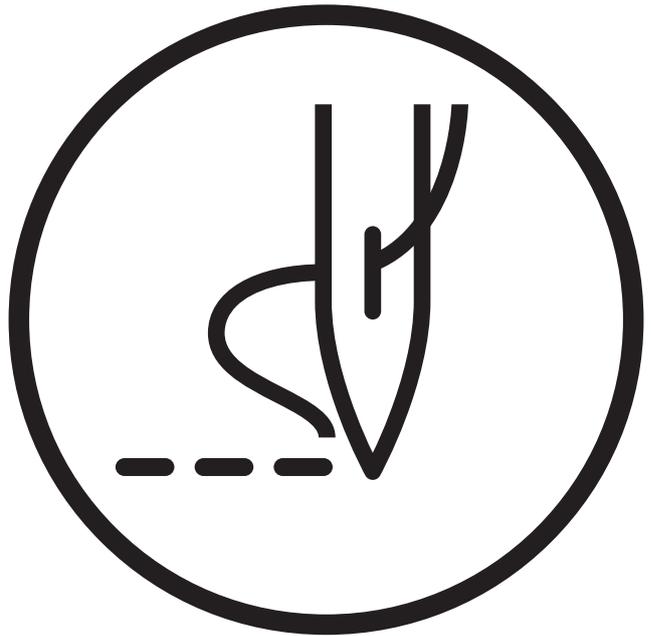


Instruction Manual

SINGLE NEEDLE DIRECT DRIVE NEEDLE FEED LOCK
STITCHER WITH THREAD TRIMMER

S-7220D-403
S-7220D-405
S-7220D-433
S-7220D



Safety Instructions

Thank you very much for buying a BROTHER sewing machine. Before using your new machine, please read the safety instructions 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, 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 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 result in death or serious injury.

WARNING

The instructions which follow this term indicate situations where failure to follow the instructions could result in death or serious injury.

CAUTION

The instructions which follow this term indicate situations where failure to follow the instructions may result in minor or moderate injury.

Symbols

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

Notes on safety

Notes during use

DANGER



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

WARNING



- Do not allow the machine to come into contact with liquids. Otherwise it may cause fire, electric shocks, or operating problems.



- If any liquid gets inside the sewing machine (machine head or control box), immediately turn off the power and disconnect the power plug from the electrical outlet, and then contact the place of purchase or a qualified technician.

Notes on the operating environment

CAUTION



- Do not connect anything to the USB port other than the USB media. Otherwise, problems with operation may result.



- Use the sewing machine in an area which is free from sources of strong electrical noise such as electrical line noise or static electric noise. Sources of strong electrical noise may cause problems with correct operation
- Any fluctuations in the power supply voltage should be within $\pm 10\%$ of the rated voltage for the machine. Voltage fluctuations which are greater than this may cause problems with correct operation.
- The power supply capacity should be greater than the requirements for the sewing machine's power consumption. Insufficient power supply capacity may cause problems with correct operation.
- The ambient temperature should be within the range of 5°C to 35°C during use. Temperatures which are lower or higher than this may cause problems with correct operation.
- The relative humidity should be within the range of 45% to 85% during use, and no dew formation should occur in any devices. Excessively dry or humid environments and dew formation may cause problems with correct operation.
- In the event of an electrical storm, turn off the power and disconnect the power cord from the wall outlet. Lightning may cause problems with correct operation.

Notes during installation

CAUTION



- Do not connect the power cord plug until installation is complete. The machine may operate if the treadle is depressed by mistake, which could result in injury.
- Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
- 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.



- Machine installation should only be carried out by a qualified technician.
- When securing the cords, do not bend the cords excessively or fasten them too hard with staples. Otherwise, fire or electric shocks may occur.

	<ul style="list-style-type: none"> • 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. Diarrhea or vomiting may result. Keep the oil and grease out of the reach of children.
	<ul style="list-style-type: none"> • Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done. • The sewing machine weighs approximately 45 kg (99 lb). The installation should be carried out by two or more people. • Turn off the power switch before inserting or removing the plug. Otherwise damage to the control box may result. • If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
	<ul style="list-style-type: none"> • 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.

Notes during sewing

 CAUTION	
	<ul style="list-style-type: none"> • Turn off the power switch while threading and replacing the bobbin, and when not using or going away from the sewing machine. The machine may operate if the treadle is depressed by mistake, which could result in injury. • 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 sewing machine while sewing. Otherwise, it may result in injury or damage to the sewing machine. • Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries. • 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. • Do not hold the machine head by the panel when tilting it back or returning it to its original position. Otherwise, it may result in injury or damage to the sewing machine.
	<ul style="list-style-type: none"> • To prevent problems, do not use objects with sharp points to operate the operation panel. • 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.
	<ul style="list-style-type: none"> • 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. • If using a work table which has casters, the casters should be secured in such a way so that they cannot move. • 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.

Notes during cleaning

 CAUTION	
	<ul style="list-style-type: none">• Turn off the power switch and disconnect the power cord before carrying out these operations. The machine may operate if the treadle is depressed by mistake, which could result in injury.• Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.• 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.• Do not hold the machine head by the panel when tilting it back or returning it to its original position. Otherwise, it may result in injury or damage to the sewing machine.
	<ul style="list-style-type: none">• 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. Diarrhea or vomiting may result. Keep the oil and grease out of the reach of children.

Notes during maintenance and inspection

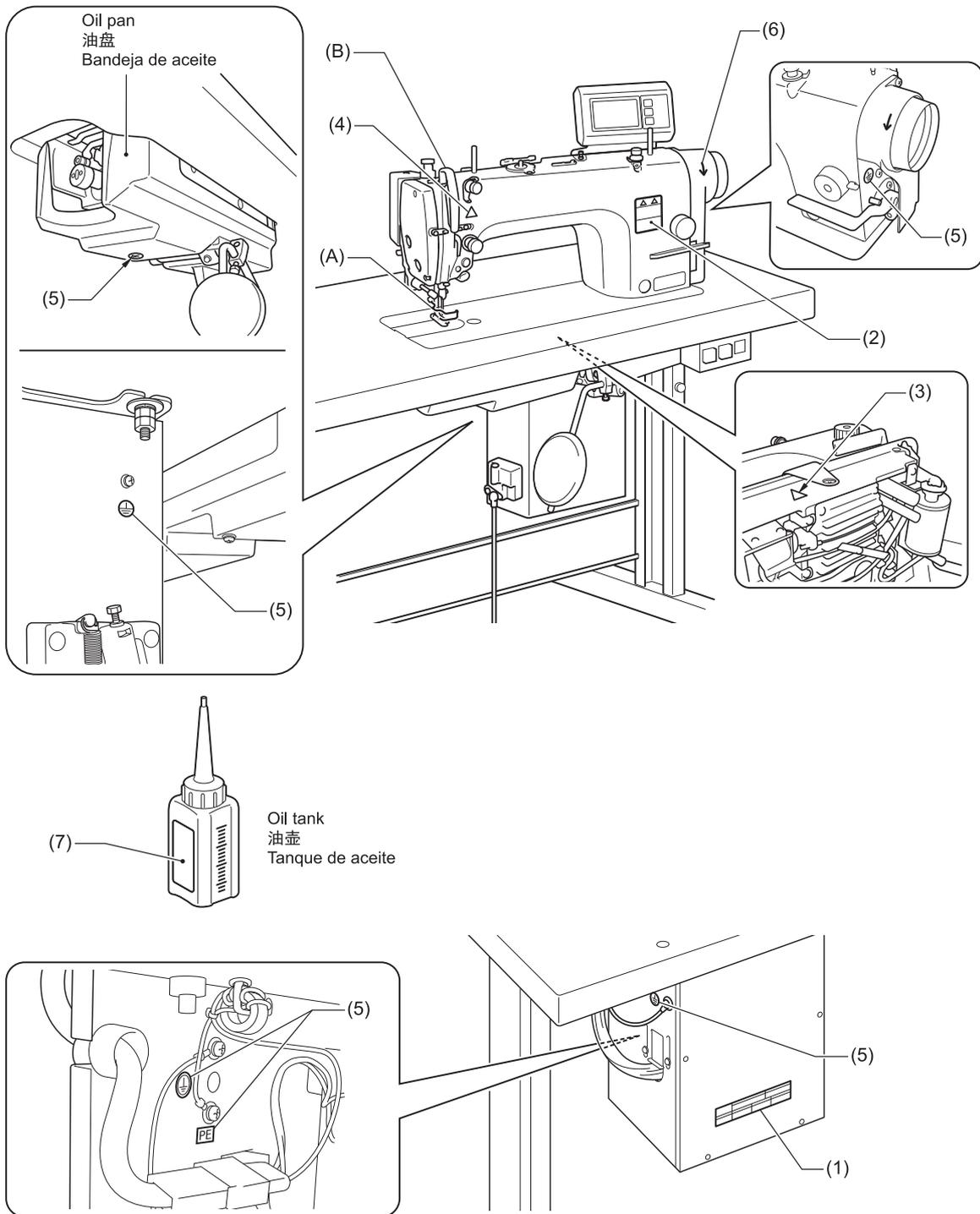
 CAUTION	
	<ul style="list-style-type: none">• Turn off the power switch and disconnect the power cord plug before carrying out inspection, adjustment or repairs, or when replacing consumable parts such as the rotary hook or knives. The machine may operate if the treadle is depressed by mistake, which could result in injury.• If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.• Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.• 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.• Do not hold the machine head by the panel when tilting it back or returning it to its original position. Otherwise, it may result in injury or damage to the sewing machine.
	<ul style="list-style-type: none">• Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
	<ul style="list-style-type: none">• Always be sure to turn off the power switch and then wait one minute before opening the motor cover. If you touch the surface of the motor, it may cause burns.
	<ul style="list-style-type: none">• Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.• When replacing parts and installing optional parts, be sure to use only genuine Brother parts. Brother will not be held responsible for any accidents or problems resulting from the use of non-genuine parts.• 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 regarding modification

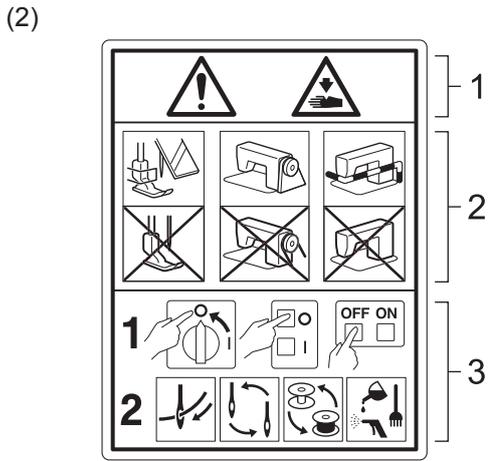
 CAUTION	
	<ul style="list-style-type: none">• To prevent accidents and problems, do not modify the sewing machine (including control devices) by yourself. Brother will not be held responsible for any accidents or problems resulting from modifications made to the sewing machine.

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.



	⚠ 危険		⚠ 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開けずこと。		触探高電圧部分、会致致受傷。 在切断电源5分钟后、再开始盖置。	
⚠ DANGER	⚠ GEFAHR	⚠ DANGER	⚠ PERIGRO	
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.	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.	



- 1 Moving parts may cause injury.
- 2 Operate with safety devices installed. ¹
- 3 Turn off the power before carrying out operations such as threading, changing the needle, bobbin, knives or hook, cleaning and adjusting.

(3) Be careful not to get your hands caught when returning the machine head to its original position after it has been tilted.

(4) Be careful to avoid injury from the moving thread take-up.

(5) 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.

(6) Direction of operation

(7) **brother**
Lubricating Oil for Machining

⚠ CAUTION

Lubricating oil may cause inflammation to eye and skin.
Wear protective glasses and gloves.

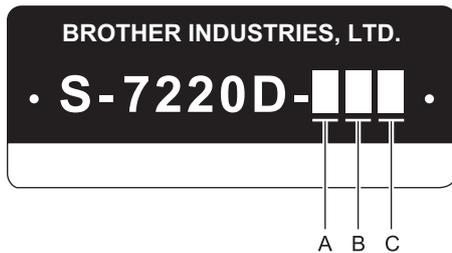
Swallowing oil can cause diarrhoea and vomiting.
Do not swallow.

Keep away from children.

FIRST AID
Eye contact :
-Rinse with plenty of cold water.
-Seek medical help.
Skin contact :
-Wash with soap and water.
If swallowed :
-Seek medical help immediately.
-Do not induce vomiting.

1 * Safety devices:
(A)Finger guard
(B)Thread take-up cover

Machine specifications



A	-	4	
	Quick reverse	○	
	Thread wiper	○	
B	-	0	3
	Lubrication type	Minimum lubrication	Semi dry
C	-	3	5
	Use	Light-weight and medium-weight materials	Heavy-weight materials
-	-403	-433	-405
Max. sewing speed	5,000 sti/min ²	4,000 sti/min	4,000 sti/min ³
Start backtacking and continuous backtacking speed	220 to 3,000 sti/min		
End backtacking speed	1,800 sti/min		
Max. stitch length	4.5mm		5.5mm
Presser foot height	Lifting lever	6mm	
	Knee lifter	16mm	
Feed dog height	1.0mm		1.2mm
Needle (DBx1, DPx5)	#11 to #18		#19 to #22
Motor	AC servo motor		
Power supply	Single-phase 200V-230V, 3-phase 200V-230V, Power consumption 500 VA ⁴		
Control circuit	Microprocessor		

Hook

-403, -433	-405
Lubricated / for medium materials	Lubricated / for heavy materials

Lubricating oil

	-403, -405	-433
Rotary hook	High-speed spindle	High-speed spindle
Needle bar		Special Brother grease

² When sewing at speeds of 4,000 sti/min or higher, set the stitch length to 3.5 mm or less.

³ When sewing at speeds of 3,000 sti/min or higher, set the stitch length to 4.5 mm or less.

⁴ If using a power supply voltage which is outside the normal specifications, contact the place of purchase.

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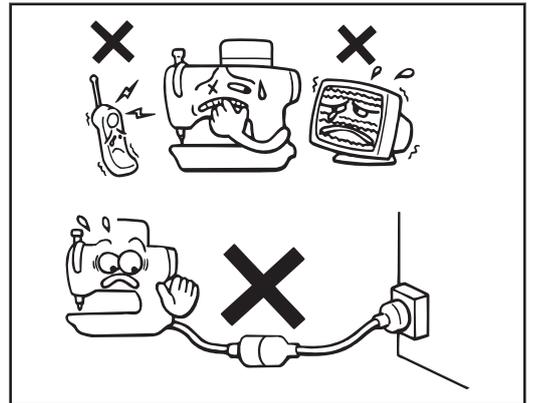
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Points to note before installation

 CAUTION	
	<ul style="list-style-type: none"> Do not connect the power cord plug until installation is complete. The machine may operate if the treadle is depressed by mistake, which could result in injury. Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries. 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.
	<ul style="list-style-type: none"> Machine installation should only be carried out by a qualified technician.
	<ul style="list-style-type: none"> Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done. The sewing machine weighs approximately 45 kg (99 lb). The installation should be carried out by two or more people. The installation should be carried out by two or more people.

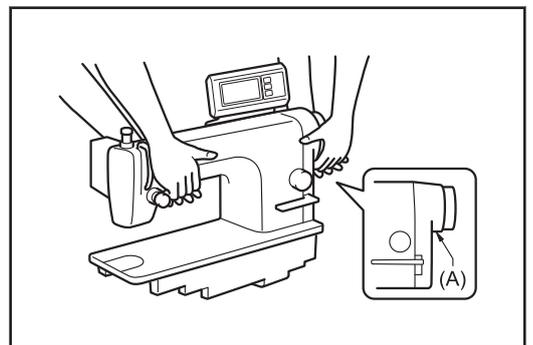
About the machine set-up location

- Do not set up this sewing machine near other equipment such as televisions, radios or cordless telephones. Such equipment may be affected by electronic interference from the sewing machine.
- The sewing machine should be plugged directly into an AC wall outlet. Operation problems may result if extension cords are used.



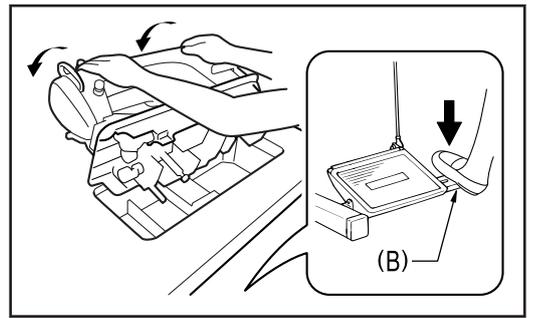
Carrying the machine

- The sewing machine should be carried by the arm and the motor cover by two people as shown in the illustration.
- Hold the motor cover (A) by hand also so that the pulley does not rotate.
- Do not hold the operation panel.



Tilting back the machine head

- Hold section (B) with your foot so that the table does not move, and then push the arm with both hands to tilt back the machine head.
- Do not hold the operation panel.



Returning the machine head to its original position

1. Clear away any tools, etc. which may be near the table holes.
 2. While holding the face plate with your left hand, gently return the machine head to the upright position with your right hand.
- Do not hold the operation panel.

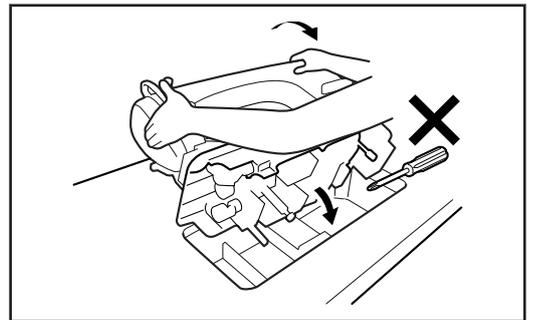
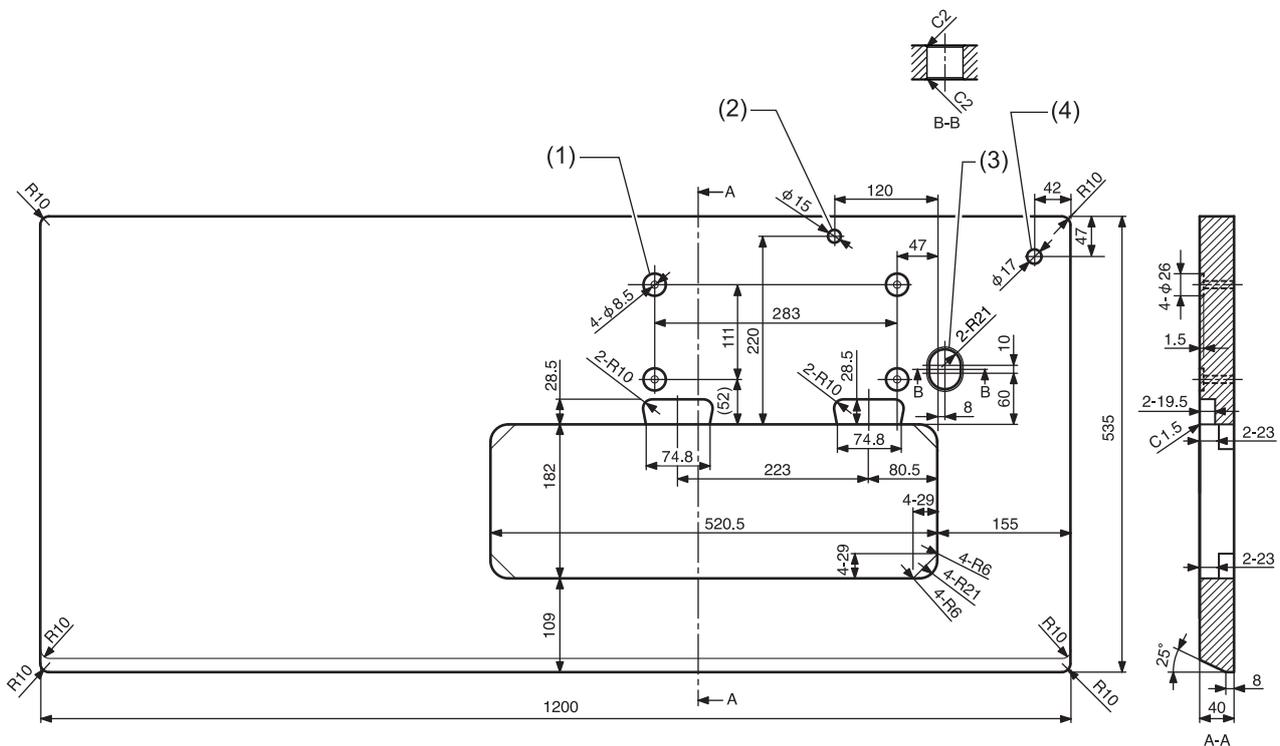


Table processing diagram

- The top of the table should be 40 mm in thickness and should be strong enough to hold the weight and withstand the vibration of the sewing machine.
- Drill holes as indicated in the illustration below.

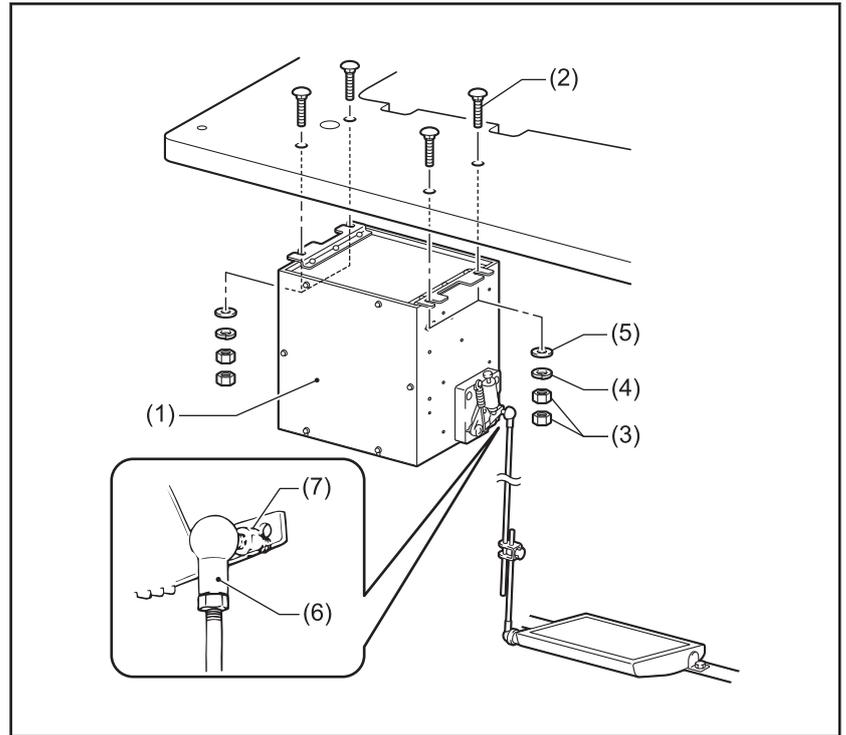


- (1) Control box mounting hole
- (2) Head rest hole
- (3) Cord hole
- (4) Cotton stand hole

Installing the sewing machine

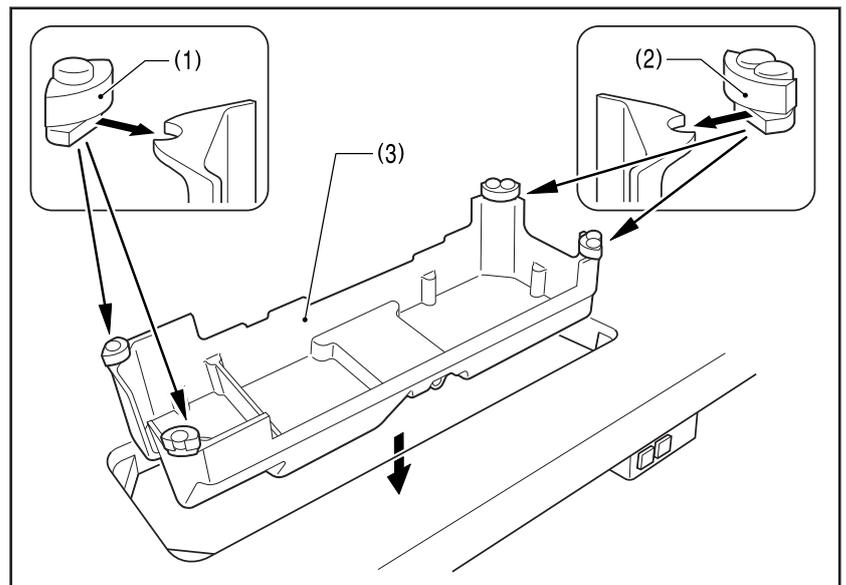
1 Install the control box and the connecting rod.

