.

(3) Loosen nuts ❽ and ❾ for valve #10 and adjust roller speed by turning speed controllers ❿ and ⓫. Speed controller ❿ is for forward feeding and speed controller ⓫ is for return.

15 Adjusting Folding Clamp Adjustment

If the height of folding clamp is lower than the center blade when the clamp is down, the outer dimension of the pocket will be larger or the pocket will swell. If it is higher than the center blade, the clamp will touch the blade and the tacking blade will not be able to move.

★ Apply air pressure and turn power switch on.



※ Conduct tucking blade adjustment first because compatibility of different models may be lost by this adjustment.

(1) Secure arm R ❶ and arm L ❷ with setscrews ❹ at same angle against shaft ❸ so that they will not move sideways against folding base support ❺.

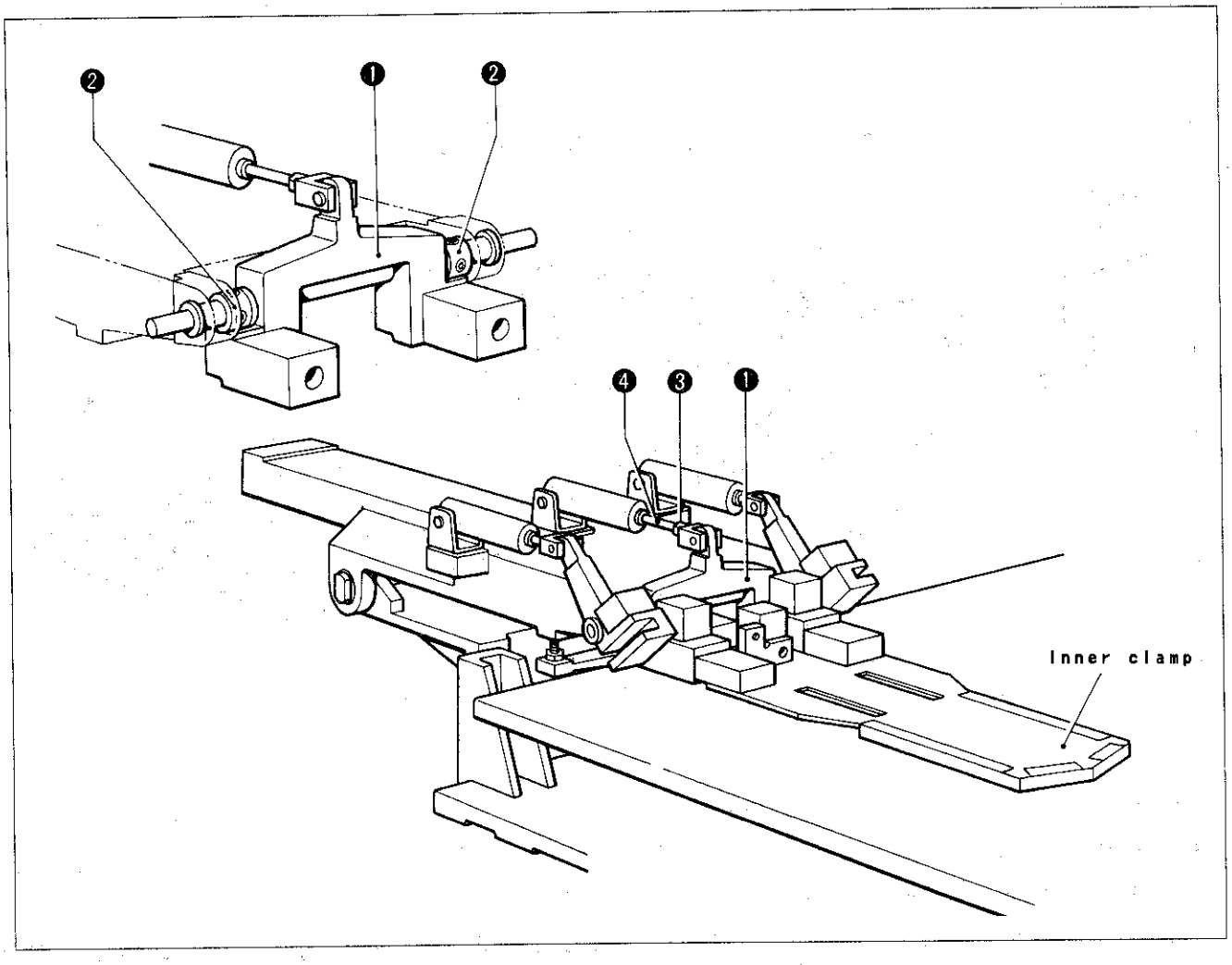
(2) Loosen two rod nuts ❻ and ❼ and adjust height of folding clamp ❿ by giving same amount of turns on right and left rods ❽ and ❾. Since rods ❽ and ❾ are M10 · P1.25, each turn will move them 1.25mm.

※ Be sure to confirm folding group features with AUTO mode.

16 Adjusting Inner Clamp

If the inner clamp is too high, the pocket cloth on the center blade cannot be clamped properly when the inner clamp comes down. If it is too low, the height is not convenient for the operator when the clamp goes up and the air cushion for the cylinder will not work when it comes down.

★ Apply air pressure and turn power switch on.



※ Compatibility of different models may be lost through this adjustment.

(1) Secure inner clamp lever ❶ as its longitudinal direction is accurately positioned by two collars ❷.

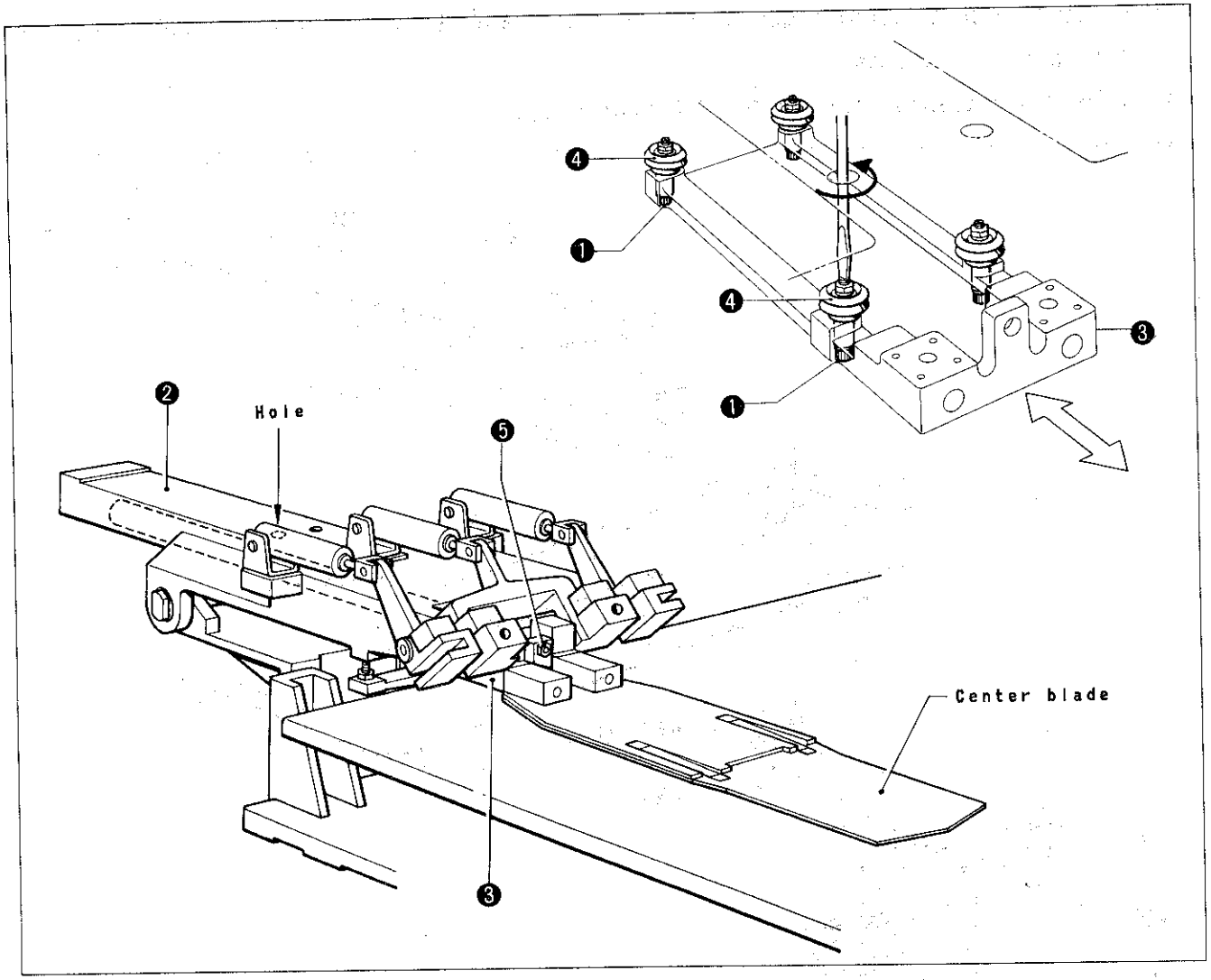
(2) Loosen nut ❸ and adjust inner clamp height by turning rod ❹.
Since the rod is M8·P1.25, each turn will give 1.25 mm of movement.

※ Be sure to select AUTO mode to confirm folding mechanism features.

17 Adjusting Center Blade

The bearing part consists of two coaxial shafts on the right and two excentric shafts on the left. Adjust the blade by turning the two shafts on the left.

★ Apply air pressure and turn power switch off.



(1) Loosen two bolts ❶, adjust by turning counterclockwise with a screwdriver through a hole in folding base ❷ and then secure bolts ❶.

(2) Move center blade support ❸ to check for its smooth movement and that each bearing ❹ will revolve under finger pressure.
Re-adjust bearing ❹ if it slips.

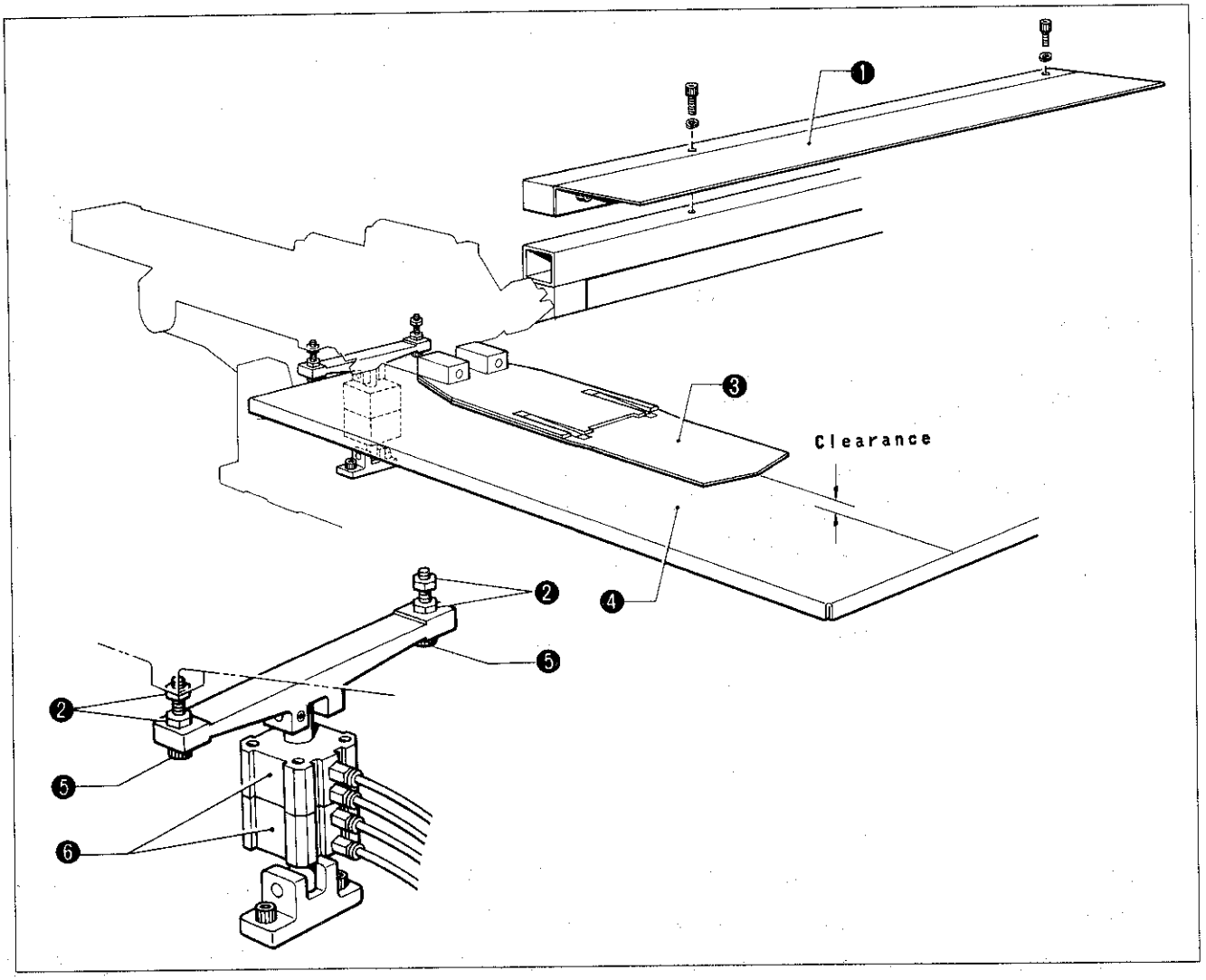
※ Front-to-back position may be adjusted by loosening rod nut ❺ (P1.25) but compatibility of different models will always be lost.

18 Adjusting Folding Base Height(1)

The outer folding shape will swell if the clearance between the center blade and needle plate is large; cloth mismatching will be caused when drawing out the center blade if it is small.

Adjust so that some resistance can be felt when the front cloth is clamped at the lowest point of the folding base.

★ Apply air pressure and turn power switch off.



(1) Remove table L ❶ and loosen four nuts ❷ on right and left.

Turn bolts ❺ counter-clockwise (when viewed from below) to increase clearance between center blade ❸ and needle plate ❹.

Turn them clockwise to decrease the clearance. Give exactly the same amount of turn on right and left.

Bolts ❺ are P1.25. Each turn will result in about a 2 mm change of center blade ❸ position.

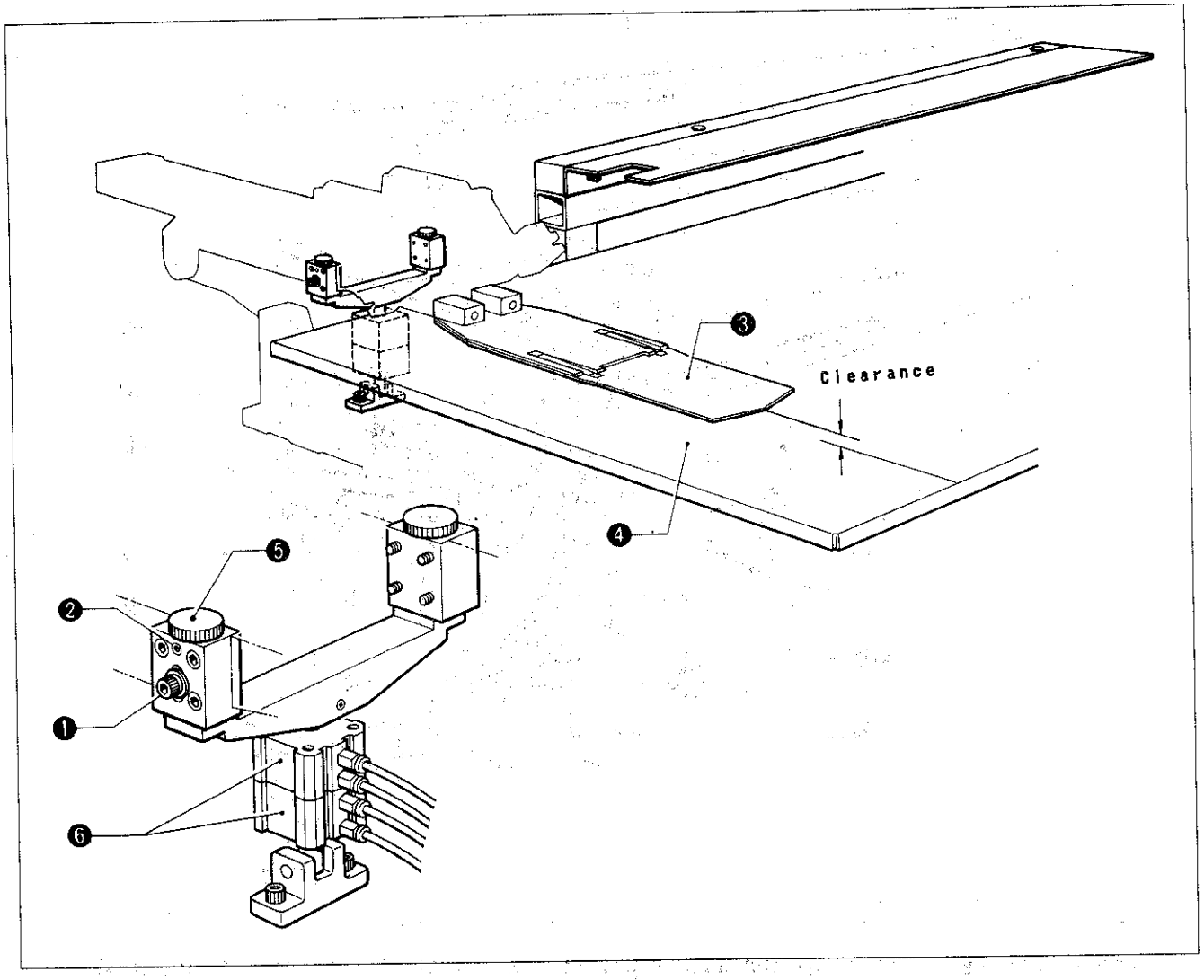
※ Be sure to balance folding base height on right and left, otherwise cylinder ❻ for folding base may fail to move.

18 Adjusting Folding Base Height(2)

If the clearance between the center blade and needle plate is large, the outer folding shape will swell, if it is small, cloth mismatching will be caused when drawing center blade.

Adjust so that some resistance can be felt when the front cloth is clamped at the lowest point of the folding base.

★ Apply air pressure and turn power switch off.



(1) Loosen two bolts ❶ and then two setscrews ❷.

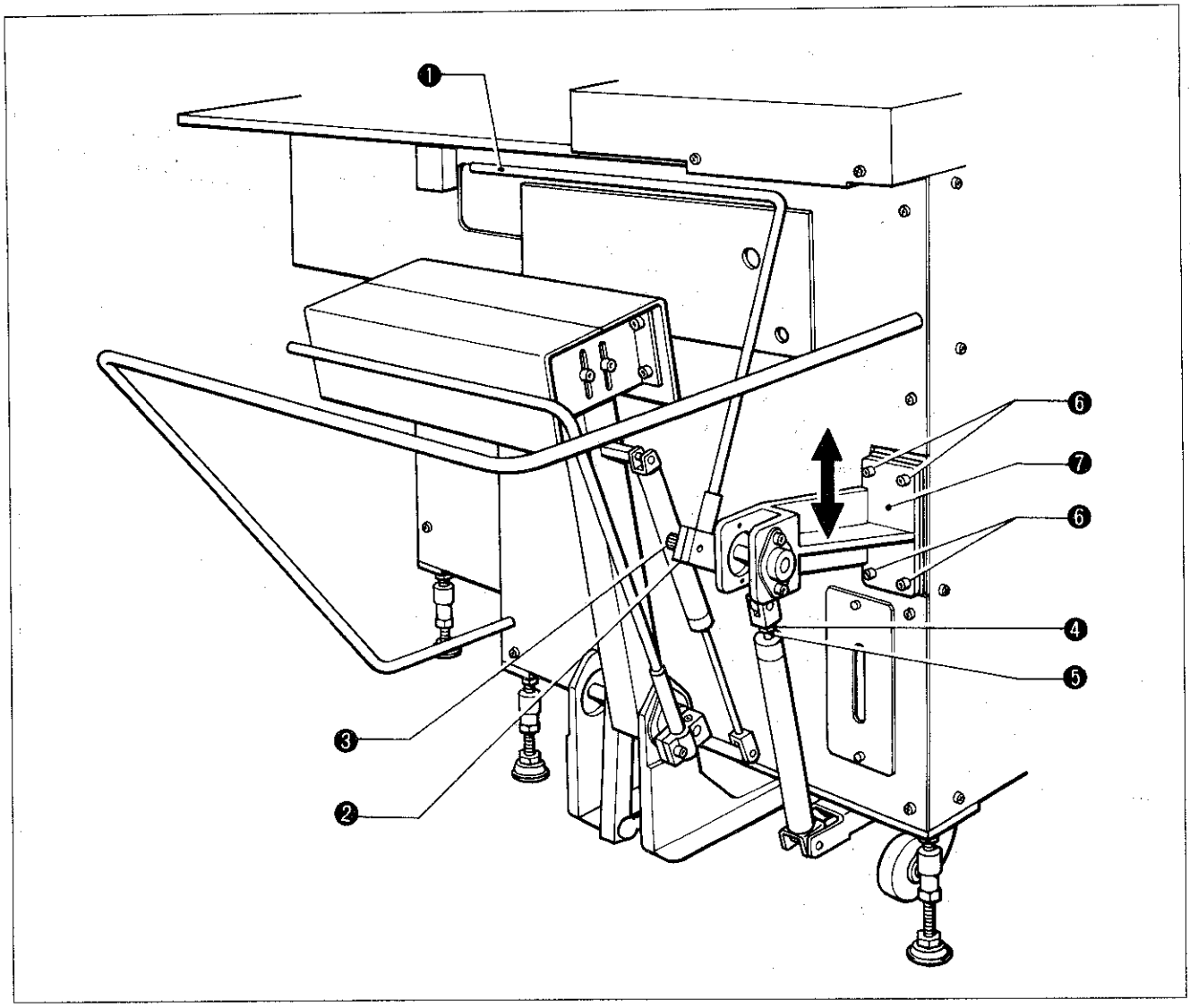
(2) Turn adjusting screws ❺ clockwise (when viewed from upper side) to increase the clearance between center blade ❸ and needle plate ❹.
Turn them counter-clockwise to decrease the clearance. Give exactly the same amount of turn on right and left.
The pitch of adjusting screws ❺ is 1.0 mm. Each turn will result in about a 2 mm change of center blade position.
※ Be sure to balance height on right and left, otherwise cylinder ❻ for folding base may fail to move.

(3) Fully tighten two bolts ❶ and two setscrews ❷.

19 Adjusting Stacker Wiper

Adjust the stacker wiper so as not to touch the front cover when it returns after operation. If the wiper position is too close to the operator, the front cloth ready to be sewn may be caught.

★ Apply air pressure and turn power switch off.



(1) Loosen bolt ❸ on lever ❷ and adjust position and angle for installing wiper ❶.

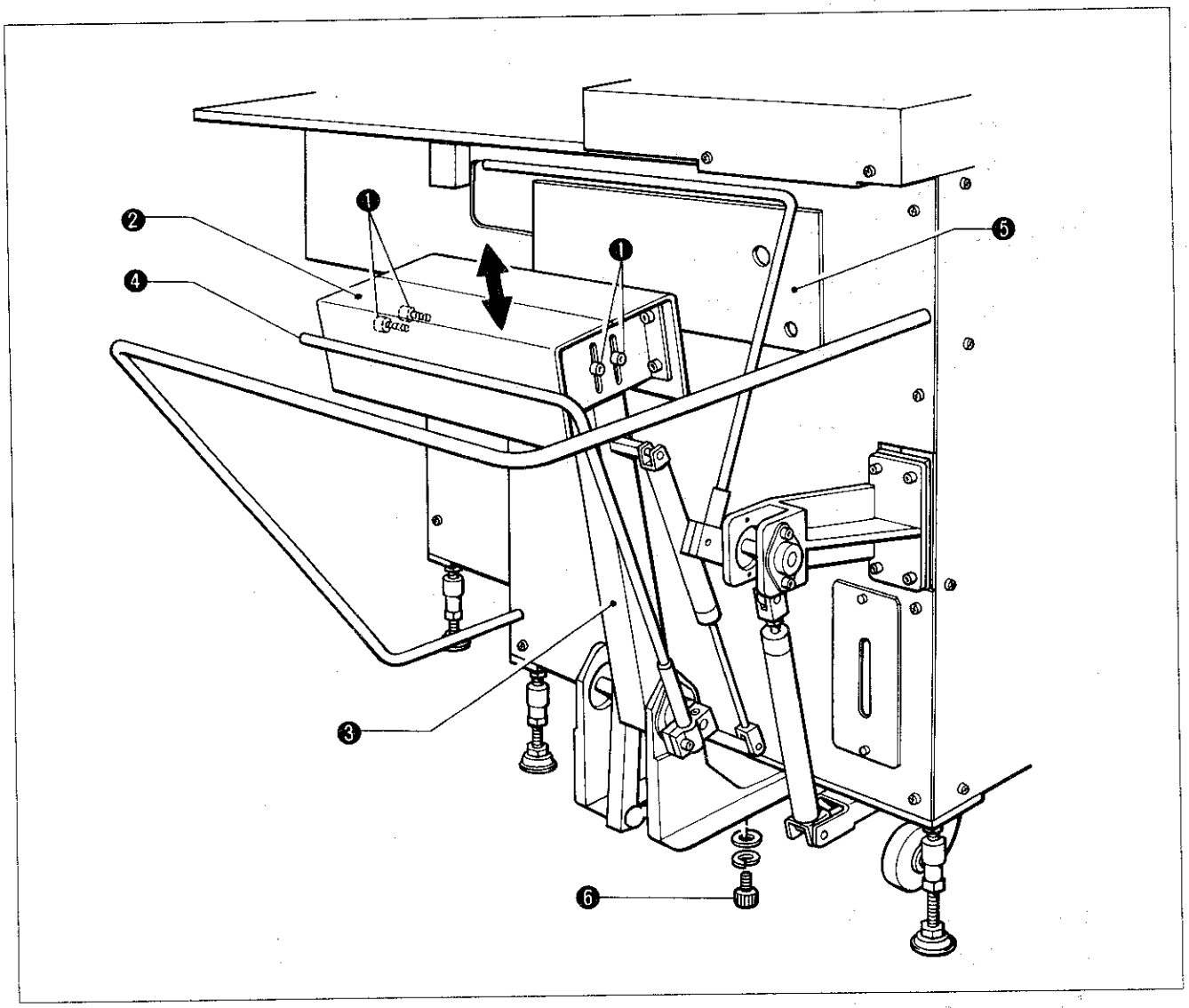
(2) Loosen rod nut ❹ and adjust angle of wiper ❶ at stand-by position by turning rod ❺. If it is not in adjustable range, loosen four bolts ❻ and adjust by vertically moving base ❼ which enables a large amount of adjustment.

※ Tighten the setscrew at rod end for 5 mm deep or more.

20 Adjusting Stacker Table

The Maximum of each front-cloth feed adjustment by the stacker roller is 95 mm. For better-balanced stacking, adjust the stacker table height. Install the table so it will make paralle contact with the caul.

★ Apply air pressure and turn power switch off.



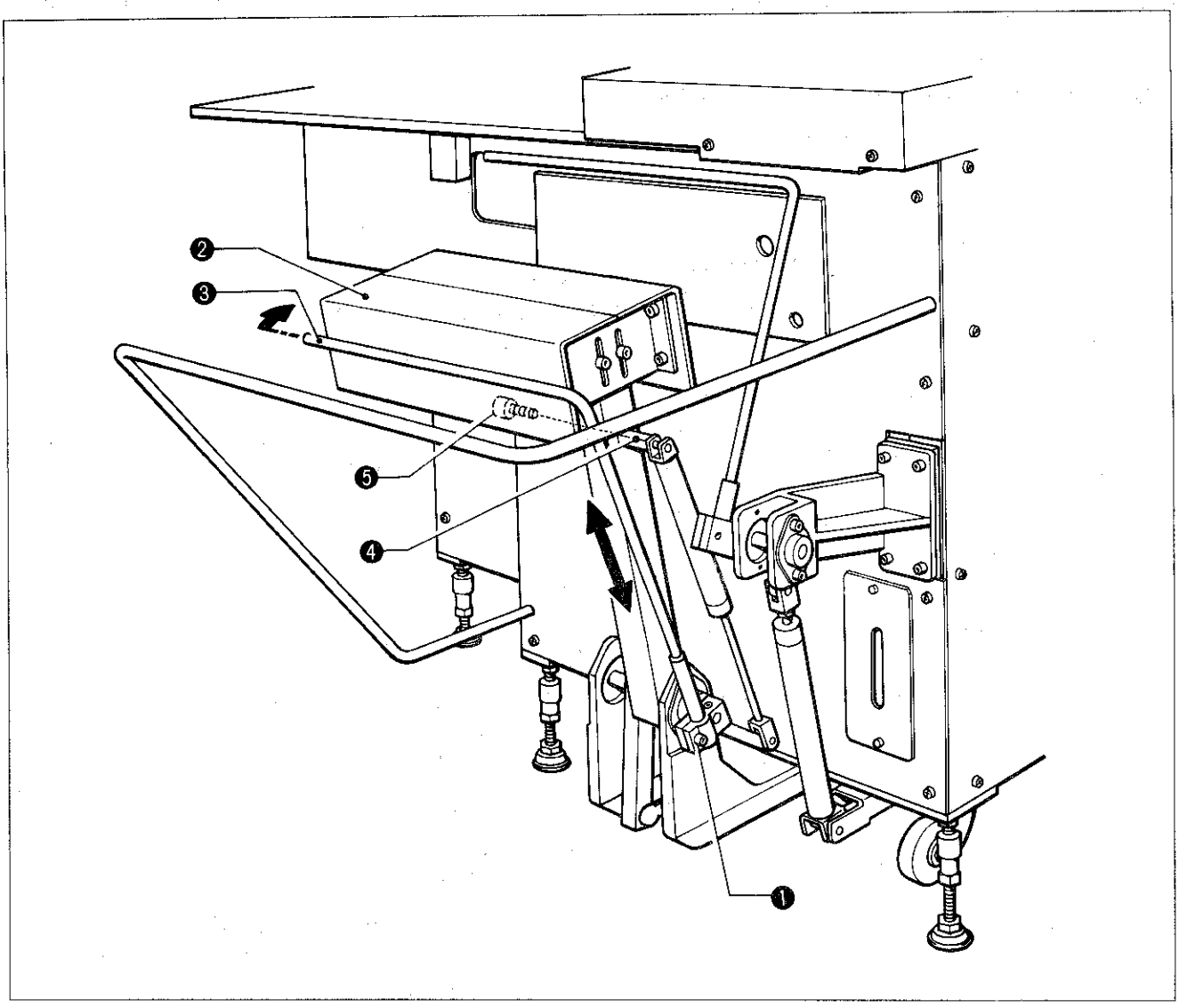
(1) Loosen four bolts ❶ and adjust height of stacker table ❷. Secure so as to be parallel to frame ❸.

(2) Adjust Presser bar ❹ at the same time.

(3) Loosen four bolts ❻ and adjust parallel between stacker table ❷ and caul ❺.

21 Adjusting Presser Bar

★ Apply air pressure and turn power switch off.



(1) Loosen bolt ❶ and adjust height of presser bar ❸ so bar is as high as middle of stacker table ❷.

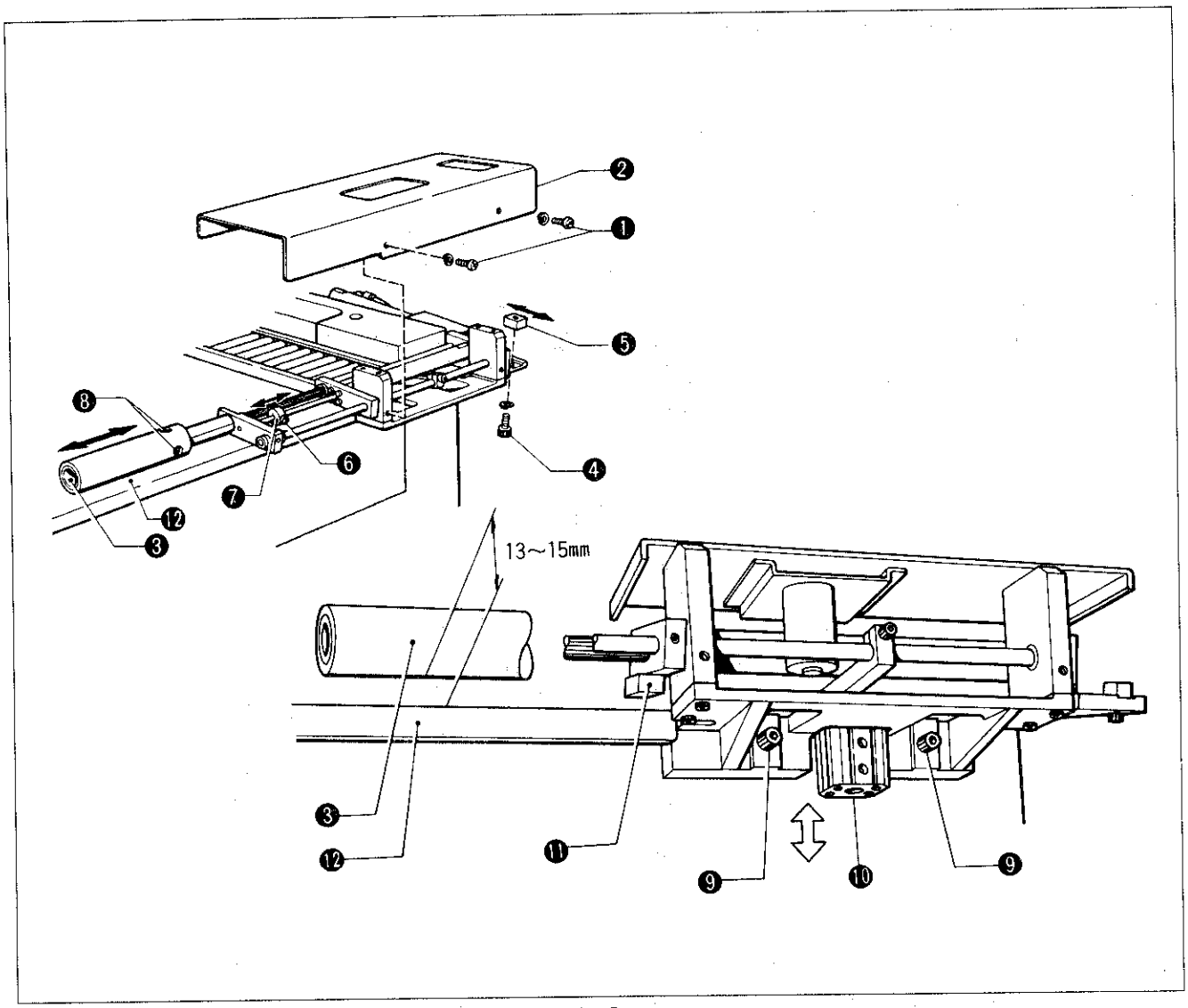
(2) Adjust angle of presser bar ❸ so its end will point a little inward.

(3) Loosen bolt ❺ and adjust clevis #1 ❹ so presser bar ❸ firmly presses stacker table ❷.

22 Adjusting Stacker Roller

The maximum roller feed is 400mm reduceable in three steps of about 95mm each. Right transfer is adjustable steplessly between 0 to 140mm.

★ Release air pressure and turn power switch off.



(1) Remove six screws ❶ and roller cover B ❷.

(2) Remove bolt ❹ and adjust roller ❸ revolutions by varying position of rack stopper ❺.

(3) Loosen bolt ❻ and adjust right transfer by varying position of stopper ❼.

(4) Loosen two setscrews ❽, and adjust position of roller ❸.

Height Adjustment

(1) Loosen two bolts ❾ to adjust height.

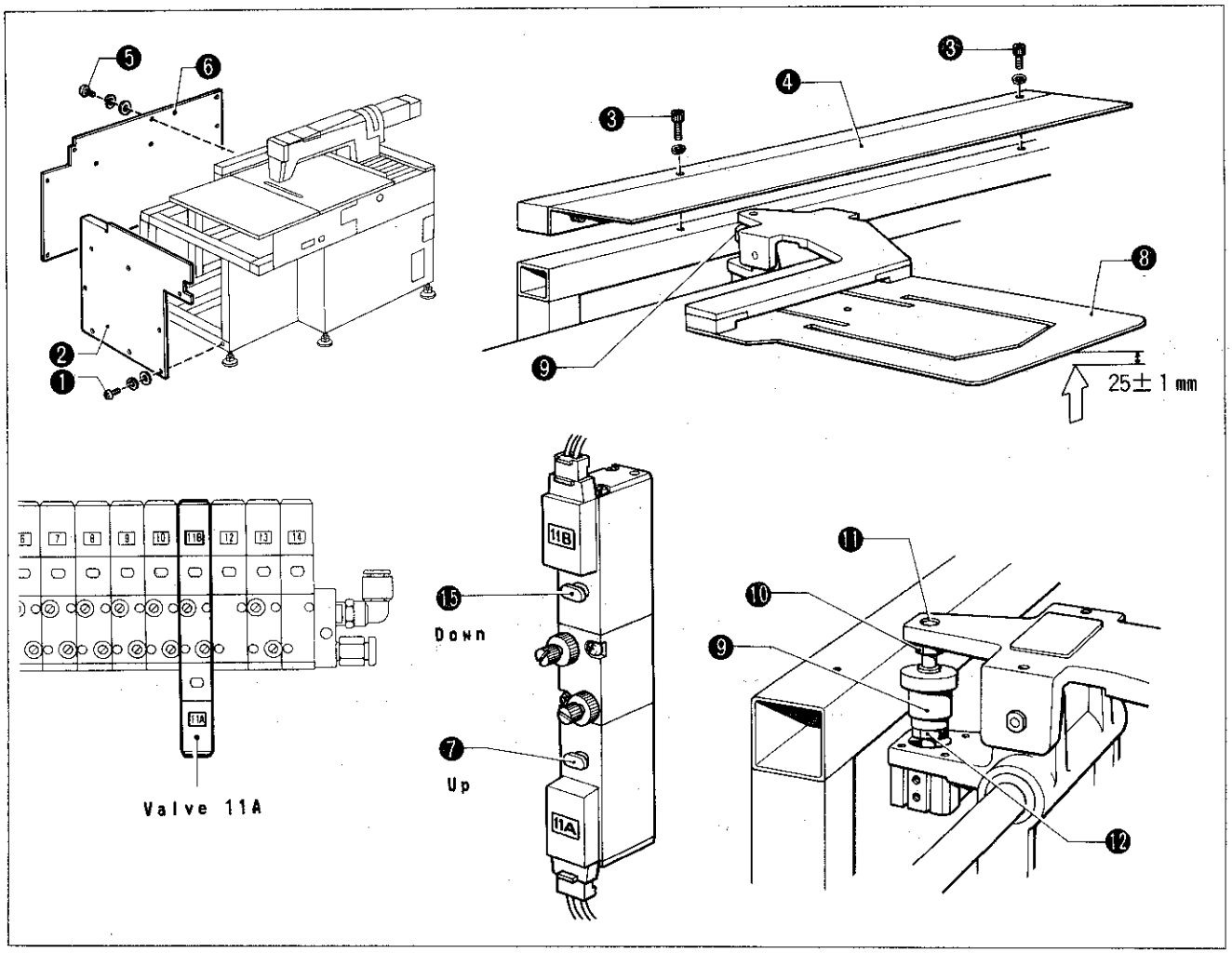
(2) When cylinder ❿ for vertical movement is retracted, spacer ⓫ and needle plate ⓬ should be in contact with and sponge of roller ❸ should lightly touch needle plate ⓬ in parallel.

(3) When cylinder ❿ for vertical movement is extended, there should be some clearance (13 to 15mm) between needle plate ⓬ and sponge of roller ❸ so that the front cloth will not be caught.

23 Adjusting Presser Foot Height and Pressure

Adjust the presser foot so that the distance between front bottom surface and the needle plate surface is 25±1 mm with the clamped pressure of 0.5 to 1kgf/cm².

★ Apply air pressure and turn power switch off.



Remove eleven screws ❶ and left frame side cover ❷.

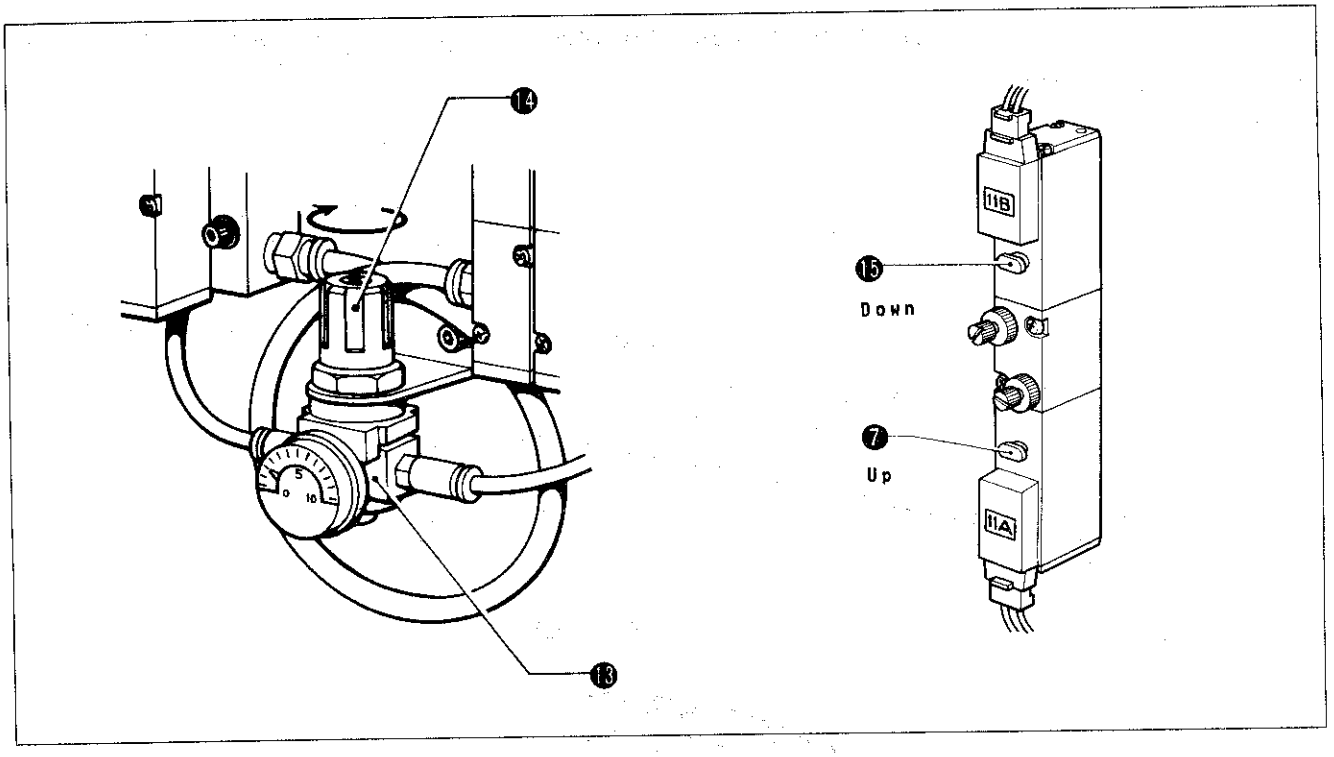
1. Sewing clamp height adjustment

(1) Remove two bolts ❸ and table L ❹. Remove fifteen screws ❺ and back face cover ❻.

(2) Press manual button ❼ for valve #11A to raise sewing clamp ❽.

(3) Loosen nut ❿ on floating joint ❾ and adjust height by turning screw ❿ at the end of floating joint ❾. Tightly lock nut ❿ after adjustment. Also tightly lock nut ⓬ under floating joint ❾ at the same time.

2. Pressure Adjustment

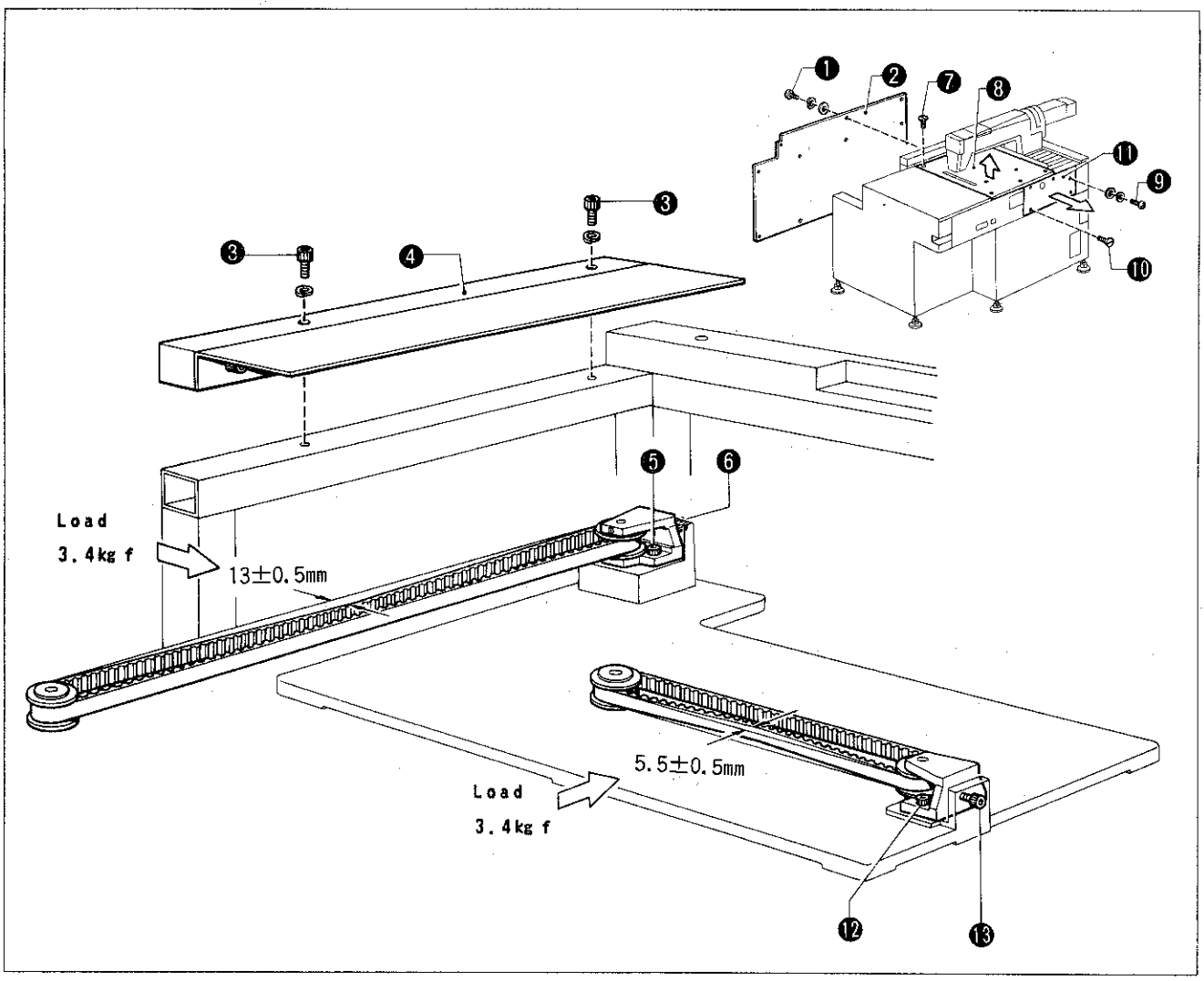


(1) Pull up cap ⑭ of regulator ⑬. Turn cap clockwise to increase pressure.
Pressure will change greaty by turning cap only a little.
Be sure to press manual buttons ⑦ and ⑮ alternatively to check for pressure.
Push down cap ⑭ and lock it after adjustment.

※ This pressure greatly influences folding. See Manual for Folding Margine Mechanism.

24 Adjusting Belt Tension

Insufficient belt tension results in inaccurate needle entrance ; excessive belt tension shortens belt use life.



X-direction Belt Tension Adjustment

(1) Turn power switch off and remove fifteen screws ❶ and back face cover ❷.

(2) Remove two bolts ❸ and table L ❹.

(3) Loosen two bolts ❺ and adjust belt tension by turning bolt ❻ so that the slack will be 13 ± 0.5mm with a load of 3.4 kgf on the middle of belt.

Y-direction Belt Tension Adjustment

(1) Turn power switch to OFF.

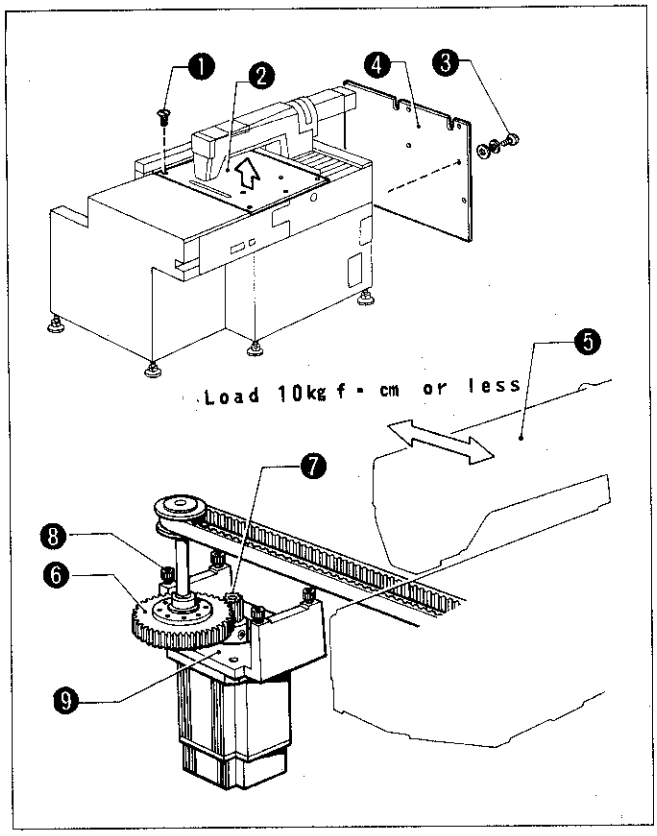
(2) Remove screw ❼ and needle plate ❽.
Remove three bolts ❾, three screws ❿ and caul ⓫.

