

First Edition: 12 December 2018

SERVICE MANUAL

MODEL: SKYLINE S6

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Replacing external parts



Face cover

To remove:

1. Remove the setscrews A. Remove the face cover.

To attach:

Follow the above procedure in reverse.



Belt cover

To remove:

1. Remove the cap and setscrew B.



2. Remove the setscrew C.



3. Loosen the two setscrews D.

4. Pull the rear side of the belt cover to disengage it from the rear cover.

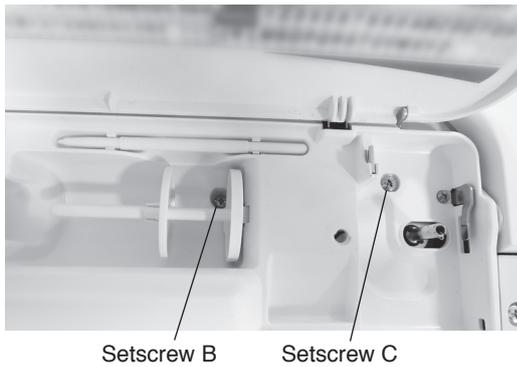
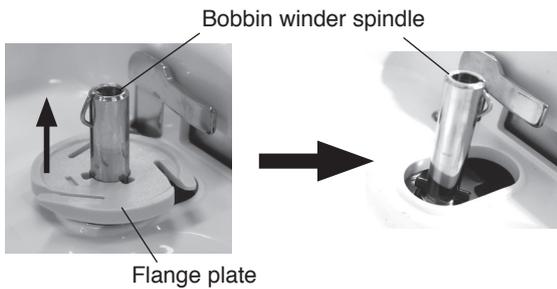
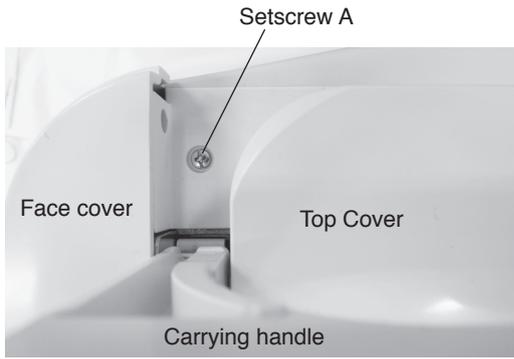
5. Remove the belt cover.

To attach:

Follow the above procedure in reverse.

Make sure all the tabs and hooks fit together precisely.

Replacing external parts



Top cover

To remove:

1. Raise the carrying handle and remove the setscrew A.

2. Open the top cover. Pull out the flange plate from the bobbin winder spindle.

3. Remove the setscrews B and C.

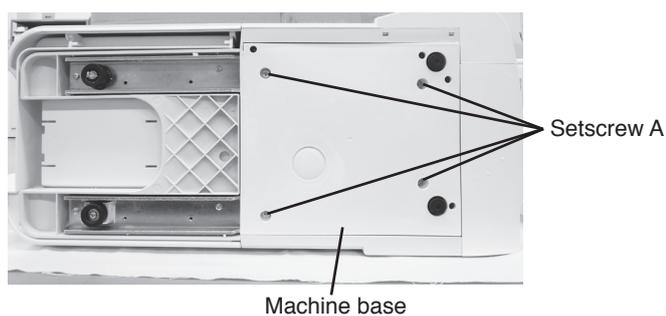
4. Open the face cover. Close the top cover and raise the carrying handle. Pull the top cover toward you to remove it.

To attach:

Follow the above procedure in reverse.

To attach the flange plate, put the flange plate on to the bobbin winder spindle, and push the flange plate down. Turn the flange plate until it snaps to the pin of the bobbin winder spindle.

Replacing external parts



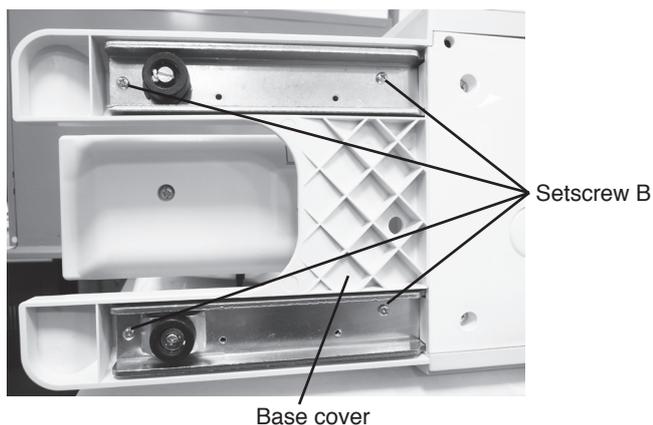
Machine base

To remove:

1. Remove the setscrews A.
2. Remove the machine base.

To attach:

Follow the above procedure in reverse.



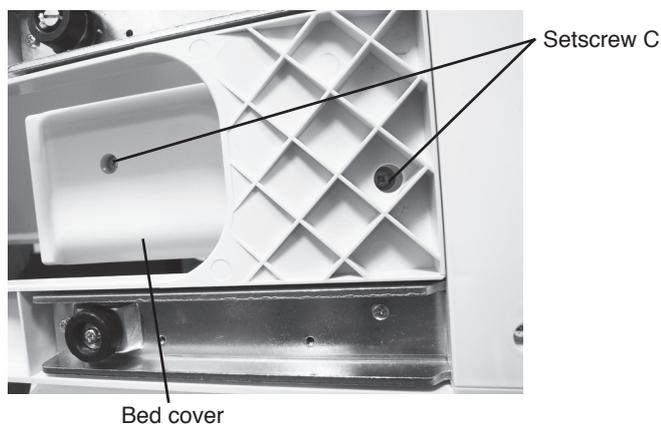
Base cover

To remove:

1. Remove the setscrews B.
2. Remove the base cover.

To attach:

Follow the above procedure in reverse.



Bed cover

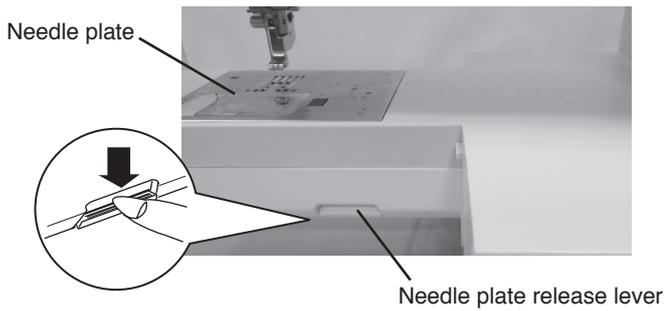
To remove:

1. Remove the setscrews C.
2. Remove the bed cover.

To attach:

Follow the above procedure in reverse.

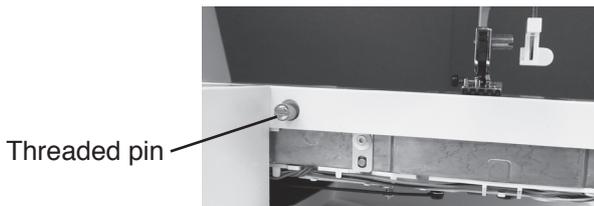
Replacing external parts



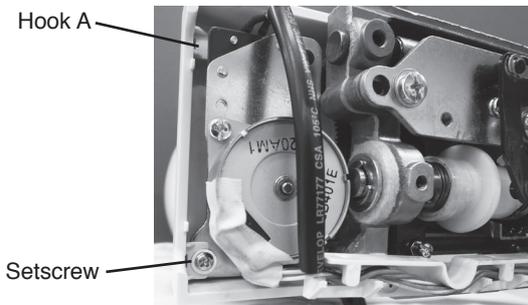
Free arm cover

To remove:

1. Remove the machine base and base cover (refer to page 3). Remove the presser foot. Push down the needle plate release lever to remove the needle plate. Remove the bed cover (refer to page 3).



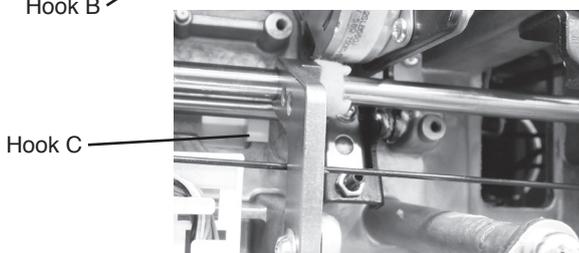
2. Remove the threaded pin.



3. Loosen the setscrew and unlock the hook A by sliding the free arm cover to the left.

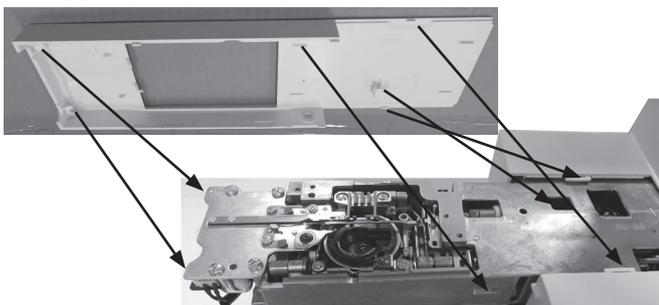


4. Pull out the free arm cover forcedly to the left while pulling open the front side to disengage the hook B and remove the free arm cover.

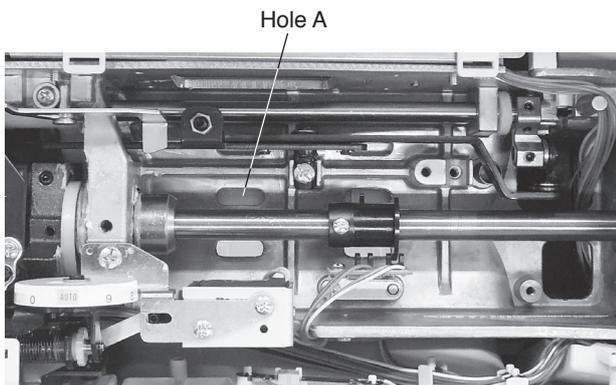
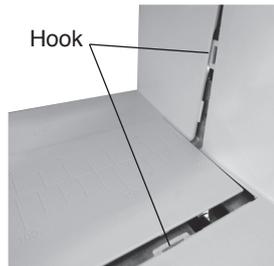
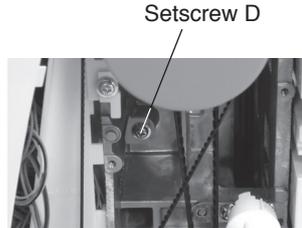
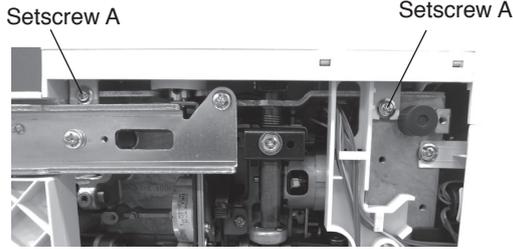


To attach:

1. Place the free arm cover on the free arm inserting the hook C into the opening.
2. Insert the right end of the free arm cover under the front cover by pushing the right end. Push the free arm cover until all the hooks and tabs snap in place.
3. Follow the steps 1 to 3 of removal procedure in reverse.



Replacing external parts



Front cover

To remove:

1. Remove the top cover, belt cover, base cover, machine base and free arm cover (refer to pages 1 to 4).
2. Loosen the setscrews A (underside of the machine).

3. Remove the setscrew B.

4. Loosen the setscrew C (behind the face cover).
5. Loosen the setscrew D (inside of the machine body).

6. Unlock the hooks from the front cover.

7. While pushing the rear cover through the hole A with a screwdriver, remove the front cover.
Remove the connectors from the circuit board A.

To attach:

- Follow the above procedure in reverse.
Refer to page 8 for locating connector posts.

Replacing external parts

Setscrew A



Rear cover

To remove:

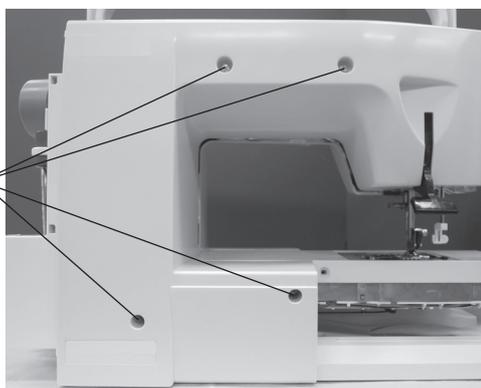
1. Lower the presser foot. Remove the belt cover, top cover and base cover (refer to pages 1 to 3).
2. Loosen the setscrew A.

Setscrew B



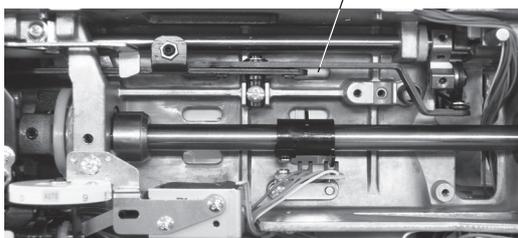
3. Loosen the setscrew B.

Setscrew C



4. Remove the four setscrews C.

Hole D



5. Push the rear cover from the holes D and E with a screwdriver to remove the hook of rear cover.
6. Remove the rear cover.

Hole E



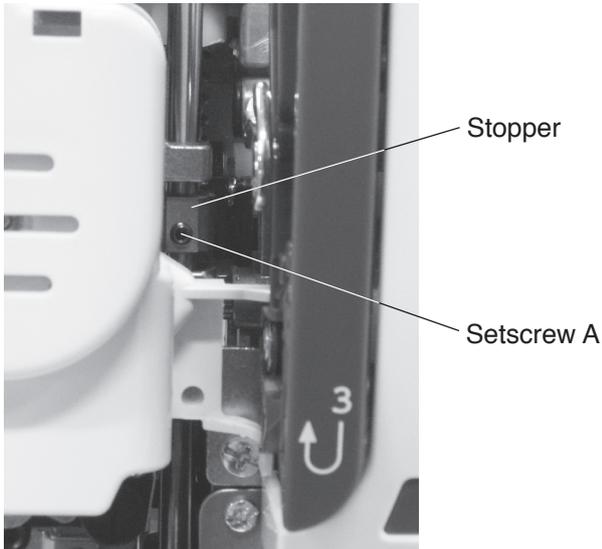
To attach:

Follow the above procedure in reverse.

Replacing mechanical parts

Needle threader hook position

If the hook of the threader plate is damaged, change or adjust the part as follows:



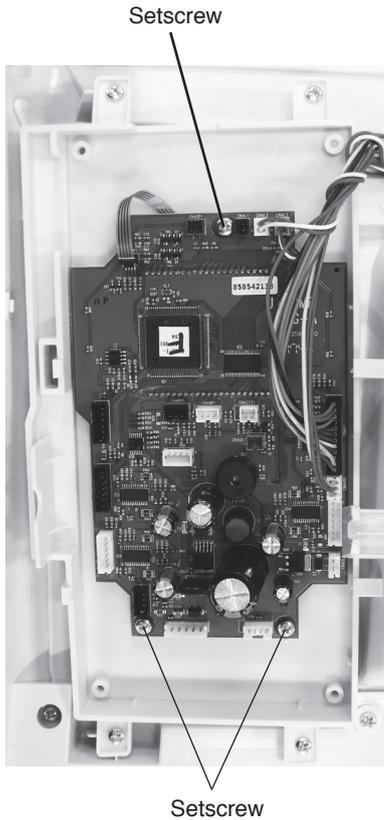
1. Push down the threader lever and hold it just before the threader hook enters the needle eye.
2. If the threader hook is not aligned vertically with the needle eye, loosen the setscrew A. Adjust the stopper position so that the hook enters into the needle eye. Tighten the setscrew A.