- (1) Control box
- (2) Bolt [4 pcs.]
- (3) Nut [8 pcs.]
- (4) Spring washer [4 pcs.]
- (5) Washer [4 pcs.]
- (6) Connecting rod
- (7) Nut



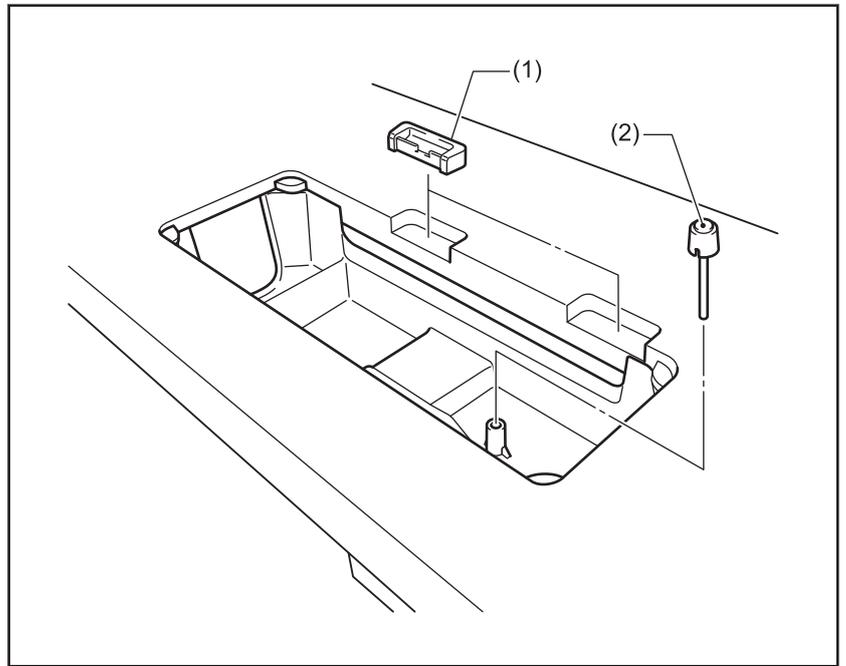
2 Install the oil pan.

- (1) Head cushion(left) [2 pcs]
- (2) Head cushion(right) [2 pcs]
- (3) Oil pan



3 Install the rubber cushions and the knee lifter complying bar.

- (1) Rubber cushion [2 pcs.]
- (2) Knee lifter complying bar

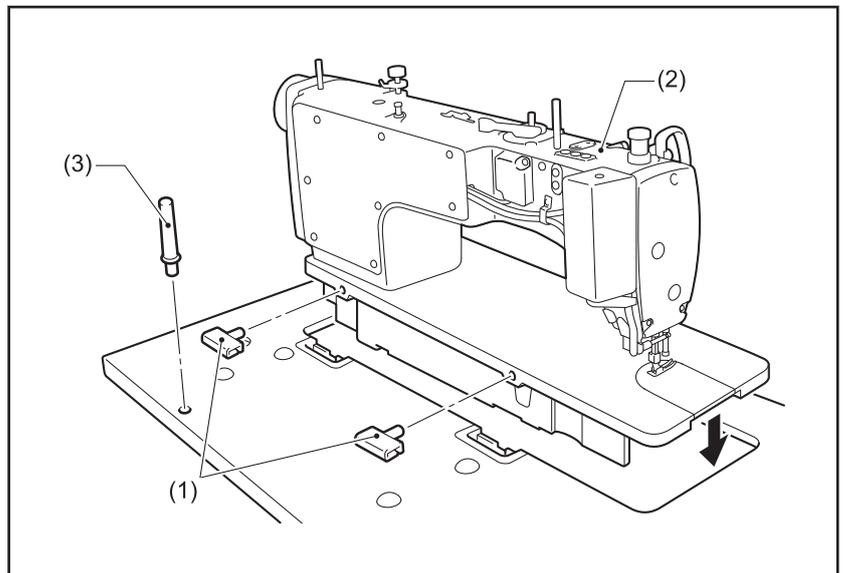


4 Install the machine head.

- (1) Hinge [2 pcs.]
- (2) Machine head
- (3) Head rest

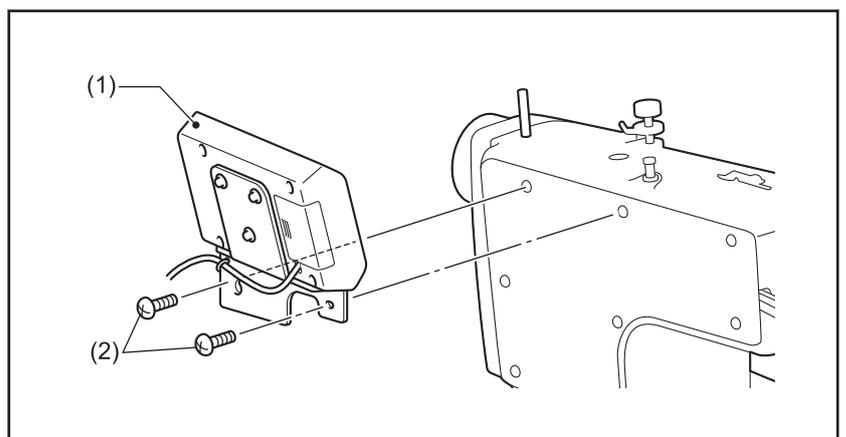
⚠ CAUTION

Tap the head rest securely into the table as far as it will go. If the head rest is not tapped in as far as it will go, there is the danger that the machine head will not be sufficiently stable when it is tilted back.



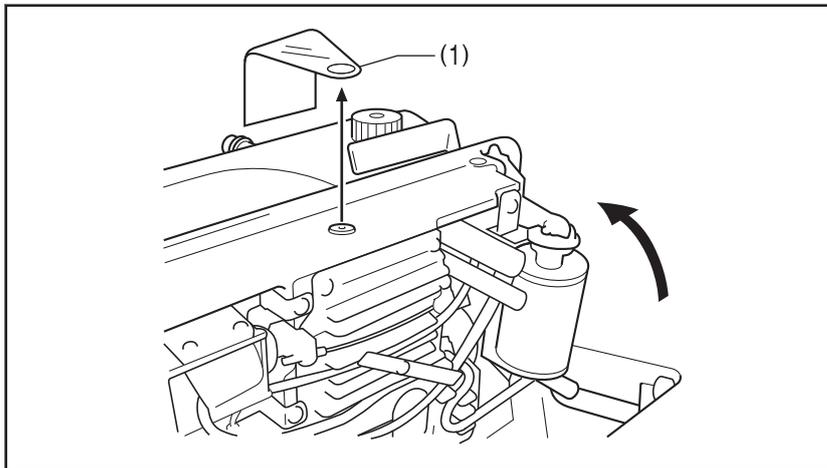
5 Install the operation panel.

- (1) Operation panel
- (2) Screw [2 pcs.]
(Use for tightening rear cover)



6 Remove the seal.

- (1) Sticker

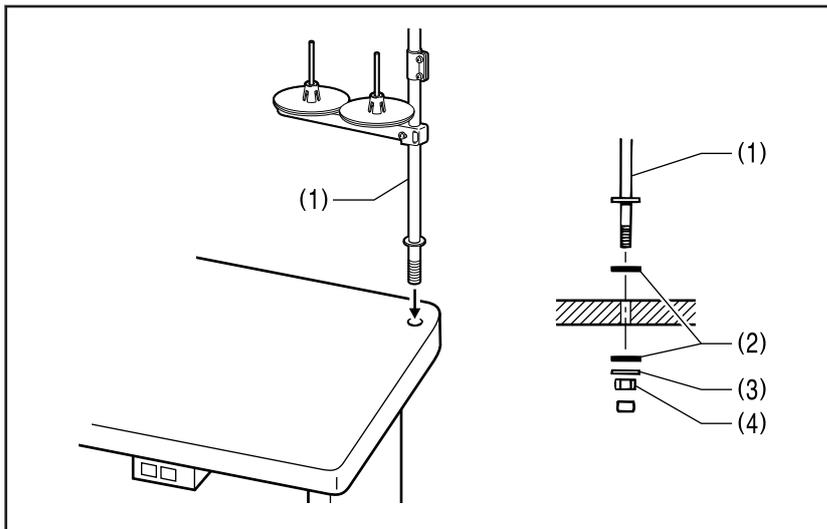


7 Install the cotton stand.

- (1) Cotton stand
- (2) Rubber cushion [2 pcs.]
- (3) Washer
- (4) Nut



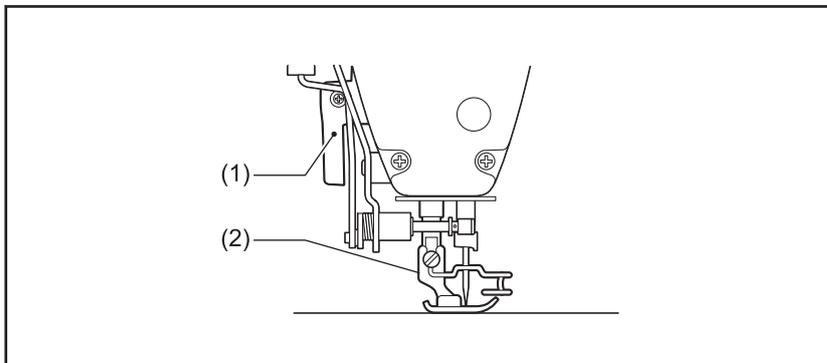
Securely tighten the nut so that the two rubber cushions and the washer are securely clamped and so that the cotton stand does not move.



Adjusting the knee lifter

8 Turn the machine pulley so that the feed dog is below the top of the needle plate.

9 Lower the presser foot (2) by using the lifting lever (1).

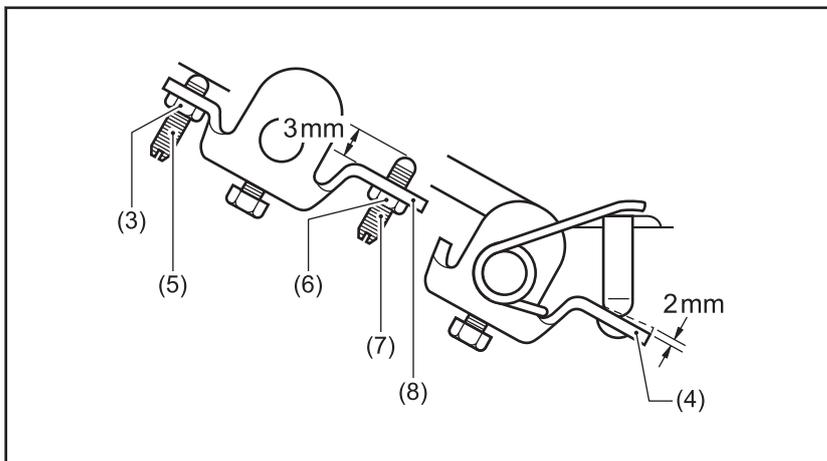


10 Loosen the nut (3).

11 Turn the screw (5) to adjust so that the amount of movement (play) in the knee lifter (4) is approximately 2 mm when the knee lifter plate is gently pressed.

After adjustment is completed, securely tighten the nut (3).

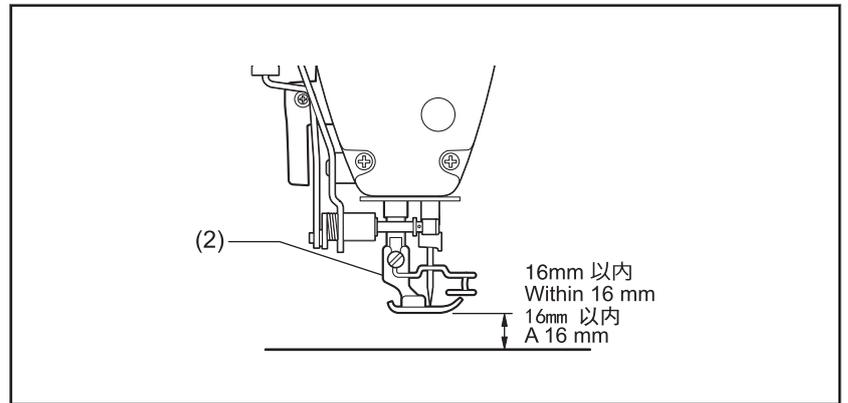
12 Loosen the nut (6).



13 Turn the screw (7) until the distance between the end of the screw (7) and the knee lifter (8) is approximately 3mm.

14 Turn the adjusting screw (7) to adjust so that the presser foot (2) is at the desired position within a distance of 16mm from the needle plate when the knee lifter plate is fully pressed.

15 After adjustment is completed, securely tighten the nut (6).



Lubrication

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 <JXTG Energy Sewing Lube 10N; VG10> specified by Brother. If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil EssoTex SM10; VG10>.

CAUTION

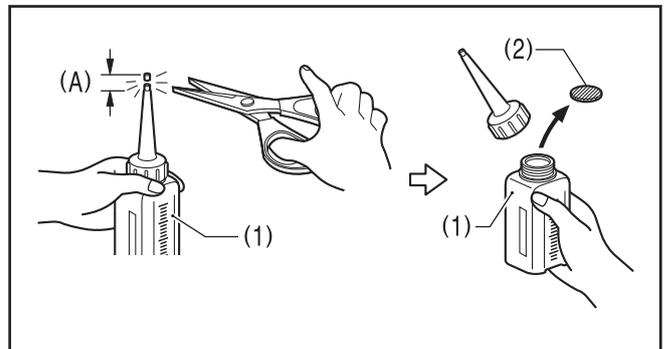


- When cutting the nozzle of the oil tank, hold the base of the nozzle securely. If you hold the end of the nozzle, injury from the scissors may result.



- Do not connect the power cord plug until adding lubricating oil is complete. 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. Diarrhea or vomiting may result. Keep the oil and grease out of the reach of children.

- 1 Hold the base of the nozzle of the accessory oil tank (1), and use scissors to cut about half-way along the straight section (A) of the nozzle.
- 2 Loosen and remove the nozzle, and then remove the seal (2).
- 3 Tighten the nozzle.



Lubricating the oil cover

- 4 Tilt back the machine head.
- 5 Remove the rubber cap (1).
- 6 Pour 120 ml of lubricating oil into the oil tank (2).

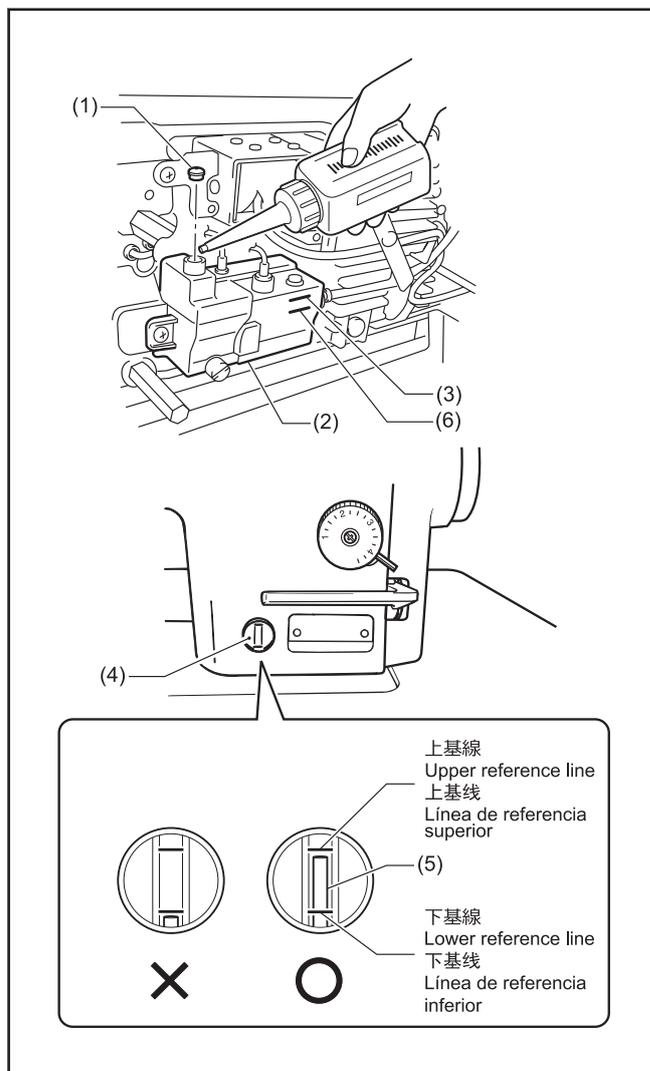
NOTE

Use the upper reference line (3) as a guide when pouring.

- 7 Replace the rubber cap (1).
- 8 Return the machine head to its original position.
- 9 Check that the oil gauge (5) comes to the upper reference line in the oil gauge window (4).

NOTE

If the oil gauge drops below the lower reference line (or if the oil level drops below the lower reference line (6) on the oil tank), be sure to replenish the oil.



Connecting the cords

DANGER



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

CAUTION



- Do not connect the power cord until all cords have been connected. The machine may operate if the treadle is depressed by mistake, which could result in injury.



- When securing the cords, do not bend the cords excessively or fasten them too hard with staples. Otherwise, fire or electric shocks may occur.



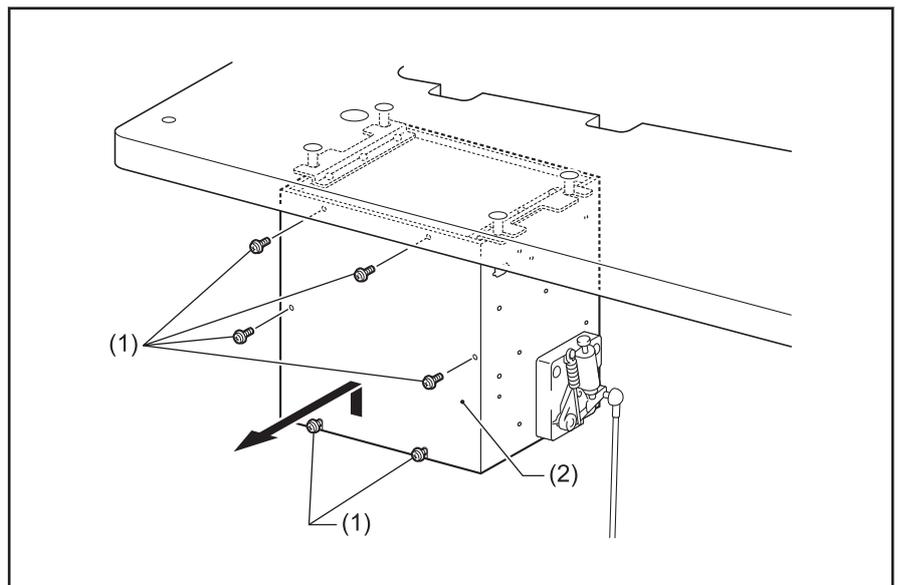
- Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.



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

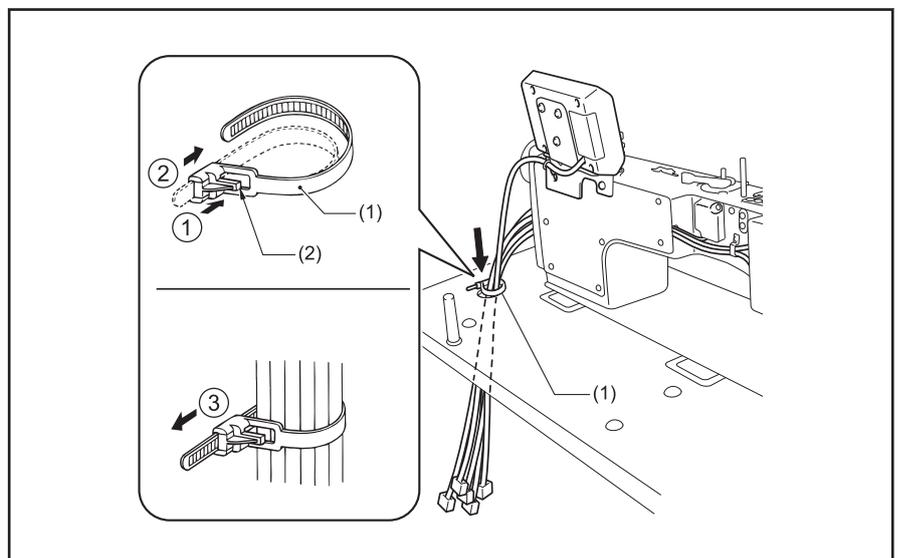
Opening the control box cover

- 1 Remove the top four of the six screws with washer (1), and loosen the bottom two.
 - (1) Screw with washer [6 pcs.]
 - (2) Cover
- 2 Open the control box cover.



Securing the cords

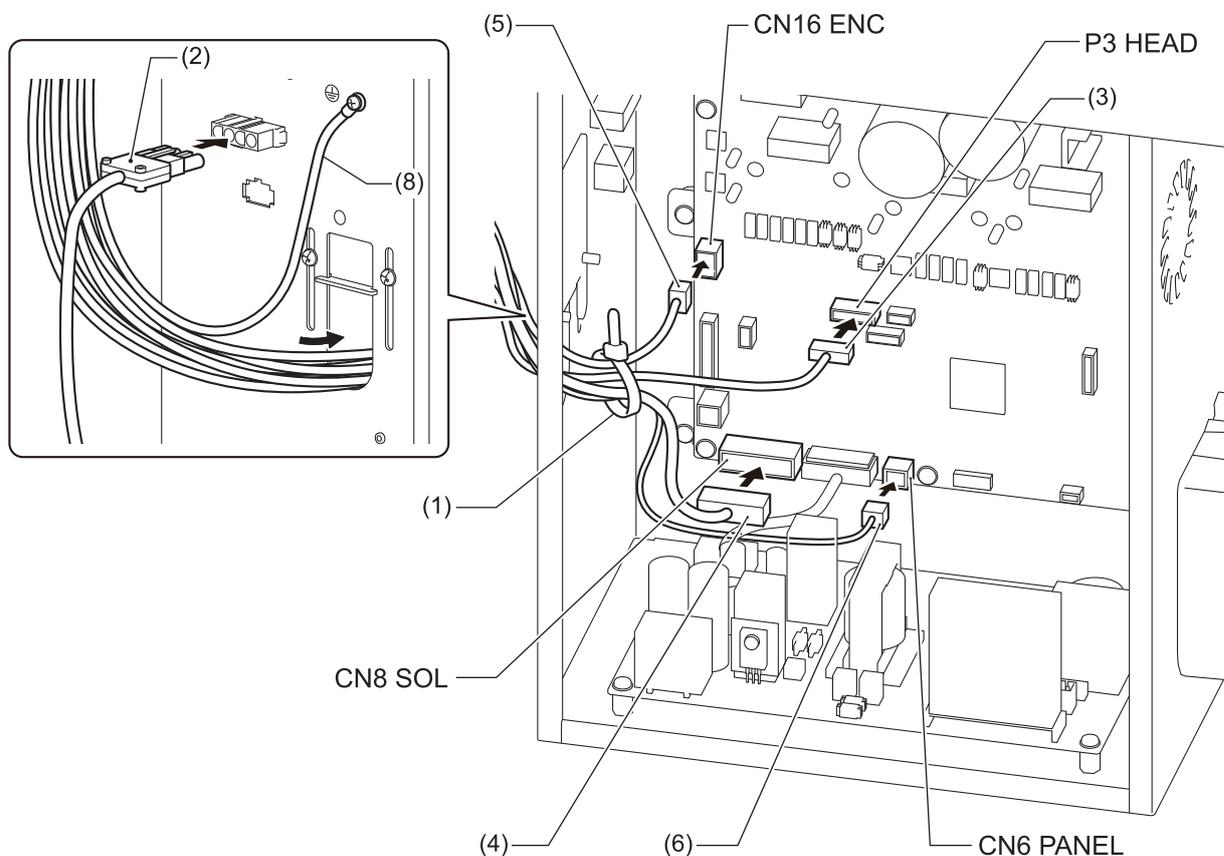
- 3 Use the cable tie (1) to secure the cords.
 - (1) Repeat cable tie
 - (2) Tab



Connecting the cords

4 Connect the ground wire (8).

5 Connect the cords.



Connector	P.C. board indication	Repeat cable tie
(2) Machine motor connector 4-pin	Outside control box	
(3) Head detector unit connector 6-pin	P3 HEAD	(1)
(4) Solenoid connector 14-pin	CN8 SOL	(1)
(5) Encoder connector 10-pin	CN16 ENC	(1)
(6) Operation panel connector 8-pin	CN6 PANEL	(1)

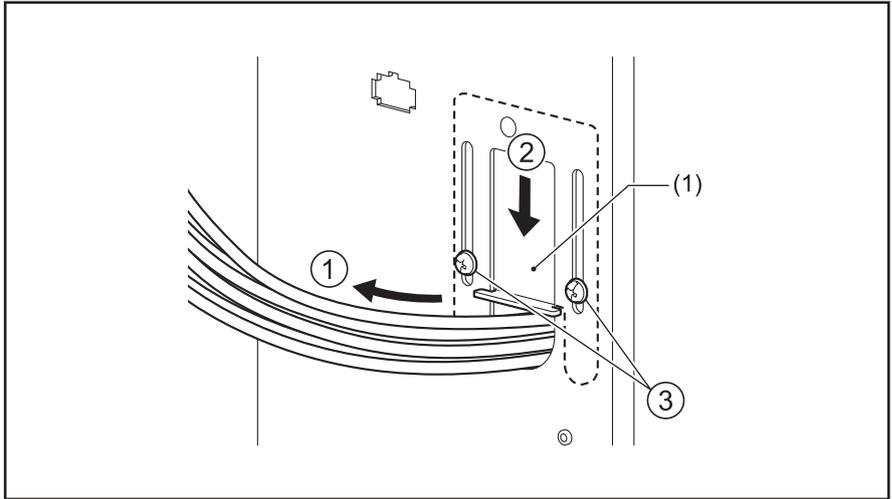
NOTE

Bind the cords in such a way that the connector does not get pulled out.

