

LH4-B800E HE-8000

INSTRUCTION MANUAL



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

ELECTRONIC LOCKSTITCH BUTTON HOLER



brother®

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

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

Symbols

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

2. Notes on safety

DANGER



Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltage 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 high-frequency welders. 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 electrical consumption. Insufficient power supply capacity 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.



Avoid exposure to direct sunlight during use. Exposure to direct sunlight 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 more than 56 kg. The installation should be carried out by two or more people.



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



Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.



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 belt 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.












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

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



Keep the oil out of the reach of children.

CAUTION










Sewing

- | | |
|---|--|
|  This sewing machine should only be used by operators who have received the necessary training in safe use beforehand. |  If using a work table which has casters, the casters should be secured in such a way so that they cannot move. |
|  The sewing machine should not be used for any applications other than sewing. |  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result. |
|  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. |  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. |
|  Turn off the power switch at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury. <ul style="list-style-type: none">• When threading the needle• When replacing the bobbin and needle• When not using the machine and when leaving the machine unattended |  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, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury. |  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.
Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.
Keep the oil out of the reach of children. |
|--|---|

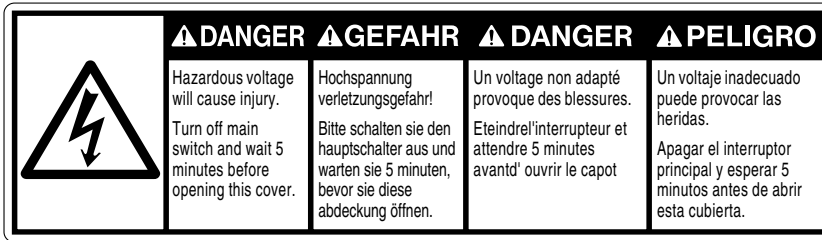
Maintenance and inspection

- | | |
|---|--|
|  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician. |  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions. |
|  Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system. |  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught. |
|  Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury. <ul style="list-style-type: none">• When carrying out inspection, adjustment and maintenance• When replacing consumable parts such as the rotary hook |  Use only the proper replacement parts as specified by Brother. |
|  Turn off the power switch before inserting or removing the plug, otherwise damage to the control box could result. |  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. |

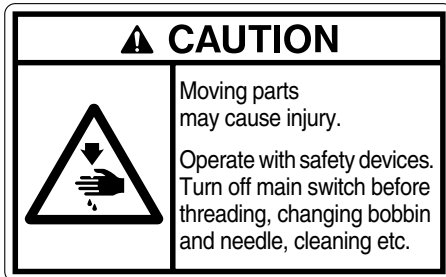
3. Warning labels

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



2



Safety device
Eye guard
Finger guard
Thread take-up cover
Belt cover
Belt cover plate, etc.

3



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.

4

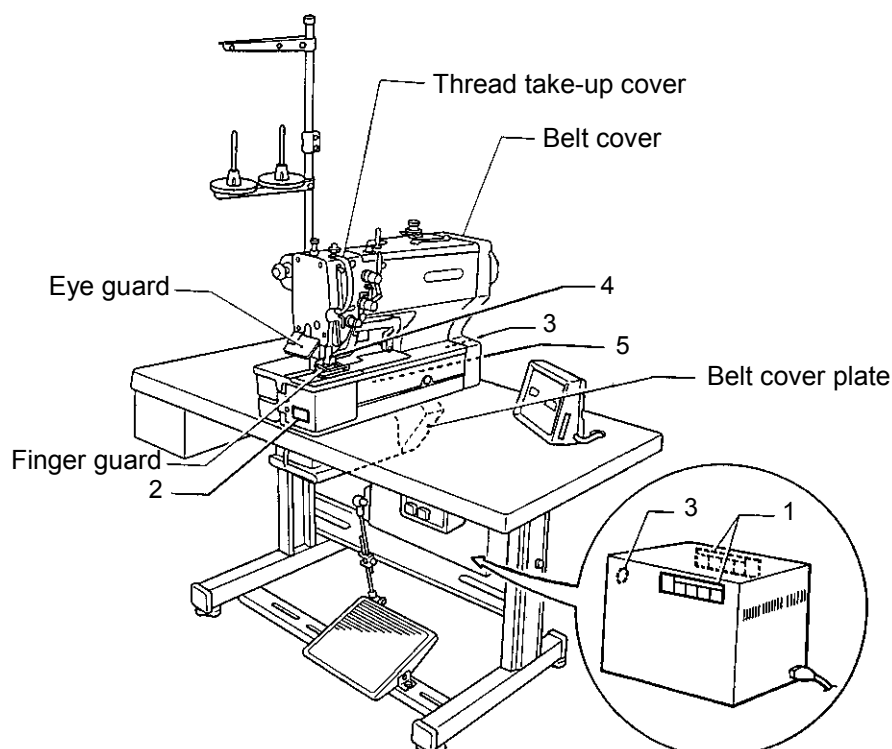


Do not touch any of the cutter or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.

5



Do not touch any of the fan or press any objects against the machine, as this may result in personal injury or damage to the machine.



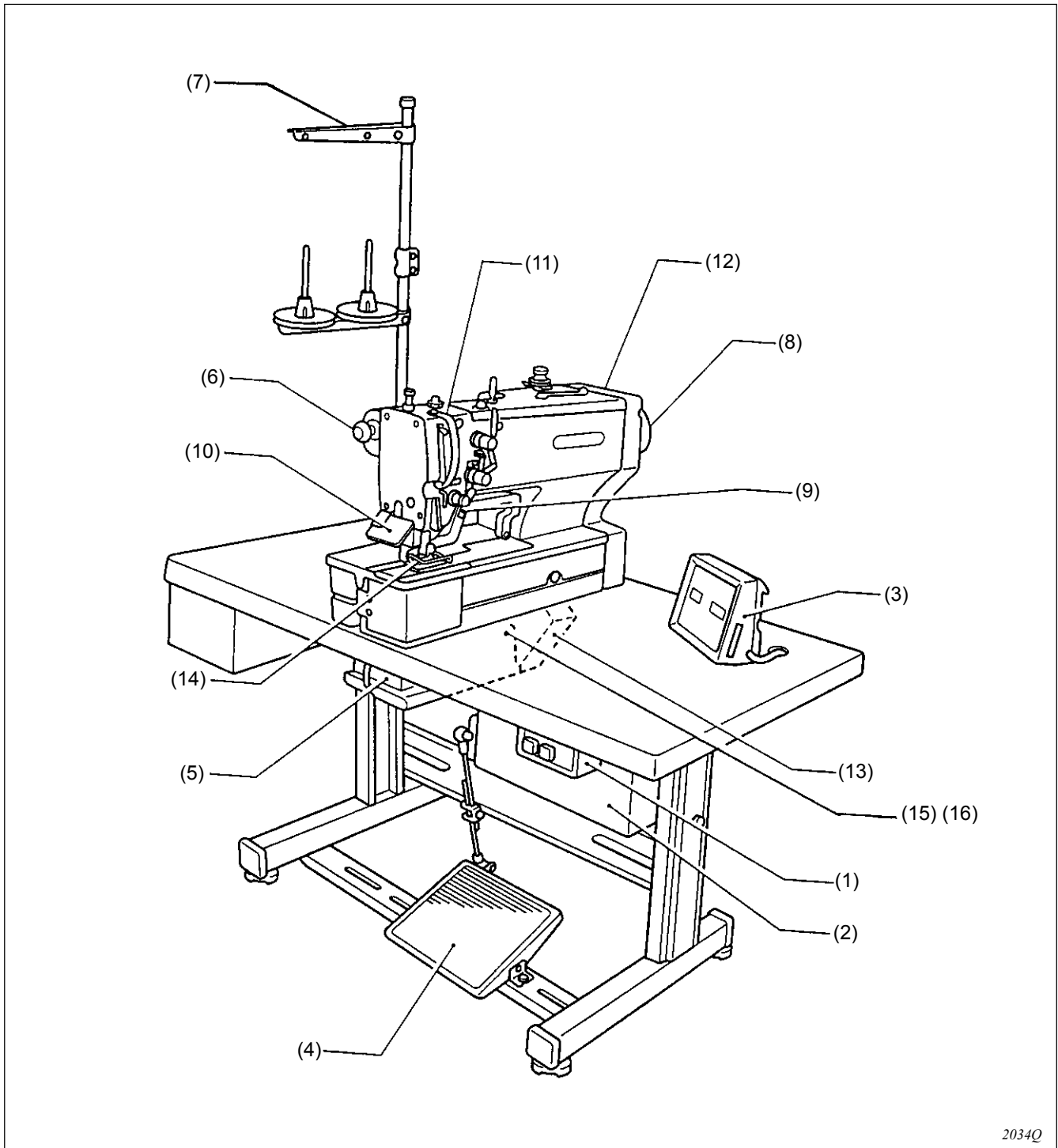
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1. NAME OF EACH PART



2034Q

- | | | |
|------------------|--------------------|---------------------------|
| (1) Power switch | (2) Control box | (3) Operation panel |
| (4) Treadle | (5) AC servo motor | (6) Emergency stop switch |
| (7) Spool stand | (8) Pulley | (9) Tension release lever |

Safety devices

- | | | |
|-----------------------|---------------------------|-----------------------|
| (10) Eye guard | (11) Thread take-up cover | (12) Belt cover |
| (13) Belt cover plate | (14) Finger guard | (15) Finger protector |
| (16) Belt retainer | | |

2. SPECIFICATIONS

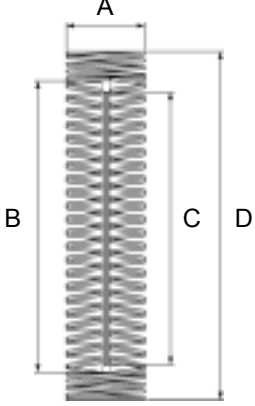
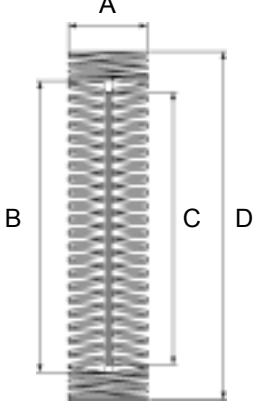
2-1. Subclass



Subclass



Subclass

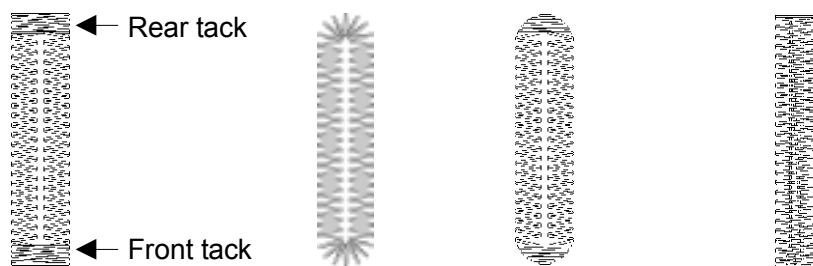
Subclass	-2	-3	-5
Main use	Buttonholes for clothing such as dress shirts, blouses, work clothes and women's clothes	Buttonholes for knitted garments such as knitted underwear, sweaters, cardigans and jerseys	Buttonholes for clothing such as work clothes and women's clothes Belt holes for child seats, etc.
Buttonhole size	 <p style="text-align: right;"><i>2193Q</i></p> <p>A: Max.6 mm B: Max. zigzag stitch length 39 mm C: Length of knife 4 – 32 mm D: Max. buttonhole length 40 mm</p>	 <p style="text-align: right;"><i>2193Q</i></p> <p>A: Max.6 mm B: Max. zigzag stitch length 69 mm C: Length of knife 4 – 32 mm D: Max. buttonhole length 70 mm</p>	

2-2. Specifications

Max. sewing speed	4,000 rpm		
Zigzag mechanism	Pulse motor driven mechanism		
Feed mechanism	Pulse motor driven mechanism		
Work clamp lifter mechanism	Pulse motor driven mechanism		
Height of work clamp	13 mm (adjustable)		
Knife mechanism	Double position solenoid		
Lower thread holding device	Standard equipment		
Bobbin presser	Standard equipment		
Standard sewing pattern	21		
Memory pattern	90		
Max. number of stitch	700 stitches / program (Overall cycle program stitch no. 3,000 stitches)		
Needle	Subclass -2	Subclass -3	Subclass -5
	Schmetz Nm134#90	Schmetz Nm134#75	Schmetz Nm134#90
Data storage method	P-ROM (Custom made pattern can be added by BAS-PC/300)		
Power supply	Single phase 110 V, 220 V, 230 V, 240 V, Three phase 220 V, 380 V, 400 V, 415 V 600 VA		

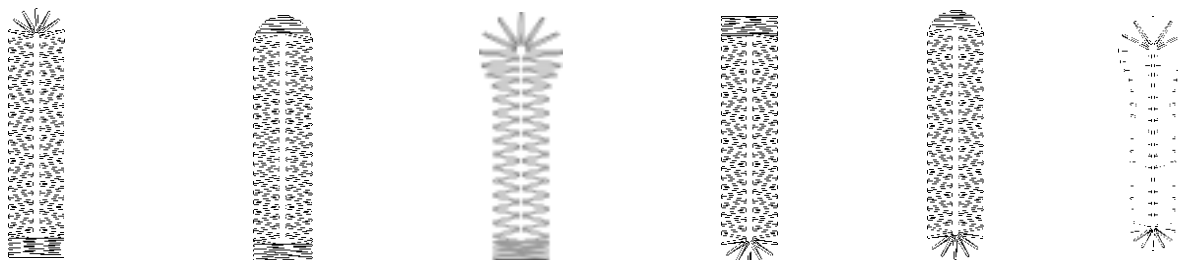
2-3. Standard sewing pattern list

[1] Rectangle [2] Radial [3] Round [4] Straight bar tack

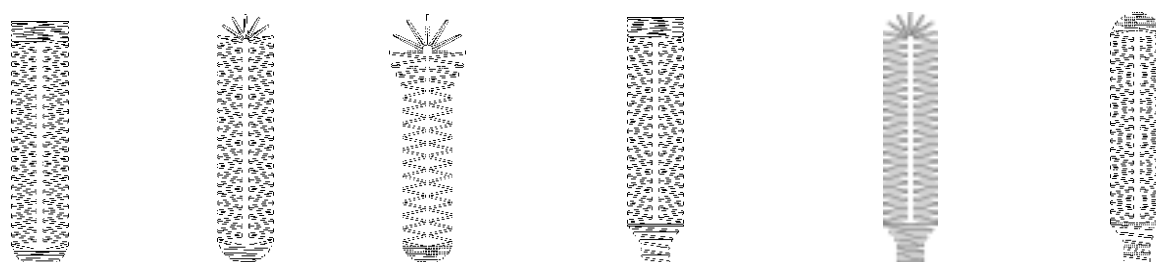


[0] Free (Combinations of rear tack shapes and the front tack shapes - 17 patterns)

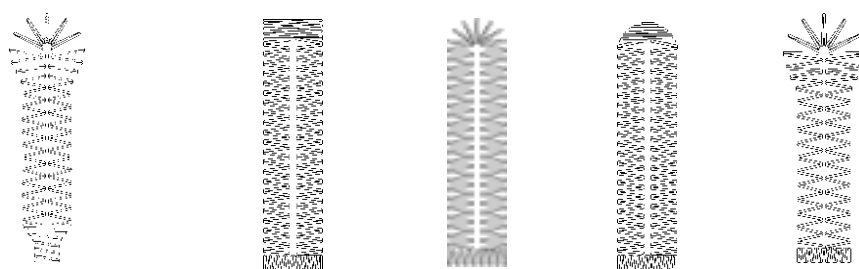
Radial-rectangle Round-rectangle Eyelet-rectangle Rectangle-radial Round-radial Eyelet-radial



Rectangle-round Radial-round Eyelet-round Rectangle-taper tack Radial-taper tack Round-taper tack



Eyelet-taper tack Rectangle-tack Radial-tack Round-tack Eyelet-tack



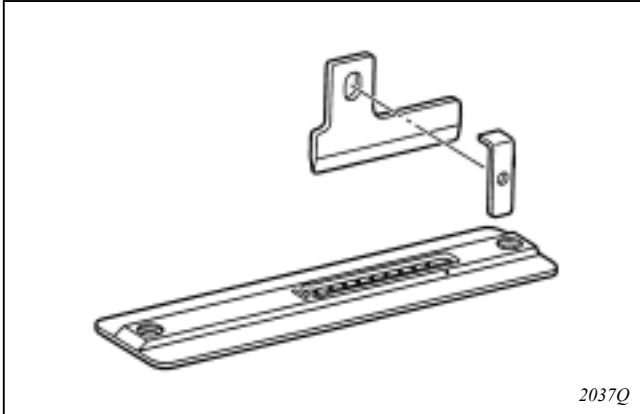
* [0] to [4] indicate the setting range for parameter No. 1. (Refer to "5-4-2. Parameter Table".)
 (In addition to the above shapes, you can create and use up to 9 additional custom made patterns using the BAS-PC/300.)

3. OPTIONAL PARTS

3. OPTIONAL PARTS

3-1. Special needle plate

This needle plate uses the elasticity of rubber to prevent the cutter from getting stuck and not returning. It also helps to keep the cutter blade sharp.



Parts name		Parts code
General materials	Needle plate set 1.2RB	S51361-001
	Needle plate set 1.4RB	S51362-001
	Needle plate set 1.6RB	S51363-001
Knitted materials	Needle plate set 1.2RB-3	S51364-001
	Needle plate set 1.4RB-3	S51365-001
	Needle plate set 1.6RB-3	S51366-001

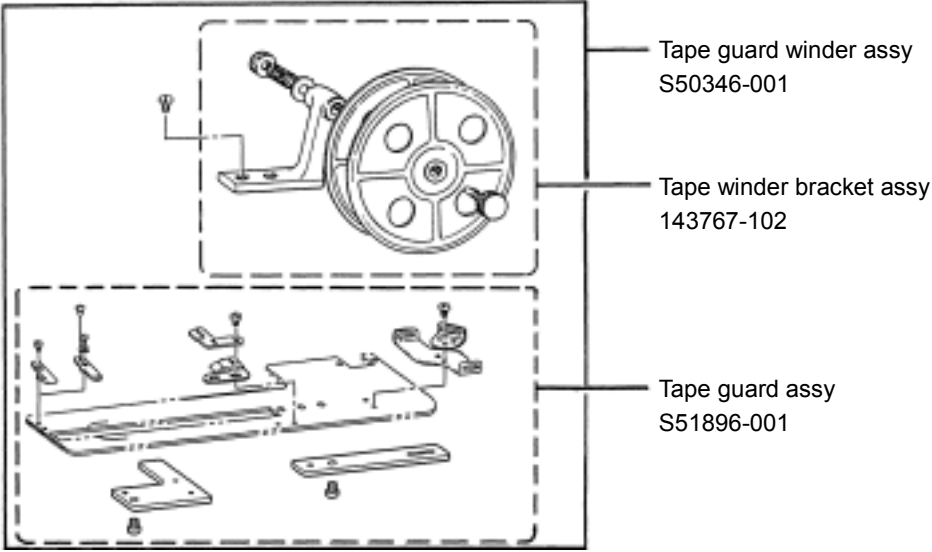
3-2. Leg parts

Parts name		Parts code
	Spacer set	183504-109
	Caster set	183501-001

3-3. Standing operation pedal

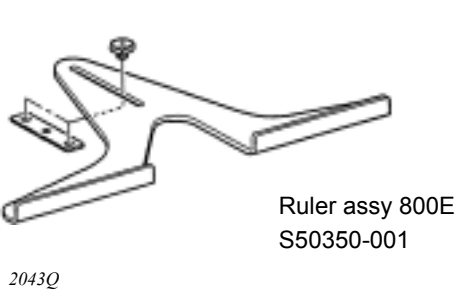
Parts name		Parts code
	Standing operation 2 pedal #6 (Two pedals + kick pedal)	J80081-040
		S47750-000 (Harness)
	Standing operation 3 pedal #40 (Three pedals)	J80380-040
		S47750-000 (Harness)

3-4. Tape guard

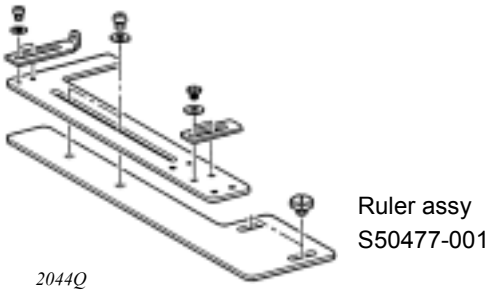


2042Q

3-5. Ruler

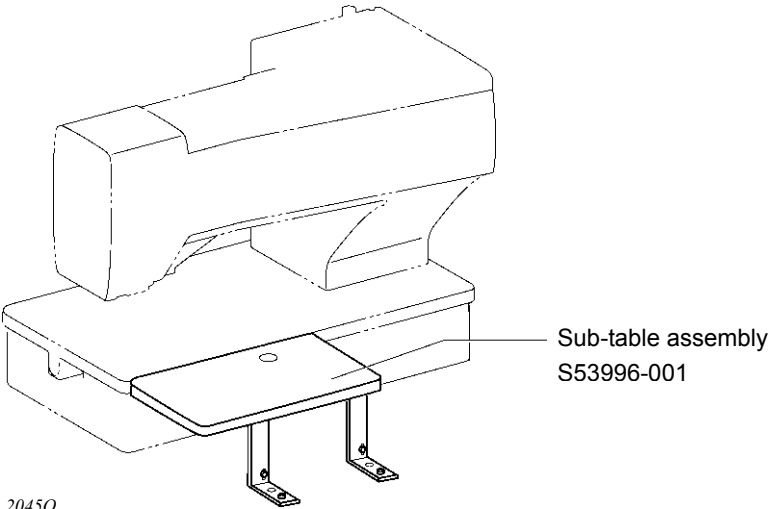


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2044Q

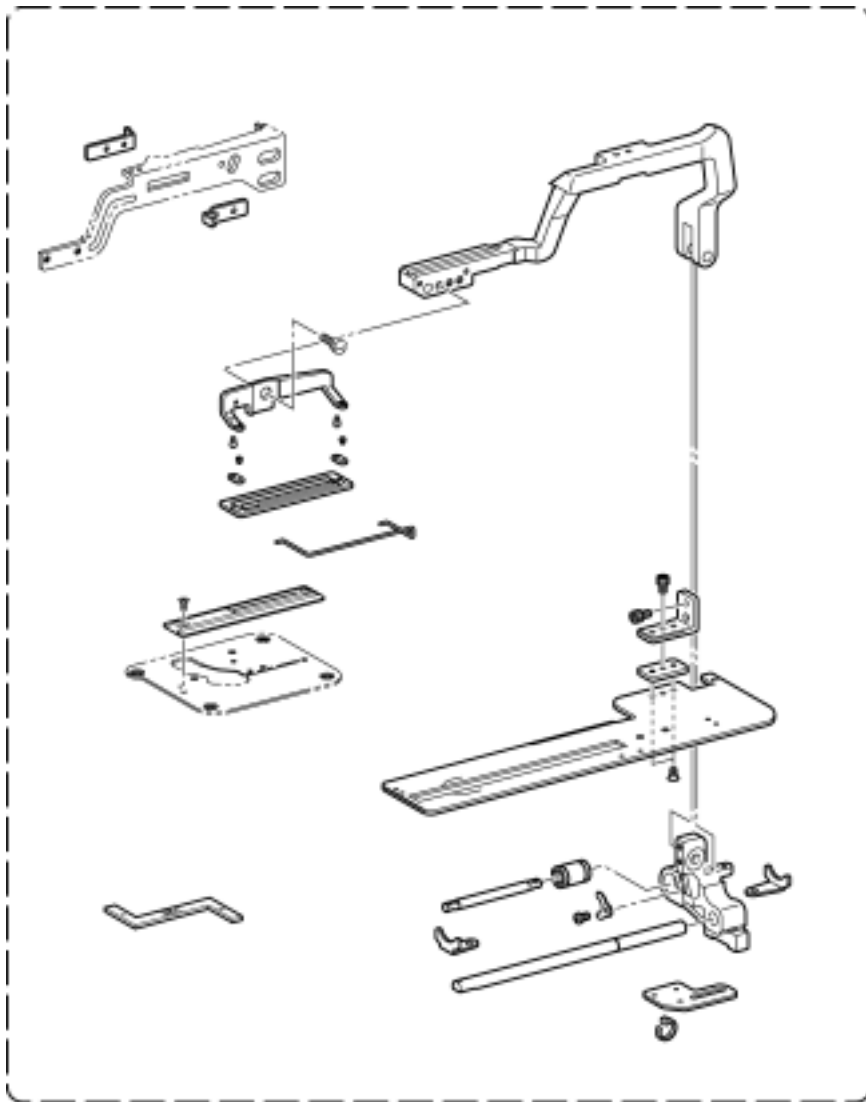
3-6. Auxiliary table



2045Q

3. OPTIONAL PARTS

3-7. Replacement parts set (for 70 mm buttonhole length)

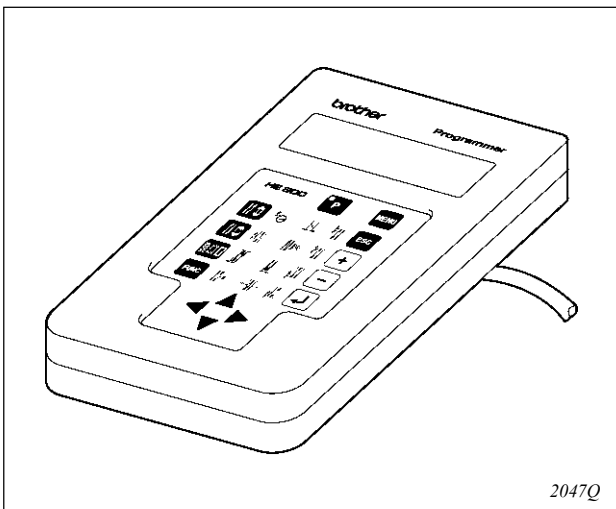


Replacement parts set -70
S54501-001

2046Q

3-8. Programmer

You can use the icon keys to retrieve parameters at a single touch, and to display them as icons on the LED screen so that the settings can be changed easily. It allows you to easily transfer data between different sewing machines.











2047Q

Parts name	Parts code
Programmer set A1 (Japanese-language Instruction Manual)	S58988-001
Programmer set A2 (English-language Instruction Manual)	S58989-001

* The only difference between Sets A1 and A2 is the Instruction Manual.

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 more than 56 kg. The installation should be carried out by two or more people.
-  Do not connect the power cord until installation is complete, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.
-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  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.
-  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 belt covers to the machine head and motor.

4-1. Power table

Use the power table which has been specially designed for each sewing machines.

	Positioning	Model code
Table/legs assembly	Vertical	127-H80-200-01
	Horizontal	127-H80-201-01

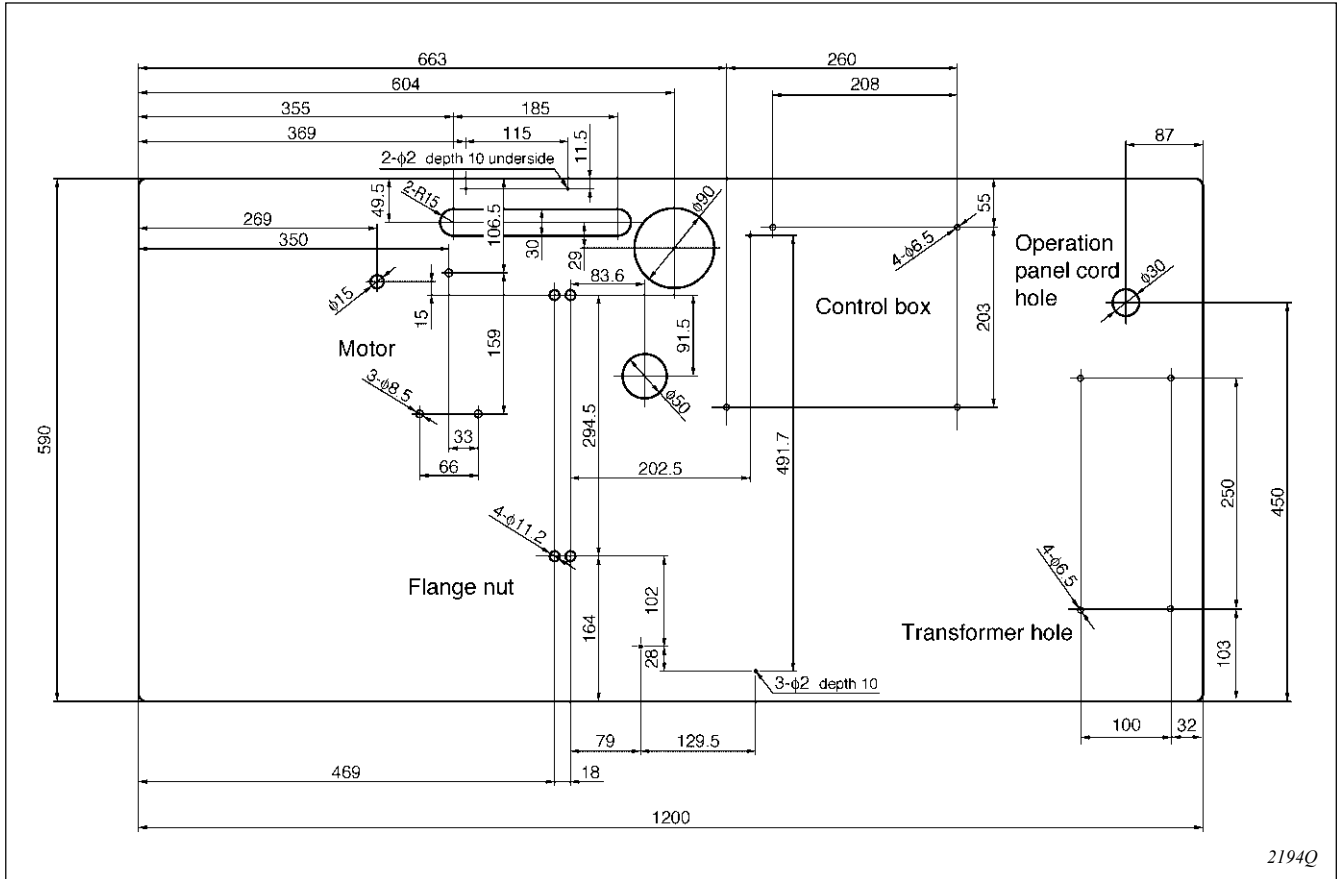
If using a commercially-available table, process it as shown in the following illustration.

NOTE:

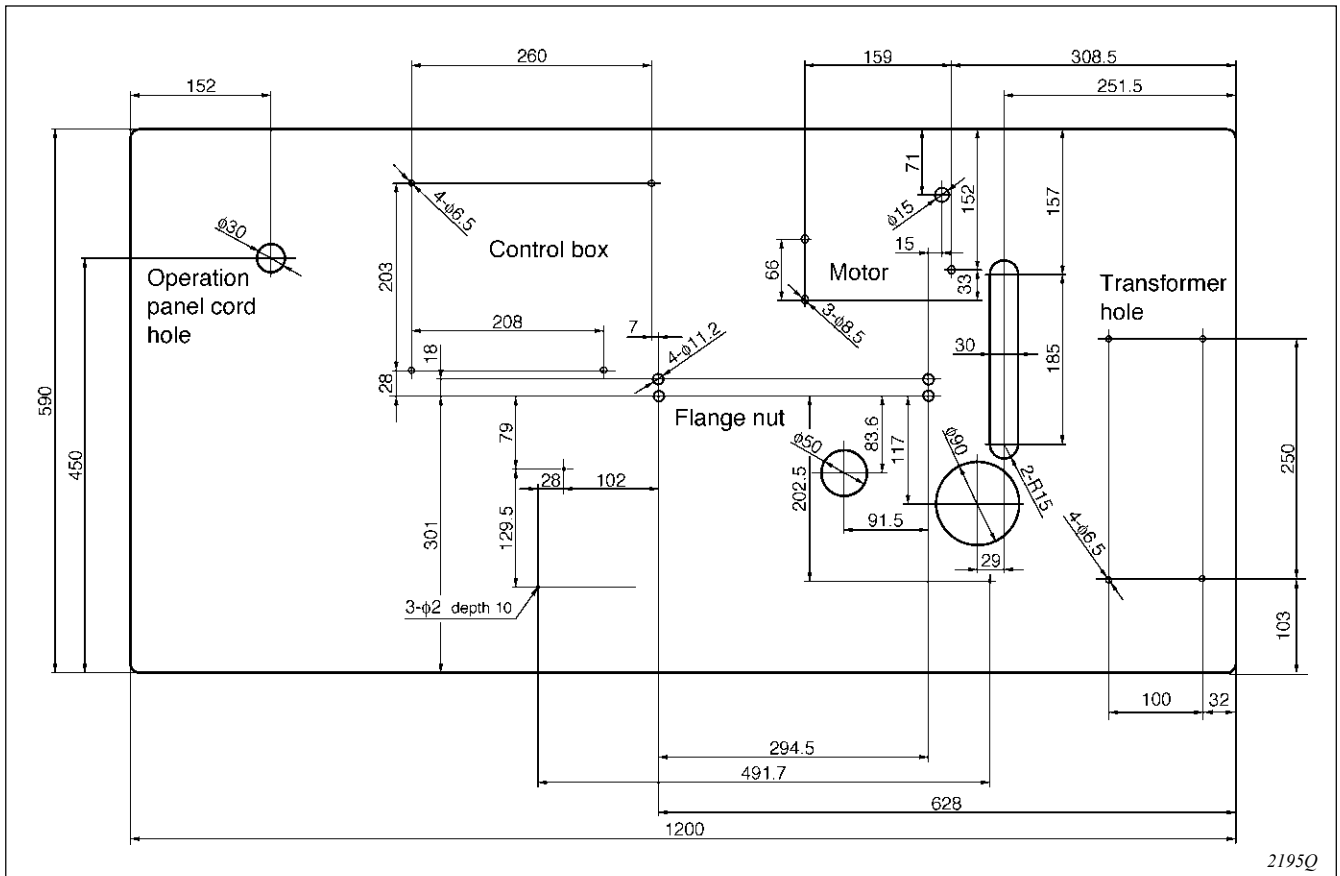
The thickness of the table should be at least 40 mm, and it should be strong enough to bear the weight and vibration of the sewing machine.

4. INSTALLATION

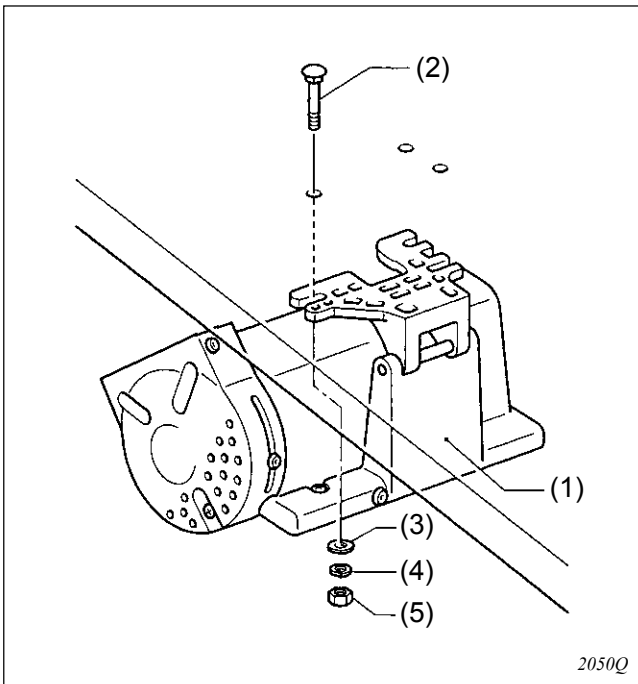
1) Vertical positioning



2) Horizontal positioning

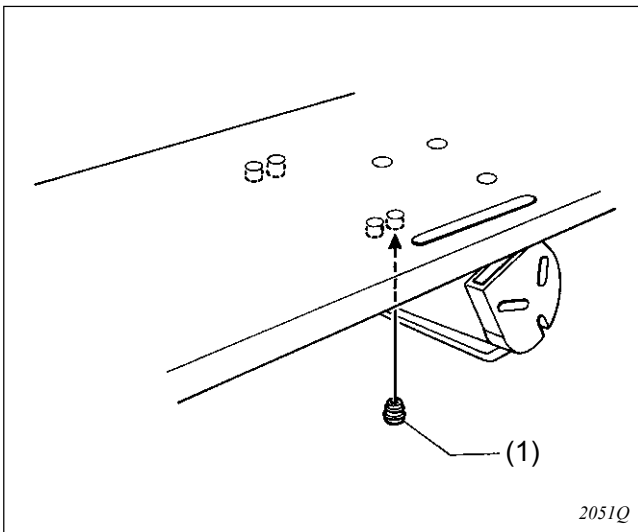


4-2. Installing the motor



Install the motor (1) with the three bolts (2), flat washers (3), spring washers (4) and nuts (5).

