



Thank you very much for buying a BROTHER sewing machine. Before using your new machine, please read the safety instructions below and the explanations given in the instruction manual.



With industrial sewing machines, it is normal to carry out work while positioned directly in front of moving parts such as the needle and thread take-up lever, and consequently there is always a danger of injury that can be caused by these parts. Follow the instructions from training personnel and instructors regarding safe and correct operation before operating the machine so that you will know how to use the machine correctly.

## SAFETY INSTRUCTIONS




### 1 Safety indications and their meanings

This instruction manual and the indications and symbols that are used on the machine itself are provided in order to ensure safe operation of this machine and to prevent accidents and injury to yourself or other people. The meanings of these indications and symbols are given below.

#### Indications

 <b>DANGER</b>	The instructions which follow this term indicate situations where failure to follow the instructions will almost certainly result in death or severe injury.
 <b>CAUTION</b>	The instructions which follow this term indicate situations where failure to follow the instructions could cause injury when using the machine or physical damage to equipment and surroundings.

#### Symbols

-  ----- This symbol(△) indicates something that you should be careful of. The picture inside the triangle indicates the nature of the caution that must be taken.  
(For example, the symbol at left means "beware of injury".)
-  ----- This symbol(⊘) indicates something that you must not do.
-  ----- This symbol(●) indicates something that you must do. The picture inside the circle indicates the nature of the thing that must be done.  
(For example, the symbol at left means "you must make the ground connection".)

## 2 Notes on safety

### DANGER



- Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.

### CAUTION

#### Installation



- Machine installation should only be carried out by a qualified technician.



- Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.



- The sewing machine weighs more than 87 kg. The installation should be carried out by two or more people.



- The top of the table should be 50 mm in thickness and should be strong enough to hold the weight and withstand the vibration of the sewing machine.



- Do not connect the power cord until installation is complete, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.



- Be sure to connect the ground. If the ground connection is not secure, you run the risk of receiving a serious electric shock.



- If using a work table which has casters, the casters should be secured in such a way so that they cannot move.



- All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not excessively bend the cords or secure them too firmly with staples, otherwise there is the danger that fire or electric shocks could occur.



- Install the belt covers to the machine head and motor.



- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.

Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.

Keep the oil out of the reach of children.



- Avoid setting up the sewing machine near sources of strong electrical noise such as high-frequency welding equipment. If this precaution is not taken, incorrect machine operation may result.

#### Sewing



- This sewing machine should only be used by operators who have received the necessary training in safe use beforehand.



- The sewing machine should not be used for any applications other than sewing.



- Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.



- Turn off the power switch at the following times, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

- When threading the needle
- When replacing the needle
- When not using the machine and when leaving the machine unattended



- Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.



- If an error occurs in machine operation, or if abnormal noises or smells are noticed, immediately turn off the power switch. Then contact your nearest Brother dealer or a qualified technician.



- If the machine develops a problem, contact your nearest Brother dealer or a qualified technician.



- If using a work table which has casters, the casters should be secured in such a way so that they cannot move.

## CAUTION

### Cleaning



- Turn off the power switch before starting any cleaning work, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.



- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.

Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.

Keep the oil out of the reach of children.

### Maintenance and inspection



- Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.



- Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.



- Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

- When carrying out inspection, adjustment and maintenance
- When replacing consumable parts such as the loopers, spreaders, knife and cutting block



- Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.



- If the power switch and air need to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.



- Use only the proper replacement parts as specified by Brother.



- If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.



- Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

### 3 Warning labels

★ The following warning labels appear on the sewing machine.  
Please follow the instructions on the labels at all times when using the machine. If the labels have been removed or are difficult to read, please contact your nearest Brother dealer.

1		<b>▲ DANGER</b>	<b>▲ GEFAHR</b>	<b>▲ DANGER</b>	<b>▲ PELIGRO</b>
		Hazardous voltage will cause injury. Turn off main switch and wait 5 minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapté provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d' ouvrir le capot	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.

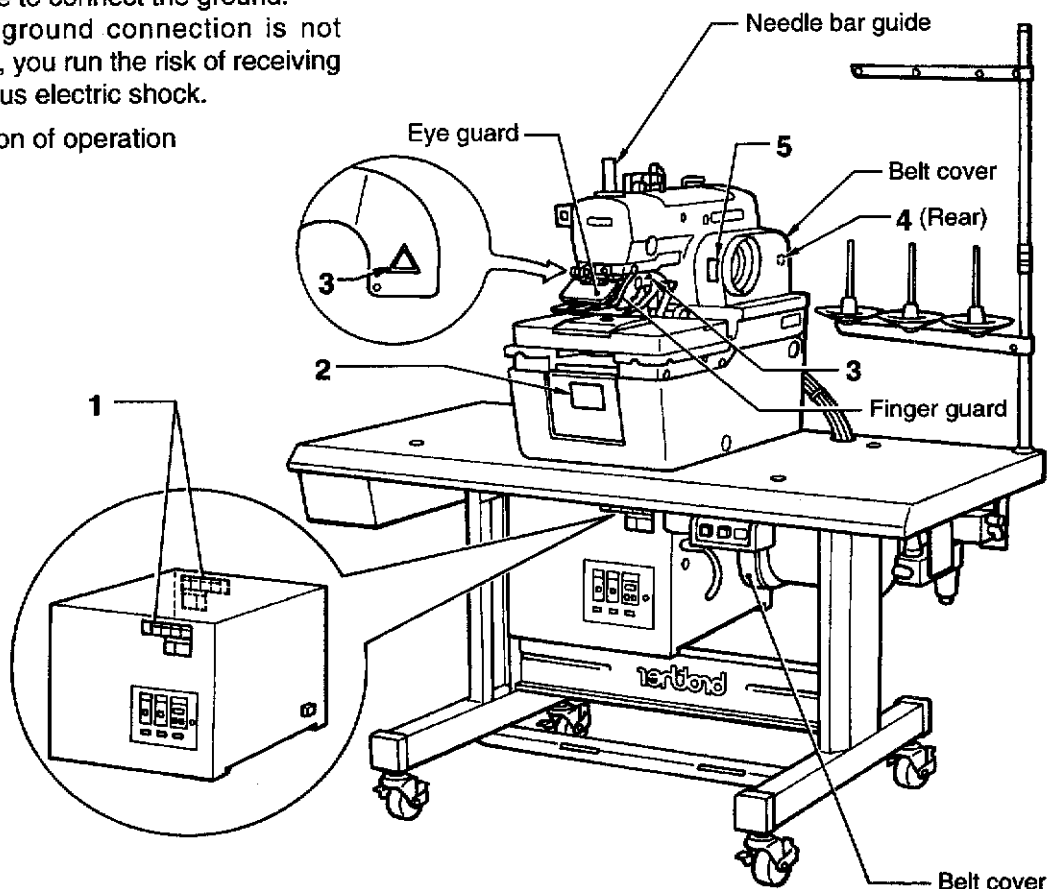
2	<b>▲ CAUTION</b>
	Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning etc.

Safety devices:  
Eye guard,  
finger guard,  
belt cover,  
needle bar  
guard etc.

3 Do not touch the cutter and hammer or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.

4 Be sure to connect the ground.  
If the ground connection is not secure, you run the risk of receiving a serious electric shock.

5 Direction of operation

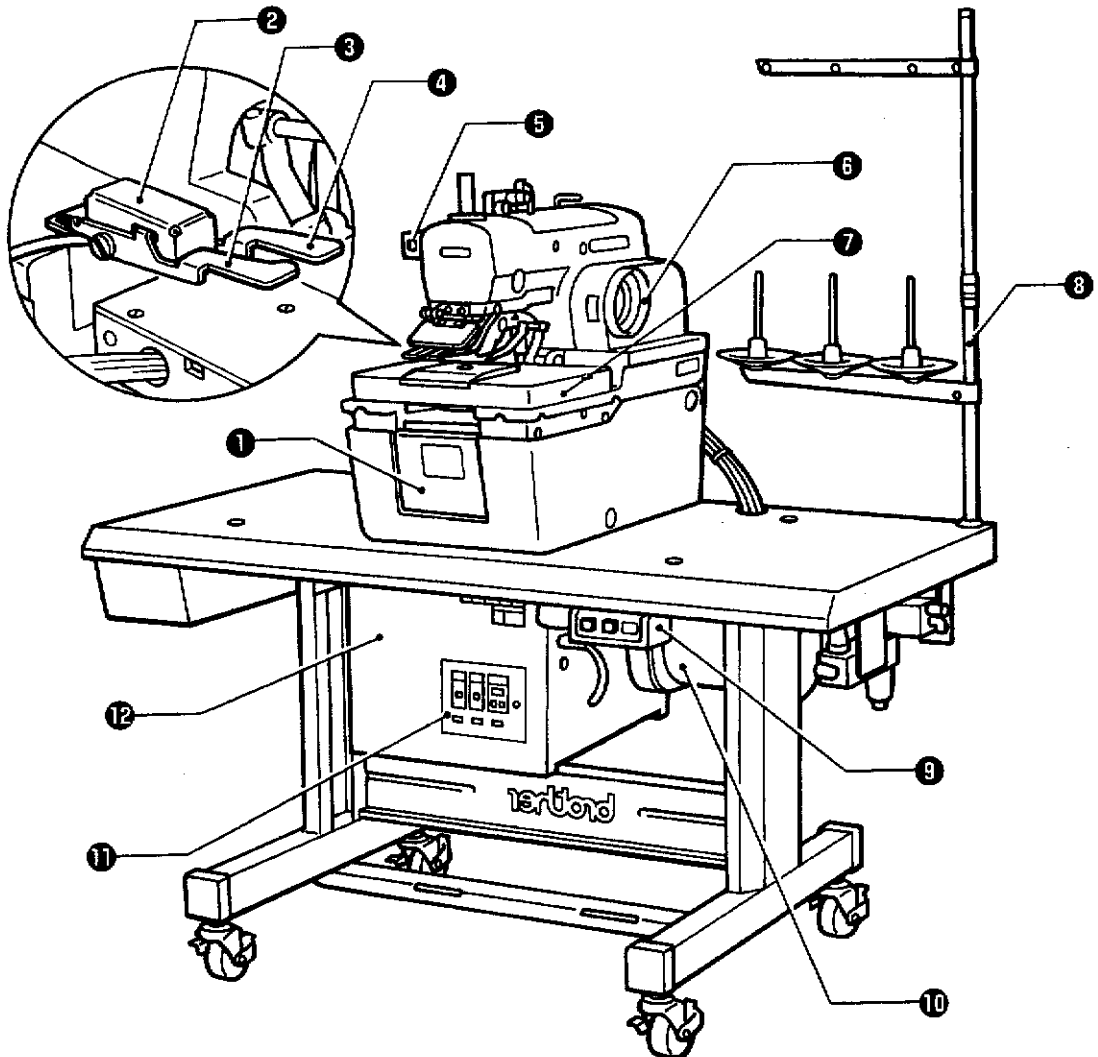


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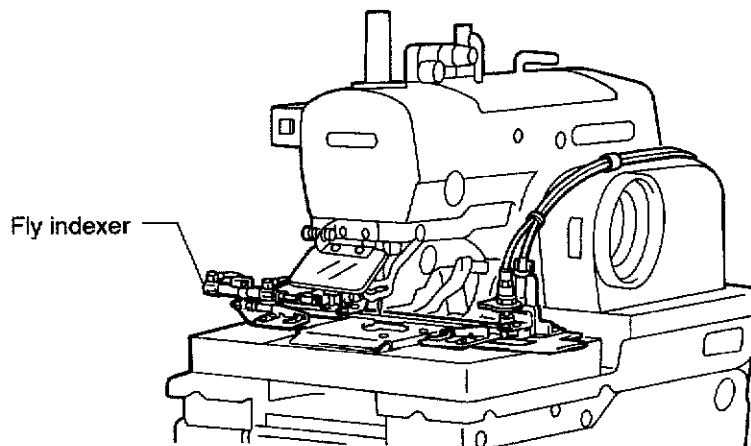
1. NAMES OF EACH PART

# 1. NAMES OF EACH PART



- |                         |                      |                        |                |
|-------------------------|----------------------|------------------------|----------------|
| ① Front cover           | ② Hand switch        | ③ Cloth presser switch | ④ Start switch |
| ⑤ EMERGENCY STOP switch | ⑥ Upper shaft pulley | ⑦ Feed bracket         | ⑧ Spool stand  |
| ⑨ Power switch          | ⑩ Motor              | ⑪ Operation panel      | ⑫ Control box  |

## Fly indexer (-52 specifications)



## 2. SPECIFICATIONS

### 2-1. Specifications



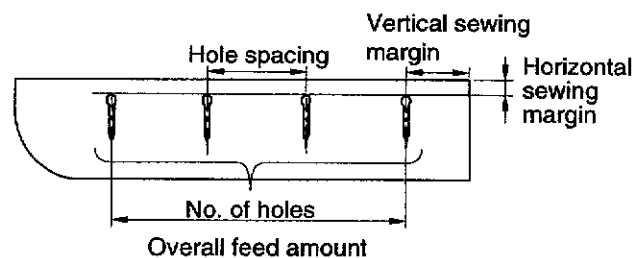
	Upper thread trimmer	Lower thread trimmer	Fly indexer
-02	○	○	—
-52	○	○	○

\* -02 and -52 specifications are further divided into L1 - L7 specifications in accordance with the stitch length. Please be sure to specify the stitch length when ordering.

Application	Jeans and work clothes
Sewing speed	1,400 - 2,000 spm (200-spm steps)
Stitch length	L1 14 - 18 mm      L5 28 - 32 mm L2 18 - 22 mm      L6 32 - 36 mm L3 22 - 26 mm      L7 36 - 40 mm L4 26 - 30 mm
Stitch width	0.9 - 1.8 mm
Needle racking width	1.5 - 3.2 mm
Tacking length	4 - 10 mm or none
Cloth presser height	16 mm
Stitch shape changing	Selected by DIP switch setting
Cut timing selection	Selected by DIP switch setting
Starting method	Dual switch (cloth presser switch and start switch) or single switch
Feed method	Intermittent feed by three pulse motors (X, Y, $\theta$ )
Needle	DO x 558 #80 - #120 (Schmetz 558)
Safety equipment	Built-in emergency stop function and automatic stopping device which stops the machine when the safety circuit is activated
Motor	Inverter-type induction motor
Air pressure	Main regulator: 0.49 MPa [5 kgf/cm <sup>2</sup> ] Knife pressure regulator: 0.3 MPa [3 kgf/cm <sup>2</sup> ]
Air consumption	43.2 $\ell$ /min. (8 cycles/min.)
Noise level	81 dB at max. speed of 2,000 spm, measured according to ISO 10821
Dimensions	1,200 mm (W) x 590 mm (D) x 1,120 mm (H)
Work table legs	T-shaped height-adjustable type
Power supply	Single-phase 110, 200, 220, 230, 240 V 3-phase 220, 380, 415 V Maximum electric power consumption : 1 kVA
Weight	163.5 kg

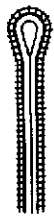
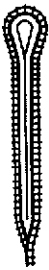


### Fly indexer specifications (-52 specifications)

Max. hole spacing	50.8 mm
Max. overall feed amount	152.4 mm (6 inch)
No. of holes	1 - 9
Horizontal sewing margin	9 - 21 mm
Vertical sewing margin	30 - 40 mm





## 2. SPECIFICATIONS

Sewing shape	Eyelet buttonhole		Straight buttonhole	
				
	Eyelet buttonhole without taper	Eyelet buttonhole with taper	Straight buttonhole without taper	Straight buttonhole with taper

### 2-2. Optional parts

The following optional parts are available for the DH4-B981.

- Select switch (S45043-009) . . . . . This switch is used to select one program from a choice of three. This conveniently-located switch makes program selection easier, so that work efficiency can be increased.
- Two-pedal foot switch (S42838-001) . . . . . This allows the cloth presser to be raised and lowered and the sewing machine to be started by pedal operation.
- Waist belt presser . . . . . When sewing eyelet buttonholes into waist belts with which have differences in thickness, this presser provides secure clamping for the different thicknesses. It prevents any slippage of the material during sewing.
  - Cloth presser (L3W) set (S43701-001)
  - Cloth presser (L4W) set (S43704-001)
- Fly indexer . . . . . This is an indexer which is specially for use when sewing flies. It allows from one to nine buttonholes to be set, and automatically feeds the material. Using this device makes the sewing of buttonholes for flies much quicker.
  - Fly indexer assembly for L1,L2 and L5 specifications (S44279-001)
  - Fly indexer assembly for L3,L4,L6 and L7 specifications (S44281-001)

### 2-3. BAS-PC/300, Programming Software for Electronic Pattern sewer (peripheral device)

General sewing conditions can be set by means of the operation panel, the operation panel DIP switches and the circuit board DIP switches.

The BAS-PC/300 can store up to a maximum of 10 sets of sewing conditions in its "data ROM", and these sets of sewing conditions can be selected and displayed by means of the operation panel.

The data-ROM which is created by the BAS-PC/300 can be used to set the knife position compensation and angle compensation functions, which cannot otherwise be set by means of switches.

However, the BAS-PC/300 requires a system of Version 3.0 or later.

The BAS-PC/300 requires the following system components which are commercially available.

- Personal computer
- Operating system
- ROM writer

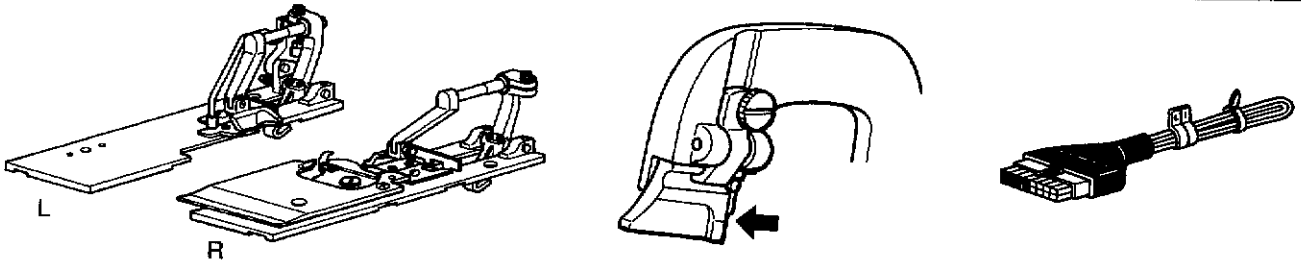
For details, please consult the place of purchase.

## 2-4. Replacement parts list for specification changes

The sewing machine can be changed to any one of L1 - L7 specifications by replacing the specified parts with the appropriate parts given below.

# -02 specifications

Specifications (buttonhole length)	Replacement parts set	Plate R assembly Plate L assembly		Cutting block	Specification harness
		L1 (14 - 18 mm)	S44238-001		
L2 (18 - 22 mm)	S44239-001	S38578-301 S38579-201	S37704-001 (S16) S37706-001 (S20)	S43338-000	
L3 (22 - 26 mm)	S44240-001	S38580-301 S38581-201	S37706-001 (S20) S37708-001 (S24)	S43339-000	
L4 (26 - 30 mm)	S44271-001	S38582-301 S38583-201	S37708-001 (S24) S42053-001 (S28)	S43340-000	
L5 (28 - 32 mm)	S44272-001	S41470-101 S41471-101	S37197-001 (26) S37199-001 (30)	S43341-000	
L6 (32 - 36 mm)	S44273-001	S41472-101 S41473-101	S37199-001 (30) S37201-001 (34)	S43342-000	
L7 (36 - 40 mm)	S44274-001	S41474-101 S41475-101	S37201-001 (34) S35093-001 (38)	S43343-000	



Note: There is 10 mm of difference in the knife cutting position between L1 - L4 and L5 - L7 specifications. (Refer to page 58.)

# -52 specifications

Specifications (buttonhole length)	Plate R assembly Plate L assembly	Cutting block	Specification harness	Cloth feed plate R
L1 (14 - 18 mm)	S38576-301 S38577-201	S37702-001 (S12) S37704-001 (S16)	S43360-000	S43809-001
L2 (18 - 22 mm)	S38578-301 S38579-201	S37704-001 (S16) S37706-001 (S20)	S43361-000	S43809-001
L3 (22 - 26 mm)	S38580-301 S38581-201	S37706-001 (S20) S37708-001 (S24)	S43362-000	S42139-101
L4 (26 - 30 mm)	S38582-301 S38583-201	S37708-001 (S24) S42053-001 (S28)	S43363-000	S42139-101
L5 (28 - 32 mm)	S41470-101 S41471-101	S37197-001 (26) S37199-001 (30)	S43364-000	S43809-001
L6 (32 - 36 mm)	S41472-101 S41473-101	S37199-001 (30) S37201-001 (34)	S43365-000	S42139-101
L7 (36 - 40 mm)	S41474-101 S41475-101	S37201-001 (34) S35093-001 (38)	S43366-000	S42139-101

Note: There is 10 mm of difference in the knife cutting position between L1 - L4 and L5 - L7 specifications. (Refer to page 58.)

# 3. INSTALLATION

## ⚠ CAUTION

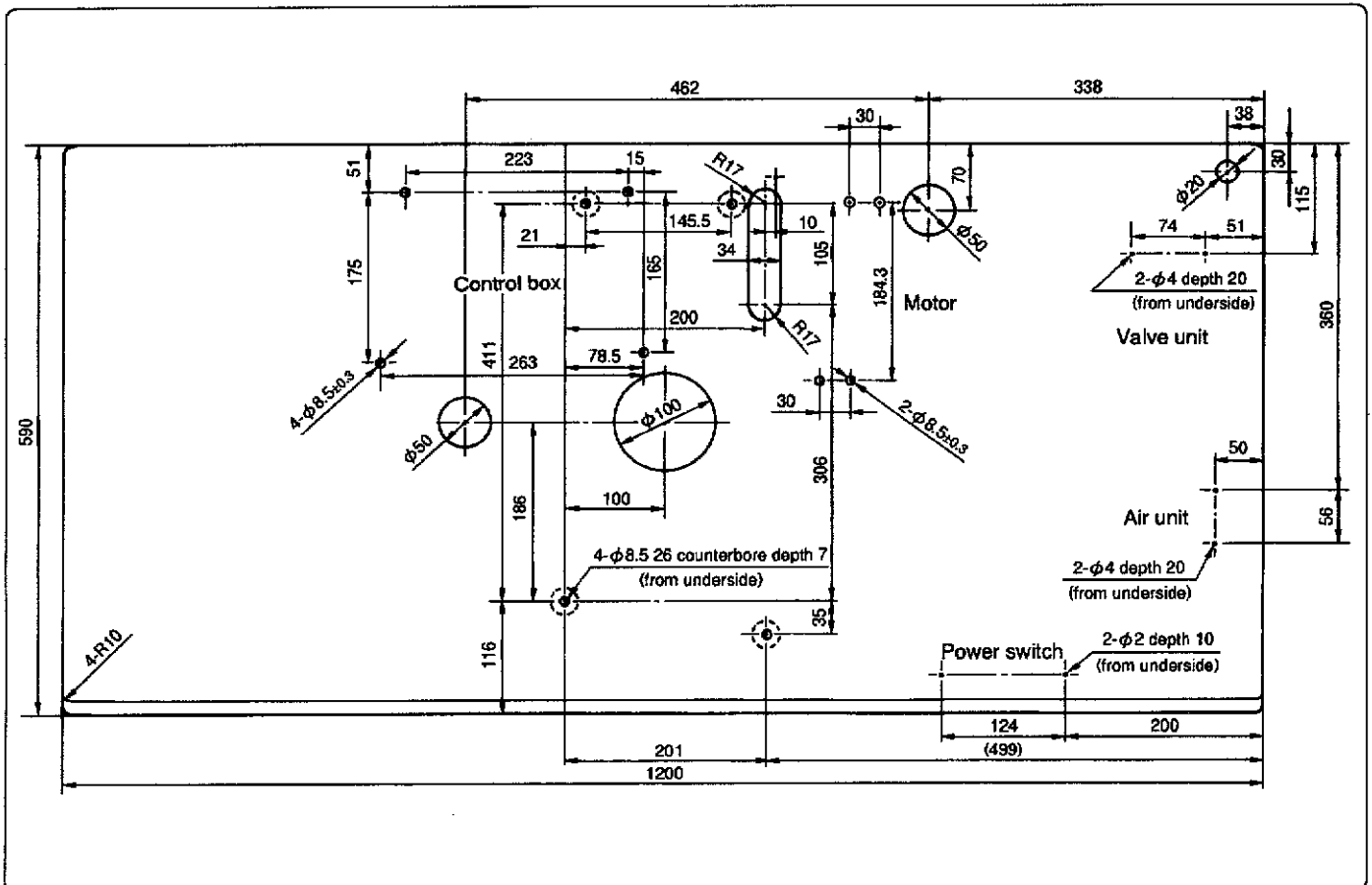
- ⊘ Machine installation should only be carried out by a qualified technician.
- ⚠ Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.
- ⚠ The sewing machine head weighs more than 87 kg. The installation should be carried out by two or more people.
- ⊘ Do not connect the power cord until installation is complete, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.
- ⚠ Install the belt covers to the machine head and motor.
- ⚠ All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not excessively bend the cable or secure it too firmly staples, otherwise there is the danger that fire or electric shocks could occur.
- ⊘ Be sure to connect the ground. If the ground connection is not secure, you run the risk of receiving a serious electric shock.
- ⚠ Avoid setting up the sewing machine near sources of strong electrical noise such as high-frequency welding equipment. If this precaution is not taken, incorrect machine operation may result.

### ■ Work table

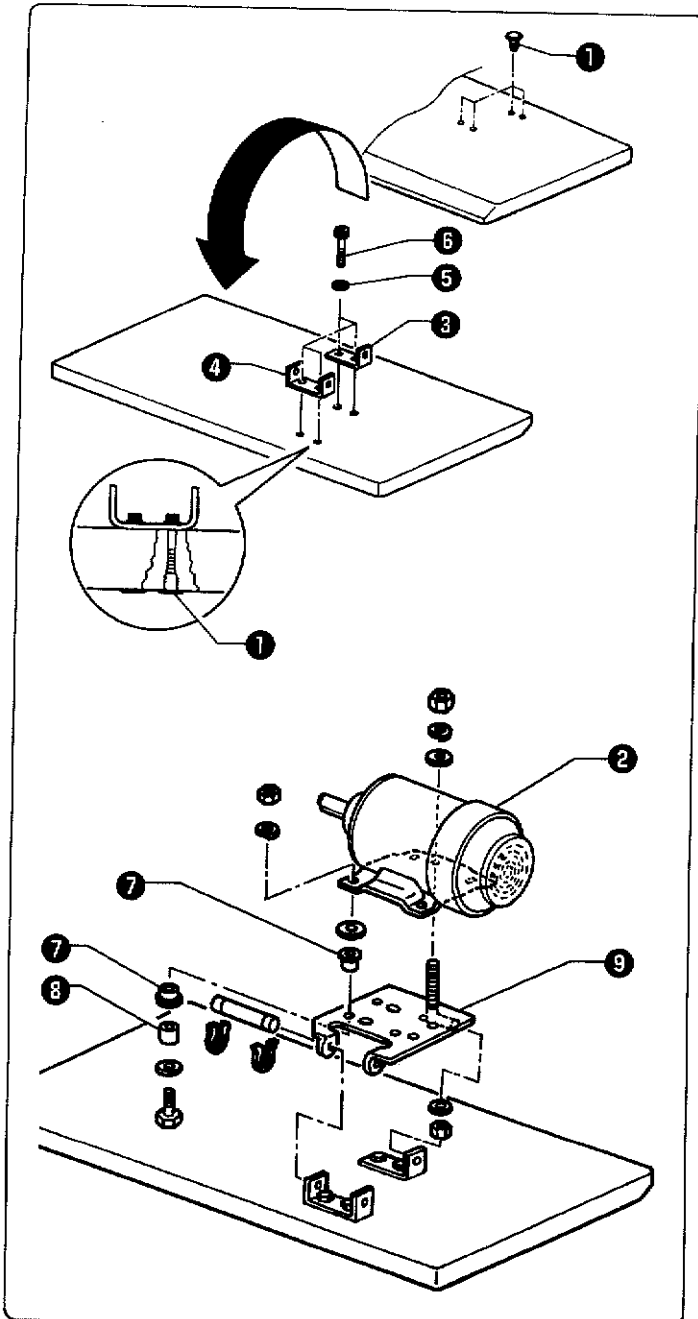
Use the special B981 work table indicated below.

	Model
Table/legs assembly	127-981-04902

When you use a commercially-available table, a thickness of 50 mm is required. Drill holes in the table as shown in the diagram below.



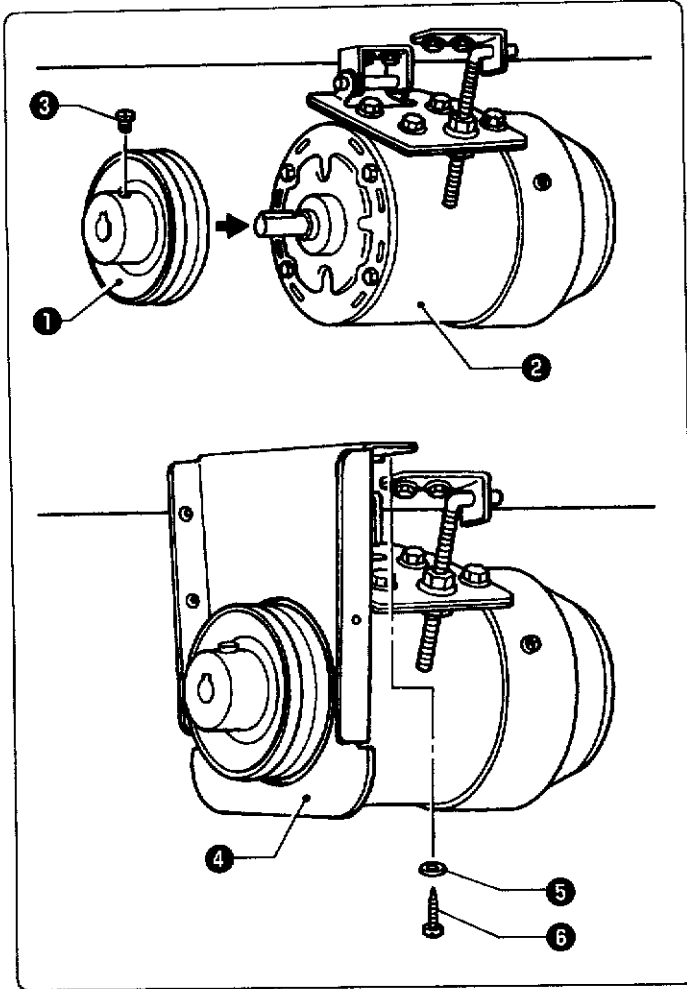
## 3-1. Installing the motor



1. Insert the four rag nuts ① into the work table.
2. Turn the work table upside down to make it easier to install the motor ②.
3. Align the L-bolt support plate ③ and the motor support plate ④ with the rag bolts ①, and then install them with the four washers ⑤ and the four bolts ⑥.
4. Place the eight accessory cushions ⑦ and the four accessory cushion collars ⑧ onto the motor bracket ⑨, and then install the motor as shown in the illustration.

### 3. INSTALLATION

#### 3-2. Installing the motor pulley



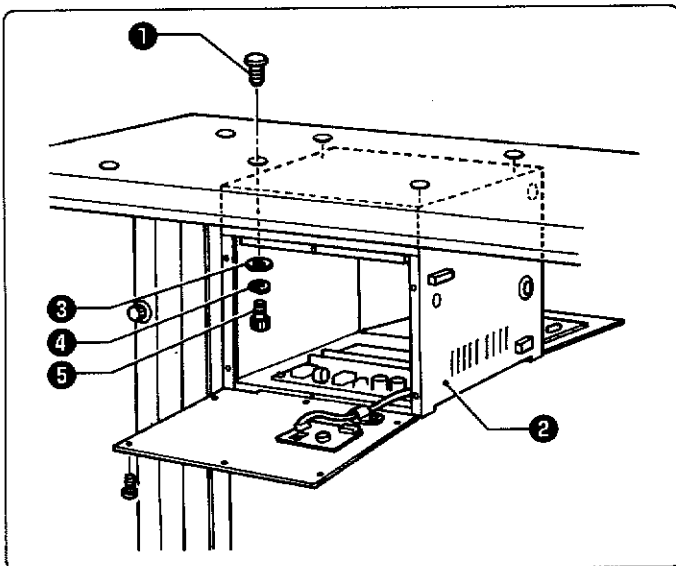
1. Place the motor pulley ① onto the shaft of the motor ② so that the key grooves are aligned, and then tighten the set screws ③ so that the center of the V groove in the motor pulley ① is aligned as closely as possible with the center of the belt hole in the power table.

2. Install the motor rear cover support ④ with the two flat washers ⑤ and the two screws ⑥.

Note:

Check that the motor rear cover support ④ does not touch the motor pulley ① or the edge of the motor.

#### 3-3. Installing the control box

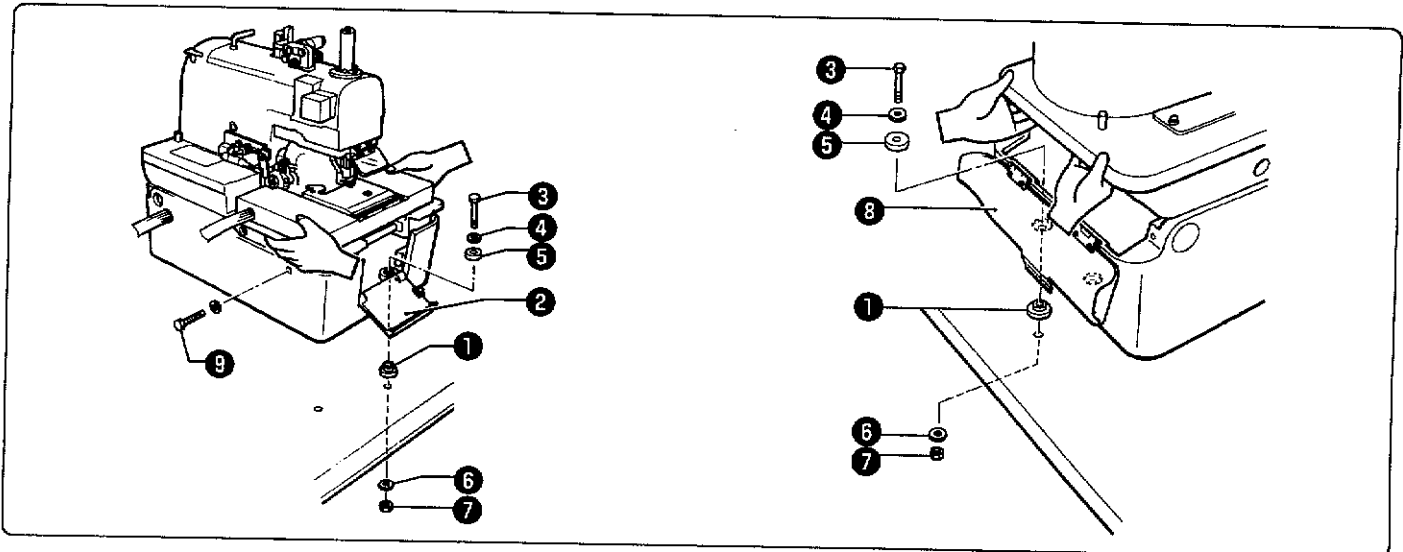


1. Insert the four rag nuts ① into the work table.
2. Open the front and rear covers of the control box ②.
3. Align the control box ② with the rag nuts ①, and then install it with the four flat washers ③, spring washers ④ and bolts ⑤.

Note:

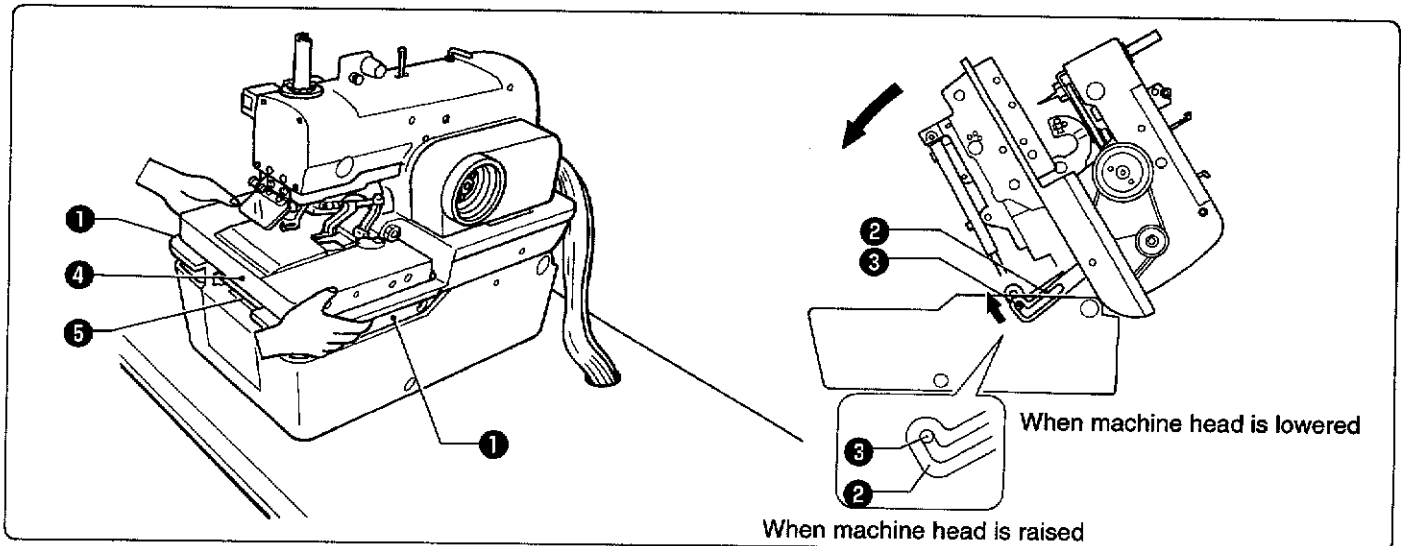
Be careful not to drop any small parts such as washers onto the circuit board when installing the bolts.

