

# **SERVICE MANUAL**

## **SKYLINE S9**

## TABLE OF CONTENTS

### Replacing external parts

Face cover .....	1
Belt cover .....	1
Top cover .....	2
Machine base .....	3
Base cover .....	3
Bed cover .....	3
Free arm cover .....	4
Front cover .....	5
Rear cover .....	6

### Replacing mechanical parts

Needle threader hook .....	7
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### Replacing electronic components

Printed circuit board A .....	8
Wireless communication module .....	9-10
Printed circuit board F .....	11
Speed control slider .....	11
Switching power supply unit .....	12
DC motor .....	13
Thread tension unit .....	14

### Mechanical adjustment

Feed dog height .....	15
Needle drop position .....	16
Clearance between needle and tip of the rotary hook .....	17-18
Hook timing .....	19
Needle bar height .....	20
Backlash between hook drive gear and lower shaft gear .....	21
Upper shaft shield plate position .....	22
Upper thread tension .....	23
Tension release mechanism .....	24
Needle threader hook position .....	25
Thread drawing lever .....	26
Upper feed dog .....	27-29
Buttonhole lever .....	30
Thread cutter .....	31
Presser bar lifter position .....	32
Presser foot lifter stopper position .....	33-34
Automatic presser foot lifter initializing position .....	35
Presser bar height .....	36
Embroidery foot height .....	37
Presser foot lifter switch .....	38
Stretch stitch feed balance .....	39
Knee lifter .....	40
Remaining bobbin thread sensor .....	41
Bobbin winder .....	42
Needle plate sensor .....	43-44
Y-carriage play adjustment .....	45
Adjusting X and Y sensors (simple adjustment) .....	46
Cloth guide start position .....	47

<b>PARTS LIST</b> .....	<b>48-77</b>
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## Replacing external parts

Setscrews A



### Face cover

#### To remove:

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

#### To attach:

Follow the above procedure in reverse.

Setscrew B



### Belt cover

#### To remove:

1. Remove the cap and setscrew B.

2. Remove the setscrew C.

Setscrew C



3. Loosen the 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:

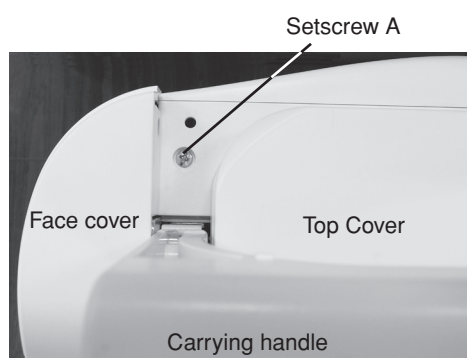
Follow the above procedure in reverse.

Make sure all the tabs and hooks fit together precisely.

Setscrews D



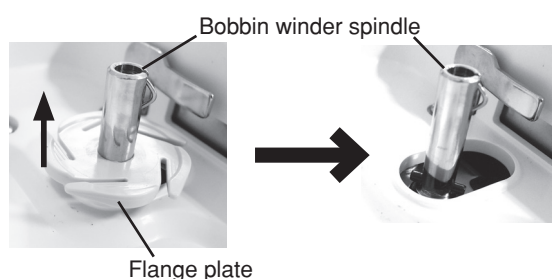
## Replacing external parts



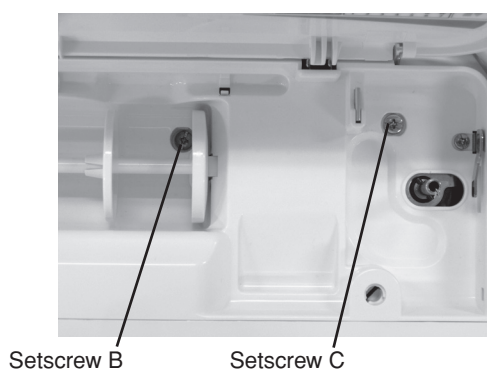
### Top cover

#### 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:

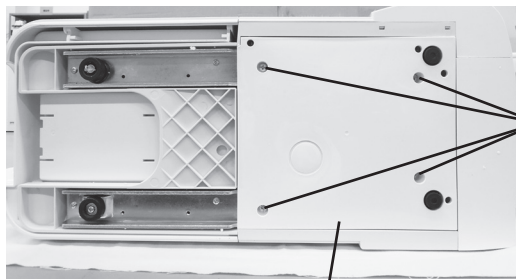
Follow the above procedure in reverse.

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

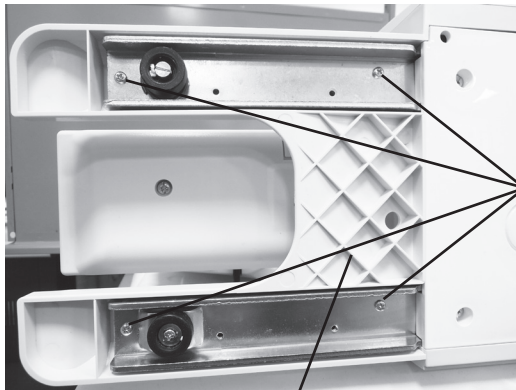
### Machine base

#### To remove:

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

#### To attach:

Follow the above procedure in reverse.



Base cover

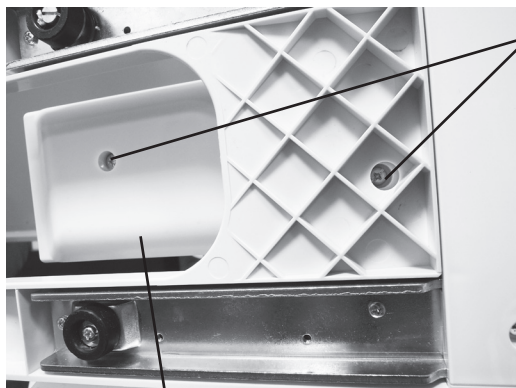
### Base cover

#### To remove:

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

#### To attach:

Follow the above procedure in reverse.



Bed cover

### Bed cover

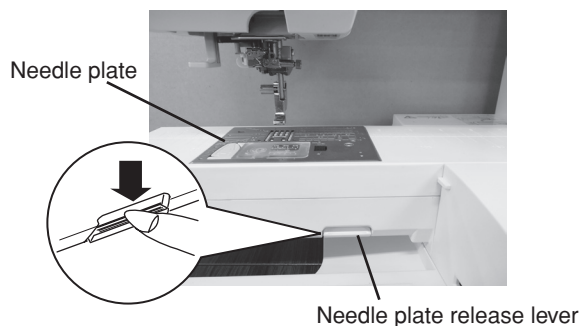
#### To remove:

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

#### To attach:

Follow the above procedure in reverse.

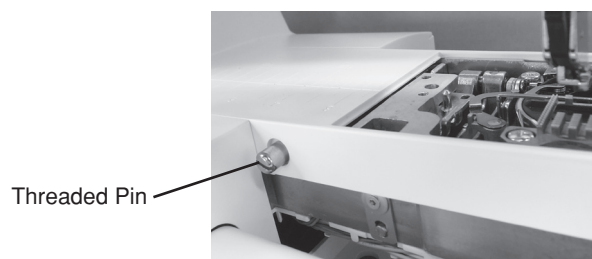
## Replacing external parts



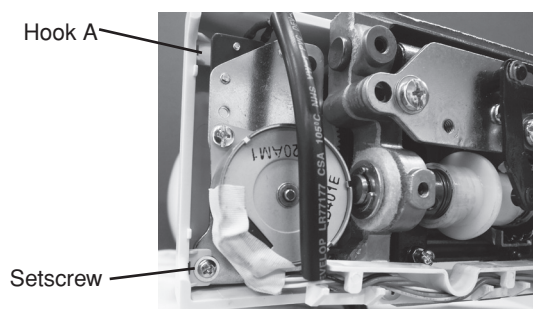
### Free arm cover

#### To remove:

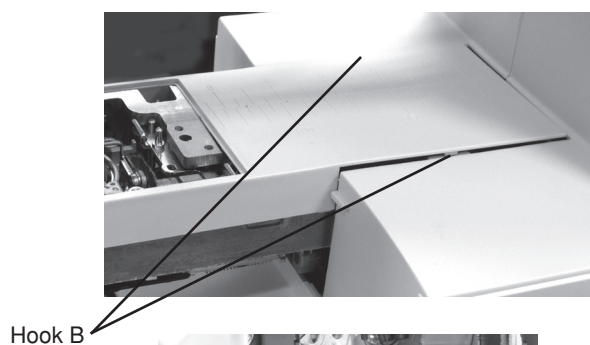
1. Remove the machine base (see page 3).  
Remove the presser foot and needle.  
Push down the needle plate release lever to remove the needle plate. Remove the bed cover (see page 3).



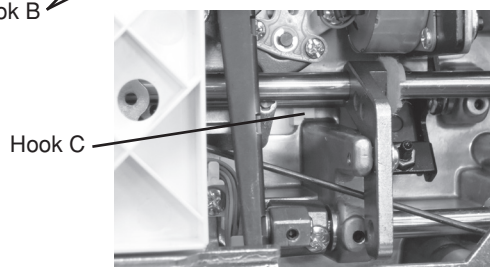
2. Remove the threaded pin.



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

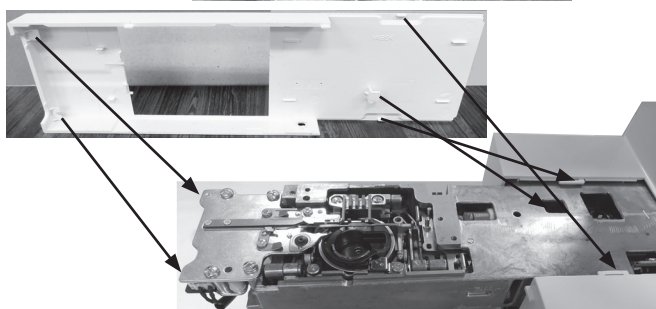


4. Pull out the free arm cover forcibly to the left while pulling open the front side to disengage the hook B and remove the free arm cover.

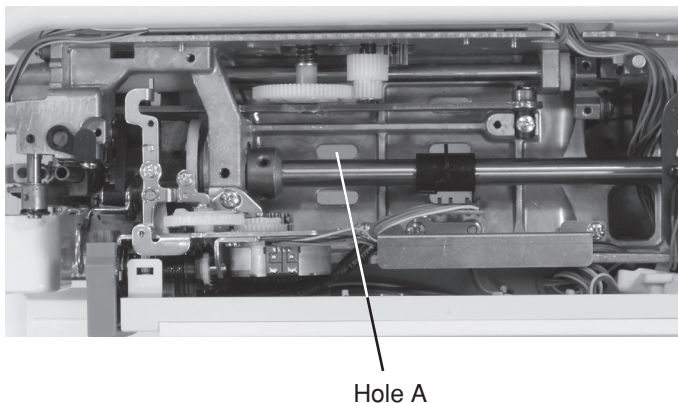
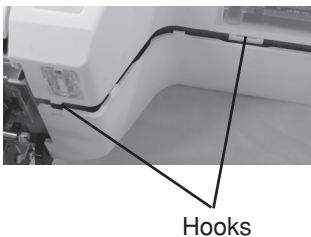
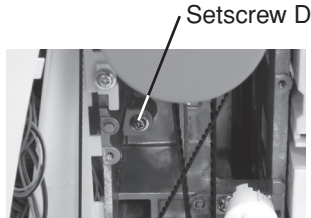
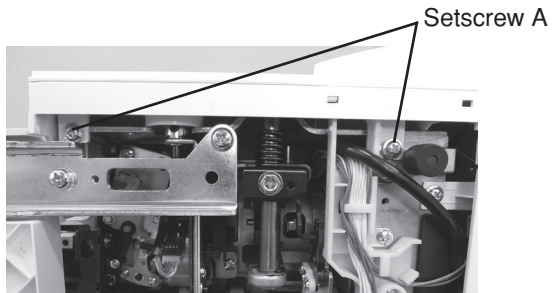


#### To attach:

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, machine base and free arm cover (see pages 1-4).
2. Loosen the setscrews A (underside of the machine).

3. Remove the setscrew B (right upper corner of the machine).

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

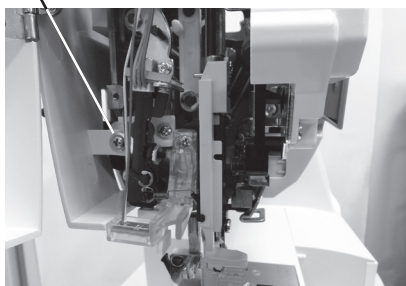


### Rear cover

#### To remove:

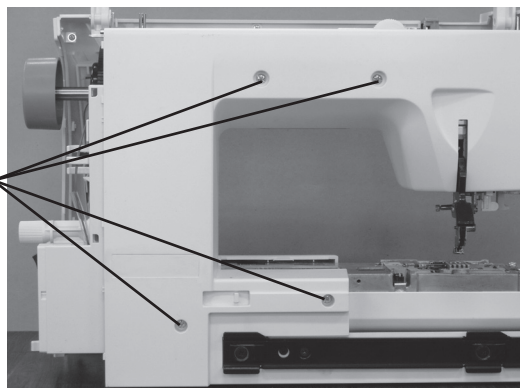
1. Lower the presser foot. Remove the belt cover, top cover, base cover and free arm cover (see pages 1-3).
2. Loosen the setscrew A.

Setscrew B



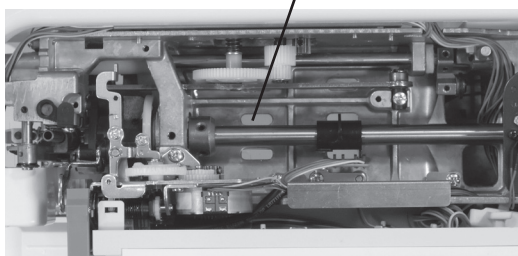
3. Loosen the setscrew B

Setscrews C



4. Remove the 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

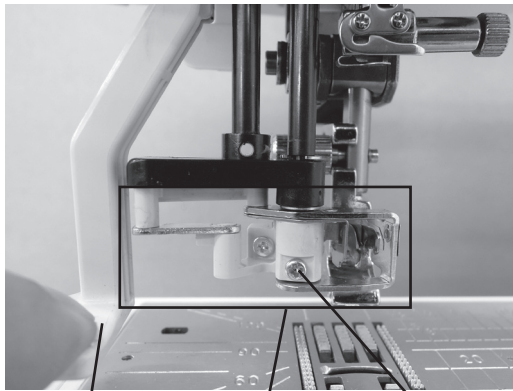


#### To attach:

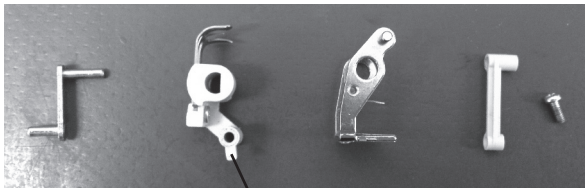
Follow the above procedure in reverse.



## Replacing mechanical parts



Threader lever      Threader unit      Setscrew



Hook holder (unit) (862627005)



Pin is engaged in the slot      Setscrew

### Needle threader hook

#### To remove:

1. Push down the threader lever as far as it will go and hold it in place. Loosen and remove setscrew.
2. Release the threader lever slowly while holding the threader unit to disengage it from the threader shaft.

3. Disassemble the threader unit and replace the threader hook. Refer the following part number when ordering service parts.

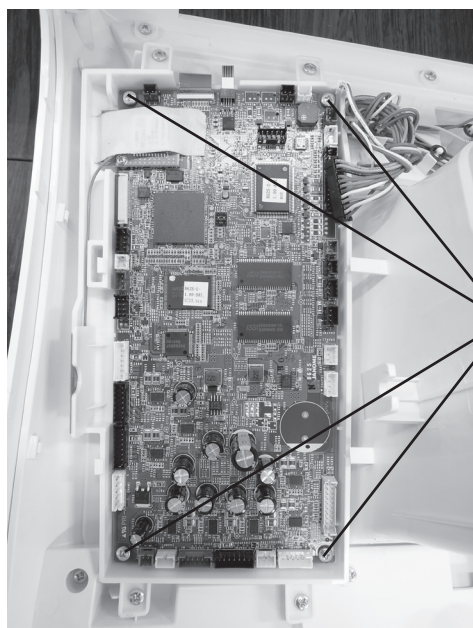
862627005: Hook holder (unit)

#### To attach:

1. Assemble the threader unit and attach them to the threader shaft by inserting the shaft into the holes.
2. Make sure the pin is engaged in the slot. Secure the threader unit to the threader shaft by tightening setscrew. Adjust the needle threader hook position (see page 25).

## Replacing electronic components

### Printed circuit board A



Setscrews

#### 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 (see page 5).
2. Disconnect the connectors from the printed circuit board A.
3. Remove the setscrews and printed circuit board A.

