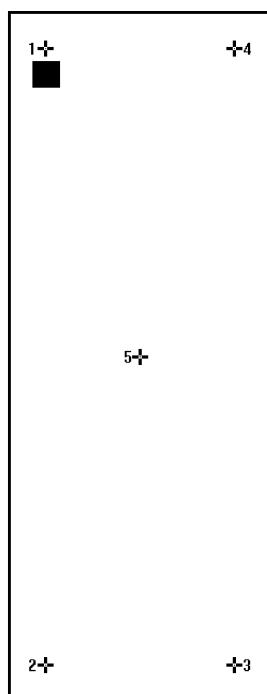


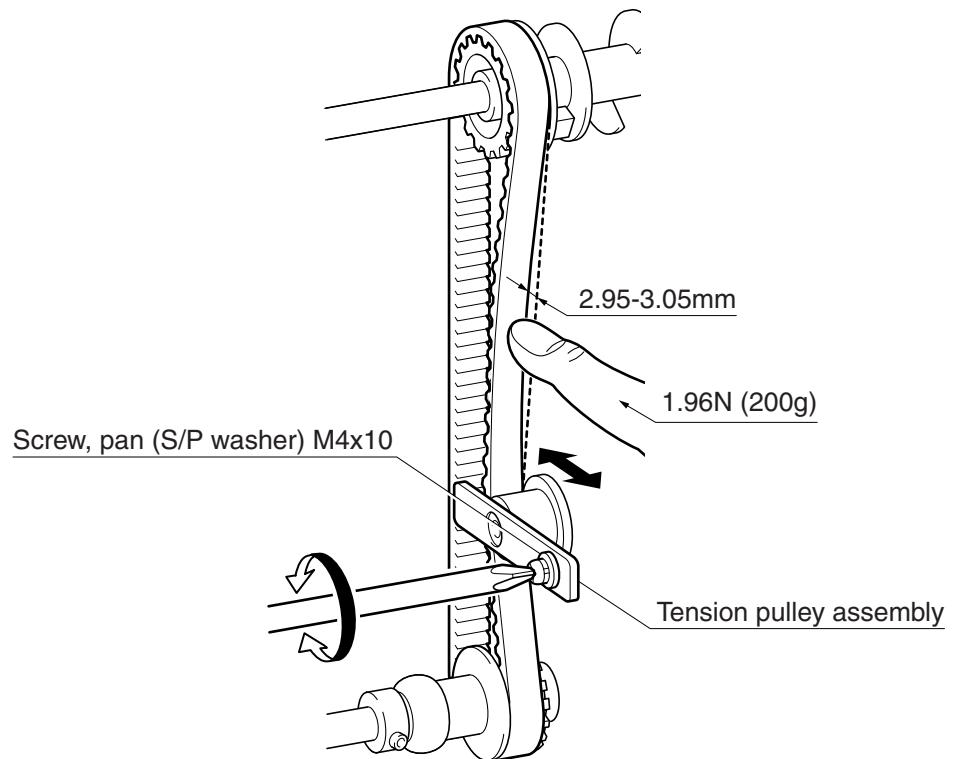
4 Adjustment

Adjustment (Main Unit)	Touch panel adjustment.....	4 - 2
	Timing belt tension adjustment	4 - 3
	Motor belt tension adjustment.....	4 - 4
	Upper shaft rotation shutter angle adjustment .	4 - 5
	Needle bar rising adjustment	4 - 6
	Needle bar height adjustment	4 - 7
	Clearance between needle and rotary hook point adjustment	4 - 8
	Three point needle drop adjustment	4 - 9
	Needle clearance left/right adjustment..	4 - 10
	Presser bar height and parallelism adjustment	4 - 11
	Needle and presser front/back position adjustment .	4 - 12
	Fine tension adjustment.....	4 - 13
	Upper thread tension adjustment.....	4 - 14
	Shuttle adjustment	4 - 15
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	Inner rotary hook tension adjustment....	4 - 17
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	Knee lifter position adjustment.....	4 - 22
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Adjustment (Modules)	Needle threader adjustment.....	4 - 27
	Feed dog height and squareness adjustment.	4 - 28
	Inner rotary hook bracket position adjustment.	4 - 29
	Front/back and left/right position of feed dog adjustment.	4 - 30

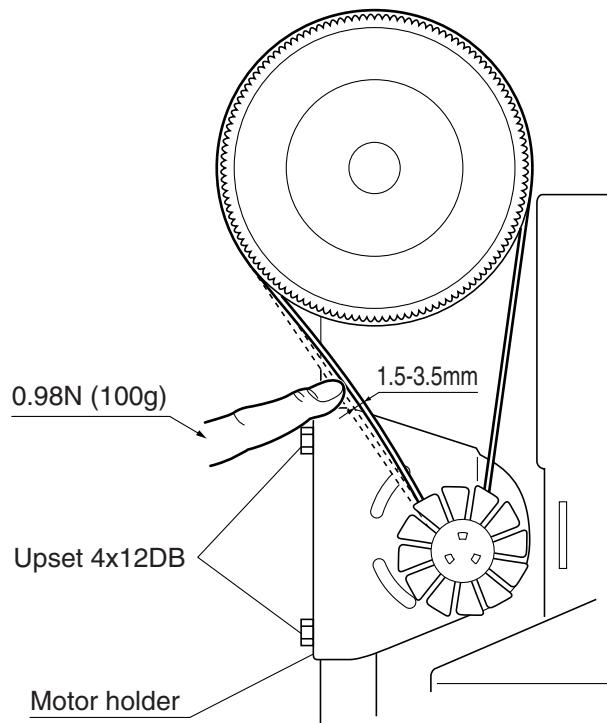
1. Turn the power on while holding down the [Start/Stop], [Reverse stitch], and [Needle position] buttons.
 2. Touch the positions marked with crosses (+) on the touch panel in order from 1 to 5.
- NOTE**
- Setting is successful if a single beep sounds when "5" is pressed.
 - An error has occurred if two beeps sound when "5" is pressed. Repeat from position 1 again.
3. Turn the power off and then on again. Check that the screen display matches the positions on the touch panel.



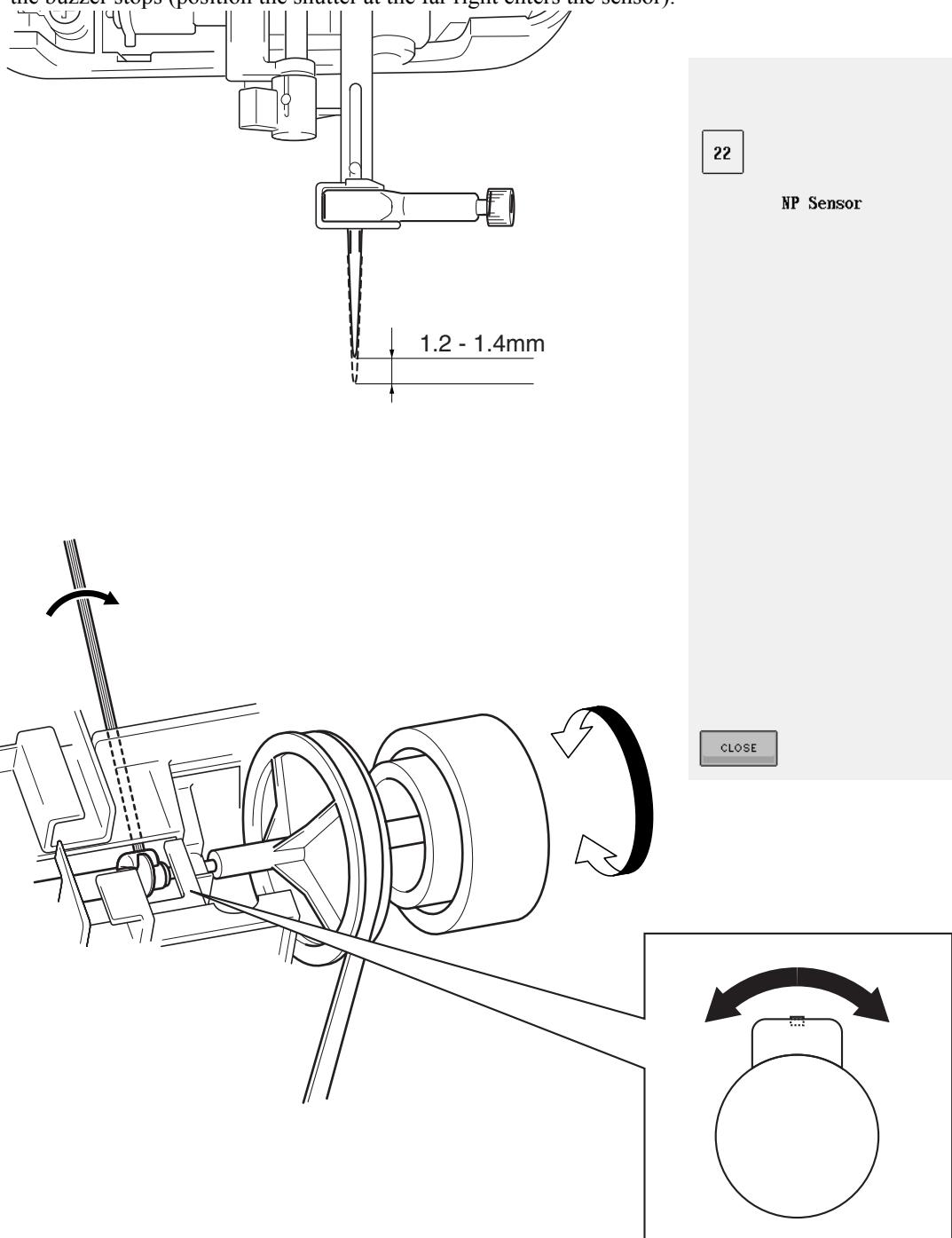
1. Loosen the pan head screw (S/P washer, M4X10) securing the tension pulley assembly.
2. Adjust the position of the tension pulley so that the belt deflects 2.95 to 3.05 mm when a force of 1.96N (200g) is applied to the center of the belt.
3. Tighten the pan head screw (S/P washer, M4X10) to secure the tension pulley assembly.



