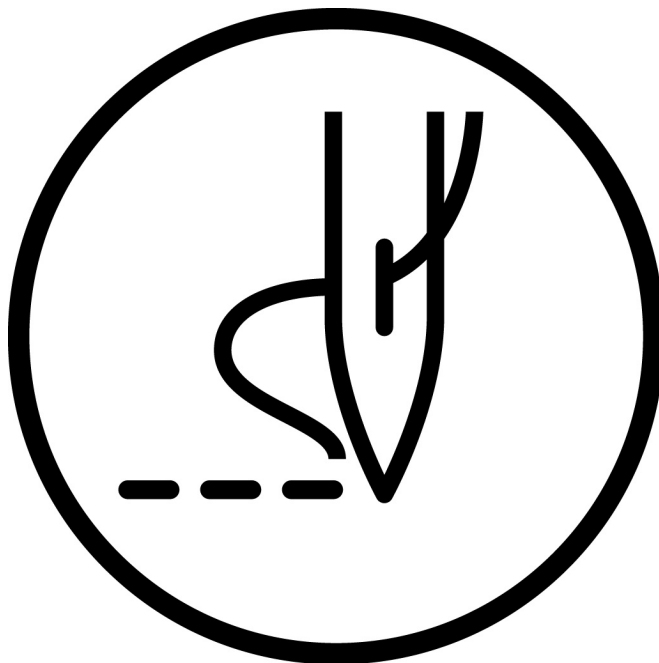


---

Please read this manual before using the machine.  
Please keep this manual within easy reach for quick reference.

---

DIRECT DRIVE  
PROGRAMMABLE ELECTRONIC PATTERN SEWER



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 it 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 result in death or serious 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 cover of the control box. Touching areas where high voltages are present can result in severe injury.

### **CAUTION**

#### **Environmental requirements**



Use the sewing machine in an area which is free from sources of strong electrical noise such as electrical line noise or static electric noise.

Sources of strong electrical noise may cause problems with correct operation.



Any fluctuations in the power supply voltage should be within  $\pm 10\%$  of the rated voltage for the machine.

Voltage fluctuations which are greater than this may cause problems with correct operation.



The power supply capacity should be greater than the requirements for the sewing machine's power consumption.

Insufficient power supply capacity may cause problems with correct operation.



The pneumatic delivery capability should be greater than the requirements for the sewing machine's total air consumption.

Insufficient pneumatic delivery capability may cause problems with correct operation.



The ambient temperature should be within the range of 5°C to 35°C during use.

Temperatures which are lower or higher than this may cause problems with correct operation.



The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices.

Excessively dry or humid environments and dew formation may cause problems with correct operation.



In the event of an electrical storm, turn off the power and disconnect the power cord from the wall outlet.

Lightning may cause problems with correct operation.

#### **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 approximately 160 kg. Use equipment such as a crane or hoist when installing the machine head and adjusting the height of the table.

If you try to lift the machine head yourself, it may cause injuries such as back injury.



Do not connect the power cord until installation is complete. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



Hold the machine head with both hands when tilting it back or returning it to its original position.

In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



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 safety covers to the machine head and motor.



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



Use a table with a height of 84 cm or less. If the table is too high, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.



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. If the oil and grease get into your eyes or onto your skin, inflammation can result.

Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

## CAUTION

### 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.
-  Be sure to wear protective goggles when using the machine.  
If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.
-  Turn off the power switch at the following times. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
  - When threading the needle
  - When replacing the bobbin and needle
  - When not using the machine and when leaving the machine unattended
-  If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
-  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
-  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.

### Cleaning

-  Turn off the power switch before carrying out cleaning. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  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. If the oil and grease get into your eyes or onto your skin, inflammation can result.  
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.  
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 before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
  - Inspection, adjustment and maintenance
  - Replacing consumable parts such as the rotary hook
-  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.
-  Hold the machine head with both hands when tilting it back or returning it to its original position.  
In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  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>⚠ 危険</b><br>高電圧部分にふれて、大けがをすることがある。電源を切り、5分たってからカバーをはずすこと。                                                                         | <b>⚠ 危険</b><br>触摸高压电部分，会导致受伤。在切断电源5分钟后，再开启盖罩。                                                                                       |
| <b>⚠ DANGER</b>                                                                                         | <b>⚠ GEFAHR</b>                                                                                                                      | <b>⚠ DANGER</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 adapte provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d'ouvrir le capot.                |
|                                                                                                         | <b>⚠ PELIGRO</b>                                                                                                                     | Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta. |

**2**

|                                                                                                                                              |                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                                                                                                                              | <b>⚠ 注意</b><br>触摸运动部分，易造成受伤。所以在装上安全保护装置后，再进行缝纫操作。在切断电源后，进行穿线，更换梭芯，机针和做清扫，调整工作。 |
| <b>⚠ CAUTION</b>                                                                                                                             |                                                                                |
| Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning etc. |                                                                                |

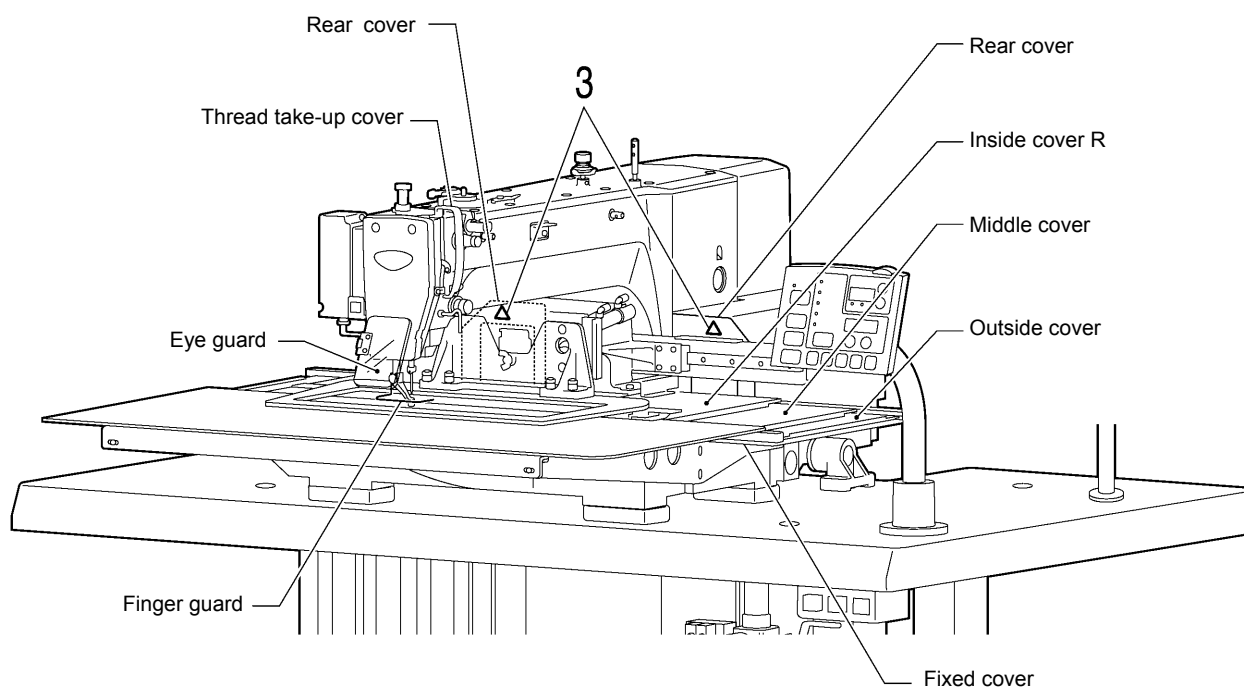
Safety devices:

Devices such as eye guard, finger guard, thread take-up cover, motor cover, X motor cover, tension release solenoid cover, inside cover, outside cover, middle cover, fixed cover and rear cover

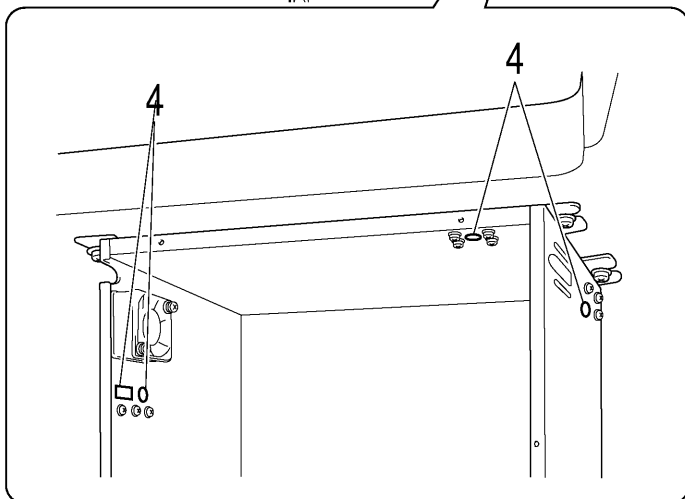
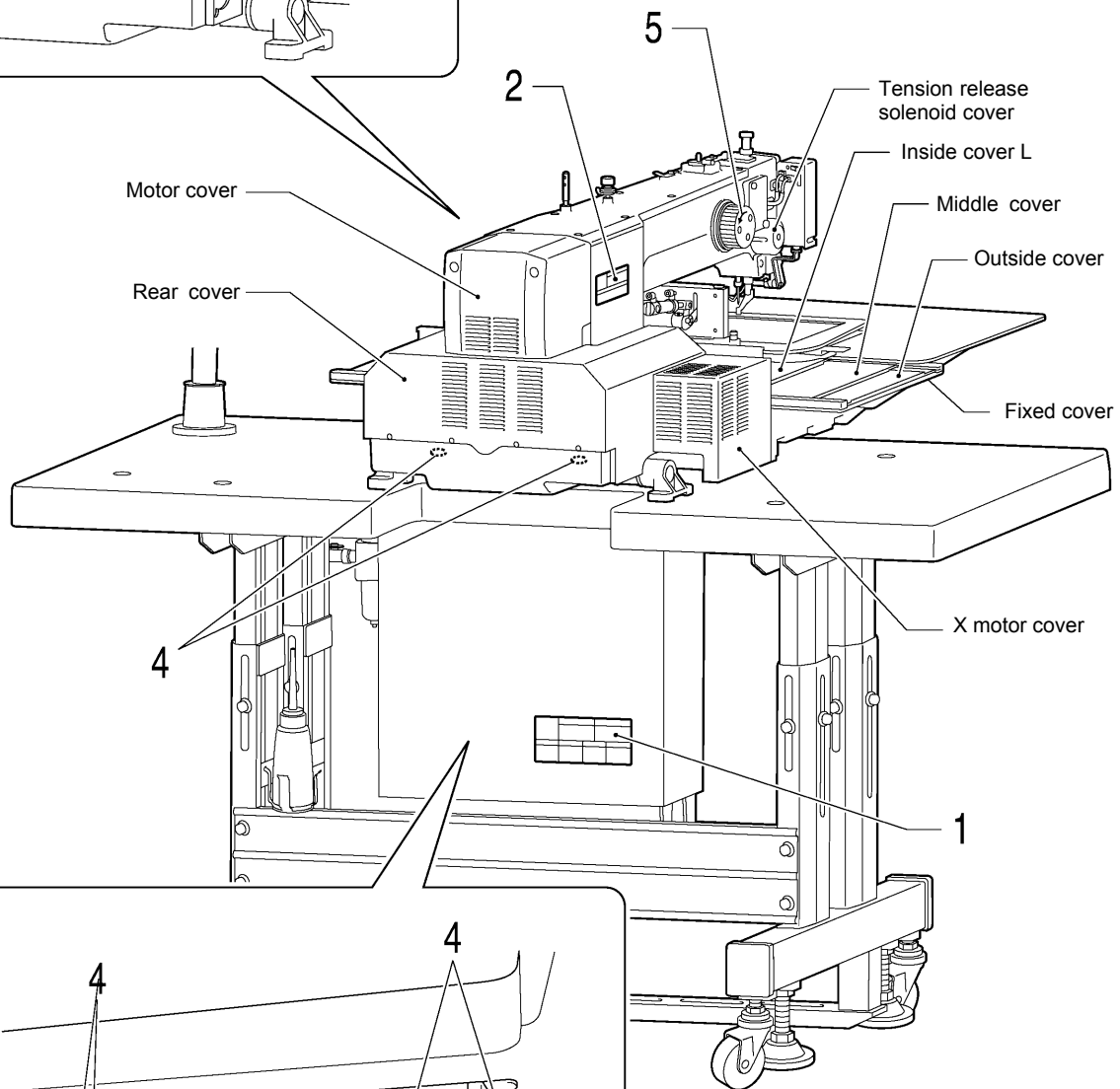
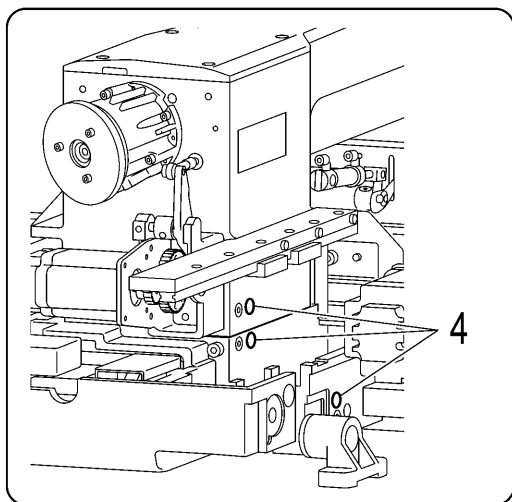
**3** Be careful to avoid getting hands caught in sliding parts.

**4** Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

**5** Direction of operation



3956M



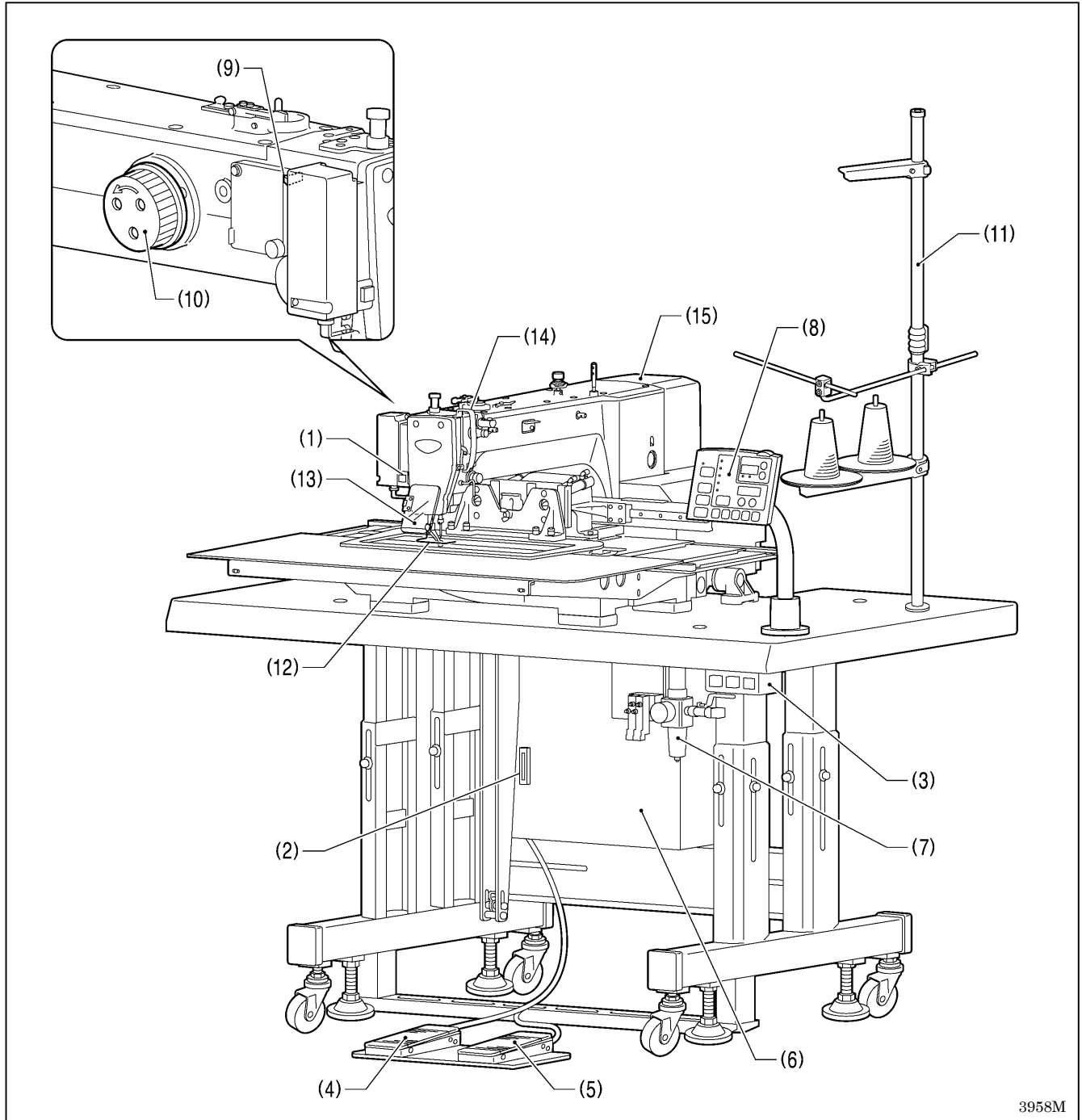
3957M

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# 1. NAMES OF MAJOR PARTS



3958M

- (1) STOP switch
- (2) CF slot
- (3) Power switch
- (4) Work clamp switch
- (5) Start switch
- (6) Control box
- (7) Solenoid valve
- (8) Operation panel
- (9) Thread wiper switch
- (10) Pulley
- (11) Cotton stand

**Safety devices:**

- (12) Finger guard
- (13) Eye guard
- (14) Thread take-up cover
- (15) Motor cover

CF™ is a trademark of SanDisk Corporation.

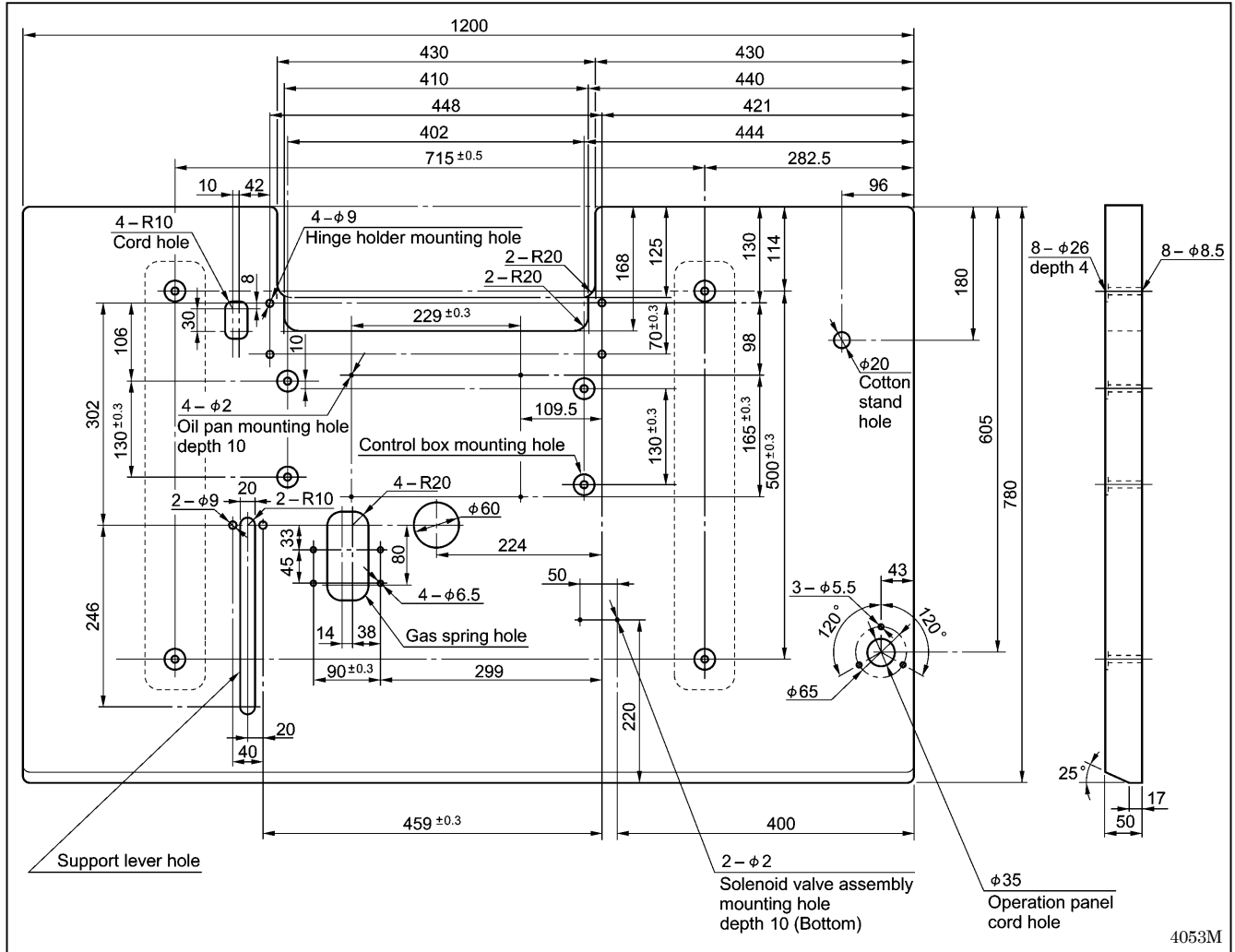
## 2. SPECIFICATIONS

|                                             |                                                                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Sewing machine                              | Lock stitch, pattern tacking sewing machine (with large shuttle hook)                                                        |
| Stitch formation                            | Single needle lock stitch                                                                                                    |
| Max. sewing speed                           | 2,700 rpm                                                                                                                    |
| Sewing area (X x Y)                         | Max. 300 x 200 mm                                                                                                            |
| Feed mechanism                              | Intermittent feed, pulse motor drive                                                                                         |
| Stitch length                               | 0.05 – 12.7 mm                                                                                                               |
| No. of stitches                             | 500,000-stitch internal memory (*)                                                                                           |
| Maximum no. of stitches                     | 20,000 stitches (per program)                                                                                                |
| No. of sewing data items that can be stored | Internal memory: 512 (*), CF card: 900                                                                                       |
| Work clamp lift method                      | Pneumatic method                                                                                                             |
| Work clamp height                           | Max. 30 mm                                                                                                                   |
| 2-step work clamp                           | Integrated-type work clamp                                                                                                   |
| Intermittent presser foot lift amount       | 22 mm                                                                                                                        |
| Intermittent stroke                         | 2 – 4.5 mm, 4.5 – 10 mm or 0 (Default setting 3 mm)                                                                          |
| Rotary hook                                 | Double-capacity shuttle hook (standard shuttle hook sold separately)                                                         |
| Wiper device                                | Standard equipment                                                                                                           |
| Thread trimmer                              | Standard equipment                                                                                                           |
| Data storage method                         | Internal memory (Flash memory), CF card (32 MB – 2 GB)<br>[Option] 3.5 floppy disk 2HD/1.44MB, 2DD                           |
| User programs                               | 50                                                                                                                           |
| Cycle programs                              | 9                                                                                                                            |
| Motor                                       | 550 W AC servo motor                                                                                                         |
| Weights                                     | Machine head approx. 160 kg, operation panel approx. 0.6 kg<br>Control box 14.2 – 16.2 kg (Differs depending on destination) |
| Power supply                                | Single-phase 220 V, Three-phase 220 V/380 V/400 V 500 VA                                                                     |
| Air pressure                                | 0.5 MPa 1.8 l/min.                                                                                                           |

\* The number of data items and stitches that can be stored will vary depending on the number of stitches in each program.

## 3. TABLE PROCESSING DIAGRAM

- The thickness of the table should be at least 50 mm, and it should be strong enough to bear the weight and vibration of the sewing machine.
- If using casters, use ones which can bear the total weight of sewing machine and table.
- Check that the control box is at least 10 mm away from the leg. If the control box and the leg are too close together, it may result in incorrect sewing machine operation.



4053M

## 4. 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 approximately 160 kg.  
Use equipment such as a crane or hoist when installing the machine head and adjusting the height of the table. If you try to lift the machine head yourself, it may cause injuries such as back injury.
-  Do not connect the power cord until installation is complete.  
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
-  Use a table with a height of 84 cm or less. If the table is too high, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  Hold the machine head with both hands when tilting it back or returning it to its original position.  
In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  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 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 a high risk of receiving a serious electric shock, and problems with correct operation may also occur.
-  Install the safety covers to the machine head and motor.

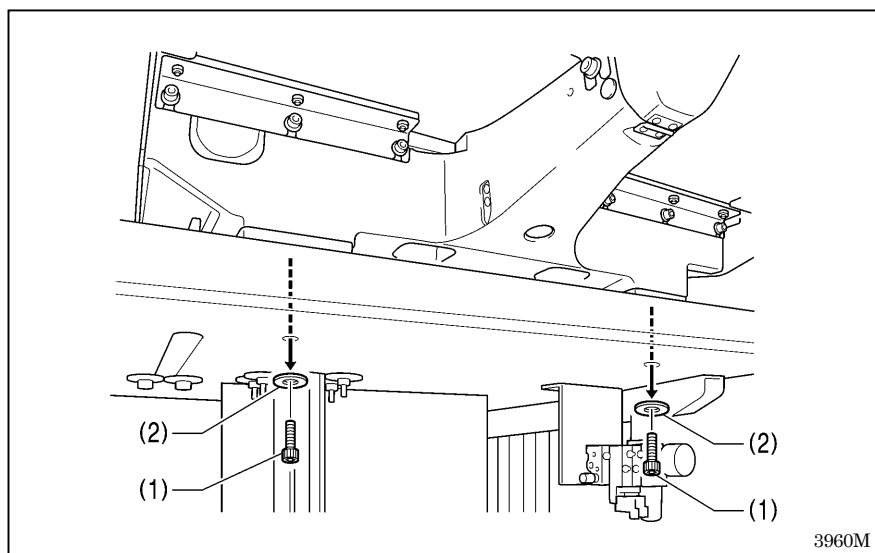
#### When placing the sewing machine on the table

Carry out the procedure starting from "4-2. Installing the control box" on the next page.

#### If the sewing machine was already installed to the table when it was delivered

Carry out the procedures indicated by [1] to [15] in the titles in the order of the numbers.

#### 4-1. Removing the machine head fixing bolts [1]



If the sewing machine was already installed to the table when it was delivered, remove the two machine head fixing bolts (1) and the two plain washers (2).

### 4-2. Installing the control box [2]

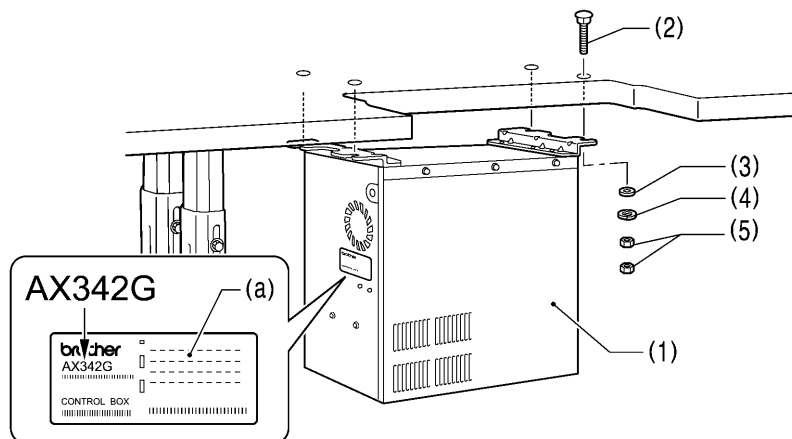


## CAUTION



The control box is heavy, so installation should be carried out by two or more people. In addition, take steps to make sure that the control box does not fall down. If this is not done, injury to feet or damage to the control box may result.

3961M



Before installing the control box (1), check that the model plate (a) on the control box (1) is "AX342G" to indicate that it is an RX-control box for BAS-342G sewing machines.

\* If the sewing machine is installed to the table, tilt back the machine head. (Refer to "4-5. Tilting back and returning the machine head".)

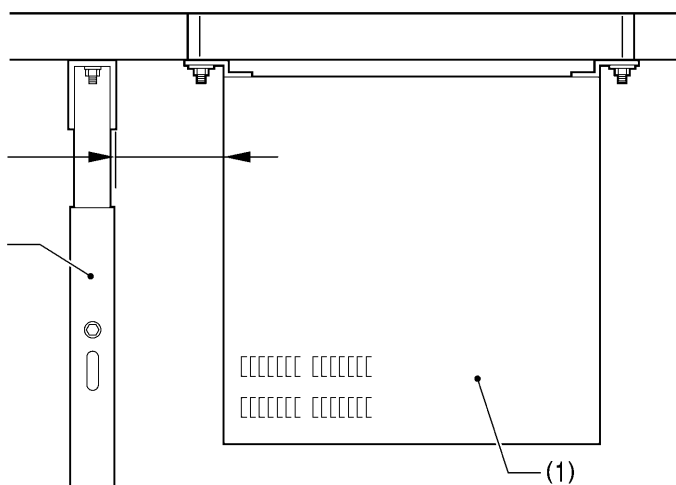
- (1) Control box
- (2) Bolts [4 pcs.]
- (3) Plain washers [4 pcs.]
- (4) Spring washers [4 pcs.]
- (5) Nuts [8 pcs.]

#### NOTE:

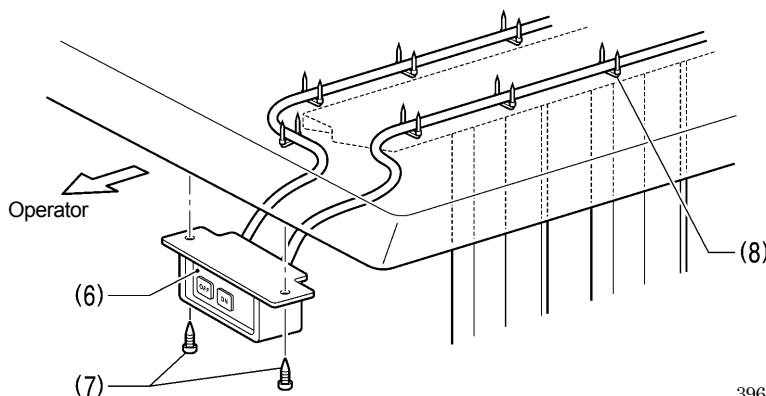
Check that the control box (1) is at least 10 mm away from the leg. If the control box (1) and the leg are too close together, it may result in incorrect sewing machine operation.

10mm or more

Leg



3962M



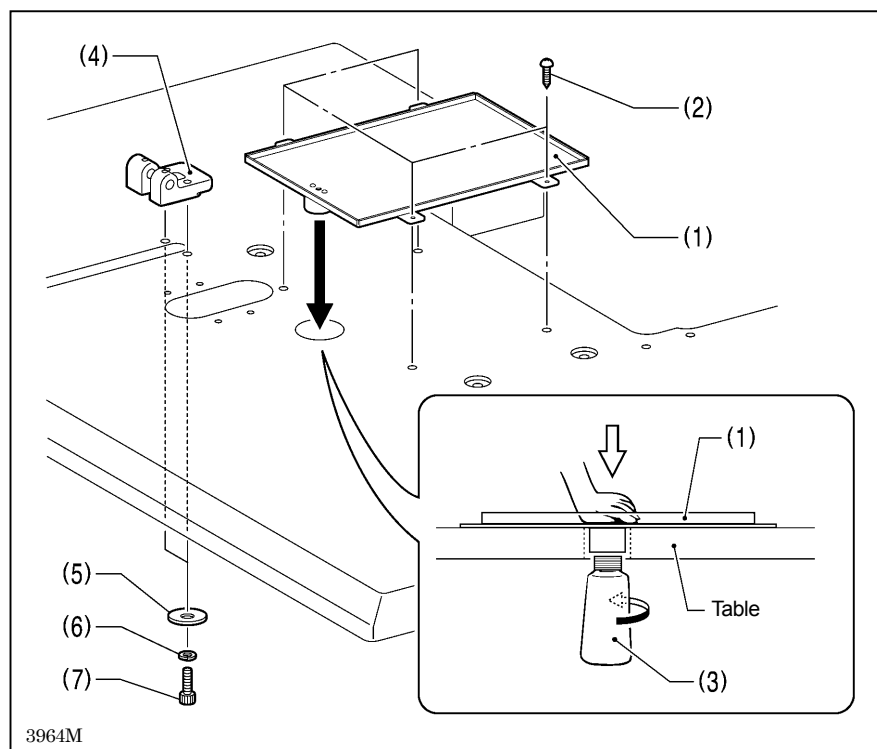
- (6) Power switch
- (7) Wood screws [2 pcs.]
- (8) Staples [7 pcs.]

#### NOTE:

Take care when tapping in the staples (8) to make sure that they do not pierce the power cord.

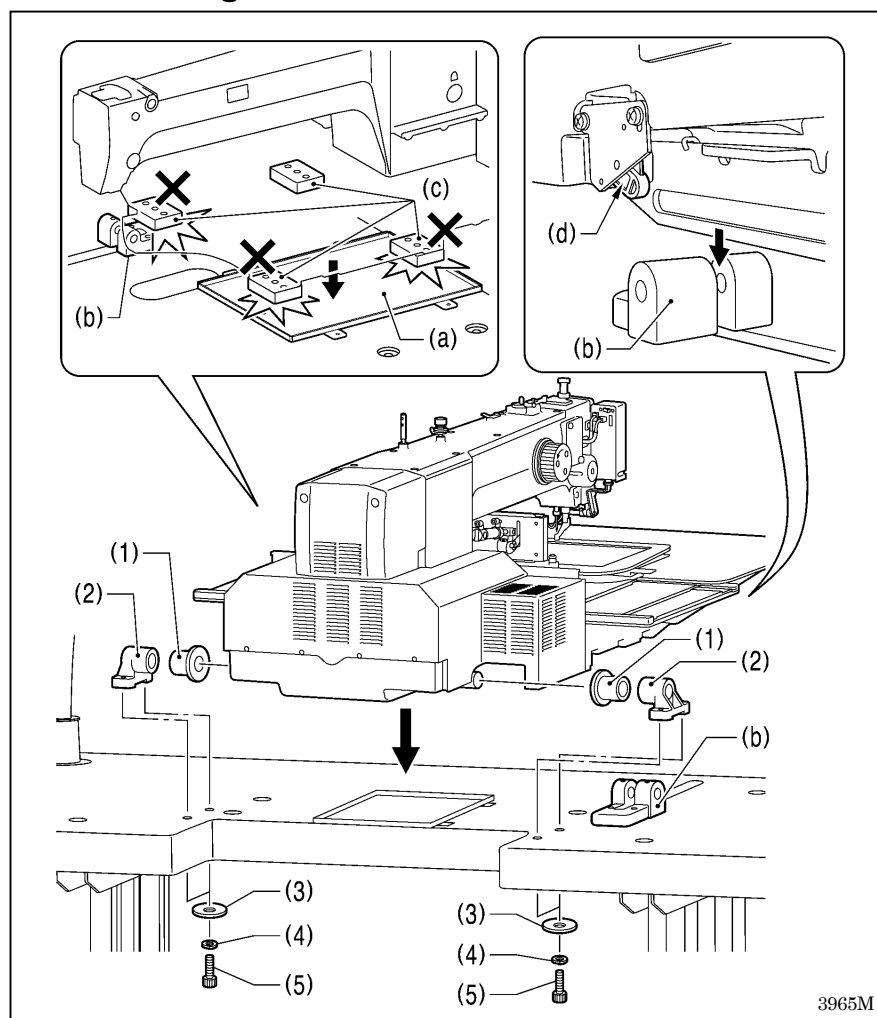
3963M

### 4-3. Installing the oil pan and support lever base



- (1) Oil pan
- (2) Wood screws [4 pcs.]
- (3) Oiler
- (4) Support lever base
- (5) Plain washers [2 pcs.]
- (6) Spring washers [2 pcs.]
- (7) Bolts [2 pcs.]

### 4-4. Installing the machine head



1. Place the machine head onto the table.

**NOTE:**

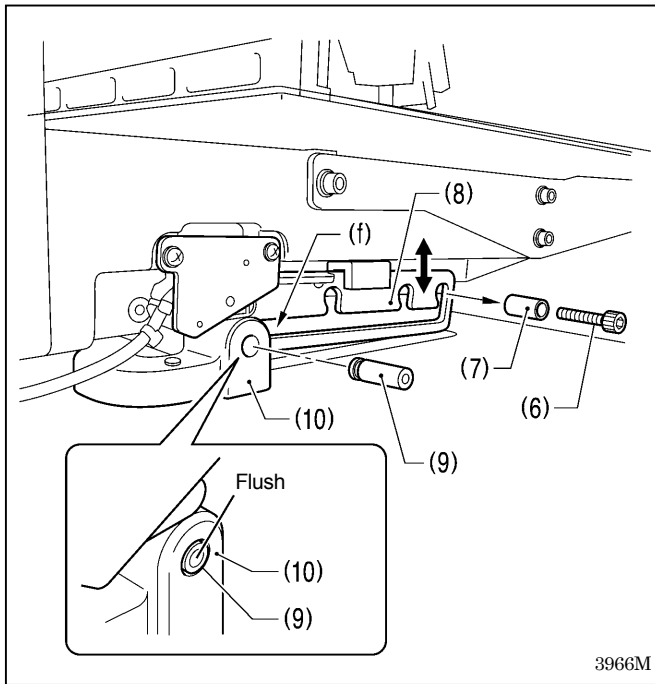
- Use a crane or hoist to install the sewing machine.
- Be careful of the following when lowering the machine head onto the table.