 If an open circuit occurs in the cords due to vibration of the sewing machine, damage to the control box may result.

Closing the cord presser plate

- 6** Loosen the cables outside the control box without stretching them too much inside the control box.
- 7** Close the cord presser plate (1).



NOTE

If the cord presser plate (1) is not closed firmly, dust will get inside the control box and may cause problems.

- 8** Connect cords that match the voltage specifications.

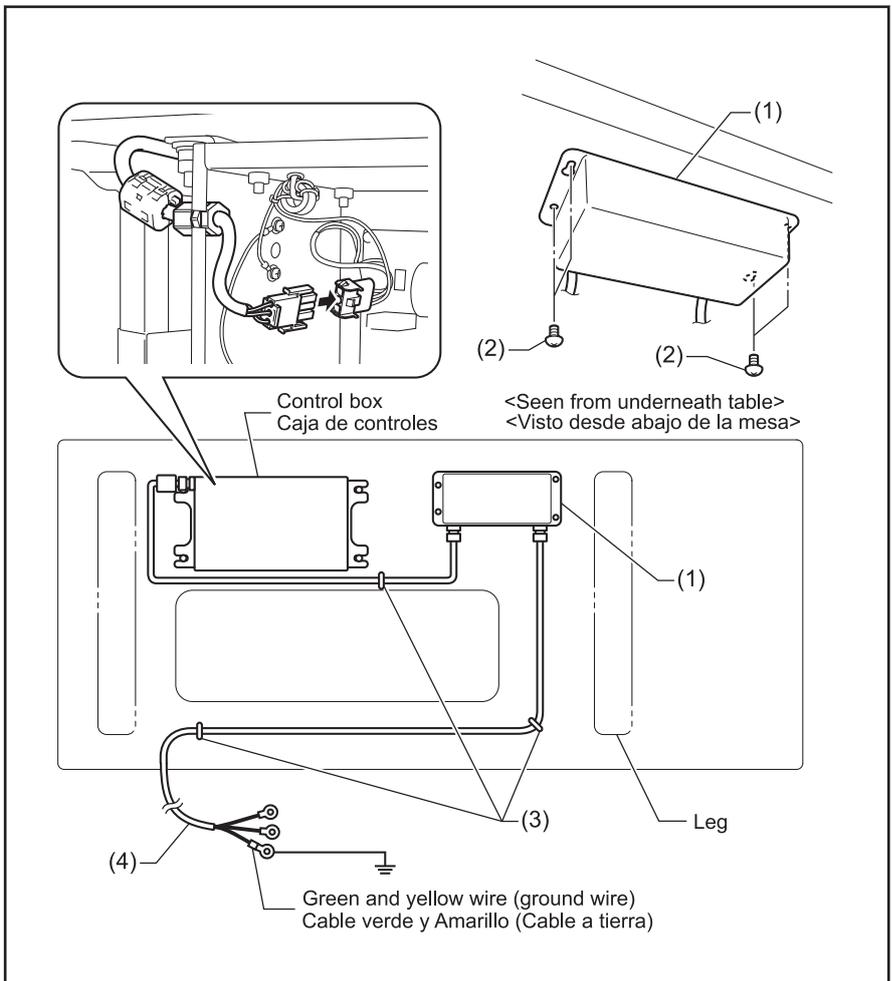
<EU specifications>

- (1) Filter box
- (2) Screws [4 pcs]
- (3) Staples [3 pcs]
- (4) Power cord

1. Attach an appropriate switch and cable to the power cord (4).

(The green and yellow wire is the ground wire.)

2. Insert the power plug into a properly-grounded electrical outlet.



NOTE

- Take care when tapping in the five staples (3) to make sure that they do not pierce the cords.
- Do not use extension cords, otherwise machine operation problems may result.

9 Connect the power cord.

1. Install the power switch (1)
2. Attach an appropriate plug to the power cord (3).
3. Insert the plug into a properly-grounded AC power supply.

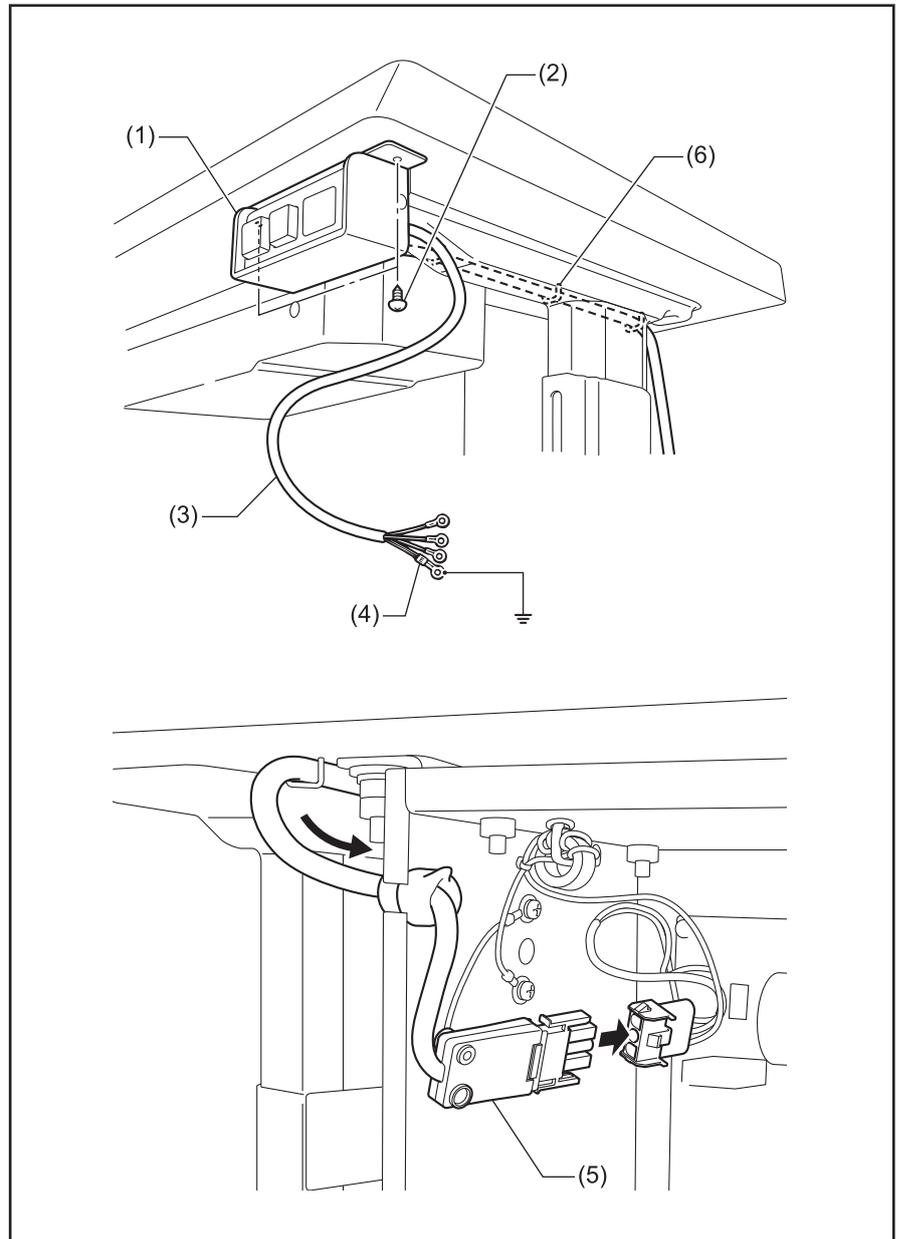
- (1) Power switch
- (2) Screw[2 pcs]
- (3) Power cord
- (4) Ground wire(green/yellow cord)
- (5) Power supply connector 3-pin
- (6) Staple[5 pcs.]



Secure the power cord in a suitable place depending on the position of the wall outlet.

CAUTION

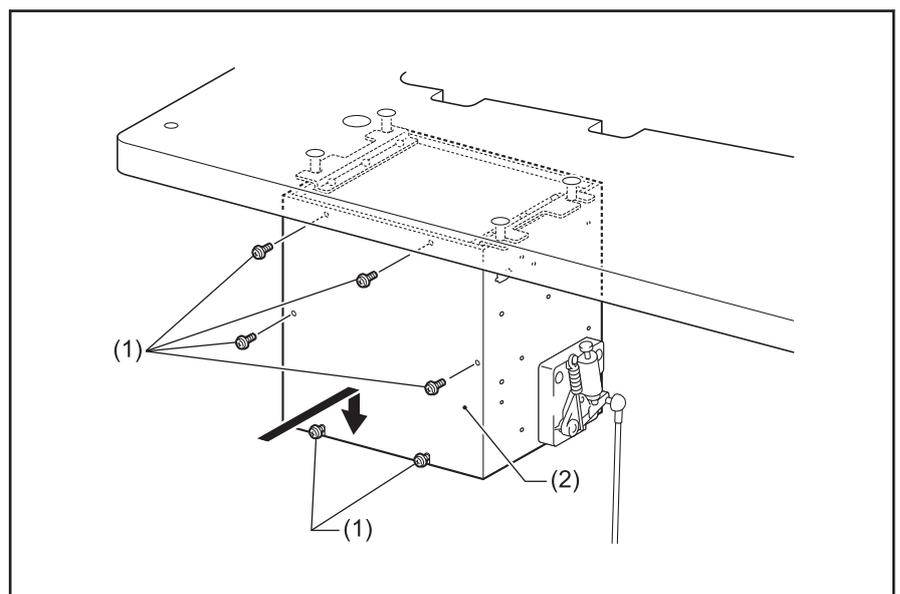
- Take care when tapping in the staples to make sure that they do not pierce the cords.
- Do not use extension cords. They may cause problems with correct operation of the sewing machine.



Closing the cover

10 Tighten the screws with washer (1).

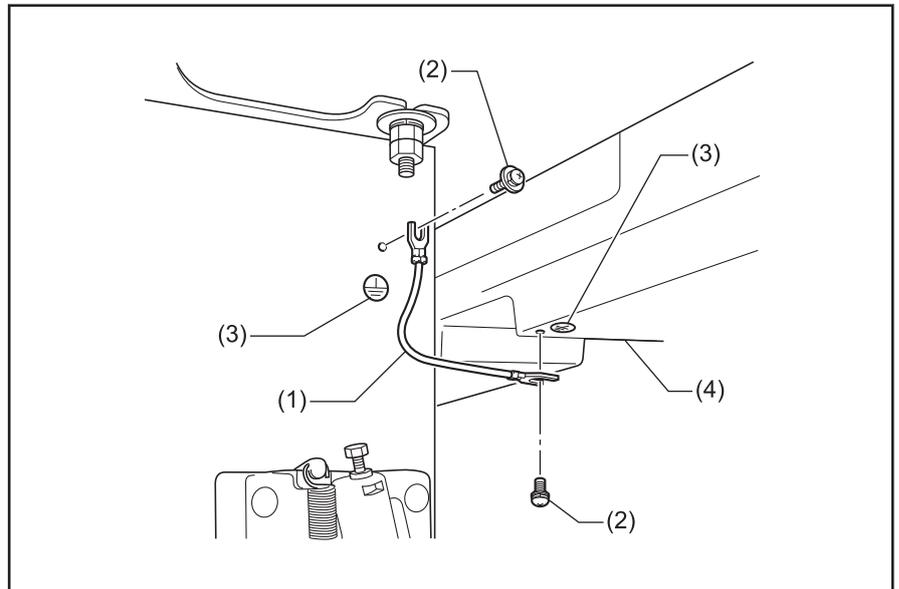
- (1) Screw with washer[6 pcs.]
- (2) Cover



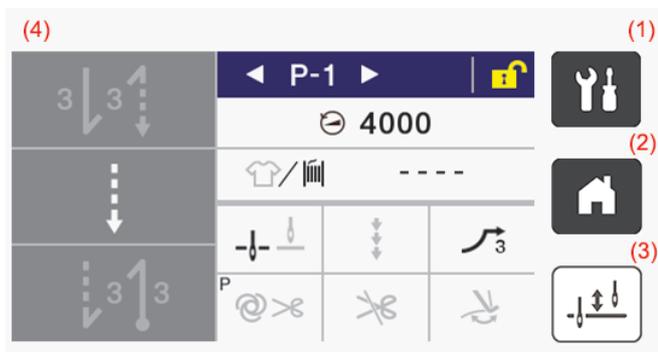
Ground wire

11 Connect the ground wires.

- (1) Ground wire
- (2) Screw with washer[2 pcs.]
- (3) Ground symbol [2 places]
- (4) Oil pan



Name and function of each operation panel item



The operation panel examples shown in this Instruction Manual are for thread trimmer specifications.

(1)  (Menu key)

This key is used to move to the menu screen.

(2)  (Home key)

This key is used to return to the home screen.

(3)  (Half stitch key)

When the sewing machine is stopped, the needle bar can be moved up and down by pressing this key.

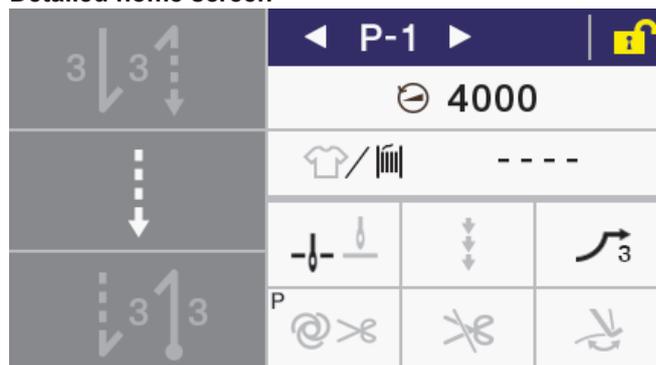
(4) Touch panel (display)

This displays messages and touch keys (icons).

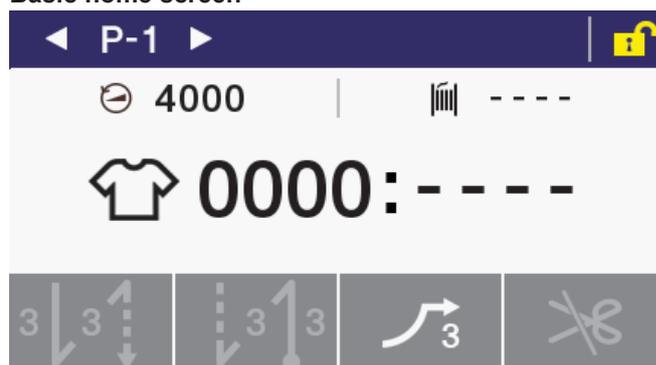
About the home screens

- The home screen is displayed when the power is turned on.
- Sewing operations are normally carried out while the home screen is displayed.
- The home screen can be switched between the detailed home screen, the basic home screen and the quick home screen.
 - * At the time of shipment from the factory, the detailed home screen is set to be displayed.
- If you keep pressing  while the home screen is displayed, you can switch between the detailed home screen, the basic home screen and the quick home screen. Furthermore, you can return to the home screen from any other screen by pressing .

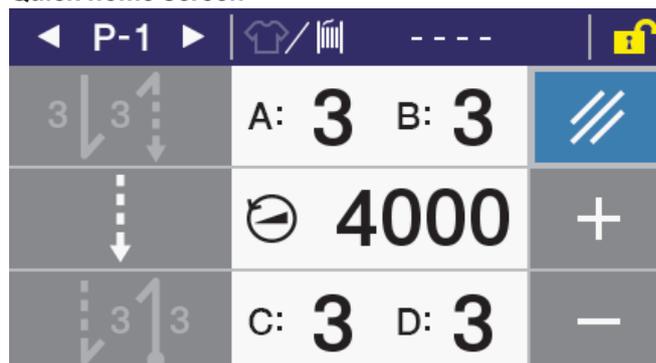
Detailed home screen



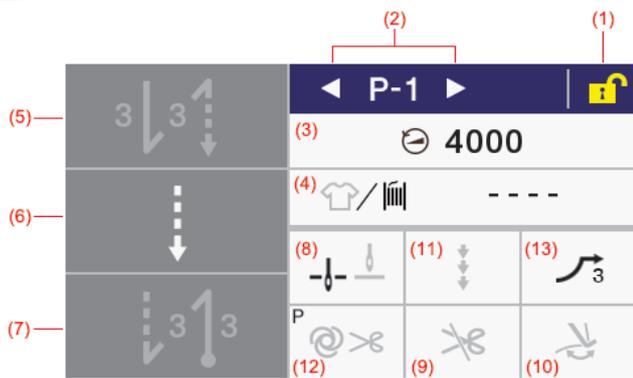
Basic home screen



Quick home screen



About the detailed home screen



(1) Screen lock key

Screen unlock key

Press this key to switch the home screen between locked and unlocked.



At the time of shipment from the factory, the screen is set to lock automatically if no operations are carried out for three minutes. (Refer to memory switch No. 310.)

(2) Program No. UP key

Program No. DOWN key

Press this key to increase (or decrease) the program number.

(3) Main sewing speed key

Press and hold this key to set the sewing speed for the main sewing.

(4) Production counter key

Lower thread counter key

The display switches between the production counter and the lower thread counter each time the icon is pressed.

If you keep pressing this key while the production counter is displayed, the display switches to the production counter setting screen.

If you keep pressing this key while the production counter is displayed, the display switches to the production counter setting screen.

(5) Start backtack key

Press this key to switch the start backtack sewing operation (off/on). If you keep pressing this key, the display switches to the start backtack setting screen.

(6) Main sewing key

If you keep pressing this key, the display switches to the main sewing method setting screen.

(7) End backtack key

Press this key to switch the end backtack sewing operation (off/on). If you keep pressing this key, the display switches to the end backtack setting screen.

(8) Needle up/down key

Press this key to switch the stop position after sewing (needle up/needle down).

(9) Thread trimming lock key

Press this key to switch thread trimming locking (disabled/enabled) when the treadle is depressed backward.

(10) Thread wiper key

Press this key to switch the thread wiper operation (off/on).

(11) Correction key

Press this key to switch correction sewing operation (off/on) by using the hand switch.

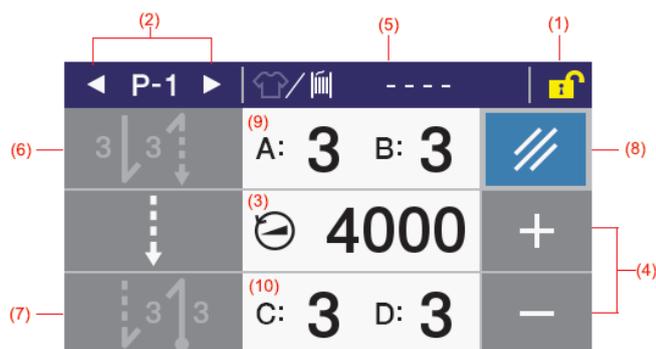
(12) AUTO key

Press this key to switch between different sewing operations (normal sewing /automatic sewing/ automatic sewing with thread trimming).

(13) Slow start key

Press this key to switch slow start operation at the sewing start (off/1/2/3/4).

About the quick home screen



(1) Screen lock key

Screen unlock key

Press this key to switch the home screen between locked and unlocked.



At the time of shipment from the factory, the screen is set to lock automatically if no operations are carried out for three minutes. (Refer to memory switch No. 310.)

(2) Program No. UP key

Program No. DOWN key

Press this key to increase (or decrease) the program number.

(3) Main sewing speed key

Press this key to set the sewing speed for the main sewing.

(4) +/- keys

The currently-selected value is increased or decreased each time one of these keys is pressed. If you keep pressing this key, the value increases or decreases more quickly.

(5) Production counter key

Lower thread counter key

The display switches between the production counter and the lower thread counter each time the icon is pressed.

You can change the value which is displayed by pressing it.

If you keep pressing this key while the production counter is displayed, the display switches to the production counter setting screen.

If you keep pressing this key while the production counter is displayed, the display switches to the production counter setting screen.

(6) Start backtack key

Press this key to switch the start backtack sewing operation (off/on). If you keep pressing this key, the display switches to the start backtack setting screen.

(7) End backtack key

Press this key to switch the end backtack sewing operation (off/on). If you keep pressing this key, the display switches to the end backtack setting screen.

(8) RESET key

Press this key to reset the currently-displayed counter value.

(9) No. of start backtack stitches A/B key

Press this key to set the number of start backtack stitches.

(10) No. of end backtack stitches C/D key

Press this key to set the number of end backtack stitches.

Types of icons

The icons which appear in the display can be broadly classified into the following three types.

Type A: Simple symbols

Example

Warning symbol 	USB media 	Current program No. 
---	--	--

Type B: Plain touch keys (symbol is always fixed)

Example

Return key (Returns to the previous screen) 	+ key (Increases a value) 	OK key (Confirm the value) 
--	--	---

Type C: Touch keys which change their setting status (symbol) each time they are pressed

Example

Lock key	Unlocked 	→ ←	Locked 
Thread wiper key	Thread wiping enabled 	→ ←	Thread wiping disabled 
Start backtack key	Start backtack enabled 	→ ←	Start backtack disabled 

Menu screen

- Press  at any screen to return to the menu screen.
- Press  or  at a menu screen to change the screen.

Program setting method

It is recommended that you register patterns that are sewn frequently as programs. After programs have been registered, you can retrieve the desired sewing patterns simply by selecting a program number, which eliminates the need to set the pattern each time.

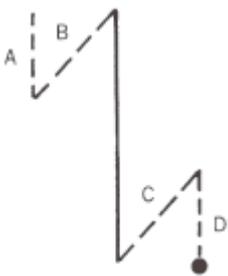
- Settings such as sewing pattern, number of stitches, sewing speed and slow start can be made separately for each program number.
- Up to nine programs from P1 to P9 can be registered.

At the time of shipment from the factory, P1 to P8 have normal sewing programs registered, and P9 has a 4-step fixed stitch sewing (name label sewing) program registered.

Program structure

A single program consists of start backtack parameters, main sewing parameters, end backtack parameters and individual functions for that program.

Stitch type (overall view)



Programs P1 to P9

Start backtack	Main sewing	End backtack	
Start backtack sewing parameters	Main sewing parameters (step 1) Main sewing parameters (step 2) Main sewing parameters (step 3) Main sewing parameters (step 20)	End backtack sewing parameters	Program individual functions

Start backtack sewing parameters

	Setting value
Start backtack sewing pattern	
Sewing speed	220 to 3000 sti/min
No. of stitches A	1 to 19 stitches

	Setting value
No. of stitches B	1 to 19 stitches

Main sewing parameters

	Setting value
Main sewing pattern	 Normal sewing/fixed stitch sewing/reverse fixed stitch sewing/pleat presser stitch sewing/continuous backtack stitch sewing

	Setting value
Sewing speed	220 to 5000 sti/min
No. of stitches E	1 to 255 stitches
No. of stitches F	1 to 19 stitches
No. of stitches A	0 to 19 stitches
No. of stitches B	1 to 19 stitches
No. of stitches C	0 to 19 stitches
No. of stitches D	0 to 19 stitches

End backtack sewing parameters

	Setting value
End backtack sewing pattern	
Sewing speed	220 to 3000 sti/min
No. of stitches C	1 to 19 stitches
No. of stitches D	1 to 19 stitches

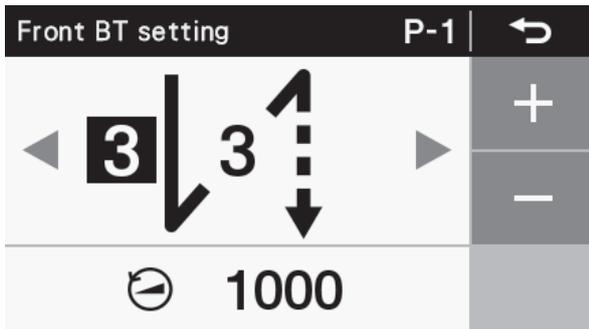
Program individual functions

	Setting value	
Needle up/down	P 	Needle stops in the down position.
	P 	Needle stops in the up position.
Thread trimming lock	P 	Thread trimming operation is carried out when the treadle is depressed backward.
	P 	Thread trimming operation by depressing the treadle backward is locked (disabled).
Thread wiper	P 	Thread wiping disabled
	P 	Thread wiping enabled
Correction sewing	P 	Correction sewing operation using the hand switch is disabled.
	P 	Correction sewing operation using the hand switch is enabled.
AUTO	P 	Normal sewing

	Setting value	
	P 	Automatic sewing
	P 	Automatic sewing with thread trimming
Slow start	P 	Slow start disabled at the sewing start
	P 	Slow start enabled at the sewing start (1)
	P 	Slow start enabled at the sewing start (2)
	P 	Slow start enabled at the sewing start (3)
	P 	Slow start enabled at the sewing start (4)

Setting start backtacking

- 1 Press [] > [Front BT setting].



