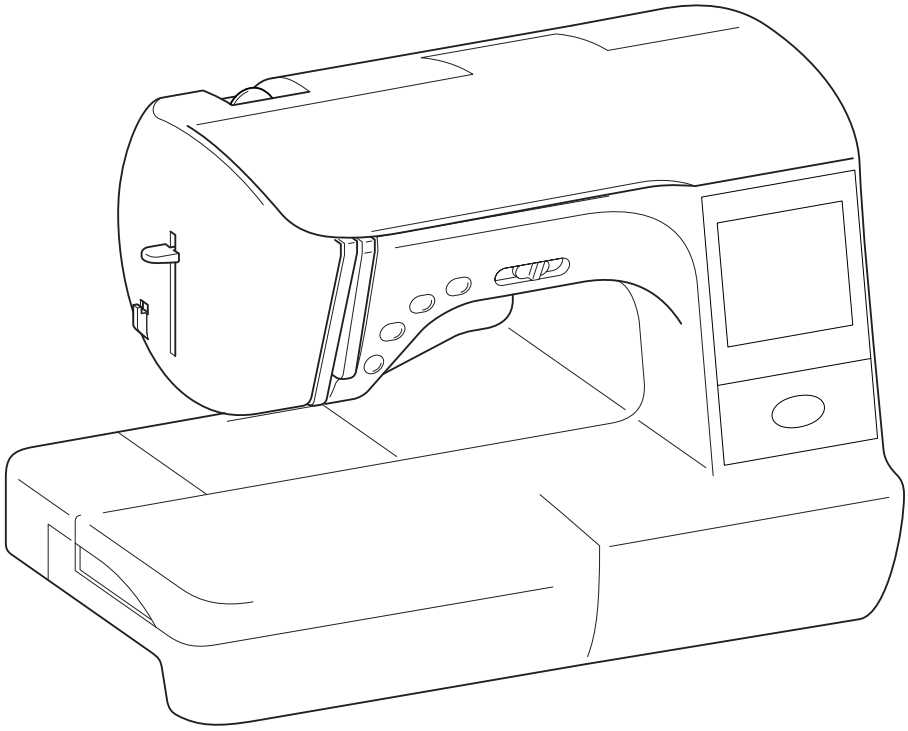
SERVICE MANUAL FOR COMPUTERIZED SEWING MACHINE



BLR3

7.2009.

GENERAL INFORMATION

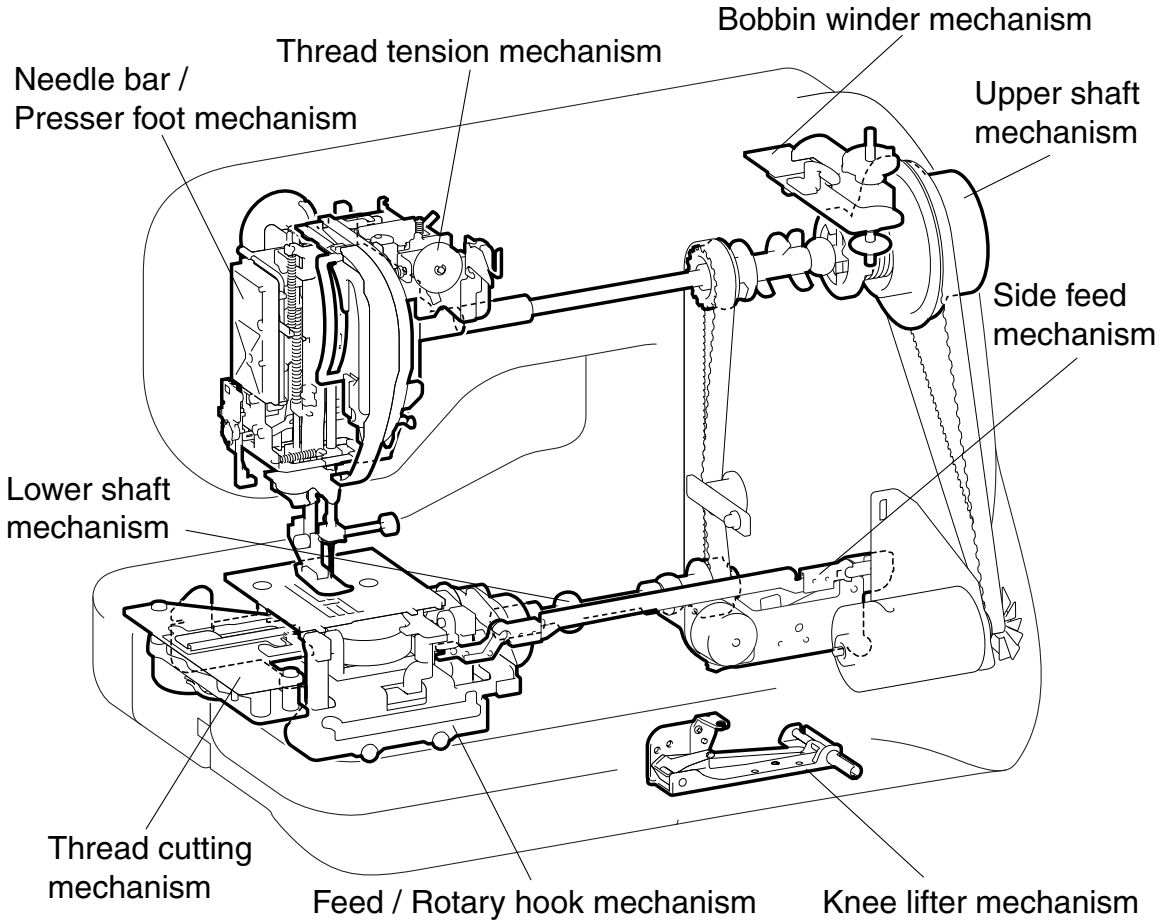
This service manual has been compiled for explaining repair procedures of this MODEL.
This was produced based on up-to-date product specifications at the time of issue, but there may have been changes of specifications for the purpose of improvements.
Contact manufacturer or local sales company for information concerning such changes.

CAUTION <To do the adjustment and the repair safely and surely, follow the instructions below. >

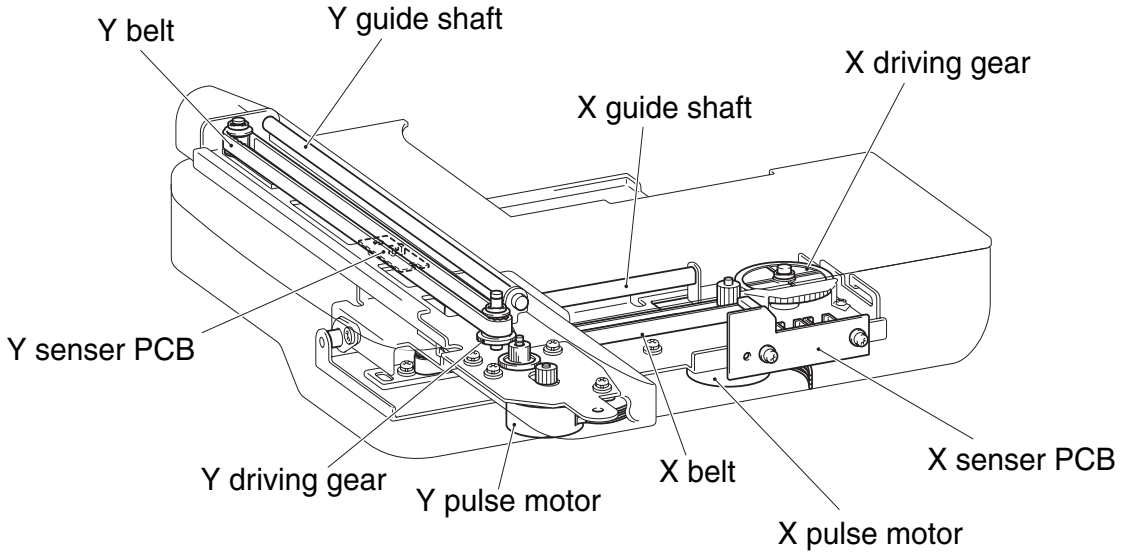
1. Do the adjustment and the repair according to operation procedure of this service manual.
2. When you attach or remove parts, turn off a power switch and then pull out a power supply plug from outlet.
3. When you replace parts, use regular parts.
4. Do not remodel a sewing machine.
5. Always use earth band when handling printed circuit boards to exclude damage of printed circuit boards by static electricity.
6. Pack printed circuit boards in antistatic packaging and avoid subjecting them to any from of impact during storage or transportation.
7. Do not touch or damage the metal portion of a printed circuit board with a screwdriver or any other tool while making repairs or the like.
8. Insert removed connectors into the proper position according to special instructions of wiring for this service manual at the repair, the adjustment and replace printed circuit boards.
9. When you remove a connector from printed circuit boards, remove it while having a connector part. (When you pull out a connector while having a lead wire part, there is a risk that a lead wire get broken.)
10. Do not damage lead wires, when you cut a band that bind up lead wires.

1 Outline of Mechanism

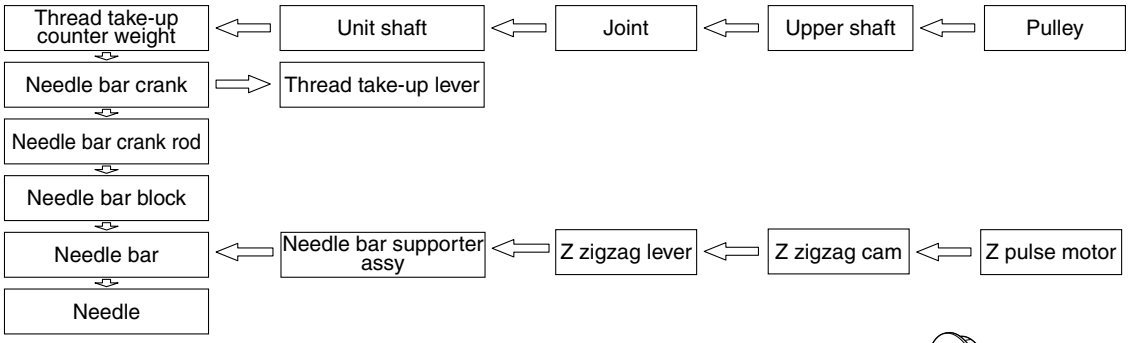
Sewing machine

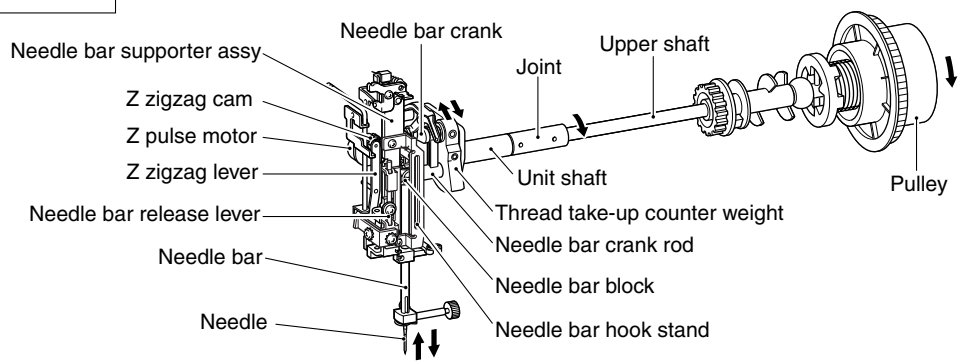


Embroidery unit

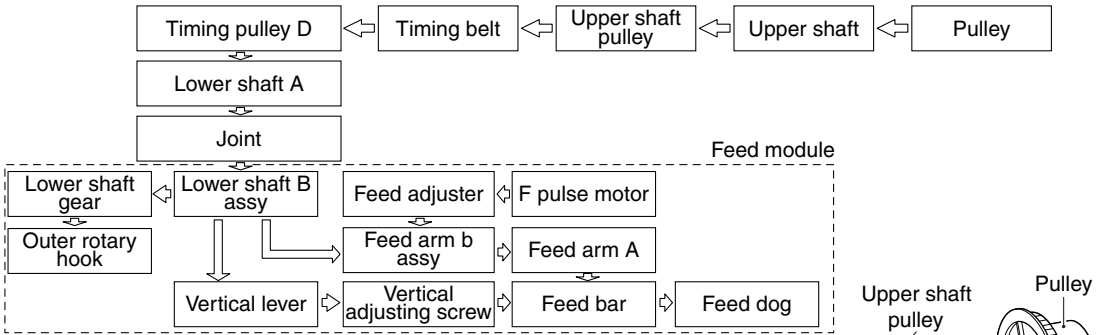


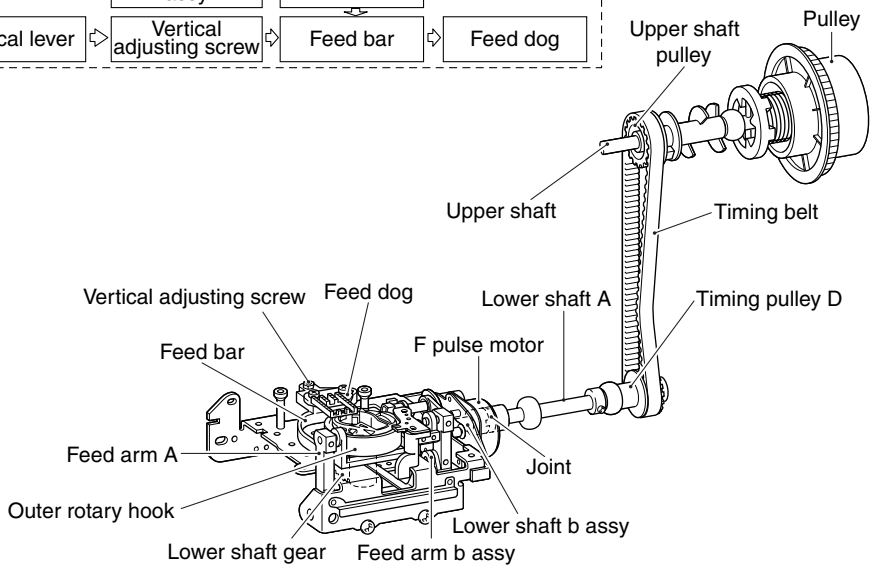
A) Up and down movement of needle bar, movement of thread take-up lever and zigzag mechanism

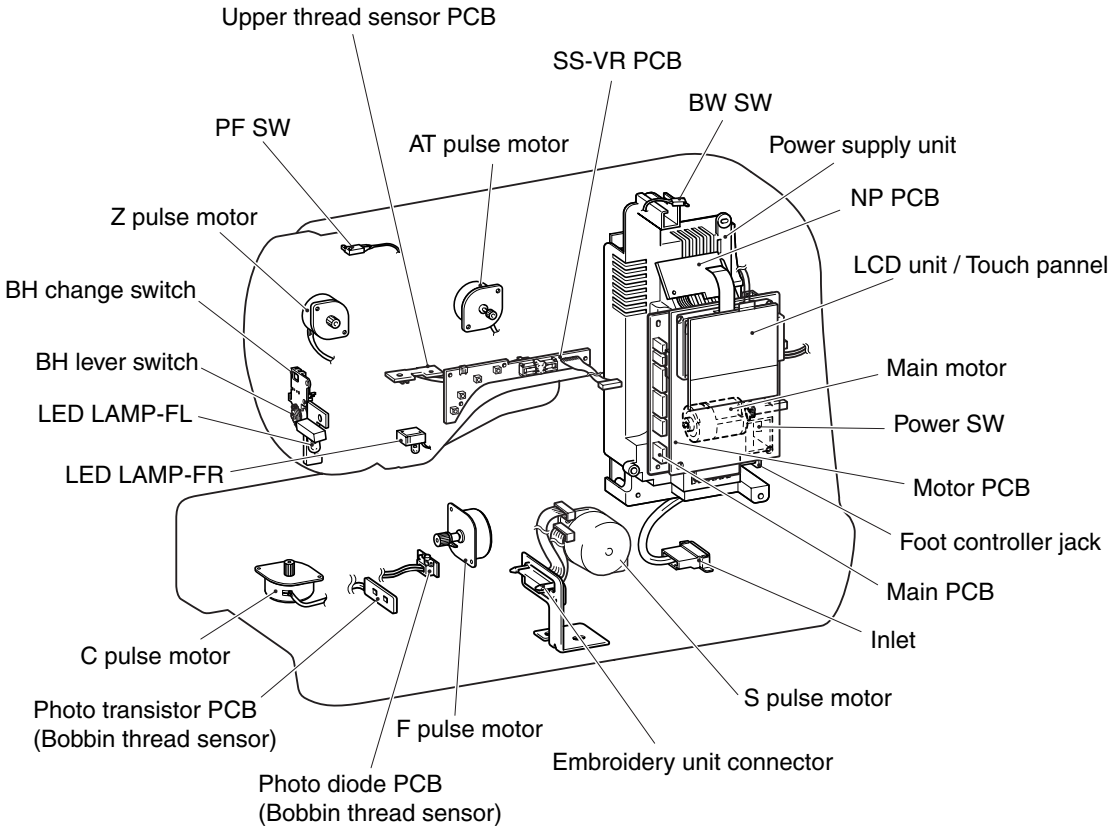


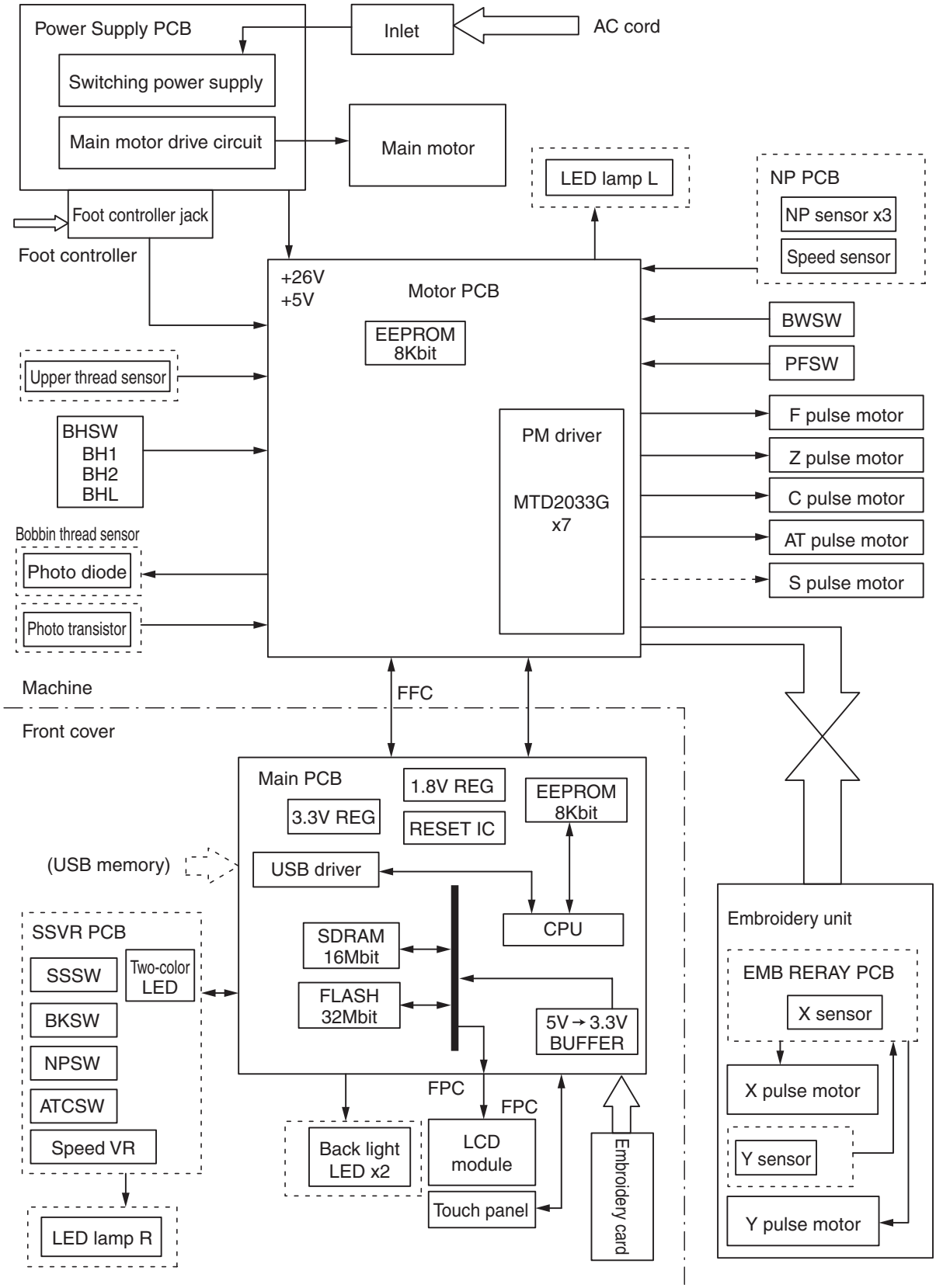


B) Movement of feed dog, rotation of outer rotary hook





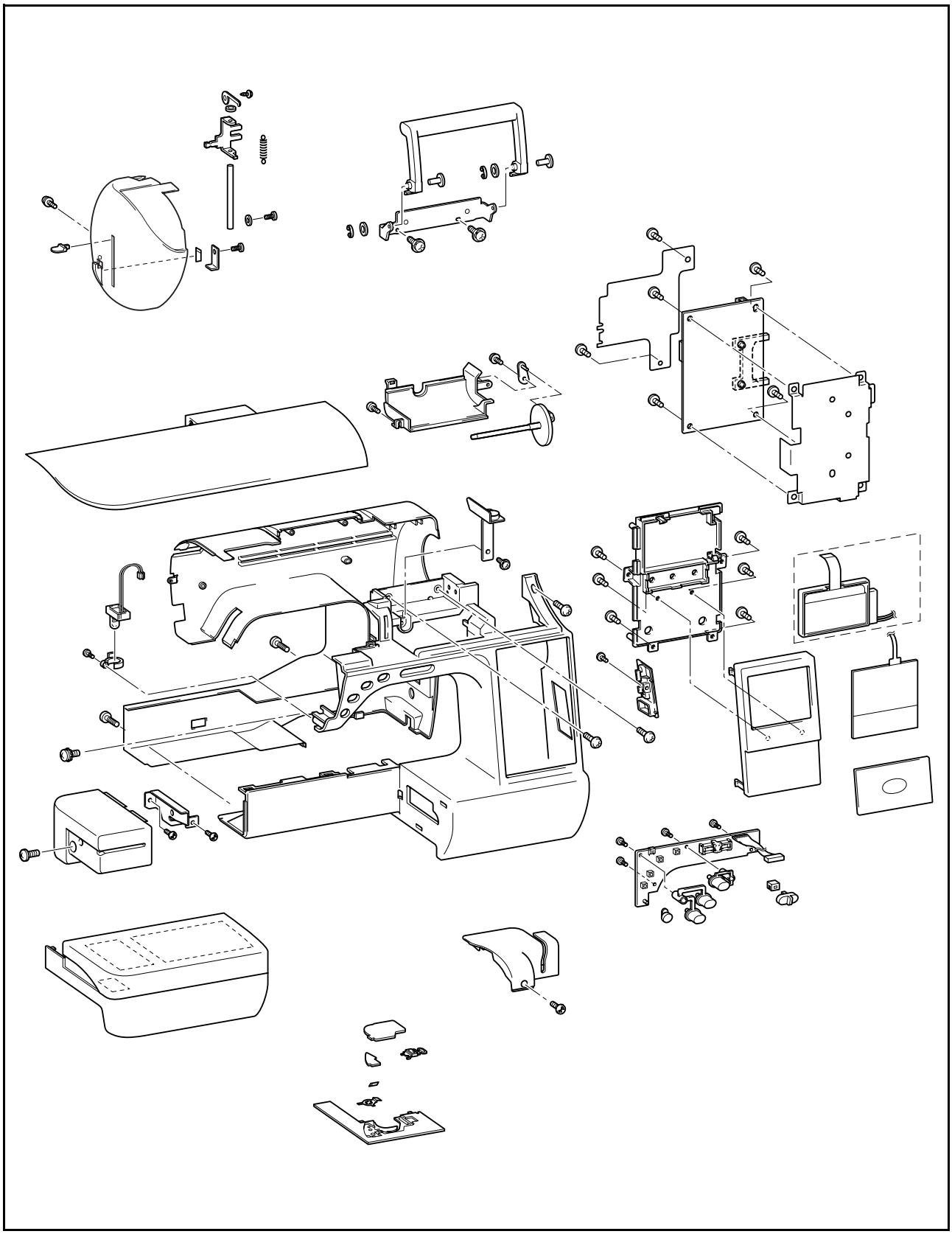

Upper thread sensor PCB
SS-VR PCB
BW SW
PF SW
AT pulse motor
Power supply unit
NP PCB
Z pulse motor
LCD unit / Touch pannel
BH change switch
BH lever switch
Main motor
LED LAMP-FL
Power SW
LED LAMP-FR
Motor PCB
Foot controller jack
Main PCB
Inlet
C pulse motor
S pulse motor
Photo transistor PCB
(Bobbin thread sensor)
F pulse motor
Embroidery unit connector
Photo diode PCB
(Bobbin thread sensor)


Power Supply PCB
Switching power supply
Main motor drive circuit
Inlet
AC cord
Main motor
LED lamp L
NP PCB
NP sensor x3
Speed sensor
Foot controller jack
Foot controller
+26V
+5V
Motor PCB
EEPROM
8Kbit
BWSW
PFSW
Upper thread sensor
BHSW
BH1
BH2
BHL
PM driver
MTD2033G
x7
F pulse motor
Z pulse motor
C pulse motor
AT pulse motor
S pulse motor
Bobbin thread sensor
Photo diode
Photo transistor
Machine
FFC
Front cover
Main PCB
1.8V REG
3.3V REG
RESET IC
EEPROM
8Kbit
(USB memory)
USB driver
CPU
SDRAM
16Mbit
FLASH
32Mbit
5V→3.3V
BUFFER
SSVR PCB
SSSW
Two-color
LED
BKSW
NPSW
ATCSW
Speed VR
LED lamp R
FPC
FPC
Back light
LED x2
LCD
module
Touch panel
Embroidery card
Embroidery unit
EMB RERAY PCB
X sensor
X pulse motor
Y sensor
Y pulse motor

Start/Stop (SS) button	Button for starting and stopping the sewing machine. The machine operates at a slow speed while the button is being held down.
Reverse/Reinforcement stitch button	This button is for reverse stitching or ending a seam. If the button is pushed, it makes three to four stitches in that place and stops automatically. It sews in the reverse with slow speed while the button is held down.
Needle position button	This button toggles the needle between the up and down positions.
Thread cutter button	This button is for cutting the thread. In case the button is pressed, the thread is cut regardless of the needle position and stop with the needle up.
Speed control lever	This lever controls the speed of sewing.
Touch Panel	Used to select pattern and input test mode number required for sewing by simply touching the display on the panel. This simplifies the oparation for selecting the desired pattern and number.
BH (button hole) switch	This switch is for detecting the forward and rear ends of the button hole according to the BH presser foot and lever.
BH (button hole) lever switch	This switch detects whether the BH lever is up or down.
Needle position (NP) sensor	This sensor detects the drive timing of each pulse motor and the vertical stop of the needle position. It detects the upper shaft angle of rotation by using a shutter attached to the upper shaft and an opitical sensor.
Speed sensor	This sensor detects the rotational speed of the main motor. It detects the upper shaft rotational speed by using a shutter attached to the upper shaft and an optical sensor.
Knee lifter sensor	This sensor detects the knee lifter movementer.
PF (Presser foot) switch	This switch detects the vertical position of the presser foot lever.
BW (bobbin winder) switch	This switch detects whether the bobbin is set for winding or not, when the bobbin thread is wound.
Foot controller jack	This is the jack for plugging in the foot controller in use.
LED lamp	White LED lamps for illuminating the work space.
Up thread sensor	Detects the presence or absence of the upper thread and whetherit is cut or not.
Photo diode, photo transistor	This assy detects the bobbin thread is low.
X sensor, Y sensor (Embroidery unit)	This sensor detects the original position of X pulse motor and Y pulse motor.