- ! Do not let any cords get clamped between the machine head and the table.
- ! Do not place the machine head cushion (c) on top of the oil pan (a) or the support lever base (b).
- ! Do not let the side (d) of the safety switch lever touch the support lever base (b).

- (1) Rubber bushes (2 pcs.)
- (2) Hinge holders (2 pcs.)
- (3) Plain washers [4 pcs.]
- (4) Spring washers [4 pcs.]
- (5) Bolts [4 pcs.]

(Continued on next page)

## 4. INSTALLATION



2. After placing the machine head onto the table, remove the bolt (6) and the spacer (7).

\* The bolt (6) and the spacer (7) are necessary for securing the support lever (8) when the machine head is removed from the table, so keep them in a safe place.

3. Pass the support lever shaft (9) through the hole in the support lever base (10) and through the groove (f) in the support lever (8), and push it in until it is flush with the surface of the support lever base (10).

\* If it is difficult to pass the support lever shaft (9) through the groove (f) in the support lever (8), move the end of the support lever (8) up and down while passing the support lever shaft (9) through.

## 4-5. Tilting back and returning the machine head

### CAUTION



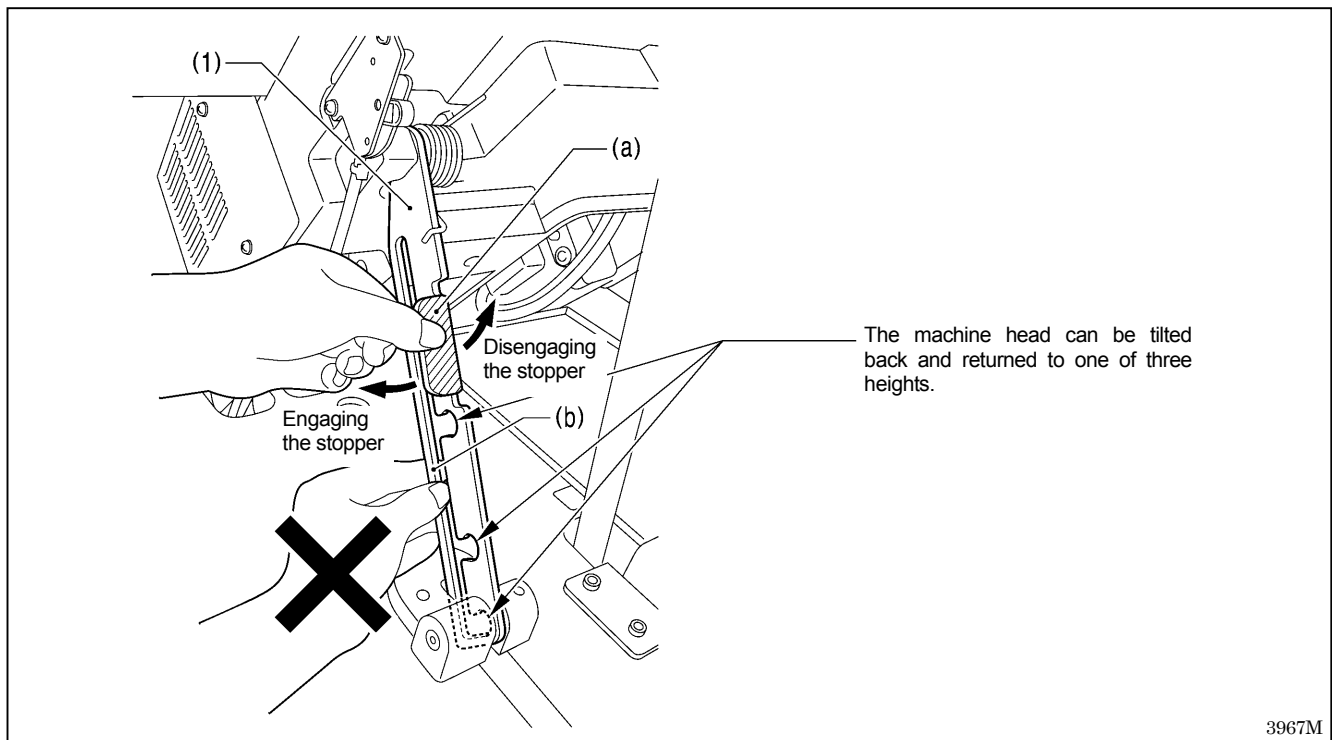
Hold the machine head with both hands when tilting it back or returning it to its original position. In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.



Always be sure to engage the stopper of the support lever (1) when tilting back the machine head. If the stopper is not engaged, the machine head may return to its original position and your hands may get caught and injury may result.

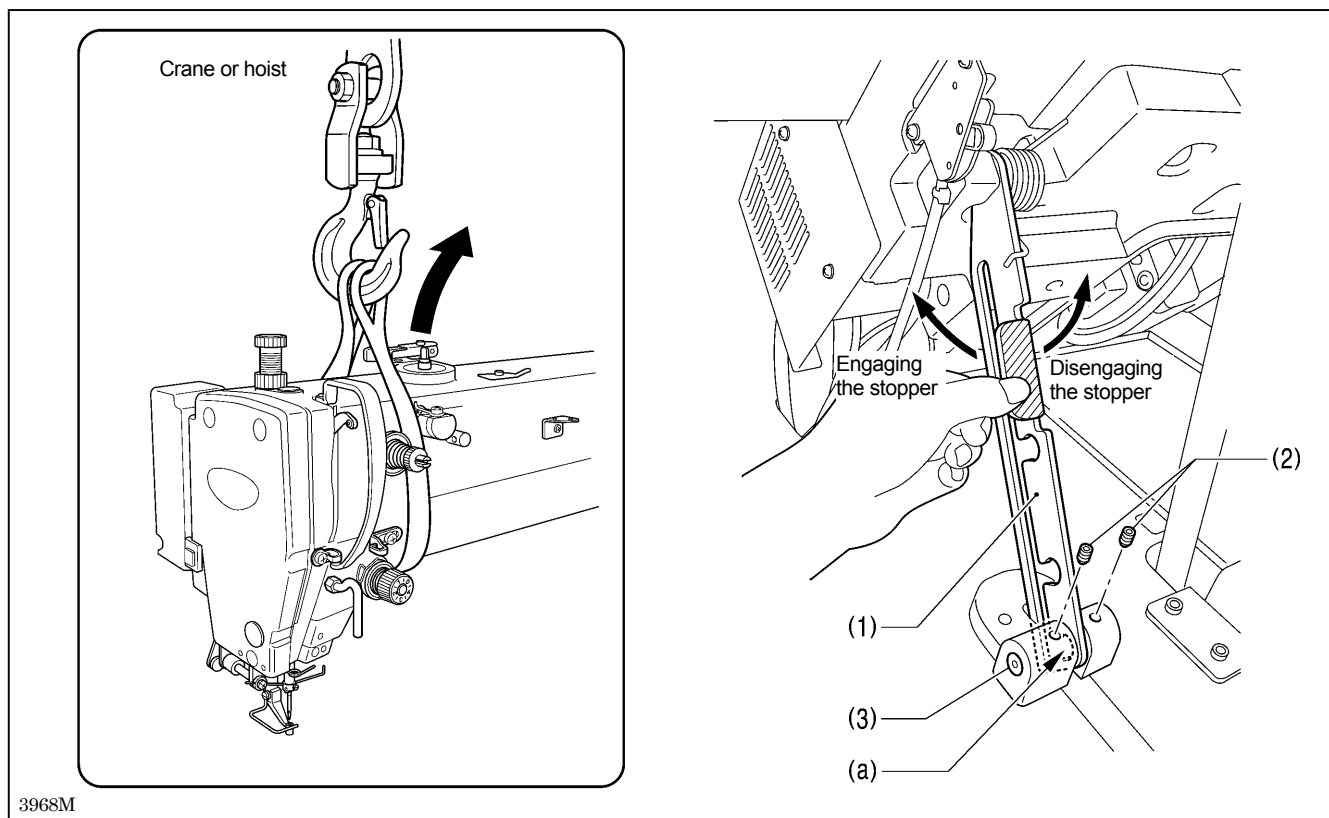


When disengaging the stopper, hold it by the knob (a). If you hold at the place indicated by (b), your hand will get caught between the support lever (1) and the table when the machine head is returned to its original position and injury will result.



The machine head can be tilted back and returned to one of three heights.

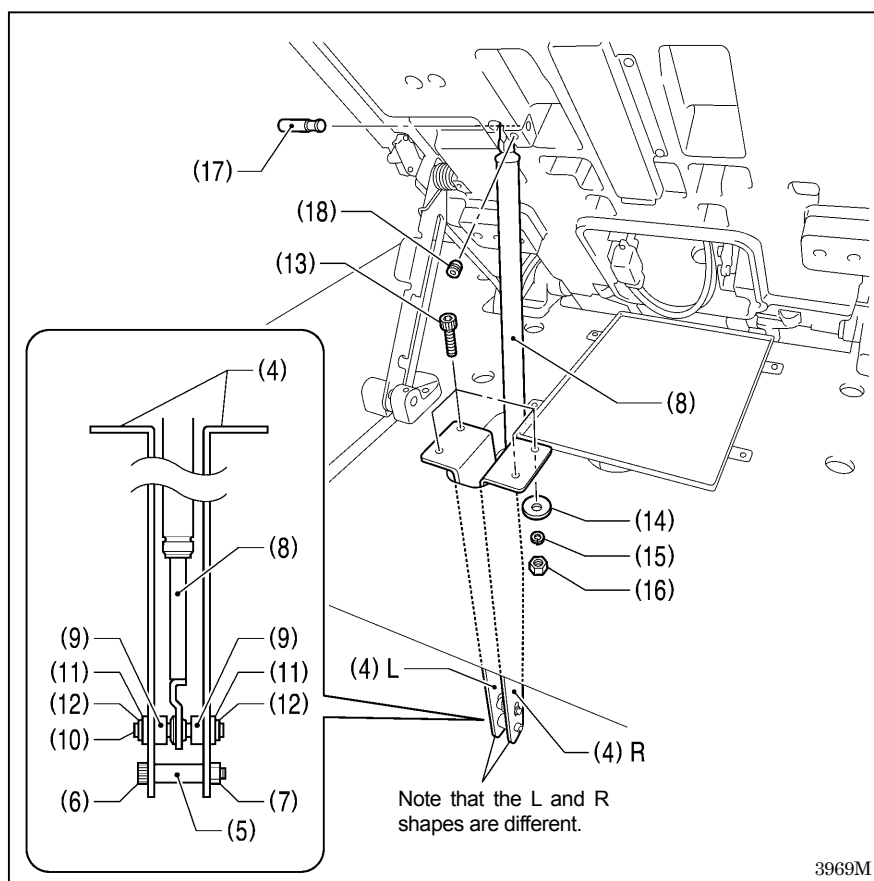
## 4-6. Installing the gas spring



1. Tilt back the machine head, and then secure the support lever (1) at stopper position (a).  
(Refer to "4-5. Tilting back and returning the machine head".)

**NOTE:** Use equipment such as a crane or hoist to tilt back the machine head.

2. Tighten the two set screws (2) to secure the support lever shaft (3).

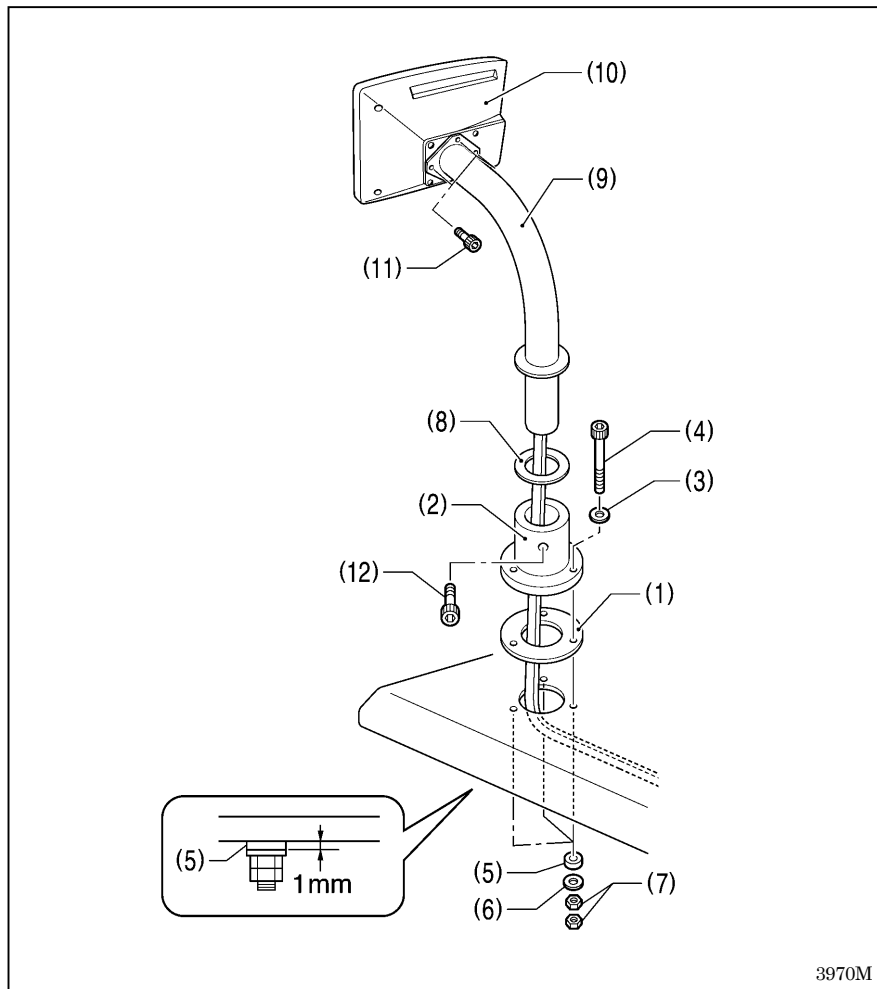


3. Install the gas spring (8).

- (4) Gas spring holders [L and R]
- (5) Spacer
- (6) Bolt
- (7) Nut
- (8) Gas spring
- (9) Shaft collars [2 pcs.]
- (10) Gas spring shaft D
- (11) Plain washers [2 pcs.]
- (12) Retaining rings E [2 pcs.]
- (13) Bolts [4 pcs.]
- (14) Plain washers [4 pcs.]
- (15) Spring washers [4 pcs.]
- (16) Nuts [4 pcs.]
- (17) Gas spring shaft U
- (18) Set screw

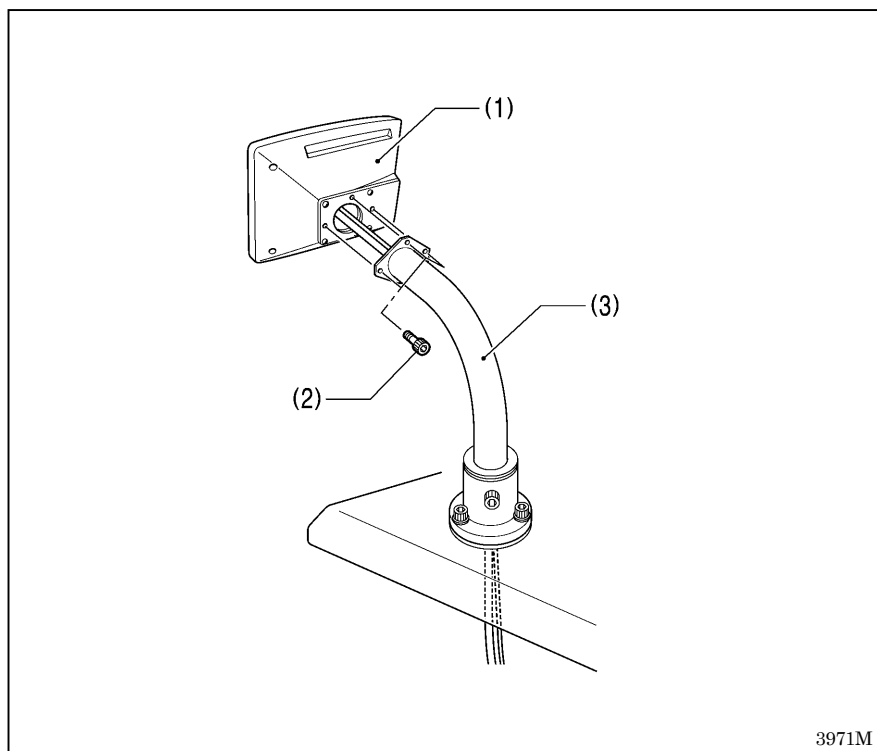
\* After installing the gas spring (8), gently return the machine head to its original position.  
(Refer to "4-5. Tilting back and returning the machine head".)

## 4-7. Installing the operation panel [3]



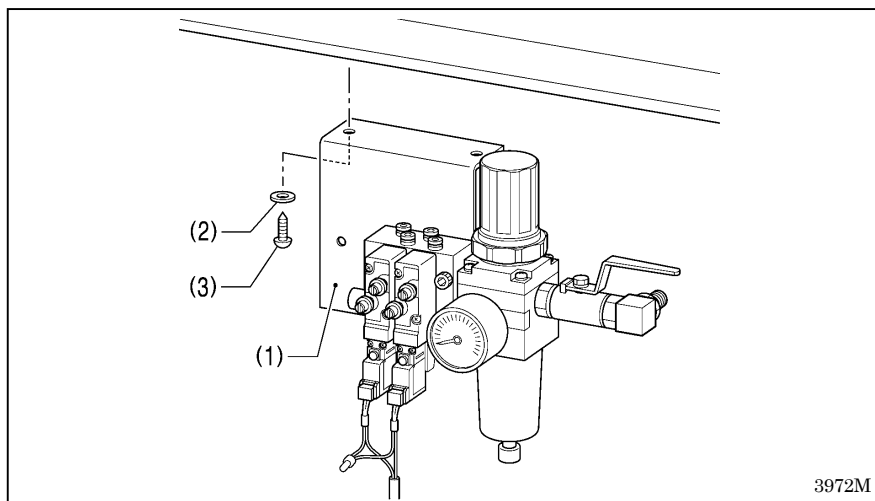
- (1) Cushion A
- (2) Operation panel base
- (3) Plain washers (medium) [3 pcs.]
- (4) Bolts [3 pcs.]
- (5) Cushions B [3 pcs.]
- (6) Plain washers (large) [3 pcs.]
- (7) Nuts [6 pcs.]
- \* Tighten until the thickness of cushion B (5) is about 1 mm.
- (8) Rubber seat
- (9) Operation panel stand
- (10) Operation panel
- \* Pass the cords of the operation panel (10) through the operation panel stand (9) and under the table.
- (11) Bolts [3 pcs.]
- (12) Bolt

< If the sewing machine was already installed to the table when it was delivered >



- (1) Operation panel
- (2) Bolts [3 pcs.]
- \* Pass the cords of the operation panel (1) through the operation panel stand (3) and under the table.

### 4-8. Installing the solenoid valve assembly



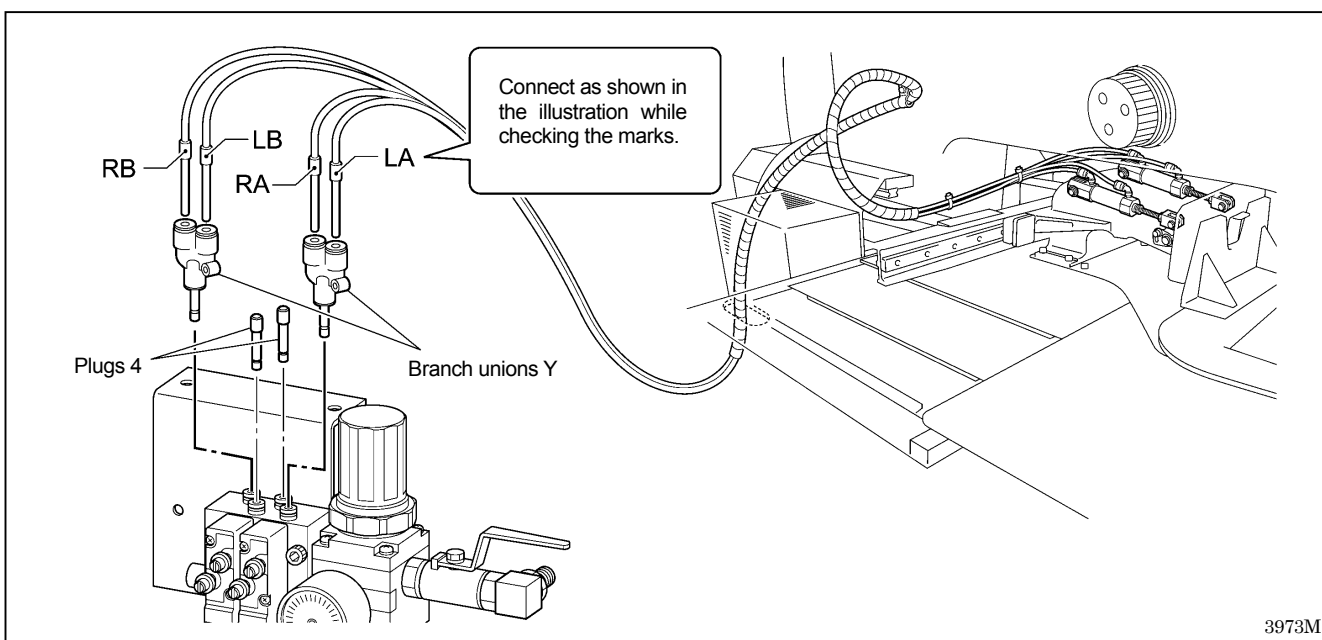
Install underneath the work table. (Refer to "3. Table processing diagram" for the installation positions.)

- (1) Solenoid valve assembly
- (2) Washers [2 pcs.]
- (3) Wood screws [2 pcs.]

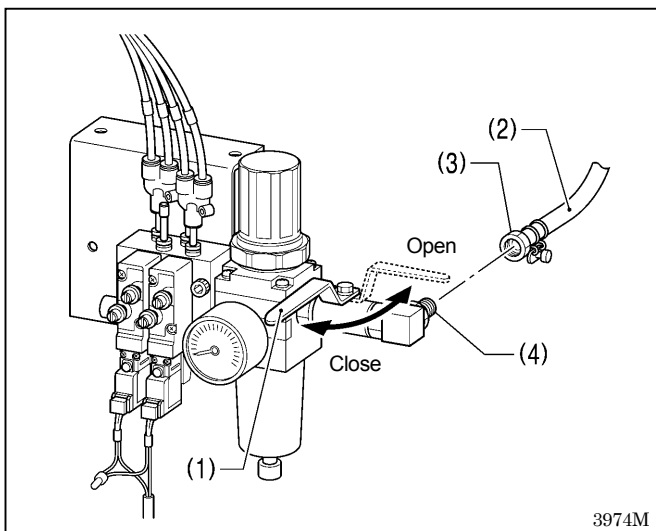
**NOTE:**

Make sure that the solenoid valve assembly does not touch the control box or the leg of the table.

### 4-9. Connecting the air tubes [4]



### 4-10. Installing the air hose [5]



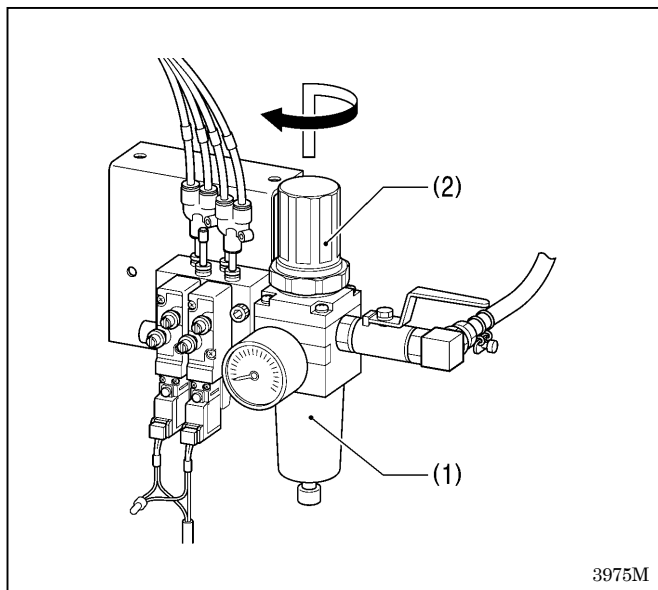
1. Close the cock (1).
2. Turn the nut (3) at the end of the air hose (2) and connect it to the valve (4).
3. Open the cock at the compressor.  
\* Check that no air is leaking from the connection of the valve (4) and air hose (2).
4. Open the cock (1).  
(The meter pointer will turn clockwise.)

**NOTE:**

Turn the cock (1) gently to open it.

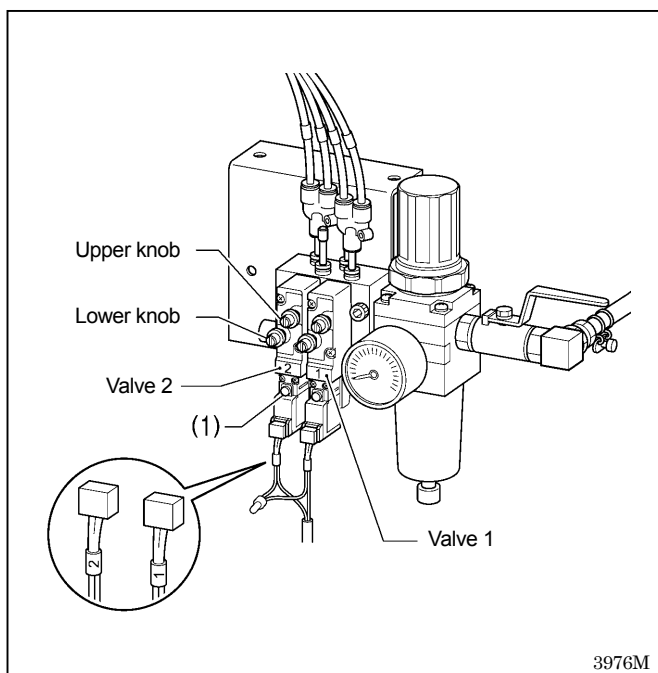
5. Adjust the air pressure. (Refer to the next page.)

## 4-11. Adjusting the air pressure [6]



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa. After adjustment is complete, push the handle (2) downward to lock it.

## 4-12. Adjusting the speed controller [7]



You can adjust the lifting and lowering speeds for the work clamp using the knobs on the valves.

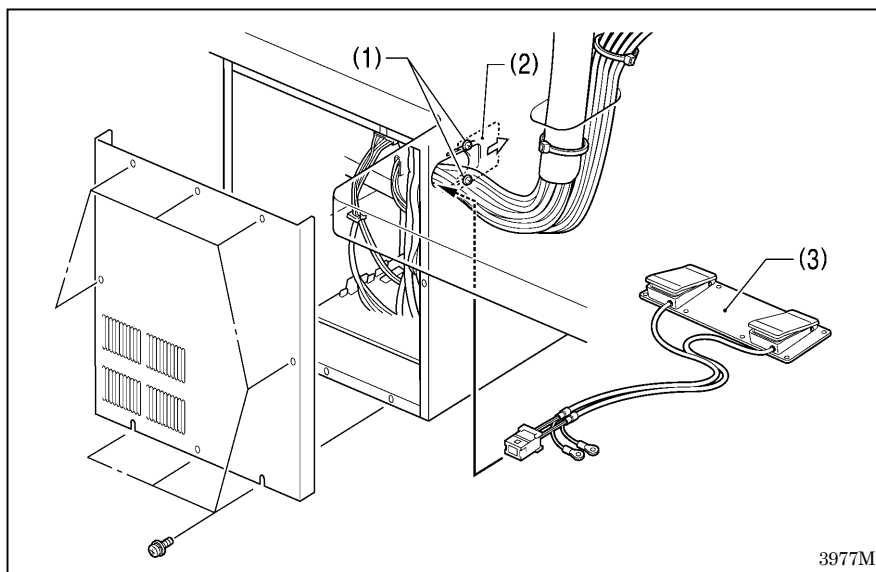
- When the upper knob is tightened, the lifting speed becomes slower. When it is loosened, the lifting speed becomes faster.
- When the lower knob is tightened, the lowering speed becomes slower. When it is loosened, the lowering speed becomes faster.

### Reference adjustments

|         |            |                                          |
|---------|------------|------------------------------------------|
| Valve 1 | Upper knob | Fully tighten                            |
|         | Lower knob | Fully tighten and then loosen by 8 turns |
| Valve 2 | Upper knob | Fully tighten and then loosen by 5 turns |
|         | Lower knob | Fully tighten                            |

You can operate the work clamp when the power is turned off by pressing the manual buttons (1).

## 4-13. Connecting the cords [8]



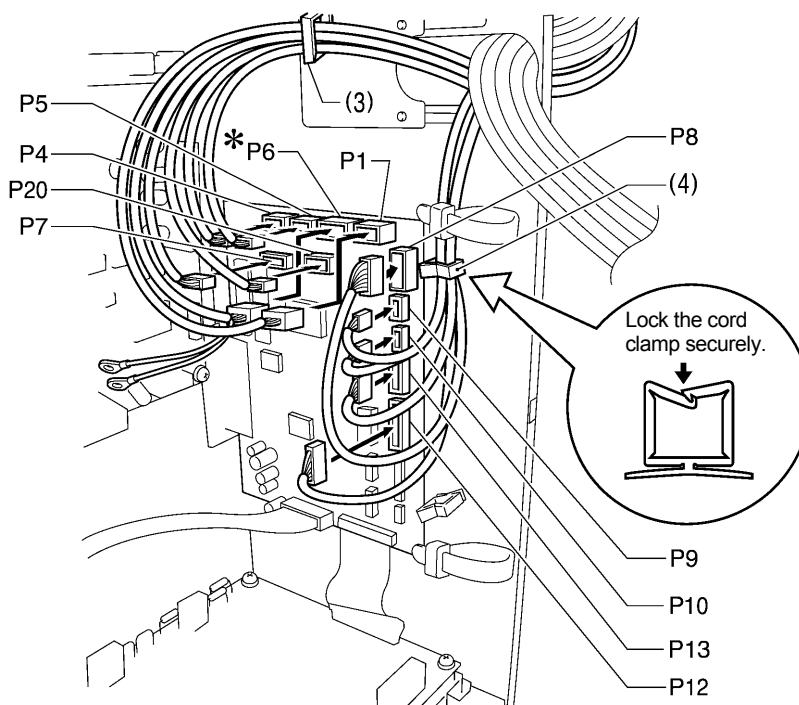
1. Remove the cover of the control box.
2. Loosen the two screws (1), and then open the cord presser plate (2) in the direction of the arrow.
3. Pass the bundle of cords from the machine head through the hole in the table, and then pass it through the hole in the control box together with the following cords.
  - Tow-pedal foot switch (3)
  - Operation panel (Do not pass the ground wires through the hole.)
  - Solenoid valve assembly
4. Securely connect the connectors as indicated in the table below.

### <Main P.C. board>

#### NOTE:

- Check that the connector is facing the correct way, and then insert it firmly until it locks into place.
- Secure the cables with cable ties and cord clamps, while being careful not to pull on the connector.

\* Be sure to make the ground connection. (Refer to "4-14. Connecting the ground".)



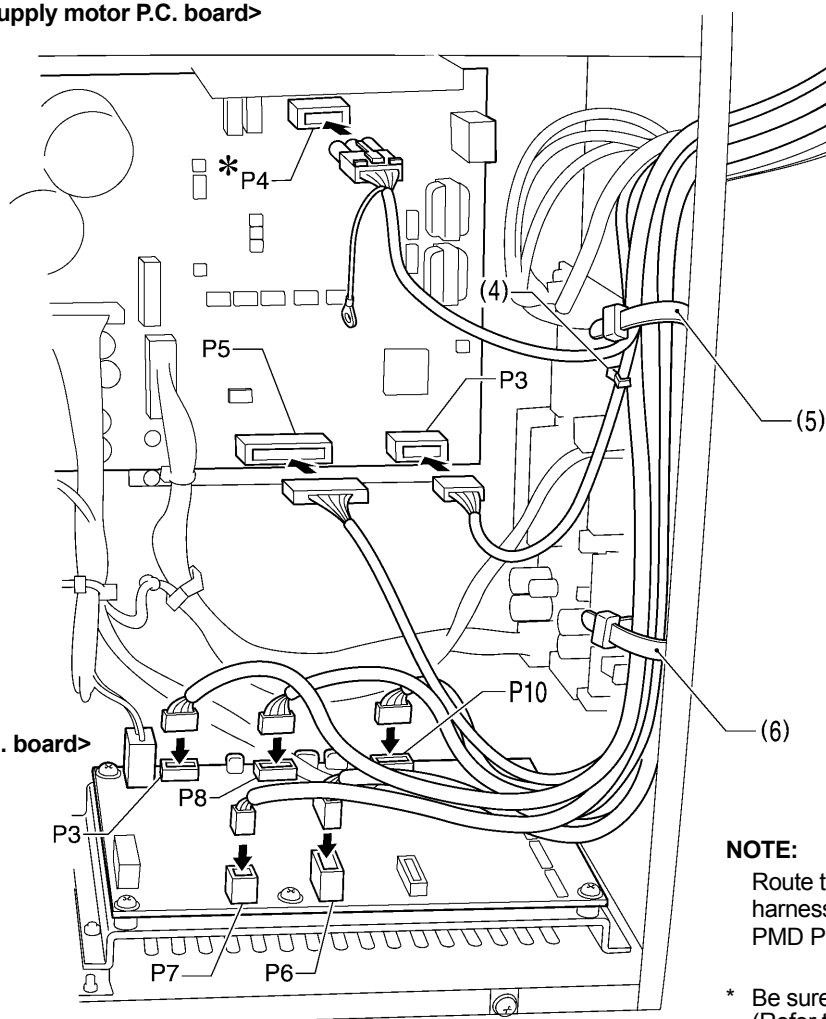
| Connector                                                 | Connection location on main P.C. board | Cord clamp |
|-----------------------------------------------------------|----------------------------------------|------------|
| X pulse motor encoder 5-pin white                         | P20 (X-ENC)                            | (3)        |
| Y pulse motor encoder 5-pin blue                          | P4 (Y-ENC)                             | (3)        |
| Intermittent presser foot pulse motor encoder 5-pin black | P5 (P-ENC)                             | (3)        |
| Foot switch 10-pin                                        | P6 (FOOT)                              | (3)        |
| Operation panel 8-pin                                     | P1 (PANEL)                             | (3)        |
| Safety switch 3-pin                                       | P9 (HEAD-SW)                           | (4)        |
| Home position sensor assembly 12-pin                      | P8 (SENSOR1)                           | (4)        |
| STOP switch 6-pin                                         | P13 (HEAD)                             | (4)        |
| Valve harness 12-pin                                      | P12 (AIR1)                             | (4)        |
| Programmer relay harness 8-pin                            | P7 (PRG)                               | (3)        |
| Fan 6-pin                                                 | P10 (SENSOR2)                          | (4)        |

3978M

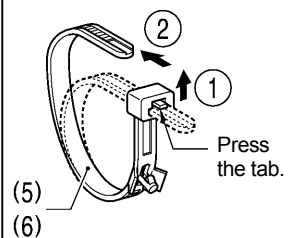
(Continued on next page)

## &lt;Power supply motor P.C. board&gt;

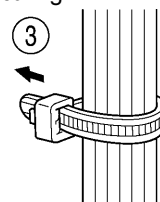
## &lt;PMD P.C. board&gt;



## &lt;Removing&gt;



## &lt;Securing&gt;

**NOTE:**

Route the X, Y and work clamp pulse motor harnesses so that they do not touch the PMD P.C.