Setscrew B

3. If the threader hook is not aligned laterally with the needle eye, loosen the setscrew B. Adjust the lateral position so that the hook enters into the needle eye. Tighten the setscrew B.

Replacing electronic components



Printed circuit board A

NOTE:

Do not disconnect connectors by pulling on cord.
To disconnect the connectors, grasp the connector, not the cord.

To remove:

1. Remove the front cover (refer to page 5).
2. Disconnect the connectors from the printed circuit board A.
3. Remove the 3 setscrews and printed circuit board A.

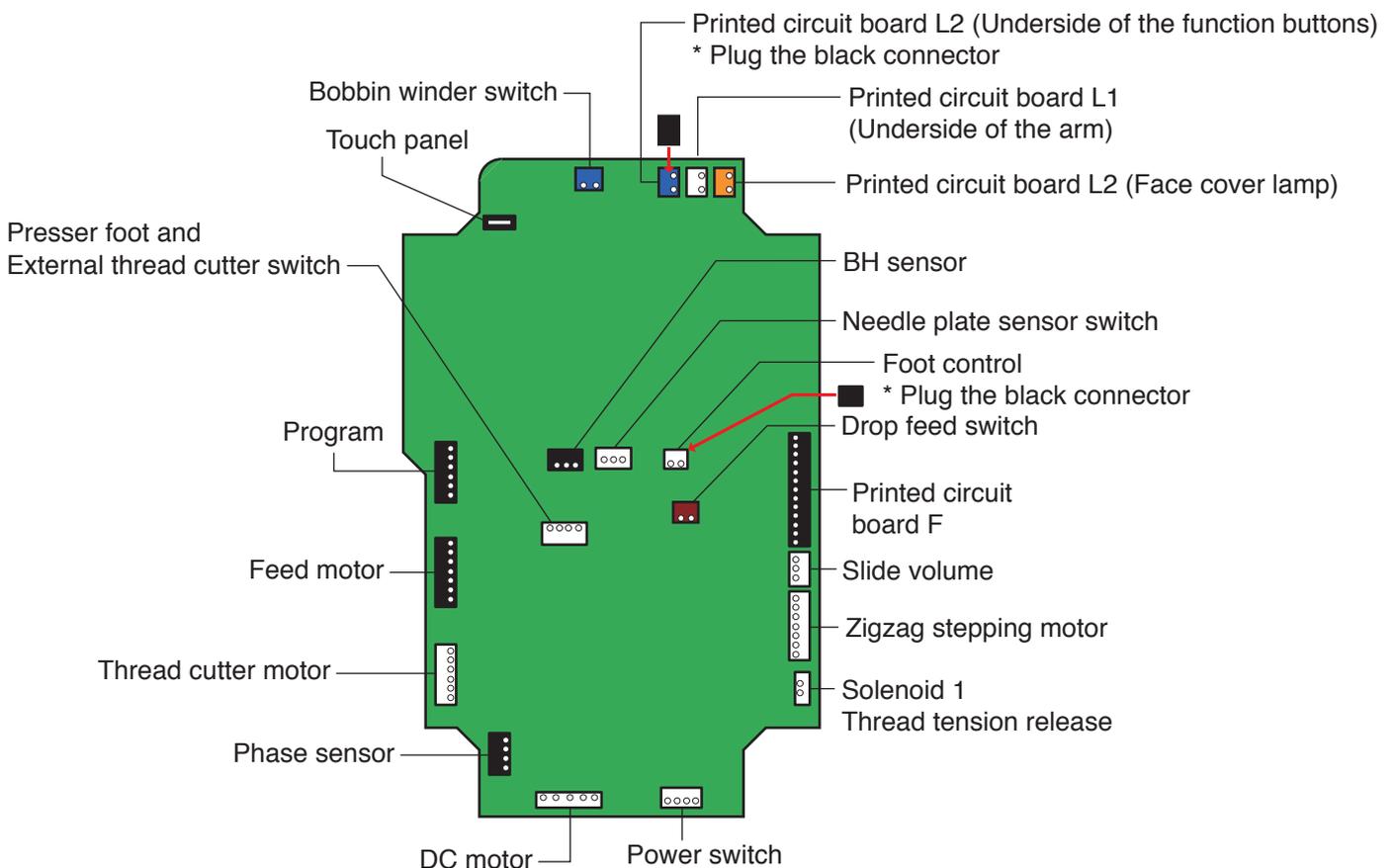
To attach:

Follow the above procedure in reverse.
Refer to the board A schematic for locating the connectors on the printed circuit board A.

After replacing the printed circuit board A, adjust the following items:

- Knee Lifter (refer to page 37)
- Presser bar height (refer to page 29)
- Embroidery foot height (refer to page 35)

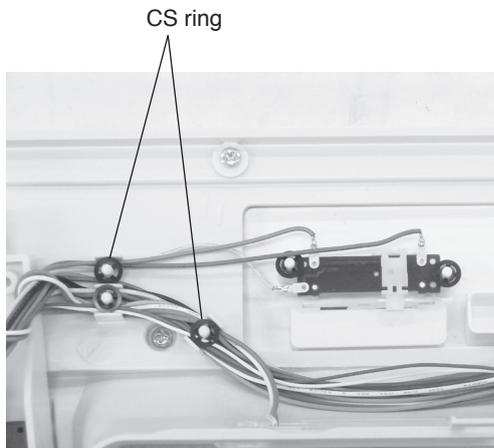
Board A schematic



Replacing electronic components

NOTE:

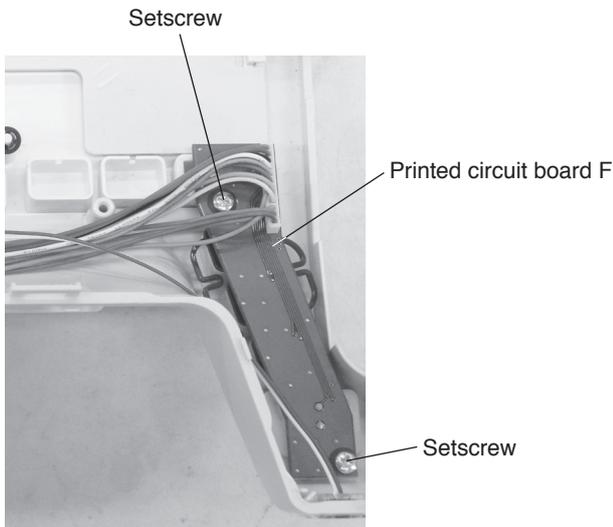
Do not disconnect connectors by pulling on cord.
To disconnect the connectors, grasp the connector,
not the cord.



Printed circuit board F

To remove:

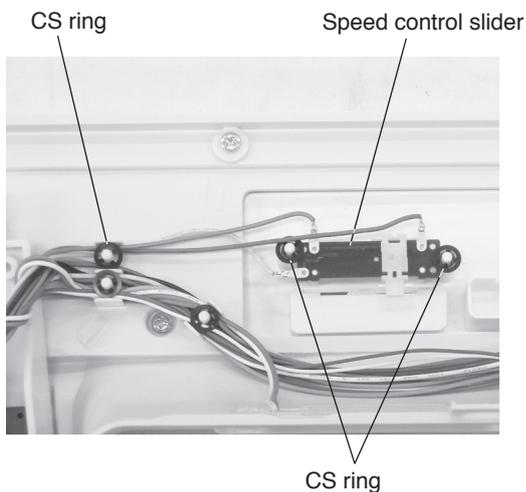
1. Remove the front cover (refer to page 5).
2. Disconnect the printed circuit board F connector from the printed circuit board A (refer to page 8).
3. Remove the CS rings.



4. Remove the setscrews, and the printed circuit board F.

To attach:

Follow the above procedure in reverse.



Speed control slider

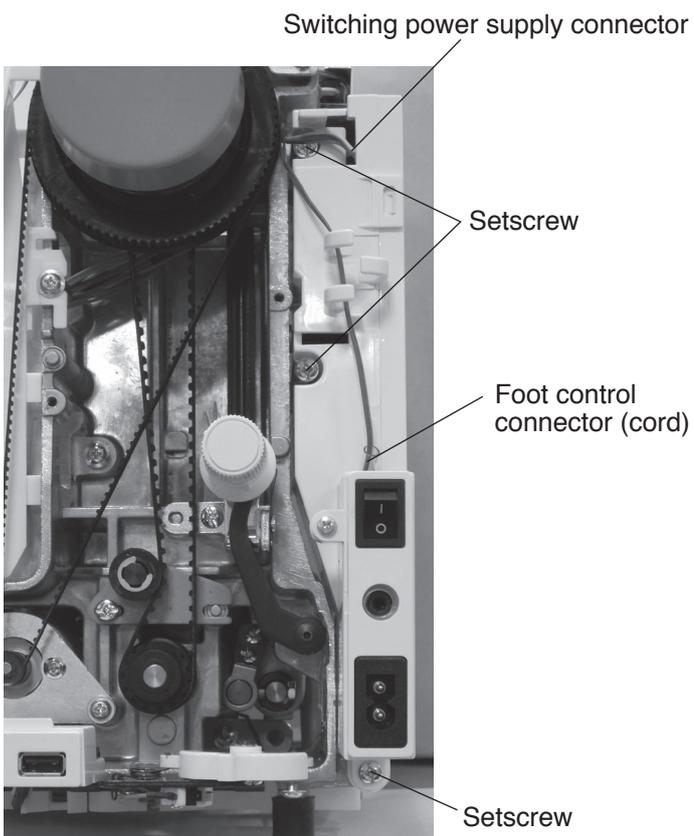
To remove:

1. Remove the front cover (refer to page 5).
2. Disconnect the speed control slider connector from the printed circuit board A (refer to page 8).
3. Remove the 3 CS rings and the speed control slider.

To attach:

Follow the above procedure in reverse.

Replacing electronic components



Switching power supply unit

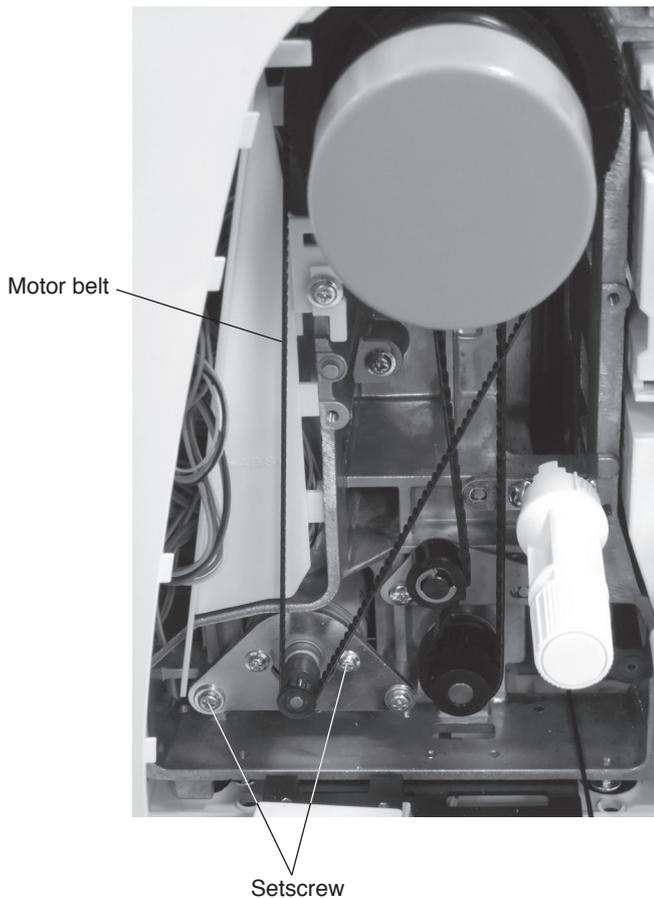
To remove:

1. Remove the belt cover, the top cover and the front cover (refer to pages 1, 2 and 5).
2. Disconnect the switching power supply connector from the switching power supply unit.
3. Remove the foot control connector from the printed circuit board A (refer to page 8).
4. Remove the setscrews, and switching power supply.

To attach:

Follow the above procedure in reverse.

Replacing electronic components



DC motor

NOTE:

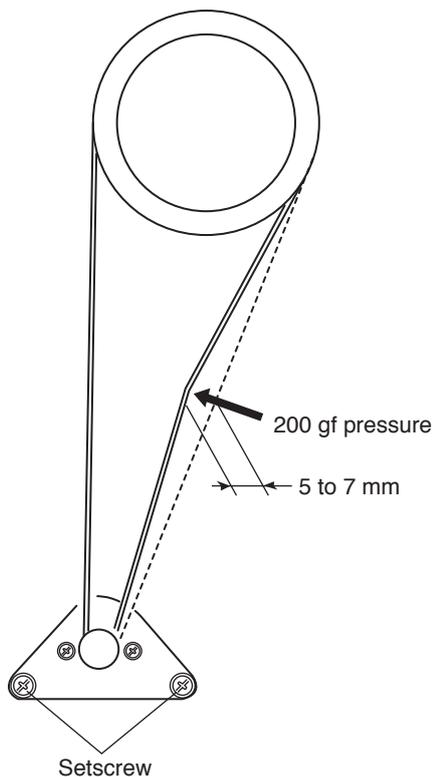
Do not disconnect connectors by pulling on cord.
To disconnect the connectors, grasp the connector,
not the cord.

To remove:

1. Remove the belt cover, the top cover and the front cover (refer to pages 1, 2 and 5).
2. Disconnect the DC motor connector from the printed circuit board A (refer to page 8).
3. Remove the motor belt.
4. Remove the setscrews (2 pcs), and the DC motor.

To attach:

1. Attach the DC motor and slightly tighten the setscrews.
2. Attach the motor belt and adjust the belt tension.
Push the middle of the belt span with approximately 200 grams-force pressure. Adjust the motor position so that the belt deflects 5 to 7 mm.
3. Tighten the setscrews securely.
4. Connect the DC motor connector to the printed circuit board A (refer to page 8).
5. Attach the front cover, the top cover and the belt cover.



Replacing electronic components

Thread tension unit

NOTE:

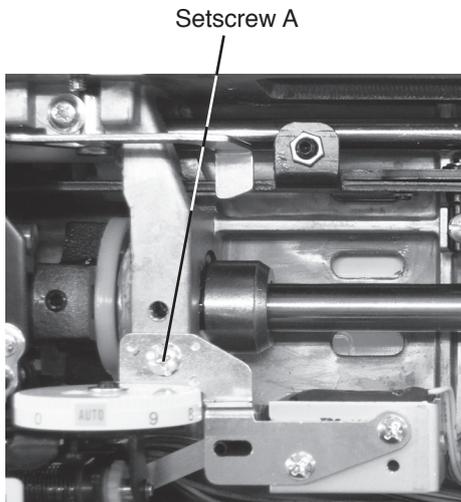
Do not disconnect connectors by pulling on cord.
To disconnect the connectors, grasp the connector,
not the cord.