### 3-4. Installing the machine head



1. Insert the accessory bed stand cushions A ① into the bed stand, and then place the machine head on top of the work table.  
 Note: When placing the machine head on top of the work table, have two or more people there to hold the handles A and B and the rear of the head C.
2. Open the front cover ②, and then use the bed stand mounting bolt ③, washer ④, cushioning rubber ⑤, bed stand cushion A ①, large washer ⑥ and nut ⑦ to attach the front right corner of the bed stand to the work table.
3. Open the rear cover ⑧, and then attach the bed stand to the work table in two places inside the stand in the same way as in step 2. above.
4. Remove the fixing bolt ⑨ and the washer.  
 Note: The fixing bolt ⑨ and washer should be kept, as they will be needed again if the machine head is moved.
5. Raise the machine head, and then attach the front left corner of the bed stand to the work table in the same way as in the steps above.  
 Note: Make sure that steps 2. to 4. above have been completed before raising the machine head.

### Raising the machine head

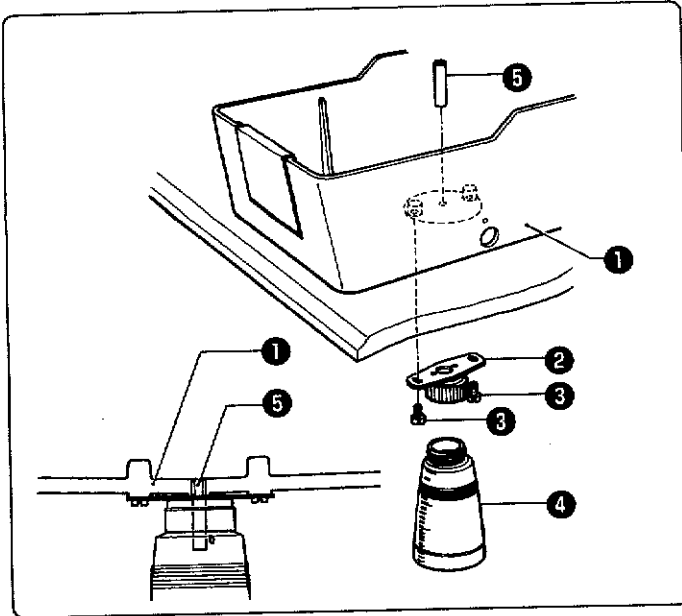


1. While holding the handles of the machine head ① with both hands, gently raise the machine head.  
 Note: Be sure to turn the power supply off before raising the machine head.
2. If you wish to keep the machine head in the raised position, insert the head support lever ② securely into the hinge lever support shaft ③.  
 Note: Always check that the head support lever ② and the hinge lever support shaft ③ are meshed.

### Lowering the machine head

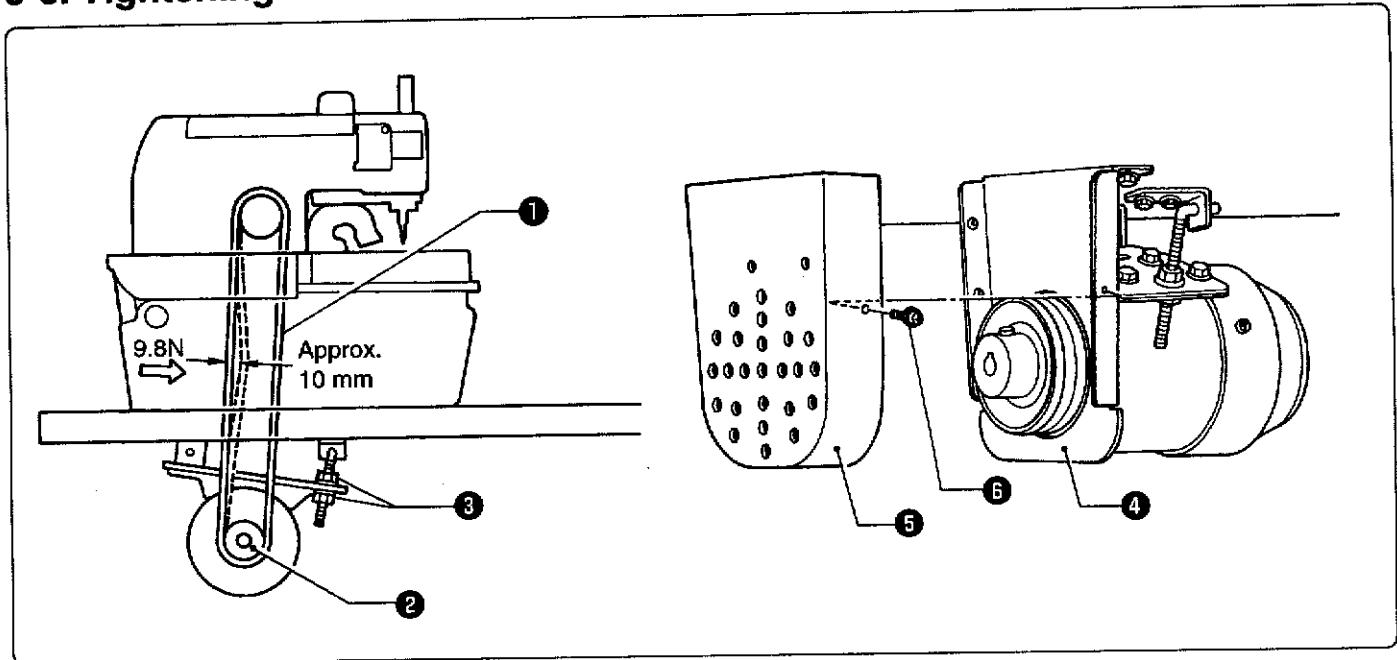
- Pull the machine head down toward you gently, remove the head support lever ② from the hinge lever support shaft ③, and then gently lower the machine head.
- Note: Do not hold the machine head by the feed bracket ④ or X feed shaft A ⑤ when it is being raised and lowered.

### 3-5. Installing the oil container



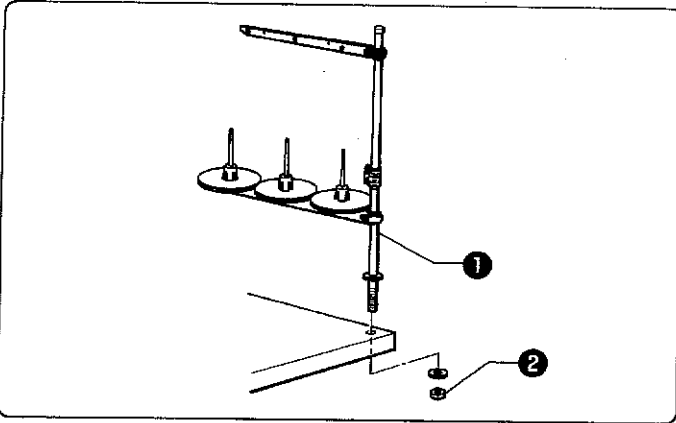
1. Install the oil draining cap support **2** to the base of the bed stand **1** with the two screws **3**.
2. Screw the oil container **4** into the oil draining cap support **2**.
3. Push the oil draining spring pin **5** into the bed stand **1** until the pin is flush with the surface of the stand.
4. Lower the machine head. (Refer to "Lowering the machine head" on prefer page.)

### 3-6. Tightening the V-belt



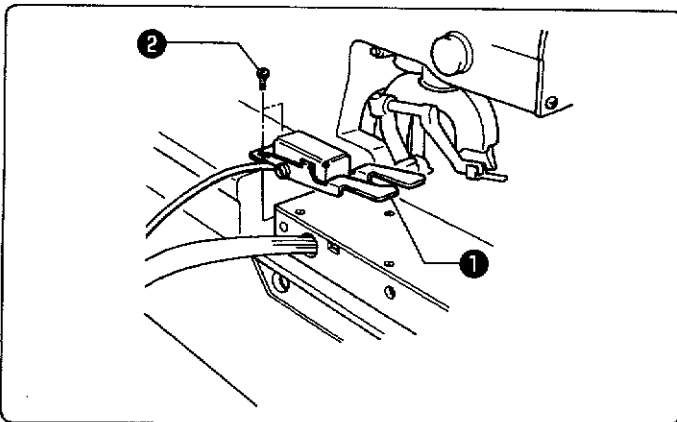
1. Open the rear cover.
2. Pass the V-belt **1** through the base of the bed stand and through the hole in the work table.
3. Place the V-belt **1** onto the motor pulley **2**.
4. Check that there is approximately 10 mm of deflection in the V-belt **1** when it is pushed in the middle with a load of 9.8N (1 kgf).  
If the tightness needs adjusting, loosen the two nuts **3** and move the motor up or down. After adjusting, tighten the nuts **3**.  
Note: Check that the motor rear cover support **4** does not touch the motor pulley **1** or the edge of the motor.
5. Install the belt cover **5** with the three screws **6**.  
Note: After a long period of use, the V-belt will become run in and will loosen around the motor pulley. When this happens, turn off the power and adjust by the procedure given in step 4. above.

### 3-7. Installing the pool stand



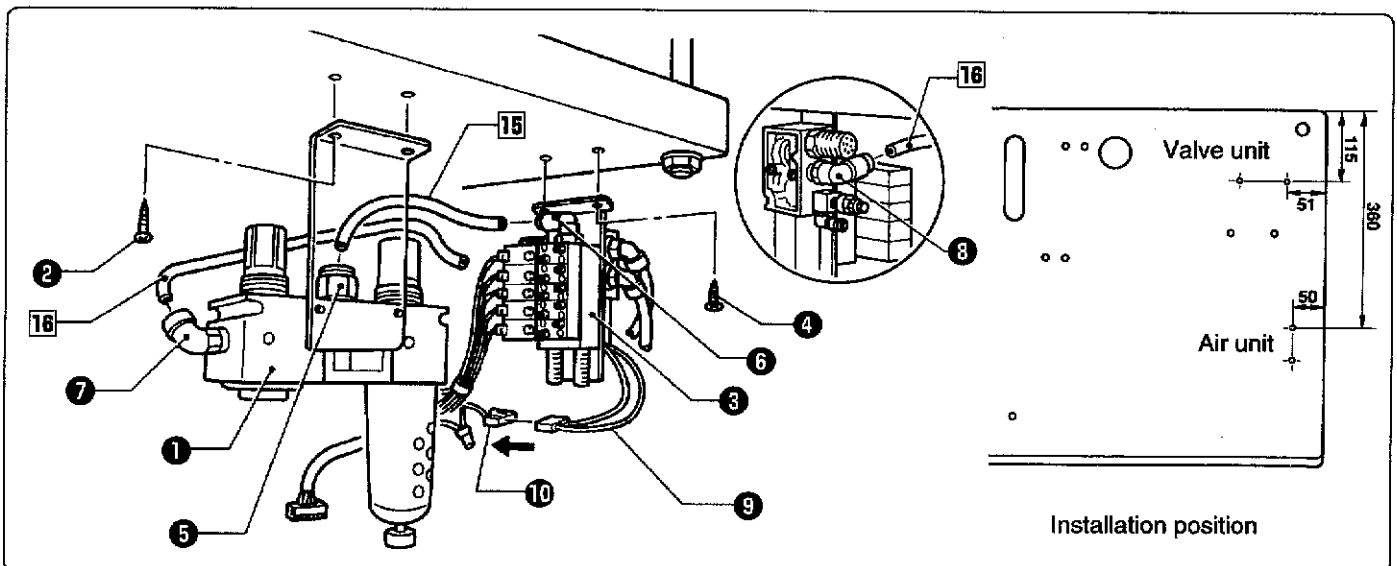
1. To assemble the pool stand ①, follow the instructions in the manual that came with the pool stand ①.
2. Secure the pool stand ① to the rear right corner of the work table with the washer and nut ②.

### 3-8. Installing the hand switch



1. Install the hand switch ① with the two screws ②.

### 3-9. Installing the air unit and the valve unit



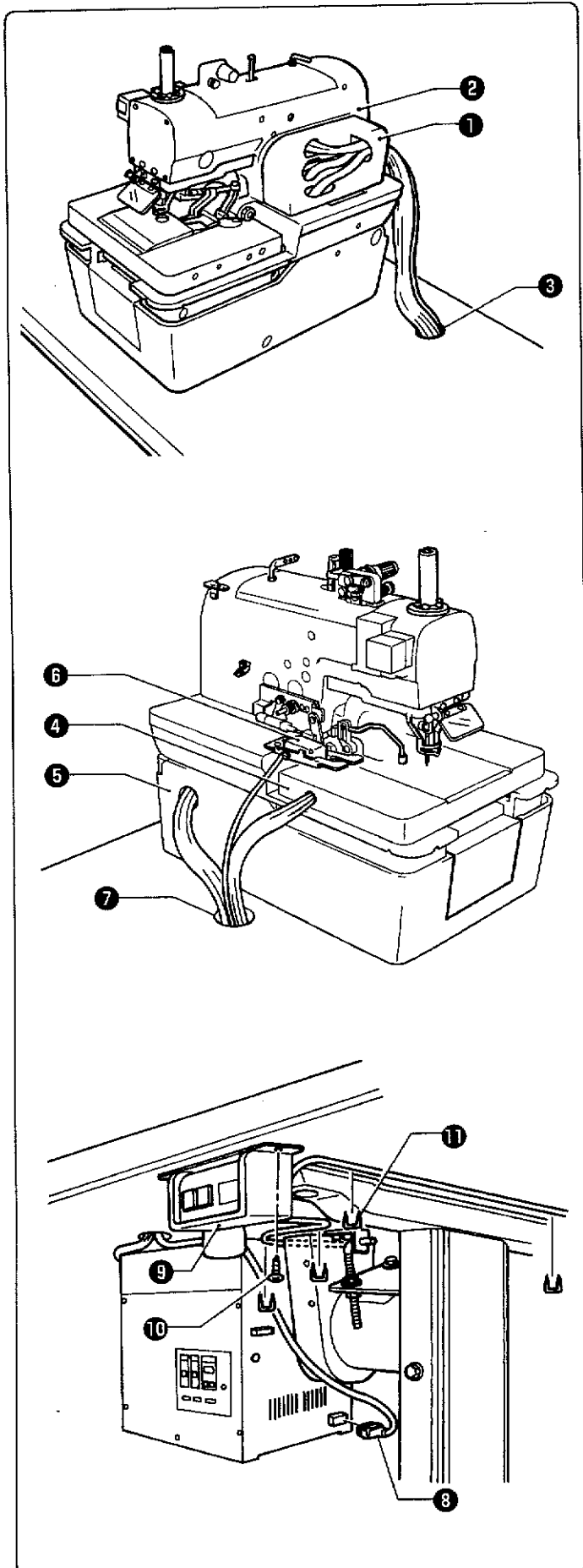
1. Install the air unit ① to the underside of the work table with the two screws ②.
2. Install the valve unit ③ with the two screws ④.
3. Connect air hose ⑮ to the intermediate joint ⑤ of the air unit ① and to the joint ⑥ of the valve assembly, and connect air hose ⑯ to joints ⑦ and ⑧.

#### Connecting the valve cables

Insert the cable ⑨ which is coming out of the valve unit to the 2-pin connector ⑩ of the valve cable assembly.



### 3-10. Connecting the wiring



1. Pass the cable and air tube which are coming out of the belt cover ① and the machine head ② through the cable hole ③ in the work table.

2. Pass the cables and air tube which are coming out of the feed bracket ④ and the left side of the bed stand ⑤ and the cable for the hand switch ⑥ through the cable hole ⑦ in the work table.

**Note:**

Leave enough looseness in the cables so that they will not be pulled when the machine head is tilted back. Adjust the looseness after all connections to the control box are complete.

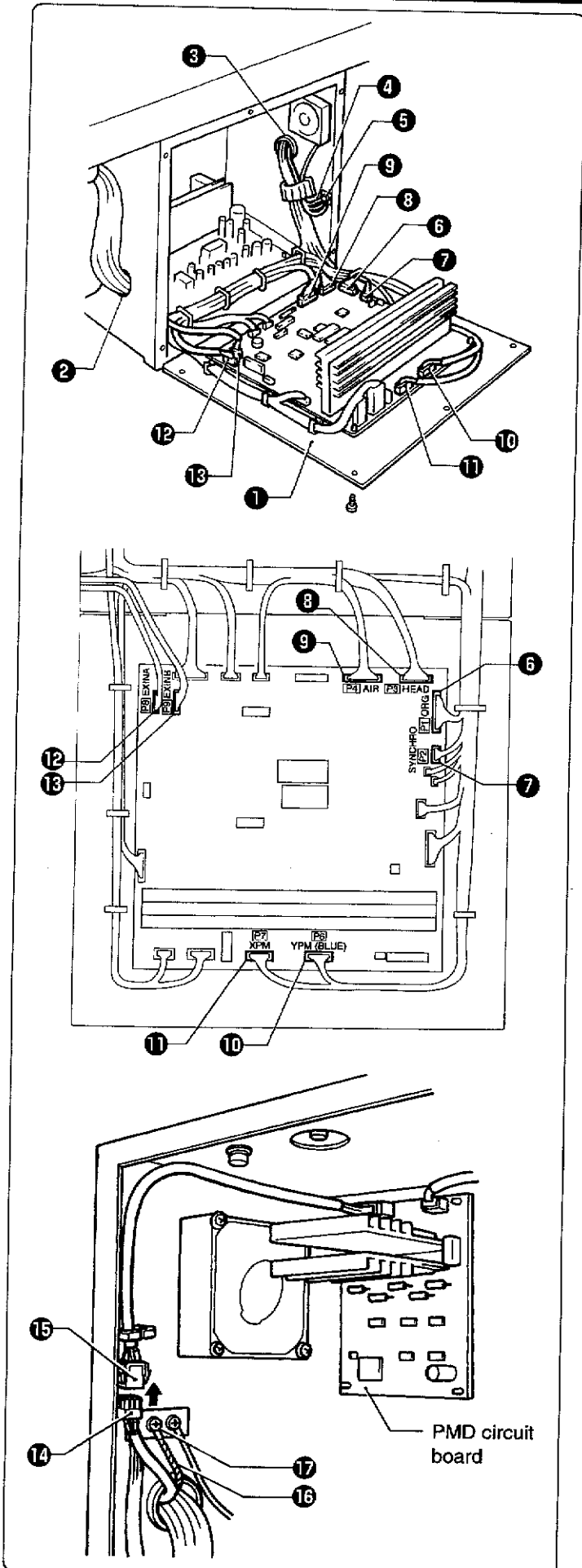
3. Connect the hand switch connector ⑧ to the control box connector.

4. Install the power switch ⑨ to the underside of the work table with the two screws ⑩. Secure the cables using staples ⑪ (in four locations).

**Connections inside the control box**

1. Open the rear cover **1** of the control box.
2. Pass the cables through the holes **2** and **3** in the side of the control box.
3. Loosen the screw **5**, and then connect the three ground cables **4** that are coming from the machine head.
4. Securely insert each of the connectors **6** - **13** as indicated below.

Machine head connectors	(Connection indications) * This is indicated on the P.C. board.
Connector <b>6</b> (12-pin with <b>1</b> mark)	P1 (ORG)
Connector <b>7</b> (5-pin with <b>2</b> mark)	P2 (SYNCHRO)
Connector <b>8</b> (9-pin with <b>3</b> mark)	P3 (HEAD)
Connector <b>9</b> (12-pin with <b>4</b> mark)	P4 (AIR)
Connector <b>10</b> (5-pin with <b>6</b> mark)	P6 (YPM) (BLUE)
Connector <b>11</b> (5-pin with <b>7</b> mark)	P7 (XPM)
Connector <b>12</b> (16-pin with <b>8</b> mark)	P8 (EXINA)
Connector <b>13</b> (18-pin with <b>9</b> mark)	P9 (EXINB)

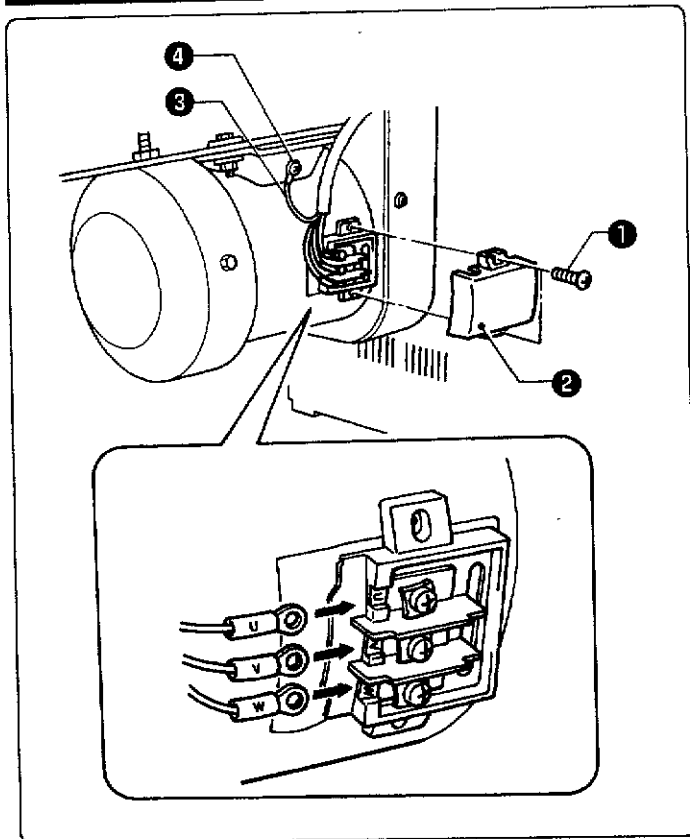


5. Insert the connector **14** (6-pin with **1R** mark) to the connector **15**.
6. Loosen the middle screw **16** and then install the ground cable **17**.
7. Secure the cables with the cable clamp as shown in the illustration.

**Note:**

When securing the cables, do not let any of the cables touch the components on the circuit board or the heat sink. Furthermore, adjust the lengths of the cables from outside the control box so that there is no looseness in the cables inside the control box.

### 3. INSTALLATION



#### Connecting the motor cables

1. Remove the screws ①, and then open the terminal block cover ② of the motor.
2. Loosen the screw ④, and then connect the ground cables ③.

3. Connect the cables so that the cable marks (U, V, W) match the symbols on the screw terminals.
4. Close the cover ②.

**Note:**

Be careful not to clamp the cables when closing the cover.

#### Connecting the air tubes

Connect the air tubes to the joints of the solenoid valve assembly, using the illustration below as a reference. Numbers are marked on each of the air hoses which come out of the sewing machine.

Label No.	Solenoid valve
5	Upper thread trimming
4	Upper thread tightening
3	Lower thread trimming
2	Cloth spreading (Sub presser *1)
1	Cloth presser

\*1 The sub presser can only be used for machines with -02 specifications.

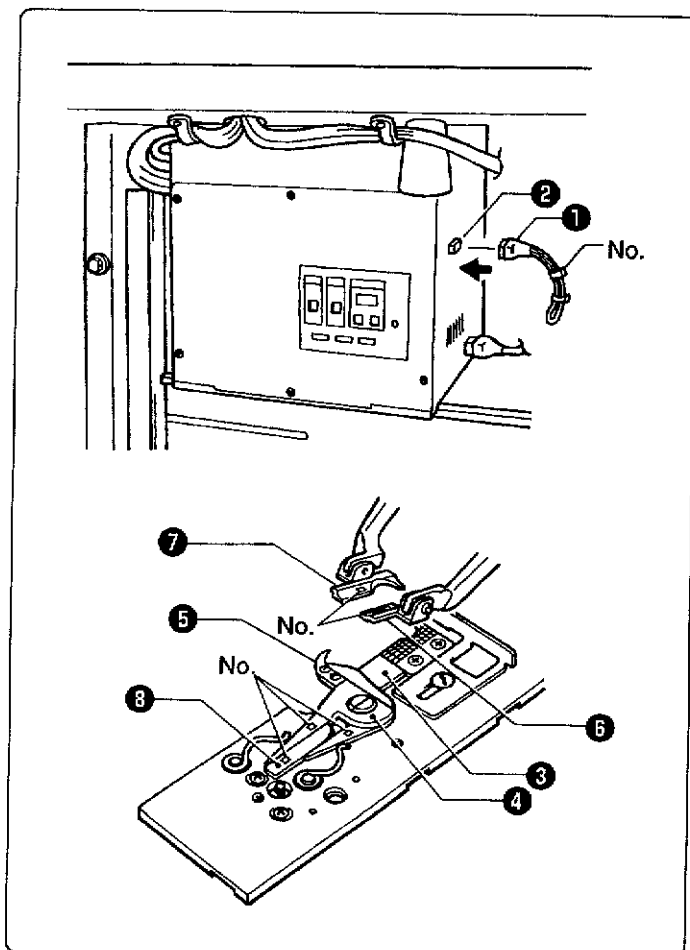
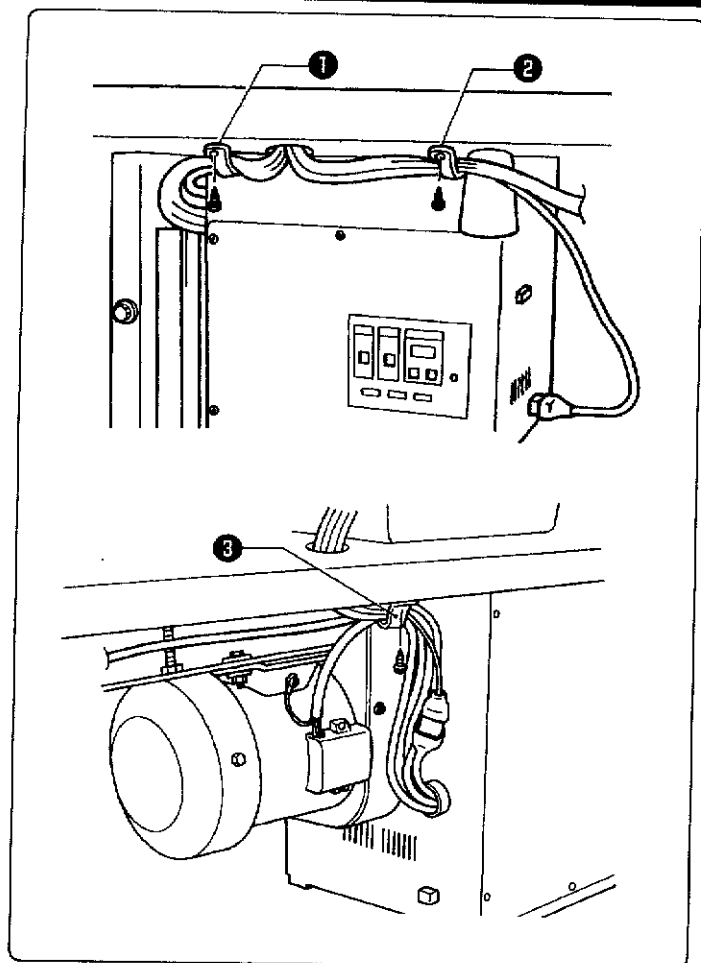
**Securing the cables**

1. Pass the cable through the cable holder ①, and then secure the cable holder ① to the underside of the work table with the screw.
2. Pass the air tube and the hand switch cable through the cable holder ②, and then secure the cable holder ② to the underside of the work table with the screw.
3. Place the machine head cable together with the valve cable assembly and motor cable, pass them all through the cable holder ③, and then secure the cable holder ③ to the underside of the work table with the screw.

Insert the specification harness ① into the control box connector ②.

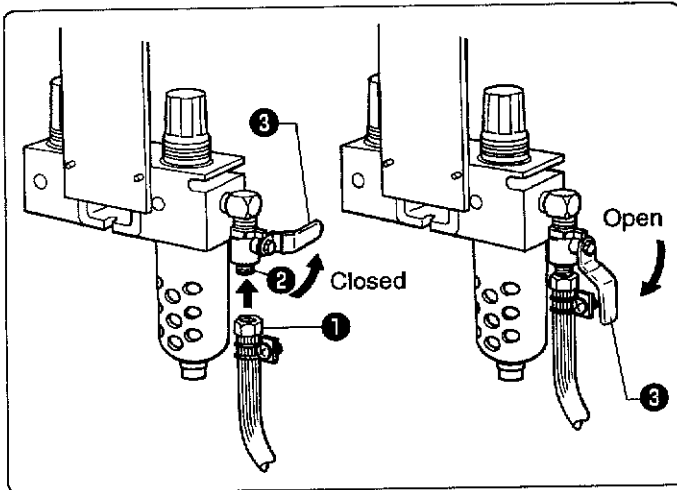
**Note:**

Check that the label number on the specification harness ① matches the movable knife (R) ③, movable knife (L) ④, loop spreader ⑤, cloth presser (R) ⑥, cloth presser (L) ⑦ and movable knife drive cam ⑧ numbers before inserting the specification harness ①. (If a connector with an incorrect label number is connected, it may cause problems such as damage to the sewing machine or thread trimming errors.)



### 3-11. Installing the air hoses

Connect the air hose from the compressor to the air unit underneath the work table.

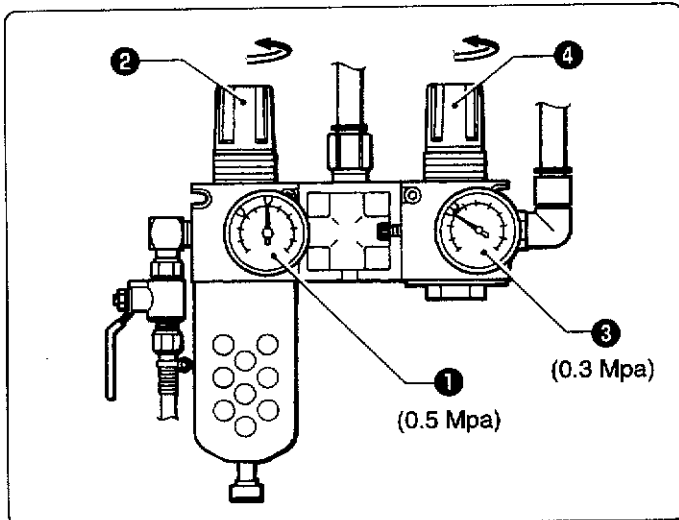


1. Turn the nut ① at the end of the air hose, and then connect the hose to the valve ②.
2. Open the air cock ③ on the compressor. Check that there is no air leaking from the valve connection.
3. Open the cock ③ by turning it in the direction of the arrow. The meter needle will move clockwise.
4. Adjust the air pressure by following the procedure on the next page.

#### Adjusting the air pressure

Set the air pressure for the knife pressure adjustment regulator ③ to the lowest pressure at which the knife can still cut the material. Set the standard air pressure for the main regulator ① to 0.5 MPa.

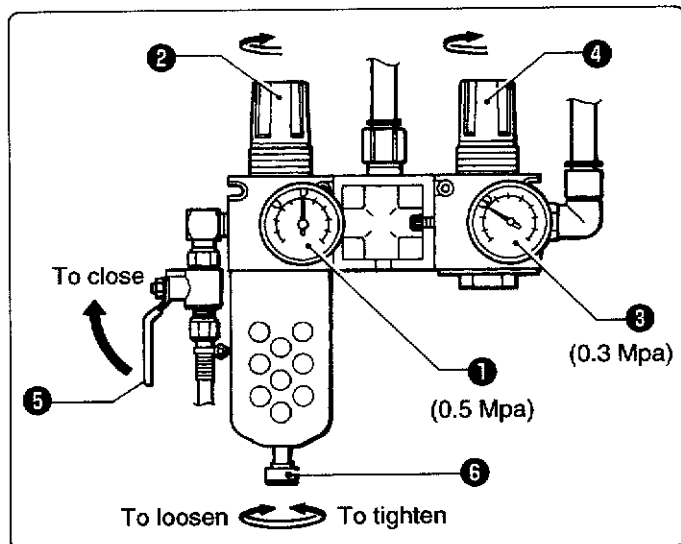
To increase the air pressure



1. Gently lift the knob ② of the main regulator ① and turn it in the direction of the arrow in the illustration. The pressure will increase when the knob ② is turned clockwise.
2. Gently lift knob ④ of the knife pressure adjustment regulator ③ and turn it in the direction of the arrow in the illustration. The pressure will increase when the knob ④ is turned clockwise.

\* The pressure for the knife pressure adjustment regulator ③ is adjusted to 0.3 MPa. Be careful not to increase this pressure needlessly, otherwise poor cutting performance or damage to the knife may result.

To decrease the air pressure



1. Close the cock ⑤. (The needle will remain at the high-pressure position.)
2. Turn the knob screw ⑥ in the direction of the arrow in the illustration to loosen it. Make sure that you turn it in the correct direction. The air will escape from the reservoir and the needle will drop.
3. Tighten the knob screw ⑥.
4. To reduce the air pressure, gently lift knob ② or knob ④ and turn it counterclockwise.
5. Open the cock ⑤. Air will enter the reservoir and the needle will move.

## 3-12. Connecting the power cord

## ⚠ CAUTION/ACHTUNG



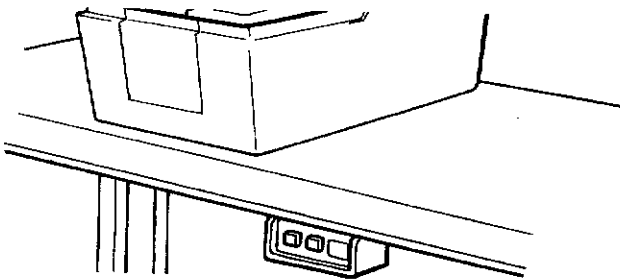
- Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.



- Be sure to connect the ground. If the ground connection is not secure, you run the risk of receiving a serious electric shock.

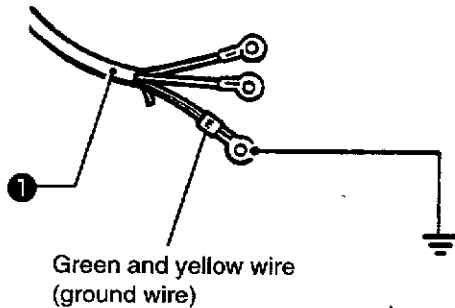


- Do not turn on the power supply until cords have been connected, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

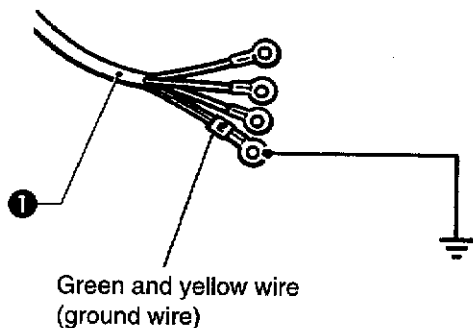


1. Attach an appropriate plug to the power cord ❶. (The green and yellow wire is the ground wire.)
2. Insert the plug into properly-grounded AC power supply.  
Note: Do not use extension cords, otherwise machine operation problems may result.

Single phase



Three phase



### 3. INSTALLATION

## **⚠ DANGER**



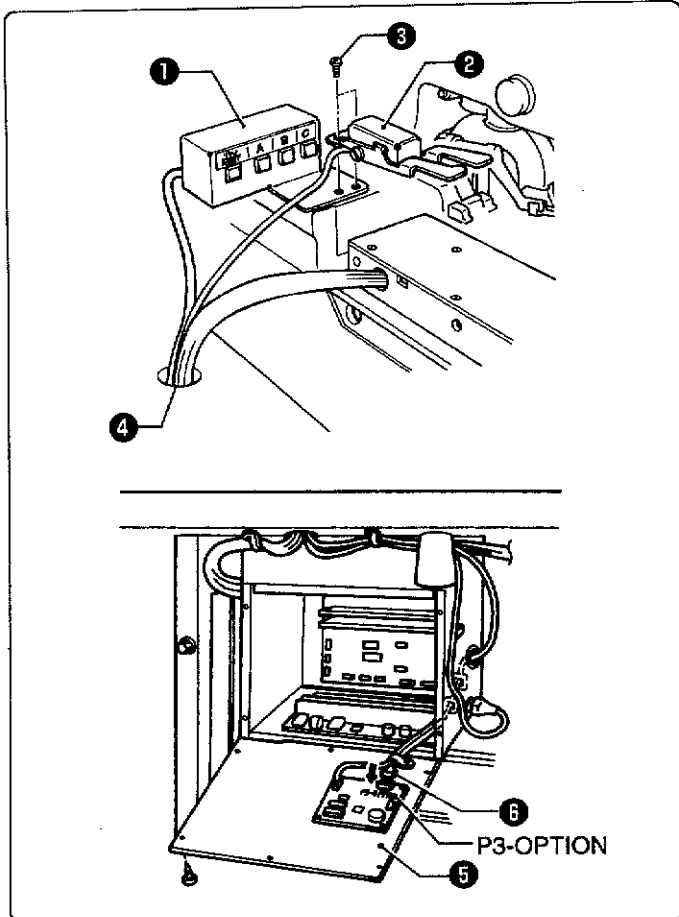
- Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.

## **⚠ CAUTION**



- Turn off the power switch and disconnect the power cord before installing any optional parts, otherwise the machine will operate if the treadle is pressed by mistake, which could result in injury.

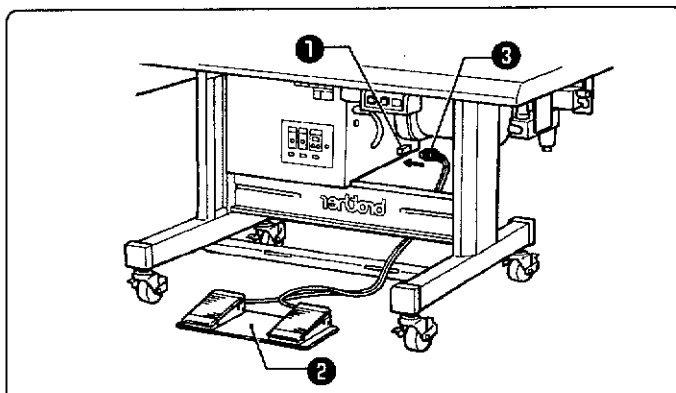
### 3-13. Installing the select switch (option)



1. Install the select switch **1** together with the hand switch **2** with the two screws **3** in the position shown in the illustration.
2. Pass the cables through the cable hole **4** in the work table.

