

# brother

## SERVICE MANUAL

### FOR

### BA-10

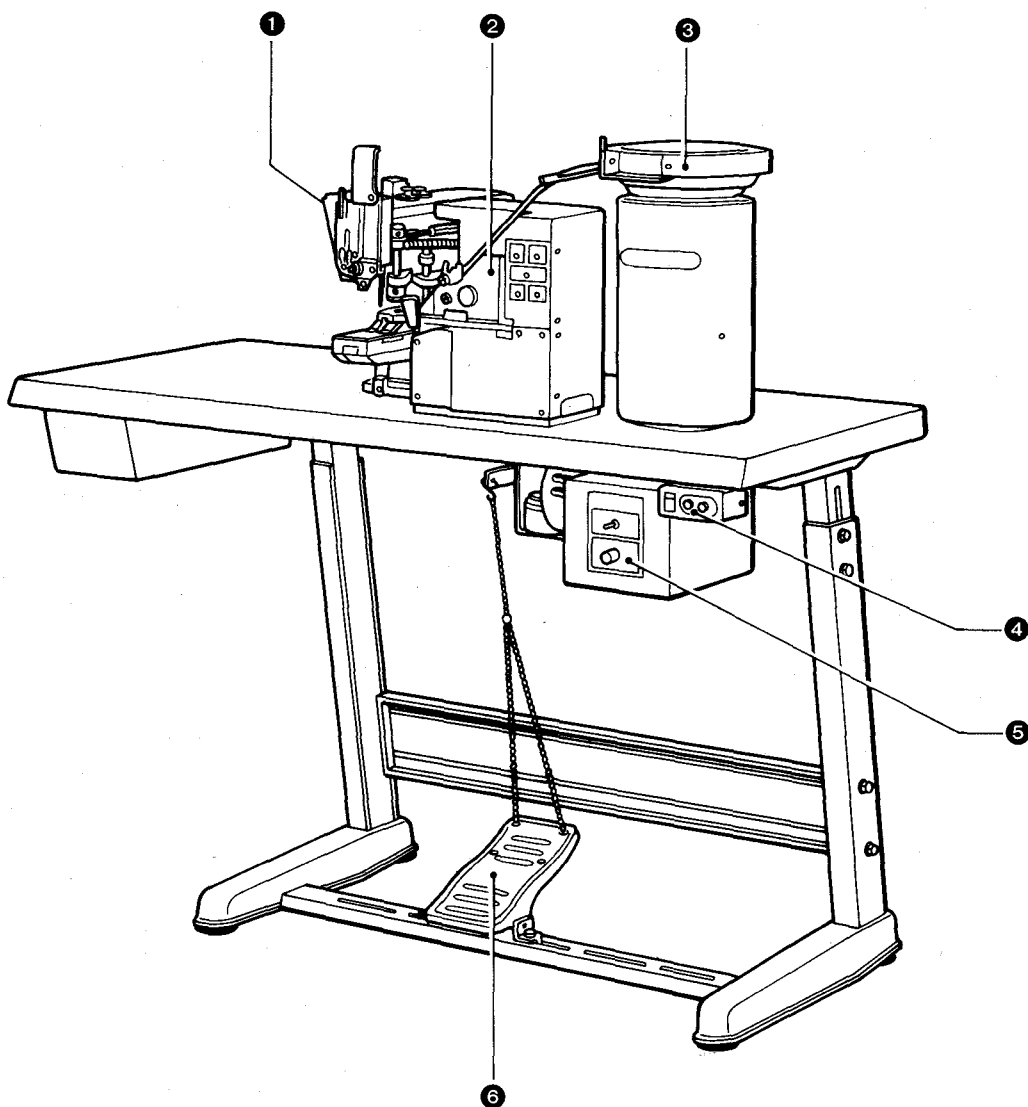


BROTHER INDUSTRIES, LTD.

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## Main Part Names



① Machine head  
② Button feeder

③ Vibration ball  
④ Power switch

⑤ Control box  
⑥ Treadle

## Cautions on Use

The sewing machine will continue to attach buttons as long as the treadle is depressed.

Be sure to turn the power off before beginning any adjustment unless specifically directed to turn the power on.

## Installation

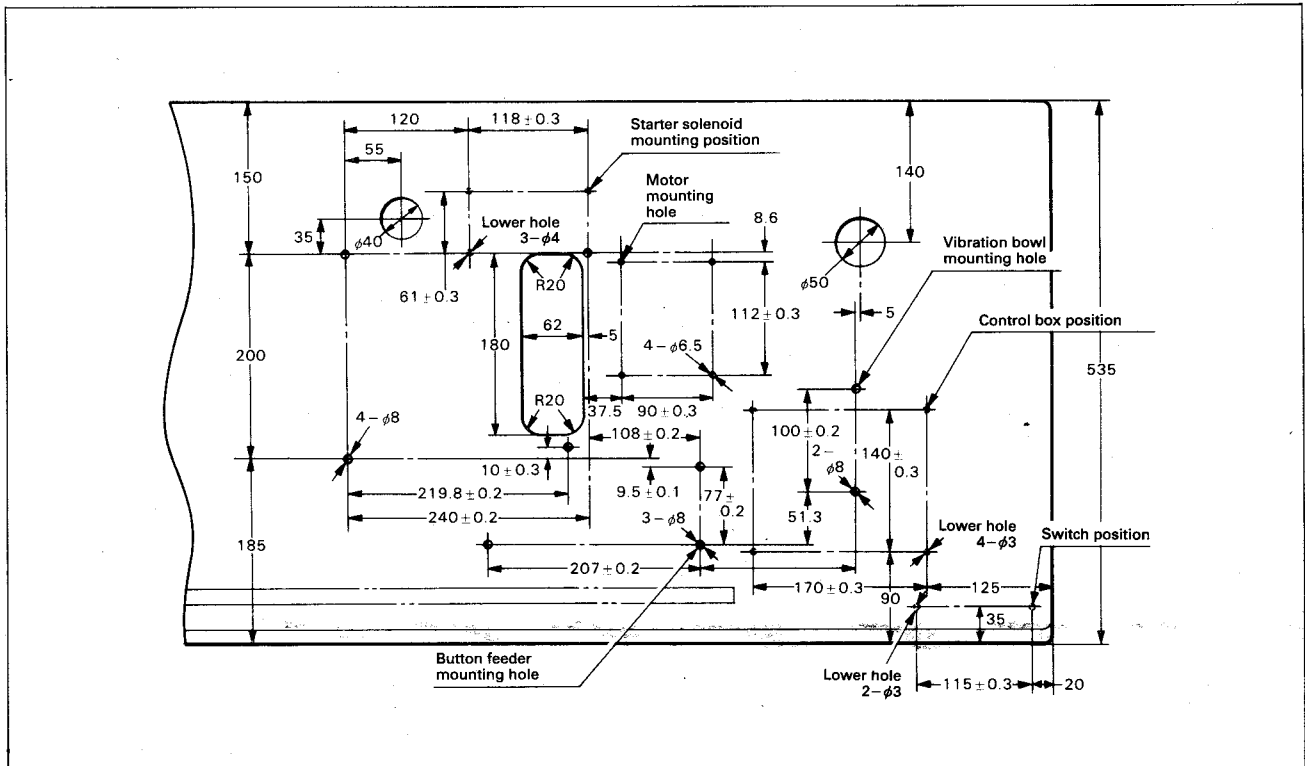
\* Please be sure to use a table 40 mm in thickness.

In case that the table is thickened or thinner than 40 mm, malfunction occurs.

### 1 Work table preparation

★ Refer to the diagram below to prepare the work table for sewing machine installation.

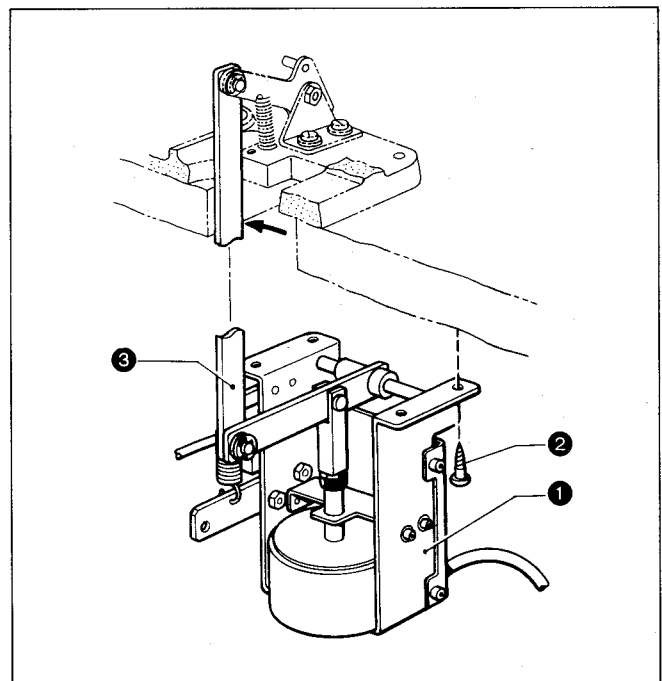
(The lower hole for the starter should be  $\phi 4$  dia. and about 30 mm deep; that for the control box power switch should be  $\phi 3$  and about 20 mm deep.)



### 2 Starter

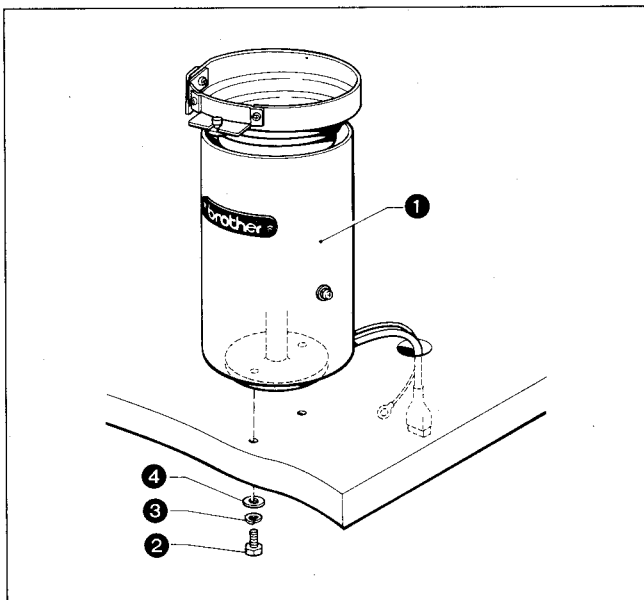
1. Align the mounting holes in the starter ① with the holes in the table.
2. Secure the starter ① to the bottom of the table with round-head wood screws ② and the bed mounting screw (1 screw).

\* Be sure the starter connecting rod ③ is on the same side as the sewing machine operating lever.



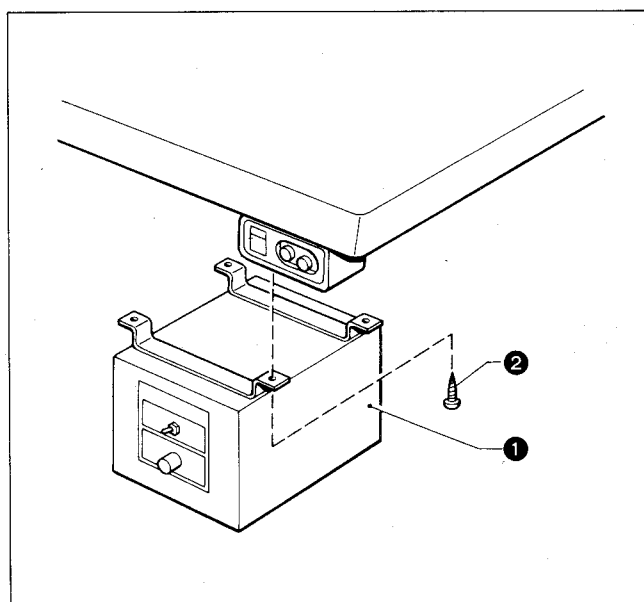
### 3 Vibration bowl

1. Install the vibration bowl ① with bolt ②, lock washer ③, and washer ④.
2. Pass the wires from the vibration bowl ① through the hole in the table.



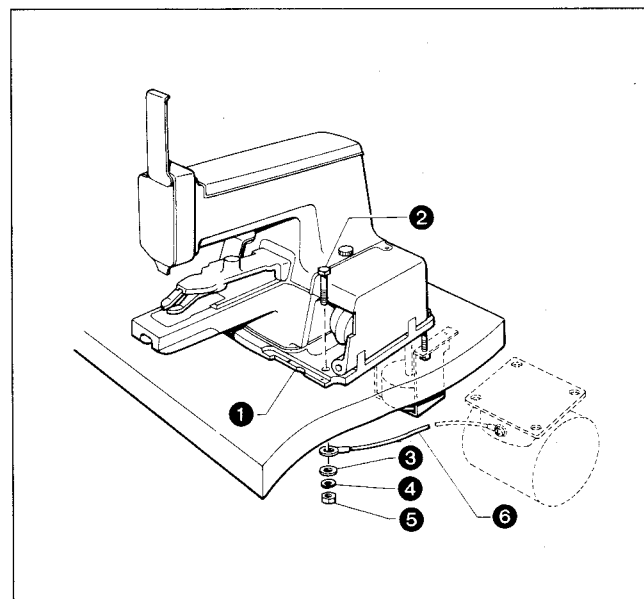
### 4 Control box

1. Mount the control box ① to the bottom of the work table with round-head wood screws ②.



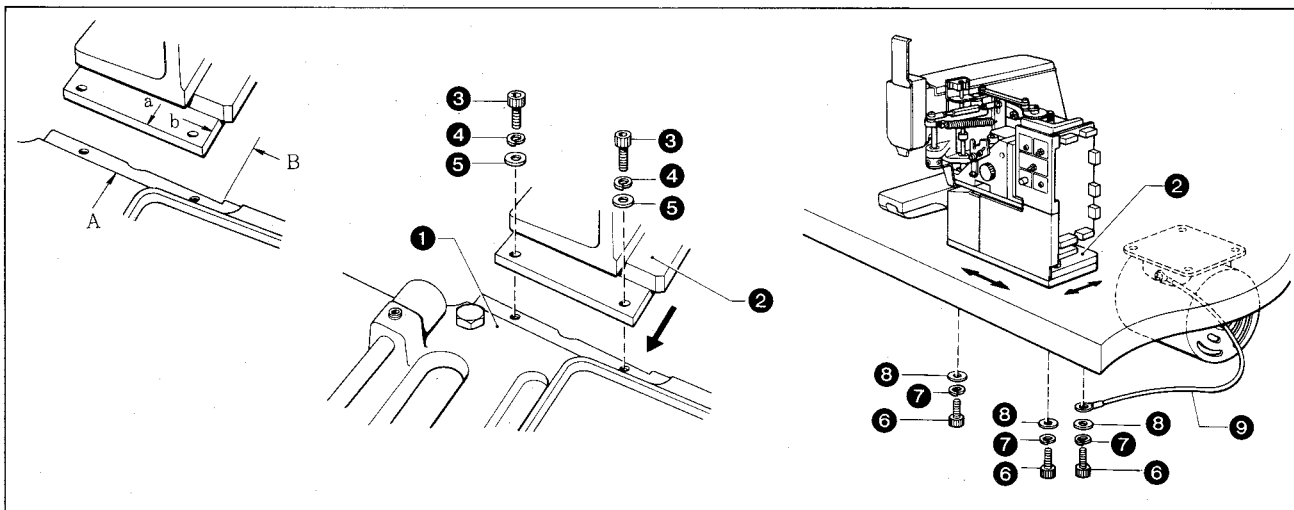
### 5 Sewing machine head

1. Lightly secure the sewing machine bed ① in place with bolts ②, washers ③, lock washers ④ and nuts ⑤.
2. Firmly tighten the nuts ⑤ after the button feeder is installed.  
(Connect ground wire ⑥)



## 6 Button feeder

★ Tilt the sewing machine.



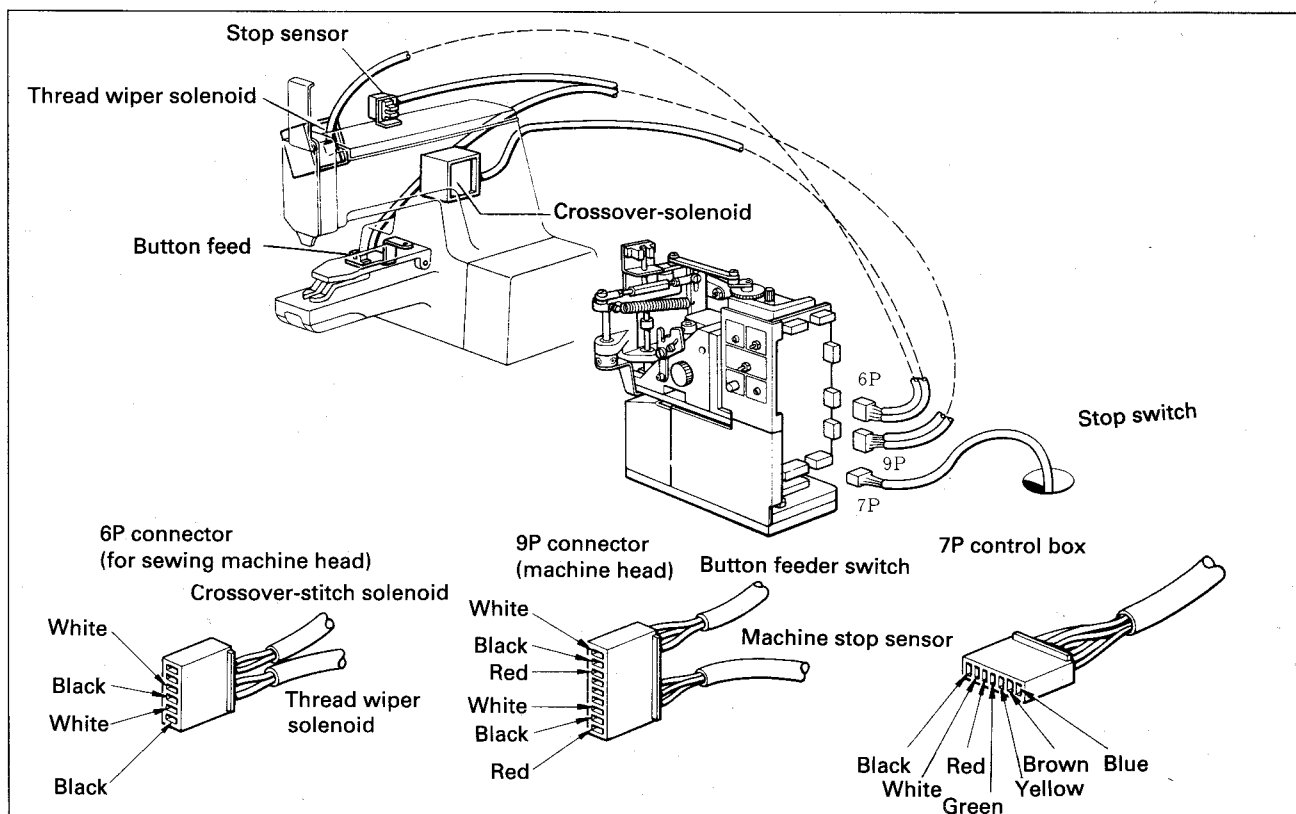
1. Align the corners of the machine bed **1** and button feeder base **2** (A and B on machine bed **1** with a and b, respectively, on feeder base **2**), and secure firmly with washer **5**, lock washer **4**, and bolt **3**. Make sure there is no film left at A on machine bed **1**.
2. Slide the sewing machine bed table **1** and button feeder base **2** as necessary to pass Allen bolts **6** with lock washers **7** and washers **8** up through the screw holes from the bottom of the table.  
(Connect ground wire **9**.)  
Now firmly tighten the nuts on the bolts holding the sewing machine bed table in place **1**.  
(Refer to **5** on the previous page.)