(3) Loosen two bolts ⓬ and adjust belt tension by turning bolt ⓭ so the slack will be 5.5 ± 0.5mm with a load of 3.4 kgf on the middle of belt.

25 Adjusting AC Servomotor Backlash

X-direction Adjustment

★ Apply air presure and turn power switch off.



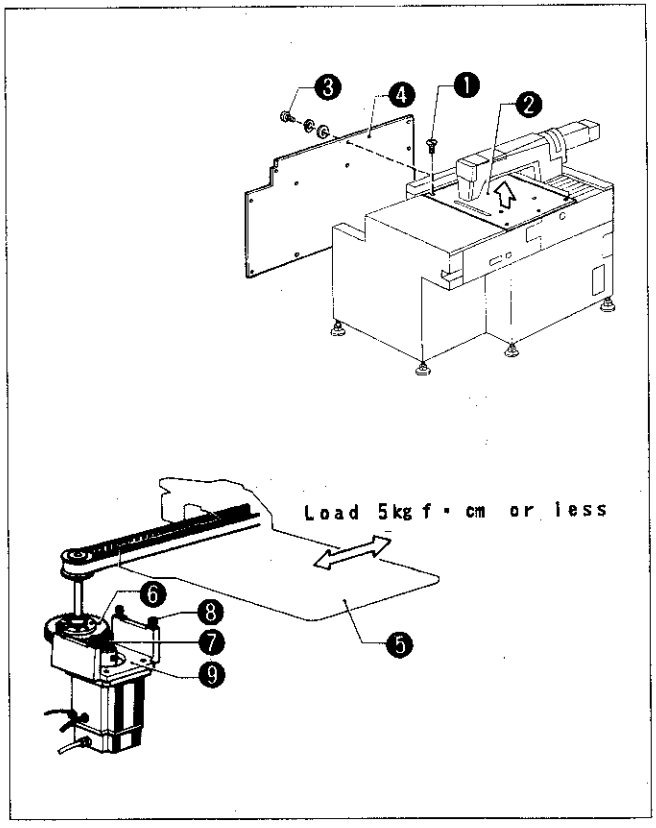
(1) Remove screw ❶ and needle plate ❷.

(2) Remove ten screws ❸ and right frame side cover ❹.

(3) Turn power switch on, loosen four bolts ❽ and turn motor supporter ❾ to adjust backlach between nylon gear ❻ and gear ❼ so as to be 0 to 0.03 mm when machine head ❺ is moved back and forth by hand. After adjustment, maintain loaded torque to move sewing machine back and forth with power switch OFF at 10kgf or less.

Y-direction Adjustment

★ Apply air presure and turn power switch off.



(1) Remove screw ❶ and needle plate ❷.

(2) Remove fifteen screws ❸ and back face cover ❹.

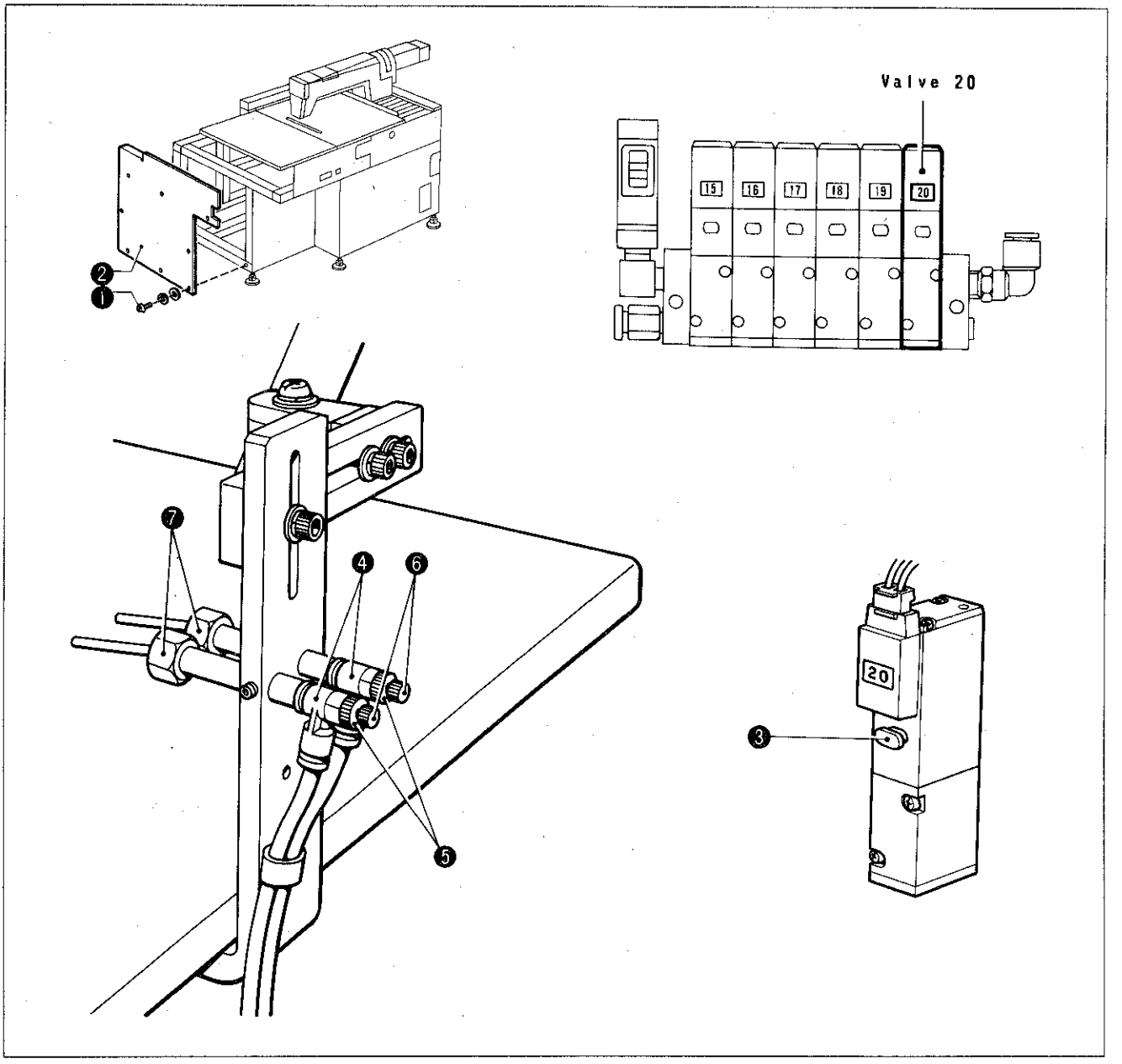
(3) Turn power switch on, loosen four bolts ❽ and turn motor supporter ❾ to adjust backlash between nylon gear ❻ and gear ❼ so as to be 0 to 0.03 mm when sewing clamp ❺ moved right and left by hand.
After adjusment, maintain loaded torque to move sewing clamp ❺ right and left with power switch off at 5kgf or less.

26 Adjusting Front Blower

Use the blower when the front cloth is curled due to storage conditions.

Control the flowrate at 0 if not in use to save compressed air consumption.

★ Apply air pressure and turn power switch off.



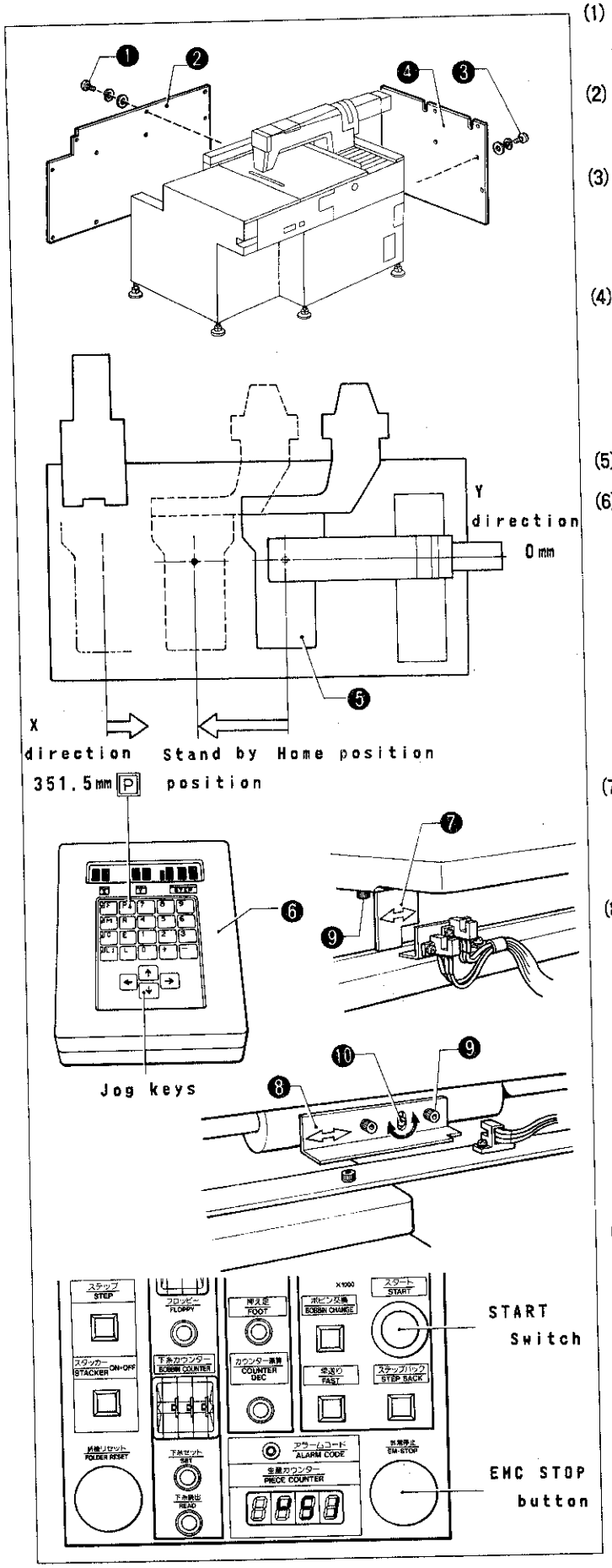
(1) Remove eleven screws ❶ and left frame side cover ❷.

(2) Press manual button ❸ for valve #20 to start blower.
Loosen nut ❺ on speed controller ❹ and adjust flowrate by turning screw ❻. Turn clockwise to reduce flowrate.

(3) Loosen nut ❼ to adjust blowing direction.

27 Checking and Adjusting Home Position

★ Apply air pressure and turn power switch off.



(1) Remove fifteen screws ❶ and back face cover ❷.

(2) Remove ten screws ❸ and right frame side cover ❹.

(3) Install and lock sewing clamp ❺ in current use. Attach programmer ❻ to main body.

(4) Turn power switch to ON. Sewing clamp ❺ will move left and then right and stop at stand-by position. Spread cloth under sewing clamp ❺.

(5) Press [P] to obtain programming state.

(6) Use jog keys (direction keys) to locate needle in the center of home position hole of sewing clamp ❺.
Adjust slit A ❼ and slit B ❽ so programmer will display 151.5 mm for X direction and 0 mm for Y direction.
Programmer display should show [2][2], [0][0]

(7) Loosen two bolts ❾ in slit A ❼ or slit B ❽, as required, and finely adjust by turning slit pin ❿.

(8) After adjustment, raise needle to its upper point and press [2][2][2][R]. Sewing clamp ❺ will stand-by position.

※ If the control panel displays error code ⊔51, press EM STOP button, move needle bar to the highest position (flashing light will go off) and press green START button switch.

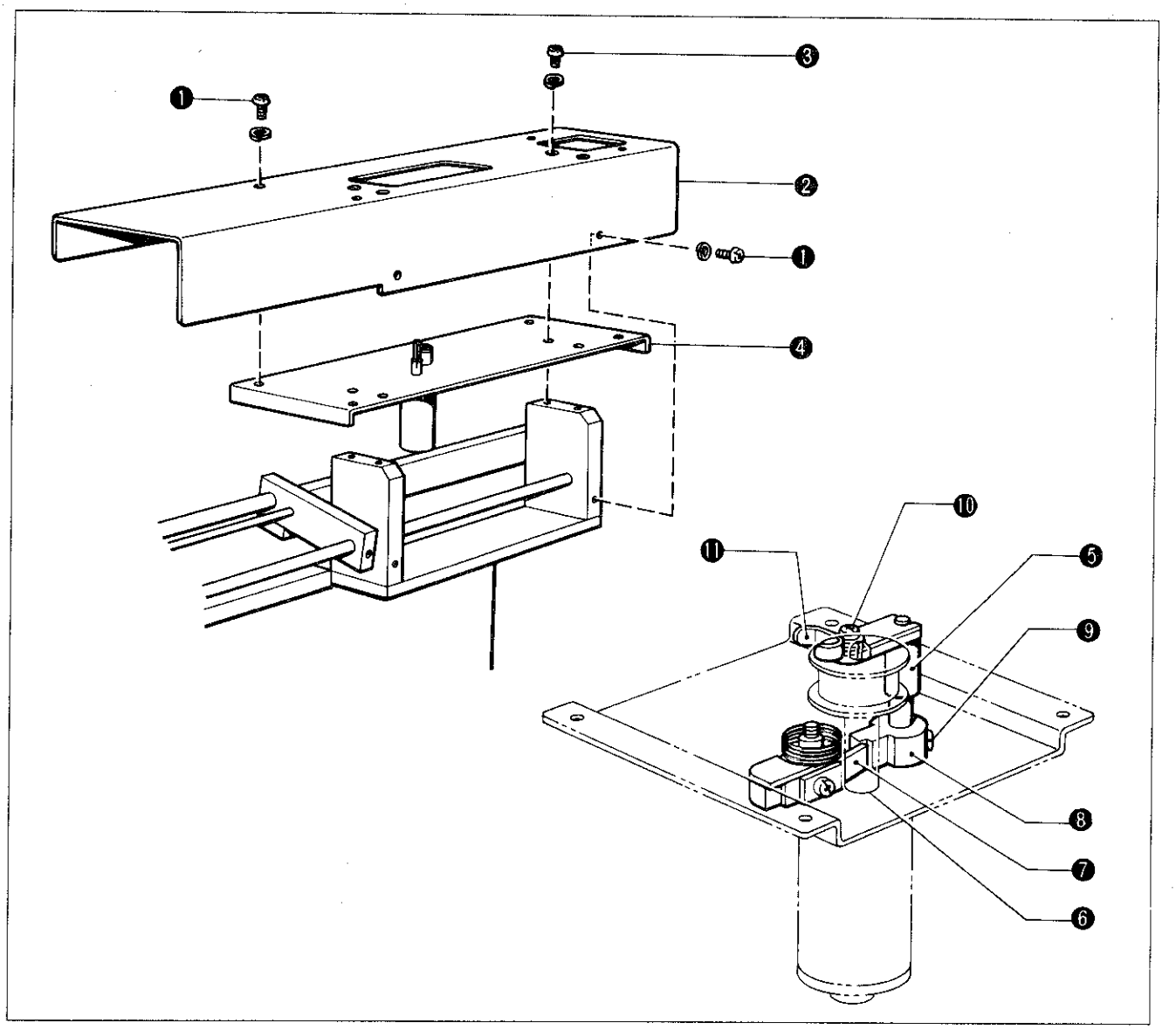
(9) Press [P] again to release the programming state. Programmer display will go off.

(10) Repeat procedures (5) to (9) to adjust home position.

※ If the control panel displays error code ⊔51, press EM STOP button, move needle bar to the highest position (flashing light will go off) and press green START button switch.

28 Adjusting Bobbin Winder

★ Turn power switch off.



1. Bobbin Winder Claw Positioning

(1) Remove six screws ❶ and roller cover B ❷ and then remove four screws ❸ and bobbin winder base ❹.

(2) Move bobbin holder arm ❺ in direction of bobbin winder shaft ❻ to a position just before finishing bobbin thread winding.

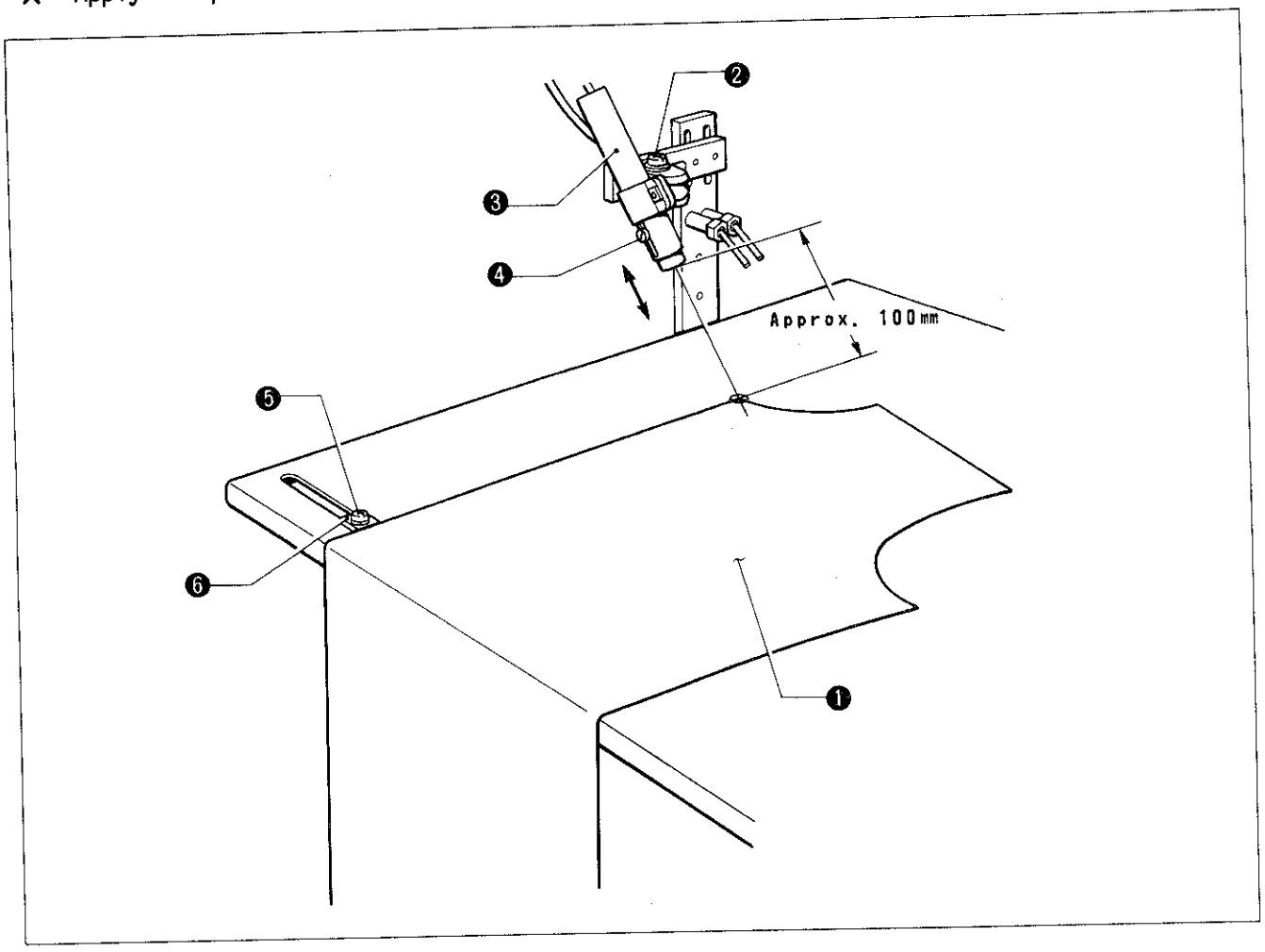
(3) Tighten two screws ❾ so that spring plate ❼ will be positioned on a stepped part of bobbin winder claw ❽.

2. Bobbin Holder Arm Positioning

(1) Loosen screw ❿ and adjust bobbin holder arm ⓫ by turning it to set proper thread amount.

29 Adjusting Marker and Front Locator

★ Apply air pressure and turn power switch on.



1. Marker Adjustment

(1) Position mark onto corner part of front cloth ❶ to be located.

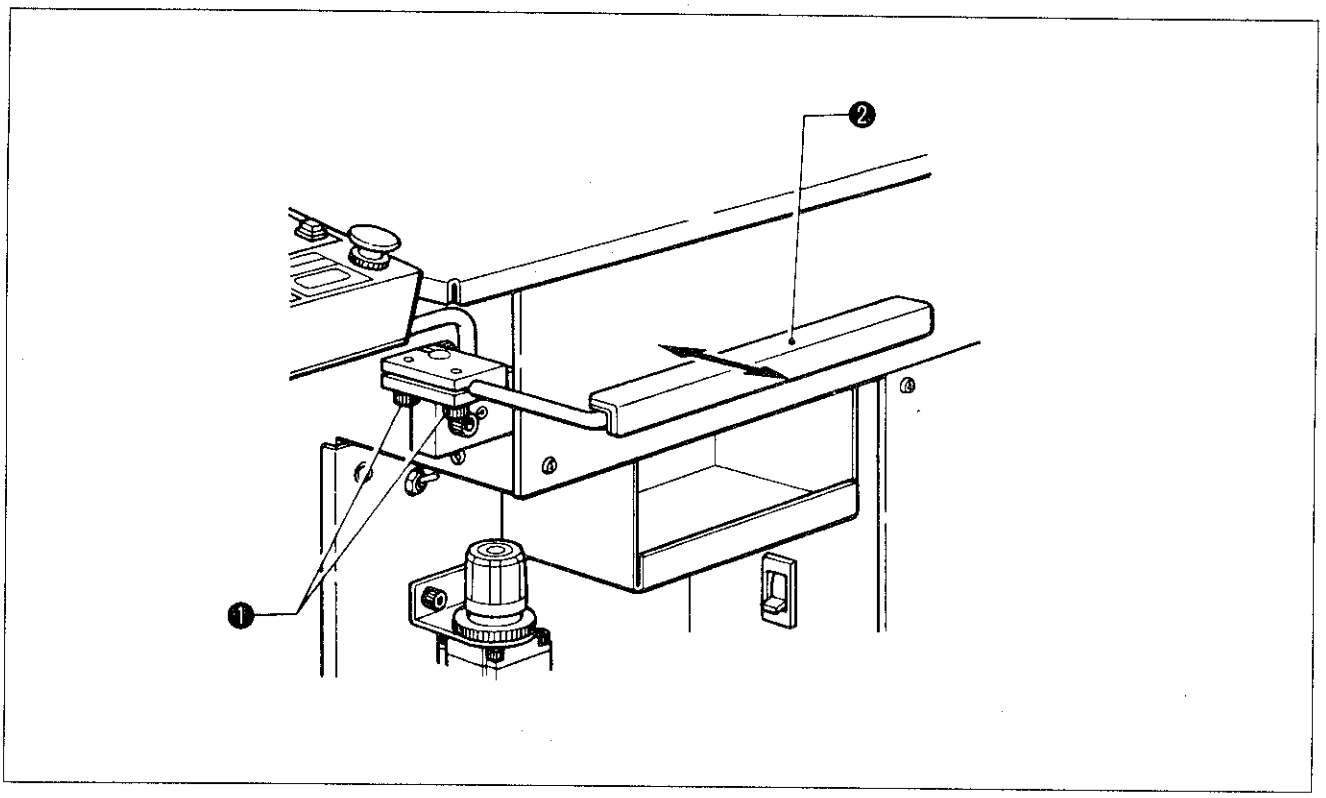
(2) Loosen screw ❷ and adjust direction of marker ❸.

(3) Loosen screw ❷ and position marker ❸ so that distance between mark and lens end will be about 100 mm. Loosen screw ❹ for fine adjustment.

2. Front Locator Adjustment

(1) Loosen screw ❺ and adjust locator ❻ by moving it right and left.

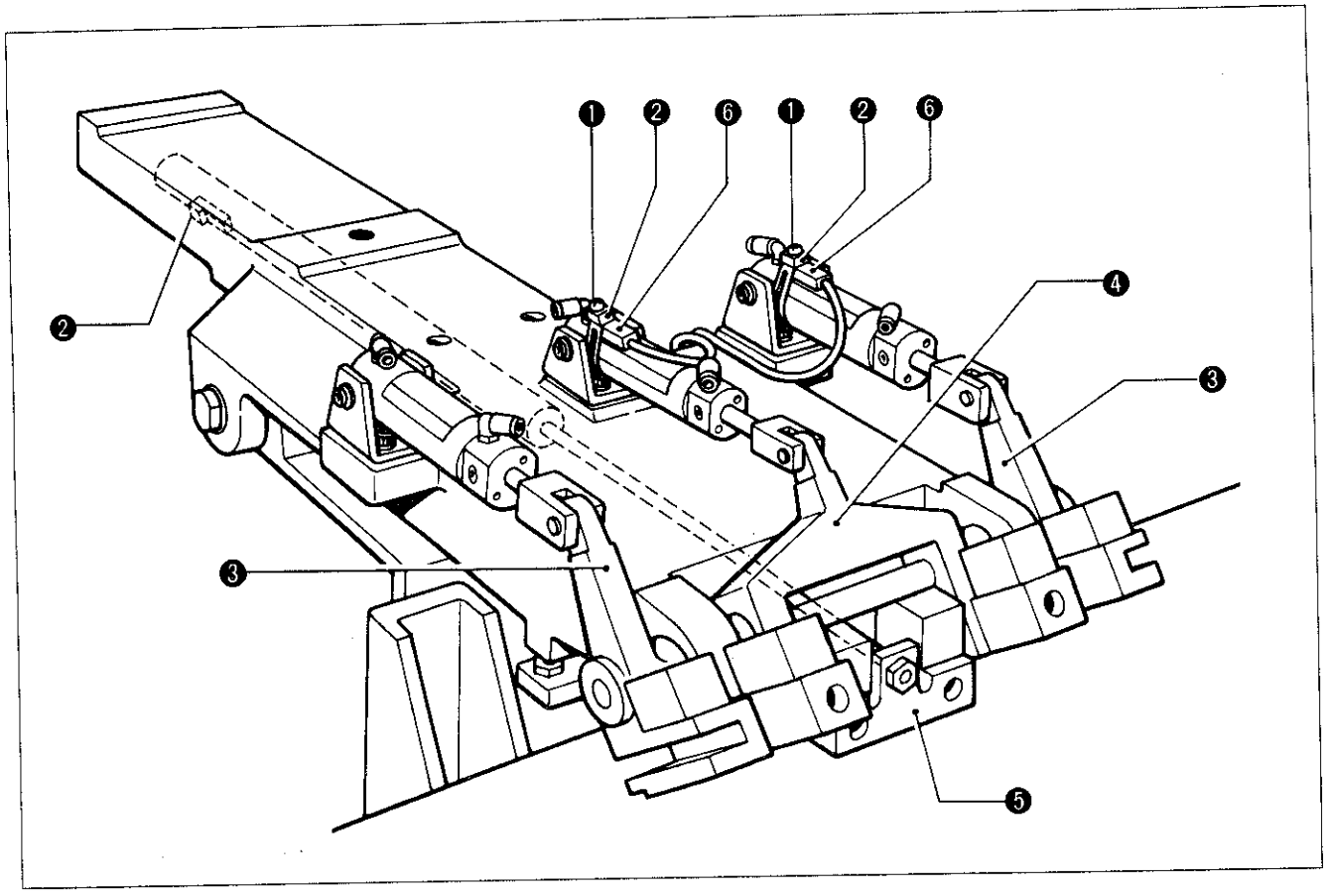
30 Adjusting Front Supporter



(1) Loosen two bolts ❶ and adjust front supporter ❷.

31 Adjusting Cylinder Sensors

★ Release air and turn power switch on. Remove all folding mechanism parts.



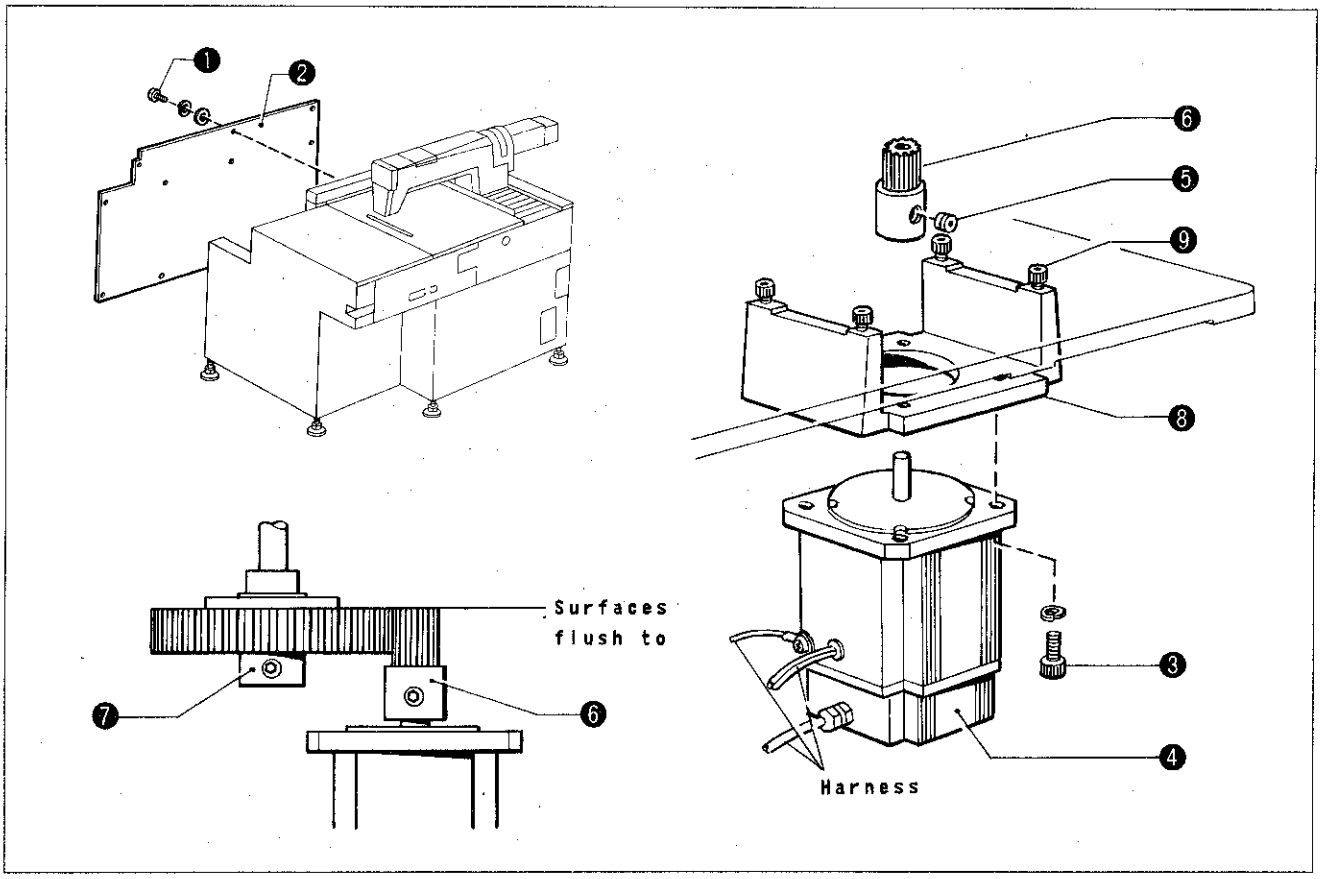
(1) Loosen screws ❶ and adjust sensors ❷ position.

(2) Manually operate folding group suppot arm ❸, inner clamp lever ❹ and center blade supporter ❺ and adjust them so each LED of sensors ❻ will come on about 5 mm before stroke end of each cylinder.

REPLACEMENT, ADJUSTMENT AND MAINTENANCE OF GEARS

1 Replacing and Adjusting Motor-side Gears

★ Release air pressure and turn power switch off.



(1) Remove fifteen screws ❶ and back face cover ❷.

(2) Replacement and adjustment are the same on X and Y axes.

(3) Remove four bolts ❸ and motor ❹.

(4) Loosen two setscrews ❺ and remove gear ❻.
For easy removal, hold gear ❻ between two screwdrivers.

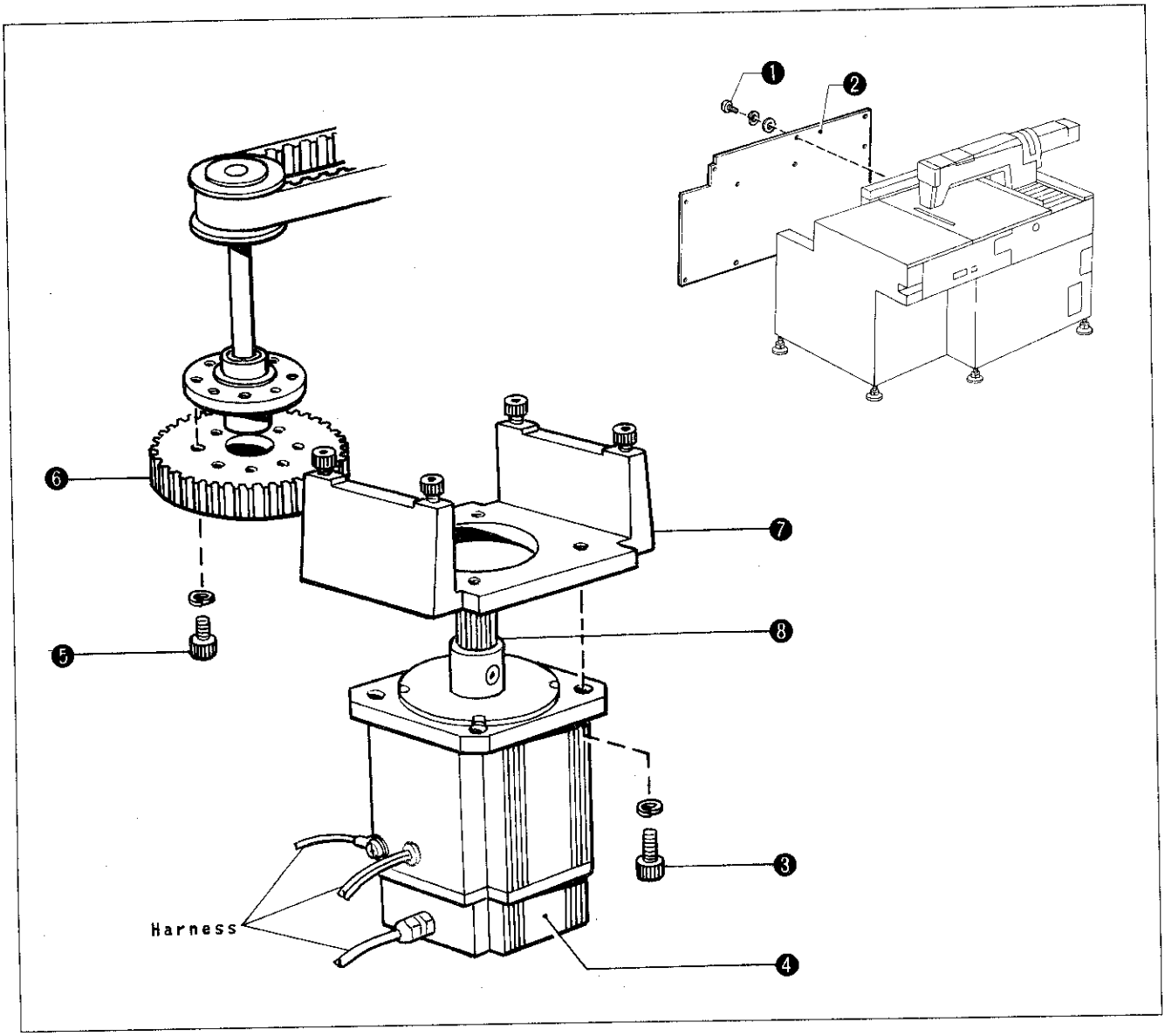
(5) Install new gear ❻ on motor ❹ shaft, position nylon gear ❼ surface flush to gear ❻ surface, and tighten setscrews ❺.

(6) Secure motor ❹ on motor supporter ❽ with fout bolts ❸.

※ Place motor ❹ harness in a strain-free direction.

※ Loosen four bolts ❾ and adjust any backlash between gear ❻ and nylon gear ❼ by moving motor supporter ❽. Follow the same procedure if the gears are engaged too tight.
See "25 Adjusting AC Servomotor Backlash".

2 Replacing and Adjusting Pulley-side Nylon Gears



(1) Remove fifteen screws ❶ and back face cover ❷.

(2) Replacement and adjustment are the same on X and Y axes.

(3) Remove four bolts ❸ and motor ❹.

(4) Remove six bolts ❺ and replace nylon gear ❻.

(5) Secure motor ❹ on motor supporter ❼ with four bolts ❸.

※ Place motor ❹ harness in a strain-free direction.

● Maintenance

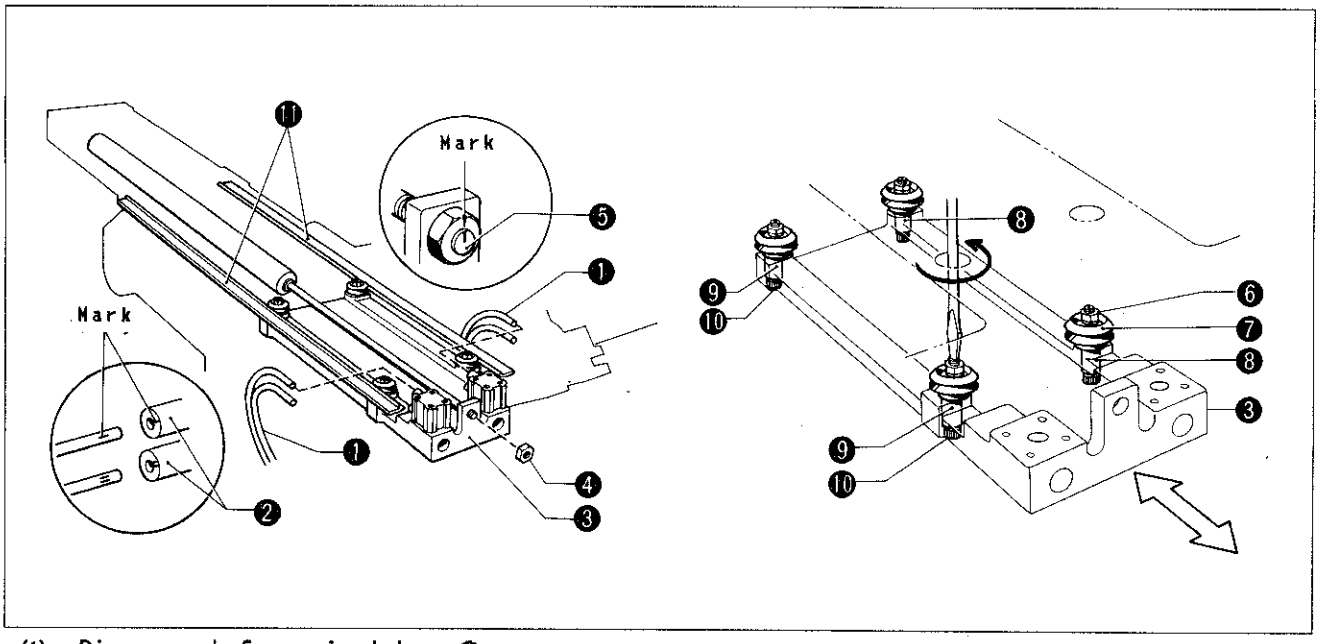
(1) Always lubricate surface of gear ❽ teeth with grease.

Replenish supplied grease on gear ❽ teeth when no grease is left on surface.

REPLACEMENT AND ADJUSTMENT OF BEARINGS

1 Replacing and Adjusting Bearings for Center Blade Supporter

★ Release air pressure and turn power switch off.



(1) Disconnect four air tubes ❶.
※ Mark air tubes ❶ and grease zerks ❷ to prevent misconnection.

(2) Pull center blade supporter ❸ toward you, loosen nut ❹ and remove center blade supporter ❸ by turning rod end ❺.
※ Mark rod end ❺ as illustrated above for reproducibility of center blade ❸ installation. Deviation in installed position will greatly influence folding effect.

(3) Remove nut ❻ on bearing to be replaced. Replace bearing ❼ with a new one and lock with nut ❻.

(4) Loosen bolts ❿ and replace shafts ❽ and ❾, if necessary.
※ Coaxial roller shaft❽ is on the right and eccentric roller shaft ❾ is on the left.
※ No adjustment is required when replacing coaxial roller shaft ❽ only.
※ The following adjustment is required after replacing eccentric roller shaft ❾.

(5) Secure bolt ❿ on coaxial roller shaft ❽ on the right.
Move bearing ❼ inward by turning eccentric roller shaft ❾ and secure temporarily with bolt ❿.

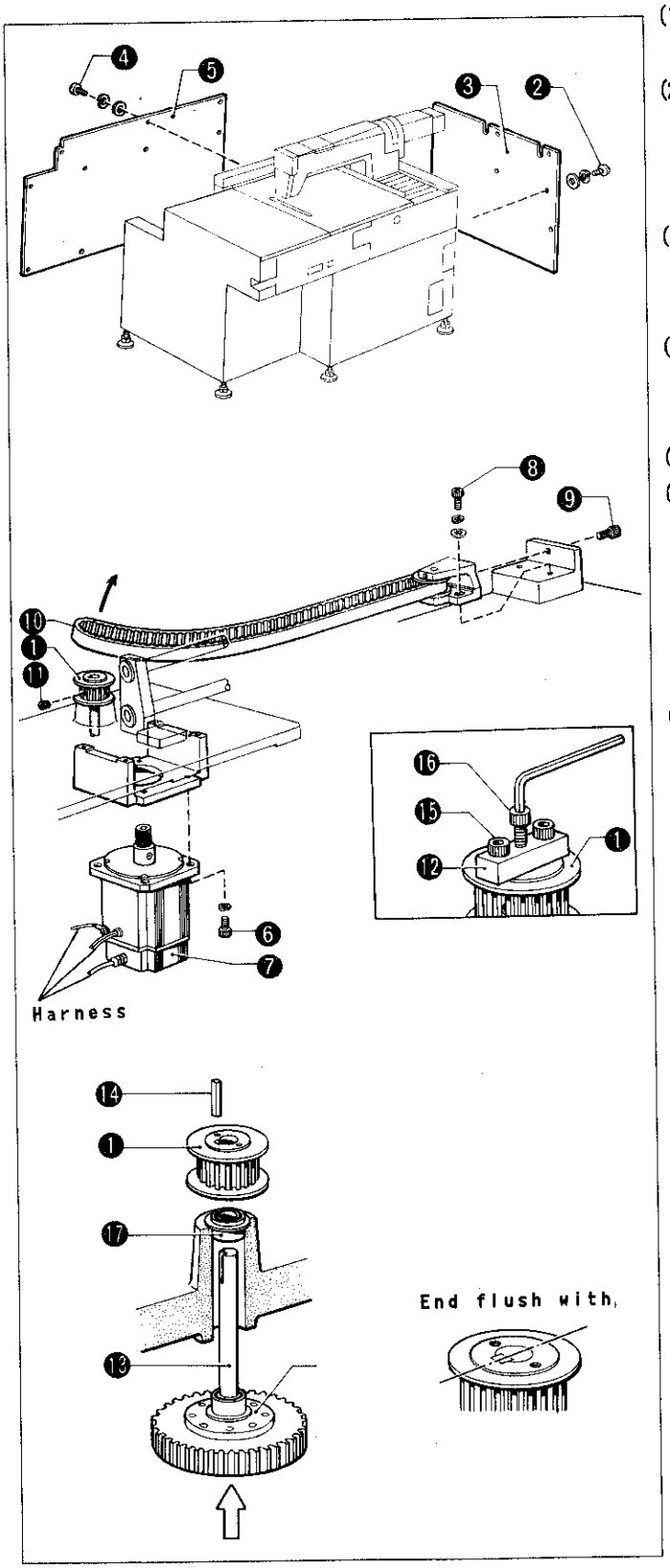
(6) Place center blade supporter ❸ on rails ⓫. Adjust bearing ❼ by turning eccentric roller shaft ❾ with screwdriver to allow smooth movement without play on rail ⓫ walls.
※ Adjust eccentric roller shaft ❾ by turning counter-clockwise.
Secure bolt ❿.

(7) Check for smooth movement of center blade supporter ❸ and rotation of each bearing ❼ even under finger pressure.
If bearing ❼ slips, re-adjust eccentric roller shaft ❾.

Replacement and Adjustment of Timing Pulleys

★ Release air pressure and turn power switch off.

1 Replacing and Adjusting Motor-side Pulleys



(1) Replacement and adjustment are the same on X and Y axes.

(2) For X-axis pulley ❶, remove ten screws ❷ and right frame cover ❸; then remove fifteen screws ❹ and back face cover ❺.

(3) Remove four bolts ❻ and motor ❼.
※ Remember motor harness direction when removing it.

(4) Loosen two bolts ❽ and tension adjusting bolt ❾ and remove timing belt ❿.

(5) Loosen setscrew ⓫.

(6) An ordinary pulley remover may be used. If there isn't one at hand, use special-purpose jig ⓬.
※ Pulley shaft ⓭ and keys ⓮ are not quenchehed and in need of special handling care.

(7) When using special-purpose jig ⓬, secure jig ⓬ on pulley ❶ with two bolts ⓯. Insert bolt ⓰ into tap in center and pull out pulley ❶ by turning.

(8) Install pulleys following procedures shown below.

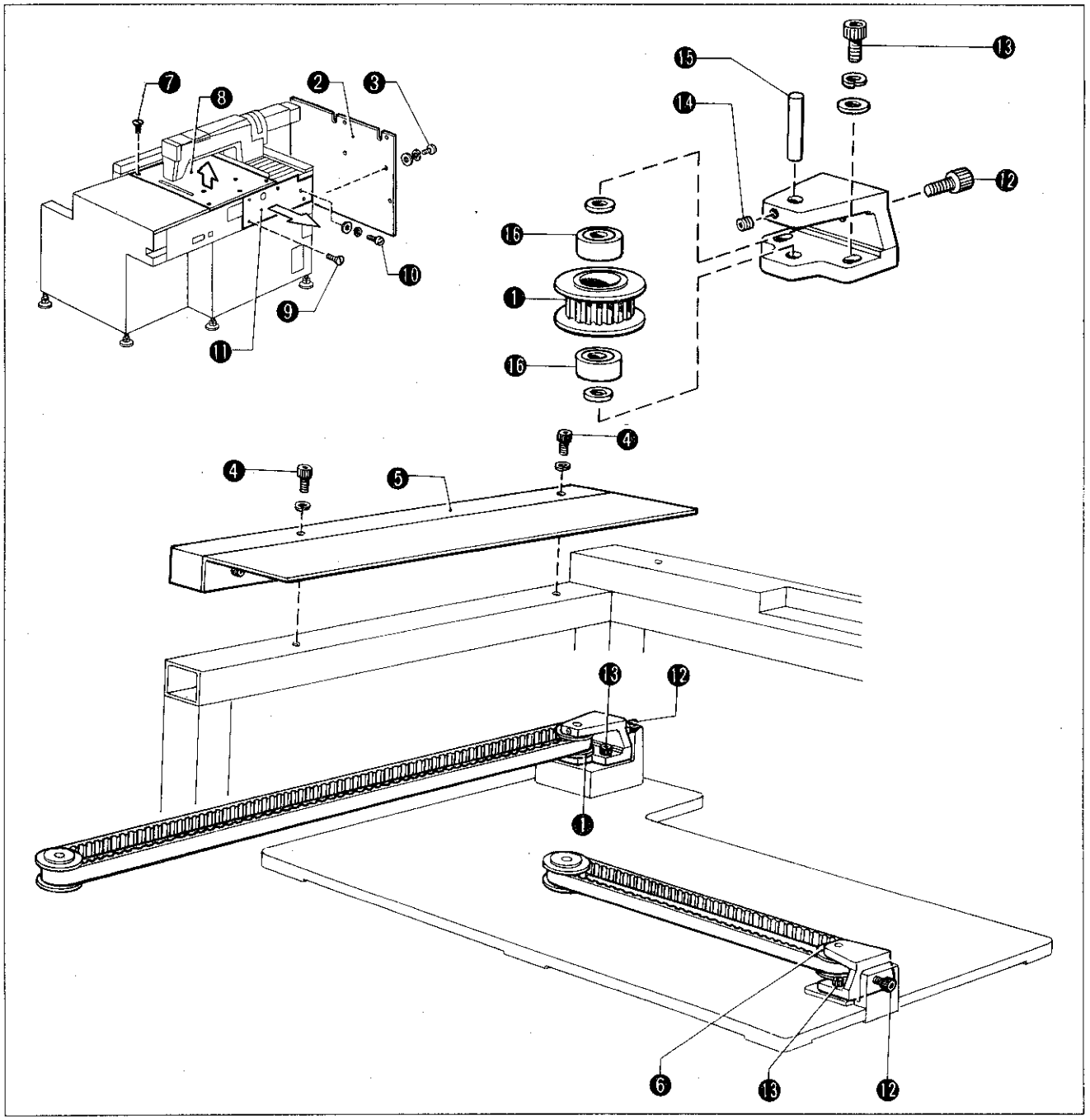
(9) Insert pulley shaft ⓭ into bearing ⓱. If keys ⓮ are deviated from pulley shaft ⓭, use plastic mallet and pliers with rag so as to fully insert keys into bearing groove till end surface of keys ⓮ and to become flush with pulley shaft ⓭ end surface.