4-3. Installing the flange nut



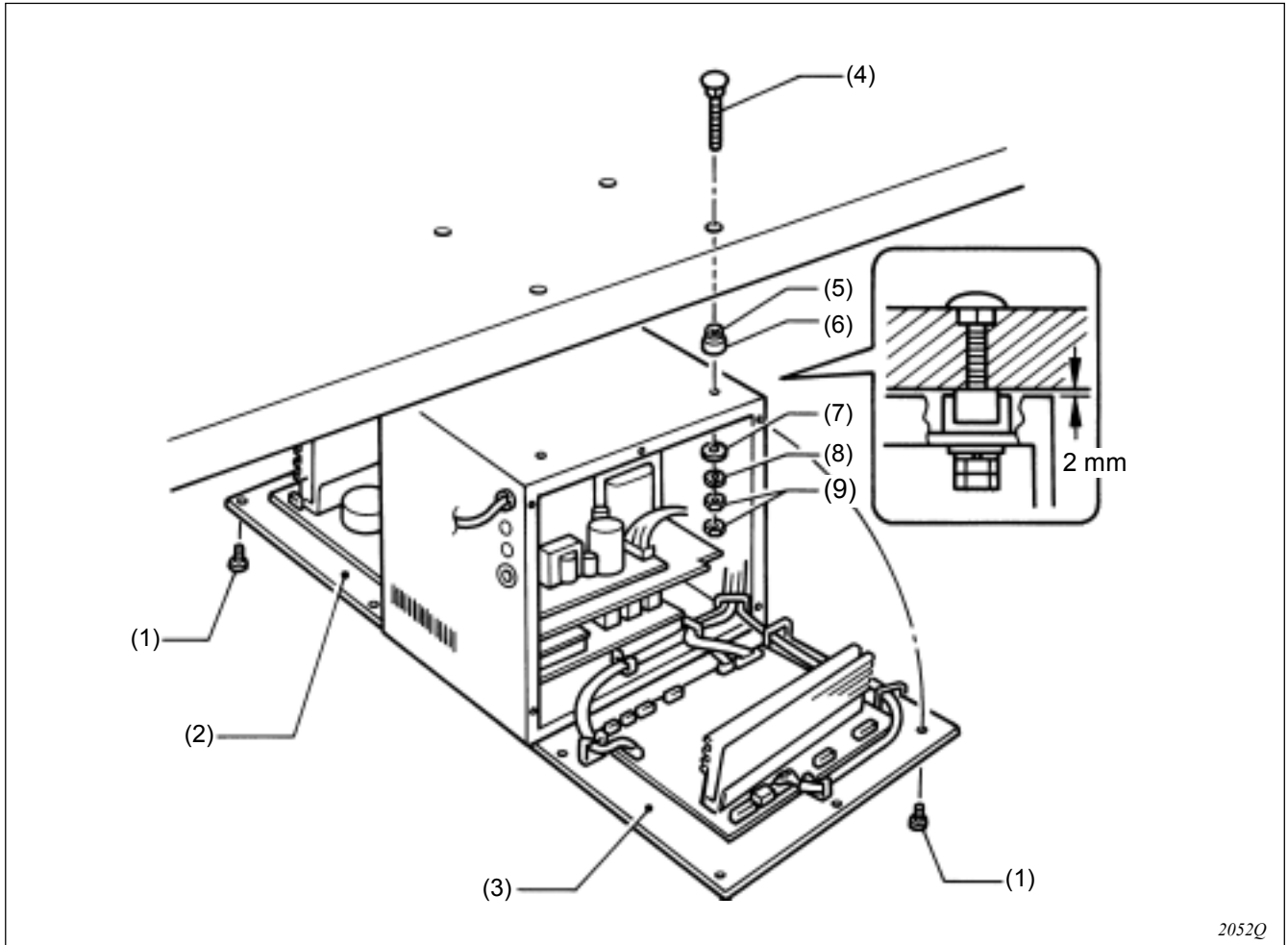
Install the four flange nuts (1) to the underside of the work table.

NOTE:

When the machine head is positioned horizontally, some flange nut installation locations may be inaccessible after the control box has been installed. Be sure to install the flange nuts correctly so that they are not at an angle.

4. INSTALLATION

4-4. Installing the control box



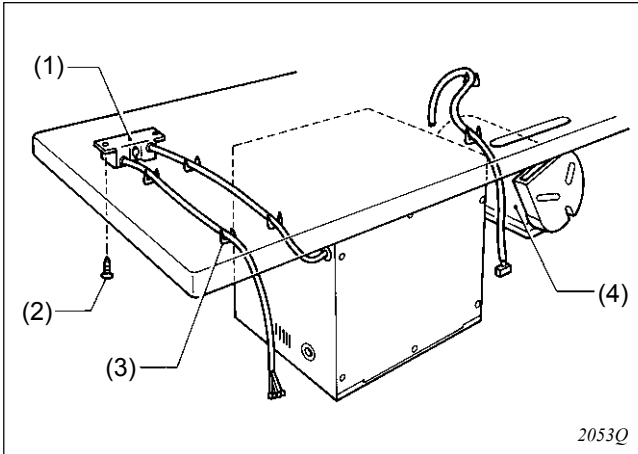
1. Remove the 12 screws (1), and then open the covers (main P.C. board mounting plate (2) and sub P.C. mounting plate (3)).

NOTE:

When opening the cover, hold it securely so that it does not fall down.

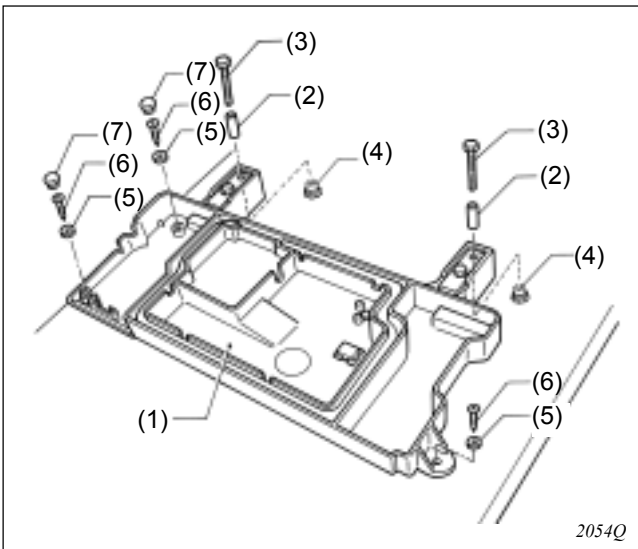
2. Install the control box with the bolts (4), cushions (5), cushion collars (6), rubber collars (7), flat washers (8) and nuts (9) as shown in the illustration. At this time, leave a gap of approximately 2 mm between the work table and the top of the box.
3. Close the covers (main P.C. board mounting plate (2) and sub P.C. mounting plate (3)), and provisionally tighten them with the screws (1). (They will be opened again when the cords are connected.)

4-5. Installing the power switch



1. Install the power switch (1) with the two screws (2).
2. Secure the power switch (1) cord and the motor (4) cord with the six staples (3).

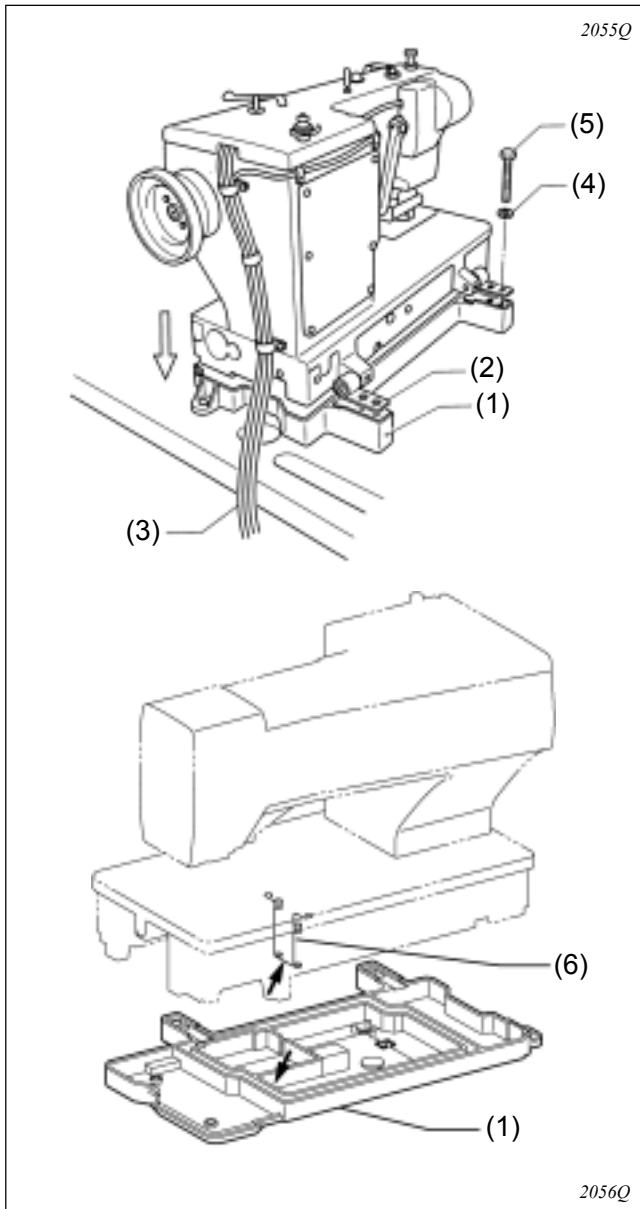
4-6. Installing the bed base



1. Place the bed base (1) on top of the work table, and insert the collars (2).
2. Provisionally tighten the flange nuts (4) onto the bolts (3), and then position the bed base (1).
3. Install the bed base (1) with the three flat washers (5) and wood screws (6).
4. Install the two rubber caps (7).
5. Remove the bolts (3).

4. INSTALLATION

4-7. Installing the machine head



NOTE:

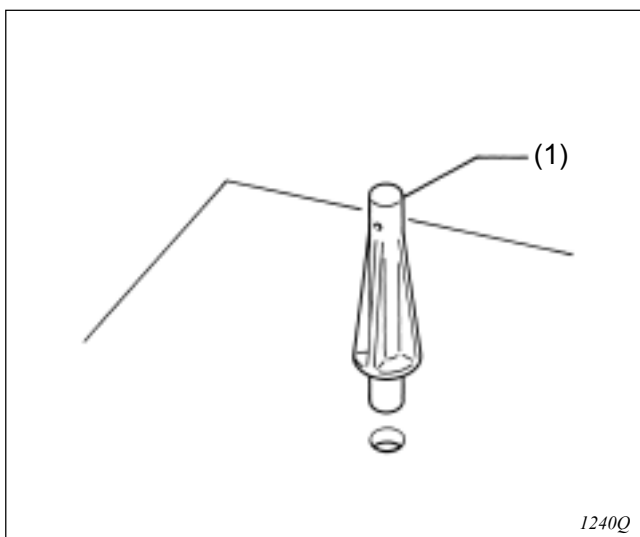
The bed base (1) is made from plastic, so be careful not to hit it with the machine head when placing the machine head on top of it.

1. Open the hinges (2) as shown in the illustration. Then place the machine head gently on top of the bed base (1), while being careful not to clamp the cords (3).
2. Install the machine head with the spring washers (4) and bolts (5).

NOTE:

Make sure that the felt support (6) do not touch the bed base (1).

4-8. Installing the head rest



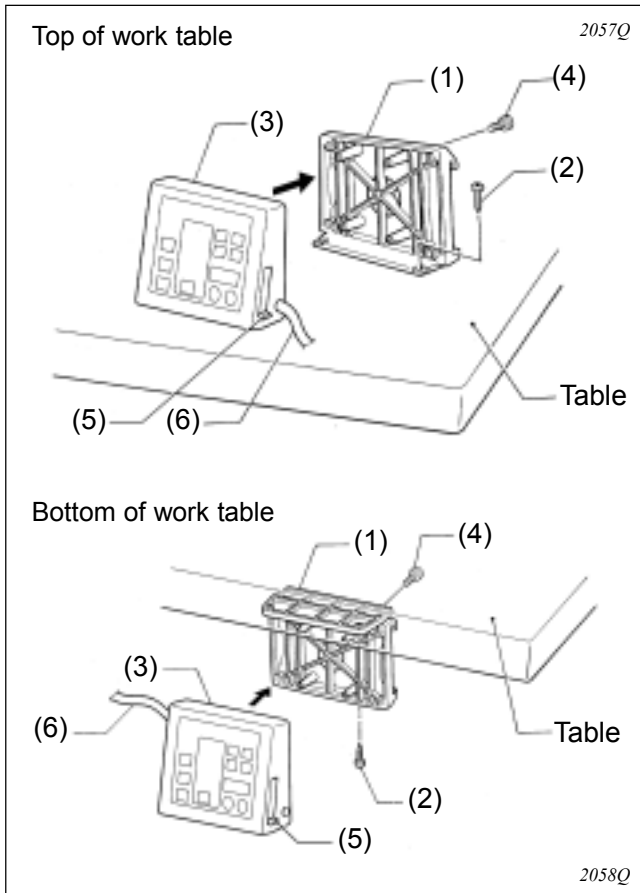
Tap the head rest (1) into the table hole.

NOTE:

Tap the head rest securely into the table hole.

If the head rest is not pushed in as far as it will go, the machine head will not be sufficiently stable when it is tilted back.

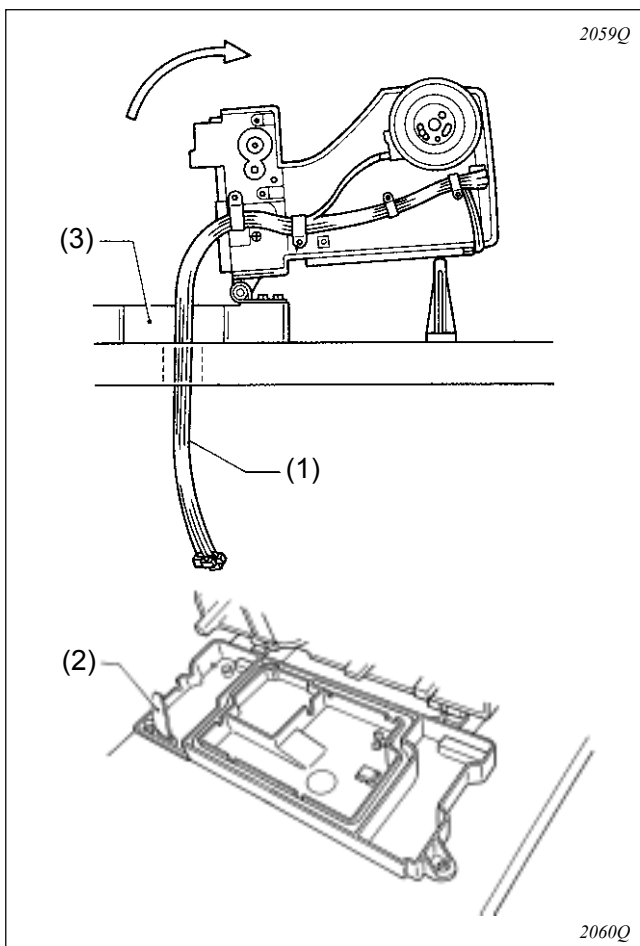
4-9. Installing the operation panel



The operation panel can be installed to either the top or bottom of the work table.

1. Install the rear frame (1) to the work table (top or bottom) with the four wood screws (2).
2. Install the front frame assy (3) to the rear frame (1) with the four screws (4).
 - * The vertical orientation of the front frame assy (3) is the same whether it is installed to the top or the bottom of the work table.
 - * Pull the harnesses such as the ground harness out of the way so that the operation panel side cover (5) can be opened and closed.
3. Insert the connector cord (6) into the control box through the hole at the side of the box.

4-10. Routing the connector cord and installing the oil stopper plate



1. Gently tilt back the machine head.
2. Pass the cords (1) through the hole in the work table.
3. Install the oil stopper plate (2).
4. Move the connector cord (1) so that it will not be clamped by the machine head and the bed base (3), and then return the machine head to its original position.

4. INSTALLATION

4-11. Connecting the cords

⚠ CAUTION

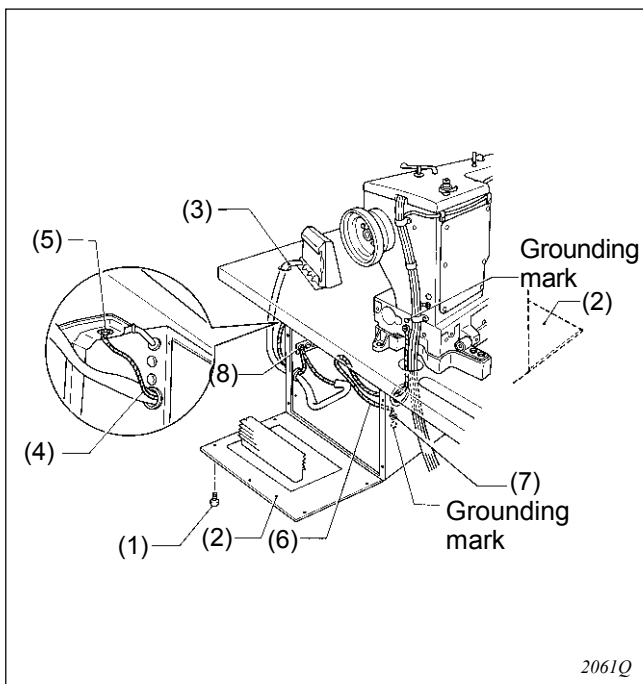


Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

NOTE:

The harness is connected in the same way regardless of whether the machine head is positioned horizontally or vertically.

4-11-1. Connecting the ground wire



1. Remove the 12 screws (1), and then open the covers (2) on both sides of the control box.

NOTE:

When opening the covers (2), hold them securely so that they do not fall down.

2. Insert the panel harness(3) into the control box.
3. Connect the ground wire (4) which is protruding out from the hole in the control box to the leg (5). Connect the ground wire (6) coming from the machine head to the ground wire (7) inside the control box. Connect the ground wire in the middle of the panel harness to the ground wire (8) inside the control box. (Grounding marks are displayed on the machine head and inside the control box.)

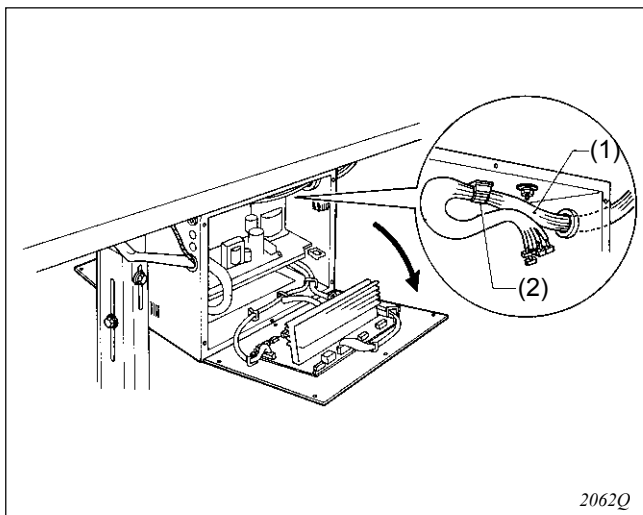
- * If the shape of the grounding screw in the leg (5) requires a different ground wire to be connected, re-place the ground wire with the accessory ground wire.

NOTE:

If the ground wires are not connected, incorrect operation may result.

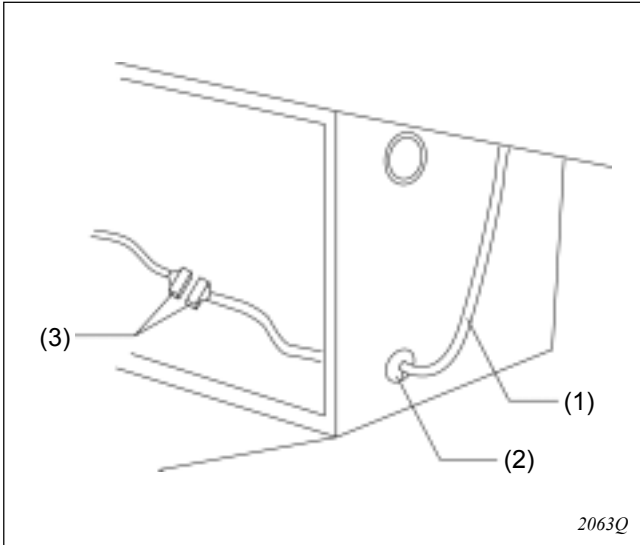
If the grounding point has been painted over, remove the paint coating before connecting the ground wire.

4-11-2. Connecting the machine head harness

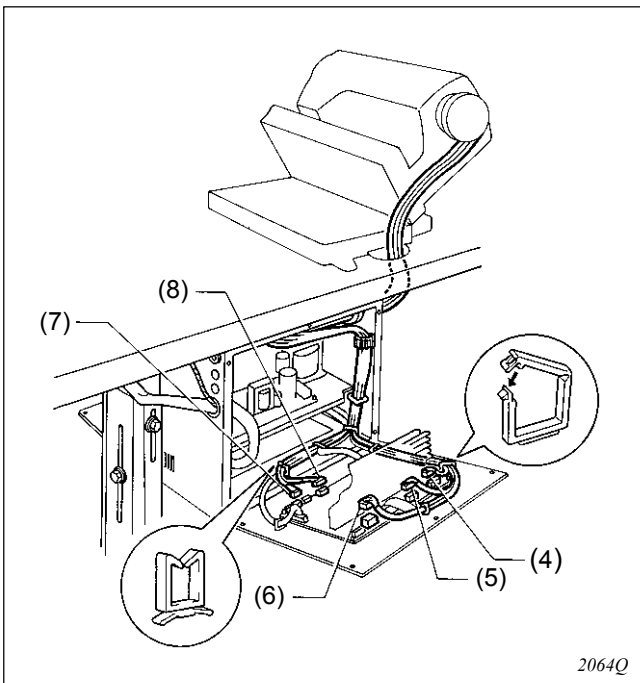


1. Insert the machine head harness (1) into the control box.
2. Tilt back the machine head.
3. Pull the harness (1) through the cord clamp (2) at the top of the control box. This cord clamp is not used when the machine head is positioned horizontally.

4-11-3. Connecting the motor harness

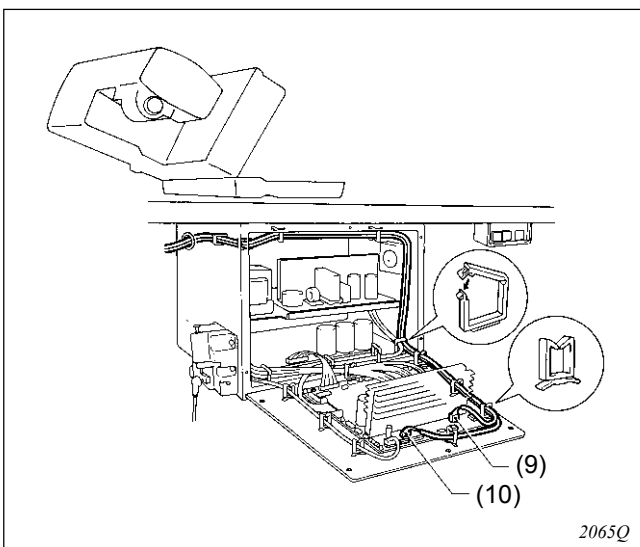


1. Pass the motor harness (1) through the rubber cushion (2).
2. Connect the connectors (3).
3. Secure the motor harness (1) with staples.



4. Connect the connectors of the feed motor harness (4) and the presser foot motor harness (5). In the same way, connect the connectors for the cutter solenoid harness (6), the DC fan motor harness (7) and the cutter home position sensor harness (8).

	Harness	Mark	Sub P.C.board indication
(4)	Feed motor<5-pin>(White)	S2	P2<FDPM>
(5)	Presser foot motor<5-pin>(Blue)	S5	P5<FTPM>
(6)	Cutter solenoid<6-pin>	S8	P8<CUTTER>
(7)	Fan<3-pin>	-	P10<FAN1>
(8)	Cutter home position sensor <12-pin>	S7	P7<OPSEN2>

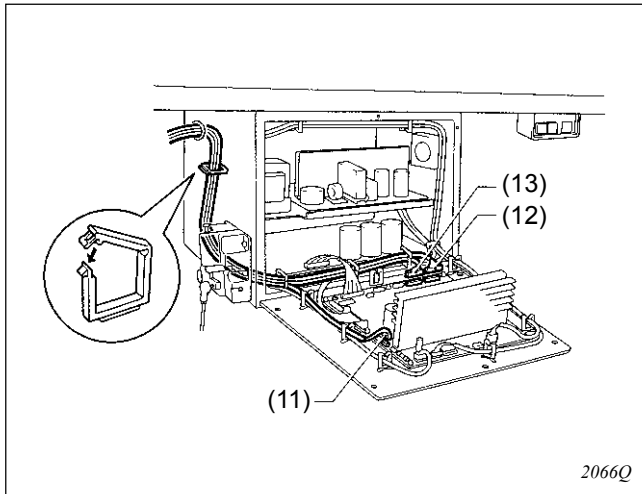


5. Connect the connectors of the zigzag motor harness (9) and the tension release solenoid harness (10).

Take note of how these two harnesses are routed through the control box so as not to confuse them with any of the other harnesses.

	Harness	Mark	Main P.C.board indication
(9)	Zigzag motor <6-pin>	M16	P16<NPM >
(10)	Tension release solenoid <6-pin>	M19	P19<OPSOL>

4. INSTALLATION



- Connect the connectors of the synchronizer harness (11), the home position sensor harness (12) and the emergency stop switch harness (13).

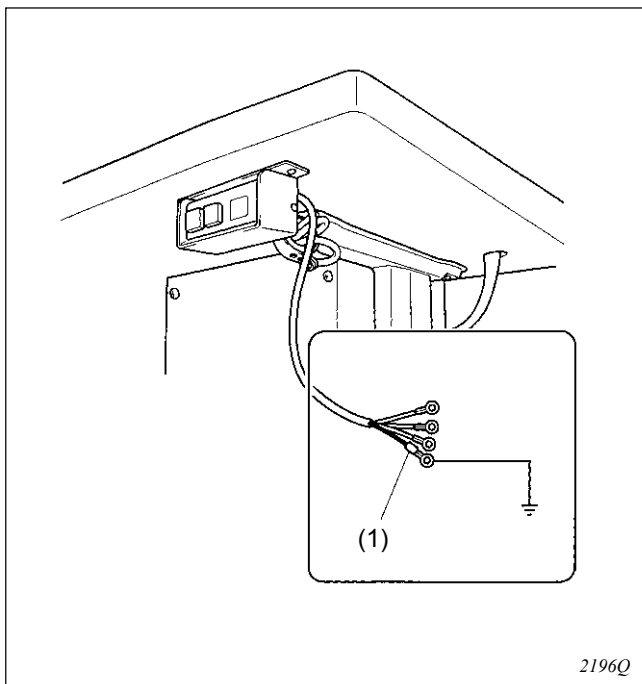
	Harness	Mark	Main P.C.board indication
(11)	Synchronizer<5-pin>	M3	P3<SYNC>
(12)	Home position sensor <12-pin>	M11	P11<ORG>
(13)	Emergency stop<11-pin>	M10	P10<HEAD>

- Secure the harnesses inside the control box using cord clamps.

NOTE:

- * Make sure that the harnesses do not come into contact with P.C. board components or with the main P.C. board heat sink or the sub-P.C. board heat sink.
 - Use the cord clamps at the top of the control box to adjust the harnesses so that they are not loose inside the control box, particularly when using the work table with the machine head positioned vertically.
- Gently return the machine head to its original position.
 - * Check that the harnesses do not touch the belt.
 - Close the covers on both sides of the control box, and tighten the 12 screws.

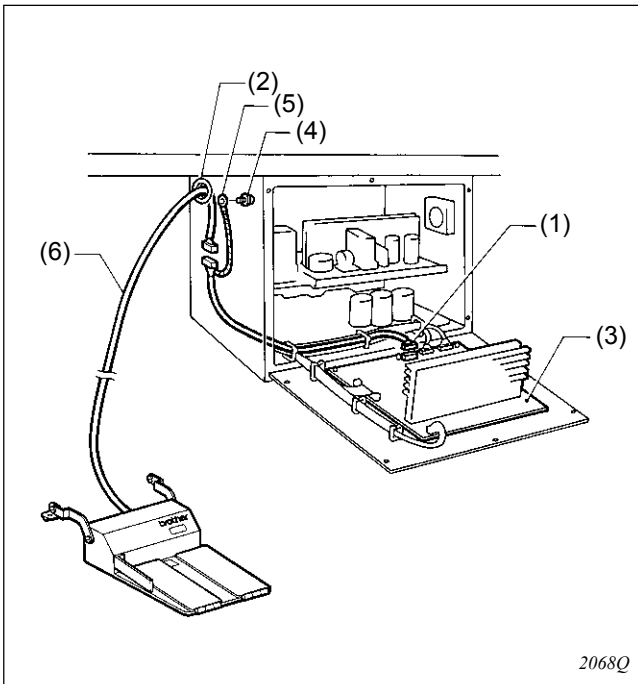
4-11-4. Connecting the power cord



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

NOTE:

- Do not use extension cord, otherwise machine operation problems may result.
- Do not connect a power supply which is not of the rated voltage, otherwise machine operation problems may result.

4-11-5. Connecting the standing pedal harness (option)

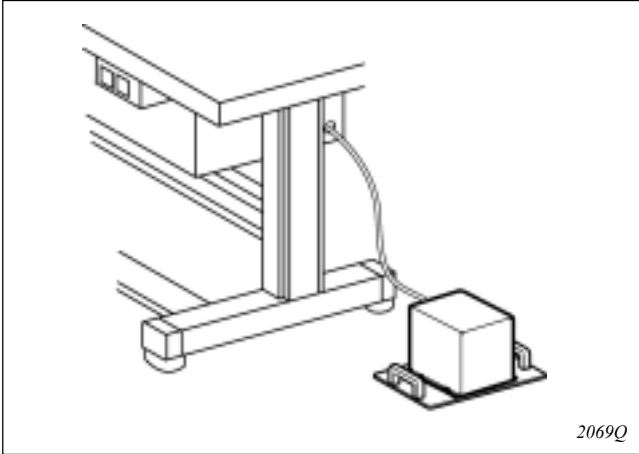
1. Pass the marked tube of the relay harness (1) into the control box through the hole (2) in the control box.
 2. Connect the relay harness (1) to connector P9 on the main circuit board (3).
 3. Remove the screw (4) which is securing the ground wires, and then add the ground wire (5) of the relay harness (1) and re-tighten the screw (4). (The green-and-yellow wire is the ground wire.)
 4. Connect the standing pedal harness (6) to the relay harness (1).
- * Connect the standing pedal harness (6) and the relay harness (1) inside the control box.

4. INSTALLATION

4-11-6. Installing the transformer

The transformer can be installed on the floor, on the work table leg (on top of the leg or on the treadle support plates) or underneath the work table.

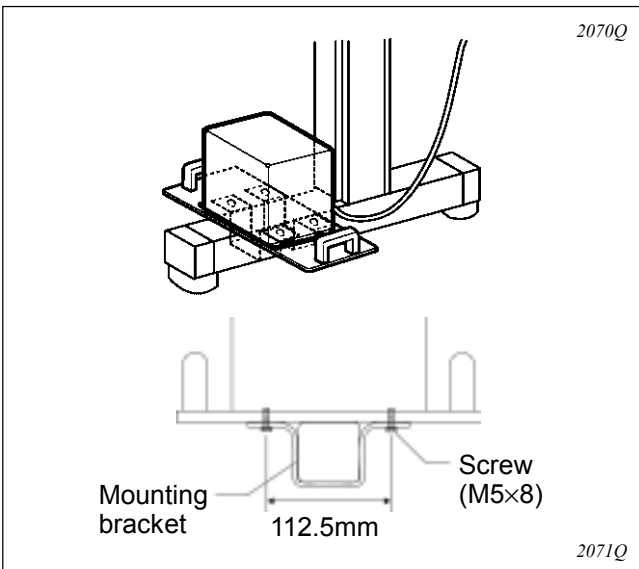
* Check the power supply rating label on the transformer to confirm that the voltage ratings for the transformer and the control box are identical.



1) Floor installation

Select a suitable location, and place the transformer on the floor in that location.

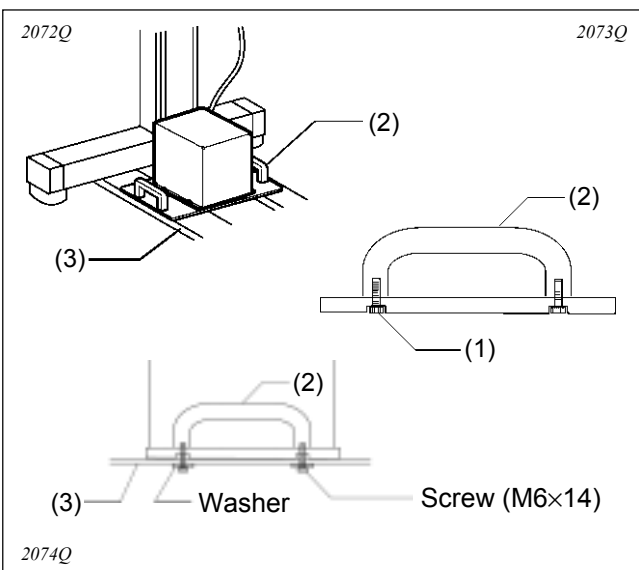
* Select a location where the transformer will not be an obstruction to people walking past.



2) Table leg installation (on top of table leg)

Secure the transformer to the top of the table leg using the mounting bracket and screws.

* The mounting bracket and screws must be obtained separately.

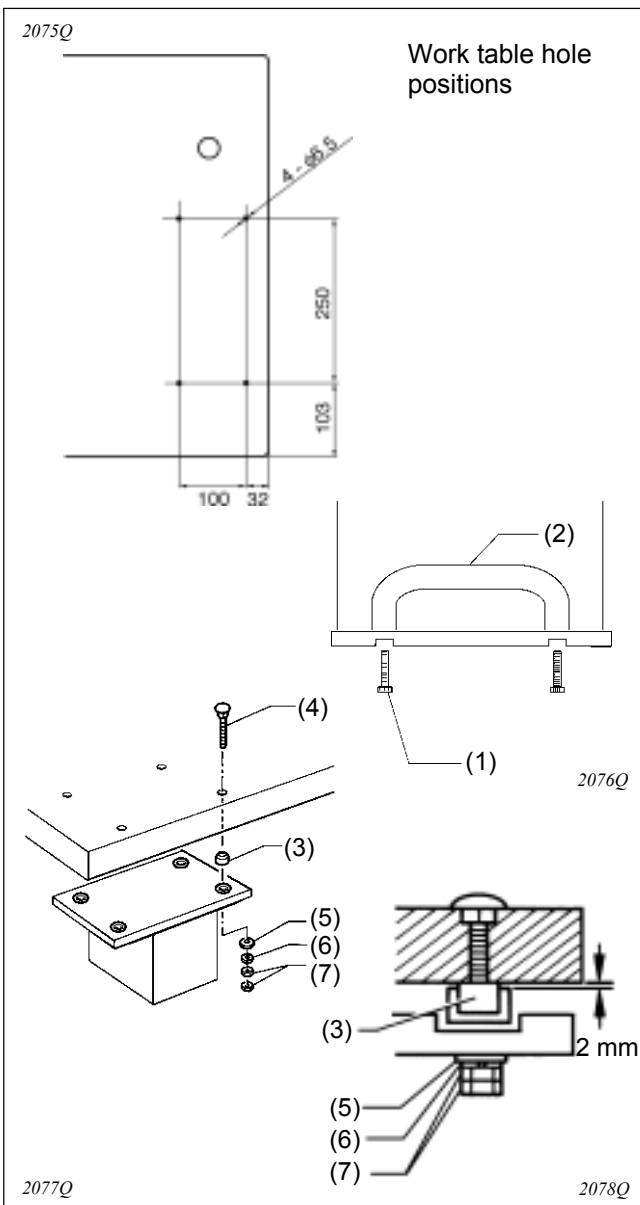


3) Table leg installation (treadle support plates)

1. Remove the screws (1), and then remove the handle (2).

2. Place the transformer onto the two treadle support plates (3) as shown in the illustration, and then secure it with the washers and screws.

* The washers and screws must be obtained separately.



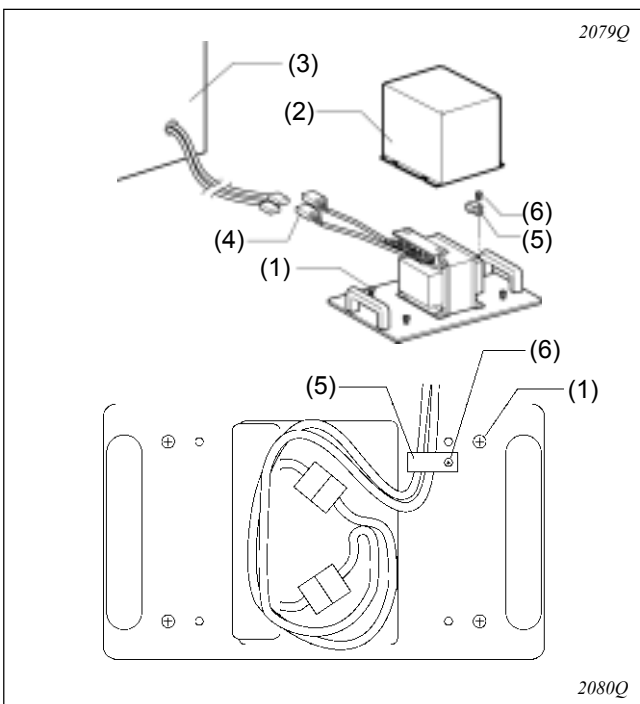
4) Installation underneath the work table

* Standard BROTHER work tables are provided with installation holes for use in installing the transformer.

1. Remove the screws (1), and then remove the handle (2).
2. Use the bolts (4), flat washers (5), spring washers (6) and nuts (7) to install the transformer as shown in the illustration, while leaving a gap of 2 mm between the work table and the cushion collars (3).

Use the bolts (4), flat washers (5), spring washers (6), nuts (7) and cushion brackets (3) which are included.

