

# **SERVICE MANUAL**

## **MC15000**

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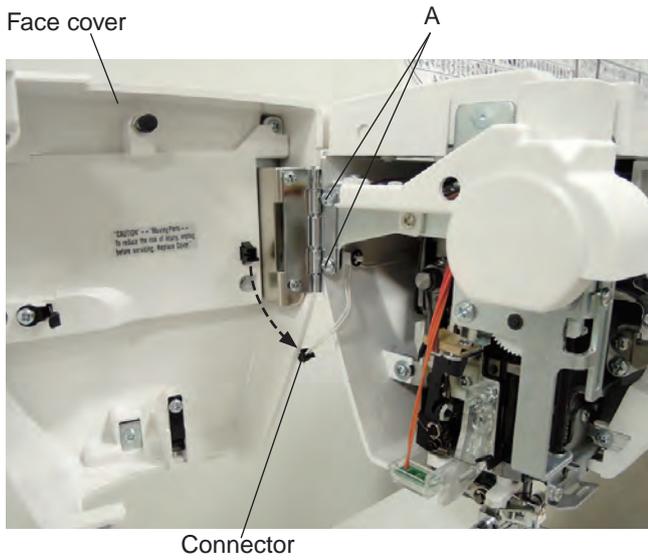
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# Changing External Parts (1)



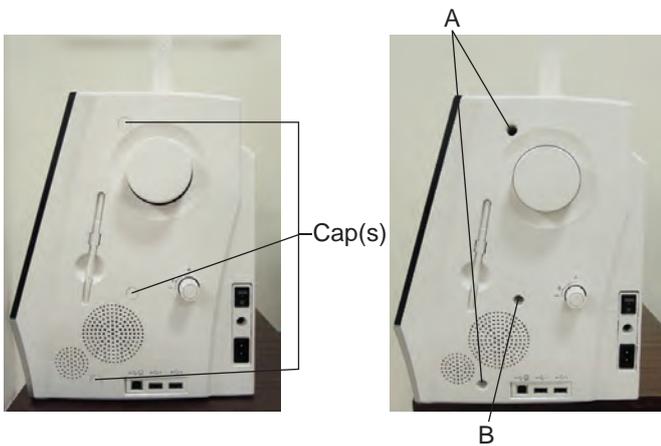
## Face cover

### To remove:

1. Open the face cover.  
Disconnect the connector.
2. Remove the setscrews A (2 pcs.).  
Remove the face plate.

### To attach:

1. Follow the above procedure in reverse.



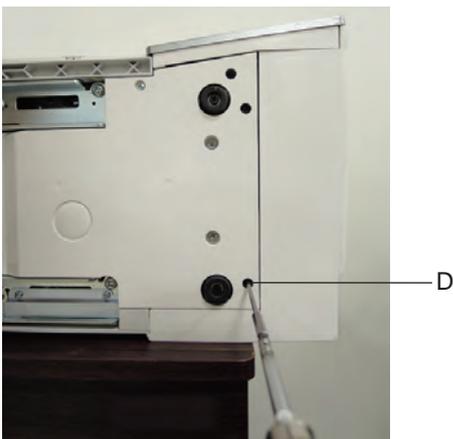
## Belt cover

### To remove:

1. Remove the caps.
2. Remove the setscrews A and B.



3. Loosen the setscrew C.

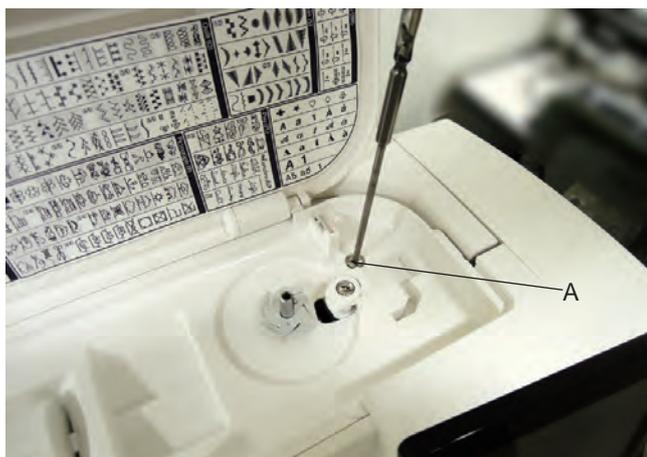


4. Loosen the setscrew D.  
Remove the belt cover.

### To attach:

1. Follow the above procedure in reverse.

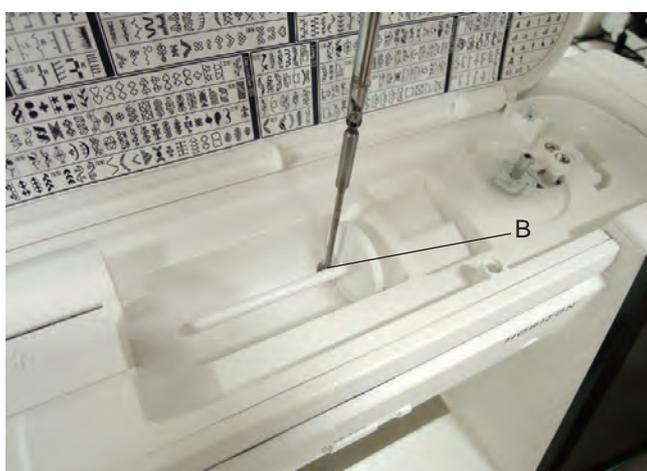
## Changing External Parts (2)



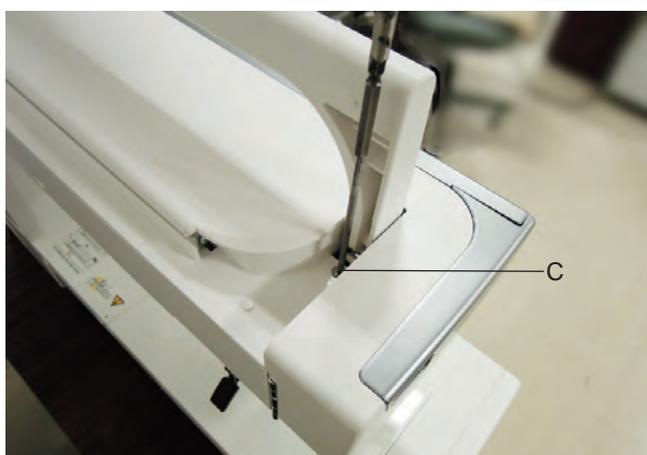
### Top cover

#### To remove:

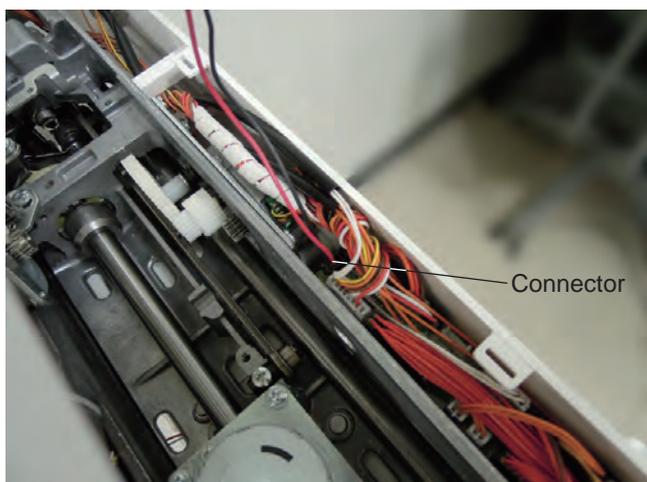
1. Open the top cover.  
Remove the setscrew A.



2. Remove the setscrew B.



3. Close the top cover.  
Raise the carrying handle.  
Remove the setscrew C.

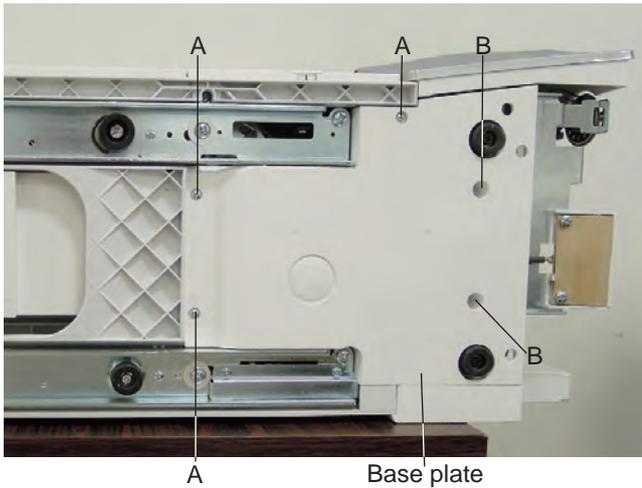


4. Detach the top cover for the machine.  
Be careful that the connector for the bobbin winding motor is still connected.  
Disconnect the connector from the machine.  
Remove the top cover .

#### To attach:

1. Follow the above procedure in reverse.  
Be careful not to bind the cords when attaching the top cover to the machine.

## Changing External Parts (3)



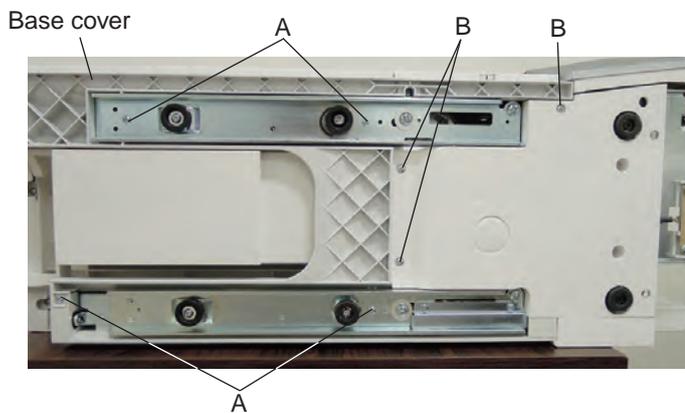
### Base plate

#### To remove:

1. Remove the setscrews A (3 pcs.).
2. Remove the setscrews B (2 pcs.).
3. Remove the base plate.

#### To attach:

1. Follow the above procedure in reverse.



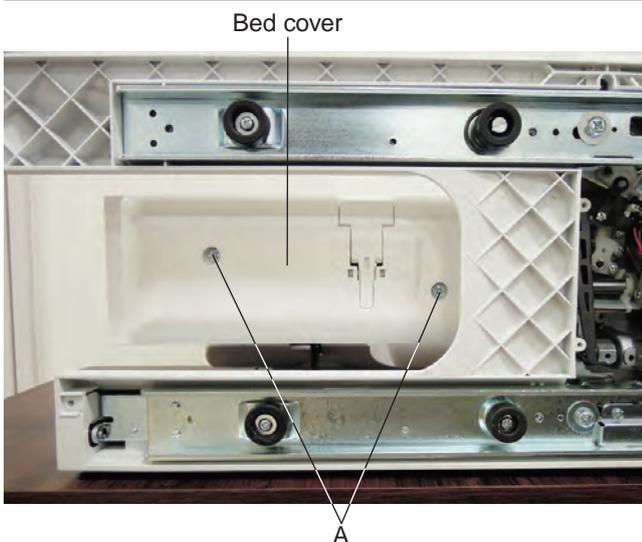
### Base cover

#### To remove:

1. Remove the extension table.  
Remove the setscrews A (4 pcs.).  
Remove the setscrews B (3 pcs.).  
Remove the base cover.

#### To attach:

1. Follow the above procedure in reverse.



### Bed cover

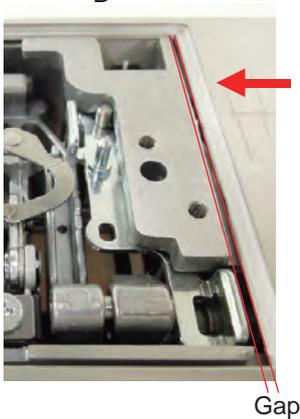
#### To remove:

1. Remove the extension table.  
Remove the setscrews A (2 pcs.).  
Remove bed cover.

#### To attach:

1. Follow the above procedure in reverse.

## Changing External Parts (4)



### Free arm cover

#### To remove:

1. Remove the needle and presser foot holder.
2. Push down the needle plate release lever.  
Remove the needle plate.
3. Remove the bed cover (see page 3).

4. Remove the setscrew A and pin B.

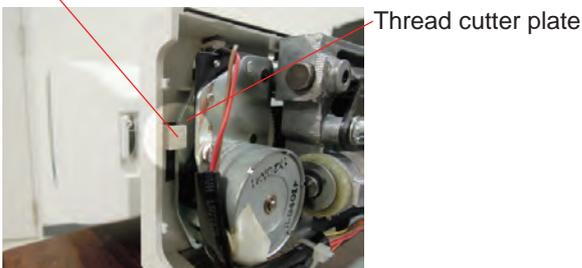
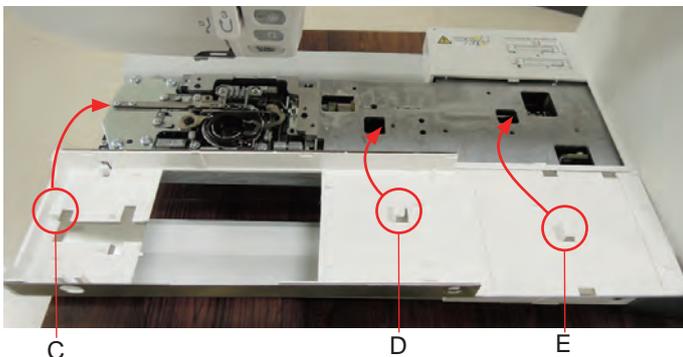
5. Slide the free arm cover in the direction of arrow so there should be no gap between the needle plate base plate and free arm cover.

Remove the free arm cover.

\* There are 3 hooks (C, D and E) holding the free arm cover as indicated. Unlatch the hooks before removing the free arm cover.

#### To attach:

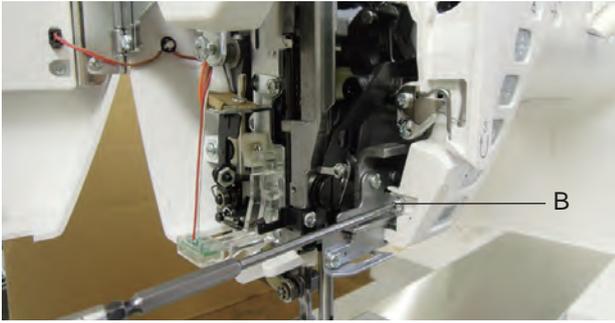
1. Latch the hooks through the holes. Press down the Free arm cover to the free arm. Slide the free arm cover to the right until it clicks and stops. Be sure that the hook C is latched to the thread cutter plate as shown.
2. Attach the setscrew and pin to fix the free arm cover.
3. Attach the needle plate. Press down the © mark on the needle plate until it clicks.



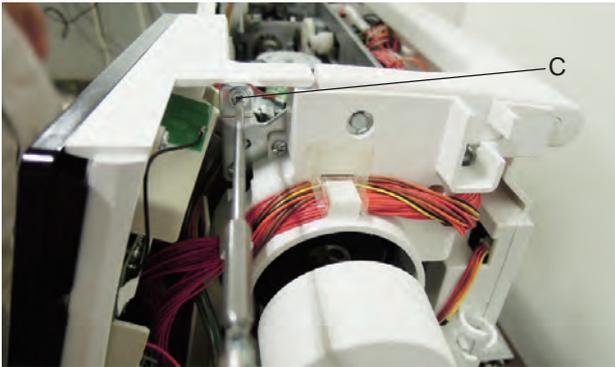
## Changing External Parts (5)



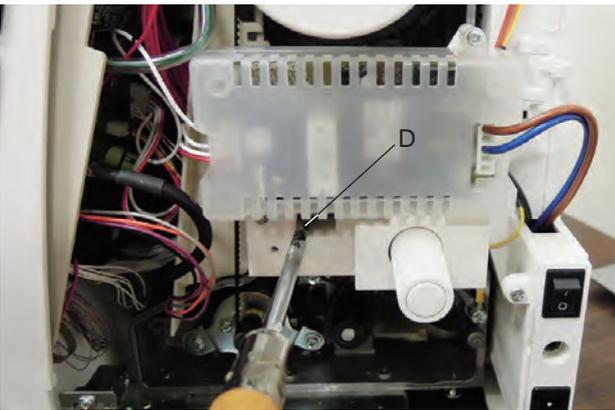
A



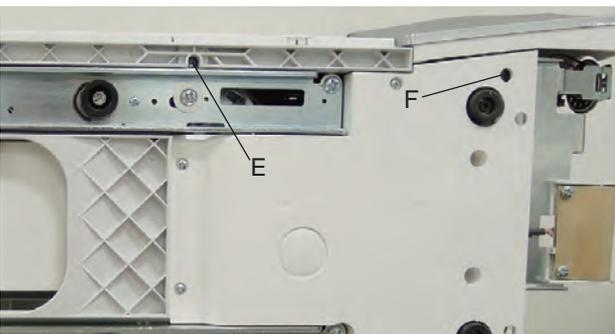
B



C



D



E

F

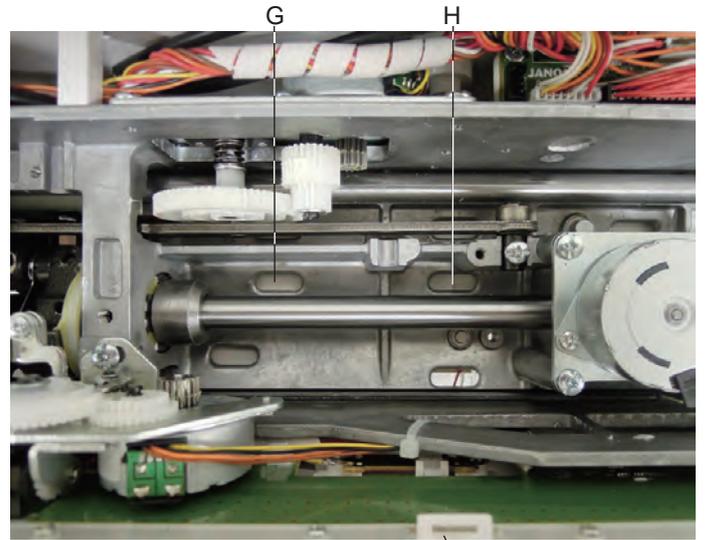
### Front cover

#### To remove:

1. Remove the belt cover and top cover (see page 1 and 2).
2. Loosen the setscrew (A, B, C, D, E and F).
3. Press down the rear cover through the holes (G and H) with a screwdriver to unlatch the front cover.
4. Remove the front cover.

#### To attach:

1. Follow the above procedure in reverse.

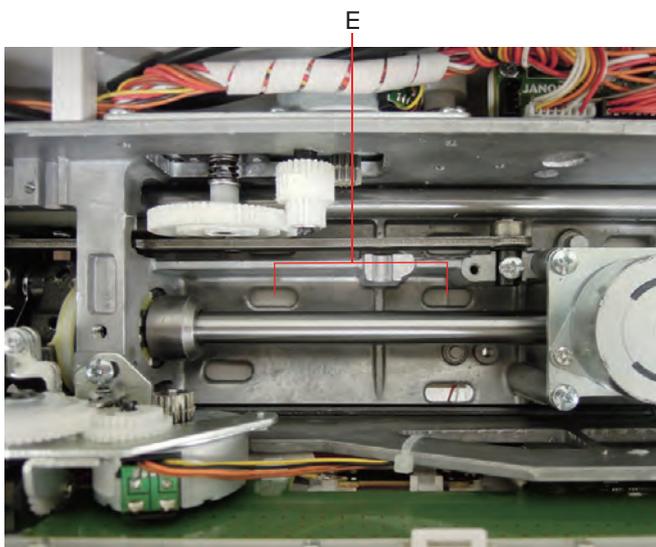
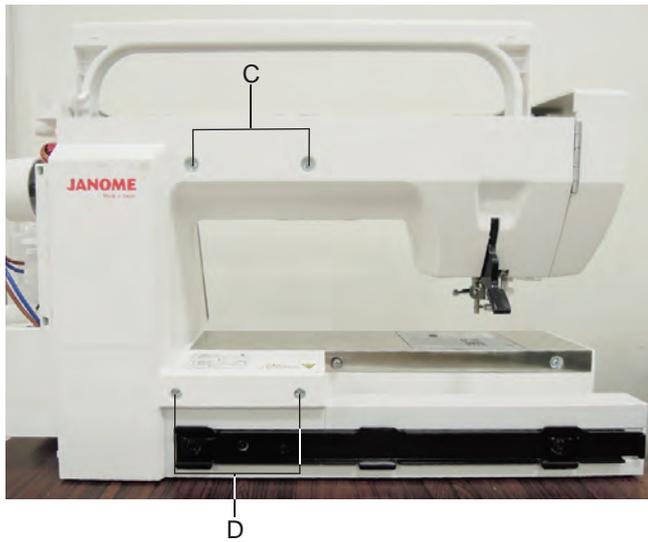
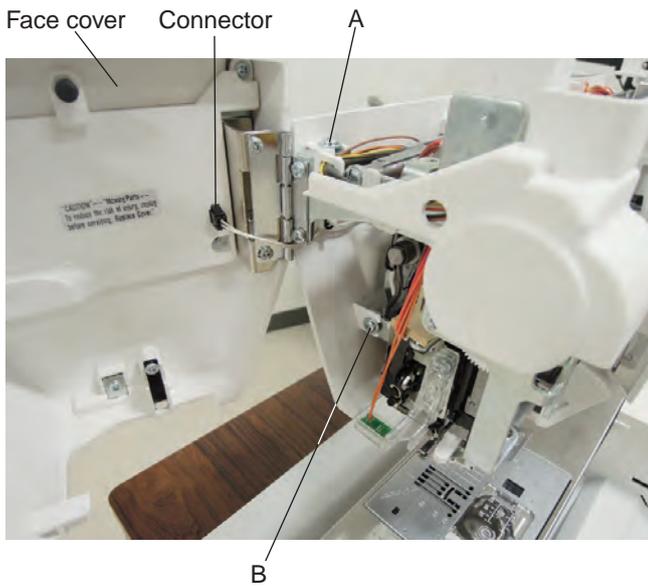


G

H

Front cover

## Changing External Parts (6)



### Rear cover

#### To remove:

1. Remove the belt cover, top cover and base cover (see page 1, 2 and 3).
2. Open the face plate and disconnect the connector.
3. Loosen the setscrews A and B.