2 Disassembly

Main parts location diagram



1 Accessory table removal

1. Remove the accessory table ①.
2. Remove the accessory table door ② from the accessory table ①.

2 Top cover removal

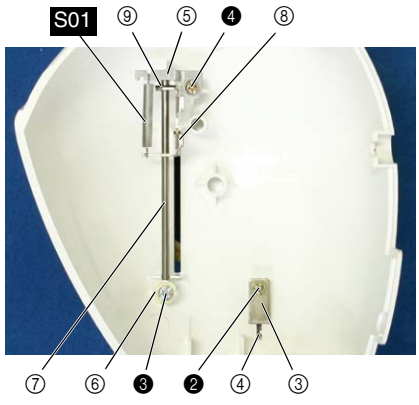
1. Remove top cover ①.

***Key point**

- Push the attached part toward the inside and remove.

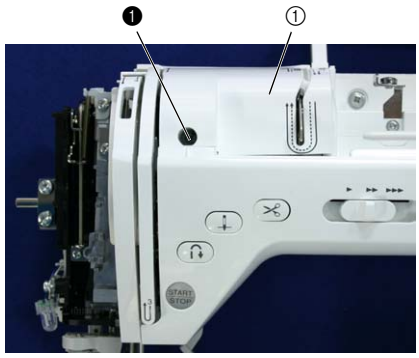
3 Face plate removal and disassembly

1. Remove the screw ❶, and then remove the face plate assembly ①.
2. Remove the needle thread lever knob ②.
3. Remove the screw ❷, and then remove the face plate cutter holder ③ and the NT lower thread cutter ④.
4. Remove the screws ❸ and ❹, and then remove the shaft presser plate ⑤ and the plain washer ⑥.
5. Remove the spring S01.
6. Remove the needle thread lever shaft ⑦.
7. Remove the needle thread lever ⑧ and the rubber washer ⑨ from the needle thread lever shaft ⑦.



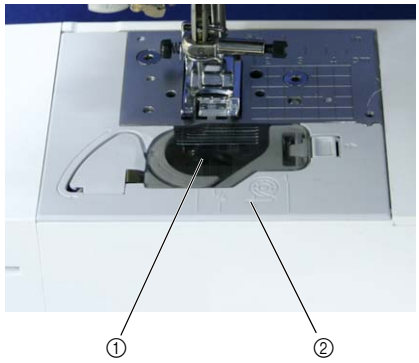
4 Front thread guard cover removal

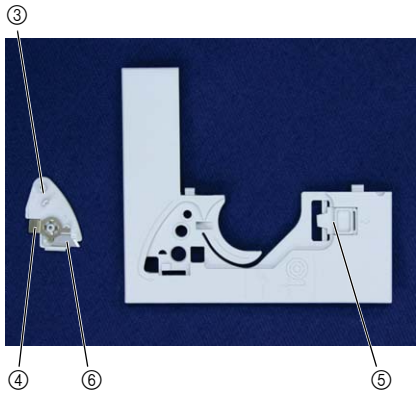
1. Remove the screw ❶, and remove the front thread guard cover ①.



5 Needle plate B removal and disassembly

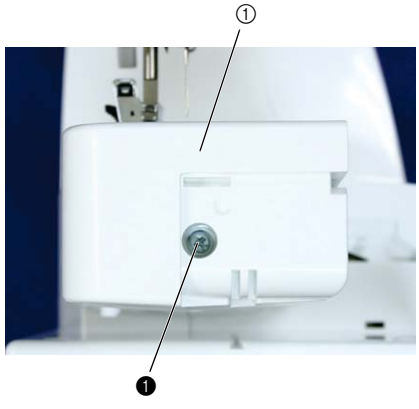
1. Remove the needle plate cover ①.
2. Remove the needle plate B ②.
3. Remove the cutter cover ③.
4. Remove the spring plate ④ from the cutter cover ③, and remove the NT lower thread cutter ⑥.
5. Undo the slide button hook (two locations), and remove the slide button ⑤.





6 Free arm cover removal

1. Remove the screw ❶, and then remove the free arm cover ①.

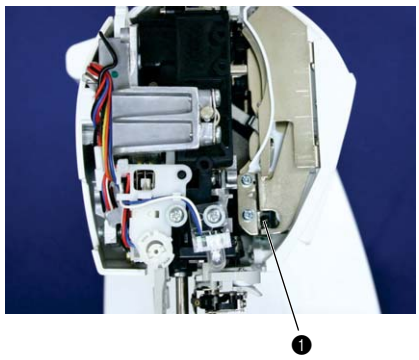


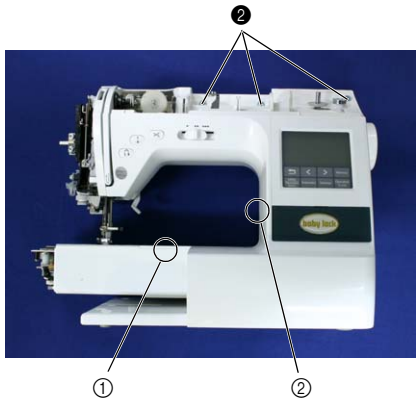
7 Front cover removal

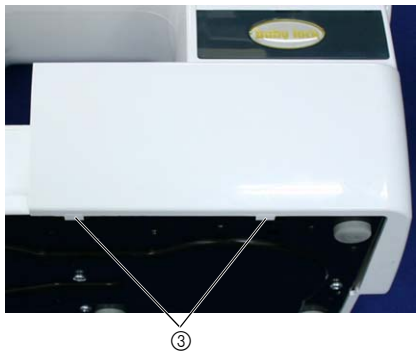
1. Remove the screw ❶ and the 3 screws ❷.
2. Remove the hook ① on the front cover, and then remove the hook ② by pushing the hook attachment section ② on the rear cover.

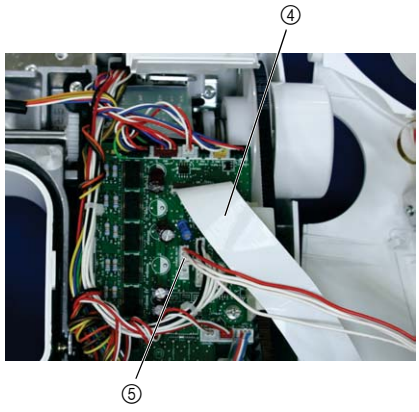
   ***Key point**
   - Be careful not to damage the hooks ① and ② on the front cover.
3. Remove the 2 bottom hooks ③ from the base plate while sliding the front cover to the right.
4. Remove the flat cable ④ and the connector ⑤ from the main PCB assembly, and then remove the front cover.

   ***Key point**
   - Move the lock of the connector ⑤ on the main PCB to the upright position to release it, and then pull out the flat cable ④.



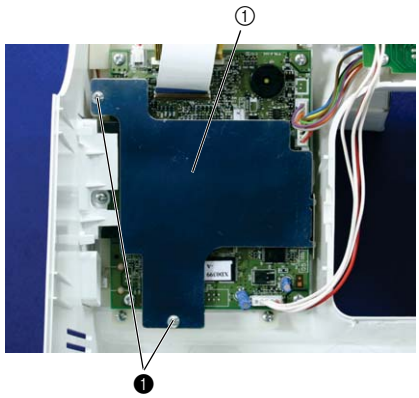






8 Board plate A removal

1. Remove the 2 screws ❶, and then remove the board plate A ①.

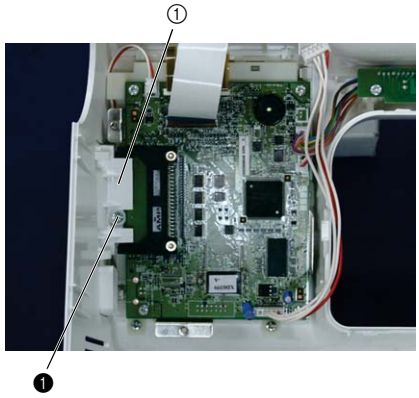


9 Card cover removal

1. Remove the screw ❶, and then remove the card cover ①.

***Key point**

- Press the 2 hooks on the card cover ① from the inside of the front cover.



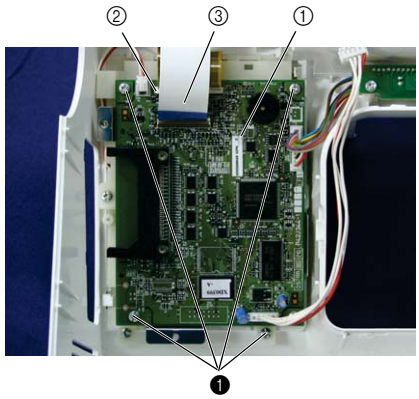
10 Main PCB assembly removal

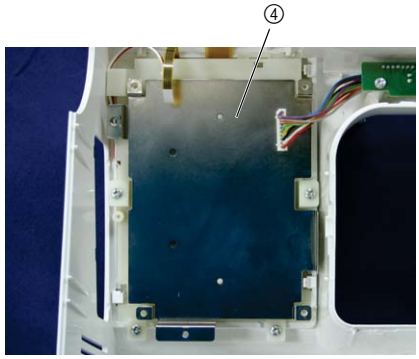
1. Remove the 3 connectors from the main PCB ①, and then disconnect the 3 FFC cords.

***Key point**

- Pull up the lock of the connector on the main PCB ① to release it, and then disconnect the FFC cord ②.
- Move the lock of the connector on the main PCB to the upright position to release it, and then disconnect the FFC cord ③.

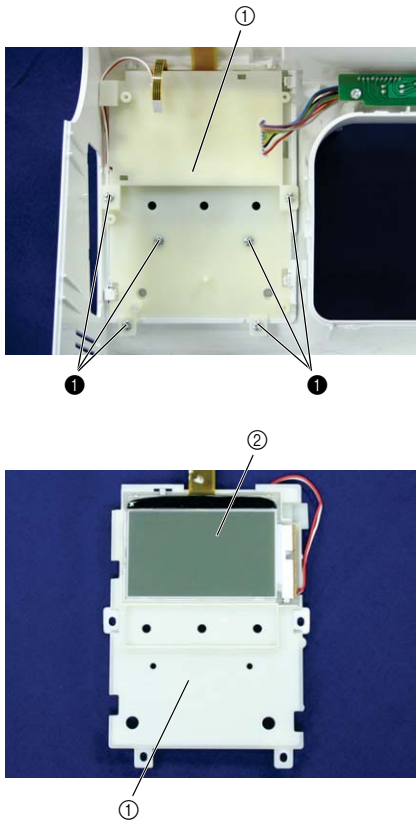
2. Remove the 4 screws ❶, and then remove the main PCB ① and the board plate B ④.





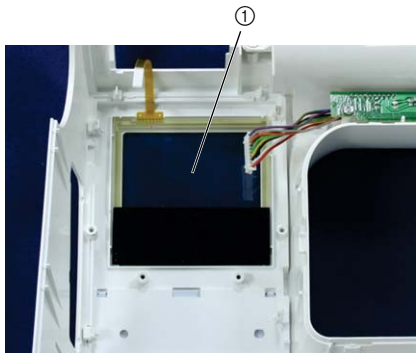
11 Main PCB holder assembly removal

1. Remove the 6 screws ❶, and then remove the main PCB holder assembly ①.
2. Remove the 2 hooks on the main PCB holder assembly ①, and then remove the light plate assembly ②.



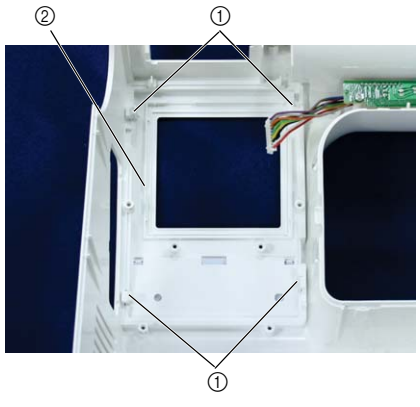
12 Touch panel assembly removal

1. Remove the touch panel assembly ① from the front cover.



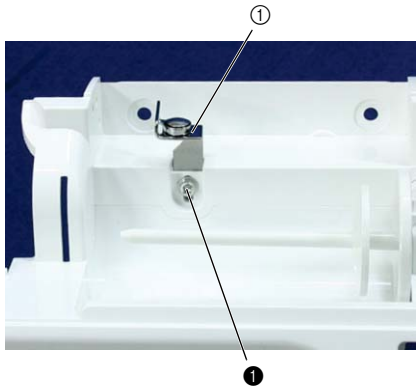
13 Indication panel removal

1. Remove the 4 hooks ① from the backside of the front cover, and then remove the indication panel ②.



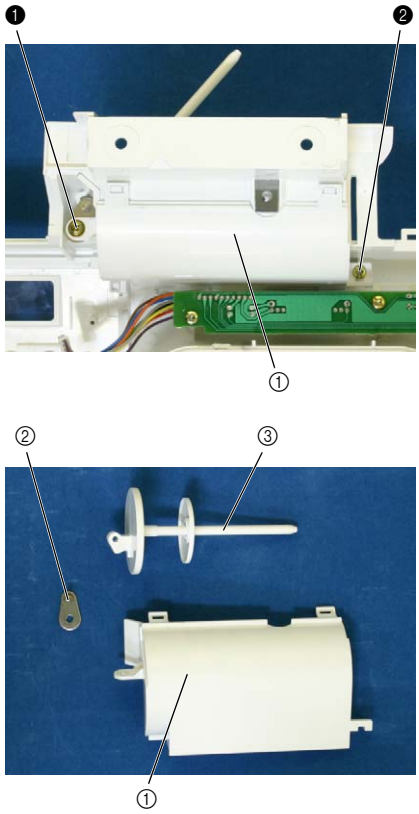
14 Front cover disassembly (bobbin winder guide assembly removal)

1. Remove the screw ❶, and remove the bobbin winder guide assembly ①.



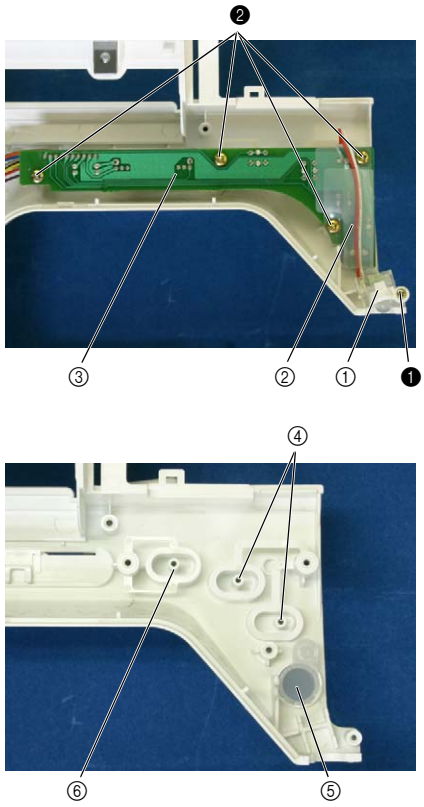
15 Front cover disassembly (spool pin holder removal)

1. Remove the screws ❶ and ❷, and then remove the thread bobbin cover ①, spool pin holder assembly ②, and spool pin ③.



16 Front cover disassembly (SS-VR PCB assembly removal)

1. Remove the screw ❶, and then remove the lamp holder supporter ①.
2. Remove the 4 screws ❷, and then remove the insulation sheet ② and the SS-VR PCB assembly ③.
3. Remove the connector of the PCB unit LED lamp (FR).
4. Remove the reverse button ④, SS button ⑤, and thread cut button ⑥.

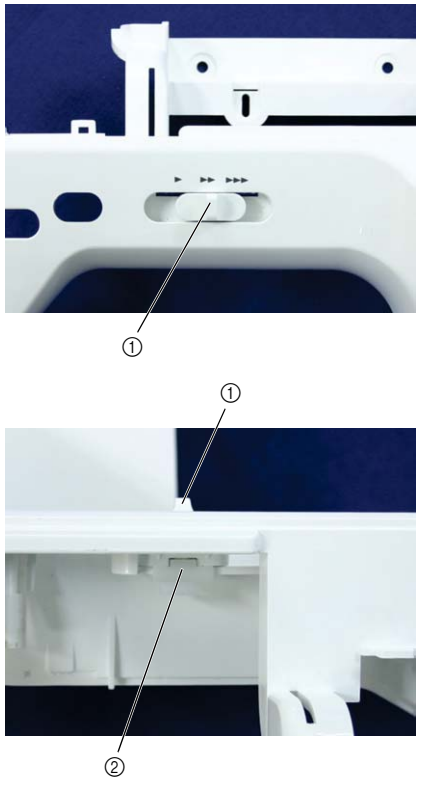


17 Front cover disassembly (SV keytop removal)

1. Remove the SV keytop ①.

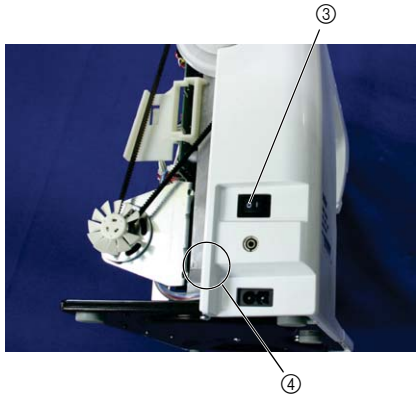
   ***Key point**
   - Insert a standard screwdriver between ① and ②, and push the SV keytop ① out on the front side.

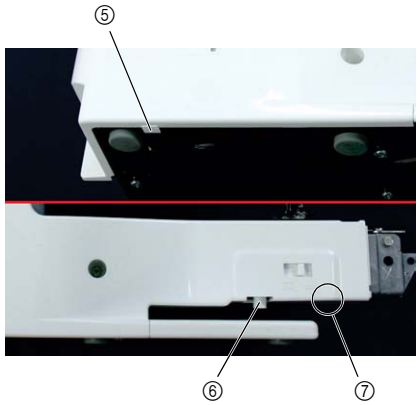
2. Remove the SV joint plate ②.

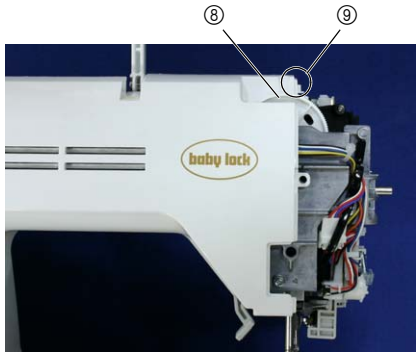


18 Rear cover removal

1. Remove the screw ❶.
2. Lower the presser lever ①, and then remove section ②, being careful to prevent the presser lever ① being caught in section ②.
3. Remove section ④, being careful to prevent the switch ③ of the power supply unit being caught in section ④.
4. Remove the hook ⑤.
5. Remove section ⑦, being careful to prevent the drop lever ⑥ being caught in section ⑦.
6. Remove section ⑨, being careful to prevent the presser dial ⑧ being caught in section ⑨, and then remove the rear cover.

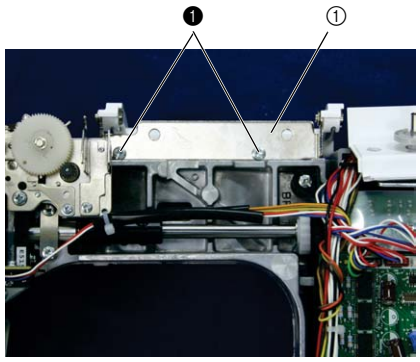


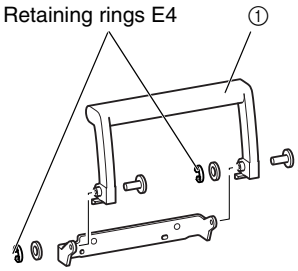




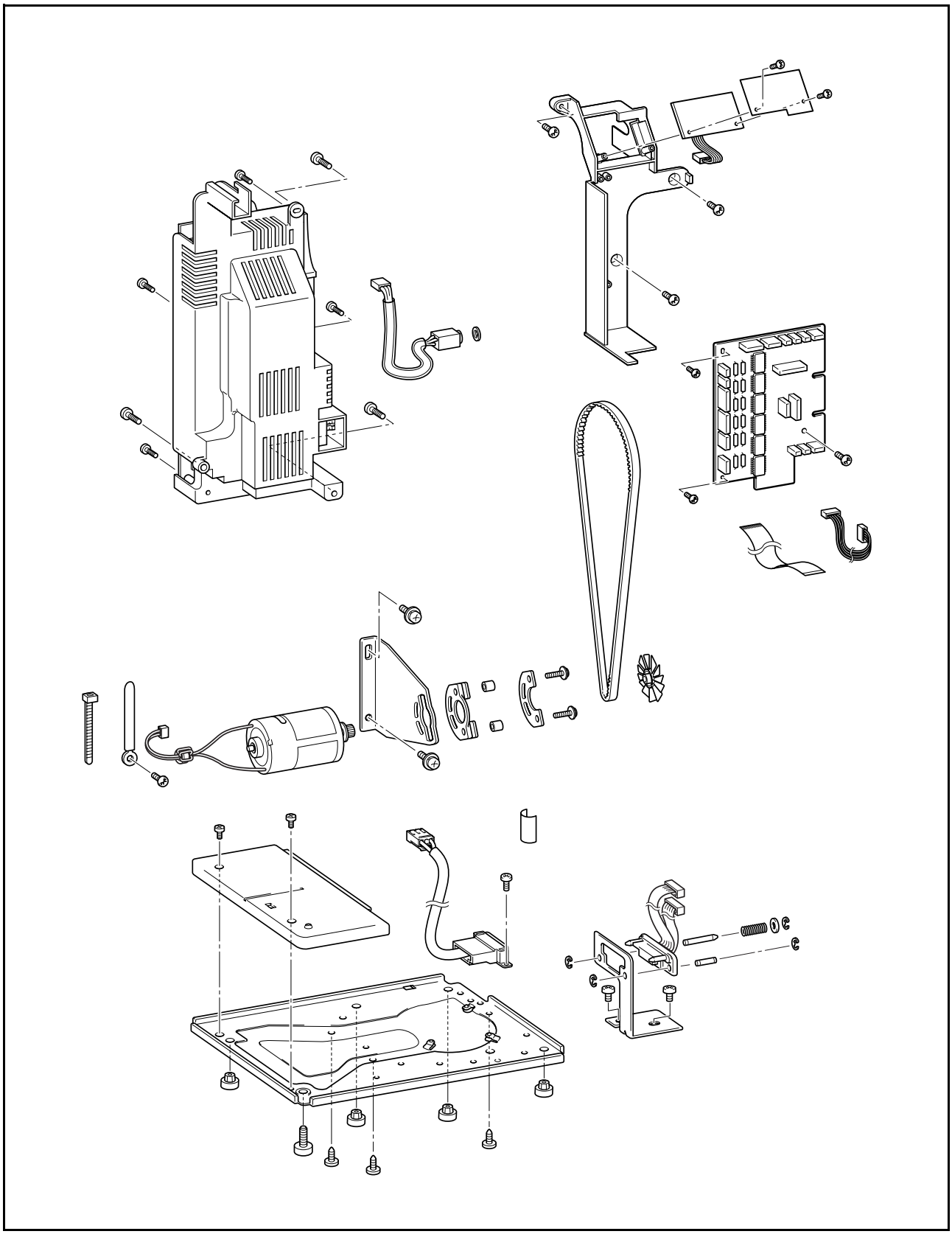
19 Handle removal

1. Remove the 2 screws ❶, and remove the handle ①.
2. Remove the 2 retaining rings E4 from the handle shafts, and remove the handle ①, the 2 handle shafts and the 2 polyester sliders from the handle holder.



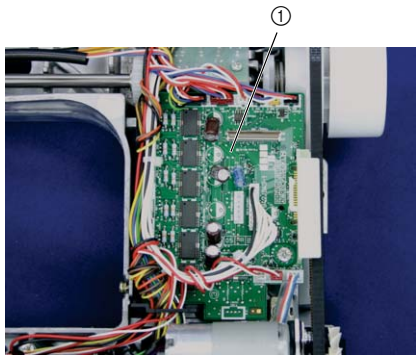


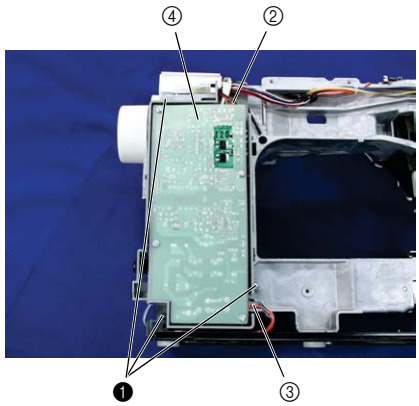
Electrical parts and motors location diagram



1 Power supply unit F removal

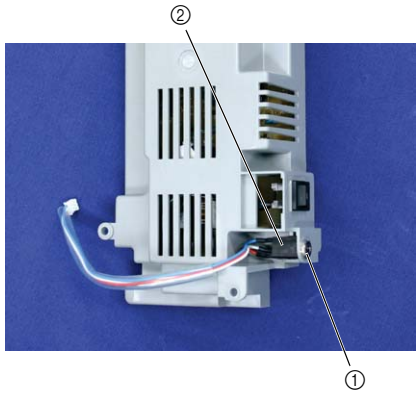
1. Unplug all of the connectors on the motor PCB assy. ①.
2. Remove the main motor connector ②.
3. Disconnect the connector ③ of the inlet assembly lead wire.
4. Remove the 3 screws ❶, and remove the power supply unit F ④.





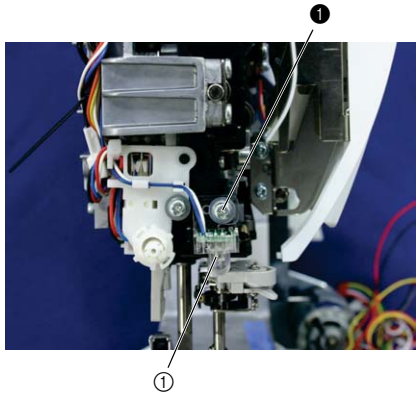
2 Assy. pin jack F removal

1. Remove the nut ①, and remove the assy. pin jack F ②.



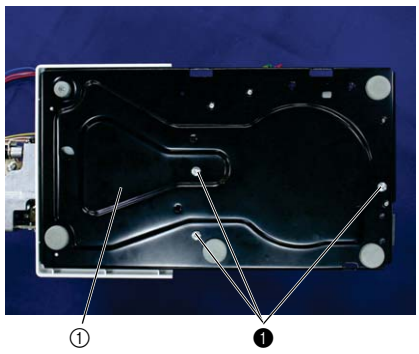
3 PCB Unit LED lamp FL removal

1. Disconnect the bands on the back of the arm bed (3 locations).
2. Remove the screw ❶, and remove the PCB unit LED lamp FL ①.



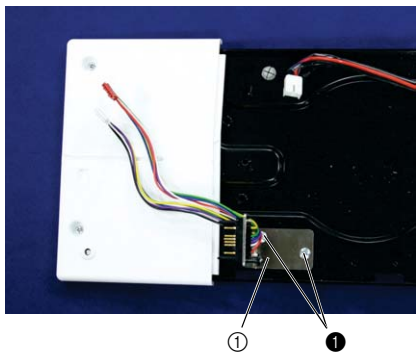
4 Base plate sub assy. removal

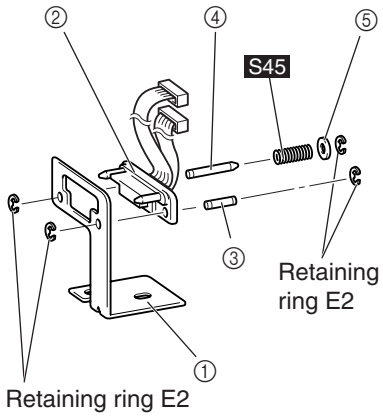
1. Remove the 3 screws ❶, and remove the base plate sub assy. ①.



5 Connector holder assembly removal and disassembly

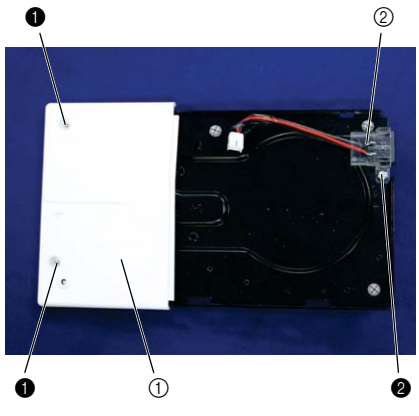
1. Remove the 2 screws ❶, and then remove the connector holder assembly ①.
2. Remove the 2 retaining rings (E2), and then remove the lead wire assembly (main body FCOMB) ②, ES pin F-A ③, and ES pin F-B ④ from the connector holder assembly ①.
3. Remove the retaining ring (E2) from ES pin F-A ③.
4. Remove the spring S45 and the feed bar spacer ⑤ from ES pin F-B ④, and then remove the retaining ring (E2).