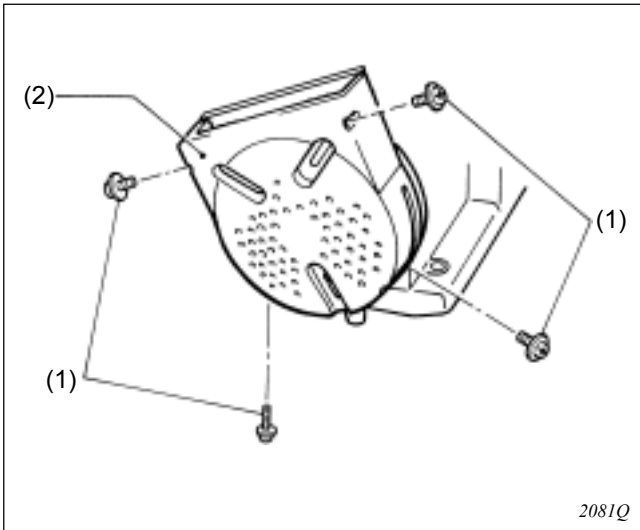
<Connecting the cords>



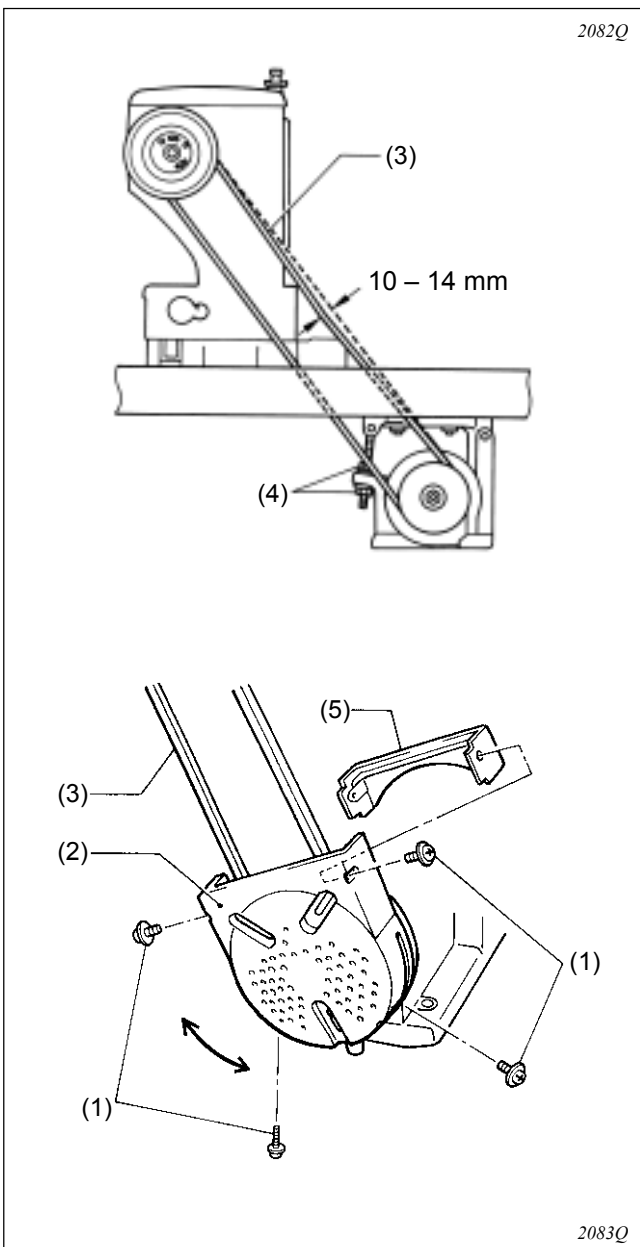
1. Loosen the screws (1), and then remove the transformer cover (2).
2. Connect the control box connector (3) to the transformer connector (4).
3. Secure the connected cords with the cord holder (5) and the screw (6), and place them inside the transformer cover (2). Install the transformer cover (2) with the screws (1).
4. Secure the cords to the work table using staples.

4. INSTALLATION

4-12. Installing the V-belt



1. Remove the screw (1), and then remove the motor belt cover (2).



2. Gently tilt back the machine head, and then place the V-belt (3) into the V grooves in the machine head pulley and the motor pulley.
3. Turn the two nuts (4) to adjust so that there is 10 - 14 mm of deflection in the V-belt (3) when it is pressed at the midway point with a force of 5 N.

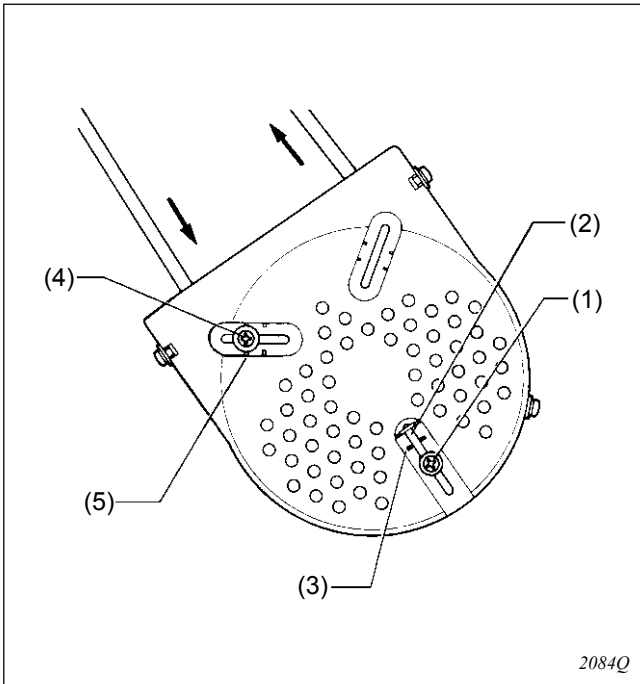
NOTE:

If the V-belt tension is too loose, or if the V-belt is stretched, the following problems could occur.

- a. The stopping position may shift,
- b. The needle bar may drift when the machine stops,
- c. An extra stitch may be sewing when the machine stops,
- d. An abnormal noise may be heard due to V-belt slipping, and
- e. The V-belt may become too loose and contact with the cover.

If any such problems occur, adjust by following the procedure described above.

4. Secure the motor belt cover (2) and the auxiliary motor belt cover (5) with the four screws (1) as shown in the illustration so that they do not touch the V-belt (3).



Adjusting the belt retainer

1. Loosen the screw (1).
2. Align the boss of the belt retainer (2) with the mark (3).
3. Tighten the screw (1).

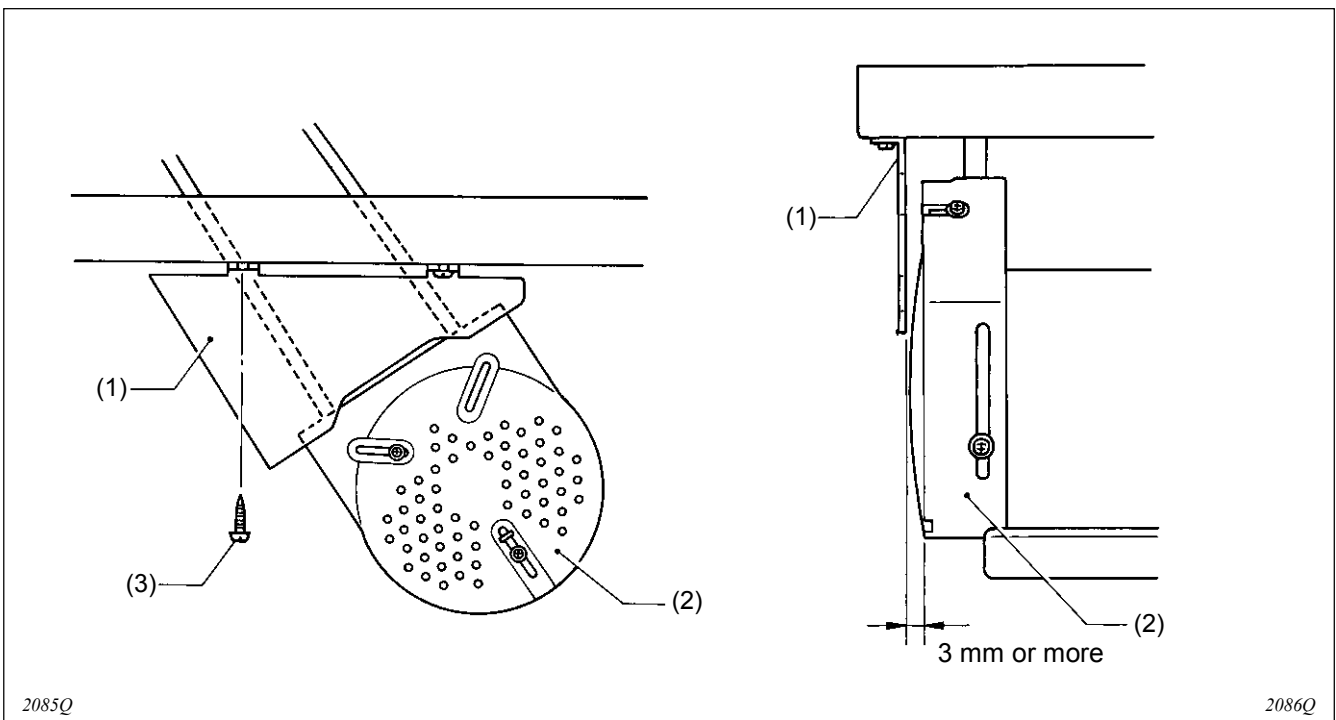
Adjusting the finger protector

1. Loosen the screw (4).
2. Align the center of the screw (4) with the mark (5).
3. After adjusting, tighten the screw (4).

4-13. Installing the belt cover plate

NOTE:

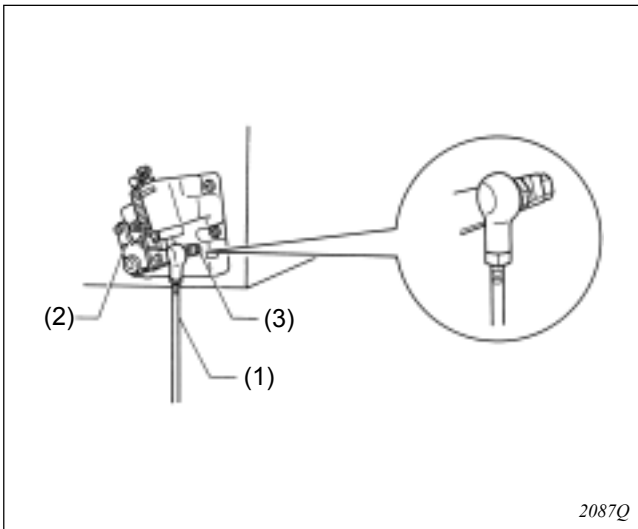
If the machine head is positioned horizontally, there is no need to install the belt cover plate.



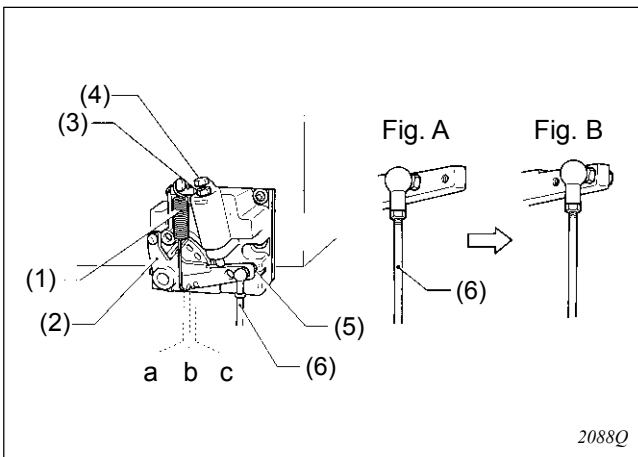
1. Set the belt cover plate (1) so that there is a gap of 3 mm or more in the longer motor direction. The belt cover plate (1) should not project out from the edge of the work table.
2. Install the belt cover (1) with the wood screws (3) so that it does not touch the motor belt cover (2).

4. INSTALLATION

4-14. Installing the treadle



Install the connecting rod (1) to the treadle lever (2) with the nut (3).



Adjusting the treadle pressure

If the machine starts running when your foot is simply resting on the treadle, or if the treadle pressure is too weak, adjust the position (a to c) at which the treadle spring (1) is hooked onto the treadle lever (2).

The treadle pressure will increase from position a to position c.

Adjusting the treadle return pressure

1. Loosen the nut (3) and turn the bolt (4). The treadle return pressure becomes heavier as the bolt (4) is tightened, and becomes lighter as the bolt (4) is loosened.
2. Tighten the nut (3).

Adjusting the treadle stroke

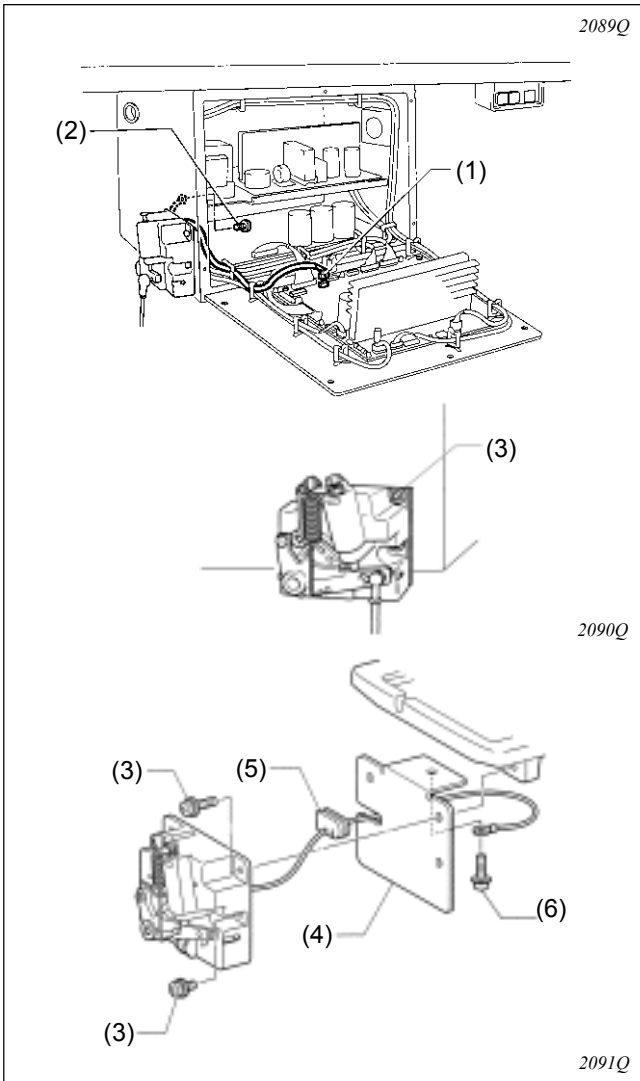
Remove the nut (5), and then move connecting rod joint (6) from the position in figure A to the position in figure B. The treadle stroke will increase by approx. 1.25 times.

* This adjustment will also affect the treadle pressure and the treadle return pressure, so these settings should be readjusted if necessary.

4-14-1. Changing the treadle unit installation position (horizontal positioning only)

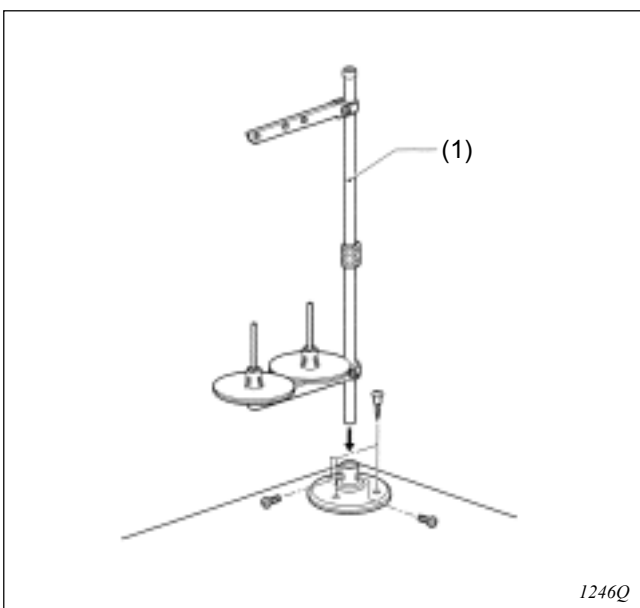
NOTE:

If the machine head is positioned horizontally, install the treadle unit to the motor.



1. Disconnect the treadle unit connector (1) inside the control box.
2. Remove the screw (2), and then disconnect the ground wire. After disconnecting the ground wire, re-tighten just the screw (2).
3. Remove the screw (3), and then remove the treadle unit.
4. Install the V cord bushing (5) to the treadle setting plate (4).
5. Install the treadle setting plate (4) and the treadle unit to the motor with the screw (3).
6. Install the ground wire with the screw (6).
7. Connect the treadle unit connector (1) inside the control box.

4-15. Installing the spool stand



Assemble the spool stand (1) while referring to the spool stand instruction manual, and then install the spool stand (1) at the left side of the work table.

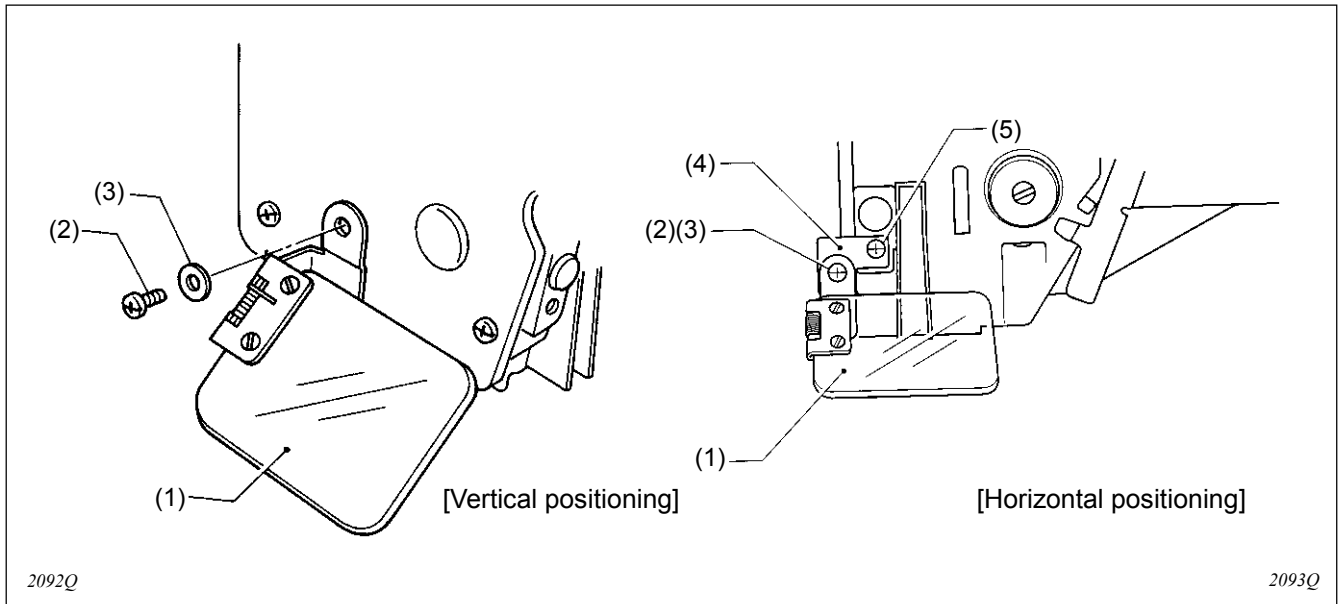
4. INSTALLATION

4-16. Installing the eye guard

CAUTION



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



Install the eye guard (1) with the screw (2) and flat washer (3).

NOTE:

If the machine head is positioned horizontally, install the eye guard support (4) to the machine head with the screw (5), and then install the eye guard (1).

4-17. Lubrication

CAUTION



Turn off the power switch before carrying out lubricating, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.



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

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

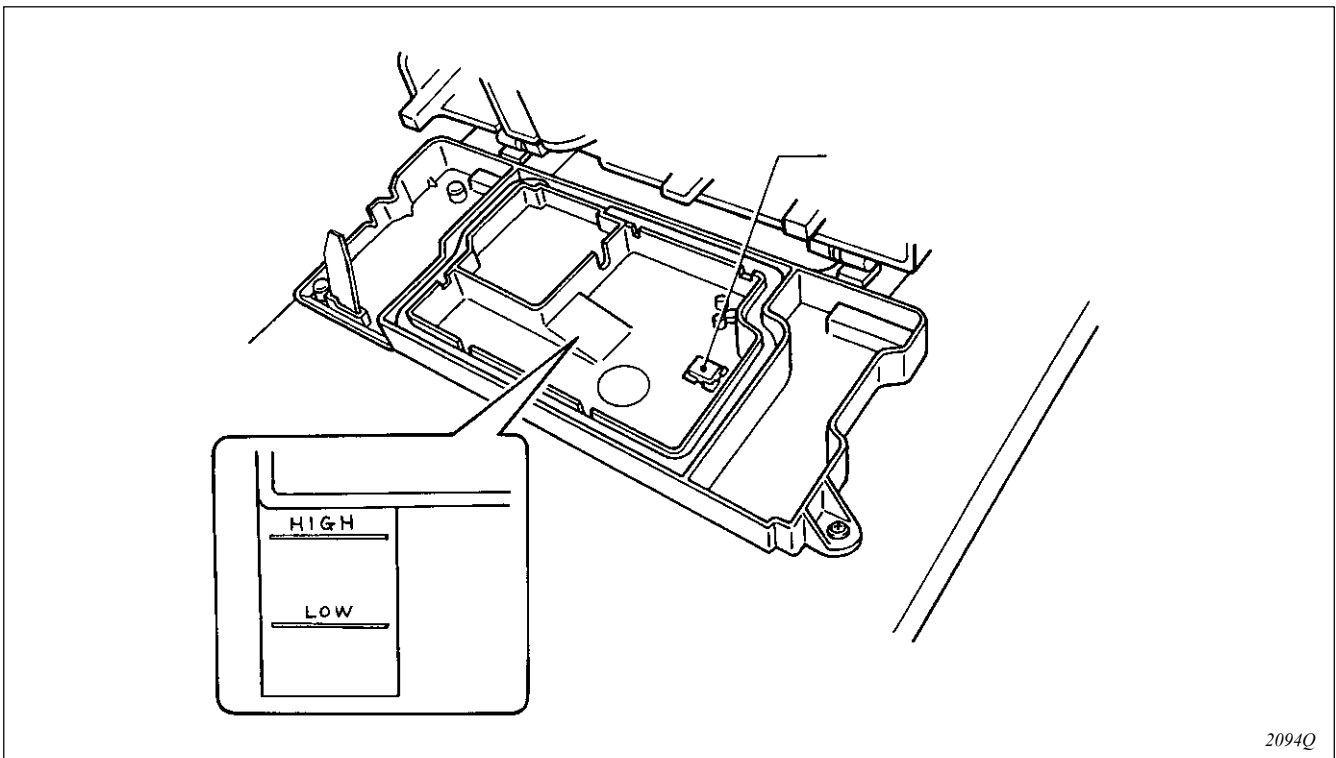
Keep the oil out of the reach of children.

NOTE:

Be sure to let the machine operate for a while after adding the oil.

Use only specified Brother oil (Nisseki Mitsubishi Sewing Lube 10N; VG10) for the machine oil.

4-17-1. Lubricating the bed base



2094Q

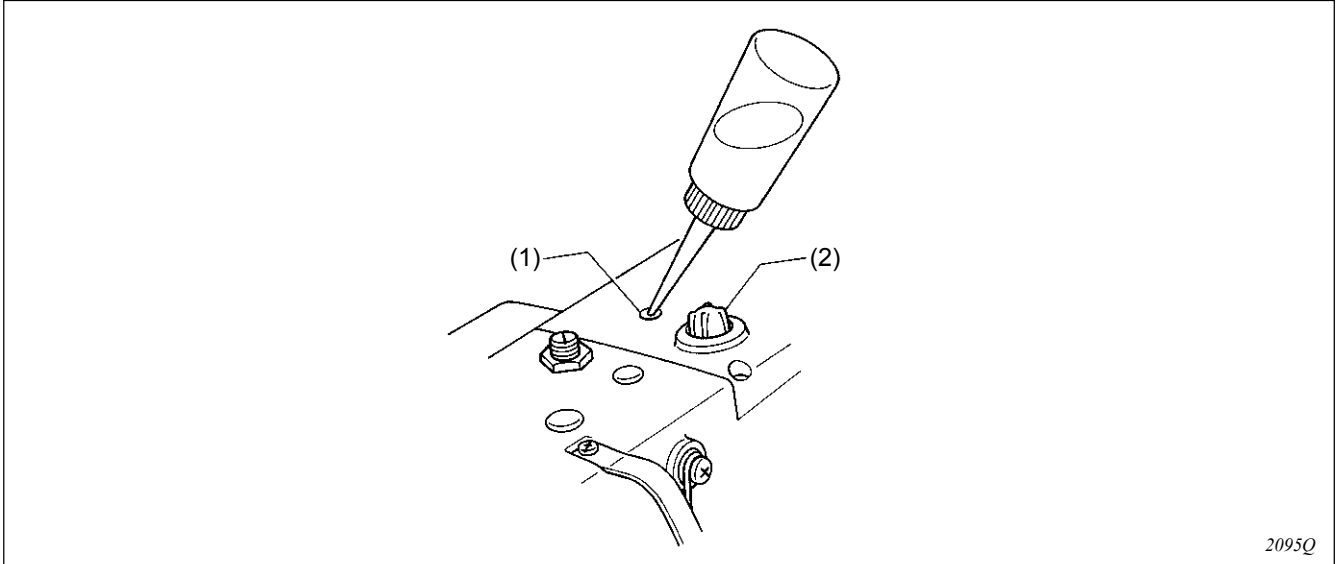
1. Set the magnet (1) in place.
2. Gently tilt back the machine head and slowly pour in lubricating oil until the oil level reaches the "HIGH" mark.
If the oil level drops below the "LOW" mark, add more lubricating oil.
3. Gently return the machine head to its original position.

4. INSTALLATION

4-17-2. Lubricating the arm

NOTE:

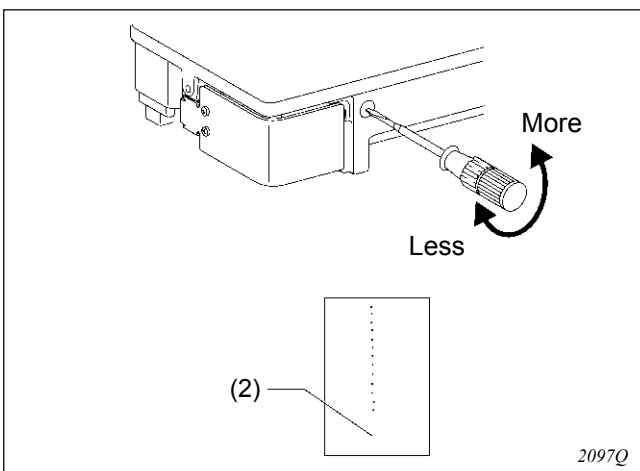
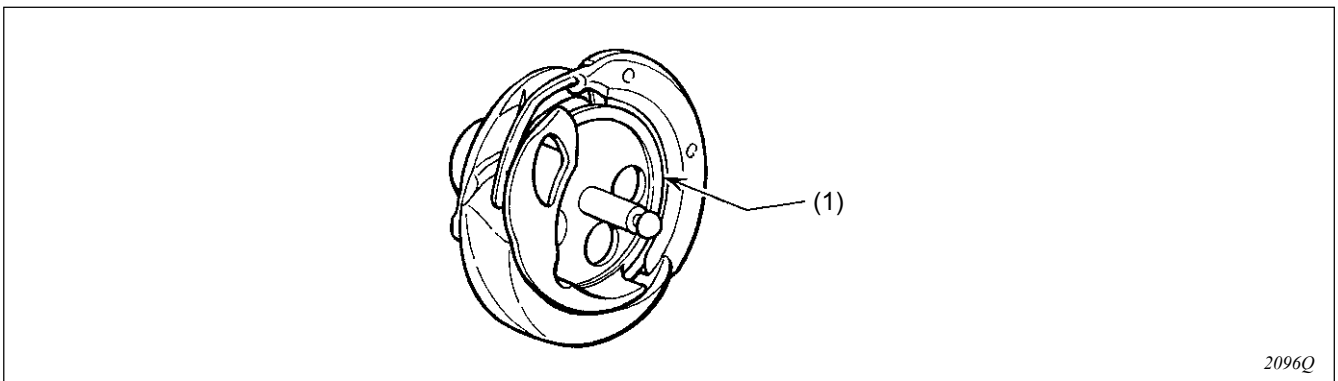
- * Be sure to lubricate the arm when first installing the machine and when the machine has not been used for an extended period of time.
- * When using the machine, check that the oil is visible through the oil cap (2). If it cannot be seen, problems such as seizure of the mechanism may occur.



Apply 5-6 drops of oil to the oil inlet (1) at the top of the arm.

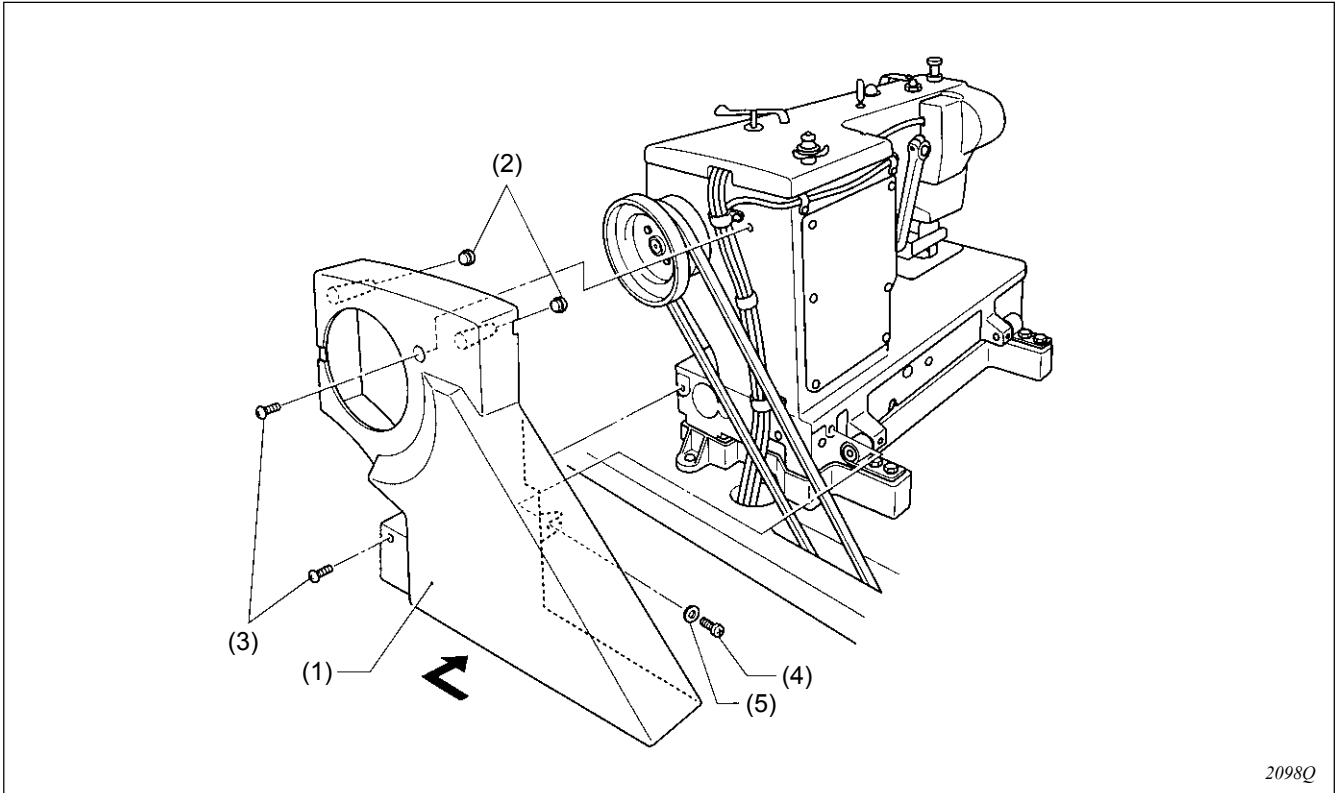
4-17-3. Lubricating the rotary hook

When first installing the machine and when the machine has not been used for an extended period of time, remove the bobbin and add 2-3 drops of oil to the rotary hook race (1) before sewing.



Rotary hook lubrication adjustment

1. Remove the rubber stopper.
 2. Turn the adjusting screw to adjust the lubrication amount.
- * Adjust so that approximately 10 drops of oil are released when the sewing machine is run at a speed of 4,000 rpm for three cycles to sew about 114 stitches. Use Kraft paper (2) or similar to catch the oil drops. As a guide, the optimum position can be obtained if the adjusting screw is tightened as much as possible and then loosened about two turns.

4-18. Installing the belt cover

2098Q

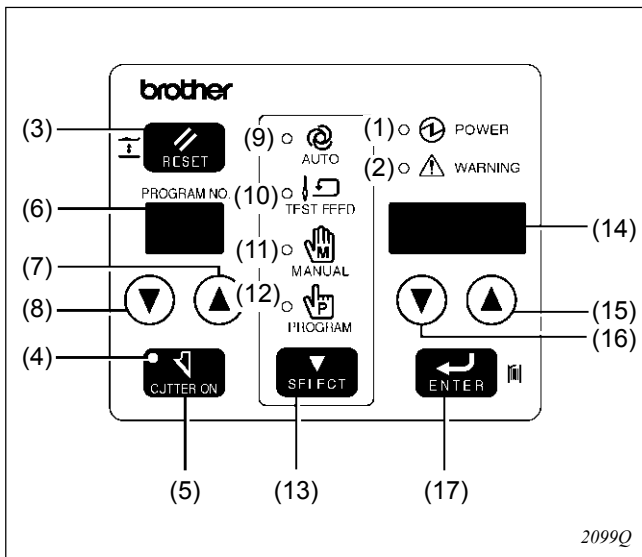
1. Attach the rubber cap (2) to the belt cover (1).
2. Insert the belt cover (1) in the direction of the arrow, and then secure it with the two screws (3), the screw (4) and the flat washer (5).

NOTE:

When tilting back the machine head, remove the screws (3), loosen the screw (4) and then remove the belt cover (1) before tilting back the machine head.

5. OPERATION

5-1. Part names and functions



- (1) POWER indicator
- (2) Warning indicator
- (3) RESET key
- (4) Cutter on indicator
- (5) CUTTER ON key
- (6) Program number LED
- (7) Program No. UP key
- (8) Program No. DOWN key
- (9) Automatic mode indicator
- (10) Test feed mode indicator
- (11) Manual mode indicator
- (12) Program mode indicator
- (13) SELECT key
- (14) Parameter display LED
- (15) Parameter UP key
- (16) Parameter DOWN key
- (17) ENTER key

NOTE:

The following symbol is used on the operation panel. This symbol has a different meaning from the meaning which is given in the "SAFETY INSTRUCTIONS" on p.i.

⋯⋯ Notification of a machine problem

(1) POWER indicator

- The POWER indicator (1) illuminates when the power is turned on.

(2) Warning indicator

- Illuminates when an error occurs, and after the RESET key is pressed to lower the work clamp but the needle is not at the up stop position when the machine pulley turns.
- This indicator also illuminates as a warning when a dangerous situation occurs, such as if the machine is connected to a high-voltage power supply by mistake.

NOTE:

- The sewing machine will not operate when the treadle is depressed while the warning indicator is illuminated.

(3) RESET key

- Used to reset errors, and to raise and lower the work clamp.

(4) Cutter on indicator

- When this indicator is illuminated, the cutter operates during automatic sewing. When it is switched off, the cutter does not operate during automatic sewing.

(5) CUTTER ON key

- This key is used to turn cutter operation during automatic mode, test feed mode, manual mode and program mode on and off. When cutter operation is turned on, the cutter on indicator illuminates.

(6) Program number LED

- Displays the program number in automatic mode, test feed mode and manual mode. Displays the parameter number in program mode.

(7) Program No. UP key

- Increases the program number by one in automatic mode, test feed mode and manual mode. Increases the parameter number by one in program mode.

(8) Program No. DOWN key

- Decreases the program number by one in automatic mode, test feed mode and manual mode. Decreases the parameter number by one in program mode.

(9) Automatic mode indicator

- Illuminates during automatic mode. The normal sewing mode is when the automatic mode indicator is illuminated.

(10) Test feed mode indicator

- Illuminates during test feed mode. This mode is used to check the number of stitches in the sewing pattern.

(11) Manual mode indicator

- Illuminates during manual mode. In this mode, a single stitch is sewn each time the machine pulley is turned manually.

(12) Program mode indicator

- This mode is used to set the various parameters for sewing programs. If the program no. UP key or ENTER key is pressed while parameter setting is being carried out, the mode changes to memory switch setting mode. If the program no. UP key or ENTER key is pressed during memory switch setting mode, the mode changes to cycle program setting mode.

(13) SELECT key

- This key is used to change between automatic mode, test feed mode, manual mode and program mode.

(14) Parameter display LED

- Displays the production counter, lower thread counter and parameter details, and also displays error codes.

(15) Parameter UP key

- Used to increase parameter values.

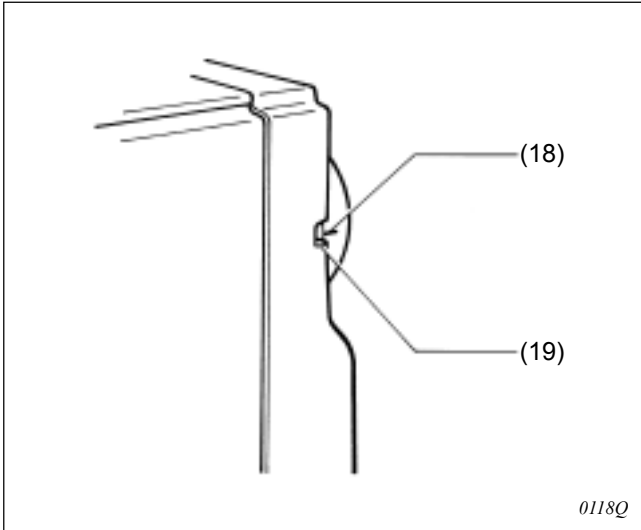
(16) Parameter DOWN key

- Used to decrease parameter values.

