

HE-800A

ELECTRONIC LOCKSTITCH BUTTON HOLER

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 (\triangle) 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 (\circ) indicates something that you must not do.
-  This symbol (\bullet) indicates something that you must do. The picture inside the circle indicates the nature of the thing that must be done.
(For example, the symbol at left means “you must make the ground connection”.)

2. Notes on safety

DANGER



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

CAUTION

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.
-  The sewing machine should not be used for any applications other than sewing.
-  Be sure to wear protective goggles when using the machine.
If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.
-  Turn off the power switch at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.
 - When threading the needle
 - When replacing the needle and bobbin
 - When not using the machine and when leaving the machine unattended
-  If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
-  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
-  Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
-  Do not touch the motor cover during operation and for one hour after operation has finished, otherwise burns may result.
-  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.
-  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
-  Turn off the power switch before inserting or removing the plug, otherwise damage to the control box could result.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  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.
-  Use only the proper replacement parts as specified by Brother.
-  If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
-  Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

3. Warning labels

The following warning labels appear on the sewing machine.

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

1

	▲ 危険 高電圧部分にふれて、大けがをすることがある。電源を切り、5分たってからカバーをはずすこと。	▲ 危険 触摸高電圧部分、会导致受伤。在切断电源5分钟后, 再开启盖罩。
▲ DANGER	▲ GEFAHR	▲ DANGER ▲ PELIGRO
Hazardous voltage will cause injury. Turn off main switch and wait 5 minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapte provoque des blessures. Eteindre l'interrupteur et attendre 5 minutes avant d'ouvrir le capot.
	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.	

2

	▲ 注意 動く部分でけがをする。安全保護装置をつけて、縫製作業をすること。電源を切ってから、糸通し、ボビンや針の交換、掃除や調整をすること。
▲ CAUTION	
Moving parts may cause injury. Operate with safety devices. Turn off main switch before threading, changing bobbin and needle, cleaning 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.

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

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.

6



High temperature warning display

5

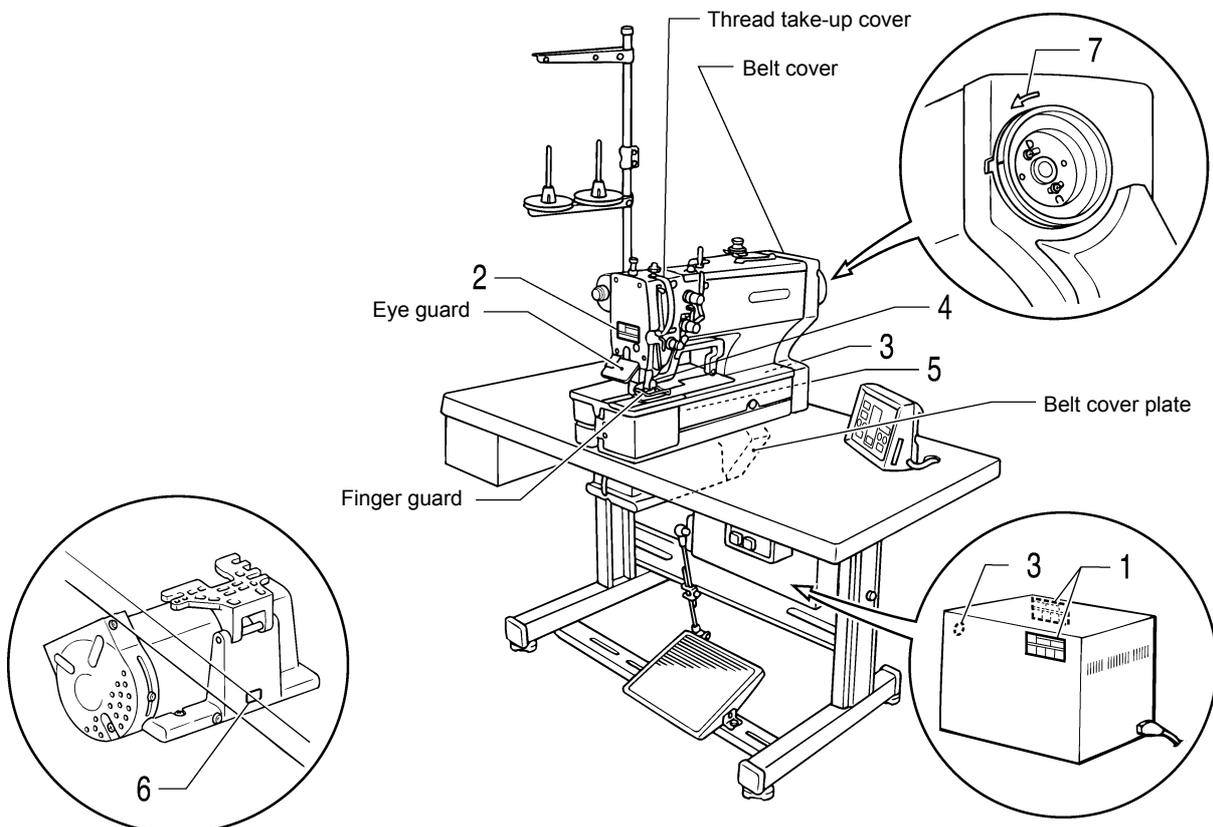


Do not touch any of the fan or press any objects against the machine, as this may result in personal injury or damage to the machine.

7



Direction of operation



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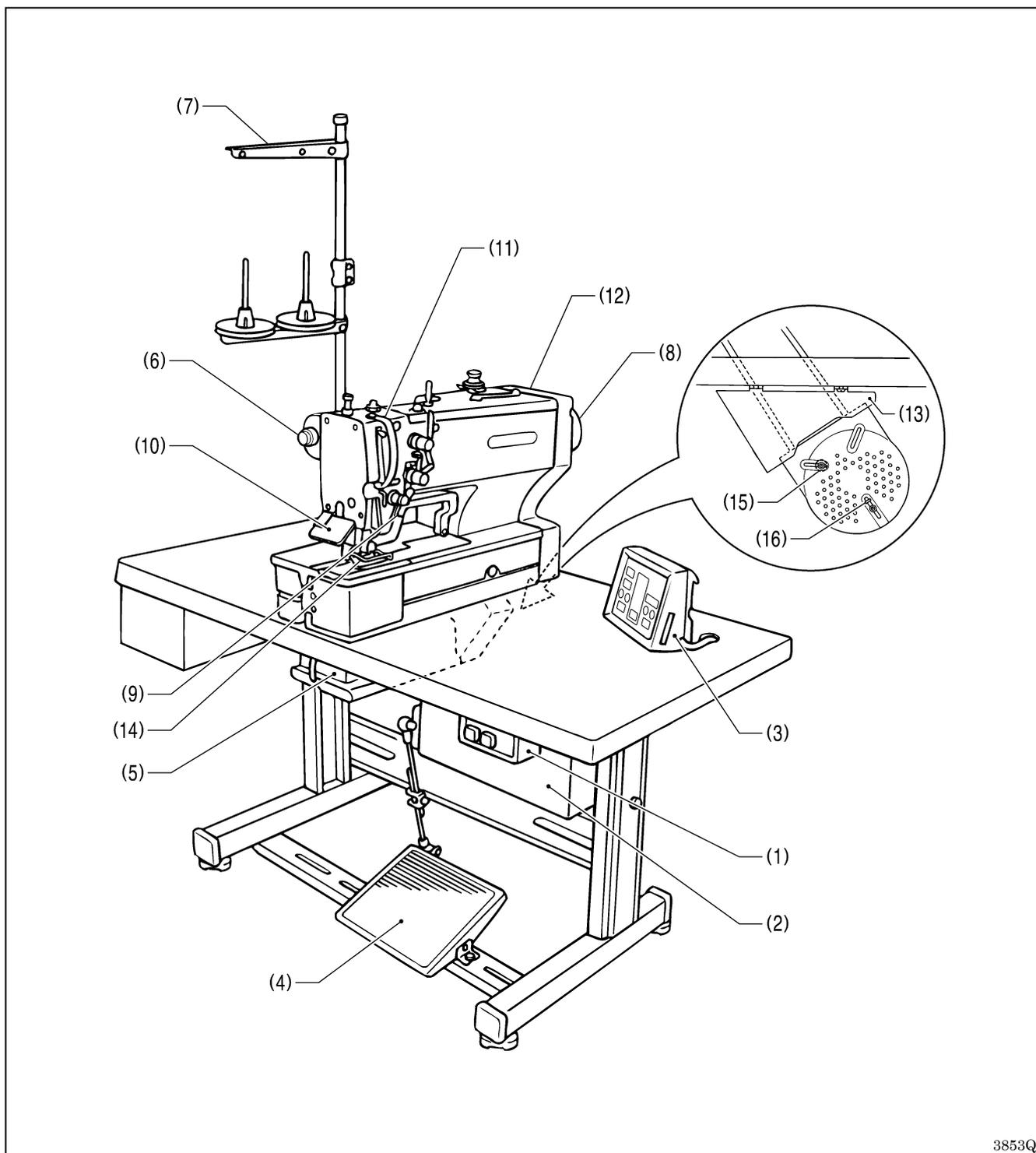
CONTENTS

1. NAME OF EACH PART	1	4-16. Installing the eye guard.....	23
2. SPECIFICATIONS.....	2	4-17. Lubrication	24
2-1. Specifications	2	4-17-1. Lubricating the bed base	24
2-2. Standard sewing pattern list.....	3	4-17-2. Lubricating the arm.....	25
3. OPTIONAL PARTS	4	4-17-3. Lubricating the rotary hook.....	25
3-1. Special needle plate.....	4	4-18. Installing the belt cover	26
3-2. Leg parts	4	5. OPERATION.....	27
3-3. Standing operation pedal	5	5-1. Name and function of each operation panel item..	27
3-4. Ruler.....	5	5-2. Home position detection (preparation).....	29
3-5. Tape guard.....	6	5-3. Operating the treadle	30
3-6. Auxiliary table.....	6	5-3-1. Operating the standing operation pedal (option)	31
3-7. PD-8000, Programmer	6	5-4. Program setting method	32
4. INSTALLATION	7	5-4-1. Program setting examples.....	33
4-1. Table processing diagram.....	7	5-4-2. Checking the length of knife	35
4-2. Installing the motor	8	5-5. Parameter table	36
4-3. Installing the flange nut	9	5-5-1. Available sewing area	45
4-4. Installing the control box	9	5-5-2. Setting the knife length.....	46
4-5. Installing the power switch	10	5-5-3. Buttonhole sewing size.....	46
4-6. Installing the bed base	10	5-5-4. Main restrictions when setting parameters	46
4-7. Installing the machine head	11	5-6. Rear tack vector shape programs.....	48
4-8. Installing the head rest.....	11	5-7. Underlay programs	49
4-9. Installing the operation panel	12	5-8. Cutter operation	50
4-10. Routing the connector cord and installing the oil stopper plate	12	5-9. Cycle program	51
4-11. Connecting the cords	13	5-10. Production counter	52
4-11-1. Connecting the ground wire	13	5-11. Bobbin thread counter	53
4-11-2. Connecting the machine head harness	13	5-12. Using the program memos	53
4-11-3. Connecting the motor harness.....	14	5-13. Adding patterns created using the programming software for electronic pattern sewer	54
4-11-4. Connecting the power cord.....	15	6. CHECKING THE SEWING PATTERN .	55
4-11-5. Connecting the standing operation pedal harness (option)	16	6-1. Test feed mode.....	55
4-11-6. Installing the transformer	17	6-2. Manual mode.....	56
4-12. Installing the V-belt.....	19	7. CORRECT USE.....	57
4-13. Installing the belt cover plate.....	20	7-1. Installing the needle.....	57
4-14. Installing the treadle connecting rod	21	7-2. Threading the upper thread	58
4-14-1. Changing the treadle unit installation position (horizontal positioning only)	22	7-3. Winding the lower thread	59
4-15. Installing the spool stand.....	23	7-4. Threading the bobbin case	60
		7-5. Thread tension.....	61

7-5-1. Lower thread tension	61	12. PROGRAM INITIALIZATION	80
7-5-2. Upper thread tension	62	12-1. Initializing all programs	80
7-5-3. Thread take-up spring height	63	12-2. Initializing a single program	80
7-5-4. Thread take-up spring tension	63	13. CHANGING FUNCTIONS USING	
7-5-5. Adjusting arm thread guide	63	THE DIP SWITCHES.....	81
8. SEWING	64	13-1. Panel DIP switches.....	81
8-1. Sewing	64	13-2. Circuit board DIP switches.....	83
8-2. If the stop switch is pressed during sewing	65	14. ERROR CODE TABLE.....	85
8-3. If the thread breaks during sewing	66	15. GAUGE PARTS LIST.....	89
8-4. Thread breakage before sewing is finished....	67	16. TROUBLESHOOTING	92
8-5. When resuming sewing in test feed mode		16-1. Upper thread breakage.....	92
or manual mode	68	16-2. Skipped stitches	93
9. CLEANING AND MAINTENANCE.....	69	16-3. Uneven seams (1)	
9-1. Cleaning	69	At the sewing start.....	94
9-2. Draining the oil	70	16-4. Uneven seams (2)	
9-3. Cleaning the control box air inlet port.....	70	Lower thread is lifted up at	
9-4. Cleaning the eye guard	70	the sewing start	95
9-5. Checking the needle	71	16-5. Uneven seams (3)	
9-6. Cleaning the length feed plate	71	Seam lifts up at the sewing start	96
10. STANDARD ADJUSTMENTS.....	72	16-6. Uneven seams (4)	
10-1. Adjusting the needle bar height.....	72	Uneven sewing pitch at the sewing start	96
10-2. Adjusting the needle and hook timing	73	16-7. Uneven seams (5)	
10-3. Adjusting the clearance between needle		Poor rounding of seam.....	96
and hook point.....	73	16-8. Uneven seams (6)	
10-4. Adjusting the inner rotary hook and		Around rear tack or front tack.....	96
rotary hook holder overlap.....	74	16-9. Uneven seams (7)	
10-5. Adjusting the work clamp pressure	74	Loose thread end at end backtack	97
10-6. Adjusting the cutter installation	74	16-10. Uneven seams (8)	
10-7. Adjusting the upper thread trimming	75	Thread sticking out at end backtack	97
10-7-1. Adjusting the installation height of		16-11. Uneven seams (9)	
the upper thread scissors.....	75	Sticking in needle plate.....	97
10-7-2. Adjusting the upper thread scissors		16-12. Uneven seams (10)	
opening timing.....	76	All stitches	98
10-8. Adjusting the lower thread clamp timing.....	77	16-13. Upper thread run out.....	99
10-9. Adjusting the bobbin presser.....	77	16-14. Unraveling of thread trimmed by upper	
10-10. Adjusting the needle up stop position.....	77	thread trimmer assembly.....	101
11. CHANGING FUNCTIONS USING		16-15. Upper thread mis-trimming	102
THE MEMORY SWITCHES	78	16-16. Needle strikes upper thread trimmer	102
11-1. Memory switch table	79	16-17. Needle breakage	103

16-18. Imperfect cutter function (imperfect material cutting)	104
16-19. Cutter does not return	105
16-20. Cutter and upper thread scissors touch ...	105
16-21. Seam is cut	105
16-22. Upper thread mis-winding	106
16-23. Work clamp is not raised (1) Pulse motor stepping sound cannot be heard	106
16-24. Work clamp is not raised (2) Pulse motor stepping sound can be heard	107
16-25. Lower thread is not trimmed (pulls when material is removed)	108
16-26. Feed mechanism does not operate or motor is out of step	108
16-27. Needle does not zigzag or noise occurs when needle zigzags	109
16-28. Sewing machine stops during sewing	109
16-29. Upper shaft does not rotate as far as the needle up stop position	109

1. NAME OF EACH PART



3853Q

- (1) Power switch
- (4) Treadle
- (7) Spool stand

- (2) Control box
- (5) AC servo motor
- (8) Pulley

- (3) Operation panel
- (6) Stop switch
- (9) Tension release lever

Safety devices

- (10) Eye guard
- (13) Belt cover plate
- (16) Belt retainer

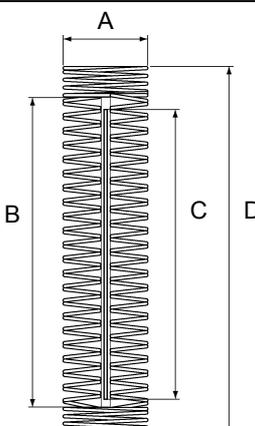
- (11) Thread take-up cover
- (14) Finger guard

- (12) Belt cover
- (15) Finger protector

2. SPECIFICATIONS

2-1. Specifications

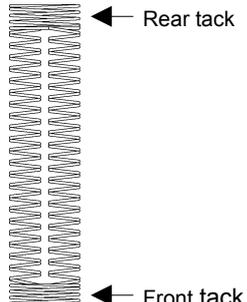
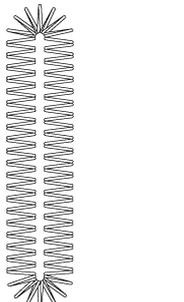
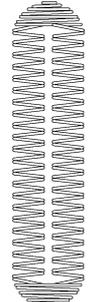
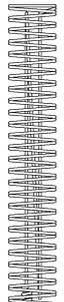


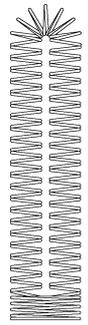
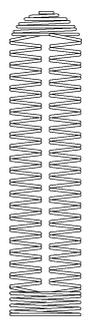
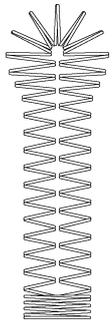
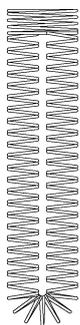
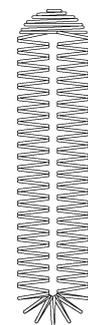
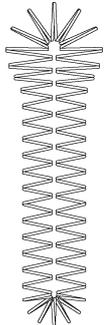
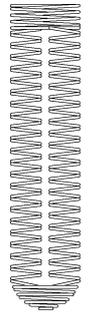
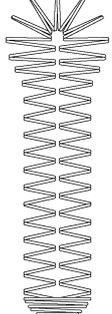
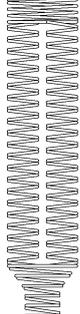
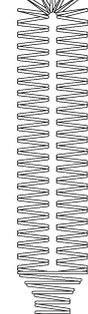
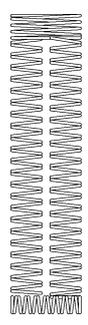
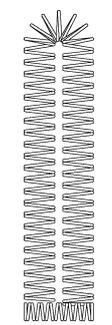
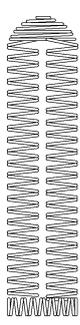
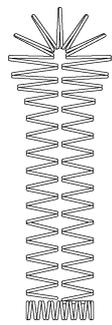
	Main use	Buttonhole size
-2	Buttonholes for clothing such as dress shirts, blouses, work clothes and women's clothes	 <p>A: Max.6 mm B: Max. zigzag stitch length 39 mm C: Length of knife 4 – 32 mm D: Max. buttonhole length 40 mm</p>
-3	Buttonholes for knitted garments such as knitted underwear, sweaters, cardigans and jerseys	

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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 max. (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	-2	-3
	Schmetz 134 Nm90	Schmetz 134 Nm75
Data storage method	P-ROM (Custom made pattern can be added by the programming software for electronic pattern sewer)	
Power supply	Single phase 110 V, 220 V, 230 V Three phase 220 V, 380 V, 400 V 600 VA	

2 - 2 . Standard sewing pattern list

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

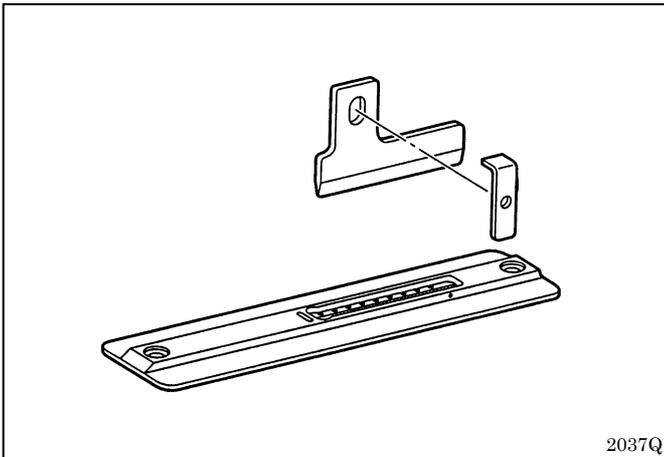
[0] Free (Combinations of rear tack shapes and the front tack shapes - 17 patterns)					
Radial-rectangle	Round-rectangle	Eyelet-rectangle	Rectangle-radial	Round-radial	Eyelet-radial
					
Rectangle-round	Radial-round	Eyelet-round	Rectangle-taper tack	Radial-taper tack	Round-taper tack
					
Eyelet-taper tack	Rectangle-tack	Radial-tack	Round-tack	Eyelet-tack	
					

* [0] to [4] indicate the setting range for parameter No. 1. (Refer to "5-5. Parameter table".)

* In addition to the above shapes, you can create and use up to 9 additional custom made patterns using the programming software for electronic pattern sewer.

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.

* The standard cutter can be used.

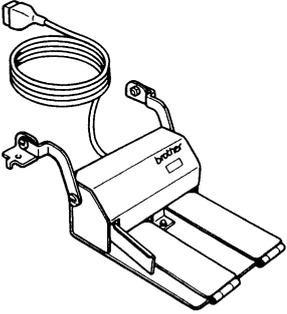
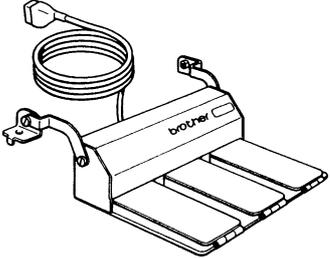
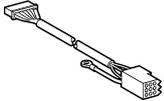
Parts name		Parts code
-2	Needle plate set 1.2RB	S51361-001
	Needle plate set 1.4RB	S51362-001
	Needle plate set 1.6RB	S51363-001
-3	Needle plate set 1.2RB-3	S51364-001
	Needle plate set 1.4RB-3	S51365-001
	Needle plate set 1.6RB-3	S51366-001

3 - 2 . Leg parts

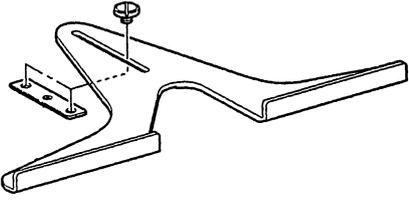
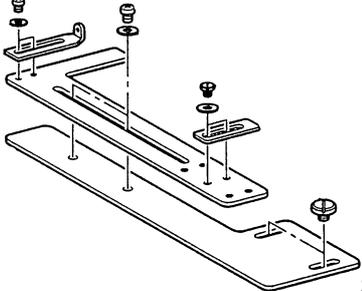
Parts name		Parts code
	Spacer set	183504-109
	Caster set	183501-001

3. OPTIONAL PARTS

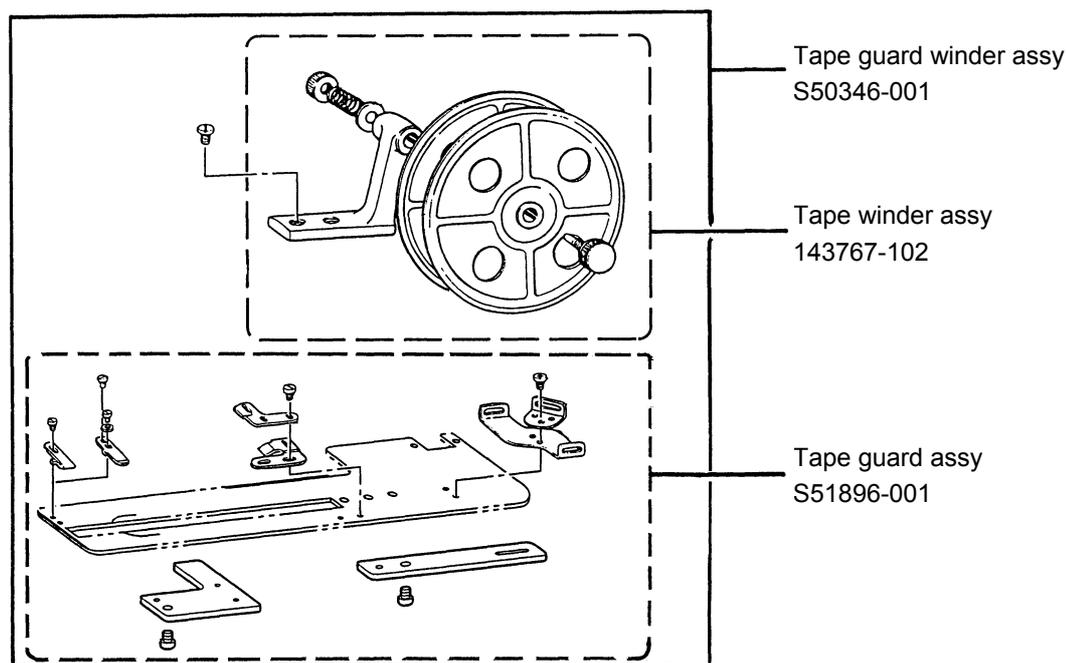
3 - 3 . Standing operation pedal

Parts name		Parts code
 <p>2040Q</p>	Two pedals + work clamp lifter pedal	J80081-040
 <p>2041Q</p>	Three pedals	J80380-040
 <p>3854Q</p>	Harness for standing operation pedal	S47750-000

3 - 4 . Ruler

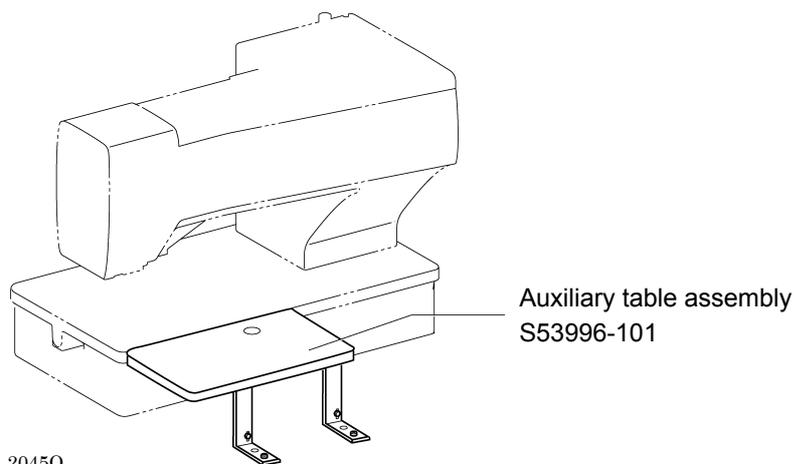
	Parts name	Parts code
Horizontal ruler	 <p>2043Q</p>	Ruler assy 800E
Vertical ruler	 <p>2044Q</p>	Ruler assy

3 - 5 . Tape guard



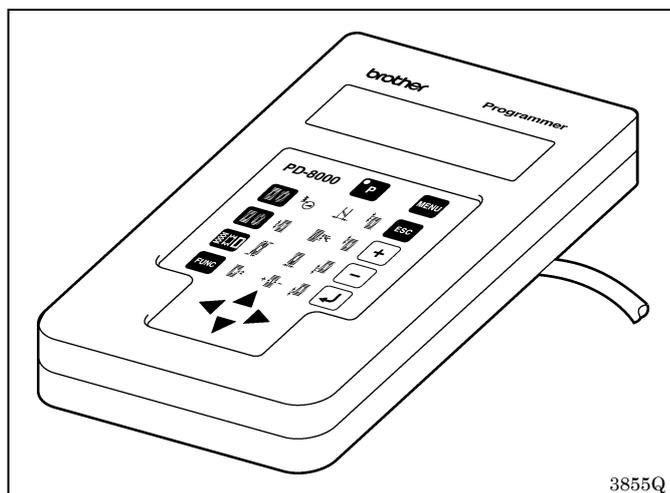
2042Q

3 - 6 . Auxiliary table



2045Q

3 - 7 . PD-8000, Programmer



3855Q

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.

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 . Table processing diagram

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

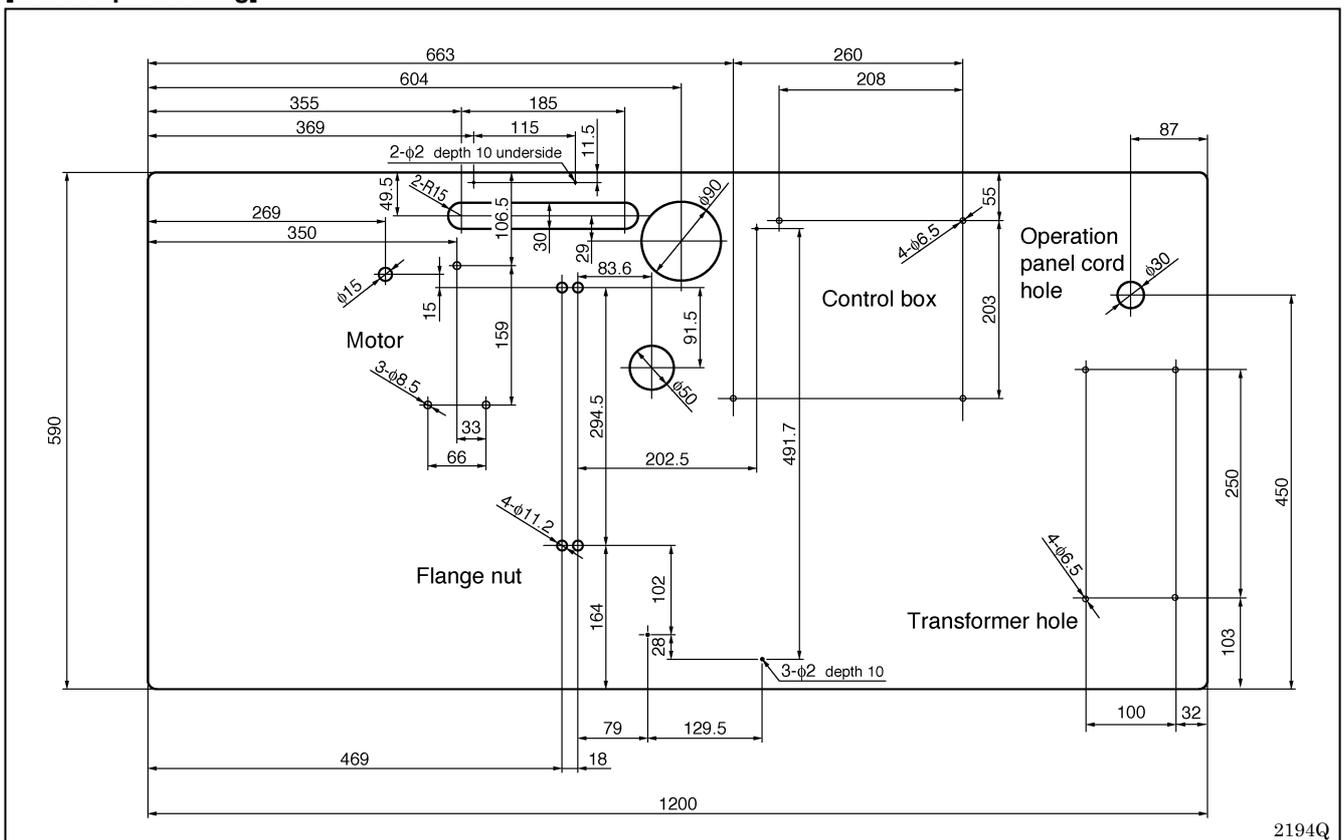
Table/legs assembly	Positioning	Model code
	Vertical	BLL-H80-200-01
Horizontal	BLL-H80-201-01	

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

Note:

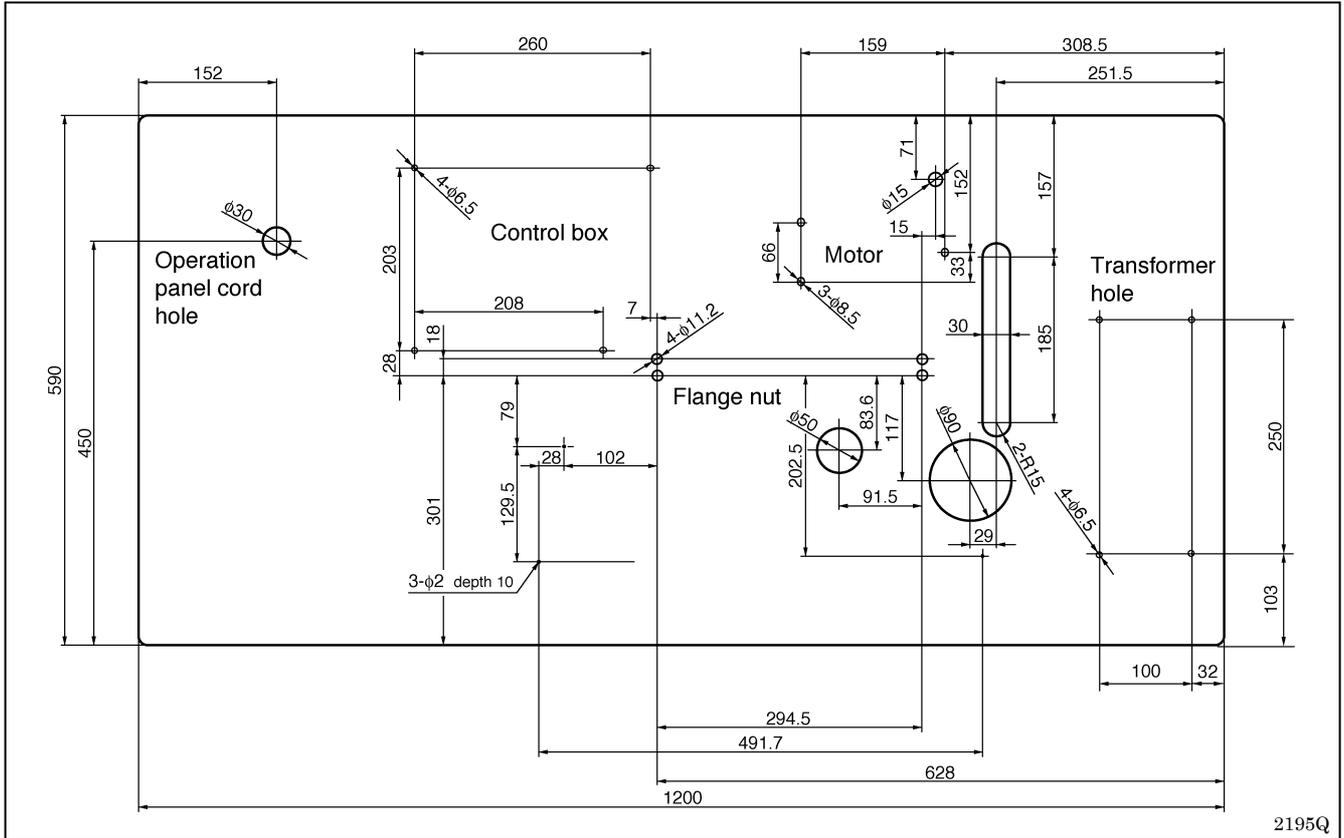
The thickness of the table should be at least 40 mm, and it should be strong enough to bear the weight and vibration of the sewing machine.

[Vertical positioning]

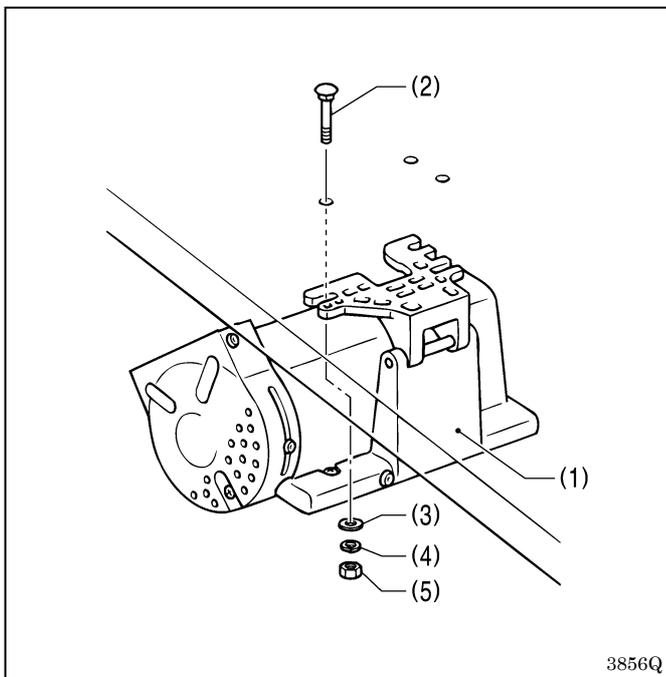


2194Q

[Horizontal positioning]

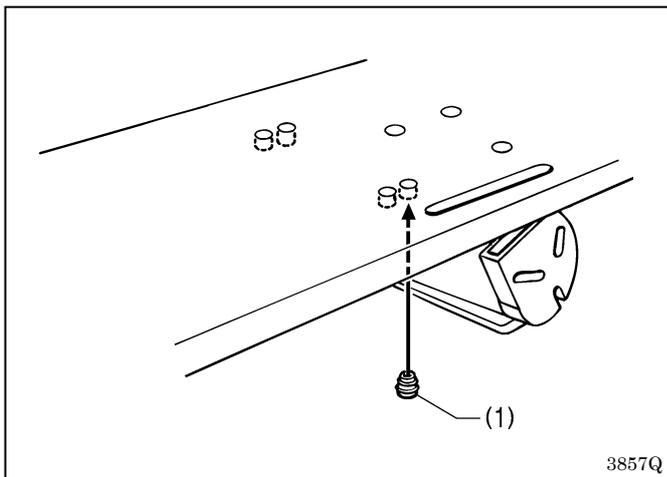


4 - 2 . Installing the motor



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

4 - 3 . Installing the flange nut



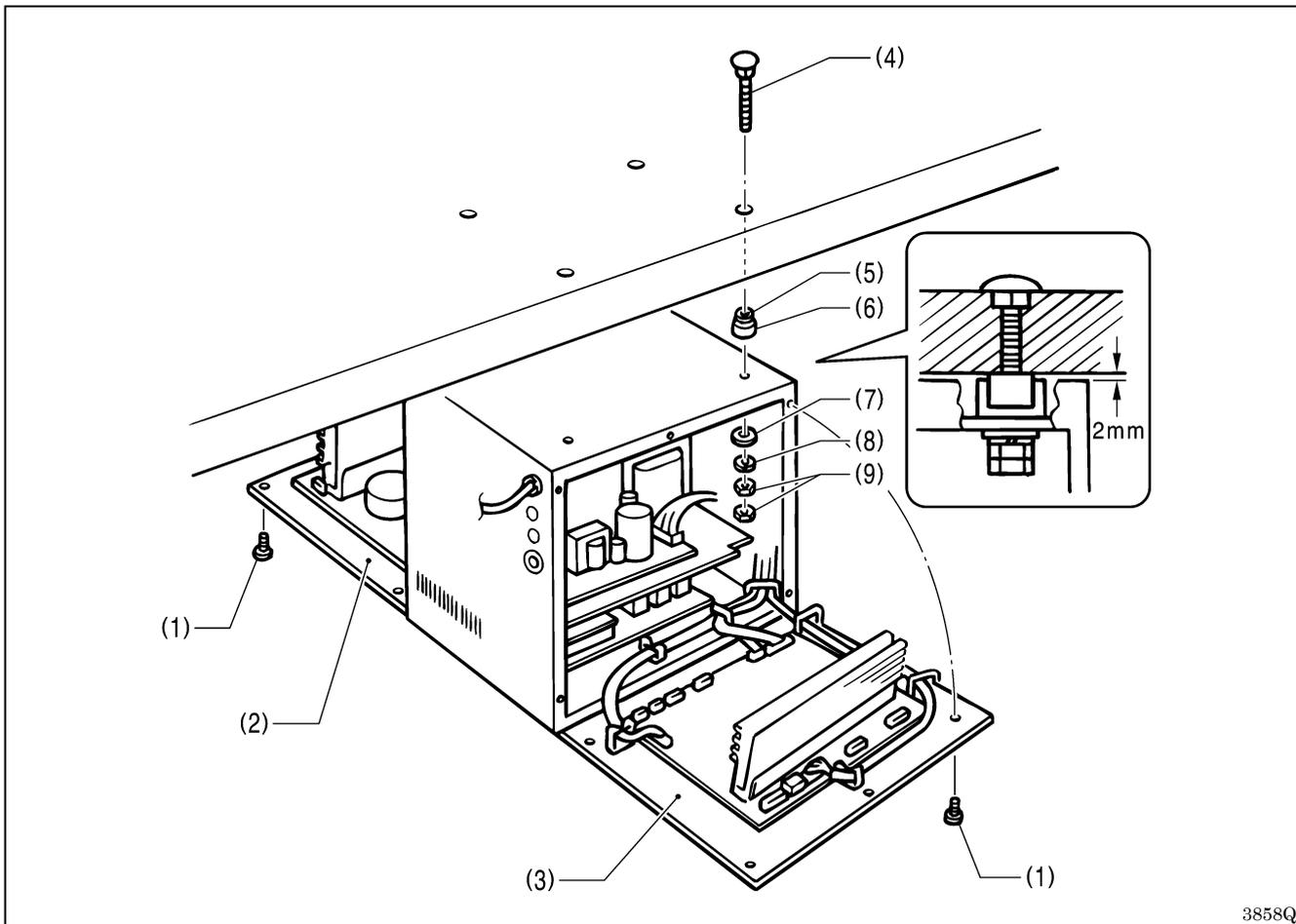
Install the four flange nuts (1) to the underside of the work table.

Note:

When the machine head is positioned horizontally, some flange nut installation locations may be inaccessible after the control box has been installed.