To remove:

1. Remove the belt cover and the top cover (refer to page 1 and 2).
2. Remove the front cover (refer to page 5).
3. Disconnect the thread tension motor connector from the printed circuit board A (refer to page 8).
4. Remove the setscrews (A) and (B).
Remove the thread tension (unit).

To attach:

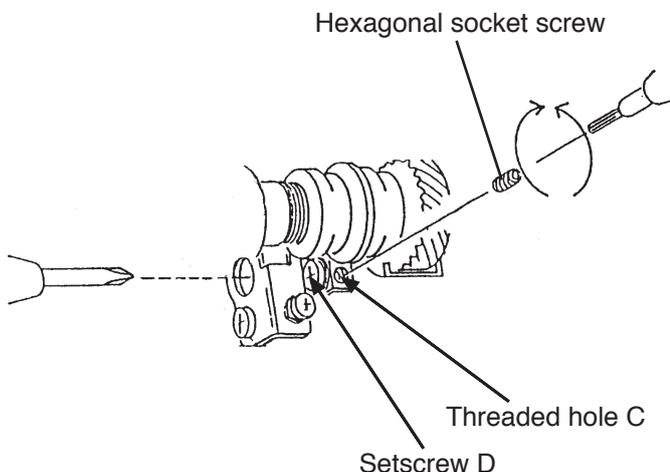
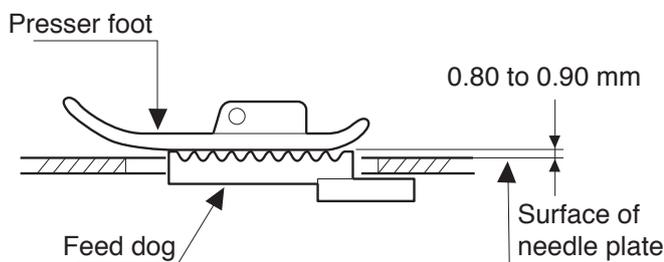
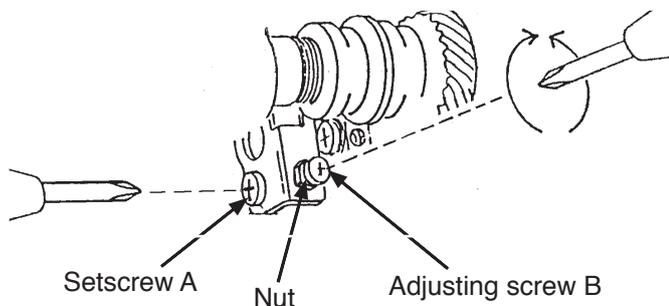
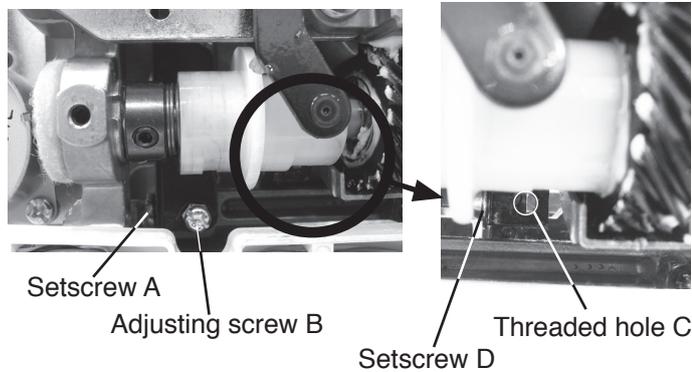
1. Follow the above procedure in reverse.
2. Check the upper thread tension (refer to page 21).



Mechanical adjustment

Feed dog height

When the foot pressure is set at maximum (AUTO+4) and the presser foot A is lowered, the highest position of the feed dog should be 0.80 to 0.90 mm from the surface of the needle plate.



1. Attach the zigzag foot A. Remove the base cover and bed cover (refer to page 3).
2. Turn the power switch ON. Adjust the foot pressure to the maximum (AUTO+4) in the ordinary sewing setting mode. Adjust the stitch length to the maximum (5.0).
3. Press the presser foot lifter button to lower the presser foot.
4. Turn the handwheel toward you to raise the feed dog to its highest position.
5. Loosen the setscrew (A).
6. Loosen the nut with a socket wrench. Turn the adjusting screw and adjust the feed dog high to 0.85 mm.
7. Tighten the nut and setscrew (A).
8. Turn the handwheel and check that the feed dog teeth are parallel with the surface of the needle plate. If not, follow the adjustment procedure below.

If the feed dog is not parallel to the surface of the needle plate at its highest position, make the adjustment as follows:

* For this adjustment, a hexagonal socket screw 4x6, part No. 000111108 is required.

1. Insert a hexagonal socket screw part No. 000111108 into the threaded hole (C) until it stops (use an Allen wrench of 2 mm width across flats).
2. Turn the setscrew D (left hand screw) clockwise to loosen it.
3. Turn the hexagonal socket screw until the feed dog is parallel with the surface of the needle plate.
4. Tighten the setscrew D by turning it counterclockwise.
5. Remove the hexagonal socket screw.
6. Attach the bed cover and base cover.

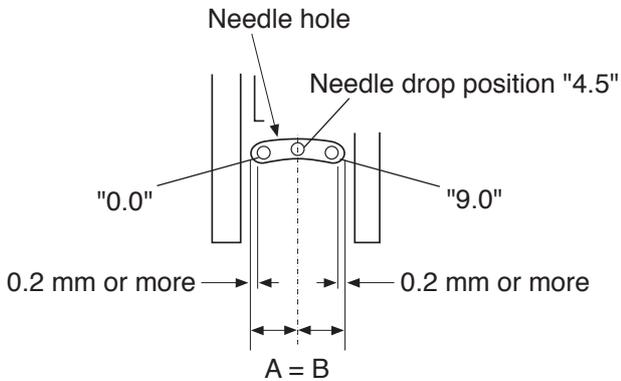
After finishing adjustment, return the foot pressure to AUTO.

Mechanical adjustment

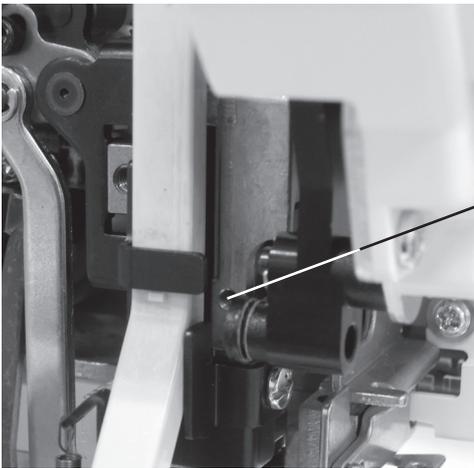
Needle drop position

When the straight stitch is selected, the needle should be positioned in the center of the needle plate hole.

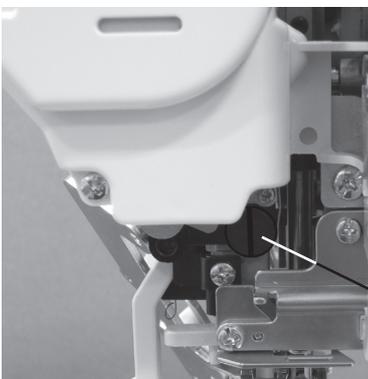
When the needle drop position is set at "0.0" and "9.0", the clearance between the side of the needle and the needle hole should be 0.2 mm or more.



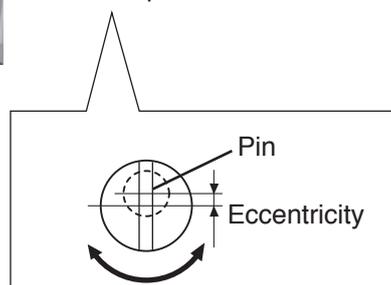
1. Attach the #14 needle. Turn the power switch ON and select straight stitch #1.
2. Check the clearance between the needle and the side of the needle hole when the needle drop position is set at "0.0" and "9.0" respectively.



3. If the clearance is less than 0.2 mm, adjust it as follows.
Loosen the hexagonal socket screw (use an Allen wrench of 2 mm width across flats).



4. Turn the eccentric pin to get 0.2 mm or more clearance. The direction of eccentric pin should be as shown. Tighten the hexagonal socket screw. Attach the straight needle plate and check if the needle drops in the center of the needle hole.

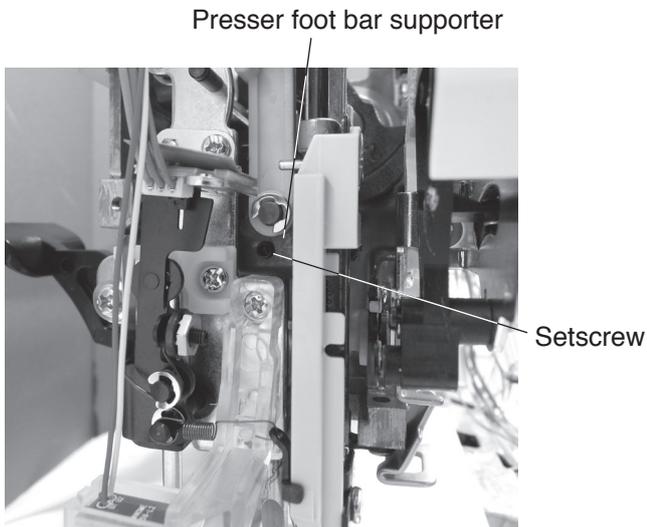


Mechanical adjustment

Presser bar height

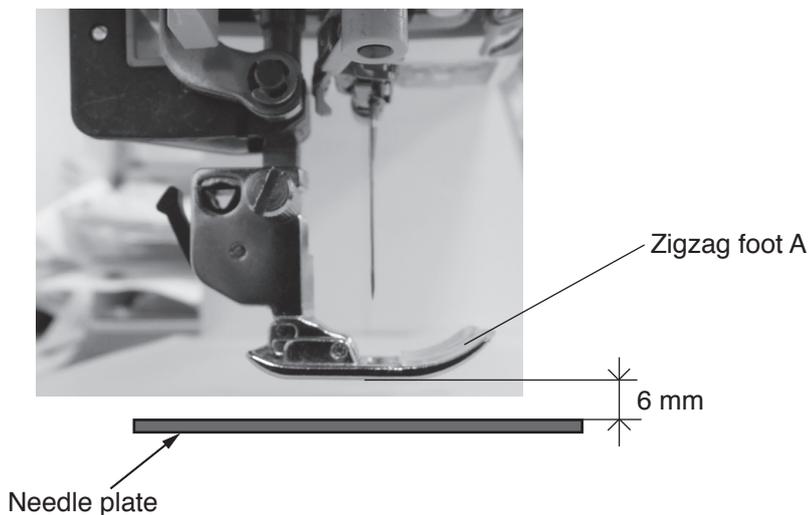
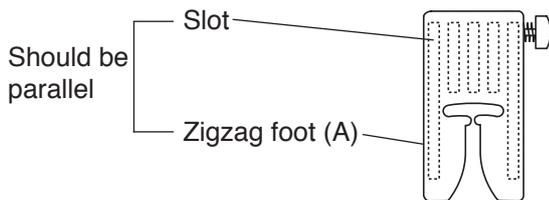
The clearance between the presser foot and the surface of the needle plate should be 6 mm when the presser foot is raised.

The presser foot (zigzag foot A) should be parallel to the slot of the feed dog teeth when attached.



To adjust:

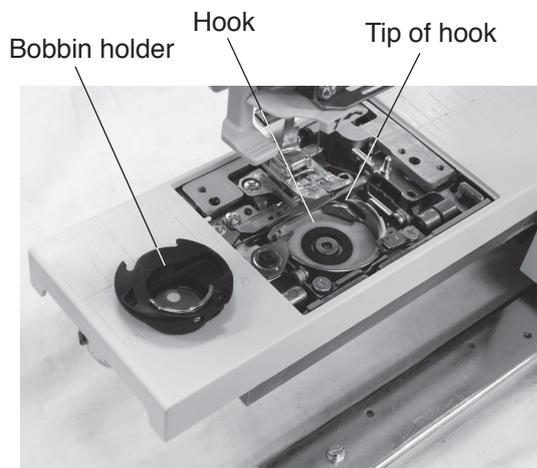
1. Attach the zigzag foot (A).
2. Drop the feed dogs.
3. Raise the presser foot with the presser foot lifter.
4. Open the face cover.
Loosen the setscrew on the presser bar supporter to adjust the presser foot direction as illustrated so the slot for the feed dog teeth and the zigzag foot should be parallel.
5. Place the 6 mm spacer (block) between the presser foot and the needle plate. Tighten the setscrew while depressing the foot against the spacer.



Mechanical adjustment

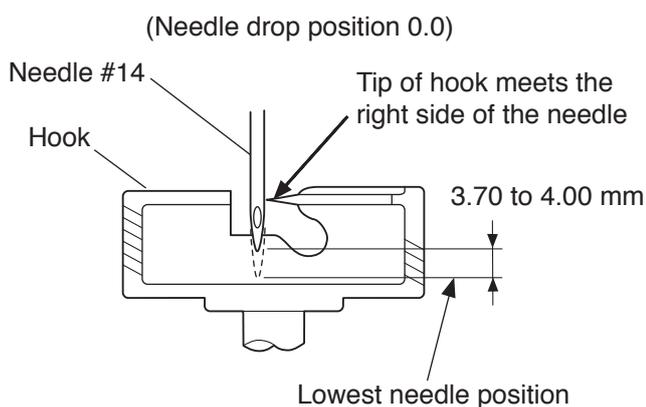
Hook timing

The amount of ascending travel of the needle bar from its lowest position to the position (Needle drop position 0.0) where the tip of the rotary hook exactly meets the right side of the needle should be 3.70 to 4.00 mm.

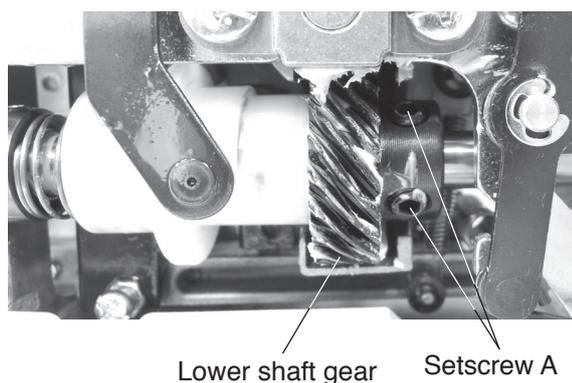


To adjust:

1. Remove the bed cover and base cover (refer to page 3).
2. Attach the needle #14.
3. Turn the power switch ON. Select straight stitch. Set the needle drop position at "0.0".
* Do not turn the switch OFF.
4. Remove the presser foot, the needle plate and the bobbin holder.