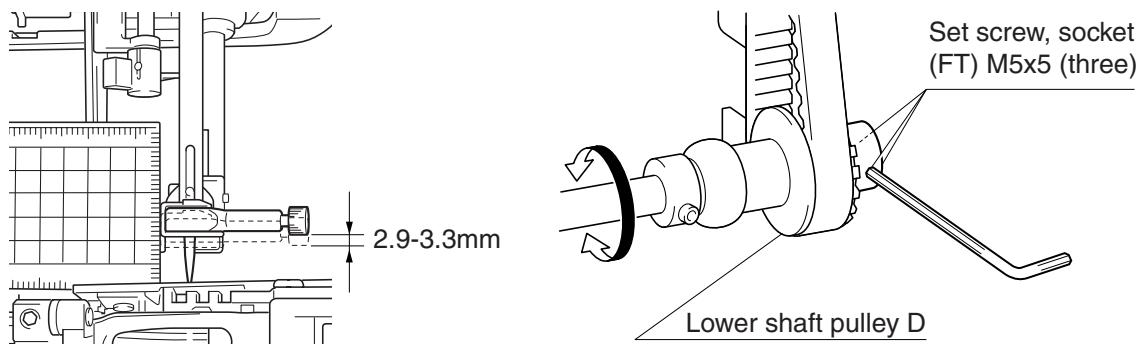
1. Loosen the screw securing the motor holder.
2. Adjust the position of the motor holder so that the belt deflects 1.5 to 3.5 mm when a force of 0.98N (100g) is applied to the center of the belt.
3. Tighten the screw to secure the motor holder.



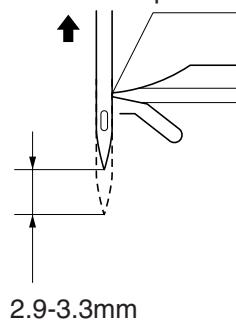
1. Start the test mode.
2. Select test mode "22". (NP sensor mode)
3. Turn the pulley to raise the needle bar to the limit.
4. Loosen the screws securing the upper shaft rotation shutter.
5. Turn the pulley to lower the needle bar $1.3\text{mm} \pm 0.1\text{mm}$
6. Rotate the upper shaft rotation shutter in the shaft rotation direction, and secure the rotation shutter at the position the buzzer stops (position the shutter at the far right enters the sensor).



1. Remove the front cover, and turn the power on while pressing [SW3] and [SW4] on the main PCB assembly.
2. Press [SW4] four times (select test mode "4" and then "" when the front cover is attached) to move the needle bar to the left base line.
3. Turn the power off.
4. Remove the 2 flat screws (M4), and then remove needle plate A from the feed base.
5. Turn the pulley by hand to lower the needle bar to the limit.
6. Loosen the 3 socket set screws (FT, M5X5) securing the lower shaft pulley D.
7. Move the lower shaft pulley D and the lower shaft A assembly so that the right edge of the needle is aligned with the tip of the outer rotary hook when the needle bar is raised 2.9 to 3.3 mm from the reference line of the lowest point. (Set a ruler on the left side and measure the distance.)
8. Tighten the 3 socket set screws (FT, M5X5) to secure the lower shaft pulley D.



The right edge of the needle and the tip coincide at a point 2.9-3.3mm above the lowest point for the needle.

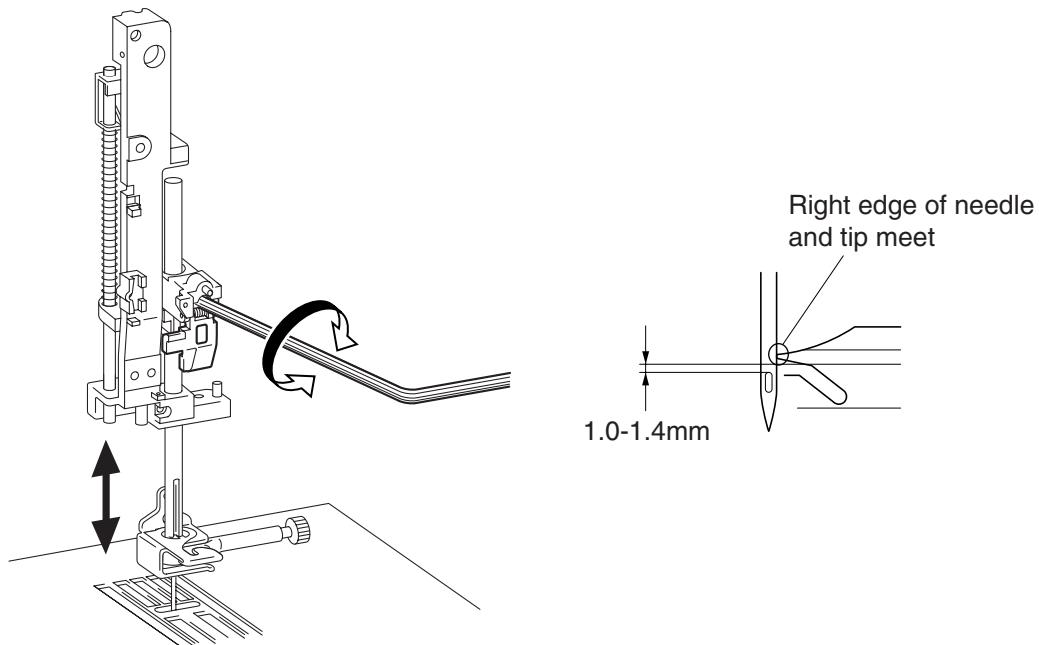


1. Remove the front cover, and turn the power on while pressing [SW3] and [SW4] on the main PCB assembly.
2. Press [SW4] four times (select test mode "4" and then "" when the front cover is attached) to move the needle bar to the left base line.
3. Turn the power off.
4. Remove the 2 flat screws (M4), and then remove needle plate A from the feed base.
5. Turn the pulley by hand until the right edge of the needle is aligned with the tip of the outer rotary hook.
6. Loosen the socket set screw (CP, M4X4) securing the needle bar block.
7. Adjust the height of the needle bar so that the clearance between the top of the needle hole and the lower edge of the outer rotary hook tip is 1.0 to 1.4 mm.

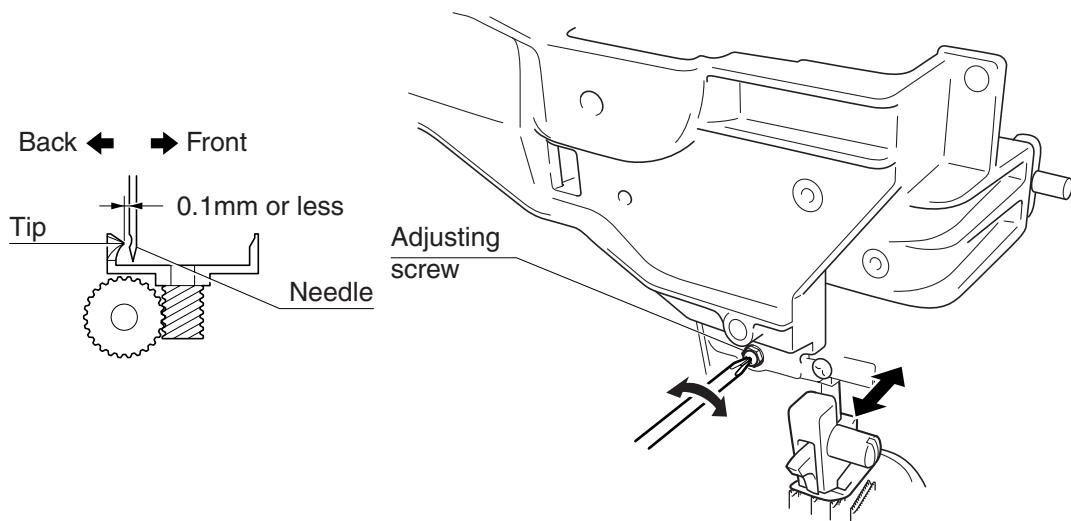
NOTE

- Make sure the needle block is straight.

