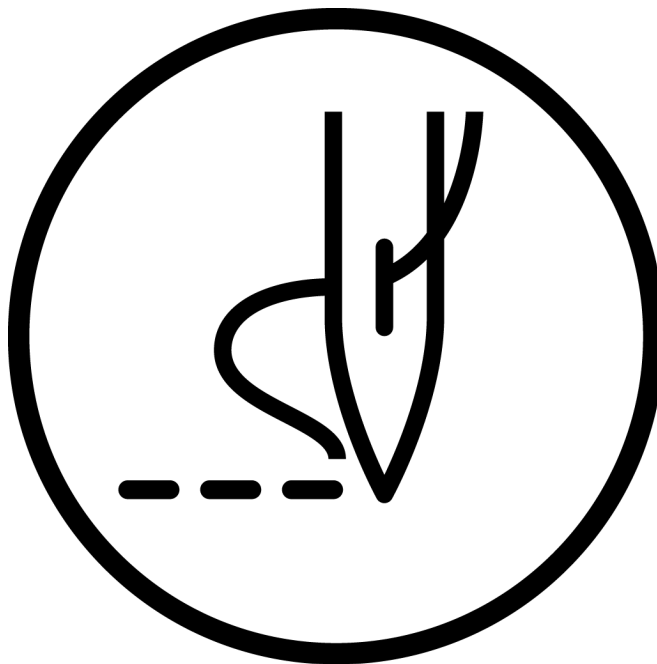


BAS-311H

INSTRUCTION MANUAL

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

DIRECT DRIVE
PROGRAMMABLE ELECTRONIC PATTERN SEWER



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

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




SAFETY INSTRUCTIONS

[1] Safety indications and their meanings

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

The meanings of these indications and symbols are given below.


Indications

 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”.)

[2] Notes on safety

DANGER



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

WARNING



Do not allow any liquids to get onto this sewing machine, otherwise fire, electric shocks or operating problems may occur.



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.

CAUTION

Environmental requirements



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

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



Any fluctuations in the power supply voltage should be within $\pm 10\%$ of the rated voltage for the machine. Voltage fluctuations which are greater than this may cause problems with correct operation.



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

Insufficient power supply capacity may cause problems with correct operation.



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

Insufficient pneumatic delivery capability may cause problems with correct operation.



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

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



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

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



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

Lightning may cause problems with correct operation.

Installation



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



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



The sewing machine weighs approximately 88 kg. The installation should be carried out by two or more people.



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



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

Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.



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



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



Install the safety covers to the machine head and motor.



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












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

Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.



Keep the oil out of the reach of children.

CAUTION










Sewing

-  This sewing machine should only be used by operators who have received the necessary training in safe use beforehand.
-  The sewing machine should not be used for any applications other than sewing.
-  Be sure to wear protective goggles when using the machine.
If goggles are not worn, there is the danger that if a needle breaks, parts of the broken needle may enter your eyes and injury may result.
-  Turn off the power switch at the following times. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - When threading the needle
 - When replacing the bobbin and needle
 - When not using the machine and when leaving the machine unattended
-  If using a work table which has casters, the casters should be secured in such a way so that they cannot move.
-  Attach all safety devices before using the sewing machine. If the machine is used without these devices attached, injury may result.
-  Do not touch any of the moving parts or press any objects against the machine while sewing, as this may result in personal injury or damage to the machine.
-  If an error occurs in machine operation, or if abnormal noises or smells are noticed, immediately turn off the power switch. Then contact your nearest Brother dealer or a qualified technician.
-  If the machine develops a problem, contact your nearest Brother dealer or a qualified technician.

Cleaning

-  Turn off the power switch before carrying out cleaning. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result.
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.
Keep the oil out of the reach of children.

Maintenance and inspection

-  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
-  Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
-  Turn off the power switch and disconnect the power cord before carrying out the following operations. If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.
 - Inspection, adjustment and maintenance
 - Replacing consumable parts such as the rotary hook
-  Disconnect the air hoses from the air supply and wait for the needle on the pressure gauge to drop to "0" before carrying out inspection, adjustment and repair of any parts which use the pneumatic equipment.
-  Hold the machine head with both hands when tilting it back or returning it to its original position.
Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  When replacing parts and installing optional accessories, 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.
-  To prevent accidents and problems, do not modify the machine yourself.
Brother will not be held responsible for any accidents or problems resulting from modifications made to the machine.

[3] Warning labels

The following warning labels appear on the sewing machine.

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

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

2

CAUTION
Moving parts may cause injury.

Operate with safety devices* installed.

Turn off the power before carrying out operations such as threading, changing the needle, bobbin, knives or hook, cleaning and adjusting.

*Safety devices

Devices such as eye guard, finger guard, thread take-up cover, side cover, rear cover, tension release solenoid cover, inner cover, outer cover, fixed cover and gas spring support cover

3 Be careful not to get your hand caught when tilting back the machine head and returning it to its original position.

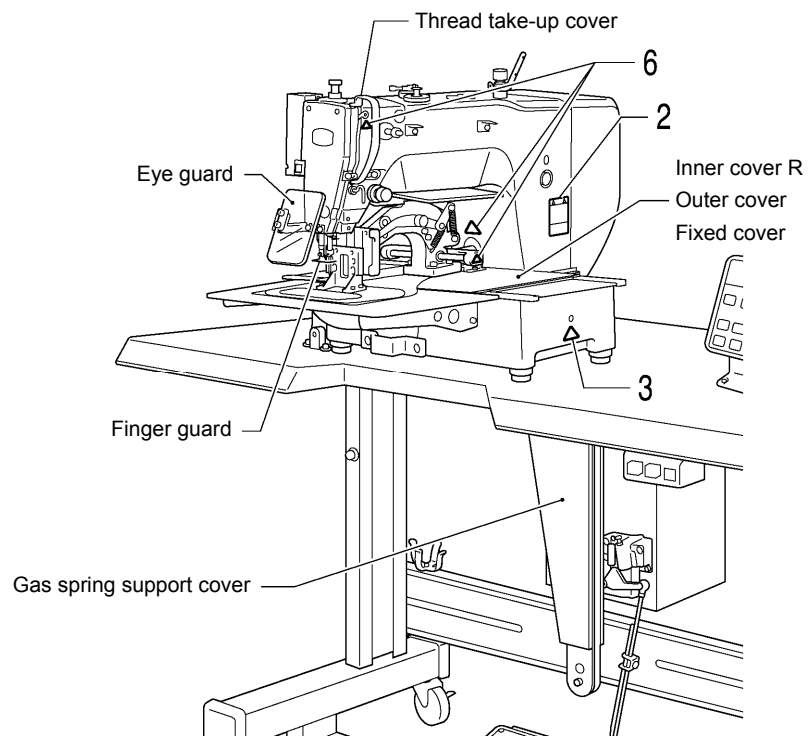
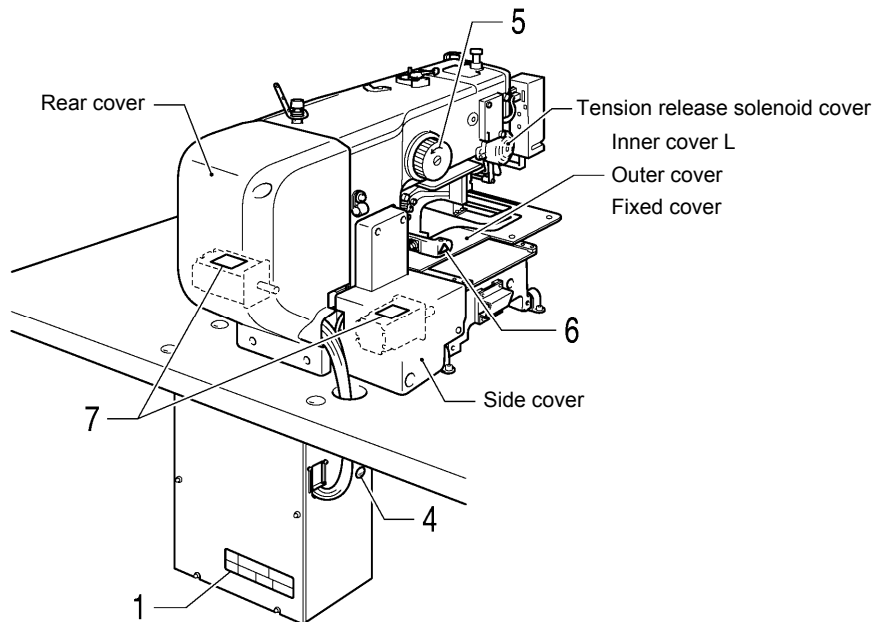
4 Be sure to connect the ground. If the ground connection is not secure, you run a high risk of receiving a serious electric shock, and problems with correct operation may also occur.

PE

5 Direction of operation

6 Be careful to avoid injury from moving parts.

7 Do not hold, otherwise problems with operation or injury may occur.



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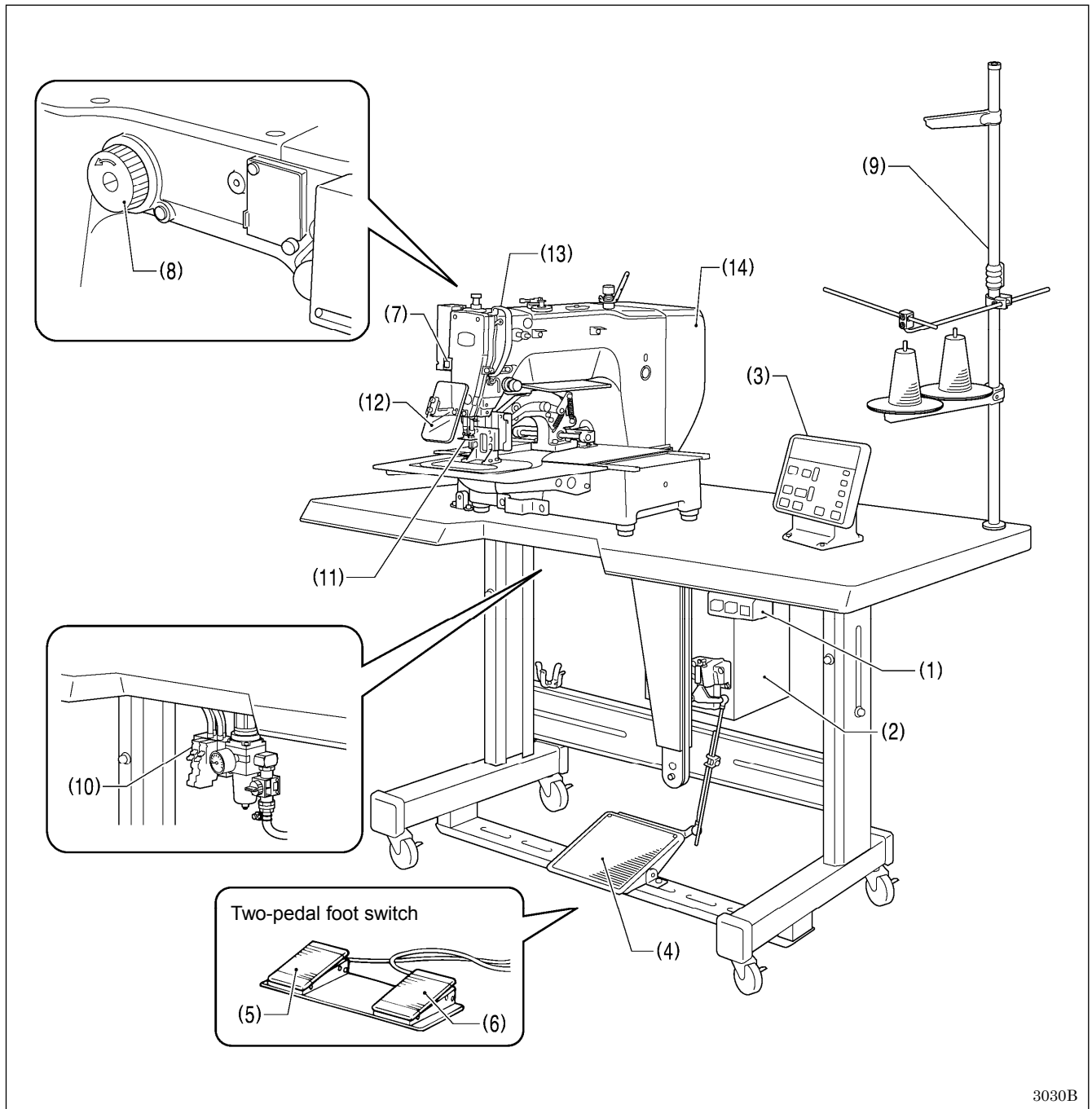
3029B

CONTENTS

1. NAMES OF MAJOR PARTS	1	5. USING THE OPERATION PANEL	
2. SPECIFICATIONS	2	(BASIC OPERATIONS)	28
3. INSTALLATION	3	5-1. Name and function of each operation	
3-1. Table processing diagram	4	panel item.....	28
3-2. Installing the control box.....	5	5-2. Program setting method.....	30
3-3. Installing the oil pan.....	5	5-2-1. Parameter list	31
3-4. Installing the machine head.....	6	5-2-2. Using the lower thread counter	33
3-5. Installing the operation panel.....	9	5-2-3. Using the production counter	34
3-6. Installing the two-pedal foot switch		5-2-4. Split number setting method	35
(pneumatic work clamp specifications)	10	5-3. Copying programs.....	36
3-7. Connecting the cords.....	10	5-4. Checking the sewing pattern.....	37
3-8. Connecting the ground wire.....	13	5-5. Setting the work clamp lift amount	38
3-9. Connecting the power cord.....	14	6. USING THE OPERATION PANEL	
3-10. Installing the cotton stand.....	17	(ADVANCED OPERATIONS)	40
3-11. Installing the pneumatic unit		6-1. Setting memory switches	40
(pneumatic work clamp specifications)	18	6-2. List of memory switch settings	41
3-12. Installing the eye guard	19	6-3. Using cycle programs	43
3-13. Installing the side cover and rear cover.....	19	6-4. Direct selection.....	46
3-14. Lubrication	20	6-5. Resetting all settings to their defaults	47
3-15. Installing the machine head fixing bolt	21	7. USING SD CARDS	48
3-16. Installing the bobbin winder tension	21	7-1. Notes on handling SD cards	
3-17. Checking the machine head switch.....	21	(commercially available)	48
4. PREPARATION BEFORE SEWING.....	22	7-2. Structure of an SD card folder	48
4-1. Installing the needle.....	22	7-3. Preparation for reading and writing data.....	49
4-2. Threading the upper thread	22	7-4. Reading additional sewing data	50
4-3. Winding the lower thread	24		
4-4. Installing the bobbin case	25		
4-5. Thread tension.....	26		
4-5-1. Lower thread tension	26		
4-5-2. Upper thread tension	26		
4-6. Starting up	27		

8. SEWING.....	51	11. LIST OF ERROR CODES.....	68
8-1. Sewing	51	12. TROUBLESHOOTING.....	75
8-2. Using the STOP switch.....	52	13. 7-SEGMENT DISPLAY LIST	79
9. CLEANING	53		
9-1. Cleaning the rotary hook	53		
9-2. Cleaning the control box air inlet ports	54		
9-3. Draining the oil.....	54		
9-4. Cleaning the eye guard	54		
9-5. Checking the needle	54		
9-6. Lubrication	54		
10. STANDARD ADJUSTMENTS	55		
10-1. Checking the machine head switch.....	55		
10-2. Thread take-up spring	56		
10-3. Arm thread guide R	56		
10-4. Adjusting the needle bar height.....	57		
10-5. Adjusting the needle bar lift amount and the driver needle guard.....	57		
10-6. Adjusting the needle clearance	58		
10-7. Adjusting the shuttle race thread guide	58		
10-8. Rotary hook lubrication amount.....	58		
10-9. Adjusting the position of the movable knife	59		
10-10. Replacing the movable and fixed knives	61		
10-11. Installing the feed plate.....	62		
10-12. Adjusting the thread wiper	63		
10-13. Presser foot installation position.....	63		
10-14. Changing the intermittent stroke	64		
10-15. Adjusting the work clamp lift amount.....	66		
10-16. Adjusting the air pressure (pneumatic work clamp specifications).....	66		
10-17. If processing the work clamps and the feed plate to a shape that matches the sewing pattern.....	67		

1. NAMES OF MAJOR PARTS

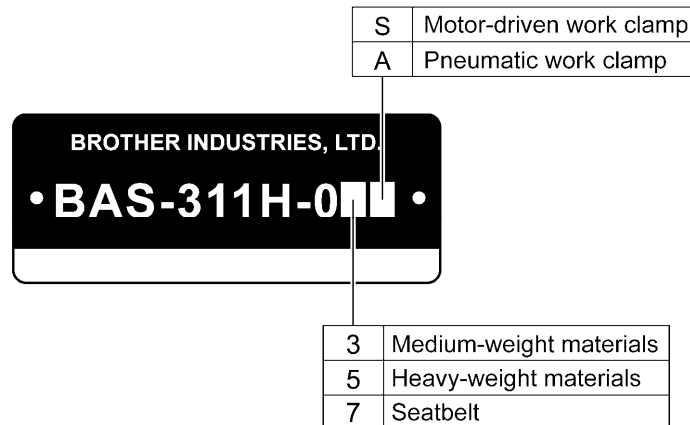


3030B

- (1) Power switch
- (2) Control box
- (3) Operation panel
- (4) Foot switch
- (5) Work clamp switch
- (6) Start switch
- (7) STOP switch
- (8) Pulley
- (9) Cotton stand
- (10) Solenoid valve (pneumatic work clamp specifications)

- Safety devices:**
- (11) Finger guard
 - (12) Eye guard
 - (13) Thread take-up cover
 - (14) Rear cover

2. SPECIFICATIONS



3190B










Sewing machine	Lock stitch pattern tacking sewing machine (with large shuttle hook)
Stitch formation	Single needle lock stitch
Max. sewing speed	2,800 sti/min
Max. sewing area (XxY)	150 x 100 mm
Feed mechanism	Intermittent feed, pulse motor drive
Stitch length	0.05 – 12.7 mm
No. of stitches	500,000-stitch internal memory (*1)
Maximum no. of stitches	20,000 stitches (per program)
No. of sewing data items that can be stored	Internal memory: 512 (*1), SD card: 900
Work clamp lift method	Motor-driven work clamp specifications: Pulse motor drive method Pneumatic work clamp specifications: Pneumatic method
Work clamp height	Motor-driven work clamp specifications: Max. 25 mm Pneumatic work clamp specifications: Max. 30 mm
2-step work clamp	Motor-driven work clamp specifications: Integrated-type work clamp Pneumatic work clamp specifications: Separate-type work clamp
Intermittent presser foot lift amount	22 mm
Intermittent stroke	2 – 4.5 mm, 4.5 – 10 mm or 0 (Default setting 3 mm)
Hook	Double-capacity shuttle hook (standard shuttle hook sold separately)
Wiper device	Standard equipment
Thread trimmer	Standard equipment
Data storage method	Internal memory (Flash memory), SD card (*2)
User programs	900
Cycle programs	30
Motor	550 W AC servo motor
Weights	Machine head approx. 88 kg, operation panel approx. 0.4 kg Control box 9 kg (Differs depending on destination)
Power source	Single-phase 100V / 220V, 3-phase 220V / 380V / 400V (For single-phase 100 V and three-phase 380 V/400 V, the trans box is required.)
Air pressure	0.5 MPa 1.8 l/min.

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

(*2) No guarantees of operation can be given for any media.

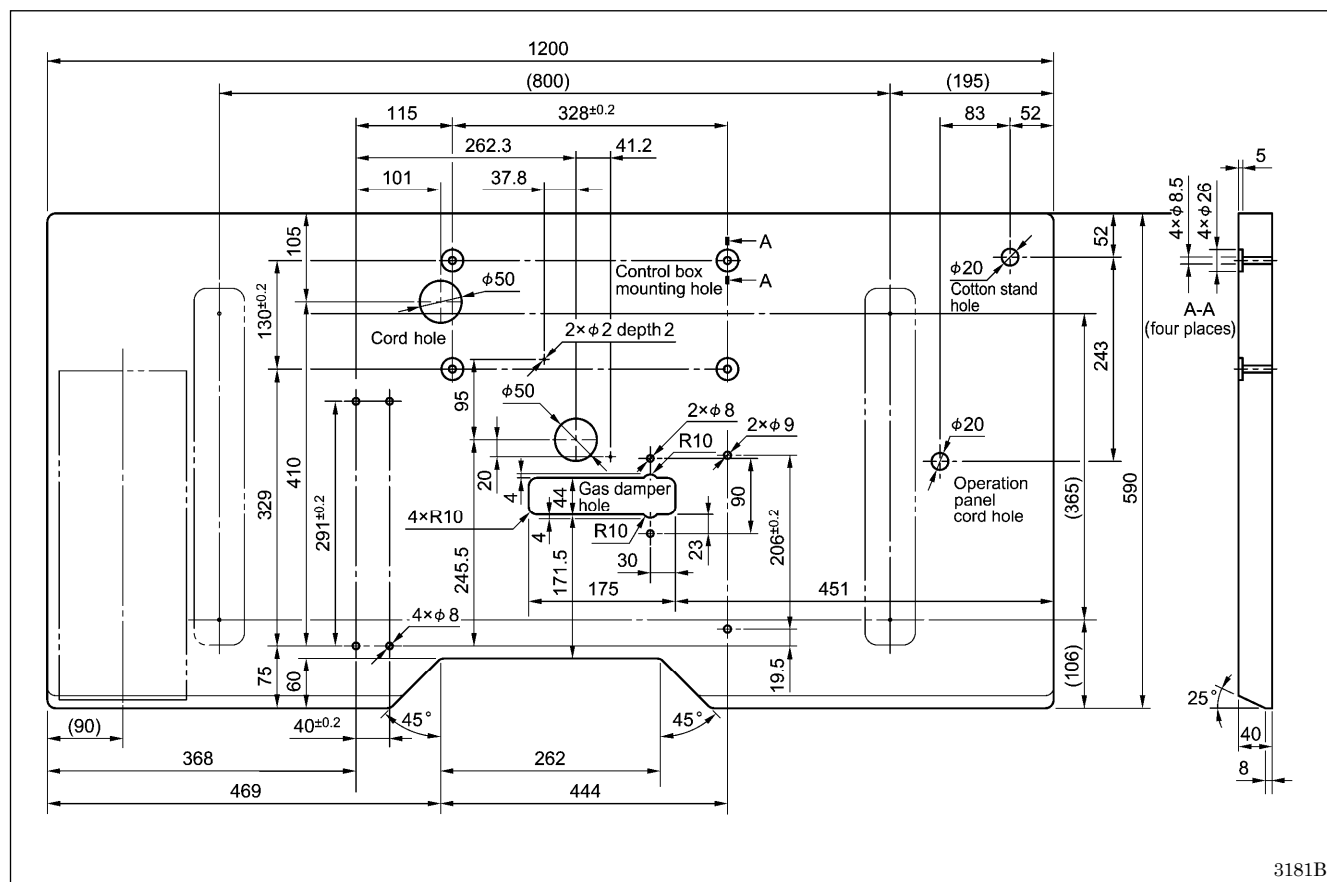
3. INSTALLATION

CAUTION

- | | | | |
|---|--|---|--|
|  | Machine installation should only be carried out by a qualified technician. |  | All cords should be secured at least 25 mm away from any moving parts. Furthermore, do not excessively bend the cords or secure them too firmly staples, otherwise there is the danger that fire or electric shocks could occur. |
|  | Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done. |  | |
|  | The sewing machine head weighs approximately 88kg. The installation should be carried out by two or more people. |  | 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. |
|  | Do not connect the power cord until installation is complete.
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result. |  | Install the safety covers to the machine head and motor. |
|  | Hold the machine head with both hands when tilting it back or returning it to its original position.
Furthermore, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result. | | |

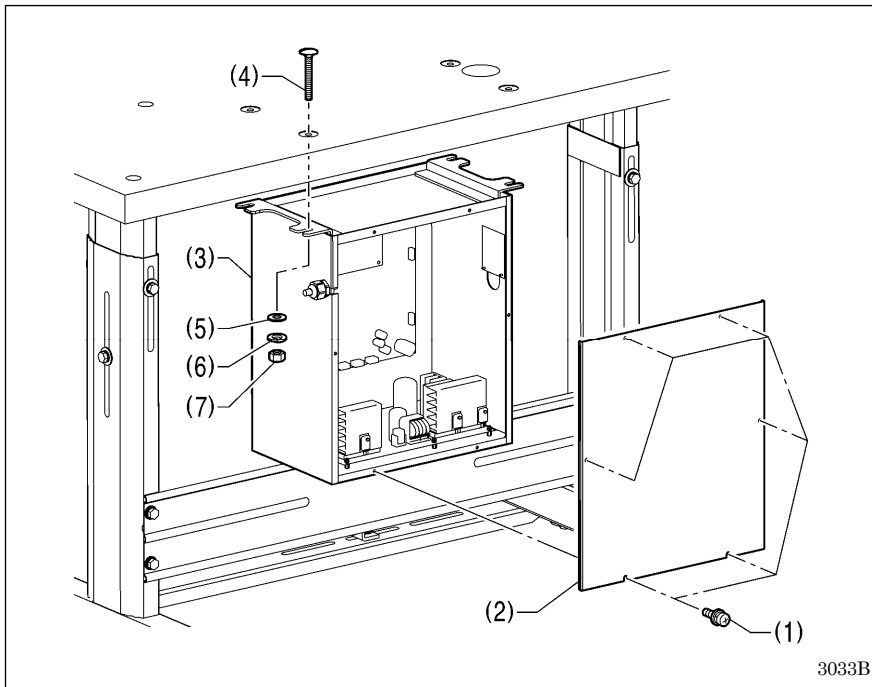
3-1. Table processing diagram

- The thickness of the table should be at least 40 mm, and it should be strong enough to bear the weight and vibration of the sewing machine.
- Check that the control box is at least 10 mm away from the leg. If the control box and the leg are too close together, it may result in incorrect sewing machine operation.



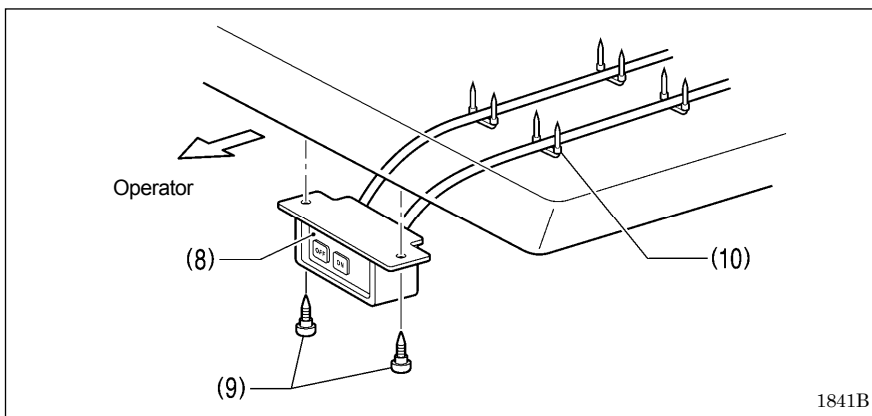
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3-2. Installing the control box



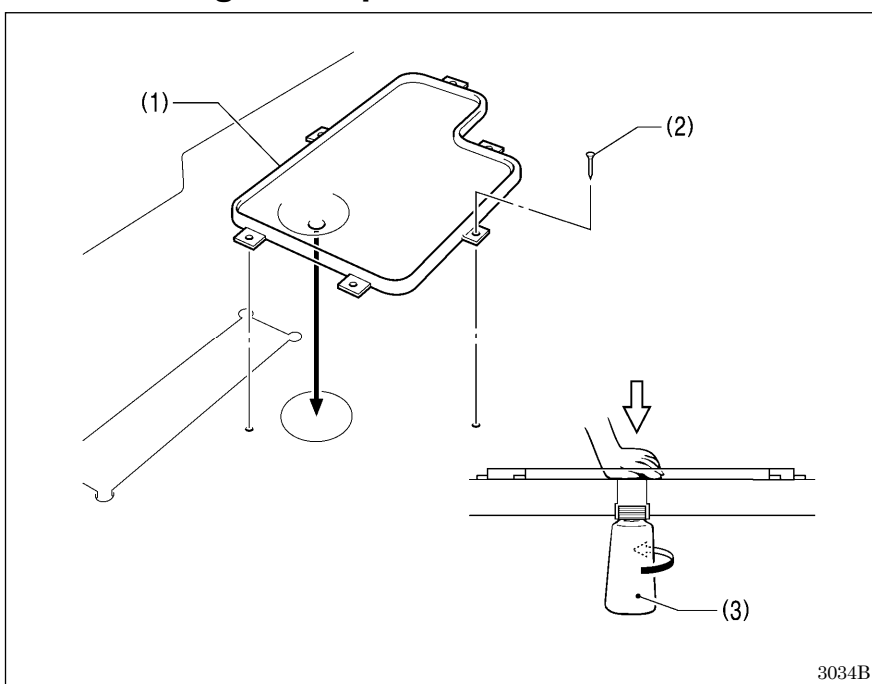
Remove the six screws (1), and then remove the control box cover (2).

- (3) Control box
- (4) Bolts [4 pcs.]
- (5) Plain washers [4 pcs.]
- (6) Spring washers [4 pcs.]
- (7) Nuts [4 pcs.]



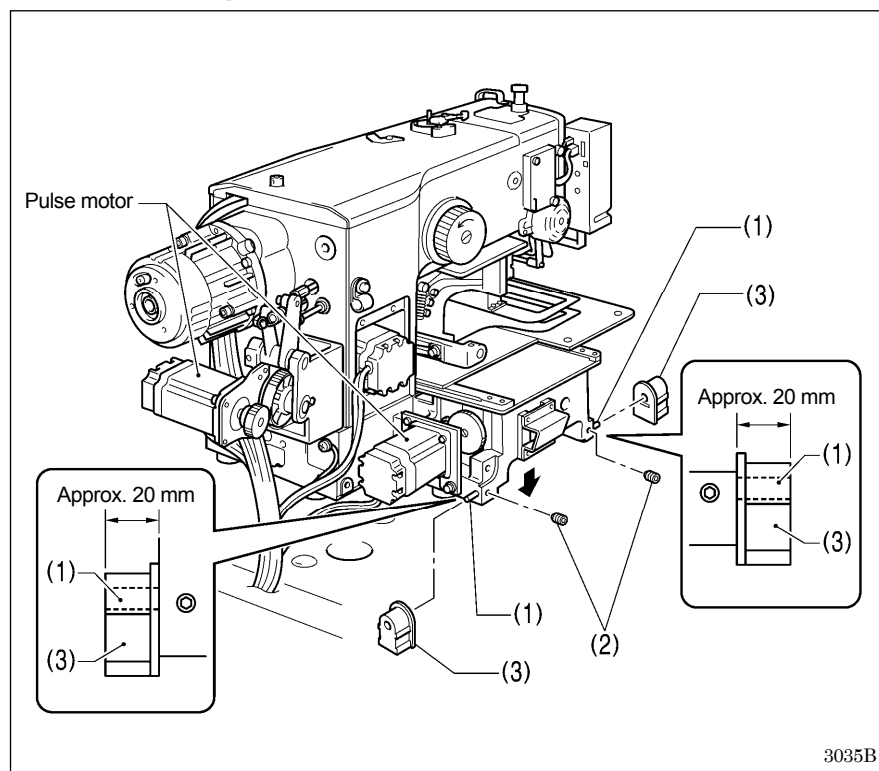
- (8) Power switch
- (9) Wood screws [2 pcs.]
- (10) Staples [4 pcs.]

