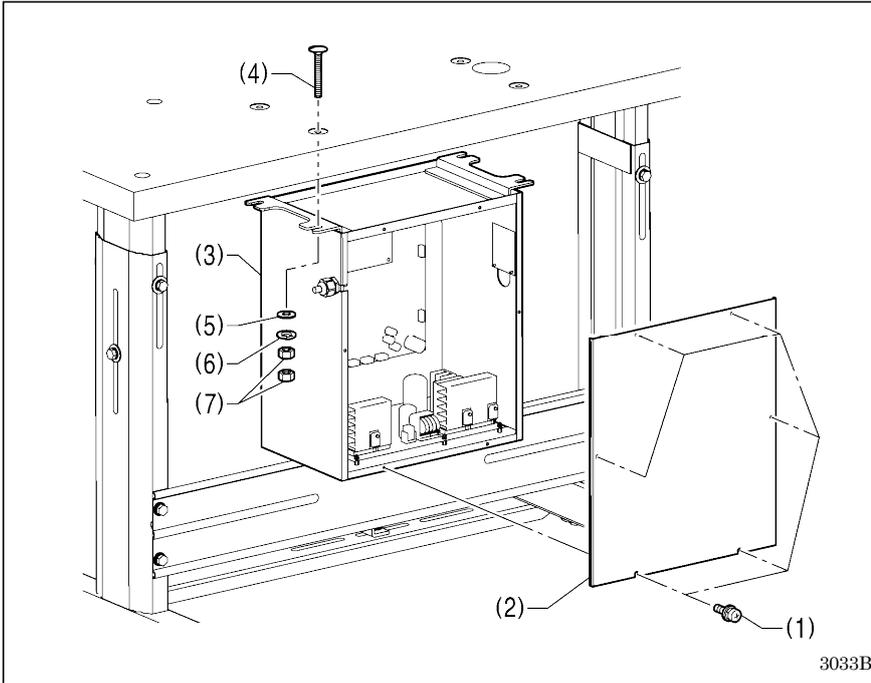


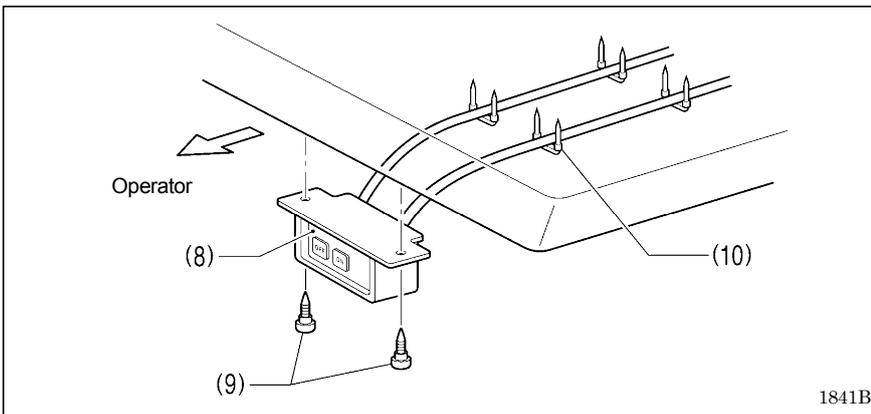
3. INSTALLATION

3-2. Installing the control box



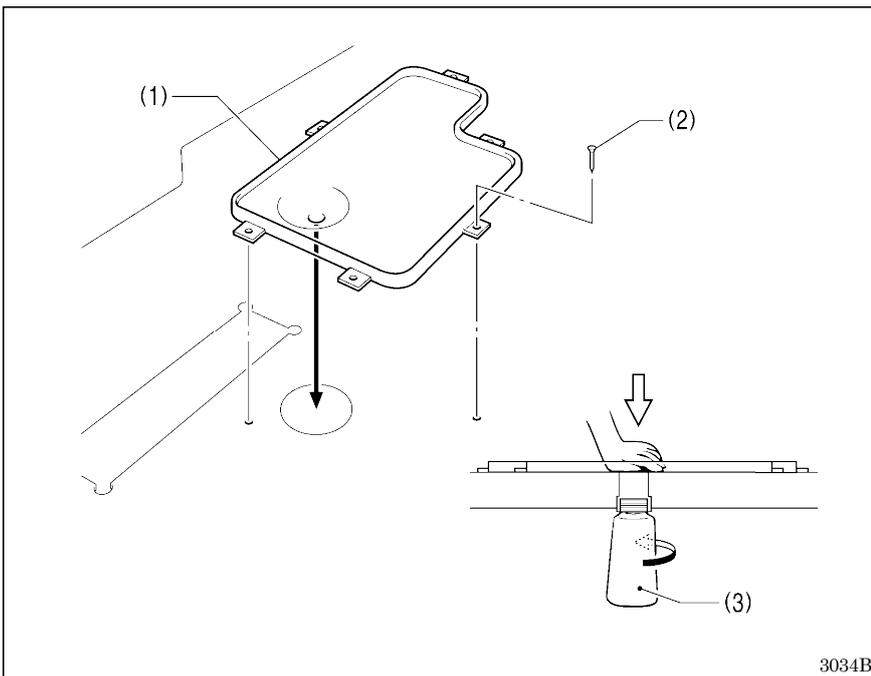
Remove the six screws (1), and then remove the control box cover (2).

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



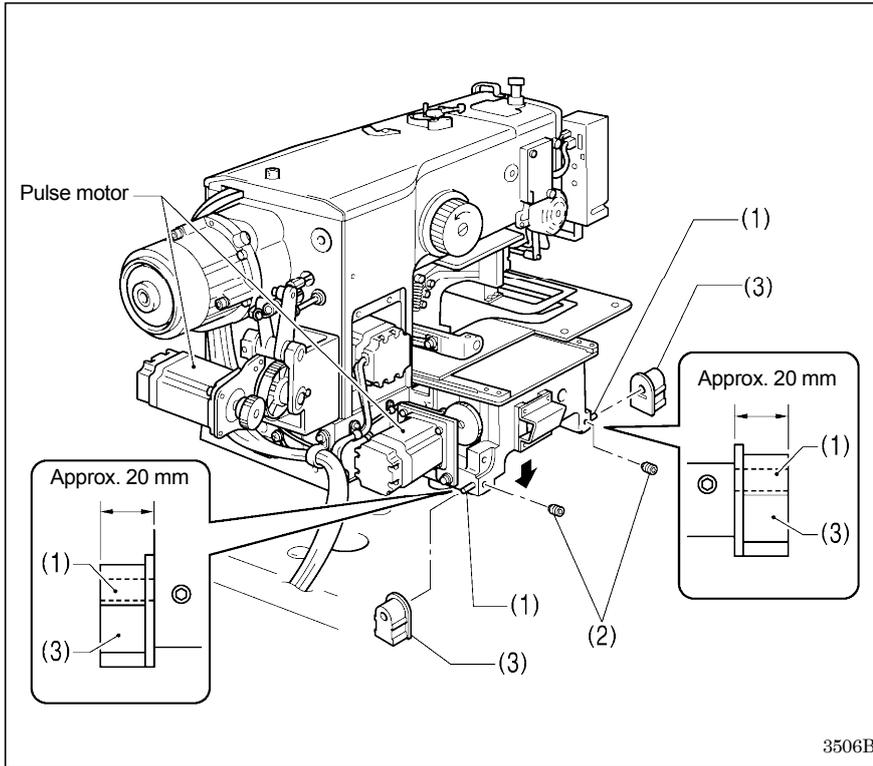
- (8) Power switch
- (9) Wood screws [2 pcs.]
- (10) Staples [4 pcs.]

3-3. Installing the oil pan



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

3-4. Installing the machine head

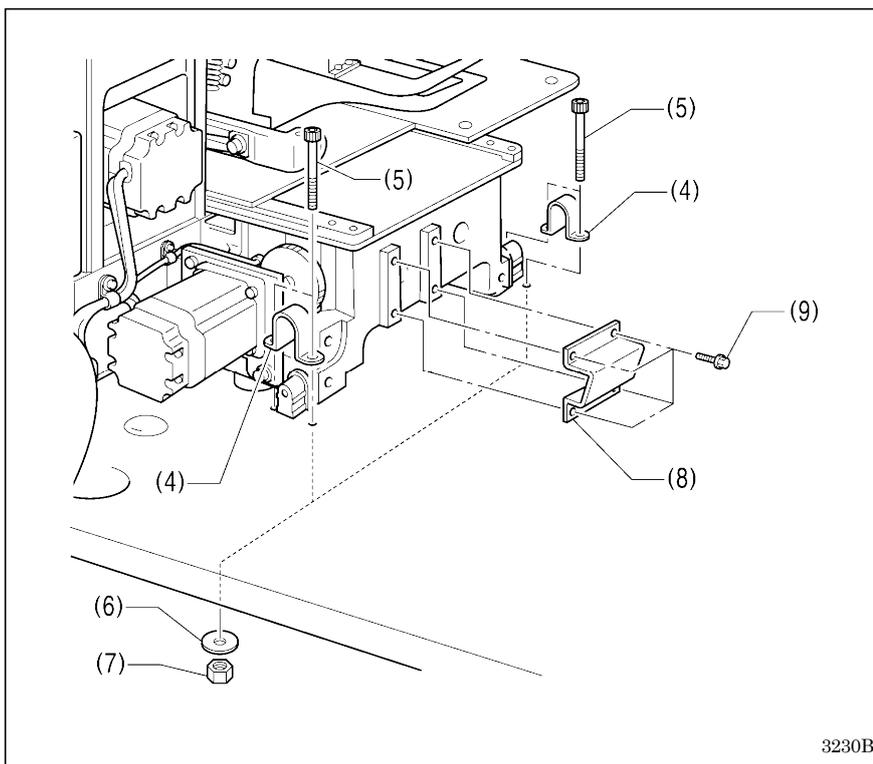


- (1) Pins [2 pcs.]
- (2) Set screws [2 pcs.]
- (3) Hinge rubber assemblies [2 pcs.]

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

NOTE:

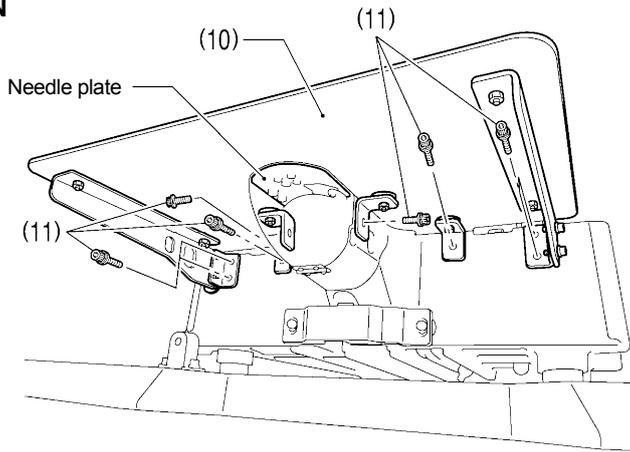
- Be careful not to get the cords clamped between the machine head and the oil pan.
- When holding the machine head, do not hold it by the pulse motor. This may cause problems with operation of the pulse motor.



- (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

BAS-311HN



3520B

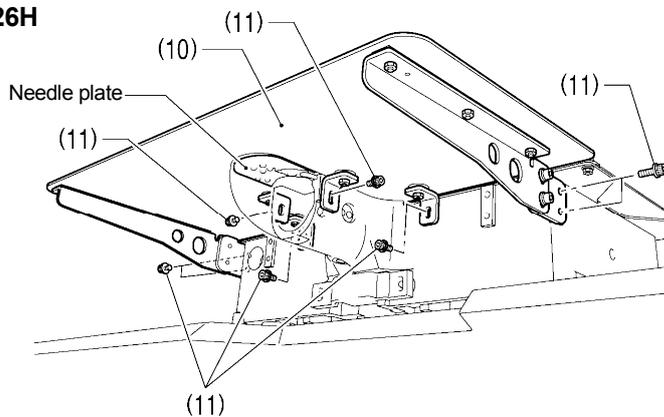
- (10) Auxiliary plate
- (11) Bolts with washer [8 pcs.]

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.

NOTE:

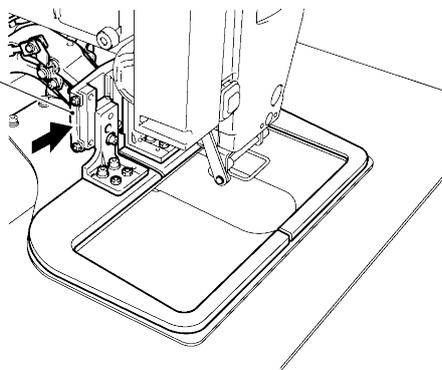
- Install the auxiliary plate (10) so that it is horizontal.
If the auxiliary plate (10) is lower than the needle plate, the feed plate may get caught on the needle plate.

BAS-326H



3431B

Work clamp arm

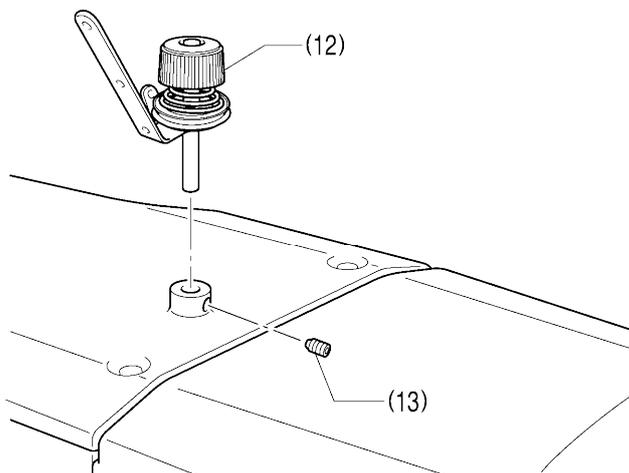


3432B

Move the work clamp arm all the way to the right when looking from the front of the sewing machine (the direction of the arrow in the illustration), and then gently tilt back the machine head.

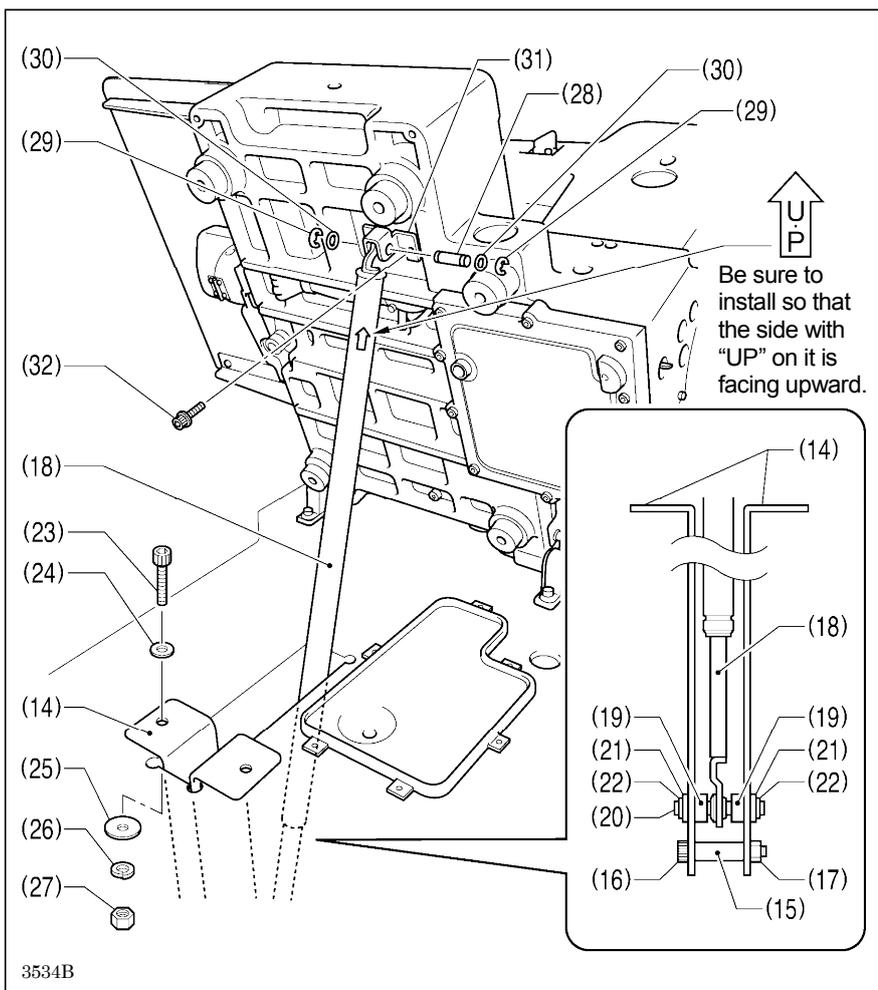
NOTE:

- Three or more people should tilt back the machine head, and it should be tilted gently while being held with both hands.
- Be careful not to clamp any items such as screwdrivers under the cushion when tilting back the machine head.

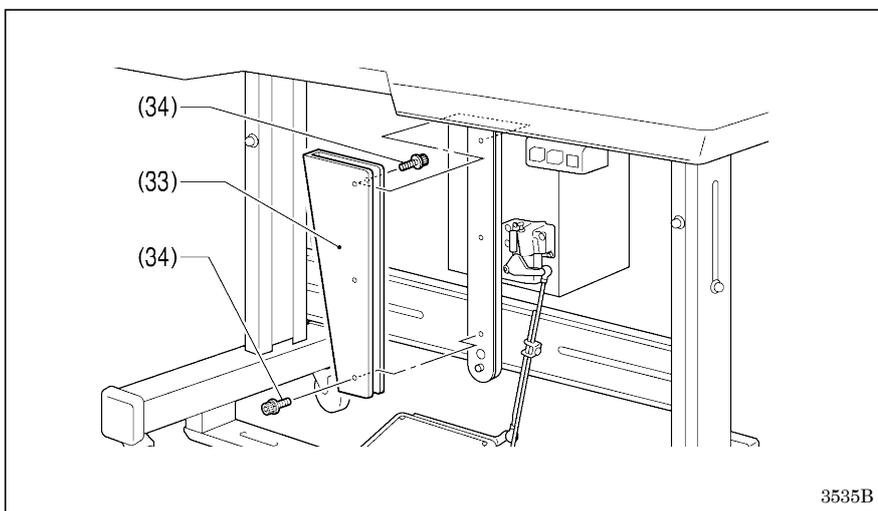


3521B

- (12) Bobbin winder tension assembly
- (13) Set screw [1 pc.]

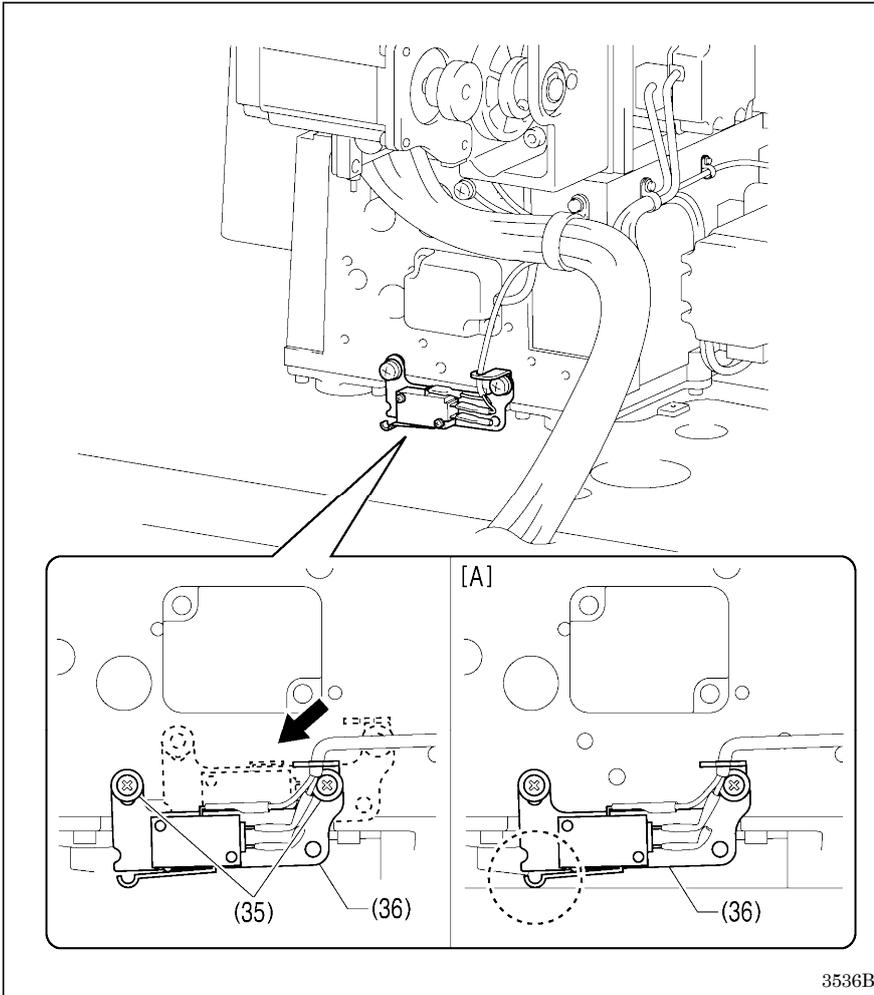


- (14) Gas spring holders [2 pcs.]
- (15) Spacer
- (16) Bolt
- (17) Nut
- (18) Gas spring
- (19) Shaft collars [2 pcs.]
- (20) Gas spring shaft D
- (21) Plain washers [2 pcs.]
- (22) Retaining rings E [2 pcs.]
- (23) Bolts [2 pcs.]
- (24) Plain washers (medium) [2 pcs.]
- (25) Plain washers (large) [2 pcs.]
- (26) Spring washers [2 pcs.]
- (27) Nuts [2 pcs.]
- (28) Gas spring shaft U
- (29) Retaining rings E [2 pcs.]
- (30) Plain washers (small) [2 pcs.]
- (31) Absorber setting plate
- (32) Bolts with washer [2 pcs.]



- (33) Gas spring support cover
- (34) Bolts with washer [6 pcs.]

3. INSTALLATION

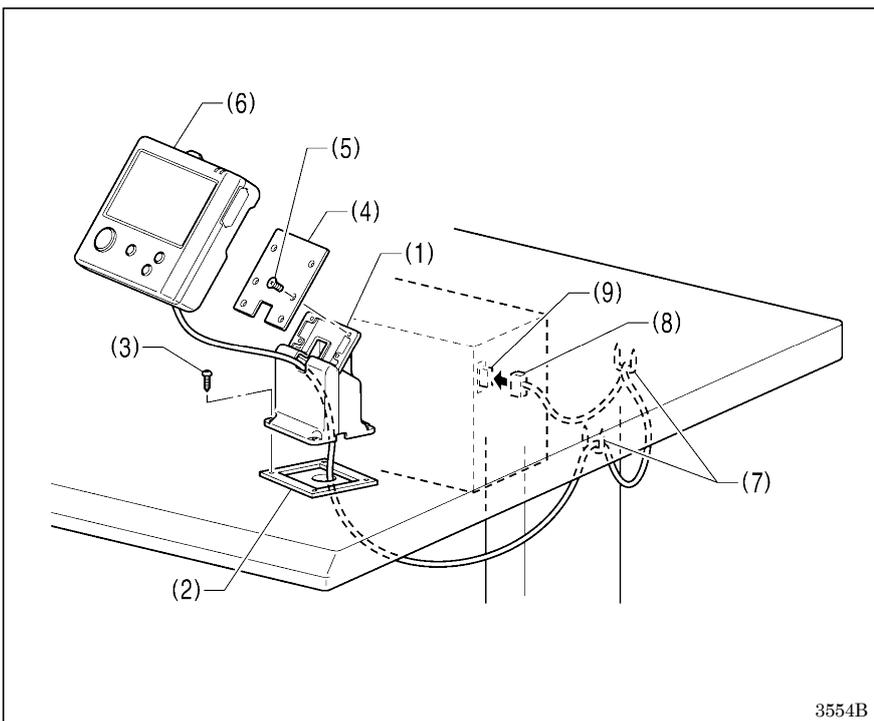


Gently return the machine head to its original position.

1. Remove the two screws (35), and then temporarily remove the machine head switch assembly (36).
2. Use the two screws (35) which were removed to install the machine head switch assembly (36) 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 "3-16. Checking the machine head switch".