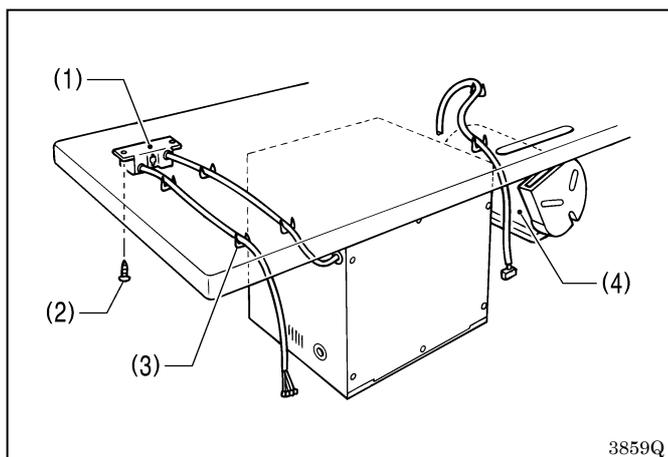
4 - 4 . Installing the control box

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



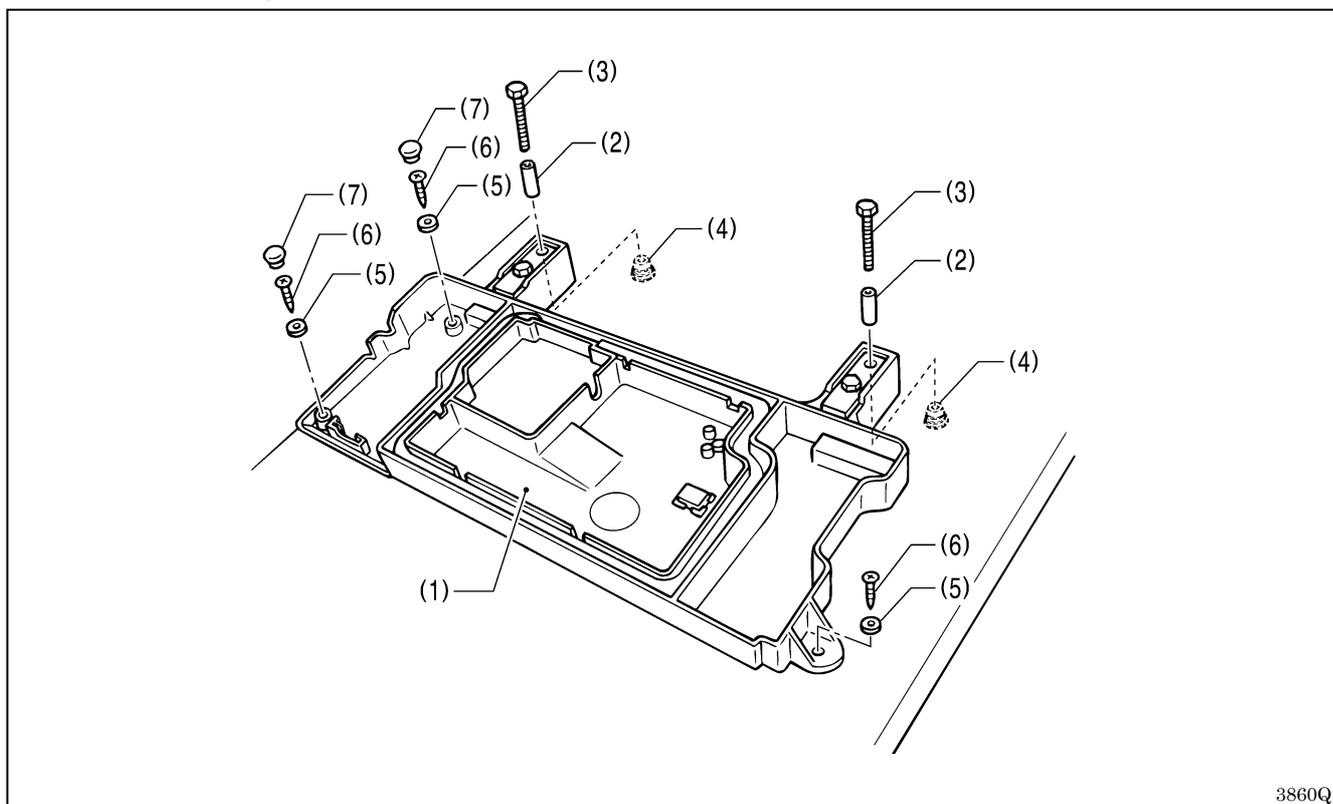
1. Remove the 12 screws (1), and then open the covers (main P.C. board mounting plate (2) and sub P.C. board mounting plate (3)).
2. Install the control box with the bolts (4), cushions (5), cushion collars (6), rubber collars (7), flat washers (8) and nuts (9) as shown in the illustration. At this time, 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



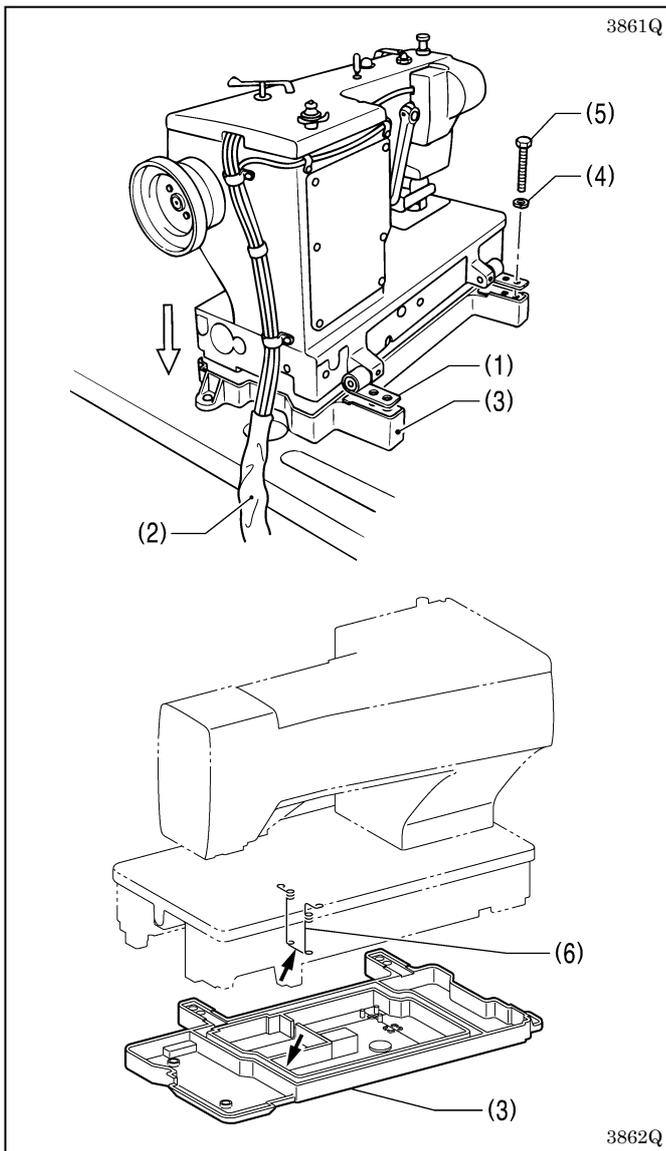
1. Install the power switch (1) with the two screws (2).
2. Secure the power switch (1) cord and the motor (4) cord with the six staples (3).

4 - 6 . Installing the bed base



1. Place the bed base (1) on top of the work table, and insert the four collars (2).
2. Provisionally tighten the four flange nuts (4) onto the four 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), and then install the two rubber caps (7).
4. Remove the four bolts (3).

4 - 7 . Installing the machine head



1. Place the two bed hinges (1) so that they are level as shown in the illustration at left, and then place the machine head gently on top of the bed base (3) so that the cables (2) do not get clamped.

Note:

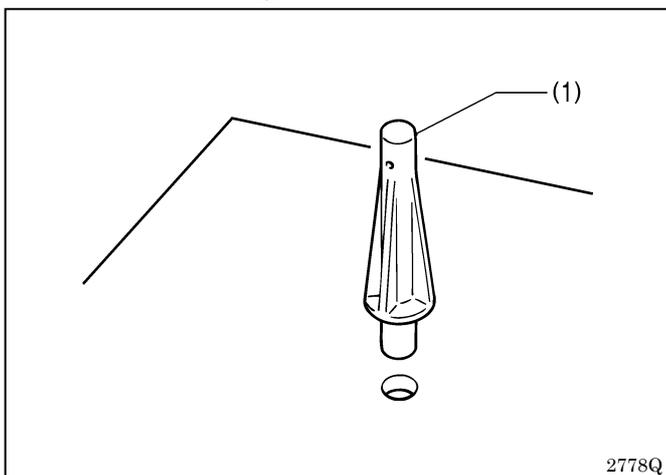
The bed base (3) is made from plastic, so be careful not to hit it with the machine head when placing the machine head on top of it.

2. Install the machine head with the four spring washers (4) and four bolts (5).

Note:

Make sure that the felt support (6) do not touch the bed base (3).

4 - 8 . Installing the head rest

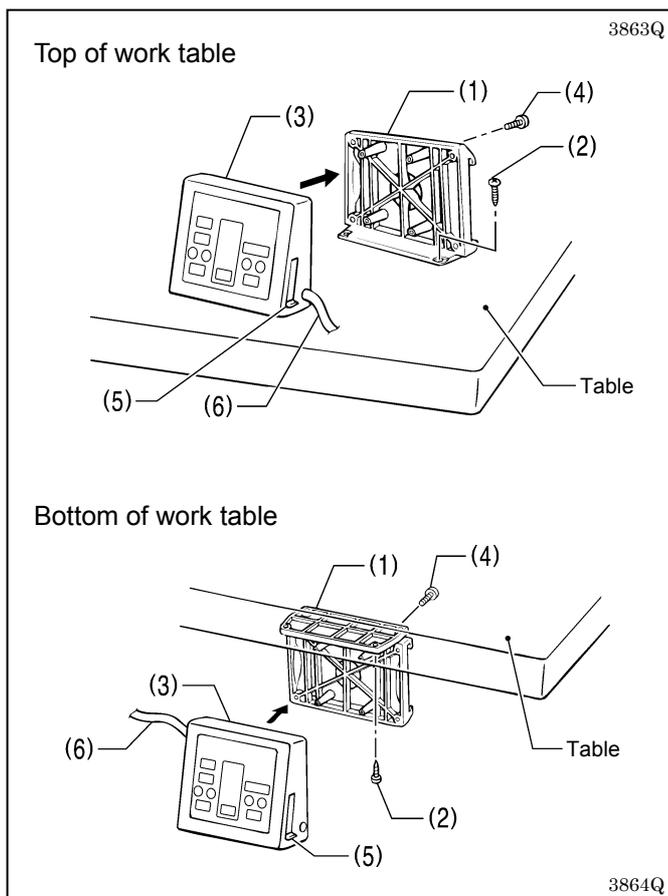


Tap the head rest (1) into the table hole.

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.

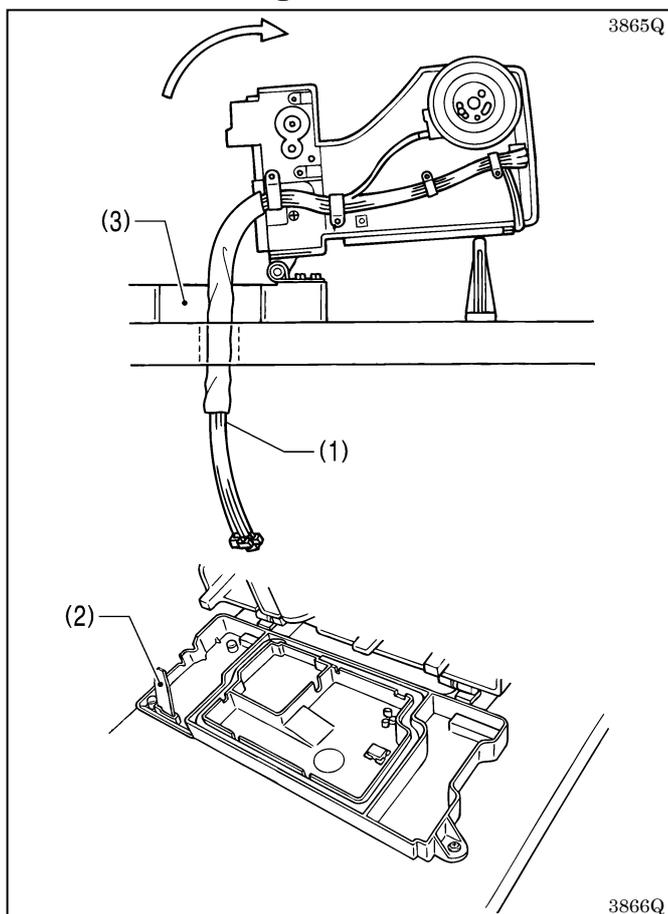
1. Install the rear frame (1) to the work table (top or bottom) with the four wood screws (2).
2. Install the front frame assembly (3) to the rear frame (1) with the four screws (4).

* The vertical orientation of the front frame assembly (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 (5) through the hole at the side of the box.

4 - 1 0 . 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.

4-1 1. Connecting the cords

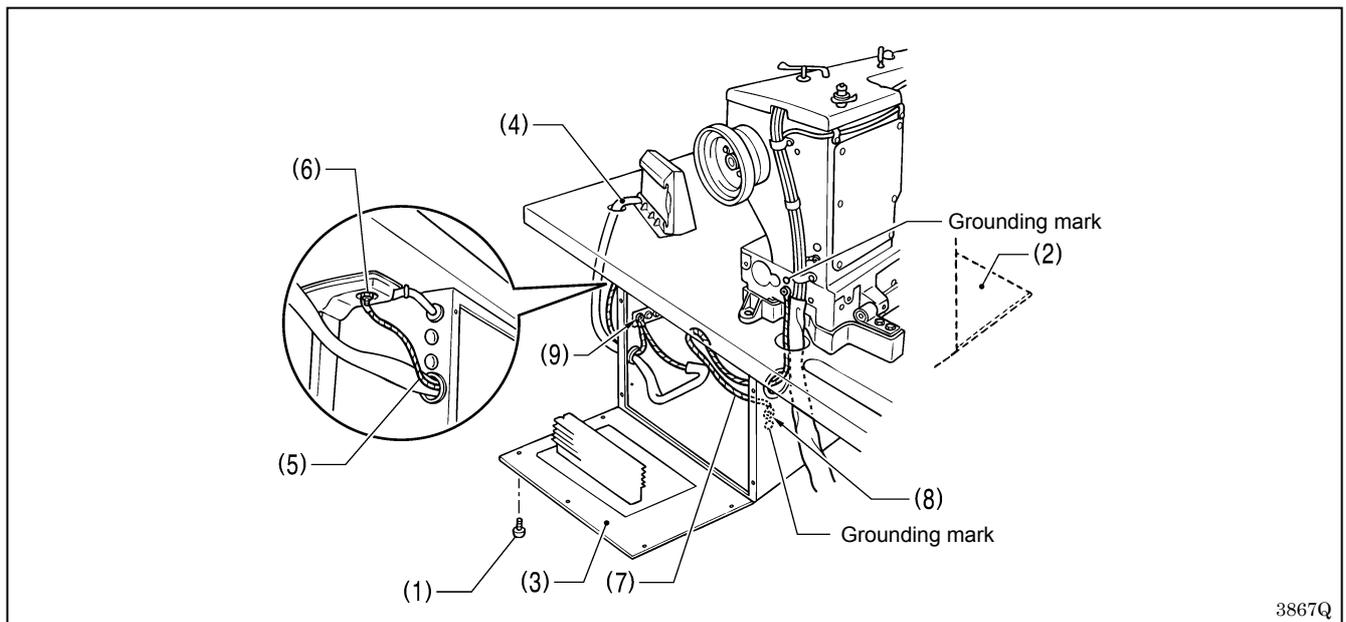
The harness is connected in the same way regardless of whether the machine head is positioned horizontally or vertically.

4-1 1-1. Connecting the ground wire

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.



3867Q

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

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

2. Insert the panel harness (4) into the control box.
3. Connect the ground wire (5) which is protruding out from the hole at the side of the control box to the leg (6).
4. Connect the ground wire (7) coming from the machine head to the grounding point (8) inside the control box.
5. Connect the ground wire in the panel harness to the ground point (9) inside the control box.

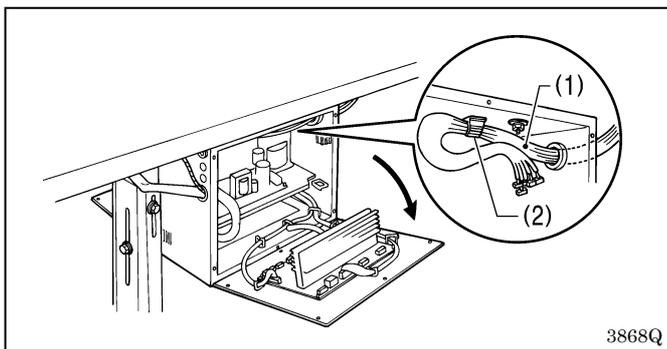
* Grounding marks are displayed on the machine head and inside the control box.

Note: If the shape of the grounding screw in the leg (6) requires a different ground wire to be connected, re-place the ground wire with the accessory ground wire.

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.

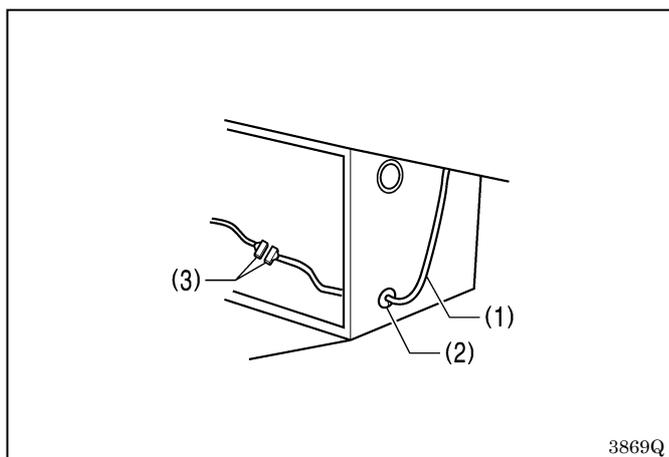
4-1 1-2. Connecting the machine head harness



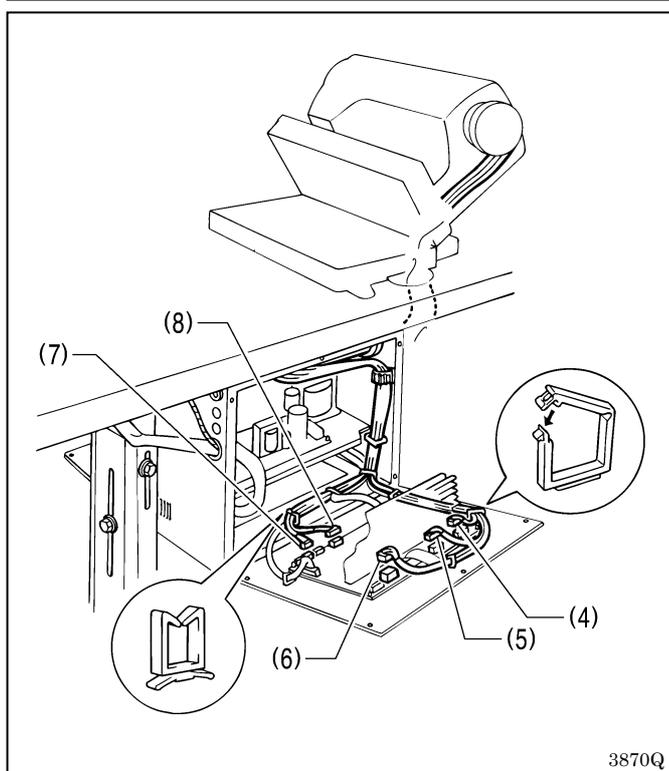
3868Q

1. Insert the machine head harness (1) into the control box.
 2. Gently 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.

4-1 1-3. Connecting the motor harness

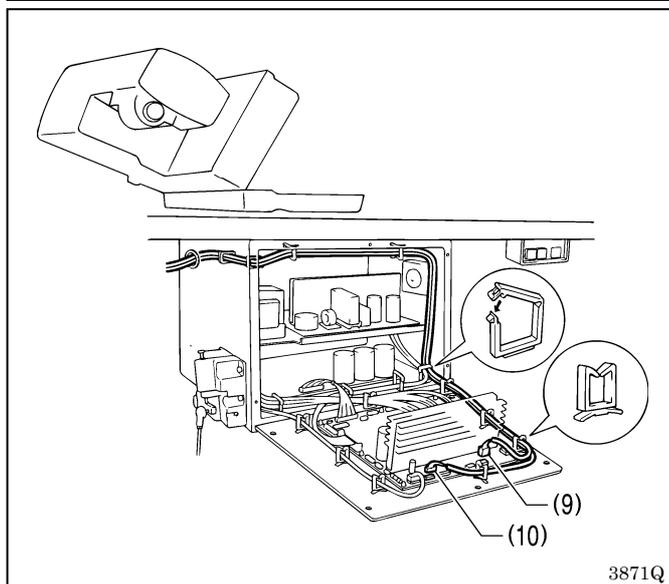


1. Pass the motor harness (1) through the cord bush (2).
2. Connect the connectors (3).
3. Secure the motor harness (1) with staples.



4. Securely insert each of the connectors (4) – (8) as indicated below.

	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)



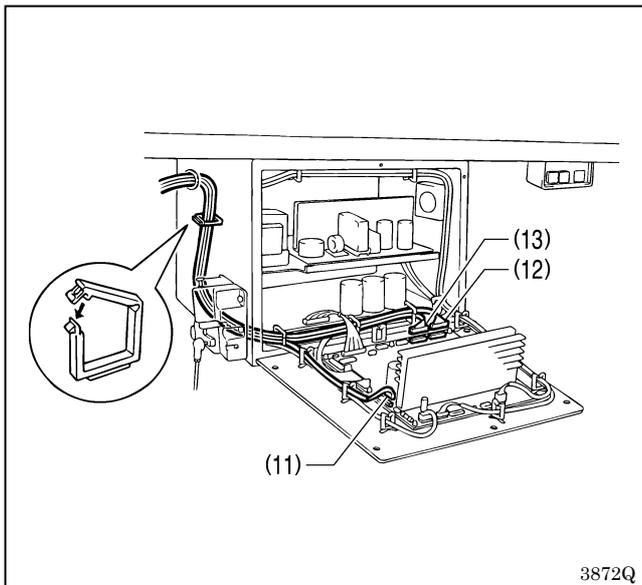
5. Securely insert the connectors (9) and (10) as indicated below.

Note:

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



6. Securely insert each of the connectors (11) – (13) as indicated below.

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

7. Secure the harnesses inside the control box using cord clamps as shown in the illustration.

Note:

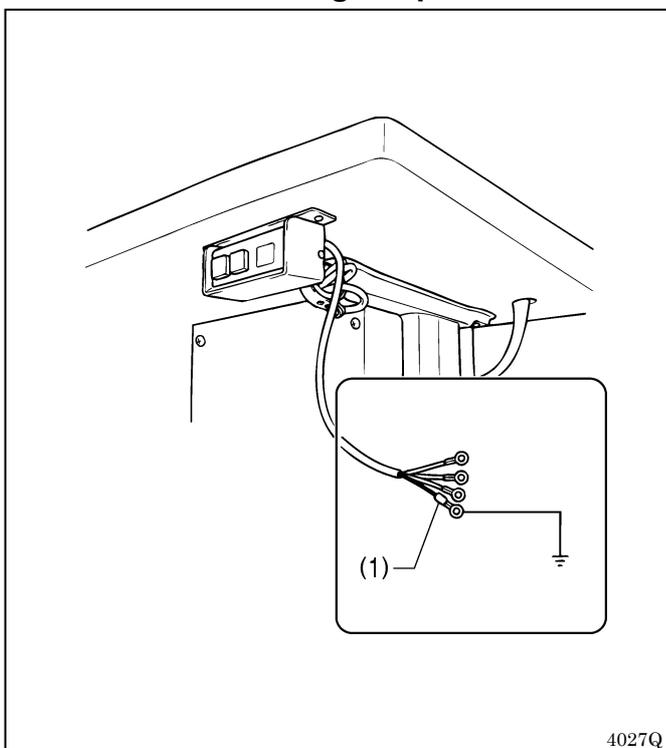
- Make sure that the harnesses do not come into contact with P.C. board components or with the main P.C. board heat sink or the sub-P.C. board heat sink.
- Use the cord clamps at the top of the control box to adjust the harnesses so that they are not loose inside the control box, particularly when using the work table with the machine head positioned vertically.

8. Gently return the machine head to its original position.

* Check that the harnesses do not touch the belt.

9. Close the covers (main P.C. board mounting plate and sub P.C. mounting plate), and tighten the 12 screws.

4 - 1 1 - 4 . Connecting the power cord

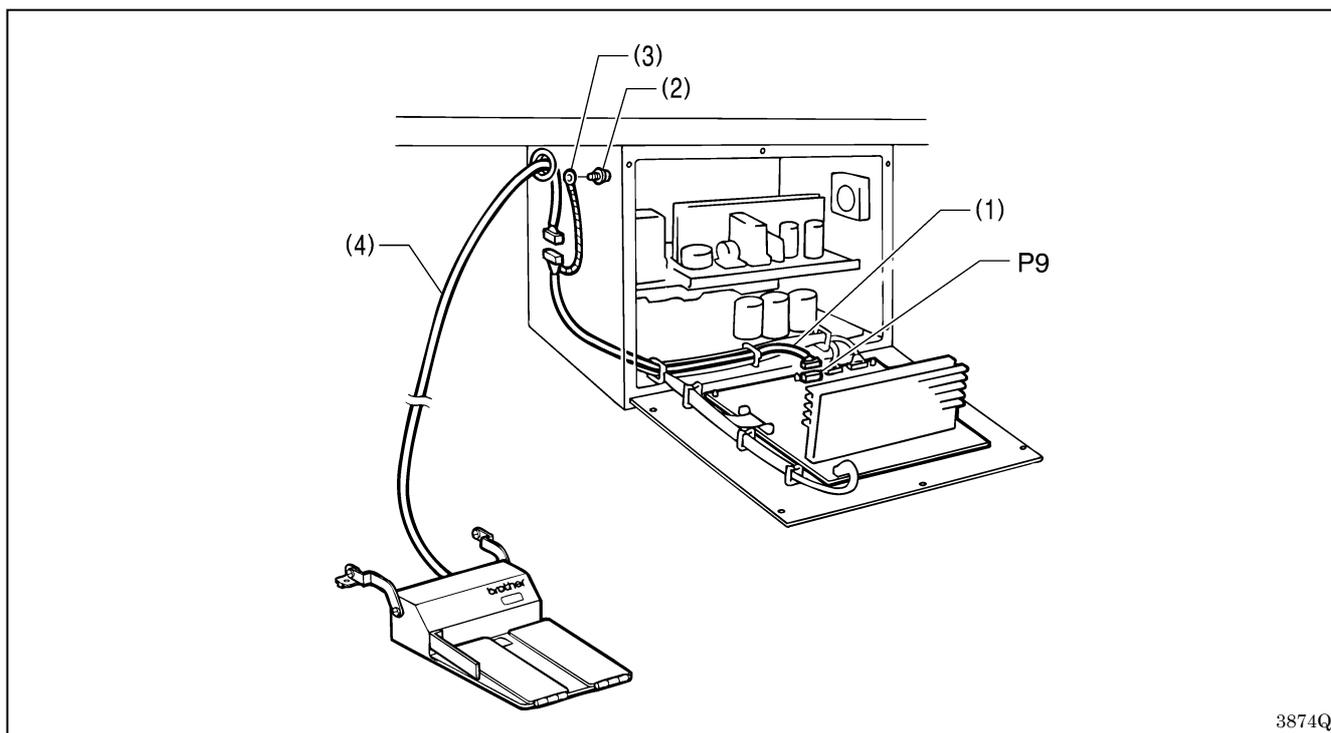


1. Attach an appropriate plug to the power cord (1).
(The green and yellow wire is the ground wire.)
2. Insert the plug into properly-grounded AC power supply.

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 - 1 1 - 5 . Connecting the standing operation pedal harness (option)



3874Q

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

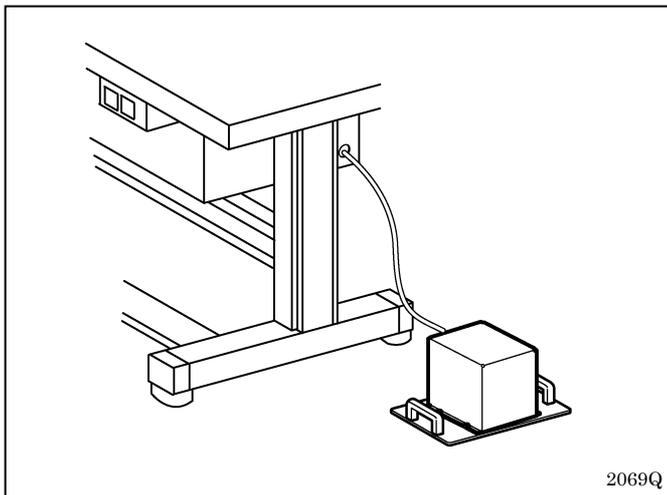
4. INSTALLATION

4 - 1 1 - 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.

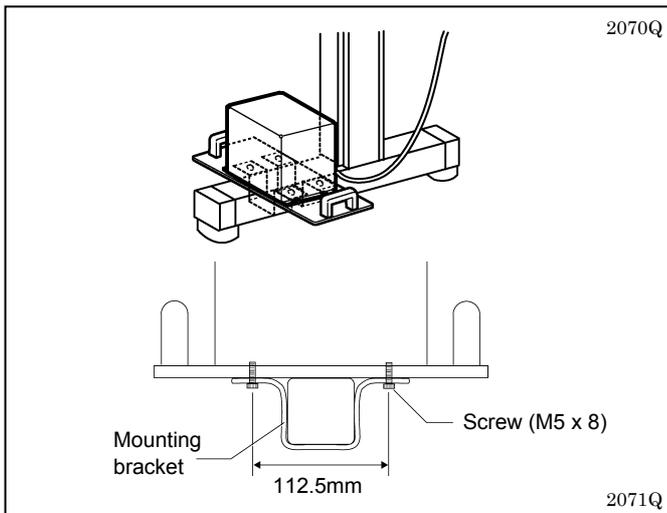
1) Floor installation



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.

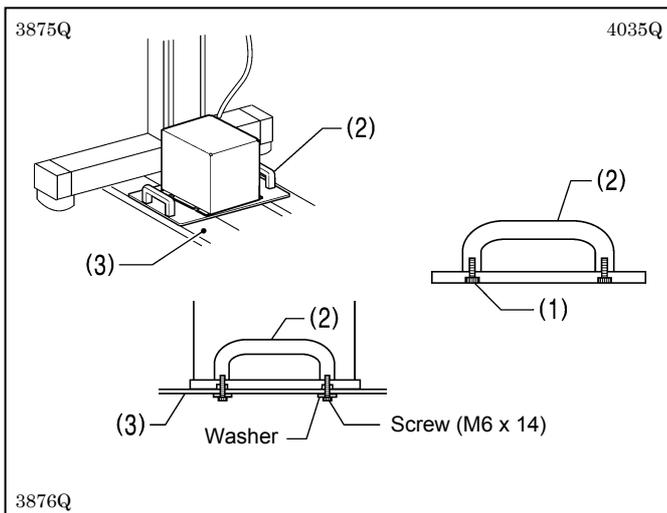
2) Table leg installation (on top of table leg)



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)

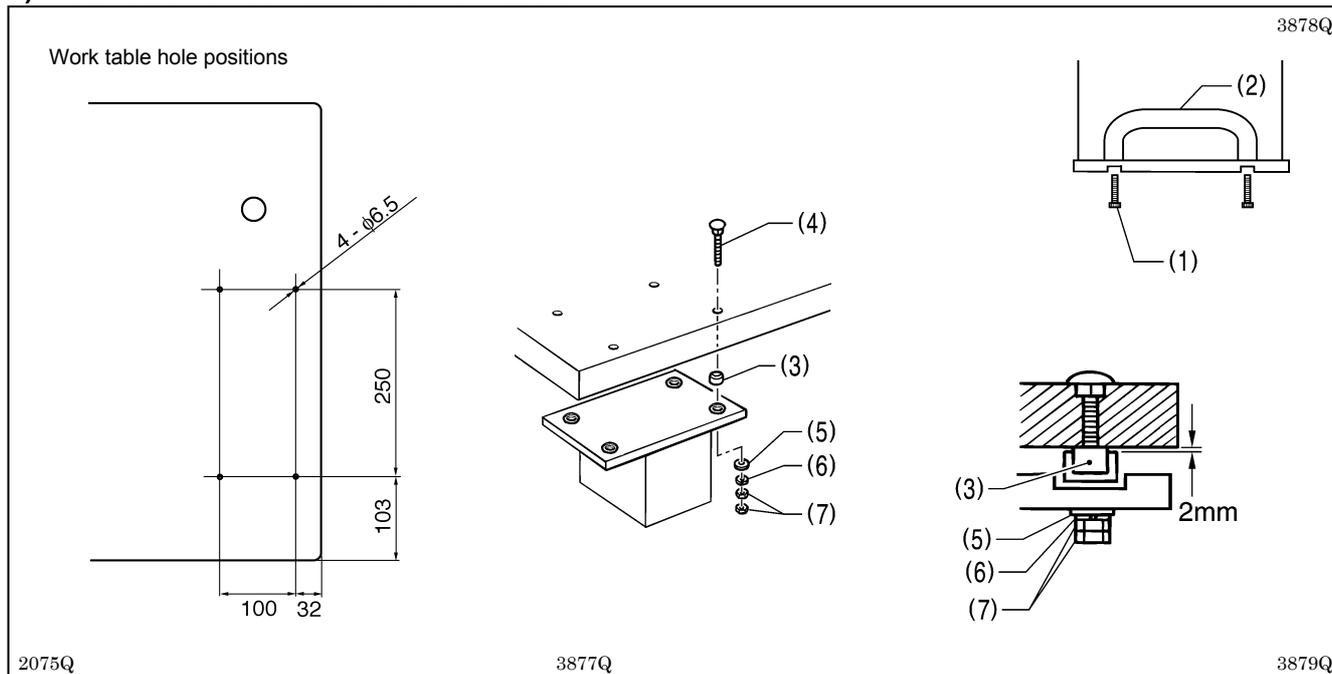


1. Remove the four screws (1), and then remove the two handles (2).

2. Place the transformer on top of the two treadle support plates (3) as shown in the diagram, and then secure it to the handle (2) using the washers and screws.

* The washers and screws must be obtained separately.

4) Installation underneath the work table

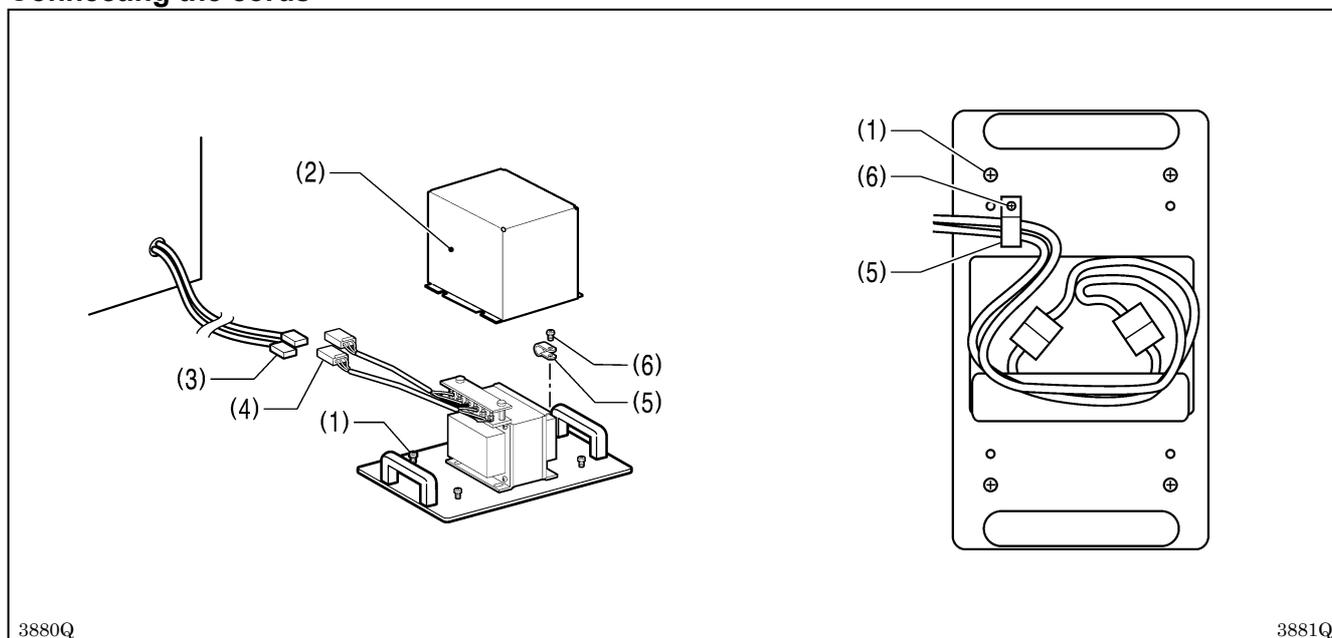


Standard BROTHER work tables are provided with installation holes for use in installing the transformer.

1. Remove the four screws (1), and then remove the two handles (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).

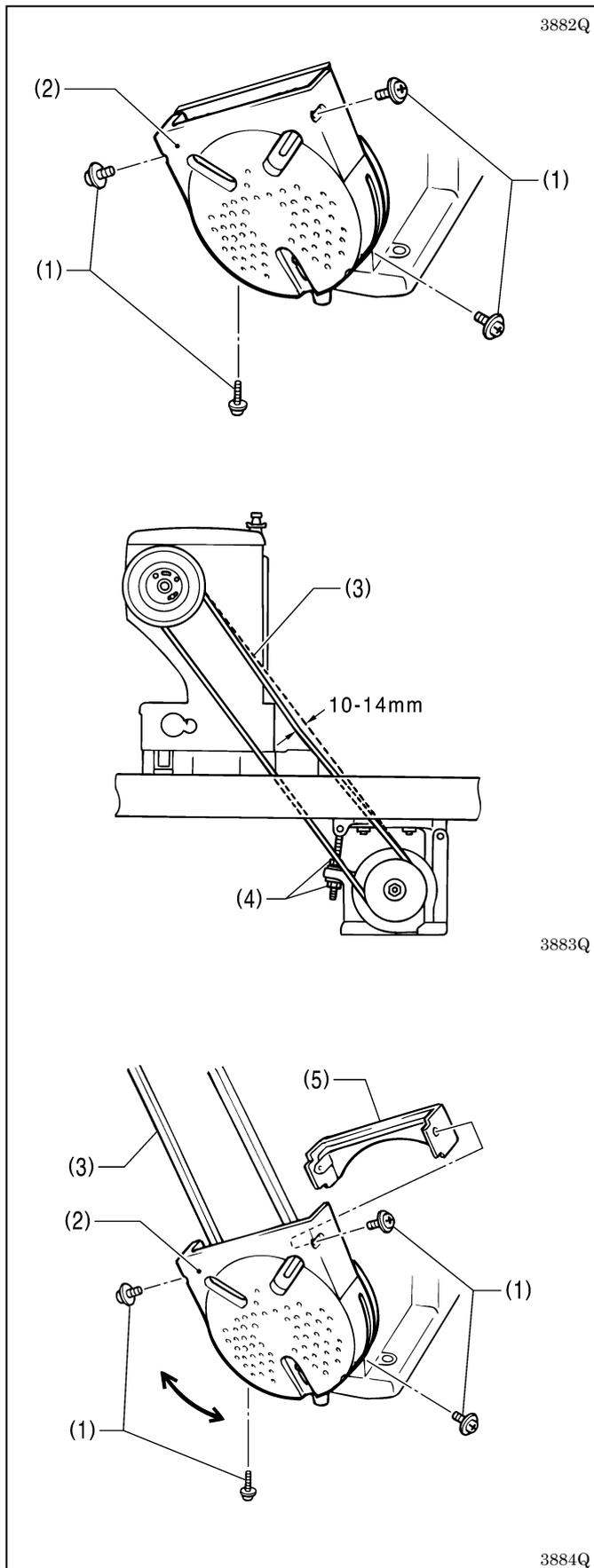
* Use the bolts, flat washers, spring washers, nuts and cushion collars which are included.

Connecting the cords



1. Loosen the four 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).
4. Install the transformer cover (2) with the four screws (1).
5. Secure the cords to the work table using staples.

4 - 1 2. Installing the V-belt



1. Remove the four screws (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.

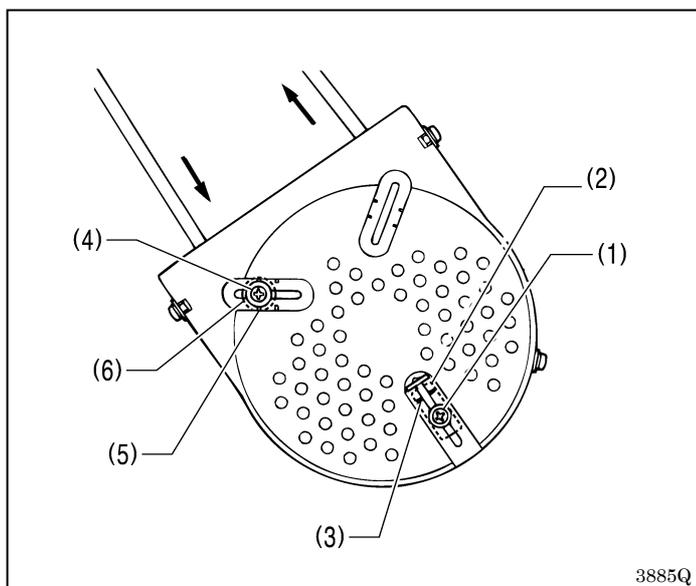
Note:

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 holder

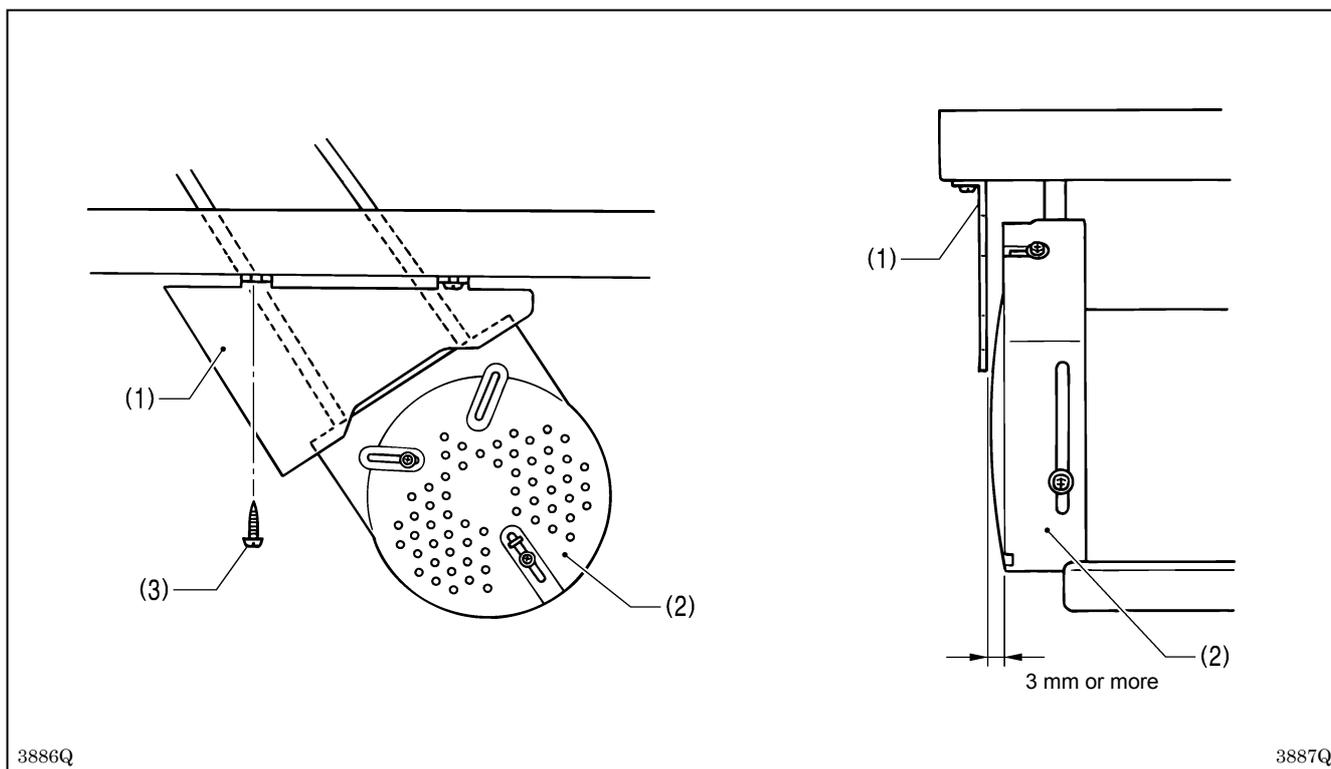
1. Loosen the screw (1).
2. Align the boss of the belt holder (2) with the mark (3).
3. After adjusting, tighten the screw (1).