\* Be sure to make the ground connection.  
(Refer to "4-14. Connecting the ground".)

| Connector                          | Connection location on power supply motor P.C. board | Cord clamp/cable tie |
|------------------------------------|------------------------------------------------------|----------------------|
| Machine head memory 7-pin          | P3 (HEAD-M)                                          | (4)                  |
| Upper shaft motor 3-pin            | P4 (UVW)                                             | (5)                  |
| Synchronizer 14-pin                | P5 (SYNC)                                            | (5), (6)             |
| Connector                          | Connection location on PMD P.C. board                | Cable tie            |
| Work clamp pulse motor 4-pin black | P3 (PPM)                                             | (5), (6)             |
| Thread trimmer solenoid 6-pin      | P6 (SOL1)                                            | (5), (6)             |
| Tension release solenoid 4-pin     | P7 (SOL2)                                            | (5), (6)             |
| Y pulse motor 4-pin blue           | P8 (YPM)                                             | (5), (6)             |
| X pulse motor 4-pin white          | P10 (XPM)                                            | (5), (6)             |

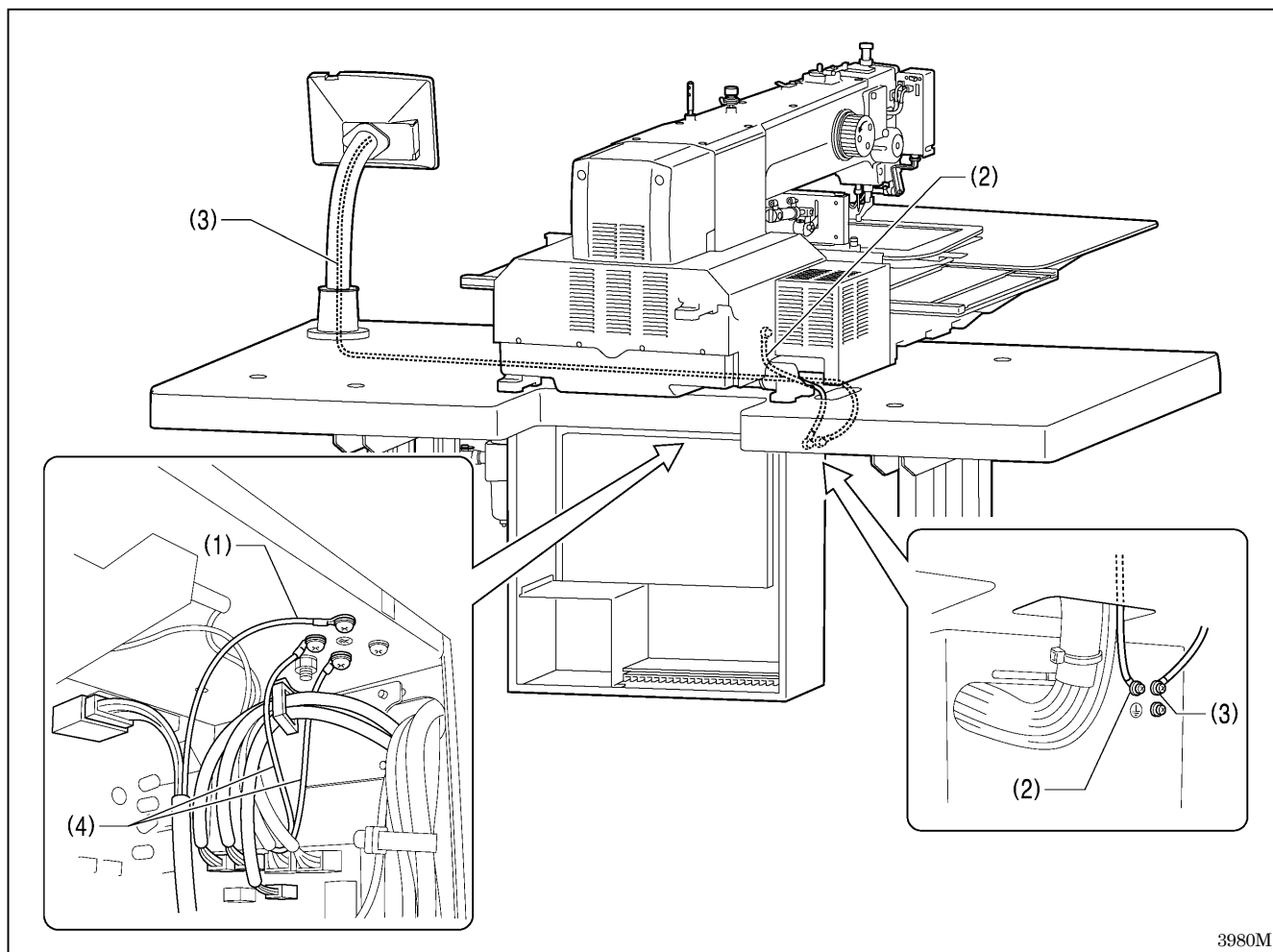
3979M

## 4-14. Connecting the ground wire [9]

### CAUTION



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

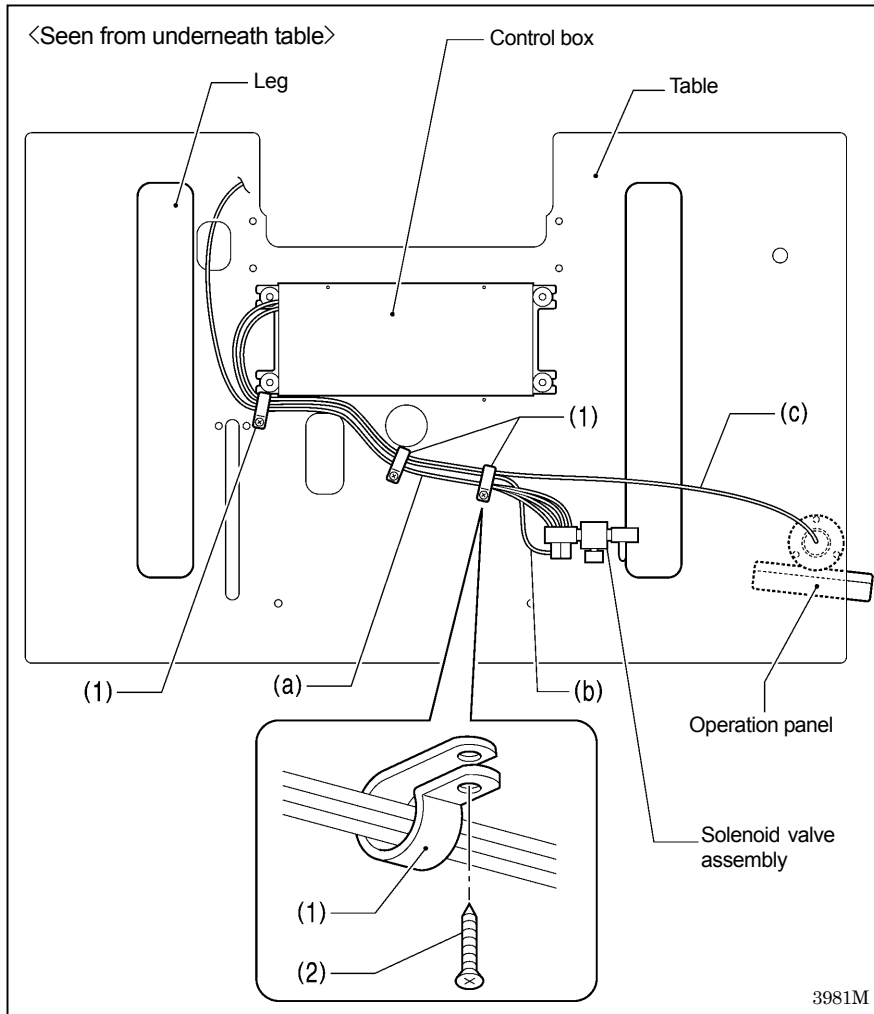


3980M

- (1) Ground wire from upper shaft motor harness
- (2) Ground wire from the machine head
- (3) Ground wire from operation panel
- (4) Ground wires from two-pedal foot switch harnesses (2 wires)

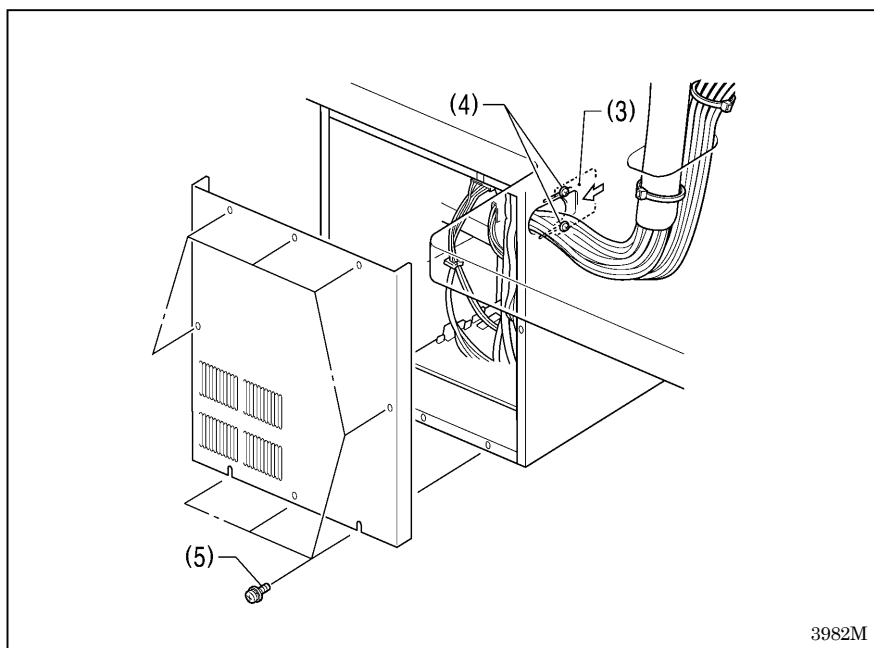
**NOTE:** Make sure that the ground connections are secure in order to ensure safety.

## 4-15. Securing the cords and air tubes [10]



Secure the air tubes (a), the solenoid valve assembly cord (b) and the operation panel cord (c) together underneath the table with the three cord holders (1).

- (1) Cord holders [3 pcs.]
- (2) Wood screws [3 pcs.]



### <Checking the cords>

1. Gently tilt back the machine head.  
(Refer to "4-5. Tilting back and returning the machine head".)
2. Check that none of the cords are being pulled.
3. Return the machine head to its original position.
4. Close the cord presser plate (3) in the direction of the arrow, and secure it by tightening the two screws (4).

#### NOTE:

Tighten the cord presser plate (3) securely so that no foreign objects or small animals can get inside the control box.

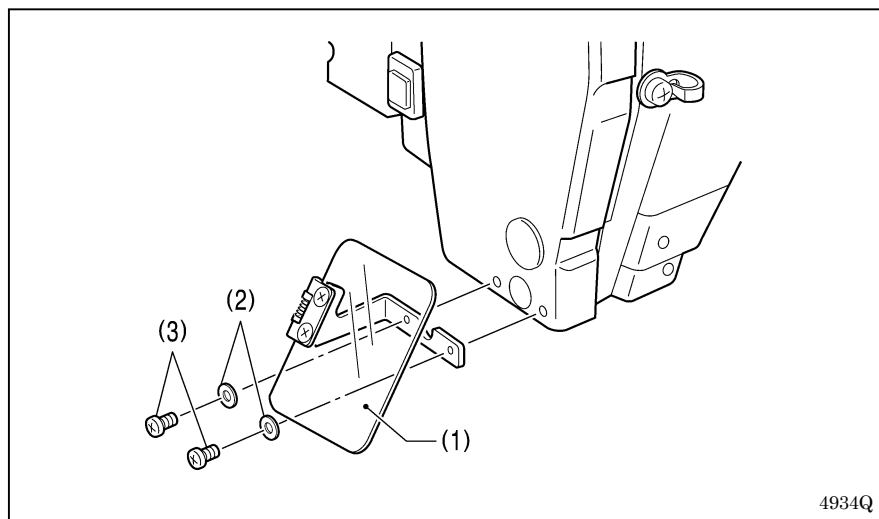
5. Secure the cover of the control box by tightening the eight screws (5).  
Check that the cords are not clamped by the cover at this time.

## 4-16. Installing the eye guard [11]

### CAUTION

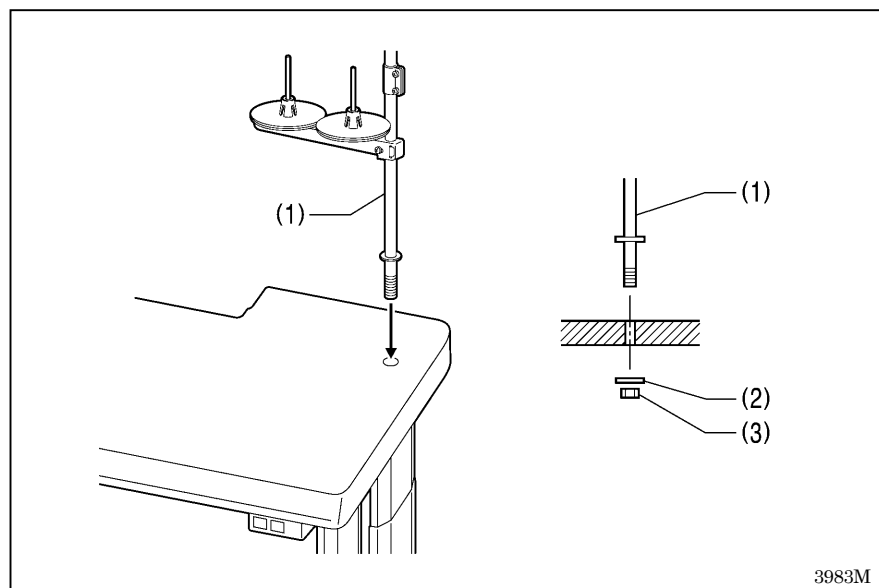


Attach all safety devices before using the sewing machine.  
If the machine is used without these devices attached, injury may result.



- (1) Eye guard assembly
- (2) Plain washers [2 pcs.]
- (3) Screws [2 pcs.]

## 4-17. Installing the cotton stand [12]



- (1) Cotton stand

### NOTE:

Fit the washer (2), and then securely tighten the nut (3) so that the cotton stand does not move.

## 4-18. Lubrication [13]

### CAUTION

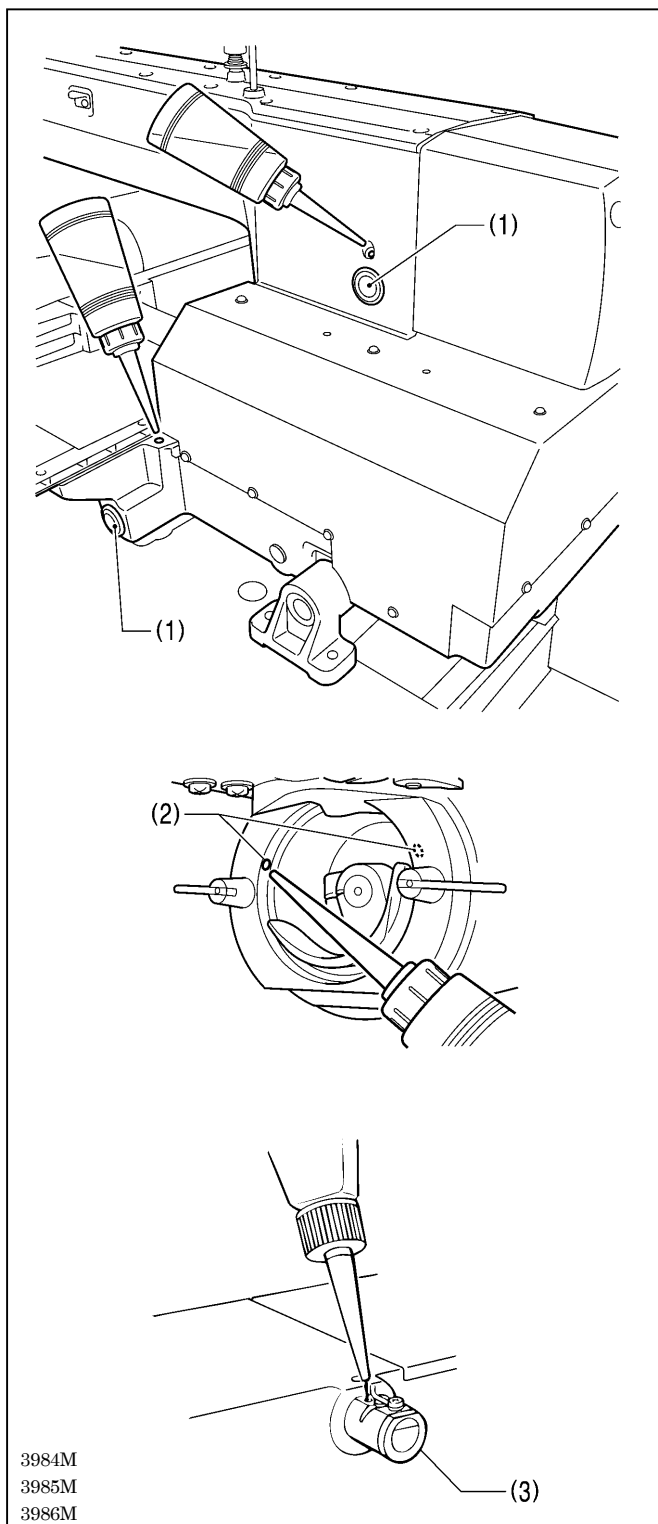


Do not connect the power cord until lubrication is complete.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



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. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.



3984M  
3985M  
3986M

- The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.
- Use only the lubricating oil <Nippon Oil Corporation Sewing Lube 10N; VG10> specified by Brother.
- \* If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil Essotex SM10; VG10>

1. Fill the arm oil tank and the bed oil tank with oil.

#### NOTE:

Be sure to add more oil when the oil level drops down to about one-third full in the oil gauge window (1). If the oil drops below the one-third full level in the oil gauge window (1), there is the danger that the sewing machine may seize during operation.

2. Pour oil in through the two holes (2) of the shuttle race base assembly so that the felt is lightly moistened.

#### NOTE:

If there is no more oil on the felt of the shuttle race base assembly, problems with sewing may result.

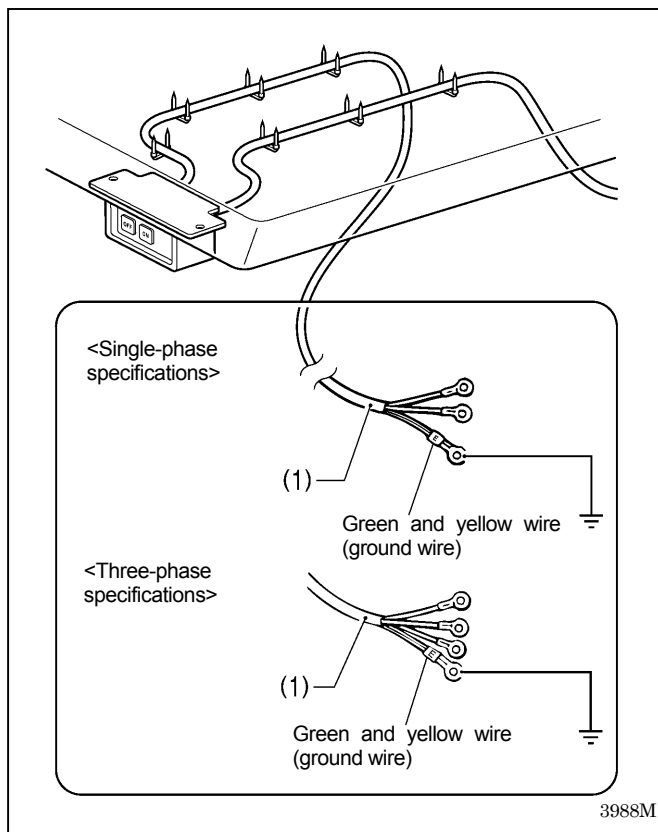
3. If using the needle cooler (3), fill it with silicon oil (100 mm<sup>2</sup>/s).  
(Refer to "5-3. Threading the upper thread" for details on using the needle cooler (3).)

## 4-19. Connecting the power cord [14]

### CAUTION



Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.



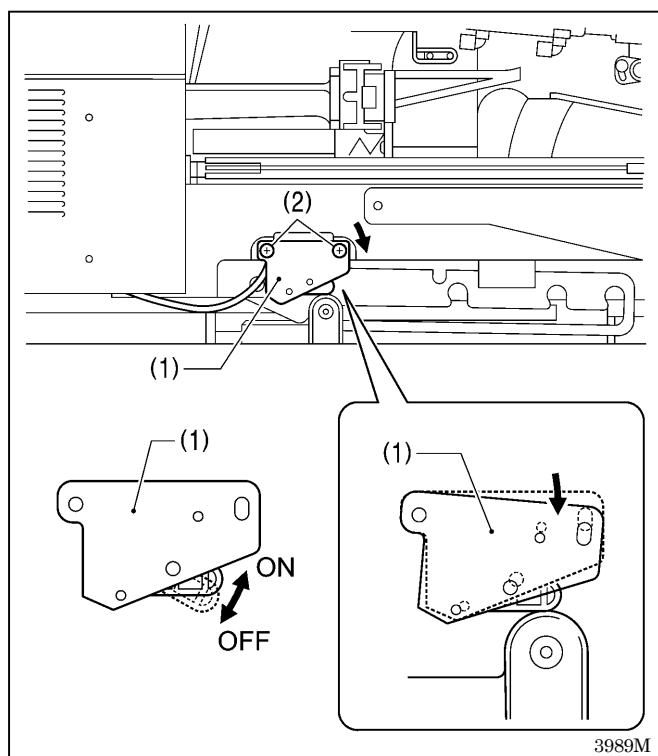
1. Attach an appropriate plug to the power cord (1). (The green and yellow wire is the ground wire.)
2. Insert the plug into a properly-grounded AC power supply.

\* The inside of the control box uses single-phase power.

#### NOTE:

- If the ground connection is not secure, electric shocks, operating errors or damage to electronic components such as P.C. boards may occur.
- Do not use an extension cord. If this is not observed, it may cause problems with correct operation.

## 4-20. Checking the safety switch [15]



1. If the machine head is tilted back, gently return it to its original position. (Refer to "4-5. Tilting back and returning the machine head".)
2. Turn on the power switch.
3. Check that no error numbers are displayed on the operation panel.

#### <If error [E050], [E051] or [E055] is displayed >

If the safety switch (1) is not turned on, error [E050], [E051] or [E055] will occur.

Check the installation position of the safety switch (1).

1. Turn off the power switch.
2. Loosen the two screws (2).
3. Push down the right side of the safety switch (1) as far as possible so that the safety switch (1) turns on, and then tighten the two screws (2).
4. Turn on the power and check that no error numbers are displayed.

## 5. PREPARATION BEFORE SEWING

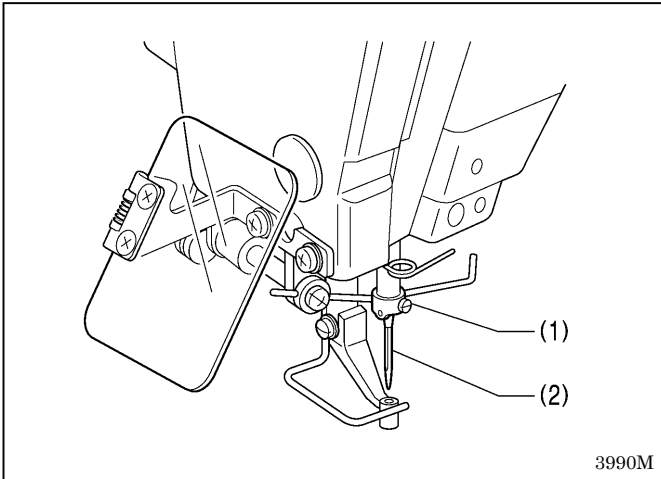
### 5-1. Installing the needle

#### ⚠ CAUTION



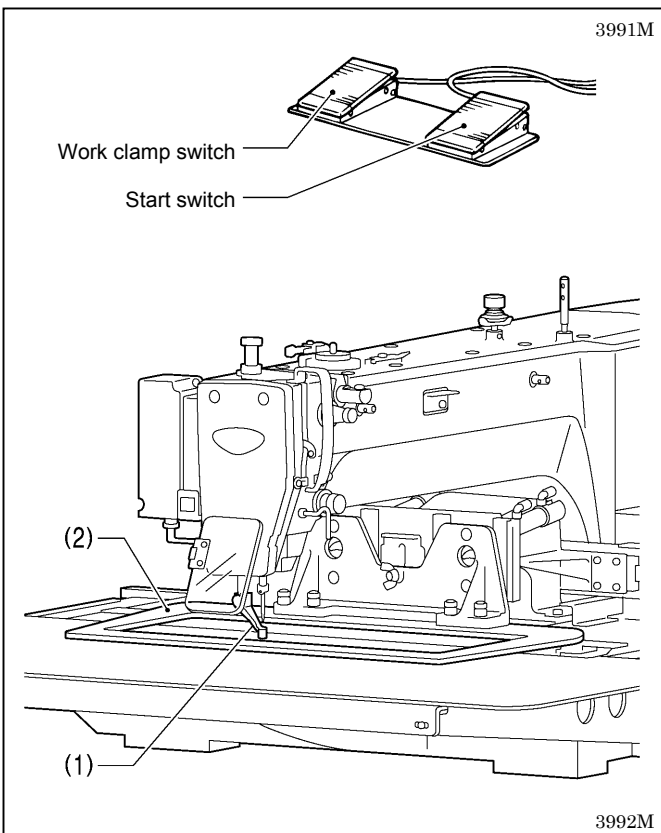
Turn off the power switch before installing the needle.

If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



1. Loosen the set screw (1).
2. Insert the needle (2) in a straight line as far as it will go, making sure that the long groove on the needle is at the front, and then securely tighten the set screw (1).

### 5-2. Operating the 2-pedal foot switch



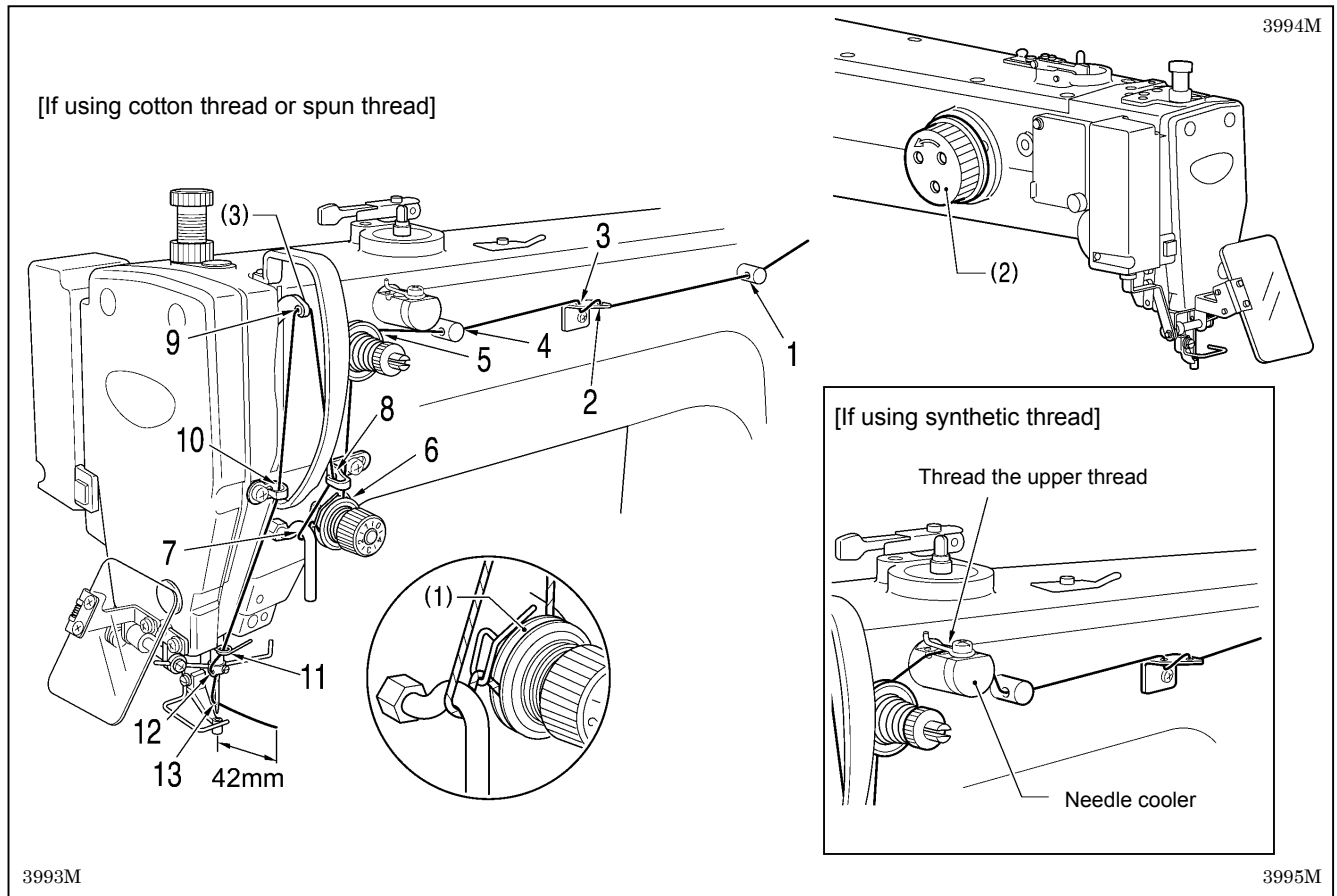
When the work clamp switch (left side) is depressed, the intermittent presser foot (1) and the work clamp (2) are lowered, and when the start switch (right side) is then depressed, the sewing machine starts operating.

\* The work clamp (2) lowering method can be changed using memory switch No. 002. (Refer to "7-3. List of memory switch settings.")

### 5-3. Threading the upper thread

Thread the upper thread correctly as shown in the illustration below.

\* When using threading mode for threading, the tension discs (1) will open so that the thread can be threaded more easily. (Refer to following page.)

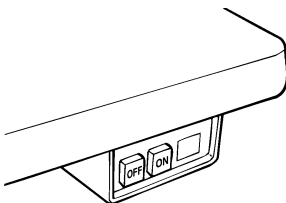
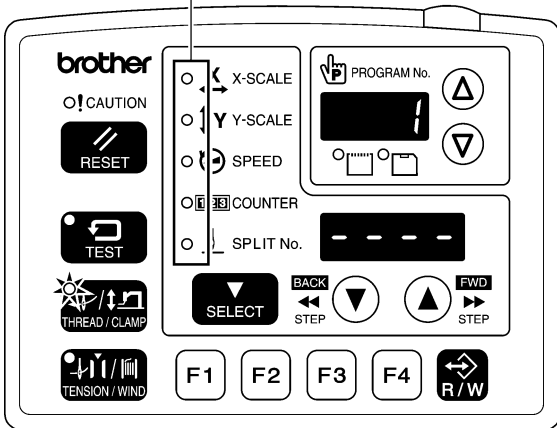


- Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 42 mm between the needle hole and the end of the thread.  
If the trailing length of the thread is too long, it may cause the thread to become tangled.

## 5. PREPARATION BEFORE SEWING

### <Threading mode>

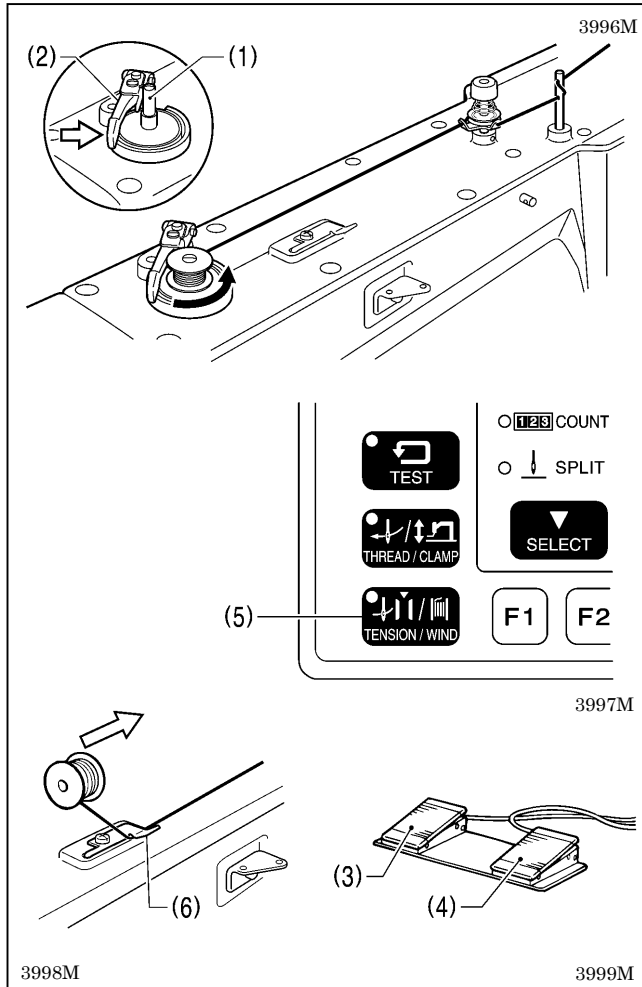
Threading mode is safe because the sewing machine will not start even when the foot switch is depressed.

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Turn on the power switch.</p>  <p style="text-align: right;">4421Q</p>                                                                                                                                                                                                                                                                                                                                                               |
| 2 | <p>All indicators switch off</p> <p>Press the THREAD/CLAMP key.</p>   <ul style="list-style-type: none"> <li>• The work clamp and the intermittent presser foot will be lowered.</li> <li>• The tension discs will open.</li> </ul> <p>THREAD/CLAMP indicator illuminates<br/>MENU indicator switches off</p> <p style="text-align: right;">4427Q</p> |
| 3 | <p><b>Threading the thread.</b></p> <ul style="list-style-type: none"> <li>• When 5 minutes have passed, the buzzer will sound and the tension discs will close.</li> </ul> <p>* When memory switch No. 564 is set to "2", the buzzer will sound after one minute has elapsed, and the tension discs will close.</p>                                                                                                                                                                                                     |
| 4 | <p><b>Ending threading mode</b></p>  <p>Press the THREAD/CLAMP key.</p> <ul style="list-style-type: none"> <li>• The work clamp and the intermittent presser foot will return to the position they were at before threading mode began.</li> </ul> <p>THREAD/CLAMP indicator switches off</p>                                                                                                                                         |

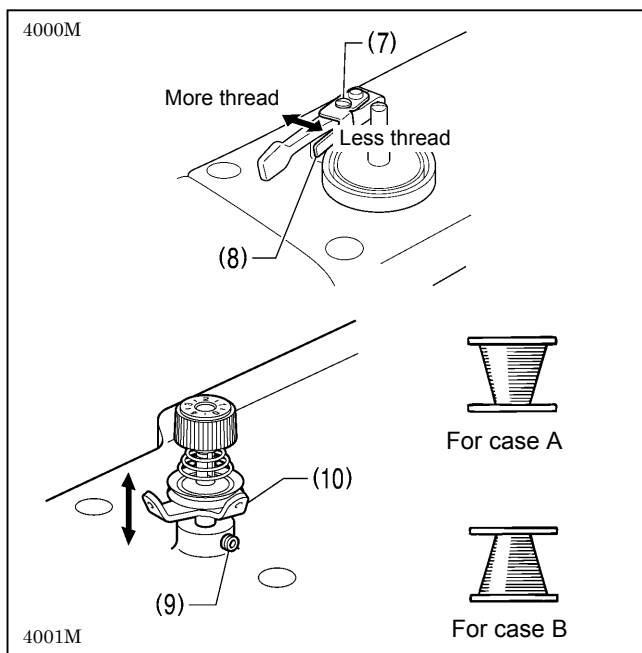
## 5-4. Winding the lower thread

**! CAUTION**

Do not touch any of the moving parts or press any objects against the machine while winding the lower thread. Injury or damage to the sewing machine may result.



1. Place the bobbin onto the bobbin winder shaft (1).
2. Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser arm (2).
3. Turn on the power switch.
4. Depress the work clamp switch (3) to lower the work clamp, and then depress the start switch (4). (Home position detection will be carried out.)
5. Check that the needle is not touching the work clamp.
6. Depress the work clamp switch (3) to lower the work clamp.
7. While pressing the TENSION/WIND key (5), depress the start switch (4).
8. Release the TENSION/WIND key (5) after the machine starts operating, and keep depressing the start switch (4) until the lower thread stops being wound onto the bobbin. (If you release the start switch (4) while this operation is in progress, hold down the TENSION/WIND key (5) and then depress the start switch (4) to restart winding of the thread.)
9. Once winding of the set amount of lower thread (80 - 90% of the bobbin capacity) is completed, the bobbin presser arm (2) will return automatically.
10. Remove the bobbin, hook the thread onto the knife (6), and then pull the bobbin in the direction of the arrow to cut the thread.

**Adjusting the bobbin winding amount**

Loosen the screw (7) and move the bobbin presser (8) to adjust.

**If the thread winds onto the bobbin unevenly**

Loosen the set screw (9) and move the bobbin winder tension assembly (10) up and down to adjust.

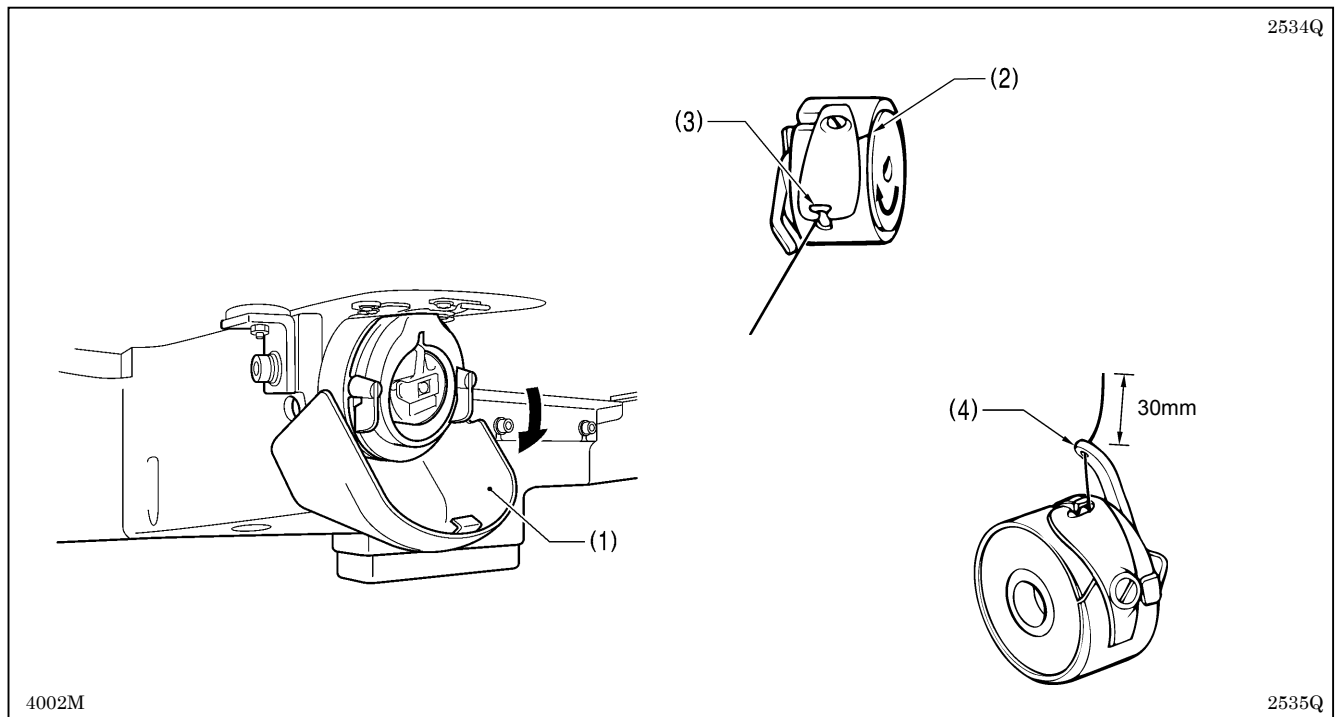
- \* For case A, move the bobbin winder tension assembly (10) down, and for case B, move it upward.