3-3. Installing the oil pan



- (1) Oil pan
- (2) Nails [6 pcs.]
- (3) Waste oil tank

3-4. Installing the machine head

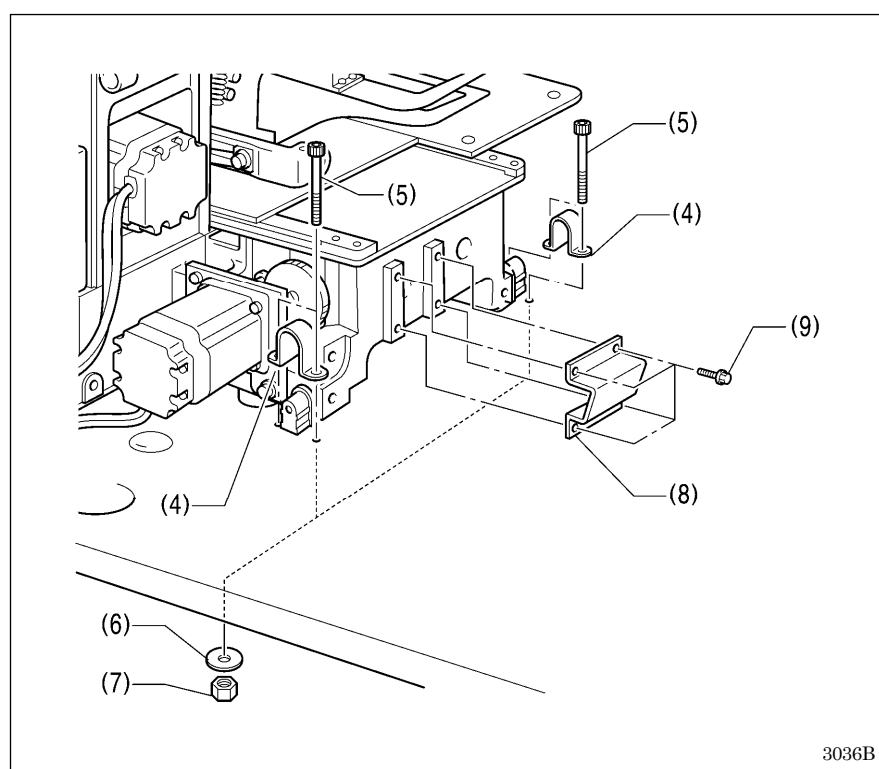


- (1) Pins [2 pcs.]
- (2) Set screws [2 pcs.]
- (3) Hinge rubber assemblies [2 pcs.]

Place the machine head gently on top of the oil pan.

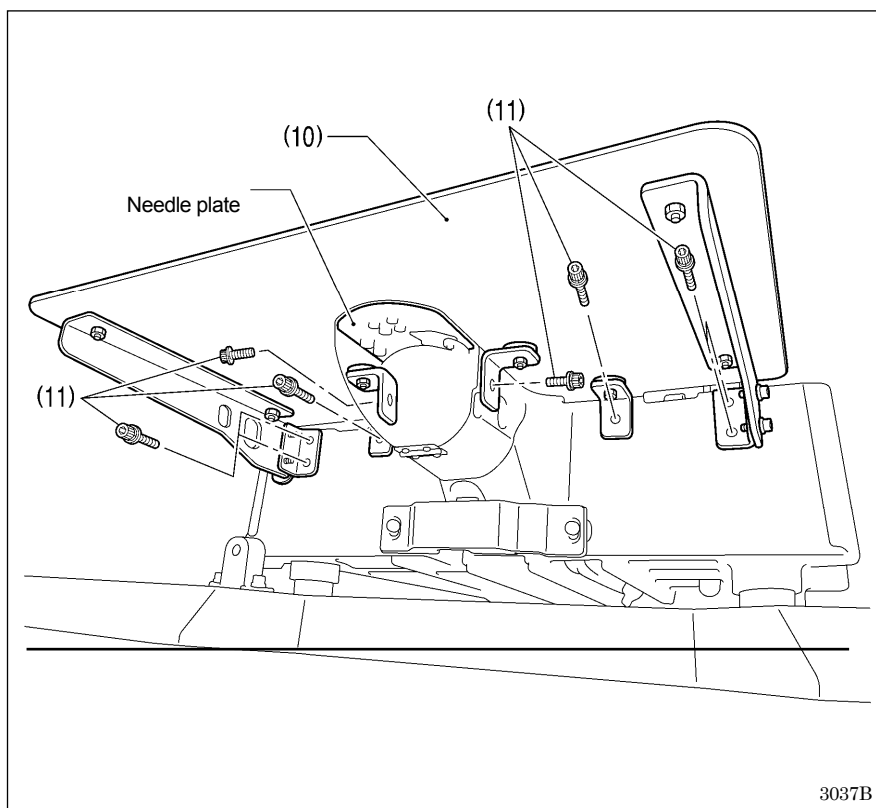
NOTE:

- Be careful not to get the cords clamped between the machine head and the oil pan.
- When holding the machine head, do not hold it by the pulse motor. This may cause problems with operation of the pulse motor.



- (4) Hinge holders [2 pcs.]
- (5) Bolts [4 pcs.]
- (6) Plain washers [4 pcs.]
- (7) Nuts [4 pcs.]
- (8) Head rest
- (9) Bolts with washer [4 pcs.]

3. INSTALLATION



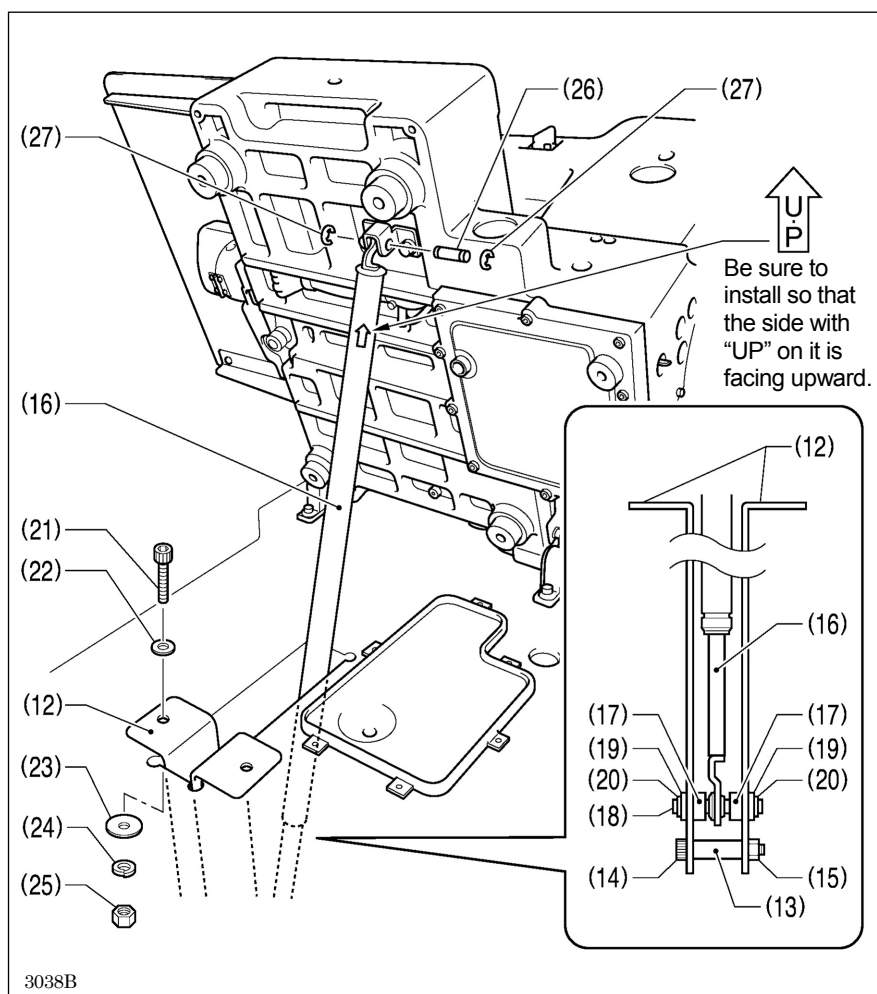
(10) Auxiliary plate

(11) Bolts with washer [8 pcs.]

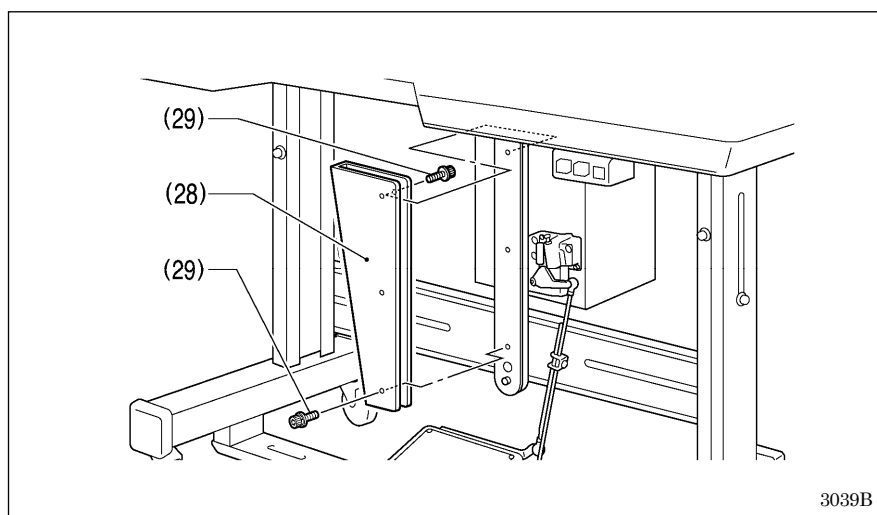
Loosen the eight bolts with washer (11), and adjust so that the auxiliary plate (10) is 0 to 0.5 mm above the needle plate (10). Gently tilt back the machine head.

NOTE:

- Install the auxiliary plate (10) so that it is horizontal.
If the auxiliary plate (10) is lower than the needle plate, the feed plate may get caught on the needle plate.
- Two or more people should tilt back the machine head, and it should be tilted gently while being held with both hands.

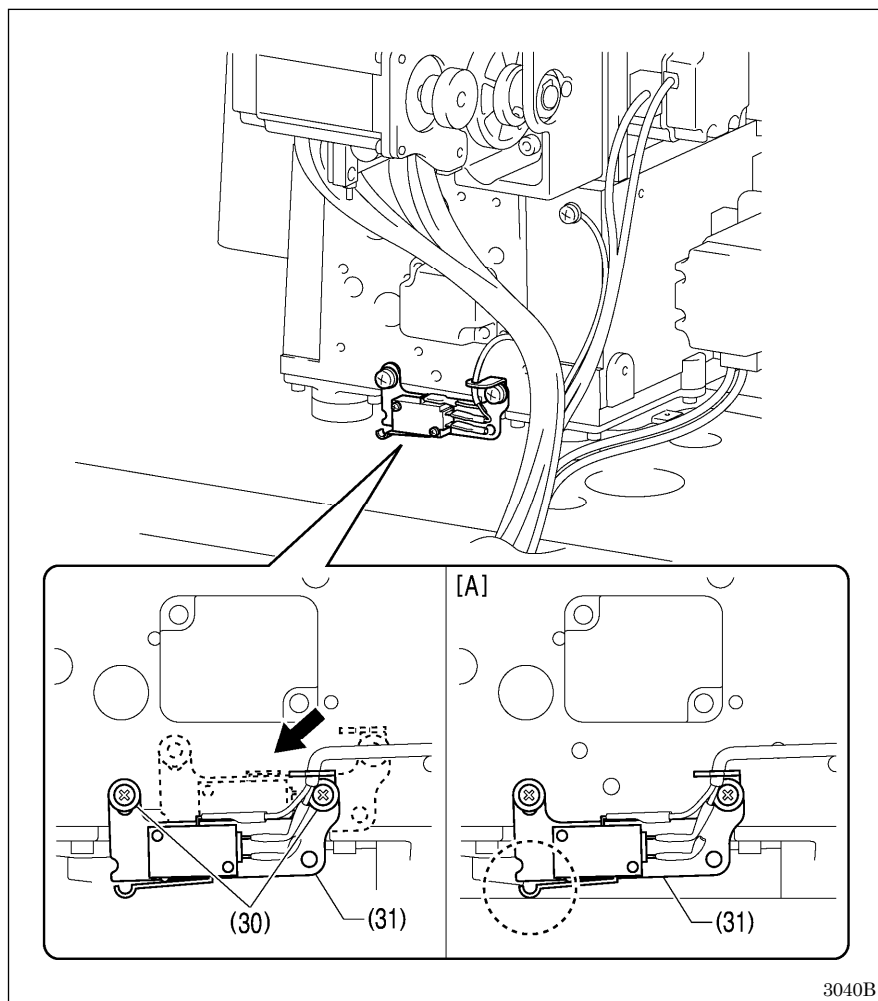


- (12) Gas spring holders [2 pcs.]
- (13) Spacer
- (14) Bolt
- (15) Nut
- (16) Gas spring
- (17) Shaft collars [2 pcs.]
- (18) Gas spring shaft D
- (19) Plain washers [2 pcs.]
- (20) Retaining rings E [2 pcs.]
- (21) Bolts [2 pcs.]
- (22) Plain washers (medium) [2 pcs.]
- (23) Plain washers (large) [2 pcs.]
- (24) Spring washers [2 pcs.]
- (25) Nuts [2 pcs.]
- (26) Gas spring shaft U
- (27) Retaining rings E [2 pcs.]



- (28) Gas spring support cover
- (29) Bolts with washer [6 pcs.]

3. INSTALLATION

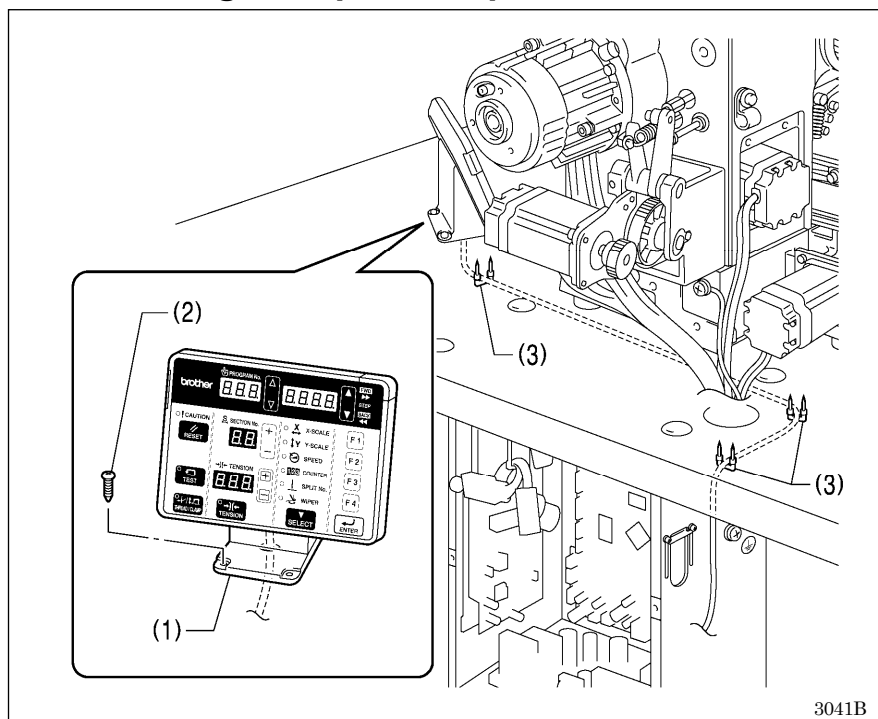


Gently return the machine head to its original position.

1. Remove the two screws (30), and then temporarily remove the machine head switch (31).
2. Use the two screws (30) which were removed to install the machine head switch (31) in the position shown in the illustration.
3. Check that the machine head switch as turned on as shown in figure [A].

* If the machine head switch is not turned on, adjust the installation position while referring to "3-17. Checking the machine head switch".

3-5. Installing the operation panel

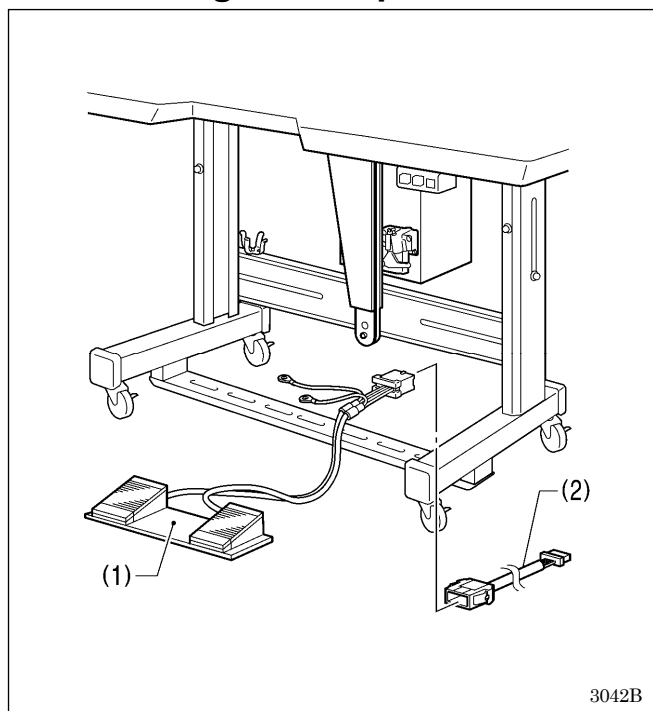


- (1) Operation panel
- (2) Wood screws [4 pcs]

* Pass the panel cord through the hole in the table, and then insert it into the control box through the hole in the side of the control box.

- (3) Staples [3 pcs]

3-6. Installing the two-pedal foot switch (pneumatic work clamp specifications)



- (1) Two-pedal foot switch
(2) Conversion harness

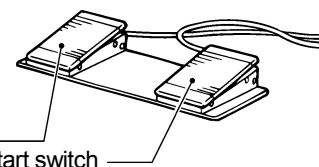
Connect the connector for the two-pedal foot switch (1) to the conversion harness (2). Insert the conversion harness (2) into the P15 (PEDAL) connector on the main P.C. board. (Refer to "3-7. Connecting the cords".)

* Be sure to make the ground connection. (Refer to "3-8. Connecting the ground wire".)

<Foot switch operating method>

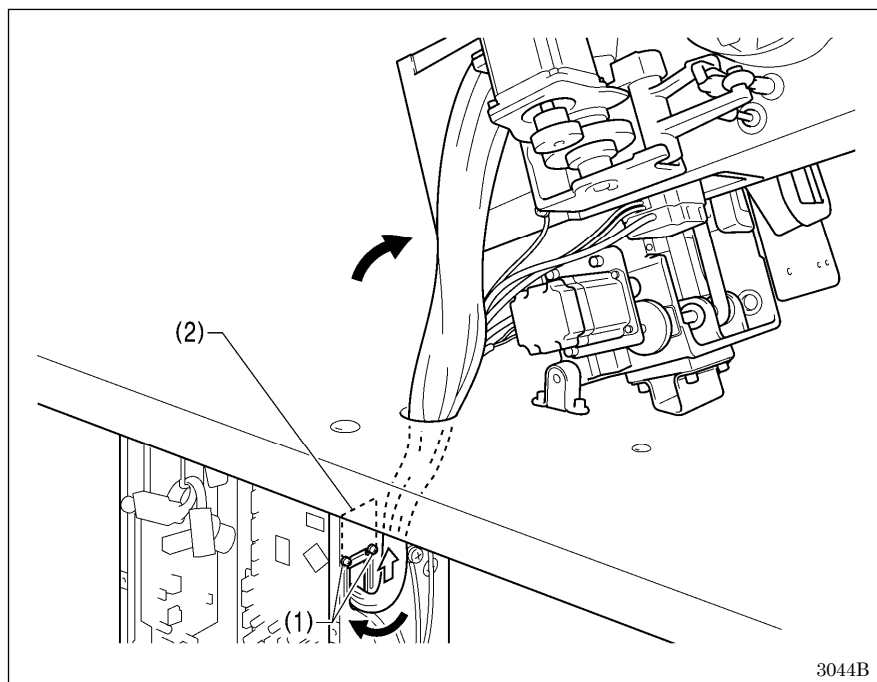
When the work clamp switch (left) is depressed, both work clamps are lowered, and when the start switch (right) is depressed, the sewing machine starts sewing.

* The work clamp lowering method can be changed using memory switch No. 002. (Refer to "6-2. List of memory switch settings".)



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3-7. Connecting the cords



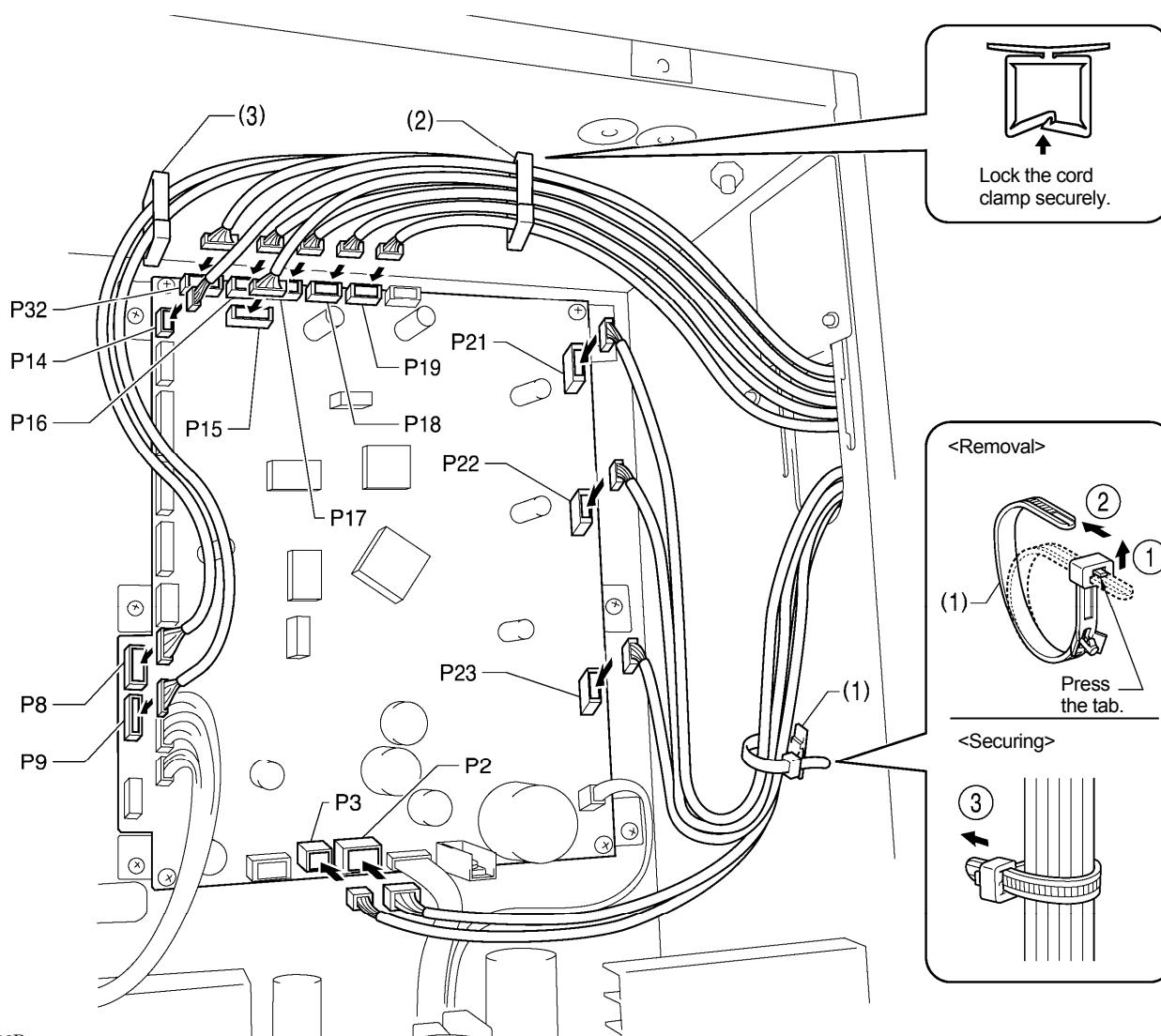
1. Gently tilt back the machine head.
2. Pass the cord bundle through the hole in the work table.
3. Loosen the two screws (1), and then open the cord presser plate (2) in the direction of the white arrow and pass the cord bundle through the opening.
4. Securely connect the connectors as indicated in the table below.
(Refer to following page.)

NOTE:

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

(Continued on next page.)

< Main P. C. board >

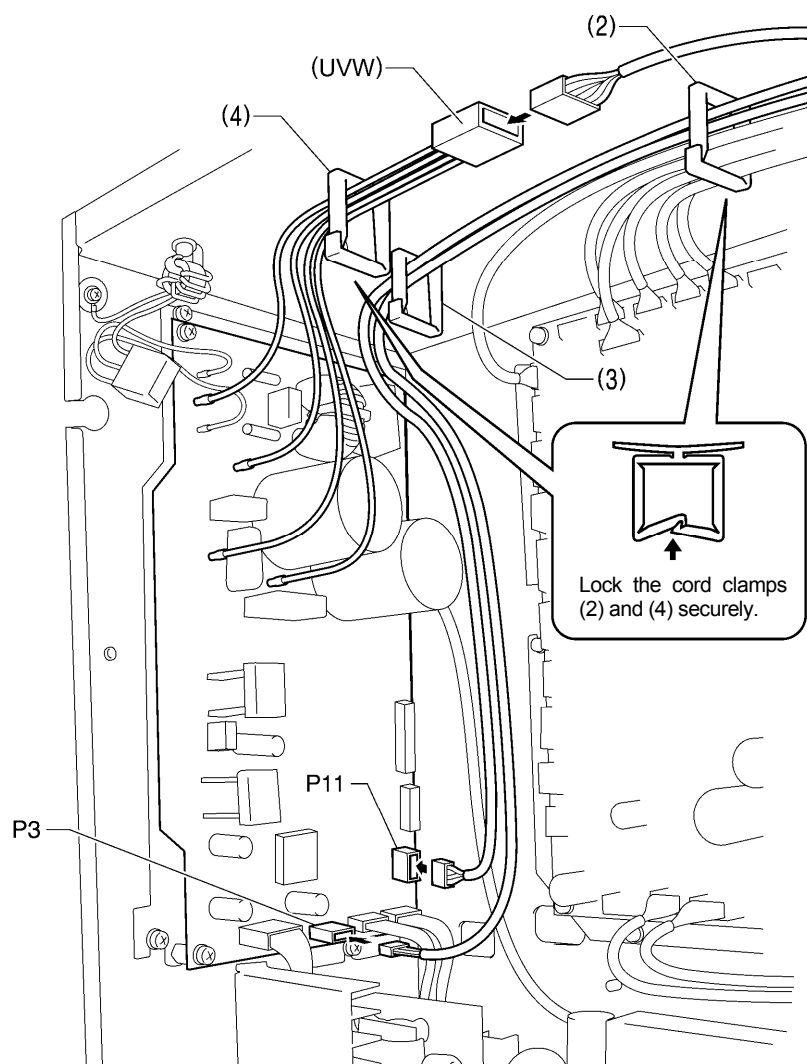


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Connectors	Connection location on main P. C. board	Cord clamps
X pulse motor encoder [5-pin] White	P17 (X-ENC)	(2)
Y pulse motor encoder [5-pin] Blue	P18 (Y-ENC)	(2)
Work clamp pulse motor encoder [5-pin] Black	P19 (P-ENC)	(2)
Machine head switch [3-pin]	P14 (HEAD-SW)	(2)
Conversion harness (two-pedal foot switch) [7-pin] White	P15 (PEDAL)	(2)
Machine head memory [6-pin]	P16 (HEAD-M)	(2)
Thread trimmer solenoid [6-pin]	P2 (SOL1)	(1)
Digital tension [4-pin]	P3 (SOL2)	(1)
X pulse motor [4-pin] White	P21 (XPM)	(1)
Y pulse motor [4-pin] Blue	P22 (YPM)	(1)
Work clamp pulse motor [4-pin] Black	P23 (PPM)	(1)
Operation panel [8-pin] Red	P32 (PROGRAMMER)	(2)
Home position sensor [12-pin] White	P8 (SENSOR1)	(2) (3)
STOP switch [6-pin] White	P9 (HEAD)	(2) (3)

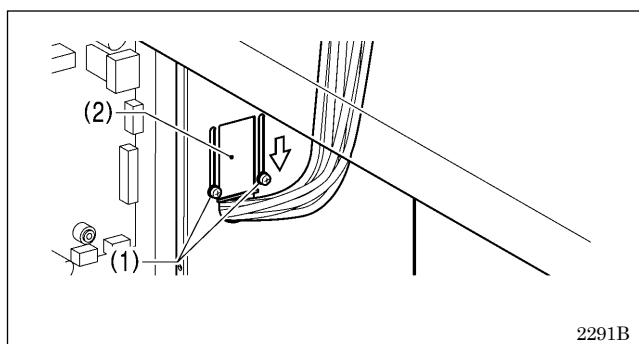
NOTE: Route the X, Y and work clamp pulse motor harnesses so that they do not touch the power supply P.C. board.

< Motor P. C. board >



3047B

Connectors	Connection location on motor P. C. board	Cord clamps/ cable ties
Upper shaft motor [4-pin]	(UVW)	(4)
Synchronizer [10-pin]	P11 (SYNC)	(2) (3)
Operation panel [4-pin]	P3 (PANEL)	(2) (3)



5. Close the cord presser plate (2) in the direction of the white arrow, and secure it by tightening the two screws (1).

NOTE:

Close the cord presser plate (2) securely so that no foreign objects, insects or small animals can get inside the control box.

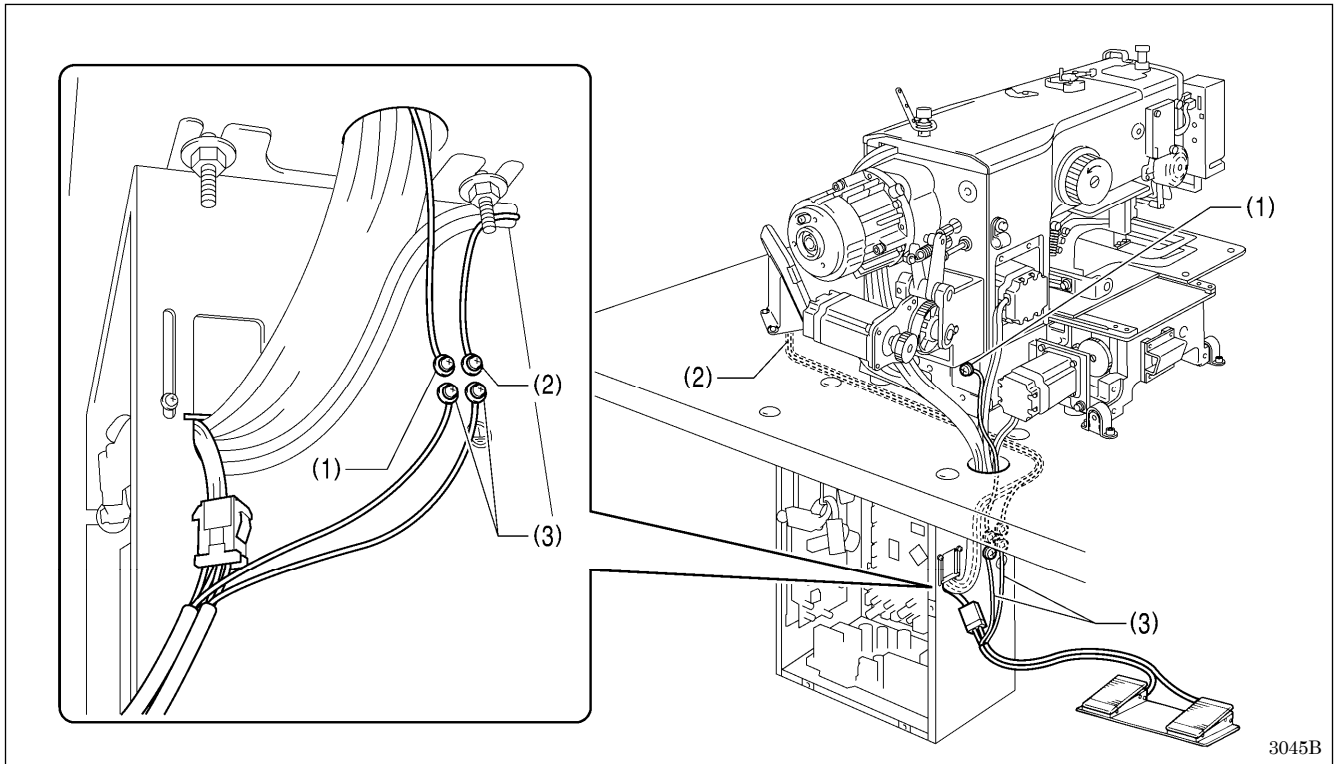
6. Check that the cords do not get pulled, and then gently return the machine head to its original position.

3-8. Connecting the ground wire

⚠ CAUTION



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



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

- Tighten the control box cover with the six screws. Check that the cords are not clamped by the cover at this time.