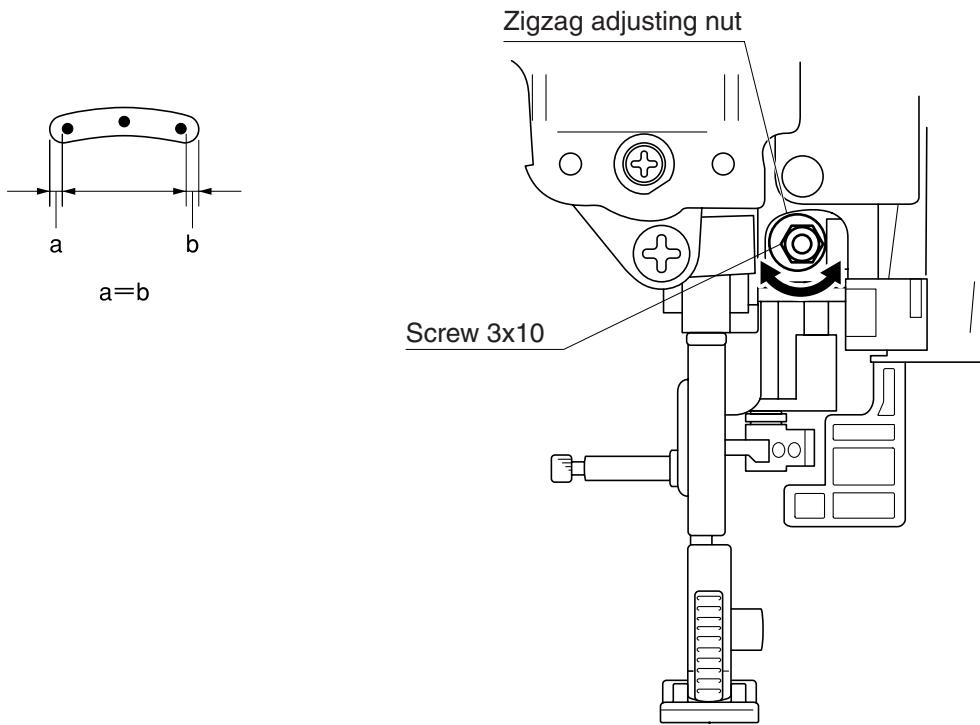
8. Adjust the needle threader.
9. Attach needle plate A to the feed base with 2 M4 screws.



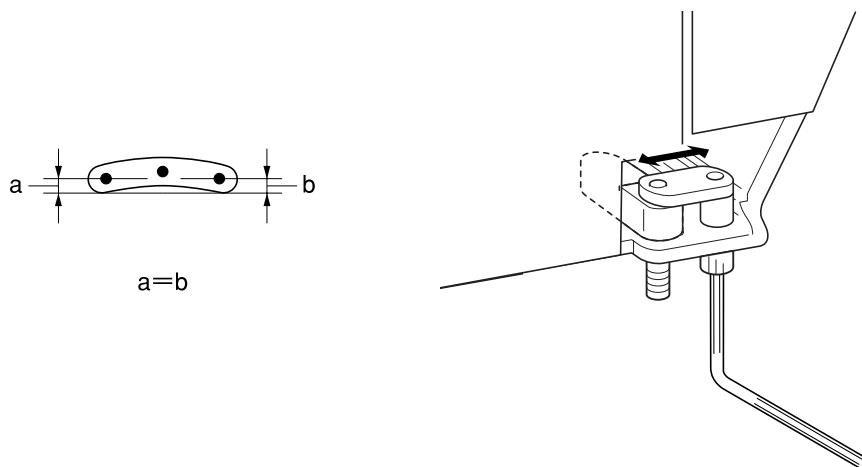
1. Remove the front cover, and turn the power on while pressing [SW3] and [SW4] on the main PCB assembly.
2. Press [SW4] four times (select test mode "4" and then "" when the front cover is attached) to move the needle bar to the left base line.
3. Turn the power off.
4. Remove the 2 flat screws (M4), and then remove needle plate A from the feed base.
5. Loosen the screw (M3X20).
6. Turn the pulley by hand until the right edge of the needle is aligned with the tip of the outer rotary hook.
7. Adjust the clearance between the needle and the outer rotary hook (front and back) to 0.1 mm or less using the adjusting screw.
8. Tighten the screw (M3X20).



1. Remove the front cover, and turn the power on while pressing [SW3] and [SW4] on the main PCB assembly.
2. Press [SW4] (select test mode "4" when the front cover is attached).
3. Turn the pulley by hand until the tip of the needle enters the needle hole.
4. Loosen the socket bolt (M3X10) of the zigzag adjusting nut.
5. Adjust the zigzag adjusting nut so that the needle drop is centered over the needle hole on needle plate A at the left base line, center base line, and right base line.
6. Tighten the socket bolt (M3X10).



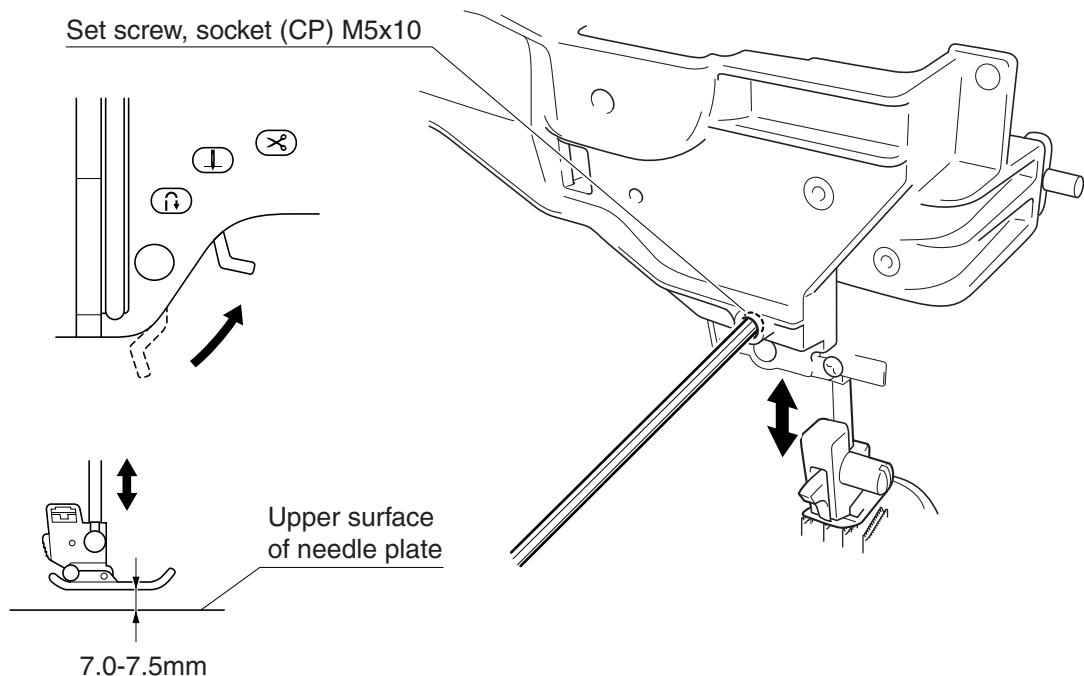
1. Turn the pulley by hand until the tip of the needle enters the needle hole.
2. Loosen the screw (3X10).
3. Move the needle holder shaft block to the left or right so that the needle drop is centered over the needle hole on needle plate A at the left base line and right base line.
4. Tighten the screw (3X10).



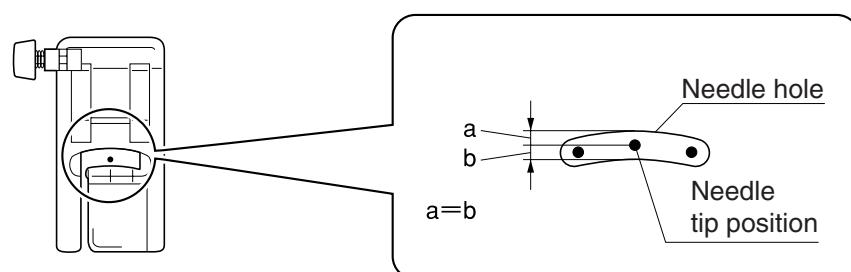
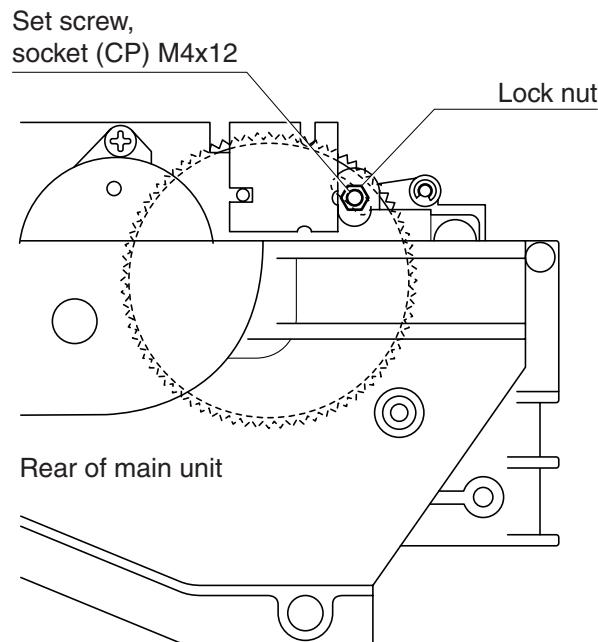
1. Turn the power on.
2. Turn the pulley by hand until the feed dog is lower than needle plate A.
3. Loosen the set screw (CP, M5X10) securing the presser bar clamp assembly.
4. Adjust the height of the presser bar so that the clearance between the top of needle plate A and the bottom of the presser is 7.0 - 7.5 mm.