## 5-5. Installing the bobbin case

### CAUTION



Turn off the power switch before installing the bobbin case.  
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



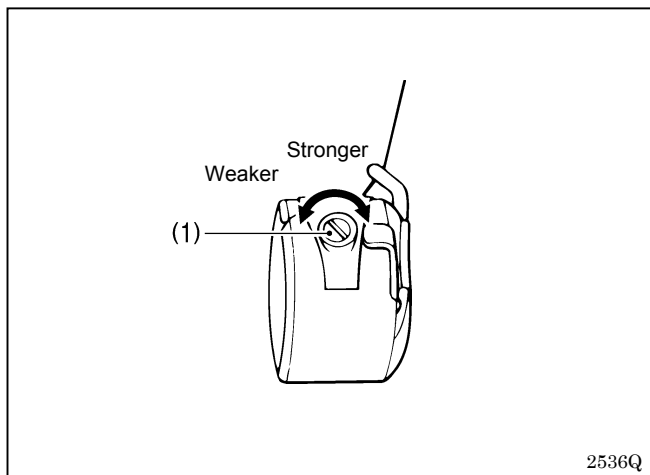
1. Pull the shuttle race cover (1) downward to open it.
2. While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
3. Pass the thread through the slot (2) and pull it out from the thread hole (3).
4. Check that the bobbin turns in the direction of the arrow when the thread is pulled.
5. Pass the thread through the lever thread hole (4), and then pull out approximately 30 mm of thread.
6. Hold the latch on the bobbin case and insert the bobbin case into the rotary hook.

## 5-6. Thread tension

### Thread tension reference

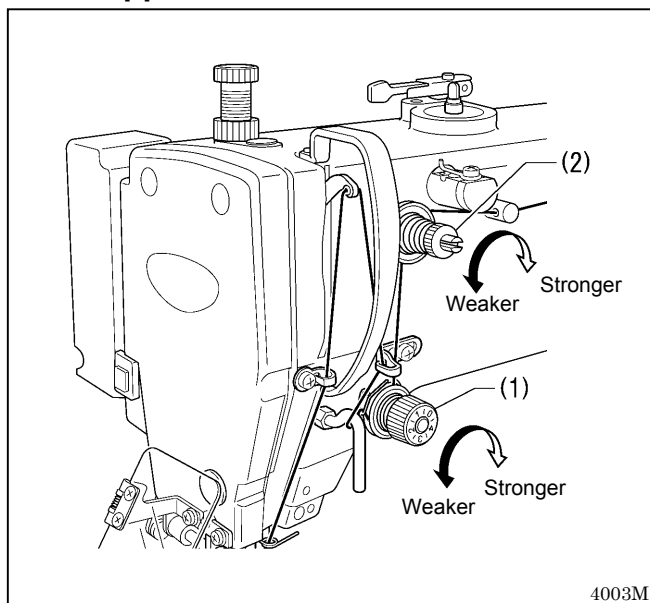
|                          |                |
|--------------------------|----------------|
| Upper thread             | #20 or similar |
| Lower thread             | #20 or similar |
| Upper thread tension (N) | 1.4 – 1.8      |
| Lower thread tension (N) | 0.3 – 0.4      |
| Pre-tension (N)          | 0.2 – 0.4      |
| Needle                   | DP × 17 #19    |

### 5-6-1. Lower thread tension



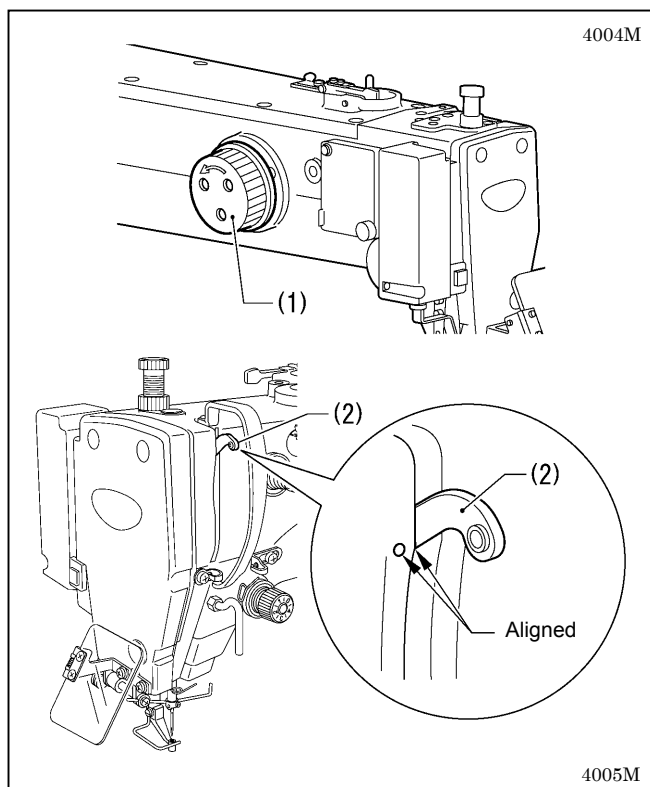
Adjust the thread tension to the weakest possible tension by turning the thread tension nut (1) until the bobbin case will not drop by its own weight while the thread end coming out of the bobbin case is held.

### 5-6-2. Upper thread tension



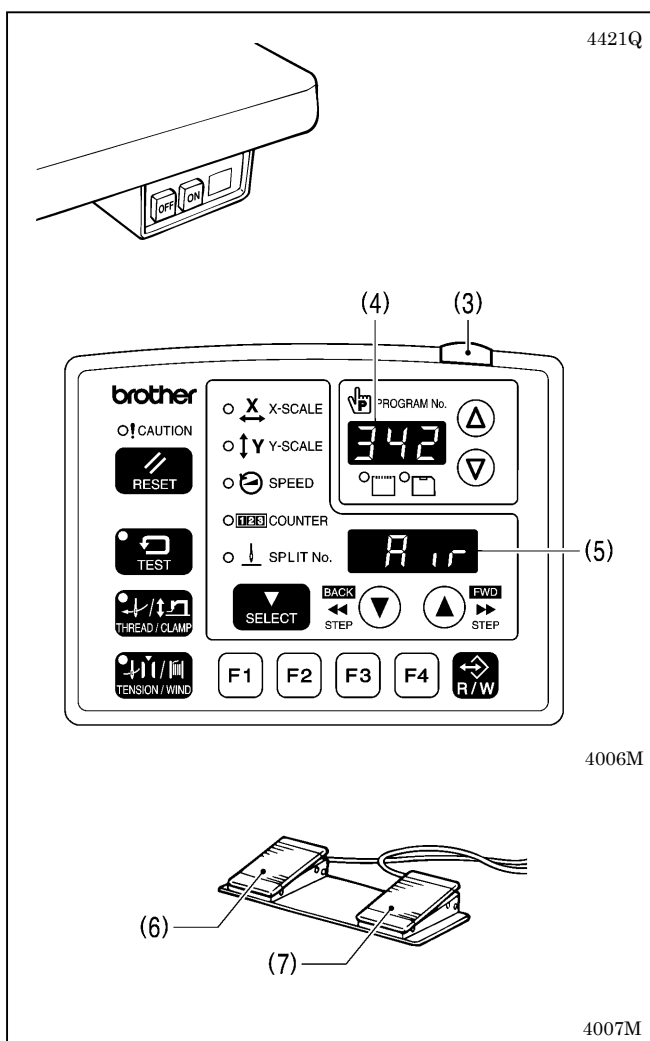
1. Turn the tension nut (1) (main tension) to adjust the tension as appropriate for the material being sewn.
2. Use the tension nut (2) (sub tension) to adjust the upper thread trailing length to about 42 mm.

## 5-7. Home position detection



**Before starting home position detection, check that the needle bar is at the needle up stop position.**

Turn the pulley (1) until the ridge at the bottom of the thread take-up (2) is aligned with the O mark on the arm.



1. Turn on the power switch.  
The POWER indicator (3) will illuminate, and the model name [342] will appear in the PROGRAM No. display (4) and [Air] will appear in the menu display (5).



After this, the program number will flash in the PROGRAM No. display (4).

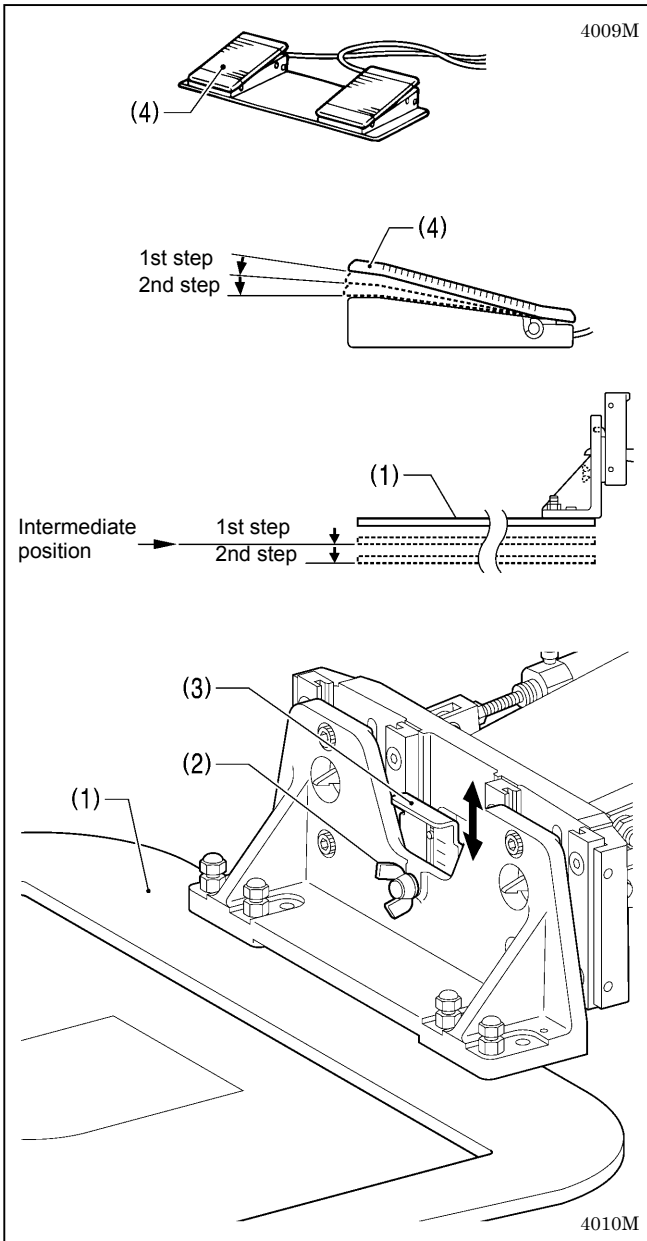
2. Depress the work clamp switch (6) to lower the work clamp, and then depress the start switch (7). (After home position detection is carried out, the work clamp will move to the sewing start position and then it will rise.)

\* For programs with a large number of stitches, the buzzer will sound after the home position is detected, and then the work clamp will move to the sewing start position.

**NOTE:**

If error "E110" is displayed when the start switch (7) is depressed, turn the pulley (1) in the direction of operation to clear the error display.

## 5-8. Setting 2-step operation for the work clamp

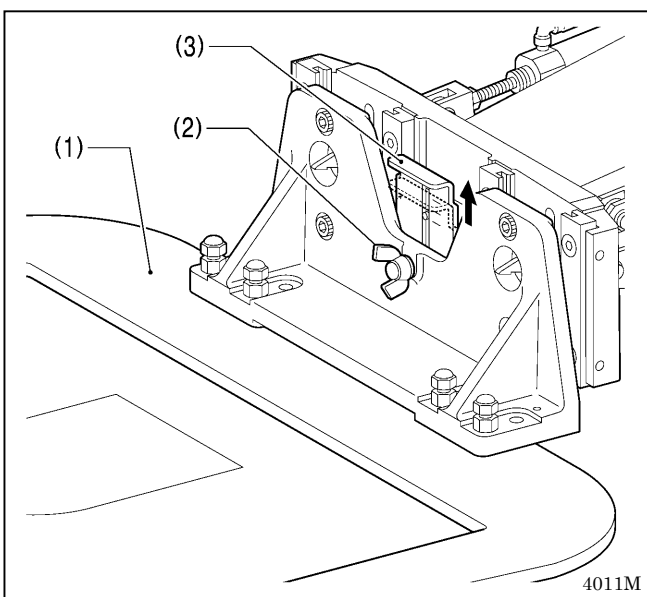


When these settings are made, the work clamp (1) can be lowered in two steps.

1. Set memory switch No. 002 to "1".  
(Refer to "7-2. Setting memory switches".)
2. With the work clamp (1) raised, loosen the wing screw (2).
3. Move the work clamp stopper (3) up or down to determine the intermediate position, and then tighten the wing screw (2) to secure the work clamp stopper (3) in place.
4. Depress the work clamp switch (4) to the 1st step and check the intermediate position for the work clamp.
5. Depress the work clamp switch (4) to the 2nd step to fully lower the work clamp.

\* 2-step work clamp operation is enabled when memory switch No. 002 is set to "1".

\* Do not set memory switch No. 002 to "2".

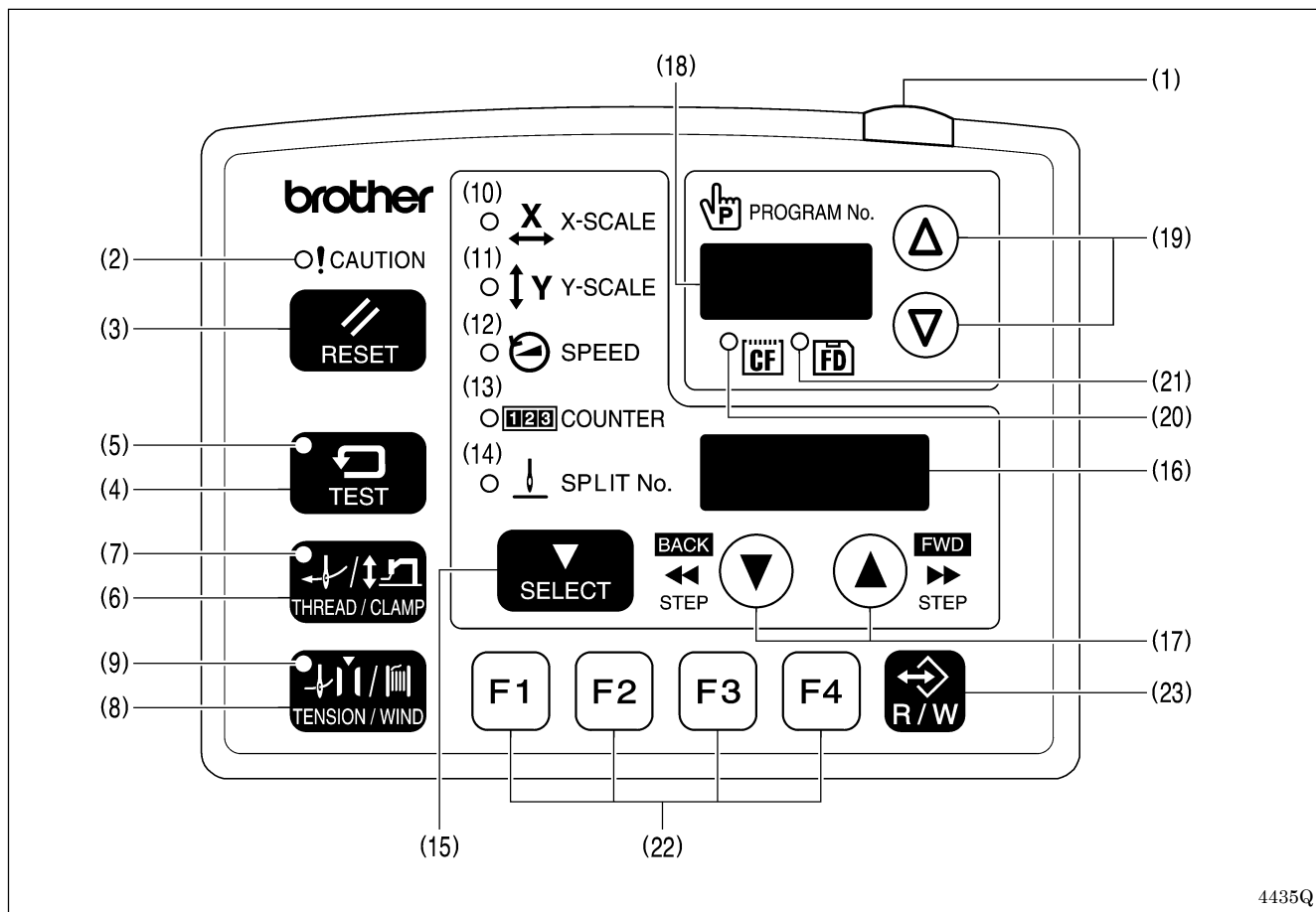


### <To return the work clamp to one-step operation>

1. Set memory switch No. 002 to "0".  
(Refer to "7-2. Setting memory switches".)
2. With the work clamp (1) raised, loosen the wing screw (2).
3. Move the work clamp stopper (3) to its highest position, and then tighten the wing screw (2) to secure the work clamp stopper (3) in place.

## 6. USING THE OPERATION PANEL (BASIC OPERATIONS)

### 6-1. Name and function of each operation panel item



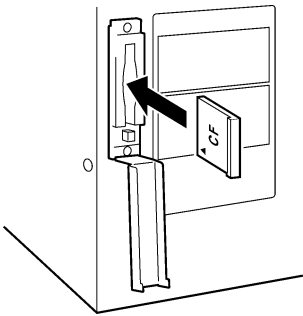
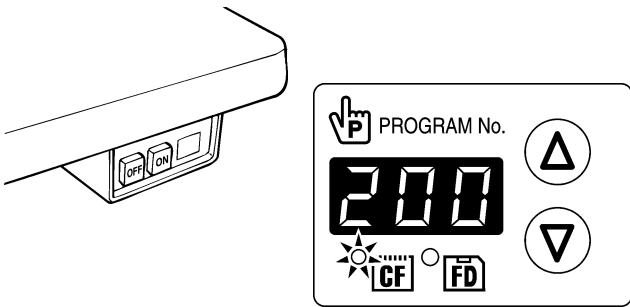
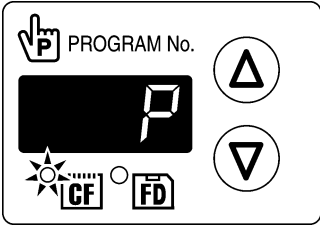
- (1) Power indicator  
Illuminates when the power is turned on.
- (2) CAUTION indicator  
Illuminates when an error occurs.
- (3) RESET key  
Used to reset errors.
- (4) TEST key  
Used to start test mode.
- (5) TEST indicator  
Illuminates when the TEST key (4) has been pressed.
- (6) THREAD/CLAMP key  
Used to start threading mode or work clamp height setting mode.
- (7) THREAD/CLAMP indicator  
Illuminates when the THREAD/CLAMP key (6) has been pressed.
- (8) TENSION/WIND key  
Used to wind the lower thread.
- (9) TENSION/WIND indicator  
Used when the digital tension set (option) is installed.

- (10) X-SCALE indicator  
Illuminates when the SELECT key (15) is pressed to shown the X-scale setting.
- (11) Y-SCALE indicator  
Illuminates when the SELECT key (15) is pressed to shown the Y-scale setting.
- (12) SPEED indicator  
Illuminates when the SELECT key (15) is pressed to shown the sewing speed setting.
- (13) COUNTER indicator  
Illuminates when the SELECT key (15) is pressed to shown the lower thread or production counter setting.
- (14) SPLIT No. indicator  
Illuminates when the SELECT key (15) is pressed to show the split setting when split data (for specifying a pause while the program is running) exists.
- (15) SELECT key  
Used to select a menu (X-scale, Y-scale, sewing speed and counter).
- (16) Menu display  
Displays information such as menu setting values, memory switch settings and error codes.
- (17) Setting keys ▼ ▲  
Used to change the value which is displayed in the menu display (16).  
In addition, it is used to move the needle position forward and back when sewing has been paused.
- (18) PROGRAM No. display  
Displays information such as program numbers.
- (19) Setting keys ▽ ▴  
Used to change the value which is displayed in the PROGRAM No. display (18).
- (20) CF media indicator  
Illuminates when a CF card (external media) is inserted while the power is turned on.
- (21) FD media indicator  
Illuminates when the FDD set (option) is connected.
- (22) Function keys [F1, F2, F3, F4]  
Used to select user programs and to set and select cycle programs.
- (23) R/W key  
Used to read data from and write data to external media.

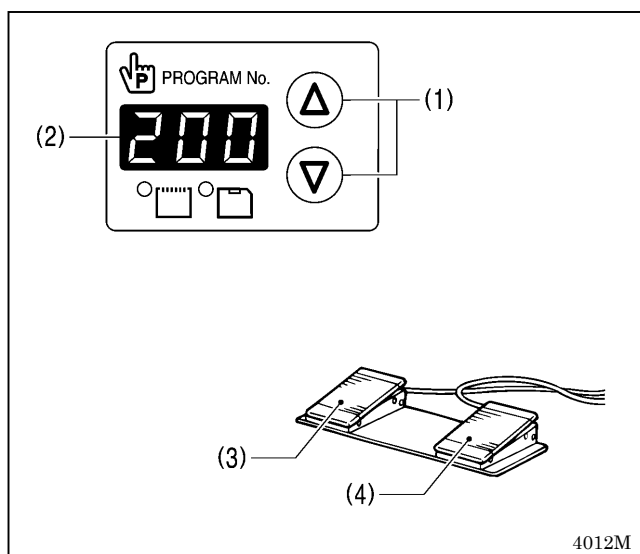
CF™ is a trademark of SanDisk Corporation.

## 6-2. Loading sewing data

Refer to "8-1. Notes on handling CF cards (sold separately)" for details on using CF cards.

|   |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |                                                                                                                                   | <p>With the power turned off, insert the CF card into the CF slot.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Make sure the CF card is facing the correct way when inserting it.</li> <li>• Always be sure to keep the cover closed except when inserting and removing the CF card. If this is not done, dust may get inside and cause problems with operation.</li> </ul> |
| 2 |  <p>CF media indicator illuminates</p>                                                                                            | <p>Turn on the power switch.</p> <p>Press the <math>\Delta</math> or <math>\nabla</math> key to select the program number (100 – 999).</p> <p>* The "----" display is used to check the feed home position.</p>                                                                                                                                                                                  |
| 3 |  <p>Loading</p>                                                                                                                 | <p>Press the R/W key.</p>  <ul style="list-style-type: none"> <li>• The buzzer will sound and the selected sewing data will be loaded from the CF card and copied into the sewing machine's internal memory.</li> </ul>                                                                                       |
| 4 | <p><b>Loading complete</b></p> <p>The PROGRAM No. display will change from " P" to the selected program number.</p> <p>Turn off the power switch, remove the CF card, and then close the cover of the CF slot.</p> |                                                                                                                                                                                                                                                                                                                                                                                                  |

## 6-3. Setting the program number

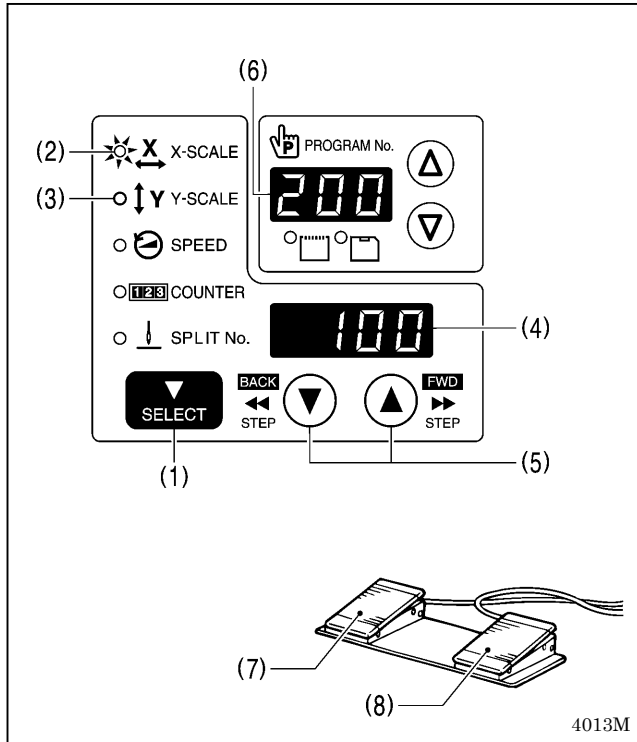


1. Press the  $\Delta$  or  $\nabla$  key (1) to select the program number that is loaded into the internal memory.
  - The program number will flash in the PROGRAM No. display (2).
  - "----" will appear at the time of shipment from the factory. (For checking feed home position)
2. Depress the work clamp switch (3) to lower the work clamp, and then depress the start switch (4).
  - The work clamp will move to the sewing start position, and then the program number will be applied.
  - The program number will stop flashing and illuminate steadily.

**NOTE:**

After completing the setting, be sure to refer to "6-6. Checking the sewing pattern" to check that the needle drop position is correct.

### 6-4. Setting the X-scale and Y-scale



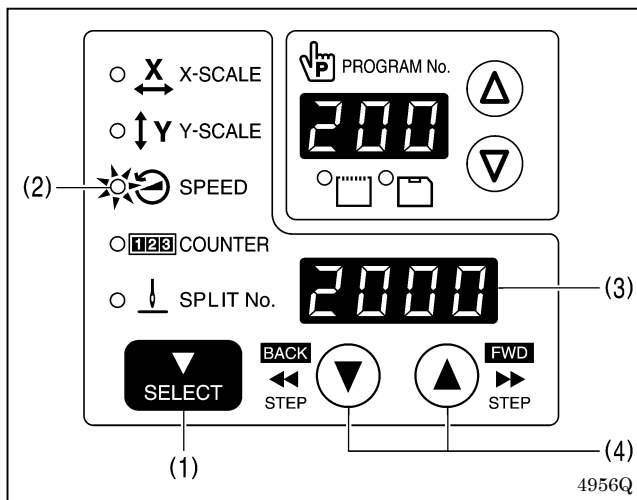
The scales are set to 100 (%) at the time of shipment from the factory.

1. Press the SELECT key (1) so that the X-SCALE indicator (2) (for X-scale setting) or the Y-SCALE indicator (3) (for Y-scale setting) is illuminated.
  - The setting value (%) will appear in the menu display (4).
  - \* When memory switch no. 402 is set to "ON", the settings will be displayed in units of mm.
2. Press the ▲ or ▼ key (5) to set the scale (0 – 400).
  - The program number will flash in the PROGRAM No. display (6).
3. Depress the work clamp switch (7) to lower the work clamp, and then depress the start switch (8).
  - The work clamp will move to the sewing start position, and then the scales will be applied.
  - The program number will stop flashing and illuminate steadily.

**NOTE:**

After completing the setting, be sure to refer to "6-6. Checking the sewing pattern" to check that the needle drop position is correct.

### 6-5. Setting the sewing speed



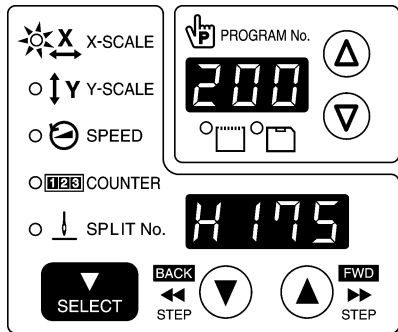
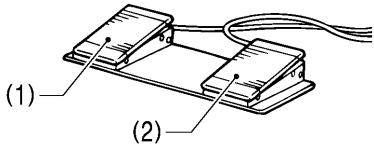
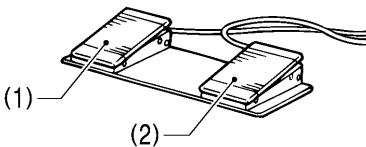
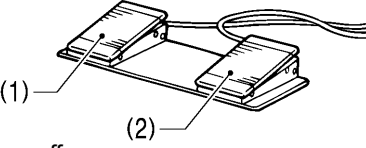
The sewing speed is set to 2000 (rpm) at the time of shipment from the factory.

1. Press the SELECT key (1) until the SPEED indicator (2) illuminates.
  - The setting value (rpm) will appear in the menu display (3).
2. Press the ▲ or ▼ key (4) to set the sewing speed. (Sewing speed setting: 400 – 2700)

## 6-6. Checking the sewing pattern

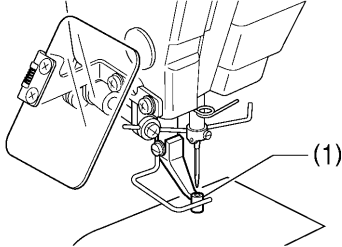
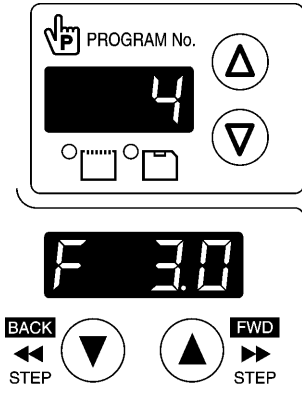
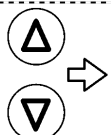
Use test feed mode to check the needle movement with only the work clamp operating.

Check that the needle hole in the needle plate does not come out from the frame of the work clamp.

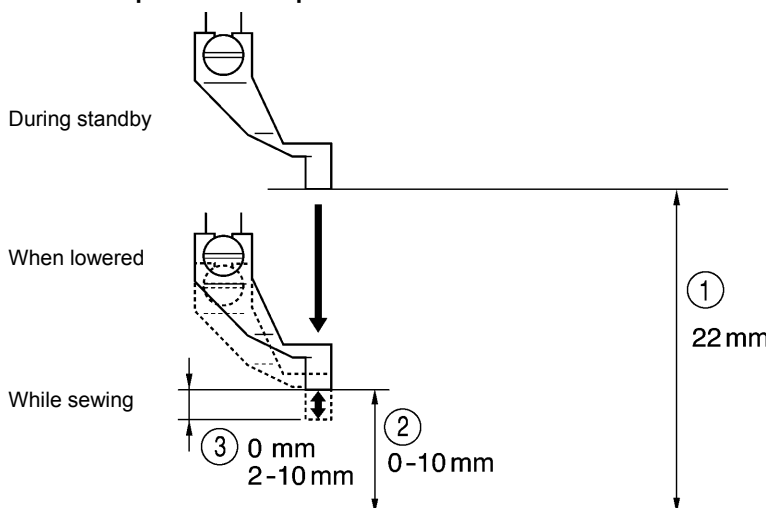
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  <p>TEST indicator illuminates</p> <p>Press the TEST key.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2 | <div data-bbox="199 510 598 840">  </div> <p>COUNTER indicator illuminates</p> <p>Select the program number to be checked, and then set the X-scale and the Y-scale.</p> <ul style="list-style-type: none"> <li>The program number will flash.</li> </ul> <p>Depress the work clamp switch (1) to lower the work clamp, and then depress the start switch (2).</p> <ul style="list-style-type: none"> <li>The work clamp will move to the sewing start position, and then the program number will stop flashing and illuminate steadily.</li> <li>The number of stitches will appear in the menu display.</li> </ul>  <p>4957Q 4014M</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3 | <p><b>Starting continuous test feed mode</b></p>  <p>Depress the work clamp switch (1) to lower the work clamp, and then depress and release the start switch (2).</p> <ul style="list-style-type: none"> <li>The work clamp will start moving continuously one stitch at a time.</li> </ul> <p>[Fast-forward test mode]<br/>If the work clamp switch (1) is depressed while the work clamp is moving, the feeding speed can be increased while the work clamp switch (1) is depressed.</p> <div data-bbox="207 1227 1433 1691">  <p>TEST indicator illuminates</p>  <p>TEST indicator switches off</p>  <p>4443Q</p> <p>When the ▲ key is pressed, the work clamp will move forward by one stitch, and when the ▼ key is pressed, the work clamp will move backward by one stitch. (It will move quicker if you keep the key pressed down.)</p> <p>4014M</p> <p>If you would like sewing to start while test feeding is in progress, press the TEST key to switch off the TEST indicator.<br/>When the start switch (2) is depressed, sewing will start.</p> </div> |
| 4 | <p>If test feeding continues until the final stitch, the work clamp will move to the sewing start position and then stop.</p> <p>Press the TEST key.</p>  <p>TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## 6-7. Setting the height of the intermittent presser foot

You can use the operation panel to change the setting value for the intermittent presser foot height.

|                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                                                                                                                                                                                                                                               | <p>All indicators switch off</p>  <p>THREAD/CLAMP indicator illuminates<br/>MENU indicator switches off</p> | <p>Press the THREAD/CLAMP key.<br/>The sewing machine will switch to threading mode.</p> <ul style="list-style-type: none"> <li>" 1" will appear in the PROGRAM No. display and the intermittent presser foot (1) will drop.</li> </ul>  <p>4445Q 4015M</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2                                                                                                                                                                                                                                                                                                               |                                                                                                            | <p>Press the <math>\Delta</math> key.<br/>The sewing machine will switch to intermittent presser foot height setting mode.</p> <ul style="list-style-type: none"> <li>" 4" will appear in the PROGRAM No. display and the intermittent presser foot (1) will rise to the setting value that appears in the menu display.<br/>(Intermittent presser foot height setting: 0.0 – 10.0)</li> </ul> <p>Press the <math>\blacktriangle</math> or <math>\blacktriangledown</math> key to set the intermittent presser foot height.</p> <ul style="list-style-type: none"> <li>The intermittent presser foot (1) will be raised or lowered to the height of the new value that has been set.</li> </ul> <p><b>NOTE:</b><br/>After making the setting, be sure to turn the pulley once by hand and check that the intermittent presser foot (1) does not touch the needle bar.</p> <p>5225Q</p> |
| <p>&lt;Changing modes&gt;</p>  <p>1" Threading mode<br/>4" Intermittent presser foot height setting mode</p> <p>4016M</p> |                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3                                                                                                                                                                                                                                                                                                               | <p><b>Ending setting mode</b></p>  <p>THREAD/CLAMP indicator switches off</p>                             | <p>Press the THREAD/CLAMP key.</p> <ul style="list-style-type: none"> <li>The setting values will be memorized.</li> <li>The intermittent presser foot (1) will return to the status that it was at before the sewing machine was switched to setting mode.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### Intermittent presser foot operation



#### ① Intermittent presser foot lift amount

#### ② Intermittent presser foot height

The settings can be made by the above operations.

However, if the intermittent presser foot height is set to a smaller setting than the intermittent presser foot stroke, the intermittent presser foot will not drop in order to prevent it from coming into contact with the needle plate. (Refer to page 63.)