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

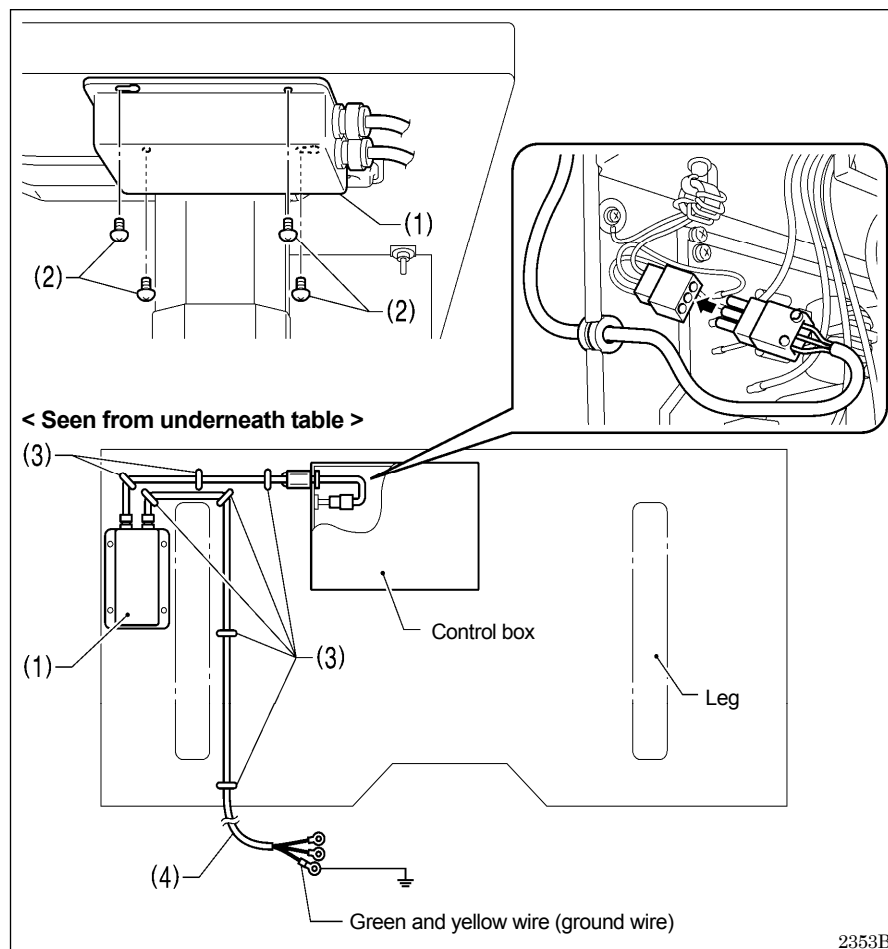
3-9. Connecting the power cord



CAUTION



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



Connect cords that match the voltage specifications.

< EU specifications >

- (1) Filter box
- (2) Screws [4 pcs]
- (3) Staples [7 pcs]
- (4) Power cord

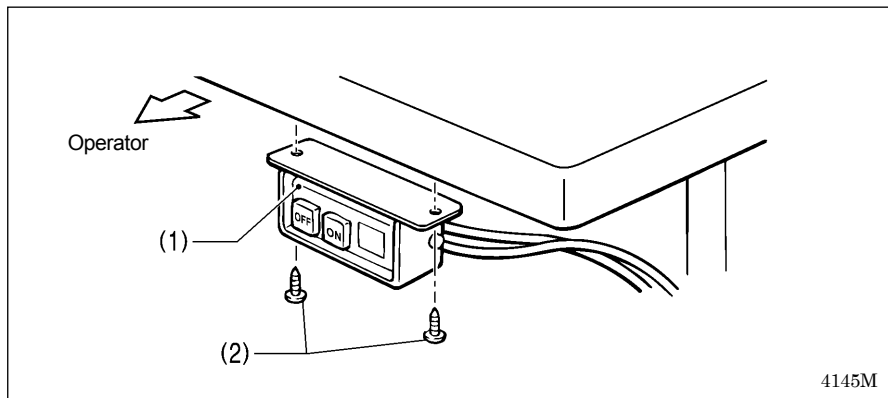
1. Attach an appropriate plug to the power cord (4). (The green and yellow wire is the ground wire.)
2. Insert the power plug into a properly-grounded electrical outlet.

NOTE:

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

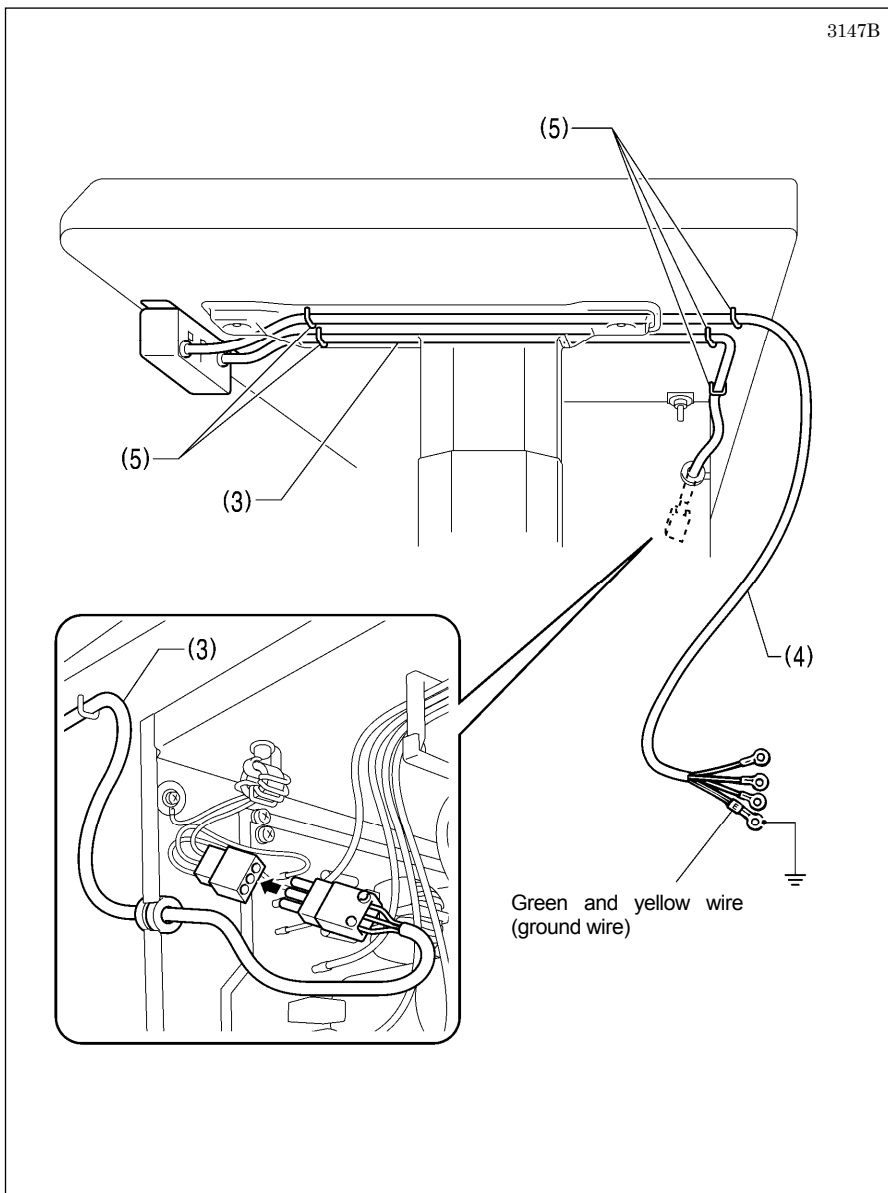
2353B

3. INSTALLATION



<200 V system >

- (1) Power switch
- (2) Screws [2 pcs]

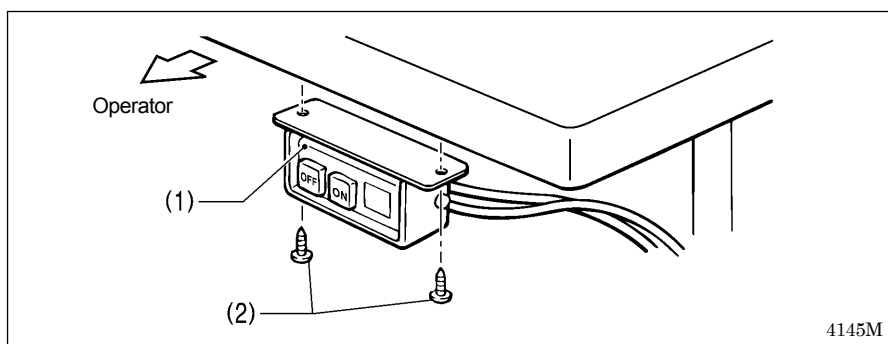


- (3) 3-pin power supply connector
- (4) Power cord
- (5) Staples [5 pcs]

1. Attach an appropriate plug 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.

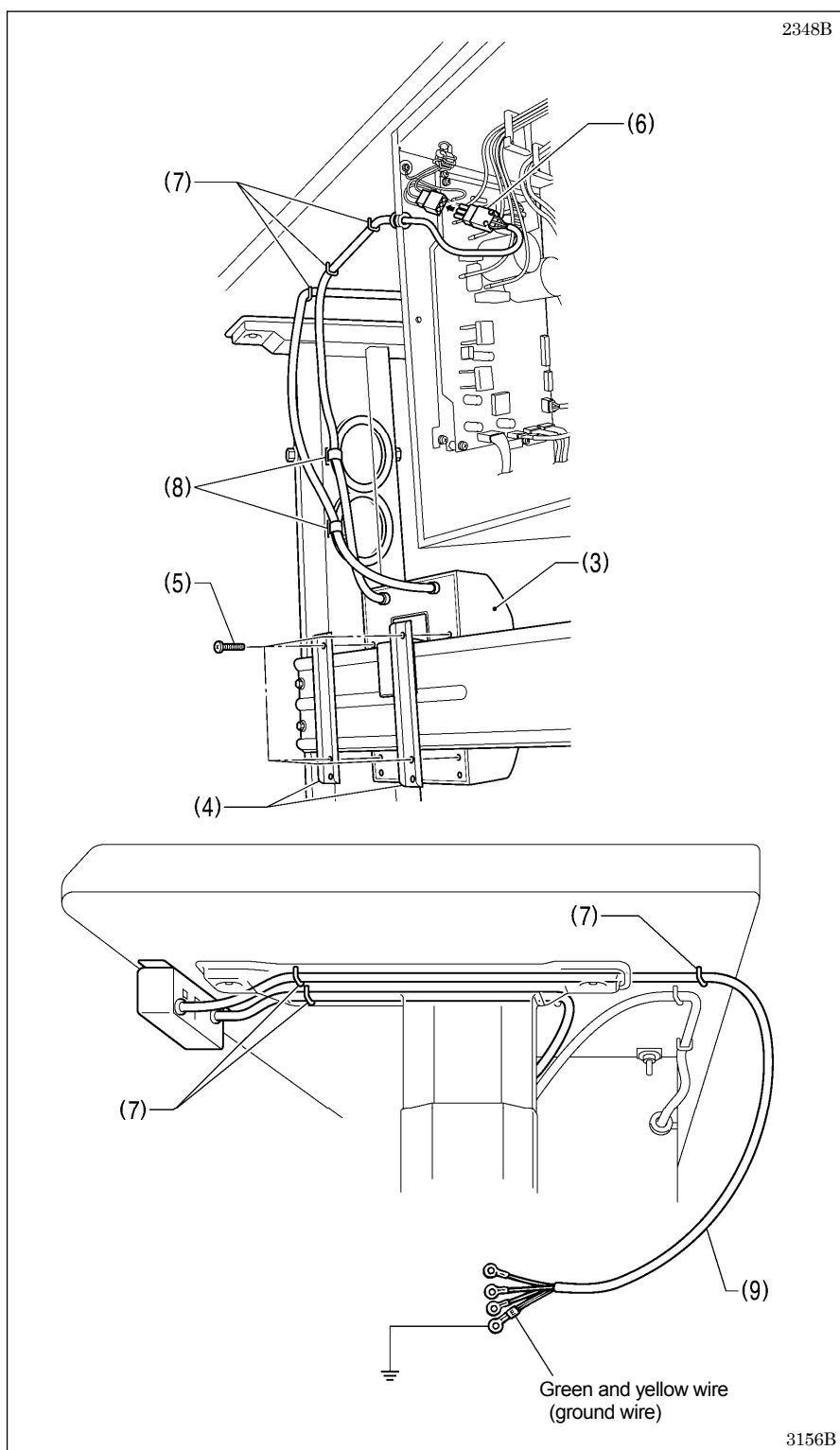
NOTE:

- Take care when tapping in the staples (5) to make sure that they do not pierce the cords.
 - Do not use extension cords, otherwise machine operation problems may result.
3. Use the six screws to tighten the cover of the control box. Check that none of the cords are being clamped by the cover at this time.



<100 V / 400 V system >

- (1) Power switch
(2) Screws [2 pcs]



- (3) Transformer box
(4) Transformer box plates [2 pcs]
(5) Screw [with washer]
(6) 3-pin power supply connector
(7) Staples [6 pcs]
(8) Cord clamps [2 pcs]
(9) Power cord

1. Attach an appropriate plug to the power cord (9). (The green and yellow wire is the ground wire.)
2. Insert the power plug into a properly-grounded AC power supply.

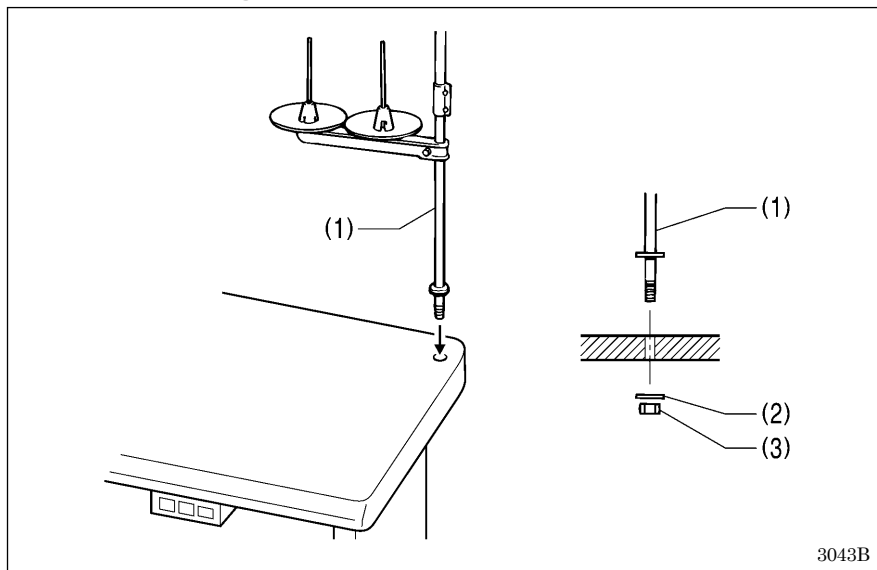
* The inside of the control box uses single-phase power.

NOTE:

- If the ground connection is not secure, electric shocks, operating errors or damage to electronic components such as P.C. boards may occur.
- Take care when tapping in the staples (7) to make sure that they do not pierce the cords.
- Do not use extension cords, otherwise machine operation problems may result.

3. Use the six screws to tighten the cover of the control box. Check that none of the cords are being clamped by the cover at this time.

3-10. Installing the cotton stand

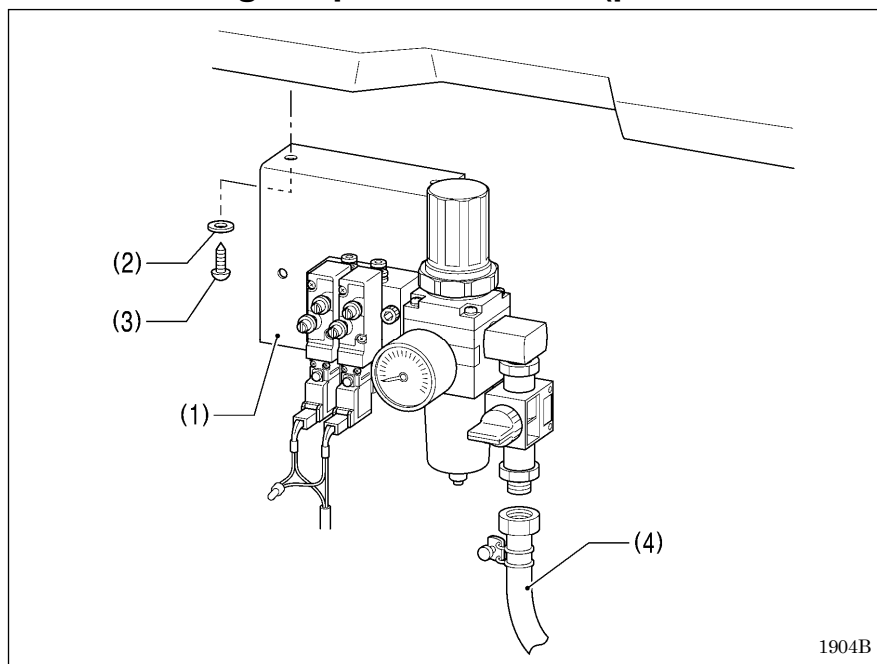


(1) Cotton stand

NOTE:

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

3-11. Installing the pneumatic unit (pneumatic work clamp specifications)



Install underneath the work table.

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

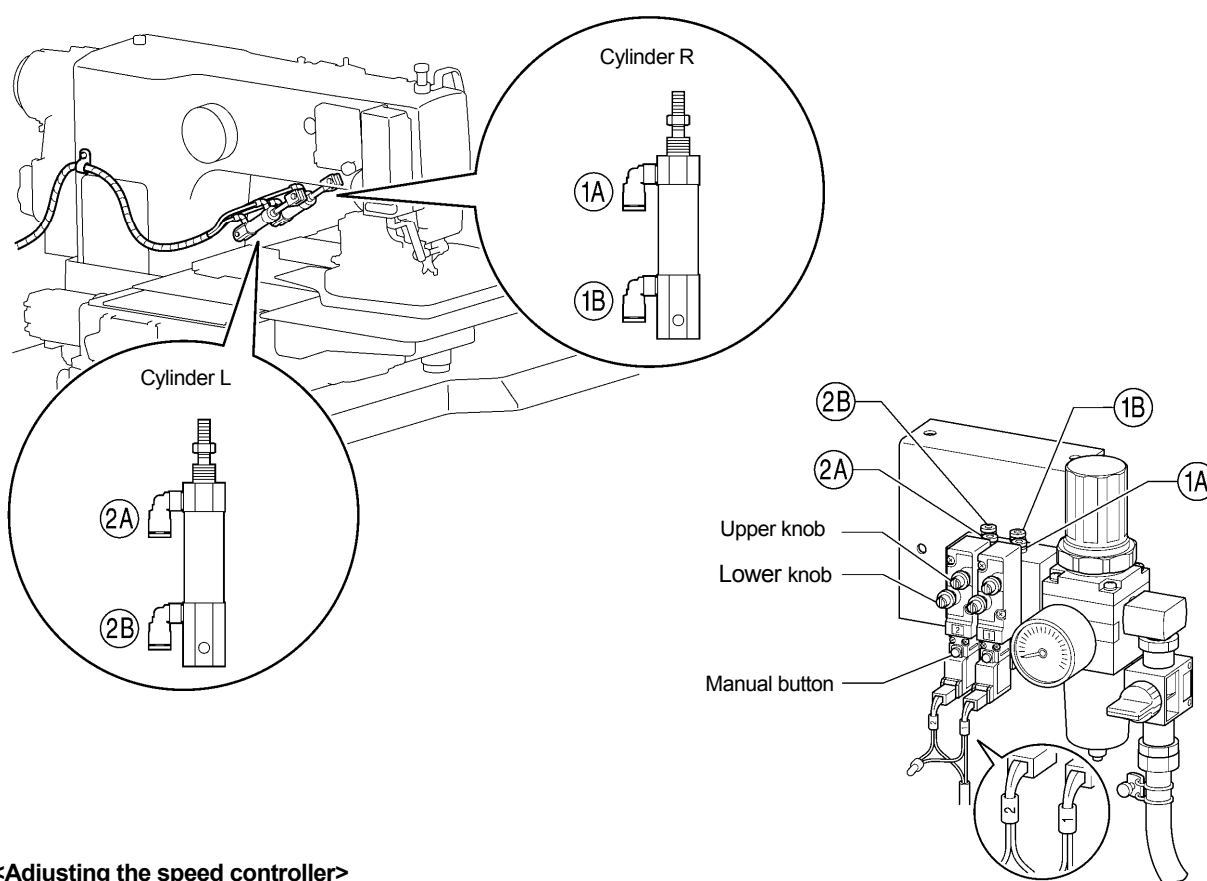
After installing the pneumatic unit, adjust the air pressure.

(Refer to "10-16. Adjusting the air pressure".)

NOTE:

Make sure that the pneumatic unit does not touch the control box or the work table leg.

Connect each air tube to the position with the corresponding number.



<Adjusting the speed controller>

You can use the valve knobs to adjust the lifting and lowering speeds.

The valve knobs should be adjusted so that the left and right sides of the work clamp operate at the same speed.

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

You can operate the work clamp while the power is turned off by pressing the manual button.

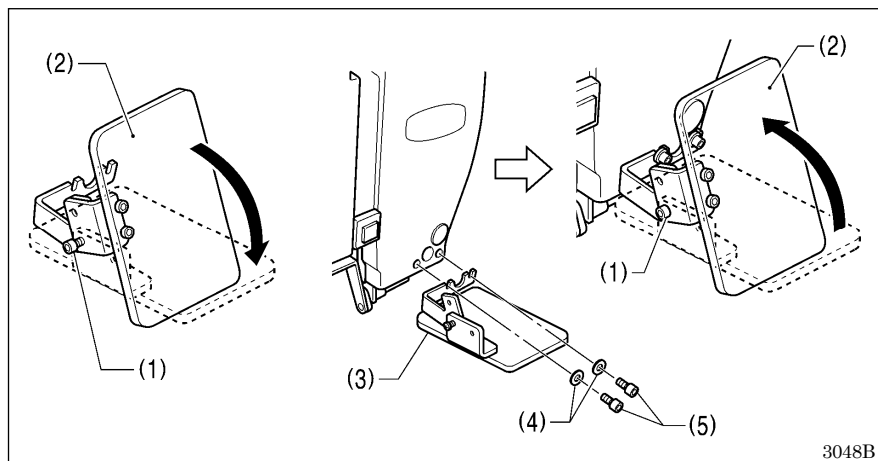
3097B 1905B

3-12. Installing the eye guard

! CAUTION



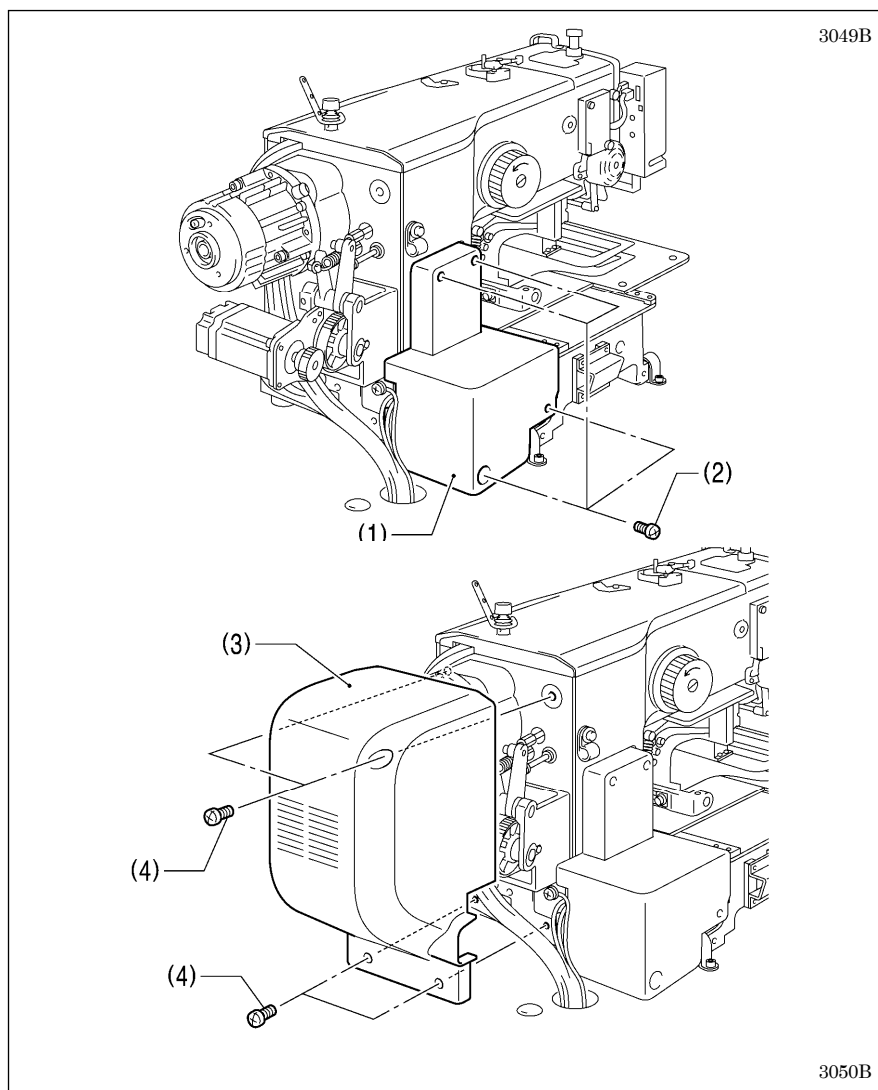
Attach all safety devices before using the sewing machine.
If the machine is used without these devices attached, injury may result.



- (1) Bolt (loosen)
- (2) Eye guard (tilt forward)
- (3) Eye guard assembly
- (4) Plain washers [2 pcs.]
- (5) Bolts [2 pcs.]

After installing the eye guard assembly (3), return the eye guard (2) to its original angle, and then tighten the screw (1) to secure it in place.

3-13. Installing the side cover and rear cover



- (1) Side cover
- (2) Screws [4 pcs.]
- (3) Rear cover
- (4) Screws [4 pcs.]

NOTE:

Be careful not to clamp the cords when installing the side cover and the rear cover.

3-14. Lubrication

! CAUTION

Do not connect the power cord until lubrication is complete.

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



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

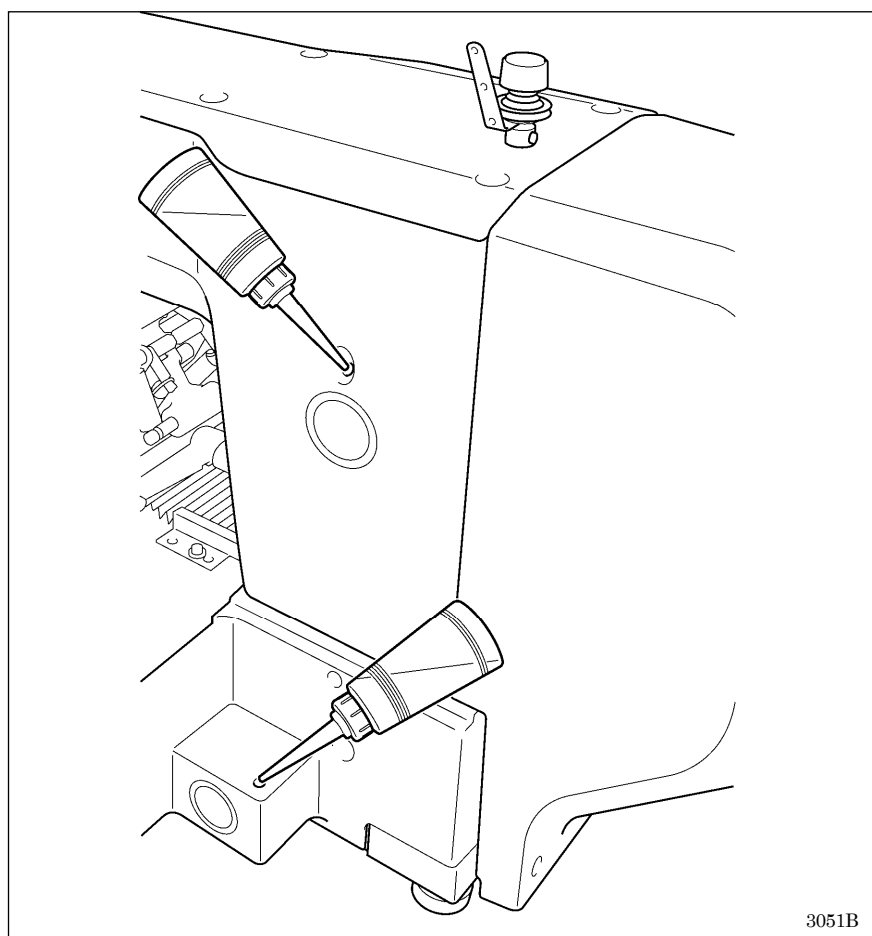
Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting.

Keep the oil out of the reach of children.

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 <JX Nippon Oil & Energy Corporation Sewing Lube 10N; VG10> specified by Brother.

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

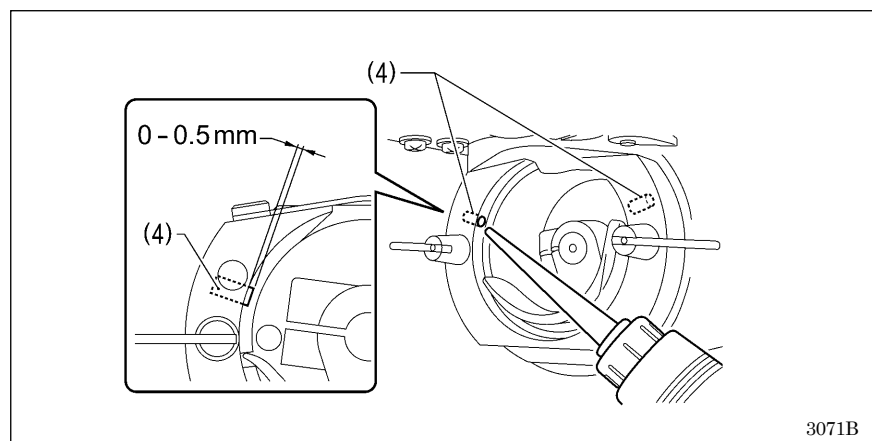


1. Fill the arm-side oil tank with oil.

2. Fill the bed-side oil tank with oil.

NOTE:

Be sure to fill the machine with oil when the oil level is down to about one-third full in the oil sight glass. If the oil drops below the one-third level, there is the danger that the machine may seize during operation.



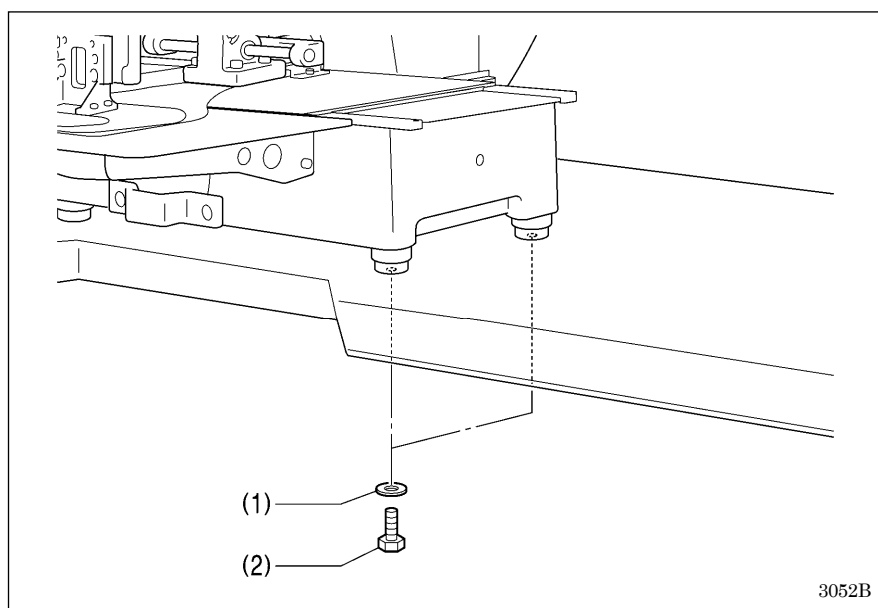
3. Pour oil in through the two holes of the shuttle race base assembly so that the felt (4) is lightly moistened.

NOTE:

- The two pieces of felt (4) should normally project by 0 to 0.5 mm from the hook race. Be careful not to push in the felt (4) when lubricating.
- If there is no more oil on the felt (4) of the shuttle race base assembly, problems with sewing may result.

3-15. Installing the machine head fixing bolt

When transporting the sewing machine, secure the machine head to the table with the machine head fixing bolt.