(17) ENTER key

- Used to accept a program number during automatic mode. Used to accept changed values for parameter settings during program mode.
- If the sewing machine is started while the ENTER key is being pressed during automatic mode, only the sewing machine will operate and the mode will change to lower thread winding mode.

5-2. Home position return (preparation)



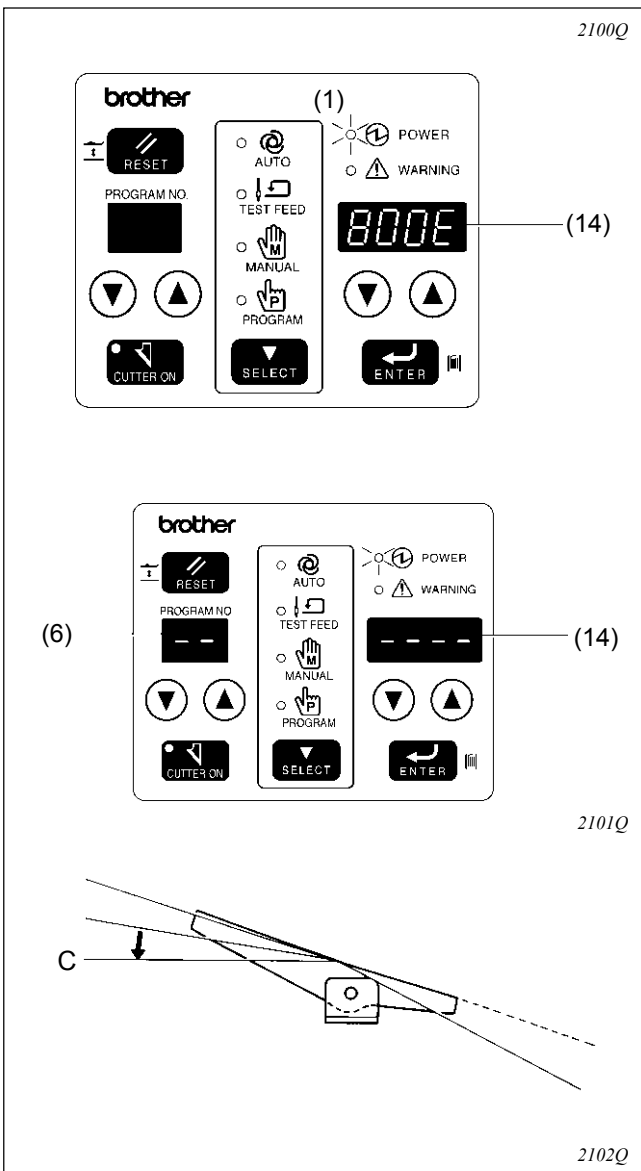
Before starting home position return.....

Check that the needle bar is at its highest position. Turn the machine pulley so that the index mark (18) on the pulley is between the marks (19) on the belt cover.

If the machine is started while the index mark (18) is not between these two marks (19), error message "E-02" will be displayed. At this time, the error will be cleared if you turn the machine pulley to set the needle to the needle up stop position.

NOTE:

When transporting and installing the sewing machine, the thread trimming mechanism may move so that the machine pulley cannot be turned. In such cases, do not force the pulley to turn. Move the thread trimming mechanism to the home position, or turn the machine pulley in the reverse direction to set the needle to the needle up stop position.



1. Turn on the power.

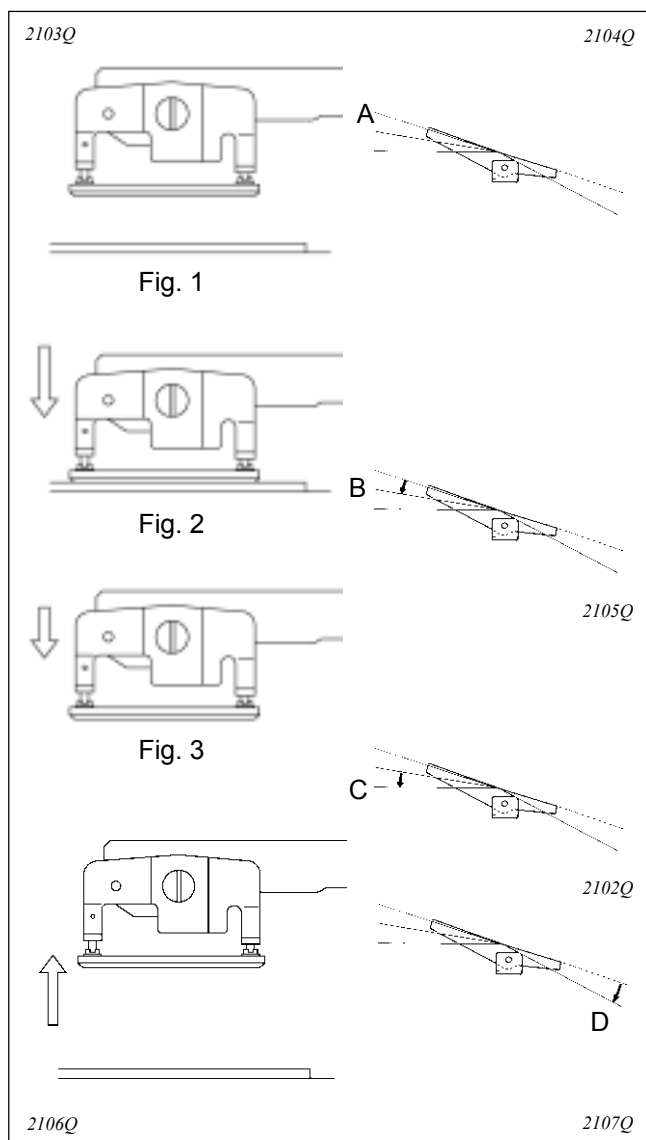
- The POWER indicator (1) will illuminate and the model number will appear for one second in the parameter display LED (14).

- After this, "--" will appear in the program number LED (6) and "----" will appear in the parameter display LED (14).

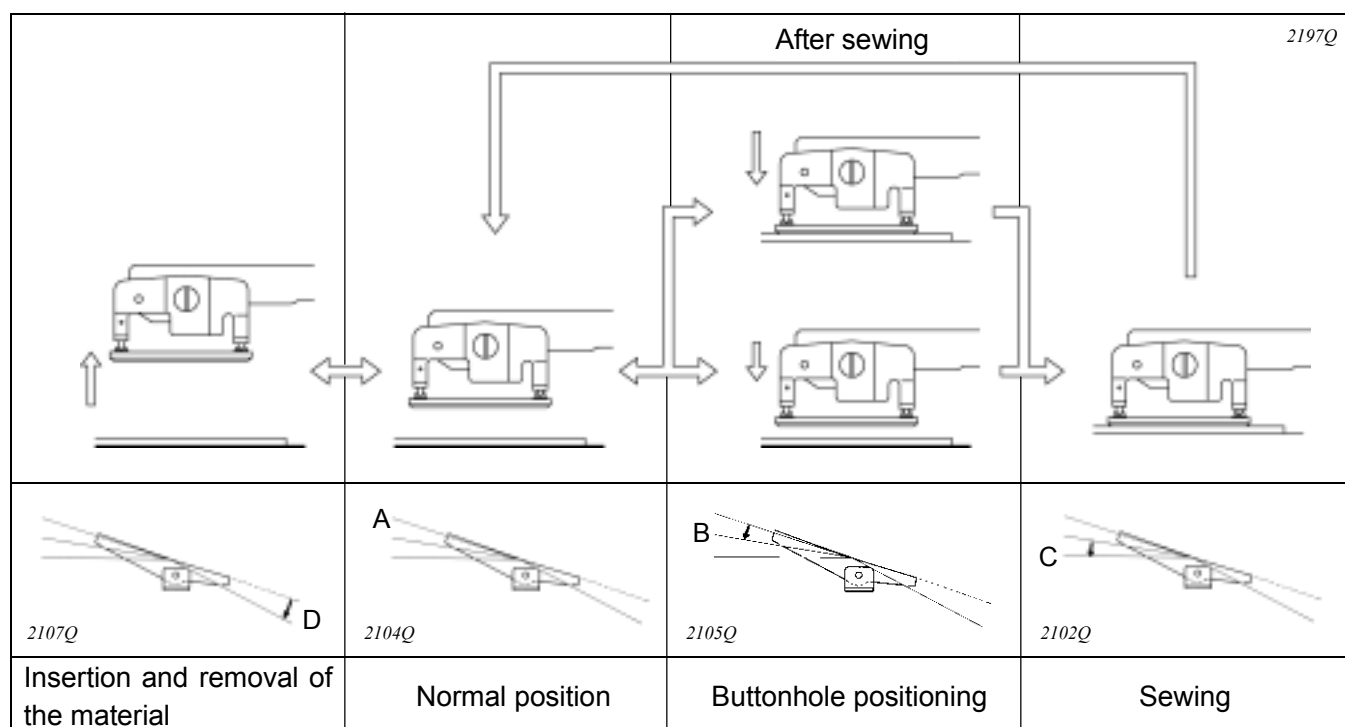
2. Depress the treadle to the 2nd step [C].

- The sewing machine will move to the home position, and the work clamp will move to the neutral position.
- After the home position has been reached, the mode will change to the mode which was active when the power was turned off (automatic/test feed/manual/program).

5-3. Operating the treadle

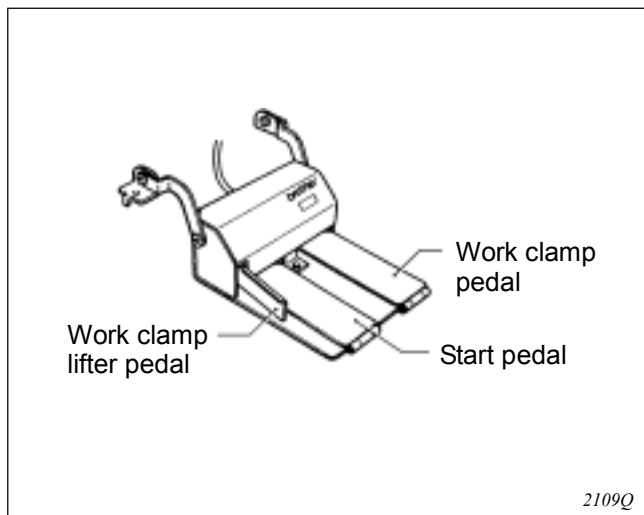


1. When the treadle is not depressed [A], the work clamp is at the neutral position.
 - * The work clamp lifter height at the neutral position can be changed to between 1 mm and 13 mm using memory switch No. 05. [Figure 1]
2. When the treadle is depressed to the 1st step [B], the work clamp drops.
 - * When memory switch No. 06. is off, the work clamp drops to its lowest position. [Figure 2]
 - * If memory switch No. 06. is set to between 0.1-8 mm, the work clamp drops to the height which has been set. This is useful for positioning the material. (Soft press) [Figure 3]
3. When the treadle is depressed to the 2nd step [C], the machine starts sewing.
4. When the treadle is depressed backward to the position in [D], the work clamp rises to the height which has been set using memory switch No. 04. This is useful for inserting and removing the material.



5. OPERATION

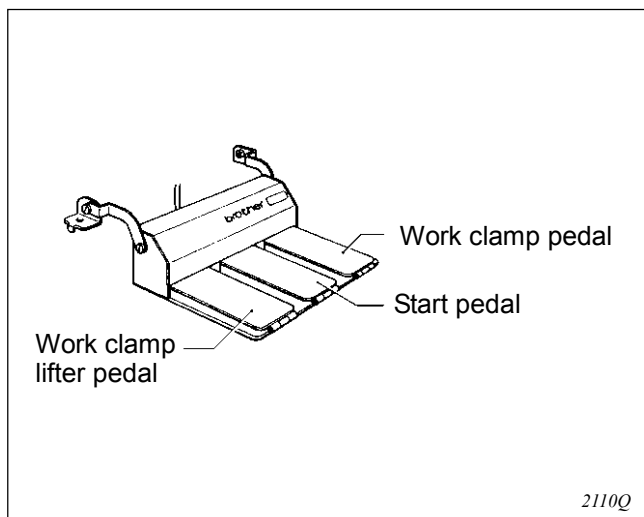
5-3-1. Operating the standing pedal (option)



[Two pedals + kick pedal]

When the work clamp pedal (right side) is depressed, the work clamp is lowered, and when the start pedal (left side) is depressed, sewing starts.

When the kick pedal is kicked to the outside, the work clamp rises. (functions in the same way as depressing the treadle backward.)



[Three pedals]

When the work clamp pedal (right side) is depressed, the work clamp is lowered, and when the start pedal (the middle) is depressed, sewing starts.

When the work clamp lifter pedal (left side) is depressed, the work clamp rises. (Functions in the same way as depressing the treadle backward.)


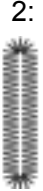


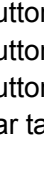

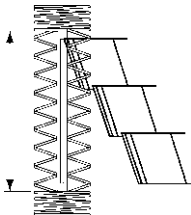
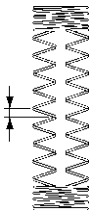
5-4. Program setting method

5-4-1. Program initialization condition



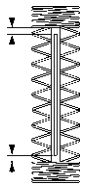
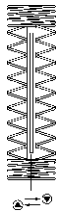
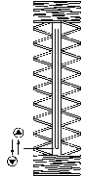
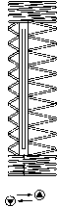

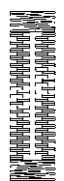
The parameters and memory switches for program numbers 1 to 90 are all set to their default values.


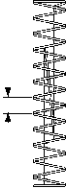

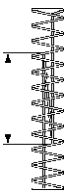


5-4-2. Parameter table

- The parameter values can be stored independently for each program.
 - The allowable setting range for some parameters may vary from the range specified, depending on the settings of other parameters.
 - The number of stitches which can be sewn may vary depending on settings for parameters such as zigzag width and feed length.
 - The zigzag width ratio cannot be set when the rear tack pattern is set to an eyelet pattern.
 - If all underlays have been set, the order of sewing is underlays sewn together, then saw-shape underlays and then rectangle underlays.
- * The cutter operating distance may become smaller depending on the settings for parameter No. 2 (Length of knife) and parameter No. 3 (zigzag stitch length [multi-working knife]), so in such cases the speed will be reduced automatically.

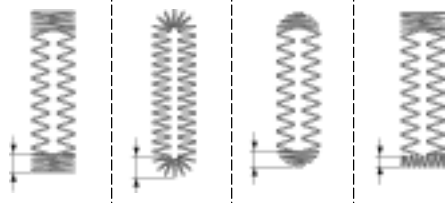
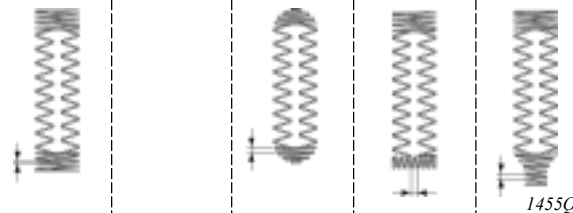
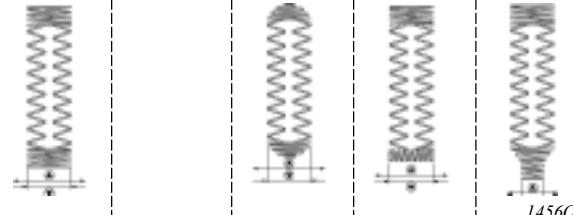

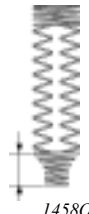

No.	Setting items	Setting range	Unit	Default
00	Sewing speed (zigzag part)	1,000 – 4,000 rpm	100	3,600
01	Buttonhole/Straight bar tack 0:  1:  2:  3:  4:  <i>1437Q</i>	0: Buttonhole (free) 1: Buttonhole (rectangle) 2: Buttonhole (radial) 3: Buttonhole (round) 4: Bar tack		1
02	Length of knife  <i>1438Q</i>	4.0 - 32.0 mm However, when panel DIP switches B-3, B-4 or B-5 are at OFF, OFF and ON respectively when initialization is carried out, the initial value will be set to 6.0.	0.1	13.0 (6.0)
03	Zigzag stitch length (multi-working knife)  <i>1439Q</i>	OFF: Single working knife 4.0 - 69.0 mm However, the setting range will be limited by the work clamp size setting value which has been set by the B panel DIP switches.	0.1	OFF
04	Zigzag pitch  <i>1440Q</i>	0.10 - 2.00 mm	0.025	0.350

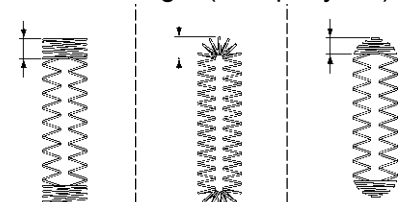
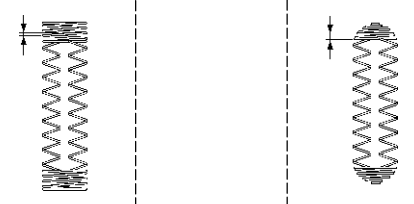
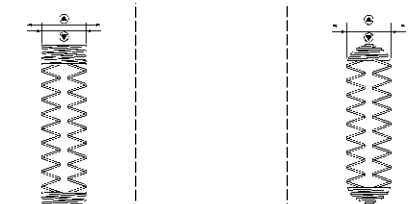
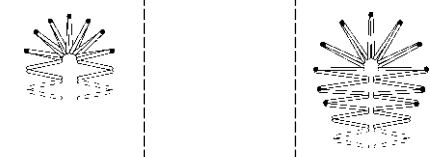
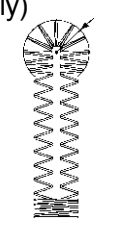
5. OPERATION

No.	Setting items	Setting range	Unit	Default
05	Zigzag width  <i>1441Q</i>	1.0 - 3.0 mm	0.1	1.5
06	Knife X space  <i>1442Q</i>	- 0.4 - 1.0 mm	0.1	0.4
07	Knife Y space  <i>1443Q</i>	0.00 - 2.00 mm	0.05	1.00
08	Knife X position alignment  <i>1444Q</i>	- 0.5 - 0.5 mm	0.1	0.0
09	Knife Y position alignment  <i>1445Q</i>	- 0.8 - 0.8 mm	0.1	0.0
10	Zigzag width ratio (at left)  <i>1446Q</i>	0.30 - 0.70	0.01	0.50
11	Stitch type (whip/purl) Whip:  Purl:  <i>1447Q</i>	0: Whip 1: Zigzag purl 2: Zigzag, rear tack purl 3: Zigzag, front tack purl 4: Purl		1

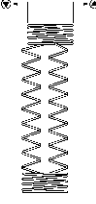




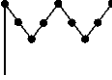
No.	Setting items	Setting range	Unit	Default	
Straight bar tack	13	Straight bar tack length  <i>1448Q</i>	7.0 - 40.0 mm	0.1	13.0
	14	Straight bar tack pitch  <i>1449Q</i>	0.2 - 2.0 mm	0.1	0.8
	15	Straight bar tack width  <i>1450Q</i>	1.5 - 6.0 mm	0.1	2.0
	16	Running speed	1,000 - 3,000 rpm	100	2,000
	17	Running length  <i>1451Q</i>	3.0 - 32.0 mm	0.1	11.0
	18	Running pitch  <i>1452Q</i>	1.0 - 5.0 mm	0.1	2.0
	19	Running width  <i>1453Q</i>	0.5 - 3.0 mm	0.1	1.0





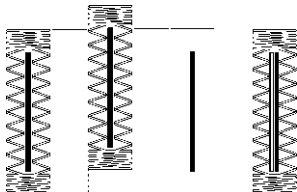
5. OPERATION

No.	Setting items	Setting range	Unit	Default
20	Front tack pattern <div style="display: flex; justify-content: space-around; text-align: center;"> Rectangle Radial Round Tack Taper tack </div>	0: Rectangle 1: Radial 2: Round 3: Tack 4: Taper tack	1	0
21	Front tack length (except taper tack)  1454Q	0.5 - 5.0 mm	0.1	1.0
22	Front tack pitch (except radial)  1455Q	0.05 - 1.00 mm	0.05	0.30
23	Front tack width correction (except radial)  1456Q	- 2.0 - +2.0 mm	0.1	0.0
24	No. of front tack stitch (radial)  1457Q	5 - 11 stitches	2	7
25	Taper tack length (taper tack)  1458Q	1.0 - 5.0 mm	0.1	3.0
26	Front tack sideways correction (rectangle only)  1459Q	- 1.0 - 1.0 mm	0.1	0.0


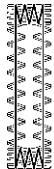
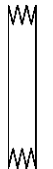

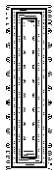
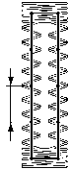
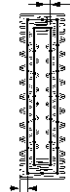
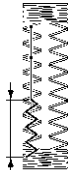
No.	Setting items	Setting range	Unit	Default
30	Rear tack pattern Rectangle Radial Round Eyelet	0: Rectangle 1: Radial 2: Round 3: Eyelet	1	0
31	Rear tack length (except eyelet)  <i>1460Q</i>	0.5 - 5.0 mm	0.1	1.0
32	Rear tack pitch (except radial, eyelet)  <i>1461Q</i>	0.05 - 1.00 mm	0.05	0.30
33	Rear tack width correction (except radial, eyelet)  <i>1462Q</i>	- 2.0 - +2.0 mm	0.1	0.0
34	No. of rear tack stitch (radial, eyelet)  <i>1463Q</i>	5 - 11 stitches	2	7
35	Eyelet buttonhole radius (eyelet type only)  <i>1464Q</i>	1.0 - 3.0 mm	0.1	2.0

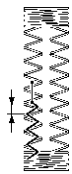

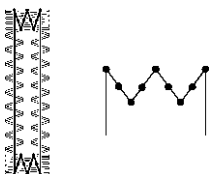

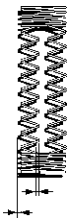

5. OPERATION

No.	Setting items	Setting range	Unit	Default
36	Rear tack sideways correction (rectangle only)  <i>1465Q</i>	- 1.0 - 1.0 mm	0.1	0.0
37	Rear tack vector shape (rectangle only) 1:  2:  3:  <i>1466Q</i>	1. Triangle 2. Rectangle 3. Saw-shape	1	1
38	No. of stitches in X direction for saw-shaped rear tack vector shape (When sewing saw-shaped rear tack stitches for rectangular buttonholes)  <i>1467Q</i>	2 - 14 stitches	2	4
39	No. of stitches in Y direction for saw-shaped rear tack vector shape (When sewing saw-shaped rear tack stitches for rectangular buttonholes)  <i>1468Q</i>	1 - 5 stitches	1	1

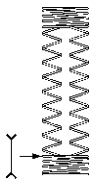
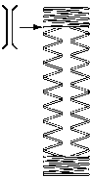
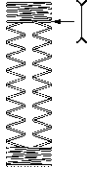
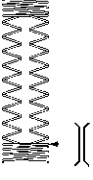
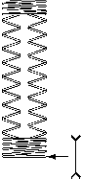

No.	Setting items	Setting range	Unit	Default
40	Start backtack  <i>1469Q</i>	0 - 6 stitches	2	2
41	Start backtack width  <i>1470Q</i>	0.5 - 3.0 mm	0.1	0.5
42	Start backtack pitch  <i>1471Q</i>	0.10 - 0.80 mm	0.05	0.30
43	End backtack  <i>1472Q</i>	1- 6 stitches	1	4
44	Cutter operation 0: 1: 2: 3:  <i>1473Q</i>	0: Center knife (standard) 1: Rear knife (feeding) 2: Front knife 3: Front knife + Center knife However, 2 and 3 are only valid for two cycles or more.	1	0

5. OPERATION

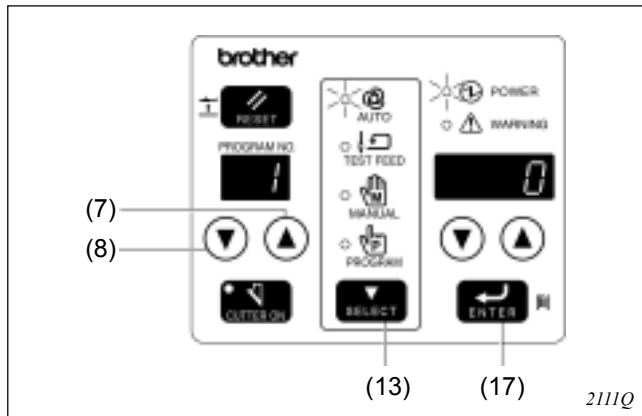
No.	Setting items	Setting range	Unit	Default
45	No. of underlays sewn together  <i>1474Q</i>	0 - 1	1	0
46	Saw-shaped underlays 1:  2:  3:  <i>1475Q</i>	0: No saw-shaped underlay 1: Front and rear tack 2: Rear tack only 3: Front tack only	1	0
47	No. of rectangle underlays  <i>1476Q</i>	0 - 9	1	0
48	Underlay speed	1,000 - 3,000 rpm	100	2,000
49	Underlay feed pitch  <i>1477Q</i>	0.5 - 6.0 mm	0.1	2.0
50	Underlay offset  <i>1478Q</i>	0.3 - 1.0 mm	0.1	0.8
51	Underlay sewing start length  <i>1479Q</i>	2.0 - 10.0 mm	0.1	4.0

No.	Setting items	Setting range	Unit	Default
52	Underlay sewing start pitch  <i>1480Q</i>	0.2 - 2.0 mm	0.1	1.0
53	Saw-shaped underlay bar tack X stitch no.  <i>1481Q</i>	2 - 14 stitches	2	4
54	Saw-shaped underlay bar tack Y stitch no.  <i>1482Q</i>	1 - 5 stitches	1	1
55	2-cycle sewing 1: Double stitch 2: Crossed double stitch  <i>1483Q</i>	0: No double stitch 1: Double stitch 2: Crossed double stitch	1	0
56	No. of bar tacks sewn for 2-cycle sewing	1 - 2	1	2
57	First offset for 2-cycle sewing  <i>1484Q</i>	0.0 - 0.8 mm	0.1	0.3
58	Zigzag underlay stitch width  <i>1485Q</i>	0.0 - 3.0 mm	0.1	0
59	Slow start stitches	0 - 4 stitches	1	1
60	Slow speed	500 - 1,500 rpm	100	800
61	Rear tack speed	500 - 4,000 rpm	100	4,000
62	Front tack speed	500 - 4,000 rpm	100	4,000

5. OPERATION

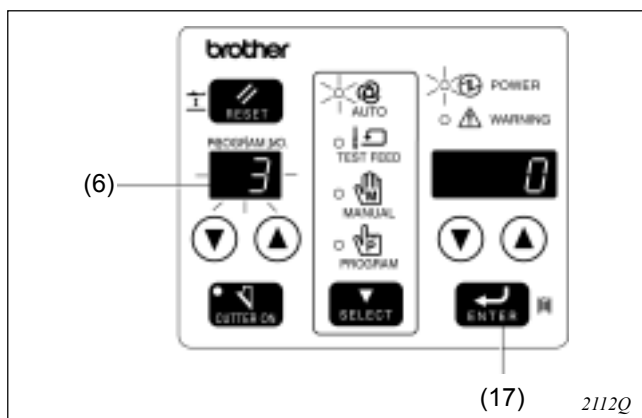
No.	Setting items	Setting range	Unit	Default
63	Sewing start tension apply timing  <i>1486Q</i>	- 4 - 6 stitches	1	0
64	Rear bar tack tension release timing  <i>1487Q</i>	- 4 - 4 stitches	1	0
65	Rear bar tack tension apply timing  <i>1488Q</i>	- 4 - 4 stitches	1	0
66	Front bar tack tension release timing  <i>1489Q</i>	- 4 - 4 stitches	1	0
67	Sewing end tension apply timing  <i>1490Q</i>	- 5 - 0 stitches	1	0
68	Rear tack width (rectangle only) OFF: Condense stitch 0.1 - 1.5 mm  <i>1491Q</i>	OFF: Condense stitch 0.1 - 1.5 mm Rear tack width (Normally set to 1.0)	0.1	OFF
69	Program copy	OFF, 1 - 90 (Specify copy source)	1	OFF

5-4-3. Changing program details

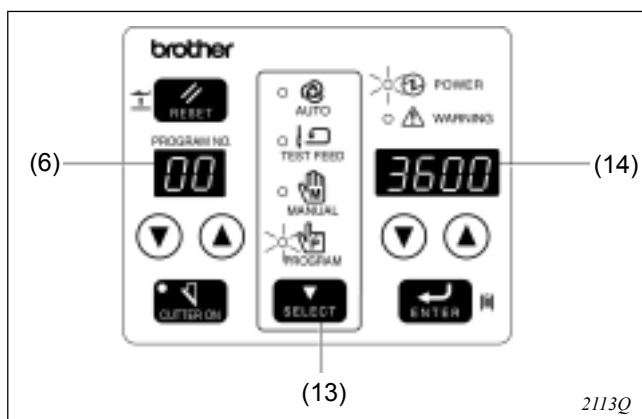


Example 1: This example shows how to make a buttonhole (round) setting for program number 3.

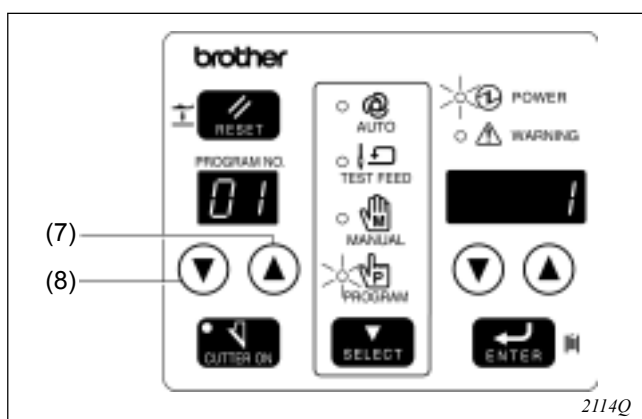
1. Press the SELECT key (13) to change the mode to automatic, test feed or manual mode. Use the program No. keys (7) and (8) to select the program number (example: program number 3), and then press the ENTER key (17).



(When you press the ENTER key (17), the program number will be accepted and the program number LED (6) will stop flashing. The program number will not be accepted if the ENTER key (17) is not pressed.)

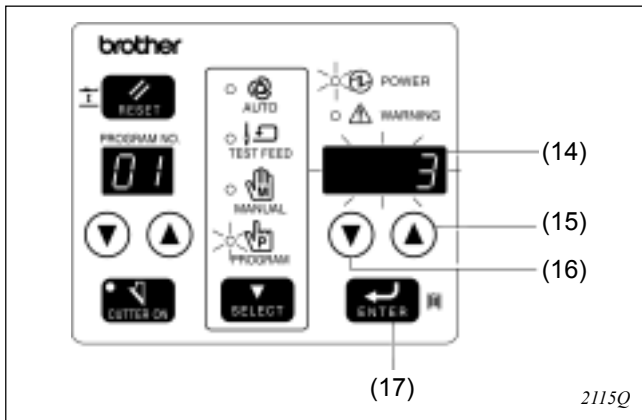


2. Press the SELECT key (13) to change the mode to program mode.
 - The parameters for the program number which was selected in step 1 will appear.
 - The parameter number will appear in the program number LED (6).
 - The parameter setting value will appear in the parameter display LED (14).



3. Use the program No. keys (7) and (8) to select the number for the parameter to be changed. (Example: Button hole/bar tack setting - Parameter No. 01)

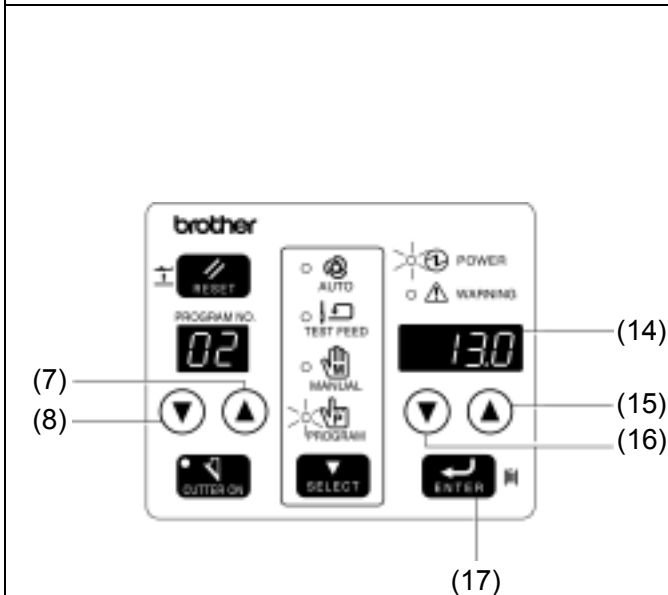
5. OPERATION



- Use the parameter keys (15) and (16) to change the setting for the selected parameter. (Example: Buttonhole (round) setting value - 3.)
(When you press the ENTER key (17), the parameter setting will be changed and the parameter display LED (14) will stop flashing. The setting will not be changed if the ENTER key (17) is not pressed.)

- Repeat steps 3 and 4 to change other parameter settings.

Checking the length of knife



Use the program No. keys (7) and (8) to select parameter No. 02.
(Parameter No. 02 is used to set the length of the knife.)

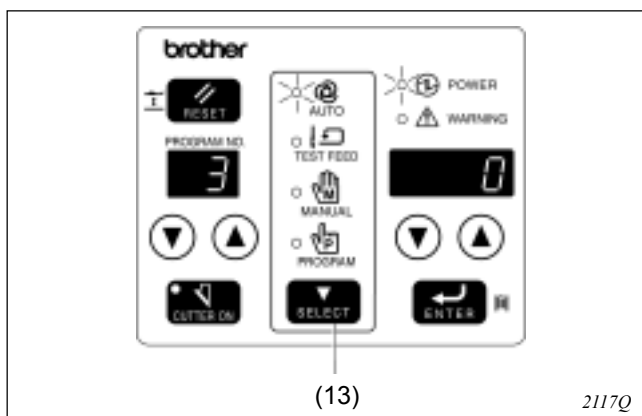
Check that the length of the knife which is has been installed is the same as the length setting which appears in the parameter display LED (14). If the values are different, use the parameter keys (15) and (16) to change the parameter setting value so that it is the same as the length of the knife, and then press the ENTER key (17).
(The length of the knife has now been set.)

NOTE:

Be sure to change the knife length setting if the knife is replaced with a knife of a different length.

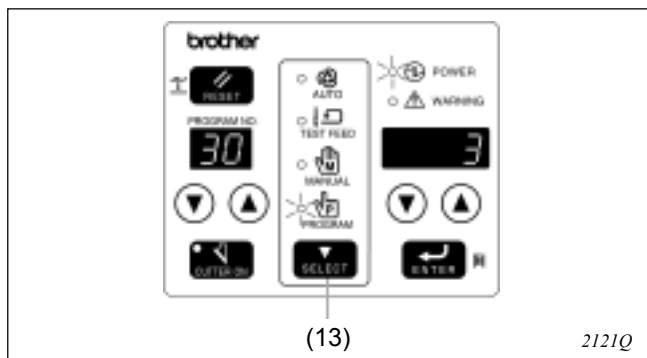
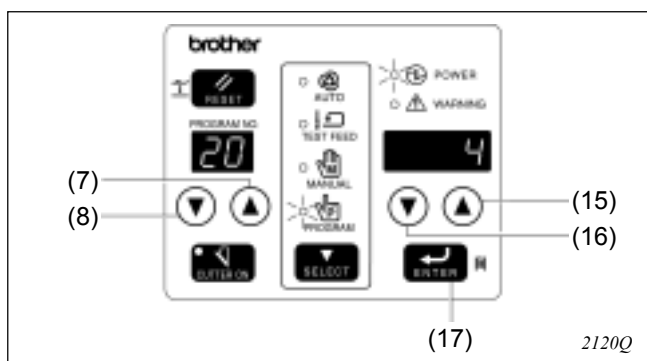
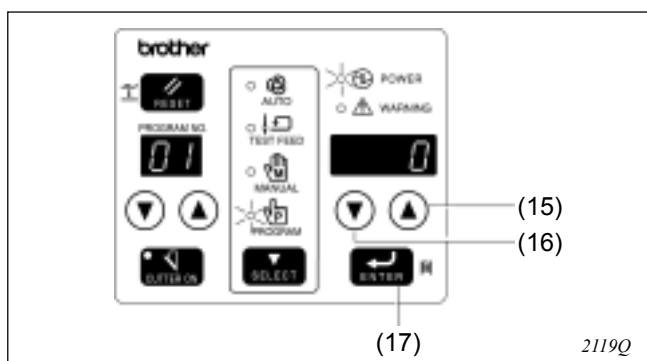
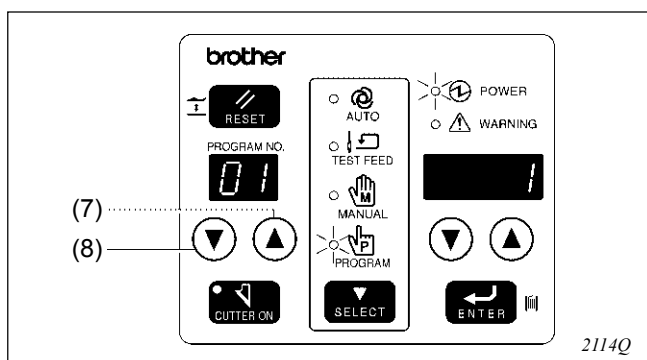
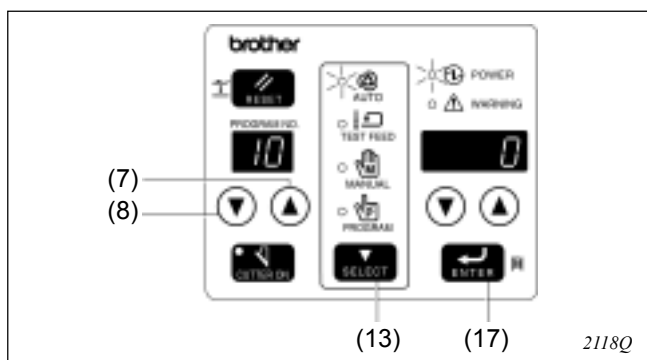
The stitch length will be automatically determined by the value for the length of the knife which has been set. Therefore, if the knife length is not set correctly, problems may occur, such as the bar tacking stitches being cut by the knife.