NOTE

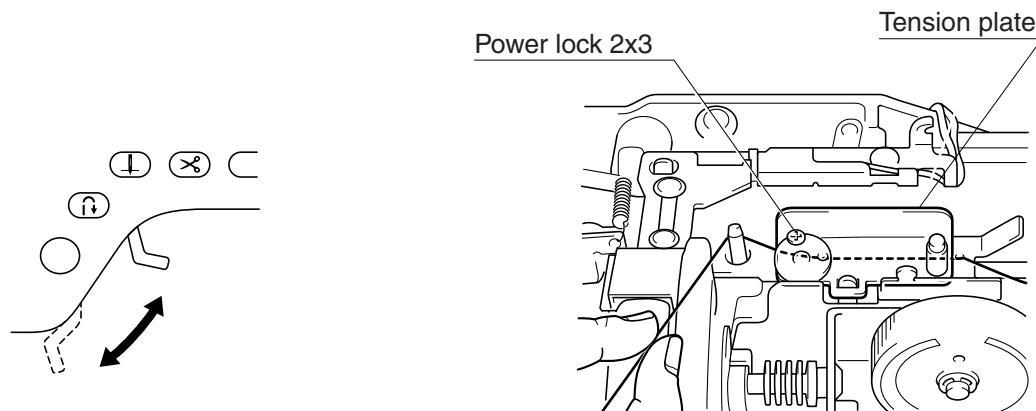
- Use the J foot.
- Adjust the presser bar so that the needle plate feed dog hole is parallel to the presser.



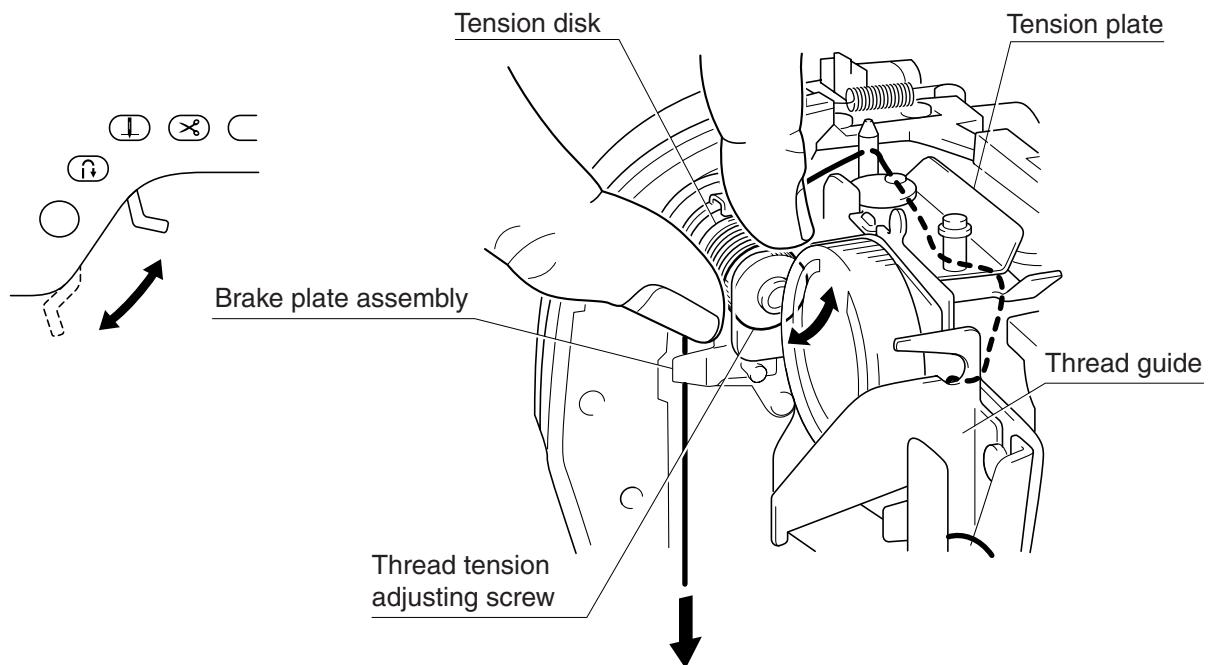
1. Turn the pulley by hand until the tip of the needle enters the needle hole.
2. Loosen the lock nut.
3. Move the needle tip to the center position (front/back) of the needle hole using the socket set screw (CP, M4X12).
4. Tighten the lock nut.



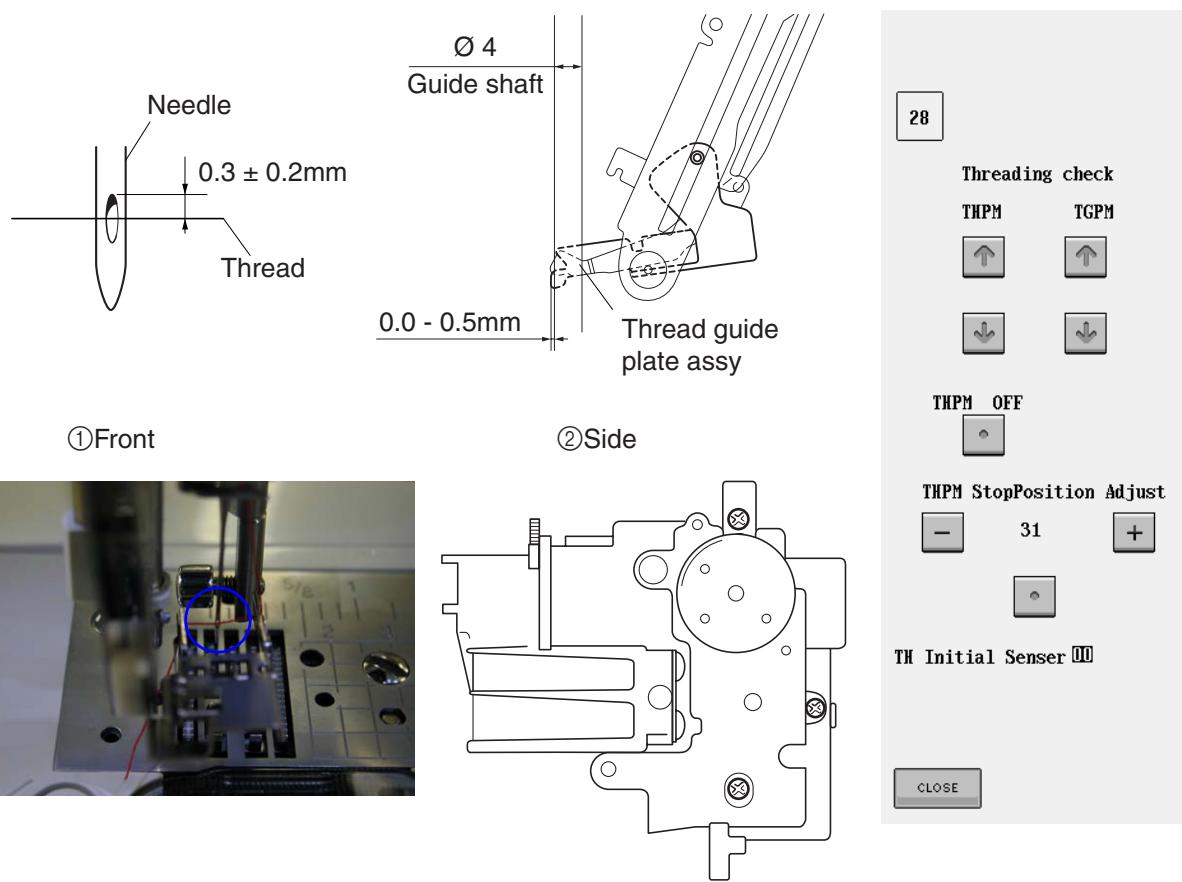
1. Raise the presser foot lifter.
2. Pass the Schappe Spun Sewing Thread #60 through the thread guide and then the tension plate.
3. Lower the presser foot lifter.
4. Pull the thread with a tension gauge, and adjust the tension to 0.08 to 0.11N (8 to 11g) using the power lock (2x3).



1. Raise the presser foot lifter.
2. Turn the power on, and check that the AT pulse motor returns to its home position.
3. Turn the power off.
4. Pass the Schappe Spun Sewing Thread #60 through the thread guide, tension plate, tension disk, and brake plate assembly in this order.
5. Lower the presser foot lifter.
6. Pull the thread with a tension gauge, and adjust the tension to 0.51 to 0.62N (52 to 63g) using the thread tension adjusting screw.
7. Apply a small amount of screw lock agent to the thread tension adjusting screw.