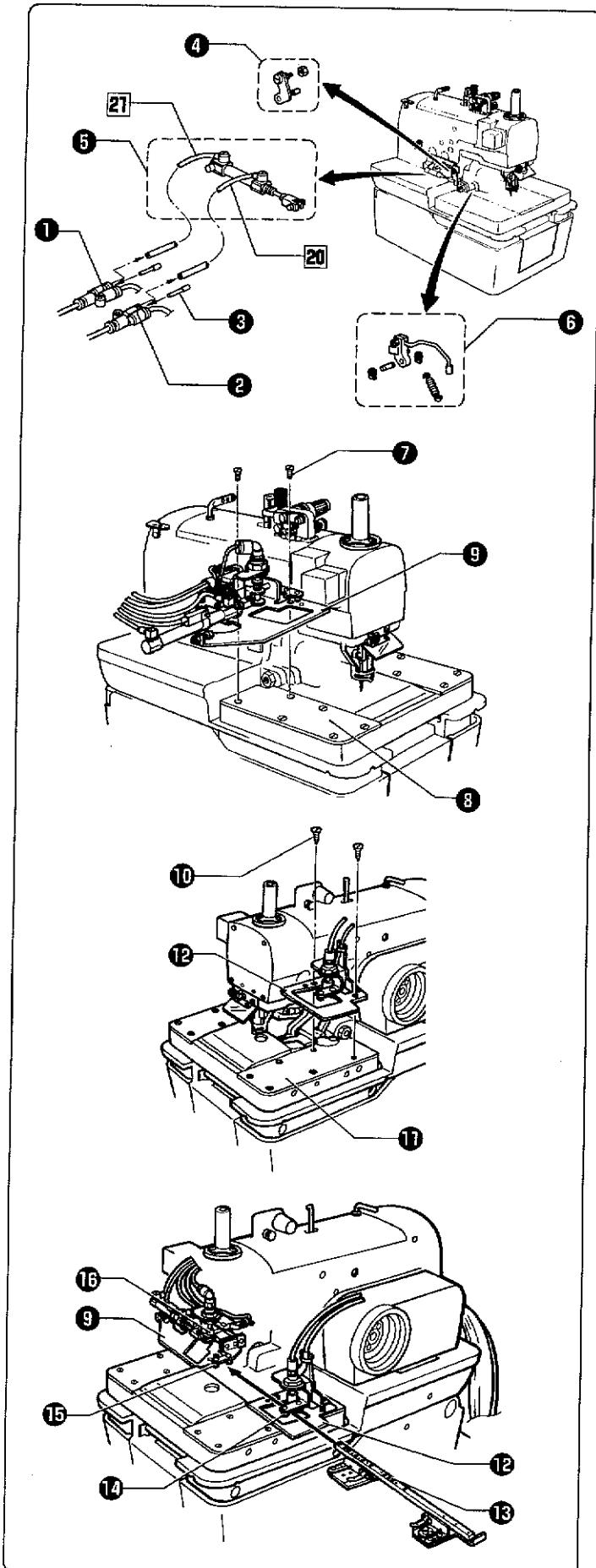
3. Open the front cover **5** of the control box, and then pass the cable through the hole at the right.
4. Insert the connector **6** in the position shown in the illustration.
5. Secure the cable with the cable clamp as shown in the illustration.

### 3-14. Installing the foot switch (option)



1. Insert the connector **3** of the foot switch **2** into the control box connector **1**.

## 3-15. Installing the indexer (option)



## Installing the indexer main unit

1. After disconnecting air hoses 20 and 21, insert the two plugs 3 into joints 1 and 2. In addition, remove parts 4, 5 and 6 indicated in the illustration.

2. Remove the screws 7 from feed bracket cover (L) 8, and then install feed base (L) 9.

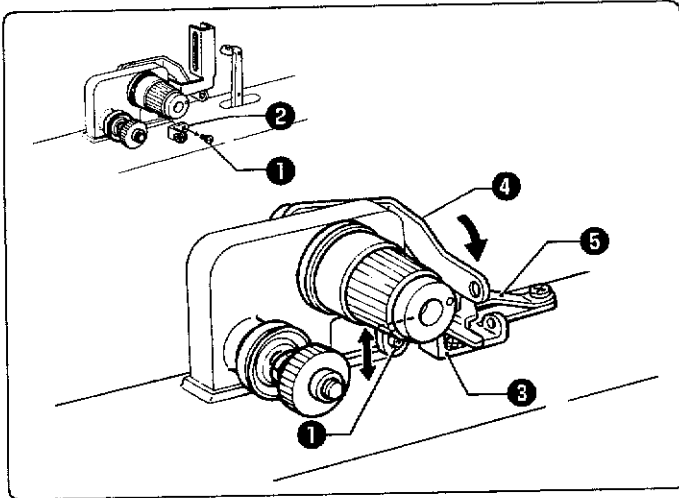
3. Remove the screws 10 from feed bracket cover (R) 11, and then install feed base (R) 12.

4. Pass the cloth feed bar 13 between the rollers of feed bar guide (R) 14 and feed bar guide (L) 15, and place it on top of feed base (L) 9 and feed base (R) 12.

\* Push down the chuck pin 16 and check that it goes smoothly into all of the holes in the cloth feed bar 13. If it does not go in smoothly, re-adjust the installation positions of feed base (L) 9 and feed base (R) 12.

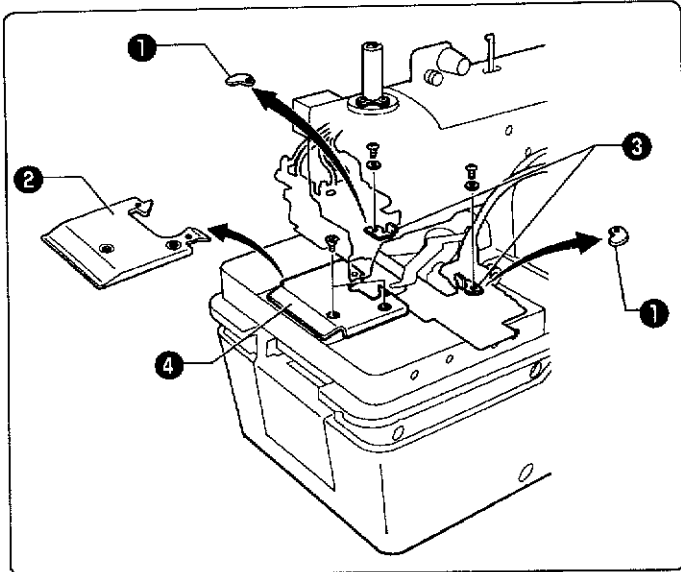


### 3. INSTALLATION



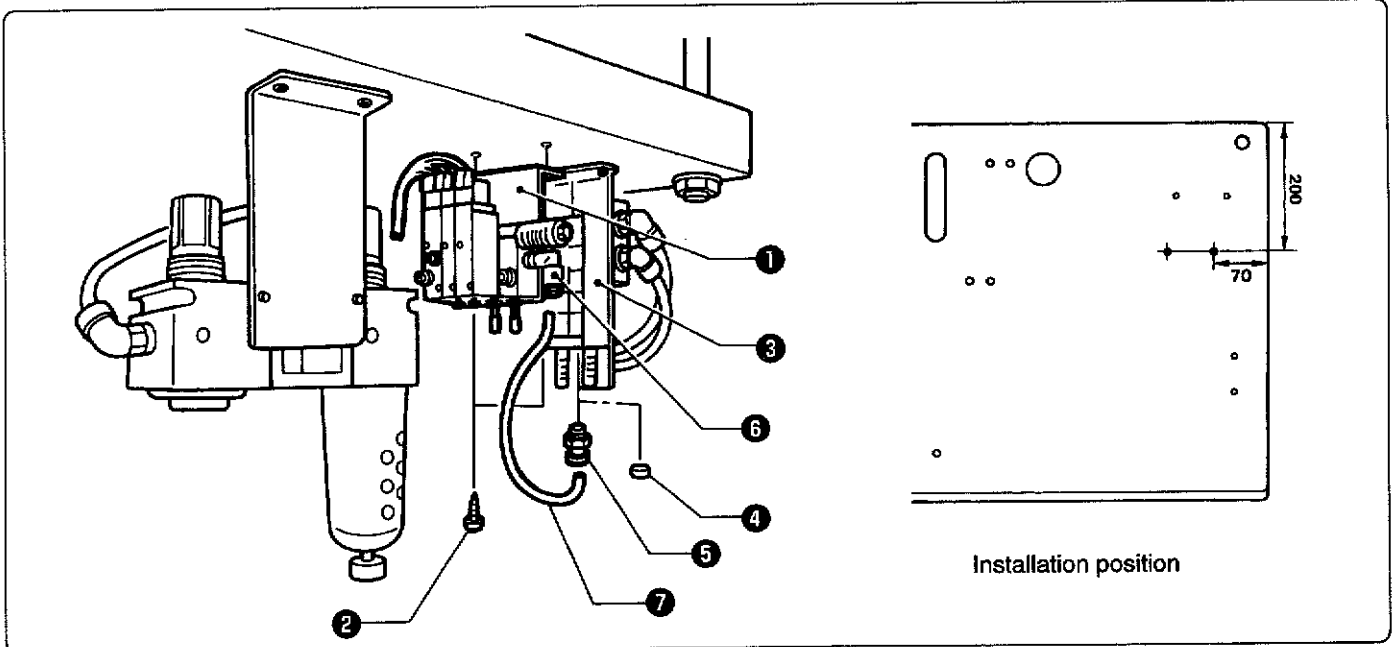
#### Installing the upper thread presser

1. Loosen the screw ①, and then remove the thread guide ②.
2. Install the upper thread presser ③ with the screw ①.  
\* Adjust the height of the upper thread presser support ③ so that it presses against the upper thread presser plate ⑤ when the upper thread pick-up lever ④ is lowered.



#### Replacing the plate presser and presser plate

Remove the plate presser ① and presser plate (U) ②, and replace them with plate presser (l) ③ and presser plate (l) ④.



#### Installing the valve unit

1. Install the valve unit ① with the screw ②.
2. Remove the stopper plug (with the P mark) ④ from the valve unit ③, and then install the joint ⑤.
3. Connect the 6 mm-diameter air tube ⑦ to joints ⑤ and ⑥.

**Connecting the connectors**

1. Insert the 3-pin connectors **8**, **9** and **10** of the valve harness into the solenoid valves of the valve unit **1** so that the label numbers match.
2. Insert the 15-pin connector **2** into the connector of the indexer intermediate cable **3**.

3. Open the rear cover **5** of the control box.
4. Insert the connector **5** of the indexer intermediate cable **3** in the position shown in the illustration.
5. Secure the cable with the cable clamp.

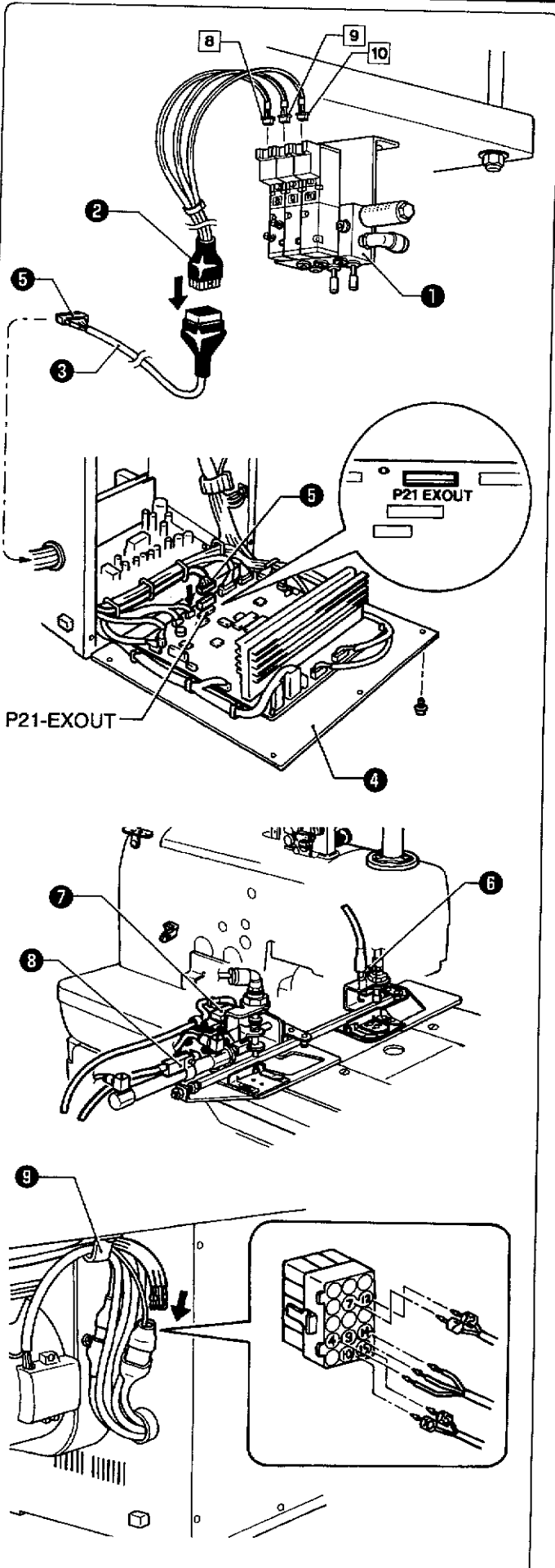
6. Insert the two pins of limit switch (R) **6** and the two pins of limit switch (L) **7** into the 15-pin connector terminals with matching numbers.
7. Connect the three pins of the cylinder sensor **8** into the 15-pin connector so that the cable colors match the connector numbers as given in the table below.  
\* If the cable colors are red, white and black, refer to the colors in brackets.

**Note:**

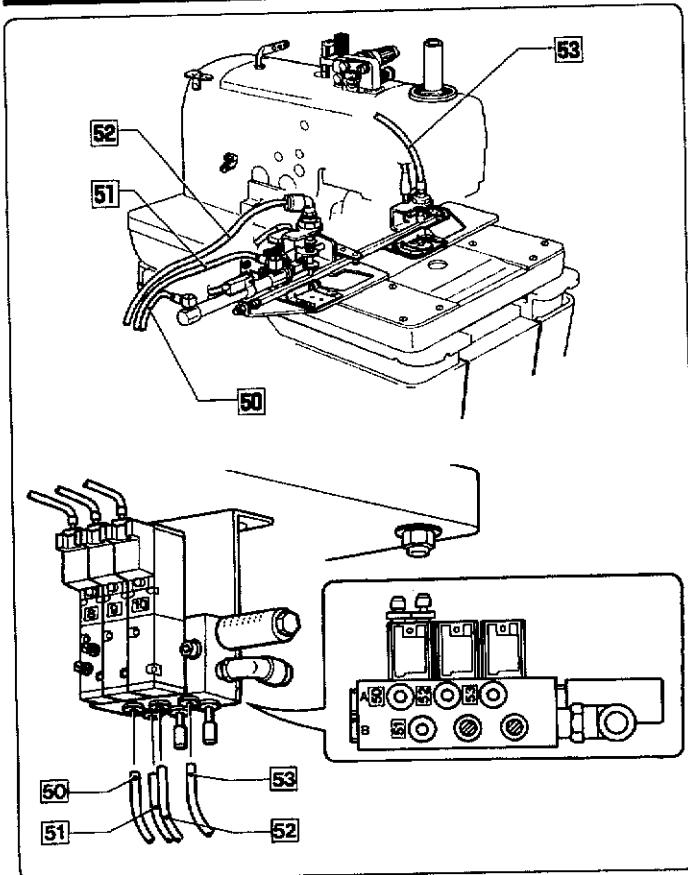
First disconnect the connector before inserting the pins, and then after inserting the pins, re-connect the connector.

	Switch pin No.	Cable color	15-pin Connector
Limit switch (R) <b>6</b>	7	White	7
	12	Black	12
Limit switch (L) <b>7</b>	10	White	10
	15	Black	15
Cylinder sensor <b>8</b>		Brown (Red)	4
		Black (White)	9
		Blue (Black)	14

8. Secure the cable with the cable clamp **9**.



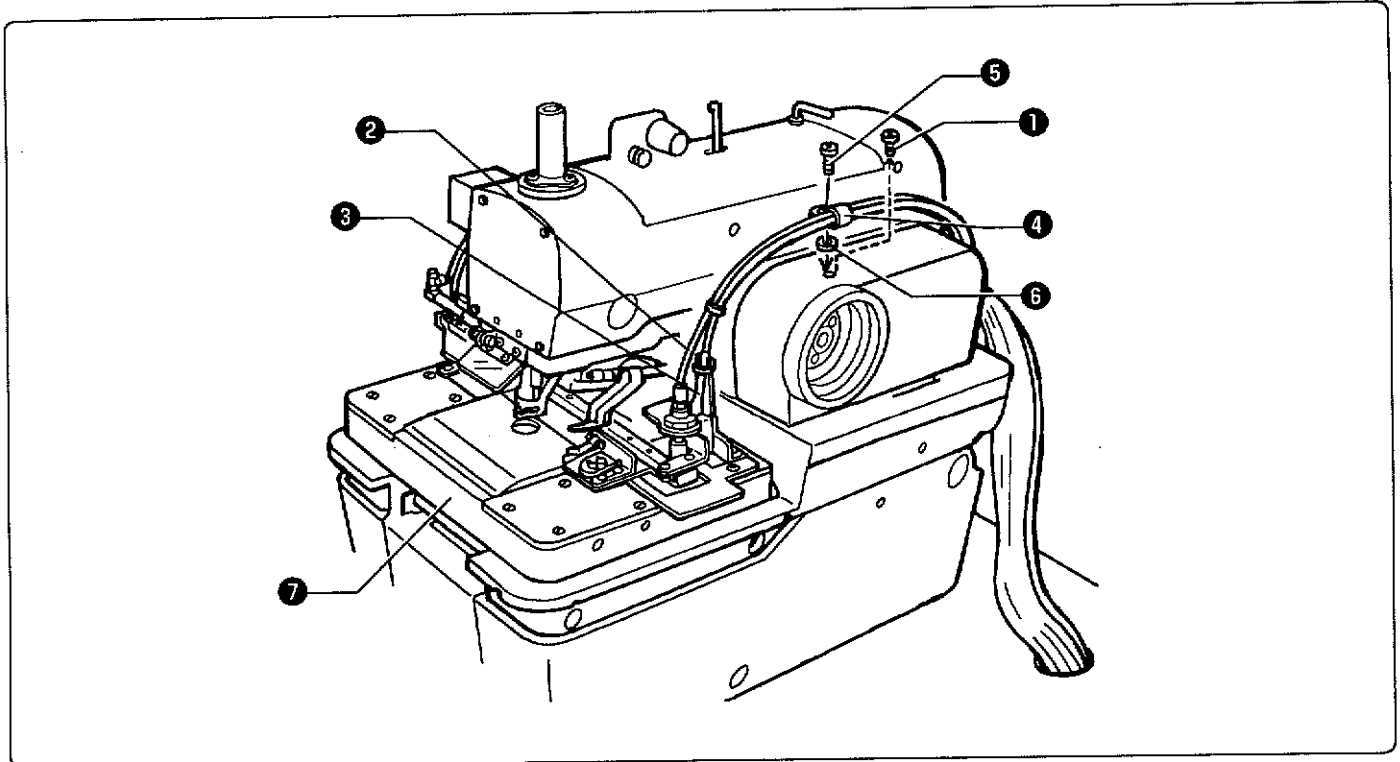
### 3. INSTALLATION



#### Connecting the air tubes

Connect air tubes 50, 51, 52 and 53 to the places with the corresponding numbers on the valve unit.

Label No.	Solenoid valve type
50, 51	For cloth feed drive cylinder
52	For chucking cylinder
53	For holding cylinder



#### Securing the air tubes and cables

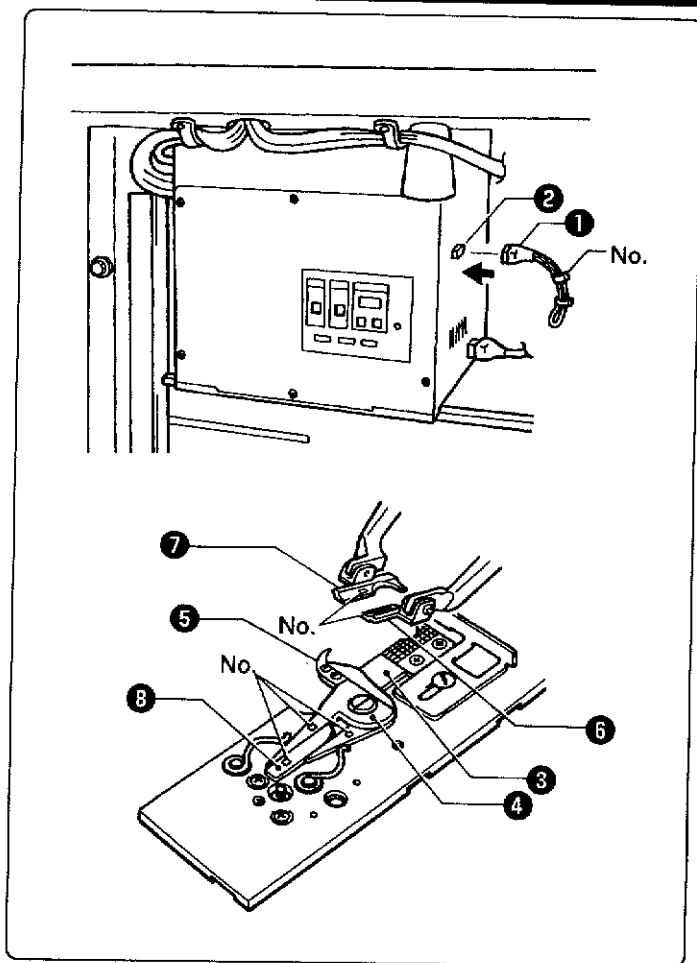
1. Remove the screw (length 8 mm) 1.
  2. Secure the air tube 2 and cable 3 with the cable presser 4, screw (length 16 mm) 5 and washer 6.
- \* Leave enough slack in the air tube 2 and cable 3 at this time to allow for the movement of the feed bracket 7.

Insert the indexer specification harness ① into the control box connector ②.

\* If another specification harness has been inserted into this connector, first disconnect this harness and then insert the indexer specification harness ①.

Note:

Check that the label number on indexer the specification harness ① matches the movable knife (R) ③, movable knife (L) ④, loop spreader ⑤, cloth presser (R) ⑥, cloth presser (L) ⑦ and movable knife drive cam ⑧ numbers before inserting the specification harness ①. (If a connector with an incorrect label number is connected, it may cause problems such as damage to the sewing machine or thread trimming errors.)



## 4. LUBRICATION

### CAUTION

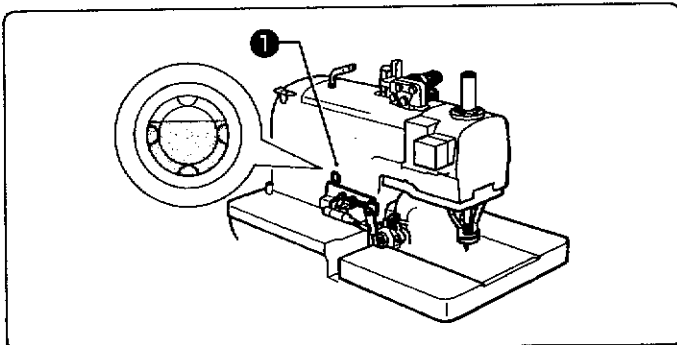


- Turn off the power switch before starting lubricating, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.
- Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea. Keep the oil out of the reach of children.

### 4-1. Adding oil to the sewing machine

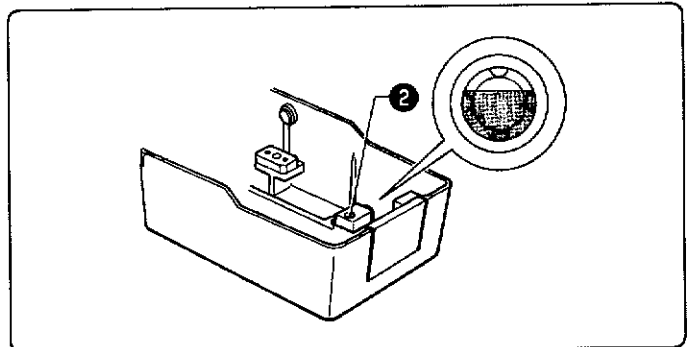
Use only specified Brother oil (Nisseki Sewing Lube 10) for the machine oil. Check the oil level by looking at the sight glass. If the oil level is low, replenish the oil supply. When filling with oil, some oil will get onto the thread. Carry out a test sewing to ensure that your material does not get stained with oil.

#### Filling the arm oil tank



1. Pour approximately 10 cc of machine oil into the arm oil tank ① (until it is about four-fifths full).

#### Filling the bed base oil tank

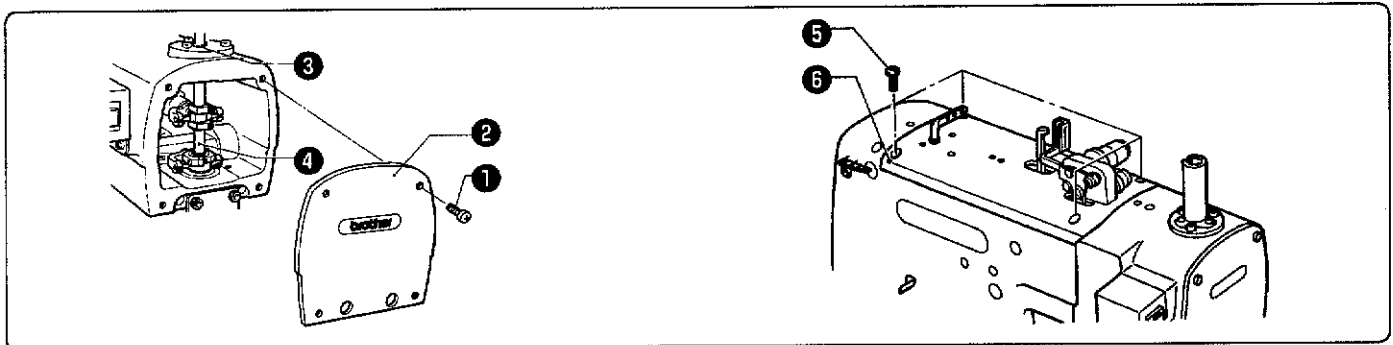


1. Raise the machine head.
2. Pour approximately 20 cc of machine oil into the bed base oil tank ② (until it is about four-fifths full).
3. Lower the machine head.

#### Oiling the needle bar and cam

Oil these parts once a day.

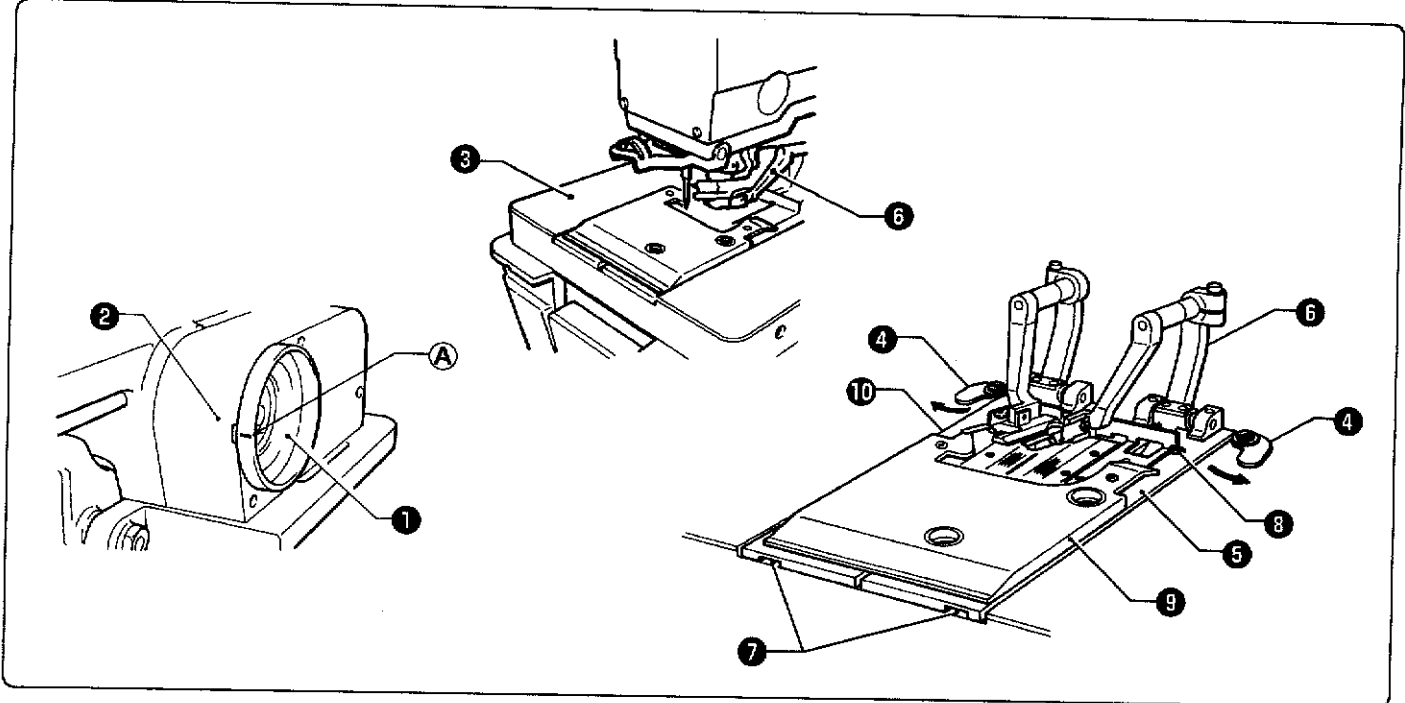
Oil the moving parts of the needle bar, looper and spreader mechanisms and also the cam groove, roller, the felt at the base of the wick and the wick before using the sewing machine for the first time, and also after long periods of non-use.



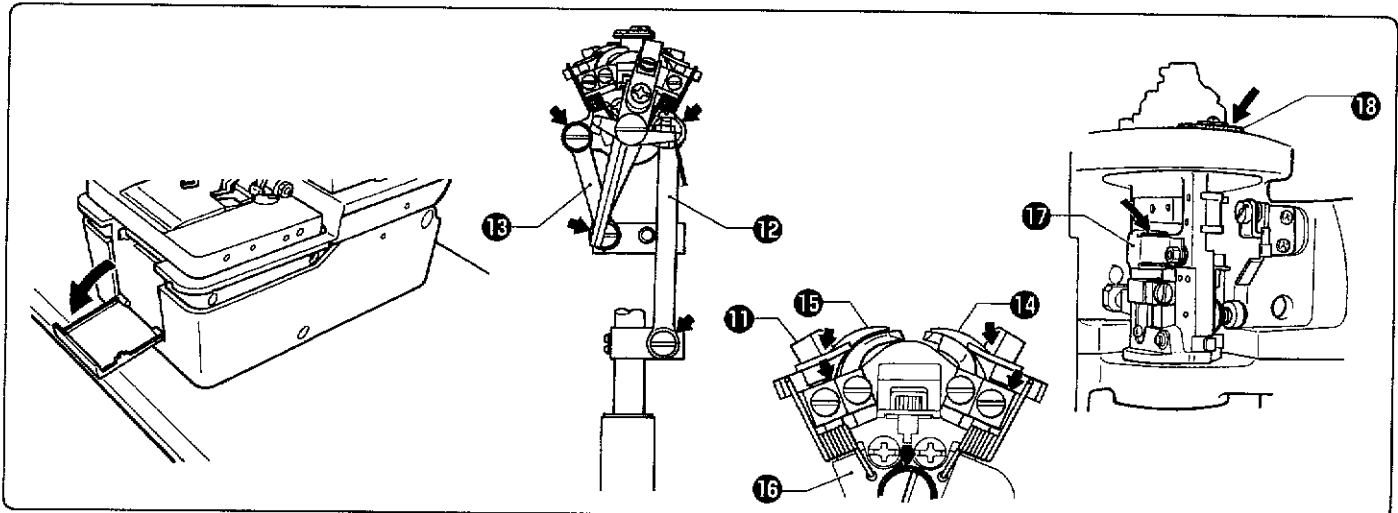
1. Remove the four screws ①, and then remove the face plate ②.
2. Add a few drops of oil to the needle bar bracket U ③ and to the needle bar ④.
3. Remove the four screws ⑤, and then remove the top cover ⑥ (before using the sewing machine for the first time, and also after long periods of non-use).
4. Add a few drops of oil to the felt and to the wick.
5. After adding oil, replace the face plate ② and the top cover ⑥.

## Oiling the looper, spreader and race stand

### Removing the cloth presser plates



1. Turn the upper shaft pulley **1** toward you until the mark on the pulley **A** is aligned with the notch in the pulley cover **2**.
2. Move the feed bracket **3** toward you.
3. Turn the left and right plate pressers **4** in the directions indicated by the arrows.
4. Lift up the clamp lever **6** and the notched section **7** of the right cloth presser plate **5**, remove the right cloth presser plate **5** from the pin **8**, and then pull the right cloth presser plate **5** toward you to remove it.  
 Note: If the lower thread trimmer has been installed, move cloth presser plate U **9** to a position where it can be removed without its touching the needle.  
 Raise cloth presser plate U **9**, pass the needle through the hole, and then remove cloth presser plate U **9** from the pin **8**.
5. Remove the left cloth presser plate **10** in the same way as the right cloth presser plate **5** was removed.

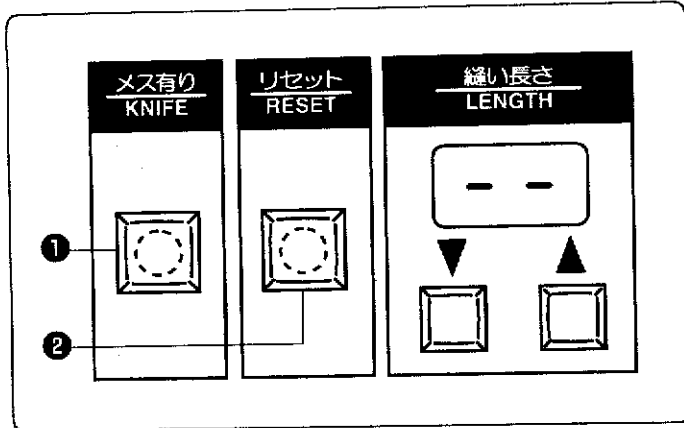


6. Open the front cover.
7. Turn the race stand and add a few drops of oil to the spreader cam **11**, and to the supports for the looper link **12** and spreader link **13**.
8. Add a few drops of oil to the shafts of the right spreader **14**, left spreader **15** and looper holder base **16**.
9. Fill the felt tank **17** on the race stand with oil also.
10. Add 5 - 6 drops of oil to the felt **18** which is attached to the sliding surfaces of the race stand and the bed.
11. Close the front cover.
12. Install the cloth presser plates by carrying out the steps 5., 4. and 3. in that order.

## 5. CORRECT USE

### 5-1. Initializing settings

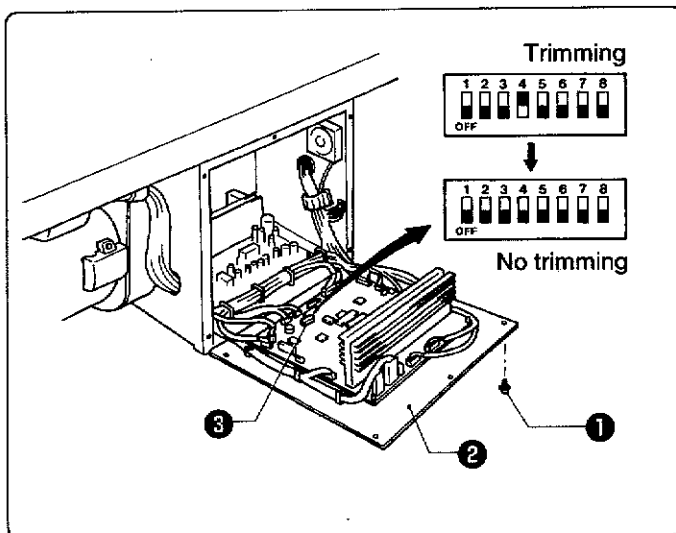
If "59" appears on the front panel display when the power is turned on, be sure to carry out the following procedure to initialize all settings. ("59" may appear after a PROM has been replaced or after long periods of non-use. For details on the "59" message display, refer to page 40.)



1. Turn off the power.
2. While pressing the KNIFE switch ① and the RESET switch ②, turn the power back on.
3. Once the data has been initialized, the machine will switch to the normal standby condition ("--" will appear on the display).

### 5-2. Changing the lower thread and gimp thread trimming

The sewing machine is set to lower thread and gimp thread trimming when it is shipped from the factory. (DIP switch C No. 4 ③ is set to ON.)



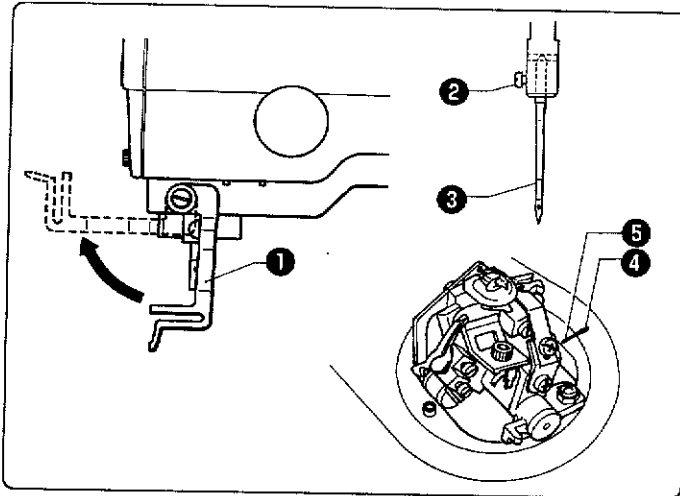
1. Turn off the power.
2. Remove the six screws ①.
3. Open the rear plate ② of the control box.
4. Set DIP switch C No. 4 ③ on the circuit board to OFF.
5. Close the rear plate ② and tighten the six screws ①.