Adjusting the finger protector

1. Loosen the screw (4).
2. Align the center of the screw (4) with the mark (5) to adjust the position of the finger protector (6).
3. After adjusting, tighten the screw (4).

4 - 1 3. Installing the belt cover plate

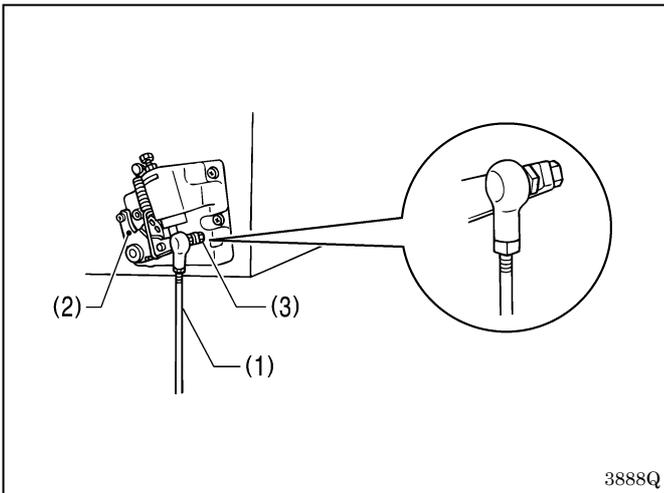
Note: If the machine head is positioned horizontally, there is no need to install the belt cover plate.



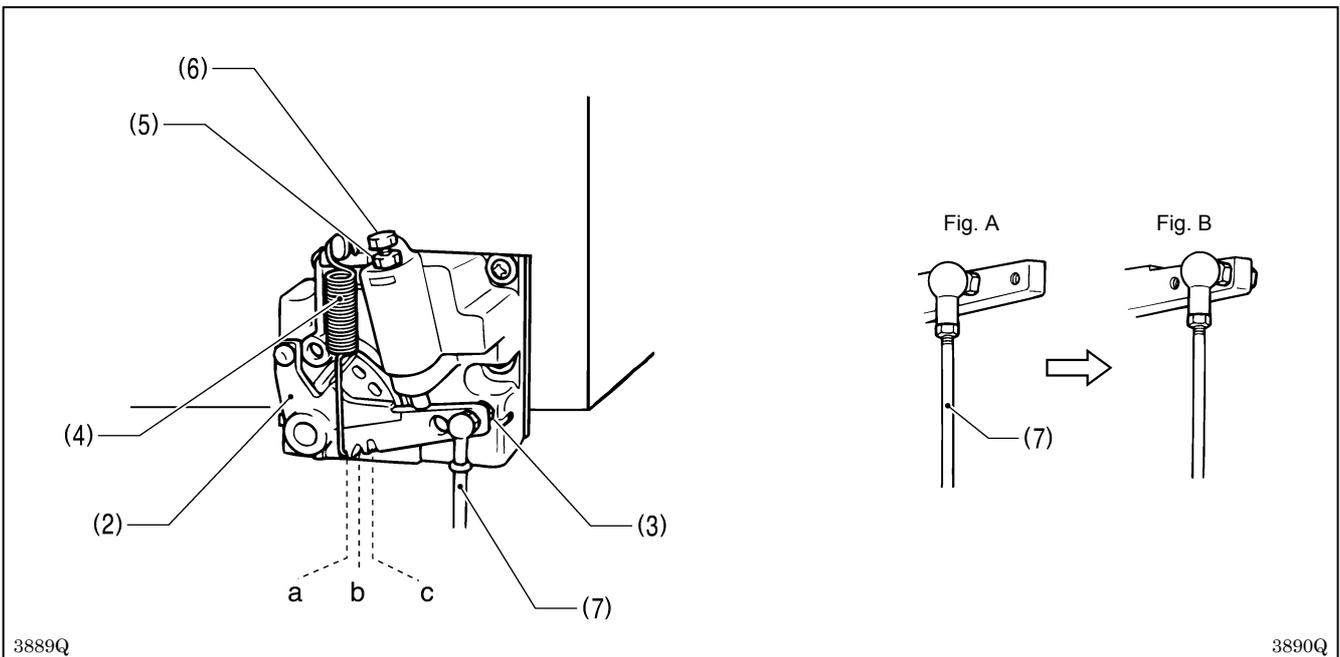
Install the belt cover (1) with the two wood screws (3) so that it does not touch the motor belt cover (2).

* Set the belt cover plate (1) so that there is a gap of 3 mm or more in the longer motor direction, and also should not be projected out from the edge of the work table.

4-1 4. Installing the treadle connecting rod



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 (4) 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 (5) and turn the bolt (6).

* The treadle return pressure becomes heavier as the bolt (6) is tightened, and becomes lighter as the bolt (6) is loosened.

2. Tighten the nut (5).

Adjusting the treadle stroke

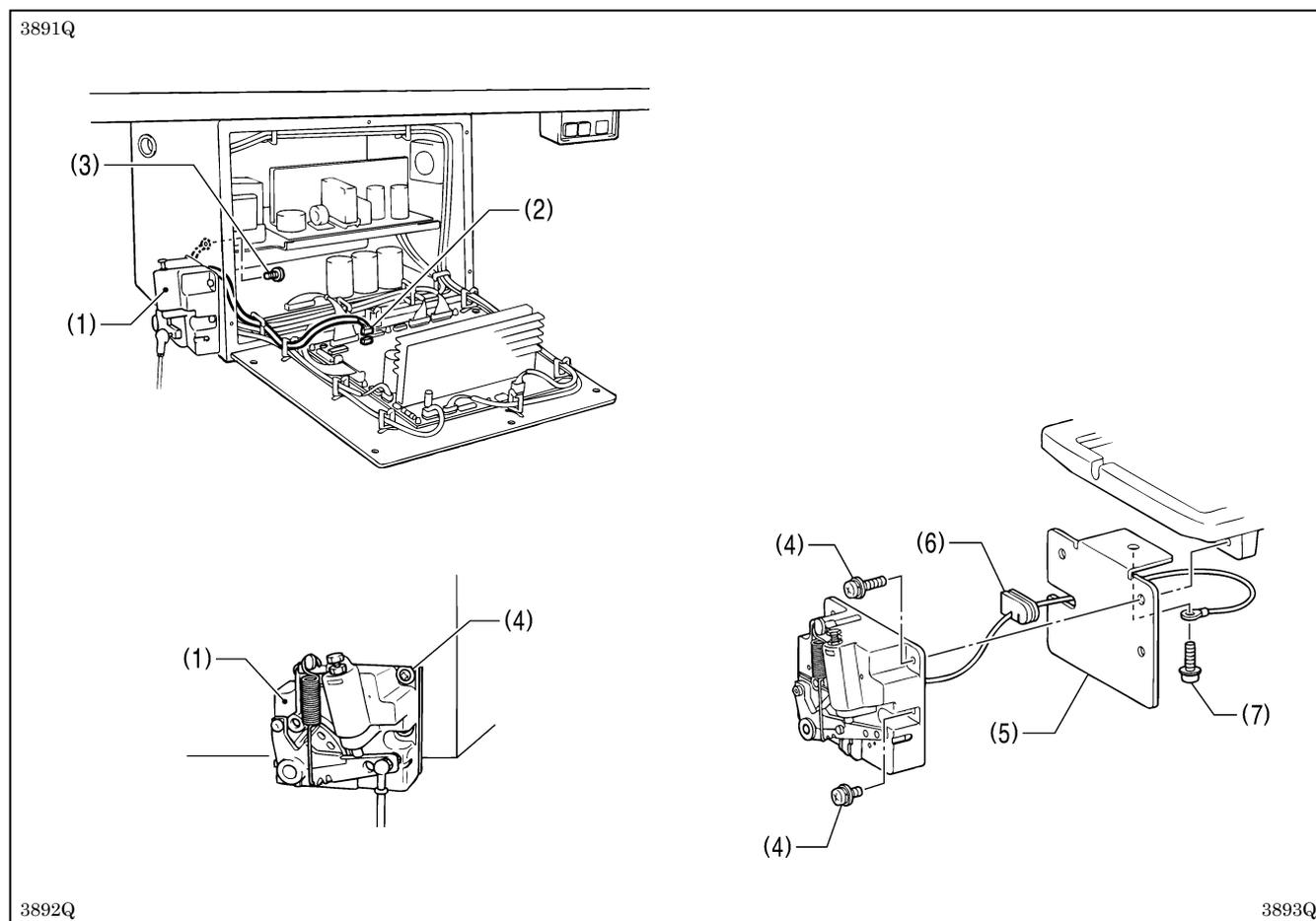
Remove the nut (3), and then move connecting rod joint (7) from the position in figure A to the position in figure B.

The treadle stroke will increase by approximately 1.25 times.

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

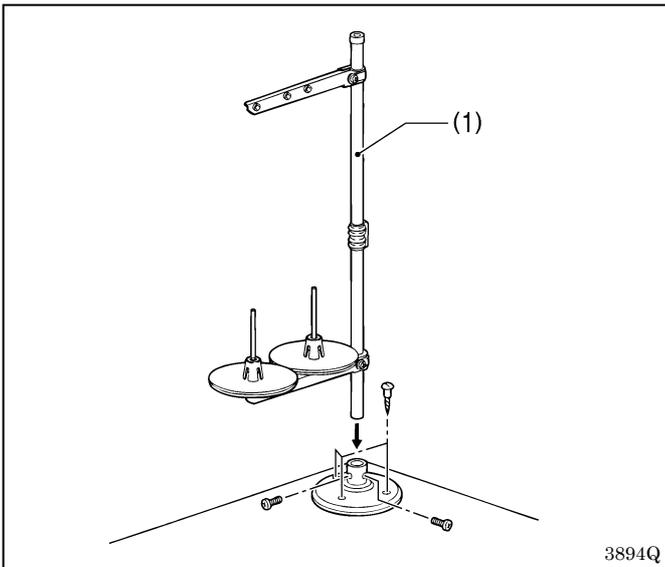
4 - 1 4 - 1 . Changing the treadle unit installation position (horizontal positioning only)

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



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

4-15. Installing the spool stand



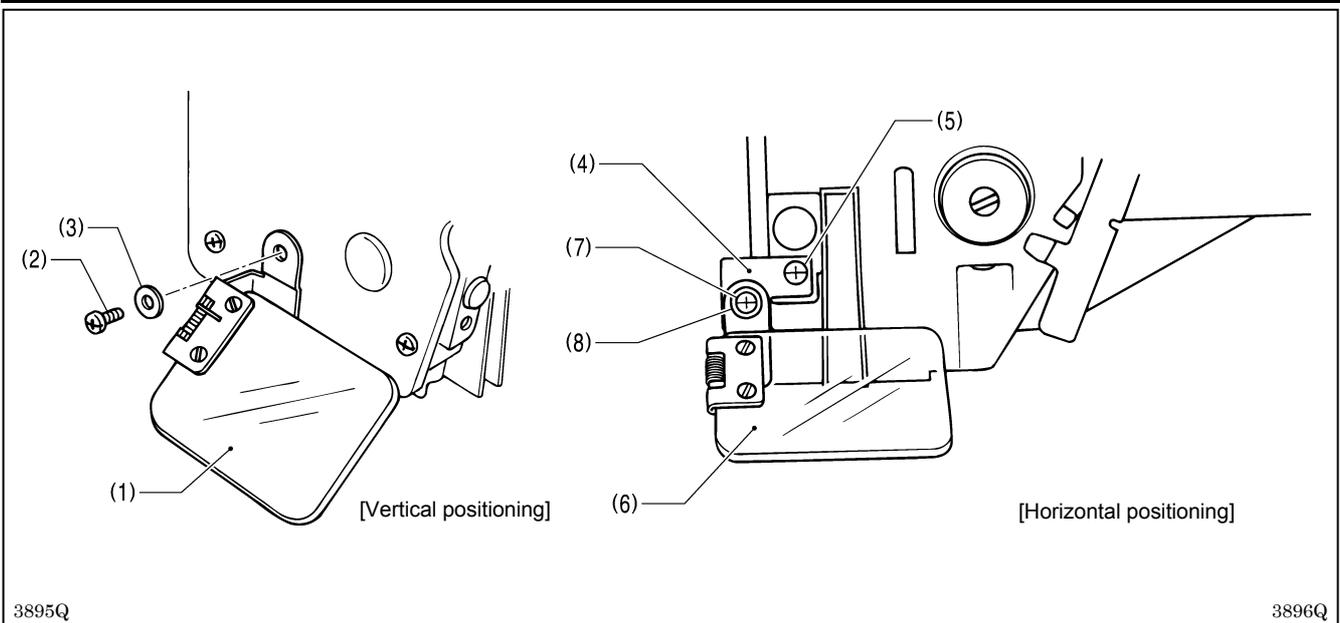
Assemble the spool stand (1) while referring to the spool stand instruction manual, and then install the spool stand (1) at the left side of the work table.

4-16. 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.



[Vertical positioning]

Install the eye guard (1) with the screw SM4.76-32x6 (2) and the flat washer (3).

[Horizontal positioning]

1. Install the eye guard support (4) to the machine head with the screw (5).
2. Install the eye guard (6) with the screw SM4.76-32x6 (7) and the flat washer (8).

4-1 7. Lubrication

CAUTION



Turn off the power switch before starting 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.

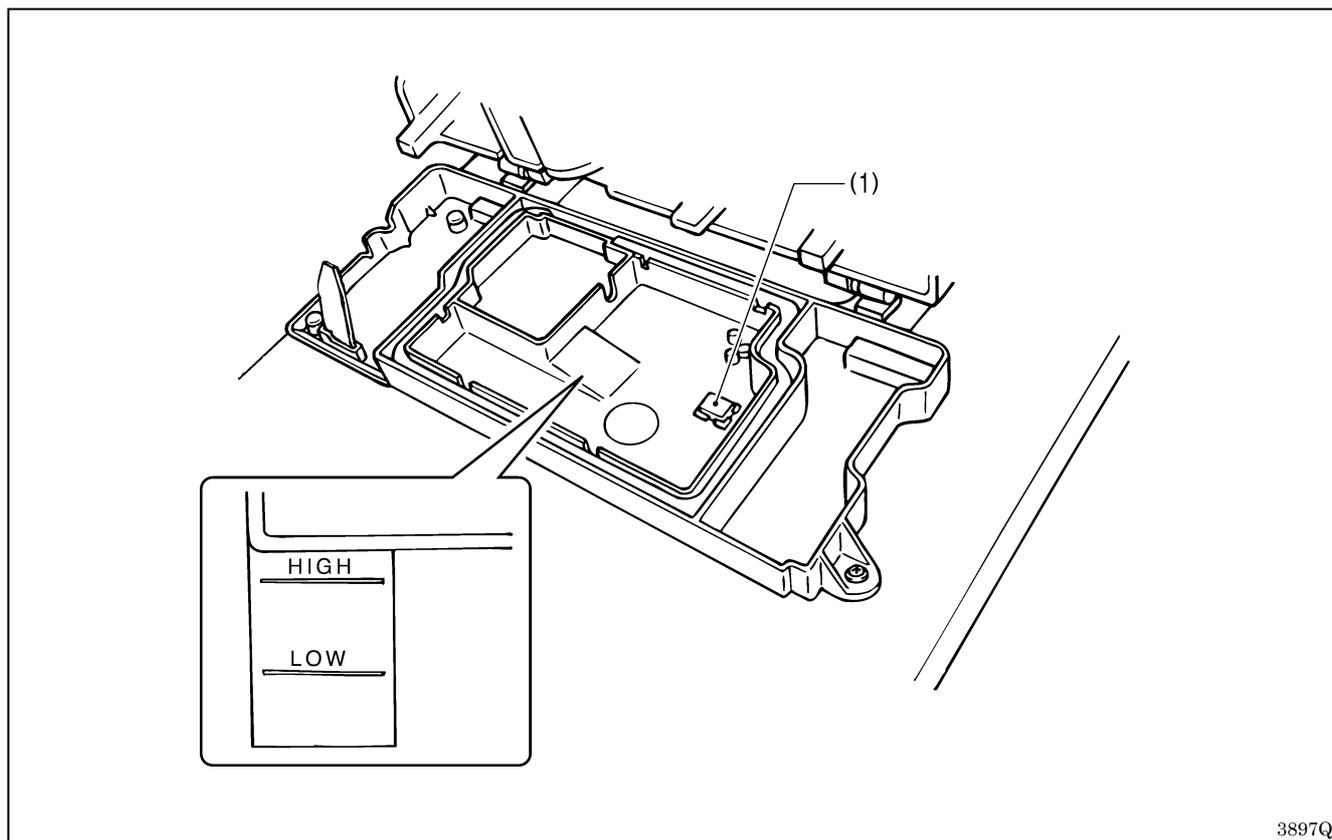
Note:

The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.

Use only the lubricating oil <Nisseki Mitsubishi Sewing Lube 10 N; VG10> specified by Brother.

* If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil EssoTex SM10; VG10>

4-1 7-1. Lubricating the bed base

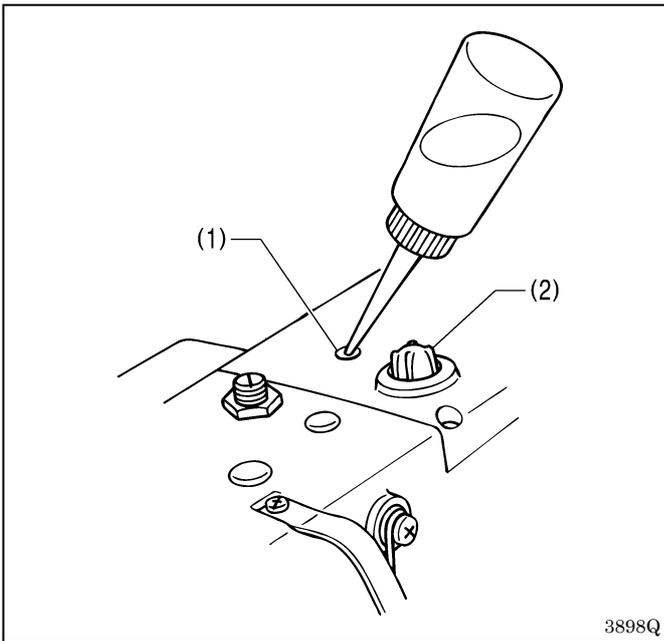


1. Gently tilt back the machine head.
2. Set the magnet (1) in place.
3. Slowly pour in lubricating oil until the oil level reaches the "HIGH" mark.
4. Gently return the machine head to its original position.

* Periodically tilt back the machine head and check the lubricating oil level. If the oil level drops below the "LOW" mark, add more lubricating oil.

* Replace the lubricating oil about once every six months.

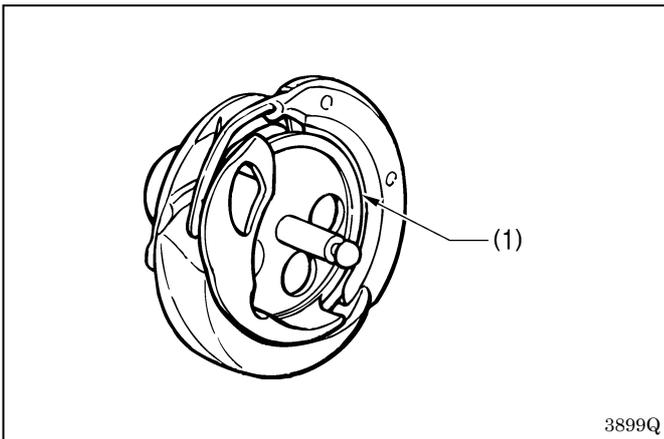
4 - 1 7 - 2 . Lubricating the arm



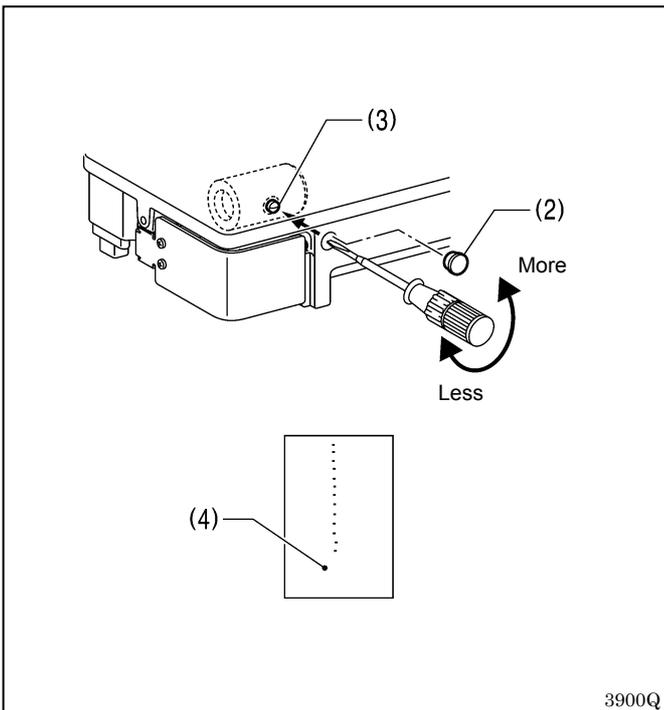
Apply 5-6 drops of oil to the oil inlet (1) at the top of the arm.

* When using the machine, check that the oil is visible through the oil window (2). If it cannot be seen, problems such as seizure of the mechanism may occur.

4 - 1 7 - 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.

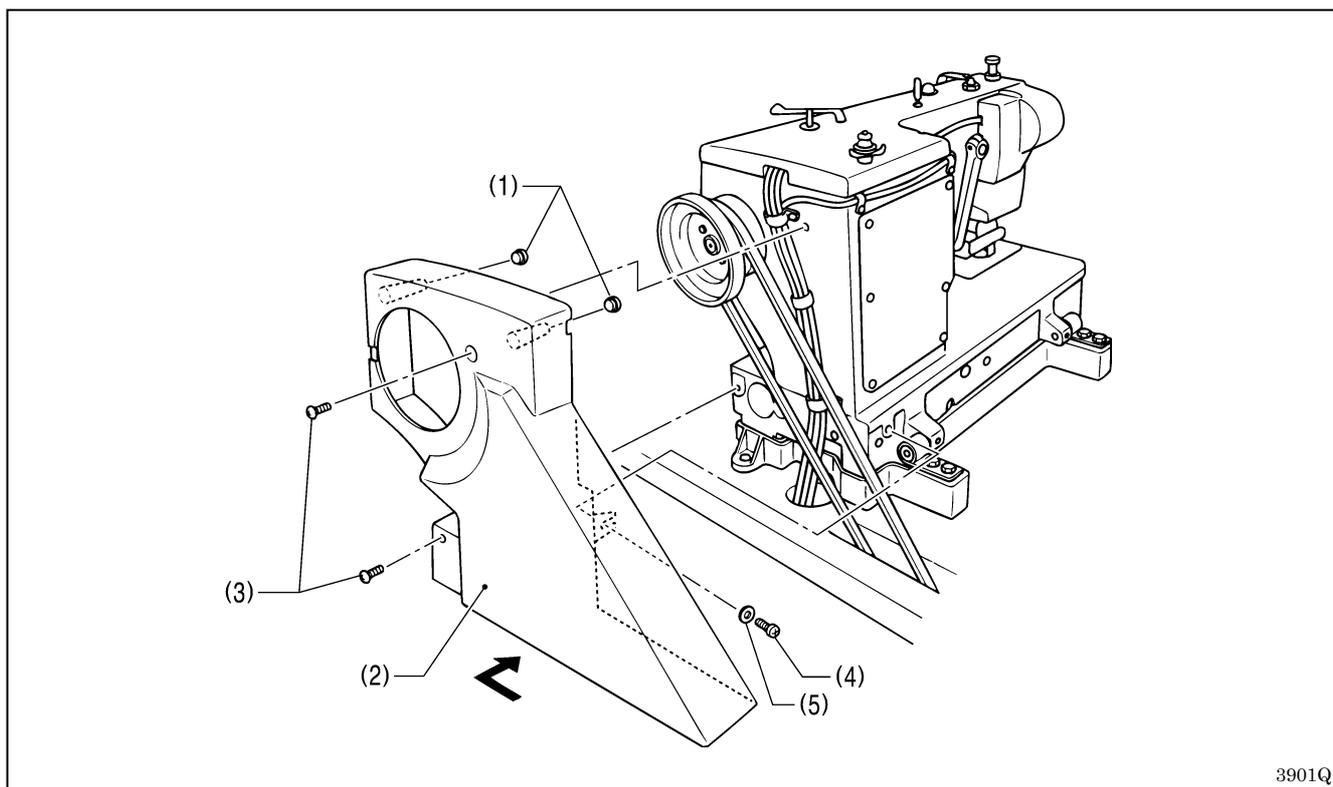


Rotary hook lubrication adjustment

1. Remove the rubber cap (2).
2. Turn the adjusting screw (3) 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 (4) or similar to catch the oil drops. As a guide, the optimum position can be obtained if the adjusting screw (3) is tightened as much as possible and then loosened about two turns.

4 - 1 8 . Installing the belt cover



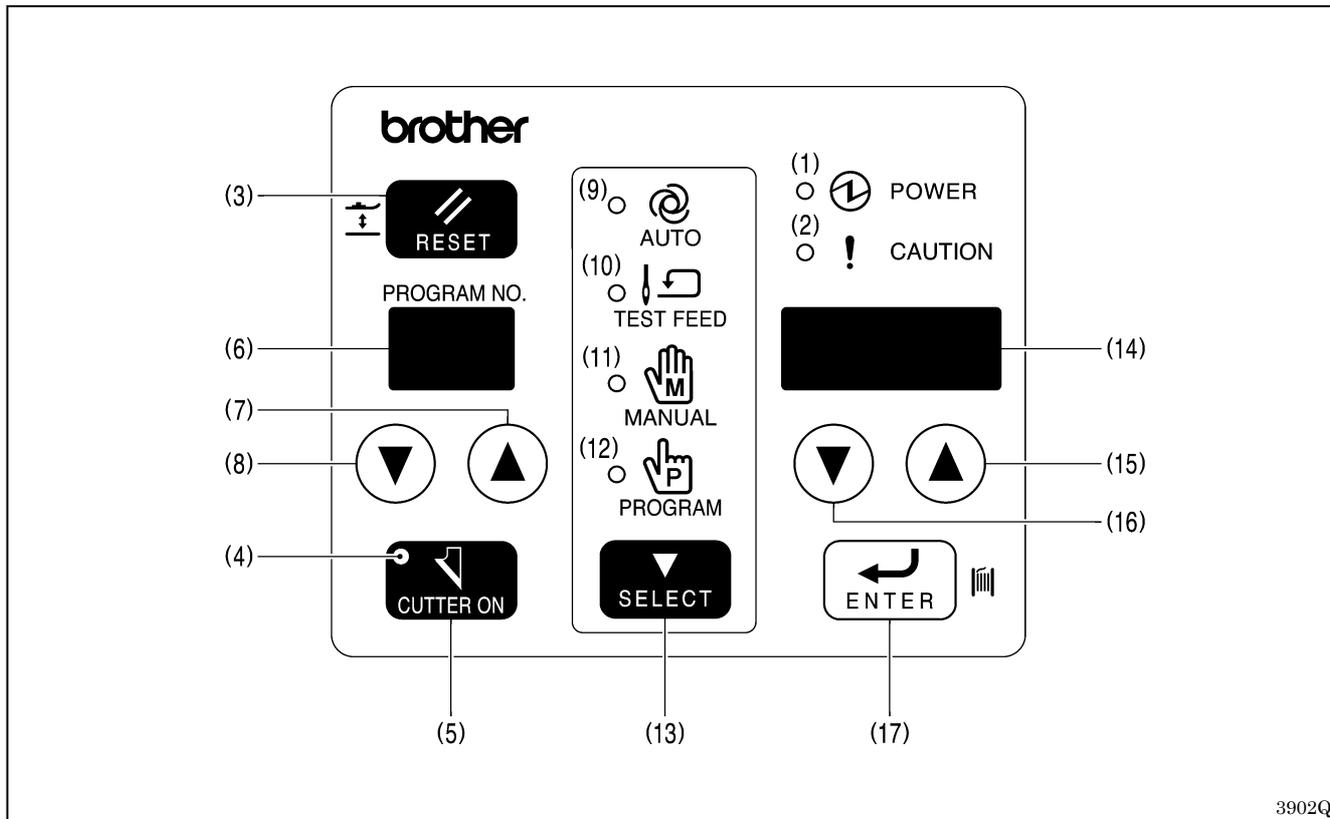
1. Attach the two rubber caps (1) to the belt cover (2).

2. Insert the belt cover (2) 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 (2).

5. OPERATION

5 - 1 . Name and function of each operation panel item



(1) Power indicator

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.

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.

If the warning indicator is illuminated, the sewing machine will not start even if the treadle is depressed.

(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.

* The program number changes in the order 1 → 2 → ... → 90 → P1 → ... → P9 → C1 → ... → C9 → C0. → ... C9.
→ 1. P1 to P9 are programs that are created by the programming software for the electronic pattern sewer, and C1 to C9. are cycle programs.

(7) Program No. UP key

Press to increase the value in the program number LED.

(8) Program No. DOWN key

Press to decrease the value in the program number LED.

(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 and the ENTER key is pressed simultaneously while parameter setting is being carried out, the mode changes to memory switch setting mode. If the program no. UP key and the ENTER key is simultaneously 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

- In automatic mode, this display shows the production counter, lower thread counter or error codes.
- In test feed mode and manual mode, the number of stitches remaining is displayed.
- In program mode, the parameter details are shown.

(15) Parameter UP key

Used to increase parameter values.

(16) Parameter DOWN key

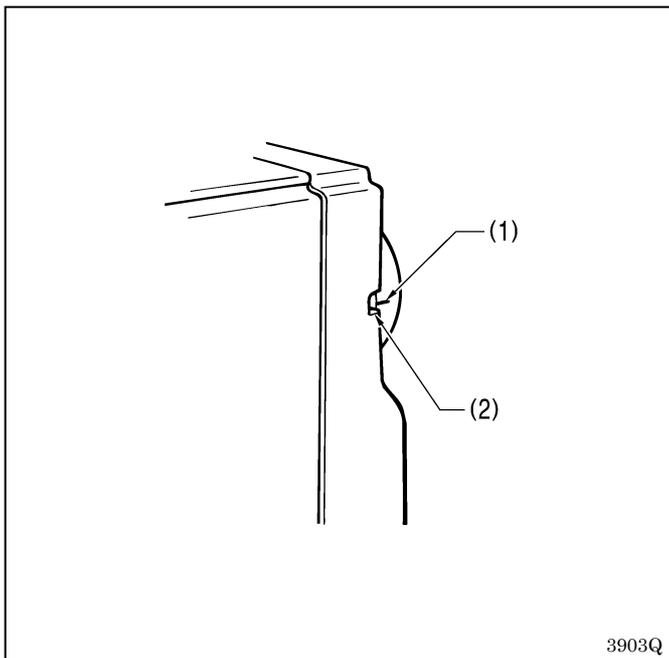
Used to decrease parameter values.

(17) ENTER key

Used to accept a program number during automatic mode. Used to accept changed values for parameter settings during program mode.

If you depress the treadle to start the sewing machine 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 detection (preparation)



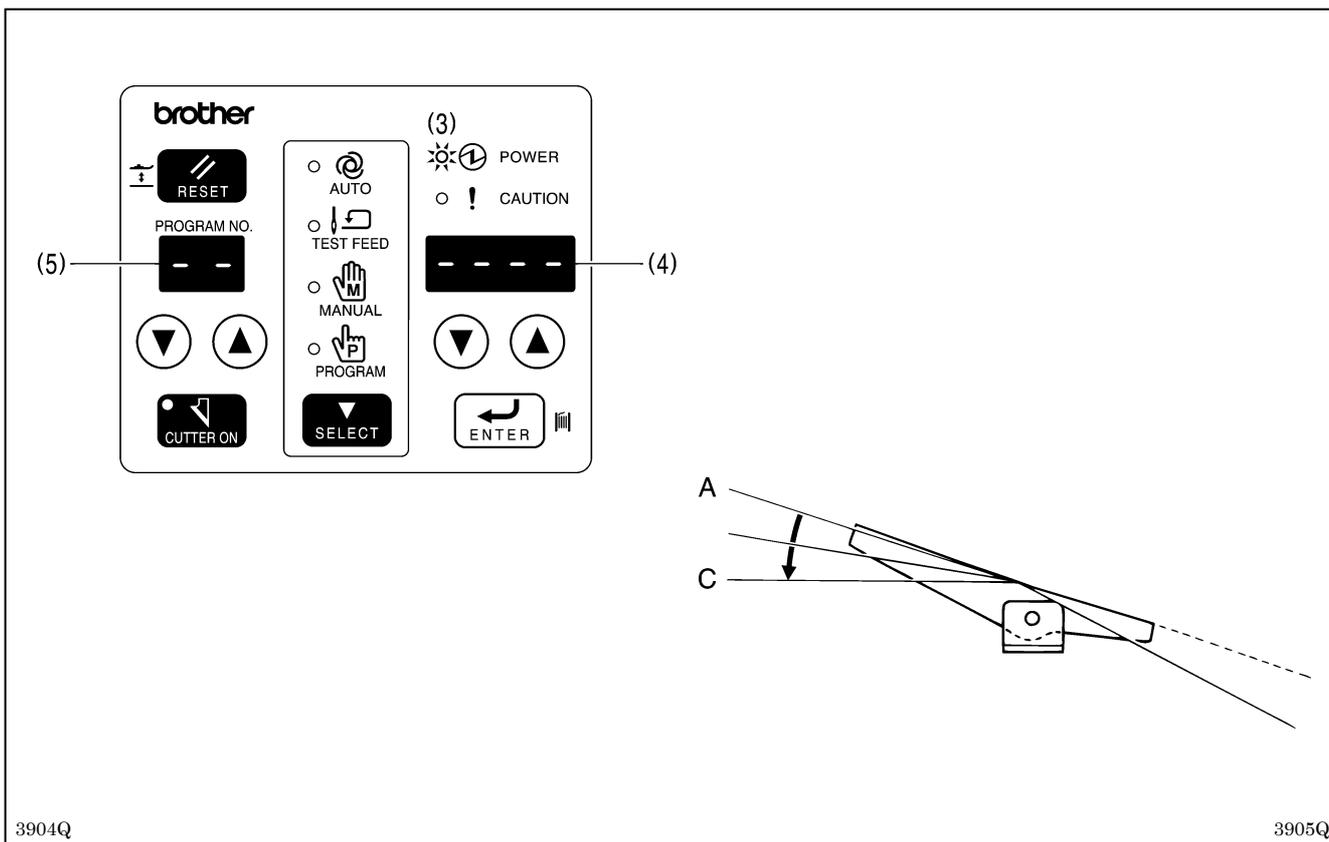
Before starting home position detection, check that the needle bar is at its highest position.

Turn the machine pulley so that the index mark (1) on the pulley is inside the mark (2) on the belt cover.

If the machine is started while the index mark (1) is not inside the mark (2), 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 (3) will illuminate and the model number will appear for one second in the parameter display LED (4).

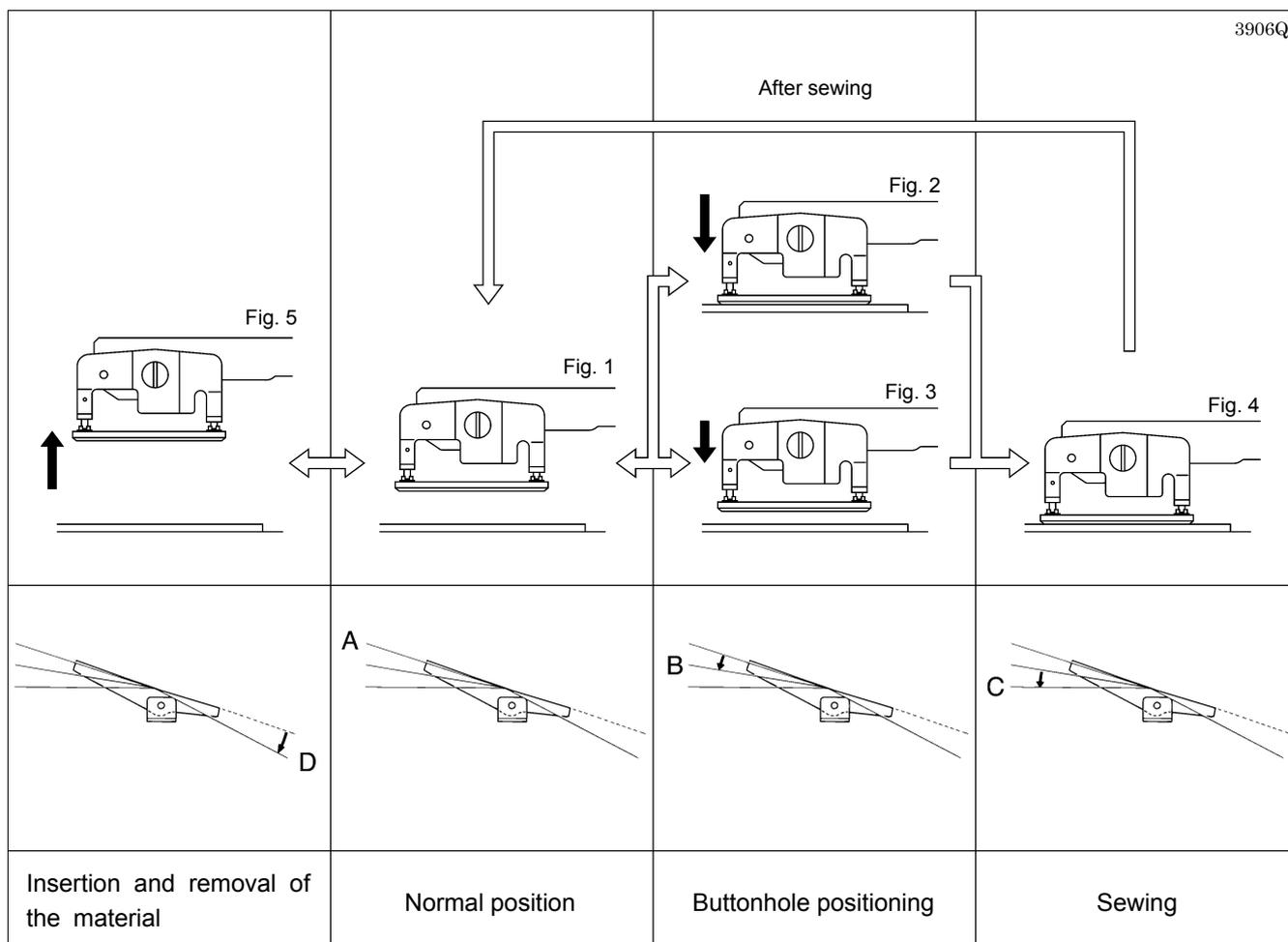
After this, "--" will appear in the program number LED (5) and "----" will appear in the parameter display LED (4).

2. Depress the treadle to the 2nd step [C], and then release it.

* 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. (Figure 1)

* The work clamp lifter height at the neutral position can be changed to between 1 mm and 13 mm using memory switch No. 05. (Initial value is 10 mm.)

2. When the treadle is depressed to the 1st step [B], the work clamp lowers, and when the treadle is returned to [A], the work clamp returns to the neutral position.

* When memory switch No. 06 is set to off, the work clamp is lowered to its lowest position. (Figure 2)

If memory switch No. 06. is set to between 0.1 – 8.0 mm, the work clamp is lowered to the height which has been set. This is useful for positioning the material. (Light work clamp) (Figure 3)

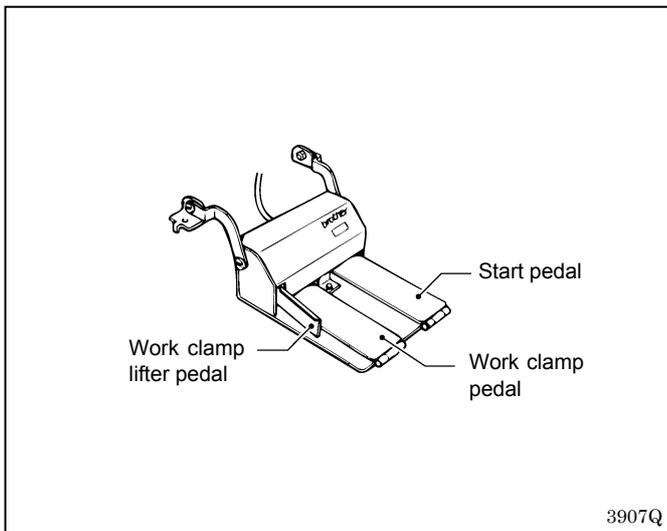
3. When the treadle is depressed to the 2nd step [C], the machine starts sewing. (Figure 4)

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. (Figure 5)

* The work clamp rises while the treadle is being depressed backward, and it returns to the neutral position when the treadle is released.

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

Note: Set the circuit board DIP switch 2 - No.1 to ON. (Refer to “13. CHANGING FUNCTIONS USING THE DIP SWITCHES”.)

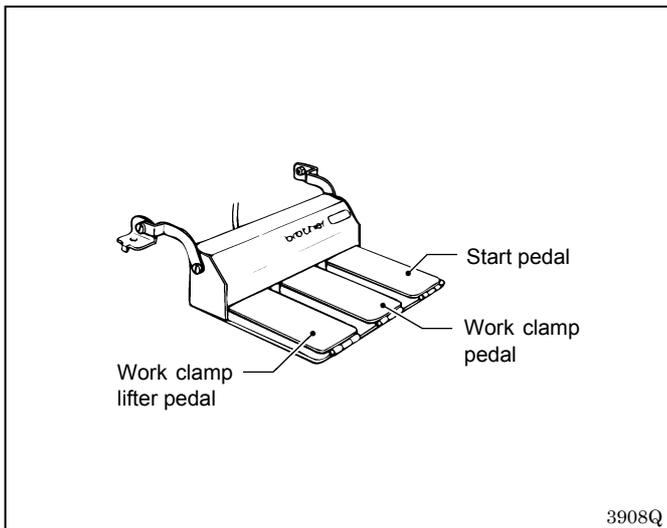


Two pedals + Work clamp lifter pedal

When the work clamp pedal (left side) is depressed, the work clamp lowers, and when it is depressed once more, the work clamp returns to the neutral position.

When the start pedal (right side) is depressed, sewing starts.

When the work clamp lifter pedal is pushed toward the outside, the work clamp rises while the pedal is being pushed. (functions in the same way as depressing the treadle backward.)



Three pedals

When the work clamp pedal (middle) is depressed, the work clamp lowers, and when it is depressed once more, the work clamp returns to the neutral position.