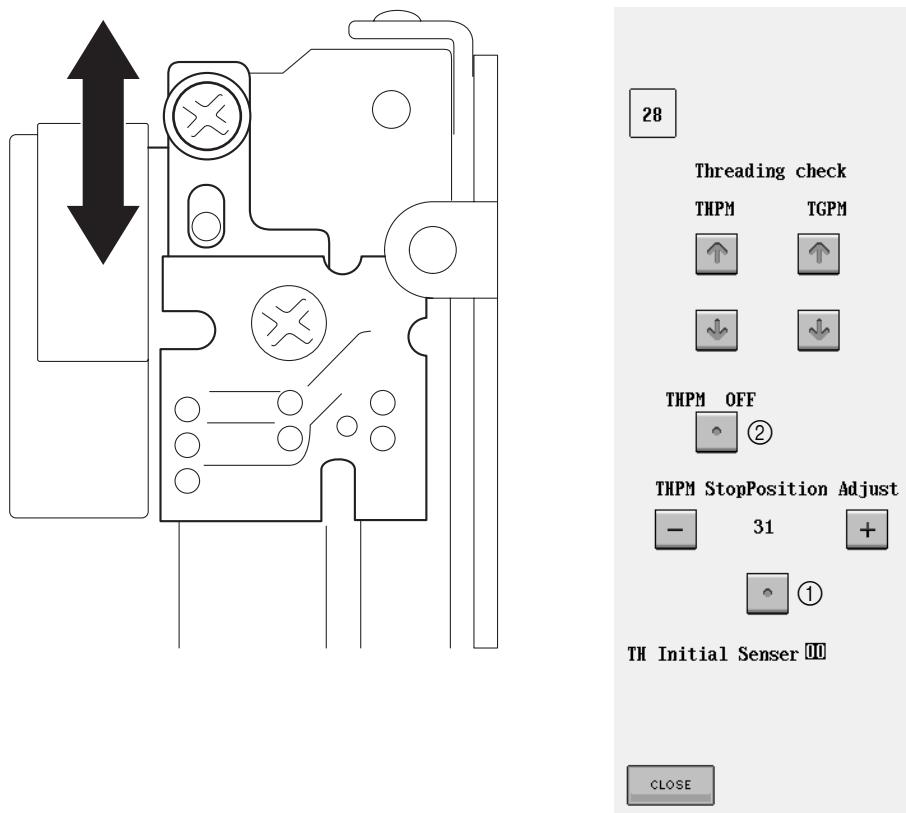


1. Adjust the needle thread block.
2. Remove the thread guide hook.
3. Turn the pulley by hand until the base line comes to the top.
4. Select test mode "22". (NP sensor mode)
5. Turn the pulley by hand until it reaches the position the buzzer stops (upper shaft rotation angle 32°).
6. Press [Close].
7. Select test mode "28".
8. Select THPM "↓" and then lower the shuttle to the limit.
9. Turn the power off.
10. Loosen the 3 screws securing the shuttle, and position the shuttle as below.
 - ① Distance from top edge of needle hole to thread
: $0.3 \text{ mm} \pm 0.2 \text{ mm}$
 - ② Length that tip of hook on thread guide plate assembly protrudes from needle threader shaft (shaft that needle thread hook is to be attached to) when viewed from side (right angle)
: $0 - 0.5 \text{ mm}$
11. Tighten the 3 screws to secure the shuttle.
12. Attach the thread guide hook.

**NOTE**

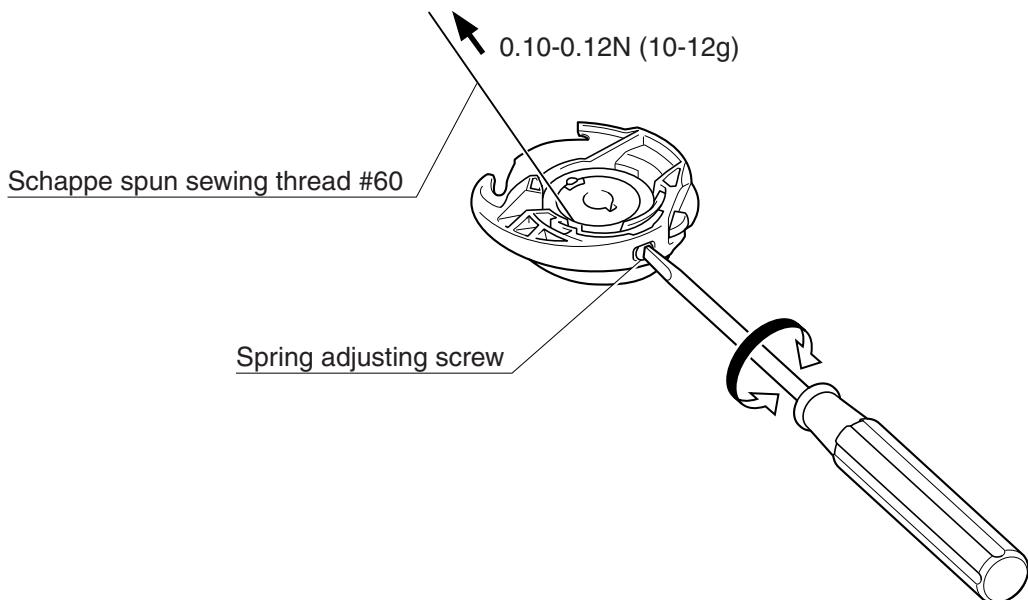
- As a result of the above adjustment, both ends of the thread are positioned behind the needle, resulting in the thread curving at the needle as shown in the attached photo (correct state).
- When positioned too far in front (curvature too small), the thread will be chipped or threading failure will occur.
- When positioned too far behind (the thread guide plate assembly contacts the needle thread hook), threading failure will occur.

1. Select test mode "28".
2. Confirm [THPM Stop Position Adjust] is FF, press ①
3. Press ② [THPM OFF]
4. Turn the THPM by hand until it reaches the position the shuttle begin a movement.
5. Loosen the screw of the TH sensor holder.
6. Raise and lower the TH sensor holder, fit the TH sensor the position just before the buzzer stops, and tighten the screw of the TH sensor holder.

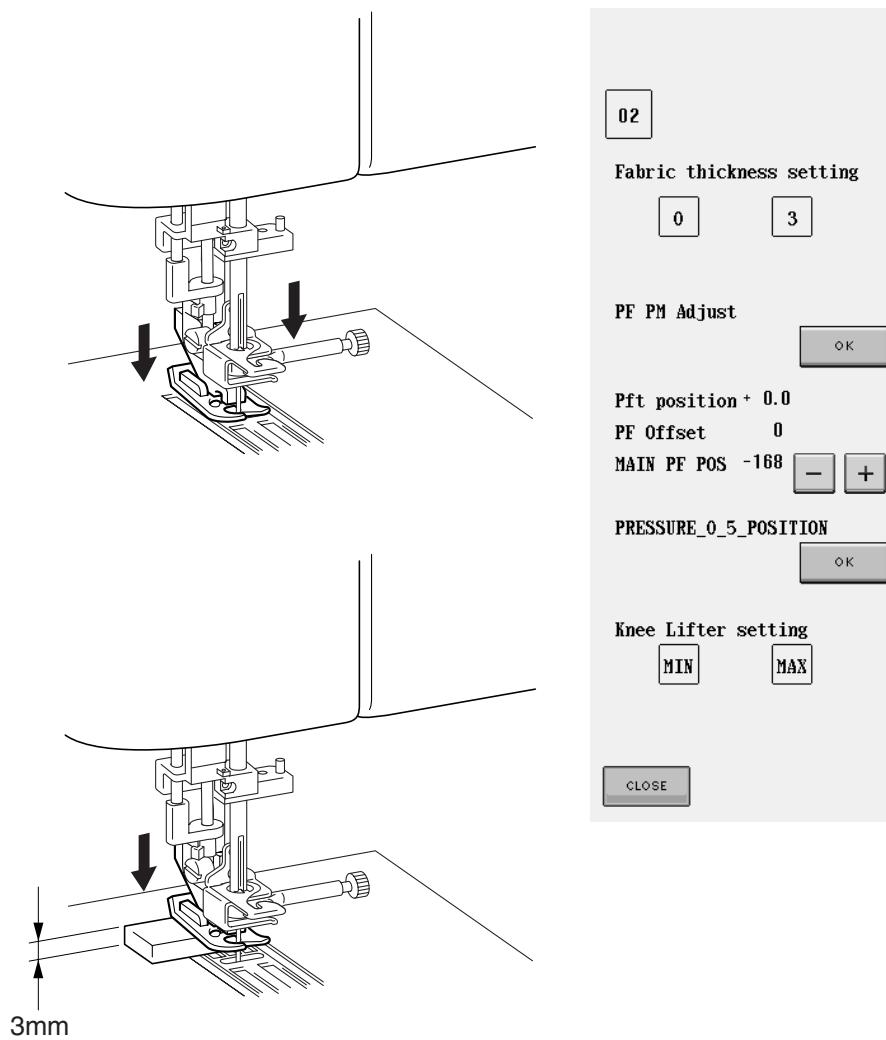


1. Set a bobbin (wound with Schappe Spun Sewing Thread #60) to the inner rotary hook, and thread the needle.
2. Pull the thread with a tension gauge, and adjust the tension to 0.10 to 0.12N (10 to 12g) using the spring adjusting screw.
3. Apply a small amount of screw lock agent to the spring adjusting screw.

Check the inner rotary hook for embroidery.



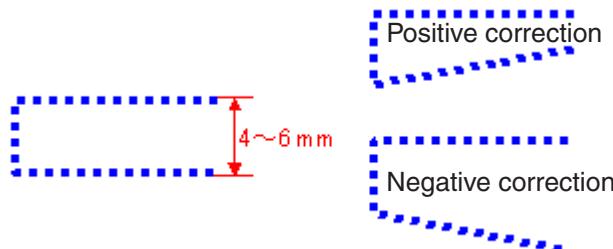
1. Start the test mode.
2. Select [02] on the screen.
3. Turn the pulley by hand until the feed dog is lower than the needle plate.
4. Lower the presser lever, and then press [0] on the screen.
5. Raise the presser lever, and insert a 3 mm gauge.
6. Lower the presser lever, and press [3] on the screen.
7. Remove the 3mm gauge, lower the press lever.
8. Press [OK] of PF AM Adjust
9. Press [CLOSE].



