brother

SERVICE MANUAL

FOR

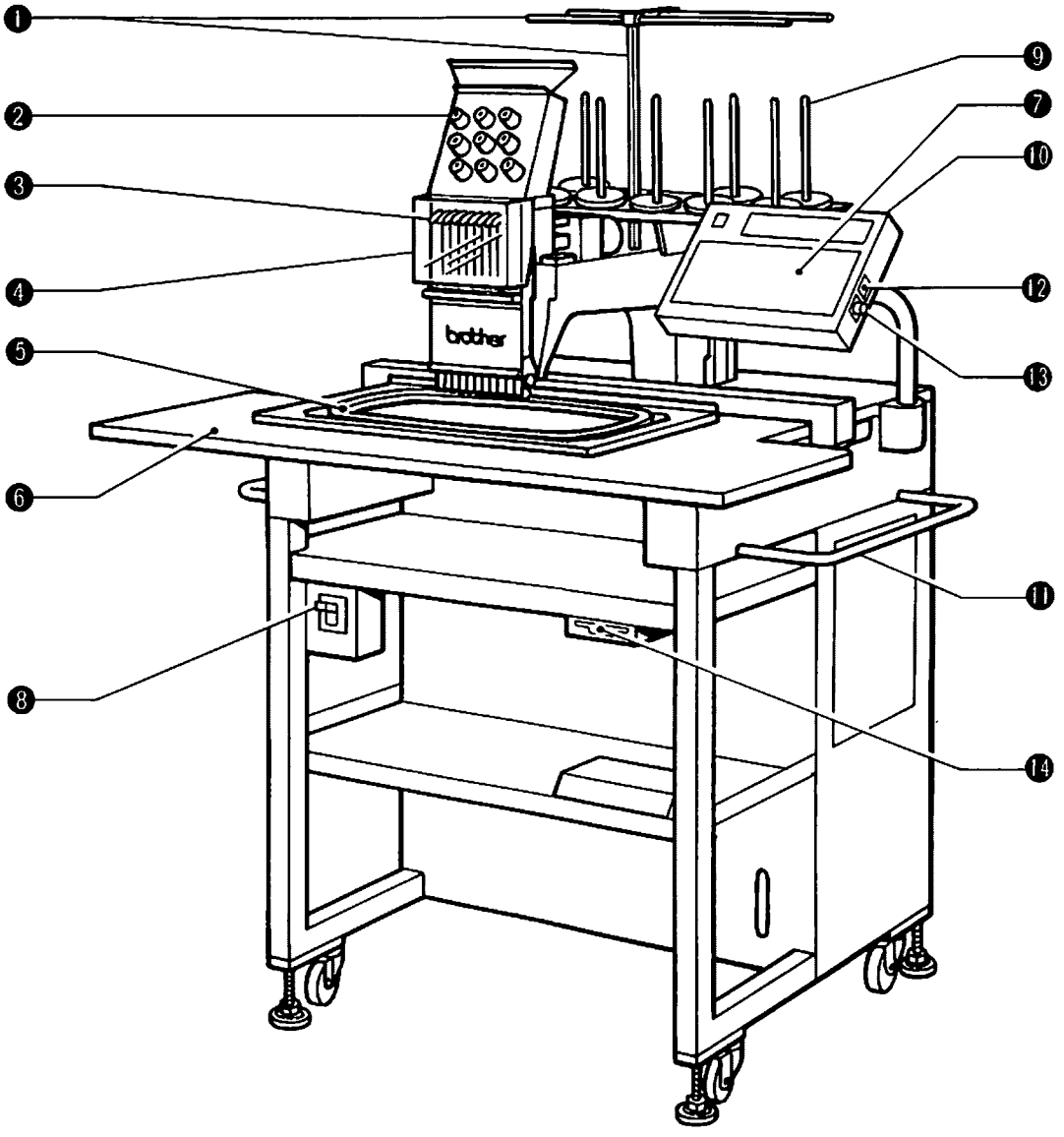
BAS-411
BAS-415

SINGLE HEAD ELECTRONIC EMBROIDERY MACHINE

CONTENTS

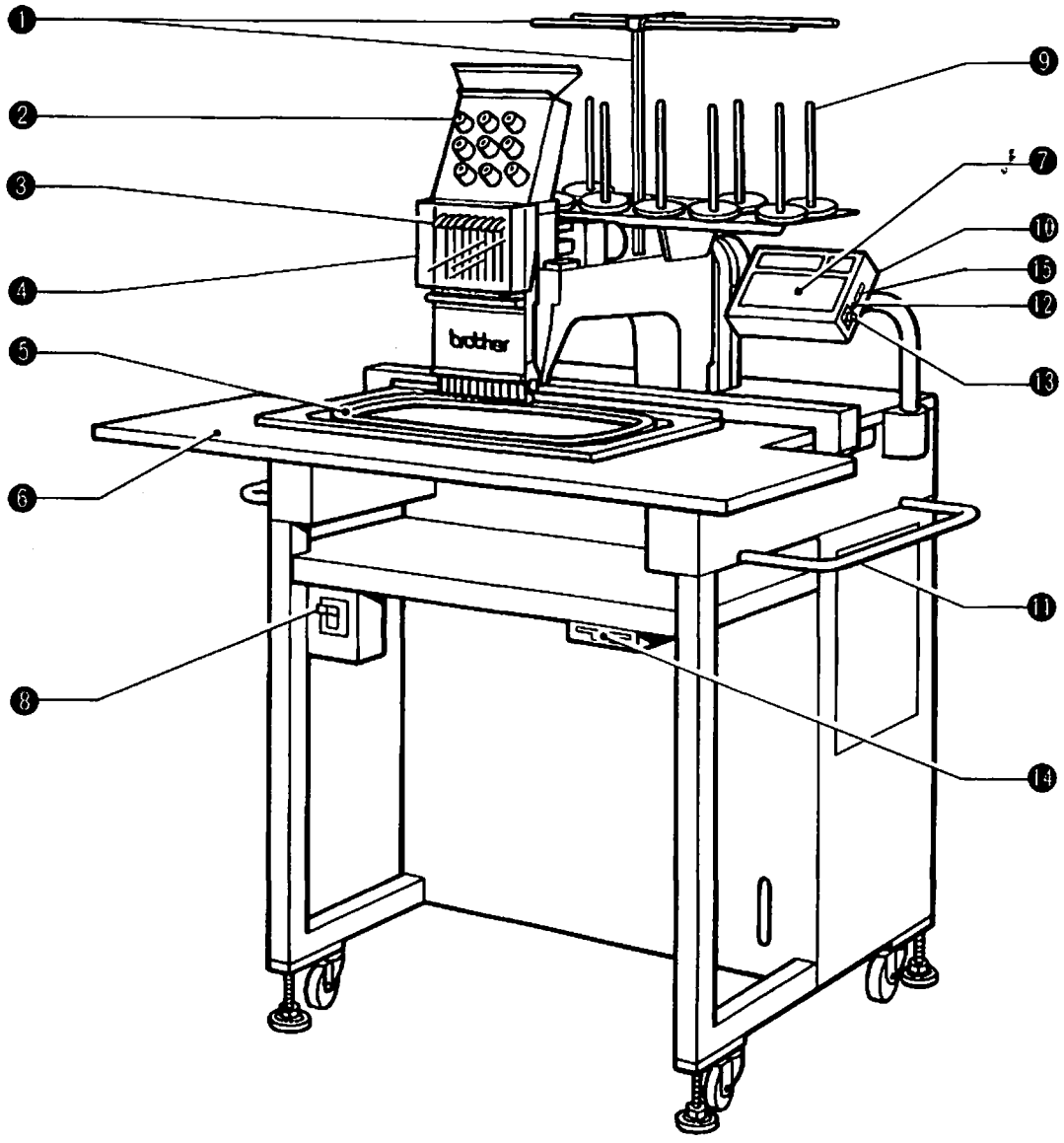
Part names

BAS-411



❶ Thread guide bar
❷ Thread tension dial
❸ Thread take-up
❹ Thread take-up cover
❺ Embroidery hoop
❻ Table plate
❼ Operation panel
❽ Power switch
❾ Spool shaft (B)
❿ Keyboard assembly
⓫ Guard bar
⓬ Contrast dial of liquid crystal display
⓭ Speed dial
⓮ Disk drive

BAS-415



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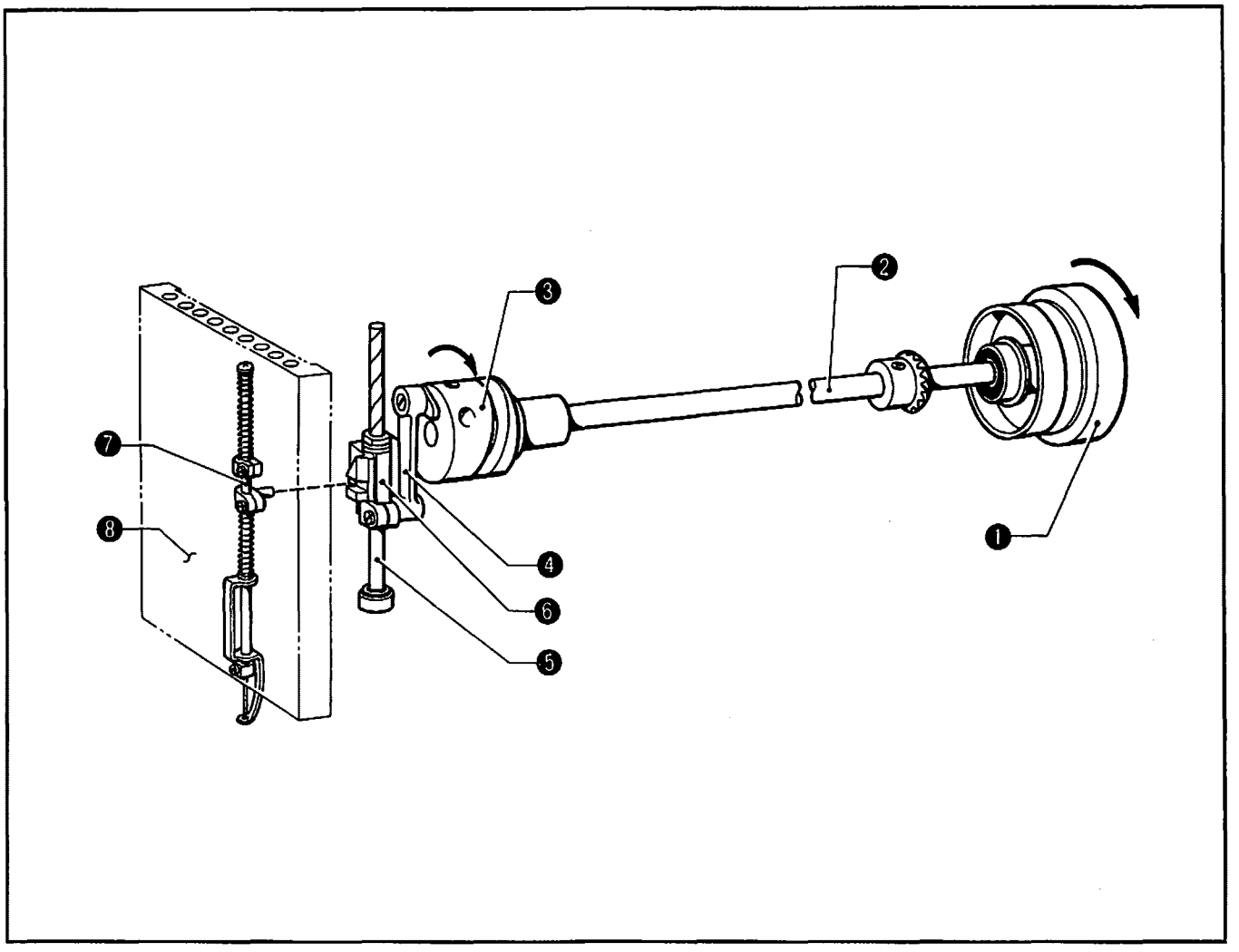
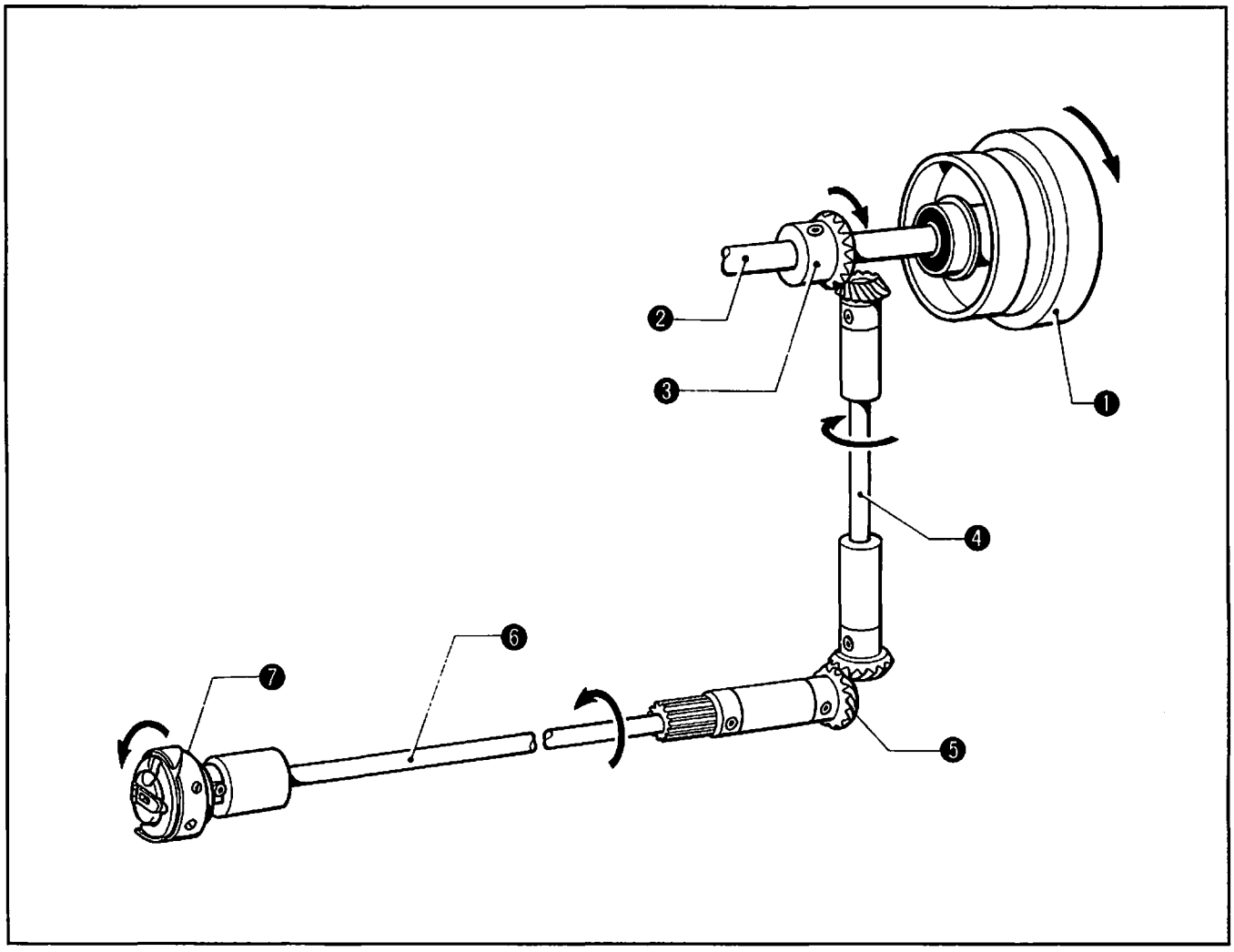
MECHANICAL DESCRIPTIONS

1 Upper shaft mechanism



1) When the pulley ❶ rotates in the direction of the arrow, it transmits the rotation to the upper shaft ❷. The upper shaft ❷ then rotates the thread take-up driving cam ❸.
2) The thread take-up driving cam ❸ transmits the motion to the connecting rod ❹.
3) The up and down motion parts ❻, attached to the main needle bar ❺, move the needle bar ❼ up and down.
4) The needle bar ❼ is guided by the needle bar case ❽.

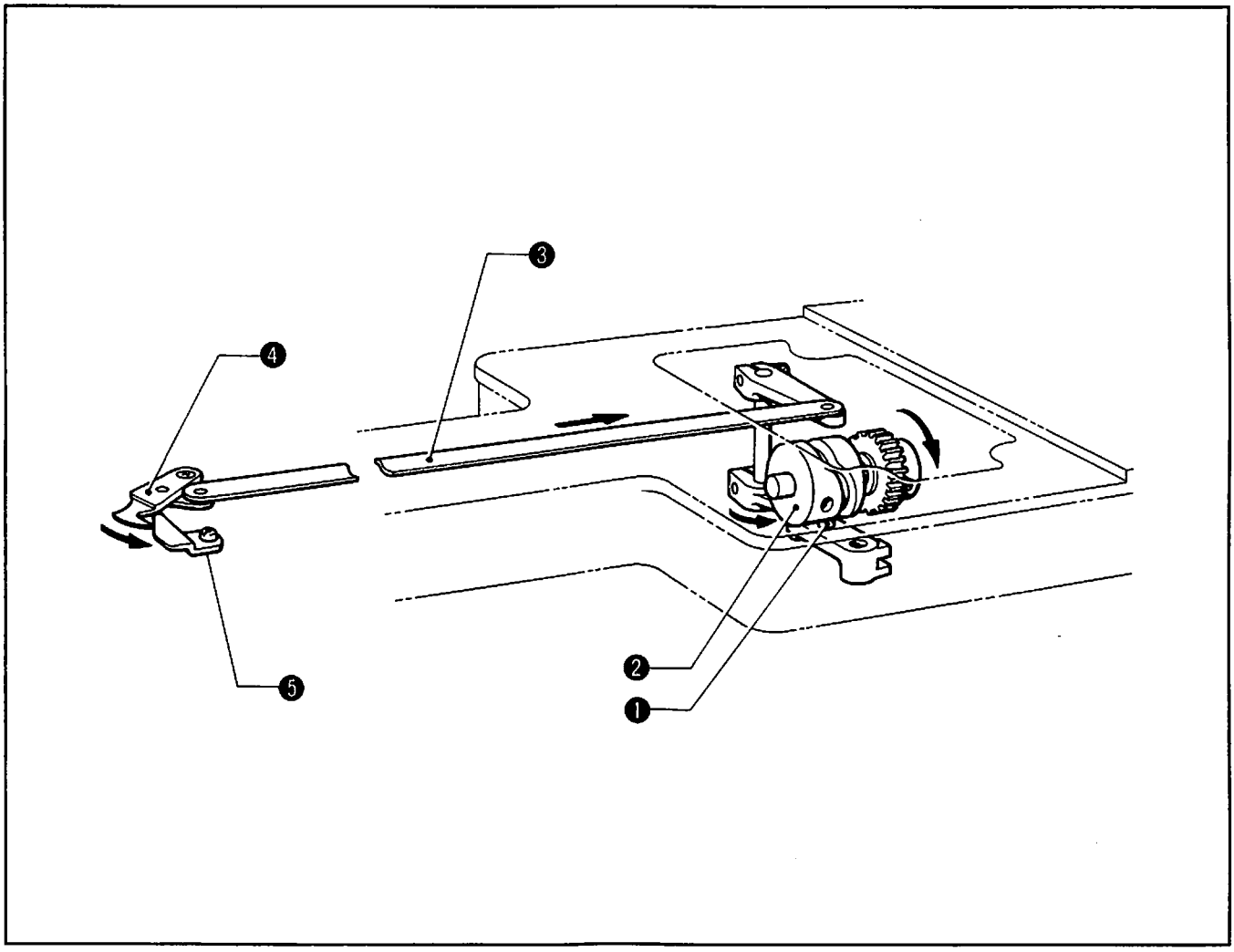
2 Lower shaft and rotary hook mechanism



1) When the pulley ❶ rotates in the direction of the arrow, it transmits the rotation to the upper shaft ❷. The upper shaft ❷ then rotates upper shaft gear (A) ❸.
2) Upper shaft gear (A) ❸ transmits the movement to the lower shaft gear ❺ via the vertical shaft ❹.
3) The lower shaft gear ❺ transmits the rotation to the attached lower shaft ❻. Then the rotary hook ❼, attached to the lower shaft ❻, rotates in the direction of the arrow.

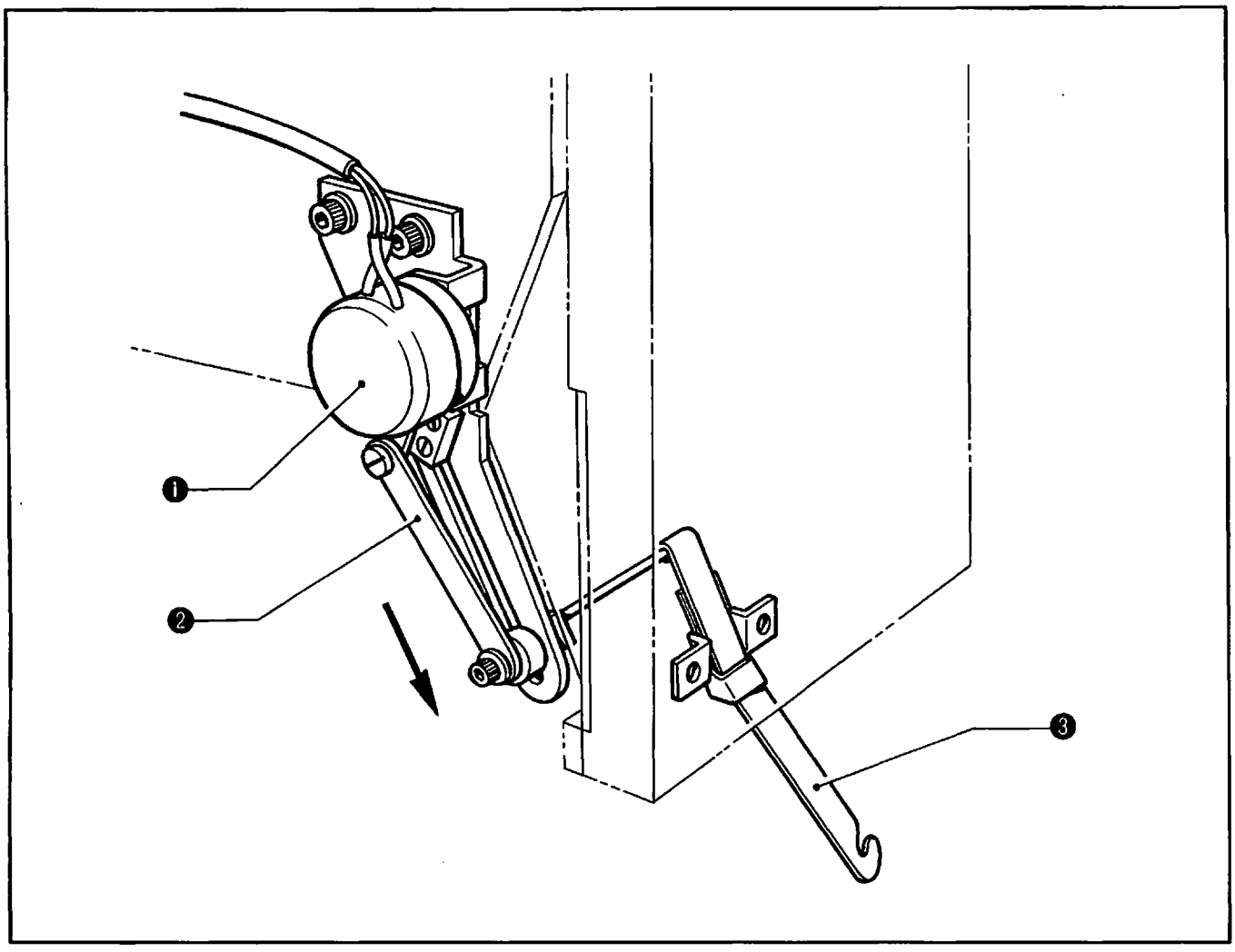
NOTE: In BAS - 411 and 415, the rotary hook makes two revolutions for each revolution made by the pulley.

3 Thread trimmer mechanism



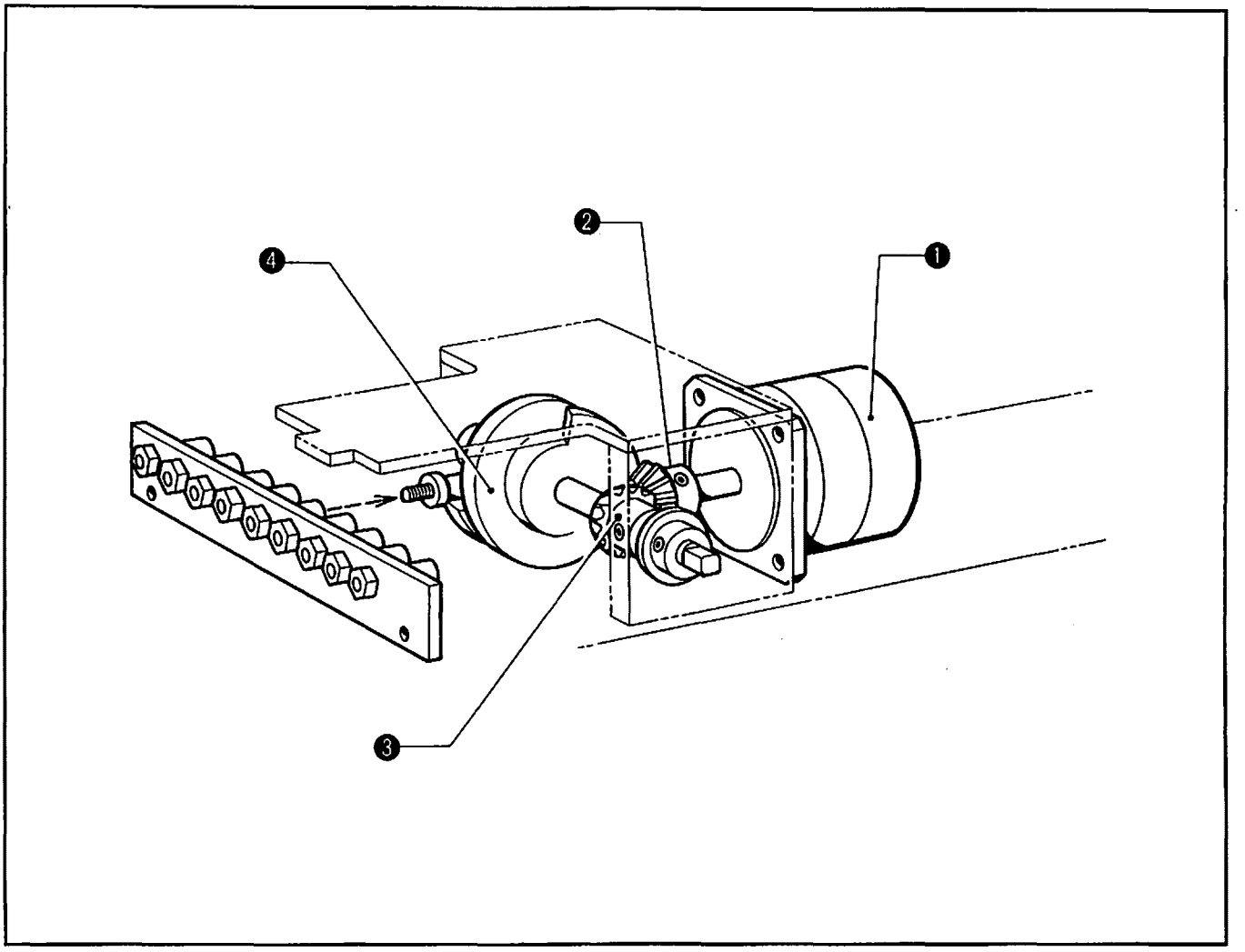
After the final stitch, roller shaft (A) ❶ moves into the groove of the cam ❷, and connecting plate (B) ❸ moves. Then the knife ❹ engages with the fixed knife ❺, trimming the thread.

4 Thread wiper mechanism



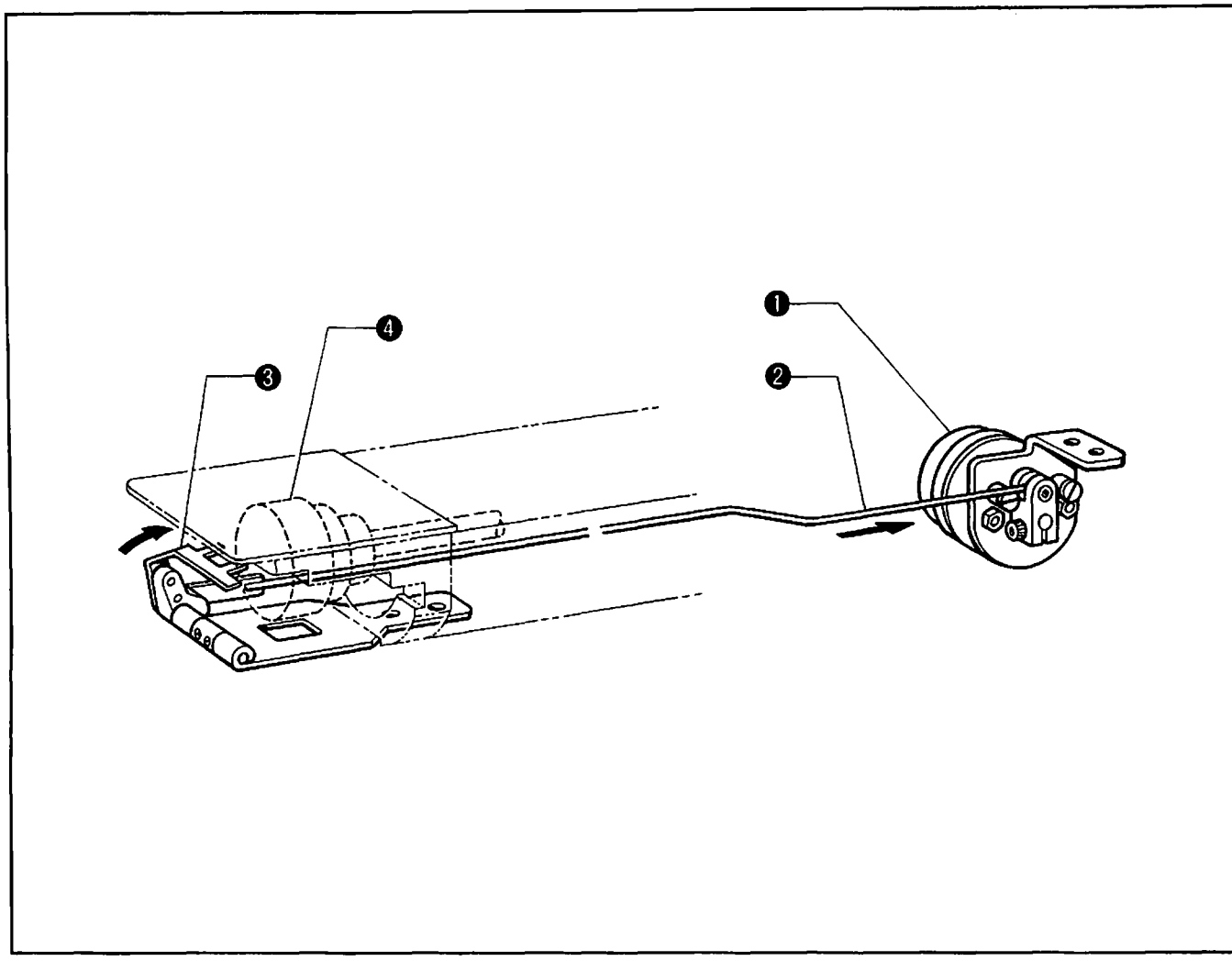
After sewing is completed, the thread guide solenoid ❶ moves the plate ❷ in the direction of the arrow, and the upper thread guide hook ❸ attached to the plate ❷ brings the trimmed thread to the thread presser. The thread presser secures the trimmed thread.

5 Needle bar flip-up mechanism



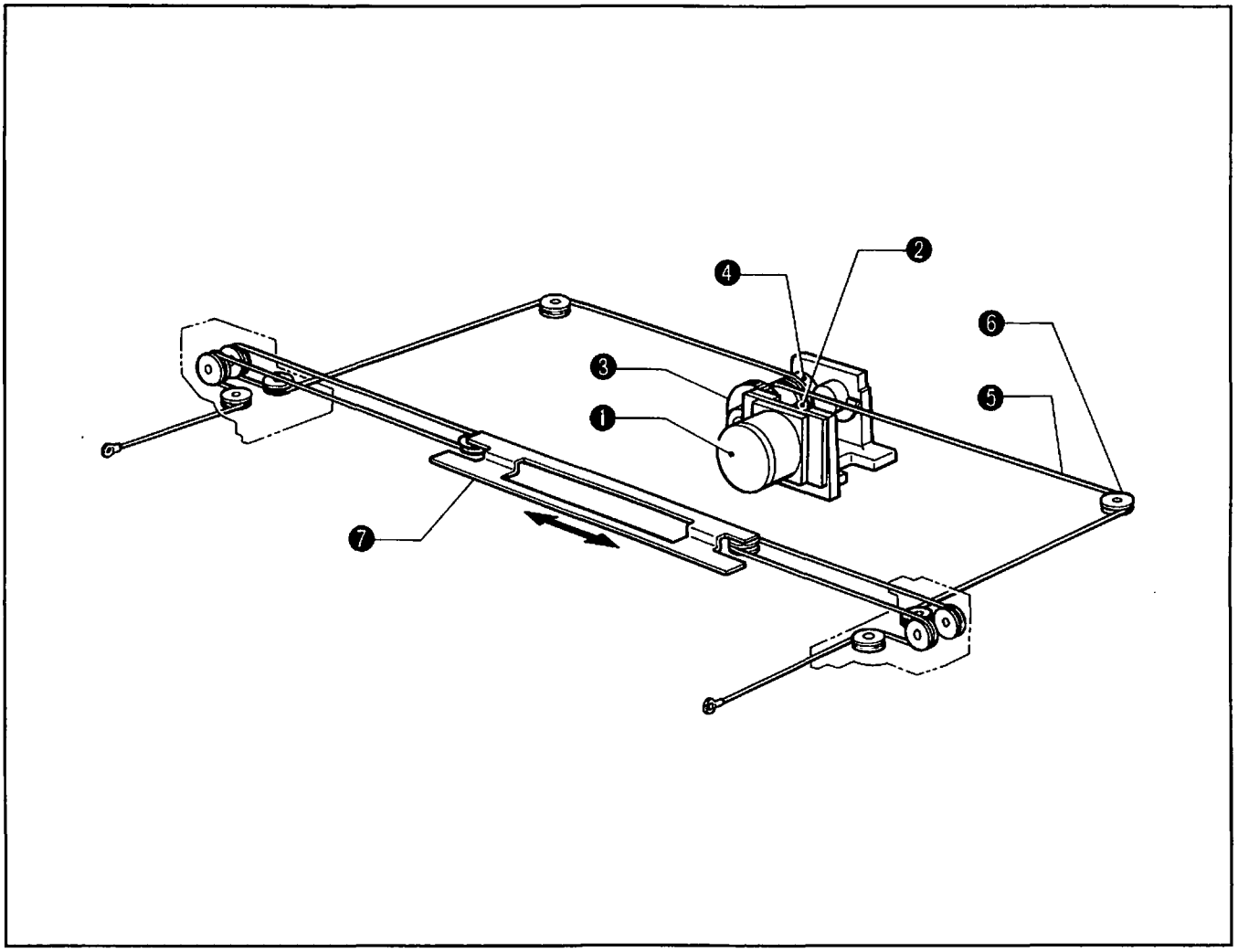
After receiving the set needle bar flip-up signal, cam gears (A) ❷ and (B) ❸ attached to the pulse motor ❶ are activated . The needle bar flip-up is performed by the change cam ❹.

6 Picker mechanism



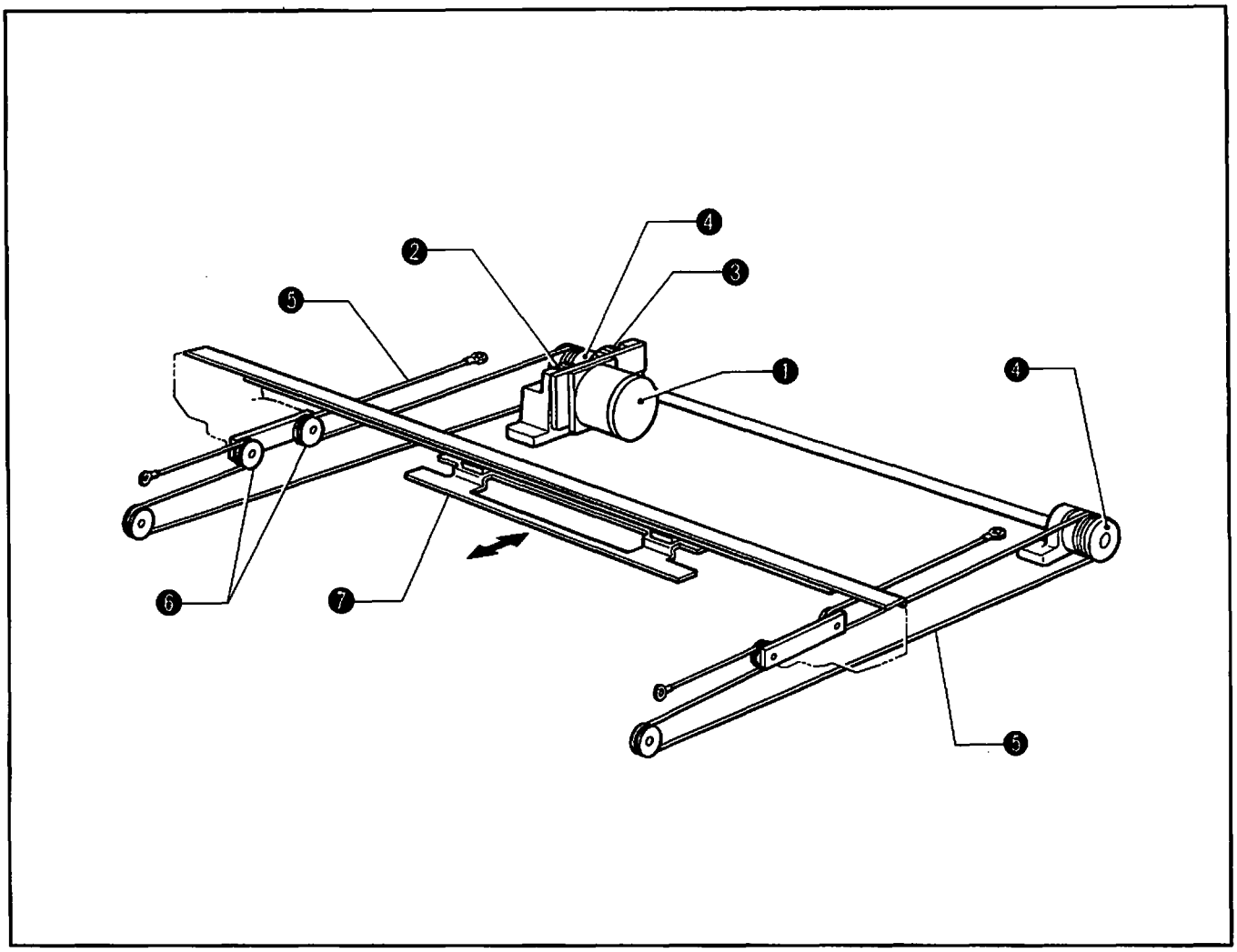
The picker solenoid ❶ functions at the beginning of sewing and after thread trimming. The picker ❸ attached to connecting plate (A) ❷ moves in the direction of the bobbin case ❹, then pulls the upper thread under the material.
During thread trimming, the picker ❸ operates to keep the needle thread length constant.

7 Drive, (X) feed mechanism



1) Pinion gear (B) ❷ attached to the X-pulse motor ❶ rotates, then transmits the rotation to idle gear (A) ❸.
2) When idle gear (A) ❸ rotates, the (X) wire ❺ reeled in the wire drum (X) ❹ moves the carriage ❼ in the direction of the X-axis (left ↔ right) via the pulley ❻.

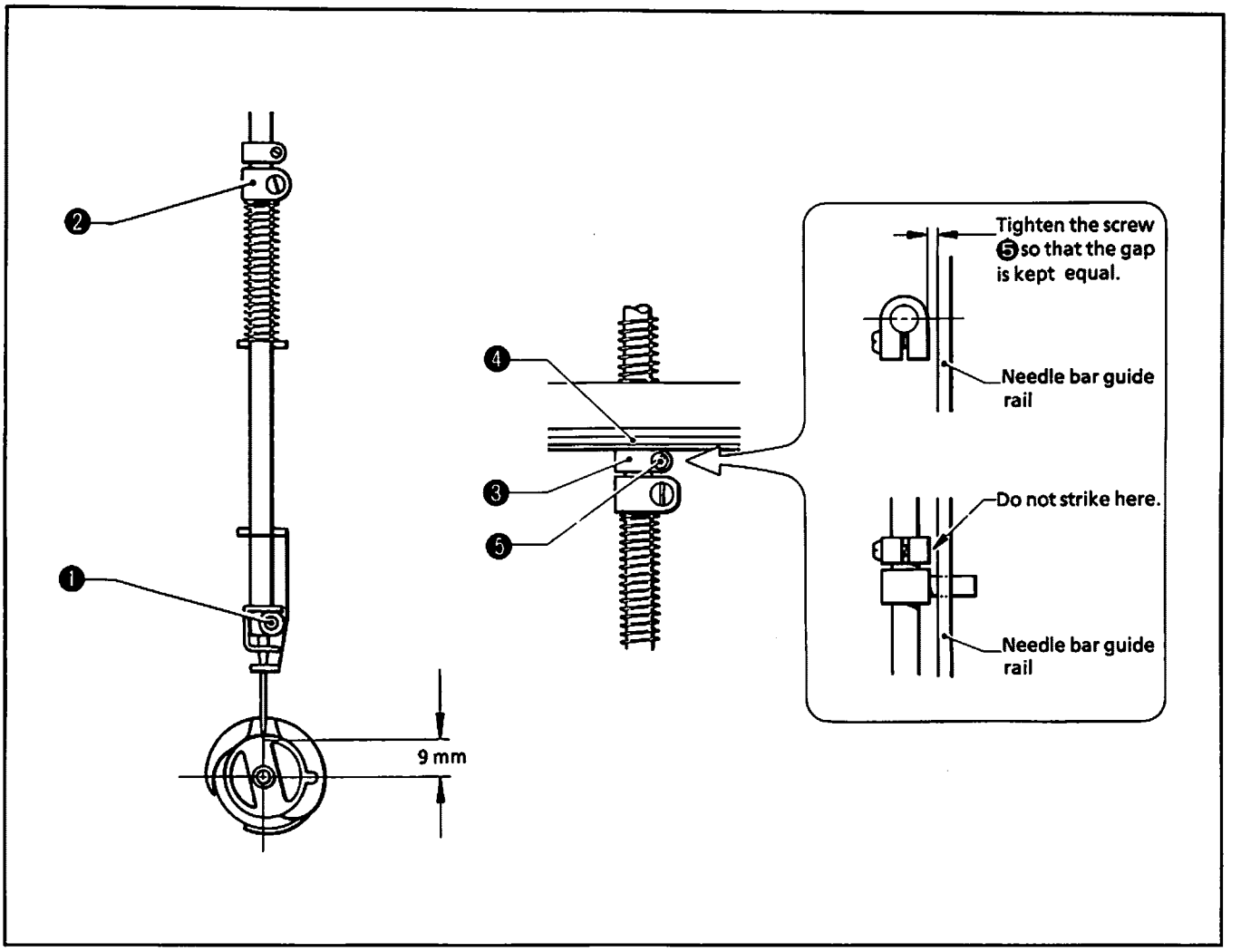
[8] Drive, (Y) feed mechanism



1) Pinion gear (B) ❷ of the Y-pulse motor ❶ rotates, then transmits the rotation to idle gear (A) ❸.
2) When idle gear (A) ❸ rotates, the (Y) wires ❺ (left) and (right) reeled in the wire drums (Y) ❹ on the right and the left move the carriage ❼ in the direction of the Y-axis (backwards ↔ forwards) via the pulley ❻.

STANDARD ADJUSTMENT

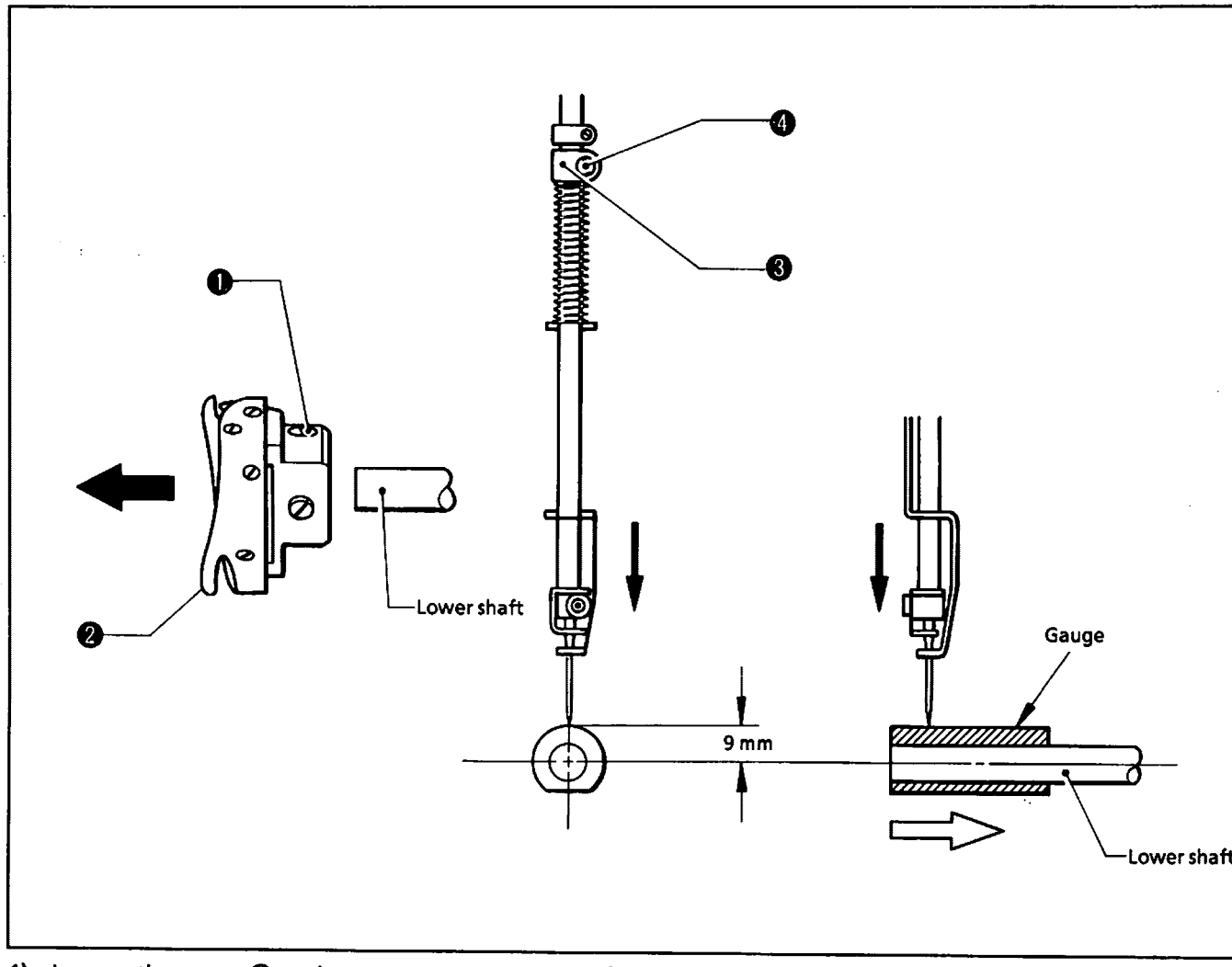
1 Adjusting needle bar height



1) Lower the needle bar to its lowest position. When the needle tip is raised 9 mm above the center of the rotary hook shaft, tighten the screw of the needle bar clamp ❷ so that the screw ❶ leans to the right 25° - 30°.
2) Raise the needle bar to its highest position. Lightly press the stopper ❸ to the cushion rubber ❹ side. Then tighten the screw ❺ so that it is positioned in the front.

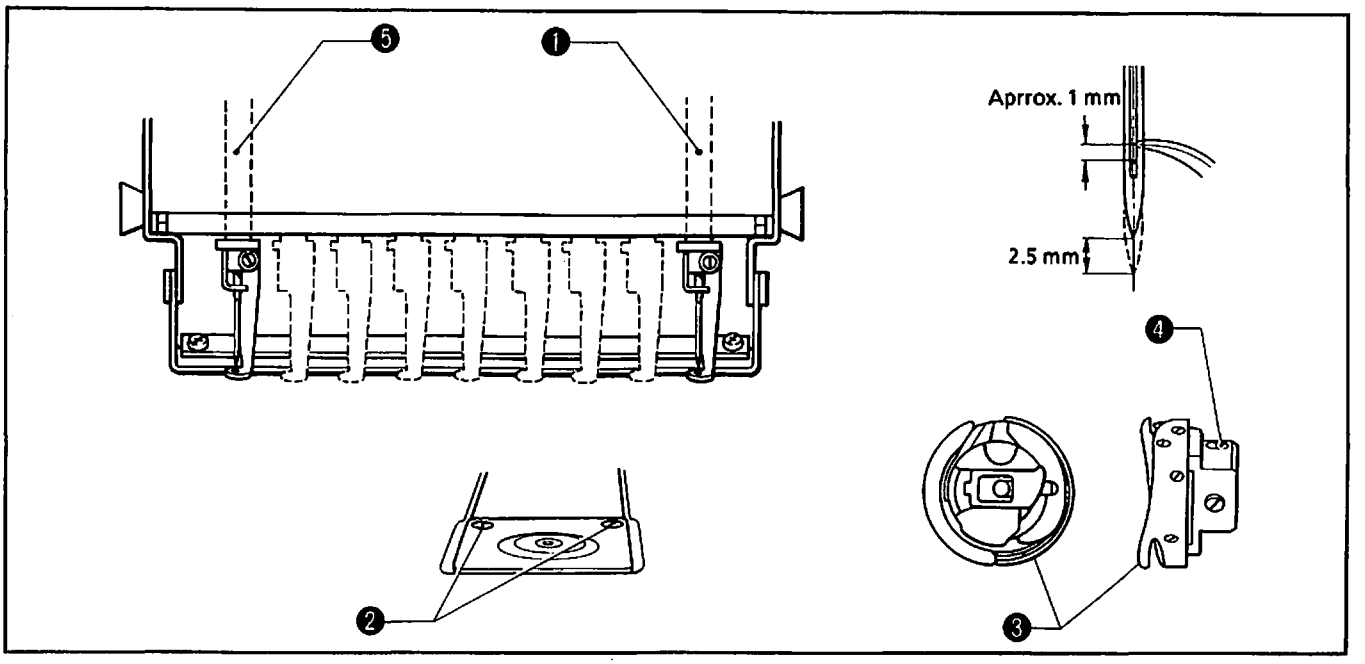
NOTE: Make sure that the stopper does not strike the needle bar guide rail.

When using the gauge (optional)



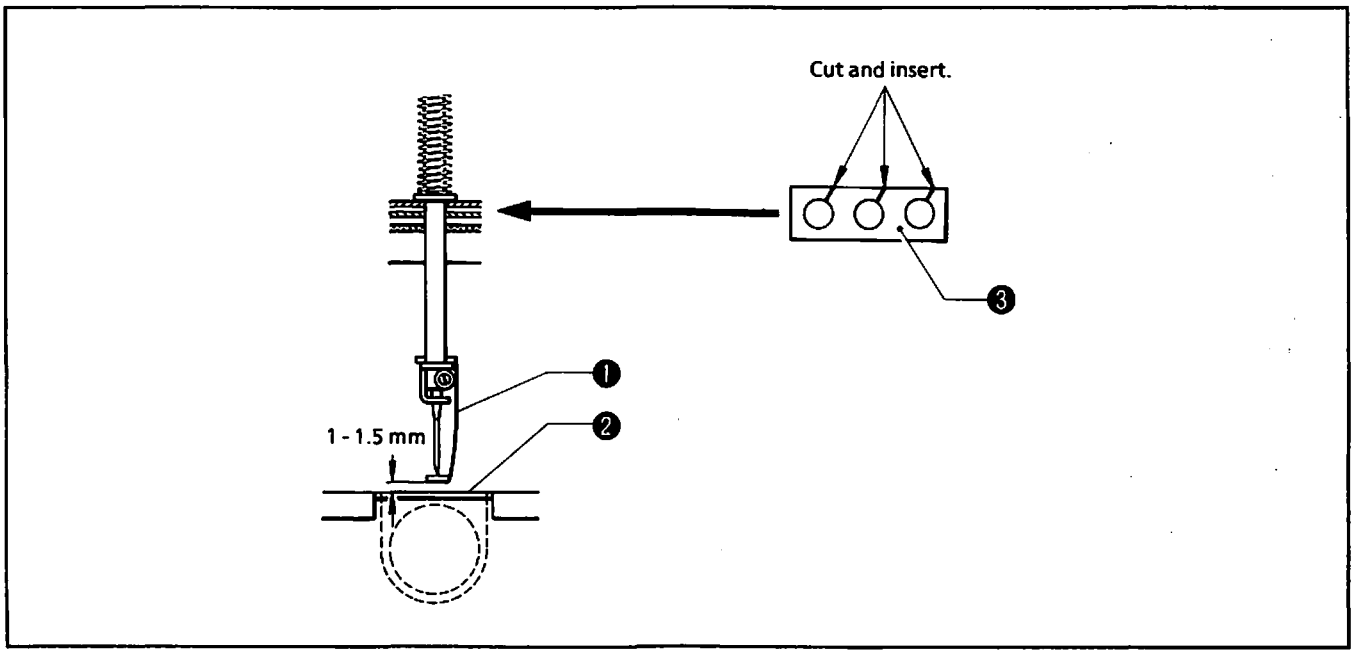
1) Loosen the screw ❶ and remove the rotary hook ❷ from the lower shaft.
2) Insert the gauge (option) into the lower shaft.
3) Loosen the screw ❹ of the needle bar clamp ❸. Turn the pulley until the needle tip lightly contacts the gauge at its lowest position.
   NOTE: Do not use the flat part of the gauge at this time.
4) Tighten the screw ❹ of the needle bar clamp ❸ firmly.