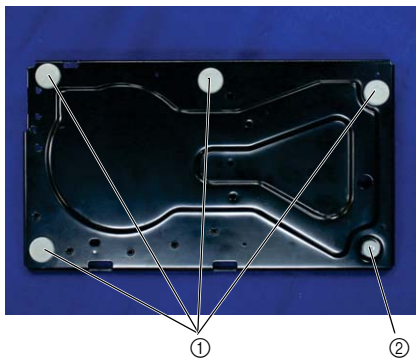
6 Base plate cover and inlet assembly removal

1. Remove the 2 screws ❶, and then remove the base plate cover ①.
2. Remove the screw ❷, and then remove the inlet assembly ②.



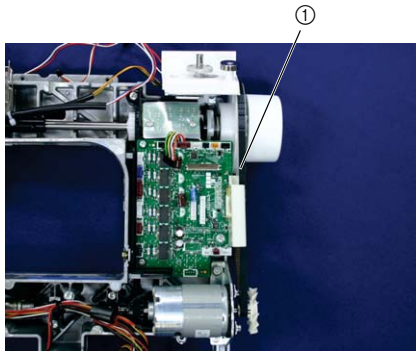
7 Base rubber removal

1. Remove the 4 base rubbers A ①.
2. Remove the adjusting screw assembly ②.



8 Timing belt (motor belt) removal

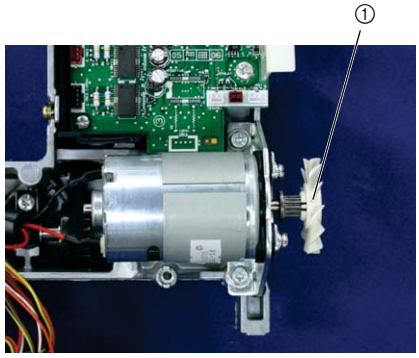
1. Remove the timing belt ①.



9 Motor fan removal

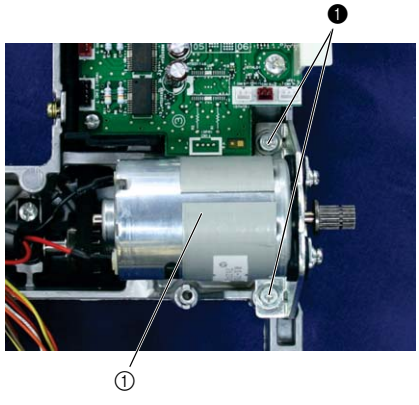
1. Remove the motor fan ①.

NOTE •Be careful not to bend the fins of the motor fan ①.



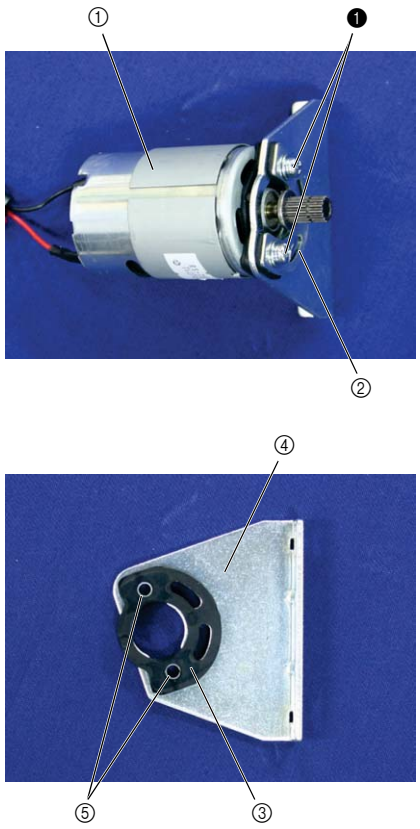
10 Main motor assembly removal

1. Remove the 2 screws ❶, and remove the main motor assembly ①.



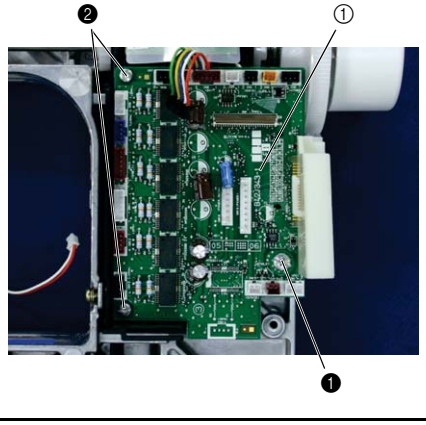
11 Main motor assembly disassembly

1. Remove the 2 screws ❶, and remove the main motor assembly ① and the motor spacer presser ②.
2. Remove the fender rubber ③ from the motor holder ④.
3. Remove the 2 spacer 4x6 ⑤ from the fender rubber ③.



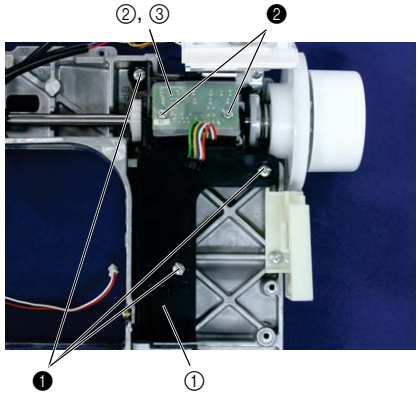
12 Motor PCB assy. removal

1. Remove the screw ❶ and the 2 screws ❷, and remove the motor PCB assy. ①.



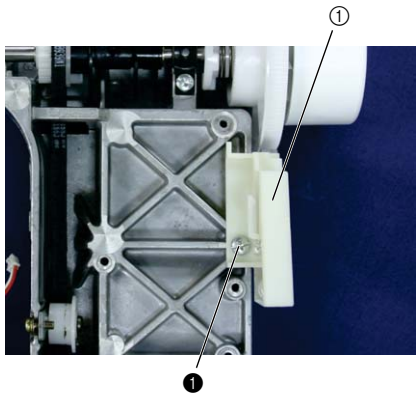
13 NP PCB assy. removal

1. Remove the 3 screws ❶, and remove the PCB holder ①.
2. Remove the 2 screws ❷, and remove the insulation sheet ② and the NP PCB assy ③ from the PCB holder ①.

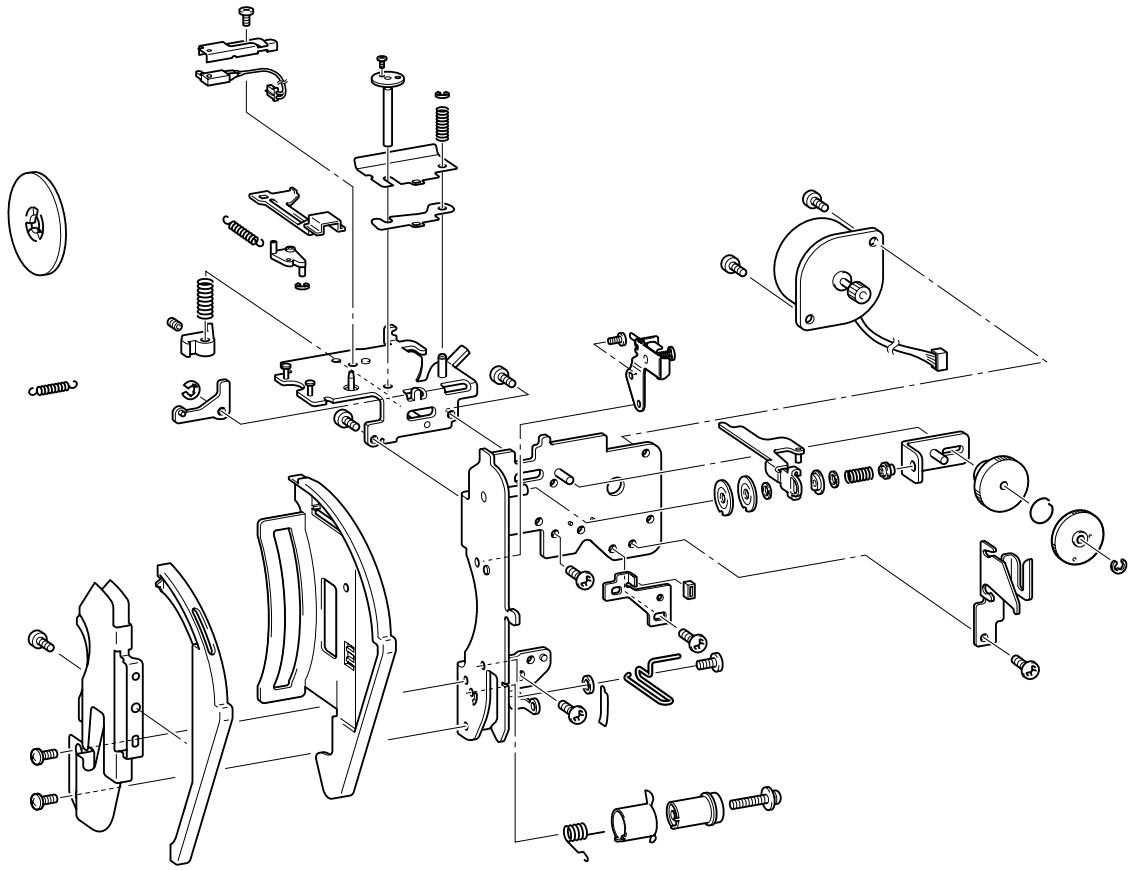


14 Belt guard removal

1. Remove the screw ❶, and then remove the belt guard ①.

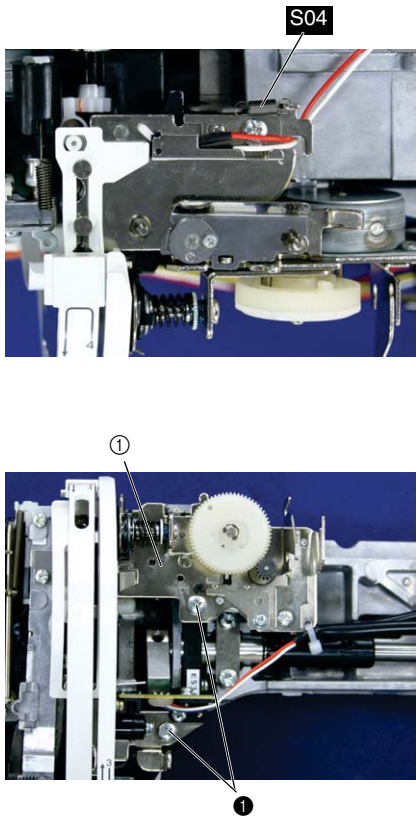


Thread tension mechanism location diagram



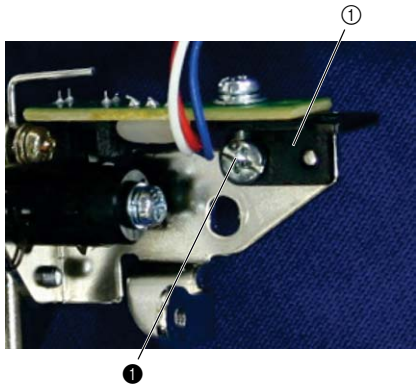
1 Thread tension assy removal

1. Remove the spring S04.
2. Remove the 2 screws ❶, and remove the thread tension assy ①.



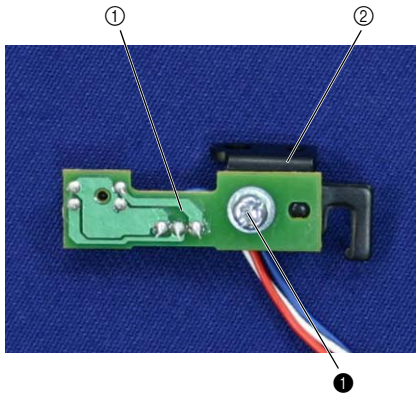
2 Upper thread PCB unit removal

1. Remove the screw ❶, and then remove the upper thread PCB unit ①.



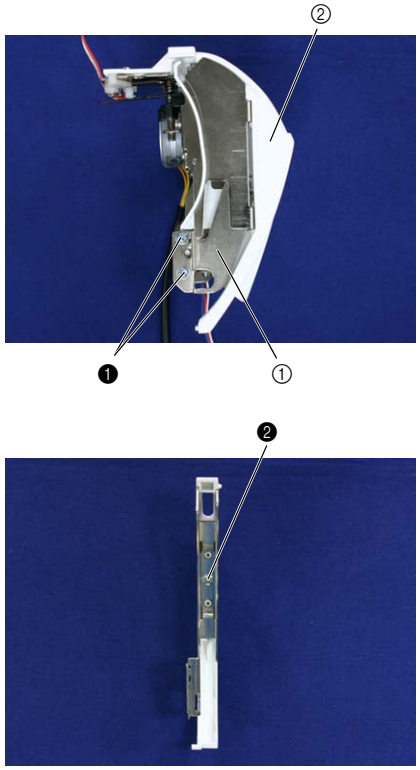
3 Upper thread PCB unit disassembly

1. Remove the screw ❶, and then remove the upper thread PCB assembly ① from the thread sensor holder ②.



4 Thread guide removal

1. Remove the 2 screws ❶, and remove the thread guide assy. ①.
2. Remove the screw ❷, and remove the thread guide cover ②.

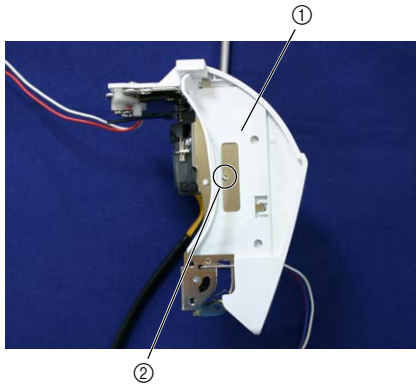


5 Thread guide cover removal

1. Remove the thread guide cover ①.

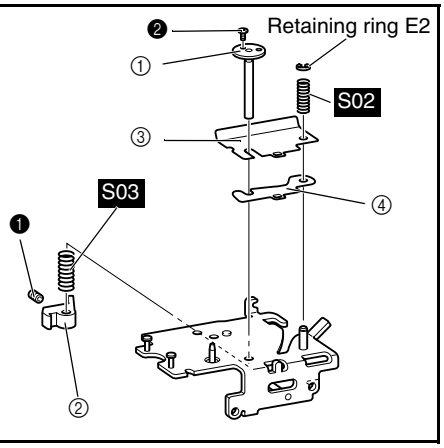
***Key point**

- Lift the protrusion ② and slide to the right.



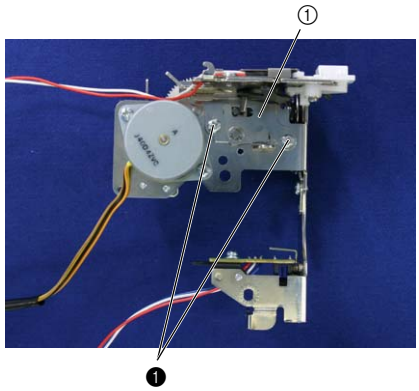
6 Tension plate removal

1. Remove retaining ring E2, and remove the spring S02.
2. Remove the screw ❶, and remove the tension pressure assy ① the spring S03 and the tension release cam ②.
3. Remove the tension plate ③ and the spacer ④.
4. Remove the screw the screw ❷.



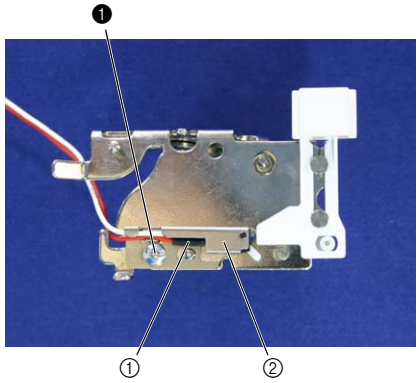
7 Thread release holder assy. F removal

1. Remove the 2 screws ❶, and remove the thread release holder assy. ①.



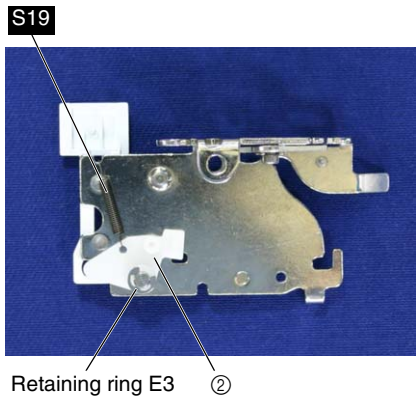
8 PF-F SW assy. removal

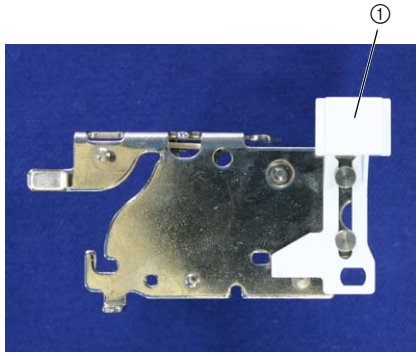
1. Remove the screw ❶, and remove the PF-F SW assy ① and the presser switch holder ②.



9 Thread guide shutter removal

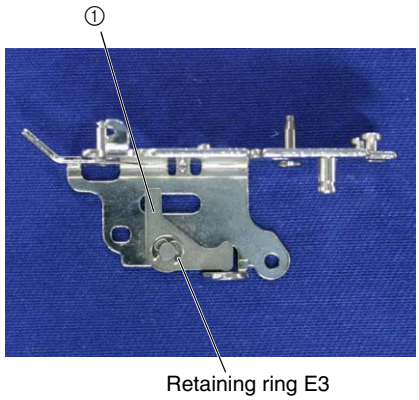
1. Remove the spring S19.
2. Remove retaining ring E3, and remove the thread guide shutter ① and the thread guide shutter link ②.





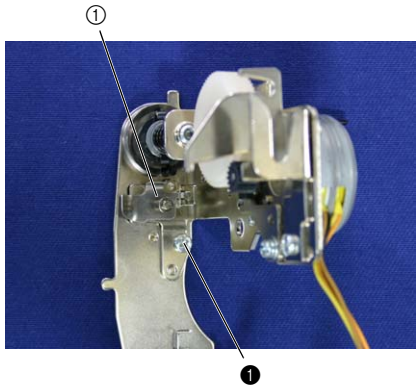
10 Tension releaser link removal

1. Remove the retaining ring E3 and remove the tension releaser link ①.



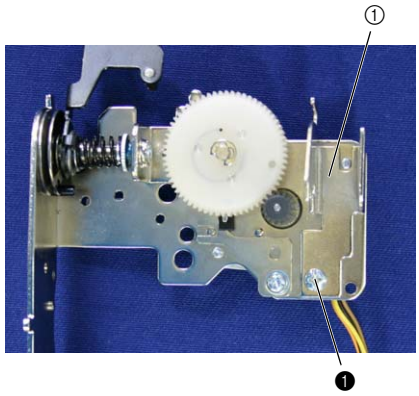
11 Plate assembly removal

1. Remove the screw ❶, and remove the plate assembly ①.



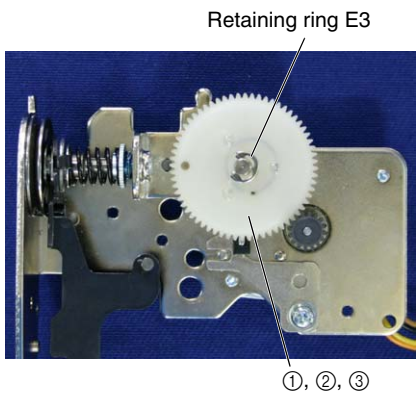
12 Thread guide removal

1. Remove the 2 screws ❶, and remove the thread guide ①.



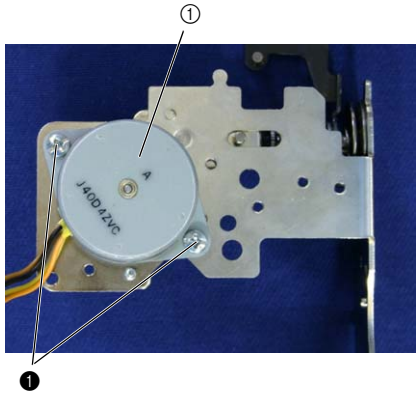
13 Thread tension gear removal

1. Remove the retaining ring E3 and remove the thread tension gear ①, thread tension gear cover ② and the spring ③.



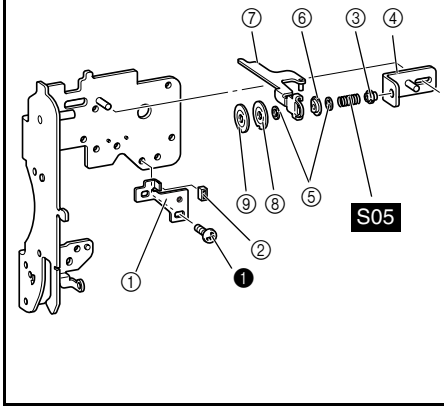
14 AT pulse motor removal

1. Remove the 2 screws ❶, and remove the AT pulse motor ①.



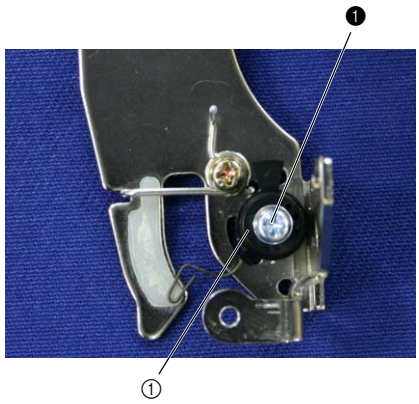
15 Tension disk removal

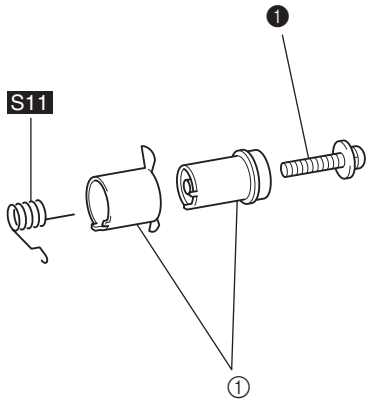
1. Remove the screw ❶, and remove the initial adjustment plate ①.
2. Remove the rubber ② from the initial adjustment plate ①.
3. Loosen the thread tension adjusting screw ③, and remove the tension plate assy ④.
4. Remove the thread tension adjusting screw ③, the spring S05 , washer ⑤, tension disc washer ⑥, tension release plate assy A ⑦, washer ⑤, tension disk B ⑧ and tension disk A ⑨.



16 Thread take up spring removal

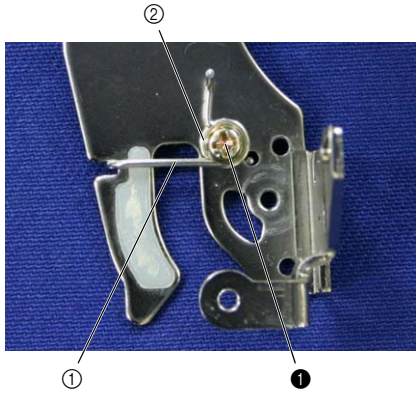
1. Remove the screw ❶, and remove the thread catching spring case ①.
2. Remove the spring S11 from the thread catching spring case ①.



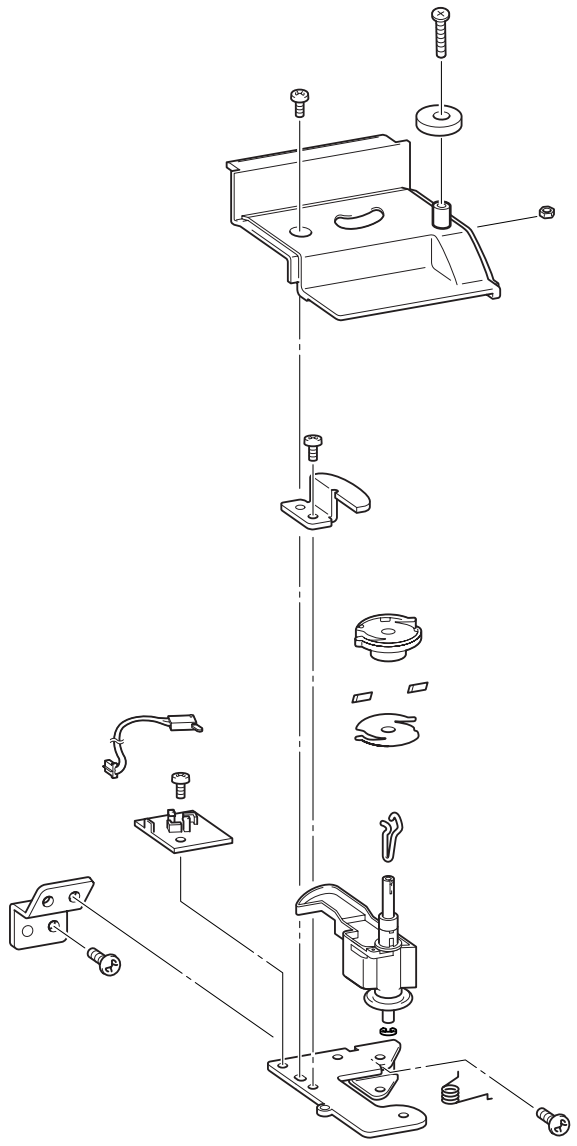


17 Thread guide wire removal

1. Remove the screw ❶, and remove the thread guide wire ① and the washer ②.

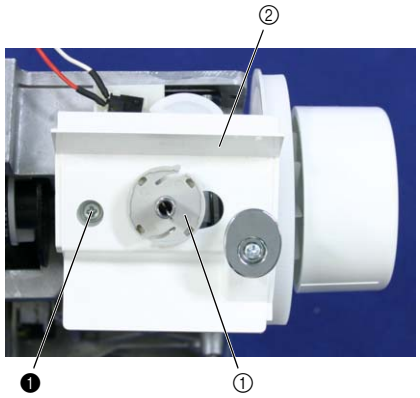


Bobbin winder mechanism location diagram



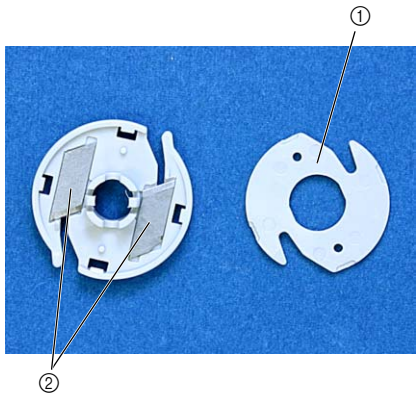
1 Bobbin winder cover removal

1. Remove the bobbin base ①.
2. Remove the screw ❶, and remove the bobbin winder cover ②.



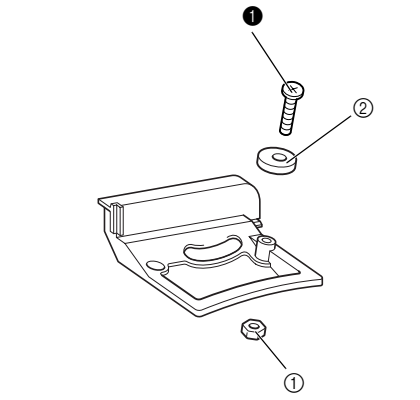
2 Bobbin base disassembly

1. Remove the bobbin thread cutter holder ①.
2. Remove the 2 NT lower thread cutters ②.



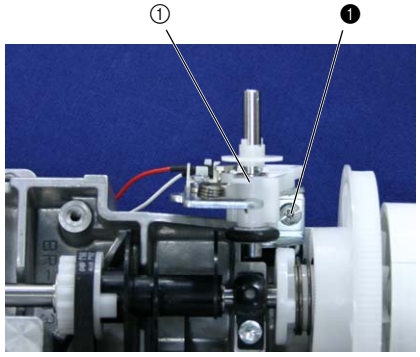
3 Bobbin presser removal

1. Remove the screw ❶ and the M3 nut ①, and remove the bobbin presser ②.



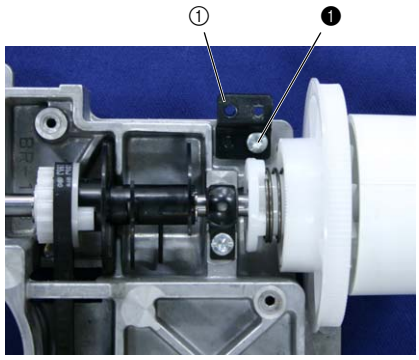
4 Bobbin winder assembly removal

1. Remove the screw ❶, and remove the bobbin winder assembly ①.



5 BW holder supporter removal

1. Remove the screw ❶, and remove the BW holder supporter ①.

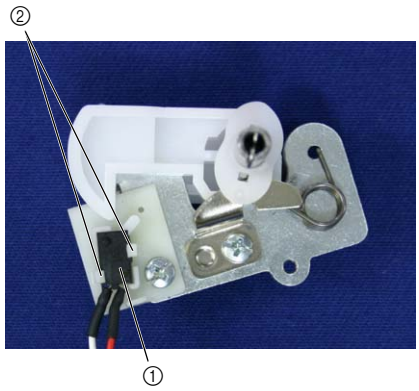


6 BW-F SW assy. removal

1. Remove the BW-F SW assy ①.

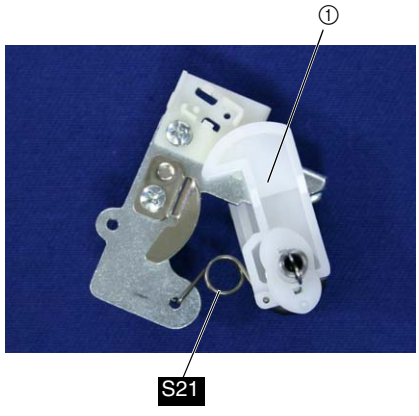
***Key point**

- Open the SW adjust plate ② clip and remove it.