(10) While supporting bottom of gear holder ⓲, which is incorporated with pulley shaft ⓭, install timing pulley ❶ using a plastic mallet or the like.
※ There should be no play on pulley when entire pulley shaft ⓭ is moved up and down.

(11) Complete installation through procedures (5) to (1).

※ See "[24] Adjusting Belt Tension" and adjust the tension.

2 Replacing and Adjusting Tension-adjusting-side Pulleys



(1) Replacement and adjustment are the same on X and Y axes.

(2) For X-axis pulley ❶, remove ten screws ❷ and right frame cover ❸; then remove two bolts ❹ and table L ❺.
For Y-axis pulley ❻, remove screw ❼, needle plate ❽.
Remove screw ❾, nut ❿ and caul ⓫.

(3) Remove bolt ⓬ and bolt ⓭.

(4) Loosen setscrew ⓮ and draw out pulley shaft D ⓯.
※ Pulley shafts D ⓯ are not quenched and need special handling care.

(5) Remove bearing ⓰ from pulley ❶ and replace it on new pulley ❶.

(6) Complete installation through procedures (4) to (1).
※ See "24 Adjusting Belt Tension" and adjust the tension.

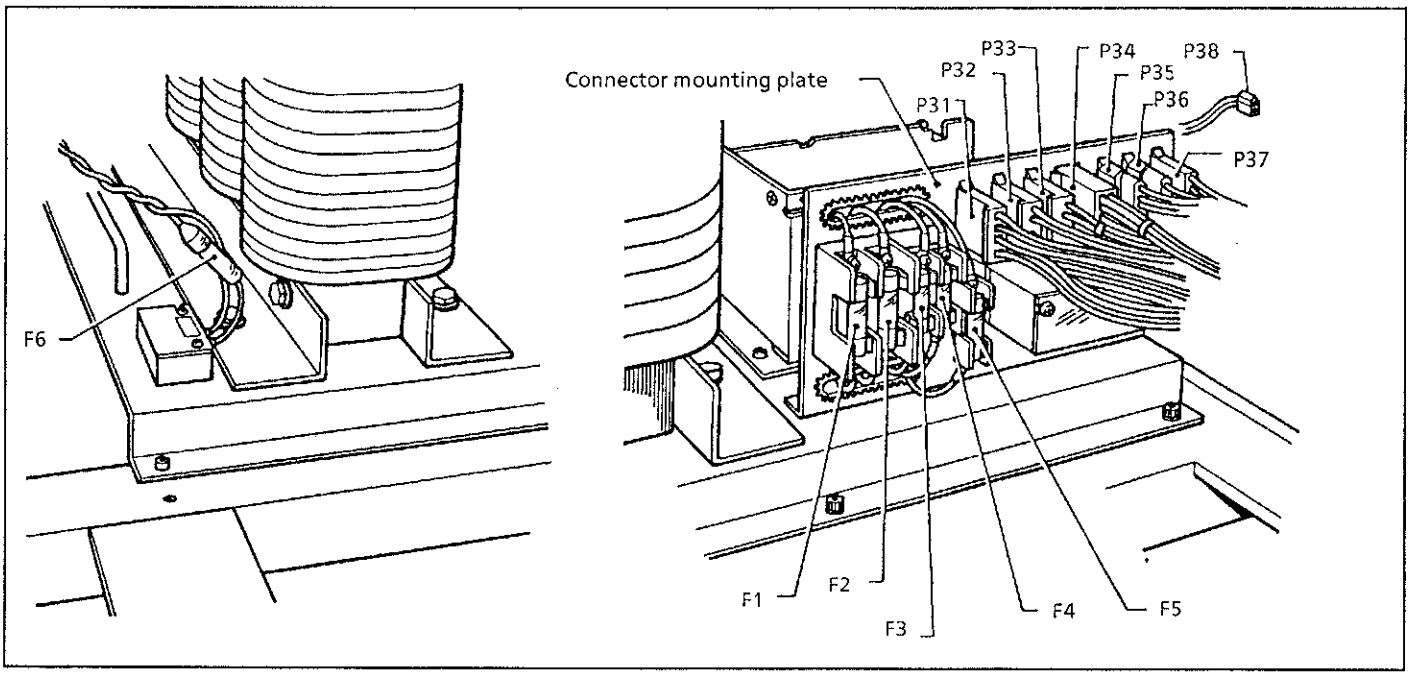
4. ELECTRICAL EQUIPMENT

ADJUSTING ELECTRICAL EQUIPMENT

Be sure to turn off the power switch when replacing or adjusting the equipment.

1 Fuse

1. Positioning fuse



1) Open the frame side cover (right). Fuses F1-F5 are attached on the connector mounting plate of the power supply. Fuse F6 is attached to the power supply of a certain specification.

2. Fuses capacity

No.	Fuses types and capacity	Uses
1	Glass-tube fuses with arc-extinguishing material 20A-250V	Servo motor (X-axis, Y-axis, Sewing machine motor)
2	Glass-tube fuses with arc-extinguishing material 20A-250V	Servo motor (X-axis, Y-axis, Sewing machine motor)
3	Glass-tube fuse 5A-125V	Servo motor driver (+24V) Cooling fan (AC100V) Control circuit board (+5V +12V –12V) Folding machine circuit board (+5V) Marker (+5V) FDD control (+5V)
4	Glass-tube fuse 5A-125V	Bobbin winder motor (+24V) Air solenoid (+24V) Thread trimmer solenoid (+24V)
5	Slow-blow fuse 1A-125V	Bobbin winder motor (+24V)
6	Light harness 0.5A-250V	Work light (AC220V)

(The machines of some specification codes are not equipped with #6.)

3. Replacing fuse

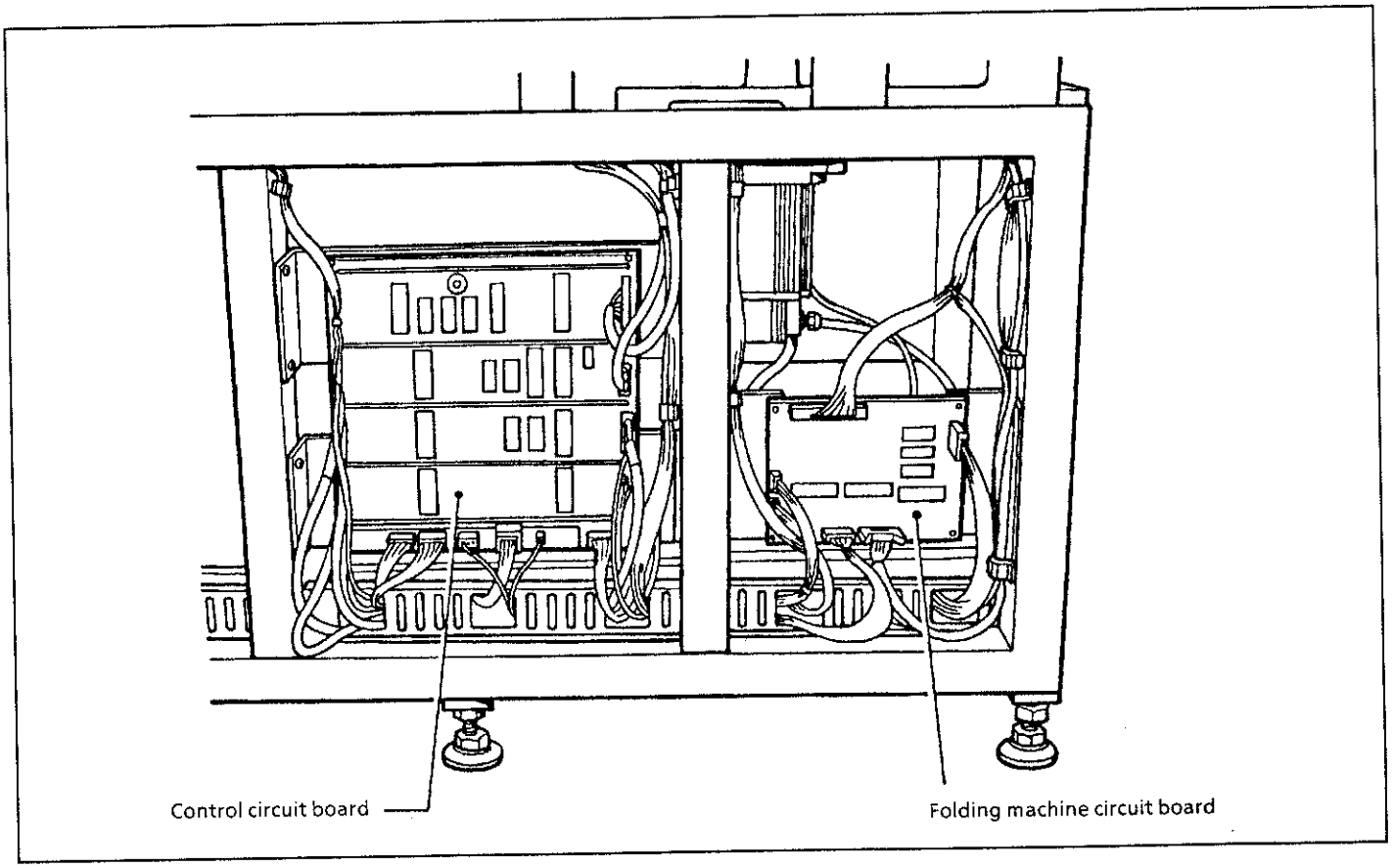
When replacing a fuse, refer to the table below listing problems when a fuse is blown. Be sure to replace a fuse with one of the same capacity.

FuseNo.	Problem	Ref.
1,2	The feeder and the sewing machine motor do not move at all.	Trouble shooting, #2
3	The display of the operation box and the power indicator do not light. The feeder and the sewing machine motor do not move at all.	#3
4	The air solenoid (the folding machine, the stacker) does not move at all. The bobbin winder motor does not move at all. The thread trimmer solenoid does not move at all.	#6
5	The bobbin winder motor does not move at all.	
6	The work light does not light.	

[2] Circuit board

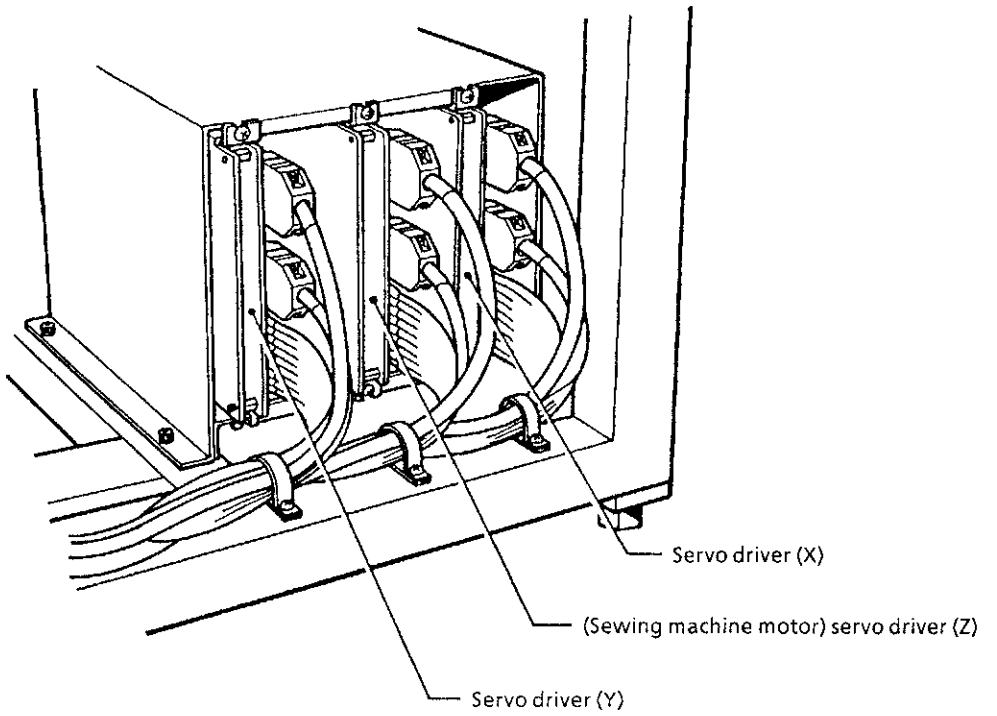
1. Positioning circuit board

1) Open the rear cover to make sure the control circuit board and the folding machine circuit board are installed as shown in the figure below.



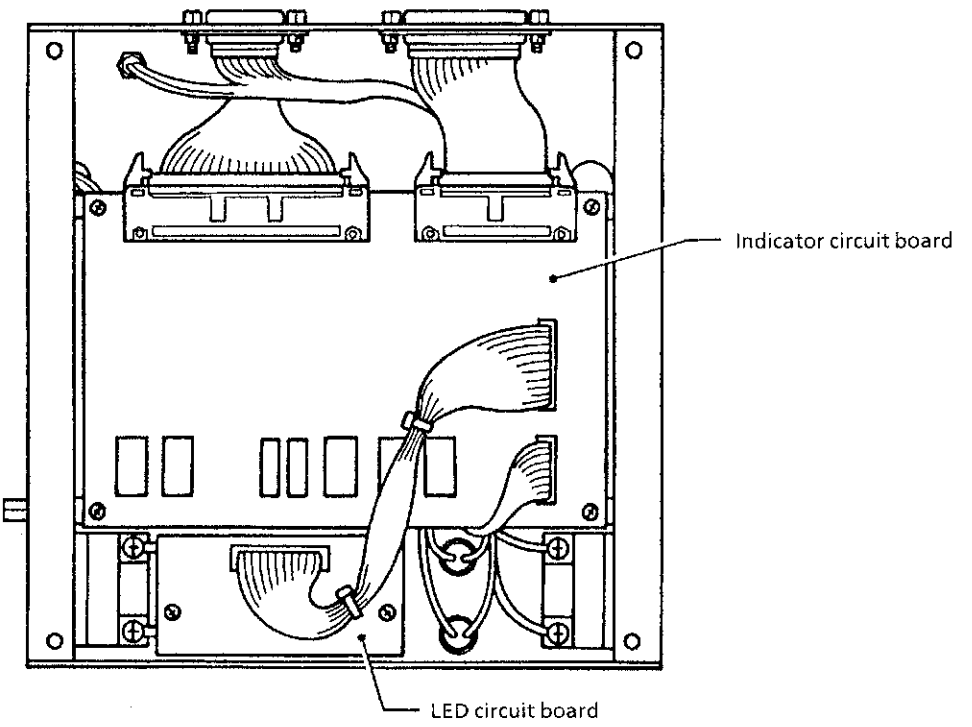
2) Open the frame side cover (left) to make sure servo motor drivers (X), (Y), and (Z) are installed as shown in the figure below.

NOTE: Servo driver (Z) is the machine motor servo driver.



The circuit boards in the operation box

3) Unscrew the screws holding the operation box to make sure the indicator circuit board and the LED circuit board are installed inside the operation box as shown in the figure below.



2. Circuit boards functions

(1) Control circuit board

- Outputting a command signal to driver (X).
- Outputting a command signal to driver (Y).
- Outputting a command signal to driver (Z).
- Controlling a floppy disk.
- Driving the air solenoid. (The air blower, the thread blower, and the presser foot.)
- Driving the thread trimmer solenoid.
- Checking the state of each switch.
- Controlling programming.
- Communicating with the folding machine circuit board.
- Communicating with the operation box.

(2) The folding machine circuit board

- Driving the air solenoid. (The folding machine, the stacker.)
- Checking the state of each switch.
- Communicating with the control circuit board.

(3) Servo motor drivers (X), (Y), and (Z)

- Driving each servo motor.

(4) The circuit board in the operation box

a. The indicator circuit board.

- Checking the state of each switch.
- Communicating with the control circuit board.
- Outputting to the LED circuit board.

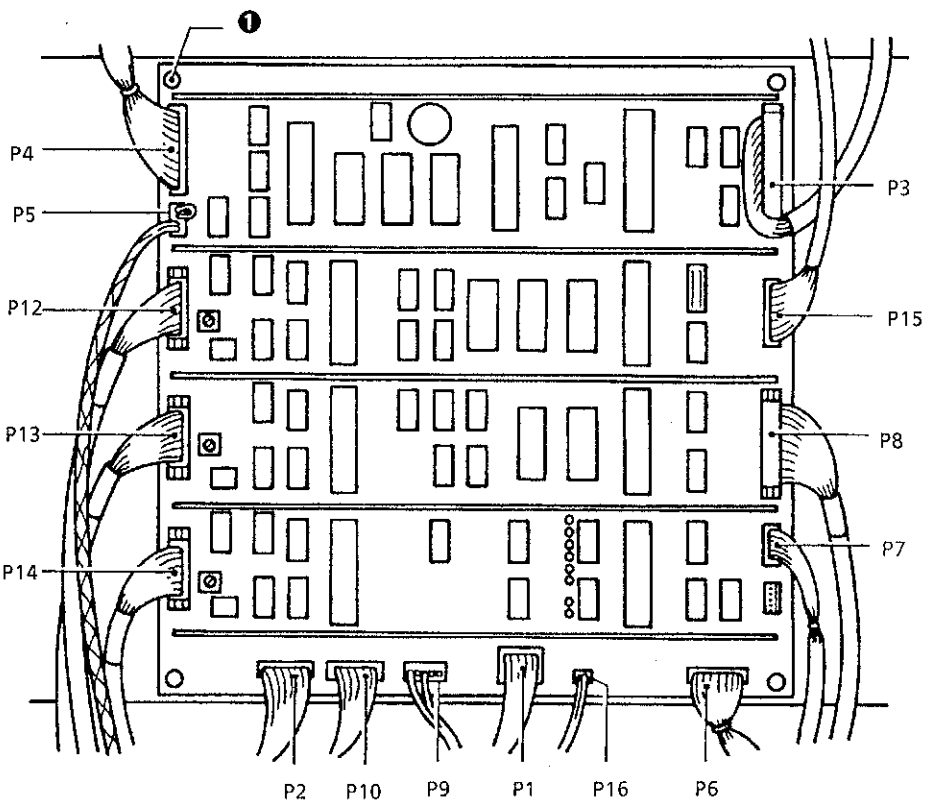
b. The LED circuit board

- Showing the data sent from the indicator circuit board.

3 Replacing circuit board

Be sure to turn off the power switch and open the rear cover (the control circuit board, the folding machine circuit board) or the frame side cover (left) (the servo driver) when replacing a circuit board.

1. Replacing control circuit board

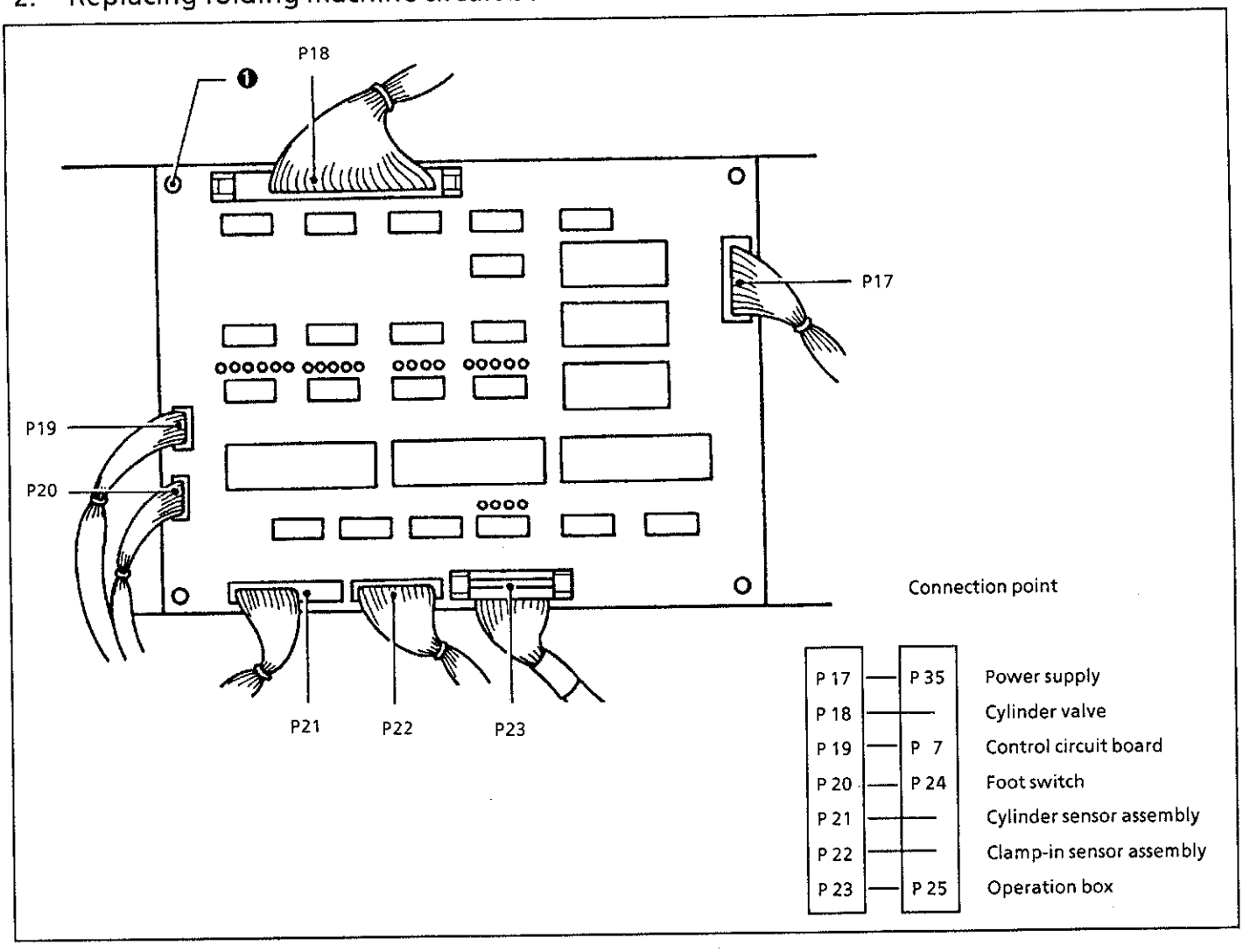


Connection point

P 1	P 34	Power supply
P 2	P 11	Programmer
P 3	P 55	Floppy disk
P 4	—	Photosensor assembly
P 5	P 28	Air switch
P 6	P 53	Sewing machine sensor
P 7	P 19	Folding machine circuit board
P 8	P 26	Operation box
P 9	P 30	Thread trimmer solenoid
P 10	—	Presser foot
P 11	—	(Spare)
P 12	P 42	Driver (X)
P 13	P 44	Driver (Y)
P 14	P 46	Driver (Z)
P 15	—	Jig pattern assembly
P 16	—	Buzzer assembly

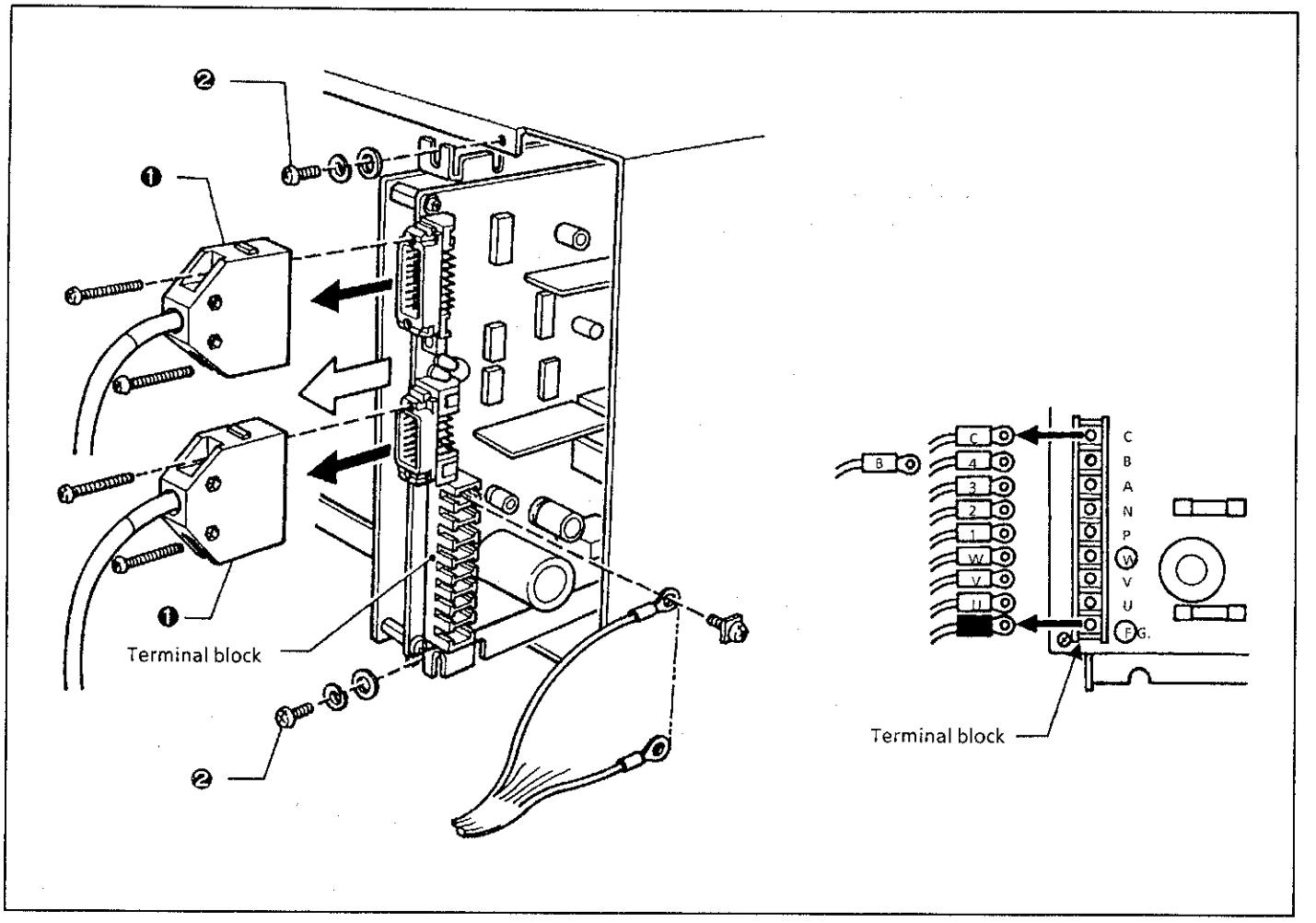
1) Disconnect the 15 connectors.
2) Bend down the clips of four card spacers ❶ to remove them from the circuit board.
3) Pinch the clips and insert the card spacers ❶ into the holes of the circuit board.
4) Insert the connector, holding the back of the connector area so that excessive pressure may not be put on to one part of the circuit board. The print pattern may be cracked, and the circuit may be broken.
   NOTE: Follow this precaution when replacing the PROM.
   NOTE: The number of the connectors in the figure (P1, P2...) refers to the number of the control block diagram. See the control block diagram. (Same in the following figures)

2. Replacing folding machine circuit board



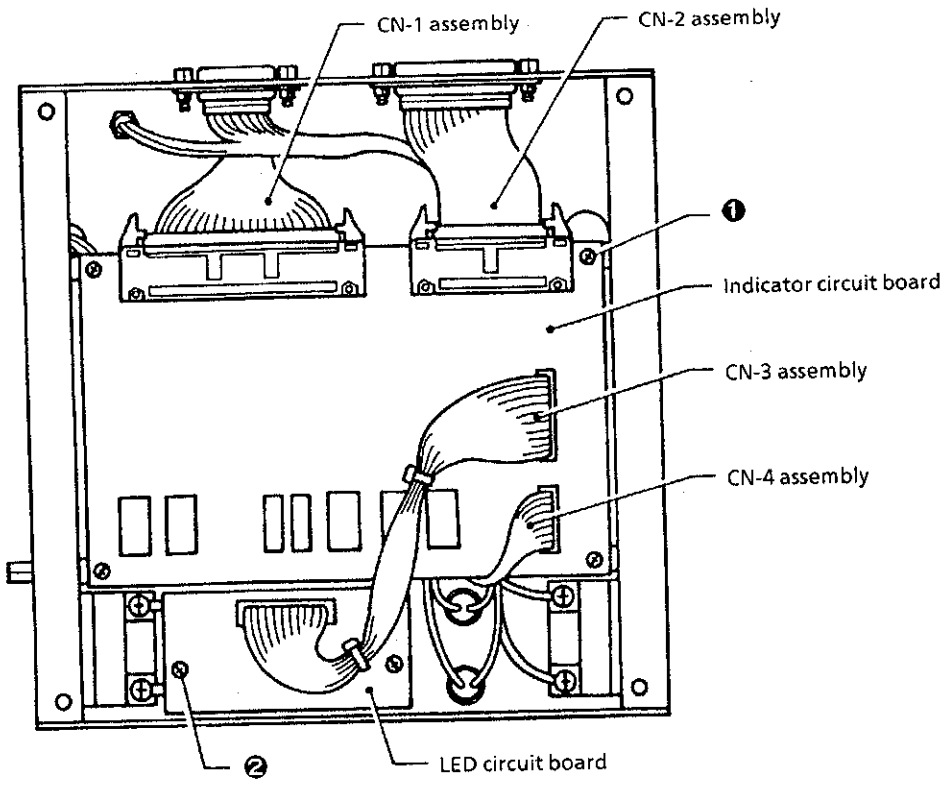
1) Disconnect the 7 connectors.
2) Bend down the clips of four card spacers ❶ to remove them from the circuit board.
3) Pinch the clips and insert the card spacers ❶ into the holes of the circuit board.
4) Insert the connector, holding the back of the connector area so that excessive pressure may not be put on to one part of the circuit board. The print pattern may be cracked, and the circuit may be broken.
   NOTE: Follow this precaution when replacing the PROM.
   NOTE: The number of the connectors in the figure (P17 to P23) refers to the number of the control block diagram. See the control block diagram.

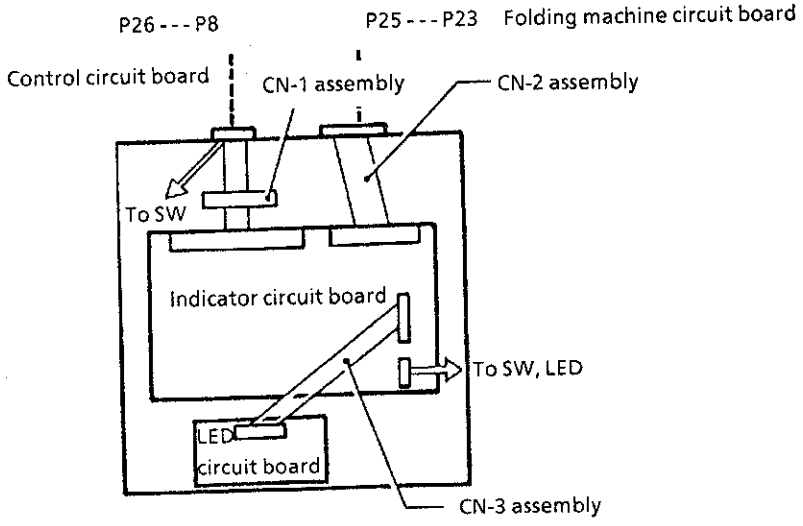
3. Replacing servo motor drivers (X), (Y), and (Z)



1) Disconnect the 2 connectors ❶. (Each connector has two screwed joints.)
2) Unscrew the two screws ❷ of each driver, and pull the driver forward. (Pull it so that the terminal block of the driver sticks out the body of the driver a little, and that the connected wire is not loaded.)
3) Remove the wire connected to the terminal block. (Remember the order of removal.)
4) Pull out the driver.

4. Circuit boards in operation box



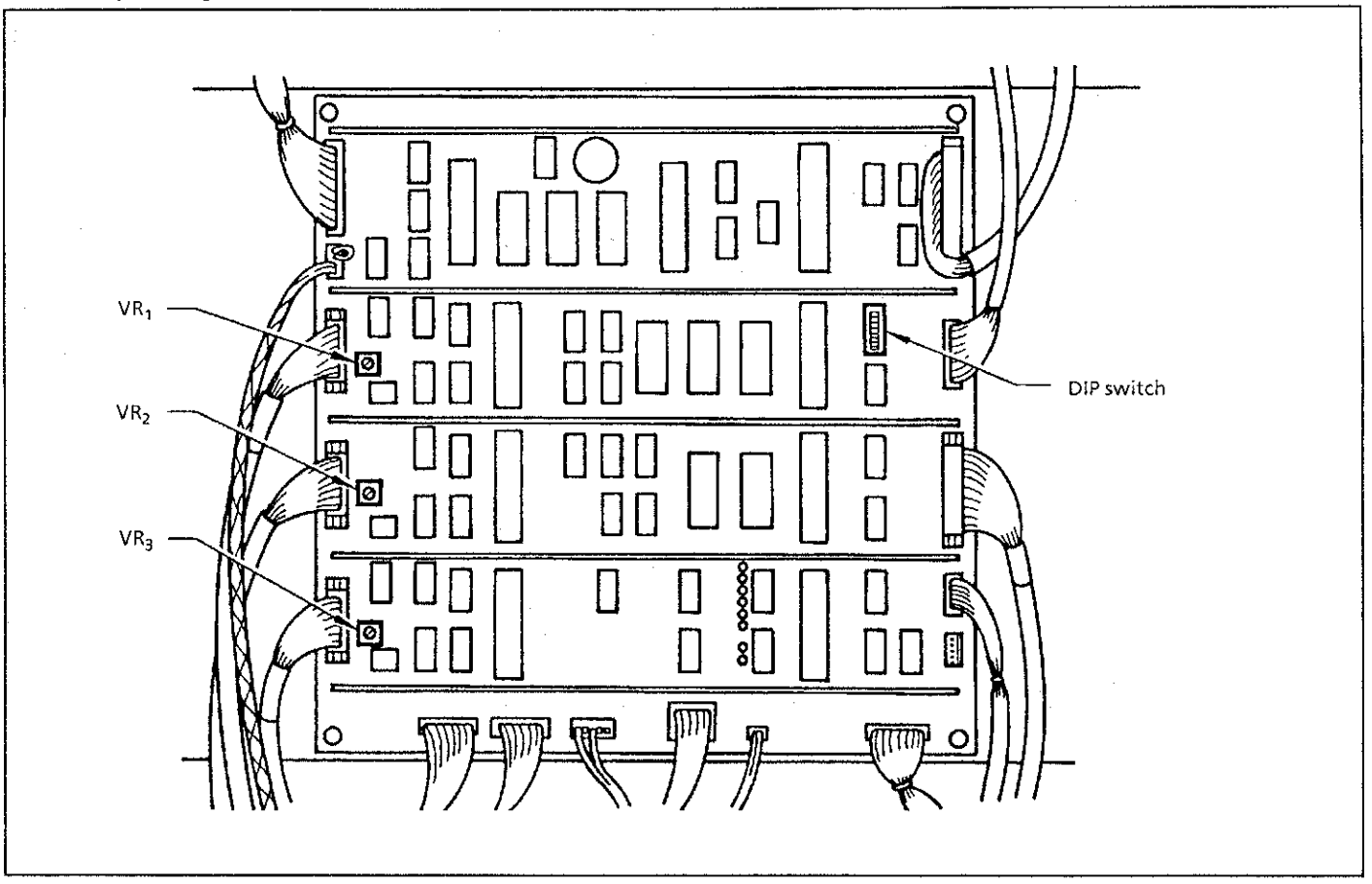


A. Replacing the indicator circuit board
   1) Disconnect the 4 connectors. (CN-1 to CN-4 assembly)
   2) Unscrew the 4 screws ❶ holding the circuit board.

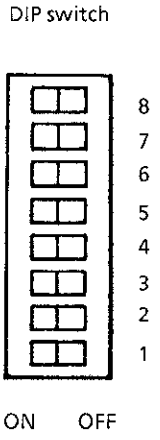
B. Replacing the LED circuit board
   1) Disconnect the connector. (CN-3 assembly)
   2) Unscrew the 2 screws ❷ holding the circuit board.

4 Using trimmer resistor and DIP switch on control circuit board

1. Adjusting trimmer resistor (VR_1, VR_2, VR_3)



The function of the trimmer resistor is to adjust the response of the servo system. Ordinarily, the trimmer resistor need not to be adjusted, and the all resistors are turned counterclockwise until they stop. (Already adjusted at shipping.)
VR_1, VR_2, and VR_3 correspond to X-axis, Y-axis, and Z-axis (sewing machine motor) respectively.



2. Using DIP switch

DIP SW No.	State	Function
1	ON	Machine sews even when number of sewing clamp assembly and number of read program are different.
	OFF	Error "U53" appears and machine does not sew when number of sewing clamp assembly and number of read program are different.
2	ON	After sewing has been completed and sewing clamp assembly has risen, next operation starts after 0.2 sec. interval.
	OFF	After sewing has been completed and sewing clamp assembly has risen, next operation starts immediately.
3	ON/OFF	Spare
4	ON/OFF	Spare
5	ON/OFF	Spare
6	ON	Set at power ON. At sewing start and sewing end, machine rotates at low speed for one stitch.
	OFF	Set at power ON. At sewing start, machine rotates at low speed for two stitches.
7	ON	When folding has been completed and sewing clamp comes to folder, pulse number shows gap to origin. (1 pulse = about 0.025mm)
	OFF	Only piece number is displayed.
8	ON	Set at power ON. Enter test mode of machine head rotation, and other functions do not operate.
	OFF	Set at power ON. Operate in normal mode.

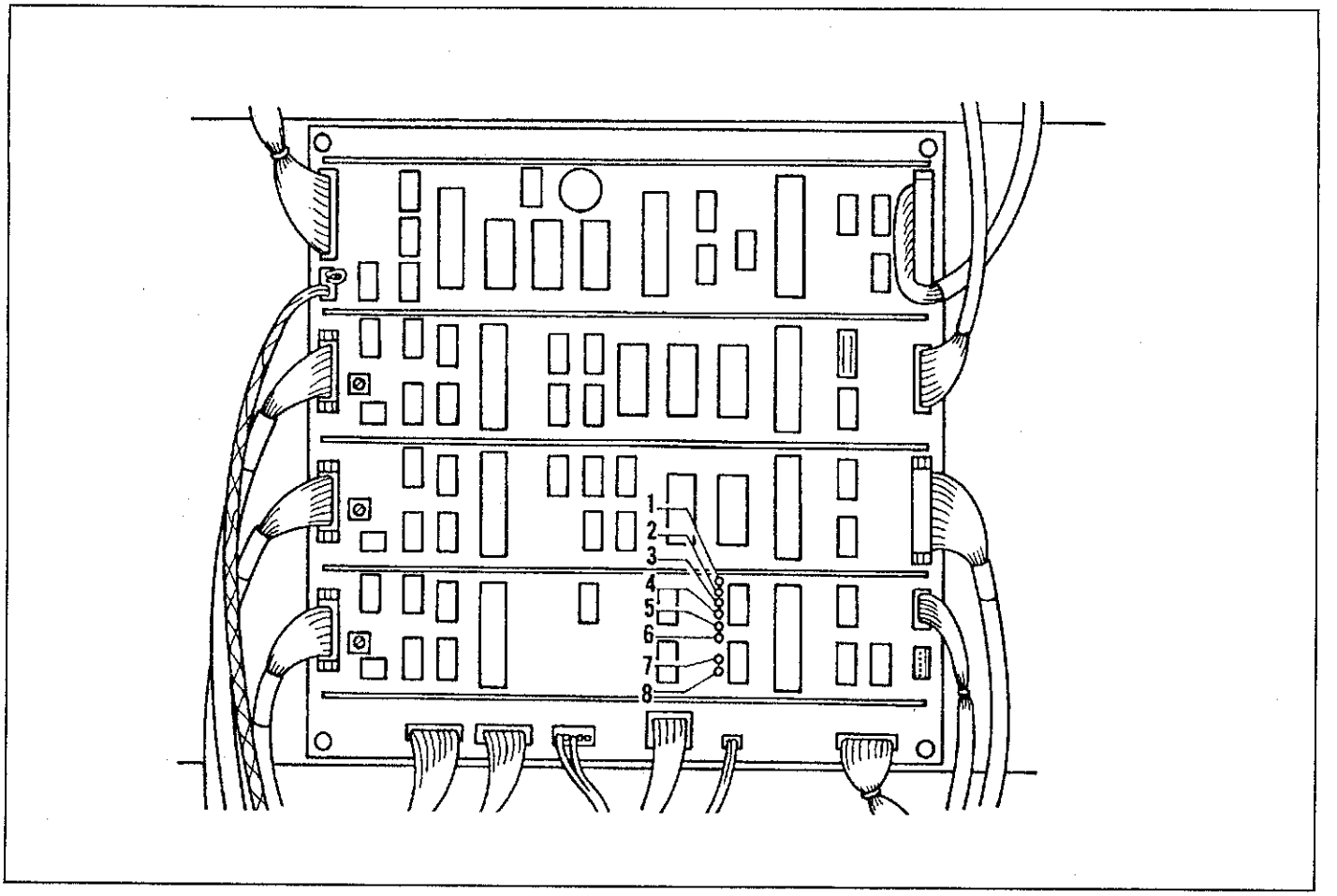
NOTE: The DIP switch function may be changed due to improvement.

NOTE: Be sure to turn off the power before changeover of the DIP switch.

5 LEDs of circuit boards

1. Control circuit board

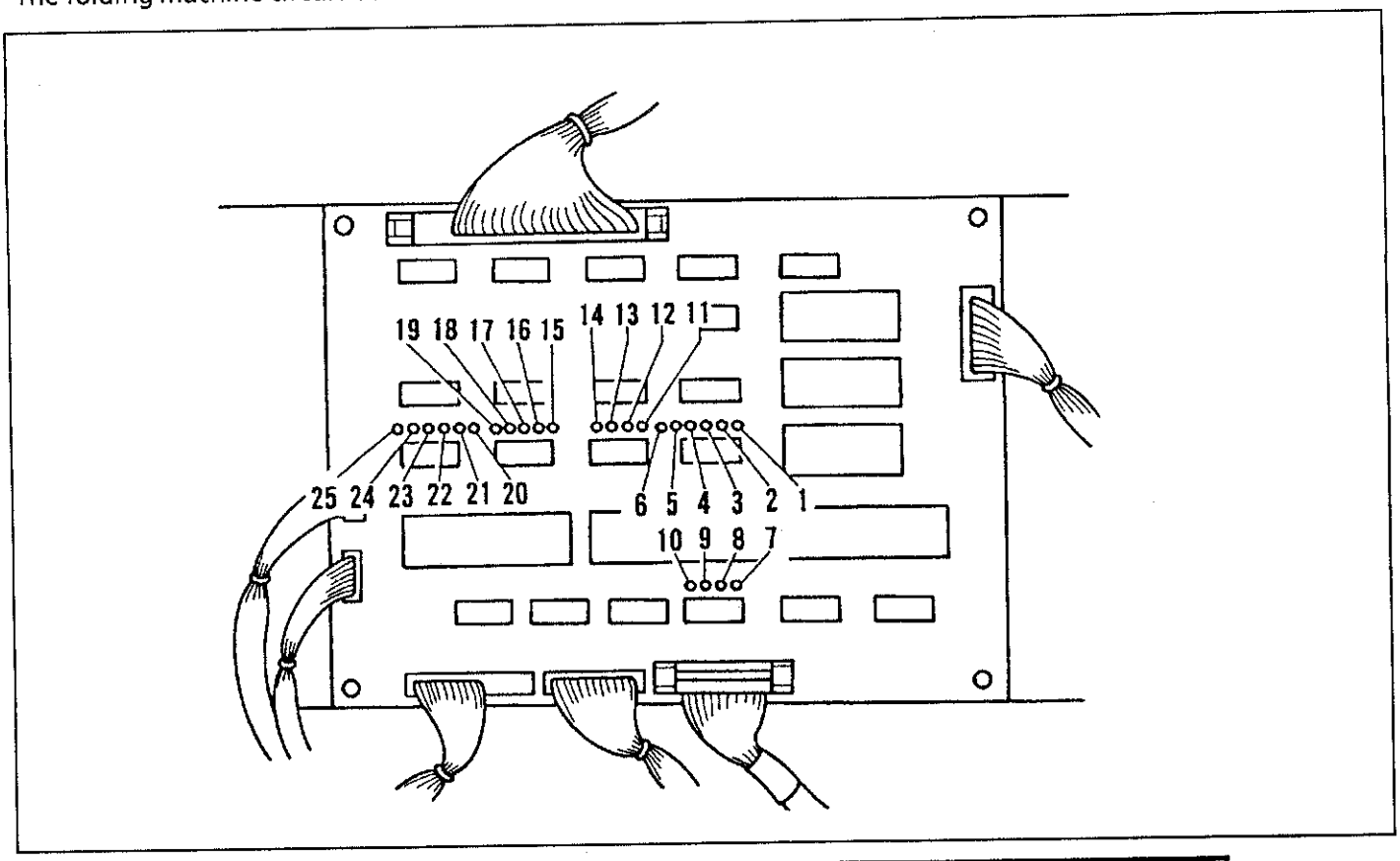
The control circuit board state when the LED lights is as follows.



LED No.	State (when the LED lights.)
1	Sewing machine motor servo ON
2	Y-axis motor servo ON
3	X-axis motor servo ON
4	Front air blower ON
5	Thread blower ON
6	Presser foot air solenoid ON
7	Thread trimmer solenoid ON
8	----------

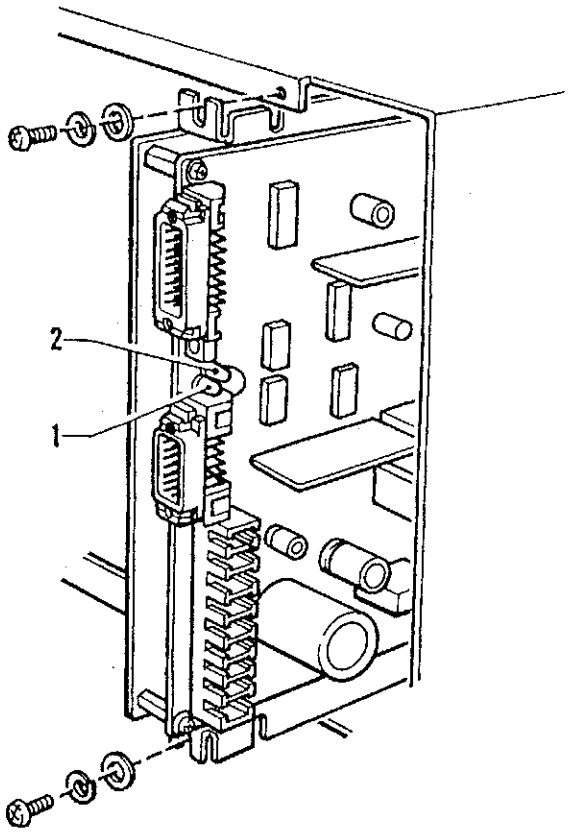
2. Folding machine circuit board

The folding machine circuit board state when the LED lights is as follows.



LED No.	State (when the LED lights.)	LED No.	State (when the LED lights.)
1	Stacker presser bar cylinder ON	14	Tucking blade 1 cylinder ON
2	Sewing clamp cylinder descend	15	Tucking blade 2 cylinder ON
3	Sewing clamp cylinder ascend	16	Inner clamp cylinder descend
4	Stacker roller right left cylinder ON	17	Inner clamp cylinder ascend
5	Stacker base cylinder ON	18	Folding clamp cylinder descend
6	Stacker wiper cylinder ON	19	Folding clamp cylinder ascend
7	Clamp-in sensor 2 ON	20	Center blade backward
8	Clamp-in sensor 3 ON	21	Center blade forward
9	Clamp-in sensor 1 ON	22	Folding base 1 cylinder ON
10	Clamp-in sensor 4 ON	23	Stacker roller cylinder ON
11	Tucking blade 4 cylinder ON	24	Vacuum solenoid valve ON
12	Tucking blade 3 cylinder ON	25	Stacker roller up down cylinder ON
13	Folding base 2 cylinder ON		

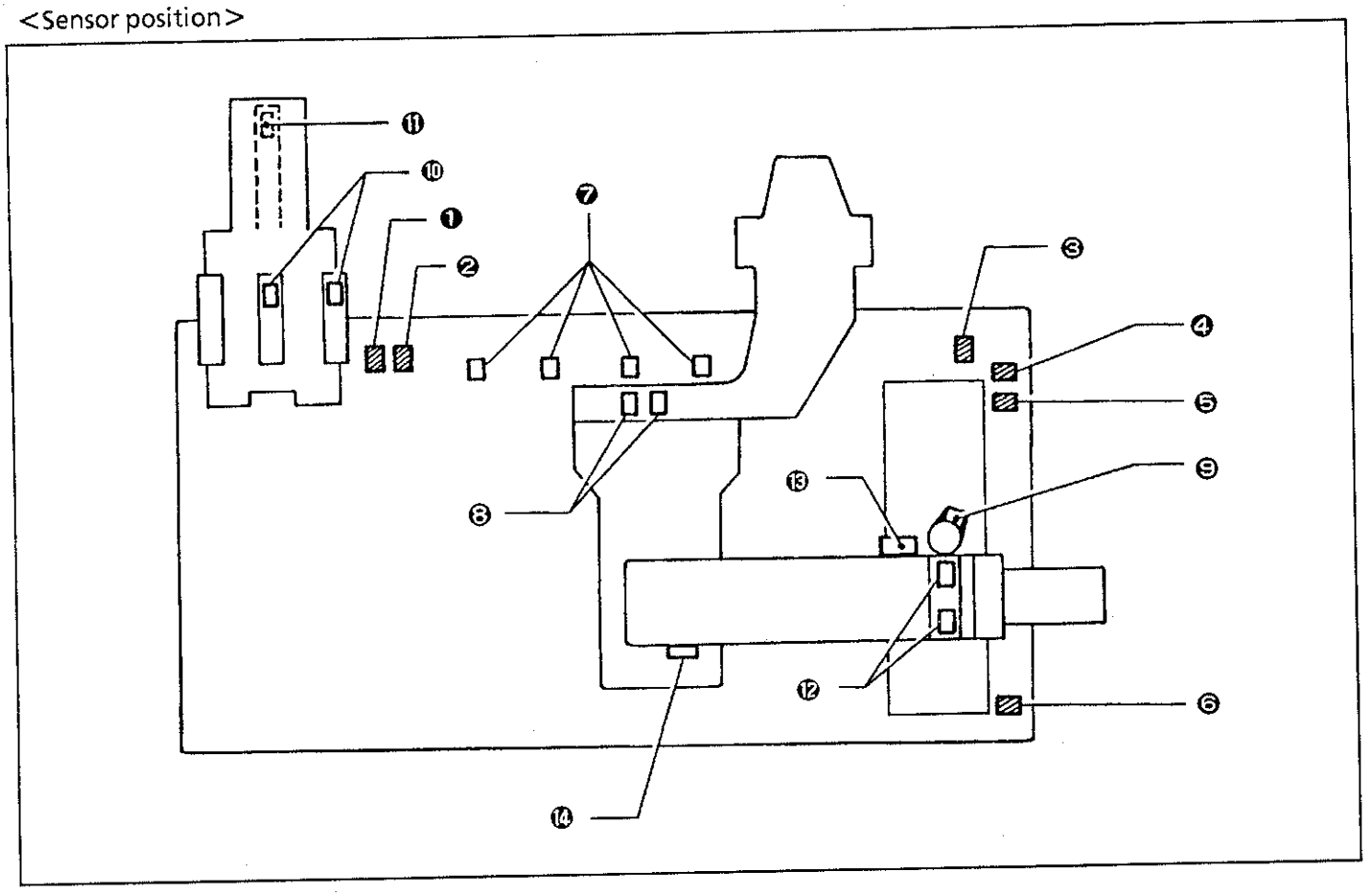
3. LED of servo motor driver



(1) The green LED: Indicates the control power (+ 24V) is ON.
(2) The red LED: Indicates trouble with the motor, the encoder, or the circuit. The operation box displays "U87", "U88", or "U89". The LED is turned off in normal operation.