## 7 Cord connections

★ Connect all wires and connectors as indicated in the figures below.

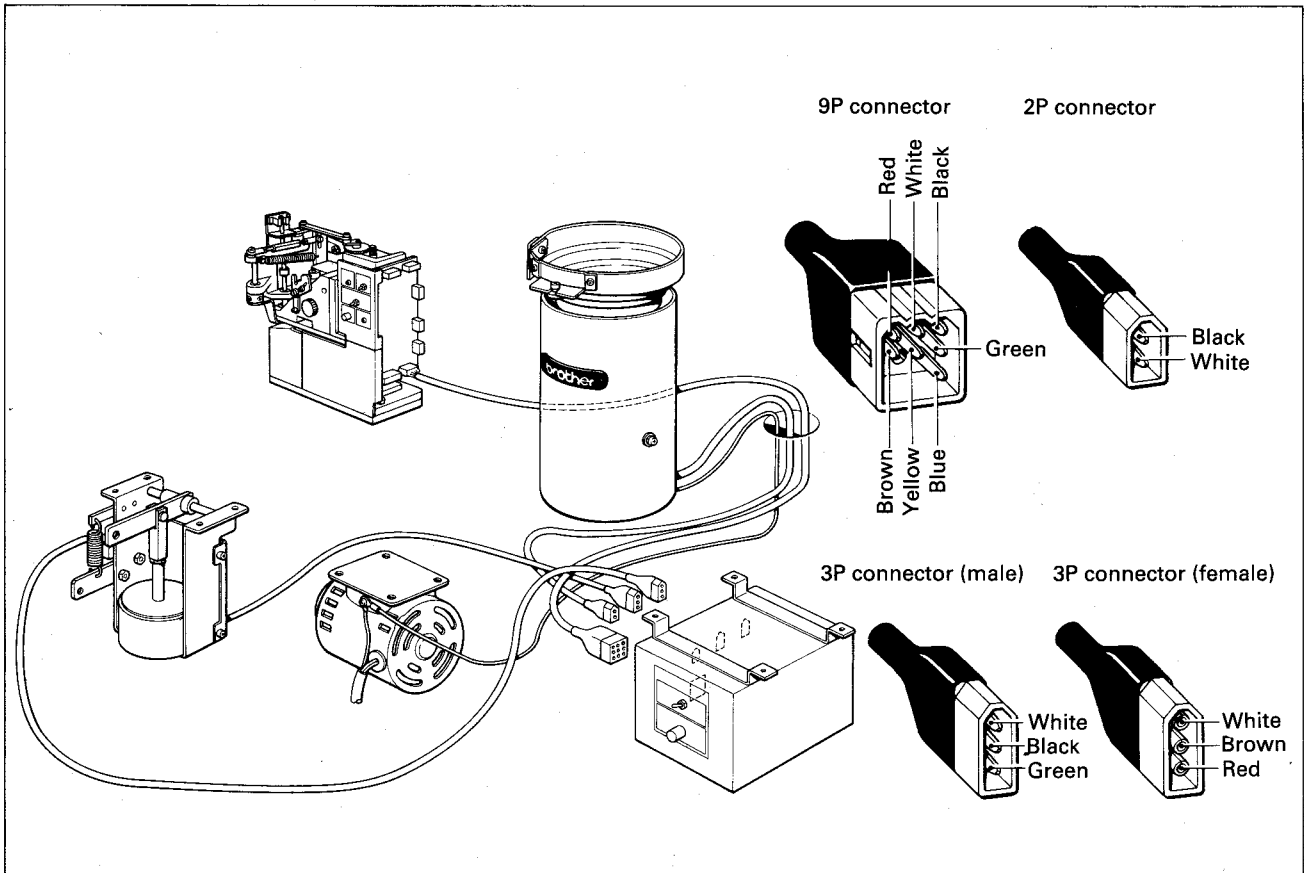
### Button feeder connection

\* Pull on the connector to make sure it will not come disconnected after connecting the pins.

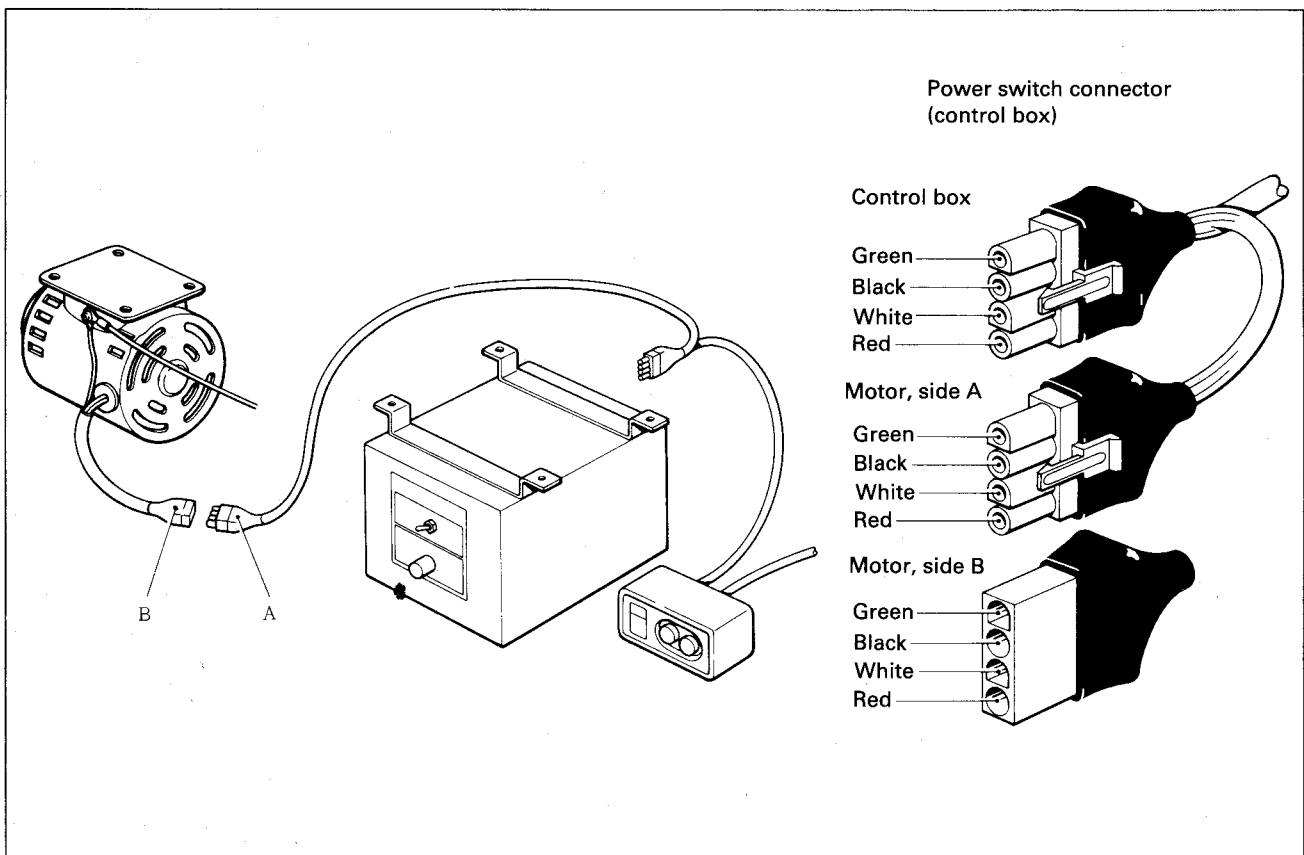


## Control box connection

★ Connect the ground wire from the vibration bowl to the motor.

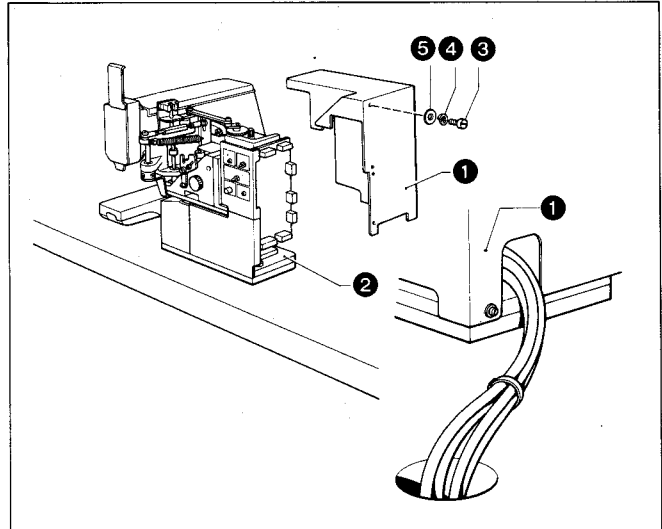


## Power switch connection



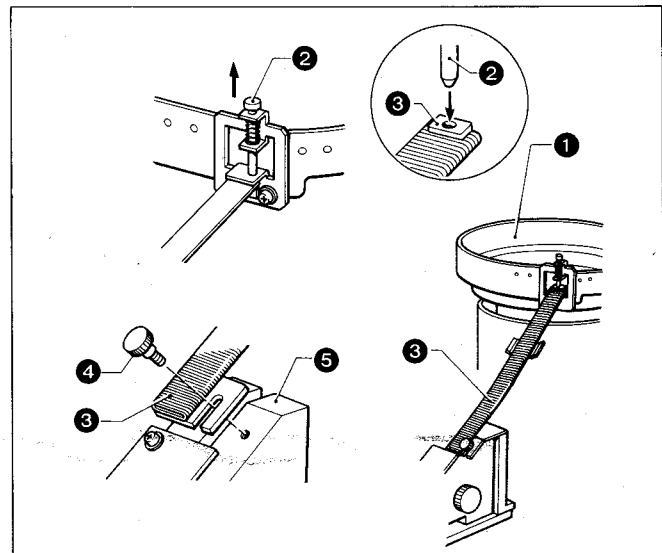
## 8 Cover

- ★ Attach the button feeder cover ① to the button feeder ② with screw ③, lock washer ④, and washer ⑤.
- \* Be sure to pass the wires through the hole in the cover when attaching the button feeder cover ①.

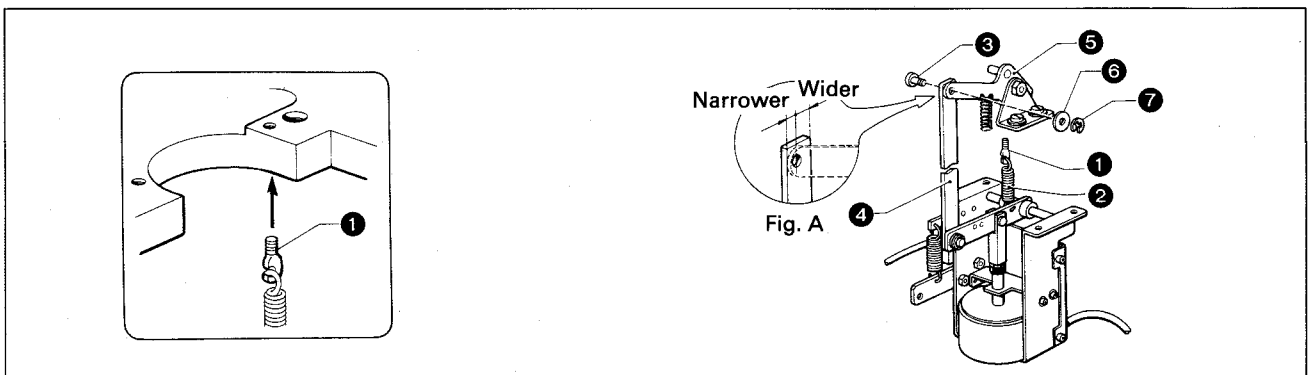


## 9 Shooter

1. Raise the shooter lock pin ② on the vibration bowl ①, and secure the shooter ③ by inserting the pin ② through the notch in the shooter.
2. Secure the shooter ③ with thumb screw ④ on button feeder ⑤.



## 10 Starter connecting rod and operating lever



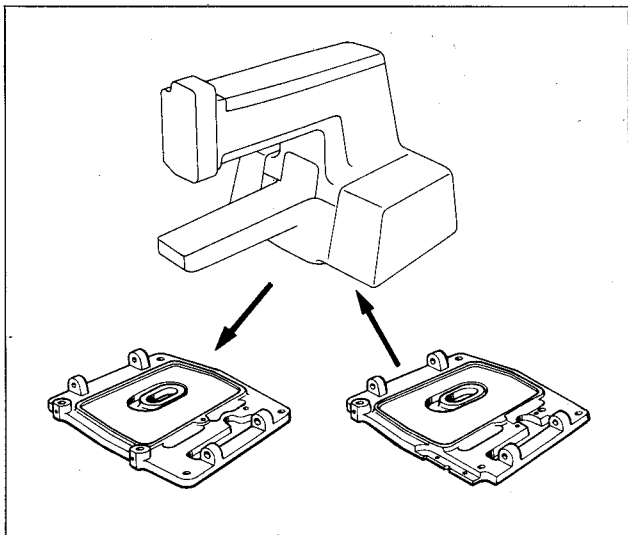
1. Tilt the sewing machine.
2. Mount the spring peg ① on the bottom of the sewing machine bed table.
3. Mount the operating lever spring ② on the peg.
4. Pass the starter connecting rod pin ③ through the starter connecting rod ④ and operating lever ⑤, and secure the pin with washer ⑥ and snap ring ⑦.
- \* After this installation refer to page 22 and readjust the starter solenoid.
- \* As shown in the figure above, the hole in the starter connecting rod ④ are not located in the center of the rod, Mount the rod with the wider hole-to-edge gap towards the operating lever spring ②.



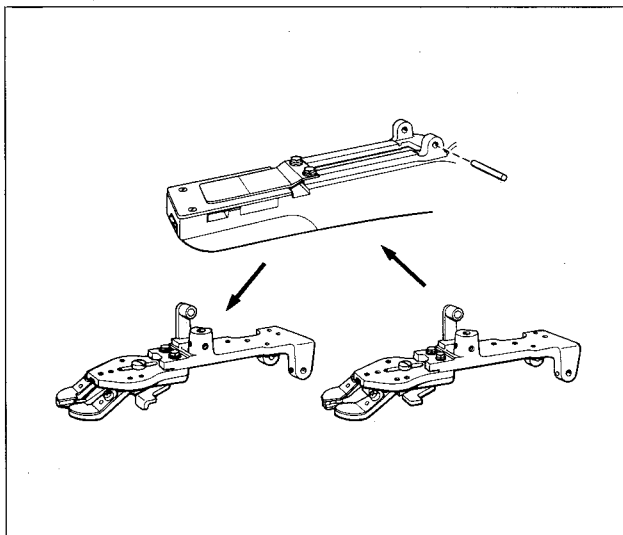
## 11 Standard specification model modifications

★ The following parts must be replaced or installed when using a standard specifications B917 sewing machine. The crossover-stitch attachment cannot be installed with model B917.

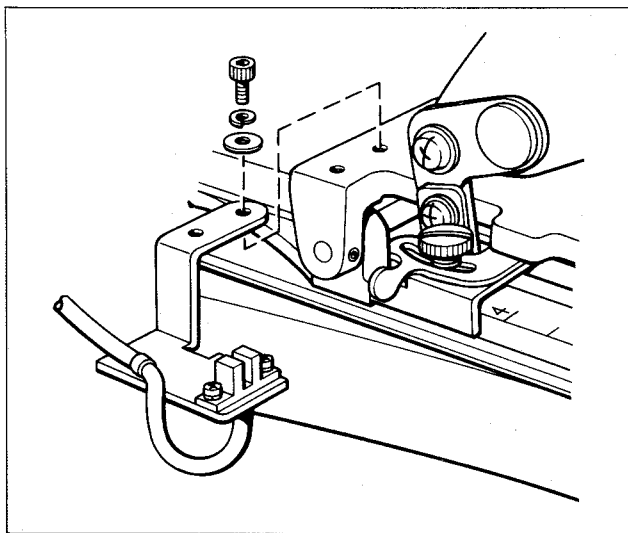
1. Replace the sewing machine bed table.