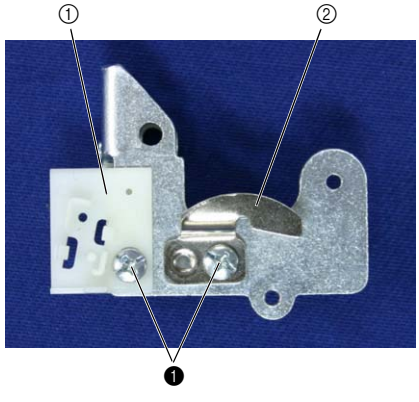
7 BW shaft holder assembly removal

1. Move the BW shaft holder assembly ① to the right (bobbin winding ON).
2. Remove the spring S21.
3. Remove the BW shaft holder assembly ①.

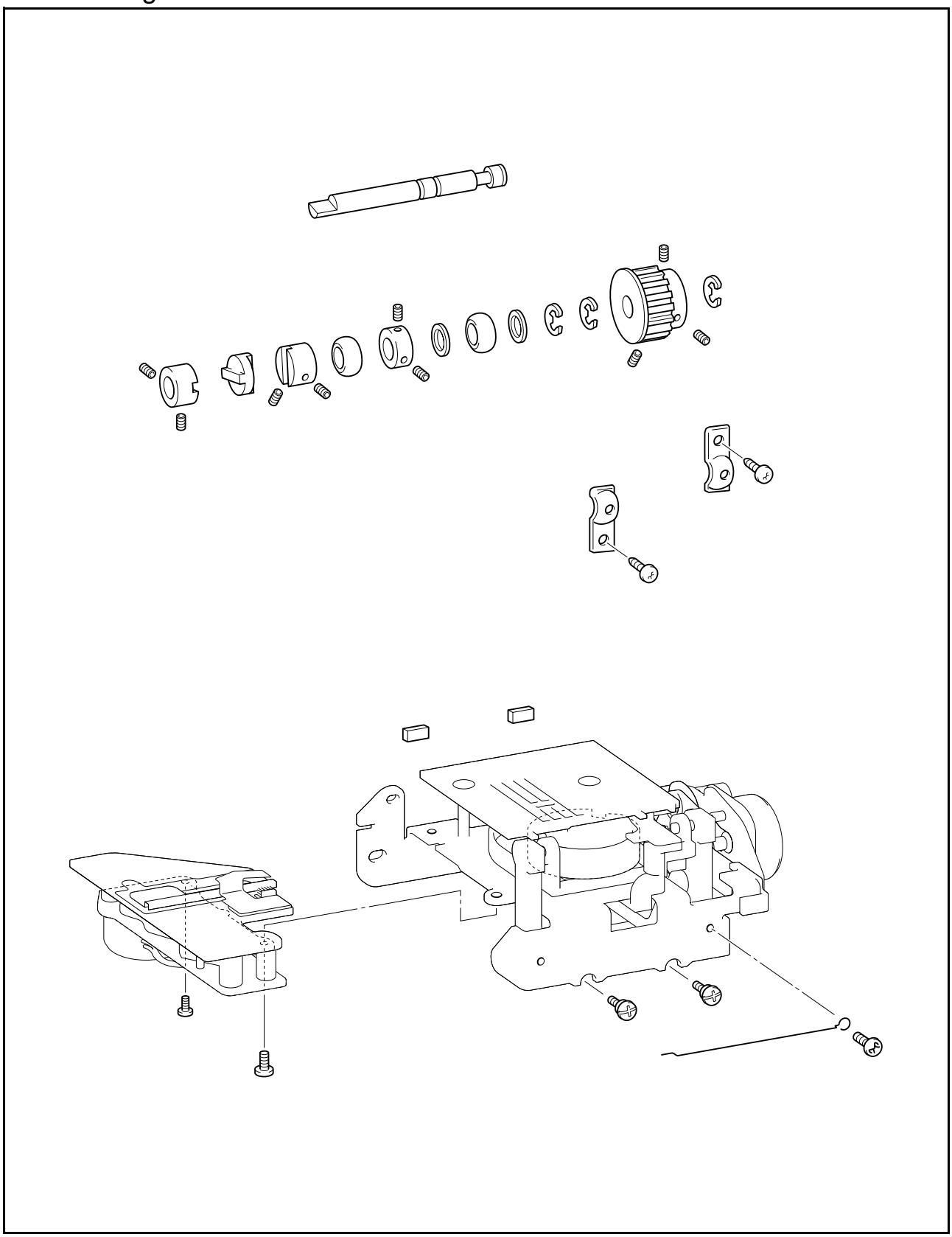


8 Bobbin winder shaft stopper removal

1. Remove the 2 screws ❶, and remove the SW adjust plate ① and the bobbin winder shaft stopper ②.

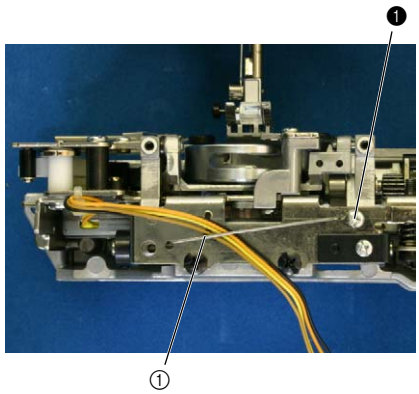


Rotary hook drive mechanism / Feed and bobbin mechanism / Cutter assy. location diagram



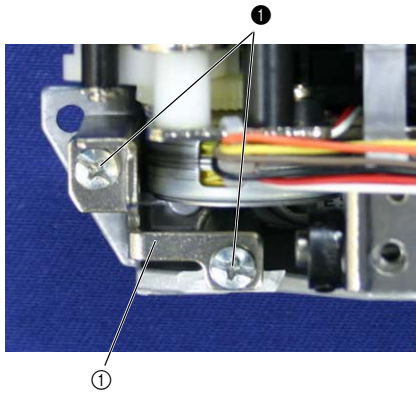
1 Leading guide removal

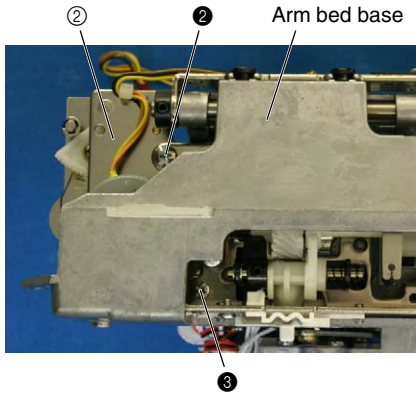
1. Remove the screw ❶, and then remove the leading guide ①.



2 Thread cutter module removal

1. Remove the 2 screws ❶, and then remove the free arm plate ①.
2. Remove the screws ❷ and ❸, and then remove the thread cutter module ②.



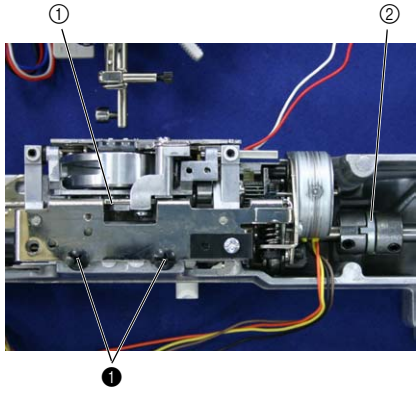


3 Feed module removal

1. Rotate the upper shaft, and bring the needle bar to its highest point
2. Remove the 2 screws ❶, and detach the feed module ① and the disk ②.

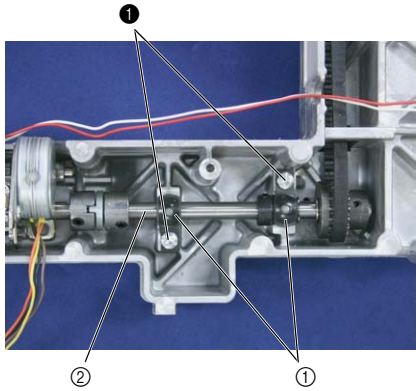
***Key point**

- Raise the needle bar to the top position.



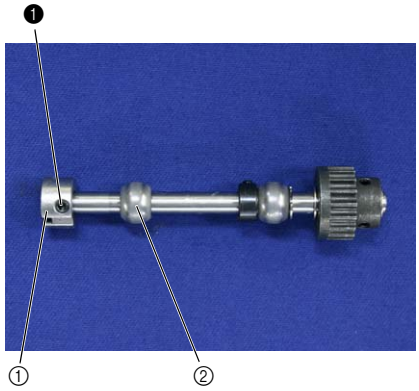
4 Lower shaft A assy. removal

1. Remove the 2 screws ❶, and remove the 2 bushing pressers ①.
2. Remove the lower shaft A assy ②.



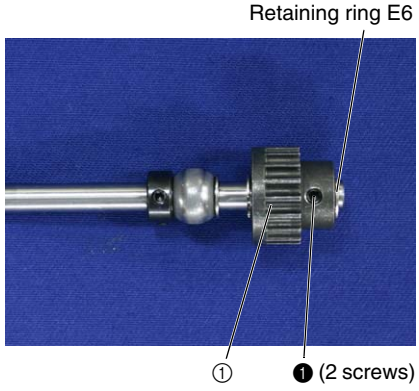
5 Joint removal

1. Remove the 2 screws ❶, and remove the joint ① and the lower shaft bushing ②.



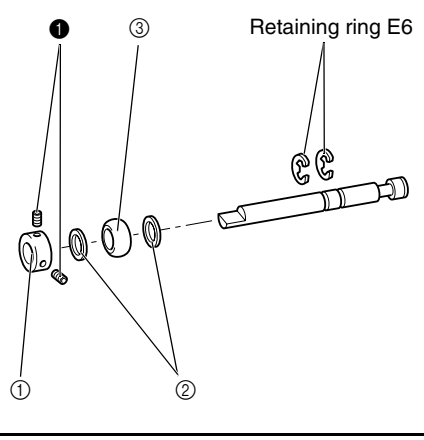
6 Timing pulley D removal

1. Remove the 2 screws ❶.
2. Remove retaining ring E6, and remove the timing pulley D ①.

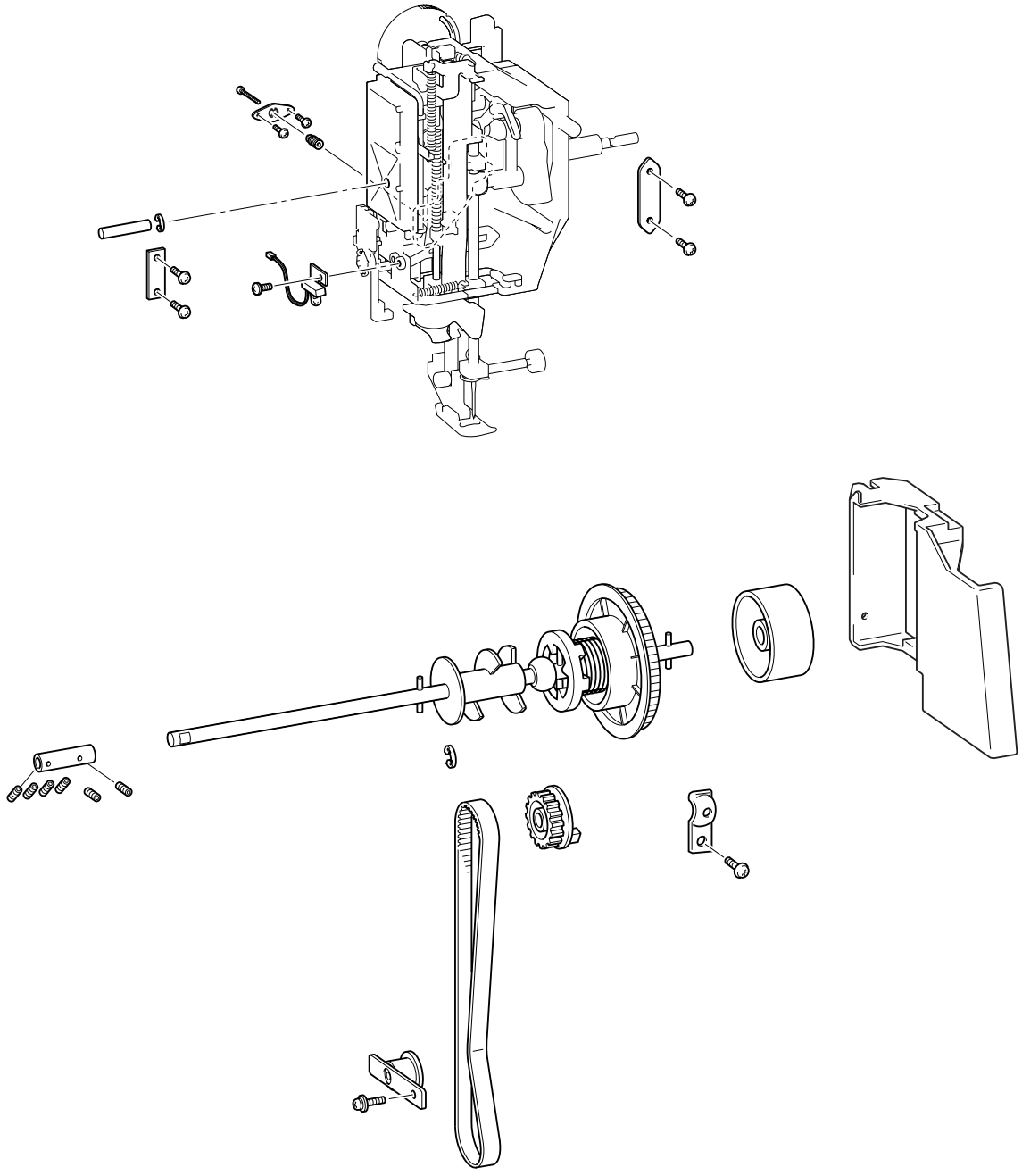


7 Lower shaft bushing removal

1. Remove the 2 screws ❶, and remove the set screw collar ①, thrust washer ②, lower shaft bushing ③ and thrust washer ②.
2. Remove the 2 retaining rings E6.

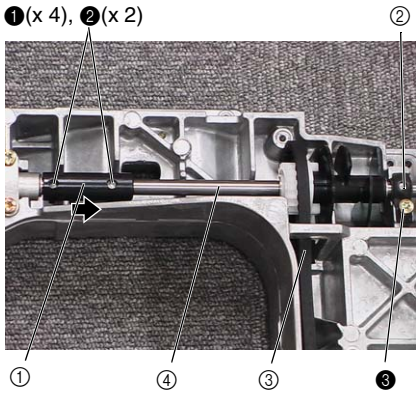


Needle bar, presser mechanism / Upper shaft mechanism location diagram



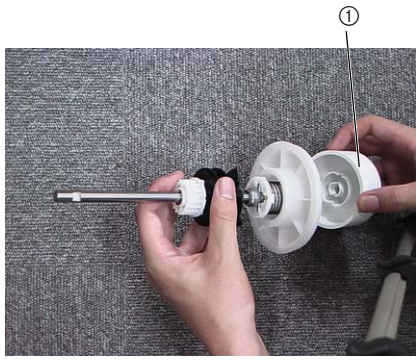
1 Upper shaft removal

1. Remove the 4 screws ❶ and the 2 screws ❷, and slide the fixed joint ① to the right.
2. Remove the screw ❸, and detach the bushing presser ②.
3. Remove the timing belt ③ and the upper shaft ④.
4. Remove the fixed joint ① from the upper shaft ④.



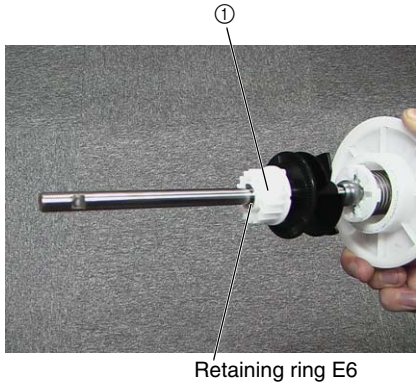
2 Pulley removal

1. Remove the pulley ①.



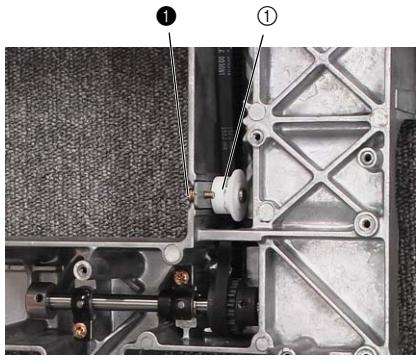
3 Upper shaft pulley removal

1. Remove retaining ring E6, and remove the upper shaft pulley ①.



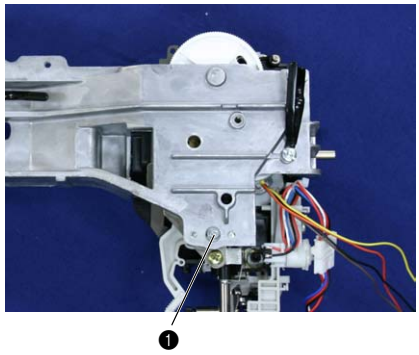
4 Tension pulley assembly removal

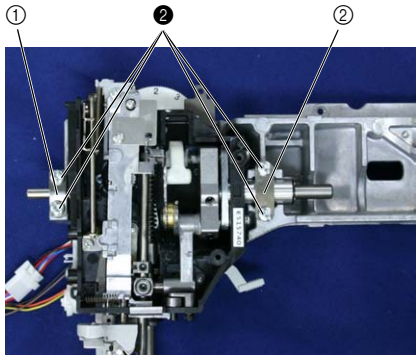
1. Remove the screw ❶, and remove the tension pulley assembly ①.

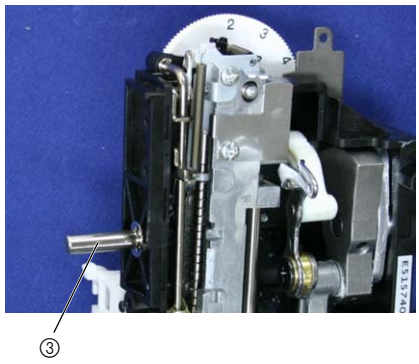


5 Needle-presser module removal

1. Remove the screw ❶.
2. Remove the 4 screws ❷, and detach the presser plate A ① and the presser plate B ②.
3. Remove the needle-presser module.
4. Detach the shaft ③ from the needle-presser module.



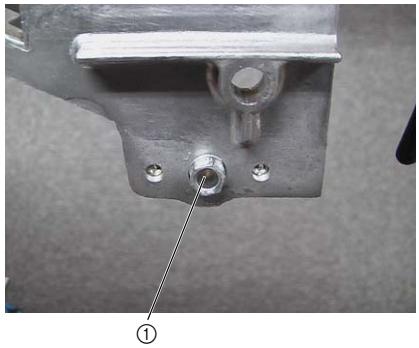




6 Plate spring removal

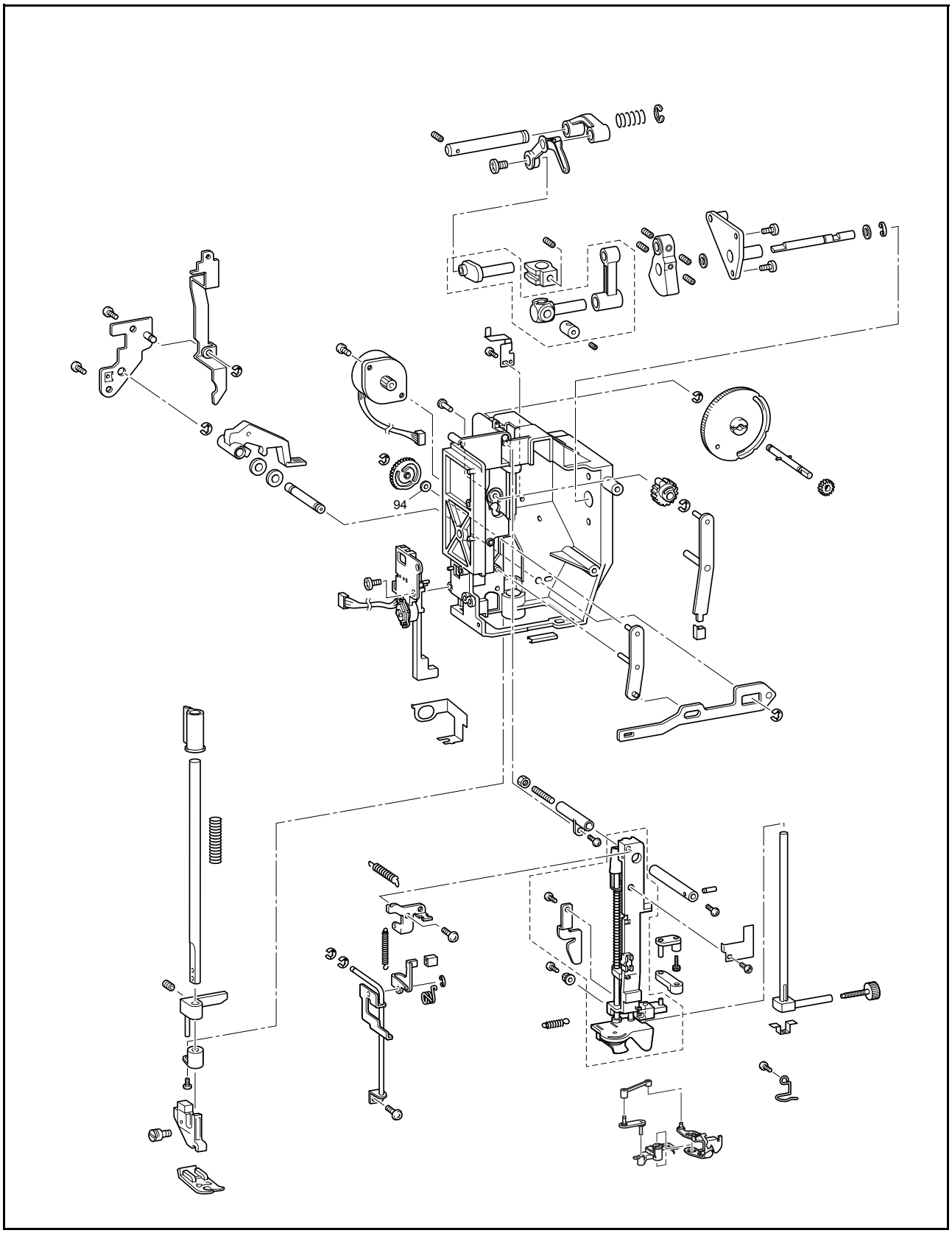
1. Remove the adjusting screw ①.
2. Remove the 2 screws ❶, and remove the plate spring ②.

*Rear view



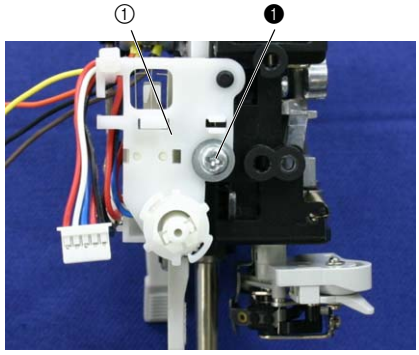
*Front view

Needle-presser module breakout diagram



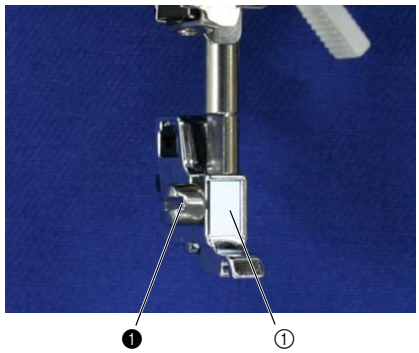
1 BH switch assy. removal

1. Remove the screw ❶, and detach the BH switch assy ①.



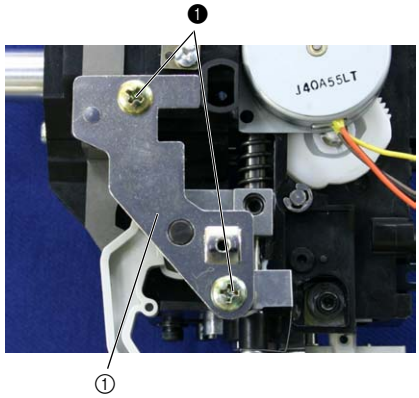
2 Presser feed holder assy. removal

1. Remove the screw ❶, and detach the presser feed holder assy ①.



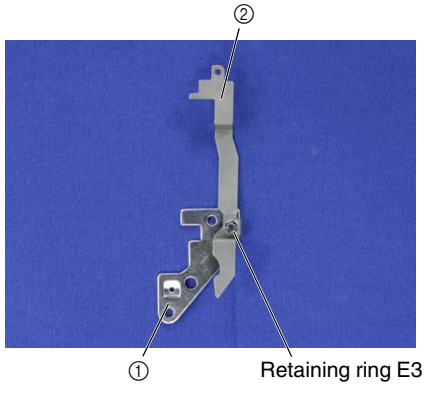
3 Adjusting plate assy. removal

1. Remove the 2 screws ❶, and remove the adjusting plate assy ①.



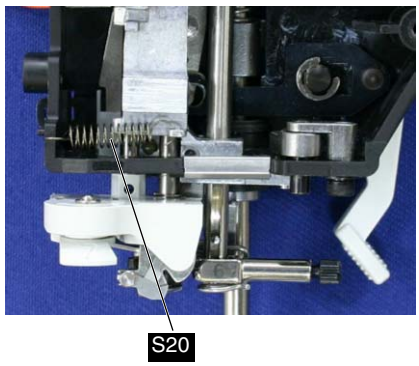
4 Adjusting plate ASSY disassembly

1. Remove the retaining ring E3, and then remove the tension releaser C ② from the adjusting plate assembly ①.



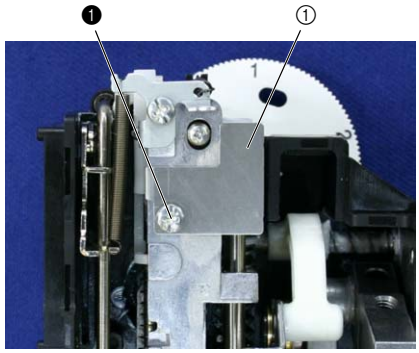
5 Spring-Z removal

1. Remove the spring S20.



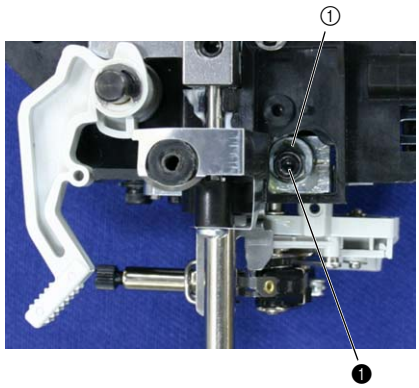
6 Thread take-up lever back plate removal

1. Remove the screw ❶, and then remove the thread take-up lever back plate ①.



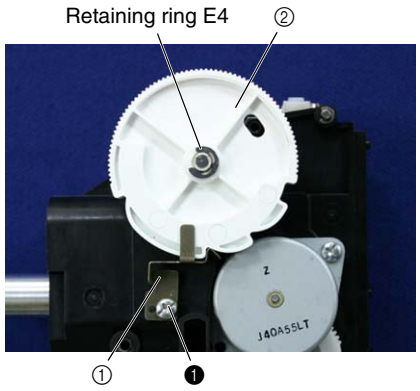
7 Zigzag adjusting nut removal

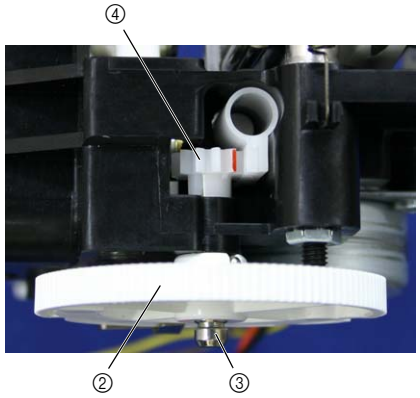
1. Remove the screw ❶, and remove the zigzag adjusting nut ①.