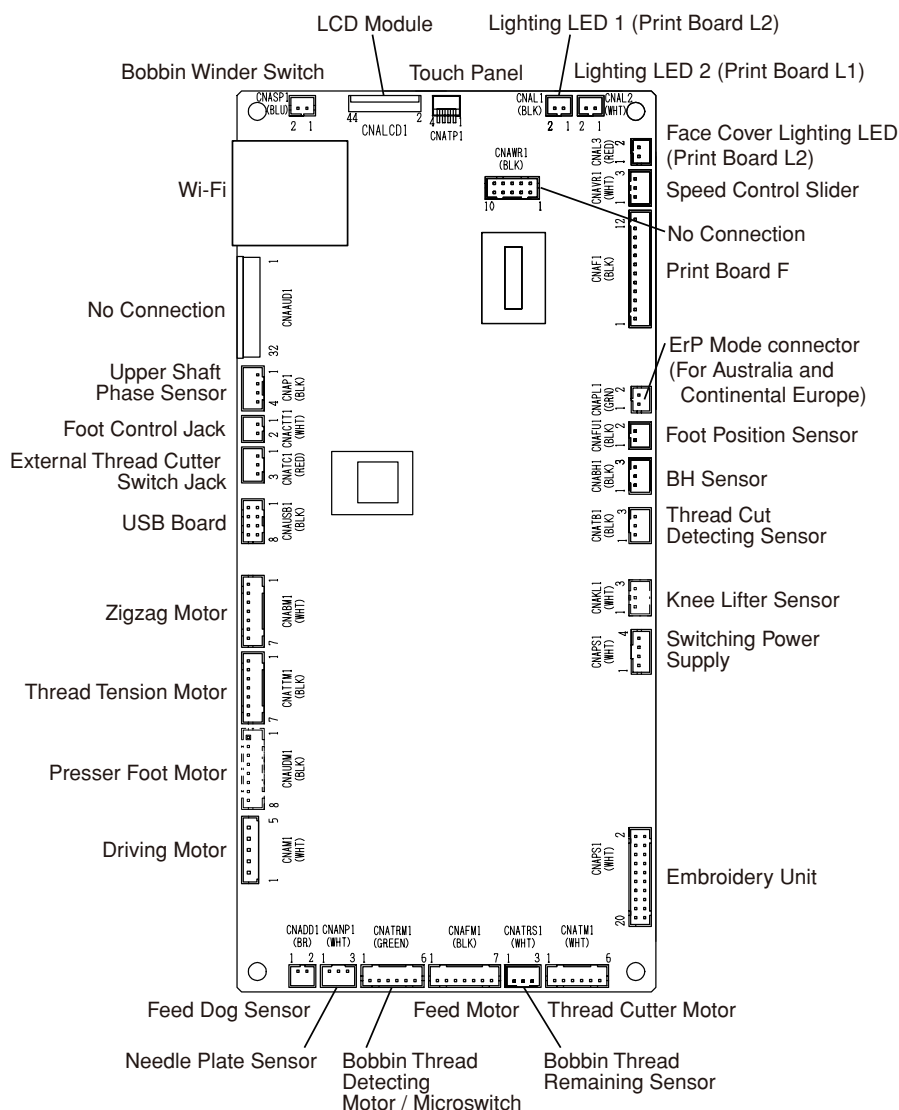
#### To attach:

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

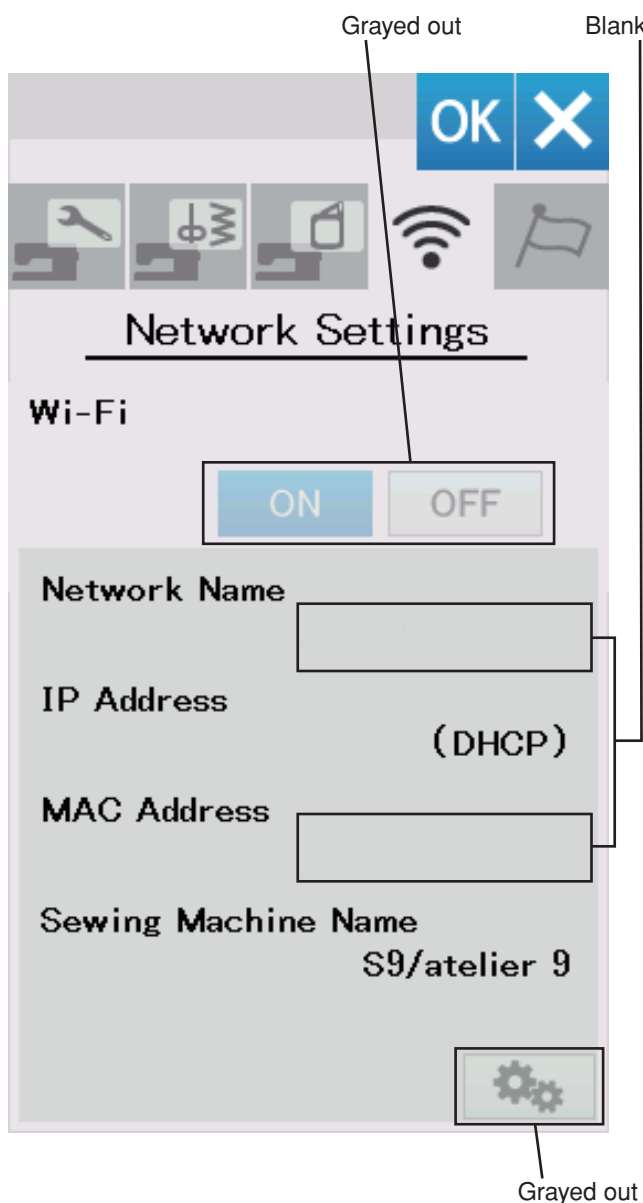
After replacing the printed circuit board A, adjust the following items:

- Knee Lifter (see page 40)
- Presser bar height (see page 36)
- Embroidery foot height (see page 37)

### Board A schematic



## Replacing electronic components



### Wireless communication module (1)

#### Symptom:

The wireless LAN ON/OFF function is grayed out and the network name and IP address are blank.

When the machine is turned ON, S9 / atelier 9 performs wireless LAN initialization according to either of the following procedures:

- An initialization according to the default setting value.
- An initialization according to the previously stored setting value.

In case of procedure b), it may require 20 seconds maximum to perform the initialization.

Exit the wireless LAN setup menu. Be sure that 20 seconds have passed after turning the power switch ON, and select the menu again.

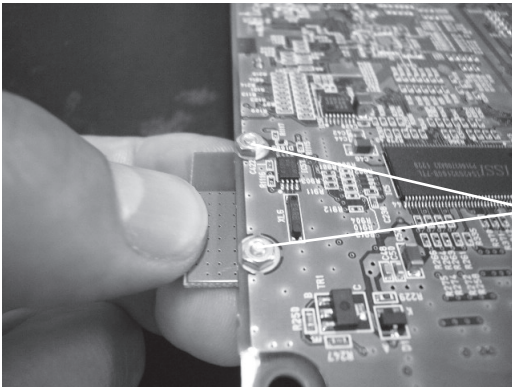
If the symptom persists after 20 seconds of standby time, the communication module may be out of order or installed improperly. Replace the communication module or try installing the module again by following the procedure in next page.

# Replacing electronic components

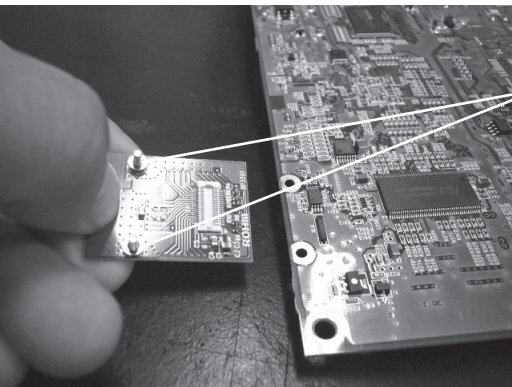
## Wireless communication module (2)

### To remove:

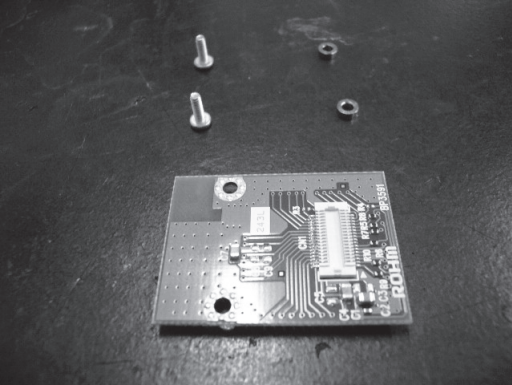
1. Remove the the printed circuit board A from the machine (see page 8).  
Tune the printed circuit board A rear-side up.  
Hold the communication module lightly, and remove the nuts.



Nuts

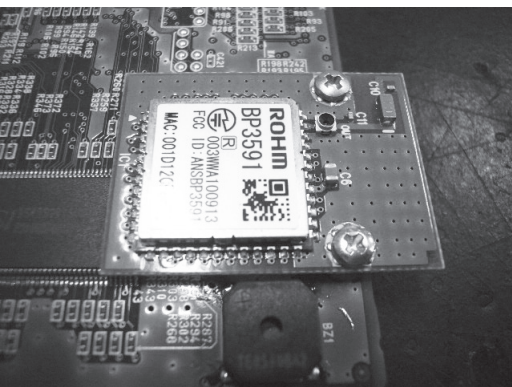


Spacers



2. Remove the module from the printed circuit board A.

3. Flip the module and remove the spacers and setscrews.



### To attach:

1. Follow the above procedure in reverse.  
Attach the communication module with the setscrews.  
A torque to tighten the setscrews should be more than 1kgf·cm, and do not tighten the setscrews too much.

### Parts #

- 862-528-005: Communication module
- 000-249-601: Spacer CB-200-1.5E
- 000-062-206: Nut 2-1-4
- 000-169-802: Setscrew 2x6



## Replacing electronic components

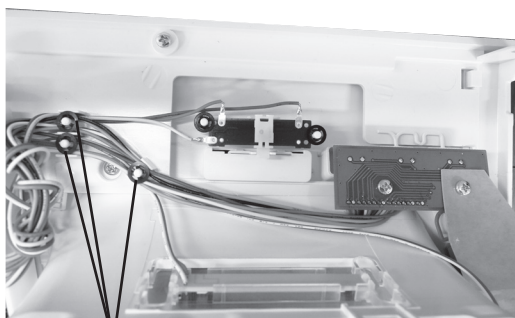
### NOTE:

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

### Printed circuit board F

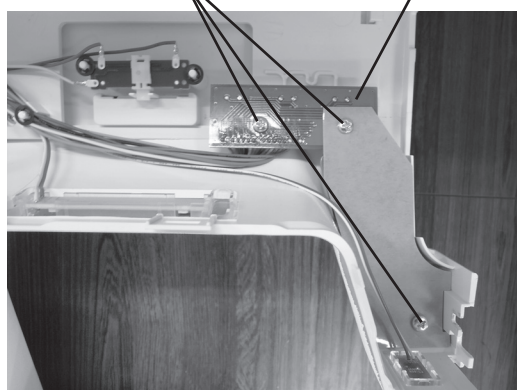
#### To remove:

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



CS rings

Setscrews Printed circuit board F

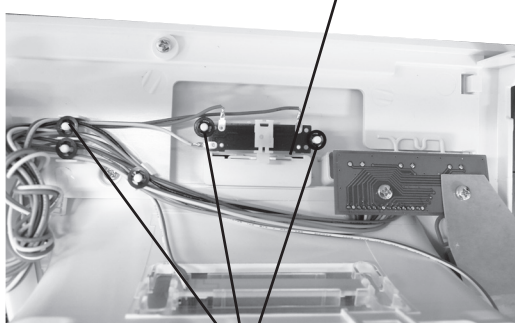


4. Remove the setscrews, and the printed circuit board F.

#### To attach:

Follow the above procedure in reverse.

Speed control slider



CS rings

### Speed control slider

#### To remove:

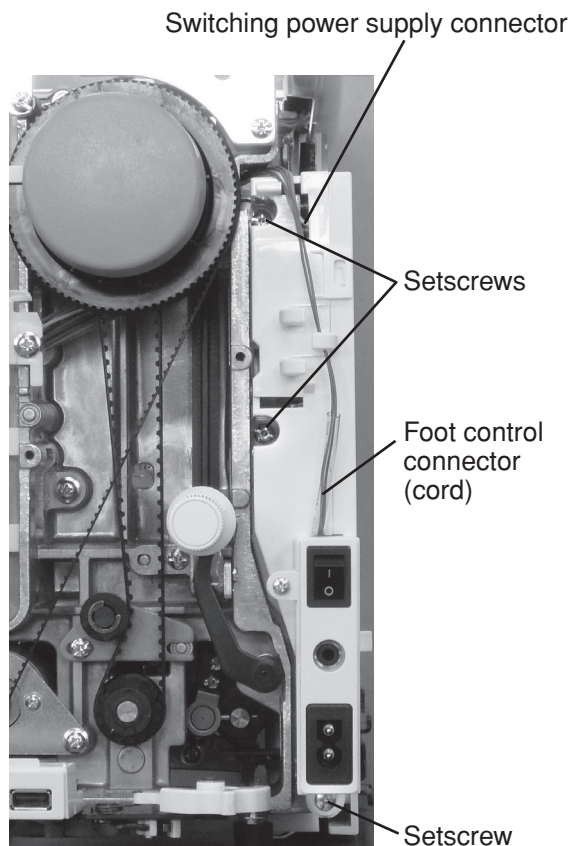
1. Remove the front cover (see page 5).
2. Disconnect the speed control slider connector from the printed circuit board A (see page 8).
3. Remove the CS rings and the speed control slider.

#### To attach:

Follow the above procedure in reverse.

## Replacing electronic components

### For U.S.A. and Canada



#### Switching power supply unit

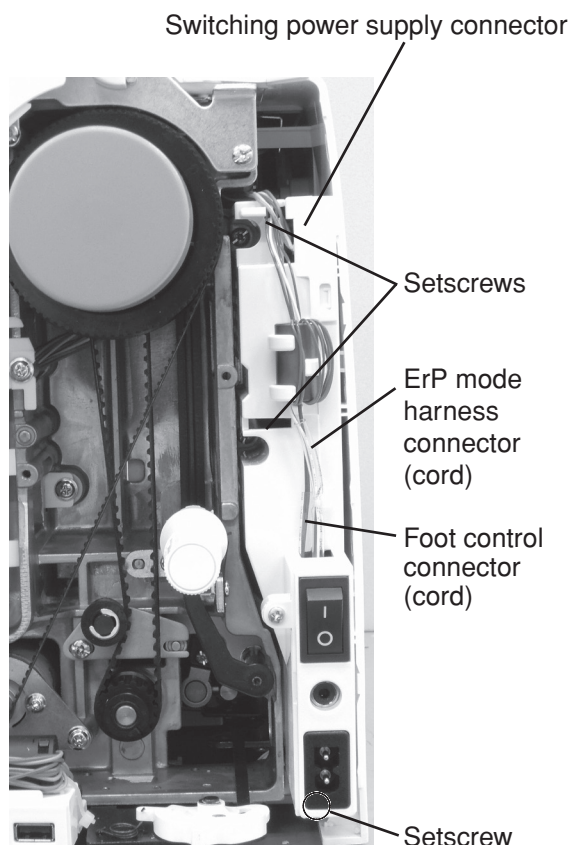
##### To remove:

1. Remove the belt cover, the top cover and the front cover (see 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 (see page 8).
4. Remove the setscrews, and switching power supply.

##### To attach:

Follow the above procedure in reverse.

### For Australia and Continental Europe



#### Switching power supply unit

##### To remove:

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

##### To attach:

Follow the above procedure in reverse.

## Replacing electronic components

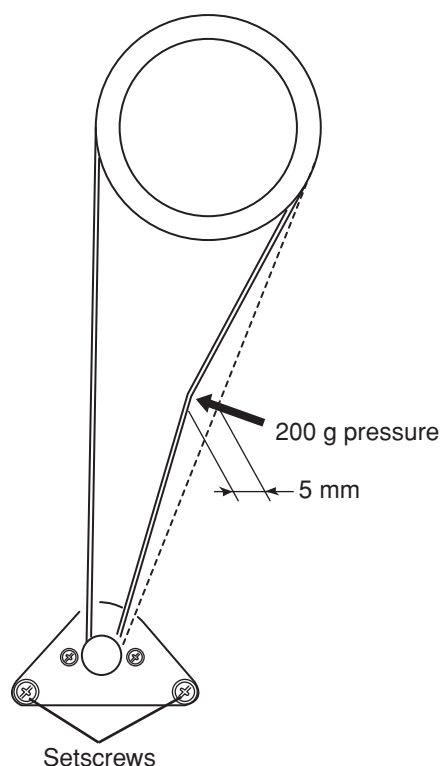
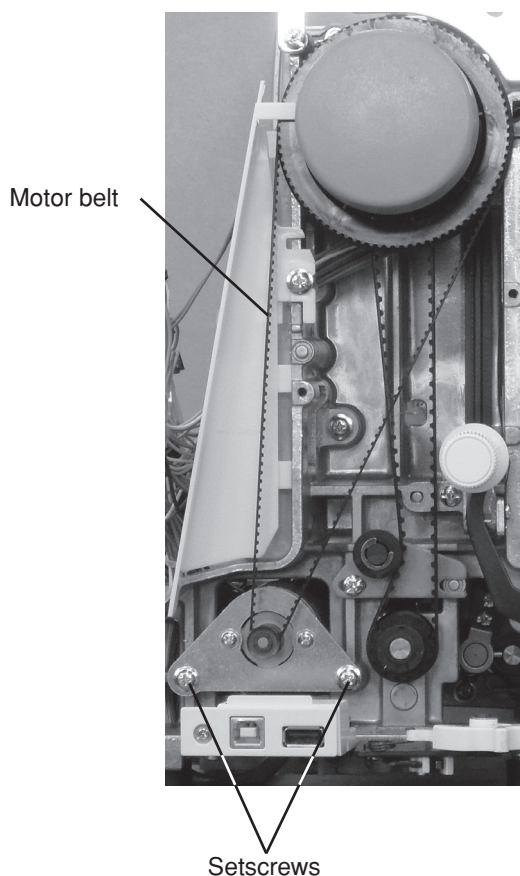
### DC motor

#### 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 (see pages 1, 2 and 5).
2. Disconnect the DC motor connector from the printed circuit board A (see page 8).
3. Remove the motor belt.
4. Remove the setscrews, 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 pressure. Adjust the motor position so that the belt deflects 5 mm.
3. Tighten the setscrews securely.
4. Connect the DC motor connector to the printed circuit board A (see page 8).
5. Attach the front cover, the top cover and the belt cover.