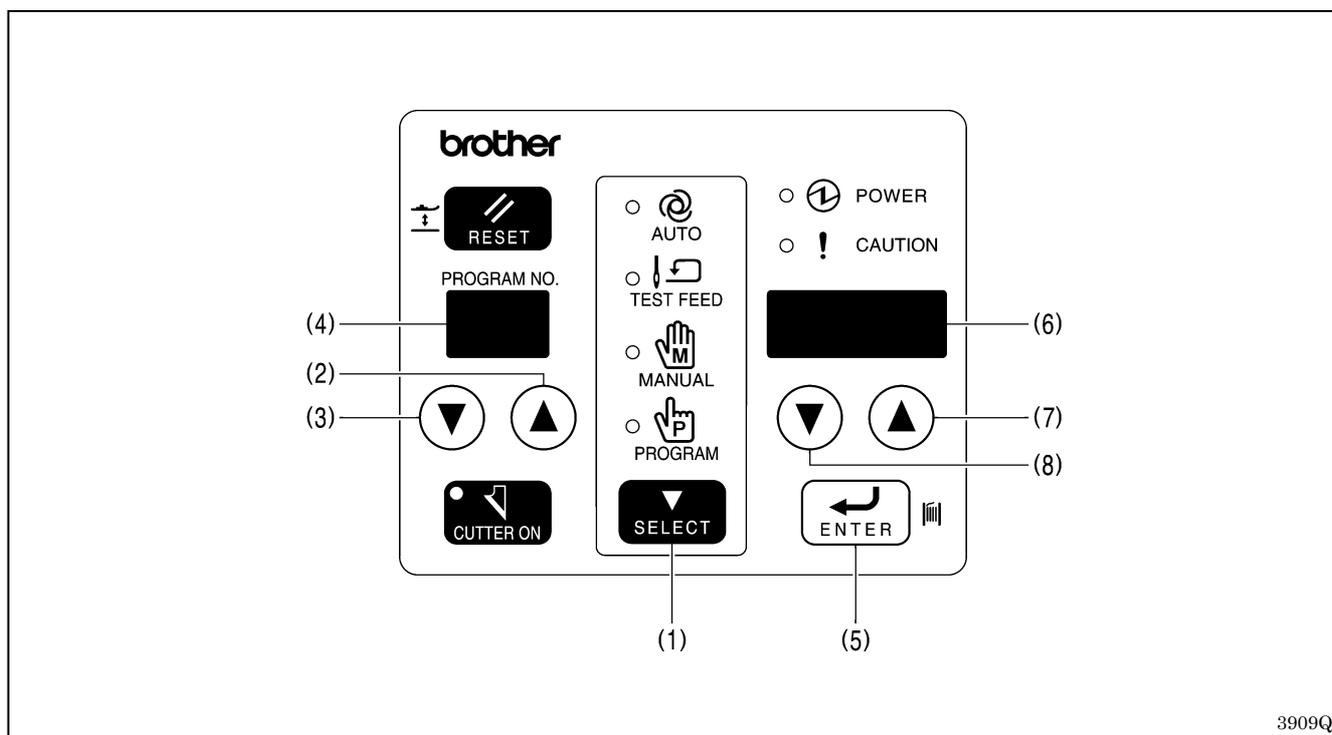
When the start pedal (right side) is depressed, sewing starts.

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

When circuit board DIP switch 2 - No. 3 is set to ON, you can set the work clamp to lower while the work clamp pedal is being depressed.

5 - 4 . Program setting method

The parameters for program numbers 1 to 90 are all set to their default values at the time of shipment. (Refer to “5-5. Parameter table”.)



1. Press the SELECT key (1) to change the mode to automatic, test feed or manual mode.
2. Press the program No. keys (2) and (3) to select the program number (1 - 90) for the program to be changed.
 - * The program number will flash in the program number LED (4).
3. Press the ENTER key (5).
 - * The program number will be accepted and the program number LED (4) will stop flashing and illuminate steadily.

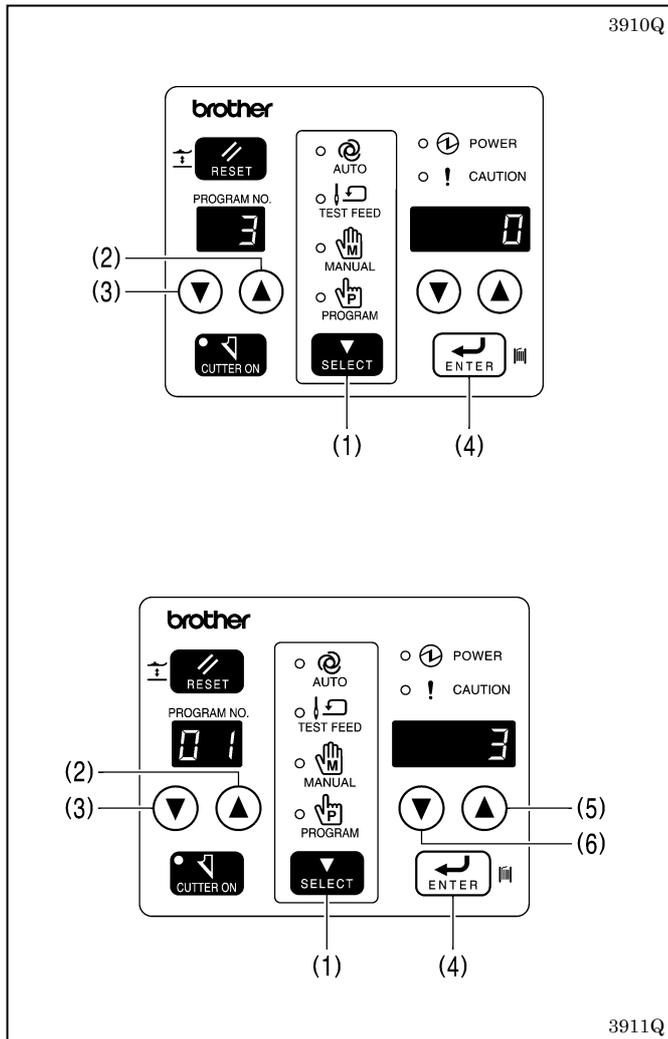
Note: The program number will not be accepted if the ENTER key (5) is not pressed.
4. Press the SELECT key (1) to change the mode to program mode.
 - * The parameter number for the program number that was selected above will appear in the program number LED (4), and the parameter setting value will appear in the parameter display LED (6).
5. Press the program No. keys (2) and (3) to select the number for the parameter to be changed.
6. Press the parameter keys (7) and (8) to change the parameter setting, and then press the ENTER key (5).
 - * The parameter setting will be changed and the parameter display LED (6) will stop flashing and illuminate steadily.

Note: The setting will not be changed if the ENTER key (5) is not pressed.
7. Press the SELECT key (1) to change the mode to automatic mode.

The setting details can be saved in the pro-gram notes of the program memos for easy checking. (Refer to “5-12. Using the program memos”.)

5 - 4 - 1 . Program setting examples

Example 1: How to make a buttonhole (round) setting for program number 3.

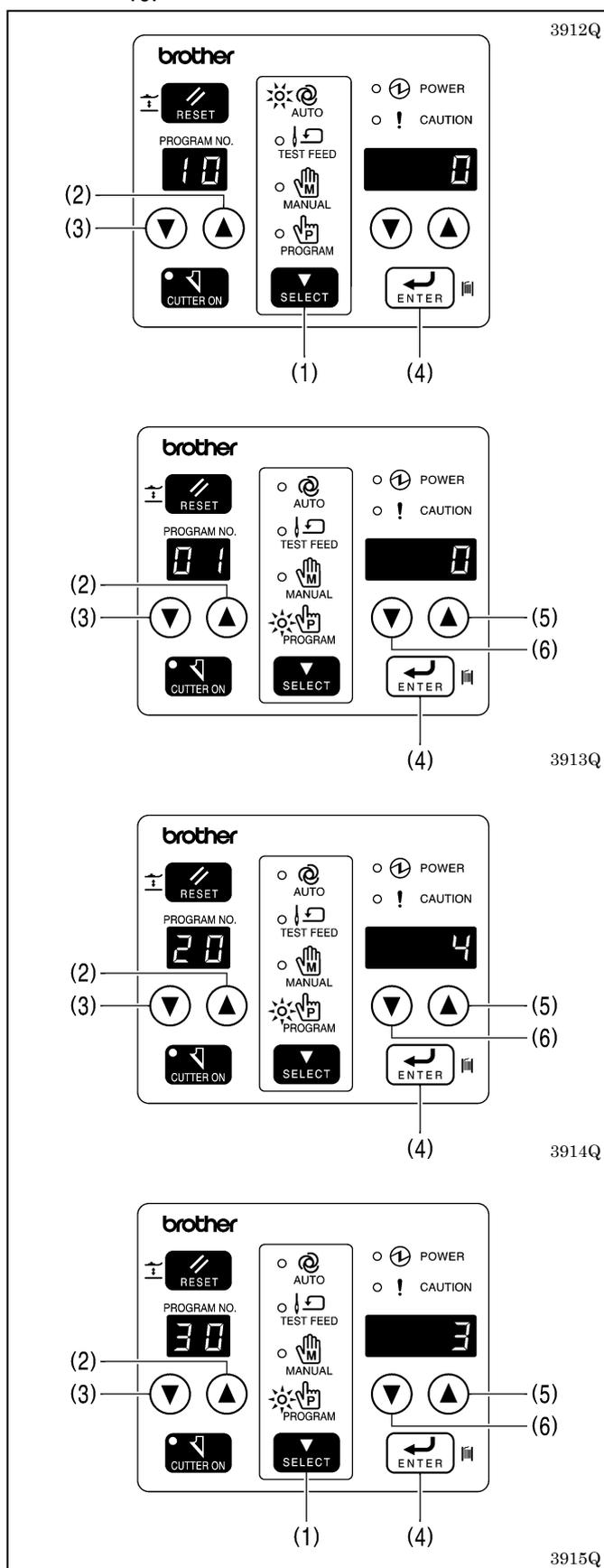


Set parameter number 01 to "buttonhole stitch (round) setting value 3".

1. Press the SELECT key (1) to change the mode to automatic, test feed or manual mode.
2. Press the program No. keys (2) and (3) to select the program number 3, and then press the ENTER key (4).
3. Press the SELECT key (1) to change the mode to program mode.
4. Press the program No. keys (2) and (3) to select the parameter number 01.
5. Press the parameter keys (5) and (6) to select the parameter setting value 3, and then press the ENTER key (4).
6. Press the SELECT key (1) to change the mode to automatic mode.

A round buttonhole sewing pattern has now been set for program No. 03.

Example 2: How to set a taper tack for the front tack pattern and an eyelet for the rear tack pattern to program number 10.



First, set parameter number 01 to "buttonhole stitch (free) setting value 0".

1. Press the SELECT key (1) to change the mode to automatic, test feed or manual mode.
2. Press the program No. keys (2) and (3) to select the program number 10, and then press the ENTER key (4).
3. Press the SELECT key (1) to change the mode to program mode.
4. Press the program No. keys (2) and (3) to select the parameter number 01.
5. Press the parameter keys (5) and (6) to select the parameter setting value 0, and then press the ENTER key (4).

Next, set parameter number 20 to "Taper tack setting value 4".

6. Press the program No. keys (2) and (3) to select the parameter number 20.
7. Press the parameter keys (5) and (6) to select the parameter setting value 4, and then press the ENTER key (4).

Next, set parameter number 30 to "Eyelet setting value 3".

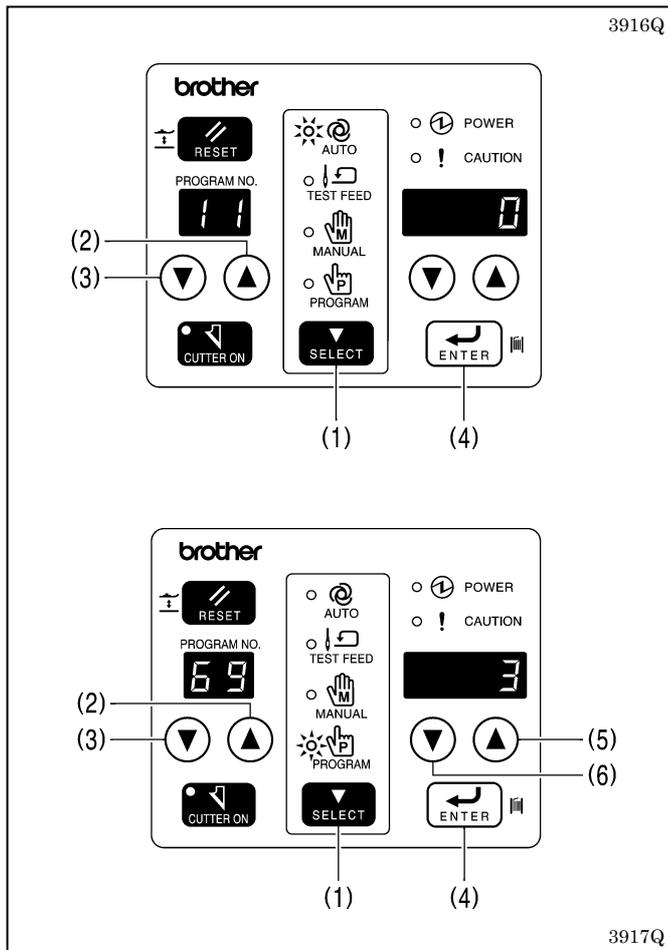
8. Press the program No. keys (2) and (3) to select the parameter number 30.
9. Press the parameter keys (5) and (6) to select the parameter setting value 3, and then press the ENTER key (4).

An eyelet taper-tack buttonhole has now been set for program No. 10.

10. Press the SELECT key (1) to change the mode to automatic mode.

5. OPERATION

Example 3: How to copy the settings for program No. 3 to program No. 11.



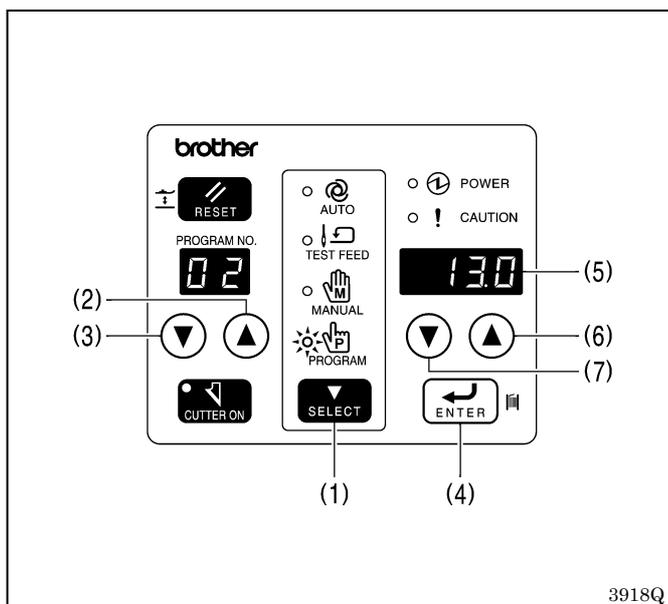
Set parameter number 69 to "Copy source program number setting value 3".

1. Press the SELECT key (1) to change the mode to automatic, test feed or manual mode.
2. Press the program No. keys (2) and (3) to select the program number 11, and then press the ENTER key (4).
3. Press the SELECT key (1) to change the mode to program mode.
4. Press the program No. keys (2) and (3) to select the parameter number 69.
5. Press the parameter keys (5) and (6) to select the parameter setting value 3, and then press the ENTER key (4).

The parameters for program number 3 will then be copied to the parameters for program number 11.

6. Press the SELECT key (1) to change the mode to automatic mode.

5-4-2. Checking the length of knife



1. Press the SELECT key (1) to change the mode to automatic, test feed or manual mode.
2. Press the program No. keys (2) and (3) to select the program number 11, and then press the ENTER key (4).
3. Press the SELECT key (1) to change the mode to program mode.
4. Press the program No. keys (2) and (3) to select the parameter number 02 (length of knife).
5. Check that the length of the knife that is installed to the sewing machine matches the knife length setting that is being displayed in the parameter display LED (5).
6. If the knife lengths are different, press the parameter keys (6) and (7) until the knife length setting matches the length of the knife that is installed to the sewing machine, and then press the ENTER key (4).

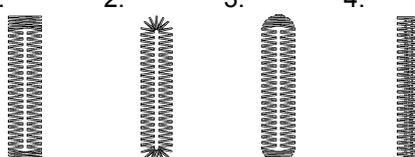
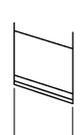
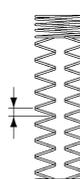
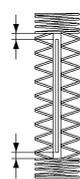
Note:

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

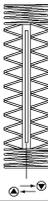
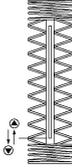
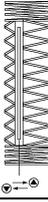
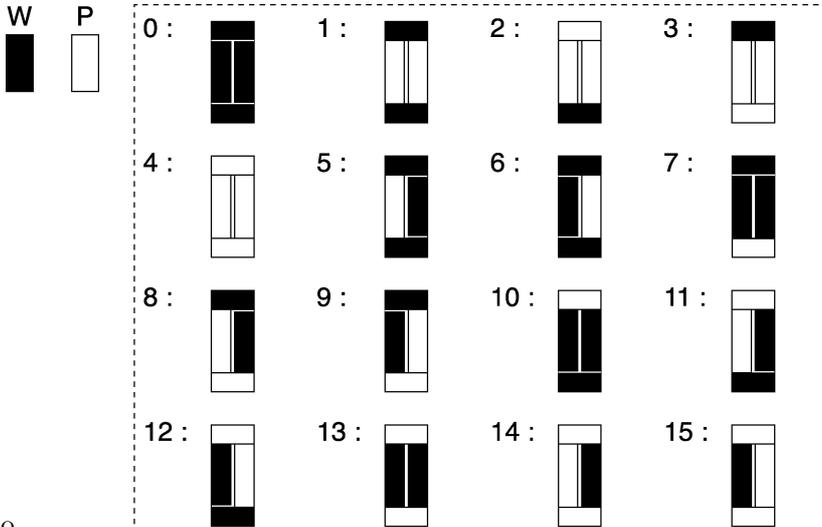
The stitch length will be automatically determined by the value for the length of the knife which has been set. Therefore, if the knife length is not set correctly, problems may occur, such as the bar tacking stitches being cut by the knife.

5 - 5 . Parameter table

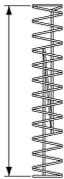
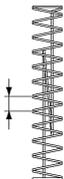
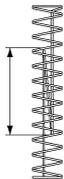
- The parameter values can be stored independently for each program.
- The allowable setting range for some parameters may vary from the range specified, depending on the settings of other parameters. (Refer to “5-5-4. Main restrictions when setting parameters”.)
- Depending on the needle zigzag amount and feed amount settings, it may not be possible to carry out sewing at some setting speeds.
- 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.
- Parameters that are not applicable to a particular program will be skipped and not displayed.

No.	Setting items	Setting range	Unit	Default
00	Sewing speed (zigzag part)	1,000 - 4,000rpm	100	3,600
01	Buttonhole stitch/Straight tack stitch 0: 1: 2: 3: 4: 	0: Buttonhole (free) 1: Buttonhole (rectangle) 2: Buttonhole (radial) 3: Buttonhole (round) 4: Bar tack	1	1
02	Length of knife 	4.0 - 32.0mm However, when panel DIP switch B – No. 3, No. 4 and No. 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)
04	Zigzag pitch 	0.10 - 2.00mm	0.025	0.350
05	Zigzag width 	1.0 - 3.0mm	0.1	1.5
06	Knife X space 	-0.4 - 1.0mm	0.1	0.4
07	Knife Y space 	0.00 - 2.00mm	0.05	1.00

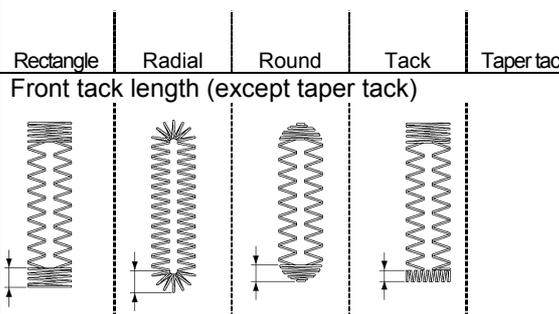
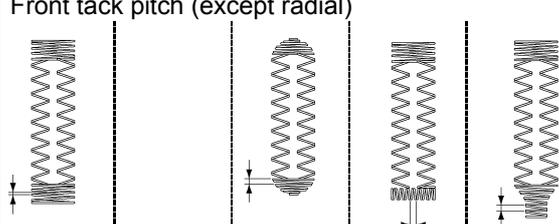
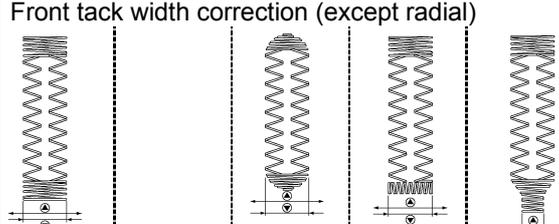
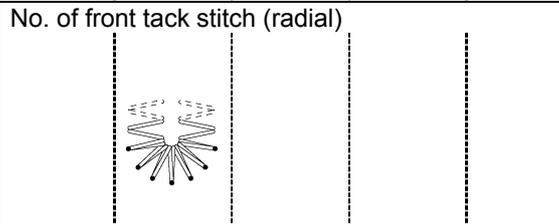
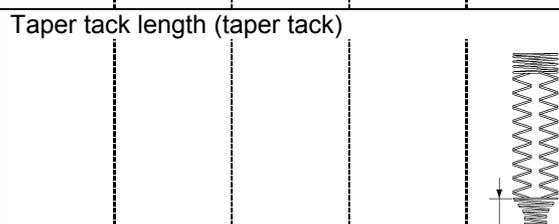
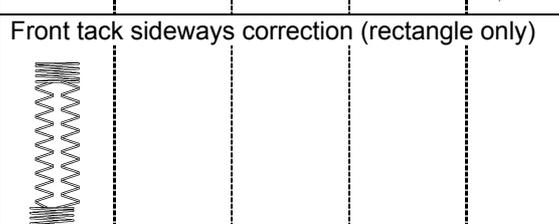
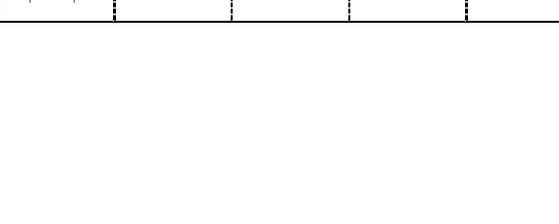
5. OPERATION

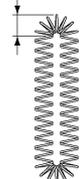
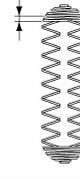
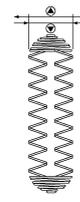
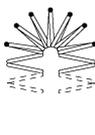
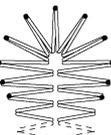
No.	Setting items	Setting range	Unit	Default
08	Knife X position alignment 	-0.5 - 0.5mm	0.1	0.0
09	Knife Y position alignment 	-0.8 - 0.8mm	0.1	0.0
10	Zigzag width ratio (at left) 	0.30 - 0.70	0.01	0.50
11	Stitch type Whip (W):  Purl (P):  Rear tack  Left zigzag stitch  Right zigzag stitch  Front tack   3919Q 3920Q		1	1

* Nos. 13 to 19 are for straight bar tacks.

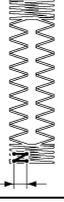
No.	Setting items	Setting range	Unit	Default
13	Straight bar tack length 	7.0 - 40.0mm	0.1	13.0
14	Straight bar tack pitch 	0.2 - 2.0mm	0.1	0.8
15	Straight bar tack width 	1.5 - 6.0mm	0.1	2.0
16	Running speed	1,000 - 3,000rpm	100	2,000
17	Running length 	3.0 - 32.0mm	0.1	11.0
18	Running pitch 	1.0 -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

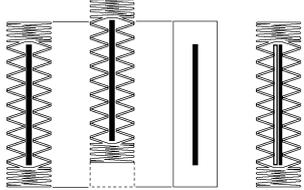
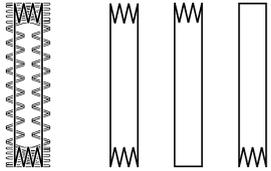
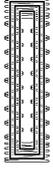
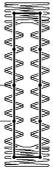
5. OPERATION

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

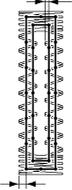
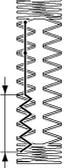
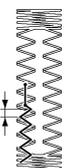
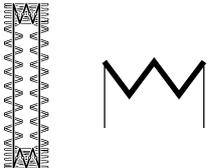
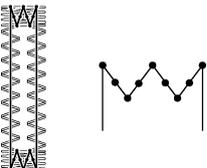
No.	Setting items	Setting range	Unit	Default
30	Rear tack pattern	0: Rectangle 1: Radial 2: Round 3: Eyelet	1	0
31	<div style="display: flex; justify-content: space-around; font-size: small;"> Rectangle Radial Round Eyelet </div> Rear tack length (except eyelet) <div style="display: flex; justify-content: space-around; margin-top: 10px;">    </div>	0.5 - 5.0mm	0.1	1.0
32	Rear tack pitch (except radial, eyelet) <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>	0.05 - 1.00mm	0.05	0.30
33	Rear tack width correction (except radial, eyelet) <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>	-2.0 - 2.0mm	0.1	0.0
34	No. of rear tack stitch (radial, eyelet) <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>	5 - 11 stitches	2	7
35	Eyelet buttonhole radius (eyelet type only) <div style="display: flex; justify-content: space-around; margin-top: 10px;">  </div>	1.0 - 3.0mm	0.1	2.0

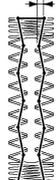
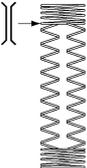
5. OPERATION

No.	Setting items	Setting range	Unit	Default
36	Rear tack sideways correction (rectangle only) 	-1.0 - 1.0mm	0.1	0.0
37	Rear tack vector shape(rectangle only) 1:  2:  3: 	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) 	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) 	1 - 5 stitches	1	1
40	Start backtack 	0 - 6 stitches	2	2
41	Start backtack width 	0.5 - 3.0mm	0.1	0.5
42	Start backtack pitch 	0.10 - 0.80mm	0.05	0.30

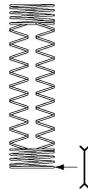
No.	Setting items	Setting range	Unit	Default
43	End backtack 	1 - 6 stitches	1	4
44	Cutter operation 0: 1: 2: 3: 	0: Operates when the front tack of the last cycle is sewn (standard) 1: Operates when sewing is finished and material is feeding. 2: Operates immediately before the left zigzag stitch of the last cycle is sewn. 3: Operates twice: immediately before the left zigzag stitch of the last cycle is sewn and when the front tack of the last cycle is sewn. However, 2 and 3 are only valid for two cycles or more.	1	0
45	No. of underlays sewn together 	0 - 1	1	0
46	Saw-shaped underlays 	0: No saw-shaped underlays 1: Front and rear tack 2: Rear tack only 3: Front tack only	1	0
47	No. of rectangle underlays 	0 - 9	1	0
48	Underlay speed	1,000 - 3,000rpm	100	2,000
49	Underlay feed pitch 	0.5 - 6.0mm	0.1	2.0

5. OPERATION

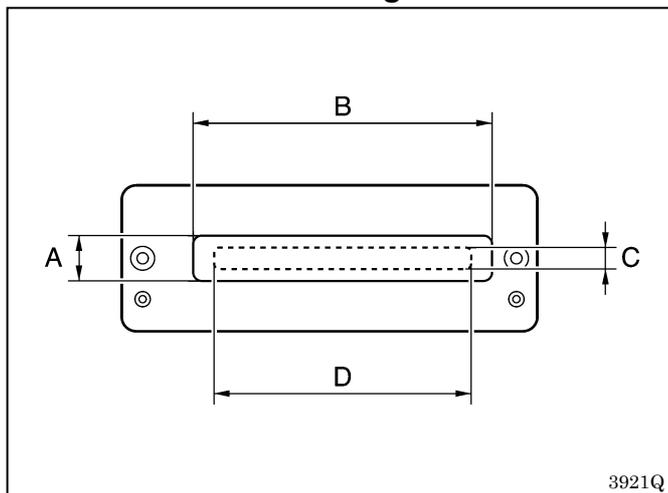
No.	Setting items	Setting range	Unit	Default
50	Underlay offset 	0.3 - 1.0mm	0.1	0.8
51	Underlay sewing start length 	2.0 - 10.0mm	0.1	4.0
52	Underlay sewing start pitch 	0.2 - 2.0mm	0.1	1.0
53	Saw-shaped underlay bar tack X stitch no. (Only for saw-shaped stitch with underlay) 	2 - 14 stitches	2	4
54	Saw-shaped underlay bar tack Y stitch no. (Only for saw-shaped stitch with underlay) 	1 - 5 stitches	1	1
55	2-cycle sewing 1: Double stitch 2: Crossed double stitch 	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

No.	Setting items	Setting range	Unit	Default
57	First offset for 2-cycle sewing 	0.0 - 0.8mm	0.1	0.3
58	Zigzag underlay stitch width 	0.0 - 3.0mm	0.1	0.0
59	Slow start stitches	0 - 4 stitches	1	1
60	Slow speed	500 - 1,500rpm	100	800
61	Rear tack speed	500 - 4,000rpm	100	4,000
62	Front tack speed	500 - 4,000rpm	100	4,000
63	Sewing start tension apply timing 	-4 - 6 stitches	1	0
64	Rear bar tack tension release timing 	-4 - 4 stitches	1	0
65	Rear bar tack tension apply timing 	-4 - 4 stitches	1	0
66	Front bar tack tension release timing 	-4 - 4 stitches	1	0

5. OPERATION

No.	Setting items	Setting range	Unit	Default
67	Sewing end tension apply timing 	-5 - 0 stitches	1	0
68	Rear tack width (rectangle only) OFF: Condense stitch 0.1 - 1.5mm  	OFF: Condense stitch 0.1 - 1.5mm (Normally set to 1.0)	0.1	OFF
69	Program copy	OFF, 1 - 90 (Specify copy source)	1	OFF

5-5-1. Available sewing area



The available sewing area (C x D) is determined by a combination of the work clamp size (A x B) and the needle plate hole size. Set panel DIP switch B correctly in accordance with the work clamp and needle plate being used. (Refer to "13-1. Panel DIP switches".)

If DIP switch B is not set correctly, it will not be possible to set the normal values for the parameter. In addition, the needle and cutter may touch the work clamp and needle breakages or damage to the cutter may result.

Work clamp size (A X B)	DIP switch B setting						Available sewing area (C x D)	
	No.3	No.4	No.5	No.7	No.8	No.6=ON (Needle plate hole size 5.4mm)	No.6=OFF (Needle plate hole size 7.3mm)	
5.4 X 19.0	OFF	OFF	ON	N/A	N/A	4.0 X 15.0	4.0 X 15.0	
5.4 X 24.5	*			OFF	ON	4.0 X 20.0	4.0 X 20.0	
5.4 X 36.0	*			OFF	OFF	4.0 X 32.0	4.0 X 32.0	
6.8 X 24.5	OFF	ON	ON	N/A	N/A	4.0 X 20.0	5.4 X 20.0	
6.8 X 36.0	ON	OFF	OFF	N/A	N/A	4.0 X 32.0	5.4 X 32.0	
6.8 X 47.0	*			ON	OFF	4.0 X 40.0	5.4 X 40.0	
7.3 X 24.5	ON	OFF	ON	N/A	N/A	4.0 X 20.0	6.0 X 20.0	
7.3 X 36.0	ON	ON	OFF	N/A	N/A	4.0 X 32.0	6.0 X 32.0	
7.3 X 47.0	*			ON	ON	4.0 X 40.0	6.0 X 40.0	

* ON, ON, ON or OFF, ON, OFF or OFF, OFF, OFF

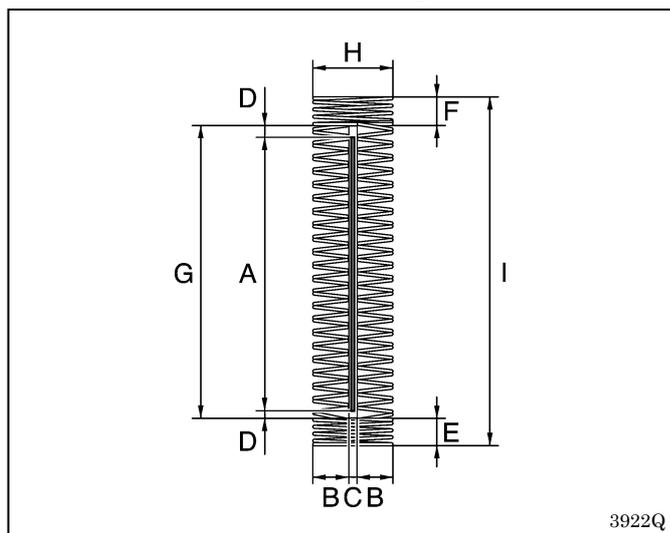
5-5-2. Setting the knife length

Set parameter number 02 to the knife length that matches the cutter being used. (Refer to "5-4-2. Checking the length of knife".)

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.

5-5-3. Buttonhole sewing size



- A. Length of knife (Parameter No.02)
- B. Zigzag width (Parameter No.05)
- C. Knife X space (Parameter No.06)
- D. Knife Y space (Parameter No.07)
- E. Front tack length (Parameter No.21)
- F. Rear tack length (Parameter No.31)
- G. Zigzag stitch length (A + D + D) *
- H. Bar tack width (B + B + C) *
- I. Buttonhole length (A + D + D + E + F) *

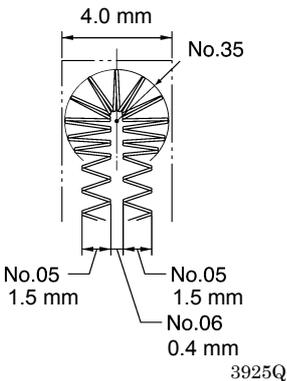
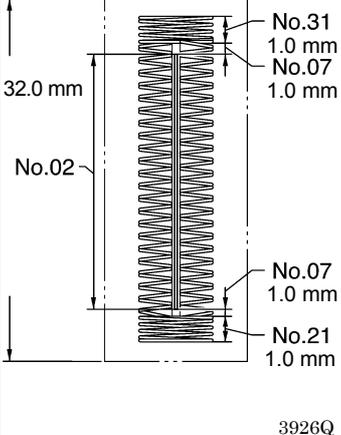
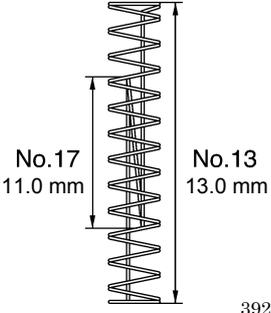
* Set automatically.

5-5-4. Main restrictions when setting parameters

When the sewing area is set to 4.0 x 32.0 (default setting)

Symptom	Cause		Remedy
Parameter number 05 (Zigzag width) does not become larger.	If the sewing area is 4.0 mm and parameter number 06 (Knife X space) is set to 0.4 mm, the zigzag width that can be entered will be limited to $(4.0 - 0.4) \div 2 = 1.8$ mm.		A
Parameter number 06 (Knife X space) does not become larger.	If the sewing area is 4.0 mm and parameter number 05 (Zigzag width) is set to 1.8 mm, the knife X space that can be entered will be limited to $4.0 - (1.8 + 1.8) = 0.4$ mm.		
Parameter number 08 (Knife X position alignment) does not become larger or smaller.	The buttonhole is aligned to the left or right of the sewing area, so only values that are within the available space inside the sewing area can be entered. In the example shown in the illustration, the alignment can only be adjusted by up to 0.2 mm to the plus side and the minus side.		A
Parameter number 10 (Zigzag width ratio [at left]) does not become larger or smaller.	See illustration.		
Parameter number 26 (Front tack sideways correction) and parameter number 36 (Rear tack sideways correction) do not become larger or smaller.	See illustration.		

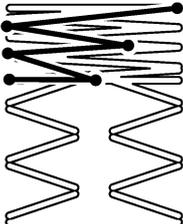
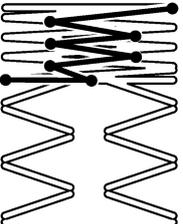
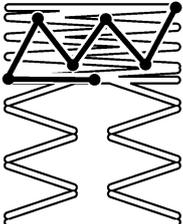
5. OPERATION

Symptom	Cause	Remedy	
Parameter number 35 (Eyelet buttonhole radius) does not become larger or smaller.	If the sewing area is 4.0 mm and parameter number 06 (Knife X space) is set to 0.4 mm and parameter number 05 (Zigzag width) is set to 1.5 mm, the eyelet buttonhole radius that can be entered will be a minimum of $(1.5 + 1.5 + 0.4) \div 2 = 1.7$ mm, and a maximum of $4.0 \div 2 = 2.0$ mm.	 <p>Diagram showing the eyelet buttonhole radius. The total width is 4.0 mm. The zigzag width (No.05) is 1.5 mm. The knife X space (No.06) is 0.4 mm. The diagram is labeled 3925Q.</p>	A
Parameter number 02 (Length of knife) does not become larger.	If the sewing area is 32.0 mm and parameter number 07 (Knife Y space) is set to 1.0 mm, parameter number 21 (Front tack length) is set to 1.0 mm and parameter number 31 (Rear tack length) is set to 1.0 mm, the knife length will be $32.0 - 1.0 - 1.0 - 1.0 = 28.0$ mm. (The default setting is 27.8 mm to match the positions of the needle and cutter.)	 <p>Diagram showing the knife length. The total sewing area is 32.0 mm. The knife Y space (No.07) is 1.0 mm. The front tack length (No.21) is 1.0 mm. The rear tack length (No.31) is 1.0 mm. The diagram is labeled 3926Q.</p>	A
Parameter number 07 (Knife Y space) does not become larger.	See illustration.		
Parameter number 21 (Front tack length) and parameter number 31 (Rear tack length) do not become larger.	See illustration.		
Parameter number 13 (Straight bar tack length) does not become smaller.	The initial setting for parameter number 13 (Straight bar tack length) is 13.0 mm, and for parameter number 17 (Running length) it is 11.0 mm. At this time, the straight bar tack length cannot be set to less than 11.0 mm.	 <p>Diagram showing the straight bar tack length. The running length (No.17) is 11.0 mm. The straight bar tack length (No.13) is 13.0 mm. The diagram is labeled 3927Q.</p>	B

<Remedy>

- A. Change the work clamp over to a larger work clamp. Alternatively, change the needle plate to one with a larger hole.
Note: Be sure to change the setting for panel DIP switch B also.
- B. Set parameter number 17 (Running length) to a smaller value and then set the straight bar tack length.

5 - 6 . Rear tack vector shape programs

Parameter No. 37		
1: Triangle	2: Rectangle	3: Saw-shape
 <p>3928Q</p>	 <p>3929Q</p>	 <p>3930Q</p>

Setting range 1: Triangle

General sewing

Setting range 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.

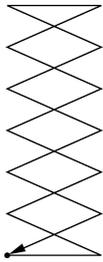
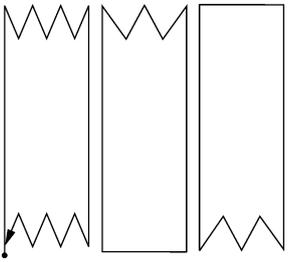
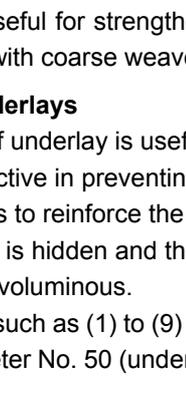
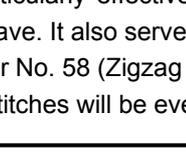
Setting range 3: Saw-shape

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 - 7 . 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.

Parameter No.			
45	46	47	58
			
Underlays sewn together 3931Q	Saw-shape underlays 3932Q	Rectangle underlays 3933Q	Zigzag underlay stitch 3934Q

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.

Saw-shape underlays

- 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.

Rectangle underlays

- 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.

Zigzag underlay stitch

If parameter No. 58 (Zigzag underlay stitch width) 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 saw-shaped underlay stitching or rectangle underlay stitching.

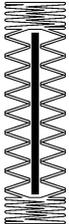
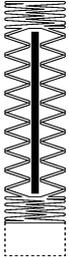
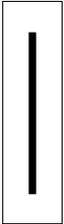
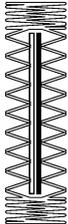
- This is particularly effective in preventing seams from unravelling in materials which appear not to have a very coarse weave. It also serves to reinforce the buttonhole.
- If parameter No. 58 (Zigzag underlay stitch width) [Dimension A in the illustration] is set to about 0.4 mm, the zigzag underlay stitches will be even stronger than other underlay stitches.

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

5 - 8 . Cutter operation

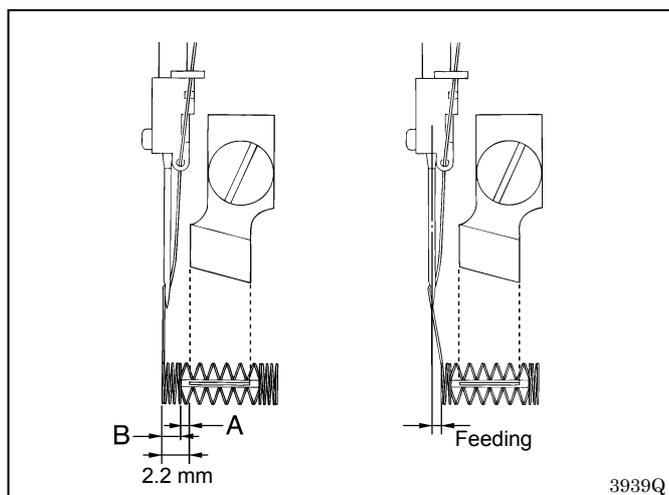
The cutter operating pattern can be selected from the following four patterns.

Parameter No. 44			
0	1	2	3
			
Operates when the front tack of the last buttonhole cycle is sewn.	Operates near the front tack when sewing is finished and material is feeding.	Operates immediately before the left zigzag stitch of the last cycle is sewn.	Operates twice: immediately before the left zigzag stitch of the last cycle is sewn and when the front tack of the last cycle is sewn.
3935Q	3936Q	3937Q	3938Q

Setting range 0:

General sewing

Setting range 1:



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.

For example, if the knife Y space (A) is set to 0.5 mm, the front tack length (B) will not go below 1.7 mm. At such times, the front tack length can be set to less than 1.7 mm when using cutting after sewing.

Once sewing is finished and material feeding has finished, the cutter will operate.

Setting range 2:

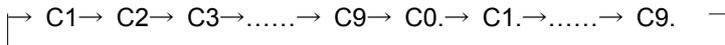
- Does not operate during the first sewing cycle. Only applies to second and subsequent cycles (during underlay sewing and overlap sewing).
- This is used in cases such as when the rough edges of the material after cutting are hemmed by the buttonhole stitches.
- The cutter operates before the left zigzag stitch of the last cycle is sewn.

Setting range 3:

- Does not operate during the first sewing cycle. Only applies to second and subsequent cycles (during underlay sewing and overlap sewing).
- 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 immediately before the left zigzag stitch of the last cycle is sewn, and it operates again when the front tack of the last cycle is sewn.

5 - 9 . Cycle program

Cycle program can contain up to a maximum of nineteen steps.



This section shows an example where C1 is set to program number 3 and C2 is set to program number 10.

Step	C1	C2
Program No.	3	10

3940Q

brother

RESET

PROGRAM NO.

▲

▼

CUTTER ON

○ AUTO

○ TEST FEED

○ MANUAL

PROGRAM

SELECT

○ POWER

○ CAUTION

ENTER

(4)

(3)

(9)

(8)

(1)

(2)

(7)

(5)

(6)

Cutter on

Cutter off

[C1] [3.]