8 Presser dial removal

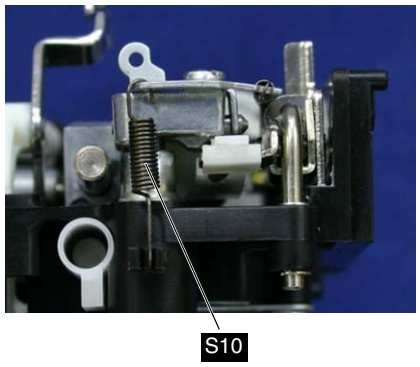
1. Remove the screw ❶, and remove the spring plate ①.
2. Remove the retaining ring E4, and then remove the presser dial ②, the presser dial gear shaft assy ③, and the presser dial gear ④.





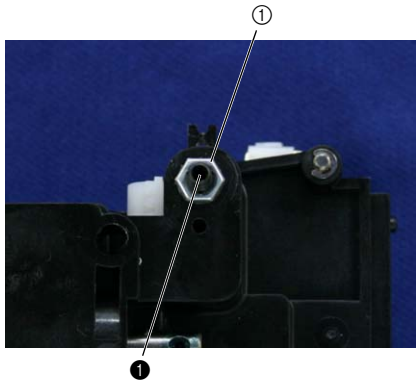
9 Spring removal

1. Remove the spring S10 .



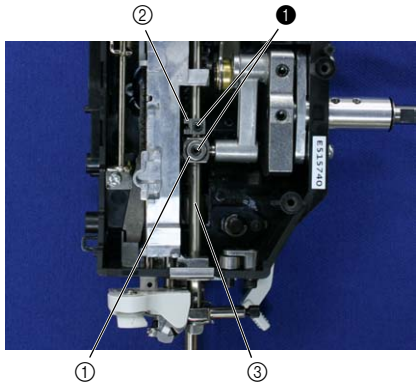
10 Lock nut removal

1. Remove the lock nut ① and the screw ❶.



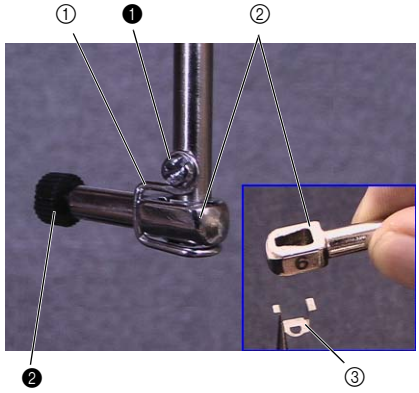
11 Needle bar assy. removal

1. Remove the 2 screws ❶.
2. Remove the needle bar ① and the needle thread block ②.



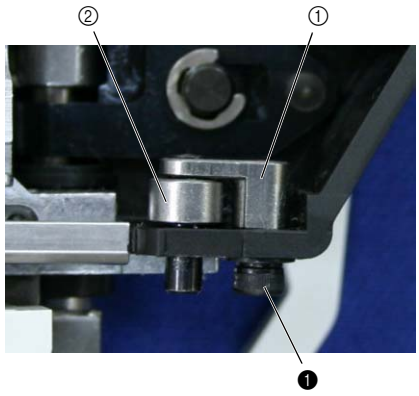
12 Needle bar assy. disassembly

1. Remove the screw ❶, and detach the needle bar thread guide ①.
2. Remove the screw ❷, and remove the needle block ②.
3. Remove the needle thread plate ③ from the needle block ②.



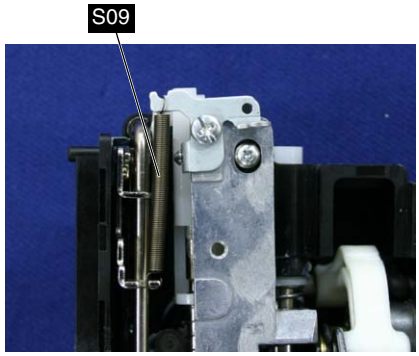
13 Needle holder shaft block removal

1. Remove the screw ❶, and remove the needle holder shaft block ① and the needle holder block ②.



14 Lever A spring removal

1. Remove the spring S09 .

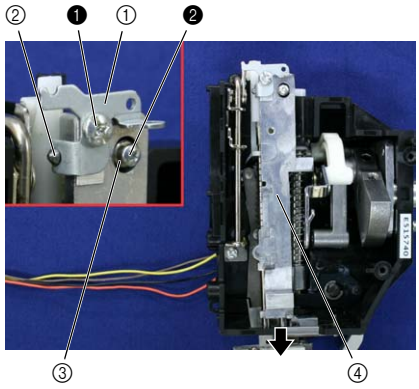


15 Needle bar supporter assy. removal

1. Remove the screw ❶, and remove the plate ①.
2. Remove the screw ❷, and remove the shaft ②.
3. Remove the shaft ③.
4. Remove the needle bar supporter assy ④.

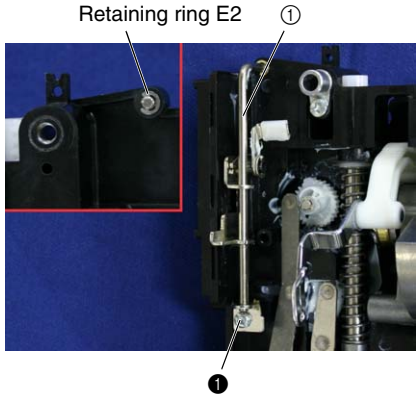
***Key point**

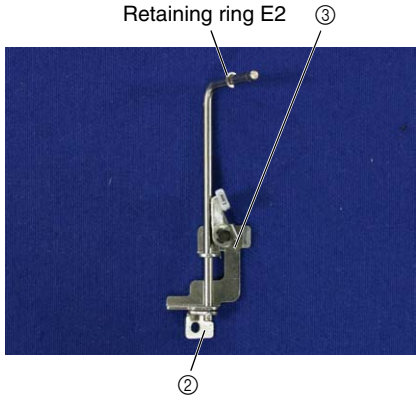
- Move the Z zigzag lever assy to the right.



16 Lever AB assy. removal

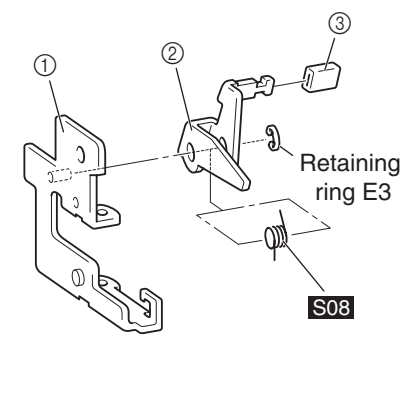
1. Remove retaining ring E2.
2. Remove the screw ❶, and remove the lever guide shaft ①.
3. Remove the lever presser plate ②, lever AB assy ③ and the retaining ring E2 from the lever guide shaft ①.





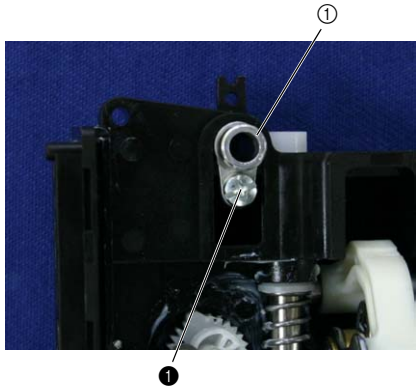
17 Lever AB assy. disassembly

1. Remove retaining ring E3, and remove the lever B ② and the spring S08 from the lever A assy. ①.
2. Remove the cap ③ from the lever B ②.



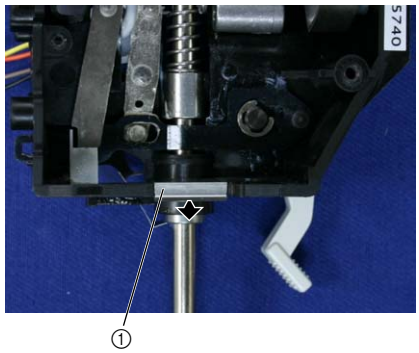
18 Shaft bushing A removal

1. Remove the screw ❶, and detach the shaft bushing A ①.



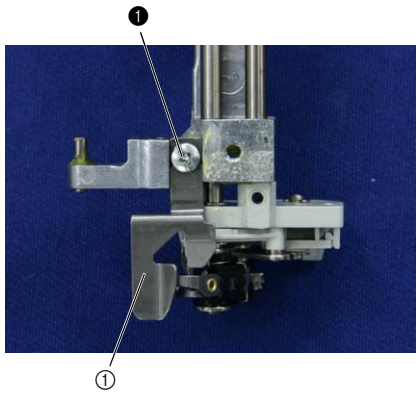
19 Thread guide plate removal

1. Remove the thread guide pate ①.



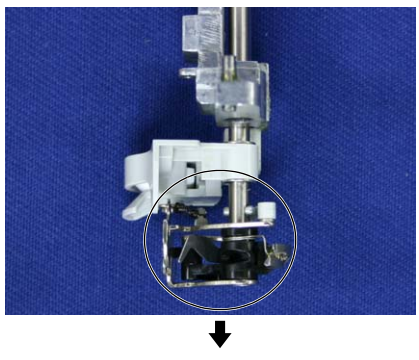
20 Hook release plate removal

1. Remove the screw ❶, and detach the hook release plate ①.



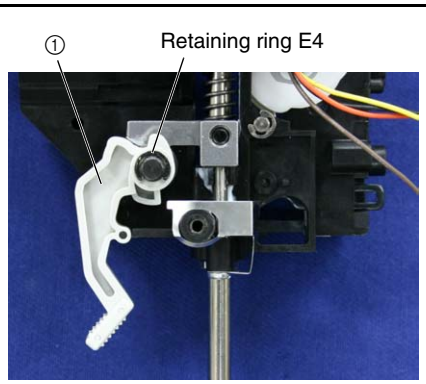
21 Threader hook assy. disassembly

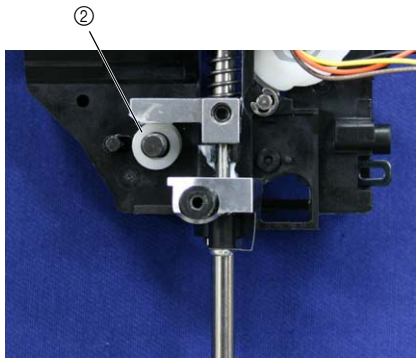
1. Remove the thread guide assy, threader hook assy, link A assy, and link B.

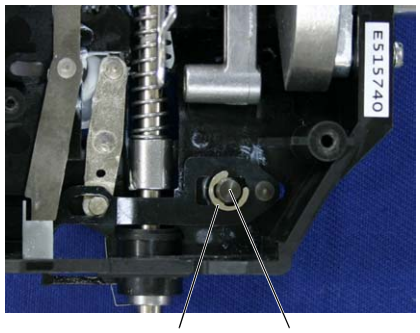


22 Presser foot lifter removal

1. Remove the retaining ring E4.
2. Remove the presser foot lifter ① and the 2 washer ②.
3. Remove the presser lift shaft ③ and remove the retaining ring E4.





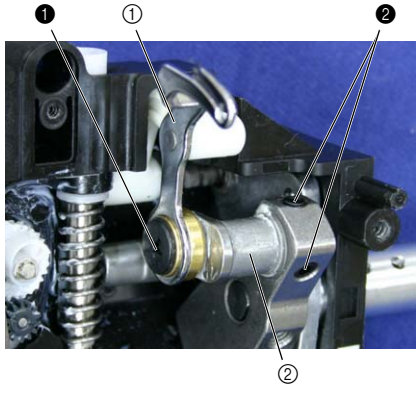


23 Thread take-up assy. removal

1. Remove the screw ❶, and detach the thread take-up lever assy ①.

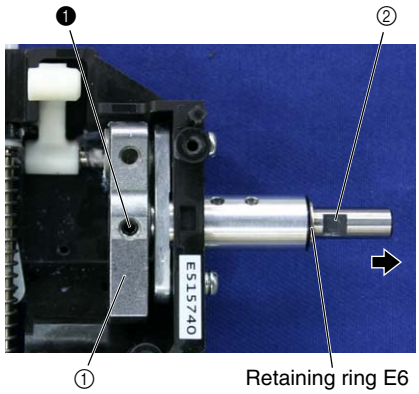
NOTE •The screw ❶ is reverse threaded.

2. Remove the 2 screws ❷, and detach the needle bar crank rod assy ②.



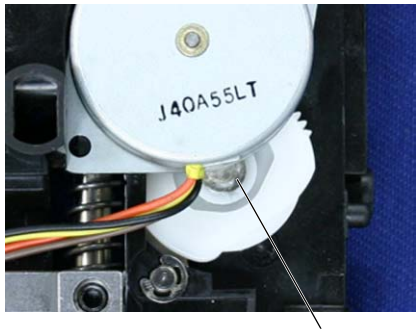
24 Thread take-up counter weight removal

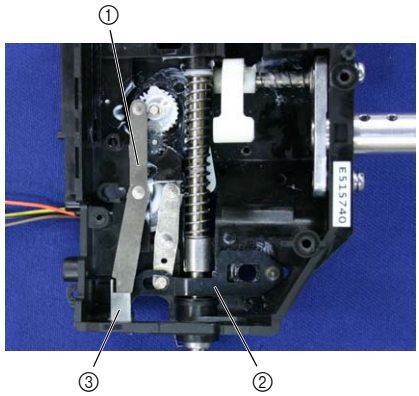
1. Remove the 2 screws ❶, and thread take-up counter weight ①, thrust washer, unit shaft ② and thrust washer.
2. Remove the retaining ring E6 from the unit shaft ②.



25 Z zigzag lever and thread releaser assy. removal

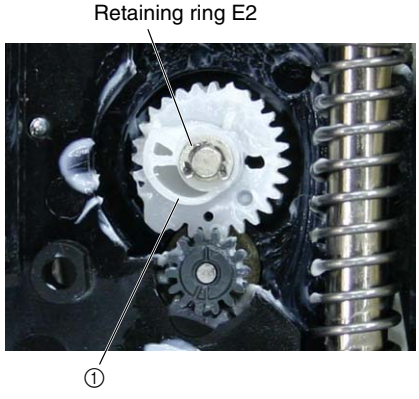
1. Remove the retaining ring E3.
2. Detach the Z zigzag lever ① and the thread releaser assy ②.
3. Remove the Z lever cup ③ from the Z zigzag lever ①.





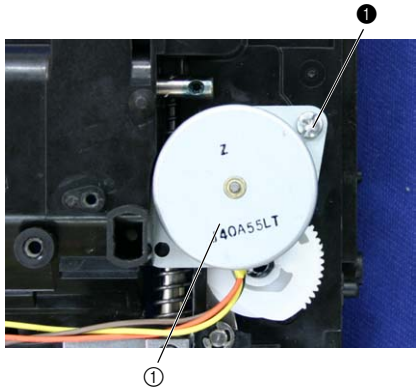
26 Remove the Z zigzag cam

1. Remove the retaining ring E2, and remove the Z zigzag cam ①.



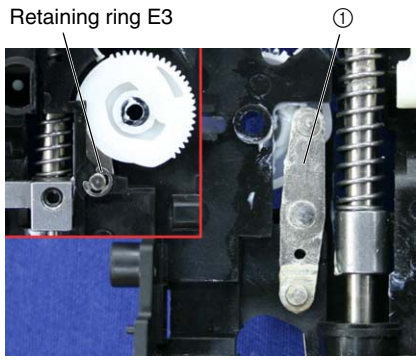
27 Z pulse motor removal

1. Remove the screw ❶, and detach the Z pulse motor (ZPMSMJ35-4840-A) ①.



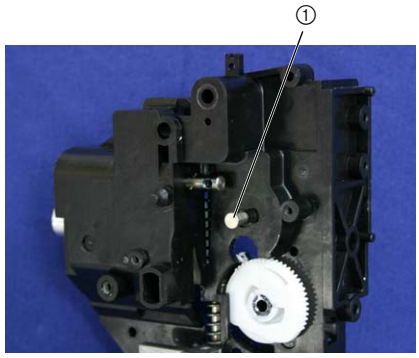
28 Thread release lever assy. removal

1. Remove thte retaining ring E3.
2. Remove the thread release lever assy ① and the polyester slider.



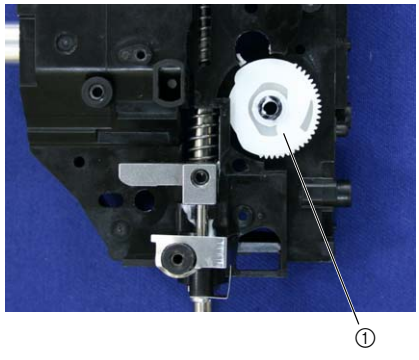
29 Remove the shaft

1. Remove the shaft ①.



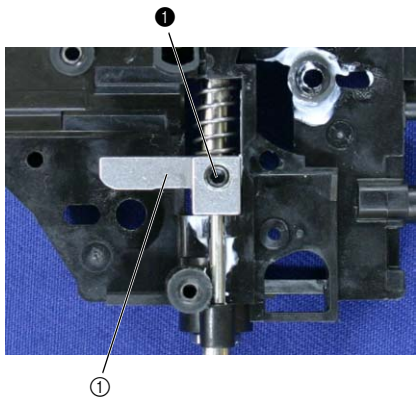
30 T cam removal

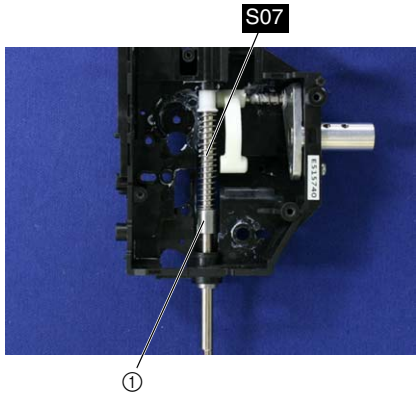
1. Remove the T cam ①.

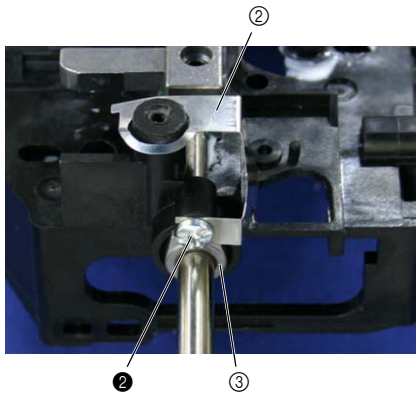


31 Presser bar removal

1. Remove the screw ❶ from the presser bar clamp assembly ①, and then pull the presser bar downward.
2. Remove the presser bar clamp assembly ① and spring S07.
3. Remove the screw ❷, and then remove the plate spring ② and the presser bar bushing ③.

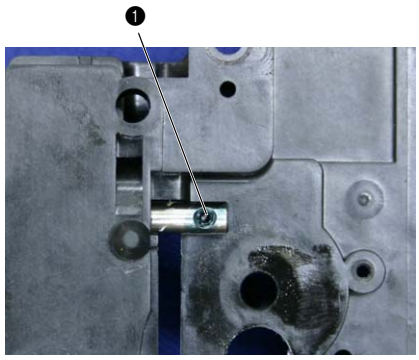


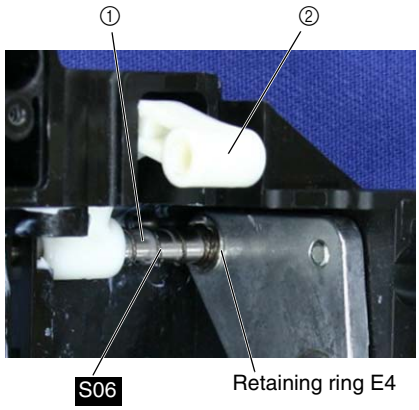




32 Thread take-up lever link removal

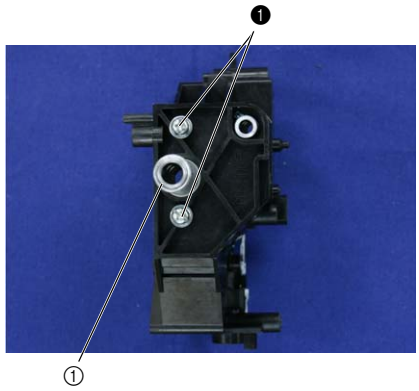
1. Remove the screw ❶.
2. Remove the retaining ring E4, and remove the shaft ①, spring S06 and thread take-up lever link ②.



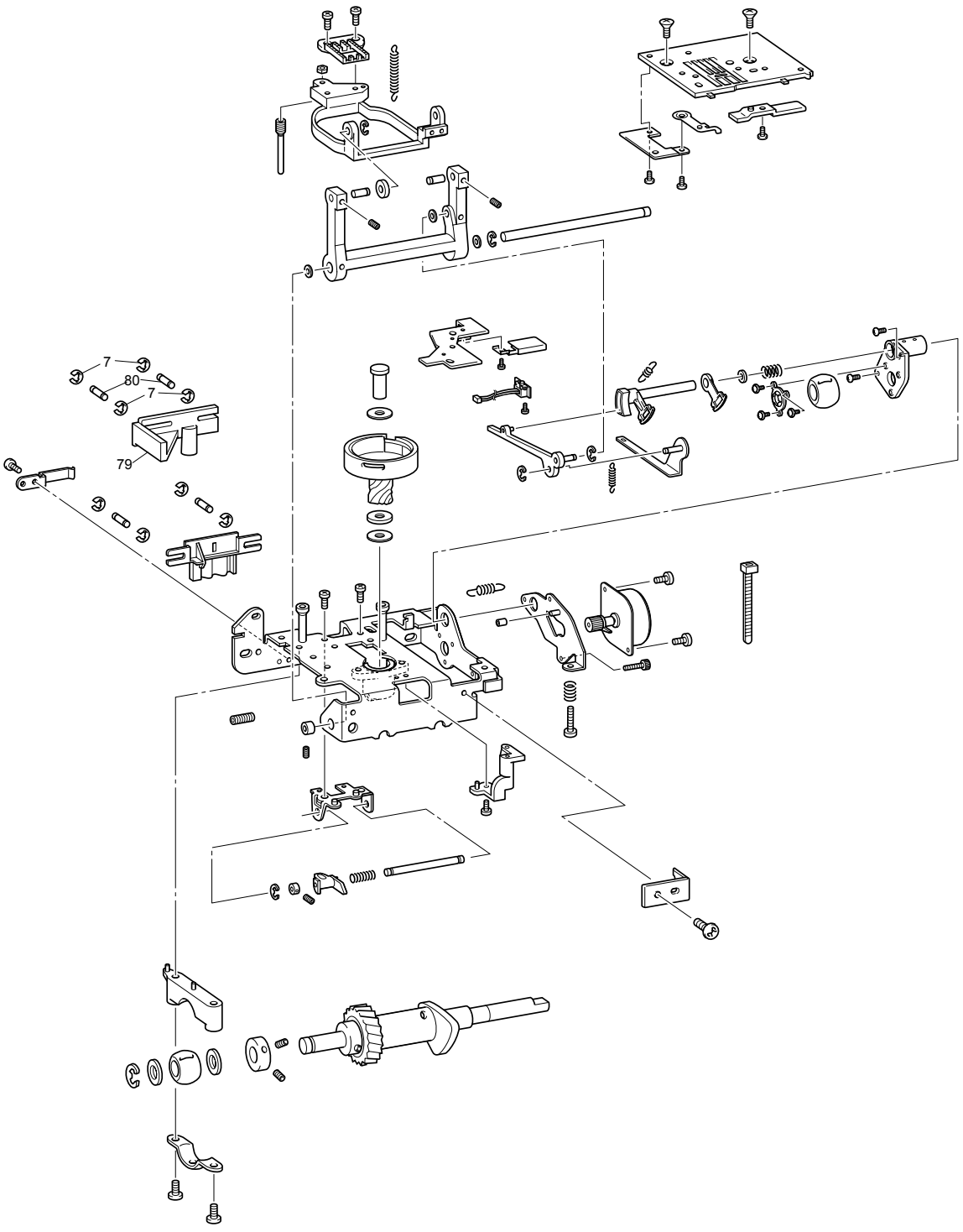


33 Shaft bushing assembly removal

1. Remove the 2 screws ❶, and remove the shaft bushing assembly ①.

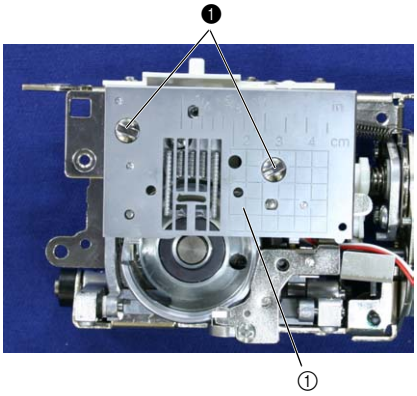


Feed and bobbin module breakout diagram



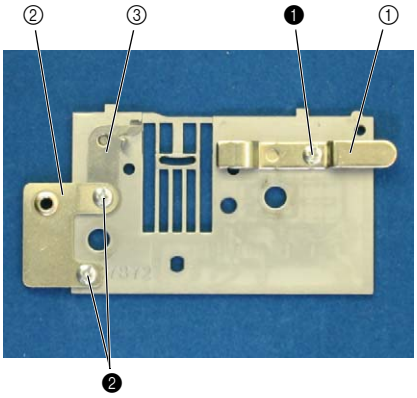
1 Needle plate A removal

1. Remove the 2 screws ❶, and remove the needle plate A ①.



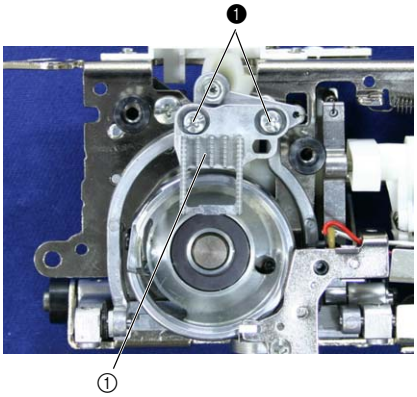
2 Needle plate A disassembly

1. Remove the screw ❶, and then remove the F gear stopper plate ①.
2. Remove the 2 screws ❷, and then remove the needle plate B support plate ② and the stopper plate ③.