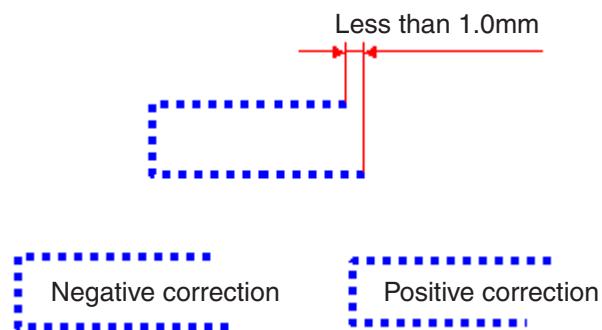
1. Start the test mode.
2. Press [36] on the screen, and check sewing condition using Schappe Spun Sewing Thread #60.
3. Adjust the following so that the pattern shape is appropriate:
 - ① Adjust the feed dog height and alignment so that the U-shape is almost on the right and the sewing length at the upper section is 26.0 to 31.0 mm.



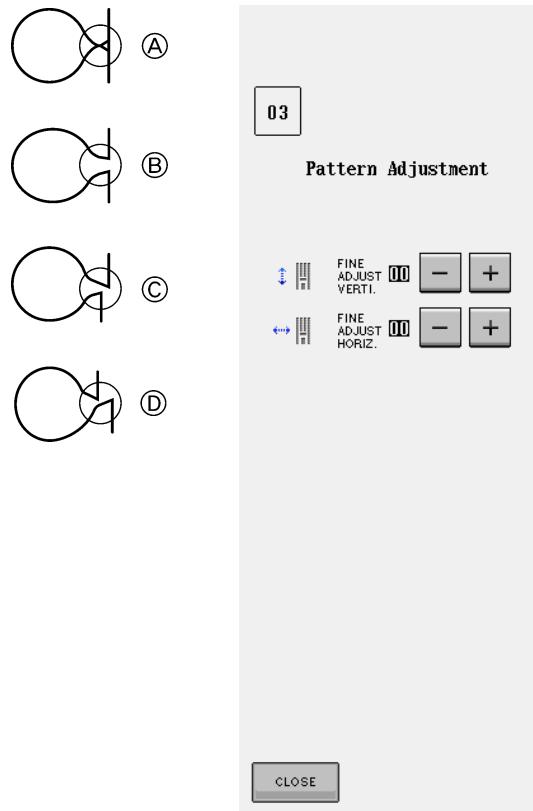
- ② Adjust the skew feed correction value so that the vertical clearance on the right is 4.0 to 6.0 mm.



- ③ Adjust the left/right length correction value so that the difference between the upper and lower length is 1.0 mm or less.



1. Start the test mode
2. Select [03] on the screen.
3. Press the [Start/Stop] switch.
4. Adjust the correction value to prevent pattern overlapping, opening, and/or shift.

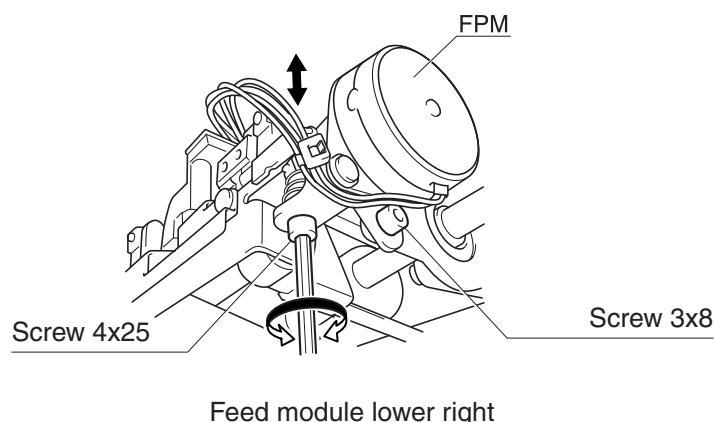
***Key point**

- If the pattern is compressed in the ↑ direction, press the vertical [+] button. (A)
- If the pattern is stretched in the ↑ direction, press the vertical [-] button. (B)
- If the pattern is compressed in the ←→ direction, press the horizontal [+] button. (C)
- If the pattern is stretched in the ←→ direction, press the horizontal [-] button. (D)

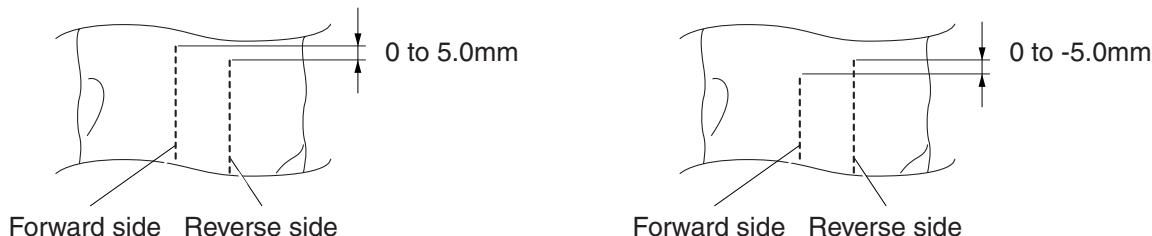
1. Remove the front cover, and turn the power on while pressing [SW3] and [SW4] on the main PCB assembly. (Select [13] in test mode.)
2. Press [SW2] to enter "Feed forward and backward mode."
3. Press [SW1] to run the machine in "Feed forward and backward mode," checking the forward and backward feed length.
4. Loosen the screw (3X8) securing the FPM holder assembly.
5. Adjust the forward and backward feed length using the FPM holder assembly screw (4X25).

***Key point**

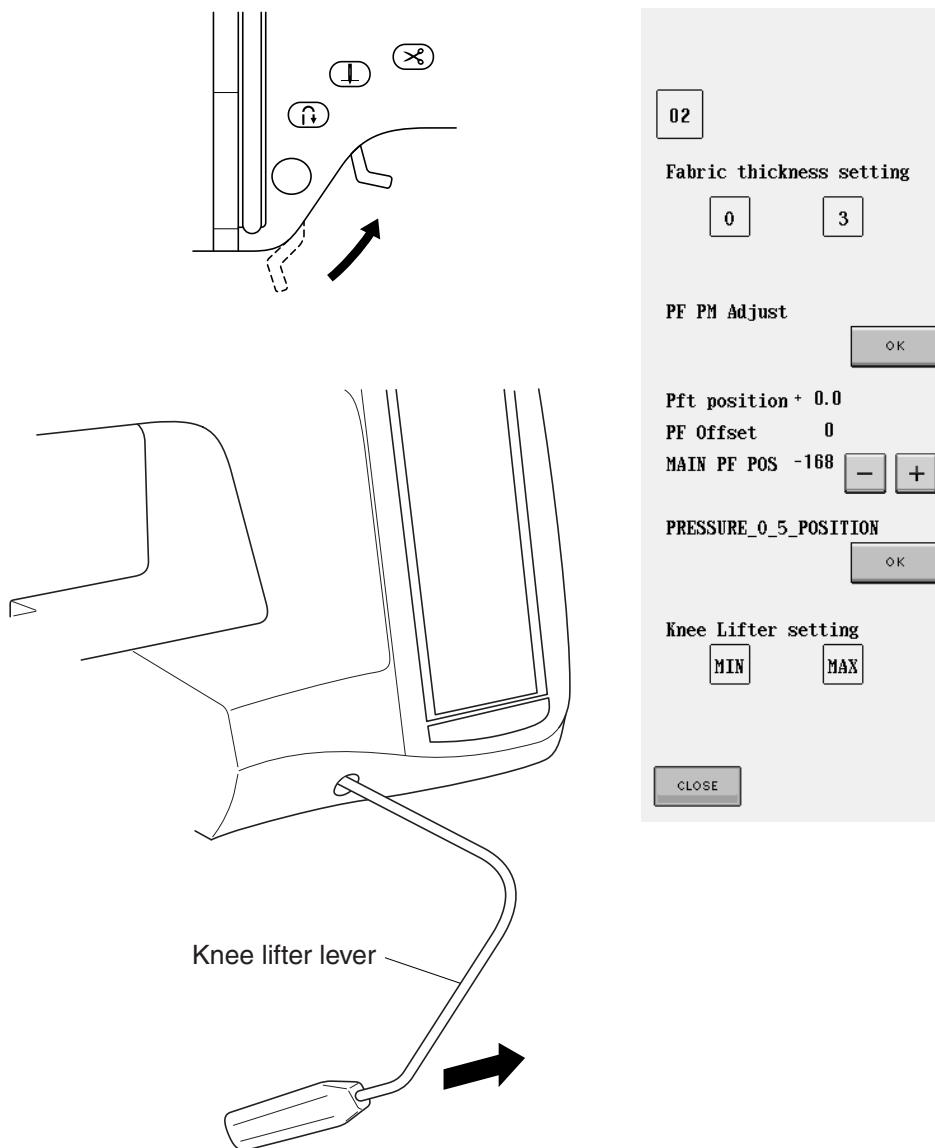
- After feeding the two layers of broadcloth with a sheet of paper inserted between them, forward and backward for 100 stitches, check that the forward feed length is $0 \pm 5.0\text{mm}$ longer than the backward feed length.
- Tightening the screw (4X25) increases the backward feed length.
- Loosening the screw (4X25) decreases the backward feed length.