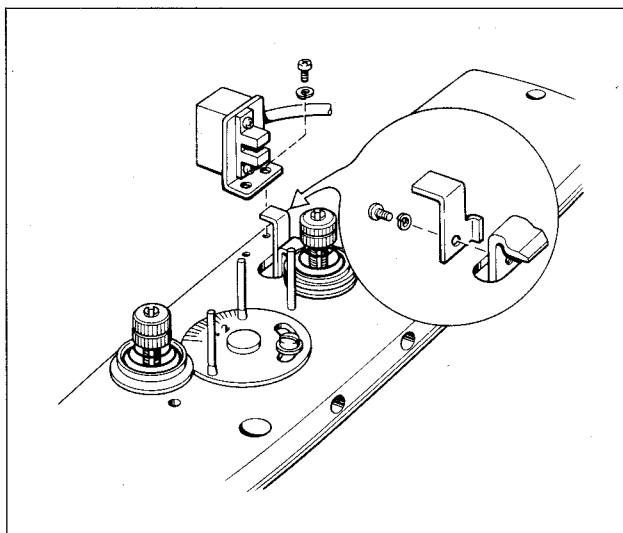
2. Replace the button clamp.



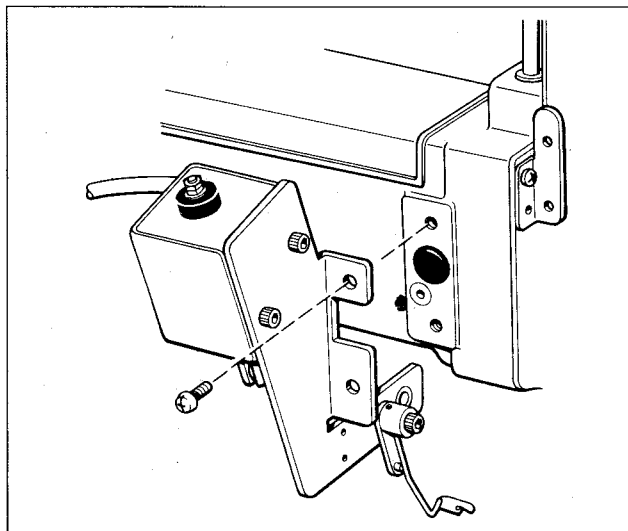
3. Install a button feed sensor.



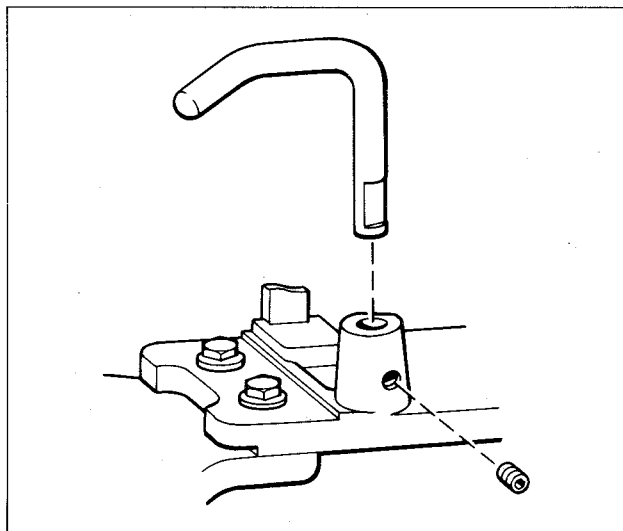
4. Install a machine stop sensor.



5. Install a thread wiper attachment.



6. Install the button holder latch.



\* Refer to the previous pages for button feeder, vibration bowl, and control box installation.

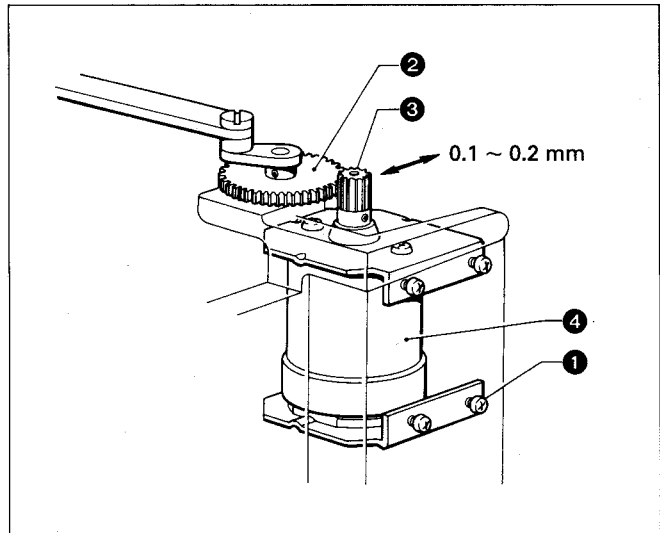
## Adjustments

### 1 Button feeder adjustments

#### 1. Button positioner motor and solenoid installation

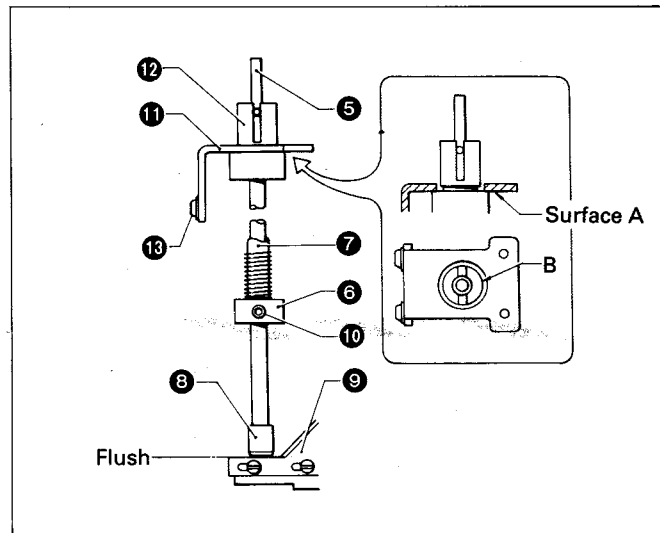
##### 1. Button positioner motor

- (1) Loosen screw ①, and adjust the backlash between gear ② and gear ③ to 0.1 to 0.2 mm.
- (2) Firmly tighten screw ① so that the button positioner motor ④ does not move after adjusting the backlash.
- (3) Grease around gear ②.

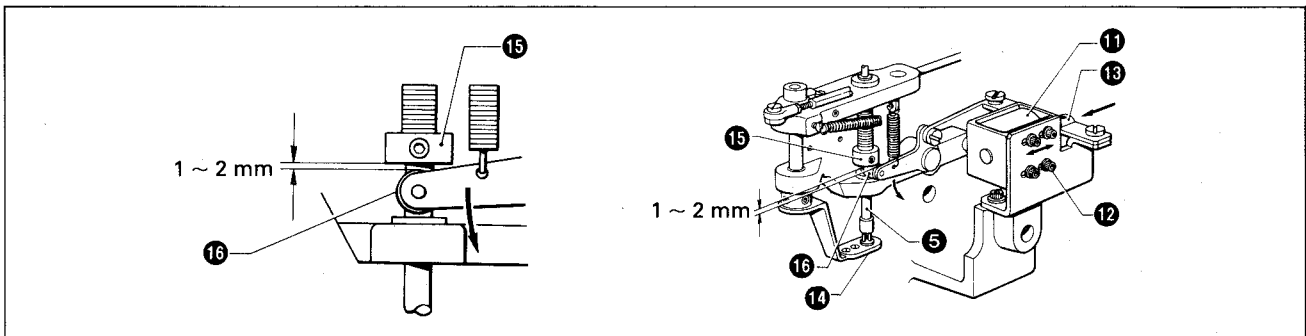


##### 2. Shaft height adjustment

- (1) Adjust shaft ⑤ so that the bottom of the button presser ⑧ and slide ⑨ are flush when button positioner dog ⑥ is fully raised and contacting collar ⑦. Tighten screw ⑩ to hold the shaft ⑤ in place.
- (2) Secure guide ⑪ with screw ⑬ so that there is no looseness in button positioner shaft guide ⑫. Make sure shaft guide ⑫ is flush to guide ⑪ and that not just one side is touching. Make sure perimeter B does not contact the sides.



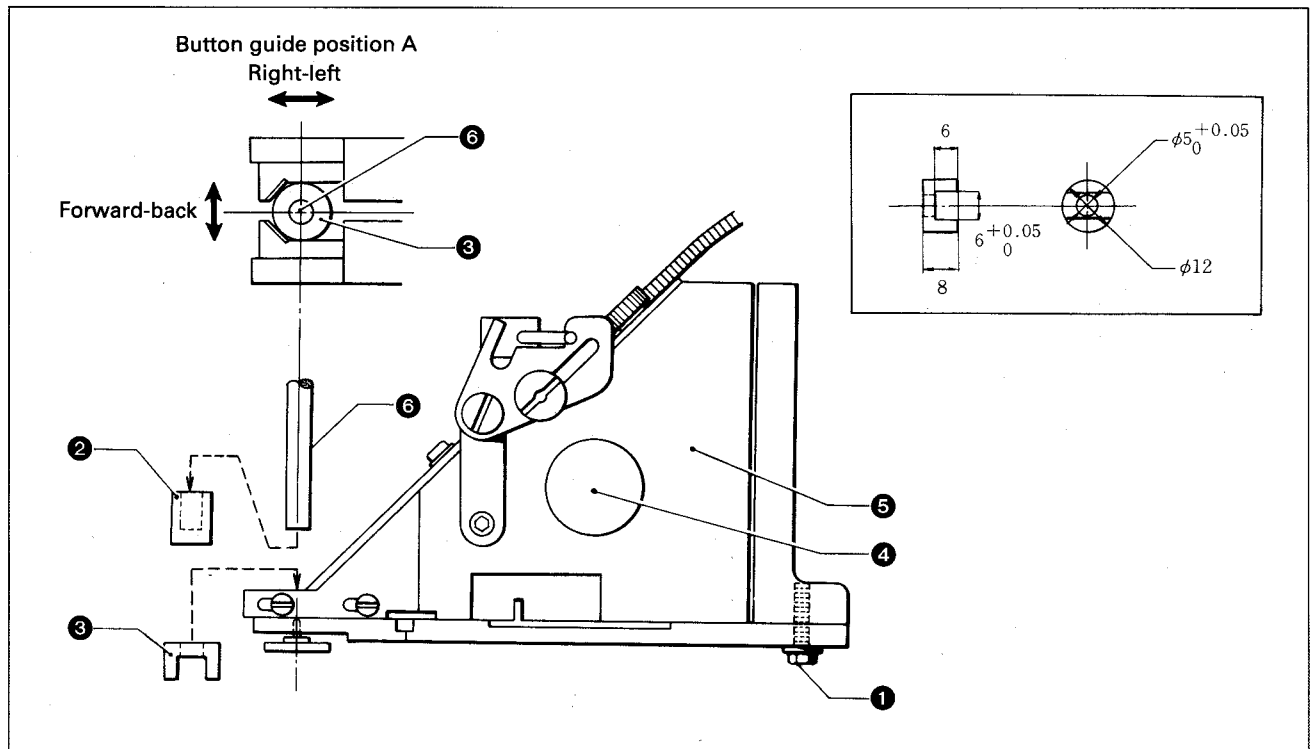
##### 3. Button positioner solenoid



- (1) Lightly tighten button positioner solenoid ⑪ with bolt ⑫.
- (2) Push plunger ⑬ to the stroke end of the solenoid in the direction of the arrow.  
When shaft ⑤ rides on button carrier pin ⑭, the gap between set collar ⑮ and roller bearing shaft ⑯ should be 1 to 2 mm. Shift solenoid ⑪ to adjust.
- (3) Firmly tighten bolt ⑫ after finishing the adjustment.

## 2. Button positioner location

### 1. Bed slide position adjustment



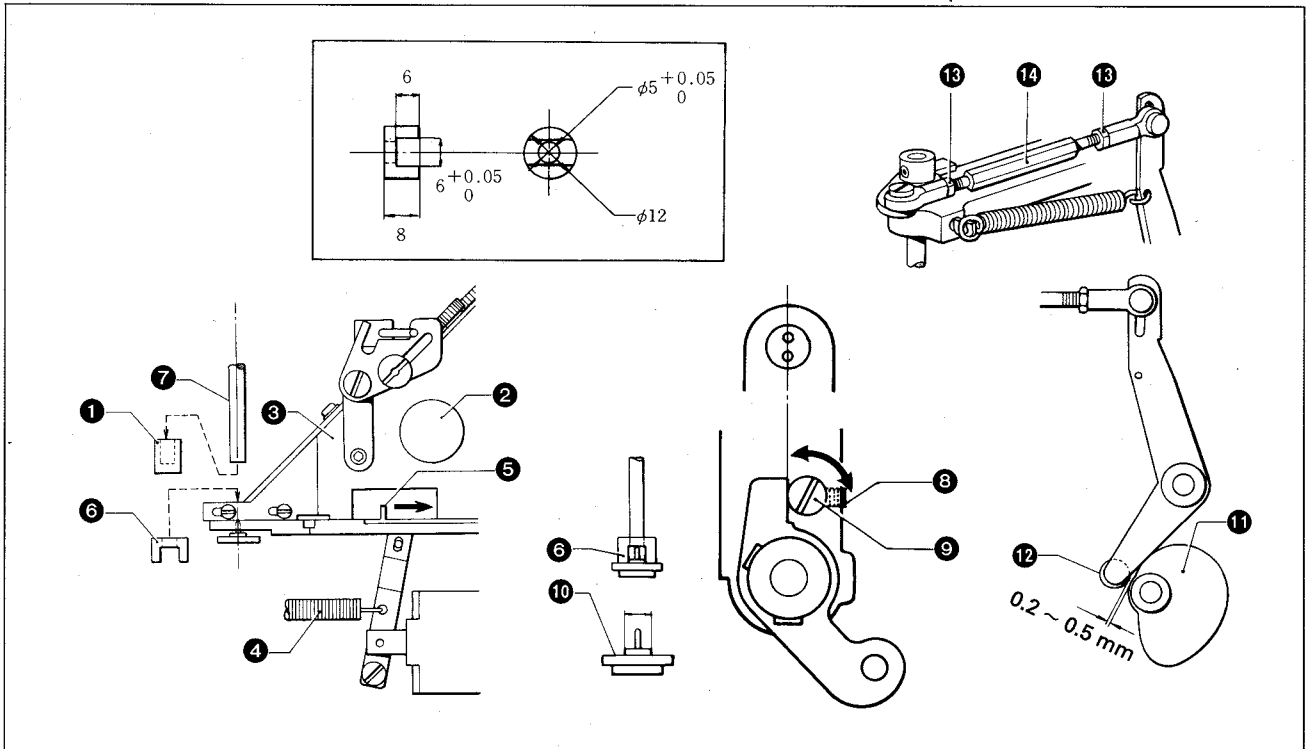
#### ① Using a gauge

- (1) Remove the button feeder cover and front cover, and loosen bolt ①.
- (2) Remove button presser ②.
- (3) Insert gauge ③ to button guide position A.
- (4) Turn screw ④ and adjust the slide ⑤ width to the outer gauge diameter.
- (5) Move slide ⑤ as necessary while lowering shaft ⑥ so that the shaft ⑥ smoothly enters the into  $\phi 5$  mm hole in the gauge.
- (6) Firmly tighten bolt ①.
- (7) Mount button presser ②.

#### ② Not using a gauge

- (1) Remove the button feeder cover and front cover, and loosen bolt ①.
- (2) Remove button presser ②.
- (3) Insert as small a button as possible to button guide position A.
- (4) Turn screw ④ and adjust the slide ⑤ width to the button diameter.
- (5) Move slide ⑤ as necessary so that the center of shaft ⑥ is aligned with the center of the button.
- (6) Firmly tighten bolt ①.
- (7) Mount button presser ②.

## 2. Button clamp and button carrier adjustment



### ① Using a gauge

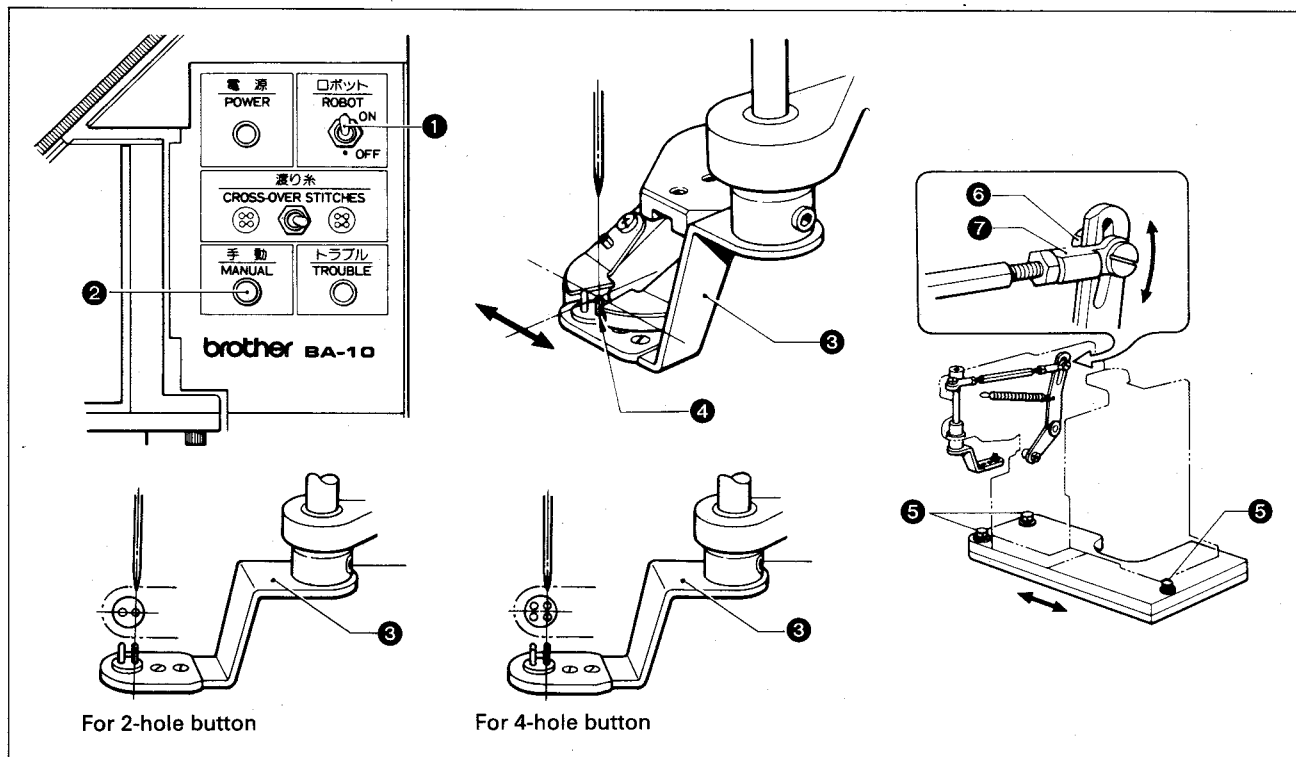
- (1) Remove the button feeder cover and front cover, and loosen bolt ①.
- (2) Turn screw ② and set the bed ③ width to greater than 15 mm.
- (3) Remove spring ④, and move button carrier shutter ⑤ in the direction of the arrow.
- (4) Turn the gauge ⑥ so the  $\phi 6$  mm groove is on the bottom, and slide the gauge on shaft ⑦.
- (5) Loosen screw ⑧, turn pin ⑨, and adjust part A of button carrier ⑩ so that it enters the groove of gauge ⑥.