#### ③ Intermittent stroke

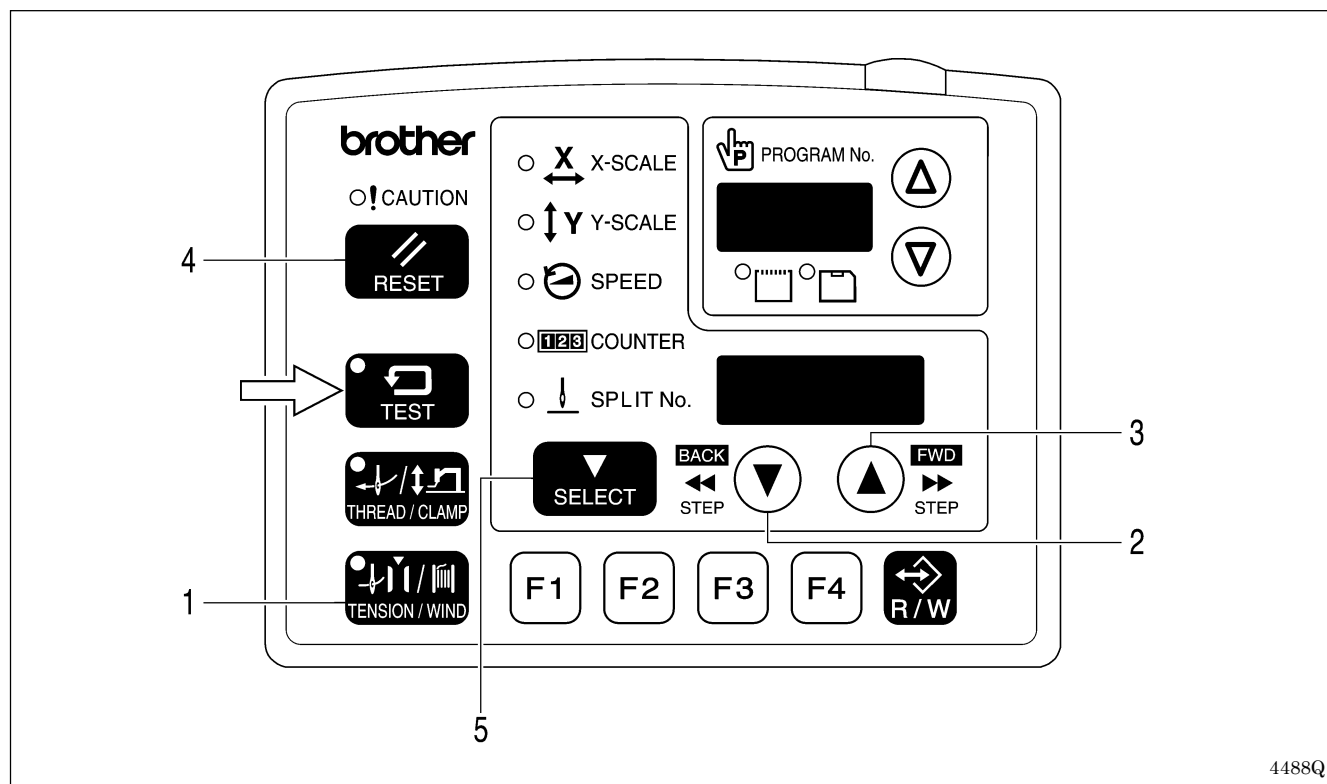
Refer to "11-13. Changing the intermittent stroke" when making the adjustment.

5033Q

## 7. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

### 7-1. List of advanced functions

While holding down the TEST key, press the corresponding combination key.



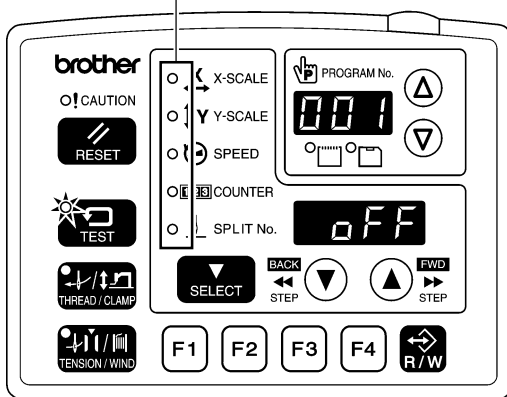
4488Q

|   |                                                                                                                                                                                                                         |                                                                                                |       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------|
| 1 |  +                                                | Memory switch setting mode<br>Refer to "7-2. Setting memory switches".                         | 4489Q |
| 2 |  +                                                | Lower thread counter setting mode<br>Refer to "7-4. Using the lower thread counter".           | 4490Q |
| 3 |  +                                                | Production counter setting mode<br>Refer to "7-5. Using the production counter".               | 4491Q |
| 4 | <b>When SPEED indicator is illuminated</b><br> +  | Production counter temporary display function<br>Refer to "7-5. Using the production counter". | 4492Q |
| 5 |  +                                                | User program setting mode<br>Refer to "7-7. Using user programs".                              | 4493Q |

## 7-2. Setting memory switches

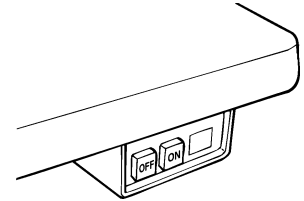
1

All indicators switch off



While pressing the SELECT key, turn on the power switch.

\* Keep pressing the SELECT key until the model name is displayed and the buzzer beeps once.



or

With the power turned on, press the TEST key and the TENSION/WIND key simultaneously.

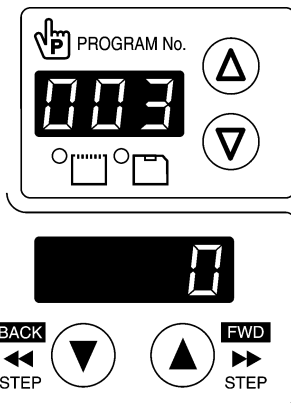


- The memory switch number will appear in the PROGRAM No. display, and its setting value will appear in the menu display.

Menu indicator switches off  
TEST indicator illuminates

4449Q 4421Q

2

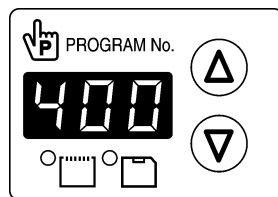


Press the  $\Delta$  or  $\nabla$  key to select the memory switch number.  
(Refer to "7-3. List of memory switch settings" on the next page.)

Press the  $\blacktriangle$  or  $\blacktriangledown$  key to change the setting.

4961Q

If you would like to display only the numbers of memory switches that have been changed from default settings



While pressing the SELECT key, press the  $\Delta$  or  $\nabla$  key.

- The numbers of memory switches that have been changed from default settings will appear in order.
- If no memory switches have been changed from their default settings, the display will not change and the buzzer will beep twice.

4452Q

3

Ending setting mode



Press the TEST key.

- The changes will be memorized and the sewing machine will switch to home position detection standby.

TEST indicator switches off



- If you would like to return the setting for a single memory switch to the default setting, press the RESET key while the number for that memory switch is displayed.
- To return the settings for all memory switches to the default settings, keep pressing the RESET key for two or more seconds until the buzzer makes a long beep.

## 7-3. List of memory switch settings

| No. | Setting range                                    | Setting items                                                                                                                                                                                                                                                                                           | Initial value |
|-----|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 001 | Work clamp lift timing after sewing is completed |                                                                                                                                                                                                                                                                                                         | ON            |
|     | OFF                                              | Lifts at the final stitch position.                                                                                                                                                                                                                                                                     |               |
|     | ON                                               | Lifts after moving to the home position.                                                                                                                                                                                                                                                                |               |
| 002 | Integrated-type work clamp drop operation        |                                                                                                                                                                                                                                                                                                         | 0             |
|     | 0                                                | Work clamp dropping in one step                                                                                                                                                                                                                                                                         |               |
|     | 1                                                | Work clamp dropping in two steps (*1)                                                                                                                                                                                                                                                                   |               |
|     | 2                                                | Do not use this setting.                                                                                                                                                                                                                                                                                |               |
| 100 | Sewing start speed                               |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | The sewing speed for the first 1 – 5 stitches is set by memory switch numbers 151 – 155.<br>(Refer to the service manual for details of memory switch Nos. 151 – 155.)                                                                                                                                  |               |
|     | ON                                               | 1st stitch at 400 rpm, 2nd stitch at 400 rpm, 3rd stitch at 600 rpm, 4th stitch at 900 rpm, 5th stitch at 2,000 rpm                                                                                                                                                                                     |               |
| 200 | Single-stitch test feed                          |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | Test feed starts when the start switch is depressed, and it continues automatically until the final stitch.                                                                                                                                                                                             |               |
|     | ON                                               | Test feeding <ul style="list-style-type: none"> <li>Is carried out one stitch at a time each time the work clamp switch is depressed</li> <li>Is carried out continuously while the start switch is depressed</li> <li>Is carried out one stitch at a time when the pulley is turned by hand</li> </ul> |               |
| 300 | Production counter display                       |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | Lower thread counter display                                                                                                                                                                                                                                                                            |               |
|     | ON                                               | Production counter display                                                                                                                                                                                                                                                                              |               |
| 400 | User programs                                    |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | Disabled                                                                                                                                                                                                                                                                                                |               |
|     | ON                                               | User program mode is enabled.                                                                                                                                                                                                                                                                           |               |
| 401 | Cycle programs                                   |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | Disabled                                                                                                                                                                                                                                                                                                |               |
|     | ON                                               | When sewing user programs, the set programs are sewn in numeric order.                                                                                                                                                                                                                                  |               |
| 402 | Maximum reduction ratio (mm display) (*2)        |                                                                                                                                                                                                                                                                                                         | OFF           |
|     | OFF                                              | Displayed as %.                                                                                                                                                                                                                                                                                         |               |
|     | ON                                               | Displayed as mm.                                                                                                                                                                                                                                                                                        |               |
| 403 | Split mode selection                             |                                                                                                                                                                                                                                                                                                         | 0             |
|     | 0                                                | Continuous split (split menu is disabled before split detection)                                                                                                                                                                                                                                        |               |
|     | 1                                                | Continuous split (split menu is always enabled)                                                                                                                                                                                                                                                         |               |
|     | 2                                                | Independent split                                                                                                                                                                                                                                                                                       |               |

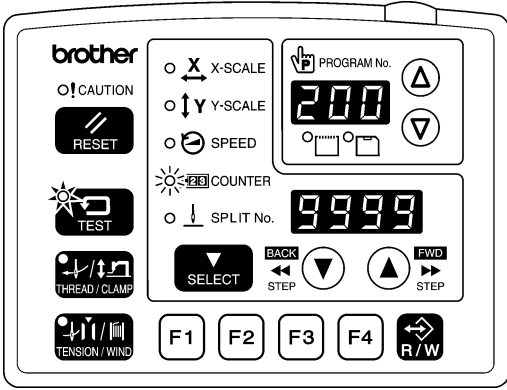
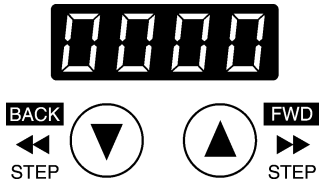
(\*1) The position of the work clamp stopper must be set. (Refer to "5-8. Setting 2-step operation for the work clamp".)

(\*2) The mm display may differ slightly from the actual sewing size.

## 7-4. Using the lower thread counter

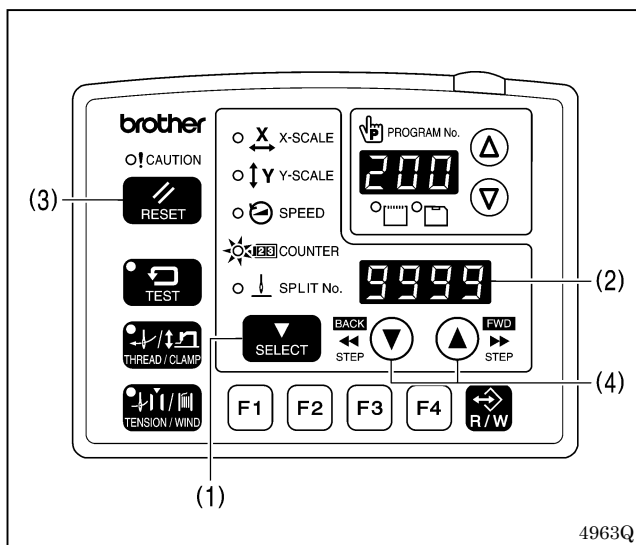
If you use the lower thread counter to set the number of articles which can be sewn with the amount of lower thread available, you can stop the lower thread running out in the middle of sewing a pattern.

### <Setting defaults>

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  <p>While pressing the TEST key, press the ▼ key.</p>   <ul style="list-style-type: none"> <li>The initial value which was set previously will appear in the menu display.</li> </ul> <p>TEST indicator illuminates, COUNTER indicator flashes <span style="float: right;">4962Q 4455Q</span></p>                                                                                                                                                                                                                                                               |
| 2 |  <p>Press the ▲ or ▼ key to set the initial value.</p> <ul style="list-style-type: none"> <li>The initial value can be set from 1 ("0001") to 9999 ("9999").</li> <li>If the initial value is set to "0000", the lower thread counter will not operate.</li> <li>If you press the RESET key during setting mode, the value will become "0000".</li> </ul> <div style="border: 1px dashed black; padding: 5px;">  If you press the R/W key during setting mode, the initial value for the program number being displayed will be stored, and you can set the lower thread counter separately for each item of sewing data.     </div> <p>4456Q</p> |
| 3 | <p><b>Ending setting mode</b></p>  <p>Press the TEST key.</p> <ul style="list-style-type: none"> <li>The initial value will be memorized.</li> </ul> <p>TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### <Lower thread counter operation>

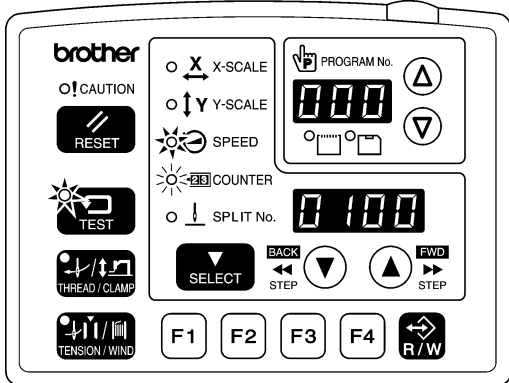
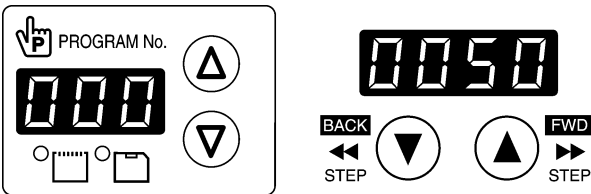
If you press the SELECT key (1) to select the counter display menu when memory switch no. 300 is set to "OFF", the COUNTER indicator will illuminate and the lower thread counter will appear in the menu display (2).



- Each time the sewing of a single article is completed, the value shown in the menu display (2) is reduced by 1.
  - When the lower thread counter reaches "0000", the buzzer will sound continuously. The sewing machine will not operate during this time, even if the foot switch is depressed.
  - When you press the RESET key (3), the buzzer will stop, the initial value will appear in the menu display (2) and sewing will be possible.
    - If no initial value has been set, the display will be "0000".
- \* You can press the ▲ or ▼ key (4) to set the lower thread counter to a desired value. However, this value will not be stored as the initial value.
- \* If a lower thread counter value is set, the lower thread counter will operate even if the lower thread counter is not being displayed.

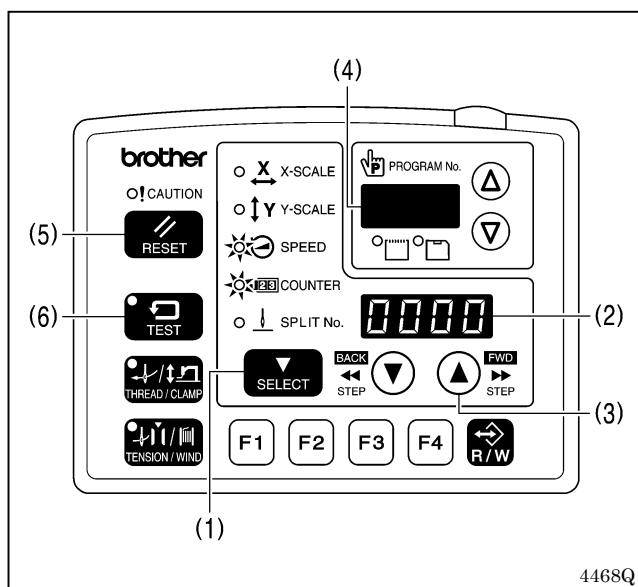
## 7-5. Using the production counter

### <Setting the counter value>

|   |                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  <p>TEST indicator and SPEED indicator illuminate<br/>COUNTER indicator flashes</p> | <p>While pressing the TEST key, press the ▲ key.</p>   <ul style="list-style-type: none"> <li>The counter value that was previously set will appear as a 7-digit number in the PROGRAM No. display and the menu display.</li> </ul> |
| 2 |                                                                                     | <p>Press the ▲ or ▼ key to set the counter value.</p> <ul style="list-style-type: none"> <li>The counter value can be set to between "000" "0000" and "999" "9999".</li> <li>If you press the RESET key during setting mode, the value will become "000" "0000".</li> </ul>                                                                                                                              |
| 3 | <p>Ending setting mode</p>  <p>TEST indicator switches off</p>                    | <p>Press the TEST key.</p> <ul style="list-style-type: none"> <li>The counter value will be memorized.</li> </ul>                                                                                                                                                                                                                                                                                        |

### <Production counter operation>

If you press the SELECT key (1) to select the counter display menu when memory switch no. 300 is set to "ON", the SPEED and COUNTER indicators will illuminate and the production counter will appear in the menu display (2).



- Each time the sewing of a single article is completed, the value shown in the menu display (2) is increased by 1.
- While the ▲ key (3) is being pressed, the first three digits will appear in the PROGRAM No. display (4) so that the total number of digits displayed will be seven.
- If you press the RESET key (5) for 2 seconds or more, the counter value will be reset to [0000].

#### Temporary display function

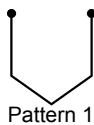
You can display the production counter temporarily while the lower thread counter is being displayed.

When the SPEED indicator is illuminated, hold down the TEST key (6) and then press the RESET key (5) to display the production counter in the menu display (2).

Press the TEST key (6) or the SELECT key (1) to switch the menu back to the normal menu display.

\* You can start sewing while the temporary display still appears.

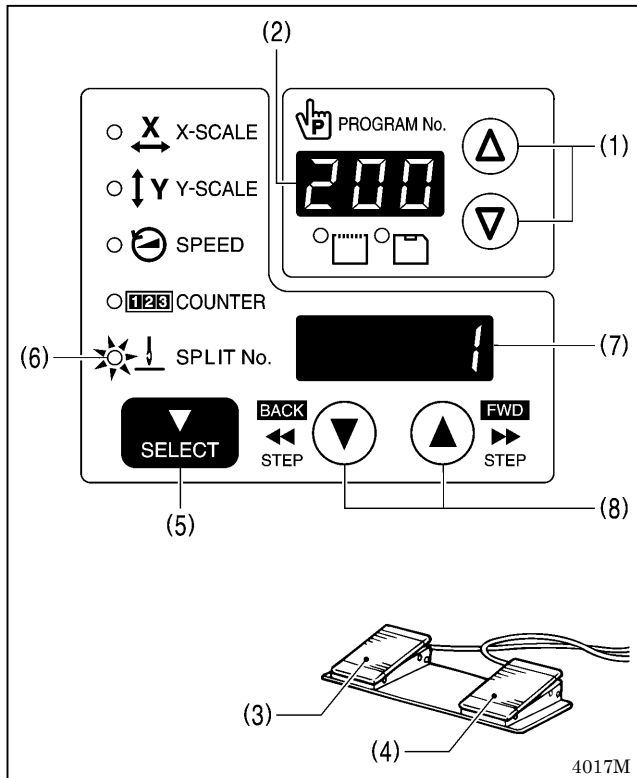
## 7-6. Setting the split number



If split data (data that causes sewing to pause) exists within a single program, the numbers that are used to specify the patterns that are separated by split data are called split numbers.

Pattern 1: Split No. 1  
Pattern 2: Split No. 2  
Pattern 3: Split No. 3

4964Q



1. Press the  $\Delta$  or  $\nabla$  key (1) to select a program number for a program that contains split data.
  - The program number will flash in the PROGRAM No. display (2).
2. Depress the work clamp switch (3) to lower the work clamp, and then depress the start switch (4).
  - The work clamp will move to the sewing start position, and then the program number will be applied.
  - The program number will stop flashing and illuminate steadily.
3. Press the SELECT key (5) so that the SPLIT No. indicator (6) illuminates.
  - The split number will appear in the menu display (7).
4. Press the  $\Delta$  or  $\nabla$  key (8) to set the split number.

The setting for memory switch No. 403 lets you select the split mode.

### [Continuous split]

Memory switch No. 403 = 0 (Split mode is enabled after split data is detected)

Memory switch No. 403 = 1 (Split mode is always enabled)

- Sewing is carried out each time in the order of steps 1  $\rightarrow$  2  $\rightarrow$  3  $\rightarrow$  1 (for example, if there are two sections of split data).

### [Independent split]

Memory switch No. 403 = 2

- The pattern for the displayed split number is sewn independently.

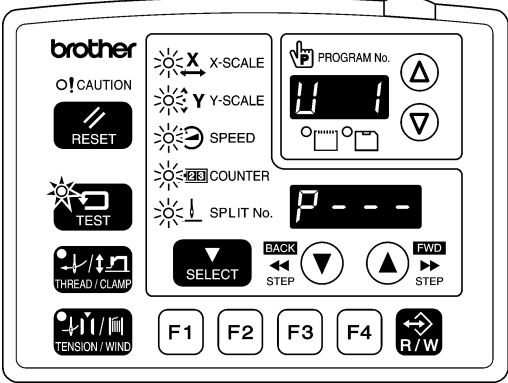
## 7-7. Using user programs

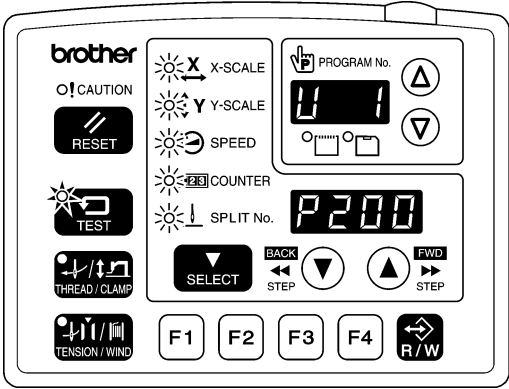
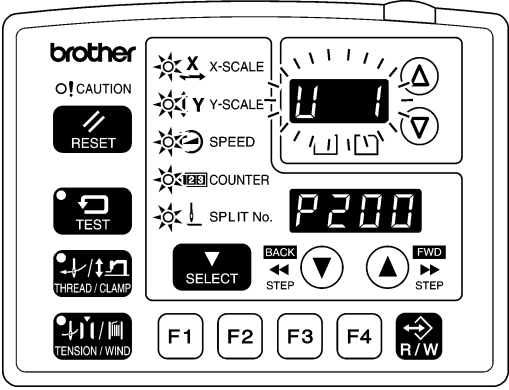
Up to 50 different combinations of settings including program no., X-scale, Y-scale, sewing speed and intermittent presser foot height can be memorized as user programs (U1 to U50).

If you are sewing certain patterns over and over again, it is useful to record the settings for these patterns into a user program.

User programs are enabled when memory switch no. 400 is set to "ON".

### <Recording user programs>

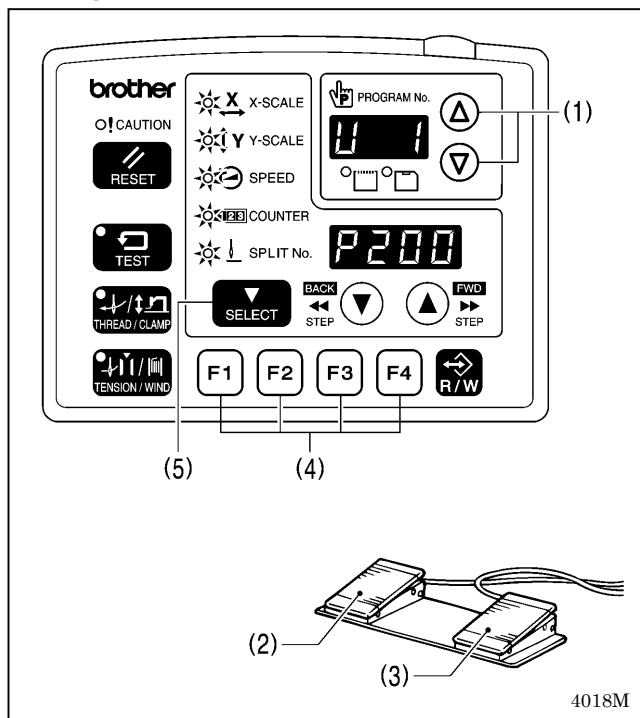
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p><b>Select a user program number.</b></p>  <p>TEST indicator illuminates, MENU indicator flashes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>While pressing the TEST key, press the SELECT key.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <ul style="list-style-type: none"> <li>Switch to user program recording mode. Check that the menu indicators are flashing.</li> <li>The user program number will appear in the PROGRAM No. display, and "P- - -" will appear in the menu display.</li> </ul> <p>Press the ▲ or ▼ key to select the user program number.</p> <p style="text-align: right;">4469Q</p> |
| 2 | <p><b>First, set the program number.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Press the ▲ or ▼ key to set the user program number to be recorded.</p> <p><b>NOTE:</b></p> <p>Select a program number that is recorded in the internal memory. You cannot specify program numbers on removable media.</p> <p style="text-align: right;">4966Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3 | <p><b>Next, set the X-scale.</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p> X-SCALE</p> <p><input type="radio"/>  Y-SCALE</p> <p><input type="radio"/>  SPEED</p> </div> <div style="text-align: center;">  <div style="display: flex; justify-content: space-around; align-items: center;"> <div> <p>BACK</p> <p>◀ STEP</p> </div> <div> <p>▼</p> </div> <div> <p>▲</p> </div> <div> <p>FWD</p> <p>STEP ▶</p> </div> </div> </div> </div> <p>X-SCALE indicator flashes</p> | <p>Press the SELECT key.</p> <div style="text-align: center;">  </div> <p>Press the ▲ or ▼ key to set the X-scale to be recorded.</p> <p style="text-align: right;">4470Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4 | <p><b>Next, set the Y-scale.</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p><input type="radio"/>  X-SCALE</p> <p> Y-SCALE</p> <p><input type="radio"/>  SPEED</p> </div> <div style="text-align: center;">  <div style="display: flex; justify-content: space-around; align-items: center;"> <div> <p>BACK</p> <p>◀ STEP</p> </div> <div> <p>▼</p> </div> <div> <p>▲</p> </div> <div> <p>FWD</p> <p>STEP ▶</p> </div> </div> </div> </div> <p>Y-SCALE indicator flashes</p> | <p>Press the SELECT key.</p> <div style="text-align: center;">  </div> <p>Press the ▲ or ▼ key to set the Y-scale to be recorded.</p> <p style="text-align: right;">4472Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                    |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <p><b>Next, set the sewing speed.</b></p> <p> <input type="radio"/> X X-SCALE<br/> <input type="radio"/> Y Y-SCALE<br/>  SPEED         </p> <p>     </p> <p>SPEED indicator flashes</p> | <p>Press the SELECT key.</p> <p></p> <p>Press the ▲ or ▼ key to set the sewing speed to be recorded.</p> <p>4474Q</p>                                                                                                            |
| 6 | <p><b>Next, set the intermittent presser foot height.</b></p> <p>  </p> <p>     </p> <p>THREAD/CLAMP indicator flashes</p>                                                              | <p>Press the SELECT key.</p> <p></p> <p>Press the ▲ or ▼ key to set the intermittent presser foot height to be recorded.</p> <p>4969Q</p>                                                                                        |
| 7 |  <p>TEST indicator illuminates, MENU indicator flashes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>Press the SELECT key.</p> <p></p> <ul style="list-style-type: none"> <li>If setting further user programs, select the user program number and then repeat steps 2 to 7.</li> </ul> <p>4970Q</p>                               |
| 8 |  <p>TEST indicator switches off, MENU indicator illuminates</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>Press the TEST key.</p> <p></p> <p><b>This completes the recording of a user program.</b></p> <ul style="list-style-type: none"> <li>The user program number will flash in the PROGRAM No. display.</li> </ul> <p>4971Q</p> |

(Continued on next page)

## 7. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

### <Setting method>



- Press the  $\Delta$  or  $\nabla$  key (1) to select the user program number that you would like to use.
  - If the user program number is flashing, depress the work clamp switch (2) to lower the work clamp, and then depress the start switch (3). (The work clamp will move to the sewing start position.)
  - User programs U1 to U10 can be selected directly using function keys F1 to F4 (4). (Refer to "7-9. Direct selection".)
- Check that the needle drop position is correct, and then start sewing. (Refer to "6-6 Checking the sewing pattern".)
  - If you press the SELECT key (5), you can check the settings for the displayed user program (such as X-scale, Y-scale and sewing speed).

### <Clearing method>

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1</p> | <p>TEST indicator illuminates, MENU indicator flashes</p> <p>4970Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>2</p> | <p>While pressing the TEST key, press the SELECT key</p> <ul style="list-style-type: none"> <li>Switch to user program recording mode. Check that the menu indicators are flashing.</li> <li>The user program number will appear in the PROGRAM No. display, and the program number will appear in the menu display.</li> </ul> <p>Press the <math>\Delta</math> or <math>\nabla</math> key (1) to select the user program number that you would like to clear.</p> <p>Press the RESET key.</p> <ul style="list-style-type: none"> <li>The buzzer will sound and the user program with the number selected will be cleared.</li> </ul> <p><b>NOTE:</b></p> <p>If a cleared user program has been stored as part of a cycle program, the step that involves that user program will become blank. The cycle program itself will not be cleared.</p> <p><b>Clearing all user programs</b></p> <p>Press and hold the RESET key for 2 seconds or more.</p> <ul style="list-style-type: none"> <li>The buzzer will sound and all user programs will be cleared.</li> </ul> <p><b>NOTE:</b></p> <p>If any cycle programs have been memorized, all of the memorized cycle programs will also be cleared.</p> |

## 7-8. Using cycle programs

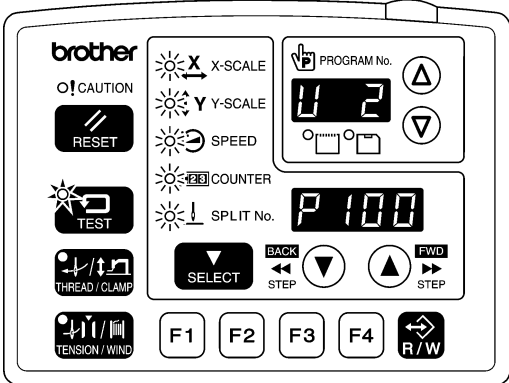
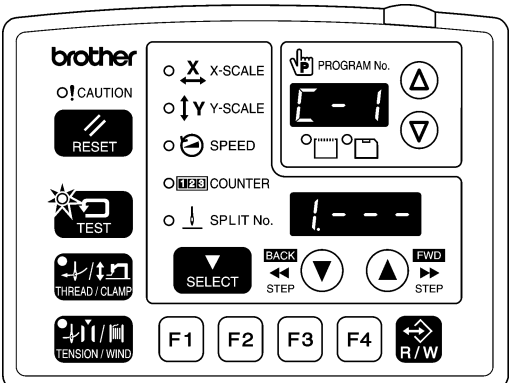
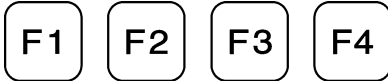
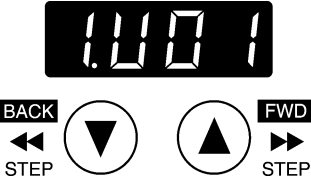
Sewing patterns that have been recorded in user programs can be recorded in up to nine cycle programs (C-1 to C-9).

One cycle program can contain up to a maximum of fifteen steps.

When sewing the sewing patterns in numerical order, it can be useful to record them in a cycle program beforehand.

**Cycle programs are enabled when memory switch nos. 400 and 401 are set to "ON".**

### <Recording method>

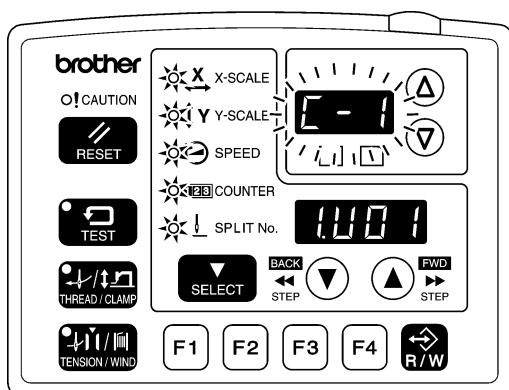
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p><b>Switch to user program recording mode.</b></p>  <p>TEST indicator illuminates, MENU indicator flashes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>While pressing the TEST key, press the SELECT key.</p>  <ul style="list-style-type: none"> <li>• Check that the menu indicators are flashing.</li> <li>• The user program number will appear in the PROGRAM No. display, and the program number will appear in the menu display.</li> </ul> <p>Record the sewing pattern that you would like to use in a cycle program into a user program.</p> <p>4973Q</p> |
| 2 | <p><b>Switch to cycle program recording mode, and select the cycle program number.</b></p>  <p>MENU indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>Press a function key from F1 to F4.</p>  <ul style="list-style-type: none"> <li>• The cycle program number (C-1 to C-4) will appear in the PROGRAM No. display, and "1.---" will appear in the menu display.</li> </ul> <p>Press the function key (F1 to F4) or press the <math>\Delta</math> or <math>\nabla</math> key to select the cycle program number.</p> <p>4428Q</p>                               |
| 3 | <p><b>Set step 1.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>Press the <math>\Delta</math> or <math>\nabla</math> key to select the user program number that you would like to record.</p> <p>Press the SELECT key.</p>  <p>4444Q</p>                                                                                                                                                                                                                                   |
| 4 | <p><b>Set the rest of the steps in the same way from step 2 onward.</b><br/>         From step 9 onward, "A.---", "b.---", "c.---", "d.---", "E.---" and "F.---" will be displayed.</p> <hr/> <p><b>If you would like to return to a previous step during the setting procedure</b><br/>         &lt;For cycle programs C-1 to C-4&gt;<br/>         1. Press the respective function key from F1 to F4 to return to the display for step 1.<br/>         2. Press the SELECT key until the desired step is reached.<br/>         &lt;For cycle programs C-5 to C-9&gt;<br/>         1. Press the <math>\Delta</math> or <math>\nabla</math> key to switch the cycle program number.<br/>         2. Select the desired cycle program number again, and then press the SELECT key until the desired step is reached.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## 7. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

**5** To record another cycle program, repeat steps 2 to 4.

**6** End cycle program recording mode.

Press the TEST key.



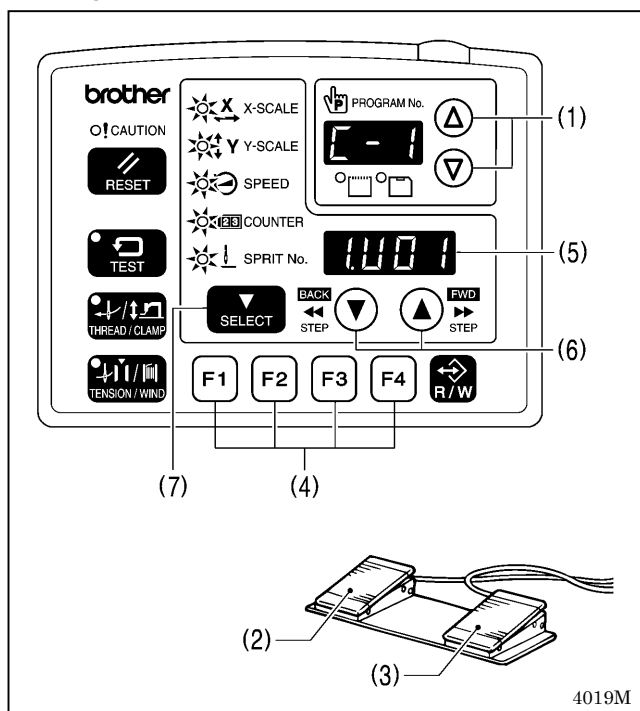
**This completes the recording of cycle programs.**

- The cycle program number will flash in the PROGRAM No. display.

TEST indicator switches off, MENU indicator illuminates

4439Q

### <Setting method>



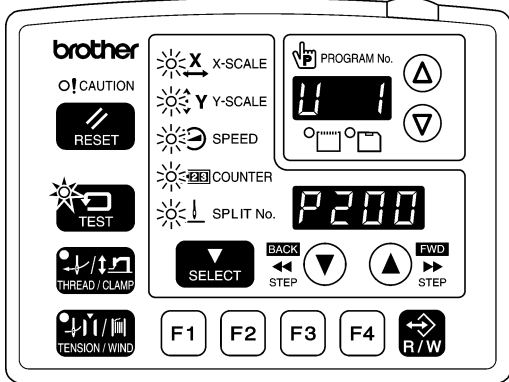
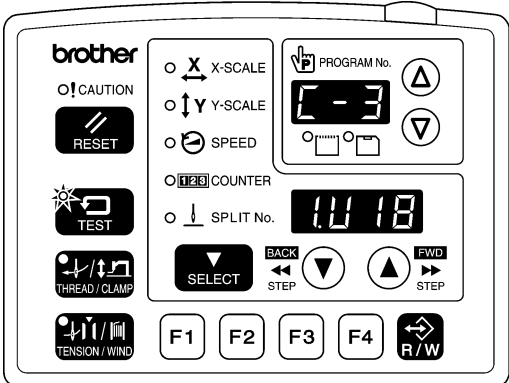
1. Press the  $\Delta$  or  $\nabla$  key (1) to select the cycle program number that you would like to use.
  - If the cycle program number is flashing, depress the work clamp switch (2) to lower the work clamp, and then depress the start switch (3). (The work clamp will move to the sewing start position.)
  - The cycle program number can be selected directly by pressing function keys F1 to F4 (4). (Refer to "7-9. Direct selection".)
2. Check that the needle drop position is correct, and then start sewing. (Refer to "6-6 Checking the sewing pattern".)
3. The recorded user program will be sewn step by step, and when the final step is complete, the menu display (5) will return to showing step 1.

- If you press the  $\Delta$  or  $\nabla$  key (6), you can return to the previous step or skip to the next step respectively.
- If you press the SELECT key (7), you can check the details (such as X-scale, Y-scale and sewing speed) of the user program for the displayed step. The setting cannot be changed at this time.

#### NOTE:

If cycle program sewing mode is active (when memory switch no. 401 is "ON") but no cycle programs have been recorded, the user programs will be sewn in numeric order.