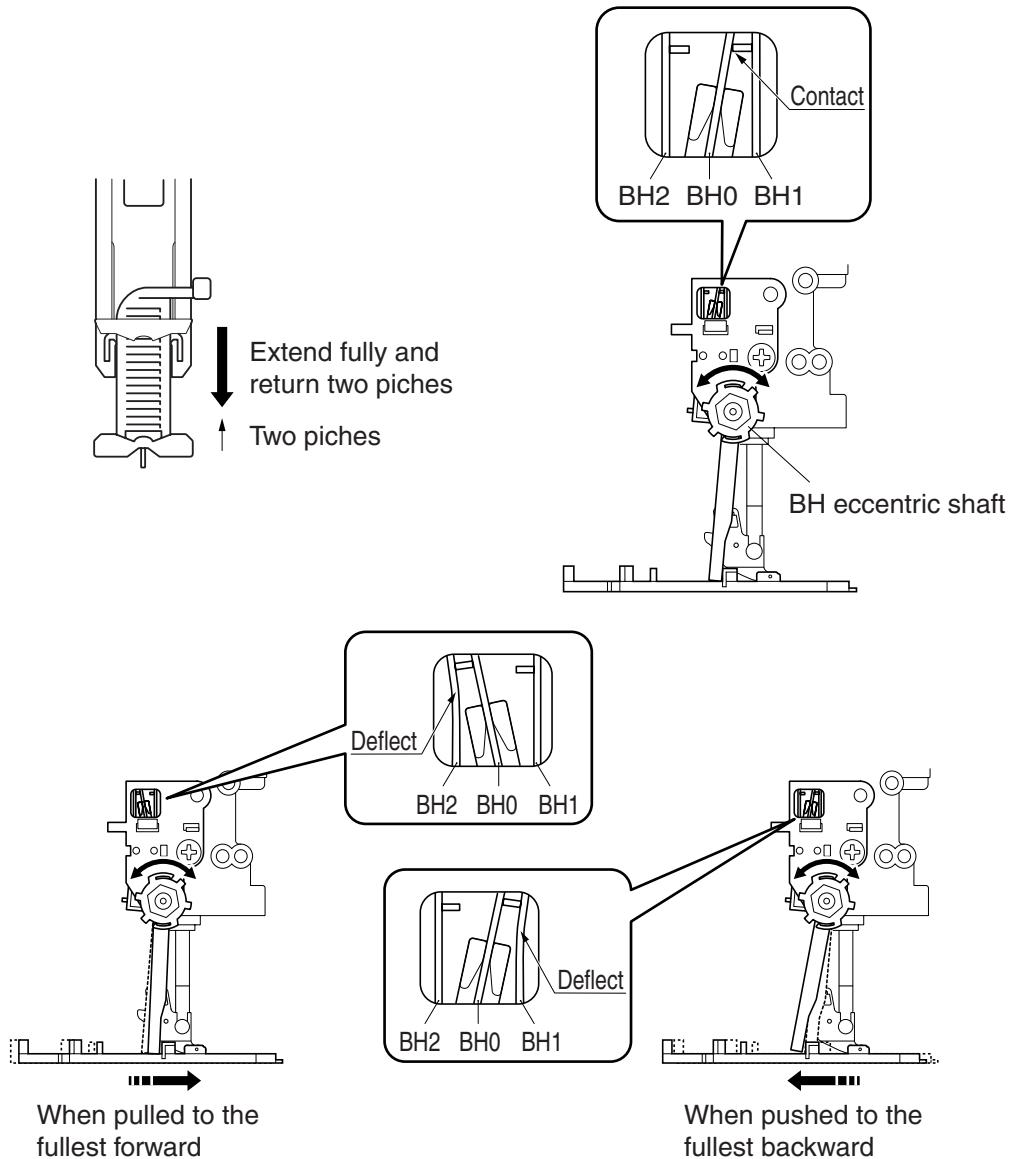
Feed module lower right



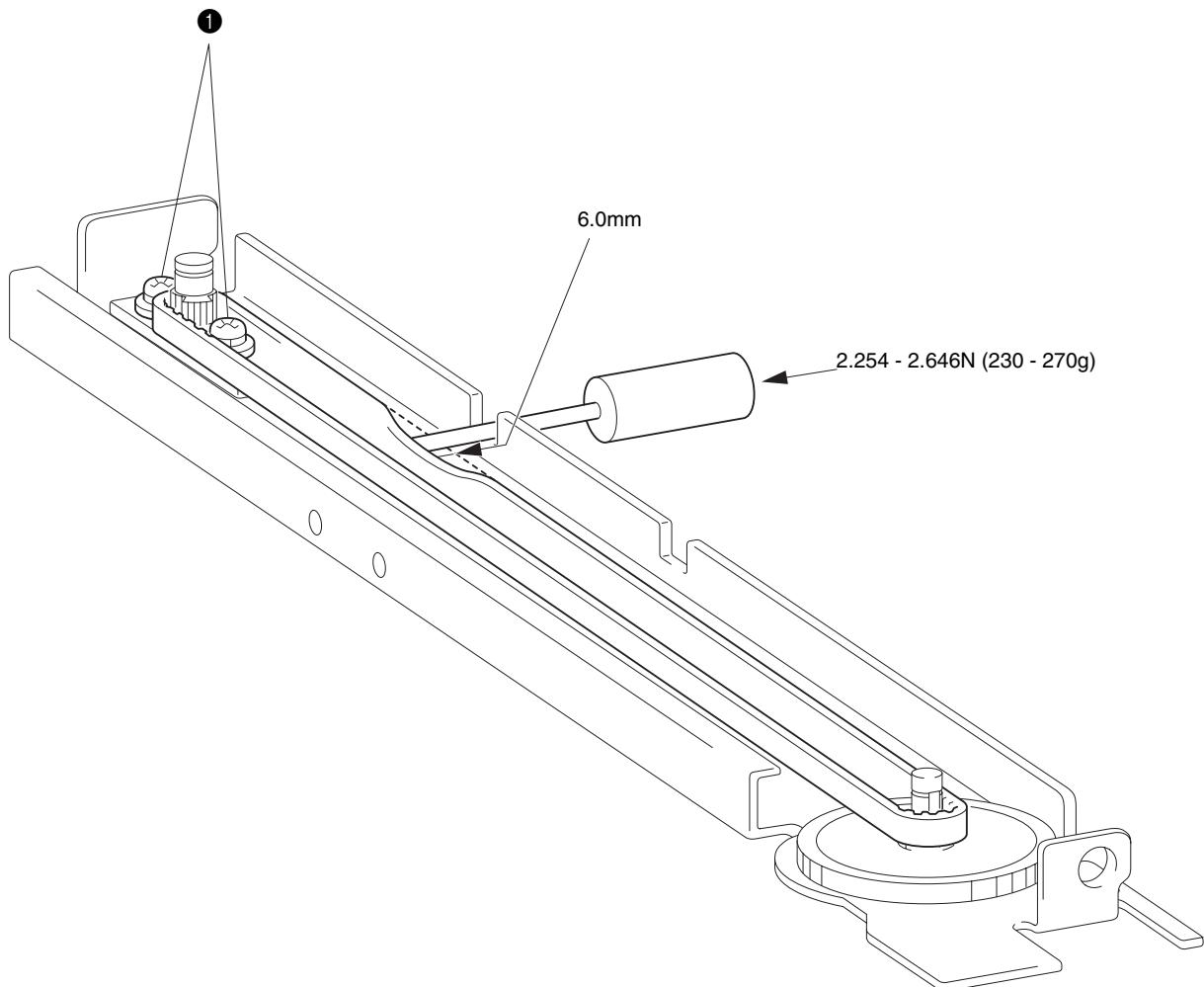
1. Start test mode.
2. Select test mode "2".
3. Turn the pulley by hand until the feed dog is lower than the needle plate top face.
4. Lower the presser lever, and press [MIN].
5. Insert the lever, and press [MAX] with the lever fully turned to the right.
6. Press [CLOSE].



1. Raise the presser foot lifter.
2. Set the BH presser to a point two pitches less than the maximum length.
3. Attach the BH presser.
4. Lower the presser foot lifter.
5. Lower the BH lever, and set it to the BH presser.
6. Rotate the BH eccentric shaft so that BH0 contacts BH1.

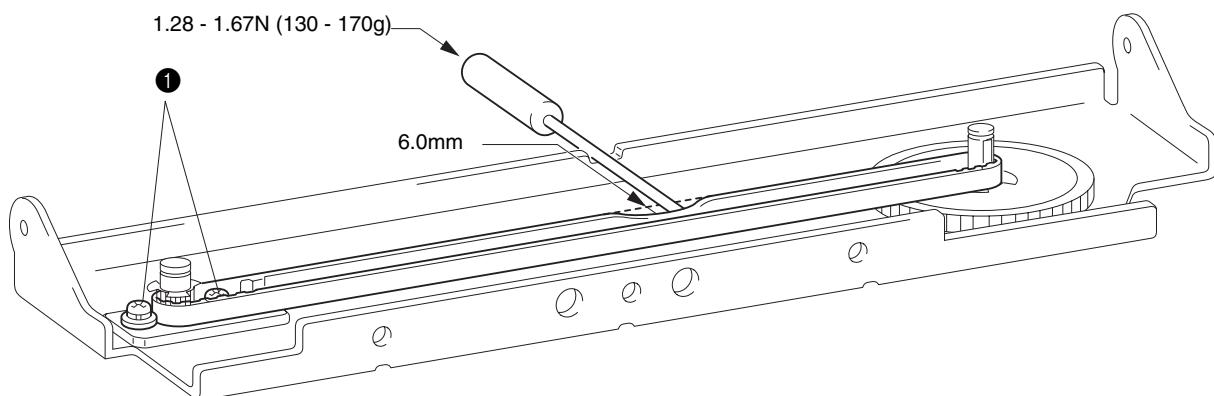


1. Loosen the 2 screws ①.
2. Move the tension pulley plate assembly right and left to adjust the X-belt tension.
3. Tighten the 2 screws ①.
Load when center of X-belt is deflected 6.0 mm: 2.254 to 2.646N (230 to 270g)



1. Loosen the 2 screws (①).
2. Move the tension pulley plate assembly right and left to adjust the Y-belt tension.
3. Tighten the 2 screws (②).