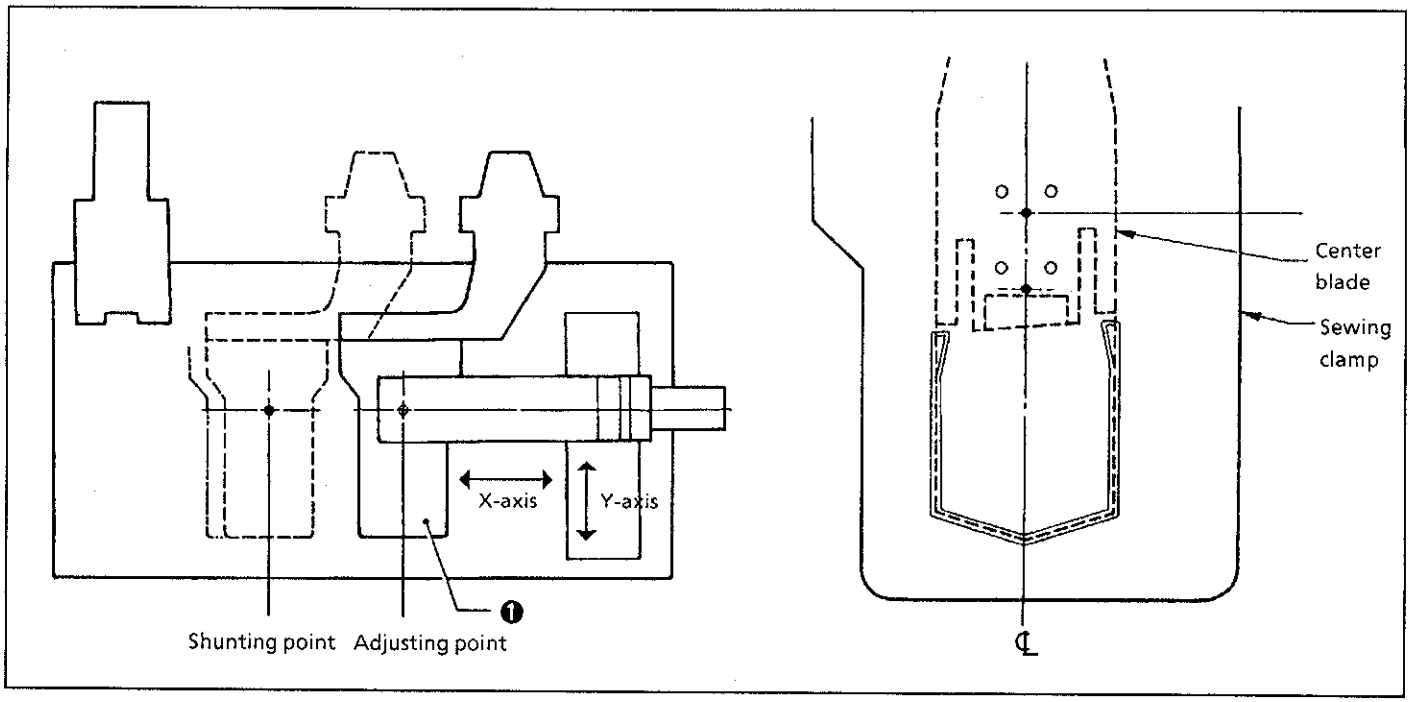
6 Function and position of sensors

<Sensor position>



❶ X – over travel sensor
❷ X origin sensor
❸ X + over travel sensor
❹ Y + over travel sensor
❺ Y origin sensor
❻ Y – over travel sensor
❼ 4 Clamp-in sensors
❽ 6 Jig pattern sensors
❾ Cylinder sensor 1
⓾ 2 Cylinder sensors 2
⓫ Cylinder sensor 3
⓬ Sewing machine sensor (Needle up, Synchronizing)
⓭ Amplifier unit (Needle thread breakage detector)
⓮ Needle thread breakage detector fiber unit

1. Origin sensor



(1) When the power is turned on, the sewing clamp ❶ moves to the left along the X-axis, the sewing machine moves upward along the Y-axis. The sewing clamp and the sewing machine stop where the origin sensors of both axes are turned ON (where the dog blocks the sensor).

(2) The sewing clamp and the sewing machine move backward for about 15 mm from the stop positions. Then they move again at low speed until the origin sensors are turned ON.

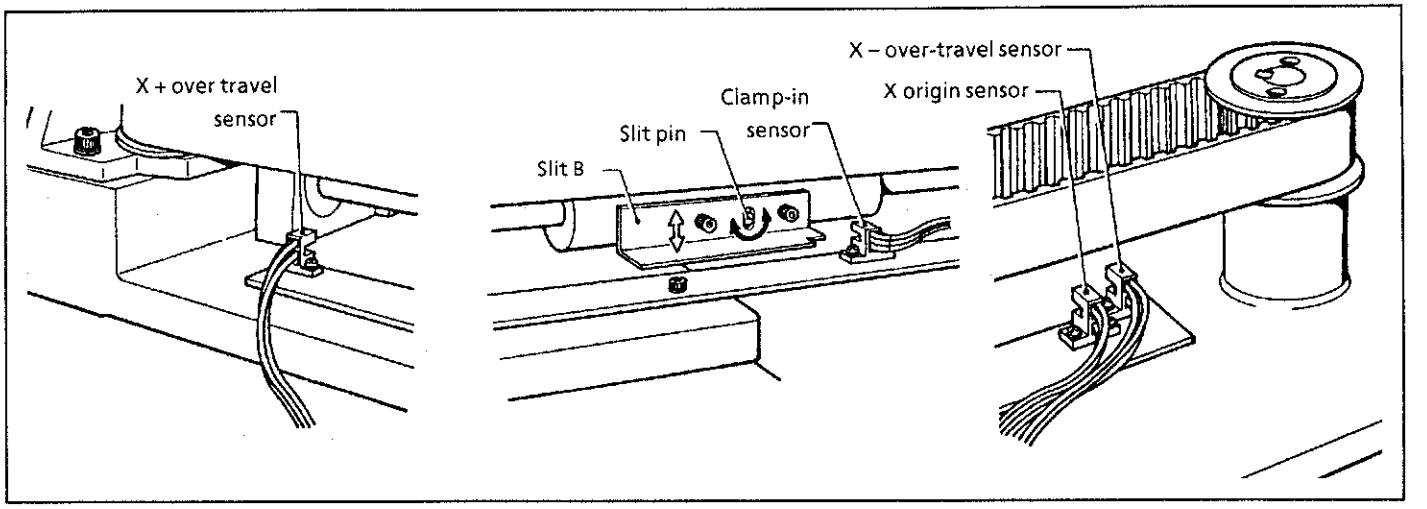
(3) After the origin is located, the sewing machine ❶ does not move, and the sewing clamp moves to the shunting position (350 mm to the right) and stops.

(4) When the folding machine is in the manual mode (MAN), and the sewing clamp moves to the folding machine and then clamps the center blade, the centers of the center blade and the sewing clamp should be aligned.

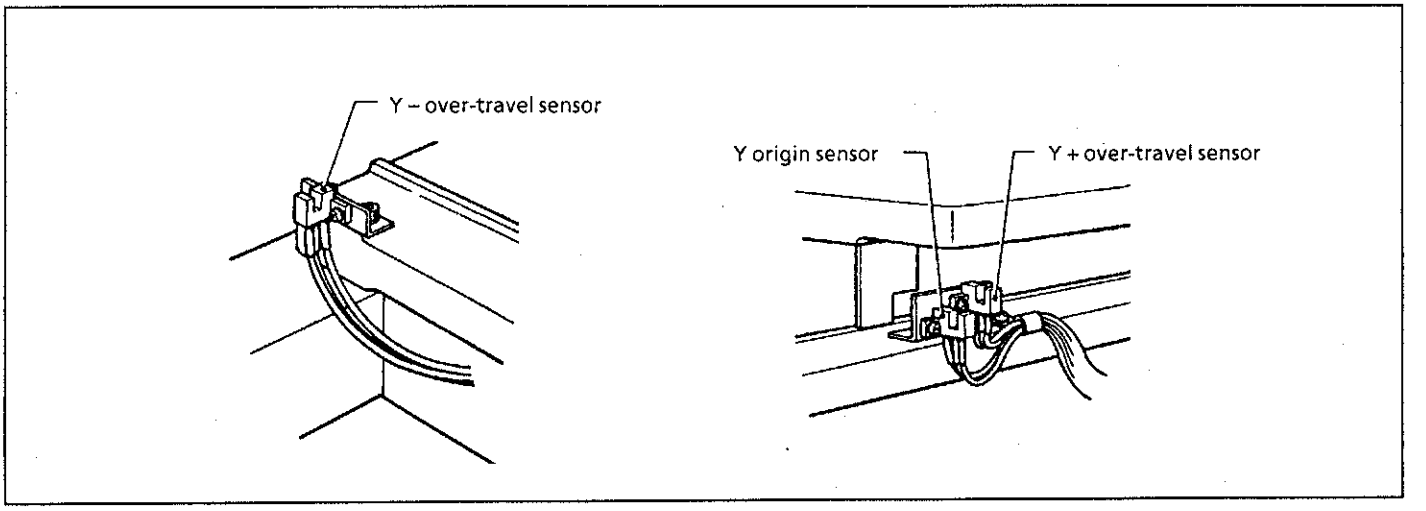
(5) When the X origin sensor has breakage or is blocked by dust, error code "U94" appears when the power is turned on, and this cannot be cleared.
When the Y origin sensor has breakage or is blocked by dust, the sewing machine does not move, but the X-axis moves when the power is turned on. When the X origin sensor is turned ON and the X-axis moves backward for 15mm, the sewing machine moves downward for 15mm. Then error code "U95" appears, and this cannot be cleared.

2. Over-travel sensor

X-axis

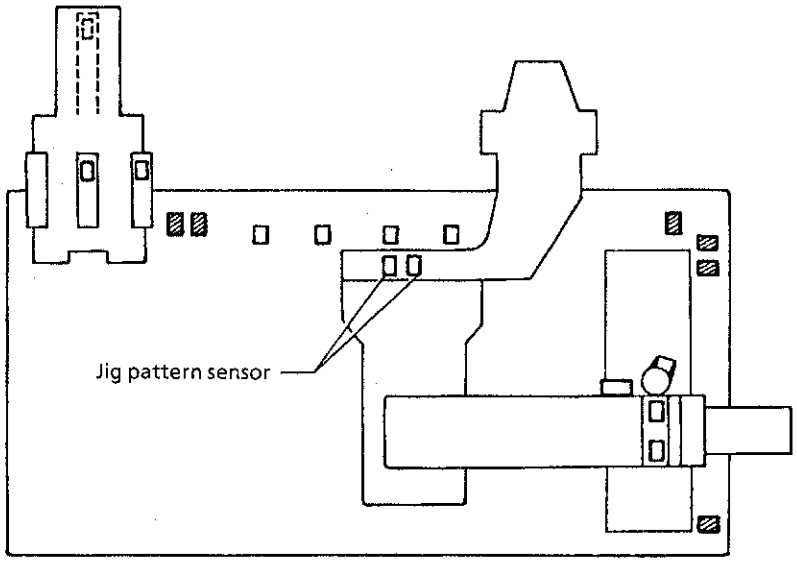


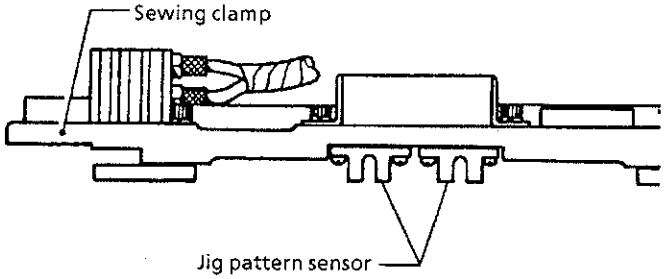
Y-axis



(1) The over-travel sensor controls the movable area of the X-axis and the Y-axis.
(2) If the feed overruns while feeding and the sensor turns ON, the motor driver turns OFF automatically, and the driving pulley stops.
(3) If breakage occurs at the sensor connecting position, or if the connectors are not connected properly, the fail safe function displays an alarm, such as "U83", "U84", "U85", or "U86" even if the feed does not overrun.

3. Jig pattern sensor

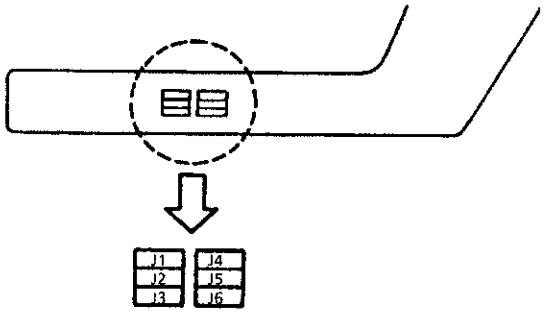




(1) The jig pattern sensor checks if the number of the program read from the floppy disk and the number of the sewing clamp set to the machine are identical. This sensor prevents the machine from malfunctioning when the numbers are different.

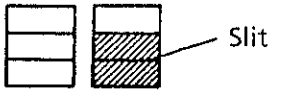
(2) When DIP switch 1 is turned ON, the machine can sew regardless of the signal of the jig pattern sensor. (Set the DIP switch OFF in usual operation. It is set OFF for shipping.)

(3) The jig pattern sensor consists of 6 photointerrupters. This sensor checks 64 jig patterns by combining the slits on the sewing clamp.



Sensor No.	Weight of the code
J1	32
J2	16
J3	8
J4	4
J5	2
J6	1

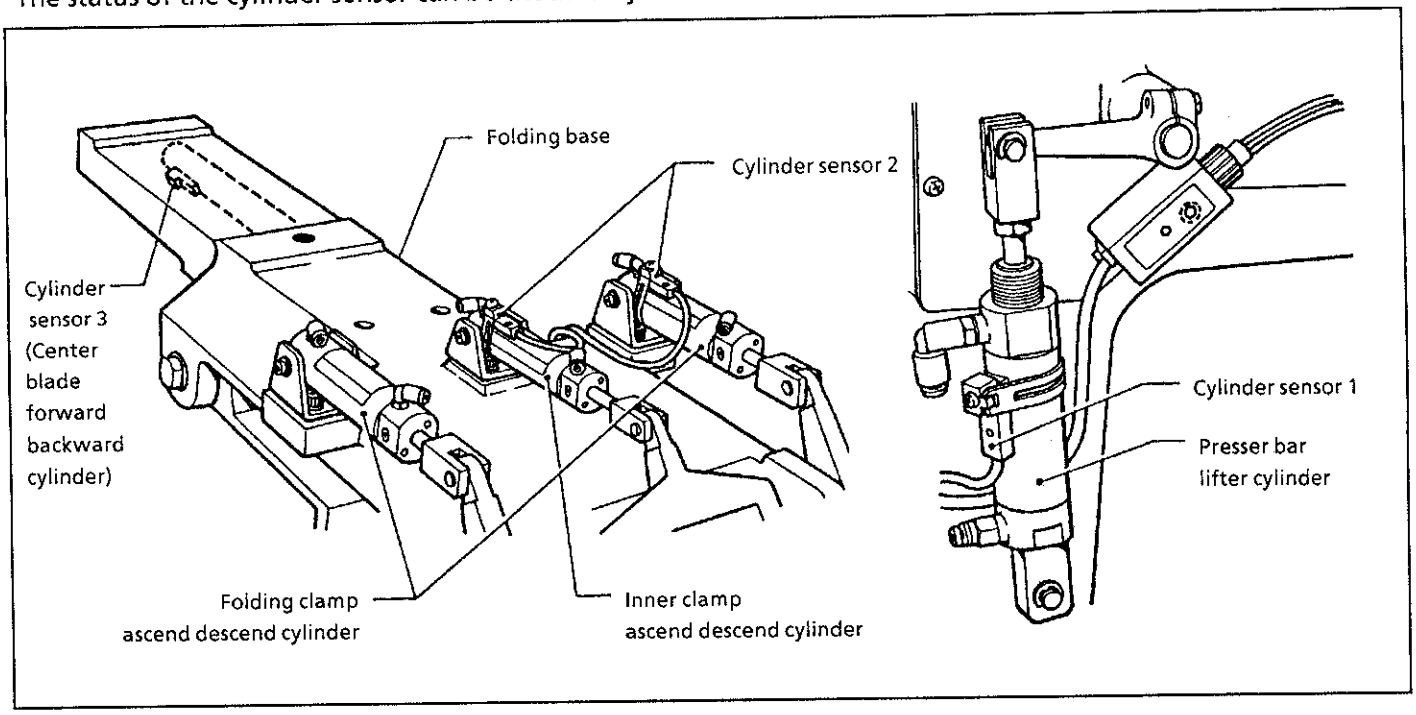
ex.



Recognize: 2 + 1 = 3

4. Cylinder sensor

The status of the cylinder sensor can be checked by the red built-in sensor LED.



(1) The cylinder sensor detects the recede positions of the driving cylinder rods of the folding clamp assembly, the inner clamp assembly, and the center blade, then transmits them to the folding machine circuit board.

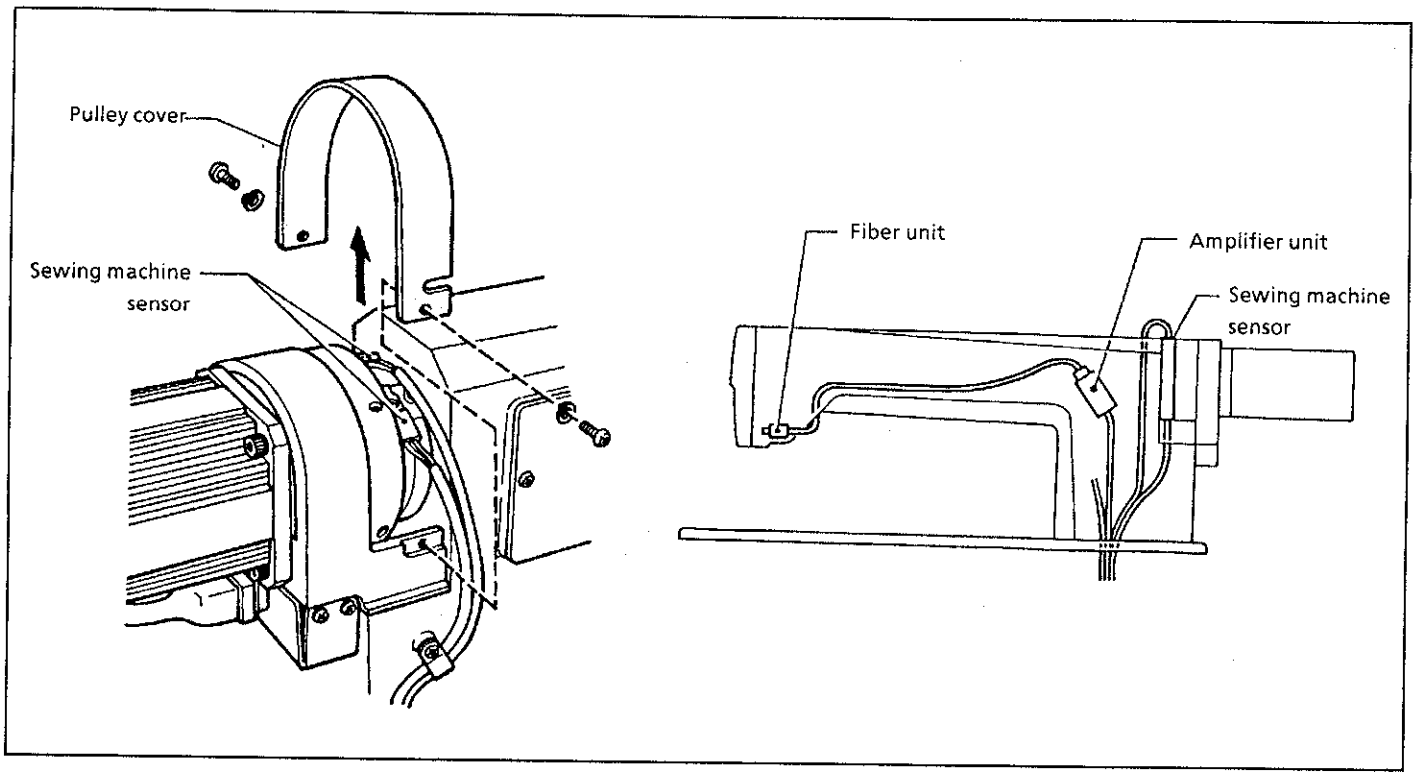
(2) Because the folding machine circuit board commands the sewing clamp to come to the pocket after receiving this signal, the machine cannot sew if the breakage occurs in the sensor.

(3) If cylinder sensor 2 is not turned ON within a certain time when the power is turned on and when the folding machine is reset, the control software decides to display an error.

(4) If cylinder sensor 3 is not turned ON while the center blade receding; the origin is not located, and after folding has been completed and the center blade recedes, the sewing clamp does not move to the sewing machine.

(5) If cylinder sensor 1 of the presser foot is not turned ON when the presser foot ascends; the origin is not located, and the sewing clamp does not move to the sewing machine to sew as described in (4).

5. Sewing machine sensor

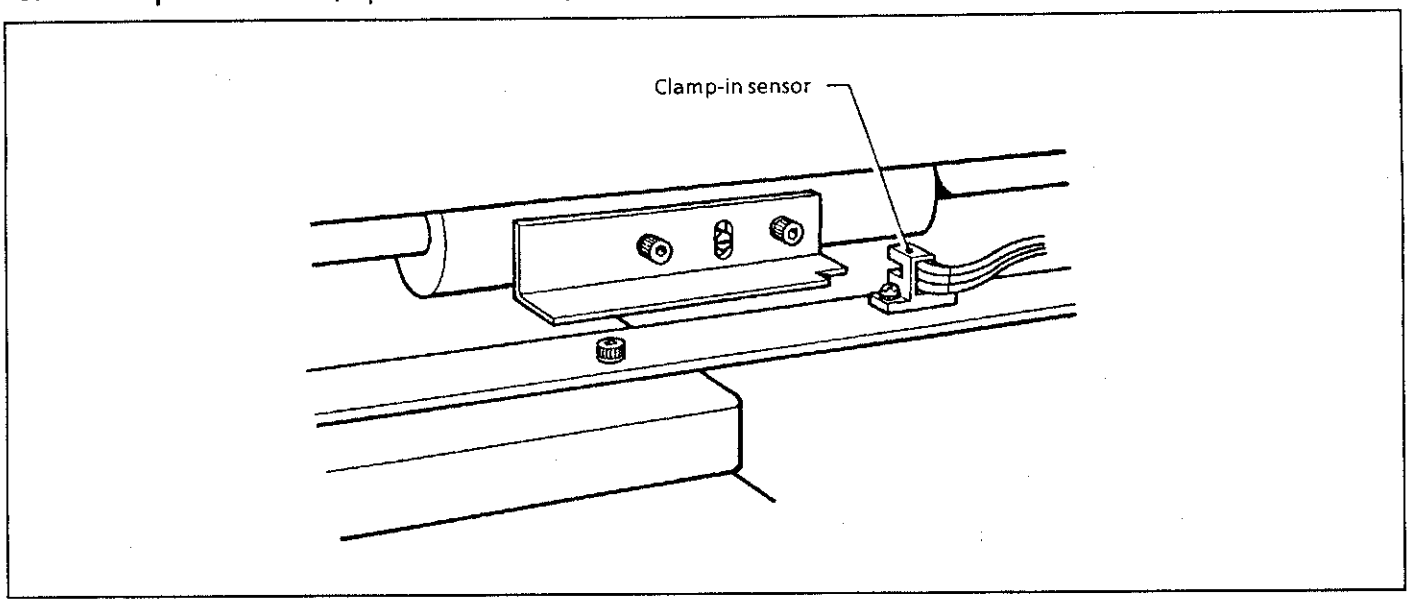


(1) Needle up sensor (Photosensor)
- The needle up sensor sends a signal when the needle bar approaches its upper dead point.
- This signal stops the needle at its up point.

(2) Synchronizing sensor (Photosensor)
- The synchronizing sensor sends a synchronizing signal for the machine motor and the feeder.
- This signal decides the timing of operating the thread trimmer solenoid.

(3) Needle thread breakage detector
- The needle thread breakage detector consists of the fiber unit and the amplifier unit.
- The detector sends the signal when the needle thread breaks.
- This signal displays an error and stops the machine .
- The needle thread breakage function can be ignored by controlling the needle thread monitor switch.

6. Clamp- in sensor (4 photosensors)



(1) When the sewing clamp is in the area of the folding machine, or when the folding clamp descends, at least one of the 4 photosensors is blocked, and the center blade does not move forward.

(2) After the sewing clamp moved toward the sewing machine, all the clamp sensors are turned ON, the center blade moves forward, and the folding machine is ready for operation.

7 Adjusting sensors

1. Origin sensor

After replacing the origin sensor due to breakage or other troubles, be sure to adjust the position.
Refer to the function of the sensors.

2. Over-travel sensor

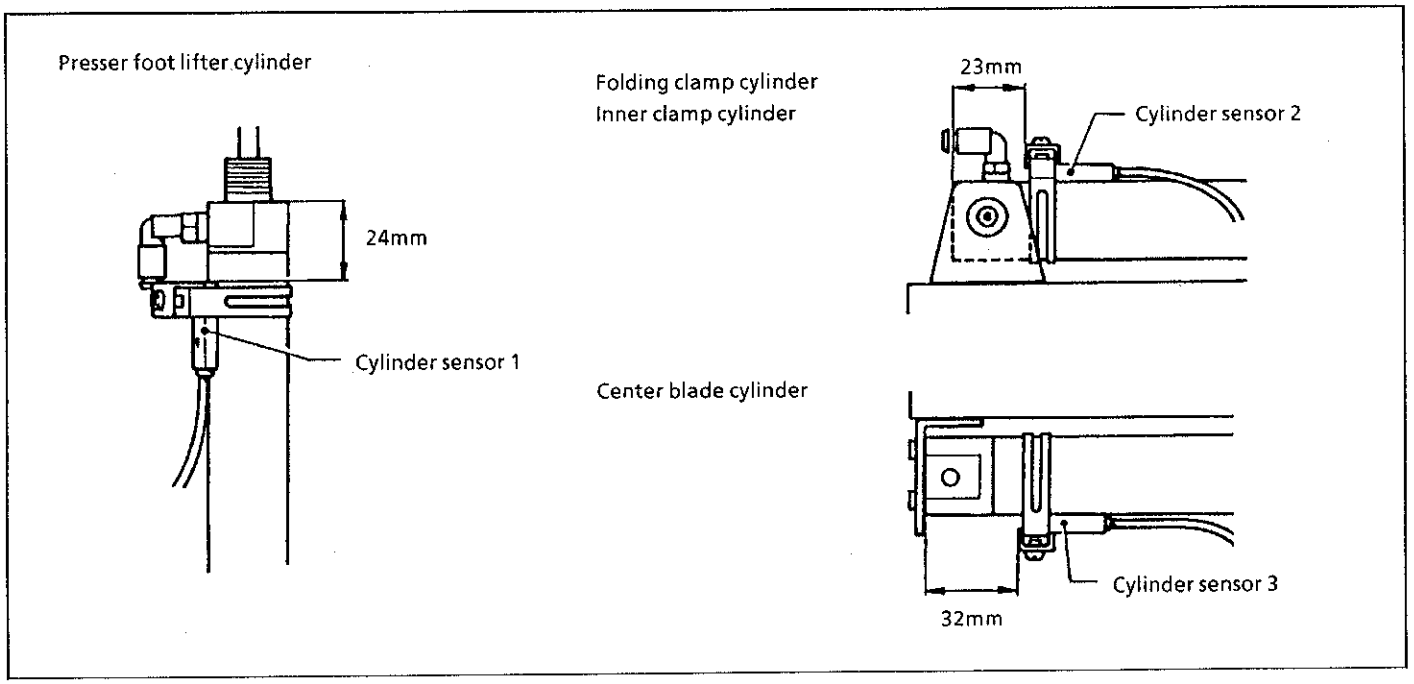
The over-travel sensor is not adjustable.

3. Jig pattern sensor

The jig pattern sensor is not adjustable.

4. Cylinder sensor

Set the folding clamp assembly, the inner clamp assembly, and the presser foot in their up position, set the center blade in its backward position, and set the machine power ON. Then make sure the LED of the sensor is lit.
When attaching the sensor, refer to the standard position shown in the figure below.



5. Sewing machine sensor

See page 2-26 of the machine head portion.

6. Needle thread breakage detector

See page 2-21 of he machine head portion.

7. Clamp-in sensor

The clamp-in sensor is not adjustable.

8 Connectors

Refer to the control block diagram for P1 and P2.

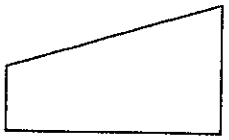
Connector No.	Connected parts	Main signal	Problem caused by defective connection
P1 = P34	Power supply - Control circuit board	+ 5V (Control circuit board) + 12V (RS232C) – 12V (RS232C) + 24V (Air solenoid, Thread trimmer solenoid)	Control does not function. Programmer does not operate properly. Air cylinder does not operate. Thread is not trimmed. Machine speed is not controlled.
P2 = P11	Control circuit board - Programmer	Programmer input output signal (RS232C) Programmer power supply	Programmer does not operate. Switch of programmer does not operate. Display of programmer is not indicated correctly.
P3 = P55 P54 = P36	Control circuit board - Floppy disk Power supply - Floppy disk	Floppy disk input output signal Floppy disk power supply	Floppy does not operate. Defective reading and writing of floppy.
P4	Photosensor signal input	Photosensor signal (X-axis - over, origin signal) (Y-axis - over, origin signal)	Alarm appears and machine does not operate. Origin is not located.
P5 = P28	Control circuit board - Air switch	Air pressure switch signal	"U82" appears and machine does not operate.
P6 = P53	Control circuit board - Sewing machine sensor harness	Needle up signal Synchronizing signal Thread breakage signal Presser foot ascend descend signal	"U51" appears. Needle does not stop at up position. Thread is not trimmed. Feeder does not operate. "U52" appears without needle thread breakage. Sewing clamp assembly does not enter sewing area when presser foot rises.
P7 = P19	Control circuit board - Folding machine circuit board	Input output signal of control circuit board and folding machine circuit board	"U90" appears and is not reset. Machine does not sew after folding has been completed. Folding machine is not reset.
P23 = P25	Folding machine circuit board - Operation box	Switch state of operation box	Right foot switch descend one step, but no other operation. (Origin is located)

Connector No.	Connected parts	Main signal	Problem caused by defective connection
P9 = P30	Control circuit board - Thread trimmer solenoid	Thread trimmer solenoid driving signal	Defective thread trimming
P10	Control circuit board - Solenoid valve	Air blower driving signal Thread blower driving signal Presser foot cylinder driving signal	Defective air blower operation Defective thread blower operation Defective presser foot cylinder operation. Then machine does not operate properly, and comes to stop.
P8 = P26	Control circuit board - Operation box	Operation box input indication	Nothing displayed, nothing functions. (EM-STOP is ON) Defective operation of each switch.
P12 = P42 P13 = P44 P31 P32 P41 = P47 P43 = P49 P48 P50	Control circuit board - Driver (X) [Servo harness (X)] Control circuit board - Driver (Y) [Servo harness (Y)] Power supply - Driver (X) [Power supply harness (C)] Power supply - Driver (Y) [Power supply harness (C)] Driver (X) - Driving motor [Encoder harness (X)] Driver (Y) - Driving motor [Encoder harness (Y)] Driver (X) - Motor (X) [Motor power harness (X)] Driver (X) - Motor (Y) [Motor power harness (Y)]	Driver (X) control signal Driver (Y) control signal 24V (Driver control) 150V (Motor driving) Motor driving signal Encoder signal	Defective feed motor operation "U87" (X-axis) or "U88" (Y-axis) appears, machine stops, and alarm is not reset by pressing EM-STOP.

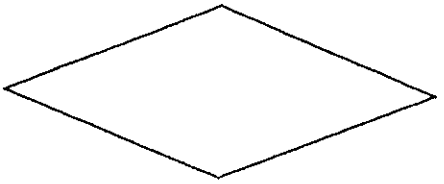
Connector No.	Connected parts	Main signal	Problem caused by defective connection
P14 = P46	Control circuit board - Driver (Z) [Servo harness (Z)]	Driver (Z) control signal	Defective machine motor operation
P45 = P51	Driver (Z) - Sewing machine motor [Encoder harness]	24V (Driver control) 150V (Motor driving)	"U89" appears, and is not reset.
P52	Driver (Z) - Sewing machine motor [Motor power harness (Z)]	Motor driving signal	
P33	Power supply - Driver (Z) [Power supply harness (C)]	Encoder signal	
P15	Control circuit board - Photosensor (Jig pattern sensor)	Clamp number checking signal	"U53" appears, and machine does not sew.
P16	Control circuit board -Buzzer	Buzzer driving signal	Buzzer does not function.
P17 = P35	Power supply - Folding machine circuit board	+ 5V (Folding machine circuit board) + 24V (Air solenoid)	Control does not function correctly, folding machine does not operate. Air cylinder does not operate. "U90" appears , and is not reset.
P18	Folding machine circuit board - Cylinder valve	Cylinder valve driving signal	Air cylinder does not operate.
P20 = P24	Folding machine circuit board - Foot switch	Foot switch signal (right, left)	Folding machine does not operate.
P21	Folding machine circuit board - Cylinder sensor	Cylinder sensor signal (CYL 1, 2, 3)	Folding machine does not operate. "U90" appears, and is not reset. Sewing clamp assembly does not operate.
P22	Folding machine circuit board - Clamp-in sensor (Photosensor)	Clamp-in sensor signal	Center blade does not move forward. Folding machine does not operate.
P37 = P29	Power supply - Thread winder motor	Thread winder motor driving signal	Thread is not wound.
P27 = P38	Power supply - Marker	Marker driving signal	Marker does not light.
P39 = P40	Power supply - Earth [Earth inductor]	Earth	Machine may malfunction.