3-5. Installing the LCD panel

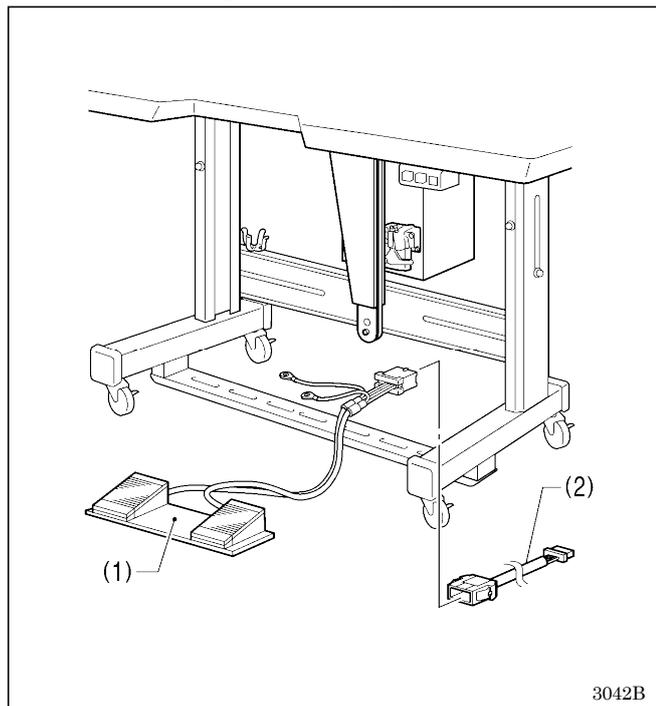


- (1) Cradle
- (2) Rubber cushion
- (3) Wood screws [4 pcs.]
- (4) Setting plate
- (5) Flat screws [4 pcs.]
- (6) LCD panel
- (7) Staples [2 pcs.]

• Pass the cord of the LCD panel (8) through the table hole, and then insert it into the (PANEL) connector (9) on the side of the control box.

• Tighten the four wood screws (3) so that the thickness of the rubber cushion (2) is 5 mm.

3-6. Installing the two-pedal foot switch



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

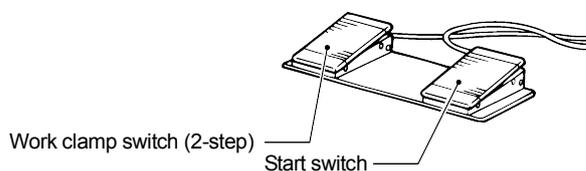
Connect the connector for the two-pedal foot switch (1) to the conversion harness (2). Insert the conversion harness (2) into the P15 (PEDAL) connector on the main P.C. board. (Refer to "3-7. Connecting the cords".)

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

<Two-pedal foot switch operating method>

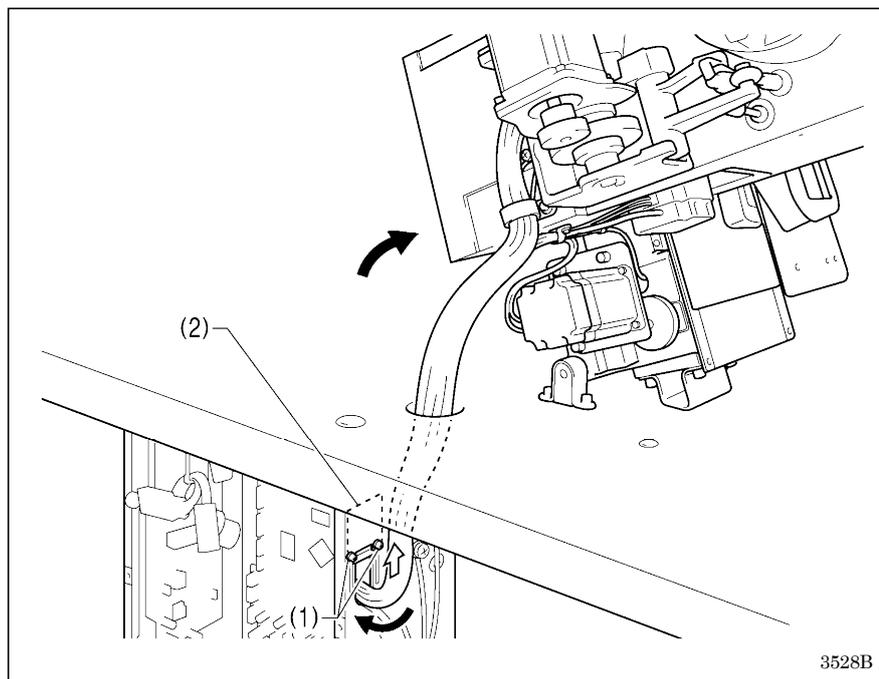
When the work clamp switch (left) is depressed, both work clamps are lowered, and when the start switch (right) is depressed, the sewing machine starts sewing.

* The work clamp lowering method can be changed using memory switch No. 002. (Refer to "2-2. List of memory switch settings" in the "LCD Panel/Operation Panel" Instruction Manual.)



4923Q

3-7. Connecting the cords



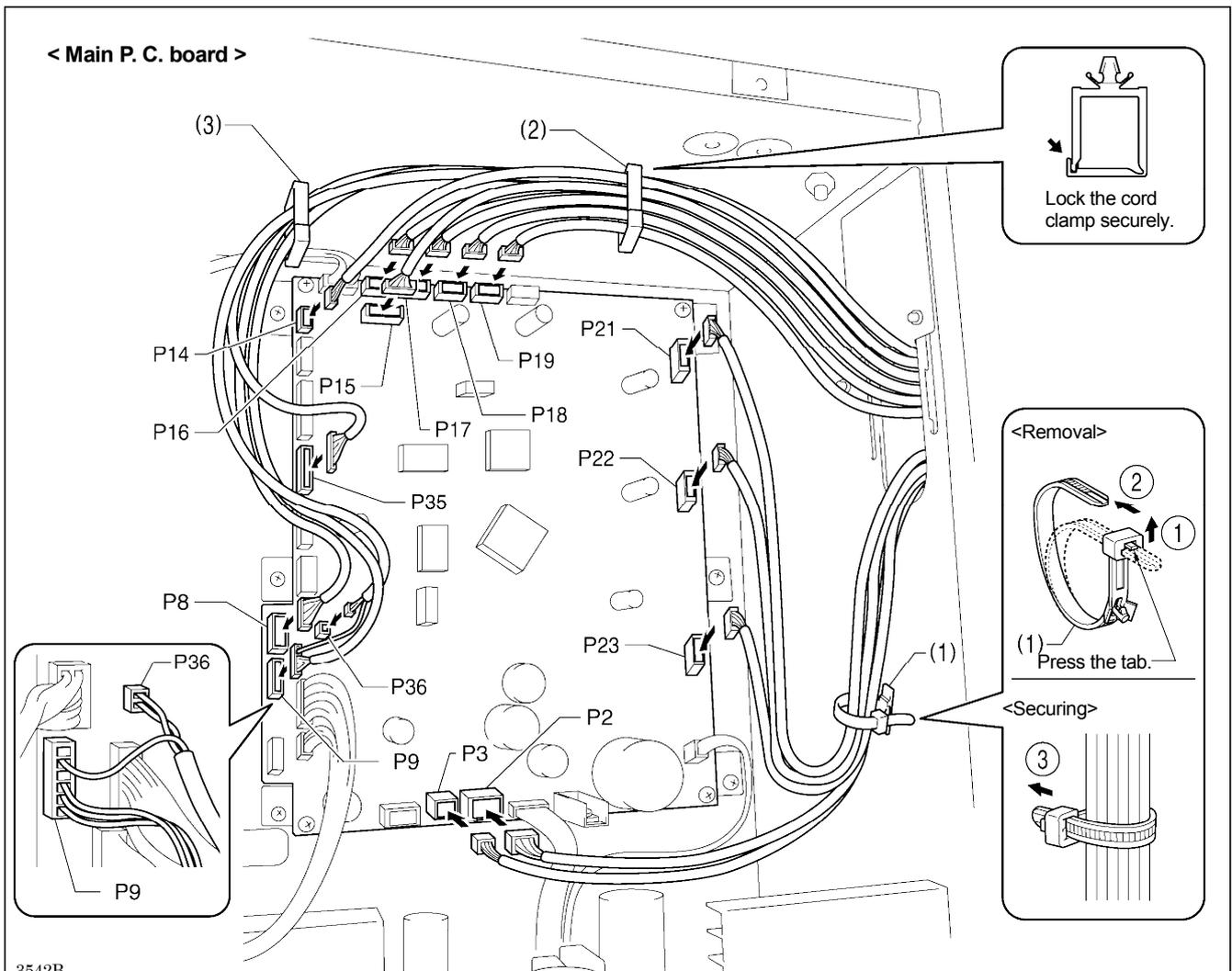
1. Gently tilt back the machine head.
2. Pass the cord bundle through the hole in the work table.
3. Loosen the two screws (1), and then open the cord presser plate (2) in the direction of the white arrow and pass the cord bundle through the opening.
4. Securely connect the connectors as indicated in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

3528B

3. INSTALLATION

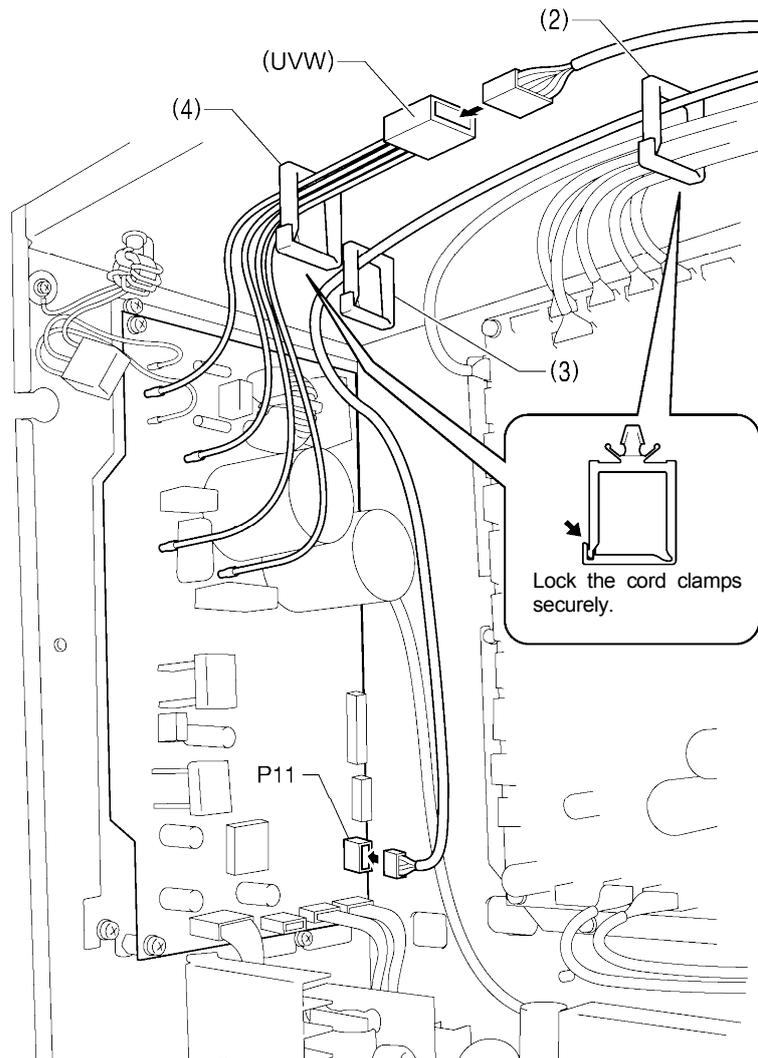


3542B

Connectors	Connection location on main P. C. board	Cord clamps / cable ties
X pulse motor encoder [5-pin] White	P17 (X-ENC)	(2)
Y pulse motor encoder [5-pin] Blue	P18 (Y-ENC)	(2)
Intermittent presser foot 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 solenoid / Tension release solenoid [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)
Home position sensor [12-pin] White	P8 (SENSOR1)	(2) (3)
STOP switch [6-pin] White	P9 (HEAD)	(2) (3)
Valve harness [12-pin] (pneumatic work clamp specifications)	P35 (EX-OUT1)	(2) (3)
Upper thread breakage detector [2-pin] White	P36, P9(HEAD)	(2) (3)

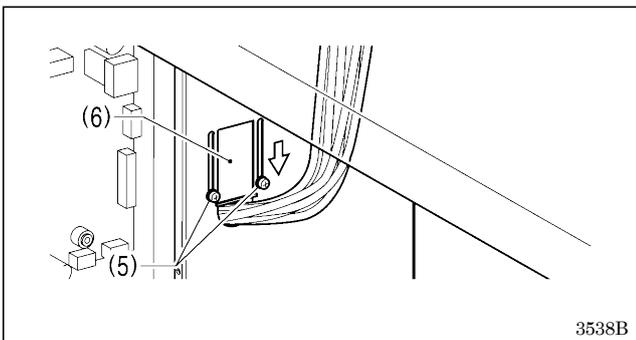
NOTE: Route the X, Y and work clamp pulse motor harnesses so that they do not touch the power supply P.C. board at the bottom of the control box.

< Motor P. C. board >



3537B

Connectors	Connection location on motor P. C. board	Cord clamps
Upper shaft motor [4-pin]	(UVW)	(4)
Synchronizer [10-pin]	P11 (SYNC)	(2) (3)



- Close the cord presser plate (6) in the direction of the white arrow, and secure it by tightening the two screws (5).

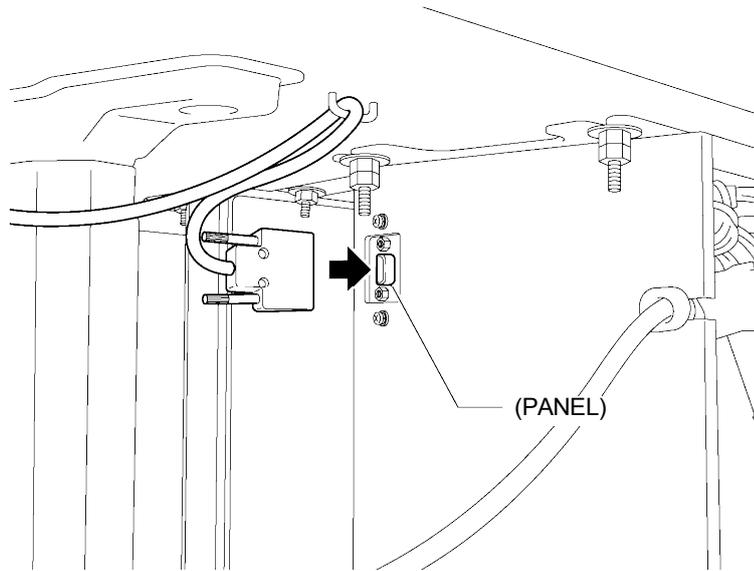
NOTE:

Close the cord presser plate (6) securely so that no foreign objects, insects or small animals can get inside the control box.

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

3. INSTALLATION

<LCD panel>



Connector	D-sub connector
LCD panel [9-pin]	(PANEL)

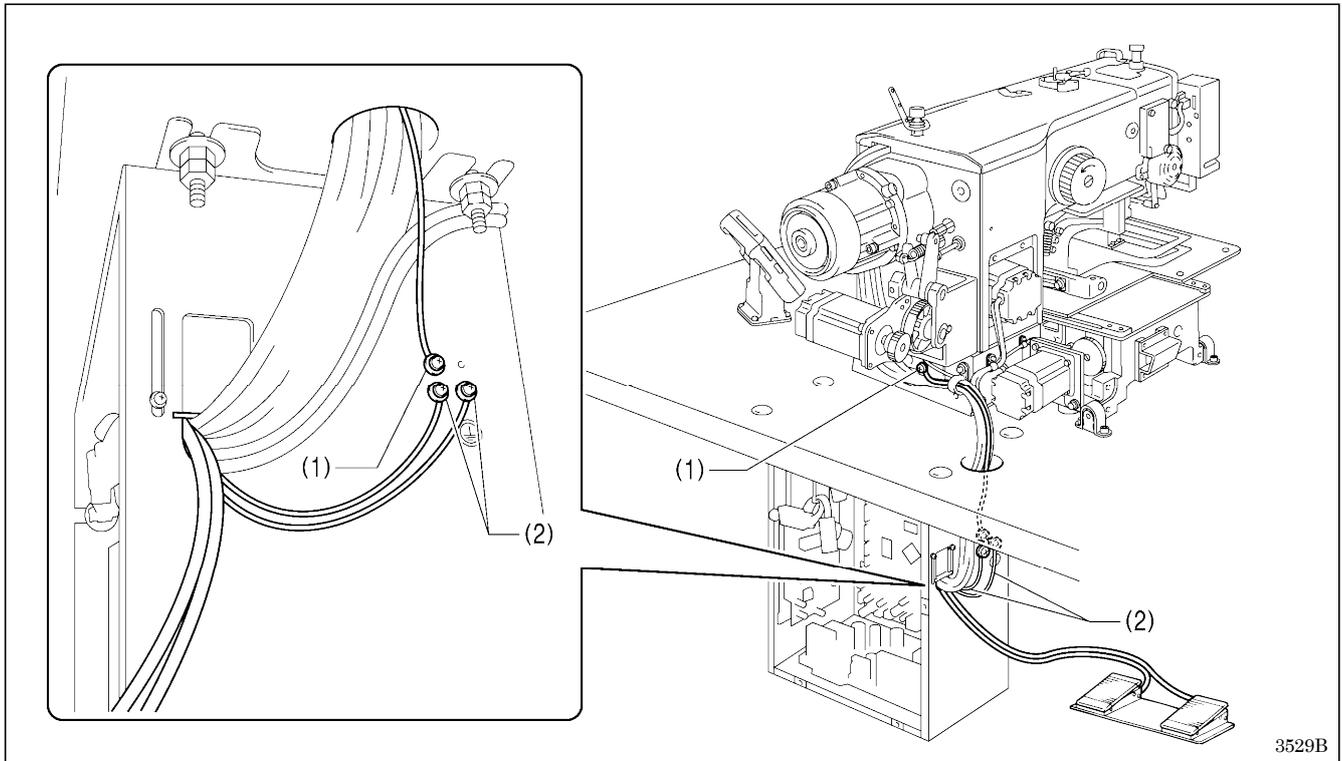
3557B

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 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.

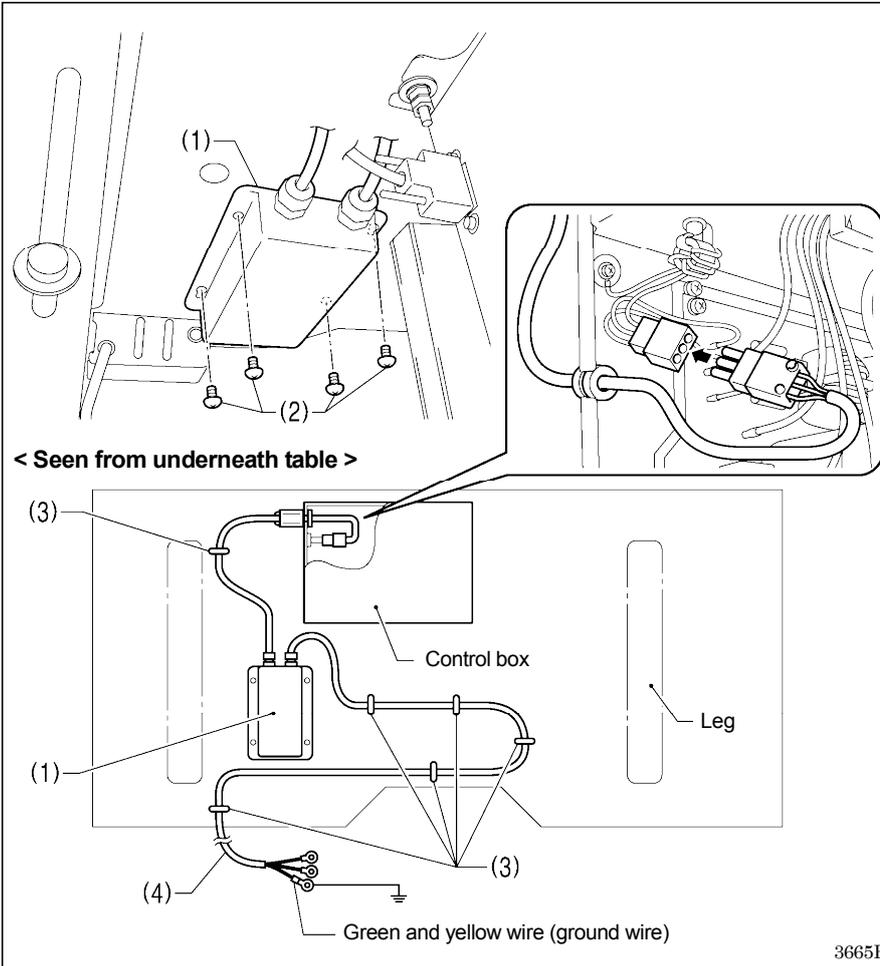
NOTE: Make sure that the ground connections are secure in order to ensure safety.

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 >

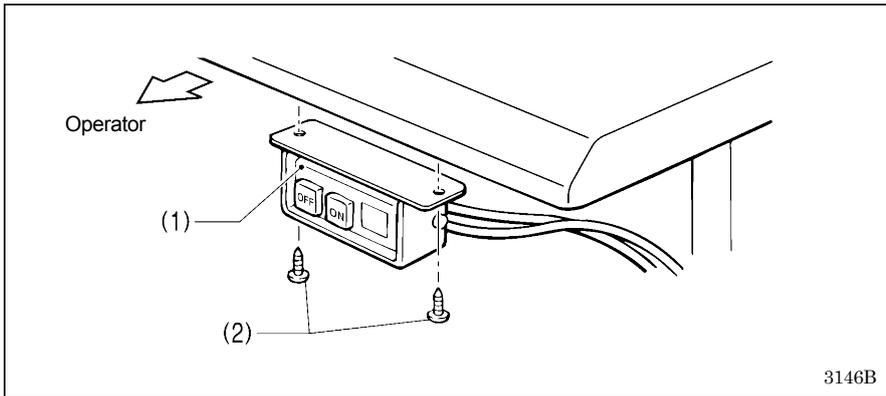
- (1) Filter box
- (2) Screws [4 pcs.]
- (3) Staples [6 pcs.]
- (4) Power cord

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

NOTE:

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

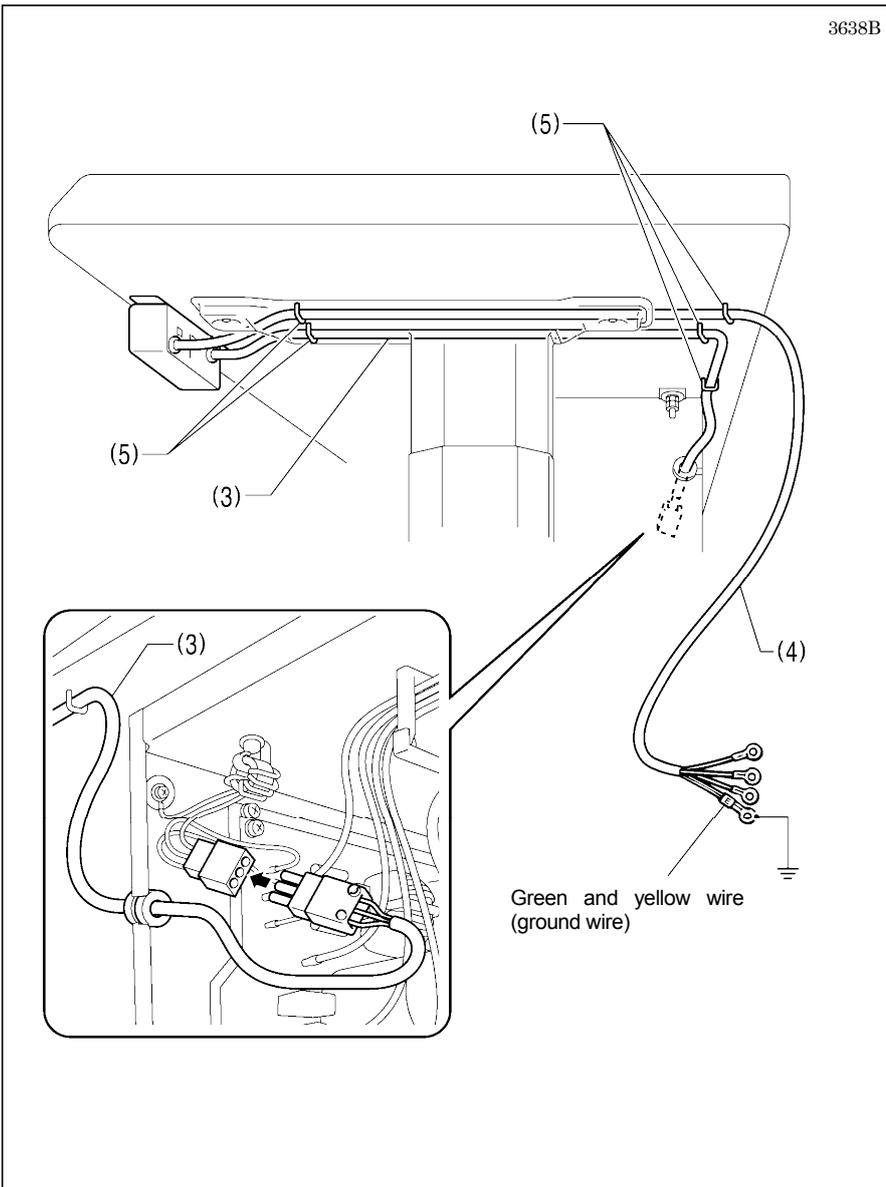
3665B



<200 V system >

- (1) Power switch
- (2) Wood screws [2 pcs.]