2 Adjusting timing of needle and rotary hook



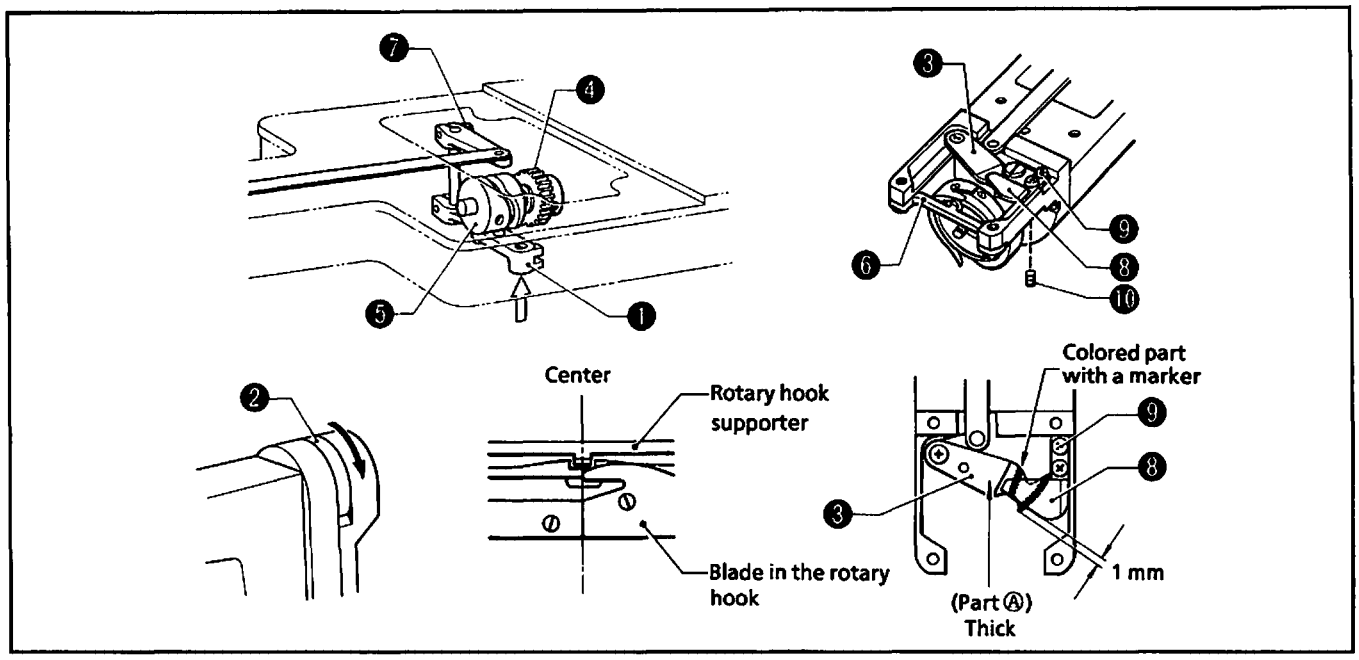
1) Select the first needle bar ❶.
2) Remove the two screws and the needle plate ❷.
3) When the needle bar is raised 2.5 mm (201°) above its lowest position (180°), loosen the screw ❹ of the rotary hook ❸, and adjust so that the needle meets the rotary hook point. Then, temporarily tighten the two stop screws.
   At this time, the needle bar height should be about 1 mm. (Figure A)
4) As for other needle bars, if the gap between the needle and rotary hook point is 0.01 - 0.2 mm, tighten the 3 screws of the rotary hook.

3 Adjusting cloth presser height



Adjust the cloth presser ❶ height with the cushion rubber ❸. The cloth presser ❶ height should be raised 1 - 1.5 mm from the needle plate ❷ at the cloth presser's lowest position. (A sheet of the cushion rubber is 0.5 mm thick.)

4 Adjusting knife and fixed knife



1. Attaching fixed knife

1) Attach the fixed knife so that the attached part parallels the rotary hook base. The movable knife broadens at part Ⓐ. Make sure the fixed knife doesn't contact it at this part.

2. Knife timing

1) While pushing the cam lever ❶ up with a finger, rotate the pulley ❷ in the direction of the arrow. When the knife ❸ begins to move, the pulley will become harder to turn. At this time, tighten the screw of the 24 J gear ❹, fix the cam ❺ by hand so it does not rotate, and turn the pulley. The rotary hook blade should be in the center of the rotary hook supporter ❻.
2) Tighten the screw of the 24 J gear ❹ so there is no backlash of the cam in the direction of the lower shaft. While pushing the cam lever ❶ up with a finger, rotate the pulley ❷ again. When the knife ❸ begins to move, the blade in the rotary hook should be in the center of the rotary hook supporter ❻.

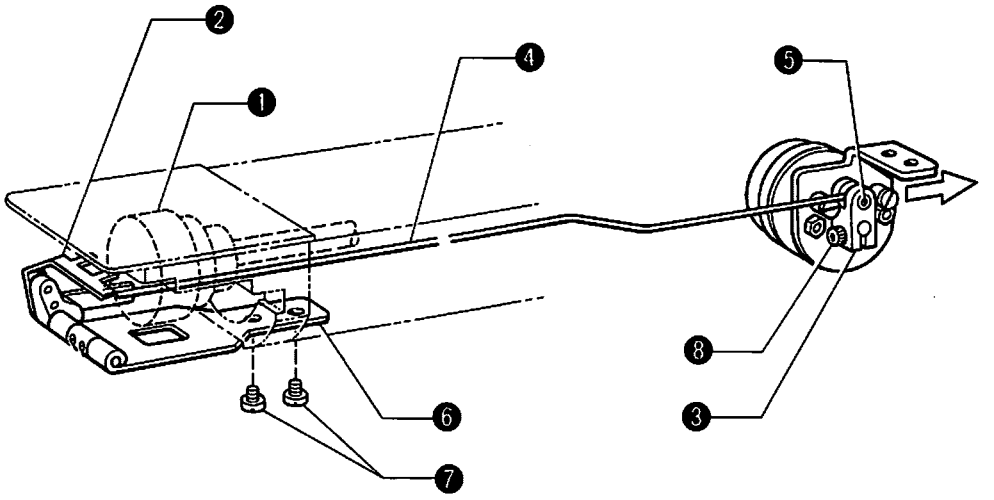
3. Knife position

Loosen the screw ❼ and adjust the knife ❸ position so that its end projects 1 mm beyond the fixed knife's tip. After thread trimming, the knife should be in this position.
If the knife does not stop at the stop position, the upper shaft will be locked and it cannot make one full revolution. In that case, move the knife to the stop position by hand.

4. Knife and fixed knife

1) With a marker, color the back of the knife ❸ and engage it with the fixed knife ❽ manually. Check that the colored portion is shaved equally. This shows proper knife engagement.
2) If the engagement is wrong, loosen the screw ❾ of the fixed knife ❽ and adjust the inclination with the lower set screw ❿.
   NOTE: The inclination of the fixed knife ❽ should be adjusted with the two top screws ❾ and the bottom set screw ❿.
   NOTE: This is fine adjustment. Adjust carefully.

5 Adjusting picker



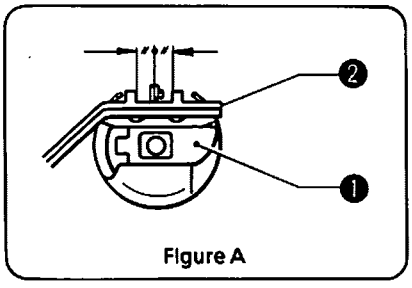
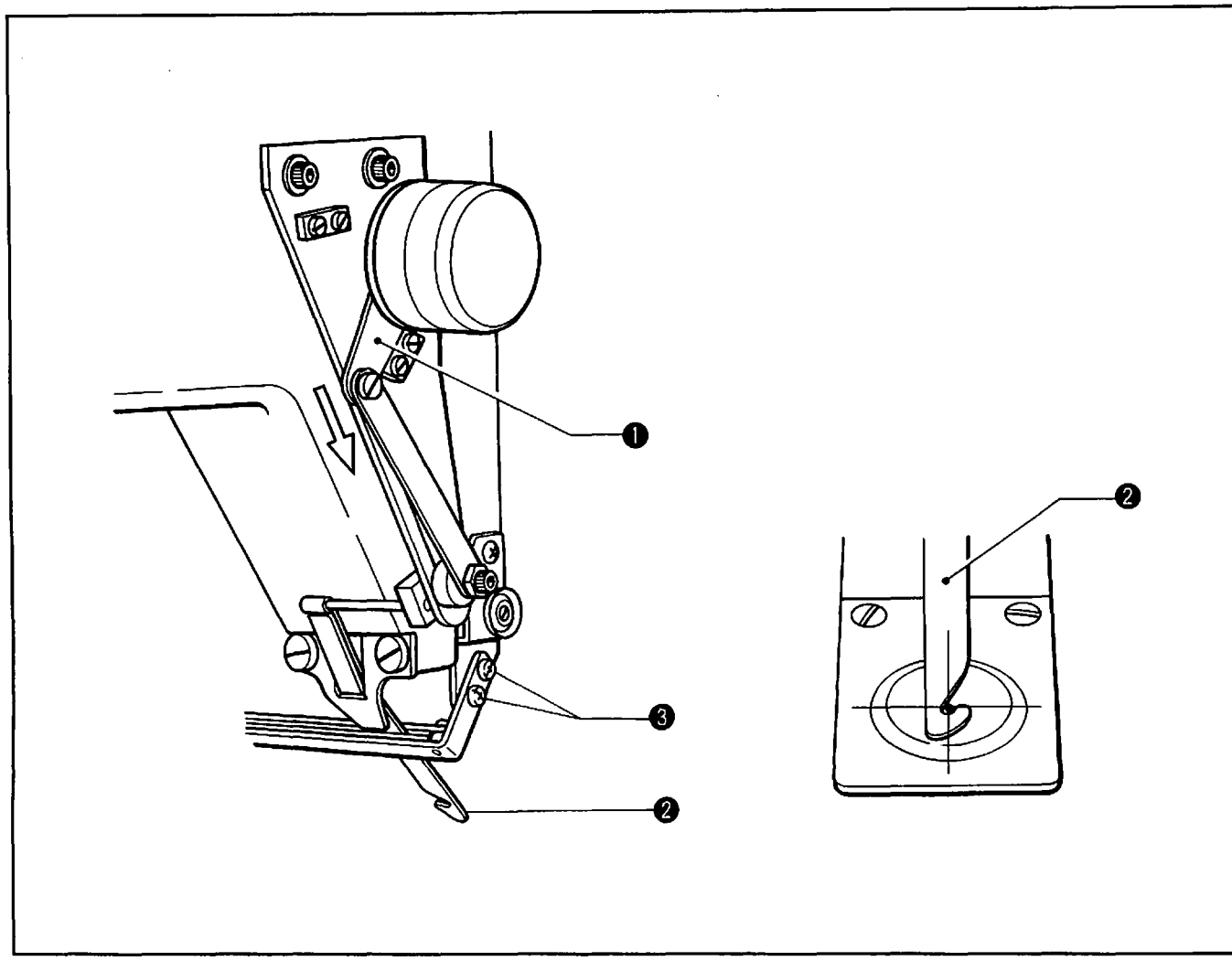


Figure A

1) Insert the bobbin case ❶ containing the bobbin into the rotary hook and set the picker ❷ position.
2) Leave the solenoid arm ❸ pushed to the needle bar side, then tighten connecting plate (A) ❹ with the screw ❺.
3) Adjust the picker ❷ so that there is no looseness and so that it functions lightly. Then tighten the picker bracket ❻ with the screw ❼.
4) Adjust the gap between the point of the picker and the bobbin to 1 - 1.5 mm. Leave the solenoid arm ❸ pushed to the pulley side (the solenoid operation position), then tighten the screw ❽.
5) Adjust the picker position so that it is bisected by the bobbin case spring (see figure A).

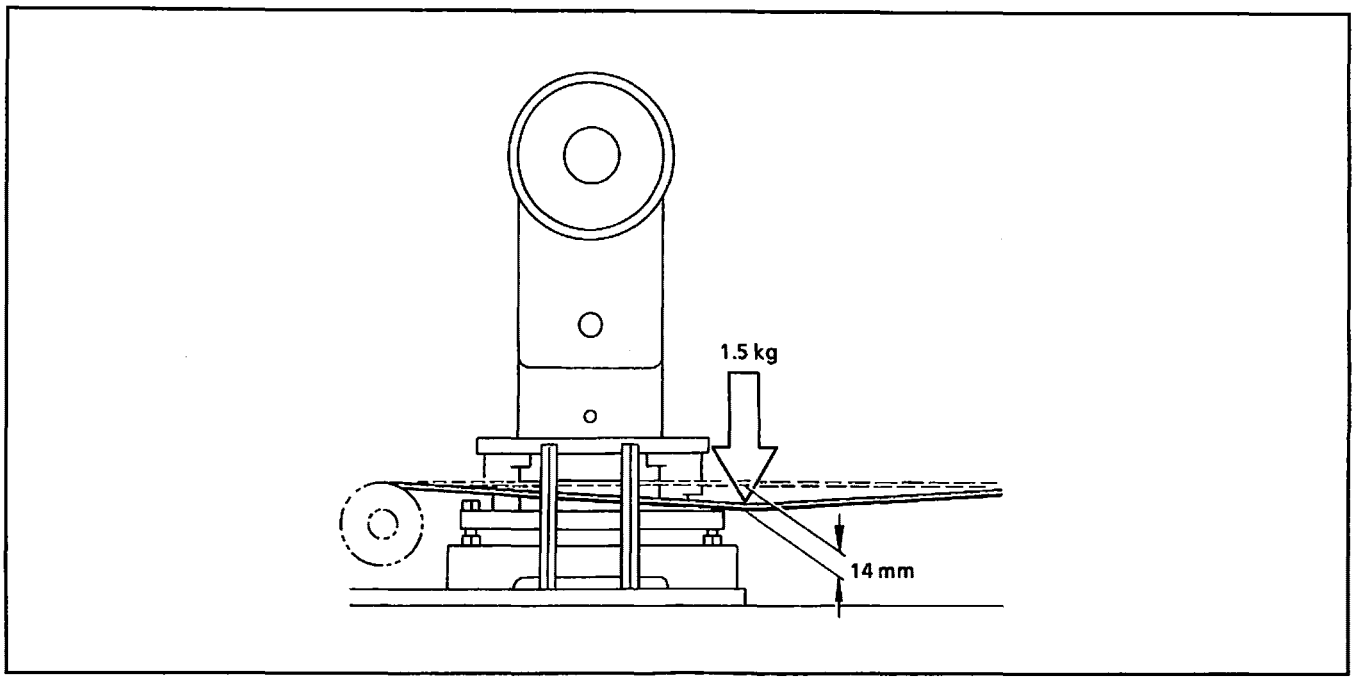
6 Adjusting the thread wiper



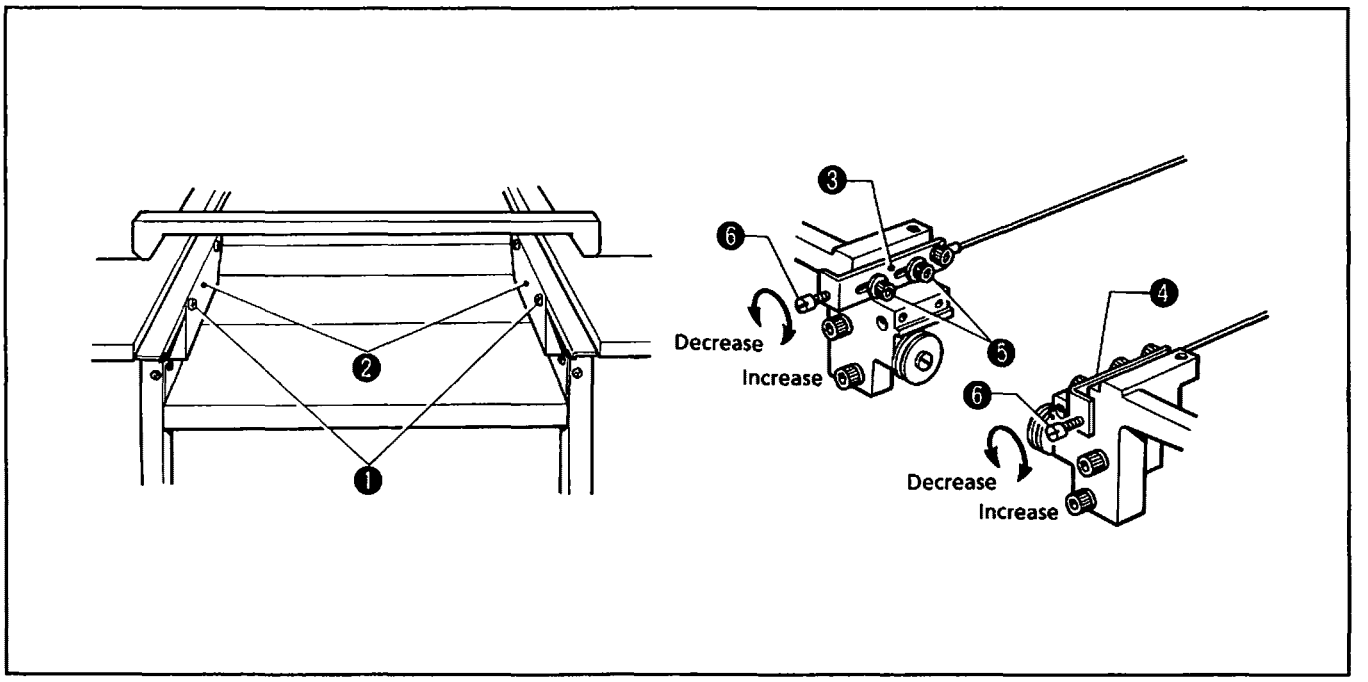
1) With a finger, move the solenoid arm ❶ in the direction of the arrow. Loosen the two screws ❸ then adjust the upper thread guide hook ❷ so that it moves slightly.
2) Adjust the upper thread guide hook ❷ so that its cut part is located at the center of the needle hole.

7 Adjusting wire tension

1. X-feed wire



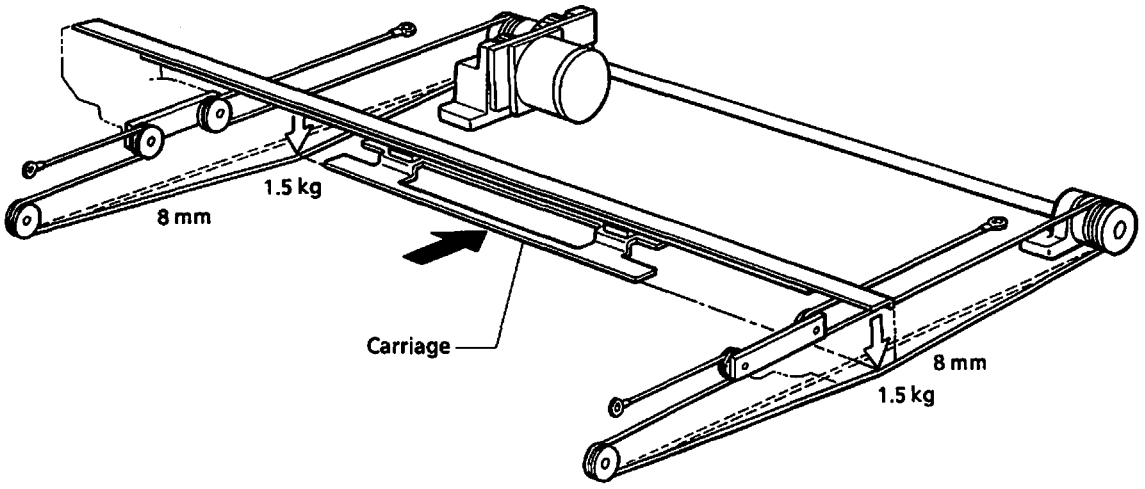
Using a 1.5 kg torque wrench or a similar tool, push at the location marked by the arrow and adjust so there is a deflection of approximately 14 mm.



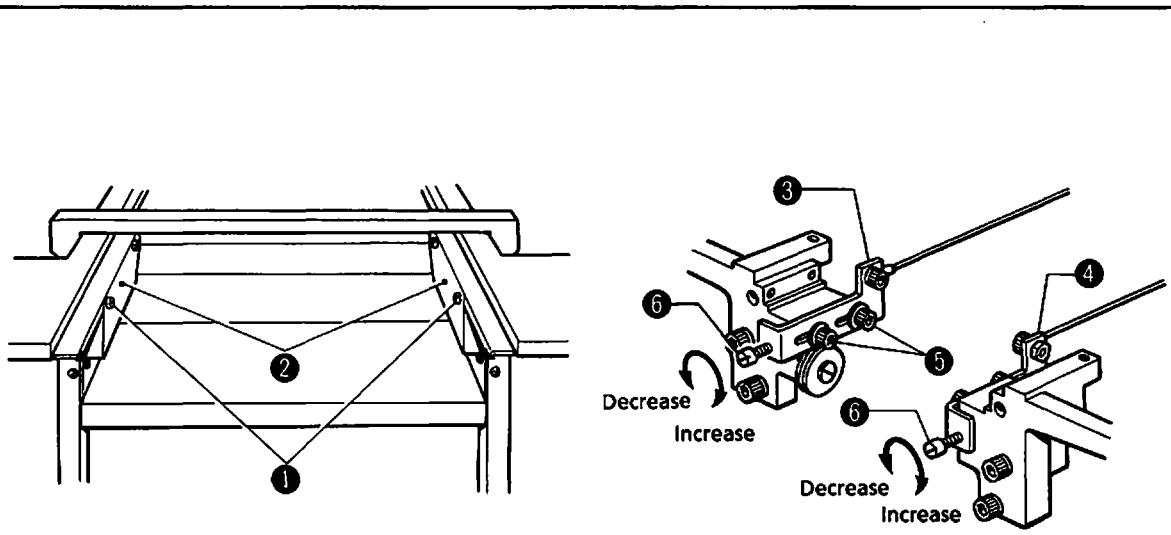
How to adjust

1) Remove the seven screws ❶ and the two covers (LR, LL) ❷.
2) Loosen the two screws ❺ of both hook (LX) ❸ and hook (RX) ❹.
3) There are two stoppers (U) ❻ on the right and the left sides. Turning them clockwise will increase the tension and turning them counterclockwise will decrease the tension.
4) When the tension is proper, tighten screw ❺.
5) After tightening screw ❺, firmly retighten stoppers (U) ❻ so there is no looseness.

2. Y-feed wire



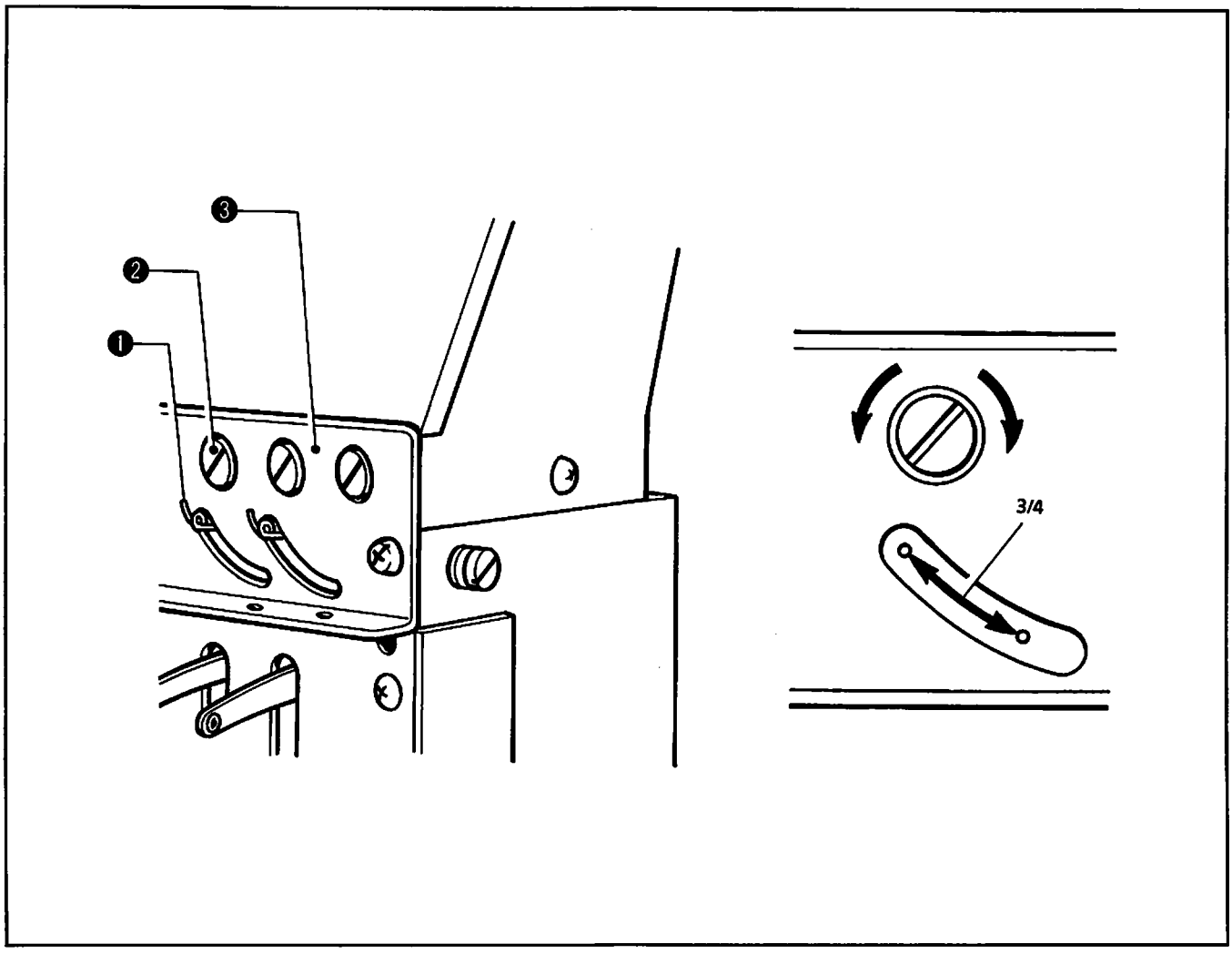
At points on the right and left wires where a line extended from the carriage intersects (see the arrow-marked points in diagram), adjust the deflection to approximately 8 mm, using a 1.5 kg torque wrench or a similar tool.



How to adjust

1) Remove the seven screws ❶ and the two covers (LR, LL) ❷.
2) Loosen the two screws ❺ of both hook (LY) ❸ and hook (RY) ❹.
3) There are two stoppers (U) ❻ on the right and the left sides. Turning them clockwise will increase the tension and turning them counterclockwise will decrease the tension.
4) When the tension is proper, tighten screw ❺.
5) After tightening screw ❺, firmly retighten stopper (U) ❻ so there is no looseness.

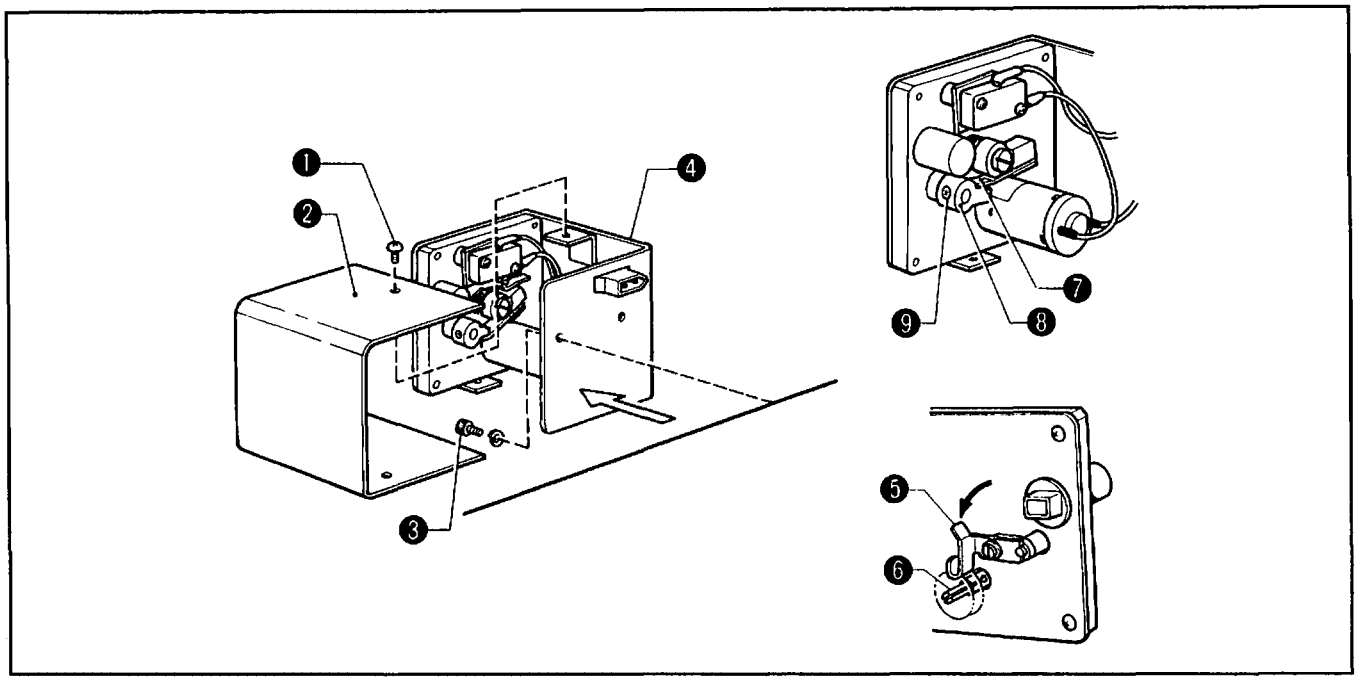
8 Adjusting thread breakage detect stud



When the needle thread is pulled near the needle and the thread which moves the thread breakage detect stud ❶ is slowly returned, the thread breakage detect stud ❶ should return to its position smoothly. Adjust the tension by moving shaft no.1 ❷ right or left.
(Adjust so that the spring moves within 3/4 of the hole ❸ of the 2-stage thread guide)
NOTE: When #120 thread is used, the needle thread tension should be from 60 - 120 g..

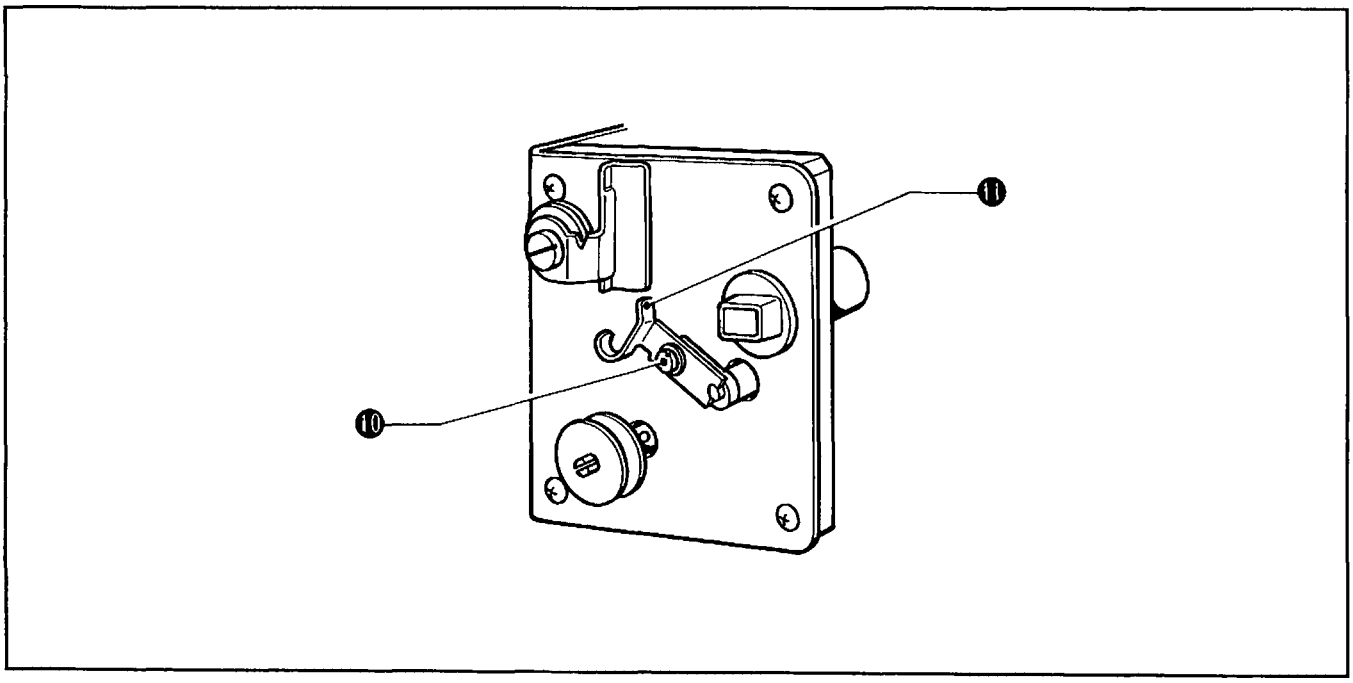
[9] Adjusting bobbin winder

1. Positioning bobbin winder claw stud screw



1) Remove the three screws ❶ and the bobbin winder cover ❷.
   Remove the two screws ❸ and the bobbin winder equipment assembly ❹.
2) Move the bobbin presser ❺ toward the bobbin winder shaft ❻. Stop moving just before it reaches the position where thread-winding ends.
3) Tighten the two screws ❾ so that the plate spring ❼ is at the stepped section of the bobbin winder claw ❽.

2. Positioning button presser

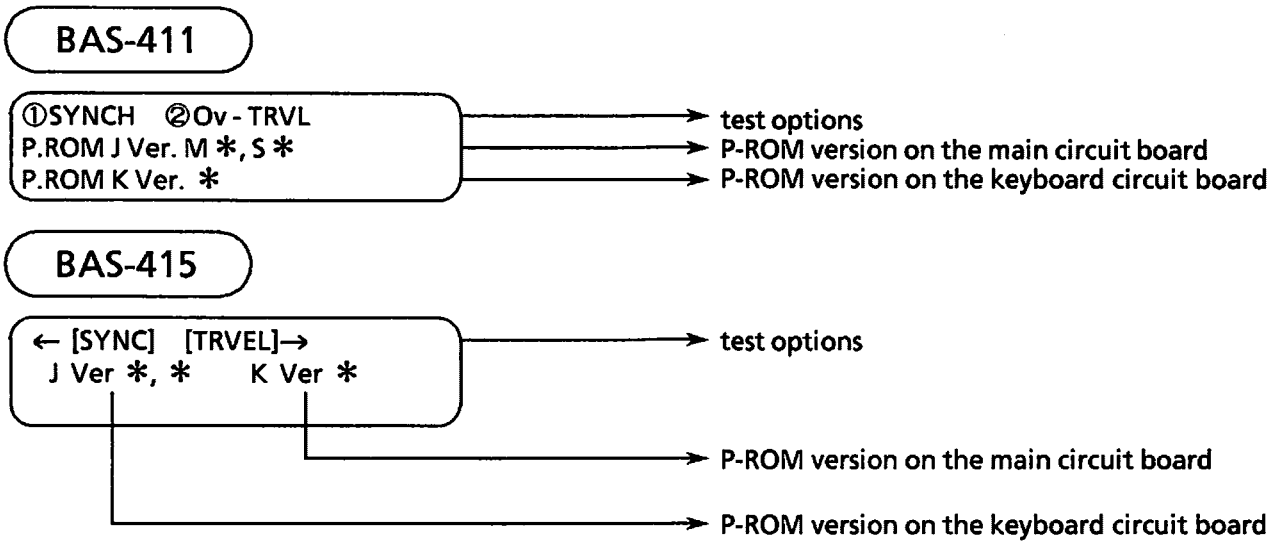


Loosen the screw ⓫ and adjust the bobbin presser ⓫ so that the proper amount of thread can be wound on the bobbin.

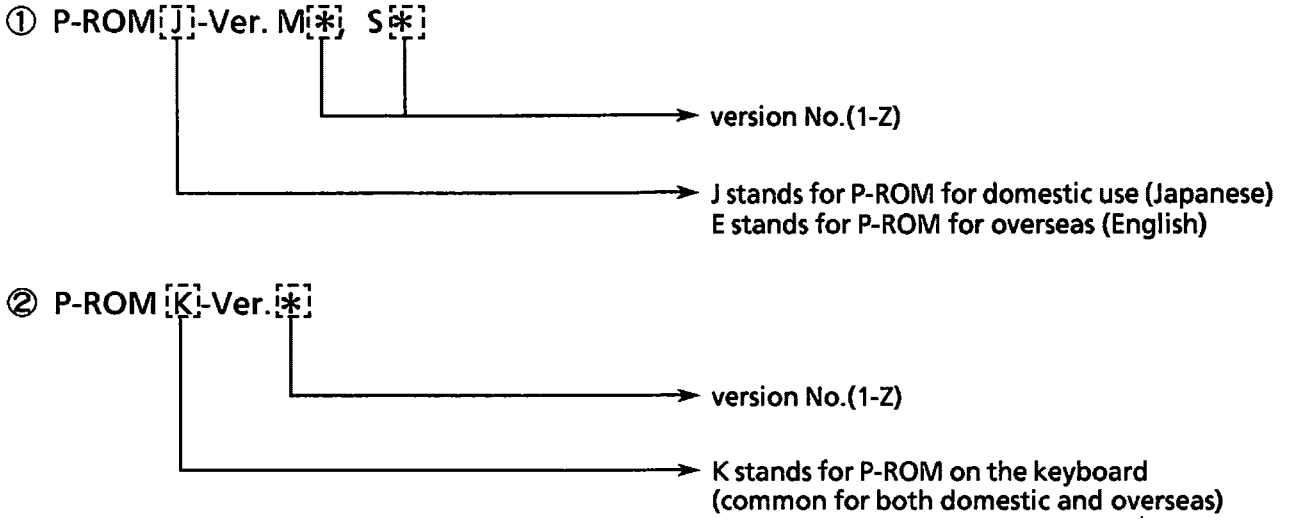
⑩ BAS-411·415 test mode

The BAS-411 and 415 main menu contain test mode functions. Although the test options will not be displayed, pressing the number <0> key (BAS-411) or the <✻> key on the keyboard (BAS-415) will start test mode operation.

1. Explanation of test mode display



2. Explanation of P-ROM version

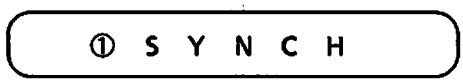


※ **How to start the test mode**

BAS-411 ..... Select the <0> key in the main menu.
BAS-415 ..... Select the <✻> key in the main menu.

3. Explanation of test menu

1)



The menu for adjusting the needle position detecting synchronizer on the machine upper shaft.

2)

The menu for adjusting the position of the overtravel sensor.

Pressing alphanumeric keys <1> or <2> will set the machine into one of the test modes.
After adjustment, press the <END> key to return to the main menu. (BAS-411·415)

11 Adjusting synchronizer

The synchronizer detects the needle position and synchronizes the motion of the needle and the holder base.
When the emergency stop operates after the power switch is turned on, or when the machine stops after thread trimming, the needle bar will be released in the jump condition, and the thread take-up will stop at the same position as the other 8 needle bars.

1. Adjusting machine stop position (stop signal)

BAS-411

①SYNCH ②Ov - TRVL
ROM J-Ver. M*, S*
ROM K-Ver. *

BAS-415

← [SYNC] [TRVEL]→
J-Ver * K-Ver *

BAS-411

SYNCH check TDU

BAS-415

SYNCH. T=● D=● U=○

1) Turn on the machine power.

2) (BAS-411)
Press the alphanumeric key <0> key in the main menu.

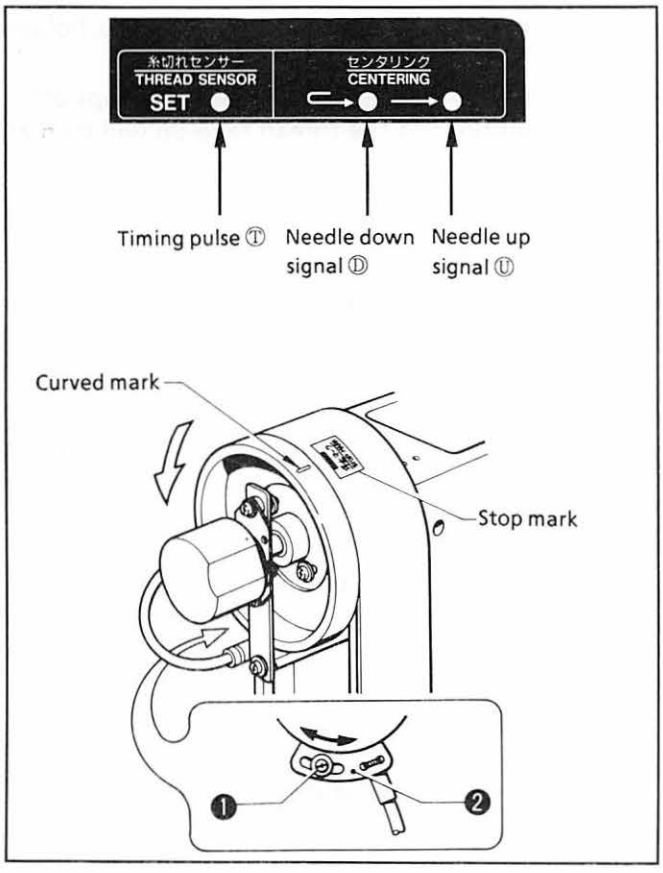
(BAS-415)
Press the <*> key in the main menu.

3) (BAS-411)
Press the <1> key to select ①SYNCH.

4) The green LED located on the upper right of the panel will display the numbers from ① to ③ as shown in the figure on the left.

(BAS-415)
By pressing the <◁> key, select [SYNC].

The circles next to "T" and "D" in the display are black.



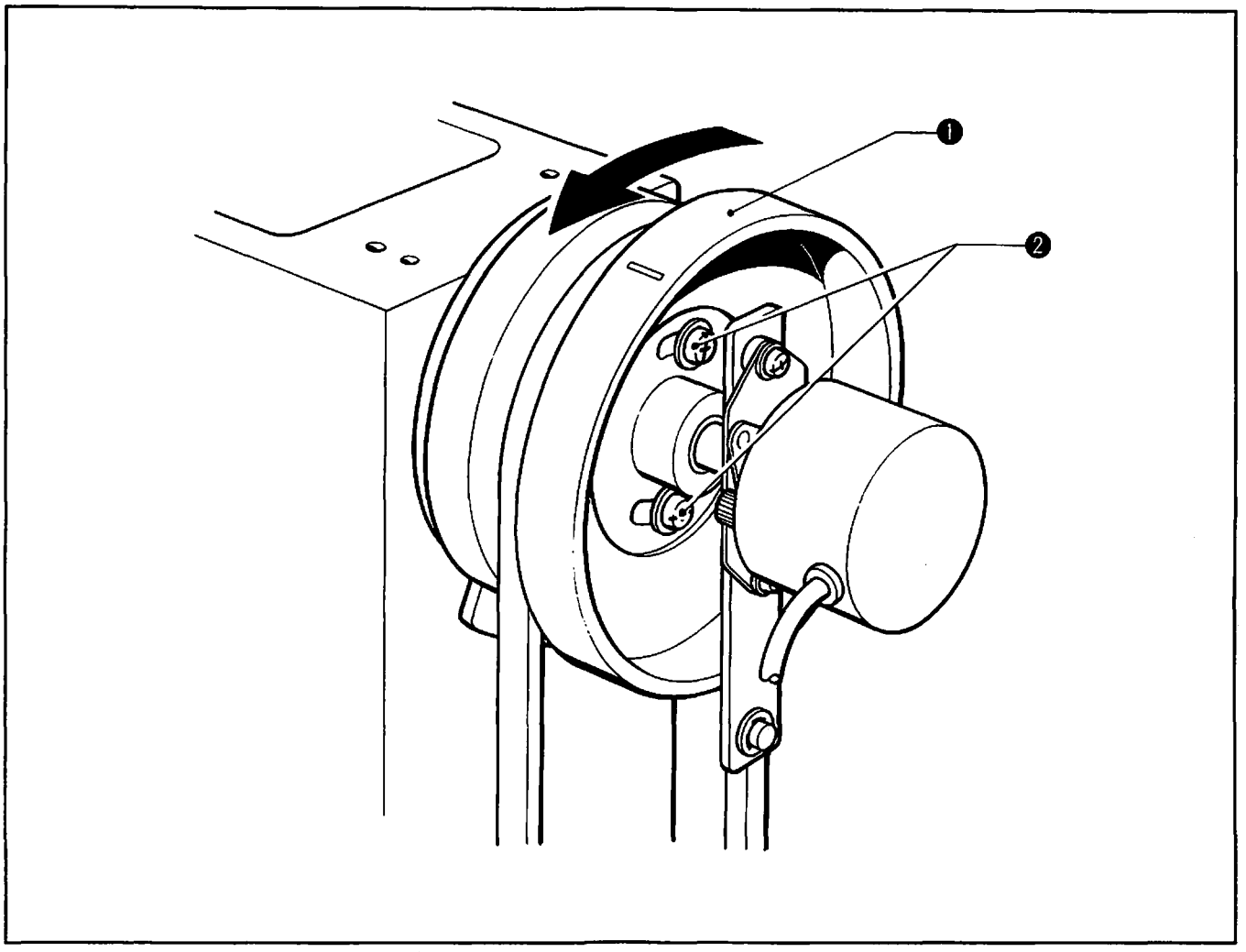
The synchronizer will display the signals as follows:

①timing pulse Ⓣ ..... blinks every 7.5°
②needle down signal Ⓓ ... goes off at – 210°
③needle up signal Ⓤ ..... goes off when between – 92.5° and 112.5°

92.5° ..... When the needle bar is lowered 20 mm below its highest position.
112.5° ..... When the needle bar is lowered 29 mm below its highest position.
210° ..... When the needle bar is raised 20 mm above its lowest position.

5) Turn the machine pulley in its normal direction. To adjust the synchronizer assembly ❷, loosen the screw ❶ so that the needle stop signal goes off when the needle is 20 mm below its highest position.
NOTE: At this time, the curved mark on the pulley should be aligned with the stop mark.

2. Adjusting needle down signal



When the machine pulley ❶ is turned in its normal direction and the needle is 5 mm above its lowest position, the lit needle down signal should go off. Loosen the two screws ❷ to adjust.

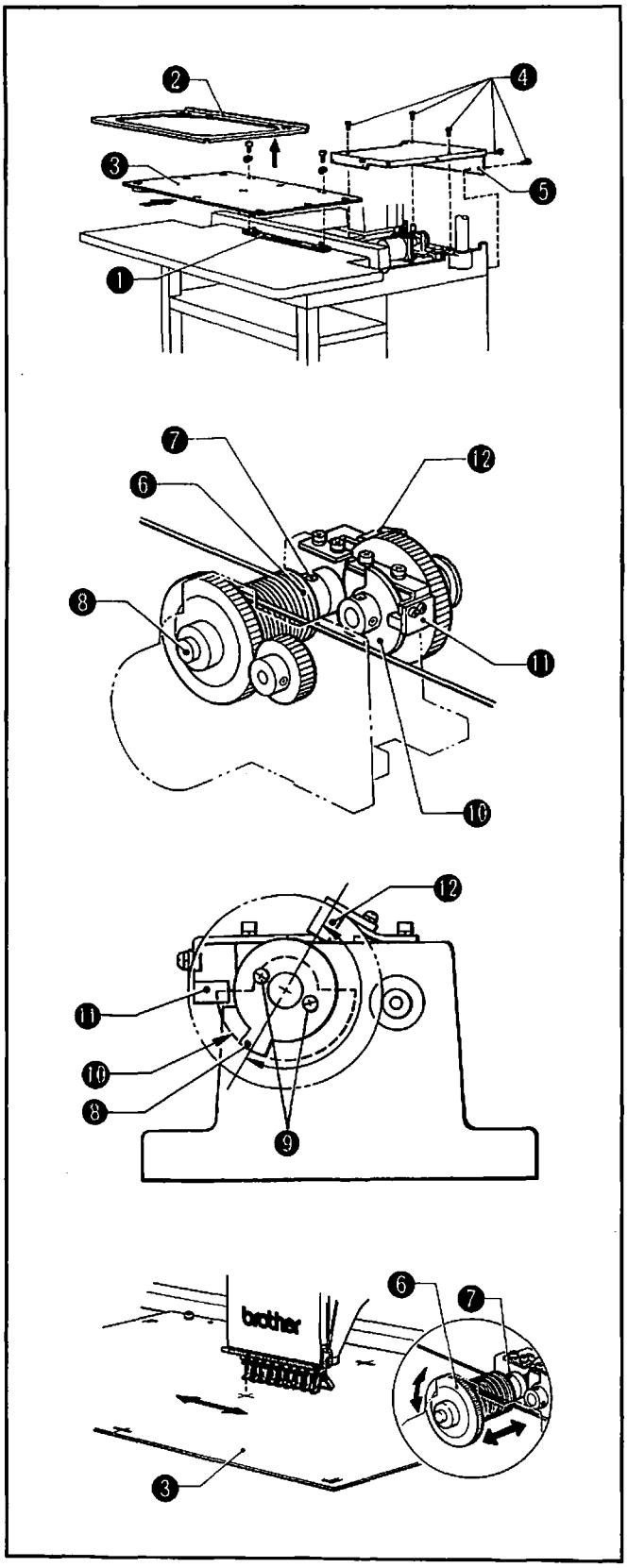
NOTE 1: When procedure 1 "Adjusting machine stop position" is done, the needle down signal will move to the same angle. Be sure to adjust the needle down signal when machine stop position has been adjusted. When only the needle down signal is adjusted, the machine stop position does not need to be adjusted.

NOTE 2: How to attach the sewing machine pulley
Rotate the sewing machine in the normal rotation direction. Align the first screw with the screw stop of the upper shaft and attach the pulley. Then, tighten the screw.

⑫ Adjusting home position using home position plate

NOTE1: Use the XY-axis home position plate assembly (S21078-001 optional).
NOTE2: Before making this adjustment, turn the power switch off.

<X-direction>



1) Remove the holder base ❷ from the X-carriage ❶, and then attach the XY-axis home position plate assembly ❸.

2) Remove the seven screws ❹ and table R ❺.

3) Loosen set screw ❼ of wire drum X ❻ so that wire drum X ❻ can turn idly.

4) Temporarily tighten the screw ❾ so that the X-limit dog ❽ is centered in its hole.

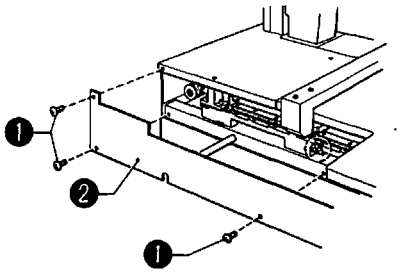
5) Attach the X-limit dog ❽ so that it is opposite (180 degrees) from the sensor ⓬ when the X-axis home position dog ⓫ interrupts sensor ⓫ light.

6) While holding down the EMERGENCY key, turn on the power.

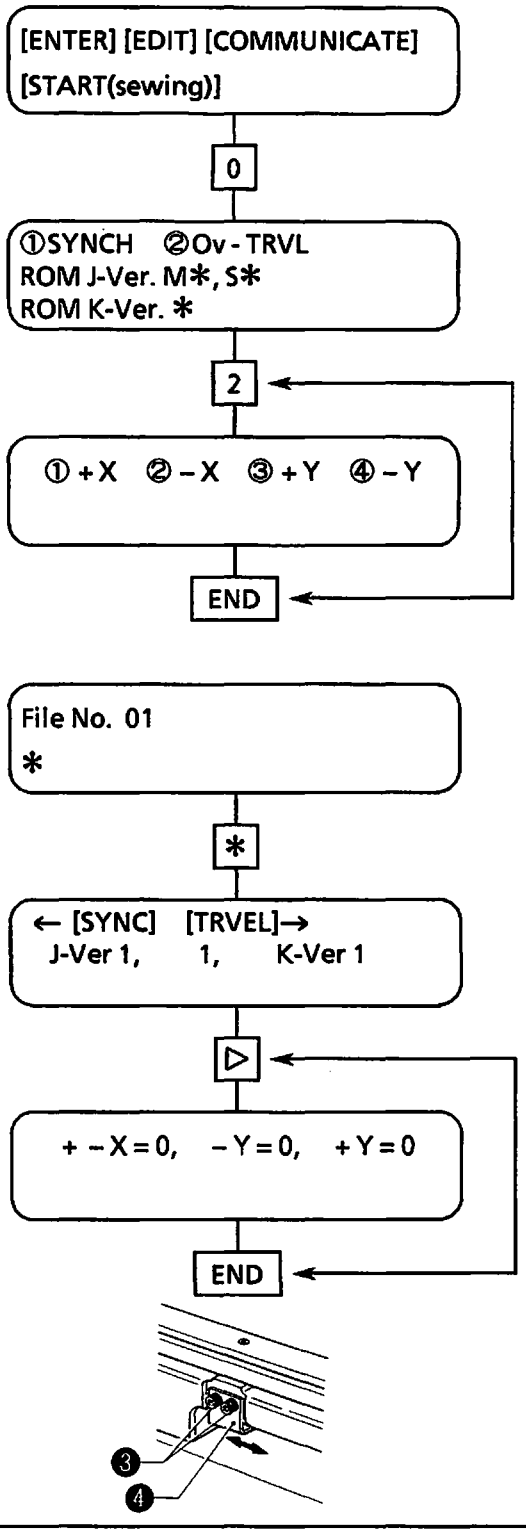
7) The machine detects the X-home position and the XY-axis home position plate ❸ stops.