### 5-3. Installing the needle

## CAUTION



- Turn off the power switch before installing the needle, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.



Use only Schmetz D0 x 558 #80 - #120 needles.

1. Raise the finger guard ①.
2. Loosen the screw ②, and then remove the needle ③.
3. Insert the new needle ③ as far as it will go so that the groove is facing toward you.
4. Securely tighten the screw ②.
5. Remove the cloth presser plates. (Refer to page 24.)  
Note: After removing the cloth presser plates, check that the index mark ④ on the machine head is aligned with the index mark ⑤ on the race stand before inserting the needle ③ (when the race stand is turned fully to the right).
6. Lower the finger guard ①.

### 5-4. Threading the upper thread

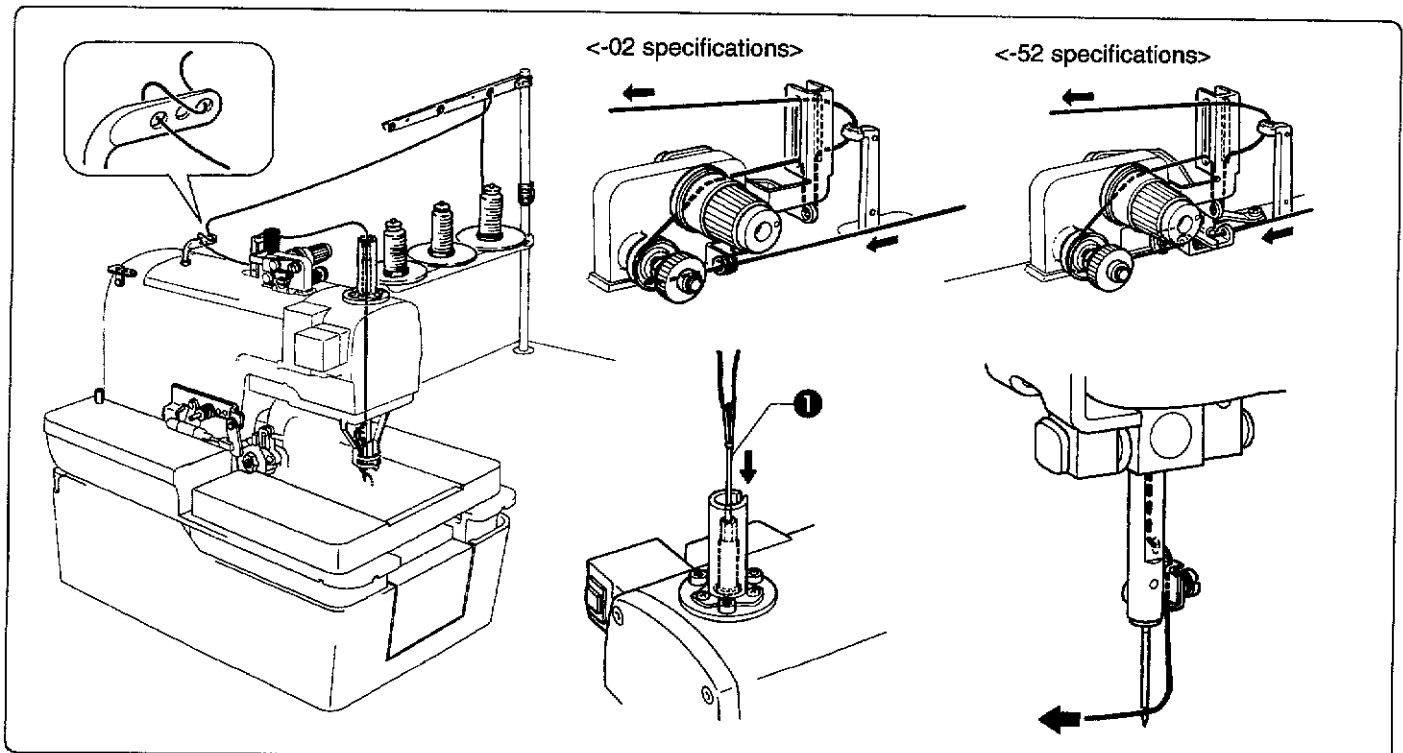
## CAUTION



- Turn off the power switch before threading the thread, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

Thread the upper thread as shown in the illustration below.

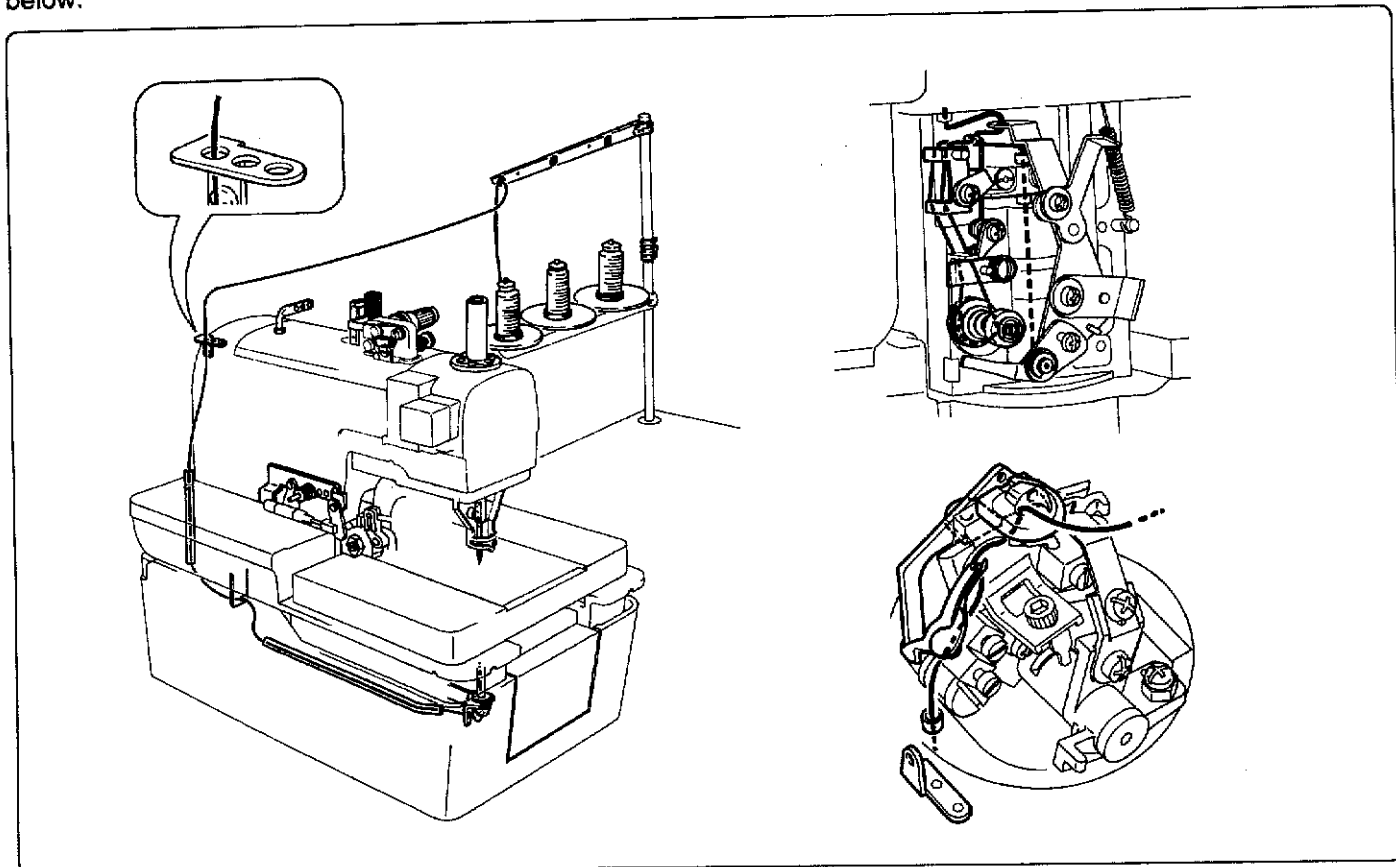
\* Use the accessory needle threader ①.





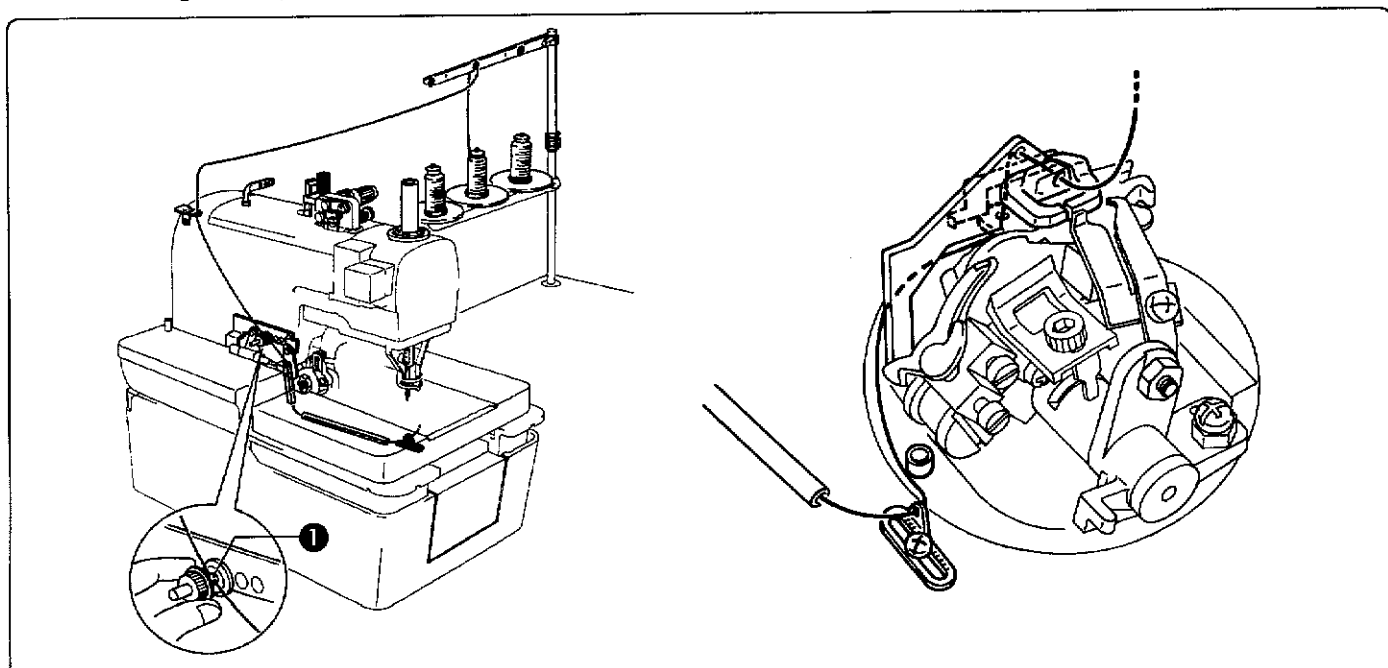
### 5-5. Threading the lower thread

Remove the cloth presser plates (refer to page 24), and then thread the lower thread as shown in the illustration below.



### 5-6. Threading the gimp thread

Remove the cloth presser plates (refer to page 24), and then thread the gimp thread as shown in the illustration below. Once threading is complete, replace the cloth presser plates.

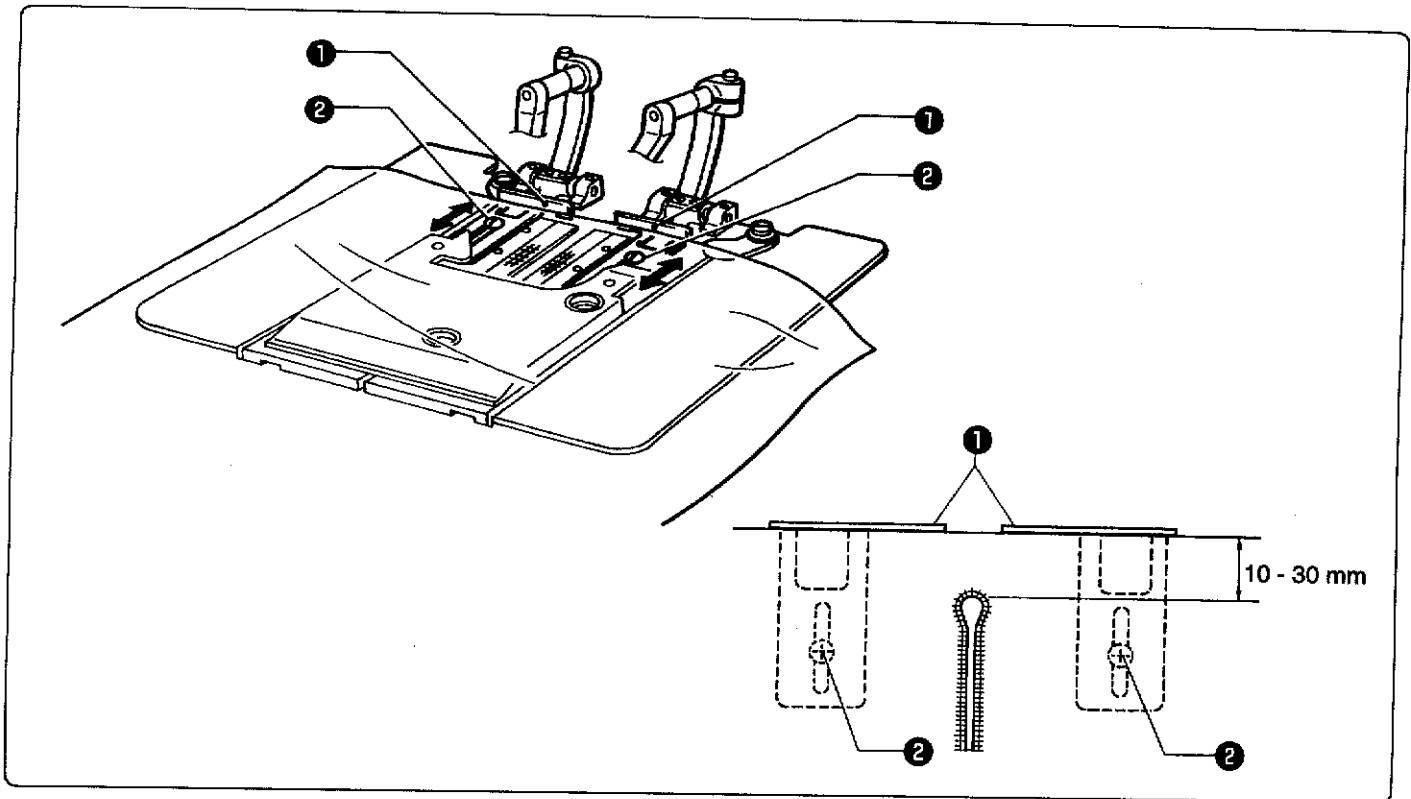


Pass the gimp thread through the hole in the thread tension stud ❶.

\* Refer to page 61 for details on adjusting the trailing length for the gimp thread.

## 5-7. Setting the material

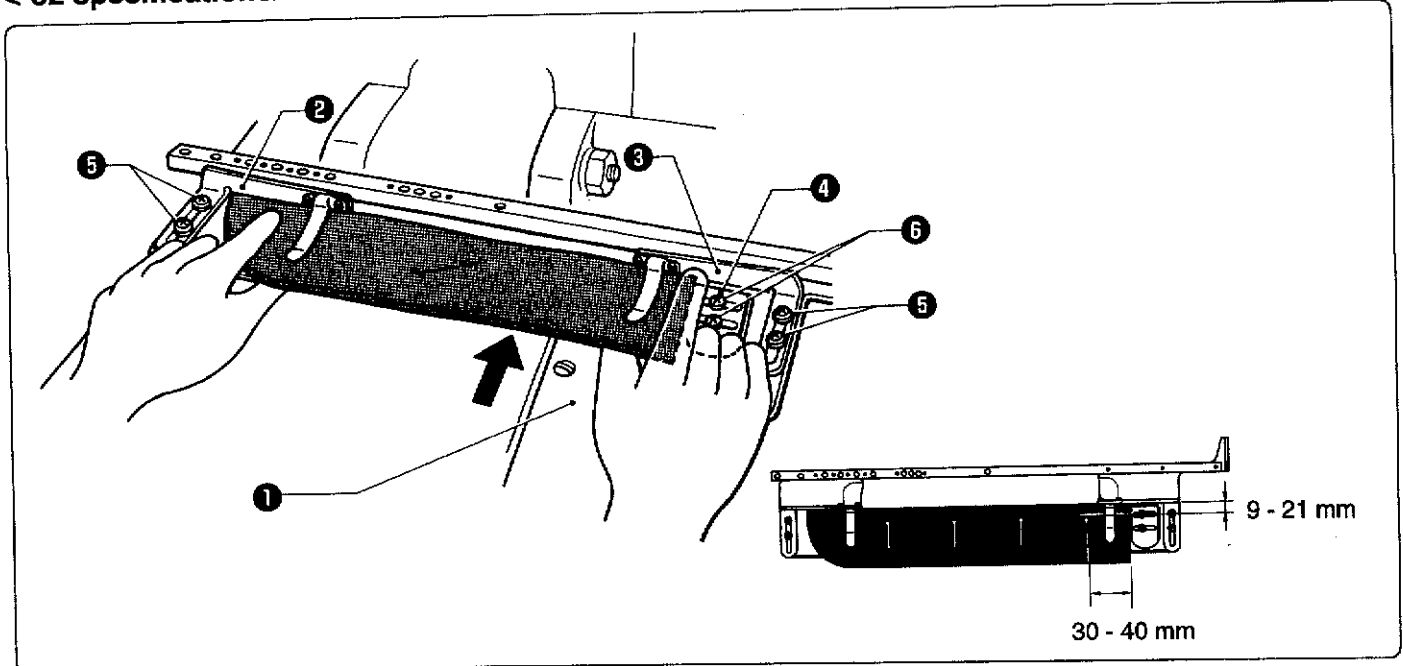
<-02 specifications>



1. Insert the material so that it touches the right and left cloth guides ①.
2. The sewing margin can be adjusted to within 10 - 30 mm.
3. Loosen the screws ② at left and right and move the cloth guides ① back and forth to adjust the sewing margin.

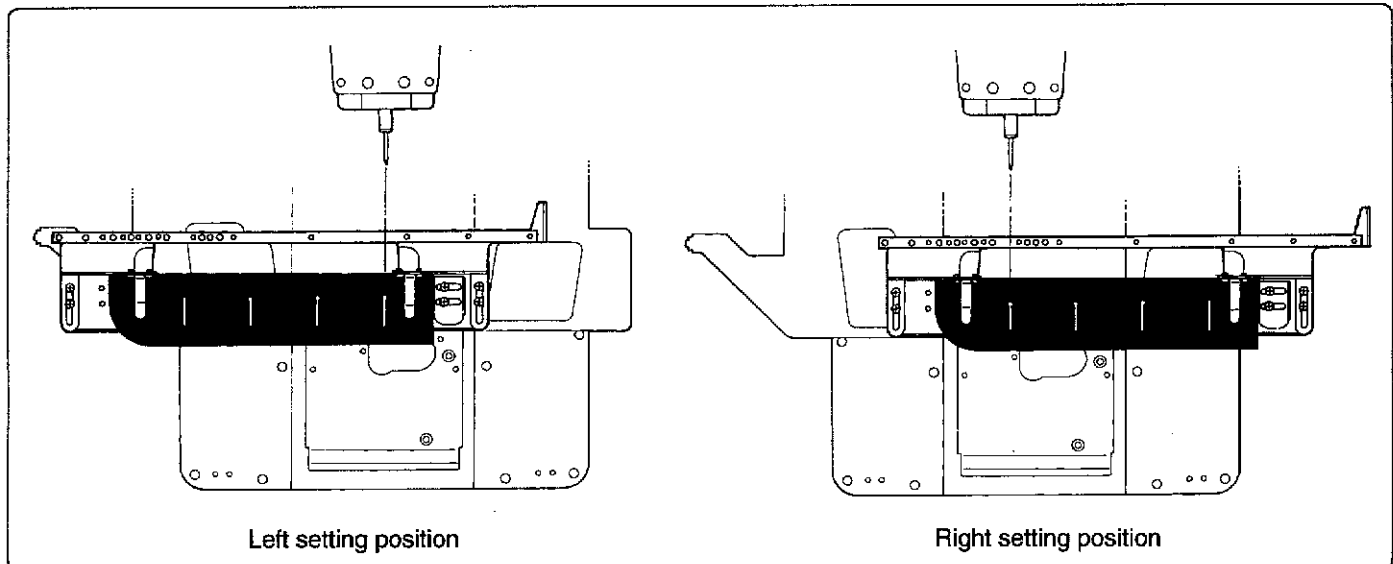
## 5. CORRECT USE

### <-52 specifications>



1. Place the material (fly) on top of the feed bracket ①, and then feed the material (fly) in until it reaches horizontal cloth setting guide (L) ② and horizontal cloth setting guide (R) ③.  
\* Check that the right edge of the material (fly) is straight against the left edge of the vertical cloth setting guide ④ at this time.
2. The vertical sewing margin can be adjusted between 9 - 21 mm.  
Loosen the four screws ⑤, and then move horizontal cloth setting guide (L) ② and horizontal cloth setting guide (R) ③ forward or back to adjust.
3. The horizontal sewing margin can be adjusted between 30 - 40 mm.  
Loosen the two screws ⑥, and move the vertical cloth setting guide ④ to the left or right to adjust.

### Cloth setting position



The sewing start position can be set to either the left setting position or the horizontal setting position. (Refer to page 36.)

#### When set to the left setting position

This is the normal setting position for the cloth.

\* After the last buttonhole is sewn, the cloth feed bar returns to the left setting position.

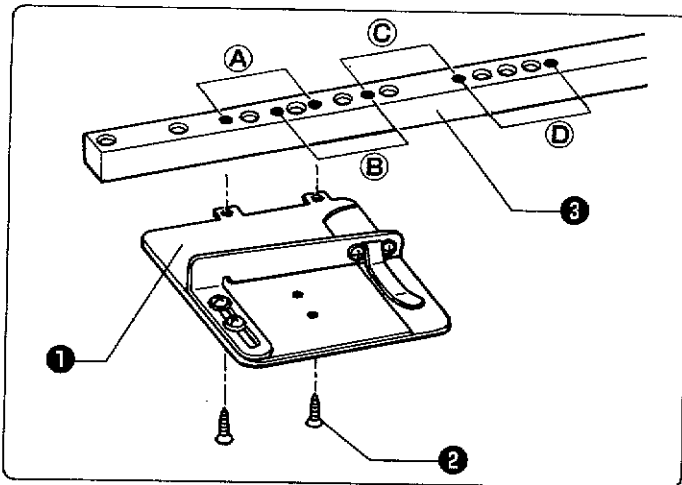
#### Horizontal setting position

The cloth is set to both the left setting position and right setting position.

\* The next piece of cloth is set at the position that the last buttonhole was sewn.

### 5-8. Setting the installation position for cloth feed plate (L) (-52 specifications)

The installation position for cloth feed plate (L) can be set to one of four positions depending on the spacing between buttonholes and the number of buttonholes to be sewn. When the spacing between buttonholes sewn have been changed, the installation position for cloth feed plate (L) should also be changed. Refer to the illustration and table below at this time.



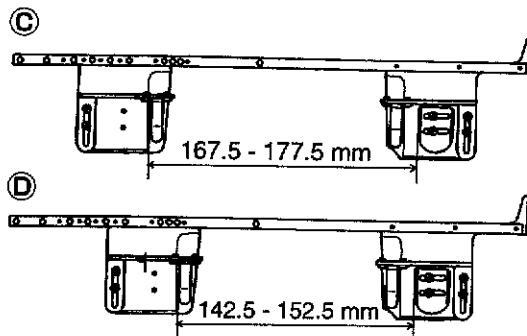
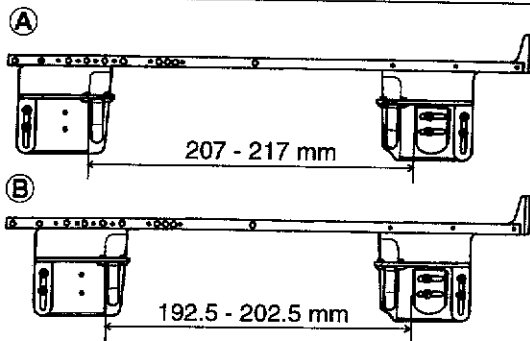
Install cloth feed plate (L) ① to the cloth feed bar ③ with the screws ②.

**Caution**

Do not sew four buttonholes when cloth feed plate (L) is installed in a position for sewing three buttonholes.

**Installation position**

Hole spacing \ No. of holes	38.1mm	44.45mm	50.8mm
3	D	D	C
4	B	C	A



### 5-9. Replacing the PROMs

Refer to the following when replacing the PROMs (for example, when upgrading the version number). At this time, be particularly careful not to make a mistake with the direction of the PROM.

<Control circuit board>

B981  
MN-□

The PROM which is marked "MN" is the main PROM. This PROM is mounted in position ①.

B981  
MT-□

The PROM which is marked "MT" is the machine motor PROM. This PROM is mounted in position ②.

<Panel circuit board>

B981  
PL-□

The PROM which is marked "PL" is the panel PROM. This PROM is mounted in position ③.

B981  
DA-□

The PROM which is marked "DA" is the data PROM. This PROM is mounted in position ④.

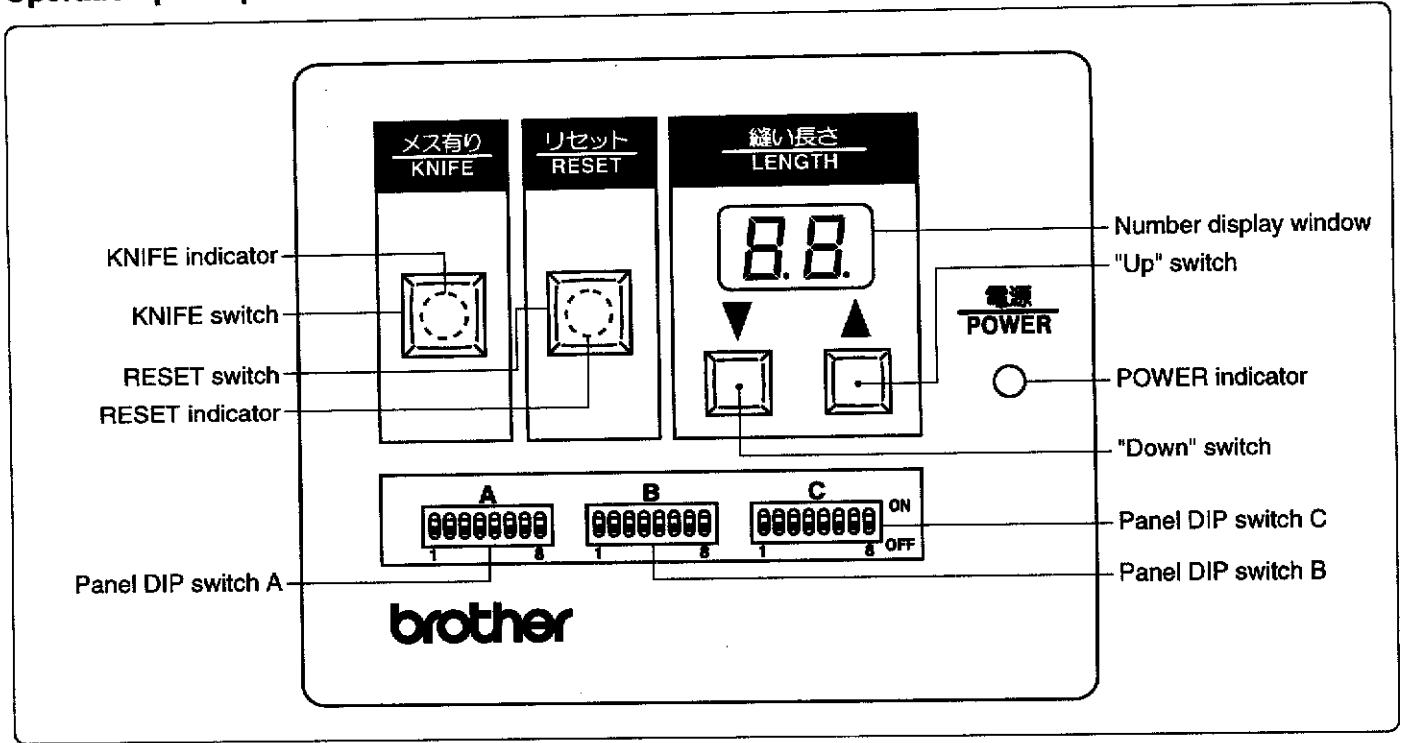
\* The data PROM is only mounted when carrying out sewing based on data created using the BAS-PC/300.

\* The figure inside the box indicates the version number.

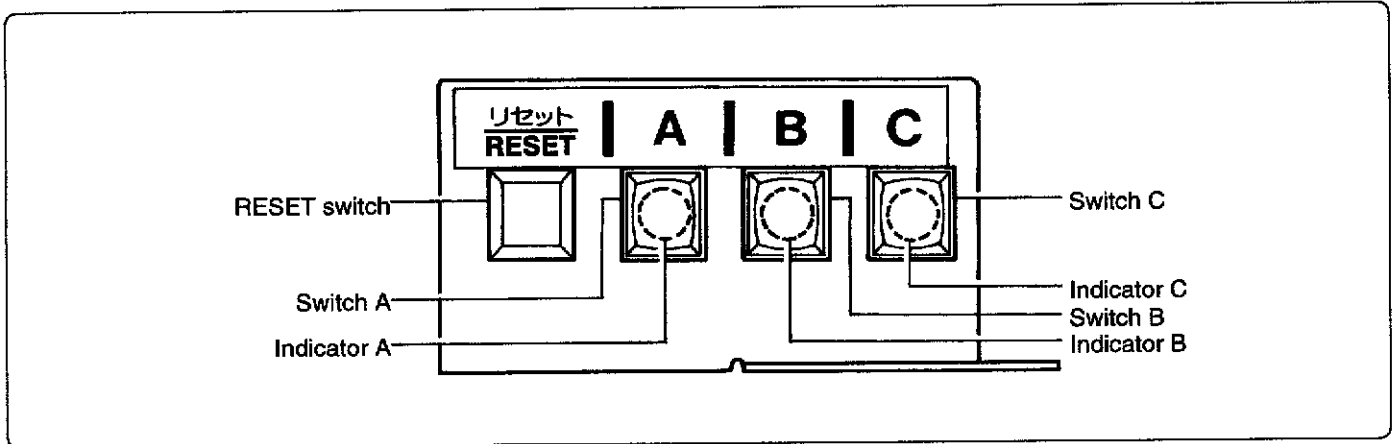
# 6. USING THE OPERATION PANEL

## 6-1. Panel switch and indicator names

### Operation panel part names

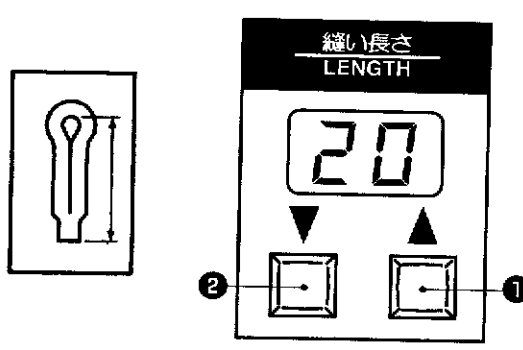


### Select switch (option) part names



If the start switch is pressed after the power is turned on, the feed bracket will move to the cloth setting position. The buttonhole length and the knife cutting operation can then be set.

## 6-2. Setting the buttonhole length



Specifications	Buttonhole length
L1	14 - 18 mm
L2	18 - 22 mm
L3	22 - 26 mm
L4	26 - 30 mm
L5	28 - 32 mm
L6	32 - 36 mm
L7	36 - 40 mm

1. The buttonhole can be set in steps of 1 mm.

\* Refer to the table below for the setting ranges.

Note:

You cannot set the buttonhole length to a value that would make the difference between the buttonhole length and the tacking length less than 7 mm.

2. Press the "Up" switch ① or the "Down" switch ② to set the desired buttonhole length.

Note:

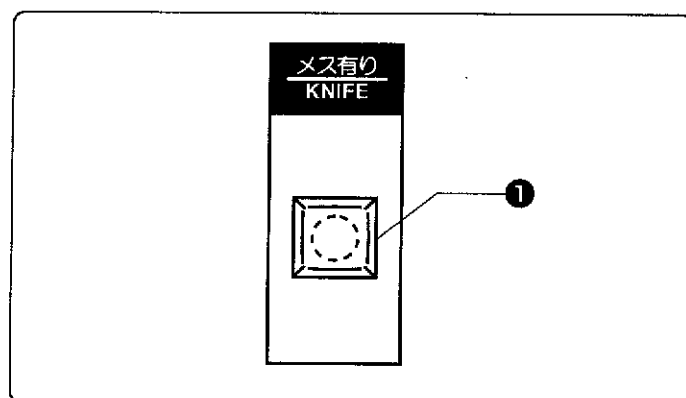
If the set buttonhole length is outside the allowable setting range because of changes made to the machine specifications, the data will be automatically changed so that it is within the allowable range.

Example: For L1 specifications

If the buttonhole length has been set to 20 mm and the machine is changed to L1 specifications, the buttonhole length will be automatically changed to 18 mm.

\* The buttonhole length setting is only valid when in AUTO mode.

## 6-3. Turning cutting on and off



1. Press the KNIFE switch ①.

\* The setting will switch between cutting on and cutting off.

\* When the KNIFE indicator is illuminated, cutting is turned on; if the KNIFE indicator is switched off, cutting is turned off.

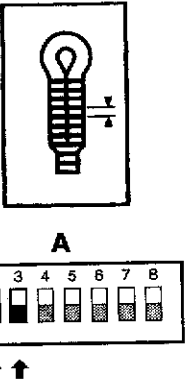
\* The knife will not operate when cutting is turned off.

Refer to page 34 for details on switching between cutting before sewing and cutting after sewing.

### 6-4. Setting by changing the panel DIP switches

Always turn off the power supply before changing any of the DIP switch settings.

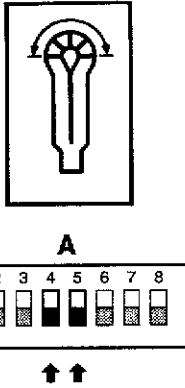
#### A. Setting the stitch pitch



No. 1	No. 2	No. 3	Stitch pitch
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	<input type="checkbox"/> ON	0.9 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	<input type="checkbox"/> OFF	1.0 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	<input type="checkbox"/> ON	1.1 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	1.2 mm
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	1.3 mm
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> ON	1.4 mm
<input type="checkbox"/> ON	<input type="checkbox"/> ON	<input type="checkbox"/> OFF	1.6 mm
<input type="checkbox"/> ON	<input type="checkbox"/> ON	<input type="checkbox"/> ON	1.8 mm

1. Turn off the power.
2. The stitch pitch can be set to between 0.9 - 1.8 mm.
3. Change the settings for panel DIP switch A No. 1, No. 2 and No. 3 to set the desired stitch pitch.
4. Turn on the power.

#### B. Setting the number of eyelet stitches



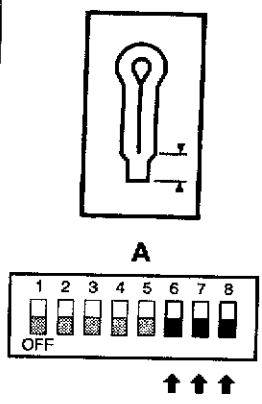
No. 4	No. 5	No. of eyelet stitches
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	Standard no. of stitches - 2
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	Standard no. of stitches - 1
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	Standard no. of stitches
<input type="checkbox"/> ON	<input type="checkbox"/> ON	Standard no. of stitches + 1

1. Turn off the power.
2. The stitch number setting range for eyelet buttonholes and straight buttonholes is the standard stitch number plus two stitches or minus one stitch.  
\* The standard number of stitches is automatically determined by the stitch pitch, cutting shape and whether cutting before sewing, or cutting after sewing have been set. (Refer to the table below.)
3. Change the settings for panel DIP switch A No. 4 and No. 5 to set the desired stitch pitch.
4. Turn on the power.

Standard number of eyelet stitches

Stitch pitch		0.9 mm	1.0 mm	1.1 mm	1.2 mm	1.3 mm	1.4 mm	1.6 mm	1.8 mm
		0.9 mm	1.0 mm	1.1 mm	1.2 mm	1.3 mm	1.4 mm	1.6 mm	1.8 mm
Cutting shape No. 1 (eyelet hole)	Cutting before sewing	10	9	8	7	7	6	6	6
	Cutting after sewing	11	10	9	8	8	7	7	6
Cutting shape No. 2 (eyelet hole)	Cutting before sewing	11	10	9	8	8	7	7	6
	Cutting after sewing	12	11	10	9	9	8	8	7
Cutting shape No. 3 (eyelet hole)	Cutting before sewing	12	11	10	9	9	8	8	7
	Cutting after sewing	13	12	11	10	10	9	8	7
Cutting shape No. 5 (straight hole)	Cutting before sewing	8	7	7	6	6	5	5	5
	Cutting after sewing	8	8	7	7	6	6	6	5

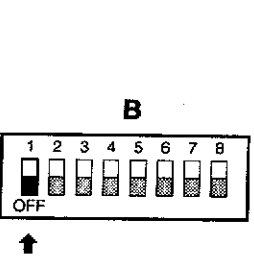
### C. Setting the taper bar tacking length



No. 6	No. 7	No. 8	Taper bar tacking length
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	<input type="checkbox"/> ON	0 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	<input type="checkbox"/> OFF	4 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	<input type="checkbox"/> ON	5 mm
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	6 mm
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	7 mm
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> ON	8 mm
<input type="checkbox"/> ON	<input type="checkbox"/> ON	<input type="checkbox"/> OFF	9 mm
<input type="checkbox"/> ON	<input type="checkbox"/> ON	<input type="checkbox"/> ON	10 mm

1. Turn off the power.
2. The taper bar tacking length can be set to between 4 - 10 mm.
3. Set to 0 mm for no taper bar tacking. At this time, the offset value is ignored.
4. Change the settings for panel DIP switch A No. 6, No. 7 and No. 8 to set the desired taper bar tacking length.
5. Turn on the power.