5. Turn the handwheel toward you to lower the needle at its lowest position.

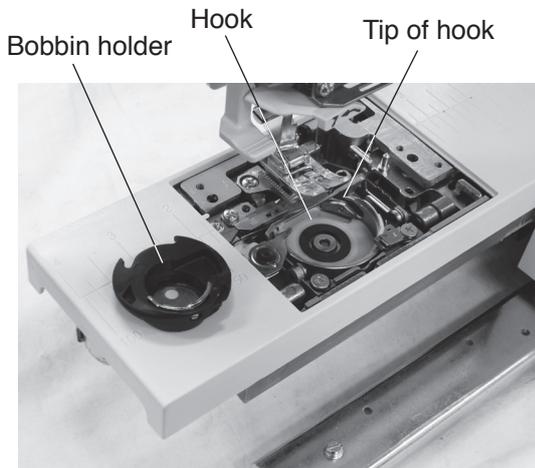


6. Loosen the setscrews A (use an Allen wrench of 2 mm width across flats).
7. Turn the handwheel toward you to raise the needle bar by 3.85 mm from its lowest position.
8. Turn the lower shaft gear until the tip of rotary hook meets with the right side of the needle. Tighten the setscrews A.
* Check the needle bar height after this adjustment.
9. Attach the bed cover and base cover.

Mechanical adjustment

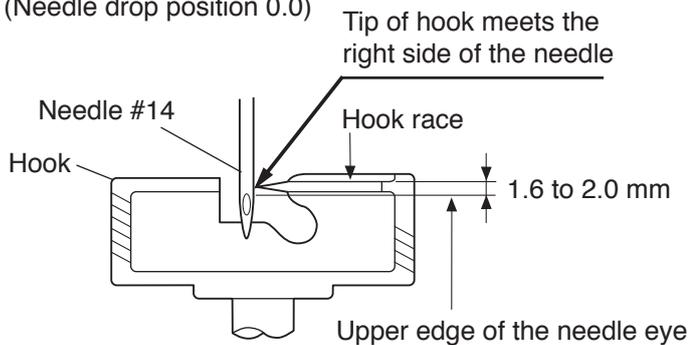
Needle bar height

The distance between the upper edge of the needle eye and the hook race should be in the range of 1.6 to 2.0 mm when the tip of the hook meets right side of the needle in the needle drop position "0.0" as the needle ascends from its lowest position.

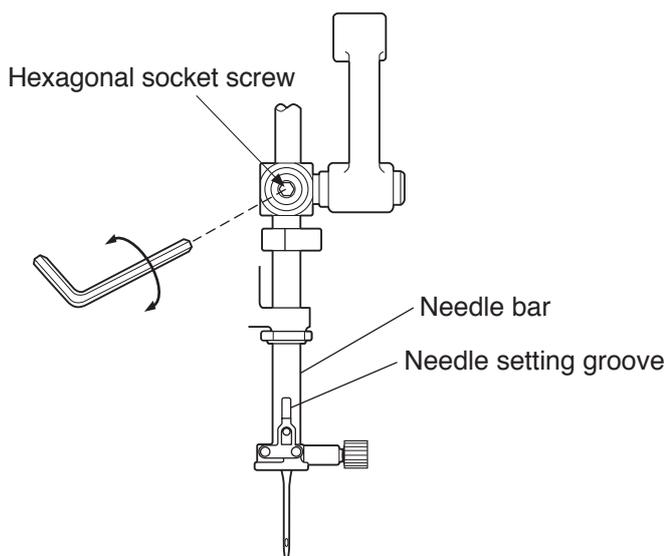


1. Attach the needle #14.
2. Turn the power switch ON. Select straight stitch. Set the needle drop position at "0.0".
* Do not turn the switch OFF.
3. Remove the presser foot, the needle plate and the bobbin holder.

(Needle drop position 0.0)



4. Turn the handwheel toward you until the tip of hook meets the right side of the needle.

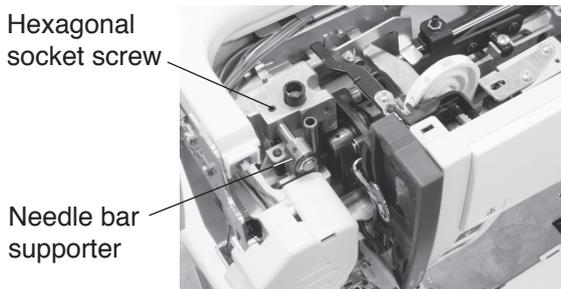
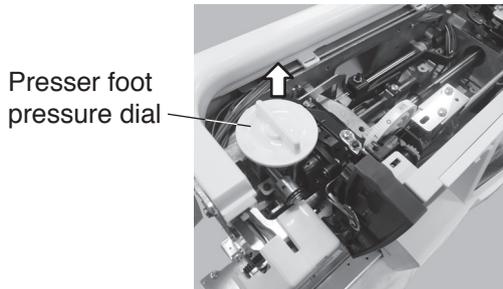
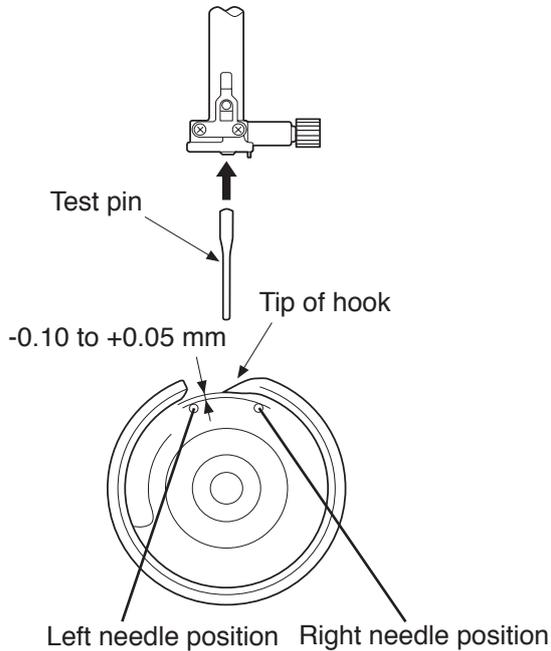


5. Loosen the hexagonal socket screw (use an Allen wrench of 2 mm width across flats).
6. Move the needle bar to adjust the needle bar height. Tighten the hexagonal socket screw. Be careful not to turn the needle bar.
7. Attach the bobbin holder and the needle plate.

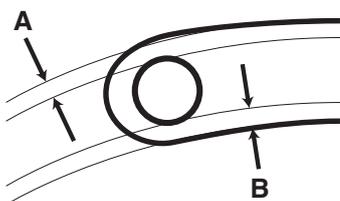
Mechanical adjustment

Clearance between needle and tip of the rotary hook (method 1)

The clearance between the needle and the point of hook should be -0.10 to $+0.05$ mm.



Clearances A and B must be even



1. Remove the top cover (refer to page 2).
2. Remove the presser foot, the needle plate and the bobbin holder.
3. Remove the presser foot pressure dial.
4. Attach the test pin.
5. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the factory setting mode. Press "Bobbin" key. The machine will set the zigzag width at maximum.
6. Turn the handwheel toward you until the tip of the hook comes behind the test pin.

7. Loosen the hexagonal socket screw (use an Allen wrench of 2 mm width across flats) and move the needle bar supporter in the direction of the red arrow so the test pin just touch the tip of the hook. Tighten the hexagonal socket screw.

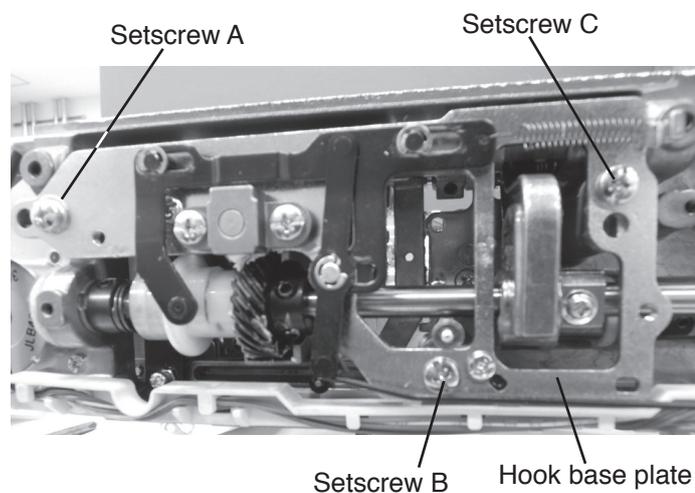
8. Attach the bobbin holder and the needle plate. Check the needle drop position. The needle drops in the center of the needle plate hole as shown.

If the clearances A and B are not even, adjust the needle drop position first and then adjust the clearance between the needle and the tip of the hook by the method (2) on the next page.

Mechanical adjustment

Clearance between needle and tip of the rotary hook (method 2)

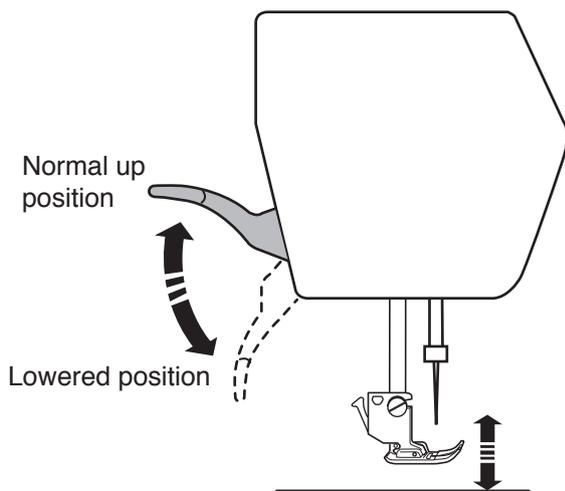
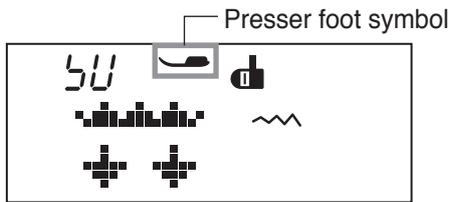
The clearance between the needle and the point of hook should be -0.10 to $+0.05$ mm.



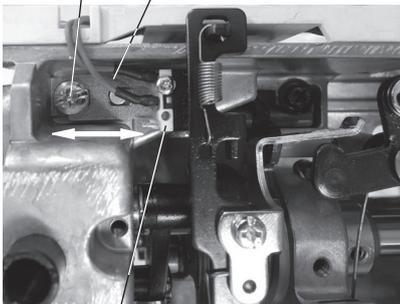
1. Remove the bed cover (refer to page 3).
2. Loosen the setscrews A, B and C. Tighten the setscrew C lightly.
3. Turn the handwheel toward you until the tip of the hook comes behind the test pin. Adjust the clearance between the needle and the tip of the rotary hook, by moving the hook base plate up or down, so the test pin just touch the tip of the hook.
4. Tighten the setscrews A, B and C.
5. Check the backlash between the lower shaft gear and the hook drive gear. If the backlash is too great or the engagement of the gears is too tight, adjust the backlash (refer to page 19).

Mechanical adjustment

Presser bar lifter switch position adjustment

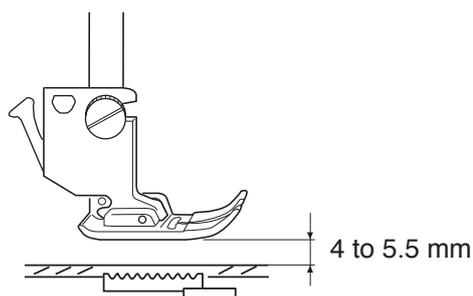


Setscrew
Switch set plate



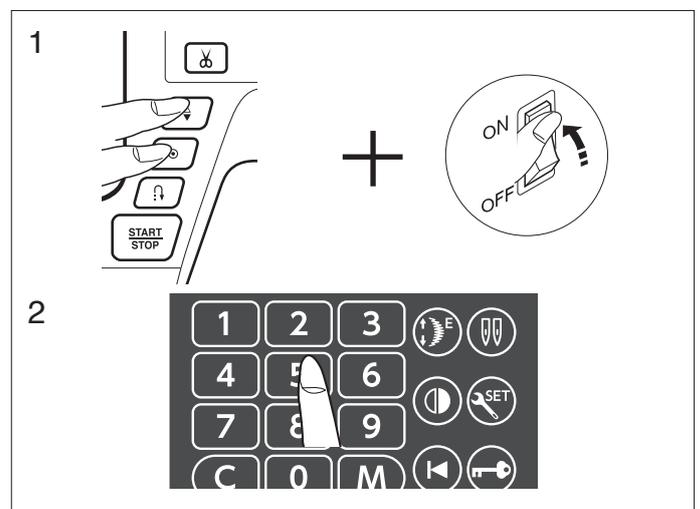
Presser bar lifter switch

Top left side of the machine
(Presser foot presser dial removed)



To check:

1. While pressing the needle up/down and lock stitch buttons, turn the power switch on. The LCD displays "----".
2. Press "5" key to enter the sensor test mode.
3. When the presser bar is at normal up position, the presser foot symbol appears. When the presser bar is at lowered position, the presser foot symbol disappears. If not, follow the procedure below.



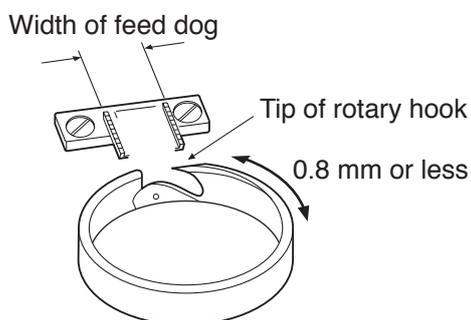
To adjust:

1. Remove the top cover (refer to page 2).
2. Loosen the setscrew and adjust the position of the switch set plate. The clearance between the foot and needle plate should be in the range of 4 to 5.5 mm when the presser foot symbol disappears.
3. Turn off the power switch.
4. Attach the top cover.

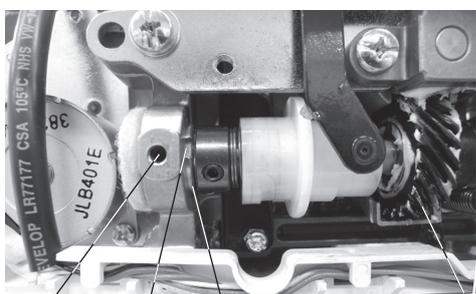
Mechanical adjustment

Backlash between hook drive gear and lower shaft gear

The rotary play of the hook should be 0.8 mm or less when the tip of rotary hook is within the width of feed dog.



1. Remove the base cover and bed cover (refer to page 3).
2. Remove the presser foot, the needle plate and the bobbin holder.
* Cover the needle plate with the fabric to prevent damaging when removing, the needle plate.
3. Turn the handwheel toward you so the tip of the rotary hook is within the width of feed dog as shown. Check the rotary play of the hook.