8) Turn XY-home position plate assembly ❸ manually and adjust the needle tip position so that it is in the center of the cross of the XY-axis home position plate ❸. Then, tighten screw ❼ firmly so that there is no end play of the shaft.

<Y-direction>



Remove screw ❶ and cover LV ❷ on the left.



BAS-411

1) Turn on the power.
Press the <0> key in the main menu.

2) Press the <2> key to select Ov-TRVL.

3) Loosen the bolt ❸. While pressing the <2> key and <END> key alternately, adjust the sensor bracket ❹ by moving it in the Y direction (forward and backward).

BAS-415

1) Turn on the power.
Press the <*> key in the main menu.

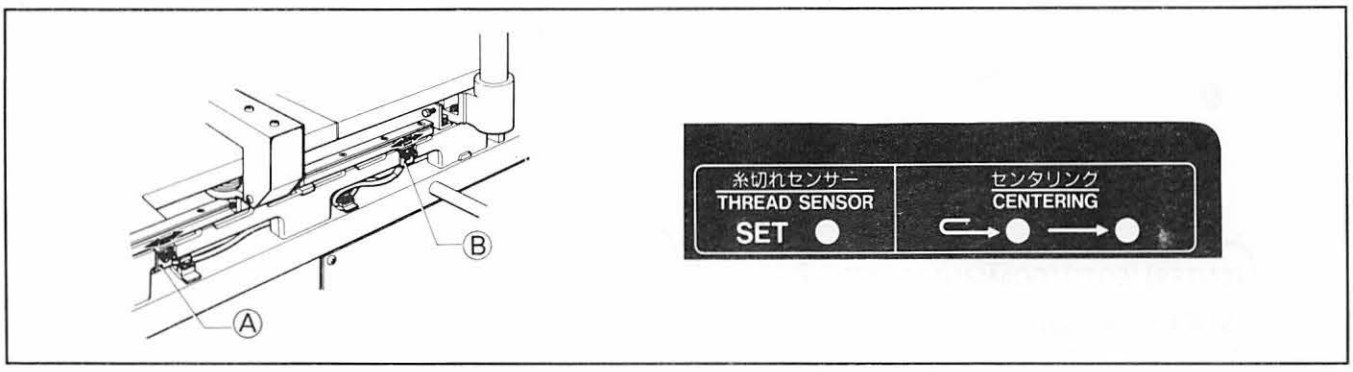
2) Press the <→> key to select "TRVEL."

3) Loosen the bolt ❸. While pressing the <→> key and <END> key alternatly, adjust the sensor bracket ❹ by moving it in the Y direction (forward and backward).

NOTE: Move the sensor bracket toward the center if the needle is not in the center of the cross.

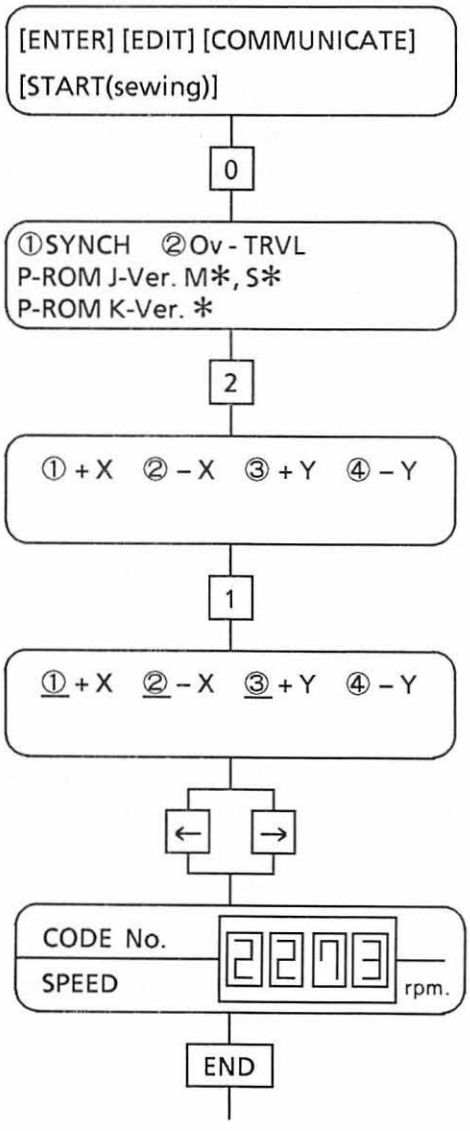
13 Positioning over limit sensor

<Over limit sensor location>



BAS-411

<X-direction>



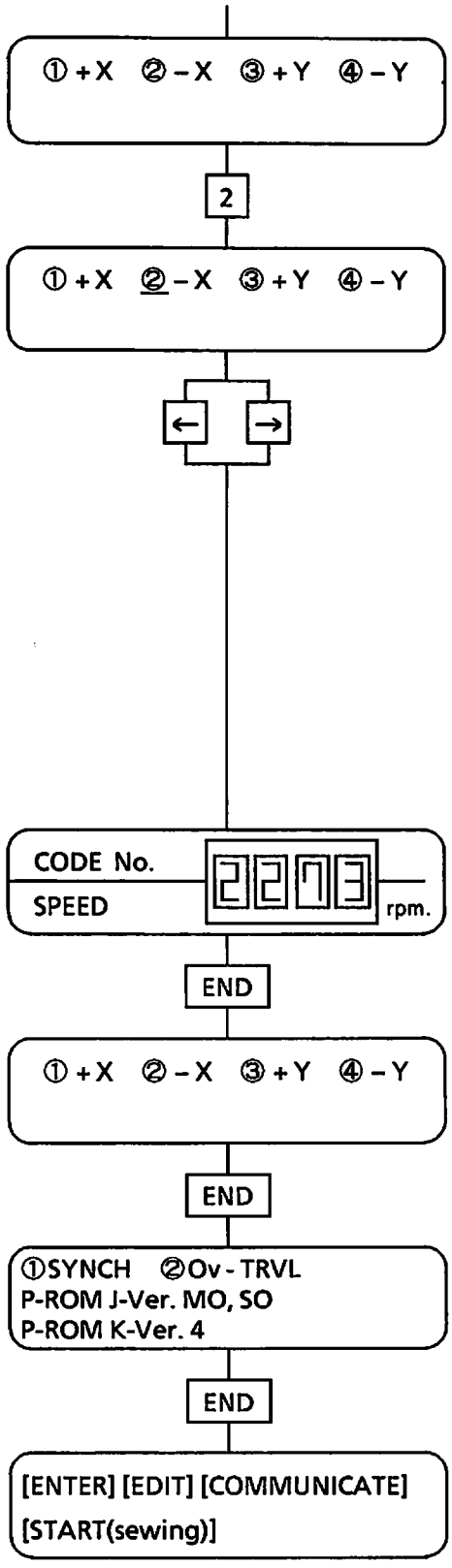
1) Press the numeric key <0> in the main menu.

2) Press the <2> key to select ②Ov - TRVL.

3) Press the <1> key. The hoop and the holder base move 227.3 mm to the left. The figure "227.3" is displayed on the panel and the cursor appears under the number ①.

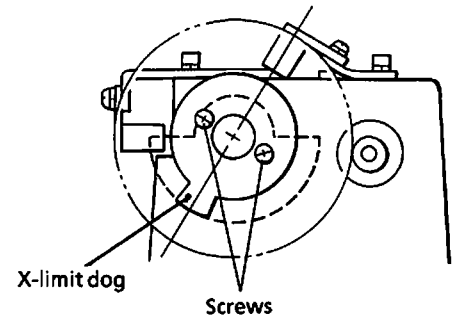
4) Loosen two screws of the X-limit dog and adjust so that the thread sensor indicator lights with the figure on the display between 227.0 mm and 227.5 mm when <←> and <→> keys are pressed.

5) Press the <END> key.



6) Press the <2> key. The hoop and the holder base move 227.3 mm to the right. The figure "227.3" is displayed on the panel and the cursor appears under the number ②.

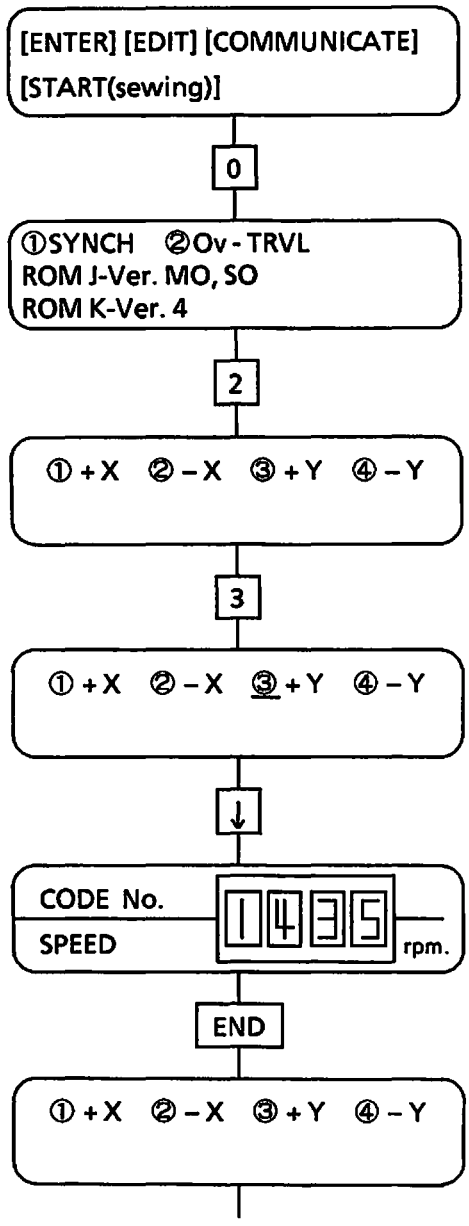
7) Loosen two screws of the X-limit dog and adjust so that the centering indicator lights with figure on the display between 227.0 mm - 227.5 mm when jog keys <←> and <→> are pressed.



8) Press the <END> key twice. The message "CAUTION MOVING!" is displayed and the hoop and the holder base move to the center.

9) Press the <END> key again to return to the main menu.

<Y-direction>



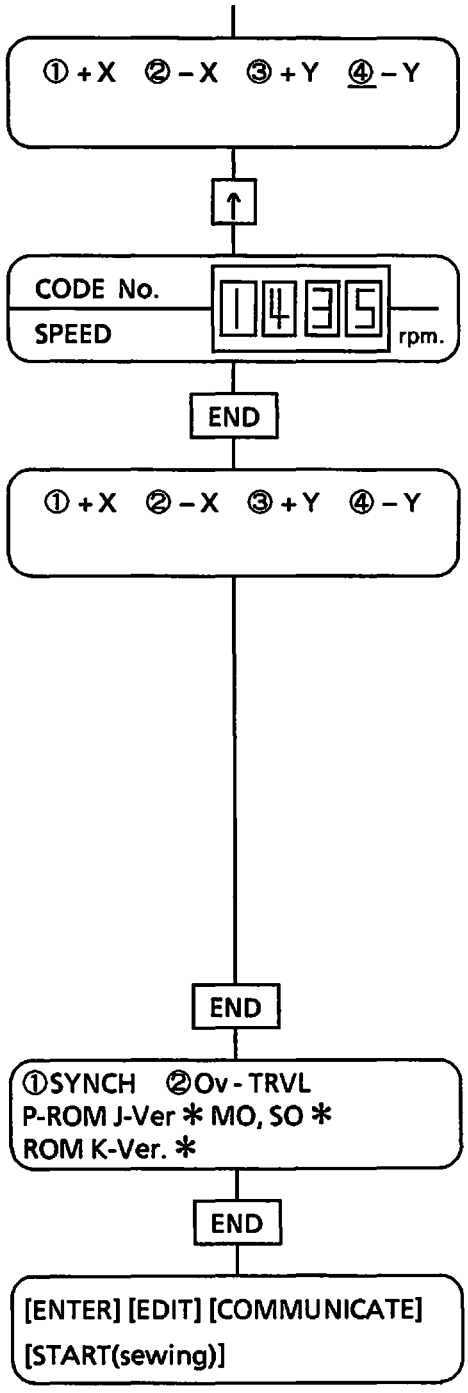
1) Press the numeric key <0> in the main menu.

2) Press the <2> key to select ②Ov - TRVL.

3) Press the <3> key. The hoop and the holder base move 143.5 mm toward the operator. The figure "143.5" is displayed on the panel and the cursor appears under the number ③.

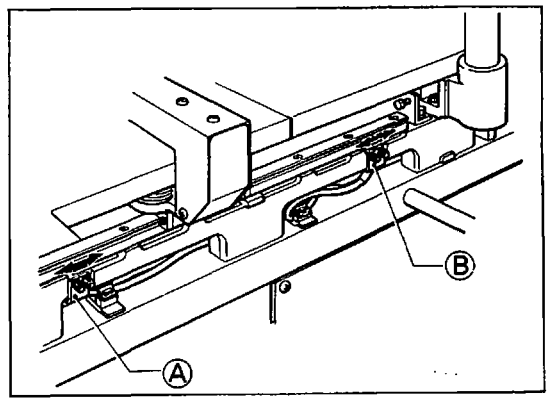
4) Loosen two bolts. Adjust sensor bracket A position so that the thread sensor indicator lights with the figure on the display between 143.0 mm - 144.0 mm when <↑> or <↓> is pressed. (143.5 mm desireble)

5) Press the <END> key.



6) Press the <4> key. The hoop and the holder base move 143.5 mm away from the operator. The figure "143.5" is displayed on the panel and the cursor appears under the number ④.

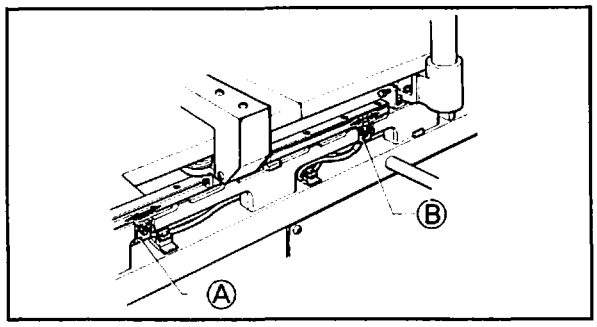
7) Adjust sensor bracket B position so that the centering indicator lights with the figure on the display between 143.0 mm - 144.0 mm when <↑> or <↓> is pressed. (143.5 mm most desireble)

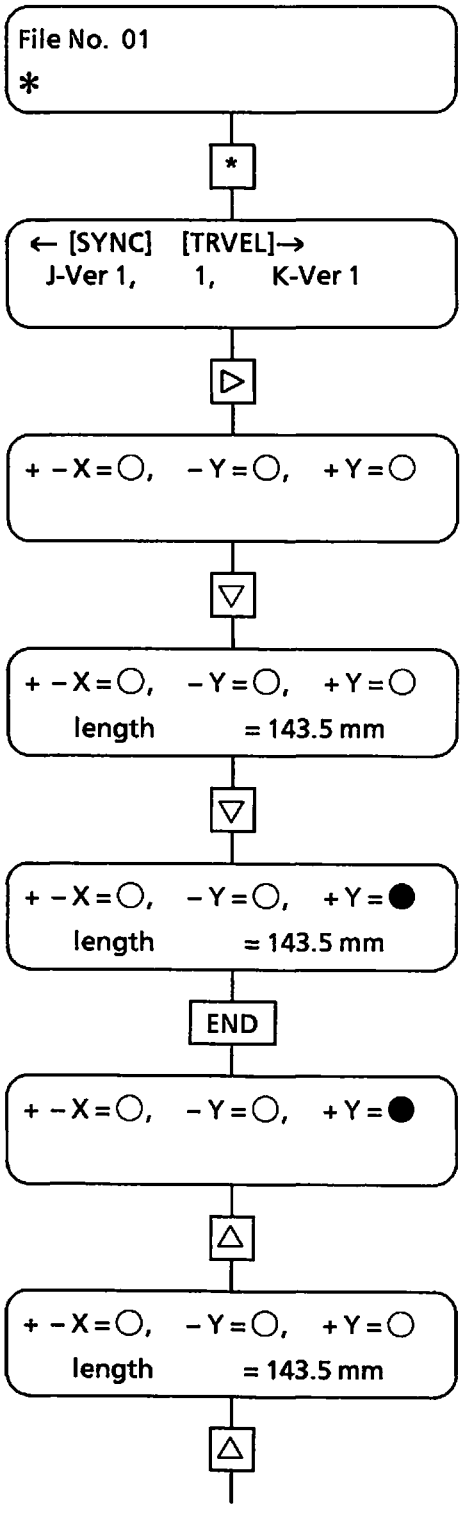


8) Press the <END> key three times to return to the main menu.

BAS-415

<Y-direction>





1) Press the <✻> key in the main menu.

2) Press the <▷> key to select TRAVEL.

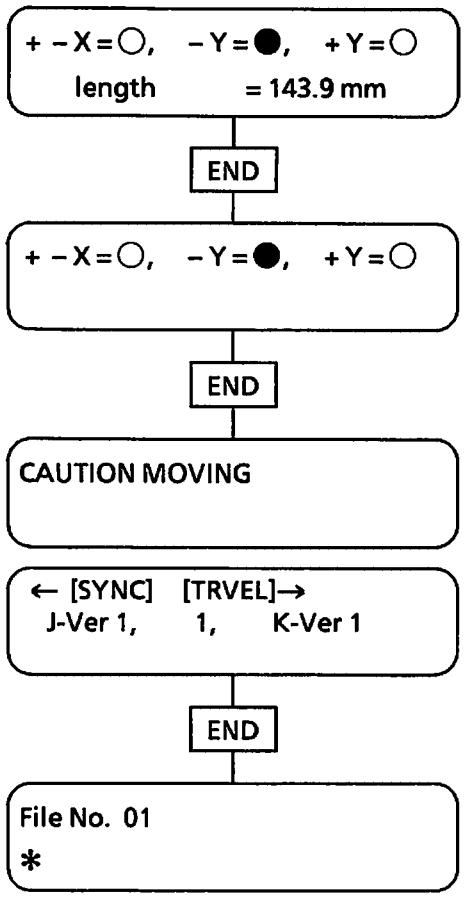
3) Press the <▽> key. The hoop and the holder base move 143.5 mm toward the operator and the figure "143.5" is displayed on the display.

4) Press the <▽> key again. Loosen two bolts and adjust the sensor bracket A position so that the circle of the "+Y=○" turns black when length is between 143.0 mm and 143.7 mm.

5) After adjustment, press the <END> key.

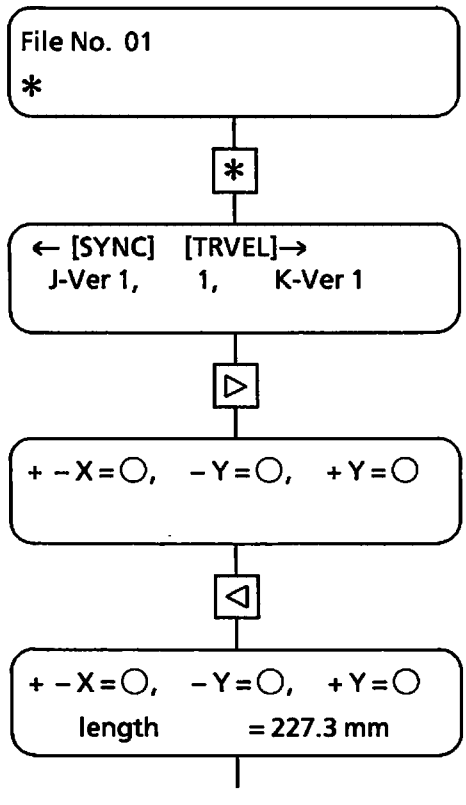
6) Press the <△> key. The hoop and the holder base move 143.5 mm away from the operator and the figure "143.5" is displayed on the display.

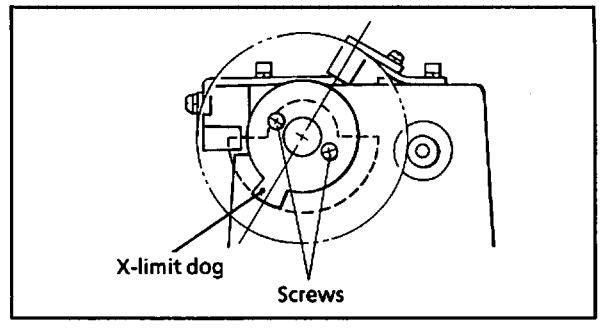
7) Press the <△> key again. Loosen two bolts and adjust the sensor bracket B position so that the circle of the "-Y=○" turns black when length is between 143.3 mm and 143.7 mm.



8) After adjustment, pressing the <END> key twice returns the machine to its home position and pressing it three times returns the machine to the main menu.

<X-direction>

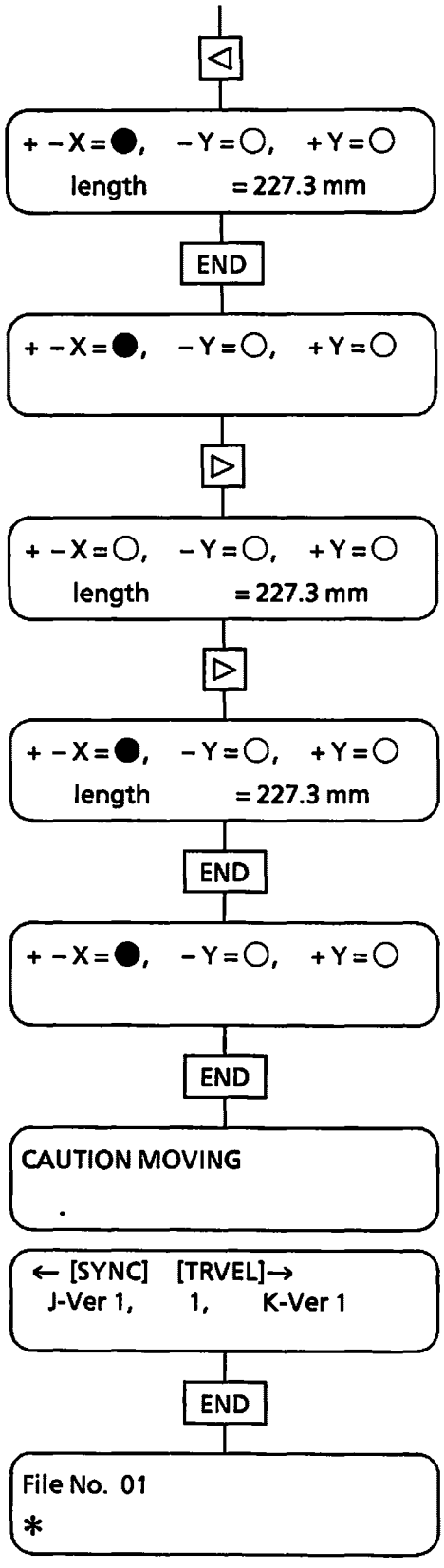




1) Press the <*> key in the main menu.

2) Press the <▷> key to select TRAVEL.

3) Press the <◁ > key. The hoop and the holder base move 227.3 mm to the left and the figure "227.3" is displayed on the display.



4) Press the <◁> key again. Loosen two screws of the X-limit dog and adjust so that the circle of the "+ −X=○" turns black when length is between 227.0 mm and 227.5 mm.

5) After adjustment, press the <END> key.

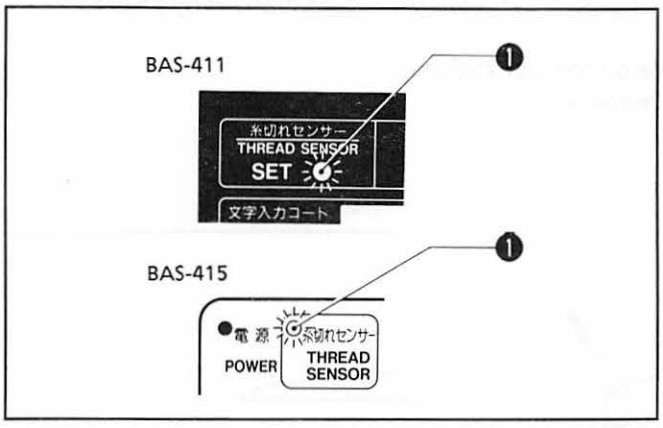
6) Press the <▷> key. The hoop and the holder base move 227.3 mm to the right and the figure "227.3" is displayed on the display.

7) Press the <▷> key again. Loosen two screws of the X-limit dog and adjust so that the circle of the "+ −X=○" turns black when length is between 227.0 mm and 227.5 mm.

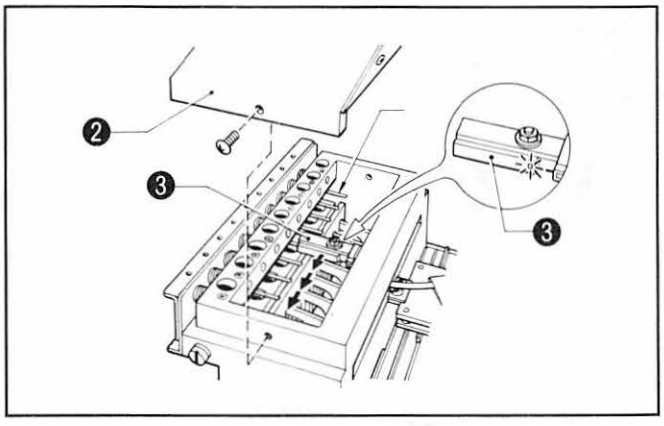
8) After adjustment, pressing the <END> key twice returns the machine to its home position and pressing it three times returns the machine to the main menu.

14 How to adjust thread sensor (thread breakage detector)

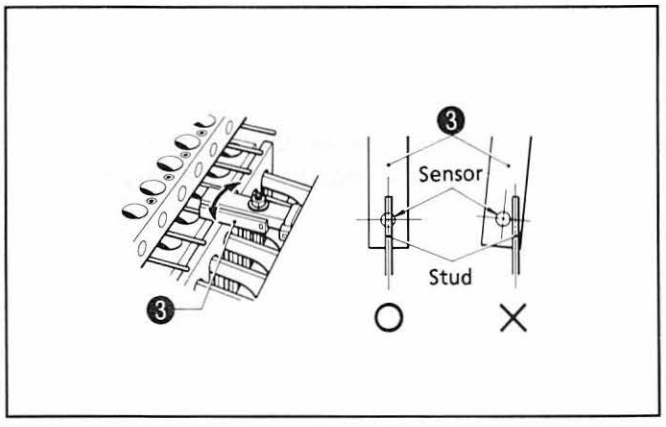
If the thread sensor does not function:



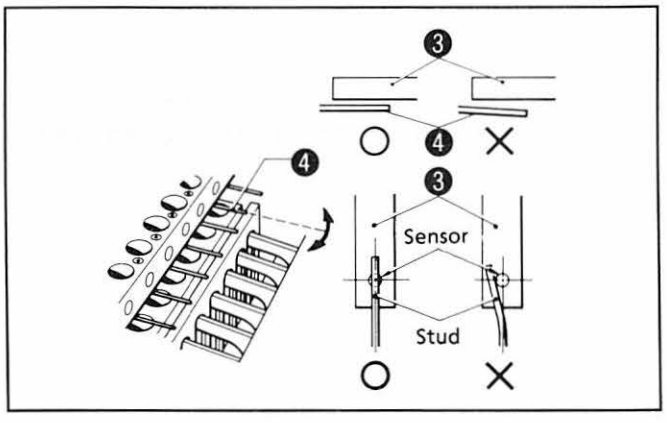
1) Make sure that the thread sensor indicator ❶ is on.



2) Remove the adjustment base ❷ and make sure that the switch ❸ indicator lights at each needle bar position.



3) If the indicator of the switch ❸ does not light at most needle bar positions, adjust the switch ❸ position.



4) If the indicator of the switch ❸ does not light at a specific needle bar, adjust its thread breakage detect stud ❹ by gently bending it with a plier.
NOTE: Do not overbend. The stud ❹ may break.

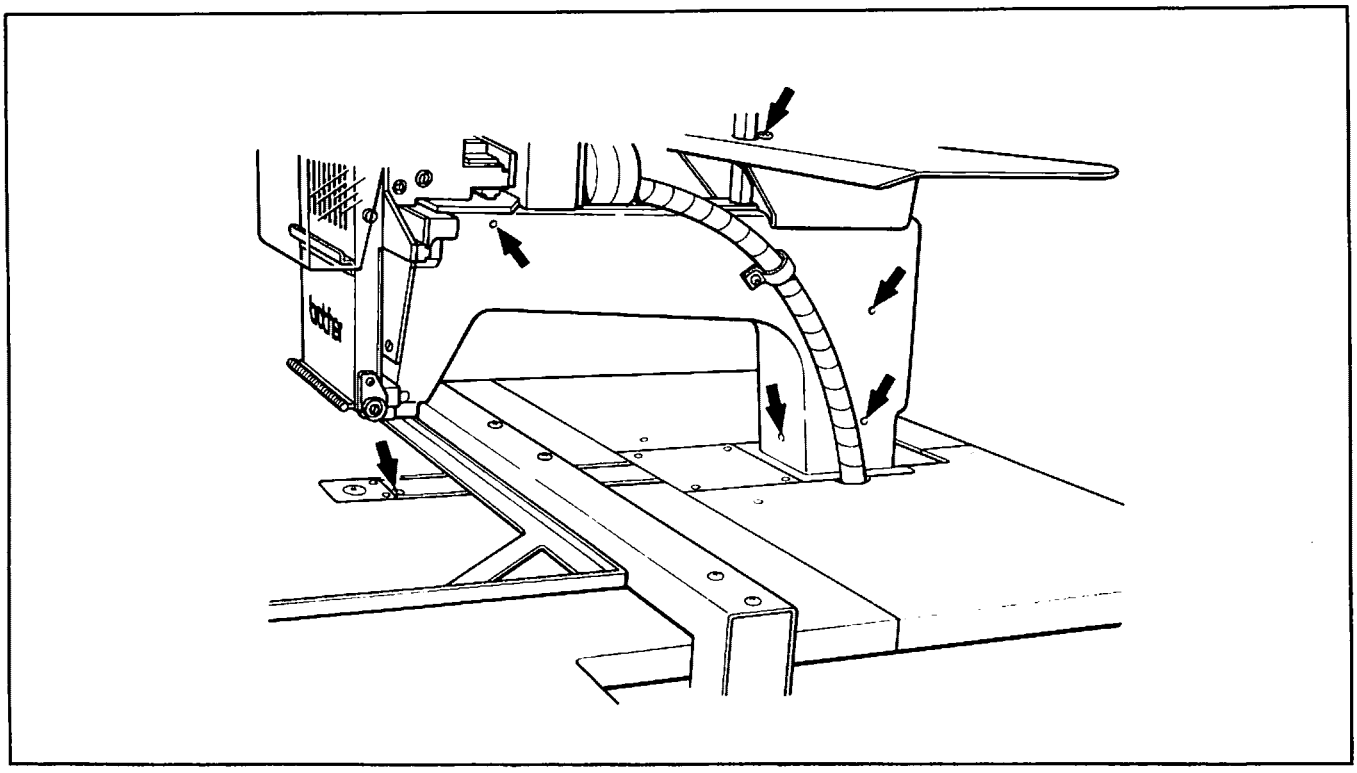
LUBRICATION

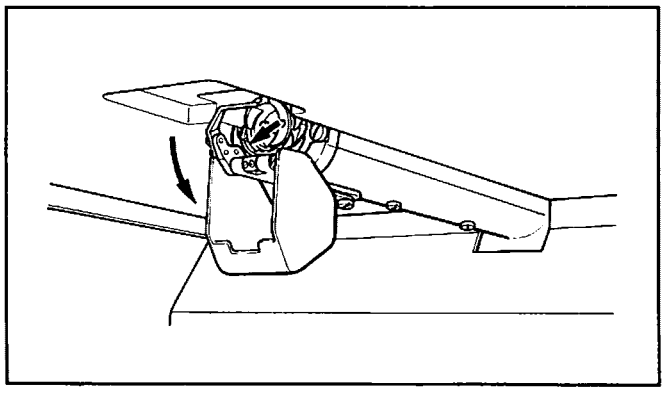
1 Machine head

Lubrication is necessary for keeping the machine in good condition.
Everyday before using the machine, add 1-2 drop(s) of oil at each location in the figure marked by an arrow.

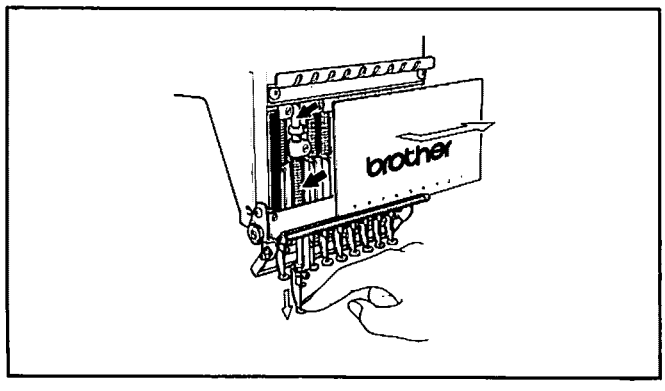
NOTE: ①Be sure to use Brother- specified sewing machine oil for lubrication.
②Overlubrication may cause oil to drip on to the material.

1) Lubricate these six places:



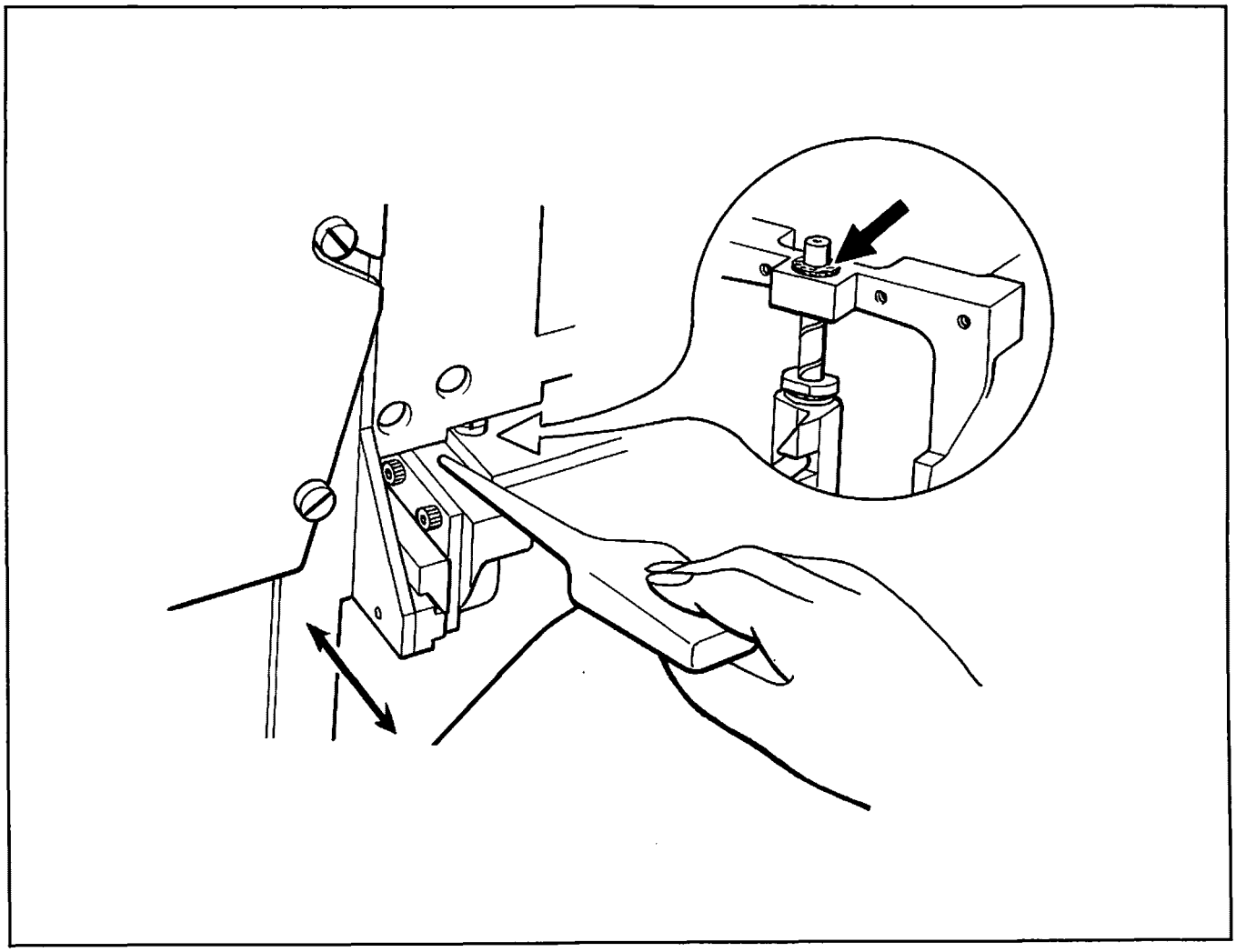


2) Add a drop of oil at the reel of the rotary hook.
NOTE: Do not lubricate aside from the rotary hook.



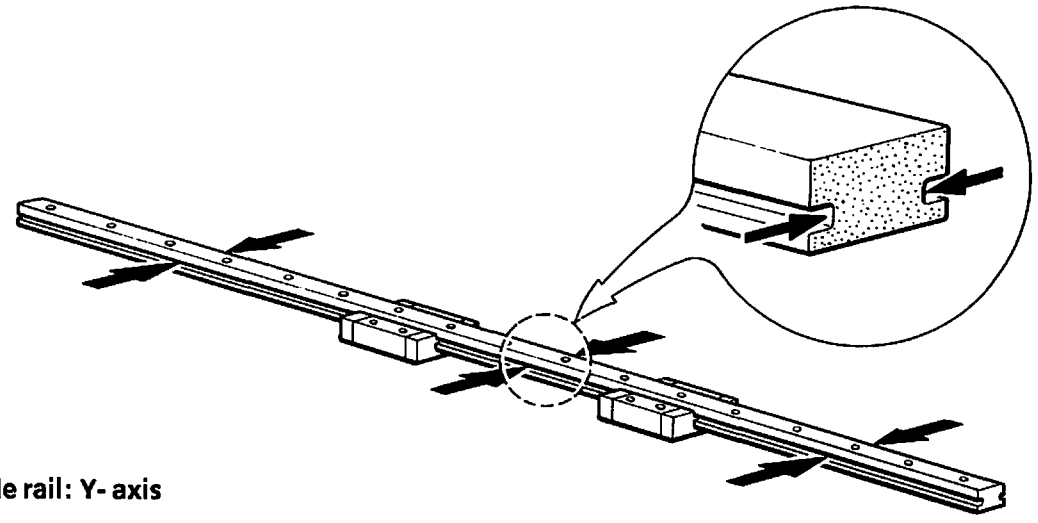
3) Lubricate two places on each needle on the needle bar. (18 places should be lubricated in all.)

4) Move the needle bar case all the way to the right or the left side. From the side of the machine head, apply one or two drop(s) of grease to the base needle bar and the base needle bar felt.
When the machine is used every day, lubricate daily before using.

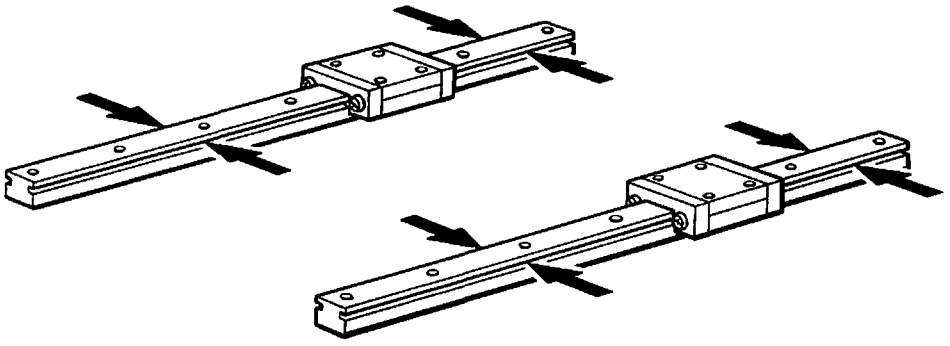


2 Feed guide mechanism

Linear guide rail: X- axis

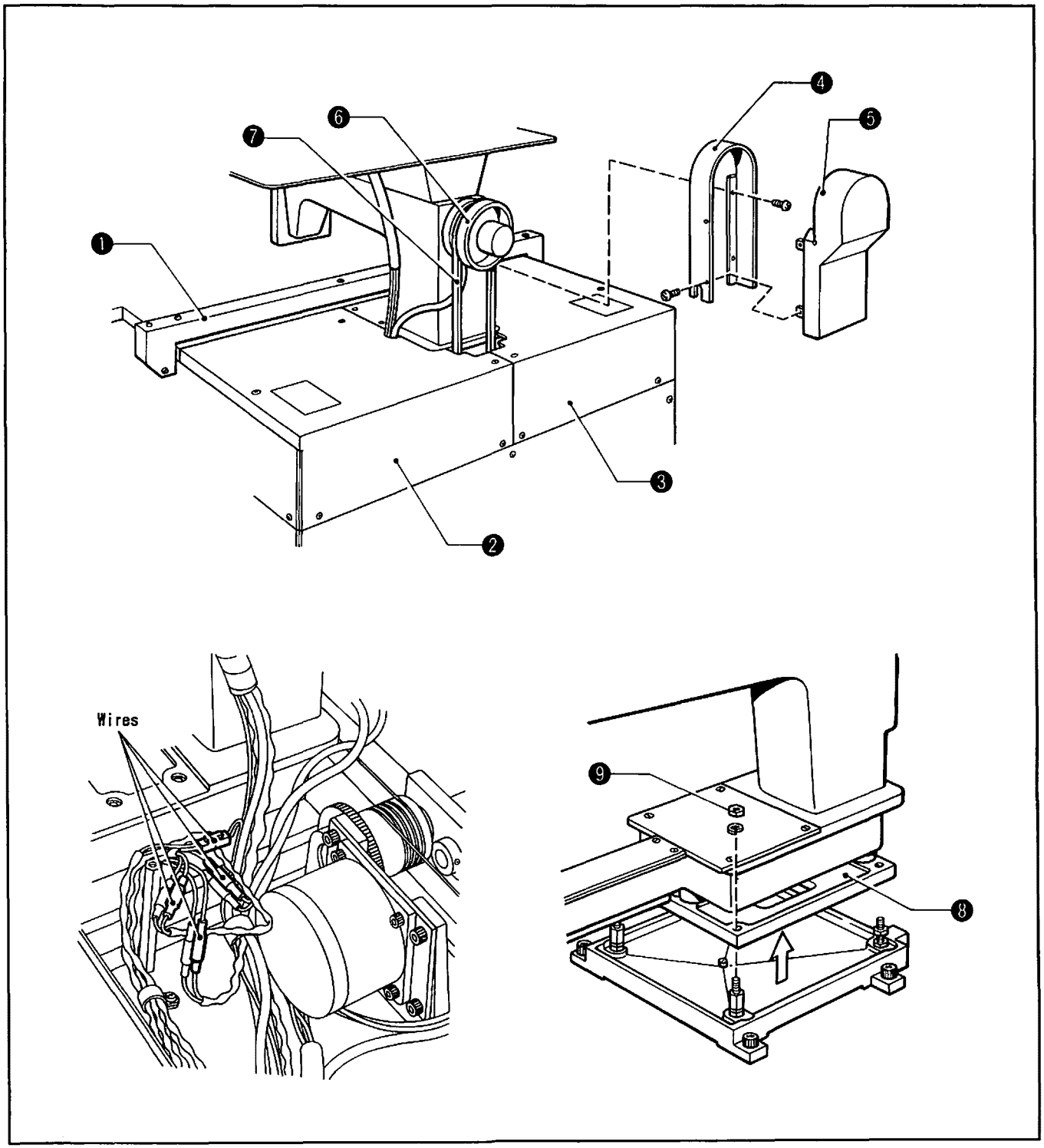


Linear guide rail: Y- axis



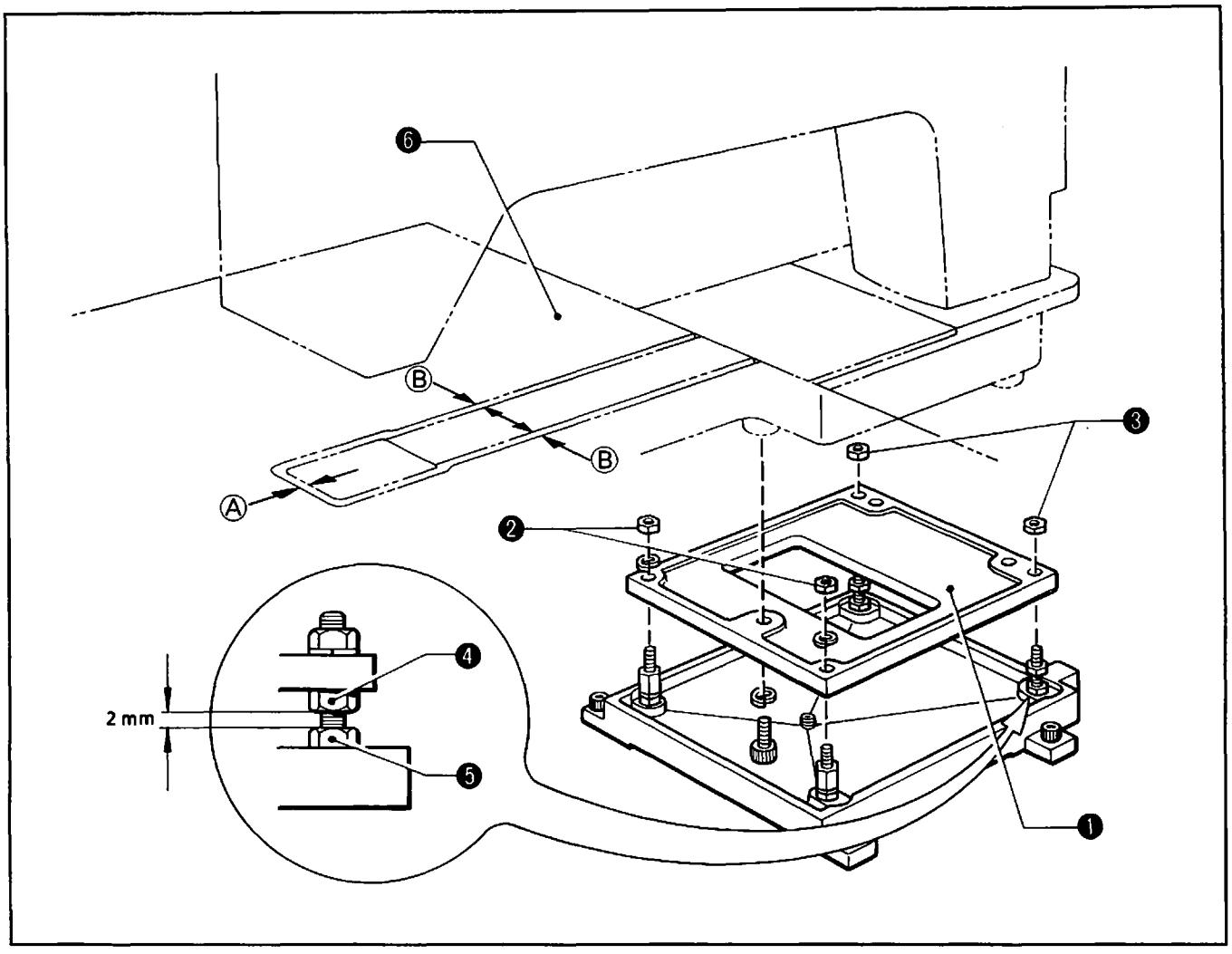
NOTE 1: For lubrication, use Brother- specified grease tank 30.
NOTE 2: Be sure to lubricate every 6 months.
NOTE 3: After applying grease to the X·Y guide rail, move the X carriage right and left 2-3 times.
NOTE 4: Before applying grease, remove covers to make the work easier.

1 Removing and adjusting machine head (1)



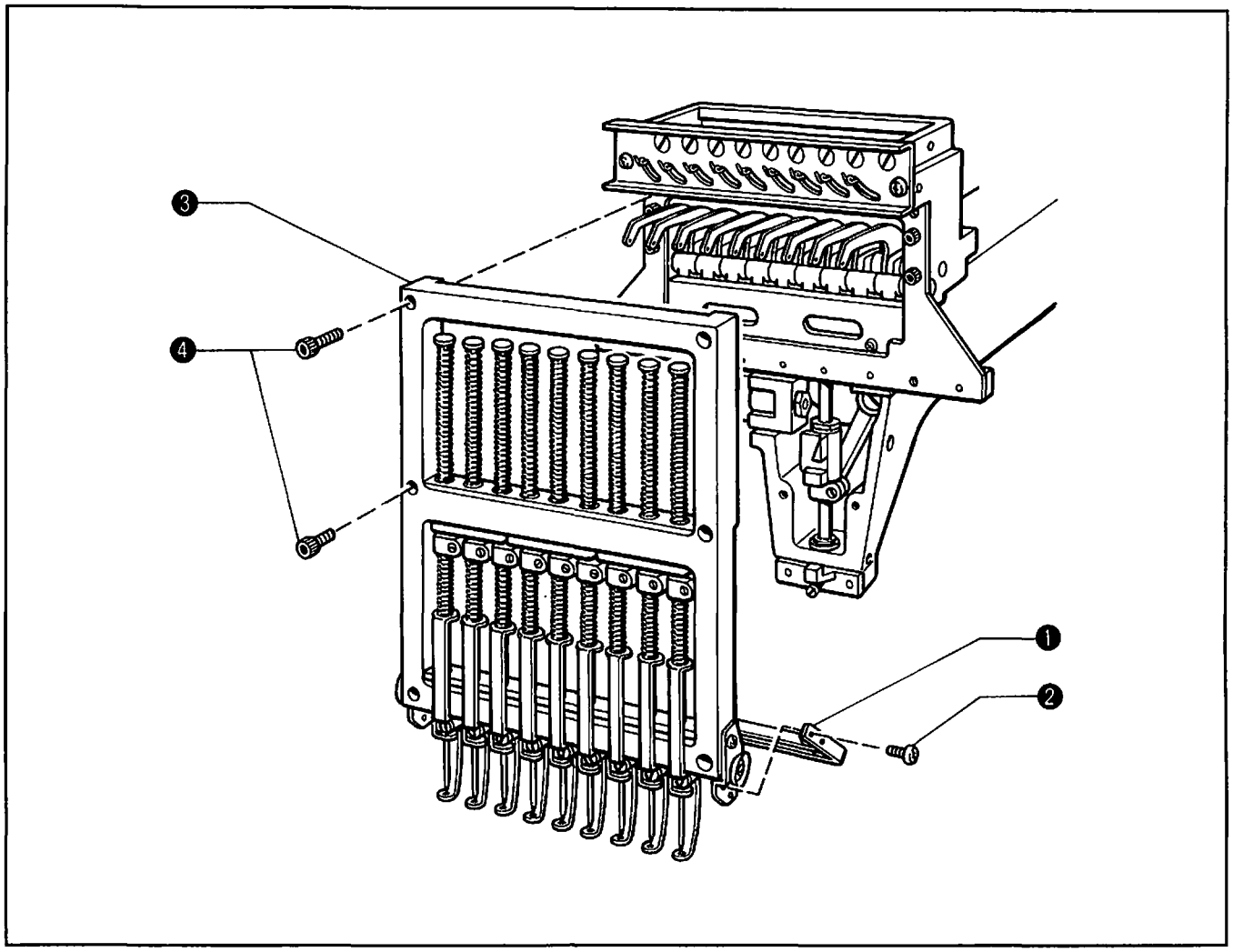
1) Remove the X-carriage cover ❶, table (R) ❷, table (L) ❸, and belt covers (A) ❹ and (B) ❺ in that order.
2) Remove the belt ❼ from the pulley ❻.
3) Remove the wires from the curcuit board, the synchronizer, and the ground.
4) Loosen the four nuts ❾ securing the sewing machine base ❽. With the sewing machine base ❽ attached to the machine head, remove the machine head.

2 Removing and adjusting machine head (2)



1) Use the four nuts ❷ and ❸ on the base ❶ to adjust.
   Be sure to have an approximately 2 mm space between nut ❹ and nut ❺ when adjusting.
2) The distance from table (C) ❻ to the end of the cyrindrical bed Ⓐ, and distance Ⓑ should be the same.
   Use the two rear nuts ❸ to adjust.
3) After adjustment, tighten the four nuts ❷ and ❸.

3 Removing needle bar case



Before replacing parts related to the needle bar mechanism, be sure to remove the needle bar case.

1) Loosen the four screws ❷ of the thread presser base ❶.
2) Remove the four screws ❹ of the needle bar case ❸ and the case.
3) Adjust the needle bar case ❸ so that it moves right and left slightly when attached with four screws.