[C1] [3.]

[C2] [3.] [0.]

[C2] [3.] [10.]

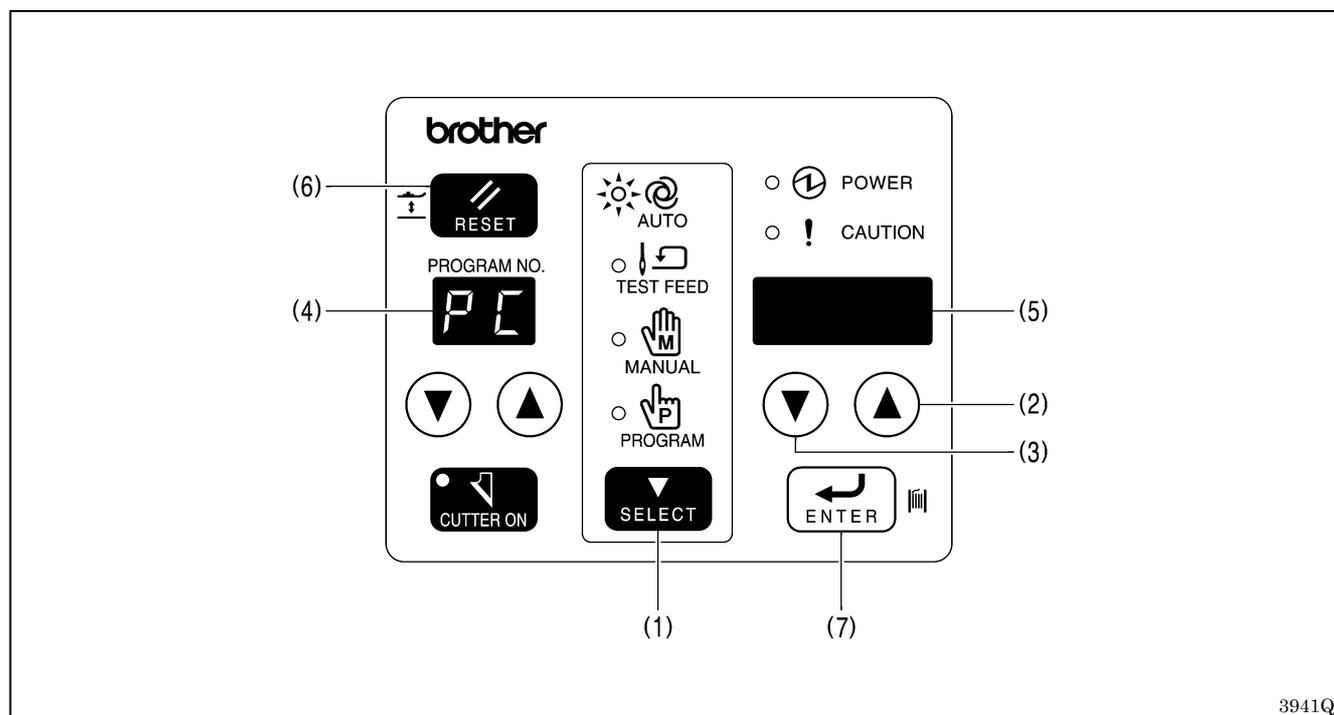
1. Press the SELECT key (1) to change the mode to program mode.
2. While pressing the ENTER key (2), press the program No. UP key (3). Repeat this operation twice.
* "C1" will appear in the program number LED (4).
3. Press the parameter keys (5) and (6) to select the program number 3.
* The program number 3 will appear in the parameter display LED (7).
4. Use the CUTTER ON key (8) to set whether the cutter is turned on or 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 (9) is switched off during cycle sewing, the cutter operation will always be off.
5. Press the ENTER key (2) to accept the program number 3.
* The display will stop flashing and illuminate steadily.
6. Press the program No. UP key (3).
* "C2" will appear in the program number LED (4). The numbers "3." [the program number for C1] and "0." will appear in the parameter display LED (7).
7. Press the parameter keys (5) and (6) to select the program number 10.
8. Use the CUTTER ON key (8) to set whether the cutter is turned on or off.
9. Press the ENTER key (2) to accept the program number 10.
* The display will stop flashing and illuminate steadily.
10. Press the SELECT key (1) to change the mode to automatic mode. "C1" will appear in the program number LED (4).

Clearing the cycle program

Program number "0" signifies a clear status. If "0" is set, the setting details for all subsequent steps will be cleared. If C1 is set to "0", the cycle program will be cleared.

5-10. Production counter

Check that panel DIP switch A - No.4 is at the OFF setting. (Refer to "13. CHANGING FUNCTIONS USING THE DIP SWITCHES".)



1. Press the SELECT key (1) to change the mode to automatic mode.
2. Press the parameter keys (2) and (3) simultaneously.
 - * "PC" will flash in the program number LED (4), and the production counter value will appear in the parameter display LED (5).
3. Press the parameter keys (2) and (3) to change the production counter setting.
 - * The production counter setting will flash while the setting is being changed.

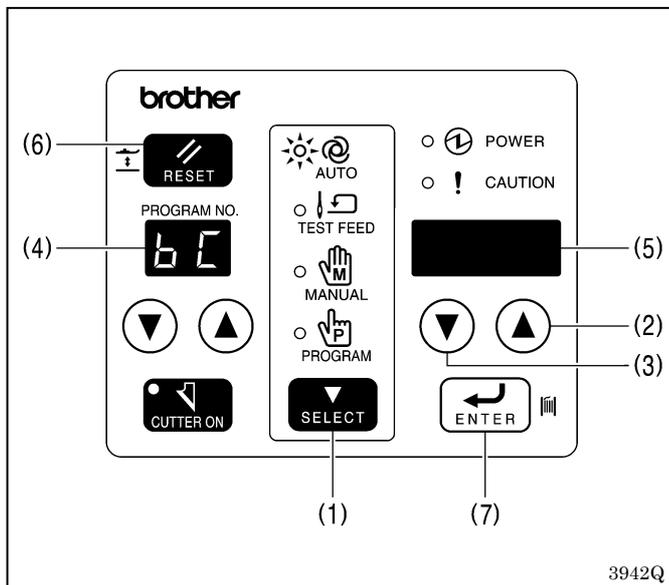
If you would like to set the production counter to "0", press the RESET key (6).

4. Press the ENTER key (7). The production counter value will be accepted and the mode will return to automatic mode.
 - * If you press the SELECT key (1) while the production counter value is still flashing, the mode will return to automatic mode without the production counter value being changed.

5 - 1 1 . Bobbin thread counter

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

Check that panel DIP switch A - No.4 is at the ON setting. (Refer to “13. CHANGING FUNCTIONS USING THE DIP SWITCHES”.)



1. Press the SELECT key (1) to change the mode to automatic mode.
2. Press the parameter keys (2) and (3) simultaneously.
 - * "bC" will flash in the program number LED (4), and the bobbin thread counter value will appear in the parameter display LED (5).
3. Press the RESET key (6).
 - * The previously-set bobbin thread counter value will appear in the parameter display LED (5).
4. Press the parameter keys (2) and (3) to change the bobbin thread counter setting.
 - * The bobbin thread counter setting will flash while the setting is being changed.
5. Press the ENTER key (7). The bobbin thread counter value will be accepted and the mode will return to automatic mode.

6. When the number of articles set by the bobbin thread counter have all been sewn, the previously-set bobbin thread counter value will appear in the parameter display LED (5), and an alarm will start sounding continuously.

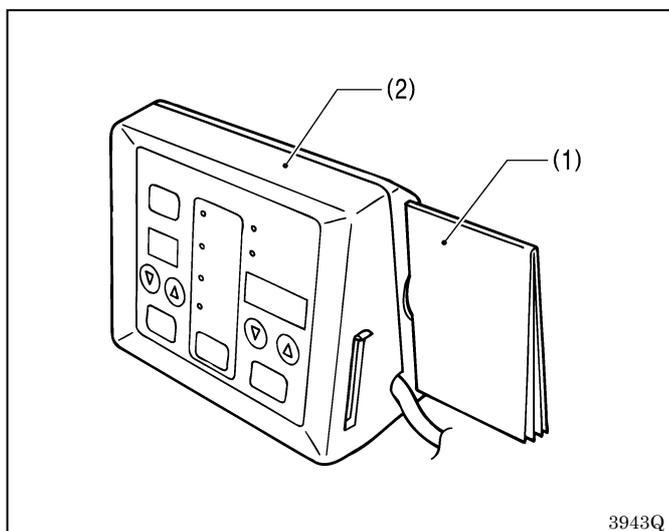
* The sewing machine will not operate during this time, even if the treadle is depressed.

7. Replace the bobbin, and then press the ENTER key (7).

* The alarm will stop sounding, the parameter display LED (5) will stop flashing and light steadily, and normal sewing can then be carried out.

* If you press parameter keys (2) and (3) at this time, you can change the setting value for the bobbin thread counter. Press the ENTER key (7) to accept the setting.

5 - 1 2 . Using the program memos



Insert the program memos (1) into the rear of the operation panel (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.

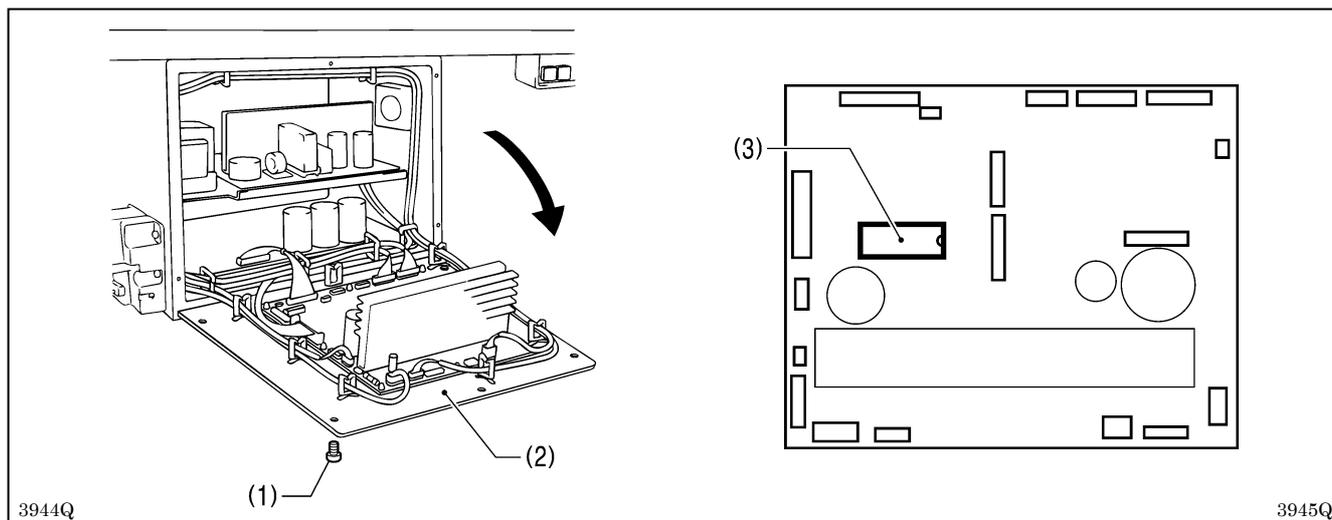
5-1 3. Adding patterns created using the programming software for electronic pattern sewer

You can use the programming software for electronic pattern sewer 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.



1. Remove the six screws (1), and then open the cover (main P.C. board mounting plate (2)).

Note: When opening the cover, 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 programming software for electronic pattern sewer. Refer to the Operating Instructions for the programming software for electronic pattern sewer for details on how to create patterns.

4. Add the pattern(s) created 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.

Note: If attached in reverse way, P-ROM may be damaged.

6. Close the cover (main P.C. board mounting plate (2)), and tighten the six screws (1).

The program numbers for patterns which have been created using the programming software for electronic pattern sewer 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

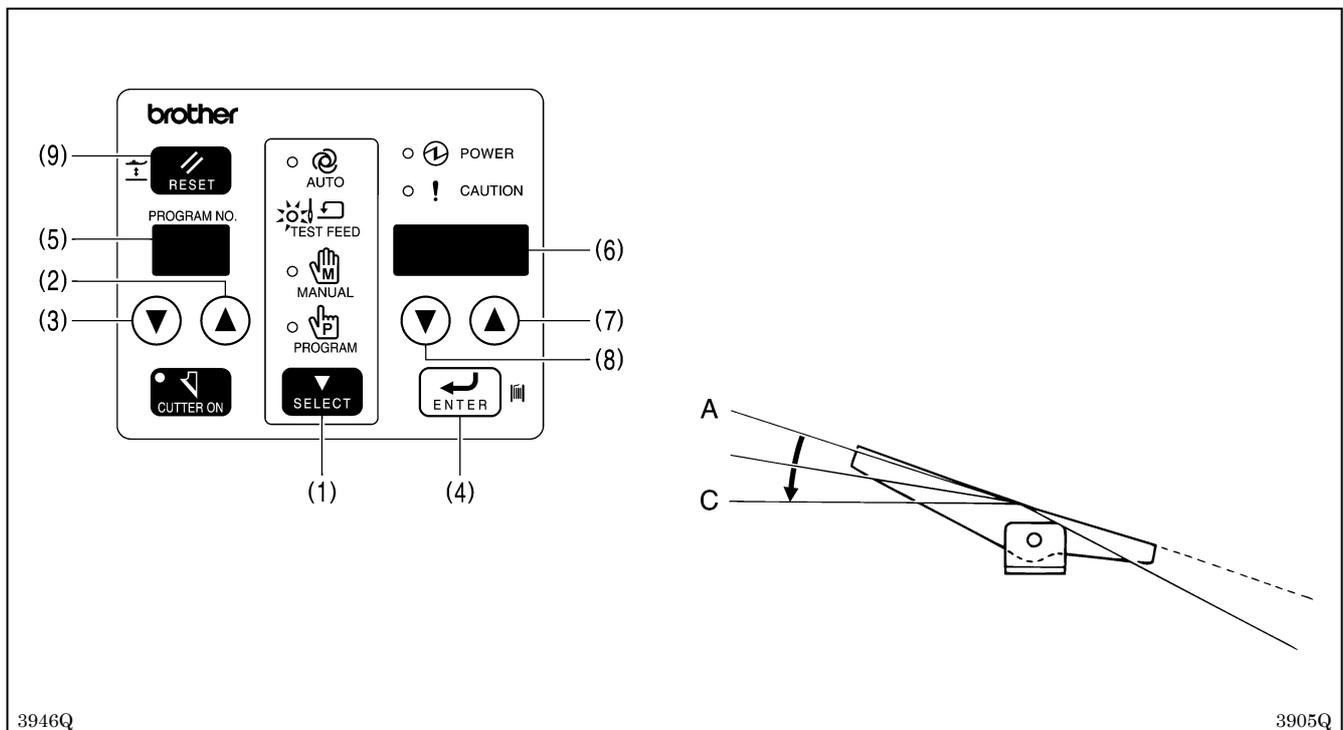
You can check and change the following parameters for patterns which have been created using the programming software for electronic pattern sewer.

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

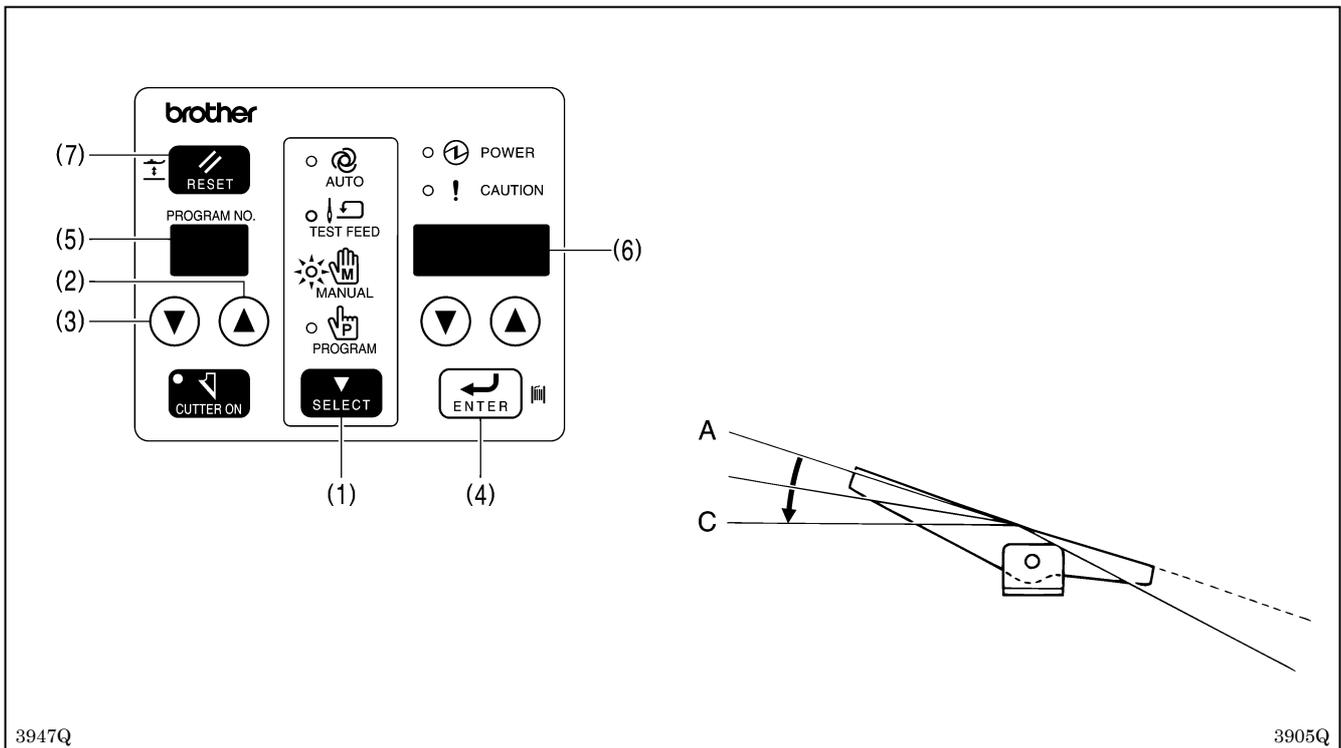
6 - 1 . Test feed mode



1. Press the SELECT key (1) to change the mode to automatic mode.
2. Press the program No. keys (2) and (3) to select the number for the program to be checked, and then press the ENTER key (4).
 - * The program number LED (5) will stop flashing and light steadily.
3. Press the SELECT key (1) to change the mode to test feed mode.
 - * The number of stitches in the selected program will appear as "H****" in the parameter display LED (6).
4. Depress the treadle from the neutral position [A] to the 2nd step [C].
 - * The work clamp will be lowered, and the needle zigzag and feed mechanisms will move to the sewing start position.
5. 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.
 - * The needle zigzag and feed mechanisms will also advance by one step if you press the parameter UP key (7). The needle zigzag and feed mechanisms will also retreat by one step if you press the parameter DOWN key (8).
 - * If the knife has been set to operate, the buzzer will sound and "C-On" will appear in the parameter display LED (6).
6. The machine will stop at the final stitch position, and "H o" will appear in the parameter display LED (6).
7. 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.
8. Press the SELECT key (1) to change the mode to automatic mode.

- If you press the SELECT key (1) during the checking operation, the mode will change to manual mode. If you press the SELECT key (1) 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 (9). The sewing machine will move to the home position, and the work clamp will move to the neutral position.

6 - 2 . Manual mode



1. Press the SELECT key (1) to change the mode to automatic mode.
2. Press the program No. keys (2) and (3) to select the number for the program to be checked, and then press the ENTER key (4).
 - * The program number LED (5) will stop flashing and light steadily.
3. Press the SELECT key (1) to change the mode to manual mode.
 - * The number of stitches in the selected program will appear as "H****" in the parameter display LED (6).
4. Depress the treadle from the neutral position [A] to the 2nd step [C].
 - * The work clamp will be lowered, and the needle zigzag and feed mechanisms will move to the sewing start position.
5. 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 in the parameter display LED (6).
6. Stop turning the machine pulley when "H o" appears in the parameter display LED (6) and the pulley is at the needle up stop position.
7. 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.
8. Press the SELECT key (1) to change the mode to automatic mode.

- If you turn the machine pulley to the needle up stop position and press the SELECT key (1) 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 (7). The sewing machine will move to the home position, and the work clamp will move to the neutral position.

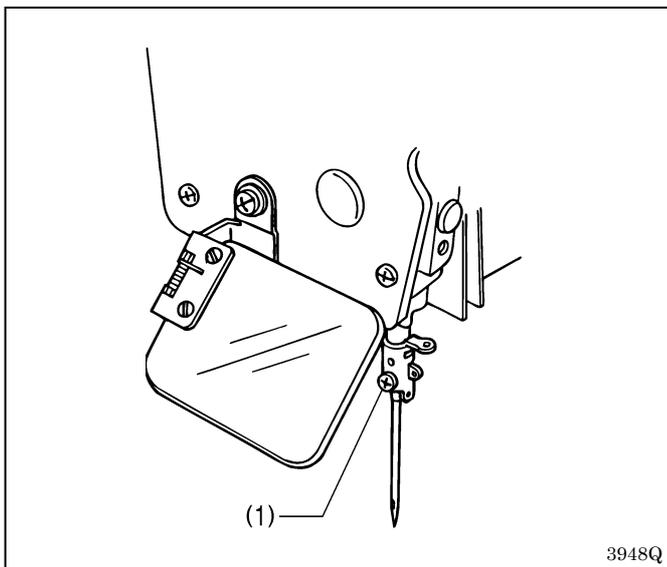
7. CORRECT USE

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



Use a Schmetz Nm 134 needle.

1. Loosen the set screw (1).
2. Insert the needle as far as it will go so that the groove is facing toward pulley.
3. Securely tighten the set screw (1).

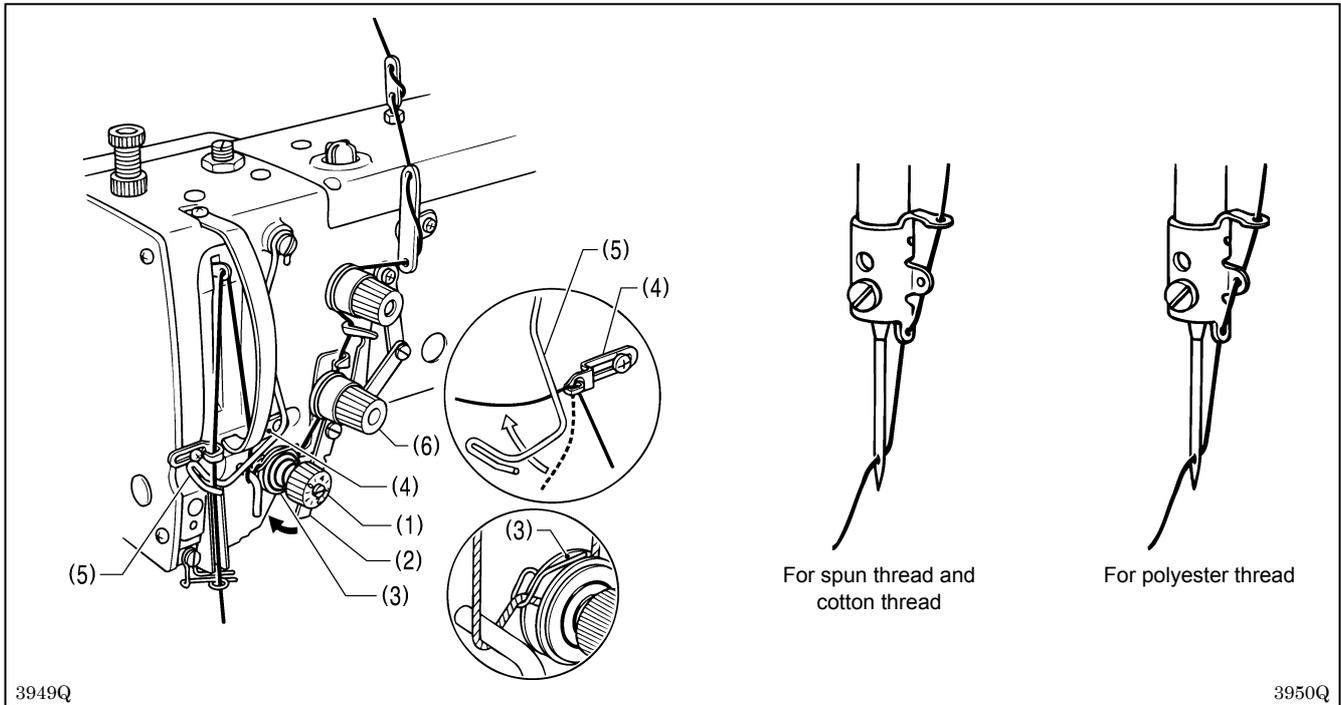
[At the time of shipment]

Spec.	-2	-3
Needle	134 Nm90	134 Nm75

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.

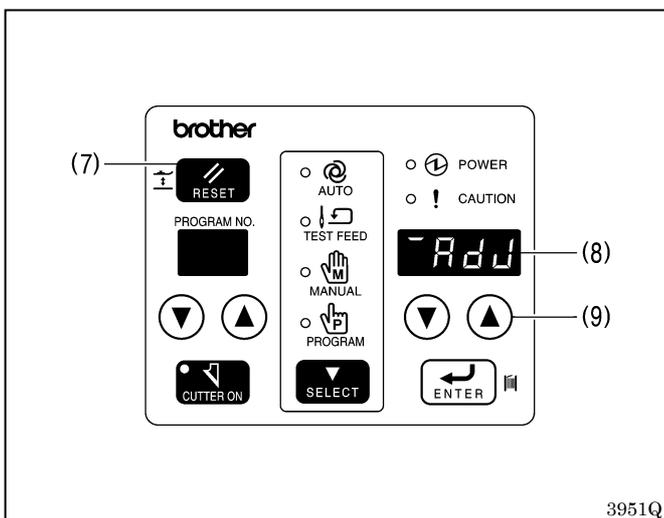


Thread the upper thread correctly as shown in the illustration.

- 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.
- 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.
- Push the needle bar to the right to make it easier to pass the thread through the needle.

Note:

- If you start sewing without passing the thread through the thread guide (5), error "E-01" will be generated and the sewing machine will stop.
- 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.



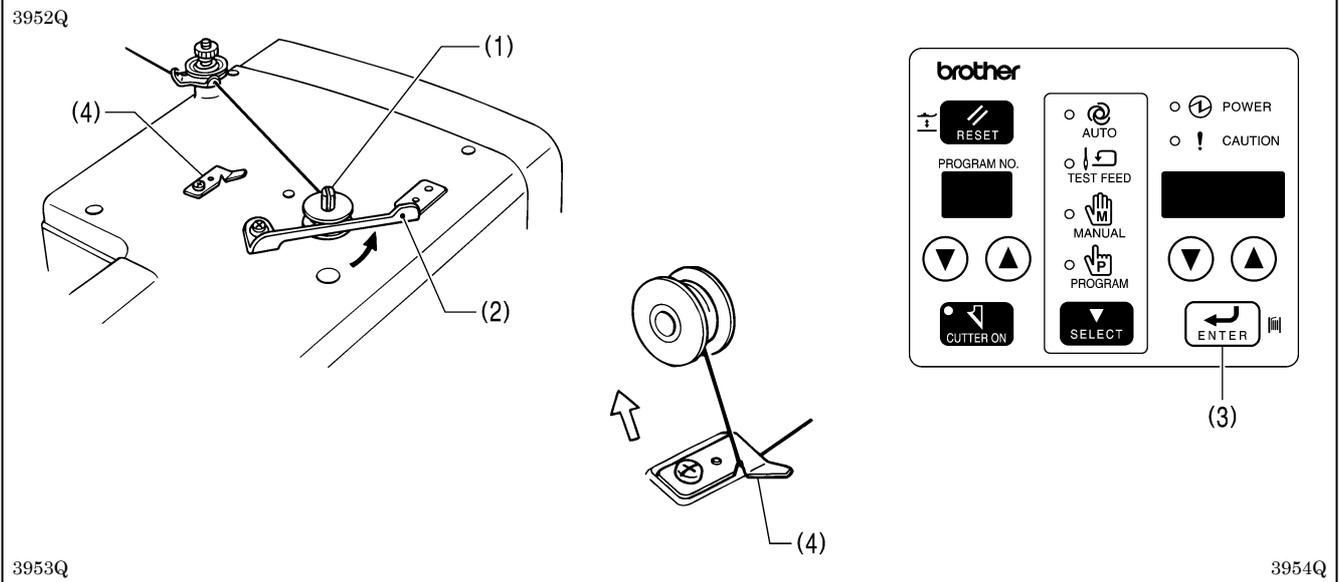
Threading the thread at the sewing start position

1. Turn on the power and set the sewing machine to the home position.
2. Press the RESET key (7).
 - * The work clamp will be lowered, and "Adj" will appear in the parameter display LED (8). The sewing machine will not operate during this time, even if the treadle is depressed.
3. Press the parameter UP key (9).
 - * The needle bar will move to the right to make threading easier.
4. Press the RESET key (7).
 - * The needle bar will move to the center position and the work clamp will rise.

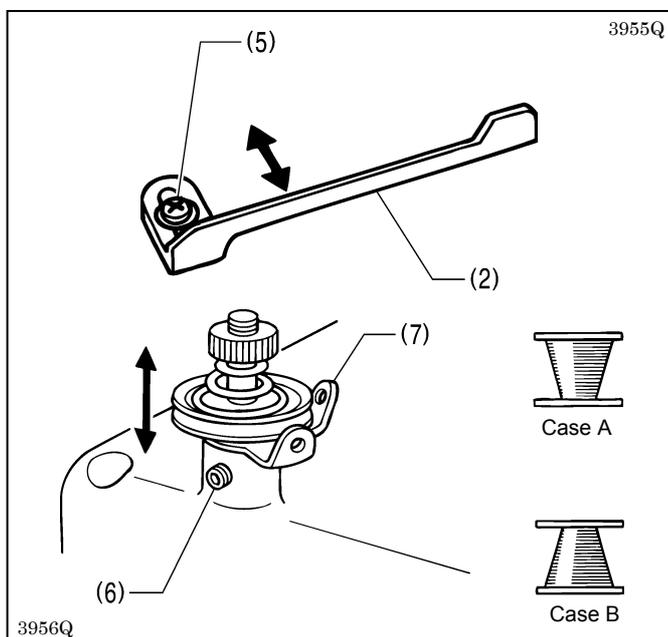
7 - 3 . Winding the lower thread

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



Adjusting the bobbin winding amount

Loosen the screw (5) and adjust the bobbin presser (2).

If the thread winds onto the bobbin unevenly

Loosen the set screw (6) and move the bobbin wider tension bracket (7) up and down to adjust.

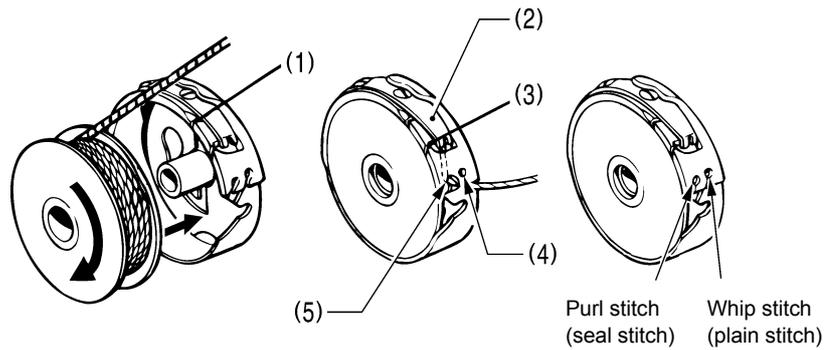
* For case A, move the bobbin winder tension bracket down, and for case B, move it upward.

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.



2812Q

1. Insert the bobbin into the bobbin case 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.

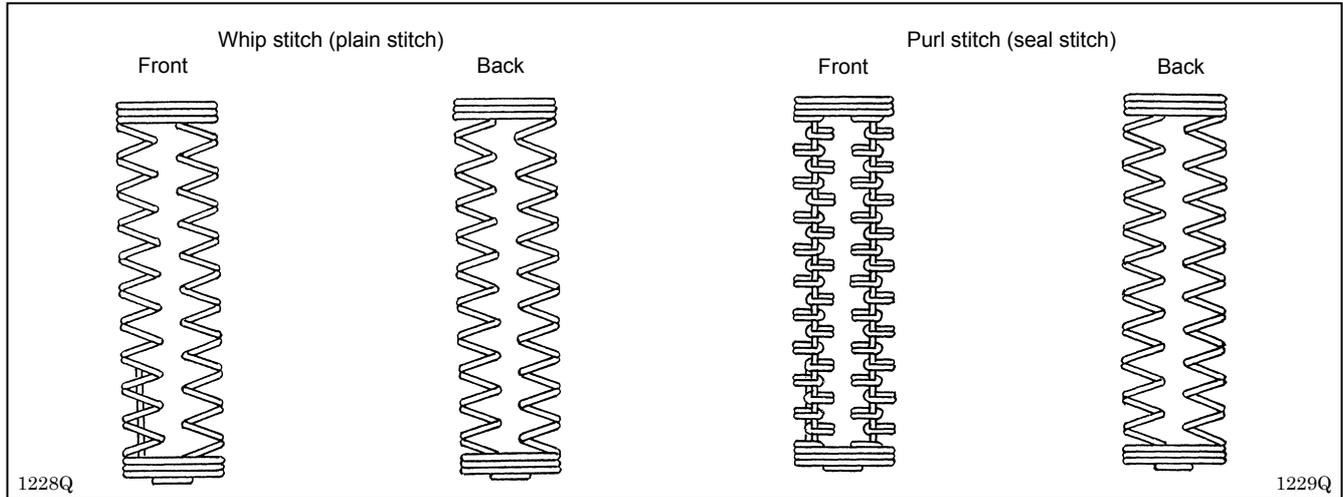
2. Pass the thread through the slot (1) and then under the tension spring (2) and through the slot (3).

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).

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.

[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.

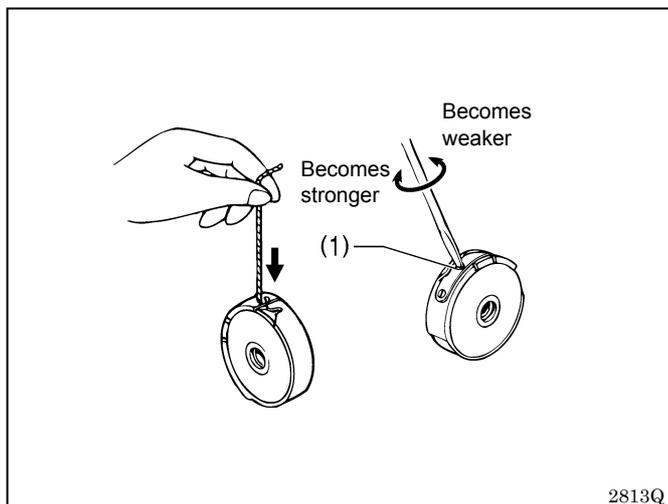
Purl stitch (seal stitch)

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.

[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 (N)	0.3 - 0.7	0.50 - 0.85	0.75 - 2.00	1.0 - 2.2
Lower thread tension (N)	0.15 - 0.25		0.05 - 0.15	
Thread take-up spring tension (mm)	4 - 6			
Thread take-up spring height (N)	0.1 - 0.2			

7 - 5 - 1 . Lower thread tension



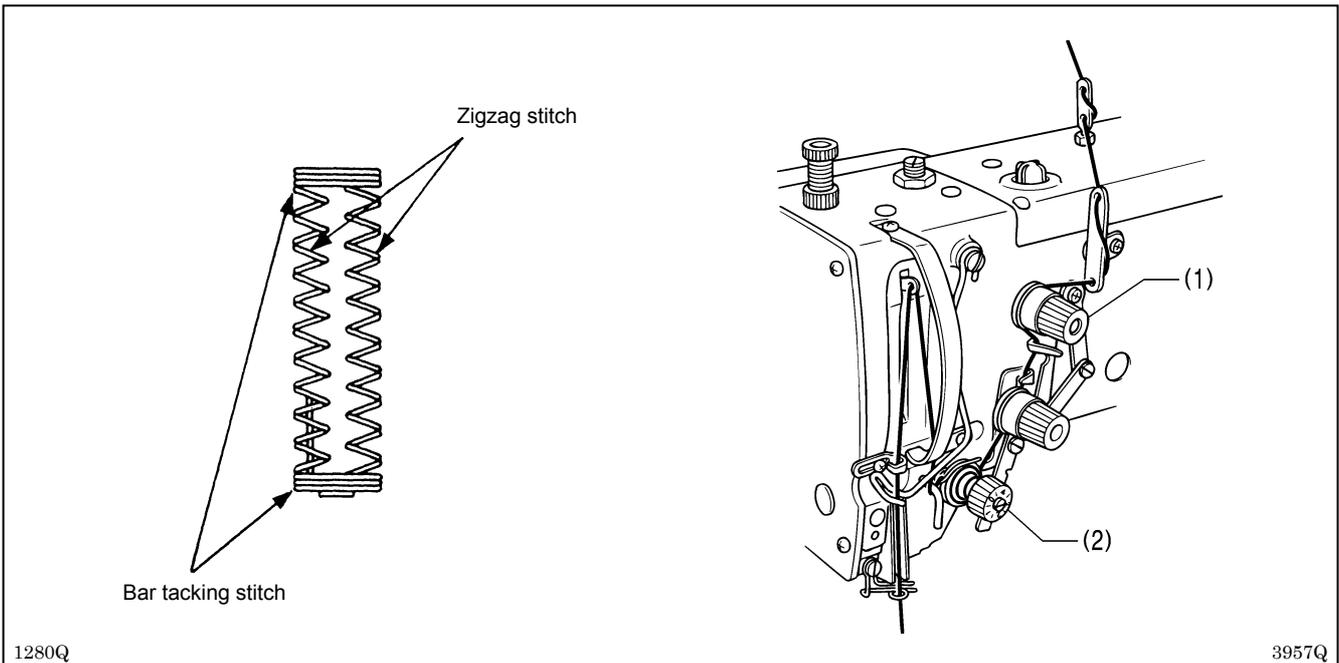
Whip stitch (plain stitch)

Adjust by turning the adjusting 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.

Purl stitch (seal stitch)

Adjust by turning the adjusting 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.

7-5-2. Upper thread tension



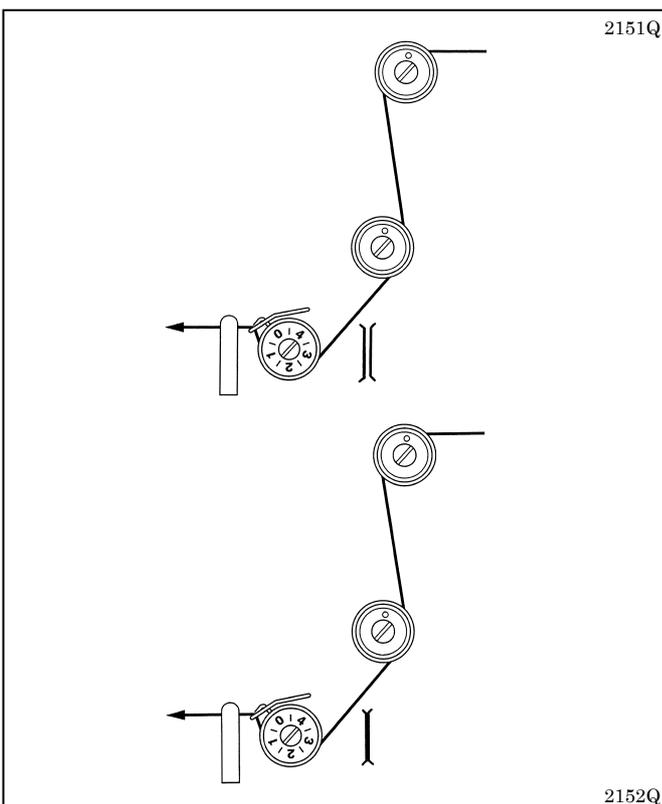
Whip stitch (plain stitch)

Turn the tack tension control (1) 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 (2) at this time.

* Bar tacking stitches and zigzag stitches are sewn at the tension which is set by the tack tension control (1), so that zigzag tension is automatically disabled. If the zigzag tension control (2) is loosened, the upper thread trailing length after upper thread trimming may become longer.

Purl stitch (seal stitch)

1. Turn the tack tension control (1) to adjust the thread tension so that a clean whip stitch is obtained at the bar tacking areas.
2. Turn the zigzag tension control (2) while watching the looping of the zigzag stitch.



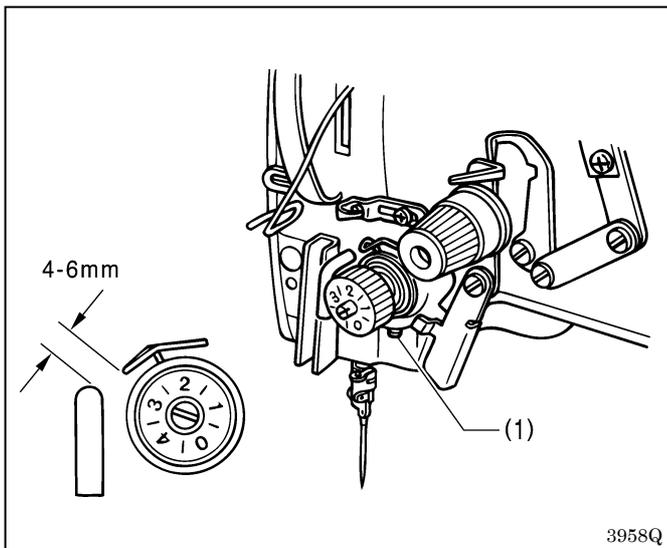
Upper thread tension for whip stitches (with zigzag tension open)

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)

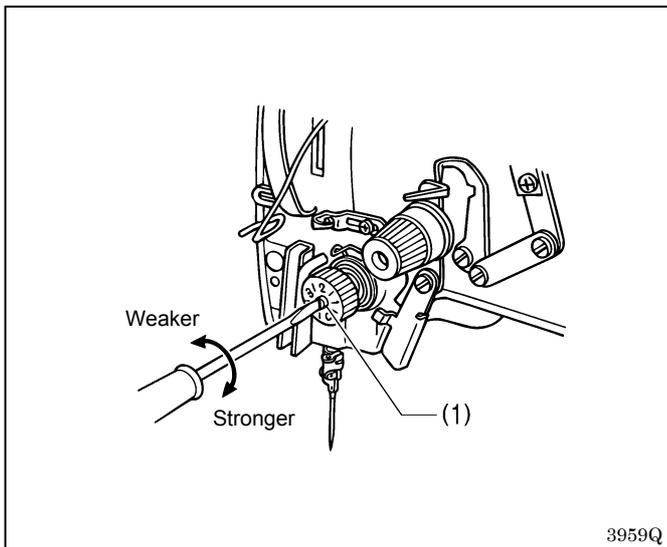
When using a program that has purl stitches set, press the RESET key to lower the work clamp, and then take the measurement shown in the illustration.