3146B



3638B

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

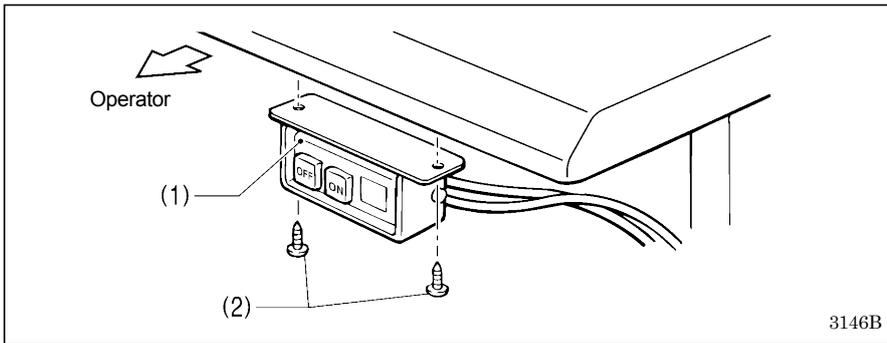
1. Attach an appropriate plug to the power cord (4). (The green and yellow wire is the ground wire.)
2. Insert the power plug into a properly-grounded electrical outlet.

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.

Green and yellow wire
(ground wire)

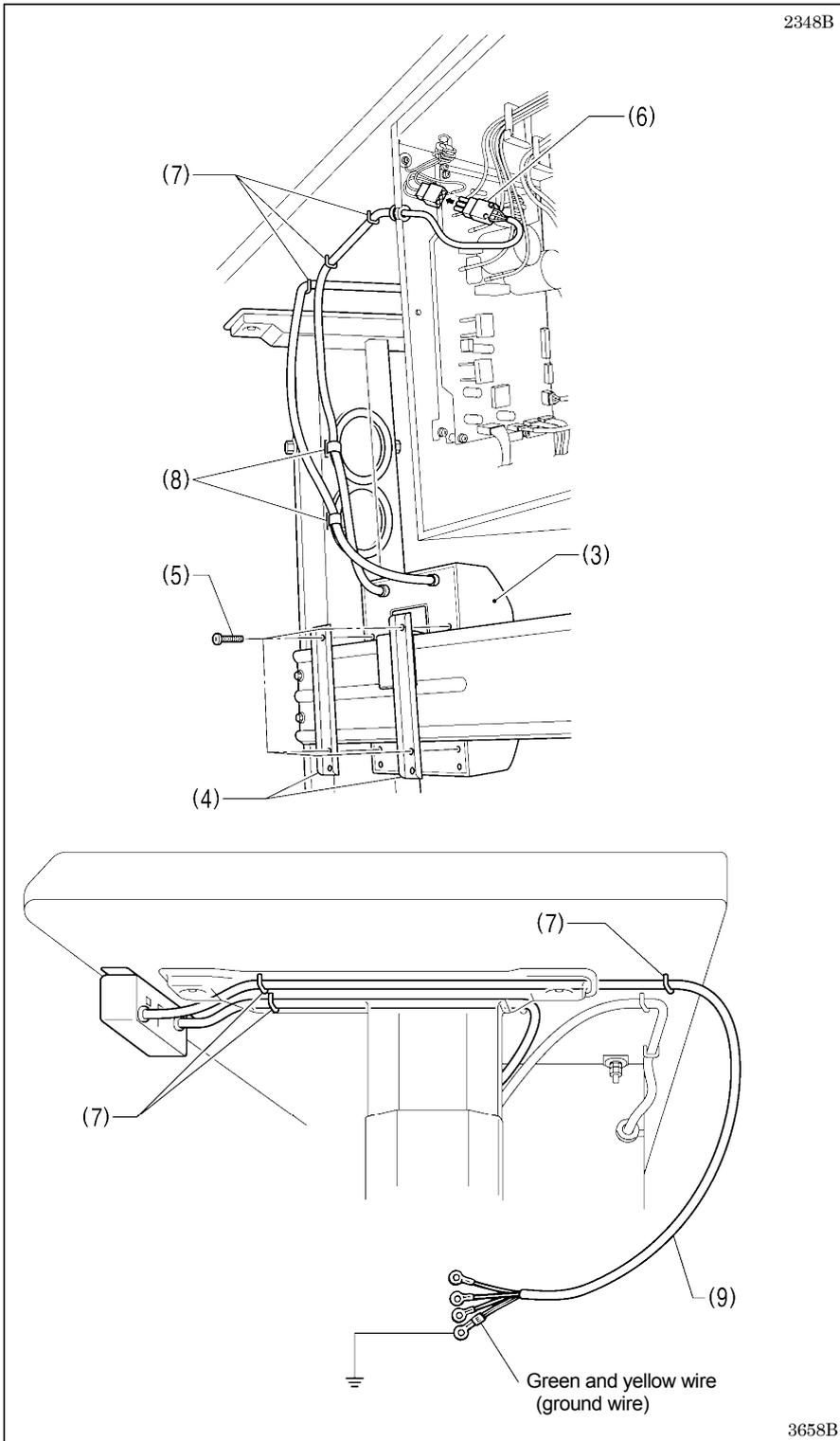
3. INSTALLATION



<100 V / 400 V system >

- (1) Power switch
- (2) Wood screws [2 pcs.]

3146B



2348B

- (3) Transformer box
- (4) Transformer box plates [2 pcs.]
- (5) Screws [with washer] [4 pcs.]
- (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.

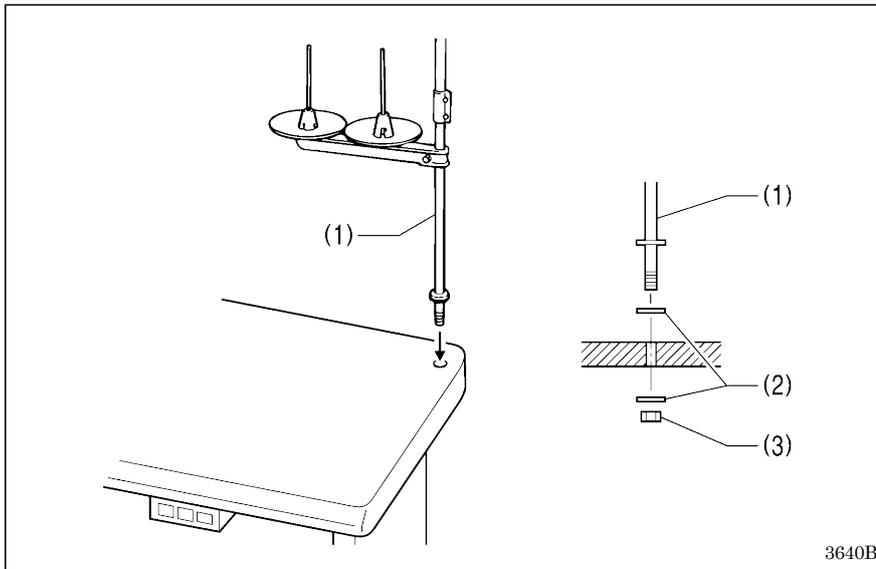
* The inside of the control box uses single-phase power.

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.

3658B

3-10. Installing the cotton stand

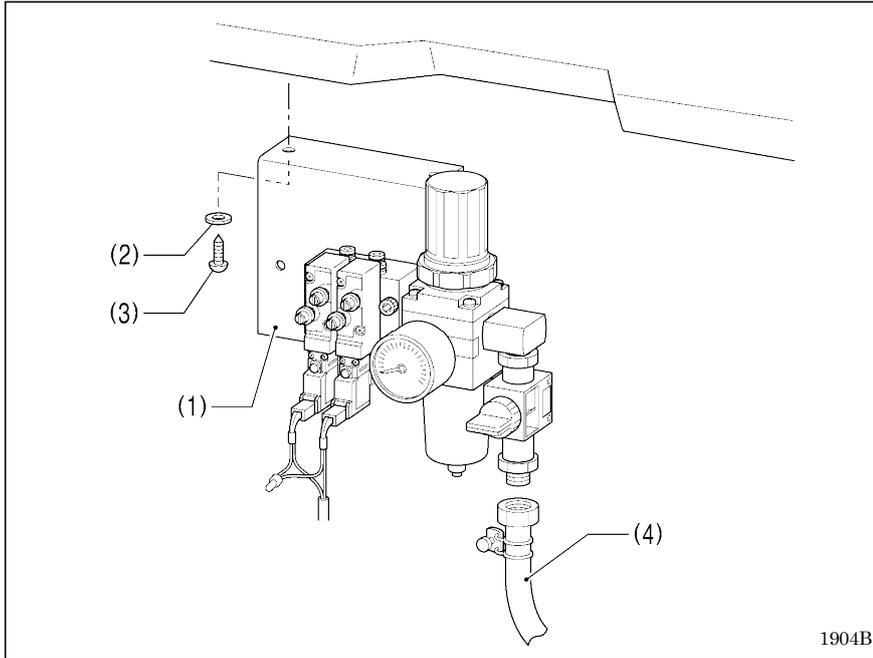


(1) Cotton stand

NOTE:

Securely tighten the nut (3) so that two washers (2) are securely clamped so that the cotton stand (1) does not move.

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



Install underneath the work table.

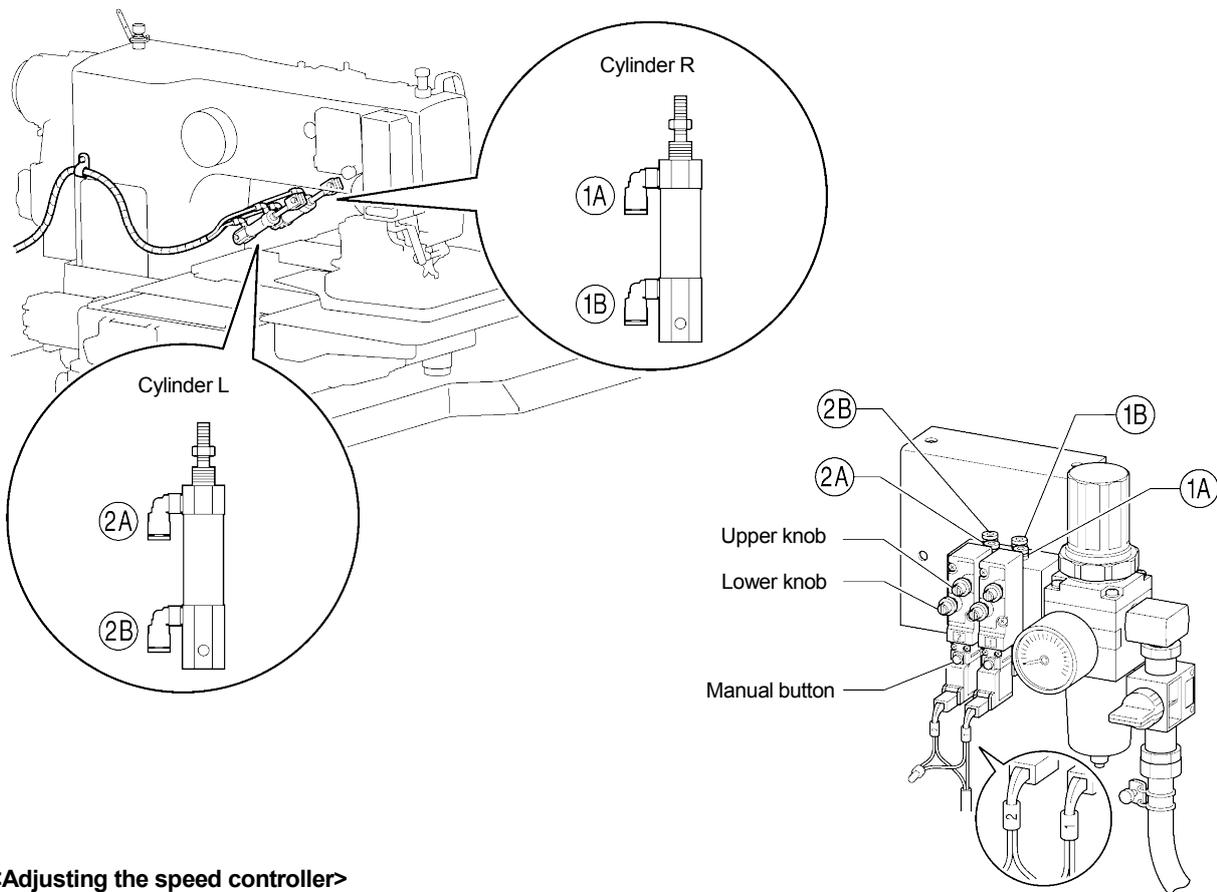
- (1) Solenoid valve assembly
- (2) Washers [2 pcs.]
- (3) Wood screws [2 pcs.]
- (4) Rubber hose (OPTION PARTS)

After installing the pneumatic unit, adjust the air pressure.
(Refer to "7-18. 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 knob to adjust the lifting and dropping speeds for the work clamp.

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.

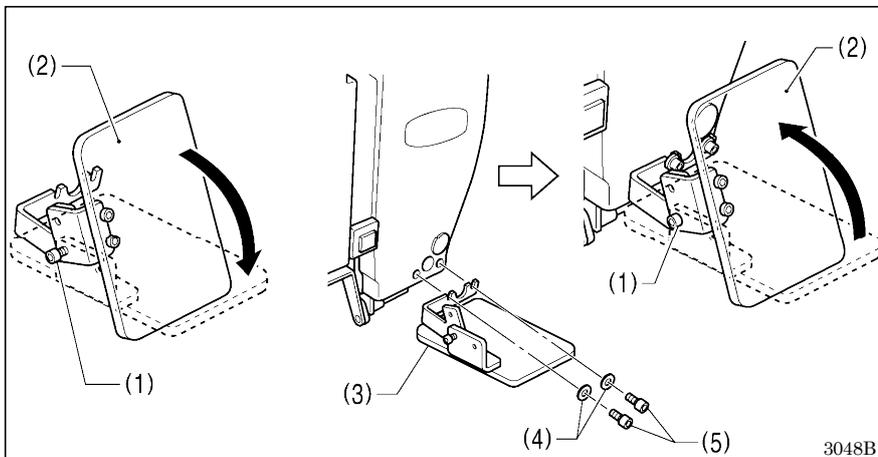
3235B 1905B

3-12. Installing the eye guard

⚠ CAUTION



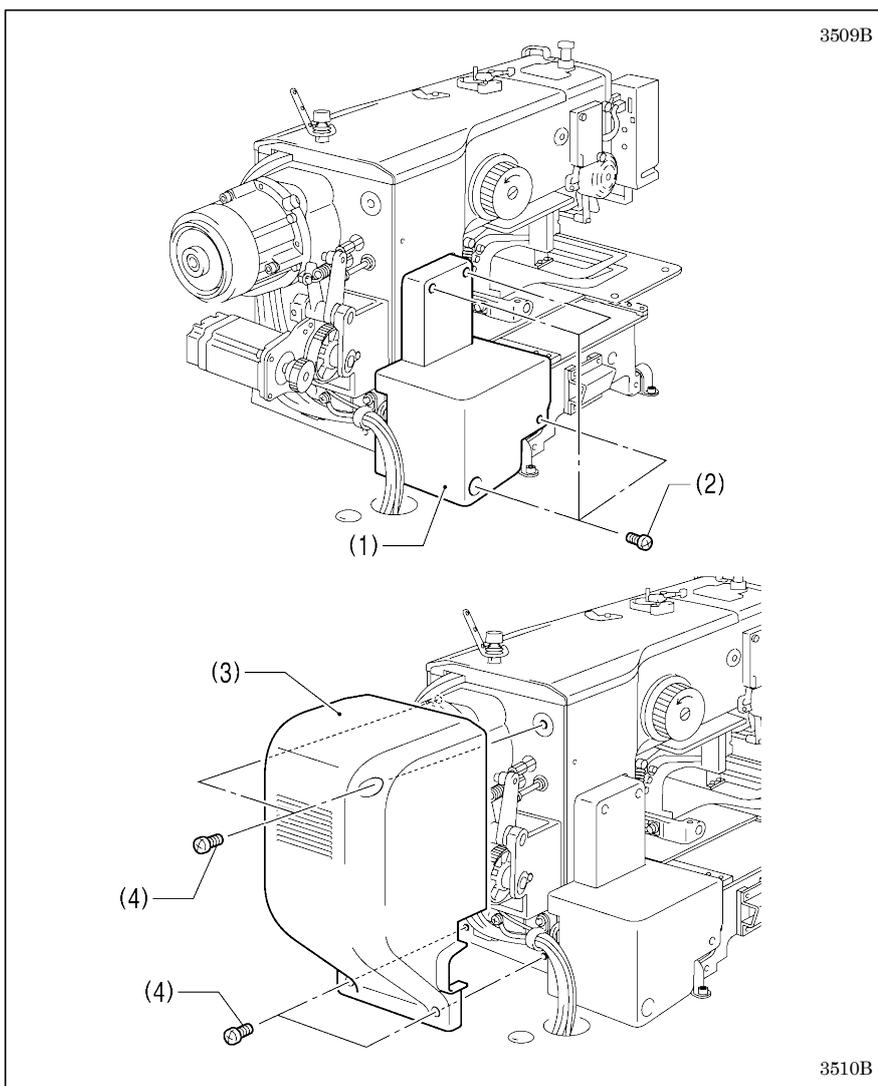
Attach all safety devices before using the sewing machine.
If the machine is used without these devices attached, injury may result.



- (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 bolt (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.

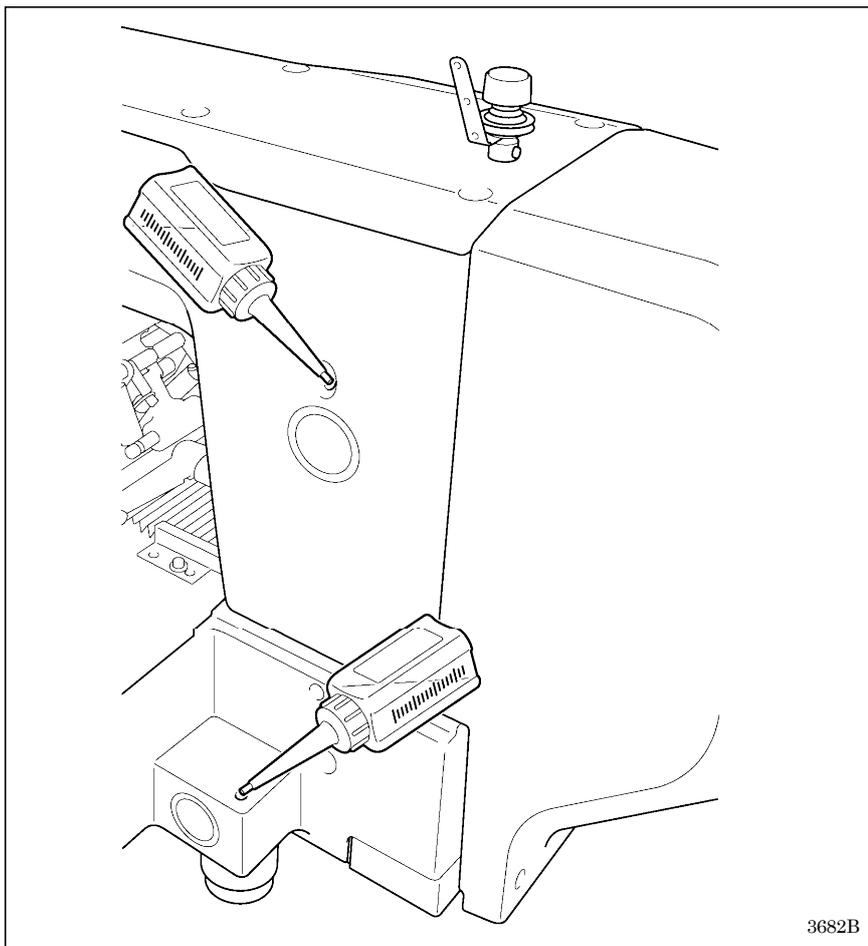


Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin. If the oil and grease get into your eyes or onto your skin, inflammation can result. Furthermore, do not drink or eat the lubricating oil or grease. They 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 N10; VG10> specified by Brother.

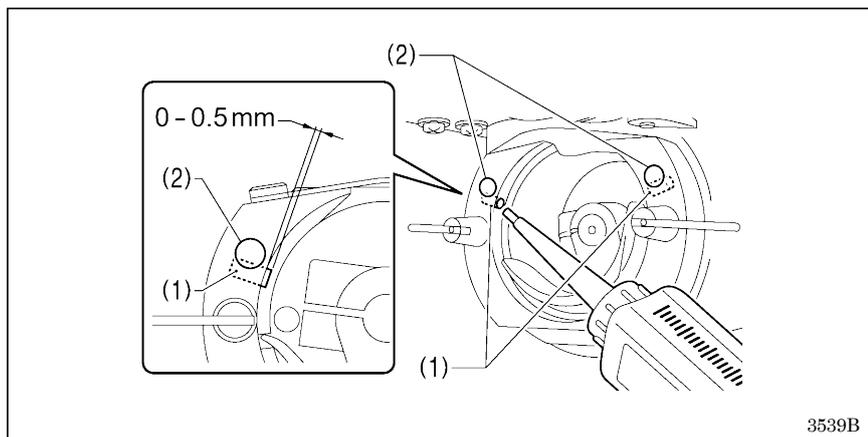
* If this type of lubricating oil is difficult to obtain, the recommended oil to use is <Exxon Mobil EssoTex SM10; VG10>.



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 (1) is lightly moistened.

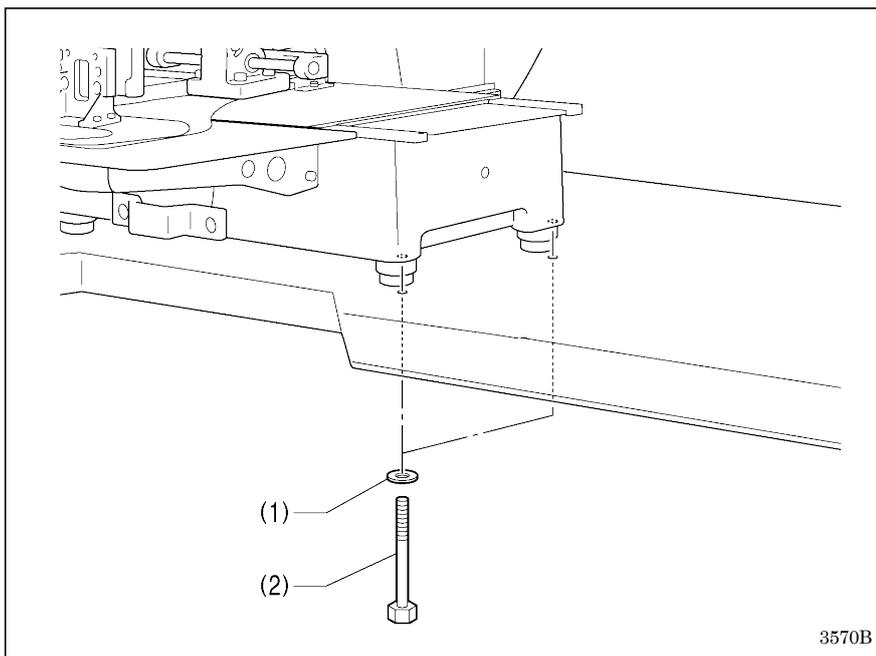
If it is difficult to add oil, you can also remove the rubber plug (2) and pour in the oil through the hole.

NOTE:

- The two pieces of felt (1) should normally project by 0 to 0.5 mm from the hook race. Be careful not to push in the felt (1) when lubricating.
- If there is no more oil on the felt (1) 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 bolts.

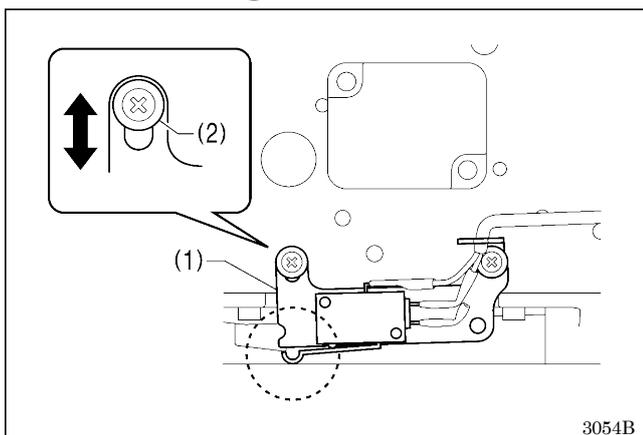


- (1) Plain washers [2 pcs.]
- (2) Machine head fixing bolts [2 pcs.]