4 Replacing up and down motion parts

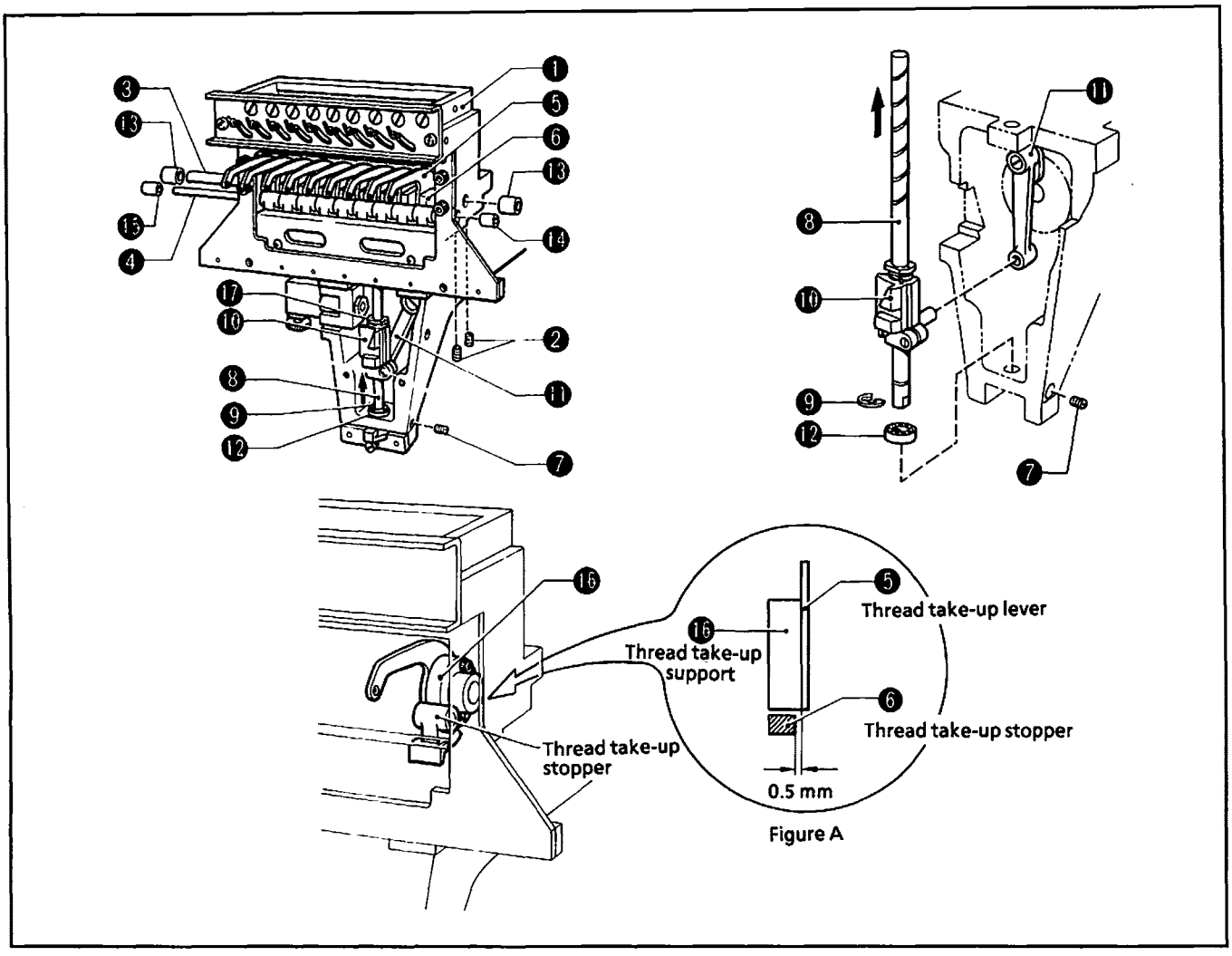
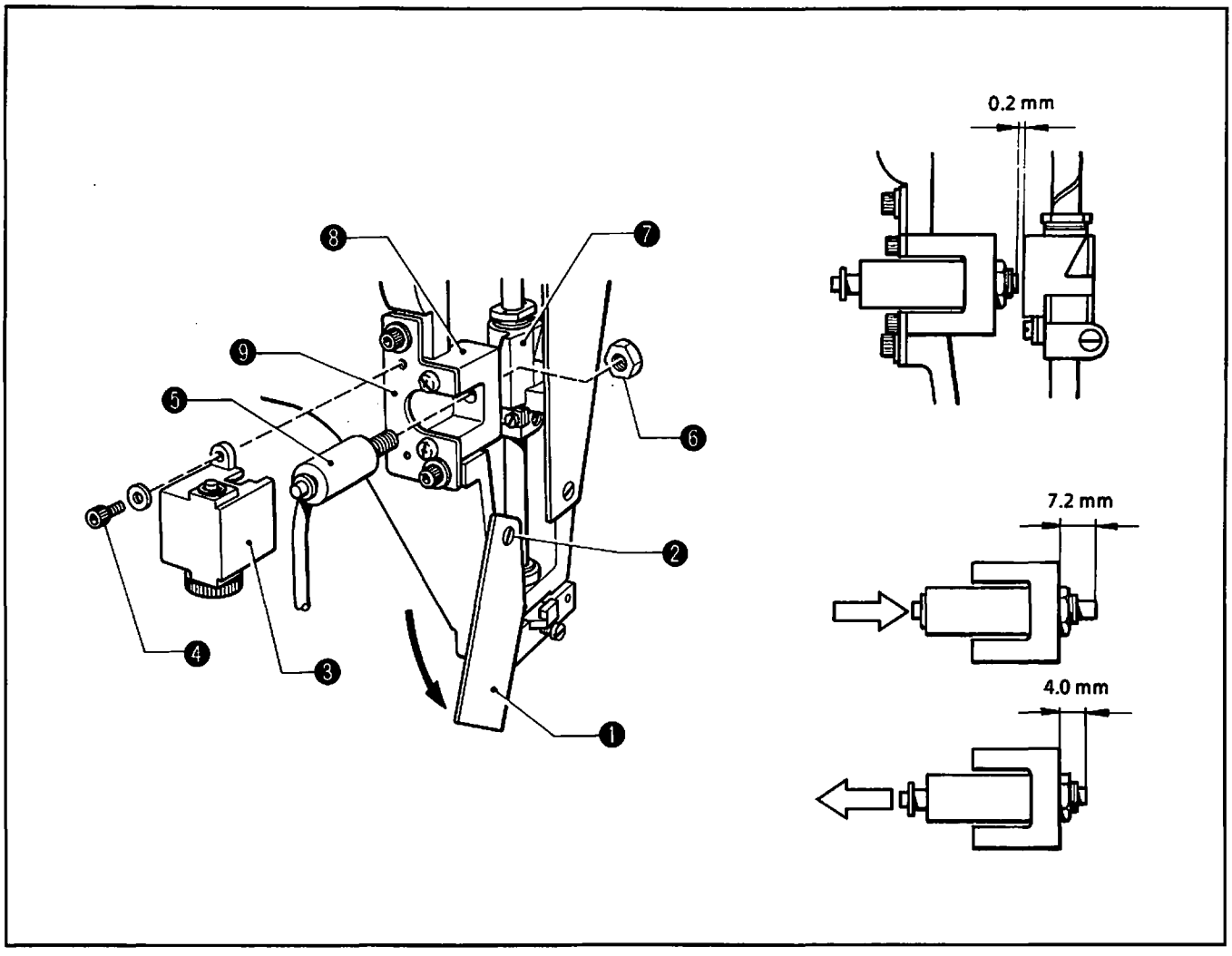


Figure A

1) Loosen the four screws ❷ on the right and the left sides of the bottom of the thread take-up base ❶.
2) Move the thread take-up shaft ❸ and the thread take-up supporter shaft ❹ 30 – 40 mm, and remove 1 or 2 thread take-up lever(s) ❺ and thread take-up stopper(s) ❻.
3) Loosen the screw ❼ on the bottom of the right side of the arm.
   Remove the E ring ❾ attached to the main needle bar ❽, then pull out the main needle bar ❽ from above.
4) Remove the up and down motion parts ❿ from the connecting rod ⓫.
5) When assembling, reverse the above procedure.
   NOTE1: When attaching the main needle bar ❽, secure the bearing ⓬ by pressing it with the E ring ❾ which will be attached to the main needle bar ❽.
   NOTE2: When attaching the thread take-up lever(s) ❺ and the thread take-up stopper ❻, fix them so there is a 0.5 mm space between ⓭ and ⓮ or ⓭ and ⓯.
   NOTE3: Make sure that the thread take-up stopper ❻ does not contact the thread take-up lever ❺ and that it is in the thread take-up support ⓰. (Fig.A)

5 Replacing jump solenoid

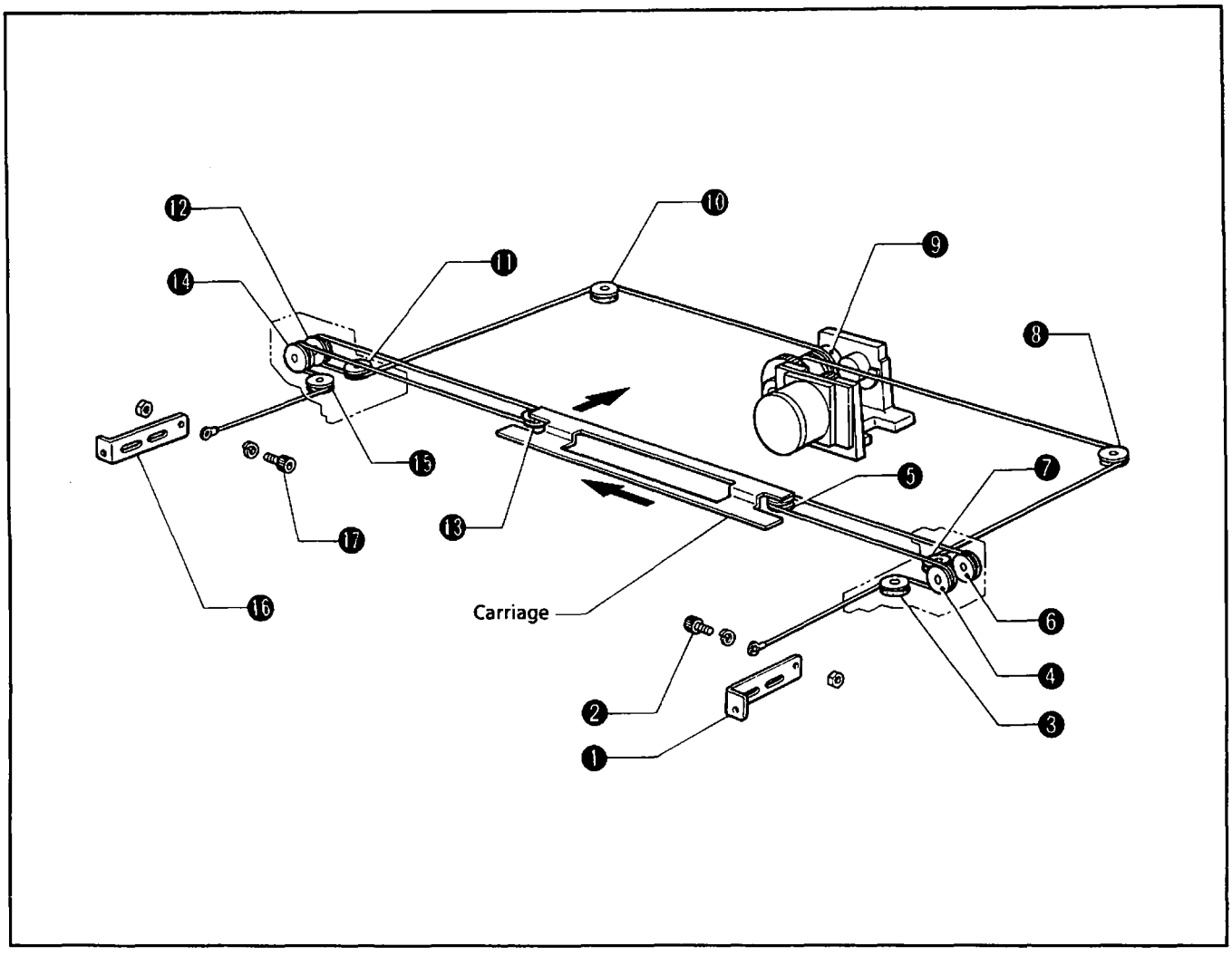


1) Loosen the set screw ❷ of front cover (L) ❶ and move cover (L) ❶ to the bottom left.
2) Remove the two set screws ❹ from the solenoid cover ❸ and the cover.
3) Remove the nut ❻ of the solenoid ❺. Then, remove the solenoid while turning it.
4) When assembling, reverse the above procedure.

NOTE1: The end of the solenoid ❺ should not contact the up and down motion parts ❼. Adjust the distance between them to approximately 0.2 mm by moving nut ❻.
Adjustment references:
When the solenoid rod is pushed, the distance between the end of the rod and the nut is 7.2 mm.
When the solenoid rod is returned, the distance between the end of the rod and the nut is 4.0 mm.

NOTE2: To avoid mispositioning of the solenoid, do not remove the solenoid bracket ❽ or the bracket base ❾.

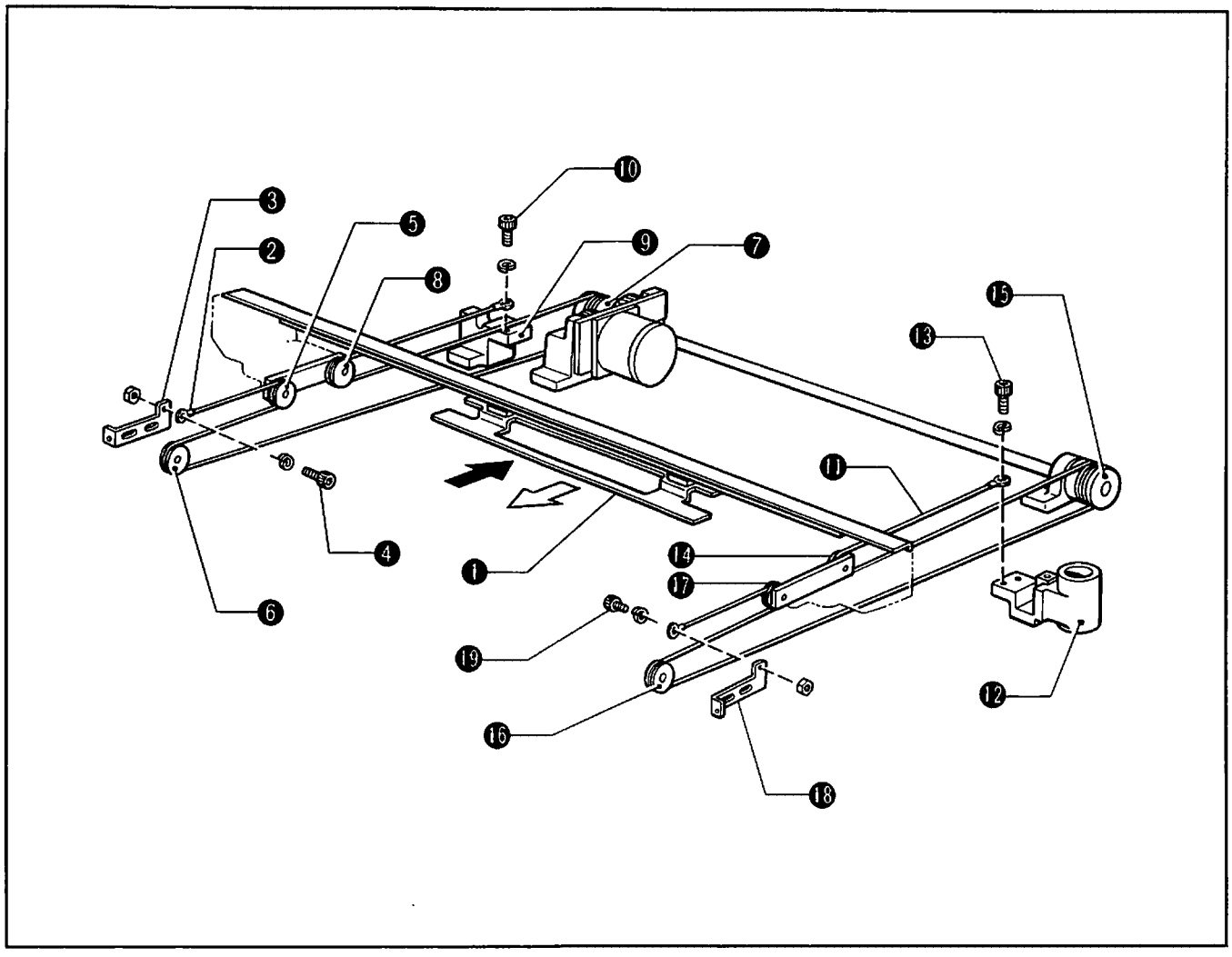
6 Attaching X wire



1) Position the carriage in the back, toward the left of the machine, making sure it does not move.
2) Attach the wire end (the end closer to the ball) to hook (RX) ❶ with bolt ❷.
3) Feed the wire around pulley ❸ from the left side, then under pulley ❹. Then feed it behind pulley ❺ from the left side, and over pulley ❻. Then, feed the wire around pulley ❼ from the left, and finally wind it around pulley ❽ from the right.
4) After winding the wire around pulley ❽, feed some slack into the wire.
   Then, put the ball on the wire into the hole of wire drum (X) ❾.
   Fit the wire completely into the groove, then wind the wire eight times around the wire drum.
5) Feed the wire around the back of pulley ❿, then around pulley ⓫ from the left.
6) Wind the wire onto pulley ⓬ from below, then around pulley ⓭ from the left.
7) Wind the wire over pulley ⓮ from above, then around pulley ⓯ from the left.
   Attach the wire to hook (LX) ⓰ with bolt ⓱.

NOTE: Be careful not to scratch the wire. The wire is coated with resin and a scratch may decrease its durability.

7 Attaching Y wire



Y wire (L)

1) Push the carriage ❶ to the back and secure it.
2) Use the bolt ❹ to attach (Y) wire L ❷ end (the end furthest from the ball) to hook (LY) ❸.
3) Put the wire onto pulleys ❺ and ❻. Then, put the wire ball into the hole of wire drum (Y) ❼.
   Wind the wire four times, put it around pulley ❽, then attach it to stand (RL) ❾ with the bolt ❿.

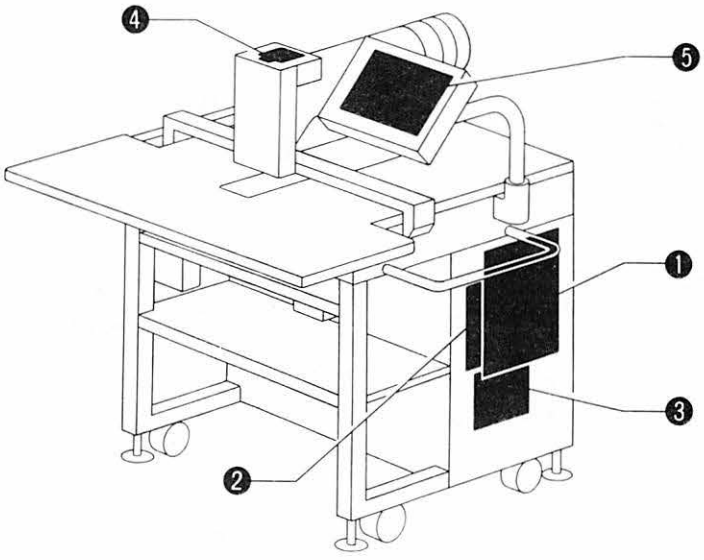
Y wire (R)

1) Pull the carriage ❶ forward and secure it.
2) Use the bolt ⓭ to attach (Y) wire R ⓫ end (the end closest to the ball) to stand (RR) ⓬.
3) Put the wire on to pulley ⓮. Then, put the wire ball into the hole of wire drum (Y) ⓯.
   Wind the wire four times, put it around pulleys ⓰ and ⓱, then, attach it to hook (RY) ⓲ with the bolt ⓳.

ELECTRIC COMPONENTS

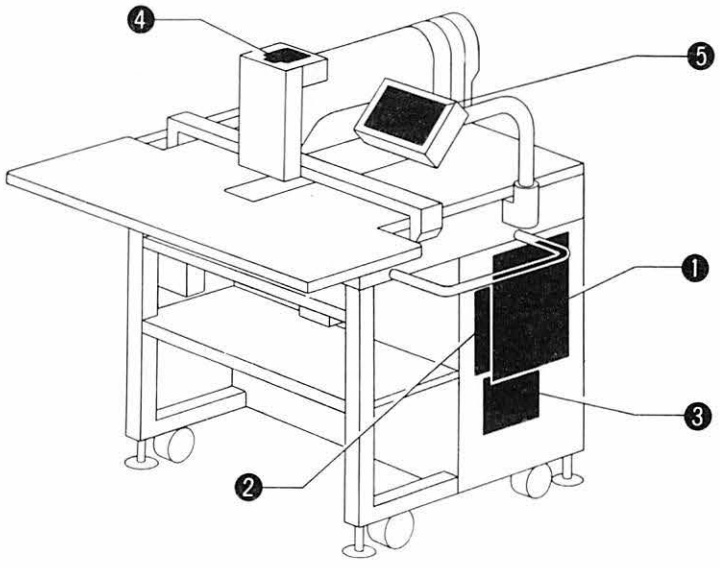
1 Circuit board locations

BAS-411

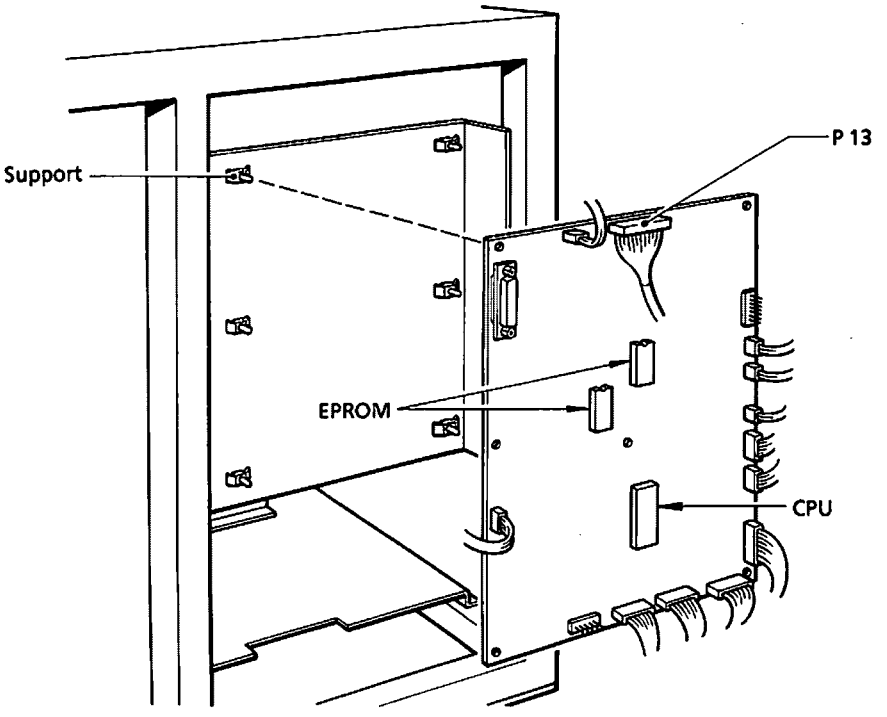


1. Main circuit board
2. PMD circuit board
3. Sewing machine motor circuit board
4. Synchronizer circuit board
5. Keyboard circuit board

BAS-415



[2] Replacing circuit boards



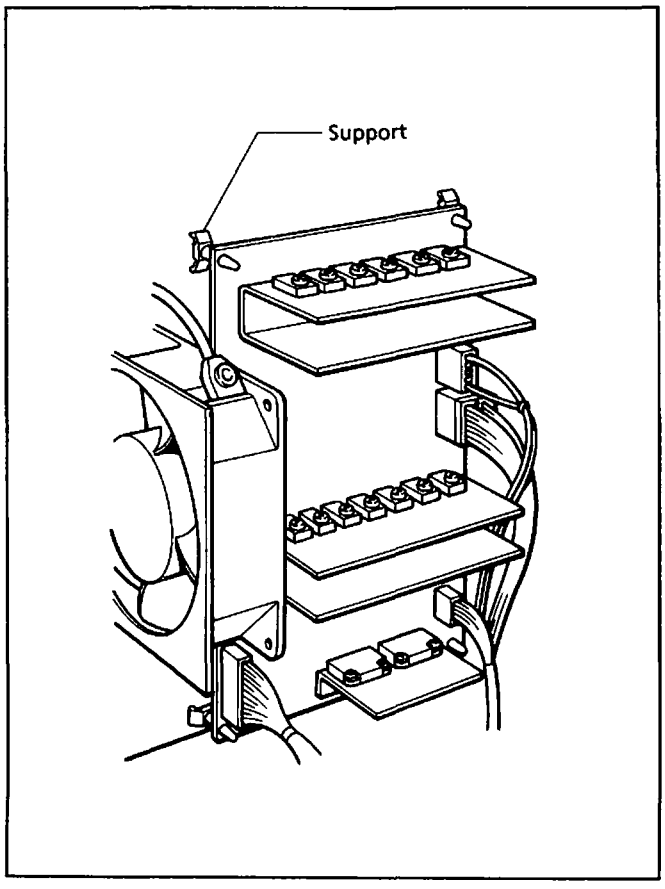
Main circuit board

Be sure to turn off the power and open the cover before replacement.

1) Disconnect 15 connectors.
2) Press the six circuit board support clamps inward and remove the main circuit board from the supports. Replace the main circuit board.
3) Place new main circuit board on the supports. Secure the circuit board by pushing down near each of the support clamps until it snaps into position.
4) Connect the connectors while supporting the circuit board from the back side. Be sure not to treat the circuit board forcefully.

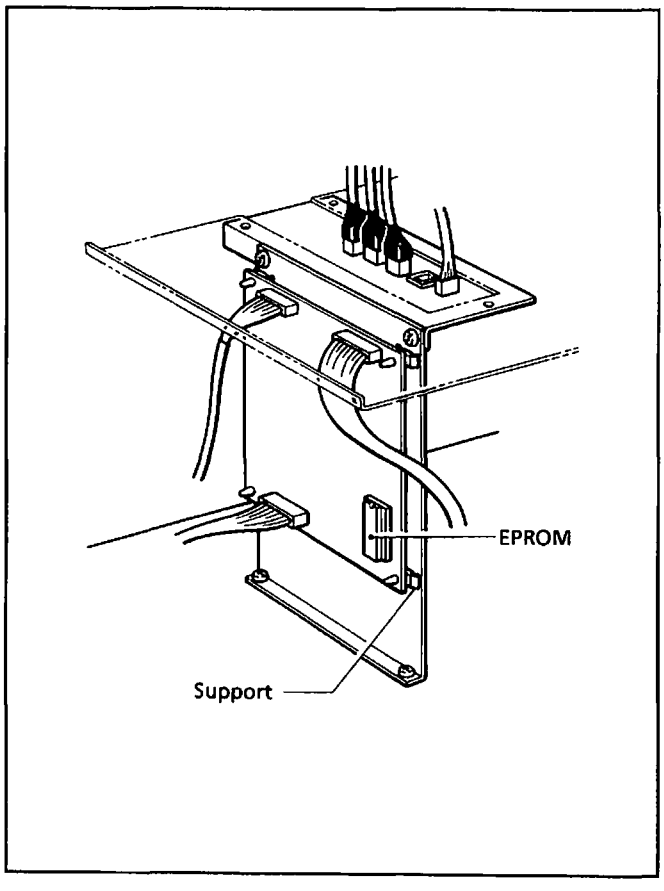
NOTE1: When replacing connectors, treat them carefully. Do not pull on the wires when detaching the connectors.
NOTE2: Note that the flat cable P13 is directional (refer to the arrow). It can not be inserted in the opposite direction.
NOTE3: Treat the circuit boards carefully. MOS-IC in the circuit boards is easily damaged by static electricity. Also, do not touch IC pins.
NOTE4: Do not bend circuit boards. The circuit pattern or IC may be broken by external force due to the large size of the circuit board.
NOTE5: Check that new main circuit board has a CPU (HD64180) and two EP-ROMs (27512).
NOTE6: When turning the power on for the first time after replacing the main circuit board, be sure to do it while holding down the emergency stop switch. This clears the internal memory.

PMD pulse motor circuit board



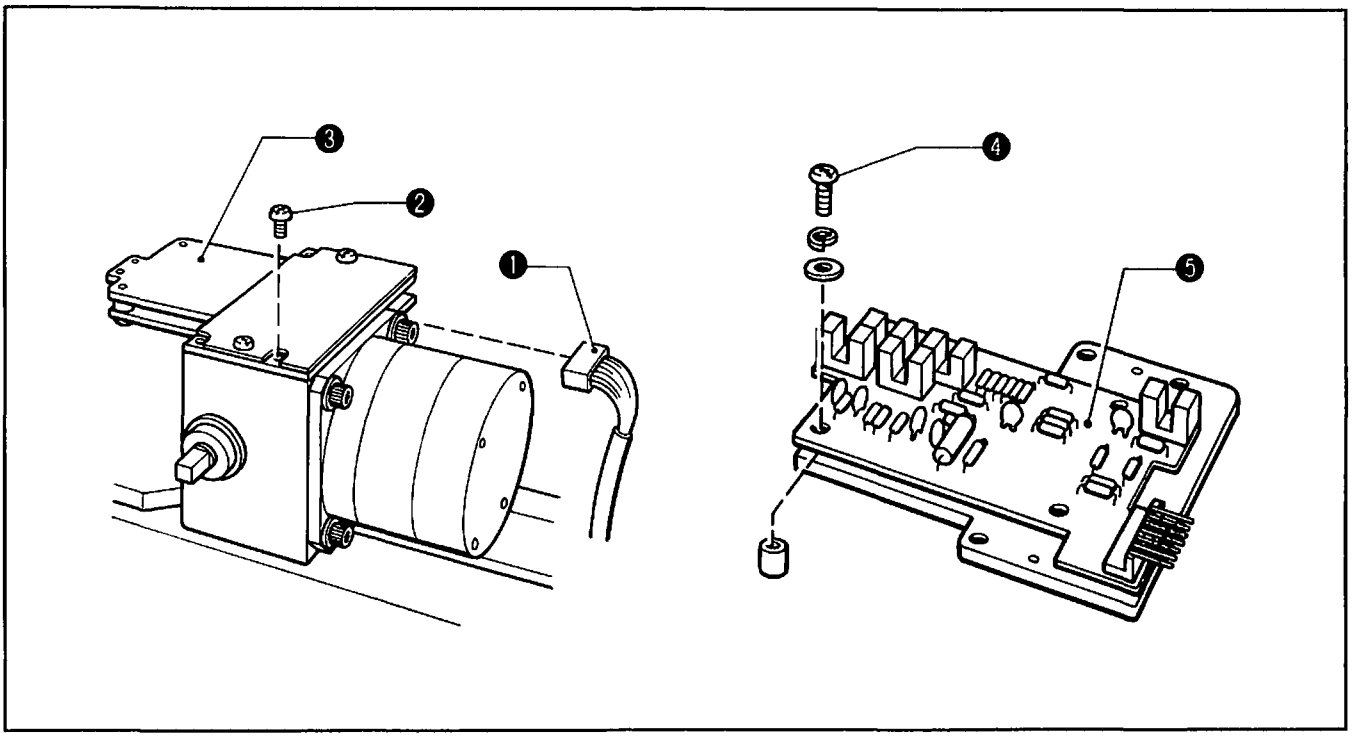
1) Disconnect the four connectors.
2) Push the five circuit board supports towards the inside and remove the pulse motor circuit board.
   Replace the pulse motor circuit board.
3) Place new pulse motor circuit board on the supports. Secure the circuit board by pushing down near each of the supports. The support tips will snap into position, securing the circuit board.

Machine motor circuit board



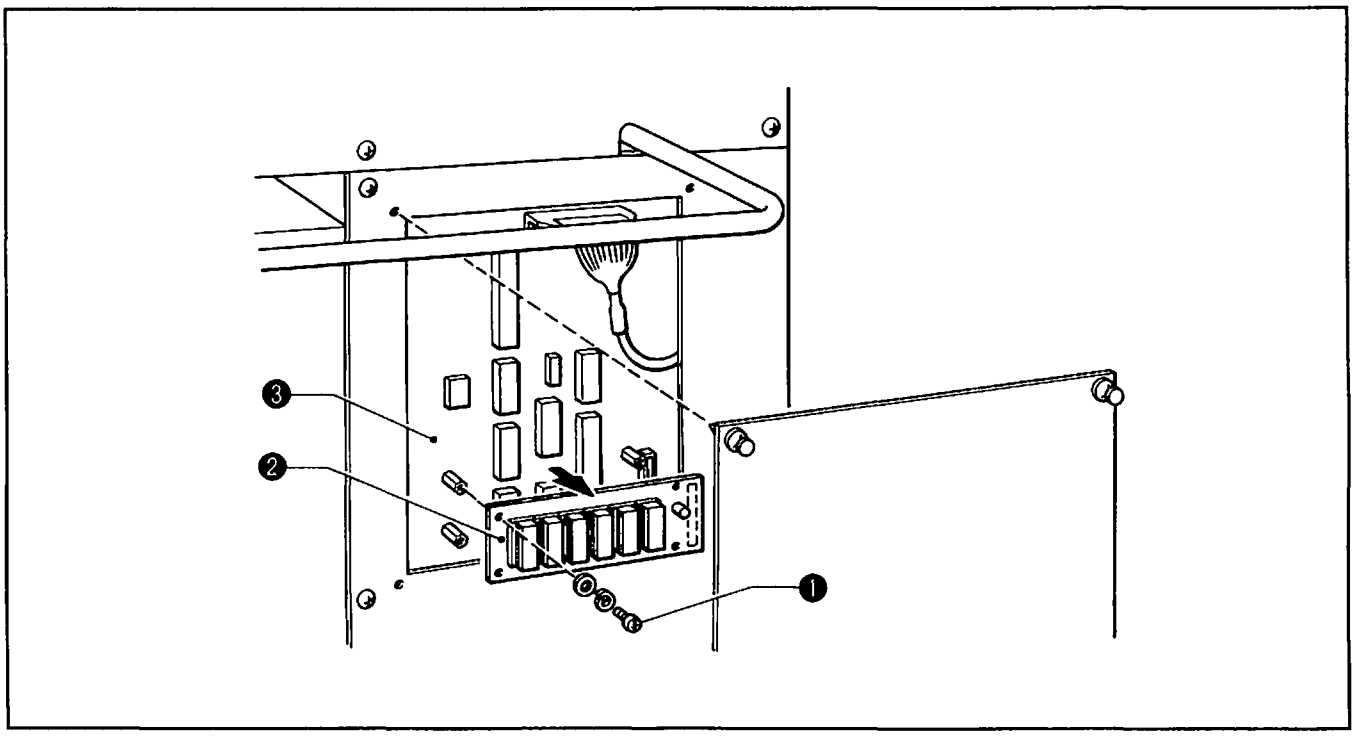
1) Disconnect the three connectors.
2) Push the four circuit board supports towards the inside and remove the machine motor circuit board.
   Replace the machine motor circuit board.
3) Place new machine motor circuit board on the supports. Secure the circuit board by pushing down near each of the supports. The support tips will snap into position, securing the circuit board.

Synchronizer circuit board



1) Disconnect the connector ❶.
2) Remove the three screws ❷ and the circuit board attachment base ❸.
3) Remove the four screws ❹ and the synchronizer circuit board ❺.

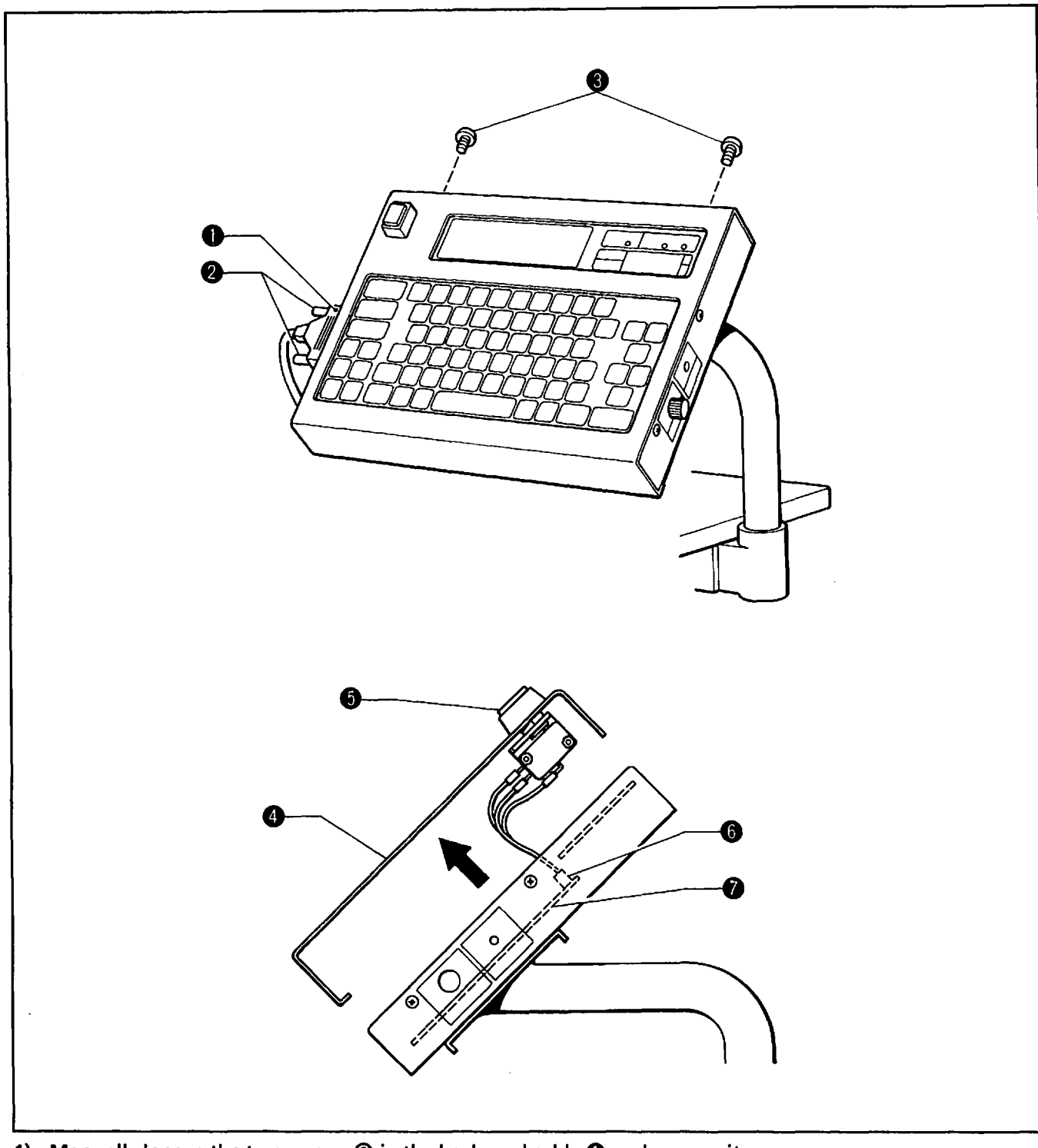
Memory expansion circuit board (option)



1) Remove four screws ❶ and then remove the memory expansion circuit board ❷ from the main circuit board ❸.

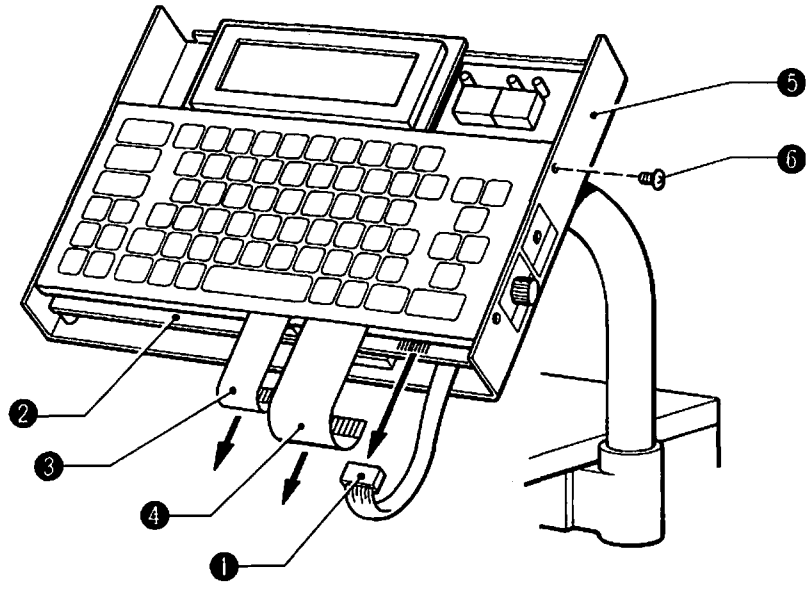
NOTE: When turning on power of BAS-411·415 for the first time after replacing the memory expansion circuit board ❷, be sure to do it while holding down the EMERGENCY switch. The inside memory will be cleared.

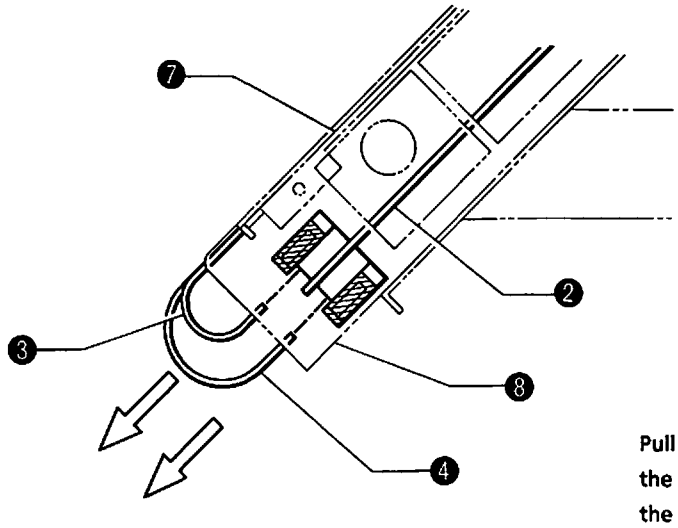
Keyboard circuit board (1)



1) Manually loosen the two screws ❷ in the keyboard cable ❶ and remove it.
2) Loosen the two screws ❸. Pull the upper part of the panel ❹ toward yourself and detach it. At this time, do not pull strongly on the EMERGENCY stop switch ❺ cable.
3) Disconnect the EMERGENCY switch ❺ connector ❻ from the keyboard circuit board ❼.

Keyboard circuit board (2)

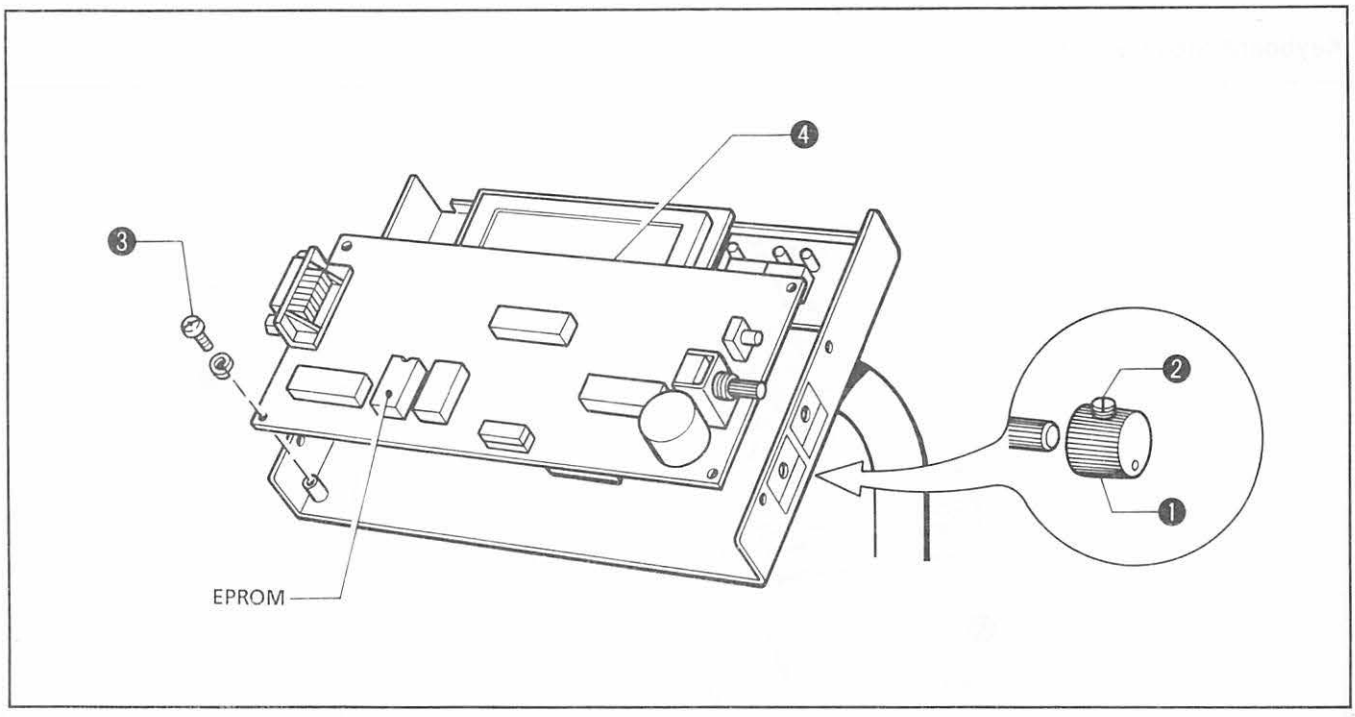




Pull the hatched part of the black connector attached to the flat cable shown in the figure on the left. Release the lock and pull the flat cable toward yourself.

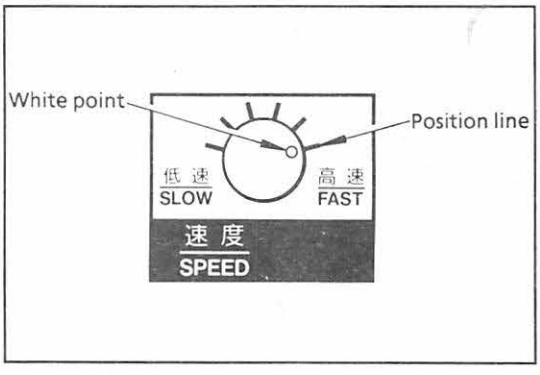
4) Disconnect the connector ❶ from the keyboard circuit board ❷.
5) Disconnect the flat cables ❸ and ❹ from the keyboard circuit board ❷.
6) Loosen the four screws ❻ on the right and left sides of the supporter ❺. Remove the key sheet ❼ from the panel base ❽.

Keyboard circuit board (3)

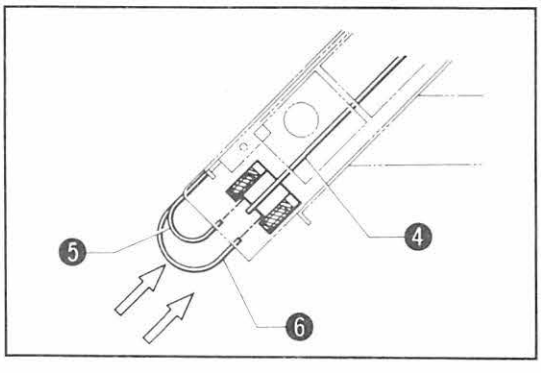


7) Loosen the screw ❷ so that the knob ❶ can be removed easily. Then, remove the knob ❶.
8) Remove the four screws ❸ and the keyboard circuit board ❹.
9) When assembling, reverse the above procedure. For assembling, note the following points.

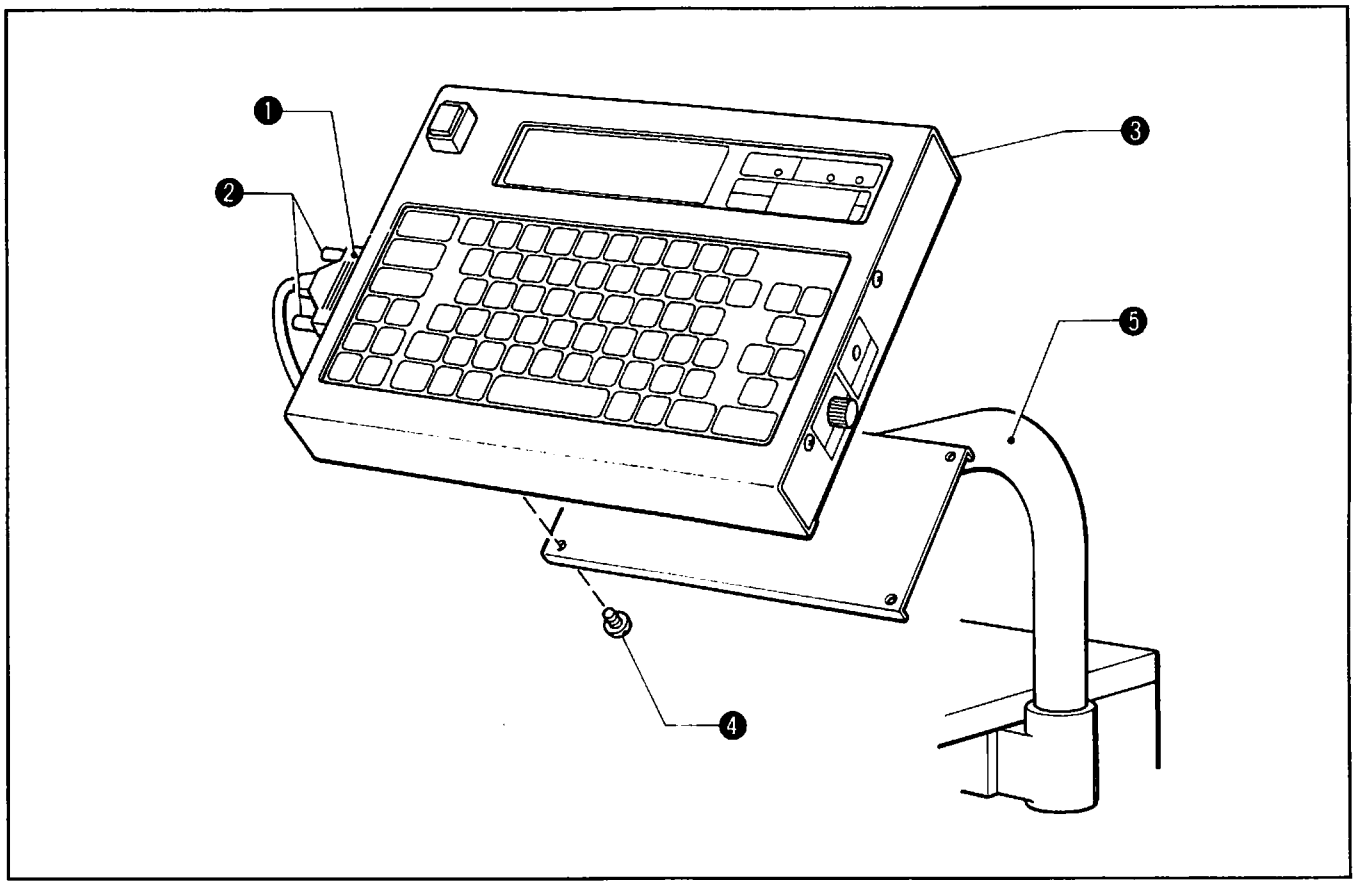
NOTE1: Attach the contrast knob ❶ as follows:
Align the white point of the knob ❶ with the position line. Tighten the screw ❷.



NOTE2: Insert the connectors of the flat cables ❺ and ❻ while the black connector lock is released. Insert the hatched part of the connector to lock it in place.
Pull the flat cables ❺ and ❻ lightly to check if they are locked properly.
If flat cable is loose, the cables may have been improperly inserted into the slots. Release the lock and insert into the slots correctly.



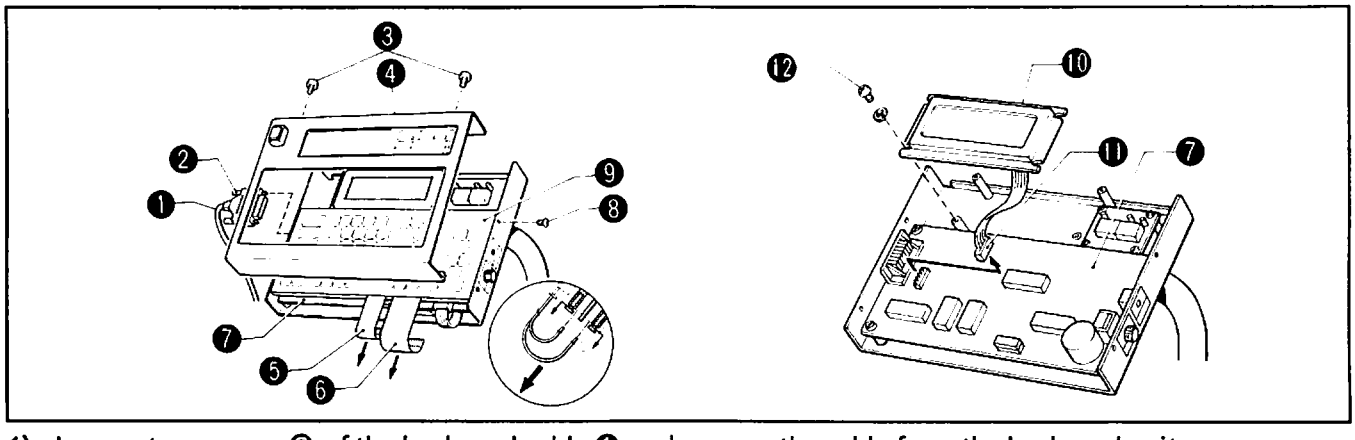
Keyboard unit



When replacing the whole keyboard unit, follow the procedures below.