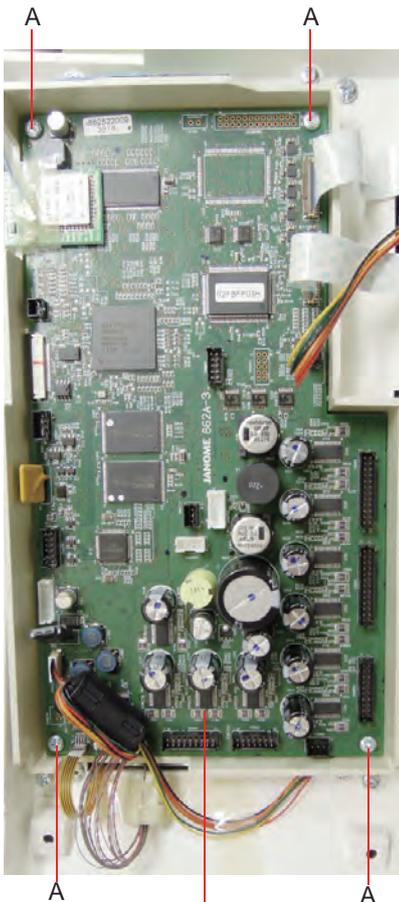
4. Remove the setscrews C (2 pcs.) and D (2 pcs.).

5. Press down the rear cover through the holes E to unlatch the front cover.
6. Remove the rear cover.

#### To attach:

1. Follow the above procedure in reverse.

# Replacing electronic components



Printed circuit board A

## Printed circuit board A

### NOTE:

Do not disconnect the 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. Remove the setscrews A (4 pcs.) and printed circuit board A.

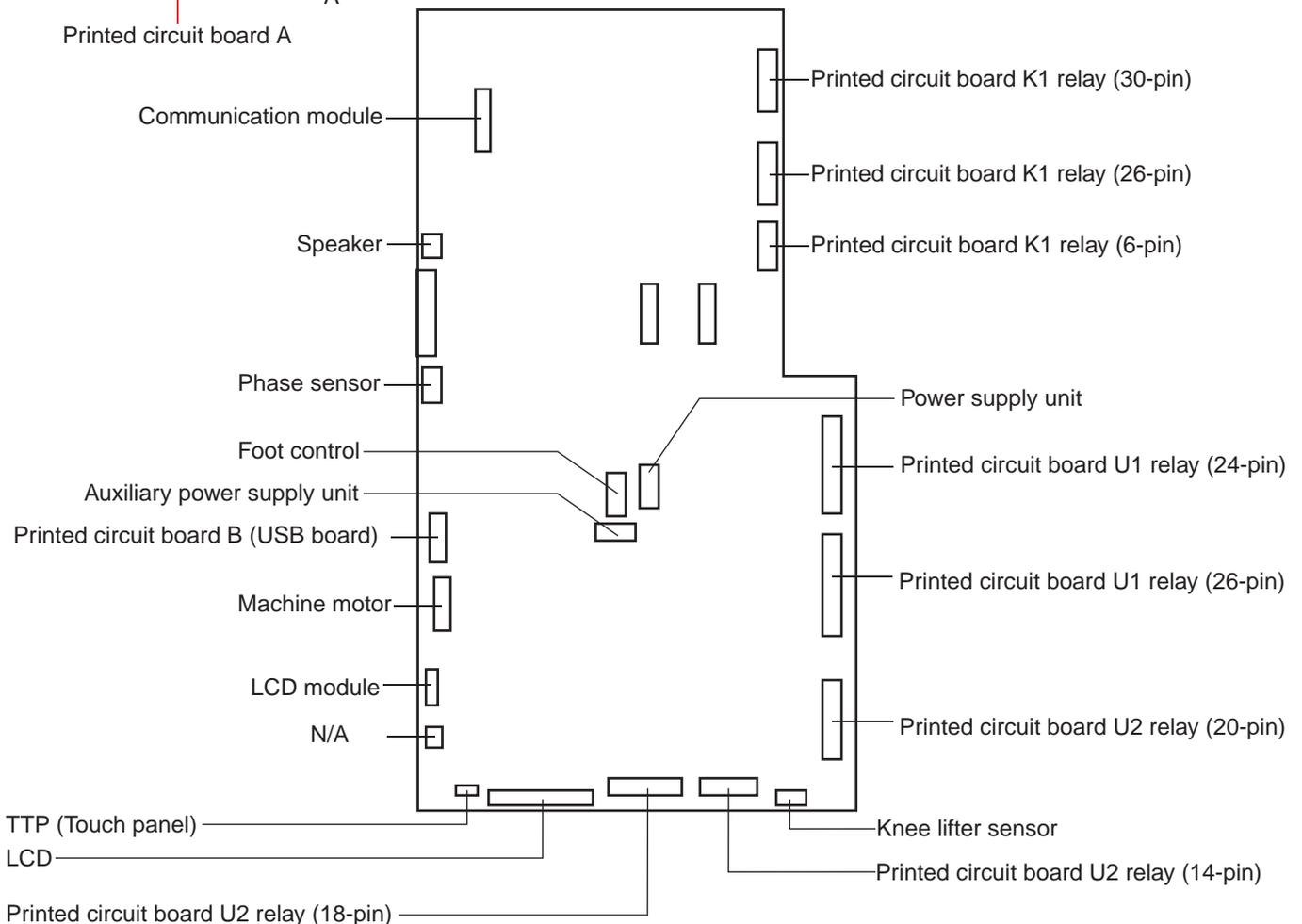
### To attach:

1. Follow the above procedure in reverse.

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

- Knee Lifter (see page 48)
- Cloth guide start position (see page 53)
- Remaining bobbin thread sensor (see page 49)
- Presser bar height (see page 44)
- Embroidery foot height (see page 45)
- \* Adjust the embroidery foot height after the presser bar height adjustment.

## Printed circuit board A connection



# Replacing electronic components



## 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, MC15000 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.

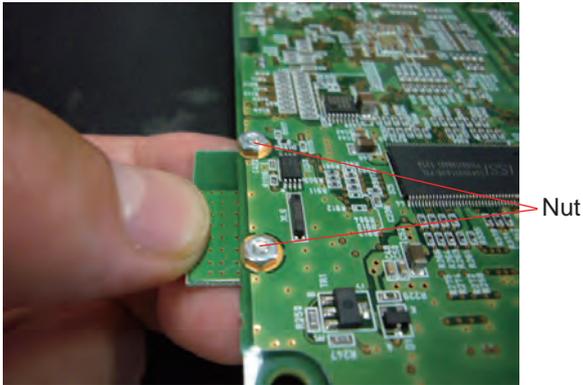
If the symptom persists after 20 seconds of standby time, the communication module may be out of order or installed improperly. Replace the communication module or try installing the module again by following the procedure in next page.

# Replacing electronic components

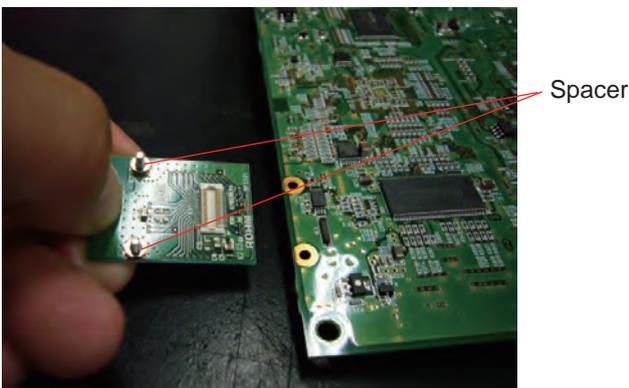
## Communication module (2)

### To remove:

1. Remove the the printed circuit board A from the machine (see page 7).  
Tune the printed circuit board A rear-side up.  
Hold the communication module lightly, and remove the nuts (2 pcs.).



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



3. Flip the module and remove the spacers (2 pcs.) and setscrews (2 pcs.).



### To attach:

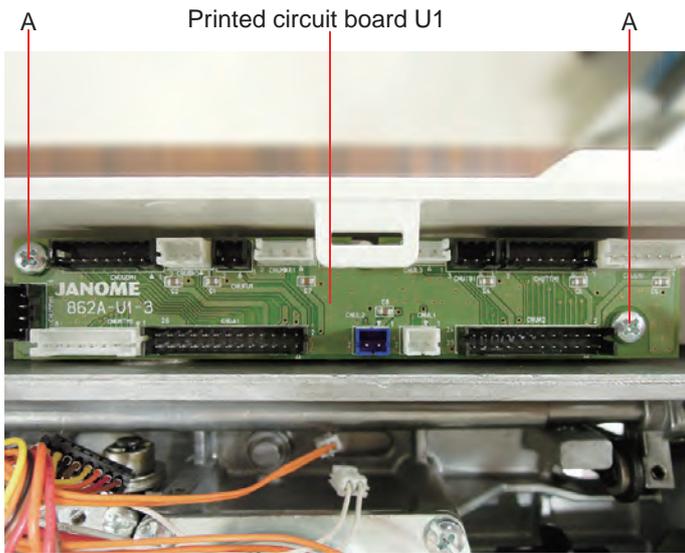
1. Follow the above procedure in reverse.  
Attach the communication module with the setscrews.  
A torque to tighten the setscrews should be more than 1kgf-cm, and do not tighten the setscrews too much.

### Parts #

- 862-528-005: Communication module
- 000-249-601: Spacer
- 000-062-206: Nut
- 000-169-802: Setscrew



# Replacing electronic components



Printed circuit board U1

## Printed circuit board U1

### NOTE:

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

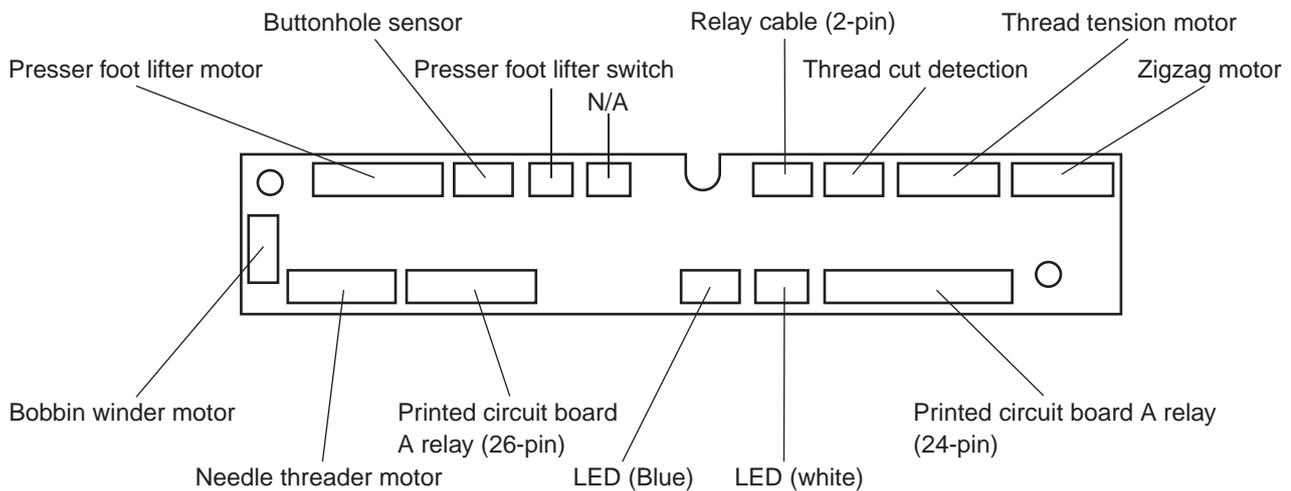
### To remove:

1. Remove the top cover (see page 2).
2. Disconnect the connectors. Remove the setscrews A (2 pcs.) and printed circuit board U1.

### To attach:

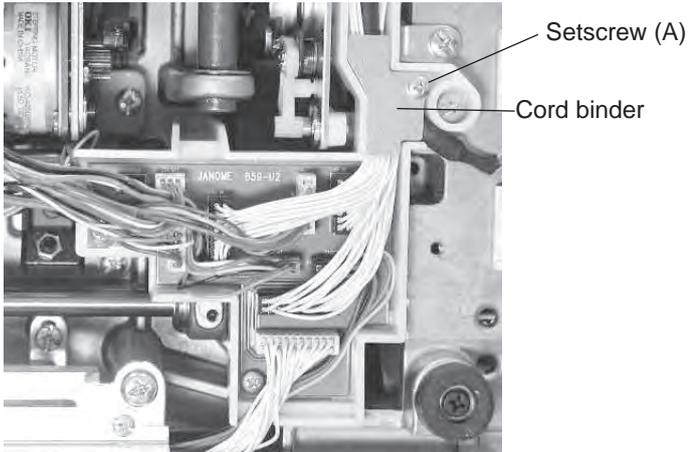
1. Follow the above procedure in reverse.

## Circuit board U1 connection



# Replacing electronic components

## Printed circuit board U2



### NOTE:

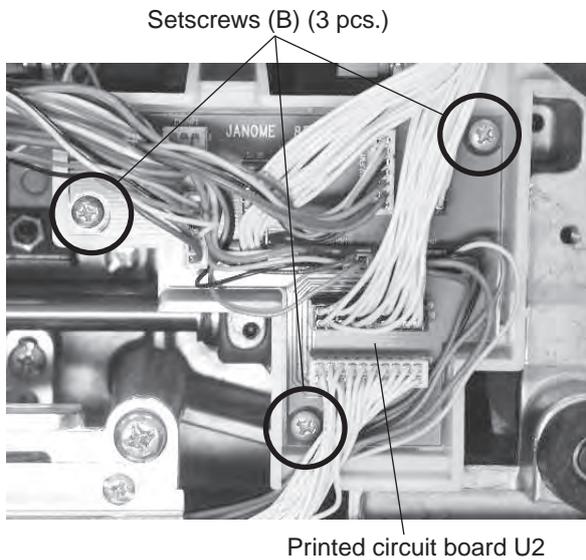
Do not disconnect the connectors by pulling on cord.  
To disconnect the connectors, grasp the connector, not the cord.

### To remove:

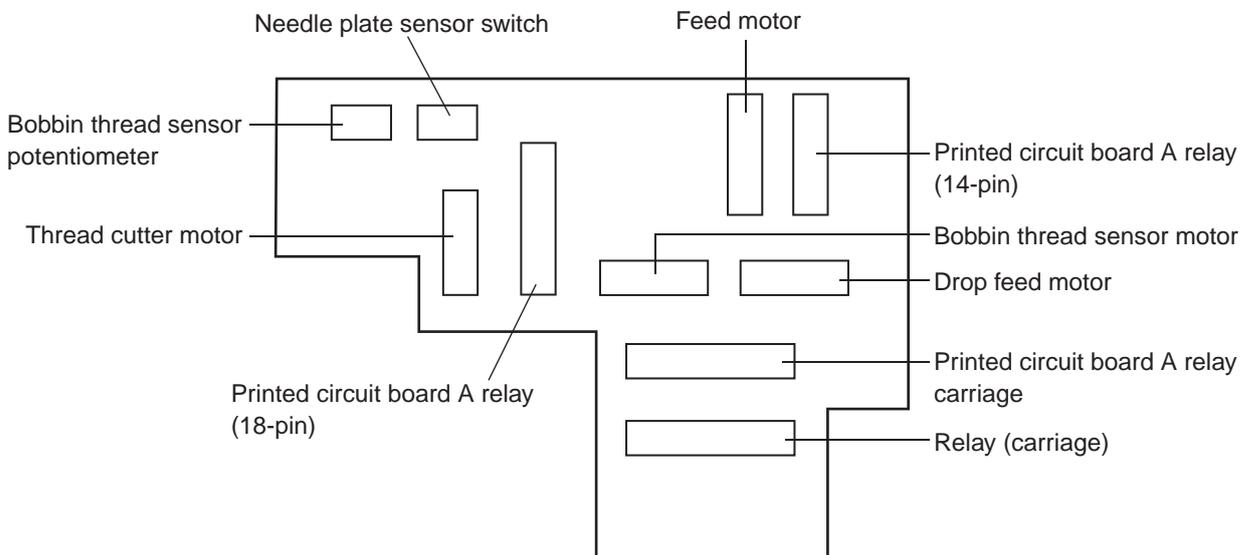
1. Remove the base plate (see page 2).
2. Remove the setscrew (A). Disconnect the connectors.
3. Disconnect the connectors and setscrews (B).  
Remove the printed circuit board U2.

### To attach:

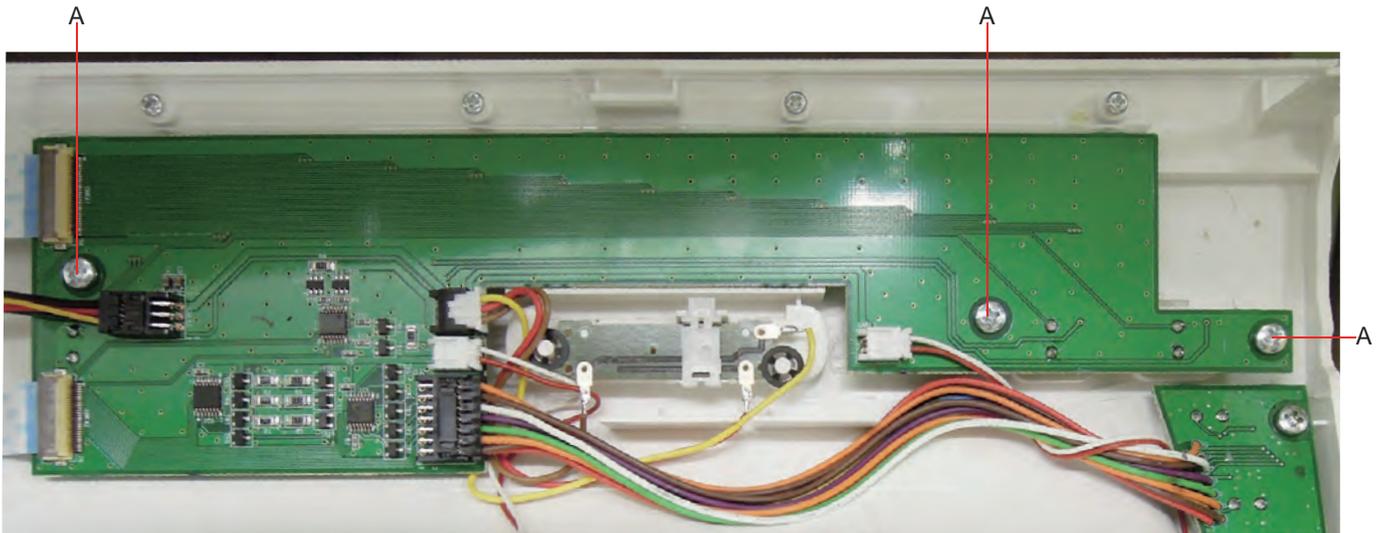
1. Follow the above procedure in reverse.



## Circuit board U2 connection



# Replacing electronic components



## Printed circuit board K

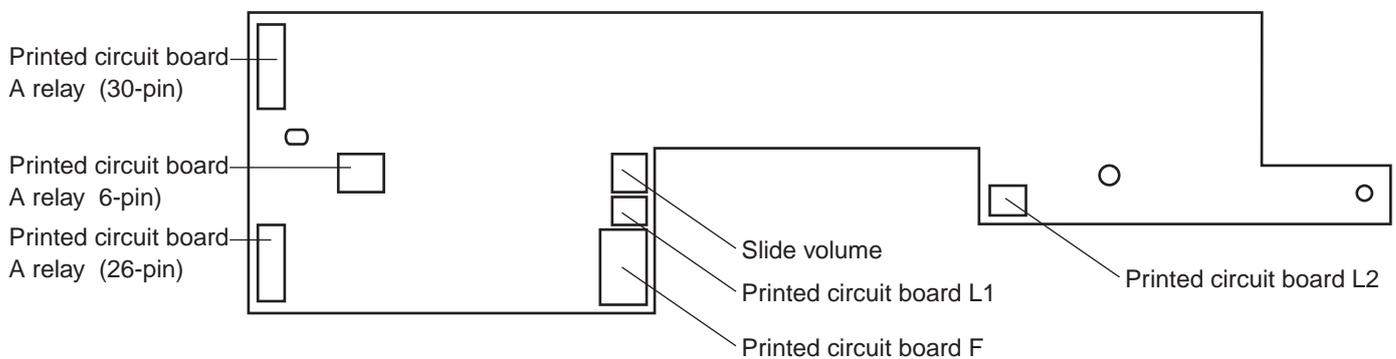
### To remove:

1. Remove the front cover (see page 5).
2. Disconnect the connectors from the circuit board K.
3. Remove the setscrews (3 pcs), and the circuit board K.

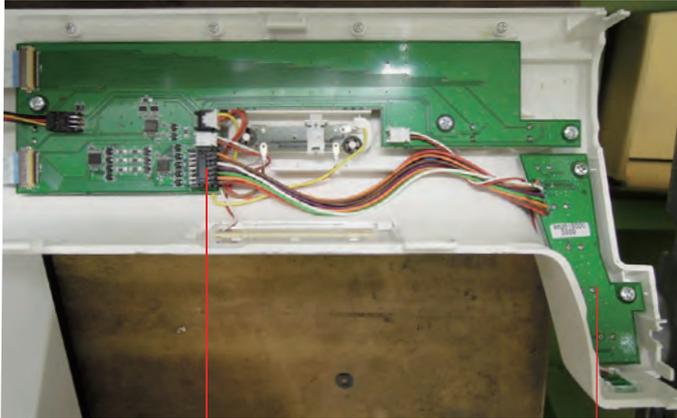
### To attach:

1. Follow the above procedure in reverse.

## Circuit board K connection



# Replacing electronic components



A

Printed circuit board F

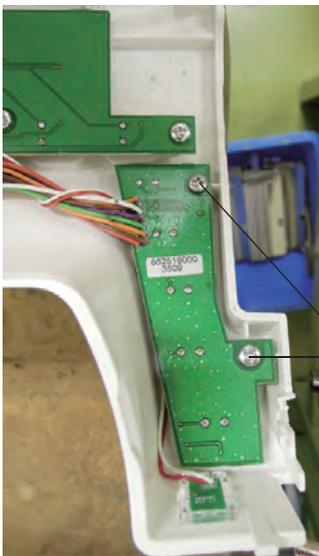
## Printed circuit board F

### To remove:

1. Remove the front cover (see page 5).
2. Disconnect the connector A from the circuit board K.
3. Remove the setscrews (2 pcs), and the circuit board F.