7-5-3. Thread take-up spring height



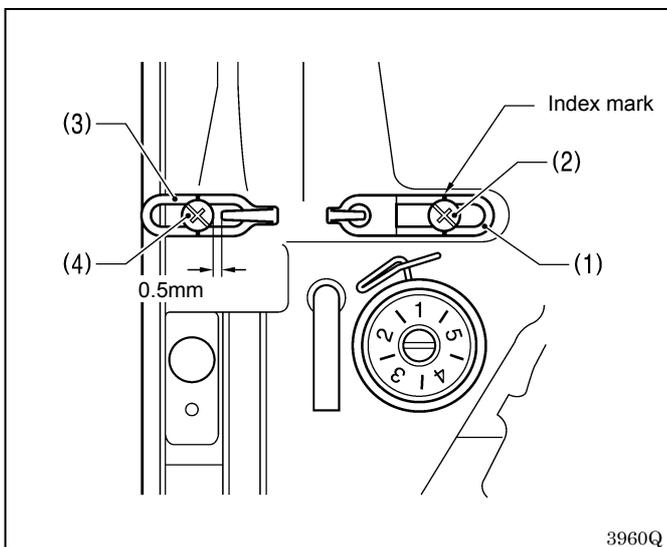
Loosen the set screw (1), and turn the entire thread tension adjuster to adjust the thread take-up spring height to between 4 - 6 mm in accordance with the material to be sewn.

7-5-4. Thread take-up spring tension



Turn the thread tension stud (1) to adjust the thread take-up spring tension to between approximately 0.1 - 0.2 N in accordance with the material to be sewn.

7-5-5. Adjusting arm thread guide



The standard position of arm thread guide (1) is when the screw (2) is aligned with the index mark.

The standard position for the arm thread guide (3) is when the clearance between it and the screw (4) is 0.5 mm as shown in the illustration.

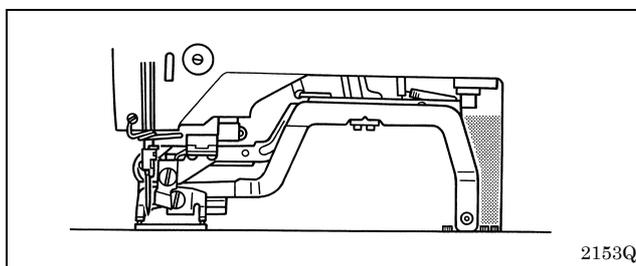
8. SEWING

CAUTION

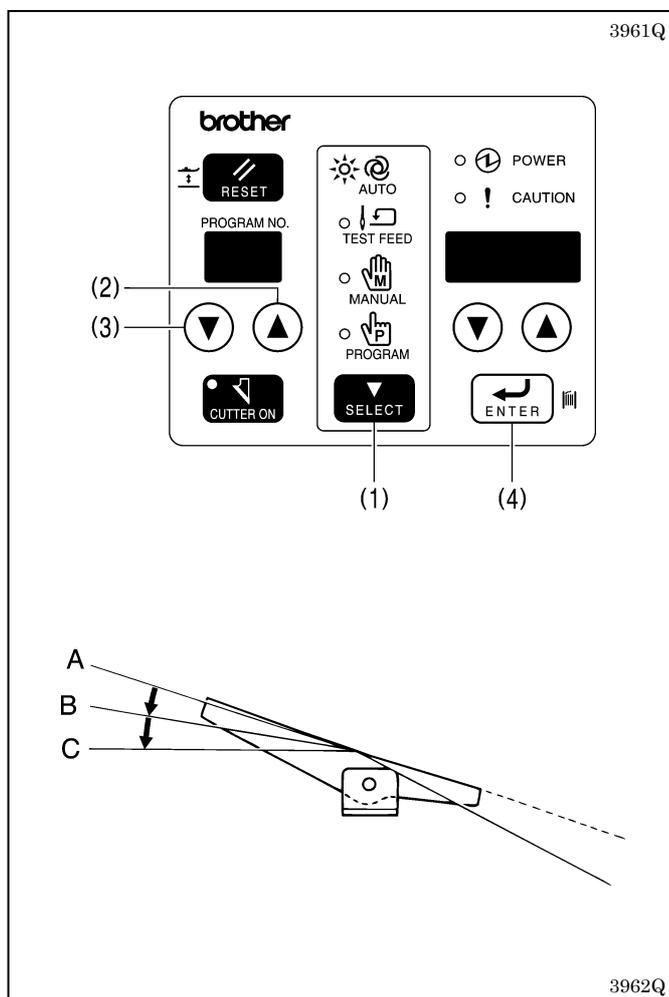
-  Turn off the power switch at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.
 - When threading the needle
 - When replacing the bobbin and needle
 - When not using the machine and when leaving the machine unattended
-  Do 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.
-  When holding the material, place your right hand at the back and your left hand at the front. If your left hand is toward the back, it may get caught in the feed arm when it operates or it might touch the moving parts of the needle trimmer and injury may result.
-  Do not touch the motor cover during operation and for one hour after operation has finished, otherwise burns may result.

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.



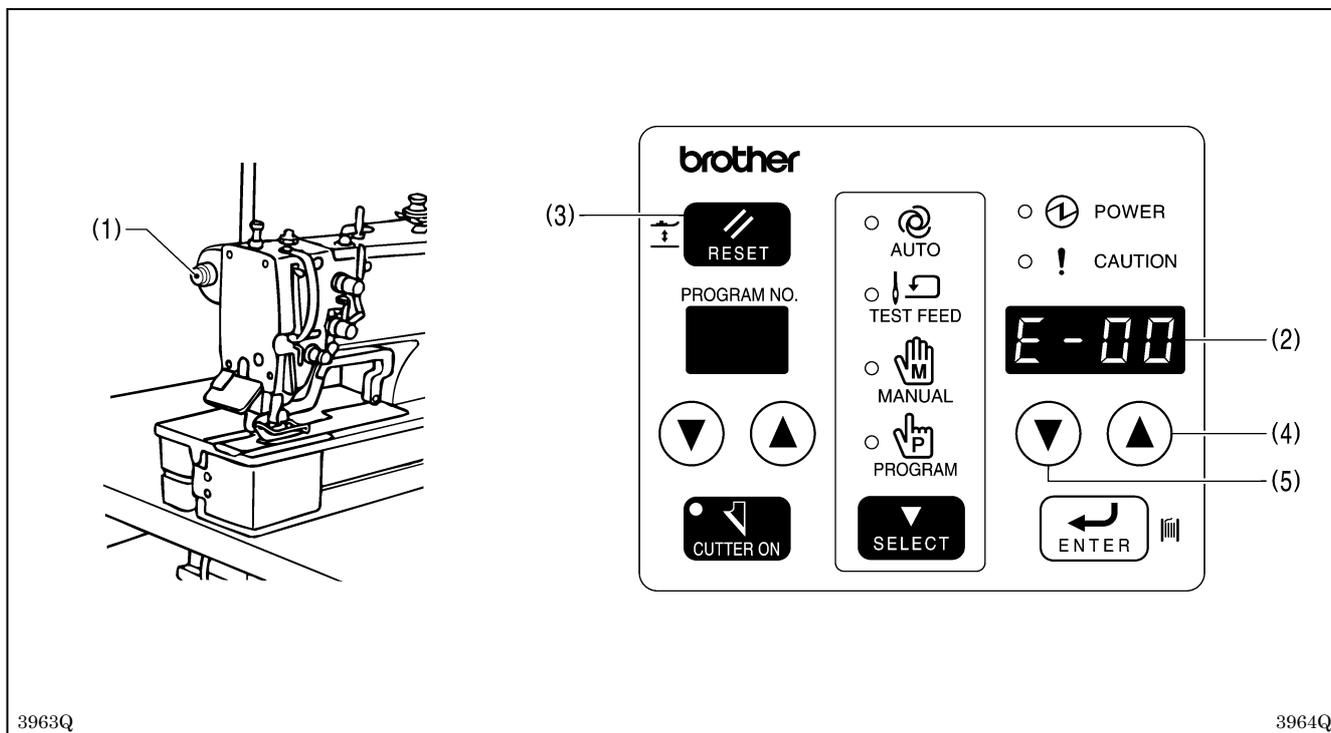
8 - 1. Sewing



1. Turn on the power.
 2. Depress the treadle to the 2nd step [C]. (Refer to “5-2. Home position detection (preparation)”.)
 3. Press the SELECT key (1) to change the mode to automatic mode.
 4. Press the program No. keys (2) and (3) to select the number for the program to be sewn.
 5. Press the ENTER key (4).
 6. Set the material in place, and then depress the treadle from [A] to the 1st step [B]. The work clamp will be lowered.
 7. Depress the treadle from the 1st step [B] to the 2nd step [C]. 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 - No. 4 = OFF). If in lower thread counter mode (DIP switch A - No. 4 = ON), the lower thread counter will decrease by 1.
- * When the number of articles set by the bobbin thread counter have all been sewn, an alarm will start sounding continuously. The sewing machine will not operate during this time, even if the treadle is depressed. Press the ENTER key (4) to cancel the alarm. (Refer to “5-11. Bobbin thread counter”.)

8 - 2 . If the stop switch is pressed during sewing

When the stop switch (1) is pressed, the sewing machine will stop and "E-00" will appear in the parameter display LED (2).



To finish sewing in this condition [Next sewing]

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

To start sewing again from slightly before or after the stop point [Resuming sewing]

1. Press the parameter UP key (4) to move the zigzag and feed mechanisms to the next sewing position.
Press the parameter DOWN key (5) 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.

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 (5), press the RESET key (3).
* The needle zigzag and feed mechanisms will return to the sewing start position, but the work clamp will not rise.
2. Depress the treadle to start sewing.

* If sewing is paused while it is in progress, the needle will move to the right side and stop, so that it will be easier to thread the thread.

* If panel DIP switch A - No. 3 is set to ON, you can stop the sewing machine by depressing the treadle backward in the same way as if the stop switch (1) is pressed.

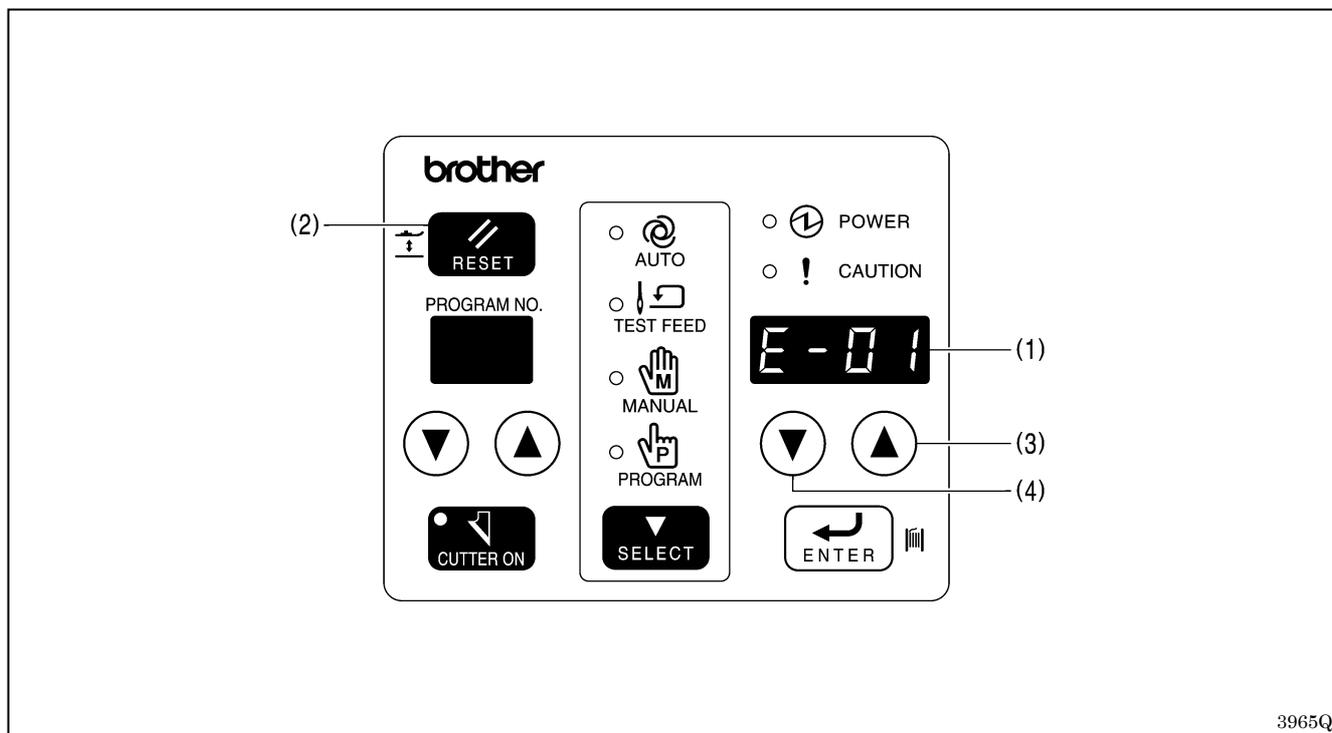
Note:

- Depressing the treadle backward to stop the sewing machine only works when the machine is starting, and the work clamp can be raised while the sewing machine is stopped.
- Always turn off the power before changing any of the DIP switch settings. Any changes to the DIP switch positions will not be effective until the power is switched off and back on again.

8 - 3 . If the thread breaks during sewing

When the thread breakage detector operates, the sewing machine will stop and "E-01" will appear in the parameter display LED (1).

Re-thread the thread.



To finish sewing in this condition [Next sewing]

1. Press the RESET key (2). The needle zigzag and feed mechanisms will return to the sewing start position, and the work clamp will rise.
2. Sewing will start again when the treadle is depressed.

To start sewing again from slightly before or after the thread breakage [Resuming sewing]

1. Press the parameter UP key (3) to move the zigzag and feed mechanisms to the next sewing position.
Press the parameter DOWN key (4) 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.

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 (4), press the RESET key (2).
* The needle zigzag and feed mechanisms will return to the sewing start position, but the work clamp will not rise.
2. Depress the treadle to start sewing.

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

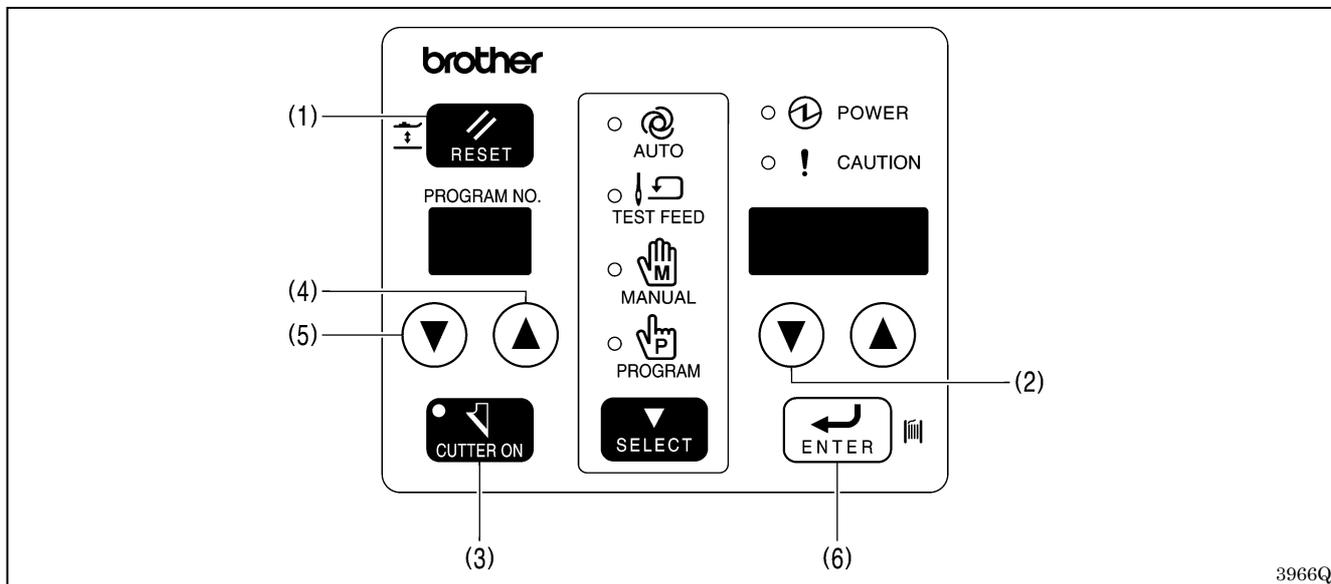
An alarm will sound while the error is being displayed, but if circuit board DIP switch 1 - No. 7 is set to ON, you can set the alarm to sound only three times. (Refer to "13. CHANGING FUNCTIONS USING THE DIP SWITCHES".)

8 - 4 . Thread breakage before sewing is finished

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.

Note: This is enabled when panel DIP switch A - No. 1 is set 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.



To finish sewing in this condition [Finish]

1. Press the RESET key (1). The needle zigzag and feed mechanisms will return to the sewing start position, and the work clamp will rise.
2. Sewing will start again when the treadle is depressed.

To start sewing again from slightly before or after the thread breakage [Resuming sewing]

1. Press the parameter DOWN key (2) to move the zigzag and feed mechanisms to the position to continue sewing from.
2. If you do not want the cutter to operate, press the CUTTER ON key (3) to disable cutter operation.
3. Depress the treadle. The rest of the sewing will be carried out.
4. After sewing is complete, depress the treadle backward.
 - * The thread will be trimmed and the work clamp will be raised.
5. Before carrying out the next sewing operation, press the CUTTER ON key (3) to enable cutter operation.

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 (2), press the RESET key (1).
 - * The needle zigzag and feed mechanisms 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 (3) to disable cutter operation.
3. Depress the treadle to start sewing.
4. After sewing is complete, depress the treadle backward.
 - * The thread will be trimmed and the work clamp will be raised.
5. Before carrying out the next sewing operation, press the CUTTER ON key (3) to enable cutter operation.

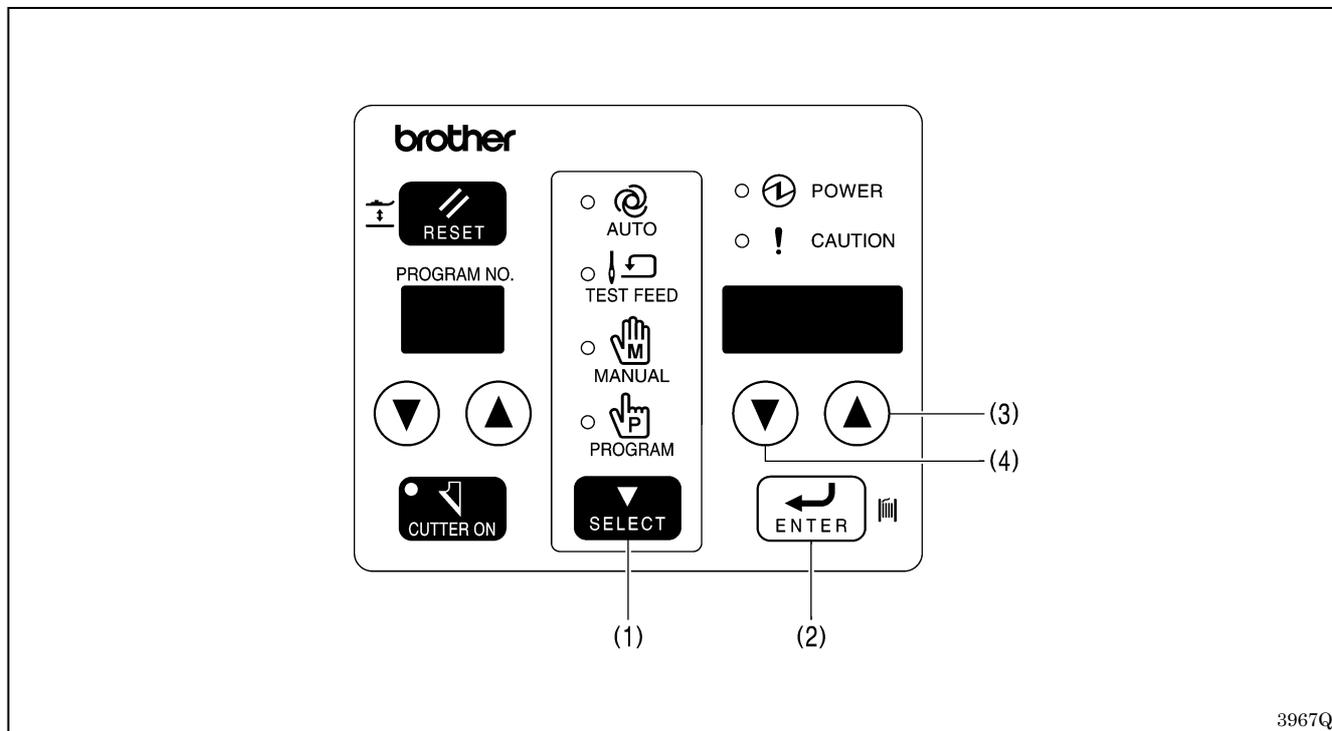
To sew from the sewing start point without raising the work clamp in the other program (without shifting the material) [Re-sewing in the other program]

The other 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.)

1. Press the Program No. keys (4) or (5) to select the program, and then press the ENTER key (6).
2. If you do not want the cutter to operate, press the CUTTER ON key (3) to disable cutter operation.
3. Depress the treadle to start sewing.
4. After sewing is complete, depress the treadle backward.
 - * The thread will be trimmed and the work clamp will be raised.
5. Before carrying out the next sewing operation, press the CUTTER ON key (3) to enable cutter operation.
6. Return the program number to the previous number.

8 - 5 . When resuming sewing in test feed mode or manual mode

If the thread breaks during sewing and sewing finishes without the broke thread being detected, you can operate the sewing machine in test feed mode or manual mode until the needle zigzagging and material feed reach the point where sewing was interrupted, and then complete the rest of the sewing.



1. Press the SELECT key (1) to change the mode to test feed or manual mode.
2. Move the needle zigzag and feed mechanisms 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".)
3. Raise the needle bar to its highest position.

Note: If the needle bar is not at its highest position when the next step is carried out, error "E-02" will be displayed.
Turn the machine pulley to raise the needle bar to its highest position before continuing.
4. While pressing the ENTER key (2), press the SELECT key (1).

* The mode will change to automatic mode and "E-00" will be displayed.

Note: When step 4. is carried out, the mode cannot be returned to test feed mode or manual mode.
5. Press the parameter UP key (3) or the parameter DOWN key (4).

* The "E-00" display will be cleared.
6. Depress the treadle to start sewing from the current position.

9. CLEANING AND 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.

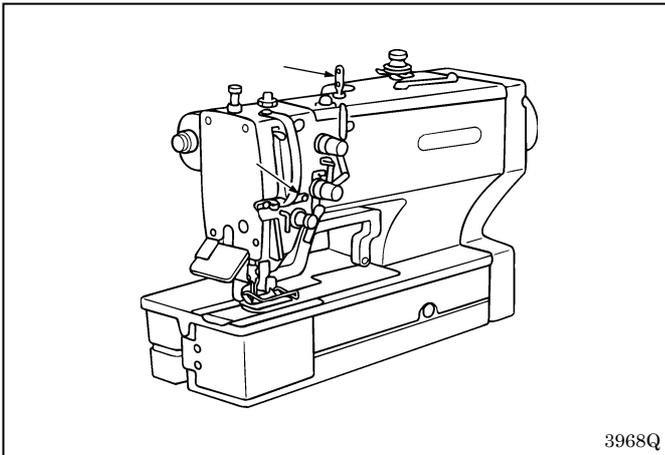


Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.

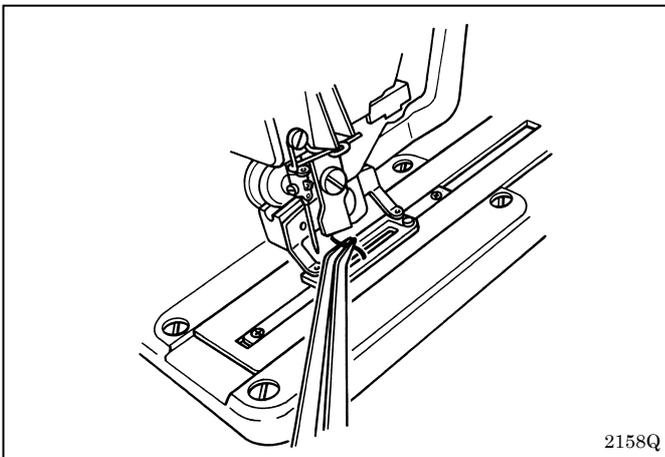
Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhoea.

Keep the oil out of the reach of children.

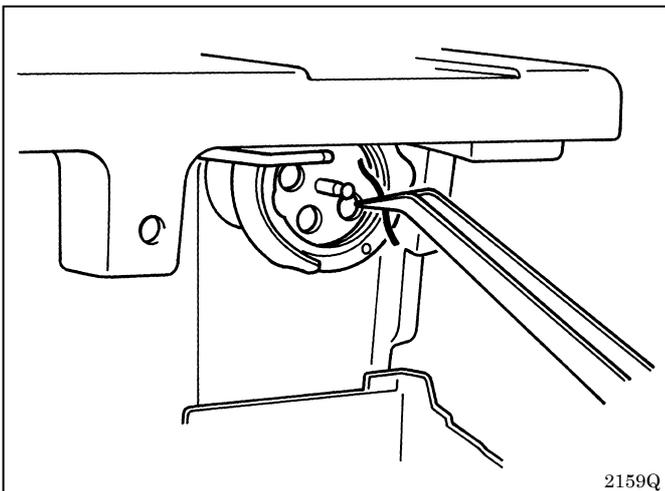
9 - 1 . Cleaning



Remove lint and dust from the thread passages.



Remove lint and dust from around the work clamp and scissors.

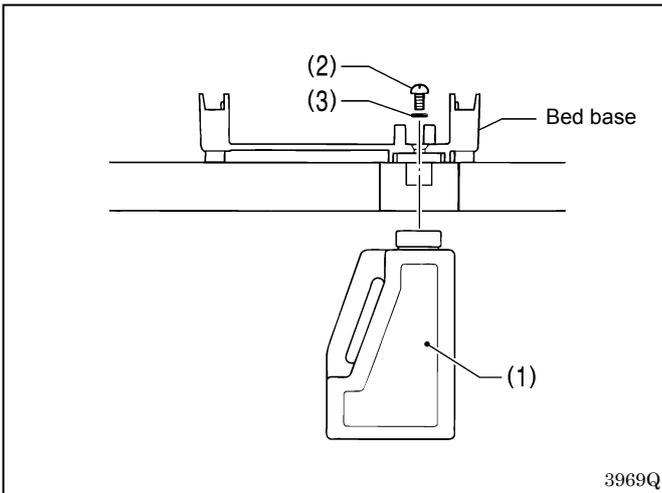


Remove the bobbin case, and remove dust and lint from around the shuttle and fixed knife.

Also wipe the bobbin to remove oil.

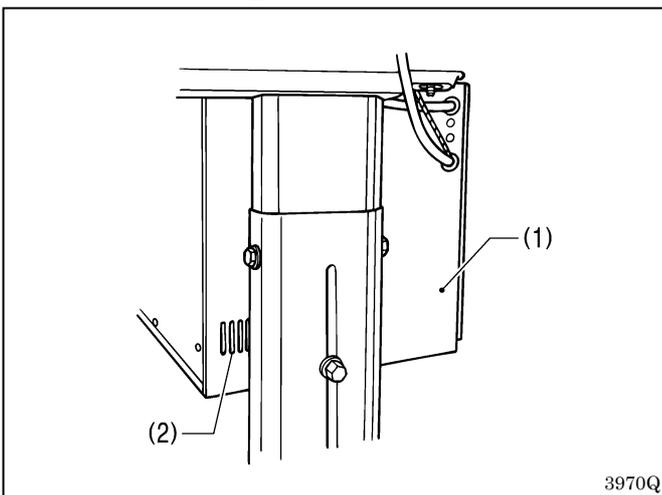
* Periodically clean around the bobbin thread trimmer underneath the needle plate to remove any dust and thread scraps. If you continue using the sewing machine while dust or thread scraps have built up, it may cause the work clamp lifter pulse motor to go out of step.

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 table, and then remove the screw (2).
3. After the lubricating oil has been drained, make sure that the O-ring (3) is in the correct position, and then tighten the screw (2).

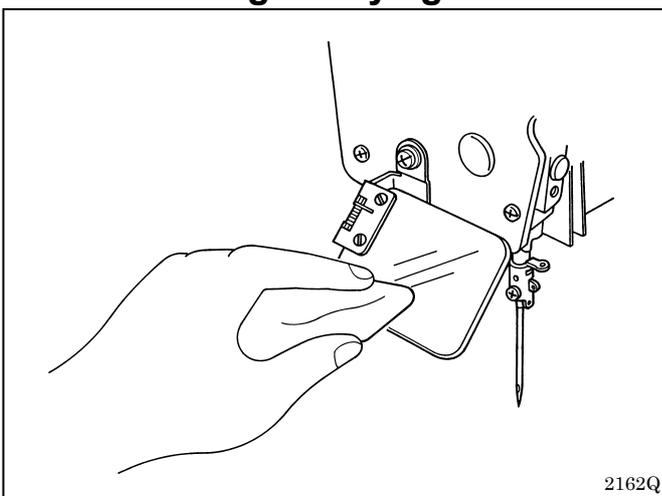
9 - 3 . Cleaning the control box air inlet port



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

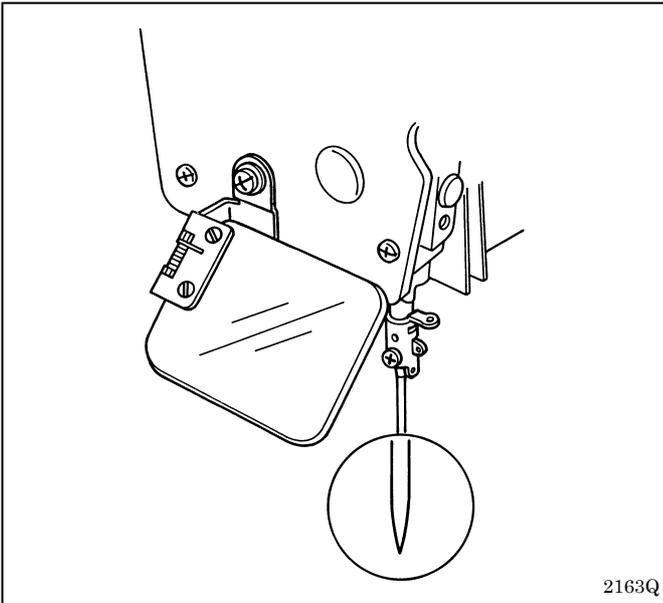


Wipe the eye guard clean with a soft cloth.

Note:

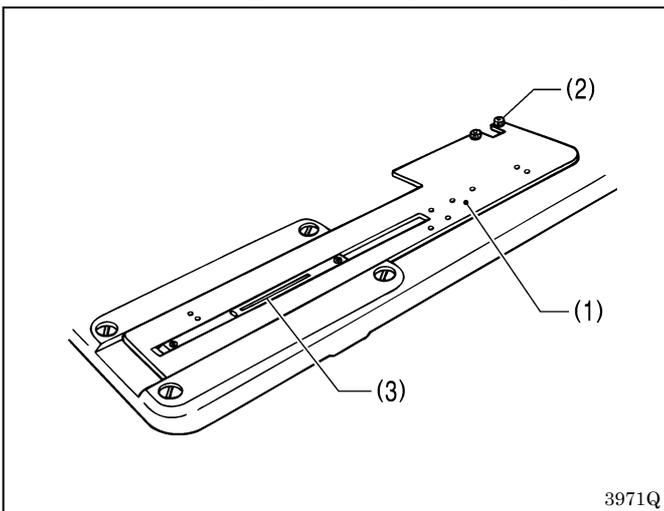
Do not use solvents such as kerosene or thinner to clean the eye guard.

9 - 5 . Checking the needle



Always check that the tip of the needle is not broken and also the needle is not bent 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 two bolts (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 hot. 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 on the power, and after the sewing machine returns to the home position, press the RESET key before carrying out the following adjustments.

* The work clamp will lowered and " -Adj " will appear in the parameter display LED. The sewing machine will not operate when the treadle is depressed at this time.

"10-1. Adjusting the needle bar height"

"10-2. Adjusting the needle and hook timing"

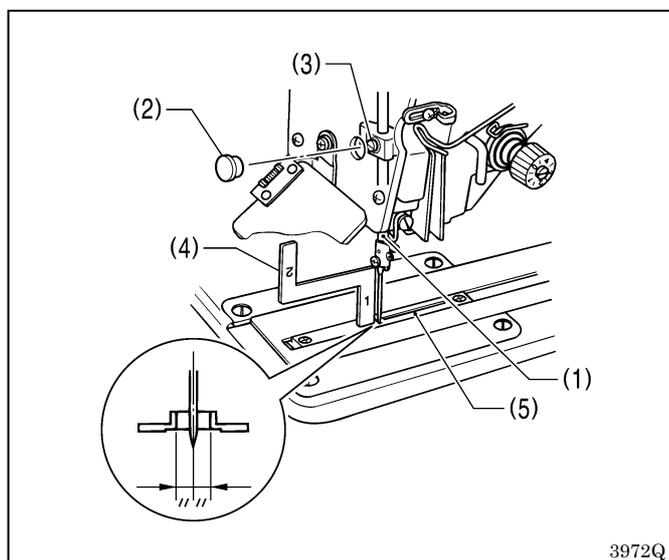
"10-3. Adjusting the clearance between needle and hook point"

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

"10-9. Adjusting the bobbin presser"

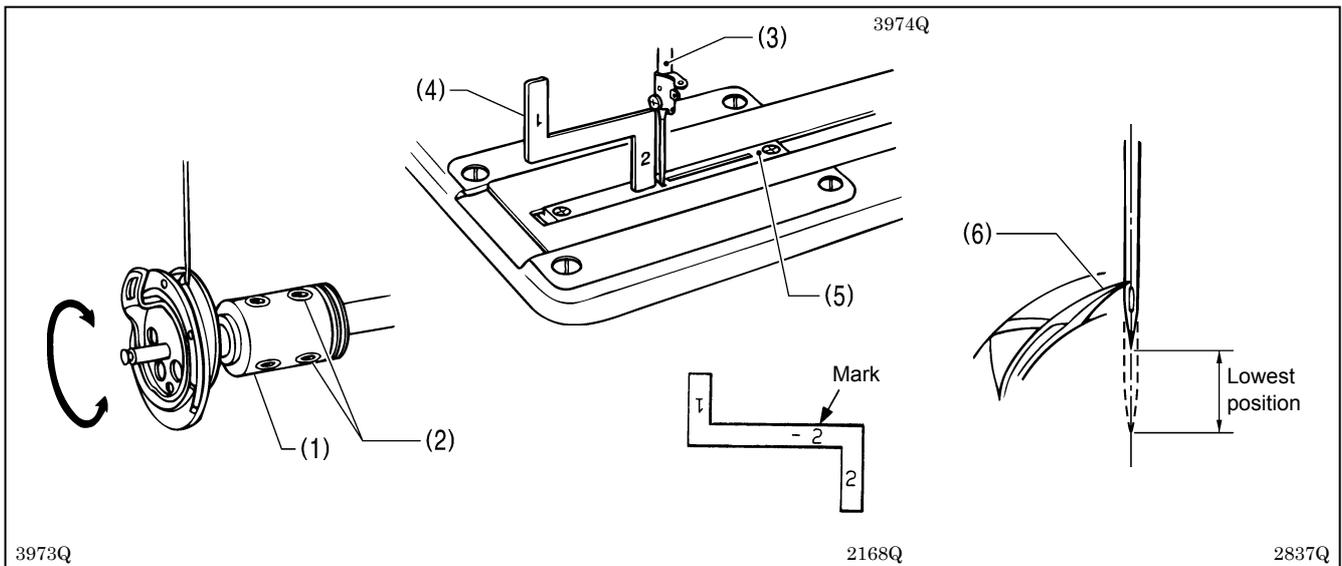
Turn off the power supply before carrying out all but the above tasks.

10-1. Adjusting the needle bar height

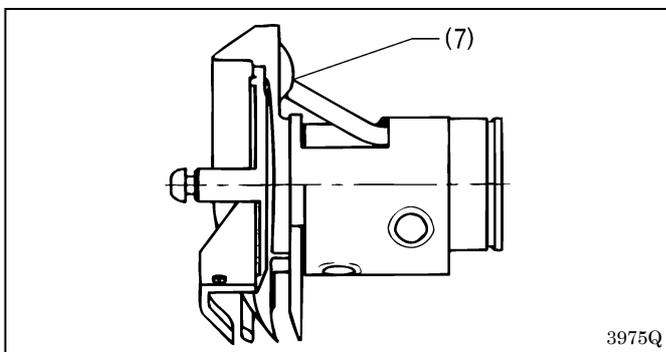


1. Set the sewing machine to the home position and then press the RESET key.
 2. Set the needle bar (1) to its lowest position.
 3. Remove the rubber cap (2) from the face plate, and then loosen the set screw (3) of the needle bar clamp.
 4. Insert the "1" part of the gauge (4) between the needle plate (5) and the lower edge of the needle bar (1), and touch the needle bar against the gauge.
 5. Tighten the set screw (3).
 6. Install the rubber cap (2).
- * Different gauges are used for each of the two specifications -2 and -3, so make sure that the gauge being used matches the specifications and application for the sewing machine being adjusted.

1 0 - 2 . Adjusting the needle and hook timing



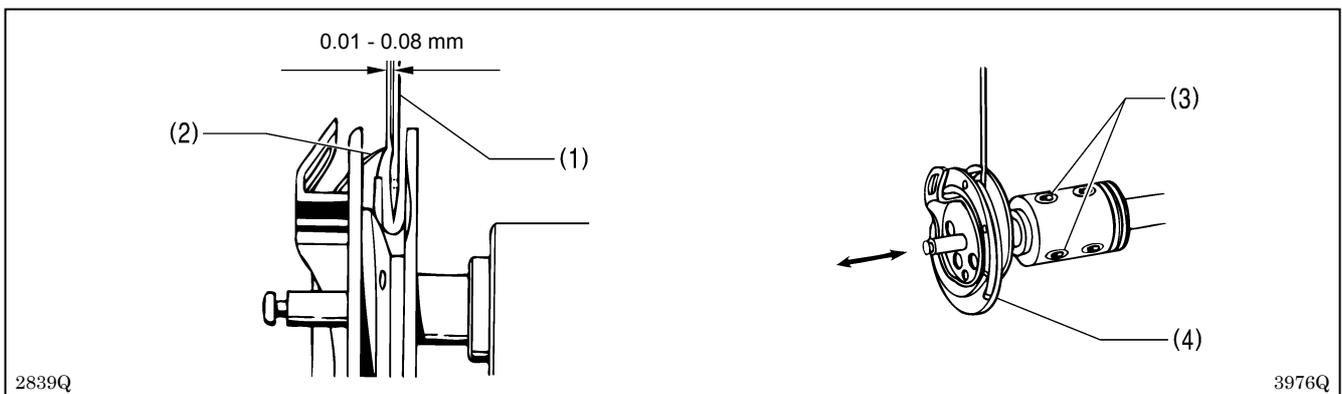
1. Set the sewing machine to the home position and then press the RESET key.
 2. Loosen the two screws (2) of the rotary hook joint (1).
 3. Turn the pulley in the regular direction of rotation (toward the front) so that the needle bar (3) just begins to rise from its lowest position.
 4. Insert the "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 two specifications -2 and -3, so make sure that the gauge being used matches the specifications and application for the sewing machine being adjusted.



Note:

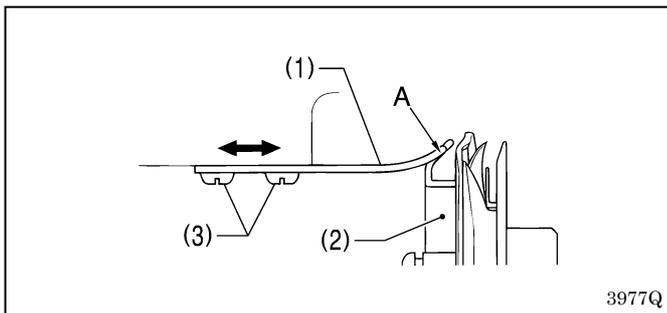
When installing the rotary hook joint, install using the set screw so that the oil inlets in the rotary hook and rotary hook joint (7) are aligned.

1 0 - 3 . Adjusting the clearance between needle and hook point



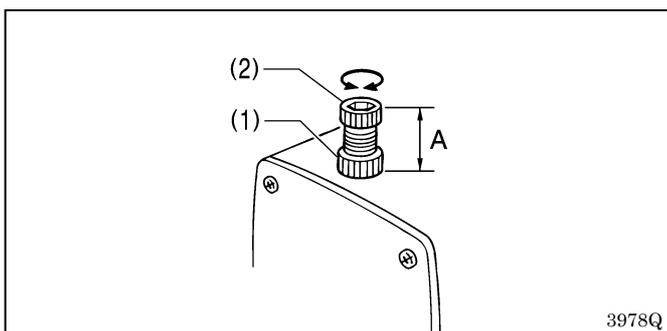
1. Set the sewing machine to the home position and then press the RESET key.
2. Loosen the screws (3) and move the rotary hook (4) forward or back until there is a clearance of 0.01 to 0.08 mm between the needle (1) and the hook point (2).

1 0 - 4 . Adjusting the inner rotary hook and rotary hook holder overlap



Loosen the two screws (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).

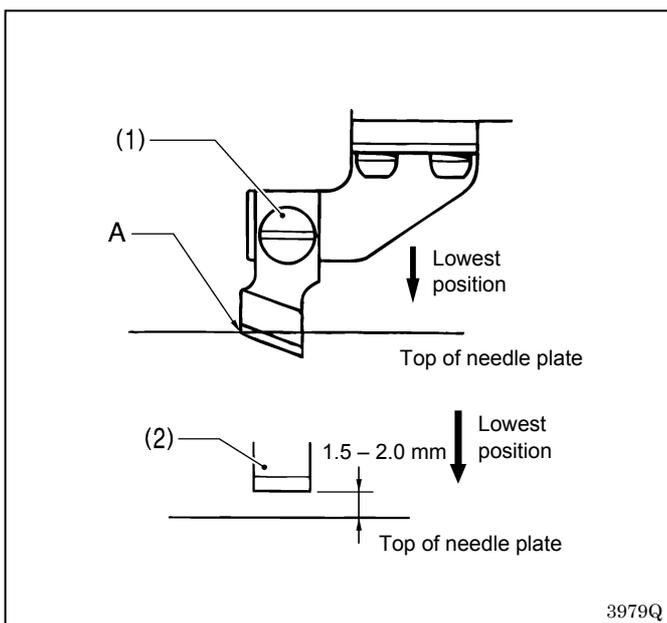
1 0 - 5 . Adjusting the work clamp pressure



The standard distance A is 30 mm (approximately 30 N).

Loosen the nut (1) and turn the adjusting screw (2) to adjust the work clamp pressure.

1 0 - 6 . Adjusting the cutter installation

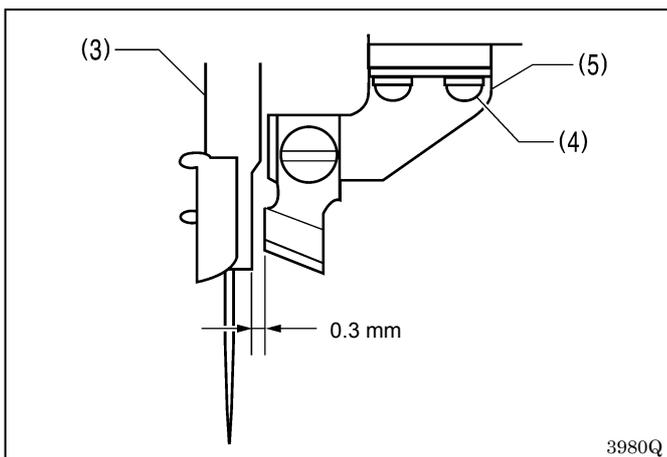


1. Install the cutter with the screw (1) so that the tip A of the cutter blade is aligned with the top of the needle plate when the cutter is pressed down by hand to its lowest position.