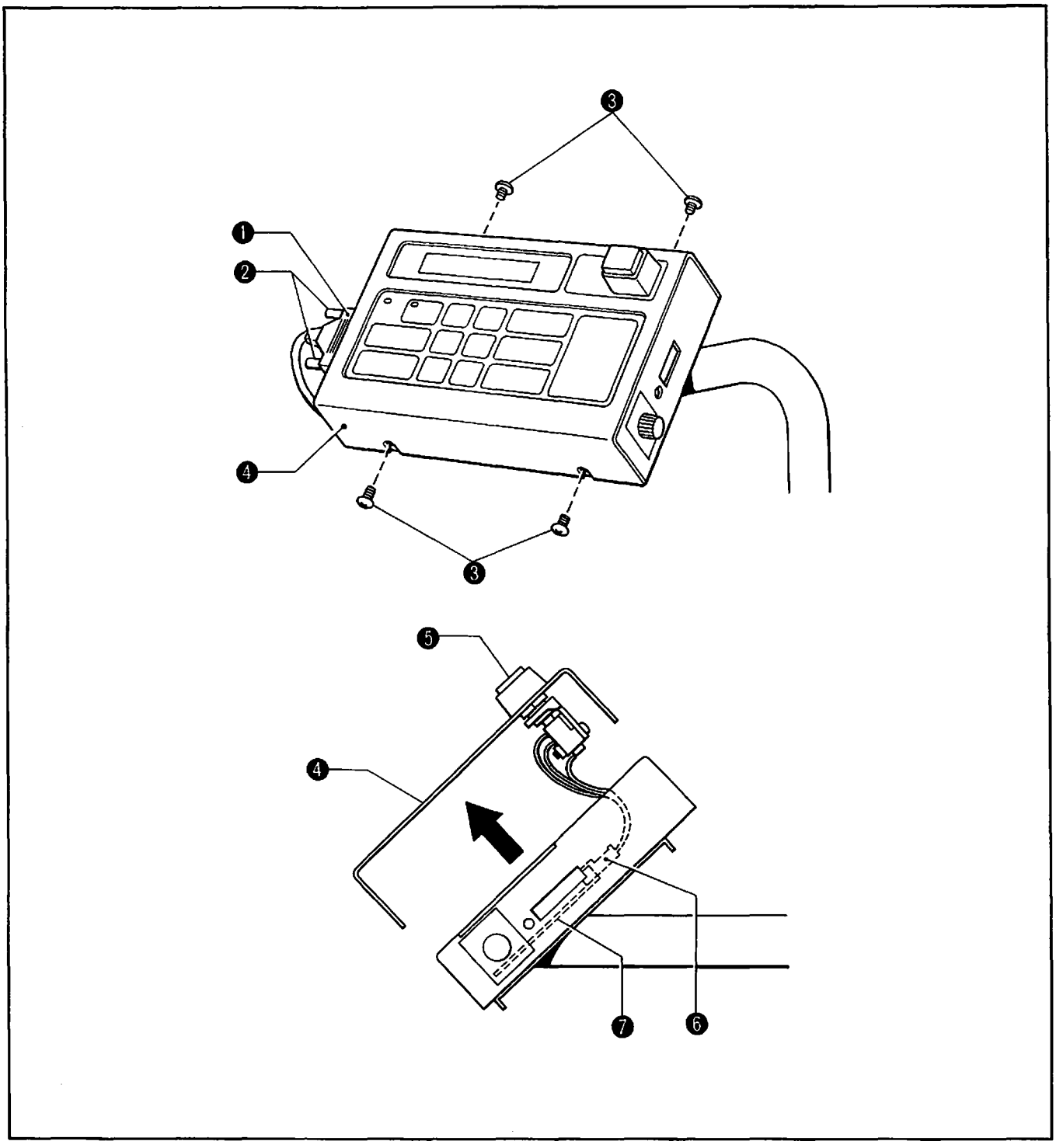
1) Manually loosen the two screws ❷ in the board cable ❶ and remove it.
2) Remove the four screws ❹ on the back side of the keyboard unit ❸. Then remove it from the keyboard stand ❺.
   At this time, be careful not to drop the keyboard unit ❸.
3) When assembling, reverse the above procedure.

LCD module assembmly



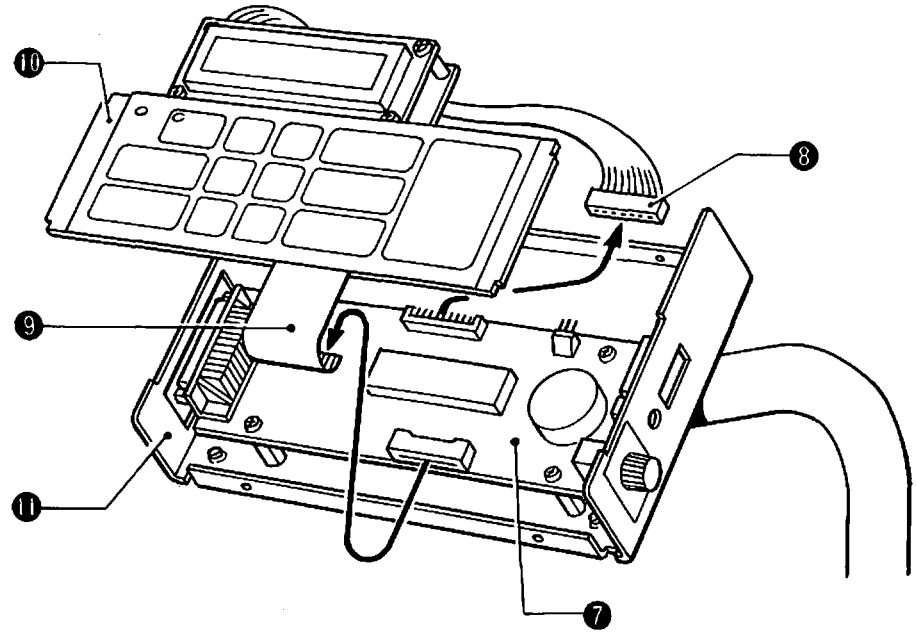
1) Loosen two screws ❷ of the keyboard cable ❶ and remove the cable from the keyboard unit.
2) Remove two screws ❸ and the 411 panel ❹.
3) Remove the flat cables ❺ and ❻ from the keyboard circuit board ❼.
4) Remove four screws ❽ and the support ❾.
5) Remove the LCD module assembly ❿ connector ⓫ from the keyboard circuit board ❼.
6) Remove four screws ⓬ and the LCD module assembly ❿.

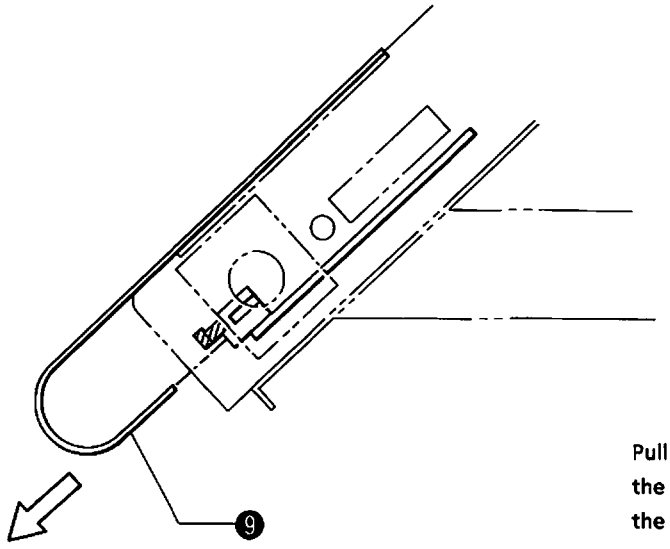
Keyboard circuit board (1)



1) Manually loosen the two screws ❷ in the keyboard cable ❶ and remove it.
2) Loosen the four screws ❸. Pull the upper part of the panel ❹ toward yourself and detach it.
   At this time, do not pull strongly on the EMERGENCY stop switch ❺ cable.
3) Disconnect the EMERGENCY switch ❺ connector ❻ from the keyboard circuit board ❼.

Keyboard circuit board (2)

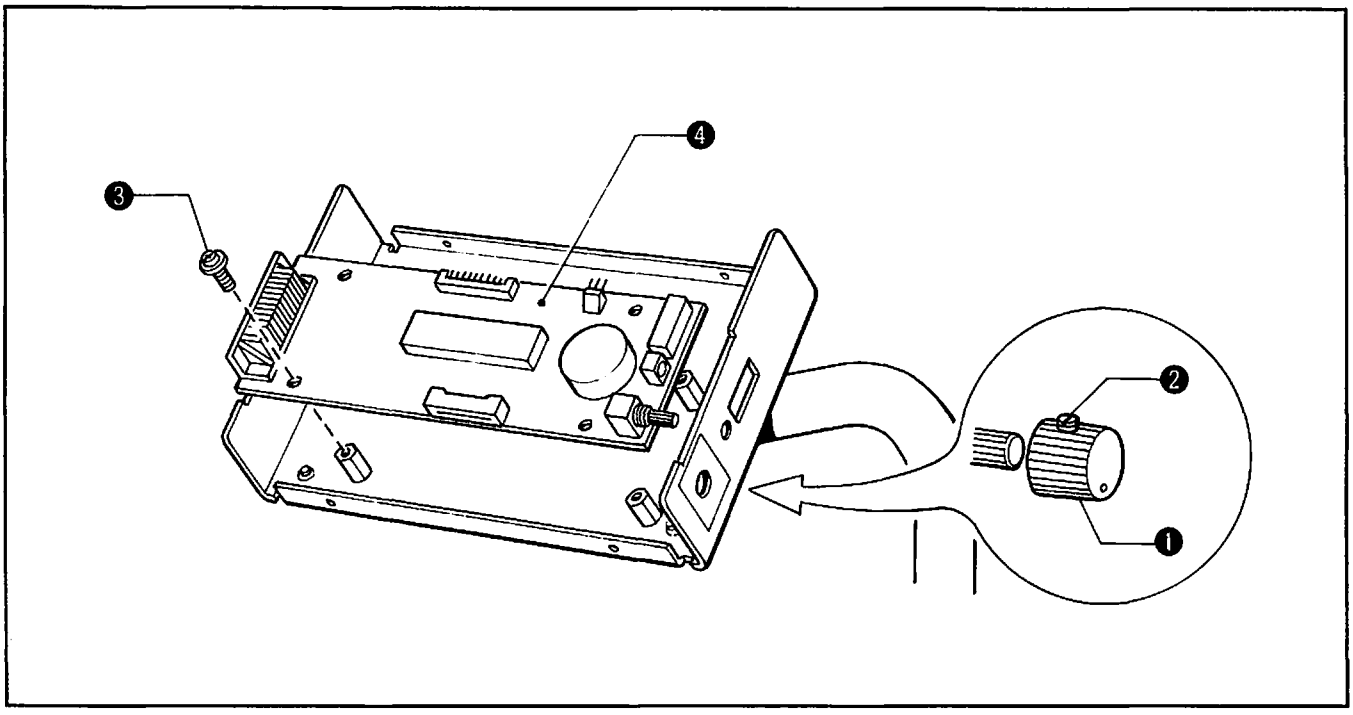




Pull the hatched part of the black connector attached to the flat cable shown in the figure on the left. Release the lock and pull the flat cable toward yourself.

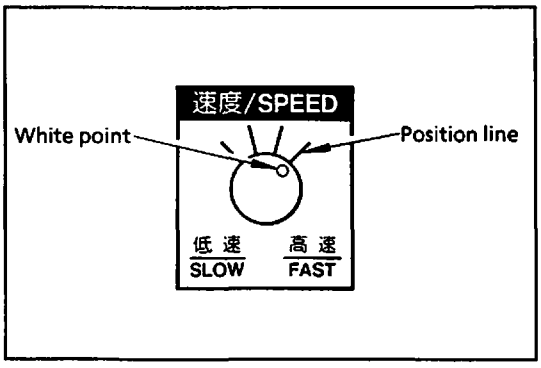
4) Disconnect the connector ❽ from the keyboard circuit board ❼.
5) Disconnect the flat cable ❾ from the keyboard circuit board ❼.
6) Lift the key sheet support ❿ and remove it from the panel base ⓫.

Keyboard circuit board (3)

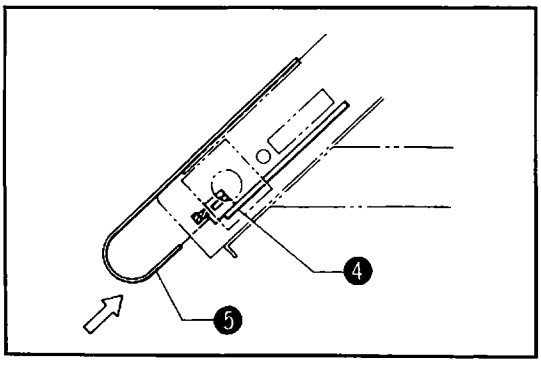


7) Loosen the screw ❷ so that the knob ❶ can be removed easily. Then, remove the knob ❶.
8) Remove the four screws ❸ and the keyboard circuit board ❹.
9) When assembling, reverse the above procedure. For assembling, note the following points.

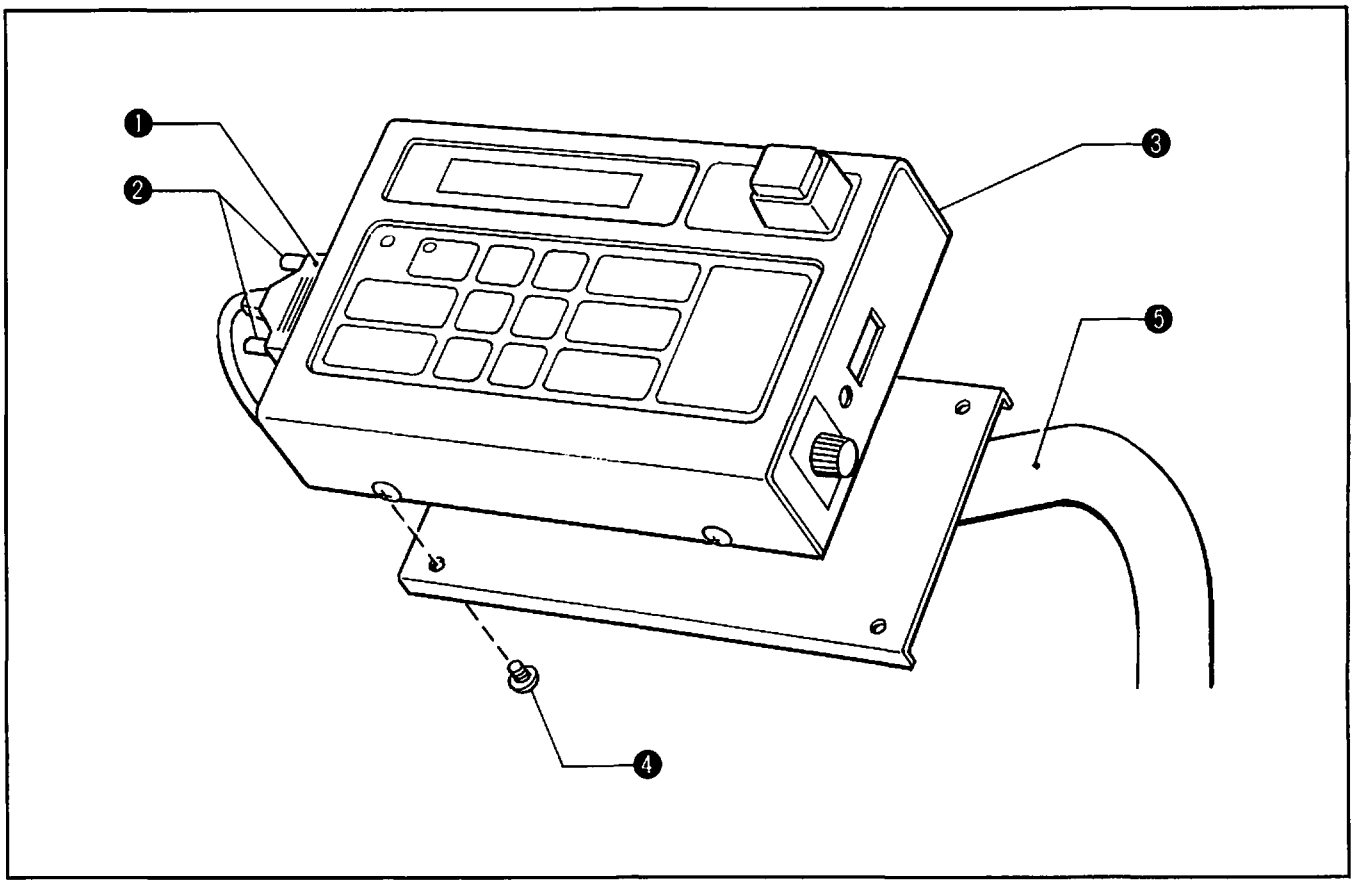
NOTE1: Attach the contrast knob ❶ as follows:
Align the white point of the knob ❶ with the position line. Tighten the screw ❷.



NOTE2: Insert the flat cable ❺ connector while the black connector lock is released. Insert the hatched part of the connector to lock it in place.
Pull the flat cable ❺ lightly to check if it is locked properly.
If flat cable is loose, the cables may have been improperly inserted into the slots. Release the lock and insert into the slots correctly.



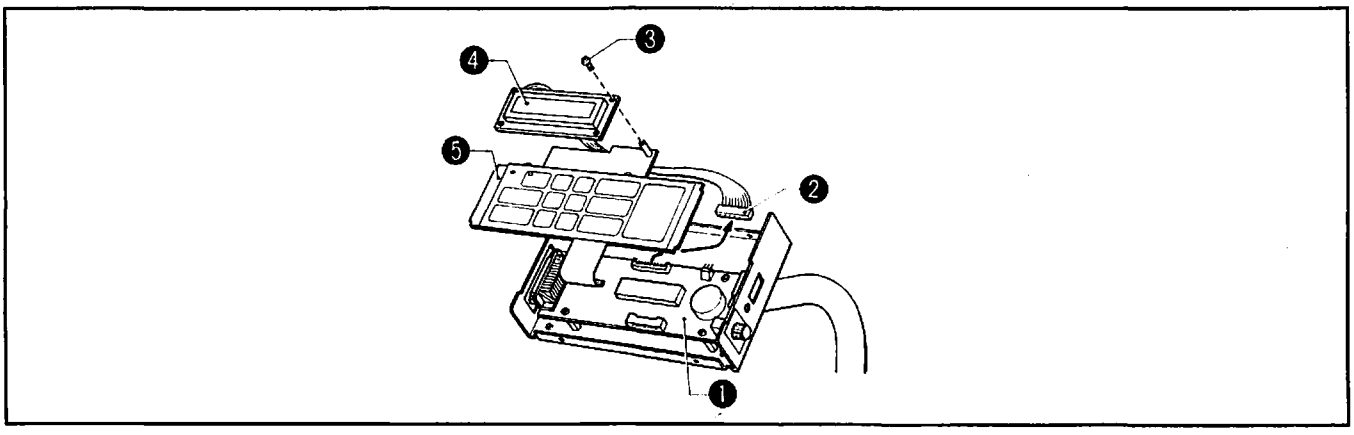
Keyboard unit



When replacing the whole keyboard unit, follow the procedures below.

1) Manually loosen the two screws ❷ in the board cable ❶ and remove it.
2) Remove the four screws ❹ on the back side of the keyboard unit ❸. Then remove it from the keyboard stand ❺.
   At this time, be careful not to drop the keyboard unit ❸.
3) When assembling, reverse the above procedure.

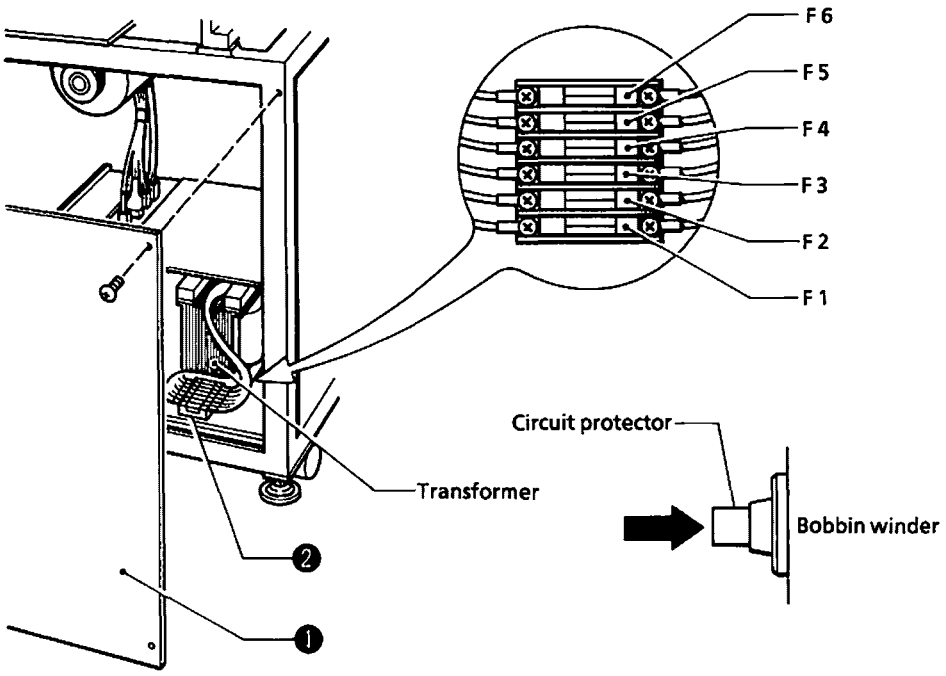
LCD module assembmly



1) Remove the connector ❷ from the keyboard circuit board ❶.
2) Remove three screws ❸ and the LCD module assembly ❹.

3. Fuses

1. Position of fuses



1) Remove cover (B) ❶.
2) There is a fuse holder in front of the transformer in the power supply unit. Six fuses are fixed in the fuse holder ❷.

NOTE: Be sure to turn off the power before replacement.

2. Fuse type and capacity

No.	Fuse type & capacity	Part code	Reference
F1	Fuse 15A	S02887-000	for Pulse motor
F2	Slow blow fuse	S11705-000	for Regulator
F3	Fuse B	152565-000	for Solenoid
F4	Slow blow fuse	S11705-000	for Bobbin winder
F5	Fuse B	152565-000	for Lamp
F6	G Fuse 5AFB	S08030-000	for Sewing machine motor

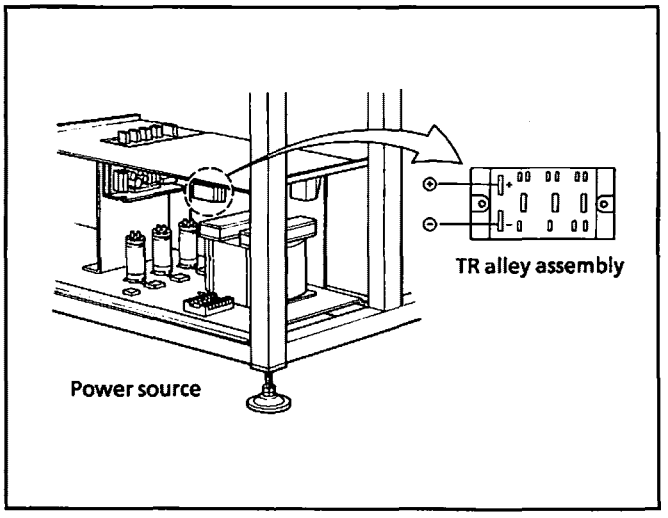
NOTE: Be sure to use only fuses of authorized types and capacities.
NOTE: While the circuit protector is activated, the thread winding motor will not rotate. Let the protector cool for a while before pushing it back. Otherwise, it may trip again.
NOTE: During replacement, tightly attach each fuse into its socket.

3. Replacing fuse

The following problems occur if the fuse is blown.
When replacing fuse, be sure to use a new one having the same quality and capacity as the old one.

Fuse No.	Problem
F1	X and Y carriages do not move at all. Home position detection error occurs.
F2	Operation panel display is blank and the sewing machine does not operate.
F3	Thread trimmer does not function.
F4	Bobbin winder motor does not operate.
F5	Light marker does not light.
F6	Sewing machine motor does not run at all. Overload

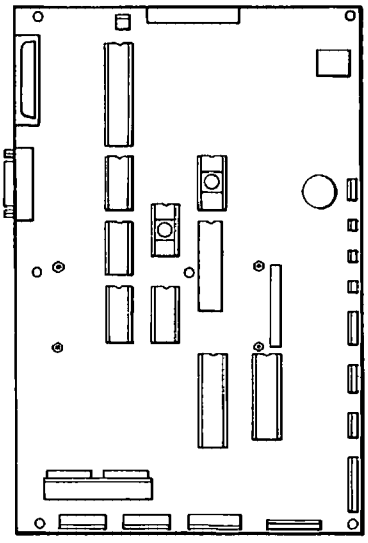
Before replacing fuse 6, check the TR alley assembly referring to below.



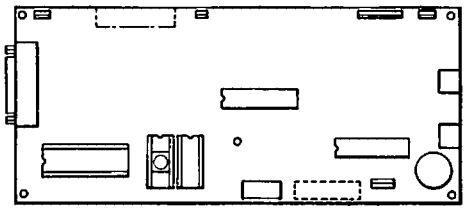
Using a tester, measure the resistance between + and −.
If the resistance is not 60Ω, it is defective.
If the resistance is either 0Ω or ∞Ω, replace the TR alley assembly and the motor circuit board instead of replacing fuse 6.

4 P-ROMs

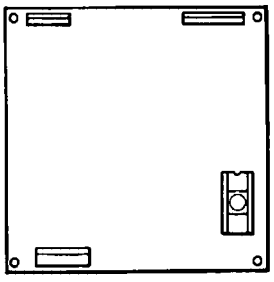
BAS-411



Main circuit board

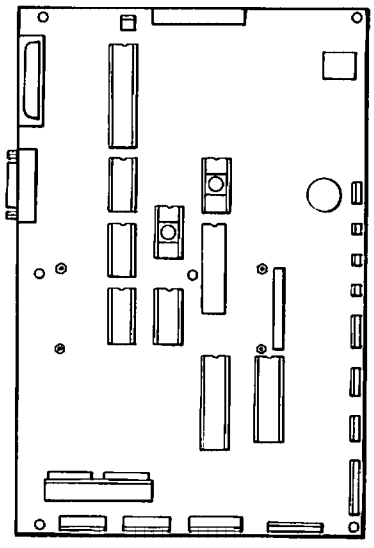


Keyboard circuit board

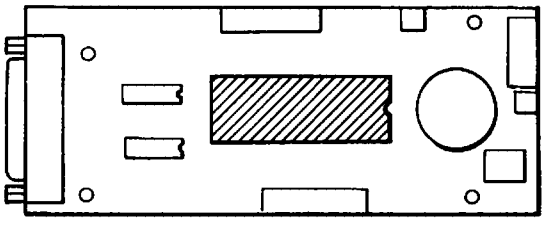


Sewing machine motor circuit board
(common for all models)

BAS-415



Main circuit board

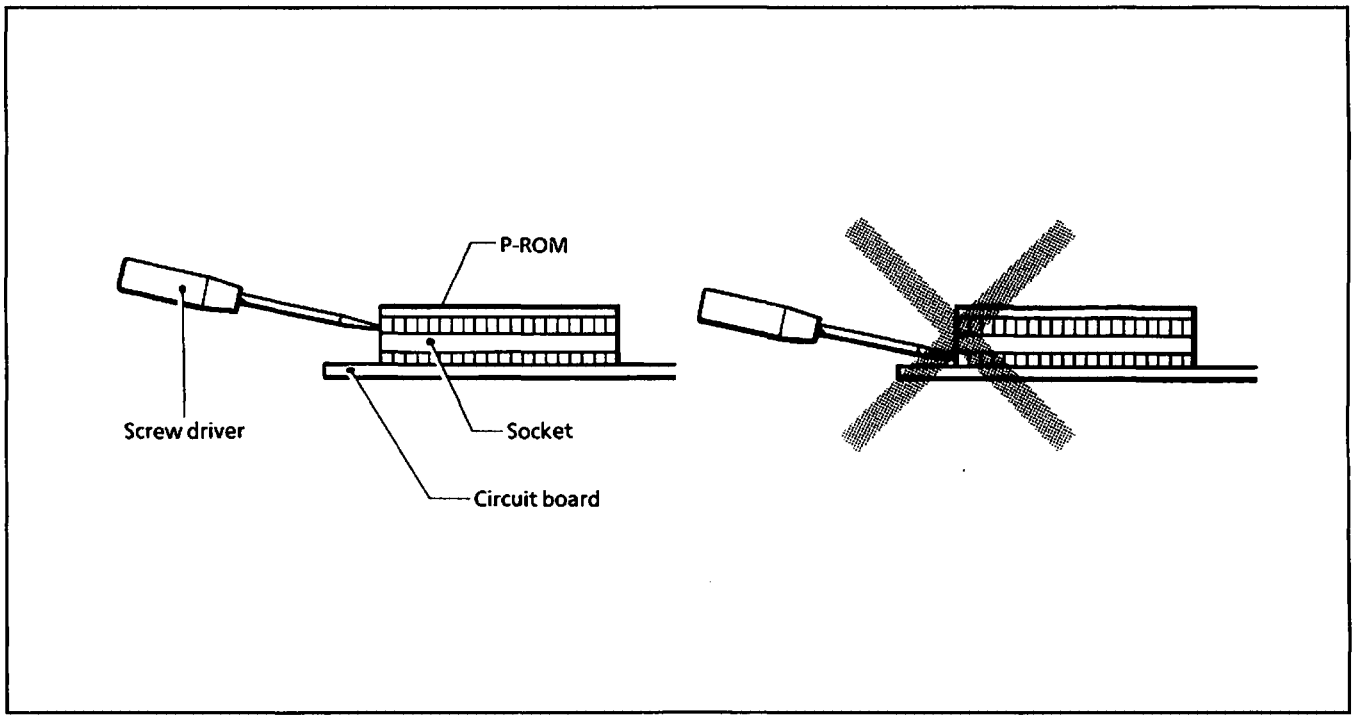


Keyboard circuit board

Be sure to turn off the power before replacement.

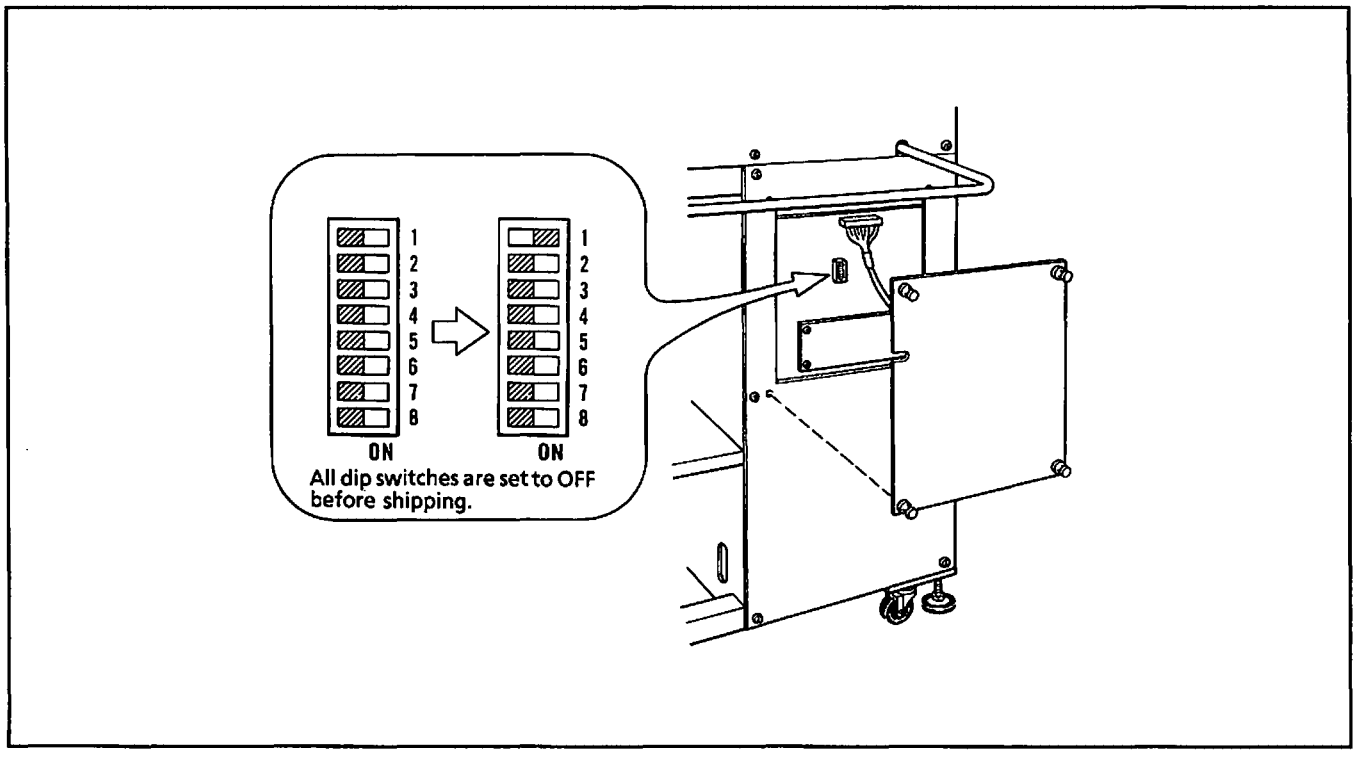
NOTES:

1. Use care when handling the PROMs. Make sure the pins are properly inserted in the sockets.
2. Do not apply excessive force when mounting the PROM on the circuit board.
3. Confirm that the PROMs are in the correct position and direction.
4. Use of the special PROM removal tool is recommended when removing the PROM. If a screwdriver must be used, be careful not to damage the PROM socket. Carefully lift the PROM little by little from both sides. See the figure.



5 DIP switches

BAS-411



1. SW1 ..... Use this key to choose between mm and inch unit system.

At shipping, DIP SW1 is set to OFF. By switching the DIP switch on, the total length of a pattern or the set sewing area can be specified in inches.

Display in inches

Example1 Area

ARA : V 10.10 mm H 15.30 mm

This indicates that the vertical length is 10.10 inches (=257mm) and the horizontal length is 15.30 inches (=389mm).

Example2 Total length

LG : V 10.00 mm H 15.00 mm

When setting the total length :
the data is in 4 digits, the minimum unit being 0.01inches.

Example3 To set and confirm hoop feed point

HOP: X 10.00 mm Y 15.00 mm

Example entry

When setting the vertical length for 3.5 inches and the horizontal length for 10 inches:

Vertical | 0 | 3 | 5 | 0 | Press numeric keys | 0) | 3 / F3 | 5 " F5 | 0)

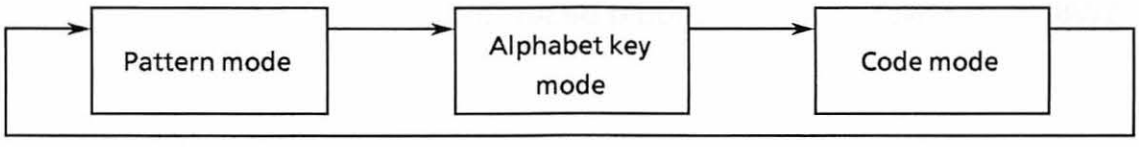
Horizontal | 1 | 0 | 0 | 0 | Press numeric keys | 1 ! F1 | 0) | 0) | 0)

Enter degits in order from left to right.

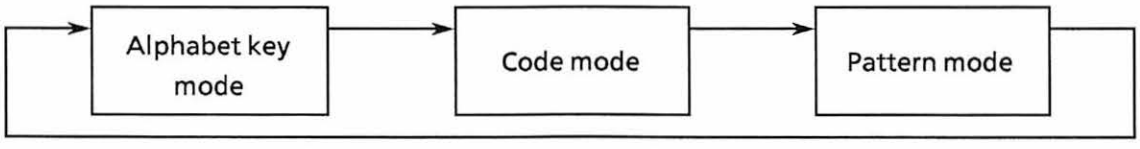
NOTE: In using inches, errors within 0.254 mm should be tolerated, for the minimum unit is 0.01 inches.
In using millimeters, errors within 1 mm should be tolerated, for the minimum unit is 1 mm.

2. SW2 ..... Mode switching order can be changed by PATTERN key in entry mode using DIP switch 2.

◦ SW2 = ON
Pattern mode is displayed first.



◦ SW2 = OFF
Alphabet mode is displayed first.



3. SW3 ..... The sewing start point of the embroidery can be changed by switching DIP switch 3.

◦ When the DIP switch 3 is ON
When the entered data is one pattern, the needle location will be the sewing start point (the first stitch).
In this case, the area check and the test feed function are not available.
In entry mode or when the entered data is two patterns or more, the sewing start point will be the same as when the SW3 is OFF.

◦ SW3 = OFF
The sewing start point is selected by the centering function.

4. SW4 ..... Use this key to set the thread trimming between characters (Brother format) to ON/OFF.

- SW4 = ON
  Thread trimming will not be done between characters. (Cross-over stitch is possible.)

- SW4 = OFF
  Thread trimming will be automatically done between characters. (Cross-over stitch is not possible.)

5. SW5 ..... Data reading or sewing can be completed even if another floppy disk is inserted half way.

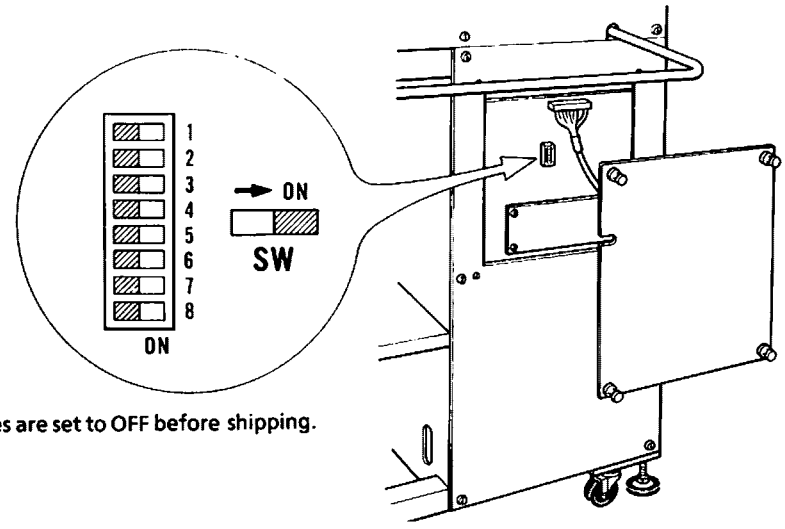
- SW5 = ON
  Even if another floppy disk is inserted during data reading or sewing of a character (pattern), machine will continue reading or sewing until it is done.
- SW5 = OFF
  If another floppy disk is inserted during data reading or sewing of a pattern (character), machine will stop operation at that point.

NOTE: Do not take out the floppy disk from the disk drive during data reading or sewing. It may cause errors or hinder correct sewing.

6. SW6-SW8 ..... Not available (Should be set to OFF.)

BAS-415

1. Dip switch functions on main printed circuit board

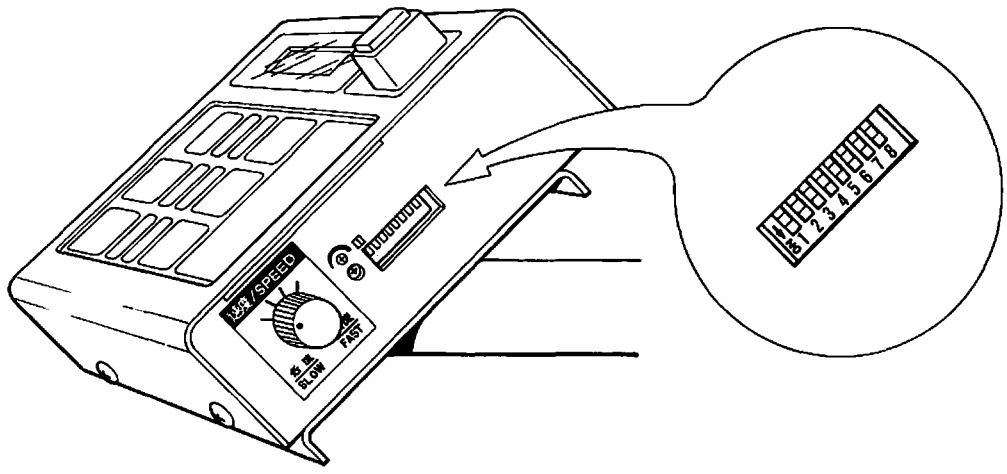


All dip switches are set to OFF before shipping.

switch number	state	function
SW1	OFF	To set paper tape reading speed to 9600 baud
	ON	To set paper tape reading speed to 4800 baud
SW2	OFF	To store data of floppy disk in the memory
	ON	To read and sew data of floppy disk (Data cannot be stored in the memory.)
SW3	OFF	If another floppy disk is inserted during data reading or sewing of a pattern (character), machine will stop operation at that point.
	ON	Even if another floppy disk is inserted during data reading or sewing of a character (pattern), machine will continue reading or sewing until it is done.
SW4	OFF	To display pattern name of sewing data during sewing
	ON	To display sewing speed (rpm.) during sewing
SW5	OFF	Spare (Use with OFF.)
	ON	
SW6	OFF	Spare (Use with OFF.)
	ON	
SW7	OFF	Spare (Use with OFF.)
	ON	
SW8	OFF	To display Japanese
	ON	To display English

NOTE: The power of the machine should be turned off before changing switch.
If the power is not turned off, functions do not change.

2. Dip switch functions on operation panel



switch number	state	function			
SW1		To jump stitch after thread trimming		SW1	SW2
			more than 8 stitches	OFF	OFF
			more than 5 stitches	ON	OFF
SW2			more than 3 stitches	OFF	ON
			without thread trimming	ON	ON
SW3	OFF	To set boring mode to OFF			
	ON	To set boring mode to ON			
SW4	OFF	To set boring shift to OFF (when dip sw 3 is ON)			
	ON	To set boring shift to ON (when dip sw 3 is ON)			
SW5	OFF	To return to sewing start point after sewing			
	ON	Not to return to sewing start point after sewing			
SW6	OFF	To adjust timing of hoop movement and needle rise for thick material			
	ON	To adjust timing of hoop movement and needle rise for thin material			
SW7	OFF	To set sewing start point of editing system data to first stitch			
	ON	To set sewing start point of editing system data to center of mask			
SW7	OFF	Spare (Use with OFF.)			
	ON				

NOTE: The power of the machine should be turned off before changing switch.
If the power is not turned off, functions do not change.

6 Connectors

1. Main circuit board connectors

Refer to the control block diagram to check the connector locations.

Connector No.	Connecting point	Drive signals	Symptoms resulting from bad connection
P1	Not available	----------	----------
P2	Main circuit board - Solenoid	Solenoid drive signal	Solenoid does not operate.
P3	Main circuit board - Power supply equipment	+ 5V (whole control PCB) + 12V (RS232C) – 12V (RS232C) + 60V (Solenoid)	· Control function does not operate well, or does not operate at all. · Communication function does not work. · Solenoid does not operate.
P4	Main circuit board - PMD circuit board (P1)	Pulse motor control signal	· X-axis pulse motor does not run. · Y-axis pulse motor does not run. · Pulse motor for needle bar replacing does not run. (Needle bar does not move.)
P5	Main circuit board - Sewing machine motor circuit board (P3)	Sewing machine motor control signal	· Sewing machine motor does not run. · Thread trimmer does not function . · Overload
P6	Not available	----------	----------
P7	Main circuit board - Synchronizer circuit board	needle movement possible needle location signal	· Improper needle bar position (Needle bar case does not move.) · Needle bar case locking · Improper needle bar case position · Improper needle bar position (Wrong needle bar is selected.)
P8	Main circuit board - Overtravel sensor	Mechanical area over signal	· When power is turned on, "area over" is displayed although the needle is in the sewing area. · During sewing, "area over" is displayed although the needle is in the sewing area.
P9	Main circuit board - Y home position sensor	Y-axis center detection	· When power is turned on, "area over" is displayed.
P10	Main circuit board - X home position sensor	X-axis center detection	· When power is turned on, "area over" is displayed.
P11	Main circuit board - Thread sensor (Thread breakage detector)	Needle thread breakage signal	· Thread breakage detector does not activate. · Thread breakage detector always activates.

Connector No.	Connecting point	Drive signals	Symptoms resulting from bad connection
P12	Main circuit board - cap sensor	cap frame overtravel signal cap frame home position signal	· Cap frame home position is not detected. · When power is turned on, "overtravel" is displayed. · Machine cannot enter cap frame mode.
P13 P14	Main circuit board - 3.5 in. floppy disk drive Main circuit board - 3.5 in. floppy disk drive	Input/Output signal of FDD FDD power supply	· FDD does not function. · Data in floppy disk cannot be read.
P15	Main circuit board - Editing system or paper tape reader	Serial comminucation control signal	· Comminucation with editing system cannot be done. (Data cannot be received.) · Data in the tape cannot be read through paper tape reader.
P16	Main circuit board - Operation keyboard	Operation keyboard control signal	· Nothing happens after power is turned on. · Display is blank.
P17	Main circuit board - Synchronizer	Needle up signal	· Synchronizing signal · Timing pulse signal
P18	Main circuit board - Rotary encoder	X-Y feed synchronize signal	· Thread trimming is not performed. · Hoop and holder base do not move either in X or Y direction.

2. Sewing machine motor circuit board connectors

Refer to the control block diagram to check the connector locations.

Connector No.	Connecting point	Drive signals	Symptoms resulting from bad connection
P1	Sewing machine motor circuit board - Power supply unit	6V AC (Sewing machine motor drive signal)	· Sewing machine motor does not run. · Thread trimming is not performed. · Overload
P2	Sewing machine motor circuit board - Power supply unit	Sewing machine motor drive signal	· Sewing machine motor does not run. · Thread trimming is not performed. · Overload
P3	Sewing machine motor circuit board - Main circuit board (P5)	Sewing machine motor drive signal	· Sewing machine motor does not run. · Thread trimming is not performed. · Overload

3. X- and Y-carriage pulse motor (PMD) PCB connectors

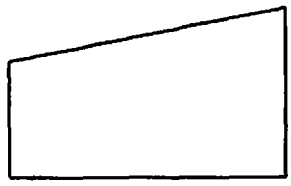
Refer to the control block diagram to check the connector locations.

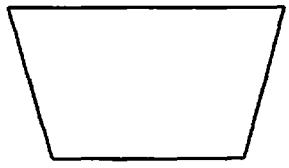
Connector No.	Connecting point	Drive signals	Symptoms resulting from bad connection
P1	Pulse motor circuit board - Main circuit board (P4)	Pulse motor drive signal	· X-axis pulse motor does not move. · Y- axis pulse motor does not move. · Pulse motor for needle bar change does not move.
P2	Pulse motor circuit board - Power supply unit	Pulse motor driving power Approx. +37V	· X and Y home position is not detected when power is turned on. · Unbalanced pattern · Needle bar cannot be replaced. · Needle bar case locking · Improper needle bar case position
P3	Pulse motor circuit board - XY pulse motor	X and Y pulse motor drive control power supply	· X and Y home position is not detected when power is turned on. · Unbalanced pattern
P4	Pulse motor circuit board - Index motor	Drive control power for needle change pulse motor	· Needle bar cannot be replaced. · Needle bar case locking · Improper needle bar case position

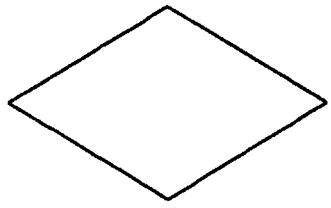
7 Trouble shooting flow chart

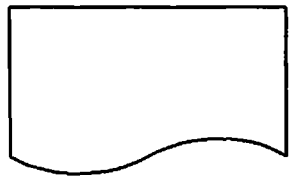
BAS-411

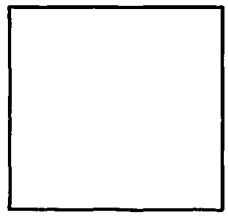
1. Symbols

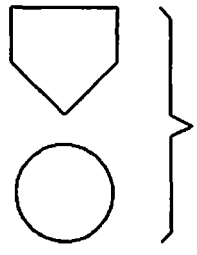
1.  indicates manual operation.

2.  indicates switch operation.

3.  selects the course of action to follow, using a yes-or-no decision-making process.

4.  indicates that the procedure to follow appears in the first column of "problem determination and solution table."

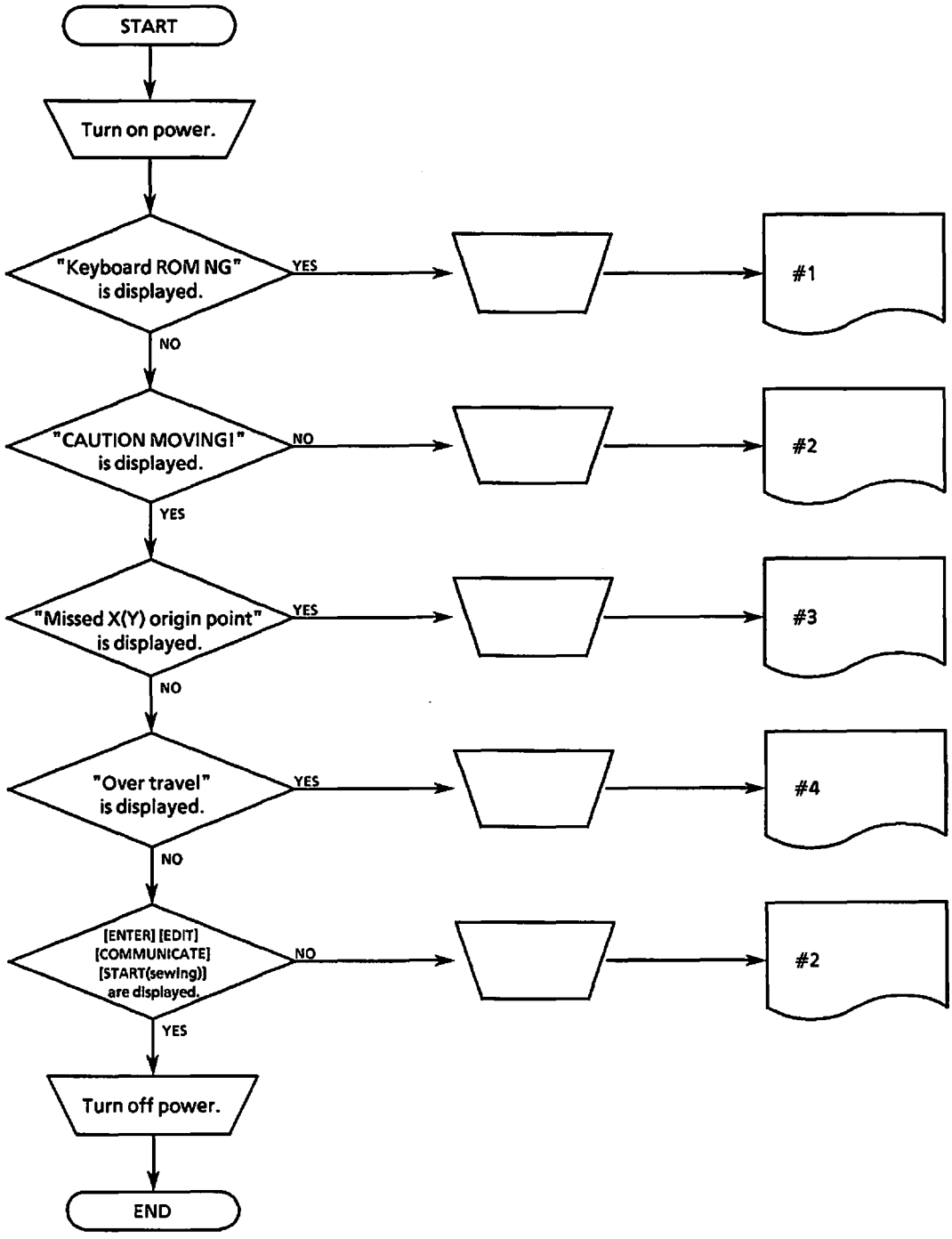
5.  indicates setting-up operation.

6.  indicates that the procedure to follow appears on the next page.

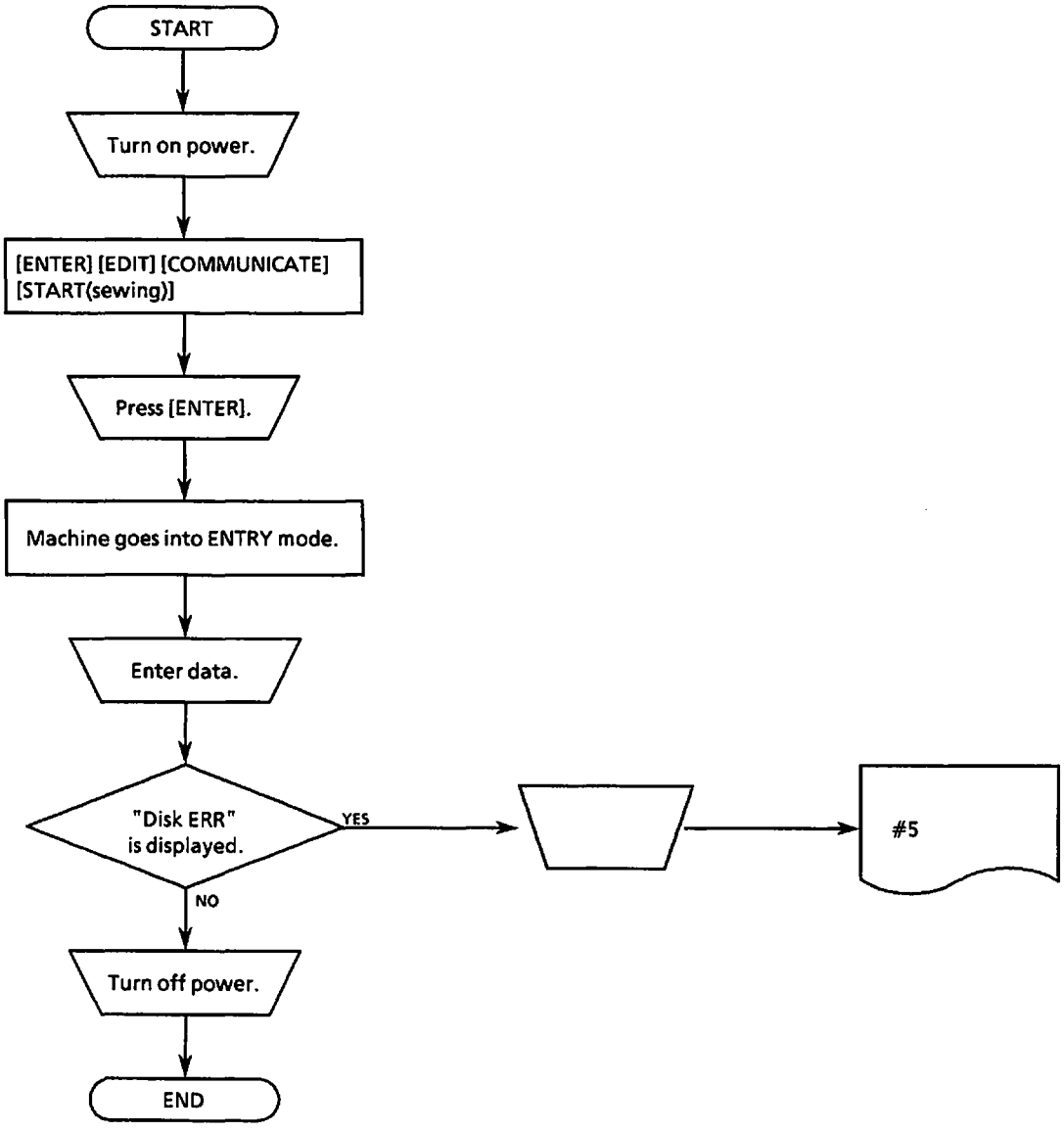
7.  indicates turning-off the power switch.