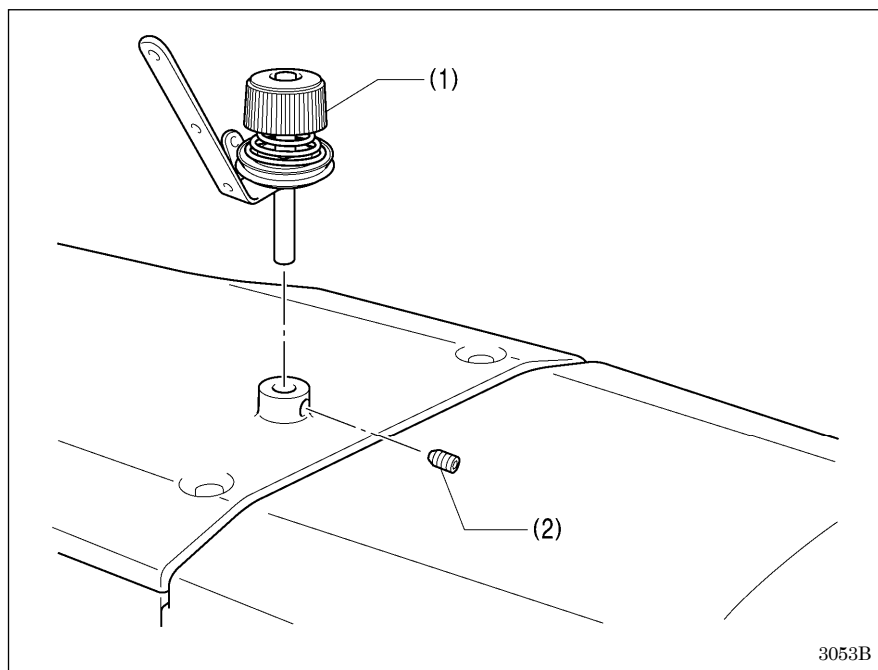


- (1) Plain washer [2 pcs.]
- (2) Machine head fixing bolts [2 pcs.]

NOTE:

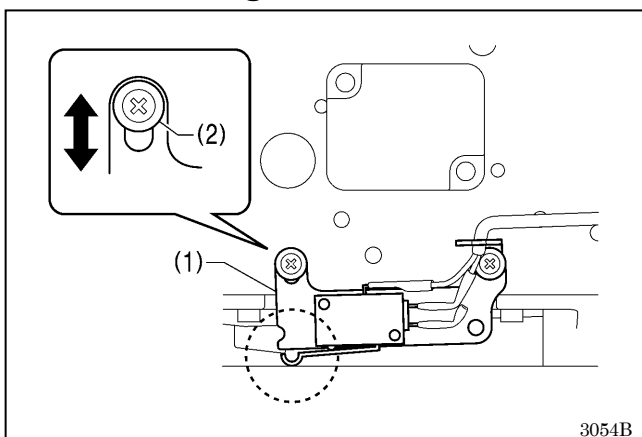
When operating the sewing machine, remove the machine head fixing bolt.

3-16. Installing the bobbin winder tension



- (1) Bobbin winder tension
- (2) Set screw [1 pc.]

3-17. Checking the machine head switch



1. Turn on the power switch.
2. Check that no error numbers appear on the operation panel.

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

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

Use the screw (2) to adjust the installation position of the machine head switch as shown in the illustration.

4. PREPARATION BEFORE SEWING

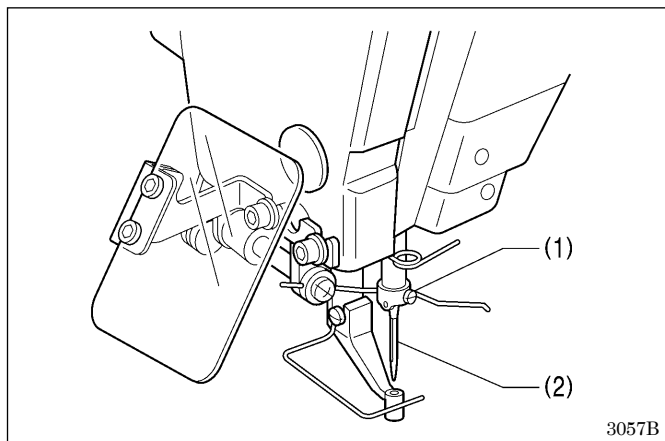
4-1. Installing the needle

CAUTION



Turn off the power switch before installing the needle.

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



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

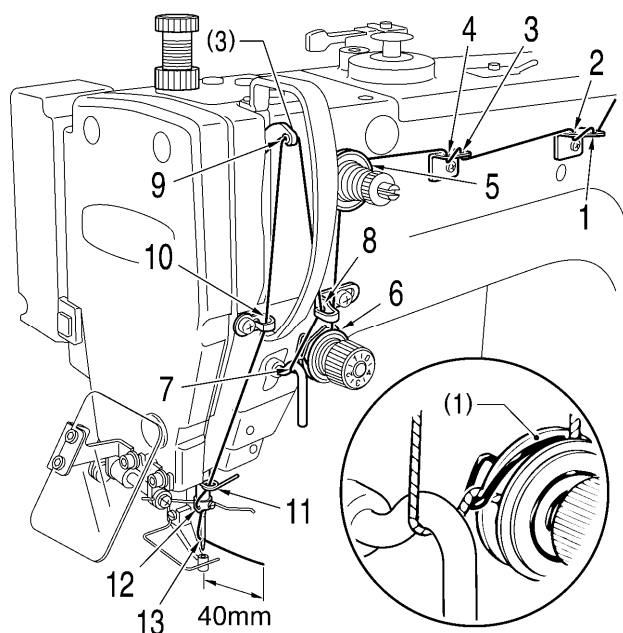
3057B

4-2. Threading the upper thread

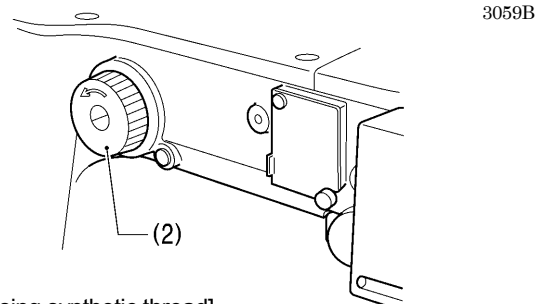
Thread the upper thread correctly as shown in the illustration below.

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

[If using cotton thread or spun thread]

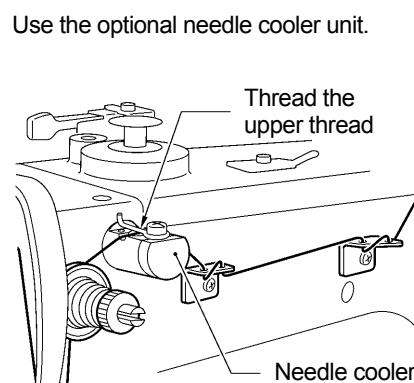


3058B



3059B

[If using synthetic thread]



3060B

- Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 40 mm between the needle hole and the end of the thread.
If the trailing length of the thread is too long, it may cause the thread to become tangled.

4. PREPARATION BEFORE SEWING

<Threading mode>

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

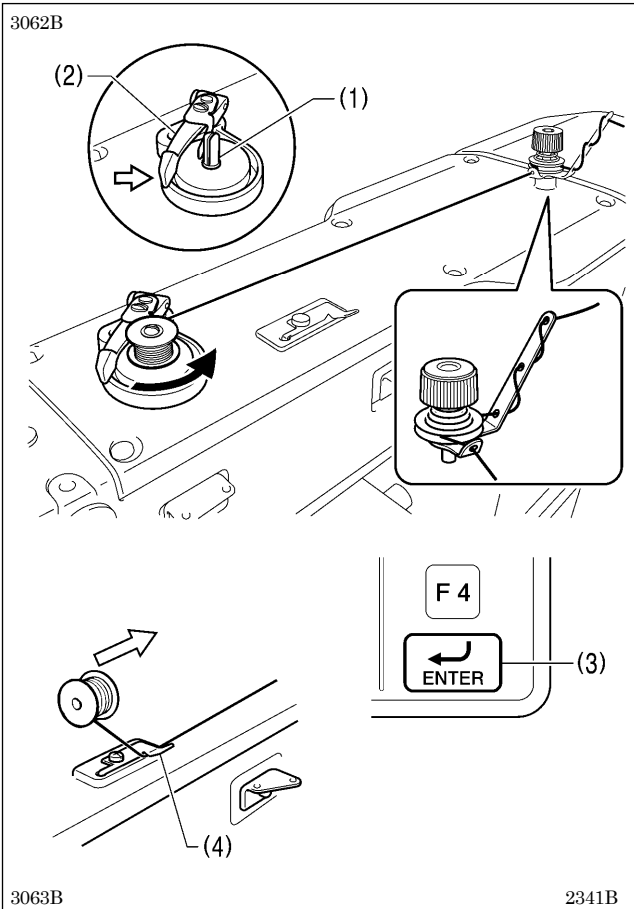
1	<div data-bbox="343 248 632 443" data-label="Image"> </div> <div data-bbox="810 226 1077 255" data-label="Text"> <p>Turn on the power switch.</p> </div> <div data-bbox="1385 439 1445 463" data-label="Text"> <p>3055B</p> </div>
2	<div data-bbox="384 495 595 521" data-label="Text"> <p>All indicators switch off</p> </div> <div data-bbox="217 551 756 934" data-label="Image"> </div> <div data-bbox="807 472 1149 504" data-label="Text"> <p>Press the THREAD/CLAMP key.</p> </div> <div data-bbox="911 515 1051 600" data-label="Image"> </div> <div data-bbox="807 622 1120 685" data-label="List-Group"> <ul style="list-style-type: none"> • The work clamp will drop. • The tension discs will open. </div> <div data-bbox="392 963 791 1021" data-label="Text"> <p>THREAD/CLAMP indicator illuminates MENU indicator switches off</p> </div> <div data-bbox="1380 994 1445 1019" data-label="Text"> <p>3061B</p> </div>
3	<p>Threading the thread.</p>
4	<div data-bbox="189 1077 454 1111" data-label="Text"> <p>Ending threading mode</p> </div> <div data-bbox="209 1115 547 1205" data-label="Image"> </div> <div data-bbox="807 1077 1149 1111" data-label="Text"> <p>Press the THREAD/CLAMP key.</p> </div> <div data-bbox="807 1108 1453 1164" data-label="List-Group"> <ul style="list-style-type: none"> • The work clamp will return to where it was before threading mode was started. </div> <div data-bbox="379 1220 791 1249" data-label="Text"> <p>THREAD/CLAMP indicator switches off</p> </div> <div data-bbox="1380 1220 1445 1245" data-label="Text"> <p>2390B</p> </div>

4-3. Winding the lower thread

CAUTION



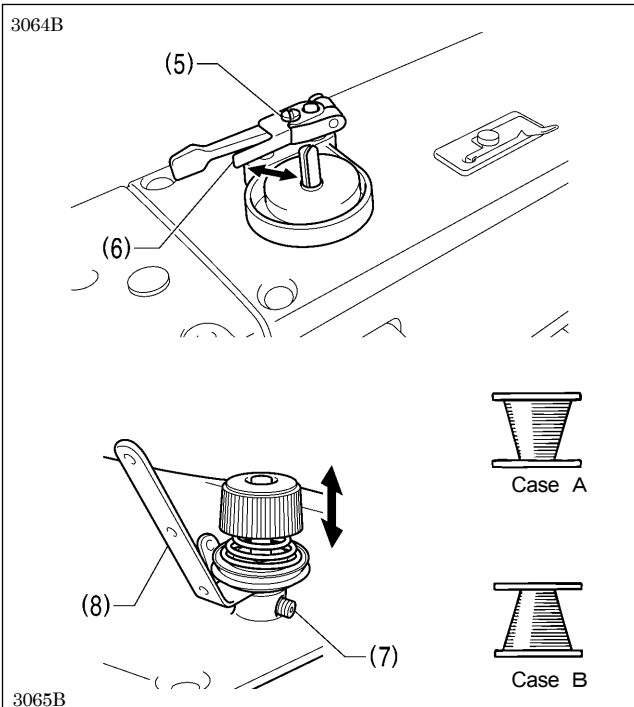
Do not touch any of the moving parts or press any objects against the machine while winding the lower thread, as this may result in personal injury or damage to the machine.



1. Place the bobbin onto the bobbin winder shaft (1).
2. Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser arm (2).
3. Turn on the power switch.
4. Depress the foot switch to the second step. The feed mechanism will move to the home position.
5. Check that the needle does not touch the work clamp, and then while pressing the ENTER key (3), depress the foot switch to the 2nd step.
6. Release the ENTER key (3) after the machine starts operating, and keep depressing the foot switch until the lower thread stops being wound onto the bobbin. (If you release the foot switch before winding is complete, and then depress it again while pressing the ENTER key (3), winding will start again.)
7. Once winding of the set amount of lower thread (80 - 90% of the bobbin capacity) is completed, the bobbin presser arm (2) will return automatically.
8. Remove the bobbin, hook the thread onto the knife (4), and then pull the bobbin in the direction of the arrow to cut the thread.

Adjusting the bobbin winding amount

Loosen the screw (5) and move the bobbin presser (6).



If the thread winds onto the bobbin unevenly

Loosen the set screw (7) and move the bobbin wider tension assembly (8) up and down to adjust.

- * For case A, move the bobbin winder tension assembly (8) down, and for case B, move it upward.

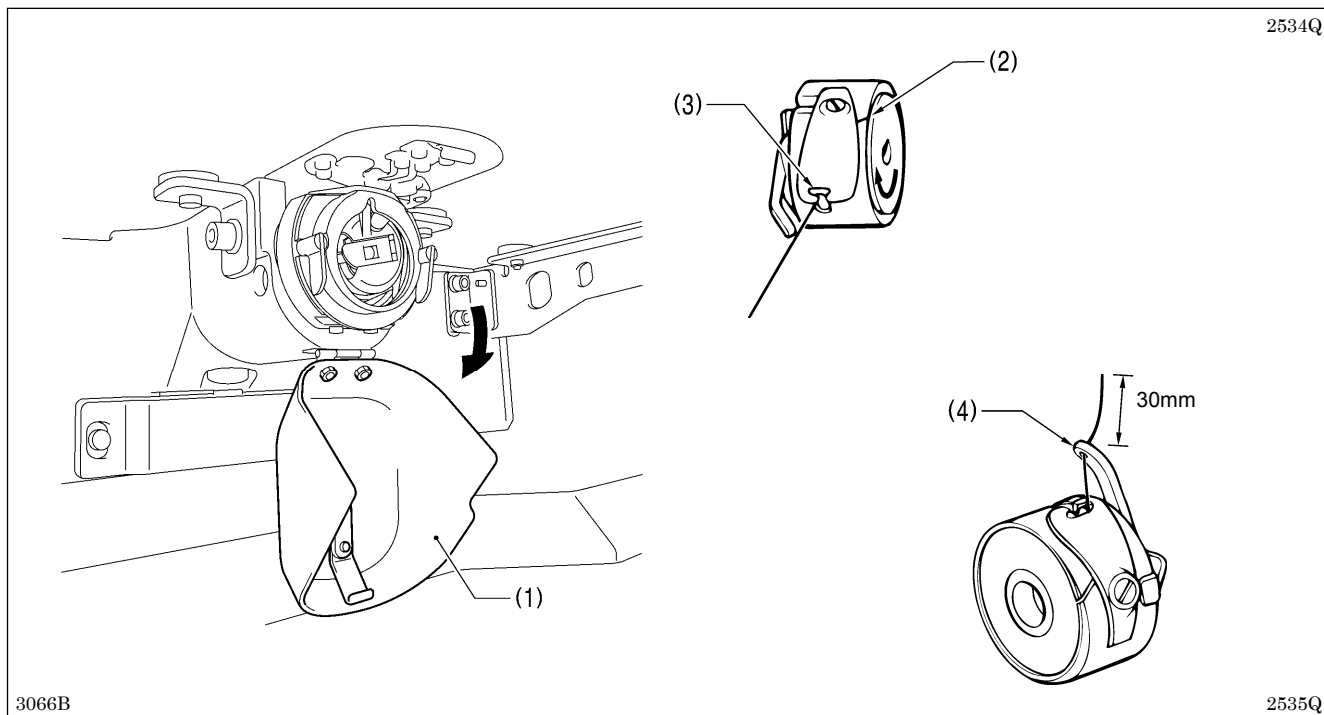
4-4. Installing the bobbin case

CAUTION



Turn off the power switch before installing the bobbin case.

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



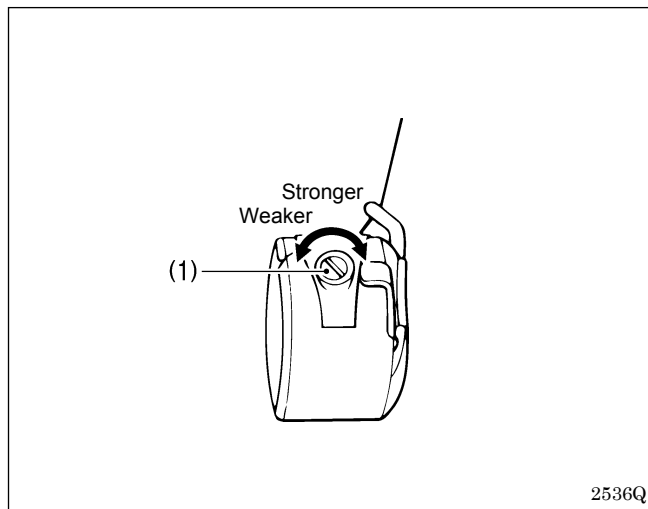
1. Pull the shuttle race cover (1) downward to open it.
2. While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
3. Pass the thread through the slot (2) and pull it out from the thread hole (3).
4. Check that the bobbin turns in the direction of the arrow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

4-5. Thread tension

[Thread tension reference]

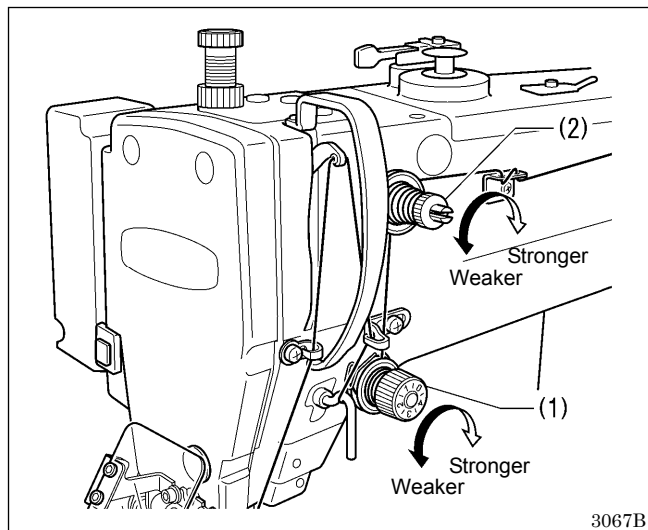
Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07[])
Upper thread	#50 or similar	#20 or similar	#4 or similar
Lower thread	#50 or similar	#20 or similar	#4 or similar
Upper thread tension (N)	0.8 – 1.2	1.4 – 1.8	1.2 – 2.0
Lower thread tension (N)	0.2 – 0.3		1.0 – 1.5
Pre-tension (N)	0.1 – 0.3	0.1 – 0.6	0.3 – 0.6
Needle	DP x 5 #16	DP x 17 #19	DP x 17 #25
Normal sewing speed	2,000 sti/min	2,000 sti/min	1,300 sti/min

4-5-1. Lower thread tension



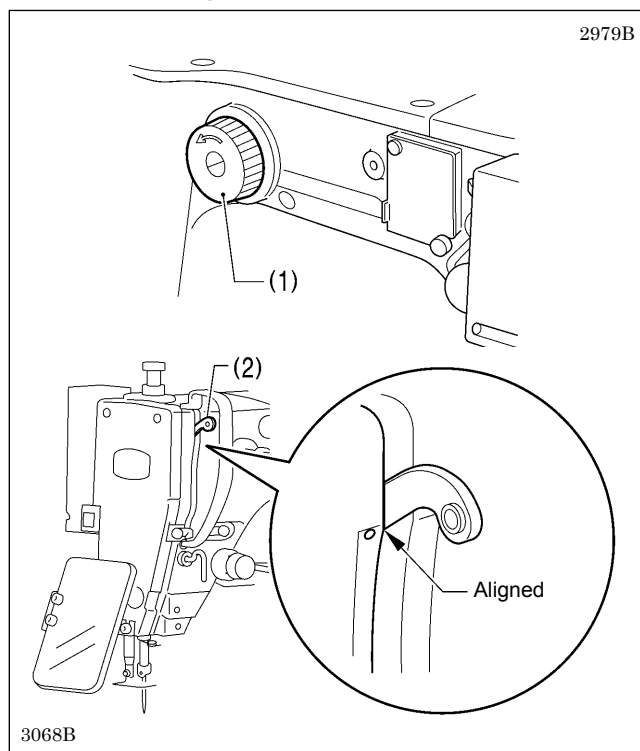
Adjust the thread tension to the weakest possible tension by turning the thread tension nut (1) until the bobbin case will not drop by its own weight while the thread end coming out of the bobbin case is held.

4-5-2. Upper thread tension



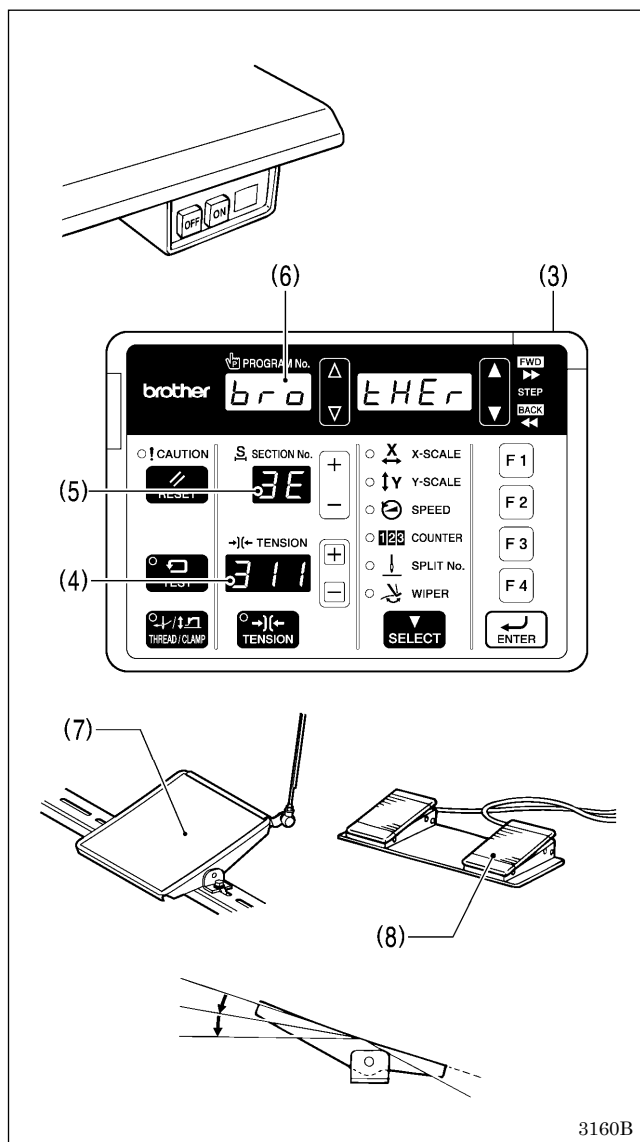
1. Turn the tension nut (1) (main tension) to adjust the tension as appropriate for the material being sewn.
2. Use the tension nut (2) (sub tension) to adjust the upper thread trailing length to about 40 mm.

4-6. Starting up



Before turning on the power switch, check that the needle bar is at the needle up stop position.

Turn the pulley (1) in the direction of the arrow until the ridge at the bottom of the thread take-up (2) is aligned with the index mark.



1. Turn on the power switch.

The POWER indicator (3) will illuminate, and the model name will appear in the tension value display (4) and the specifications will appear in the section No. display (5).

Specifications		Display
Medium-weight materials Motor-driven work clamp	—03S	3E
Medium-weight materials Pneumatic work clamp	—03A	3A
Heavy-weight materials Motor-driven work clamp	—05S	5E
Heavy-weight materials Pneumatic work clamp	—05A	5A
Seatbelts	—07A	7A

3151B 3152B 3153B 3154B 3155B

After this, the program number will flash in the program No. display (6).

2. Depress the foot switch (7) to the 2nd step.
The sewing machine will move to the home position and the work clamp will rise.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch (8).)

NOTE:

If error "UP" appears when the foot switch is depressed, turn the pulley (1) in the direction of operation to clear the error.

5. USING THE OPERATION PANEL (BASIC OPERATIONS)

(12) SPLIT No. indicator

Illuminates when the SELECT key (14) is pressed to show the split setting when split data (for specifying a pause while the program is running) exists.

(13) WIPER indicator

Illuminates when the SELECT key (14) is pressed to switch to the thread wiper.

(14) SELECT key

Used to select the desired menu (horizontal and vertical scale, sewing speed, counter, (split No.), thread wiping).

(15) PROGRAM No. display

Shows information such as program numbers.

(16) Menu display

Displays information such as menu setting values, memory switch settings and error codes.

(17) Setting keys ∇ Δ

Used to change the value which is displayed in the PROGRAM No. display (15).

(18) Setting keys \blacktriangledown \blacktriangle

Used to change the value which is displayed in the menu display (16).

(19) TENSION key

Not used.

(20) TENSION indicator

Not used.

(21) SECTION No. display

Not used.

(22) TENSION display

Shows the program number when copying programs and using SD cards.

(23) Setting keys [+ , -]

Not used.

(24) Setting keys []

Not used.



(25) ENTER key

Used to accept the values which are displayed in places such as the menu display (16).

(26) Function keys [F1, F2, F3, F4]

Used to directly select program numbers and cycle program numbers.

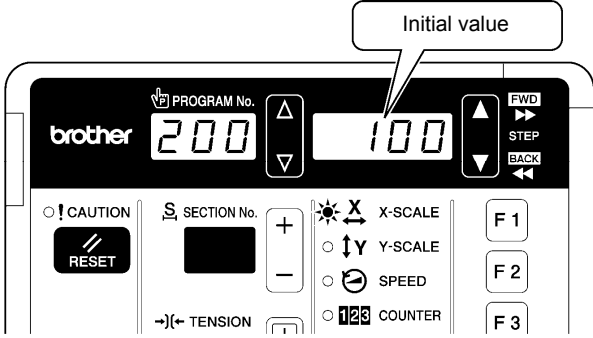
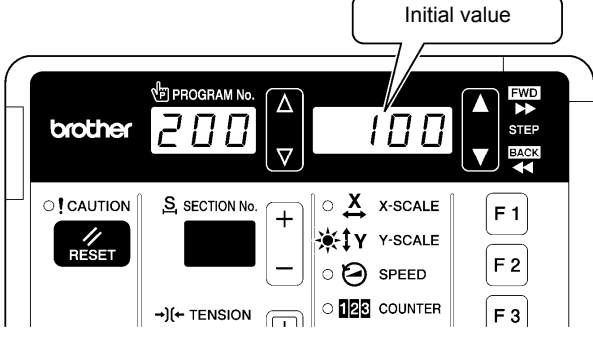
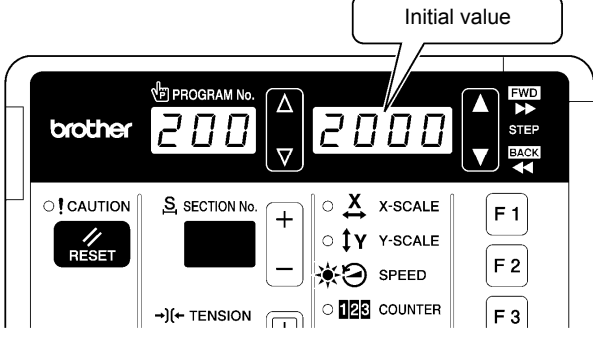
5-2. Program setting method

1	<p>Select the item to be changed.</p> <p>Press the SELECT key.</p> <p>• The selected parameter changes in the order shown in the illustration below each time the SELECT key is pressed.</p> <p>X-scale → Y-scale → Sewing speed → Slow start pattern → Counter → Split No. → Thread wiping</p>  <p>2401B</p>
2	<p>Change the setting for the parameter. (Refer to 5-2-1. Parameter list on the next page for details on parameter changes.)</p> <p>Press the ▲ or ▼ key to change the parameter setting.</p>  <p>3072B</p>
3	<p>Repeat steps 1 to 2 above to record the settings for each parameter.</p>

- * When memory switch No. 400 is set to ON, the horizontal scale, vertical scale, sewing speed and work clamp height can be recorded separately for each program number.
- * When memory switch No. 100 is set to ON, slow start patterns can be recorded separately for each program number.

5. USING THE OPERATION PANEL (BASIC OPERATIONS)

5-2-1. Parameter list

Parameter	Setting range and initial value	Display
X-scale	<p>0% - 400% (Limited by available sewing area.)</p> <p>(Initial value is 100%.)</p> <p>* The setting can be displayed in “mm” units by setting memory switch No. 402 to “ON”.</p>	 <p>3073B</p>
Y-scale	<p>0% - 400% (Limited by available sewing area.)</p> <p>(Initial value is 100%.)</p> <p>* The setting can be displayed in “mm” units by setting memory switch No. 402 to “ON”.</p>	 <p>3074B</p>
Sewing speed	<p>200 sti/min to 2800 sti/min Setting units are 100 sti/min.</p> <p>(Initial value is 2000 sti/min.)</p> <p>* The setting is displayed in units of 10 sti/min. For a setting of 2000 sti/min, the display will be “200”.)</p>	 <p>3075B</p>

Parameter	Setting range and initial value	Display																																																
Slow start pattern	Lo1-Lo9 (Initial values: Lo4)																																																	
	The starting-up speed at the sewing start can be adjusted.																																																	
	<ul style="list-style-type: none">* The smaller the number, the slower the start.* This is used to stop the thread from pulling out at the sewing start, and at times when skipped stitches might easily occur.																																																	
	<table><tr><td></td><td>Lo1</td><td>Lo2</td><td>Lo3</td><td>Lo4</td><td>Lo5</td><td>Lo6</td><td>Lo7</td><td>Lo8</td><td>Lo9</td></tr><tr><td>Sewing speed for 1st stitch</td><td>200</td><td>200</td><td>300</td><td>400</td><td>400</td><td>400</td><td>400</td><td>600</td><td>800</td></tr><tr><td>Sewing speed for 2nd stitch</td><td>200</td><td>300</td><td>400</td><td>400</td><td>500</td><td>600</td><td>800</td><td>1000</td><td>1200</td></tr><tr><td>Sewing speed for 3rd stitch</td><td>300</td><td>400</td><td>500</td><td>600</td><td>800</td><td>1000</td><td>1200</td><td>1600</td><td>*1</td></tr><tr><td>Sewing speed for 4th stitch</td><td>500</td><td>600</td><td>700</td><td>900</td><td>1200</td><td>1400</td><td>*1</td><td>*1</td><td>*1</td></tr></table>			Lo1	Lo2	Lo3	Lo4	Lo5	Lo6	Lo7	Lo8	Lo9	Sewing speed for 1st stitch	200	200	300	400	400	400	400	600	800	Sewing speed for 2nd stitch	200	300	400	400	500	600	800	1000	1200	Sewing speed for 3rd stitch	300	400	500	600	800	1000	1200	1600	*1	Sewing speed for 4th stitch	500	600	700	900	1200	1400	*1
	Lo1	Lo2	Lo3	Lo4	Lo5	Lo6	Lo7	Lo8	Lo9																																									
Sewing speed for 1st stitch	200	200	300	400	400	400	400	600	800																																									
Sewing speed for 2nd stitch	200	300	400	400	500	600	800	1000	1200																																									
Sewing speed for 3rd stitch	300	400	500	600	800	1000	1200	1600	*1																																									
Sewing speed for 4th stitch	500	600	700	900	1200	1400	*1	*1	*1																																									
	*1 Sewing will be carried out at the sewing speed which is set by the parameters.																																																	
Counter	Refer to “5-2-3. Using the production counter”.																																																	
Split No.	Refer to “5-2-4. Split number setting method”.																																																	
Thread wiping	ON, OFF (Initial setting is “ON”.)																																																	

5-2-2. Using the lower thread counter

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

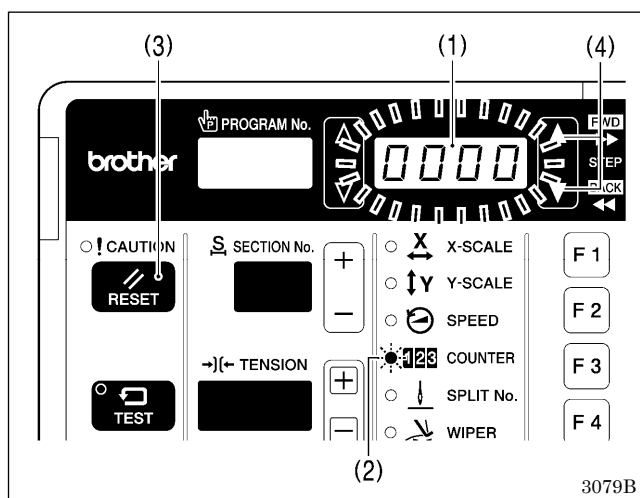
<Initial value setting>

1	Change the mode to lower thread counter setting mode.	While pressing the TEST key, press the ▼ key.
		<ul style="list-style-type: none"> The initial value which was set previously will appear in the menu display.
TEST indicator and COUNTER indicator flash		3077B 2426B
2	Change the initial value.	Press the ▲ or ▼ key (1) to set the initial value. <ul style="list-style-type: none"> The initial value can be set from 1 ("0001") to 9999 ("9999"). If the initial value is set to "0000", the lower thread counter will not operate. If you press the RESET key, the setting will become "0000". If the value is changed, the display will change to flashing.
		3078B
<div style="border: 1px dashed black; padding: 5px;"> <p>If you press the ENTER key during setting mode, the initial value for the program number which was displayed before switching to setting mode will be memorized, and you can set the lower thread counter separately for each program number.</p> </div>		
3	Ending setting mode	Press the TEST key. <ul style="list-style-type: none"> The initial value will be memorized.
		TEST indicator switches off
2404B		

<Lower thread counter operation>

If the initial value is set to other than "0", the lower thread counter will operate. (It operates even if the lower thread counter display is not active.)