* If using the flat cutter (2), install with the screw (1) so that there is a clearance of 1.5 - 2.0 mm between the cutter and the top of the needle plate.

Note:

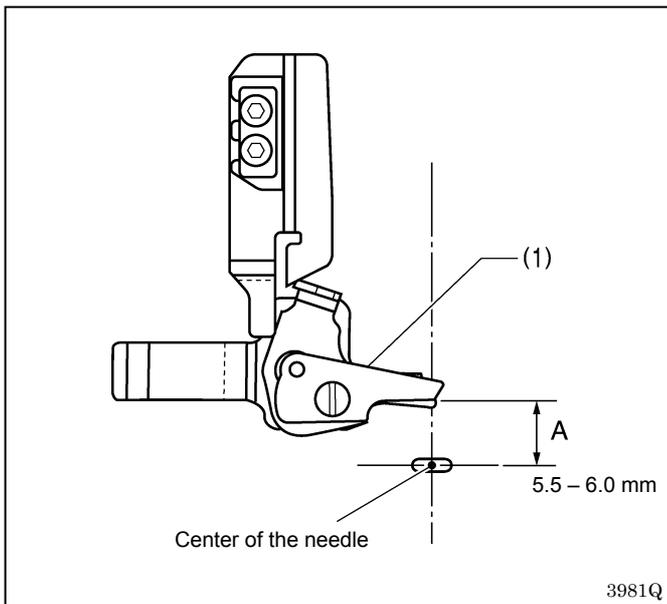
- When the cutter is driven by the solenoid, the movement will be approximately 2 mm greater than that shown in the illustration.
- If the cutter does not cut properly, the cutter may get stuck in the material and not return. If this happens, replace or sharpen the cutter. A special needle plate which helps to prevent the cutter from getting stuck and which helps maintain the cutting edge is available as an option. (Refer to "3. OPTIONAL PARTS".)



2. Loosen the two screws (4), and move the cutter holder (5) to adjust so that the clearance between the cutter and the needle bar (3) is 0.3 mm.

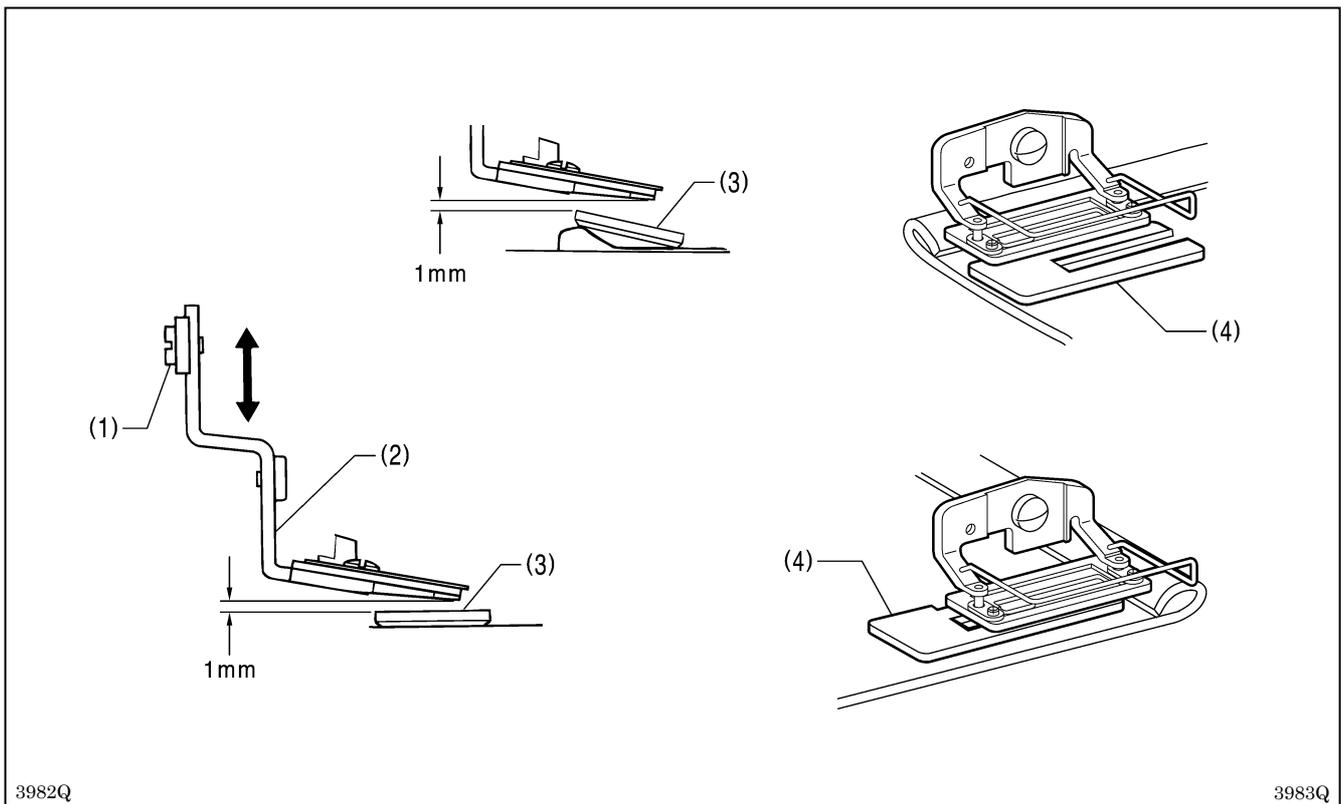
* Check that the needle bar (3) does not touch the cutter when it moves sideways.

1 0 - 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.

1 0 - 7 - 1 . Adjusting the installation height of the upper thread scissors



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

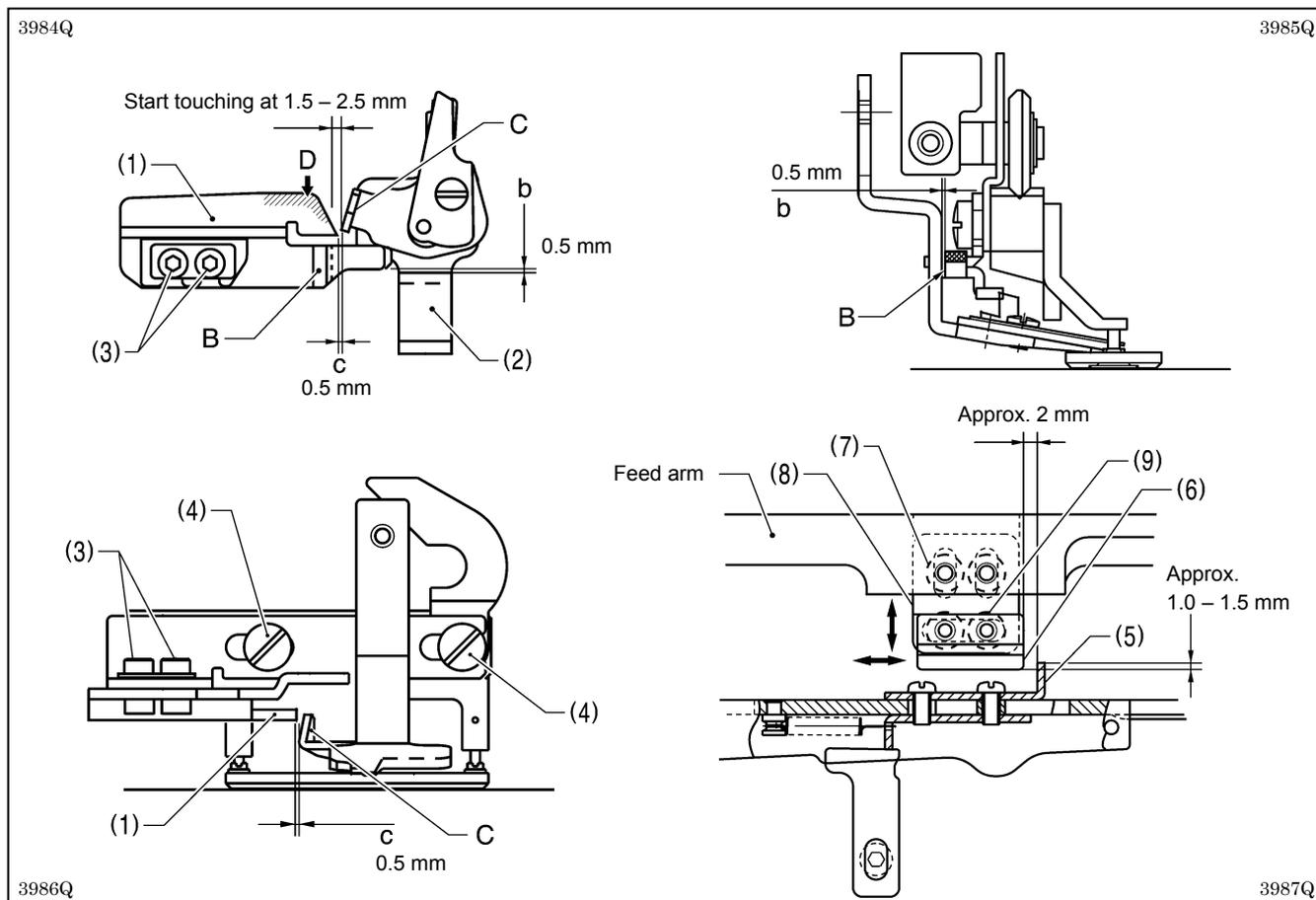
Note:

The work clamp (3) will tilt when sewing joints, so adjust so that the upper thread scissors (2) do not touch it. If the upper thread scissors (2) 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.

1 0 - 7 - 2 . Adjusting the upper thread scissors opening timing

After setting the sewing machine to the home position, press the RESET key and then make the adjustment.



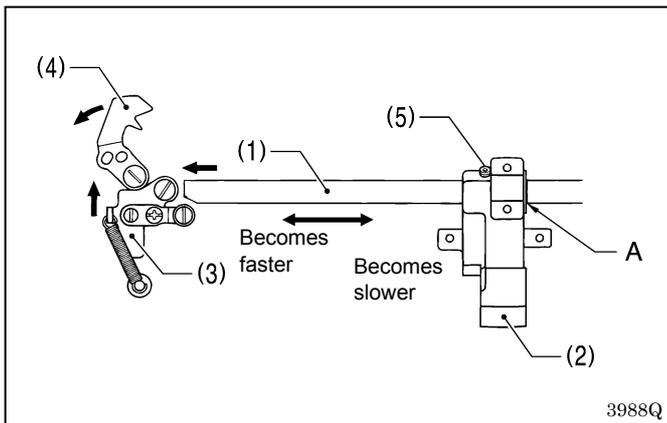
Gradual opening timing adjustment

1. Loosen the two bolts (3), and then adjust so that the distance (b) between ridge line (B) on the opening cam (1) and the upper thread scissors (2) is 0.5 mm, and so that ridge line (B) on the opening cam is parallel to the feed direction.
2. Loosen the two screws (4), and then adjust so that the distance (c) between the rising section (C) of the upper thread scissors (2) and the tip of the opening cam (1) is approximately 0.5 mm when the upper thread scissors (2) are closed.
 - * If you would like the scissors to start opening earlier, make the distance smaller. However, if you make the distance smaller, check that the rising section (C) of the upper thread scissors (2) does not touch the opening cam (1) and prevent the upper thread scissors (2) from opening when the work clamp is lowered.
3. Apply grease to the inclined face (D) of the opening cam (1).

Scissors fully opening timing adjustment

1. Loosen the two bolts (7), and then adjust the support plate (8) so that the back plate (5) and the cam (6) overlap by approximately 1.0 – 1.5 mm.
 - Note:** 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 two bolts (9), and then adjust the clearance between the bend in the back plate (5) and the cam (6) 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 (2) open smoothly during feeding.
 - Note:** If the upper thread scissors (2) do not open smoothly, the upper thread scissors (2) may touch the cutter and needle breakage may occur.

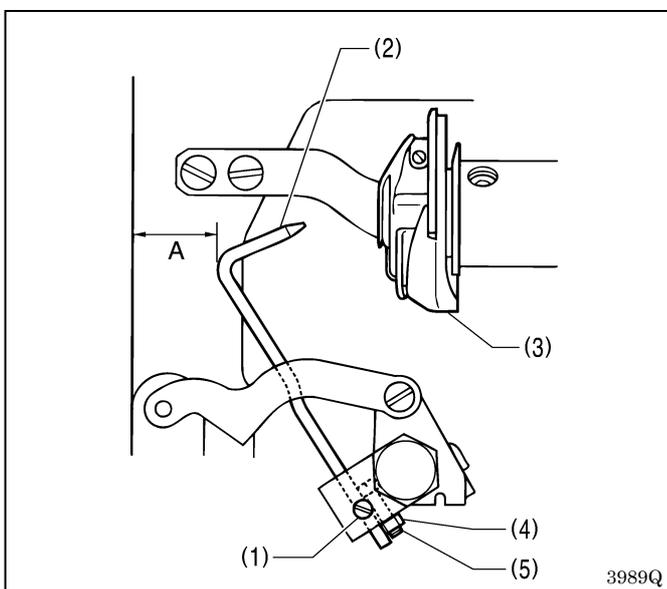
1 0 - 8 . Adjusting the lower thread clamp timing



When reference line A on feed guide shaft B (1) is aligned with the edge of the feed arm support (2), the opening plate (3) will start moving when the feed mechanism moves 6 - 7 mm from the home position, and the lower thread retainer (4) will open.

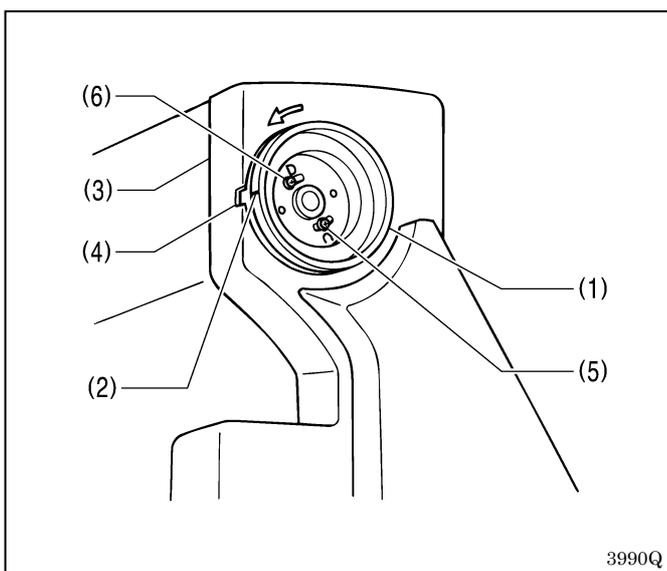
To change the opening timing, loosen the screw (5) of the feed arm support (2) and move feed guide shaft B (1) to the left or right.

1 0 - 9 . Adjusting the bobbin presser



1. Set the sewing machine to the home position and then press the RESET key.
2. Loosen the set screw (1), and then adjust so that the bobbin presser (2) goes into the hole in the bobbin case (3).
3. 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.

1 0 - 1 0 . 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). The machine pulley (1) will stop more slowly if the screw (5) is moved counter to the normal direction of rotation, and will stop more quickly if the screw (5) is moved in the normal direction of rotation.

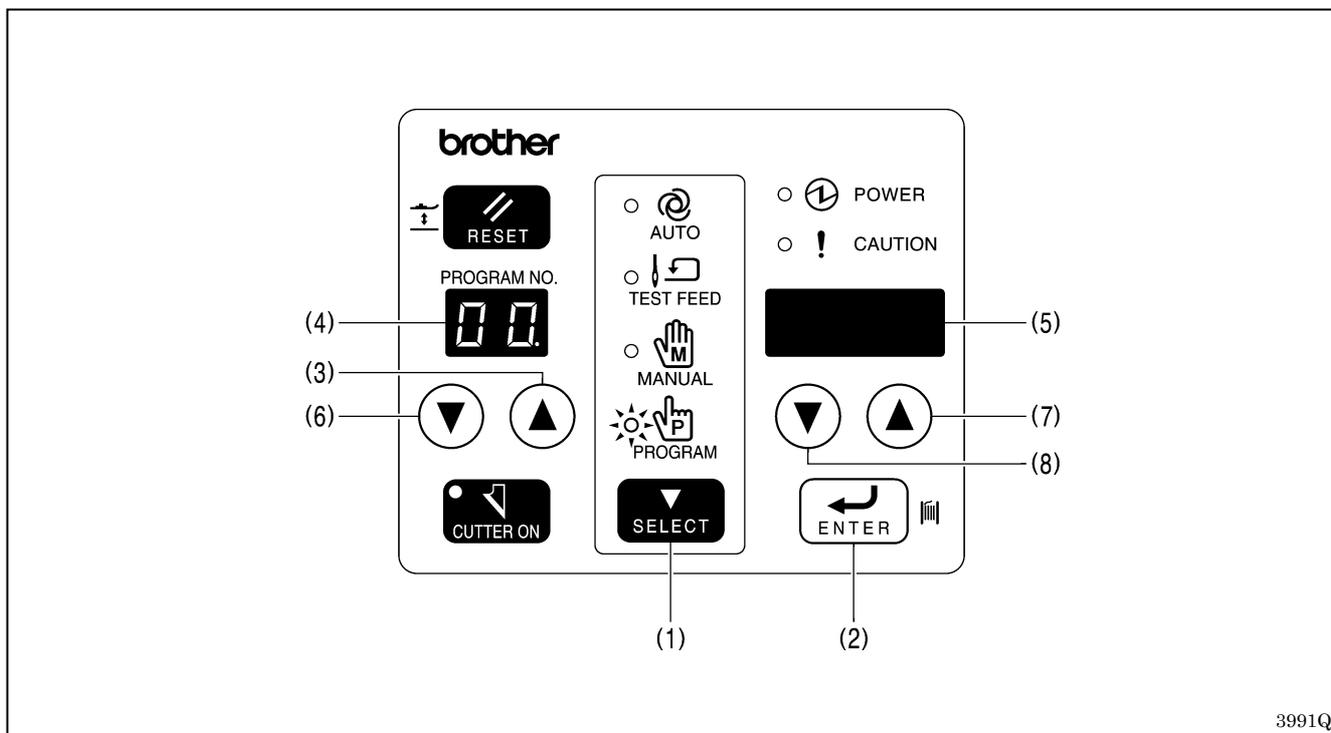
Note:

The screw (6) at the "D" mark is an adjusting screw for the needle down detection function and is adjusted to match the feed timing, so it should not be loosened.

* If the index mark (2) is not inside the mark (4) when the sewing machine is started, and 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.

1 1. CHANGING FUNCTIONS USING THE MEMORY SWITCHES

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



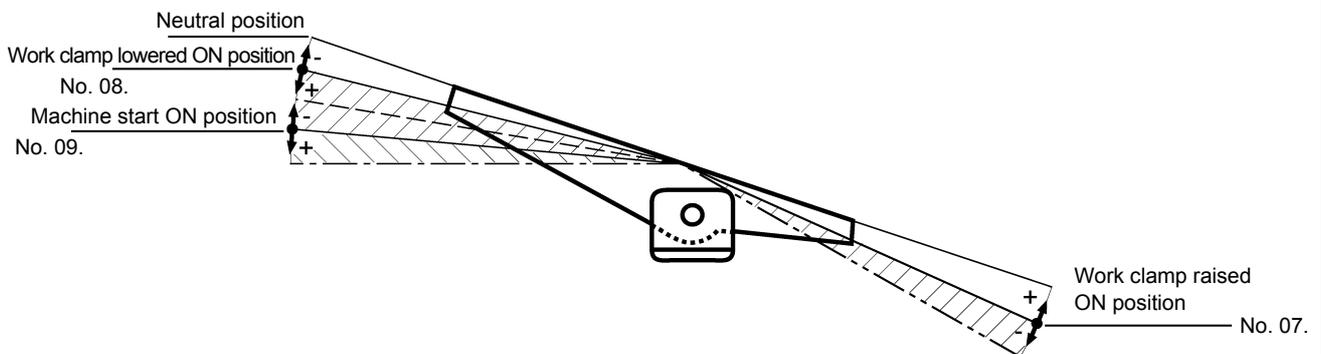
1. Press the SELECT key (1) to change the mode to program mode.
2. While pressing the ENTER key (2), press the program NO. UP key (3).
 - * The memory switch number "00." will appear in the program number LED (4), and the setting for that memory switch number will appear in the parameter display LED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

1 1 - 1 . Memory switch table

The memory switch settings are effective for all programs.

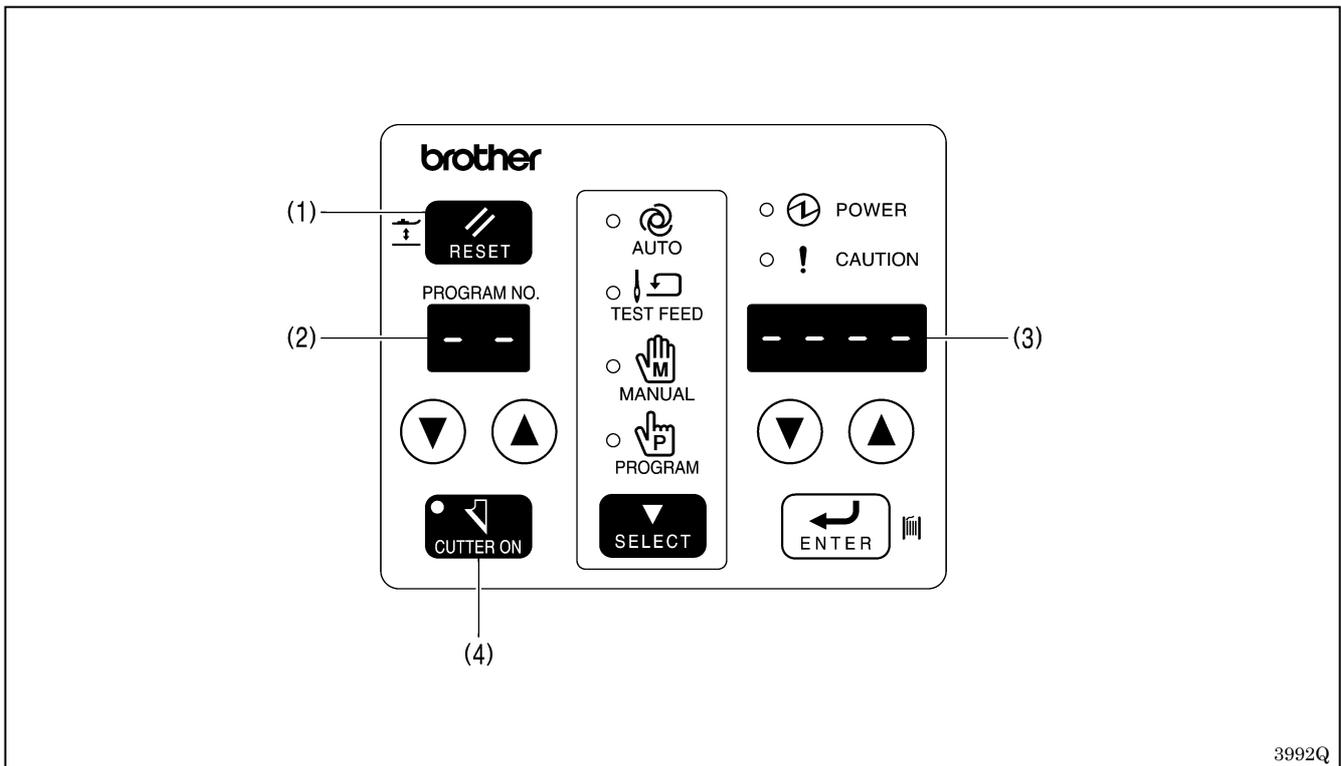
No.	Setting items	Setting range	Unit	Default
00.	Cutter power	-1: Light 0: Light - Normal 1: Normal 2: Normal - Medium 3: Medium 4: Heavy	1	1
02.	Work clamp lifting speed	-4 - 4	1	0
03.	Work clamp lowering speed	-4 - 4	1	0
04.	Work clamp height when treadle is depressed backward	1 - 13mm	1	13
05.	Work clamp height at neutral position	1 - 13mm	1	10
06.	Soft press height	OFF, 0.1 - 8.0mm	0.1	OFF
07.	Threshold value correction when work clamp is lifted	-10 - 10	1	0
08.	Threshold value correction when work clamp is lowered	-10 - 10	1	0
09.	Threshold value correction at start	-10 - 10	1	0
10.	Extension time for continuous sewing	OFF, 100 - 1,000ms	100	OFF
11.	Home position return cycle	OFF, 1 - 10	1	1
12.	Feed timing	-10 - 10 (x 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
15.	Preventing the zigzag speed from being changed	ON: Changes are prevented OFF: Changes are allowed	-	OFF

Memory switch No. 07. 08. 09.



2188Q

1 2 . PROGRAM INITIALIZATION



3992Q

1 2 - 1 . Initializing all programs

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

Settings which are initialized

- Parameters
- Memory switches
- Production counter and lower thread counter
- * If any cycle programs have been set, they will also be cleared.

3. Set the feed mechanism to the home position. (Refer to "5-2. Home position detection (preparation)".)

1 2 - 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 (4), turn on the power switch.
 - * The number of the program that will be initialized will appear in the program number LED (2), 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, "--" will appear in the program number LED (2), and "----" will appear in the parameter display LED (3).

Settings which are initialized

- Parameters

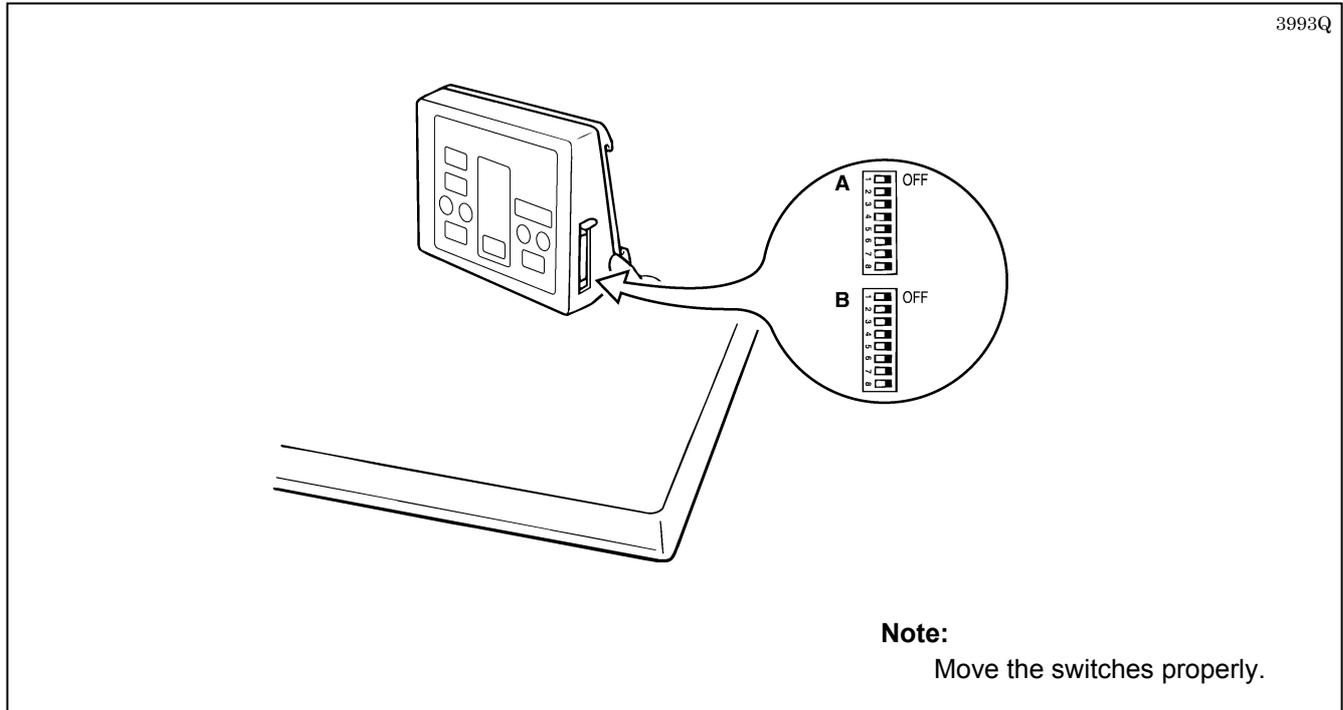
4. Set the feed mechanism to the home position. (Refer to "5-2. Home position detection (preparation)".)

1 3 . CHANGING FUNCTIONS USING THE DIP SWITCHES

1 3 - 1 . Panel DIP switches

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

Any changes to the DIP switch positions will not be effective until the power is switched off and back on again.



DIP switch A

No.	ON/OFF	Setting items	Default
1	ON	Work clamp remains lowered after sewing is complete (rises when treadle is depressed backward)	OFF
	OFF	Work clamp rises after sewing is complete	
2	ON	-	OFF
	OFF	-	
3	ON	Pausing enabled during automatic sewing when the treadle is depressed backward	OFF
	OFF	Pausing disabled during automatic sewing when the treadle is depressed backward	
4	ON	Display setting during automatic mode = bobbin 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	

DIP switch B

No.	ON/OFF	Setting items	Default
1	ON	-	OFF
	OFF	-	
2	ON	-	OFF
	OFF	-	
3, 4, 5	ON, ON, ON	Panel DIP switches B - No. 7 and No. 8 are enabled.	OFF, OFF, OFF
	ON, ON, OFF	Work clamp size: 7.3 × 36.0 mm (Sewing area: 6.0 × 32.0 mm)	
	ON, OFF, ON	Work clamp size: 7.3 × 24.5 mm (Sewing area: 6.0 × 20.0 mm)	
	ON, OFF, OFF	Work clamp size: 6.8 × 36.0 mm (Sewing area: 5.4 × 32.0 mm)	
	OFF, ON, ON	Work clamp size: 6.8 × 24.5 mm (Sewing area: 5.4 × 20.0 mm)	
	OFF, ON, OFF	Panel DIP switches B - No. 7 and No. 8 are enabled.	
	OFF, OFF, ON	Work clamp size: 5.4 × 19.0 mm (Sewing area: 4.0 × 15.0 mm)	
	OFF, OFF, OFF	Panel DIP switches B - No. 7 and No. 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 × 47.0 mm (Sewing area: 6.0 × 40.0 mm)	OFF, OFF
	ON, OFF	Work clamp size: 6.8 × 47.0 mm (Sewing area: 5.4 × 40.0 mm)	
	OFF, ON	Work clamp size: 5.4 × 24.5 mm (Sewing area: 4.0 × 20.0 mm)	
	OFF, OFF	Work clamp size: 5.4 × 36.0 mm (Sewing area: 4.0 × 32.0 mm)	

* If the programs are initialized when Nos. 3, 4 and 5 are set to OFF, OFF and ON respectively, the initial value for parameter No. 02 - Cutter size will be set to 6.0 mm. (Normal default value is 13.0 mm.)

1 3 - 2 . Circuit board DIP switches



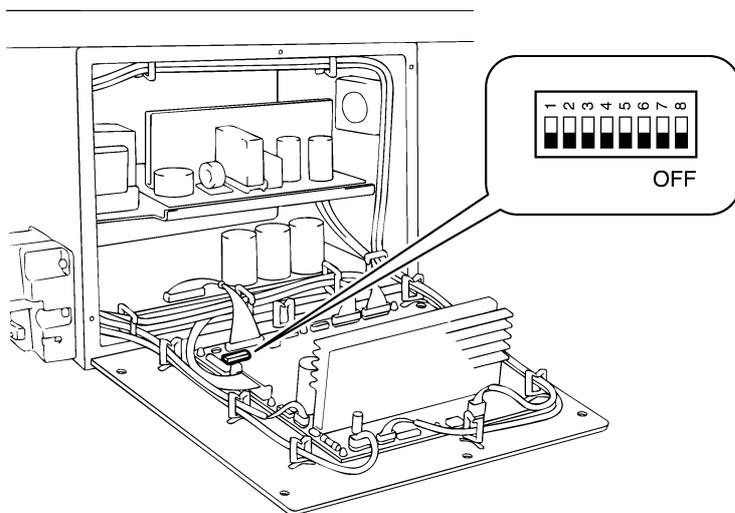
Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.

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

Any changes to the DIP switch positions will not be effective until the power is switched off and back on again.

Circuit board DIP switch 1

3994Q



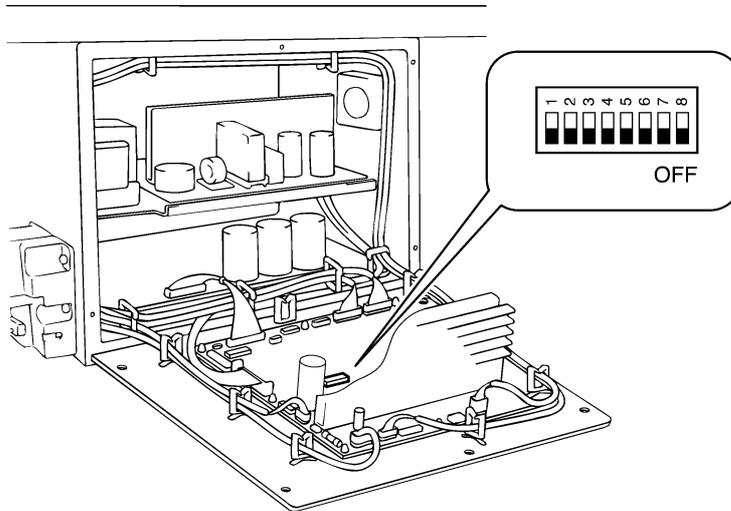
Note:

Move the switches properly.

No.	ON/OFF	Setting items	Default
1	ON	-	OFF
	OFF	-	
2	ON	-	OFF
	OFF	-	
3	ON	-	OFF
	OFF	-	
4	ON	-	OFF
	OFF	-	
5	ON	-	OFF
	OFF	-	
6	ON	-	OFF
	OFF	-	
7	ON	Three warning beeps	OFF
	OFF	Continuous warning beep	
8	ON	Zigzag motor energization is turned off during pauses or when a thread breakage occurs	OFF
	OFF	Zigzag motor energization is not turned off during pauses or when a thread breakage occurs	

Circuit board DIP switch 2

3995Q



Note:
Move the switches properly.

No.	ON/OFF	Setting items	Default
1	ON	Pedal: for standing operation	OFF
	OFF	Pedal: for seated operation	
2	ON	Starting possible only when work clamp is lowered	OFF
	OFF	Starting possible regardless of work clamp position	
3	ON	During standing pedal operation, the work clamp lowers only while the work clamp pedal is being depressed.	OFF
	OFF	During standing pedal operation, the work clamp keeps lowering when the work clamp pedal is released.	
4	ON	-	OFF
	OFF	-	
5	ON	-	OFF
	OFF	-	
6	ON	100V, 110V specifications	ON/OFF
	OFF	200V, 220V, 230V, 380V, 400V specifications	
7	ON	-	OFF
	OFF	-	
8	ON	-	OFF
	OFF	-	

1 4 . 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	STOP switch was pressed.	<ol style="list-style-type: none"> 1. Release the STOP switch. <ul style="list-style-type: none"> • To restart sewing, press the parameter DOWN key and then depress the treadle to step 2. • To cancel sewing, press the RESET key. 2. If an error still occurs after 1. is carried out, check that connector P10 on the main P.C. board is properly connected.
E-01	Upper thread breakage	<ol style="list-style-type: none"> 1. Thread the thread, or check that the thread has been passed through the thread guide. <ul style="list-style-type: none"> • To restart sewing, press the parameter DOWN key and then depress the treadle to step 2. • To cancel sewing, press the RESET key. 2. If an error still occurs after 1. is carried out, check that connector P10 on the main P.C. board is properly connected.
E-02	Needle up sensor is OFF.	<ol style="list-style-type: none"> 1. Turn the pulley by hand to set the needle to its highest position. 2. Check if the sewing machine operation is sluggish because of a reason such as thread tangled around the rotary hook. 3. If an error still occurs after 1. and 2. are carried out, check that connector P3 on the main P.C. board is properly connected.
E-05	Zigzag positioning is not carried out.	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check that connector P11 on the main P.C. board is properly connected. 3. Check the operation of the zigzag home position sensor monitor lamp.
E-06	Feed positioning is not carried out.	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check that connector P11 on the main P.C. board is properly connected. 3. Check the operation of the feed home position sensor monitor lamp.
E-07	Work clamp positioning is not carried out.	<p>Turn off the power.</p> <p><If E-07 occurs other than when machine is moving to the home position or starting></p> <ol style="list-style-type: none"> 1. Check that connector P11 on the main P.C. board is properly connected. 2. Check the operation of the work clamp home position sensor monitor lamp. <p><If E-07 occurs when machine is starting></p> <ol style="list-style-type: none"> 1. Check the upper thread trimming mechanism, particularly for wear in the opening cam. 2. Apply grease to the inclined face of the opening cam.
E-08	Cutter home position sensor is off.	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check if the solenoid stopper tightening nut or the cutter sensor mounting screw is loose and if the cutter solenoid (shaft, etc.) is damaged. 3. Check that connector P23 on the main P.C. board and connector P13 on the sub P.C. board are properly connected. 4. Check the operation of the cutter home position sensor monitor lamp.

Code	Cause	Remedy
E-20	Feed and work clamp motor overcurrent	<ol style="list-style-type: none"> 1. Turn off the power and check that the feed mechanism is normal and that the work clamp moves smoothly. 2. Check that connectors P2 and P5 on the sub P.C. board are properly connected. 3. Check that connector P22 on the main P.C. board and connector P10 on the sub P.C. board are properly connected.
E-21	Zigzag motor overcurrent	<ol style="list-style-type: none"> 1. Turn off the power and check if the zigzag mechanism moves smoothly. 2. Check that connector P16 on the main P.C. board is properly connected.
E-30	Treadle is depressed to step 2.	<ol style="list-style-type: none"> 1. Return the treadle to the neutral position. 2. If an error still occurs after 1. is carried out, check that connector P7 on the main P.C. board is properly connected.
E-31	Treadle is depressed to step 1.	<ol style="list-style-type: none"> 1. Return the treadle to the neutral position. 2. If the error still occurs after step 1 is carried out, adjust the threshold value for memory switch No. 08 to a positive value. 3. Check that connector P7 on the main P.C. board is properly connected.
E-32	Treadle is depressed backward.	<ol style="list-style-type: none"> 1. Return the treadle to the neutral position. 2. If the error still occurs after step 1 is carried out, adjust the threshold value for memory switch No. 07 to a negative value. 3. Check that connector P7 on the main P.C. board is properly connected.
E-40	Control circuit board heat sink is overheating.	<ol style="list-style-type: none"> 1. Turn off the power and check that the inside of the control box is being properly ventilated. 2. Clean the filter of the air intake and the cooling fan. (Remove dust.)
E-41	Inside air circulation fan problem	<ol style="list-style-type: none"> 1. Turn off the power and clean the inside air circulation cooling fan. (Remove dust.) 2. Check that connectors P13 and P20 on the main P.C. board are properly connected. 3. Check that connectors CN2, CN3 and CN4 on the 1-step power supply circuit board are properly connected.
E-42	Exhaust fan problem	<ol style="list-style-type: none"> 1. Turn off the power and clean the exhaust cooling fan. (Remove dust.) 2. Check that connectors P1 and P20 on the main P.C. board are properly connected. 3. Check that connectors CN2, CN3 and CN4 on the 1-step power supply circuit board are properly connected.
E-44	2-step power supply circuit board +55V relay error	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check that connector P3 on the sub P.C. board is properly connected. 3. Check that connectors P3 and P4 on the 2-step power supply circuit board are properly connected. 4. Check that connectors P10 and P13 on the sub P.C. board are properly connected. 5. Check that connectors P22 and P23 on the main P.C. board are properly connected. <p>* This error can occur if a three-phase sewing machine is used with a single-phase power supply.</p>
E-51	X pitch error	Turn off the power and initialize the parameter settings.
E-52	Y pitch error	Turn off the power and initialize the parameter settings.
E-53	Multi-working knife error	Use the programming device (the programming software for the electronic pattern sewer or a programmer) to delete multi-working knife operations.
E-54	Overall cycle program stitch no. error (Exceeds 3,000 stitches.)	Clear the cycle program to reset the error automatically.

14. ERROR CODE TABLE

Code	Cause	Remedy
E-55	Stitch no. error (Exceeds 700 stitches.)	<ol style="list-style-type: none"> Turn off the power and then back on again. * The zigzag pitch, front tack pitch and rear tack pitch will be automatically doubled and the error will be cleared. If an error still occurs after 1. is carried out, turn off the power and initialize the parameter settings.
E-59	Sewing data error	Turn off the power and initialize the parameter settings.
E-62	Needle up error during operation	<p>Turn off the power.</p> <p><Software></p> <ul style="list-style-type: none"> If the sewing machine stops before the needle up position, reduce the setting value for machine motor parameter No. 00 (machine motor stopping position). If the sewing machine stops after the needle up position, increase the setting value for machine motor parameter No. 00 (machine motor stopping position). <p><Hardware></p> <ol style="list-style-type: none"> Turn the pulley by hand and check if the upper shaft locks or not. If an error still occurs after 1. is carried out, check that connector P3 on the main P.C. board is properly connected.
E-63	Needle down error during operation	<ol style="list-style-type: none"> Turn off the power. Turn the pulley by hand and check if the upper shaft locks or not. If an error still occurs after 1. is carried out, check that connector P3 on the main P.C. board is properly connected.
E-64	Timing signal error during operation	<ol style="list-style-type: none"> Turn off the power. Turn the pulley by hand and check if the upper shaft locks or not. If an error still occurs after 1. is carried out, check that connector P3 on the main P.C. board is properly connected.
E-70	Machine motor running error	<ol style="list-style-type: none"> Turn off the power. Check that machine motor harness connector CN7 on the 1-step power supply circuit board is properly connected. Check that the pins of machine motor harness connector CN7 are inserted correctly.
E-74	EEPROM error	Turn off the power and replace the main P.C. board.
E-80	Communication ready error	<ol style="list-style-type: none"> Turn off the power. Check that there is data in the main circuit board ROM. Check that the ROM chips of the main P.C. board are properly connected. (Check position, orientation, lead clinching.)
E-81	Communication error	<ol style="list-style-type: none"> Turn off the power. Check that there is data in the main circuit board ROM. Check that the ROM chips of the main P.C. board are properly connected. (Check position, orientation, lead clinching.)
E-90	Machine motor overload (Excessive load during sewing.)	<ol style="list-style-type: none"> Turn off the power. Turn the pulley by hand and check if the upper shaft locks or not. Check that connectors P3 and P6 on the main P.C. board are properly connected. Check that machine motor harness connector CN7 and power supply harness connector CN8 on the 1-step power supply circuit board are properly connected.