NOTE:

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

3-16. Checking the machine head switch



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

<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

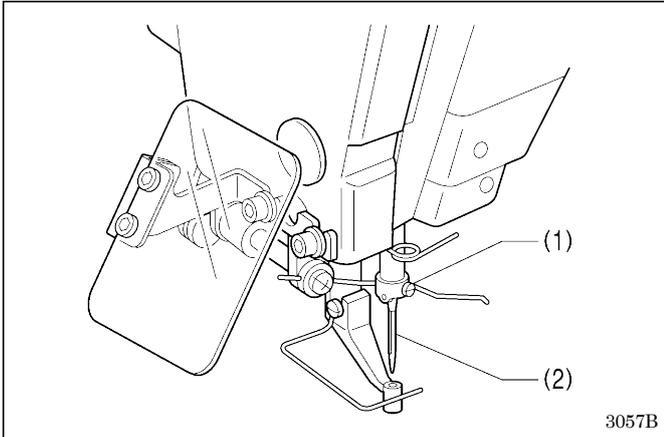
4-1. Installing the needle

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.



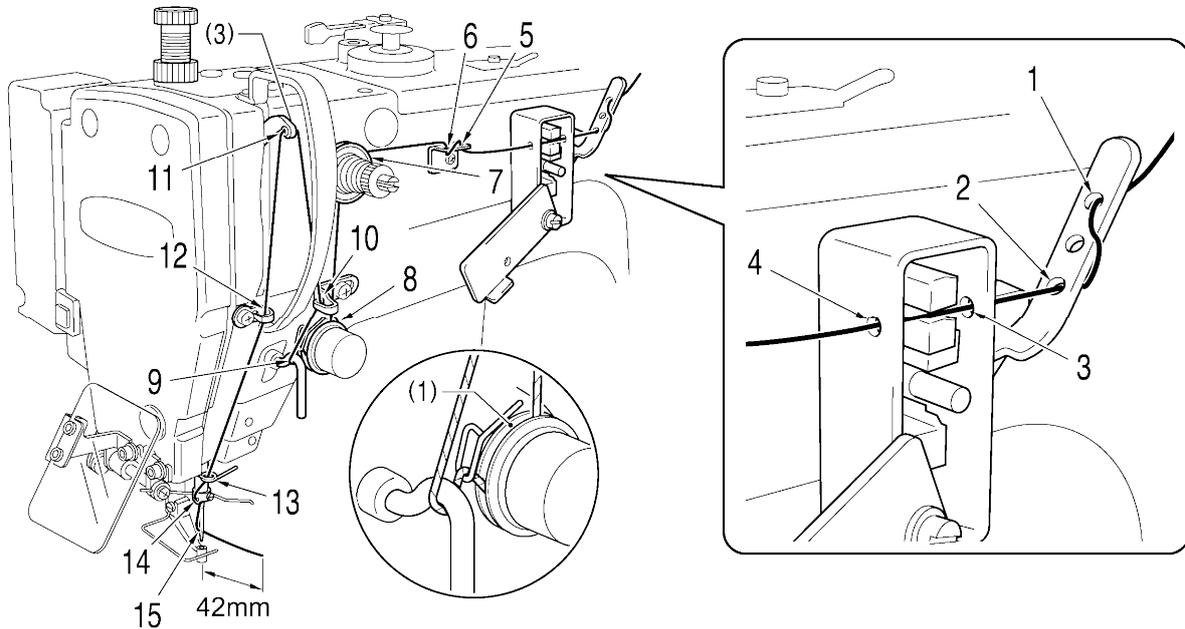
1. Loosen the set screw (1).
2. Insert the needle (2) in a straight line as far as it will go, making sure that the long groove on the needle is at the front, and then securely tighten the set screw (1).

4-2. Threading the upper thread

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

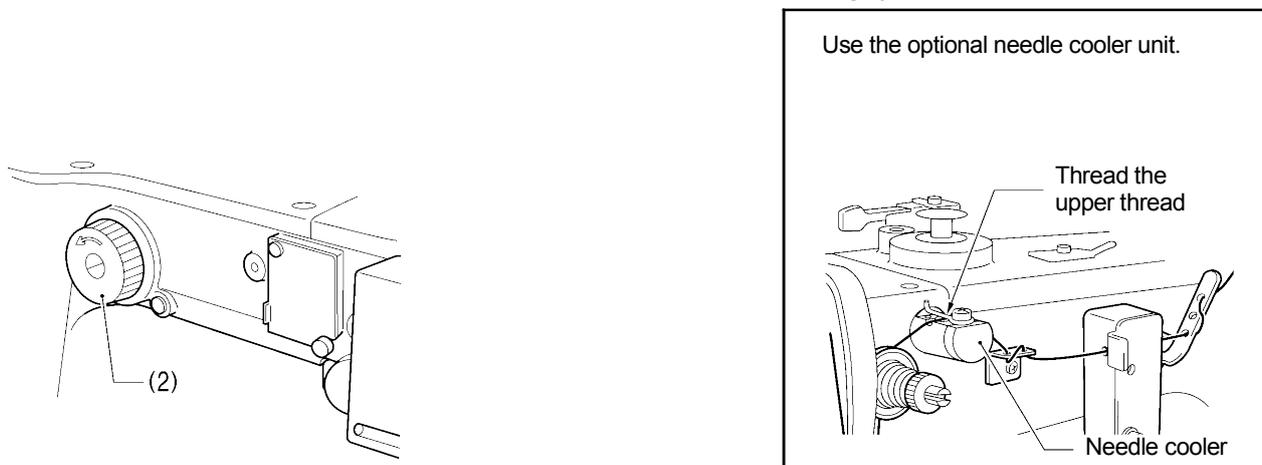
- * When using threading mode for threading, the thread can be threaded more easily.
Refer to <Threading mode> (P. 24)

[If using cotton thread or spun thread]



3559B

[If using synthetic thread]



3059B

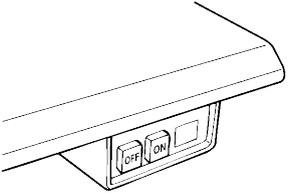
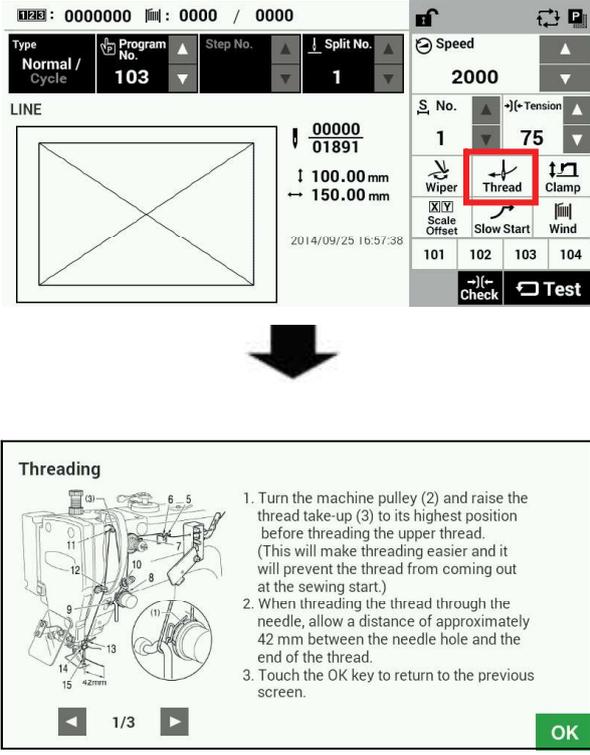
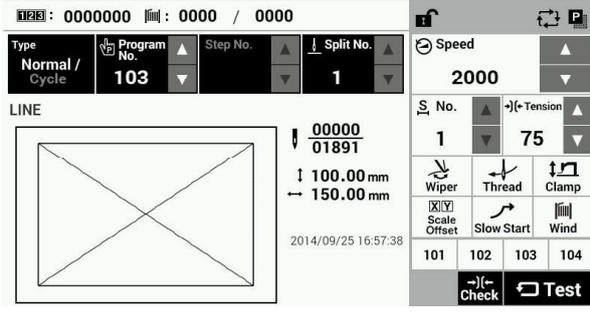
3558B

- Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread.
(This will make threading easier and it will prevent the thread from coming out at the sewing start.)
- When threading the thread through the needle, allow a distance of approximately 42 mm between the needle hole and the end of the thread.
If it is too long, the thread may become tangled, and if it is too short, the thread may pull out at the sewing start.
- If you would like to adjust the sensitivity of the thread breakage sensor, refer to "7-2. Adjusting the sensitivity of the thread breakage sensor".

4. PREPARATION BEFORE SEWING

<Threading mode>

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

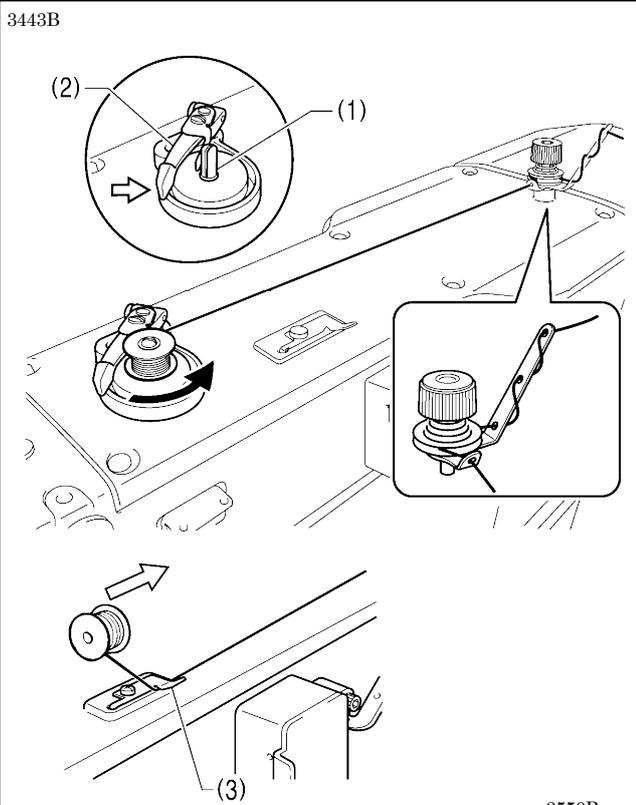
<p>1</p>		<p>Turn on the power.</p>
<p>2</p>	 <p>Threading</p> <ol style="list-style-type: none"> 1. Turn the machine pulley (2) and raise the thread take-up (3) to its highest position before threading the upper thread. (This will make threading easier and it will prevent the thread from coming out at the sewing start.) 2. When threading the thread through the needle, allow a distance of approximately 42 mm between the needle hole and the end of the thread. 3. Touch the OK key to return to the previous screen. 	<p>Touch the Thread key on the screen.</p>  <ul style="list-style-type: none"> • Work clamp will drop. • The tension discs will open.
<p>3</p>	<p>Threading the thread.</p>	
<p>4</p>	<p>Ending threading mode</p> <p>The display will return to the previous screen.</p> 	<p>Touch the OK key on the screen.</p>  <ul style="list-style-type: none"> • The work clamp will return to where it was before threading mode was started.

3055B

4-3. Winding the lower thread

CAUTION

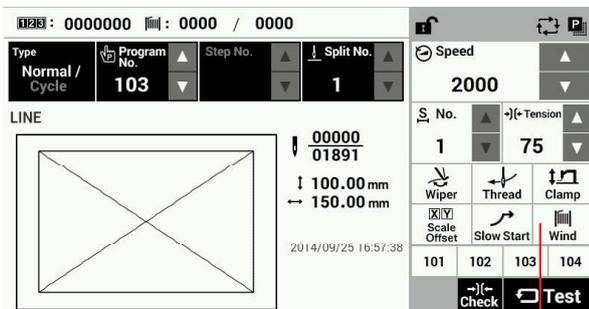
Do not touch any of the moving parts or press any objects against the machine while winding the lower thread, as this may result in personal injury or damage to the machine.



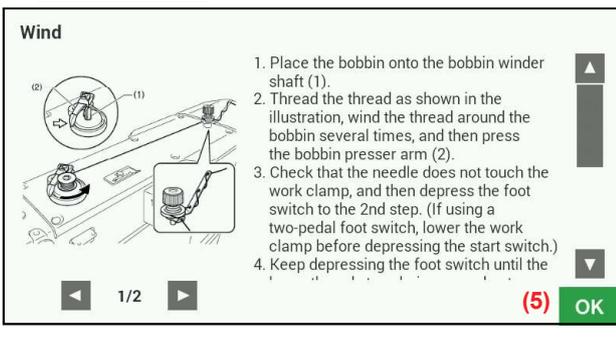
1. Place the bobbin onto the bobbin winder shaft (1).
2. Thread the thread as shown in the illustration, wind the thread around the bobbin several times, and then press the bobbin presser arm (2).
3. Turn on the power.
4. Depress the foot switch to the second step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
Home position detection will be carried out.
5. Touch the Wind key (4) on the screen.
6. The display will switch to the thread winding mode screen.
7. Check that the needle does not touch the work clamp, and then depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)
8. Keep depressing the foot switch until the lower thread stops being wound onto the bobbin.
9. Once winding of the set amount of lower thread (80 - 90% of the bobbin capacity) is completed, the bobbin presser arm (2) will return automatically.
10. Remove the bobbin, hook the thread onto the knife (3), and then pull the bobbin in the direction of the arrow to cut the thread.
11. Touch the OK key (5) to return to the previous screen.



3550B

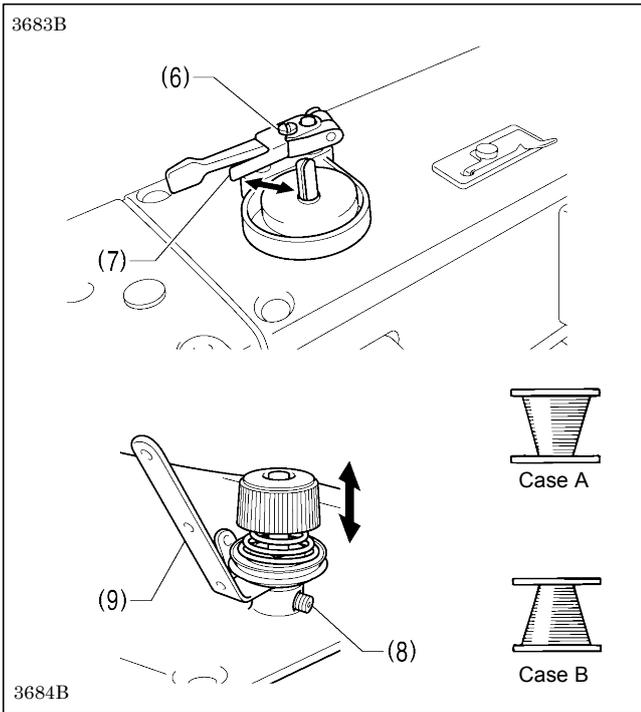


(4)



(5) OK

4. PREPARATION BEFORE SEWING



Adjusting the bobbin winding amount

Loosen the screw (6) and move the bobbin presser (7).

If the thread winds onto the bobbin unevenly

Loosen the set screw (8) and move the bobbin winder tension assembly (9) up and down to adjust.

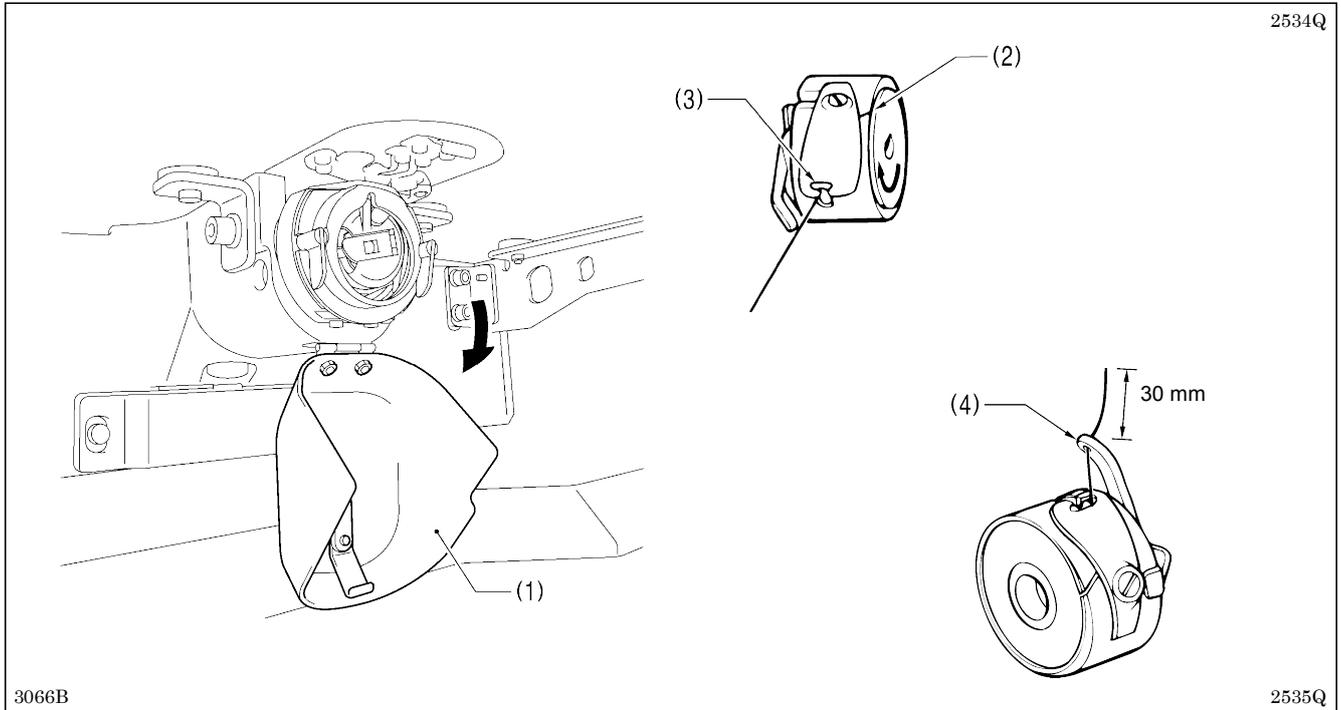
* For case A, move the bobbin winder tension assembly (9) down, and for case B, move it upward.

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. PREPARATION BEFORE SEWING

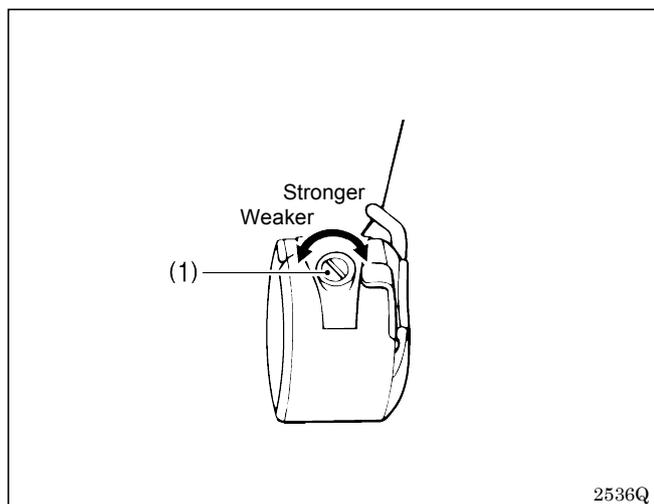
4-5. Thread tension

[Thread tension reference]

Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07A)
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) [Tension value]	0.8 – 1.2 [80 - 120]*1	1.4 – 1.8 [140 - 180]*1	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

*1 This is the tension value when the pretension is 0.1 N.

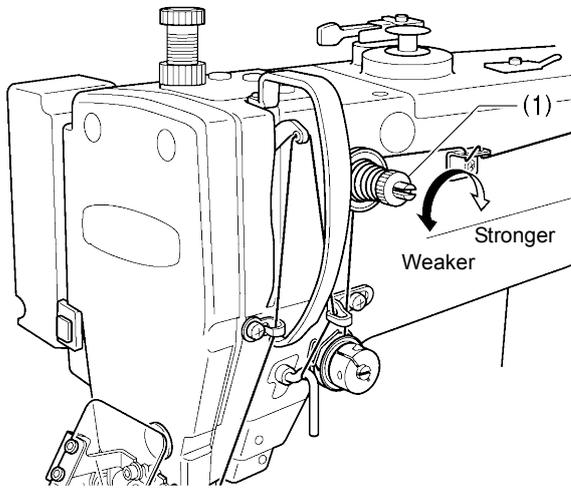
4-5-1. Lower thread tension



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

4-5-2-1. Upper thread tension (Medium-weight materials specifications <-03[]>, Heavy-weight materials specifications <-05[]>)

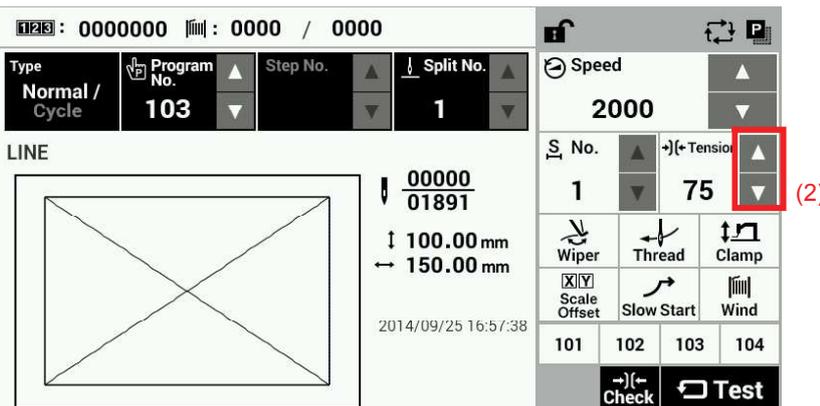


3545B

Use the digital tension to adjust the tension as appropriate for the material being sewn. (Refer to “Setting the tension value” below.)

Turn the tension nut (1) (sub-tension) to adjust so that the upper thread trailing length is about 42 mm.

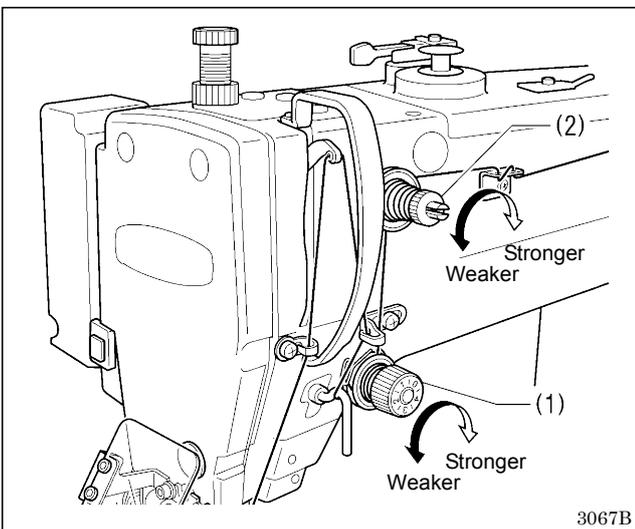
[Sewing operation screen]



Setting the tension value

Touch the Δ and ∇ keys (2) on the sewing operation screen to increase or decrease the Tension value.

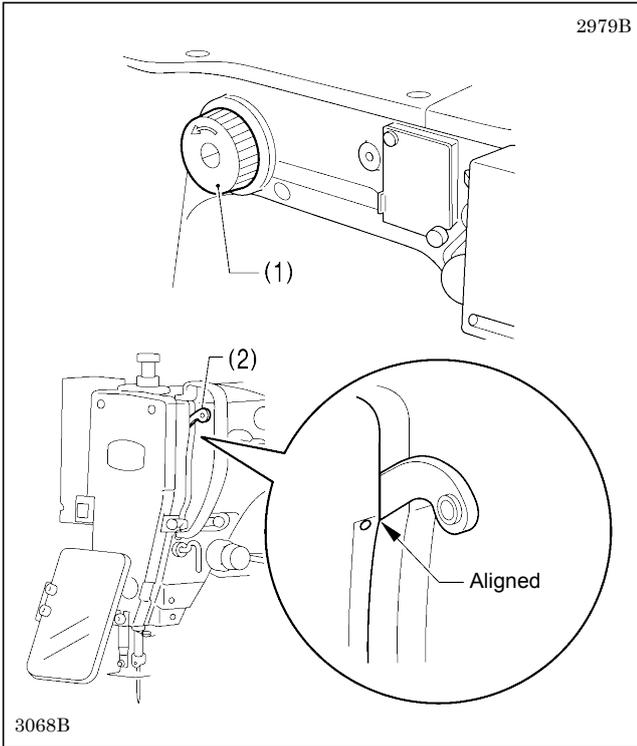
4-5-2-2. Upper thread tension (Seatbelt specifications <-07A>)



3067B

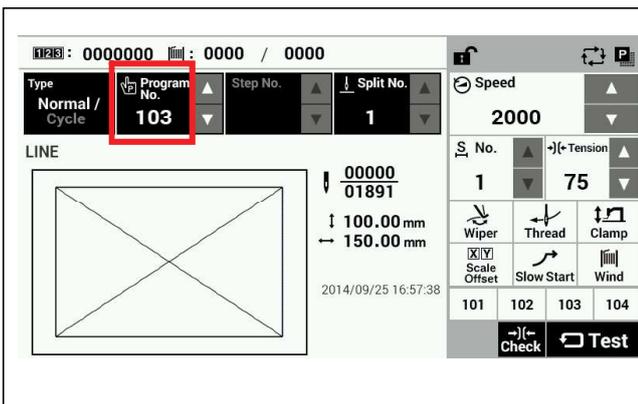
1. Turn the tension nut (1) (main tension) to adjust the tension as appropriate for the material being sewn.
2. Use the tension nut (2) (sub-tension) to adjust so that the upper thread trailing length after thread trimming is about 42 mm.