### To attach:

1. Follow the above procedure in reverse.



Setscrews

# Replacing electronic components

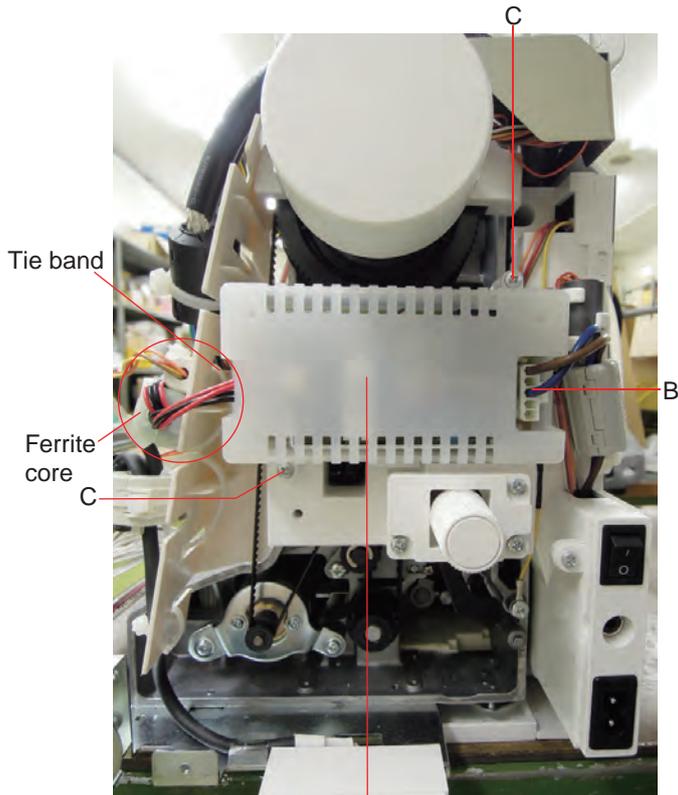
## Switching power supply unit

### • Before removing

1. Remove the belt cover, top cover, front cover and the rear cover (see pages 1, 2 and 5).

### • Removing the auxiliary power supply unit case

2. Disconnect the connector of the auxiliary power supply unit from the printed circuit board A (see page 7).  
Cut the tie band of the ferrite core and remove the cords from the board.
3. Disconnect the connector B from the case.
4. Remove the setscrews C (2 pcs.).
5. Remove the auxiliary power supply unit case from the machine.



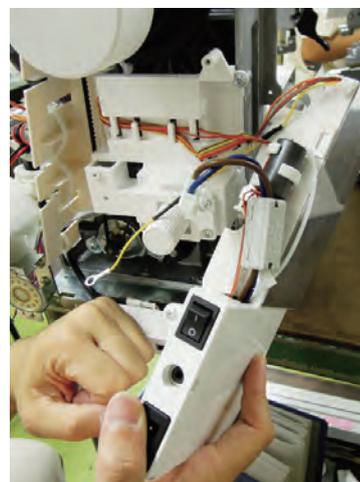
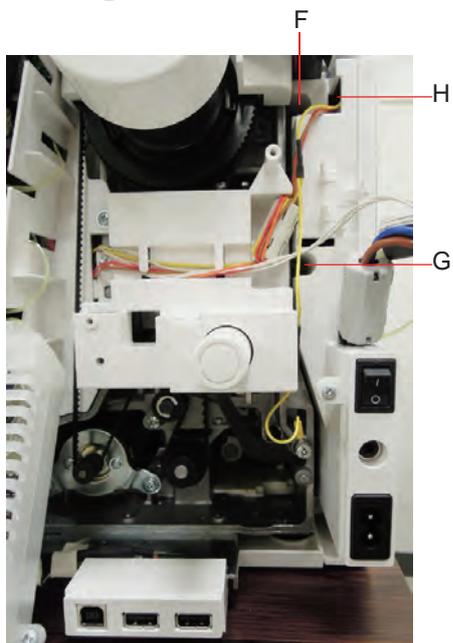
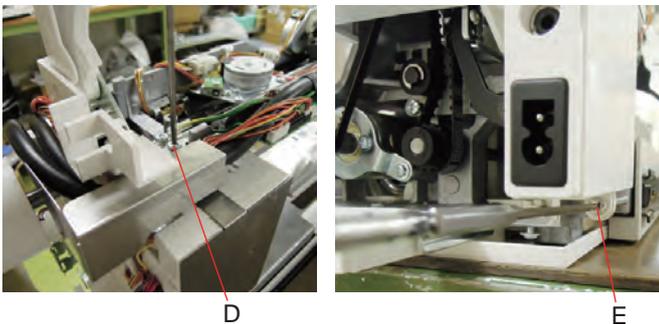
Auxiliary power supply unit case

### • Removing the power supply unit

6. Remove the setscrews D (top of the machine), E (under the power supply unit), F and G (end of the holes as shown).
7. Disconnect the connector H from the power supply unit.
8. Remove the power supply unit.

### To attach:

1. Follow the above procedure in reverse.



# Replacing electronic components

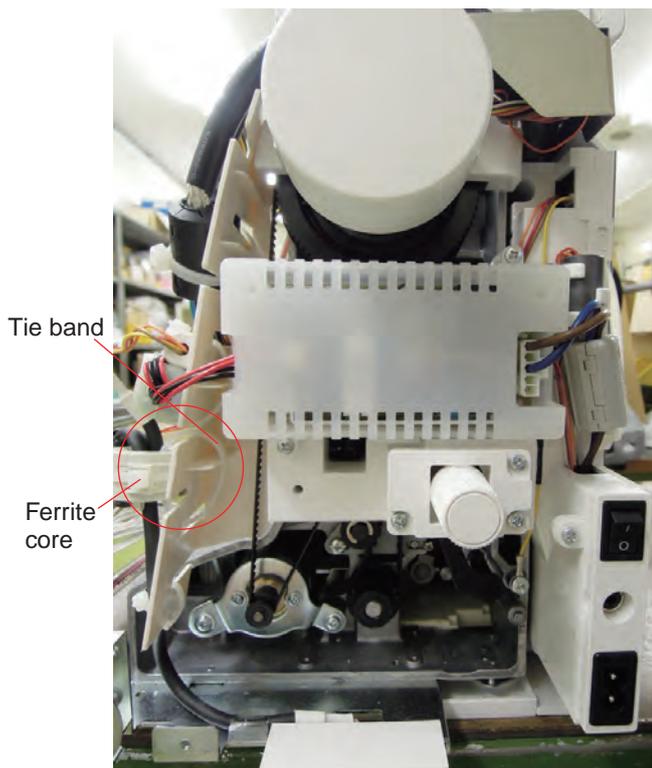
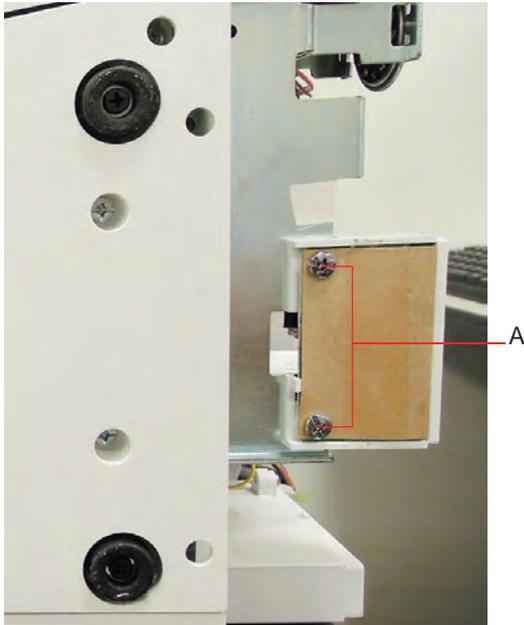
## USB unit

### • Before removing

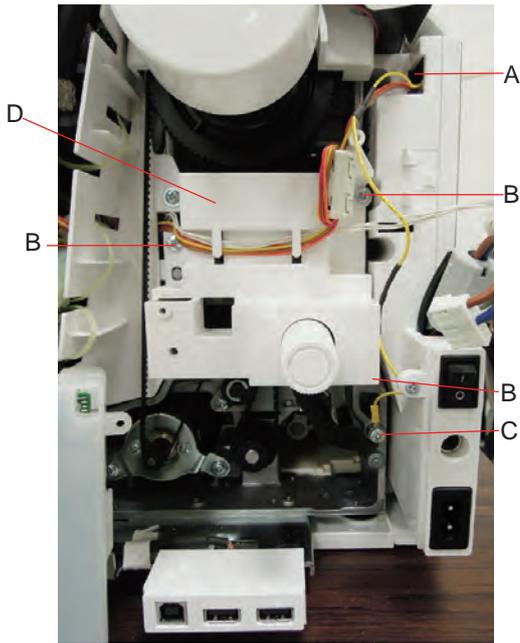
1. Remove the belt cover, top cover and the front cover (see pages 1, 2 and 5).

### • Removing the USB unit

2. Disconnect the connector of the USB board from the printed circuit board A (see page 7).  
Cut the tie band of the ferrite core and remove the cords from the board.
3. Remove the setscrews A (2 pcs.).
4. Remove the USB unit from the machine.



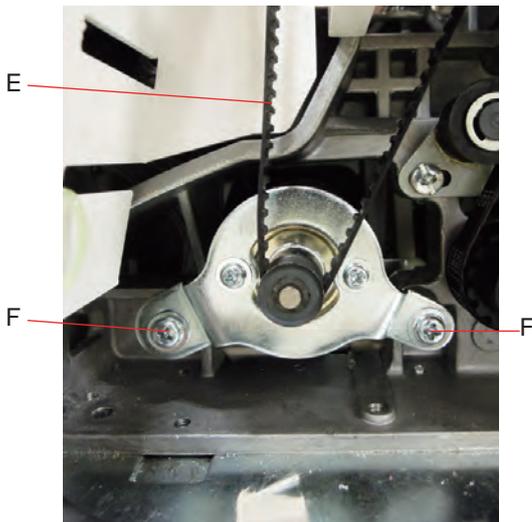
# Replacing electronic components



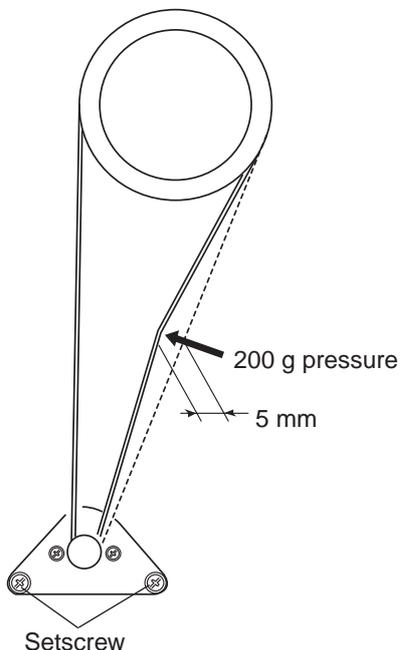
## Driving motor

### To remove:

1. Remove the belt cover, the top cover, the front cover and auxiliary power supply unit case (see page 1, 2, 5 and 13).
2. Disconnect the connector of the foot control from the printed circuit board A (see page 7).
3. Disconnect the connector A from the power supply unit. Remove the setscrew C and the ground wire. Remove the setscrews B (3 pcs.) and the case D.



4. Disconnect the driving motor connector from the printed circuit board A.
5. Remove the motor belt E.
6. Remove the setscrews F (2 pcs), and the driving motor.



### To attach:

1. Attach the driving motor. Tighten the setscrews F temporarily.
2. Adjust the motor belt deflection to about 5 mm by pressing the middle of the motor belt with your finger with approximately 200 grams of pressure.
3. Tighten the setscrews F securely.
4. Attach the driving motor connector and the foot control connector to the printed circuit board A.
5. Attach the case D with the setscrews B. Be careful not to bind the cords with the cover. Attach the connector A to the power supply unit. Attach the ground wire with the setscrew C.

# Replacing electronic components

Thread tension unit



## Thread tension unit

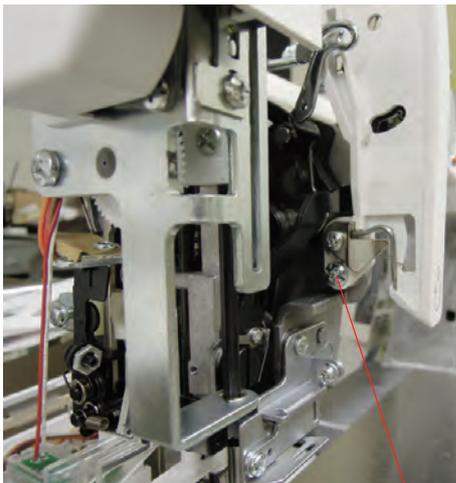
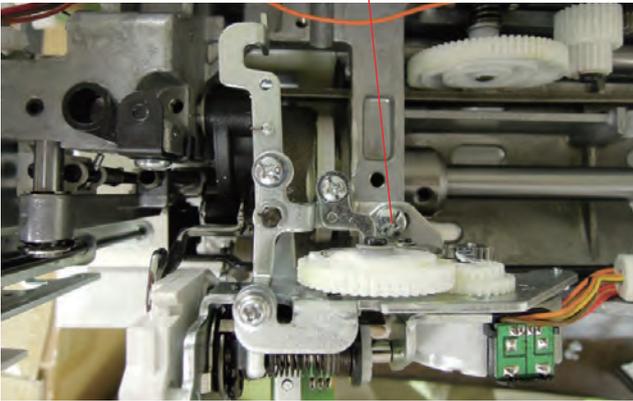
### To remove:

1. Remove the belt cover and the top cover (see page 1 and 2).
2. Remove the front cover (see page 5).
3. Disconnect the thread cut detection connector and the thread tension motor connector from the printed circuit board U1 (see page 9).
4. Cut the tie bands and remove the ferrite cores as necessary.
5. 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 26).

Setscrew A

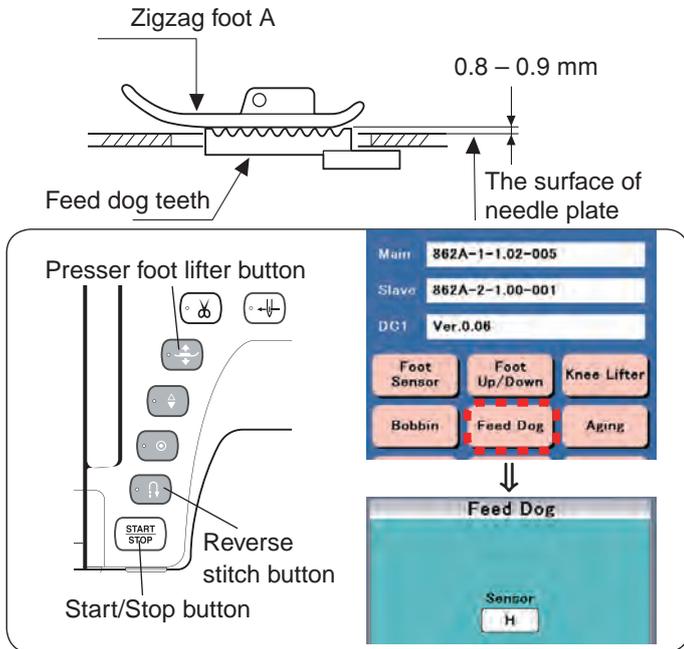


Setscrew B

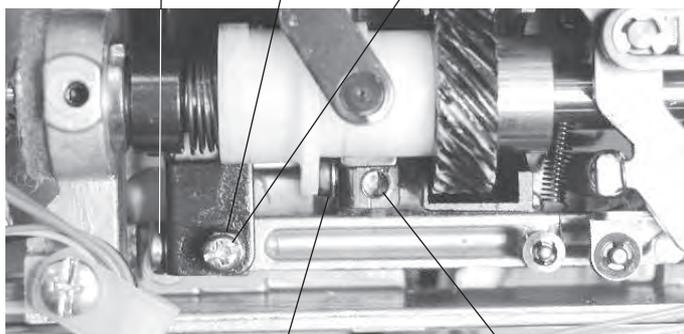
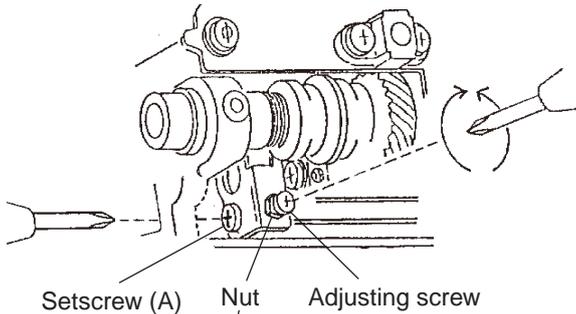
# Mechanical adjustment

## Feed dog height

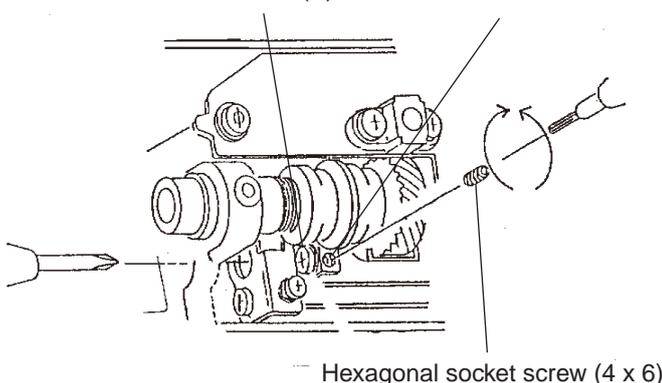
The highest position of the feed dog should be between 0.80 and 0.90 mm from the surface of the needle plate.



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 at 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. Be sure that the feed dog teeth are parallel with the surface of the needle plate. If not, follow the adjustment procedure below.



Setscrew (B) Threaded hole



Hexagonal socket screw (4 x 6)

## Feed dog parallel adjustment

1. Prepare the hexagonal socket screw (4x6). Insert the hexagonal socket screw to the threaded hole, and turn it until the tip of the screw reaches to the bottom.
2. Loosen the setscrew (B).
3. Turn the hexagonal socket screw and adjust the feed dog parallel to the needle plate.
4. Tighten the setscrew (D).
5. Remove the hexagonal socket screw.
6. Be sure the feed dog and needle plate are parallel.

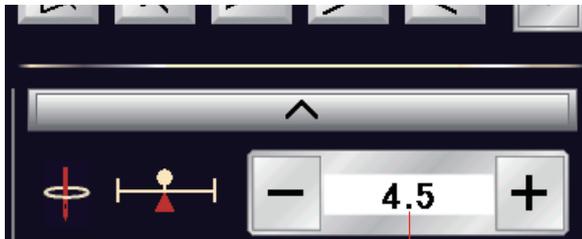
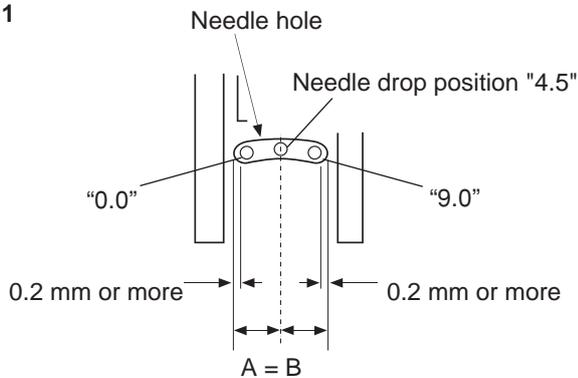
# Mechanical adjustment

## 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.

Fig. 1



Needle drop position

1. Attach the needle #14.
2. Turn the power switch ON. Select straight stitch (). Check that the needle drop position is centered when the drop position is set at "4.5", and the clearance between the side of the needle and the needle hole is 0.2 mm or more when the needle position is set at "0.0" and "9.0" (see fig. 1). If this is not the case, adjust as follows;
3. Loosen the hexagonal socket screw (fig. 3). Turn the eccentric pin to adjust the needle drop position. The direction of eccentric pin should be as shown as fig. 2.
4. Tighten the hexagonal socket screw. Check the hook timing and the needle bar height after this adjustment (see page 20 and 21).



Eccentric pin

Fig. 2

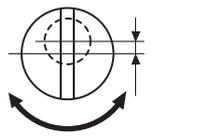
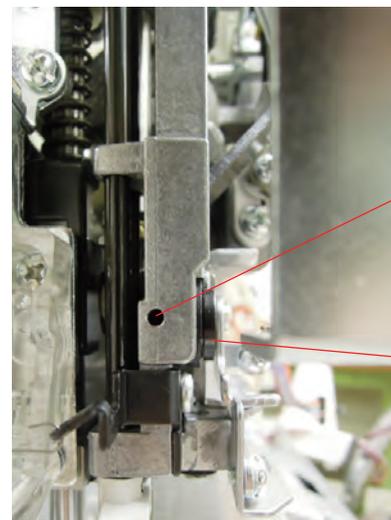


Fig. 3



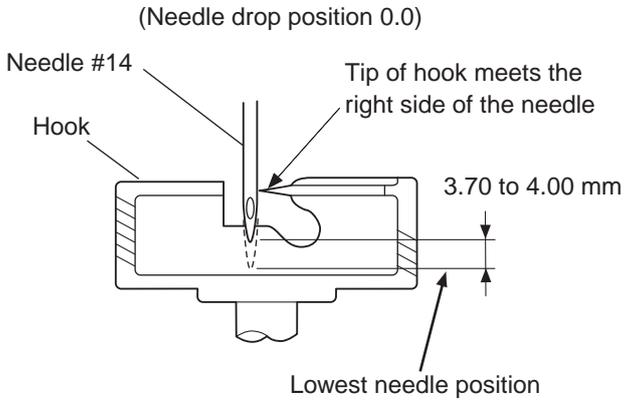
Hexagonal socket screw

Eccentric pin

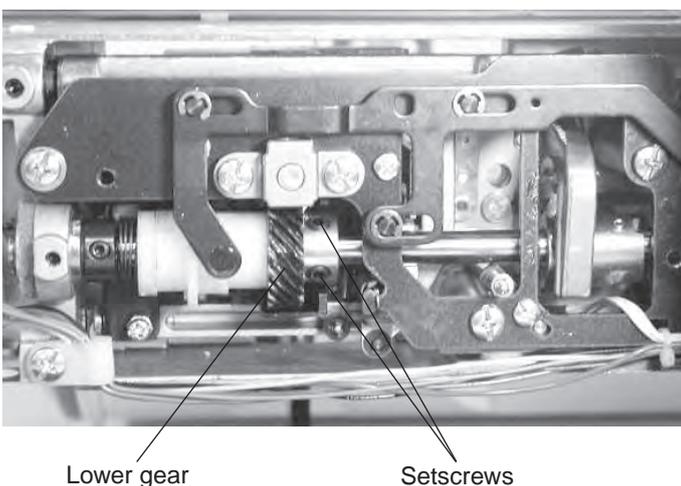
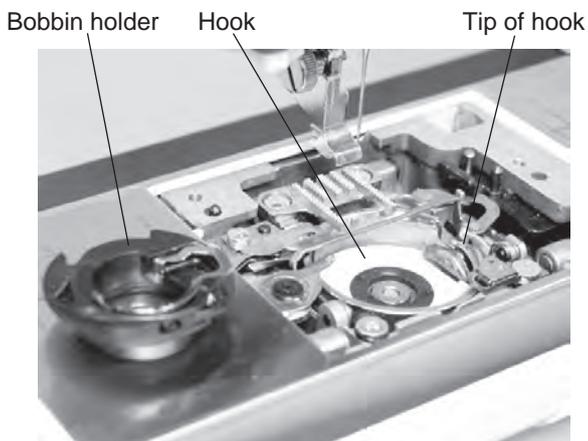
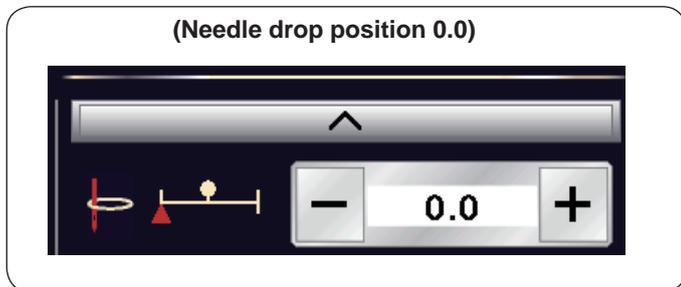
# Mechanical adjustment

## 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



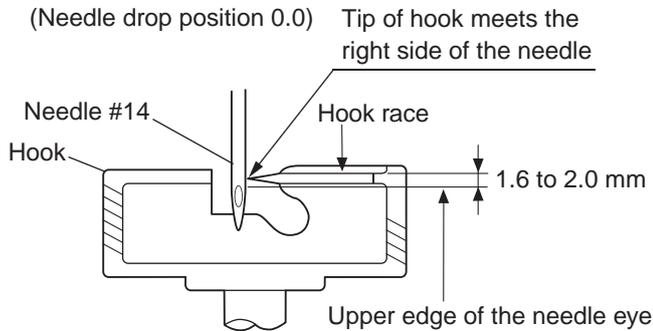
1. Remove the bed cover (see page 3).
2. Attach the needle #14.
3. Turn the power switch ON. Select straight stitch (  ). Set the needle drop position at "0.0".  
\* Do not turn the switch OFF.
4. Remove the presser foot, the needle plate and the bobbin holder. (see page 4)  
\* Cover the needle plate 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 setscrew of the lower shaft gear.
7. Turn the handwheel toward you to raise the needle bar further 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 of the lower shaft gear.  
\* Check the needle bar height after this adjustment.