- 2 Set the start backtack sewing parameters.
 1. Press  or  to select the sewing pattern.
Press  or  to change the value.
 2. Press  to select the start backtack sewing speed.
Press  or  to change the value.
- 3 Press .
Press this to return to the Home screen.

The settings which are made here are applied to  (Start backtack key) in the home screen.

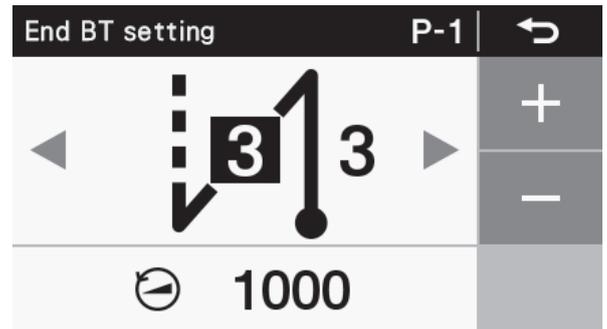
Start backtack sewing parameter settings

	Setting value	Setting unit	Default value
Start backtack sewing pattern			

	Setting value	Setting unit	Default value
No. of stitches A	0 to 19 stitches	1 stitch	1 stitch
No. of stitches B	1 to 19 stitches	1 stitch	1 stitch
No. of stitches C	0 to 19 stitches	1 stitch	1 stitch
No. of stitches D	0 to 19 stitches	1 stitch	1 stitch

Setting end backtacking

- 1 Press [] > [End BT setting].



- 2 Set the start backtack sewing parameters.
 1. Press or to select the sewing pattern.
Press or to change the value.
 2. Press to select the start backtack sewing speed.
Press or to change the value.

- 3 Press .

Press this to return to the Home screen.

* The settings which are made here are applied to

(End backtack key) in the home screen.

End backtack sewing parameter settings

	Setting value	Setting unit	Default value
End backtack sewing pattern		—	
Sewing speed	220 to 3000 sti/min	100 sti/min	1200 sti/min
No. of stitches C	1 to 19 stitches	1 stitch	1 stitch
No. of stitches D	1 to 19 stitches	1 stitch	1 stitch

Using program individual functions and program common functions

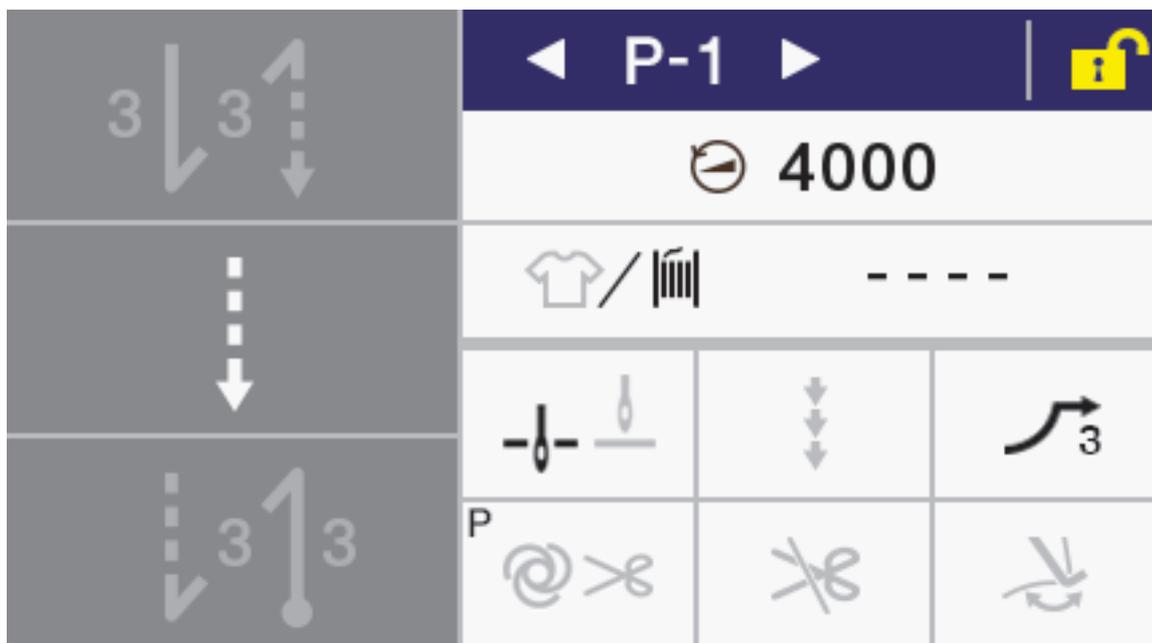
- In addition to start backtack sewing, main sewing and end backtack sewing, the following 6 types of functions are also included in the parameters which are necessary for sewing.

Needle up/down, thread trimming lock, thread wiping, correction sewing, AUTO, slow start.

- Of these 6 types of functions, the functions which can be set separately for each program are called "program individual" functions.

When an assignment is made to a program individual function, a "P" symbol appears in the top-left corner of the icon.

On the other hand, the functions which can be set in common for all programs (P1 to P9) are called "program common" functions.



- Each of the 6 types of functions can be set to be used as either a program individual function or a program common function. (Memory switch No. 301 to No. 306)

At the time of shipment from the factory, the settings are as follows.

	Program individual functions	Program common functions
Needle up/down	×	○
Thread trimming lock	×	○
Thread wiper	×	○
Correction sewing	×	○
AUTO	○	×
Slow start	×	○

Needle up/down

This sets whether the needle bar stops in the up position or the down position when the treadle is returned to the neutral position and sewing stops.

	Setting details
	Needle stops in the down position. However, the needle will stop in the up position when the treadle is depressed backward, and after thread trimming (needle raised) during automatic sewing.
	Needle stops in the up position.

Thread trimming lock

This sets the thread trimming operation when the treadle is depressed backward.

	Setting details
P 	Thread trimming operation is carried out when the treadle is depressed backward.
P 	Thread trimming operation by depressing the treadle backward is locked (disabled).

Thread wiper

Thread wiping operation can be set.

	Setting details
P 	Thread wiping operation is disabled after thread trimming.
P 	Thread wiping operation is enabled after thread trimming. If thread trimming operation is disabled, thread wiping operation will also be disabled.

Correction sewing

Correction sewing operation can be set.

	Setting details
P 	Correction sewing operation using the hand switch is disabled.  _____ Operating the hand switch may result in an operation other than correction sewing being carried out. _____ The operation mode can be changed to a different mode from correction sewing. For more detailed information "Hand switch".
P 	Correction sewing operation using the hand switch is enabled. If the sewing machine is stopped, sewing will be carried out at slow speed while the hand switch is being pressed. The operation mode can be changed to correction sewing. For more detailed information "Hand switch".

AUTO

Automatic sewing and thread trimming operations can be set. However, they can only be set in conjunction with continuous backtack sewing and fixed stitch sewing.

	Setting details
P 	Automatic sewing is not carried out, and sewing stops when the treadle is returned to the neutral position.
P 	Sewing is carried out automatically for the number of stitches which have been set (start and end backtacking and fixed stitch sewing) simply by depressing the treadle once. After sewing is complete, depress the treadle backward to carry out thread trimming.

	Setting details
	<p>Sewing is carried out automatically for the number of stitches which have been set (start and end backtacking, fixed stitch sewing, thread trimming) simply by depressing the treadle once.</p> <p>After sewing is complete, thread trimming is carried out automatically.</p>

Slow start

The slow start pattern at the sewing start after thread trimming can be set.

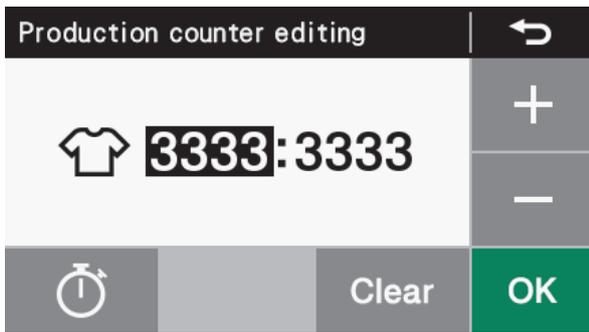
	Setting details
P 	Sewing is carried out without slow start operation.
P 	Sewing is carried out according to slow start pattern 1. 1st stitch: 400 sti/min 2nd stitch: 400 sti/min 3rd stitch: 400 sti/min 4th stitch: 4000 sti/min
P 	Sewing is carried out according to slow start pattern 2. 1st stitch: 400 sti/min 2nd stitch: 400 sti/min 3rd stitch: 4000 sti/min 4th stitch: 4000 sti/min
P 	Sewing is carried out according to slow start pattern 3. 1st stitch: 700 sti/min 2nd stitch: 700 sti/min 3rd stitch: 4000 sti/min 4th stitch: 4000 sti/min
P 	Sewing is carried out according to slow start pattern 4 (original pattern). 1st stitch: Speed set by memory switch No. 403 1st stitch: Speed set by memory switch No. 404 1st stitch: Speed set by memory switch No. 405 1st stitch: Speed set by memory switch No. 406

Using the production counter

The production counter can be used to let you know how many items have been sewn.

The production counter increases by 1 each time thread trimming is carried out.

- 1 Press [] > [Production counter editing].



- 2 Press  or  to change the production counter value.

When the value is changed, the production counter will flash.

- If you would like to return the setting to "0000", press .

- 3 Press .

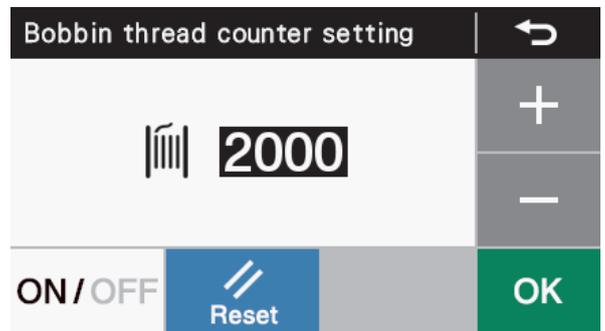
The value will be confirmed and the display will return to the home screen.

Using the lower thread counter

The lower thread counter can be used to let you know approximately how much lower thread is remaining.

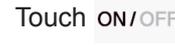
- The lower thread counter should be used as a guide only.
- The value displayed by the lower thread counter display is reduced by 1 from the initial setting value each time the sewing machine sews 10 stitches, and a warning is given when the counter reaches "-1".

- 1 Press [] > [Bobbin thread counter setting].



- 2 Press  or  to change the lower thread counter value.

When the value is changed, the production counter will flash.

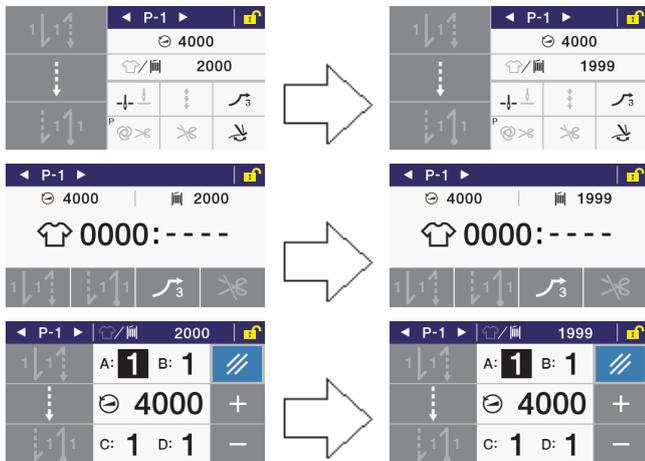
- The setting range is from 1 to 9999.
- Touch  to switch the setting between on and off.
- When set to [OFF], the counter will stop operating.
- You can press  to provisionally reset the value to the one which was set previously, but only if the counter function is [ON].

- 3 Press .

The value will be confirmed and the display will return to the home screen.

Lower thread counter operation

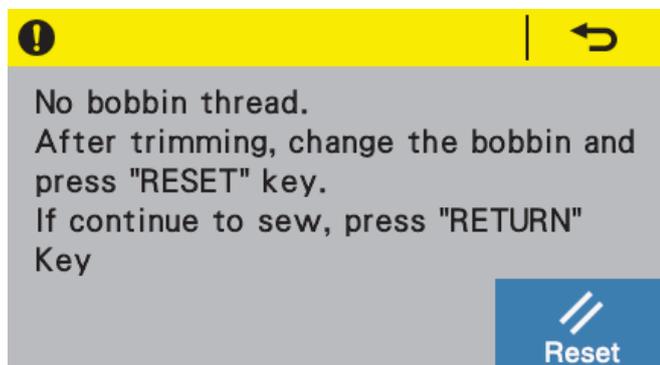
When sewing is carried out, the value shown in the lower thread counter display is reduced by 1 for every 10 stitches sewn. However, the display is only updated when the treadle is returned to the neutral position.



Lower thread out warning when sewing stops (before thread trimming)

If the lower thread counter has dropped to below -1 when the sewing machine stops sewing, the warning buzzer sounds 5 times (1 second on/1 second off), and a lower thread counter warning message is displayed.

Sewing will not be possible at this time, even if the treadle is depressed forward.



If replacing the bobbin

- 1 Depress the treadle backward to trim the thread.
- 2 Replace the bobbin.
- 3 Press .

The lower thread counter value will return to the value which was previously set.

If not replacing the bobbin

- 4 Press .

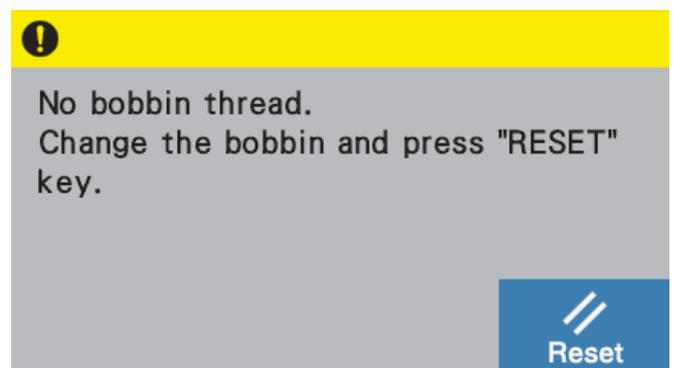
The lower thread counter value will remain unchanged.

The display will return to the screen which was being displayed before the lower thread counter out warning appeared, and sewing will be possible.

Lower thread out warning when sewing is complete (after thread trimming)

If the lower thread counter has dropped to below "-1" after sewing is finished, the warning buzzer sounds 5 times (1 second on/1 second off), and a lower thread counter warning message is displayed.

Sewing will not be possible at this time, even if the treadle is depressed forward.



- 1 Replace the bobbin.
- 2 Press .

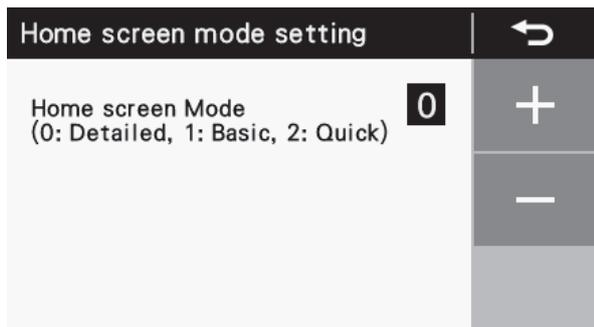
The lower thread counter value will return to the value which was previously set.

The display will return to the screen which was being displayed before the lower thread counter out warning appeared, and sewing will be possible.

Setting the home screen mode

You can select from three different types of home screen display: the detailed home screen, the basic home screen and the quick home screen.

1 Press [] > [Home screen mode setting].



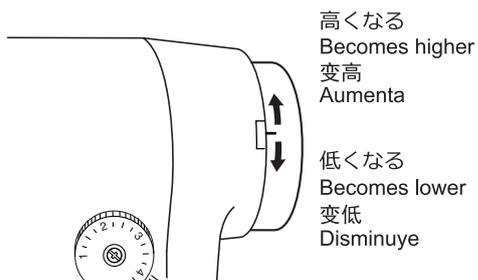
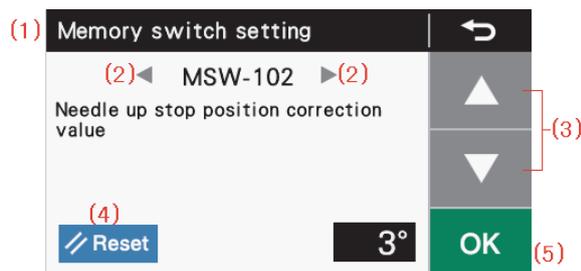
2 Press or to change the value.

3 Press .

Press this to return to the Home screen.

Adjusting the needle up stop position

1 Press [] > [Memory switch setting].



The memory switch setting screen (1) will be displayed.

2 Press or to select memory switch number (No. 102).

3 Press or (3) to change the setting value (4) for the needle up stop position.

- If you press , the setting value will increase up to 10 and the needle up stop position will become lower.

- If you press , the setting value will decrease down to -10 and the needle up stop position will become higher.

- The default setting value is "0".

If the value that is displayed is different from the value that is currently set, the value in the display will flash.

- If you would like to return the setting to the initial value, press .

- is only displayed when the setting value (the value being displayed) is different from the initial value.

4 Press (5).

The setting for the needle up stop position will be stored.

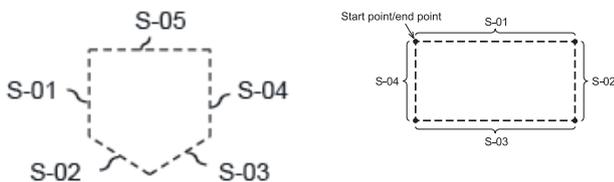
The setting display will change from flashing to illuminated. (This completes the needle up stop position setting.)

- A setting value of "10" corresponds to an angle of rotation of approximately 10° for the upper shaft.

- If the needle bar is not at the needle up stop position, the needle up warning screen will be displayed.

Adding and deleting steps

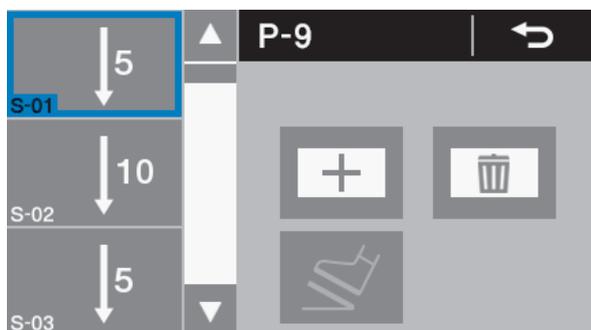
You can put together programs, such as the one shown in the illustration for pocket sewing or name label sewing, by registering multiple steps in the main sewing section.



- Steps can be added (up to a maximum of 20 steps) to or deleted (to a minimum of 1 step) from the currently-selected program.
- However, if fixed stitch sewing or reverse fixed stitch sewing is not selected, it will not be possible to switch to this mode.

1 Press [] > [Program setting] > [Add/Delete step].

The program number, step number, sewing pattern and cursor for the currently-selected program are displayed.



2 Press or to change the cursor position.

When adding a step

3 Press .

A step will be added after the cursor position.

- The sewing pattern for the added step will be the fixed stitch sewing pattern.
- If the number of steps has already reached 20, no further steps can be added.

When deleting a step

4 Press .

The step at the cursor position will be deleted.



However, if only one step is remaining, the delete key will be disabled.

5 Press .

Press this to return to the Home screen.

When more than one step had been added for sewing, the number of stitches in the step which is currently being sewn will be completed, and then sewing will continue on to the next step.

Editing steps

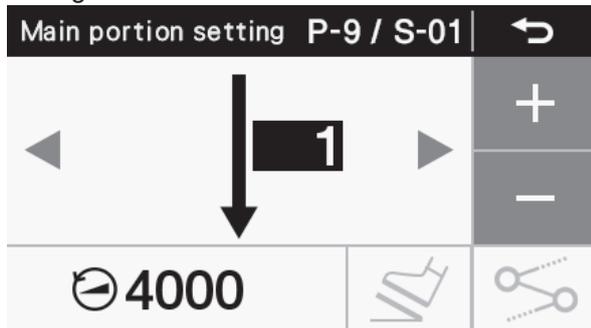
The number of stitches can be changed separately for each step.

The setting is made from the detail home screen.

1 Press  or  to select the step number to be edited.

2 Press and hold  (Main sewing key).

The sewing machine will switch to main sewing setting mode.



3 Set the start backtack sewing parameters.

1. Press  or  to select the sewing pattern.

Press  or  to change the value.

4 Set the start backtack sewing parameters.

1. Press  to select the start backtack sewing speed.

Press  or  to change the value.

2. Press .

Press the key to switch linking between enabled and disabled.



No linking with next step



Linking with next step

5 Press .

The display will return to the previous screen.

Setting main sewing parameters when several steps exist

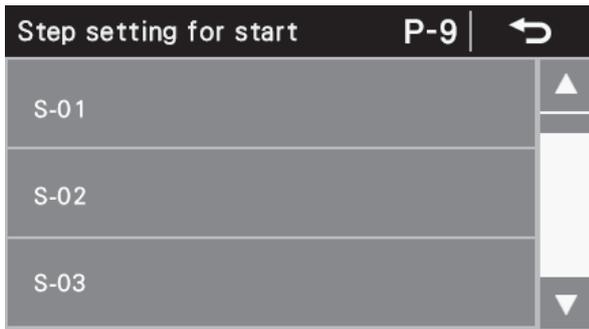
	Setting value	Setting unit	Default value
Main sewing pattern	 	—	
Sewing speed	220 to 5000 sti/min	100 sti/min	4000 sti/min
No. of stitches E	1 to 255 stitches	1 stitch	1 stitch
Linking	 	—	

Setting the sewing start step

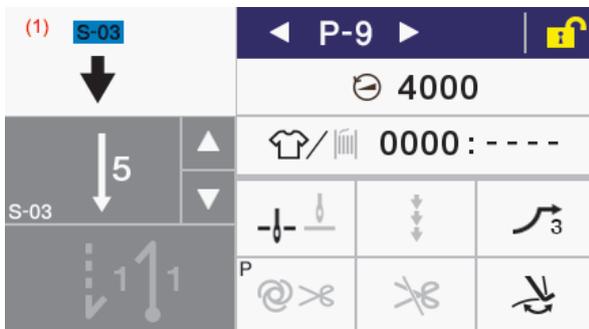
If sewing is interrupted by a problem such as a thread breakage occurring and you need to resume sewing from the point where sewing was interrupted, you can start sewing from the middle of a step.

Carry out this operation from the detailed home screen.

- 1 Select [] > [Program setting] > [Step setting for start].



- 2 Select the desired step number. The step number (1) for starting sewing will be displayed.

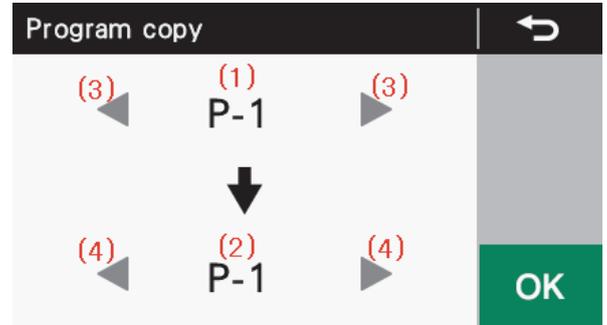


- Depress the treadle to start sewing from that step.
- When sewing is finished, the sewing start step number (1) is cleared and the display returns to the normal detailed home screen.
- If the program number is changed or the power is turned off and back on, the sewing start step number (1) will be cleared even if sewing is not carried out.