## Replacing electronic components

### Thread tension unit

**NOTE:**

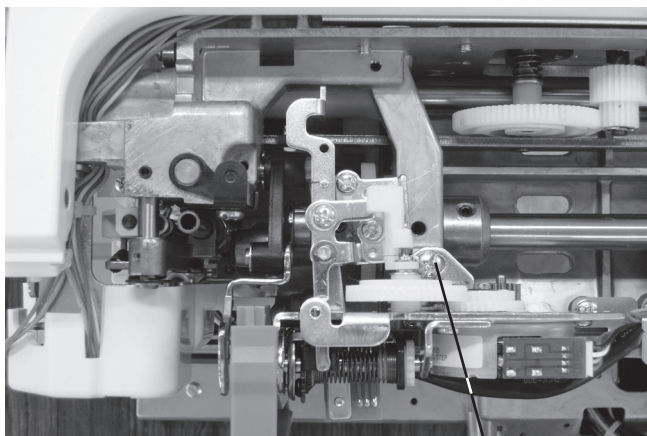
Do not disconnect connectors by pulling on cord.  
To disconnect the connectors, grasp the connector, not the cord.

**To remove:**

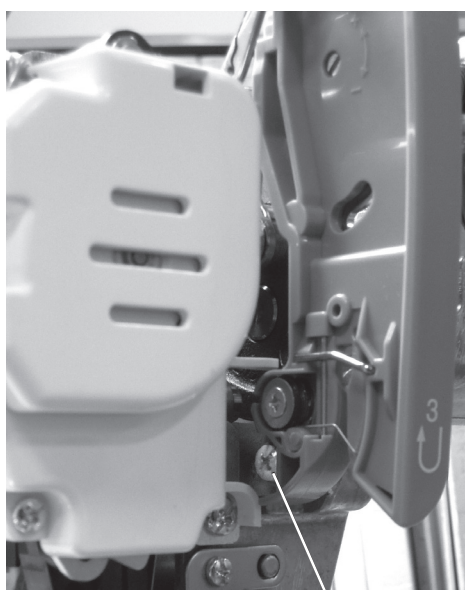
1. Remove the top cover (see page 2).
2. Remove the front cover (see page 5).
3. Disconnect the thread tension motor connector from the printed circuit board A (see page 8).
4. Remove the setscrews A and B.  
Remove the thread tension (unit).

**To attach:**

1. Follow the above procedure in reverse.
2. Check the upper thread tension (see page 23).



Setscrew A



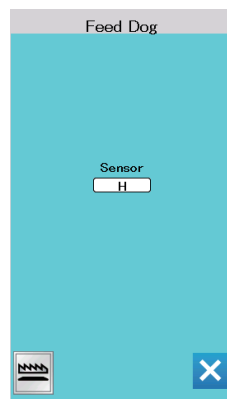
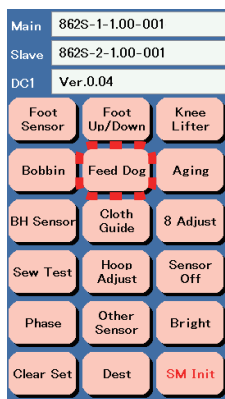
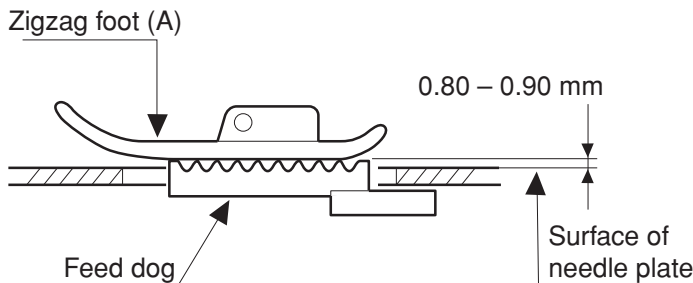
Setscrew B



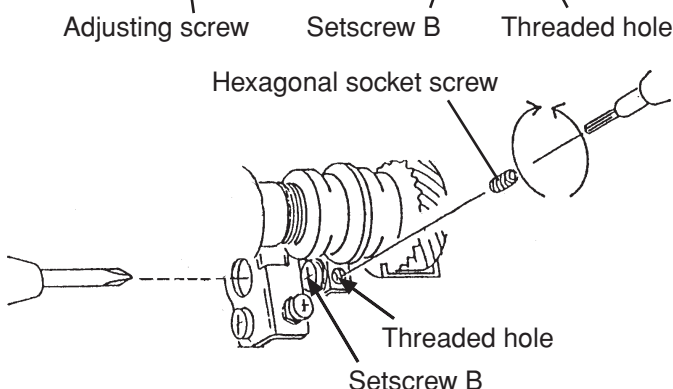
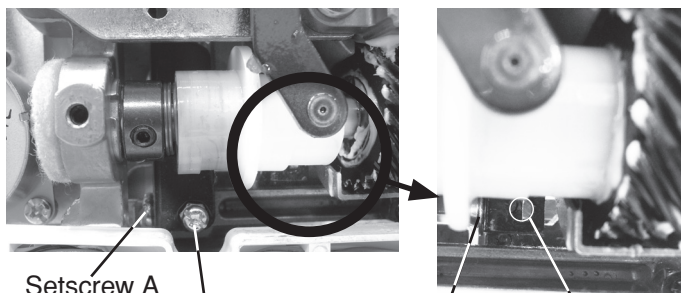
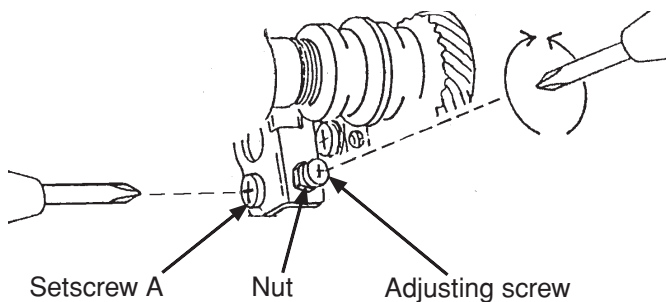
## Mechanical adjustment

### Feed dog height

When the foot pressure is set at maximum (AUTO+4) and the zigzag 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 bed cover (see page 3).
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode. Press "Feed Dog" key. The presser foot pressure value will be set at "Auto +4", and the stitch length value will be set at "5.0" automatically.
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. Turn the adjusting screw to adjust the feed dog height. The highest position of the feed dog should be between 0.80 and 0.90 from the surface of the needle plate.
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.



### Feed dog parallel adjustment

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 until it stops (use an Allen wrench of 2 mm width across flats).
2. Turn the setscrew B (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 B by turning it counterclockwise.
5. Remove the hexagonal socket screw.
6. Attach the bed cover and base cover.

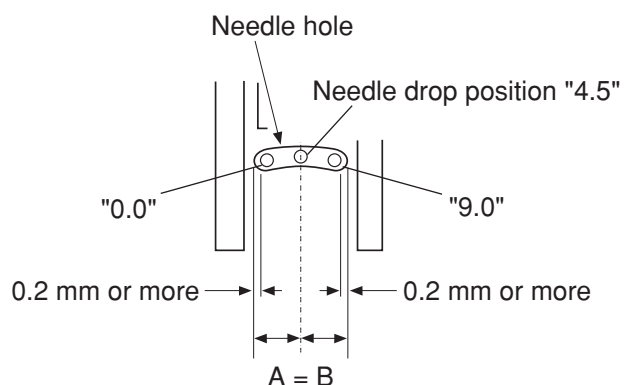
After finishing adjustment, return the foot pressure to AUTO.

## Mechanical adjustment

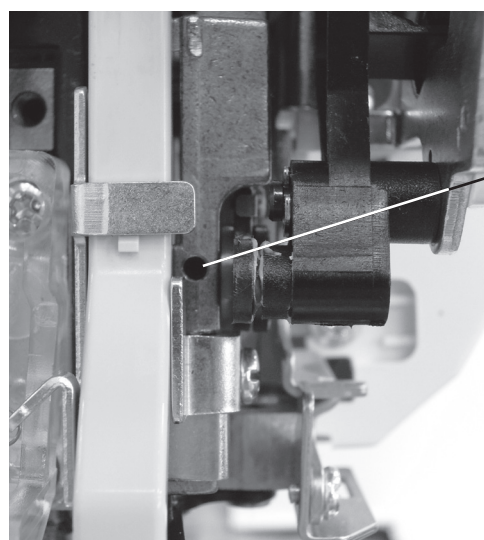
### Needle drop position

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

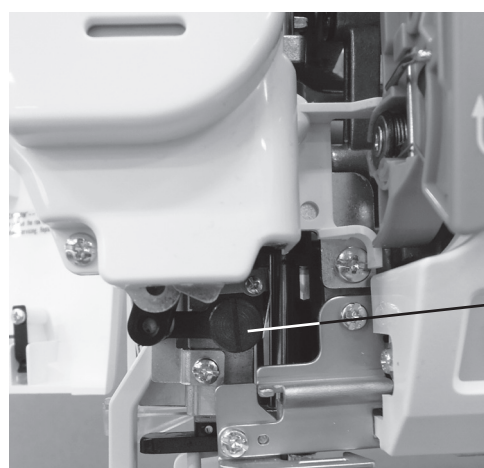
When the needle drop position is set at "0.0" and "9.0", the clearance between the side of the needle and the needle hole should be 0.2 mm or more.



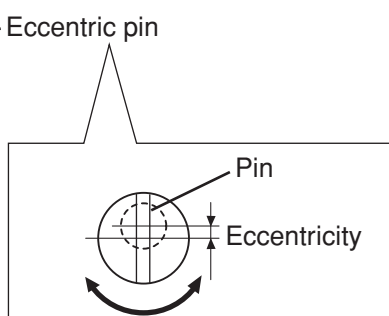
1. Attach the #14 needle. Turn the power switch ON and select straight stitch.
2. Check the clearance between the needle and the side of the needle hole when the needle drop position is set at "0.0" and "9.0" respectively.



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).



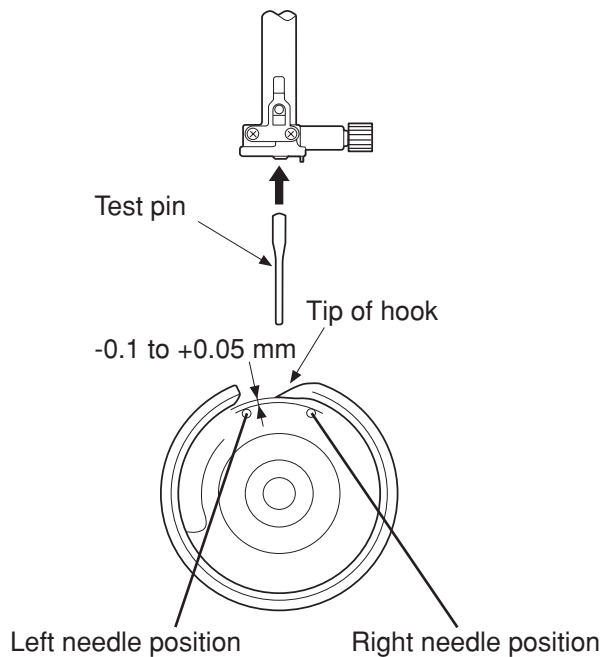
4. Turn the eccentric pin to get 0.2 mm or more clearance. The direction of eccentric pin should be as shown. Tighten the hexagonal socket screw. Attach the straight needle plate and check if the needle drops in the center of the needle hole.



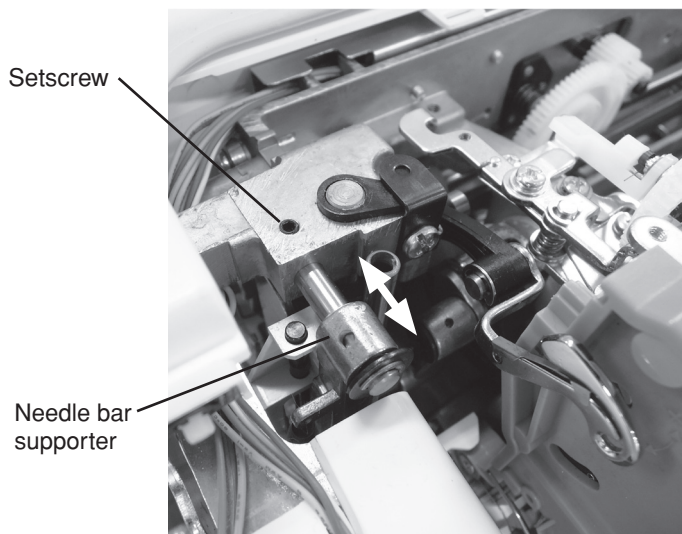
## Mechanical adjustment

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

The clearance between the needle and the point of hook should be -0.1 to +0.05 mm.



1. Remove the top cover (see page 2).
2. Remove the presser foot, the needle plate and the bobbin holder.  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
3. Attach the test pin.
4. 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.
5. Turn the handwheel toward you until the tip of the hook comes behind the test pin.



6. Loosen the setscrew (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 setscrew.

Clearances A and B must be even



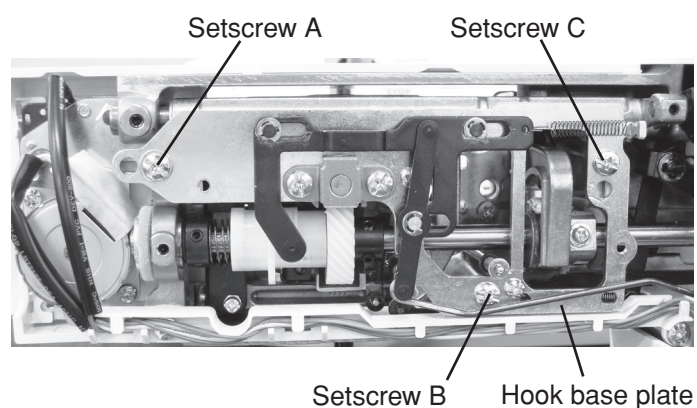
7. Attach the bobbin holder and the needle plate. Check the needle drop position. The needle drops in the center of the needle plate hole as shown.

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  $-0.1$  to  $+0.05$  mm.



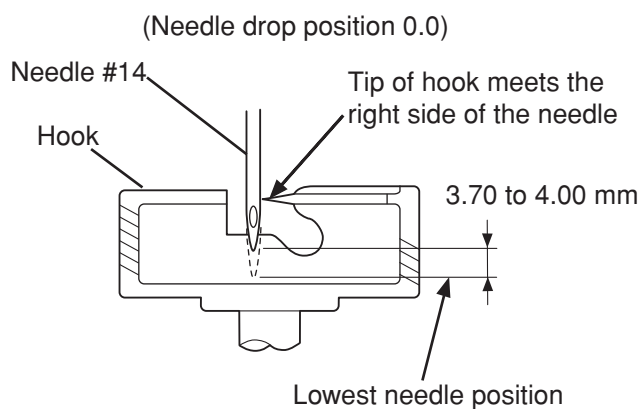
1. Remove the bed cover (see page 3).
2. Loosen the setscrews A, B and C. Tighten the setscrew C lightly.
3. Turn the handwheel toward you until the tip of the hook comes behind the test pin. Adjust the clearance between the needle and the tip of the rotary hook, by moving the hook base plate up or down, 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 (see page 21).



# Mechanical adjustment

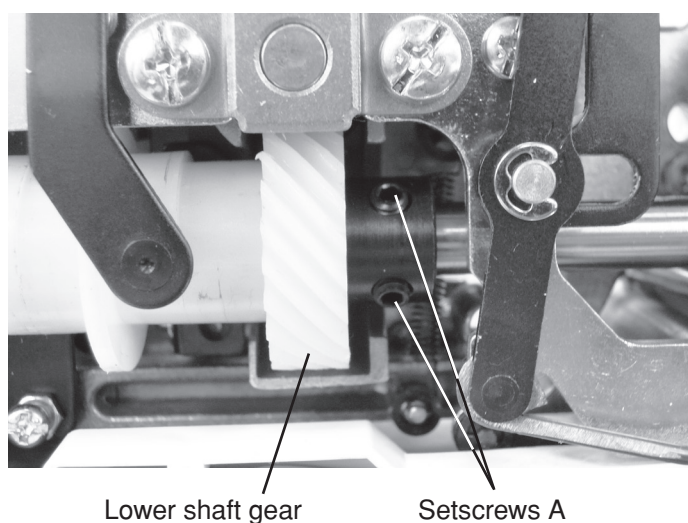
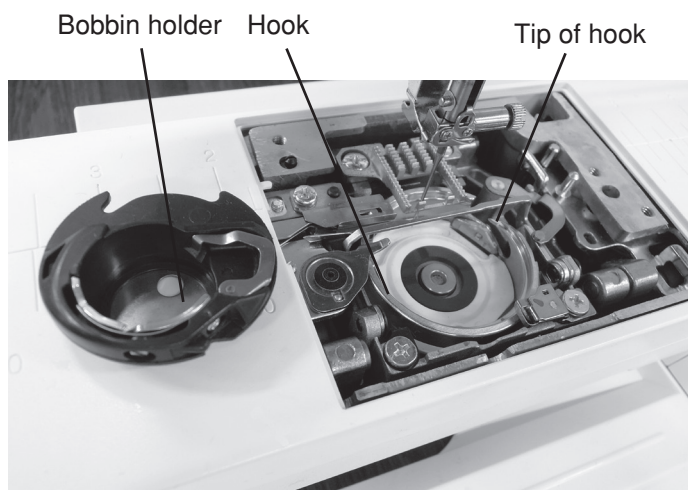
## Hook timing

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 (see 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. (see page 4)  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
5. Turn the handwheel toward you to lower the needle at its lowest position.