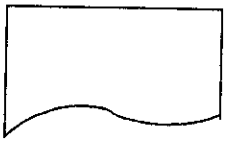
9 Trouble shooting

1. Meaning of the symbols

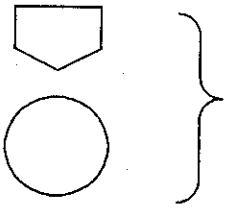
1  Manual operation

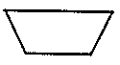
2  Manual switch operation

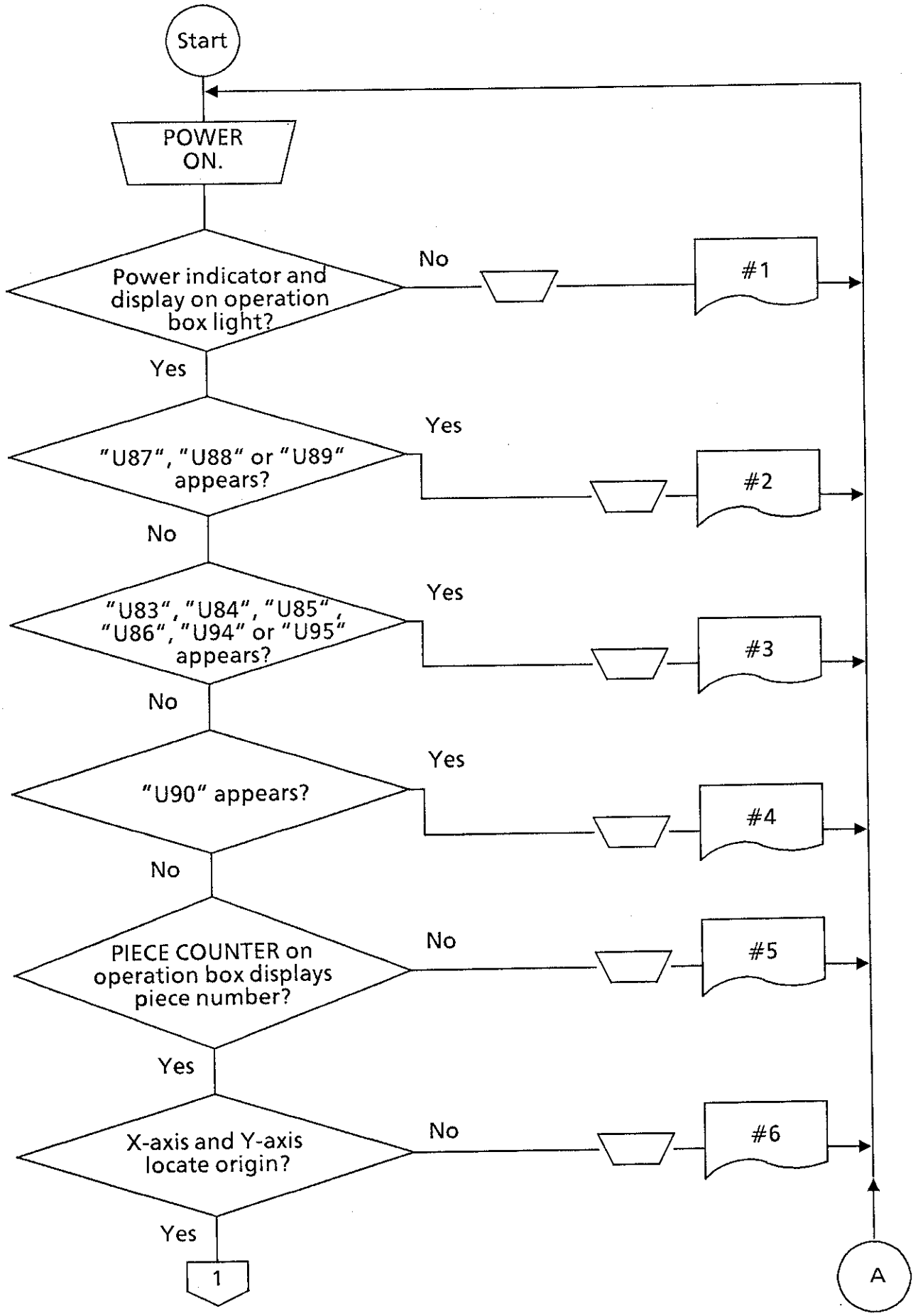
3  Decision

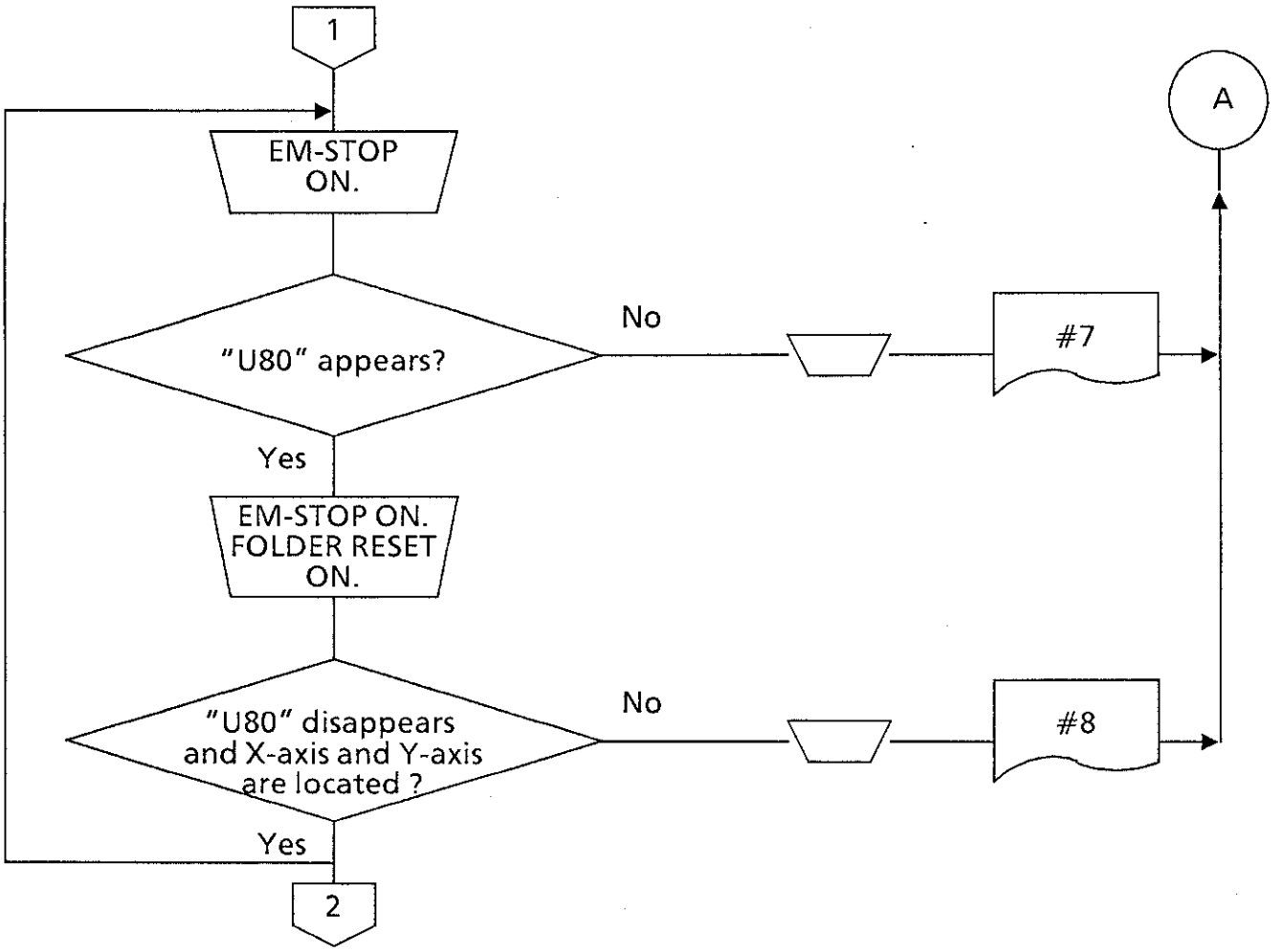
4  Reference documents

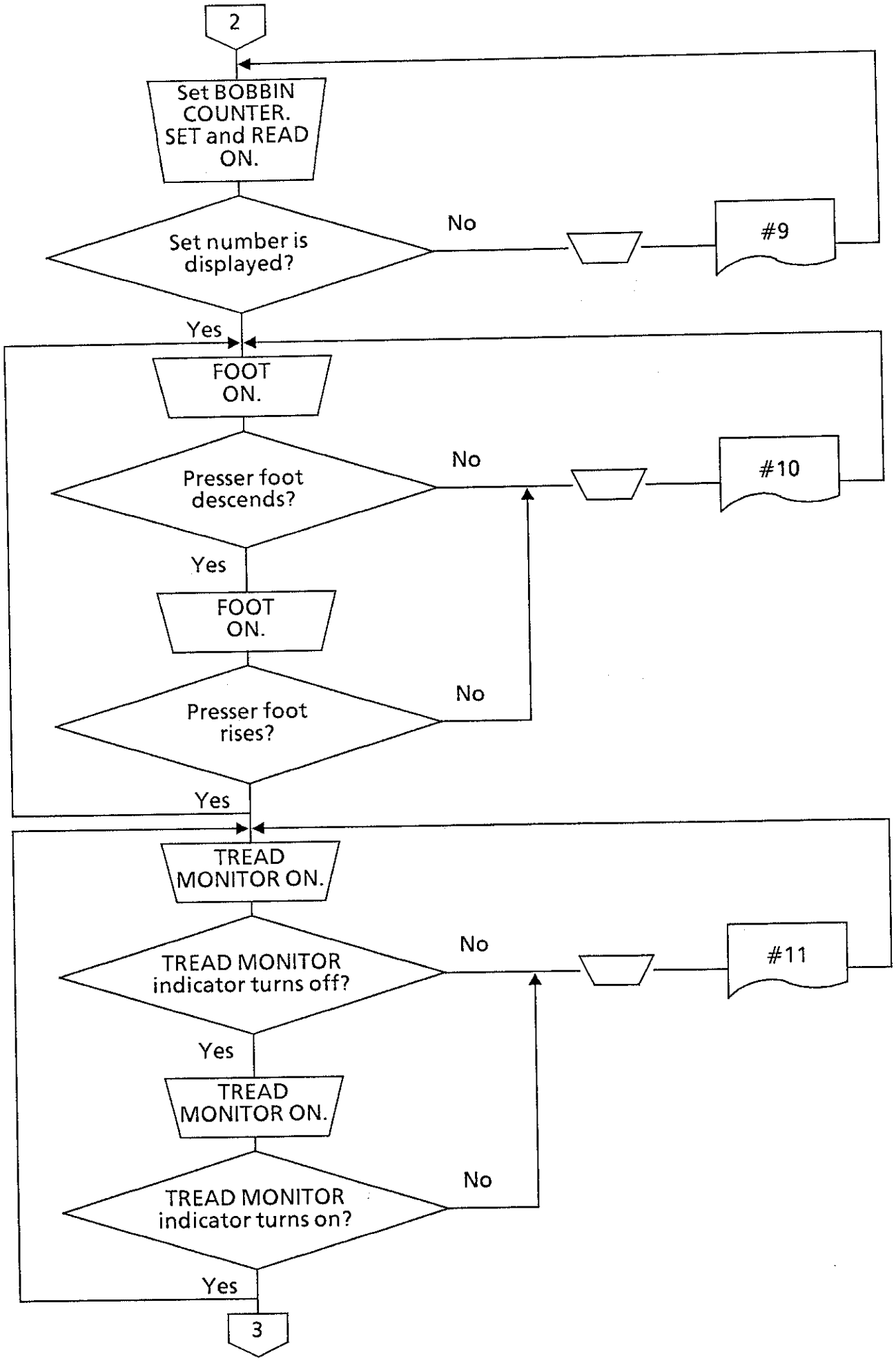
5  Condition

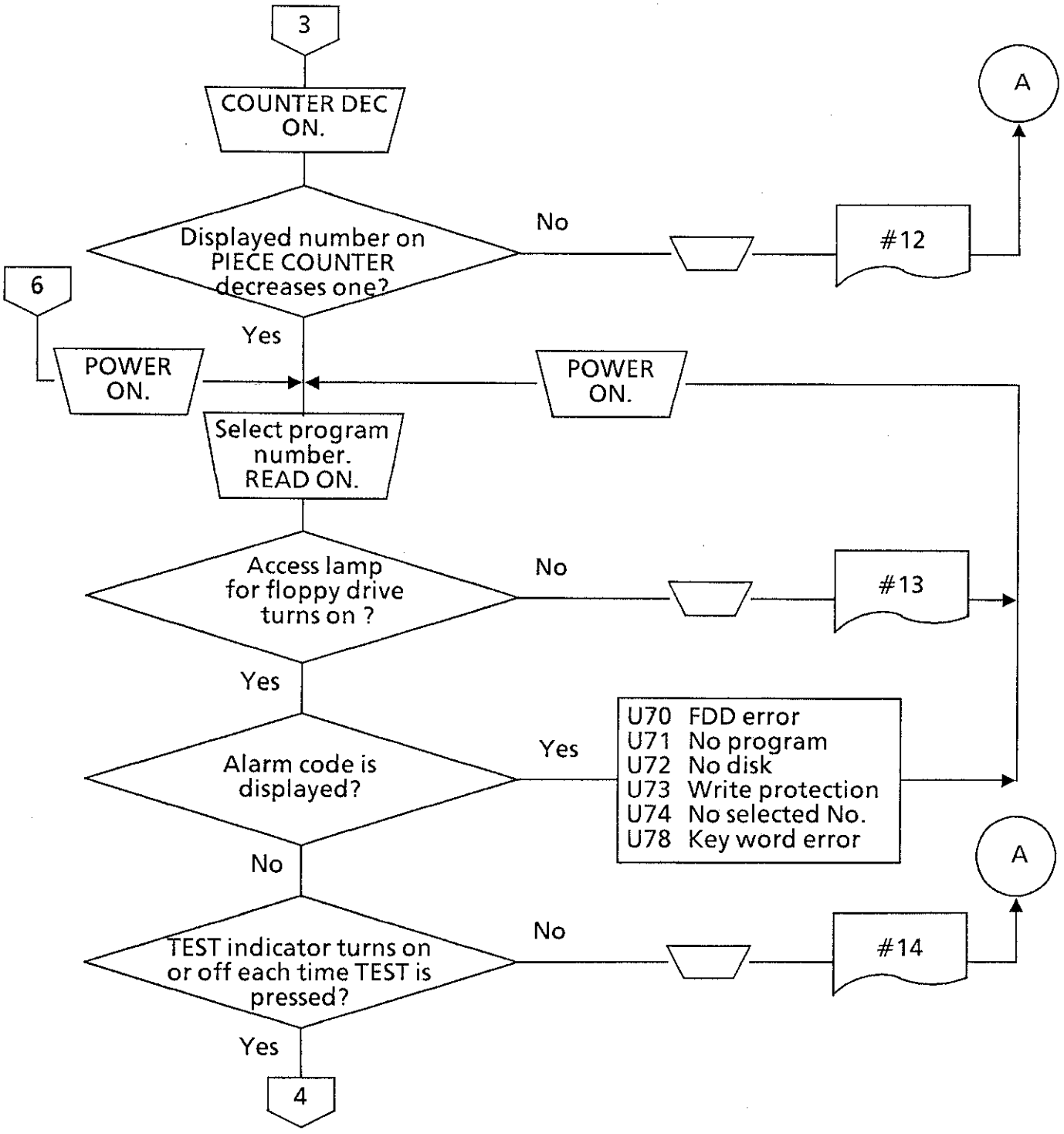
6  Connector

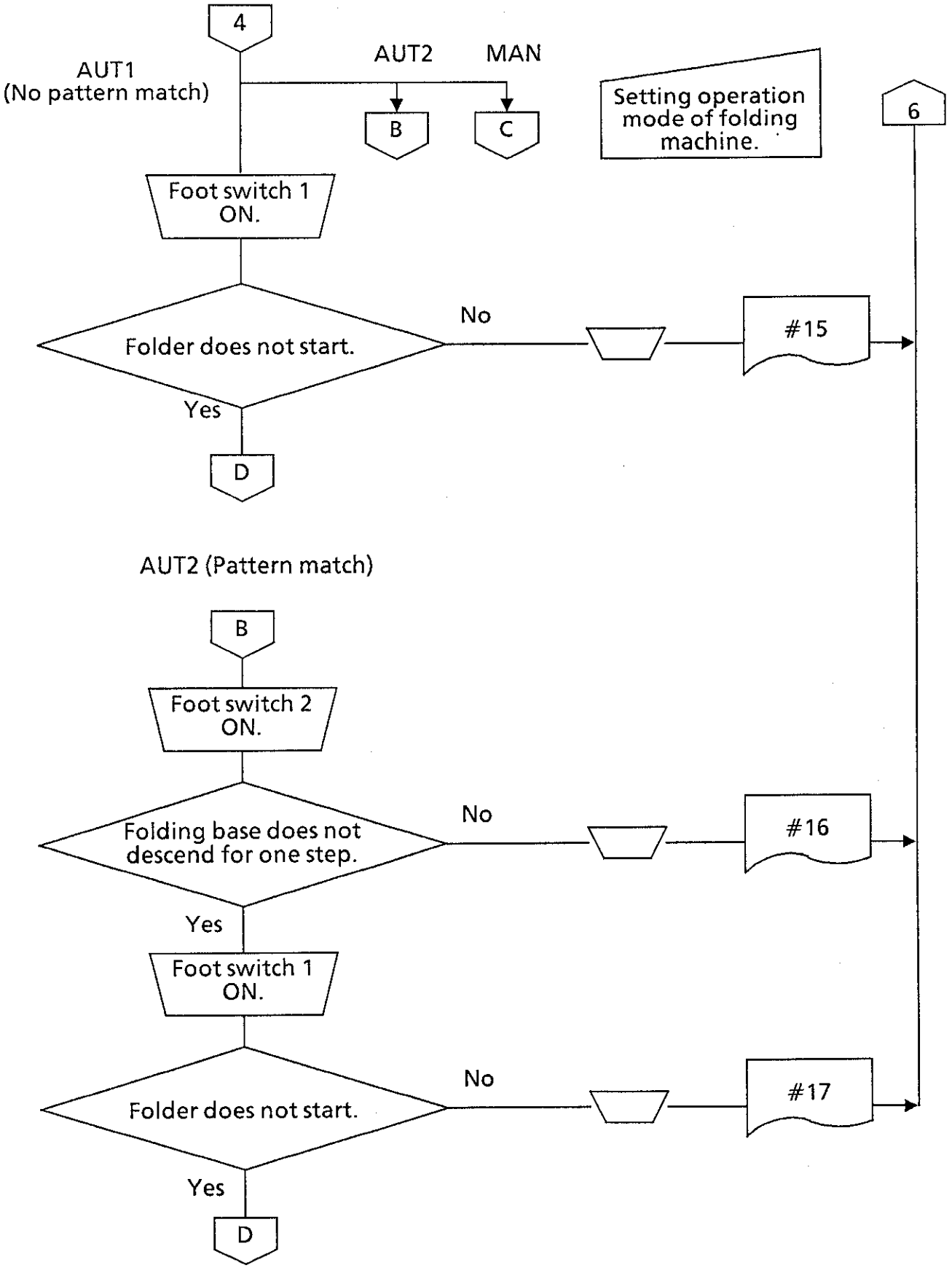
7  Power switch OFF

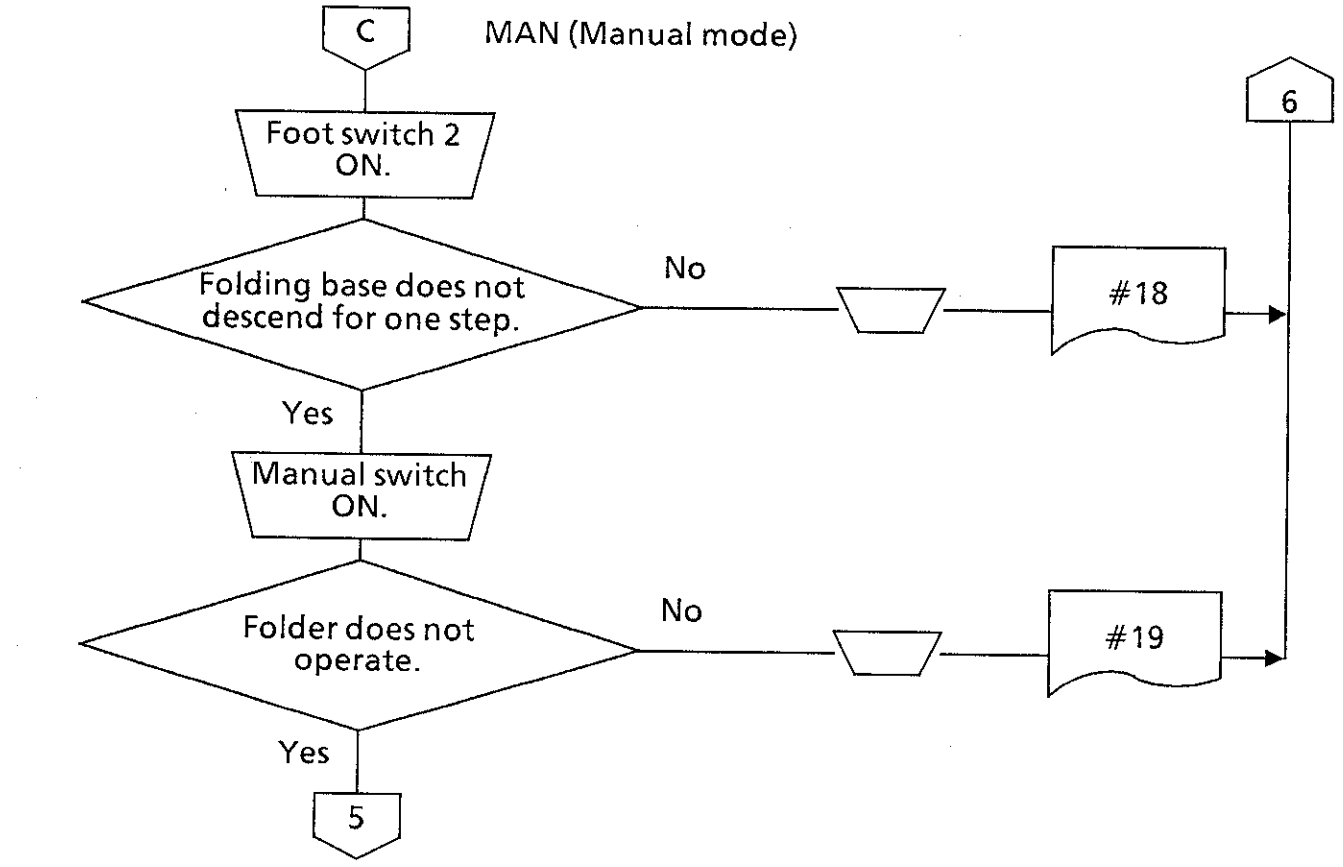

Start
POWER ON.
Power indicator and display on operation box light?
No
#1
Yes
"U87", "U88" or "U89" appears?
Yes
#2
No
"U83", "U84", "U85", "U86", "U94" or "U95" appears?
Yes
#3
No
"U90" appears?
Yes
#4
No
PIECE COUNTER on operation box displays piece number?
No
#5
Yes
X-axis and Y-axis locate origin?
No
#6
Yes
1
A

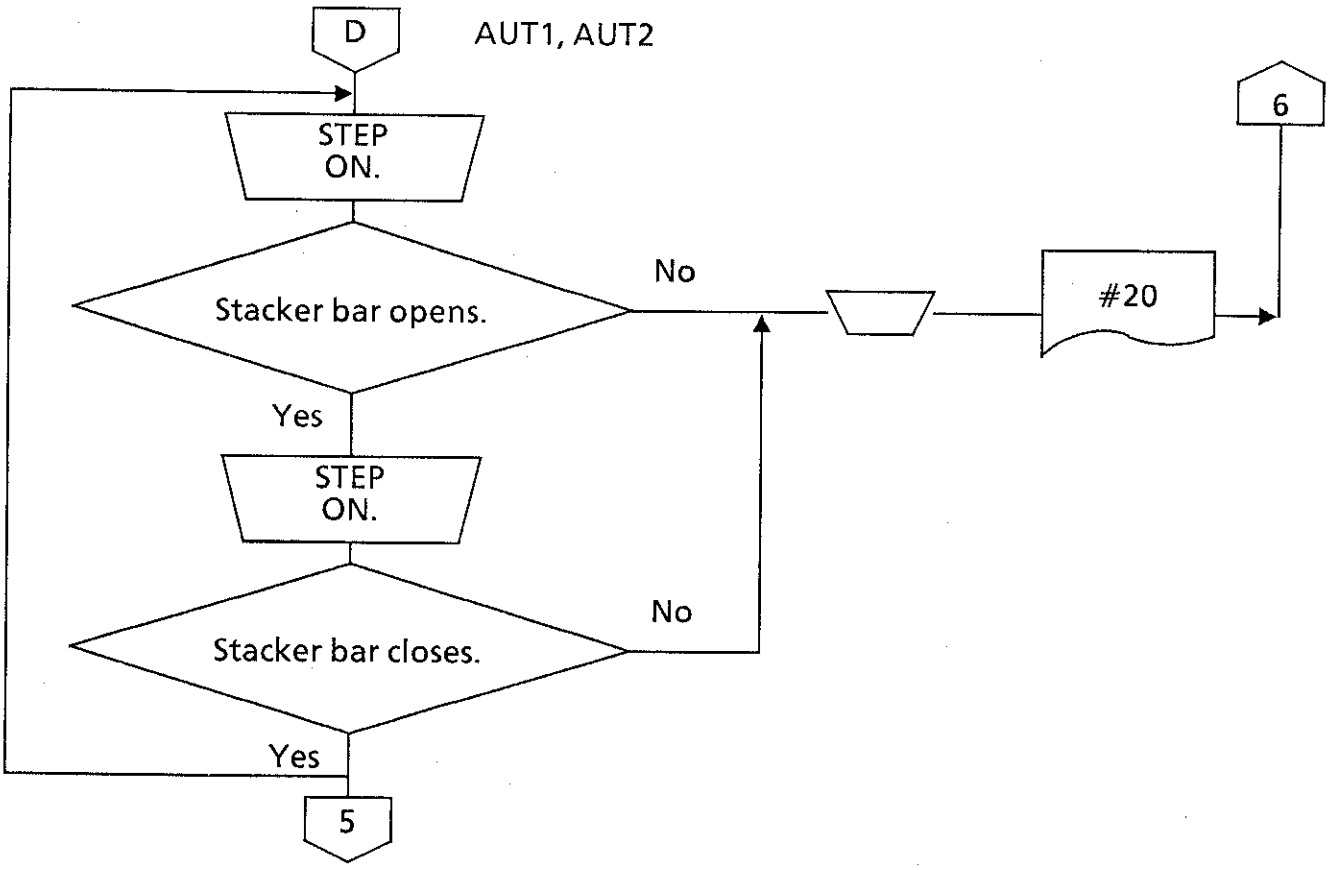

1
EM-STOP ON.
"U80" appears?
No
#7
A
Yes
EM-STOP ON. FOLDER RESET ON.
"U80" disappears and X-axis and Y-axis are located ?
No
#8
Yes
2

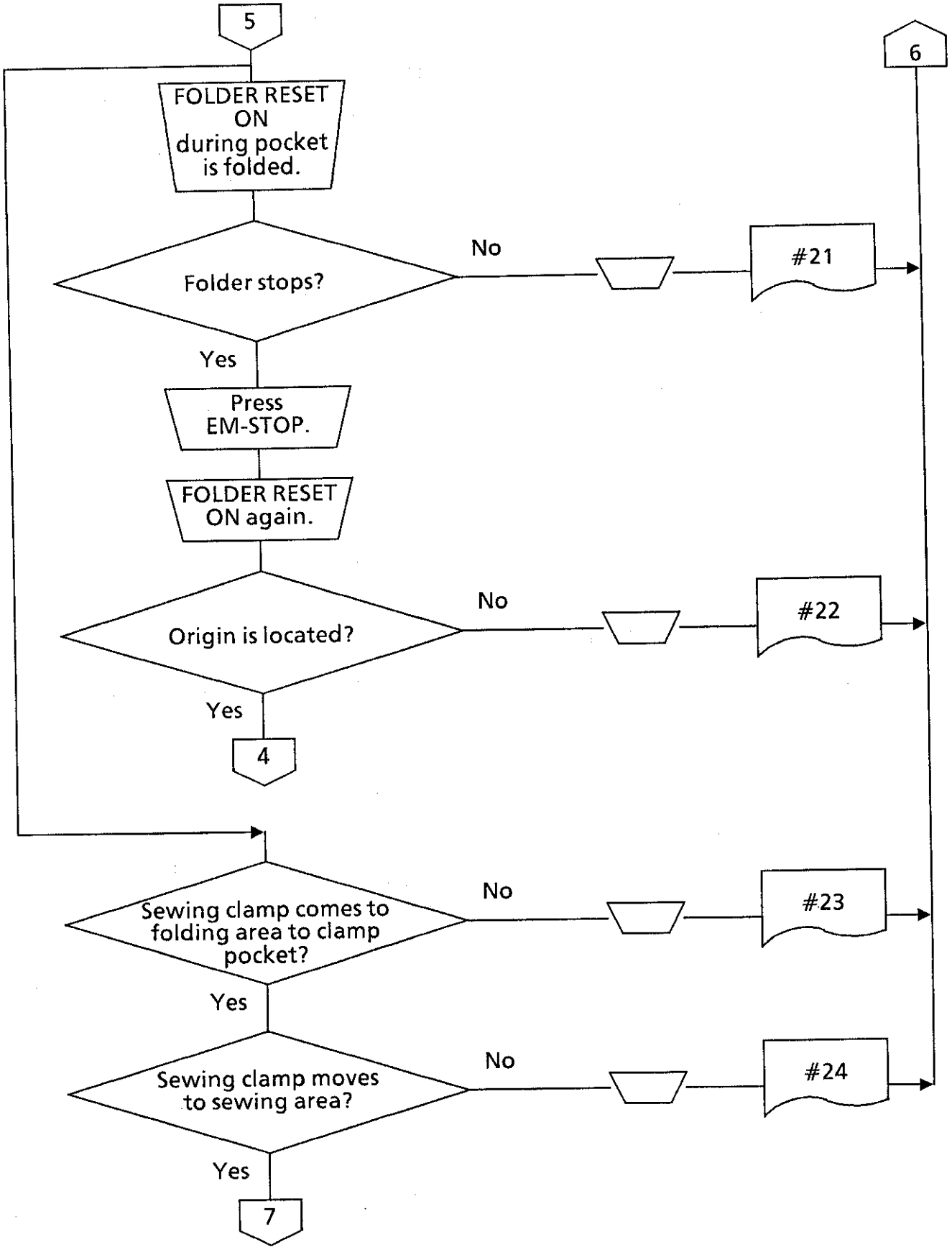

2
Set BOBBIN COUNTER. SET and READ ON.
Set number is displayed?
No
#9
Yes
FOOT ON.
Presser foot descends?
No
#10
Yes
FOOT ON.
Presser foot rises?
No
Yes
TREAD MONITOR ON.
TREAD MONITOR indicator turns off?
No
#11
Yes
TREAD MONITOR ON.
TREAD MONITOR indicator turns on?
No
Yes
3

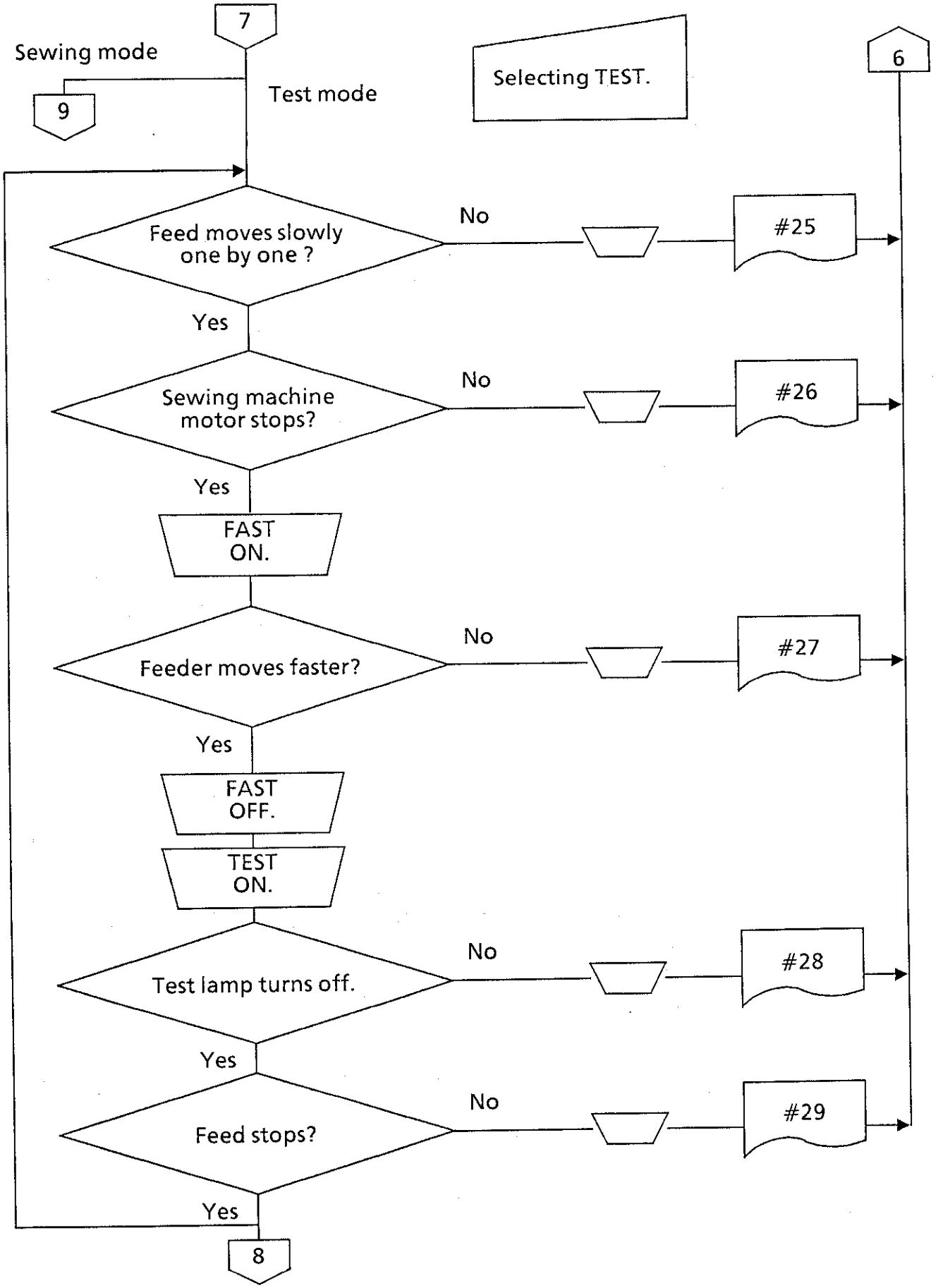

3
COUNTER DEC ON.
Displayed number on PIECE COUNTER decreases one?
No
#12
A
6
Yes
POWER ON.
POWER ON.
Select program number. READ ON.
Access lamp for floppy drive turns on ?
No
#13
Yes
Alarm code is displayed?
Yes
U70 FDD error
U71 No program
U72 No disk
U73 Write protection
U74 No selected No.
U78 Key word error
No
A
TEST indicator turns on or off each time TEST is pressed?
No
#14
Yes
4

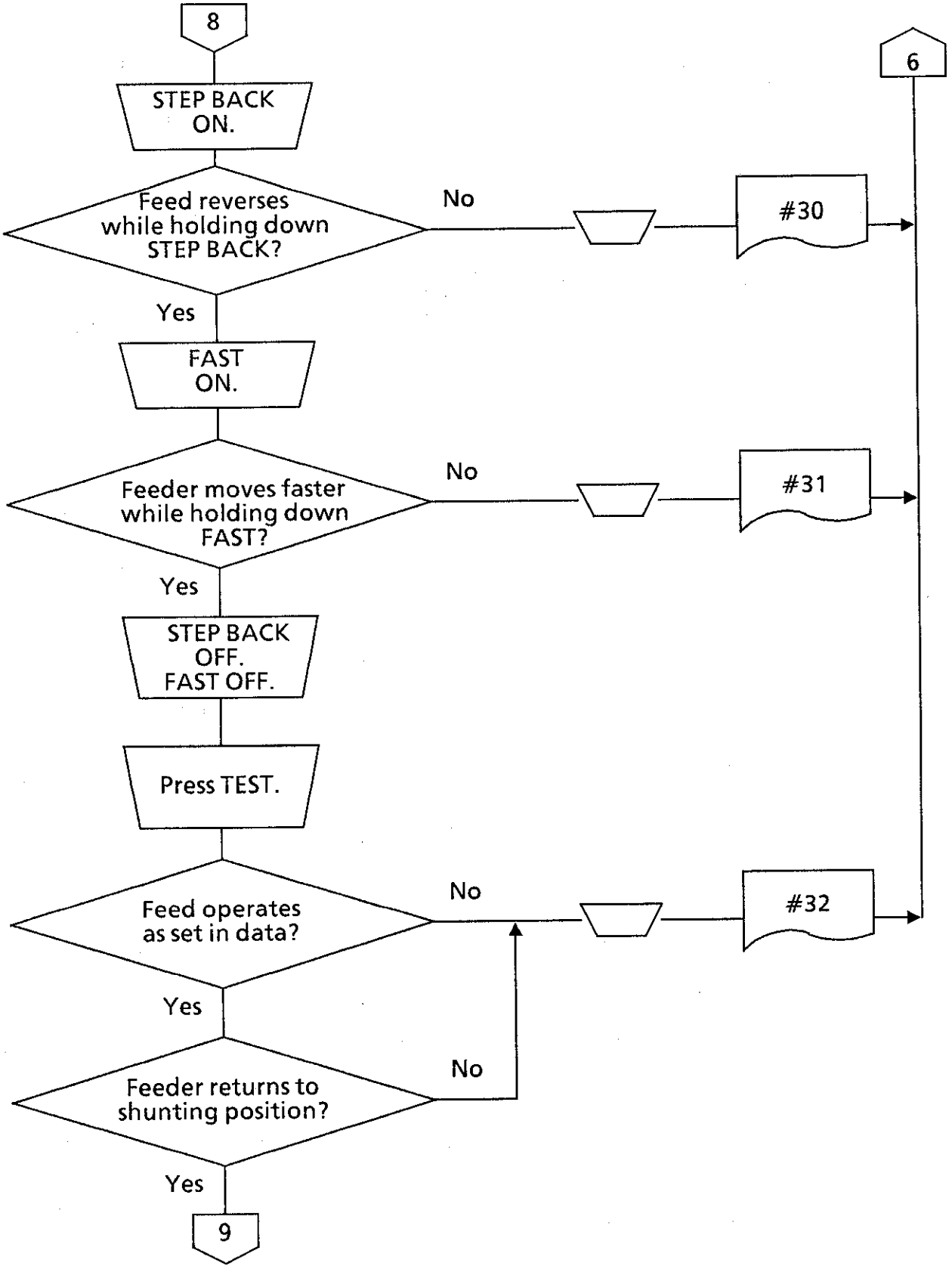

4
AUT1
(No pattern match)
AUT2
MAN
B
C
Setting operation mode of folding machine.
6
Foot switch 1 ON.
Folder does not start.
No
#15
Yes
D
AUT2 (Pattern match)
B
Foot switch 2 ON.
Folding base does not descend for one step.
No
#16
Yes
Foot switch 1 ON.
Folder does not start.
No
#17
Yes
D

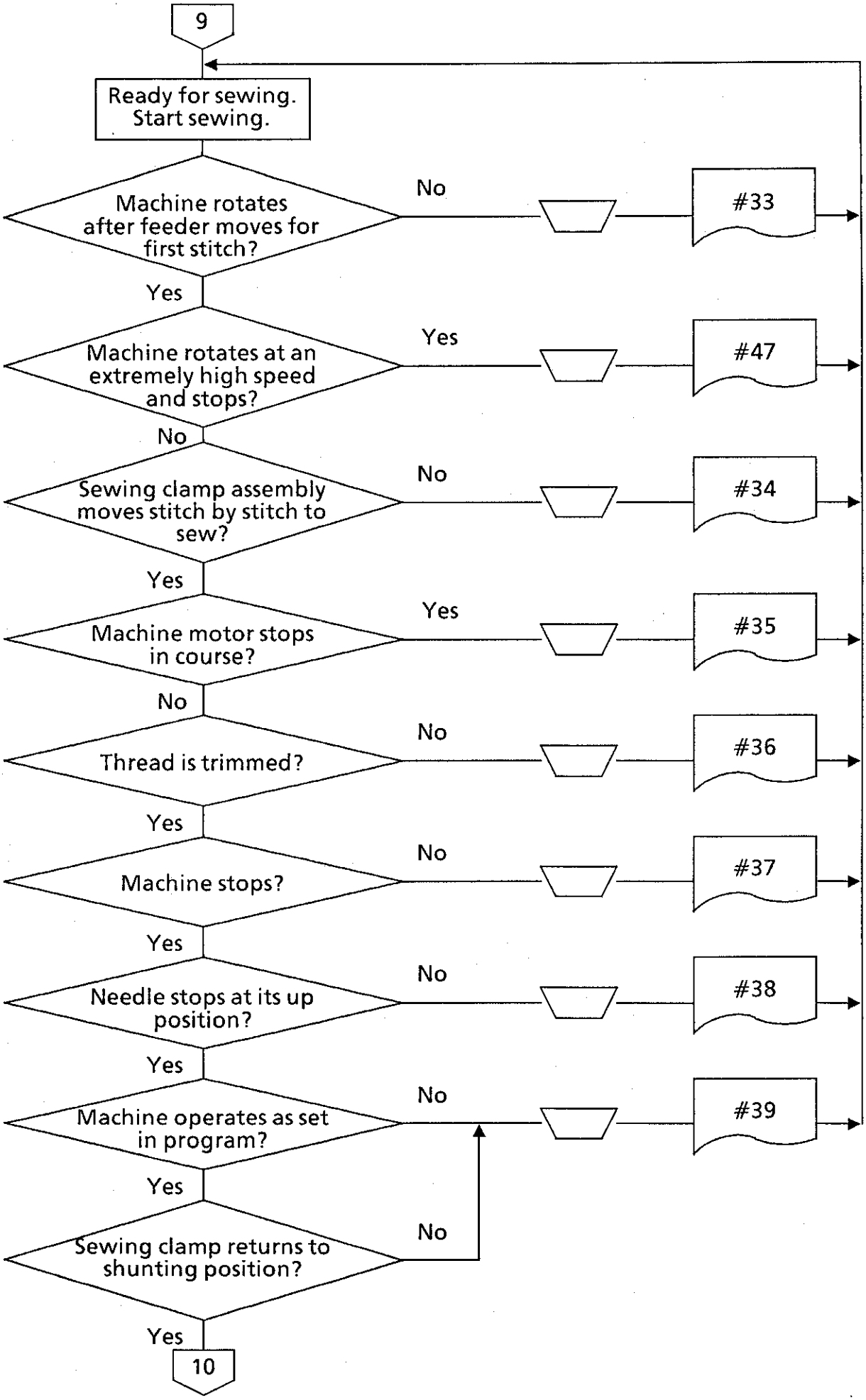

C
MAN (Manual mode)
Foot switch 2 ON.
Folding base does not descend for one step.
No
#18
6
Yes
Manual switch ON.
Folder does not operate.
No
#19
Yes
5

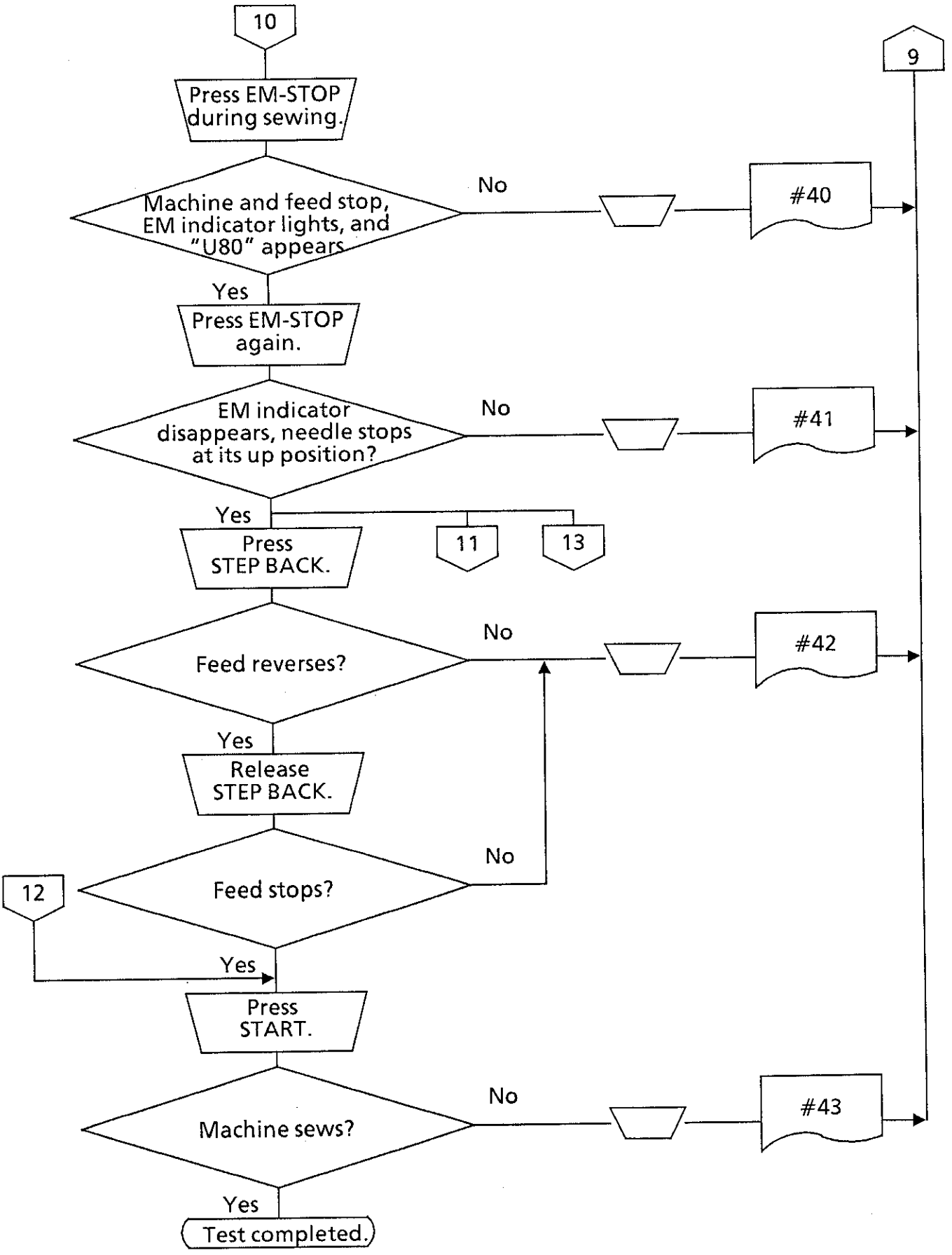

D
AUT1, AUT2
STEP ON.
Stacker bar opens.
No
#20
6
Yes
STEP ON.
Stacker bar closes.
No
Yes
5


5
6
FOLDER RESET ON during pocket is folded.
Folder stops?
No
#21
Yes
Press EM-STOP.
FOLDER RESET ON again.
Origin is located?
No
#22
Yes
4
Sewing clamp comes to folding area to clamp pocket?
No
#23
Yes
Sewing clamp moves to sewing area?
No
#24
Yes
7

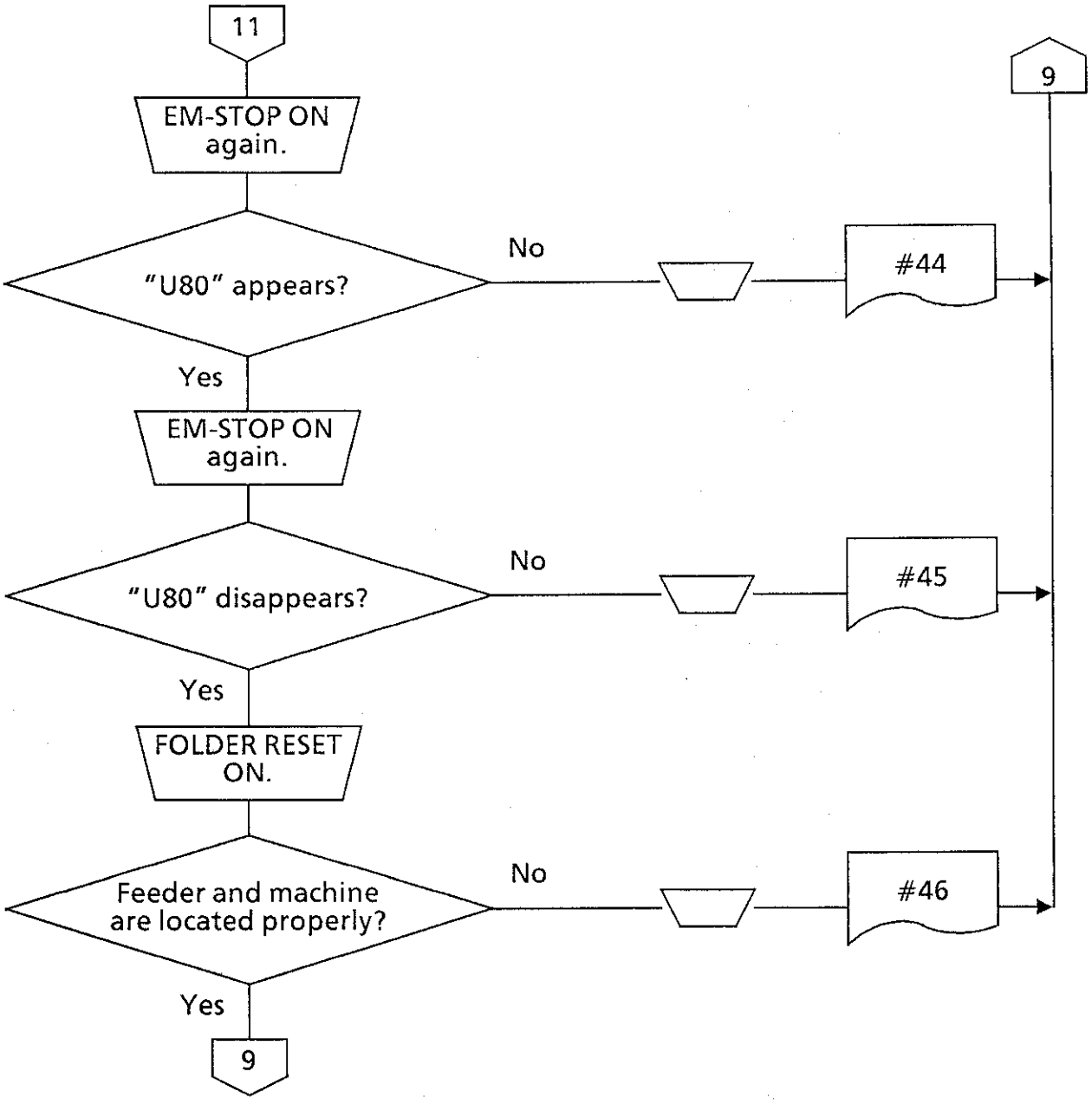

7
Sewing mode
9
Test mode
Selecting TEST.
6
Feed moves slowly one by one ?
No
#25
Yes
Sewing machine motor stops?
No
#26
Yes
FAST ON.
Feeder moves faster?
No
#27
Yes
FAST OFF.
TEST ON.
Test lamp turns off.
No
#28
Yes
Feed stops?
No
#29
Yes
8

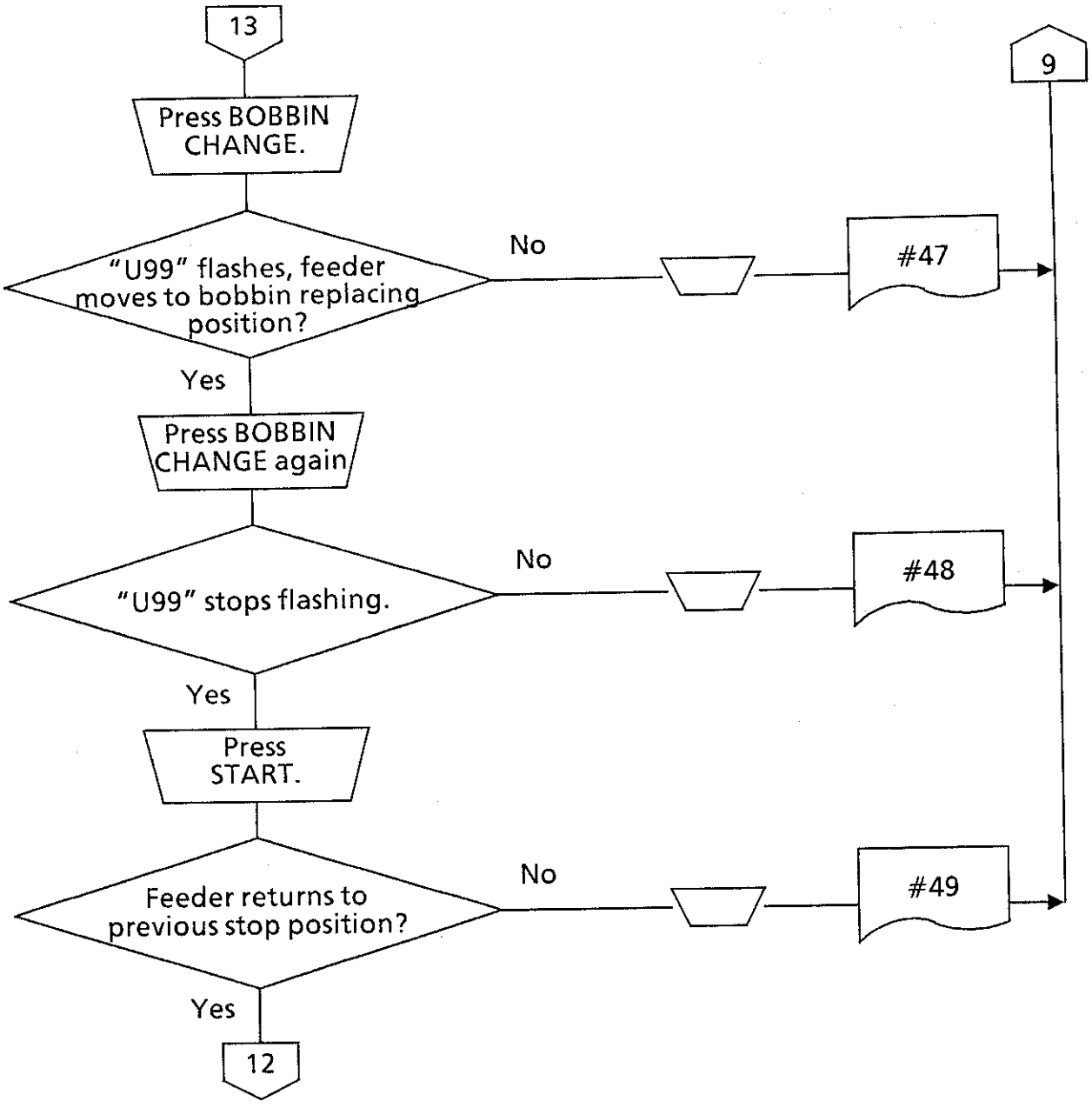

8
STEP BACK ON.
Feed reverses while holding down STEP BACK?
No
#30
6
Yes
FAST ON.
Feeder moves faster while holding down FAST?
No
#31
Yes
STEP BACK OFF.
FAST OFF.
Press TEST.
Feed operates as set in data?
No
#32
Yes
Feeder returns to shunting position?
No
Yes
9

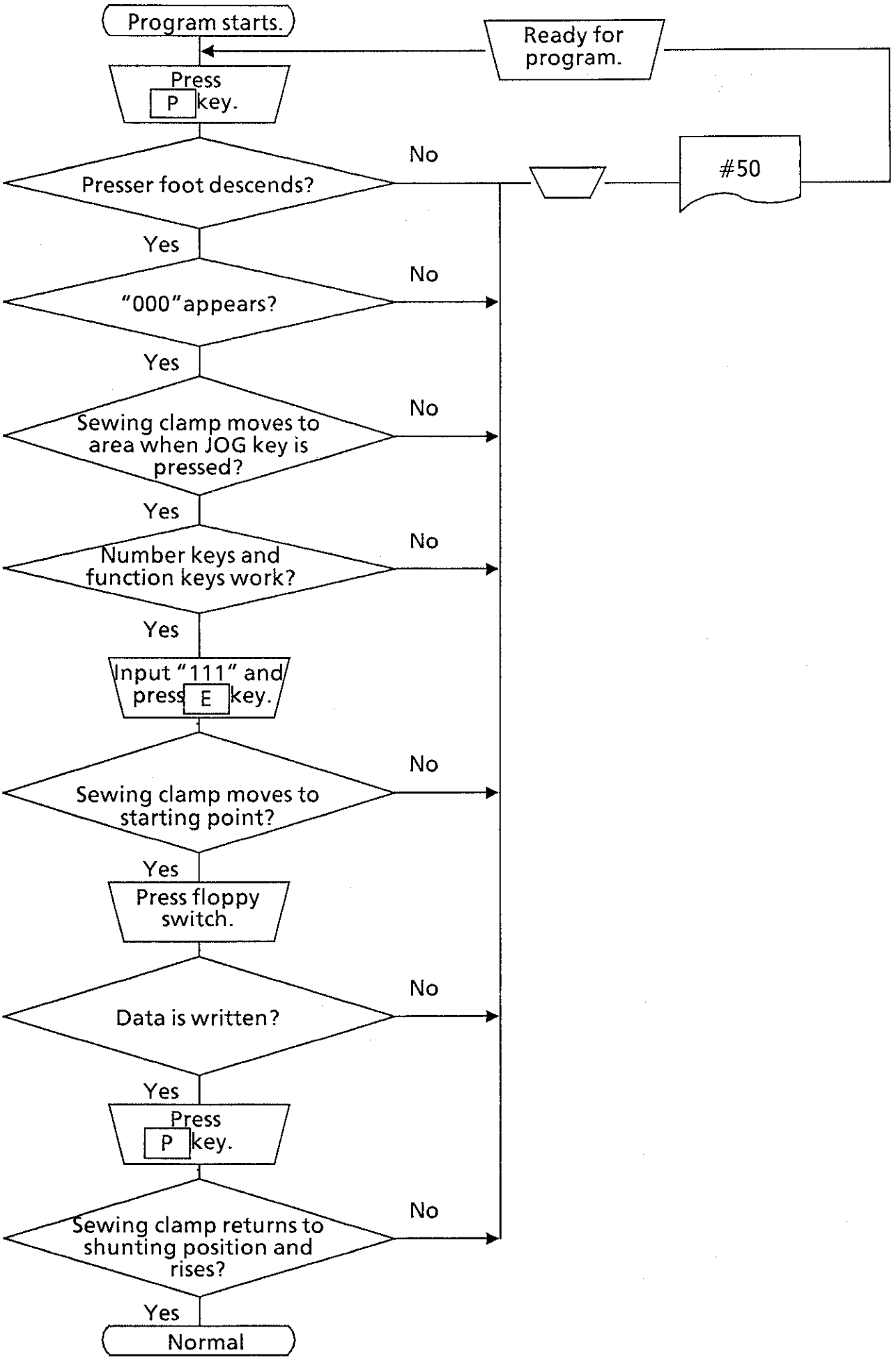

9
Ready for sewing.
Start sewing.
Machine rotates after feeder moves for first stitch?
No
#33
Yes
Machine rotates at an extremely high speed and stops?
Yes
#47
No
Sewing clamp assembly moves stitch by stitch to sew?
No
#34
Yes
Machine motor stops in course?
Yes
#35
No
Thread is trimmed?
No
#36
Yes
Machine stops?
No
#37
Yes
Needle stops at its up position?
No
#38
Yes
Machine operates as set in program?
No
#39
Yes
Sewing clamp returns to shunting position?
No
Yes
10


10
Press EM-STOP during sewing.
Machine and feed stop, EM indicator lights, and "U80" appears
No
#40
9
Yes
Press EM-STOP again.
EM indicator disappears, needle stops at its up position?
No
#41
Yes
Press STEP BACK.
11
13
Feed reverses?
No
#42
Yes
Release STEP BACK.
Feed stops?
No
12
Yes
Press START.
Machine sews?
No
#43
Yes
Test completed.

Normal


11
EM-STOP ON again.
"U80" appears?
No
#44
9
Yes
EM-STOP ON again.
"U80" disappears?
No
#45
Yes
FOLDER RESET ON.
Feeder and machine are located properly?
No
#46
Yes
9


13
Press BOBBIN CHANGE.
"U99" flashes, feeder moves to bobbin replacing position?
No
#47
Yes
Press BOBBIN CHANGE again
"U99" stops flashing.
No
#48
Yes
Press START.
Feeder returns to previous stop position?
No
#49
Yes
12
9


Program starts.
Ready for program.
Press P key.
Presser foot descends?
No
#50
Yes
"000" appears?
No
Yes
Sewing clamp moves to area when JOG key is pressed?
No
Yes
Number keys and function keys work?
No
Yes
Input "111" and press E key.
Sewing clamp moves to starting point?
No
Yes
Press floppy switch.
Data is written?
No
Yes
Press P key.
Sewing clamp returns to shunting position and rises?
No
Yes
Normal

2. Counter measure

Notes for failure diagnostics

1. Be sure to turn off the power before plugging and unplugging the machine.
2. Be sure to turn off the power before opening the cover and disconnecting cables.
3. In the following tables the check, repair or adjustment item number ①, ② ··· requires measuring resistance after turning off the power. The item number ❶, ❷ ··· requires measuring voltage after turning on the power.
4. Be sure to replace a fuse with one which has the same quality and capacity.
5. Be sure to check harnesses and connectors by referring to "10. Harness Connection".

Before adjustment

1. Check fuse breakage.
2. Check that each plug is securely connected.
3. #1, #2 ··· in the following tables correspond to those numbers in the flow chart.