Copying programs

To create a program with parameters that are almost exactly the same as those of another program, you can copy the original program and change just the parts which need to be changed.

- 1 Press [] > [Program setting] > [Program copy].



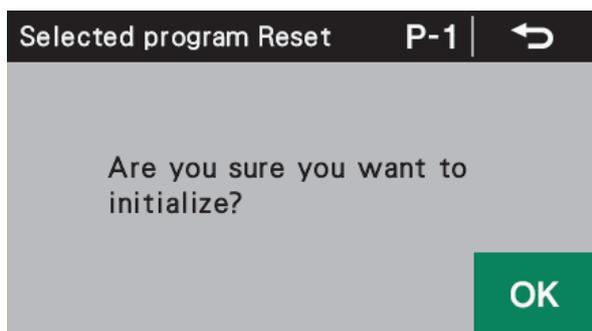
After switching to program copy mode, the program number which is currently selected is displayed as the copying source program number (1) and as the copying destination program number (2).

- 2 Press  or  (3) to select the copying source program number (1).
- 3 Press  or  (4) to select the copying destination program number (2).
- 4 Press  .
The program will be copied.
At this time, the copy destination program number will be the program number which is currently selected.
- 5 Press  .
Press this to return to the Home screen.

Initializing the currently-selected program

If you would like to recreate the program which is currently selected from the beginning, you can reinitialize the program instead of deleting each step one by one.

- 1 Press [] > [Program setting] > [Selected program Reset].



- 2 Press .

The program will be initialized.

- 3 Press .

The display will return to the program setting screen.

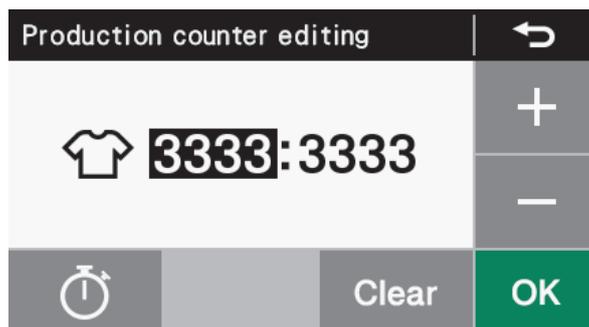
Setting the working pace

The target counter can be used to let you know the state of work progress.

The target counter increases by 1 each time the time set as the working pace has elapsed.

However, counting is not carried out during the period from when the power is turned on until sewing starts.

- 1 Press [] > [Production counter editing].



- 2 Press .

The sewing machine will switch to working pace setting mode.



- If the operating status (1) for the target counter is set to OFF, the target counter function will not operate. It will not be possible to set the working pace at this time either.
- Press  to set the operating status to , so that the working pace can be set.

- 3 Press  or  to change the working pace value.

- The working pace can be set to between 00'01" and 59'59".
- If you would like to return the setting to the value which was set previously, press .

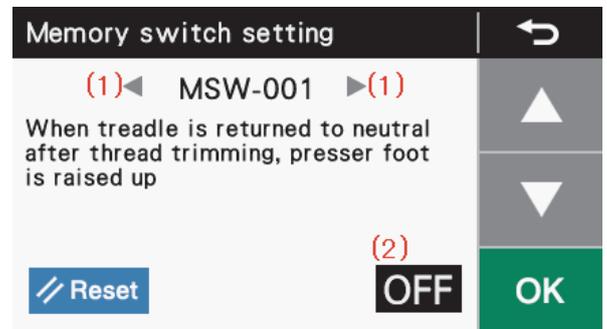
4 Press **OK**.

The value will be confirmed and the mode will return to production counter editing mode.

Setting memory switches (standard)

The settings for the memory switches are valid for all programs.

1 Press [] > [Memory switch setting].



2 Press  or  to select the memory switch number (1).

At this time, keep pressing  and then press  or  at the same time to select only the memory switches with current values that are different from their initial values.

3 Press  or  to change the memory switch value (2).

If the value that is displayed is different from the value that is currently set, the value in the display will flash.



- If you would like to return the setting to the initial value, press .
-  is only displayed when the setting value (the value being displayed) is different from the initial value.

4 Press **OK**.

The memory switch setting will be stored.

The setting display will change from flashing to illuminated.

5 Press .

The display will return to the previous screen.

List of memory switches

Presser foot lifter and treadle settings (001 to 099)

No.	Setting range	Default value	Setting unit	Setting details
001	ON/OFF	* 1	—	<p>When treadle is returned to neutral after thread trimming, presser foot is raised up</p> <p>ON: Presser foot is raised</p> <p>OFF: Presser foot is not raised</p> <hr/> <p> Rises when memory switch No. 851 is set to "OFF" (Refer to the Service Manual for details of memory switch No. 851.)</p>
002	ON/OFF	OFF	—	<p>After treadle stops at neutral, presser foot is raised up</p> <p>ON: Presser foot is raised</p> <p>OFF: Presser foot is not raised</p>
003	ON/OFF	ON	—	<p>After treadle stops at neutral, presser foot can be raised up when treadle depressed one step backward.</p> <p>ON: Enabled</p> <p>OFF: Disabled</p>
004	ON/OFF	ON	—	<p>When treadle depressed backward, thread trimming and end backtack sewing is possible.</p> <p>ON: Thread trimming and end backtack sewing operations are enabled</p> <p>(However, if thread trimming operation is locked, needle up operations will be carried out without thread trimming.)</p> <p>OFF: Thread trimming and end backtack sewing operations are disabled (presser foot lifts when the treadle is depressed backward)</p>
010	ON/OFF	OFF	—	<p>After standing operation pedal is used, treadle operation is possible.</p> <p>(Alternating operation is possible)</p> <hr/> <p> Does not include operation of presser foot lifter pedal.</p> <hr/> <p>In the case of simultaneous operation, the standing operation pedal has priority.</p> <p>ON: Treadle operation is still enabled after standing operation pedal has been used (alternating operation is possible)</p> <p>OFF: Treadle operation is disabled after standing operation pedal has been used</p>
011	0 to 1	0	1	<p>Operation when standing up variable speed pedal is ON</p> <p>0: Sewing speed corresponds to treadle depression amount</p> <p>1: Sewing speed corresponds to sewing speed set for main sewing (constant speed)</p>

¹ Other than Europe and America: ON
Europe and America: OFF

No.	Setting range	Default value	Setting unit	Setting details
012	0 to 500 (ms)	80 (ms)	10 (ms)	Delay time from standing operation pedal turning on until motor starts operating
013	ON/OFF	ON	—	When AUTO function is set ON, pauses when presser foot pedal is ON. ON: Sewing is interrupted when presser foot lifter pedal turns on (pause operation) OFF: No operation
014	ON/OFF	ON	—	When AUTO function is set ON, motor operation can be turned on and off by slightly depressing the high speed pedal ON/OFF. ON: Motor operation switches on/off each time the high-speed pedal is depressed slightly to ON and back to OFF OFF: Disabled (sewing machine motor does not stop)
015	ON/OFF	ON	—	Presser foot raising/lowering using thread trimming pedal after thread trimming ON: Presser foot can be raised and lowered  If memory switch No. 051 is set to "ON", thread trimming pedal operation is disabled after the presser foot lifter pedal has been operated during standing operation. (Refer to the Service Manual for details of memory switch No. 051.) OFF: No operation (only possible using presser foot lifter pedal)

Sewing machine motor settings (100 to 199)

No.	Setting range	Default value	Setting unit	Setting details
100	OFF, 1 to 3	OFF	1	Slow control after sewing start OFF: Disabled 1: Only at the sewing start after thread trimming 2: Only when sewing is restarted 3: Always at the sewing start
101	1 to 5	1	1	Degree of slow startup immediately after sewing start (A larger number means a slower startup)  This is not displayed when memory switch No. 100 is set to "OFF".
102	-10 to 10 (degrees)	0 (degrees)	1	Needle up stop position correction value
103	-10 to 10 (degrees)	0 (degrees)	1	Needle down stop position correction value

Panel operation settings (300 to 399)

No.	Setting range	Default value	Setting unit	Setting details
300	1 to 3	1	1	Movement when bobbin counter warning. 1: Sewing can continue by pressing the return key 2: Sewing is only possible when lower thread counter is reset after replacing the bobbin. 3 : If the counter reaches "0", sewing stops, and the operation for a setting of "1" occurs.
301	0, 1	0	1	Program common function / program individual function settings Needle up/down 0: Program common functions 1: Program individual functions
302	0, 1	0	1	Program common function / program individual function settings Thread trimming lock 0: Program common functions 1: Program individual functions
303	0, 1	0	1	Program common function / program individual function settings Thread wiper 0: Program common functions 1: Program individual functions
304	0, 1	0	1	Program common function / program individual function settings Correction sewing 0: Program common functions 1: Program individual functions
305	0, 1	1	1	Program common function / program individual function settings AUTO/ auto thread trimming 0: Program common functions 1: Program individual functions
306	0, 1	0	1	Program common function / program individual function settings Slow start 0: Program common functions 1: Program individual functions
310	OFF, 30 to 600 (seconds)	180	30	Automatic panel lock ON standby time OFF: Automatic panel lock is disabled 30 to 600: Panel open time before panel lock turns on (sec)  _____ The standby time is only counted at the home screen. If any other screen is displayed, the panel lock does not operate.

No.	Setting range	Default value	Setting unit	Setting details
311	OFF, ON	OFF	—	Panel auto lock when power is turned on OFF: Disabled ON : Enabled

Sewing program settings (400 to 499)

No.	Setting range	Default value	Setting unit	Setting details
400	ON/OFF	OFF	—	Stopping and sewing speed during start backtacking ON: When the treadle is returned to the neutral position, start backtacking can be stopped before it is finished, and the speed during start backtacking becomes the speed corresponding to the treadle depression amount (low speed - start backtacking speed) OFF: When the treadle is returned to the neutral position, start backtacking ends, sewing stops and the sewing speed becomes the start backtacking speed (constant)
401	ON/OFF	ON	—	Feed direction when sewing machine motor is stopped immediately after start backtacking is complete OFF: Sewing machine motor stops after start backtacking is complete  <u>If memory switch No. 400 is set to "OFF", operation occurs when the treadle is depressed slightly.</u> ON: After start backtack sewing, the feed moves forward, then the sewing machine motor stops.
402	1 to 2	1	1	Fixed stitch sewing load function when main unit is sewing pleat stitches 1: Reverse stitch sewing operation when hand switch is pressed 2: Fixed stitch sewing operation when hand switch is pressed
403	300 to 4000 (sti/min)	4000	100	1st stitch sewing speed for slow start original pattern
404	300 to 4000 (sti/min)	4000	100	2nd stitch sewing speed for slow start original pattern
405	300 to 4000 (sti/min)	4000	100	3rd stitch sewing speed for slow start original pattern
406	300 to 4000 (sti/min)	4000	100	4th stitch sewing speed for slow start original pattern
408	2 to 6	2	1	Repeat pattern when start backtacking sewing pattern (AB) is selected 2: A-B 3: B-A-B 4: A-B-A-B * Same as AB (x2) 5: B-A-B-A-B 6: A-B-A-B-A-B * Same as AB (x3)
409	2 to 6	2	1	Repeat pattern when end backtacking sewing pattern (CD) is selected

No.	Setting range	Default value	Setting unit	Setting details
				2: C-D 3: C-D-C 4: C-D-C-D 5: C-D-C-D-C 6: C-D-C-D-C-D
410	0 to 1	0	1	Operation mode for manual production counter increment function using hand switch 0 : Counter can be incremented at any time 1 : Counter can only be incremented after sewing stops and thread has been trimmed

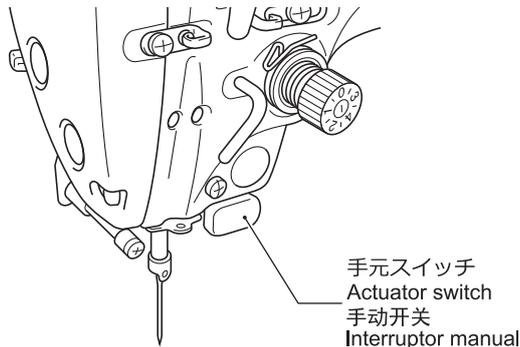
Standard device settings (500 to 599)

No.	Setting range	Default value	Setting unit	Setting details
500	OFF, 1	1	1	Presser foot lifter switch function OFF: Disabled 1: Presser foot lifter switch

Hand switch

The following functions can be assigned to the hand switch.

(The operation of the hand switches will vary depending on the status of the correction sewing icon.)



Settings when using as correction sewing switch

Settings (Initial setting is "1".)	Operation when hand switch is pressed
OFF: <Disabled>	Correction sewing operation is not carried out even when the hand switch is pressed
1: <Single correction sewing>	Stops after sewing a single stitch
2: <Continuous correction sewing>	If the switch is kept pressed, sewing continues.
3: <Reverse single correction sewing>	The feed stops after sewing a single reverse stitch
4: <Reverse continuous correction sewing>	If the switch is kept pressed, reverse sewing continues.
5: <Single correction sewing>	Stops after half stitch sewing

These settings are enabled when the correction sewing icon is illuminated ().

Settings for other than correction sewing switch

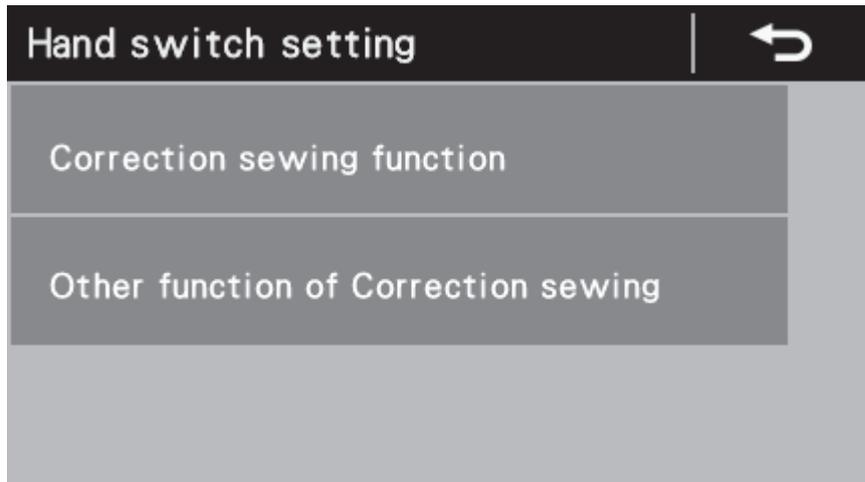
Settings (Initial setting is "4".)	Operation when hand switch is pressed
OFF: <Disabled>	
1: <Reverse>	Feed moves in reverse while the switch is being pressed.
2: <Thread trimming>	When the switch is pressed, thread trimming is carried out. * When this function is selected, the hand switch operates as a thread trimming switch even if the correction sewing icon is turned on.
3: <Presser foot raising>	If the switch is pressed while tread trimming is stopped, the presser foot is raised.
4: <Presser foot raising (switching)>	While tread trimming is stopped, the presser foot is raised and lowered each time the switch is pressed.
5: <Production counter manual count increase>	The production counter increases by 1 each time the switch is pressed while sewing is stopped.
6: <Single end backtack cycle cancel>	When the switch is pressed, end backtacking is canceled once for that sewing pattern, and end backtacking is now sewn even when the treadle is depressed backward.

Settings (Initial setting is "4".)	Operation when hand switch is pressed
7: <Move to next program>	<p>When cycle sewing is selected, sewing moves to the next program each time the switch is pressed.</p> <p> <u>Refer to the Service Manual for details on cycle sewing.</u></p>

* These settings are enabled when the correction sewing icon is turned off ().

Setting hand switch functions

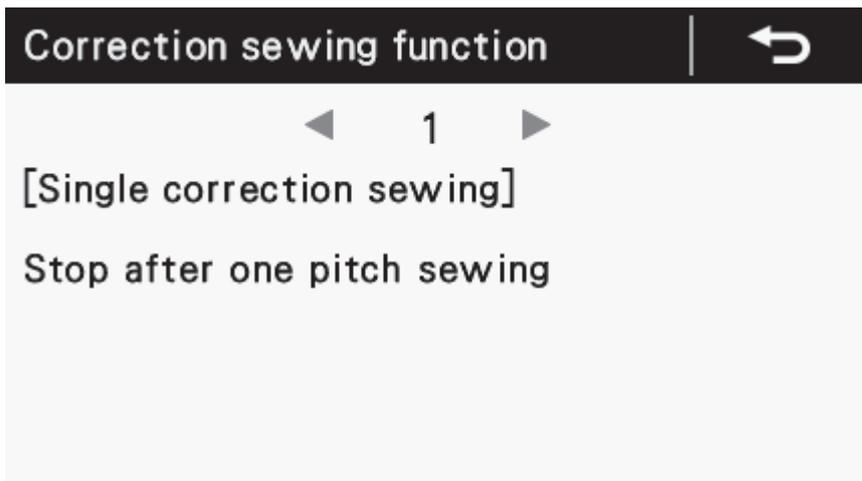
- 1 Press [] > [Hand switch setting].



- 2 Select the desired menu.

Example: Setting the hand switch so that it functions as a correction sewing switch

1. Press [Correction sewing function].



- 3 Press  or  to select the desired setting item.

- 4 Press .

Press this to return to the Home screen.

Reading and writing data using USB media

Programs and memory switch data can be copied between sewing machines by means of USB media.

⚠ CAUTION

⊘

- Do not connect anything to the USB port other than the USB media. Otherwise, problems with operation may result.

Switching to USB media read/write mode

1 Connect the USB media to the sewing machine.

2 Press [] > [USB media read/write].

The currently-selected read/write item and illustration will be displayed.

 Multi card readers may not be recognized correctly.



3 Use the  or  keys to change the read/write item.

4 Press .

The selected read/write item will be run. The read/write in progress screen will be displayed.

 If no USB media is connected at this time, the message "USB media can not be detected." will be displayed.

5 Press .

The display will return to the previous screen.

Data read/write items in USB media mode and media folder structure

The data writing items which can be selected in USB media read/write mode and the structure of the media folders are as described below.

Read/write items that can be selected

Code	Setting item	Read/write direction
1	Read all programs	USB media → (Panel) → Sewing machine
2	Write all programs	USB media ← (Panel) ← Sewing machine
3	Read all memory switches	USB media → (Panel) → Sewing machine
4	Write all memory switches	USB media ← (Panel) ← Sewing machine
5	Read all data	USB media → (Panel) → Sewing machine
6	write all data	USB media ← (Panel) ← Sewing machine
7	Write production information	USB media ← (Panel) ← Sewing machine
8	Write error log	USB media ← (Panel) ← Sewing machine

Creating folders for USB media

Data type	Filename	Folder name
Program	ISMUPG.SEW	¥BROTHER¥ISM¥ISMDE**¥ (* is the value for memory switch No. 750.) (Refer to the Service Manual for details of memory switch No. 750.)
Memory switches	ISMMSW.SEW	Same as above
Cycle programs	ISMCYC.SEW	Same as above
Program common functions	ISMCOM.SEW	Same as above
Hand switch	ISMHSW.SEW	Same as above

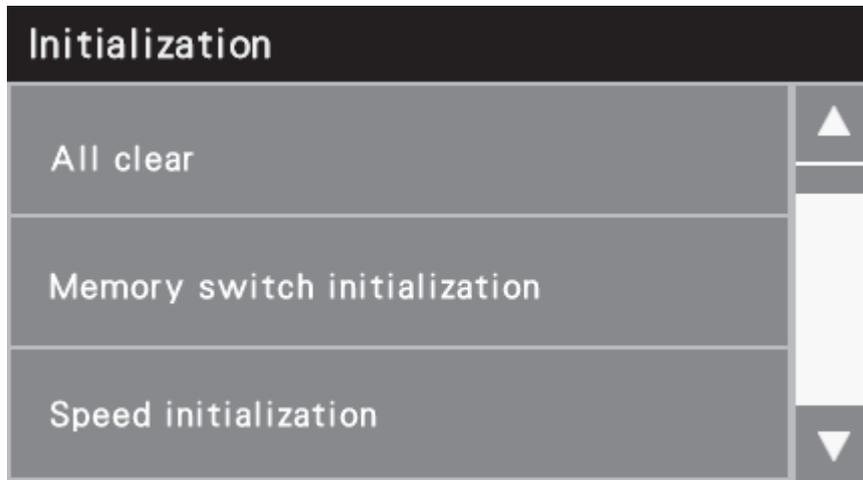
Data type	Filename	Folder name
Error log	E*****.LDT M*****.LDT	\BROTHER\ISM \ISMLDT\
Production data	P*****.LDT	Same as above

Initialization

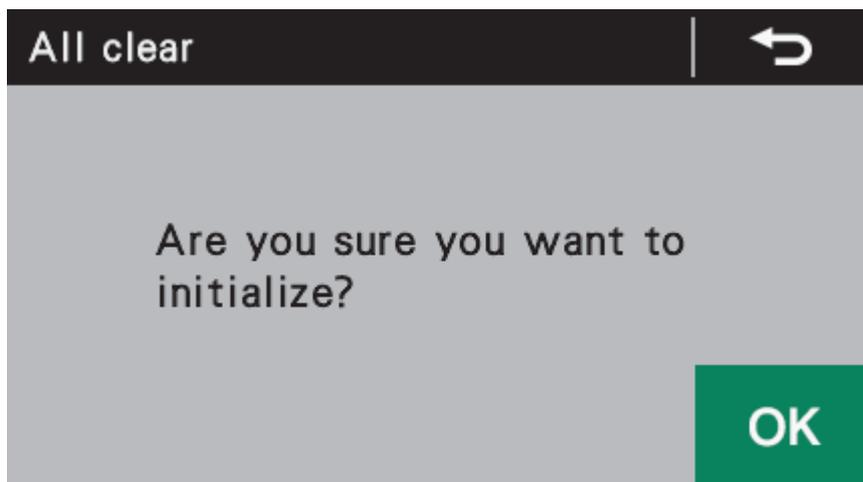
If the sewing machine stops operating normally, the cause may be that an incorrect setting may have been made for the memory data by means of memory switches, for instance. In such cases, it may be possible to restore normal operation by initializing the stored data.

- 1 While pressing , turn on the power switch.

The display will switch to the initialization menu screen.



- 2 Select the item to be initialized.



- 3 Select .

Initialization will then be carried out. When initialization is complete, the display will return to the initialization menu screen.

- 4 Press .

Press this to return to the Home screen.

Points to note before sewing

⚠ CAUTION

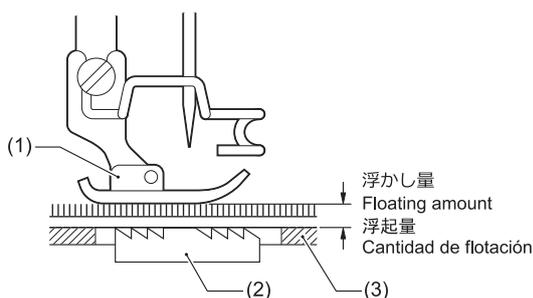


- Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
- Turn off the power switch while threading and replacing the bobbin, and when not using or going away from the sewing machine. The machine may operate if the treadle is depressed by mistake, which could result in injury.
- Do not touch any of the moving parts or press any objects against the sewing machine while sewing. Otherwise, it may result in injury or damage to the sewing machine.
- Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
- 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.

Adjusting the presser foot floating amount (minute lifting amount)

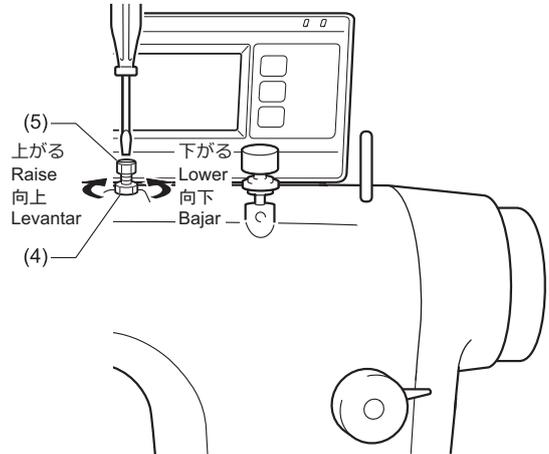
When sewing stretch materials and materials with long pile, you can make minute adjustments to the floating amount for the presser foot (1) in accordance with the material.

- 1 Turn the sewing machine pulley by hand to move the feed dog (2) below the needle plate (3).



- 2 Use the lifting lever to lower the presser foot (1).

- 3 Loosen the nut (4).



- 4 Use a screwdriver to turn the adjustment screw (5) to adjust the floating amount.