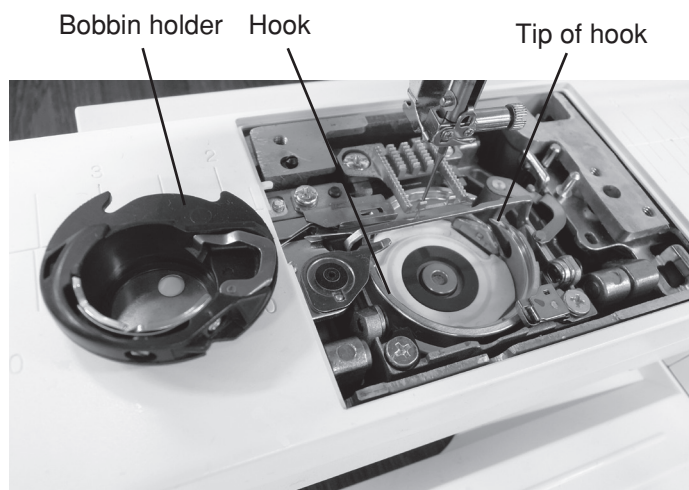
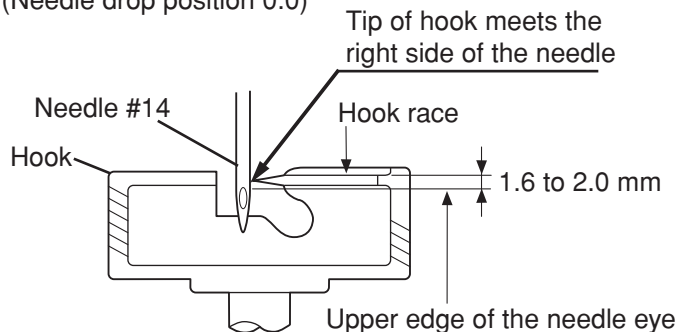
6. Loosen the setscrews A (use an Allen wrench of 2 mm width across flats).
7. Turn the handwheel toward you to raise the needle bar by 3.85 mm from its lowest position.
8. Turn the lower shaft gear until the tip of rotary hook meets with the right side of the needle. Tighten the setscrews A.  
\* Check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

# Mechanical adjustment

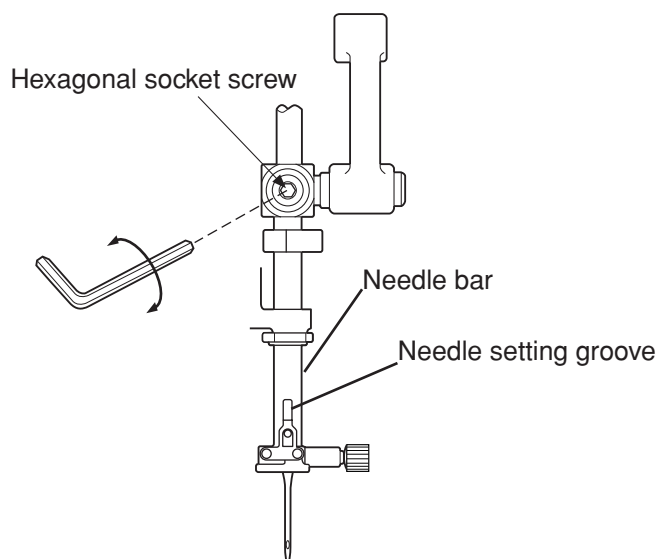
## Needle bar height

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.

(Needle drop position 0.0)



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.  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
4. Turn the handwheel toward you until the tip of hook meets the right side of the needle.

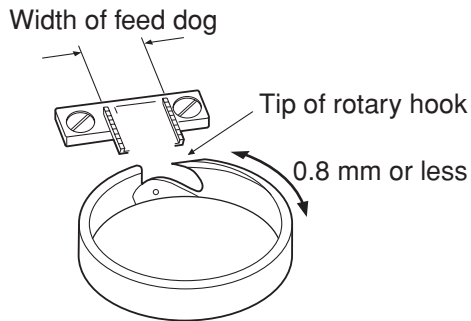


5. Loosen the hexagonal socket screw (use an Allen wrench of 2 mm width across flats).
6. Move the needle bar to adjust the needle bar height. Tighten the hexagonal socket screw. Be careful not to turn the needle bar.
7. Attach the bobbin holder and the needle plate.

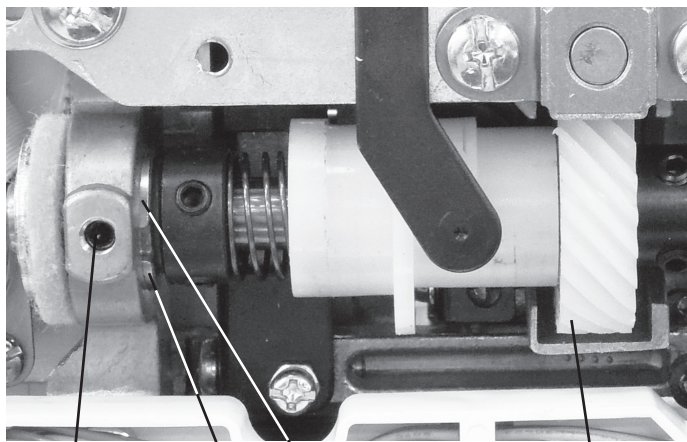
# Mechanical adjustment

## 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.



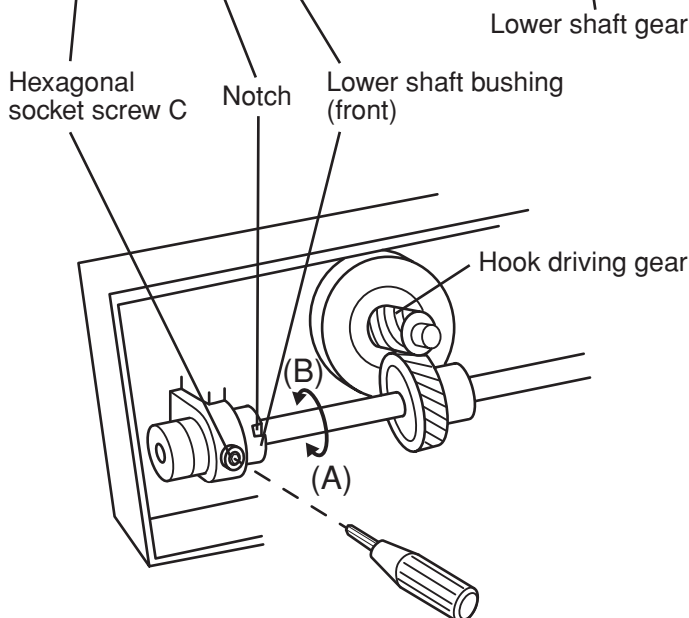
1. Remove the base cover and bed cover (see page 3).
2. Remove the presser foot, the needle plate and the bobbin holder.  
\* Cover the needle plate with the fabric to prevent damaging when removing, the needle plate.
3. Turn the handwheel toward you so the tip of the rotary hook is within the width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



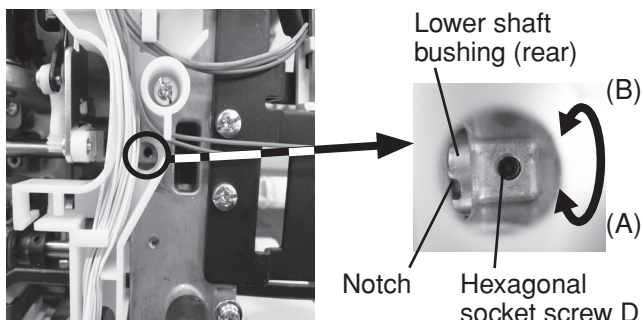
4. If the backlash is too much or too little, loosen the hexagonal socket screws C and D (use an Allen wrench of 2 mm width across flats).  
\* Turn the both lower shaft bushings in the direction (A), if the backlash is more than 0.8 mm.  
\* Turn the both lower shaft bushings in the direction (B), if 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.



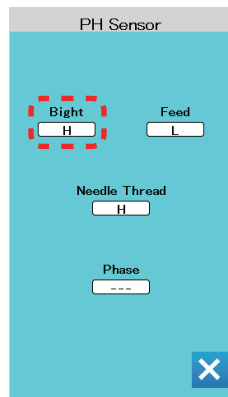
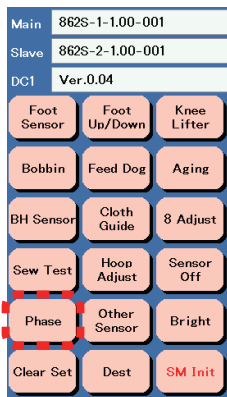
5. Tighten the hexagonal socket screws C and D.
6. Attach the base cover, bed cover, the presser foot, needle plate and the bobbin holder.



# Mechanical adjustment

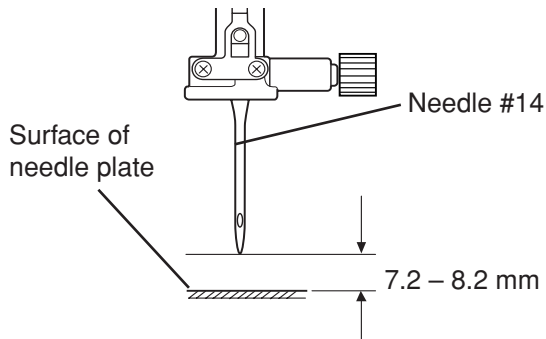
## Upper shaft shield plate position

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:

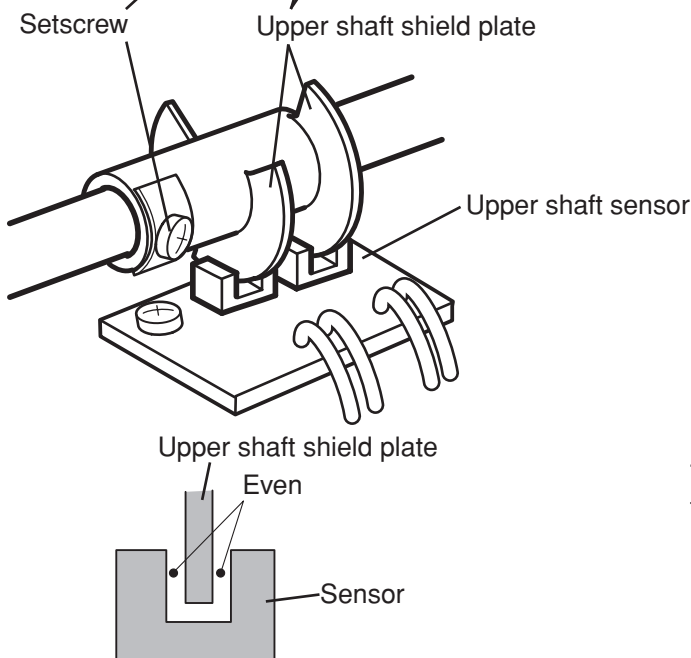
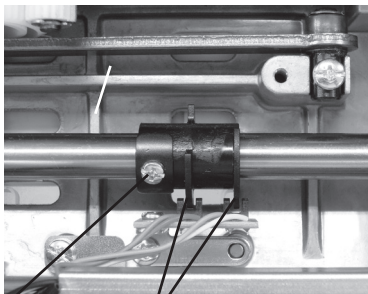
1. Attach the needle #14.
2. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "Phase" key.



3. Turn the handwheel toward you slowly to bring the needle up from its lowest. The indication below "Bight" changes from L to H.
4. 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 (see page 2).
2. Turn the handwheel toward you and raise the needle 7.7 mm above the surface of the needle plate.
3. Loosen the setscrew of the upper shaft shield plate. Turn the upper shaft shield plate until the indication changes from L to H. Tighten the setscrew.

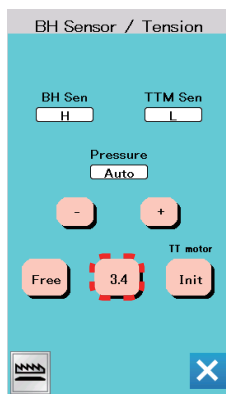
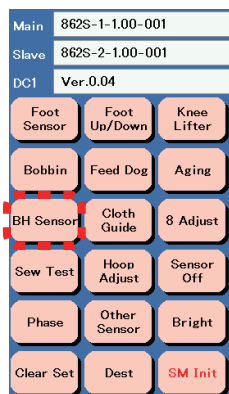


The position of the upper shaft shield plate should be in the center of the upper shaft sensor.

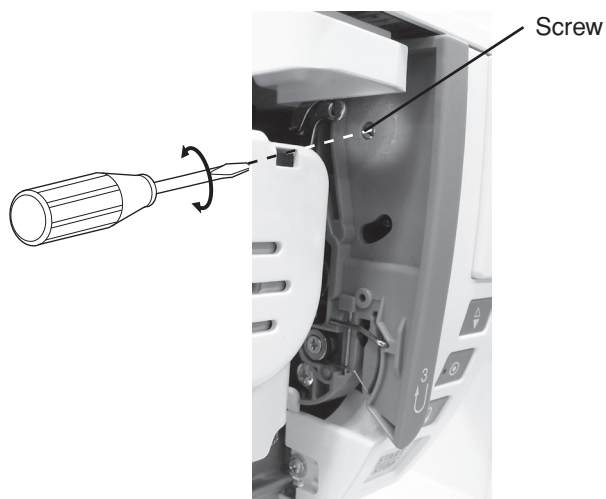
# Mechanical adjustment

## Upper thread tension

The standard upper thread tension should be 59 to 67 grams when the machine is set for pattern No.1 and the thread tension is set at "3.4", measured with a #50 polyester thread being pulled at approximately 110 mm/sec. in the direction of arrow.

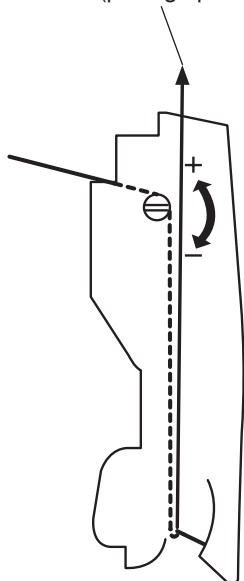


1. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "BH Sensor" key.



2. Thread #50 polyester thread to the machine.
3. Set the thread tension "3.4" by pressing "3.4" key.
4. Open the face plate.
  - (A) If the thread tension is less than 59 gr, turn the screw in the direction of "+".
  - (B) If the thread tension is more than 67 gr, turn the screw in the direction of "-".

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



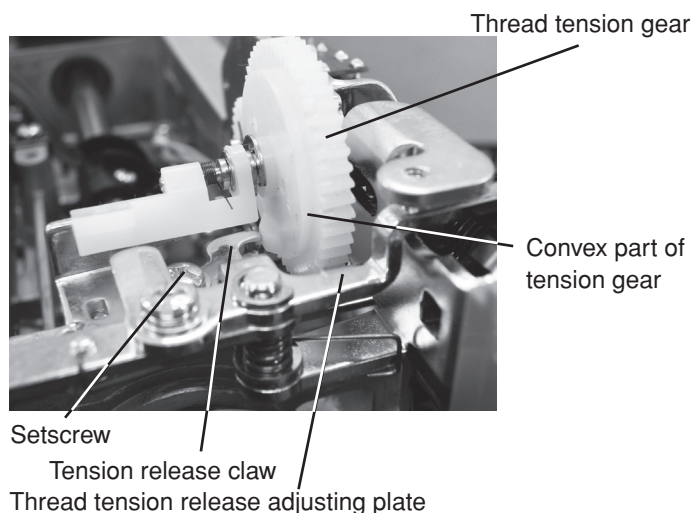


# Mechanical adjustment

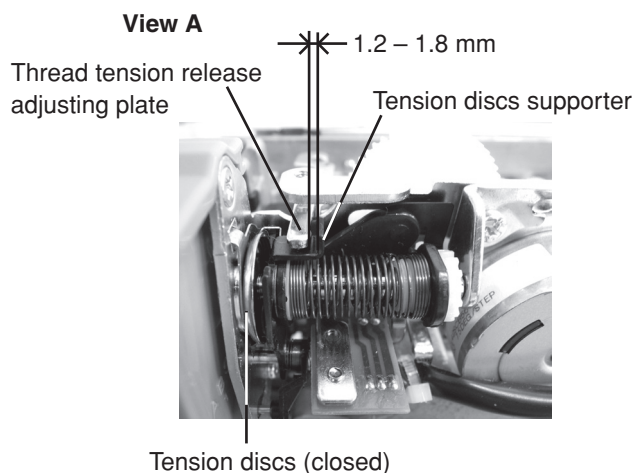
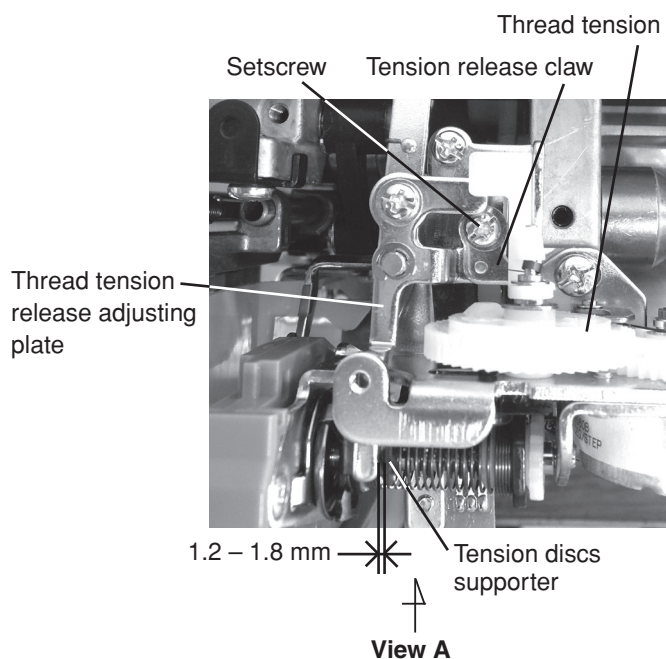
## Tension release mechanism

When the presser foot lifter is raised, the tension release mechanism should work correctly.