2116Q



- Press the SELECT key (13) to change the mode to automatic.

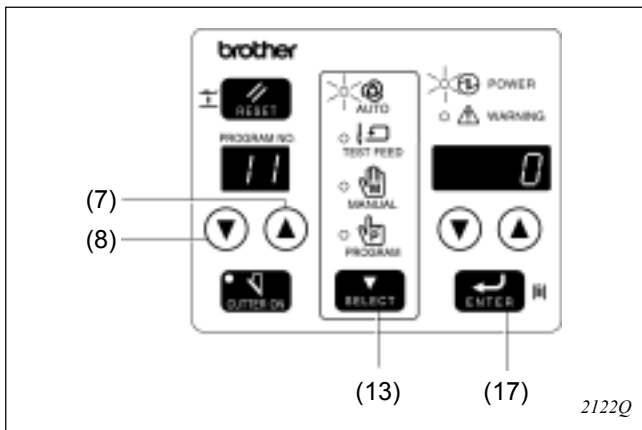
- * A round buttonhole sewing pattern has now been set for program No. 03.
- * The setting details can be saved in the program notes of the program memos for easy checking.



Example 2: This example shows how to set a taper tack for the front tack pattern and an eyelet for the rear tack pattern.

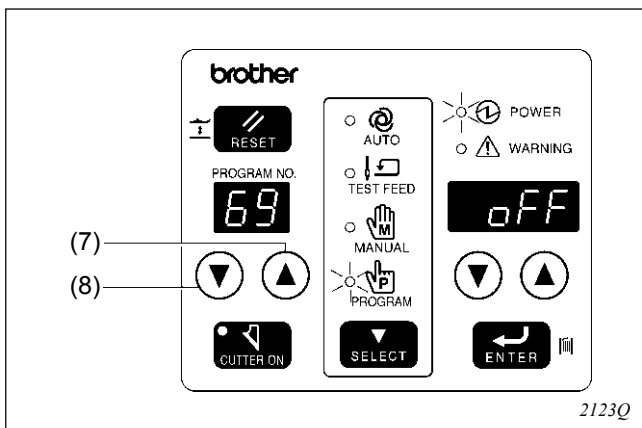
1. Press the SELECT key (13) to change the mode to automatic, test feed or manual mode. Use the program No. keys (7) and (8) to select the program number for the program to use (example: program No. 10), and then press the ENTER key (17).
2. Press the SELECT key (13) to change the mode to program mode.
3. Use the program No. keys (7) and (8) to select the number for the parameter to be changed. (Example: Button hole/bar tack setting - Parameter No. 01).
4. Use the parameter keys (15) and (16) to change the setting for the selected parameter (Example: Buttonhole (free) setting value - 0), and then press the ENTER key (17).
5. Use the program No. keys (7) and (8) to select the next parameter number. (Example: Front tack pattern - Parameter No. 20).
6. Use the parameter keys (15) and (16) to change the setting for the selected parameter (example: Taper tack pattern setting value - 4), and then press the ENTER key (17).
7. Repeat steps 5 and 6 to set parameter No. 30. (Example: Rear tack pattern - Parameter No. 30) (Example: Eyelet pattern setting value - 3)
8. Press the SELECT key (13) to change the mode to automatic mode.
 - * An eyelet taper-tack buttonhole has now been set for program No. 10.
 - * The setting details can be saved in the program notes of the program memos for easy checking.

5. OPERATION

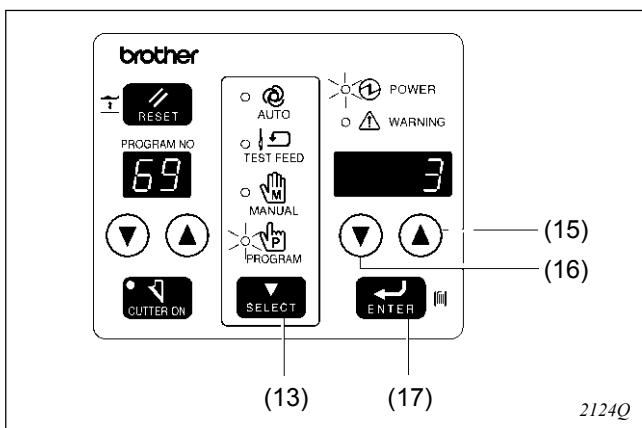


Example 3: This example shows how to copy the settings for program No. 3 to program No. 11.

1. Press the SELECT key (13) to change the mode to automatic, test feed or manual mode. Use the program No. keys (7) and (8) to select the program number for the program to use (example: program No. 11), and then press the ENTER key (17).
2. Press the SELECT key (13) to change the mode to program mode.

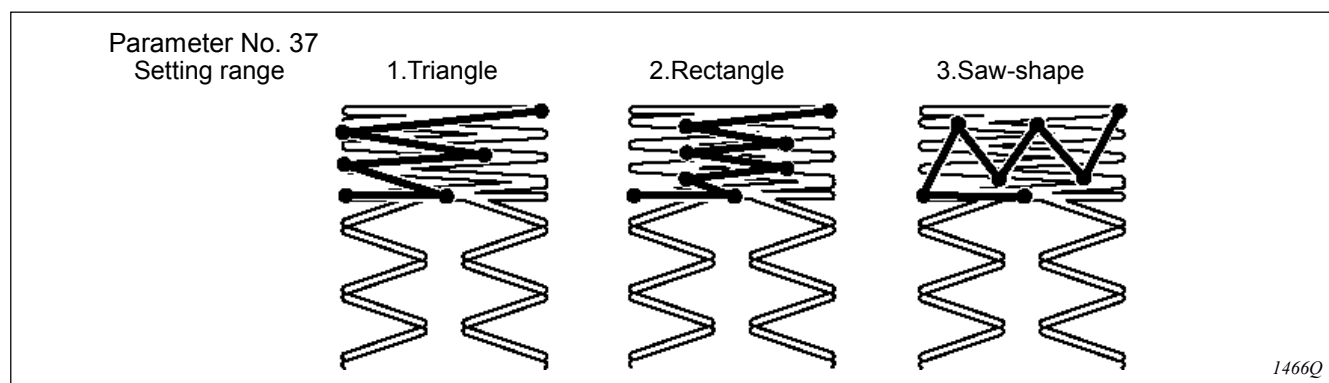


3. Use the program No. keys (7) and (8) to select the number for the parameter to be changed. (Example: Program copy - Parameter No. 69).



4. Use the parameter keys (15) and (16) to change the setting for the selected parameter (Example: Copy source setting value - 3), and then press the ENTER key (17).
 5. Press the SELECT key (13) to change the mode to automatic mode.
- * The parameters for the copy source program will then be copied to the copy destination program number.

5-4-4. Rear tack vector shape programs



1. Triangle

- General sewing

2. Rectangle

- This is effective for preventing the material from getting stuck in the needle hole when sewing the rear tack, which can happen when using lightweight materials.
(An offset is used so that the stitches do not overlap when sewing the reverse zigzagging for the rear tack.)
- * Reducing the number of front tack stitches is effective in preventing the material getting stuck at the front tack.
- * Using a needle plate with a small needle hole (1.2) as well can also help in preventing the material from getting stuck.

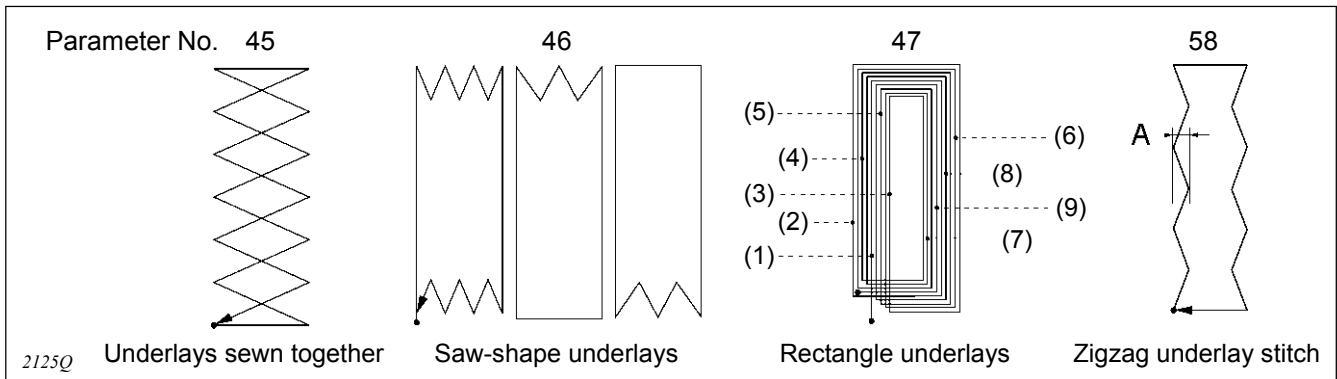
3. Saw-shape

- This is effective for preventing dimples in the rear tack, without the need for underlay sewing.
- * The number of stitches for the saw-shape type of sewing is set by means of parameter Nos. 38 and 39.

5. OPERATION

5-4-5. Underlay programs

Four types of underlay patterns are available. These four types can also be combined. Refer to the examples of use to determine which type of underlay to use.



1. Underlays sewn together

- This type of underlay pattern is used for resewing if the knife has operated before the seam has been formed, such as when sewing is complete without the upper thread breaking even though the lower thread has run out. It is particularly useful for sewing up the hole made by the knife beforehand at times when zigzag stitches do not hold properly.
- The pile of fluffy fabrics is pressed down before sewing, so that the buttonhole finish looks more attractive.

2. Saw-shape underlay

- This type of underlay is useful for stretch materials to prevent them from stretching.
- It is useful for preventing dimples from forming during bar tacking. Radial-type buttonholes are useful for preventing dimples.
- It is also useful for strengthening the buttonholes to stop the seam from unravelling, which can often happen with materials with coarse weaves.

3. Rectangle underlay

- This type of underlay is useful for stretch materials to prevent them from stretching.
- This is effective in preventing seams from unravelling in materials which appear not to have a very coarse weave. It also serves to reinforce the buttonhole.
- If the seam is hidden and the seam width seems small, you can sew 2 - 3 rectangle underlays to make the material look more voluminous.
- Underlays such as (1) to (9) in the illustration can be sewn in slightly different positions by changing the setting value for parameter No. 50 (underlay offset) so that the seam does not become too stiff and to further increase the feeling of volume.

4. Zigzag underlay stitch

- This is particularly effective in preventing seams from unravelling in materials which appear not to have a very coarse weave. It also serves to reinforce the buttonhole.
(If parameter No. 58 - Zigzag width [Dimension A in the illustration] is set to about 0.4 mm, the zigzag underlay stitches will be even stronger than other underlay stitches.)
- * If parameter No. 58 is set after saw-shaped underlay stitches or rectangle underlay stitches have been set, zigzag underlay stitches will only be sewn for the first cycle of underlay stitching.)

NOTE:

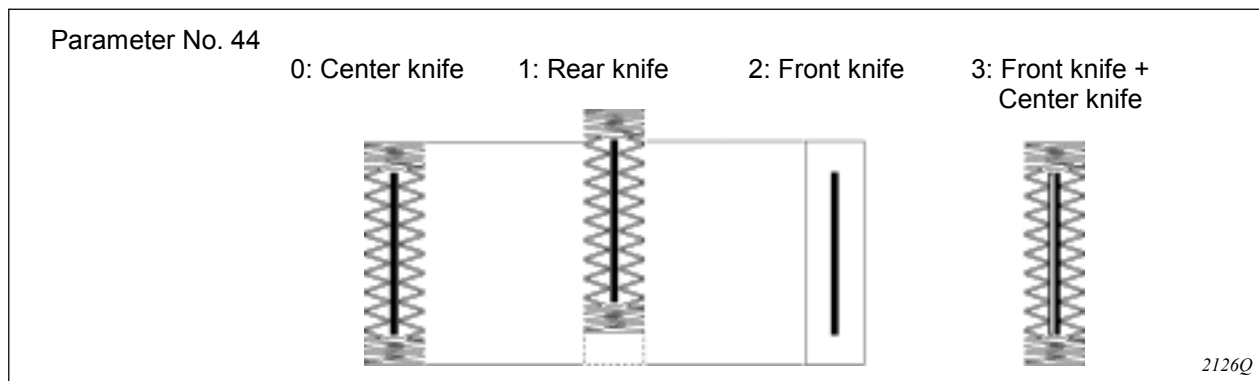
When sewing underlays, the number of bar tacking stitches will increase, so that thread breakages or broken needles may occur. To avoid such problems, reduce the number of underlays or drop the sewing speed.

- * When underlays are sewn together, the order of sewing is underlays sewn together → saw-shape underlays → rectangle underlays.

5-4-6. Cutter operation

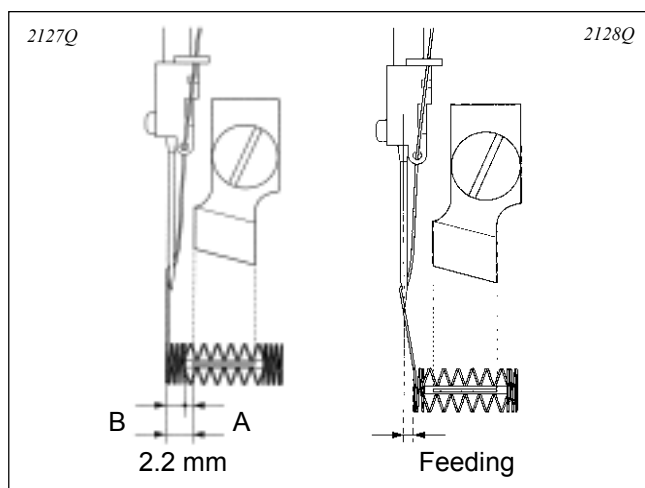
The cutter operating pattern can be selected from the following four patterns.

- Center knife operation, where the cutter operates when sewing of the buttonhole is complete
- Rear knife operation, where the cutter operates when sewing of the buttonhole is complete and the material is fed so that the cutter is near the front tack
- Front knife, where the cutter operates before the final cycle of zigzagging stitches is sewn
- A combination of front knife and center knife



0: Center knife (standard)

1: Rear knife



Because the needle and knife positions are separated by 2.2 mm as shown in the illustration, the distance between the edge of the front tack and the edge of the buttonhole cannot be set to less than 2.2 mm. In other words, if the knife Y space (A) is set to 0.5 mm, the front tack length (B) cannot be set to less than 1.7 mm. If you would like the front tack length to be less than 1.7 mm, the cutter can be made to operate after sewing and feeding are complete.

2: Front knife (Not available for single cycles. Only available when sewing two or more cycles.)

- This is used in cases such as when the rough edges of the material after cutting are hemmed by the buttonhole stitches.

The cutter operates before the left zigzag stitch of the last cycle is sewn.

3: Front knife + Center knife

(Not available for single cycles. Only available when sewing two or more cycles.)

- This is used in cases such as when the rough edges of the material after cutting are hemmed by the buttonhole stitches.

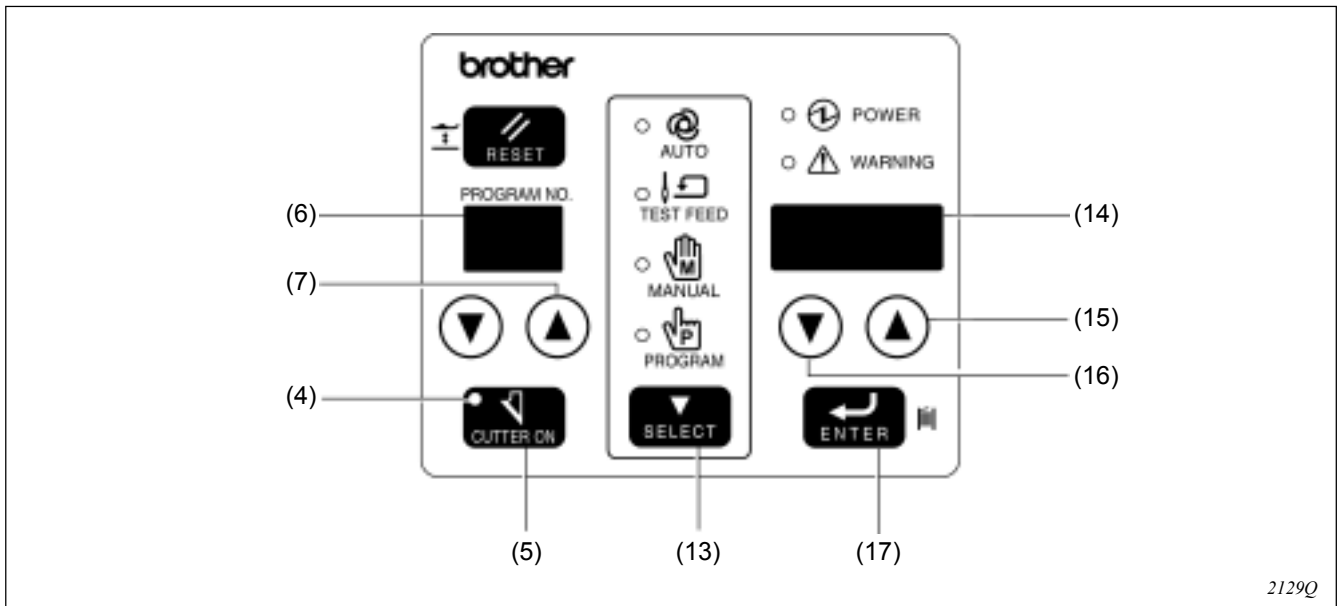
It can also be used if the rough edges of the material block the buttonhole after the left and right zigzag stitches have been sewn.

The cutter operates before the left zigzag stitch of the last cycle is sewn, and then operates again after the right zigzag stitch is sewn.

5. OPERATION

5-4-7. Cycle program

This example shows how to set C1 to program No. 3 and C2 to program No. 10. A single cycle program can contain up to nineteen sewing patterns (C1 to C19).



1. Press the SELECT key (13) to change the mode to program mode.
2. While pressing the ENTER key (17), press the program no. UP key (7). Repeat this operation twice. ("C1" will appear in the program number LED (6).)

Cutter on



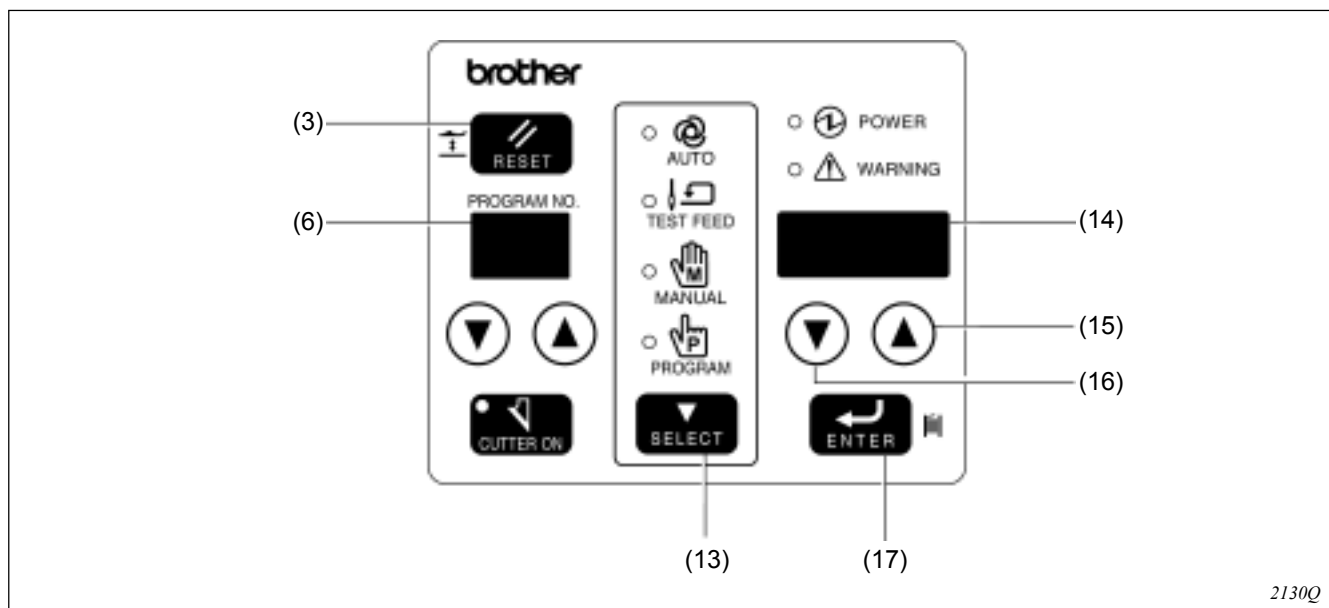
Cutter off



3. Use the parameter keys (15) and (16) to select the number of the program to be set to C1 (example: program number 3). (The program number will appear in the parameter display LED (14).) The CUTTER ON key (5) can be used to turn cutter operation on and off. If "." appears in the display, the cutter is turned on, and if "." does not appear, the cutter is turned off. However, if the cutter on indicator (4) is switched off during cycle sewing, the cutter operation will always be off.
4. Press the ENTER key (17) to accept the program number for C1. (The display will stop flashing.)
5. Press the program no. UP key (7). ("C2" will appear in the program number LED (6). The numbers "3" [the program number for C1] and "0" will appear in the parameter display LED (14).)
6. Use the parameter keys (15) and (16) to select the number of the program to be set to C2 (example: program number 10).
7. Press the ENTER key (17) to accept the program number for C2. (The display will stop flashing.)
8. Repeat steps 5, 6 and 7 to enter program numbers for C3 through to C19.
9. When the SELECT key (13) is pressed, the mode will change to automatic mode and the program number "C1" will appear.

5-4-8. Changing the production counter

- Check that panel DIP switch SW-A4 is at the OFF setting. (Refer to "13. Changing functions using the DIP switches".)

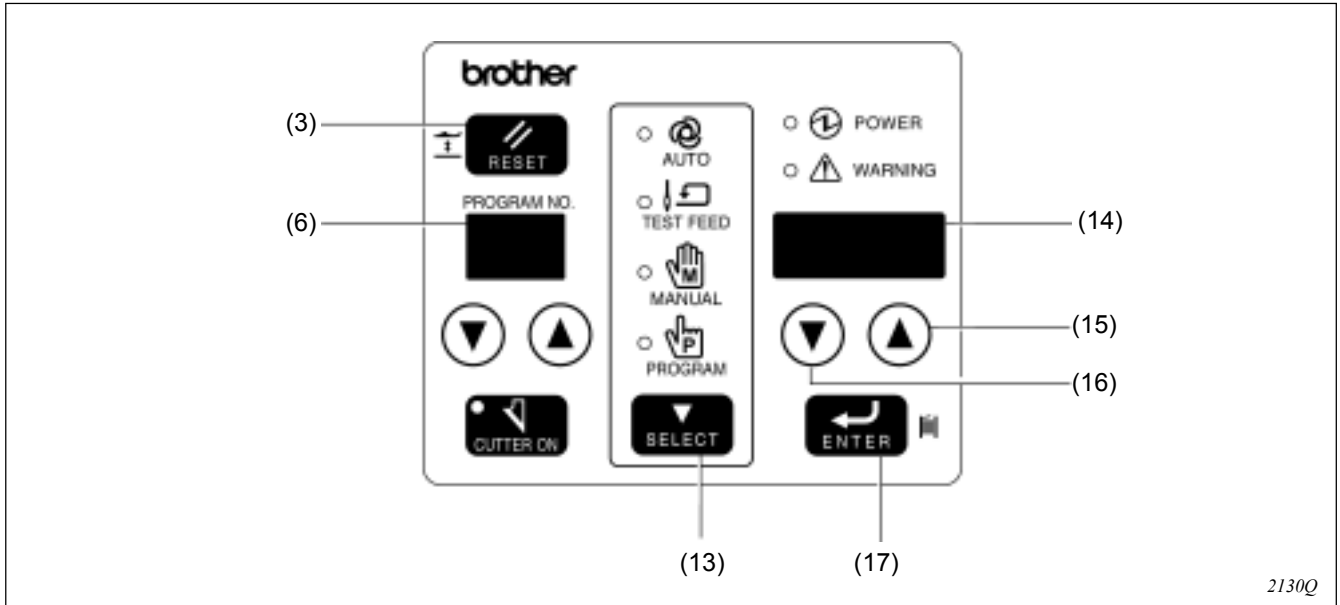


1. Press the SELECT key (13) to change the mode to automatic mode.
2. Press the parameter UP key (15) and the parameter DOWN key (16) simultaneously. ("PC" will flash in the program number LED (6). The current production counter setting will appear in the parameter display LED (14).)
3. Use the parameter keys (15) and (16) to change the production counter, and then press the ENTER key (17).
(The production counter setting will flash in the parameter display LED (14) while the setting is being changed. When the ENTER key (17) is pressed, the setting value will be changed, the parameter display LED (14) will stop flashing and the mode will change to automatic mode.)
 - * If you press the SELECT key (13) while the display is flashing, the mode will change to automatic mode without changing the production counter setting.
 - * If you press the RESET key (3), the production counter will change to 0, and this change will be accepted when the ENTER key (17) is pressed.

5. OPERATION

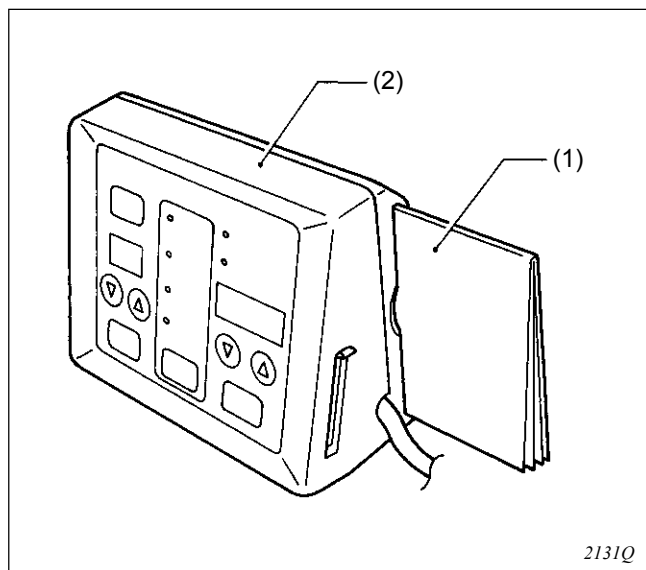
5-4-9. Changing the lower thread counter setting value

- Check that panel DIP switch SW-A4 is at the ON setting. (Refer to "13. Changing functions using the DIP switches".)



1. Press the SELECT key (13) to change the mode to automatic mode.
2. Press the parameter UP key (15) and the parameter DOWN key (16) simultaneously. ("bC" will flash in the program number LED (6). The current lower thread counter setting will appear in the parameter display LED (14).)
3. Press the RESET key (3). (The previously-set lower thread counter value will appear in the parameter display LED (14).)
4. Use the parameter keys (15) and (16) to change the lower thread counter setting.
5. Press the ENTER key (17). (The parameter display LED (14) will stop flashing and the setting value will be changed.)

5-5. Using the program memos



Insert the program memos (1) into the rear of the operation box (2) for safekeeping.

Program memo contents

1. Easy reference guide
2. Error code table
3. Parameter table
4. Program notes

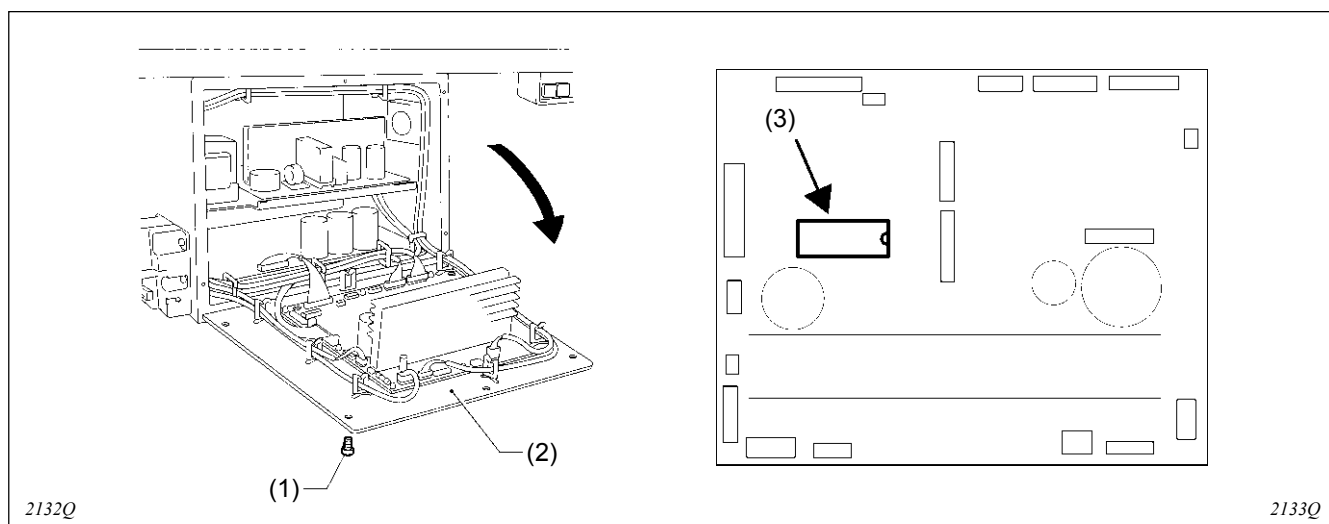
Use a lead pencil to make any additions to the parameter table and for writing anything into the program notes. If you do so, additions can be removed using an eraser and the space can be re-used. The program notes are useful for recording what patterns have been entered into which programs.

5-6. Adding patterns created using the BAS-PC/300

You can use the BAS-PC/300 to create your own sewing patterns. Up to nine of the patterns which you create in this way can be programmed into a P-ROM.

⚠ DANGER

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



Adding patterns to a P-ROM

1. Remove the six screws (1), and then open the operator's side cover (2) of the control box.

NOTE:

- When opening the cover (2), hold it securely so that it does not fall down.
2. Remove the P-ROM (3) from the main P.C. board.
3. Create the pattern(s) using the BAS-PC/300. Refer to the Operating Instructions for the BAS-PC/300 for details on how to create patterns.
4. Add the pattern(s) created using the BAS-PC/300 to the P-ROM (3).
5. Install the P-ROM (3) to the main P.C. board so that it faces as shown in the illustration.
6. Close the cover (2) of the control box, and tighten the six screws (1).

5. OPERATION

The program numbers for patterns which have been created using the BAS-PC/300 range from P1 to P9. However, program numbers which have not yet been assigned to a program will not appear on the program number LED.

→ 1 → 2 → 3 →..... → 90→ P1 → P2 → → P9 → 1 → 2 →

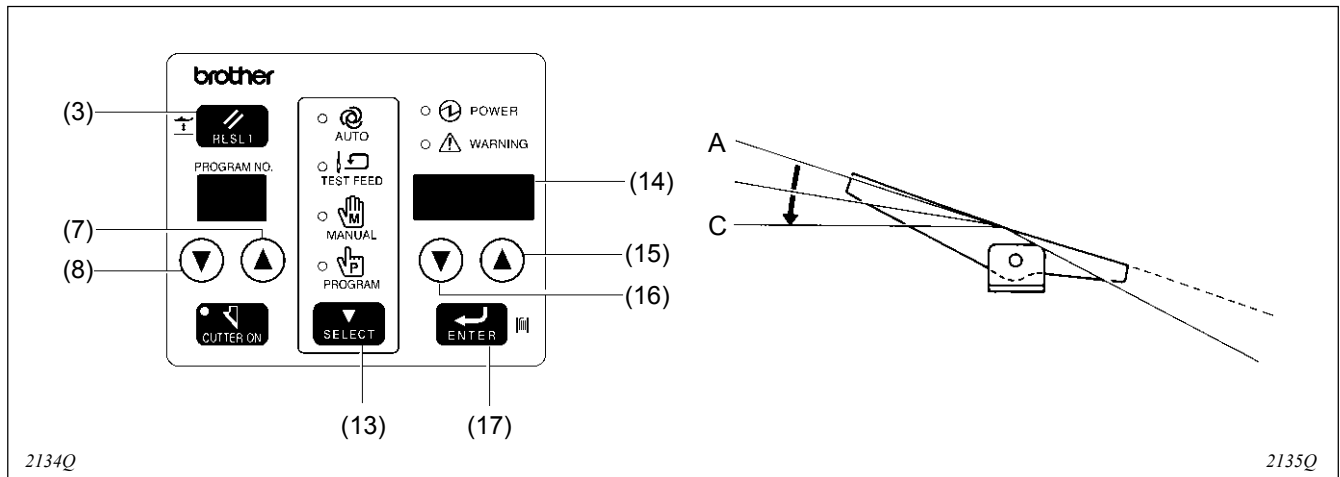
You can check and change the following parameters for patterns which have been created using the BAS-PC/300.

No.	Setting items	Setting range	Unit	Default
00	Sewing speed (zigzag part)	1,000 - 4,000 rpm	100	3,600
02	Length of knife	Value is for checking purposes and cannot be changed.	-	-
08	Knife X position alignment	-0.5 - 0.5 mm	0.1	0.0
09	Knife Y position alignment	-0.8 - 0.8 mm	0.1	0.0
16	Running speed (Straight bar tack)	1,000 - 3,000 rpm	100	2,000
48	Underlay speed	1,000 - 3,000 rpm	100	2,000
60	Slow speed	500 - 1,500 rpm	100	800
61	Rear tack speed	500 - 4,000 rpm	100	4,000
62	Front tack speed	500 - 4,000 rpm	100	4,000

6. CHECKING THE SEWING PATTERN

You can check the sewing pattern which has been programmed, and also the needle zigzagging and feed operation. Checking can be carried out using test feed mode, or by turning the machine pulley by hand in manual mode. These two modes can also be combined in order to carry out checking.

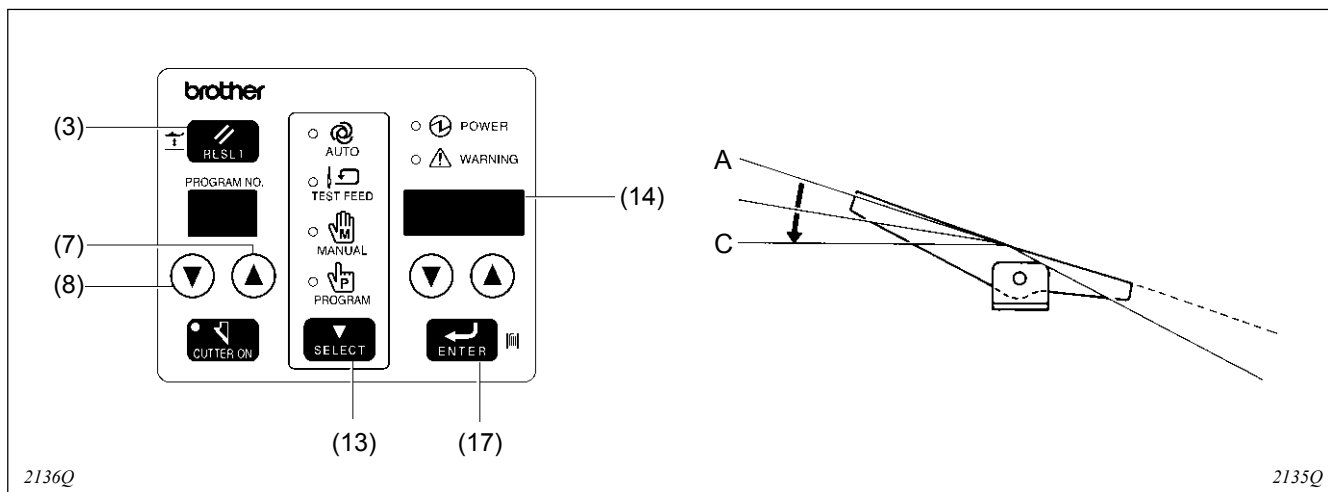
6-1. Test feed mode (for checking the sewing pattern without turning the machine pulley by hand)



1. Press the SELECT key (13) to change the mode to automatic mode. Use the program No. keys (7) and (8) to select the number for the program to be checked, and then press the ENTER key (17).
(The program number will stop flashing.)
2. Press the SELECT key (13) to change the mode to test feed mode.
("H****" and the number of stitches in the selected program will appear in the parameter display LED (14).)
3. Depress the treadle from the neutral position [A] to the 2nd step [C].
(The work clamp will drop.)
4. Return the treadle to the neutral position [A], and then depress it once more to the 2nd step [C]. The needle zigzag and feed mechanisms will each advance by one step while the treadle is being depressed. In addition, the needle zigzag and feed mechanisms will also advance by one step if you press the parameter UP key (15).
The needle zigzag and feed mechanisms will also retreat by one step if you press the parameter DOWN key (16).
(If the knife has been set to operate, the buzzer will sound and "C-On" will appear.)
5. "Ho" will appear in the parameter display LED (14), and the machine will stop at the final stitch position.
6. Return the treadle to the neutral position [A], and then depress it to the 2nd step [C]. The sewing machine will move to the home position, and the work clamp will rise.
7. Press the SELECT key (13) to change the mode to automatic mode.
 - If you press the SELECT key (13) during the checking operation, the mode will change to manual mode. If you press the SELECT key (13) once more, the mode will change back to test feed mode.
 - If you would like to stop checking before the operation has completed, press the RESET key (3). The sewing machine will move to the home position, and the work clamp will move to the neutral position.