4-6. Starting up



Before turning on the power, 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.



Turn on the power.

If a program has been registered, the program number and a preview of the sewing pattern will be displayed.

No programs are registered at the time of shipment from the factory, and so "----" is displayed as the program number (No.).

For details on the sewing data reading method, refer to "3. USING STORAGE MEDIA" in the "LCD Panel/Operation Panel" Instruction Manual.

5. 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.

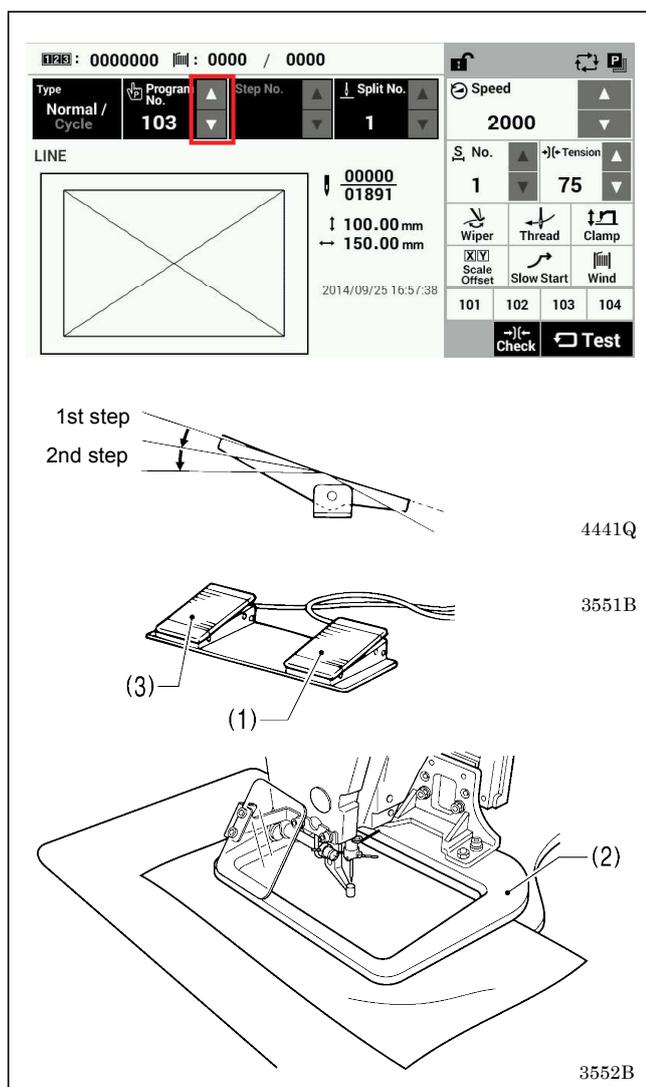
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.

- When 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.

5-1. Sewing



1. Turn on the power.
2. Touch the Δ or ∇ key to select the number for the program to be sewn.

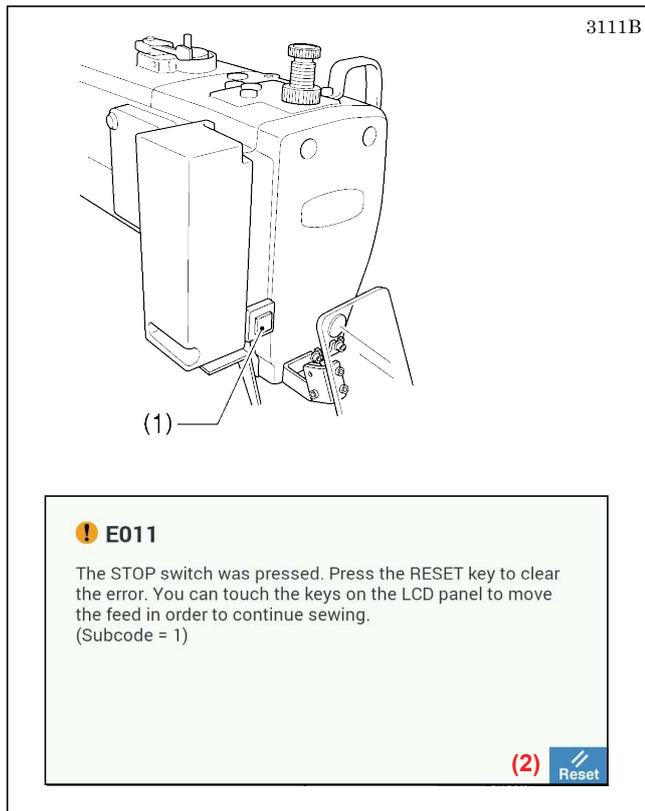
* For details on reading sewing data from SD cards and USB memory devices, refer to "3-4. Importing items of sewing data separately in the "LCD Panel/Operation Panel" Instruction Manual.

3. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, lower the work clamp (2) before depressing the start switch (1).)
Home position detection will be carried out.
4. Place the materials under the work clamp (2).
5. Depress the foot switch to the 1st step.
(If using a two-pedal foot switch, depress the work clamp switch (3).)
The work clamp (2) will be lowered.
6. Depress the foot switch to the 2nd step.
(If using a two-pedal foot switch, depress the start switch (1).)
The sewing machine will start sewing.
7. After sewing is completed, the thread trimmer will operate. And then the work clamp (2) 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.

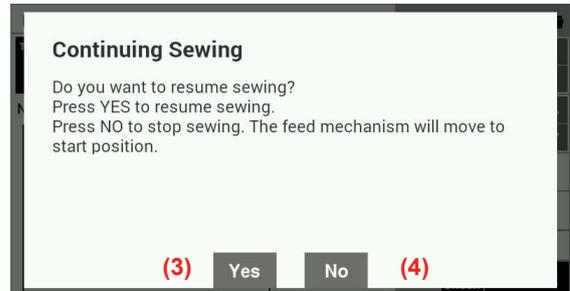
5-2. Using the STOP switch

If you press the emergency stop switch (1) to during actual sewing, an error dialog box will be displayed and the sewing machine will immediately stop.



<Clearing>

1. Touch the Reset key (2).
 - The thread will be trimmed, and then the error dialog box on the screen will disappear and the buzzer will stop.
2. A dialog box asking you to confirm if you want to continue sewing will be displayed.



<Continuing sewing from a stopping point>

If the thread breaks or the lower thread runs out during sewing, you can then continue sewing from the point where the thread broke or ran out.

<p>1</p>		<p>Touch "Yes" (3) to return to the resewing standby screen.</p>
<p>2</p>	<p>(5) (6)</p>	<p>Touch the keys (5) and (6) on the screen to return to the position where sewing is to be resumed.</p> <p>When you touch the key (5), the feed will move backward by 1 stitch, and when you touch the key (6), the feed will move forward by 1 stitch.</p>
<p>3</p>	<p>2nd step</p>	<p>Depress the foot switch to the 2nd step. (If using a two-pedal foot switch, depress the start switch.) The sewing machine will start operating and sewing will start.</p>

<Returning to the sewing start position without continuing sewing>

If you do not wish to continue sewing, touch "No" (4).

- After home position detection is carried out, the mechanism will return to the sewing start position.

6. CLEANING

! CAUTION

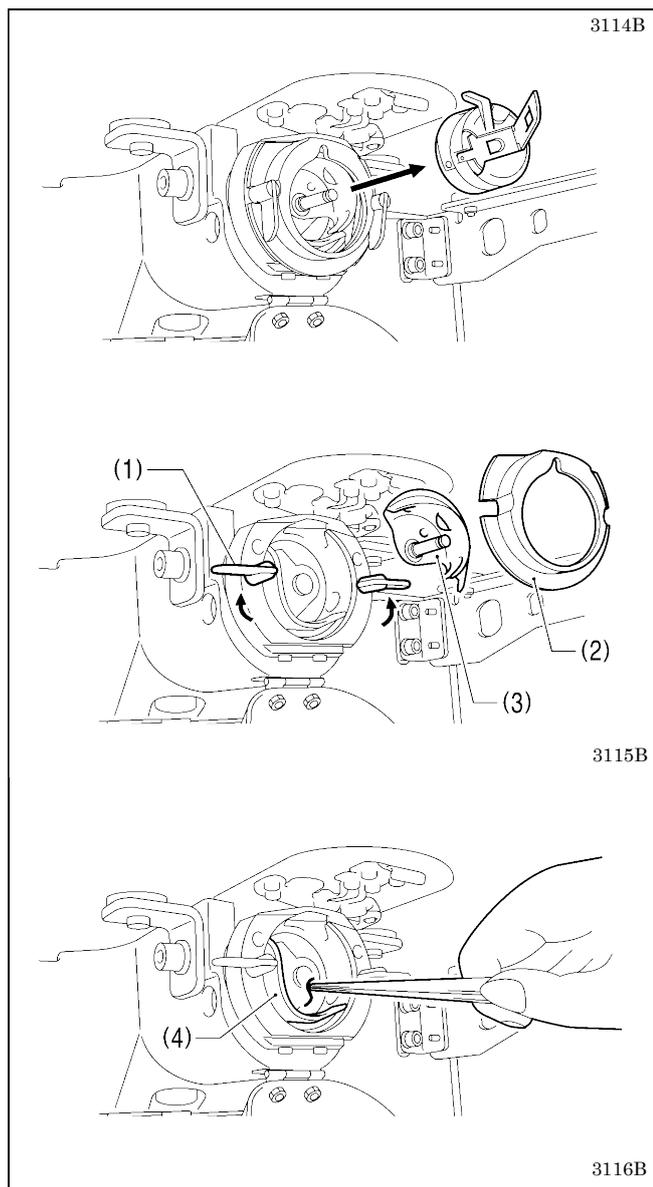


Turn off the power switch before carrying out cleaning.
If the foot switch is depressed by mistake, the sewing machine might start operating and injury could result.



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.

6-1. Cleaning the rotary hook

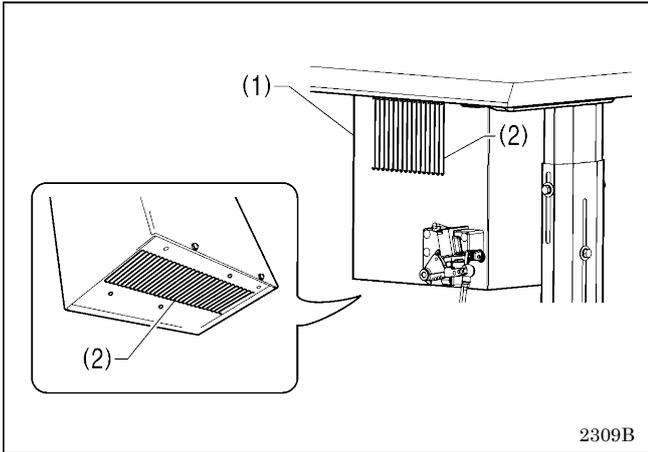


1. Pull the shuttle race cover downward to open it, and then remove the bobbin case.

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).

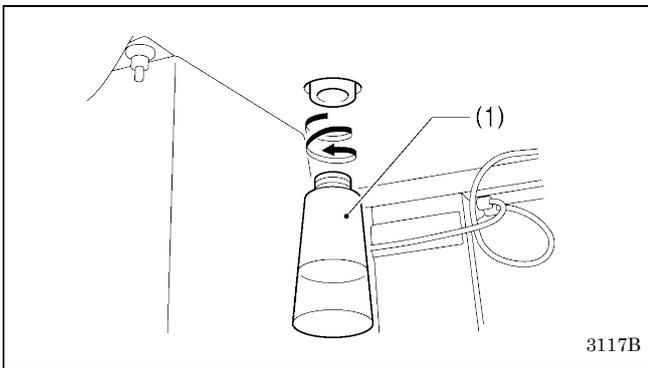
3. Clean all the dust and lint from around the driver (4), the top of the rotary hook thread guide and the shuttle race.

6-2. Cleaning the control box air inlet ports



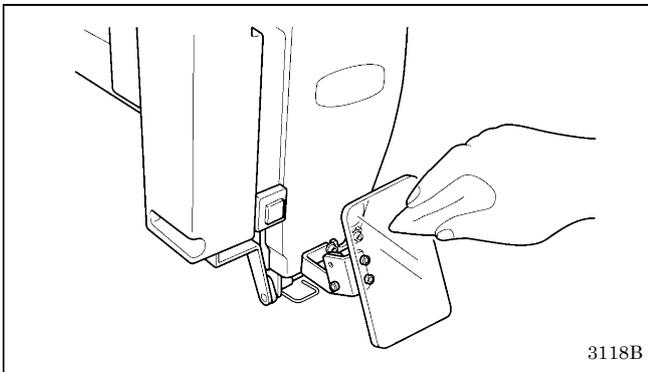
Use a vacuum cleaner to clean the filter in the air inlet ports (2) of the control box (1) at least once a month.

6-3. 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.

6-4. Cleaning the eye guard

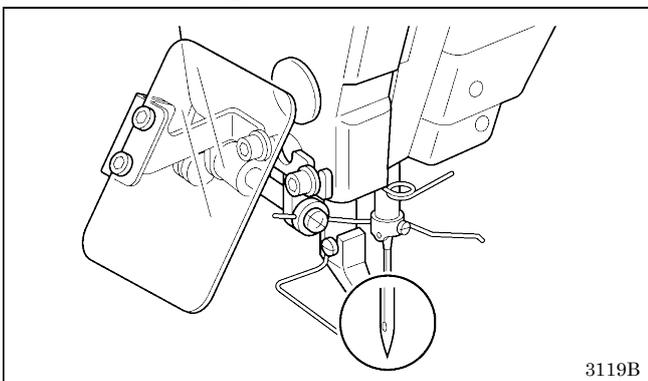


Wipe the eye guard clean with a soft cloth.

NOTE:

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

6-5. 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.

6-6. Lubrication

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

6-7. Applying grease (Feed mechanism BAS-311HN)

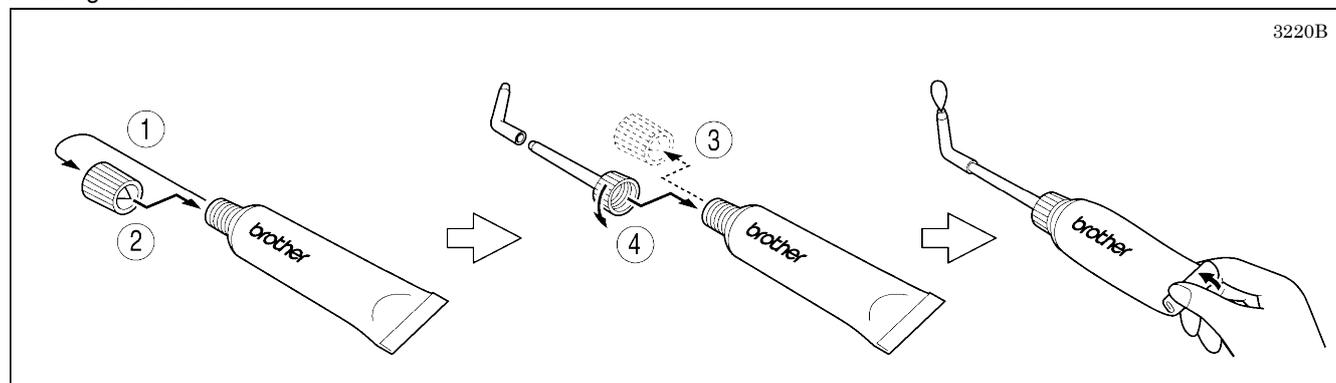
If you are frequently sewing heavy-weight materials, using the sewing machine for long periods or using the sewing machine in places where there is a lot of dust, it is recommended that you apply grease to maintain the performance of the feed mechanism.

<Applying grease>

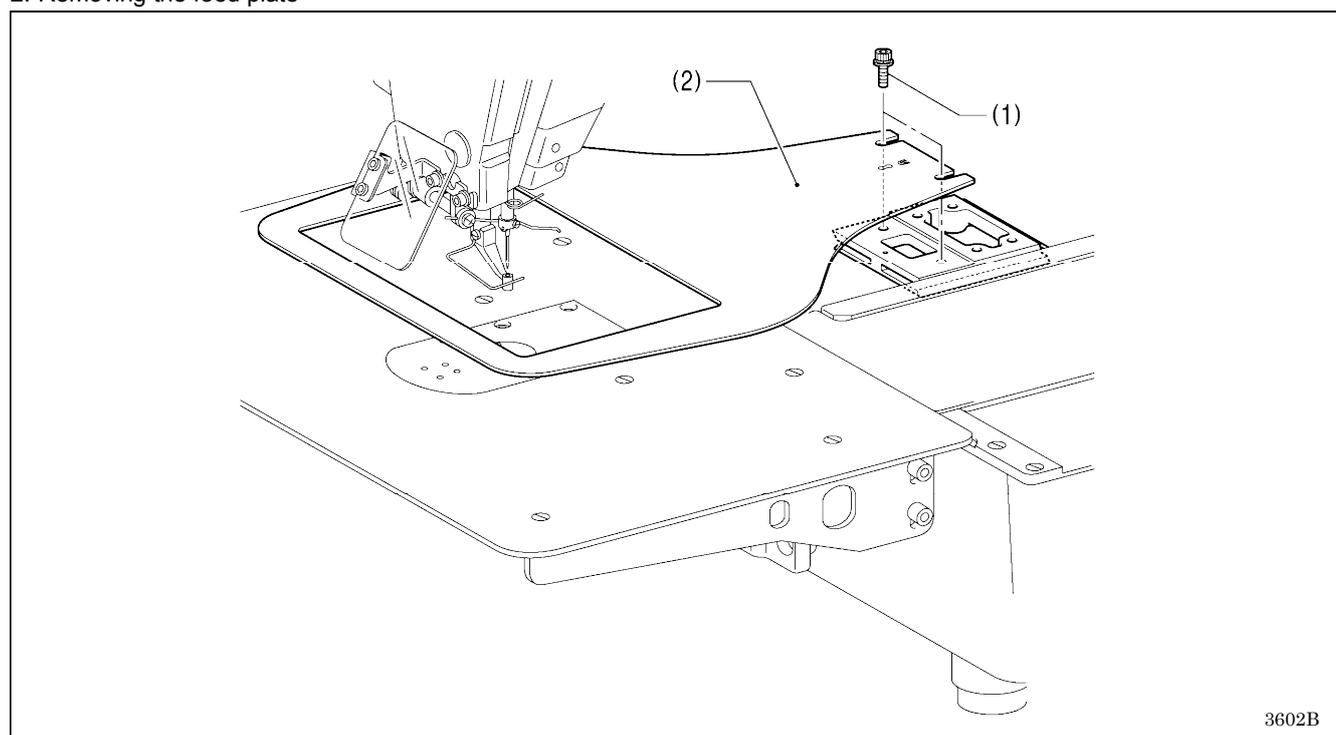
Use Brother-specified "Grease unit (SB1275-101)".

Ask the place of purchase for details on obtaining these items.

1. Using the tube



2. Removing the feed plate



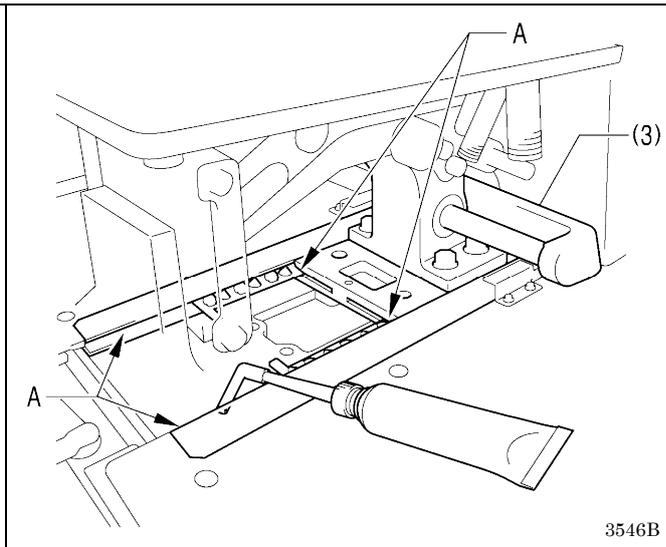
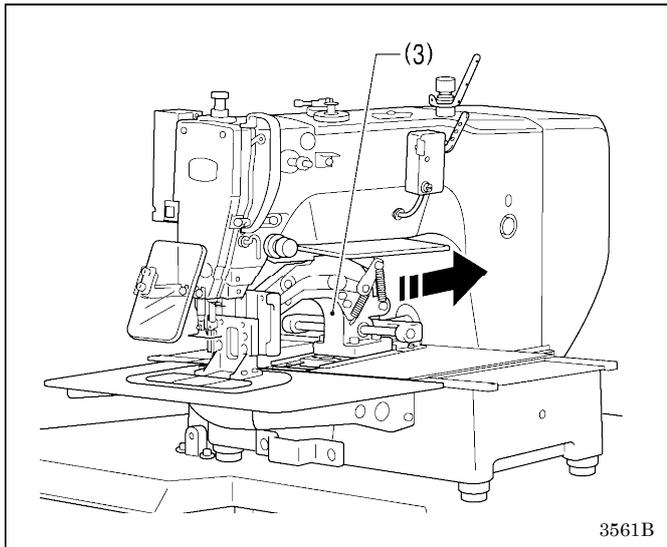
Loosen the two bolts (1), and then remove the feed plate (2).

NOTE:

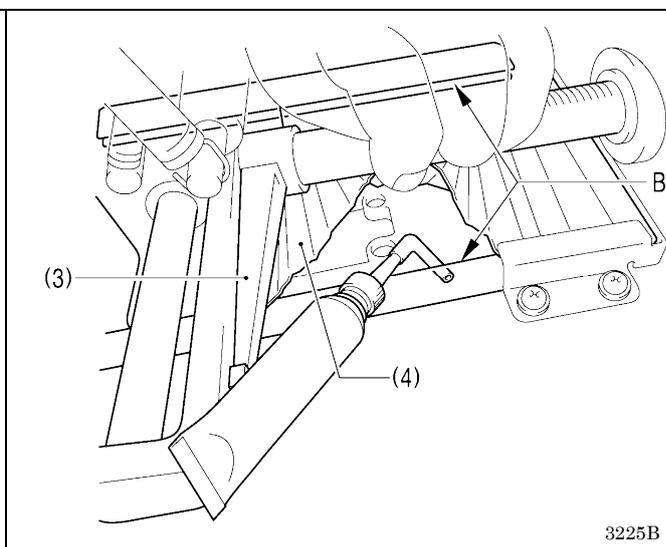
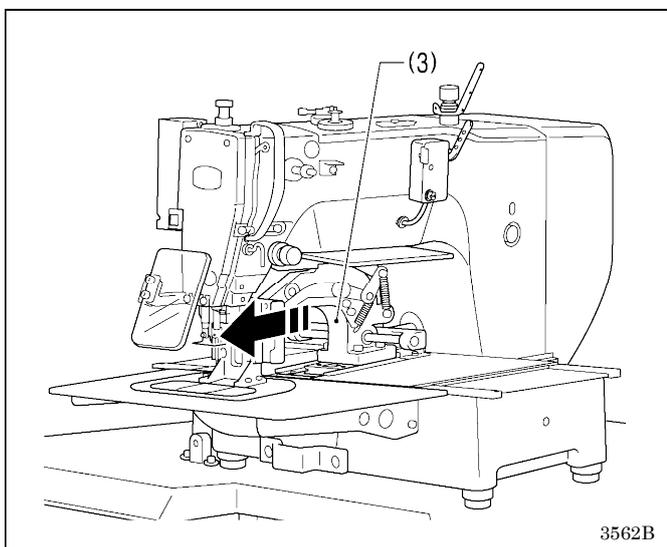
Never loosen or remove any bolts other than the bolts which are securing the feed plate (2).

6. CLEANING

3. Applying grease



Push the work clamp arm (3) all the way to the rear edge, and then apply grease to groove A.



Push the work clamp arm (3) all the way to the front edge, lift up the bellows (4), and then apply grease to groove B.