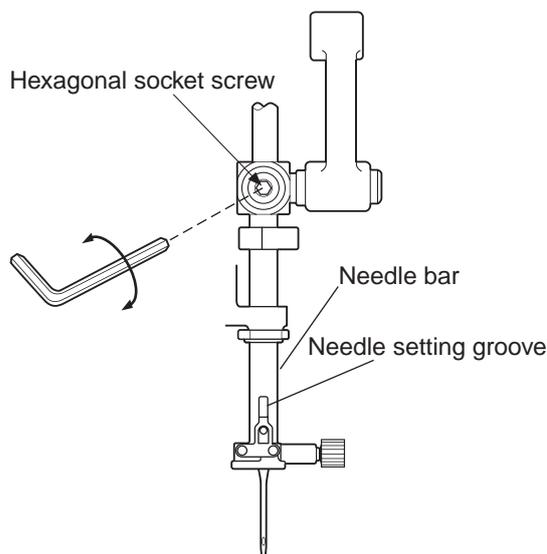
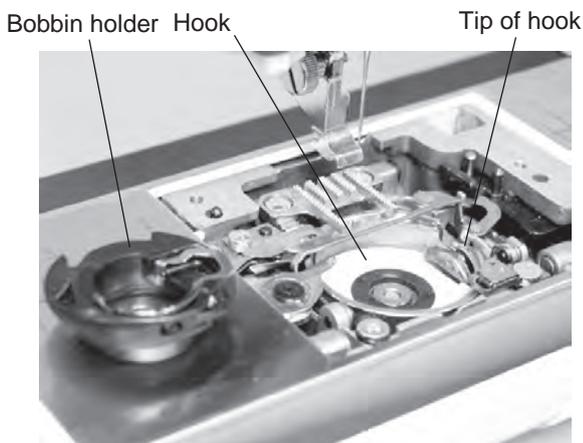
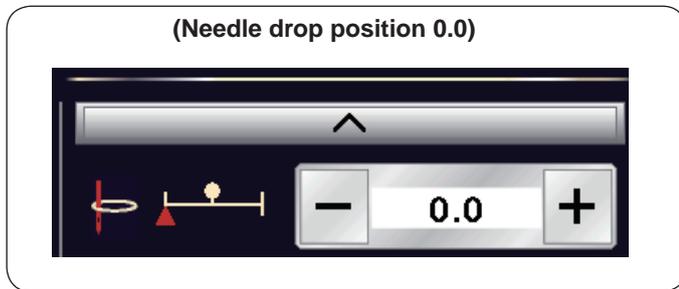
# Mechanical adjustment

## 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.



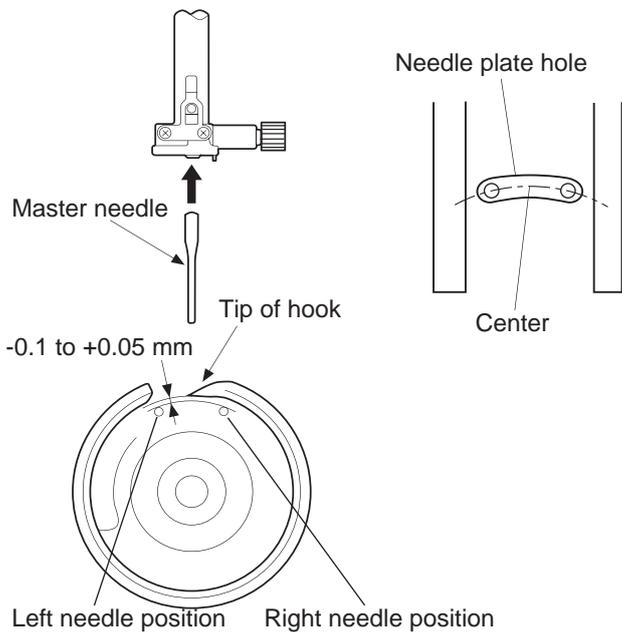
1. Attach the needle #14.
2. Turn the power switch ON. Select straight stitch (  ). Set the needle drop position at "0.0".  
\* Do not turn the switch OFF.
3. Remove the presser foot, the needle plate and the bobbin holder. (see page 4)  
\* Cover the needle plate with the fabric to prevent damaging 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.
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, needle plate.



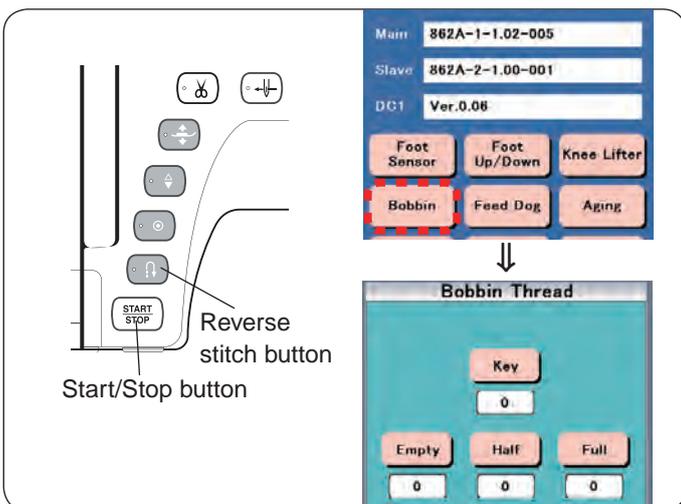
# Mechanical adjustment

## Clearance between needle and tip of the rotary hook

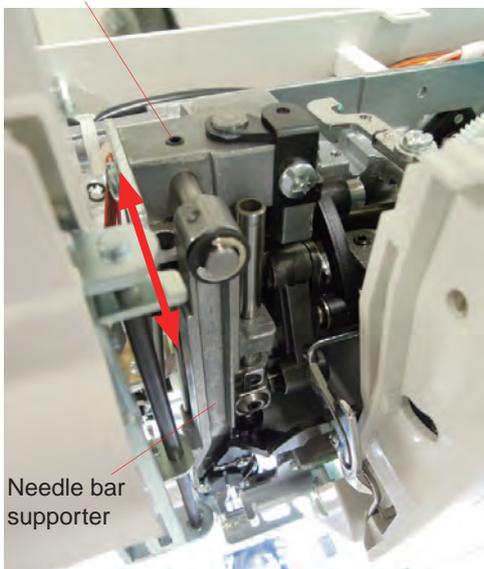
The clearance between the needle and the point of hook should be  $-0.1$  to  $+0.05$  mm.

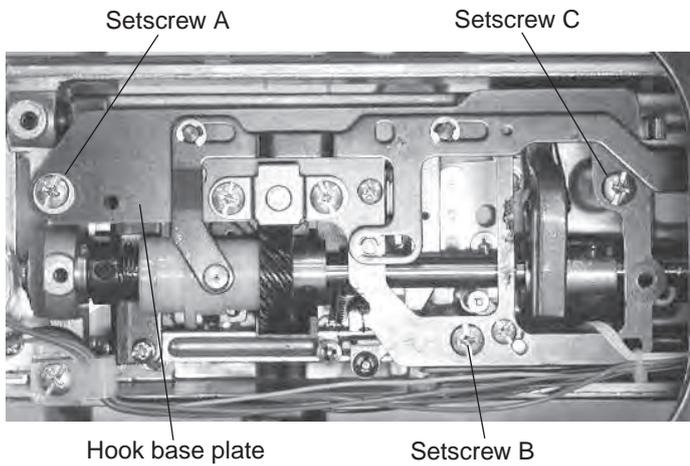


1. Remove the top cover (see page 2).
2. Remove the presser foot, the needle plate and the bobbin holder. (see page 4)  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
3. Attach the master needle.
4. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode.  
Press "Bobbin" key. The machine will set the zigzag width at maximum.
5. Turn the handwheel toward you. Adjust the clearance between the needle and the tip of the rotary hook, by moving the needle bar supporter in the direction of arrow, to adjust the clearance between the needle and tip of hook.
6. Tighten the setscrew.
7. Attach the bobbin holder and the needle plate. Be sure that the needle drops in the center of the needle plate hole as shown.



Setscrew





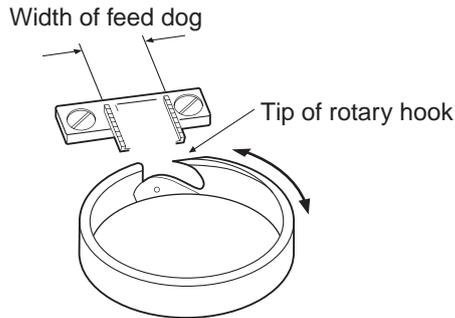
## Clearance adjustment 2

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. Adjust the clearance between the needle and the tip of the rotary hook, by moving the hook base plate up or down, to adjust the clearance between the needle and 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 24).

# Mechanical adjustment

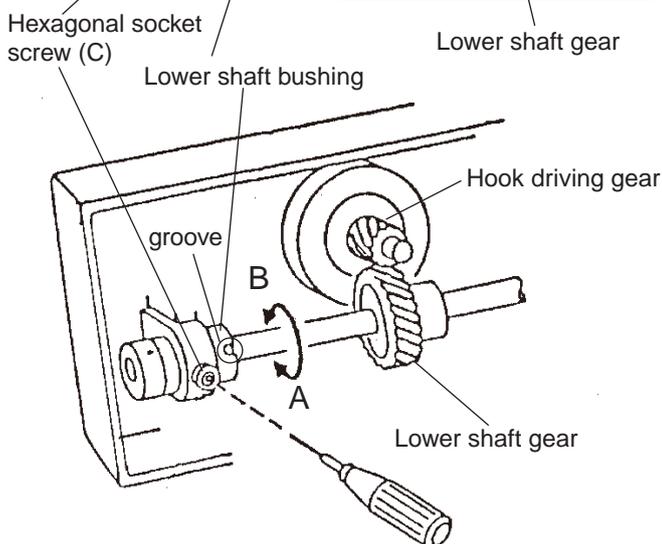
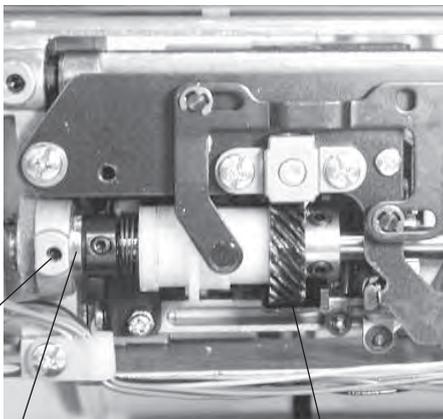
## Backlash between hook drive gear and lower shaft gear

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.

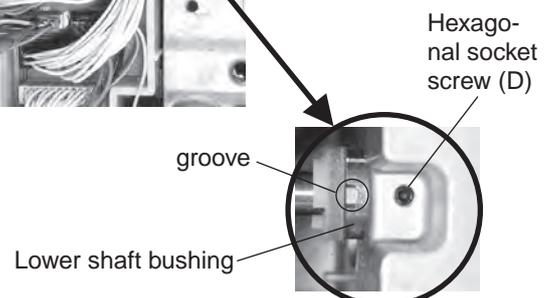
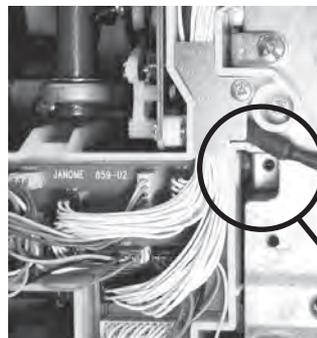


1. Remove the base cover and bed cover (see page 2 and 3).
2. Remove the presser foot, the needle plate and the bobbin holder. (see page 4)  
\* Cover the needle plate with the fabric to prevent damaging the needle plate when removing.
3. Turn the handwheel toward you so the the tip of the rotary hook is within the width of feed dog as shown in figure 1. Check the rotary play of the hook.
4. If the backlash is too much or too little, loosen the hexagonal socket screw (C) and (D) and following the adjustment procedure.  
If the backlash is too great (more than 0.8 mm), turn the lower shaft bushings in direction A. If the engagement of gear is too tight, and the machine does not turn smoothly, ) turn the lower shaft bushings in direction B. Adjust the grooves of the lower shaft bushing as well.
5. Tighten the hexagonal socket screws.

Lower bushing of the front side



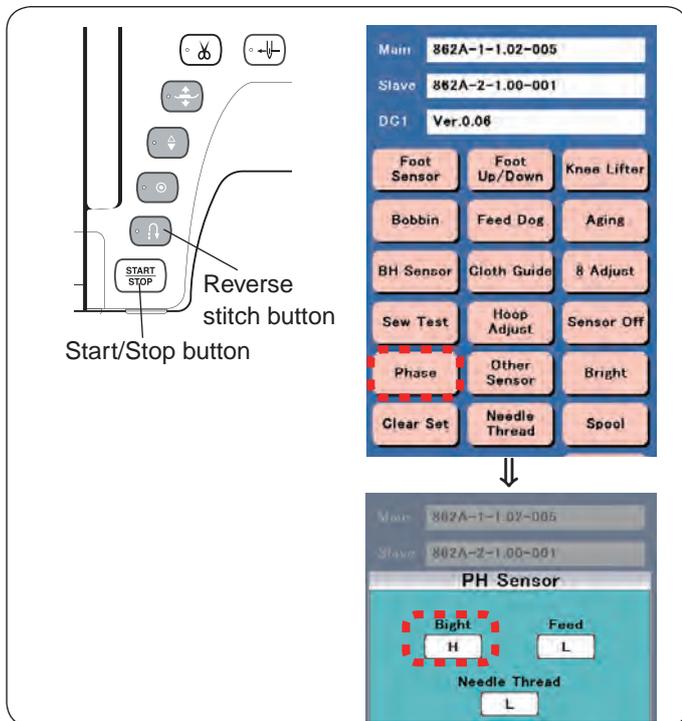
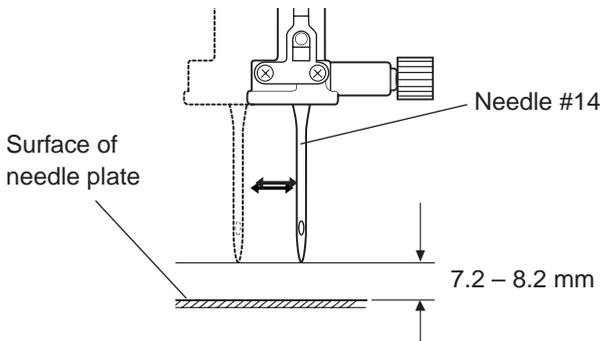
Lower bushing of the belt cover



# 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.

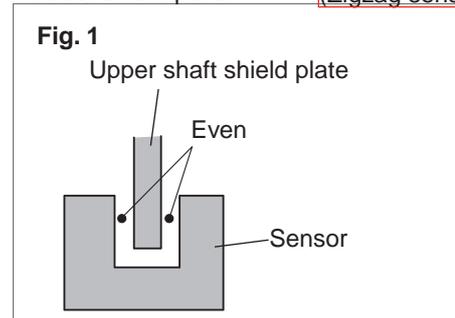
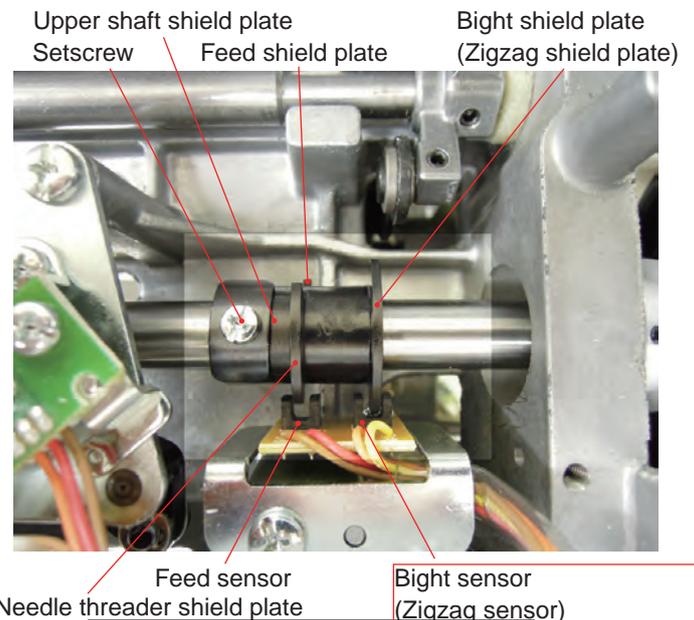


### To check:

1. Attach the needle #14.
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode. Press "Phase" key.
3. Turn the handwheel toward you slowly until the needle from its lowest position until "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:

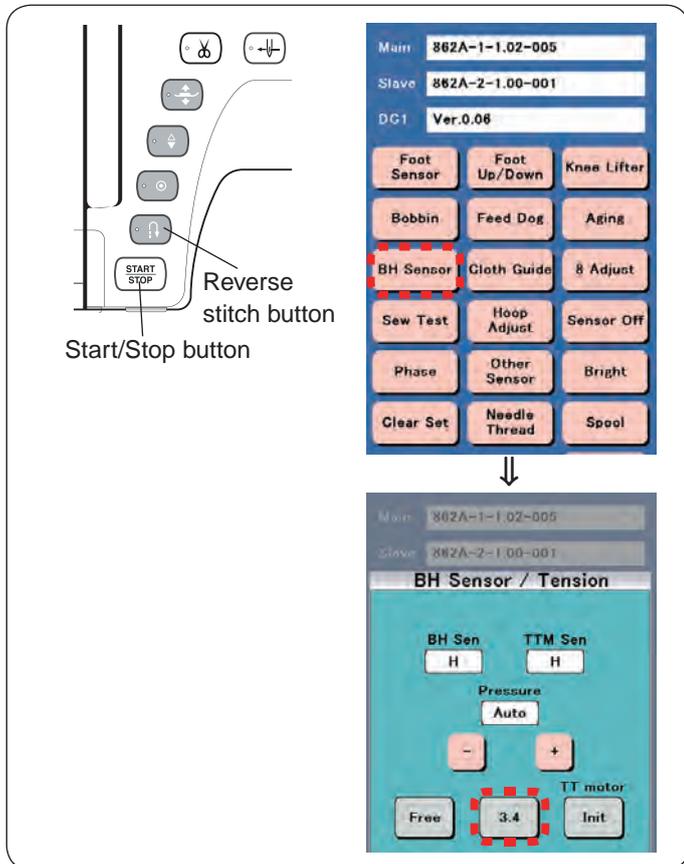
1. Remove the top cover (see page 2).
  2. Turn the handwheel toward you and raise the needle 7.7 mm above the surface of the needle plate.
  3. Loosen the setscrew of the upper shaft shield plate. Turn the upper shaft shield plate until "Bight" changes from L to H. Tighten the setscrew.
- \* The position of the upper shaft shield plate should be in the center of the upper shaft sensor (see Fig. 1.)



# Mechanical adjustment

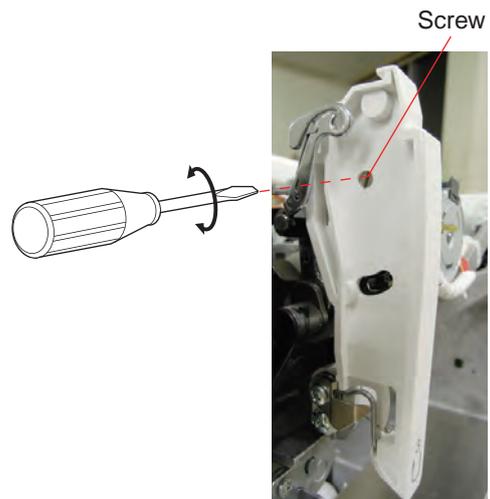
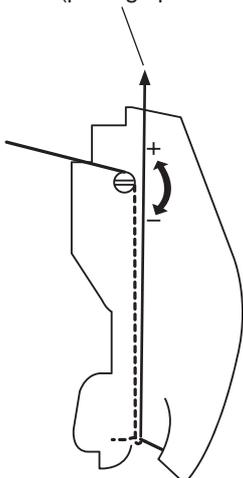
## Upper thread tension

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 to enter 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 g, turn the screw in the direction of "+".
  - (B) If the thread tension is more than 67 g, turn the screw in the direction of "-".