6. CHECKING THE SEWING PATTERN

6-2. Manual mode (for checking the sewing pattern by turning the machine pulley by hand)



1. Press the SELECT key (13) to change the mode to automatic mode. Use the program No. keys (7) and (8) to select the number for the program to be checked, and then press the ENTER key (17).
(The program number will stop flashing.)
2. Press the SELECT key (13) to change the mode to manual mode.
(“H***” and the number of stitches in the selected program will appear in the parameter display LED (14).)
3. Depress the treadle from the neutral position [A] to the 2nd step [C].
(The work clamp will drop.)
4. Turn the machine pulley by hand.
(The needle zigzag and feed mechanisms will each advance by one step each time the machine pulley is turned.)
(If the knife has been set to operate, the buzzer will sound and "C-On" will appear.)
5. Stop turning the machine pulley when "Ho" appears in the parameter display LED (14) and the pulley is at the needle up stop position.
6. When the treadle is depressed once more to the 2nd step [C], the sewing machine will move to the home position, and the work clamp will rise.
7. Press the SELECT key (13) to change the mode to automatic mode.
 - If you turn the machine pulley to the needle up stop position and press the SELECT key (13) during the checking operation, the mode will change to test feed mode.
 - If you would like to stop checking before the operation has completed, press the RESET key (3). The sewing machine will move to the home position, and the work clamp will move to the neutral position.

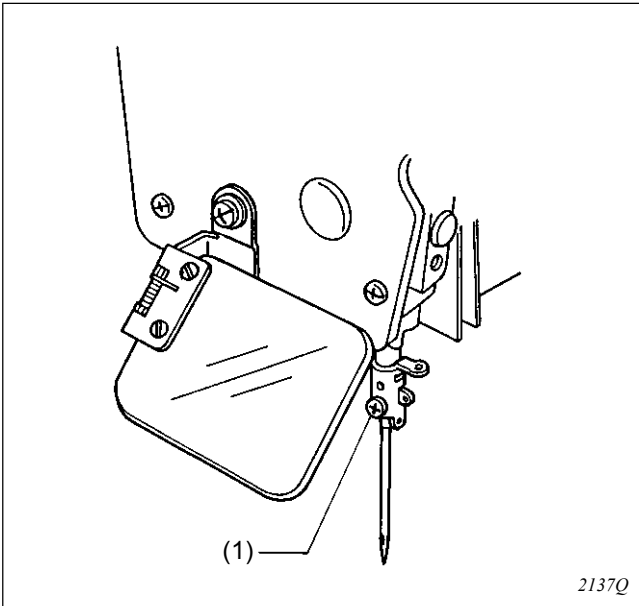
7. CORRECT USE

⚠ CAUTION



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

7-1. Installing the needle



1. Use a Schmetz Nm 134 needle.
2. Loosen the set screw (1), insert the needle as far as it will go so that the groove is facing toward pulley, and then tighten the set screw (1).

* Factory default

Sub class -2, -5	Sub class -3
Schmetz Nm134#90	Schmetz Nm134#75

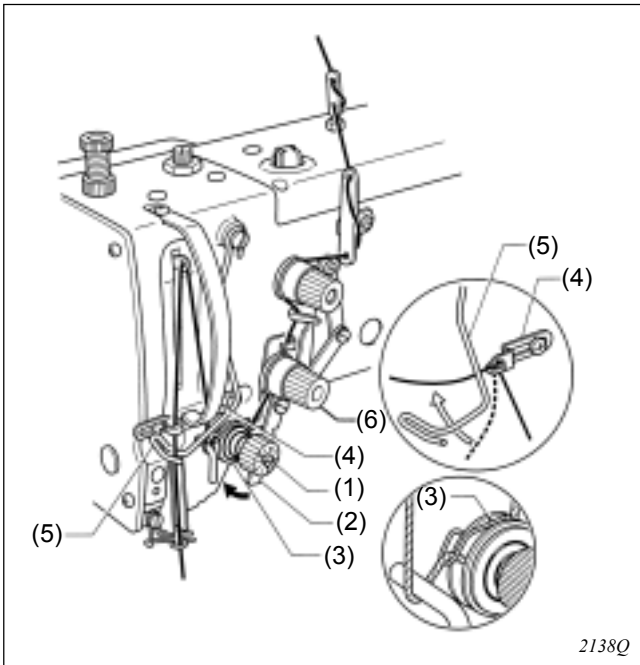
7. CORRECT USE

7-2. Threading the upper thread

CAUTION



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



Thread the upper thread correctly as shown in the illustration.

- 1) When pulling the thread out from the zigzag thread tension (1), move the tension release lever (2) in the direction of the arrow to open the tension discs (3) in order to make it easier to pull out the thread.
- 2) After threading the arm thread guide (4), pass the thread under the thread guide (5) as shown in the illustration to make it easier to thread.
- 3) Push the needle bar to the right to make it easier to pass the thread through the needle.

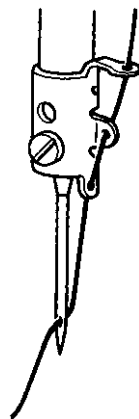
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2139Q



For spun thread and cotton thread

2140Q



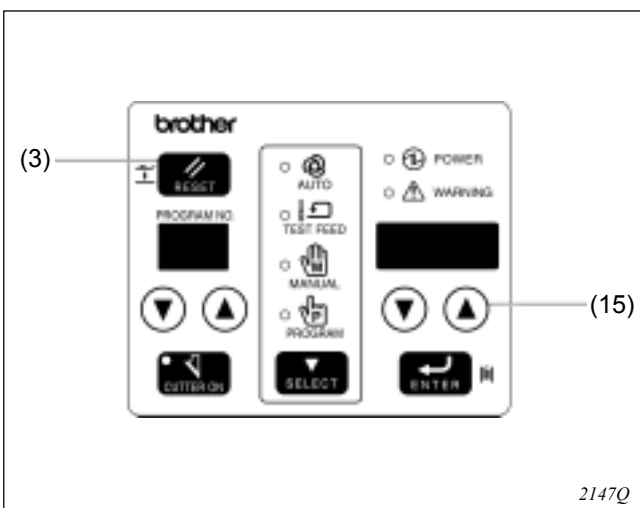
For polyester thread

NOTE:

The thread tension (6) is used to prevent the upper thread from becoming knotted, tangled or loose, so do not touch it. It is tightened only gently. If it is tightened too firmly, the knob may become damaged.

Threading the thread at the sewing start position

1. Press the RESET key (3).
The work clamp will be lowered.
2. Press the parameter up key (15).
The needle bar will move to the right to make threading easier.
3. Press the RESET key (3).
The needle bar will move to the center position and the work clamp will be raised.

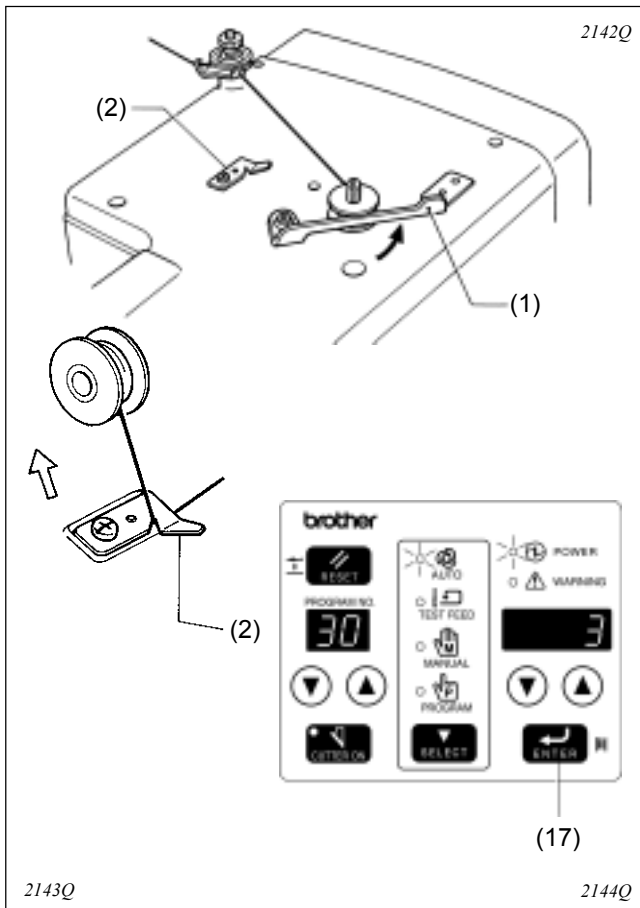


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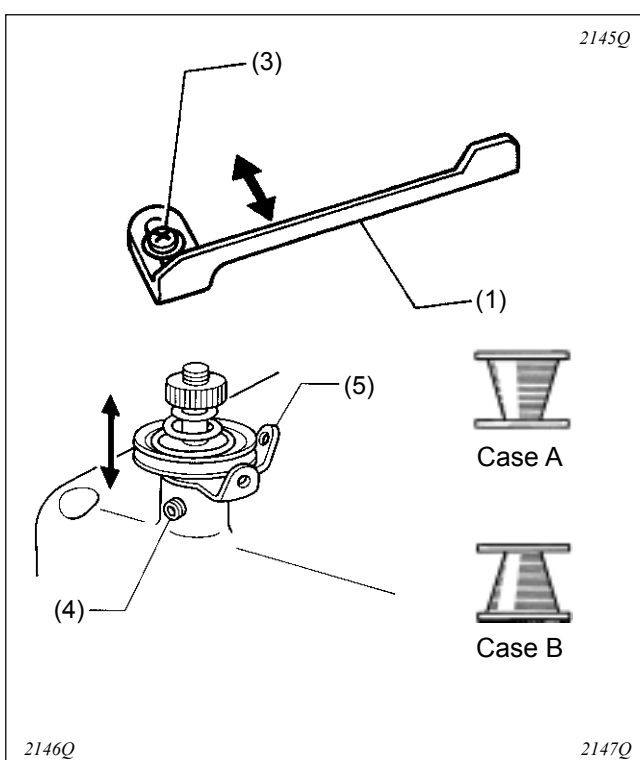
7-3. Winding the lower thread

⚠ CAUTION

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



1. Place the bobbin all the way onto the shaft.
2. Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser (1).
3. Turn on the power switch. Depress the treadle to set the machine to the home position.
4. While pressing the ENTER key (17) on the operation panel, depress the treadle until the machine starts operating, and then release the key. Only the upper shaft and lower shaft will then operate; the zigzag and feed mechanisms and the presser foot will not operate. When the lower thread has finished winding, return the treadle to the neutral position.
5. Remove the bobbin, hook the thread onto the knife (2), and then pull the bobbin in the direction of the arrow to cut the thread.

**Adjusting the bobbin winding amount**

Loosen the screw (3) and adjust the bobbin presser (1).

If the thread winds onto the bobbin unevenly

Loosen the set screw (4) and move the bobbin wider tension bracket (5) up and down to adjust.

* For case A, move the bobbin winder tension bracket down, and for case B, move it upward.

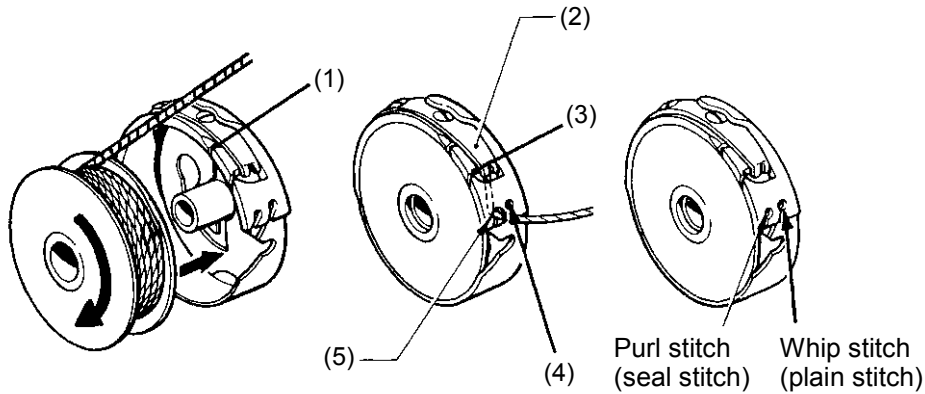
7. CORRECT USE

7-4. Threading the bobbin case

⚠ CAUTION



Turn off the power switch before removing or inserting the bobbin case, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.



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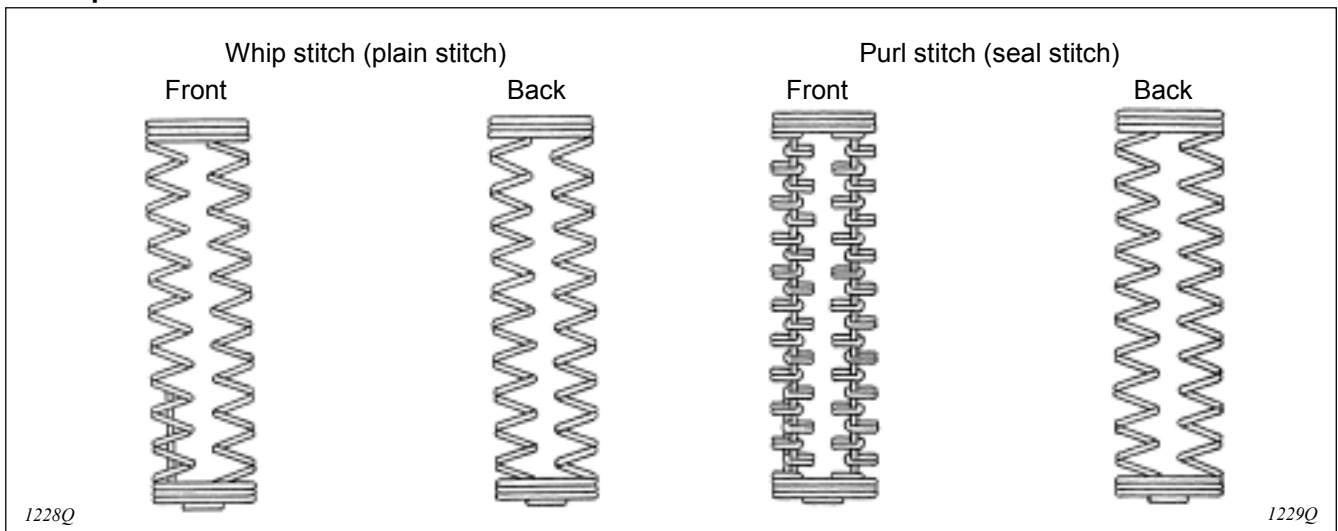
1. Insert the bobbin into the bobbin case. Insert as shown in the illustration.

NOTE:

If the bobbin is inserted back to front, the bobbin will spin freely and the work clamp pulse motor will get out of step.

2. Pass the thread through the slot (1) and then under the tension spring (2) and through the slot (3). When sewing whip stitches, pull approximately 40 mm of thread out from the thread hole (4), and when sewing purl stitches, pull approximately 40 mm of thread out from thread hole (5).
3. Insert the bobbin case into the bottom of the rotary hook.

Stitch patterns



Whip stitch (plain stitch)

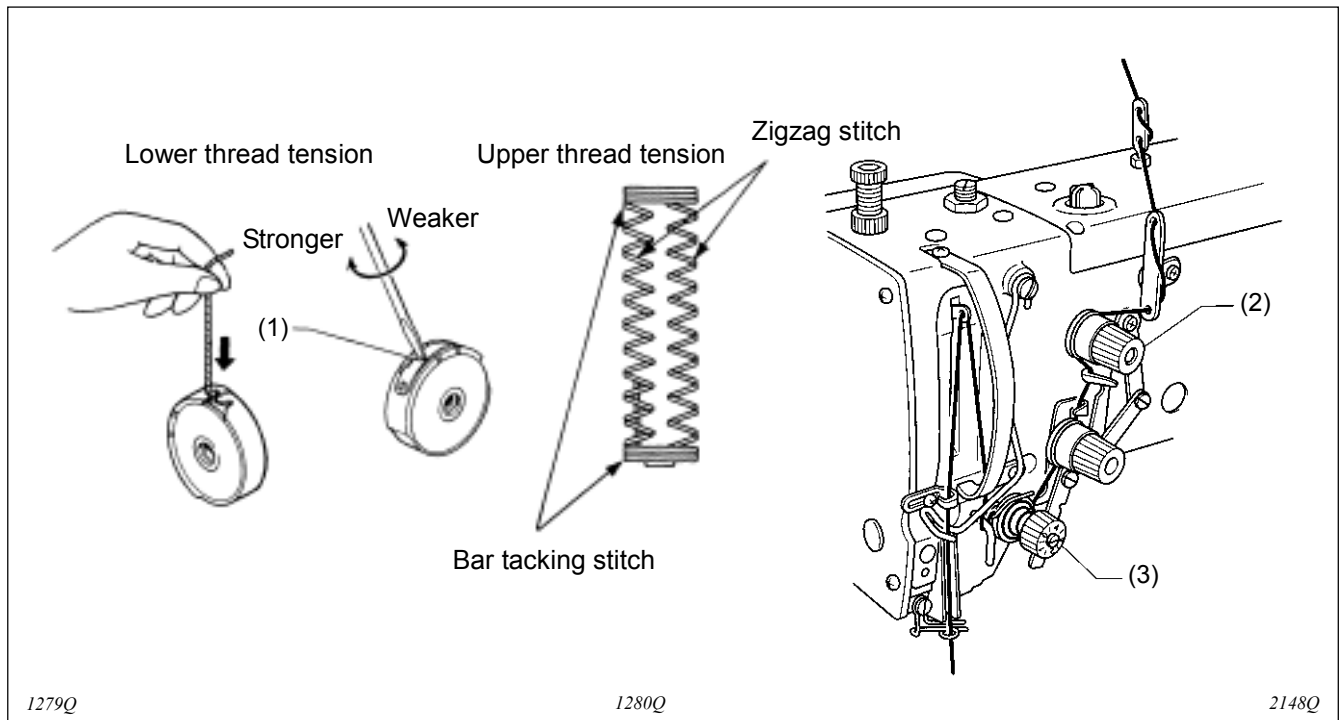
The above stitch pattern in which the upper thread moves over the top and the bottom thread moves over the bottom of the material in a zigzag pattern is called a “whip” stitch. This pattern is identical to the zigzag pattern of a lock stitch zigzag machine.

Purl stitch (seal stitch)

The above pattern in which the upper needle thread tension is high and the upper needle follows a straight line through the seam center while the lower thread moves left to right and intertwines with the upper thread is called a “purl” stitch.

7-5. Thread tension

The shapes of the seams for all patterns which have been stored in programs 1 to 90 can be set using parameter No. 11. Make the following adjustments in accordance with the seam shape which has been set.



Whip stitch (plain stitch)

1. Adjust by turning the adjustment screw (1) until the bobbin case drops when it is shaken slightly (0.15 - 0.25 N) while the thread end coming out of the bobbin case is held.
2. Turn the tack tension control (2) to adjust the thread tension so that a clean whip stitch is obtained at the bar tacking areas and the zigzag areas. There is no need to loosen the zigzag tension control (3) at this time. Bar tacking stitches and zigzag stitches are sewn at the tension which is set by the tack tension control (2), so that zigzag tension is automatically disabled. If the zigzag tension control (3) is loosened, the upper thread trailing length after upper thread trimming may become longer.

Purl stitch (seal stitch)

1. Adjust by turning the adjustment screw (1) until the bobbin case drops gently by its own weight (0.05 - 0.15 N) while the thread end coming out of the bobbin case is held.
2. Turn the tack tension control (2) to adjust the thread tension so that a clean whip stitch is obtained at the bar tacking areas.
3. Turn the zigzag tension control (3) while watching the looping of the zigzag stitch.

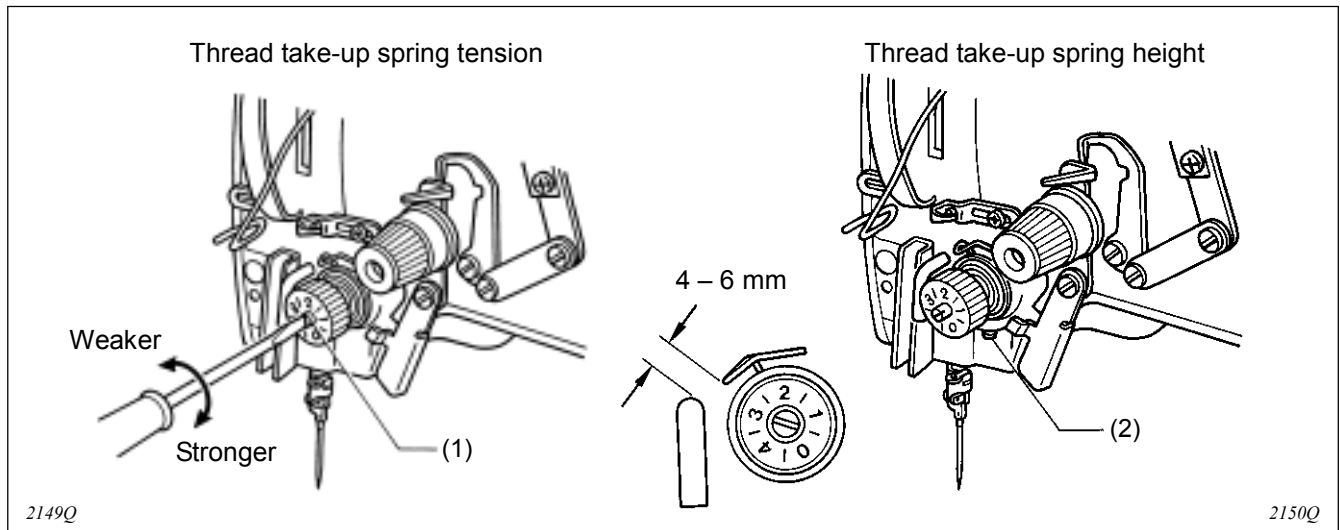
7. CORRECT USE

Thread take-up spring tension

Turn the thread tension stud (1) to adjust the thread take-up spring tension to between approximately 0.10 - 0.20 N in accordance with the material to be sewn.

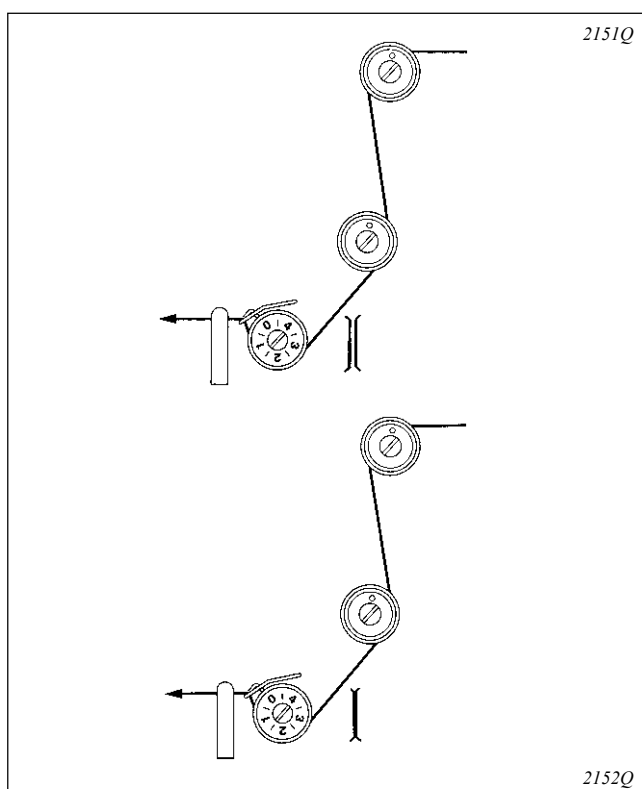
Thread take-up spring height

Loosen the set screw (2), and turn the entire thread tension adjuster to adjust the thread take-up spring height to between 4 - 6 mm in accordance with the material to be sewn.



Reference thread tension

Stitch patterns	Whip stitch		Purl stitch	
Upper thread	Polyester #50	Spun #60	Polyester #50	Spun #60
Lower thread	Polyester #50	Spun #60	Polyester #50	Spun #60
Upper thread tension	0.30 - 0.70 N	0.50 - 0.85 N	0.75 - 2.00 N	1.00 - 2.20 N
Lower thread tension	0.15 - 0.25 N		0.05 - 0.15 N	
Thread take-up spring tension	0.10 - 0.20 N			
Thread take-up spring height	4 - 6 mm			



Upper thread tension for whip stitches (with zigzag tension open)

When using a program that has whip stitches set, press the RESET key to lower the work clamp, and then take the measurement shown in the illustration.

Upper thread tension for purl stitches (with zigzag tension closed)

When using a program that has purl stitches set, press the RESET key to lower the work clamp, and then take the measurement shown in the illustration.

8. SEWING

⚠ CAUTION



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

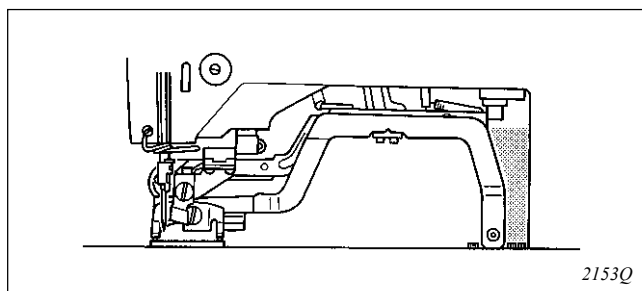
- When threading the needle
- When replacing the bobbin and needle
- When not using the machine and when leaving the machine unattended.



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.

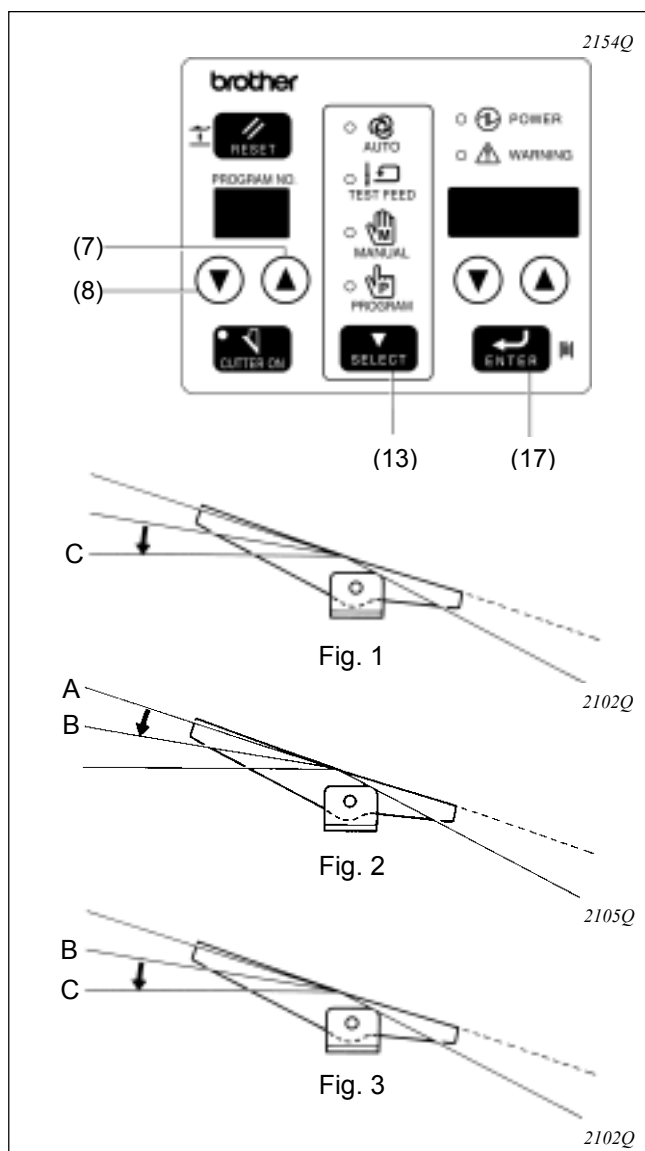
NOTE:

- The feed arm can move, so be careful of the clearance.
- When using the machine, check that the oil is visible through the oil cap. If it cannot be seen, stop the machine and eliminate the cause of the problem.



2153Q

8-1. Sewing



1. Turn on the power.
2. Depress the treadle to the 2nd step [C]. [Figure 1] (Refer to "5-2. Home position return (preparation)".)
3. Press the SELECT key (13) to change the mode to automatic mode. Use the program No. keys (7) and (8) to select the number for the program to be sewn, and then press the ENTER key (17).
4. Set the material in place, and then depress the treadle from the neutral position [A] to the 1st step [B]. [Figure 2] (The work clamp will drop.)
5. Depress the treadle from the 1st step [B] to the 2nd step [C]. [Figure 3]
 - The sewing machine will start sewing.
 - Once the sewing operation has completed normally, the production counter will increase by 1 if in production counter display mode (DIP switch A-4 = OFF). If in lower thread counter mode (DIP switch A-4 = ON), the lower thread counter will decrease by 1.

8. SEWING

8-1-1. If the emergency stop switch is pressed during sewing

The sewing machine will stop and "E-00" will appear in the parameter display LED (14). Turn the knob of the emergency stop switch to the right to release it.

1. To finish sewing in this condition

Next sewing

- 1) Press the RESET key (3).
(The feed mechanism will return to the sewing start position and the work clamp will rise.)
- 2) Sewing will start again when the treadle is depressed.

2. To start sewing again from slightly before or after the emergency stop point

Resuming sewing

- 1) Press the parameter UP key (15) to move the zigzag and feed mechanisms to the next sewing position. Press the parameter DOWN key (16) to move the zigzag and feed mechanisms to the previous sewing position. (The "E-00" display will be cleared at this time.)
- 2) Move to the position to continue sewing from, and then depress the treadle. The rest of the sewing will be carried out.

3. To sew from the sewing start point without raising the work clamp (without shifting the material)

Re-sewing

- 1) While pressing the parameter DOWN key (16), press the RESET key (3).
(The feed mechanism will return to the sewing start position, but the work clamp will not rise.)
- 2) Depress the treadle to start sewing.

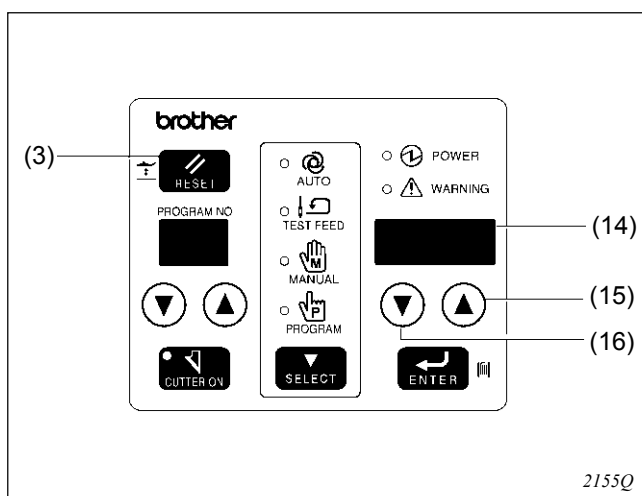
* If panel DIP switch A-3 is set to ON, an emergency stop will occur when the treadle is depressed, in the same way as when the emergency stop switch is pressed.

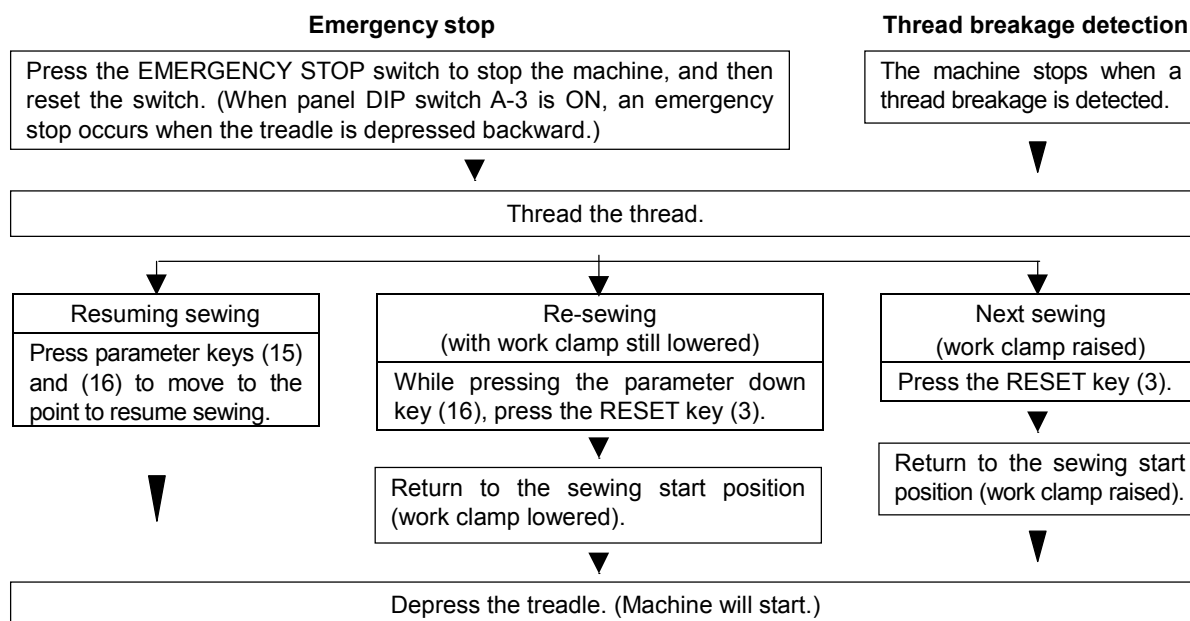
NOTE:

Turn the power off before changing the DIP switch settings. If the settings are changed while the power is still on, they will not take effect.

NOTE:

Forcing emergency stops using the treadle only works while the sewing machine is running. If the sewing machine is stopped, the work clamp will be raised.





8-1-2. If the thread breaks during sewing

The sewing machine will stop and "E-01" will appear in the parameter display LED (14).
Re-thread the thread.

1. To finish sewing in this condition

Next sewing

- 1) Press the RESET key (3).
(The feed mechanism will return to the sewing start position and the work clamp will rise.)
- 2) Sewing will start again when the treadle is depressed.

2. To start sewing again from slightly before or after the thread breakage

Resuming sewing

- 1) Press the parameter UP key (15) to move the zigzag and feed mechanisms to the next sewing position. Press the parameter DOWN key (16) to move the zigzag and feed mechanisms to the previous sewing position. (The "E-01" display will be cleared at this time.)
- 2) Move to the position to continue sewing from, and then depress the treadle. The rest of the sewing will be carried out.

3. To sew from the sewing start point without raising the work clamp (without shifting the material)

Re-sewing

- 1) While pressing the parameter DOWN key (16), press the RESET key (3).
(The feed mechanism will return to the sewing start position, but the work clamp will not rise.)
- 2) Depress the treadle to start sewing.

If the emergency stop or thread breakage detector operates during sewing, the needle will move to the right before the sewing machine stops, in order to make threading easier.

8. SEWING

8-1-3. Thread breakage before sewing is finished

Set panel DIP switch A-1 to ON.

Even if sewing is complete, leave the work clamp lowered and check the sewing. Then depress the treadle backward to trim the thread and raise the work clamp.

If the thread breaks just before sewing is complete, and then sewing is completed without the thread breakage being detected, the following operations are possible.

1. To finish sewing in this condition

Finish

- 1) Press the RESET key (3).
(The feed mechanism will return to the sewing start position and the work clamp will rise.)
- 2) Sewing will start again when the treadle is depressed.

2. To continue sewing from around the location of the breakage

Resuming sewing

- 1) Press the parameter DOWN key (16) to move to position to continue sewing from.
- 2) If you do not want the cutter to operate, press the CUTTER ON key (5) to turn off the cutter.
- 3) Depress the treadle. The rest of the sewing will be carried out.
- 4) After sewing is complete, depress the treadle. The thread will be trimmed and the work clamp will be raised.
- 5) Before carrying out any further sewing, press the CUTTER ON key (5) to turn on the cutter.

3. To sew from the sewing start point without raising the work clamp (without shifting the material)

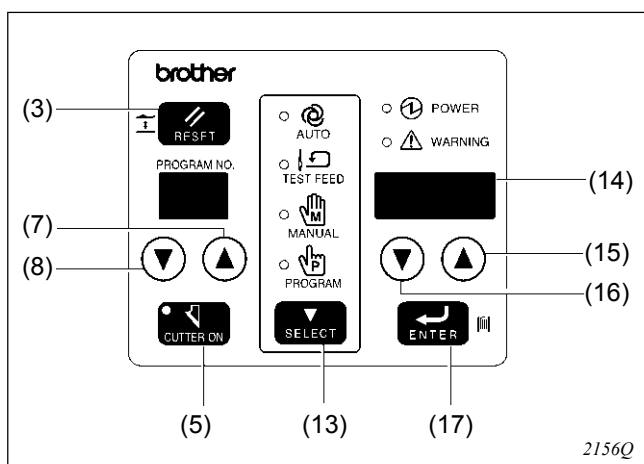
Re-sewing

- 1) While pressing the parameter DOWN key (16), press the RESET key (3).
(The feed mechanism will return to the sewing start position, but the work clamp will not rise.)
- 2) If you do not want the cutter to operate, press the CUTTER ON key (5) to turn off the cutter.
- 3) Depress the treadle to start sewing.
- 4) After sewing is complete, depress the treadle. The thread will be trimmed and the work clamp will be raised.
- 5) Before carrying out any further sewing, press the CUTTER ON key (5) to turn on the cutter and return the program number to the previous number.