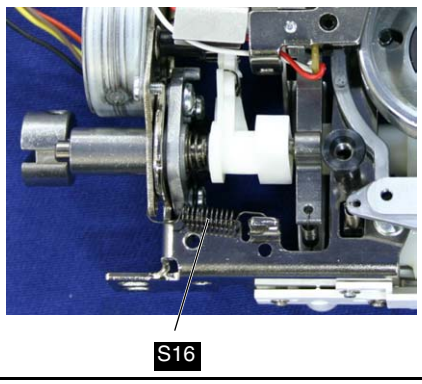
3 Feed dog removal

1. Remove the 2 screws ❶, and remove the feed dog ①.



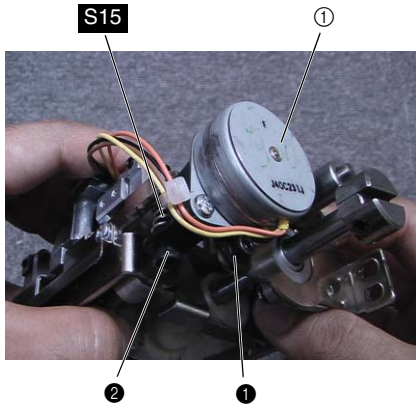
4 FPM spring removal

1. Remove the spring S16.



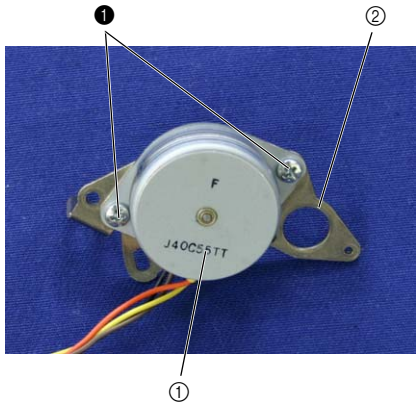
5 F pulse motor assembly removal

1. Remove the screw ❶ and the screw ❷, and detach the spring S15 and the F pulse motor assembly ①.



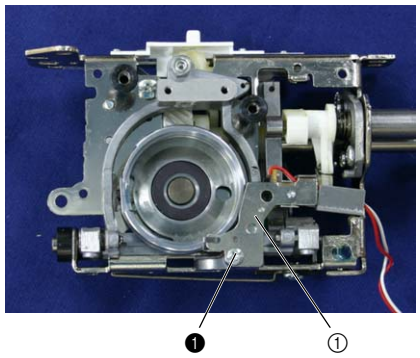
6 F pulse motor disassembly

1. Remove the 2 screws ❶, and remove the F pulse motor (FPMSMJ35-4840-C) ①.
2. Remove the rubber from the FPM holder assy. ②.



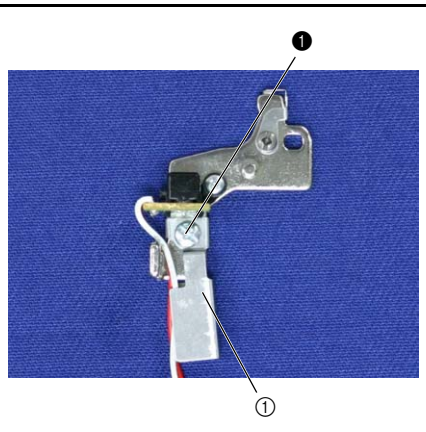
7 Inner rotary hook bracket assy. removal

1. Remove the screw ❶, and remove the inner rotary hook bracket assy ①.



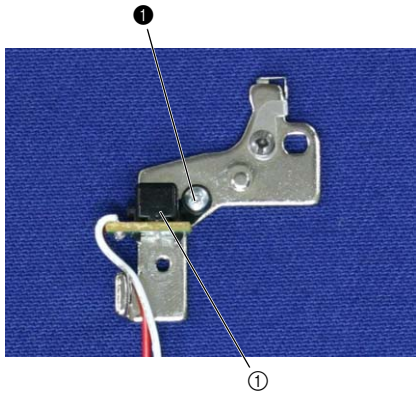
8 Cord supporter removal

1. Remove the screw ❶, and then remove the cord supporter ①.



9 Photo diode holder assembly removal

1. Remove the screw ❶, and then remove the photo diode holder assembly ①.

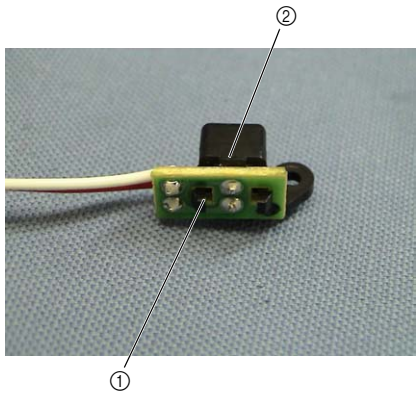


10 Photo diode assembly disassembly

1. Remove the photo diode assembly ① from the photo diode holder ②.

***Key point**

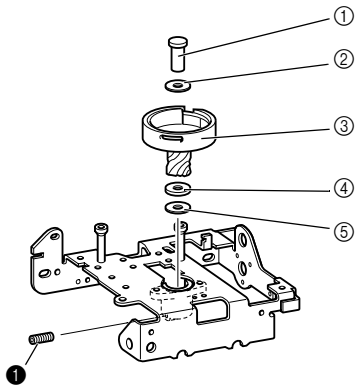
- Disengage the 2 hooks on the photo diode holder ②.



11 Outer rotary hook assy. removal

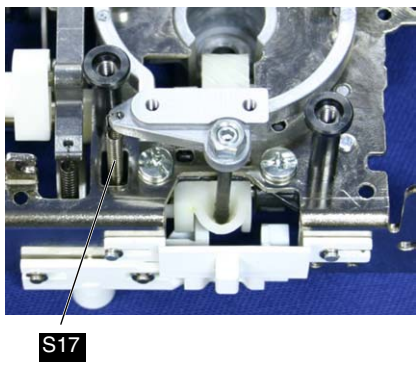
1. Remove the screw ❶, and remove the outer rotary hook shaft ①, spacer ②, outer rotary hook assy ③, washer 6 ④ and the spacer ⑤.

NOTE •Spacer and washer 6 attachment order
outer rotary hook shaft --> spacer (thin) --> outer rotary hook assy. ① --> washer 6 (thick) --> spacer (thin)



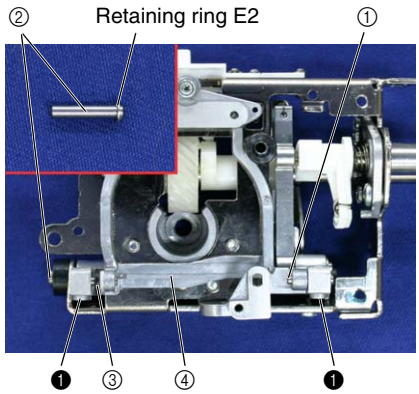
12 Feed bar spring removal

1. Remove the spring S17.



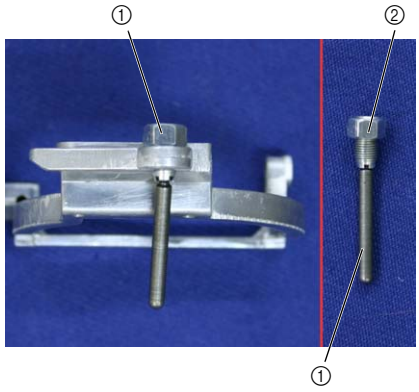
13 Feed bar removal

1. Remove the 2 screws ❶, and remove the feed bar shaft A ①, feed bar ② spacer and feed bar shaft B ③.
2. Remove the feed bar ④.



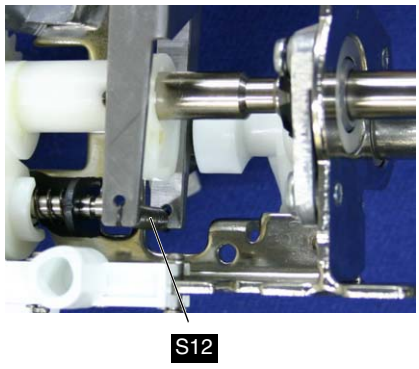
14 Vertical adjusting screw removal

1. Remove the vertical adjusting screw ①.
2. Remove the M5 nut ② from the vertical adjusting screw ①.



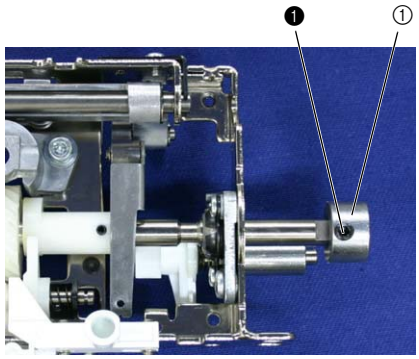
15 Feed supporting plate spring removal

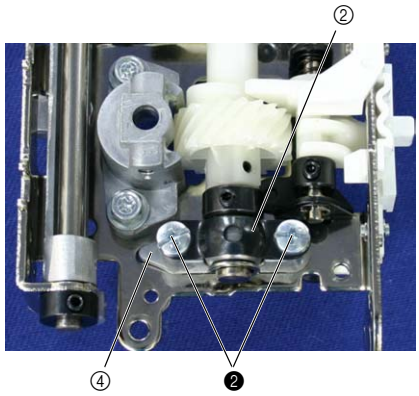
1. Remove the spring S12.

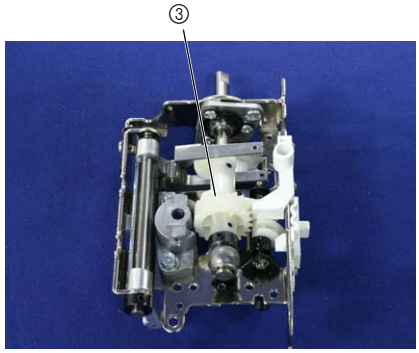


16 Lower shaft B assy. removal

1. Remove the 2 screws ❶, and remove the joint ①.
2. Remove the 2 screws ❷, and remove the bushing presser A ②.
3. Remove the lower shaft B assy ③.
4. Remove the bushing supporter A ④ from the feed base.

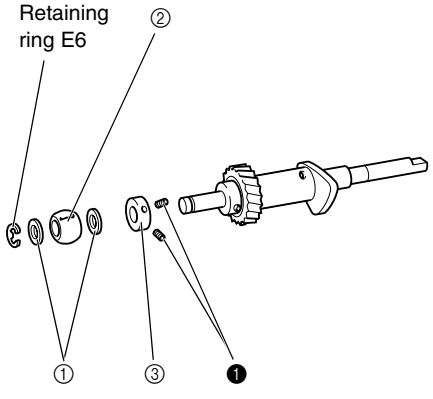






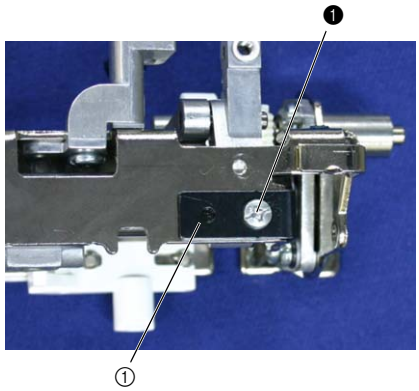
17 Lower shaft B assy. disassembly

1. Remove the retaining ring E6, and remove the thrust washer ①, lower shaft bushing ② and thrust washer ①.
2. Remove the 2 screws ❶, and remove the set screw collar ③.



18 Shaft stopper plate removal

1. Remove the screw ❶, and then remove the shaft stopper plate ①.



19 Set screw collar removal

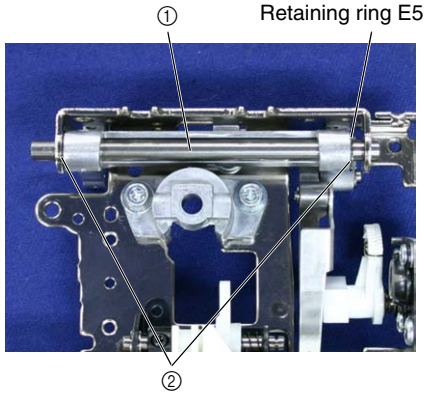
1. Remove the screw ❶, and then remove the set screw collar ①.

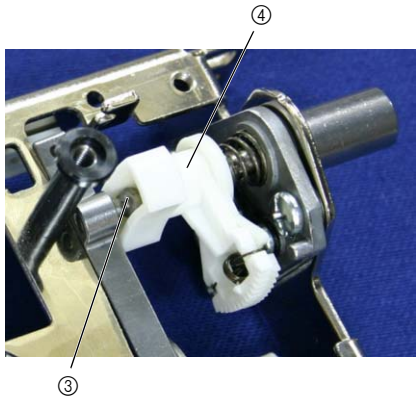
20 Feed arm assembly removal

1. Remove the retaining ring (E5) of the horizontal feed shaft ①.
2. Pull the horizontal feed shaft ① to the left to remove it, and then remove the 2 thrust washers ②.
3. Remove the feed arm assembly from the bottom of the feed/rotary hook module.

***Key point**

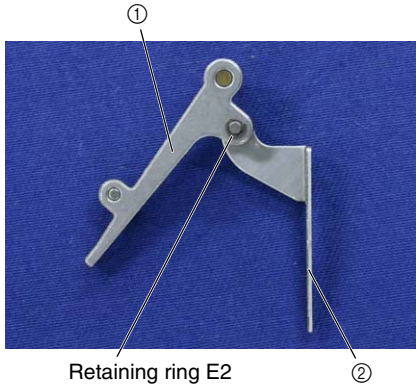
- Remove the rectangular feed slide shaft of feed arm B ③ on the top of the feed arm assembly from the feed adjuster ④.





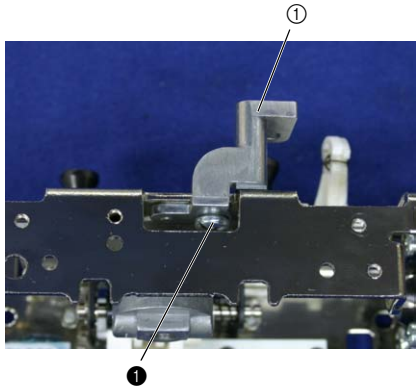
21 Feed arm assy. disassembly

1. Remove the retaining ring E3, and remove the feed arm B assy ① and the polyester slider.
2. Remove the retaining ring E2, and remove the feed supporting plate assy ② from the feed arm B assy ①.



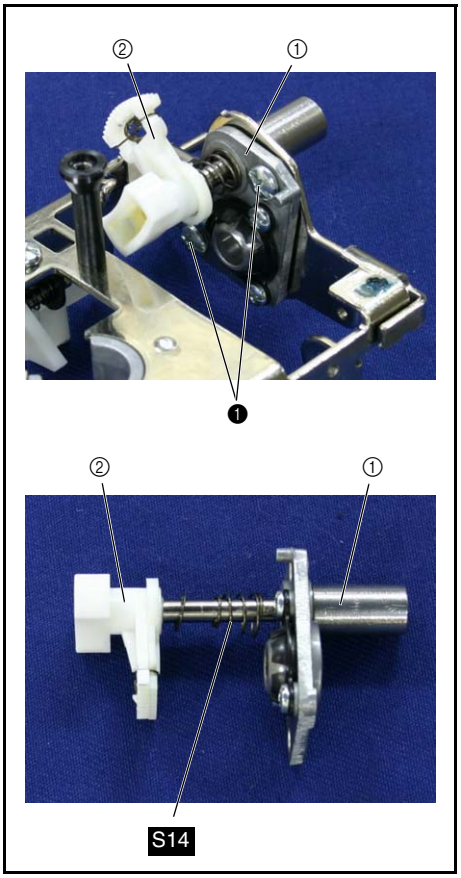
22 Stopper plate block assy. removal

1. Remove the screw ❶, and remove the stopper plate block assy ①.



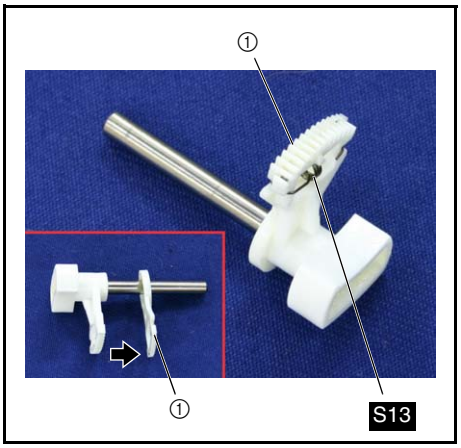
23 Feed adjuster assembly removal

1. Remove the 2 screws ❶, and remove the bushing supporter assy ①, feed adjuster assembly ②, spring S14 and polyester slider.



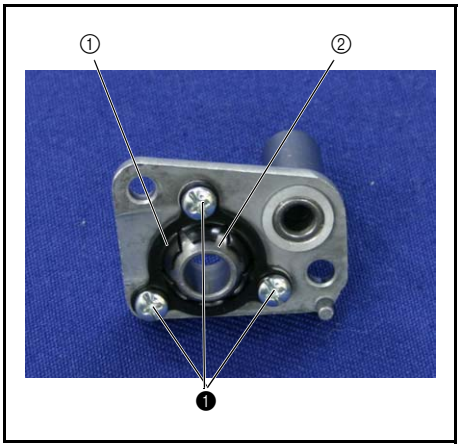
24 Feed adjuster assembly disassembly

1. Remove the spring S13, and detach the F gear ①.



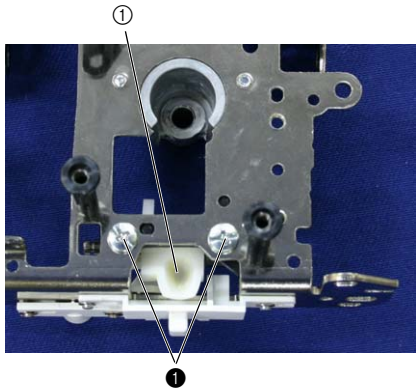
25 Bushing presser B removal

1. Remove the 3 screws ❶, and remove the bushing presser B ① and the lower shaft bushing ②.



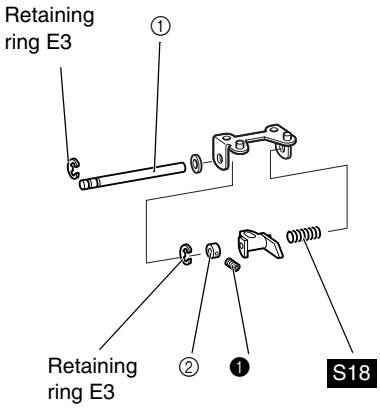
26 Drop assy. removal

1. Remove the 2 screws ❶, and remove the drop assy. ①.



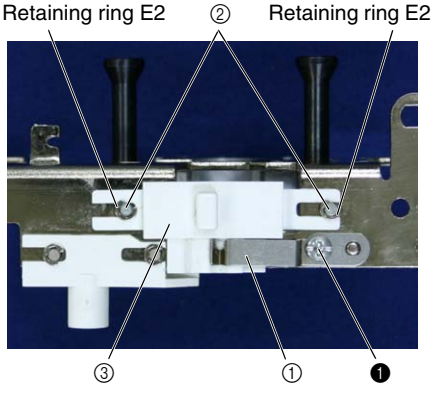
27 Drop assy. disassembly

1. Remove the screw ❶.
2. Remove the retaining ring E3, and remove the vertical feed shaft ①, polyester slider, set screw collar 4 ② and spring S18.
3. Remove the retaining ring E3 from the vertical feed shaft ①.



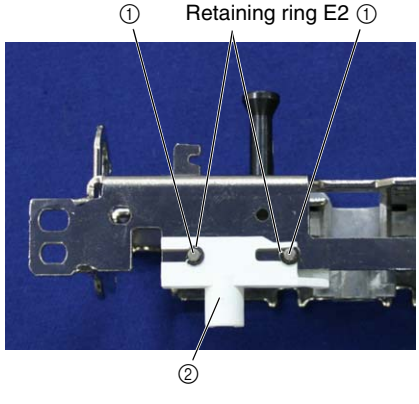
28 Drop knob removal

1. Remove the screws ❶, and remove the spring plate ①.
2. Remove the 2 retaining rings E2, and remove the 2 slide shafts B ② and the drop knob ③.
3. Remove the 2 retaining rings E2 from the 2 slide shafts B ②.

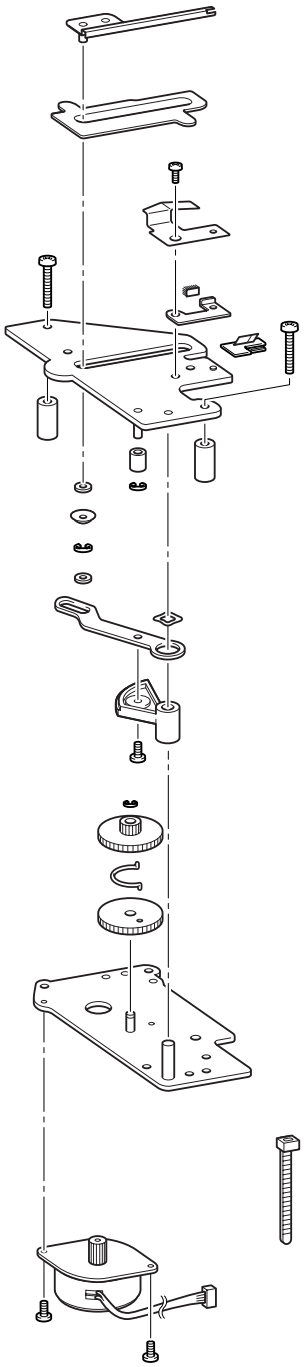


29 Drop lever FE removal

1. Remove the 2 retaining rings (E6), and then remove the 2 slide shafts A ① and the drop lever FE ②.
2. Remove the 2 retaining rings (E6) from 2 slider shafts A ①.

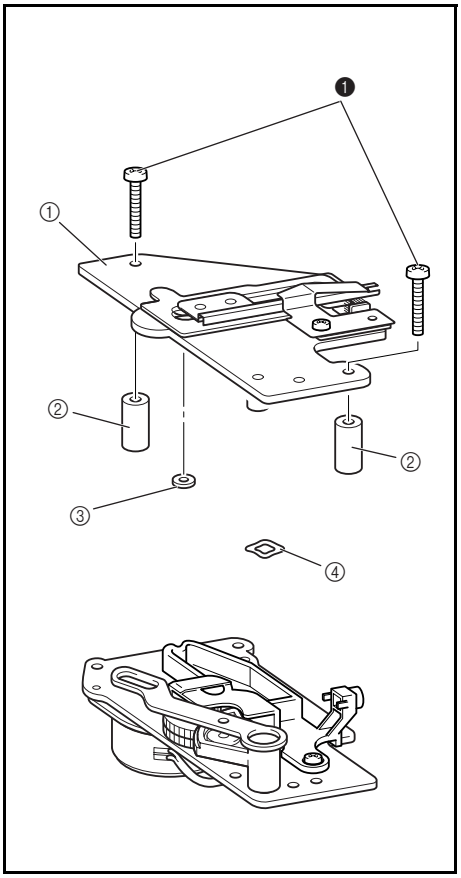


Thread cutter module breakout diagram



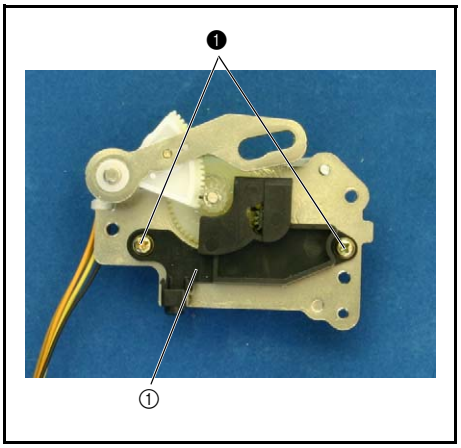
1 Thread cutter frame assembly removal

1. Remove the 2 screws ❶, and then remove the thread cutter frame assembly ①, 2 collars ②, and polyester slider ③.
2. Remove the wave-shape spring washer ④.



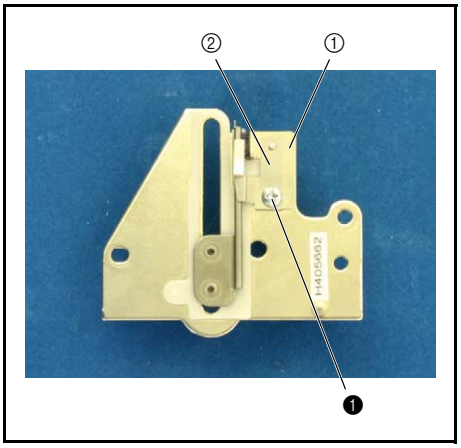
2 Photo transistor assembly removal

1. Remove the 2 screws ❶, and then remove the photo transistor assembly ①.



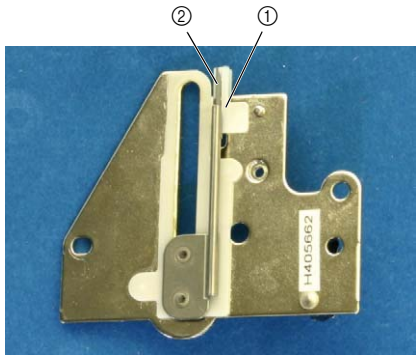
3 Presser plate removal

1. Remove the screw ❶, and then remove the presser plate ① and spring ②.



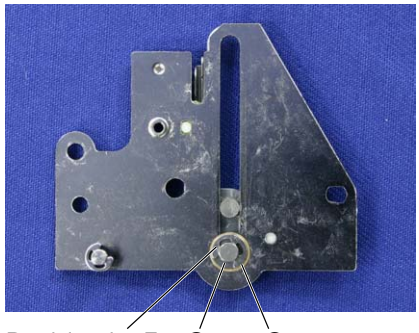
4 Cutter holder assembly removal

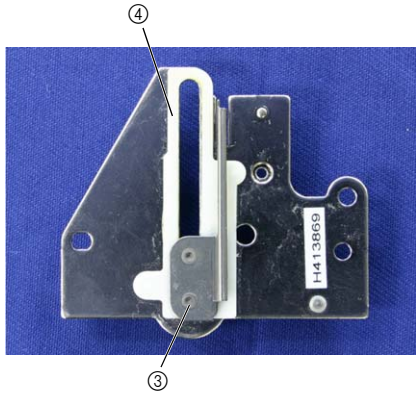
1. Remove the cutter holder assembly ①.
2. Remove the NT lower thread cutter ② from the cutter holder assembly ①.



5 Thread hook assy. disassembly

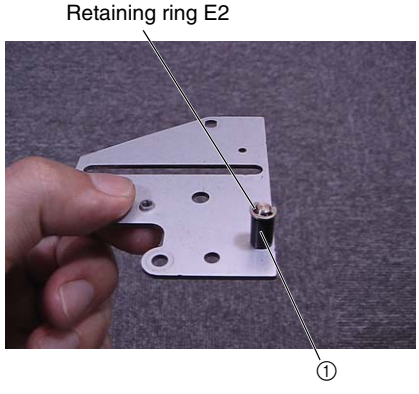
1. Remove the retaining ring E4, and remove the polyester slider ①, polyester slider ② and the thread hook assy ③.
2. Detach the spacer ④.