Make sure the carrier cam ⑪ to roller bearing ⑫ gap is 0.2 mm to 0.5 mm. Loosen nut ⑬ and turn connecting rod ⑭ to adjust the gap.

### ② Not using a gauge

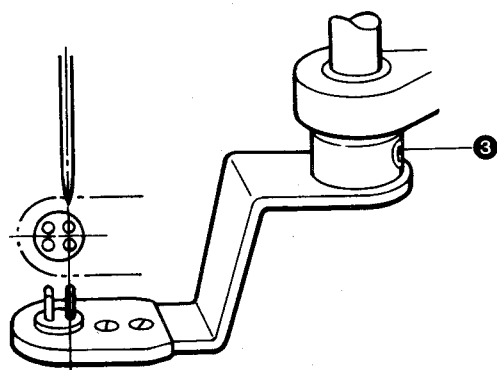
- (1) Remove the button clamp ①.
  - (2) Loosen screw ⑧, turn eccentric pin ⑨, and align button carrier ⑩ with the center of the shaft ⑦.
- Make sure the carrier cam ⑪ to roller bearing ⑫ gap is 0.2 mm to 0.5 mm. Loosen nut ⑬ and turn connecting rod ⑭ to adjust the gap.

### 3. Adjustment of the feeder position

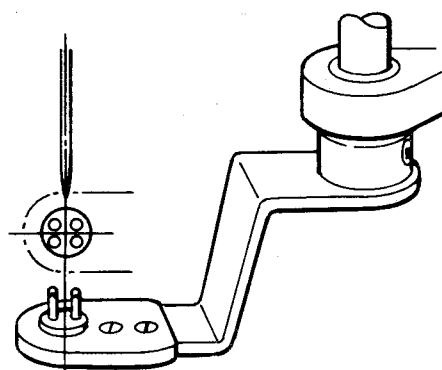


- (1) Check whether or not the feeder switch ① is at the ON position.
- (2) While pressing and holding the manual switch ②, switch on the power switch.
- (3) While continuing to hold the manual switch ②, move the arm ③ for button movement until it grasps a button. (Stop where the button clamp begins to rise.)  
\* Assist the button clamp by lifting up.
- (4) Adjust so that the needle tip and the button receiving pin ④ coincide.  
Right/left position adjustment  
Loosen bolt ⑤ and adjust the entire button feeder left or right.  
Front/back position adjustment  
Loosen nut ⑥, and move joint ⑦ up or down and arm ③ front or back to adjust.  
Press the manual switch ② after the adjustment is completed to return the button transport arm ③.  
\* Turn the sewing machine pulley to make sure the needle does not strike the button.

Needle point and button carrier pin positions  
for X- and Z- sewing patterns

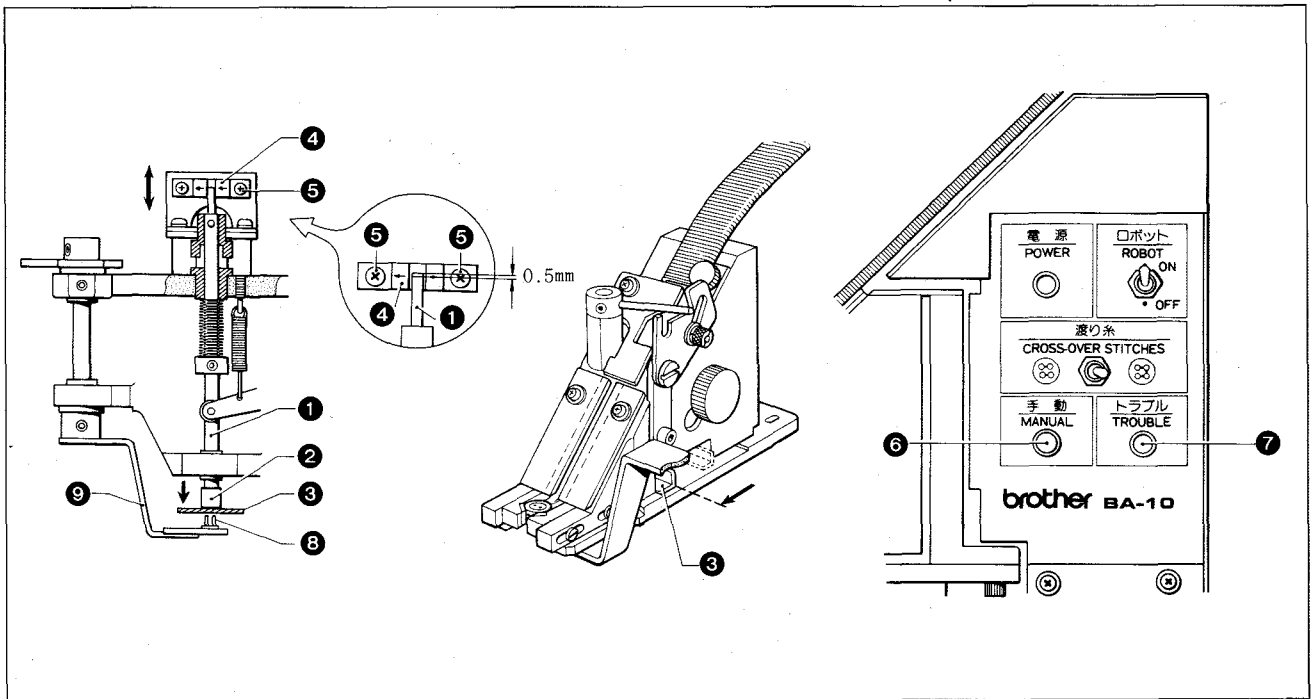


For X-sewing pattern



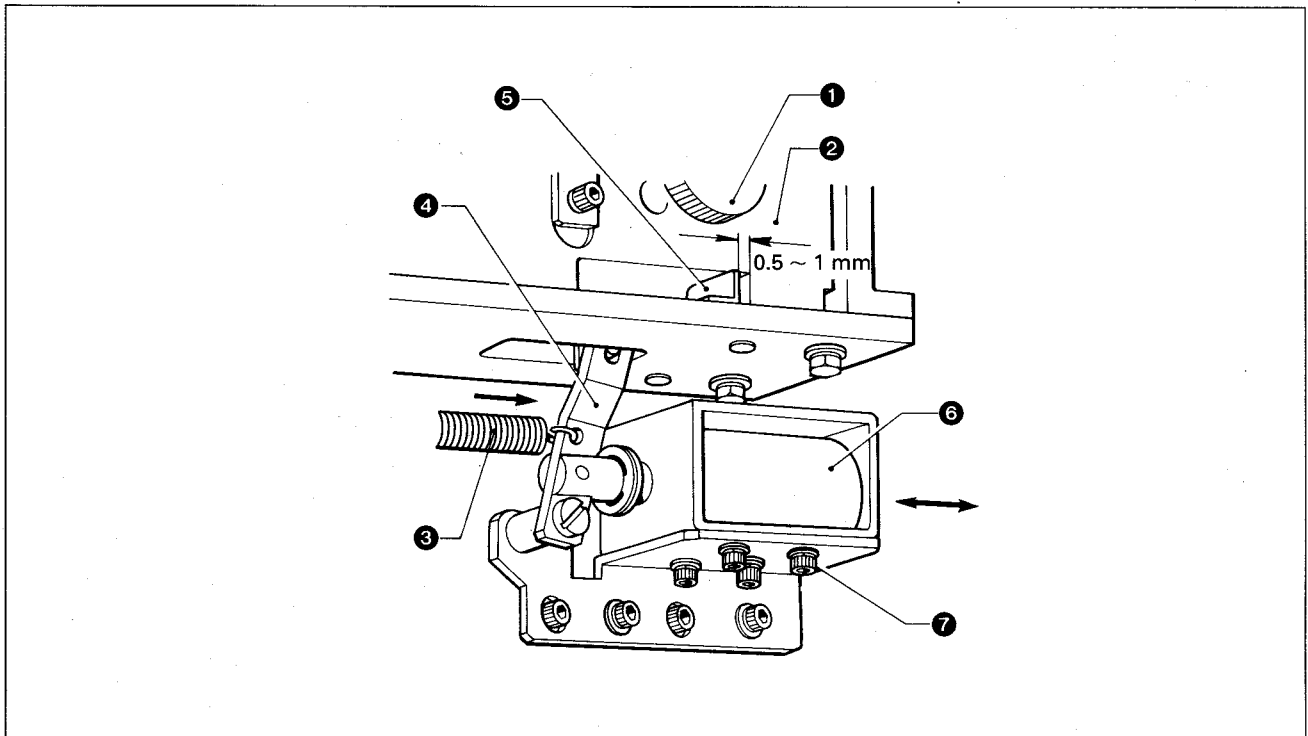
For Z-sewing pattern

### 3. Button positioner sensor



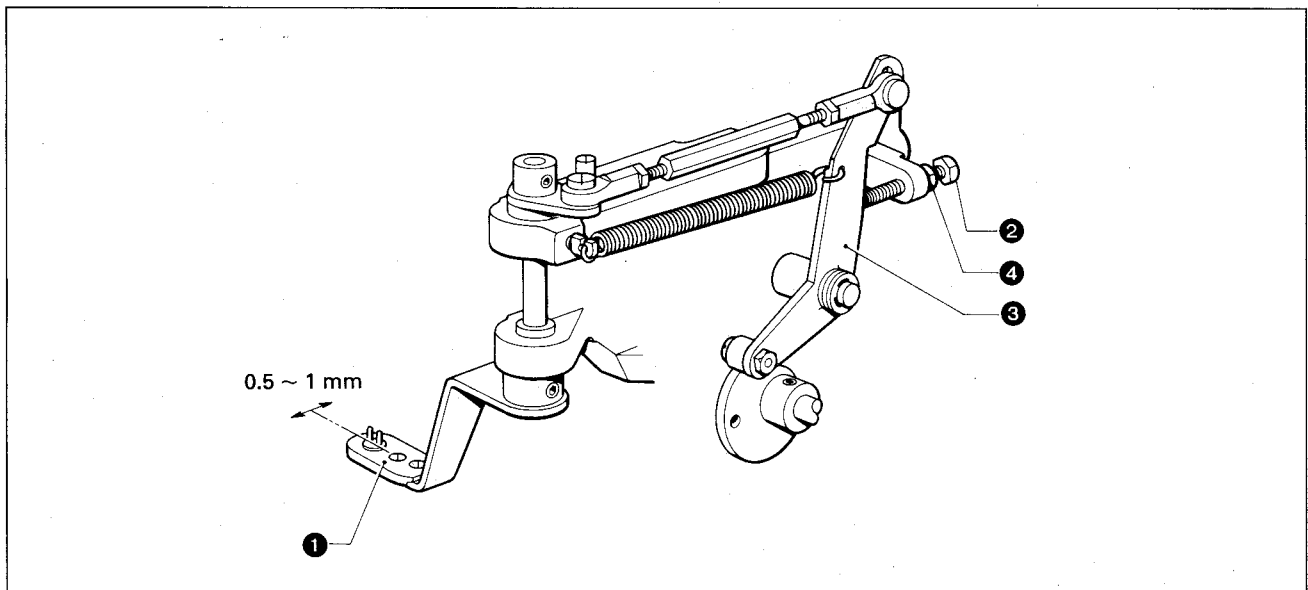
1. Remove any buttons from the slide.
  2. Turn the power switch off. Use a screwdriver or similar tool to pull shaft ① down so that button presser ② contacts button carrier ③.  
The top of shaft ① should be 0.5 mm above the arrow index on sensor ④. Loosen screw ⑤ and move sensor ④ up or down to adjust.
  3. Check A
    - (1) Turn the power on.
    - (2) Move button carrier ③ by hand in the direction of the arrow so that button carrier ③ does not open, and then press MANUAL switch ⑥. The TROUBLE indicator ⑦ should light in about 2 sec.
    - (3) If shaft ① rises soon and TROUBLE indicator ⑦ blinks, lower sensor ④ slightly and repeat the above.
  4. Check B
    - (1) Press MANUAL switch ⑥, and make sure shaft ① rises soon and TROUBLE indicator ⑦ blinks.
    - (2) If TROUBLE indicator ⑦ lights in about 2 sec., raise sensor ④ slightly and repeat from Check A.
- A. If the button positioner sensor is too high**
- a. The button transport arm ⑨ will work before a button is placed on the button carrier ⑧ if the button positioner sensor ④ is too high.
  - b. To adjust, loosen sensor ④ and lower the button positioner sensor ④.
- B. If the button positioner sensor is too low**
- a. The trouble indicator ⑦ will light about 2 sec. after the power is turned on if the button positioner sensor ④ is too low.
  - b. To adjust, turn the power off, loosen screw ⑤ and raise the button positioner sensor ④.

#### 4. Shutter solenoid installation



1. Turn knob ① to adjust the bed slide ② width to the minimum setting.
2. Remove the spring ③.
3. When the button carrier shutter drive lever ④ moves all the way over in the direction of the arrow, gap of the button carrier shutter ⑤ to bed slide ② gap should be 0.5 ~ 1 mm. To adjust, move the solenoid ⑥, and then tighten bolt ⑦.
4. Mount the spring ③ on the lever.

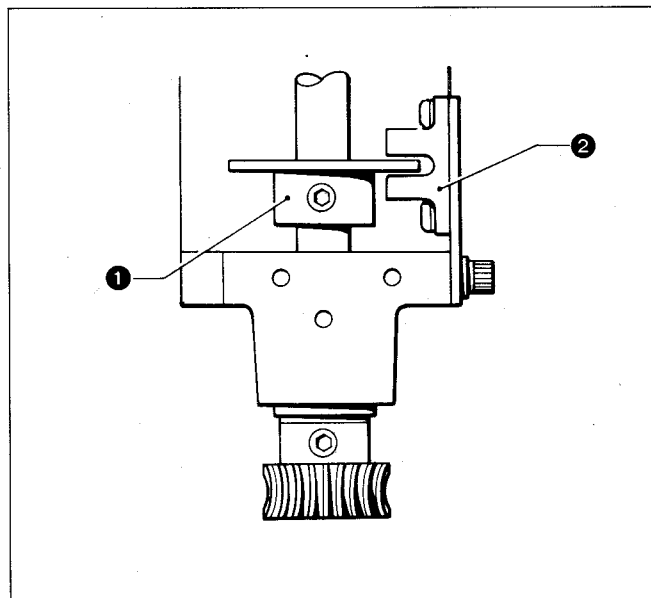
#### 5. Button carrier stop screw



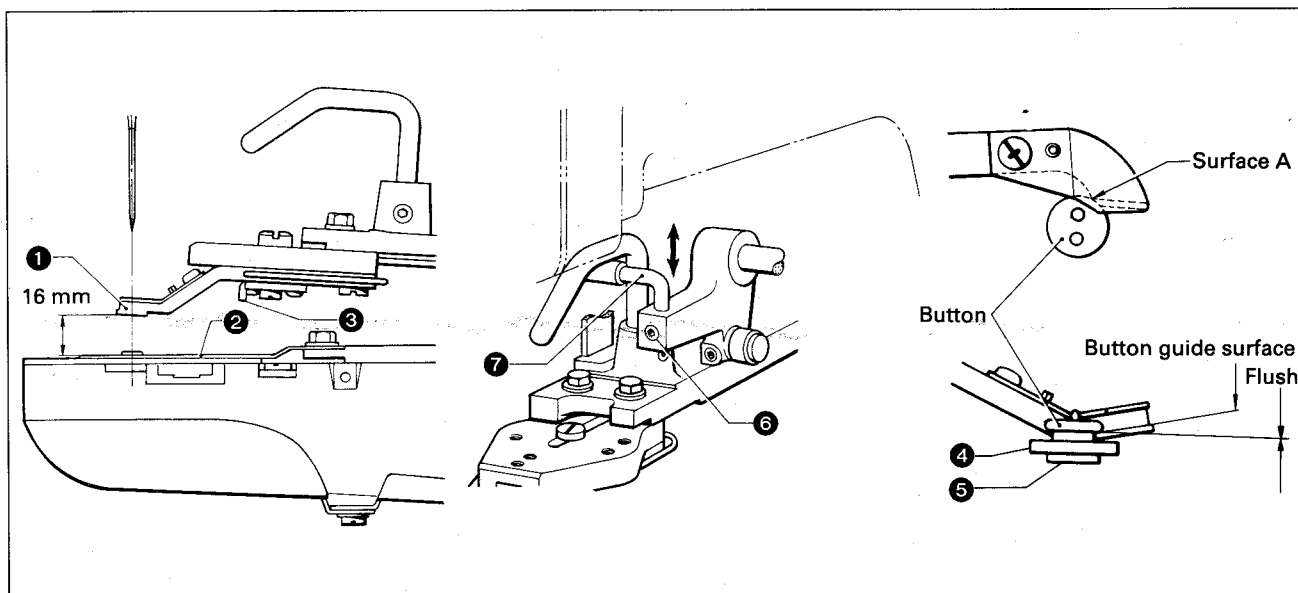
- ★ Adjust the button carrier. See page 10.
1. Inch the button carrier ① all the way forward (needle side), and adjust the overrun prevention screw ②.
  2. Adjust the stop screw so that the lever ③ to stop screw ② gap is 0.5 to 1 mm at the button carrier ①, and then tighten nut ④.