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#1 When power is turned on, power indicator does not light.	1. Power is not supplied. 2. Power switch and cord	❶ Measure voltage of three-phase power supply with circuit tester. ① Remove front cover (right), turn power switch on with power supply plug unplugged, and check terminals of power supply plug and power supply equipment with tester to check conductivity. It must be conductive.	Power supply harness (E) No-fuse breaker Power supply harness (D) Power supply LED	
	3. Regulator 4. Power supply harness (A)	❶ Disconnect P34, P35, P36 and P38, and check voltage at + 5V output terminal of regulator. It must be + 5V.	AVR-2 (5V, ± 12V)	
	5. Operation box harness	❷ Connect P34, P35, P36 and P38, and check voltage at + 5V output terminal of regulator. (Turn off power before each check.) ◦ It must be + 5V when harnesses are connected. ◦ When power supply (+ 5V) drops lower, check harnesses and units, and replace if necessary.	Power supply harness (A) Operation box harness Operation box Control circuit board	
	6. Operation box 7. Control Circuit board 8. Fuse F3 breakage	❸ Disconnect P26, and check voltage at 1 pin(+) and 14 pin(−). It must be + 5V.	FDD FDD power supply harness Fuse	
#2 When power is turned on, "U87", "U88" or "U89" appears.	1. Power supply harness (C) 2. Servo harness (X) 3. Servo harness (Y) 4. Servo harness (Z) 5. Encoder harness (X) 6. Encoder harness (Y) 7. Encoder harness (Z) 8. Motor power harness (X) 9. Motor power harness (Y) 10. Motor power harness (Z) 11. Control circuit board 12. Fuse F1, F2 breakage	1 Check if connectors P12, P13, P14, P31, P32, P33, P41, P42, P43, P44, P45, P46, P47, P48, P49, P50, P51 and P52 are securely connected.	Power supply harness (C) Servo harness (X) Servo harness (Y) Servo harness (Z) Encoder harness (X) Encoder harness (Y) Encoder harness (Z) Motor power harness (X) Motor power harness (Y) Motor power harness (Z) Control circuit board Fuse	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#3 When power is turned on, "U83", "U84" "U85", "U86", "U94" or "U95" appears.	1. Photo sensor assembly 2. Control circuit board	1 Check if soldered lead of sensor is broken. 2 Check if groove of sensor collects dust. 3 Check if P4 is securely connected.	Photo sensor assembly Photo sensor Control circuit board	
#4 When power is turned on, "U90" appears.	1. Folder harness 2. Folder circuit board 3. Operation of cylinder sensor 4. Control circuit board	1 Check if P7 and P19 are securely connected. 2 Check if cylinder sensor works properly.	Folder harness Folder circuit board Cylinder sensor Control circuit board	18
#5 Operation box does not display piece number.	1. Indicator circuit board LED circuit board Operation box harness Operation box 2. Control circuit board	1 Check if P8 and 26are securely connected. 2 Check if connectors inside operation box are securely connected.	Indicator circuit board LED circuit board Operation box harness Operation box Control circuit board	
#6 X and Y axis do not locate origin.	1. Driver (X) Driver (Y) Main circuit board Servo harness (X) Servo harness (Y) Power supply harness (C) Motor power harness (X) Motor power harness (Y) Encoder harness (X) Encoder harness (Y) Photosensor assembly 2. Motor 3. Fuse F4 breakage 4. Cylinder sensor	1 Check if P12 = P42, P13 = P44, P41 = P47, P43 = P49, P31, P32, P48, P50 and P4 are securely connected. 2 Check if connectors of terminals of each driver are securely connected. ⊖ Check if voltage is supplied to terminals of drivers (X) and (Y). 1 Replace driving motor. Check cylinder sensor operation.	Driver (X) Driver (Y) Control circuit board Servo harness (X) Servo harness (Y) Power supply harness (C) Motor power harness (X) Motor power harness (Y) Encoder harness (X) Encoder harness (Y) Photosensor assembly Fuse Three-phase bridge and other parts of power supply equipment Driving motor Fuse Cylinder sensor	18

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#7 When EM-STOP button is pressed, "U80" does not appear.	1. See #5. 2. EM-STOP button 3. Control circuit board	1 See #5. 2 Check if P8 and 26 are securely connected. 3 Check if EM-STOP button works properly.	See #5. Operation box harness Switch 7M Control circuit board	
#8 When EM-STOP button is pressed, "U80" is not released and X and Y axis are not located.	1. See #7. 2. Control circuit board	1 See #7.	See #7. Control circuit board	
#9 When READ button is pressed, bobbin counter is not set and producible piece number is not displayed.	1. See #5. 2. BOBBIN COUNTER SET button 3. BOBBIN COUNTER READ button	1 See #5. 2 Check if BOBBIN COUNTER SET and BOBBIN COUNTER READ buttons operate properly.	See #5. BOBBIN COUNTER SET button BOBBIN COUNTER READ button	
#10 Presser foot does not operate.	1. See #5. 2. FOOT button 3. Presser foot valve 4. Presser foot harness 5. Air mechanism	1 See #5. 2 Check if FOOT button operates properly. 3 Check if valve 14 works properly and presser foot harness are securely connected.	See #5. FOOT button Valve 14 Presser foot harness	
#11 Thread monitor LED does not light.	1. See #5. 2. THREAD MONITOR button 3. THREAD MONITOR LED	1 See #5. 2 Check if THREAD MONITOR button operates properly. 3 Check if lead of THREAD MONITOR LED is broken.	See #5. THREAD MONITOR button THREAD MONITOR LED	
#12 Piece counter number is not decreased.	1. See #5. 2. COUNTER DEC button	1 See #5. 2 Check if COUNTER DEC button operates properly.	See #5. COUNTER DEC button	
#13 Data is not read from floppy disk.	1. See #5. 2. FDD power supply harness FDD harness 3. FDD 4. Control circuit board	1 See #5. 2 Check if FLOPPY and PROGRAM NO. buttons operate properly. 3 Check if P36 = P54, P55 = P3 are securely connected. 4 Replace FDD. 5 Replace control circuit board.	See #5. FLOPPY button, PROGRAM NO. button FDD power supply harness FDD harness FDD Control circuit board	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#14 TEST LED does not light.	1. See #5. 2. TEST button 3. TEST LED	1 See #5. 2 Check if TEST button and TEST LED operate properly.	See #5. TEST button TEST LED	
#15 When foot switch is pressed, folding machine does not operate.	1. Foot switch harness Foot switch Solenoid driving harness 2. Folding machine circuit board 3. Control circuit board 4. Folding machine harness	1 Check if P20, P24 and P18 are securely connected. 2 Replace folding machine circuit board. 3 Replace control circuit board. 1 Check if P19 = P7 are securely connected. Connectors of the same number must be conductive.	Foot switch harness Foot switch Solenoid driving harness Solenoid valve Folding machine circuit board Control circuit board Folding machine harness	
#16 When foot switch 2 is pressed, folding base does not descend for one step.	1. See #15.	1 See #15.	See #15.	
#17 When foot switch 1 is pressed, folding base does not operate.	1. See #15.	1 See #15.	See #15.	
#18 When foot switch 2 is pressed, folding base does not descend for one step.	1. See #15.	1 See #15.	See #15.	
#19 When foot switch 1 is pressed, folding machine does not operate.	1. See #15.	1 See #15.	See #15.	
#20 When STEP button is pressed, stacker bar does not operate.	1. See #6. 2. STEP button	1 See #6. 2 Check if STEP button operates properly.	See #6. STEP button	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#21 While folding, FOLDER RESET is turned on and folding machine does not stop.	1. FOLDER RESET button 2. Folding machine operation box harness 3. Folding machine circuit board	1 Check if FOLDER RESET button operates properly. 2 Check if Folding machine operation box harness and P23 = P25 are securely connected. (Check breakage.)	FOLDER RESET button Folding machine operation box harness	
#22 Origin is not located.	1. See #6.	1 See #6. 2 Check if FOLDER RESET button operates properly.	See #6. FOLDER RESET button	
#23 Sewing clamp assembly does not come to clamp pocket.	1. See #6. 2. Cylinder sensor (Folding clamp, inner clamp and center blade) 3. Folding machine harness	1 See #6. 1 Check if P21 is securely connected. ❷ Check if sensors of cylinders 1 and 2 are ON. (LED must light.) 3 Check P19 and P7. (Connectors of the same number must be conductive.)	See #6. Cylinder sensor Folding machine harness	
#24 Sewing clamp assembly does not move to sewing area.	1. See #6. 2. Machine sensor Machine sensor harness 3. Cylinder sensor (center blade)	1 See #6. 1 Check P6 = P53. ❷ Check if sensor of presser foot cylinder is ON. (LED must light.) 3 Check if cylinder sensor (center blade) LED is ON.	See #6. Machine sensor (needle up sensor) Machine sensor harness Cylinder sensor (center blade)	
#25 Feeder does not move slowly stitch by stitch.	1. See #5. 2. See #6. 3. TEST button	1 See #5. 1 See #6.	See #5 and #6. TEST button	
#26 During test operation, sewing machine motor rotates.	1. Control circuit board 2. Machine motor driver		Control circuit board Machine motor driver	
#27 When FAST button is pressed in test mode, feed does not become faster.	1. See #5. 2. See #6. 3. FAST button	1 See #5. 1 See #6. 2 Check if FAST button operates properly.	See #5. See #6. FAST button	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#28 When test button is pressed in test mode, test lamp does not go off.	1. See #5. 2. TEST button	1 See #5. 2 Check if TEST button operates properly.	See #5. TEST button	
#29 When test mode is released, feed does not stop.	1. See #6. 2. See #28.	1 See #6. 1 See #28.	See #6. See #28.	
#30 When STEP BACK button is pressed, feed does not reverse.	1. See #5. 2. STEP BACK button	1 See #5. 2 Check if STEP BACK button operates properly.	See #5. STEP BACK button	
#31 While holding down STEP BACK and FAST buttons, feed does not reverse at fast feed.	1. See #5. 2. STEP BACK button FAST button	1 See #5. 2 Check if STEP BACK and FAST buttons operate properly.	See #5. STEP BACK button FAST button	
#32 Feed does not move as set in data.	1. Defective adjusting of feed. 2. See #6.	1 Adjust feed mechanism. 1 See #6.	See #6.	
#33 At sewing start, machine does not rotate. ("U89" appears.)	1. Fuse breakage 2. Defective power supply (150V) 3. Power supply harness (C) Driver (Z) 4. Motor 5. Control circuit board Servo harness Motor power harness (Z) Encoder harness (Z) 6. Power supply(24V)	① Remove F1, F2 and F3, and check conductivity. It must be conductive. ❶ Remove P33 and check voltage. ❶ Check if voltage is conducted to terminals of driver (Z). Replace motor. 2 Check if P33, P14 = P46, P45 = P51, and P52 are securely connected. 3 Check if trimmer resistor (VR3) on control circuit board is fully rotated to the left. 1 Check power supply (24V).	Fuse 20A Fuse B Power supply equipment Power supply harness (C) Driver (Z) Machine motor assembly Control circuit board Servo harness (Z) Motor power harness (Z) Encoder harness (Z) AVR1	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#34 Machine does not sew. (Machine rotates, but sewing clamp does not operate.)	1. See #6.	1 See #6.	See #6.	
#35 During sewing, machine stops suddenly.	1. Too much load on machine 2. See #33.	1 Adjust head of sewing machine. 2 See #33.	 See #33.	
#36 Thread is not trimmed.	1. Machine sensor harness Machine harness 2. Thread trimmer solenoid 3. Thread trimmer harness 4. Control circuit board	1 Check if P53 and P6 are securely connected. ① Check resistance of both ends of solenoid. (It must be 6Ω.) 1 Remove P9 and P30, and check conductivity. 1 Replace control circuit board.	Sewing machine sensor harness Sewing machine harness Thread trimmer solenoid Thread trimmer harness Control circuit board	
#37 After thread is trimmed, machine does not stop.	1. Machine sensor 2. Control circuit board	1 Check if needle up sensor operates properly. (Breakage, connection) 1 Replace Control circuit board.	Machine sensor (needle up sensor) Control circuit board	
#38 Needle does not stop at its up position.	1. See #37.	1 See #37.	See #37.	
#39 Machine does not sew as set in program.	1. See #32. 2. See #33.	1 See #32. 1 See #33.	See #32. See #33.	
#40 When EM-STOP button is pressed during sewing, machine does not stop.	1. Control circuit board 2. See #7.	1 Replace control circuit board. 1 See #7. 2 Check if EM-STOP button operates properly.	Control circuit board See #7. EM-STOP button	
#41 When EM-STOP is released during sewing, thread is not trimmed.	1. See #36, #37 and #38.	1 See #36, #37 and #38.	See #36, #37 and #38.	
#42 STEP BACK button does not operate.	1. See #5. 2. See #30.	1 See #5. 2 See #30.	See #5 and #30.	

Check point	Cause (Defective parts)	Check, repair, adjustment	Parts to be replaced	Ref. page
#43 After sewing has once stopped, machine does not start sewing again.	1. See #33, #34, #35 and #36.	1 See #33, #34, #35 and #36.	See #33, #34, #35 and #36.	
#44 When EM-STOP is on, "U80" does not appear.	1. See #40.	1 See #40.	See #40.	
#45 When EM-STOP button is pressed, display does not return to previous state.	1. See #40.	1 See #40.	See #40.	
#46 When EM-STOP button is pressed, origin is not located.	1. See #5 and #6.	1 See #5 and #6.	See #5 and #6.	
#47 When BOBBIN CHANGE button is pressed, machine does not move to bobbin replacing position.	1. See #5. 2. See #6. 3. Control circuit board 4. BOBBIN CHANGE button	1 See #5. 1 See #6. 1 Replace control circuit board. 1 Check if BOBBIN CHANGE button operates properly.	See #5. See #6. Control circuit board BOBBIN CHANGE button	
#48 When BOBBIN CHANGE button is pressed, "U99" does not appear.	1. See #47.	1 See #47.	See #47.	
#49 After bobbin change has been finished, machine does not move back to previous position.	1. See #5. 2. See #6.	1 See #5. 2 See #6.	See #5. See #6.	
#50 Programmer does not operate.	1. Programmer 2. Control circuit board 3. Programmer harness	1 Replace programmer. 1 Replace control circuit board 1 Check if programmer harness is securely connected to connector. (Check breakage.)	programmer Control circuit board programmer harness	

10 Harness connection

Power supply harness A

PCB side	Power supply side	Voltage
1	1	0V
2	2	24V
3	3	0V
4	4	5V
5	5	+ 12V
6	6	– 12V

Power supply harness B

PCB side	Power supply side	Voltage
1	1	5V
2	2	0V
3	3	24V
4	4	0V

Power supply harness C

Power supply side	PCB side	Voltage
1	1 (P)	150V
2	2 (N)	0V
3	3 (A)	24V
4	4 (B)	0V

FDD power supply harness

PCB side	FDD side
1	1
2	2

(Terminal connection)

FDD Harness

PCB side	FDD side
1A	1A
2A	2A
3A	3A
4A	4A
5A	5A
6A	6A
7A	7A
8A	8A
9A	9A
10A	10A
11A	11A
12A	12A
13A	13A
14A	14A
15A	15A
16A	16A
17A	17A

PCB side	FDD side
1B	1B
2B	2B
3B	3B
4B	4B
5B	5B
6B	6B
7B	7B
8B	8B
9B	9B
10B	10B
11B	11B
12B	12B
13B	13B
14B	14B
15B	15B
16B	16B
17B	17B

Folder harness

Control PCB side	Folder PCB side
1	1
2	2
3	3
4	4
5	5
6	6
7	7

Foot switch harness

PCB side	Switch side	
1	1	Foot SW1 (left)
2	2	
3	3	
4	4	
–	5	
–	6	
5	7	Foot SW2 (right)
6	8	
–	9	

Thread trimmer harness

PCB side	Solenoid side
1	1
2	2

Programmer harness

PCB side	Programmer side
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Presser foot harness

PCB side	Valve side	
1	14 +	Presser foot
2	14 –	
3	12 +	Thread blower
4	12 –	
5	20 +	Front blower
6	20 –	

Bobbin winder harness

PCB side	Motor side	Voltage
1	1	24V
2	2	0V

Air switch harness

PCB side	Switch side
2 - 3	
3 - 2	
5	2
6	1

Solenoid drive harness

PCB side	Valve side
1 A	1B +
1 B	1B –
2 A	1A +
2 B	1A –
3 A	13 +
3 B	13 –
4 A	21 +
4 B	21 –
5 A	4 +
5 B	4 –
6 A	3B +
6 B	3B –
7 A	3A +
7 B	3A –
8 A	2B +
8 B	2B –
9 A	2A +
9 B	2A –
10 A	5 +
10 B	5 –
11 A	15 +
11 B	15 –
12 A	16 +
12 B	16 –
13 A	17 +
13 B	17 –
14 A	18 +
14 B	18 –
15 A	6 +
15 B	6 –
16 A	7 +
16 B	7 –
17 A	8 +
17 B	8 –
18 A	11B +
18 B	11B –
19 A	11A +
19 B	11A –
20 A	10 +
20 B	10 –
21 A	9 +
21 B	9 –

Machine harness

Machine sensor assembly

PCB side	Machine side	Connector side	Sensor side	
1	1	1	Amplifier (red)	Thread breakage detector
2	2	2	Amplifier (brown)	
3	3	3	Amplifier (black)	
4	4	4	Synchronization 3	
5	5	5	Synchronization 1	
6	6	6	Synchronization 2	
7	7	7	Needle up 3	
8	8	8	Needle up 1	
9	9	9	Needle up 2	
10	10	10	SMC sensor (red)	Presser foot sensor
11	11	11	SMC sensor (white)	
12	12	12	SMC sensor (black)	

Folding machine operation box harness

PCB side	Box side
1 A	1
1 B	9
2 A	2
2 B	10
3 A	3
3 B	11
4 A	4
4 B	12
5 A	5
5 B	13
6 A	6
6 B	14
7 A	7
7 B	15
8 A	8
8 B	

Operation box harness

PCB side	Box side
1 A	1
1 B	14
2 A	2
2 B	15
3 A	3
3 B	16
4 A	4
4 B	17
5 A	5
5 B	18
6 A	6
6 B	19
7 A	7
7 B	20
8 A	8
8 B	21
9 A	9
9 B	22
10 A	10
10 B	23
11 A	11
11 B	24
12 A	12
12 B	25
13 A	13
13 B	

Encoder harness (X) and (Y)

PCB side	Servo side
1	2
2	1
3	8
4	14
5	9
6	15
7	10
8	16
9	11
10	17
11	12
12	18
13	13
14	19

Encoder harness (Z)

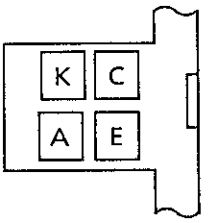
PCB side	Servo side
1	2
2	1
3	8
4	14
5	9
6	15
7	10
8	16
9	11
10	17
11	12
12	18

Servo harness (X), (Y) and (Z)

PCB side	Servo side
1 A	9
1 B	8
2 A	22
2 B	14
3 A	21
3 B	13
4 A	23
4 B	15
5 A	20
5 B	12
6 A	19
6 B	11
7 A	7
7 B	25

Photo sensor assembly

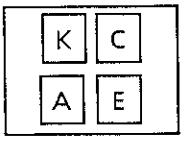
PCB side	Sensor side
1 2 3	X + A, C X + E X + K
4 5 6	X – A, C X – E X – K
7 8 9	Y + A, C Y + E Y + K
10 11 12	Y – A, C Y – E Y – K
13 14 15	X0 A, C X0 E X0 K
16 17 18	X0 A, C X0 E X0 K



Sensor (EE-SV3) terminal assingment (bottom view)

Clamp in sensor assembly

Folder PCB side	Sensor side
1 2 3	1 A 1 C 1 K, E
4 5 6	2 A 2 C 2 K, E
7 8 9	3 A 3 C 3 K, E
10 11 12	4 A 4 C 4 K, E



Sensor (EE-SG3) terminal assignment (bottom view)

Cylinder sensor assembly

Folder PCB side	Sensor side	
1 2 3	1 red 1 white 1 black	Folding clamp
4 5 6	2 red 2 white 2 black	Inner clamp
7 8 9		
10 11 12	3 red 3 white 3 black	Center blade
13 14 15		

Jig pattern sensor assembly

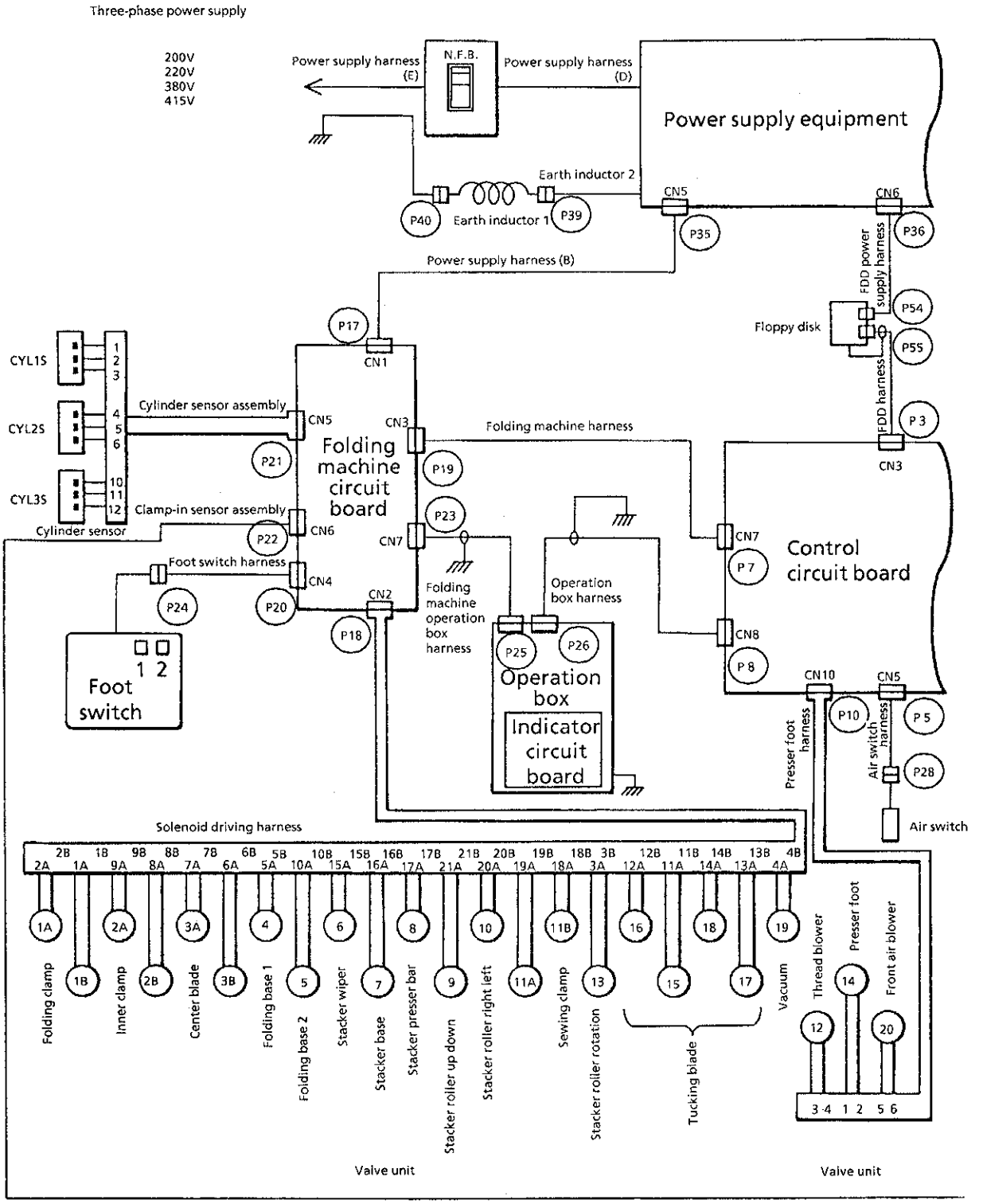
PCB side	Sensor side
1	A, C common
2	J1 E
3	J1 K
4	J2 E
5	J2 K
6	J3 E
7	J3 K
8	J4 E
9	J4 K
10	J5 E
11	J5 K
12	J6 E
13	J6 K

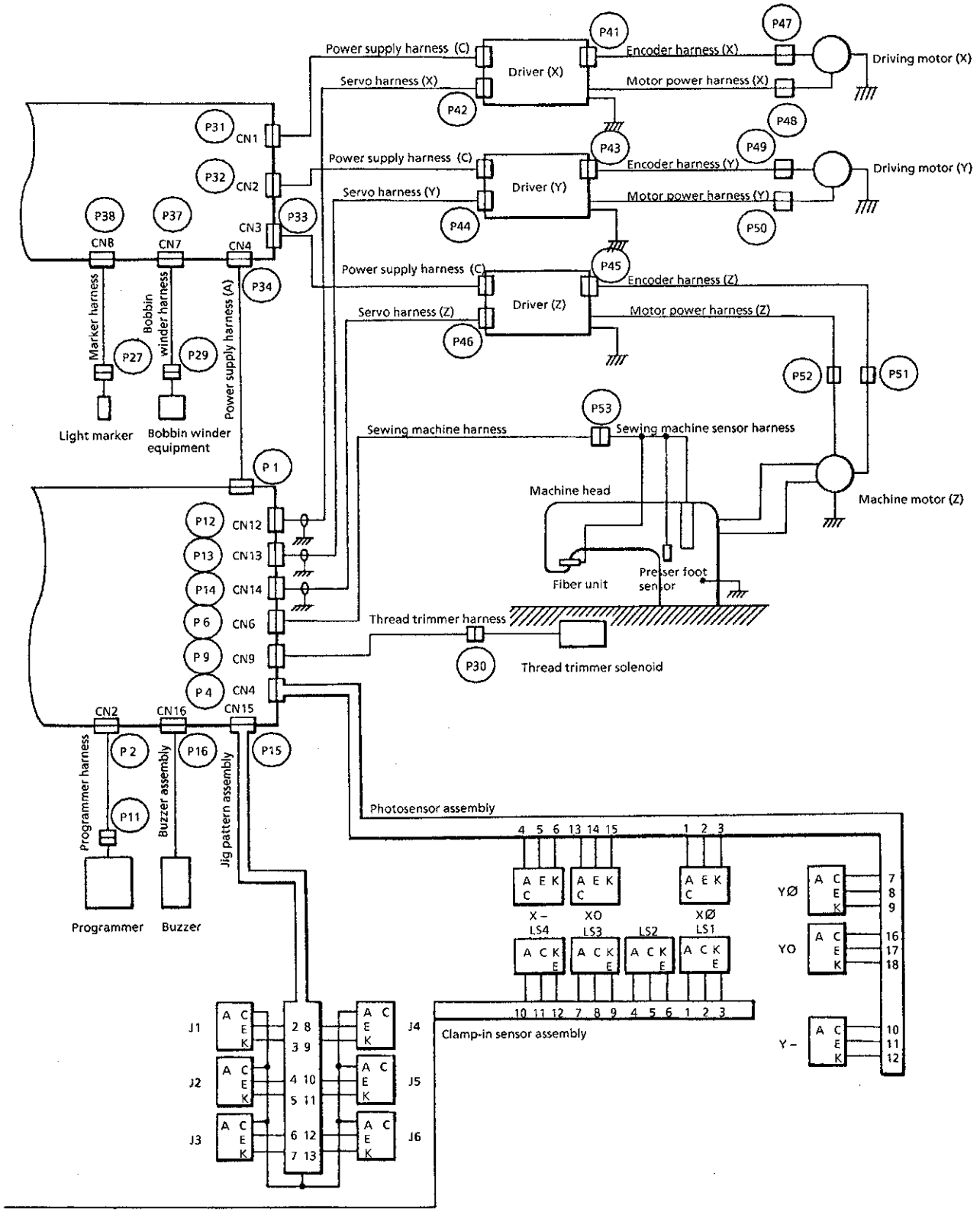
Foot switch harness 2 (specification for manual switch)

Folder PCB side	Foot switch side	Manual SW1 (left)	Manual SW2 (right)
1	—	1	—
2	—	—	2
3	3		
4	4		
5	7		
6	8		
	5		
	6		
	9		

Manual SW1 – 2 = Manual SW2 – 1
(Cross over)

11 Control block diagram




Power supply harness (C)
Servo harness (X)
Driver (X)
Encoder harness (X)
Motor power harness (X)
Driving motor (X)
Power supply harness (C)
Servo harness (Y)
Driver (Y)
Encoder harness (Y)
Motor power harness (Y)
Driving motor (Y)
Power supply harness (C)
Servo harness (Z)
Driver (Z)
Encoder harness (Z)
Motor power harness (Z)
Marker harness
Bobbin winder harness
Power supply harness (A)
Light marker
Bobbin winder equipment
Sewing machine harness
Sewing machine sensor harness
Machine head
Machine motor (Z)
Fiber unit
Presser foot sensor
Thread trimmer harness
Thread trimmer solenoid
Programmer harness
Buzzer assembly
Jig pattern assembly
Photosensor assembly
Programmer
Buzzer
Clamp-in sensor assembly

The following cases are not failures.

CASE 1 The sewing clamp does not come to the folding machine after folding has been completed.

[Measure 1] When PIECE COUNTER displays the current piece number after the EM-STOP button is pressed twice, press the FOLDER RESET button then locate the origin to move the sewing clamp.

[Measure 2] When folding has been completed, the machine stops with "U51" and the needle is not at its highest position, press the EM-STOP button to make "U51" flash.

Rotate the pulley manually to display the current piece number again, then press the START button.

When "U51" appears while programming and test sewing, be sure to press the START button.

[Measure 3] When folding has been completed, "U60" appears when data is not read.

Press the EM-STOP button to display the current piece number again. Then press the FLOPPY button to read the required program. Finally press the START button.

[Measure 4] When sewing has been completed and BOBBIN COUNTER zeros, buzzer beeps and "U50" flashes.

Reset the alarm then press the BOBBIN CHANGE button to replace the bobbin thread. After replacing, press the BOBBIN CHANGE to stop flashing of "U99". Finally press START button to make the machine come to the origin then to start sewing.

When sewing with BOBBIN COUNTER "0", reset the alarm and press the START button. BOBBIN COUNTER will not operate while sewing.

[Measure 5] In measures 1-4 above, the machine starts sewing after such procedures as pressing the START button or reading data. In other cases, any buttons except EM-STOP might not operate. This might be caused by unplugging the programmer plug when the power is ON. In this case, press the EM-STOP button and readjust from the beginning. Be sure to plug and unplug the programmer plug when the power is OFF.

CASE 2 After programming, the program is not written on a floppy disk or an error occurs.

[Measure 1] When a floppy disk is not set properly, "U72" appears.

[Measure 2] When write protection for a floppy disk is not released, "U73" appears. Cover the write protection window of the floppy disk.

[Measure 3] When a number from 64 to 99 is set as the program, "U74" appears.

[Measure 4] When "111E" is not input at a program end, a key word is not made and "U78" appears. In this case, data for needle locations from start to the current location is stored. Continue programming or, input "111E" then write the data into a floppy disk.

CASE 3 When the sewing clamp is in the folding machine area, the EM-STOP button is pressed twice to make "U80" disappear. After that, when resetting the folding machine, "U96" appears.

[Measure] When the X origin sensor is ON, "U96" appears to show that there is no problem if the sensor moves 15 mm to the right. As described in page 15, when the sewing clamp is at its shunting position, operating the procedures in CASE 3 might cause the presser foot to hit the sewing clamp, damaging the whole machine. When the sewing clamp is at the origin and is not blocked by dust, reset the alarm and the folding machine to return to the first condition.

If the machine is not reset after the correct measurement, check the items listed below.

Error code	Check point
U51	1. Sewing machine sensor harness breakage, or defective connection 2. Sewing machine harness breakage, or defective connection 3. Sensor trouble
U52	1. Sewing machine sensor harness breakage, or defective connection 2. Sewing machine harness breakage, or defective connection 3. Sensor trouble
U53	1. Jig pattern harness breakage, or defective connection 2. Sensor trouble
U70	1. FDD harness breakage, or defective connection 2. FDD power supply harness breakage, or defective connection 3. Floppy disk drive (FDD) trouble 4. Defective operation box 5. Operation box harness breakage, or defective connection
U71	1. FDD harness breakage, or defective connection 2. Defective disk 3. Defective operation box 4. Operation box harness breakage, or defective connection
U72	1. FDD harness breakage, or defective connection
U73	1. FDD harness breakage, or defective connection
U74	1. Defective operation box 2. Operation box harness breakage, or defective connection
U80	1. Defective operation box 2. Operation box harness breakage, or defective connection
U82	1. Improper setting of air switch 2. Air switch harness breakage, or defective connection 3. Air switch trouble
U83, 84, 85, 86	1. Photosensor harness breakage, or defective connection 2. Photosensor is blocked by dust. 3. Photosensor trouble
U87, 88, 89	1. Servo harness breakage, or defective connection 2. Encoder harness breakage, or defective connection 3. Motor power harness breakage, or defective connection

After checking the items listed above, if the machine has no troubles and shows the error codes, the control circuit board or the driver should be replaced.

5. FOLDING MACHINE

BASIC ADJUSTMENTS FOR DELIVERY

- There is not perfect compatibility between the folding machine and the sewing machine. A folding machine which is ordered at the same time as the sewing machine does not have to be readjusted much because the folding machine has been adjusted to the sewing machine at shipping. But a folding machine which is ordered alone needs to be readjusted when delivered because it has been adjusted to a different sewing machine at shipping.
- Never loosen the screws securing the sewing clamp (Figure 3), which is attached using a gauge.
- Adjustment is performed by loosening the screws securing the center blade assembly (Figure 1), the inner clamp assembly (Figure 2) and the folding clamp assembly (Figure 4). The adjustment procedures are described below:

1) Turn on the air, then turn on the power.
2) Attach the folding machine to the sewing machine, then lock the folding machine.
3) Set a body under the center blade (Figure 1). Using the programming equipment, perform the test operation to check that the needle will not contact the sewing clamp (Figure 3). While performing the test, never sew the body.
4) If the needle does not descend into the groove center of the sewing clamp (Figure 3), shift the programmed pattern in parallel or reprogram partially.
5) Adjust the center blade (Figure 1) so that its edge comes to the approximate groove-center of the sewing clamp (Figure 3) when the sewing clamp clamps the material at the origin.
6) The inner clamp (Figure 2) and the folding clamp (Figure 4) must be adjusted against the center blade (Figure 1).
7) Actually sew the pockets. If a problem occurs, see the following pages to adjust the parts.

Ex. Three corner (home plate) model

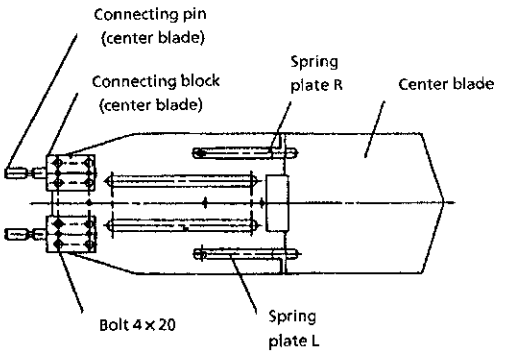


Figure 1 Center blade assembly

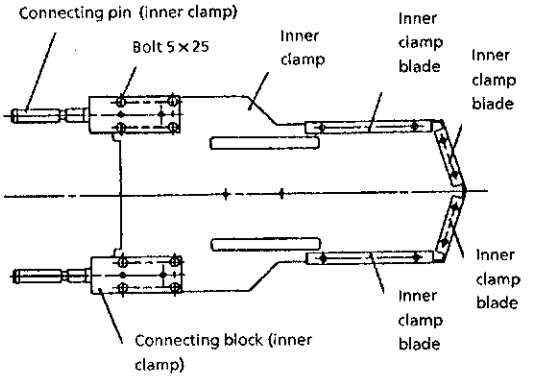


Figure 2 Inner clamp assembly

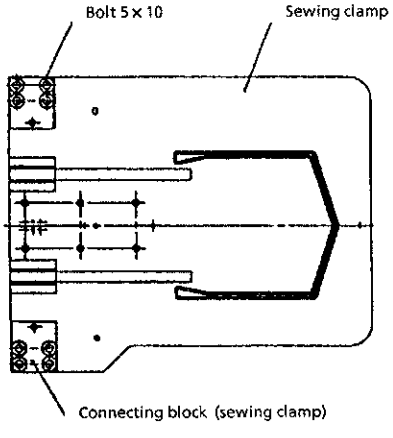


Figure 3 Sewing clamp assembly

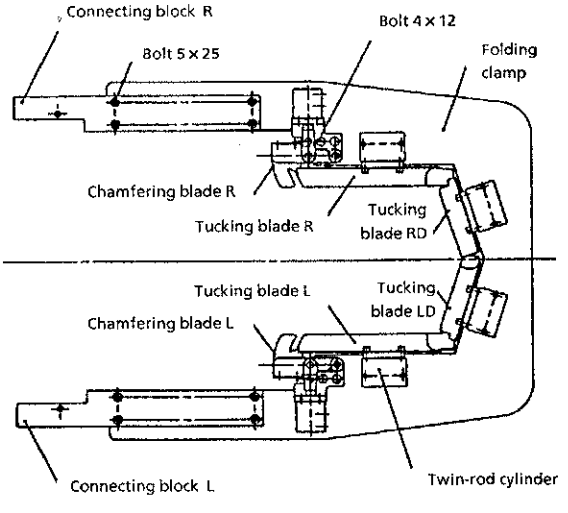
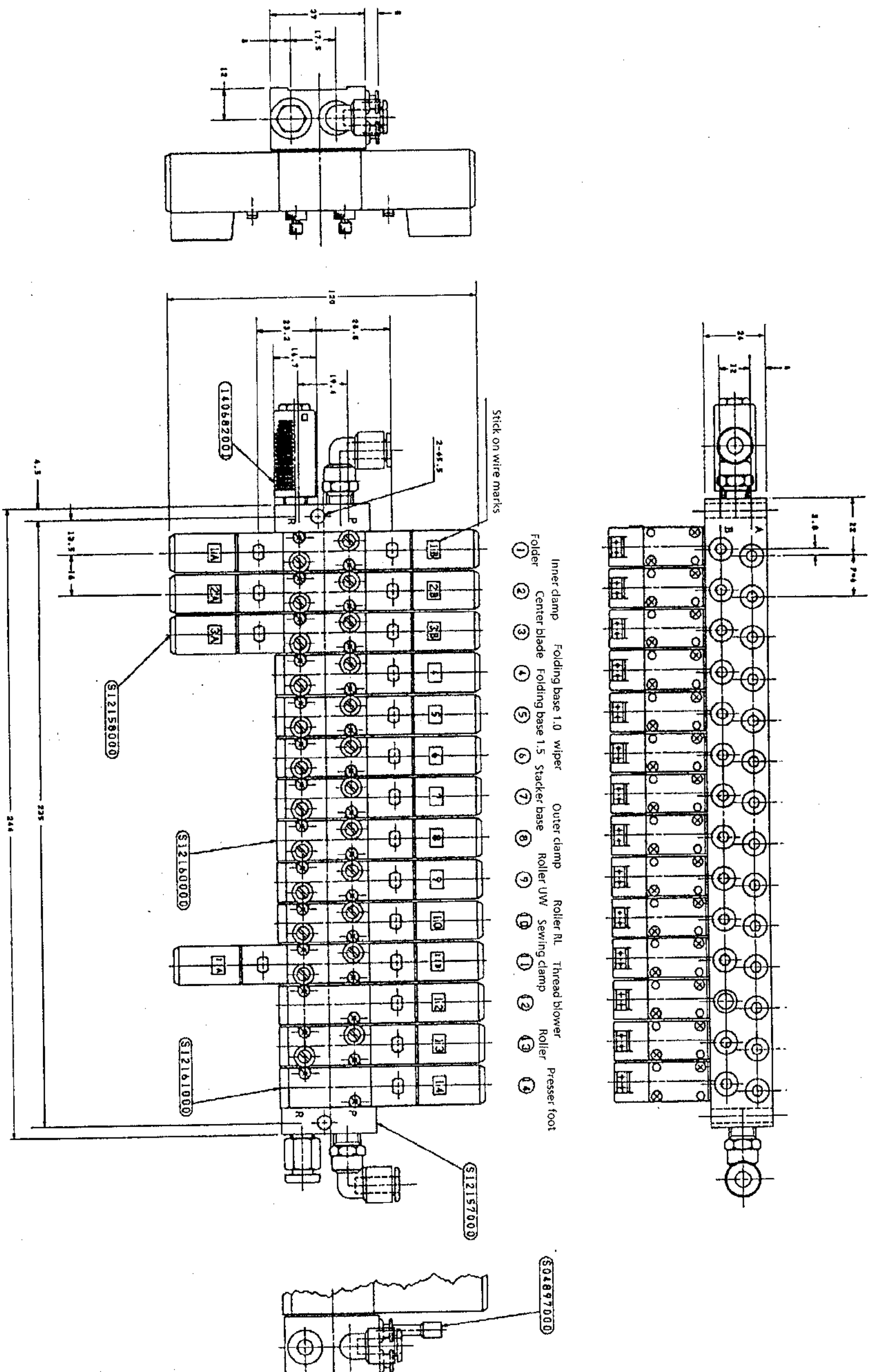
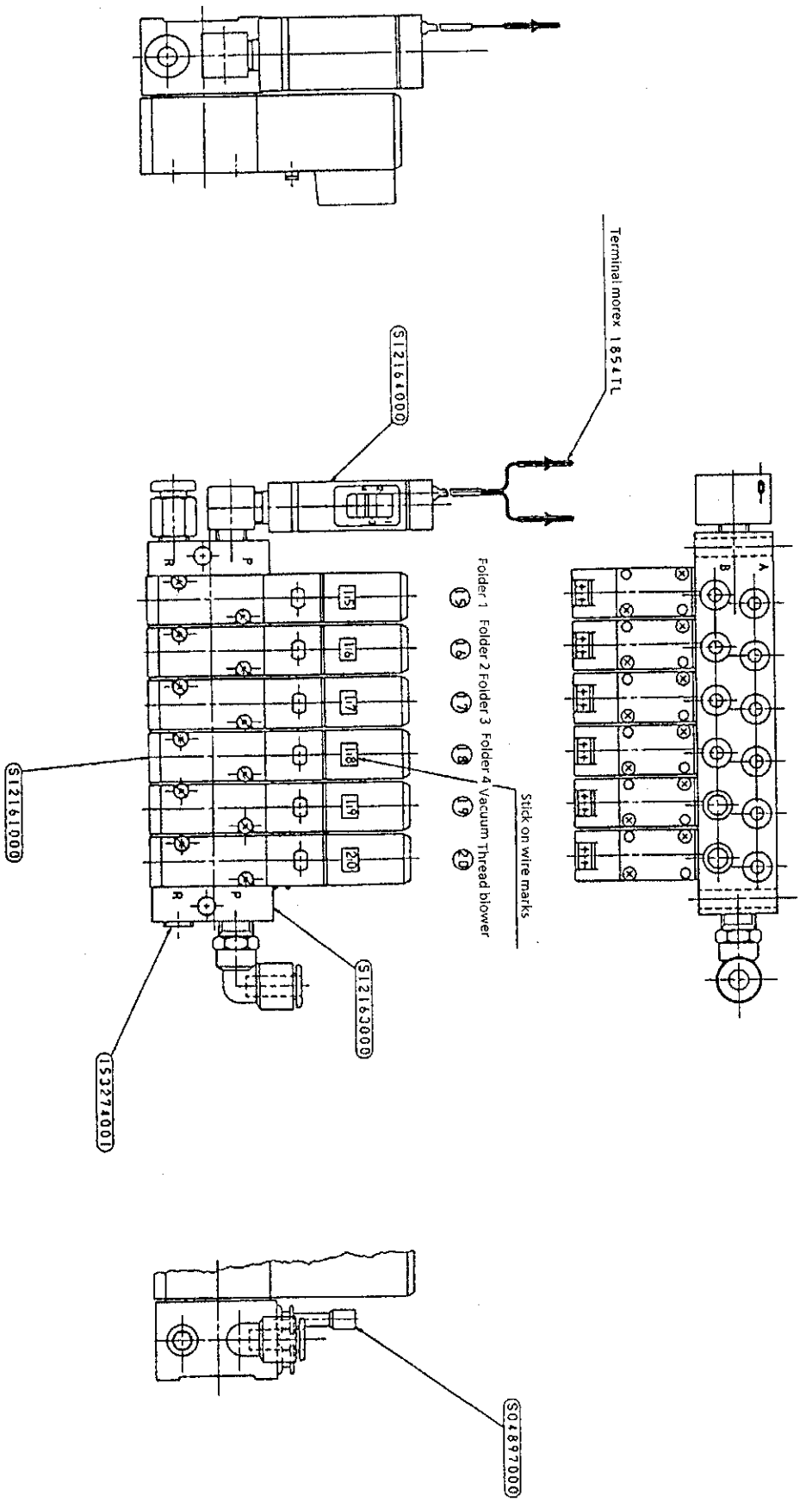


Figure 4 Folding clamp assembly



Stick on wire marks
14068200
S12158000
S12160000
S12161000
S12157000
S04897000
① Folder
② Inner clamp
③ Center blade
④ Folding base 1.0
⑤ Folding base 1.5
⑥ wiper
⑦ Stacker base
⑧ Outer clamp
⑨ Roller UW
⑩ Roller RL
⑪ Sewing clamp
⑫ Thread blower
⑬ Roller
⑭ Presser foot


Terminal morex 1854TL
S12164000
S12161000
S12163000
153274001
S04897000
Folder 1
Folder 2
Folder 3
Folder 4
Vacuum
Thread blower
Stick on wire marks

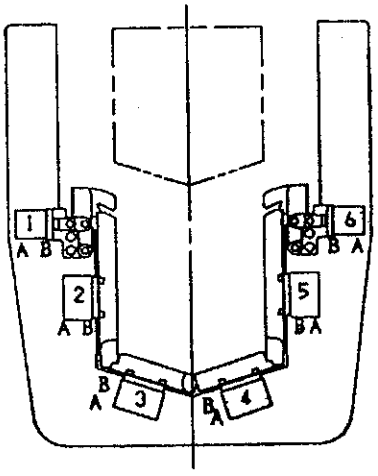
Valve operation order, multiconnector and valve connection

The valve operation order: Valves 15 to 18 turn ON in turn, and they turn OFF in reverse order.
The multiconnectors and valves connections are as follows:

Multiconnector No.		Cylinder No. – Port
1	——	15 - B
2	——	15 - A
3	——	16 - B
4	——	16 - A
9	——	17 - B
10	——	17 - A
11	——	18 - B
12	——	18 - A

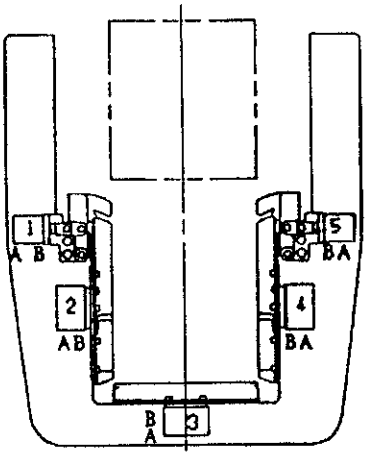
(1) Three corner (home plate) model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑥B
2	——	①A, ⑥A
3	——	④B
4	——	④A
9	——	③B
10	——	③A
11	——	②B, ⑤B
12	——	②A, ⑤A



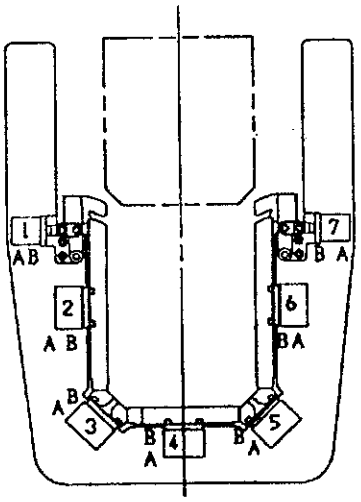
(2) Two corner (square) model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑤B
2	——	①A, ⑤A
3	——	③B
4	——	③A
9	——	②B, ④B
10	——	②A, ④A
11	——	Oil cap
12	——	Oil cap



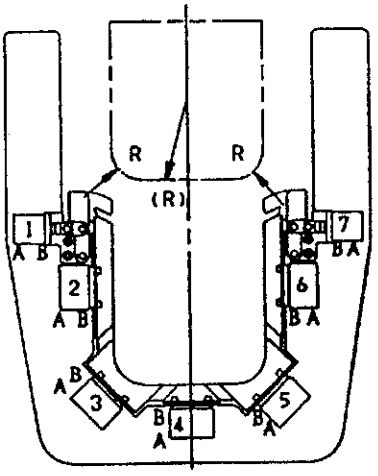
(3) Four corner model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑦B
2	——	①A, ⑦A
3	——	②B, ④B, ⑥B
4	——	②A, ④A, ⑥A
9	——	③B, ⑤B
10	——	③A, ⑤A
11	——	Oil cap
12	——	Oil cap



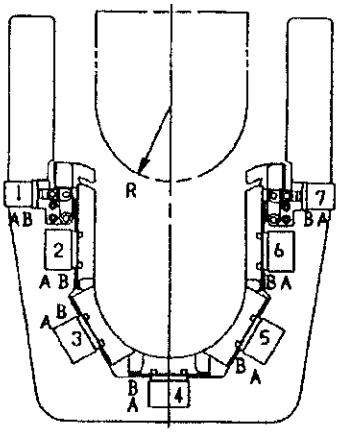
(4) Round corner model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑦B
2	——	①A, ⑦A
3	——	②B, ④B, ⑥B
4	——	②A, ④A, ⑥A
9	——	③B, ⑤B
10	——	③A, ⑤A
11	——	Oil cap
12	——	Oil cap



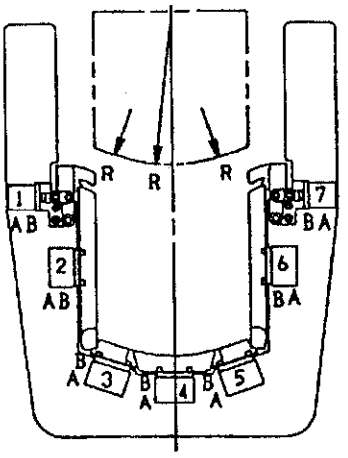
(5) Ship bottom (one arc) model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑦B
2	——	①A, ⑦A
3	——	②B, ④B, ⑥B
4	——	②A, ④A, ⑥A
9	——	③B, ⑤B
10	——	③A, ⑤A
11	——	Oil cap
12	——	Oil cap



(6) Ship bottom (three arcs) model

Multiconnector No.		Cylinder No. – Port
1	——	①B, ⑦B
2	——	①A, ⑦A
3	——	④B
4	——	④A
9	——	③B, ⑤B
10	——	③A, ⑤A
11	——	②B, ⑥B
12	——	②A, ⑥A

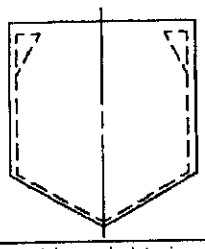
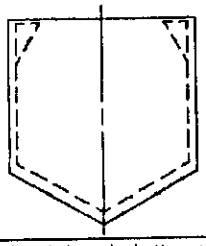
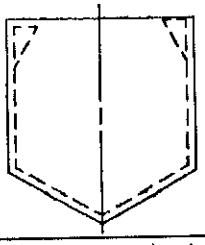
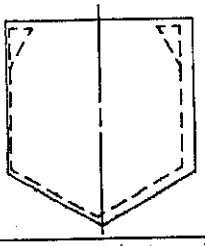
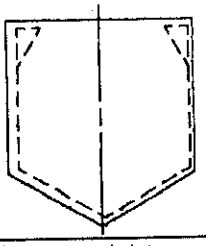
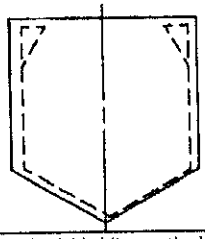
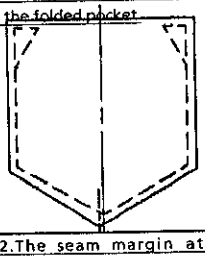
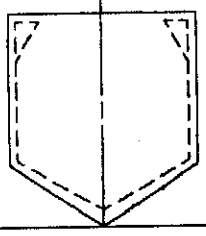
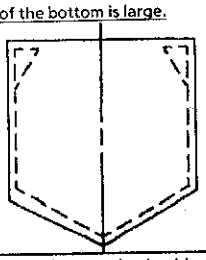
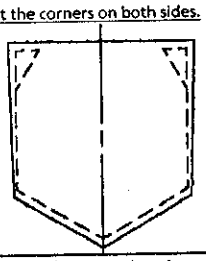
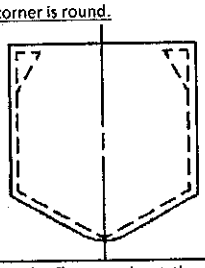
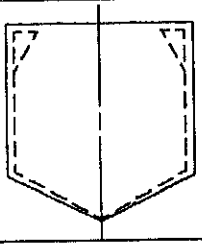
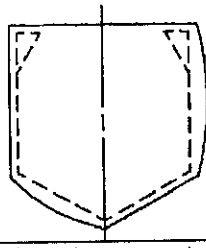
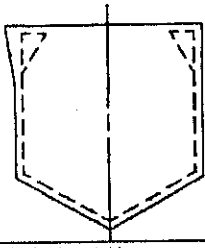
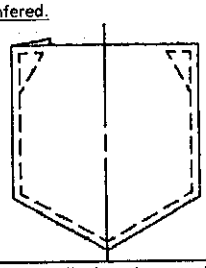
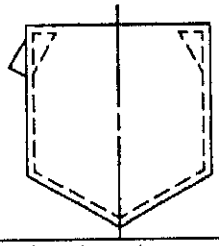
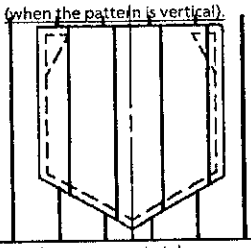
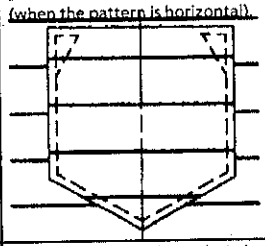
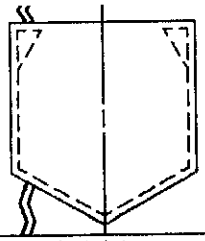
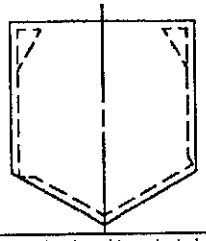
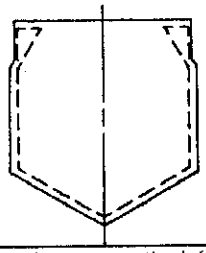
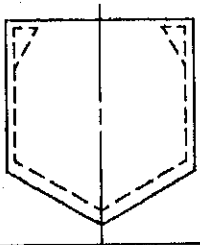
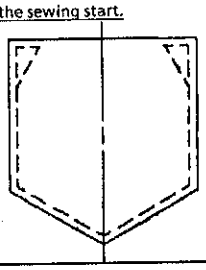
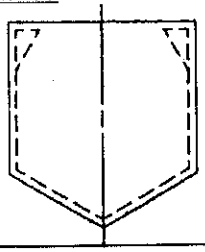
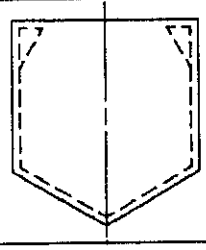
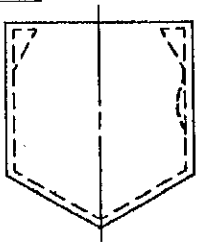
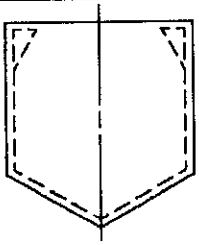
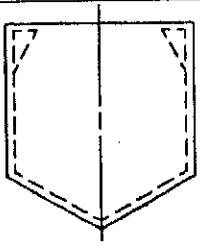
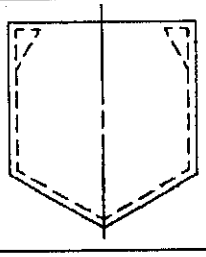
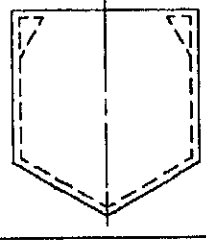


ADJUSTMENT

Troubles are described in the following pages. Actually, some of the troubles may happen simultaneously. Solve the biggest one first.