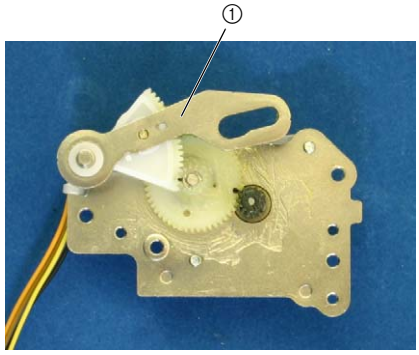
6 Rubber removal

1. Remove the retaining ring E2, and remove the rubber ①.



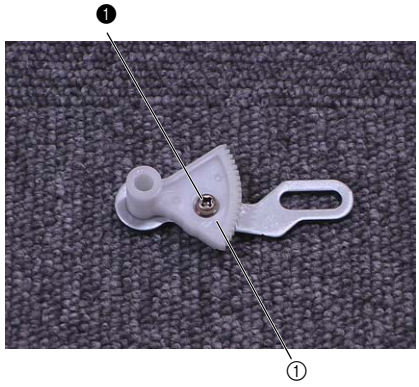
7 Thread cutter lever assy. removal

1. Remove the thread cutter lever assy ①.



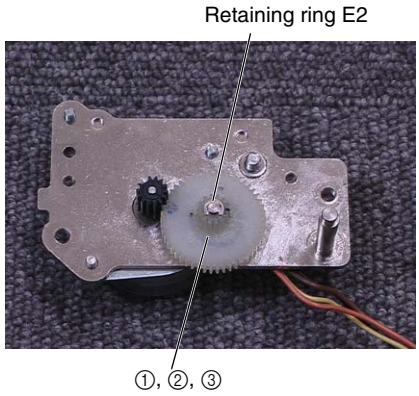
8 Thread cutter lever assy. disassembly

1. Remove the screw ❶, and remove the thread cutter lever gear ①.



9 Idle gear A and idle gear B removal

1. Remove the retaining ring E2, and remove the idle gear A ①, idle gear B ② and spring ③.

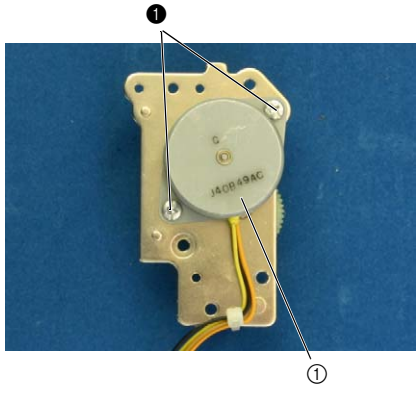


10 Pulse motor C removal

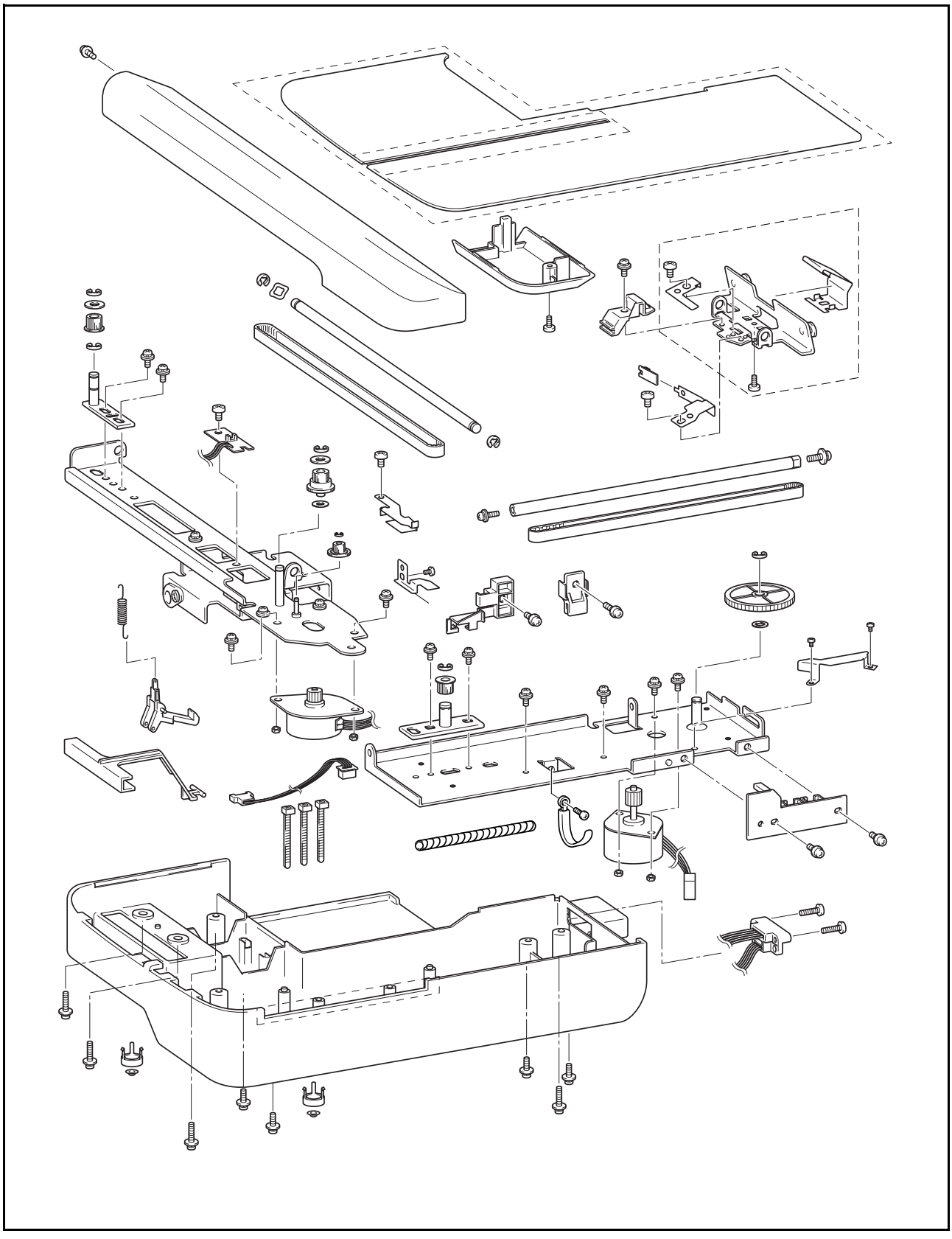
1. Remove the 2 screws ❶, and then remove the pulse motor C (CPMSMJ35-4840-B) ①.

***Key point**

- Cut the band.

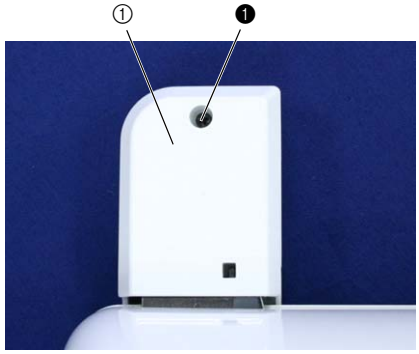


Embroidery parts location diagram



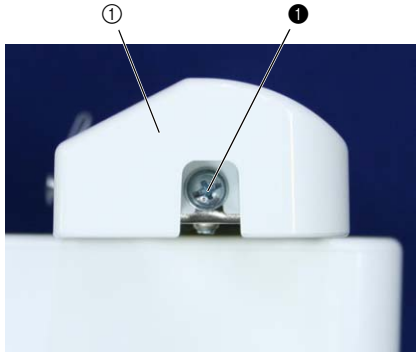
1 YPM cover removal

1. Remove the screw ❶, and then remove the YPM cover ①.



2 X carriage cover removal

1. Remove the screw ❶, and then remove the X carriage cover ①.

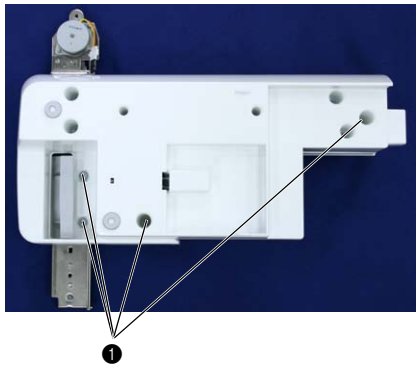


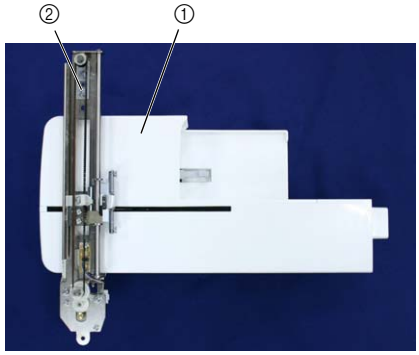
3 ES main cover assembly removal

1. Remove the 4 screws ❶, and then remove the ES main cover assembly ①.

***Key point**

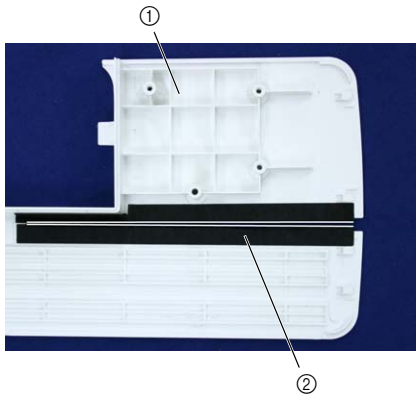
- Position the embroidery machine as shown in the photo on the right, and then slide the X carriage assembly ① to the left.
- Arrows are engraved on the outer surface of the base cover to indicate the locations of the 4 screws ❶.





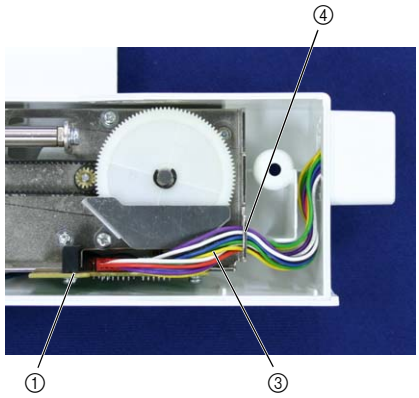
4 Groove cover removal

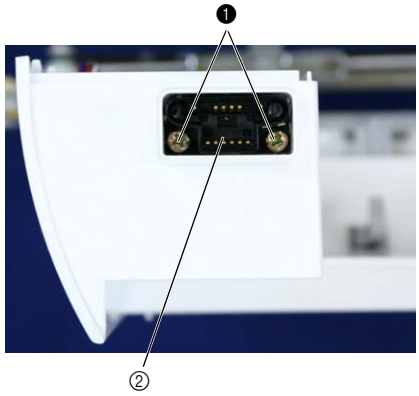
1. Remove the groove cover ② from the ES main cover assembly ①.



5 Lead wire assembly (EMB unit FCOMB) removal

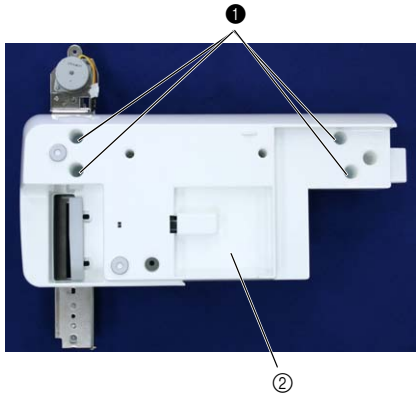
1. Remove the 2 connectors from the EMB relay PCB assembly ①.
2. Remove the lead wire ③ of the lead wire assembly (EMB unit FCOMB) ② from the guide ④ of the main frame subassembly.
3. Remove the 2 screws ❶, and then remove the lead wire assembly ②.

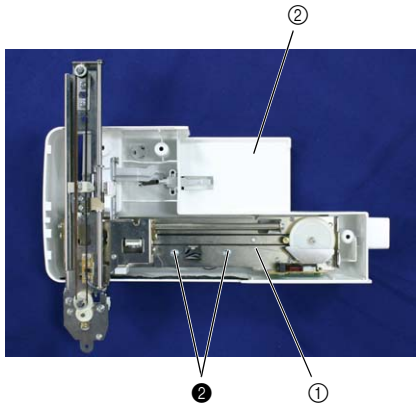




6 ES base cover unit removal

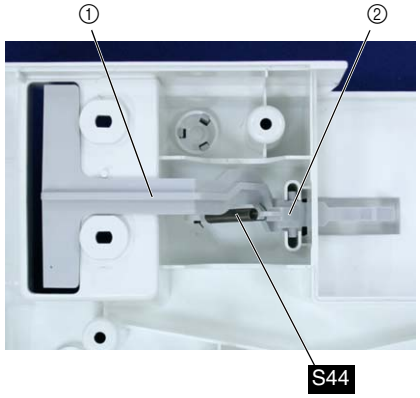
1. Remove the 6 screws (❶x4, ❷x2), and then remove the EX base cover unit ② from the main frame ①.





7 Lock release lever assembly removal

1. Remove the spring S44 from the lock finger ② on the lock release lever assembly ①.
2. Remove the lock release lever assembly ①.
3. Remove the spring S44 from the ES base cover.

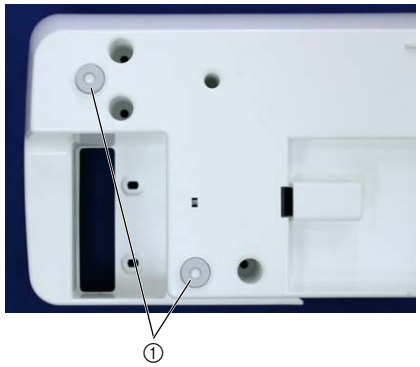


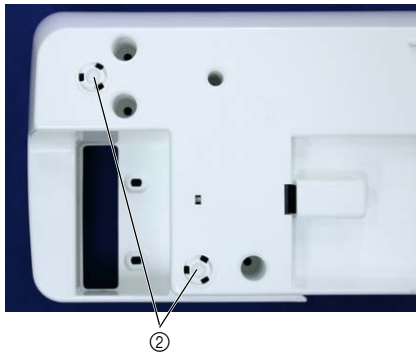
8 Lock release lever ASSY disassembly

1. Remove the lock finger ② from the lock release lever ①.

9 Rubber cushion and rubber cushion cover removal

1. Disengage the 3 hooks from the outer surface of the ES base cover, and then remove the 2 rubber cushion covers ①.
2. Peel the 2 rubber cushions ② from the ES base cover.



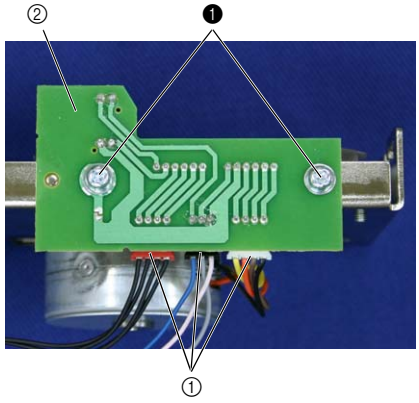


10 Groove cover removal

1. Remove the groove cover ① from the ES base cover.

11 EMB relay PCB assembly removal

1. Remove the 3 connectors ① from the EMB relay PCB assembly ②.
2. Remove the 2 screws ❶, and then remove the EMB relay PCB assembly ②.

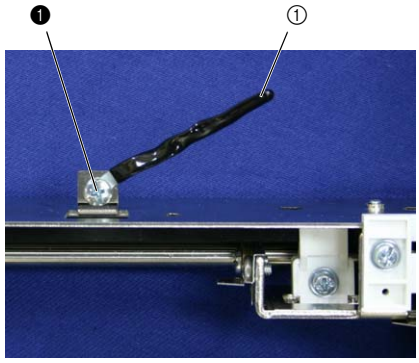


12 Coating clip removal

1. Remove the screw ❶, and then remove the coating clip ①.

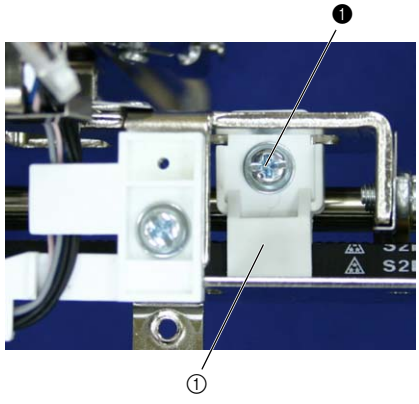
***Key point**

- Cut the band



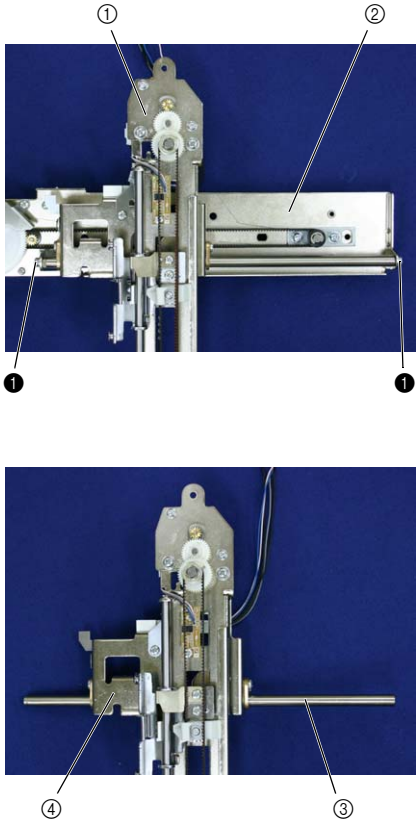
13 X belt presser removal

1. Remove the screw ❶, and then remove the X belt presser ①.



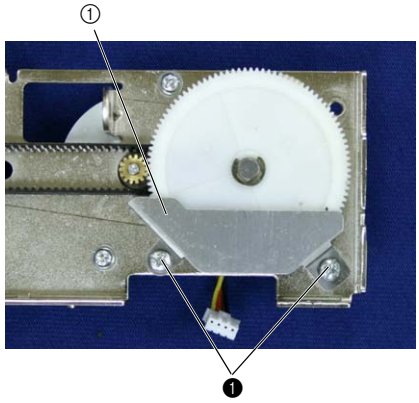
14 XY carriage unit removal

1. Remove the 2 screws ❶, and then remove the XY carriage unit ① from the main frame ②.
2. Remove the X guide shaft ③ from the Y carriage assembly ④.



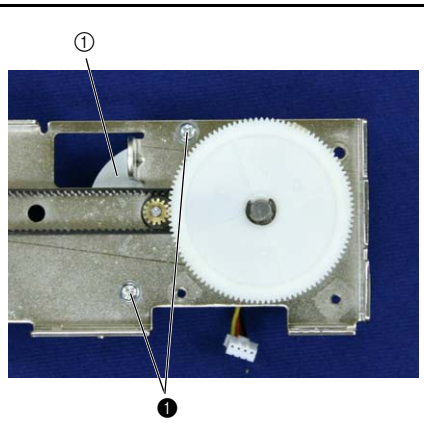
15 Oil guard plate removal

1. Remove the 2 screws ❶, and then remove the oil guard plate ①.



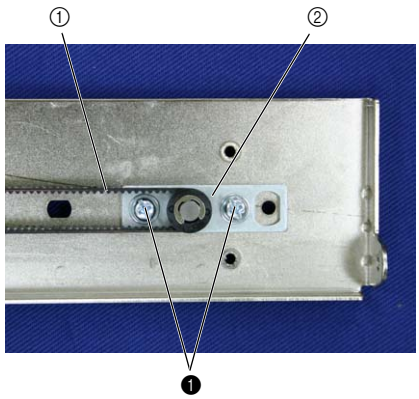
16 X pulse motor assembly removal

1. Remove the 2 screws ❶, and then remove the X pulse motor assembly ①.



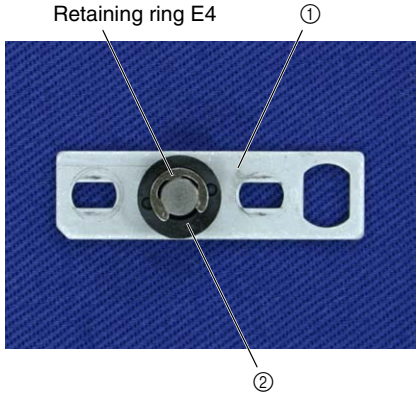
17 X tension pulley assembly removal

1. Remove the 2 screws ❶, and then remove the timing belt ① and the X tension pulley assembly ②.



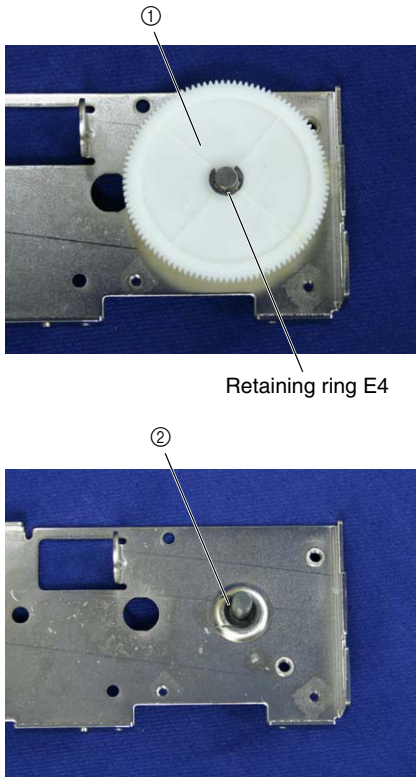
18 X tension pulley ASSY disassembly

1. Remove the retaining ring (E4), and then remove the tension pulley ② from the X tension pulley assembly ①.



19 X driving gear pulley removal

1. Remove the retaining ring (E4), and then remove the X driving gear pulley ① and the washer ②.

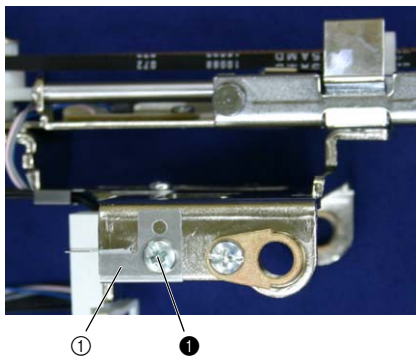


20 X initial shutter removal

1. Remove the screw ❶, and then remove the X initial shutter ①.

***Key point**

- The X initial shutter has sharp edges. Be careful when handling it.

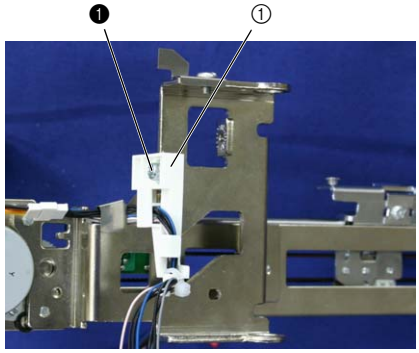


21 X slider removal

1. Remove the lead wire from the guide of the X slider ①.
2. Remove the screw ❶, and then remove the X slider ①.

***Key point**

- Cut the band.



22 Cord guide removal

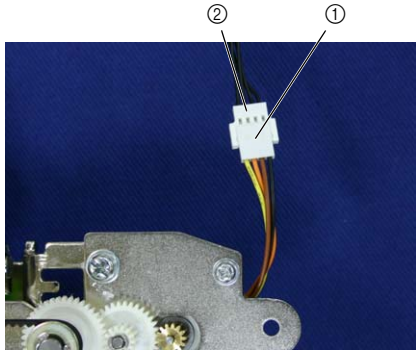
1. Remove the screw ❶, and then remove the cord guide ①.

23 Lead wire assembly YPM relay removal

1. Remove the lead wire assembly YPM relay ② from the lead wire connector on the Y pulse motor assembly ①.

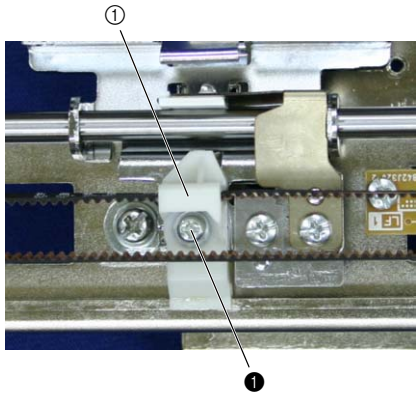
***Key point**

- Cut the band securing the Y sensor PCB assembly's lead wire and the lead wire assembly YPM relay ②.



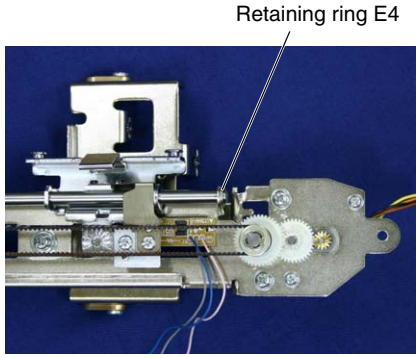
24 Y slider removal

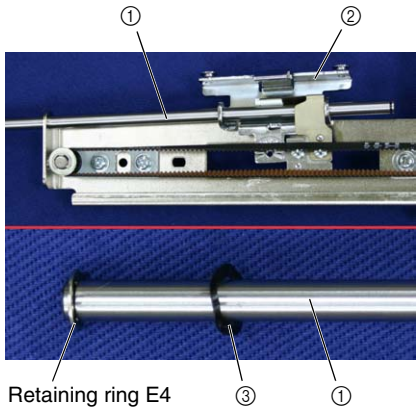
1. Remove the screw ❶, and then remove the Y slider ①.



25 Y carriage unit removal

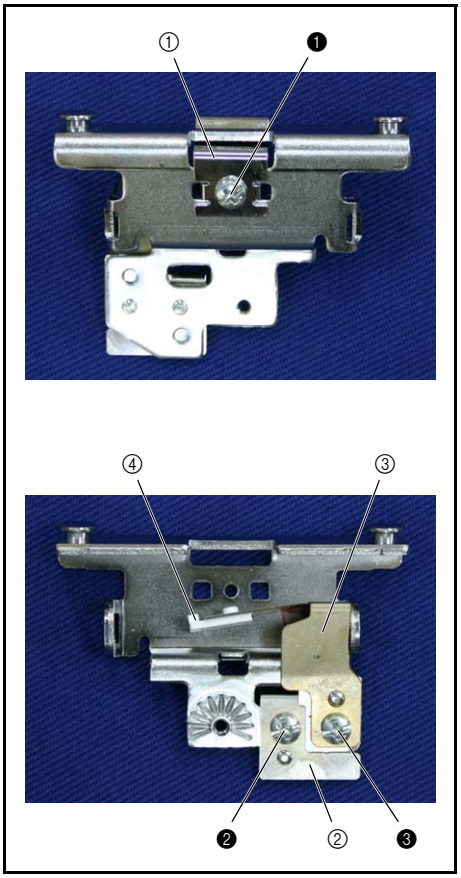
1. Remove the retaining ring (E4).
2. Pull out the Y guide shaft ① from the Y carriage unit ②.
3. Pull out the wave spring washer ③ from the Y guide shaft ①, and then remove the retaining ring (E4).





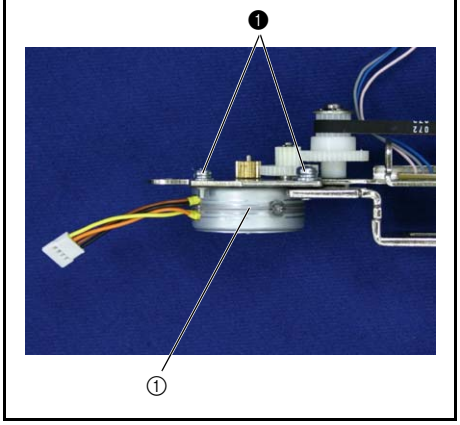
26 Y carriage ASSY disassembly

1. Remove the screw ❶, and then remove the spring ①.
2. Remove the screw ❷, and then remove the Y initial shutter ②.
3. Remove the screw ❸, and then remove the Y guide shaft presser plate ③.
4. Remove the Y guide shaft presser ④ from the Y guide shaft presser plate ③.



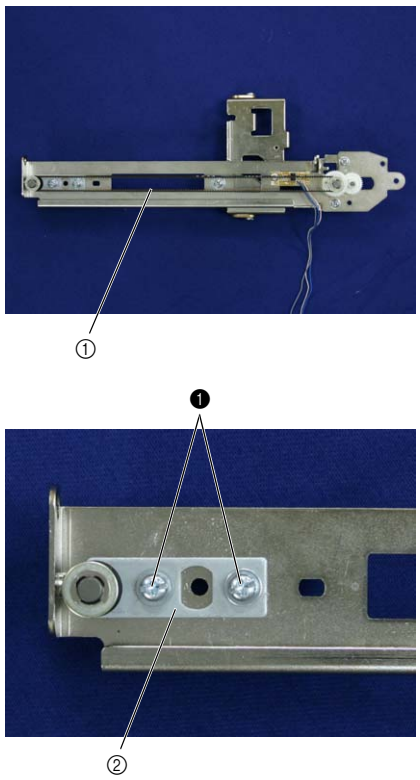
27 Y pulse motor assembly removal

1. Remove the 2 screws ❶, and then remove the Y pulse motor assembly ①.



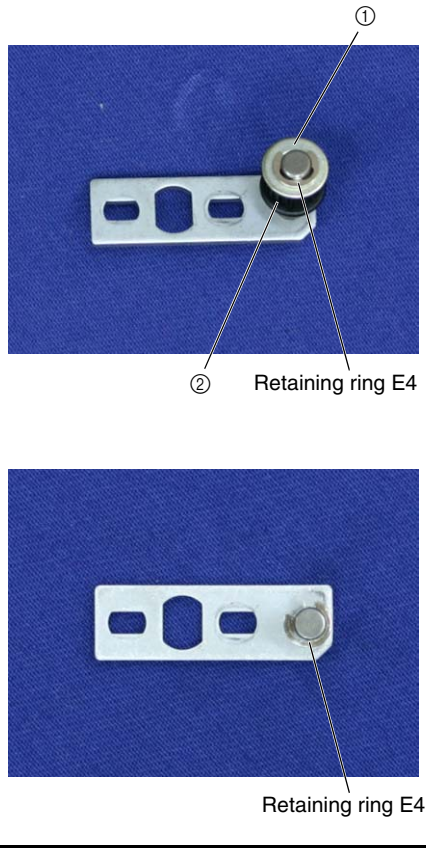
28 Y tension pulley assembly removal

1. Remove the 2 screws ❶, and then remove the timing belt ① and the Y tension pulley assembly ②.



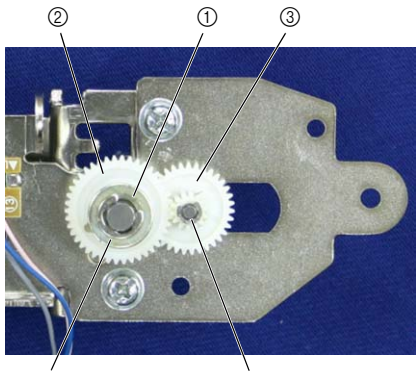
29 Y tension pulley ASSY disassembly

1. Remove the retaining ring (E4), and then remove the plain washer (M6) ① and the tension pulley ②.
2. Remove the retaining ring (E4).