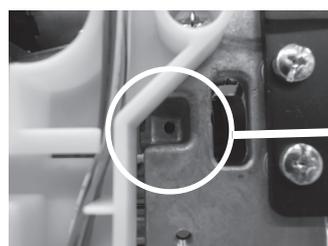
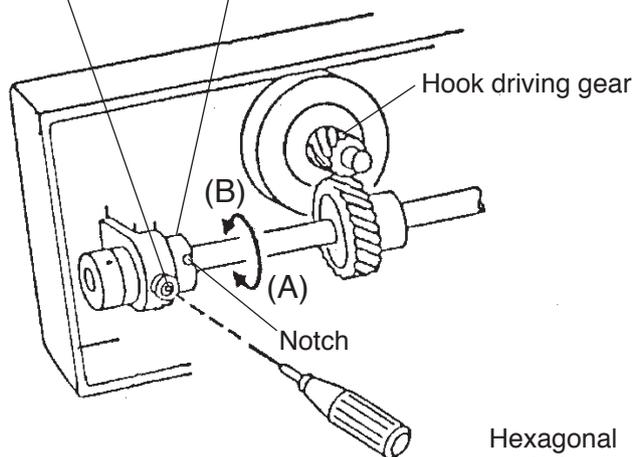


Hexagonal socket screw C
Notch
Lower shaft gear

4. If the backlash is too much or too little, loosen the hexagonal socket screws (C) and (D) (use an Allen wrench of 2 mm width across flats).
* Turn the both lower shaft bushings in the direction (A), if the backlash is more than 0.8 mm.
* Turn the both lower shaft bushings in the direction (B), if the engagement of gear is too tight, and the machine does not turn smoothly.

NOTE:

The notches in the both bushings should face in the same direction.



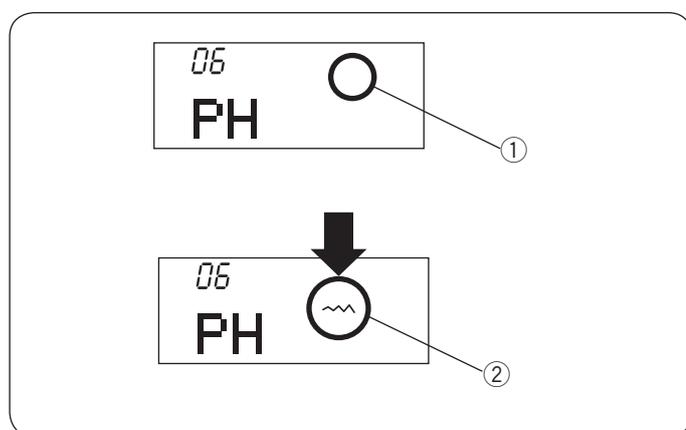
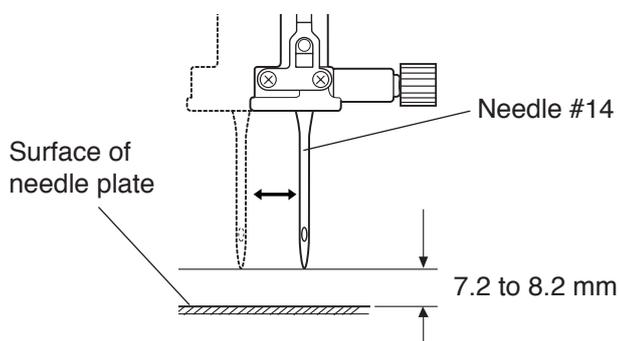
Notch
Hexagonal socket screw D
Lower shaft bushing (rear)

5. Tighten the hexagonal socket screws (C) and (D).
6. Attach the base cover, bed cover, the presser foot, needle plate and the bobbin holder.

Mechanical adjustment

Upper shaft shield plate position

When the machine is set for zigzag stitch, the needle should start to swing 7.2 to 8.2 mm above the surface of the needle plate.

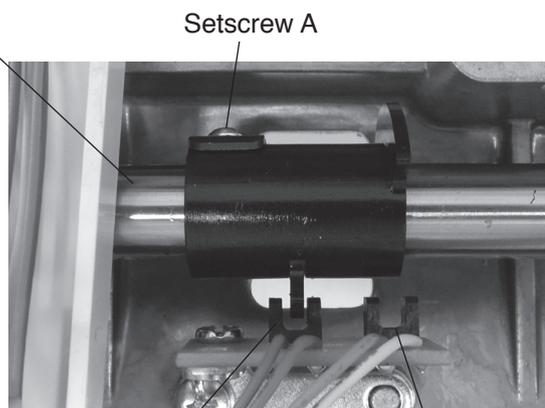
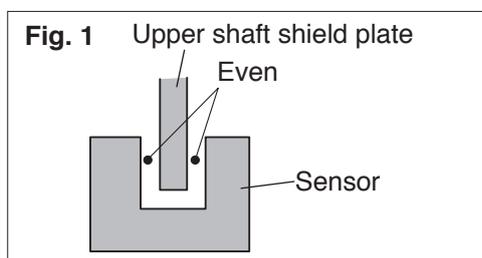
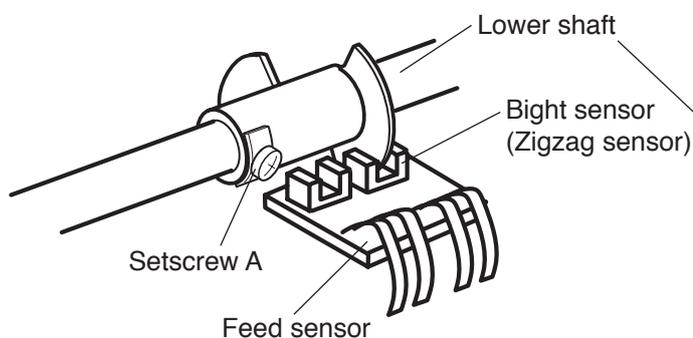


To check:

1. Attach the needle #14.
2. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on. The LCD display "----".
3. Press "1" key to enter the self-diagnostic mode. Press the start/stop button 5 times to enter phase check mode (LCD displays "06" and "PH").
4. Turn the handwheel toward you until PH changes to " " ① to "~~~~" ② on LCD.
5. The needle height should be 7.2 to 8.2 mm above from the surface of the needle plate. If not, adjust the upper shaft shield position.

To adjust:

1. Remove the top cover.
2. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on. The LCD display "----". Press "1" key to enter the self-diagnostic mode. Press the start/stop button 5 times to enter phase check mode (LCD displays "06" and "PH").
3. Turn the handwheel toward you to raise the needle at 7.7 mm above the surface of the needle.
4. Loosen the setscrew A of the lower shaft shield plate. Turn shield plate until the sensor signal changes from " " ① to "~~~~" ②.
5. Position the lower shaft shield plate in the center of slit of the lower shaft sensor (see fig. 1). Tighten the setscrew A.
5. Attach the top cover.

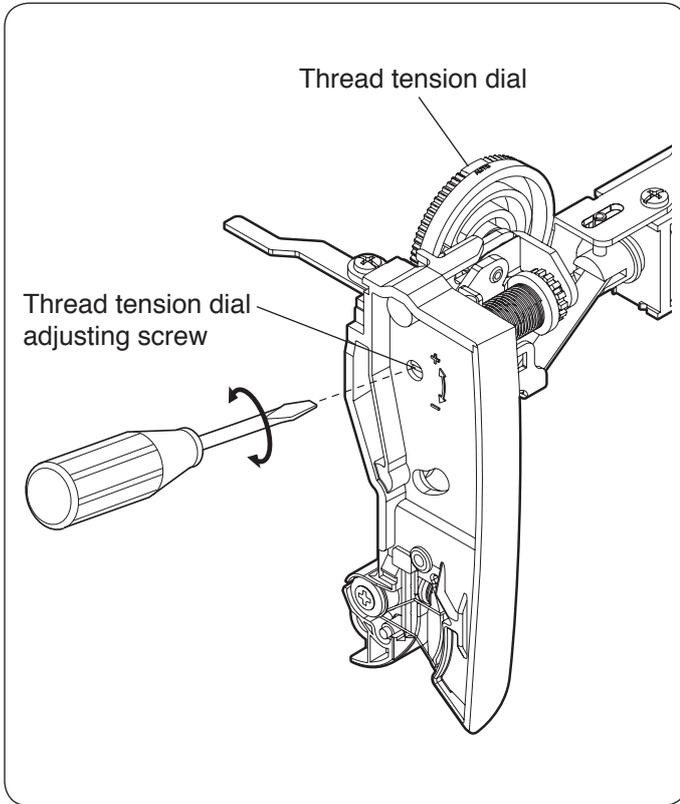


Feed sensor Bight sensor (Zigzag sensor)

Mechanical adjustment

Upper thread tension

The standard upper thread tension should be 75 to 90 grams when pulling the thread (while polyester thread size 50) at the speed of 110 mm/sec with the tension at "AUTO" (Be sure the presser foot is lowered).

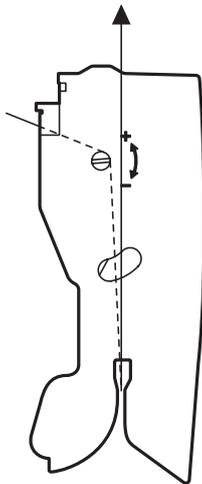


1. Set the thread tension dial to "AUTO".
2. Open the face cover.
Adjust the tension by turning the thread tension adjusting screw.

To lower the tension, turn it clockwise (in the direction of "-").

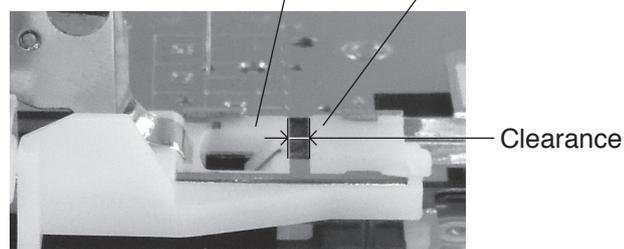
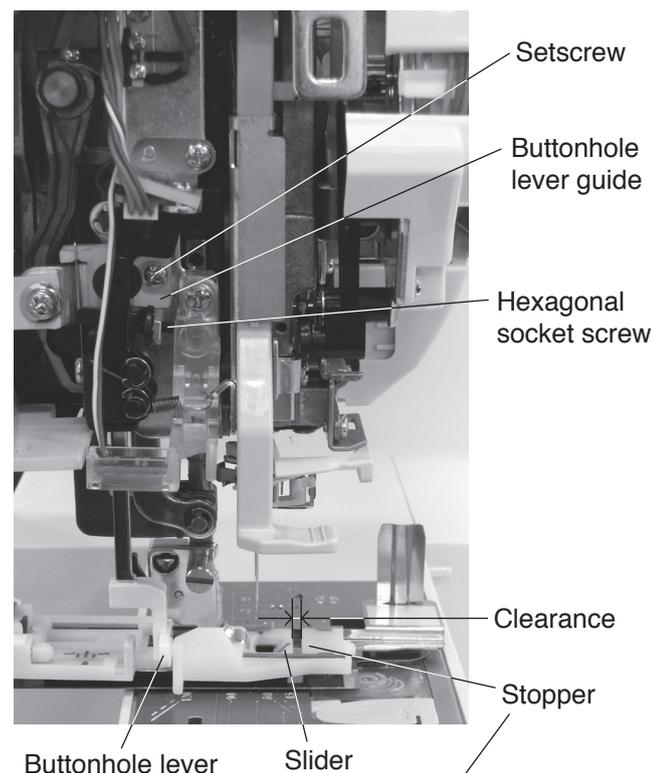
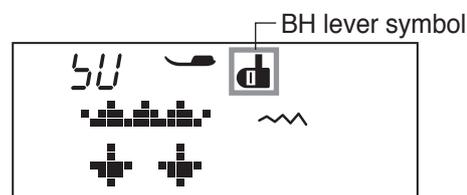
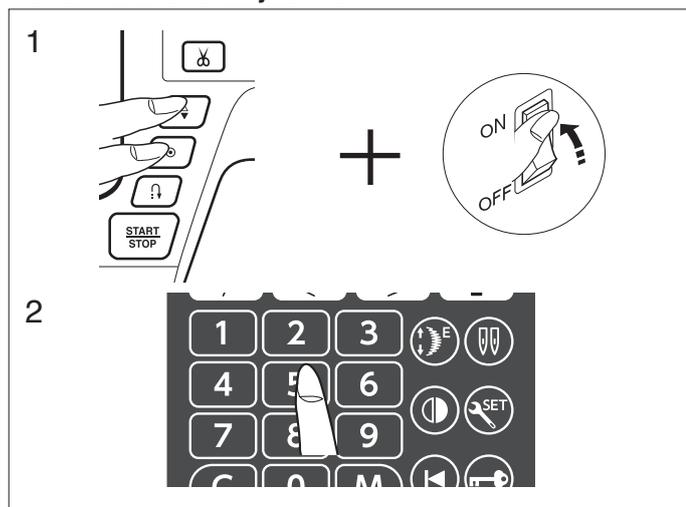
To tighten the tension, turn it counterclockwise (in the direction of "+").

Pulling direction: (pulling speed 110 mm/sec.)



Mechanical adjustment

Buttonhole lever adjustment



To prepare:

1. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on.
The LCD display “----”.
Press “5” key to enter the sensor test mode.
2. Attach the automatic buttonhole foot R.
Place a piece of paper between the presser foot and the needle plate for easier adjustment.

Buttonhole lever sensor position adjustment:

1. Adjust the clearance between the stopper and the presser foot slider to 1.6 mm.
Lower the buttonhole foot and the buttonhole lever.
2. Loosen the hexagonal socket screw until LCD displays BH lever symbol. Tighten the hexagonal socket screw slowly until the lever symbol disappears.

Buttonhole lever guide adjustment:

1. Adjust the clearance between the stopper and the presser foot slider to 2.6 mm.
Lower the buttonhole foot.
2. Lower the buttonhole lever. Loosen the setscrew of the Buttonhole lever guide.
Adjust the buttonhole lever guide left or right so the Buttonhole lever slightly touches to the Buttonhole foot.
Tighten the setscrew.

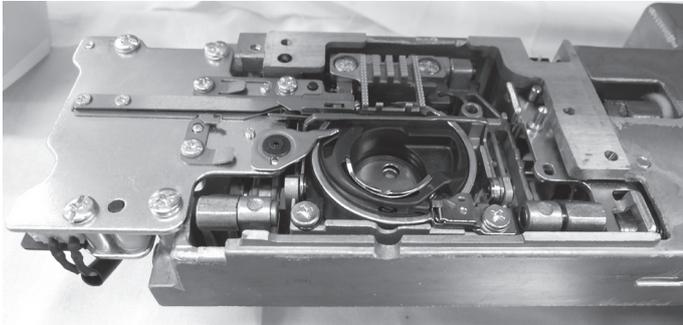
To check:

1. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on.
The LCD display “----”.
Press “5” key to enter the sensor test mode.
2. Adjust the clearance between the stopper and the presser foot slider to 1.4 mm.
Be sure that the LCD displays BH lever symbol.
Adjust the clearance between the stopper and the presser foot slider to 1.8 mm.
Be sure that the BH lever symbol disappears.
If the BH lever symbol appears, adjust the buttonhole sensor position again.
3. After checking the buttonhole sensor position, Slide the buttonhole lever so the buttonhole lever does not touch to the buttonhole foot (Buttonhole lever should be released).
Be sure that BH lever symbol is not on the LCD.
Move the buttonhole lever to the right and left very slightly, and be sure again that the BH lever symbol is not shown on the LCD.
If the BH lever symbol appears, adjust the buttonhole lever guide adjustment again.