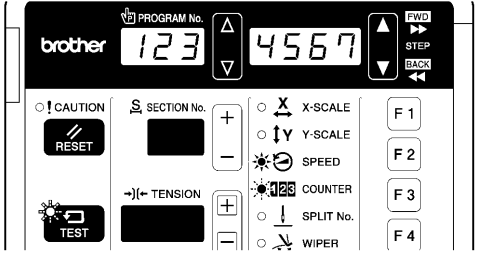
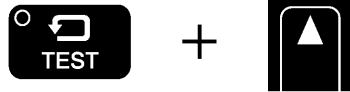
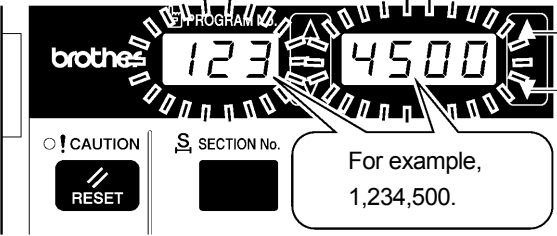


If you press the SELECT key so that the COUNTER indicator illuminates, the current counter value will be displayed in the menu display (1).



- Each time the sewing of a single article is completed, the value shown in the menu display (1) is reduced by 1.
- If the lower thread counter becomes "0000", the menu display (1) and the COUNTER indicator (2) will flash and a buzzer will sound. The sewing machine will not operate during this time, even if the foot switch is depressed.
- When you press the RESET key (3), the initial value for the lower thread counter will appear in the menu display (1) and sewing will be possible.
 - You can press the ▲ or ▼ key (4) to set the lower thread counter to the desired value. However, this value will not be memorized as the initial value.
 - If you press the RESET key (3) for 2 seconds or more, you can return the lower thread counter to its initial value even if the current value is not "0000".

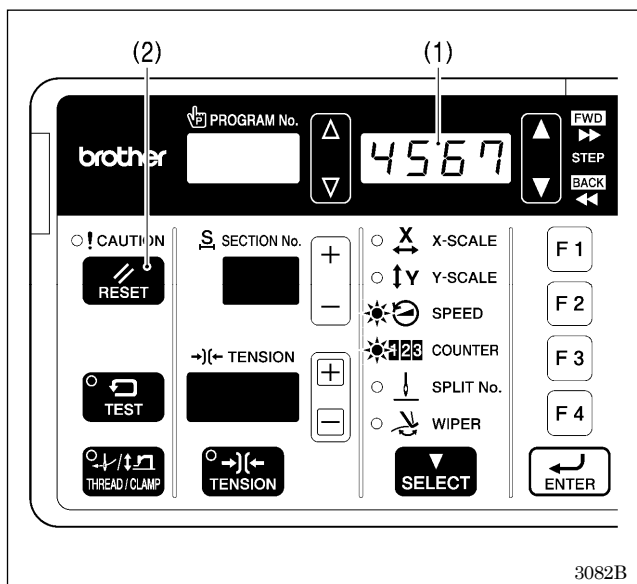
5-2-3. Using the production counter

<Setting the counter value>

1	<p>Change the mode to production counter setting mode.</p>  <p>SPEED indicator illuminates TEST indicator and COUNTER indicator illuminate</p>	<p>While pressing the TEST key, press the ▲ key.</p>  <ul style="list-style-type: none"> The 7 digits of the current counter value will be displayed in the PROGRAM No. display and the menu display. <p>3080B 2430B</p>
2	<p>Change the counter value.</p>  <p>(1)</p>	<p>Press the ▲ or ▼ key (1) to set the counter value.</p> <ul style="list-style-type: none"> The counter value can be set from [000][0000] to [999][9999]. If you press the RESET key during setting mode, the value will become [000][0000]. If the value is changed, the display will change to flashing. <p>3081B</p>
3	<p>Apply the changed parameter setting.</p>  <p>2414B</p>	<p>Press the ENTER key.</p> <ul style="list-style-type: none"> The value will be applied and the display will change to illuminated. If you press the TEST key without pressing the ENTER key, you can cancel the parameter changes.
4	<p>Ending setting mode</p>  <p>TEST indicator switches off</p>	<p>Press the TEST key.</p> <p>2404B</p>

<Production counter operation>

The production counter is always operating. (It operates even if the production counter display is not active.) If you press the SELECT key so that the COUNTER indicator illuminates when memory switch No. 300 is 'ON', the current production counter value will be displayed in the menu display instead of the lower thread counter value. (The SPEED indicator will also illuminate at this time.)



1. The counter is incremented by 1 each time one sewing operation is complete. If the production counter display is active, the number being displayed in the menu display (1) will be incremented by 1.

* If you would like the digits to be displayed in all columns, use the temporary display function described below.

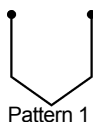
* If you press the RESET key (2) for 2 seconds or more, the counter value can be reset to [0000].

Temporary display function

• While pressing the ENTER key, press the F1 key. The production counter will be displayed as 7 digits while the keys are being pressed.

• While pressing the ENTER key, press the F2 key. The lower thread counter will be displayed while the keys are being pressed.

5-2-4. Split number setting method



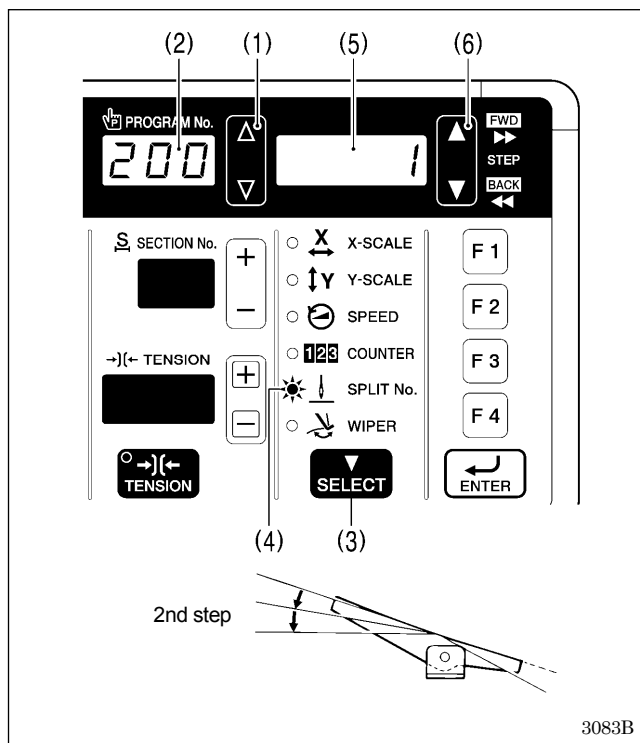
If split data (data that causes sewing to pause) exists within a single program, the numbers that are used to specify the patterns that are separated by split data are called split numbers.

Pattern 1: Split No. 1

Pattern 2: Split No. 2

Pattern 3: Split No. 3

4964Q



1. Press the Δ or ∇ key (1) to select a program number for a program that contains split data.
 - The program number will flash in the PROGRAM No. display (2).
2. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
 - The feed mechanism will move to the home position and the program number will be accepted.
 - The program number will stop flashing and illuminate steadily.
3. Press the SELECT key (3) so that the SPLIT No. indicator (4) illuminates.
 - The split number will appear in the menu display (5).
4. Press the Δ or ∇ key (6) to set the split number.

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

[Continuous split]

Memory switch No. 403 = 0 (Split mode is always enabled)

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

[Independent split]

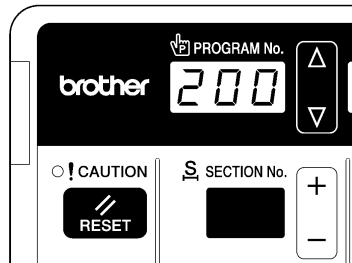
Memory switch No. 403 = 1

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

5-3. Copying programs

Sewing programs can be copied to other program numbers.

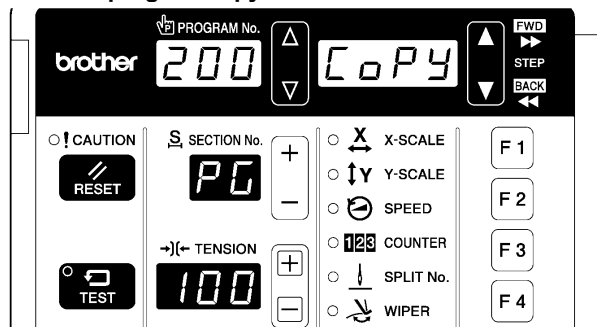
- 1** Press the Δ or ∇ key to select the program number that you would like to use as the copying destination.



For example, to copy program number 200:

3084B

- 2** Switch to program copy mode.



3161B

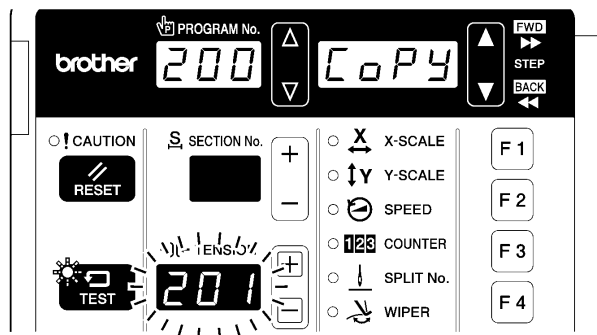
While pressing the TEST key, press the SELECT key.



- “CoPy” will appear in the menu display, and the copying destination program number will appear in the tension value display.

2397B

- 3** Select the copying destination program number.



For example, to copy to program number 201:

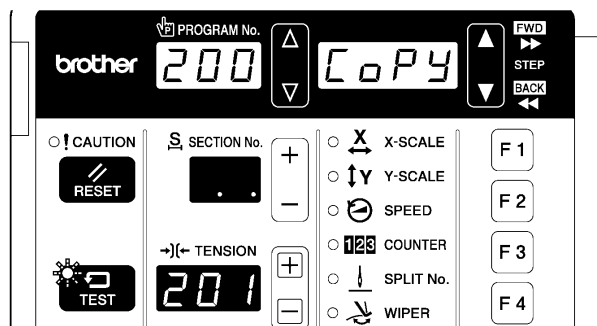
3085B

Press the $+$ or $-$ key to change the copying destination program number.

- * If a program has already been recorded in the selected copying destination program number, “..” will appear in the section display.

- 4** Copy the program.

Press the ENTER key.



3086B

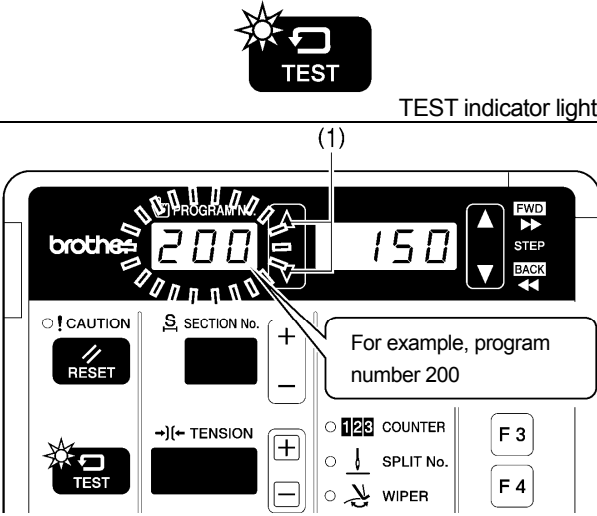
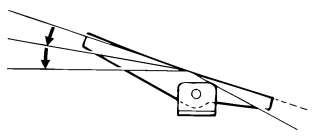
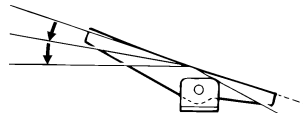
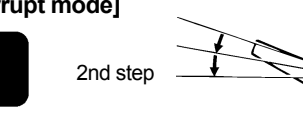
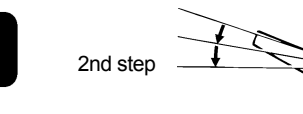
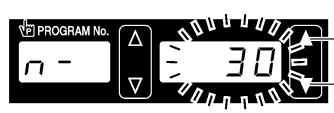
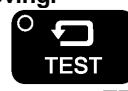
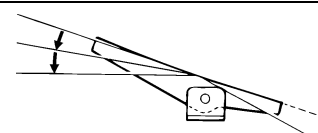


- The program items will be copied.

2414B

5-4. Checking the sewing pattern

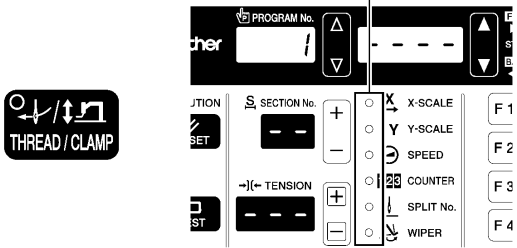
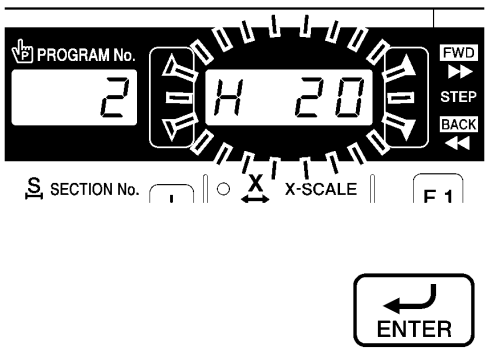
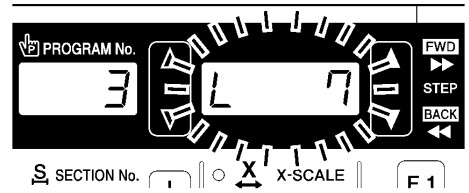
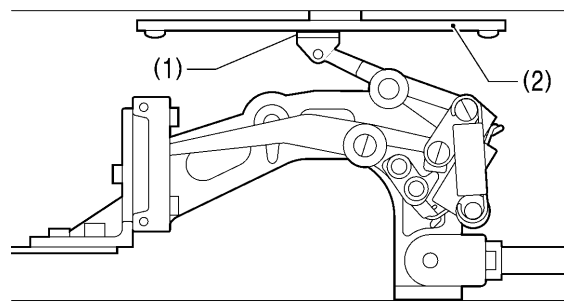
Use test feed mode to operate the feed mechanism in order to check the needle movement.
Check that the needle hole does not come out from the frame of the work clamp.

1	 <p>TEST indicator lights</p> <p>(1)</p> <p>For example, program number 200</p> <p>Program No. flashes → illuminates</p>	<p>1. Press the TEST key.</p> <ul style="list-style-type: none"> The number of stitches remaining until the final stitch will be displayed in the menu display. <p>2416B</p> <p>2. Press the Δ or ∇ key (1) to set the program number that you would like to check.</p> <p>If the PROGRAM No. display is flashing, depress the foot switch to the 2nd step.</p> <ul style="list-style-type: none"> The feed mechanism will move to the home position and the program number will change from flashing to illuminated.  <p>2nd step</p> <p>3087B 4441Q</p>
2	<p>Start continuous test feed mode.</p>  <p>4441Q</p> <p>[Test interrupt mode]</p>  <p>2nd step</p> <p>TEST indicator flashes</p> <p>[Paused sewing standby mode]</p>  <p>2nd step</p> <p>TEST indicator switches off</p>  <p>(2) (3)</p> <ul style="list-style-type: none"> If you press the Δ key (2) while this mode is active, the feed mechanism will move forward by one stitch, and if you press the ∇ key (3), the feed mechanism will move back by one stitch. (The feed will move quicker if you keep the key pressed down.) If you press the RESET key, the feed mechanism will return to the sewing start position. <p>2417B</p>	<p>Depress the foot switch to the 2nd step and then release it.</p> <ul style="list-style-type: none"> The feed mechanism starts moving continuously one stitch at a time. (The stitch number display will be decremented by one stitch at a time.) The TEST indicator will flash. <p>[Fast-forward test mode]</p> <p>If you depress the foot switch to the 1st step while the feed mechanism is moving, the speed of the feeding operation will become faster while the foot switch is being depressed.</p> <p>If you would like to stop the feeding operation, press the TEST key.</p> <ul style="list-style-type: none"> If you depress the treadle to the 2nd step, feeding operation will restart. <p>If you would like sewing to resume from the point where it was paused, press the TEST key while test feeding is paused to switch off the TEST indicator.</p> <ul style="list-style-type: none"> If you depress the treadle to the 2nd step, sewing will start. <p>2404B 2416B 4441Q</p>
3	<p>Once the test feed reaches the final stitch, the feed mechanism stops moving.</p>  <p>TEST indicator switches off</p> <p>2404B</p>	<p>Press the TEST key.</p>
4	<p>1st step</p> 	<p>Depress the foot switch to the 1st step.</p> <p>The work clamp will rise and the preparation for sewing will be completed.</p> <p>4441Q</p>

5-5. Setting the work clamp lift amount

The settings for the work clamp and intermediate work clamp lift amount can be changed using the operation panel.

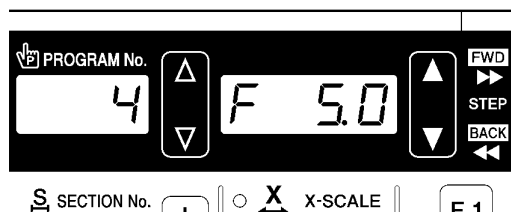
* For pneumatic work clamp specifications, only threading mode and intermittent presser foot height setting mode will be available.

1	<p>All indicators switch off</p>  <p>THREAD/CLAMP indicator illuminates MENU indicator switches off</p>	<p>Press the THREAD/CLAMP key. The sewing machine will switch to threading mode.</p> <ul style="list-style-type: none"> " 1" will appear in the PROGRAM No. display, and the work clamp will be lowered.
2	<p>Motor-driven work clamp specifications only</p> 	<p>Press the Δ key. The sewing machine will switch to work clamp height setting mode.</p> <ul style="list-style-type: none"> " 2" will appear in the PROGRAM No. display, and the work clamp will be raised to the setting value which appears in the menu display. (Work clamp height setting: 15 – 25) <p>Press the Δ or ∇ key to set the work clamp height.</p> <ul style="list-style-type: none"> The work clamp will be raised or lowered to the height of the setting value. If you press the Δ or ∇ key to change the height, the height display will flash. If you press the RESET key while the height display is flashing, the setting value will return to the value before the change was made. Press the ENTER key to accept the setting.
	<p>When the setting value for memory switch No. 003 is "2"</p> 	<p>Press the Δ key. The sewing machine will switch to intermediate work clamp height setting mode.</p> <ul style="list-style-type: none"> " 3" will appear in the PROGRAM No. display, and the work clamp will move to the setting value that appears in the menu display. (Intermediate work clamp height setting: 1 – 15) <p>Press the Δ or ∇ key to set the intermediate work clamp height.</p> <ul style="list-style-type: none"> The work clamp will be raised or lowered to the height of the setting value. If you press the Δ or ∇ key to change the intermediate work clamp height, the height display will flash. If you press the RESET key while the height display is flashing, the setting value will return to the value before the change was made. Press the ENTER key to accept the setting.
	<p>NOTE: When setting the work clamp height and the intermediate presser foot work clamp height, check that the slider (1) is touching the work clamp lifter plate assembly (2).</p> 	

3091B

5. USING THE OPERATION PANEL (BASIC OPERATIONS)

3



Press the Δ key.

The sewing machine will switch to intermittent presser foot height setting mode.

- "4" will appear in the PROGRAM No. display, and the work clamp will rise to the setting value that appears in the menu display. (Intermittent presser foot height setting: 0.0 – 10.0)

Press the Δ or ∇ key to set the intermittent presser foot height.

- The intermittent presser foot will rise or drop to the height of the new value that has been set.
- If you press the RESET key while the height display is flashing, the setting value will return to the value before the change was made.
- Press the ENTER key to accept the setting.

NOTE:

After making the setting, be sure to turn the pulley once by hand and check that the intermittent presser foot does not touch the needle bar.

3092B

<Changing modes>



Motor-driven work clamp specifications

- " 1" Threading mode
- ↑↓ " 2" Work clamp height setting mode
- ↑↓ " 3" Intermediate work clamp height setting mode (*)
- ↑↓ " 4" Intermittent presser foot height setting mode

* When the setting value for memory switch No. 003 is "2"

Pneumatic work clamp specifications

- " 1" Threading mode
- ↑↓ " 4" Intermittent presser foot height setting mode

3093B

4

Ending setting mode

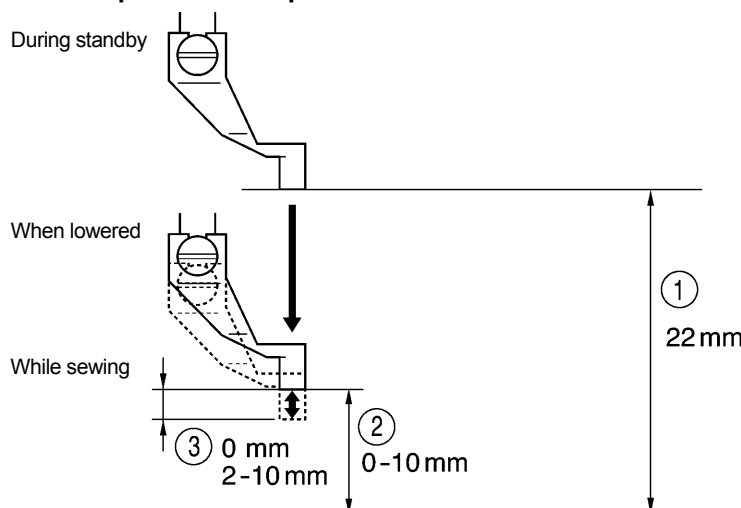


Press the THREAD/CLAMP key.

- The setting values will be memorized.
- The work clamp will return to where it was before setting mode was started.

THREAD/CLAMP indicator switches off

Intermittent presser foot operation



5033Q

① Intermittent presser foot lift amount

② Intermittent presser foot height

The settings can be made by the above operations.

However, set the intermittent presser foot height to a higher setting than the intermittent stroke.

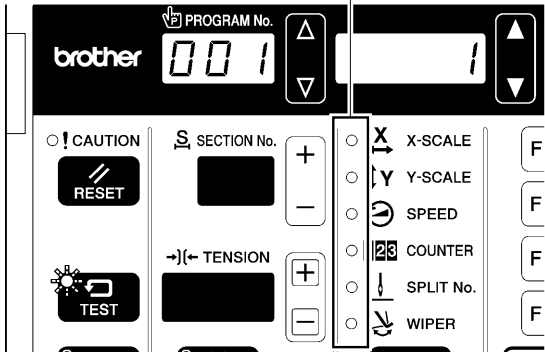


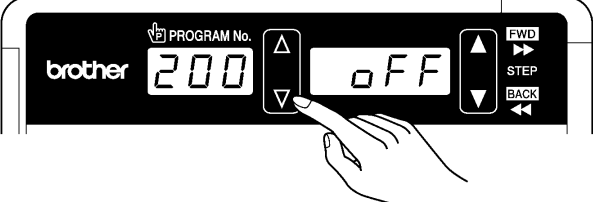


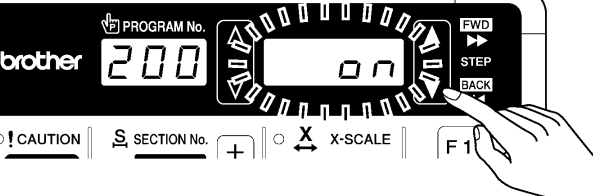


* If it is set smaller, the intermittent presser foot will come into contact with the needle plate.

③ Intermittent stroke

Refer to "10-14. Changing the intermittent stroke" when making the adjustment.

6. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

6-1. Setting memory switches

1	<p>Change the mode to memory switch setting mode.</p> <p>All indicators switch off</p>  <p>Menu indicator switches off, TEST indicator flashes</p>	<p>While pressing the TEST key, press the TENSION key.</p> <p> + </p> <ul style="list-style-type: none"> The memory switch number will appear in the PROGRAM No. display, and the setting value for that memory switch number will appear in the menu display. <p>3094B 2421B</p>
2	<p>Select the memory switch that you would like to change the setting for.</p>  <p>If you would like to display only the numbers of memory switches that have been changed from default settings</p> <p>(1)</p> <p> + </p>	<p>Press the Δ or ∇ key to select the memory switch number.</p> <p>3095B</p> <p>While pressing the SELECT key, press the Δ or ∇ key (1).</p> <ul style="list-style-type: none"> The numbers of memory switches that have been changed from default settings will appear in order. <p>2423B</p>
3	<p>Change the memory switch parameters.</p> 	<p>Press the \blacktriangle or \blacktriangledown key to change the setting value.</p> <ul style="list-style-type: none"> The flashing display means that the setting has not yet been applied. You can make the initial setting appear in the display by pressing the RESET key. <p>3096B</p>
4	<p>Apply the changed parameter setting.</p> <p></p> <p>2414B</p>	<p>Press the ENTER key.</p> <ul style="list-style-type: none"> The menu display will change from flashing to illuminated, and this means that the setting has been applied. If you press the Δ or ∇ key (1) or the TEST key without pressing the ENTER key, you can cancel the parameter changes.
5	Repeat steps 2 to 4 above to set each memory switch.	
6	<p>Exit setting mode.</p> <p></p> <p>TEST indicator switches off</p>	<p>Press the TEST key.</p> <ul style="list-style-type: none"> The changes will be memorized and the sewing machine will switch to home position detection standby. <p>2404B</p>

6-2. List of memory switch settings

No.	Setting range	Setting items	Initial value
001	Work clamp lift timing after sewing is completed		2
	0	Work clamp is not raised automatically.	
	1	Work clamp is raised at the final stitch position.	
	2	Work clamp is raised after moving to the home position.	
002	Work clamp lowering sequence for separate work clamp (pneumatic specifications only)		0
	0	Left and right work clamps are lowered at the same time.	
	1	Work clamp is lowered in the order left -> right.	
	2	Work clamp is lowered in the order right -> left.	
003	Work clamp lowering operation (solenoid specifications only)		2
	0	Analog lowering: Work clamp is lowered in direct proportion to the pedal depression amount, and sewing starts when the pedal is fully depressed. *This operation is only possible for foot switch specifications; for two-pedal foot switch specifications, operation is the same as for a 2-step work clamp.	
	1	1-step work clamp: Work clamp is lowered when pedal is depressed to the 1st step, and sewing starts when pedal is depressed to the 2nd step.	
	2	2-step work clamp: Work clamp is lowered to intermediate height when pedal is depressed to the 1st step, and work clamp is fully lowered and sewing starts when the pedal is depressed to the 2nd step.	
100	Slow start method		OFF
	OFF	The sewing speed for the first 5 stitches will be in accordance with the setting for memory switch Nos. 151 to 155. (Ask the place of purchase for details on memory switch Nos. 151 to 155.)	
	ON	The sewing speed for the first 5 stitches can be selected from the nine slow start patterns "Lo1" to "Lo9". (Refer to "5-2-1. Parameter list".) The initial value is "Lo4".	
200	Single-stitch test feed		OFF
	OFF	Test feed starts when the foot switch (start switch) is depressed, and it continues automatically until the final stitch.	
	ON	Test feed starts when the foot switch (start switch) is depressed, and it moves forward by one stitch each time the switch is depressed. In addition, when the TEST indicator is illuminated, test feed will move forward one stitch at a time when the machine pulley is turned by hand.	
300	Production counter display		OFF
	OFF	Lower thread counter display	
	ON	Production counter display	
400	Sewing condition detail settings		OFF
	OFF	Parameters which are common to all programs are used.	
	ON	Parameters can be set separately for each program.	
402	Unit display for pattern zoom ratio		OFF
	OFF	Displayed as %.	
	ON	Displayed as mm.	
403	Split mode selection		0
	0	Continuous split mode	
	1	Single split mode	
405	Cycle program No. (C01 to C30) display		ON
	OFF	Disabled (not displayed)	
	ON	Enabled (displayed)	

6. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

No.	Setting range	Setting items	Initial value
406	Program numbers switched by F keys		0
	0	When the F1 to F4 keys are pressed, operation switches to sewing program numbers 101 to 104.	
	1	When the F1 to F4 keys are pressed, operation switches to cycle program numbers C01 to C04. * Selection is possible when memory switch No. 400 is set to ON.	
	2	When the F1 to F4 keys are pressed, operation switches to the program number which has been pre-assigned to the respective key. Assignment to F1 key: Memory switch No. 407 Assignment to F2 key: Memory switch No. 408 Assignment to F3 key: Memory switch No. 409 Assignment to F4 key: Memory switch No. 410	
407	Assignment to F1 key		101
	100 to 999, C01 to C30	If memory switch No. 406 = 3, operation switches to the program number which has been set.	
408	Assignment to F2 key		102
	100 to 999, C01 to C30	If memory switch No. 406 = 3, operation switches to the program number which has been set.	
409	Assignment to F3 key		103
	100 to 999, C01 to C30	If memory switch No. 406 = 3, operation switches to the program number which has been set.	
410	Assignment to F4 key		104
	100 to 999, C01 to C30	If memory switch No. 406 = 3, operation switches to the program number which has been set.	

6-3. Using cycle programs

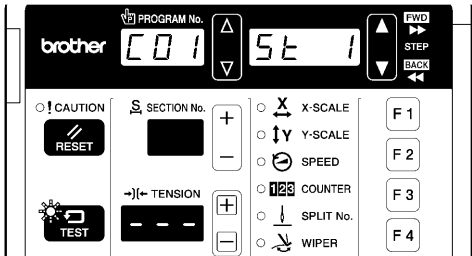



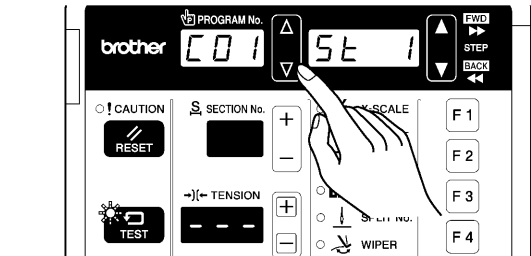
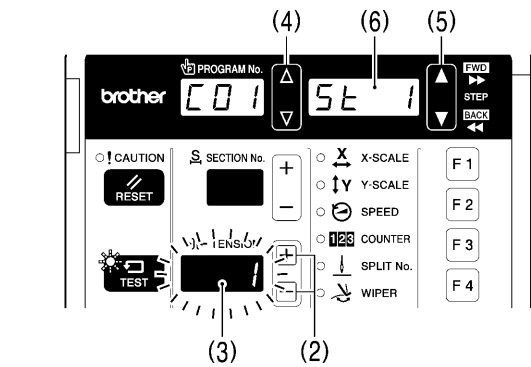



Sewing patterns that have been recorded in user programs can be recorded in up to 30 cycle programs (C01 to C30).

One cycle program can contain up to a maximum of 50 steps (St1 to St50).


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

* If memory switch No. 400 is set to OFF, cycle program setting and selection cannot be carried out.

<Recording method>

<p>1</p>	<p>Switch to cycle program recording mode.</p>  <p>3102B TEST indicator flashes</p>	<p>While pressing the TEST key, press the  key (1).</p>  +  (1) 2436B 2382B
<p>2</p>	<p>Select a cycle program number.</p>  <p>3103B TEST indicator flashes</p>	<p>Press the Δ or ∇ key to select the cycle program number that you would like to use.</p> <ul style="list-style-type: none"> 'St 1' will be displayed.
<p>3</p>	<p>Select the program number to be recorded in step 1.</p>  <p>TEST indicator flashes 3104B 2382B 2383B</p>	<p>Press the  or  key (2) to display the program number to be recorded in the TENSION display (3).</p> <ul style="list-style-type: none"> If the value is changed, the display will change to flashing. To cancel the recording, keep the RESET key pressed for more than 2 seconds so that '---' is displayed.
<p>4</p>	<p>Apply the program setting.</p>	<p>Press the ENTER key.</p>  2414B <ul style="list-style-type: none"> The display will change from flashing to illuminated, and this means that the setting has been applied. If you press the Δ/∇ keys (4), the Δ/∇ keys (5) or the TEST key without pressing the ENTER key, you can cancel the parameter changes.