## 6. Feeder origin sensor

- Install the feeder origin sensor ② so that it does not contact plate ①.



## 7. Button clamp height



★ The gap between the feed plate ② top and button clamp ① bottom should be 16 mm when the sewing machine is stopped.

The button carrier pin and adjustor ③ will not meet with this gap.

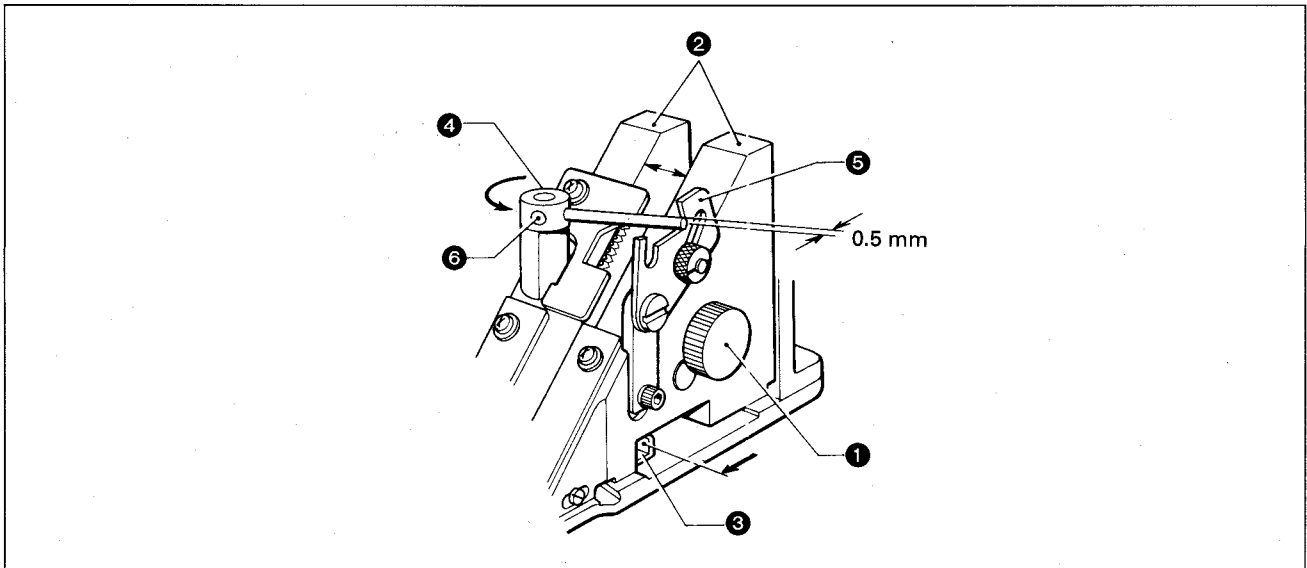
Align the button carrier ④ top with the surface of the button clamp ① which holds the button.

### Non-alignment adjustment

1. The button carrier will move slowly if the power switch is turned on with the manual switch depressed.
  2. Move button transport arm ⑤, and stop machine inching when the button is at button guide surface A.
  3. Make sure that top of button carrier ④ is flush with the button guide surface of button clamp ①.  
If they are not properly aligned, loosen Allen screw ⑥ and move the presser bar lifter roller arm ⑦ up or down.
- \* Lift the button clamp ① by hand when the button transport arm ⑤ is being inched forward.
  - \* Press the manual switch to return the button transport arm ⑤ when the adjustment is completed.

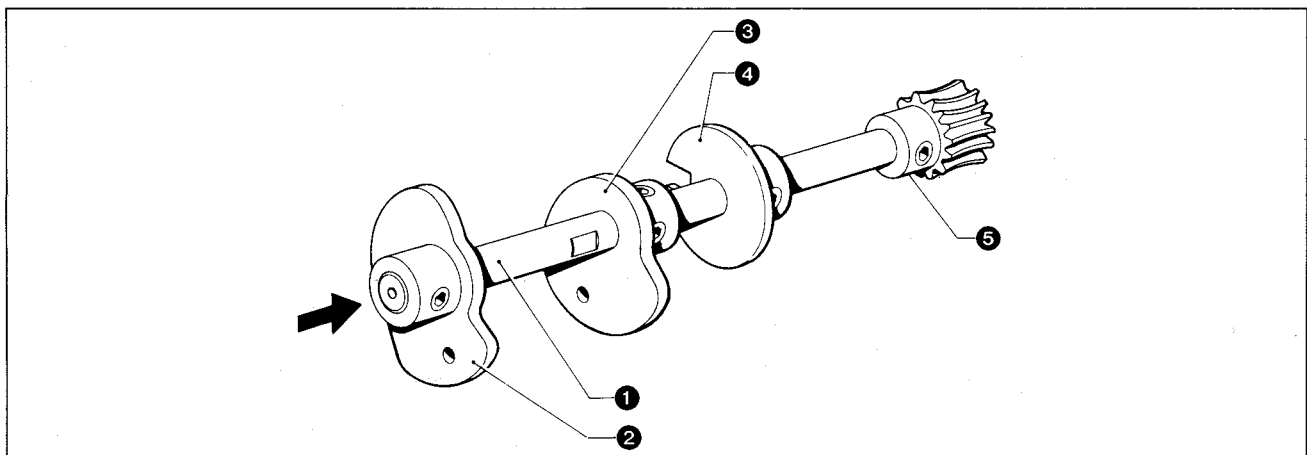


## 8. Independent feed drive lever



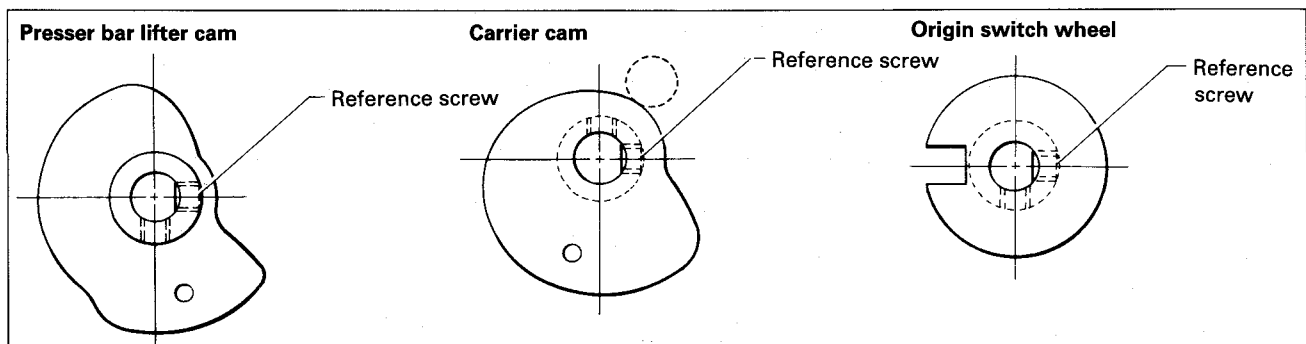
1. Turn the knob ① to set the bed slide ② to the maximum (greater than 22 mm) setting.
2. When the button carrier shutter ③ has moved in the direction of the arrow and contacts the stopper, the gap between the independent feed drive lever ④ and cam ⑤ should be 0.5 mm. Loosen screw ⑥ to adjust.

## 9. Cam shaft installation



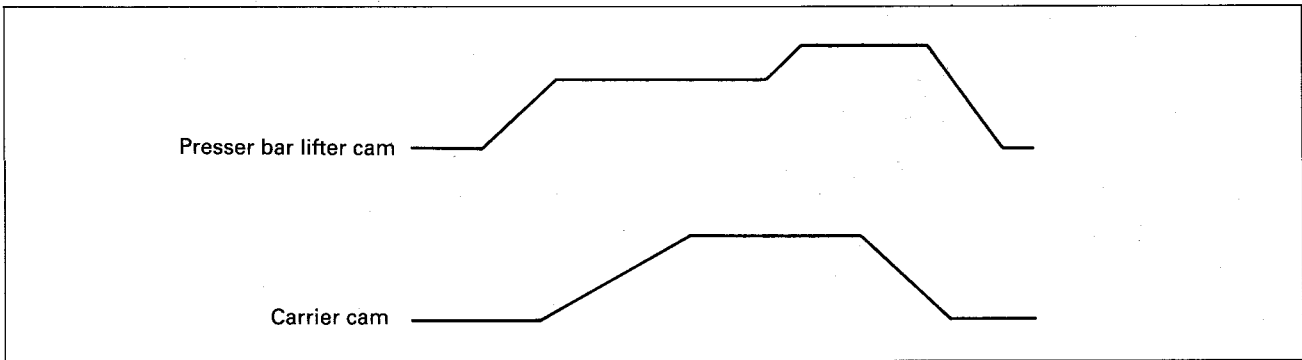
1. The presser bar lifter cam ②, carrier cam ③, origin sensor wheel ④, and worm wheel ⑤ are mounted on the cam shaft ①.
2. When the flat side of the cam shaft is facing front (towards the operator), all cam set screws should be visible on this side.

The cams and wheels will appear as shown below when seen from the arrow in the figure above.



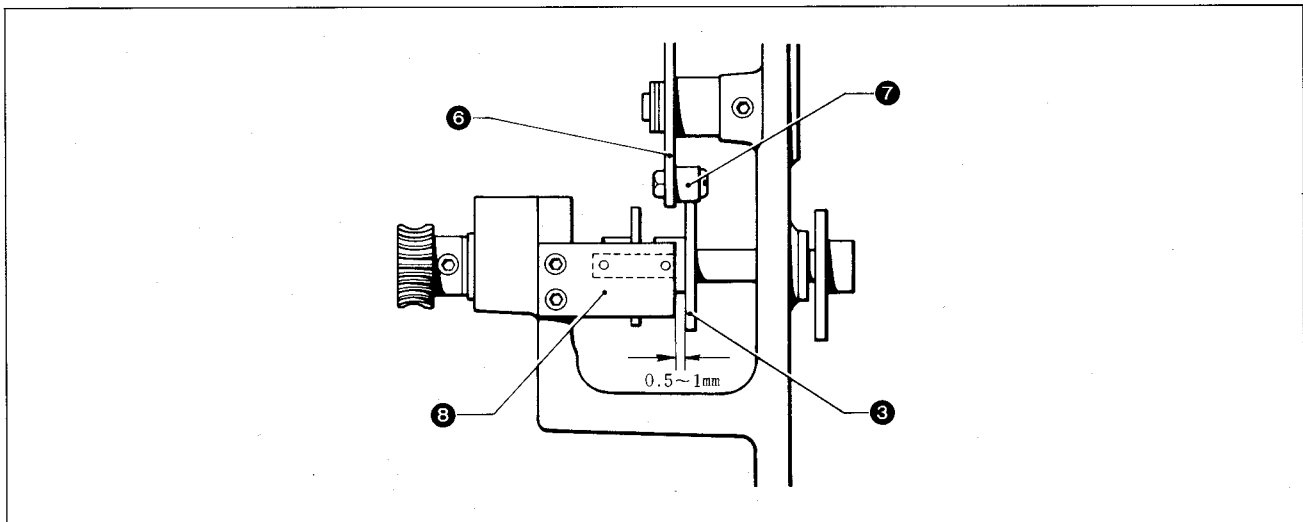
3. Insert a bushing between the presser bar lifter cam ② and worm wheel ⑤ to remove any looseness and chatter in cam and wheel action.

## Linear cam stroke

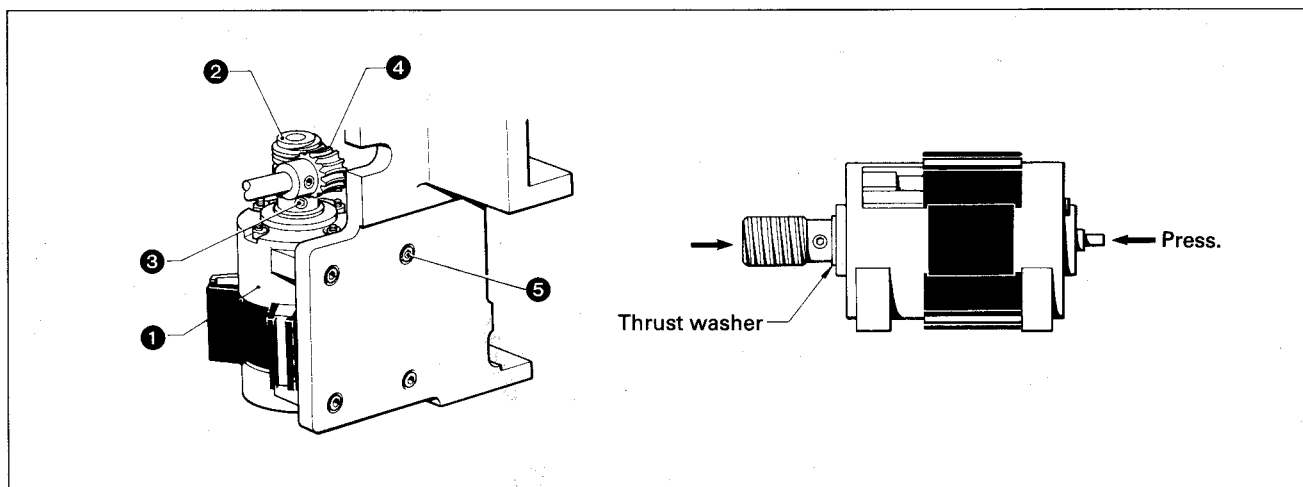


4. Mount the carrier cam ③ at the carrier driver lever (B) ⑥ roller bearing ⑦ needle reference position.

\* Make sure the switch mounting plate ⑧ and carrier cam ③ do not strike. (There should be a gap of about 0.5 to 1.0 mm.)



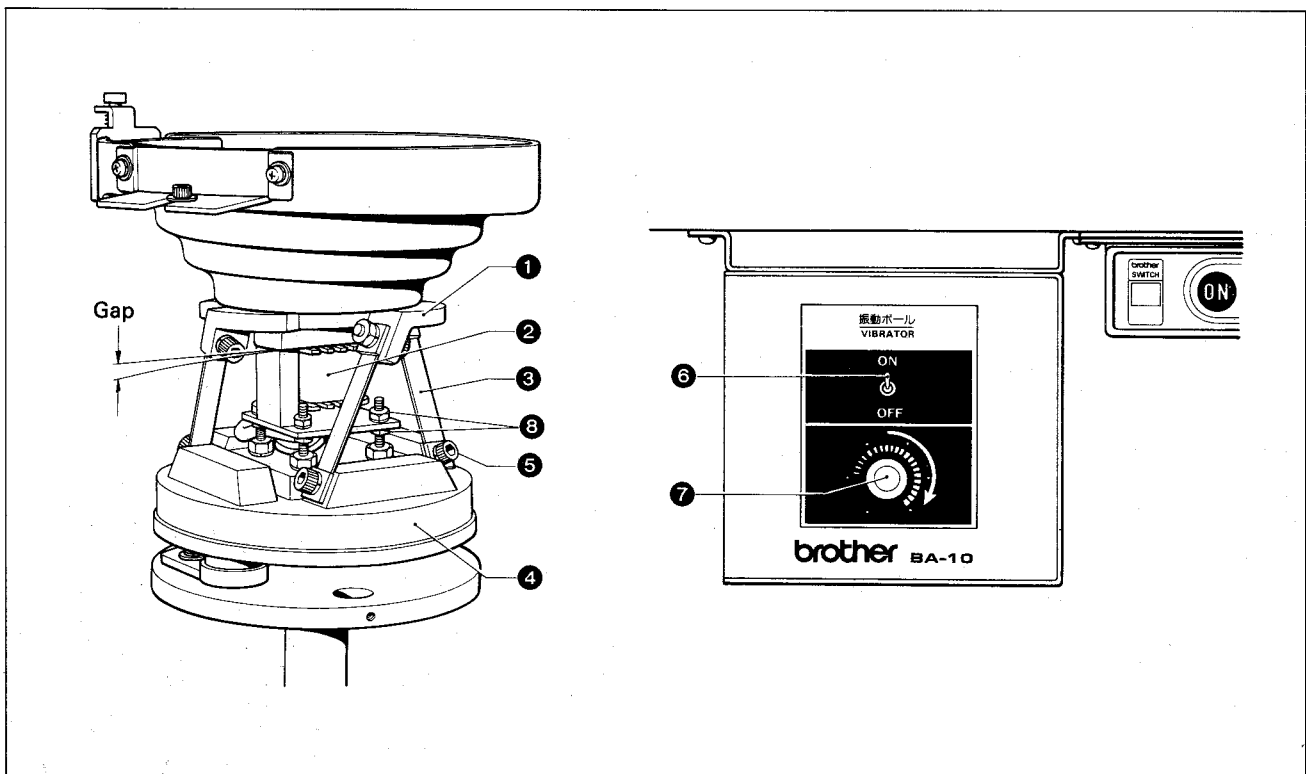
## 10. Carry motor, worm, worm wheel backlash



1. Secure the worm ② to the carry motor ① with the set screw ③. Push against the back end of the motor shaft to remove any play when mounting the screw ③.
2. There should be approximately 0.1 mm to 0.2 mm of play in the worm ② and worm wheel ④ when measured at the outer diameter of the presser bar lifter cam.
3. Secure the carry motor ① with bolt ⑤.

## 11. Vibration solenoid and leaf spring

### Vibration solenoid and bowl carrier gap adjustment



1. Remove the bowl carrier and remove the feeder cover.
2. Adjust the bowl carrier ① bottom to vibration solenoid ②. The bowl will not vibrate properly and will emit an abnormal sound if this gap is not properly adjusted.
3. Firmly bolt ⑤ the leaf spring ③, base ④, and bowl carrier ①. The bowl will not vibrate properly if these three parts are not firmly secured.  
(Use a 1.0 mm thick spring ③ for 60 Hz models, and a 0.8 mm thick spring for 50 Hz models.)
4. Press the power switch, and set the vibration bowl switch ⑥ on.
5. Turn the vibration adjustment control ⑦ all the way to the right to the maximum vibration setting.
6. Loosen the vibration solenoid ② nut ⑧ and adjust the gap.