Mechanical adjustment

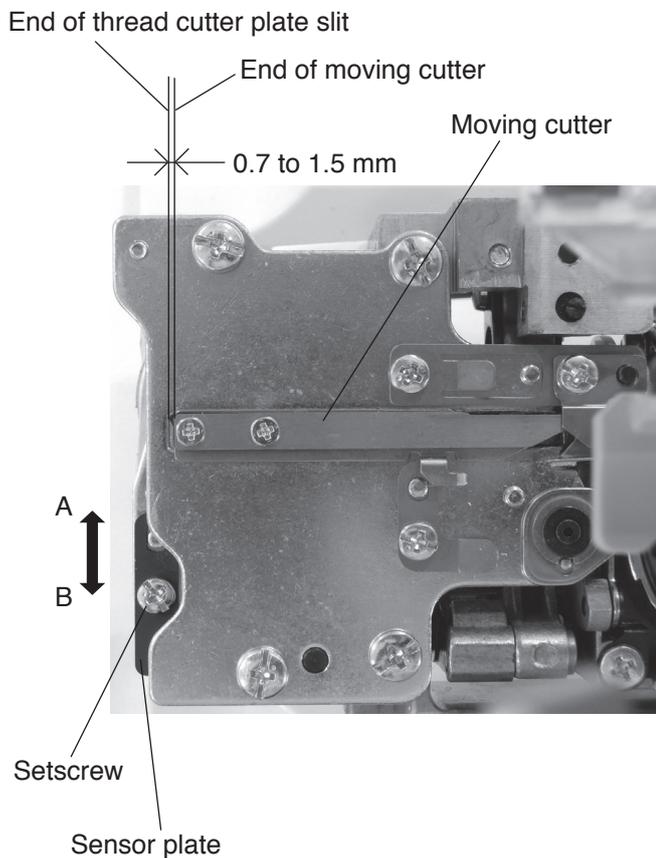
Thread cutter

The distance between the end of thread cutter plate slit and the end of moving cutter should be in the range of 0.7 to 1.5 mm.



To check:

1. Remove the bed cover and free arm cover (refer to pages 3 to 4).
2. Turn the power switch ON.
The moving cutter motor is initialized, and moving cutter moves to its home position automatically.
3. The distance between the end of moving cutter and the end of thread cutter plate slit should be 0.7 to 1.5 mm.
If not, adjust it as follows.



To adjust:

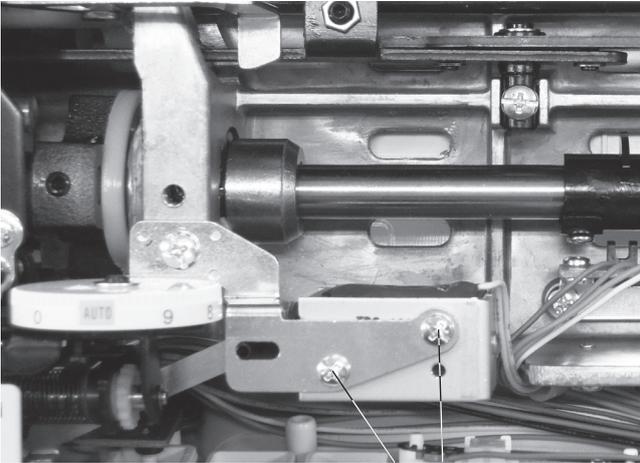
1. Turn the power switch OFF. Loosen the setscrew on the sensor plate.
2. If the distance is smaller than 0.7 mm, move the sensor plate in the direction of A.
If the distance is larger than 1.5 mm, move the sensor plate in the direction of B.
3. Turn the power switch ON to initialize the cutter position and check if the distance is within 0.4 to 1.2 mm.
4. Attach the bed cover and free arm cover.

Mechanical adjustment

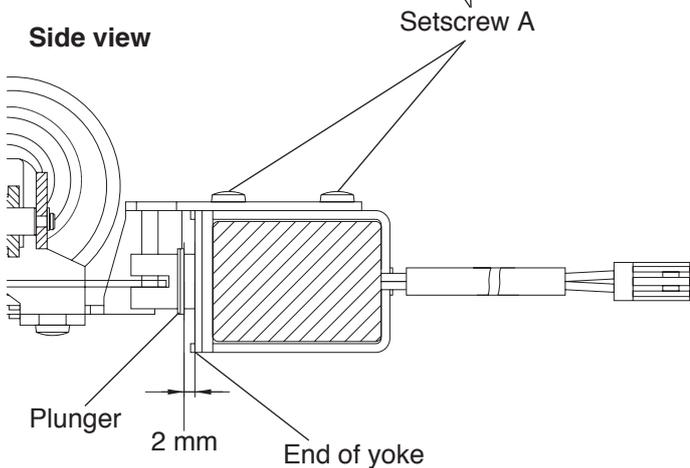
Solenoid position adjustment

When the tension disk is closed, the clearance between the plunger and the end of yoke should be 2.0 mm.

TOP VIEW



Side view

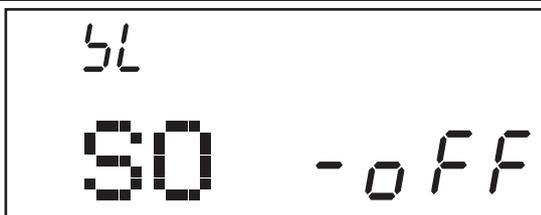
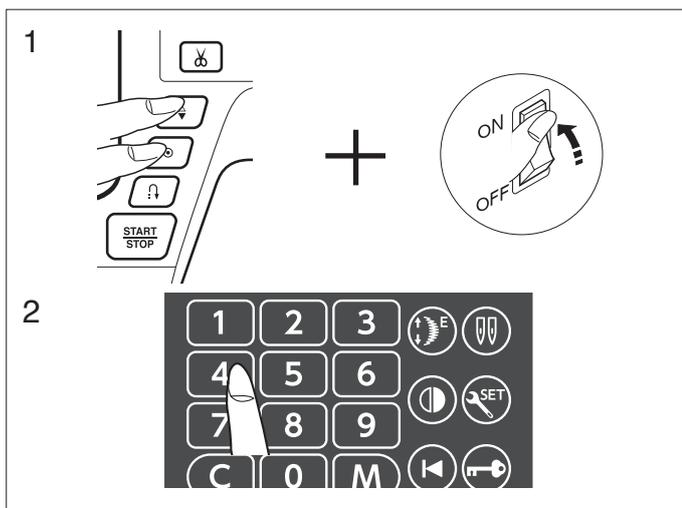


[To check]

1. Remove the top cover (Refer to page 2).
2. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on. The LCD display “----”. Press “4” key to enter the solenoid test mode.
3. Press the needle up/down button to release the thread tension. The LCD will display “--on”. Make sure the needle thread in the tension disk can be pulled when the confirm button is pressed.
4. Turn the power switch off.
5. Attach the top cover.

[Adjustment]

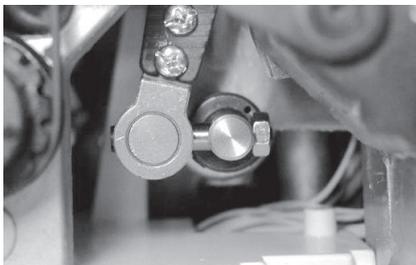
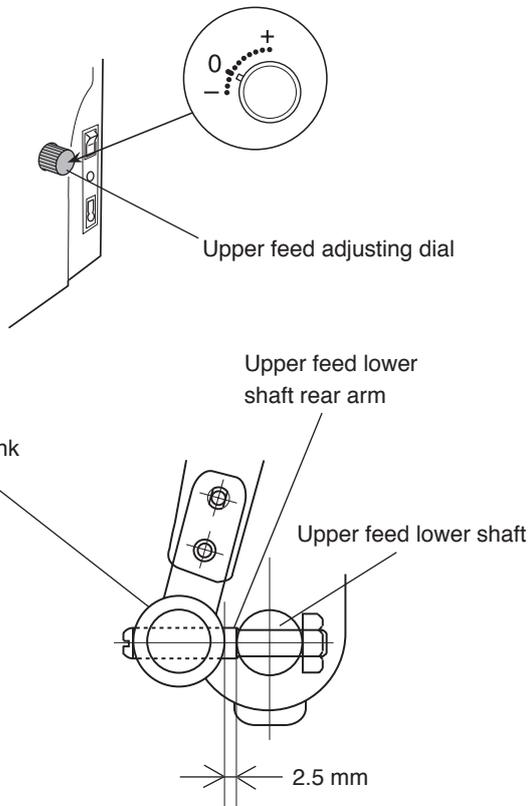
1. Remove the top cover.
2. Loosen the setscrews A.
3. Adjust the clearance between the plunger and the yoke to 2 mm with the tension disk closed.
4. Tighten the setscrews A.
5. Attach the top cover.



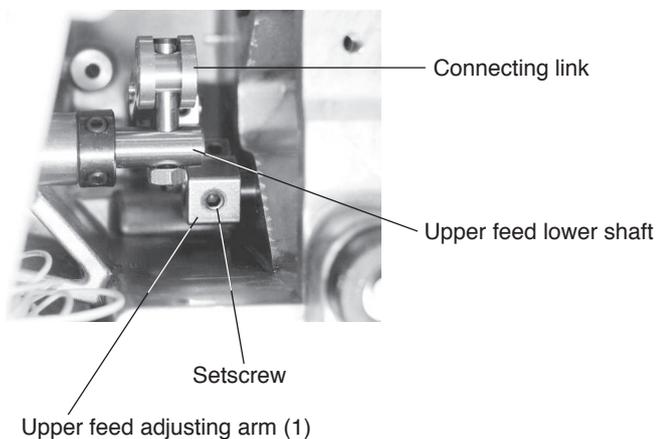
Mechanical adjustment

Upper feed dog (1)

The clearance between the connecting link and upper feed lower shaft should be 2.5 mm when the upper feed adjusting dial is set to "0".



View from the belt cover side



View from the bottom

To check:

1. Set the upper feed adjusting dial at "0". Remove the belt cover and base cover (Refer to page 1 to 2).
2. Turn the power switch on and select ($\frac{1}{4}$) stitch. Lower the feed dog.
3. Press the needle up/down button twice to raise the needle, and the upper feed dog position will be initialized.
4. Check if the clearance between the connecting link and upper feed lower shaft is 2.5 mm. If not, adjust it as follows.

To adjust:

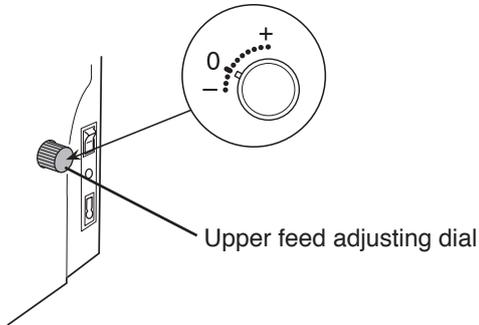
1. Loosen the setscrew (use an Allen wrench of 2 mm width across flats) on the upper feed adjusting arm (1). Adjust the clearance between the connecting link and upper feed lower shaft to 2.5 mm.

Mechanical adjustment

Upper feed dog (2)

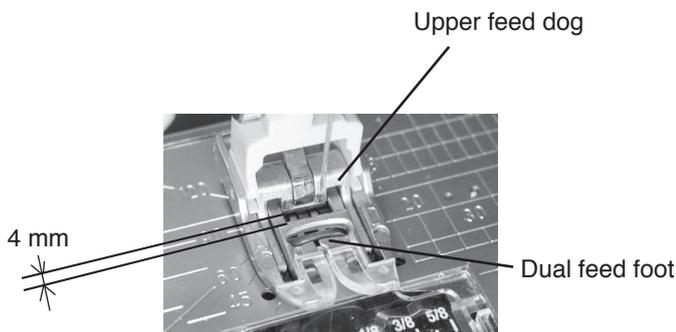
The clearance between the dual feed foot and upper feed dog should be 4 mm when the stitch length is set at "0".

* Check the upper feed dog (1) (refer to page 25) before this adjustment.

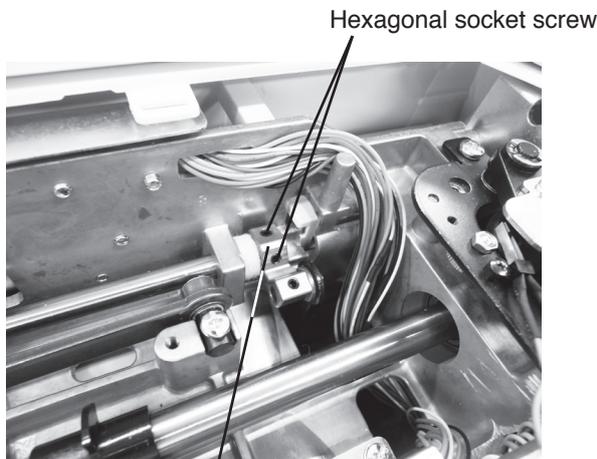


To check:

1. Set the upper feed adjusting dial at "0". Attach the dual feed foot.
2. Turn the power switch on and select ($\frac{1}{2}$) stitch. Lower the feed dog.
3. Press the needle up/down button twice to raise the needle, and the upper feed dog position will be initialized.
4. Press the presser foot lifter button to lower the presser foot. Turn the power switch off.



5. The clearance between the dual feed foot and upper feed dog should be 4 mm. If not, follow the procedure below.



To adjust:

1. Remove the top cover (refer to page 2).
2. Loosen the hexagonal socket screws on upper feed upper shaft rear arm (use an Allen wrench of 2 mm width across flats).
3. Insert the 4 mm spacer between the upper feed dog and dual feed foot to adjust the clearance. Tighten the hexagonal socket screws.

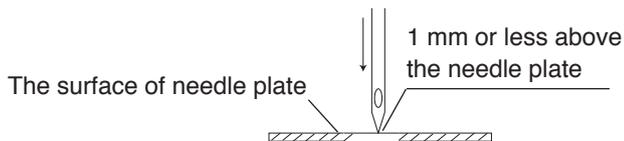
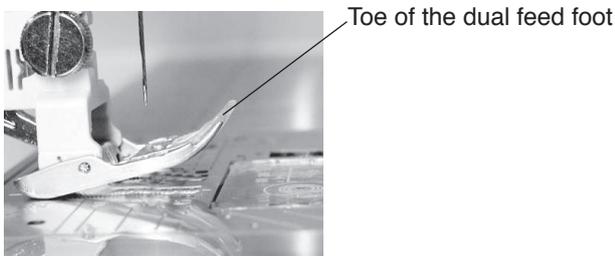
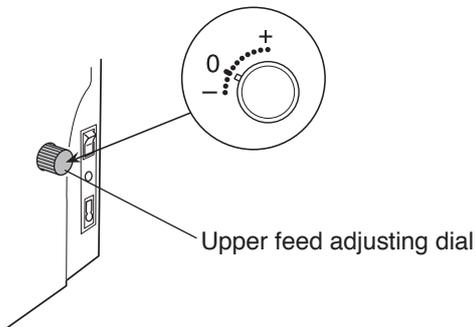
Upper feed upper shaft rear arm

View from the right upper corner of the machine

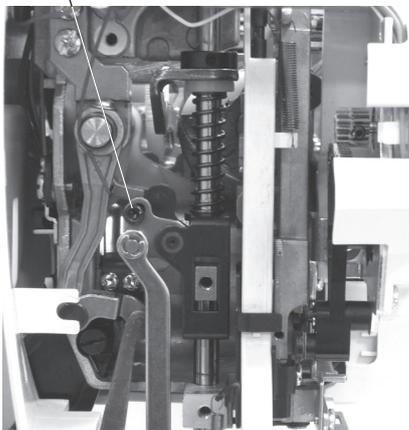
Mechanical adjustment

Upper feed dog (3)

The dual feed foot sits on the needle plate firmly with no gap when the needle tip comes 1 mm or less above the needle plate.