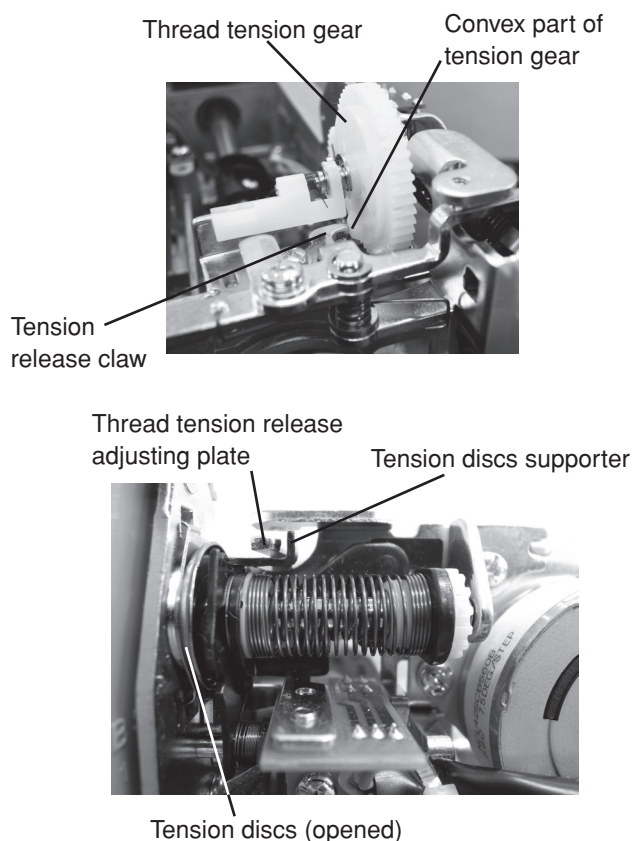
### Convex is NOT set at tension release claw



1. Remove the belt cover and top cover (see pages 1-2).
2. Remove the front cover (see page 5).
3. Turn the power switch OFF. Turn the thread tension gear until the convex part of tension gear is NOT set at the tension release claw.
4. Loosen the setscrew.
5. Adjust the clearance between the tension release adjusting plate and the tension disc supporter to 1.2 mm – 1.8 mm.
6. Turn the thread tension gear until the convex part of tension gear is set at the tension release claw. Be sure that the tension release adjusting plate touches the tension discs supporter and the tension discs opened slightly.



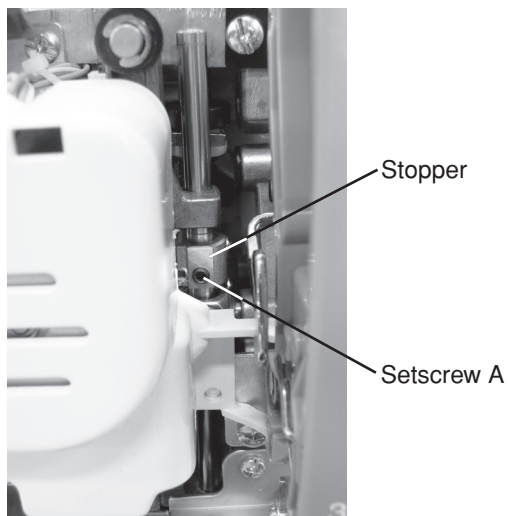
### Convex is set at tension release claw



# Mechanical adjustment

## Needle threader hook position

The threader hook comes out through the needle eye from behind when the needle threader button is pressed.



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.



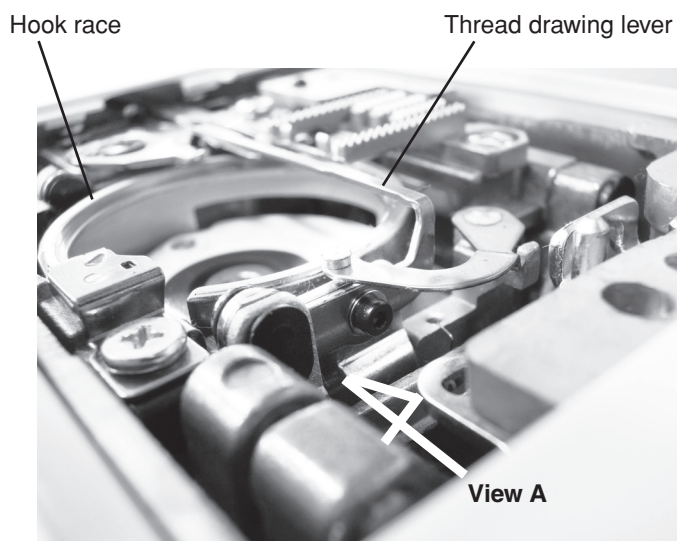
Setscrew B

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.

# Mechanical adjustment

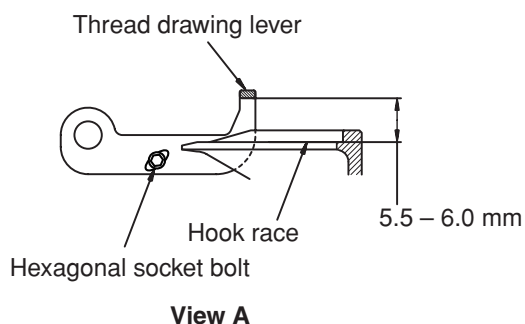
## Thread drawing lever

The standard height of the thread drawing lever from the surface of bobbin holder should be in the range of 5.5 – 6.0 mm.



1. Remove the presser foot, the needle plate and the bobbin holder.

\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.



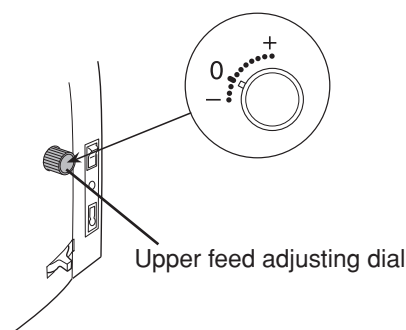
2. Loosen the hexagonal socket bolt (use an Allen key of 1.5 mm width across flats) . Adjust the distance between the lower part of thread drawing lever and the hook race to 5.75 mm by moving the thread drawing lever up or down.
3. Tighten the hexagonal socket bolt.



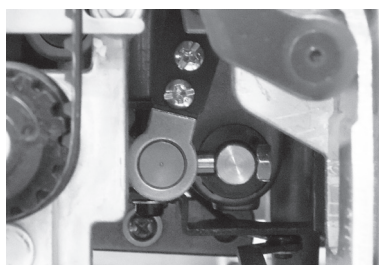
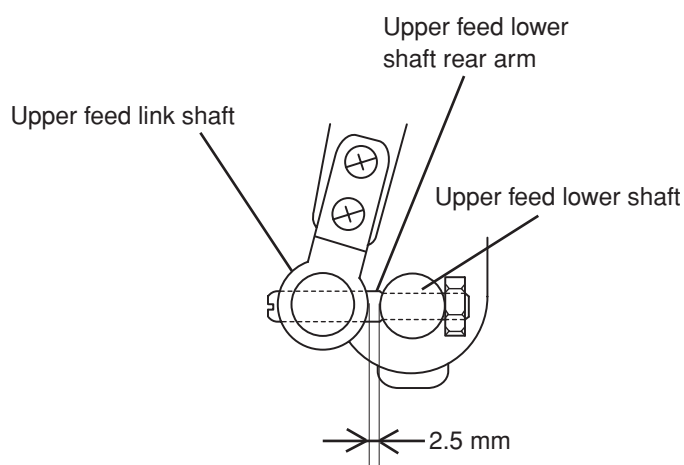
# Mechanical adjustment

## Upper feed dog (1)

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



Upper feed adjusting dial



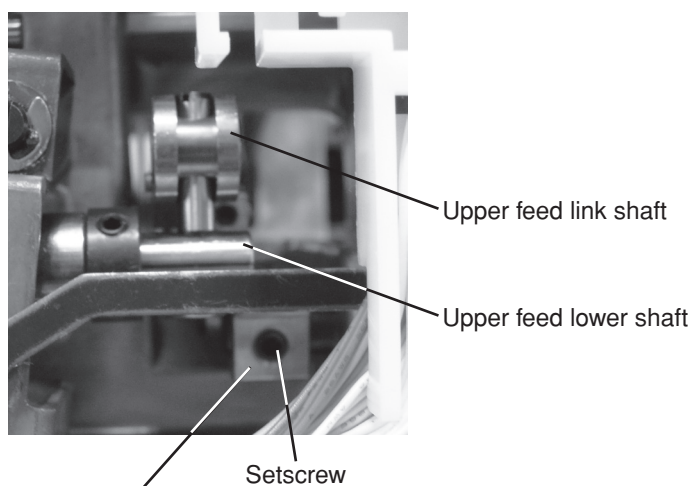
View from the belt cover side

### To check:

1. Set the upper feed adjusting dial at "0".  
Remove the belt cover and base cover (see page 1-3).
2. Turn the power switch ON and select straight 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 upper feed link shaft 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.  
Adjust the clearance between the upper feed link shaft and upper feed lower shaft to 2.5 mm.



Upper feed adjusting arm

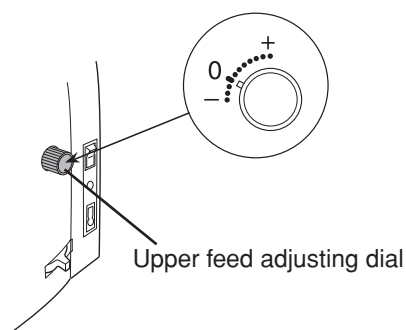
View from the bottom

# Mechanical adjustment

## Upper feed dog (2)

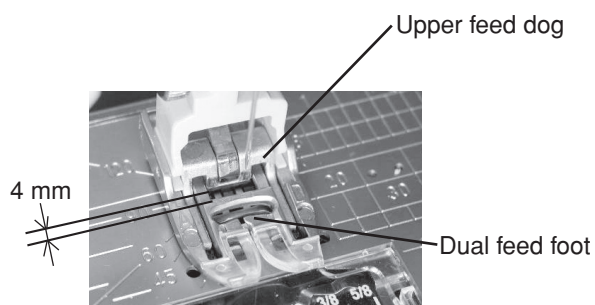
The clearance between the dual feed foot and upper feed dog should be 4 mm when the stitch length is set at "0".

\* Check the upper feed dog (1) (see page 27) before this adjustment.

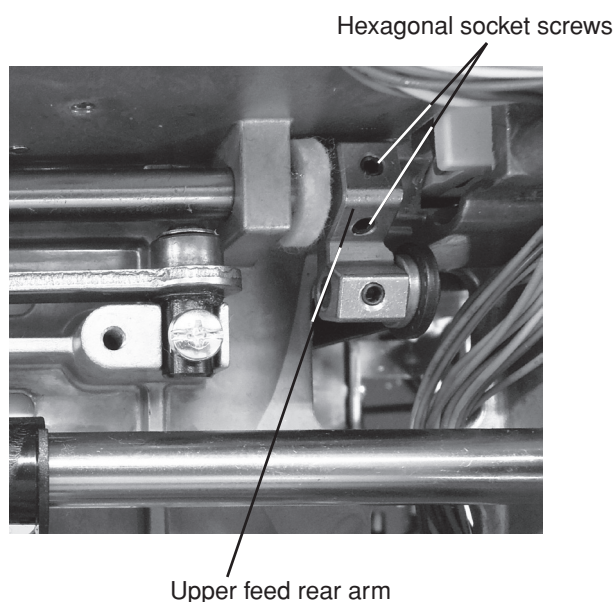


### To check:

- 1 Set the upper feed adjusting dial at "0".  
Attach the dual feed foot.
2. Turn the power switch ON and select straight 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:

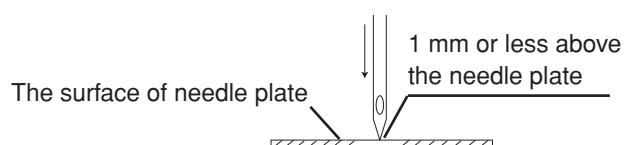
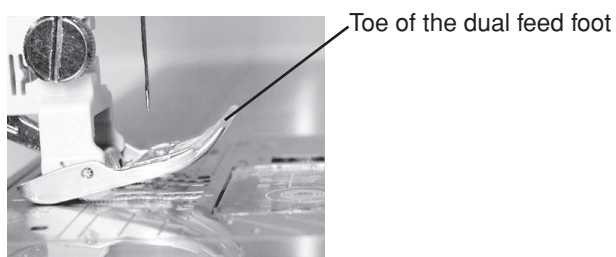
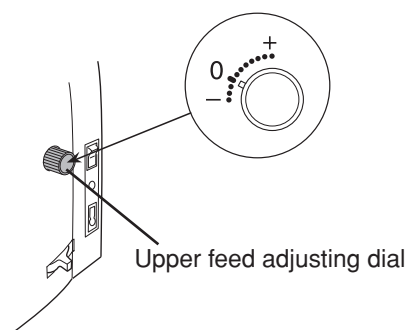
- 1 Remove the top cover (see page 2).
2. Loosen the hexagonal socket screws on upper feed rear arm (use an Allen wrench of 2 mm width across flats).
3. Insert the 4 mm spacer between the upper feed dog and dual feed foot to adjust the clearance. Tighten the hexagonal socket screws.

View from the right upper corner of the machine

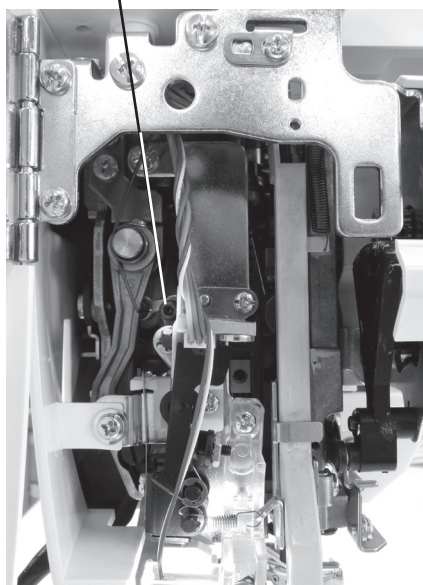
# Mechanical adjustment

## 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:

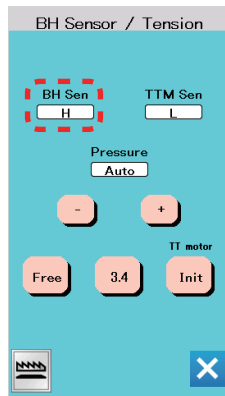
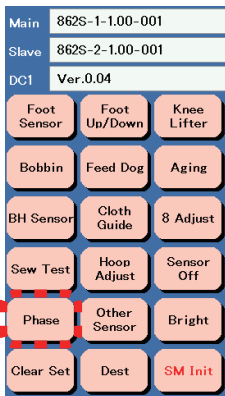
1. Set the upper feed adjusting dial at "0".  
Attach the dual feed foot.
2. Turn the power switch ON and select (  ) stitch.  
Lower the feed dog.
3. Press the needle up/down button twice to raise the needle, and the upper feed dog position will be initialized.
4. Press the presser foot lifter button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

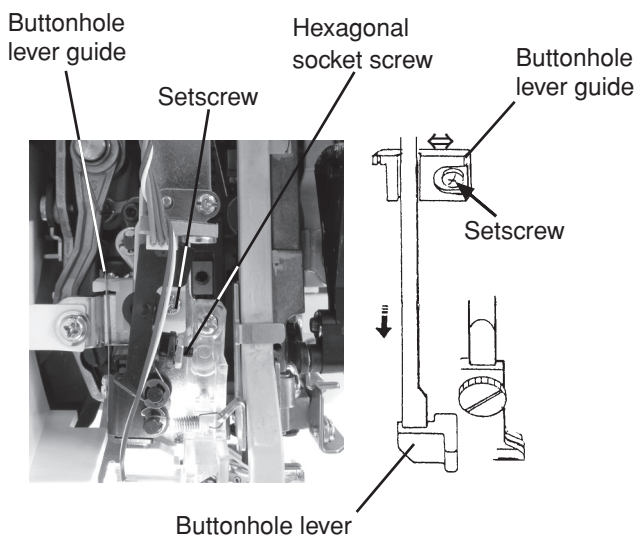
1. Open the face plate. Loosen the hexagonal socket bolt (use an Allen wrench with 2.5 mm width across flats).
2. Turn the handwheel toward you until the needle tip matches with the surface of the needle plate.
3. Tighten the hexagonal socket bolt while pressing the dual feed foot against the needle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

# Mechanical adjustment

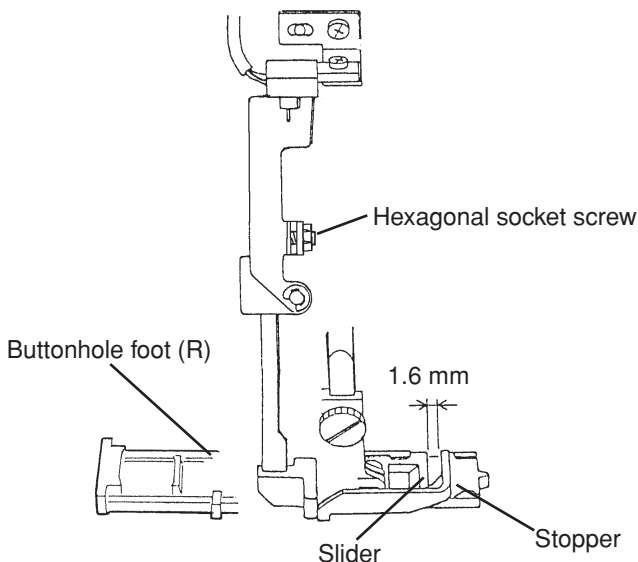
## Buttonhole lever



1. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "BH Sensor" key.



2. Open the face cover. Lower the Buttonhole lever. Loosen the setscrew on the buttonhole lever guide. Move the buttonhole lever guide to the left to adjust the position. Tighten the setscrew when the indication below "BH Sen" changes from "H" to "L".

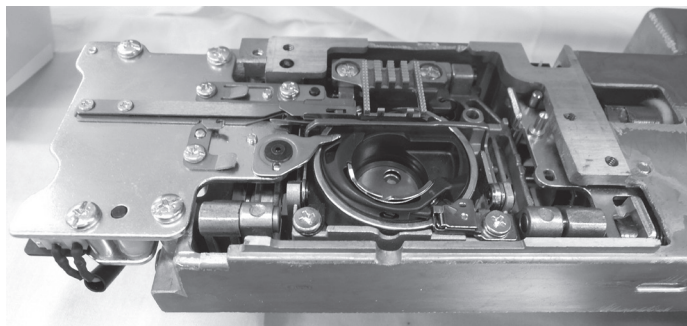


3. Attach the automatic buttonhole foot (R). Insert a 1.6 mm thick spacer between the stopper and slider of the foot.
4. Press the presser foot lifter button to lower the automatic buttonhole foot (R). Lower the buttonhole lever.
5. Turn the hexagonal socket screw counterclockwise (use an Allen wrench of 2 mm width across flats) until the indication below "BH Sen" shows "H". Turn the setscrew slowly clockwise until the indication changes to "L".