Load when center of Y-belt is deflected 6.0 mm: 1.28 to 1.67N (130 to 170g)



1. Attach the embroidery hoop to the machine and turn the power on.
2. Turn the power off.
3. Remove the embroidery hoop.
4. Loosen the screws securing the embroidery hoop stay plate.
5. Adjust the clearance between the cover and the embroidery hoop stay plate to 3.3 to 3.7 mm at a position 5 mm from the right edge of the embroidery hoop stay plate.
6. Tighten the screws to secure the embroidery hoop stay plate.

1. Attach a needle.
2. Turn the pulley to raise the needle bar to the limit.
3. Loosen the socket set screw (FT, M4X4) securing the needle thread block.
4. Adjust the height of the needle thread block so that the threading hook passes through the needle hole, and secure the needle thread block with the socket set screw (FT, M4X4).

***Key point**

- Secure the socket set screw (FT, M4X4) at a position slightly to the left when viewed from the front of the machine.
- Adjust the height so that the upper edge of the threading hook is level with the upper edge of the needle hole.

NOTE

- If the position of the needle thread block socket set screw is too far to the left, the hook will not operate and treading is not possible.
- If the position of the needle thread block socket set screw is too far to the right, the needle thread block will contact the needle bar supporter assembly, resulting in damage.

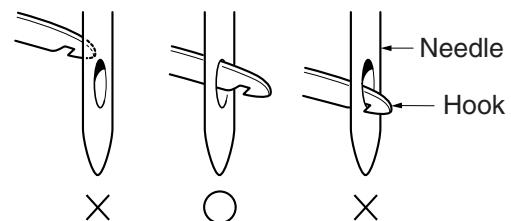
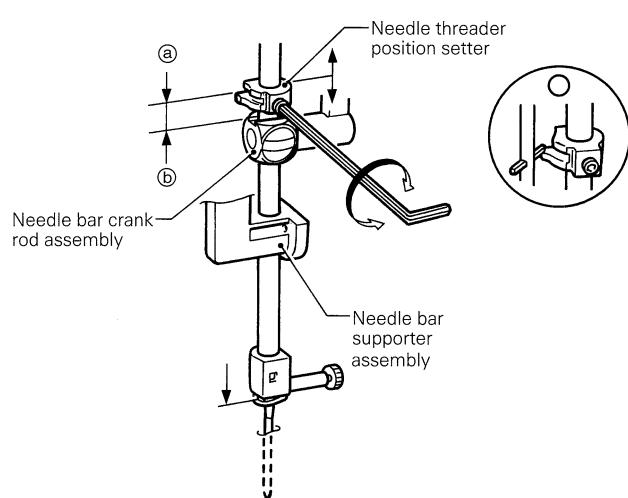


Fig. 1

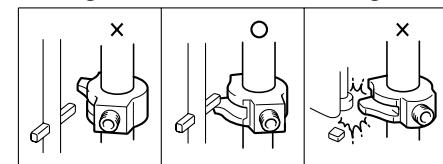
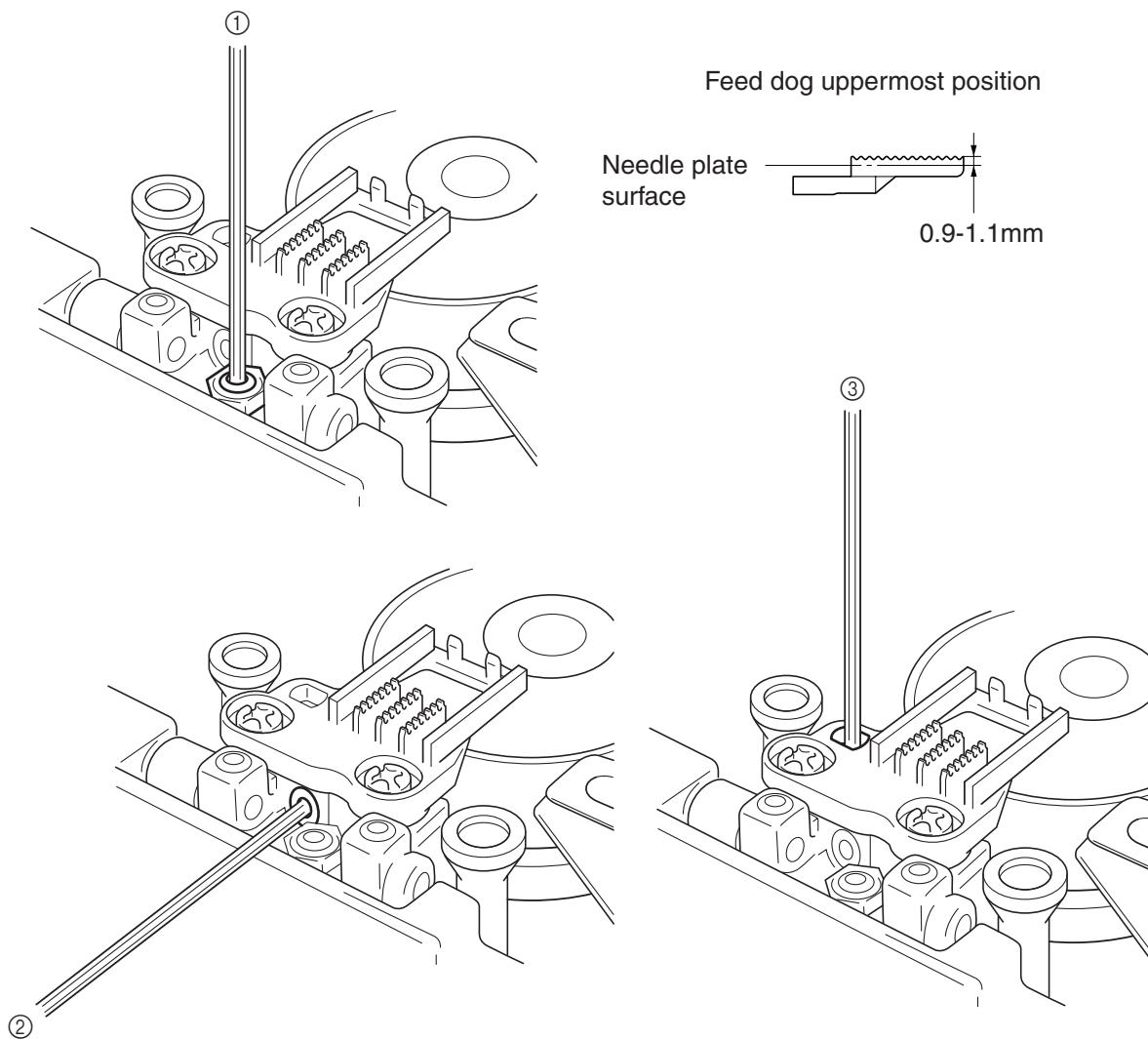
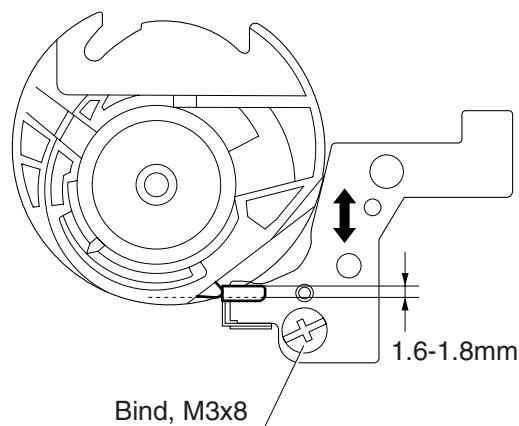


Fig. 2

1. Turn the pulley to raise the feed dog to limit. (The D-cut of lower shaft B should be facing up.)
2. Loosen the M5 nut.
3. Adjust the vertical adjuster so that the far back tooth of the feed dog is 0.9 to 1.1 mm from the top face of needle plate A.
4. Tighten the M5 nut, being careful not to allow the vertical adjuster assembly to turn.
5. Loosen the bolt next to the feed adjuster, and then tighten it again.
6. Adjust the bolt on the operator's side so that the feed dog is at the right angle.
(After adjustment, check that the front tooth is level with the far back tooth of the feed dog.)



1. Set the inner rotary hook in the outer rotary hook.
2. Loosen the screw (bind, M3X8) securing the inner rotary hook bracket assembly.
3. Adjust the position of the inner rotary hook bracket assembly so that the inner rotary bracket assembly contacts the inner rotary hook along 1.6 to 1.8 mm, and secure the inner rotary hook bracket assembly with the screw (bind, M3X8).



1. Select text mode "6".
2. Select the [E] key. (Set the feed to "0" and the feed dog to center.)
3. Loosen the 2 screws (bind, M3x8), temporarily attach needle plate A, and adjust the front/back and left/right right positions of the feed dog.
 - *Key point
 - Adjust the clearance between the forward edge of the feed dog middle tooth and needle plate A to 3.2 to 3.8 mm.
 - Adjust the clearance (left/right) between the feed dog and needle plate A to be equal.
 - Do not allow the feed dog to engage needle plate A at an angle.
4. Secure the feed dog with 2 screws (bind, M3x8).
5. Fully tighten the M4 screws to secure needle plate A.