Hexagonal socket bolt



To check:

1. Set the upper feed adjusting dial at "0".
Attach the dual feed foot.
2. Turn the power switch on and select ($\frac{1}{2}$) stitch.
Lower the feed dog.
3. Press the needle up/down button twice to raise the needle, and the upper feed dog position will be initialized.
4. Press the presser foot lifter button to lower the presser foot.
Turn the power switch off.
5. Raise the toe of the dual feed foot and leave it as it is.
6. Turn the handwheel toward you to lower the needle until the needle tip comes 1 mm or less above the needle plate.
7. The toe of the foot lands on the needle plate and there is no gap to allow the foot flapping.
If not, adjust it as follows.

To adjust:

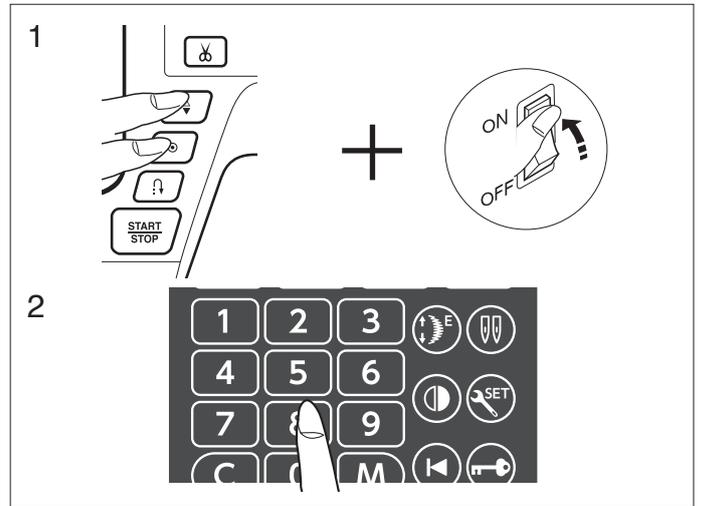
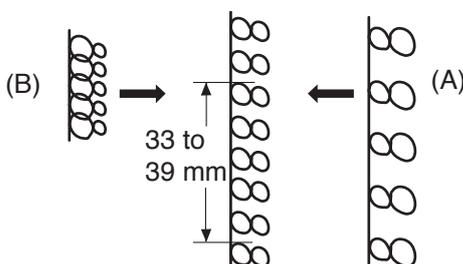
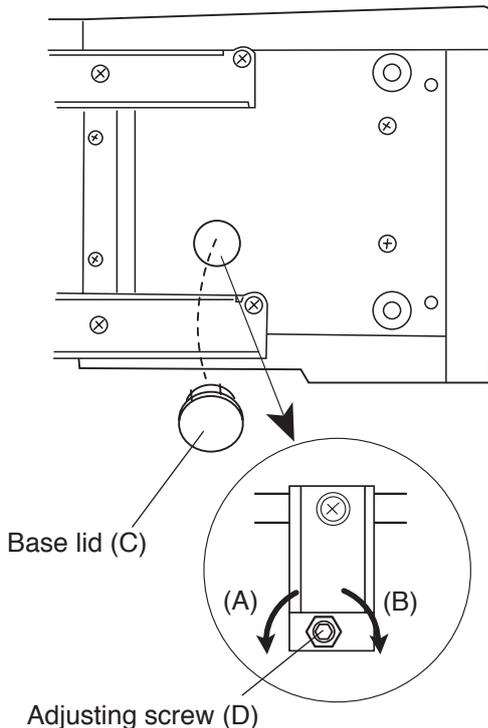
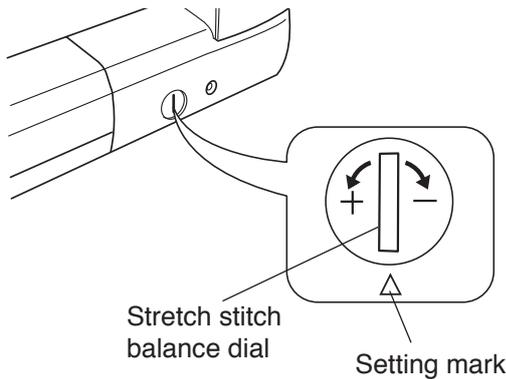
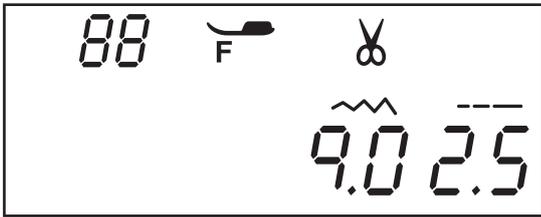
1. Open the face plate. Loosen the hexagonal socket bolt (use an Allen wrench with 2.5 mm width across flats).
2. Turn the handwheel toward you until the needle tip matches with the surface of the needle plate.
3. Tighten the hexagonal socket bolt while pressing the dual feed foot against the needle plate.
4. Check if there is no gap (see step 7 above).

Mechanical adjustment

Stretch stitch feed balance

Adjust the stretch stitch balance dial at the setting mark.

The measurement of five of test patterns should be in the range of 33 to 39 mm as shown.



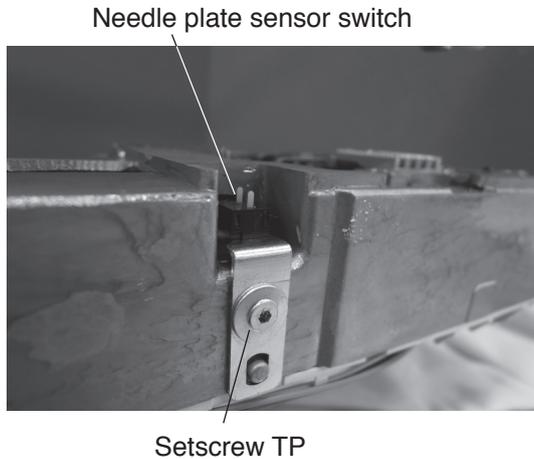
To adjust:

1. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on. The LCD display “----”. Press “8” key.
2. Set the stretch stitch balance dial at the setting mark.
3. Attach the satin stitch foot (F). Sew test patterns and check the measurement of five of them. The range of patterns should be in the range of 33 to 39.
4. If not, remove the base lid C. Press the right arrow of button. The adjusting screw D comes to the adjusting position.
 - Turn the adjusting screw in the direction of A if the measurement is more than 39 mm.
 - Turn the adjusting screw in the direction of B if the measurement is less than 33 mm.
5. Press the right arrow of button and sew test patterns. Check the measurement of five of them.
6. Turn off the power switch.
7. Attach the base lid C.

Mechanical adjustment

Needle plate switch (method 1)

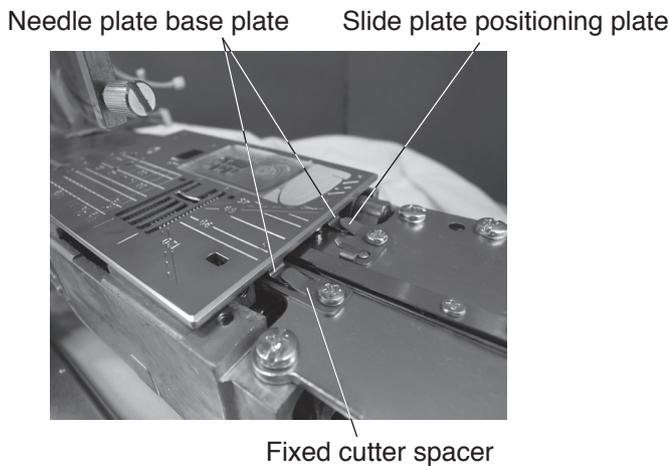
Fig. 1



To check and adjustment:

1. Prepare the needle plate and the needle plate for straight stitch.
2. Remove the bed cover and free arm cover.
3. Insert the needle plate base plate under the fixed cutter spacer and the slide plate positioning plate. Press the  mark to attach the needle plate.
4. The distance between the bottom side of the needle plate and the micro switch base plate should be in the range of 11 to 11.5 mm.
If not, loosen the setscrew TP and move the base plate up or down to adjust it. Tighten the setscrew TP firmly after the adjustment.
The actuator of the micro switch should be aligned with the needle plate sensor knob as shown in fig 3.

Fig. 2



(Needle plate sensor switch)

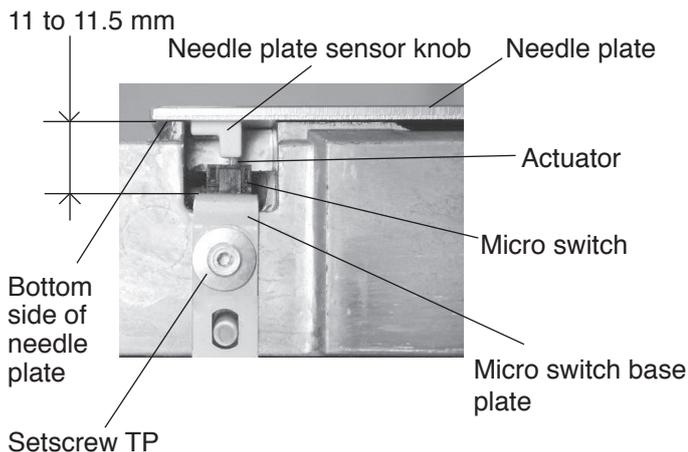
To remove:

1. Remove the base cover, bed cover and the free-arm cover (Refer to page 2 to 4).
2. Disconnect the needle plate sensor switch connector from the printed circuit board A (Refer to page 7).
3. Remove the setscrew TP and the needle plate sensor switch.

To attach:

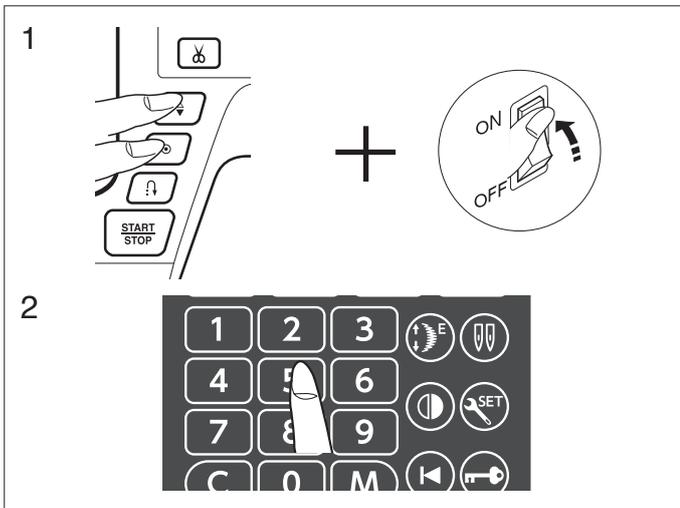
1. Attach the needle plate sensor switch with the setscrew TP. Tighten the setscrew TP lightly.
2. Connect the needle plate sensor switch connector to the printed circuit board A.
3. Check the needle plate sensor and adjust as necessary (see the adjustment procedure above).
4. Tighten the setscrew TP firmly.
5. Attach the base cover, bed cover and free-arm cover.

Fig. 3



Mechanical adjustment

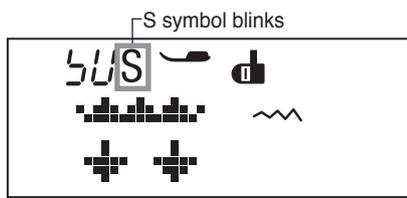
Needle plate switch (method 1)



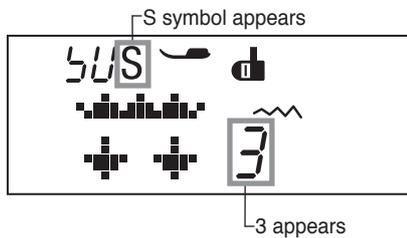
To check:

1. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on.
The LCD display “----”.
Press “5” key to enter the sensor test mode.

Needle plate attached:



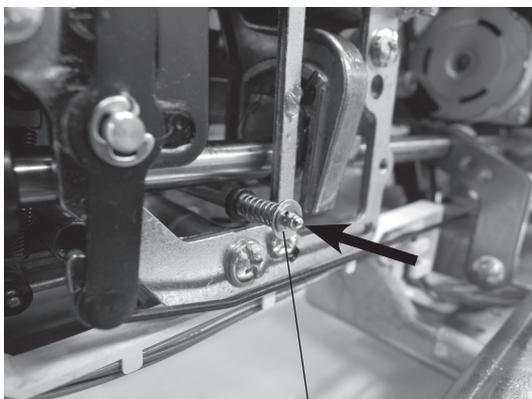
Needle plate for straight stitch attached:



2. Be sure that S symbol appears and blinks when the needle plate is attached.

3. Replace the needle plate with the needle plate for straight stitch. Be sure that S symbol and number 3 appears.
If not, adjust the micro switch base plate position (see page 28).

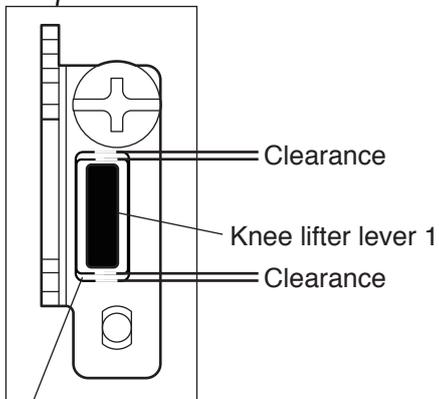
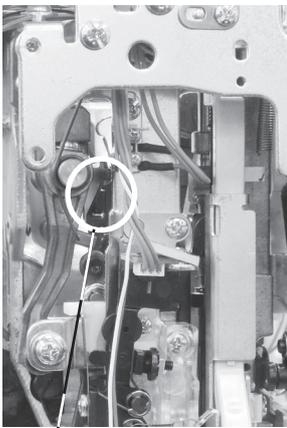
* To remove the needle plate, press the needle plate replacing bar in the direction of arrow with a screwdriver.