Reprogramming must be done only when the folder adjustment is not enough to solve the troubles.

1 Trouble shooting

1.Seam deviates down in parallel. 	2.Seam deviates up in parallel (reverse case of 1.). 	3.The seam margin at the pocket top is different. 	4.Seam deviates to the left in parallel. 	5.Seam deviates to the right in parallel. 
6.Partial seam deviates in parallel. 	7.The stitch at the bottom corner is not aligned with the center line of the folded pocket. 	8. The seam margin at the bottom is large. 	9. The seam margin at one side of the bottom is large. 	10. The seam margin is too small at the corners on both sides. 
11.The folded line at the bottom corner is round. 	12.The seam margin at the bottom is too small. 	13.The pocket outline is curved. 	14.The pocket opening is wide. 	15.The pocket opening is not chamfered. 
16.The flap margin at the pocket opening is out of the pocket. 	17.The pocket pattern is not aligned with the body pattern (when the pattern is vertical). 	18.The pocket pattern is not aligned with the body pattern (when the pattern is horizontal). 	19.The body wrinkles. 	20.The needle location at the corners is improper. 
21.The pocket top is narrow. 	22.The seam margin is large. 	23.The pocket has skipped stitches at the sewing start. 	24.The stitch pitch is uneven at the corners. 	25.The pocket has skipped stitches or thread breakage at the pocket top. 
26.The seam on the left side winds. 	27.The seam margin is large. (Thick material) 	28 	29 	30 

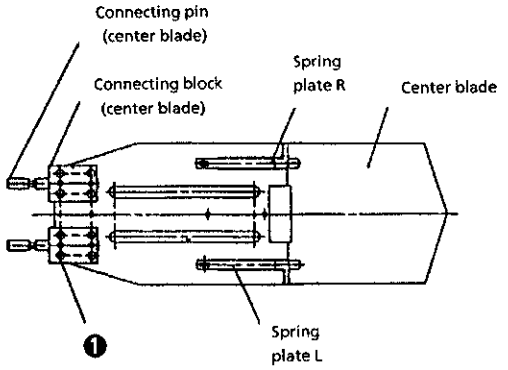
1. Seam deviates down in parallel.

Cause

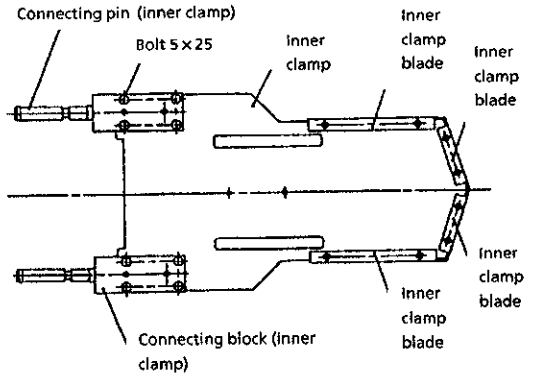
1) The pocket material is improperly folded because the center blade is attached above the correct position.

◦ After loosening the eight bolts ❶, shift the center blade forward in the loose holes of the connecting blocks (center blade) then fasten the bolts ❶.
At this time, the inner clamp assembly and the folding clamp assembly might need to be shifted forward simultaneously.

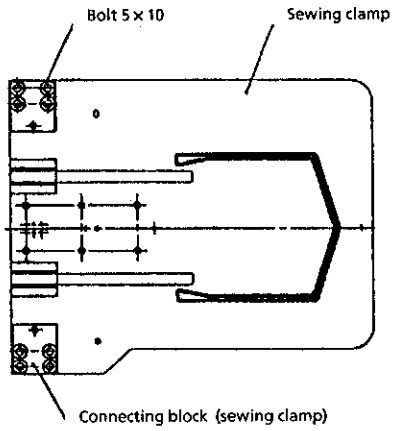
Center blade assembly



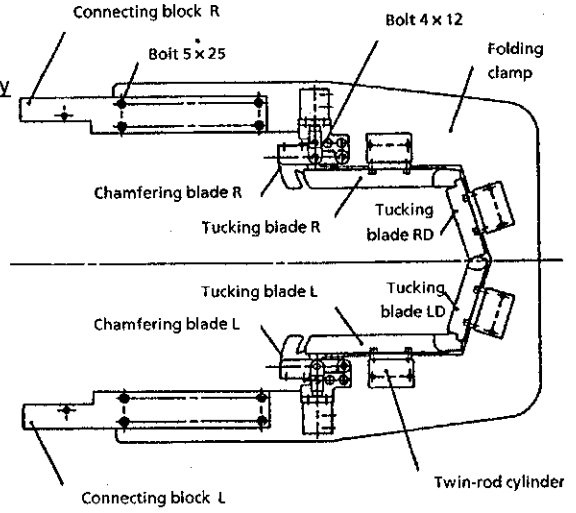
Inner clamp assembly



Sewing clamp assembly



Folding clamp assembly

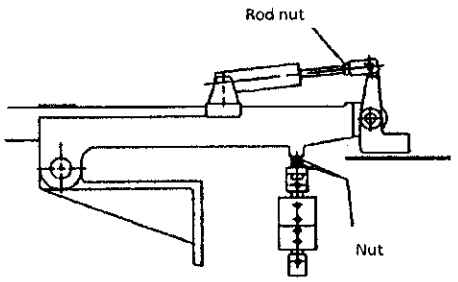


2) The pocket material or body strays when the center blade retracts from the pocket.

a) The center blade has burrs.

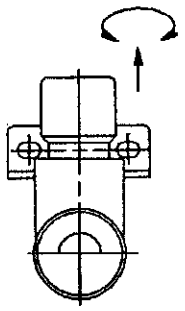
◦ Buff the top and bottom surfaces and the all edges.

b) When the power is OFF, the gap between the center blade bottom surface and the needle plate top surface is not proper. The small gap moves the pocket material and the body simultaneously; the big one makes only the pocket material stray upward.



◦ Remove the table (L) and the face cover on the left. As shown in the figure on the left, loosen the four nuts on both sides, then adjust the center blade height by rotating the four bolts. One rotation raises or lowers the inner clamp lever by 1.25 mm, and raises or lowers the center blade by 2-3 mm. Adjust the center blade height so that it lightly presses the body when the center blade is at its lowest position.

c) The sewing clamp assembly lightly presses the folded pocket, or descends slowly.



◦ Remove the face cover on the left. Set the pressure of the sewing clamp assembly to 0.5-1 kg/cm^2 by adjusting the regulator in the figure on the left; excessively high pressure might make the material stray while the material is sewn or carried. Be sure to check that the pressure is proper by pressing the valves ⑪ A and B mutually by hand.

◦ When the sewing clamp assembly descends slowly, adjust the speed control of the valve ⑪ B. If the assembly descends too early, the pocket material might be improperly folded in the flap margins.

d) The sponge attached underneath the sewing clamp assembly near the operator is improperly stuck.

3) The spring plates (R) and (L) in the center blade assembly and the inner clamp blades in the inner clamp assembly are improperly attached.

4) Program defect

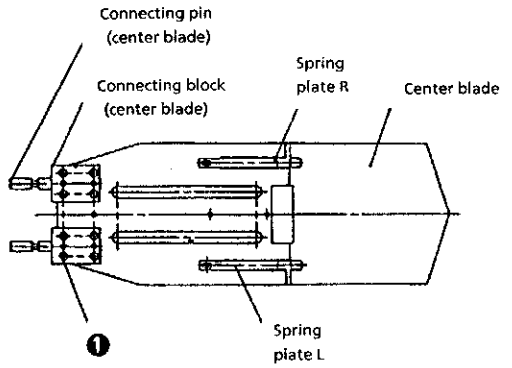
◦ Reprogram to shift the programmed pattern in parallel when the seam deviation is small.

2. Seam deviates up in parallel (reverse case of 1).

Cause

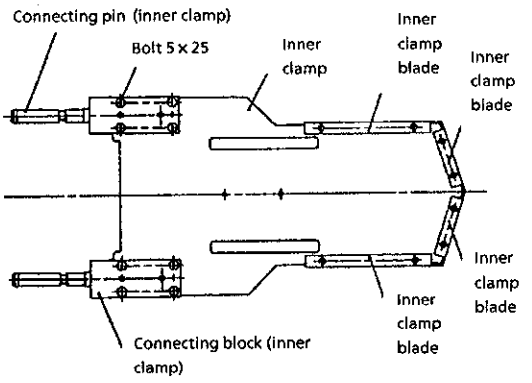
1) The pocket material is improperly folded because the center blade is attached below the correct position.

Center blade assembly

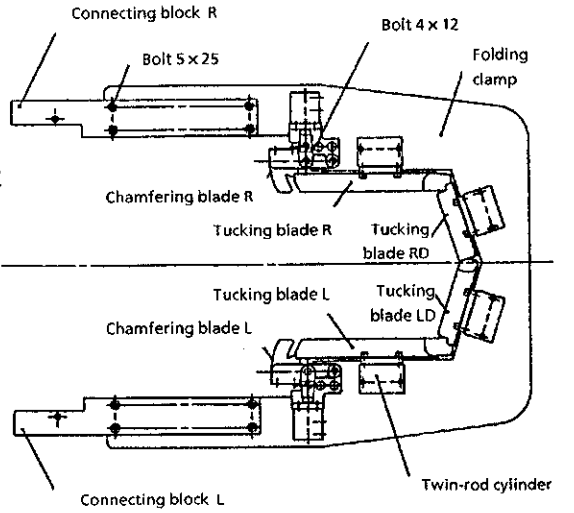


◦ After loosening the eight bolts ❶, shift the center blade backward in the loose holes of the connecting blocks (center blade), then fasten the bolts ❶.
At this time, the inner clamp assembly and the folding clamp assembly might need to be shifted backward simultaneously.

Inner clamp assembly



Folding clamp assembly



2) The spring plates (R) and (L) in the center blade and the inner clamp blades in the inner clamp assembly are improperly attached.

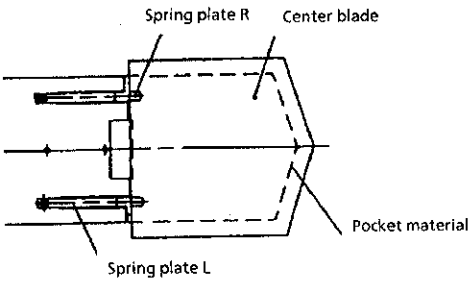
3) Program defect

◦ Reprogram to shift the programmed pattern in parallel when the seam deviation is small.

3. The seam margin at the pocket top is different.

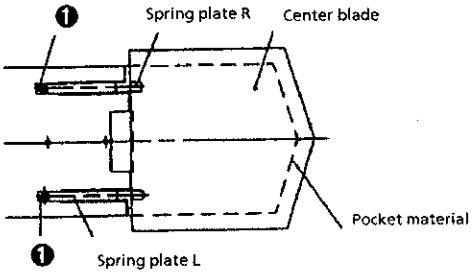
Cause

1) The pocket material is improperly set.



◦ Set the pocket material correctly to the spring plates (R) and (L).

2) The spring plates (R) and (L) are improperly adjusted.



◦ Adjust the spring plates' positions by loosening their two screws ❶. At this time, the spring plates must be centered in the grooves of the center blade.

3) The pressure of the spring plates (R) and (L) is too high.

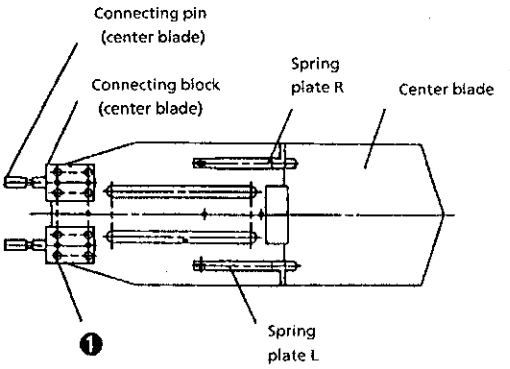
◦ Bend the spring plates upward to decrease the spring pressure.

4. Seam deviates to the left in parallel.

Cause

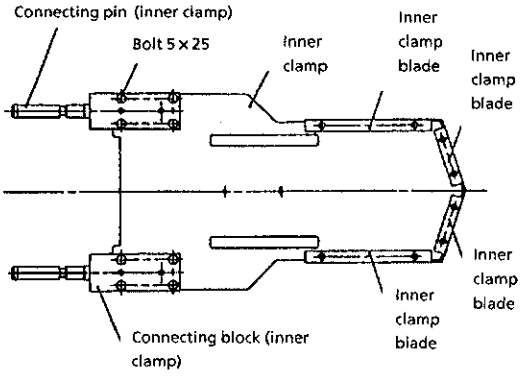
1) The pocket material is improperly folded because the center blade is attached to the right of the correct position.

Center blade assembly

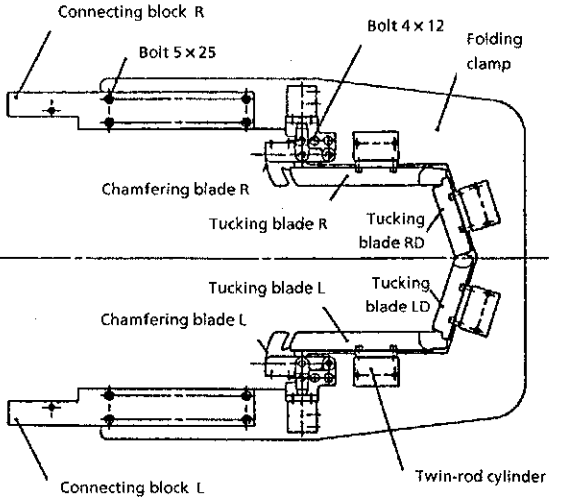


◦ After loosening the eight bolts ❶, shift the center blade to the left in the loose holes of the connecting blocks (center blade), then fasten the bolts ❶. At this time, the inner clamp assembly and the folding clamp assembly might need to be shifted to the left simultanenously.

Inner clamp assembly



Folding clamp assembly



2) Program defect

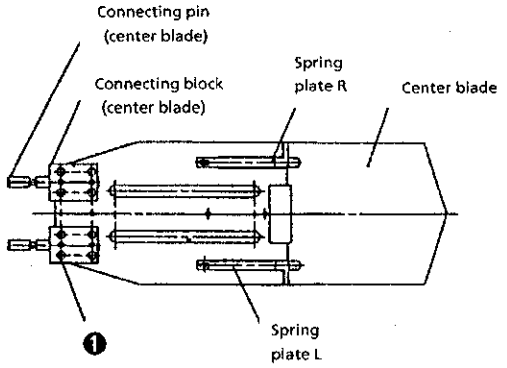
◦ Reprogram to shift the programmed pattern in parallel when the seam deviation is small.

5. Seam deviates to the right in parallel.

Cause

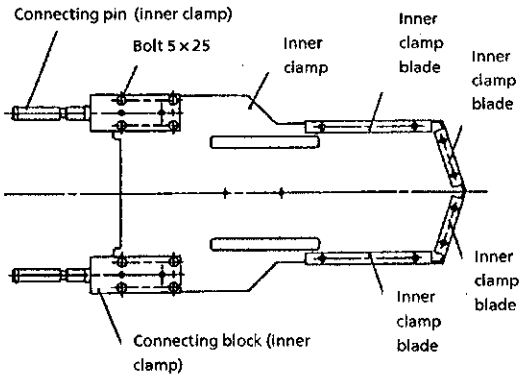
1) The pocket material is improperly folded because the center blade is attached to the right of the correct position.

Center blade assembly

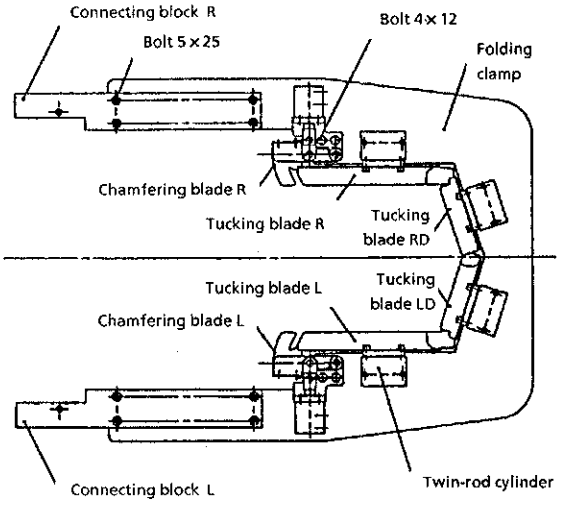


◦ After loosening the eight bolts ❶, shift the center blade to the right in the loose holes of the connecting blocks (center blade), then fasten the bolts ❶.
At this time, the inner clamp assembly and the folding clamp assembly might need to be shifted to the right simultanenously.

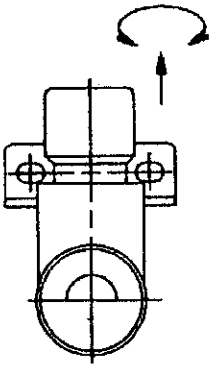
Inner clamp assembly



Folding clamp assembly



2) The body strays to the left while the sewing clamp assembly is moving.



◦ If the needle plate has burrs, remove the burrs and buff the needle plate. Level the steps on both sides of the needle groove of the needle plate.
◦ Adjust the pressure of the sewing clamp assembly. Remove the face cover on the left. Set the pressure of the sewing clamp assembly to 0.5-1 kg/cm^2 by adjusting the regulator in figure on the left. Be sure to check that the pressure is proper by pressing the valves ⑪ A and B mutually by hand.

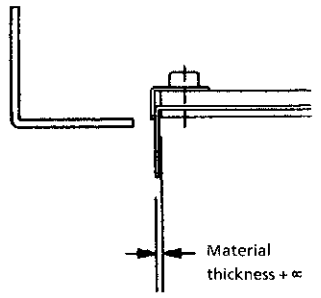
3) Program defect

◦ Reprogram to shift the programmed pattern in parallel when the seam deviation is small.

6. Partial seam deviates in parallel.

Cause

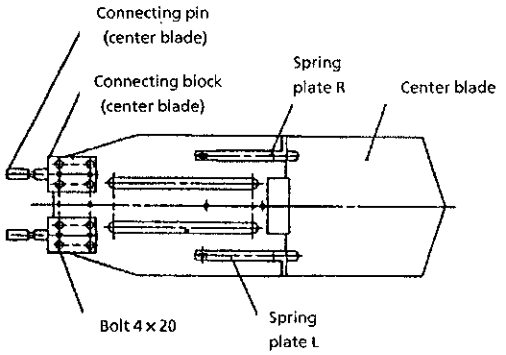
1) The inner clamp blades are improperly attached.



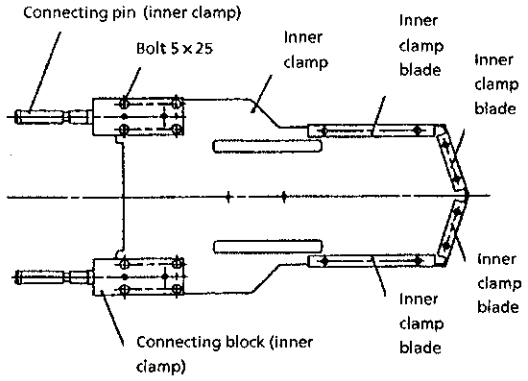
(1) The seam margin is large.
This happens when the gap between the center blade edge and the inner clamp blades is too small or too large, or when the inner clamp blades strike the center blade. Adjust the gap width to the pocket material thickness + ∝, as shown in the figure on the left.

(2) The seam margin is small.
Increase the gap between the center blade edge and the inner clamp blades.

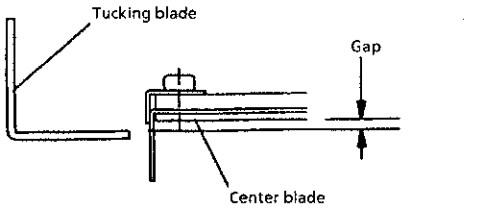
Center blade assembly



Inner clamp assembly



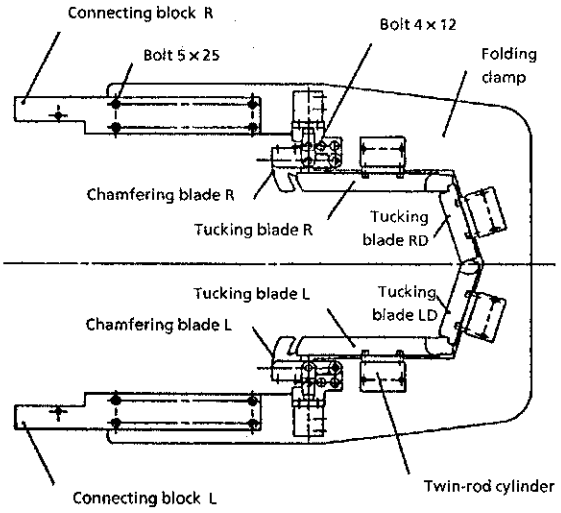
2) The gap between the tucking blades (R), (L), (RD) and (LD) of the folding clamp assembly and the center blade is improperly adjusted.



(1) The seam margin is large.
Reduce the gap between the tucking blades and the center blade.
At this time, be sure not to move the tucking blades back and forth or side to side.

(2) The seam margin is small.
Enlarge the gap between the tucking blades and the center blade.
At this time, be sure not to move the tucking blades back and forth or side to side.

Folding clamp assembly

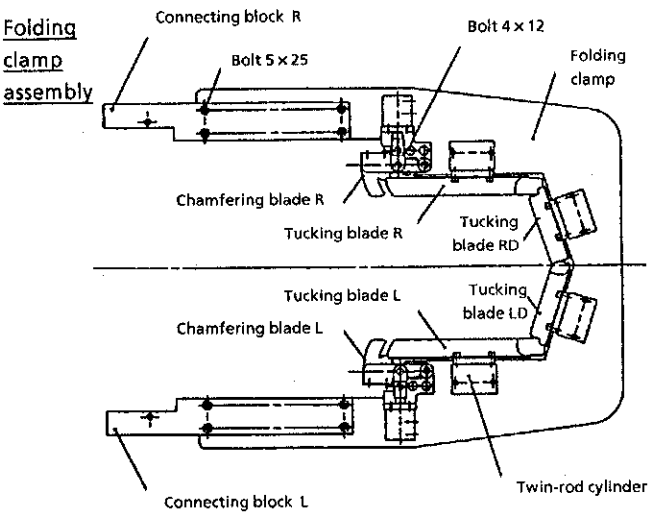


3) The tucking blades (R), (L), (RD) and (LD) have burrs.

◦ Remove the burrs and buff the tucking blades.

4) Because the tucking blades (R), (L), (RD) and (LD) are attached below the correct position, the pocket material strays with the body when the tucking blades retract.

◦ Raise and reattach the tucking blades. Be sure not to move the tucking blades back and forth or side to side.



5) Because the gap between the center blade and the needle plate is small, the pocket material strays with the body when the tucking blades (R), (L), (RD) and (LD) retract.

◦ Refer to "Trouble 14. Cause 4)".

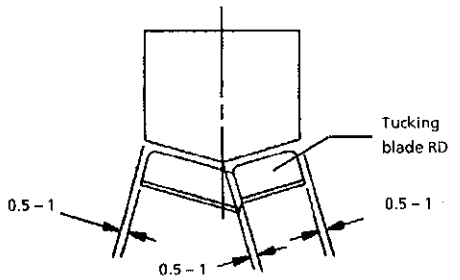
6) Program defect

◦ Reprogram partially.

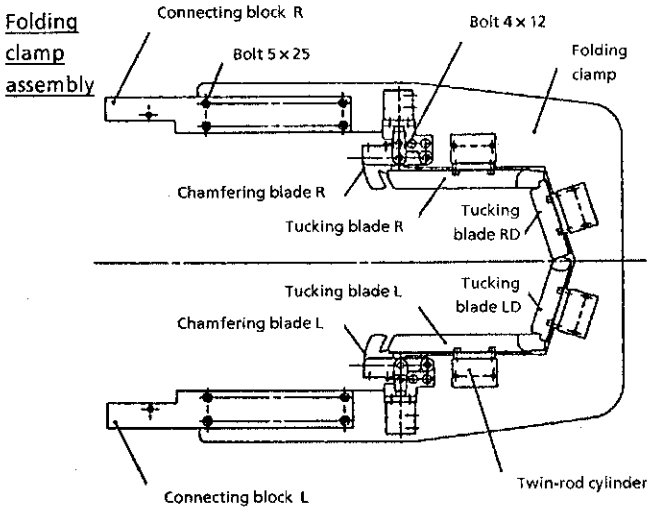
7. The stitch at the bottom corner is not aligned with the center line of the folded pocket.

Cause

1) The left edge of the tucking blade (RD) is off to the left.



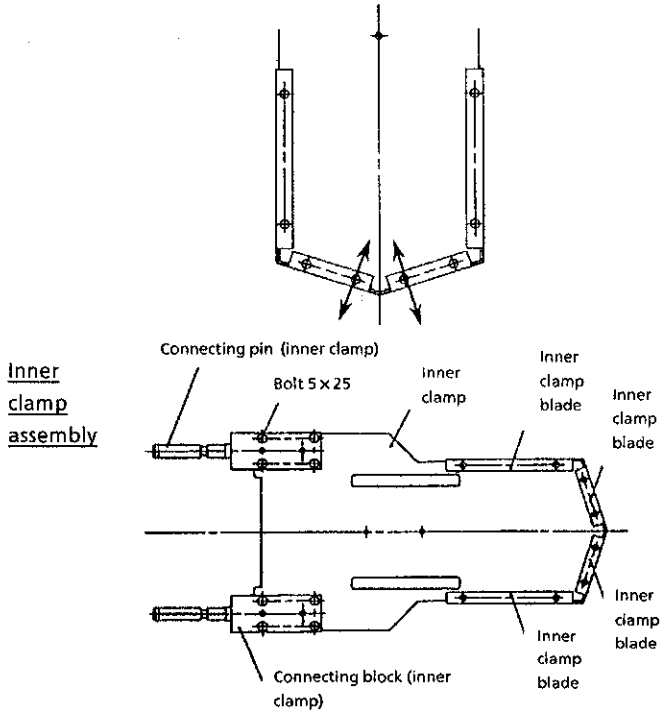
◦ Set the gap between the center blade top and the tucking blade (RD) left edge to 0.5-1 mm, as shown in the figure on the left.



2) The right edge of the tucking blade (LD) has burrs.

◦ Remove the burrs and buff the tucking blade (LD).

3) The inner clamp blades are improperly adjusted.



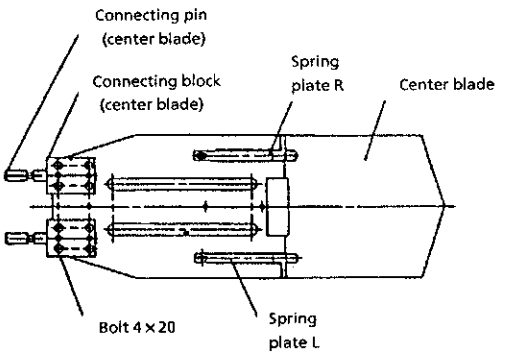
◦ Loosen the screws of the inner clamp blades, then adjust the two inner clamp blades, as shown in the figure on the left.

4) Program defect

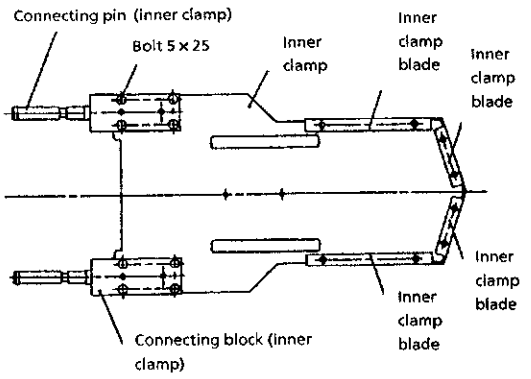
◦ Reprogram partially.

8. The seam margin at the bottom is large.

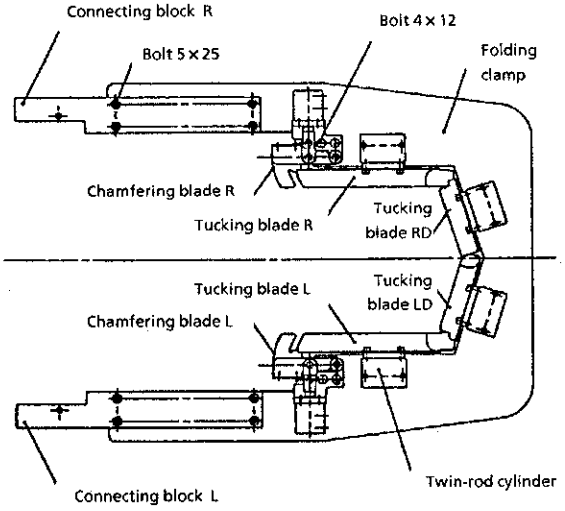
Center blade assembly



Inner clamp assembly

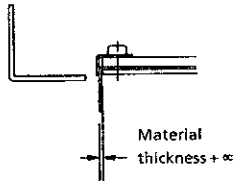


Folding clamp assembly



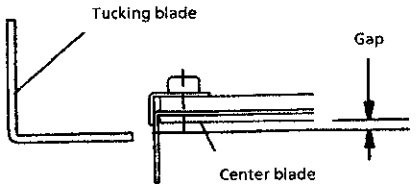
Cause

1) The inner clamp blades are improperly adjusted.



- After loosening the inner clamp blade attaching screws, adjust the gap between the center blade edge and the inner clamp blades. In case the gap is large, refer to "Trouble 6. Cause 1)".

2) The tucking blades (LD) and (RD) are improperly adjusted.



- Adjust the gap between the tucking blades and the center bottom surface.
  At this time, be sure not to slide the tucking blades side to side. A large gap increases the seam margin at the bottom, a small gap decreases the seam margin at the bottom.

3) The tucking blades (LD) and (RD) have burrs at the place corresponding to the pocket trouble.

- Remove the burrs and buff. At this time, be sure not to slide the tucking blades side to side.

4) There is no gap between the tucking blade (LD) and (RD).

- Adjust the gap so that it is about the same thickness as a piece of pocket material.

5) The gap between the tucking blade (LD) in the folding clamp assembly and the center blade is improperly adjusted.

- Refer to "Trouble 6. Cause 2)".

6) Program defect

- Reprogram partially.

9. The seam margin at eight side of the bottom is large.

Cause

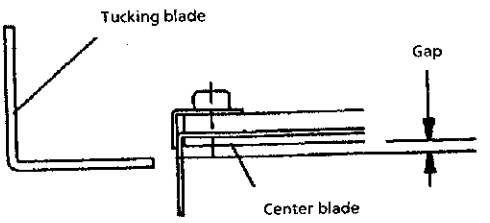
1) The inner clamp blades are improperly adjusted.

◦ Refer to "Trouble 6. Cause 1)".

2) The tucking blade (LD) or (RD) has burrs at the place corresponding to the pocket trouble.

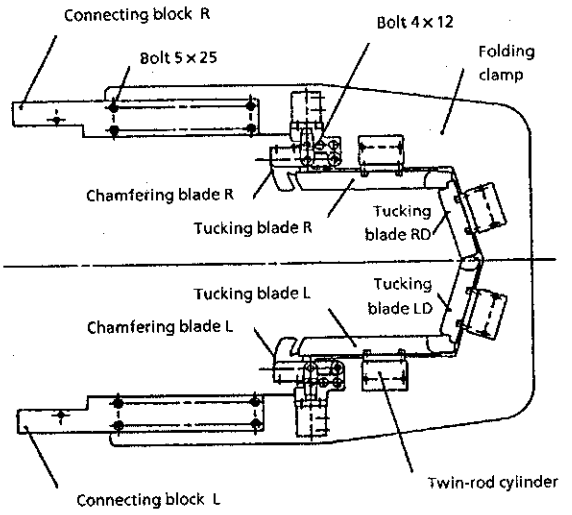
◦ Remove the burrs and buff. At this time, be sure not slide the tucking blade side to side.

3) The gap between the tucking blade (LD) and the center blade is improperly adjusted.



◦ Because a large gap increases the seam margin, loosen the two screws to reduce the gap.
At this time, be sure not to slide the tucking blade (LD) side to side.

Folding clamp assembly



4) Program defect

◦ Reprogram partially.

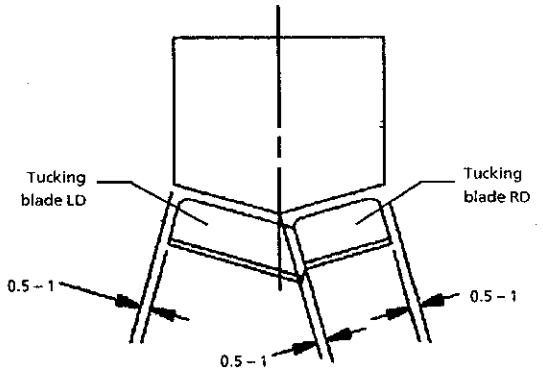
10. The seam margin is too small at the corners on both sides.

Cause

1) The inner clamp blades are improperly adjusted.

◦ Refer to "Trouble 6. Cause 1)".

2) The tucking blades (LD) and (RD) are improperly adjusted.



◦ Shift the tucking blade (LD) slightly to the left to increase the seam margin on the left side. Shift the tucking blade (RD) slightly to the right.

3) The gap between the tucking blades (R) and (L) and the center blade is improperly adjusted.

◦ Refer to "Trouble 6. Cause 2)".

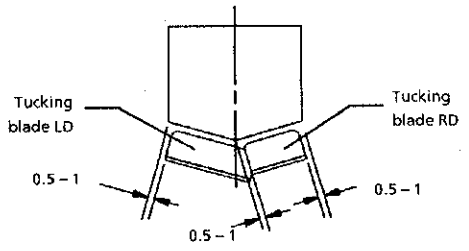
4) Program defect

◦ Reprogram partially.

11. The folded line at the bottom corner is round.

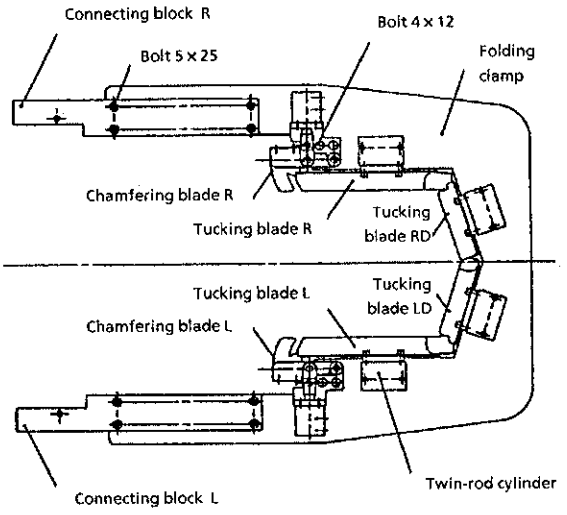
Cause

1) The inner clamp blades (LD) and (RD) are improperly adjusted.



◦ If this is caused by the tucking blade (RD) being off to the left, refer to "Trouble 7. Cause 1)".

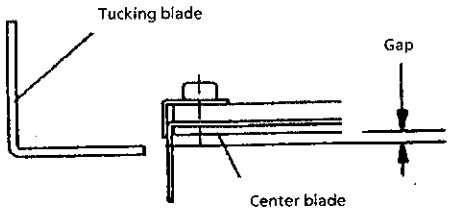
Folding clamp assembly



2) There is no gap between the tucking blade (LD) and (RD).

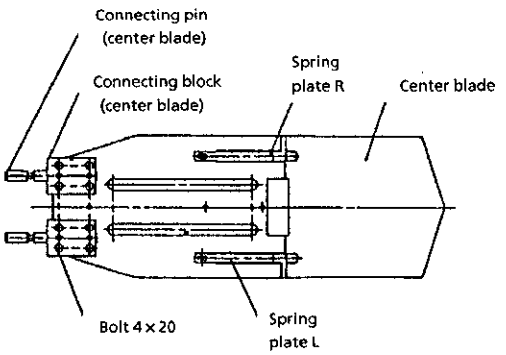
◦ Adjust the gap so that it is about the same thickness as a piece of pocket material.

3) The gap between the tucking blades (LD) and (RD) and the center blade is improperly adjusted.



◦ The pocket material is chafed because the gap between the tucking blades and the center blade might not be large enough. Adjust the gaps between each of them to the pocket material thickness + ∝.

Center blade assembly



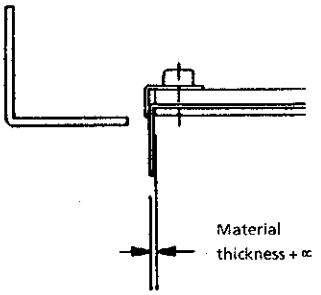
4) The center blade corner is broken.

◦ The broken center blade might need to be replaced.

12. The seam margin at the bottom is too small.

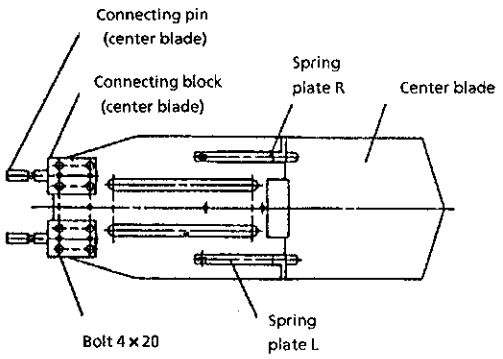
Cause

1) The inner clamp blades are improperly adjusted.

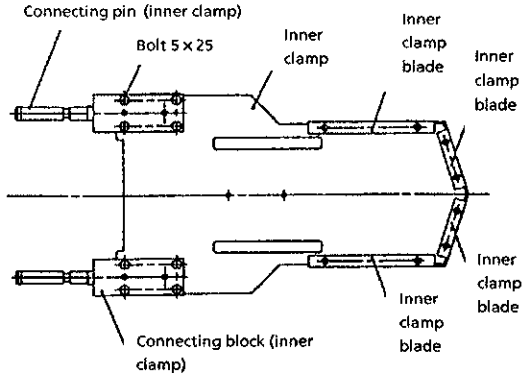


◦ Slightly enlarge the gap between the center blade edge and the inner clamp blades at the place corresponding to the pocket trouble. The gap should be the material thickness + ∝.

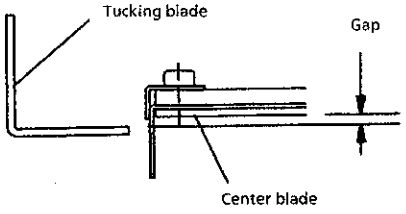
Center blade assembly



Inner clamp assembly

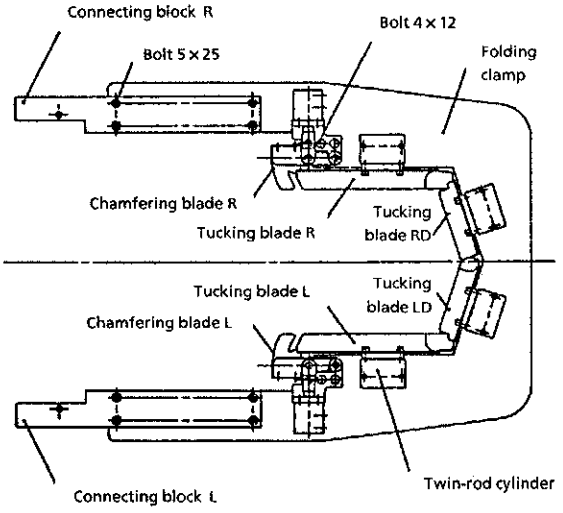


2) The gap between the tucking blade (RD) and (LD) is improperly adjusted.



◦ Slightly enlarge the gap between these tucking blades and the center blade at the place corresponding to the pocket trouble.
At the time, be sure not to move the tucking blades back and forth.

Folding clamp assembly



3) Program defect

◦ Reprogram partially.

13. The pocket outline is curved.

Cause

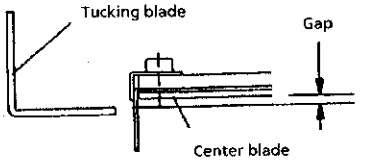
1) The flap margin is small.

◦ Make the flap margin at least 8 mm.

2) The tucking blades have burrs.

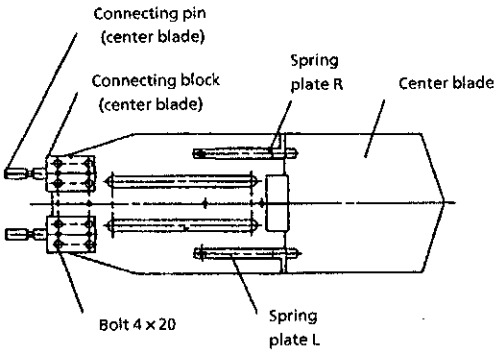
◦ Remove the burrs and buff the tucking blades.

3) The gap between the tucking blades of the folding clamp assembly and the center blade is improperly adjusted.

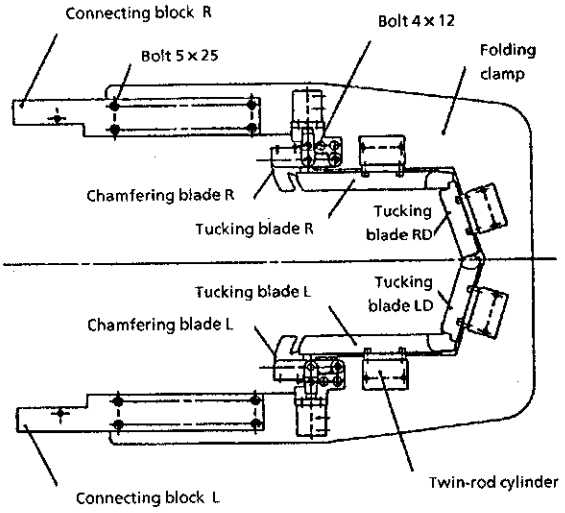


◦ Reduce the gap. At this time, be sure not to move the tucking blades back and forth or side to side.

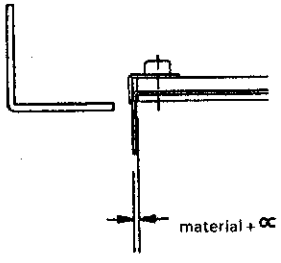
Center blade assembly



Folding clamp assembly

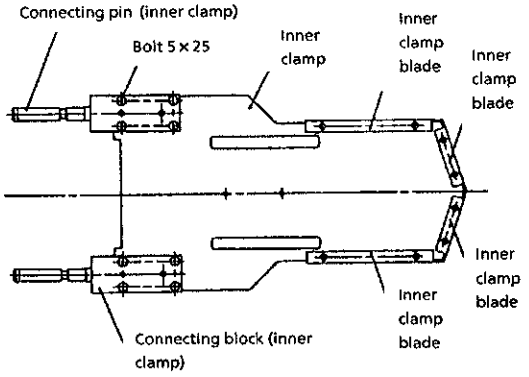


4) The inner clamp blades are improperly attached.

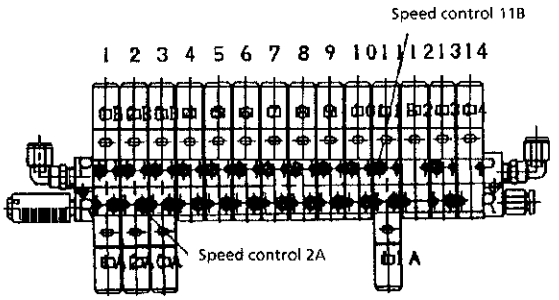


◦ This happens when the gap between the center blade edge and the inner clamp blades is too small or too large, or when the inner clamp blades strike the center blade. Set the gap width to the pocket material thickness + α, as shown in the figure on the left.