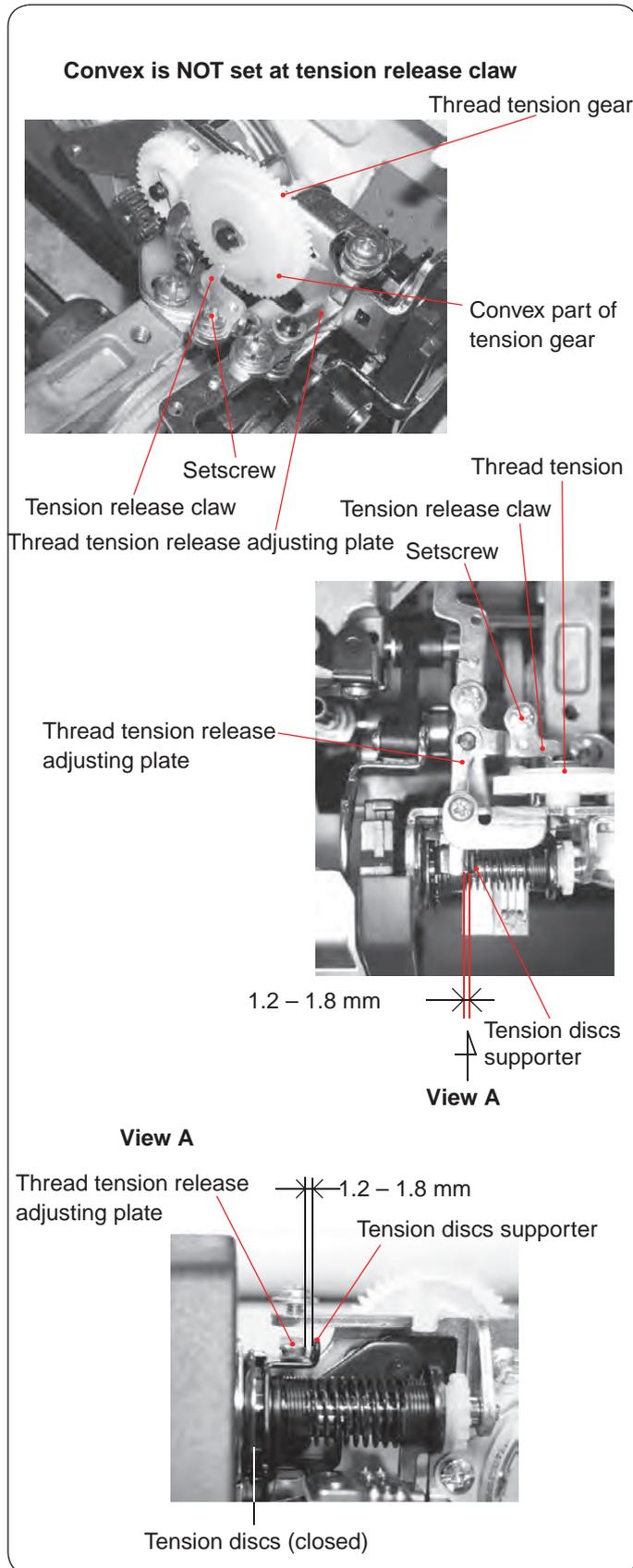
Pulling direction: (pulling speed 110 mm/sec.)



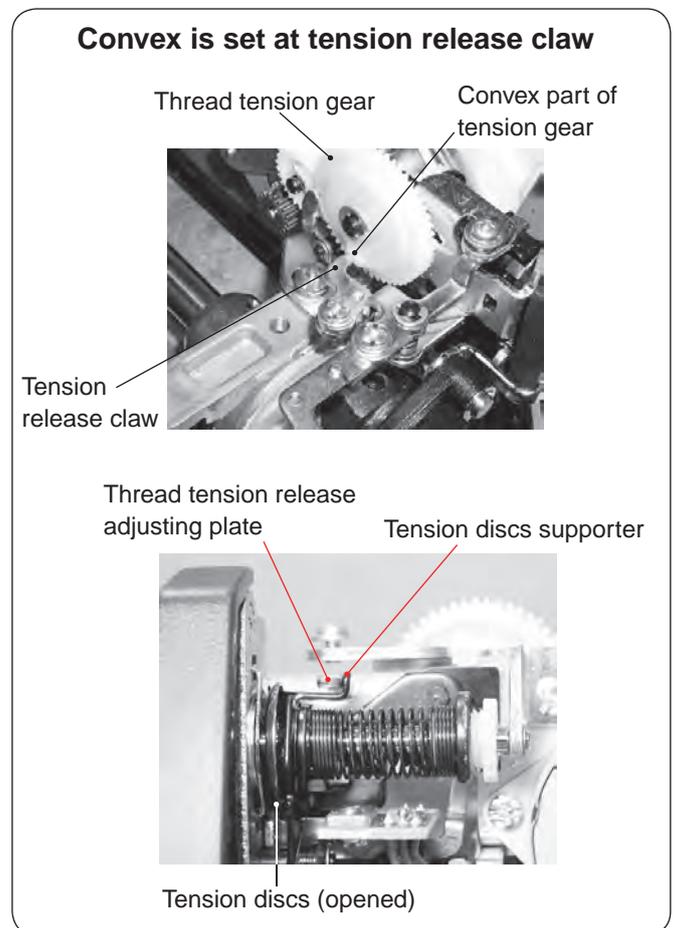
# Mechanical adjustment

## Tension release mechanism

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



- 1 Remove the belt cover and top cover (see pages 1 and 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.



# Mechanical adjustment

## Needle threader holder (threader hook) replacement

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



### To remove:

1. Loosen the setscrew A to remove the needle threader holder.



2. Prepare the replacement parts (order them as necessary).

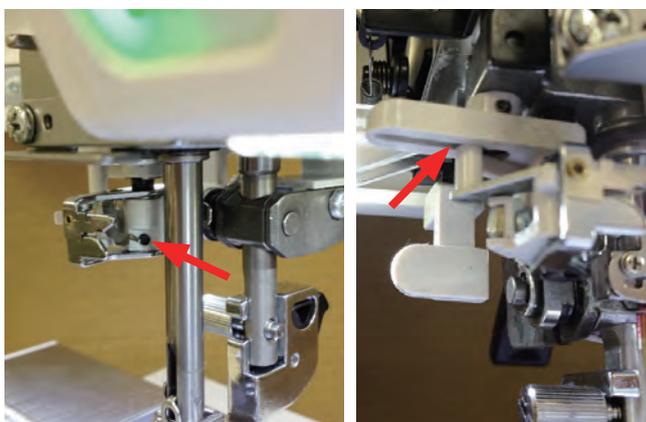
- ① 858-266-009: Link plate 2
- ② 862-627-005: Hook holder (unit)
- ③ 862-626-004: Threader plate (unit)
- ④ 858-265-008: Link plate 1
- ⑤ 000-230-403: Setscrew A



3. Assemble the parts ①, ② and ④ as shown.



4. Attach the part ③ to the assembled parts as shown.



5. Attach the assembled parts with the setscrew A.  
Be sure that the pin of the link plate is inserted in the slit as shown.  
Adjust the needle threader hook position (see to the next page).

# Mechanical adjustment

## Needle threader hook position adjustment

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

Needle up/down button

Reverse stitch button

Start/Stop button

Main 862A-1-1.02-005

Slave 862A-2-1.00-001

DC1 Ver.0.06

Foot Sensor Foot Up/Down Knee Lifter

Bobbin Feed Dog Aging

BH Sensor Cloth Guide 8 Adjust

Sew Test Hoop Adjust Sensor Off

Phase Other Sensor Bright

Clear Set Needle Thread Spool

Main 862A-1-1.02-005

Slave 862A-2-1.00-001

**Needle Thread**

NT Phase H NTM Sen I H

NTM Step 0

Dn Up

Down Adjust Top

Set Init

Threader hook

**Vertical hook position adjustment**

Hexagonal socket screw

Rotation pin stopper

2.7 mm

Needle bar supporter

**Horizontal hook position adjustment**

Threader hook

Setscrew

Needle eye

### Check:

1. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode.  
Press "Needle Thread" key.
2. Press the needle up/down button twice to raise the needle to its highest position.
3. Press "Down" key.  
The needle threader will automatically go down and the threader hook comes out through the needle eye from behind and stop.  
If the threader hook is off the needle eye and cannot go through it, adjust as follows;

### Adjustment:

1. Be sure that the hook timing and the needle bar height is correct before this adjustment (see pages 19 and 20).
2. Turn the handwheel counterclockwise slowly until the "NT Phase" changes from "H" to "L".  
Turn the handwheel clockwise very slightly until the "NT Phase" changes from "L" to "H".
3. Press the "Adjust" key.  
The needle threader will automatically go down.
4. Press the "Dn" key until the threader hook comes just behind the needle eye.
5. Adjust the hook position horizontally or vertically as necessary;

#### Vertical hook position adjustment:

Loosen the hexagonal socket screw.  
Adjust the clearance between the bottom of the rotation pin stopper and the top of the needle bar supporter to 2.7 mm.  
Tighten the hexagonal socket screw.

#### Horizontal hook position adjustment:

- Loosen the setscrew with a screwdriver and adjust the hook position to the left or right so the hook can go through the needle eye from behind.  
Tighten the setscrew.
6. Press the "Dn" key until the hook comes out through the needle eye as shown.  
Press the "Set" key.
  7. Press the "Top" key to raise the needle threader.  
Press the "Down" key.  
Be sure that the threader hook comes out through the needle eye from behind.

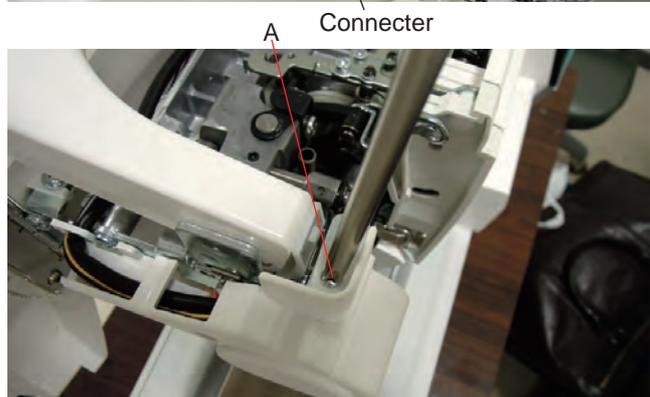
# Mechanical adjustment

## Needle thread motor replacement

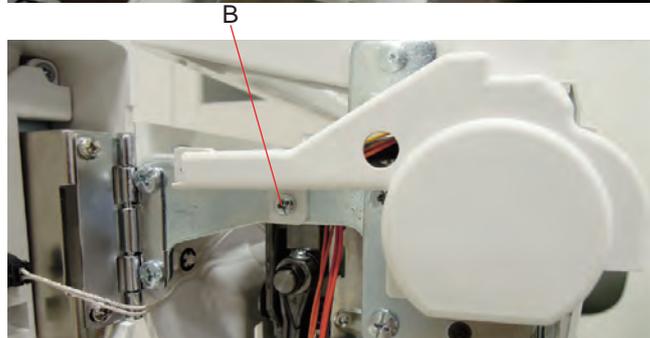
If the needle thread motor is damaged, change the part as follows:



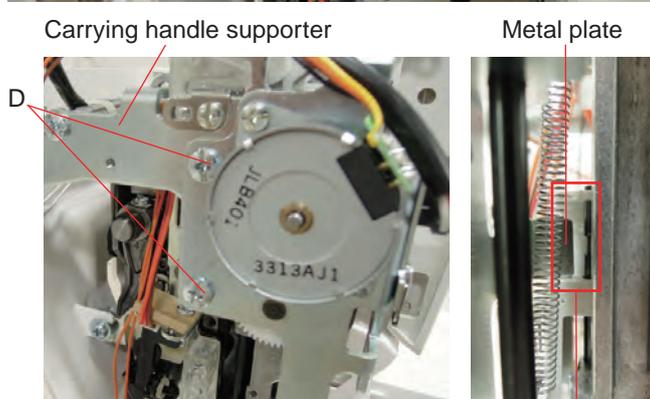
1. Remove the top cover (see page 2).  
Disconnect the connector from the face cover.



2. Loosen the setscrew A.



3. Remove the setscrew B to remove the motor cover.



6. Remove the setscrews D.  
Remove the motor and the needle threader unit from the carrying handle supporter.  
Disconnect the connector of the needle threader motor from the printed circuit board U1 (see to page 8).  
Replace the needle thread motor unit.

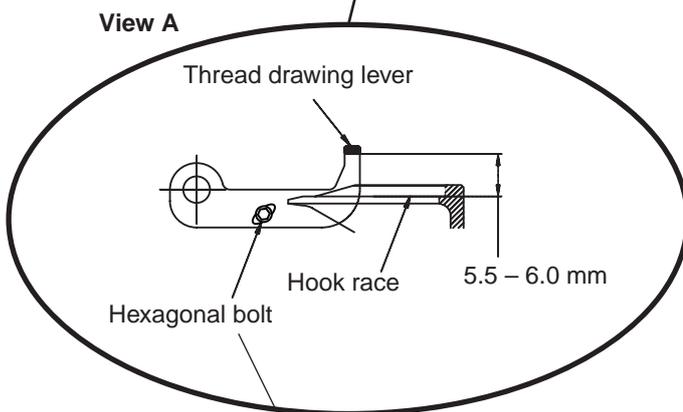
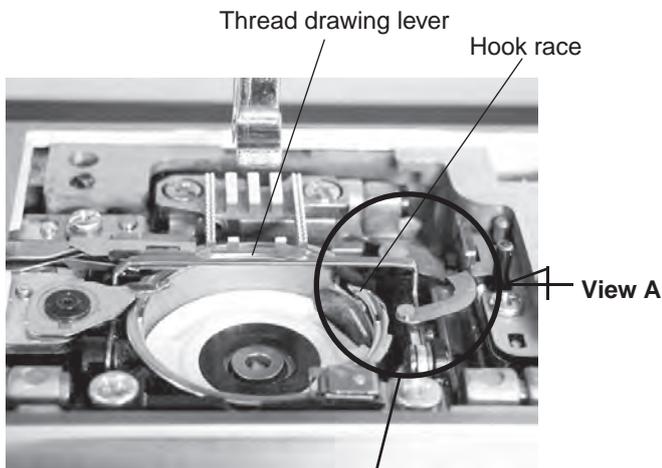
### To attach:

1. Follow the above procedure in reverse.  
Be sure that the metal plate of the motor unit is inserted in the space as shown when attached.

# 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.

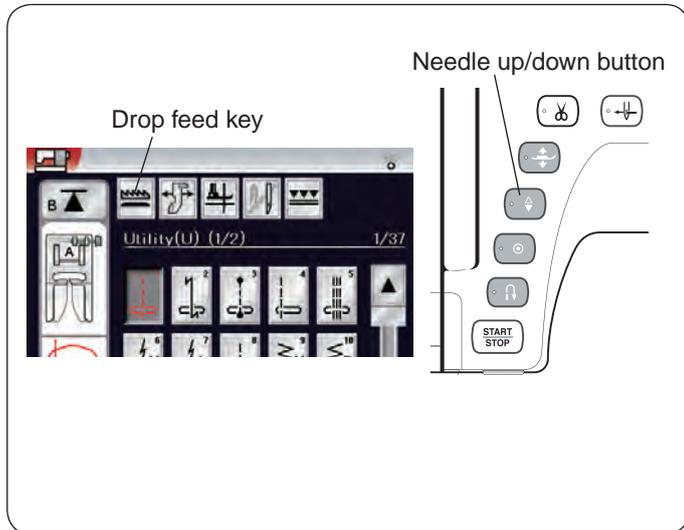


1. Remove the presser foot, the needle plate and the bobbin holder. (see page 4)  
\* You may use a fabric to prevent damaging the needle or the presser foot holder when removing the needle plate.
2. Loosen the hexagonal bolt. Adjust the distance between the lower part of thread drawing lever and the hook race to 5.75 mm by moving the thread drawing lever up or down.
3. Tighten the hexagonal bolt.

# Mechanical adjustment

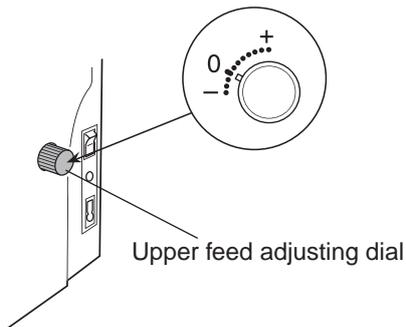
## Upper feed dog (1)

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".

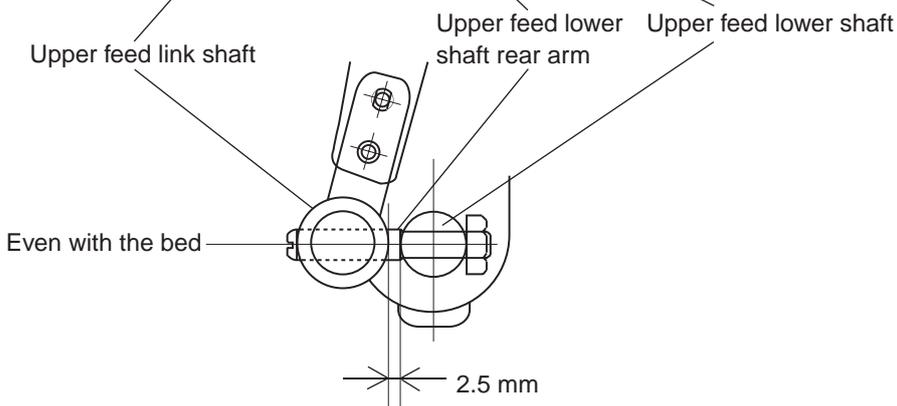


### To check:

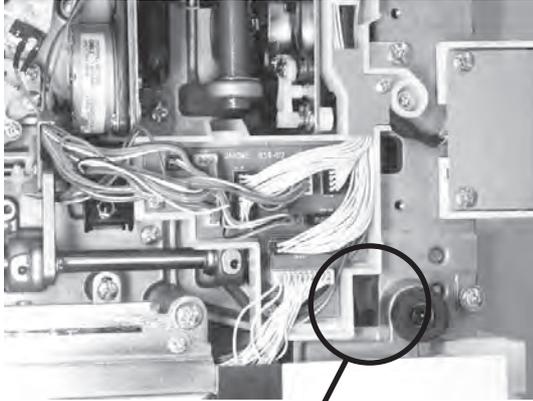
- 1 Remove the belt cover and base cover (see page 1 and 2).
- 2 Turn the power switch on and select (  ) stitch. Press the drop feed key to drop the feed dog.
- 3 Turn the upper feed adjusting dial to set the dial at "0".
- 4 Press the needle up/down button twice to raise the needle. Turn the power switch off.
  - \* In order to initialize the feed dog position, press the needle up/down button twice and reset the needle position even though needle position is set at raised position.
- 5 Check if the clearance between the upper feed link shaft and upper feed lower shaft is 2.5 mm. If not, follow the procedure on page 33.



### View from the belt cover side

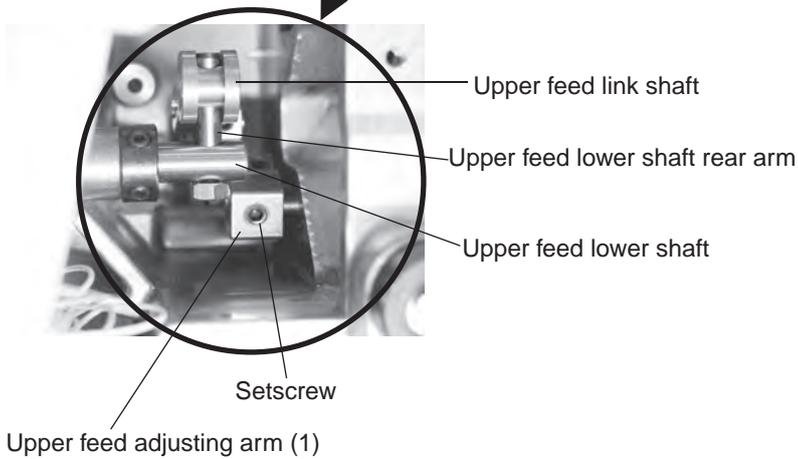


**View from the base cover side**



**To adjust:**

- 1 Loosen the setscrew on the upper feed adjusting arm (1). Adjust the clearance between the upper feed link shaft and upper feed lower shaft to 2.5 mm.