4. To sew from the sewing start point without raising the work clamp in the next program (without shifting the material)

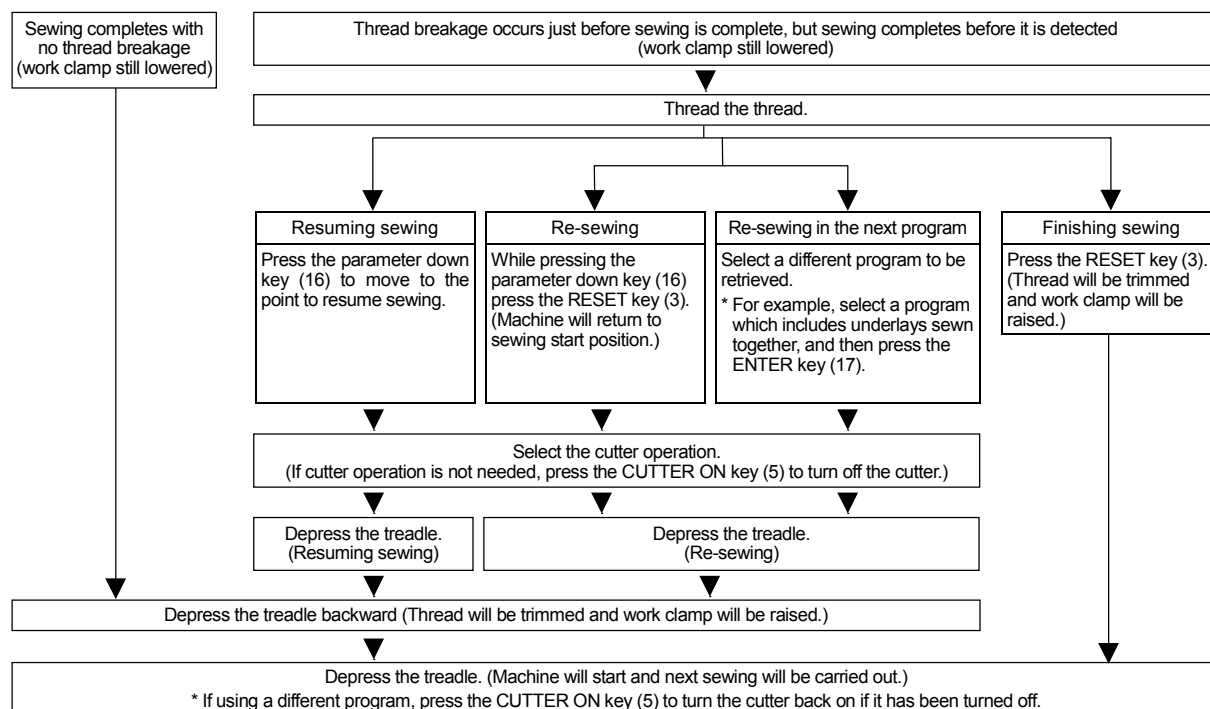
Re-sewing in the next program

- 1) The next program number can be retrieved when re-sewing.
(For example, if there is a program which has already been assigned to a different program number which has the same buttonhole shape and which has underlays sewn together as an added function, then you can retrieve that program.)
Press the Program No. UP key (7) or the Program No. DOWN key (8) to select the program, and then press the ENTER key (17).
- 2) If you do not want the cutter to operate, press the CUTTER ON key (5) to turn off the cutter.



- 3) Depress the treadle to start sewing.
- 4) After sewing is complete, depress the treadle.
The thread will be trimmed and the work clamp will be raised.
- 5) Before carrying out any further sewing, press the CUTTER ON key (5) to turn on the cutter and return the program number to the previous number.

* DIP switch A-1 = ON



8-1-4. When resuming sewing in test feed mode or manual mode

1. Use the SELECT key (13) to switch to either test feed mode or manual mode.
2. Move to the point to resume sewing using the operations that apply to whichever mode being used.
 - * Refer to "6-1. Test feed mode" or "6-2. Manual mode".

NOTE:

If using manual feed mode, raise the needle bar to its highest position before proceeding to step 3. below.

If the needle bar is not at its highest position when step 3. below is carried out, error "E-02" will be displayed. Turn the machine pulley to raise the needle bar to its highest position before continuing.

3. While pressing the ENTER key (17), press the SELECT key (13).
 - * The mode will change to automatic mode and "E-00" will be displayed.

NOTE:

When step 3. is carried out, the mode cannot be returned to test feed mode or manual mode.

4. Press the parameter up key (15) or the parameter down key (16).
 - * The "E-00" display will be cleared.
5. Depress the treadle.
 - * Sewing will start from the current position.

8-1-5. Lower thread counter

- When panel DIP switch A-4 is set to ON ... lower thread counter mode
1. When the lower thread counter reaches 0, replace the lower thread.
 - The sewing machine will not start at this time, even if the treadle is pressed.
 2. Press the ENTER key (17).
 - The lower thread counter setting value will appear in the parameter display LED (14) and normal sewing can then be carried out.
- * To change the lower thread counter setting value, refer to "5-4-9. Changing the lower thread counter setting value".

9. MAINTENANCE

CAUTION



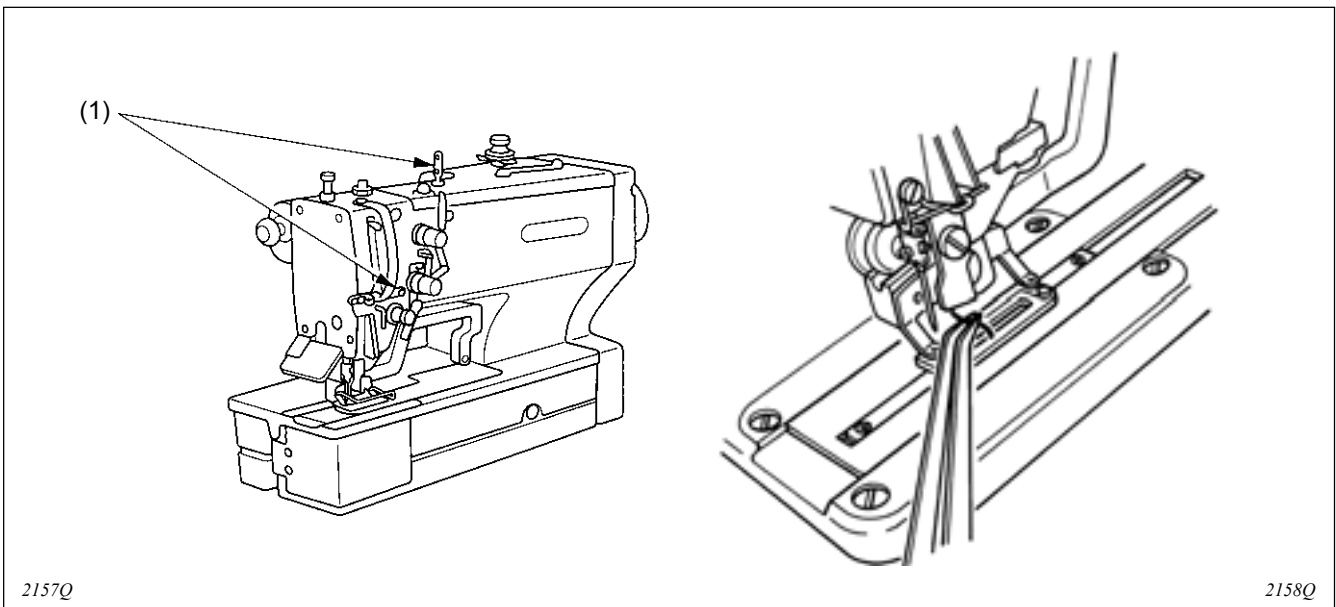
Turn off the power switch before carrying out cleaning, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.



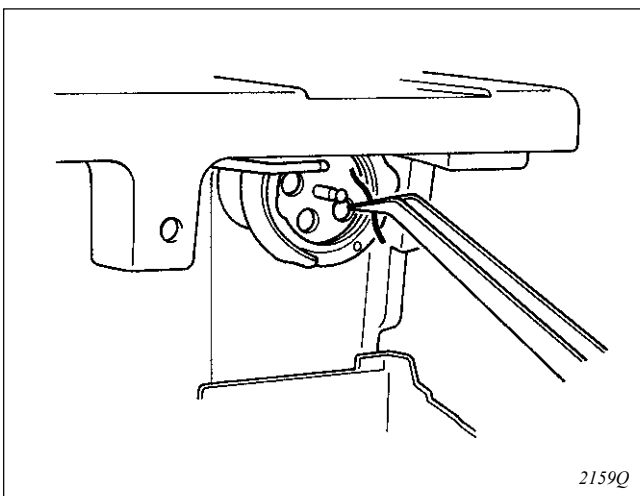
Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.

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

9-1. Cleaning



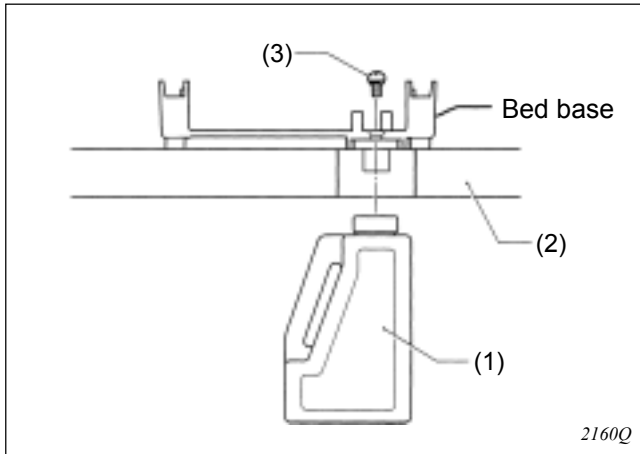
Remove lint and dust from the thread passages (1).
Remove lint and dust from around the work clamp.



Remove the bobbin case, and remove lint and dust from around the shuttle.

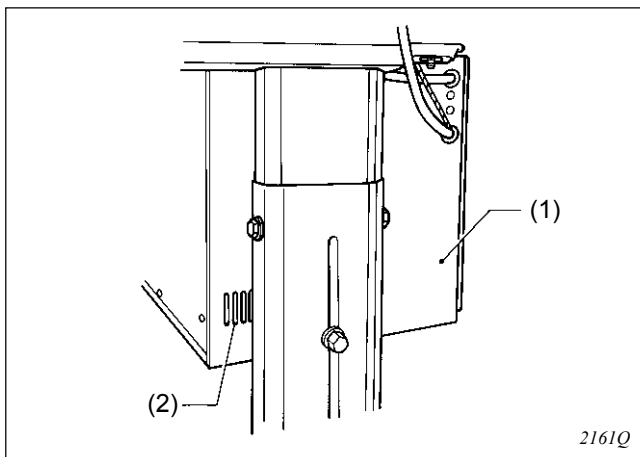
Clean away any thread scraps and cotton dust from around the lower thread trimmer mechanism.

9-2. Draining the oil



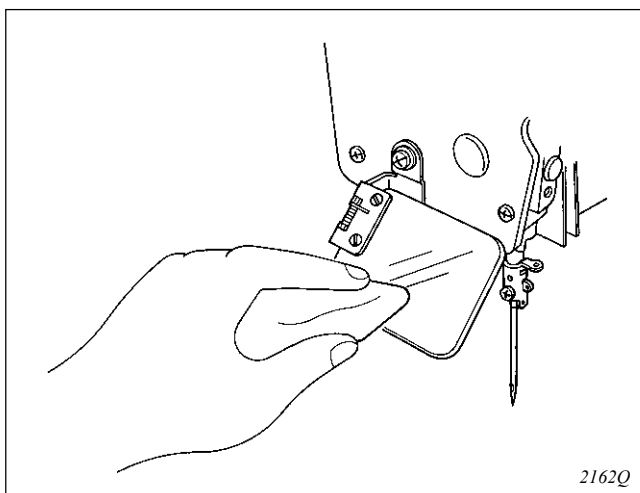
1. Remove the belt cover, and then gently tilt back the machine head.
2. Place the oil tank (1) against the underside of the work table (2), and then remove the screw (3).
3. After the oil has all drained out, tighten the screw (3).

9-3. Cleaning the control box air inlet port



Use a vacuum cleaner to clean the filter in the air inlet port (2) of the control box (1) at least once a month. If the machine is used while the air inlet port is blocked, the inside of the control box will overheat. When this happens, the overheating error code ("E-40") will be displayed and you will not be able to operate the sewing machine.

9-4. Cleaning the eye guard



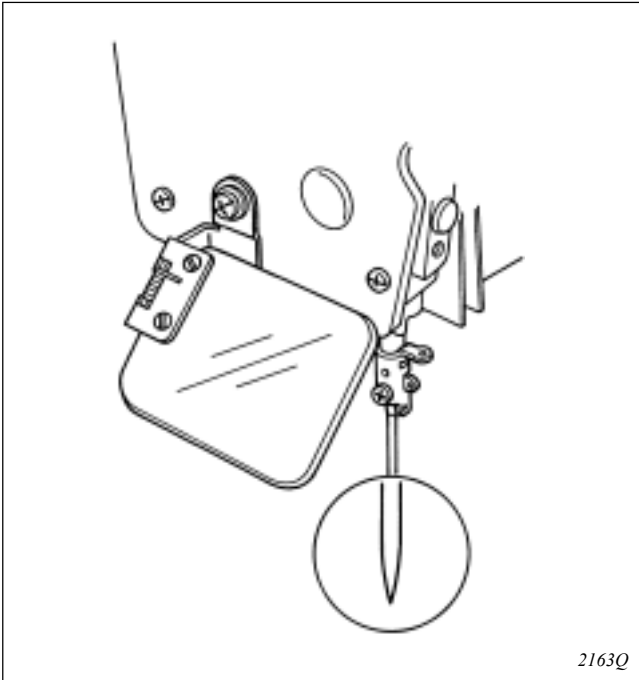
Wipe the eye guard clean with a soft cloth.

NOTE:

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

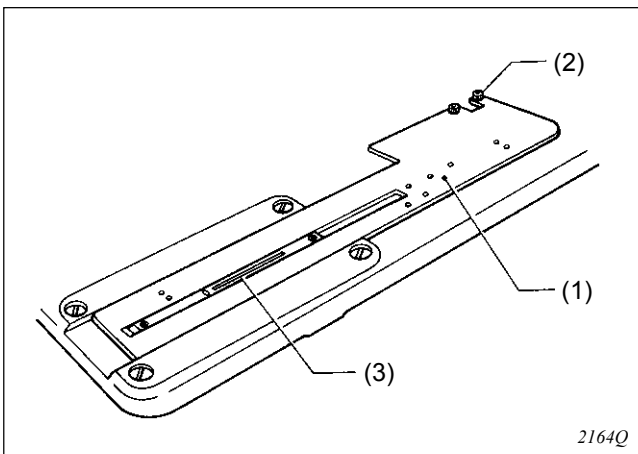
9. MAINTENANCE

9-5. Checking the needle



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

9-6. Cleaning the length feed plate



Clean the length feed plate (1) if foreign materials such as shavings start getting onto the material.

1. Loosen the screw (2), and then remove the length feed plate (1).
2. Clean the underside of the length feed plate (1) and the needle plate (3).

10. STANDARD ADJUSTMENTS

⚠ CAUTION

- ⊘ Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
- ⚠ Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
- ⚠ Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.
 - When carrying out inspection, adjustment and maintenance
 - When replacing consumable parts such as the rotary hook
- ⚠ Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
- ⚠ If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
- ⚠ If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.

NOTE:

- The pulse motor may become warm. Be careful not to touch it when tilting back the machine head.
- The feed pulse motor cooling fan spins while the machine power supply is turned on. Be careful of this when tilting back the machine head.
- Take care when handling the knife.

Turn off the power supply before carrying out all but the following tasks.

“10-1. Needle bar height”

“10-2. Needle and hook timing adjustment”

“10-3. Adjusting the clearance between needle and hook point”

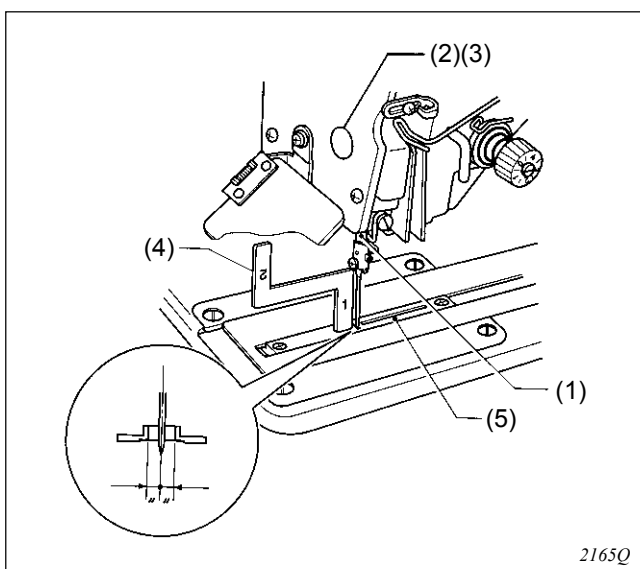
“10-7-2. Adjusting the upper thread scissors opening timing”

“10-9. Adjusting the bobbin presser”

Turn on the power, and after the sewing machine returns to the home position, press the RESET key before carrying out the above adjustments.

* The work clamp will drop and "Adj" will appear in the numeric display. The sewing machine will not operate when the treadle is pressed at this time.

10-1. Needle bar height



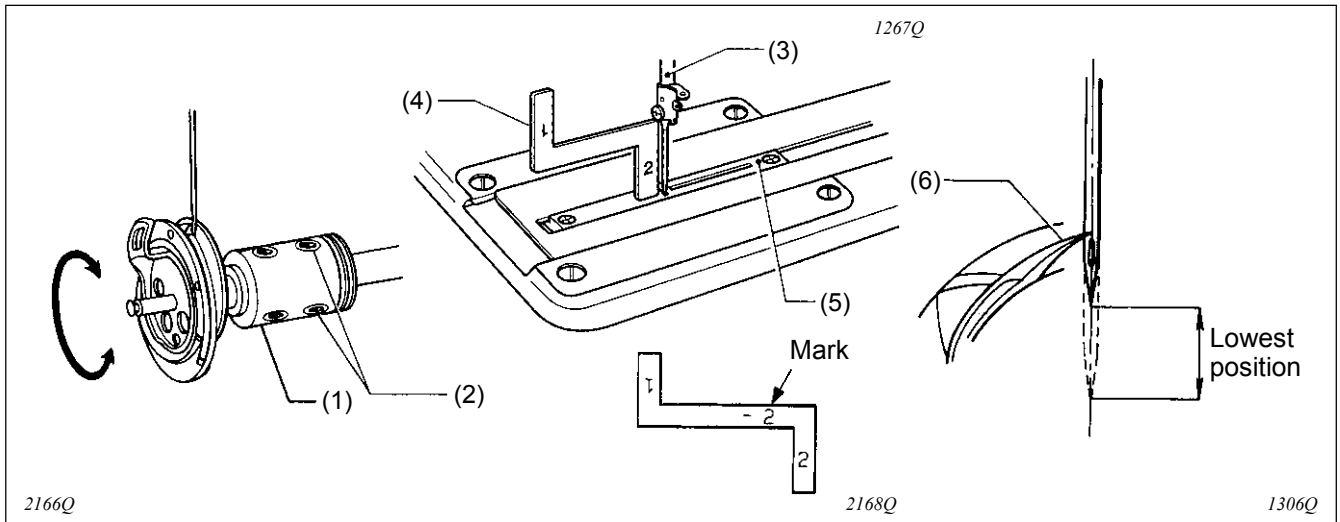
After the sewing machine has returned to the home position, press the RESET key before carrying out this adjustment.

1. Set the needle bar (1) to its lowest position.
2. Remove the rubber cap (2) from the face plate, and then loosen the screw (3) of the needle bar clamp.
3. Insert the “1” part of the gauge (4) between the needle plate (5) and the lower edge of the needle bar (1), and touch the needle bar against the gauge.
4. Tighten the screw (3).
5. Install the rubber cap (2).

* Different gauges are used for each of the three sub-classes -2, -3 and -5, so make sure that the gauge being used matches the specifications and application for the sewing machine being adjusted.

10. STANDARD ADJUSTMENTS

10-2. Needle and hook timing adjustment

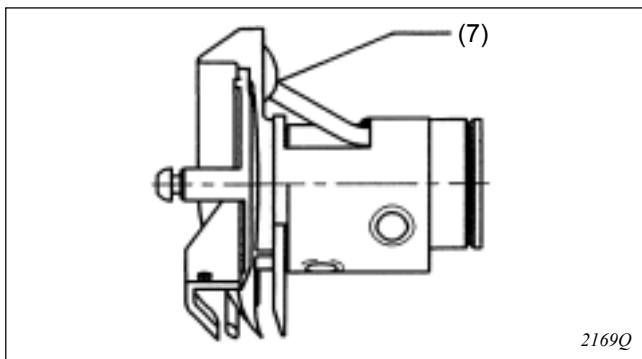


After the sewing machine has returned to the home position, press the RESET key before carrying out this adjustment.

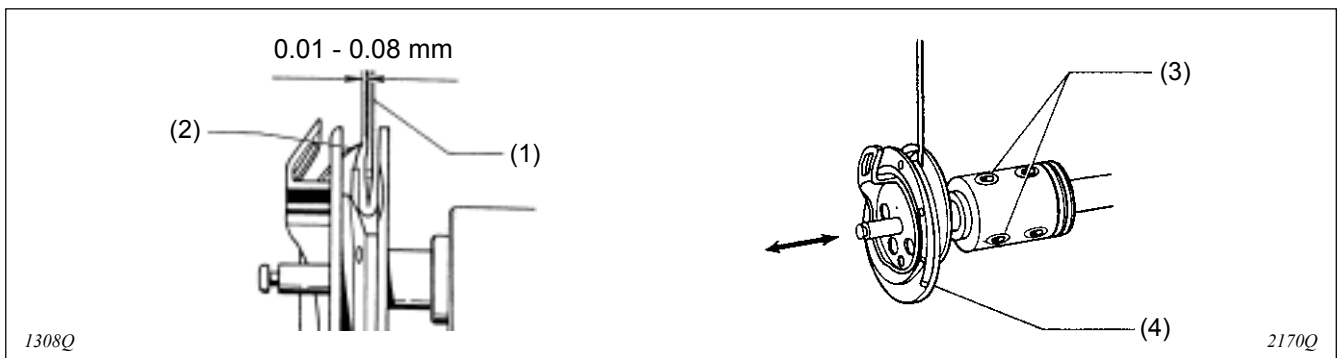
1. Loosen the two screws (2) of the rotary hook joint (1).
2. Turn the pulley in the regular direction of rotation (toward the front) so that the needle bar (3) just begins to rise from its lowest position.
3. Insert the "2" part of the gauge (4) between the needle plate (5) and the lower edge of the needle bar (3), and then align the rotary hook point (6) with the center of the needle when the needle bar contacts the gauge. Different gauges are used for each of the three sub-classes -2, -3 and -5, so check the timing gauge identification marks before using them.

NOTE:

When installing the rotary hook joint, install using the set screw so that the oil inlets in the rotary hook and rotary hook joint (7) are aligned.



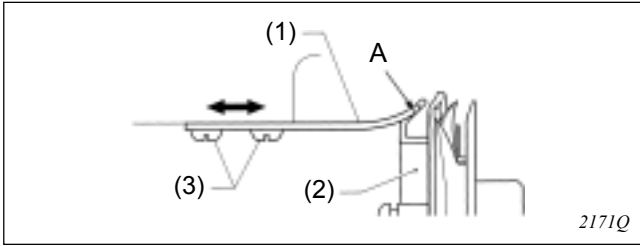
10-3. Adjusting the clearance between needle and hook point



After the sewing machine has returned to the home position, press the RESET key before carrying out this adjustment.

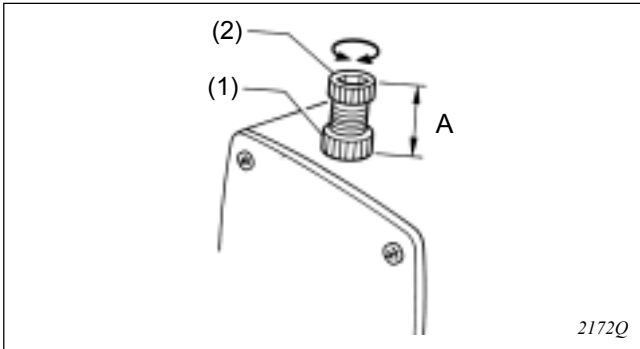
Loosen the screws (3) and move the rotary hook (4) forward or back until there is a clearance of 0.01 to 0.08 mm between the needle (1) and the hook point (2).

10-4. Adjusting the inner rotary hook and rotary hook holder overlap



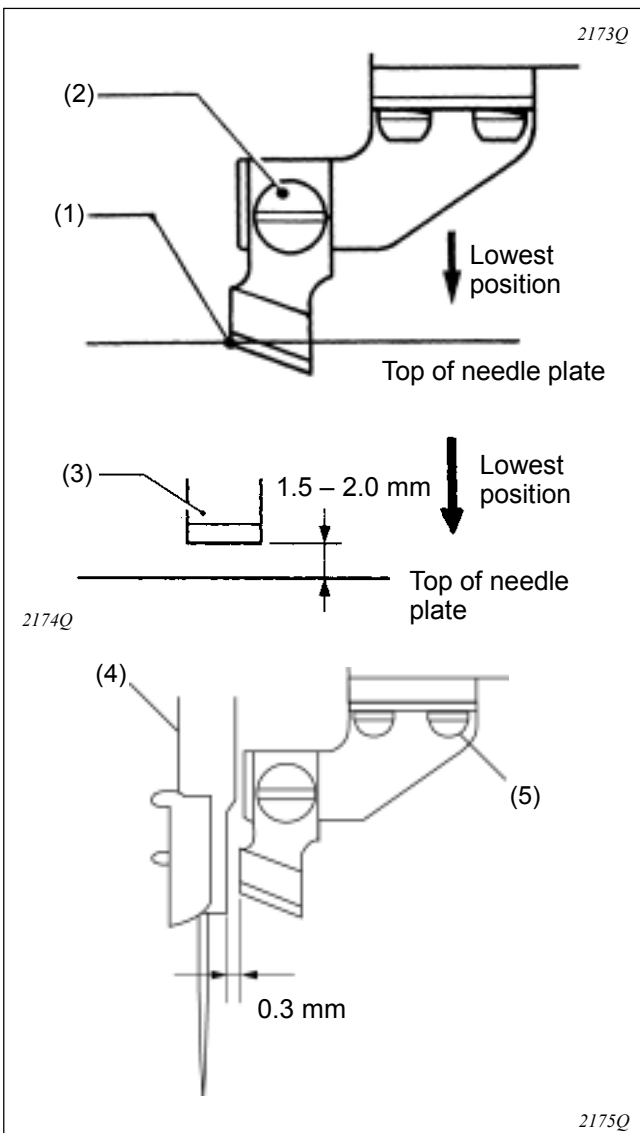
Loosen the screw (3) to adjust so that the tip of the rotary hook holder (1) does not protrude past the edge A of the inner rotary hook (2).

10-5. Adjusting the work clamp pressure



1. The standard distance A is 30 mm (approximately 30 N).
2. Loosen the nut (1) and turn the presser adjusting screw (2) to adjust the work clamp pressure.

10-6. Adjusting the knife installation



1. Install the knife with the screw (2) so that the top (1) of the knife blade is aligned with the top of the needle plate when the knife is pressed down by hand to its lowest position.
For the flat cutter (3), install with the screw (2) so that the top (1) of the knife blade is 1.5 – 2.0 mm above the top of the needle plate.

NOTE:

When the knife is driven by the solenoid, the movement will be approximately 2 mm greater than that shown in the illustration.

NOTE:

If the knife does not cut properly, the knife may get stuck in the material and not return. If this happens, replace or sharpen the knife.

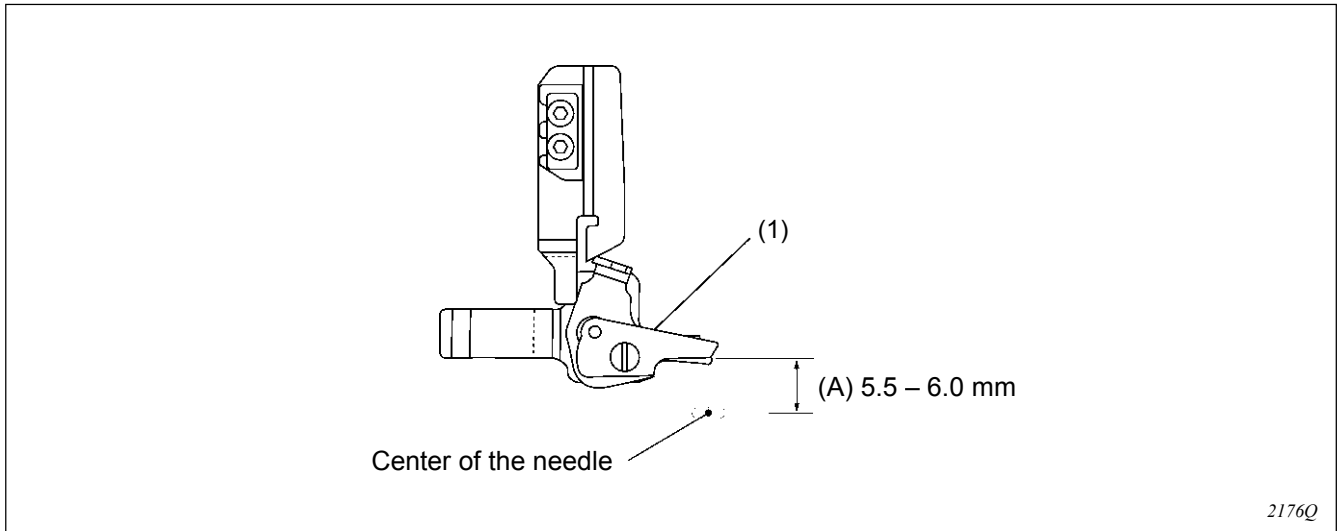
A special needle plate which helps to prevent the knife from getting stuck and which helps maintain the cutting edge is available as an option.

2. Loosen the screw (5) to adjust so that the clearance between the cutter and the needle bar (4) is 0.3 mm.
* Check that the needle bar (4) does not touch the cutter when it moves sideways.

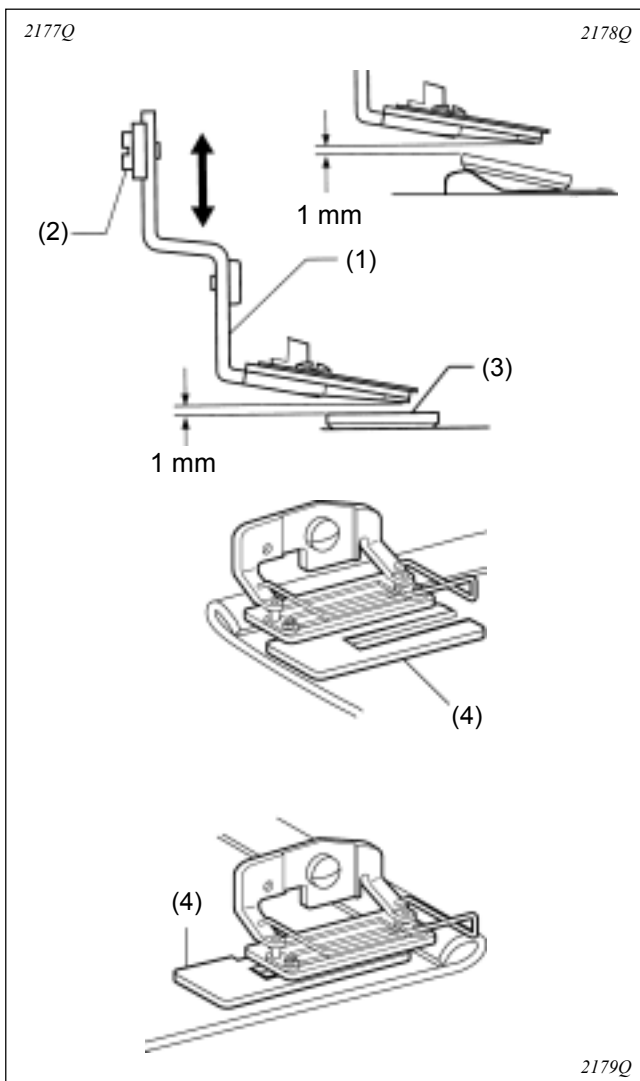
10. STANDARD ADJUSTMENTS

10-7. Adjusting the upper thread trimming

The standard distance (A) between the upper thread scissors (1) and the center of the needle is 5.5 to 6.0 mm when the work clamp is lowered by pressing the RESET key after setting the machine to the home position.



10-7-1. Adjusting the installation height of the upper thread scissors



Loosen the screw (2), and then move the upper thread scissors (1) up or down to adjust the clearance between the upper thread scissors (1) and the work clamp (3) to approximately 1 mm.

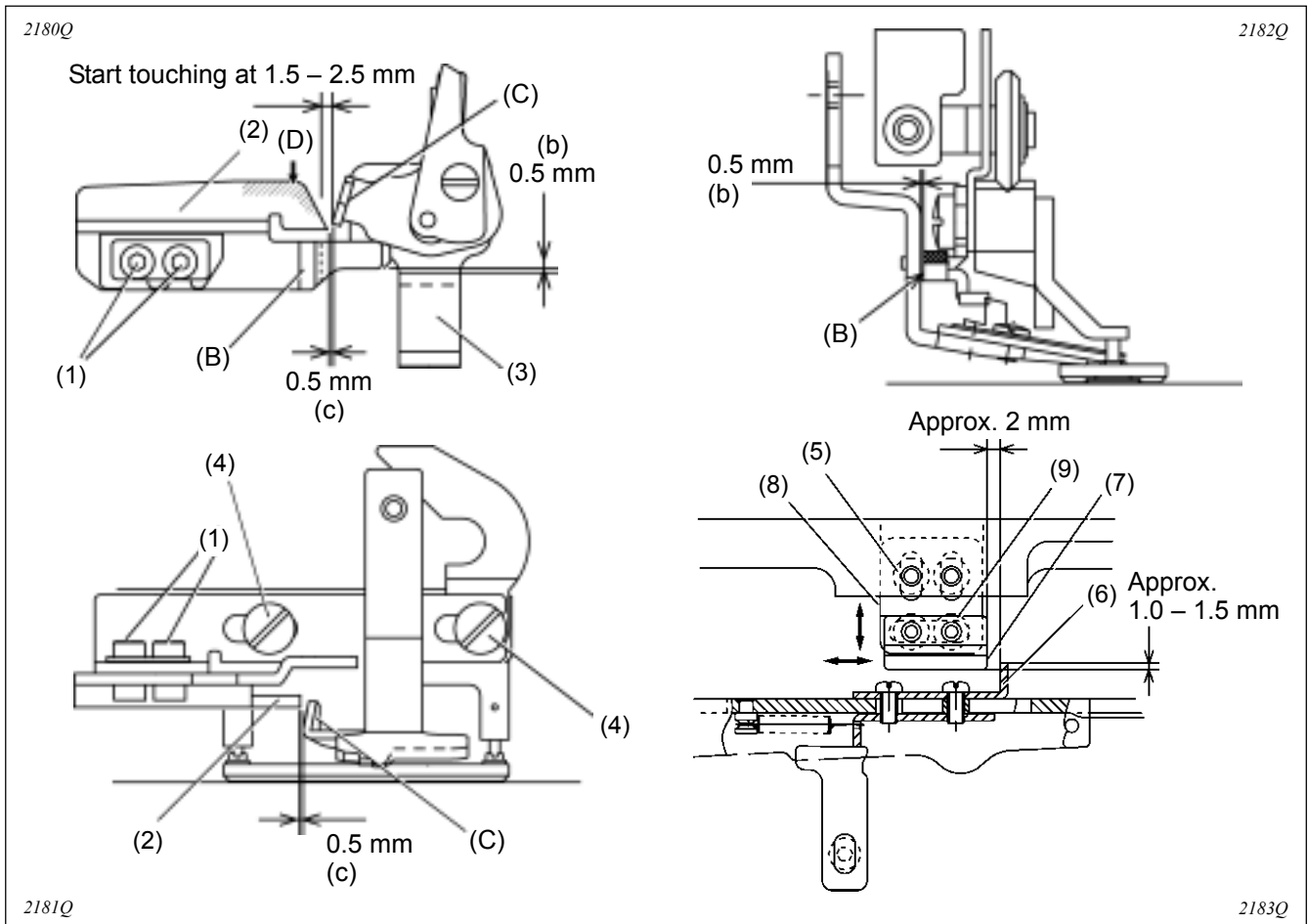
NOTE:

The work clamp (3) will tilt when sewing joints, so adjust so that the upper thread scissors (1) do not touch it. If the upper thread scissors (1) touch the work clamp (3), the work clamp lifter pulse motor may get out of step.

* If the tilting of the work clamp (3) causes skipped stitches to occur when sewing material joints, use the accessory auxiliary sheet (4) as shown in the illustration.

10-7-2. Adjusting the upper thread scissors opening timing

After the sewing machine has returned to the home position, press the RESET key before carrying out this adjustment.



<Gradual opening timing adjustment>

1. Loosen the screws (1), and then adjust so that the distance (b) between ridge line (B) on the opening cam (2) and the upper thread scissors (3) is 0.5 mm, and so that ridge line (B) on the opening cam is parallel to the feed direction.
2. Loosen the screw (4), and then adjust so that the distance (c) between the rising section (C) of the upper thread scissors (3) and the tip of the opening cam (2) is approximately 0.5 mm when the upper thread scissors (3) are closed.