Inner clamp assembly

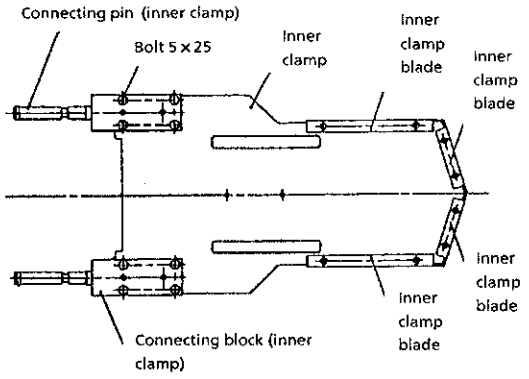


5) When the inner clamp assembly descends quickly, or excessively high pressure is applied to the pocket, or the material is fine, the outline is curved because the air is pressed out to the side of the pocket.

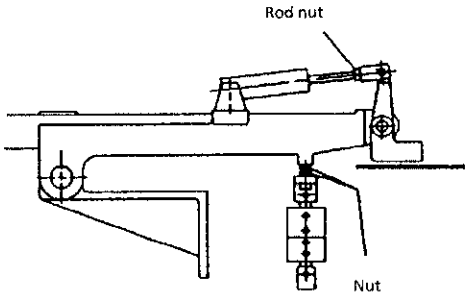


◦ To adjust the inner clamp descending speed, remove the face cover on the left, then rotate clockwise the speed control of the valve ⑪ B. The too slow speed results in "Trouble 1". To decrease the pressure, refer to "Trouble 1. Cause 2) of c)".

Inner clamp assembly

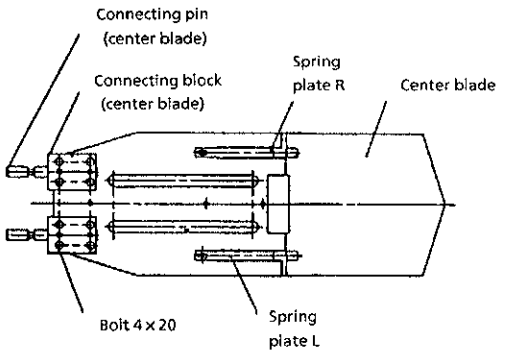


6) When the center blade is at its lowest position, the folded part of the pocket gradually returns to its original position while waiting because of the big gap between the center blade and the needle plate.



◦ Remove the table (L) and the face cover on the left. As shown in the figure on the left, loosen the four nuts on both sides, then adjust the center blade height by rotating the four bolts. One rotation raises or lowers the inner clamp lever by 1.25 mm, and raises or lowers the center blade by 2-3 mm. Adjust the center blade height so that it lightly presses the body when the center blade is at its lowest position.

Center blade assembly



7) Program defect

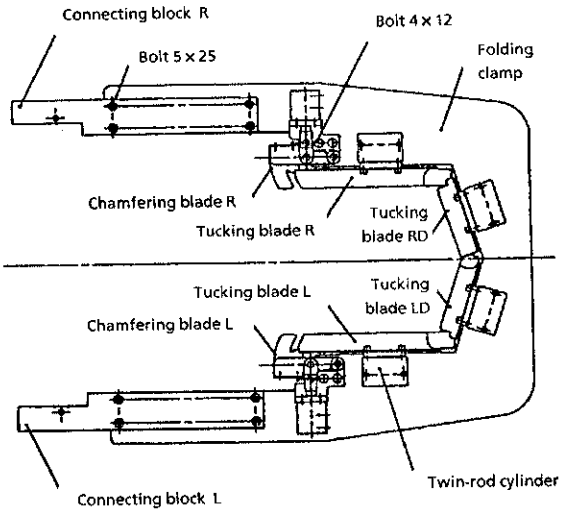
◦ If the trouble is not solved by the adjustments above, reprogram partially.

14. The pocket opening is wide.

Cause

1) When the chamfering blades are attached below the correct position, the body and the pocket stray when the chamfering blades retract.

Folding clamp assembly



◦ Move upward and reattach the chamfering blades. At this time, set the gap between these chamfering blades and the tucking blade (L) to about the material thickness.

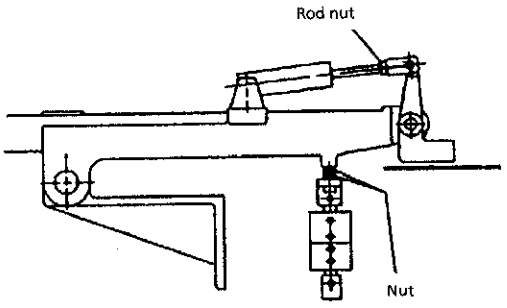
2) When the chamfering blades are attached above the correct position, the body does not stray but the pocket strays.

◦ Slightly lower the chamfering blades and the pocket opening part of the tucking blade (L). Be sure not to lower them too much , which results in "Cause 1)".

3) The tucking blade (L) has burrs.

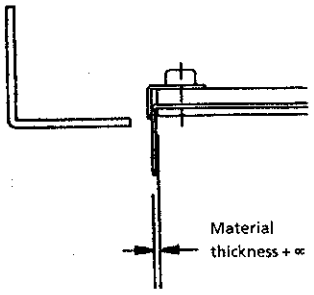
◦ Remove the burrs and buff the tucking blade.

4) The gap between the center blade and the needle plate is small.



◦ Remove the table (L) and the face cover on the left. As shown in the figure on the left, loosen the four nuts on both sides, then adjust the center blade height by rotating the four bolts. One rotation raises or lowers the inner clamp lever by 1.25 mm, and raises or lowers the center blade by 2-3 mm. Adjust the center blade height so that it lightly presses the body when the center blade is at its lowest position.

5) The inner blades are improperly adjusted.



◦ This is caused by the gap between the center blade edge and the inner clamp blades' being too large or too small, or when the inner clamp blades strike the center blade. Set the gap width to the pocket material thickness + ∝, as shown in the figure on the left.

6) Program defect

◦ Reprogram partially.

15. The pocket opening is not chamfered.

Cause

1) The flap margin is small.

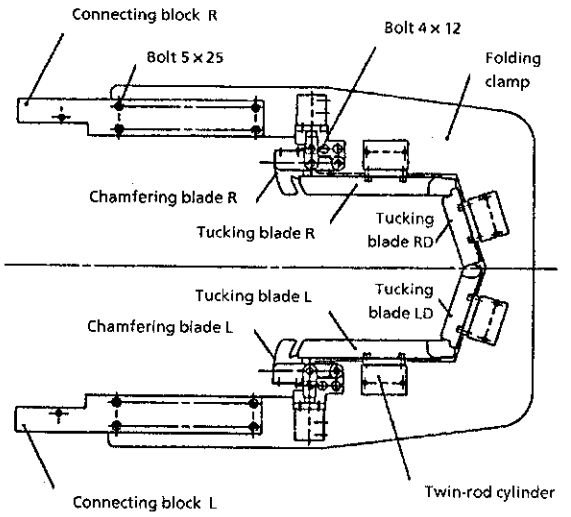
- Make the flap margin at least 8 mm.

2) The tucking blades (L) and (R) are improperly attached.

- Slide the tucking blades forward. If this adjustment is not enough to solve the trouble, enlarge the chamfered parts of the tucking blades by processing. At this time, remove the burrs and buff the blades.

3) Because the chamfering blades are improperly attached, the pocket material is pressed out when the chamfering blades go to the pocket material.

Folding clamp assembly

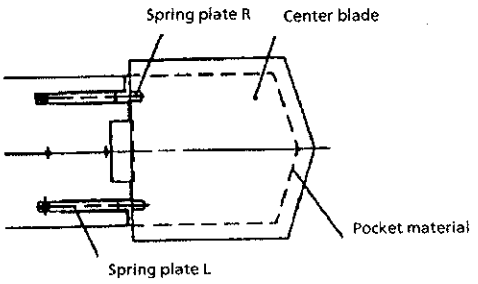


- Shift the chamfering blades or the whole chamfering mechanism backward. Check that the chamfering blades go under the pocket material.

16. The flap margin at the pocket opening is out of the pocket.

Cause

1) The flap margin is large.

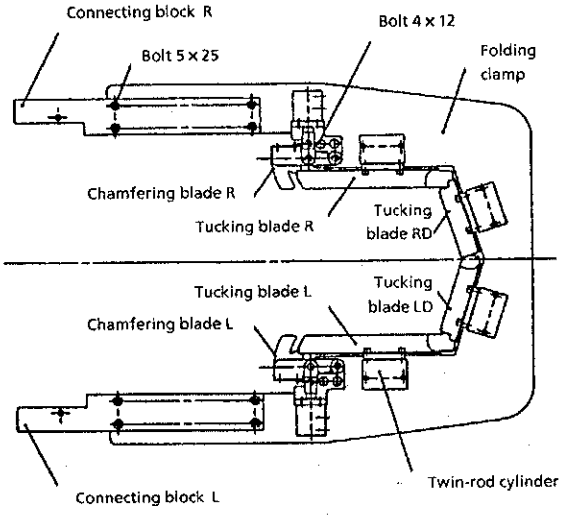


◦ Set the pocket material onto the center blade so that the flap margin is even at every point. The proper length of the flap margin is 8-12 mm. When the flap margin is larger than usual, reduce it or refer to "Cause 2)" below.

2) The front-back positions of the tucking blades (L) and (R) are improperly adjusted.

◦ Shift the tucking blades backward.

Folding clamp assembly



17. The pocket pattern is not aligned with the body pattern (when the pattern is vertical).

Cause

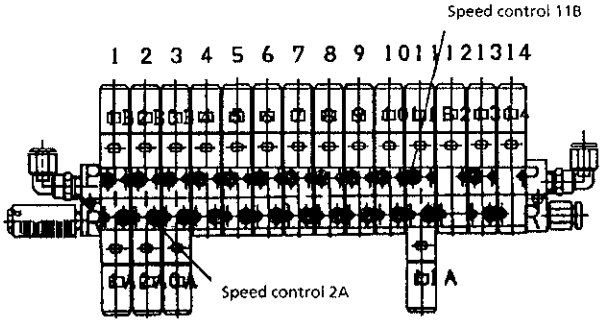
1) The pocket and the body are improperly positioned.

- Position them correctly in mode AUT2.

2) The pattern pitch of the pocket is different from that of the body.

- Check both pitches on a level surface.

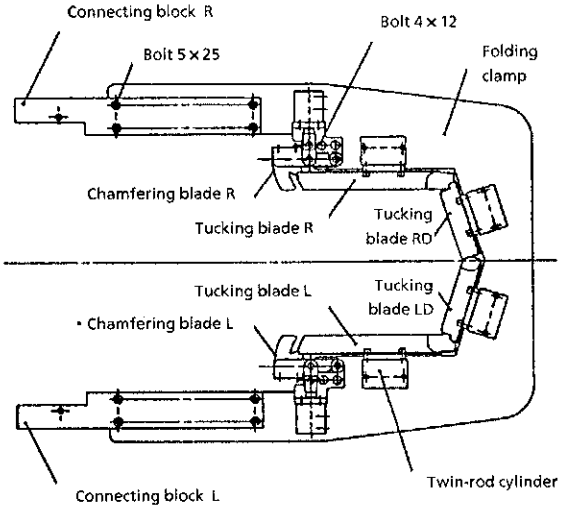
3) The inner clamp assembly or the sewing clamp assembly descends quickly.



- If the inner clamp assembly descends quickly: Check whether the pattern is aligned or not when the folded pocket is waiting. To adjust the descending speed, remove the face cover on the left, then slowly press the speed control of the valve ② A. At the same time, the cylinder air cushion near the rod might need to be loosened slightly.
- If the sewing clamp assembly descends quickly: Refer to "Trouble 13. Cause 5)".

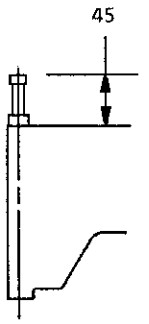
4) Because the chamfering blades or tucking blades are attached below the correct position or because the gap between the center blade and the needle plate is small, the body strays when the chamfering blades or tucking blades retract.

Folding clamp assembly



- Refer to "Trouble 14. Cause 1), 2) and 3)".

5) The body is caught by the needle plate long groove and strayed to the left during sewing.



- If the sewing clamp pressure is high: Refer to "Trouble 5. Cause 2)".
- If the presser foot pressure is high: Adjust the presser foot height to approximately 45 mm.
- Remove the burrs in the groove and buff it. If one side of the groove is higher than the other side, remove the needle plate then make the two sides level.

18. The pocket pattern is not aligned with the body pattern (when the pattern is horizontal).

Cause

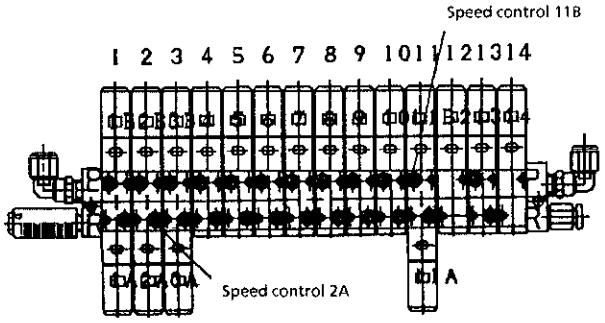
1) The pocket and the body are improperly positioned.

◦ Position them correctly in mode AUT2.

2) The pattern pitch of the pocket is different from that of the body.

◦ Check both pitches on a level surface.

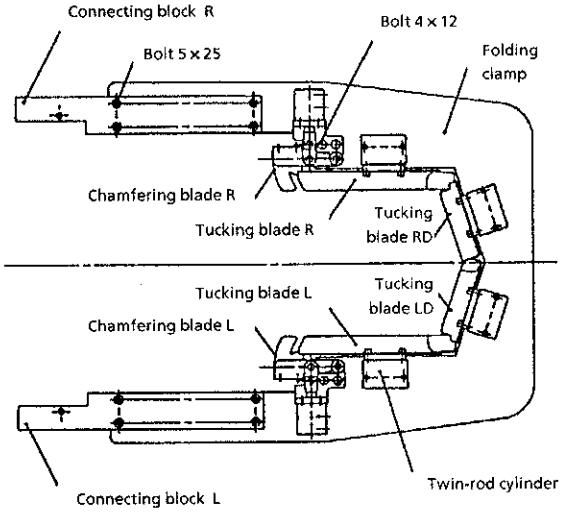
3) The inner clamp assembly or the sewing clamp assembly descends quickly.



◦ If the inner clamp assembly descends quickly: Check whether the pattern is aligned or not when the folded pocket is waiting. To adjust the descending speed, remove the face cover on the left, then slowly press the speed control of the valve ② A. At the same time, the cylinder air cushion near the rod might need to be loosened slightly.
◦ If the sewing clamp assembly descends quickly: Refer to "Trouble 13. Cause 5)".

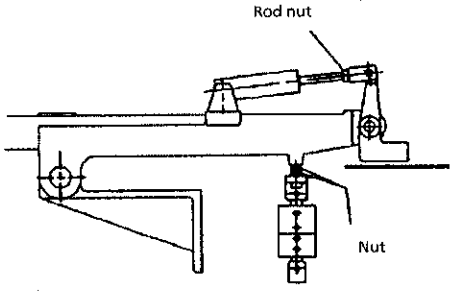
4) Because the tucking blades (LD) and (RD) are attached below the correct positions or because the gap between the center blade and the needle plate is small, the body strays when the tucking blades retract.

Folding clamp assembly



◦ Raise the tucking blades taking care not to shift them side to side.
◦ If the gap between the center blade and the needle plate is small: Refer to "Trouble 14. Cause 3)".

5) Because the folding clamp assembly is not parallel to the needle plate and leans towards the operator, the body strays forward when the folding clamp assembly descends.



◦ After loosening the two nuts at the top of the two cylinder rods which drive the folding clamp assembly, rotate the cylinder rods so that the folding clamp assembly and the needle plate are parallel. At this time, check that the tucking blades do not strike such parts as the center blade.

6) When the center blade retracts from the pocket, the pocket material or the body strays backward.

◦ Refer to "Trouble 1. Cause 2)".

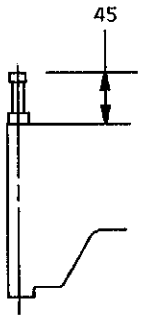
19. The body wrinkles.

Cause

1) The pressure of the inner clamp assembly is too high.

◦ Refer to "Trouble 1. Cause 2) of c)".

2) The presser foot pressure is too high.



◦ Adjust the presser foot height to approximately 45 mm.

3) The body is caught by the needle plate long groove during sewing

◦ Remove the burrs in the groove and buff it. If one side of the groove is higher than the other side, remove the needle plate then make the two sides level.

20. The needle location at the corners is improper.

Cause

1) The inertia of the X, Y moving system results in improper needle location, which is different from the programmed points.

   (Note: The machine motor rotating number might vary the needle location at each corner.)

- Reprogram to change the needle location at the corners. Change the needle location 2-3 stitches before the corner in the program. Changing the needle location for only 1 stitch make the stitch vary in pitch.

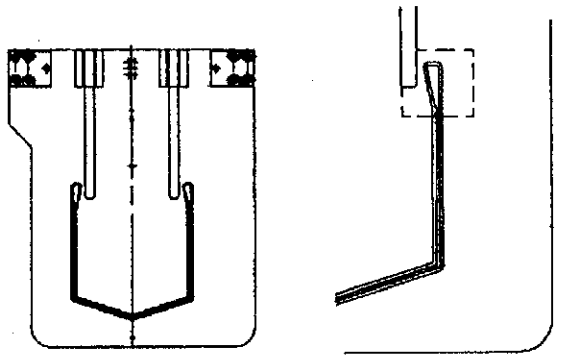
21. The pocket top is narrow.

Cause

1) The inner clamp blades are improperly attached.

- Increase the gap between the center blade edge and the the inner clamp blades at the pocket top.

2) When the top edge of the pocket material is not clamped by the sewing clamp assembly, it strays and is sewn.



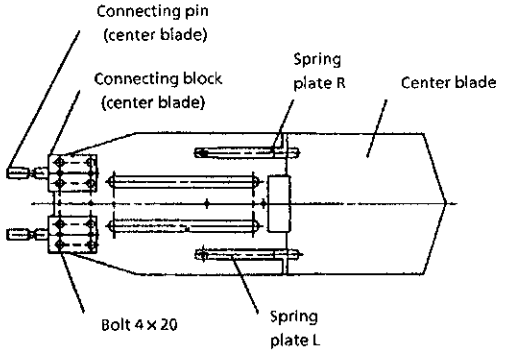
- First, as shown in the figure on the left, attach a sponge (3 mm) onto the whole part of the pocket edge of the sewing clamp bottom surface and thread the needle thread, then sew. Secondly, cut the sponge along the thread with a cutter knife, for example. Then, after removing the thread from the needle, sew 20-30 times so that the sponge does not touch the needle. If the needle strikes the sponge, thread breakage and stitch skipping might be caused.

3) Program defect

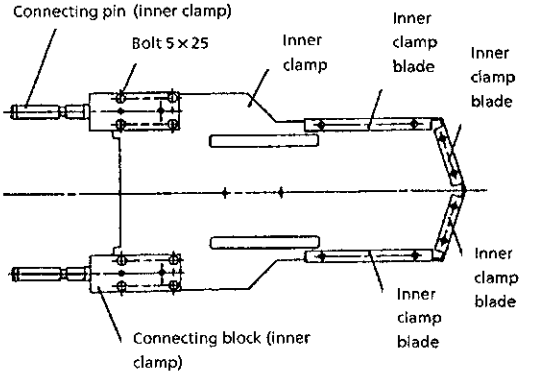
- Reprogram to change the value to slightly inside the pocket top edge.

Note: The last way to widen the pocket top is to stick and auxiliary plate (such as a tape) on the pocket top edge of the center blade. Avoid this method if possible because its durability is short.

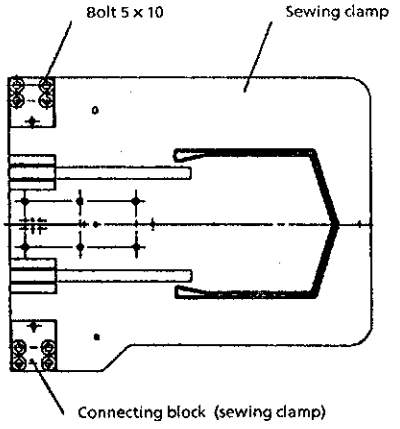
Center blade assembly



Inner clamp assembly



Sewing clamp assembly



22. The seam margin is large.

Cause

1) Because the forward part of the center blade is curved up, the gap between the needle plate and the center blade is large only at the forward part.

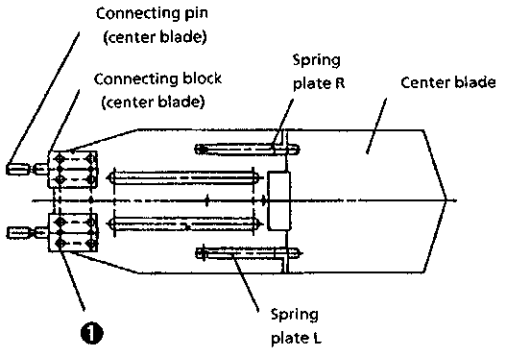
- Remove the center blade. Distort the center blade to level.

2) The inner clamp blades are improperly attached.

- Refer to "Trouble 6. Cause 1)".

3) Because the center blade assembly is attached too far forward, the pocket material is improperly folded.

Center blade assembly



- After loosening the eight bolts ❶, shift the center blade backward in the loose holes of the connecting blocks (center blade), then fasten the bolts ❶.
  At this time, the inner clamp assembly and the folding clamp assembly might need to be shifted backward simultaneously.

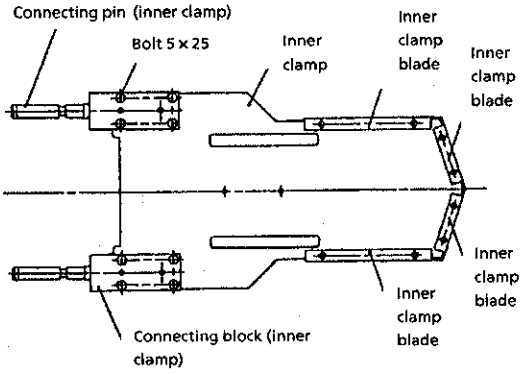
4) The tucking blades have burrs.

- Remove the burrs and buff the tucking blades.

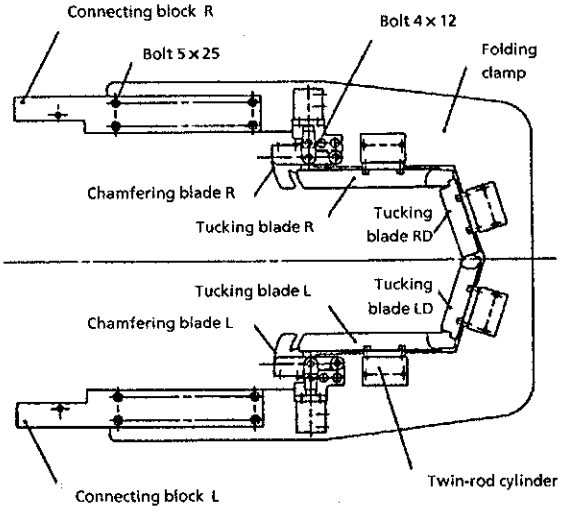
5) Program defect

- Reprogram partially.

Inner clamp assembly



Folding clamp assembly



23. The pocket has skipped stitches at the sewing start.

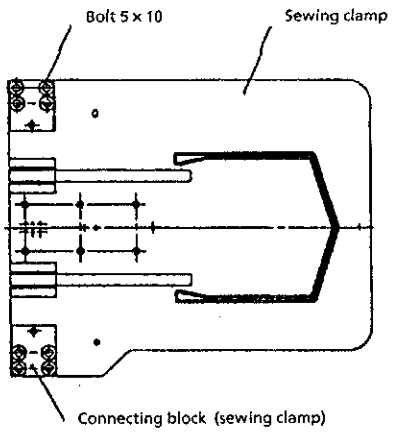
Cause

1) The needle thread coming out of the needle is short.

- Lengthen the thread in pretension.
- Check the opening amount between the tension discs.
- Perform reverse stitching 2-3 stitches after reprogramming.
- Adjust the thread blower so that it correctly blows the thread end.

2) The sewing clamp improperly presses the body and pocket materials.

Sewing clamp assembly



- Refer to "Trouble 21. Cause 2)".

24. The stitch pitch is uneven at the corners.

Cause

1) The inertia of the X, Y moving system results in improper needle location, which is different from the programmed points.

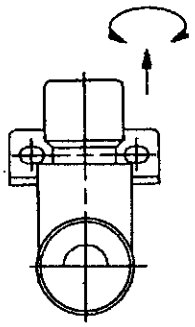
   (Note: The machine motor rotating number might vary the needle location at each corner.)

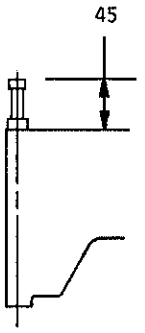
- Find the proper needle location at the corners by reprogramming and sewing several times. The machine motor rotating number might vary the best points to be programmed.

25. The pocket has skipped stitches or thread breakage at the pocket top.

Cause

1) Because the sewing clamp improperly clamps the pocket top during sewing, the pocket wobbles.





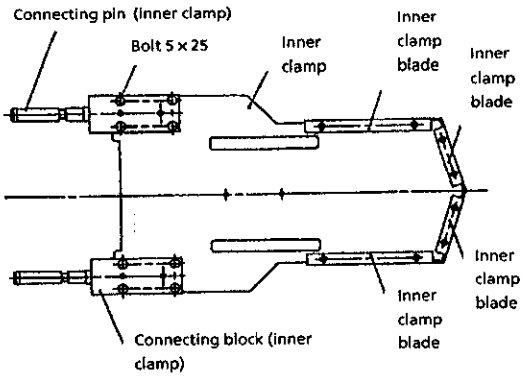
- Move the sponge as close as possible to the top edge of the pocket, then refer to "Trouble 21. Cause 2)".
- Increase the sewing clamp pressure referring to "Trouble 5. Cause 2)". Be sure not to increase the pressure excessively, which might result in vertical uneven material feeding or vertical wrinkle.
- Increase the presser foot pressure. Though the standard height of the presser foot is 45 mm, decrease the height slightly to increase the pressure. Be sure not to increase excessively, which might result in horizontal uneven material feeding or horizontal wrinkle.

26. The seam on the left side winds.

Cause

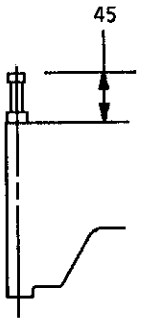
1) The inner clamp pressure is too high.

Inner clamp assembly



◦ Refer to "Trouble 1. Cause 2) of c)".

2) The presser foot pressure is too high.



◦ Adjust the presser foot height to approximately 45 mm, as shown in the figure on the left.

3) The body is caught by the needle plate long groove during sewing.

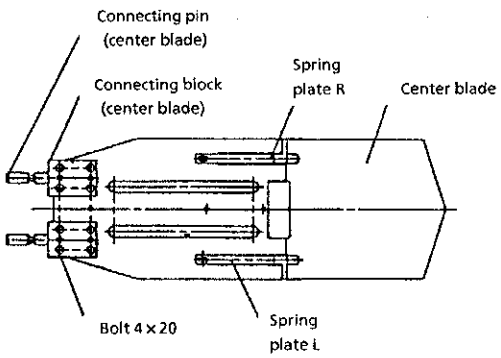
◦ Remove the burrs and buff the groove. If one side of the groove is higher than the other side, remove the needle plate then make both sides level.

27. The seam margin is large. (Thick material)

Cause

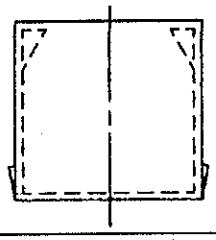
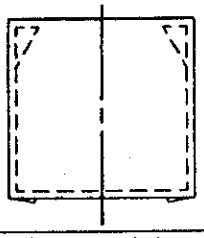
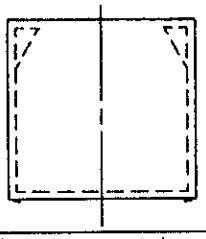
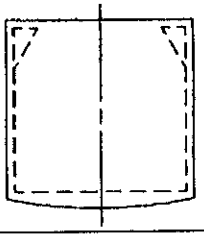
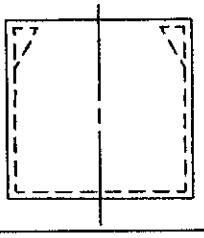
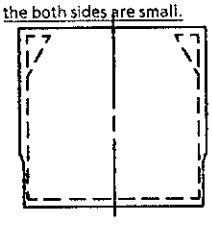
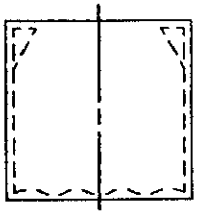
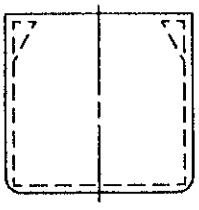
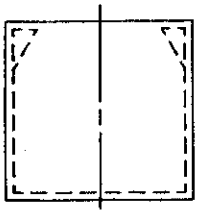
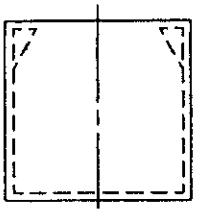
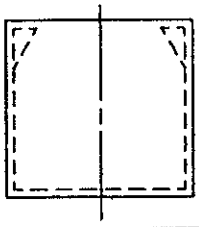
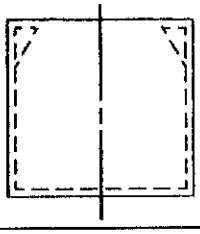
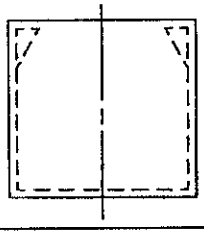
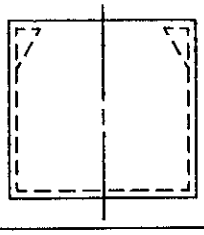
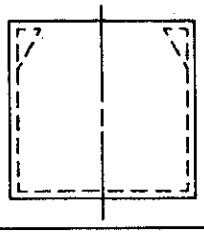
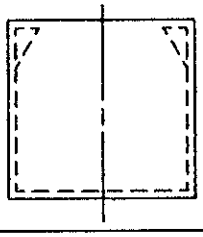
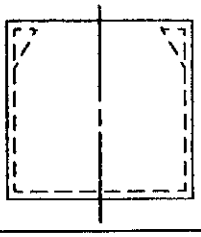
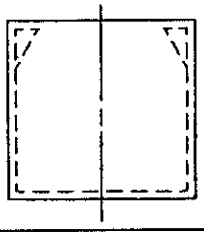
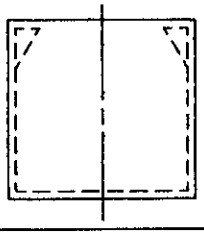
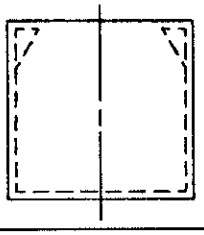
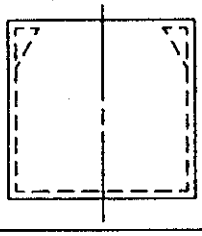
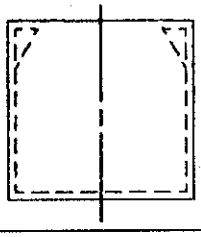
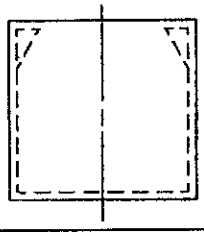
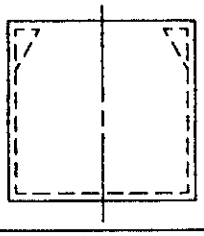
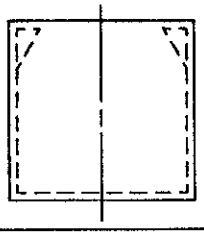
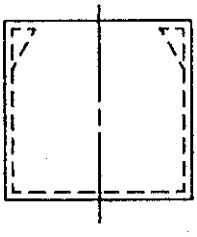
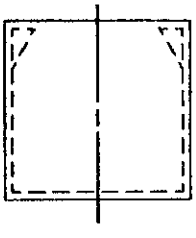
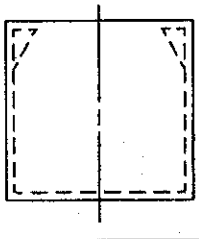
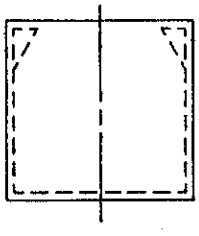
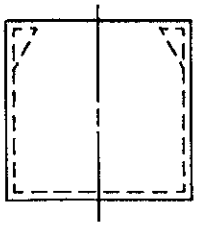
1) When the material is relatively thick, the shape of the sewn pocket is large.

Center blade assembly



- Refer to "Trouble 6.". If the adjustment in "Trouble 6." is not enough to solve this trouble, the center blade needs to be replaced by a smaller one. The standard center blade is 1.1 mm smaller on both sides than an actual pocket shape. When several sizes of center blades (for example, the 1.5 mm smaller one on both sides or the 2 mm smaller one on both sides) are available besides the standard one, almost all thicknesses of material can be managed.

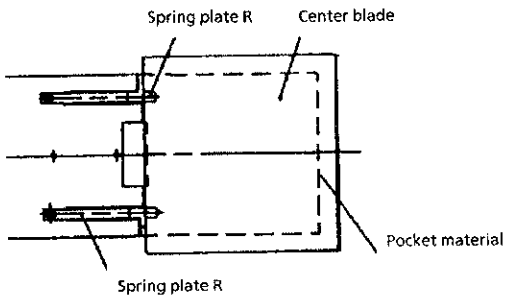
2 Characteristic troubles of two corner pattern

1.The chamfered margins at the bottom stick out on both sides. 	2.The flap margins at the bottom on both sides are not chamfered. 	3.The chamfered flap margins at the bottom stick out below. 	4.The base is curved. 	5.The tucking blades do not operate smoothly. 
6.The bottom corners rise and the seam margins near the bottom on the both sides are small. 	7.The bottom seam is zigzag chain stitch. 	8.The corners are around. 	9 	10 
11 	12 	13 	14 	15 
16 	17 	18 	19 	20 
21 	22 	23 	24 	25 
26 	27 	28 	29 	30 

1. The chamfered margins at the bottom stick out on both sides.

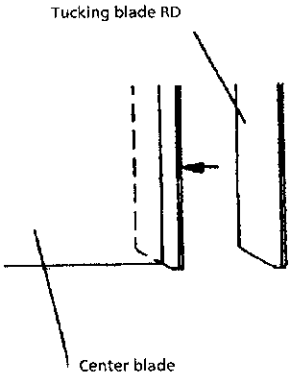
Cause

1) The flap margin is too large.



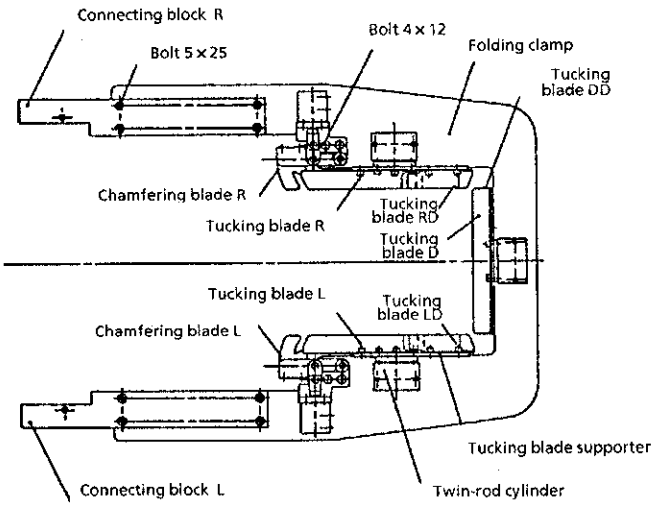
◦ Set the pocket material onto the center blade so that the flap margin is even at each point. The proper length of the flap margin is 8-12 mm. If the flap margin is larger than it should be, reduce it.

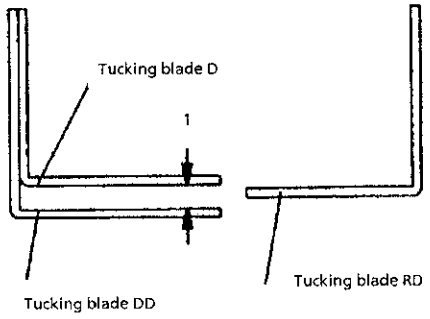
2) The tucking blade (RD) or (LD) is improperly attached.



◦ Shift the tucking blade forward, then adjust it so that its edge is aligned with the center blade corner when the cylinder driving the tucking blade works. (The alignment does not have to be perfect.) At this time, check that the tucking blades come into the gap between the tucking blades (D) and (DD).

Folding clamp assembly





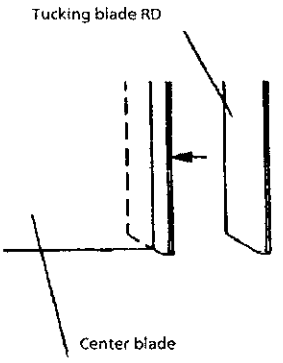
2. The flap margins at the bottom on both sides are not chamfered.

Cause

1) The flap margin on both sides are too small.

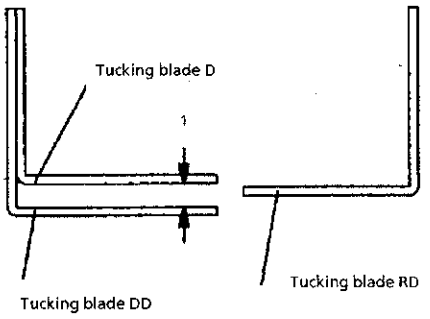
- Adjust the flap margin to 8-12 mm.

2) The tucking blade (RD) or (LD) is improperly attached.



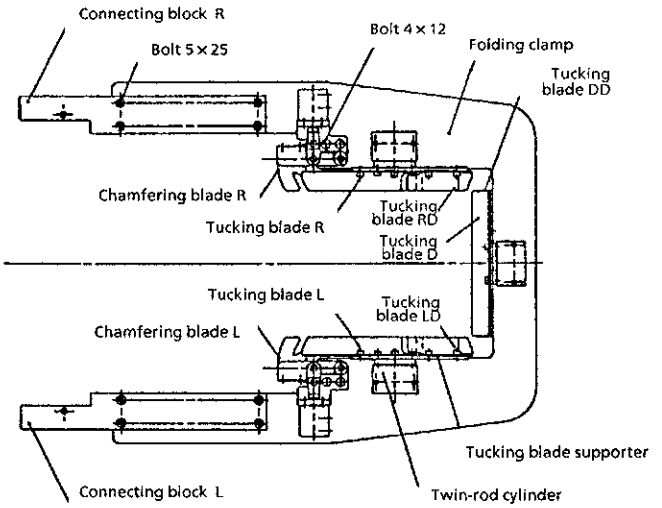
- Shift the tucking blade backward, then adjust it so that its edge is aligned with the center blade corner when the cylinder driving the tucking blade works. (The alignment does not have to be perfect.) At this time, check that the tucking blades come into the gap between the tucking blades (D) and (DD).

3) The height between the tucking blade (RD) or (LD) and the tucking blades (D) and (DD) is improperly adjusted.



- If the tucking blade (RD) or (LD) is attached above the tucking blade (D) or below the tucking blade (DD), reattach the tucking blade (RD) or (LD) , as shown in the figure on the left.

Folding clamp assembly

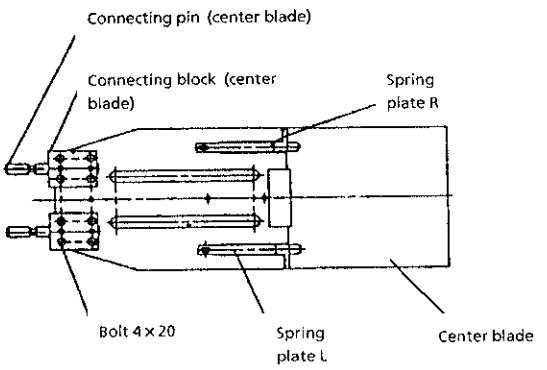


3. The chamfered flap margins at the bottom stick out below.

Cause

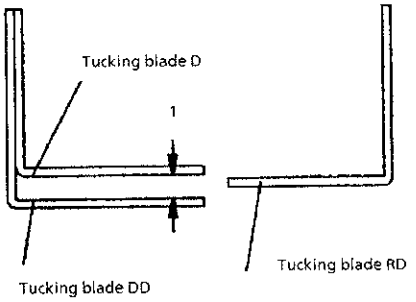
1) The tucking blade (RD) or (LD) is improperly attached.

Center blade assembly



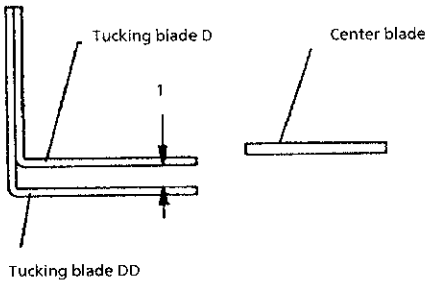
◦ Refer to "Trouble 2. Cause 2)".

2) Because the gap between the tucking blades (D) and (DD) is too small, the pocket material strays when they retract.



◦ As shown in the figure on the left, adjust the gap between the tucking blades (D) and (DD) to approximately 1 mm and also adjust these tucking blades' height so that the tucking blades (RD) and (LD) come into the center of the gap.

3) Because the tucking blade (DD) is attached below the correct position, the body strays when the tucking blade retracts.



◦ Raise the tucking blade and reattach. At this time, adjust the gap between the tucking blade (DD) and the tucking blade (D) to approximately 1 mm.

4. The base is curved.

First, refer to "Trouble 13." of pentagon pocket (page 5-24).

The cause described below is characteristic of square pockets.

Cause

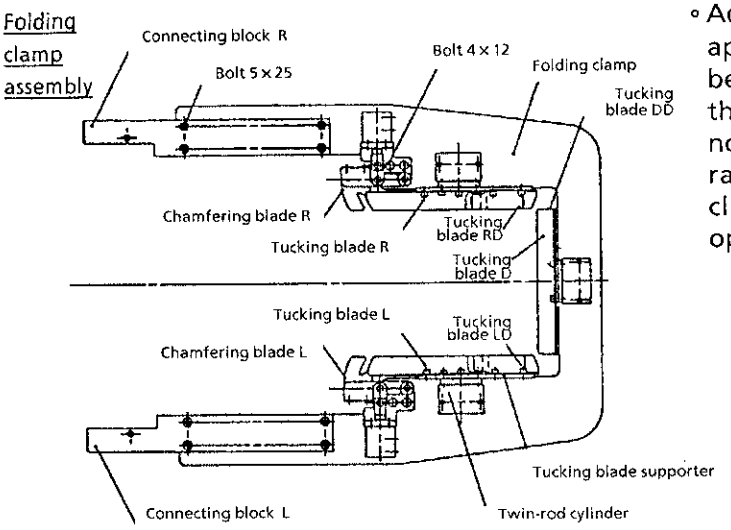
1) Because the tucking blade (DD) is attached below the correct position, the pocket material strays with the body when the tucking blade retracts.

- Raise the tucking blade and reattach. Adjust the gap between the tucking blade (DD) and the tucking blade (D) to approximately 1 mm. At this time, make sure not to raise the tucking blade (D) too much, which might cause it to hit the center blade, or cause the pocket material to stray when the tucking blade retracts.

5. The tucking blades do not operate smoothly.

Cause

1) Because the tucking blade (DD) is attached below the correct position, the tucking blades (DD) and (D) do not retract smoothly.



◦ Adjust the gap between these two tucking blades to approximately 1 mm. Then, holding the gap width between the tucking blades (RD) and (LD), raise all of the tucking blades and reattach. At this time, be sure not to shift them side to side. If they cannot be raised, attach a sponge (1 mm) onto the folding clamp assembly at the bottom surface near the operator.

6. The bottom corners rise and the seam margins near the bottom on the both sides are small.

Cause

1) When the crease of the chamfered margin is aligned with the needle location, the pocket is sewn improperly and the seam margin is small.

- Shift the tucking blades (RD) and (LD) forward and reattach to reduce the amount of flap margin to be chamfered.

2) The inner clamp blades are improperly attached.

- Slightly increase the gap between the inner clamp blades and the center blade.

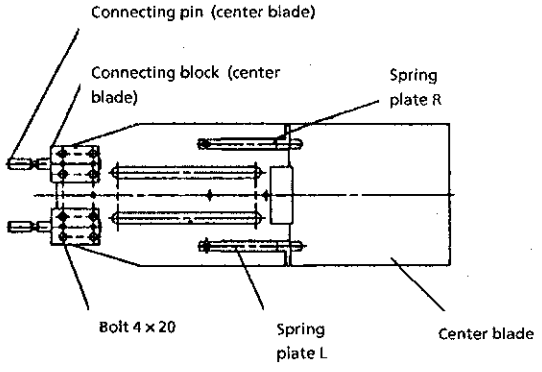
3) The gap between the tucking blades (RD) and (LD) of the folding clamp assembly and the center blade is improperly adjusted.

- Increase the gap. At this time, be sure not to move the tucking blades back and forth.

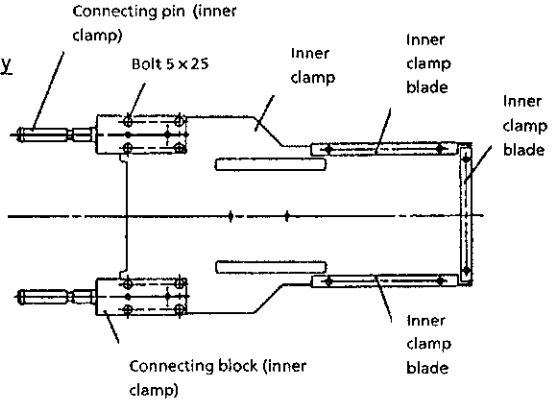
4) Program defect

- Reprogram partially.

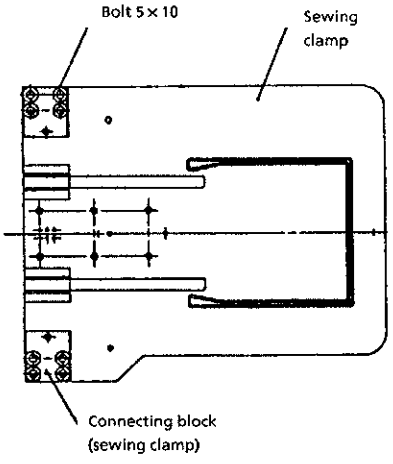
Center blade assembly



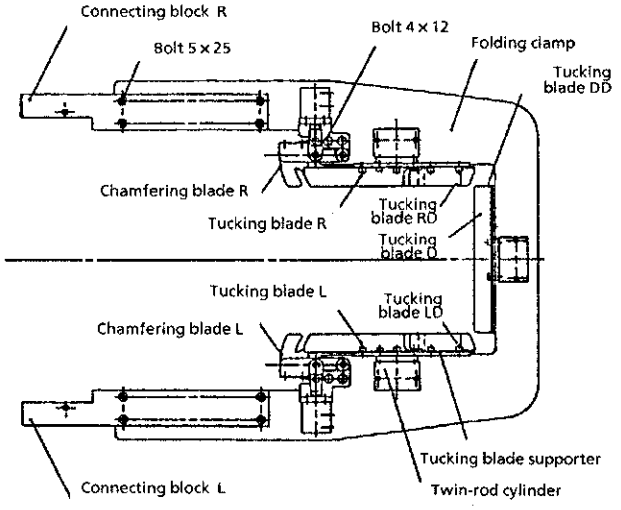
Inner clamp assembly



Sewing clamp assembly



Folding clamp assembly



7. The bottom seam is zigzag chain stitch.

Cause

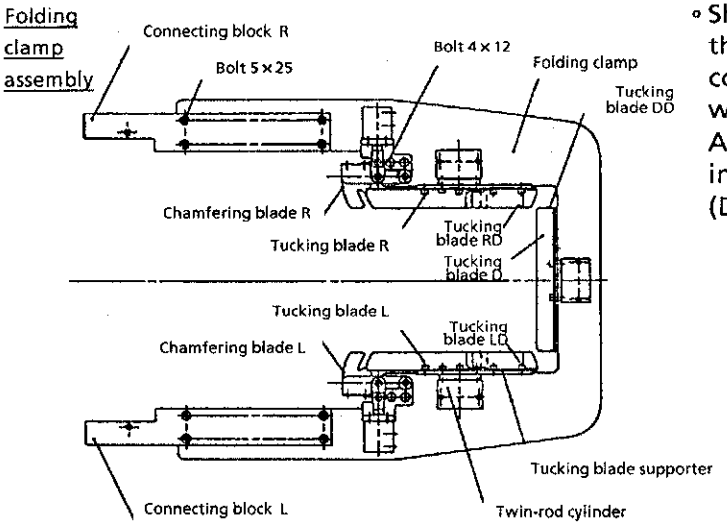
1) The seam sewn form left to right almost aligns with the border line between the hitch stitch and perfect stitch. This problem happens when both of these stitches appear.

◦ Because this is a basic property in a sewing machine, there is no fundamental measure for it. When adjusting, rotate the needle approximately 10-15° clockwise, looking from the bottom. Be sure not to rotate it more, which might result in the needle's striking the rotating hook.

8. The corners are around.

Cause

1) The tucking blades (RD) and (LD) are attached backward from their correct position.



- Shift the tucking blades forward, then adjust them so that their edges are aligned with the center blade corners when the cylinders driving the tucking blades work. (The alignment does not have to be perfect.) At this time, check that these tucking blades come into the gap between the tucking blades (D) and (DD).

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