2. Troubleshooting flow chart

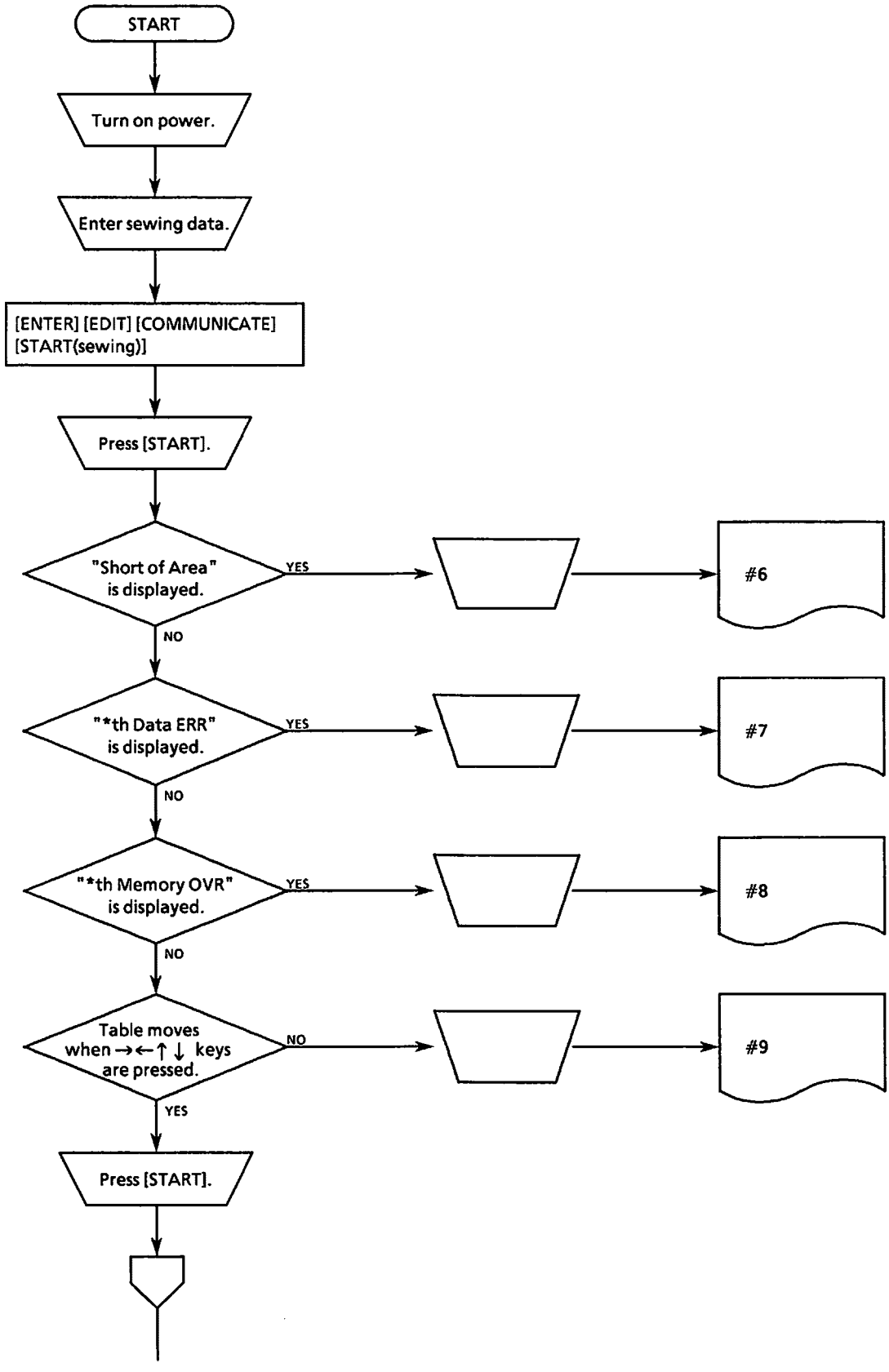
(1) When power is turned ON:

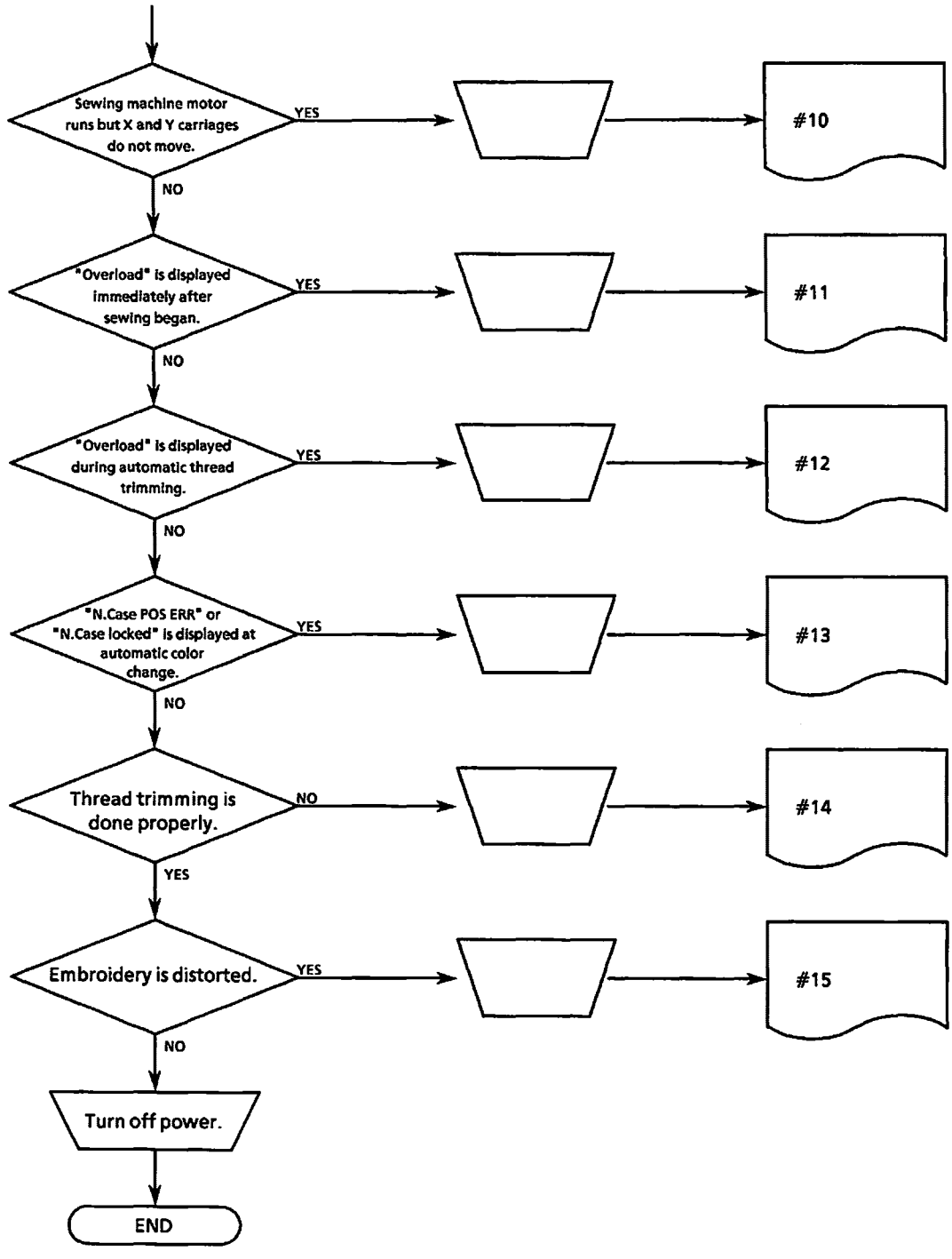


(2) In data entry mode

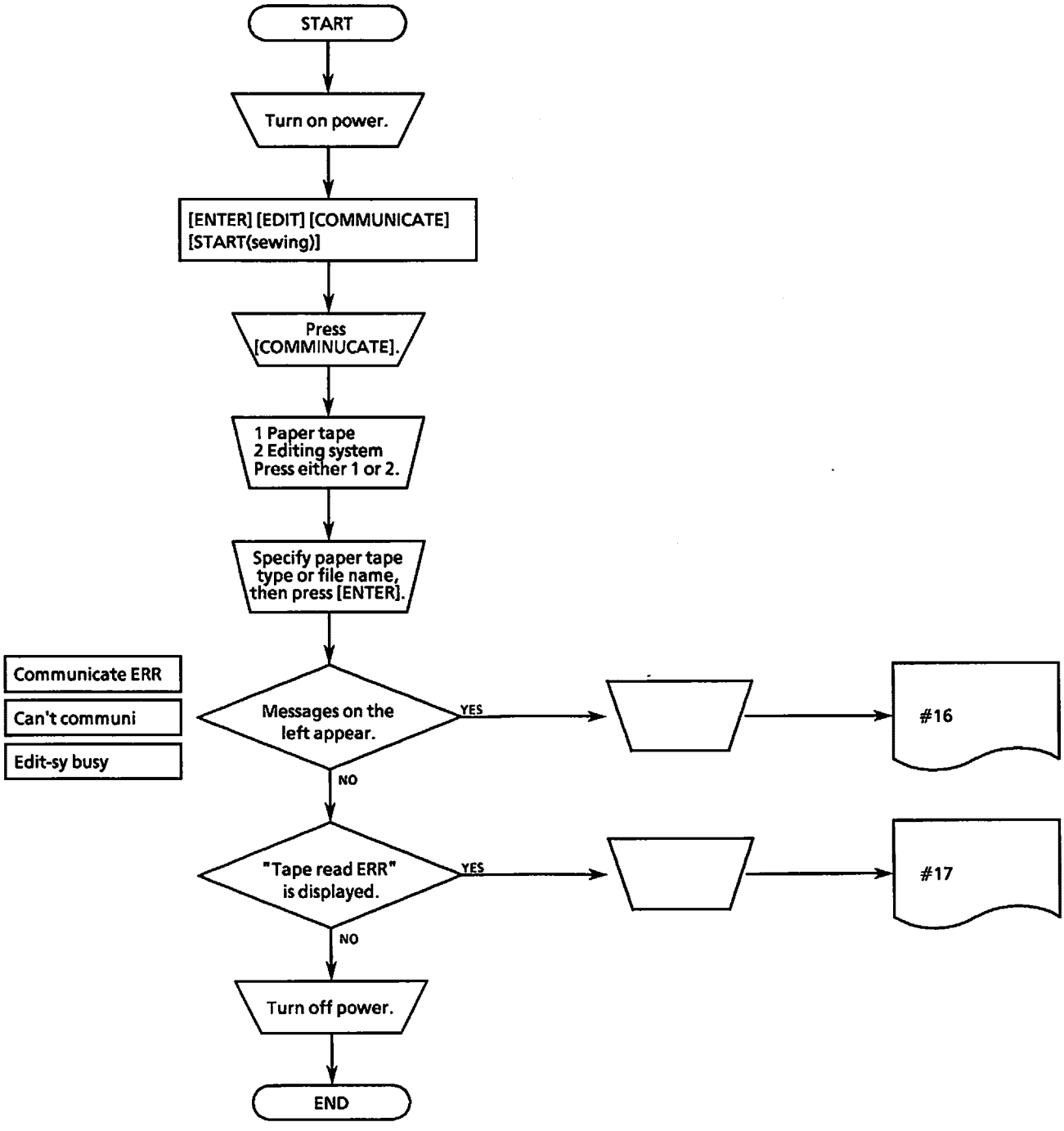


(3) In sewing mode

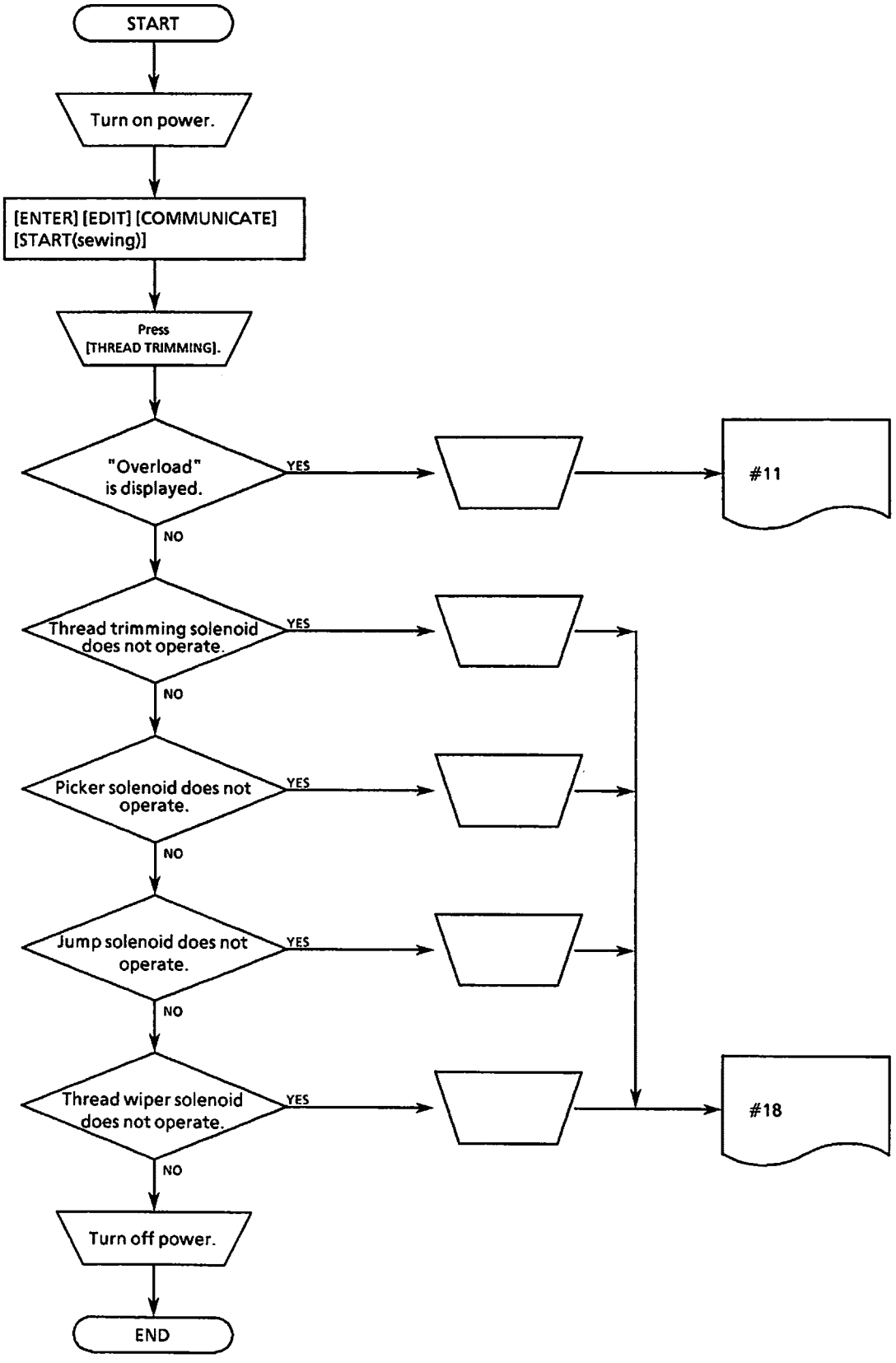




(4) In communication mode



(5) Electric solenoid



3. Problem determination and solution

Precautions

1. Be sure to turn off the power before plugging/unplugging the power cord.
2. Be sure to turn off the power switch before opening the machine cover or disconnecting cables.
3. Letters marked with an asterisk (ex. (a)*) in the CHECK/ADJUSTMENT/REPAIR column indicate that those items should be checked while the power is applied.
4. When replacing a fuse, be sure to use a new one having the same quality and capacity as the old one.
5. Check that all harnesses and connectors are correctly connected.

Before making adjustment

1. Check that no fuse is blown and each plug is correctly inserted.
2. Confirm the problem area referring to the troubleshooting flow chart.

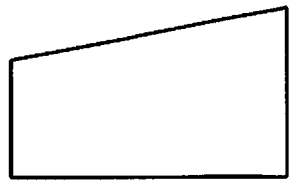
NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#1 Keyboard ROM NG is displayed.	1. Keyboard P-ROM version is improper.	Replace the keyboard P-ROM with the one matching main circuit board P-ROM.	P-ROM of keyboard	P 50
#2 "CAUTION MOVING!" is not displayed.	1. Power is not supplied.	(a)* Measure voltage of single phase power supply. If the voltage is not 100V AC (120V, 220V, 240V depending on where it is used.), it is defective.		
	2. Power switch or its cord defective	Remove face cover on the left, turn on the power with power plug unconnected, then measure transformer input terminals of the power supply plug and power supply unit. If there is no continuity, the power switch is defective.	Power supply cord Breaker	
	3. Regulator defective	(a)* With connector P3 unplugged, measure +5V output terminal of regulator. If it is +5V, it is normal. Similarly, check the +12Vand -12V terminals. If it is +12V or -12V, it is normal.	Regulator	P 92
	4. Power harness defective	(a)* While connector P3 is plugged, check +5V, +12V and -12V terminals on the main circuit board. If they are +5V, +12V and -12V each, they are normal.	Power supply harness A Main circuit board	P 92
	5. Keyboard cable defective	Check that there is continuity between same numbers in double end connector of keyboard assembly. If there is no continuity, it is defective.	Keyboard cable	P 96
	6. Operation panel defective	Replace operation panel.	Operation panel	P 50
	7. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
	8. Fuse F2 blown	Replace fuse.	Fuse	P 58
#3 "Missed X-ORG. PT" or "Missed Y-ORG. PT" is displayed.	1. Pulse motor harness defective	Check that connector P4 is correctly connected and proper continuity tested for.	Pulse motor harness	P 92
	2. Pulse motor power supply defective	(a)* With connector P2 on PMD circuit board unplugged, check the voltage of pins No.1 (+) and No.5(-). If it is not 37V, it is defective.	Power supply unit	P 92
	3. Pulse motor defective	Replace pulse motor.	Pulse motor	
	4. PMD circuit board defective	Replace PMD circuit board.	PMD circuit board	P 48
	5. Main circuit board	Replace main circuit board.	Main circuit board	P 47
	6. Fuse F1 blown	Replace fuse.	Fuse	P 58
#4 "Over travel" is displayed.	1. Home position sensor defective	Check that connectors P9 and P10 are correctly connected and proper continuity tested for.	Home position sensor	P 93,94
	2. Over travel sensor defective	Check that connector P8 is correctly connected and proper continuity tested for.	Over travel sensor	P 93
	3. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47

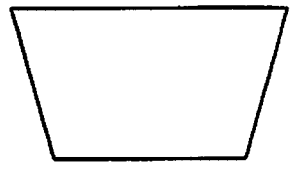
NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#5 "Disk ERR." is displayed.	1. Floppy harness defective	Check that connector P13 is correctly connected and proper continuity tested for.	Floppy harness	P 94
	2. FDD power supply harness defective	(a) Check that connector P14 is correctly connected or proper continuity tested for. (b)* With connector P14 removed, measure voltage between pin 1 (+) and pin 2 (-). If it is not +5V, it is defective.	FDD power supply harness	P 94 P 94
	3. Floppy disk drive defective	Replace floppy disk drive.	Floppy disk drive	
	4. Improper media	(a) Check that it is correct for machine. (b) Check that media type is correct. 2DD cannot be replaced by 2HD, and vice versa.	Media Media type	
	5. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
#6 "Short of Area" is displayed.	Mis-operation	Check area and ratio in editing mode.	----------	
#7 "*th data ERR." is displayed.	Improper media	Check media.	Replace media.	
#8 "*th Memory OVR" is displayed.	1. Mis-operation	Entered data exceeds the inside memory capacity and cannot be managed.	----------	
	2. Memory expansion board defective	Replace memory expansion board.	Memory expansion board	P 49
	3. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
#9 Hoop does not move.	Mis-operation Refer to item #3.	Area is set too small. Re-edit in editing mode. Refer to item #3.	---------- Refer to item #3.	Refer to item #3.
#10 Sewing machine runs but hoop does not move.	1. Encoder harness defective	Check that connector P18 is correctly connected and proper continuity tested for.	Encoder harness	P 98
	2. Rotary encoder defective	Replace rotary encoder.	Rotary encoder	
	3. Synchronizer defective	Replace synchronizer.	Synchronizer	
#11 Overload occurs immediately after sewing began.	1. Sewing machine motor circuit board harness defective	Check that connector P17 is correctly connected and proper continuity tested for.	Sewing machine motor circuit board harness	P 98
	2. Sewing machine motor circuit board	Replace sewing machine motor circuit board.	Sewing machine motor circuit board and transistor alley	P 48
	3. Transistor alley defective	Replace transistor alley.		P 59
	4. Fuse F6 blown	Replace fuse.	Fuse	P 58
#12 Overload occurs during automatic thread trimming.	Machinery defective Refer to item #11.	Repair and adjust machinery. Refer to item #11.	Refer to item #11.	
#13 Errors relative to needle bar case appear.	1. Index circuit board harness defective	Check that connector P7 is correctly connected and proper continuity tested for.	Index circuit board harness	P 93
	2. Pulse motor harness defective	Check that connector P4 is correctly connected and proper continuity tested for.	Pulse motor harness	P 92
	3. Needle change pulse motor defective	Replace pulse motor.	Pulse motor	
	4. PMD circuit board defective	Replace PMD circuit board.	PMD circuit board	P 48
	5. Fuse F1 blown	Replace fuse.	Fuse	P 58

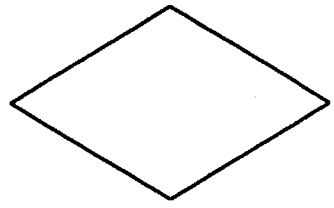
NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#14 Thread trimming is not normal.	Refer to "(5) electric solenoid" in troubleshooting.			
#15 Embroidery is distorted.	1. Improperly adjusted machinery 2. PMD circuit board defective 3. Mis-operation	Re-adjust machinery. Replace PMD circuit board. (a) Check if machine is operated in hoop mode with cap sensor. (b) Check if machine is operated in cap frame mode without cap sensor.	---------- PMD circuit board ---------- ----------	 P 48
#16 Errors relative to communication appear.	1. Improper RS cable 2. Paper tape reader defective 3. Editing system defective 4. Main circuit board defective	Check that RS cable is correctly connected and proper continuity tested for. (a) Check that power is turned on. (b) Check that paper tape is set. (c) Replace paper tape reader. (a) Check that power is turned on. (b) Check that machine enters communication mode. (c) Replace editing system. Replace main circuit board.	RS cable Paper tape reader Editing system Main circuit board	 P 47
#17 "Tape read Error" is displayed.	1. Mis-operation 2. Improper tape 3. Tape reader defective	Select correct tape type. (a) Poor punch of paper tape (b) Paper tape runs short. (a) Dirty head of paper tape reader (b) Replace tape reader.	---------- Re-punch tape. Clean head. Tape reader	
#18 Solenoid does not operate.	1. Solenoid harness defective 2. Solenoid power defective 3. Solenoid defective 4. Main circuit board defective 5. Improper machinery 6. Fuse F3 blown 7. Refer to item #10.	Check connector P2 is correctly connected and proper continuity tested for. (a)* With connector P3 unplugged, check voltage between pins 6 (+) and 8 (-). If it is +60V, it is normal. With connector P2 unplugged, measure resistance values of pins below. No.1 No.2 thread trimming solenoid 47Ω No.3 No.4 thread wiper solenoid 23Ω No.5 No.6 jump solenoid 185Ω No.7 No.8 picker solenoid 650Ω Each voltage should have above specified values. Replace main circuit board. Readjust machinery. Replace fuse. Refer to item #10.	 Power supply unit Thread trimming solenoid Thread wiper solenoid Jump solenoid Picker solenoid Main circuit board ---------- Fuse Refer to item #10.	P 92 P 92 P 92 P 47 P 58

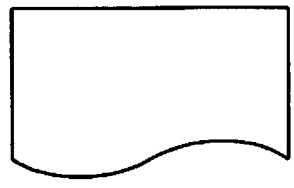
BAS-415

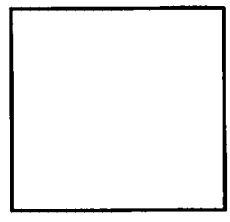
1. Symbols

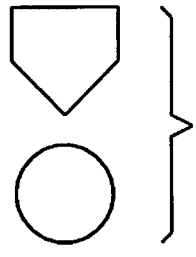
1.  indicates manual operation.

2.  indicates switch operation.

3.  selects the course of action to follow, using a yes-or-no decision-making process.

4.  indicates that the procedure to follow appears in the first column of "problem determination and solution table."

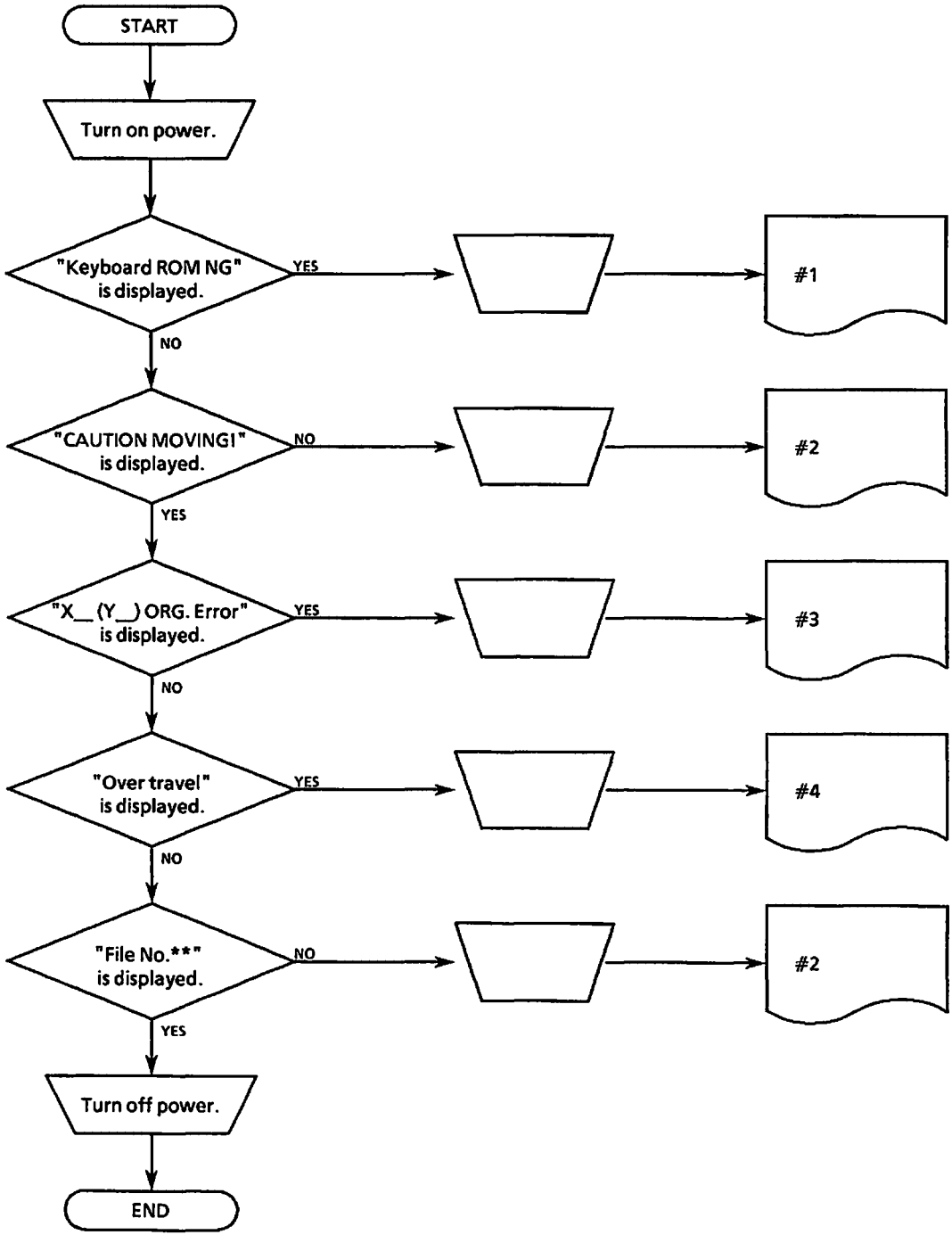
5.  indicates setting-up operation.

6.  indicates that the procedure to follow appears on the next page.

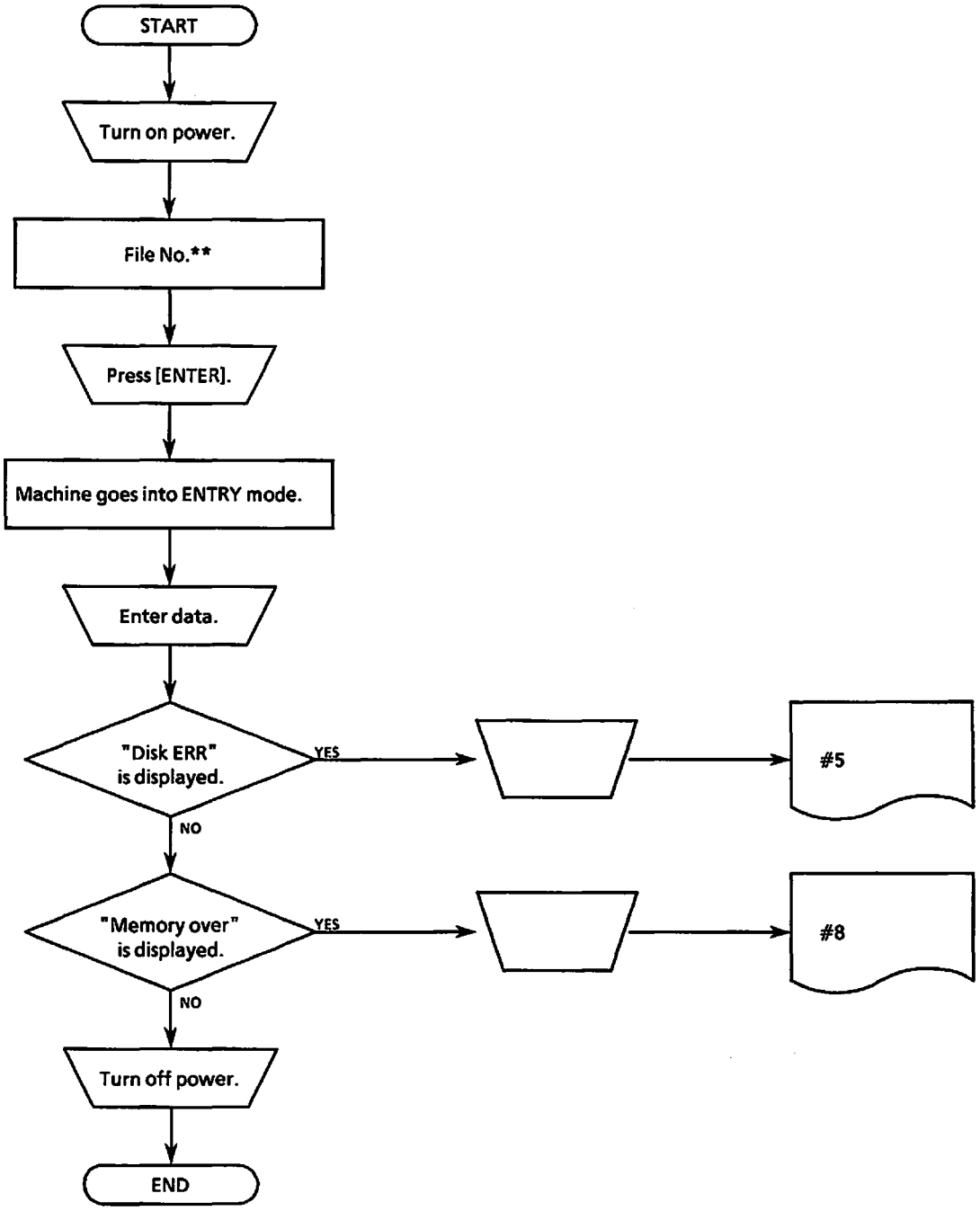
7.  indicates turning-off the power switch.

2. Troubleshooting flow chart

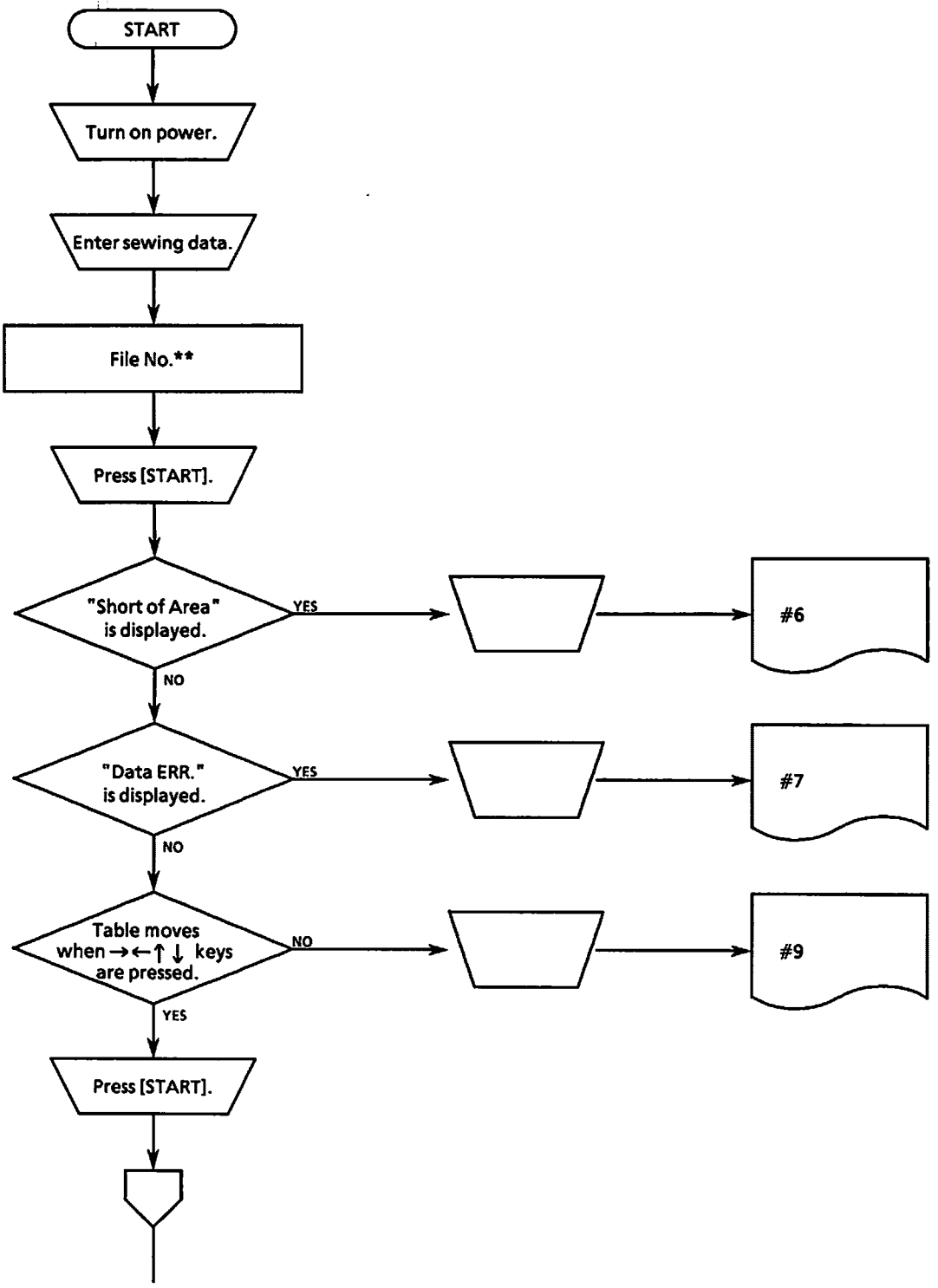
(1) When power is turned ON:

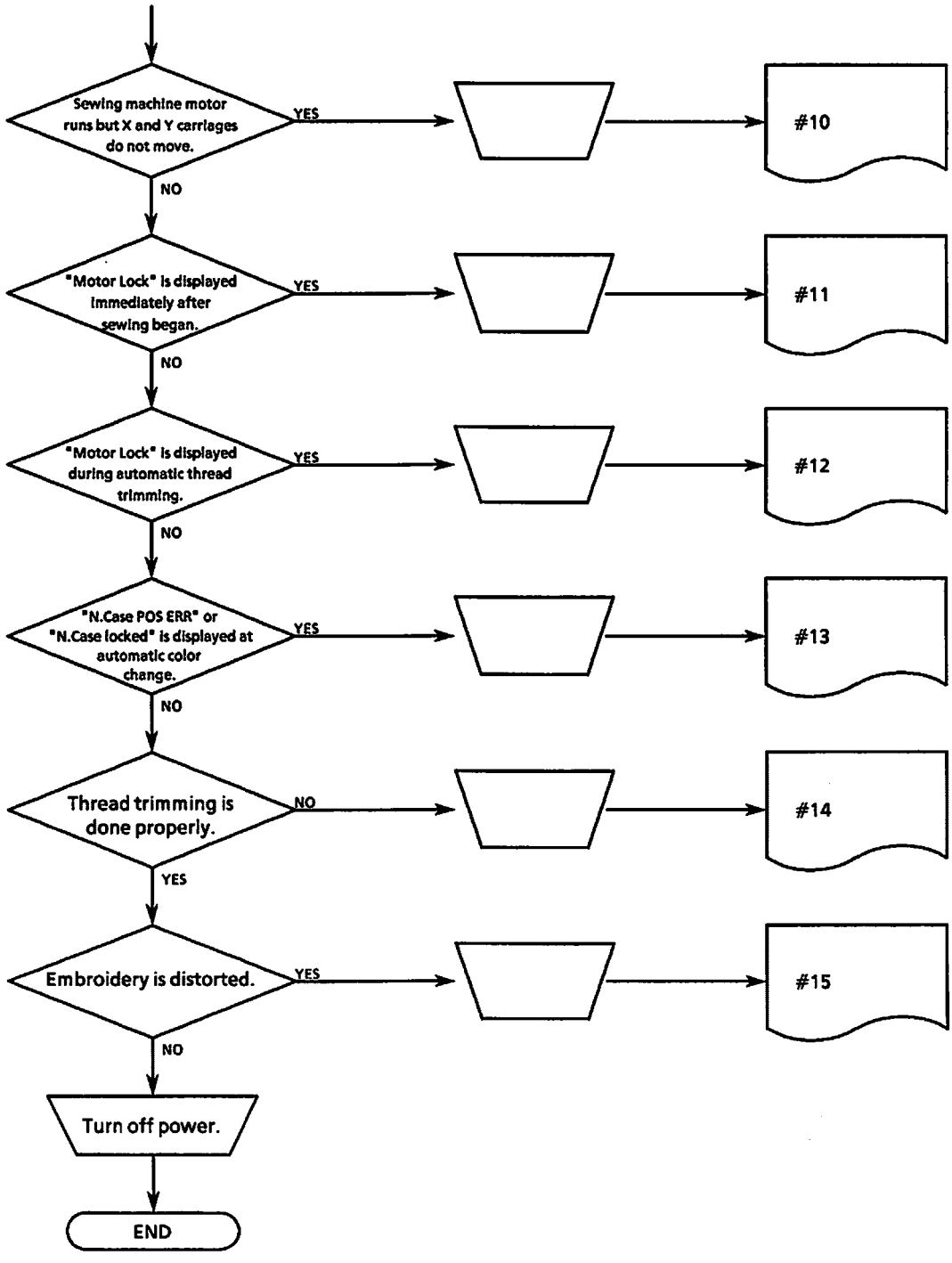


(2) In data entry mode

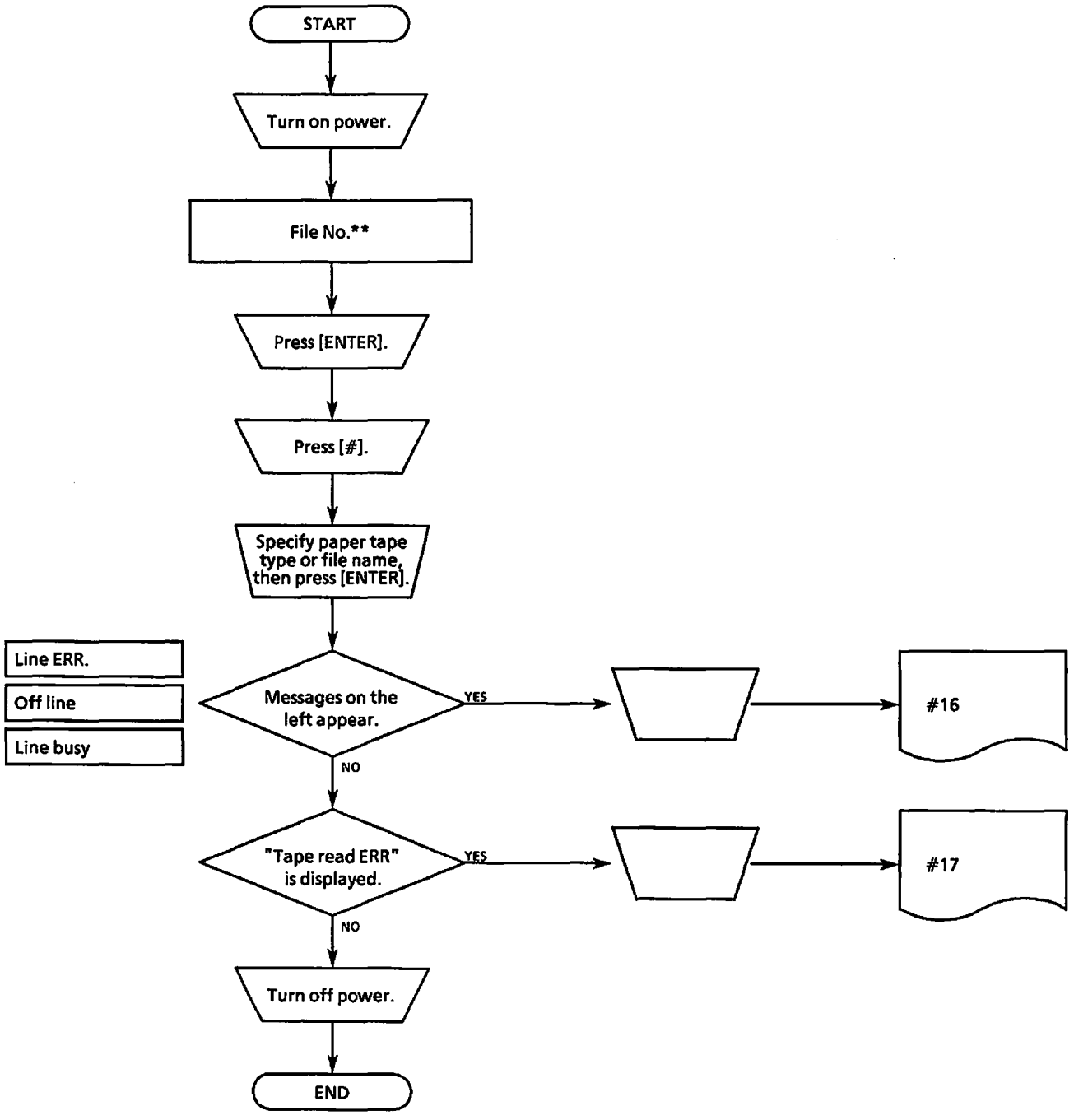


(3) In sewing mode

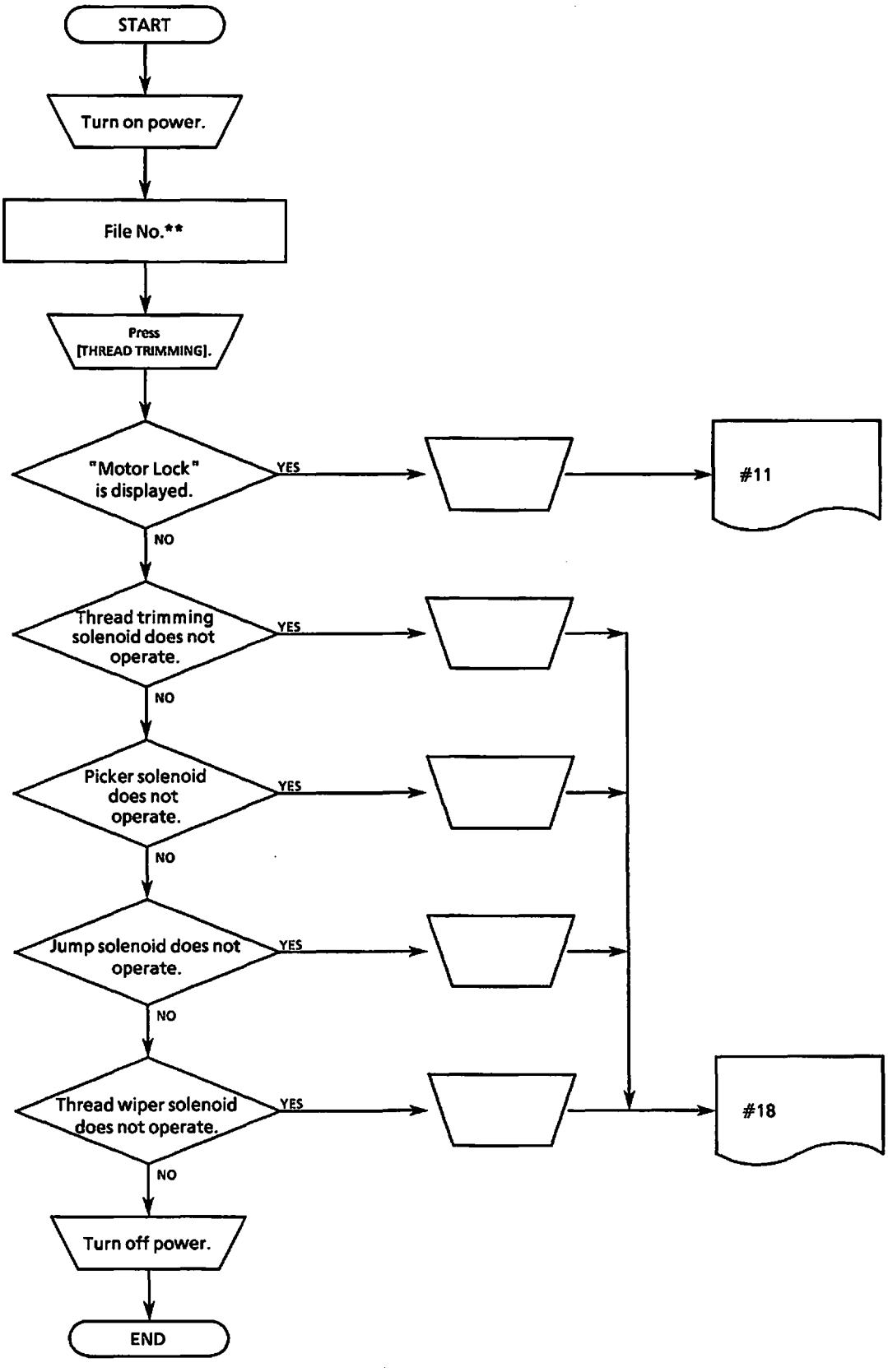




(4) In communication mode



(5) Electric solenoid



3. Problem determination and solution

Precautions

1. Be sure to turn off the power before plugging/unplugging the power cord.
2. Be sure to turn off the power switch before opening the machine cover or disconnecting cables.
3. Letters marked with an asterisk (ex. (a)*) in the CHECK/ADJUSTMENT/REPAIR column indicate that those items should be checked while the power is applied.
4. When replacing a fuse, be sure to use a new one having the same quality and capacity as the old one.
5. Check that all harnesses and connectors are correctly connected.

Before making adjustment

1. Check that no fuse is blown and each plug is correctly inserted.
2. Confirm the problem area referring to the troubleshooting flow chart.

NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#1 Keyboard ROM NG is displayed.	1. CPU version of keyboard is incorrect.	Change CPU version of keyboard to proper version matching PROM of PCB.	CPU of keyboard	P 54
#2 "CAUTION MOVING!" is not displayed.	1. Power is not supplied.	(a)* Measure voltage of single phase power supply. If the voltage is not 100V AC (120V, 220V, 240V depending on where it is used.), it is defective.		
	2. Power switch or its cord defective	Remove face cover on the left, turn on the power with power plug unconnected, then measure transformer input terminals of the power supply plug and power supply unit. If there is no continuity, the power switch is defective.	Power supply cord Breaker	
	3. Regulator defective	(a)* With connector P3 unplugged, measure +5V output terminal of regulator. If it is +5V, it is normal. Similarly, check the +12Vand -12V terminals. If it is +12V or -12V, it is normal.	Regulator	P 92
	4. Power harness defective	(a)* While connector P3 is plugged, check +5V, +12V and -12V terminals on the main circuit board. If they are +5V, +12V and -12V each, they are normal.	Power supply harness A Main circuit board	P 92
	5. Keyboard cable defective	Check that there is continuity between same numbers in double end connector of keyboard assembly. If there is no continuity, it is defective.	Keyboard cable	P 97
	6. Operation panel defective	Replace operation panel.	Operation panel	P 57
	7. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
	8. Fuse F2 blown	Replace fuse.	Fuse	P 58
#3 "X__ORG.Error" or "Y__ORG.Error" is displayed.	1. Pulse motor harness defective	Check that connector P4 is correctly connected and proper continuity tested for.	Pulse motor harness	P 92
	2. Pulse motor power supply defective	(a)* With connector P2 on PMD circuit board unplugged, check the voltage of pins No.1 (+) and No.5(-). If it is not 37V, it is defective.	Power supply unit	P 92
	3. Pulse motor defective	Replace pulse motor.	Pulse motor	
	4. PMD circuit board defective	Replace PMD circuit board.	PMD circuit board	P 48
	5. Main circuit board	Replace main circuit board.	Main circuit board	P 47
	6. Fuse F1 blown	Replace fuse.	fuse	P 58
#4 "Over travel" is displayed.	1. Home position sensor defective	Check that connectors P9 and P10 are correctly connected and proper continuity tested for.	Home position sensor	P 93,94
	2. Over travel sensor defective	Check that connector P8 is correctly connected and proper continuity tested for.	Over travel sensor	P 93
	3. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47

NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#5 "Disk ERR." is displayed.	1. Floppy harness defective	Check that connector P13 is correctly connected and proper continuity tested for.	Floppy harness	P 94
	2. FDD power supply harness defective	(a) Check that connector P14 is correctly connected or proper continuity tested for.	FDD power supply harness	P 94
		(b)* With connector P14 removed, measure voltage between pin 1 (+) and pin 2 (-). If it is not +5V, it is defective.		P 94
	3. Floppy disk drive defective	Replace floppy disk drive.	Floppy disk drive	
	4. Improper media	(a) Check that it is correct for machine.	Media	
		(b) Check that media type is correct. 2DD cannot be replaced by 2HD, and vice versa.	Media type	
	5. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
#6 "Short of Area" is displayed.	Improper sewing data	Pattern size of data exceeds sewing area.	This pattern data cannot be sewn.	
#7 "Data ERR." is displayed.	Improper media	Check media.	Replace media.	
#8 "Memory over" is displayed.	1. Mis-operation	Entered data exceeds the inside memory capacity and cannot be managed.	----------	
	2. Memory expansion board defective	Replace memory expansion board.	Memory expansion board	P 49
	3. Main circuit board defective	Replace main circuit board.	Main circuit board	P 47
#9 Hoop does not move.	Refer to item #3.	Refer to item #3.	Refer to item #3.	Refer to item #3.
#10 Sewing machine runs but hoop does not move.	1. Encoder harness defective	Check that connector P18 is correctly connected and proper continuity tested for.	Encoder harness	P 98
	2. Rotary encoder defective	Replace rotary encoder.	Rotary encoder	
	3. Synchronizer defective	Replace synchronizer.	Synchronizer	
#11 Motor is locked immediately after sewing began.	1. Sewing machine motor circuit board harness defective	Check that connector P17 is correctly connected and proper continuity tested for.	Sewing machine motor circuit board harness	P 98
	2. Sewing machine motor circuit board	Replace sewing machine motor circuit board.	Sewing machine motor circuit board and transistor alley	P 48
	3. Transistor alley defective	Replace transistor alley.		P 59
	4. Fuse F6 blown	Replace fuse.	Fuse	P 58
#12 Motor is locked during automatic thread trimming.	Machinery defective Refer to item #11.	Repair and adjust machinery. Refer to item #11.	Refer to item #11.	
#13 Errors relative to needle bar case appear.	1. Index circuit board harness defective	Check that connector P7 is correctly connected and proper continuity tested for.	Index circuit board harness	P 93
	2. Pulse motor harness defective	Check that connector P4 is correctly connected and proper continuity tested for.	Pulse motor harness	P 92
	3. Needle change pulse motor defective	Replace pulse motor.	Pulse motor	
	4. PMD circuit board defective	Replace PMD circuit board.	PMD circuit board	P 48
	5. Fuse F1 blown	Replace fuse.	Fuse	P 58

NO. IN FLOW CHART AND ERROR STATUS	CAUSE	CHECK/ADJUSTMENT/REPAIR	PARTS TO BE REPLACED	REF. PAGE
#14 Thread trimming is not normal.	Refer to "(5) electric solenoid" in troubleshooting.			
#15 Embroidery is distorted.	1. Improperly adjusted machinery 2. PMD circuit board defective 3. Mis-operation	Re-adjust machinery. Replace PMD circuit board. (a) Check if machine is operated in hoop mode with cap sensor. (b) Check if machine is operated in cap frame mode without cap sensor.	---------- PMD circuit board ---------- ----------	 P 48
#16 Errors relative to communication appear.	1. Improper RS cable 2. Paper tape reader defective 3. Editing system defective 4. Main circuit board defective	Check that RS cable is correctly connected and proper continuity tested for. (a) Check that power is turned on. (b) Check that paper tape is set. (c) Replace paper tape reader. (a) Check that power is turned on. (b) Check that machine enters communication mode. (c) Replace editing system. Replace main circuit board.	RS cable Paper tape reader Editing system Main circuit board	 P 47
#17 "Tape read Error" is displayed.	1. Mis-operation 2. Improper tape 3. Tape reader defective	Select correct tape type. (a) Poor punch of paper tape (b) Paper tape runs short. (a) Dirty head of paper tape reader (b) Replace tape reader.	---------- Re-punch tape. Clean head. Tape reader	
#18 Solenoid does not operate.	1. Solenoid harness defective 2. Solenoid power defective 3. Solenoid defective 4. Main circuit board defective 5. Improper machinery 6. Fuse F3 blown 7. Refer to item #10.	Check connector P2 is correctly connected and proper continuity tested for. (a)* With connector P3 unplugged, check voltage between pins 6 (+) and 8 (-). If it is +60V, it is normal. With connector P2 unplugged, measure resistance values of pins below. No.1 / No.2 thread trimming solenoid 47Ω No.3 / No.4 thread wiper solenoid 23Ω No.5 / No.6 jump solenoid 185Ω No.7 / No.8 picker solenoid 650Ω Each voltage should have above specified values. Replace main circuit board. Readjust machinery. Replace fuse. Refer to item #10.	 Power supply unit Thread trimming solenoid Thread wiper solenoid Jump solenoid Picker solenoid Main circuit board ---------- Fuse Refer to item #10.	P 92 P 92 P 92 P 47 P 58

8 Harness connections and connectors number

BAS-411·415

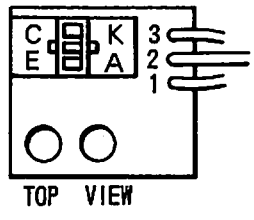
Main circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.		
P 1 (SOL 1)	1	N.C.	1	Unused solenoid	
	2	N.C.	2		
	3	N.C.	1		
	4	N.C.	2		
	5	N.C.	1		
	6	N.C.	2		
	7	N.C.	1		
	8	N.C.	2		
P 2 (SOL 2)	1	THCUT	1	Thread trimming solenoid	
	2	RET	2		
	3	WIPER	1	Thread wiper solenoid	
	4	RET	2		
	5	JUMP	1	Jump solenoid	
	6	RET	2		
	7	PICKER	1	Picker solenoid	
	8	RET	2		
P 3 (POWER)	1	+5V	1	CN11	Power supply unit
	2	+12V	2		
	3	−12V	3		
	4	±0V	4		
	5	±0V	5		
	6	OVRET (±0V)	6		
	7	N.C.	7		
	8	+Vmm	8		
	9	N.C.	9		
P 4 (PMD)	1	+5V	1	P 1 (CNT)	PMD circuit board
	2	+5V	2		
	3	$\overline{\text{IUP}}$	3		
	4	$\overline{\text{IDOWN}}$	4		
	5	$\overline{\text{YUP}}$	5		
	6	$\overline{\text{YDOWN}}$	6		
	7	$\overline{\text{XDOWN}}$	7		
	8	$\overline{\text{XUP}}$	8		
	9	$\overline{\text{SAVE}}$	9		
	10	$\overline{\text{ISAVE}}$	10		

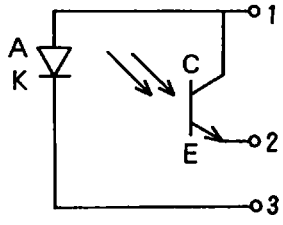
*N.C. = not connected

Main circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.		
P4 (PMD)	11	N.C.	11	P1 (CNT)	PMD circuit board
	12	PESET	12		
	13	N.C.	13		
	14	±0V	14		
	15	±0V	15		
P5 (MOTOR)	1	+5V	1	P3 (CNT)	Sewing machine motor circuit board
	2	+5V	2		
	3	$\overline{\text{HLSPD1}}$	3		
	4	$\overline{\text{HLSPD2}}$	4		
	5	$\overline{\text{MOVE}}$	5		
	6	$\overline{\text{UP}}$	6		
	7	$\overline{\text{SPD0}}$	7		
	8	$\overline{\text{SPD1}}$	8		
	9	N.C.	9		
	10	N.C.	10		
	11	$\overline{\text{TG}}$	11		
	12	±0V	12		
	13	±0V	13		
	14	N.C.	14		
	15	$\overline{\text{OVLD}}$	15		
P7 (INDEX)	1	+12V	1	Synchronizer circuit board	
	2	NP-ROT	2		
	3	±0V	3		
	4	NP-CNG0	4		
	5	NP-CNG1	5		
	6	NP-CNG2	6		
	7	NP-CNG3	7		
	8	±0V	8		
P8 (OVER)	1	+5V	1	±X	Over travel sensor
	2	OVTR±X	2		
	3	RET	3		
	4	+5V	1	+Y	
	5	OVTR+Y	2		
	6	RET	3		
	7	+5V	1	−Y	
	8	OVTR−Y	2		
	9	RET	3		
P9 (Y-ORG)	1	+5V	1	Y home position sensor	
	2	YINDEX	2		
	3	RET	3		

*N.C. = not connected

P8, P9, P10
Sensor circuit board





Main circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.		
P 10 (X-ORG)	1	+5V	1	X home position sensor	
	2	XINDEX	2		
	3	RET	3		
P 11 (TH. BRK)	1	+12V	1	Thread breakage detector	
	2	STINT	2		
	3	±0V	3		
P 12 (SEEK)	1	+5V			Cap sensor
	2	L-SEEK	4	CAP-ON	
	3	RET			
	4	+5V	1	+5V	
	5	R-SEEK	2	CAP-OVER	
	6	RET	3	RET	
P 13 (FDD)	2	2HD/$\overline{2DD}$	33	3.5" floppy disk drive (FDD)	
	4	RESERVED	31		
	6	DRIVE SEL3	29		
	8	INDEX	27		
	10	DRIVE SEL0	25		
	12	DRIVE SEL1	23		
	14	DRIVE SEL2	21		
	16	MOTOR ON	19		
	18	DIRECTION	17		
	20	STEP	15		
	22	WRITE DATA	13		
	24	WRITE GATE	11		
	26	TRACK 00	9		
	28	WRITE PROTECT	7		
	30	READ DATA	5		
	32	HEAD SELECT	3		
	34	DISK CHANGE	1		
	1.3.5.7.9. 11.13.15. 17.19.21. 23.25.27. 29.31.33	SIGNAL RETURN (±0)	2.4.6.8.10. 12.14.16. 18.20.22. 24.26.28. 30.32.34		
P 14 (FDD POWER)	1	+5V	1	3.5" FDD power supply	
	2	±0V	2		
P 15 (RS232C)	1	FG (±0V)	1	Paper tape reader or editing system	
	2	SD	3		
	3	RD	2		
	4	RTS	5		

Main circuit board			Connect to;	
Connector	Pin No.	Signal	Pin No.	
P 15 (RS232C)	5	CTS	4	Paper tape reader or editing system
	6	DSR	20	
	7	±0V	7	
	8	N.C.	8	
	9	N.C.	9	
	10	N.C.	10	
	11	N.C.	11	
	12	N.C.	12	
	13	N.C.	13	
	14	N.C.	14	
	15	N.C.	15	
	16	N.C.	16	
	17	N.C.	17	
	18	N.C.	18	
	19	N.C.	19	
	20	DTR	6	
	21	N.C.	21	
	22	N.C.	22	
	23	N.C.	23	
	24	N.C.	24	
	25	N.C.	25	

*N.C. = not connected

BAS-411

<Main circuit board>

Main circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 16 (KEY)	1	FG	1	P 9 (HOST)	Operation panel
	2	SD	2		
	3	RD	3		
	4	+5V	4		
	5	CTS	5		
	6	DSR	6		
	7	±0V	7		
	8	EMRET (±0V)	8		
	9	EMSTOP	9		
	10	+5V	10		
	11	D1	11		
	12	FLM	12		
	13	MB	13		
	14	CL1	14		
	15	CL2	15		
	16	D2	16		
	17	±0V	17		
	18	±0V	18		
	19	±0V	19		
	20	N.C.	20		
	21	N.C.	21		
	22	N.C.	22		
	23	+5V	23		
	24	+5V	24		
	25	+5V	25		

*N.C. = not connected

BAS-415

<Main circuit board>

Main circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 16 (KEY)	1	FG	1	CN3 (HOST)	Operation panel
	2	SD	2		
	3	RD	3		
	4	+5V	4		
	5	CTS	5		
	6	DSR	6		
	7	±0V	7		
	8	EMRET (±0V)	8		
	9	EMSTOP	9		
	10	+5V	10		
	11	N.C.	11		
	12	N.C.	12		
	13	N.C.	13		
	14	N.C.	14		
	15	N.C.	15		
	16	N.C.	16		
	17	±0V	17		
	18	±0V	18		
	19	±0V	19		
	20	N.C.	20		
	21	N.C.	21		
	22	N.C.	22		
	23	+5V	23		
	24	+5V	24		
	25	+5V	25		

*N.C. = not connected

BAS-411·415

<Main circuit board>

Main circuit board			Connect to;	
Connector	Pin No.	Signal	Pin No.	
P 17 (TIMING1)	1	N.C.	1	Synchronizer
	2	+5V	2	
	3	NLUP (1P/R)	3	
	4	N.C.	4	
	5	±0V	5	
	6	N.C.	6	
	7	NLDW (1P/R)	7	
	8	ENC (24P/R)	8	
P 18 (TIMING2)	1	A-PHASE	1	Rotary encoder (1000P/R)
	2	N.C.	2	
	3	N.C.	3	
	4	+5V	4	
	5	±0V	5	
		N.C.	6	

*N.C. = not connected

<Machine motor circuit board>

Machine motor circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 1 (CNT)	1	+5V	1	P 4 (PMD)	Main circuit board
	2	+5V	2		
	3	$\overline{\text{IUP}}$	3		
	4	$\overline{\text{IDOWN}}$	4		
	5	$\overline{\text{YUP}}$	5		
	6	$\overline{\text{YDOWN}}$	6		
	7	$\overline{\text{XDOWN}}$	7		
	8	$\overline{\text{XUP}}$	8		
	9	$\overline{\text{SAVE}}$	9		
	10	$\overline{\text{ISAVE}}$	10		
	11	$\overline{\text{IHALF}}$ (N.C.)	11		
	12	PESET	12		
	13	N.C.	13		
	14	±0V	14		
	15	±0V	15		
P 2 (POWER)	1	Vmm	1	CN12	Power supply unit
	2	Vmm	2		
	3	01V	3		
	4	01V	4		
P 3 (X. Y MOTOR)	1	X-A	5	X	X-pulse motor
	2	X-$\overline{\text{A}}$	6		
	7	X-B	2		
	8	X-$\overline{\text{B}}$	3		
		N.C.	1		
		N.C.	2		
	3	Y-A	5	Y	Y-pulse motor
	4	Y-$\overline{\text{A}}$	6		
	5	Y-B	2		
	6	Y-$\overline{\text{B}}$	3		
		N.C.	1		
		N.C.	2		
P 4 (INDEX MOTOR)	1	I-A	1	Needle change pulse motor	
	2	I-$\overline{\text{A}}$	2		
	3	I-B	3		
	4	I-$\overline{\text{B}}$	4		
	5	N.C.	5		
	6	N.C.	6		

*N.C. = not connected

<PMD circuit board>

PMD circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 1 (CNT)	1	+5V	1	P 4 (PMD)	Main circuit board
	2	+5V	2		
	3	$\overline{\text{IUP}}$	3		
	4	$\overline{\text{IDOWN}}$	4		
	5	$\overline{\text{YUP}}$	5		
	6	$\overline{\text{YDOWN}}$	6		
	7	$\overline{\text{XDOWN}}$	7		
	8	$\overline{\text{XUP}}$	8		
	9	$\overline{\text{SAVE}}$	9		
	10	$\overline{\text{ISAVE}}$	10		
	11	$\overline{\text{IHALF}}$ (N.C.)	11		
	12	PESET	12		
	13	N.C.	13		
	14	±0V	14		
	15	±0V	15		
P 2 (POWER)	1	Vmm	1	CN12	Power supply unit
	2	Vmm	2		
	3	01V	3		
	4	01V	4		
P 3 (X. Y MOTOR)	1	X-A	5	X	X-pulse motor
	2	X-$\overline{\text{A}}$	6		
	7	X-B	2		
	8	X-$\overline{\text{B}}$	3		
		N.C.	1		
		N.C.	2		
	3	Y-A	5	Y	Y-pulse motor
	4	Y-$\overline{\text{A}}$	6		
	5	Y-B	2		
	6	Y-$\overline{\text{B}}$	3		
		N.C.	1		
		N.C.	2		
P 4 (INDEX MOTOR)	1	I-A	1	Needle change pulse motor	
	2	I-$\overline{\text{A}}$	2		
	3	I-B	3		
	4	I-$\overline{\text{B}}$	4		
	5	N.C.	5		
	6	N.C.	6		

*N.C. = not connected

BAS-411

<Operation panel 1>

Operation panel					
Keyboard circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 1 (KEY1)	1	KEYCOM	1	Tail A	Sheet key
	2	SL7	2		
	3	SL0	3		
	4	SL1	4		
	5	SL2	5		
	6	SL3	6		
	7	SL4	7		
	8	SL6	8		
	9	SL5	9		
P 2 (KEY2)	1	DATA LOAD	1	Tail B	
	2	R7	2		
	3	R0	3		
	4	*	4		
	5	SHIFT2	5		
	6	R6	6		
	7	R5	7		
	8	R4	8		
	9	R3	9		
	10	R2	10		
	11	R1	11		
	12	SHIFT1	12		
	13	JOGY +	13		
	14	JOGX –	14		
	15	JOGX +	15		
	16	JOGY –	16		
P 3 (LAMP1)	1	N.C.	1	J1	Shift key lamp board
	2	LED3	2		
	3	LED2	3		
	4	LED1	4		
	5	LEDCOM	5		
P 4 (LAMP2)	1	LEDCOM	1	J2	7 SEG lamp board
	2	LED3	2		
	3	LED2	3		
	4	LED1	4		

*N.C. = not connected

<Operation panel 2>

Operation panel					
Keyboard circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 5 (7SEG)	1	dp	1	J1	7 SEG lamp board
	2	c	2		
	3	g	3		
	4	d	4		
	5	e	5		
	6	CMN4	6		
	7	CMN3	7		
	8	b	8		
	9	a	9		
	10	f	10		
	11	CMN1	11		
	12	CMN2	12		
P 6 (LIGHT)		Unused		Unused	
P 7 (RS232C)		Unused		Unused	
P 8 (EMSW)	1	EMRET (±0V)	N. OPEN	EMERGENCY STOP switch	
	2	EMSTOP	COMMON		
	3	+5V	N. CLOSE		
P 9 (HOST)	1	FG	1	P 16 (KEY)	Main circuit board
	2	RD	2		
	3	SD	3		
	4	CTS	4		
	5	RTS	5		
	6	DTR	6		
	7	±0V	7		
	8	EMRET (±0V)	8		
	9	$\overline{\text{EMSTOP}}$	9		
	10	+5V	10		
	11	D1	11		
	12	FLM	12		
	13	MB	13		
	14	CL1	14		
	15	CL2	15		
	16	D2	16		
	17	±0V	17		
	18	±0V	18		
	19	±0V	19		

*N.C. = not connected

<Operation panel 3>

Operation panel					
Keyboard circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
P 9 (HOST)	20	N.C.	20	P 16 (KEY)	Main circuit board
	21	N.C.	21		
	22	N.C.	22		
	23	+5V	23		
	24	+5V	24		
	25	+5V	25		
P 10 (LCD)	1	D1	1	LCD module	
	2	FLM	2		
	3	MB	3		
	4	CL1	4		
	5	CL2	5		
	6	D2	6		
	7	+5V	7		
	8	±0V	8		
	9	−5V	9		
	10	CONTRAST	10		

*N.C. = not connected

BAS-415

<Operation panel 1>

Operation panel					
Keyboard circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
CN1 (EMSW)	1	EMRET (±0V)	N. OPEN	EMERGENCY STOP switch	
	2	EMSTOP	COMMON		
	3	+5V	N. CLOSE		
CN2 (LCD)	1	±0V	15	LCD module	
	2	+5V	14		
	3	CONTRAST	13		
	4	RS	12		
	5	R/W	11		
	6	E	10		
	7	DB0	9		
	8	DB1	8		
	9	DB2	7		
	10	DB3	6		
	11	DB4	5		
	12	DB5	4		
	13	DB6	3		
	14	DB7	2		
	15	N.C.	1		
CN3 (HOST)	1	FG	1	P 16 (KEY)	Main circuit board
	2	RD	2		
	3	SD	3		
	4	CTS	4		
	5	RTS	5		
	6	N.C.	6		
	7	±0V	7		
	8	EMRET (±0V)	8		
	9	$\overline{\text{EMSTOP}}$	9		
	10	+5V	10		
	11	N.C.	11		
	12	N.C.	12		
	13	N.C.	13		
	14	N.C.	14		
	15	N.C.	15		
	16	N.C.	16		
	17	±0V	17		

*N.C. = not connected

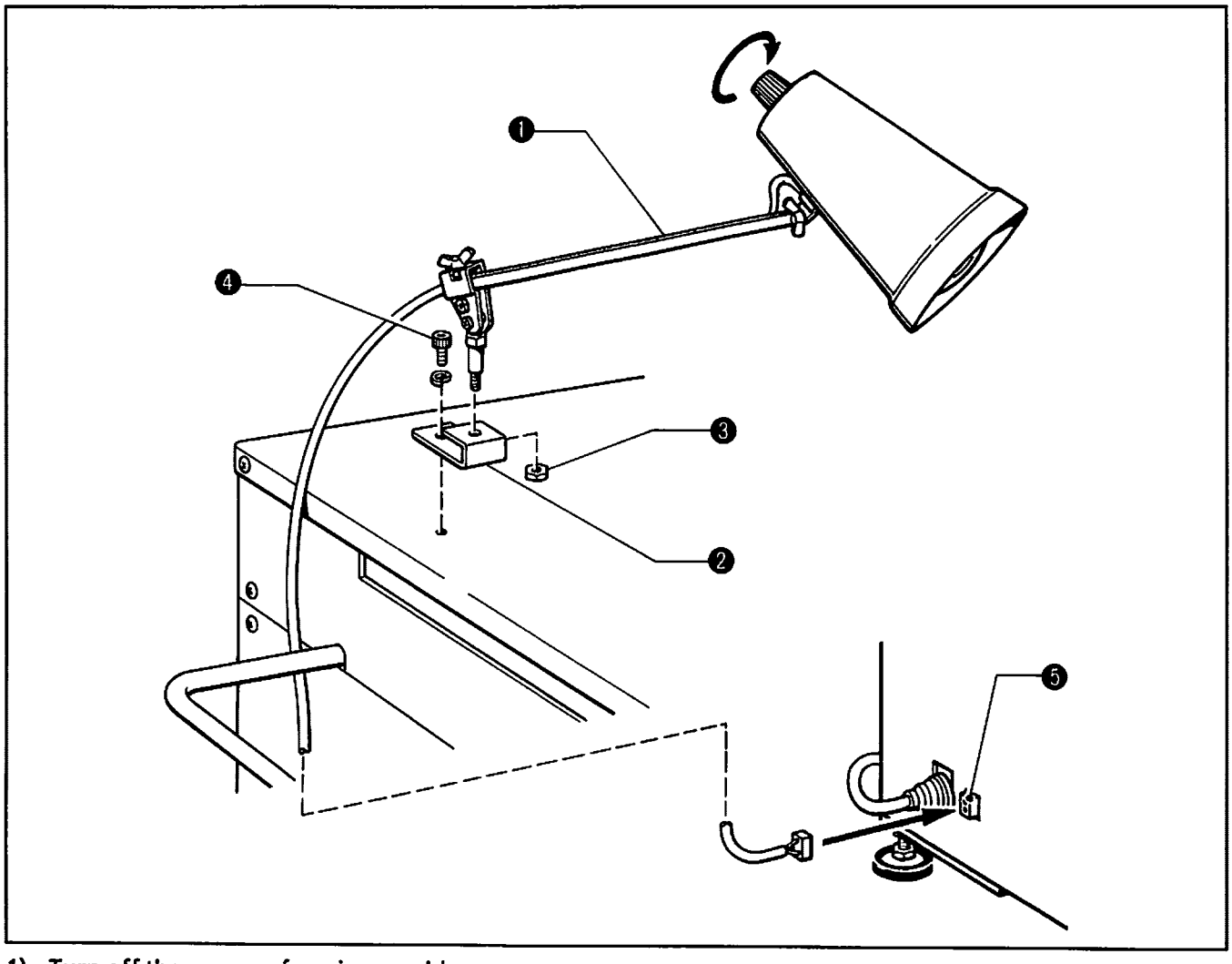
<Operation panel 2>

Operation panel					
Keyboard circuit board			Connect to;		
Connector	Pin No.	Signal	Pin No.	Connector	
CN3 (HOST)	18	±0V	18	P 16 (KEY)	Main circuit board
	19	±0V	19		
	20	N.C.	20		
	21	N.C.	21		
	22	N.C.	22		
	23	+5V	23		
	24	+5V	24		
	25	+5V	25		
CN4 (KEY)	1	SCAN0	1	Tail	Sheet key
	2	SCAN1	2		
	3	R0	3		
	4	R1	4		
	5	R2	5		
	6	R3	6		
	7	R4	7		
	8	R5	8		
	9	R6	9		
	10	R7	10		

*N.C. = not connected

EXPLANATION OF OPTIONAL PARTS INSTALLATION

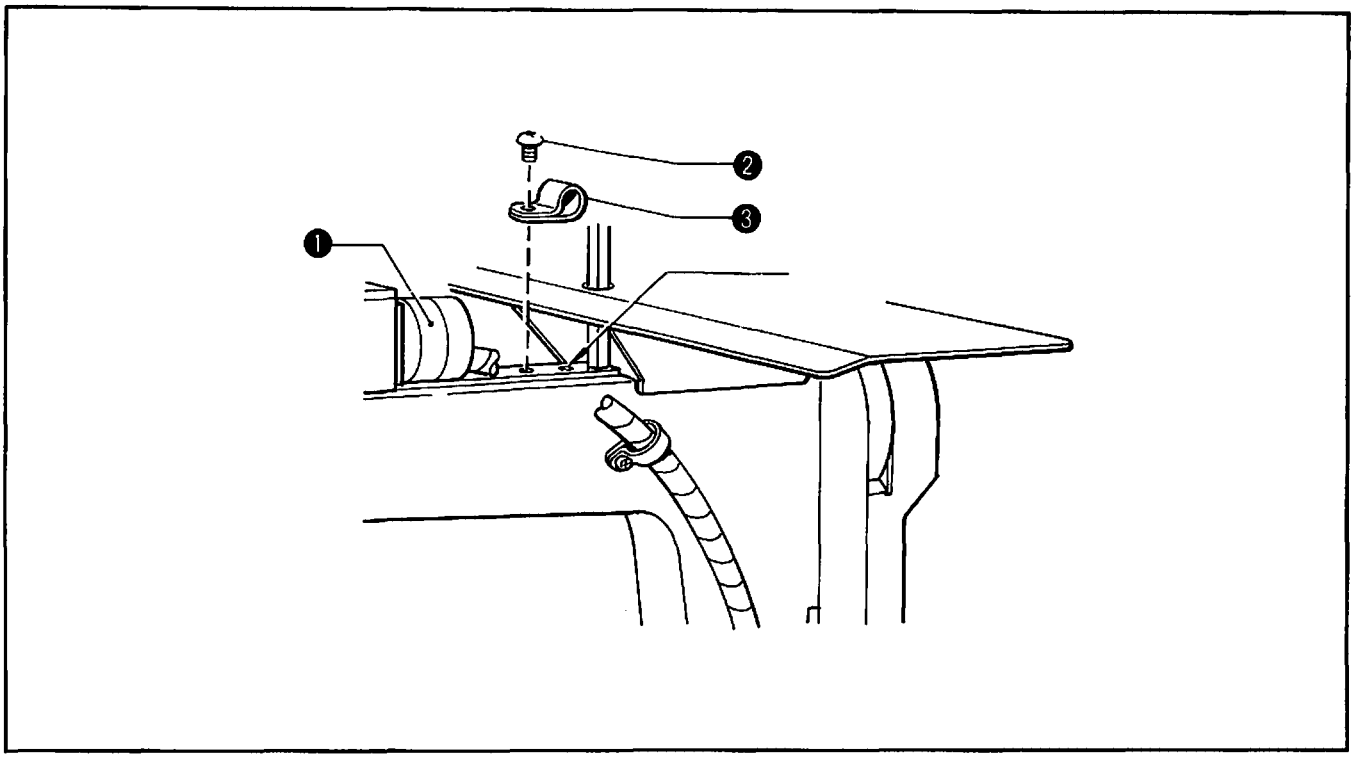
1 ML 651 lamp set



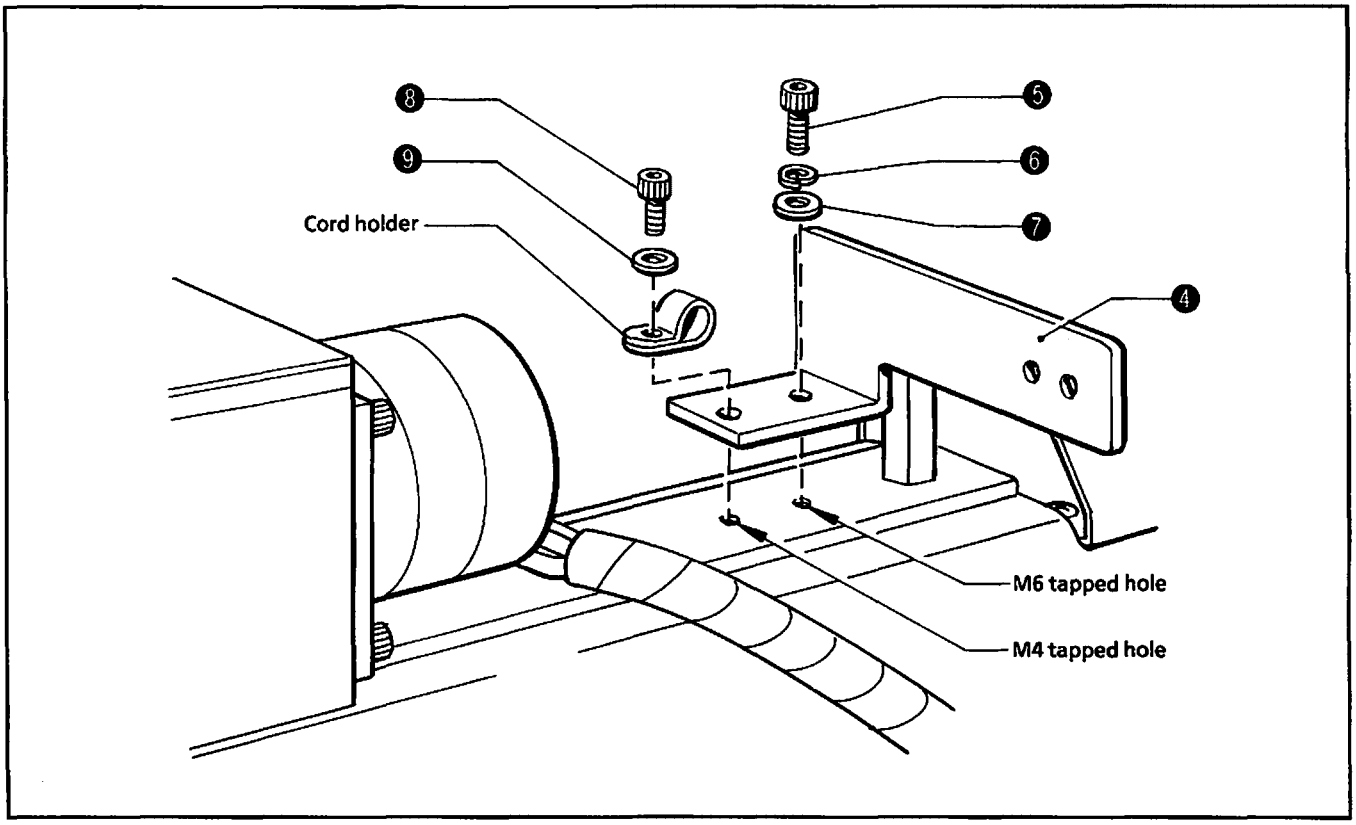
1) Turn off the power of sewing machine.
2) Attach the ML 651 lamp set assembly ❶ to the lamp set plate ❷ with the nut ❸.
3) Secure it with four screws ❹ on the table where it is not an obstacle for the carriage movement.
4) Insert the power supply cord of lamp into the connector ❺.
5) Turn on the power of sewing machine and switch on the lamp.

NOTE: The lamp connector ❺ is exclusive for the ML 651 lamp set assembly (S15378-001). Do not use other lamps. Others may cause trouble. Use 6.3V17W (AC) for the lamp.

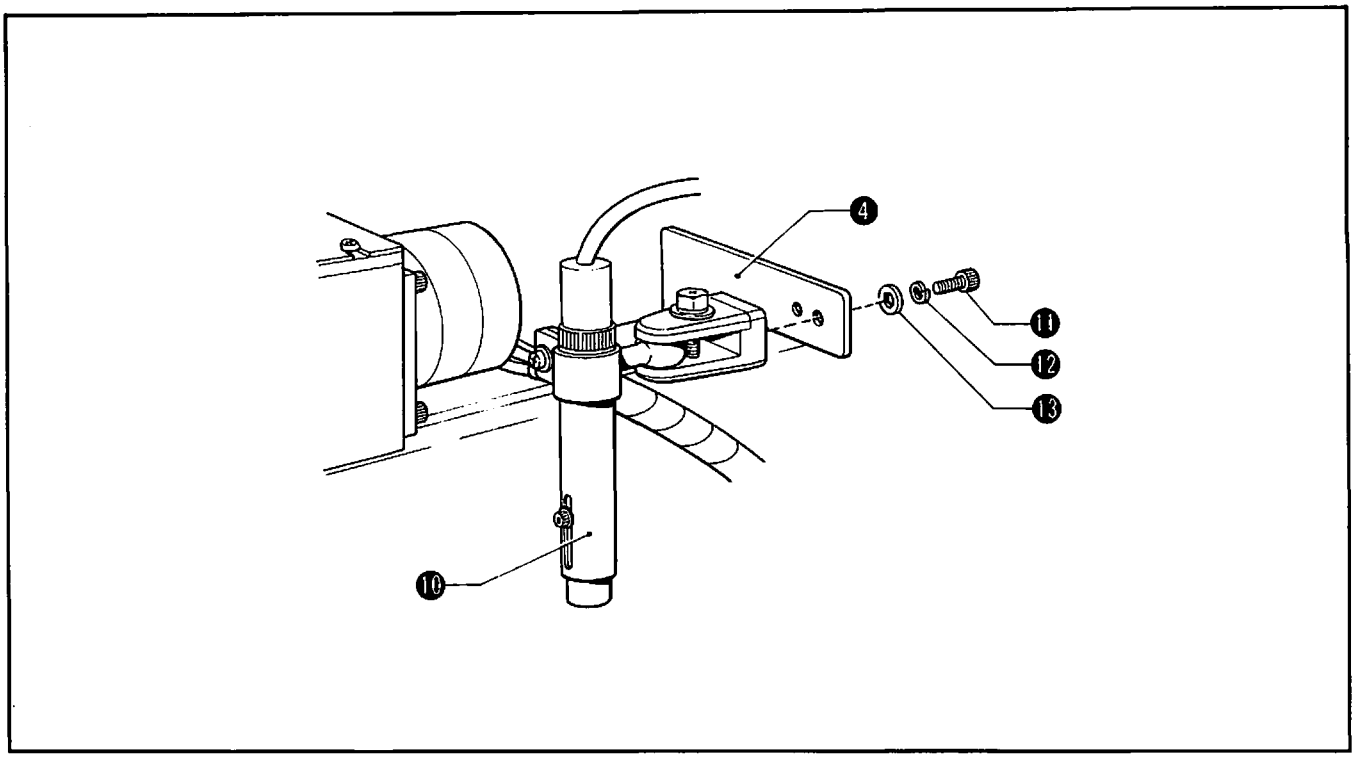
[2] Light marker



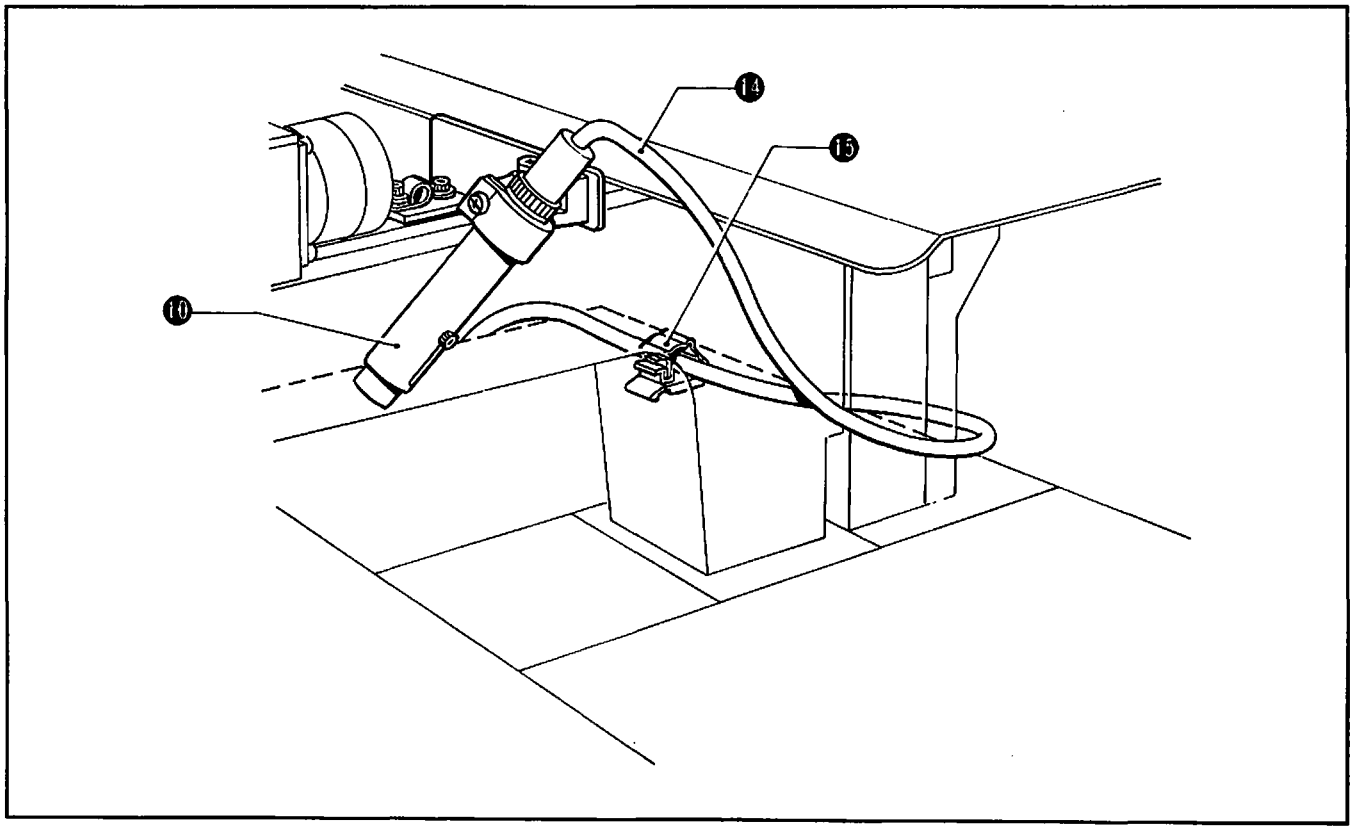
1) Turn off the sewing machine power.
2) Remove the screw ❷ on the back of needle change pulse motor ❶ and the cord holder ❸.



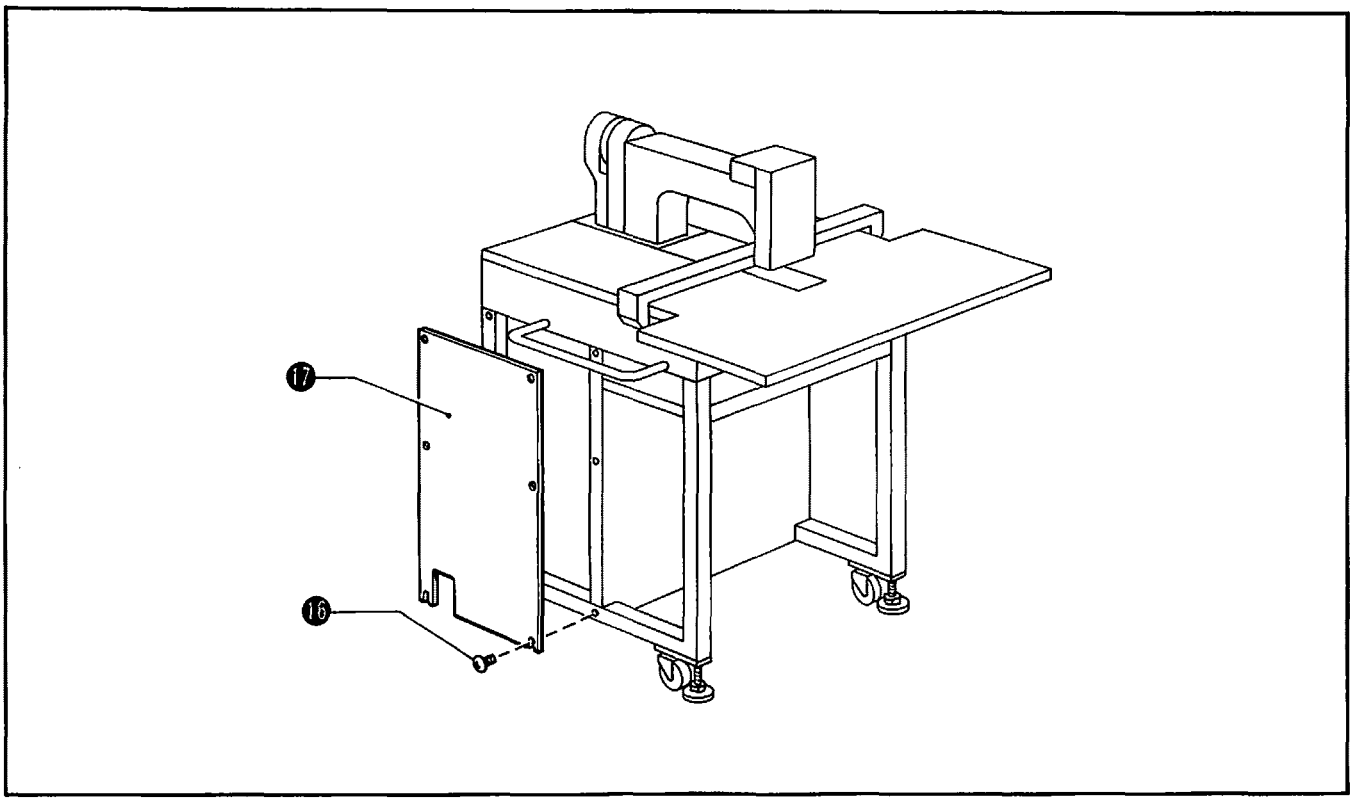
3) Attach the light marker setting plate ❹ and cord holder to the M4 tap and the M6 tap (unused) with bolt 6 x 12 ❺, spring washer 2-6 ❻, plain washer 6 ❼, bolt 4 x 10 ❽ and the plain washer ❾.



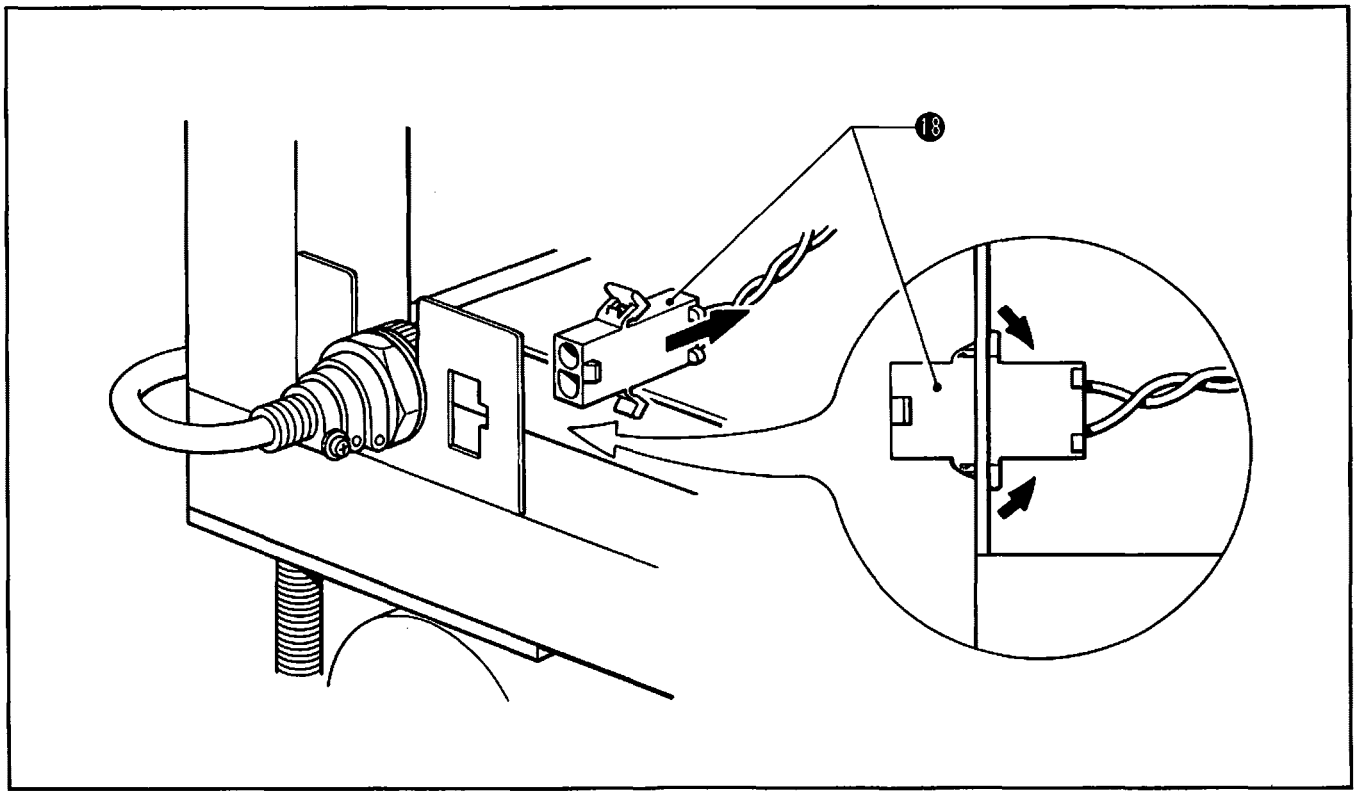
4) Secure the light marker ⑩ to the light marker setting plate ④ with the two bolts 5×14 ⑪, the two spring washers ⑫ and the two plain washers ⑬.



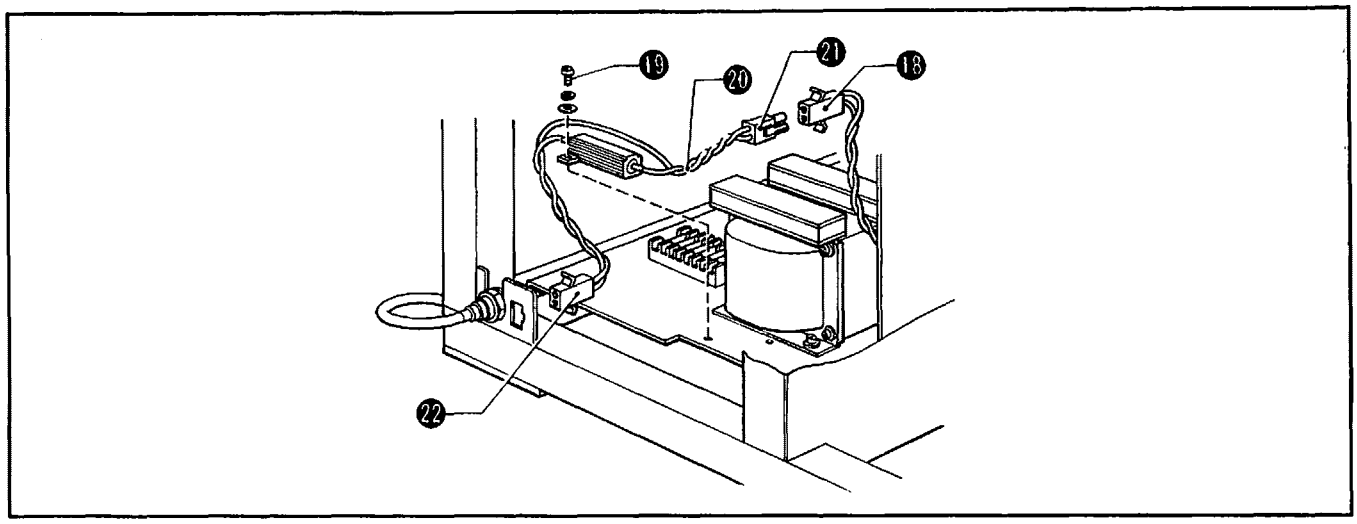
5) While pulling the cord ⑭ of light marker ⑩, fix its position where the cord is not an obstacle for the carriage movement with the cord clamp ⑮.



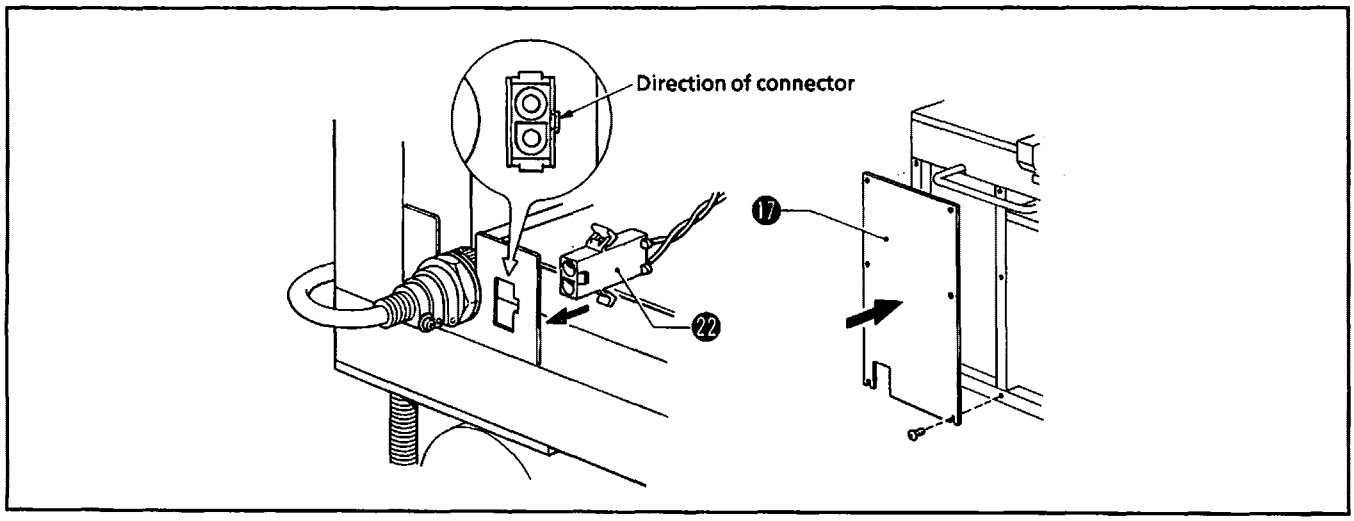
6) Remove the six screws ⑯ and the cover ⑰ of sewing machine.



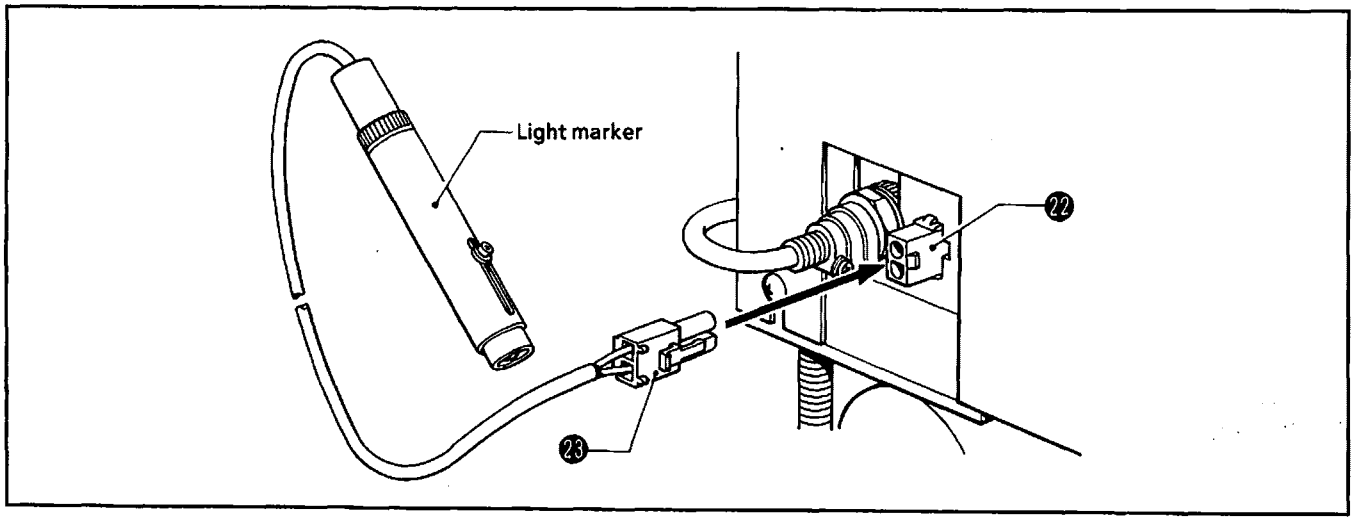
7) Bend the knob of connector ⑱ inside and remove connector ⑱.



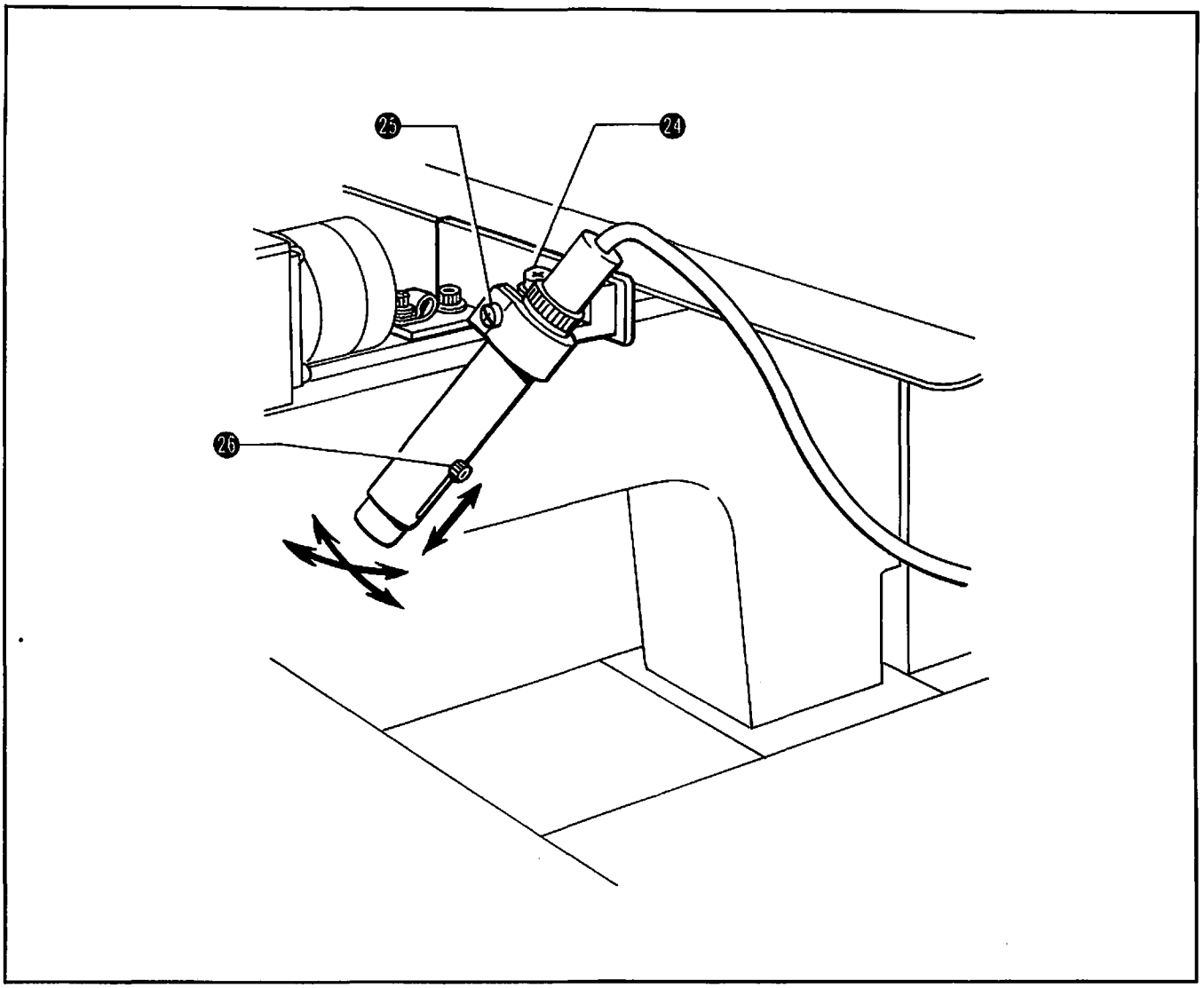
8) Secure the light marker harness assembly ⑳ with the two screws ⑲ at the bottom plate in front of the large-sized transformer.
Plug the connectors ⑱ and ㉑.