## &lt;Clearing method&gt;

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1 |  <p>While pressing the TEST key, press the SELECT key.</p>   <ul style="list-style-type: none"> <li>Switch to user program recording mode. Check that the menu indicators are flashing.</li> </ul> <p>TEST indicator illuminates, MENU indicator flashes</p>                                                                                                                                                                                                                                         | 4970Q |
| 2 |  <p>Press a function key from F1 to F4.</p>     <ul style="list-style-type: none"> <li>Switch to cycle program recording mode.</li> </ul> <p>Press the function key (F1 to F4) or press the <math>\Delta</math> or <math>\nabla</math> key to select the cycle program number to clear.</p> <p>MENU indicator switches off</p> | 4450Q |
| 3 |  <p>Press the RESET key.</p> <ul style="list-style-type: none"> <li>The buzzer will sound and the cycle program with the number selected will be cleared.</li> </ul> <div style="border: 1px solid black; padding: 5px;"> <p><b>Clearing all cycle programs</b></p> <p>Press and hold the RESET key for 2 seconds or more.</p> <ul style="list-style-type: none"> <li>The buzzer will sound and the all cycle programs will be cleared.</li> </ul> </div> <p><b>NOTE:</b> If you clear all user programs after any cycle programs have been recorded, all recorded cycle programs will also be cleared.</p>                                                             |       |

## 7-9. Direct selection (combination table)

You can use the function keys to directly select user program numbers and cycle program numbers.

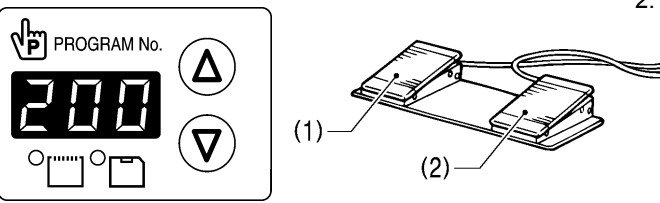
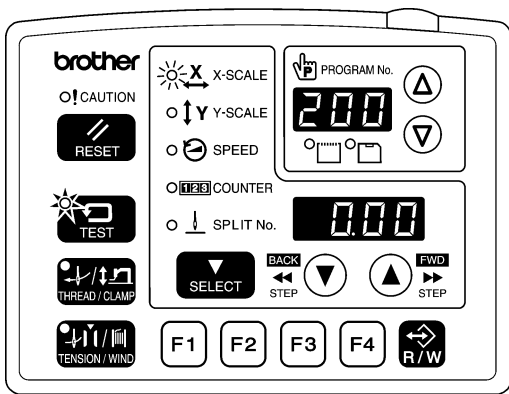
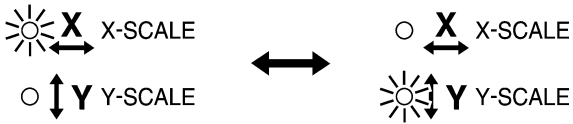
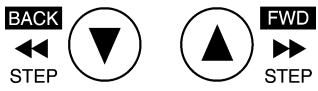
U1 to U4 and C-1 to C-4 can be selected using function keys F1 to F4.

U5 to U10 and C-5 to C-9 can be selected by simultaneously pressing combinations of function keys F1 to F4 (addition).

| U5/C-5                                                                                                                                                                                                                                                                                                                                                       | U6/C-6                                                                                                                                                                                                                                                                                                                                                                                                                                              | U7/C-7                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  + <br>Or<br> +  |  + <br>Or<br> +  +  |  + <br>Or<br> +  +  |
| U8/C-8                                                                                                                                                                                                                                                                                                                                                       | U9/C-9                                                                                                                                                                                                                                                                                                                                                                                                                                              | U10                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  +  +                                                                                               |  +  +                                                                                                                                                                                      |  +  +  +                                                                                                 |

## 7-10. X and Y parallel movement of sewing pattern

You can move the feed mechanism to the desired position to move an already-programmed sewing pattern in a parallel direction up, down or to the left or right.

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  <ol style="list-style-type: none"> <li>Press the <math>\Delta</math> or <math>\nabla</math> key to select the program number.</li> <li>Depress the work clamp switch (1) to lower the work clamp, and then depress the start switch (2).</li> </ol> <ul style="list-style-type: none"> <li>The work clamp will move to the sewing start position.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2 | Depress the work clamp switch (1) to lower the work clamp.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3 |  <p>While pressing the TEST key, press the <math>\nabla</math> key.</p>  <ul style="list-style-type: none"> <li>The parallel movement amount will appear in the menu display in units of mm.</li> </ul> <p>TEST indicator illuminates, X-SCALE indicator flashes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4 | <p><b>X-scale parallel movement mode</b>      <b>Y-scale parallel movement mode</b></p>    <p>Press the SELECT key to switch between the X-SCALE indicator and Y-SCALE indicator flashing. Select either direction.</p>  <p>The work clamp will move by 0.05 mm each time the <math>\Delta</math> or <math>\nabla</math> key is pressed. (When the distance reaches 10 mm, the amount of movement will change to 0.1 mm.)</p> <ul style="list-style-type: none"> <li>When using X-scale parallel movement mode, the needle moves the corresponding distance to the right when the <math>\Delta</math> key is pressed, and to the left when the <math>\nabla</math> key is pressed.</li> <li>When using Y-scale parallel movement mode, the needle moves the corresponding distance backward when the <math>\Delta</math> key is pressed, and forward when the <math>\nabla</math> key is pressed.</li> </ul> |
| 5 | <p><b>End parallel movement mode</b></p>  <p>Press the TEST key.</p> <p>TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

### NOTE:

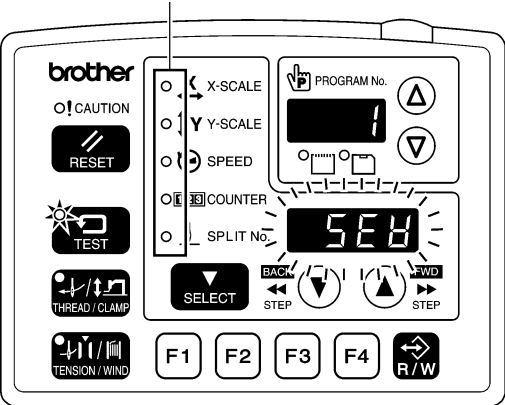
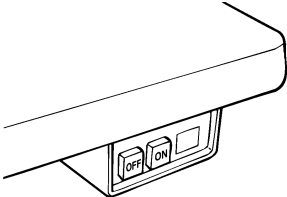
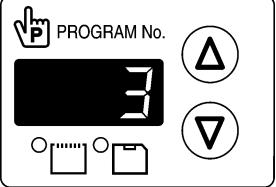
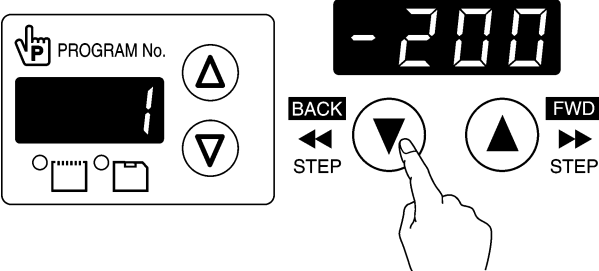
- The feed mechanism will not move to a position that would move the sewing pattern outside the sewing area.
- If you change the program number, X-scale or Y-scale settings, the amount of movement recorded will be reset.
- In addition, the amount of movement will be reset if the power switch is turned off and then back on again. However, memory switch No. 465 is set to "ON", the amount of movement will be recorded and will not be reset. (Refer to the service manual for details on memory switch No. 465.)

## 7-11. Clearing memory data (reinitialization)

If the sewing machine stops operating normally, the cause may be that an incorrect memory setting may have been made by means of the memory switch, for instance. In such cases, normal operation may be restored if the memory data is reinitialized.

| Parameter No. | Setting items                                                                                                                                           |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | [ SEW]<br>[ -***]<br>Clearing all sewing programs<br>Clearing individual sewing programs                                                                |
| 2             | [ MEM]<br>Reinitializing memory switches                                                                                                                |
| 3             | [ ALL]<br>Clearing or reinitializing all memory data (sewing programs, memory switches, user programs, cycle programs and expansion option output data) |
| 4             | [ USE]<br>Clearing user programs and cycle programs                                                                                                     |
| 5             | [ EoP]<br>Clearing expansion option output data                                                                                                         |

\* Refer to the instruction manual for the programmer for details of expansion option output.

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>All indicators switch off</p>  <p>While holding down the RESET key, turn on the power switch.</p> <p>* Keep pressing the RESET key until the model name is displayed and the buzzer beeps once.</p>   <ul style="list-style-type: none"> <li>The parameter number will appear in the PROGRAM No. display, and the setting details for that parameter will appear in the menu display.</li> </ul> <p>TEST indicator illuminates, MENU indicator switches off</p> <p>4562Q 4421Q</p> |
| 2 |  <p>Press the <math>\Delta</math> or <math>\nabla</math> key to select the parameter number that you would like to reinitialize.</p> <p>4557Q</p> <p><b>Selecting individual sewing programs</b></p>  <p>For parameter No. 1, press the <math>\nabla</math> key to change the display from " SEW" to "-***". (** is the sewing program number.)</p> <p>Press the <math>\Delta</math> or <math>\nabla</math> key to select the sewing program number that you would like to clear.</p> <p>4563Q</p>                                                                     |
| 3 |  <p>Press and hold the RESET key for 2 seconds or more.</p> <ul style="list-style-type: none"> <li>A long beep will sound and the data for the selected item will be reinitialized.</li> <li>The setting details for only the initialized item will change from flashing to steadily illuminated.</li> </ul>                                                                                                                                                                                                                                                                                                                                              |
| 4 | <p><b>End data initialization mode</b></p>  <p>Press the TEST key.</p> <p>TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## 8. USING CF CARDS

### 8-1. Notes on handling CF cards (sold separately)

- Use a CF card with a memory capacity of 32, 64, 128, 256, 512 MB, 1GB or 2GB. (CF cards with a capacity of more than 2GB are not supported.)
- Do not disassemble or modify the CF card.
- Do not bend, drop or scratch CF cards or place heavy objects on top of them.
- Avoid contact with liquids such as water, oil, solvents or drinks.
- Use and store CF cards in locations that are free from strong static electricity and electrical interference.
- Do not use or store CF cards in places where they may be subject to vibrations or shocks, direct sunlight, high temperature or humidity or strong magnetic fields from equipment such as speakers, or places which are dusty from thread scraps, etc.
- Do not subject CF cards to shocks or impacts or remove them from the sewing machine while data is being loaded or written.
- The data on the CF cards may become lost or corrupted due to some malfunction or accident. It is recommended that you make a backup of important data.
- CF cards should only be removed after the power for the sewing machine has been turned off.
- CF cards are already formatted when they are purchased, and so you should not reformat them.
- The recommended CF cards are commercially-available ones from SanDisk or HAGIWARA SYS-COM. CF cards from other manufacturers can be used, but different formatting methods may mean that loading from or writing to such cards may not be possible.

For more information, refer to the documentation provided with the CF card.

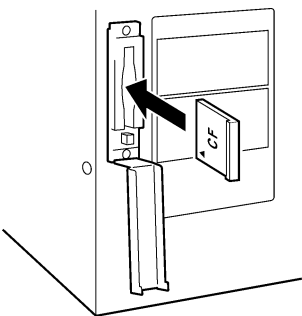
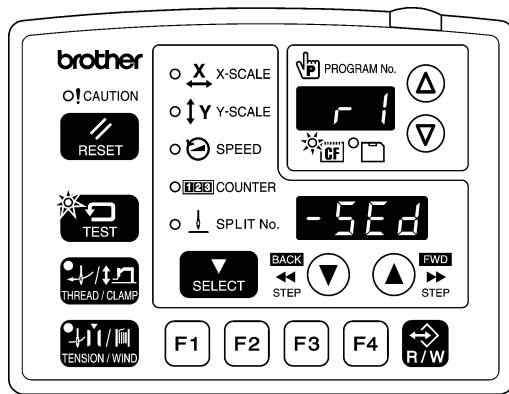
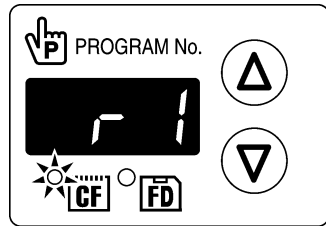
- \* This product is compatible with CF cards that have been formatted using the FAT16 method. Cards that have been formatted using the FAT32 method cannot be used.
- \* CF™ is a trademark of SanDisk Corporation.
- \* Company names and product names appearing in this manual are trademarks or registered trademarks of the respective owners. However, no TM or other similar symbols appear in the main text of this manual.

### 8-2. Structure of a CF card folder

|                                 |                           |
|---------------------------------|---------------------------|
| \BROTHER\ISM\ISMSYS\ISM05MN.MOT | : Control program         |
| \BROTHER\ISM\ISMDB00\ISMMSW.SEW | : Memory switch data      |
| *1 \ISMUPG.SEW                  | : User program data       |
| \ISMS0100.SEW                   | : Sewing data P No. = 100 |
| \ISMS0101.SEW                   | : Sewing data P No. = 101 |
| \ISMS0102.SEW                   | : Sewing data P No. = 102 |
| ⋮                               | ⋮                         |

- \*1 The underlined portion of the name of the \BROTHER\ISM\ISMDB00 folder for sewing data can be changed by changing the setting for memory switch No. 752 in order to change the folder name. Change the folder name if you would like to store sewing data for different sewing machines on a single CF card. (Refer to the service manual for details on memory switch No. 752.)

## 8-3. Data read/write mode

|   |                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |                                                                                                  | <p>With the power turned off, insert the CF card into the CF slot.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Make sure the CF card is facing the correct way.</li> <li>• Always be sure to keep the cover closed except when inserting and removing the CF card. If this is not done, dust may get inside and cause problems with operation.</li> <li>• If no valid data can be found, the CF media indicator will not illuminate.</li> </ul>                                          |
| 2 | Turn on the power switch.                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3 | <p>Switch to data read/write mode.</p>  <p>TEST indicator and CF media indicator illuminate</p> | <p>While pressing the TEST key, press the R/W key.</p>   <ul style="list-style-type: none"> <li>• The mode number will appear in the PROGRAM No. display, and the setting details for that mode will appear in the menu display.</li> <li>• The initial mode is sewing data reading mode. (Refer to the read/write mode list)</li> </ul> |
| 4 |                                                                                                | <p>Press the <math>\Delta</math> or <math>\nabla</math> key to select the mode.</p>                                                                                                                                                                                                                                                                                                                                                                                                                           |

## [Read/write mode list]

| PROGRAM No. display | Menu display | Setting items                                                                       |
|---------------------|--------------|-------------------------------------------------------------------------------------|
| r 1                 | [-SEd]       | Sewing data is read from the CF card. (*1)                                          |
| w 2                 | [SEd-]       | Sewing data is written to the CF card.                                              |
| r 3                 | [-MEM]       | Memory switch settings are read from the CF card.                                   |
| w 4                 | [MEM-]       | Memory switch settings are written to the CF card.                                  |
| r 5                 | [-UPG]       | User programs are read from the CF card.                                            |
| w 6                 | [UPG-]       | User programs are written to the CF card.                                           |
| r 7                 | [-SyS]       | Control programs are read from the CF card and used to update the firmware version. |
| w 8                 | [LoG-]       | Error log data is written to the CF card.                                           |
| r 9                 | [-Fdd]       | Sewing data is read from the floppy disk. (*2) (*3)                                 |
| w 10                | [Fdd-]       | Sewing data is written to the floppy disk. (*2)                                     |
| r 11                | [-EoP]       | Expansion option output (*4) data is read from the CF card.                         |
| w 12                | [EoP-]       | Expansion option output data is written to the CF card.                             |
| r 13                | [oPFd]       | Expansion option output data is read from the floppy disk. (*2)                     |

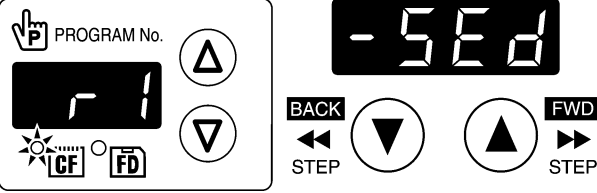
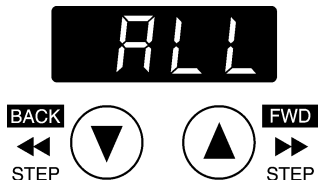
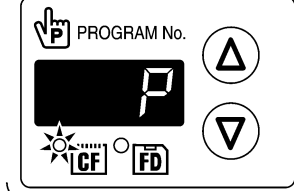
\*1 The sewing data that can be used with this sewing machine is data that has been created for the BAS-300G series.

\*2 Only valid when using an optional floppy disk drive.

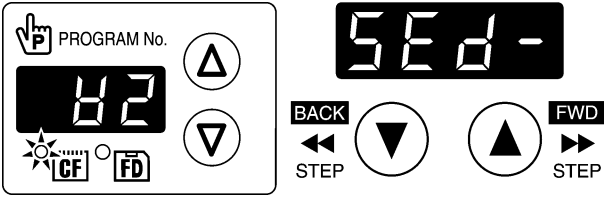
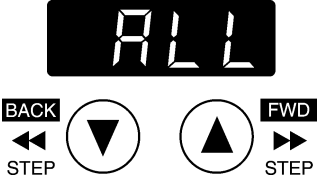
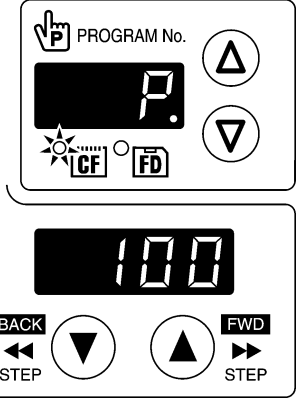
\*3 Sewing data for the BAS-300 series, BAS-300A series and BAS-300E/F series can be read.

\*4 Refer to the instruction manual for the programmer for details of expansion option output.

## 8-3-1. Reading all sewing data from the CF card at once

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Select the [r 1] data read/write mode.</p>  <p>4576Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2 | <p>Press the R/W key.</p>   <ul style="list-style-type: none"> <li>• [-SEd] will change to [ ALL].</li> <li>* If you press the ▲ or ▼ key to select the program numbers that you would like to read and then continue to carry out the following procedure, you can read the selected sewing data in separate lots.</li> </ul> <p>4577Q</p>                                                                                                                                                                                                                                  |
| 3 | <p>Press the R/W key.</p>   <ul style="list-style-type: none"> <li>• The buzzer will sound and all sewing data will be loaded from the CF card and copied into the sewing machine's internal memory.</li> <li>• The program numbers that have been read will appear in the menu display.</li> <li>* If there is a large volume of data in the CF card, it will take some time for all of it to be read. To halt the reading of data, press the STOP switch. If you then press the RESET key, the display will change back to [ ALL].</li> </ul> <p>Loading</p> <p>4976Q</p> |
| 4 | <p><b>End data read/write mode</b></p> <p>Press the TEST key.</p> <p>Turn off the power switch, remove the CF card, and then close the cover of the CF slot.</p>  <p>TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 8-3-2. Writing all sewing data to the CF card at once

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  <p>Select the [w 2] data read/write mode.</p> <p style="text-align: right;">4578Q</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2 |  <p>Press the R/W key.</p>  <ul style="list-style-type: none"> <li>• [SEd-] will change to [ ALL].</li> <li>* If you press the ▲ or ▼ key to select the program numbers that you would like to write and then continue to carry out the following procedure, you can write the selected sewing data in separate lots.</li> </ul> <p style="text-align: right;">4577Q</p>                                                                                                                                                                                                        |
| 3 |  <p>Press the R/W key.</p>  <ul style="list-style-type: none"> <li>• The buzzer will sound and the all sewing data will be copied from the internal memory onto the CF card.</li> <li>• The program numbers that have been written will appear in the menu display.</li> <li>* If there is a large volume of data in the internal memory, it will take some time for all of it to be written. To halt the writing of data, press the STOP switch. If you then press the RESET key, the display will change back to [ ALL].</li> </ul> <p style="text-align: right;">4977Q</p> |
| 4 | <p><b>End data read/write mode</b></p>  <p style="text-align: right;">Writing</p> <p>Press the TEST key.<br/>Turn off the power switch, remove the CF card, and then close the cover of the CF slot.</p> <p style="text-align: right;">TEST indicator switches off</p>                                                                                                                                                                                                                                                                                                                                                                                          |

Refer to the service manual for details on other read/write modes.

## 9. SEWING

### ! CAUTION



Turn off the power switch at the following times.

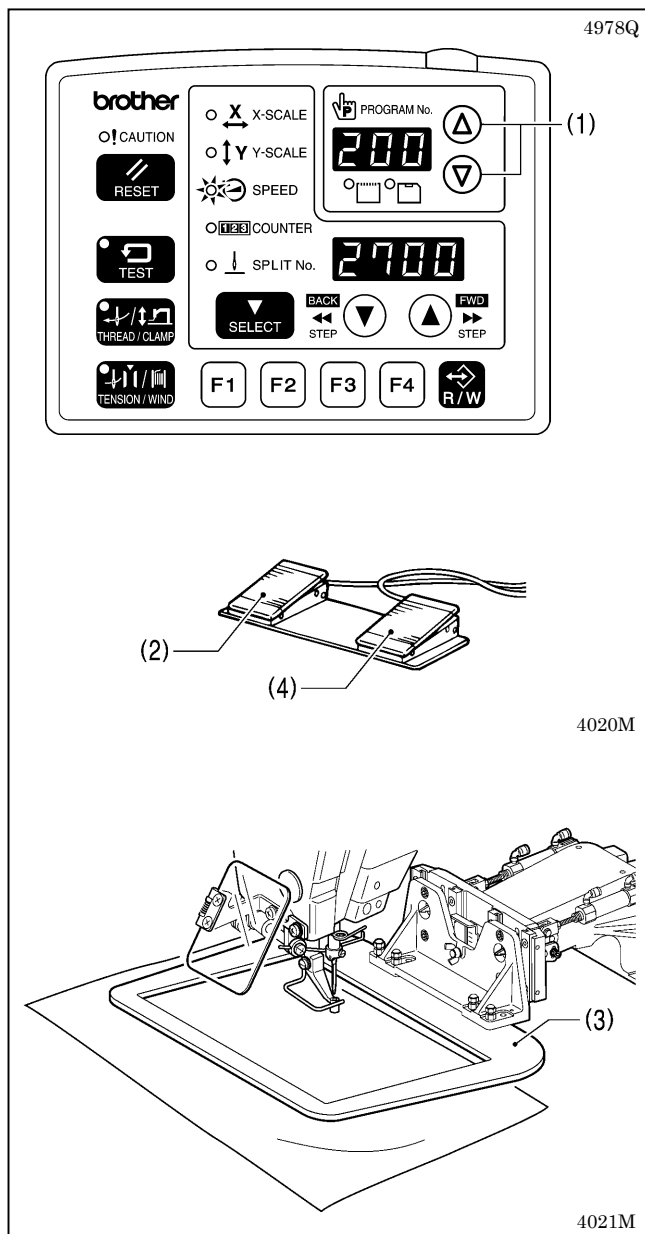
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

- When threading the needle
- When replacing the bobbin and 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.

### 9-1. Sewing



1. Turn on the power switch.
2. Press the  $\Delta$  or  $\nabla$  key (1) to select the sewing program number that you would like to use.
  - \* Refer to "6-2. Loading sewing data" for details on reading sewing data from a CF card.

3. Depress the work clamp switch (2) to lower the work clamp (3), and then depress the start switch (4).
  - The work clamp will move to the sewing start position.
  - Home position detection will be carried out immediately after the power switch is turned on.

4. Place the article to be sewn underneath the work clamp (3).
5. Depress the work clamp switch (2).
  - The work clamp (3) will drop.
6. Depress the start switch (4).
  - The sewing machine will start sewing.

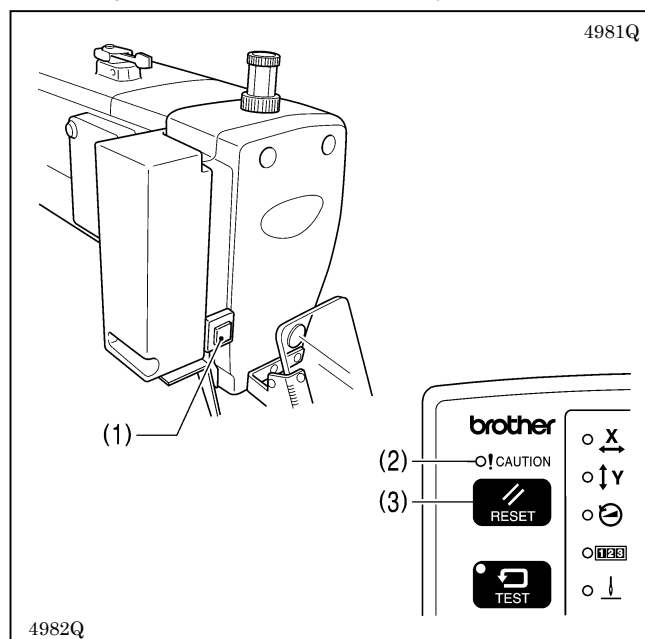
7. When sewing is complete, the thread will be trimmed and the work clamp (3) will rise.

Use a work clamp and a feed plate which will hold the article securely so that it does not slip.

If using the standard work clamp and feed plate and the article being sewn is slipping, take measures to stop the work clamp and feed plate from being slippery.

## 9-2. Using the STOP switch

If you press the STOP switch (1) while sewing or test feeding is in progress, the CAUTION indicator (2) will illuminate and the sewing machine will stop immediately.



### <Clearing>

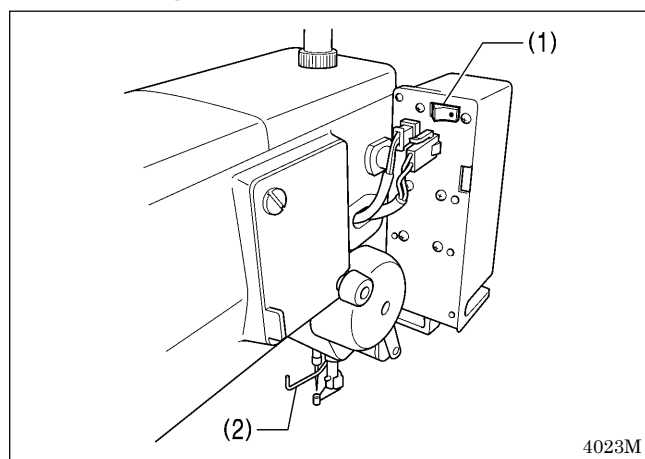
1. Press the RESET key (3).
  - The thread will be trimmed, and then the CAUTION indicator (2) will switch off and the buzzer will stop sounding.
2. If you do not wish to continue sewing, press the RESET key (3) once more.
  - The program number will flash. Carry out preparation for the next sewing.

### <Continuing sewing from a stopping point>

If you have pressed the STOP switch (1) at times such as if the thread breaks while sewing or the lower thread runs out, you can resume sewing from the point where the thread ran out.

|   |  |                                                                                                                                                                                                                                                                                                                                                                   |
|---|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 |  | Press the RESET key. <ul style="list-style-type: none"> <li>• The thread will be trimmed, and then the CAUTION indicator will switch off and the buzzer will stop sounding.</li> </ul>                                                                                                                                                                            |
| 2 |  | Press the ▼ key to return the work clamp to the position where sewing is to be continued. <ul style="list-style-type: none"> <li>• When the ▼ key is pressed, the work clamp will move backward by one stitch, and when the ▲ key is pressed, the work clamp will move forward by one stitch. (It will move quicker if you keep the key pressed down.)</li> </ul> |
| 3 |  | Depress the start switch (4). <ul style="list-style-type: none"> <li>• The sewing machine will start operating and sewing will start.</li> </ul>                                                                                                                                                                                                                  |

## 9-3. Using the thread wiper switch



The thread wiper switch (1) can be used to turn the thread wiper (2) on and off.

## 10. CLEANING

### ! CAUTION

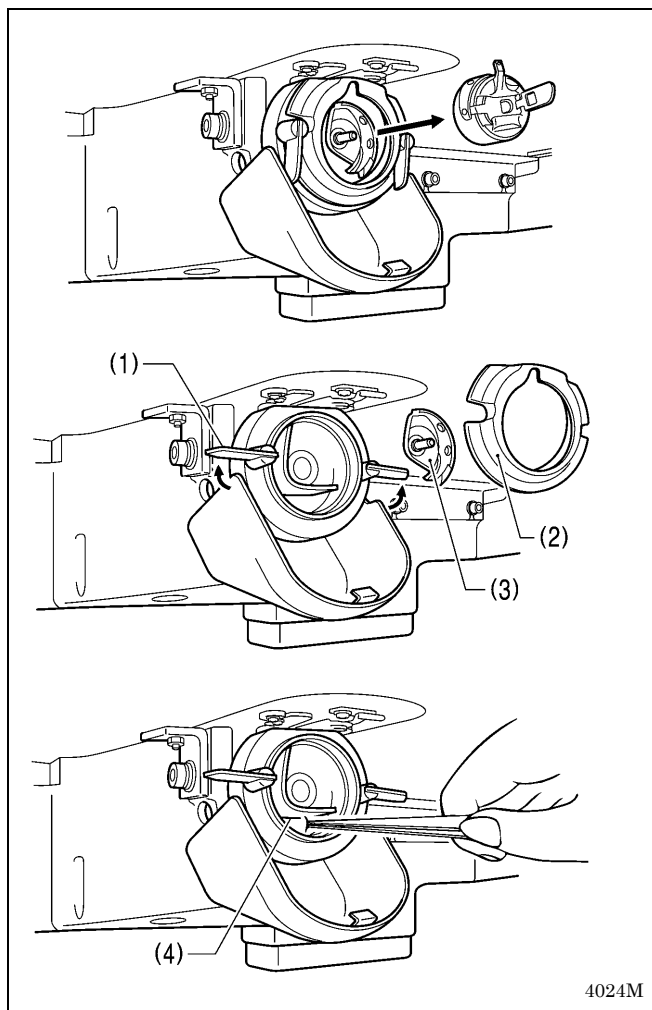


Turn off the power switch before carrying out cleaning.  
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



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. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

### 10-1. Cleaning the rotary hook

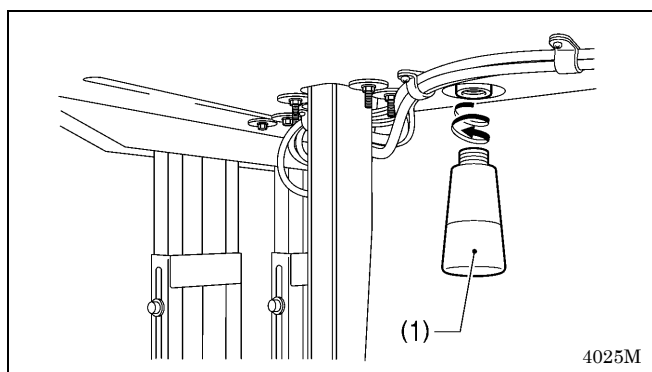


1. Pull the shuttle race cover downward to open it, and then remove the bobbin case.

2. Open the setting claw (1) in the direction indicated by the arrow, and then remove the shuttle race base (2) and the shuttle hook (3).

3. Clean all the dust and thread ends from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

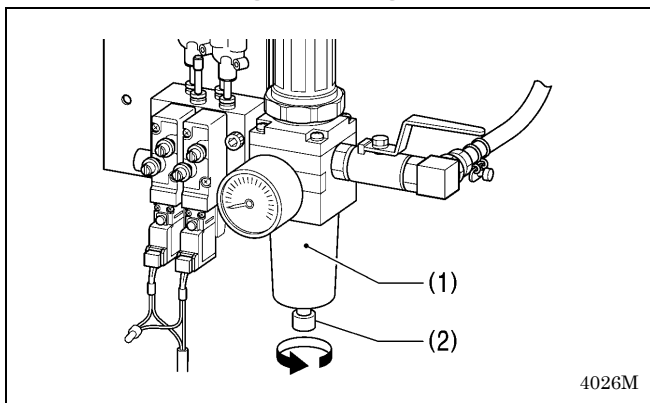
### 10-2. Draining the oil



1. Remove and empty the oiler (1) whenever it is full.

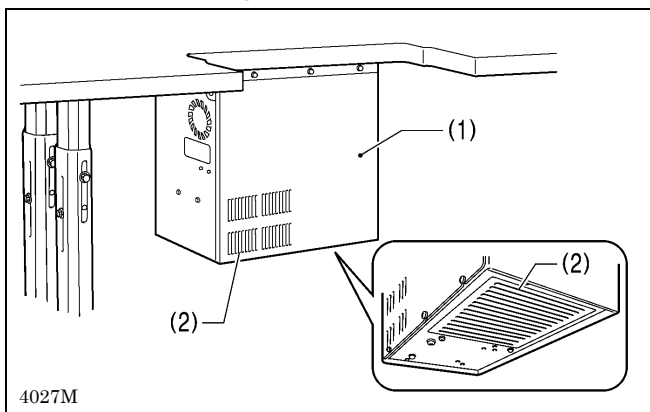
2. After emptying oiler (1), screw it back into its original position.

### 10-3. Checking the regulator



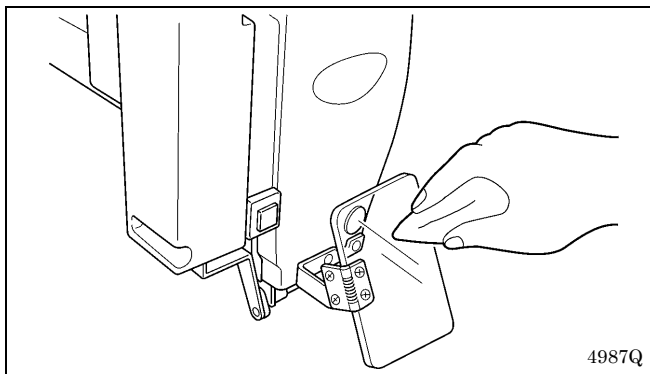
1. If water collects in the bottle of the regulator (1), turn the drain cock (2) in the direction of the arrow to drain the water.
2. After draining the water, tighten the drain cock (2).

### 10-4. Cleaning the control box air inlet ports



Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

### 10-5. Cleaning the eye guard

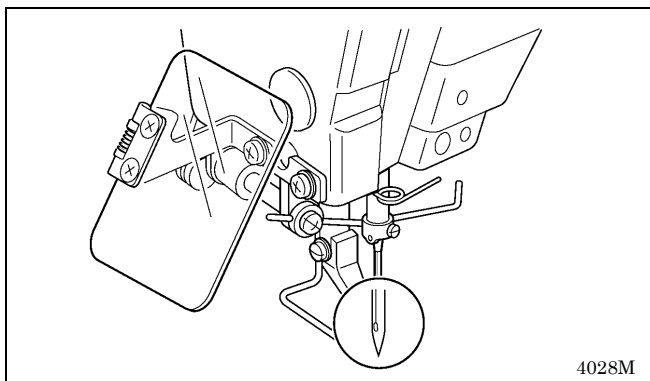


Wipe the eye guard clean with a soft cloth.

**NOTE:**

Do not use solvents such as kerosene or thinner to clean the eye guard.

### 10-6. Checking the needle



Always check that the tip of the needle is not broken and also that the needle is not bent before starting sewing.

### 10-7. Lubrication

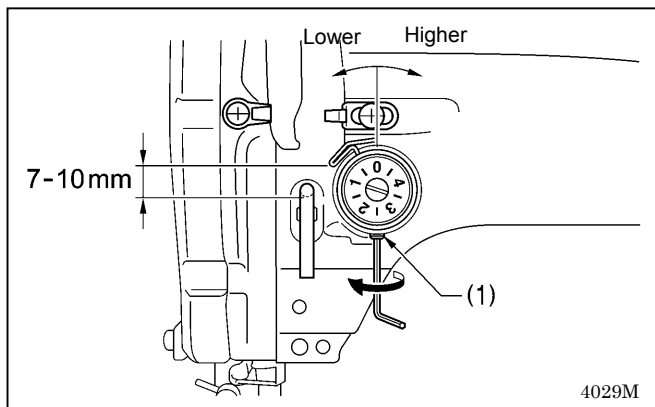
Lubricate the sewing machine while referring to "4-18. Lubrication".

# 11. 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 before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
  - Inspection, adjustment and maintenance
  - Replacing consumable parts such as the rotary hook
-  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.
-  Hold the machine head with both hands when tilting it back or returning it to its original position. In addition, do not subject the machine head to extra force while it is tilted back. If this is not observed, the machine head may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  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. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.
-  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.

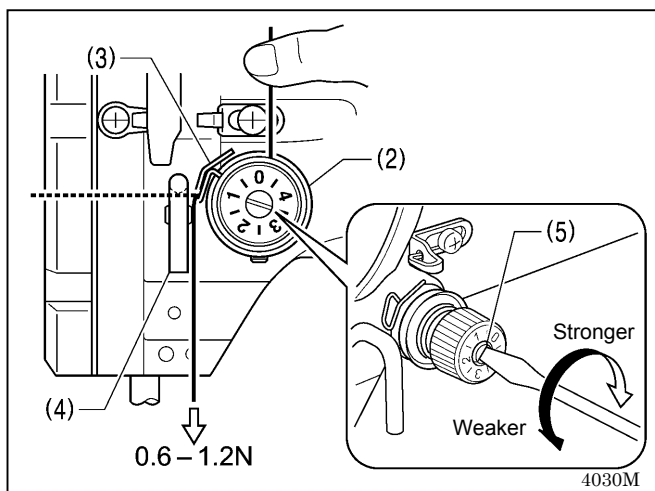
## 11-1. Adjusting the thread take-up spring



|                                   |           |
|-----------------------------------|-----------|
| Thread take-up spring height (mm) | 7 – 10    |
| Thread take-up spring tension (N) | 0.6 – 1.2 |

### <Thread take-up spring height>

Loosen the set screw (1) and turn the adjuster to adjust.