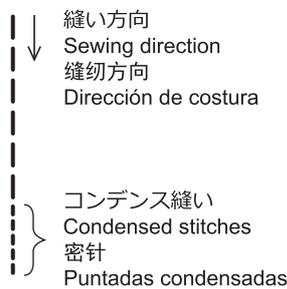
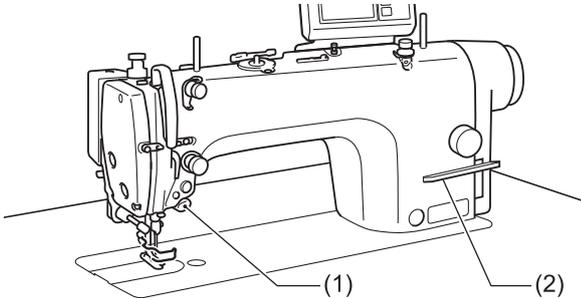
- To raise the presser foot (1), turn the adjustment screw (5) clockwise.
- To lower the presser foot (1), turn the adjustment screw (5) counterclockwise.

- 5 Tighten the nut (4).

After making the adjustment, sew a piece of material to check the floating amount.

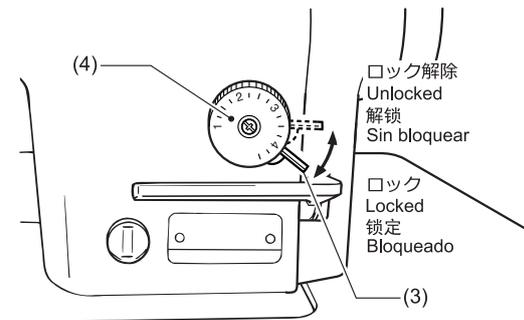
Sewing condensed stitches

- If you press the hand switch (1) or the reverse lever (2) while sewing is in progress, you can sew stitches (forward direction) with small stitch lengths.
- Before carrying out sewing, set the stitch length for condensed stitches.



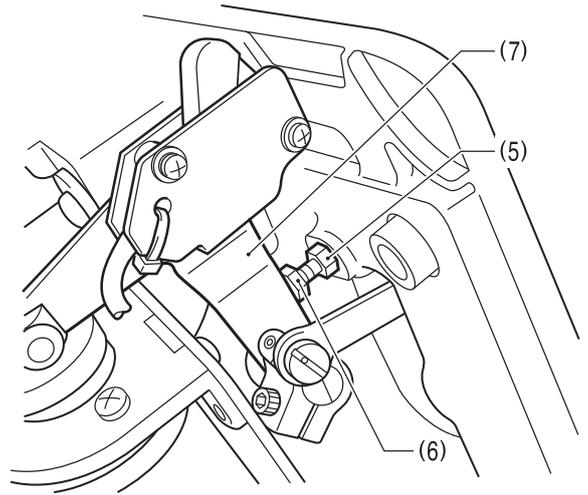
Setting condensed stitches

- 1 Lift up the dial lock lever (3) to release the lock.



- 2 Turn the stitch length dial (4) to the stitch length to be used for condensed stitches.
- 3 Tilt back the machine head.

- 4 Loosen the nut (5) and then turn the bolt (6) until its head is touching the solenoid lever (7).



- 5 Tighten the nut (5) to secure the bolt (6).
- 6 Return the machine head to its original position.

Sewing condensed stitches

- 7 Return the stitch length dial (4) to the stitch length for normal sewing.
- 8 Push down the dial lock lever (3) to engage the lock.
- 9 Start sewing.
- 10 At the position where you would like to start sewing condensed stitches, press the hand switch (1) or the reverse lever (2).
Condensed stitches are sewn while the hand switch (1) or reverse lever (2) is being pressed.

NOTE

To stop sewing condensed stitches, tighten the bolt (6) so that its head is not touching the solenoid lever (7).

5

Daily cleaning procedures

The following cleaning operations should be carried out each day in order to maintain the performance of this machine and to ensure a long service life. Furthermore, if the sewing machine has not been used for a long period of time, carry out the following cleaning procedures before using it again.

Points to note when cleaning

⚠ CAUTION

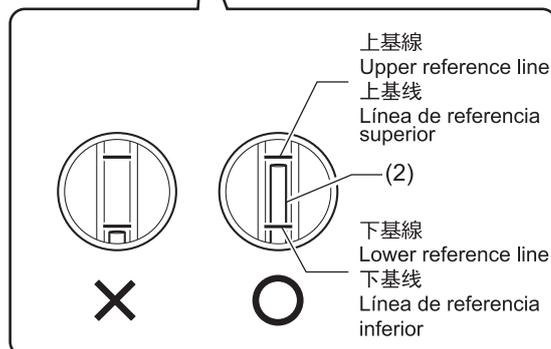
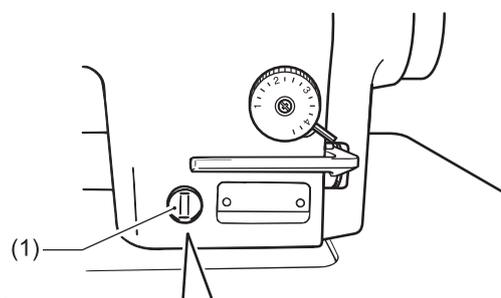
	<ul style="list-style-type: none"> • Turn off the power switch and disconnect the power cord before carrying out these operations. The machine may operate if the treadle is depressed by mistake, which could result in injury. • Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries. • 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.
	<ul style="list-style-type: none"> • 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. Diarrhea or vomiting may result. Keep the oil and grease out of the reach of children.

Adding oil to the oil tank

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

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

- If the lubricating oil level drops below the bottom reference line (2) of the oil gauge window (1), add more oil.



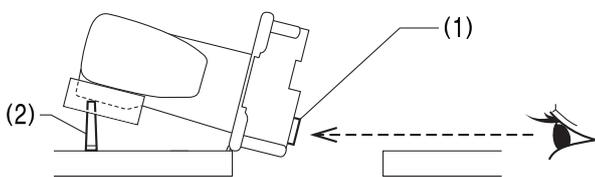
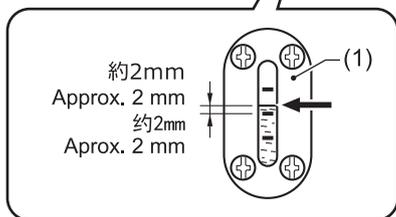
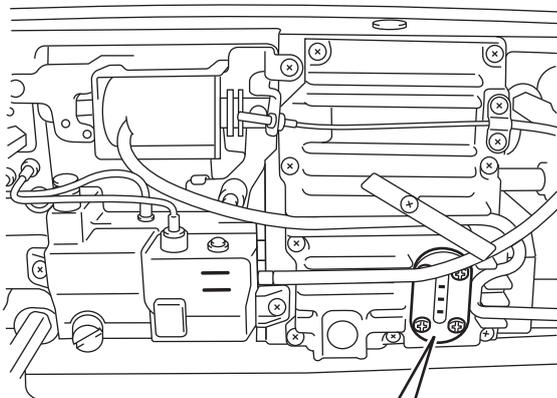
Related Information

- Lubrication on page 7

Adjusting the quantity of oil in the gear box

CAUTION

- Check the quantity of oil in the gearbox immediately after tilting back the machine head. When the machine head is left for long periods in the tilted-back position, the amount of oil in the felt inside the gearbox drops and the oil level seen from the oil window (1) rises, so that it becomes impossible to measure the actual oil level accurately.
- The position of the oil level in the oil window (1) will vary depending on the angle of the machine head. Tilt back the machine head while the head rest (2) is installed in the correct position.



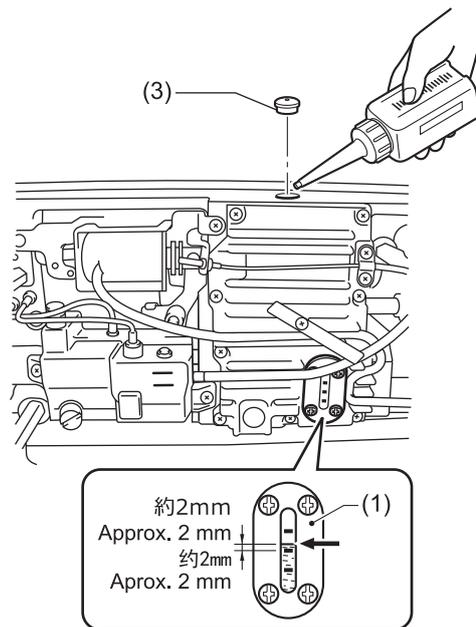
Checking the lubricating oil amount

The oil level should normally be approximately 2mm above the center reference line in the oil window (1). (70 ml of lubricating oil is added to the gearbox at the time of shipment from the factory.)

- 1 Look at the oil window (1) from directly in front.
- 2 If the oil level is below the normal level, add more lubricating oil.

Lubrication

- 1 Remove the rubber cap (3).



- 2 Add lubricating oil until the oil level is approximately 2mm above the center reference line in the oil window (1).

CAUTION

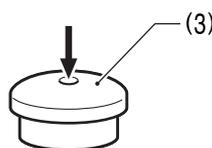
- Pour the lubricating oil 10 ml at a time while checking the oil window.
- Do not pour too much lubricating oil into the specified location. If too much oil is added, oil leaks may result.

- 3 Insert the rubber cap (3) securely.

- 4 Return the machine head to its original position.

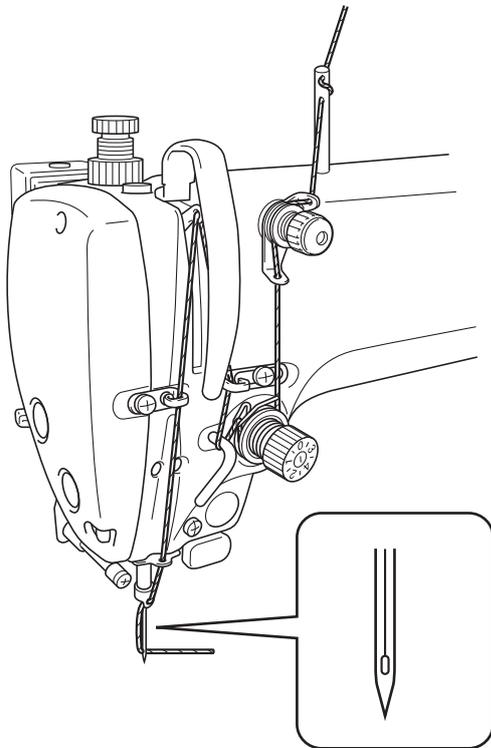
NOTE

The rubber cap (3) has a hole in it for adjusting the air pressure. When replacing the rubber cap (3) use only the replacement part specified by Brother.



Checking the condition of the needle and upper thread

- 1 Replace the needle if it is bent or if the tip is broken.



- 2 Check that the upper thread has been threaded correctly.
- 3 Carry out a test sewing.

Adding grease (when the grease up warning screen is displayed)

If the time for adding grease has been reached when the power switch is turned on, the warning buzzer sounds five times (1 second on/1 second off), and the panel display changes to the grease up warning screen. The sewing machine will not operate at this time, even if the treadle is depressed.

Grease up period has been approached
Apply grease to necessary location
Continue to re-sew without grease up,
press "OK" key

OK

To continue sewing temporarily without applying grease

- 1 Press **OK**.

The panel display will change to the home screen and sewing will be possible when the treadle is depressed.

CAUTION

- The grease up warning screen will be displayed each time the power is turned on until you apply grease and reset the notification.
- If you continue to use the sewing machine after the grease up warning screen is displayed without applying grease (or without carrying out the reset procedure), "E 100" will appear after a certain period of time and the sewing machine will be forcibly prevented from operating for safety reasons.

If this happens, apply grease and carry out the reset procedure.

- **If you continue to use the sewing machine after carrying out the reset procedure but without applying grease, problems with the sewing machine may result.**

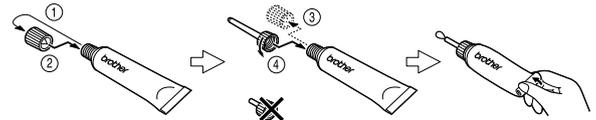
Applying grease

NOTE

Use Brother-specified "Grease unit (SB6659-101)".

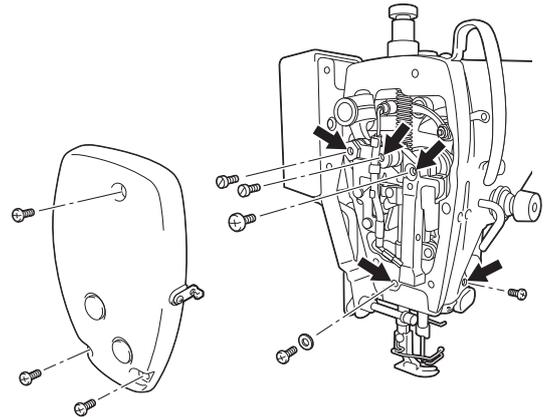
Using the tube

- 1 Make a hole in the tube and attach the nozzle according to the instructions shown in the illustration.

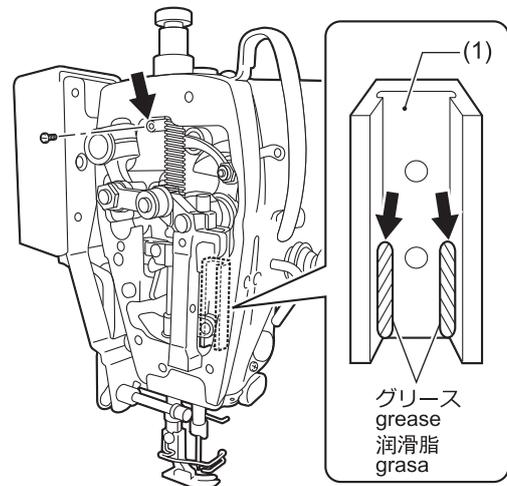


Applying grease

- 2 Follow the procedure below to apply grease to the places indicated by arrows.

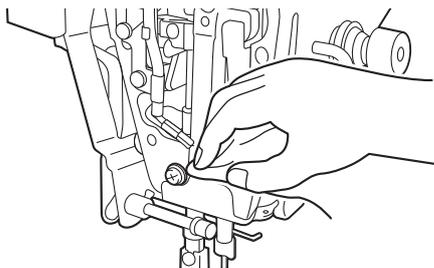


S-7220D-433



1. Turn the power switch to "OFF".
2. Remove the screw.
3. Apply grease to each of the holes until the grease overflows slightly.
4. Turn the machine pulley to raise the needle bar to a position where the slide block guide (1) can be seen, and then apply grease at the position shown in the illustration. (S-7220D-433)
5. Tighten the screw to push in the grease.
6. Turn the machine pulley by hand to move the needle bar up and down several times in order to disperse the grease.

- Use a cloth to wipe away any excess grease from around the screws.



To learn more, see *Related Information*.

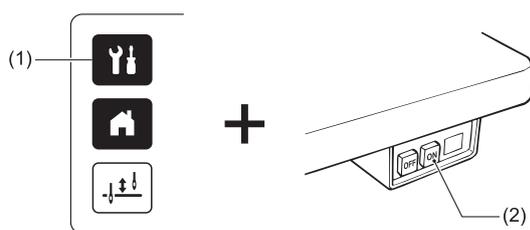
- After applying grease in the places indicated by the arrows, reset the cumulative time.

NOTE

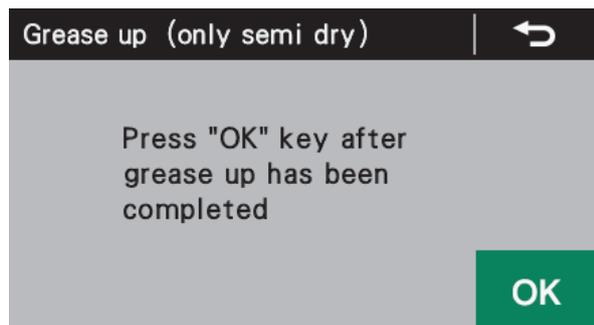
- Once the grease tube has been opened, remove the nozzle from the tube, attach the cap securely and store the tube in a cool dark place.
- The grease should be used as quickly as possible.
- When using the grease again, remove any old grease from inside the nozzle first.
- Store the tube away carefully once the tube has been opened, otherwise the grease remaining inside the tube may deteriorate, and this may affect its lubricating performance.

Clearing the cumulative time between grease applications

- While pressing  (1), turn on the power switch (2).



- Select [Grease up].



- Press .

- Press .

The display will switch to the home screen.

- Depress the treadle to run the sewing machine for 1 second or more.

- Turn the power switch to "OFF".
This completes the reset operation.

Points to note when replacing parts

⚠ CAUTION



- Turn off the power switch and disconnect the power cord before carrying out these operations. The machine may operate if the treadle is depressed by mistake, which could result in injury.
- Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
- 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.



- Replacement of parts should only be carried out by a qualified technician.

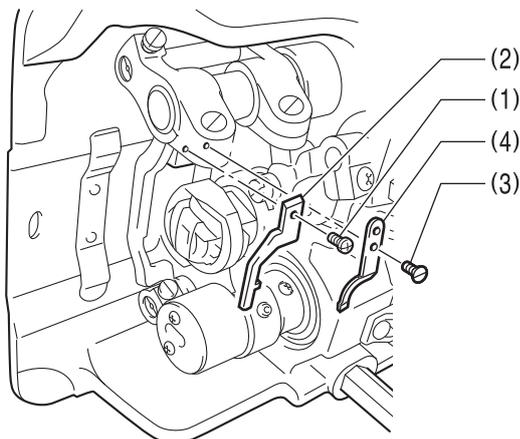


- Use only the proper replacement parts as specified by Brother.

Replacing the fixed knife and movable knife

Replacing the fixed knife

- 1 Tilt back the machine head.
- 2 Remove the screw (1), and then remove the hook stopper (2).

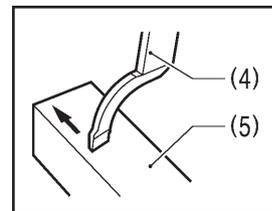


- 3 Remove the flat screw (3), and then remove the fixed knife (4).
- 4 Install the new fixed knife by following the removal procedure in reverse.



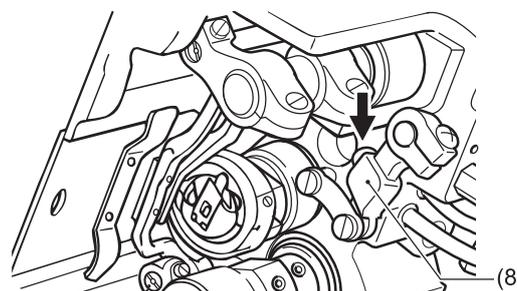
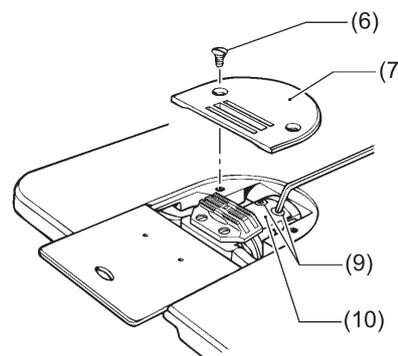
Sharpening the fixed knife

If the thread is not being cut cleanly, use a whetstone (5) to sharpen the fixed knife (4) as shown in the illustration.



Replacing the movable knife

- 5 Remove the needle, and then use the lifting lever to lift the presser foot.
- 6 Remove the two flat screws (6), and then remove the needle plate (7).



- 7 Turn the machine pulley to move the needle bar to its highest position.
- 8 Tilt back the machine head.
- 9 Push the thread trimmer lever (8) by hand in the direction of the arrow until the two flat screws (9) can be seen.

10 Remove the two flat screws (9), and then remove the movable knife (10).

11 Install the new movable knife by following the removal procedure in reverse.

Points to note when making adjustments

⚠ CAUTION



- Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
- Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
- Turn off the power switch and disconnect the power cord plug before carrying out inspection, adjustment or repairs, or when replacing consumable parts such as the rotary hook or knives. The machine may operate if the treadle is depressed by mistake, which could result in injury.
- If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.



- 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.
- 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.



- Always be sure to turn off the power switch and then wait one minute before opening the motor cover. If you touch the surface of the motor, it may cause burns.

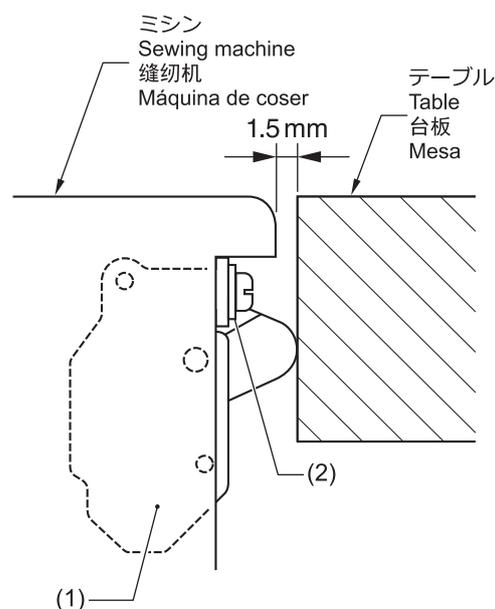
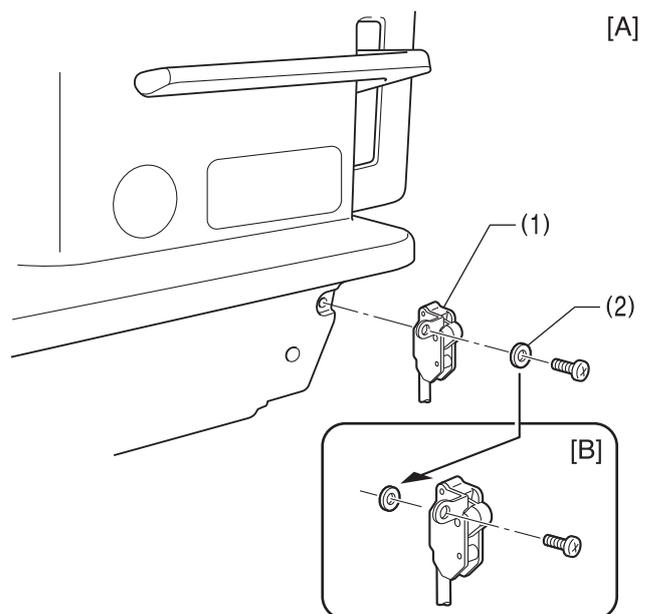
Adjusting the safety switch position

The standard amount of clearance between the machine bed and the table hole is 1.5mm. If the processing method used for the table leaves too much space between the machine head and the table hole (3.5 mm or more), it may adversely affect the operation

of the safety switch (1). In such cases, adjust the position of the safety switch (1).

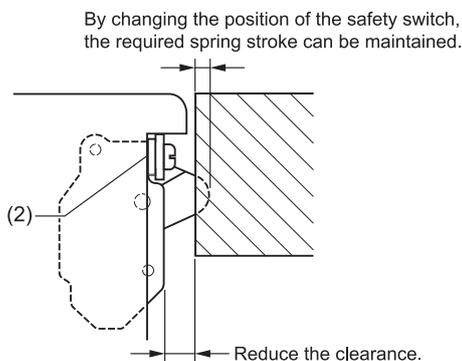
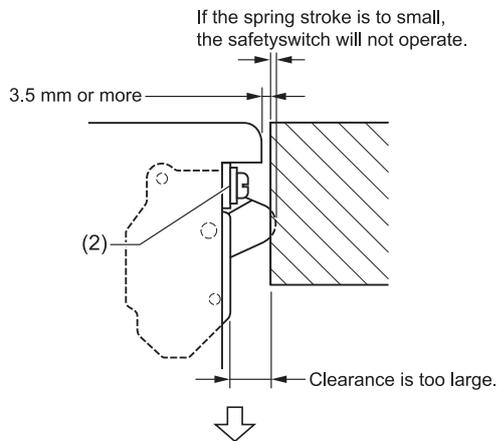


- The safety switch (1) is normally installed as shown in figure [A].
- If the stroke of the spring is small, the operation of the safety switch (1) will become poorer, and so the sewing machine may not operate even when the treadle is depressed.



- (1) Safety switch
(2) Washer

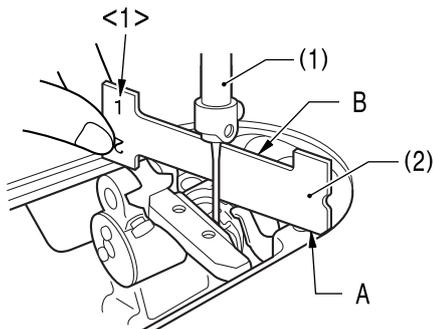
- 1 Remove the safety switch (1).
- 2 Change the position of the washer (2) to the machine bed side as shown in figure [B], and then install the safety switch (1).