9) Fit the connector ㉒ in the position where the connector ⑱ was plugged until it clicks.
10) Attach the cover ⑰ of sewing machine with the six screws.



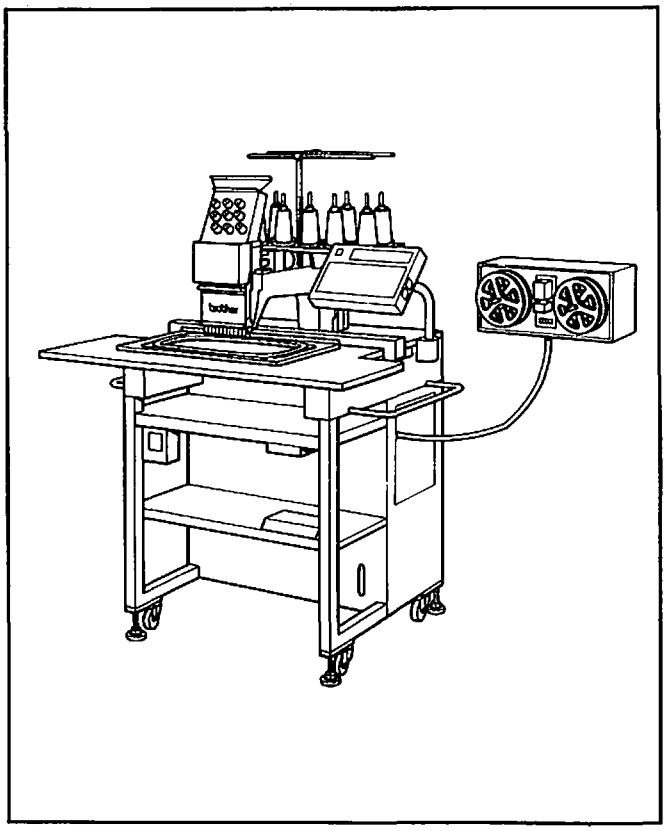
11) Plug the connector ㉓ of light marker into the connector ㉒.



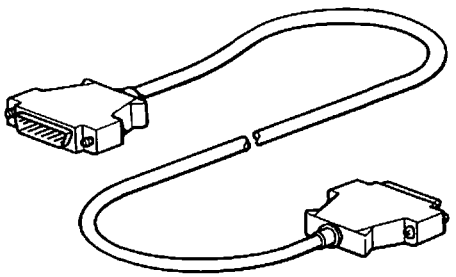
12) Turn on the power of sewing machine. Adjust the marking position of light marker so that it is aligned with the needle position by loosening the bolt ㉔ and screw ㉕.
When the two position align, loosen the bolt ㉖, slide it and adjust the focus of light.
After that, make fine adjustment of the positions and tighten the screws.

3 Connecting optional parts with machine

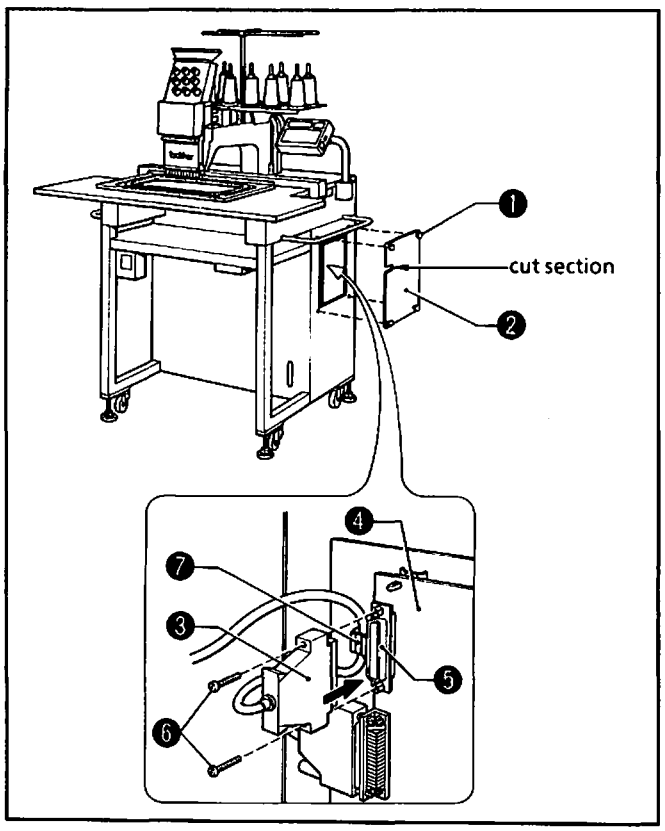
<Connecting paper tape reader with machine>



Connect them using RS cable assembly (optional).

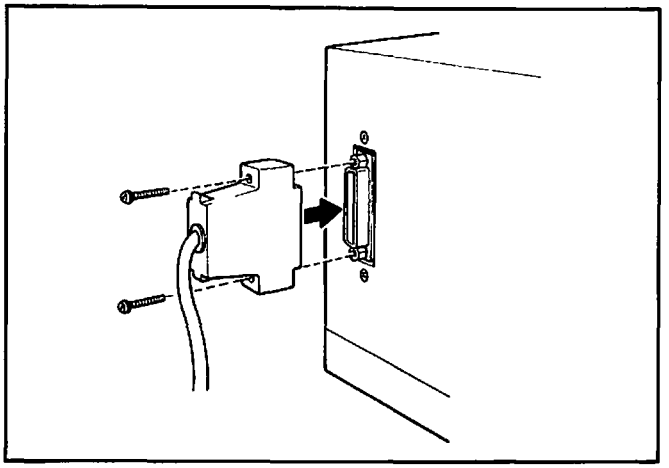


<Connecting cable with machine>



1. Remove the four nylatches ❶ and the circuit board cover ❷.
2. Connect the connector (either of the two may be used) of the RS cable assembly ❸ (optional) with the connector ❺ on the circuit board ❹. Secure the two screws ❻.
3. Fit the cord of the RS cable assembly ❸ in the cord clamp ❼. Pass the cord through the cut section and secure the circuit board cover ❷ with four nylatches ❶.

<Connecting cable with paper tape reader>



1. Connect the connector of the RS cable assembly (optional) with the RS 232C connector of the paper tape reader.

[NOTE1] Use only the paper tape readers in the table below for BAS-411 and 415.
Do not use other paper tape readers. Others may not interface with BAS-415 or cause trouble.

Maker	Production code	Interface specification (Connector type)	RS cable type (optional)
GN Telematic Inc.	GNT27	RS232C interface (female)	GNT 27 RS cable assembly Code: S17064-001 and RS cable assembly Code: S15406-001
	GNT4604	RS232C interface (DCE connector female)	RS cable assembly Code: S15406-001
		RS232C interface (DCE connector male)	GNT4604 cable assembly Code: S18957-001 and RS cable assembly Code: S15406-001
	GNT2910	RS232C interface (pin 9 male)	GNT2910 cable assembly Code: S21660-000 and RS cable assembly Code: S15406-001

* Set the paper tape reader switches as follows for BAS-411 and 415.

① Character length .... 8 bit
② Stop bit length ..... 1 bit
③ Baud rate ..... 9,600 baud (for 4,800 baud-paper tape reader, refer to next page "NOTE:4".)

* Among paper tape readers that can be connected with the BAS-411 and 415, BROTHER deals in the following paper tape reader as an option. (Contact Brother's shop for details.)

maker	type	name	part code	Vol. Spec.
GN telematic Inc.	GNT27	GNT27-100V assembly	S18444-000	AC120V- area or 240V-area AC220 - 240V-area (in Europe)

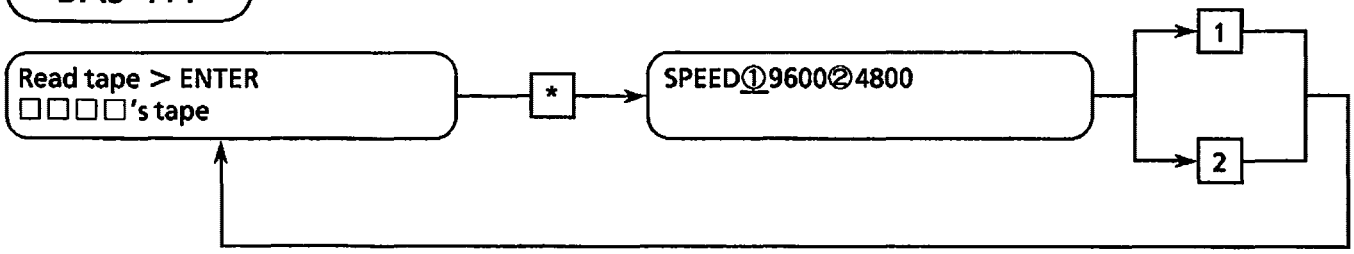
[NOTE2] When you purchase above paper tape reader GNT27;
GNT27RS cable assembly (S17064-001)
comes with it.

[NOTE3] Three switches on the paper tape reader, ①②③, are already set at shipping.

<Connecting paper tape reader with machine>

[NOTE4] Of the set points ①, ② and ③, only ③ (baud rate) can be changed on the machine.

BAS-411



Press the <1> key to set 9,600 baud. Press the <2> key to set 4,800 baud.

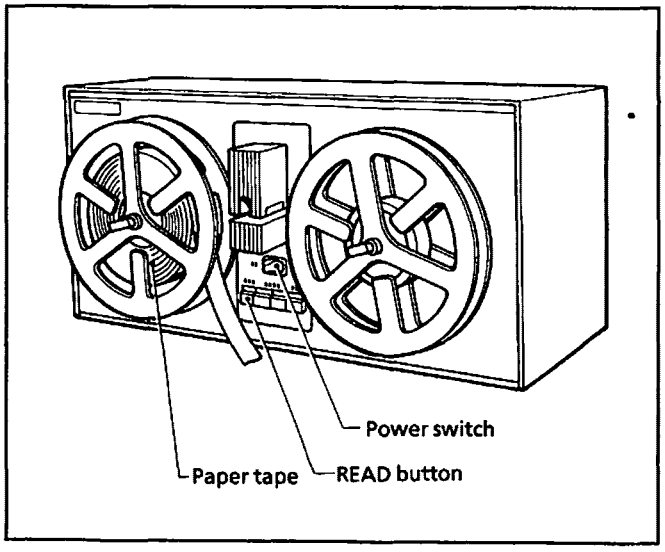
This set point will be retained until the machine is turned off. Once the machine is turned off, the set point returns to 9,600 baud.

BAS-415

Refer to page 65 "Dip switch functions ".

<Operating and preparing paper tape reader>

* Prepare the machine. (Turn on the power and select "paper tape" in the communication mode.)

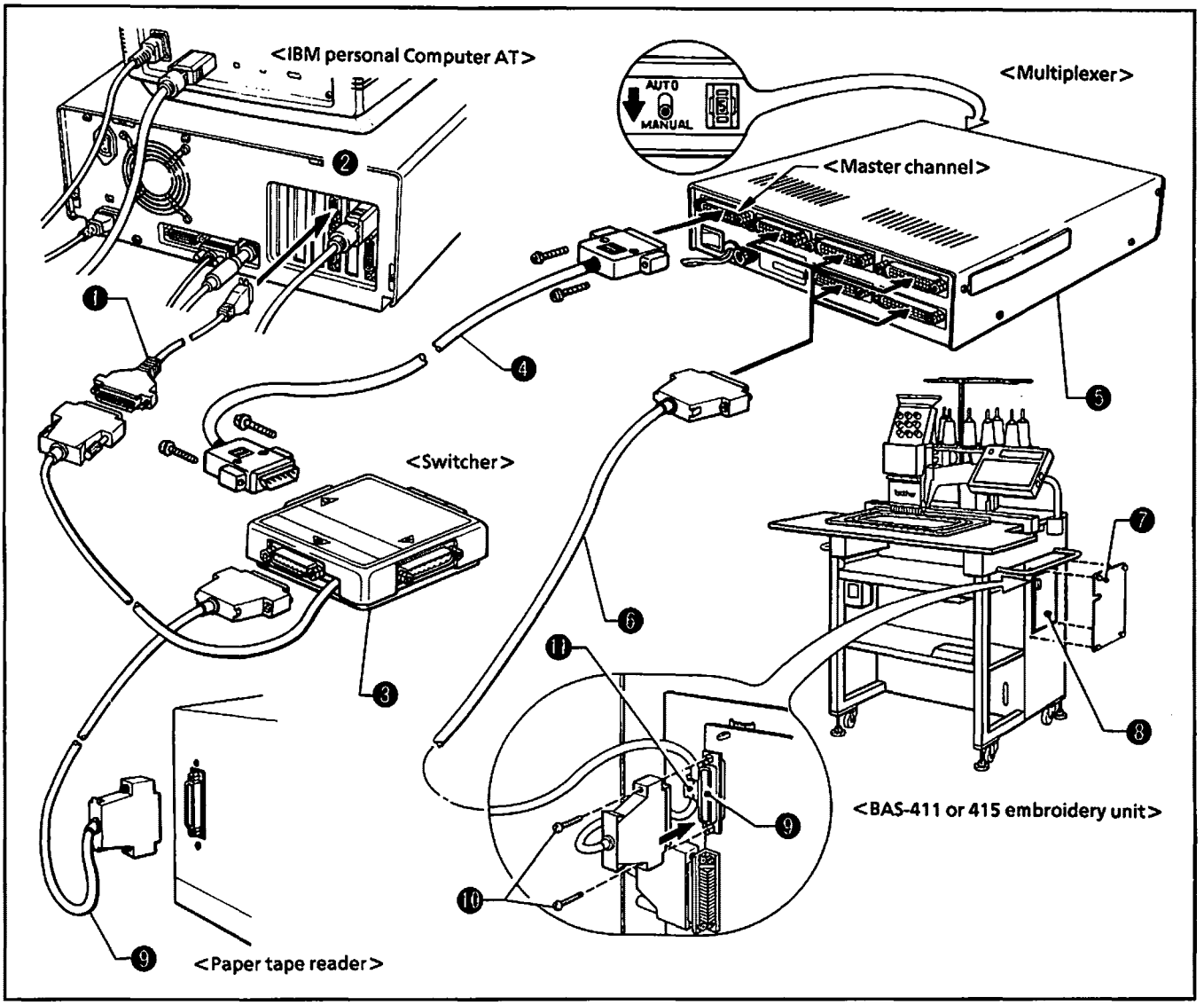


1. Turn on the power of the paper tape reader.

2. Thread the paper tape to the paper tape reader.
   1) For GNT27:
      Turn the "READ" button ON (indicator lights).
   2) For GNT4604:
      Turn the "READER" button ON and set the mode switch on the operation panel to "LINE".
   3) For NPR-5200:
      Turn the "LINE" button ON (indicator lights).
   4) For GNT2910:
      Turn the power ON.

3. Now that the paper tape reader is ready:
   Press the <ENTER> key of the machine to begin.

<Connection procedure for Embroidery units and editing system>



Connecting the Editing System with the switcher

1) Connect the connector (9 pins) of the IBM RS cable ❶ with the RS port ❷ on your personal computer.
2) Connect the host connector (25 pins) of the switcher ❸ with the connector (25 pins) of the IBM RS cable ❶ on your personal computer.

Connecting the switcher with the multiplexer

3) Connect the connecter of the multiplexer cable ❹ with the C side of the switcher ❸.
4) Connect the other connecter of the multiplexer cable ❹ with the master channel of multiplexer ❺.

Connecting the multiplexer with the BAS-411 and 415 Embroidery Units

5) Connect the RS cable ❻ with channels 0 to 4 on the multiplexer ❺.
6) Remove the cover ❼ of the machine. Connect the RS cable ❻ with the connector ❾ on the main circuit board ❽ and tighten the 2 screws ❿. Fit the RS cable ❻ in the cord clamp ⓫.

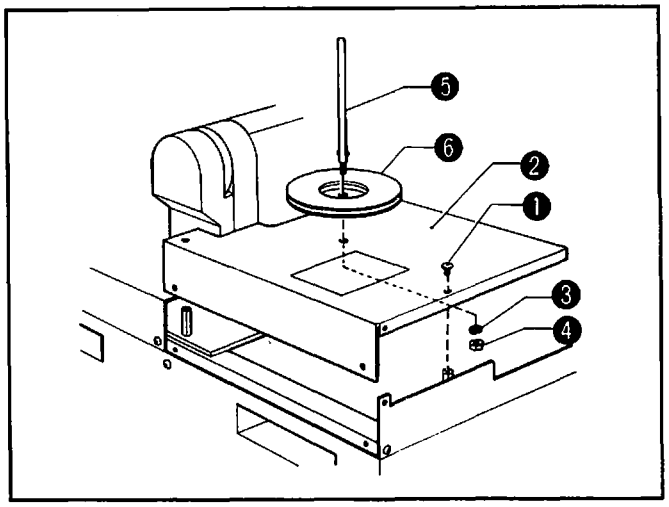
Connecting the switcher with the paper tape reader

7) Connect the RS cable ❻ with the B side of the switcher ❸.
8) Connect the paper tape reader with the RS cable ❻.

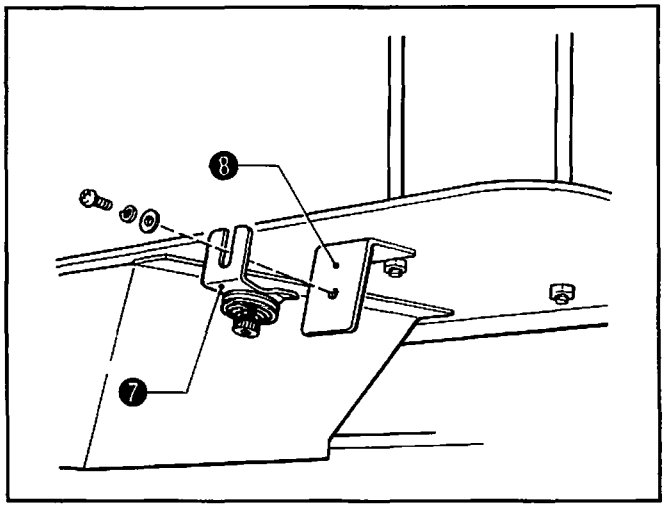
For the above connections, 6 RS cables and 1 multiplexer are needed.
Secure all cables firmly according to the above diagram.

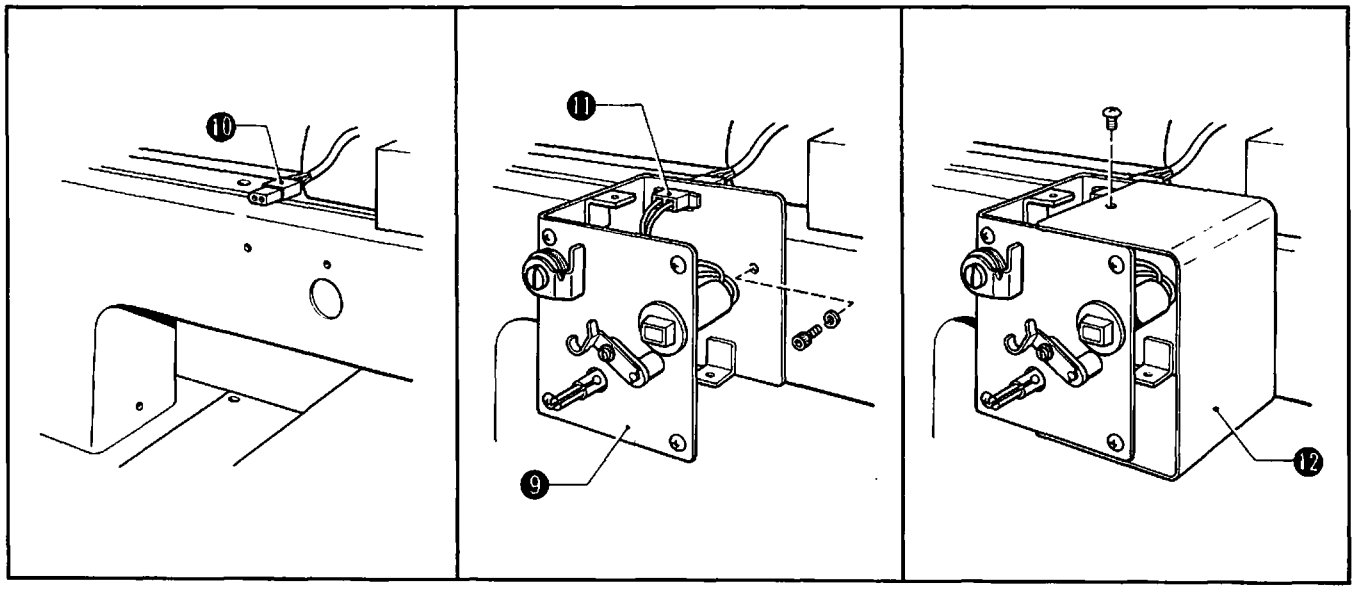
4 Bobbin winder

1. Attaching bobbin winder



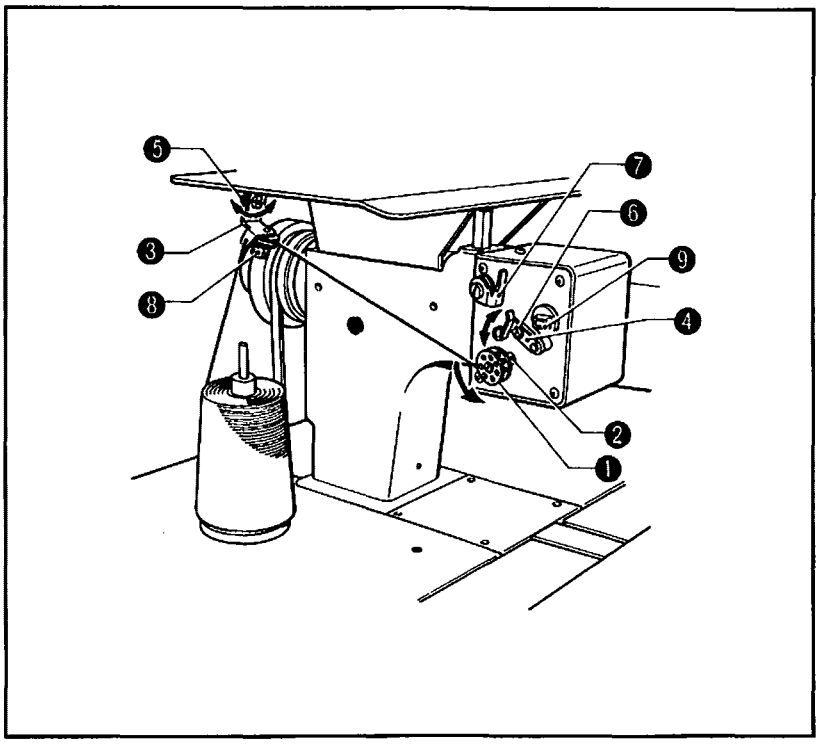
1) Loosen the four screws ❶ and remove table (L) ❷.
2) Attach spool shaft (B) ❺ to table (L) ❷ with the washer ❸ and the nut ❹. Attach table (L) ❷ to the machine body with the four screws ❶.
(Pass spool mat (A) ❻ through spool shaft (B) ❺.)
3) Attach the bobbin winder guide bracket assembly ❼ to the spool stand ❽ with the screw, the washer and the spring washer.





4) Attach the bobbin winder equipment assembly ❾ to the machine body with the two bolts and the washer, then plug the connector ⓫ of bobbin winder equipment assembly into the nylon connector ⓾.
5) Attach the bobbin winder cover ⓬ to the bobbin winder equipment assembly ❾ with the two screws.

2. Winding bobbin thread



1) Turn on the power.
2) Fit the bobbin ❶ into the bobbin winder shaft ❷.
3) Pass the thread through the thread guide ❸.
4) Wind the thread around the bobbin ❶ several times in the direction of the arrow.
5) Press the bobbin presser ❹.

NOTE: If the thread is not wound evenly, loosen the screw ❺ and move the thread guide ❸ right and left.
To wind more thread on the bobbin, loosen the screw ❻ and move the bobbin presser ❹.

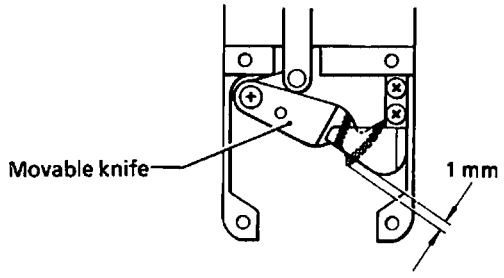
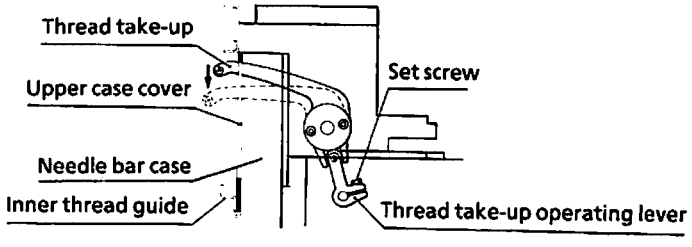
6) When winding is completed, remove the bobbin from the bobbin winder shaft and trim the thread by the thread trimmer ❼.

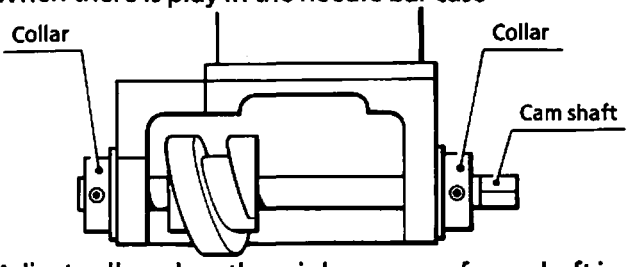
NOTE: If the thread comes out from the thread guide ❸, loosen the knob ❽. If the thread is wound too loose, tighten the knob ❽.
The bobbin winder motor does not operate if the circuit protector activated.
In that case, leave the protector until it is cooled off. Then, press the protector switch. If the protector is not cooled off, the switch does not work.

TROUBLESHOOTING

1 Mechanical problem

In case of a malfunction, diagnose the problem referring to the table below.
If the problem persists, turn off the power and contact your dealer.

Problem	Check point
1. Machine operates incorrectly.	1. Is set screw of rotary encoder loosened? 2. Is set screw of machine pulley loosened? 3. Is set screw of N65 pulley loosened? 4. Is synchronizer adjusted properly? 5. Are wires of carriages X and Y off? 6. Are set screws of wire drums X and Y loosened? 7. Are set screws of pinion gears in pulse motors X and Y loosened? 8. Is sewing data in floppy disk normal?
2. Upper shaft is locked at some point of a cycle.	1. Is movable knife for thread trimming stopped in middle of operation? [How to adjust] • Remove thread or other interruption for good thread trimming operation. • Remove needle plate and reset it in proper position manually as in the figure below.  [NOTE] When movable knife is in middle of operation, the safety system works so that the upper shaft cannot rotate. 2. Is thread take-up stopped with striking upper case cover? [How to adjust] Remove adjustment base.  Loosen the bolt of the thread take-up operating lever to adjust movable range of thread take-up, then re-tighten it. 3. Is position of needle bar clamp or stopper correct?

Problem	Check point
3. Upper shaft does not turn.	1. Is thread tangled in rotary hook? [How to adjust] Remove rotary hook and see whether upper shaft rotates or not. If thread is tangled, turn upper shaft by force to trim thread or remove rotary hook and thread.
4. Stitch cannot be made.	1. Is needle attached properly? 2. Is timing of needle and rotary hook correct?
5. Needle breaks.	1. Is needle direction and height properly adjusted? 2. Is needle bent? 3. Is needle tip blunted? 4. Is timing of needle and rotary hook correct? 5. Is there looseness or play in the needle bar case? When there is play in the needle bar case  Adjust collar when there is looseness of cam shaft in needle bar flip-up mechanism. 6. Is rotary hook holder properly attached so that rotary hook does not rotate?

[2] Electrical problem

In case of a malfunction, diagnose the problem referring to the table below.
If the problem persists, turn off the power and contact your dealer.

Problem	Check point
1. The display is blank, though power is on.	Is contrast dial properly adjusted?
2. The indicator does not light, though a floppy disk is in disk drive.	1. Is floppy disk damaged? 2. Is disk drive functioning properly?
3. When the power is turned on, the hoop moves till the hoop is over the sewing area.	Turn off the power, then turn on the power again while pressing the emergency stop button. When there is a problem even if this is done, contact your dealer.
4. When sewing is resumed in restart mode, the hoop moves till the hoop is over the area.	
5. Thread breakage detector functions and machine stops although thread breakage does not occur.	Is thread breakage detect stud operation normal? (Is spring tension proper?)

BAS-411·415

Following is displayed when trying to read sewing data from a floppy disk while the floppy disk is inserted into the floppy disk drive.

① "Disk ERR." is displayed.
② "Data ERR." is displayed.
③ "Reading" is displayed and remains .

When another floppy disk is inserted, reading and sewing can be performed normally. The floppy disk drive may not be defective, but it is not clear what is wrong.

[Cause and solution]

(1) Floppy disk has not been previously defective.
If it occurs on the floppy disk which was able to use normally before, the floppy disk may be defective. (Repairing is impossible.)
Carefully deal with floppy disk. And for security, back up data on other storage medium, like personal computer, punching machine and so on.

(2) The floppy disk was originally defective.
If it occurs at a first-time use, the floppy disk may be originally defective.
Consult with shop you bought it or its maker.

(3) Following floppy disk cannot be used in BAS-411 and 415 even though it can be used in other embroidery machine.
When 3.5" 2HD floppy disk was made in 2DD format.
When 3.5" 2DD floppy disk was made in 2HD format.

If your problem does not come under case (1), (2) or (3), please consult with Brother's shop.

3 List of error messages

BAS-411

Refer to the table below if an error message is displayed.
By pressing the <END> key, the message will disappear and the display will return to the previous menu.

<List of error messages 1>

Message when power is turned on	Cause	Solution
Keyboard ROM NG.	PROM version of key board does not match PROM version of PCB.	Change PROM version of key board to matching PROM version of PCB. Contact your dealer.
N Bar stop ERR	Pulley is not in proper position.	Turn pulley till needle bar is in proper position.
Missed X_ORG. PT Missed Y_ORG. PT	Damaged circuit board, sensor defective, cable defective, pulse motor defective, blown fuse.	Contact your dealer.
Over travel	1. X-Y carriages movement exceeds maximum area.	Turn power off. Move carriages X and Y to center of area manually, then turn power on again. If same error message is displayed again, turn power off, then on again while pressing <EMERGENCY> key. (Clearing backup memory.)
	2. Overtravel sensor is in incorrect position or defective. 3. XY home position sensor is in incorrect position or defective. 4. Damaged circuit board.	Contact your dealer.
Memory Clear	Back-up data in the memory disappears.	Press key according to message.

Message in entry mode	Cause	Solution
No File	Inputted data has something wrong.	Check file name of data and re-enter.
Data ERR.		Check where data was made, then contact your dealer.
Disk ERR.	1. Data is input without inserting floppy disk.	Insert floppy disk in proper position and re-enter.
	2. While reading data, floppy disk is removed when machine runs in sewing mode.	Do not remove floppy disk from FDD during sewing in this mode.
	3. Damaged circuit board, defective cable, defective FDD.	Contact your dealer.

When an error message is displayed, refer to the instructions below.

<List of error messages 2>

Message in editing mode	Cause	Solution
Can-'t edit Data	1. Some of data entered in communication mode has items that cannot edit. 2. Some of data entered in sewing mode while reading data has items that cannot edit. 3. According to editing item, there is item that cannot be set.	Refer to BAS-411 instruction manual page 57 "NOTE: 4".
T. Length larger	Entered value exceeds maximum area (450 mm x 285 mm).	Re-edit data.
Area Over	Improper area setting	Re-set area or re-edit data.
Arrangement Err	Value set in arrangement mode by [Each] is incorrect (ex. spaces →←↑↓ are inputted) or not all values are inputted. (ex. base line, base point.)	Refer to BAS-411 instruction manual page 83-101 "Arranging."

Message in sewing mode	Cause	Solution
No inptted Data	Without sewing data entered, you try to set machine to sewing mode.	First, input sewing data, then start sewing.
Short of Area	Improper area setting	Re-set area or re-edit data.
**th Data ERR	Entered data has something wrong.	Check where data was made, then contact your dealer.
**th Memory OVR	Too much data, or number of inputted stitches is over inside memory capacity and cannot manage it.	If memory expansion board (optional) is not set, set memory expansion board or decrease input data.
Area over	When sewing starts from current needle position, sewing pattern is over the area.	Move hoop to position where message disappears, or widen area.
B. Thread empty	Set sewing times in bobbin thread counter is completed.	Re-set sewing times in bobbin thread counter.
Thread breakage	1. Needle thread breakage 2. Needle thread is not passed through the thread sensor spring. 3. Bobbin thread breakage 4. Bobbin thread runs out.	Pass thread.
Over load	1. Pulley is too tight. 2. Electrical failure	Remove load. Contact your dealer.

When an error message is displayed, refer to the instructions below.

<List of error messages 3>

Message in communication mode	Cause	Solution
Can't communi	1. Paper tape reader or editing system does not connect with machine by cable.	Link with exclusive cable.
	2. Power of paper tape reader or editing system is not turned on.	Turn on power.
	3. Editing system does not enter communication mode.	Set editing system to communication mode.
	4. Editing system is communicating with another machine.	Wait till communication ends.
Communicate ERR.	1. Data error occurs during communicating with editing system.	Re-communicate. Set editing system to communication mode, then communicate again.
	2. Editing system exits from communication mode while machine is communicating with editing system.	
	3. Power of editing system is turned off during communicating with editing system.	Turn on power of editing system again, enter communication mode.
Edit-Sy. busy	Editing system is defective, or breakdown.	Turn on power of editing system again, enter communication mode. Contact your dealer.
Tape read ERR	1. Poor punch of paper tape	Remake paper tape.
	2. Paper tape runs short.	
	3. Dirty head of paper tape reader	Clean head.
	4. Power of paper tape reader is not turned on.	Turn on power.
	5. Paper tape type is wrongly selected.	Select proper type to read paper tape.
	6. Improper communication baud rate	Adjust baud rate.

Message in replacing needle bar	Cause	Solution
N. Case POS. ERR	1. Needle bar case is not set properly.	Position needle bar case properly.
	2. Damaged circuit board	Contact your dealer.
N. Case locked	1. Needle bar case is too tight mechanically, or locked and cannot move.	Remove load.
	2. Electrical failure	Contact your dealer.

BAS-415

Refer to the table below if an error message is displayed.
By pressing the <CLEAR>key, the message will disappear and the display will return to the previous menu.

<List of error messages 1>

Message when power is turned on	Cause	Solution
Keyboard ROM NG.	CPU version of key board does not match PROM version of PCB.	Change CPU version of key board, to proper version matching PROM. Contact your dealer.
Needle POS. Error	Pulley is not in proper position.	Turn pulley till needle bar is in proper position.
X_ORG. Error Y_ORG. Error	Damaged circuit board, sensor defective, cable defective, pulse motor defective, blown fuse.	Contact your dealer.
Over travel	1. X-Y carriages movement exceeds maximum area.	Turn power off. Move carriages X and Y to center of area manually, then turn power on again. If same error message is displayed again, turn power off, then on again while pressing <EMERGENCY> key.
	2. Overtravel sensor is in incorrect position or defective. 3. XY home position sensor is in incorrect position or defective. 4. Damaged circuit board.	Contact your dealer.
Memory CLear	Back-up data in the memory disappears.	Press key according to message.

Message in entry mode	Cause	Solution
No File	Data not registered in the floppy disk is entered.	Check file name of data and re-enter.
Data ERR.	Input data has something wrong.	Check where data was made, then contact your dealer.
Disk ERR.	1. Data is input without inserting floppy disk.	Insert floppy disk in proper position and re-enter.
	2. While reading data, floppy disk is removed when machine runs in sewing mode.	Do not remove floppy disk from FDD during sewing in this mode.
	3. Damaged circuit board, defective cable, defective FDD.	Contact your dealer.
Memory over	Too much data, or too many stitches of a data is over inside memory capacity and cannot manage it.	If memory expansion board (optional) is not set, set memory expansion board or decrease input data.

When an error message is displayed, refer tothe instructions below.

<List of error messages 2>

Message in editing mode	Cause	Solution
Can-'t edit Data	1. Some of data entered in communication mode has items that cannot edit. 2. Some of data entered in sewing mode while reading data has items that cannot edit. 3. According to editing item, there is item that cannot be set.	Refer to BAS-415 instruction manual page 48.

Message in sewing mode	Cause	Solution
No inptted Data	Without sewing data entered, you try to set machine to sewing mode.	First, input sewing data, then start sewing.
Short of Area	Entered value exceeds maximum area (450 mm × 285 mm).	This data cannot be sewn.
Data ERR.	Entered data has something wrong.	Check where data was made, then contact your dealer.
Area Over	When sewing starts from current needle position, sewing pattern is over area.	Move the hoop to position where message disappears, or spread area.
B.Thread empty	The set sewing times in bobbin thread counter is completed.	Reset sewing times in bobbin thread counter.
Thread breakage	1. Upper thread breakage. 2. Thread is not wound on thread breakage detector. 3. Bobbin thread breakage 4. Bobbin thread has run out.	Set thread.
Motor Lock	1. Pulley is too tight. 2. Electrical failure	Remove load. Contact your dealer.

Message in communication mode	Cause	Solution
Off line	1. Paper tape reader or editing system does not connect with machine by cable. 2. Power of paper tape reader or editing system is not turned on. 3. Editing system does not enter communication mode. 4. Editing system is communicating with an other machine.	Link with dedicated cable. Turn on power. Set editing system to communication mode. Wait till communication ends.

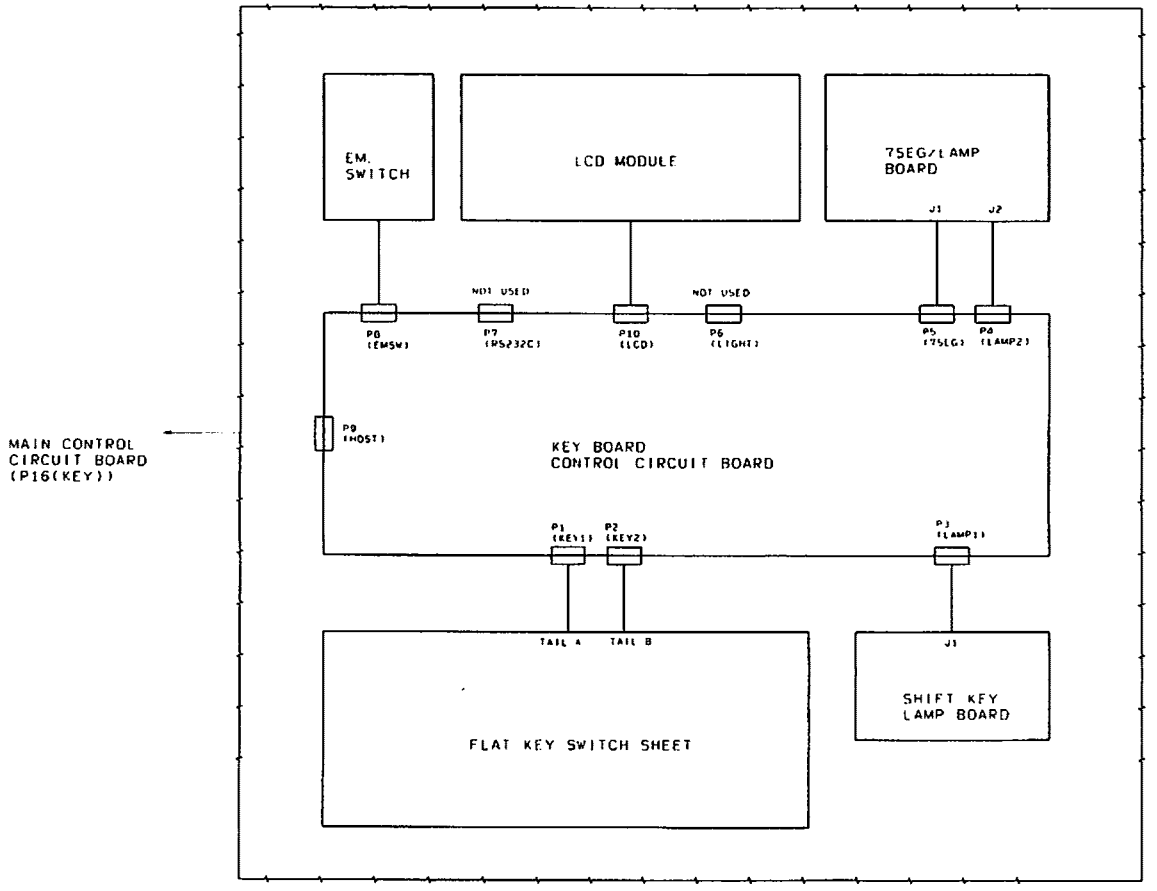
When an error message is displayed, refer tothe instructions below.

<List of error messages 3>

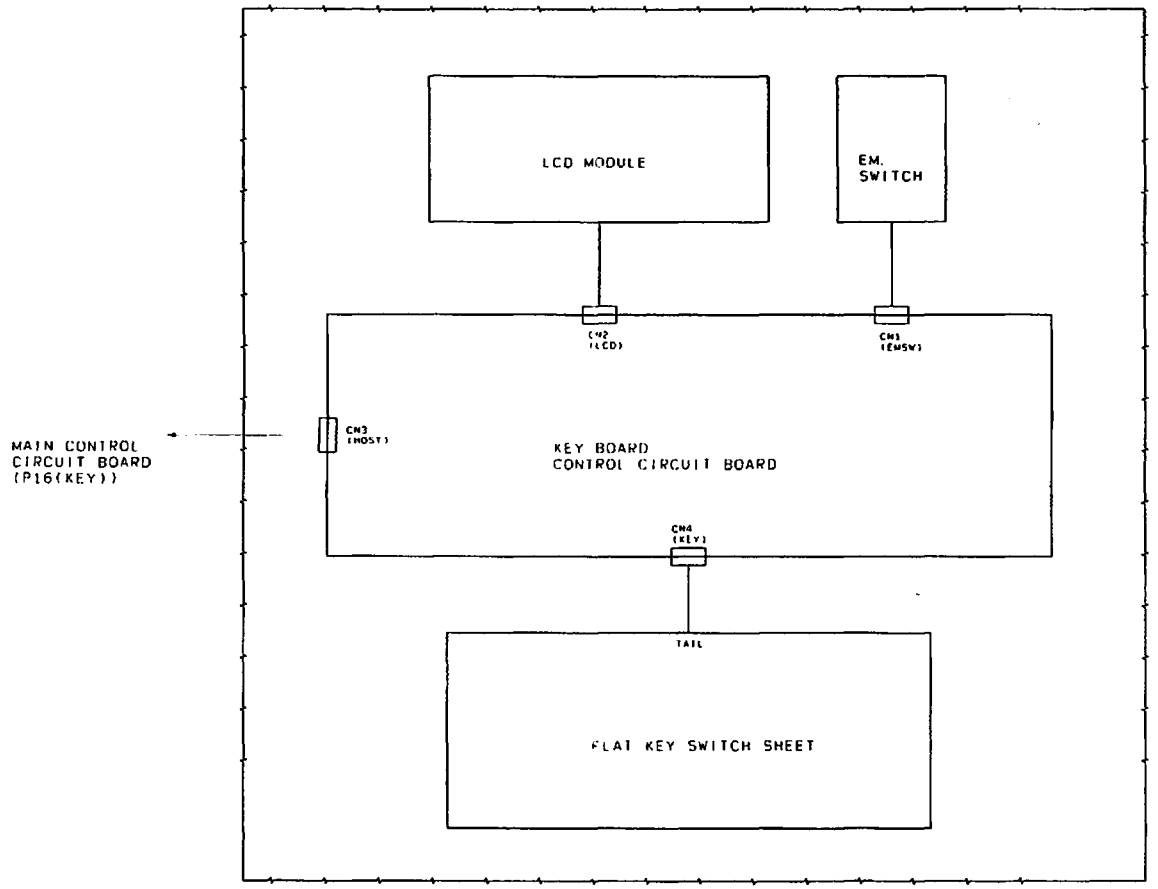
Message in communication mode	Cause	Solution
Line ERR.	1. Data error occurs during communicating with editing system.	Re-communicate.
	2. Editing system exits from communication mode while machine is communicating with editing system.	Set editing system to communication mode, then communicate again.
	3. Power of editing system is turned off during communicating.	Turn on power of editing system again, enter communication mode.
Line Busy	Editing system is defective, or breakdown.	Turn on power of editing system again, enter communication mode. Contact your dealer.
Tape read Error	1. Poor punch of paper tape.	Remake paper tape.
	2. Paper tape runs short.	
	3. Dirty head of paper tape reader.	Clean head.
	4. Power of paper tape reader is not turned on.	Turn on the power.
	5. Paper tape type is wrongly selected.	Select proper type to read paper tape.
	6. Improper communication baud rate.	Adjust baud rate.

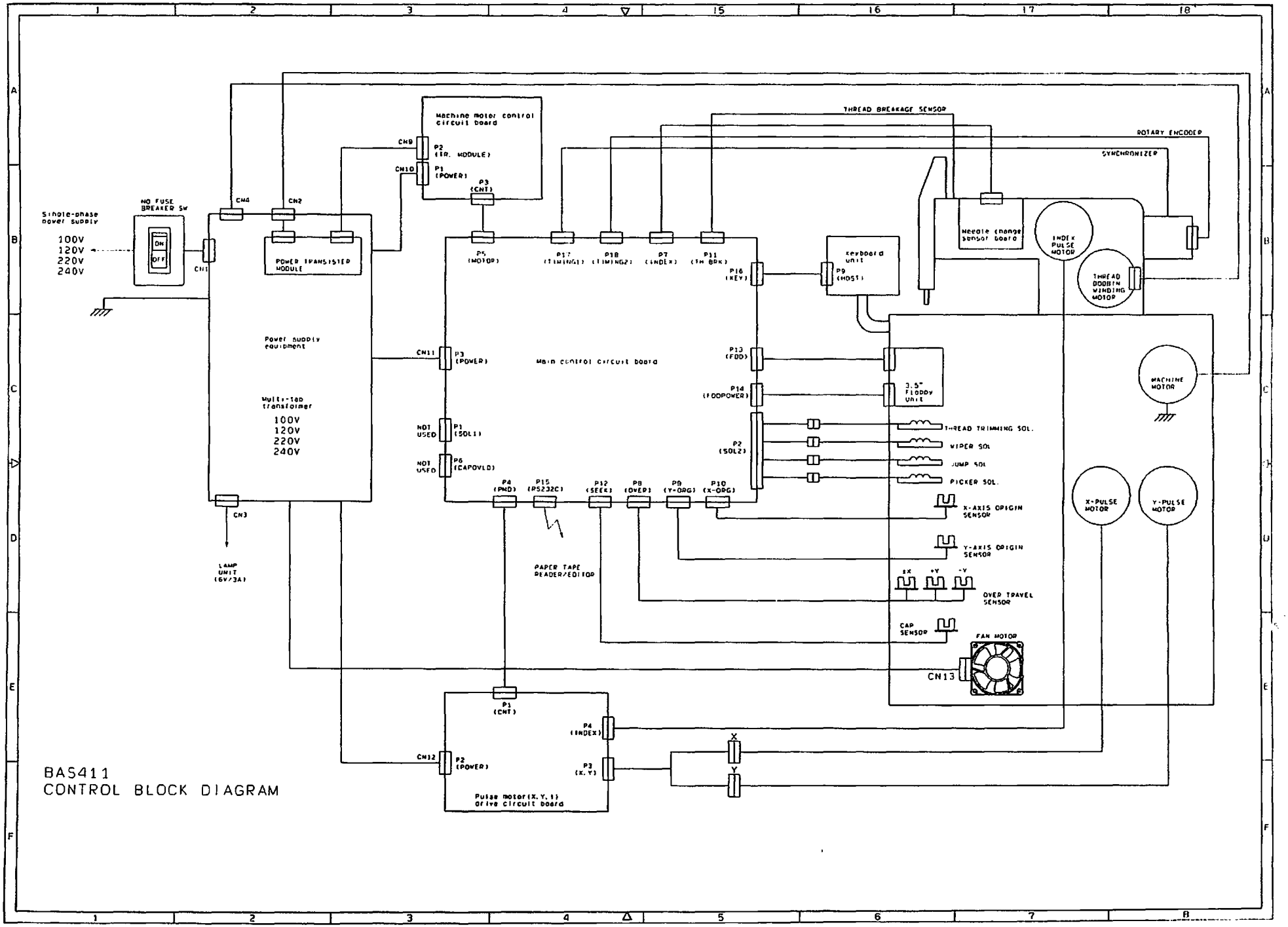
Message in replacing needle bar	Cause	Solution
N__Case POS. Error	1. Needle bar case is not set properly.	Position needle bar case properly. (Refer to page 41.)
	2. Damaged circuit board.	Contact your dealer.
N__Case Lock	1. Needle bar case is too tight mechanically, or locked and cannot move.	Remove load.
	2. Electrical failure	Contact your dealer.

BAS411 KEYBOARD UNIT
CONTROL BLOCK DIAGRAM

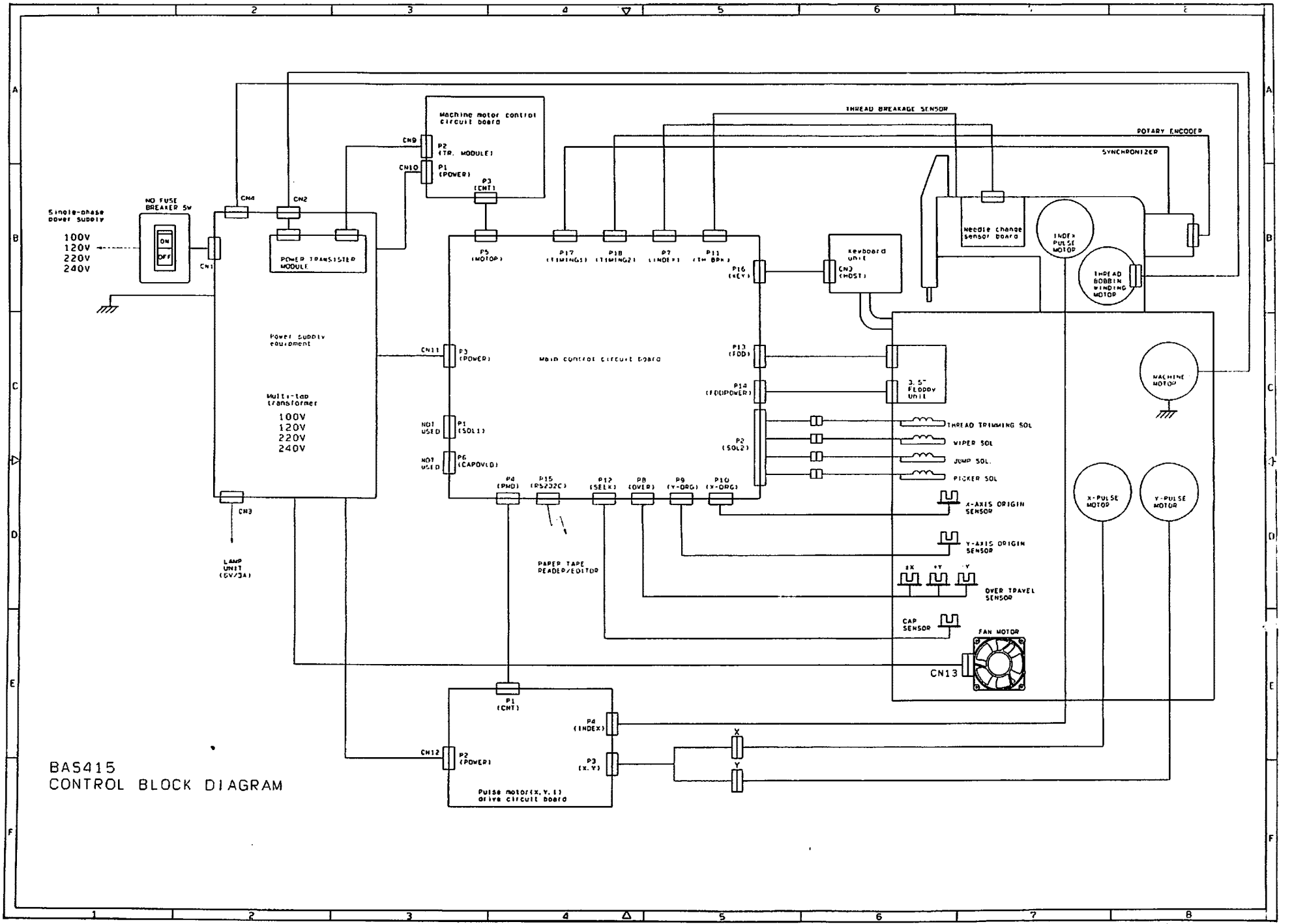


BAS415 KEYBOARD UNIT
CONTROL BLOCK DIAGRAM





BAS411
CONTROL BLOCK DIAGRAM



BAS415
CONTROL BLOCK DIAGRAM