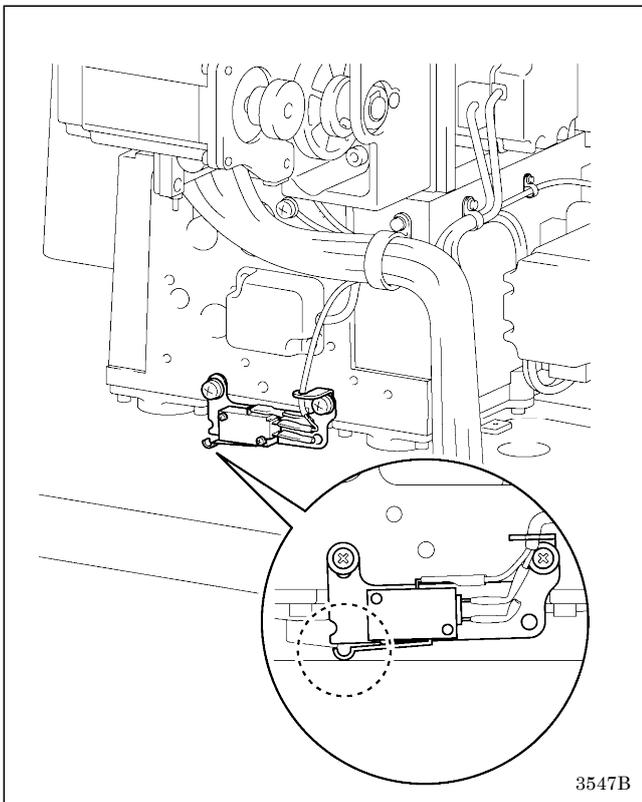
4. Install the feed plate. (Refer to “7-13. Installing the feed plate”.)

7. 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.

7-1. Checking the machine head switch

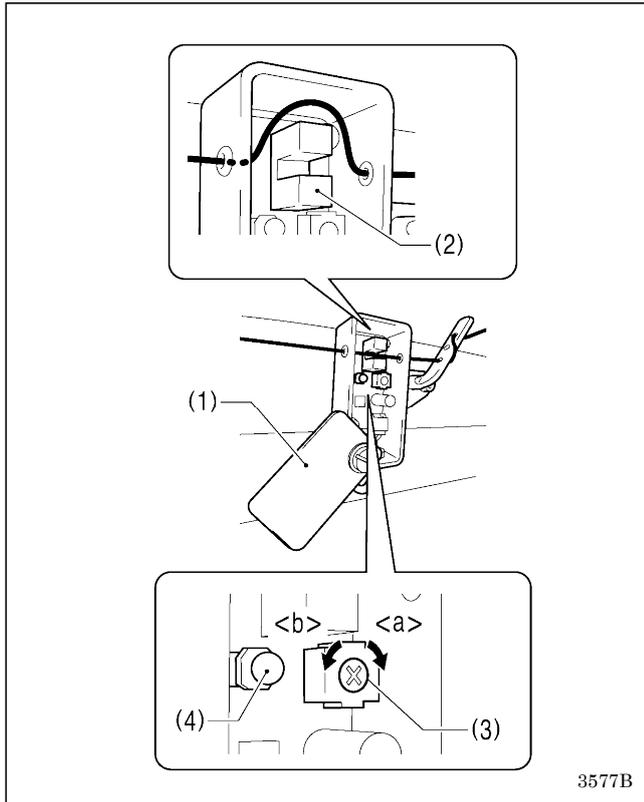


Check that the machine head switch is turned on as shown in the illustration.

NOTE:

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

7-2. Adjusting the sensitivity of the thread breakage sensor



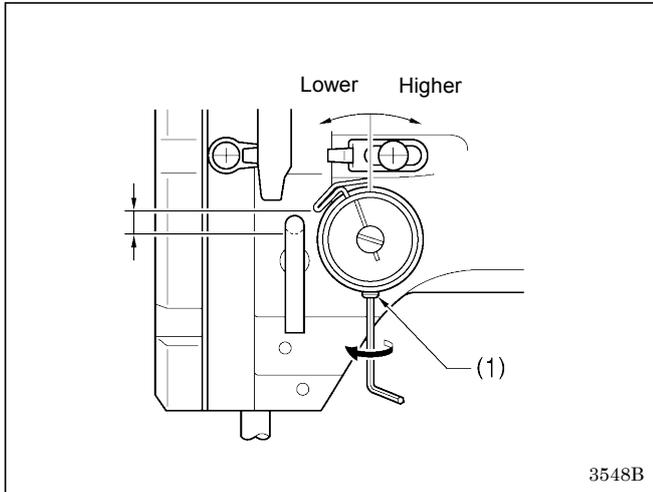
1. Open the cover (1) and remove the upper thread from the photo sensor (2).
2. Turn the control (3) to the right <a> until the LED (4) illuminates.
3. Turn the control (3) to the left until the LED (4) switches off.
4. Place the upper thread into the photo sensor (2), and close the cover (1).

NOTE:

- Thread breakages may be difficult to detect depending on the thickness of the thread and the type of material being sewn. In such cases, turn the control (3) to adjust the sensitivity, or change the number of stitches for judgment of an upper thread breakage.
- * Contact the place of purchase for information on changing the number of stitches for judgment of an upper thread breakage.
- If foreign objects get into the photo sensor (2), it will not be possible to detect thread breakages. Clean inside the photo sensor (2) to keep it free from dust and other foreign particles.
- If applying silicone to the thread, apply the silicone between the thread breakage detector and the thread take-up. If silicone is applied to the thread before it passes through the photo sensor (2), the sensor window inside the photo sensor (2) will become dirty and it will not be possible to detect thread breakages.

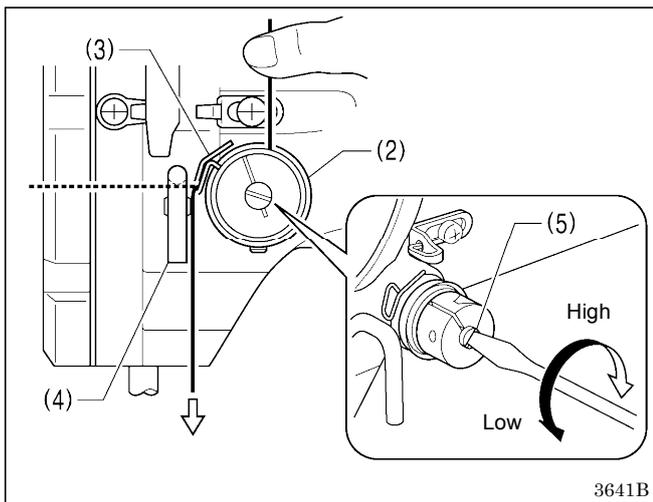
7-3. Thread take-up spring

Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07A)
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.



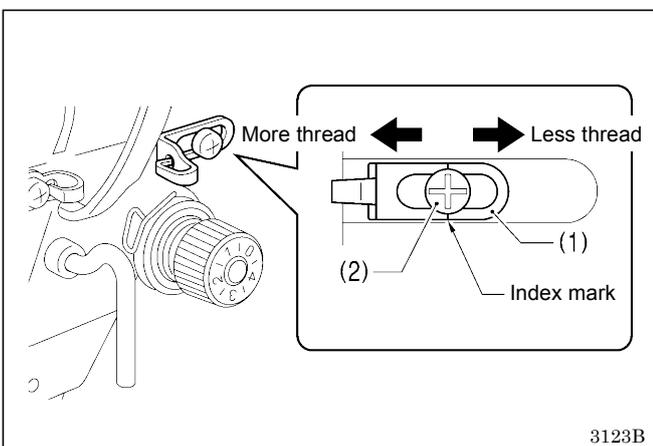
<Thread take-up spring tension>

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

NOTE:

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

7-4. Arm thread guide R



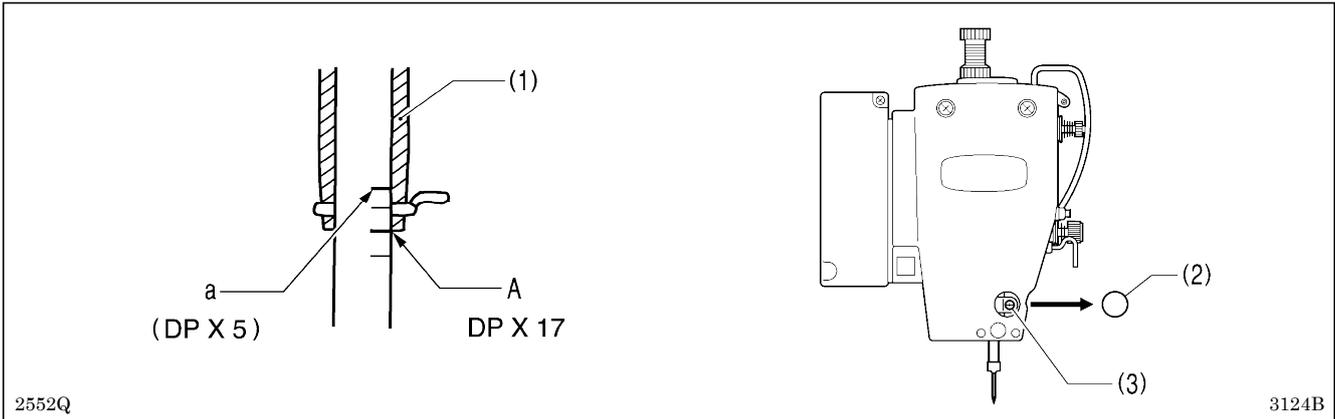
The standard position of arm thread guide R (1) is when the screw (2) is aligned with the index mark.

Loosen the screw (2) and move arm thread guide R (1) to adjust.

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

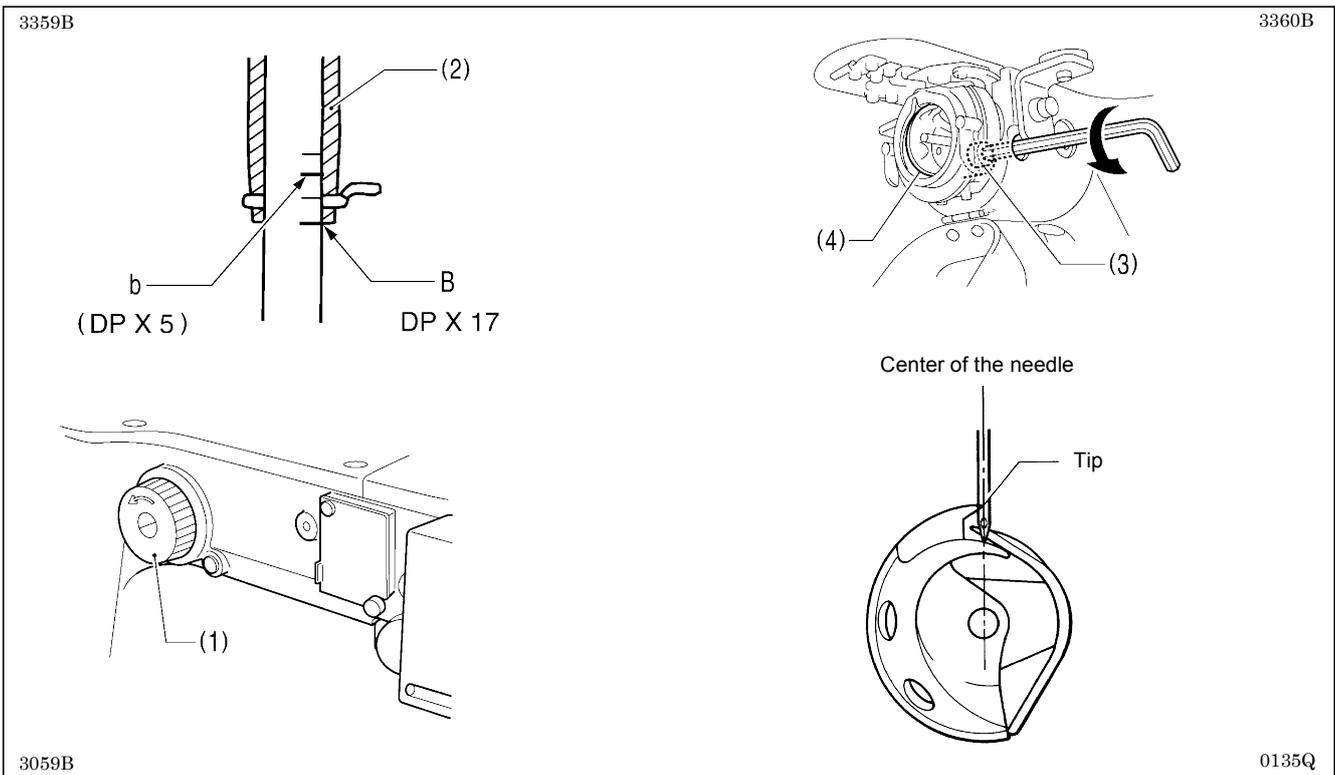
* When sewing light-weight material, move arm thread guide R (1) to the right. (The thread take-up amount will become smaller.)

7-5. Adjusting the needle bar height



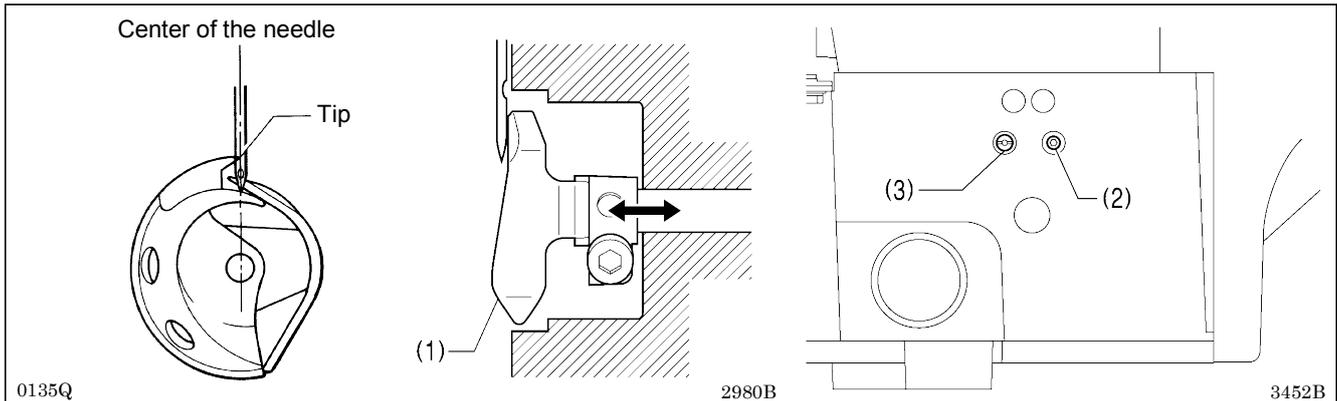
Turn the pulley in the direction of the arrow to move the needle bar to the lowest position. Then remove the rubber plug (2), loosen the screw (3) and then move the needle bar up or down to adjust so that the second reference line from the bottom of the needle bar (reference line A) is aligned with the lower edge of the needle bar bush (1).
 * If using a DP X 5 needle, align with the highest reference line (reference line a).

7-6. Adjusting the needle and rotary hook timing



1. Turn the pulley (1) 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 (2).
 * If using a DP X 5 needle, align with the reference line b which is the second reference line from the top.
2. Loosen the bolt (3).
3. Move the driver (4) sideways so that the tip of the rotary hook is aligned with the middle of the needle, and then tighten the bolt (3).

7-7. Adjusting the driver (needle guard) position



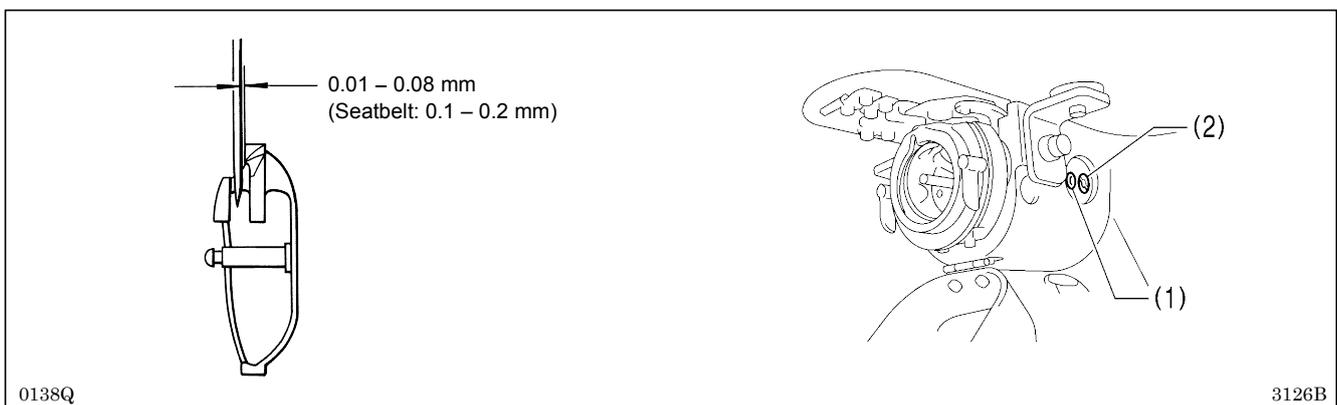
Turn the pulley in the direction of the arrow to align the tip of the rotary hook with the center of the needle, and then loosen the set screw (2) and adjust by moving the eccentric shaft (3) to adjust so that the driver (1) is touching the needle. The set screw (2) and the eccentric shaft (3) are on the right side of the bed at the rear.

NOTE:

If the driver (1) crosses the needle more than necessary, it will cause problems with the thread tension.

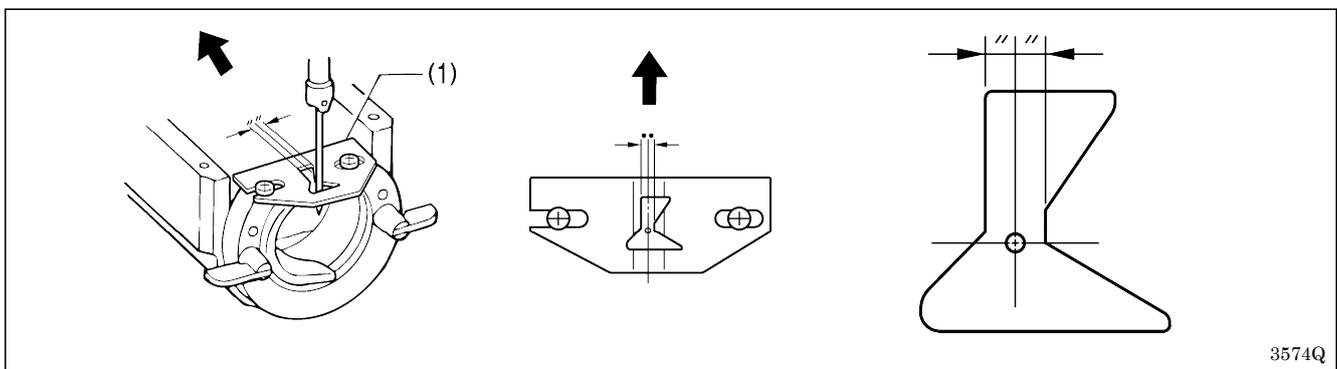
Furthermore, if it does not cross the needle at all, the tip of the rotary hook will interfere with the needle and skipped stitches may occur.

7-8. Adjusting the clearance between the needle and rotary hook tip



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 tip of the rotary hook is 0.01 to 0.08 mm.

7-9. Adjusting the shuttle race thread guide



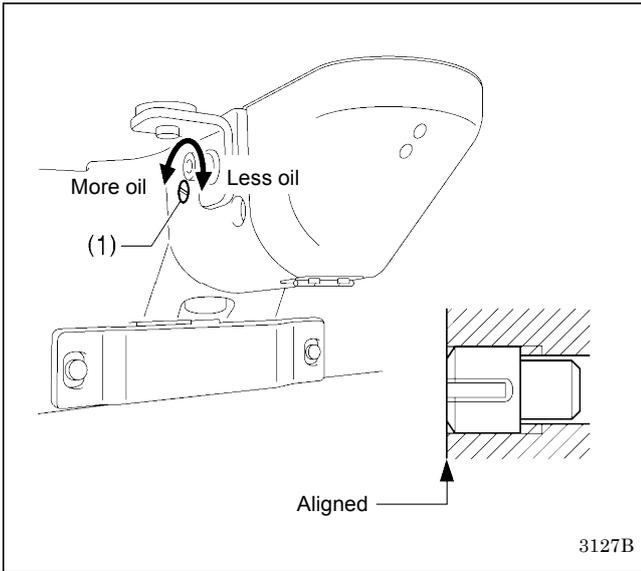
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

NOTE:

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

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

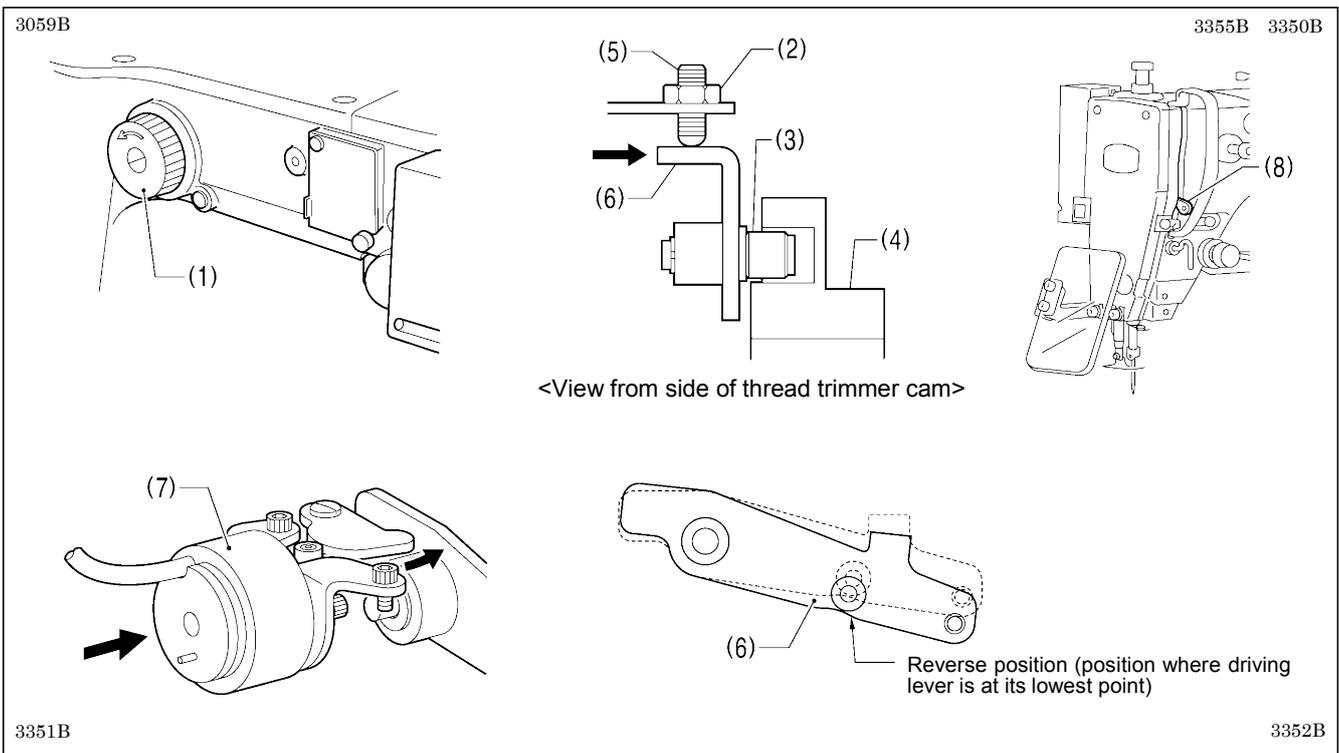
7-10. Rotary hook lubrication amount



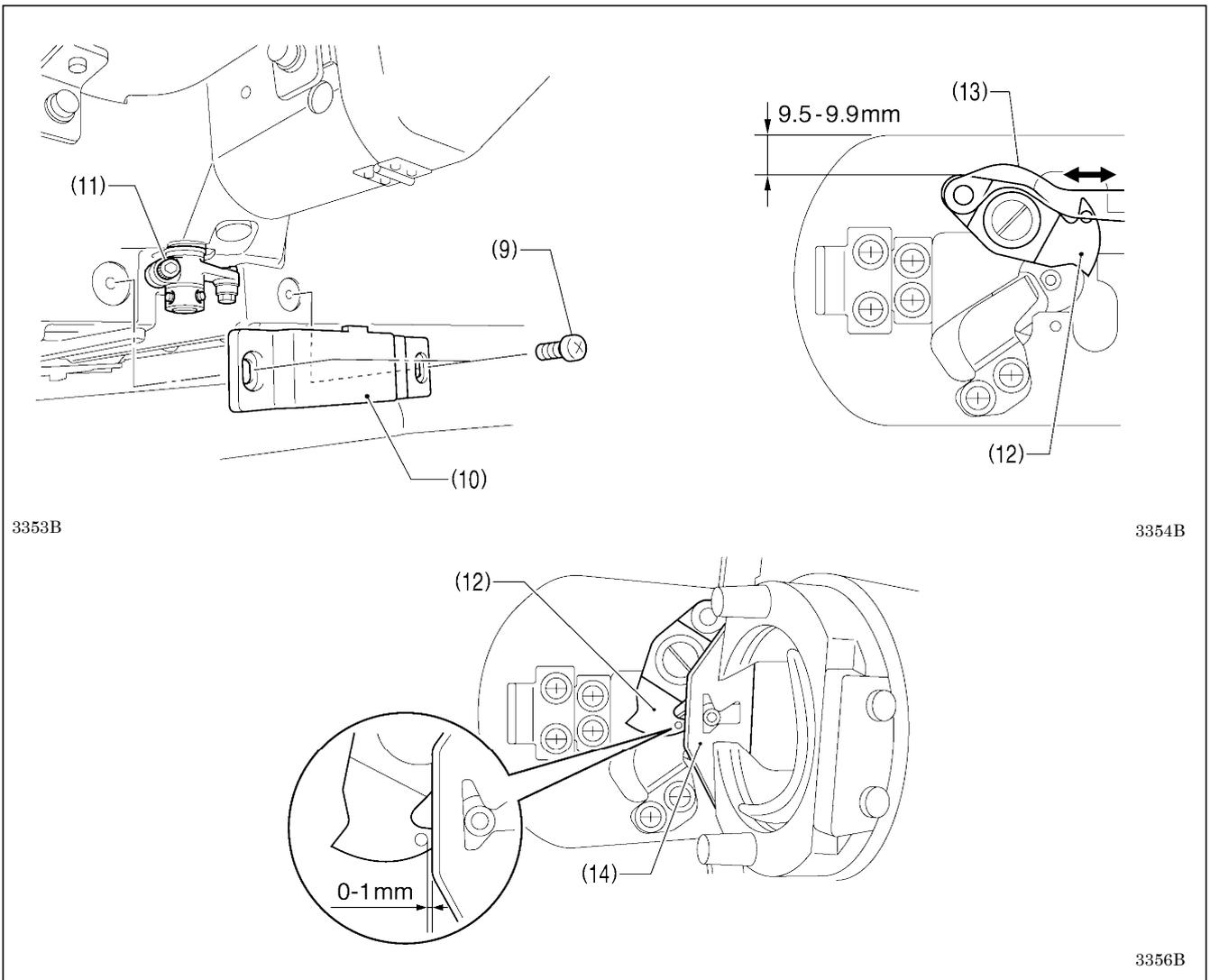
The optimum position is when the head of the set screw (1) is aligned with the edge of the bed. The rotary hook lubrication amount can be adjusted within three turns to the right from that position.