Needle plate replacing bar

Mechanical adjustment

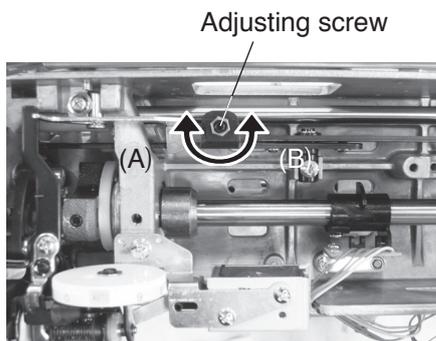
Knee lifter position



Presser bar lifter

To adjust:

1. Remove the top cover.
2. Open the face cover.
3. Remove the zigzag foot A.
4. Insert the knee lifter to the machine with the handle side up as sh.
5. Turn the knee lifter to the left to raise the presser foot. Be sure that there are clearances (clearance (upper) and clearance (lower)) between the knee lifter lever 1 and presser bar lifter. Be sure that the knee lifter shaft and the knee lifter lever 1 engage smoothly without play.
 - * Turn the adjusting screw to the direction (A) to up the knee lifter lever 1.
 - * Turn the adjusting screw to the direction (B) to down the knee lifter lever 1.
6. Remove the zigzag foot A.
7. Close the face cover.
8. Attach the top cover.



Diagnosis test

NOTE:

1. Be sure to disconnect the machine from the power supply when replacing parts.
2. The language on the LCD is English only.

Preparation

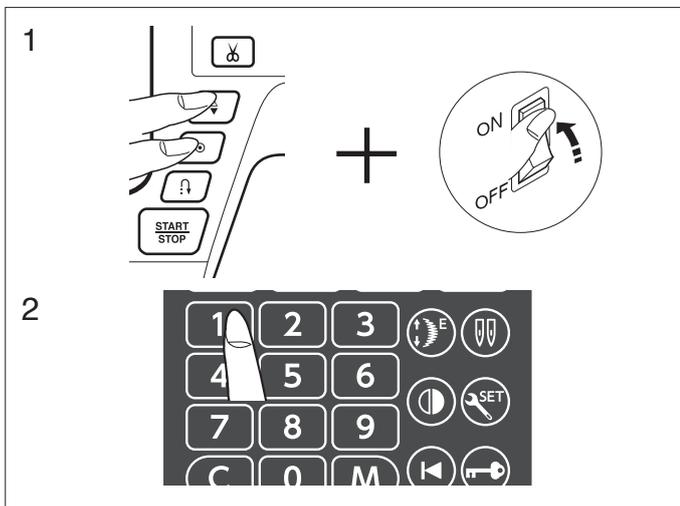
1. Shift the bobbin winder spindle to the right.
2. Turn the drop feed lever to the right (away from you) to raise the feed dog.
3. Slide the speed adjusting lever to the left.
4. Remove the presser foot and raise the presser bar lifter (at normal up position).
5. Set the needle bar at its highest position.

Before starting the diagnosis test.

Check or replace the following part(s) if nothing happens when the power switch is turned on:

1. Be sure that the machine is plugged in.
2. Be sure that the connectors are connected to the printed circuit board A (refer to page 7).
3. Replace the printed circuit board A (refer to page 7)
4. Replace the power supply cord.
5. Replace the switching power supply.

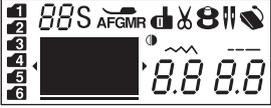
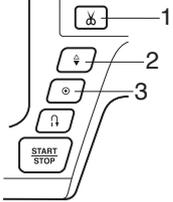
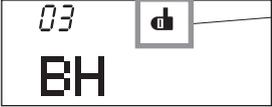
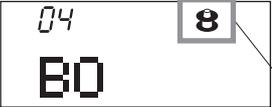
When replacing the sewing lamps or the printed circuit boards, do not turn on the machine.



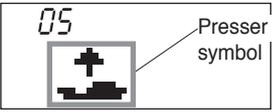
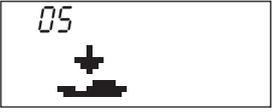
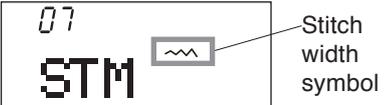
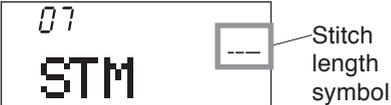
To start the diagnosis test:

1. While pressing the needle up/down and aut-lock stitch buttons, turn the power switch on.
The LCD screens display "----".
2. Press "1" key to enter the self-diagnostic mode.

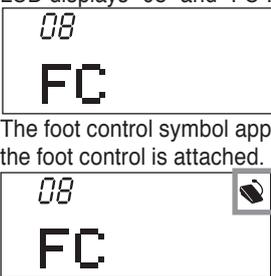
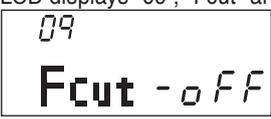
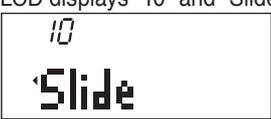
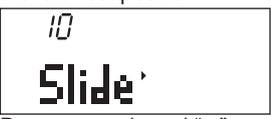
Diagnosis test

STEP AND ITEMS TO CHECK	PROCEDURE	CORRECT CONDITION	DEFECTIVE CONDITION
01) FUNCTION OF LCD, BUZZER AND LAMP	Turn on the power switch while simultaneously pressing the needle up/down button and thread cutter button. Press "1" key. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	Sewing lamp and LCD backlight lit. LCD displays "----".  Buzzer sounds. LCD displays symbols and numbers and blinks. Start/stop button blinks in red and green. 	"1" button is not responding. Sewing lamp does not lit. LCD backlight does not lit. LCD does not display. Buzzer does not sound. Machine lamp does not turned on. LCD does not display any symbols or not in order. –REMEDY– Calibrate the key position or replace the touch panel. Replace the circuit board A. Replace the machine lamp. Replace the touch panel. Replace the circuit board F.
02) BUTTON	 Press buttons 1 to 3. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "02" and "KEY". Buzzer sounds when button is pressed. Button number is displayed when the button is pressed.  LCD displays "F1" when button 1 is pressed. LCD displays "F2" when button 2 is pressed. LCD displays "F3" when button 3 is pressed.	Buzzer does not sound. LCD does not display the number correctly. –REMEDY– Replace the circuit board A. Replace the circuit board F.
03) BUTTONHOLE SENSOR	Lower the buttonhole lever. Move the buttonhole lever back and forth. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "03" and "BH". When the buttonhole lever is pulled, buzzer sounds and LCD displays BH symbol.  When the buttonhole lever is pushed, buzzer sounds and LCD displays BH symbol.	Buzzer does not sound. BH symbol does not appear. –REMEDY– Adjust the BH lever sensor position. Replace the BH lever sensor. Replace the circuit board A.
04) BOBBIN WINDER SWITCH	Move the bobbin winder spindle to the right. Return it to the left. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "04" and "BO". When the bobbin winder spindle is moved to the right, buzzer sounds and the bobbin symbol appears on LCD. When the bobbin winder spindle is moved to the left, buzzer sounds and the bobbin symbol disappears. 	Buzzer does not sound. Bobbin symbol is not displayed. –REMEDY– Adjust the bobbin winder switch position. Replace the bobbin winder switch. Replace the circuit board A.

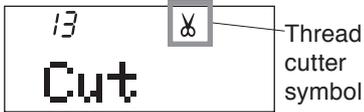
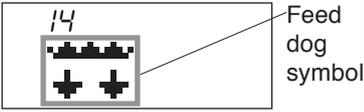
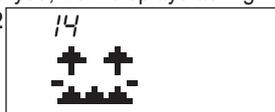
Diagnosis test

STEP AND ITEMS TO CHECK	PROCEDURE	CORRECT CONDITION	DEFECTIVE CONDITION
05) PRESSER FOOT LIFTER SWITCH	<p>Move the presser foot lifter up and down.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "05" and presser foot symbol.</p> <p>When the presser foot lifter is raised, LCD displays as Fig. 1.</p> <p>Fig. 1  Presser foot symbol</p> <p>When the presser foot lifer is lowered, buzzer sounds and LCD displays as Fig. 2.</p> <p>Fig. 2 </p>	<p>Buzzer does not sound. Presser foot symbol does not change.</p> <p>-REMEDY- Adjust the presser foot lifter switch position. Replace the presser foot lifter switch. Replace the circuit board A.</p>
06) UPPER SHAFT SHIELD POSITIONING SENSOR	<p>Turn the handwheel toward you. Lower the needle bar from its highest to lowest position. Raise the needle bar from its lowest position to highest position.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "06" and "PH".</p> <p></p> <p>Turn the handwheel. LCD displays stitch width symbol when the needle bar is at zigzag phase.</p> <p> Stitch width symbol</p> <p>LCD displays stitch length symbol when the needle bar is at feed phase.</p> <p> Stitch length symbol</p>	<p>Buzzer does not sound. Stitch width or length symbol does not appear.</p> <p>-REMEDY- Adjust the upper shaft shield plate position. Replace the sensor. Replace the circuit board A.</p>
07) ZIGZAG MOTOR (STEP MOTOR) AND FEED MOTOR	<p>Turn the handwheel toward you. Lower the needle bar its highest to position (zigzag phase). Press the needle up/down button.</p> <p>Raise the needle bar from its lowest position to its highest position (feed phase). Press the needle up/down button.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "07" and "STM".</p> <p> Stitch width symbol</p> <p>Press the needle up/down button when LCD displays stitch width symbol. The Zigzag motor will be initialized and get its default position.</p> <p> Stitch length symbol</p> <p>Press the needle up/down button when LCD displays stitch length symbol. The feed motor will be initialized and get its default position.</p>	<p>Zigzag motor does not get default position. Buzzer does not sound. LCD displays "E1".</p> <p>-REMEDY- Adjust the upper shaft shield plate position. Replace the zigzag motor. Replace the circuit board A.</p> <p>Feed motor does not get default position. Buzzer does not sound. LCD displays "E2".</p> <p>-REMEDY- Adjust the upper shaft shield plate position. Replace the feed motor. Replace the circuit board A.</p>

Diagnosis test

STEP AND ITEMS TO CHECK	PROCEDURE	CORRECT CONDITION	DEFECTIVE CONDITION
08) FOOT CONTROL	Attach the foot control to the machine. Depress the foot control as far as it goes, then release it. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "08" and "FC".  The foot control symbol appears when the foot control is attached. Buzzer sounds when the foot control is deeply depressed or released. Buzzer sounds when the foot control is connected or disconnected.	The foot control symbol does not appear. Buzzer does not sound. -REMEDY- Replace the foot control. Replace the machine socket (foot control socket). Replace the circuit board A.
09) FOOT CUT (THREAD CUTTER SWITCH)	Attach the thread cutter switch to the machine. Depress the thread cutter switch as far as it goes, then release it. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "09", "Fcut" and "-oFF".   Buzzer sounds and "--on" appears when the thread cutter switch is deeply depressed.	Buzzer does not sound. LCD does not display the "Fcut-on". -REMEDY- Replace the thread cutter switch. Replace the machine socket (thread cutter switch socket). Replace the circuit board A.
10) SLIDE VOLUME	Shift the slide volume from left to right, then return to the left. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "10" and "Slide".  Buzzer sounds and "◀" mark appears at the leftmost position.  Buzzer sounds and "▶" mark appears at the rightmost position.	Buzzer does not sound. The "◀ ▶" marks appears in opposite way. The "◀ ▶" marks does not appear. -REMEDY- Replace the circuit board A.
11) DC MOTOR	Press the needle up/down button. If the result is correct condition, press the start/stop button to proceed the next step. If the result is defective condition, press the reverse stitch button to proceed the next step.	LCD displays "11" and "DC".  Machine runs slow, then fast, and the needle bar stops at its highest position.	The machine motor does not start. The motor runs unstable. -REMEDY- Replace the DC motor. Replace the circuit board A.

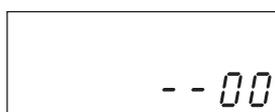
Diagnosis test

STEP AND ITEMS TO CHECK	PROCEDURE	CORRECT CONDITION	DEFECTIVE CONDITION
12) THREAD TENSION RELEASE SOLENOID	<p>Lower the presser foot. Press the needle up/down button.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "12", "SO" and "-off".</p> <p>Press the needle up/down button to switch the solenoid on or off.</p> <p>[ON] Buzzer sounds and the thread tension disk opens, and LCD displays "--on" while the thread tension disk opens. The thread tension disk will be closed automatically 5 seconds after the thread tension released.</p>  <p>[OFF] Buzzer sounds and the thread tension disc closes, and LCD displays "-off".</p> 	<p>The Thread tension disk does not open.</p> <p>-REMEDY- Replace the solenoid. Replace the circuit board A.</p>
13) THREAD CUTTER MOTOR, THREAD CUTTER SOLENOID	<p>Turn the handwheel toward you to raise the needle bar at its highest position. Press the needle up/down button.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "13" and "Cut".</p> <p>The thread cutter symbol will blink, and thread cutter motor will be initialized.</p> 	<p>Thread cutter motor does not work. LCD displays "E4".</p> <p>-REMEDY- Replace the thread cutter motor. Adjust the sensor plate position. Replace the printed circuit board A.</p> <p>Thread cutter symbol does not change.</p>
14) FEED DOG	<p>Turn the drop feed lever to the right. Turn the drop feed lever to the left.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "14" and feed dog symbol.</p> <p>When the drop feed lever is shifted away from you, LCD displays as Fig. 1.</p> <p>Fig. 1</p>  <p>When the drop feed lever is shifted toward you, LCD displays as Fig. 2.</p> <p>Fig. 2</p> 	<p>Buzzer does not sound.</p> <p>-REMEDY- Replace the drop feed dog lever unit. Replace the printed circuit board A.</p> <p>LCD does not change. LCD displays "PSErr".</p>

Diagnosis test

STEP AND ITEMS TO CHECK	PROCEDURE	CORRECT CONDITION	DEFECTIVE CONDITION
15) NEEDLE PLATE	<p>Attach the needle plate. Attach the needle plate for straight stitch.</p> <p>If the result is correct condition, press the start/stop button to proceed the next step.</p> <p>If the result is defective condition, press the reverse stitch button to proceed the next step.</p>	<p>LCD displays "15".</p> <p>When the needle plate is attached to the machine, LCD displays "PSZ".</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> </div> <p>When the needle plate for straight stitch is attached to the machine, LCD displays "PSS".</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> </div> <p>When nothing is attached to the machine, LCD displays "15" only.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> </div>	<p>Buzzer does not sound.</p> <p>-REMEDY- Replace the needle plate sensor. Replace the printed circuit board A.</p>

Buzzer sounds after few seconds when the self-diagnostic test has been finished.
The test result has been determined.



CORRECT:
Buzzer sounds and LCD displays "00"



DEFECTIVE:
Caution buzzer sounds and LCD displays the defective part number. Refer to pages 38 to 42 and fix the defective part.

The defective part number.
Refer to page 38 to 42 "Steps and items" section.

Turn the power switch off when the self-diagnostic test is finished.

TO DISPLAY THE VERSION OF THE PROGRAM

While pressing the needle up/down and auto-lock stitch buttons, turn the power switch on.
The LCD screen display "----".

Press "2" on the touch panel.

Press the Start/stop button once to display the version of the program.