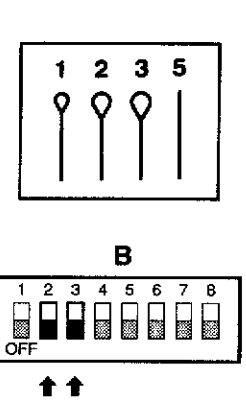
### D. Setting the knife operation method



No. 1	Knife operation method
<input type="checkbox"/> ON	Cutting before sewing
<input type="checkbox"/> OFF	Cutting after sewing

1. Turn off the power.
2. For cutting before sewing, the knife operates before the buttonhole is sewn. For cutting after sewing, the knife operates after the buttonhole is sewn.
3. Change the setting for panel DIP switch B No. 1 to set the desired knife operation method.
4. Turn on the power.

### E. Setting the eyelet shape



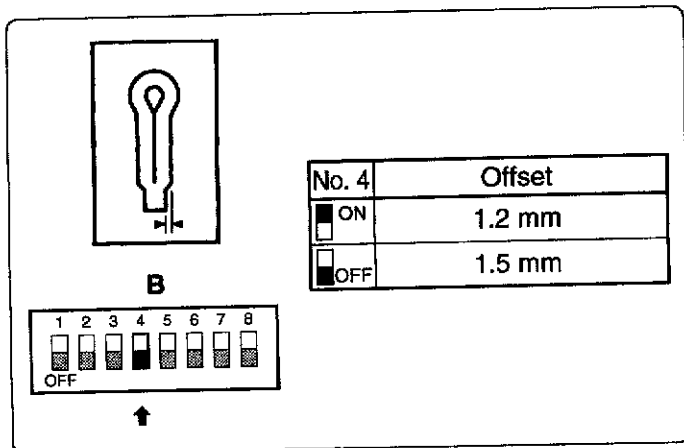
No. 2	No. 3	Eyelet shape (knife no.)
<input type="checkbox"/> OFF	<input type="checkbox"/> ON	Eyelet hole (No. 1)
<input type="checkbox"/> OFF	<input type="checkbox"/> OFF	Eyelet hole (No. 2)
<input type="checkbox"/> ON	<input type="checkbox"/> OFF	Eyelet hole (No. 3)
<input type="checkbox"/> ON	<input type="checkbox"/> ON	Straight hole (No. 5)

1. Turn off the power.
2. The eyelet shape can be selected from four types of cutting shape.  
\* Knife No. 2 is normally installed. Select the number for the eyelet shape that matches the number of the installed knife.
3. Change the settings for panel DIP switch B No. 2 and No. 3 to set the desired knife operation method.
4. Turn on the power.



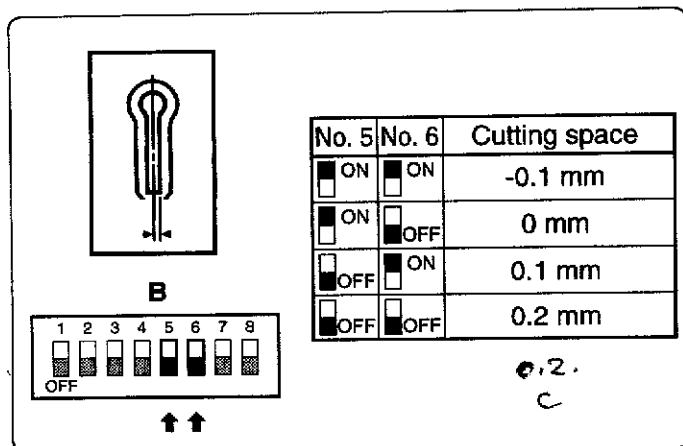
## 6. USING THE OPERATION PANEL

### F. Setting the offset (setting the taper bar tacking overlap)



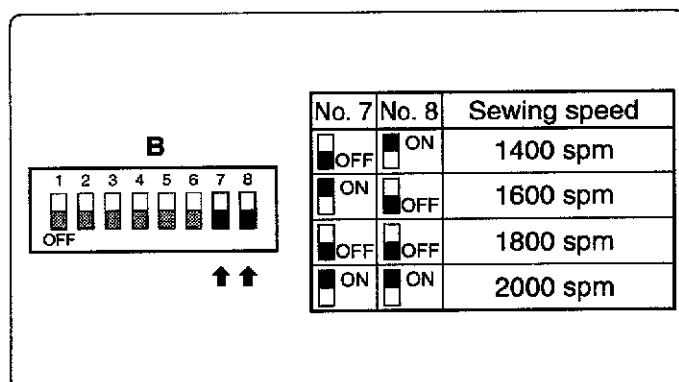
1. Turn off the power.
2. The offset can be set to 1.2 mm or 1.5 mm.
3. Change the setting for panel DIP switch B No. 4 to set the desired offset.
4. Turn on the power.

### G. Setting the cutting space

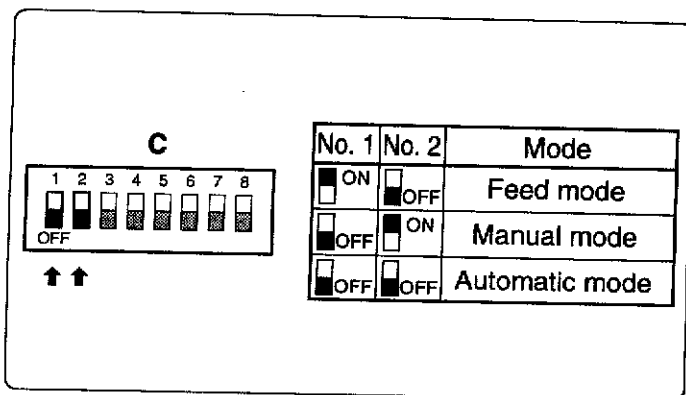


1. Turn off the power.
2. The cutting space can be set to between -0.1 - 0.2 mm.
3. Change the settings for panel DIP switch B No. 5 and No. 6 to set the desired cutting space.
4. Turn on the power.

### H. Setting the sewing speed

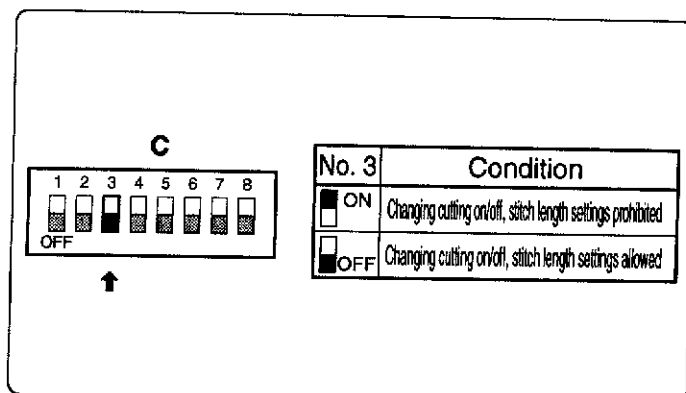


1. Turn off the power.
2. The sewing speed can be set to between 1,400 - 2,000 spm.
3. Change the settings for panel DIP switch B No. 7 and No. 8 to set the desired sewing speed.
4. Turn on the power.

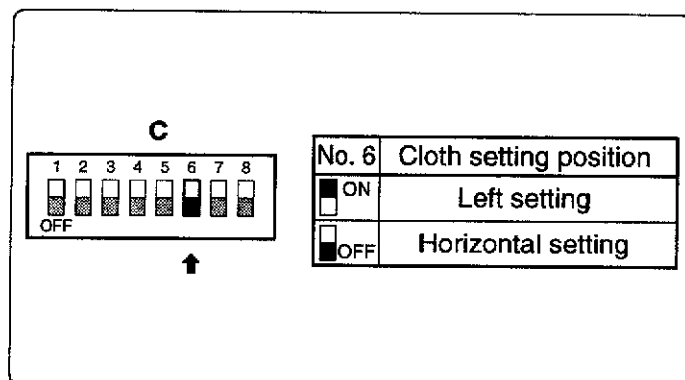
**I. Setting the mode**

1. Turn off the power.
2. Change the settings for panel DIP switch C No. 1 and No. 2 to set the desired mode.
3. Turn on the power.

- \* Feed mode is used to move only the feed bracket without sewing, in order to check the position of the article.
- \* Manual mode is used when sewing while turning the upper shaft by hand, in order to check operation.
- \* Automatic mode is used when carrying out sewing.

**J. Setting panel protection**

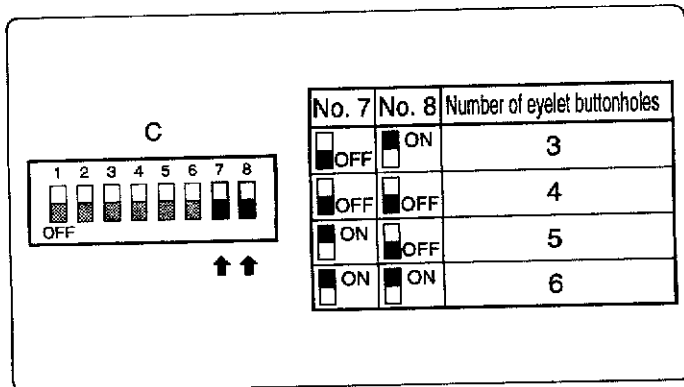
1. Turn off the power.
2. Change the settings for panel DIP switch C No. 3 to set the desired condition.
3. Turn on the power.

**K. Setting the cloth setting position (-52 specifications)**

1. Turn off the power.
2. The cloth setting position can be set to either left setting or horizontal setting.  
Setting is possible when the cloth setting bar is at the left setting position.
3. Change the settings for panel DIP switch C No. 6 to set the desired cloth setting position.
4. Turn on the power.
  - \* When set to the left setting position, cloth setting is always carried out at the left setting position.
  - \* When set to the horizontal setting position, cloth setting is carried out at both the left and right setting positions.

## 6. USING THE OPERATION PANEL

### L. Setting the number of eyelet buttonholes (-52 specifications)



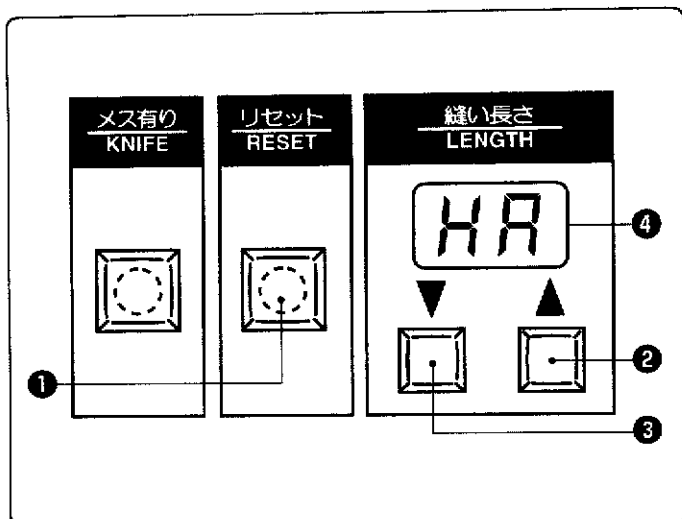
1. Turn off the power.
2. The setting range for the number of eyelet buttonholes for a single piece of cloth (fly) is 3 - 6 holes. Setting is possible when the cloth feed bar is at the left setting position.
3. Change the settings for panel DIP switch C No. 7 and No. 8 to set the desired number of eyelet buttonholes.
4. Turn on the power.

**Note:**

When changing the number of eyelet buttonholes, change the installation position of cloth feed plate (R). (Refer to page 30.)

### 6-5. Setting the number of home position start cycles

You can set the number of home position start cycles as a method of reducing the cycle time.



1. While pressing the RESET switch ①, turn on the power.
2. Press the "Up" switch ② or the "Down" switch ③ to set the number of home position start cycles in the number display window ④. The setting range is 0 - 9 and A.)
  - \* If the number of home position start cycles is set to "5", home position starting will occur once for each five sewing operations (for -52 specifications, once for each five pieces of cloth (fly)).
  - \* If the number of home position start cycles is set to "0", home position starting will not be carried out.
  - \* If the number of home position start cycles is set to "A", home position starting will be carried out for each hole.
3. Press the start switch to accept the new setting for the number of home position start cycles. The machine will then switch to the normal standby condition ("--" will appear on the display).

**Note:**

If home position starting is not carried out for each piece of material, there is the danger that the feed bracket may become overloaded for some reason and come off, which will affect the next piece to be sewn. Accordingly, it is recommended that you set the home position starting to be carried out each time ("HA" displayed).

## 6-6. Using the select switch (option)

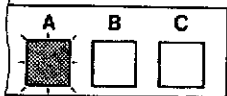
The select switch can be used to select a single program from either program A, program B or program C. The settings which are recorded for each program include the stitch length and whether cutting is turned on or off. All other settings are the same for all programs.

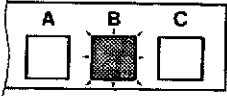
\* When the power is turned on and the start switch is pressed, the feed bracket moves to the cloth setting position. Select the program or change the program settings when the sewing machine is in this condition.

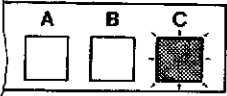
The programs are set as follows at the time of shipment from the factory.

	Program A	Program B	Program C
Stitch length	20 mm	20 mm	20 mm
Cutting on/off	Off	Off	Off

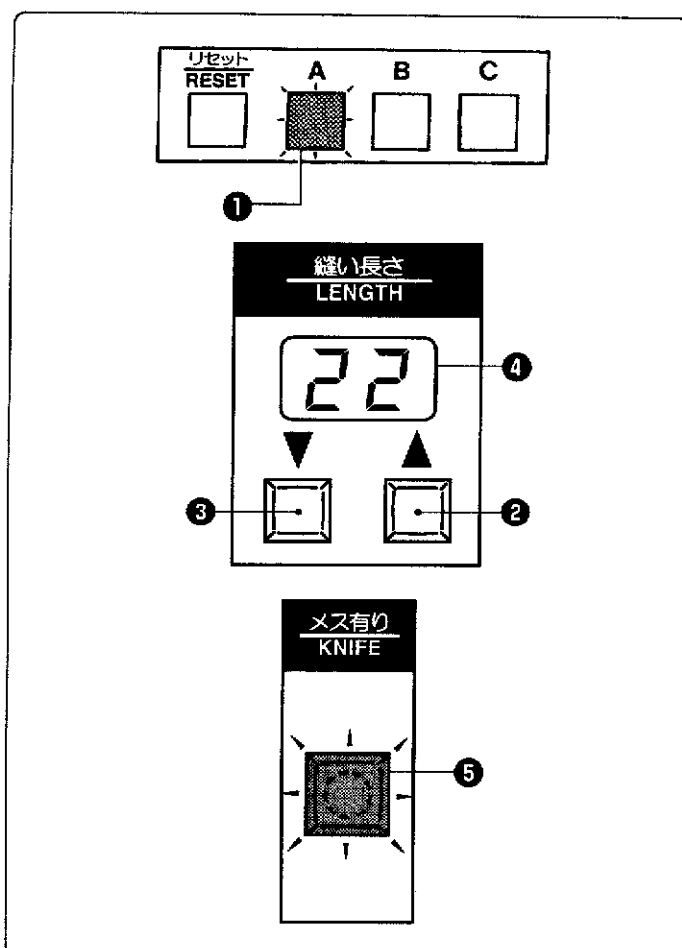
### 1. Selecting a program

Selecting program A  Press switch A. Indicator A will then illuminate.

Selecting program B  Press switch B. Indicator B will then illuminate.

Selecting program C  Press switch C. Indicator C will then illuminate.

### 2. Changing the program settings



Example: Changing the settings for program A (stitch length = 20 mm, cutting off) to a stitch length of 22 mm with cutting on.

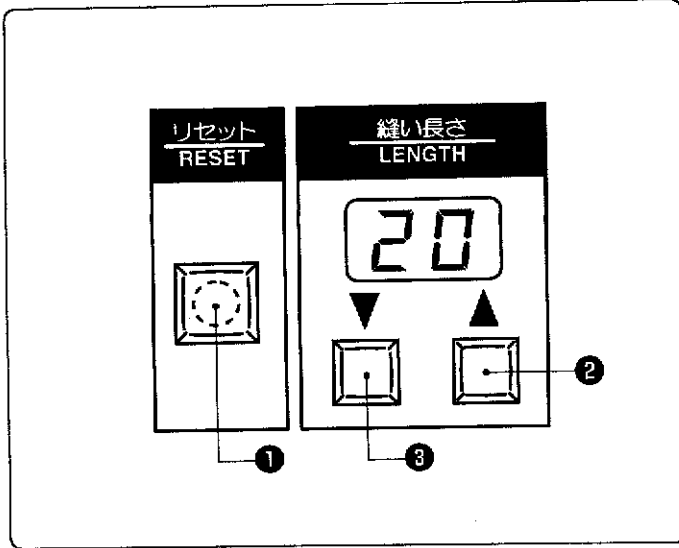
1. Press switch A ❶ so that indicator A illuminates.
2. Press the "Up" switch ❷ or the "Down" switch ❸ so that "22" is displayed in the number display window ❹.
3. Press the KNIFE switch ❺ so that the KNIFE indicator illuminates.

This completes the changing of the program settings.

### 3. Using the RESET switch

The RESET switch functions in the same way as the RESET switch on the operation panel. Operate it in the same way as the RESET switch on the operation panel.

### 6-7. Moving the cloth feed bar (-52 specifications)



While pressing the RESET switch ①, press the "Up" switch ② or the "Down" switch ③.  
The cloth feed bar will then move in the right direction or the left direction.

\* This operation is only possible when the cloth feed plate is in the left setting position (home condition).

## 6-8. List of error codes

If the buzzer sounds with a series of short beeps, a series of long beeps or a continuous beep and the RESET indicator illuminates, an error code will appear in the number display window. Check the displayed error code against the codes in the following table.

	Code	Explanation	Resetting method
Error after power is turned on	00	EMERGENCY STOP switch was pressed.	Release the EMERGENCY STOP switch and then press the RESET switch.
	02	Machine head is raised (machine head safety switch is off)	Turn off the power and check.
	03	Cloth presser switch was pressed.	Release the cloth presser switch and then press the RESET switch.
	04	Start switch was pressed.	Release the start switch and then press the RESET switch.
	06*	Limit switch (R) is turned off	Turn the limit switch on (set the cloth feed plate to the left setting position).
	07*	Limit switch (L) is turned off	Turn off the power and check.
	09	Sewing specification harness, sewing length harness and PROM version are not identical.	Turn off the power and check.
	10	Needle bar is not at the highest position.	Set the needle bar to the highest position.
	12	Cutting block is lowered.	Turn off the power and check.
	15	Lower thread and gimp trimming knife does not retract.	Turn off the power and check.
	26	Poor connection in power supply circuit board and main circuit board cables.	Turn off the power and check.
	27	Memory read/write error	Turn off the power and check.
	28	Communication ready error (panel-side)	Turn off the power and check.
29	Communication ready error (machine motor-side)	Turn off the power and check.	
Error before operation	30	EMERGENCY STOP switch was pressed.	Release the EMERGENCY STOP switch and then press the RESET switch.
	32	Machine head is raised (machine head safety switch is off).	Turn off the power and check.
	36*	Limit switch (R) is not on when it should be on.	Turn off the power and check.
	37*	Limit switch (L) is not on when it should be on.	Turn off the power and check.
	38*	Cylinder sensor is not on when it should be on.	Turn off the power and check.
	40	Needle bar has not been raised.	Set the needle bar to the highest position and then press the RESET switch.
	42	Cutting block is lowered.	Turn off the power and check.
	45	Lower thread and gimp trimming knife does not retract.	Turn off the power and check.
	50	X axis is not at the home position.	Turn off the power and check.
51	Y axis is not at the home position.	Turn off the power and check.	
52	$\theta$ axis is not at the home position.	Turn off the power and check.	
59	Sewing data has been corrupted.	Turn off the power and check.	

\* -52 specifications only

## 6. USING THE OPERATION PANEL

	Code	Explanation	Resetting method
Errors during operation	60	EMERGENCY STOP switch was pressed.	Press the RESET switch (to interrupt) or the start switch (to continue).
	62	Machine head is raised (machine head safety switch is off).	Turn off the power and check.
	66*	Limit switch (R) does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	67*	Limit switch (L) does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	68*	Cylinder sensor does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	70	Needle up signal does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	71	Needle down signal does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	72	Cutting block operation is incorrect.	Turn off the power and check.
	75	Lower thread and trimming operations are incorrect.	Turn off the power and check.
	76	Needle up signal is off during cloth feed bar movement.	Turn off the power and check.
	77	Synchronizer signal does not turn on and off when the sewing machine is starting.	Turn off the power and check.
	80	X axis does not return to the home position when the feed bracket returns to the home position.	Turn off the power and check.
	81	Y axis does not return to the home position when the feed bracket returns to the home position.	Turn off the power and check.
82	$\theta$ axis does not return to the home position when the feed bracket returns to the home position.	Turn off the power and check.	
Hardware errors	90	Communication error	Turn off the power and check.
	91	Machine motor operation error	Turn off the power and check.
	92	Abnormal voltage error	Turn off the power and check.
	93	Fan (large) lock error	Turn off the power and check.
	94	Fan (small) lock error	Turn off the power and check.
	95	X motor overcurrent error	Turn off the power and check.
	96	Y motor overcurrent error	Turn off the power and check.
	97	Control circuit board overheating error	Turn off the power and check.

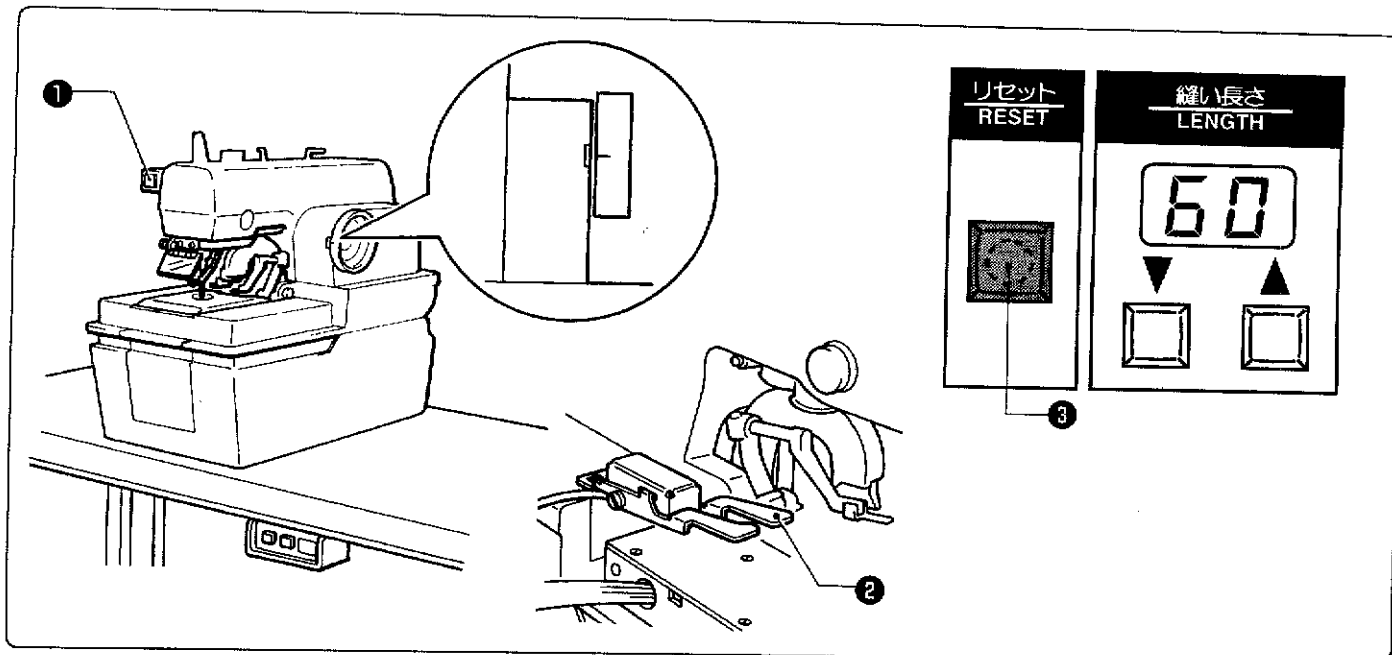
\* -52 specifications only

## 7. SEWING

Make sure you know where the EMERGENCY STOP switch is and how it is used before operating the sewing machine.

### 7-1. Using the EMERGENCY STOP switch

#### In automatic mode



1. Press the EMERGENCY STOP switch ①.
1. \* All machine operations will stop and the buzzer will sound. The RESET indicator will illuminate and "60" will appear on the number display window at this time.
2. Eliminate the cause of the problem.
  - \* Be careful not to depress the start switch ② by mistake when eliminating the cause of a problem after the EMERGENCY STOP switch ① has been pressed, otherwise the sewing machine might start operating.
  - \* The machine will not always stop in the needle up position if the EMERGENCY STOP switch ① is pressed during sewing.
  - If "40" appears in the number display window, turn the upper shaft pulley by hand to raise the needle to the needle up position (so that the marks are aligned).
3. To continue sewing, press the start switch ②.
  - \* The RESET indicator will switch off, the "60" will be cleared from the number display window and sewing will begin again.
  - To stop sewing, press the RESET switch ③.
  - \* The RESET indicator will switch off, the "60" will be cleared from the number display window and the feed bracket will return to the cloth setting position.

#### In manual mode or in automatic mode

1. Press the EMERGENCY STOP switch ①.
  - \* All machine operations will stop and the buzzer will sound. The RESET indicator will illuminate and "60" will appear on the number display window at this time.
2. Eliminate the cause of the problem.
3. Press the RESET switch ③.
  - \* The RESET indicator will switch off, the "60" error code will be cleared from the number display window and the feed bracket will return to the cloth setting position.



## 7-2. Sewing

## ⚠ CAUTION



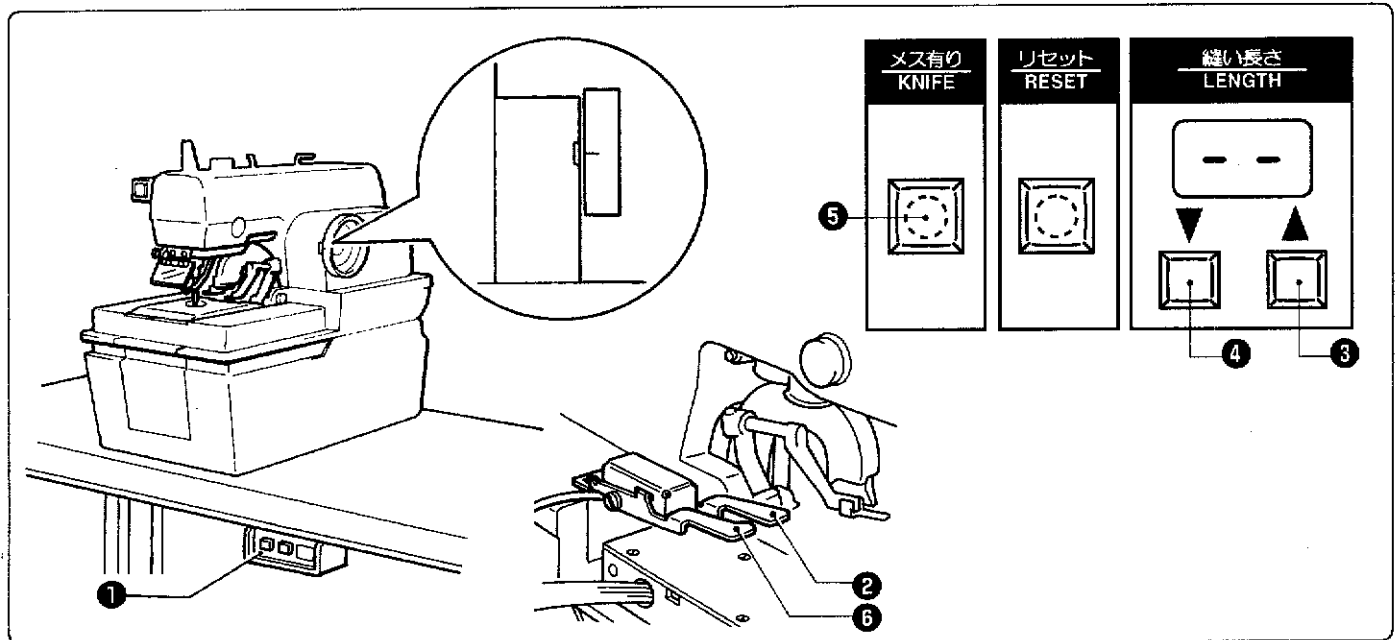
• Turn off the power switch at the following times, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

- When threading the needle
- When replacing the needle
- When not using the machine and when leaving the machine unattended



• Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.

When carrying out automatic sewing for the first time, be sure to carry out a test sewing first.



1. Switch the sewing machine to automatic mode. (Refer to page 36.)
  2. Press the power switch ① to turn on the power.
    - \* The POWER indicator will illuminate and "--" will appear in the number display window.
    - \* If the buzzer sounds and "10" appears on the number display window, raise the needle to the needle up position.
  3. Press the start switch ②.
    - \* The "--" display will be cleared from the number display window and the feed bracket will move to the cloth setting position.
  4. Press the "Up" switch ③ or the "Down" switch ④ to set the desired stitch length. (Refer to page 32.)
  5. Press the KNIFE switch ⑤ to turn cutting on or off as desired. (Refer to page 32.)
    - \* If sewing with cutting before sewing set, note that when the start switch 2) is pressed, the feed bracket will move and the cutting block will be lowered.
  6. Place the material to be sewn under the cloth presser, and then press the cloth presser switch ⑥ to lower the cloth presser. Then release the cloth presser switch ⑥.
    - To reset the material to be sewn, press the cloth presser switch ⑥ once more. The cloth presser will then be raised.
  7. Press the start switch ②. Sewing will then start.
  8. When sewing is finished, the cloth presser will be raised.
    - To repeat this operation, repeat steps 6. and 7. above.
- Note: After you have finished with the machine and have turned the power off, the previous sewing data will still be retained in memory even when the power is turned back on again. Thus you can continue with the same type of sewing.

Check the thread tension after sewing. Refer to the following page.

### 7-3. Adjusting the thread tension

Turn off the power.

Never adjust the thread tension while sewing.

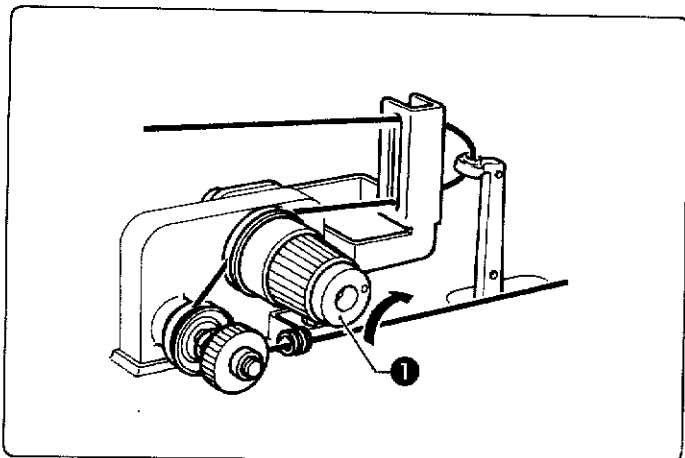
#### <Reference values>

	Woolen materials + wool gimps	Denim (3 layers)
Upper thread tension	0.882 N (90 g)	0.98 N (100 g)
Lower thread tension	0.294 N (30 g)	0.784 N (80 g)
Thread take-up spring tension	0.049 N (5 g)	0.068 N (7 g)
Thread take-up spring stroke	8 mm	8 mm
Upper and lower thread	#30 polyester	#30 cotton

\* If you change the type of material being used, it may be necessary to change the thread tension.

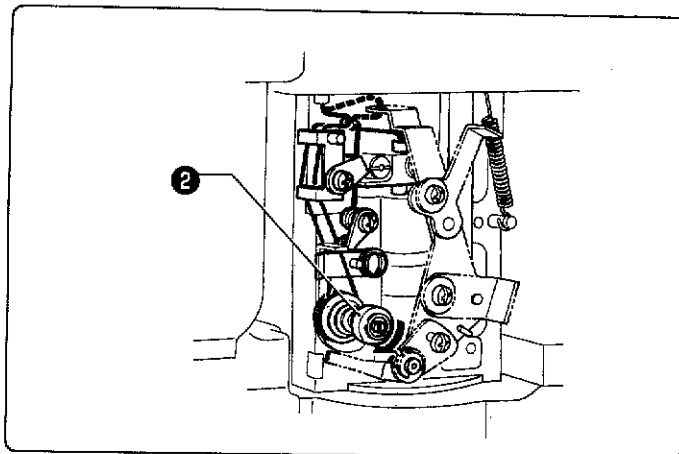
The upper thread tension given above is the tension when the upper thread is pulled out from the thread path hole of the thread take-up lever, and the lower thread tension is when the lower thread is pulled out from the needle hole in the throat plate.

#### Upper thread tension



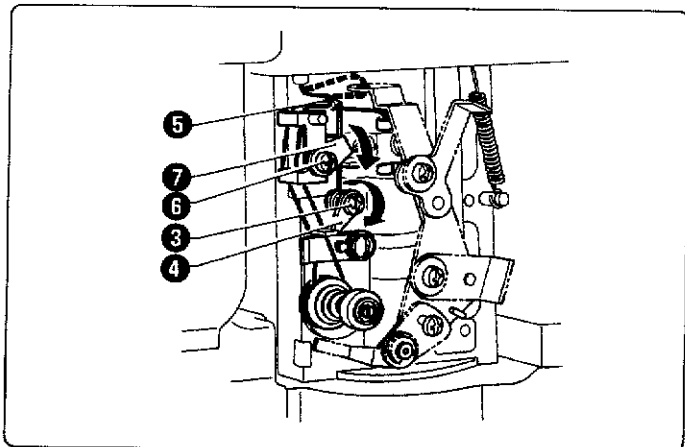
Turn the upper thread tension adjustment knob ① in the direction indicated by the arrow to increase the upper thread tension.

#### Lower thread tension



Turn the lower thread tension adjustment knob ② in the direction indicated by the arrow to increase the lower thread tension.

#### Adjusting the lower thread take-up spring tension and stroke



##### Tension adjustment

Loosen the screw ③ and turn the thread take-up spring support ④ in the direction indicated by the arrow to increase the tension of the spring ⑤.

##### Stroke adjustment

Loosen the screw ⑥ and turn the thread take-up spring guide ⑦ in the direction indicated by the arrow to increase the stroke of the spring ⑤.

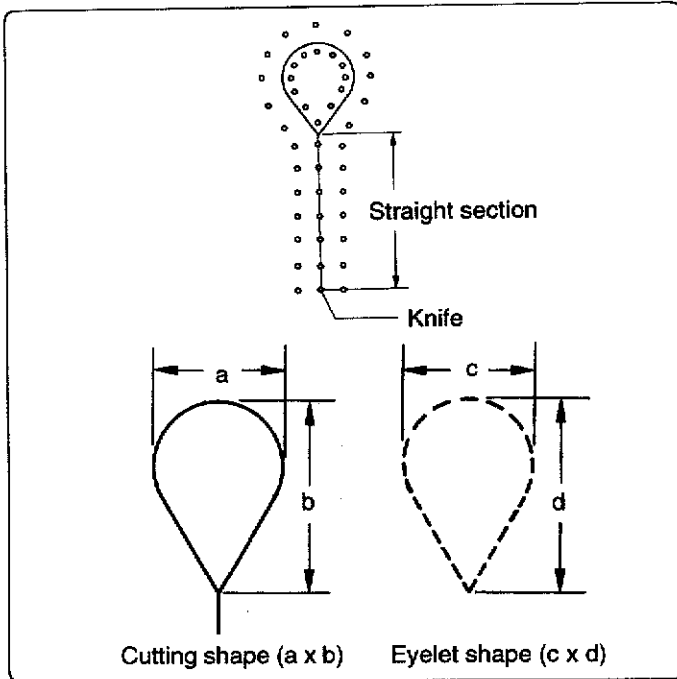
### 7-4. Needle and knife position

The feed bracket is electronically controlled by means of pulse motors.

It is not necessary to change the position of the knife when switching between cutting before sewing and cutting after sewing.

It is not necessary to change the needle down position in order to keep enough space for cutting when cutting after sewing has been selected.

#### Relationship between knife position and eyelet shape

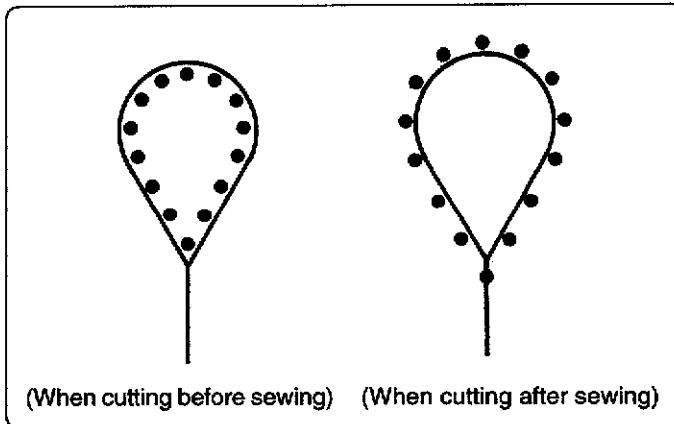


1. When cutting before sewing, the inside needle down position must be aligned accurately with the straight line section of the eyelet (when the cutting space H is 0). This is set correctly at the time of shipment from the factory.