- 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.

7-11. Adjusting the position of the movable knife

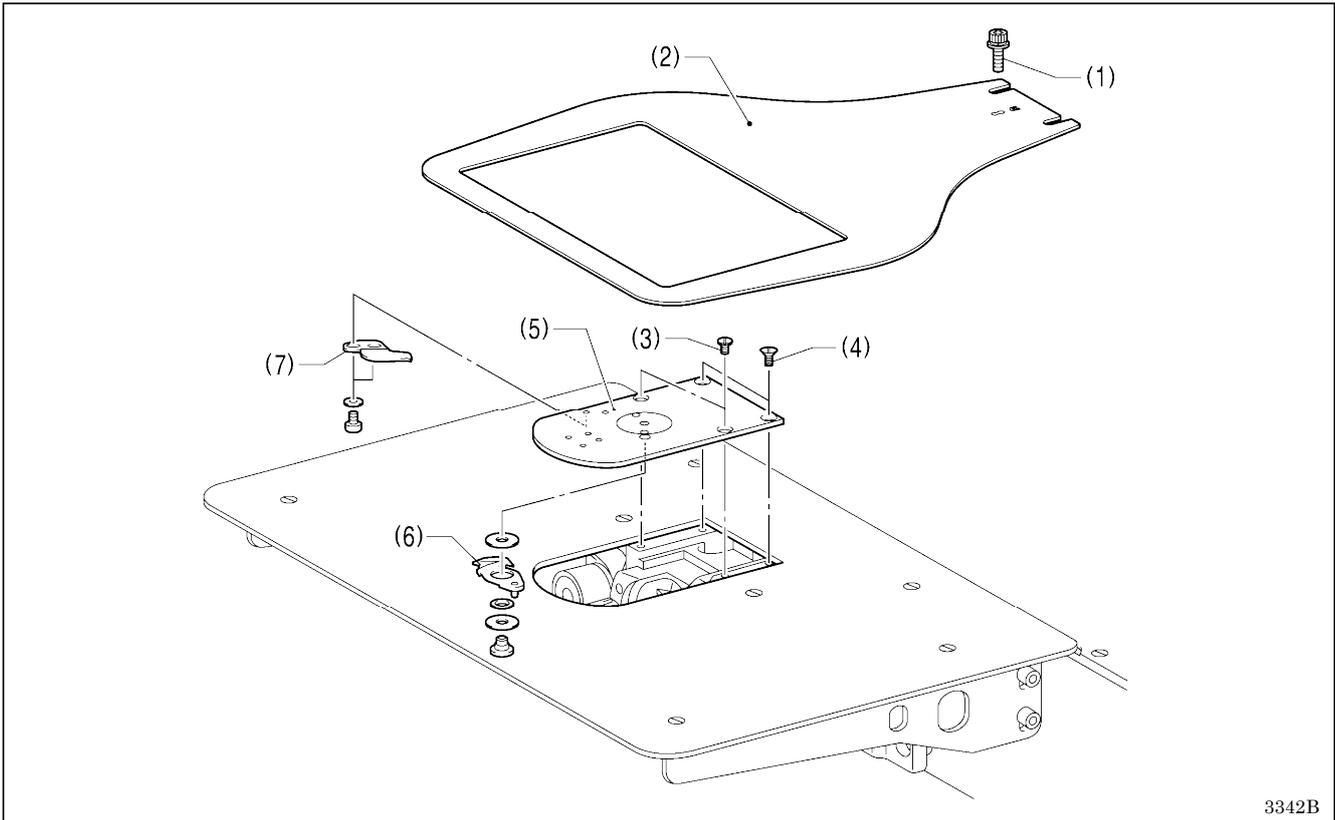


1. Open the top cover and tilt back the machine head.
2. Turn the pulley (1) by hand to move the needle bar to its lowest position.
3. Loosen the nut (2), tighten the set screw (5) until the collar (3) touches the inside of the groove in the thread trimmer cam (4), and then loosen the set screw (5) by approximately 1/4 of a turn.
4. Tighten the nut (2), 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 (6) by hand toward the thread trimmer cam (4) until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (6) returns smoothly to its original position when it is released.
5. 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 (7) as far as it will go.
6. 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 (6) to the reverse position and so that the driving lever (6) is at its lowest point (when the thread take-up (8) is close to its lowest position).



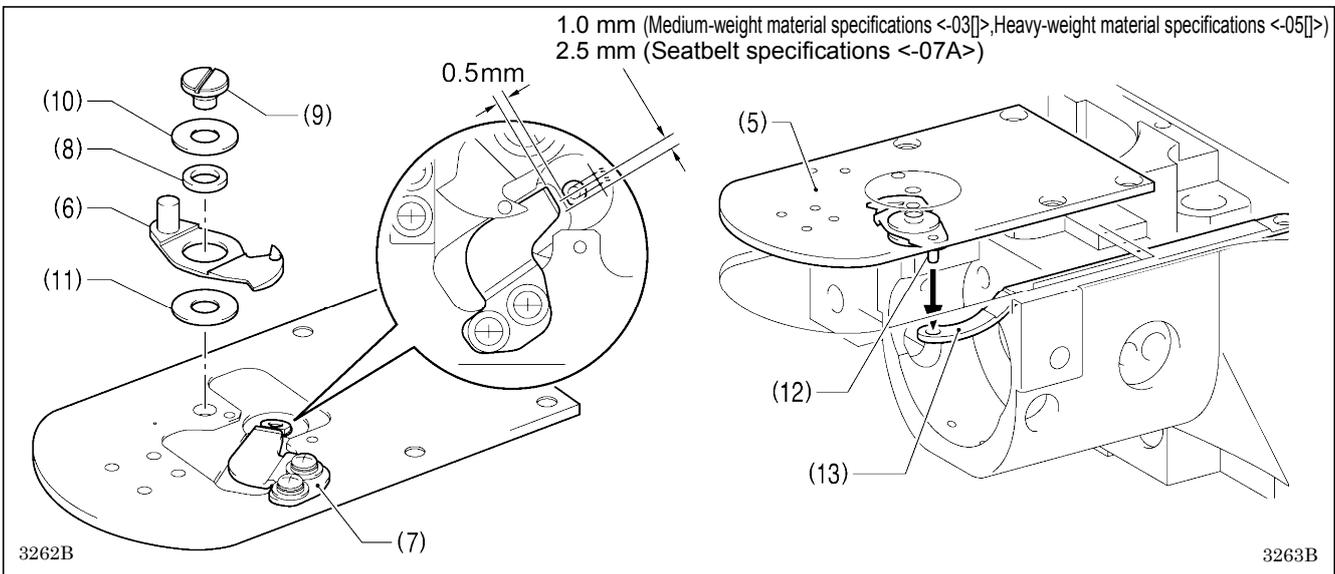
7. Loosen the two screws (9), and then remove the cover (10).
8. Loosen the bolt (11).
9. Move the movable knife connecting plate (13) back and forth to adjust so that the distance from the ridge on the right side of the needle plate to the ridge on the movable knife (12) is 9.5 to 9.9 mm.
10. After tightening the bolt (11), check the above position once more.
* Ignore the index mark on the needle plate.
11. Replace the cover (10).
12. Check that there is a gap of about 0 - 1 mm between the outside of the hole in the movable knife (12) and the ridge line on the shuttle race thread guide (14).

7-12. Replacing the movable and fixed knives



3342B

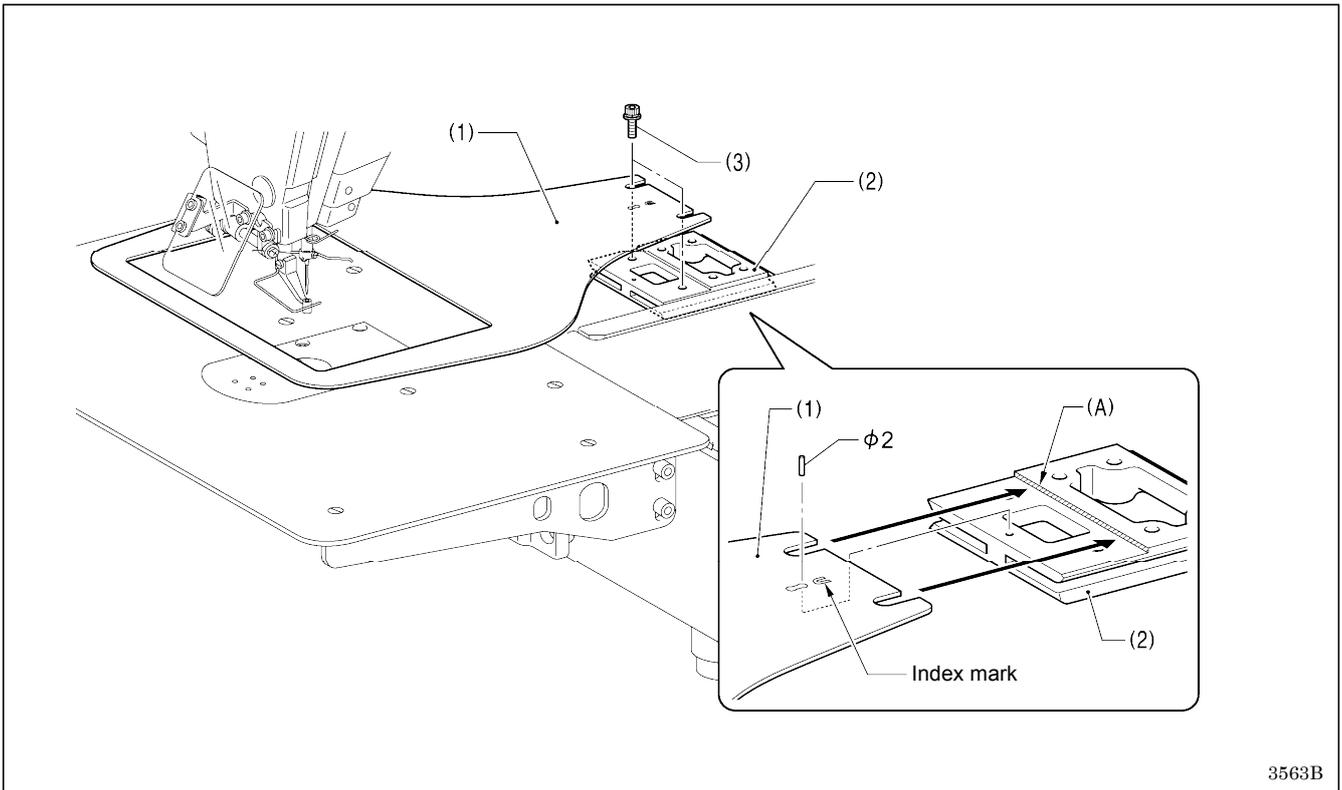
1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).



3263B

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.

7-13. Installing the feed plate



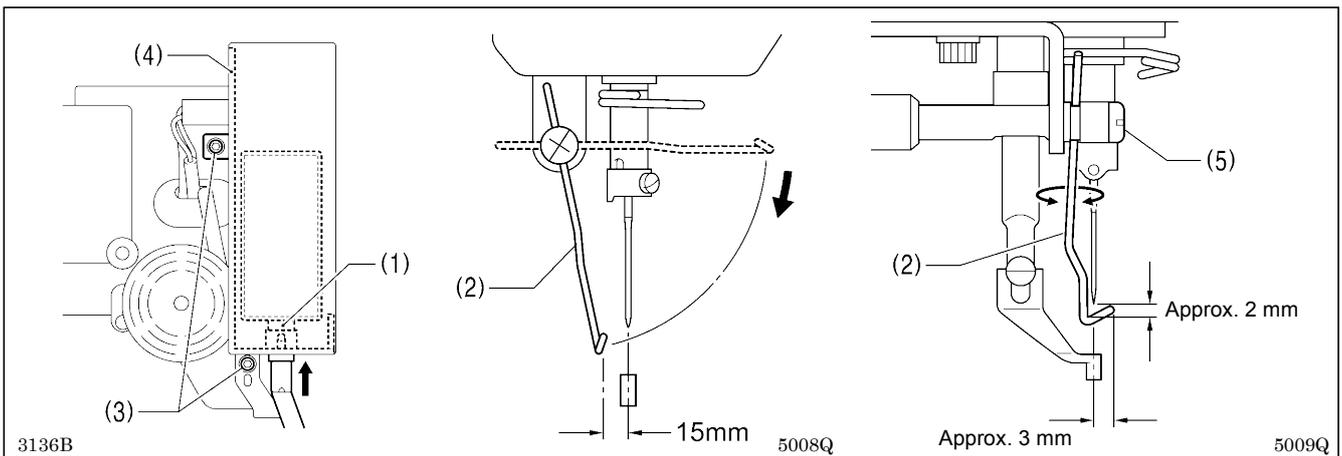
3563B

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 (A) of base plate Y (2) and use a 2 mm diameter pin (such as a DP needle) to align the hole in the feed plate (1) with the hole in base plate Y (2); then tighten the two bolts (3).

7-14. Adjusting the thread wiper



3136B

5008Q

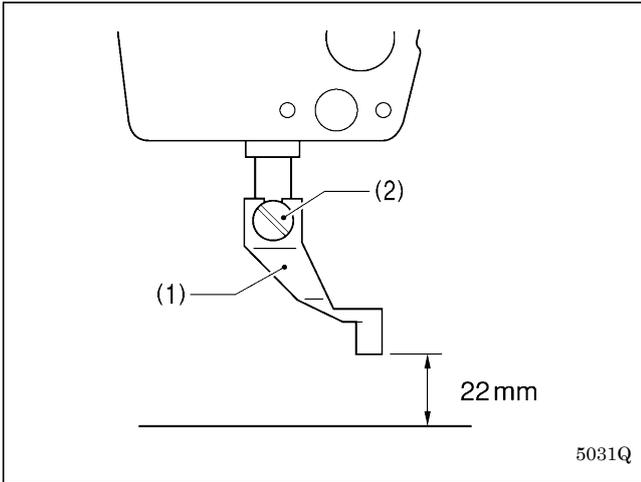
Approx. 3 mm

5009Q

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.

7-15. Intermittent presser foot installation position

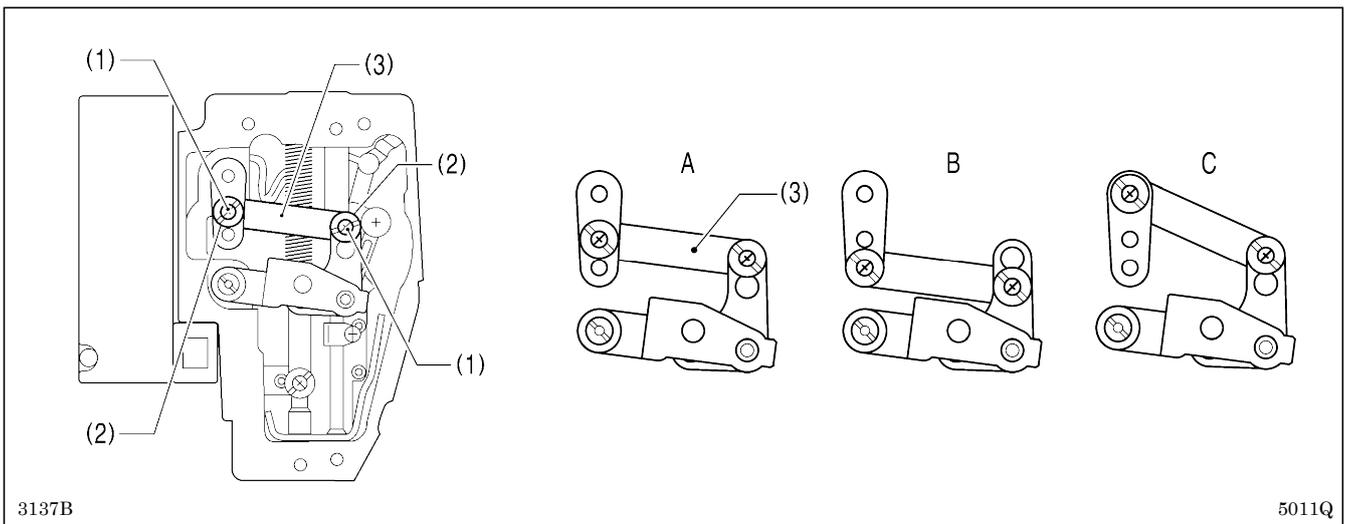


Install the intermittent presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot to the top of the needle plate is 22 mm when the sewing machine is stopped and the intermittent presser foot (1) is raised.

7-16. Adjusting the intermittent presser foot

The intermittent presser foot 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.

<Changing the installation position of stepping clamp link>

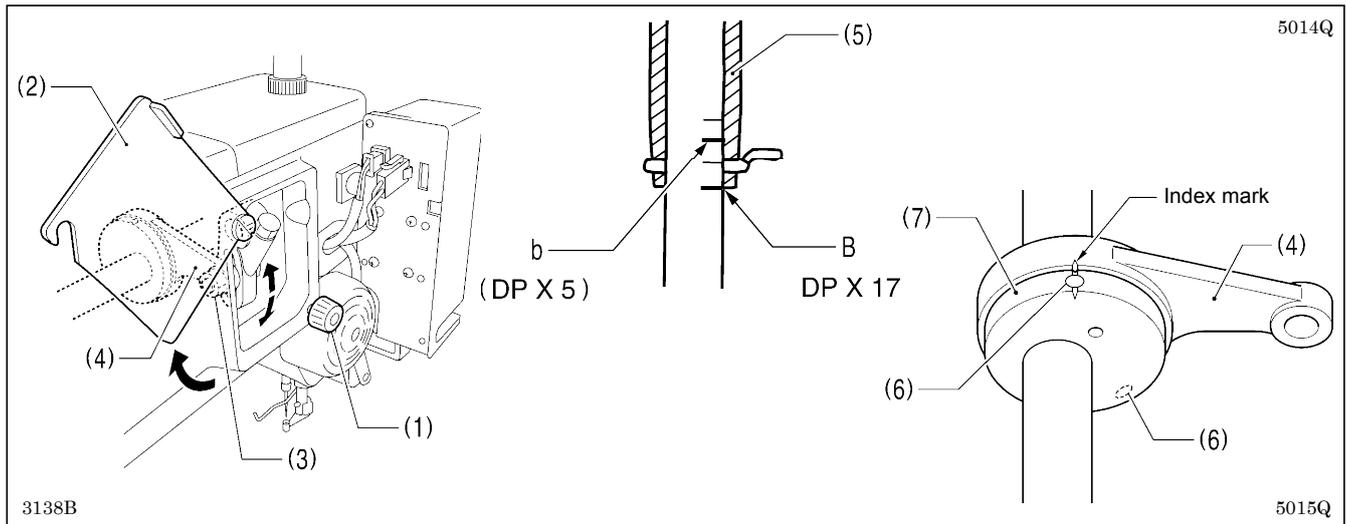


1. Remove the face plate.
2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link (3).
3. Change the installation position for stepping clamp link (3) to either A, B or C above.

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 presser foot stroke will as given in the following table.

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

<Stepping clamp connecting rod position adjustment>



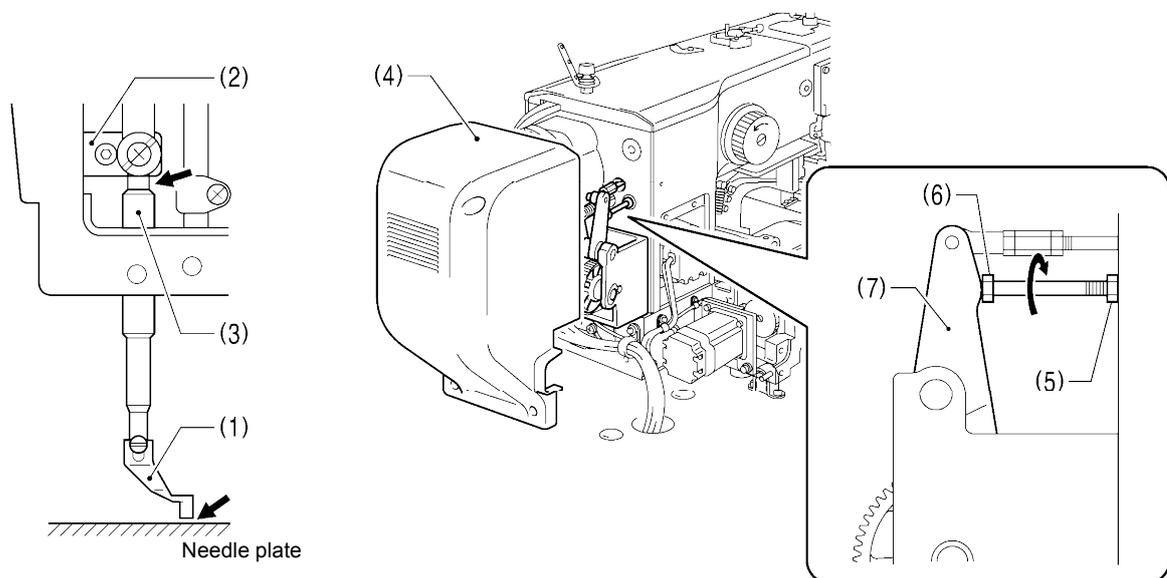
1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
 - When the stepping clamp connecting rod (4) is raised, the intermittent presser foot stroke will increase.
 - When the stepping clamp connecting rod (4)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

Next, adjust the needle bar and intermittent 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 of the stepping clamp cam (7) and the stepping clamp connecting rod (4), and then tighten the two set screws (6).

Check the following after changing the intermittent presser foot stroke.

3139B 3511B



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.

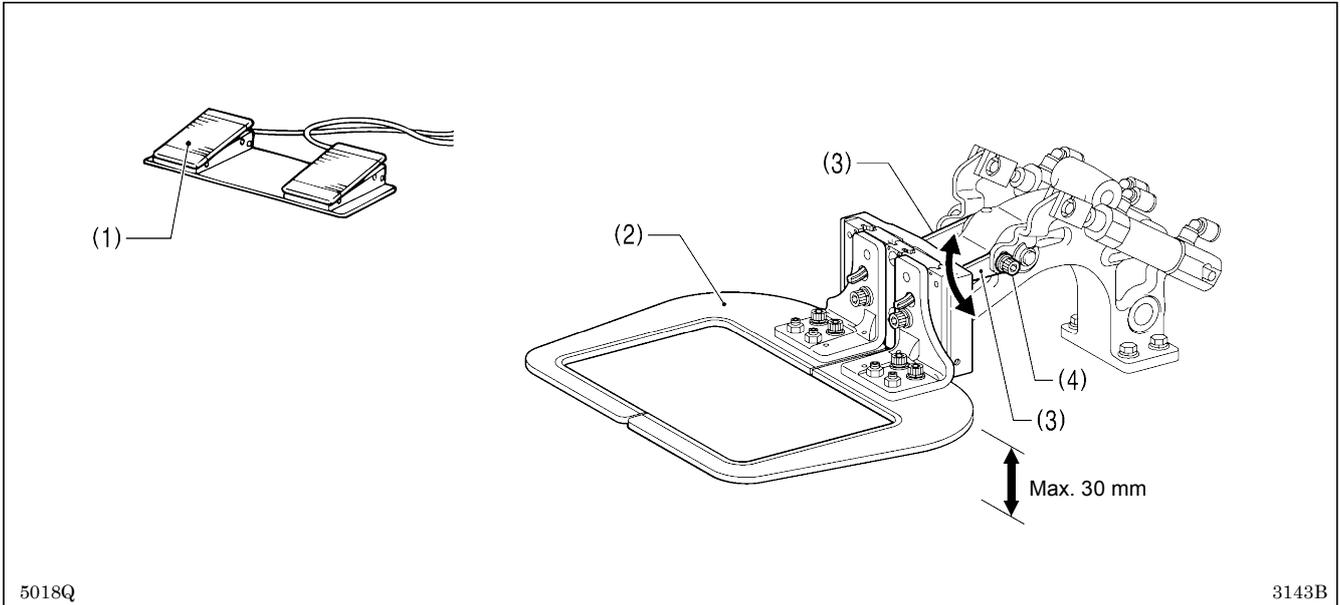
7-17. Adjusting the work clamp lift amount

<Motor-driven work clamp specifications>

The LCD panel settings can be used to adjust the height to within 15 – 25 mm. (Refer to "1-5. Setting the work clamp lift amount" in the "LCD Panel/Operation Panel" Instruction Manual.)