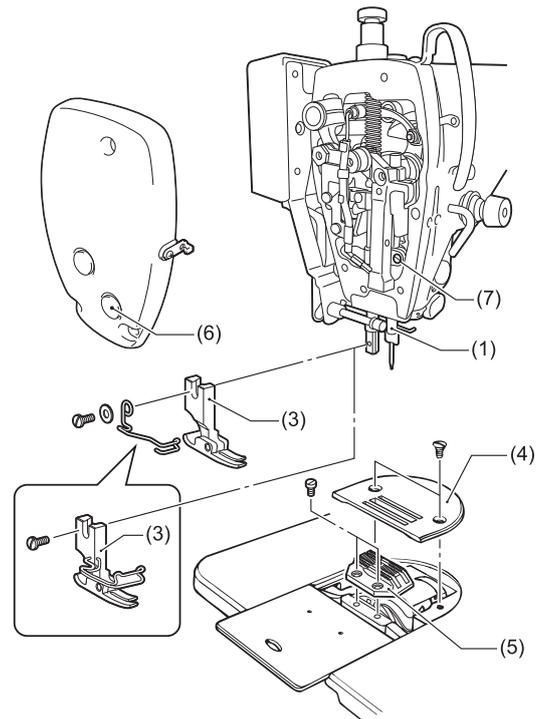
 If further adjustment is necessary, add another washer of the same thickness.

Adjusting the height of the needle bar

Adjust so that the distance from needle plate mounting surface A to the bottom edge of the needle bar (1) is the same as the height of surface B on the <1> side of the accessory timing gauge (2) when the needle bar (1) is at its lowest position as shown in the illustration.



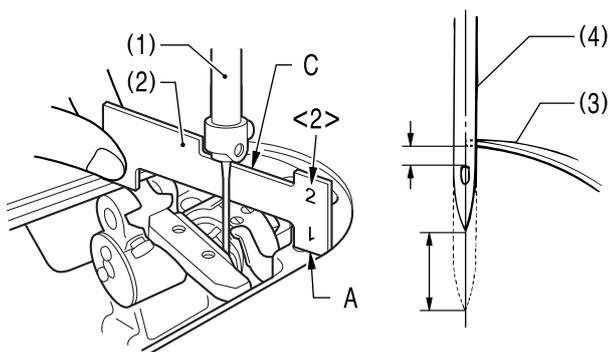
- 1 Remove the presser foot (3), needle plate (4) and feed dog (5).



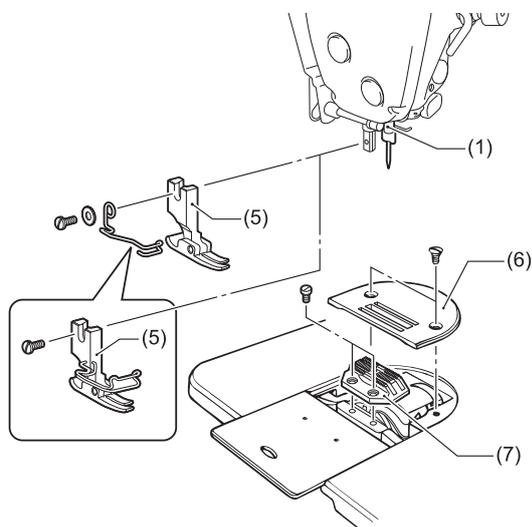
- 2 Turn the machine pulley to set the needle bar (1) to its lowest position.
- 3 Remove the rubber cap (6) from the face plate.
- 4 Loosen the screw (7).
- 5 Move the needle bar (1) up or down to adjust so that the distance from needle plate mounting surface A to the bottom edge of the needle bar (1) is the same as the height of surface B on the <1> side of the accessory timing gauge (2).
- 6 Securely tighten the screw (7).
- 7 Install the rubber cap (6).
- 8 Install the feed dog (5), needle plate (4) and presser foot (3).

Adjusting the needle and rotary hook timing

When the machine pulley is turned forward to raise the needle bar (1) 1.8 mm (2.2 mm for -405 specifications) from its lowest position, the rotary hook tip (3) should be aligned with the center of the needle (4) as shown in the illustration when the distance from needle plate mounting surface A to the bottom edge of the needle bar (1) is the same as the height of surface C on the <2> side of the accessory timing gauge (2). At this time, the gap between the upper edge of the needle hole and the rotary hook tip (3) will be 0.5 to 1.0 mm (0.8 to 1.3 mm for -405 specifications).



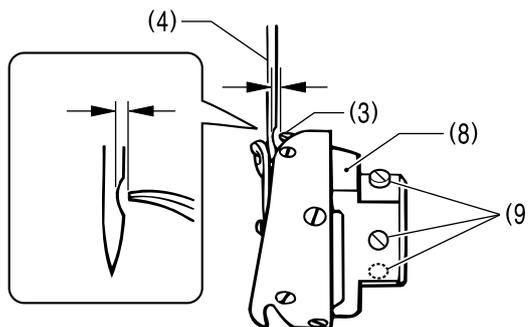
- 1 Remove the presser foot (5), needle plate (6) and feed dog (7).



- 2 Set the stitch length dial as follows.
Standard stitch length

Specifications	Stitch length dial
-4□3	0
-405	3

- 3 Loosen two of the three set screws (9) which are securing the rotary hook (8).



- 4 Turn the machine pulley to raise the needle bar (1) from its lowest position until the distance from needle plate mounting surface A to the bottom edge of the needle bar (1) is the same as the height of surface C on the <2> side of the accessory timing gauge (2).

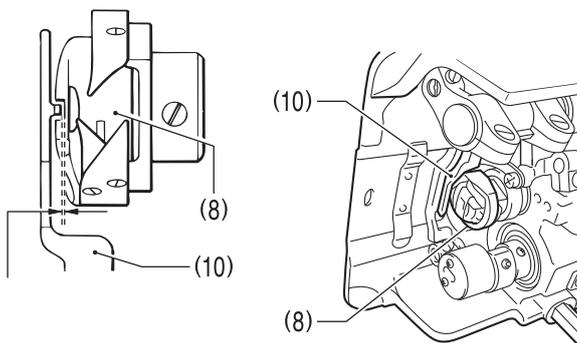
- 5 Loosen the remaining set screw (9) and align the rotary hook tip (3) with the center of the needle (4). The distance between the tip of the rotary hook (3) and the needle (4) should be approximately 0 to 0.1 mm at this time.

- 6 Securely tighten the three set screws (9).

- 7 Install the feed dog (7), needle plate (6) and presser foot (5).

Adjusting the clearance between the rotary hook and the hook stopper

- 8 Check that the thread being used passes smoothly through the clearance between the rotary hook (8) and the hook stopper (10).

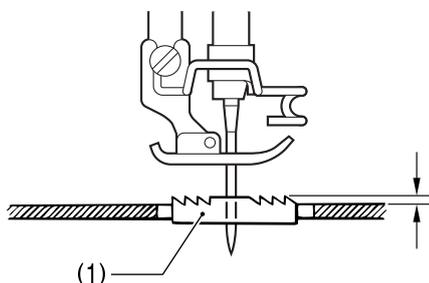


Standard clearance

Specifications	Clearance
-4□3	0.4 to 0.7 mm
-405	0.8 to 1.2mm

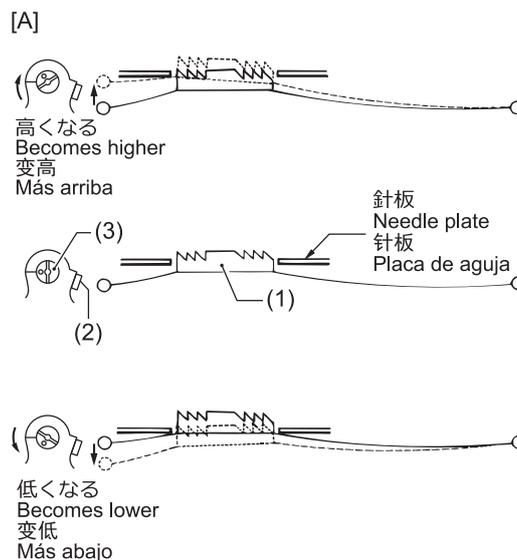
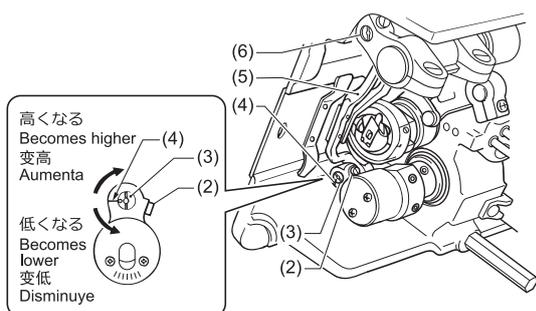
Adjusting the height of the feed dog

The standard height of the feed dog (1) when it is raised as far as possible above the surface of the needle plate is as given below.



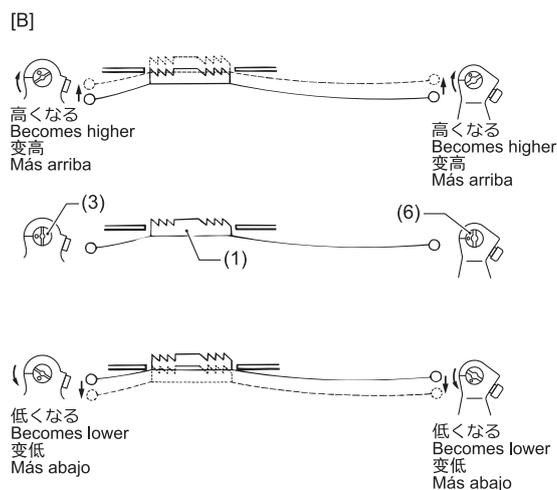
Specifications	Standard height
-4□3	1.0mm
-405	1.2mm

- 1 Turn the machine pulley to move the feed dog (1) to its highest position above the needle plate.
- 2 Tilt back the machine head.
- 3 Loosen the set screw (2).
- 4 Turn the feed lifting rocker shaft (3) within a range of 90° from the reference line (4) to adjust the vertical height of the feed bar (5). (Figure [A])



5 Tighten the set screw (2).

If you are worried about the angle of the feed dog (1), turn the feed bar shaft (6) while carrying out the above adjustment. (Figure [B]) To learn more, see *Related Information*.



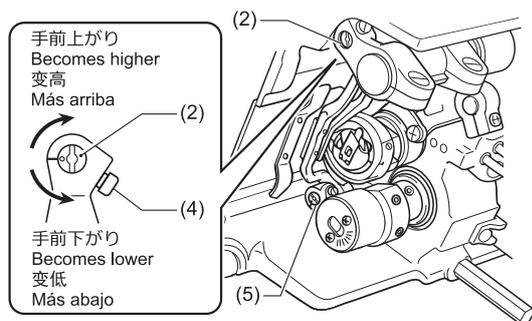
Related Information

- Adjusting the feed dog angle on page 59

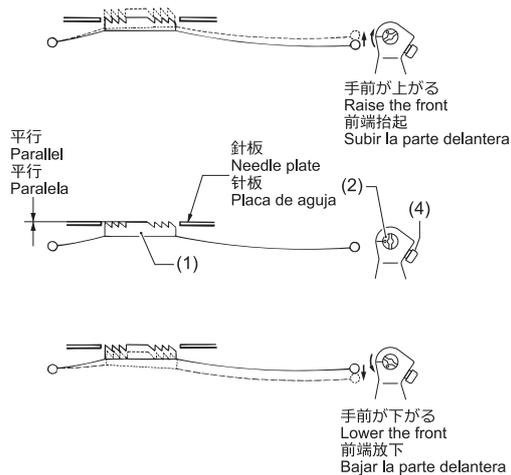
Adjusting the feed dog angle

The standard angle is for the feed dog (1) to be parallel to the needle plate when the machine pulley is turned forward to raise the feed dog (1) from its lowest position until it is flush with the top of the needle plate.

- 1 Turn the machine pulley forward to raise the feed dog (1) from its lowest position until it is flush with the top of the needle plate, and stop turning the machine pulley at that point.
- 2 Tilt back the machine head.
- 3 Loosen the two set screws (4).
- 4 Turn the feed base shaft (2) in the direction of the arrow within a range of 90° with respect to the standard position. (Figure [C])



[C]

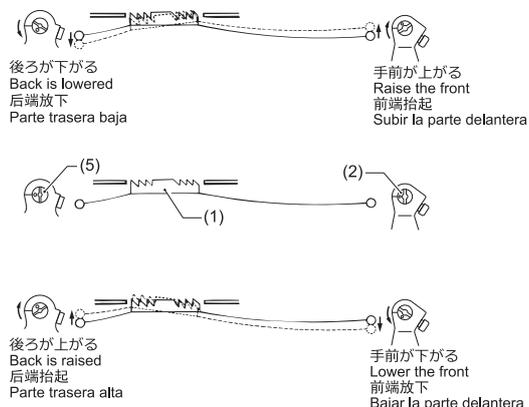


- In order to prevent puckering, lower the front of the feed dog (1).
- In order to prevent the material from slipping, raise the front of the feed dog (1).

- 5 Securely tighten the two set screws (4).

- If you would like to tilt the feed dog (1) further, turn the feed lifting rocker shaft (5) while carrying out the above adjustment. (Figure [D]) To learn more, see *Related Information*.

[D]



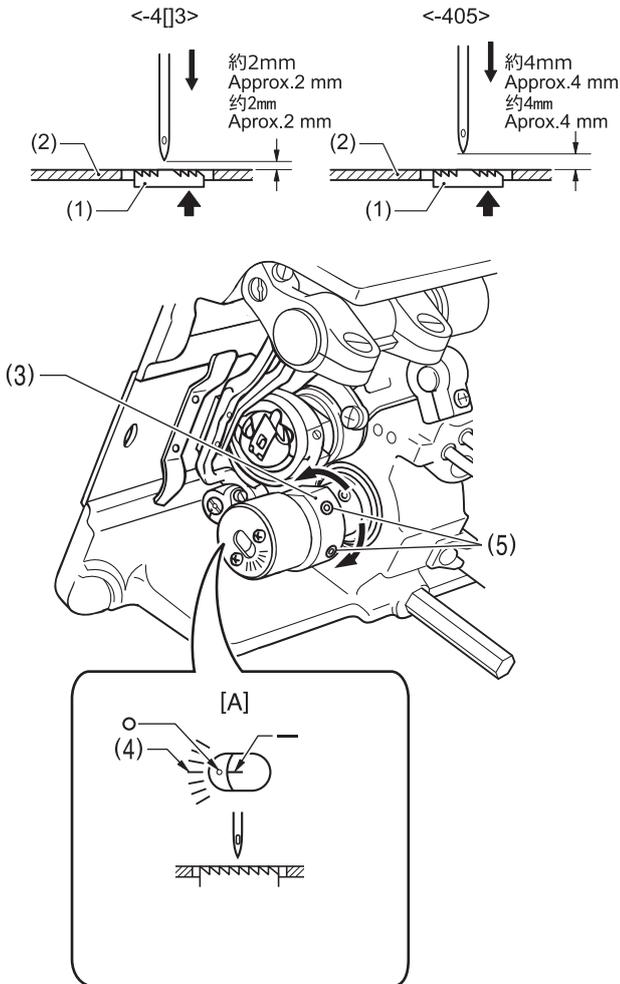
- The height of the feed dog (1) will change after the angle has been adjusted. It will be necessary to re-adjust the height of the feed dog (1).

Related Information

- Adjusting the height of the feed dog on page 58

Adjusting the needle and feed timing

The standard timing is for the tip of the needle to be in the position given below when the machine pulley is turned forward to raise the feed dog (1) from its lowest position until it is flush with the top of the needle plate (2). (At this time, the "-" mark on the lower shaft will be aligned with the center of the scale (4) (0 mark) on the vertical cam (3).) (Figure [A])



Specifications	Standard condition
-4[3]	There is a gap of approximately 2 mm between the tip of the needle and the top of the needle plate (2).
-405	There is a gap of approximately 4mm between the tip of the needle and the top of the needle plate (2).

- 1 Turn the stitch length dial to the maximum setting.

- 2 Tilt back the machine head.
- 3 Loosen the two set screws (5), and then turn the feed lifting eccentric cam (3) slightly to adjust the timing.

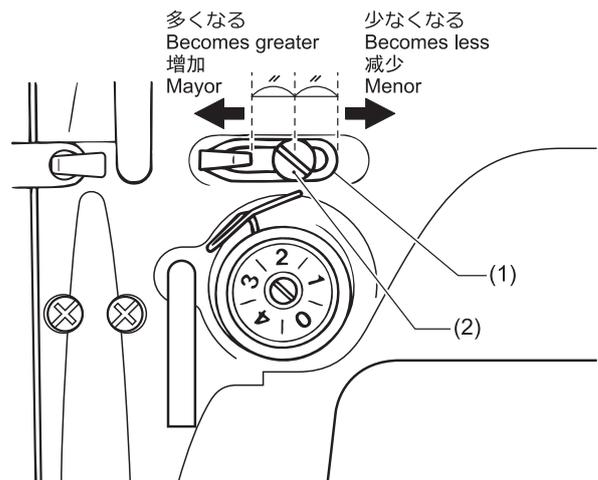
CAUTION

Use the standard needle and feed mechanism timing. If the timing is changed, broken needles may occur.

- 4 After adjusting, securely tighten the set screw (5).

Adjust the position of arm thread guide R.

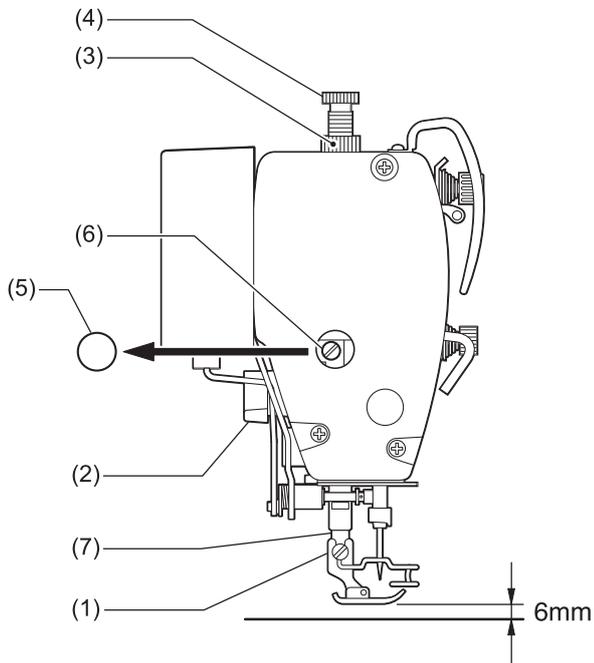
The standard position of arm thread guide R (1) is the position where the screw (2) is in the center of the adjustable range for arm thread guide R (1).



- 1 Loosen the screw (2).
 - 2 To adjust the position, move arm thread guide R (1).
- When sewing heavy-weight material, move arm thread guide R (1) to the left. (The thread take-up amount will become greater.)
 - When sewing light-weight material, move arm thread guide R (1) to the right. (The thread take-up amount will become less.)

Adjusting the height of the presser foot

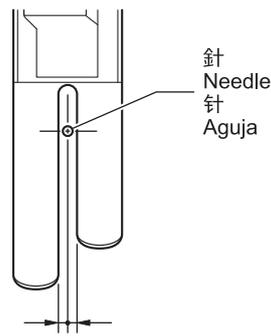
The standard height of the presser foot (1) is 6 mm when the presser foot (1) is raised by means of the lifting lever (2).



- 1** Loosen the nut (3), and then loosen the adjustment screw (4) so that there is no pressure applied to the presser foot.
- 2** Raise the presser foot (1) by using the lifting lever (2).
- 3** Remove the rubber cap (5) from the face plate.
- 4** Loosen the bolt (6) and then move the presser bar (7) up or down until the presser foot (1) is at the standard height of 6 mm.
- 5** Tighten the bolt (6).
- 6** Install the rubber cap (5).
- 7** Adjust the presser foot pressure using the presser adjustment screw (4), and then tighten the nut (3).

NOTE

After adjusting, check that the needle moves down into the center of the groove in the presser foot.



Adjusting the rotary hook lubrication amount

Use the following procedure to check the amount of oil being supplied to the rotary hook when replacing the rotary hook or when changing the sewing speed.

CAUTION

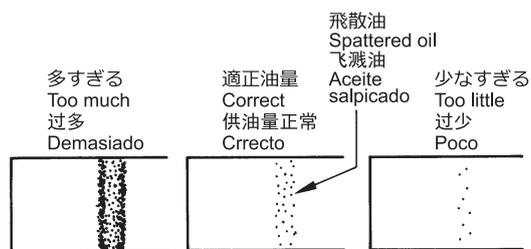
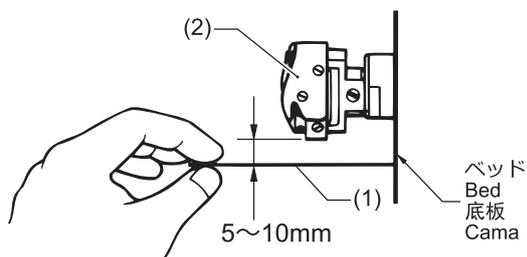
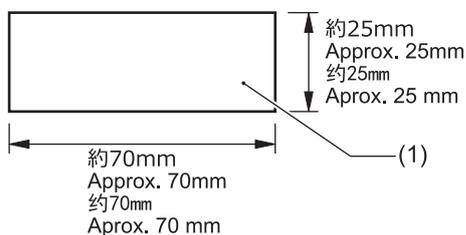


- Be careful not to touch your fingers or the lubrication amount check sheet against moving parts such as the rotary hook or the feed mechanism when checking the amount of oil supplied to the rotary hook. Otherwise injury may result.

Checking the lubrication amount

- 1 Remove the thread from all points from the thread take-up lever to the needle.
- 2 Use the lifting lever to lift the presser foot.
- 3 Run the machine at the normal sewing speed for approximately 1 minute without sewing any material (following the same start/stop pattern as when actually sewing).
- 4 Place the lubrication amount check sheet (1) to the left of the rotary hook (2) and hold it there. Then run the sewing machine at the normal sewing speed for 8 seconds.

Any type of paper can be used as the lubrication amount check sheet (1).



- 5 Check the amount of oil which has spattered onto the sheet.

If adjustment is necessary, adjust the lubrication amount.

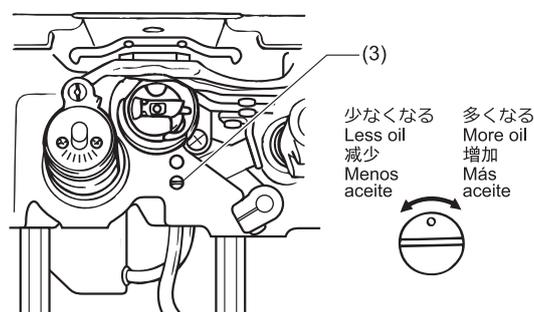
Adjusting the lubrication amount

NOTE

If the lubrication amount does not match the correct amount shown in the illustration (if the amount of spattered oil is too much or none at all), turn the oil adjustment screw (3) clockwise to fully tighten it, turn it back counterclockwise by 2 1/2 turns, and then carry out the adjustment.

- 6 Tilt back the machine head.
- 7 Turn the oil adjustment screw (3) to adjust the lubrication amount.

- If the oil adjustment screw (3) is turned clockwise, the lubrication amount becomes greater.
- If the oil adjustment screw (3) is turned counterclockwise, the lubrication amount becomes smaller.



- 8 Check the lubrication amount.

Turn the rotary hook adjusting screw (3) and check the lubrication amount repeatedly until the lubrication amount is correct.

- 9 Check the lubrication amount again after the sewing machine has been used for approximately two hours.

8

Troubleshooting

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

DANGER



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

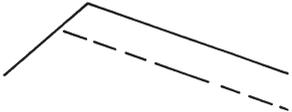
CAUTION

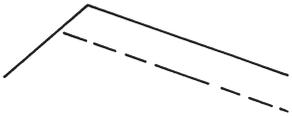
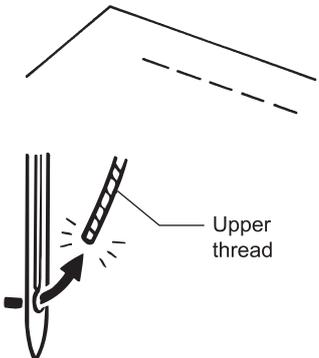
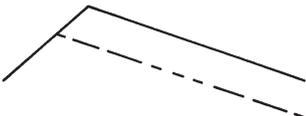


- Turn off the power switch and disconnect the power cord before carrying out these operations. The machine may operate if the treadle is depressed by mistake, which could result in injury.