2. The shape of the eyelet is automatically changed according to the shape of the knife for cutting before and after sewing and for no cutting.

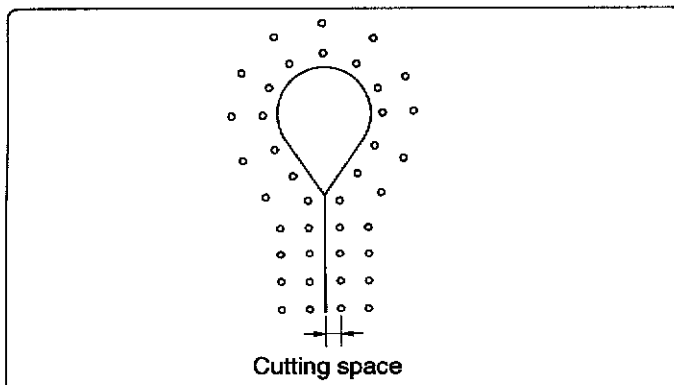
Knife No.	Cutting shape (a x b)	Eyelet shape (c x d)	
		Cutting before sewing or no cutting	Cutting after sewing
1	2.1 x 3.2	1.7 x 2.7	2.5 x 3.8
2	2.8 x 4.3	2.4 x 3.9	3.2 x 4.9
3	3.0 x 4.6	2.6 x 4.1	3.4 x 5.2
5	Straight	Straight	Straight

3. At the time of shipment, the installation position for the knife is adjusted to the position shown in the illustration at left (when the cutting space value is "0").



#### Explanation of the cutting space function

When cutting after sewing, this function moves the outer needle down positions in accordance with the knife shape so that the seam is not cut by the knife.

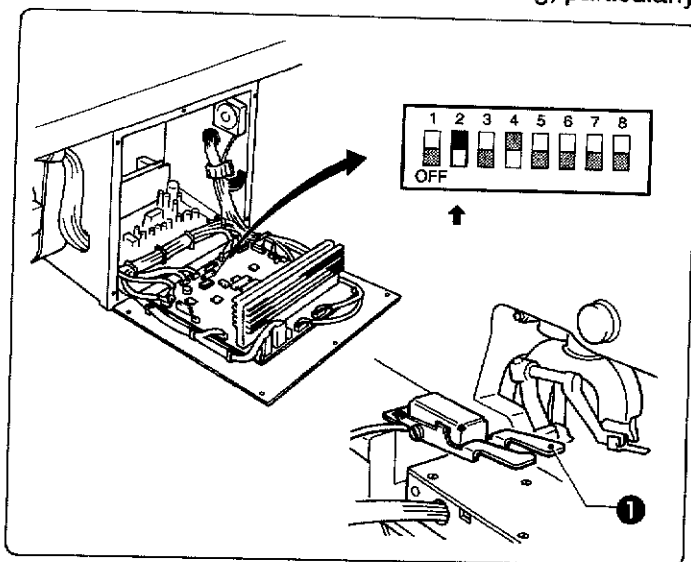


1. When cutting after sewing, set the cutting space to an appropriate value so that the seam is not cut by the knife.

\* The cutting space should generally be set to around 0.2. (Refer to page 35 for details on the setting method.)

## 7-5. Setting the feed bracket to the front position

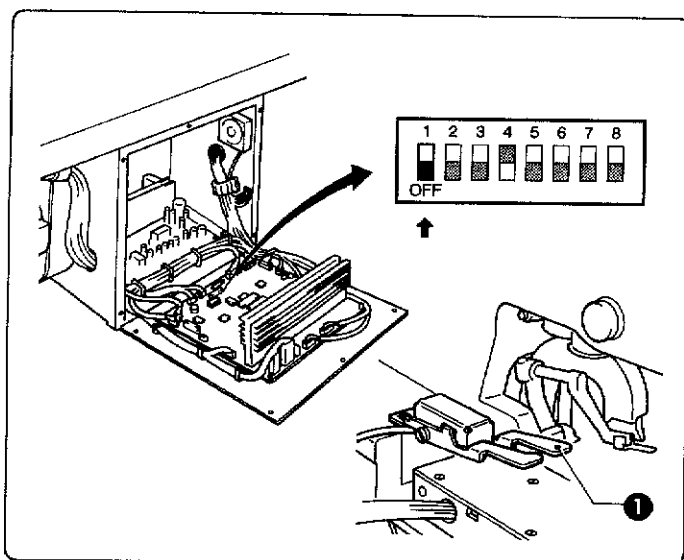
Setting the material will be easier if the feed bracket is moved forward from the standard cloth setting position.  
 \* Cycle time will be reduced with this setting, particularly if cutting after sewing is selected.



1. Turn off the power.
2. Set DIP switch C No. 2 on the control circuit board to ON.
3. Turn on the power.
4. Press the start switch ❶.
5. The feed bracket will move to the home position and then to the front position.
6. Sewing can then be carried out as normal. (Refer to page 43.)

## 7-6. Switching between single-pedal and dual-pedal operation

The cloth presser can be lowered and the machine can start sewing just by pressing the start switch, without having to use the cloth presser switch.



1. Turn off the power.
2. Change the setting of DIP switch C No. 1 on the control circuit board.  
 OFF: To use both pedals (cloth presser switch and start switch)  
 ON: To use only one pedal (start switch)
3. Turn on the power and press the start switch ❶.
4. Move the feed bracket to the cloth setting position.
5. Sewing can then be carried out as normal. (Refer to page 43.)

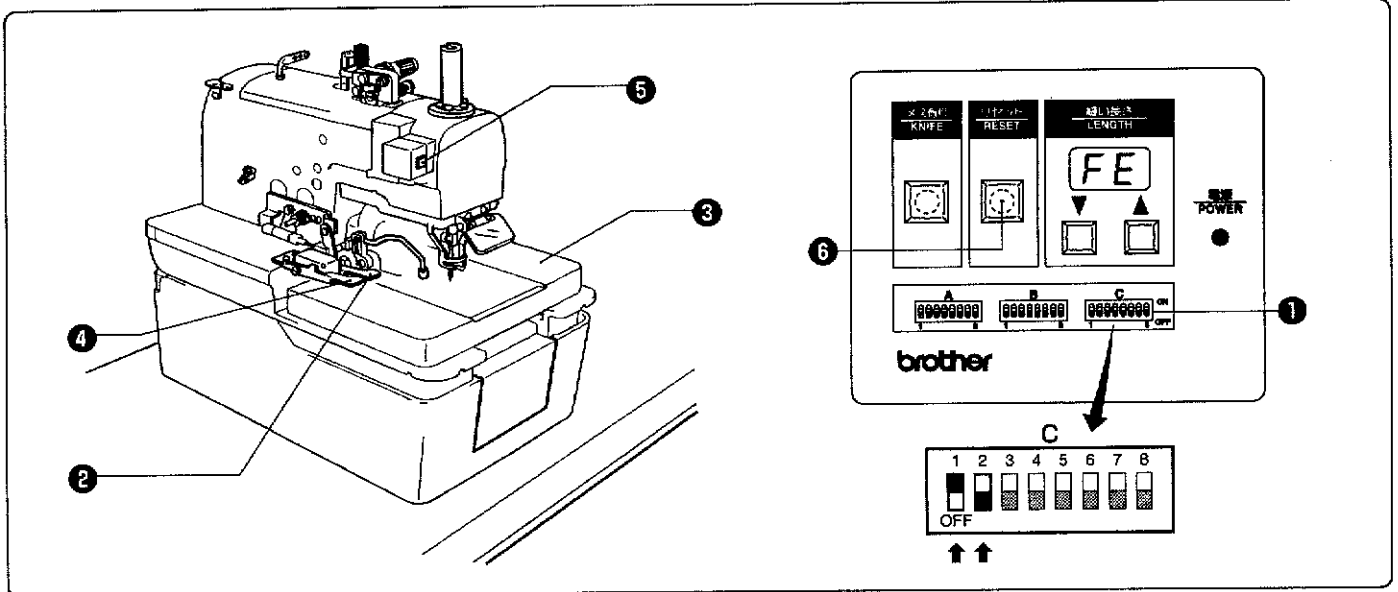
### Note:

During single pedal operation, when the start switch is pressed, the cloth presser is lowered and sewing starts straight away.

If you would like to reset the material, set to dual-pedal operation.

## 7-7. Using feed mode

In this mode, the feed bracket and the cloth presser can be moved while the needle is stopped. It is useful for checking the relative positions of the throat plate and the cloth presser. However, the buttonhole length cannot be changed.

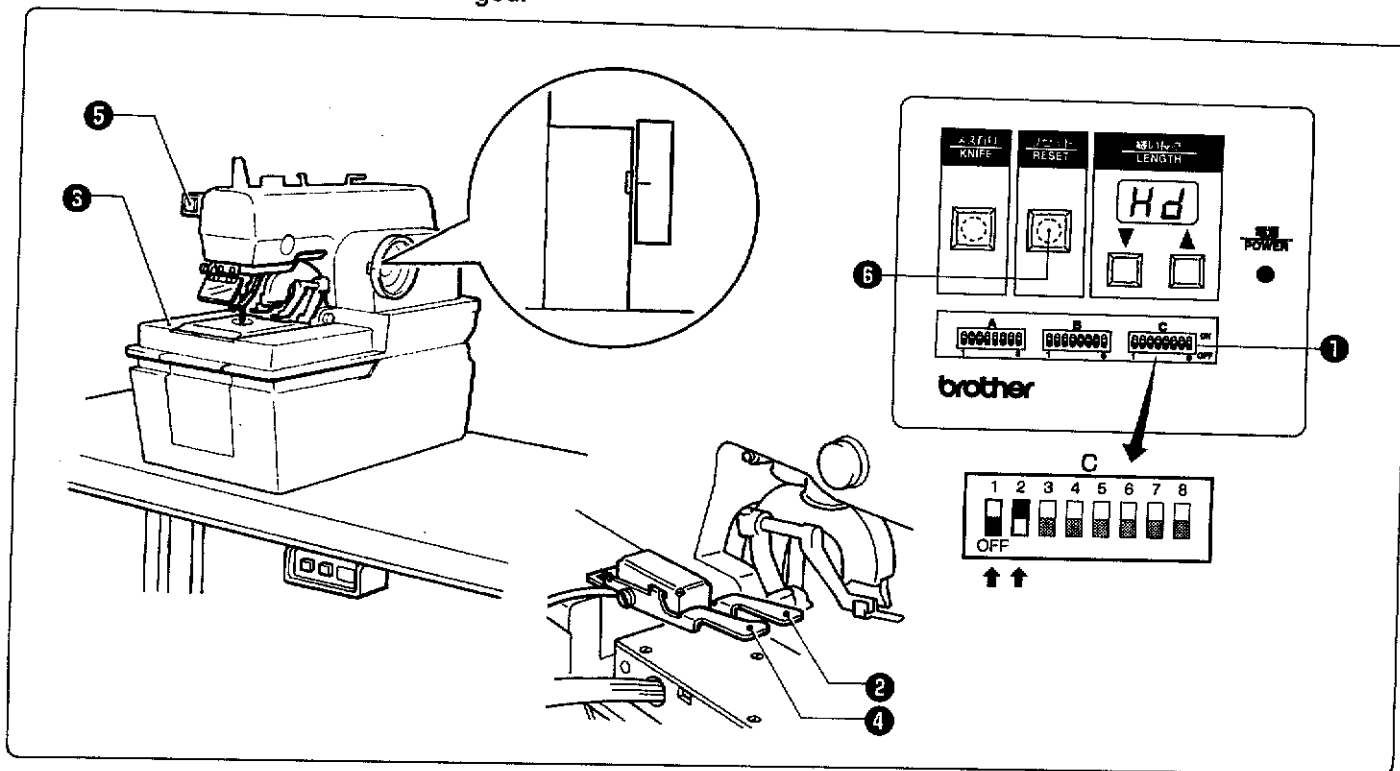


1. Turn off the power.
  2. Set DIP switch C ① No. 1 and No. 2 on the control circuit board to ON and OFF respectively.
  3. Turn on the power.
    - \* "FE" will appear to indicate feed mode.
  4. Press the start switch ②.
    - \* The feed bracket ③ will move to the cloth setting position.
  5. Press the cloth presser switch ④. The cloth presser will be lowered.
  6. Press the start switch ②.
    - \* The feed bracket ③ will move to the sewing start position.
    - \* When the start switch ② is pressed, the feed bracket ③ will move to the next sewing start position.
    - \* To return the feed bracket ③ to the cloth setting position while sewing:
      - 1) Press the EMERGENCY STOP switch ⑤.
      - 2) Press the RESET switch ⑥.
- Note: The knife will not operate during this time.

## 7-8. Using manual mode

In this mode, the needle and the feed bracket can be moved one stitch at a time by turning the upper shaft pulley by hand.

It is useful for checking the positions of the needle and the looper after the looper timing has been adjusted. However, the buttonhole length cannot be changed.



1. Turn off the power.
2. Set DIP switch C ① No. 1 and No. 2 on the control circuit board to OFF and ON respectively.
3. Turn on the power.
  - \* "Hd" will appear to indicate manual mode.
4. Press the start switch ②.
  - \* The feed bracket ③ will move to the cloth setting position.
5. Press the cloth presser switch ④. The cloth presser will be lowered.
6. Press the start switch ②.
  - \* The knife will operate only when cutting before sewing has been set.
  - \* The feed bracket ③ will move to the sewing start position.
7. Turn the upper shaft pulley toward you.
  - The feed bracket ③ will move to the next sewing position in accordance with the rotation of the upper shaft.
  - Note: If the upper shaft pulley is turned in the wrong direction, the feed bracket timing may become disrupted.
  - \* To return the feed bracket ③ to the cloth setting position while sewing:
    - 1) Press the EMERGENCY STOP switch ⑤.
    - 2) Press the RESET switch ⑥. The feed bracket ③ will then return to the cloth setting position.
8. Turn the upper shaft pulley until the last stitch has been sewn. The buzzer will then sound.
  - Note: Check that the mark on the upper shaft pulley is aligned with the notch in the pulley cover.
9. Press the start switch ③.
  - \* The movement of the feed bracket ③, lower thread trimming and operation of the cloth presser will all be carried out as a single step.
  - \* The knife will operate only when cutting after sewing has been selected.

## 8. CLEANING AND MAINTENANCE

### ⚠ CAUTION

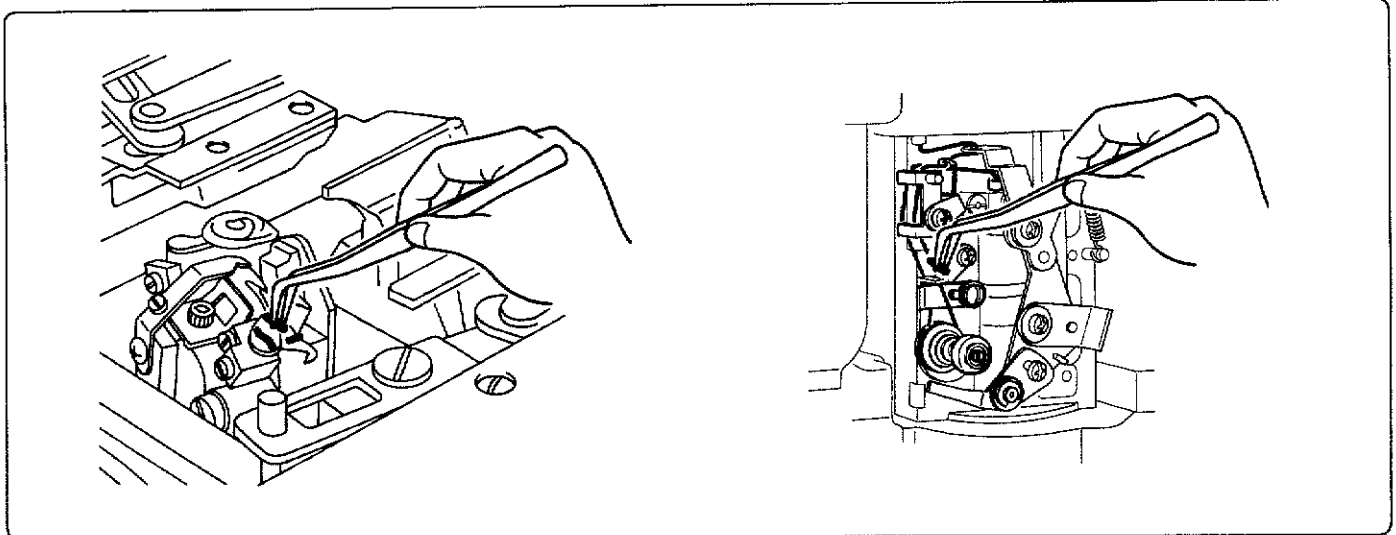


• Turn off the power switch before starting any cleaning work, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.



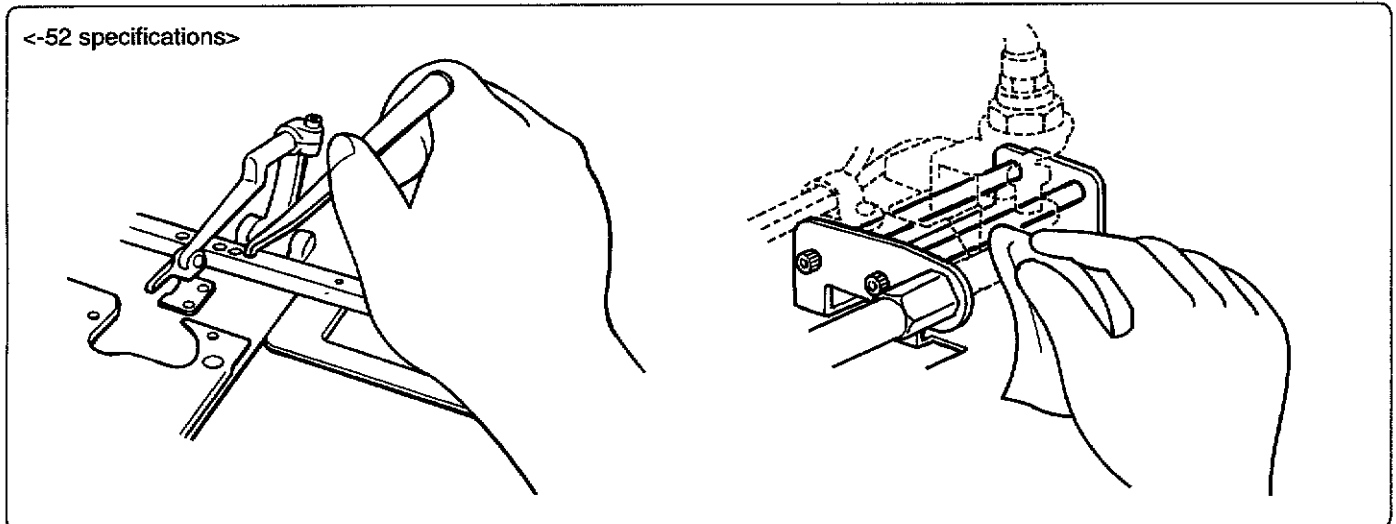
• Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea. Keep the oil out of the reach of children.

### 8-1. Cleaning



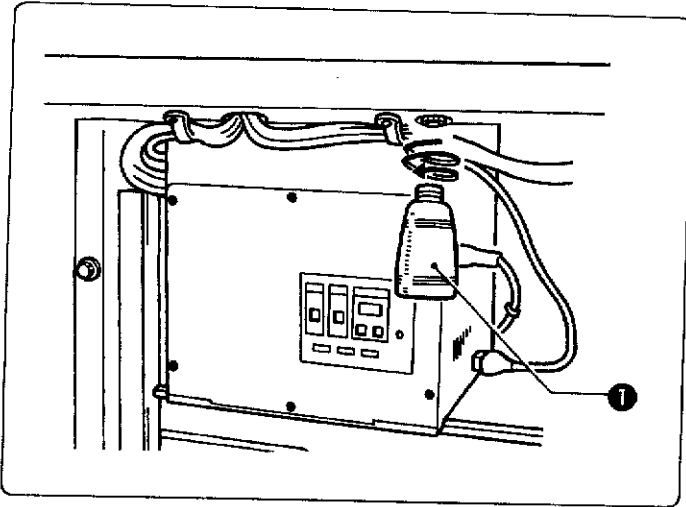
1. Turn off the power.
2. Turn the air cock to stop the air.  
\* Turn the knob to release the air.
3. Remove any thread scraps and dust, etc. from the thread paths for the needle thread, looper thread and gimp. In particular, the looper thread path should be cleaned every day to keep it free from thread scraps and dust.
4. Check the oil level by looking at the sight glass. If the oil level is low, replenish the oil supply.

<-52 specifications>



5. Remove any thread scraps and dust which have collected in the holes of the cloth feed bar.
6. Wipe away any thread scraps and dust which are adhering to the feed guide shaft.

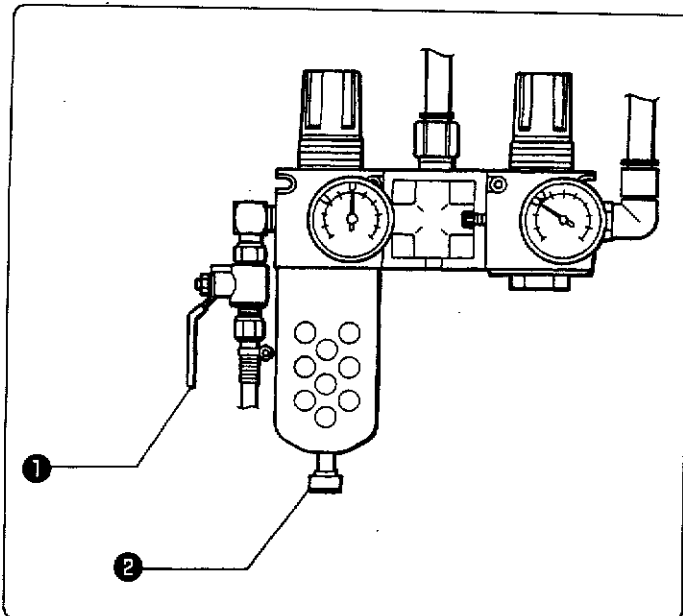
### 8-2. Draining the oil



1. When the oil container ① is full of oil, remove the oil container ① and let the oil drain out.

Note: Clean up any oil that may have been spilt onto the floor.

### 8-3. Checking the air filter



1. Close the air cock ①.
2. Turn the screw ② to release any air and water in the drain.



## 9. STANDARD ADJUSTMENTS

### ⚠ CAUTION



• Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.



• Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.



• Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the start switch is pressed by mistake, which could result in injury.

- When carrying out inspection, adjustment and maintenance
- When replacing consumable parts such as the loopers, spreaders, knife and cutting block



• Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.



• If the power switch and air need to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

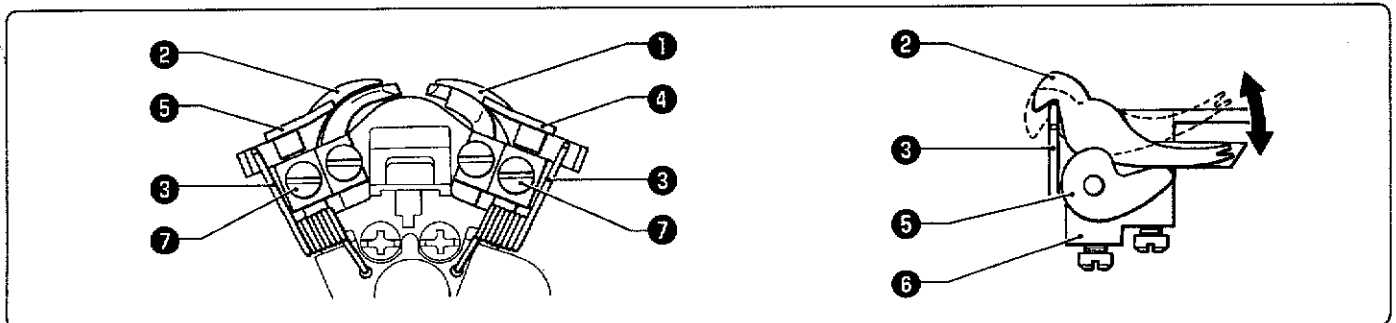


• If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.

### 9-1. Adjusting the height of the spreader and looper

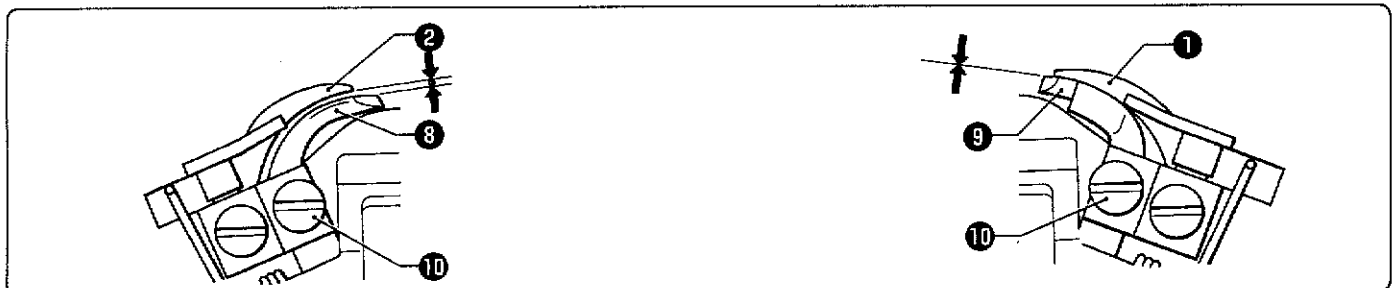
#### Spreader height

The clearance between the left spreader (forked spreader) and the left looper must be set to match the thickness of the looper thread. The clearance between the right spreader and the right looper should be as small as possible while still letting the parts slide.



1. The right spreader ① and left spreader ② move by means of springs ③. Adjust so that the spreaders move smoothly between the right spreader stopper ④, the left spreader stopper ⑤ and the looper holder base ⑥, with no looseness.
2. If adjustment is necessary, loosen the screw ⑦ and then move the right spreader stopper ④ or left spreader stopper ⑤ up or down.

#### Looper height



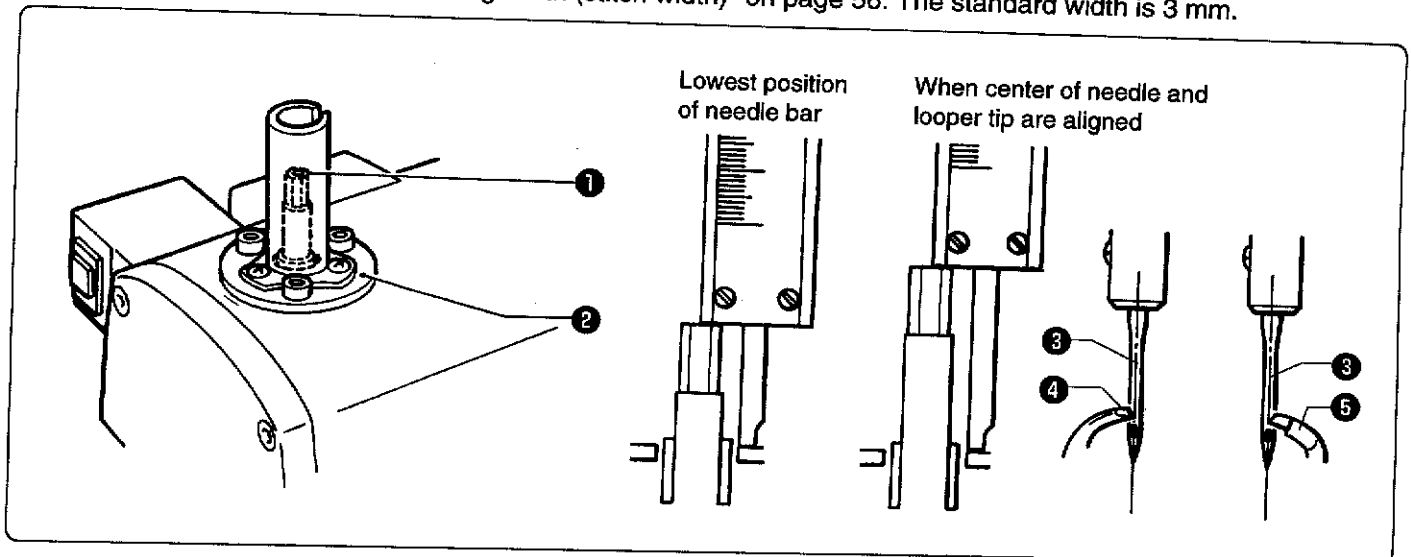
1. Set the clearance between the left looper ⑧ and the left spreader ② to the same distance as the thickness of the lower (looper) thread.
2. The clearance between the right looper ⑨ and the right spreader ① should be as small as possible.
3. If adjustment is necessary, loosen the screw ⑩ and then move the left looper ⑧ and right looper ⑨ up or down.

## 9-2. Adjusting the needle and looper timing

The distance by which the needle bar rises from its lowest position to the position where the tip of the left looper and the center of the needle are aligned should be the same as the distance from its lowest position to the position where the tip of the right looper and the center of the needle are aligned.

Before adjusting the looper timing, first adjust the stitch width (needle racking width).

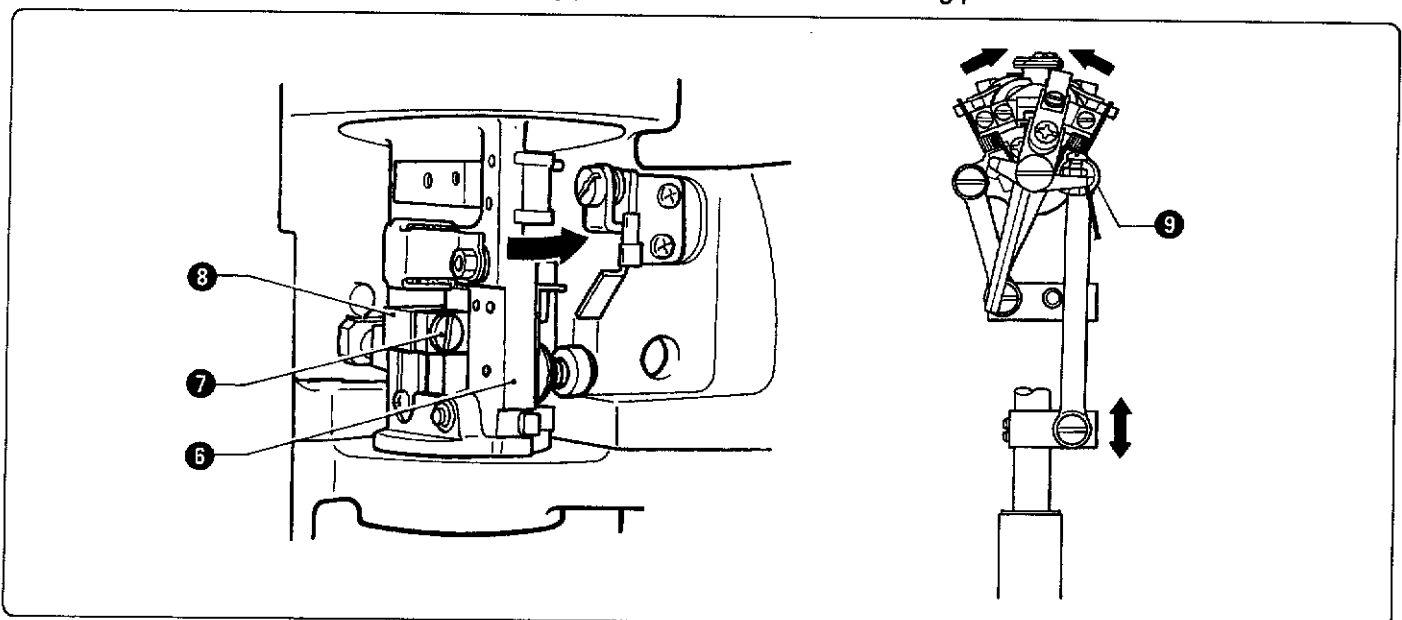
\* Refer to "Adjusting the needle racking width (stitch width)" on page 56. The standard width is 3 mm.



1. Move the needle bar to its lowest position.
2. Use calipers to measure the distance between the end of the needle bar ① and the top of the needle bar bracket ② when the needle bar is at its lowest position.
3. Turn the upper shaft pulley until the tip of the left looper ④ and the center of the needle ③ are aligned when the needle ③ is at the inside sewing position, and then use the calipers to take the same measurement as taken in step 2. Find the difference between the measurements taken in this step and in step 2.
4. Follow the same procedure as in step 3. above to find the difference between the two measurements when the needle ③ is at the outside sewing position.

\* When the needle ③ is at the inside sewing position, the tip of the left looper ④ should be aligned with the center of the needle ③, and when the needle ③ is at the outside sewing position, the tip of the right looper ⑤ should be aligned with the center of the needle ③.

\* The distance from the end of the needle bar ① and the top of the needle bar bracket ② should be the same when the needle ③ is at both the inside sewing position and the outside sewing position.

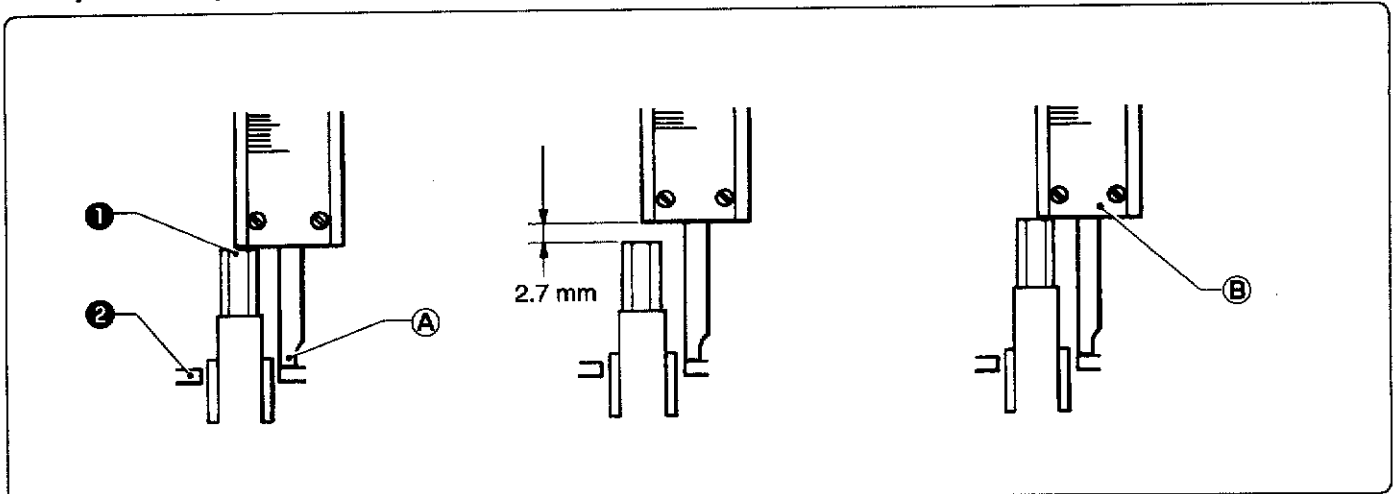


5. If adjustment is necessary, turn the race stand ⑥ in the direction indicated by the arrow in the illustration, loosen the screw ⑦, and then move the looper link support ⑧ up or down to tilt the looper holder base ⑨ to the left or right (in the direction of the arrow).

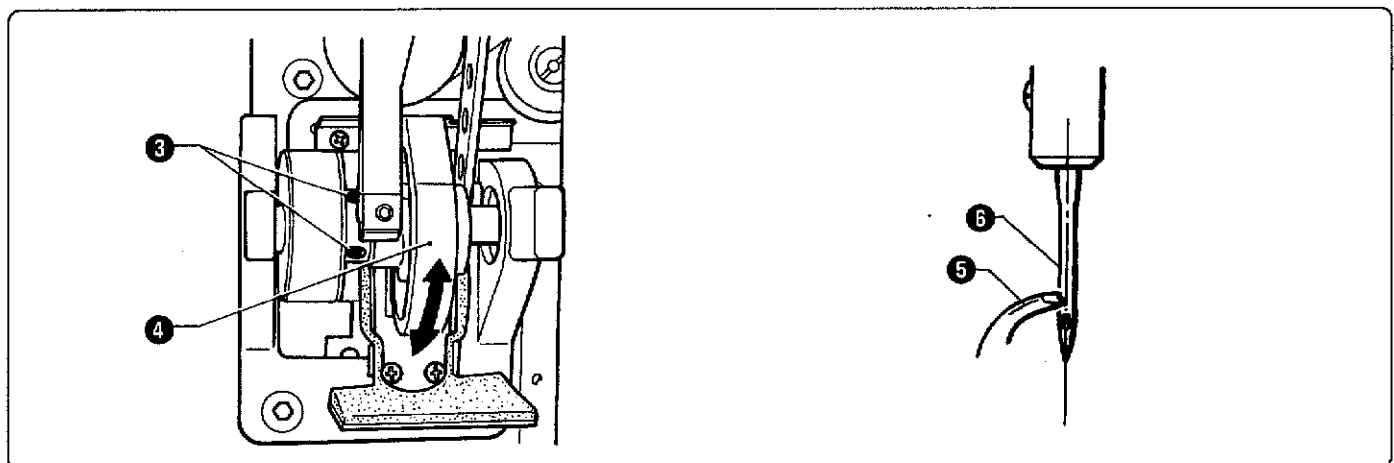
### 9-3. Adjusting the loop stroke

The loop stroke is the distance the needle bar rises from its lowest position to the position where the tips of the left and right loopers are aligned with the center of the needle. The standard loop stroke is 2.7 mm. (The loop stroke may need changing depending on the material and thread being used.)