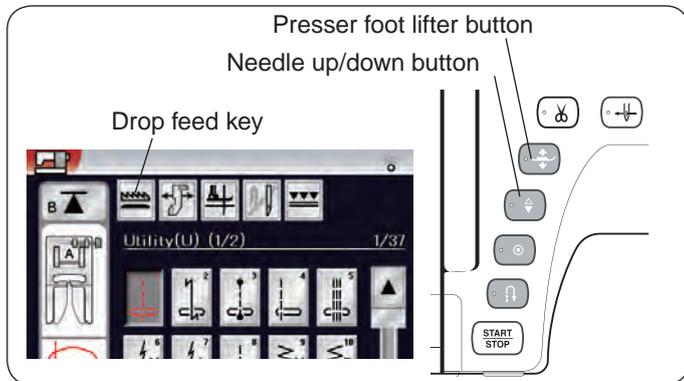


# Mechanical adjustment

## 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) (see page 31) before this adjustment.

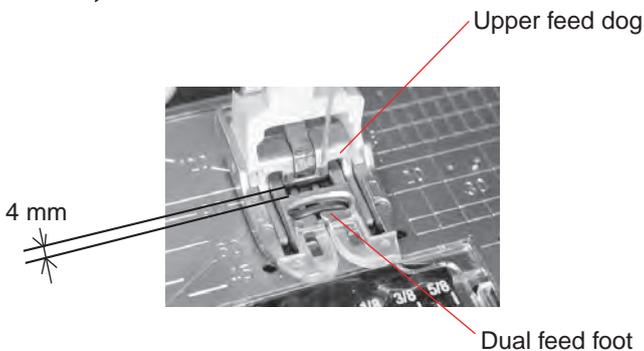
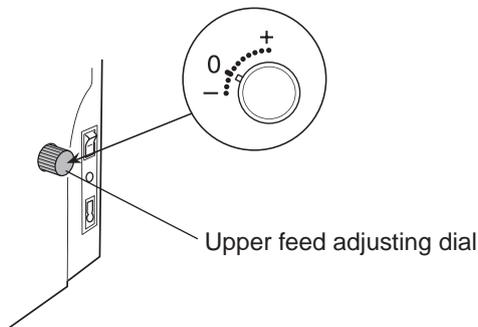


### To check:

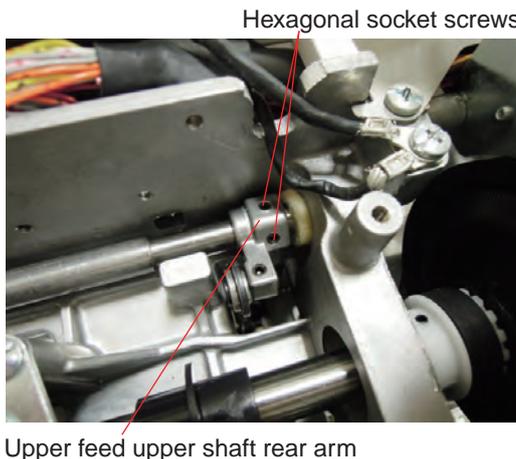
- 1 Attach the dual feed foot (see page 35).
- 2 Turn the power switch on and select ( ) stitch. (Be sure that the machine is not locked.) Press the drop feed key to drop the feed dog.
- 3 Turn the upper feed adjusting dial to set the dial at "0".
- 4 Press the needle up/down button twice to raise the needle.
  - \* In order to initialize the feed dog position, press the needle up/down button twice and reset the needle position even though needle position is set at raised position.
- 5 Press the presser foot lifter button to lower the presser foot. Turn the power switch off.
- 6 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.
- 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



### Attaching the dual feed holder:

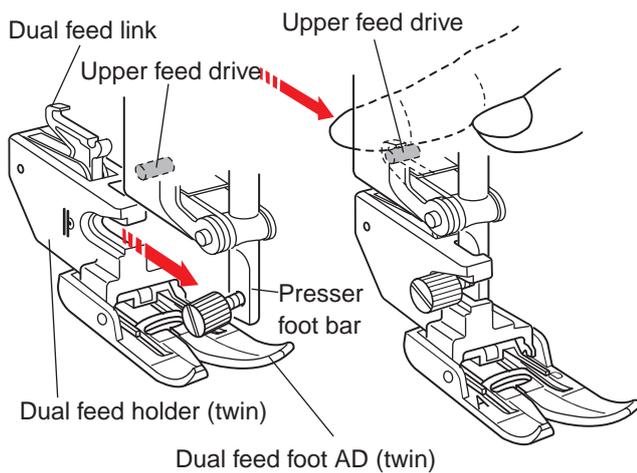
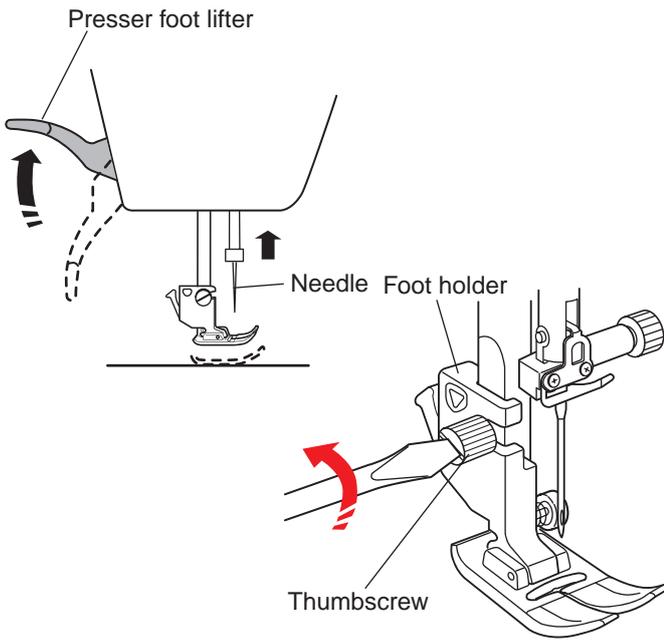
\* Attach the presser foot to the dual feed holder before attaching it.

1. Turn the power switch on. Press the lockout key to lockout the machine before replacing the foot holder.

2. Raise the needle by turning the handwheel toward you. Raise the presser foot with the presser foot lifter.

\* Do not use the up/down needle button to raise the needle, otherwise you cannot raise the presser foot with the presser foot lifter in procedure 6 below.

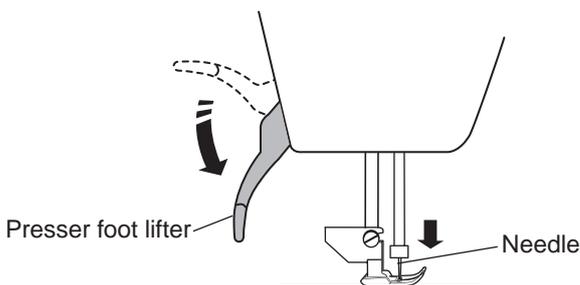
3. Loosen the setscrew with the screwdriver. Remove the presser foot holder.



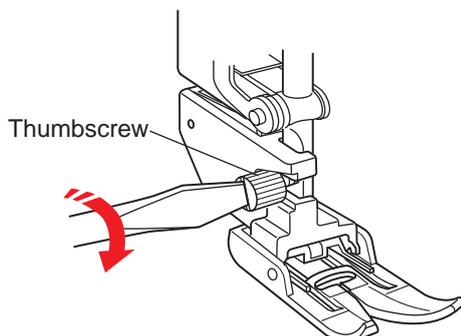
4. Tighten the thumbscrew lightly to attach the dual feed holder temporarily.

5. Push the dual feed link to engage it with upper feed drive until it clicks.

6. Lower the presser foot lifter. Lower the presser foot lifter slowly. Turn the handwheel toward you to lower the needle bar at its lowest position.



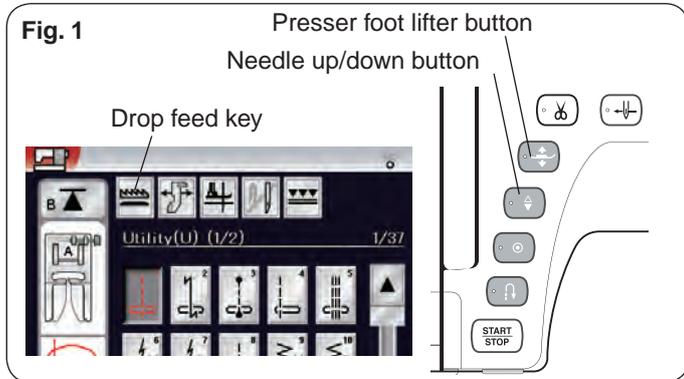
7. Loosen the thumbscrew slightly. Be sure that dual feed foot is pressed to the needle plate firmly, and tighten the thumbscrew.



# Mechanical adjustment

## Upper feed dog (3)

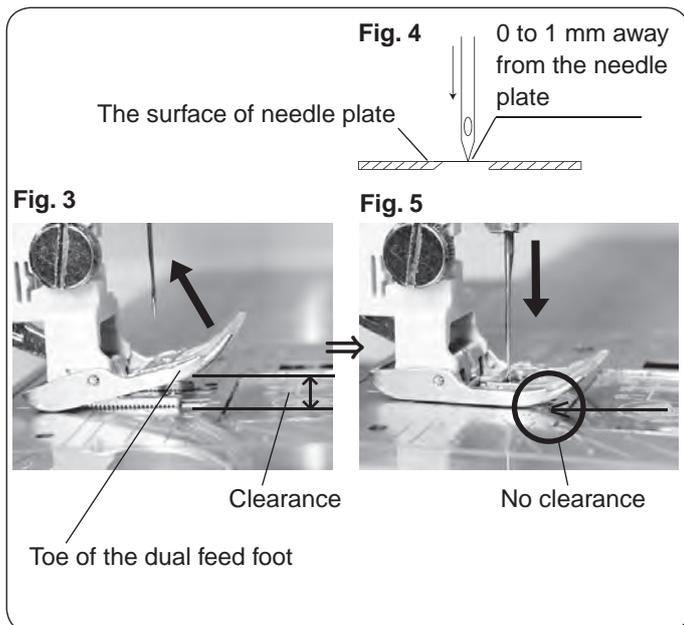
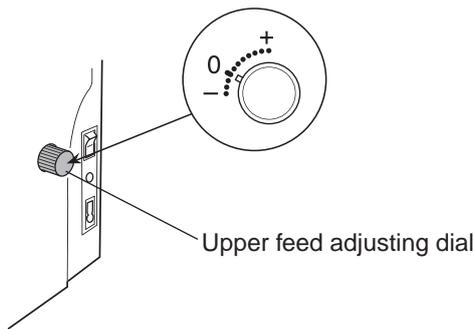
The tip of the needle height should be 0 to 1 mm above the surface of the needle plate when the toe of the dual feed foot touch the needle plate.

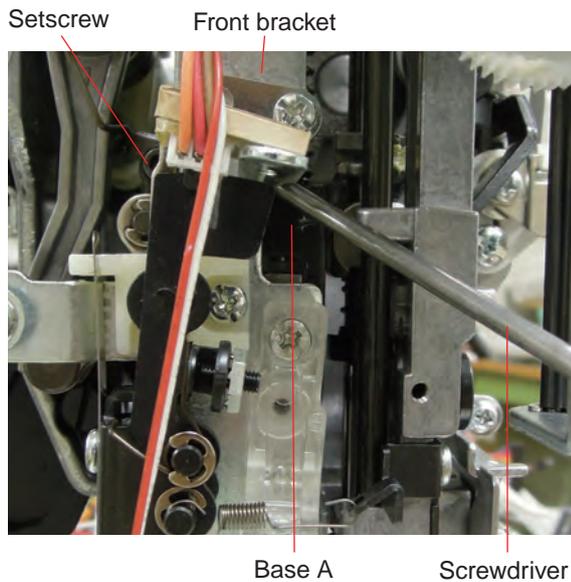
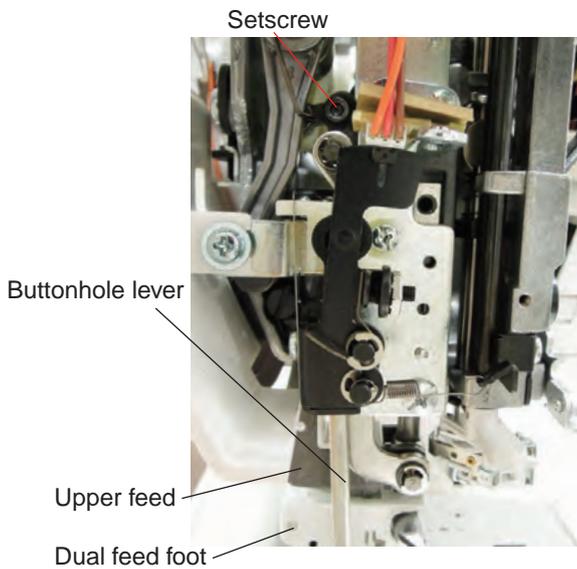


### To check:

1. Attach the dual feed foot (see page 35).
2. Attach the needle #14.
3. Turn the power switch on and select ( ) stitch. (Be sure that the machine is not locked.) Press the drop feed key to drop the feed dog.
4. Turn the upper feed adjusting dial to set the dial at "0".
5. Press the needle up/down button twice to raise the needle.
  - \* In order to initialize the feed dog position, press the needle up/down button twice and reset the needle position even though needle position is set at raised position.
6. Press the presser foot lifter button to lower the presser foot. Turn the power switch off.
7. Raise the toe of the dual feed foot in the direction of arrow in Fig. 3. Keep the toe of the dual feed dog raised.
8. Turn the handwheel toward you. There should be no clearance between the edge of the dual feed foot and needle plate when the tip of the needle reaches 1 mm or less above the surface of the needle plate.
9. If not, follow the procedure in page 37.

Fig. 2



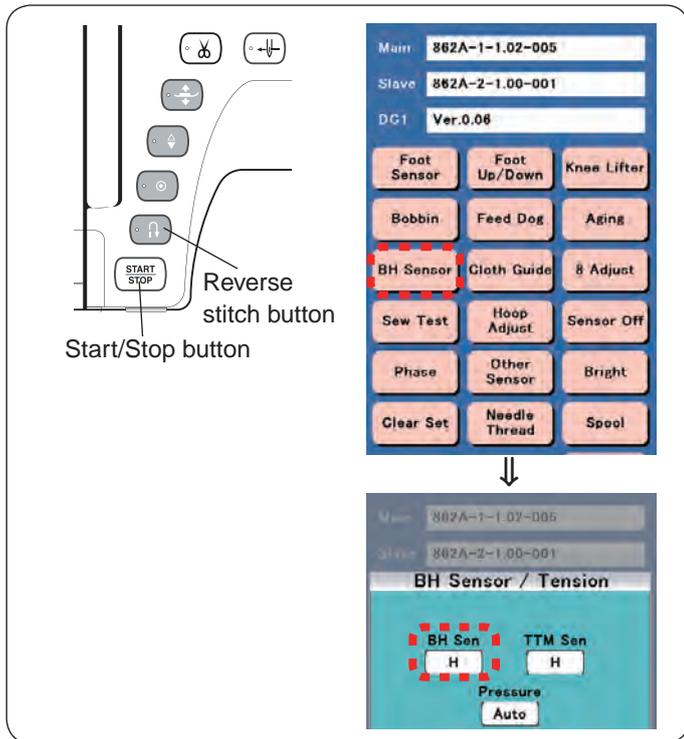


**To adjust:**

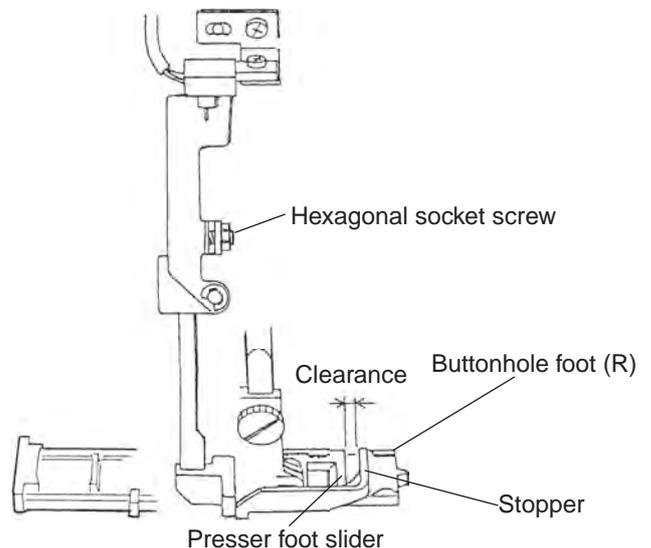
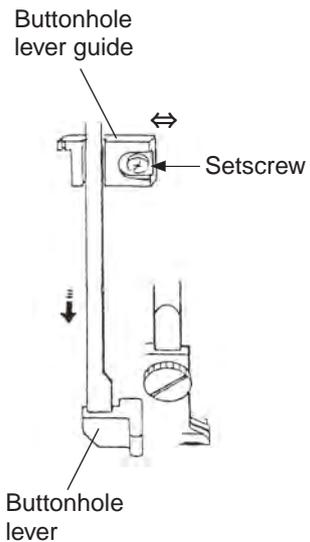
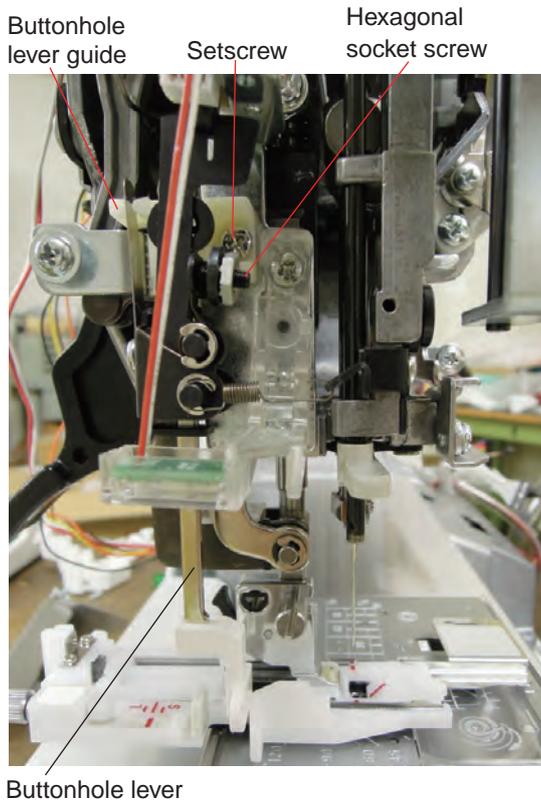
1. Turn the power switch on and select (  ) stitch.  
 (Be sure that the machine is not locked.)  
 Press the drop feed key to drop the feed dog.  
 Turn the upper feed adjusting dial to set the dial at "0".  
 Press the presser foot lifter button to lower the presser foot.  
 Turn the power switch off.  
 Turn the handwheel toward you to raise the needle.
2. Open the face plate. Loosen the setscrew.  
 \* You can lower the buttonhole lever half-way if necessary.  
 \* You may insert the screwdriver between the front bracket and the base A to fix the base of the setscrew.  
 \* The LED lamp has been removed in this image.
3. Turn the handwheel toward you until the tip of the needle matches with the surface of the needle plate.
4. Tighten the setscrew with the dual feed foot pressed to the needle plate.
5. Recheck the upper feed dog (3) (page 32).

# Mechanical adjustment

## Buttonhole lever adjustment



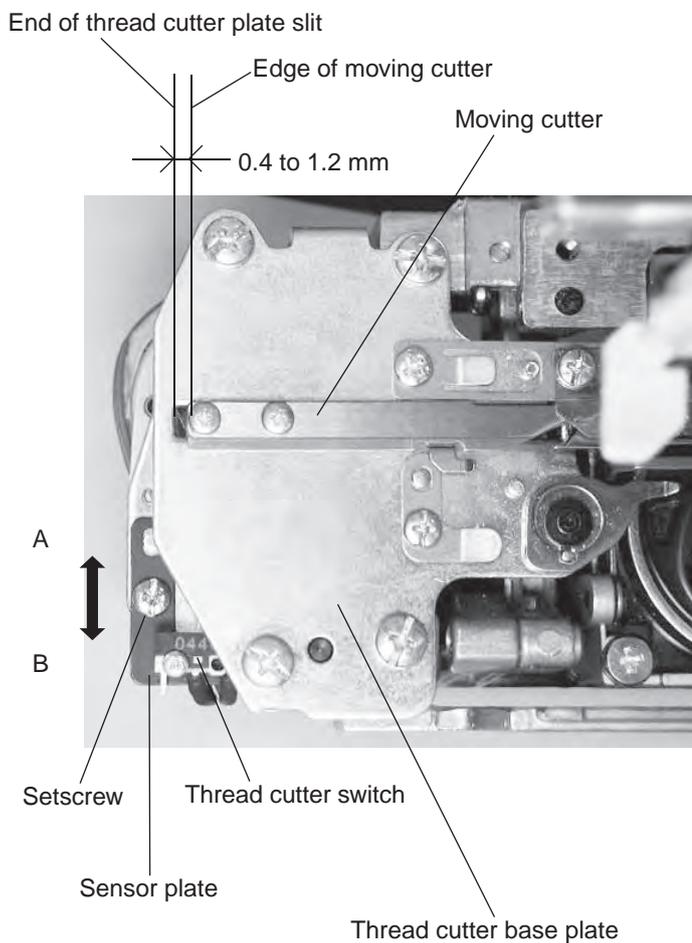
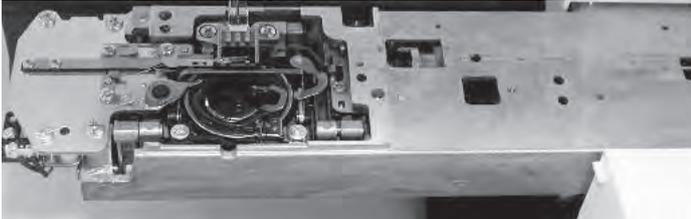
1. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode.  
Press "BH Sensor" key.
2. Open the face cover. Lower the Buttonhole lever. Loosen the setscrew of the buttonhole lever guide. Move the buttonhole lever left and right. Hold the buttonhole lever when the "BH Sen" shows "L", and tighten the setscrew.
3. Attach the automatic buttonhole foot (R). Lower the buttonhole lever.
4. Press the presser foot lifter button to lower the automatic buttonhole foot (R). Adjust the clearance between the stopper and the presser foot slider to 1.6 mm.  
\* To raise or lower the presser foot with the presser foot lifter, you need to lower the foot once by pressing the presser foot lifter button.
5. Loosen the hexagonal socket screw until the "BH Sen" shows "H". Tighten the setscrew slowly until the "BH Sen" shows "L".



# Mechanical adjustment

## Thread cutter

The distance between the end of thread cutter plate slit and the edge 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 page 3, 4).
2. Turn the power switch off. Slide the moving cutter to the right with your finger.
3. Turn the power switch on.  
The moving cutter motor is initialized, and moving cutter moves to its home position automatically.
4. The distance between the edge of moving cutter and the end of thread cutter plate slit should be 0.4 to 1.2 mm. If not, follow the procedure below.

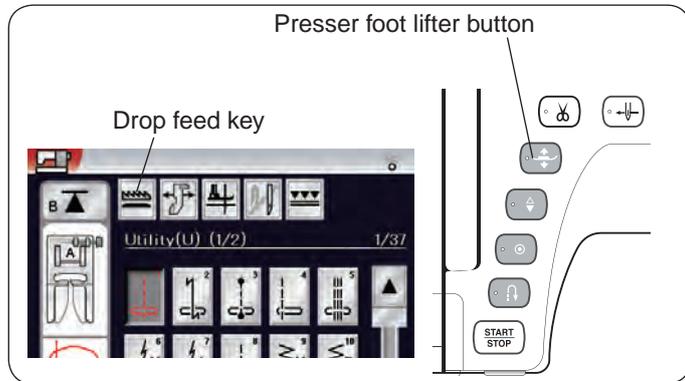
### To adjust:

1. Loosen the setscrew on the sensor plate.
2. Adjust the distance between the end of thread cutter plate slit and the edge of moving cutter to 0.8 mm by moving the sensor plate in the direction of A or B.

# Mechanical adjustment

## Presser bar lifter position

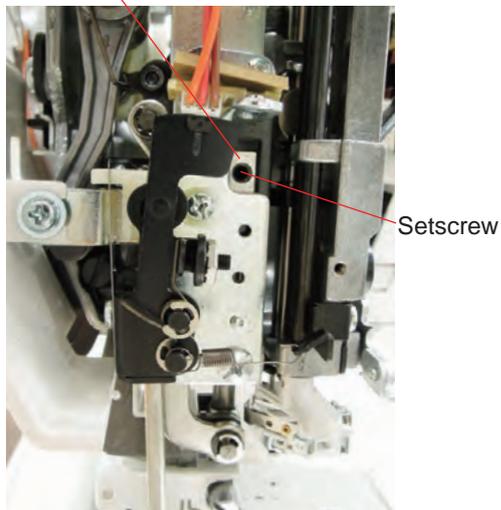
The clearance between the presser foot and the surface of the needle plate should be 6 mm when the presser foot is raised. The presser foot (zigzag foot A) should be parallel to the slot of the feed dog teeth when attached.