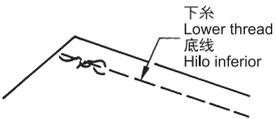
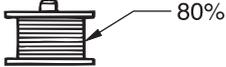
Troubleshooting during sewing

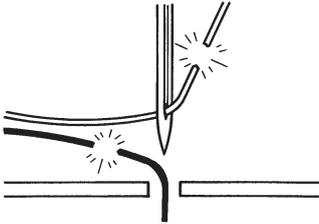
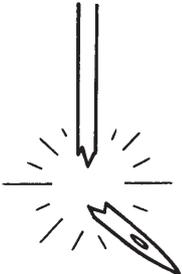
Items with a "*" in the "Page" column should only be checked by a qualified technician.

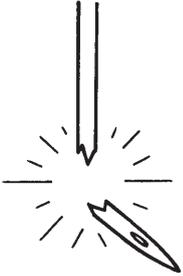
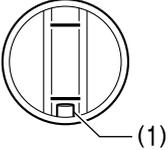
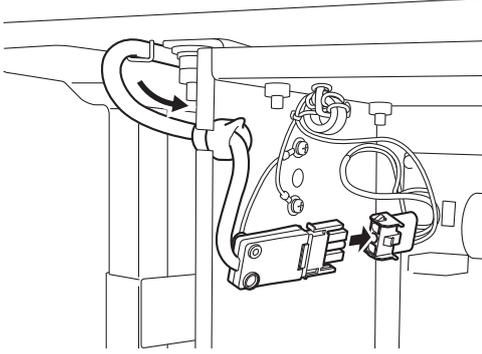
Problem	Possible cause	Page
Upper thread is not tight. 	<ul style="list-style-type: none"> • Is the upper thread tension too weak? Or is the lower thread tension too strong? Adjust the upper thread tension or lower thread tension.	
Lower thread is not tight. 	<ul style="list-style-type: none"> • Is the upper thread tension too strong? Or is the lower thread tension too weak? Adjust the upper thread tension or lower thread tension.	
Loops appear in seam. 	<ul style="list-style-type: none"> • Is the thread path not smooth enough? Use a file with a fine grain or sandpaper to polish smooth the thread path.	
	<ul style="list-style-type: none"> • Is the bobbin turning smoothly? Pull out the lower thread to check that there is no slackness in the thread tension, or replace the bobbin or bobbin case.	
Skipped stitches occur while sewing 	<ul style="list-style-type: none"> • Is the needle tip bent? Is the needle tip blunt? If the needle tip is bent or blunt, replace the needle.	
	<ul style="list-style-type: none"> • Is the needle properly installed? If it is incorrect, install the needle correctly.	
	<ul style="list-style-type: none"> • Is the machine properly threaded? If it is incorrect, thread the thread correctly.	See Checking the condition of the needle and upper thread on page 50.
	<ul style="list-style-type: none"> • Is the presser foot pressure too weak? Adjust the presser foot pressure.	
	<ul style="list-style-type: none"> • Is the needle too thin? Replace the needle with a needle that is one rank thicker.	

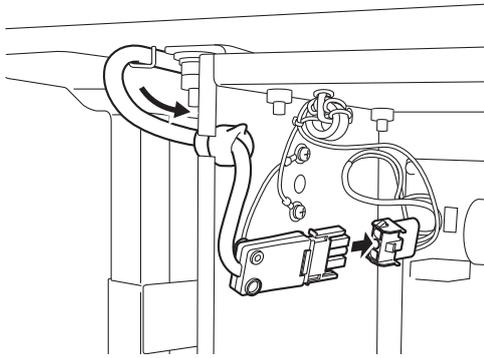
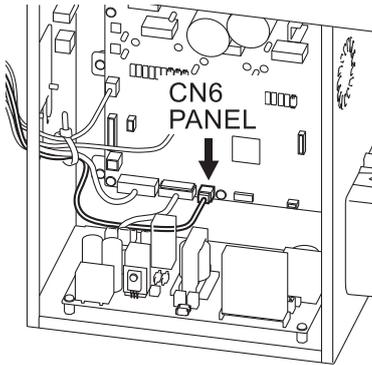
Problem	Possible cause	Page
Skipped stitches occur while sewing 	<ul style="list-style-type: none"> Is the presser foot too high? Adjust the height of the presser foot. ¹ 	See Adjusting the height of the presser foot on page 61.
	<ul style="list-style-type: none"> Is the thread take-up spring too weak? Adjust the tension of the thread take-up spring. ¹ 	
	<ul style="list-style-type: none"> Is the needle and rotary hook timing correct? Adjust the height of the needle bar. ¹ Adjust the clearance between the needle and the tip of the rotary hook. ¹ 	See Adjusting the height of the needle bar on page 56. See Adjusting the needle and rotary hook timing on page 57.
Skipped stitches at sewing start Thread unraveling at sewing start. 	<ul style="list-style-type: none"> Is the thread take-up spring tension too strong? Reduce the tension of the thread take-up spring. ¹ 	
	<ul style="list-style-type: none"> Is the thread take-up spring operating range too large? Lower the position of the thread take-up spring. ¹ 	
	<ul style="list-style-type: none"> Is the needle too thick? Replace the needle with a needle that is one rank thinner. 	
	<ul style="list-style-type: none"> Is the trailing length of the upper thread too short after thread trimming? Adjust the pretension. ¹ 	
	<ul style="list-style-type: none"> Are the threads not being trimmed cleanly? Sharpen the fixed knives, or replace the fixed and movable knives if necessary. ¹ Replace the movable knife. ¹ 	See Replacing the fixed knife and movable knife on page 53.
	<ul style="list-style-type: none"> Is the needle up stop position too high? Adjust the needle up stop position. ¹ 	See Adjusting the needle up stop position on page 29.
	<ul style="list-style-type: none"> Is the sewing speed too fast at the sewing start? Use the slow start key. ¹ 	See Using the operation panel (Basic operations) on page 14.
	<ul style="list-style-type: none"> Is the length of thread trailing out from the bobbin case after thread trimming too short? If the bobbin is spinning loosely, replace the anti-spin spring in the bobbin case. ¹ 	
Uneven seam 	<ul style="list-style-type: none"> Is the presser foot pressure too weak? Adjust the presser foot pressure. 	
	<ul style="list-style-type: none"> Is the feed dog too low? Adjust the feed dog height. ¹ 	See Adjusting the height of the feed dog on page 58.
	<ul style="list-style-type: none"> Is the bobbin damaged? If the bobbin is damaged, smooth it with an oiled grindstone or replace it. Alternatively, replace the bobbin. 	

¹ These items should only be investigated by a technician with the proper training.

Problem	Possible cause	Page
<p>Large degree of puckering (Thread is too tight)</p> 	<ul style="list-style-type: none"> • Is the upper thread tension too strong? Make the upper thread tension as weak as possible. • Is the lower thread tension too strong? Make the lower thread tension as weak as possible. • Is the needle tip blunt? Replace the needle if it is blunt. • Is the needle too thick? Replace with as thin a needle as possible. • Is the thread take-up spring tension too strong? Make the thread take-up spring tension as weak as possible. ¹ • Is the thread take-up spring operating range too large? Lower the position of the thread take-up spring to as low a position as possible. ¹ • Is the presser foot pressure too strong? Adjust the presser foot pressure. • Is the sewing speed too fast? Use the sewing speed key to gradually reduce the sewing speed. • Is the angle of the feed dog correct? Tilt the front of the feed dog down slightly. 	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p>See Using the operation panel (Basic operations) on page 14.</p> <p>See Adjusting the feed dog angle on page 59.</p>
<p>Lower thread is tangled at the sewing start. Bobbin is spinning during thread trimming.</p> 	<ul style="list-style-type: none"> • Is the bobbin spinning direction correct when the lower thread is being pulled? Set the bobbin so that it turns in the opposite direction to the rotary hook. • Is there too much thread wound onto the bobbin? The bobbin winding amount should not be more than 80%.  • Is the anti-spin spring attached? Attach the anti-spin spring. • Is the bobbin turning smoothly? If the bobbin is not turning smoothly, replace the bobbin. • Is a bobbin other than the light-alloy bobbin specified by Brother being used? Use only bobbins which are specified by Brother. 	<p></p> <p></p> <p></p> <p></p> <p></p>

Problem	Possible cause	Page
Upper and lower threads are breaking. 	<ul style="list-style-type: none"> Is the needle tip bent? Is the needle tip blunt? If the needle tip is bent or blunt, replace the needle. 	
	<ul style="list-style-type: none"> Is the needle properly installed? If it is incorrect, install the needle correctly. 	
	<ul style="list-style-type: none"> Is the machine properly threaded? If it is incorrect, thread the thread correctly. 	See Checking the condition of the needle and upper thread on page 50.
	<ul style="list-style-type: none"> Is the rotary hook sufficiently lubricated? If the oil gauge is down to the lower reference line in the oil gauge window, add more oil. 	See Lubrication on page 7.
	<ul style="list-style-type: none"> Is the upper or lower thread tension too strong or too weak? Adjust the upper thread or lower thread tension. 	
	<ul style="list-style-type: none"> Is the upper thread loose because the thread take-up spring stroke is too small? Adjust the position of the thread take-up spring. ¹ 	
	<ul style="list-style-type: none"> Is the rotary hook, feed dog or other part damaged? If the thread path is damaged, smooth it with sandpaper or similar. Alternatively, replace the damaged part. ¹ 	
	<ul style="list-style-type: none"> Is the thread path damaged? If the thread path is damaged, smooth it with sandpaper. Alternatively, replace the damaged part. ¹ 	
Incorrect thread trimming	<ul style="list-style-type: none"> Is the fixed knife or movable knife damaged or worn? Replace the fixed knife or the movable knife. ¹ 	See Replacing the fixed knife and movable knife on page 53.
Incorrect thread trimming (Upper thread is not being trimmed.) (Lower thread is not being trimmed.)	<ul style="list-style-type: none"> Is the needle properly installed? If it is incorrect, install the needle correctly. 	See Replacing the fixed knife and movable knife on page 53.
	<ul style="list-style-type: none"> Is the fixed knife or movable knife blunt? Replace the fixed knife or the movable knife. 	See Replacing the fixed knife and movable knife on page 53.
Broken needle 	<ul style="list-style-type: none"> Is the material being pushed or pulled with excessive force during sewing? 	
	<ul style="list-style-type: none"> Is the needle properly installed? If it is incorrect, install the needle correctly. 	
	<ul style="list-style-type: none"> Is the needle tip bent? Is the needle tip broken, or is the needle hole blocked? Replace the needle. 	
	<ul style="list-style-type: none"> Is the needle and rotary hook timing correct? Adjust the height of the needle bar. ¹ Adjust the clearance between the needle and the tip of the rotary hook. ¹ 	See Adjusting the height of the needle bar on page 56. See Adjusting the needle and rotary hook timing on page 57.
	<ul style="list-style-type: none"> Is the needle and feed mechanism timing correct? Adjust to the standard timing. ¹ 	See Adjusting the needle and feed timing on page 60.

Problem	Possible cause	Page
Broken needle 	<p>NOTE</p> <ul style="list-style-type: none"> It is extremely dangerous to leave any pieces of broken needle sticking in the material. If the needle breaks, search for all pieces until the whole of the needle is found again. Furthermore, we recommend that thorough steps be taken to account for such needles to comply with product liability regulations. 	
Oil gauge (1) is not visible in oil gauge window. 	<ul style="list-style-type: none"> Is the oil tank empty? Fill the oil tank with oil. 	See Lubrication on page 7.
Sewing machine does not operate when power is turned on and treadle is pressed.	<ul style="list-style-type: none"> Is the power supply for the control box disconnected? Insert the connectors securely. ¹  <ul style="list-style-type: none"> Is the operation panel set to a screen other than a screen where sewing is possible? Switch the operation panel to a screen where sewing is possible, such as the home screen. 	See Connecting the cords on page 9.
Machine does not operate at high speed.	<ul style="list-style-type: none"> Is the sewing speed setting or backtack stitch speed setting too slow? Use the sewing speed key to set the high speed. 	See Using the operation panel (Basic operations) on page 14.
Machine stops during sewing.	<ul style="list-style-type: none"> Has the sewing pattern been set to a fixed stitch pattern? In main sewing mode, set the sewing pattern to something other than "Fixed stitch". ¹ Is the power supply voltage too low? Check the power supply voltage. ¹ (If the power cord is too long or too many appliances are being run from a single outlet, this may cause voltage drops which will in turn cause the reset function to activate and stop the machine, even if the power supply itself is normal.) 	See Using the operation panel (Basic operations) on page 14.

Problem	Possible cause	Page
Nothing appears on the operation panel display.	<ul style="list-style-type: none"> Is the power supply connector disconnected from the control box? Insert the connector securely. ¹ 	See Connecting the cords on page 9.
	<ul style="list-style-type: none"> Is the 8-pin operation panel connector inside the control box disconnected? Insert the connectors securely. ¹ 	See Connecting the cords on page 9.
The panel display switches to the grease-up warning screen when the power switch is turned on.	<ul style="list-style-type: none"> This display is to notify you that it is time to apply grease. Apply grease. ¹ 	See Adding grease (when the grease up warning screen is displayed) on page 51.
The illumination becomes momentarily darker or flickers.	<ul style="list-style-type: none"> The illumination may become momentarily darker or flicker when the sewing machine starts or stops, depending on the power supply in the environment where the sewing machine is being used. This is not a sign of a malfunction. 	*

List of error codes

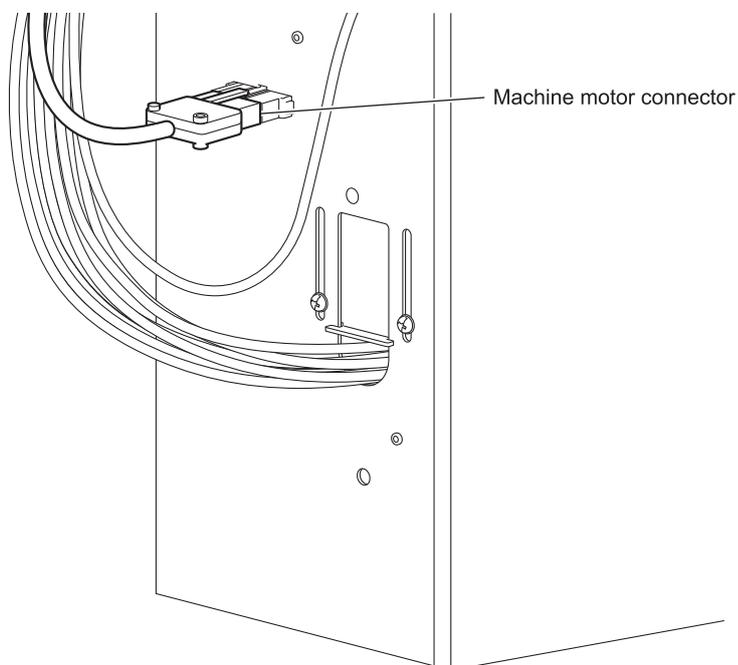
List of error codes

If an error code appears on the touch panel display

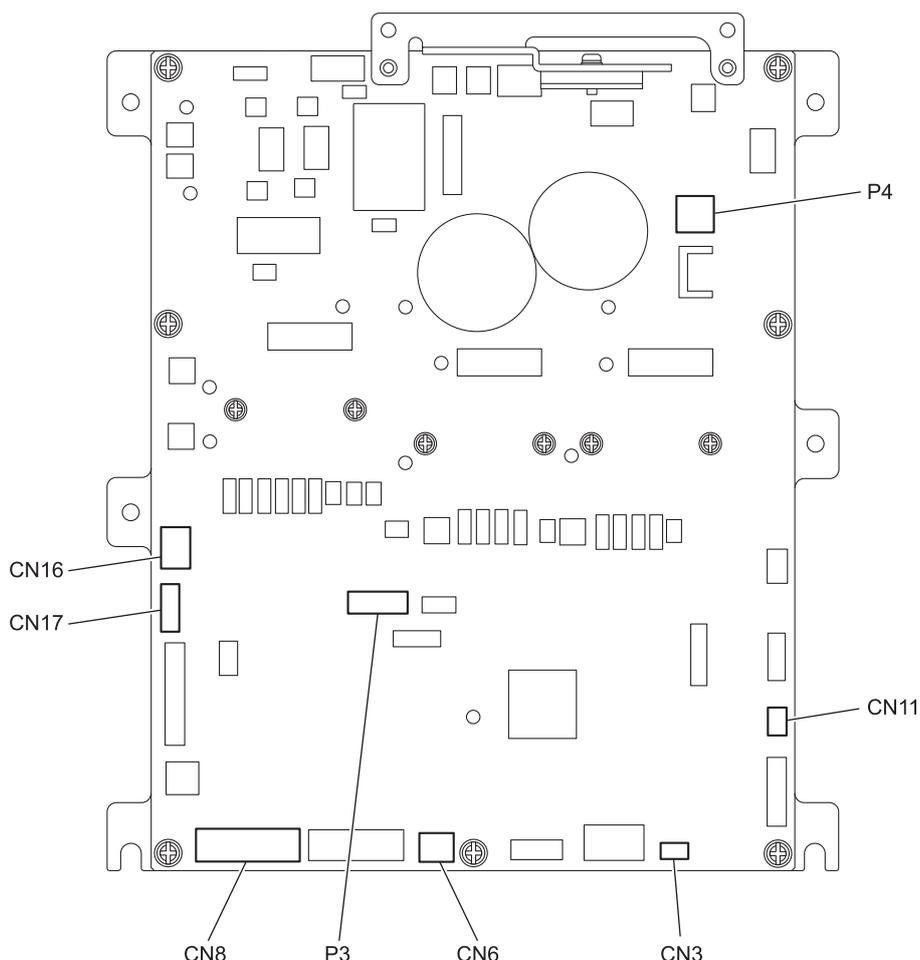
! E055

Machine head is detected as being tilted back when turn on power.
Turn off power, return head to right portion.
Turn off power, check connection of connector CN8.

Connector layout diagram



Main P.C. board



Switch-related errors

Code	Cause	Remedy
E050	Machine head is detected as being tilted back when sewing starts.	<ul style="list-style-type: none"> • Turn off the power, and then return the machine head to its original position. • Turn off the power and check the connection of connector CN8.
E051	Machine head is detected as being tilted back during sewing.	Turn off the power and check the connection of connector CN8.
E055	Machine head is detected as being tilted back when power was turned on.	<ul style="list-style-type: none"> • Turn off the power, and then return the machine head to its original position. • Turn off the power and check the connection of connector CN8.
E064	A touch key was being pressed when the power was turned on.	Turn the power off and then back on again. Do not press the touch keys when turning on the power.
E065	A disabled hardware key was being pressed when the power was turned on.	Turn the power off and then back on again. Do not press a disabled hardware key while turning on the power.
E066	A touch key was being pressed when the power was turned on.	Turn the power off and then back on again. Do not press the hand switch when turning on the power.

Code	Cause	Remedy
E090	Connection of treadle was not detected when power was turned on.	Turn off the power and check the connection of connector CN11.
E095	Treadle or standing operation pedal was being depressed when power was turned on.	Return the treadle or the standing operation pedal to the neutral position. Do not press the treadle or the standing operation pedal when turning on the power.

Sewing machine motor-related errors

Code	Cause	Remedy
E100	Time for grease up.	Turn off the power, apply grease, and then clear the grease up counter according to the method specified.
E111	The needle up stop position exceeded the specified value when the sewing machine motor stopped.	Turn off the power and check if the sewing machine motor or thread trimming mechanism is stiff or not.
E112	The needle up or needle down stop position did not reach the specified value when the sewing machine motor stopped.	Turn off the power and check if the sewing machine motor or thread trimming mechanism is stiff or not.
E113	The needle down stop position exceeded the specified value when the sewing machine motor stopped.	Turn off the power and check if the sewing machine motor or thread trimming mechanism is stiff or not.
E130	Sewing machine motor did not operate at sewing start or during sewing.	<ul style="list-style-type: none"> • Turn off the power and check if the sewing machine motor is stiff or not. • Turn off the power and check the connections of the 4-pin sewing machine motor connector and connector CN16.
E131	Sewing machine motor encoder connection was not detected when power was turned on.	Turn off the power and check the connection of connector CN16.
E132	Abnormal sewing speed of sewing machine motor was detected during sewing.	Turn off the power and check the connection of connector CN16.
E133	Problem with encoder signal of sewing machine motor	Turn off the power and check the connection of connector CN16.
E140	Sewing machine motor ran in opposite direction to the direction specified during sewing.	Turn off the power and check the connection of connector CN16.
E150	Abnormal overheating detected in sewing machine motor.	Turn off the power and recheck the sewing conditions.
E151	Motor overheating sensor connection was not detected.	Turn off the power and check the connection of connector CN16.
E161	Sewing machine motor overload was detected during sewing.	Turn off the power and recheck the sewing conditions.
E190	Sewing machine motor was running continuously for too long during sewing.	Turn the power off and then back on again.
E191	Thread trimming solenoid operation was not completed within the specified period.	Turn off power and check if the thread trimming mechanism is stiff.

Communication and memory-related errors

Code	Cause	Remedy
E400	Connection of panel was not detected when power was turned on.	Turn off the power and check the connection of connector CN6.

Code	Cause	Remedy
E410	Communication error with panel occurred when power was turned on.	Turn off the power and check the connection of connector CN6.
E422	An error occurred while reading from USB media.	<ul style="list-style-type: none"> • Press the RESET key. • Check the files in the USB media.
E424	Not enough free space in the USB media.	<ul style="list-style-type: none"> • Press the RESET key. • Increase the amount of free space.
E425	An error occurred while writing to USB media.	<ul style="list-style-type: none"> • Press the RESET key. • Use the specified USB media.
E440	Data could not be written to the backup memory (main internal P.C. board).	Turn the power off and then back on again.
E441	Data could not be read from the backup memory (main internal P.C. board).	Turn the power off and then back on again.
E442	Back up memory (main internal P.C. board) data was abnormal, so settings were initialized.	Turn the power off and then back on again.
E450	Model selections could not be read from machine head memory (internal panel).	Turn off the power and check the connection of connector P3.
E451	Data backup cannot be written to machine head memory (internal panel).	Turn off the power and check the connection of connector P3.
E452	Machine head memory is not connected.	Turn off the power and check the connection of connector P3.

Software-related errors

Code	Cause	Remedy
E582	A memory switch version updating error was detected (including specification mismatch).	Turn the power off and then back on again.
E583	A parameter version updating error was detected (including specification mismatch).	Turn the power off and then back on again.

P.C. board-related errors

Code	Cause	Remedy
E700	Abnormal rise in power supply voltage was detected when power was turned on.	Turn off the power and check the power supply voltage.
E701	Abnormal rise in sewing machine motor power supply voltage was detected.	<ul style="list-style-type: none"> • Turn off the power and check the power supply voltage. • Turn off the power and check the connection of connector P4.
E705	Abnormal drop in power supply voltage was detected.	Turn off the power and check the power supply voltage.
E709	Power supply signal could not be detected when power was turned on.	Turn the power off and then back on again.
E710	Abnormal sewing machine motor current was detected.	Turn off the power and check the connections of the 4-pin sewing machine motor connector.
E740	Fan motor does not operate.	<ul style="list-style-type: none"> • Turn off the power, and then check if the cooling fan is blocked with scraps of thread. • Turn off the power and check the connection of connector CN3.

Code	Cause	Remedy
E791	Abnormal solenoid mechanism current detected when solenoid was activated.	Turn off the power and check the connection of connector CN8.

Version updating errors

Code	Cause	Remedy
E880	Version update request could not be received when power was turned on.	Turn off the power and check the connection of connector CN6.
E881	Communication error was detected during main version update.	Turn off the power and check the connection of connector CN6.
E882	No USB media connected when power was turned on.	Turn off the power and check the connection of the USB media.
E883	Version update file could not be detected in USB media when power was turned on.	Turn off the power and then check that the version update file is contained in the USB media.
E884	Problem with version update file detected during version updating.	Turn off the power, and then repeat the version update procedure.
E885	Version update file could not be read from USB media during version updating.	Turn off the power and check the connection of the USB media.
E886	Problem with version update file detected during version updating.	Turn off the power, and then repeat the version update procedure.
E887	Version update file could not be written during version updating.	Turn off the power, and then repeat the version update procedure.
E888	Error sending or receiving version update file.	Turn off the power, and then repeat the version update procedure.
E889	Incorrect data written to flash memory.	Turn off the power, and then repeat the version update procedure.
E890	Error occurred during version update.	Turn off the power, and then repeat the version update procedure.

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



Please note that the contents of this manual may differ slightly from the actual product purchased as a result of product improvements.

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