#### If the gap is too small

The vibration solenoid ② and bowl carrier ① will strike, and a strange noise will be emitted. Lower the vibration solenoid so that the noise goes away, and then firmly tighten nut ⑧.

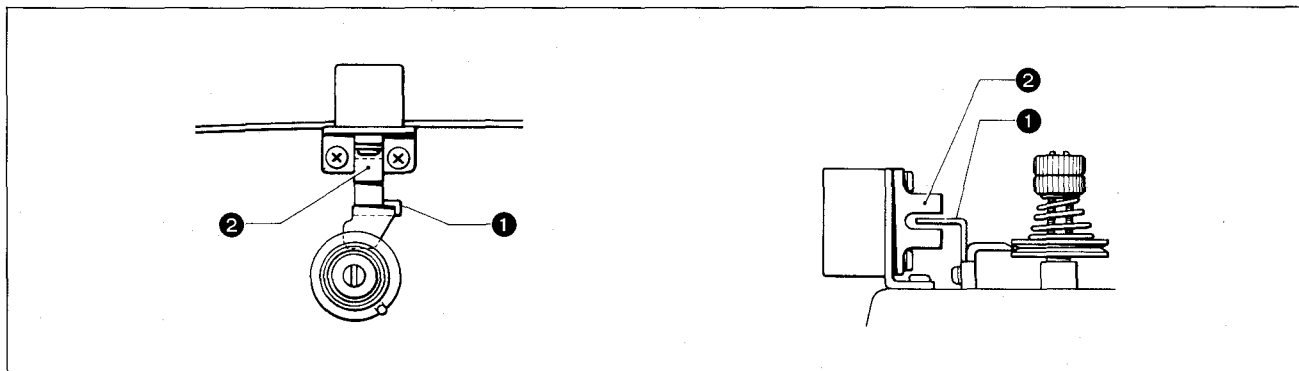
#### If the gap is too great

The buttons will not rise smoothly and the vibrator will not operate properly. Raise solenoid ② until any abnormal noise disappears, and then tighten nut ⑧.

## 2 Sewing machine head adjustments

### 1. Stop position sensor

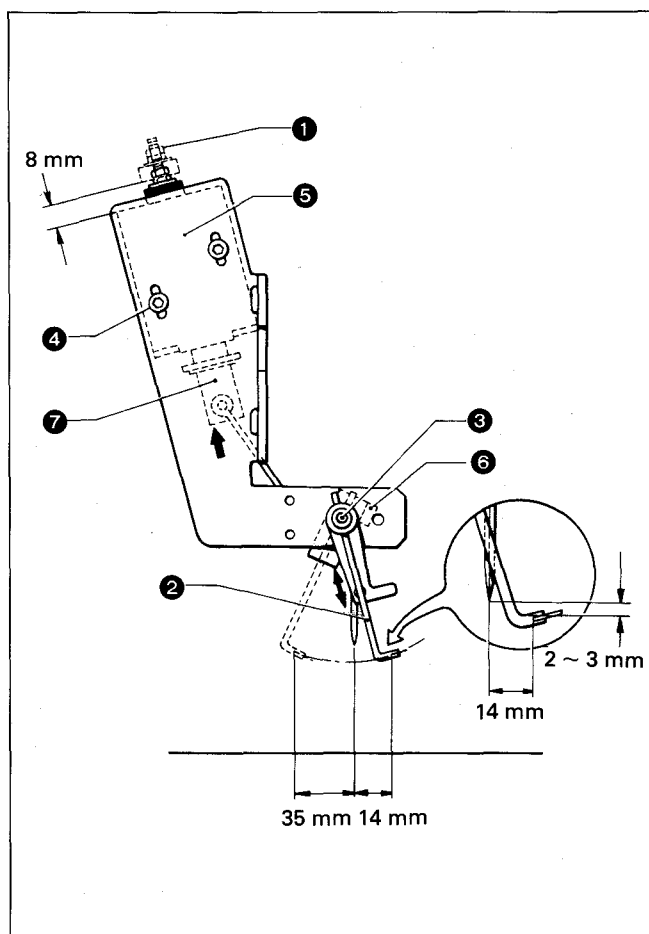
- (1) Refer to page 7, stop switch installation.
- (2) When the sewing machine is in the stop position (presser foot raised), make sure whether the sensor support plate ① interrupts the light beam for the stop sensor ②.



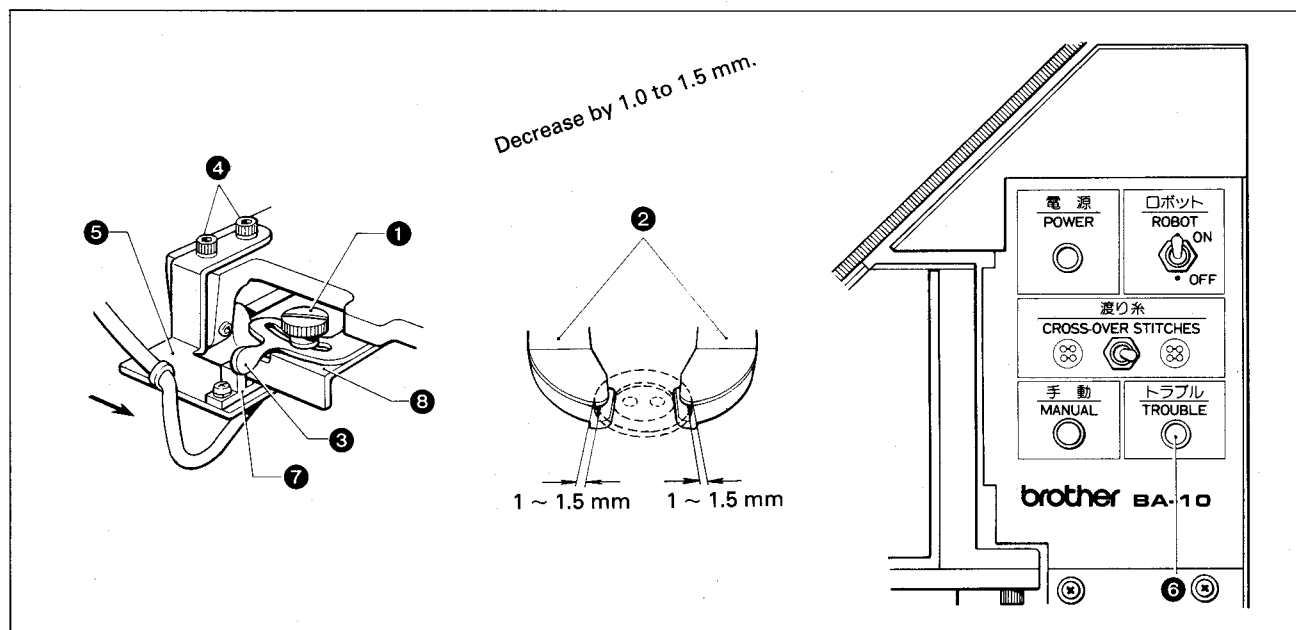
### 2. Thread wiper

- (1) Turn nut ① and adjust the solenoid stroke to 8 mm.
- (2) Loosen bolt ③ and adjust the wiper height so that there is a 2 ~ 3 mm clearance between the wiper ② and needle tip when it swings below the needle.
- (3) Tighten bolt ④ at the center of the oval hole in solenoid base ⑤.
- (4) Loosen bolt ⑥ and adjust the needle center to thread wiper ② tip gap to 14 mm.

\* Thread wiper ② stroke is approximately 35 mm when plunger (⑦) is moved all the way in the direction of the arrow.



### 3. Button feed sensor



#### 1. Button clamp adjustment

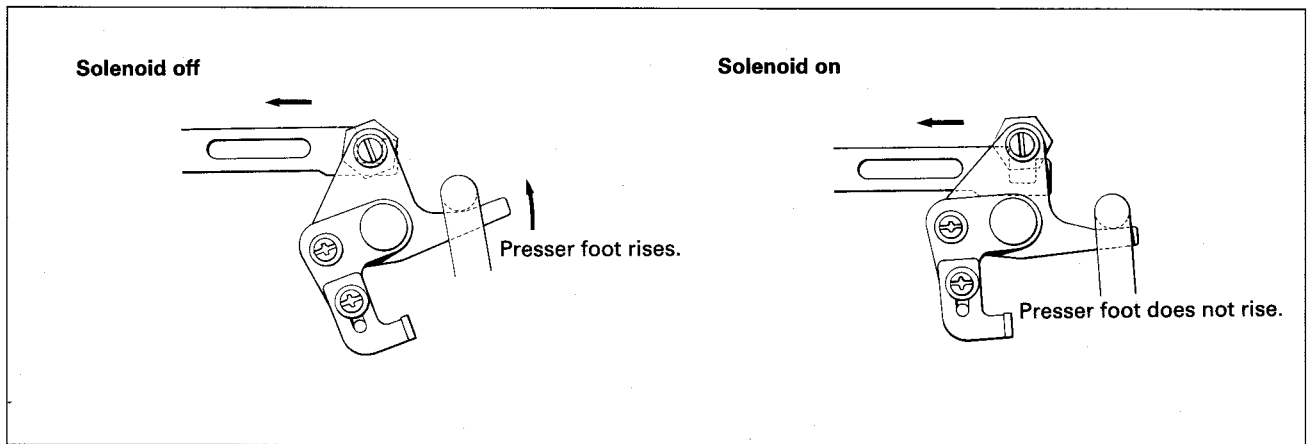
- (1) Loosen adjustment screw ①, and insert a button into the button clamp ②.
- (2) Lightly tighten adjustment screw ①, and remove the button.
- (3) Decrease the button clamp ② opening 1.0 mm to 0.5 mm with adjustment lever ③
- (4) Tighten adjustment screw ①.

#### 2. Button clamp sensor adjustment

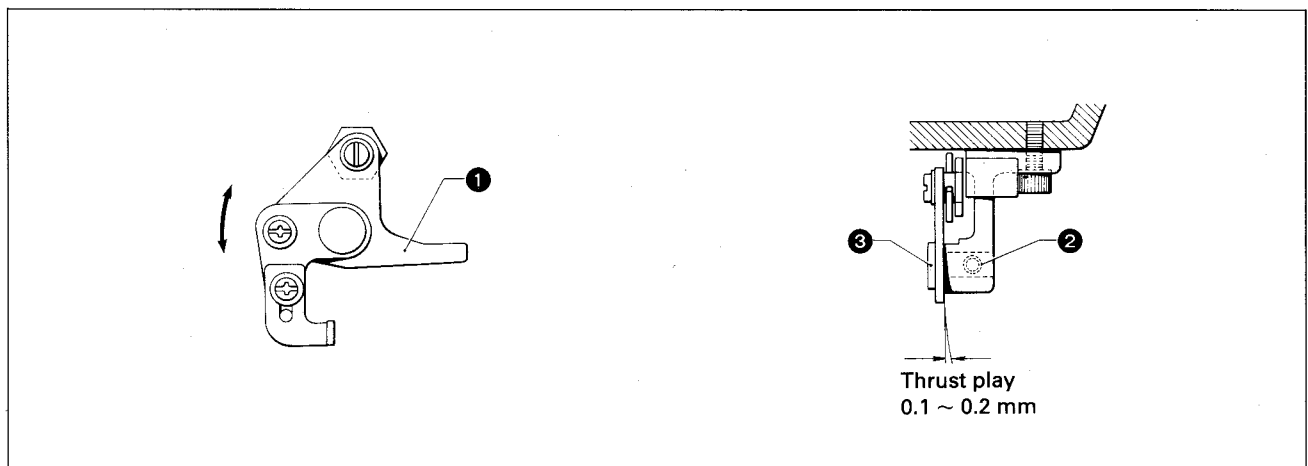
- (1) Turn the power on.
- (2) Make sure there is no button in the button clamp ②.
- (3) Loosen bolt ④ and move the sensor mount ⑤ in the direction of the arrow until the trouble indicator ⑥ blinks.
- (4) Tighten bolt ④.
- (5) Insert a button into the button clamp ②, and make sure the trouble indicator goes out.
- (6) If the trouble indicator remains blinking, move the sensor mount ⑤ in the direction opposite to the arrow until the trouble indicator ⑥ goes out.
  - \* When there is no button in the button clamp ②, the trouble indicator ⑥ should blink; when there is a button, the indicator should go out.
  - \* Make sure switch ⑦ and plate ⑧ do not strike.

#### 4. Crossover-stitch selector

The crossover-stitch selector controls the presser bar lifter drive lever and presser foot release.



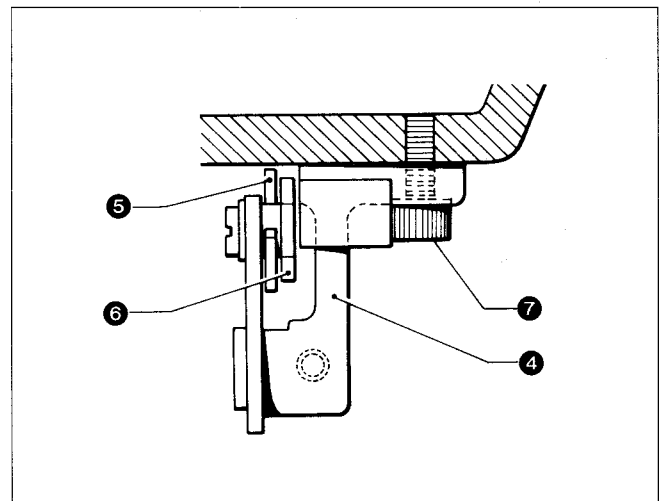
#### 1. Presser bar lifter lifting lever



- Loosen screw (2) to give 0.1 to 0.2 mm of play to the presser bar lifter lifting lever (1) and to allow the lever to turn by its own weight.  
Applying too much grease to the lever (1) and shaft (3) will make the movement more difficult. Remove any grease.

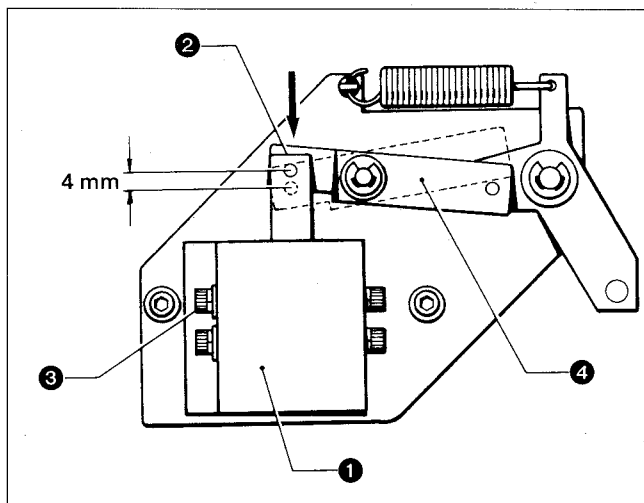
#### 2. Presser foot lifter bracket

- There should be a gap between the presser bar lifter bracket (4) and drive lever (5) as well as stepped arm (6). Loosen bolt (7) so that the drive lever moves smoothly.  
\* Bolt (7) is used to stop any oil leaks. Apply a pipe sealer and tighten the bolt.



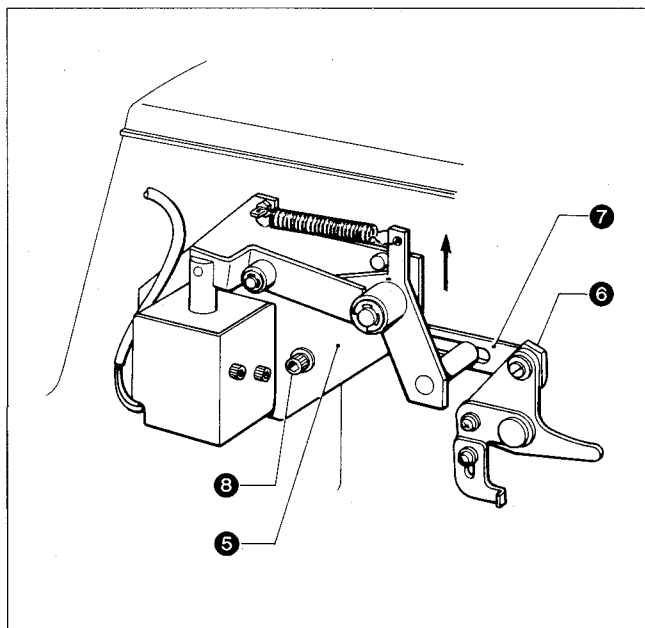
### 3. Crossover-stitch solenoid

- (1) Tighten bolt ③ so the crossover-stitch solenoid ① plunger ② stroke is 4 mm.
- (2) Press the lever ④ until the plunger ② contacts the solenoid ① to measure the stroke.