# Mechanical adjustment

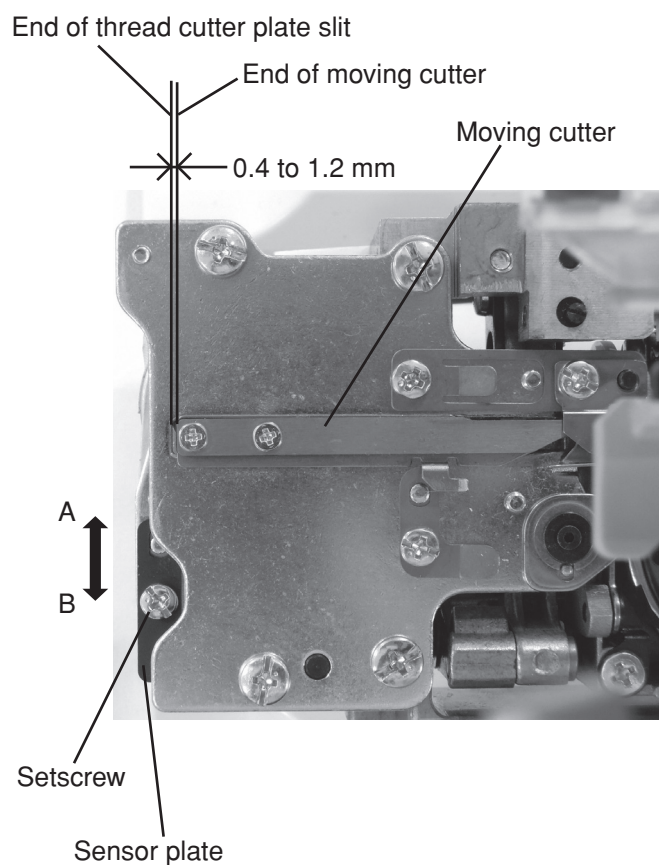
## Thread cutter

The distance between the end of thread cutter plate slit and the end of moving cutter should be in the range of 0.4 to 1.2 mm.



### To check:

1. Remove the bed cover and free arm cover (see pages 3-4).
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 0.4 to 1.2 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 0.4 mm, move the sensor plate in the direction of A.  
If the distance is larger than 1.2 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.

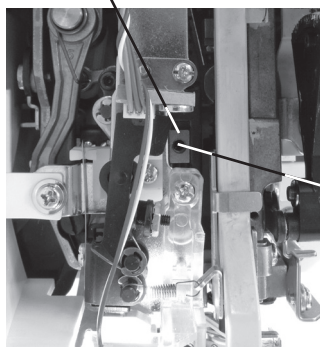


# Mechanical adjustment

## Presser bar lifter position

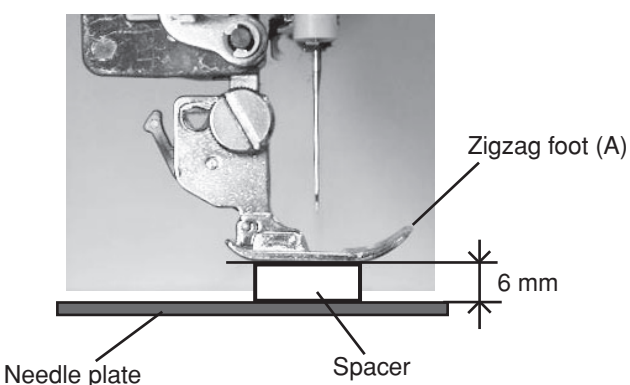
The clearance between the presser foot and the surface of the needle plate should be 6 mm when the presser foot is raised. The zigzag foot (A) should be parallel to the slot of the feed dog teeth when attached.

Presser foot bar supporter

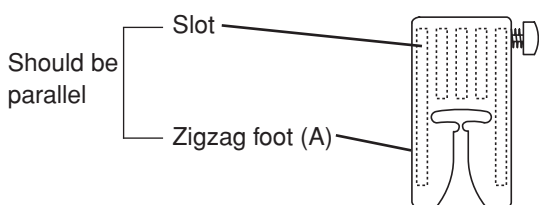


### To adjust:

1. Attach the zigzag foot (A). Lower the feed dog.
2. Turn the power switch ON. Press the presser foot lifter button to lower the presser foot. Turn the power switch OFF.
3. Raise the presser foot with the presser foot lifter.  
\* You must use the presser foot lifter to raise the presser foot for this adjustment, otherwise you cannot adjust the presser foot height correctly.



4. Open the face plate. Place the 6 mm spacer (block) between the presser foot and the needle plate. Loosen the setscrew on the presser bar supporter (use an Allen wrench of 2 mm width across flats).

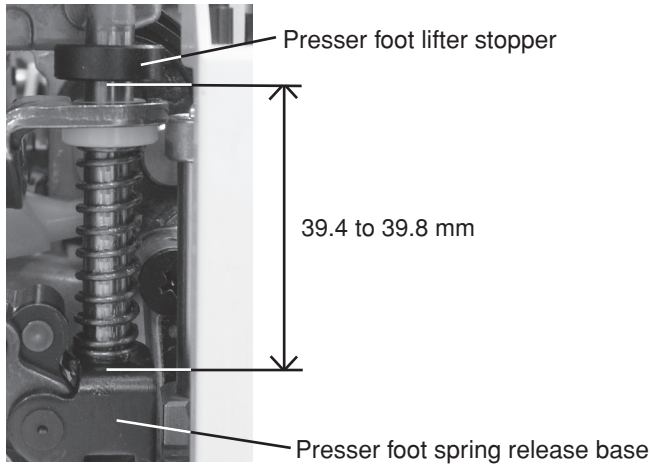


5. Adjust the presser foot direction as illustrated so the slot for the feed dog teeth and the zigzag foot (A) should be parallel. Tighten the setscrew while depressing the foot against the spacer.

# Mechanical adjustment

## Presser foot lifter stopper position (1)

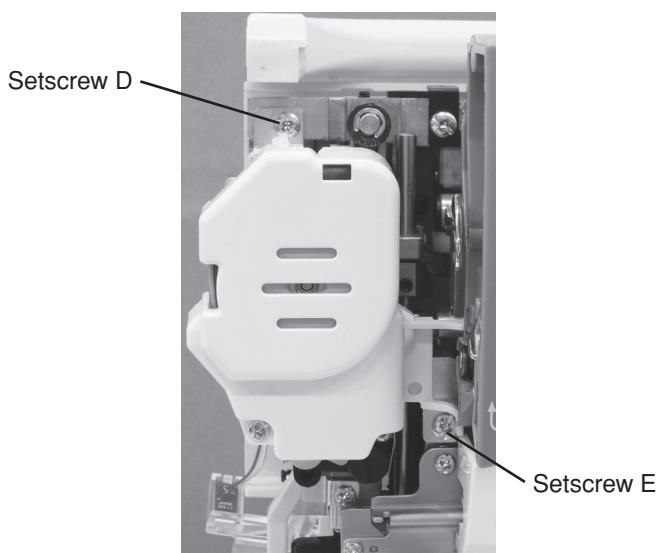
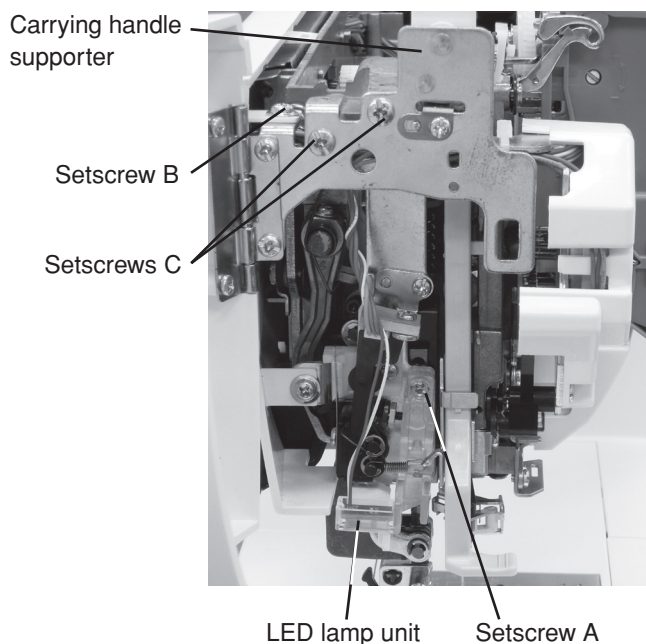
The distance between the presser foot spring release base and the presser foot lifter should be in the range of 39.4 mm to 39.8 mm when the presser foot is raised with the presser foot lifter.



### Preparation:

1. Turn the power switch ON. Press the presser foot lifter button to lower the presser foot. Turn the power switch OFF.
2. Raise the presser foot with the presser foot lifter.
3. Remove the top cover (see page 2).

4. Remove the setscrew A and the LED lamp unit. Remove the setscrews B and C. Remove the carrying handle supporter.

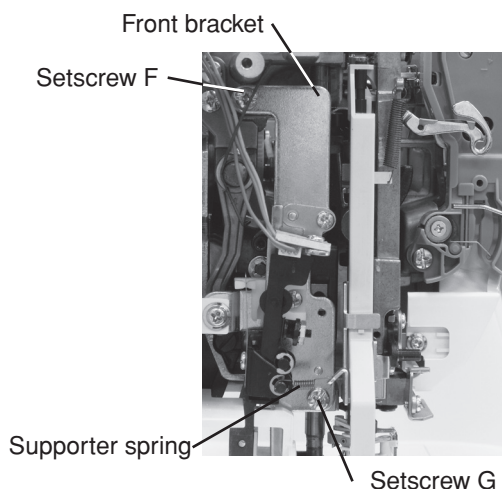


5. Remove the setscrews D and E. Remove the thread motor unit from the arm. Be careful that the thread motor unit is still connected with the cables. (You may put the piece of soft fabric at the top of the machine and place the motor unit on it while working, or disconnect the needle threader motor cable from the printed circuit board U1 and remove them together.

To be continued to the next page

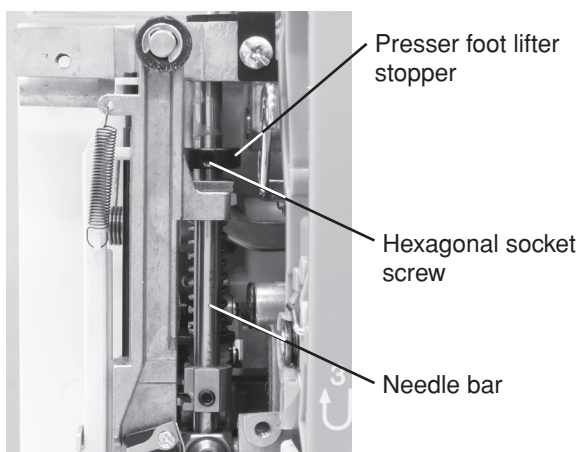
# Mechanical adjustment

## Presser foot lifter stopper position (2)



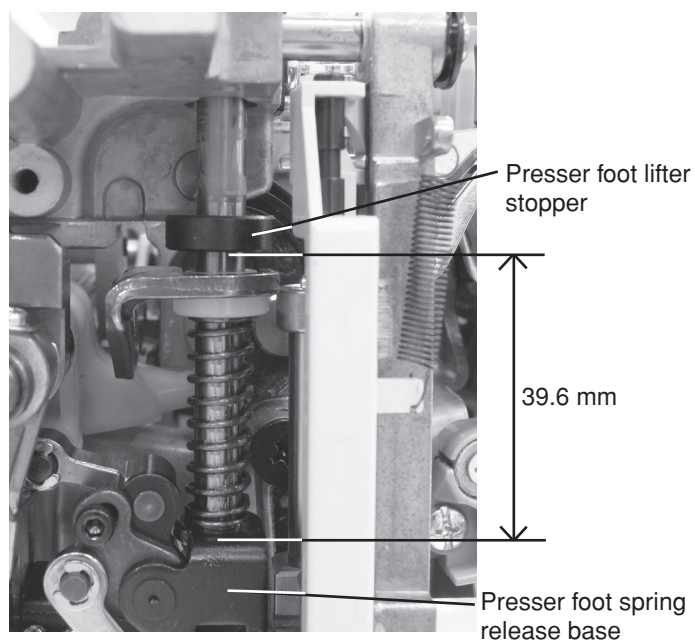
6. Remove the supporter spring.  
Remove the setscrews F and G.  
Remove the front bracket.

## Front side of the machine



### To adjust:

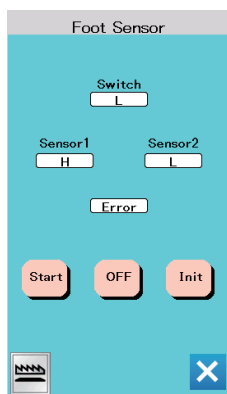
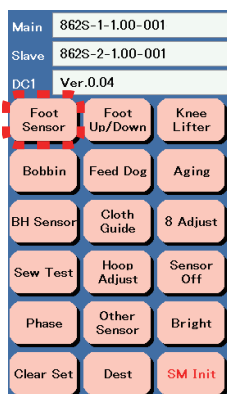
1. Turn the handwheel toward you to lower the needle.  
Raise the presser foot lifter.  
Loosen the hexagonal socket screw (use an Allen wrench of 2.5 mm width across flats) of the presser foot lifter stopper from the front side of the machine.
2. Adjust the distance between the presser foot spring release base and the presser foot lifter stopper to 39.6 mm. Tighten the hexagonal socket screw.





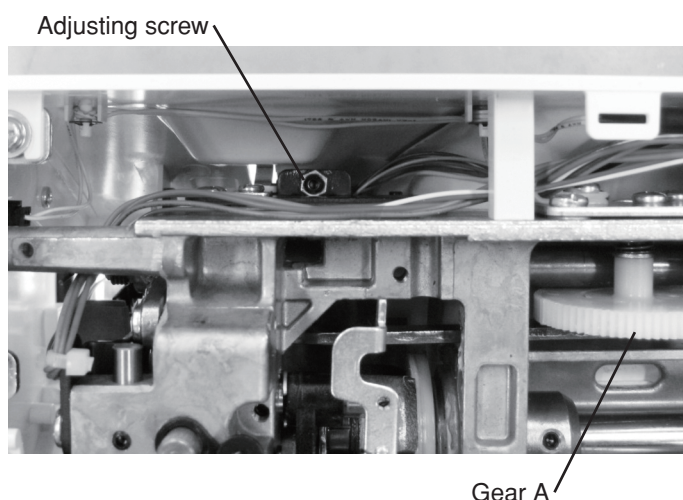
# Mechanical adjustment

## Automatic presser foot lifter initializing position



### To adjust:

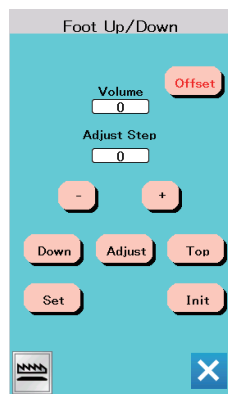
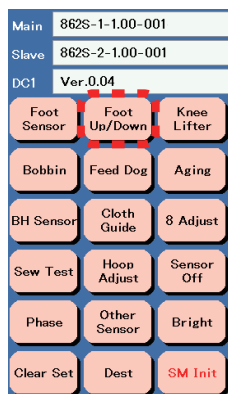
1. Remove the top cover.
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "Foot Sensor" key.



3. Turn the gear A (indicated with black arrow) with your hand to raise the presser foot.
4. Place a 13 mm thick spacer between the presser foot and the needle plate. Lower the presser foot on the spacer firmly by turning the gear A.
5. Be sure that the both Sensors 1 and Sensor 2 show "H". Press "Start" key on the touch panel.  
\* In case either Sensor 1 or Sensor 2 is not "H", turn the adjusting screw clockwise until the both Sensor 1 and Sensor 2 show "H".
6. Turn the adjusting screw counterclockwise until a beep sound and the "OK" message is shown.

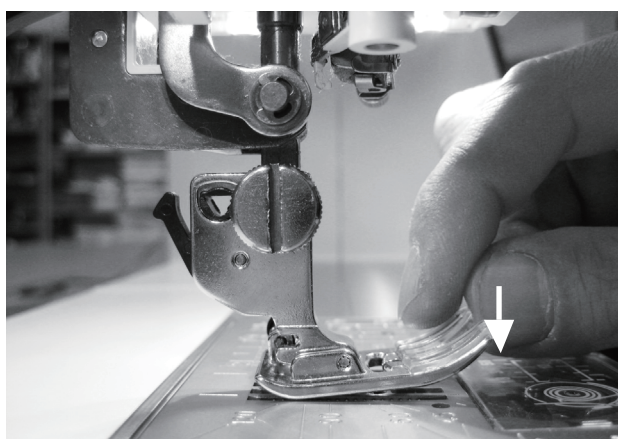
# Mechanical adjustment

## Presser bar height



### To adjust:

1. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "Foot Up/Down" key.
2. Attach the foot holder lightly (Do not tighten the thumbscrew.).
3. Press "Down" key. The presser bar will be lowered. Tighten the thumbscrew firmly.



4. Press "Init" key to initialize the settings. Press "Adjust" key to lower the foot. There should be no gap between the foot and needle plate, but no pressure applied to the needle plate. Check it by tapping the toe of the foot with fingertip as shown.

5. If there is a gap, press "+" key to lower the foot until the foot lands on the needle plate without the gap.
6. If the foot depress the needle plate, press "-" key few times to raise the presser foot, then press "+" key to lower the foot until the foot lands on the needle plate without the gap.