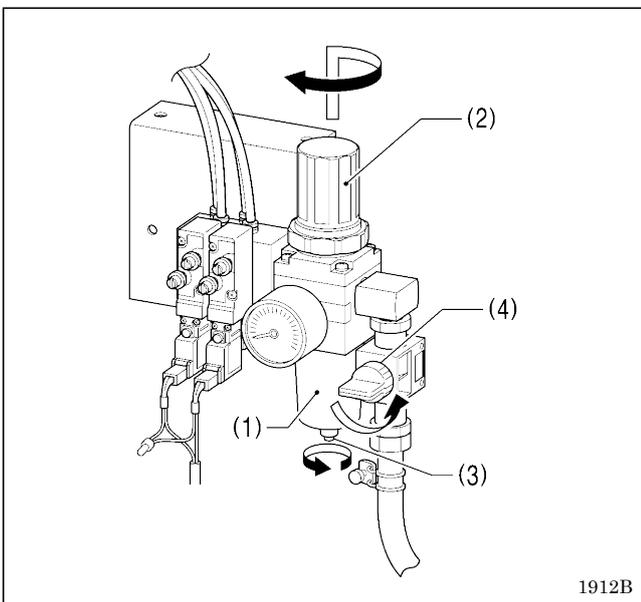
<Pneumatic work clamp specifications>

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.

7-18. Adjusting the air pressure



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

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

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.

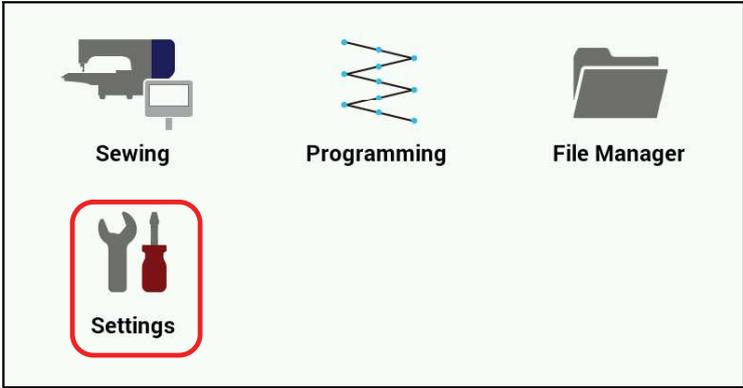
NOTE:

Open the air cock (4) slowly.

7-19. Setting method for standard depression strokes (foot switch)

The following procedure sets the operating positions for the treadle depression strokes to the standard values.

1 Signal setting entry



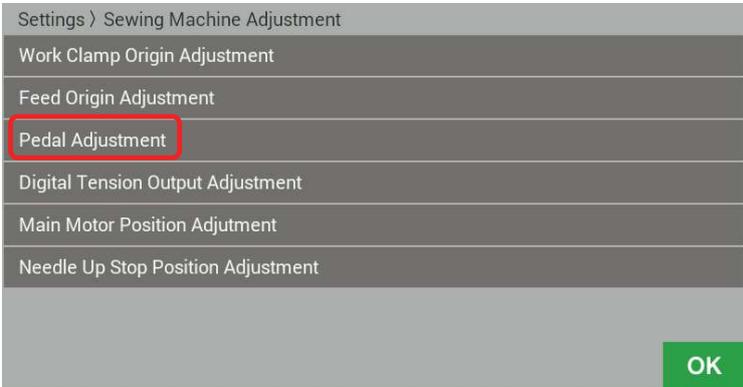
Sewing Programming File Manager

Settings



Settings

- Memory Switch
- Sewing Machine Adjustment**
- Sewing Machine Test
- Programmer
- Display
- Date and Time
- Language
- Sound



Settings > Sewing Machine Adjustment

- Work Clamp Origin Adjustment
- Feed Origin Adjustment
- Pedal Adjustment**
- Digital Tension Output Adjustment
- Main Motor Position Adjutment
- Needle Up Stop Position Adjustment

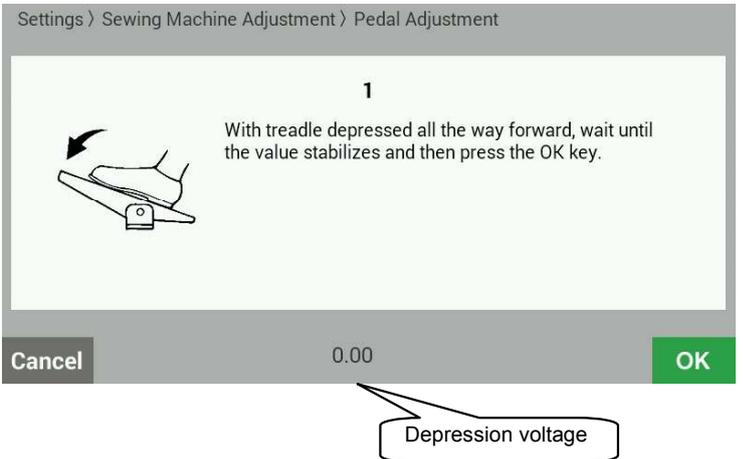
OK

If you touch the settings key on the home screen, the display will change to the setting menu screen.

If you select "Swing Machine Adjustment" from the setting menu screen, the display will change to the Sewing Machine Adjustment menu screen.

Select "Pedal Adjustment" from the Sewing Machine Adjustment menu screen.

2 Memorizing the maximum forward position



Settings > Sewing Machine Adjustment > Pedal Adjustment

1

With treadle depressed all the way forward, wait until the value stabilizes and then press the OK key.

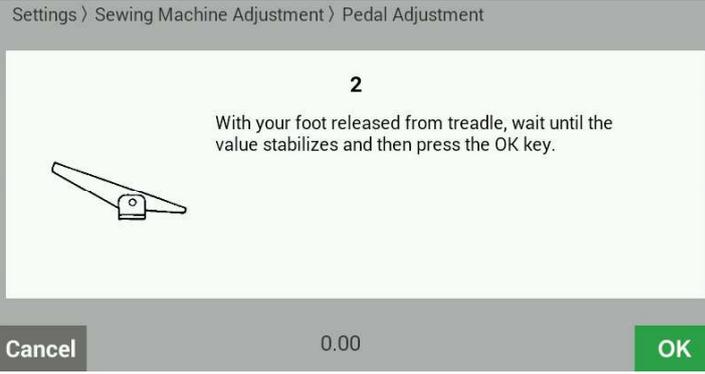
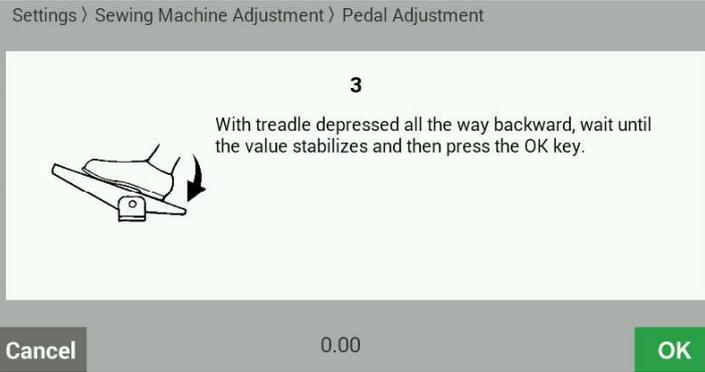
0.00

Cancel OK

Depression voltage

With the foot switch depressed all the way forward, wait until the depression voltage value stabilizes and then touch the OK key.

7. STANDARD ADJUSTMENTS

3	Memorizing the neutral position 	With your foot released from the foot switch, wait until the depression voltage value stabilizes and then touch the OK key.
4	Memorizing the maximum backward position 	With the foot switch depressed all the way backward, wait until the depression voltage value stabilizes and then touch the OK key.
5	Completion of setting 	A finished message will be displayed. NOTE: If the foot switch operation is not carried out correctly, an error will be displayed. If this happens, repeat the operation from step 2.
6	Turn off the power.	

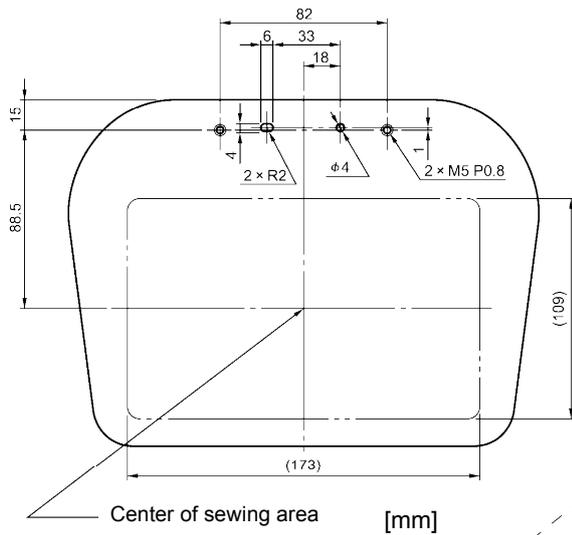
7-20. If processing the work clamps and the feed plate to a shape that matches the sewing pattern

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 (BAS-311HN: 150x100 mm, BAS-326H: 220x100 mm).

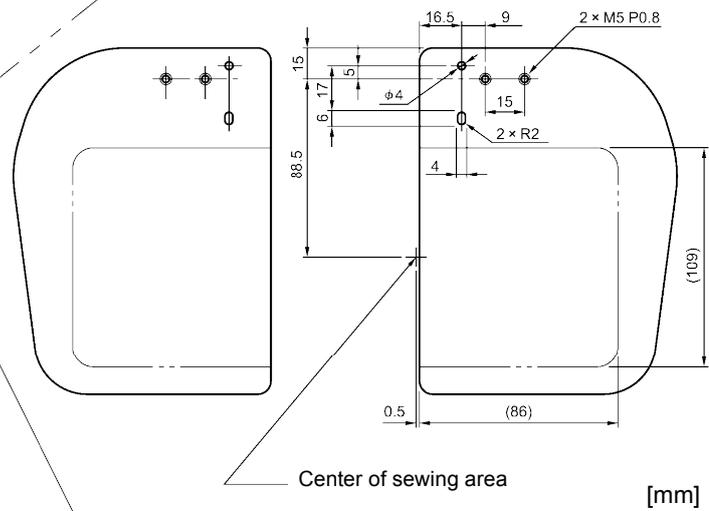
BAS-311HN

<Work clamp processing diagram>

Motor-driven work clamp specifications

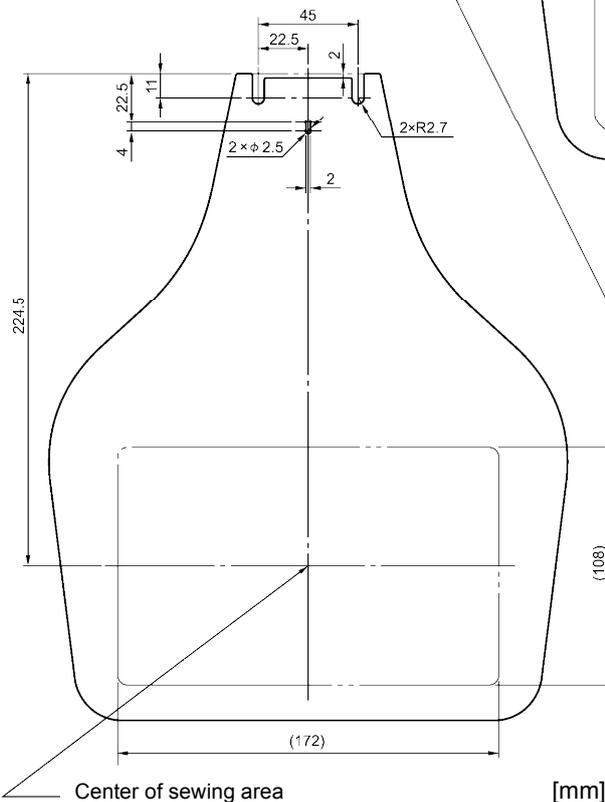


Pneumatic work clamp specifications
 The left and right work clamps are symmetrical.



<Feed plate processing diagram>

Recommended thickness 1.5 mm

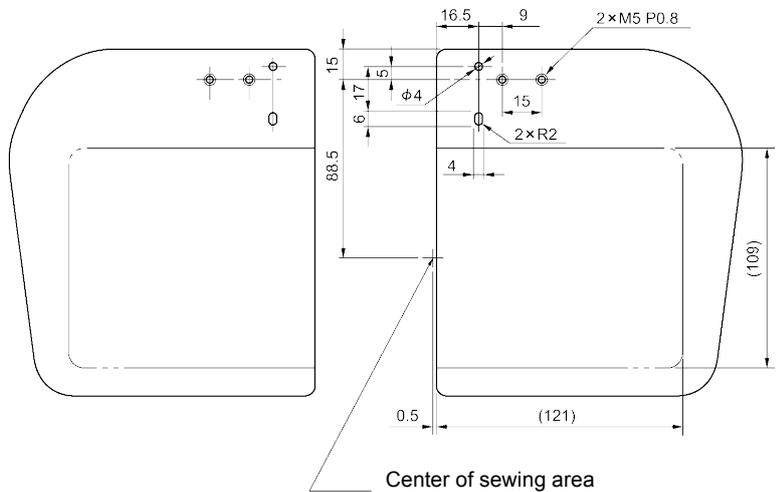


3159B

BAS-326H

<Work clamp processing diagram>

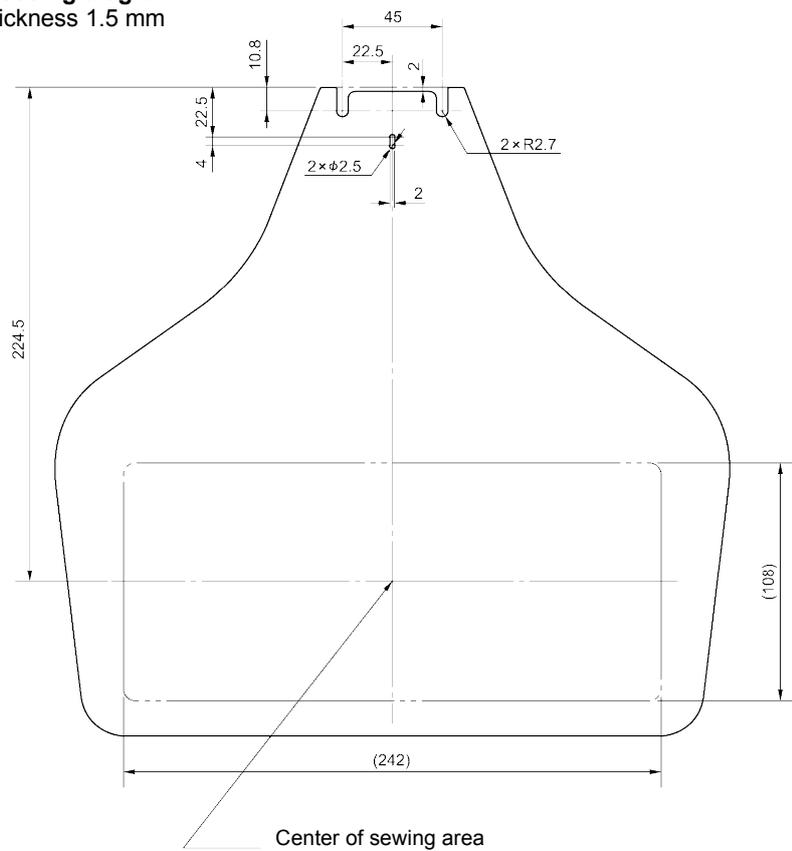
The left and right work clamps are symmetrical.



3513B

<Feed plate processing diagram>

Recommended thickness 1.5 mm



[mm]

3519B

8. 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 occurs with the sewing machine, a buzzer will sound and an error code will appear on the screen. Follow the remedy procedure to eliminate the cause of the problem.

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. You can touch the     keys on the LCD panel to move the feed in order to continue sewing.
E012	The STOP switch was pressed. Press the RESET key to clear the error, and then depress the start switch to move the feed mechanism to the home position.
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.
E020	The start switch was pressed without the work clamp being lowered. First lower the work clamp.
E025	Start switch was being depressed when power was turned on. (For a foot switch, the foot switch was being depressed to the 2nd step.) Release the switch. (For a foot switch, if E025 is not cleared even when the switch is released, readjust the depression stroke. Refer to P.49 - P.50.)
E035	Work clamp switch was being depressed when power was turned on. (For a foot switch, the foot switch was being depressed to the 1st step.) Release the switch. (For a foot switch, if E035 is not cleared even when the switch is released, readjust the depression stroke. Refer to P.49 - P.50.)
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.
E064	Touch panel was being touched when power was turned on. Release the touch panel.
E065	A key on the LCD panel was still being pressed when the power was turned on, or key is faulty. Release the key.

8. LIST OF ERROR CODES

Motor-related errors

Code	Cause of error and remedy
E110	The needle bar is not stopped in the needle up stop position. Turn the pulley until the point where the error display disappears.
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	Upper shaft 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 the 4-pin connector of the upper shaft motor on the 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 upper shaft 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 the 4-pin connector of the upper shaft motor on the motor P.C. board are properly inserted.
E133	Upper shaft 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 the 4-pin connector of the upper shaft motor on the motor P.C. board are properly inserted.
E150	Upper shaft motor is overheating, or temperature sensor is faulty. Turn off the power, and then check the upper shaft 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.
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.
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.
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.
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.
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.
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.
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.
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.
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.
E230	Feed motor stopped due to a problem. Reduce the sewing speed or change the operation settings to the settings for heavy-weight materials. Ask the place of purchase for details on the setting method.

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.
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.

8. LIST OF ERROR CODES

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 P10 on the programmer main P.C. board inside the LCD panel and the connector on the right side of the control box and connectors P2 and P3 on the motor P.C. board are properly connected.
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 P10 on the programmer main P.C. board inside the LCD panel and the connector on the right side of the control box and connectors P2 and P3 on the motor P.C. board are properly connected.
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 P10 on the programmer main P.C. board inside the LCD panel and the connector on the right side of the control box and connectors P2 and P3 on the motor P.C. board are properly connected.
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 P10 on the programmer main P.C. board inside the LCD panel and the connector on the right side of the control box and connectors P2 and P3 on the motor P.C. board are properly connected.
E420	No storage media is inserted. Press the RESET key to clear the error. Insert the storage media 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 storage media.
E422	Error occurred while reading from storage media. Check the data. Press the RESET key to clear the error. Check the data in the storage media.
E424	Insufficient space in storage media. Press the RESET key to clear the error. Use different storage media.
E425	Error occurred while writing to storage media. Check the storage media. The card may be write-protected. Press the RESET key to clear the error. Use the specified storage media.
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. * If you press the RESET key to clear the error, you can restart the machine using the backup data in the machine head memory.
E453	Problem with data in machine head memory. Turn off the power, and then turn it back on again.
E471	The program number is invalid or it has no corresponding data. Check that data for this program number is present in the internal memory.
E474	Internal memory is full and copying is not possible. Press the RESET key to clear the error. Clear the sewing data.

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. If an error occurs while reading or revising the sewing data, revise 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.
E520	Extended option output number already exists. Change the extended option output number. If not using the extended option output, initialize the data to clear the extended option output data.
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 connectors P9 and P36 on the main P.C. board are properly connected.
E670	Problem with the lower thread detector. Turn off the power, and then check the lower thread detector.

8. LIST OF ERROR CODES

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 upper shaft 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 upper shaft 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 the 4-pin connector of the upper shaft motor on the 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
E860	No main control program is present. Install the main control program.
E870	No panel control program is present. Install the panel 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.
E883	No control program is present in the storage media. Check that the control program has been saved into the correct folder.
E884	There is a problem with the control program. Write the correct file into the storage media.
E887~ E890	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.

9. 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 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. 10
		Adjust the position of the machine head switch.	P. 8 P. 37
		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. 48
	Air pressure is too weak.	Adjust the regulator so that the air pressure is about 0.5 MPa.	P. 48
	Speed controller has been tightened too far.	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.	*
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. 48
	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. 48
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. 45
		Adjust the operating stroke of the thread wiper.	P. 45
	Thread wiper position is incorrect.	Adjust the operating stroke of the thread wiper.	P. 45

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* Refer to the "LCD Panel/Operation Panel" Instruction Manual.

9. TROUBLESHOOTING

Problem	Cause	Remedy	Reference	
Lower thread winds to one side.	Height of bobbin winder tension assembly is incorrect.	Adjust the height of the bobbin winder tension assembly.	P. 26	
Lower thread winding amount is incorrect.	Bobbin presser position is incorrect.	Adjust the position of the bobbin presser.	P. 26	
Thread unraveling at sewing start.	Needle is too thick.	Select a needle that is suitable for the sewing conditions.	P. 28	
	Upper thread trailing length is too short.	When threading the thread through the needle, allow a distance of approximately 42 mm between the needle hole and the end of the thread.	P. 23	
		Adjust the sub-tension so that the upper thread trailing length after thread trimming is approximately 42 mm.	P. 29	
	Amount of lower thread being fed out from bobbin is too small.	Set the feeding amount to approximately 30 mm.	P. 27	
	Sewing start speed is too fast.	Adjust the sewing start speed.	*	
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. 28	
	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. 41	
	Clearance between needle and rotary hook tip is too large.	Adjust the needle clearance.	P. 41	
	Needle and rotary hook timing is incorrect.	Adjust the timing.	P. 40	
	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		
Process the work clamps and the feed plate into shapes that can hold the material near the seam.			P. 51 P. 52	
Adjust the intermittent height of the intermittent presser foot.			*	

(Continued on next page)

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. 28
	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. 23
	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 timing.	P. 40
	Upper thread tension is too strong.	Reduce the upper thread tension.	P. 29
	Thread take-up spring tension is too strong.	Reduce the tension of the thread take-up spring.	P. 39
	Thread breaks due to heat.	Use a needle cooler unit (optional). Reduce the sewing speed.	P. 23 *
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. 28
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. 28
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P. 41
		Adjust the needle clearance.	P. 41
	Needle and rotary hook timing is incorrect.	Adjust the timing.	P. 40
	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. 44
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P. 44
	Movable knife is not picking up the upper thread.	Adjust the timing.	P. 40
		Adjust the standby position of the movable knife.	P. 42 P. 43
	Movable knife is not picking up the needle thread because the last stitch is being skipped.	Refer to "Skipped stitches occur".	P. 60
Lower thread is not cut.	Lower thread tension is too weak.	Increase the lower thread tension.	P. 28

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9. TROUBLESHOOTING

Problem	Cause	Remedy	Reference
Upper thread is not tight.  0573M	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	P. 28
	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 presser foot is too small.	Replace the intermittent presser foot 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. 28
	Upper thread tension is too weak.	Increase the upper thread tension. *Adjust the upper thread tension after adjusting the lower thread tension.	P. 29
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P. 39
	Feed timing is too fast.	Retard the feed timing.	
	Intermittent height of intermittent presser foot is too low.	Adjust the intermittent height of the intermittent presser foot.	*
	Needle and rotary hook tip are touching.	Adjust the driver needle guard. Adjust the needle clearance.	P. 41 P. 41
Lower thread is not tight.  0574M	Lower thread tension is too weak.	Increase the lower thread tension.	P. 28
Upper thread tension is too strong.	Reduce the upper thread tension. *Adjust the upper thread tension after adjusting the lower thread tension.	P. 29	
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 42 mm.	P. 29
Upper thread trailing length is irregular.	Movable knife is blunt.	Replace the movable knife with a new one.	P. 44
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P. 44
	Sub-tension is too weak.	Adjust the sub-tension.	P. 29
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P. 39
Pattern is distorted.	Work clamp and feed plate are too heavy.	If using a heavy work clamp and feed plate, change the operation settings to the settings for heavy-weight materials. Ask the place of purchase for details on the setting method.	