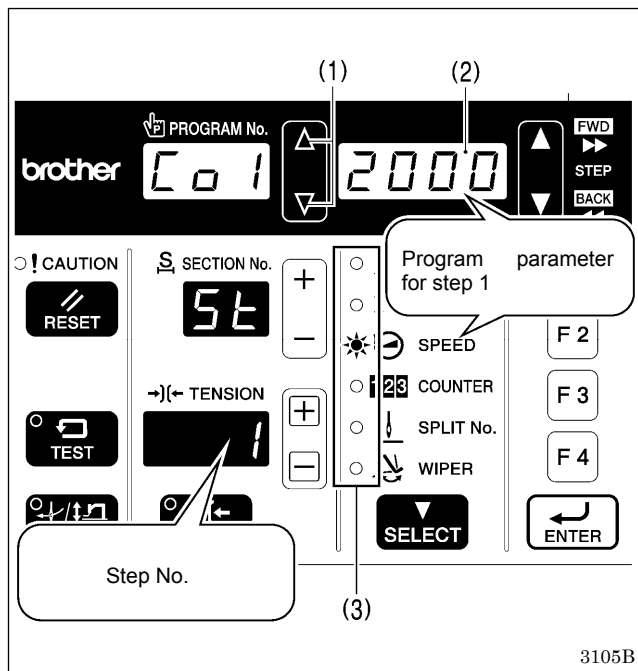
6. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

5	Repeat steps 3 and 4 above to record step 2 and subsequent steps in the same way.	Press the ▲ or ▼ key (5) to display the step number you would like to record in the menu display (6).
6	If you would like to continue setting another cycle program, repeat steps 2 to 5 above.	
7	End cycle program recording mode.	<p>Press the TEST key.</p> <div data-bbox="437 412 564 488">  </div> <p>2404B TEST indicator switches off</p> <p>This completes the recording of cycle programs.</p>

6. USING THE OPERATION PANEL (ADVANCED OPERATIONS)

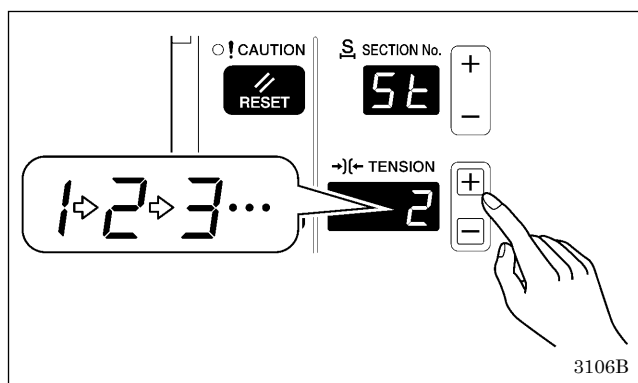
<Method of use>

When a cycle program has been recorded, the cycle program number is displayed after the program number when a program number is selected.



1. Press the Δ or ∇ key (1) to select the cycle program number that you would like to use.

- The cycle program number is displayed in the PROGRAM No. display, the step number is displayed in the TENSION display, and the parameter for that step is displayed in the menu display (2).
- When you press the SELECT key, the menu display (2) and the menu indicator (3) are switched, so that you can check the program parameters for that step.



2. Carry out sewing while referring to "8. Sewing".

- The recorded programs are carried out in the order of the steps, and when the last step is completed, sewing returns to the first step.
- If you press the $+$ or $-$ key, you can return to the previous step or skip to the next step respectively. (You do not need to carry out home position detection again.)

* When memory switch No. 405 is set to OFF, the display of cycle programs can be turned off (skipped).

6-4. Direct selection

You can use the function keys to directly select program numbers and cycle program numbers. **However, if a program number has nothing recorded, it will not be displayed.**

<Function keys>



2441B

The parameters which can be selected will vary depending on the memory switch settings.

406 = 0 (Initial setting)

Program No. 101 F 1 2442B	Program No.102 F 2 2443B	Program No.103 F 3 2444B	Program No.104 F 4 2445B
---------------------------------	--------------------------------	--------------------------------	--------------------------------

406=1

Program No.C01 F 1 2442B	Program No.C02 F 2 2443B	Program No.C03 F 3 2444B	Program No.C04 F 4 2445B
--------------------------------	--------------------------------	--------------------------------	--------------------------------

406=2

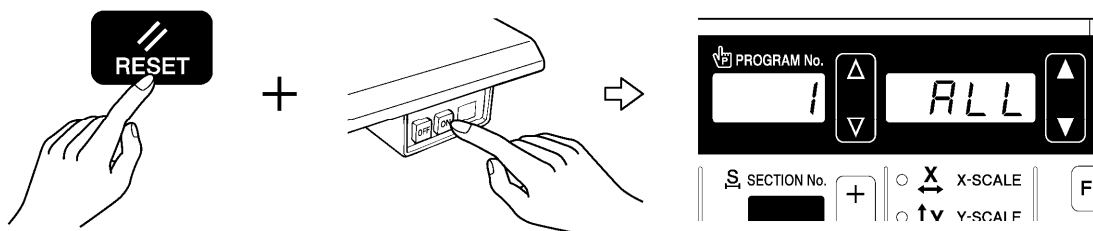
Item specified by memory switch No. 407 F 1 2442B	Item specified by memory switch No. 408 F 2 2443B	Item specified by memory switch No. 409 F 3 2444B	Item specified by memory switch No. 410 F 4 2445B
---	---	---	---

6-5. Resetting all settings to their defaults

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 following the steps given below to initialize the memory setting data.

1 Change to initialization mode.

3107B



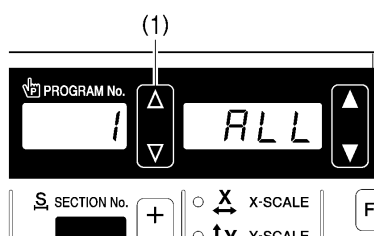
(While pressing the RESET key, press the power ON switch.)

'1' will be displayed in the PROGRAM No. display, and 'ALL' will be displayed in the menu display.

[Reference]

If the Δ or ∇ key (1) is pressed at this time, you can select the items to be initialized as shown below.

* For details on initialization items other than "ALL", contact the place of purchase.



PROGRAM No. display	Main display	Initialization item
1	「ALL」	All data in memory is cleared or initialized.
2	「MEM」	Memory switch settings are initialized.
3	「SEW」	All sewing programs or individual programs are cleared.
4	「USE」	User program sewing conditions are initialized. Cycle programs are initialized.

* To clear individual programs, press the \oplus or \ominus key to select the program number.

3108B 2382B 2383B

2



Press the ENTER key for two seconds or more.

- The menu display will change to illuminated and initialization will then be complete.

2414B

3



Press the TEST key.

2404B

7. USING SD CARDS

7-1. Notes on handling SD cards (commercially available)

- Use an SD card or a multimedia card with a capacity of 2GB or less.
- Do not disassemble or alter SD cards.
- Do not bend, drop, scratch or place heavy objects on top of the SD cards.
- Do not allow the SD cards to become wet, such as with water, oil, solvents, drinks or any other liquids.
- Do not use or store the SD cards in a locations exposed to strong static electricity or electrical interference.
- Do not use or store the SD cards in a locations exposed to vibrations or impacts, direct sunlight, extreme dust (or lint), high temperatures, high humidity, severe temperature fluctuations, or strong magnetic forces (such as from speakers).
- Do not subject the SD cards to vibration or shocks or remove them from the sewing machine while data reading or writing is in progress.
- Data on the SD cards may be lost or damaged due to some malfunction or accident. We recommend backing up important data.
- The SD cards that you purchased is already formatted. We recommend that the SD cards not be reformatted.
- The recommended SD cards are those sold by SanDisk and Panasonic. Cards from other manufacturers may use different formatting methods and may not work correctly as a result.

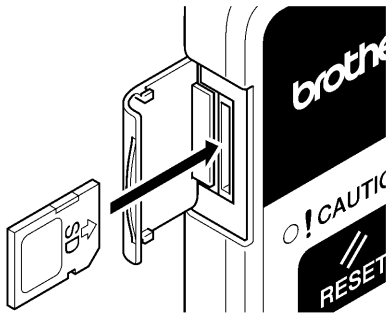
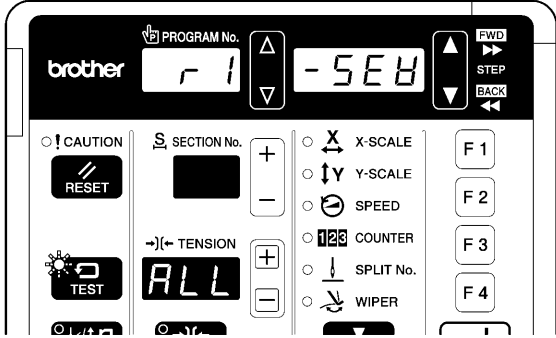


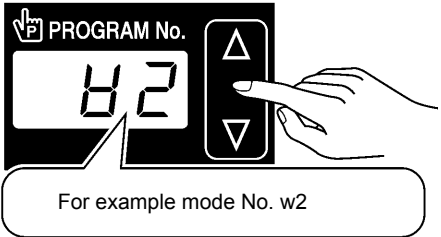
For additional information, refer to the instruction manual included with the SD cards that you have purchased.

- * This product is compatible with SD cards that have been formatted using the FAT16/32 method. Cards that have been formatted using other formatting methods cannot be used.
- * All other company and product names mentioned in this instruction manual are trademarks or registered trademarks of their respective companies. However, the explanations for markings such as TM are not clearly described within the text.

7-2. Structure of an SD card folder

Data type	Folder name	File name
Control program	\BROTHER\ISM\ISMSYS\	ISM19MN.BVP (Main control program) ISM19MT.BVP (Motor control program) ISM19PL.BVP (Panel control program)
Sewing data	\BROTHER\ISM\ISMDB**\ * '**' represents the value for memory switch No. 752. If you would like to keep additional sewing data for different sewing machines on a single SD card, change the folder name.	ISMS0***.sew * '****' represents the sewing data number.
Memory switch	Same as above	ISMMSW.SEW
Parameter	Same as above	ISMUPG.SEW
Cycle program	Same as above	ISMCYC.SEW
Error log	\BROTHER\ISM\ISMLDT\	Stores the files which relate to error logs.

7-3. Preparation for reading and writing data

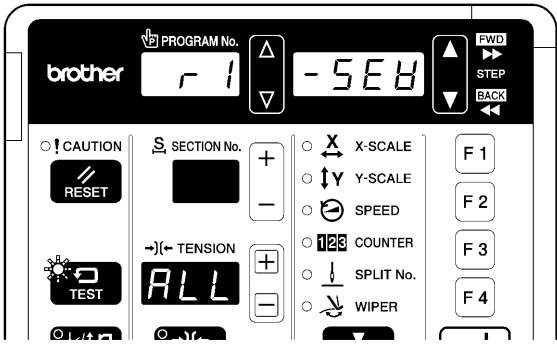
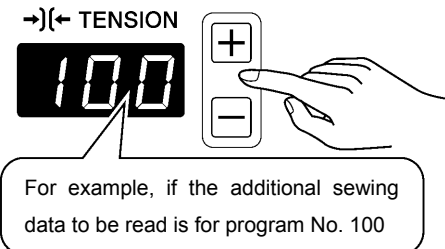


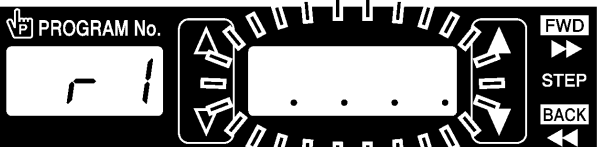






1		<p>Insert the SD card into the SD slot.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Make sure the SD card is facing the correct way. • The cover should be closed at all times except when the SD card is inserted and removed, otherwise dust may cause trouble.
2	Turn on the power switch.	
3	<p>Switching to SD data read/write mode</p>  <p>TEST indicator flashes</p>	<p>While pressing the TEST key, press the ENTER key.</p> <div style="text-align: center;">  +  </div> <p>2652B</p> <ul style="list-style-type: none"> • “sd” will appear in the PROGRAM No. display and “read” will appear in the menu display while the SD card is being read. • Once reading of the SD card is complete, the mode number will appear in the PROGRAM No. display and the setting for that mode number will appear in the menu display. • The initial mode is additional sewing data reading mode. (Refer to “Read/write mode list” below.)
4	 <p>For example mode No. w2</p>	<p>Press the Δ or ∇ key to select the mode.</p> <p>2653B</p>

[Read/write mode list]

PROGRAM No. display	Menu display	Setting items
r 1	[-Sew]	Additional sewing data is read from the SD card. *
w 2	[Sew-]	Additional sewing data is written to the SD card.
r 3	[-MEM]	Memory switch settings are read from the SD card.
w 4	[MEM-]	Memory switch settings are written to the SD card.
r 5	[-PrG]	Reads sewing program data and cycle program data from the SD card.
w 6	[PrG-]	Writes sewing program data and cycle program data to the SD card.
r 7	[-ALL]	Reads all sewing machine data (sewing program data, cycle program data, memory switch settings and additional sewing data) from the SD card.
w 8	[ALL-]	Writes all sewing machine data (sewing program data, cycle program data, memory switch settings and additional sewing data) to the SD card.
w9	[LoG-]	Error log data is written to the SD card.

* The additional sewing data that can be used with this sewing machine is data which has been created for the BAS-311H or for the BAS-300G/311G.

7-4. Reading additional sewing data

1	 <p>3098B</p>	<p>Select the “r 1” SD data read/write mode. (Refer to “7-3. Preparation for reading and writing data”.)</p> <ul style="list-style-type: none"> The number of the additional sewing data in the SD memory card folder will appear in the tension display. (The initial value displayed is “ALL”.)
2	 <p>For example, if the additional sewing data to be read is for program No. 100</p> <p>3099B</p>	<p>Press the  or  key to select the number for the additional sewing data that you would like to be read (ALL, 100 to 999).</p> <ul style="list-style-type: none"> When “ALL” is displayed, all of the additional sewing data will be read at once. Only the data in the SD card folder corresponding to the additional sewing data number will be displayed. (If there is not a single item of data in the folder, “---” will be displayed.)
3	 <p>While reading</p>  <p>The number for the additional sewing data number which is currently being read will appear in the tension value display.</p> <p>2657B 3100B</p>	<p>Press the ENTER key.</p>  <p>2414B</p> <ul style="list-style-type: none"> The buzzer will sound and the selected additional sewing data will be read from the SD card and copied into the sewing machine's internal memory. If no additional sewing data exists, an error buzzer will sound.
4	 <p>3101B</p>	<p>When the display returns to the status in step 1, reading of the additional sewing data is complete.</p> <ul style="list-style-type: none"> If you would like to use any other read/write modes, press the  or  key to select the mode and then run it.
5	<p>Ending read/write mode</p>  <p>TEST indicator switches off</p> <p>2404B</p>	<p>Press the TEST key.</p>

* Contact the place of purchase for information on other reading and writing modes.

8. SEWING

! WARNING



Do not allow any liquids to get onto this sewing machine, otherwise fire, electric shocks or operating problems may occur.



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.

! CAUTION



Turn off the power switch at the following times.

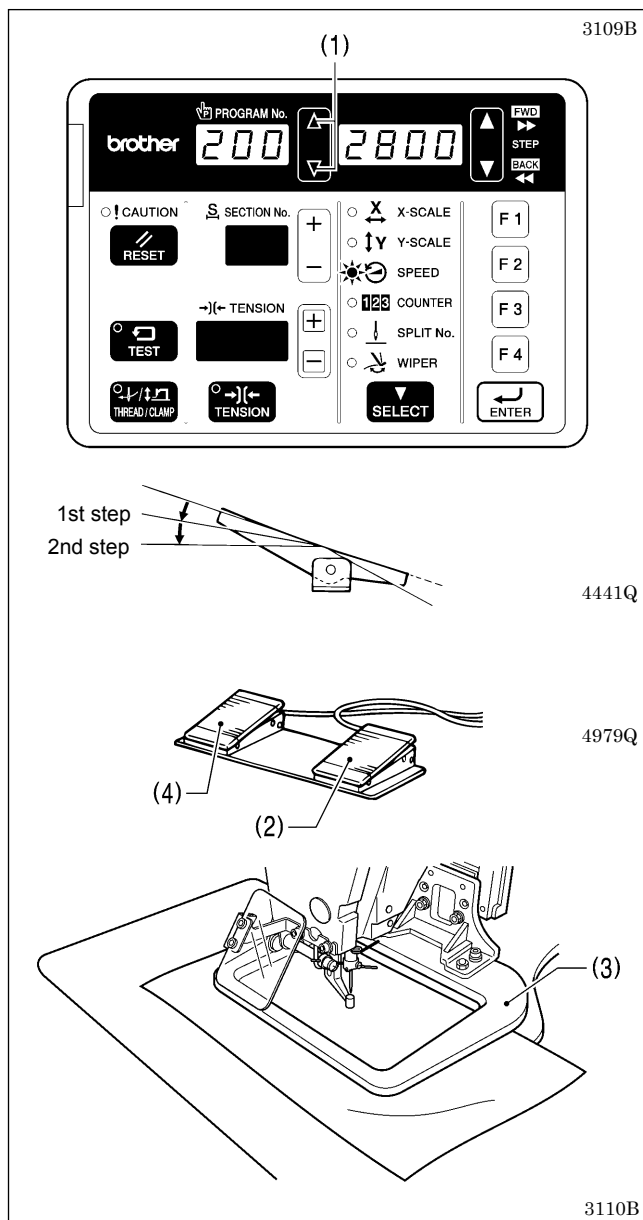
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

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



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

8-1. Sewing



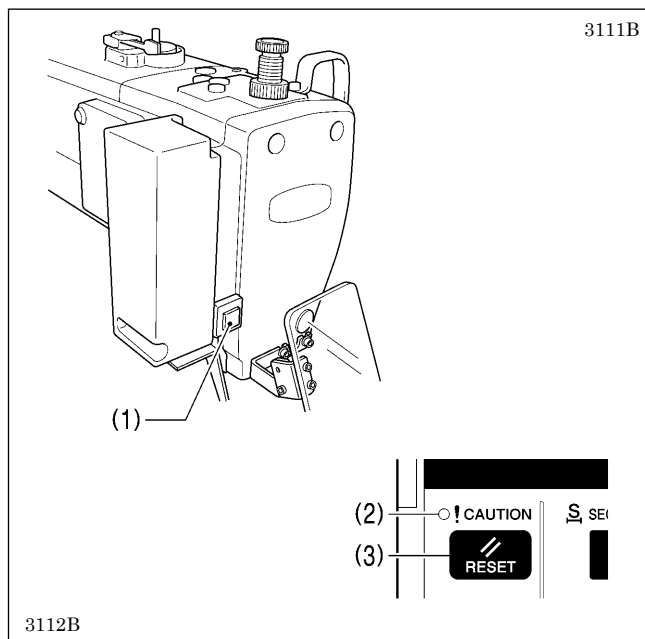
1. Turn on the power switch.
2. Press the Δ or ∇ key (1) to select the sewing program number that you would like to use.
 - * Refer to "7-4. Reading additional sewing data " for details on reading sewing data from a SD card.

3. Depress the foot switch to the 2nd step.
 - (If using a two-pedal foot switch, lower the work clamp (3) before depressing the start switch (2).)
 - The feed mechanism will move to the home position.
4. Place the material under the work clamp (3).
5. Depress the foot switch to the 1st step.
 - (If using a two-pedal foot switch, depress the work clamp switch (4).)
 - The work clamp will be lowered.
6. Depress the foot switch to the 2nd step.
 - (If using a two-pedal foot switch, depress the start switch (2).)
 - The sewing machine will start sewing.
7. After sewing is completed, the thread trimmer will operate, and then the work clamp (3) will be raised.

Use a work clamp which will hold the material securely so that it does not slip. If the material slips when using the standard work clamp and feed plate, process them so that the material does not slip.

8-2. Using the STOP switch

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


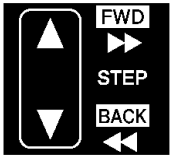
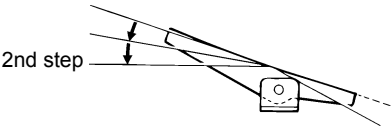


<Clearing>

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

<Continuing sewing from a stopping point>

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

1		<p>Press the RESET key.</p> <ul style="list-style-type: none"> • The thread will be trimmed, and then the CAUTION indicator will switch off and the buzzer will stop sounding.
2		<p>Press the ▼ key to return to the position where sewing stopped.</p> <ul style="list-style-type: none"> • When you press the ▼ key, the feed mechanism will move backward one stitch at a time, and when you press the ▲ key, it will move forward one stitch at a time. (The feed will move quicker if you keep the key pressed down.) <p style="text-align: right;">3113B</p>
3	 <p>2nd step</p>	<p>Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, depress the start switch.)</p> <ul style="list-style-type: none"> • The sewing machine will start operating and sewing will start. <p style="text-align: right;">4441Q</p>

9. CLEANING

CAUTION



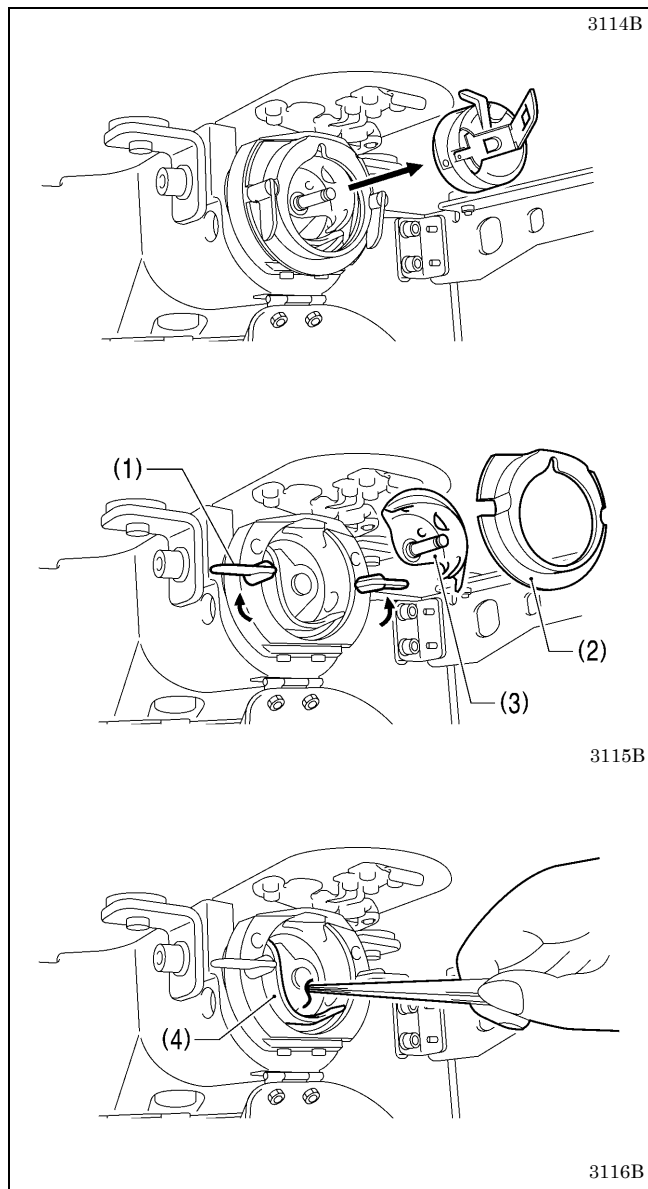
Turn off the power switch before carrying out cleaning.

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



Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They may cause diarrhea or vomiting. Keep the oil out of the reach of children.

9-1. Cleaning the rotary hook

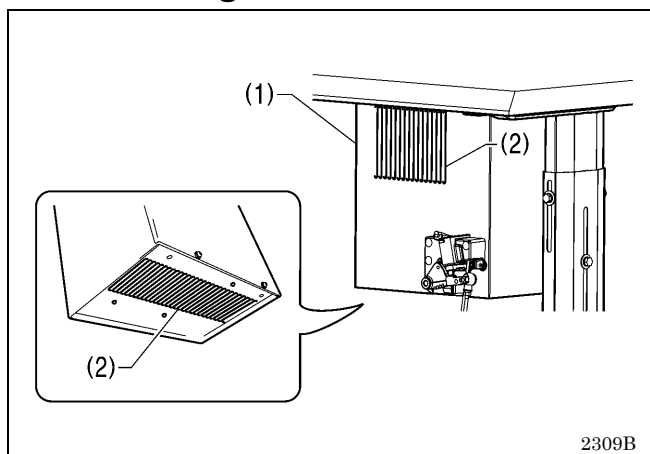


1. Pull the shuttle race cover downward to open it, and then remove the bobbin case.

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

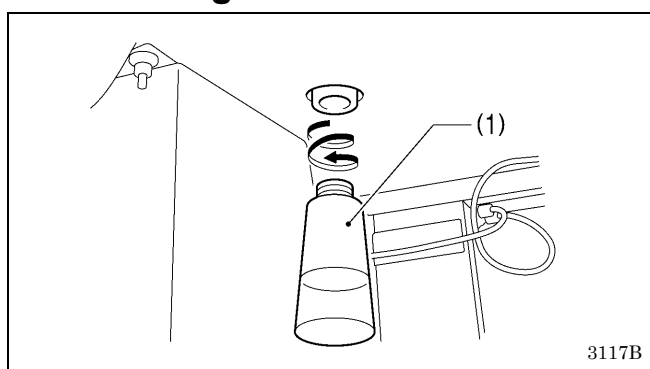
3. Clean all the dust and thread ends from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

9-2. Cleaning the control box air inlet ports



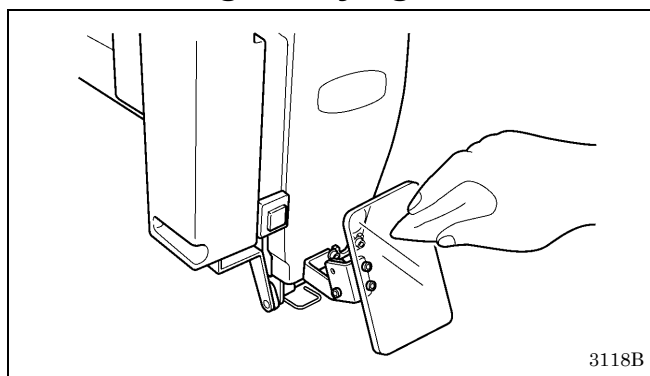
Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

9-3. Draining the oil



1. Remove and empty the waste oil tank (1) whenever it is full.
2. After emptying the waste oil tank (1), screw it back into its original position.

9-4. Cleaning the eye guard

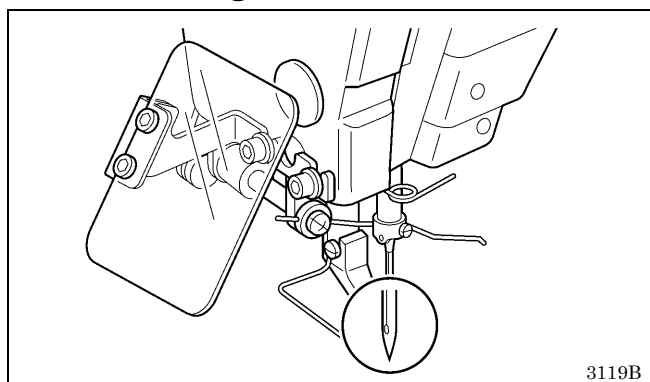


Wipe the eye guard clean with a soft cloth.

NOTE:

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

9-5. Checking the needle



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

9-6. Lubrication

Lubricate the sewing machine while referring to "3-14. Lubrication".

10. STANDARD ADJUSTMENTS

⚠ CAUTION



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



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



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

- Inspection, adjustment and maintenance
- Replacing consumable parts such as the rotary hook



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

In addition, do not apply excessive force when tilting back the machine head. The sewing machine may become unbalanced and fall down, and serious injury or damage to the sewing machine may result.

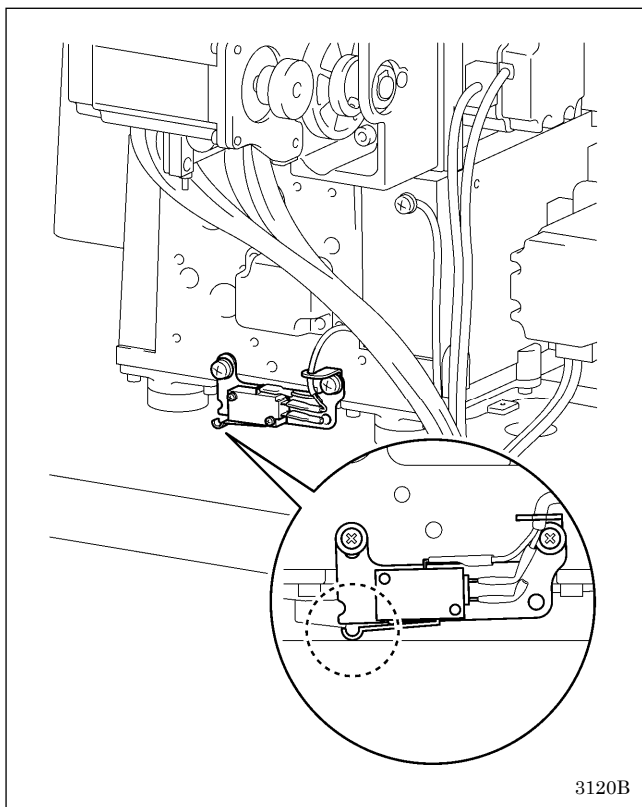


If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.



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

10-1. Checking the machine head switch



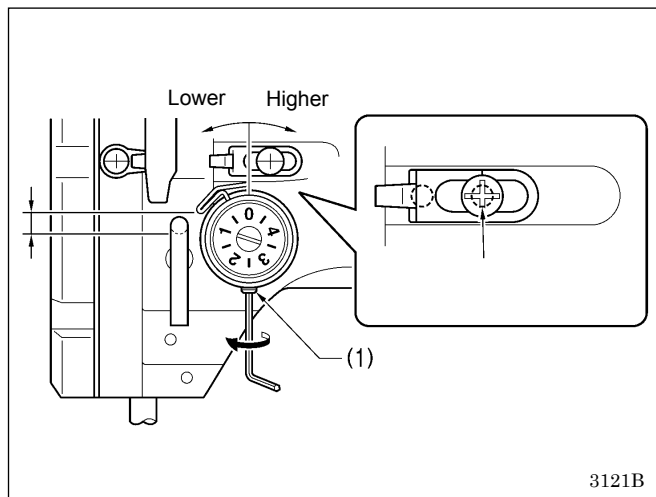
Check that the machine head switch is turned on as shown in the illustration.

NOTE:

If the machine head switch is not turned on, errors "E050", "E051" and "E055" will be generated.

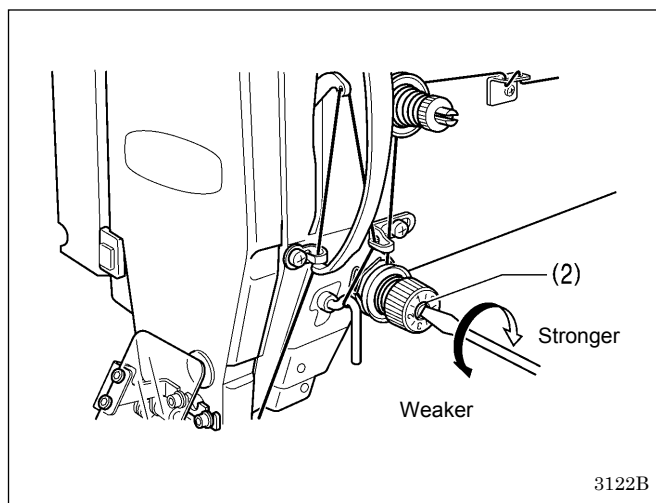
10-2. Thread take-up spring

Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07[])
Thread take-up spring height (mm)	7 – 10		2 – 4
Thread take-up spring tension (N)	0.2 – 0.5	0.6 – 1.2	1.0 – 1.4



<Thread take-up spring height>

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



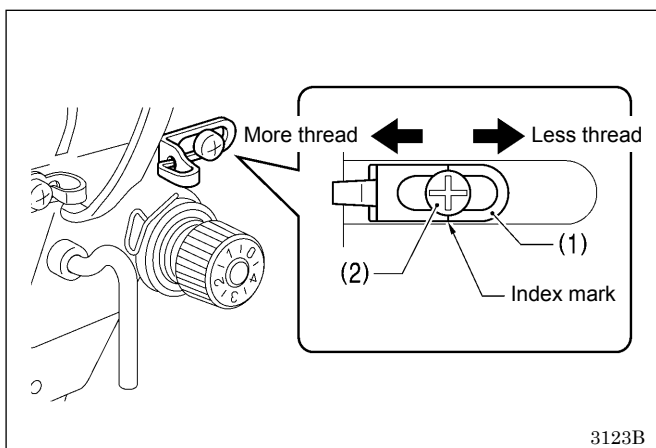
<Thread take-up spring tension>

Turn the tension stud (2) with a screwdriver to adjust the tension.