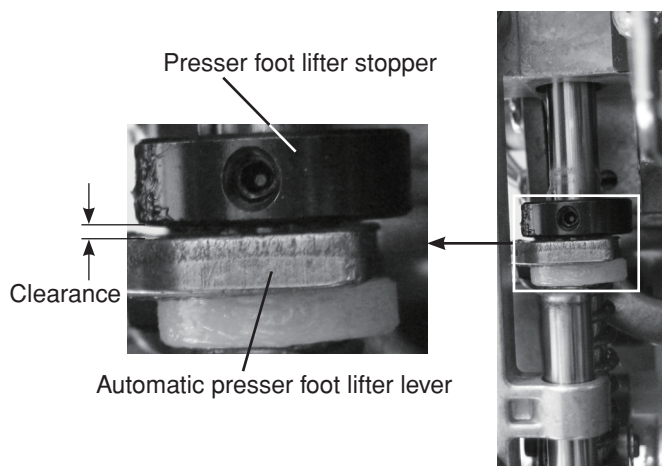
\* Adjust the presser bar height always by pressing "+" key.

Do not press "-" at the end of this adjustment.

\* The value of "Adjust Step" should be within the range of 970 to 1030. If the value is far out of the range, check Automatic Presser Foot Lifter Sensor adjustment.

7. Turn the power switch ON again to enter the ordinary sewing mode, and set the presser foot pressure to "Auto-5". Press the presser foot button to lower the presser foot. Be sure that there is a clearance between the presser foot lifter stopper and the automatic presser foot lifter lever as shown in the picture.

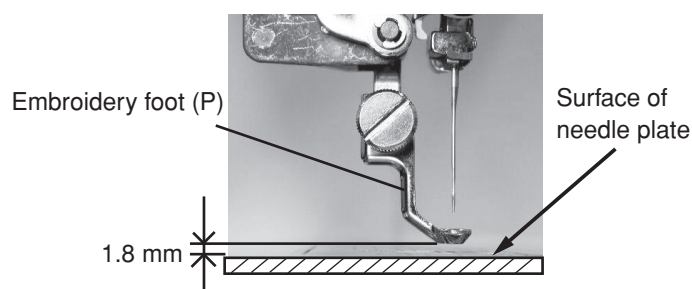
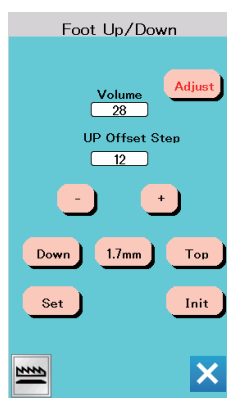
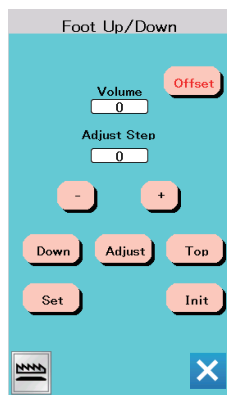
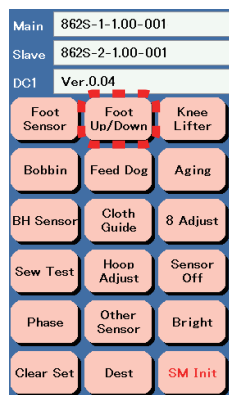
\* If there is no clearance between the presser foot lifter stopper and the automatic presser foot lifter lever, adjust the presser bar height again.



# Mechanical adjustment

## Embroidery foot height

The distance between the embroidery foot (P) and the surface of the needle plate should be in the range of 1.7 mm to 1.9 mm when the presser bar is lowered.

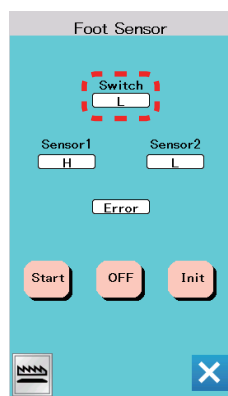
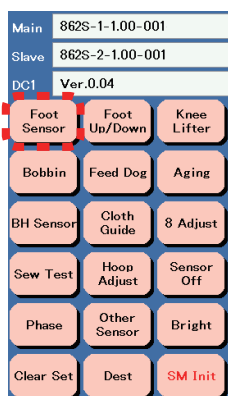


### To adjust:

1. Attach the embroidery foot (P).
  2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "Foot Up/Down" key to raise the foot.
  3. Press "Offset" key. The "Offset" key changes to "Adjust".
  4. Press "1.7 mm" key. The embroidery foot (P) is lowered. The clearance between the foot and the needle plate should be 1.7 mm to 1.9 mm.
  5. If the clearance is less than 1.7 mm, press the "-" key to raise the foot until the clearance reaches 1.8 mm.
  6. If the clearance is more than 1.9 mm, press the "+" key to lower the foot until the clearance decrease to 1.7 mm or less, then press the "-" key to raise the foot until the clearance reaches 1.8 mm.
- \* Always press the "-" key when finishing adjustment.
7. Press "Set" key to register the foot height. Press "X" key to exit the adjusting mode.

# Mechanical adjustment

## Presser foot lifter switch

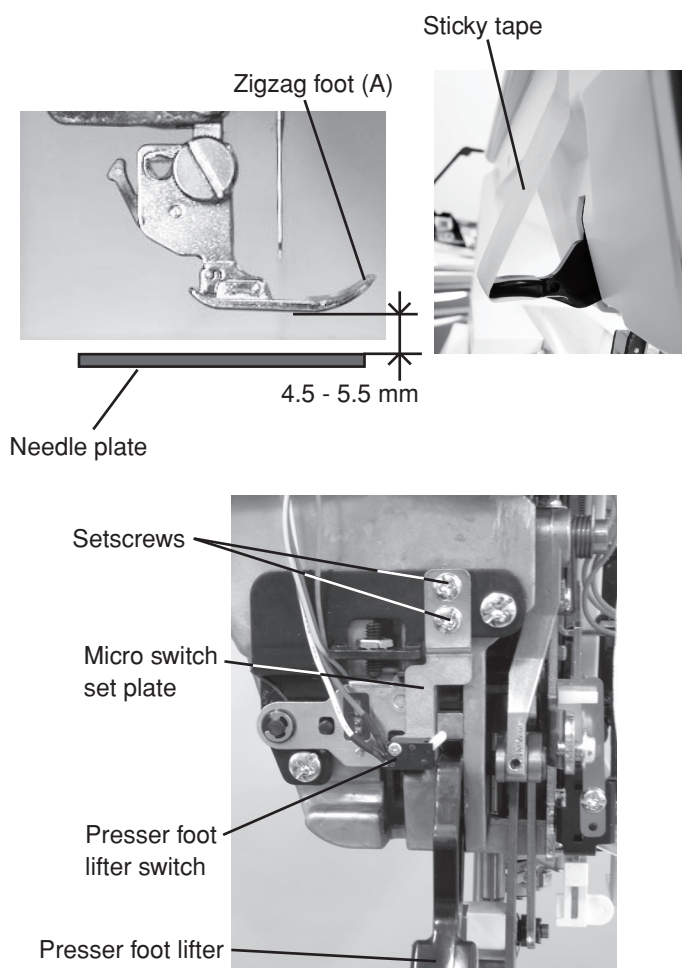


### To check:

1. Attach the zigzag foot (A) .
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode.  
Press "Foot Sensor" key.
3. Press the presser foot lifter button to lower the presser foot.  
Raise the presser foot slowly by raising the presser foot lifter. The distance between the lower part of the presser foot and the surface of needle plate should be 4.5 mm to 5.5 mm when the "Switch" changes to "H" from "L"  
If not, adjust as follows.

### To adjust:

1. Remove the rear cover (page 6).
2. Loosen the setscrews of micro switch set plate.
3. Place the 5 mm block (spacer) between the presser foot and the needle plate, and lower the presser foot.
4. Raise the presser foot lifter lightly as possible from its lowest position. Stop the presser foot lifter at the point where the lifter start to raise the presser foot.  
Fix the lifter with a sticky tape at that position.
5. Lower the micro switch set plate little by little, and stop it when the "Switch" changes to "H" from "L". Tighten the setscrews.
6. Remove the 5 mm block (spacer). Remove the sticky tape and lower the presser foot lifter.  
Raise the presser foot lifter slowly. "Switch" changes to "H" from "L" when the distance between the lower part of the presser foot and the surface of the needle plate is 4.5 to 5.5 mm.

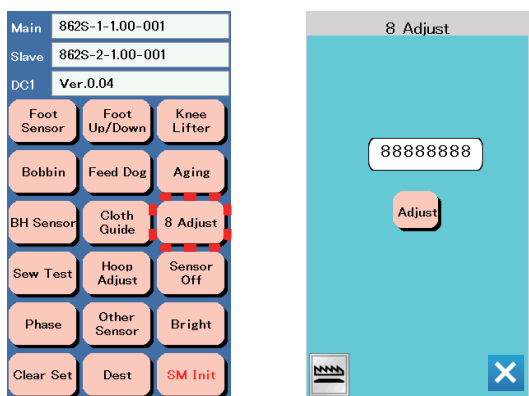


# Mechanical adjustment

## Stretch stitch feed balance

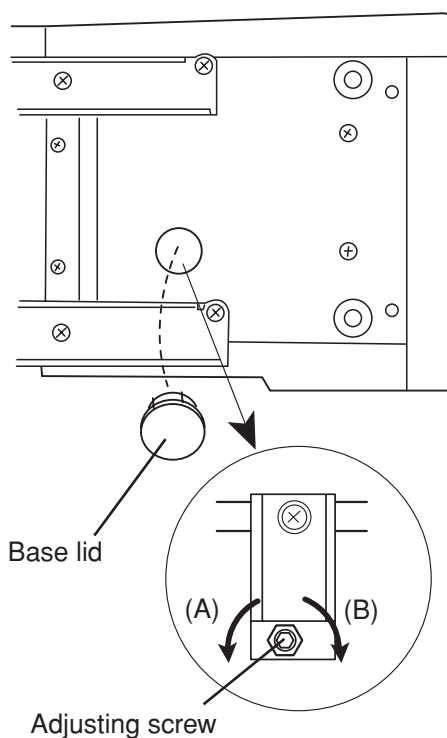
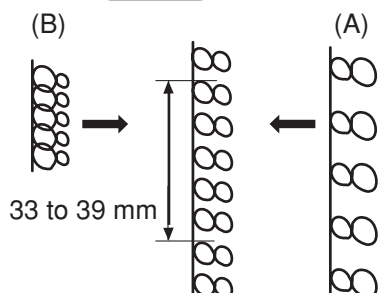
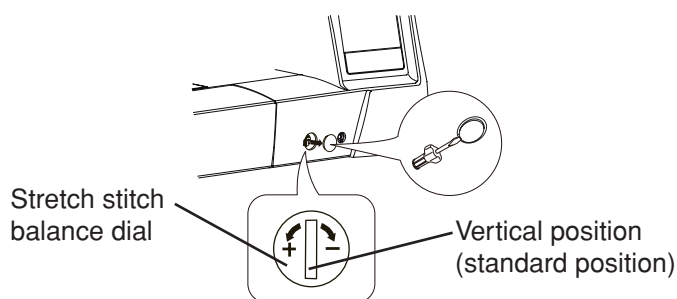
Adjust the stretch stitch balance dial at the setting mark.

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



### To adjust:

1. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "8 Adjust" key.



2. Set the stretch stitch balance dial vertical.

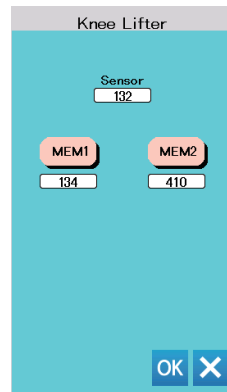
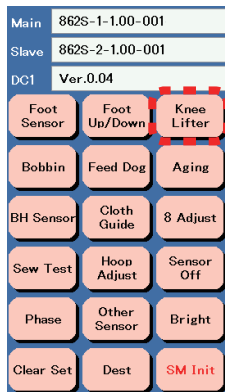
3. Attach the satin stitch foot (F). Sew test patterns and measure the length of the 5 patterns. The length should be 33 mm to 39mm.

4. If not, remove the base lid. Press the "Adjust" key so the adjusting screw comes to the adjusting position.
  - \* Turn the adjusting screw in the direction of (A) if the length is more than 39 mm.
  - \* Turn the adjusting screw in the direction of (B) if the length is less than 33 mm.
5. Sew the test pattern and measure the length of the 5 patterns.
6. Attach the base lid and turn the power switch OFF.



# Mechanical adjustment

## Knee lifter



### To adjust:

1. Turn the power switch ON while pressing the Start/ Stop button and the Reverse stitch button. The LCD shows the Factory Setting Mode. Press "Knee lifter" key.

**Knee lifter is free.**



2. Attach the knee lifter.  
Press "MEM1" key when the knee lifter is free.

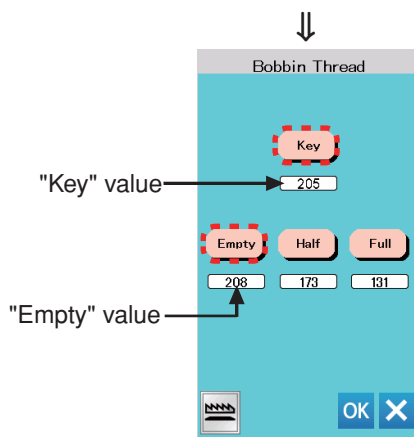
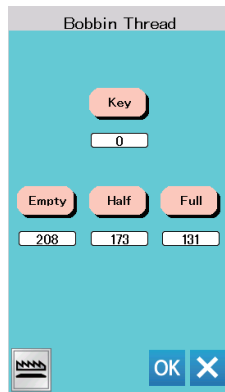
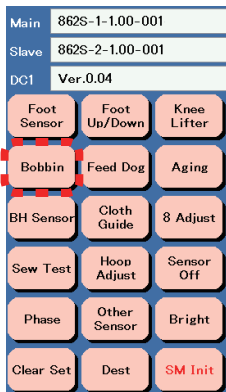
**Push the knee lifter to the right as far as it goes.**



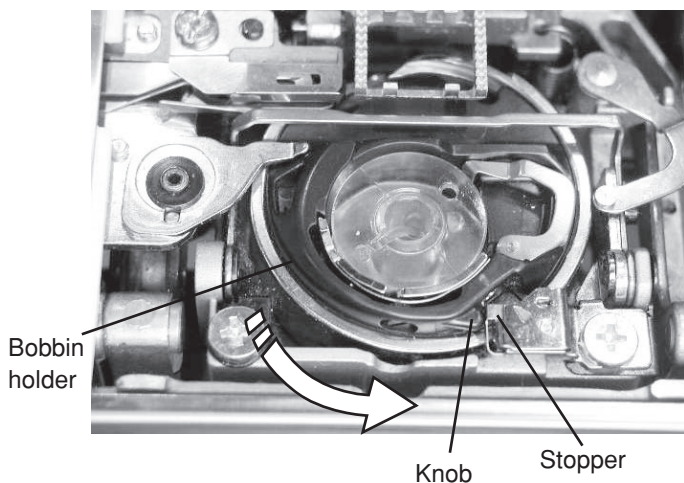
3. Push the knee lifter to the right as far as it goes and press "MEM2" key.
4. Press "OK" key.

# Mechanical adjustment

## Remaining bobbin thread sensor



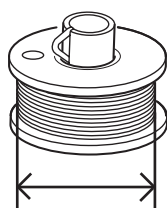
1. Prepare the empty bobbin (diameter: 8.4 mm) and the gauge bobbins (diameter: 12.5 mm and diameter: 18.9 mm).
2. Remove the presser foot and needle plate.  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
3. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode.  
Press "Bobbin" key.
4. Insert the empty bobbin in the bobbin holder (diameter: 8.4 mm).
5. Rotate the bobbin holder counterclockwise so that the knob fits to the stopper in the hook race. Press "Key" and read "Key" value.
6. Repeat the procedure 5 above few times. Press "Empty" when the same "Key" value is indicated. This value is memorized as "Empty" value.
7. Repeat the procedure 4 to 6 with the gauge bobbins (diameter 12.5 mm and 18.9 mm)  
When 12.5 mm gauge bobbin is inserted, press "Half" key to memorize the value.  
When 18.9 mm gauge bobbin is inserted, press "Full" key to memorize the value.
8. Press "OK" key.



# Mechanical adjustment

## Bobbin winder

The amount of thread wound on the bobbin should be 16.5 to 19.5 mm in diameter.



16.5 to 19.5 mm

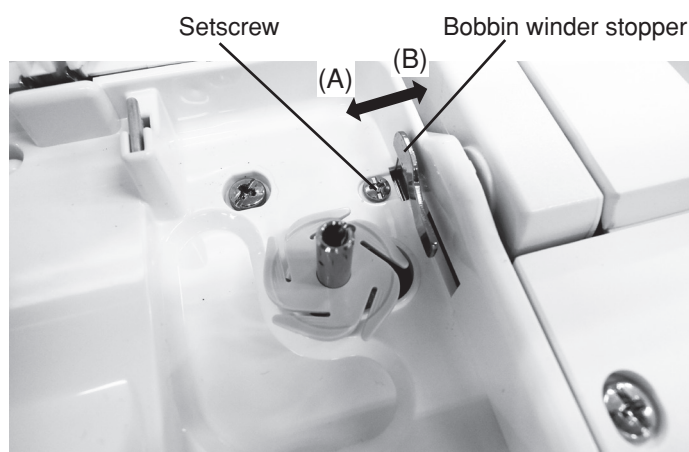
### To adjust bobbin thread amount:

1. Loosen the setscrew.

Adjust the bobbin winder stopper position to determine the thread amount of bobbin.

Move the bobbin winder stopper in the direction of (A) when the amount of thread wound on the bobbin is greater than 19.5 mm in diameter.

Move the bobbin winder stopper in the direction of (B) when the amount of thread wound on the bobbin is less than 16.5 mm in diameter.