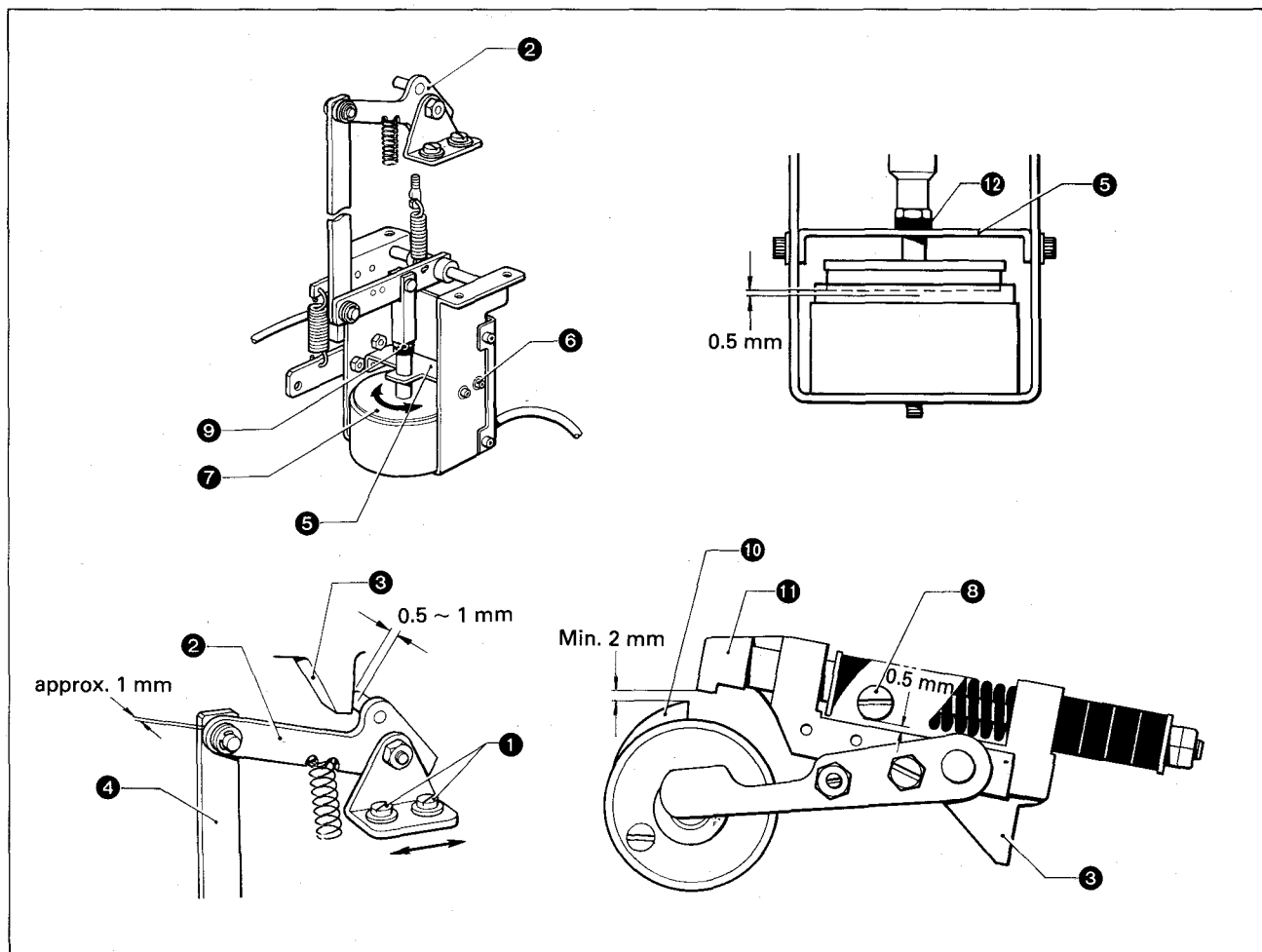


### 4. Selector

- ★ The crossover-stitch selector ⑤ is designed to have a certain amount of play. If shaft ⑥ and drive lever ⑦ do not overlap sufficiently, the selector will not work properly. Raise the right side of the selector to increase the overlap, and then tighten bolt ⑧.



## 5. Starter solenoid

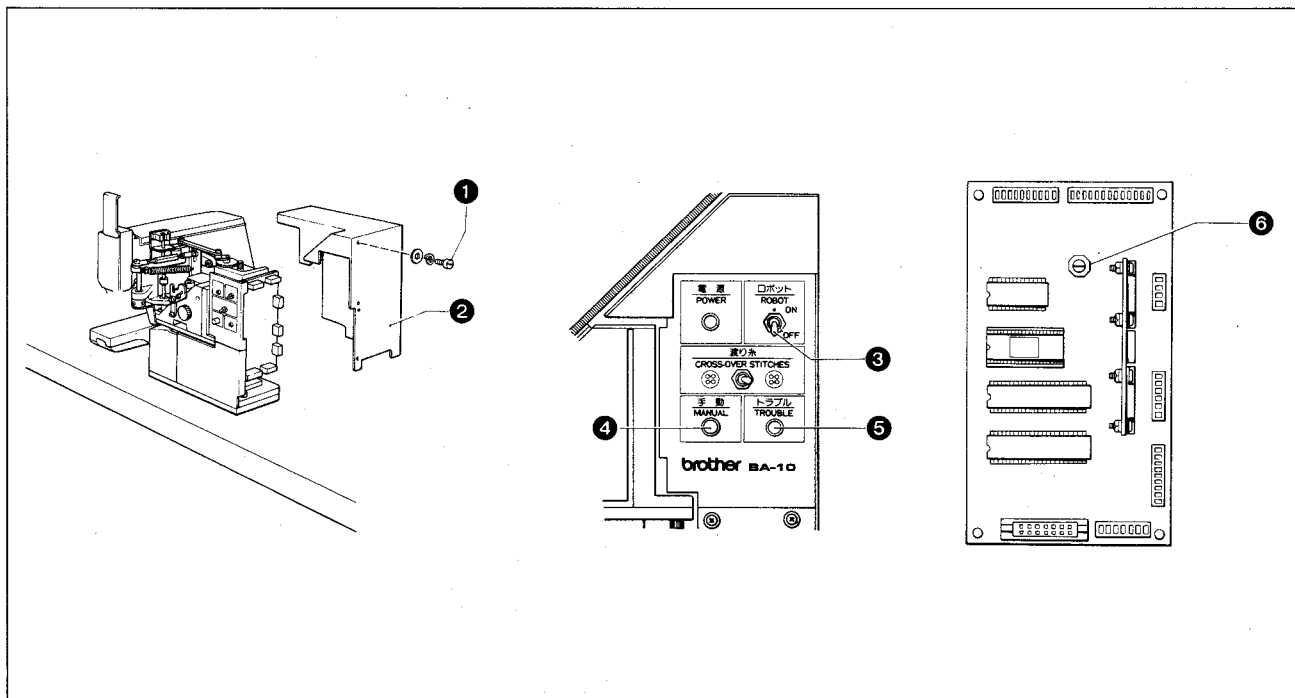


1. Loosen screw ①, and adjust the operating lever ② to clutch ③ gap to 0.5 to 1 m.
2. Tighten screw ① so that there is about 1 mm of play on clutch operting lever ②, and connecting rod ④ does not bind.
3. Loosen screw ⑥ of stopper plate ⑤.
4. Loosen nut ⑨ and turn plunger ⑦ to adjust the solenoid stroke so that the gap between clutch ③ and screw ⑧ is 0.5 ~ 1 mm when plunger ⑦ is fully depressed.  
 ★ Make sure there is at least 2 mm between clutch detent ⑩ and stopper ⑪ at this time. (The stroke at this time is approximately 8 mm.)
5. Adjust stopper plate ⑤ so that plate ⑤ and cushion ⑫ meet with 0.5 mm clearance between solenoid plunger and solenoid body. Then firmly tighten screw ⑥.  
 ★ Make sure plunger ⑦ shaft and stopper plate ⑤ do not meet at this time.



## 6. Control circuit board adjustments

### VR1 adjustment (carrier motor speed)

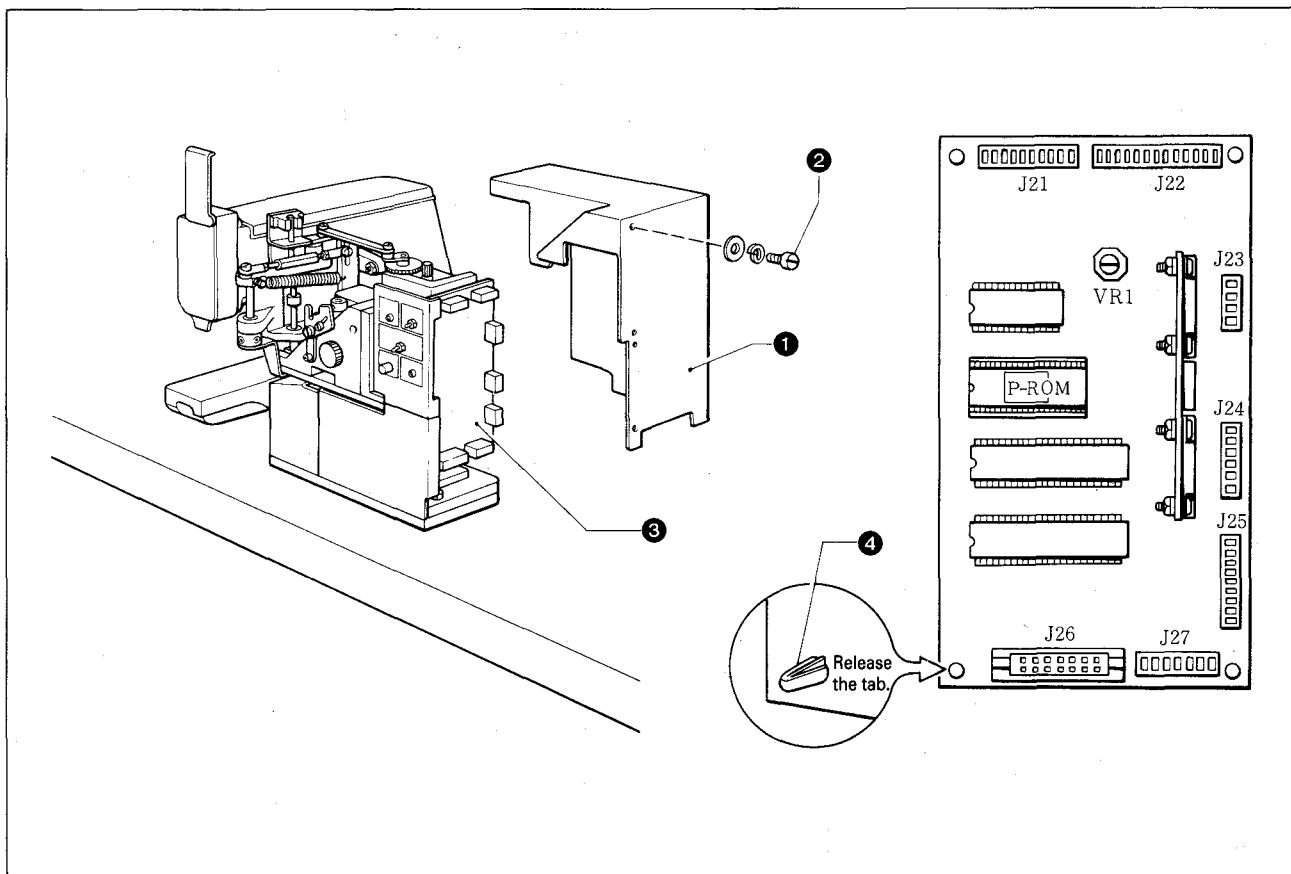


1. Remove the screws ① and remove the feeder cover ②.
2. Turn the feeder panel switch ③ off.
3. Hold feeder panel switch ④ depressed and press the power switch.
4. The button transport arm will work, and the trouble indicator ⑤ will indicate the carrier motor speed as shown below.
 

Trouble lamp ⑤ out .....	Slow
Trouble lamp ⑤ blinking .....	Normal
Trouble lamp ⑤ on .....	Fast
5. If the carrier motor speed is slow, turn VR1 ⑥ right to increase the speed; if motor speed is fast, turn VR1 ⑥ to the left to decrease the speed. Repeat step ④ and continue adjusting until a "Normal" speed is indicated by a blinking trouble indicator.
  - \* Sewing is not possible immediately after this adjustment. First bet the sewing machine power switch to off and then on again to sew.
  - \* Be sure to reset feeder panel switch ③ to ON again.

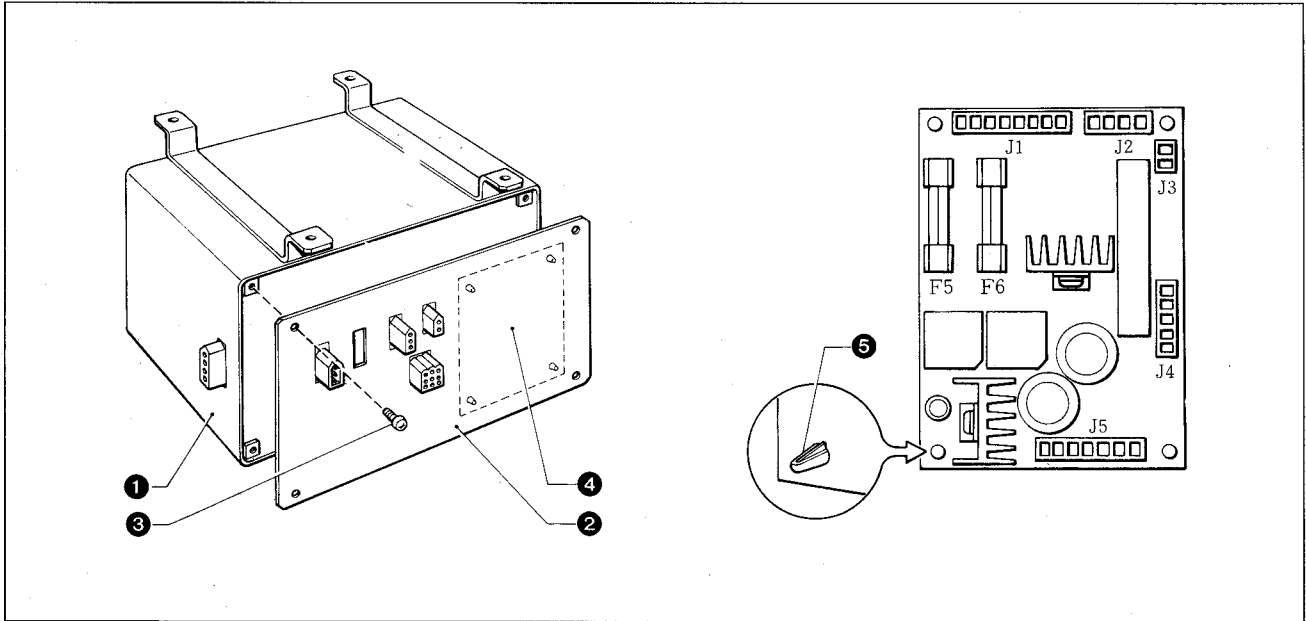
## Parts Replacement

### 1 Control circuit board



1. Remove the screws ② and remove the feeder cover ①.
2. Disconnect connectors J21, J22, J23, J24, J25, J26, and J27 connected to circuit board ③.
3. Remove the circuit board ③ from its four supports ④.
4. Connect the new circuit board by reversing the above procedure and paying particular attention to the following points.
  - \* Be sure to properly align connector polarities. Be sure to lock connectors J23, J24, J26, and J27.
  - \* Make sure the PROM is mounted on the new circuit board.
  - \* Refer to page 23 to adjust VR1.

## 2 Power circuit board



1. Remove the screws ① holding the rear cover ②.
2. Disconnect connectors J1, J2, J3, J4, and J5 connected to circuit board ③.
3. Remove the circuit board ③ from its four supports ④.
4. Connect the new circuit board by reversing the above procedure and paying particular attention to the following points.
  - \* Be sure to properly align connector polarities, and lock the connectors.
  - \* Make sure good fuses are mounted on the new circuit board. Use fuses F5 (3A) and F6 (4A).

### **3 Switch replacement**

#### **1. Start switch replacement**

- (1) Disconnect the connector.
- (2) Disconnect the start switch complete. (See page 15, Parts Book, No. 3).

#### **2. Vibration bowl switch and VR switch replacement**

- (1) Remove the cover. (See page 21, Parts Book, No.1-2-1)
- (2) Disconnect the connector.
- (3) Remove the vibration adjustment control.
- (4) Remove the vibration bowl switch and VR switch. (See page 14, Parts Book, No. 2.)

#### **3. Vibration panel switch replacement**

- (1) Remove the main cover. (See page 21, Parts Book, No. 2.)
- (2) Disconnect the connector.
- (3) Remove the vibration panel switch (B panel complete).  
(See page 10, Parts Book, No. 1-197.)

#### **4. Machine stop sensor replacement**

- (1) Remove the starter sensor support. (See page 15, Parts Book, No. 4-2.)
- (2) Disconnect the connector pins.
- (3) Disconnect the machine stop sensor complete. (See page 15, Parts Book, No. 4-1)
- (4) Readjust after replacing the switch. See page 10.

#### **5. Button feeder sensor replacement**

- (1) Remove the sensor panel. (See page 15, Parts Book, No. 1-1.)
- (2) Disconnect the connector pins.
- (3) Remove the button feeder sensor complete. (See page 31, Parts Book, No. 1-2.)
- (4) Readjust after replacing the sensor. See page 19.

#### **6. Button positioner sensor replacement**

- (1) Remove the main cover. (See page 5, Part Book, No. 2)
- (2) Remove the sensor panel. (See page 10, Parts Book, No. 1-3-4-1.)
- (3) Disconnect the connector pins.
- (4) Remove the button positioner sensor complete. (See page 10, Parts Book, No. 1-3-4-2.)
- (5) Readjust after replacing the sensor. See page 12.

#### **7. Feeder origin sensor replacement**

- (1) Remove the main cover. (See page 5, Parts Book No. 2.)
- (2) Remove the sensor panel (See page 10, Parts Book, No. 1-3-3-1.)
- (3) Disconnect the connector pins.
- (4) Remove the feeder origin sensor complete. (See page 10, Parts Book No. 1-3-3-2.)
- (5) Readjust after replacing the sensor. See page 14.

## Trouble shooting Guide

### Vibration bowl

	Problem	Cause	Solution	Page
1	Vibration bowl does not vibrate.	1. Blown fuse 2. Poor contact or short in connector  3. Poor contact or short in terminal 4. Defective vibration solenoid 5. Defective VR	1. Replace control box fuse F4 (3A). 1. Firmly connect or replace the cable. 1. Replace the terminal. 1. Replace solenoid 1. Replace VR	33    26
2	Button feeding is slow.	1. Bowl is loose 2. Leaf spring bolt is loose 3. Wrong leaf spring installed (60Hz, t1.2; 50Hz, t1.0) 4. Excessive bowl support to solenoid gap	1. Tighten the knob. 1. Tighten the bolt. 1. Replace the spring.  1. Adjust the gap.	17 17  17
3	Button top/bottom not properly aligned.	1. Improperly adjusted selector plate	1. Adjust.	
4	Buttons jam.	1. Improperly adjusted height, width plates 2. Shooter gate and bowl top are not even 3. Shooter size and button size do not match	1. Adjust height or width.  1. Adjust height of shooter support.  1. Replace shooter to match with button size.	