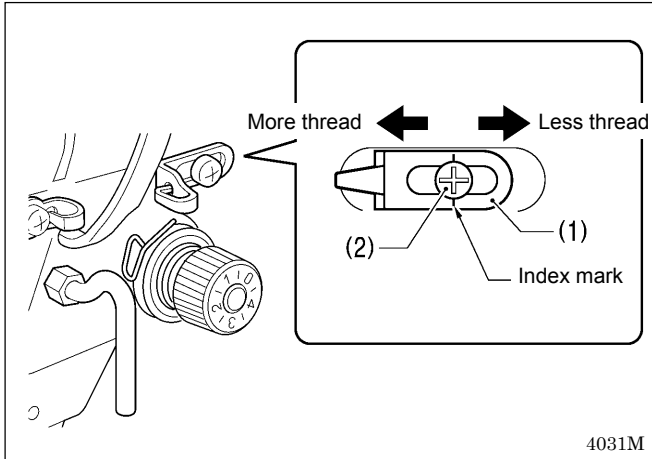
### <Thread take-up spring tension>

1. Press the upper thread slightly above the tension bracket (2) with a finger to stop the thread spooling out.
2. Pull the upper thread downward so that the thread take-up spring (3) is extended to the same height as the base of the thread guide arm (4), and then measure the tension of the thread take-up spring (3).
3. Use a screwdriver to turn the tension stud (5) in order to adjust the tension of the thread take-up spring (3).

### NOTE:

If the thread tension spring (3) is not adjusted correctly, the upper thread trailing length will be uneven after thread trimming.

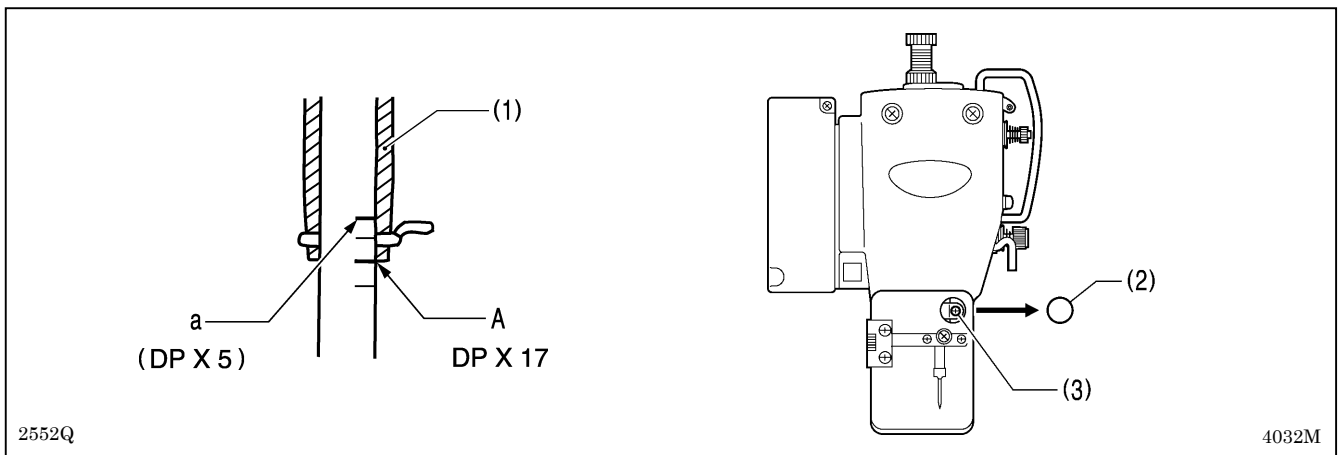
## 11-2. Adjusting arm thread guide R



The standard position of arm thread guide R (1) is when the screw (2) is aligned with the index mark. Loosen the screw (2) and move arm thread guide R (1) to adjust.

- \* When sewing heavy material, move arm thread guide R (1) to the left. (The thread take-up amount will become greater.)
- \* When sewing light material, move arm thread guide R (1) to the right. (The thread take-up amount will become less.)

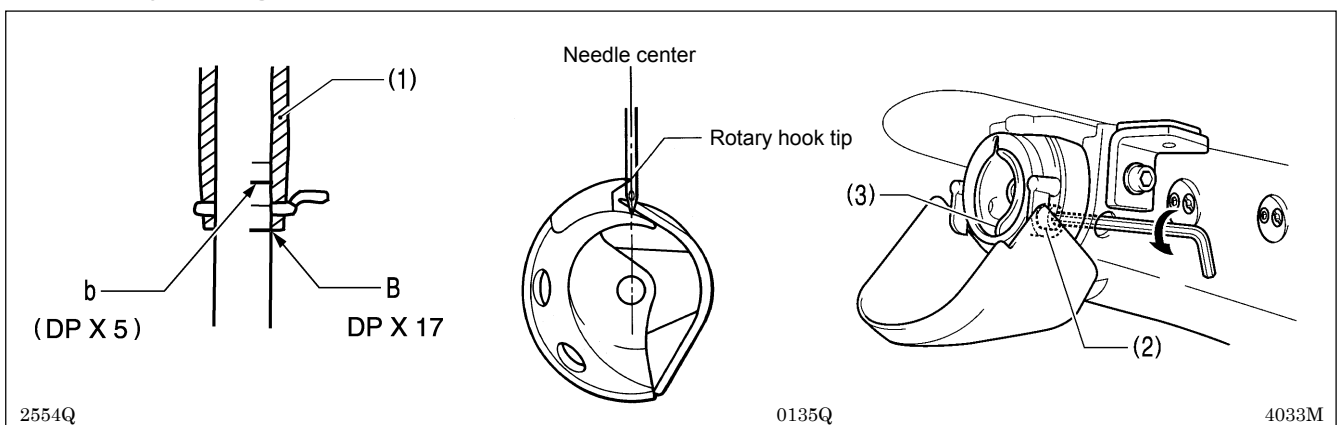
## 11-3. Adjusting the needle bar height



Turn the machine pulley to move the needle bar to the lowest position. Then remove the rubber plug (2), loosen the screw (3) and then move the needle bar up or down to adjust so that the second reference line from the bottom of the needle bar (reference line A) is aligned with the lower edge of the needle bar bush (1).

- \* If using a DP X 5 needle, use the highest reference line (reference line a).

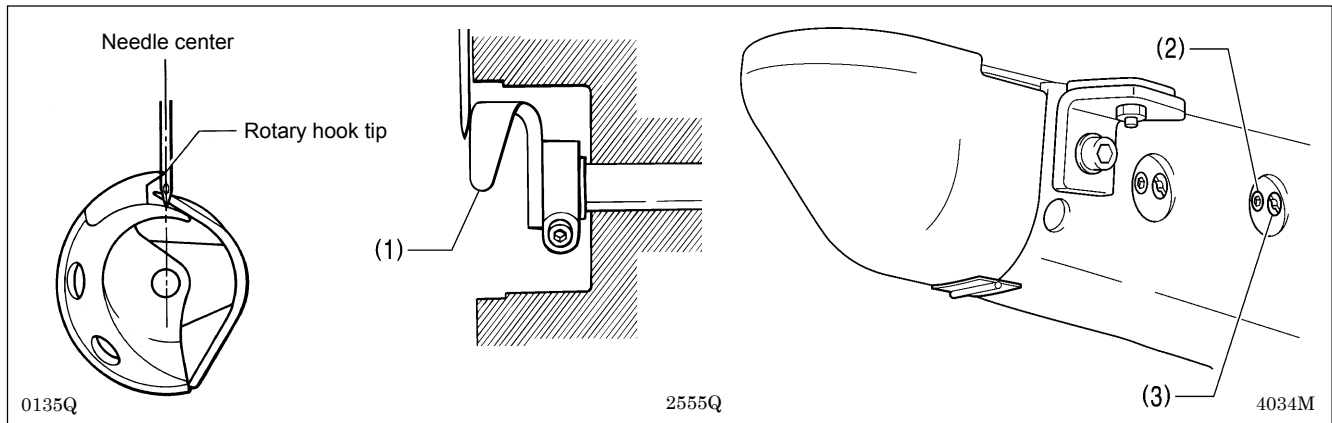
## 11-4. Adjusting the needle bar lift amount



Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (1), and then loosen the bolt (2) and move the driver (3) so that the tip of the rotary hook is aligned with the center of the needle.

- \* If using a DP X 5 needle, use the second reference line from the top of the needle bar (reference line b).

## 11-5. Adjusting the driver needle guard

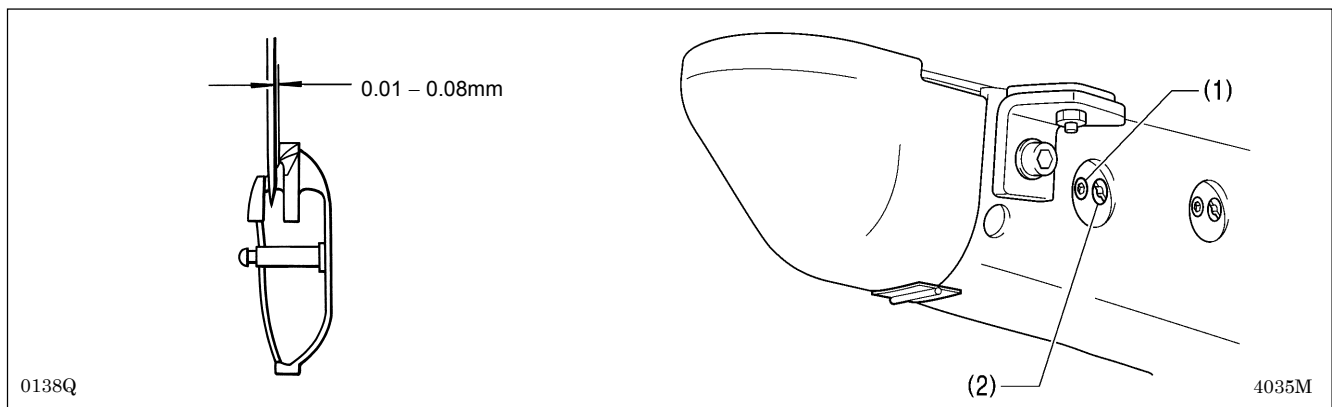


Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (2) and turn the adjusting stud (3) to adjust so that the driver needle guard (1) is touching the needle.

### NOTE:

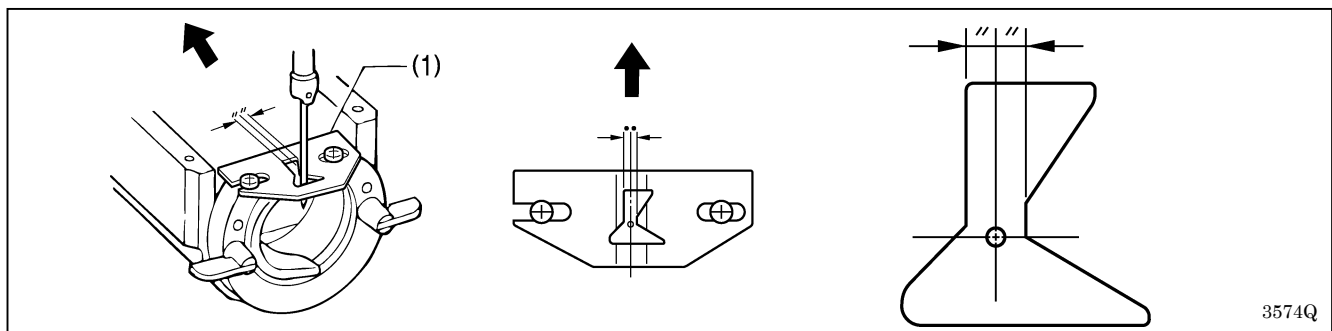
If it crosses the needle more than necessary, it will place a load on the needle, or it may cause poor thread tension. Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

## 11-6. Adjusting the needle clearance



Turn the machine pulley to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (1) and turn the adjusting stud (2) to adjust so that the clearance between the needle and the rotary hook is 0.01 – 0.08 mm.

## 11-7. Adjusting the shuttle race thread guide



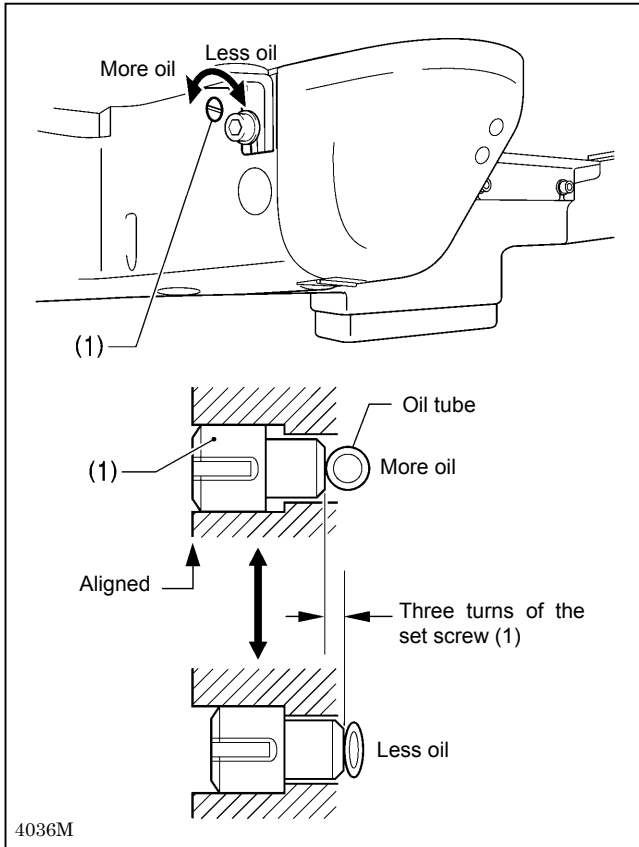
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

### NOTE:

If the shuttle race thread guide (1) is in the wrong position, thread breakages, soiled thread or tangling of the thread may occur.

The position of the shuttle race thread guide (1) is adjusted at the time of shipment from the factory. It should not be changed if possible.

## 11-8. Adjusting the rotary hook lubrication amount

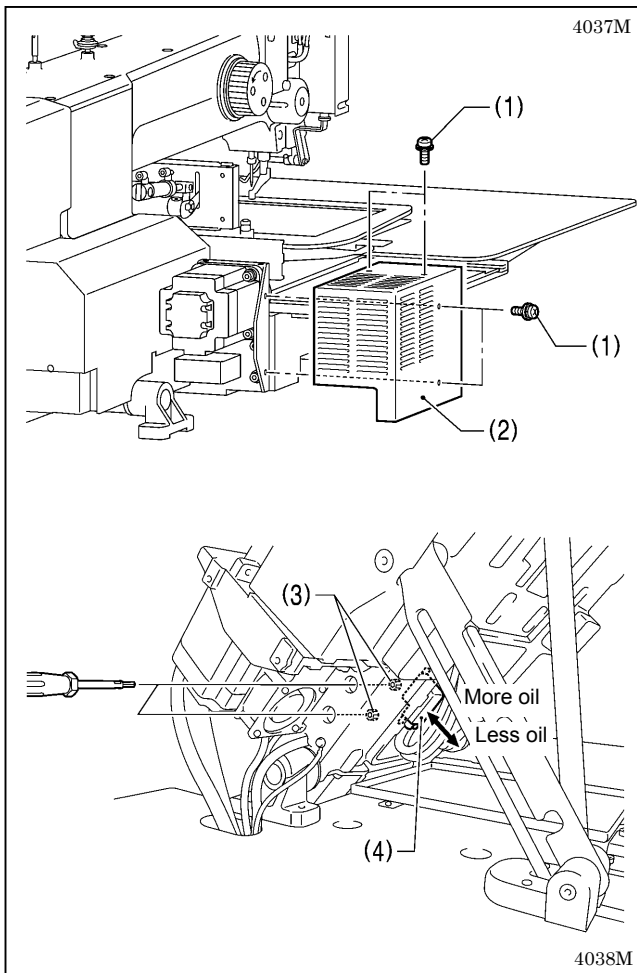


### <Adjusting by changing the pressure on the oil tube>

The optimum position is when the head of the set screw (1) is aligned with the edge of the bed. The rotary hook lubrication amount can be adjusted within three turns to the right from that position.

- If the set screw (1) is turned clockwise, the lubrication amount becomes smaller.
- If the set screw (1) is turned counterclockwise, the lubrication amount becomes greater.

\* If you would like the lubrication amount to be increased further from the position the head of the set screw (1) is aligned with the edge of the bed, use the following method to make the adjustment.



### <Adjusting by changing the amount of oil supplied from the sub-tank>

1. Remove the four screws (1), and then remove the X motor cover (2).

2. Tilt back the machine head.

3. Insert a screwdriver into the holes in the left side of the sewing machine bed and loosen the two bolts (3).

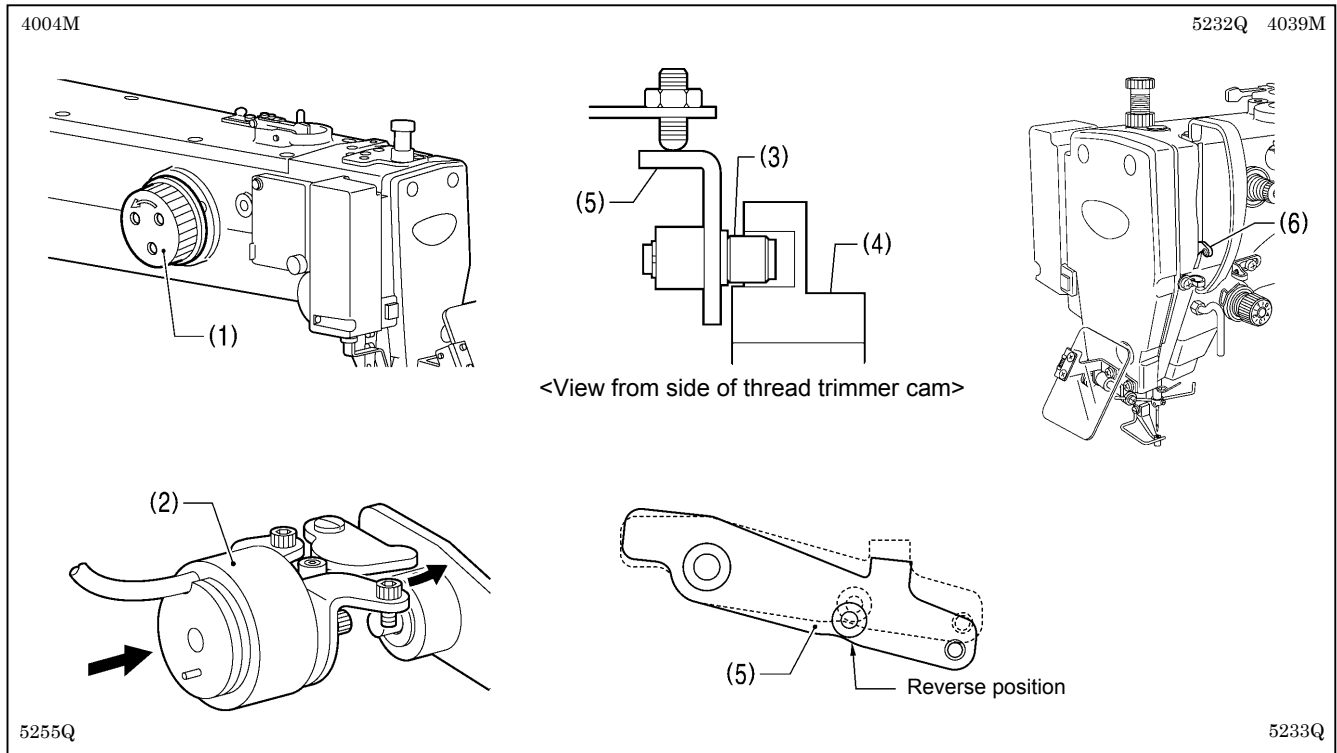
4. Move the sub-tank (4) up or down to adjust its position, and then tighten the two bolts (3).

- If the position of the sub-tank (4) is raised, the lubrication amount will increase.
- If the position of the sub-tank (4) is lowered, the lubrication amount will decrease.

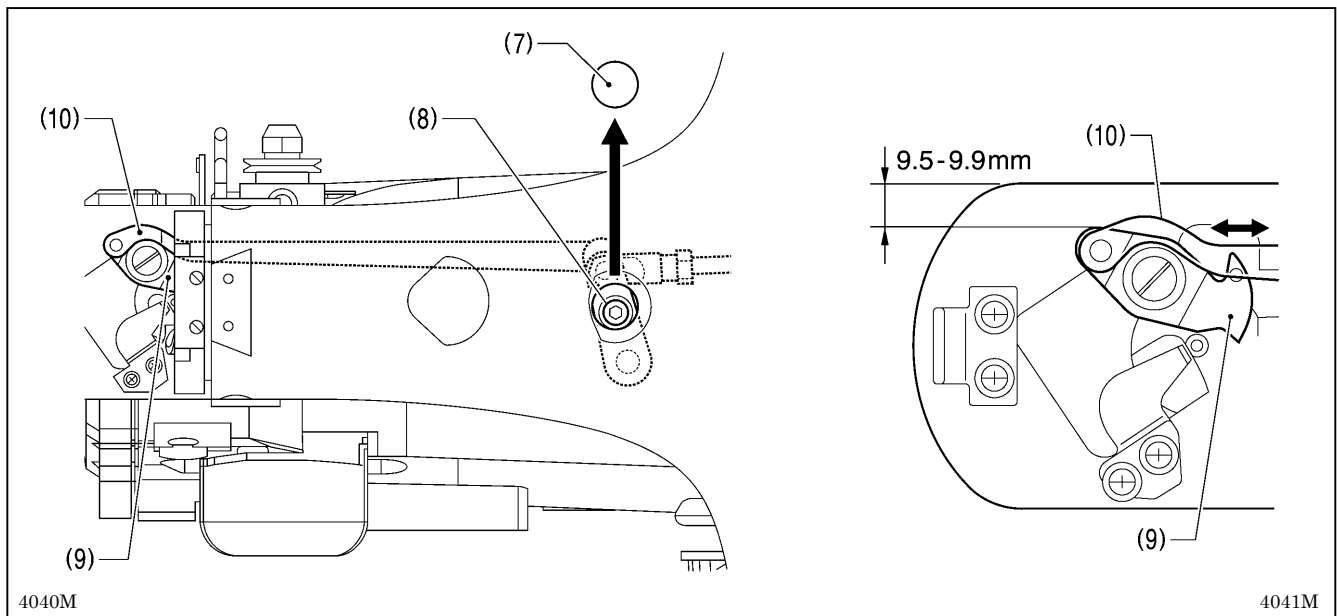
5. Return the machine head to its original position.

6. Install the X motor cover (2) with the four screws (1).

# 11-9. Adjusting the position of the movable knife

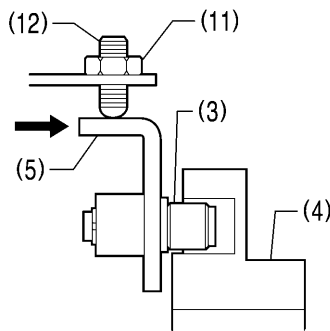
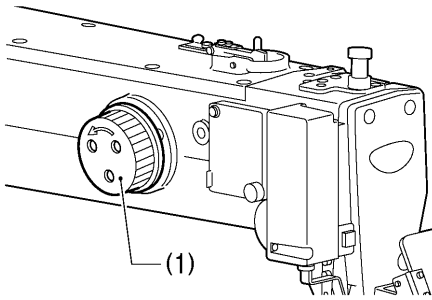


1. Open the top cover and tilt back the machine head.
2. Turn the pulley (1) by hand to lower the needle bar to its lowest position, and push the thread trimmer solenoid (2) as far as it will go.
3. With the collar (3) inserted into the groove of the thread trimmer cam (4), turn the pulley (1) by hand to set the driving lever (5) to the reverse position (when the thread take-up (6) is close to its lowest position).

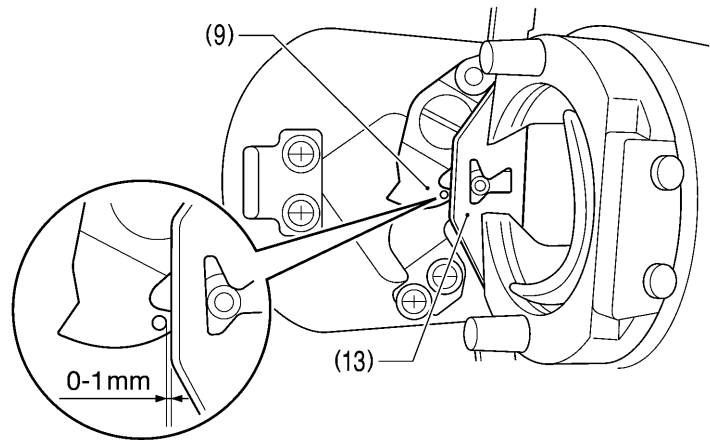


4. Remove the rubber cap (7).
5. Loosen the bolt (8).
6. Move the movable knife connecting plate (10) back and forth to adjust so that the distance from the ridge on the right side of the needle plate to the ridge on the movable knife (9) is 9.5 to 9.9 mm.
7. After tightening the bolt (8), check the above position once more.

4004M



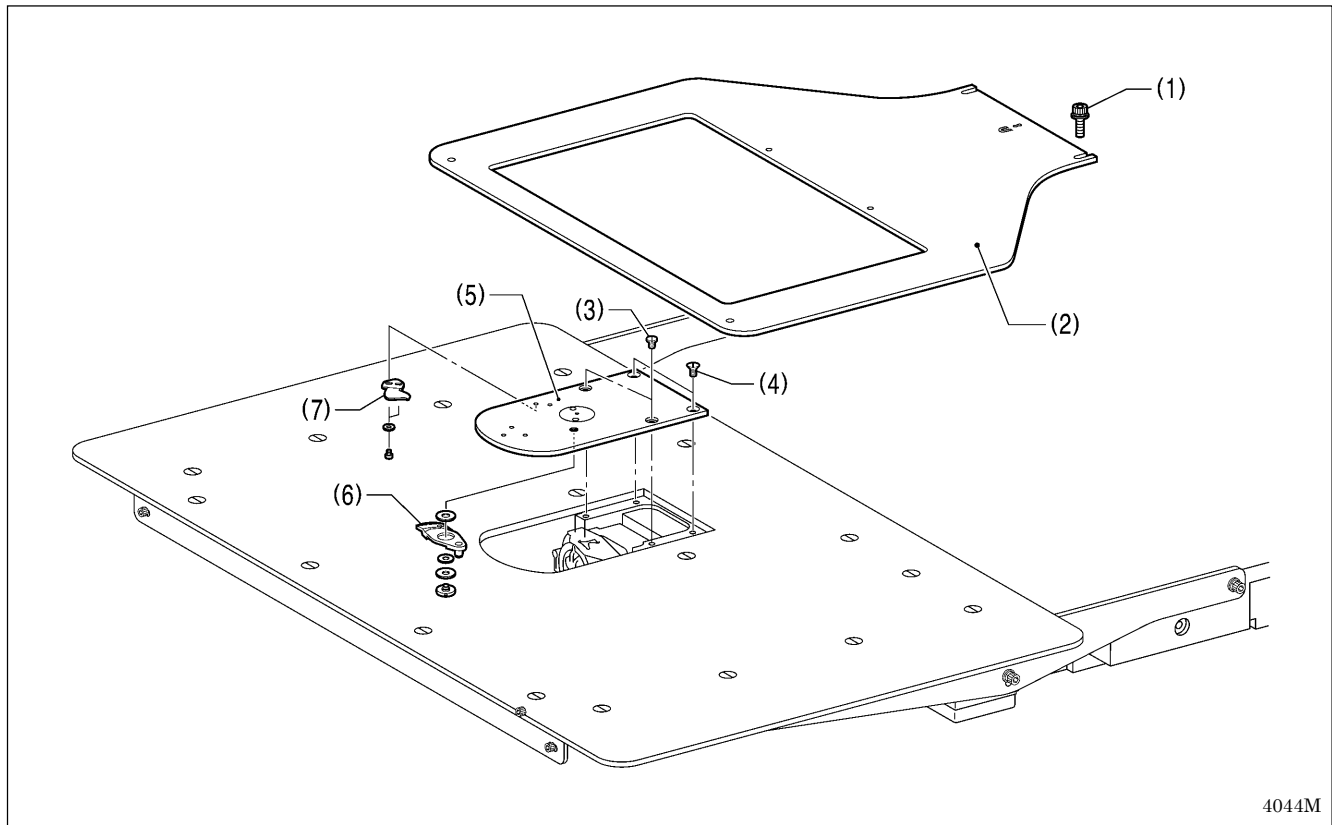
4042M



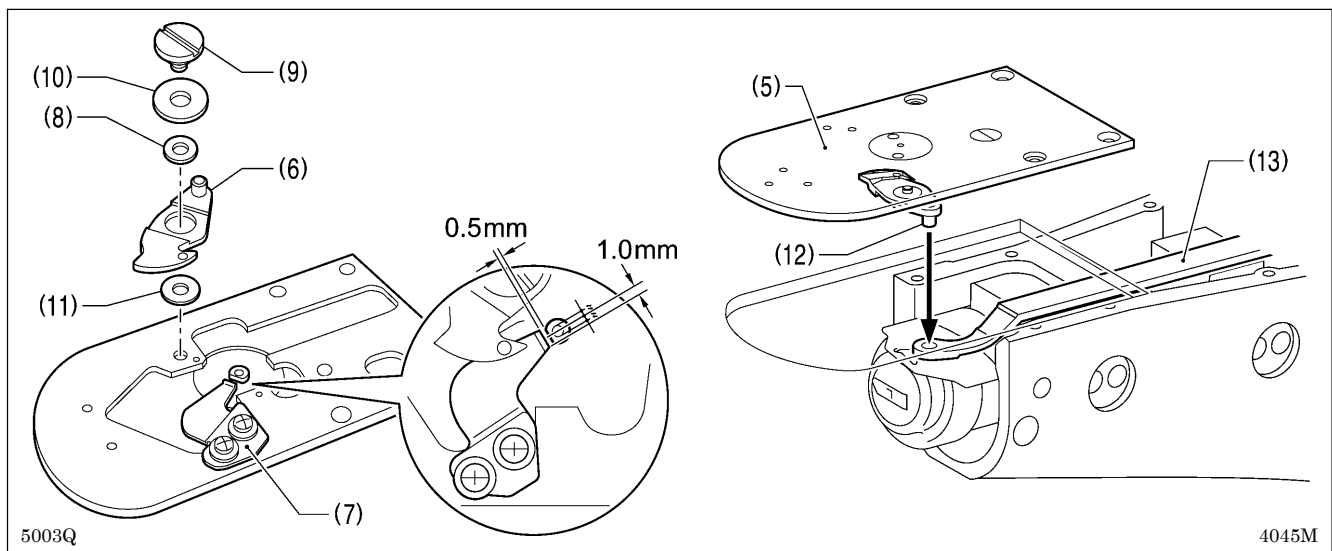
4043M

8. Turn the pulley (1) by hand to move the needle bar to its lowest position.
9. Loosen the nut (11), tighten the set screw (12) until the collar (3) is touching the inside of the groove in the thread trimmer cam (4), and then turn it back in the counterclockwise direction by approximately 1/4 of a turn.
10. Tighten the nut (11), and then check that the collar (3) is not touching the inside of the groove in the thread trimmer cam (4). In addition, push the driving lever (5) by hand toward the thread trimmer cam until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (5) returns smoothly to its original position when it is released.
11. Check that there is a gap of about 0 - 1 mm between the outside of the hole in the movable knife (9) and the ridge line on the shuttle race thread guide (13) when there is still play between the parts.

## 11-10. Replacing the movable and fixed knives

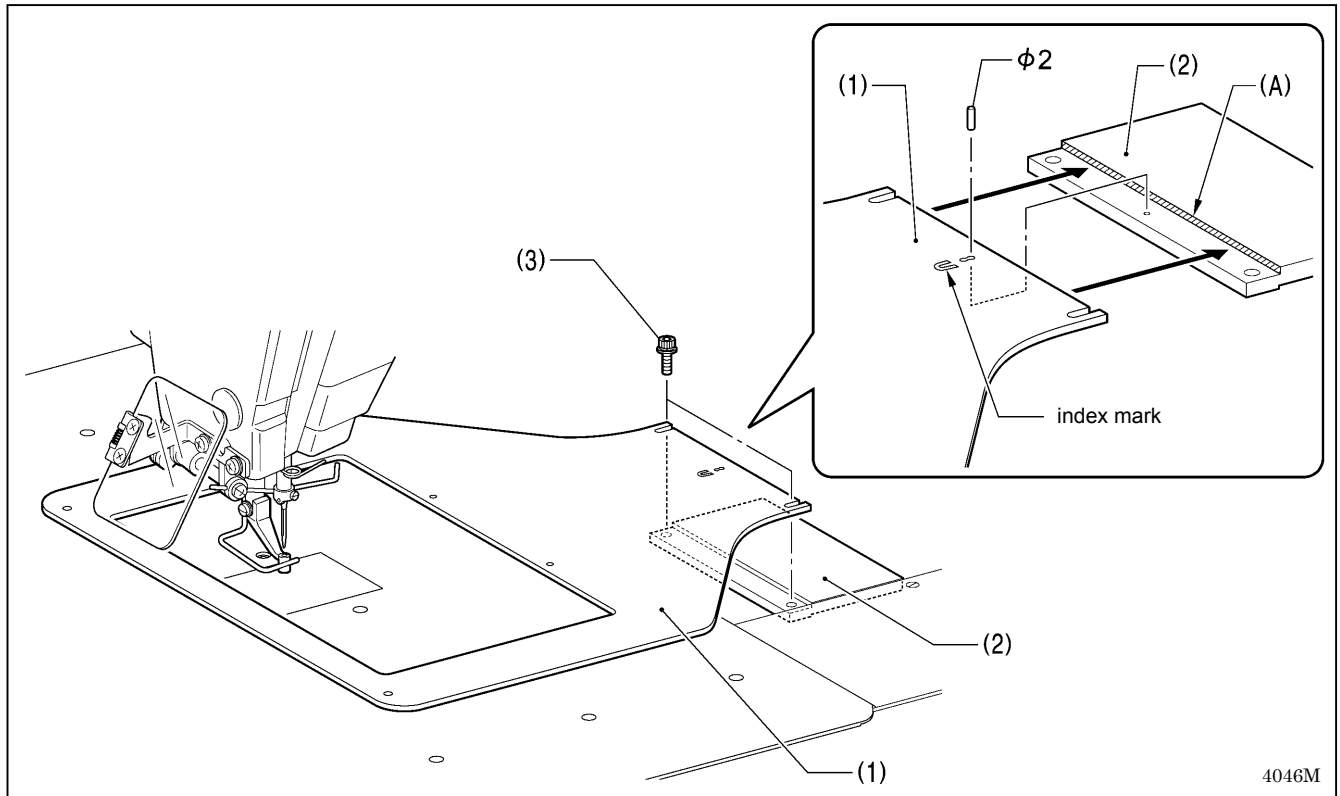


1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).



4. Install the new fixed knife (7) in the position shown in the illustration.
5. Apply grease to the outside of the collar (8) and to the shoulder screw (9), and then install the new movable knife (6) together with the thrust washer (10) and the movable knife spacer (11).
6. Check that the movable knife (6) and fixed knife (7) cut the thread cleanly. Replace the movable knife spacer with accessory spacers ( $t=0.2, 0.3, 0.4$ ) so that the knives trim the thread accurately.
  - \* If the knife pressure is too weak and the thread is not completely cut, use a thinner movable knife spacer.
  - \* If the knife pressure is too strong and the movable knife (1) turns stiffly, use a thicker movable knife spacer.
7. Apply grease to the pin (12), place it into the movable knife connecting plate (13), and install it to the needle plate (5).
8. Check that the needle is aligned with the center of the needle hole.
9. Install the feed plate (2). (Refer to the next page.)

### 11-10-1. Installing the feed plate

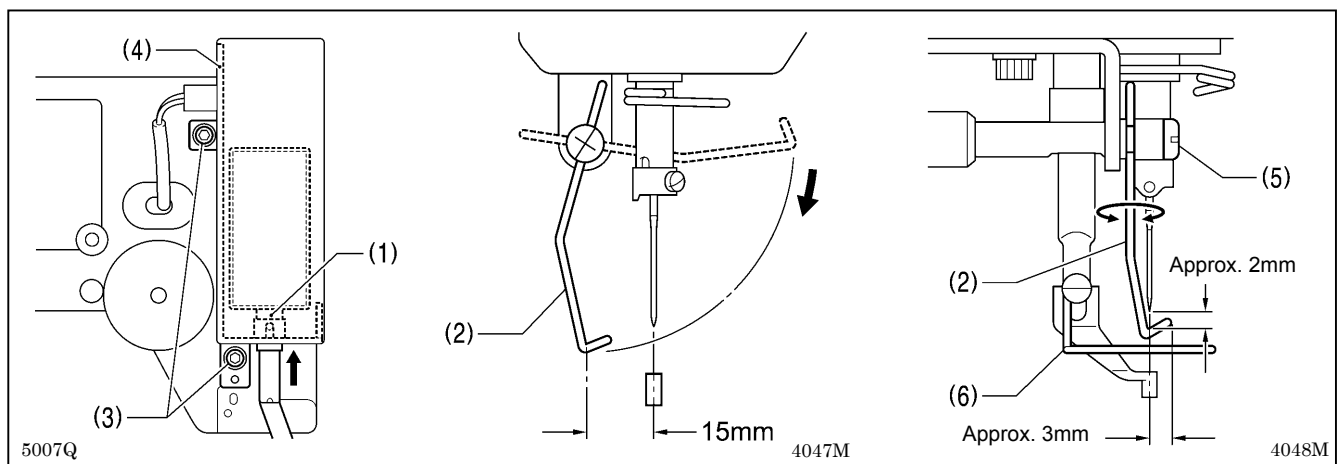


**NOTE:**

Install the feed plate so that the surface with the index mark is facing upward.