Code	Cause	Remedy
E-92	Machine motor operation error	<ol style="list-style-type: none"> 1. Turn off the power. 2. Turn the pulley by hand and check if the upper shaft locks or not. 3. Check that connectors P3 and P6 on the main P.C. board are properly connected. 4. Check that machine motor harness connector CN7 and power supply harness connector CN8 on the 1-step power supply circuit board are properly connected.
E-93	Blown solenoid fuse	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check fuse F1 on the main P.C. board. If it is blown replace it.
E-94	Machine motor IC error	<ol style="list-style-type: none"> 1. Turn off the power. 2. Turn the pulley by hand and check if the upper shaft locks or not. 3. Check that connectors P3 and P6 on the main P.C. board are properly connected. 4. Check that machine motor harness connector CN7 and power supply harness connector CN8 on the 1-step power supply circuit board are properly connected.
E-95	Power supply voltage error (high)	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check the power supply voltage in the workplace and the power supply voltage specifications for the control box. 3. Check the connection positions of connectors CN2, CN3 and CN4 on the 1-step power supply circuit board. <ul style="list-style-type: none"> • 200V specification ...CN2 • 100V, 110V, 240V, 220V, 380V, 400V, 415V specifications ... CN3 • 230V specification ... CN4
E-96	Power supply voltage error (low)	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check the power supply voltage in the workplace and the power supply voltage specifications for the control box. 3. Check the connection positions of connectors CN2, CN3 and CN4 on the 1-step power supply circuit board. <ul style="list-style-type: none"> • 200V specification ...CN2 • 100V, 110V, 240V, 220V, 380V, 400V, 415V specifications ... CN3 • 230V specification ... CN4
E-97	Machine motor locked <ul style="list-style-type: none"> • Excessive load during sewing. • Motor temperature protection function has operated. (If the motor's serial number is "G03xxxxx" or later) 	<ol style="list-style-type: none"> 1. Turn off the power. 2. Check if the timing belt is attached. 3. Turn the pulley by hand and check that the upper shaft does not lock and the pulley is not loose. 4. Check that connectors P3 and P6 on the main P.C. board are properly connected.
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.)</p> <ol style="list-style-type: none"> 1. Press the SELECT key. 2. Select a different program number and press the ENTER key. <p>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</p> <p>While pressing the ENTER key, press the RESET key.</p> <p>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</p> <p>Refer to "12-1. Initializing all programs".</p>

1 5 . GAUGE PARTS LIST

Needle plate

<For -2 specification>		
S50663-001 (1.2 mmS)	S50664-001 (1.4 mmS)	S50665-001 (1.6 mmS)
<For -3 specification>		
S51248-101 (1.2 mmS)	S51249-101 (1.4 mmS)	S51250-101 (1.6 mmS)

For flat cutter		
Specifications	-2	-3
Needle plate	S50321-001 (1.2 mmS) 	S50322-101 (1.2 mmS)
	151843-001 	156612-001

- [A] Work clamp assembly, with finger guard
- [B] Work clamp assembly
- [C] Finger guard
- [D] Work clamp

<-2 specification>			
A	S37101-102 (16 mmRS)	A	S37100-102 (25 mmRS)
B	S55347-002 (25 mmRSW)	B	S55346-002 (25 mmRSW)
C	159079-000	C	159080-000
D	159761-002	D	159762-002
	Sewing area 4 × 20		Sewing area 4 × 32
			Sewing area 6 × 32
			Sewing area 6 × 40

<-3 specification>			
A	S37103-101 (16 mm)	A	S37102-101 (25 mm)
B	S01466-201 (16 mm)	B	S01467-201 (25 mm)
C	159079-000	C	159080-000
D	145136-001	D	144630-001
	Sewing area 4 × 20		Sewing area 4 × 32
			Sewing area 5.4 × 32
			Sewing area 5.4 × 40

15. 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

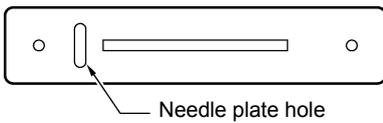
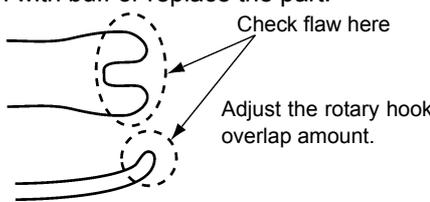
1 6 . TROUBLESHOOTING

! CAUTION



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

1 6 - 1 . Upper thread breakage

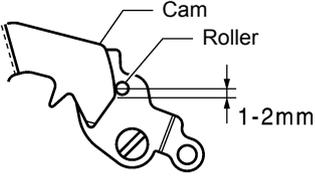
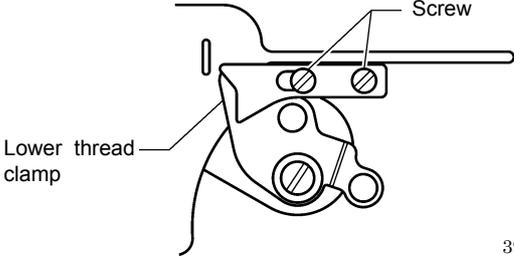
Cause	Check	Remedy	Page
Needle	Needle facing	As viewed from the direction of the face plate, attach needle so that the notched part of needle faces forward.	57
	Needle installation height	Insert the end of the needle shank so that it touches the top edge of the needle hole of the needle bar.	-
	Bent needle	Replace needle	-
	Blunt needle tip or burr	Replace needle	-
	Needle and thread	Replace needle that fits the thread	-
Threading	Upper thread threading	Thread the upper thread correctly.	58
	Lower thread threading	Thread the lower thread correctly.	60
Thread path	Flaw or abrasion on the thread path	Polish with buff or replace the part. Especially, pay attention to finishing around needle plate hole.  3996Q	-
	Flaw on the rotary hook point and rotary hook edge	Polish with buff or replace the part.	-
	Flaw on the rotary hook holder	Polish with buff or replace the part.  3997Q	-
Thread tension	Zigzag thread upper thread tension	Adjust the upper thread tension appropriately.	62
	Bar tack thread upper thread tension	Adjust the upper thread tension while checking stitches. (The stitches on top are the upper thread and the stitches underneath are the bobbin thread.)	62
Thread take-up spring	Thread take-up spring tension and stroke	Loosen the thread take-up spring tension or shorten the stroke to such a degree that does not cause double hooking. Adjust it while checking bar tacking stitches.	63

16. TROUBLESHOOTING

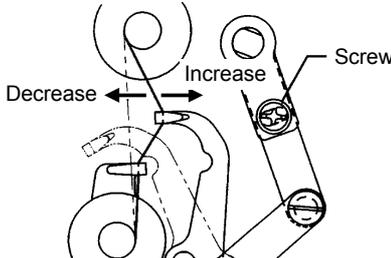
Cause	Check	Remedy	Page
Rotary hook	Needle bar height and needle bar lift amount	Adjust the needle and hook timing. 1. Adjust the needle bar height to "1" on the gauge. 2. Adjust the needle bar lift amount to "2" on the gauge.	72, 73
	Gap between needle and rotary hook	Adjust the gap between needle and rotary hook to 0.01 - 0.08 mm. (Adjust to as large as possible without causing skipped stitches to occur.) * Check that rotary hook point does not strike needle in zigzag motion.	73
	Rotary hook lubrication	<ul style="list-style-type: none"> • Too small quantity of lubrication oil will cause thread breakage. Adjust the quantity of lubrication oil. • The lubrication holes between rotary hook and rotary hook joint do not match up. 	25 73
	Thread twisted around rotary hook	Remove any twisted thread from the inner and rotary hook.	-
Upper thread amount	Arm thread guide position	Adjust the arm thread guide position	63
Bobbin case	Damaged outside of bobbin case and bent bobbin holder spring, etc.	Polish with buff or replace the part. * Use the HE-800A bobbin case.	-

1 6 - 2 . Skipped stitches

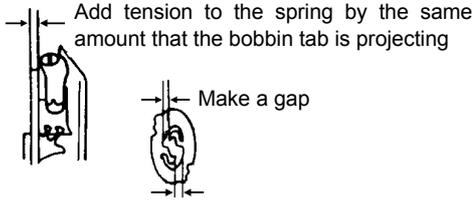
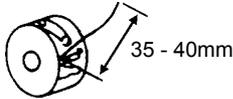
Cause	Check	Remedy	Page
Needle	Needle facing	As viewed from the direction of the face plate, attach needle so that the notched part of needle faces forward.	57
	Needle installation height	Insert the end of the needle shank so that it touches the top edge of the needle hole of the needle bar.	-
	Bent needle	Replace needle	-
	Blunt needle tip or burr	Replace needle	-
	Thin needle	Use a needle with a count that matches the thread and material.	-
Thread take-up spring	Thread take-up spring tension and stroke	Loosen the thread take-up spring tension or shorten the stroke to such a degree that does not cause double hooking. Adjust it while checking bar tacking stitches.	63
Work clamp	Work clamp pressure	Increase work clamp pressure. * The standard height of the adjustment screw is approximately 30 mm, so tighten it further than this.	74
	Relation between work clamp assembly and sewing length	Replace work clamp assembly that fits for sewing length. * When using knits or woven materials, replace the parts with the -3 specification parts: Length feed plate (for specification -3), work clamp assembly (for knits), needle plate 1.2 (for specification -3)	-
Rotary hook	Blunt rotary hook point	Polish with buff or replace the part.	-
	Needle bar height and needle bar lift amount	Adjust the needle and hook timing. 1. Adjust the needle bar height to "1" on the gauge. 2. Adjust the needle bar lift amount to "2" on the gauge.	72, 73
	Gap between needle and rotary hook	Adjust the gap between needle and rotary hook to 0.01 - 0.08 mm. (Adjust to as large as possible without causing skipped stitches to occur.) * Check that rotary hook point does not strike needle in zigzag motion.	73

Cause	Check	Remedy	Page
Thread tension	Zigzag thread upper thread tension	Adjust the upper thread tension appropriately.	62
Needle bar plate	Vertical and longitudinal needle bar play	Reduce the needle bar play, or replace the parts.	-
Lower thread clamp	Lower thread retainer cam	Lower thread retainer cam should be sitting firmly on lower thread clamp plate roller.  3998Q	-
	Thread scraps and dust blocking area around lower thread clamp and lower thread presser	Clean around the lower thread presser.	-
	Lower thread clamping force	<ul style="list-style-type: none"> • If the lower thread clamp and lower thread presser are bent, replace them. • Check that the screws are tightened.  3999Q	-
Needle plate	Relation between material and needle plate	<ul style="list-style-type: none"> • When using knit material, replace with the -3 needle plate. • Replace with a needle plate with a smaller needle hole. 	-
Joint sewing	Angle of work clamp means that material is not being clamped.	<ul style="list-style-type: none"> • Replace with short work clamp that matches the sewing length. • Use the accessory auxiliary sheet. • Process the work clamp assembly to match the joint section. (Attach or remove rubber.) 	75

1 6 - 3 . Uneven seams (1) At the sewing start

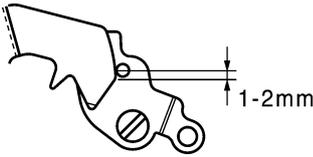
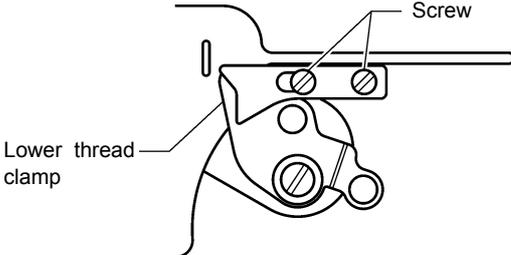
Cause	Check	Remedy	Page
Upper thread scissors	Installation height	Adjust the upper thread scissors installation height.	75
	Upper thread scissors opening timing	Adjust to an appropriate opening timing.	76
	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76
Upper thread feeding	Thread take-up amount	Loosen the screw to decrease thread take-up amount so that upper thread does not pull out of scissors assembly at the sewing start.  4000Q	-

16. TROUBLESHOOTING

Cause	Check	Remedy	Page
Lower thread (bobbin slip)	Lower thread tension	Adjust the lower thread tension appropriately.	61
	Bobbin holder spring	Add tension to the bobbin holder spring. 	-
	Lower thread retainer position	Adjust the lower thread retainer position. * Adjust lower thread retainer so that a 35 – 40 mm thread leader is left after trimming. 	-
	Bobbin presser position	Adjust the bobbin presser position.	77
	Bobbin insertion	Insert the bobbin correctly.	60
	Work clamp lifting speed	Reduce the setting for memory switch No. 02.	79

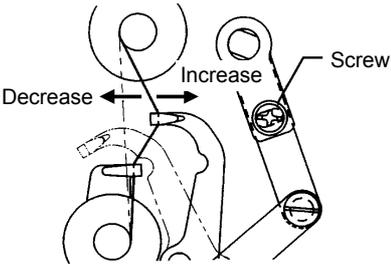
1 6 - 4 . Uneven seams (2) Lower thread is lifted up at the sewing start

The end of the lower thread protrudes above the seam at the sewing start

Cause	Check	Remedy	Page
Lower thread retainer	Lower thread retaining amount	Adjust the lower thread retaining amount. 	-
Lower thread clamp	Lower thread clamp opening timing	Adjust so that the lower thread clamp plate opens when the feed mechanism moves 6 – 7 mm.	77
	Lower thread clamping force	<ul style="list-style-type: none"> • If the lower thread clamp and lower thread presser are bent, replace them. • Check that the screws are tightened. 	-

1 6 - 5 . Uneven seams (3)Seam lifts up at the sewing start

Seam lifts up and does not tighten at the sewing start

Cause	Check	Remedy	Page
Upper thread scissors	Upper thread scissors gradual opening timing	Adjust the timing so that the upper thread scissors gradually start opening when the feed mechanism moves about 1.5 - 2.5 mm.	76
	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76
Upper thread feeding	Thread take-up amount	Loosen the screw to decrease thread take-up amount so that upper thread does not pull out of scissors assembly at the sewing start. 	-

1 6 - 6 . Uneven seams (4) Uneven sewing pitch at the sewing start

Bird's nests form at the sewing start, and after 5 – 6 mm the sewing pitch suddenly increases

Cause	Check	Remedy	Page
Lower thread clamp	Lower thread clamp opening timing	Advance the timing at which the lower thread clamp starts to open.	77

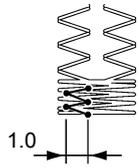
1 6 - 7 . Uneven seams (5).....Poor rounding of seam

Cause	Check	Remedy	Page
Thread tension	Zigzag thread upper thread tension	Adjust the upper thread tension appropriately.	62
	Zigzag tension disc opening	<ul style="list-style-type: none"> • Check the opening of the zigzag tension discs. • Replace the tension release solenoid. 	62
	Lower thread tension	Adjust the lower thread tension appropriately.	61
Threading	Upper thread threading	Thread the upper thread correctly.	58
	Lower thread threading	Thread the lower thread correctly.	60
Stitch patterns	Purl stitch, whip stitch	Set using parameter number 11.	37
Tension release	Tension release timing	Use parameter numbers 63 to 66 to change the tension release on and off timing.	44

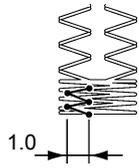
1 6 - 8 . Uneven seams (6) Around rear tack or front tack

Cause	Check	Remedy	Page
Tension release	Tension release timing	Use parameter numbers 63 to 66 to change the tension release on and off timing.	44
Threading	Upper thread threading	Thread the upper thread correctly.	58
	Lower thread threading	Thread the lower thread correctly.	60
Zigzag thread tension	Zigzag tension disc opening	<ul style="list-style-type: none"> • Adjust the tension disc opening amount. • Check the opening of the zigzag tension discs. • Replace the tension release solenoid. 	62
Upper thread scissors	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76

1 6 - 9 . Uneven seams (7) Loose thread end at end backtack

Cause	Check	Remedy	Page
Backtack shape	Check the backtack shape	Set the value for parameter No. 68 to 1.0. * If the value is set to 1.0, the rear tack will change. 	45

1 6 - 1 0 . Uneven seams (8) Thread sticking out at end backtack

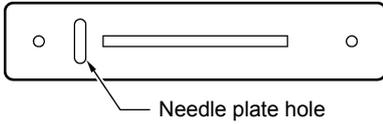
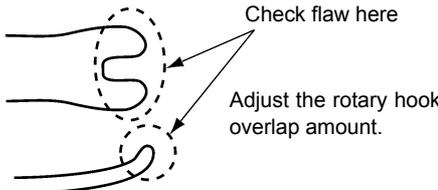
Cause	Check	Remedy	Page
Backtack shape	Check the backtack shape	Set the value for parameter No. 68 to 1.0. * If the value is set to 1.0, the rear tack will change. 	45
Uneven material feeding	Work clamp pressure	Increase work clamp pressure. * The standard height of the adjustment screw is approximately 30 mm, so tighten it further than this.	74
	Work clamp	When using knit material, replace with the -3 work clamp and needle plate.	-
	Upper thread scissors opening timing	Adjust to an appropriate opening timing.	76
	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76
	Lower thread clamp opening timing	Adjust so that the lower thread clamp plate opens when the feed mechanism moves 6 – 7 mm.	77

1 6 - 1 1 . Uneven seams (9) Sticking in needle plate

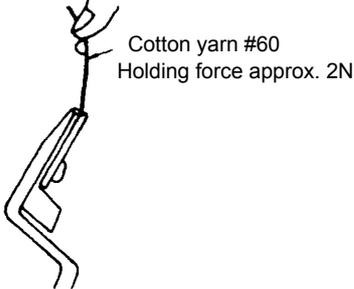
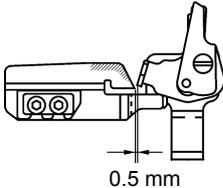
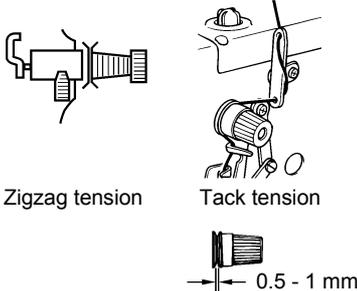
Front and rear tack sections of material gets stuck in needle hole

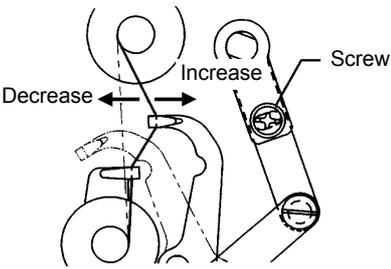
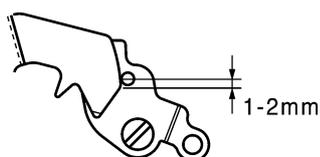
Cause	Check	Remedy	Page
Start backtack	Number of start backtack stitches	Use parameter number 40 to reduce the number of stitches in the front tack. * If the material is soft, it can be effective to set the number of stitches to 0.	41
Rear tack	Rear tack vector shape	Use parameter number 37 to set the rear tack vector shape to a rectangle. * Setting the vector shape to a rectangle can be effective when the width is less than the bar tack width.	41
Needle plate	Needle plate	<ul style="list-style-type: none"> When using knit material, replace with the -3 needle plate. Replace with a needle plate with a smaller needle hole. 	-

1 6 - 1 2 . Uneven seams (10) All stitches

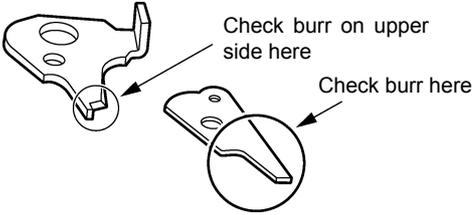
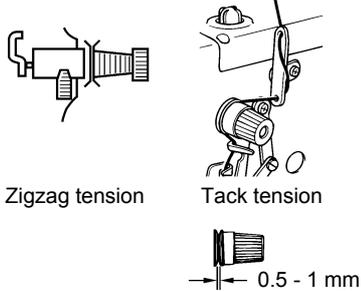
Cause	Check	Remedy	Page
Threading	Upper thread threading	Thread the upper thread correctly.	58
	Lower thread threading	Thread the lower thread correctly.	60
Thread path	Flaw or abrasion on the thread path	Polish with buff or replace the part. Especially, pay attention to finishing around needle plate hole.  3996Q	-
Needle	Needle installation	Insert needle fully into needle bar	57
	Needle size	Replace needle with thicker one.	-
Thread chips or dust	Rotary hook rim Rotary hook edge Around needle plate hole	Remove thread chips or dust	69, 71
Upper thread	Upper thread tension	Increase upper thread tension while checking stitches.	62
	Thread and needle	Replace needle with one that fits for the thread.	-
Rotary hook holder	Flaw on the rotary hook holder	Polish with buff or replace the part.  3997Q	-
	Rotary hook holder and inner rotary hook overlap amount	Adjust the rotary hook holder and inner rotary hook overlap amount.	74
Rotary hook	Rotary hook lubrication	Decrease the quantity of lubrication oil. * Note that if you reduce the amount of oil too much, thread breakages may occur.	26
Bobbin winder guide	Bobbin thread tension	Adjust the tension on the bobbin winder guide.	-
	Uneven bobbin winding	Move bobbin winder tension bracket up and down to adjust.	59
Lower thread	Lower thread tension	Adjust the lower thread tension.	61
Bobbin case	Damaged outside of bobbin case and bent bobbin holder spring, etc.	Polish with buff or replace the part. * Use the HE-800A bobbin case.	-
Stitch patterns	Purl stitch, whip stitch	Set using parameter number 11.	37

1 6 - 1 3 . Upper thread run out

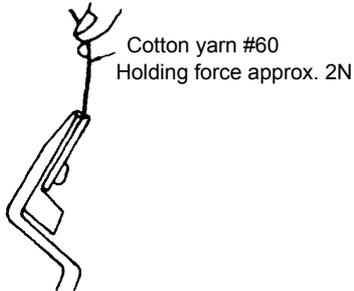
Cause	Check	Remedy	Page
Upper thread trimmer assembly	Installation position of upper thread trimmer assembly	Adjust the installation position of upper thread trimmer assembly by moving the setting plate assembly. <ul style="list-style-type: none"> • Upper thread trimmer longitudinal position adjustment • Upper thread trimmer cutting depth adjustment 	Service manual
	Upper thread trimmer assembly holding force	Adjust so that the thread does not come out when you cut it with scissors and hold the end of the thread between your fingers and gently swing the assembly. <ul style="list-style-type: none"> • Bend the scissors U or replace them so that the correct force is applied. • Repair any damage from striking the needle. 	-
	Opening cam position	Adjust the position so that the scissors do not touch the opening cam when the work clamp is lowered. 	76
Tension release timing	End of tension release at the beginning of sewing Opening amount of zigzag tension discs and bar tack tension discs	Use parameter number 63 to retard the tension release timing. <ul style="list-style-type: none"> • Adjust the zigzag tension discs by moving the tension stud bracket in and out. • Adjust the bar tack tension discs opening amount to 0.5 - 1.0 mm by removing the top cover and moving the tension release cam. 	44

Cause	Check	Remedy	Page
Upper thread feeding	Thread take-up amount	Loosen the screw to decrease thread take-up amount so that upper thread does not pull out of scissors assembly at the sewing start. 	-
Rotary hook	Needle bar height and needle bar lift amount	Adjust the needle and hook timing. 1. Adjust the needle bar height to "1" on the gauge. 2. Adjust the needle bar lift amount to "2" on the gauge.	72, 73
	Thread chips on rotary hook edge	Remove thread chips.	-
Machine stopping position	Upper shaft pulley stopping position	Adjust the needle up sensor position.	77
Lower thread	Lower thread retaining amount	Adjust the lower thread retaining amount. 	-
	Lower thread snapping	<ul style="list-style-type: none"> Use memory switch No. 02 to retard the work clamp lifting speed. Process the lower thread retainer, lower thread clamp and lower thread presser plate so that they do not snap the lower thread. 	79
	Lower thread clamp opening timing	Adjust so that the lower thread clamp plate opens when the feed mechanism moves 6 – 7 mm.	77
Sewing start speed	Slow speed	Use parameter number 60 to reduce the slow speed.	44
	Slow start stitches	Use parameter number 59 to increase the number of slow start stitches.	44
Bar tack thread tension	Bar tack thread tension is too strong.	Make the bar tack tension as weak as possible.	62
Upper thread breakage	Upper thread breaks.	Refer to "16-1. Upper thread breakage".	92, 93

1 6 - 1 4 . Unraveling of thread trimmed by upper thread trimmer assembly

Cause	Check	Remedy	Page
Upper thread trimmer assembly	Installation position of upper thread trimmer assembly	Adjust the installation position of upper thread trimmer assembly by moving the setting plate assembly. <ul style="list-style-type: none"> • Upper thread trimmer longitudinal position adjustment • Upper thread trimmer cutting depth adjustment  <p style="text-align: right;">4005Q</p>	Service manual
	Burr on tips of upper thread trimmer M and upper thread trimmer U.	Polish with buff or replace the part.  <p style="text-align: right;">4009Q</p>	-
Tension release timing	Opening amount of zigzag tension discs and bar tack tension discs (particularly zigzag tension discs)	<ul style="list-style-type: none"> • Adjust the zigzag tension discs by moving the tension stud bracket in and out. • Adjust the bar tack tension discs opening amount to 0.5 - 1.0 mm by removing the top cover and moving the tension release cam.  <p style="text-align: right;">4008Q</p>	-
Work clamp	Work clamp lifting speed	Use memory switch No. 02 to retard the work clamp lifting speed.	79

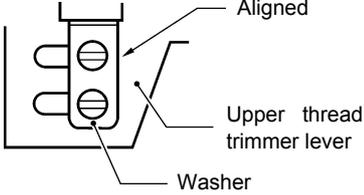
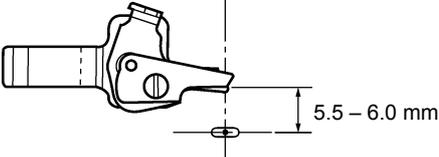
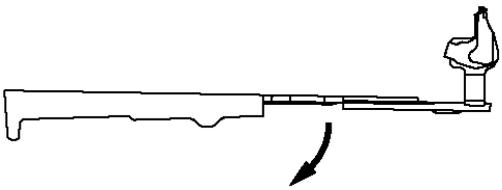
1 6 - 1 5 . Upper thread mis-trimming

Cause	Check	Remedy	Page
Upper thread trimmer assembly	Installation position of upper thread trimmer assembly	Adjust the installation position of upper thread trimmer assembly by moving the setting plate assembly. <ul style="list-style-type: none"> Upper thread trimmer longitudinal position adjustment Upper thread trimmer cutting depth adjustment 	Service manual
	Upper thread trimmer assembly holding force	Adjust so that the thread does not come out when you cut it with scissors and hold the end of the thread between your fingers and gently swing the assembly. <ul style="list-style-type: none"> Bend the scissors U or replace them so that the correct force is applied. Repair any damage from striking the needle. 	-
Trimmer driving arm	Upper thread trimmer cutting depth	Adjust the position of the trimmer driving arm roller.	Service manual

1 6 - 1 6 . Needle strikes upper thread trimmer

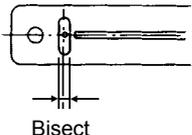
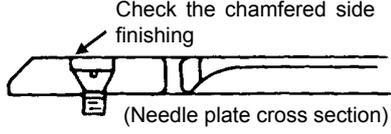
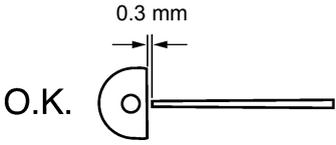
Cause	Check	Remedy	Page
Upper thread trimmer assembly	Installation position of upper thread trimmer assembly	Adjust the installation position of upper thread trimmer assembly by moving the setting plate assembly. <ul style="list-style-type: none"> Upper thread trimmer longitudinal position adjustment Upper thread trimmer cutting depth adjustment 	Service manual
	upper thread trimmer operating force	Remove any scratches and burrs, and adjust the upper thread trimmer M to open when the projection is pressed with a force of 4N or less. 	-

16. TROUBLESHOOTING

Cause	Check	Remedy	Page
Longitudinal feed arm	Installation position of the longitudinal feed arm	Move the upper thread trimmer driving link so that it stops at the face plate. In this position, tighten the bolts so that the small slot in the upper thread trimmer lever and the edge of the washer are aligned.  4011Q	-
Needle bar height in machine stopped condition	Upper shaft pulley stopping position	Adjust the needle up sensor position.	77
Cam	Upper thread scissors opening timing	Adjust so that the cam opens the stop plate properly.	76
Opening cam	Upper thread scissors gradual opening timing	Adjust the timing so that the upper thread scissors gradually start opening when the feed mechanism moves about 1.5 - 2.5 mm.	76
	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76
Work clamp home position sensor	Work clamp home position sensor position	After setting the sewing machine to the home position, press the RESET key and then adjust the distance between the upper thread trimmer and the center of the needle when the work clamp is lowered to 5.5 - 6.0 mm.  4012Q	-
Upper thread trimmer lever	Upper thread trimmer lever operating force	Adjust so that the upper thread trimmer lever opens gently when the stop plate is separated from the stopper.  4013Q	-

1 6 - 1 7 . Needle breakage

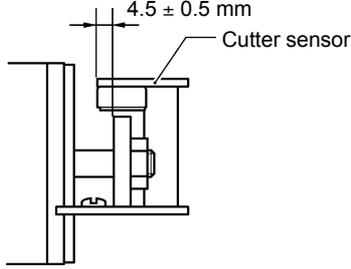
Cause	Check	Remedy	Page
Needle	Needle installation	As viewed from the direction of the face plate, insert needle fully into needle bar so that the notched part of needle faces forward.	57
Rotary hook	Needle bar height and needle bar lift amount	Adjust the needle and hook timing. 1. Adjust the needle bar height to "1" on the gauge. 2. Adjust the needle bar lift amount to "2" on the gauge.	72, 73
	Gap between needle and rotary hook	Adjust the gap between needle and rotary hook to 0.01 - 0.08 mm. (Adjust to as large as possible without causing skipped stitches to occur.) * Check that rotary hook point does not strike needle in zigzag motion.	73

Cause	Check	Remedy	Page
Needle plate	Needle plate position	Adjust the forward/back position of the needle plate so that the needle is in the center of the needle hole.  4014Q	-
	Burr on the screw hole edge (in event of uneven material feeding)	Polish with buff.  (Needle plate cross section) 4015Q	-
Upper thread trimmer assembly	Needle strikes upper thread trimmer	Refer to "16-16. Needle strikes upper thread trimmer".	102, 103
Cutter	Clearance between needle bar and cutter	Install the cutter so that the clearance between the needle bar and the cutter is 0.3 mm. * The cutter release section of the needle bar should be at a right angle to the cutter.   4016Q	74

1 6 - 1 8 . Imperfect cutter function (imperfect material cutting)

Cause	Check	Remedy	Page
Cutter	Installation position of cutter	Install the cutter so that its edge is aligned with the top of the needle plate.	74
	Cutter blade	<ul style="list-style-type: none"> • If blade is worn or chipped, sharpen it or replace it. • Replace with the special needle plate (optional). 	4
	Damage to cutter mechanism parts Loose screws	<ul style="list-style-type: none"> • Replace any parts that are damaged. • Tighten any loose screws. 	-
Cutter solenoid	Check for a disconnected cord.	Connect the cords.	-
Cutter power	Memory switches	If the material is heavy and difficult to cut, use memory switch No. 00 to increase the cutting force of the cutter.	79

16. TROUBLESHOOTING

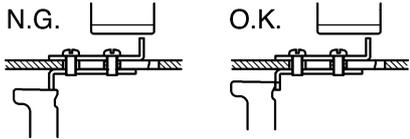
Cause	Check	Remedy	Page
Solenoid stopper	Nut	Check if the nut is loose, and tighten it securely.	-
	Cutter sensor position	<ul style="list-style-type: none"> Adjust the cutter sensor position. Check if the mounting screws are loose, and tighten them securely.  <p style="text-align: right;">4017Q</p>	-
Cutter bar guide	Smoothness of cutter operation	Adjust the cutter bar guide so that the cutter operates smoothly with no play.	-

1 6 - 1 9 . Cutter does not return

Cause	Check	Remedy	Page
Cutter	Cutter blade	If blade is worn or chipped, sharpen it or replace it.	-
Sticks in material	Needle plate	Replace with the special needle plate (optional).	4
Cutter bar guide	Smoothness of cutter operation	Adjust the cutter bar guide so that the cutter operates smoothly with no play.	-

1 6 - 2 0 . Cutter and upper thread scissors touch

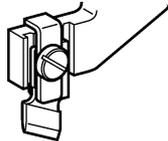
Cause	Check	Remedy	Page
Upper thread scissors	Check if the cam opens the stop plate.	Adjust the cam position. * If the feed mechanism operates when the cam has not opened the stop plate, the cutter will bump against the upper thread scissors.	76



4018Q

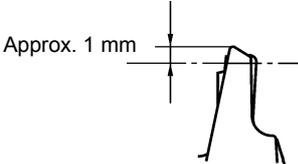
1 6 - 2 1 . Seam is cut

Cause	Check	Remedy	Page
Length of knife setting	Length of knife	Set parameter number 02 to the same value as the length of the knife being used.	36
Knife space setting	Cutting of zigzag seam	<ul style="list-style-type: none"> Use parameter number 06 to set the knife X space. Use parameter number 08 to set the knife X position alignment. 	36, 37
Cutter	Cutter play	Adjust the cutter bar guide so that the cutter operates smoothly with no play.	-
	Cutter knife bending	Use the cutter holder (option) to prevent the cutter knife from becoming bent.	-



4019Q

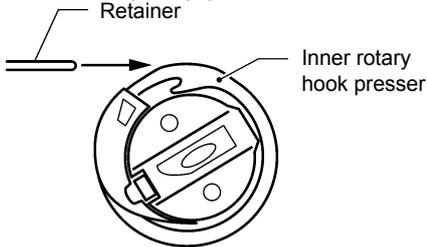
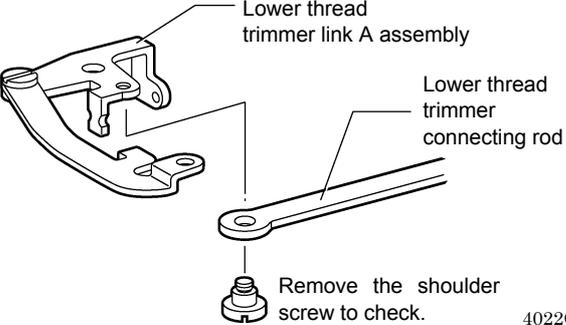
1 6-2 2. Upper thread mis-winding

Cause	Check	Remedy	Page
Upper thread scissors	Installation height	Adjust the upper thread scissors installation height.	75
	Upper thread scissors gradual opening timing	Adjust the timing so that the upper thread scissors gradually start opening when the feed mechanism moves about 1.5 - 2.5 mm.	76
	Upper thread scissors opening timing	Adjust so that the cam opens the stop plate properly.	76
	Upper thread trimmer assembly movement	<ul style="list-style-type: none"> Polish blade of upper thread trimmer M and upper thread guide with buffer. Check for burrs on the top surface of upper thread trimmer M. Replace the parts. 	-
	Lateral position of upper thread scissors	Adjust the lateral position of the upper thread scissors.	-
			4020Q
Stitch quality	Upper thread tension	Decrease tension to such a degree that it does not influence stitch quality.	62
	Zigzag width in the zigzag stitch portion	Use parameter number 05 to increase the zigzag width to such a degree that it does not influence the seam shape.	36
Work clamp	Uneven material feeding	<ul style="list-style-type: none"> Increase work clamp pressure. (Press material so that the material is properly stretched.) When using knits or woven materials, replace the parts with the -3 specification parts: Length feed plate (for specification -3), work clamp assembly (for knits), needle plate 1.2 (for specification -3) 	74
Underlay	Underlay is being sewn.	<ul style="list-style-type: none"> Use parameter number 52 to reduce the underlay sewing start pitch to about 0.5. Use parameter number 48 to reduce the underlay sewing speed. * If sewing knitted wear, the upper thread may get caught easily, so you may need to process the end of the thread. 	42, 43
Bar tack	Straight bar tacking is being carried out	When carrying out straight bar tacking, the upper thread may get caught easily, so you may need to process the end of the thread.	-

1 6-2 3. Work clamp is not raised (1) Pulse motor stepping sound cannot be heard

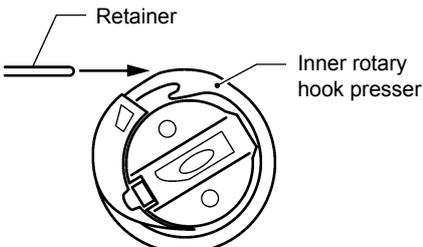
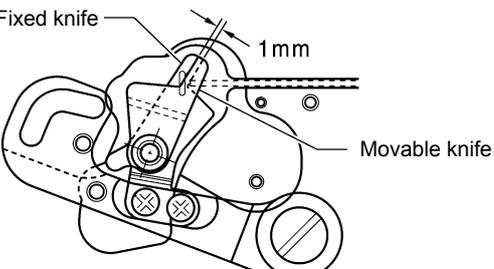
Cause	Check	Remedy	Page
Work clamp lifting height setting	Check the work clamp lifting height setting.	Change the settings of memory switch Nos. 04, 05, 06.	79
Presser lifter pulse motor	Cord connection	Check the cord connections and contacts.	-
	Presser lifter pulse motor driving gear	Check if the drive gear screw is loose.	-
Treadle	Does the work clamp rise when the treadle is depressed backward?	If it rises, use memory switch No. 08 to adjust the threshold value for lowering the work clamp to a positive value.	79

1 6 - 2 4 . Work clamp is not raised (2) Pulse motor stepping sound can be heard

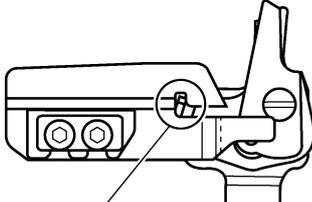
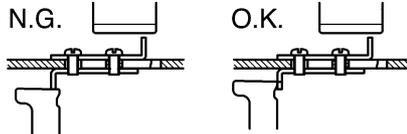
Cause	Check	Remedy	Page
Machine stopping position	Rotary hook touches lower thread retainer at the stop position	Adjust the needle up stop position.  <p style="text-align: right;">4021Q</p>	77
Work clamp lifting speed is too fast.	Work clamp lifting speed setting	Use memory switch No. 02 to retard the work clamp lifting speed.	79
Upper thread scissors	Interference between upper thread scissors and work clamp	Check the standard adjustments with the upper thread scissors removed. * Be particularly careful when sewing joints.	75
	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76
Lower thread trimmer	Interference between fixed knife set, lower thread clamp, lower thread presser and lower thread retainer.	Repair or replace the parts.  <p style="text-align: right;">4022Q</p>	-
	Rubbish, dust or thread scraps present	Remove all rubbish, dust and thread scraps from the lower thread trimmer.	-
Loose screws	Check for loose screws in the upper thread trimmer, lower thread trimmer and work clamp lifter mechanisms.	Securely tighten all screws.	-
Work clamp lifting height setting	Check the work clamp lifting height setting.	Change the settings of memory switch Nos. 04, 05, 06. * If the work clamp lifting height is too high, the lower thread trimming operation will not be timed together with the work clamp rising and the pulse motor may go out of step.	79
Threading	Lower thread threading	Insert the bobbin correctly and pass the lower thread through the bobbin case correctly. * If the bobbin is inserted back-to-front, it will spin loosely and the presser lifter may go out of step.	60
	Lower thread tension	Reduce the lower thread tension. * If the lower thread tension is too strong, the motor may go out of step. Use memory switch No. 02 to reduce the work clamp lifting speed setting to make the lifting speed slower.  <p style="text-align: center;">Buff this section to reduce the thread retaining resistance.</p> <p style="text-align: right;">4023Q</p>	61 79

Cause	Check	Remedy	Page
Upper thread scissors	Upper thread scissors operation	Adjust the upper thread scissors to the standard setting.	76
Work clamp home position sensor	Work clamp home position sensor position	Adjust the work clamp home position sensor position.	-

1 6 - 2 5 . Lower thread is not trimmed (pulls when material is removed)

Cause	Check	Remedy	Page
Machine stopping position	Rotary hook touches lower thread retainer at the stop position	Adjust the needle up stop position. 	77
Fixed knife set	Fixed knife and movable knife do not mesh.	Adjust the fixed knife set installation position. 	-
	Knife tip is bent or chipped.	Repair or replace the knife.	-

1 6 - 2 6 . Feed mechanism does not operate or motor is out of step

Cause	Check	Remedy	Page
Feed pulse motor	Cord connection	Check the cord connections and contacts.	-
Upper thread scissors	Upper thread scissors position	Remove and re-install the upper thread scissors.  <p>Projection on scissors M is inserted. * Always make sure that the upper thread scissors are in the correct position before use.</p>	-
	Check if the cam opens the stop plate.	Adjust the cam position. * If the feed mechanism operates when the cam has not opened the stop plate, the cutter will bump against the upper thread scissors. 	76

16. TROUBLESHOOTING

Cause	Check	Remedy	Page
Feed home position sensor	Feed home position sensor position	Adjust the feed home position sensor position.	-
Feed timing belt	Feed timing belt tension	Adjust the feed timing belt.	-

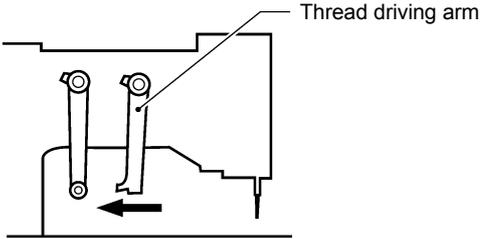
1 6 - 2 7 . Needle does not zigzag or noise occurs when needle zigzags

Cause	Check	Remedy	Page
Zigzag home position sensor	Zigzag home position sensor position	Adjust the zigzag home position sensor position.	-
Stopper	Stopper position	Adjust the stopper position.	-

1 6 - 2 8 . Sewing machine stops during sewing

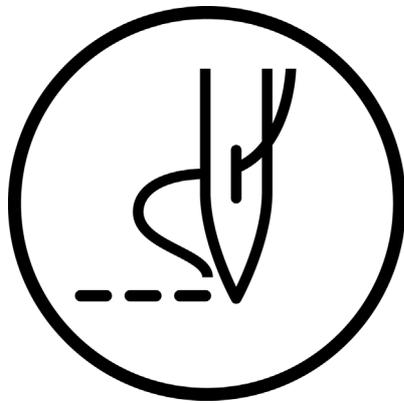
Cause	Check	Remedy	Page
Thread breakage detector	Thread breakage detector position	Adjust the thread breakage detector position. * If the detector is not adjusted, sewing may stop even when the thread is not broken.	-
Pauses	Panel DIP switch A - No. 3	When panel DIP switch A - No. 3 is set to ON, sewing will pause when the treadle is depressed backward. * If the treadle is depressed very firmly and then released, the pedal may depress backward and cause sewing to be paused.	81
Threading	Upper thread threading	Pass the thread correctly through the thread guide.	58
Error [E-07]	Upper thread scissors operation	Apply grease to the inclined face of the opening cam.	76

1 6 - 2 9 . Upper shaft does not rotate as far as the needle up stop position

Cause	Check	Remedy	Page
Thread retainer and rotary hook are touching.	Thread trimmer mechanism position	<ul style="list-style-type: none"> • Turn the machine pulley backward to set the needle bar to the needle up position. • Push the thread driving arm in the direction of the arrow to set the thread trimming mechanism to the home position. 	-

4026Q

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INSTRUCTION MANUAL

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