\* Carry out the adjustment in "9-2. Adjusting the needle and looper timing" before making this adjustment.



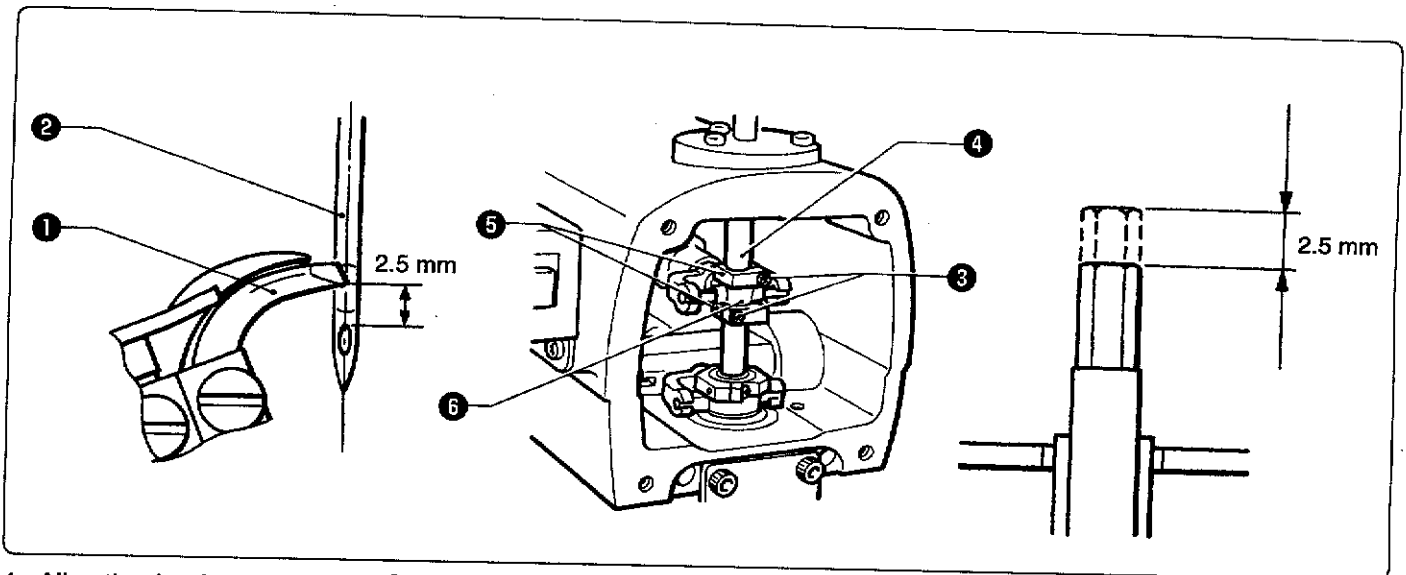
1. In the same way as in "9-2. Adjusting the needle and looper timing", move the needle bar to its lowest position with the needle at the inside sewing position, and then use calipers to measure the distance between the end of the needle bar ① and the top of the needle bar bracket ②.
2. Add 2.7 mm to the value obtained in step 1. above.
3. Touch the end of the calipers ④ against the top of needle bar bracket ②, and then turn the upper shaft pulley until the end of the needle bar ① touches the edge of the calipers ③. Check that the tip of the left looper is aligned with the center of the needle at this time.
4. In the same way, check that the tip of the right looper is aligned with the center of the needle when the needle is at the outside sewing position.



5. If the tips of the loopers are not aligned with the center of the needle, carry out the adjustment below.  
 Raise the machine head.  
 Loosen the two screws ③ of the lower shaft timing pulley, hold the upper shaft pulley so that it doesn't move, and then turn the lower shaft cam ④ in the direction indicated by the arrow until the tip of the left looper ⑤ is aligned with the center of the needle ⑥. Once they are aligned, tighten the two screws ③.  
 After adjusting, check that the screws have been adequately tightened.  
 Once this adjustment has been carried out, repeat the procedure given in "9-2. Adjusting the needle and looper timing".

### 9-4. Adjusting the height of the needle bar

The standard height for the needle bar is 2.5 mm. (The needle bar height may need changing depending on the material and thread being used.)

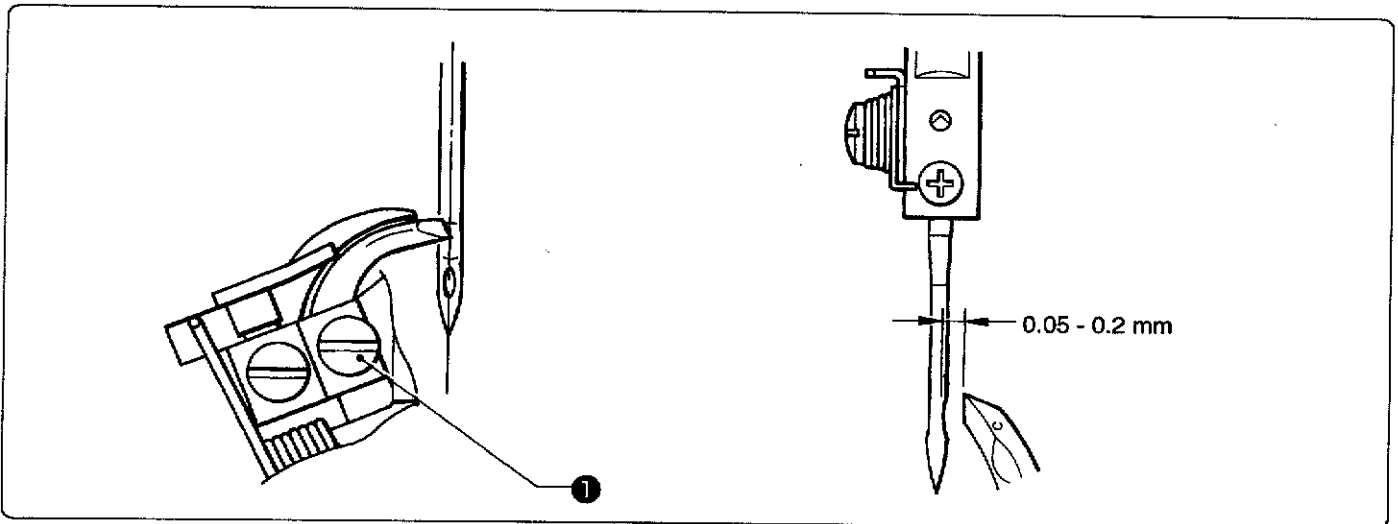


1. Align the tip of the left looper ① with the center of the needle ② when the needle ② is at the inside sewing position.
2. Remove the face plate.
3. Loosen the screw ③ of the needle bar clamp ⑤ and adjust the height of the needle bar ④.  
\* After aligning the tip of the left looper ① with the top edge of the needle hole, lower the needle bar ④ 2.5 mm.
4. Adjust so that there is as little play as possible, and so that the needle bar clamp ⑤ and the needle bar horizontal link ⑥ can maintain their oil films. This will help to ensure that the needle bar turns smoothly.

### 9-5. Adjusting the clearance between the looper and needle

Be sure to carry out this adjustment after changing the size of the needle.

The clearance between the tip of the looper and the needle should be 0.05 - 0.2 mm.

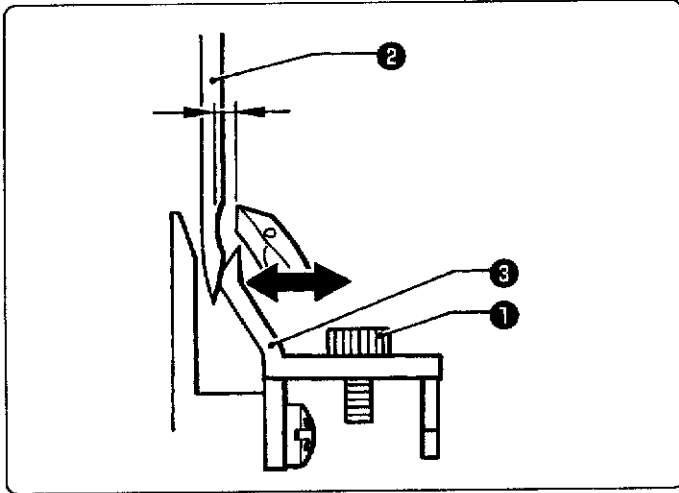


1. Loosen the looper screw ① and then adjust the clearance.  
\* This clearance must be uniform while the race stand is rotating (through 360°).  
If the clearance is not uniform, adjust the turning center for the needle bar. (This adjustment is made at the time of shipment from the factory.)  
\* After making the adjustment in step 1. above, carry out the adjustment procedure given in "9-7. Adjusting the spreader mounting positions".

### 9-6. Adjusting the needle guard

Be sure to carry out this adjustment after changing the size of the needle.

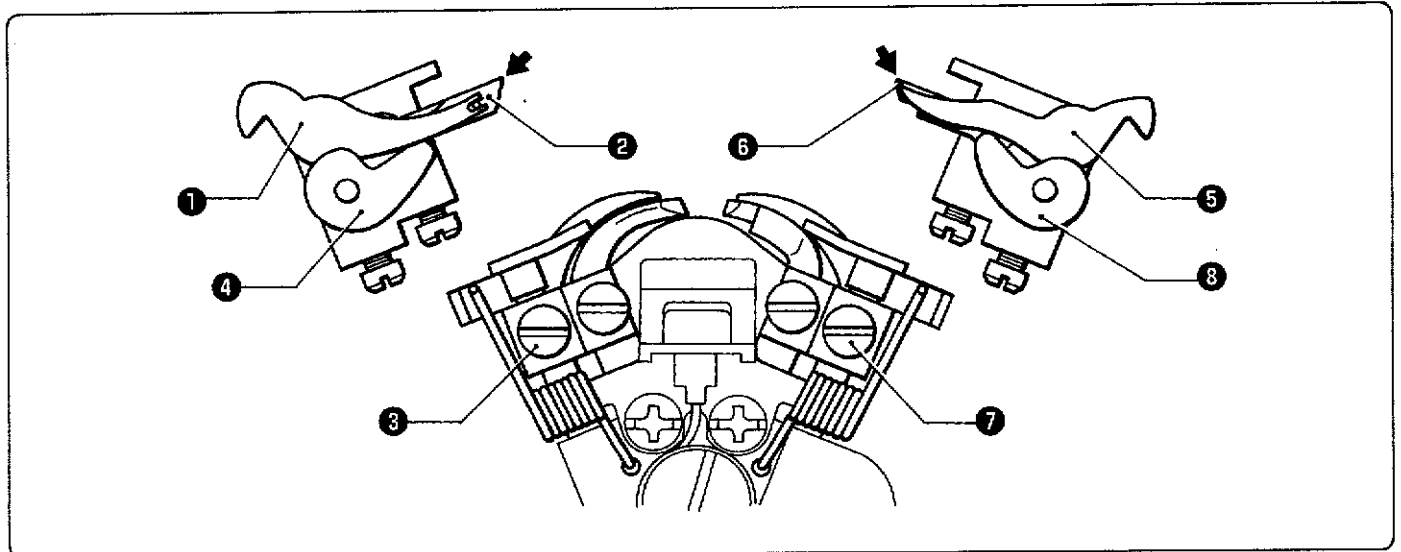
The needle must remain stationary with respect to the needle guard until the tip of the looper reaches the needle.



1. Loosen the screw ① and then move the needle guard ③ in the directions indicated by the arrows by an appropriate amount in accordance with the thickness of the needle ②.

Note: Adjust so that the looper clasps the upper thread securely.

### 9-7. Adjusting the spreader mounting positions



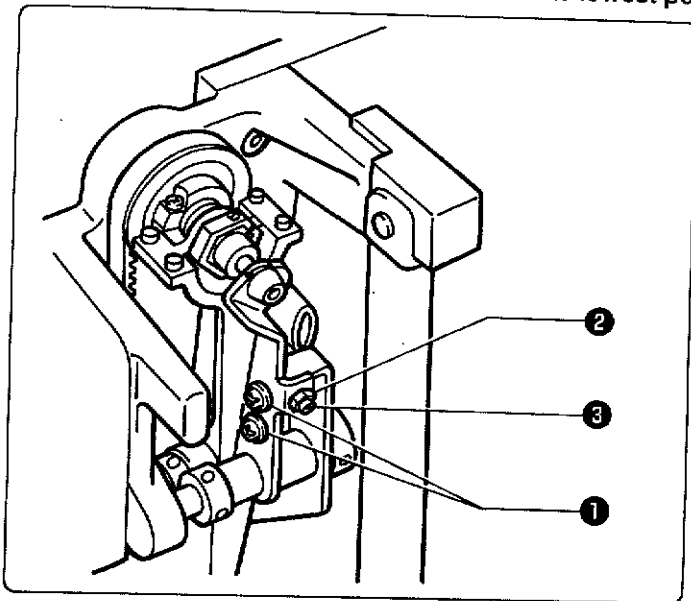
1. Loosen the screw ③ and adjust the position of the left spreader stopper ④ so that the fork of the left spreader ① is aligned with the lower thread guide hole of the left looper ②.
2. Loosen the screw ⑦ and adjust the position of the right spreader stopper ⑧ so that the tip of the right spreader ⑤ is aligned with the tip of the right looper ⑥.

Note: Both the left spreader ① and right spreader ⑤ should be installed so that they do not project past the tips of the left looper ② and right looper ⑥ respectively.

### 9-8. Adjusting the spreader timing

When the needle is at the inside sewing position, the left spreader should touch the left spreader stopper and stop immediately before the needle bar reaches its lowest position.

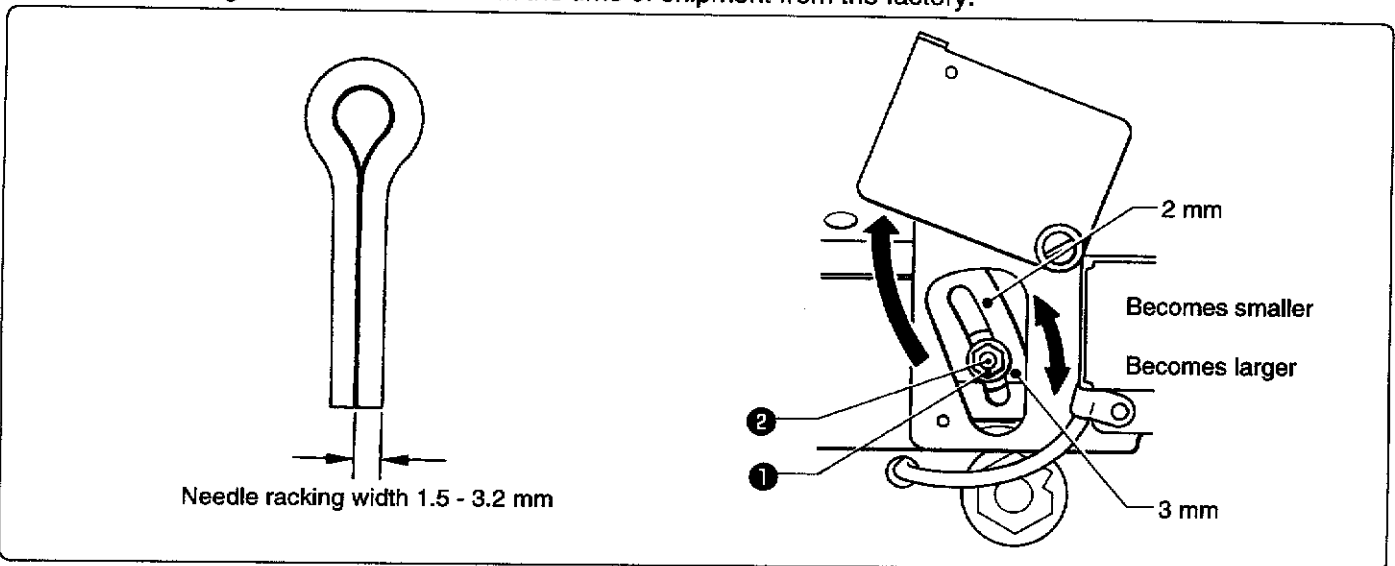
When the needle is at the outside sewing position, the right stopper should touch the right spreader stopper and stop immediately before the needle bar reaches its lowest position.



1. Raise the machine head.
2. Loosen the screw ① and the nut ②, and then turn the adjusting screw ③ to adjust the spreader timing.
3. After adjusting, tighten the nut ② and the screw ①.

### 9-9. Adjusting the needle racking width (stitch width)

The needle racking width is set to 3 mm at the time of shipment from the factory.



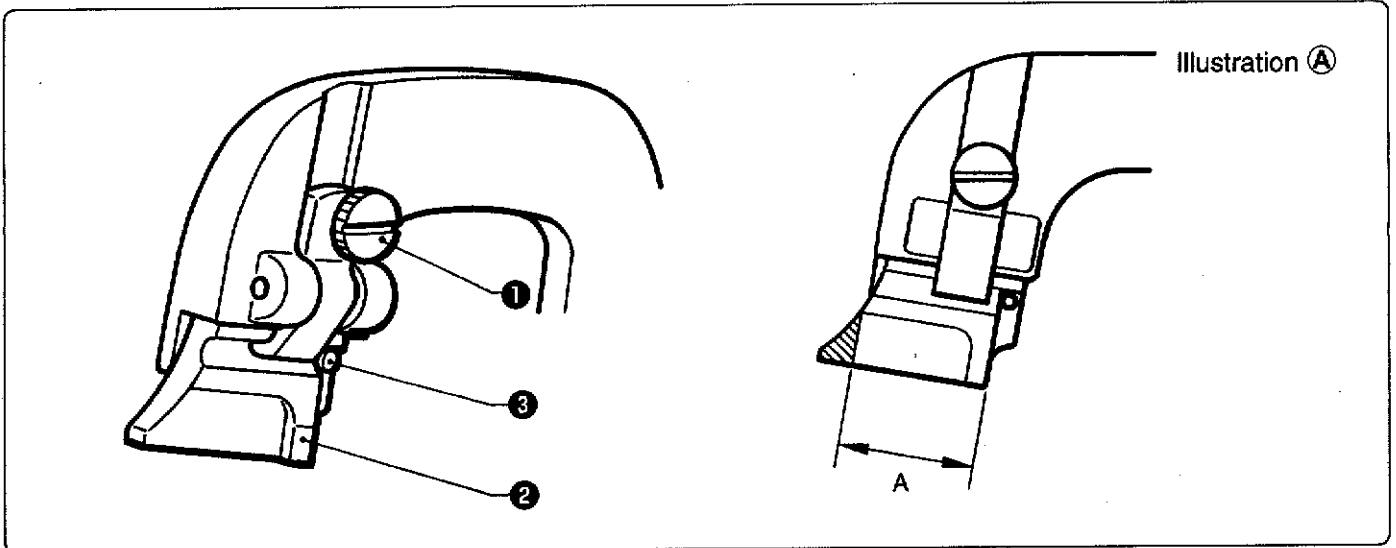
1. Loosen the needle racking adjustment nut ① and then adjust the needle racking width by sliding the sliding the adjustment screw ② vertically along the oval slot.

The stitch width becomes smaller as the adjustment screw ② is moved upward.

Note: If the needle racking width is changed greatly, you should re-adjust the timing between the needle and the loopers.

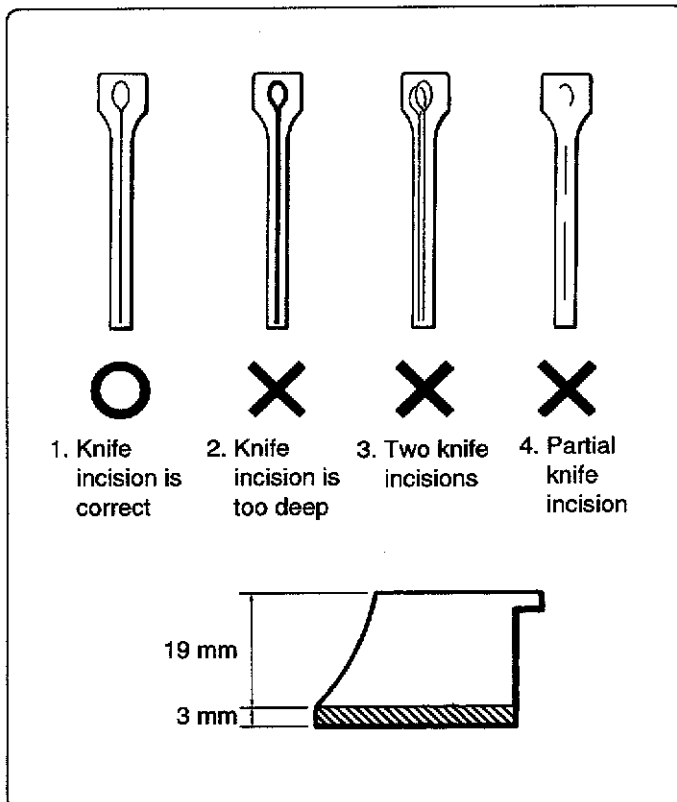
(Refer to "9-2. Adjusting the needle and looper timing".)

### 9-10. Changing the knife cutting length (Replacing the cutting block)



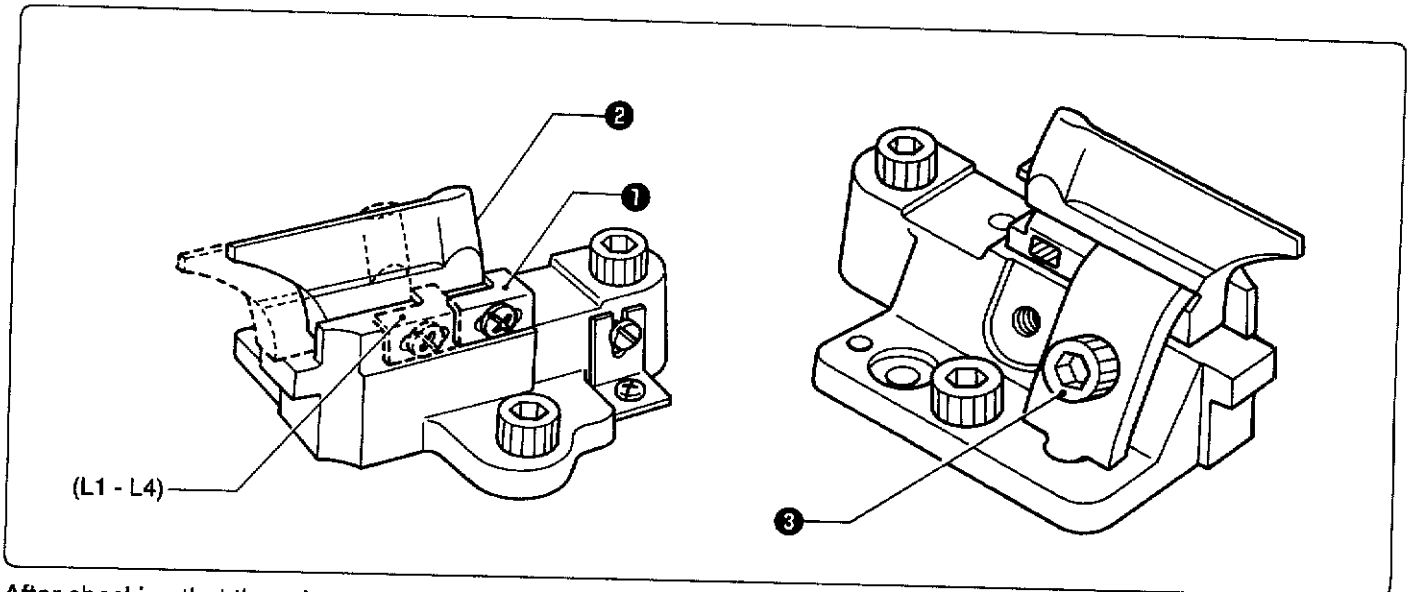
1. Grind or replace the cutting block after changing the knife cutting length.
  2. Loosen the screw ①, and then remove the cutting block ②.  
Because the knife cutting length is set in accordance with the length of the cutting block, grind the cutting block as shown in ④ in the above illustration.  
Cutting block length ④ = Knife cutting length + 1.5 mm
  3. When installing the cutting block, push in the pin ③ and then tighten the screw ①.
- \* Do not use knives with different numbers on the same cutting block. If knives with different numbers are used, accurate cutting will not be possible and the knife will be damaged.

### 9-11. Adjusting the contact between the knife and the cutting block



1. Remove the cutting block.
2. If the knife incision on the surface of the cutting block is very deep, if there are two or more incisions on the cutting block because different knives were used, or if only part of the incision has been made, grind the surface of the cutting block smoothly until a single knife incision can still be seen faintly.
3. The cutting pressure over the whole of the cutting block should be uniform so that the material will be cut cleanly.  
Grind the surface of the cutting block so that the knife incision will be uniform over the whole of the cutting block.  
\* The cutting block can be filed until its height is 19 mm.
4. If the material cannot be cut cleanly even though the cutting block has been ground correctly, check whether the tip of the knife is worn.  
\* If the tip is worn, replace the knife.  
\* Do not use the old cutting block after the knife has been replaced, otherwise it may damage the tip of the knife.

## 9-12. Replacing the knife



After checking that there is no clearance between the knife stopper ① and the knife ②, loosen the screw ③ and then remove the knife ②.

Insert the new knife ② into the knife stopper ①, and then tighten it with the screw ③.

**NOTE:** For L1 - L4 specifications, secure the knife stopper ① in the position closest to you (the position indicated by the dotted lines).

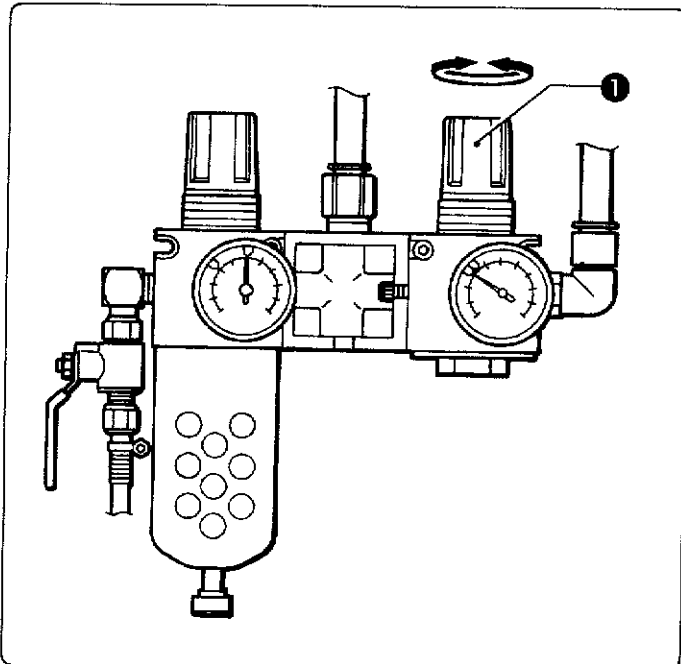
\* When replacing the knife ②, make sure that the knife number matches the number for the eyelet shape. Replace the knife and cutting block as a set.

If knives with different numbers are used on the same cutting block, accurate cutting will not be possible, and damage to the knife may result.

## 9-13. Adjusting the cutting pressure

Adjust the cutting pressure to the minimum pressure that still allows the material to be cut.

\* If the knife cutting length is 20 mm, sufficient cutting performance can be obtained with an air pressure of 0.2 MPa. To adjust the cutting pressure, adjust the air pressure of the knife pressure adjustment regulator ① which is mounted underneath the work table.

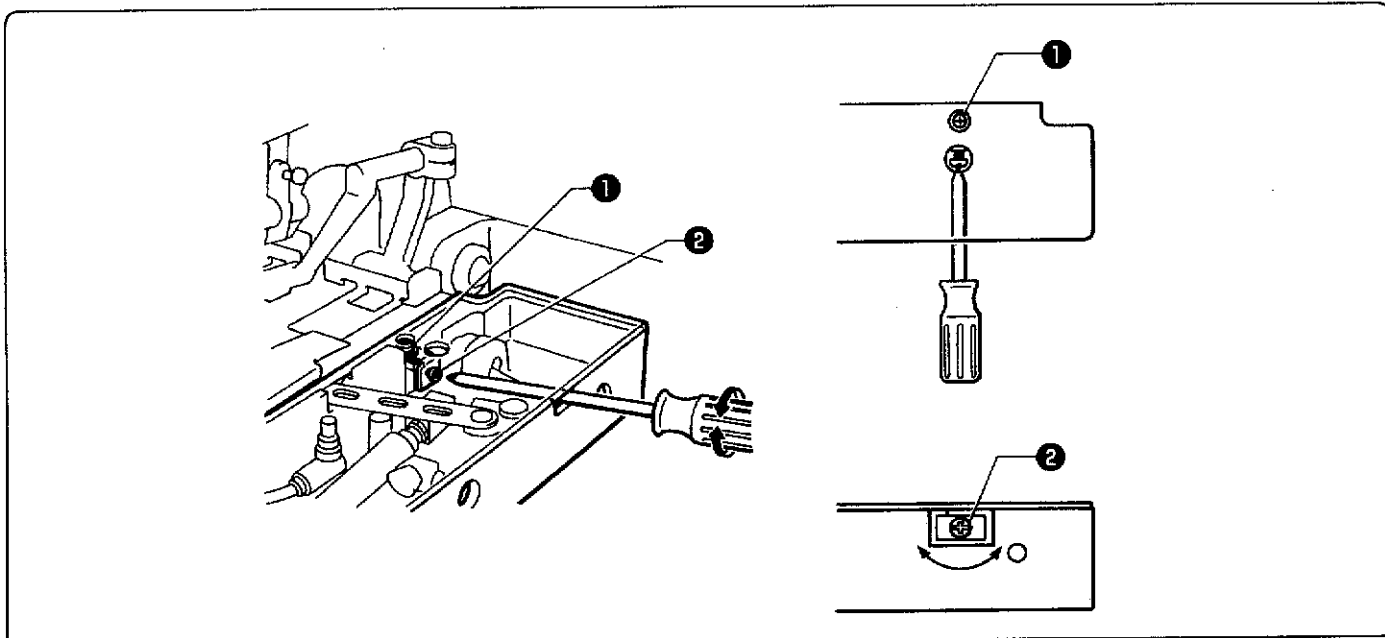


\* If the cutting pressure is increased to more than is necessary, it will cause the cutting block to become worn or the knife to become damaged.

\* If the material cannot be cut cleanly, do not increase the cutting pressure over the maximum limit. Check the contact between the knife and the cutting block, while referring to "9-11. Adjusting the contact between the knife and the cutting block".

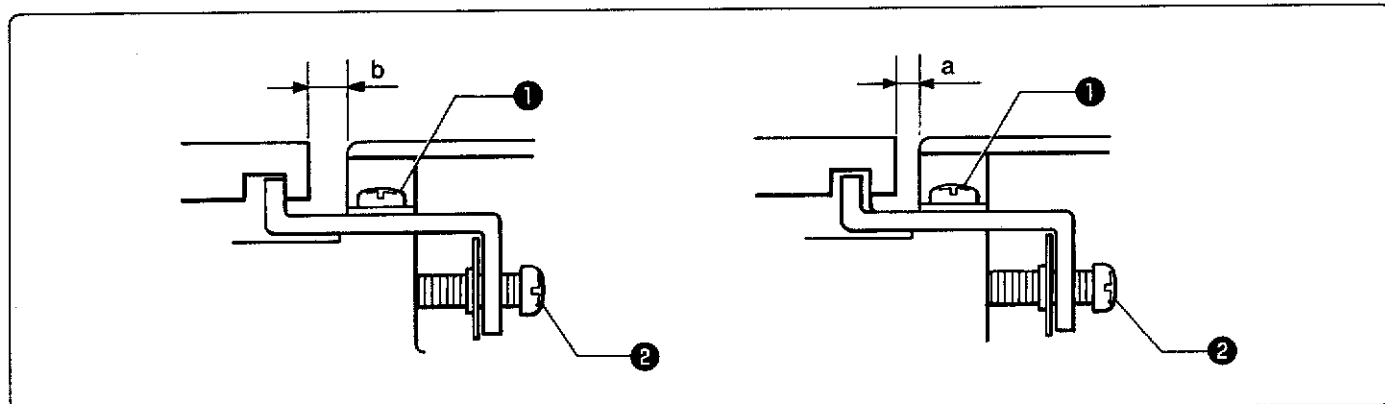


### 9-14. Adjusting the cloth opening amount



1. Loosen the screw ❶, and then insert a screwdriver into the notch in the side of the feed bracket and turn the adjusting screw ❷ to adjust the opening amount.
  2. After tightening the screw ❶, measure the opening amount.
- Note: Adjust so that the opening amounts for the left and right cloth presser plates are equal.  
 \* It is usually sufficient for one cloth presser plate to open by 0.8 mm.

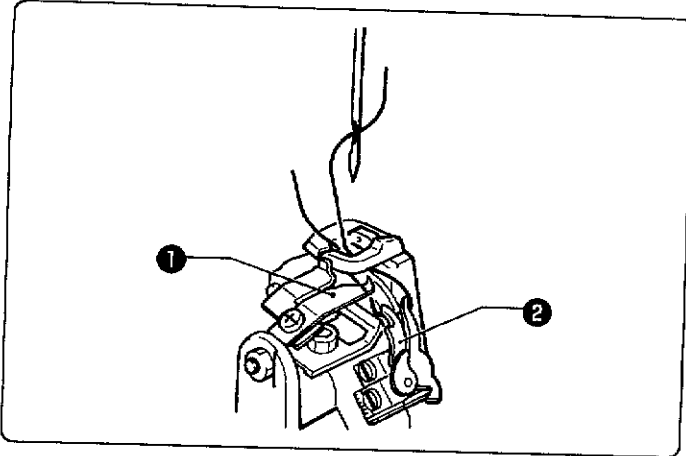
#### Measuring the opening amount



1. Switch the mode to feed mode. (Refer to page 36.)
2. Lower the cloth presser and then use calipers to measure the distance a.
3. Press the start switch. The feed bracket will move and then the left and right cloth presser plates will open.
4. Use calipers to measure the distance b.
5. The difference between a and b is the opening amount. (Opening amount = a - b)

### 9-15. Adjusting the trimming of the upper thread

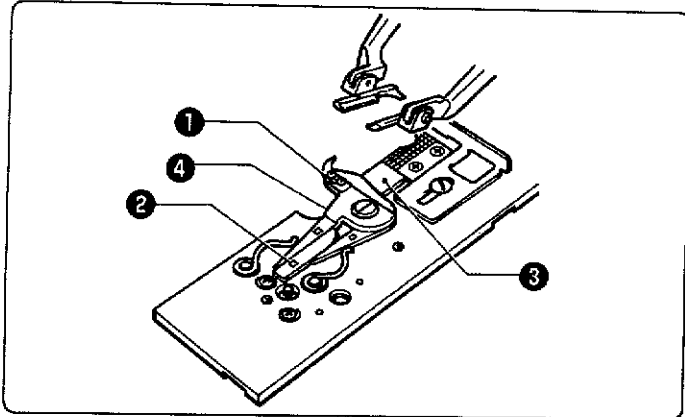
The upper thread should be trimmed at the correct time after sewing is completed.



1. Adjust so that the needle thread trimmer knife ① cuts only one of the threads in front of the right looper ②.  
Note: If both strands of the thread loop (forward and back) are cut, the thread remaining in the needle may become too short and skipped stitches may result.

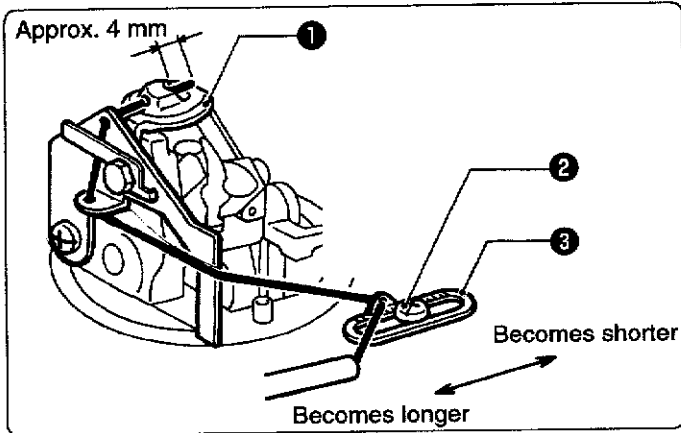
### 9-16. Adjusting the trimming of the lower thread and gimp thread

The lower thread and gimp thread should be trimmed at the correct time after the feed bracket has returned to the home position.



1. The mechanism is adjusted so that the lower thread and gimp thread are spread by the loop spreader ①.
2. The movable knife drive cam ② operates so that the right movable knife ③ and the left movable knife ④ come together to cut the thread.

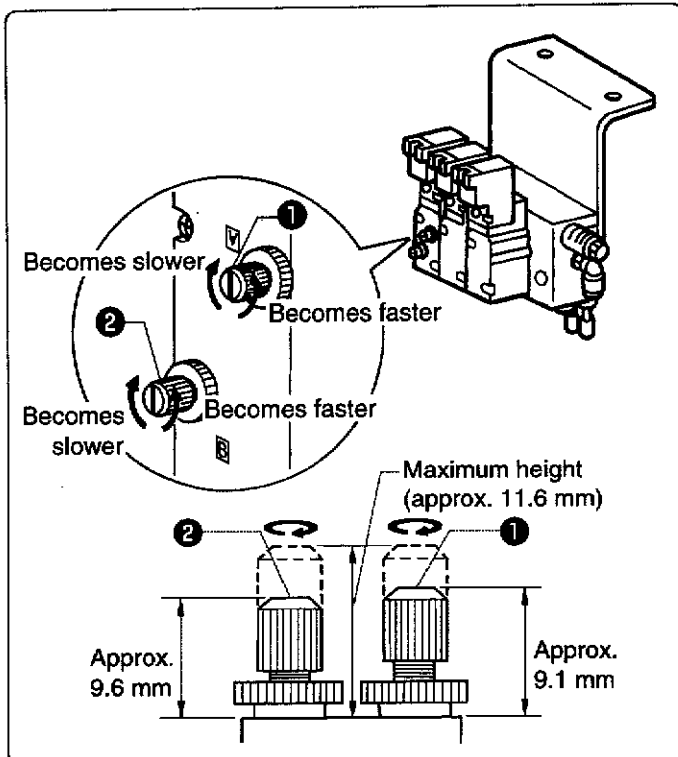
### 9-17. Adjusting the gimp length after trimming



Adjust so that approximately 4 mm of the gimp thread is coming out from the throat plate ①.