Place the rear edge of the feed plate (1) against the stepped part of base plate Y (2) (hatched shaded section (A)) and use a 2 mm diameter pin (such as a needle) to align the hole in the feed plate (1) with the hole in base plate Y (2); then tighten the two bolts (3).

### 11-11. Adjusting the thread wiper

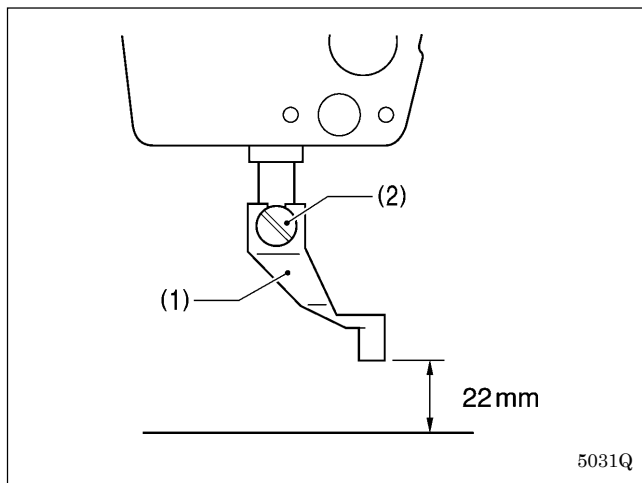


1. Loosen the two screws (3) and shift the entire solenoid setting plate (4) up or down to adjust so that the thread wiper (2) is 15 mm in front of the needle center when the plunger (1) of the thread wiper solenoid is driven to the full stroke.
2. Loosen the screw (5) and adjust the position of the thread wiper (2) so that the distance from the thread wiper to the tip of the needle is approximately 2 mm and the tip of the thread wiper (2) is approximately 3 mm from the center of the needle when the thread wiper (2) passes below the needle during operation.

**NOTE:**

Check that the thread wiper (2) does not touch the finger guard (6).

## 11-12. Presser foot installation position

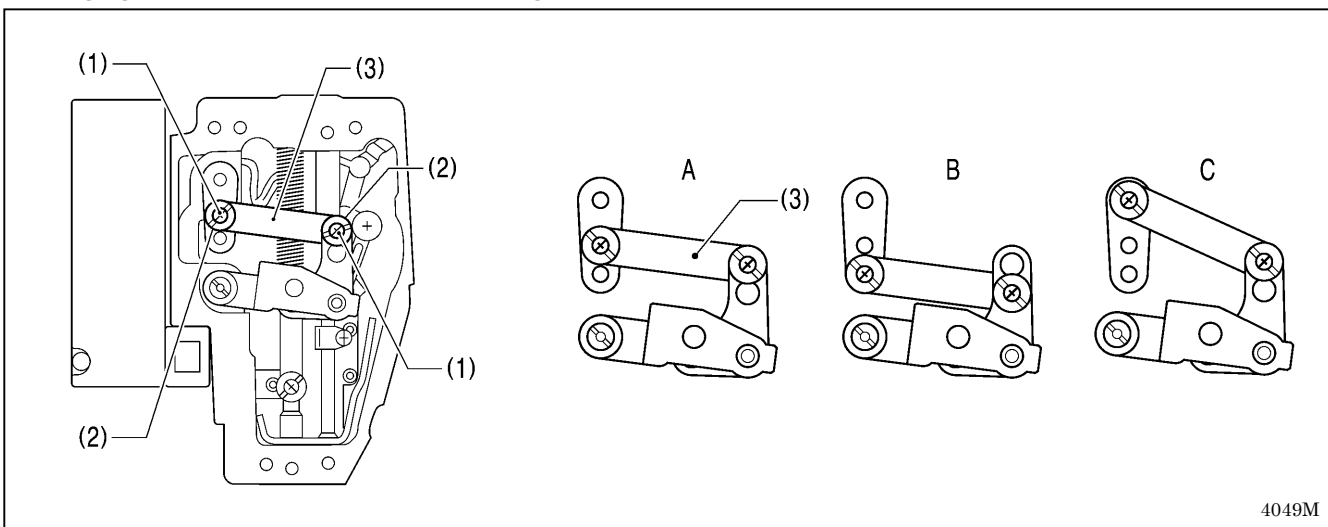


Install the presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot to the top of the needle plate is 22 mm when the sewing machine is stopped and the presser foot (1) is raised.

## 11-13. Changing the intermittent stroke

The intermittent stroke can be adjusted to within 2 – 10 mm by adjusting the position of the stepping clamp connecting rod and changing the installation position of stepping clamp link A.

### <Changing the installation position of stepping clamp link A>

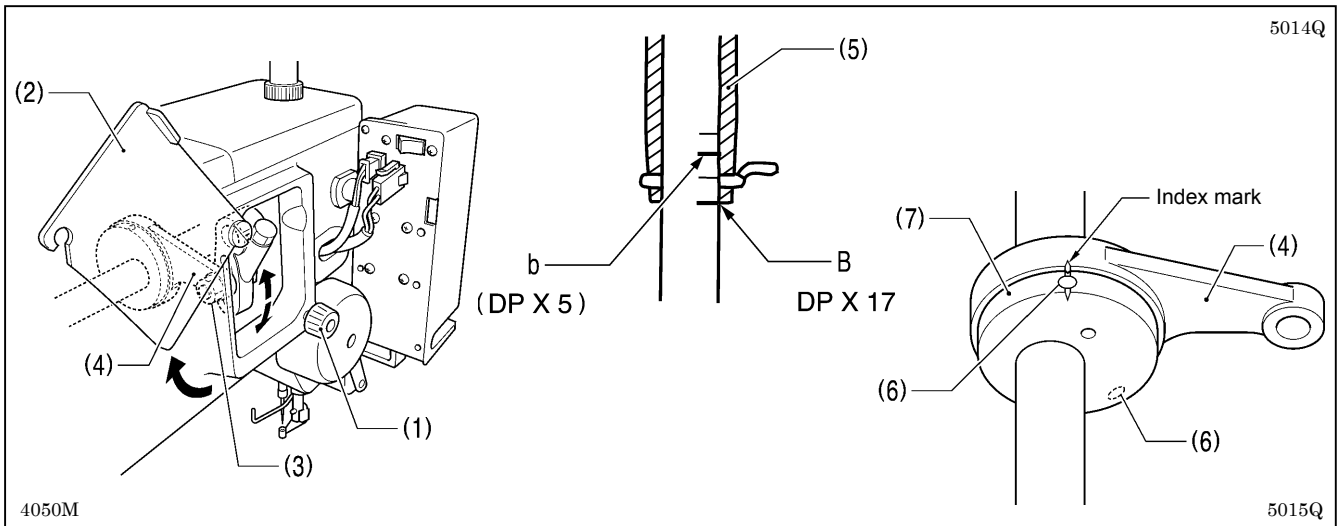


1. Remove the face plate.
2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link A (3).
3. Change the installation position for stepping clamp link A (3) to either A, B or C above.

If the position of the stepping clamp connecting rod is adjusted as described in the following at any one of the installation positions, the adjustment range for the intermittent stroke will be as given in the following table. (Refer to the next page.)

| Installation position | Intermittent stroke range                     |  |
|-----------------------|-----------------------------------------------|--|
| A                     | 2 – 4.5mm                                     |  |
| B                     | 4.5 – 10mm                                    |  |
| C                     | 0 mm (Presser foot does not move up and down) |  |

## &lt;Stepping clamp connecting rod position adjustment&gt;



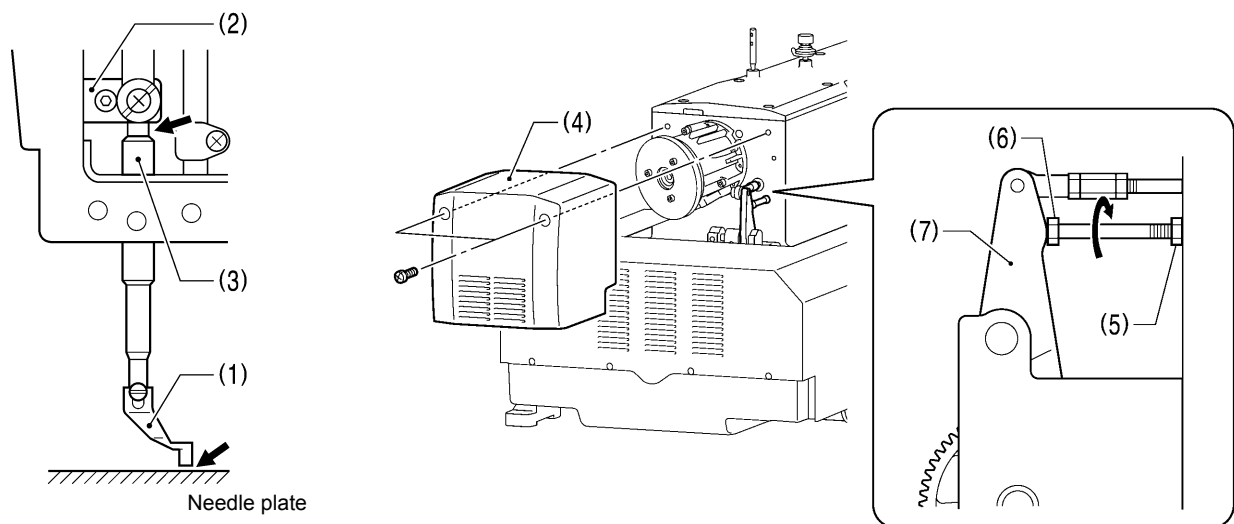
1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
  - When the stepping clamp connecting rod (4) is raised, the intermittent stroke will increase.
  - When the stepping clamp connecting rod (4) is lowered, the intermittent stroke will decrease.

Next, adjust the needle bar and presser foot timing.

3. Turn the machine pulley to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (5).  
(If using a DP x 5 needle, align with the second reference line from the top (reference line b).)
4. Open the top cover and loosen the two set screws (6).
5. Align the index marks on the stepping clamp cam (7) and the stepping clamp connecting rod (4), and then tighten the set screws (6).

Check the following after changing the intermittent stroke.

5016Q 4051M



1. With the intermittent presser foot (1) lowered, turn the pulley to move the intermittent presser foot (1) to its lowest position.
2. Check that the presser foot (1) does not touch the needle plate and that the presser bar clamp (2) does not touch the presser bar bush (3).

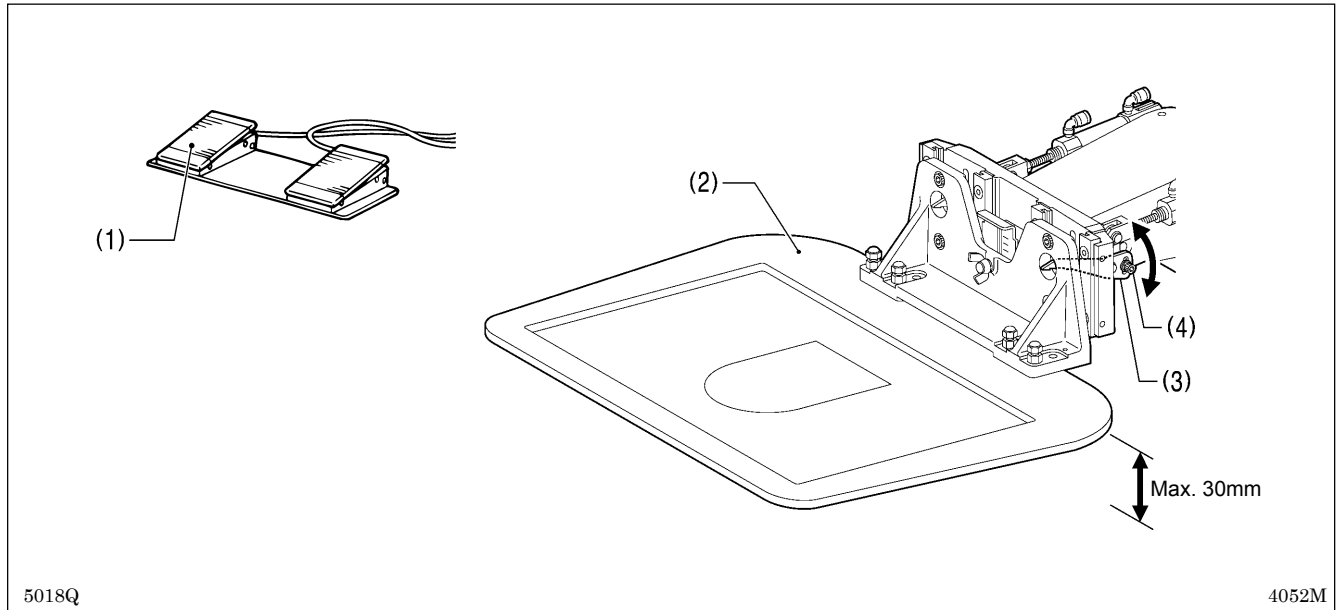
## &lt;If they are touching&gt;

Remove the motor cover (4).

Loosen the nut (5), and turn the bolt (6) until it is pressing against the intermittent drive lever (7), and then adjust until the two points mentioned above are not touching.

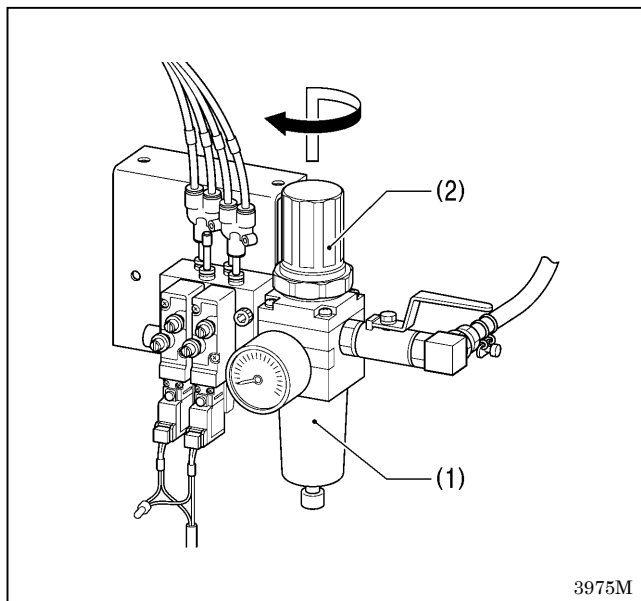
### 11-14. Adjusting the work clamp lift amount

The maximum lift amount for the work clamp (2) is 30 mm above the top of the needle plate.



1. Turn on the air, and then turn on the power switch.
2. Depress the work clamp switch (1) to raise the work clamp (2).
3. Loosen the two bolts (4) of the work clamp lifter lever (3), and then move the work clamp lifter lever (3) up or down to adjust the lift amount.

### 11-15. Adjusting the air pressure



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa. After adjustment is complete, push the handle (2) downward to lock it.

# 12. TABLE OF ERROR CODES

## DANGER



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

If a malfunction should occur with the sewing machine, a buzzer will sound and an error code will appear in the display window. Follow the remedy procedure to eliminate the cause of the problem.

### Switch-related errors

| Code        | Cause and remedy                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E010</b> | Stop switch was pressed. Press the RESET key to clear the error.                                                                                                                                                                                                                                                                                                                                             |
| <b>E011</b> | Stop switch was pressed. Press the RESET key to clear the error.<br>Press the ▼ key to move the work clamp so that you can continue sewing.                                                                                                                                                                                                                                                                  |
| <b>E015</b> | The stop switch was still being pressed, or there is a problem with the stop switch connection.<br>Turn off the power, and then check that connector P13 on the main P.C. board is properly connected.                                                                                                                                                                                                       |
| <b>E016</b> | Problem with the stop switch connection.<br>Turn off the power, and then check that connector P13 on the main P.C. board is properly connected.                                                                                                                                                                                                                                                              |
| <b>E025</b> | The power was turned on while the start switch was still being depressed, or the start switch was depressed without the work clamp being lowered.<br>If the power has been turned on while the start switch was still depressed, turn off the power and check the start switch.<br>If the start switch was depressed without lowering the work clamp, depress the work clamp switch to lower the work clamp. |
| <b>E035</b> | The work clamp switch is depressed.<br>Turn off the power, and then check the work clamp switch.                                                                                                                                                                                                                                                                                                             |
| <b>E036</b> | A foot switch that does not match specifications is connected, or work clamp mode has not been set correctly.<br>Use a foot switch that matches specifications, or initialize the memory switch settings.                                                                                                                                                                                                    |
| <b>E050</b> | Machine head tilting was detected after the power was turned on.<br>Turn off the power, and then return the machine head to its original position.<br>Check that connector P9 on the main P.C. board is properly connected.                                                                                                                                                                                  |
| <b>E051</b> | Machine head tilting was detected while the sewing machine was operating.<br>Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.                                                                                                                                                                                                                              |
| <b>E055</b> | Machine head tilting was detected when the power was turned on.<br>Turn off the power, and then return the machine head to its original position.<br>Check that connector P9 on the main P.C. board is properly connected.                                                                                                                                                                                   |
| <b>E065</b> | An operation panel key was still being pressed when the power was turned on, or key is faulty.<br>Turn off the power and check the operation panel.                                                                                                                                                                                                                                                          |

### Upper shaft motor-related errors

| Code        | Cause and remedy                                                                                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E110</b> | Needle up stop position error.<br>Turn the machine pulley until the point where the error display disappears.                                                           |
| <b>E111</b> | Upper shaft did not stop at the needle up stop position when the sewing machine stopped.<br>Turn the machine pulley until the point where the error display disappears. |
| <b>E120</b> | Needle drop signal could not be detected.<br>Turn off the power, and then check the synchronizer connection.                                                            |
| <b>E121</b> | Thread trimming was not completed.<br>Turn off the power, and then check if the cutting edges of the fixed knife and movable knife are damaged or worn.                 |

(Continued on next page)

## 12. TABLE OF ERROR CODES

| Code        | Cause and remedy                                                                                                                                                                                                                                                                                                                             |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E130</b> | Sewing machine motor stopped due to a problem, or synchronizer is faulty.<br>Turn off the power, and then turn the machine pulley and check if the sewing machine has locked up.<br>Check that connectors P4 and P5 on the power supply motor P.C. board are properly connected.                                                             |
| <b>E131</b> | Synchronizer is faulty.<br>Turn off the power, and then check that connector P5 on the power supply motor P. C. board is properly connected.                                                                                                                                                                                                 |
| <b>E132</b> | Problem detected with sewing machine motor operation.<br>Turn off the power, and then check that connector P4 on the power supply motor P.C. board is properly connected.                                                                                                                                                                    |
| <b>E133</b> | Sewing machine motor stopping position is incorrect.<br>Turn off the power, and then check that connector P5 on the power supply motor P.C. board is properly connected.                                                                                                                                                                     |
| <b>E150</b> | Sewing machine motor is overheating, or temperature sensor is faulty.<br>Turn off the power, and then check the sewing machine motor.<br>(When sewing data with a small number of stitches (15 stitches or less) is sewn repeatedly (short cycle operation), the upper shaft motor may overheat and the "E150" error code may be generated.) |

### Feed mechanism-related errors

| Code        | Cause and remedy                                                                                                                                                                                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E200</b> | X-feed motor home position cannot be detected.<br>Problem with X -feed motor or poor X home position sensor connection.<br>Turn off the power, and then check that connector P10 on the PMD P.C. board and connector P20 on the main P.C. board are properly connected. |
| <b>E201</b> | X-feed motor stopped due to a problem.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                                                                                         |
| <b>E202</b> | Problem with X-feed motor or Y-feed motor home position adjustment data.<br>Re-adjust the home position.                                                                                                                                                                |
| <b>E204</b> | X feed motor stopped abnormally during sewing.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                                                                                 |
| <b>E205</b> | X feed motor stopped abnormally while moving to the sewing start position.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                                                     |
| <b>E206</b> | X feed motor stopped abnormally during test feeding.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                                                                           |
| <b>E207</b> | X feed motor stopped abnormally during programming.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                                                                            |
| <b>E210</b> | Y-feed motor home position cannot be detected.<br>Problem with Y-feed motor or poor Y home position sensor connection.<br>Turn off the power, and then check that connector P8 on the PMD P.C. board and connector P4 on the main P.C. board are properly connected.    |
| <b>E211</b> | Y-feed motor stopped due to a problem.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                                                                                         |
| <b>E214</b> | Y feed motor stopped abnormally during sewing.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                                                                                 |
| <b>E215</b> | Y feed motor stopped abnormally while moving to the sewing start position.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                                                     |
| <b>E216</b> | Y feed motor stopped abnormally during test feeding.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                                                                           |
| <b>E217</b> | Y feed motor stopped abnormally during programming.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                                                                            |

### Work clamp-related errors

| Code        | Cause and remedy                                                                                                                                                                                                                                                                |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E300</b> | Work clamp home position cannot be detected.<br>Problem with work clamp motor or poor work clamp home position sensor connection.<br>Turn off the power, and then check that connector P3 on the PMD P.C. board and connector P5 on the main P.C. board are properly connected. |
| <b>E301</b> | Intermittent presser foot raised or lowered position cannot be detected.<br>Turn off the power, and then check if there are any problems in the intermittent presser foot vertical direction.                                                                                   |
| <b>E303</b> | Problem with work clamp motor home position adjustment data.<br>Re-adjust the home position.                                                                                                                                                                                    |

**Communication and memory-related errors**

| Code        | Cause and remedy                                                                                                                                                                                                                                                    |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E401</b> | Connection communication error with power supply motor P. C. board detected when power was turned on.<br>Turn off the power, and then check that connector P6 on the power supply motor P.C. board and connector P17 on the main P.C. board are properly connected. |
| <b>E402</b> | Communication error with programmer detected when power is turned on.<br>Turn off the power, and then check that connector P7 on the main P.C. board is properly connected.                                                                                         |
| <b>E403</b> | Connection error with PMD P. C. board detected when power was turned on.<br>Turn off the power, and then check that connector P1 on the PMD P.C. board is properly connected.                                                                                       |
| <b>E410</b> | Communication error with main P. C. board detected.<br>Turn off the power, and then turn it back on again.                                                                                                                                                          |
| <b>E411</b> | Communication error with power supply motor P. C. board detected.<br>Turn off the power, and then turn it back on again.                                                                                                                                            |
| <b>E412</b> | Communication error with programmer detected.<br>Turn off the power, and then turn it back on again.                                                                                                                                                                |
| <b>E413</b> | Communication error with PMD P. C. board detected.<br>Turn off the power, and then turn it back on again.                                                                                                                                                           |
| <b>E420</b> | No CF card is inserted.                                                                                                                                                                                                                                             |
| <b>E421</b> | Program contents are incorrect and cannot be used, or no data.<br>Check that the CF card or floppy disk contains data with this program number.                                                                                                                     |
| <b>E422</b> | Error occurred while reading the CF card or floppy disk.<br>Check the data on the CF card or floppy disk.                                                                                                                                                           |
| <b>E424</b> | Insufficient free space on CF card.<br>Use a different CF card.                                                                                                                                                                                                     |
| <b>E425</b> | Error occurred while writing to the CF card or floppy disk.<br>Use the specified type of CF card.<br>Check if the floppy disk is write-protected and if it has enough free space.                                                                                   |
| <b>E426</b> | R/W key has not been pressed.<br>Press the R/W key to load the data.                                                                                                                                                                                                |
| <b>E427</b> | CF card or floppy disk does not contain any data with this program number.<br>Check the program number.<br>Data that has already been loaded into internal memory can be used without having to press the R/W key again.                                            |
| <b>E430</b> | Data cannot be backed up to main P.C. board.<br>Turn off the power, and then turn it back on again.                                                                                                                                                                 |
| <b>E440</b> | Data memory error on main P.C. board.<br>Turn off the power, and then turn it back on again.                                                                                                                                                                        |
| <b>E450</b> | Model selection cannot be read from the machine head memory.<br>Turn off the power and check that connector P3 on the power supply motor P.C. board is properly connected.                                                                                          |
| <b>E451</b> | Data cannot be backed up to machine head memory.<br>Turn off the power, and then turn it back on again.                                                                                                                                                             |
| <b>E452</b> | Machine head memory is not connected.<br>Turn off the power, and then check that connector P3 on the power supply motor P.C. board is properly connected.                                                                                                           |
| <b>E474</b> | Internal memory is full and copying is not possible.<br>Clear the sewing data.                                                                                                                                                                                      |

## 12. TABLE OF ERROR CODES

### Data editing-related errors

| Code        | Cause and remedy                                                                                                                                                                                  |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E500</b> | The enlargement ratio setting caused the sewing data to extend outside the sewing area.<br>Set the enlargement ratio again.                                                                       |
| <b>E501</b> | Sewing data that exceeds the sewing machine's sewing area was loaded.<br>Check the size of the sewing data.                                                                                       |
| <b>E502</b> | The enlargement ratio caused the data pitch to exceed the maximum pitch of 12.7 mm.<br>Set the enlargement ratio again.                                                                           |
| <b>E510</b> | Invalid code in sewing data.<br>Reload the data from the CF card or floppy disk.                                                                                                                  |
| <b>E511</b> | No end code has been input into sewing data.<br>Input an end code, or change the program number.                                                                                                  |
| <b>E512</b> | Number of stitches exceeds allowed maximum.                                                                                                                                                       |
| <b>E520</b> | Extended option output number already exists. Change the extended option output number.<br>If not using the extended option output, initialize the data to clear the extended option output data. |
| <b>E530</b> | Changing program number is prohibited.                                                                                                                                                            |

### P.C. board-related errors

| Code        | Cause and remedy                                                                                                                                                                                                |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E700</b> | Abnormal rise in power supply voltage.<br>Turn off the power and check the input voltage.                                                                                                                       |
| <b>E701</b> | Abnormal rise in sewing machine motor drive voltage.<br>Turn off the power, and then check the voltage.                                                                                                         |
| <b>E705</b> | Abnormal drop in power supply voltage.<br>Turn off the power and check the input voltage.                                                                                                                       |
| <b>E710</b> | Abnormal current detected in sewing machine motor.<br>Turn off the power, and then check if there are any problems with the sewing machine.                                                                     |
| <b>E711</b> | Abnormal current detected in X-feed motor.<br>Turn off the power, and then check if there are any problems in the X-feed direction.                                                                             |
| <b>E712</b> | Abnormal current detected in Y-feed motor.<br>Turn off the power, and then check if there are any problems in the Y-feed direction.                                                                             |
| <b>E713</b> | Abnormal current detected in work clamp motor.<br>Turn off the power, and then check if there are any problems with the X-feed mechanism, Y-feed mechanism or work clamp lifter.                                |
| <b>E730</b> | External error input (AIRSW) detected.<br>Turn off the power, and then check the air pressure.                                                                                                                  |
| <b>E740</b> | Control box cooling fan does not operate.<br>Turn off the power, and then check if the cooling fan is blocked with scraps of thread.<br>Check that connector P22 on the main P.C. board is properly connected.  |
| <b>E741</b> | X-feed motor cooling fan does not operate.<br>Turn off the power, and then check if the cooling fan is blocked with scraps of thread.<br>Check that connector P10 on the main P.C. board is properly connected. |
| <b>E742</b> | Y-feed motor cooling fan does not operate.<br>Turn off the power, and then check if the cooling fan is blocked with scraps of thread.<br>Check that connector P10 on the main P.C. board is properly connected. |

If an error code that is not listed above appears or if carrying out the specified remedy does not solve the problem, contact the place of purchase.

# 13. TROUBLESHOOTING

- Please check the following points before calling for repairs or service.
- If the following remedies do not fix the problem, turn off the power switch and consult a qualified technician or the place of purchase.



## CAUTION



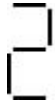
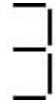
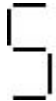
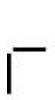
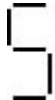
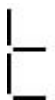
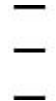
Turn off the power switch and disconnect the power cord before carrying out troubleshooting.  
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

| Problem                                         | Cause                                                   | Remedy                                                                           | Reference |
|-------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------|-----------|
| Work clamp does not lift.                       | Work clamp moves stiffly.                               | Apply a suitable amount of grease to the sliding parts of the work clamp slider. |           |
| Work clamp does not drop.                       | Air tube of presser lifter cylinder is bent or damaged. | Straighten the bend in the tube or replace the tube.                             |           |
| Work clamp lift amount is incorrect.            | Work clamp lifter lever position is incorrect.          | Adjust the position of the work clamp lifter lever.                              | P. 65     |
| Work clamp does not lift to the maximum height. | Cylinder joint position is incorrect.                   | Adjust the position of the cylinder joint.                                       |           |
| Thread wiper does not operate correctly.        | The thread wiper is obstructing the needle.             | Adjust the height of the thread wiper.                                           | P. 62     |
|                                                 |                                                         | Adjust the stroke of the thread wiper.                                           | P. 62     |
|                                                 | Thread wiper position is incorrect.                     | Adjust the stroke of the thread wiper.                                           | P. 62     |
| Lower thread winds to one side.                 | Bobbin winder tension assembly height is incorrect.     | Adjust the height of the bobbin winder tension assembly.                         | P. 22     |
| Lower thread winding amount is incorrect.       | Bobbin presser position is incorrect.                   | Adjust the position of the bobbin presser.                                       | P. 22     |
| Thread slips out of the needle.                 | Stitches being skipped at the sewing start.             | Refer to "Skipped stitches occur".                                               | P. 71     |
|                                                 | Upper thread trailing length is uneven.                 | Adjust the sub-tension.                                                          | P. 24     |
|                                                 | Position of shuttle race thread guide is incorrect      | Adjust the position of the shuttle race thread guide.                            | P. 57     |

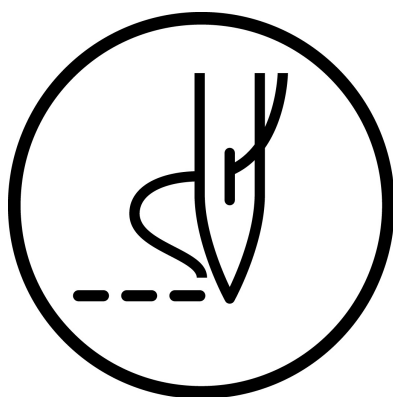
| Problem                        | Cause                                                              | Remedy                                                                                  | Reference      |
|--------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------|
| <b>Upper thread breaks.</b>    | Upper thread tension is too strong.                                | Adjust the upper thread tension.                                                        | P. 24          |
|                                | Needle is incorrectly installed.                                   | Install the needle correctly.                                                           | P. 19          |
|                                | Thread is too thick for the needle.                                | Select a thread that matches the needle.                                                | P. 24          |
|                                | Thread take-up spring tension and height are incorrect.            | Adjust the tension and height of the thread take-up spring.                             | P. 55          |
|                                | Damage or burring of the rotary hook, needle hole plate or needle. | Repair or replace the problem part.                                                     |                |
|                                | Thread breaking from heat (Synthetic thread)                       | Use a cooling tank.                                                                     | P. 20          |
|                                | Thread is threaded incorrectly.                                    | Thread the thread correctly.                                                            | P. 20          |
| <b>Lower thread breaks.</b>    | Lower thread tension is too strong.                                | Adjust the lower thread tension.                                                        | P. 24          |
|                                | Damage to corners of needle hole plate or bobbin case.             | Repair or replace the problem part.                                                     |                |
| <b>Skipped stitches occur.</b> | Clearance between needle and rotary hook tip is too great.         | Adjust the needle clearance.                                                            | P. 57          |
|                                | Needle and rotary hook timing is incorrect.                        | Adjust the needle bar lift amount.                                                      | P. 56          |
|                                | The driver is covering the needle more than necessary.             | Adjust the driver needle guard.                                                         | P. 57          |
|                                | Needle is bent.                                                    | Replace the needle.                                                                     |                |
|                                | Needle is incorrectly installed.                                   | Install the needle correctly.                                                           | P. 19          |
| <b>Needle is broken.</b>       | Clearance between needle and rotary hook tip is too great.         | Adjust the needle clearance.                                                            | P. 57          |
|                                |                                                                    | Adjust the needle bar lift amount.                                                      | P. 56          |
|                                | Needle is bent.                                                    | Replace the needle.                                                                     |                |
|                                | Needle deflection                                                  | Select a needle that is suitable for the sewing conditions.<br>Reduce the sewing speed. | P. 24<br>P. 30 |
|                                | Needle is too thin.                                                | Select a needle that is suitable for the sewing conditions.                             | P. 24          |
| <b>Thread jamming.</b>         | Thread take-up spring tension and height are incorrect.            | Adjust the tension and height of the thread take-up spring.                             | P. 55          |
|                                | Needle and rotary hook timing is incorrect.                        | Adjust the needle bar lift amount.                                                      | P. 56          |
|                                | Shuttle race thread guide is not separating the threads.           | Adjust the position of the shuttle race thread guide.                                   | P. 57          |

| Problem                                                                                              | Cause                                                                                      | Remedy                                                             | Reference |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------|
| <b>Upper thread is not trimmed.</b>                                                                  | Movable knife is not cutting cleanly.                                                      | Replace with a new one.                                            | P. 61     |
|                                                                                                      | Fixed knife is not cutting cleanly.                                                        | Sharpen the fixed knife or replace it with a new one.              | P. 61     |
|                                                                                                      | Movable knife is not picking up the upper thread.                                          | Adjust the position of the shuttle race thread guide.              | P. 57     |
|                                                                                                      |                                                                                            | Adjust the needle bar lift amount.                                 | P. 56     |
|                                                                                                      | Movable knife is not picking up the upper thread because the last stitch is being skipped. | Refer to "Skipped stitches occur".                                 | P. 71     |
|                                                                                                      | Movable knife position is incorrect.                                                       | Adjust the position of the movable knife.                          | P. 59     |
|                                                                                                      | Sub-tension is too weak.                                                                   | Turn the sub-tension nut to adjust the tension.                    | P. 24     |
| <b>Poor stitch finish on underside of material.</b>                                                  | Shuttle race thread guide is not separating the threads enough.                            | Adjust the position of the shuttle race thread guide.              | P. 57     |
|                                                                                                      | Incorrect tightening of the upper thread                                                   | Adjust the upper thread tension.                                   | P. 24     |
|                                                                                                      | Upper thread trailing length is uneven.                                                    | Adjust the sub-tension.                                            | P. 24     |
| <b>Incorrect tightening of the thread</b>                                                            | Upper thread tension is too weak.                                                          | Adjust the upper thread tension.                                   | P. 24     |
|                                                                                                      | Lower thread tension is too weak.                                                          | Adjust the lower thread tension.                                   | P. 24     |
|                                                                                                      | Thread take-up spring tension and height are incorrect.                                    | Adjust the tension and height of the thread take-up spring.        | P. 55     |
|                                                                                                      | Position of arm thread guide R is incorrect.                                               | Adjust the position of arm thread guide R.                         | P. 56     |
| <b>Upper thread trailing length is uneven.</b>                                                       | Thread take-up spring tension and height are incorrect.                                    | Adjust the tension and height of the thread take-up spring.        | P. 55     |
|                                                                                                      | Sub-tension is too weak.                                                                   | Turn the sub-tension nut to adjust the tension.                    | P. 24     |
|                                                                                                      | Fixed knife is not cutting cleanly.                                                        | Sharpen the fixed knife or replace it with a new one.              | P. 61     |
| <b>Sewing machine does not operate when the power is turned on and the foot switch is depressed.</b> | Safety switch does not work.                                                               | Check if the safety switch cord is disconnected.                   | P. 12     |
|                                                                                                      |                                                                                            | Adjust the position of the safety switch.                          | P. 18     |
|                                                                                                      |                                                                                            | If the safety switch is malfunctioning, replace it with a new one. |           |

# 14. 7-SEGMENT DISPLAY

|                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 0                                                                                 | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   | 9                                                                                   |
|  |  |  |  |  |  |  |  |  |  |
| A                                                                                 | B                                                                                 | C                                                                                 | D                                                                                 | E                                                                                 | F                                                                                 | G                                                                                 | H                                                                                   | I                                                                                   | J                                                                                   |
|  |  |  |  |  |  |  |  |  |  |
| K                                                                                 | L                                                                                 | M                                                                                 | N                                                                                 | O                                                                                 | P                                                                                 | Q                                                                                 | R                                                                                   | S                                                                                   | T                                                                                   |
|  |  |  |  |  |  |  |  |  |  |
| U                                                                                 | V                                                                                 | W                                                                                 | X                                                                                 | Y                                                                                 | Z                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|  |  |  |  |  |  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |





## INSTRUCTION MANUAL

**BROTHER INDUSTRIES, LTD.** <http://www.brother.com/>

15-1, Naeshiro-cho, Mizuho-ku, Nagoya 467-8561, Japan. Phone: 81-52-824-2177

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