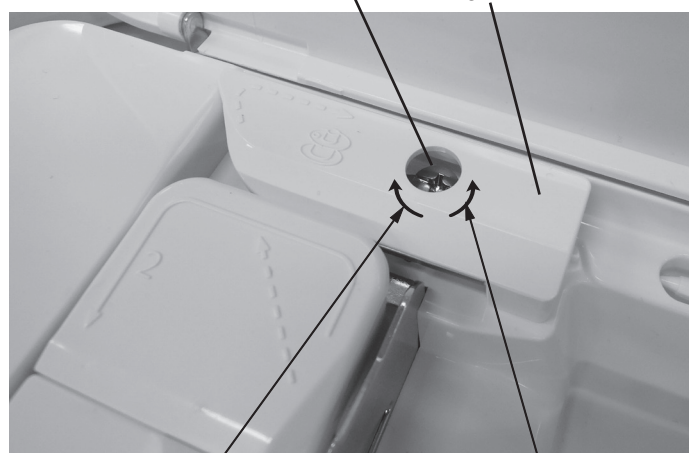


Thread guide screw

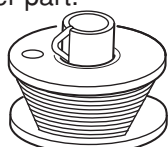
Bobbin winder thread guide cover

### To adjust evenness of thread amount:

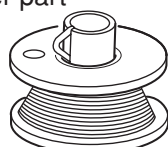
1. Turn the thread guide screw to adjust the evenness of thread amount.



The upper part thread amount is bigger than its lower part.



The upper part thread amount is smaller than its lower part

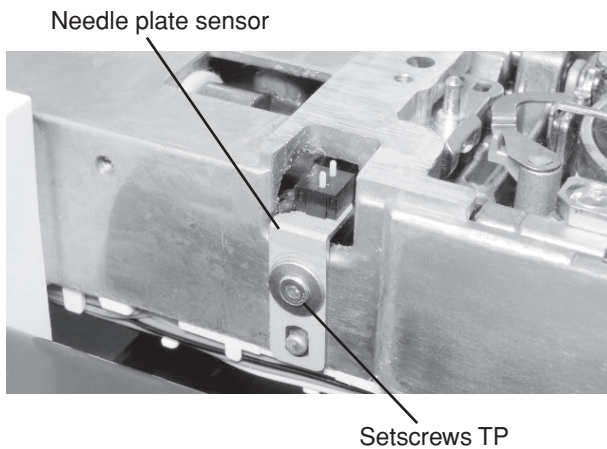


If the thread amount of the lower part of bobbin is smaller than its upper part, turn the guide screw to the right.

If the thread amount of the upper part of bobbin is smaller than its lower part, turn the guide screw to the left.

# Mechanical adjustment

## Needle plate sensor (1)

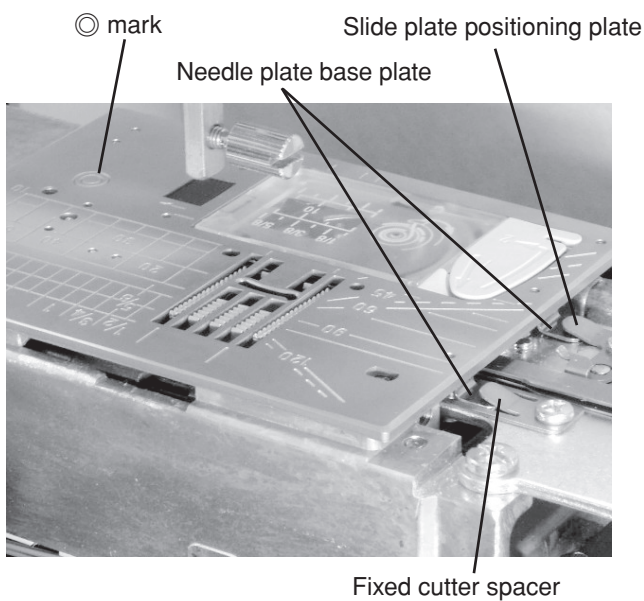


### To remove:

1. Remove the base cover, bed cover and the free-arm cover (see pages 3 and 4).
2. Disconnect the connector from the needle plate sensor switch from the printed circuit board A (see page 8).
3. Remove the setscrew TP and the needle plate sensor switch.

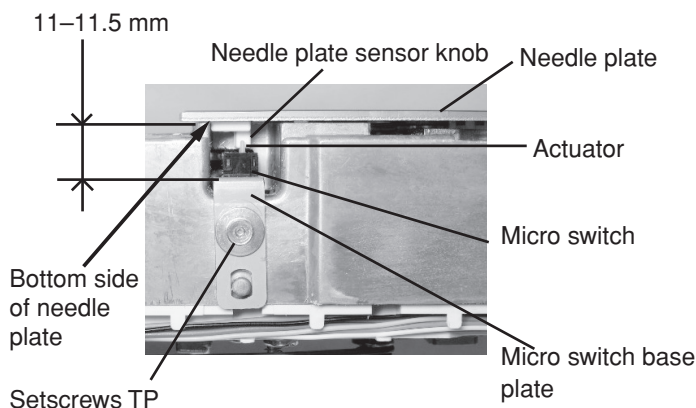
### To attach:

1. Attach the needle plate sensor switch with the setscrews 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 below).
4. Tighten the setscrews TP firmly.
5. Attach the base cover, bed cover and free-arm cover.



### To check and adjustment:

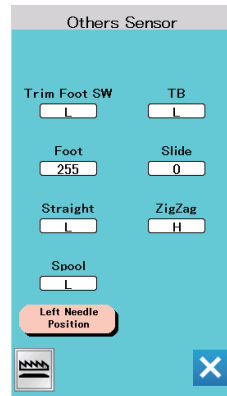
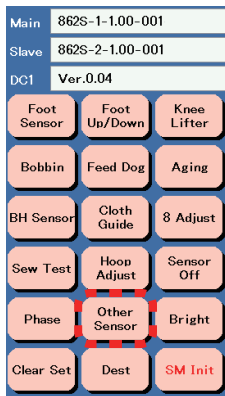
1. Prepare the needle plate and the needle plate for straight stitch.
2. Insert the needle plate base plate under the fixed cutter spacer and the slide plate positioning plate. Press the © mark to attach the needle plate.



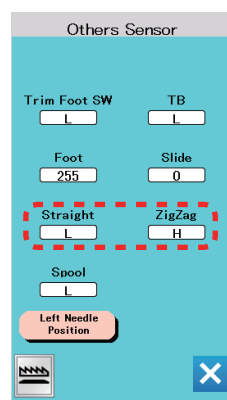
3. The distance between the bottom side of the needle plate and the micro switch base plate should be in the range of 11 – 11.5 mm.  
If not, loosen the setscrews TP and move the base plate up or down to adjust it. Tighten the setscrews TP firmly after the adjustment.  
The actuator of the micro switch should be aligned with the needle plate sensor knob.

# Mechanical adjustment

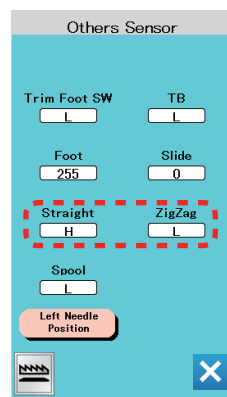
## Needle plate sensor (2)



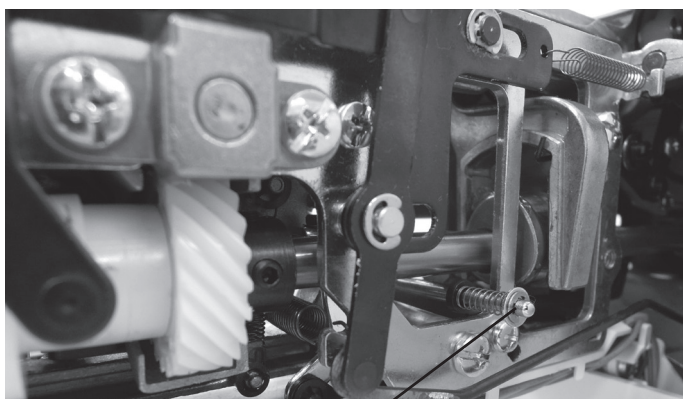
Needle plate attached:



Needle plate for straight stitch attached:



4. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode.  
Press "Other sensor" key.
5. Be sure that "Straight" indicates "L", and "ZigZag" indicates "H" when the needle plate is attached.
6. Replace the needle plate with the needle plate for straight stitch. Be sure that "Straight" indicates "H", and "Zigzag" indicates "L".  
If not, adjust the micro switch base plate position (see page 43).  
\* To remove the needle plate, press the needle plate replacing bar in the direction of arrow with a screwdriver.



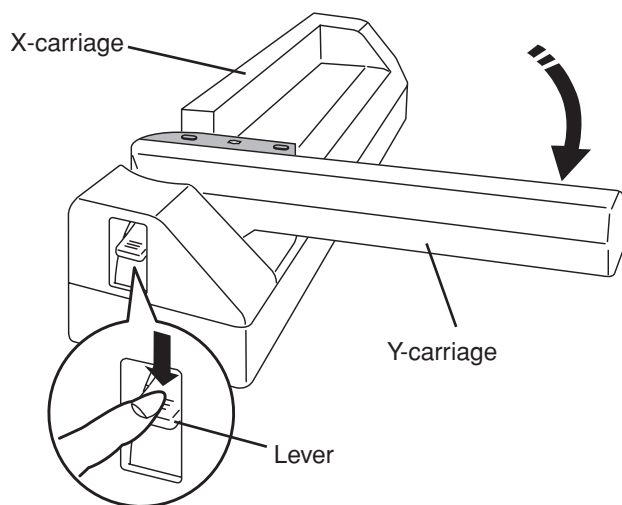
Needle plate replacing bar



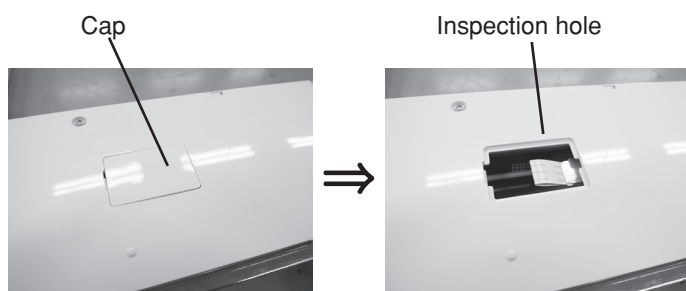
# Mechanical adjustment

## Y-carriage play adjustment

Be sure that there is no play in the Y-carriage, when extracted.

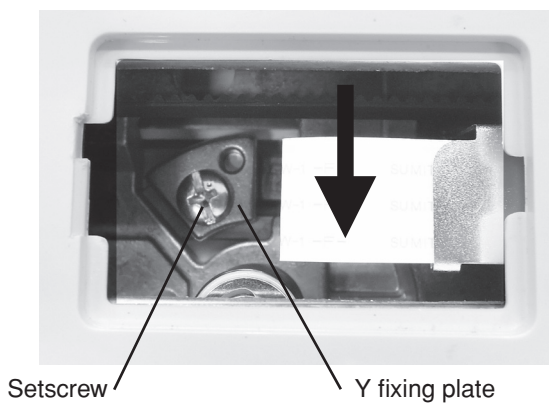


1. Push down the lever to open the Y-carriage.



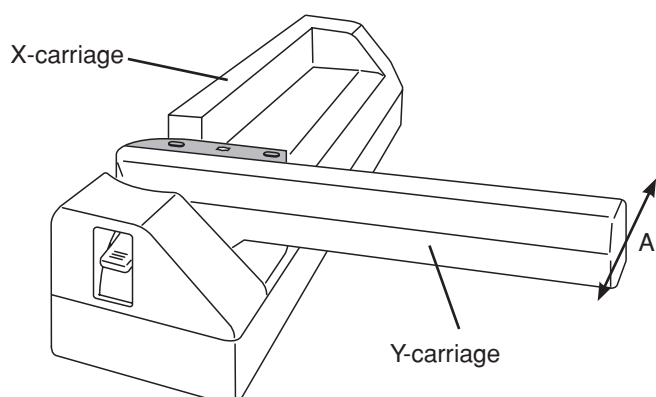
2. Remove the cap under the embroidery unit.

3. Move the X-carriage to the point where you can access the Y fixing plate from the inspection hole.



4. Loosen the setscrew.

5. Tighten the setscrew while pushing the Y fixing plate in the direction of arrow.

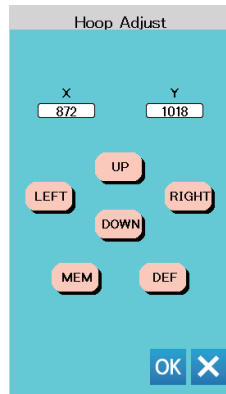
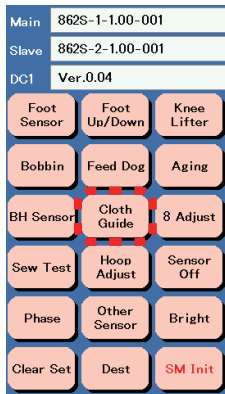


6. Be sure that there is no play in the Y-carriage in the direction of arrow A.

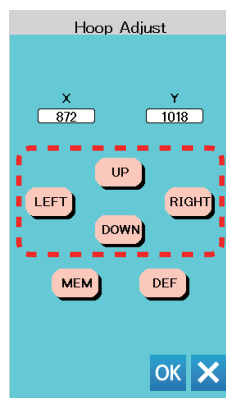
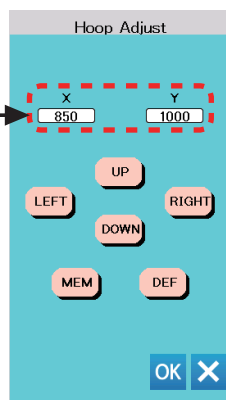
7. Attach the cap and return the X-carriage to the home position. Close the Y-carriage.

# Mechanical adjustment

## Adjusting X and Y sensors (simple adjustment)

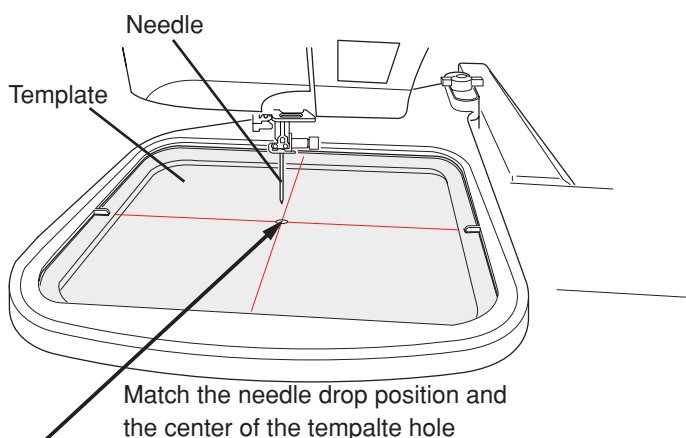


X and Y value



### To adjust:

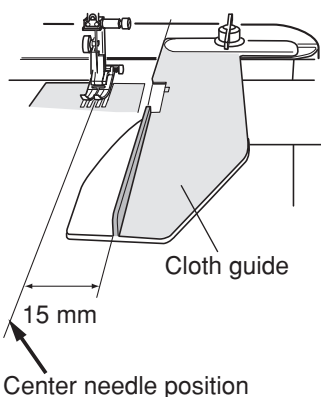
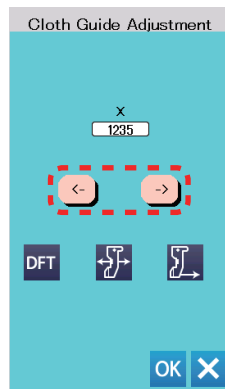
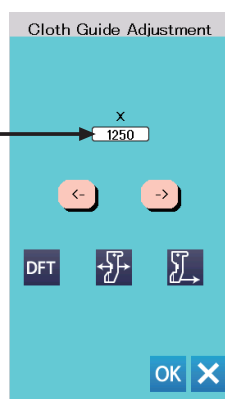
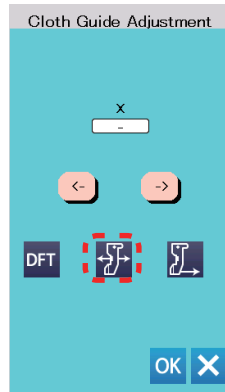
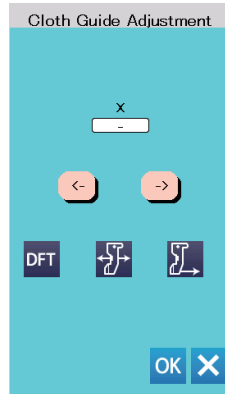
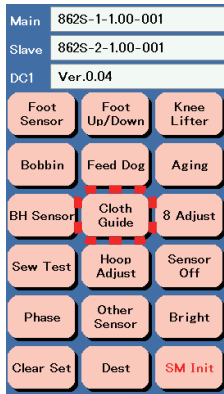
1. Remove the foot holder.
2. Turn the power switch OFF.  
Attach the embroidery unit.  
Extend the carriage arm.
3. Attach the embroidery hoop and the template.
4. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode.  
Press "Hoop Adjust" key.
5. The needle moves to the left needle position, and the hoop moves to its starting position.  
(Default position: X=850 Y=1000)
6. Adjust the hoop position so that the needle drops to the center of the template hole.  
Press **LEFT** or **RIGHT** key to adjust the horizontal hoop position (X value).  
\* Adjust the X value in the range of 800 to 900.  
Press **UP** or **DOWN** key to adjust the vertical hoop position (Y value).  
\* Adjust the Y value in the range of 950 to 1050.
7. Press OK key.



# Mechanical adjustment

## Cloth guide start position

The distance between the cloth guide and center needle position should be 15 mm when the cloth guide is at the start position.



1. Turn the power switch OFF. Attach the embroidery hoop.  
(Do not open the Y-carriage.)
2. Attach the cloth guide to the embroidery carriage.
3. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the Factory Setting Mode.  
Press "Cloth Guide" key.
4. Press "[Stitch Icon]" key.  
The cloth guide moves to the start position, and the initial X value 1250 is indicated.  
The initial X value is "1250".
5. Press "<-" key or ">" key to move the cloth guide to the position 15 mm away from the center needle position.  
\* Adjust the X value in the range of 1200 to 1300.
6. Press "OK" key.