1. Loosen the screw ② and move the gimp thread guide (J) ③ in the direction of the arrow to adjust the length.

### 9-18. Adjusting the cloth feeding speed (-52 specifications)



Turn the A-side needle valve ① or B-side needle valve ② to adjust the cloth feeding speed.

**Caution**

The cloth feeding speed is adjusted to an appropriate speed at the time of shipment from the factory, and should not be changed unnecessarily.

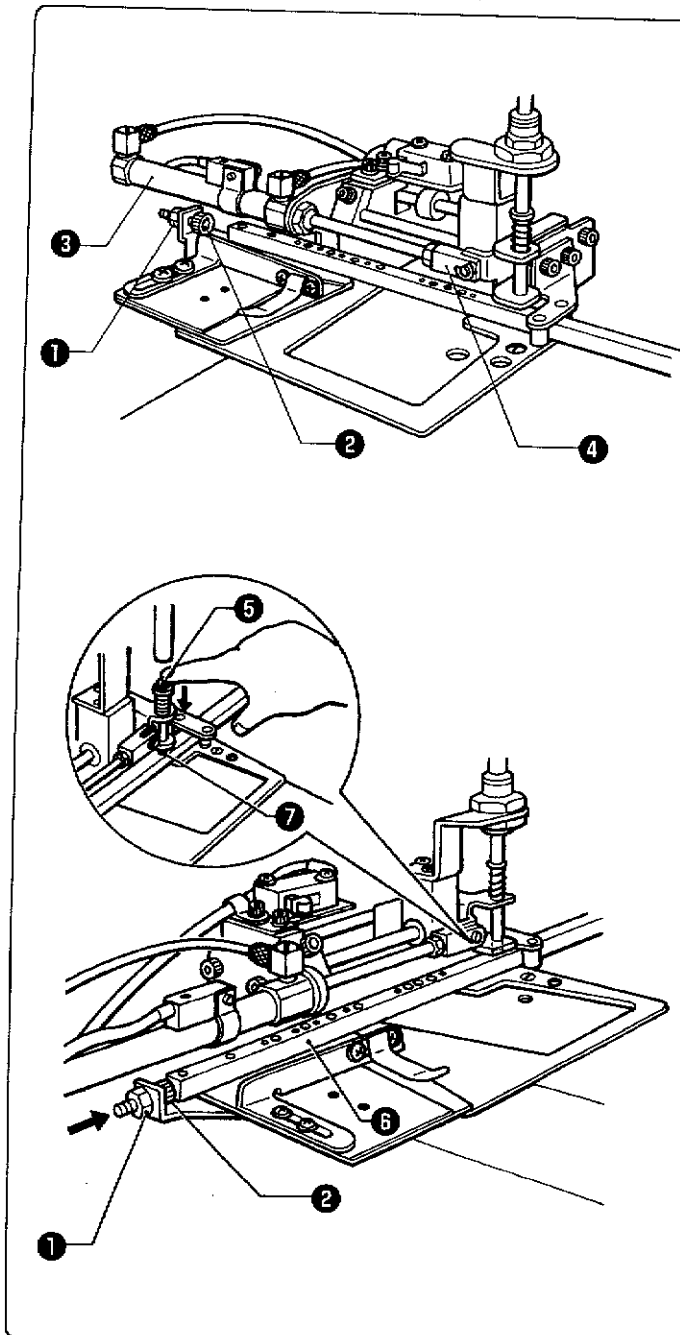
**At the time of shipment**

A-side needle valve ... At a height of approximately 9.6 mm from the surface of the valve body (turned 6 full rotations from the maximum height)

B-side needle valve ... At a height of approximately 9.1 mm from the surface of the valve body (turned 7 full rotations from the maximum height)

### 9-19. Adjusting the cloth feed bar home position (-52 specifications)

The cloth feed bar home position is adjusted by means of the bolt which is installed to feed base L. After carrying out this adjustment, adjust the installation position for limit switch (R). (Refer to page 64.)



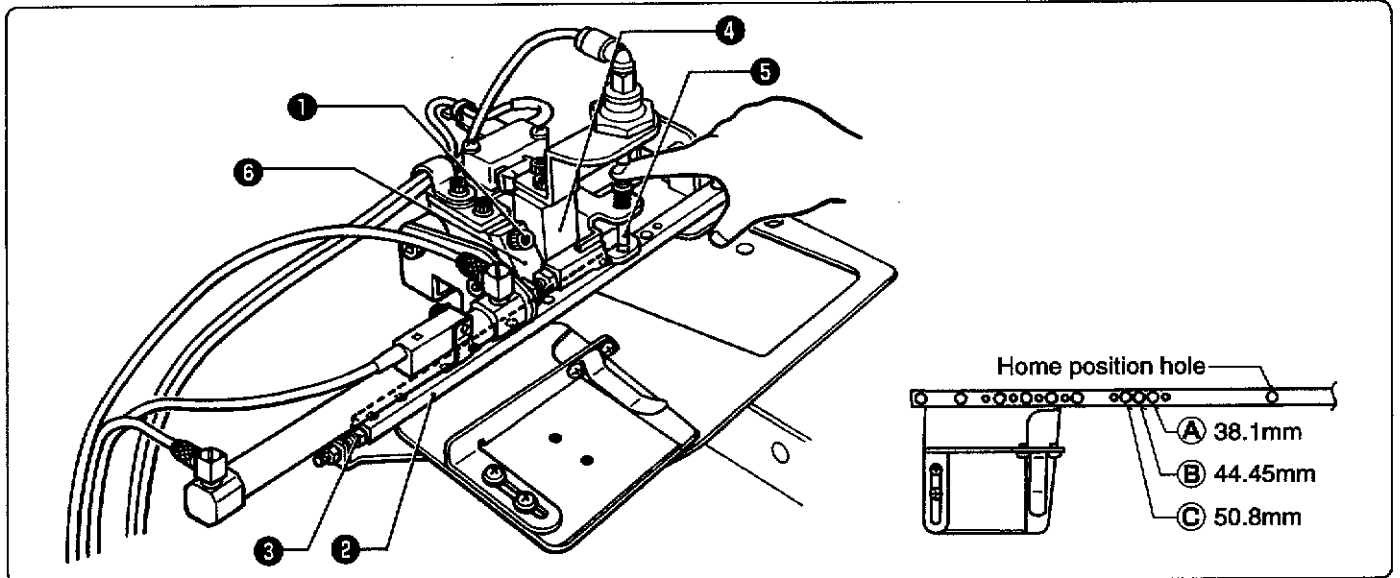
1. Loosen the nut ① and then turn the bolt ② so that it moves to the left.
2. Pull the cylinder rod ④ of the cloth feed cylinder ③ as far to the right as it will go.

3. Insert the chuck pin ⑤ into the home position hole ⑦ (refer to page 63) in the cloth feed bar ⑥.
4. Turn the bolt ② to move it to the right until it gently touches the cloth feed bar ⑥.
5. Tighten the nut ① to secure the bolt ② in position.
6. Check that the chuck pin ⑤ fits smoothly into the home position hole ⑦ when the cloth feed bar ⑥ is touching the bolt ②.

\* If the chuck pin ⑤ is not fitting smoothly, repeat the procedure in steps 1. to 5.

## 9-20. Adjusting the indexer hole spacing (-52 specifications)

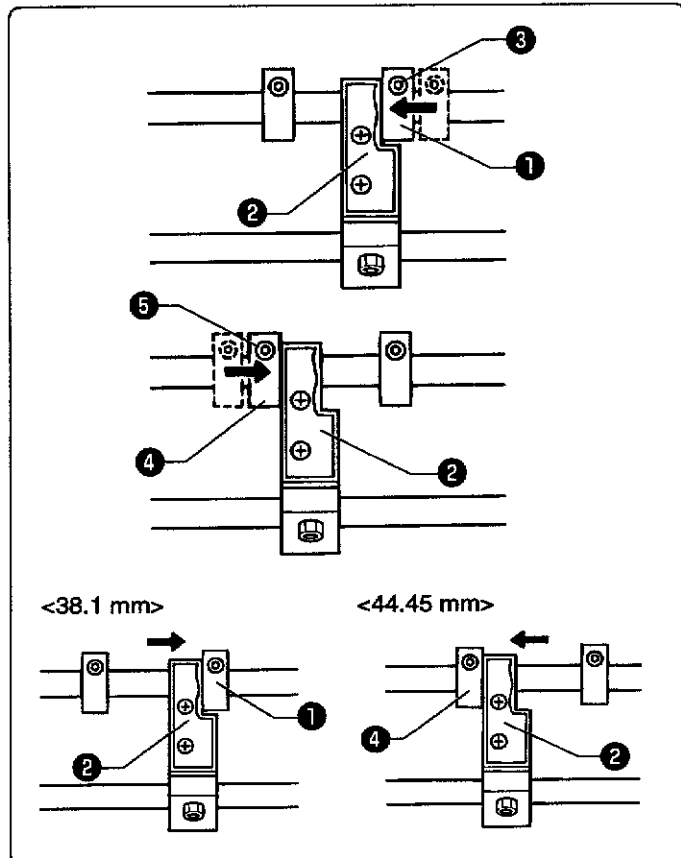
Before carrying out this adjustment, check that the home position adjustment for the cloth feed bar has been carried out correctly. (Refer to page 62.)



1. Loosen the bolt ①.
2. Push the cloth feed bar ② against the home position bolt ③.
3. Move the feed movable block ④ so that the chuck pin ⑤ goes smoothly into the indexer holes (38.1 mm - ①, 44.45 mm - ②, 50.8 mm - ③).
4. Place the stop block ⑥ firmly against the feed movable block ④, and then tighten the bolt ① to secure it in place.

### ■ Using the set collar

Using the set collar makes it easy to change between two different hole spacing settings. The right-hand set collar can be used to set the smaller hole spacing, and the left-hand collar can be used to set the larger hole spacing.

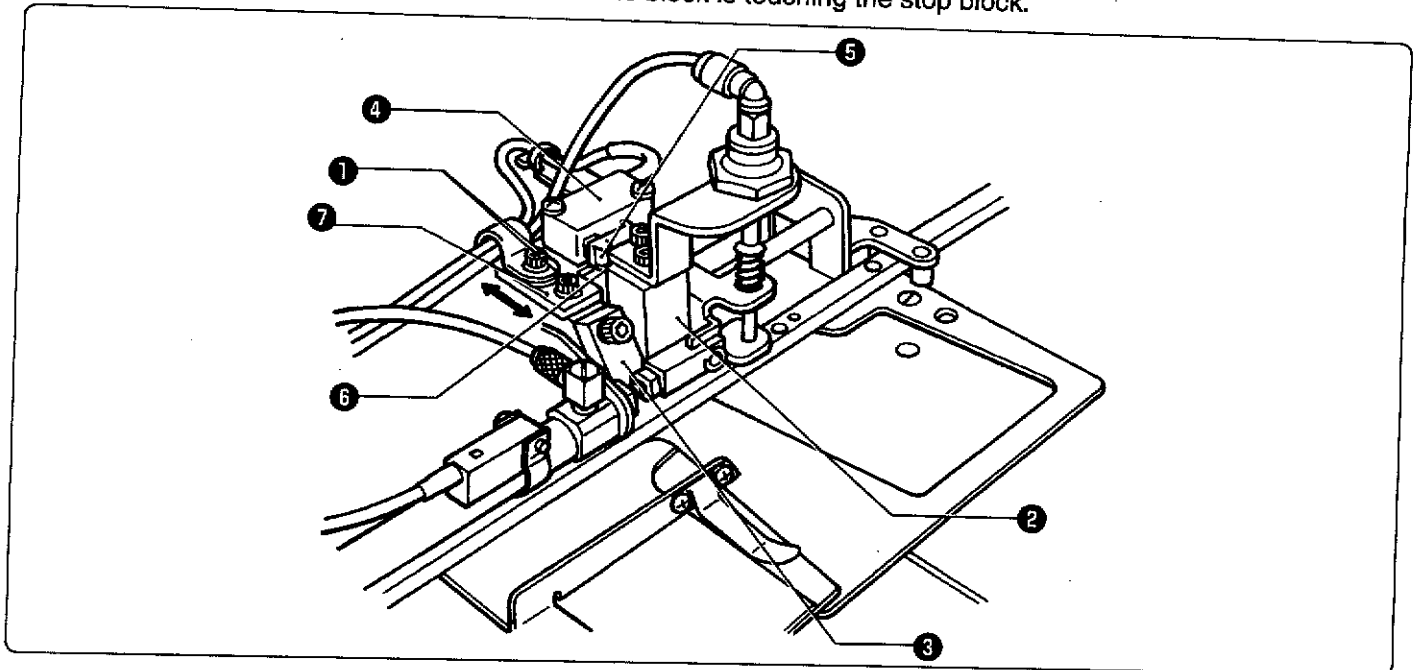


Example: For spacings of 38.1 mm (1-1/2") and 44.45 mm (1-3/4")

1. Set the hole spacing to 38.1 mm (1-1/2").
2. Place the right-hand set collar ① against the stop block ②, and then secure it by tightening the screw ③.
3. Set the hole spacing to 44.45 mm (1-3/4"). (Refer to the previous page.)
4. Place the left-hand set collar ④ against the stop block ②, and then secure it by tightening the screw ⑤.
5. From now on, if you want to have hole intervals of 38.1 mm (1-1/2"), move the stop block ② so that it is against the right-hand set collar ① and secure it in this position, and if you want to have hole intervals of 44.45 mm (1-3/4"), move the stop block ② so that it is against the left-hand set collar ④ and secure it in this position. Use the same setting method if using other combinations of different hole intervals.

### 9-21. Adjusting the position of limit switch L (-52 specifications)

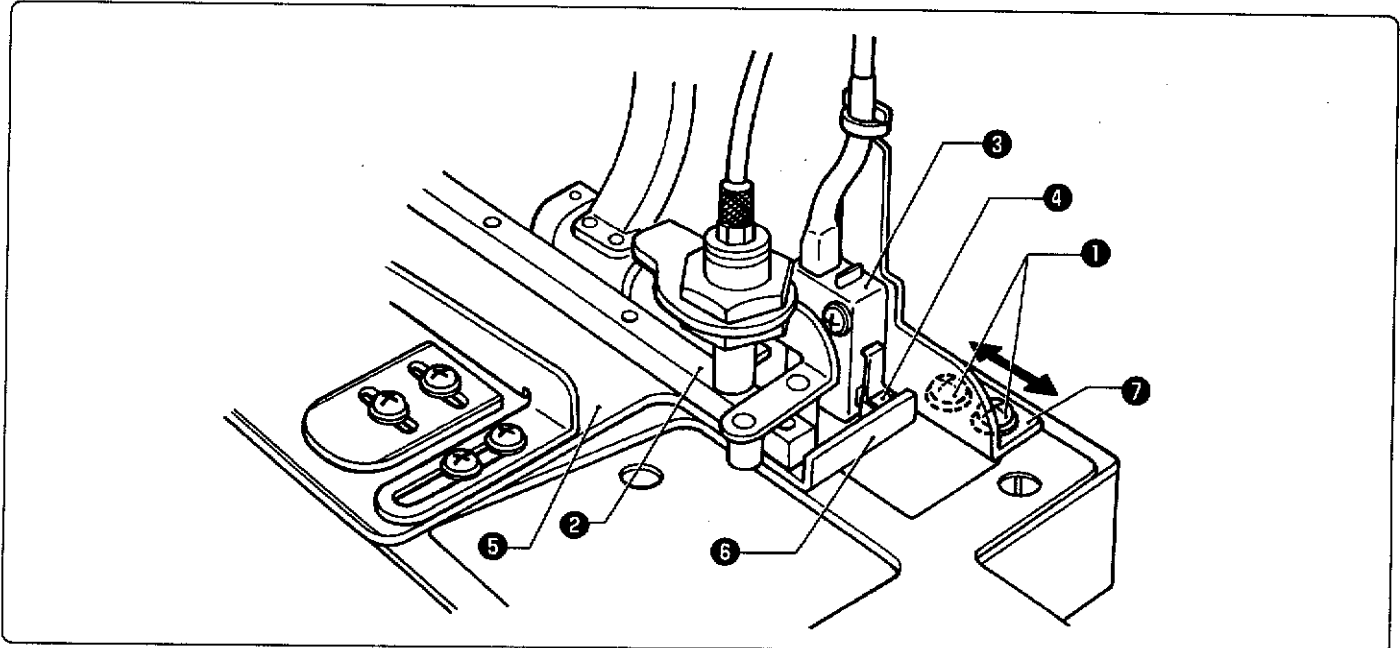
Limit switch L must turn on when the feed movable block is touching the stop block.



1. Loosen the two bolts ①.
2. Place the feed movable block ② and the stop block ③ firmly against each other.
3. Adjust the position of the switch set plate ⑦ so that limit switch L ④ turns on when the roller ⑤ is pressed by the dog ⑥ of the feed movable block ②.
4. Tighten the two bolts ①.

### 9-22. Adjusting the position of limit switch R (-52 specifications)

Limit switch R must turn on when the cloth feed bar is at the left setting position.



1. Loosen the two screws ①.
2. Move the cloth feed bar ② to the left setting position.
3. Adjust the position of feed bar guide R ⑦ so that limit switch R ③ turns on when the roller ④ is pressed by the dog ⑥ of cloth feed plate R ⑤.
4. Tighten the two screws ①.

# 10. SUMMARY OF DIP SWITCHES

Always turn off the power supply before changing any of the DIP switch settings.

## 10-1. Front panel DIP switches

The ON/OFF positions of the DIP switches inside the front panel are checked only once when the power is turned on. Any changes to the DIP switch positions will not be effective until the power is switched off and back on again.

**Factory default settings**  
(all switches are set to OFF)

Stitch pitch	1.2 mm
No. of eyelet stitches	Standard no. of stitches
Taper bar tacking length	6 mm
Knife operation method	Cutting after sewing
Eyelet shape	Eyelet hole (No. 2)
Offset	1.5 mm
Cutting space	0.2 mm
Sewing speed	1800 spm
Mode	Automatic mode
Panel protection	Changing cutting on/off, stitch length settings allowed
Cloth setting position (-52 specifications)	Horizontal setting
No. of eyelet holes (-52 specifications)	4

### Panel DIP switch A

No.	ON/OFF	Description
1, 2, 3	ON,ON,ON	Stitch pitch = 1.8 mm
	ON,ON,OFF	Stitch pitch = 1.6 mm
	ON,OFF,ON	Stitch pitch = 1.4 mm
	ON,OFF,OFF	Stitch pitch = 1.3 mm
	OFF,OFF,OFF	Stitch pitch = 1.2 mm
	OFF,ON,ON	Stitch pitch = 1.1 mm
	OFF,ON,OFF	Stitch pitch = 1.0 mm
	OFF,OFF,ON	Stitch pitch = 0.9 mm
4, 5	ON,ON	No. of eyelet stitches = Standard no. of stitches + 1
	OFF,OFF	No. of eyelet stitches = Standard no. of stitches
	ON,OFF	No. of eyelet stitches = Standard no. of stitches - 1
	OFF,ON	No. of eyelet stitches = Standard no. of stitches - 2
6, 7, 8	ON,ON,ON	Taper bar tacking length = 10 mm
	ON,ON,OFF	Taper bar tacking length = 9 mm
	ON,OFF,ON	Taper bar tacking length = 8 mm
	ON,OFF,OFF	Taper bar tacking length = 7 mm
	OFF,OFF,OFF	Taper bar tacking length = 6 mm
	OFF,ON,ON	Taper bar tacking length = 5 mm
	OFF,ON,OFF	Taper bar tacking length = 4 mm
	OFF,OFF,ON	Taper bar tacking length = 0 mm

**Panel DIP switch B**

No.	ON/OFF	Description
1	ON	Cutting after sewing
	OFF	Cutting before sewing
2, 3	ON,ON	Straight buttonhole (No. 5)
	ON,OFF	Eyelet buttonhole (No. 3)
	OFF,OFF	Eyelet buttonhole (No. 2)
	OFF,ON	Eyelet buttonhole (No. 1)
4	ON	Offset = 1.2 mm
	OFF	Offset = 1.5 mm
5, 6	ON,ON	Cutting space = -0.1 mm
	ON,OFF	Cutting space = 0 mm
	OFF,ON	Cutting space = 0.1 mm
	OFF,OFF	Cutting space = 0.2 mm
7, 8	ON,ON	Sewing speed = 2,000 spm
	OFF,OFF	Sewing speed = 1,800 spm
	ON,OFF	Sewing speed = 1,600 spm
	OFF,ON	Sewing speed = 1,400 spm

**Panel DIP switch C**

No.	ON/OFF	Description
1, 2	ON,ON	Spare
	ON,OFF	Feed mode
	OFF,ON	Manual mode
	OFF,OFF	Automatic mode
3	ON	Changing cutting on/off, stitch length settings prohibited
	OFF	Changing cutting on/off, stitch length settings allowed
4	ON	Spare
	OFF	Spare
5	ON	Spare
	OFF	Spare
6※	ON	Left setting
	OFF	Horizontal setting
7, 8※	ON,ON	No. of holes per cycle = 6
	ON,OFF	No. of holes per cycle = 5
	OFF,OFF	No. of holes per cycle = 4
	OFF,ON	No. of holes per cycle = 3

※ Valid only for -52 specifications



### 10-2. Circuit board DIP switches

## ⚠ DANGER



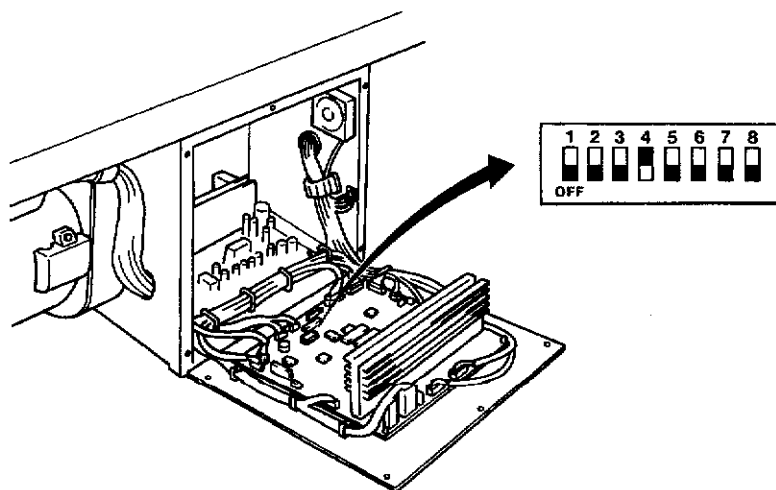
- Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.

The ON/OFF positions of the DIP switches inside the front panel are checked only once when the power is turned on. Any changes to the DIP switch positions will not be effective until the power is switched off and back on again.

#### Circuit board DIP switch C

No.	ON/OFF	Description
1	ON	1 pedal (for start switch)
	OFF	2 pedals (for cloth presser switch and start switch)
2	ON	Front position setting (reduces cycle time when cutting after sewing and no lower thread trimming are set)
	OFF	Back position setting (reduces cycle time when cutting before sewing and no lower thread trimming are set)
3	ON	Cloth presser ON after sewing
	OFF	Cloth presser OFF after sewing
4	ON	Upper and lower thread trimming
	OFF	Upper thread trimming
5	ON	Spare
	OFF	Spare
6	ON	Spare
	OFF	Spare
7	ON	Spare
	OFF	Spare
8	ON	Spare
	OFF	Spare

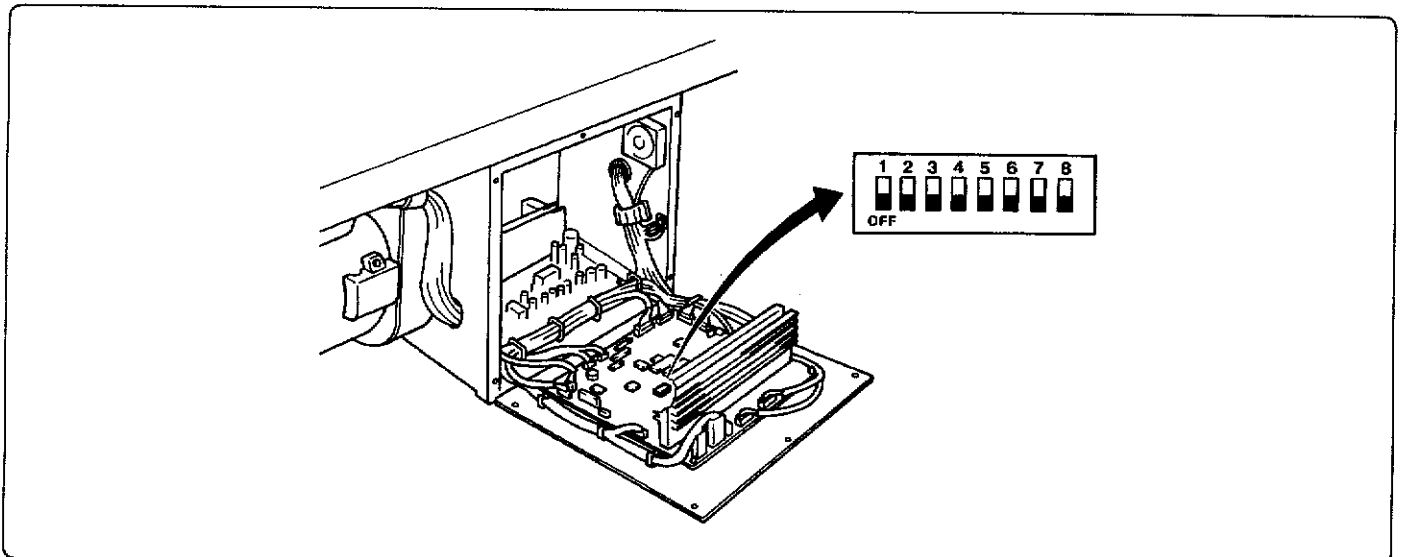
The machine is shipped from the factory with the DIP switches set as follows.



## Circuit board DIP switch D

No.	ON/OFF	Description
1	ON	Spare
	OFF	Spare
2	ON	Spare
	OFF	Spare
3	ON	Spare
	OFF	Spare
4	ON	Spare
	OFF	Spare
5	ON	Spare
	OFF	Spare
6	ON	Spare
	OFF	Spare
7	ON	Spare
	OFF	Spare
8	ON	Spare
	OFF	Spare

The machine is shipped from the factory with the DIP switches set as follows.



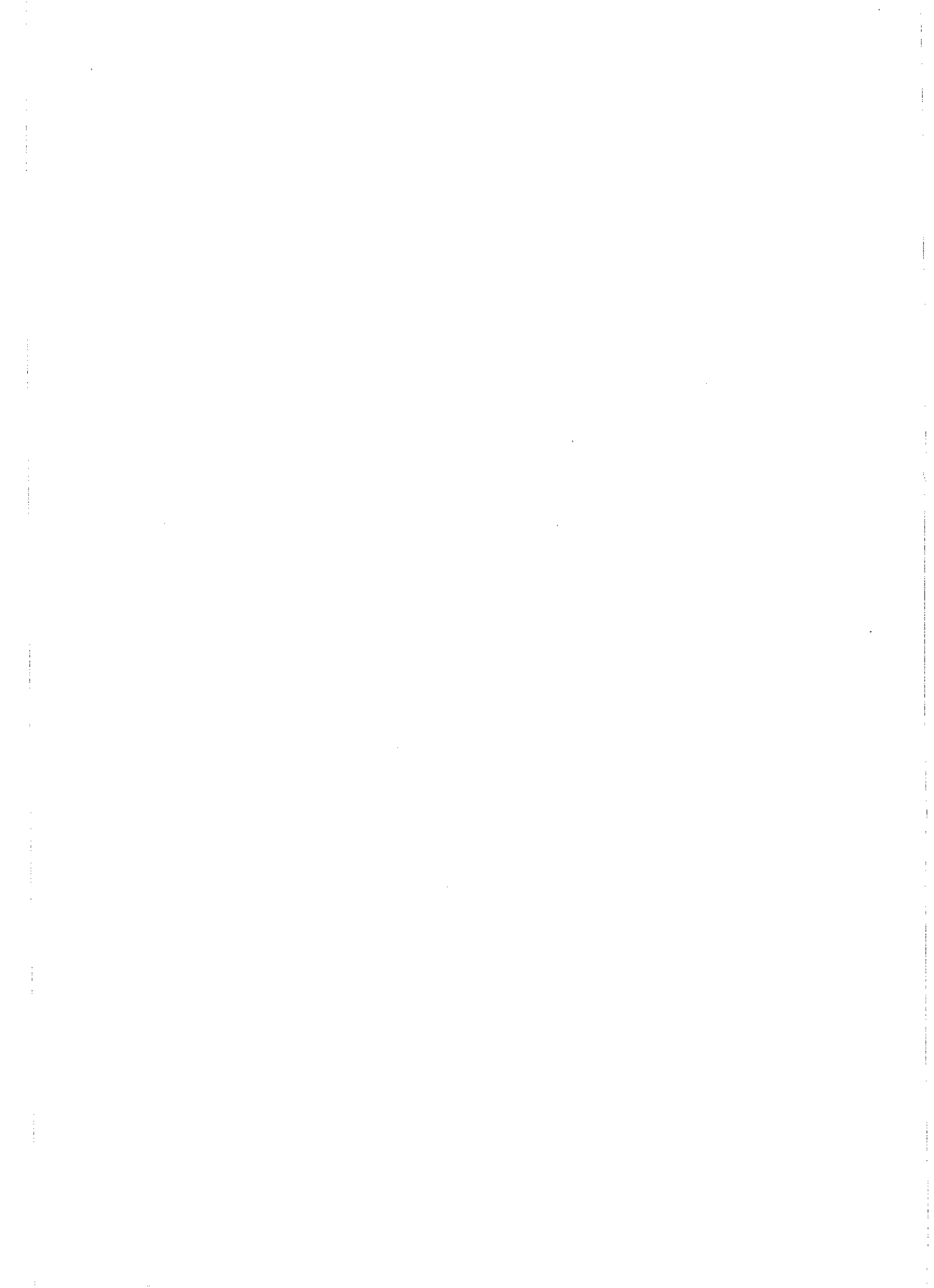
# 11. TROUBLESHOOTING

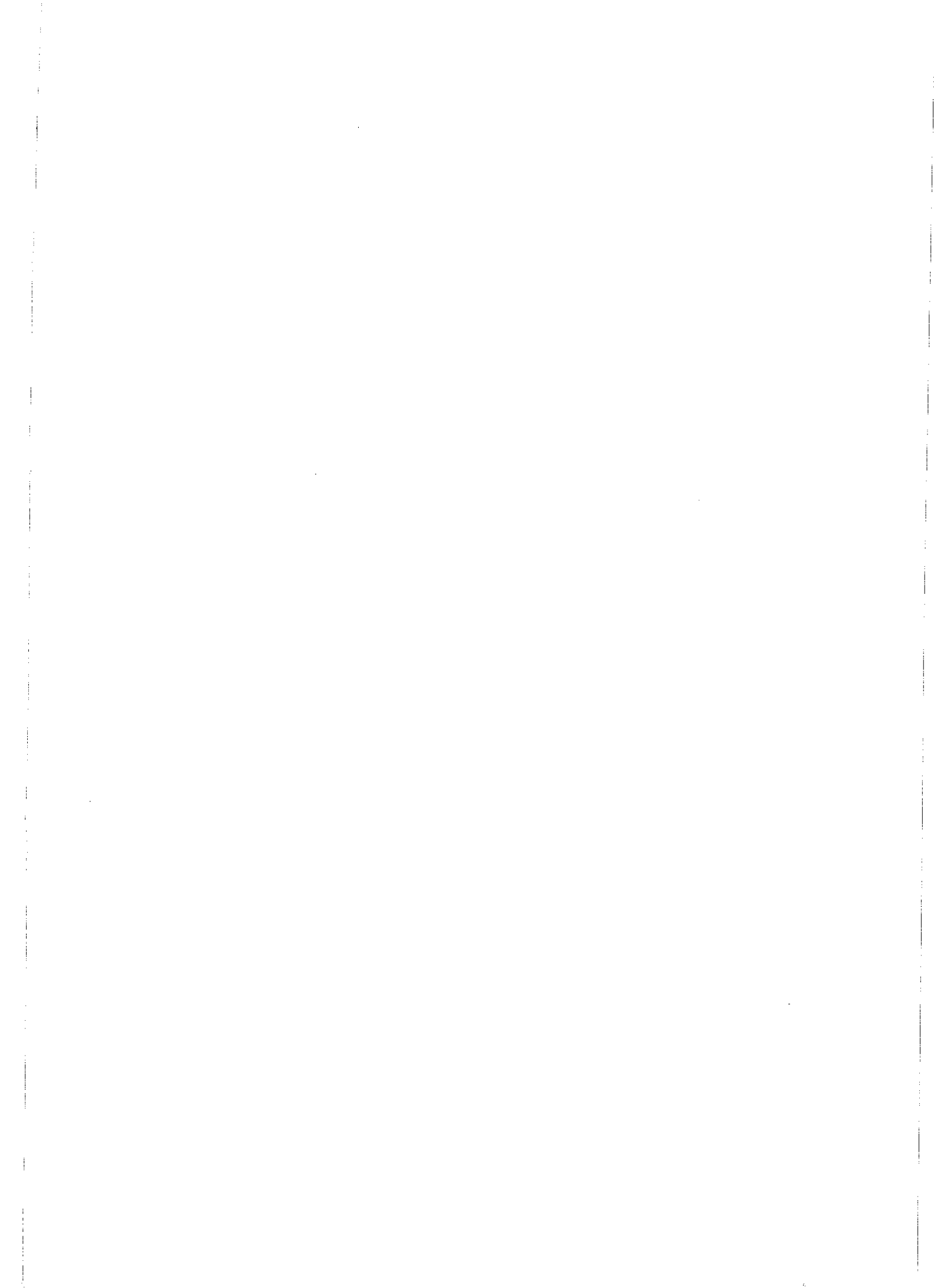
If there is a problem with operation, first check that the threads are correctly threaded and that the needle is correctly installed.

## MACHINE HEAD

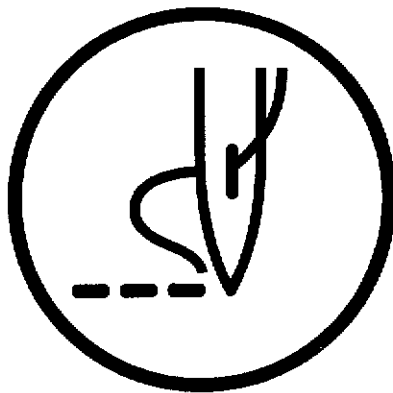
Problem	Cause	Remedy	Page
Thread breaks.	Thread tension control nut pressure is too strong.	Adjust to an appropriate pressure.	44
	Thread is of poor quality.	Use a better-quality thread.	/
	Thread is too thick for the needle.	Use a differently-sized needle.	/
	Needle groove or needle hole are not smooth.	Replace with a new needle.	26
	Needle and looper adjustment is incorrect.	Adjust the needle bar height or the looper and spreader height.	51
Skipped stitches occur.	Thread tension control nut pressure is too strong or too weak.	Adjust to an appropriate pressure.	44
	Needle point is broken or bent.	Replace with a new needle.	26
	Needle and looper adjustment is incorrect, or clearance is incorrect.	Adjust correctly.	52
	Needle and needle guard adjustment is incorrect.	Adjust correctly while referring to "9-6 Adjusting the needle guard."	55
	Looper tip is blunt.	Repair with an oilstone or replace the looper with a new one.	/
Needle breaks.	Needle is bent.	Replace with a new needle.	26
	Needle and looper adjustment is incorrect.	Adjust the needle bar height or the looper and spreader height.	51
	Needle and needle guard adjustment is incorrect.	Adjust correctly while referring to "9-6. Adjusting the needle guard."	55

Problem	Cause	Remedy	Page
Upper thread is not cut.	Knife is blunt.	Replace with a new knife.	58
	Knife does not move to the full stroke because air pressure is too weak.	Adjust the air pressure.	58
	Upper thread trimmer knife is not picking up the upper thread.	Install the upper thread trimmer knife so that it cuts only one side of the upper thread loop.	60
	Movable knife is not picking up the needle thread because the last stitch is being skipped.	Refer to the remedies given under "Skipped stitches occur" in this troubleshooting chart.	69
	Movable knife position is incorrect.	Adjust the position of the movable knife or the loop spreader.	60
Lower thread is not cut.	Knife is blunt.	Replace with a new knife.	58
	Knife does not move to the full stroke because air pressure is too weak.	Adjust the air pressure.	58
	Movable knife position is incorrect.	Adjust the position of the movable knife or the loop spreader.	60
Thread slips out of the needle at the sewing start.	Thread nipper spring force is too weak.	Adjust the force of the thread nipper spring.	60
	Upper thread length is too short after trimming.	Install the upper thread trimmer knife so that it cuts only one side of the upper thread loop.	60
	Needle and looper adjustment is incorrect.	Adjust the needle bar height or the looper and spreader height.	51
	Not enough upper thread is being fed out.	Adjust the amount of upper thread being fed out.	53
Material is not being cut cleanly.	Knife and cutting block are not contacting properly.	Grind the cutting block surface.	58
	Cutting pressure is too weak.	Adjust the cutting pressure so that it is strong enough.	57
	Knife is blunt.	Replace with a new knife.	57





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**INSTRUCTION MANUAL**

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