## Button feeder

	Problem	Cause	Solution	Page
1	Buttons jam.	<ol style="list-style-type: none"> <li>1. Improperly adjusted bed slide width</li> <li>2. Button top cover, spacers are not used properly</li> <li>3. Bed slide top is dirty and obstructed</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the width.</li> <li>1. Replace with cover and spacers for the buttons in use</li> <li>1. Clean or remove.</li> </ol>	
2	Improper independent feed	<ol style="list-style-type: none"> <li>1. Improperly adjusted bed slide width</li> <li>2. Improperly adjusted or loose swing rod</li> <li>3. Improperly adjusted or loose stopper A</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust.</li> <li>1. Adjust swing rod.</li> <li>2. Tighten screw.</li> <li>1. Adjust.</li> <li>2. Tighten screw.</li> </ol>	15
3	Button not fed to button carrier.	<ol style="list-style-type: none"> <li>1. Improperly adjusted bed slide</li> <li>2. Improperly positioned button carrier</li> <li>3. Improperly adjusted button positioner switch</li> <li>4. Improperly functioning button carrier (shutter)</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust.</li> <li>1. Adjust.</li> <li>1. Adjust switch height.</li> <li>1. Adjust solenoid position.</li> <li>2. Replace solenoid. (OK if resistance is approx. 13 Ω)</li> </ol>	11 9 12 13
4	Button not fed to clamp.	<ol style="list-style-type: none"> <li>1. Defective button clamp</li> <li>2. Improperly adjusted button clamp width</li> <li>3. Improperly adjusted button carrier and clamp height</li> <li>4. Button carrier is too fast</li> <li>5. Excessive button carrier overrun</li> <li>6. Improperly positioned button carrier</li> <li>7. Improperly used crossover stitch selector</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust width.</li> <li>1. Adjust height.</li> <li>1. Adjust moving speed.</li> <li>1. Adjust stop screw.</li> <li>1. Adjust needle location and pin position.</li> <li>1. Do not use the crossover stitch with 8 (6) stitches in a 4-hole button.</li> </ol>	19 14 23 13 11
5	Button carrier does not return to origin.	<ol style="list-style-type: none"> <li>1. Contact with button clamp</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust button clamp height.</li> </ol>	14
6	Button positioner does not function.	<ol style="list-style-type: none"> <li>1. Defective DC motor</li> <li>2. Loose set screw in gear</li> <li>3. Improperly adjusted button positioner solenoid</li> <li>4. Defective solenoid</li> <li>5. Contact between button positioner sensor and shift; no vertical motion</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace motor.</li> <li>1. Tighten screw.</li> <li>1. Adjust solenoid.</li> <li>1. Replace solenoid.</li> <li>1. Adjust sensor.</li> </ol>	8 8 8 12
7	Cam shaft does not turn.	<ol style="list-style-type: none"> <li>1. Improperly adjusted worm and worm wheel backlash</li> <li>2. Blown fuse</li> <li>3. Defective DC motor</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust backlash.</li> <li>1. Power circuit board fuse F6 (4A).</li> <li>1. Replace motor.</li> </ol>	16 25
8	Swing rod does not turn.	<ol style="list-style-type: none"> <li>1. Improper button stopper position</li> <li>2. Button guide shaft and button shaft lever screw are loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust so the end of the button stopper enters between the buttons.</li> <li>1. Retighten the screw. (Also tighten the screw rod.)</li> </ol>	Operation Manual, page 5 15
9	TROUBLE indicator lights even though button is on button carrier.	<ol style="list-style-type: none"> <li>1. Improperly adjusted button positioner sensor</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the sensor.</li> </ol>	12
10	Carrier does not move smoothly; button positioning does not occur.	<ol style="list-style-type: none"> <li>1. Improperly adjusted worm wheel and worm backlash</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the backlash.</li> </ol>	16

## Other mechanical problems (thread wiper, crossover stitch, feeder sensor)

	Problem	Cause	Solution	Page
1	Button in button clamp but trouble indicator still lights.	1. Improperly adjusted button feeder switch	1. Adjust switch.	19
		2. Improperly adjusted button clamp width	2. Adjust button clamp.	19
		3. Defective switch or short	1. Replace switch. 2. Replace pin connector.	26
2	Thread wiper does not function.	1. Wiper solenoid defect or short	1. Replace wiper solenoid. 2. Replace pin connector.	
3	Thread wiper does not catch thread.	1. Improperly adjusted stroke 2. Loose screw	1. Adjust 2. Tighten.	18
4	Button clamp does not rise.	1. Improperly functioning presser foot lifter lever	1. Adjust so the lever will move of its own weight.	20
		2. Presser bar lifter drive lever and pin do not mesh.	1. Adjust crossover stitch attachment base installation.	20
5	Crossover stitch selector does not function.	1. Panel switch defect or short 2. Crossover stitch solenoid defect or short	1. Replace switch. 2. Replace pin connector. 1. Replace solenoid. 2. Replace pin connector.	26

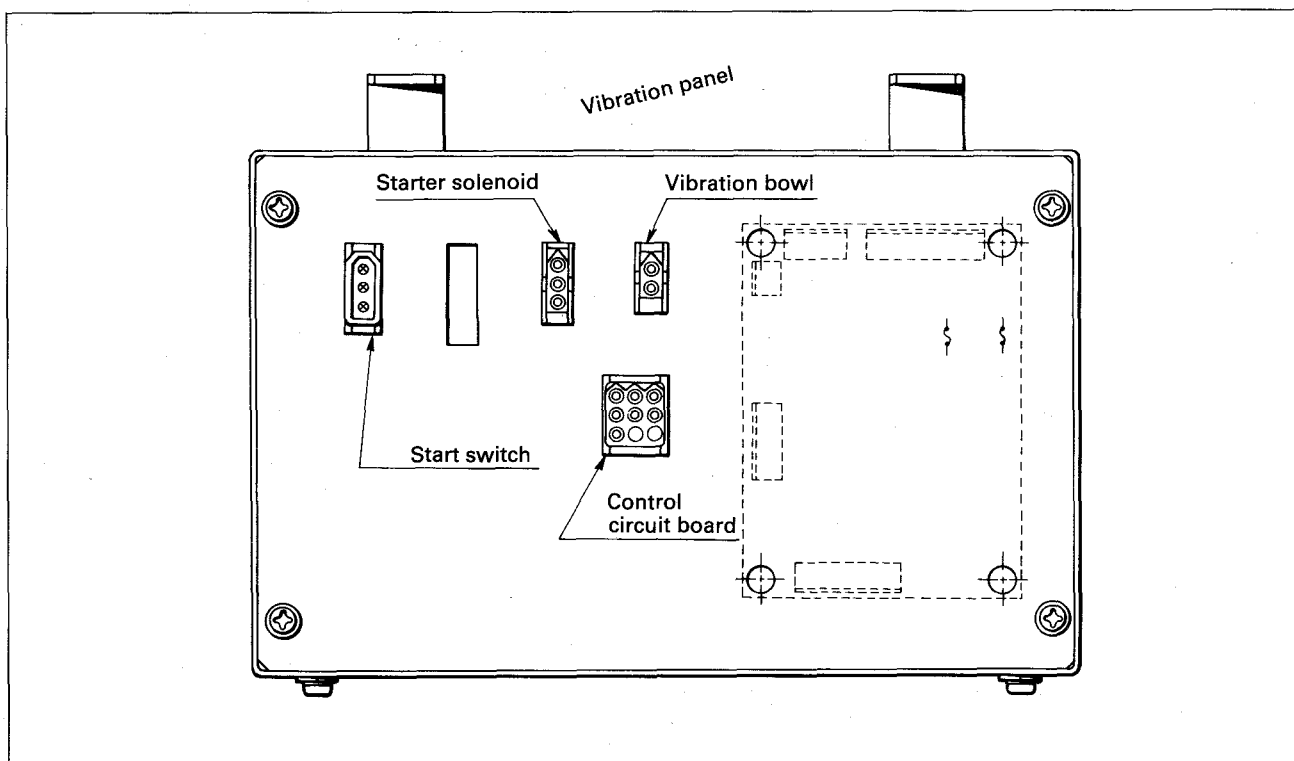
## Electrical systems

Problem	Cause	Check	Solution	Page
Trouble indicator lights when power switch is turned on.	1. Disconnected connector or short	1. Connector J22 on control circuit board	1. Firmly connect or replace cable.	24
	2. Corroded or shorted feeder power switch	1. Feeder power switch	1. Clean or replace.	26
	3. Improper feeder adjustment	1. Button clamp height, carrier motor gear adjustment	1. Adjust.	14
	4. Improper stop sensor adjustment	1. Stop sensor	1. Adjust.	14
Sewing machine does not start even though treadle pressed.	1. Disconnected connector or short	1. Control box connectors (3P, male/female)	1. Firmly connect or replace cable.	32
		2. Connector J4, power circuit board		25
		3. Connector J25, control circuit board		24
	2. Blown fuse	1. Fuse F6, power circuit board	1. Replace.	25
	3. Improperly adjusted or defective starter switch	1. Start switch stroke	1. Adjust or replace switch.	26
	4. Improperly adjusted or shorted starter solenoid	1. Starter solenoid stroke	1. Adjust or replace solenoid.	22
Power switch ON but feeder panel power indicator does not light.	1. Disconnected connector or short	1. Power outlet, power connector	1. Firmly connect or replace cable.	25
		2. Connectors J1, J5, power circuit board		32
		3. 9P connector, control box		24
		4. Connectors J27, J21, control circuit board		26
	2. Burnt out bulb	1. Power indicator bulb	1. Replace bulb.	33
	3. Blown fuse	1. Fuse F4 (3A), control box	1. Replace fuse.	25
		2. Fuse F5 (3A), power circuit board		
Power switch ON but vibration bowl does not move.	1. Disconnected connector or short	1. Connectors J2, J3, power circuit board	1. Firmly connect or replace cable.	25
		2. 2P connector, control box		32
	2. Short in vibration bowl solenoid	1. Vibration solenoid adjustment	1. Replace solenoid.	17
	3. Vibration solenoid adjustment	1. Vibration solenoid gap	1. Adjust.	17
Button in button clamp but cannot sew.	1. Improperly adjusted or shorted button feed switch	1. Is trouble indicator blinking?	1. Adjust or replace switch.	19 26
Button is not fed to button clamp.	1. Improperly adjusted button positioner switch	1. Is trouble indicator blinking?	1. Adjust.	23
	2. Improperly adjusted button clamp height	1. Check with inching operation.	1. Adjust.	9
	3. Improperly adjusted vibration bowl	1. Is button supplied to shooter?	1. Adjust	11



## Circuit Diagrams

### 1 Control box connectors



	Vibration bowl	Wire color
1	Vibration solenoid	Black
2	Vibration solenoid	White

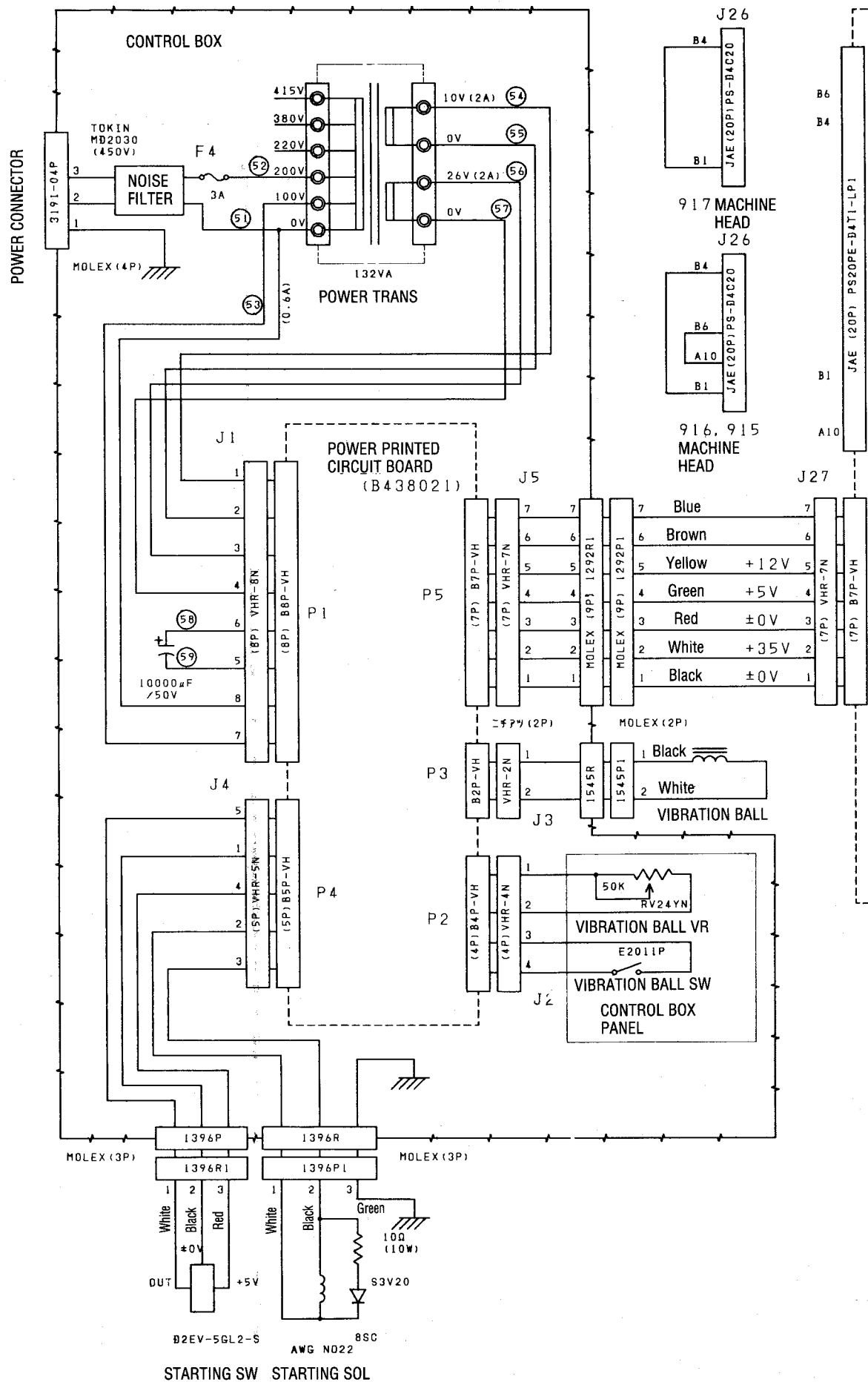
	Vibration solenoid	Wire color
1	Solenoid	White
2	Solenoid	Black
3	Ground	Green

	Start switch	Wire color
1	OUT	White
2	$\pm 0V$	Black
3	+5V	Red

	Control circuit board	Wire color
1	$\pm 0V$	Black
2	+35V	White
3	$\pm 0V$	Red
4	+5V	Green
5	+12V	Yellow
6	Start signal	Brown
7	Start signal	Blue
8	—	—
9	—	—

	Vibration panel	Wire color
1	Level	Black
2	Level	White
3	Switch	Red
4	Switch	Green

## 2 Block diagram



P26

# CONTROL PRINTED CIRCUIT BOARD (B438013)

For button robot  
RESET

STARTING SW

±0V

P27

P21

P22

P23

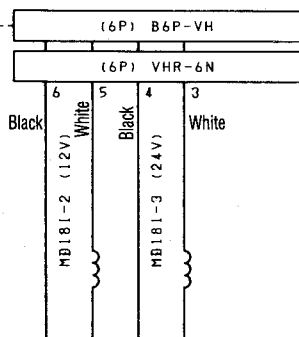
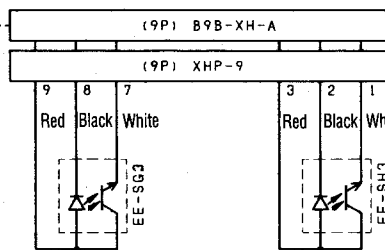
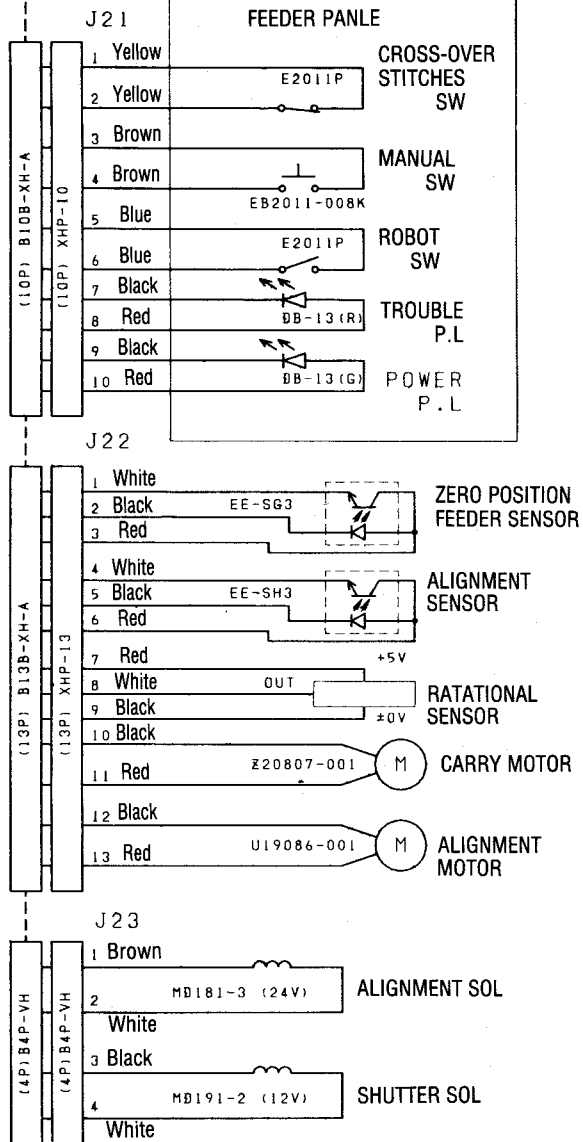
P25

P24

J25

J24

## FEEDER PANLE



Machine head