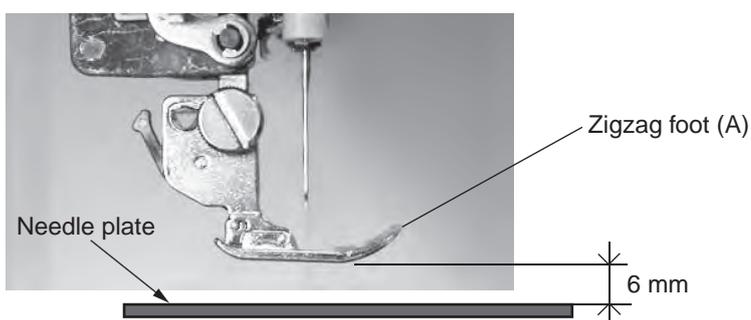
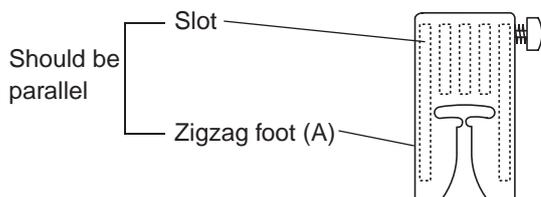
### To adjust:

1. Attach the zigzag foot (A).
2. Turn the power switch on. Press the drop feed key to lower the feed dogs.
3. Press the presser foot lifter button to lower the presser foot. Turn the power switch off.
4. 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.
5. Open the face plate. 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.
6. Place the 6 mm spacer (block) between the presser foot and the needle plate. Tighten the setscrew while depressing the foot against the spacer.

Presser foot bar supporter



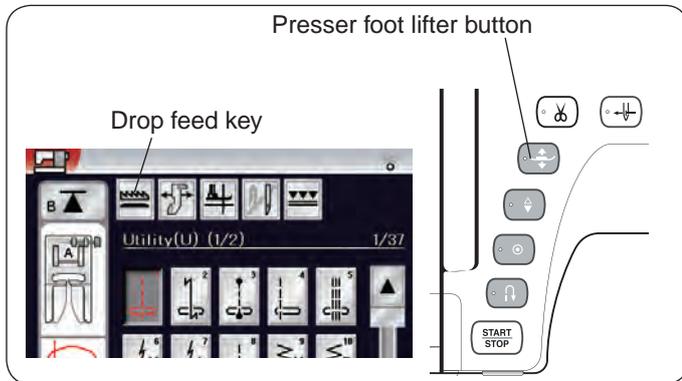
\*LED lamp has been removed in this image.



# Mechanical adjustment

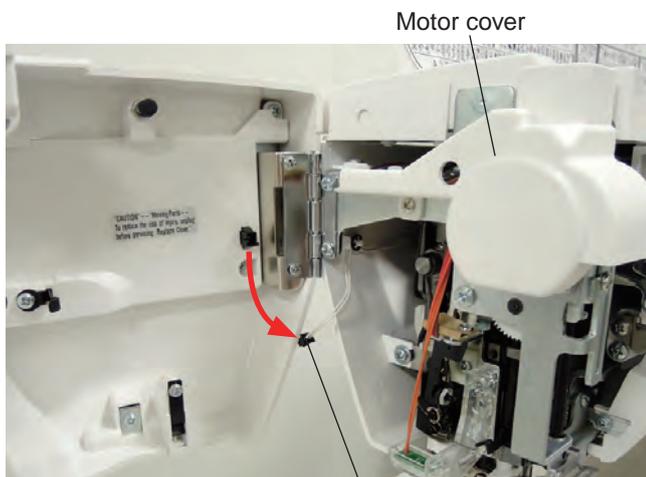
## Presser foot lifter stopper position (1)

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.

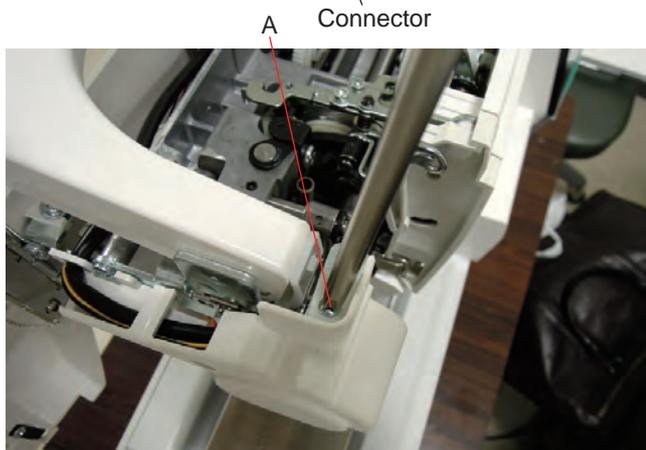


### Preparation:

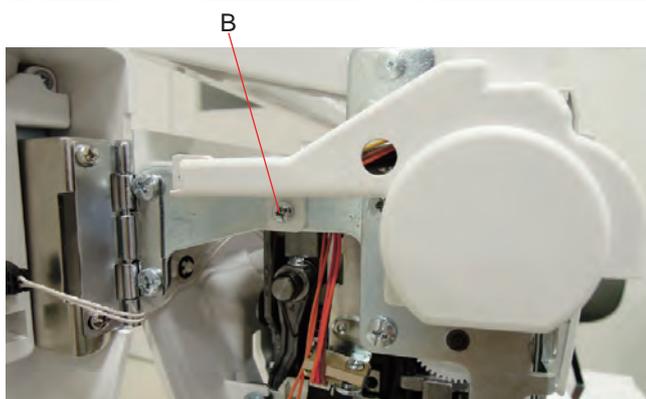
1. Turn the power switch on. Press the drop feed key to lower the feed dogs. Turn the power switch off.
2. Raise the presser foot with the presser foot lifter.



3. Remove the top cover (see page 2).  
Disconnect the connector from the face cover.



4. Loosen the setscrew A.

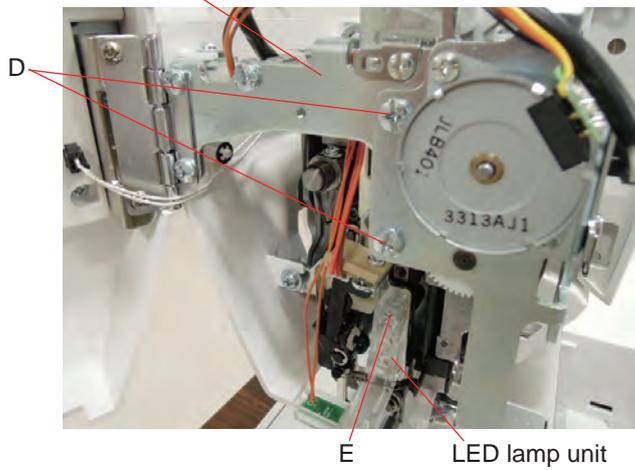


5. Remove the setscrew B to remove the motor cover.

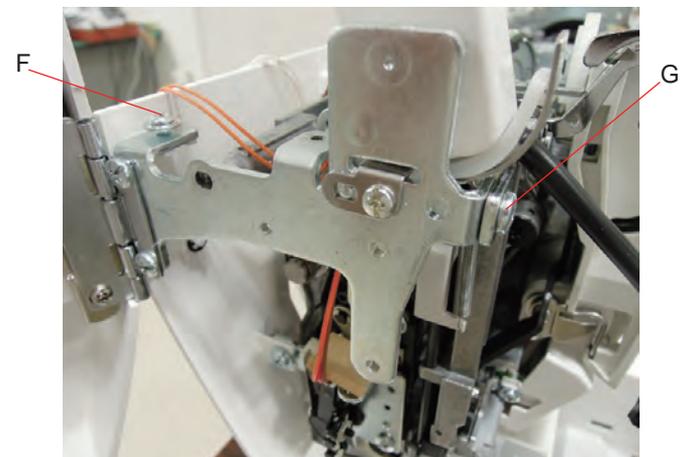
# Mechanical adjustment

## Presser foot lifter stopper position (2)

Carrying handle supporter

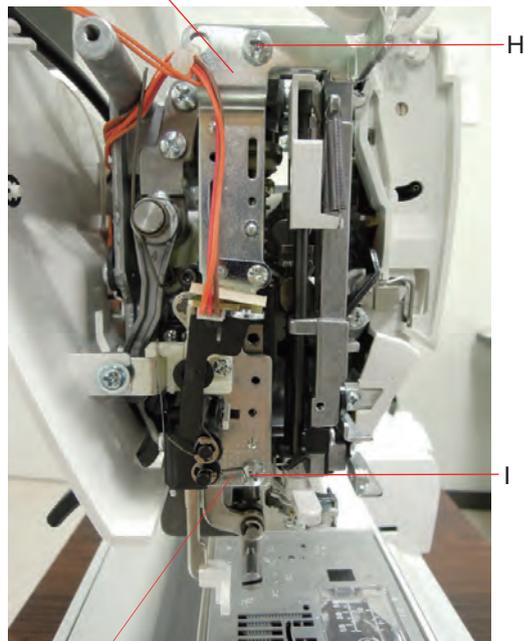


6. Remove the setscrews D.  
Remove the thread motor unit from the carrying handle supporter.  
Be careful that the thread motor unit is still connected with the cables.  
(You may put the piece of soft fabric at the top of the machine and place the motor unit on it while working, or disconnect the needle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



7. Remove the setscrews F and G.  
Remove the carrying handle supporter.

Front bracket



Supporter spring

8. Remove the supporter spring.  
Remove the setscrews H and I.  
Remove the front bracket.

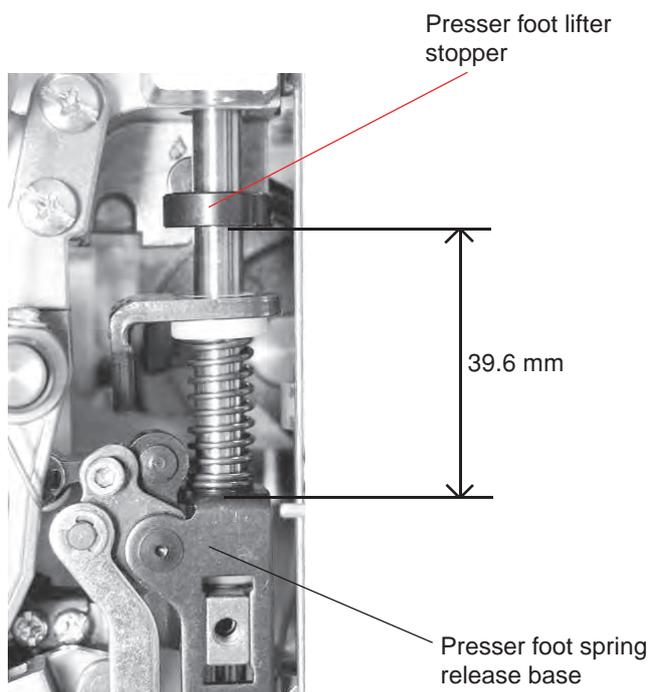
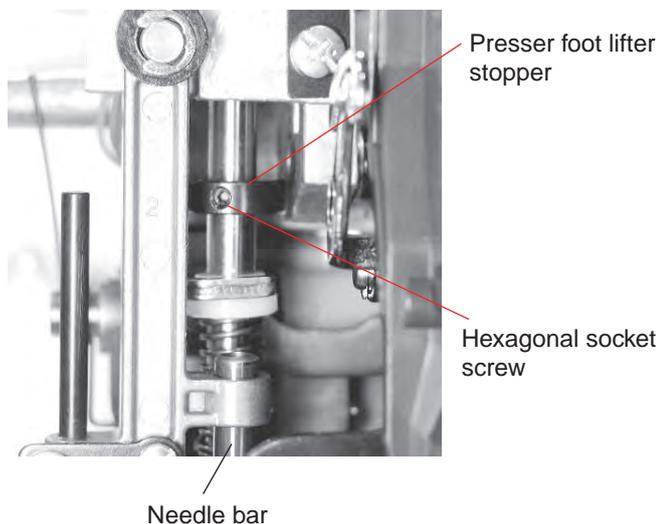
# Mechanical adjustment

## Presser foot lifter stopper position (3)

### To adjust:

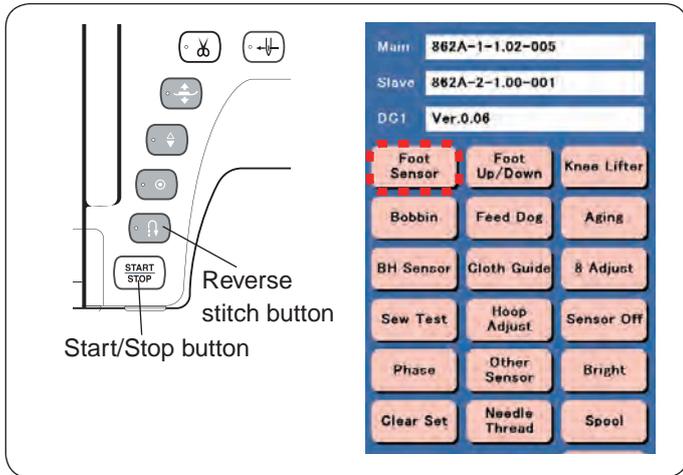
1. Turn the handwheel toward you to lower the needle.  
Raise the presser foot lifter.  
Loosen the hexagonal socket screw of the presser foot lifter stopper from the front side of the machine.
2. Adjust the distance between the presser foot spring release base and the presser foot lifter stopper to 39.6 mm.  
Tighten the hexagonal socket screw.

Front side of the machine



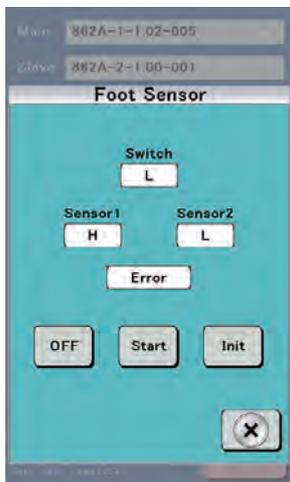
# Mechanical adjustment

## Automatic presser foot lifter initializing sensor position



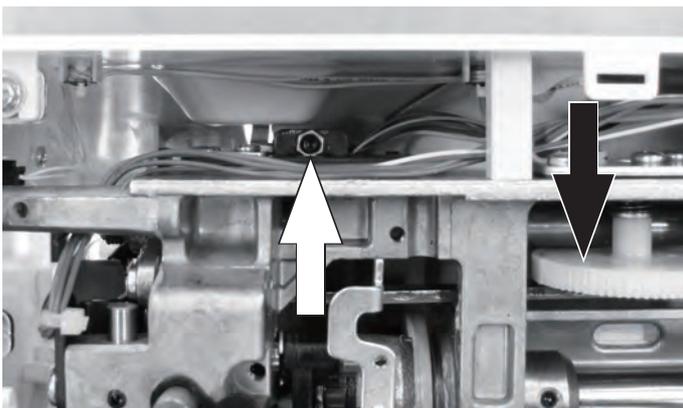
### To adjust:

1. Remove the top cover.
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode. Press "Foot Sensor" key.



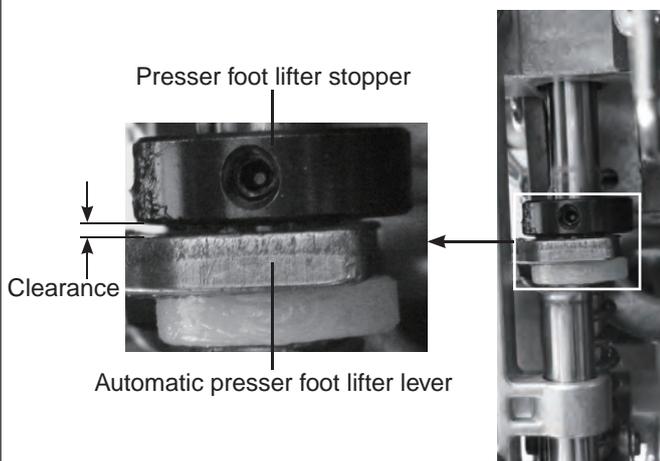
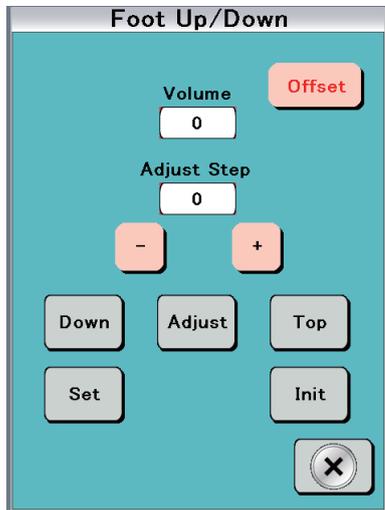
3. Turn the gear A (indicated with black arrow) with your hand to raise the presser foot.
4. Place the 13 mm spacer between the presser foot and the needle plate. Lower the presser foot on the spacer firmly.
5. Be sure that the both sensors 1 and 2 are "H". Press "Start" on the touch panel. Turn the adjusting screw counterclockwise until the "OK" message shown on the display with beep sounds.

\* In case either of sensor 1 and 2 are not "H", turn the adjusting screw (indicated with white arrow) clockwise to change the both sensors to "H".



# Mechanical adjustment

## Presser bar height



### To adjust:

1. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter 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. Check if there is a space between the foot and needle plate by tapping the foot tip with fingers as shown. If there is not enough space to tap the foot tip, press "-" few times to raise the presser bar, giving a enough space between the needle plate and the presser foot.
  5. Press "+" once and tap the foot to check the space. Repeat this step until the tapping sound is gone.
  6. Press "+" again to apply foot pressure, then press "set" to register the presser bar height.
- \* Adjust the presser bar height always by pressing "+" key. Do not press "-" at the end of this adjustment. In case "+" button pressed too many times, press "-" few times and return the procedure 4 above.
  - \* 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.
  - \* 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

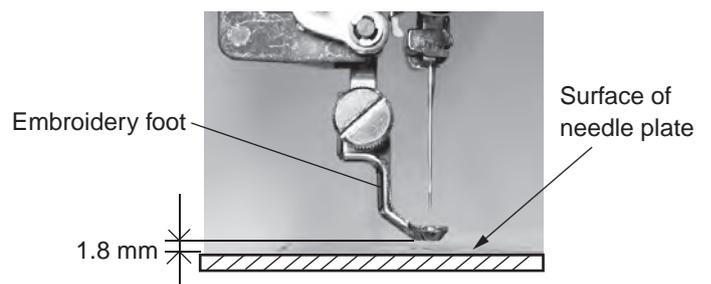
The distance between the embroidery foot and the surface of the needle plate should be in the range of 1.7 mm to 1.9 mm when the presser bar is lowered.

The sequence of screenshots illustrates the following steps:

- Pressing the "Foot Up/Down" key on the main menu.
- Pressing the "Offset" key in the "Foot Up/Down" menu.
- Pressing the "1.7mm" key in the "UP Offset Step" menu.
- Pressing the "Set" key to confirm the adjustment.

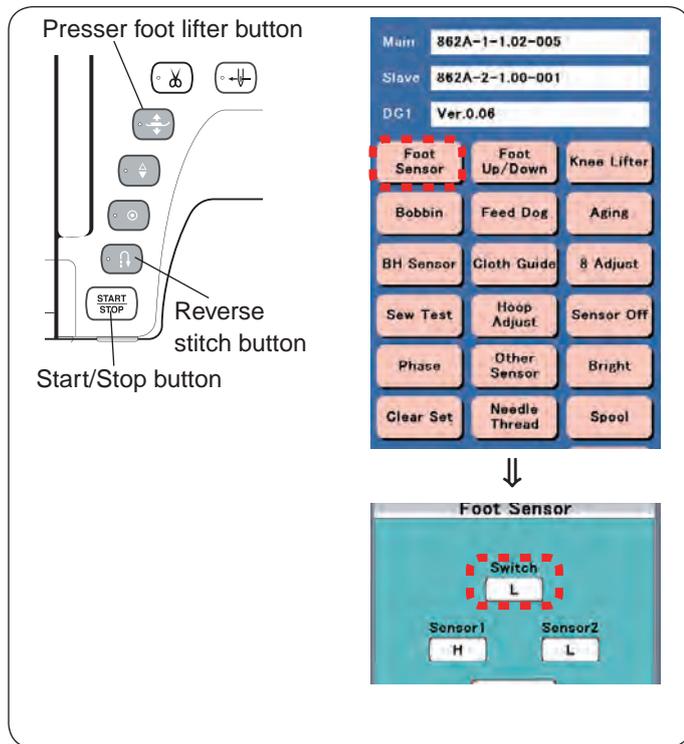
### To adjust:

1. Attach the embroidery foot (P).
2. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode.  
Press "Foot Up/Down" key.  
\* The presser foot will rise when it is lowered.
3. Press "Offset" key. The "Offset" key changes to "Adjust".
4. Press "1.7 mm"  
\* The embroidery foot will be lowered.
5. Press "+" or "-" to adjust the distance between the lower edge of the embroidery foot and the surface of the needle plate to 1.8 mm. Adjust the embroidery foot height slightly higher than 1.8 mm so the adjustment can be finished by pressing "-" key at the end.  
\* This adjustment must be completed by pressing "-".  
\* Press "-" to raise the presser foot bar.  
\* Press "+" to lower the presser foot bar.
5. Press "Set" key.  
The embroidery foot height will be memorized.  
Press "X" key to exit the adjusting mode.