If you would like the scissors to start opening earlier, make the distance smaller. However, if the distance is too small, check that the work clamp does not touch the rising section (C) of the upper thread scissors (3) of the opening cam (2) when it is lowered and prevent the upper scissors (3) from opening.

- * Apply grease to the inclined face (D) of the opening cam (2).

<Scissors fully opening timing adjustment>

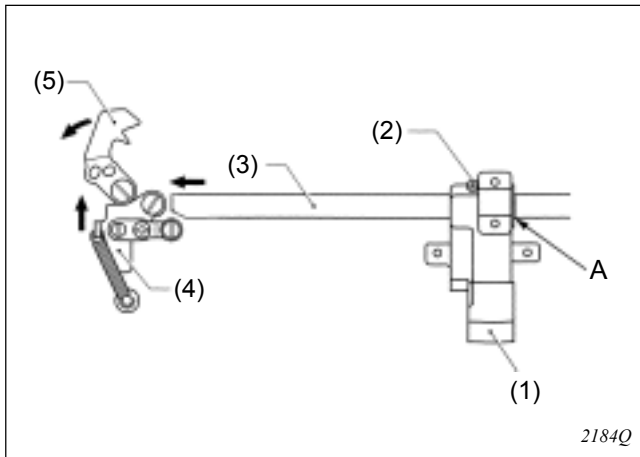
1. Loosen the screw (5), and then adjust the support plate (8) so that the back plate (6) and the cam (7) overlap by approximately 1.0 – 1.5 mm.
 - * If the amount of overlap is too small, the upper thread scissors will not open properly and the upper thread scissors and the cutter may touch each other.
2. Loosen the screw (9), and then adjust the clearance between the bend in the back plate (6) and the cam (7) to approximately 2 mm. If you would like the scissors to start opening earlier, make this clearance smaller.
3. Check that the upper thread scissors (3) open smoothly during feeding.

NOTE:

If the upper thread scissors (3) do not open smoothly, the upper thread scissors (3) may touch the cutter and needle breakage may occur.

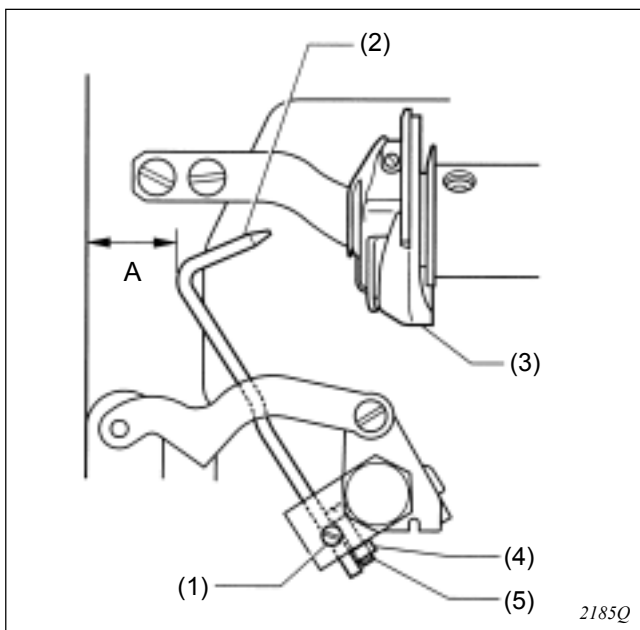
10. STANDARD ADJUSTMENTS

10-8. Adjusting the lower thread clamp timing



Loosen the set screw (2) of the feed arm support (1), and then align the reference line A on feed guide shaft B (3) with the edge of the feed arm support (1). When the feed mechanism moves by approximately 6 - 7 mm, the opening plate (4) will move and the lower thread retainer (5) will open. Move feed guide shaft B (3) to the left or right to change the opening timing.

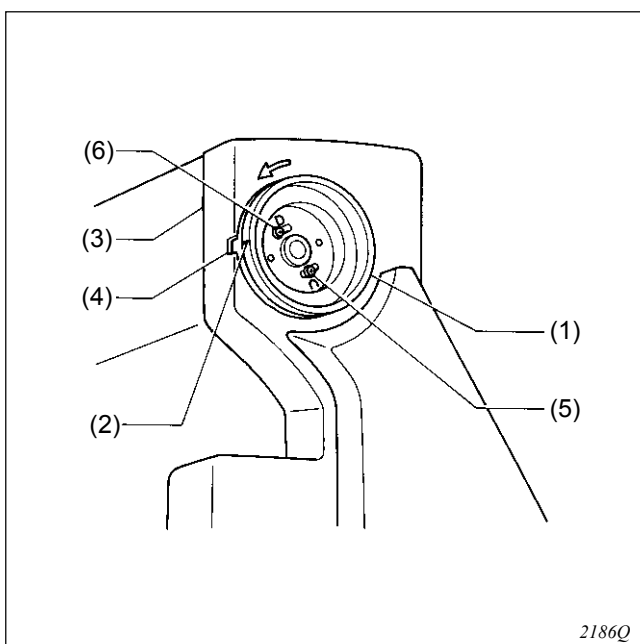
10-9. Adjusting the bobbin presser



After the machine head has returned to the home position, press the RESET key before carrying out this adjustment.

1. Loosen the set screw (1), and then adjust so that the bobbin presser (2) goes into the hole in the bobbin case (3).
2. Check that the work clamp is at the home position, and then loosen the nut (4) and turn the screw (5) to adjust the clearance A between the bobbin presser (2) and the edge of the bed to approximately 12.5 mm.

10-10. Adjusting the needle up stop position



The needle up stop position is adjusted so that the index mark (2) on the machine pulley (1) is inside the mark (4) on the belt cover (3).

If adjustment is necessary, loosen the screw (5) of the machine pulley (1) and adjust the position of the machine pulley (1). The machine pulley (1) stops later if it is turned clockwise, and it stops later if it is turned counter clockwise.

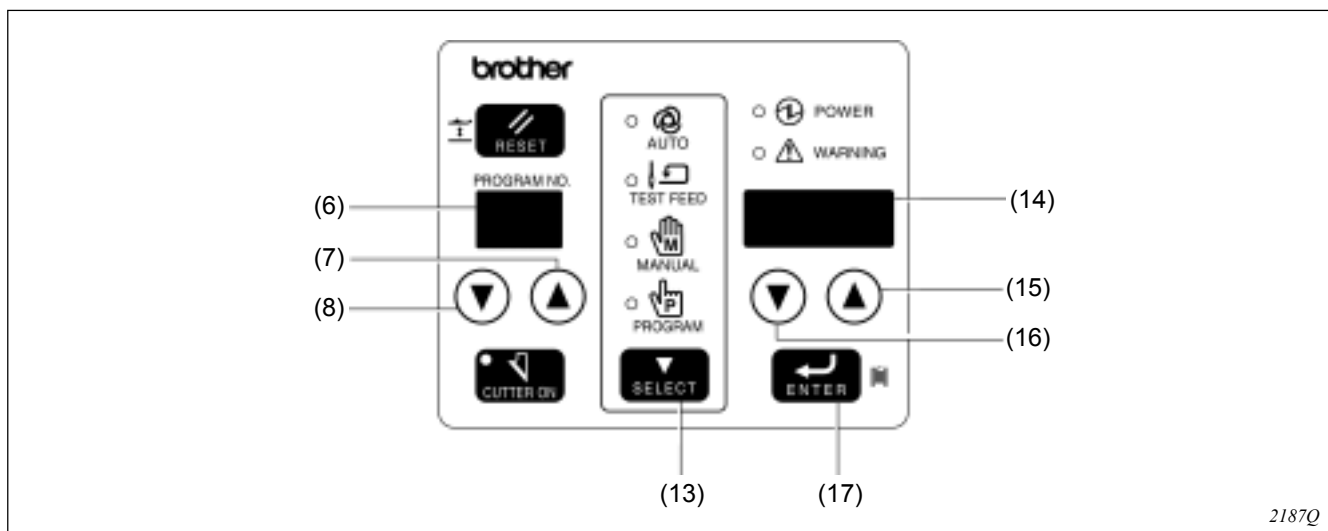
The screw (6) is a screw for detecting the machine stop position, and should not be loosened.

NOTE:

If the index mark (2) is not inside the mark (4) when the sewing machine is started, error code "E-02" will be displayed. Turn the machine pulley to move the index mark (2) to the correct position and then start the sewing machine.

11. CHANGING FUNCTIONS USING THE MEMORY SWITCHES

- Refer to the memory switch table for details of memory switch settings.
- The memory switches are valid for all programs (program Nos. 1 to 90).
- When a memory switch number is being displayed in the program number LED (6), a dot will appear after the memory switch number. (Example: 00.)



1. Press the SELECT key (13) to change the mode to program mode.
2. While pressing the ENTER key (17), press the program no. UP key (7).
 - The memory switch number "00." will appear in the program number LED (6). The setting for that memory switch number will appear in the parameter display LED (14).
3. Use the program No. keys (7) and (8) to select the number for the memory switch to be changed.
 - The setting for that memory switch number will appear in the parameter display LED (14).
4. Use the parameter keys (15) and (16) to change the memory switch setting.
 - The memory switch setting will flash while it is being changed.
5. Press the ENTER key (17) to accept the new setting.
 - The memory switch setting will stop flashing.
 - Press the SELECT key (13) to change the mode to automatic mode.

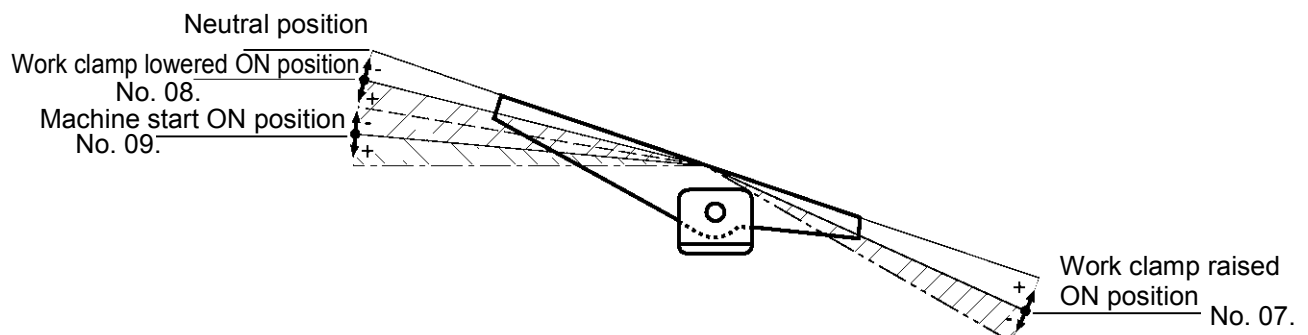
11. CHANGING FUNCTIONS USING THE MEMORY SWITCHES

Memory switch table

Effective for all programs

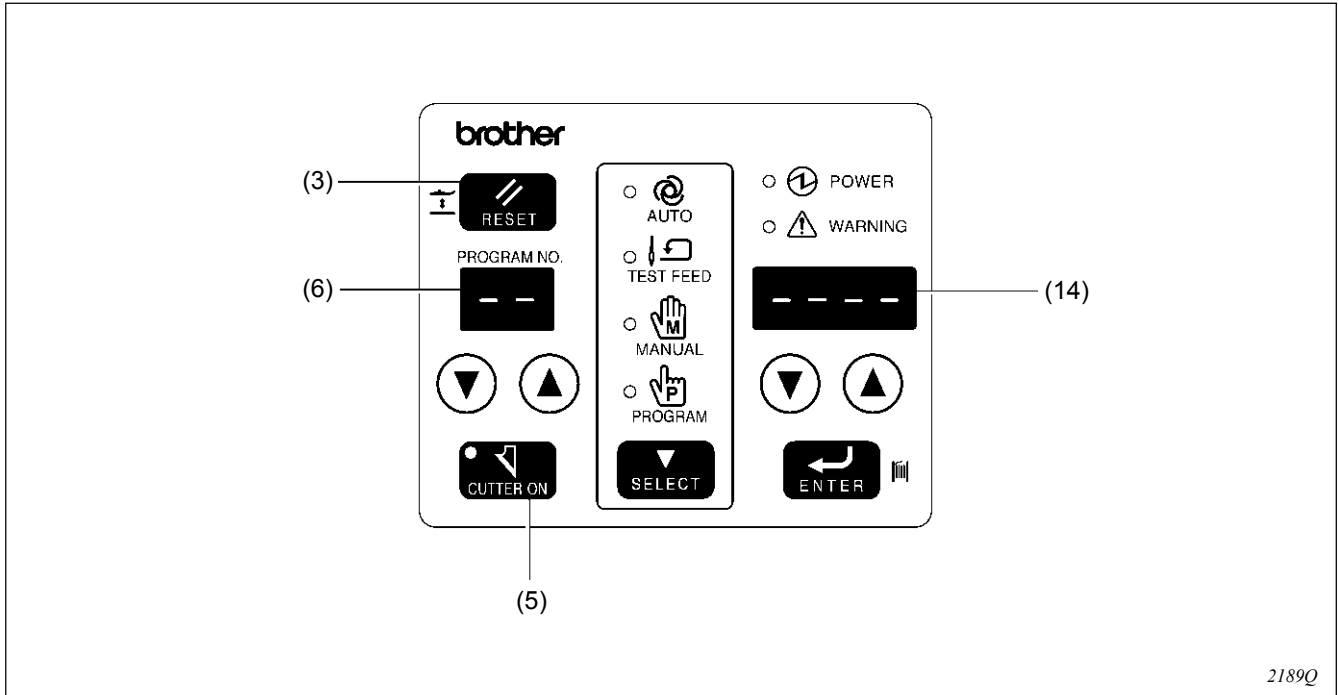
No.	Setting items	Setting range	Unit	Default
00.	Cutter power	Weak ↑ -1 Light 0 Light - Normal 1 Normal 2 Normal - Medium 3 Medium ↓ 4 Heavy Strong	1	1
02.	Work clamp lifting speed	- 4 - 4	1	0
03.	Work clamp lowering speed	- 4 - 4	1	0
04.	Work clamp height when treadle is depressed backward	1 - 13 mm	1	13
05.	Work clamp height at neutral position	1 - 13 mm	1	10
06.	Soft press height	OFF, 0.1 - 8.0 mm	0.1	OFF
07.	Threshold valve correction when work clamp is lifted	-10 - 10	1	0
08.	Threshold valve correction when work clamp is lowered	-10 - 10	1	0
09.	Threshold valve correction at start	-10 - 10	1	0
10.	Extension time for continuous sewing	OFF, 100 - 1,000 ms	100	OFF
11.	Home position return cycle	OFF, 1 - 10	1	1
12.	Feed timing	-10 - 10 (× 0.24°)	1	0
13.	Cutter dimension display during automatic mode	ON: Cutter dimensions are displayed. OFF: Production counter or bobbin thread counter is displayed.	-	OFF
14.	Program number changing enabled when program lock is set	ON: Program numbers can be changed and the programmer can be started. OFF: Program numbers cannot be changed and the programmer cannot be started.	-	OFF

Memory switch No. 07., 08., 09.



2188Q

12. PROGRAM INITIALIZATION



12-1. Initializing all programs

1. While pressing the RESET key (3), turn on the power switch.
All LEDs on the operation panel will illuminate and the buzzer will sound continuously for 8 seconds.
2. Once all programs have been initialized, [- -] and [- - -] will appear in the program number LED (6) and the parameter display LED (14) respectively.

Settings which are initialized

1. Parameters
 2. Memory switches
 3. Production counter and lower thread counter
- * If any cycle programs have been set, they will also be erased.
3. Return the sewing machine to the home position
(Refer to "5-2. Home position return (preparation)").

12-2. Initializing a single program

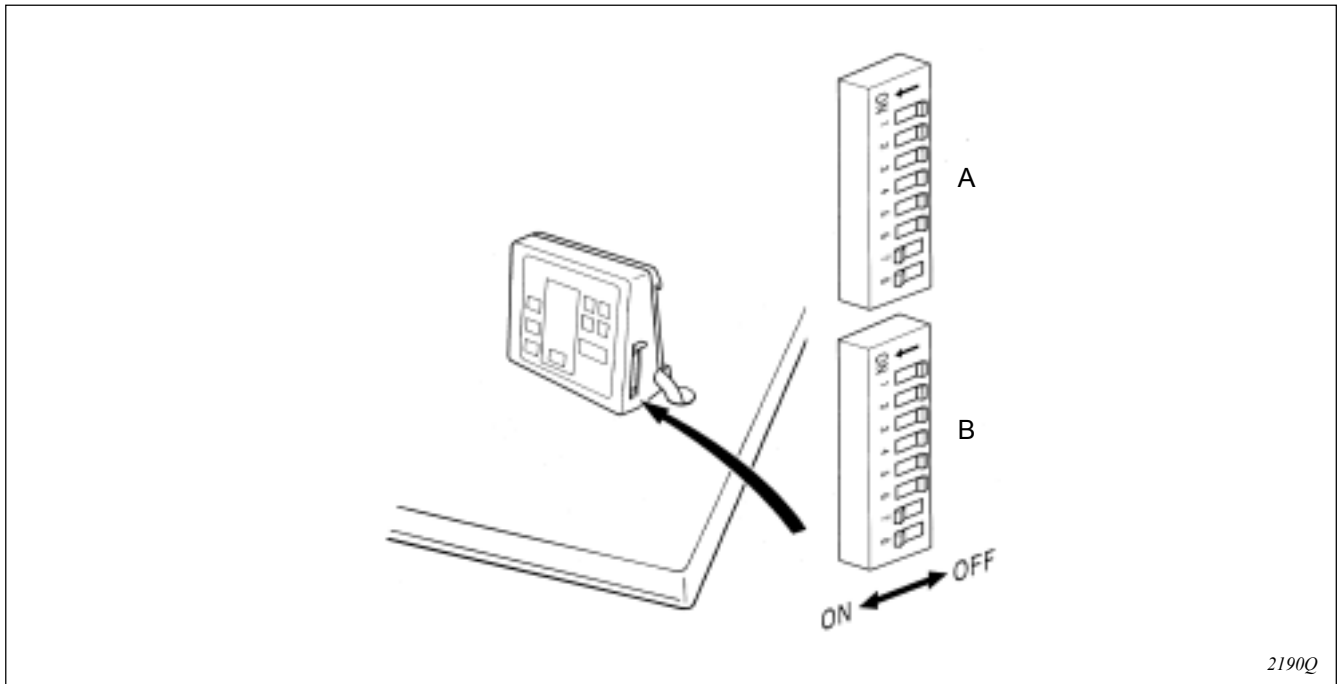
1. Select the number of the program to be initialized, and then turn off the power.
2. While pressing the CUTTER ON key (5), turn on the power switch.
The number of the program that will be initialized will appear in the program number LED (6), and then all other LEDs will illuminate and the buzzer will sound four times.
3. When all parameters of the selected program have been initialized, and [- -] and [- - -] will appear in the program number LED (6) and the parameter display LED (14) respectively.

Settings which are initialized

1. Parameters
4. Return the sewing machine to the home position.
(Refer to "5-2. Home position return (preparation)").

13. CHANGING FUNCTIONS USING THE DIP SWITCHES

13-1. Panel DIP switches



1. Slide the panel side cover to open it.
2. Change the DIP switch setting.
 - * Refer to the DIP switch table for an explanation of the functions of each DIP switch.
3. Slide the panel side cover downward to close it.

NOTE:

Turn the power off before changing the DIP switch settings.
If the settings are changed while the power is still on, they will not take effect.

13. CHANGING FUNCTIONS USING THE DIP SWITCHES

Panel DIP switch table

DIPSWA

No.		Setting item	Default
1	ON	Work clamp remains lowered after sewing is complete (lifts when pedal is depressed)	OFF
	OFF	Work clamp lifts after sewing is complete	
2	ON	–	OFF
	OFF	–	
3	ON	Emergency stop using work clamp lifter switch enabled during automatic sewing	OFF
	OFF	Emergency stop using work clamp lifter switch disabled during automatic sewing	
4	ON	Display setting during automatic mode = lower thread counter (Default: 100)	OFF
	OFF	Display setting during automatic mode = production counter (Default: 0)	
5	ON	2-cycle sewing ON (All programs will be set to 2-cycle sewing regardless of the setting for parameter No. 55.)	OFF
	OFF	2-cycle sewing OFF	
6	ON	–	OFF
	OFF	–	
7	ON	Upper thread breakage detection disabled	OFF
	OFF	Upper thread breakage detection enabled	
8	ON	Programs disabled	OFF
	OFF	Programs enabled	

DIPSWB

No.		Setting item	Default
1	ON	–	OFF
	OFF	–	
2	ON	–	OFF
	OFF	–	
3, 4, 5	ON, ON, ON	Work clamp size: 7.3 × 75 mm (Sewing area: 6.0 × 70 mm)	OFF, OFF, OFF
	ON, ON, OFF	Work clamp size: 7.3 × 36 mm (Sewing area: 6.0 × 32 mm)	
	ON, OFF, ON	Work clamp size: 7.3 × 24.5 mm (Sewing area: 6.0 × 20 mm)	
	ON, OFF, OFF	Work clamp size: 6.8 × 36 mm (Sewing area: 5.4 × 32 mm)	
	OFF, ON, ON	Work clamp size: 6.8 × 24.5 mm (Sewing area: 5.4 × 20 mm)	
	OFF, ON, OFF	Panel DIP switches B-7 and B-8 are enabled.	
	OFF, OFF, ON	Work clamp size: 5.4 × 19 mm (Sewing area: 4.0 × 15 mm)	
	OFF, OFF, OFF	Panel DIP switches B-7 and B-8 are enabled.	
6	ON	Needle plate size: 5.4 mm (Max. needle zigzag feed width = 4.0 mm)	OFF
	OFF	Needle plate size: 7.3 mm (Max. needle zigzag feed width = 6.0 mm)	
7, 8	ON, ON	Work clamp size: 7.3 × 47 mm (Sewing area: 6.0 × 40 mm)	OFF, OFF
	ON, OFF	Work clamp size: 6.8 × 47 mm (Sewing area: 5.4 × 40 mm)	
	OFF, ON	Work clamp size: 5.4 × 24.5 mm (Sewing area: 4.0 × 20 mm)	
	OFF, OFF	Work clamp size: 5.4 × 36 mm (Sewing area: 4.0 × 32 mm)	

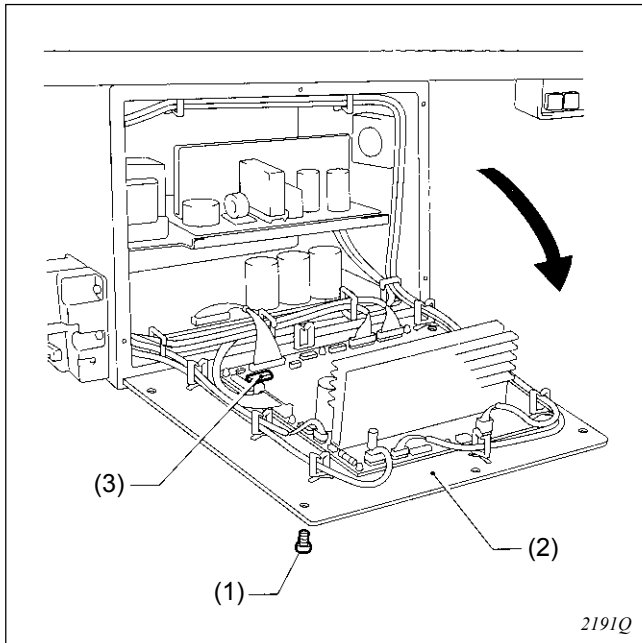
* If the programs are initialized when Nos. 3, 4 and 5 are set to OFF, OFF and ON (Work clamp size: 5.4 × 19 mm [Sewing area: 4.0 × 15 mm]) respectively, the initial value for parameter No. 02 - Cutter size will be set to 6.0.

13. CHANGING FUNCTIONS USING THE DIP SWITCHES

13-2. Control circuit board DIP switches

⚠ DANGER

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



1. Remove the six screws (1), and then open the operator's side cover (2) of the control box.

NOTE:

When opening the cover (2), hold it securely so that it does not fall down.

2. Change the setting of the DIP switch (3).
 - Refer to the DIP switch table for an explanation of the functions of each DIP switch.
3. Close the cover (2) of the control box, and tighten the six screws (1).

NOTE:

Turn the power off before changing the DIP switch settings.

If the settings are changed while the power is still on, they will not take effect.

13. CHANGING FUNCTIONS USING THE DIP SWITCHES

DIP switch inside the control box table

DIPSW1

No.	Setting item	Default
1	ON	–
	OFF	–
2	ON	–
	OFF	–
3	ON	–
	OFF	–
4	ON	–
	OFF	–
5	ON	–
	OFF	–
6	ON	–
	OFF	–
7	ON	Three warning beeps
	OFF	Continuous warning beep
8	ON	Needle feed motor excitation turned off during emergency stop and thread breakage
	OFF	Needle feed motor excitation not turned off during emergency stop and thread breakage

DIPSW2

No.	Setting item	Default
1	ON	Pedal: for standing operation
	OFF	Pedal: for seated operation
2	ON	Starting possible only when work clamp is lowered
	OFF	Starting possible regardless of work clamp position
3	ON	–
	OFF	–
4	ON	–
	OFF	–
5	ON	–
	OFF	–
6	ON	100V, 110V specifications
	OFF	200V, 400V specifications
7	ON	–
	OFF	–
8	ON	–
	OFF	–

14. GAUGE PARTS LIST

Needle plate





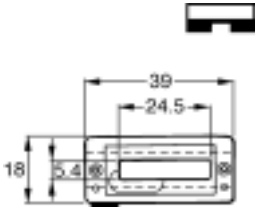
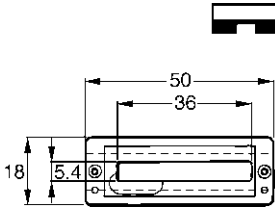
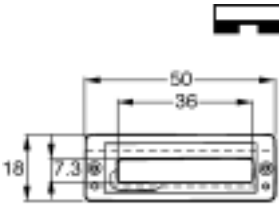
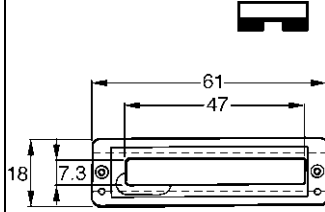




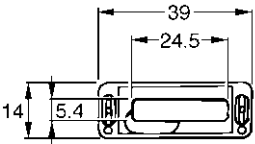
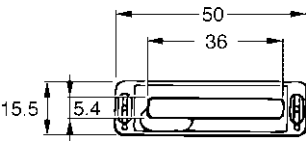
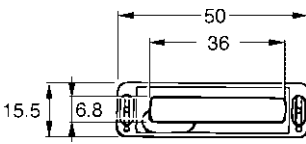
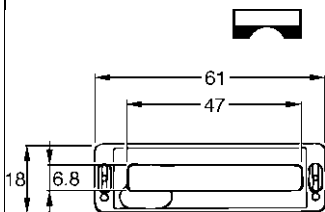
<For "-2">		
S50663-001 (1.2mmS)	S50664-001 (1.4mmS)	S50665-001 (1.6mmS)
<For "-3">		
S51248-101 (1.2mmS)	S51249-101 (1.4mmS)	S51250-101 (1.6mmS)
<For "-5">		
S55344-001 (1.2mm)	S54522-001 (1.4mm)	

For "flat cutter"


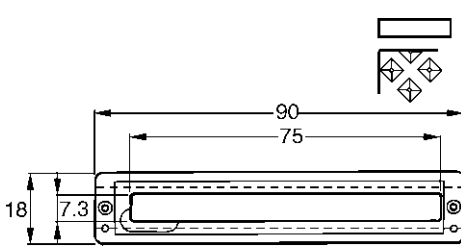
<For "-2">	
Needle plate S50321-001 (1.2mmS)	Plastic plate 151843-001
<For "-3">	
Needle plate S50322-101 (1.2mmS)	Plastic plate 156612-001

14. GAUGE PARTS LIST

- *1 Work clamp assy, W/F-G
- *2 Work clamp assy
- *3 Finger guard
- *4 Work clamp

<For "-2">			
*1 S37101-102 (16mmRS)	*1 S37100-102 (25mmRS)	*1 S55347-002 (25mmRSW)	*1 S37109-102 (32mmRS)
*2 159764-202 (16mmRS)	*2 159765-202 (25mmRS)	*2 S55346-002 (25mmRSW)	*2 159766-202 (32mmRS)
*3 159079-000	*3 159080-000	*3 159080-000	*3 159081-000
			
*4 159761-002	*4 159762-002	*4 S55345-002	*4 159763-002
			
Sewing area 4 × 20	Sewing area 4 × 32	Sewing area 6 × 32	Sewing area 6 × 40
<For "-3">			
*1 S37103-101 (16mm)	*1 S37102-101 (25mm)	*1 S55350-001 (25mmW)	*1 S37110-101 (32mm)
*2 S01466-201 (16mm)	*2 S01467-201 (25mm)	*2 S55349-001 (25mmW)	*2 S01468-201 (32mm)
*3 159079-000	*3 159080-000	*3 159080-000	*3 159081-000
			
*4 145136-001	*4 144630-001	*4 S55348-001	*4 144632-001
			
Sewing area 4 × 20	Sewing area 4 × 32	Sewing area 5.4 × 32	Sewing area 5.4 × 40

- *1 Work clamp assy, W/F-G
- *2 Work clamp assy
- *3 Finger guard
- *4 Work clamp

<For "-5">
*1 S54518-101
*2 S54514-101
*3 S54517-000

*4 S54515-001
 <p style="text-align: center;">Sewing area 6 × 70</p>

14. GAUGE PARTS LIST

Cutter

S51117-001	S51290-001	S51351-001	S51352-001	S51353-001	S51354-001
1/4	3/8	7/16	1/2	9/16	5/8
S51355-001	S51356-001	S25642-001	S51357-001	S51358-001	
11/16	3/4	13/16	7/8	1	
S51359-001	S51360-001		S01271-001	S01272-001	
29	32		3/8	7/16	
S01273-001	S03280-001	S01274-001	S01275-001	S01276-001	S35630-001
1/2	9/16	5/8	3/4	7/8	1

15. ERROR CODE TABLE

DANGER

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

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.

For errors which do not require the power to be turned off (i.e. errors which can be reset), two short beeps will sound. For error E-02, three short beeps will sound.

For errors which require the power to be turned off (i.e. errors which cannot be reset), a single long beep will sound.

Code	Cause	Remedy
E-00	EMERGENCY STOP switch was pressed.	To restart sewing: Press the parameter down key and then depress the treadle to step 2. To cancel sewing: Press the RESET key.
E-01	Upper thread breakage	To restart sewing: Press the parameter down key and then depress the treadle to step 2. To cancel sewing: Press the RESET key.
E-02	Needle up sensor is OFF.	Turn the machine pulley by hand to raise the needle.
E-05	Zigzag positioning is not carried out.	Turn off the power.
E-06	Feed positioning is not carried out.	Turn off the power.
E-07	Work clamp positioning is not carried out.	Turn off the power.
E-08	Cutter home position sensor is off.	Turn off the power.
E-20	Feed and work clamp motor overcurrent	Turn off the power.
E-21	Zigzag motor overcurrent	Turn off the power.
E-30	Treadle is depressed to step 2.	Return the treadle to the neutral position.
E-31	Treadle is depressed to step 1.	Return the treadle to the neutral position.
E-32	Treadle is depressed backward.	Return the treadle to the neutral position.
E-40	Control board heat sink is overheating.	Turn off the power.
E-41	Inside air circulation fan problem	Turn off the power.
E-42	Exhaust fan problem	Turn off the power.
E-44	2-step power supply circuit board +55V relay error	Turn off the power.
E-50	Pattern shape does not match pattern shape specifications.	Pattern shape for data created using the BAS-PC/300 does not match the pattern shape specifications. Turn off the power.
E-51	X pitch error	Turn off the power.
E-52	Y pitch error	Turn off the power.
E-54	Overall cycle program stitch no. error	Exceeds 3,000 stitches. Clear the cycle program and reset automatically.
E-55	Stitch no. error	Exceeds 700 stitches. Turn off the power.
E-59	Sewing data error	Turn off the power. Re-initialize the programs.

15. ERROR CODE TABLE

Code	Cause	Remedy
E-62	Needle up error during operation	Turn off the power.
E-63	Needle down error during operation	Turn off the power.
E-64	Timing signal error during operation	Turn off the power.
E-70	Machine motor running error	Turn off the power.
E-74	EEPROM error	Turn off the power.
E-80	Communication ready error	Turn off the power.
E-81	Communication error	Turn off the power.
E-90	Machine motor overload	Excessive load during sewing. Turn off the power.
E-92	Machine motor operation error	Turn off the power.
E-93	Blown solenoid fuse	Turn off the power. Replace the fuse.
E-94	Machine motor IC error	Turn off the power.
E-95	Power supply voltage error (high)	Power supply voltage is too high. Turn off the power.
E-96	Power supply voltage error (low)	Power supply voltage is too low. Turn off the power.
ArEA	Sewing data values exceed the needle plate size or work clamp size which have been set using the panel DIP switches.	<p>Three resetting methods are available depending on the application.</p> <p>A. By selecting a different program number (If you would like to keep the program which exceeds the area.) Press the SELECT key. Select a different program number. Press the ENTER key. If the data for the selected program number does not exceed the sewing area, the error will be cleared.</p> <p>B. By initializing the program While pressing the ENTER key, press the RESET key. * All parameters (00 to 69) for the program will then be initialized and the machine will switch to program mode.</p> <p>C. By initializing all programs Refer to "12. PROGRAM INITIALIZATION".</p>
C-Er	When using the multi-working knife, the knife operation distance cannot be reduced.	<p>Three resetting methods are available depending on the application.</p> <p>A. Replace the knife with a longer knife. Press the SELECT key to change to automatic mode. Press the SELECT key to change to program mode. Enter the length of the new knife as the setting for parameter 02 (Length of knife). Press the SELECT key to change to automatic mode. * If "C-Er" is displayed again, replace with an even longer knife.</p> <p>B. By initializing the program Initialize only the programs which cause "C-Er" to be displayed. While pressing the ENTER key, press the RESET key. * All parameters (00 to 69) for the program will be initialized.</p> <p>C. Change the zigzag pitch and zigzag stitch length (multi-working knife). 1. Press the SELECT key to change to automatic mode. Press the SELECT key to change to program mode. 2. Reduce the setting value for parameter 04 (Zigzag pitch). Increase the setting for parameter 03 (Zigzag stitch [multi-working knife]). 3. Press the SELECT key to change to automatic mode. * If "C-Er" is still displayed, repeat steps 1. to 3.</p>

16. TROUBLESHOOTING

Problem	Cause	Check	Remedy	Page
Upper thread breaks	Burrs in needle hole.	Needle	Replace the needle.	57
	Needle is incorrectly installed.	Needle position	Install the needle correctly.	57
	Threading is incorrect.	Threading	Thread the upper thread correctly.	58
	Upper thread tension is too strong.	Main and auxiliary tension	Adjust to an appropriate tension.	61
	Thread is too thick for the needle hole.	Needle and thread	Replace the needle with one that is suitable for the thread.	
Lower thread breaks	Lower thread tension is too strong.	Lower thread tension	Adjust to an appropriate tension.	61
	Bobbin case threading is incorrect.	Bobbin case threading	Thread the bobbin correctly to match the sewing.	60
Skipped stitches	Needle is incorrectly installed.	Needle position	Install the needle correctly.	57
	Threading is incorrect.	Threading	Thread the upper thread correctly.	58
	Needle and rotary hook timing is incorrect.	Needle and rotary hook timing	Adjust the timing of the needle and rotary hook.	72
	Clearance between Needle and rotary hook is too large.	Needle and rotary hook clearance	Adjust the clearance between the needle and rotary hook.	72
	Needle bar height is incorrect.	Needle bar height	Adjust the height of the needle bar.	71
Poor thread tightening	Lower thread tension is too strong.	Lower thread tension	Adjust to an appropriate tension.	61
	Thread in bar tacking area is not tight.	Tension at tack tension	Adjust the tack tension.	61
	Thread in zigzag sewing area is not tight.	Tension at zigzag tension	Adjust the zigzag tension.	61
	Clearance between inner rotary hook and rotary hook holder is incorrect.	Clearance between inner rotary hook and rotary hook holder	Adjust the clearance between the inner rotary hook and rotary hook holder.	73

16. TROUBLESHOOTING

Problem	Cause	Check	Remedy	Page
Needle breaks	Needle is incorrectly installed.	Needle position	Install the needle correctly.	57
	Needle and rotary hook timing is incorrect.	Needle and rotary hook timing	Adjust the timing of the needle and rotary hook.	72
	Buttonhole width or length is incorrect.	Work clamp	Replace the work clamp.	/
	Upper thread scissors do not open smoothly.	Upper thread scissors opening	Adjust the upper thread scissors opening timing.	75
	Upper thread scissors position is incorrect.	Upper thread scissors position	Adjust the position of the upper thread scissors.	/
Presser foot pulse motor is out of step.	Upper thread scissors installation is incorrect.	Clearance between upper thread scissors and work clamp	Install the upper thread scissors correctly.	74
	Bobbin is spinning loosely.	Bobbin insertion method	Insert the bobbin correctly.	60
Upper shaft cannot be turned manually.	Loop spreader and rotary hook are touching.	Thread trimmer mechanism position	Move the thread trimmer mechanism to the home position.	30
			Turn the machine pulley backward to set the needle bar to the needle up position and then return to the home position.	30
Sewing machine does not start after emergency stop.	Emergency stop switch has not been released.	Emergency stop switch	Turn the emergency stop switch knob to release it.	64
Cutter blade damaged.	Cutter position is incorrect.	Cutter position	Adjust the cutter to the center of the needle plate cutter groove.	/
	Upper thread scissors do not open smoothly and touch cutter.	Upper thread scissors opening	Adjust the upper thread scissors opening timing.	75

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INSTRUCTION MANUAL

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