NOTE:

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

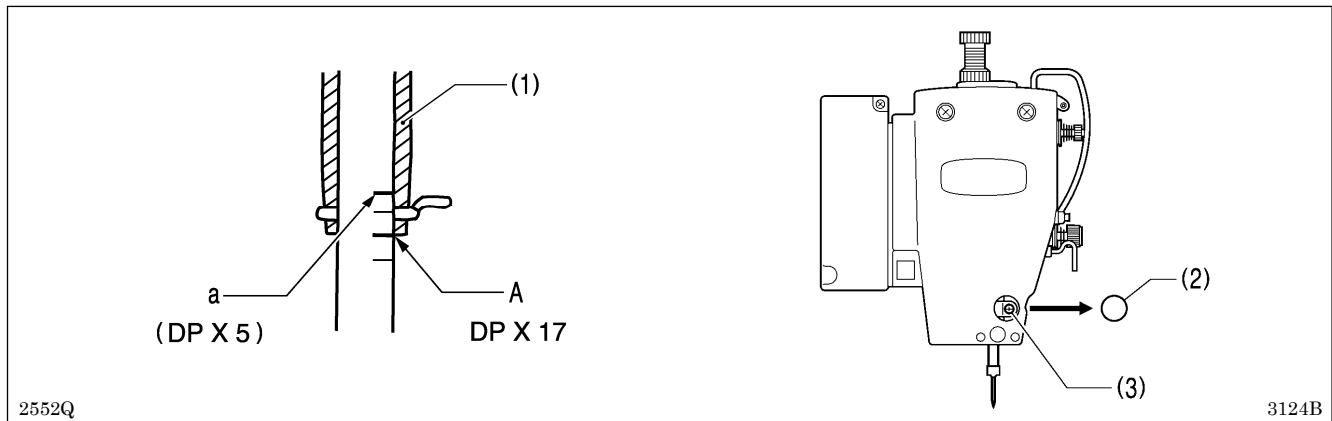
10-3. Arm thread guide R



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

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

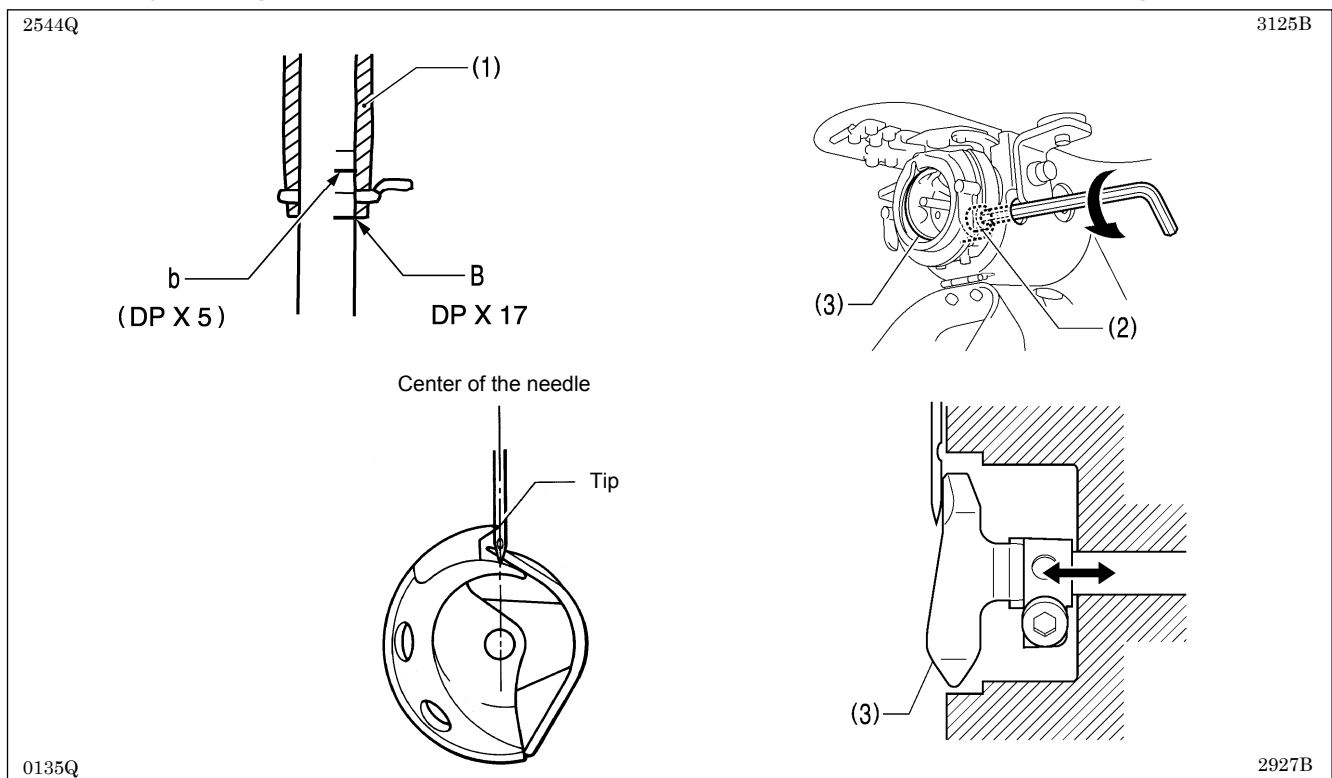
10-4. Adjusting the needle bar height



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

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

10-5. Adjusting the needle bar lift amount and the driver needle guard



1. Turn the pulley in the direction of the arrow to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (1).

* If using a DP x 5 needle, align with reference line b which is the second reference line from the top.

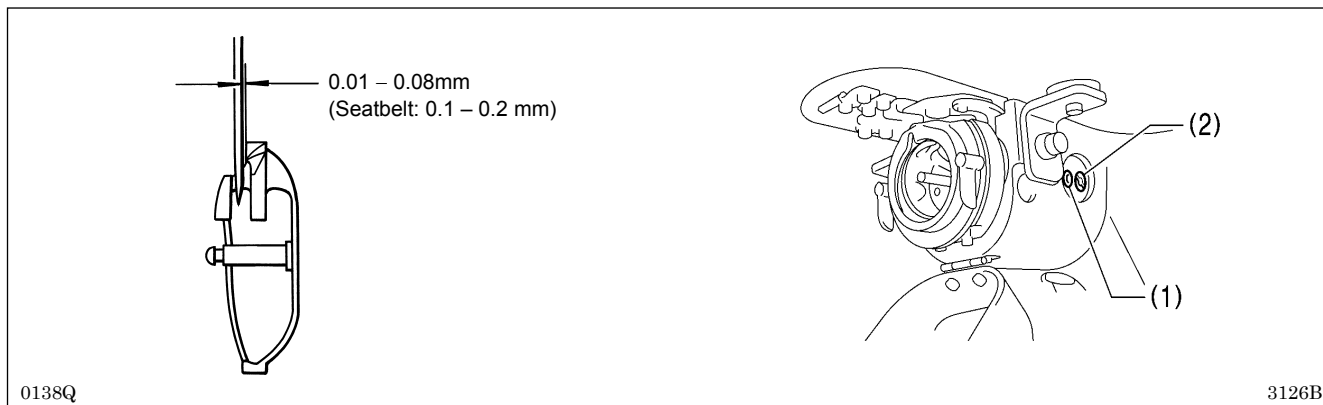
2. Loosen the bolt (2).

3. Move the driver (3) back and forth to adjust so that it is touching the needle when the tip of the rotary hook is aligned with the center of the needle, and then tighten the bolt (2).

NOTE:

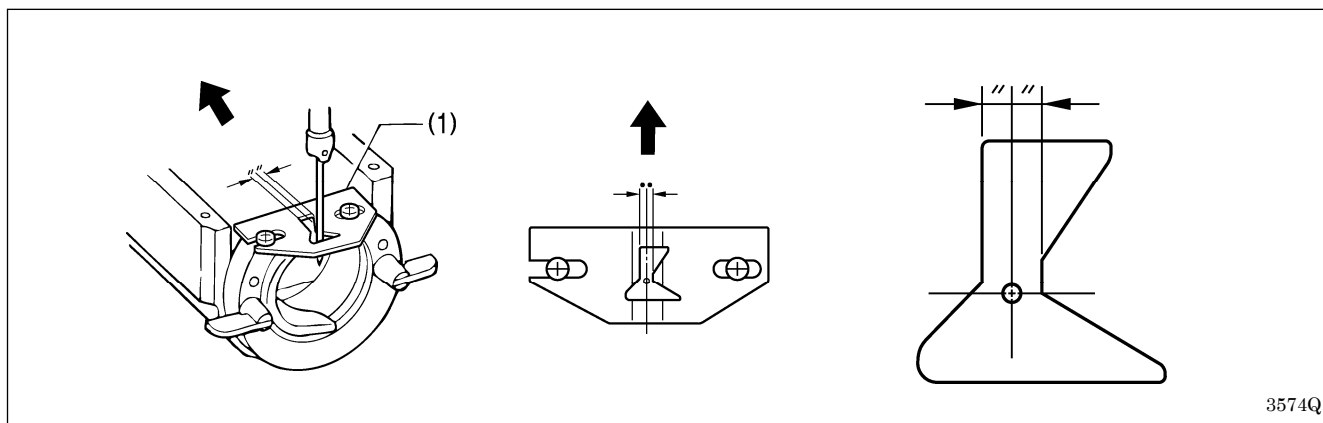
If the driver (3) crosses the needle more than necessary, it will place a load on the needle, or it may cause poor thread tension. Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

10-6. Adjusting the needle clearance



Turn the pulley in the direction of the arrow to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (1) and turn the eccentric shaft (2) to adjust so that the clearance between the needle and the rotary hook is 0.01 to 0.08 mm.

10-7. Adjusting the shuttle race thread guide



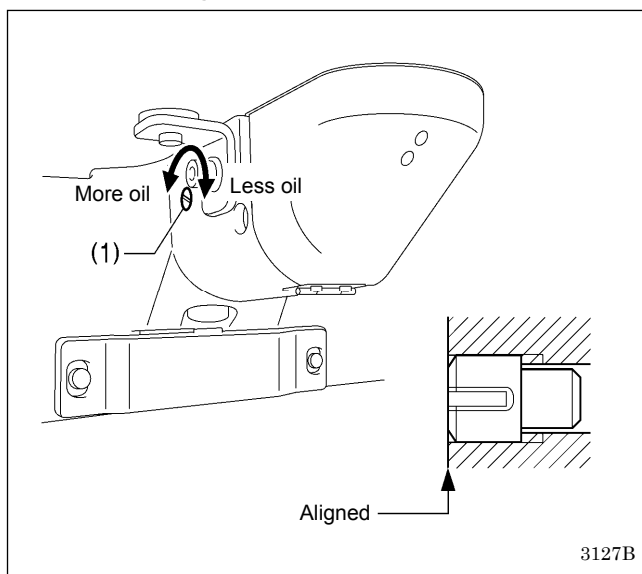
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

NOTE:

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

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

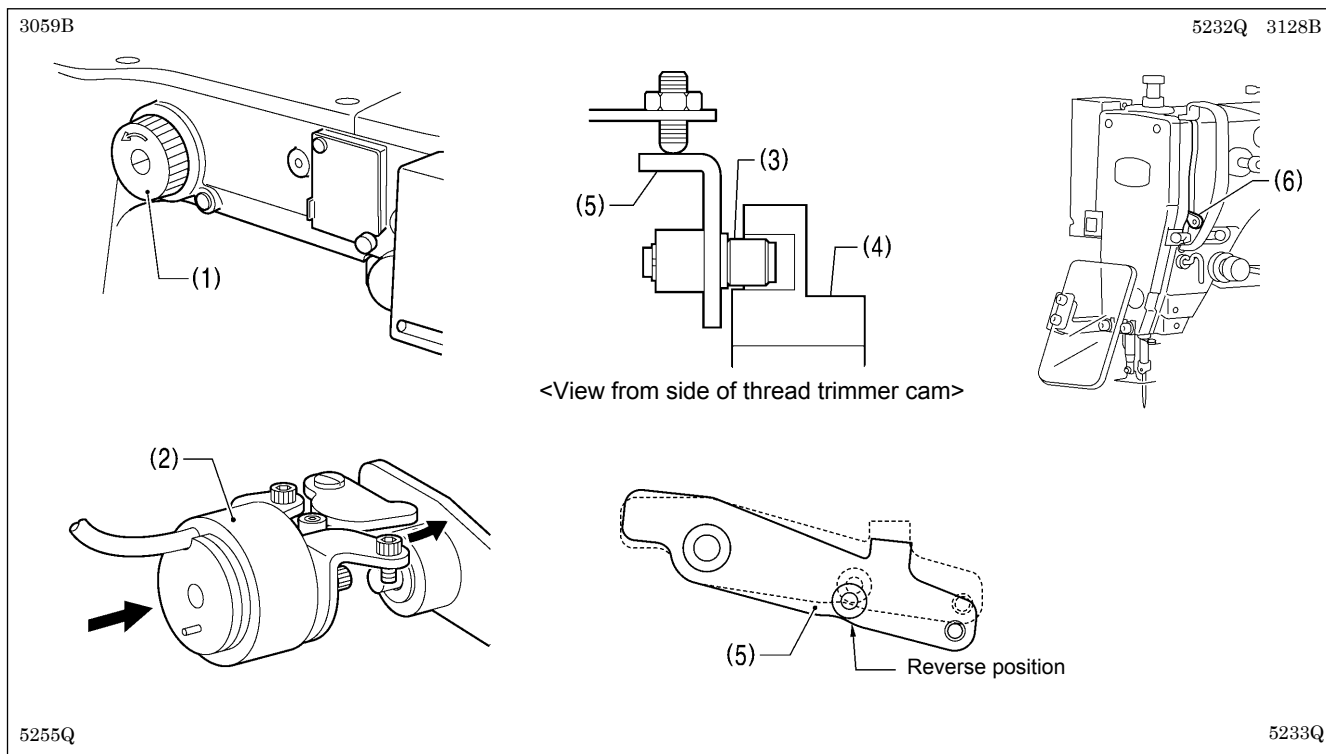
10-8. Rotary hook lubrication amount



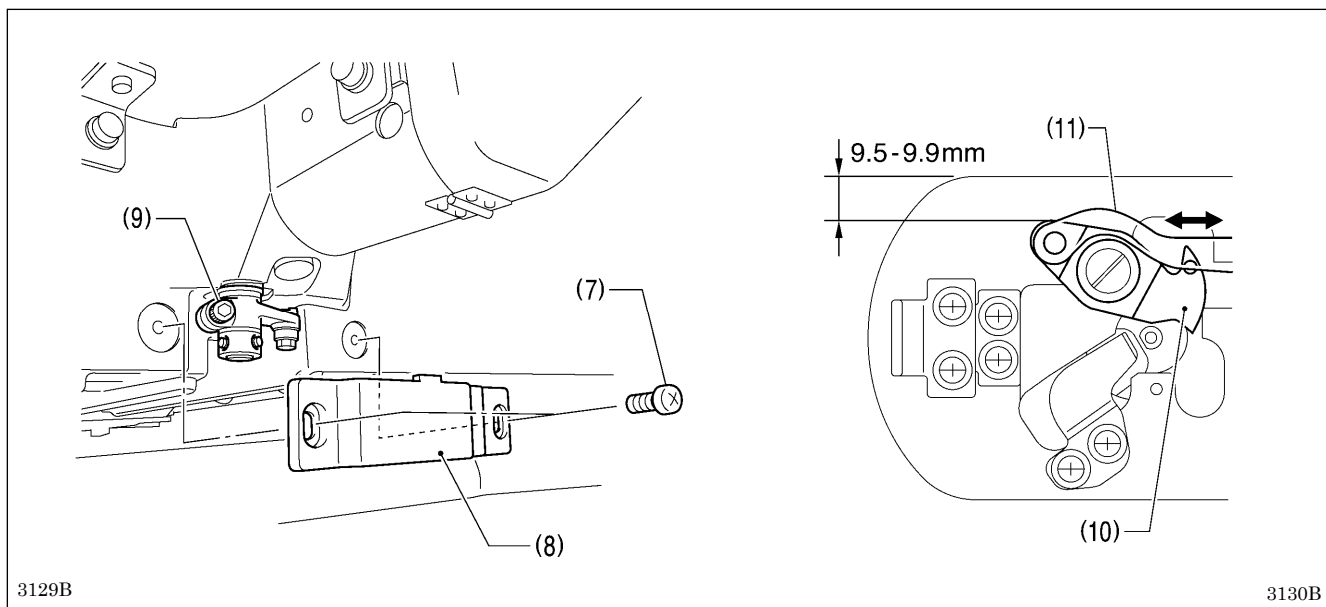
The optimum position is when the head of the set screw (1) is aligned with the edge of the bed. The rotary hook lubrication amount can be adjusted within three turns to the right from that position.

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

10-9. Adjusting the position of the movable knife

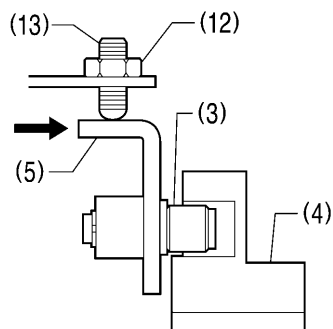
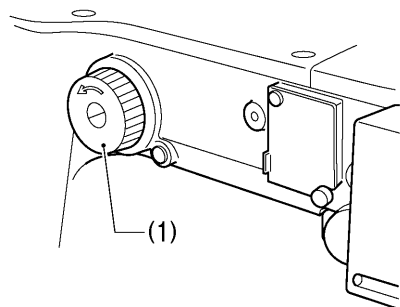


1. Open the top cover and tilt back the machine head.
2. Turn the pulley (1) by hand in the direction of the arrow to move the needle bar to its lowest position, and push the thread trimming solenoid (2) as far as it will go.
3. With the collar (3) inserted into the groove of the thread trimmer cam (4),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

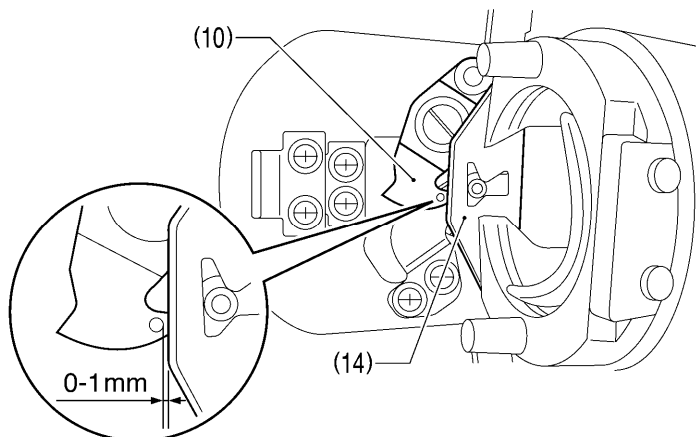


4. Loosen the two screws (7), and then remove the cover (8).
5. Loosen the bolt (9).
6. Move the movable knife connecting plate (11) back and forth to adjust so that the distance from the ridge on the right side of the needle plate to the ridge on the movable knife (10) is 9.5 to 9.9 mm.
7. After tightening the bolt (9), check the above position once more.

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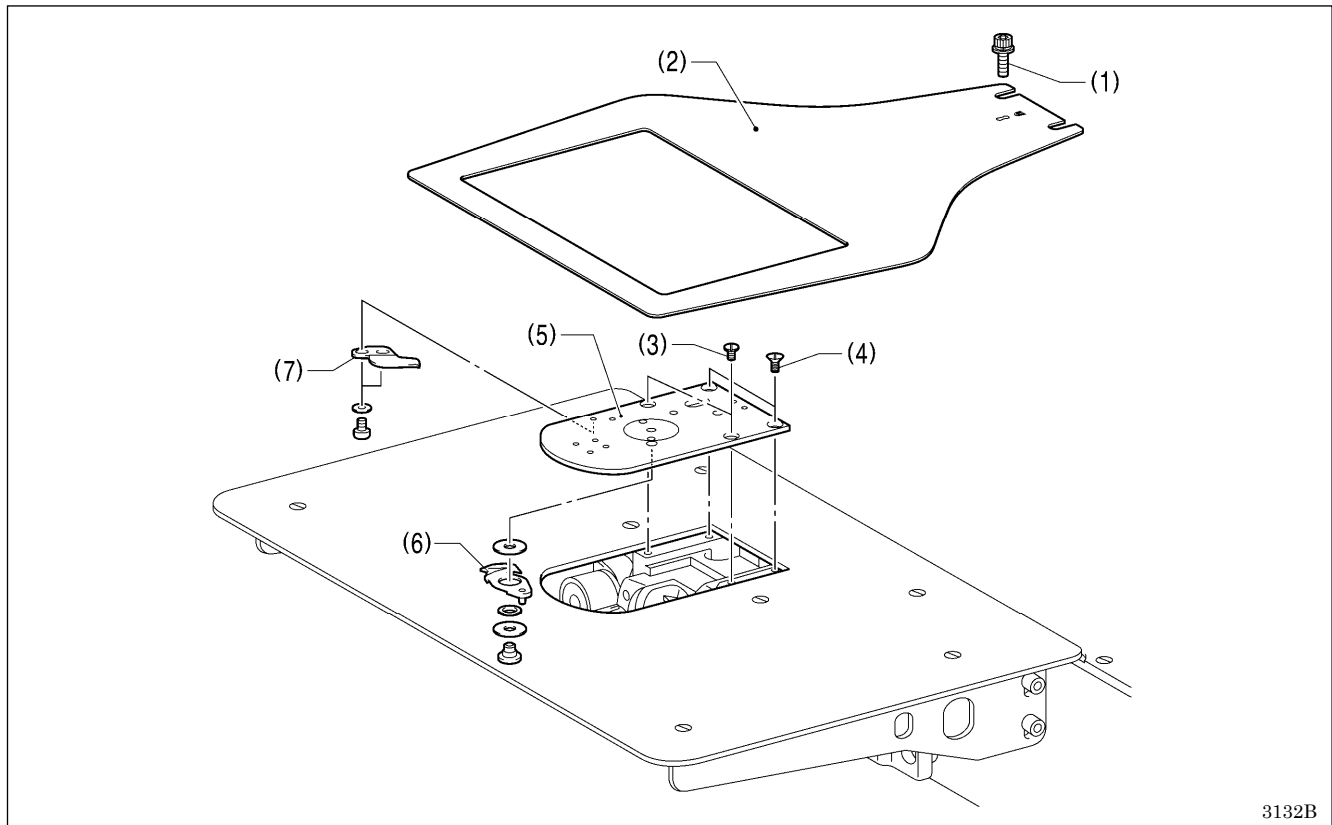
3131B



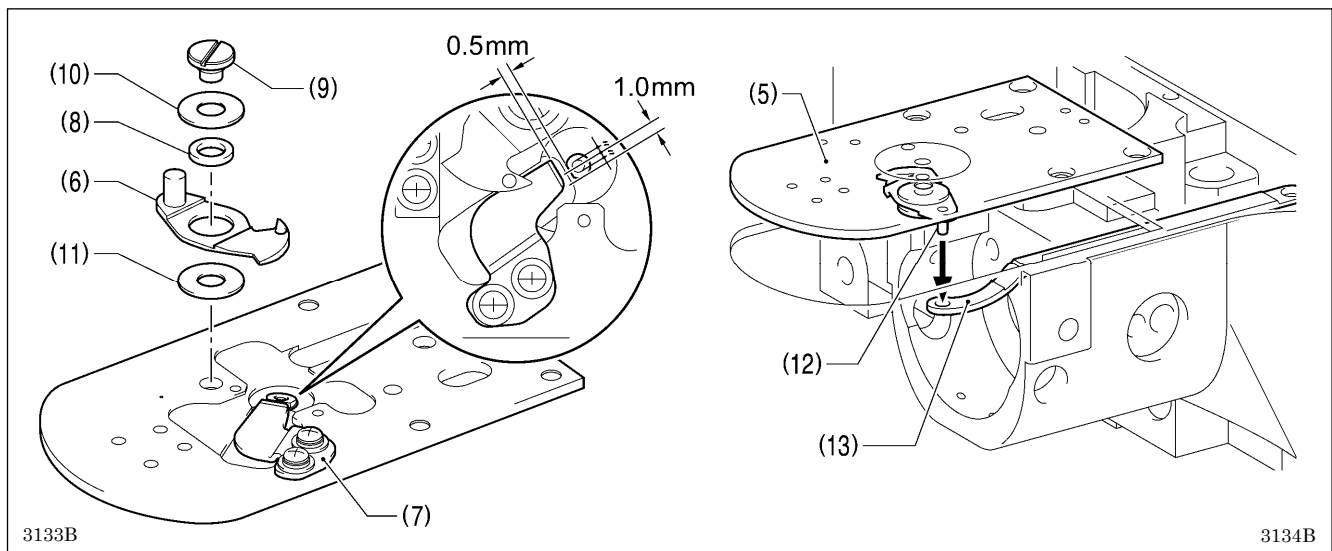
3145B

8. Replace the cover (8).
9. Turn the pulley (1) by hand to move the needle bar to its lowest position.
10. Loosen the nut (12), tighten the set screw (13) until the collar (3) is touching the inside of the groove in the thread trimmer cam (4), and then turn it back in the counterclockwise direction by approximately 1/4 of a turn.
11. Tighten the nut (12), and then check that the collar (3) is not touching the inside of the groove in the thread trimmer cam (4). In addition, push the driving lever (5) by hand toward the thread trimmer cam until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (5) returns smoothly to its original position when it is released.
12. Check that there is a gap of about 0 - 1 mm between the outside of the hole in the movable knife (10) and the ridge line on the shuttle race thread guide (14) when there is still play between the parts.

10-10. Replacing the movable and fixed knives

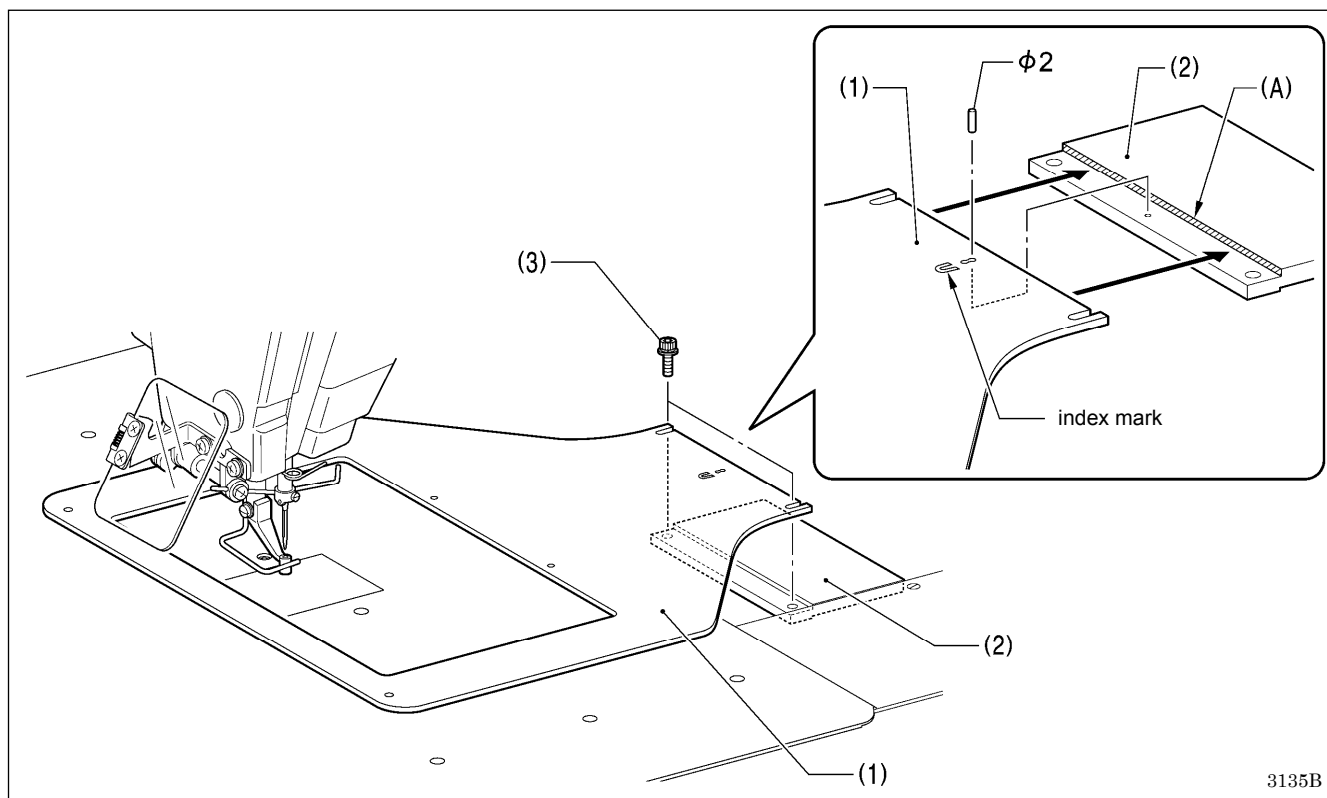


1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).



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

10-11. Installing the feed plate

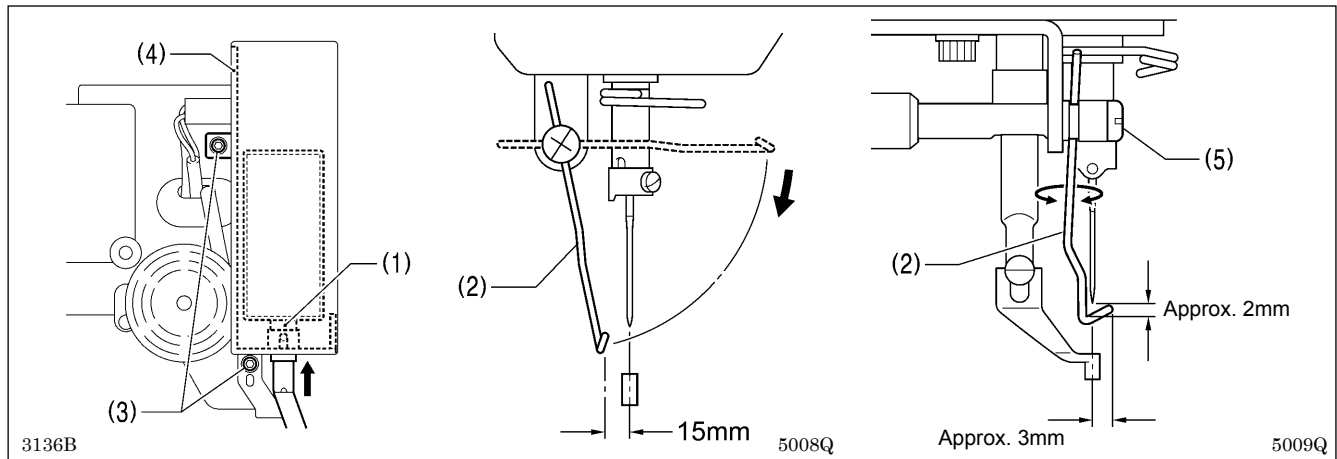


NOTE:

Install the feed plate (1) so that the surface with the index mark (U) is facing upward.