# Mechanical adjustment

## Presser foot lifter switch

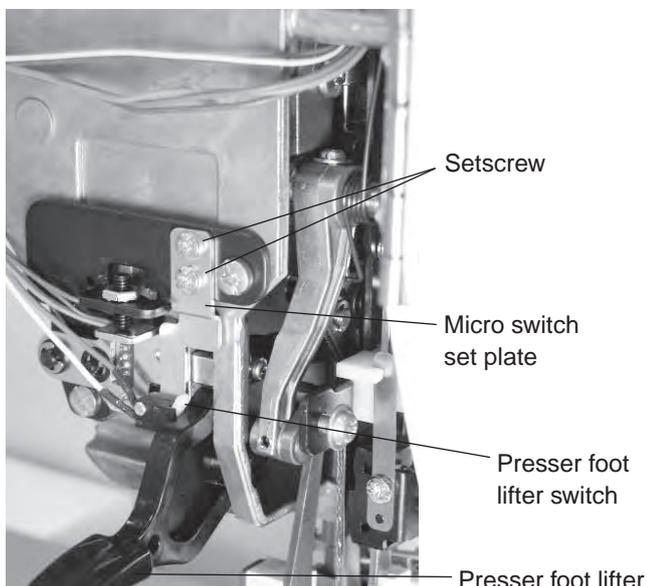
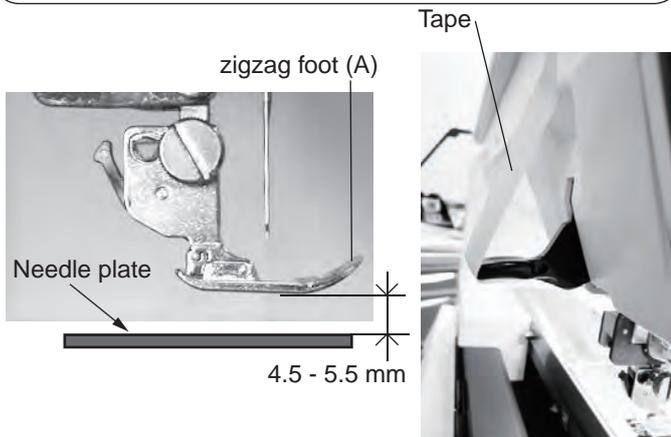


### To check:

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 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.

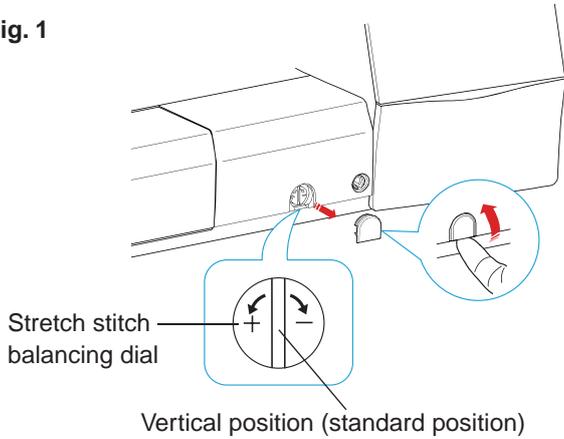


# Mechanical adjustment

## Stretch stitch balance

When the stretch pattern "8" is sewn 8 times with the stretch stitch balancing dial at the standard setting mark, the length of five of stretch patterns should be in the range of 33 to 39 mm.

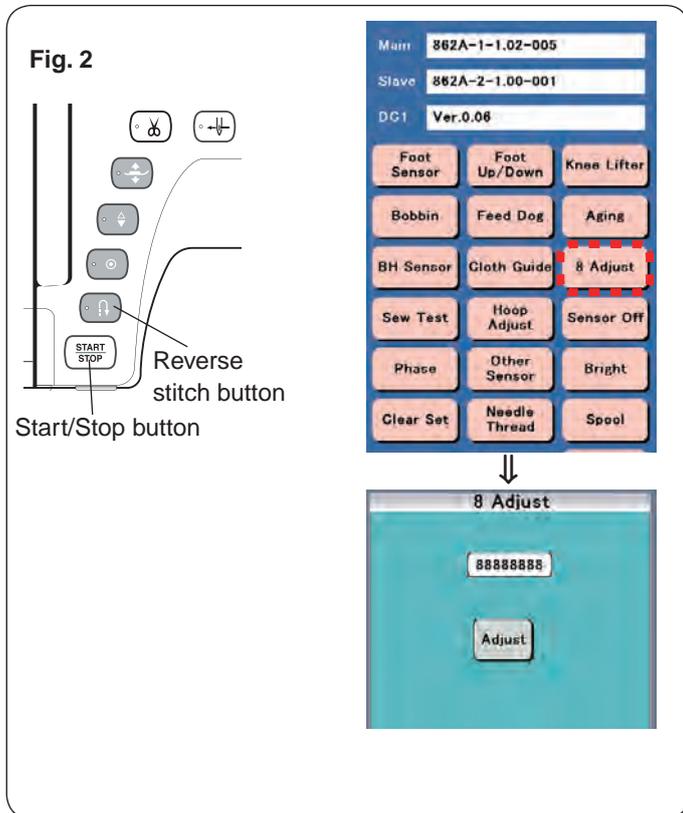
Fig. 1



### To check:

1. Attach the satin stitch foot (F).
2. Turn the stretch stitch balance dial at the vertical position as illustrated in Fig. 1.
3. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode. Press "8 Adjust" key (see Fig. 2).
4. Sew the patterns at the maximum speed until the machine stops automatically. The machine will sew "8" eight times. Check the length between the 3rd "8" and 7th "8" (Five "8" patterns). The length should be in the range of 33 to 39 mm (see Fig. 4).

Fig. 2



### To adjust:

1. Remove the cap on the base cover (see Fig. 3).
2. If the length is more than 39 mm, turn the adjusting screw in the direction of A  
If the length is less than 33 mm, turn the adjusting screw in the direction of B.

Fig. 3

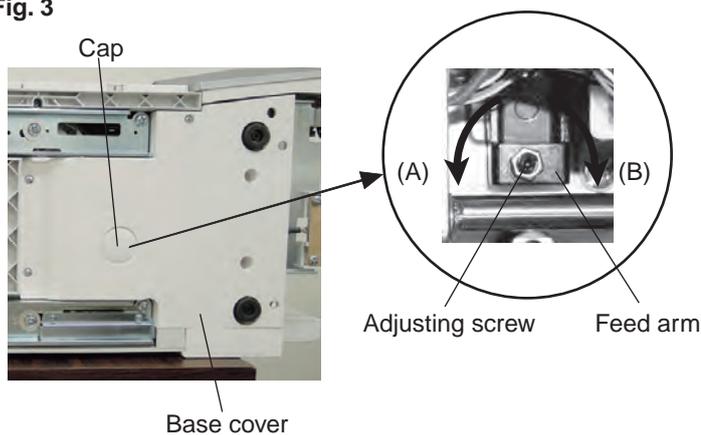
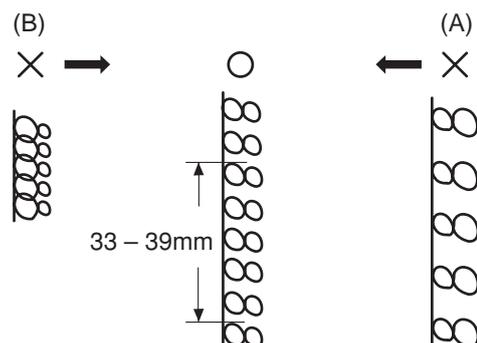
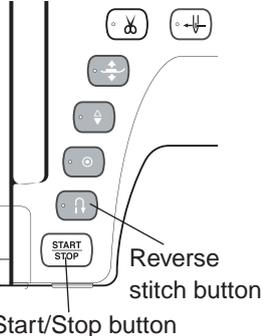


Fig. 4



# Mechanical adjustment

## Knee lifter



Start/Stop button  
Reverse stitch button

**Knee lifter attached to the machine**



**Knee lifter is moved to the right**



Main 862A-1-1.02-005		
Slave 862A-2-1.00-001		
DC1 Ver.0.06		
Foot Sensor	Foot Up/Down	Knee Lifter
Bobbin	Feed Dog	Aging
BH Sensor	Cloth Guide	8 Adjust
Sew Test	Hoop Adjust	Sensor Off
Phase	Other Sensor	Bright
Clear Set	Needle Thread	Spool

⇓

**Knee Lifter**

Sensor  
109

MEM1  
111

MEM2  
321

OK
✕

⇓

**Knee Lifter**

Sensor  
321

MEM1  
111

MEM2  
321

OK

✕

### To adjust:

1. Attach the knee lifter.
3. Turn the power switch ON while pressing the Start/Stop button and the Reverse stitch button to enter the factory setting mode.  
Press "Knee lifter" key.
3. Attach the knee lifter.  
Press "MEM1" when the knee lifter is free.
4. Push and hold the knee lifter to the right and press "MEM2" key.
5. Press "OK" key.

# Mechanical adjustment

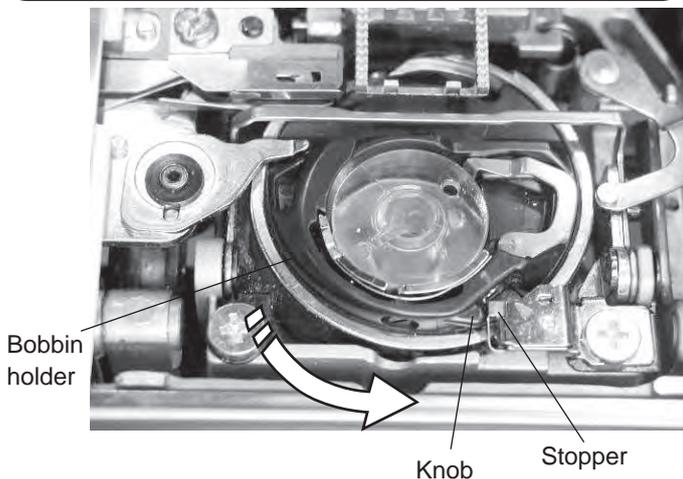
## Remaining bobbin thread sensor

The diagram illustrates the process of adjusting the bobbin thread sensor. It shows the control panel with the 'Bobbin' button highlighted in red. The LCD screen displays the 'Bobbin Thread' menu with the following options and values:

Option	Value
Key	0
Empty	183
Half	153
Full	110

The 'Key' value is shown as 180 in the final step, and the 'Empty' value is highlighted with a red dashed box. Labels indicate the 'Key' value and 'Empty' value.

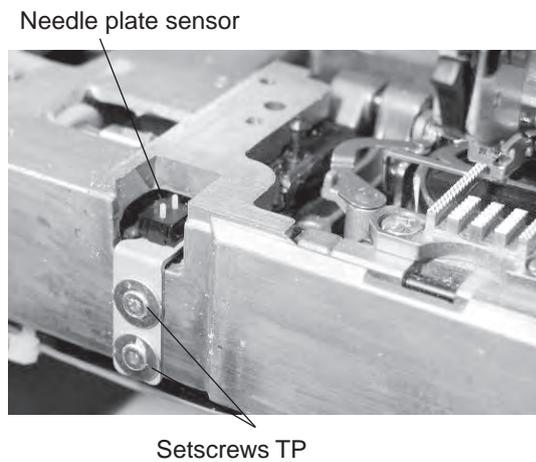
1. Prepare the empty bobbin (diameter: 8.4 mm) and the gauge bobbins (diameter: 12.5 mm and diameter: 18.9 mm).
2. Remove the presser foot and needle plate. (see page 4)  
\* You may use a fabric to prevent damaging the needle plate.
3. Turn the power switch ON while pressing the Start/Stop button and 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

## Needle plate sensor

Fig. 1



### To remove:

1. Remove the base cover, bed cover and the free-arm cover (see page 2 to 4).
2. Disconnect the connector from the needle plate sensor switch from the printed circuit board U2 (see page 10).
3. Remove the setscrews TP and the needle plate sensor switch.

### To attach:

1. Attach the needle plate sensor switch with the setscrews TP. Tighten the setscrews TP lightly.
2. Connect the needle plate sensor switch connector to the printed circuit board U2.
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 as shown in fig 3.

Fig. 2

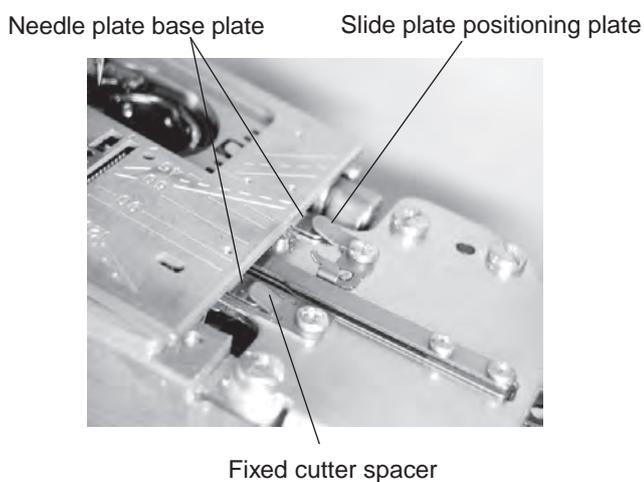
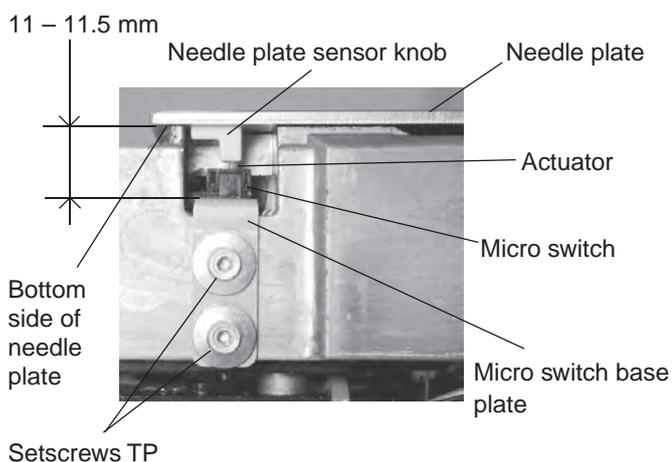
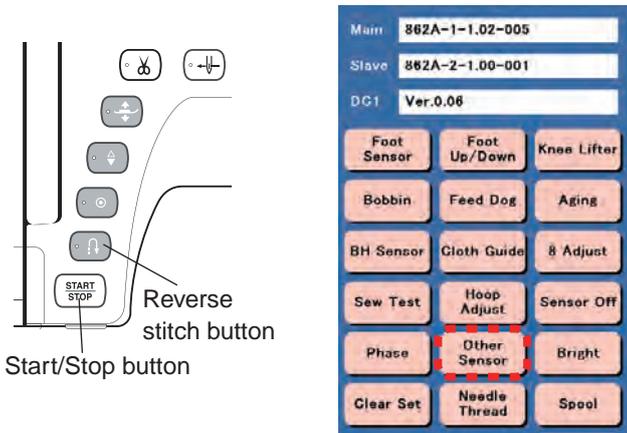
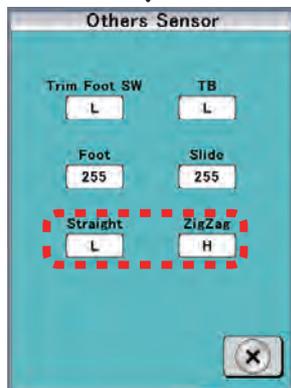


Fig. 3

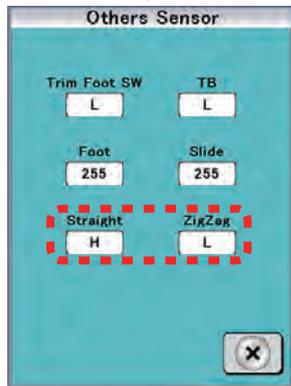




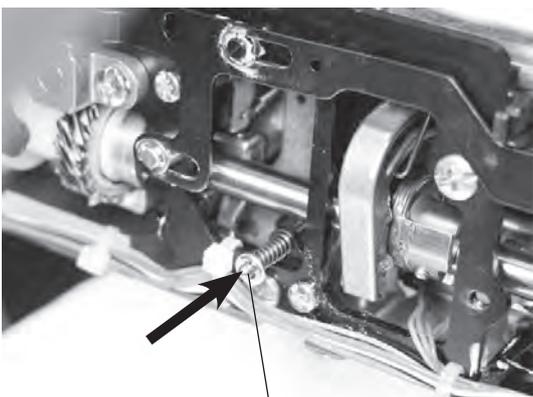
Needle plate attached:



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 50).  
\* To remove the needle plate, press the needle plate replacing bar in the direction of arrow with a screwdriver.



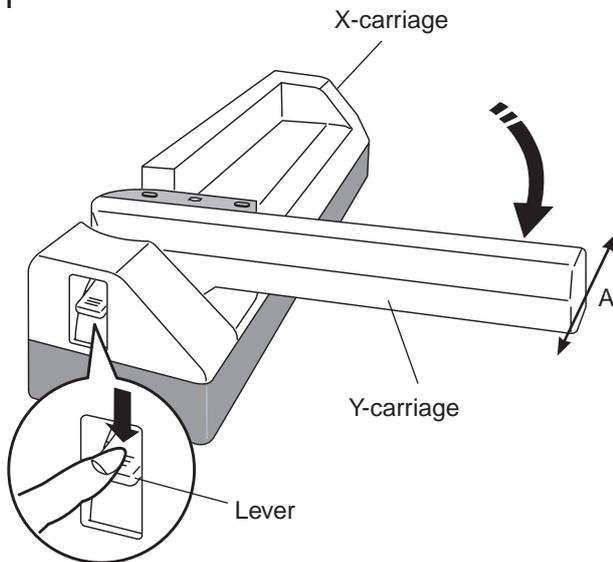
Needle plate replacing bar

# Mechanical adjustment

## Y-carriage play adjustment

There should be no play in the direction of arrow A (see fig. 1).

Fig. 1



1. Push down the lever to open the Y-carriage.
2. Remove the cap under the embroidery unit (see fig. 2).
3. Move the X-carriage to the point where you can access the Y fixing plate from the inspection hole (see fig. 2 and 3).
4. Loosen the setscrew.
5. Tighten the setscrew while pushing the Y fixing plate in the direction of arrow (see fig. 3).
6. Be sure that there is no play in the Y-carriage in the direction of arrow A (see fig. 1). Attach the cap and return the X-carriage to the home position. Close the Y-carriage.

Fig. 2

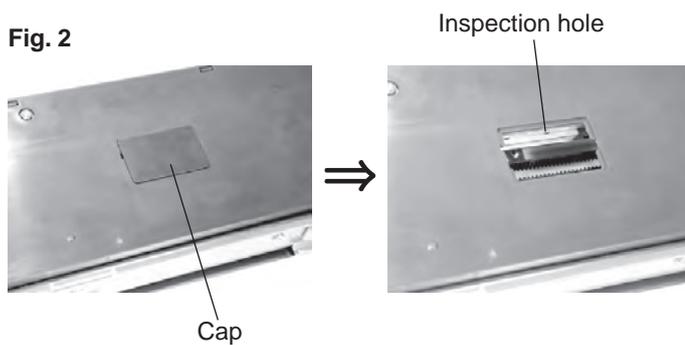
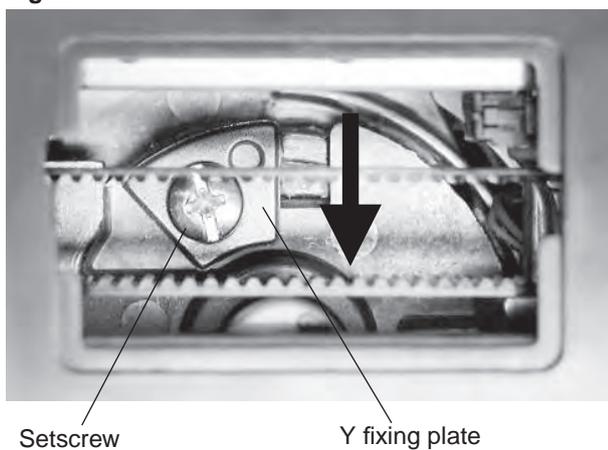


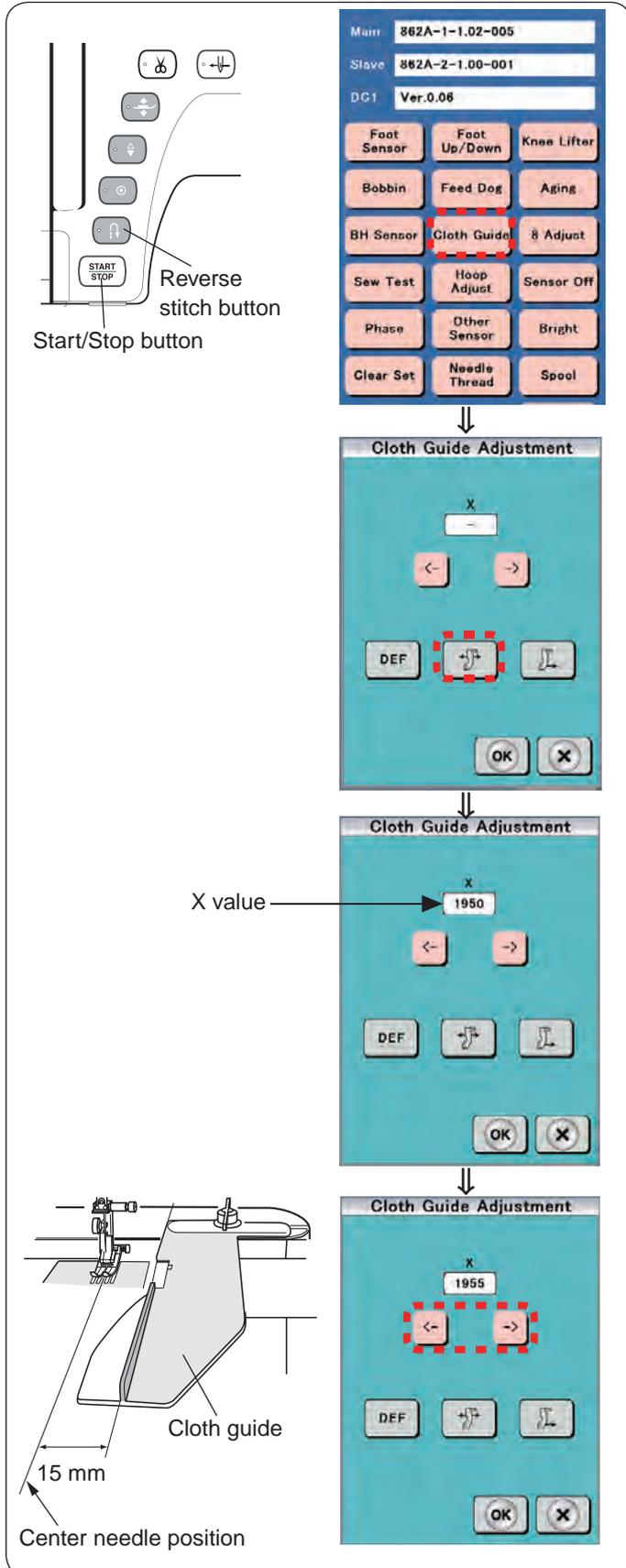
Fig. 3



# 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 "" key. The cloth guide moves to the start position, and the initial X value 1950 is indicated. The initial X value is "1950".
5. Press "" key or "" to move the cloth guide to the position 15 mm away from the center needle position. \* Adjust the X value in the range of 1900 to 2000.
6. Press "OK" key.