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

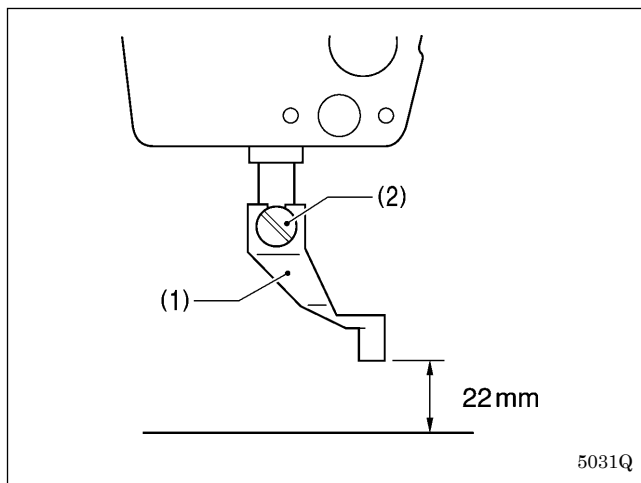
10-12. Adjusting the thread wiper



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

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

10-13. Presser foot installation position

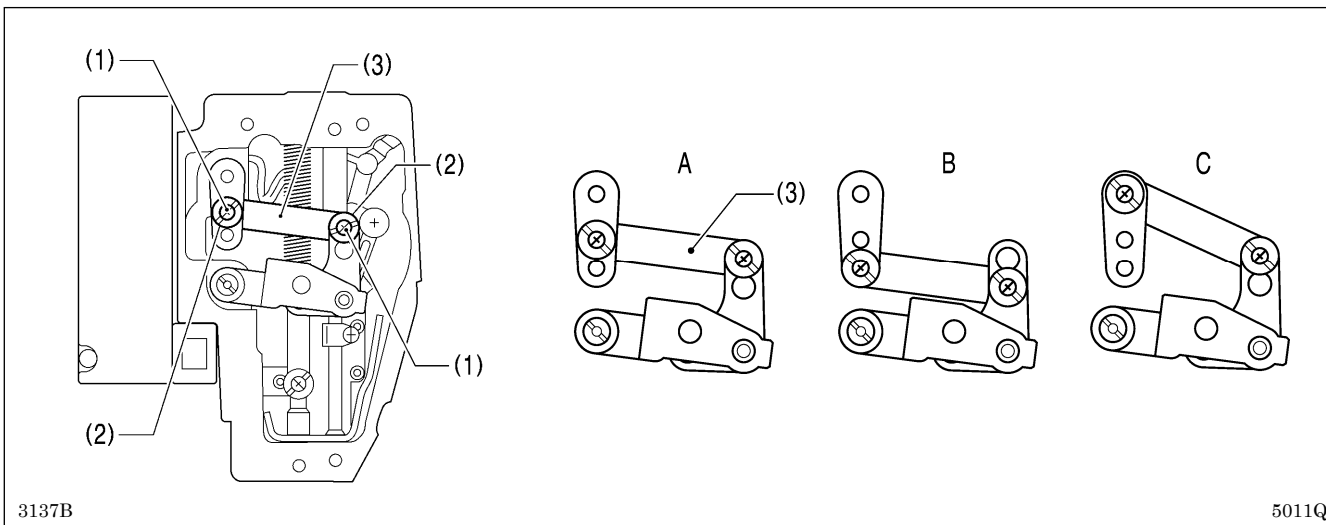


Install the presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot to the top of the needle plate is 22 mm when the sewing machine is stopped and the presser foot (1) is raised.

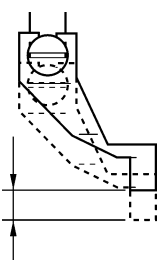
10-14. Changing the intermittent stroke

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

<Changing the installation position of stepping clamp link A>



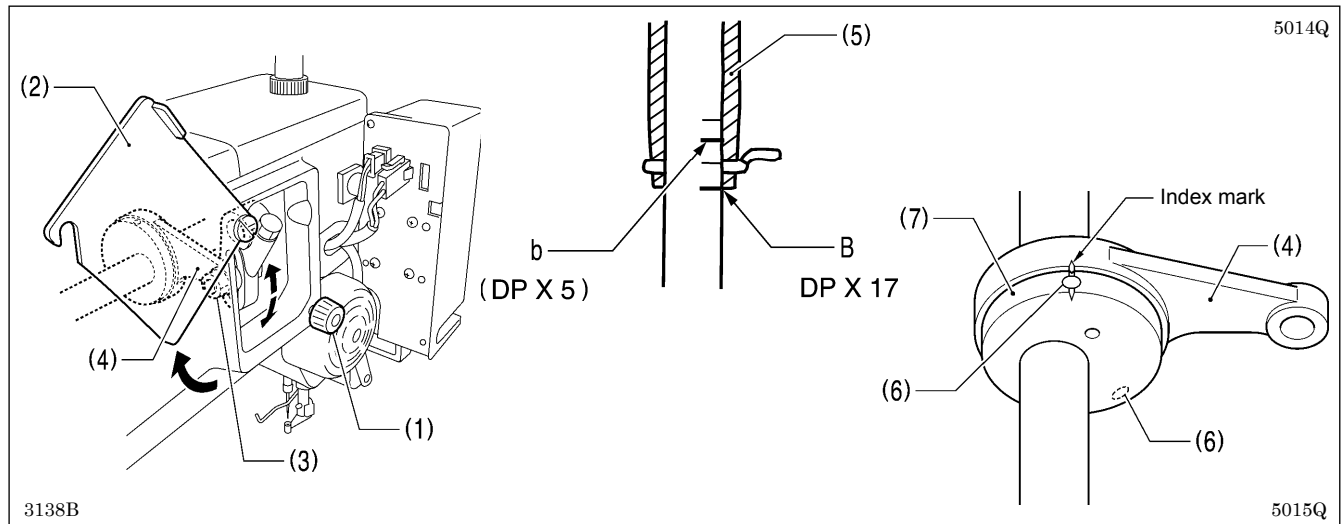
1. Remove the face plate.
 2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link A (3).
 3. Change the installation position for stepping clamp link A (3) to either A, B or C above.
- If the position of the stepping clamp connecting rod is adjusted as described in the following at any one of the installation positions, the adjustment range for the intermittent stroke will as given in the following table.

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

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10. STANDARD ADJUSTMENTS

<Stepping clamp connecting rod position adjustment>



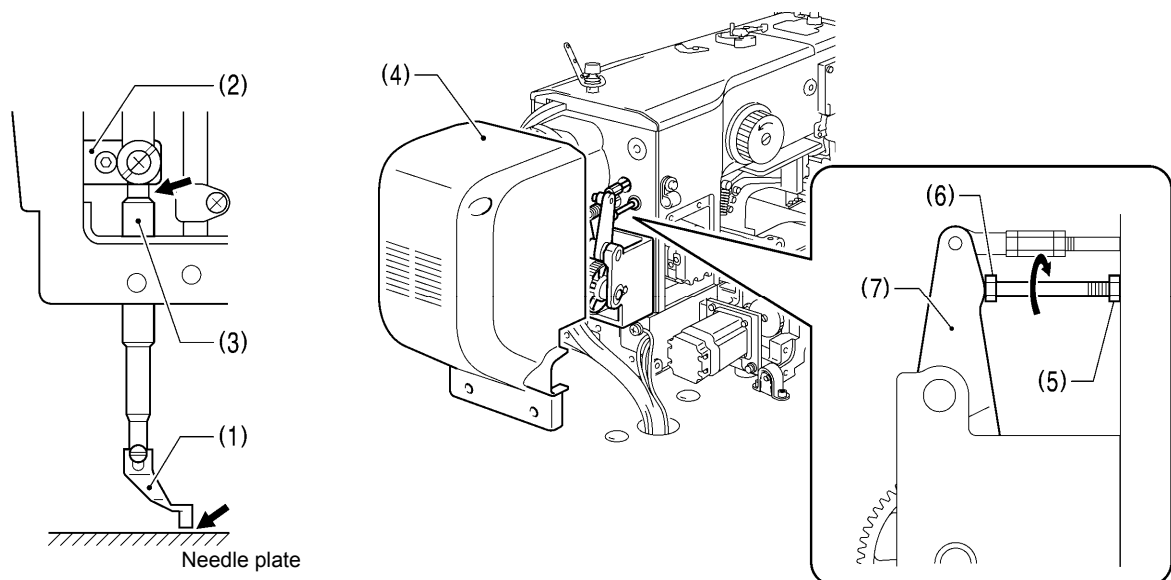
1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
 - When the stepping clamp connecting rod (4) is raised, the intermittent stroke will increase.
 - When the stepping clamp connecting rod (4) is lowered,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

Next, adjust the needle bar and presser foot timing.

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

Check the following after changing the intermittent stroke.

3139B 3140B



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

<If they are touching>

Remove the motor cover (4).

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

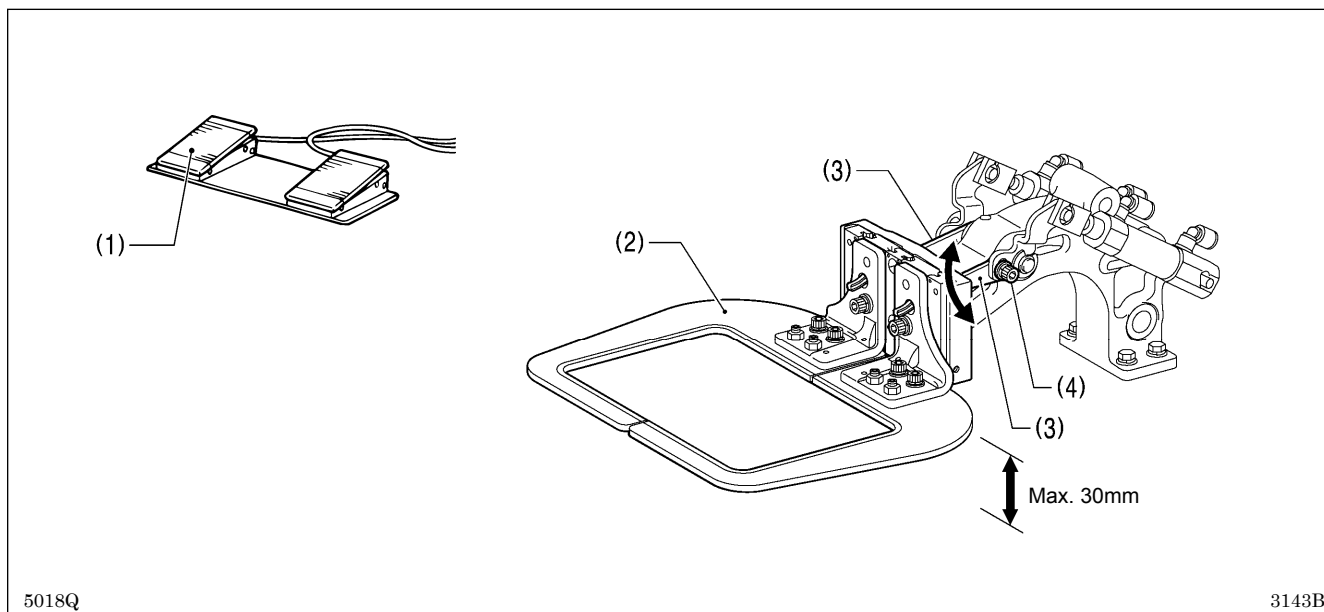
10-15. Adjusting the work clamp lift amount

<Motor-driven work clamp specifications>

The operation panel settings can be used to adjust the height to within 15 – 25 mm. (Refer to "5-5. Setting the work clamp lift amount.")

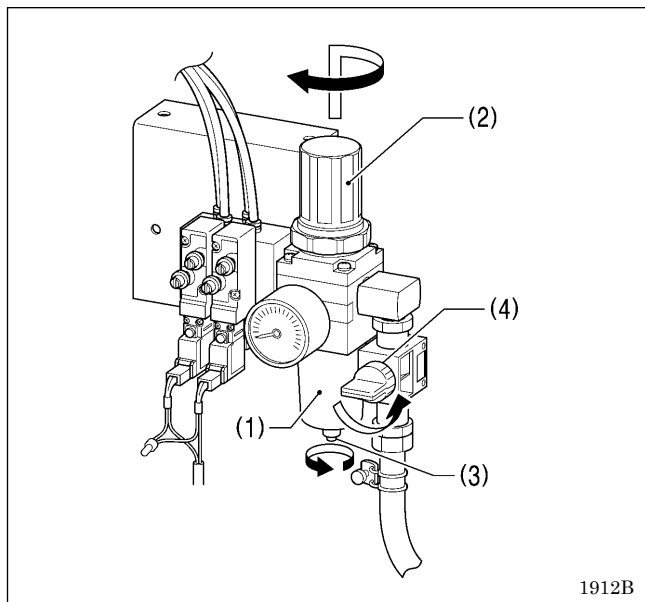
<Pneumatic work clamp specifications>

The maximum lift amount for the work clamp is 30 mm above the surface of the needle plate.



1. Turn on the air, and then depress the work clamp switch (1) to raise the work clamp (2).
2. Loosen the two bolts (4) of the work clamp arm lever (3), and move the work clamp arm lever (3) up or down to adjust.

10-16. Adjusting the air pressure (pneumatic work clamp specifications)



Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa.

After adjustment is complete, push the handle (2) downward to lock it.

If water has collected in the bottle of the regulator (1), turn the drain cock (3) in the direction indicated by an arrow to drain the water.

NOTE:

Open the air cock (4) slowly.

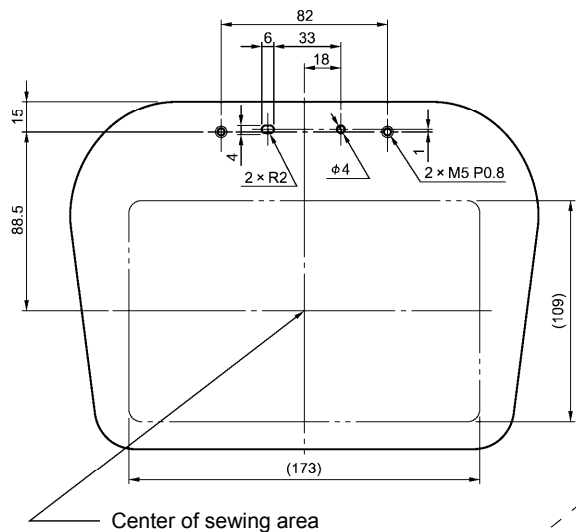
10-17. If processing the work clamps and the feed plate to a shape that matches the sewing pattern

Process the work clamps and feed plate which match the sewing pattern, while referring to the processing diagram below.

* Values in () are the recommended sizes when sewing using the maximum area (150x100 mm).

<Work clamp processing diagram>

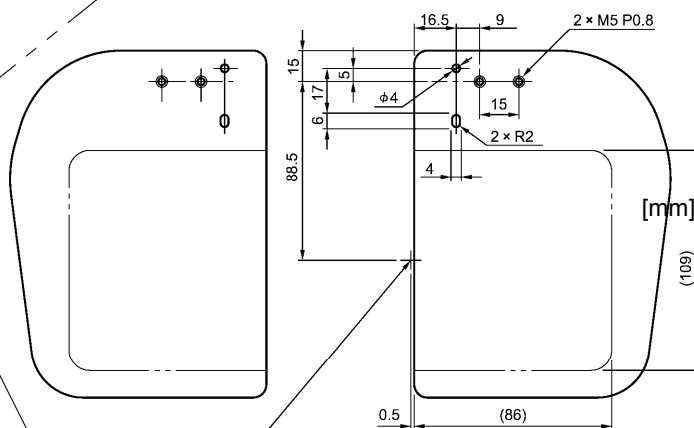
Motor-driven work clamp specifications



[mm]

Pneumatic work clamp specifications

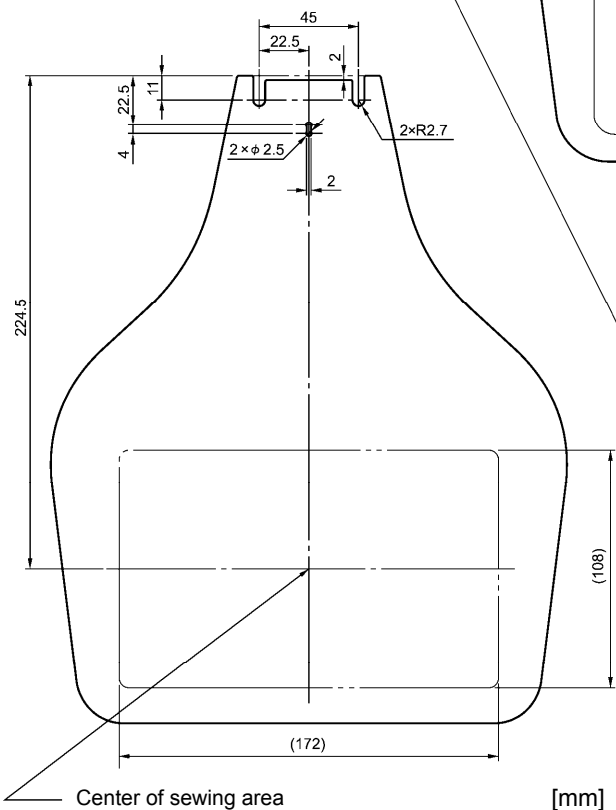
The left and right work clamps are symmetrical.



[mm]

<Feed plate processing diagram>

Recommended thickness 1.5 mm



[mm]

3159B

11. LIST OF ERROR CODES



DANGER



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

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

Warnings displayed as symbols

Code	Cause of error and remedy
CLdn	The start switch was pressed without the work clamp being lowered. First lower the work clamp.
UP	The needle bar is not stopped in the needle up stop position. Turn the pulley until the point where the error display disappears.

Switch-related errors

Code	Cause of error and remedy
E010	The STOP switch was pressed. Press the RESET key to clear the error.
E011	The STOP switch was pressed. Press the RESET key to clear the error. Press the ▼ key to move the feed mechanism so that you can continue sewing.
E015	The stop switch was still being pressed when the power was turned on, or there is a problem with the stop switch connection. Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.
E016	Problem with the stop switch connection. Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.
E025	Start switch was being depressed when power was turned on. (For a one-pedal foot switch, the foot switch was being depressed to the 2nd step.) Turn off the power and check the foot switch.
E035	Work clamp switch was being depressed when power was turned on. (For a one-pedal foot switch, the foot switch was being depressed to the 1st step.) Turn off the power and check the foot switch.
E050	Machine head tilting was detected after the power was turned on. Turn off the power, and then return the machine head to its original position. Check that connector P14 on the main P.C. board is properly connected.
E051	Machine head tilting was detected while the sewing machine was operating. Turn off the power, and then check that connector P14 on the main P.C. board is properly connected.
E055	Machine head tilting was detected when the power was turned on. Turn off the power, and then return the machine head to its original position. Check that connector P14 on the main P.C. board is properly connected.
E065	An operation panel key was still being pressed when the power was turned on, or key is faulty. Turn off the power and check the operation panel.

11. LIST OF ERROR CODES

Motor-related errors

Code	Cause of error and remedy
E100	Turn off the power, add grease, and then carry out the specified reset operations.
E111	Upper shaft did not stop at the needle up stop position when the sewing machine stopped. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board and connector P6 on the main P.C. board are properly inserted.
E121	Thread trimming was not completed. Turn off the power, and then check if the cutting edges of the fixed knife and movable knife are damaged or worn.
E130	Sewing machine motor stopped due to a problem, or synchronizer is faulty. Turn off the power, and then turn the pulley and check if the sewing machine has locked up. Check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E131	Synchronizer is not connected correctly. Turn off the power, and then check that connector P11 on the motor P.C. board is properly connected.
E132	Problem detected with sewing machine motor operation. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E133	Sewing machine motor stopping position is incorrect. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E150	Sewing machine motor is overheating, or temperature sensor is faulty. Turn off the power, and then check the sewing machine motor. (When sewing data with a small number of stitches (15 stitches or less) is sewn repeatedly (short cycle operation), the upper shaft motor may overheat and the "E150" error code may be generated.)

Feed mechanism-related errors

Code	Cause of error and remedy
E200	X-feed motor home position cannot be detected. Problem with X-feed motor or poor X home position sensor connection. Turn off the power, and then check that connectors P17, P21 and P8 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E201	X-feed motor stopped due to a problem. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E204	X-feed motor stopped due to a problem during sewing. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E205	X-feed motor stopped due to a problem while moving to the sewing start position. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E206	X-feed motor stopped due to a problem during test feeding. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E210	Y-feed motor home position cannot be detected. Problem with Y-feed motor or poor Y home position sensor connection. Turn off the power, and then check that connectors P18, P22 and P8 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E211	Y-feed motor stopped due to a problem. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E214	Y-feed motor stopped due to a problem during sewing. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E215	Y-feed motor stopped due to a problem while moving to the sewing start position. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E216	Y-feed motor stopped due to a problem during test feeding. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)

11. LIST OF ERROR CODES

Work clamp-related errors

Code	Cause of error and remedy
E300	Work clamp home position cannot be detected. Problem with work clamp motor or poor work clamp home position sensor connection. Turn off the power, and then check that connectors P19, P23 and P8 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)
E301	Work clamp raised or lowered position cannot be detected. Turn off the power, and then check if there are any problems in the work clamp vertical direction. Turn off the power, and then check that connectors P19 and P23 on the main P.C. board are properly connected. Check that LD1 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F2 is blown.)

Communication and memory-related errors

Code	Cause of error and remedy
E400	Communication error detected between the main P.C. board and the panel P.C. board when the power was turned on. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E401	Communication error detected between the main P.C. board and the motor P.C. board when the power was turned on. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E410	Communication error detected between the main P.C. board and the panel P.C. board. Turn off the power, and then turn it back on again. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E411	Communication error detected between the main P.C. board and the motor P.C. board. Turn off the power, and then turn it back on again. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E412	Communication error detected between the panel and the programmer. Turn off the power, and then turn it back on again.
E420	No SD card is inserted. Press the RESET key to clear the error. Insert an SD card and then try again.
E421	The program number is invalid or it has no corresponding data. Press the RESET key to clear the error. Check that data for this program number is present on the SD card.
E422	An error occurred while reading from the SD card. Check the data. When reading 311G user programs, first read the sewing data. Press the RESET key to clear the error. Check the data on the SD card.
E424	Insufficient free space on the SD card. Press the RESET key to clear the error. Use a different SD card.
E425	An error occurred while writing to the SD card. Check the SD card. The card may be write-protected. Press the RESET key to clear the error. Use the specified type of SD card.
E427	The program containing the specified cycle program has been cleared. Press the RESET key to clear the error. Redo the cycle program.
E430	Data cannot be backed up to the main P.C. board (flash memory). Turn off the power, and then turn it back on again.
E440	Data cannot be backed up to the main P.C. board (EEPROM). Turn off the power, and then turn it back on again.
E450	Model selection cannot be read from the machine head memory. Turn off the power, and then check that connector P16 on the main P.C. board is properly connected.
E452	Machine head memory is not connected. Turn off the power, and then check that connector P16 on the main P.C. board is properly connected.
E474	Internal memory is full and copying is not possible. Press the RESET key to clear the error. Clear the sewing data.

11. LIST OF ERROR CODES

Data editing-related errors

Code	Cause of error and remedy
E500	The enlargement ratio setting caused the sewing data to extend outside the sewing area. Set the enlargement ratio again. Press the RESET key to clear the error.
E502	The enlargement ratio caused the data pitch to exceed the maximum pitch of 12.7 mm. Press the RESET key to clear the error. Set the enlargement ratio again.
E510	Error in sewing data. Press the RESET key to clear the error. Re-read the pattern from the SD card. If the data still generates an error, re-create the data.
E511	No end code has been input into pattern data. Press the RESET key to clear the error.
E512	Number of stitches exceeds allowed maximum. Press the RESET key to clear the error.
E581	Memory switch file cannot be read correctly. The model for the data which was read does not match the model being written to. Press the RESET key to clear the error. Read data for the same sewing machine model.
E582	Memory switch versions do not match. Press the RESET key to clear the error. Read data for the same version.
E583	User program versions do not match. Press the RESET key to clear the error. Read data for the same version.

Device-related errors

Code	Cause of error and remedy
E600	Upper thread breakage occurred. Thread the upper thread. Re-sewing is then possible. Turn off the power, and then check that connector P14 on the main P.C. board is properly connected.
E670	Problem with the lower thread detector. Turn off the power, and then check the lower thread detector.
E690	Thread nipper motor home position cannot be detected. Problem with thread nipper motor or poor thread nipper home position sensor connection. Turn off the power, and then check the position of the thread nipper lever. Clean underneath the needle plate to remove any thread scraps. Turn off the power, and then check that connectors P4 and P20 on the main P.C. board are properly connected. Check that LD2 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F1 is blown.)
E692	Abnormal thread nipper motor stop. Turn off the power, and then check the position of the thread nipper lever. Clean underneath the needle plate to remove any thread scraps. Turn off the power, and then check that connectors P4 and P20 on the main P.C. board are properly connected. Check that LD2 on the main P.C. board is illuminated while the power is on. (If it is not illuminated, fuse F1 is blown.)

P.C. board-related errors

Code	Cause of error and remedy
E700	Abnormal rise in power supply voltage. Turn off the power, and then check the input voltage.
E701	Abnormal rise in sewing machine motor drive voltage. Turn off the power, and then check the voltage.
E705	Abnormal drop in power supply voltage. Turn off the power, and then check the input voltage.
E710	Abnormal current detected in sewing machine motor. Turn off the power, and then check if there are any problems with the sewing machine. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E711	Abnormal current detected in pulse motor. Turn off the power, and then check if there are any problems with the work clamp operation.
E730	External error input (AIRSW) detected. Turn off the power, and then check the air pressure.

Version updating-related errors

Code	Cause of error and remedy
E870	No control program is present. Install the control program.
E880	Version update requests cannot be received. Turn off the power, and then turn it back on again.
E881	Version updating did not complete normally. Turn off the power, and then repeat the version update procedure.
E882	Communication error detected between the main P.C. board and the panel P.C. board. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E883	No control program is present on the SD card. Check that the control program has been saved into the correct folder.
E884	There is a problem with the control program. Save the correct file onto the SD card.
E885~ E887	Version updating could not be carried out. Turn off the power, and then turn it back on again.

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.

12. TROUBLESHOOTING

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

CAUTION



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

Problem	Cause	Remedy	Reference
Sewing machine does not start when the power is turned on and the foot switch is depressed.	Machine head switch does not work.	Check if the machine head switch cord is disconnected.	P. 11
		Adjust the position of the machine head switch.	P. 9 P. 55
		If the machine head switch is malfunctioning, replace it with a new one.	
Work clamp does not work. • Work clamp * Pneumatic work clamp specifications only	Air cock is closed.	Open the air cock.	P. 66
	Air pressure is too weak.	Adjust the regulator so that the air pressure is about 0.5 MPa.	P. 66
	Speed controller has been tightened too far. (Other than when using the thread trimming cylinder)	Work clamp: Adjust the speed controller by loosening it 4 turns from the fully-tightened position.	P. 18
Thread wiper does not work.	Thread wiper setting is OFF.	Set the thread wiper setting to ON.	P. 32
Work clamp does not rise to the maximum height.	Work clamp arm lever position is incorrect. *Pneumatic work clamp specifications	Adjust the position of the work clamp arm lever.	P. 66
	Work clamp arm assembly stopper position is incorrect. *Motor-driven work clamp specifications	Adjust the position of the work clamp arm assembly stopper.	
Work clamp pressure is too weak. * Pneumatic work clamp specifications only	Air pressure is too weak.	Adjust the regulator so that the air pressure is about 0.5 MPa.	P. 66
Work clamp pressure is not uniform at front and back of work clamp.	Work clamp is tilted.	Adjust the tilt of the work clamp.	
Thread wiper does not operate correctly.	The thread wiper is obstructing the needle.	Adjust the height of the thread wiper.	P. 63
		Adjust the operating stroke of the thread wiper.	P. 63
	Thread wiper position is incorrect.	Adjust the operating stroke of the thread wiper.	P. 63

(Continued on next page)



Problem	Cause	Remedy	Reference
Lower thread winds to one side.	Height of thread winder tension device is incorrect.	Adjust the height of the thread winder tension device.	P. 24
Lower thread winding amount is incorrect.	Bobbin presser position is incorrect.	Adjust the position of the bobbin presser.	P. 24
Thread unraveling at sewing start.	Needle is too thick.	Select a needle that is suitable for the sewing conditions.	P. 26
	Upper thread trailing length is too short.	When threading the thread through the needle, allow a distance of approximately 40 mm between the needle hole and the end of the thread.	P. 22
		Adjust the sub-tension so that the upper thread trailing length after thread trimming is approximately 40 mm.	P. 26
	Amount of lower thread being fed out from bobbin is too small.	Set the feeding amount to approximately 30 mm.	P. 25
	Sewing start speed is too fast.	Adjust the sewing start speed.	P. 32
Skipped stitches occur.	Rotary hook tip is missing.	Replace the part.	
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	P. 26
	Needle is too thick.		
	Needle is bent.	Replace the needle.	P. 22
	Needle is not installed correctly.	Install the needle so that it faces correctly.	P. 22
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P. 57
	Clearance between needle and rotary hook tip is too large.	Adjust the needle clearance.	P. 58
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	P. 57
	Material is flapping.	Replace the needle hole plate with one with a smaller needle diameter.	
		Use a thinner feed plate. * Recommended thickness: 1.5 mm	P. 67
		Process the work clamps and the feed plate into shapes that can hold the material near the seam.	P. 67
		Adjust the intermittent height of the intermittent work clamp.	P. 38

(Continued on next page)





































12. TROUBLESHOOTING

Problem	Cause	Remedy	Reference
Upper thread is breaking.	Thread is too thick for the needle.	Select a thread which is suitable for the needle.	P. 26
	Needle is not installed correctly.	Install the needle so that it faces correctly.	P. 22
	Thread is not threaded correctly.	Thread the thread correctly.	P. 22
	Damage or burring in parts such as the rotary hook, needle hole plate, needle or thread path.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	P. 57
	Upper thread tension is too strong.	Reduce the upper thread tension.	P. 26
	Thread take-up spring tension is too strong.	Reduce the tension of the thread take-up spring.	P. 56
	Thread breaks due to heat.	Use a needle cooler unit. Reduce the sewing speed.	P. 22 P. 31
Lower thread is breaking.	Damage to the needle hole plate or bobbin case.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Lower thread tension is too strong.	Reduce the lower thread tension.	P. 26
Needle breaks.	Needle is bent.	Replace the needle.	P. 22
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	P. 26
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P. 57
		Adjust the needle clearance.	P. 58
	Needle and rotary hook timing is incorrect.	Adjust the needle bar lift amount.	P. 57
	Feed timing is too slow.	Advance the feed timing.	
Upper thread is not cut.	Movable knife is blunt.	Replace the movable knife with a new one.	P. 61
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P. 61
	Movable knife is not picking up the upper thread.	Adjust the needle bar lift amount.	P. 57
		Adjust the standby position of the movable knife.	P. 59
	Movable knife is not picking up the needle thread because the last stitch is being skipped.	Refer to "Skipped stitches occur".	P. 76
Lower thread is not cut.	Lower thread tension is too weak.	Increase the lower thread tension.	P. 26

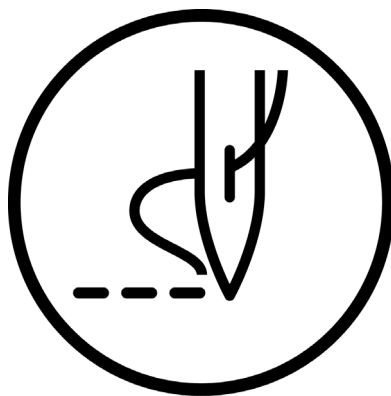
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Problem	Cause	Remedy	Reference
Upper thread is not tight. 	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	P. 26
	Hole diameter in needle hole plate is too small.	Replace the needle hole plate with one with a larger hole diameter.	
	Feed plate is too thin.	Use a thicker feed plate. *Recommended thickness: 1.5 mm	
	Hole diameter of intermittent work clamp is too small.	Replace the intermittent work clamp with one with a larger hole diameter.	
	Sliding parts of outer rotary hook and inner hook have little or no sewing machine oil.	Lubricate the felts for the sliding parts of the outer rotary hook and inner hook.	P. 20
	Damage or burring in parts such as the rotary hook, needle hole plate, needle or thread path.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Lower thread tension is too strong.	Reduce the lower thread tension.	P. 26
	Upper thread tension is too weak.	Increase the upper thread tension. *Adjust the upper thread tension after adjusting the lower thread tension.	P. 26
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P. 56
	Feed timing is too fast.	Retard the feed timing.	
	Intermittent height of intermittent work clamp is too low.	Adjust the intermittent height of the intermittent work clamp.	P. 38
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P. 57
		Adjust the needle clearance.	P. 58
0573M			
Lower thread is not tight. 	Lower thread tension is too weak.	Increase the lower thread tension.	P. 26
	Upper thread tension is too strong.	Reduce the upper thread tension. *Adjust the upper thread tension after adjusting the lower thread tension.	P. 26
0574M			
Uneven thread tightening at the sewing start.	Bobbin spinning	Use an anti-spin spring.	
Poor seam finish on underside of material at the sewing start.	Upper thread trailing length is too long.	Adjust the sub-tension so that the upper thread trailing length after thread trimming is approximately 40 mm.	P. 26
Upper thread trailing length is irregular.	Movable knife is blunt.	Replace the movable knife with a new one.	P. 61
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P. 61
	Sub-tension is too weak.	Adjust the sub-tension.	P. 26
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P. 56

13. 7-SEGMENT DISPLAY LIST

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

4268M



INSTRUCTION MANUAL

* 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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This is the original instructions.

BAS-311H
SB4717-001 E
2013.08. B (1)

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