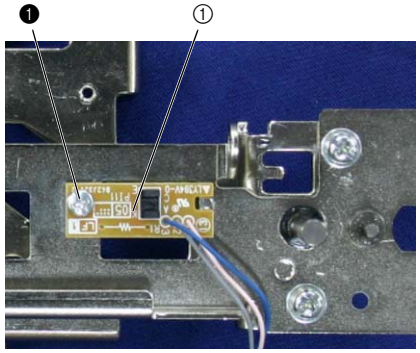
30 Y driving gear pulley assembly removal

1. Remove the retaining ring (E4), and then remove the plain washer (M6) ① and the Y driving gear pulley ②.
2. Remove the retaining ring (E2), and then remove the gear ③.



31 Y sensor PCB assembly removal

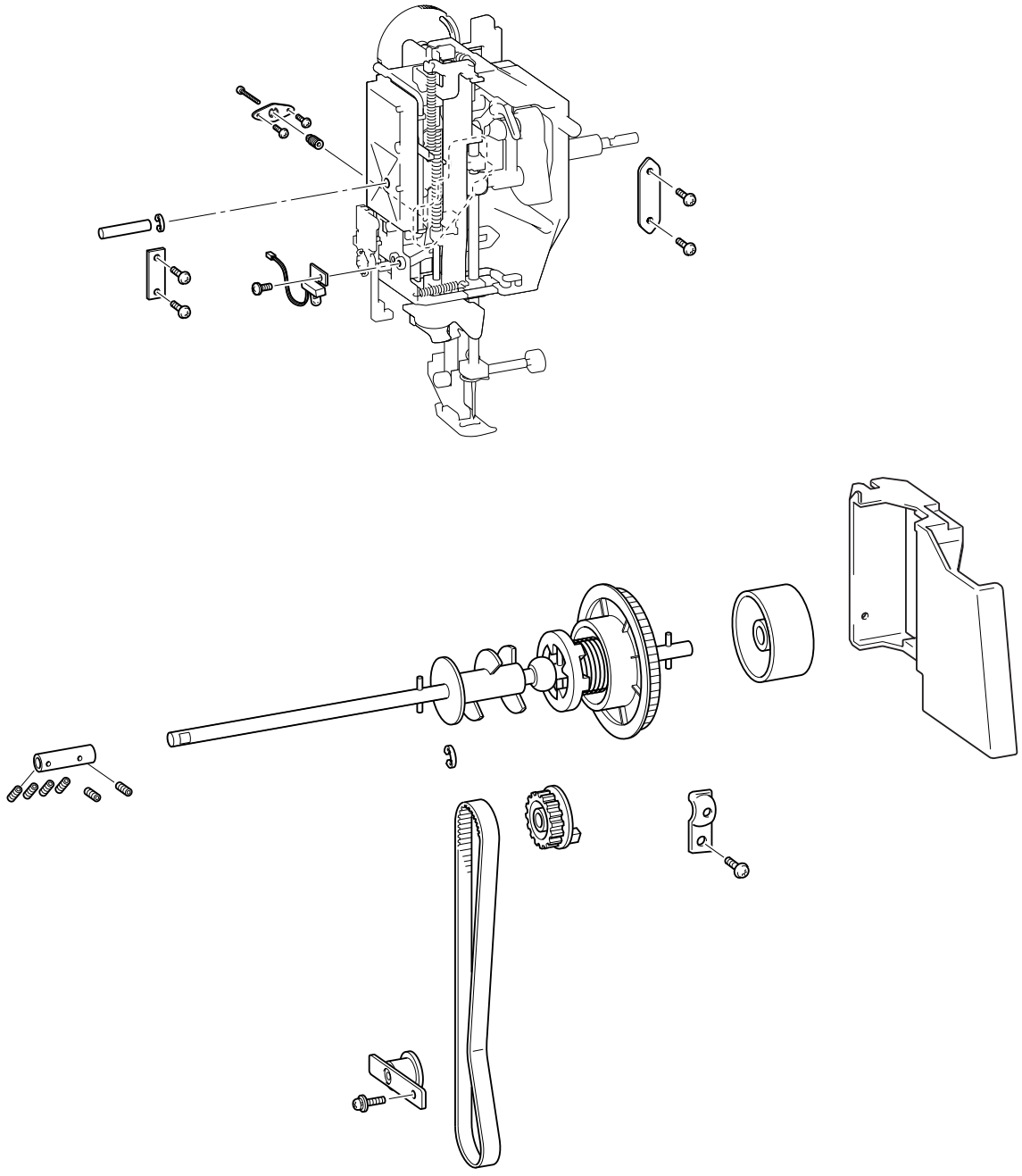
1. Remove the screw ❶, and then remove the Y sensor PCB assembly ①.



3 Assembly

When disassembly and assembly are performed, make adjustments according to "4 Adjustments."

Needle bar, presser mechanism / upper shaft mechanism location diagram

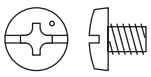


1 Plate spring attachment

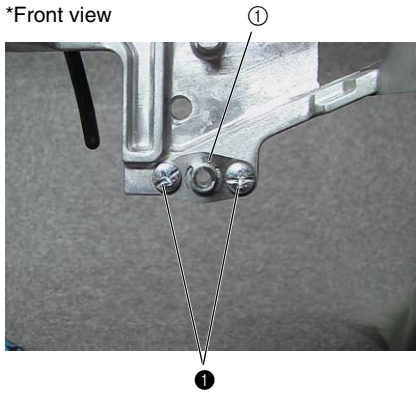
1. Attach the plate spring ① from the front of the arm bed using the 2 screws ❶.
2. Attach the plate spring ① from the back of the arm bed using the adjusting screw ②.

***Key point**

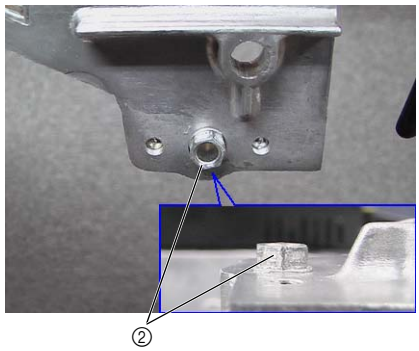
- Tighten adjusting screw ② so that the screw threads are completely hidden.

❶		Screw, Bind M4X5	Torque 1.18 – 1.57 N·m

*Front view



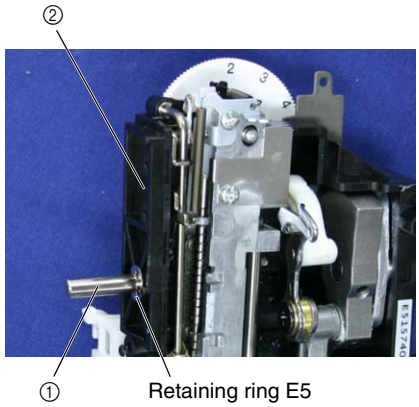
*Rear view

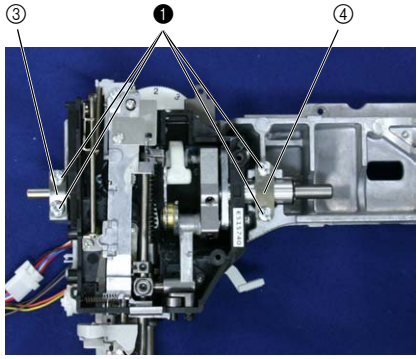


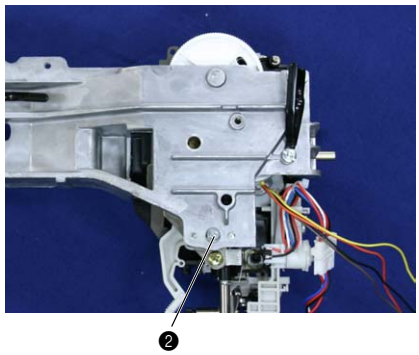
2 Needle-presser module attachment

1. Attach the retaining ring E5 to the shaft ①.
2. Insert the shaft ① into the shaft hole on the left side of the needle presser module ②.

   ***Key point**
   - Insert the shorter end of the shaft ① from the reataining ring (E5) into the shaft hole on the needle presser module ②.
3. Insert the shaft ① into the needle presser module ②, and then attach the presser plate A ③ with the 2 screws ❶.
4. Attach the presser plate B ④ with the 2 screws ❶.
5. Tighten the screw ❷ temporarily. (Fully tighten the screw after performing 4-11 Needle clearance adjustment.)



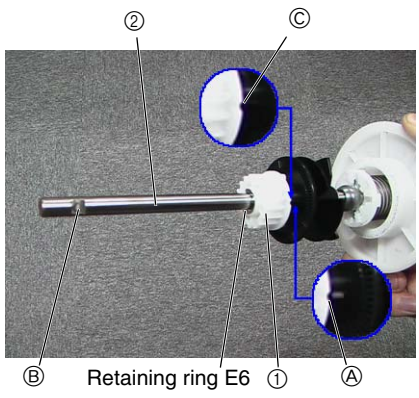




❶	Taptite, Bind S M4X10	Torque 1.47 – 1.98 N·m
❷	Screw, Pan M3X20	Torque 0.78 – 1.18 N·m

3 Upper shaft pulley attachment

1. Align the base line on the rotation shutter Ⓐ (on the same surface as the upper shaft Ⓑ D cut) and the base line on the upper shaft pulley Ⓒ, and attach the upper shaft pulley ① to the upper shaft assy. ②.
2. Attach retaining ring E6.

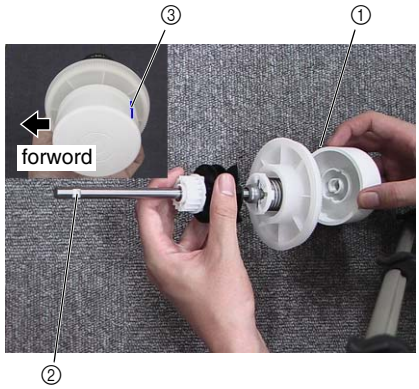


4 Pulley attachment

1. Attach the pulley ① to the upper shaft assy.

***Key point**

- When the D cut ② on the upper shaft is facing forward, the pulley base line ③ is on the upper side.



5 Upper shaft assy. attachment

1. Attach the fixed joint ① to the upper shaft.

***Key point**

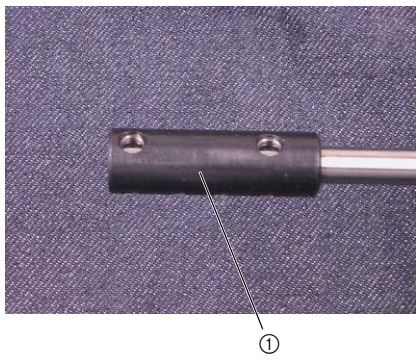
- Attach so that the fixed joint ① screw holes are toward the left side.

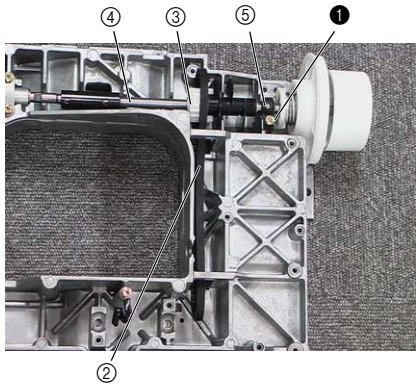
2. Place the timing belt ② around the upper shaft pulley ③, and insert the upper shaft assembly ④.
3. Attach the bushing presser ⑤ using the screw ❶.

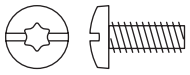
***Key point**

- Move the fixed joint ① to the left side of the upper shaft.

Screw holes toward the left side





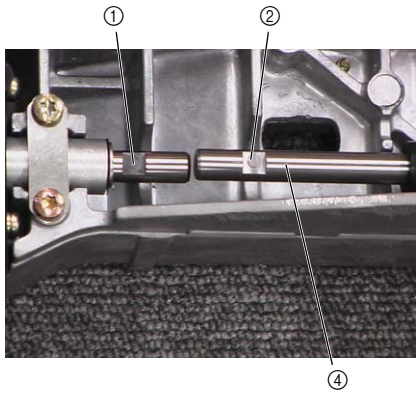
❶		Taptite, Bind S M4X10	Torque 1.47 – 1.98 N·m

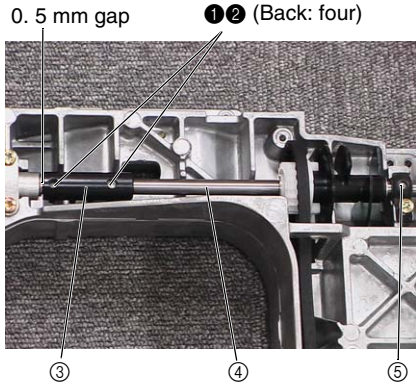
6 Connecting the needle-presser module and upper shaft

1. Face the unit shaft D cut ① and the upper shaft D cut ② forward.
2. Screw the 2 screws ❶ into the fixed joint ③.

   ***Key point**
   - Adjust the gap on the left side of the fixed joint ③ to 0.5 mm.
   - Align the screw holes for the screw ❶ with the D cuts ① and ②.
3. Rotate the upper shaft ④ 180 degrees, and screw the 4 screws ❷ into the fixed joint ③.
4. Tap the lower shaft bushing ⑤ on lightly so that the upper shaft ④ turns easily.

Needle bar and presser unit assy. and fixed joint gap	0.5 mm

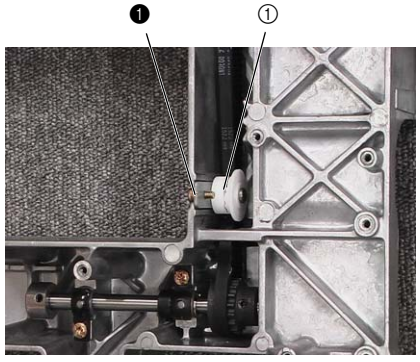




❶		Set Screw, Socket (FT) M5X5	Torque 1.37 – 1.79 N·m
❷		Set Screw, Socket (CP) M4X4	Torque 0.78 – 1.18 N·m

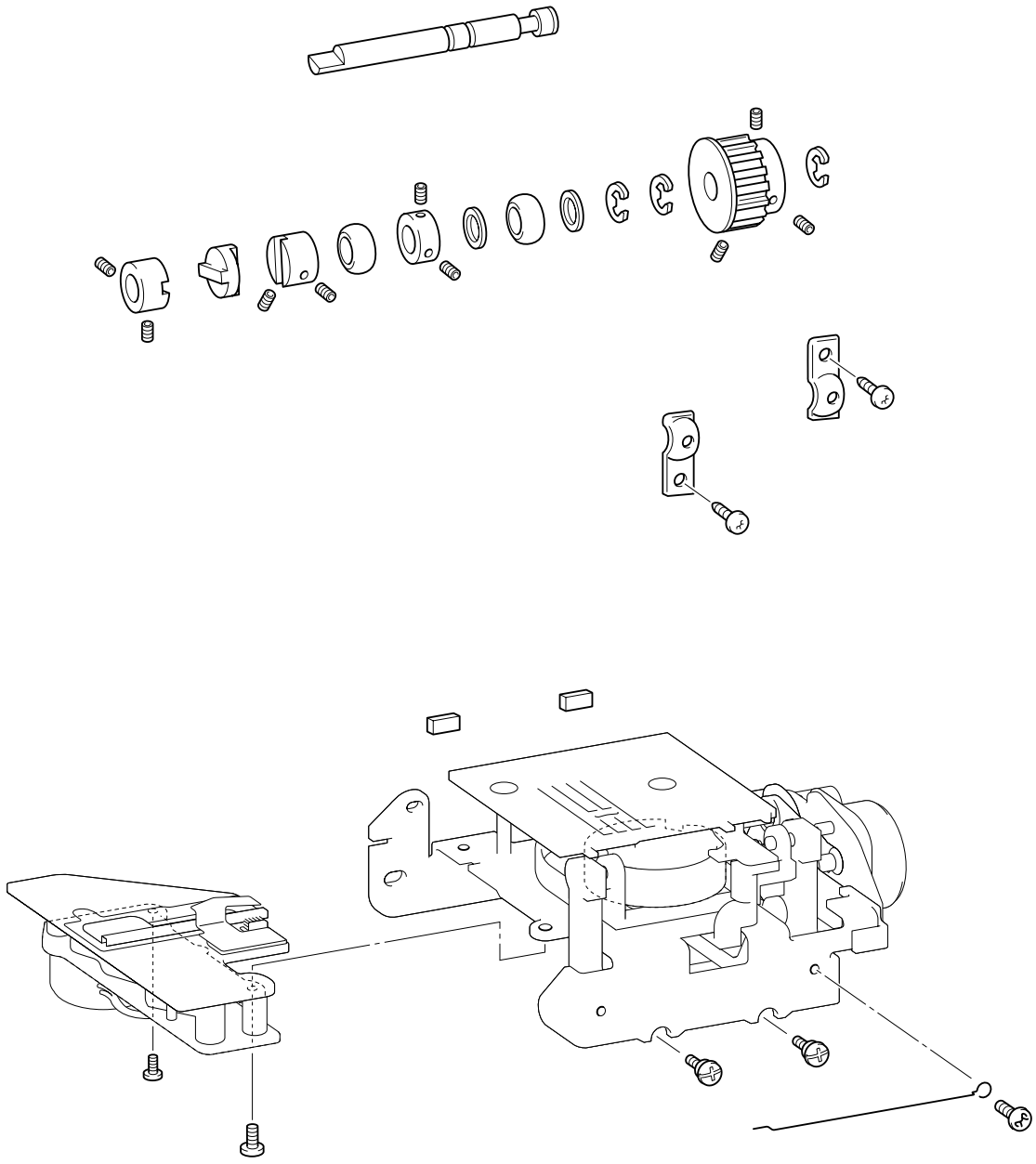
7 Tension pulley assembly attachment

1. Hand start the screw the screw ❶ in the tension pulley ① and attach to the arm bed (fully tighten after 4 - 6 "Timing belt tension.").



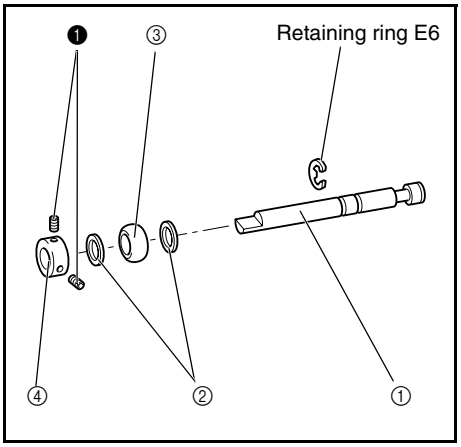
❶		Screw, Pan (S/P washer) M4X10DA	Torque 1.18 – 1.57 N·m

Rotary hook drive mechanism / Feed and bobbin mechanism /Cutter assy. location diagram



1 Assembling the Lower shaft A assembly

1. Attach the retaining ring E6 to the lower shaft A ①.
2. Attach the thrust washer ②, lower shaft bushing ③, thrust washer ② and set screw collar ④ (Face the ground surface toward the lower shaft bushing).
3. Move the set screw collar ④ to the right and secure it with the 2 screws ❶.



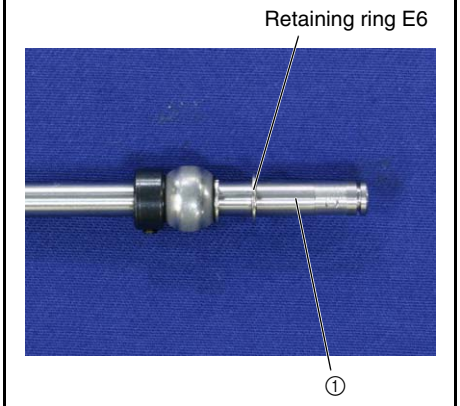
❶	Set Screw, Socket (CP) M4X4	Torque 1.47 – 1.98 N·m

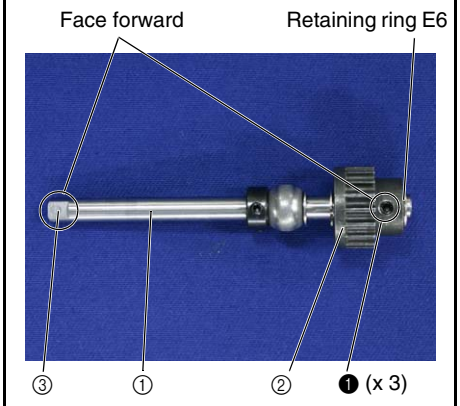
2 Timing pulley D attachment

1. Attach the retaining ring E6 to the lower shaft A ①.
2. Attach the timing pulley D ② to the lower shaft A ①, and attach the retaining ring E6.
3. Hand start the 3 screws ❶ in the timing pulley D ②.
   (Fully tighten after 4 - 12 "Needle bar rising".)

***Key point**

- With the lower shaft A D cut ③ facing forward, secure using one of the three screw holes in the timing pulley D ② in the forward facing position.





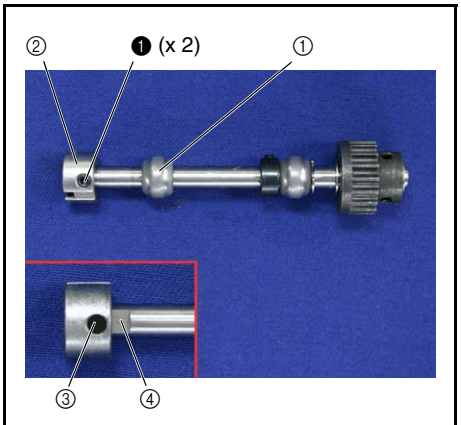
❶	Set Screw, Socket (FT) M5X5	Torque 1.18 – 1.57 N·m

3 Joint attachment

1. Put the lower shaft bushing ① on the lower shaft A assy.
2. Put the joint ② on the lower shaft A assy., and hand start the 2 screws ❶ (fully tighten after 3 - 9 "6 feed module attachment.)

***Key point**

- Align the screw hole ③ in the joint with the D cut ④ in lower shaft A.



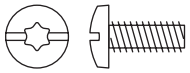
❶	Set Screw, Socket (FT) M5X5	Torque 1.18 – 1.57 N·m

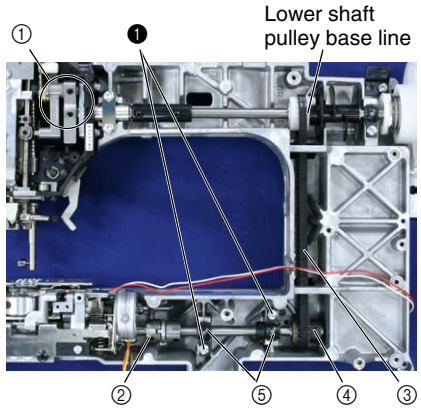
4 Lower shaft A attachment

1. Rotate the lower shaft, and bring the needle bar to its highest point ① (lower shaft pulley base line forward).
2. Insert lower shaft A.

***Key point**
- Face the screw hole ② in the joint forward, and attach the timing belt ③ to timing pulley D ④.

3. Attach the 2 bushing pressers ⑤ using the 2 screws ❶.

❶		Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m



5 feed module attachment

1. Rotate the lower shaft, and bring the needle bar to its highest point (lower shaft pulley base line forward).
2. Apply EPNOC AP(N)0 to the disk ①, and attach it to the lower shaft joint.
3. Rotate feed module lower shaft B, and bring the solid dot on the outer rotary hook to the front, directly above the D cut in lower shaft B.
4. Attach the feed module attachment.

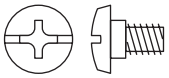
***Key point**
- The needle bar should be at the highest point.
- The solid circle mark on the outer rotary hook should be forward.
- (Feed module side) D cut in lower shaft B is directly above

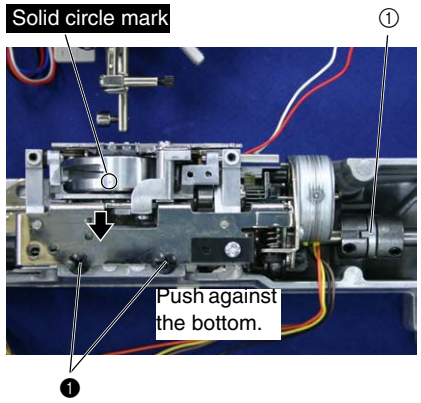
5. Attach the 2 screws ❶.

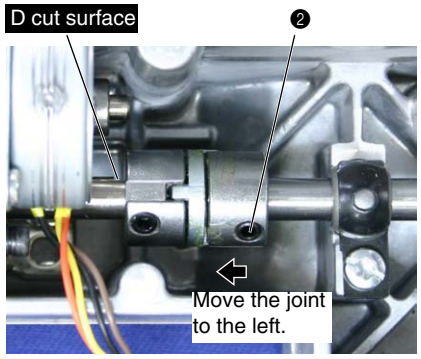
***Key point**
- While holding the feed module against the bottom, tighten the screw ❶ on the left.

6. Move the lower shaft A joint to the left, and fully tighten the 2 screws ❷.

Application of EPNOC AP(N)0 to joint contact area	Small amount XC8387***

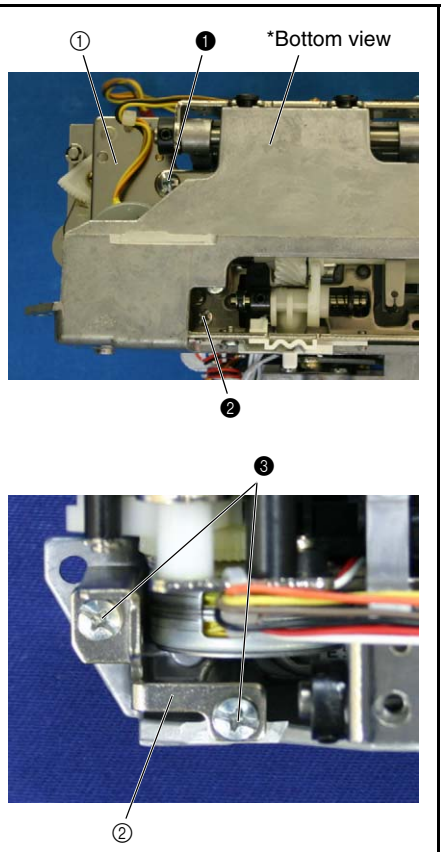
❶		Screw M4	Torque 1.18 – 1.57 N·m
❷		Set Screw, Socket (FT) M5X5	Torque 1.47 – 1.96 N·m





6 Thread cutter module attachment

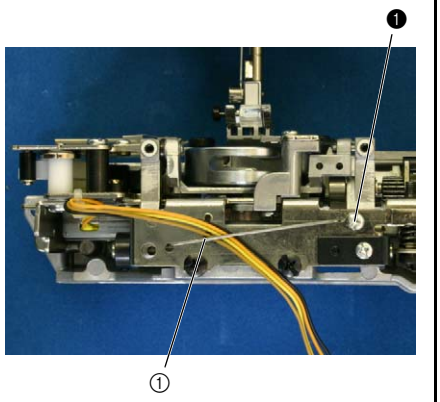
1. Attach the thread cutting module ① with the screws ❶ and ❷.
2. Attach the free arm plate ② with the 2 screws ❸.



❶ ❸	Screw, Bind M4X5	Torque 1.18 – 1.57 N·m
❷	Screw, Bind M3X5	Torque 0.78 – 1.18 N·m

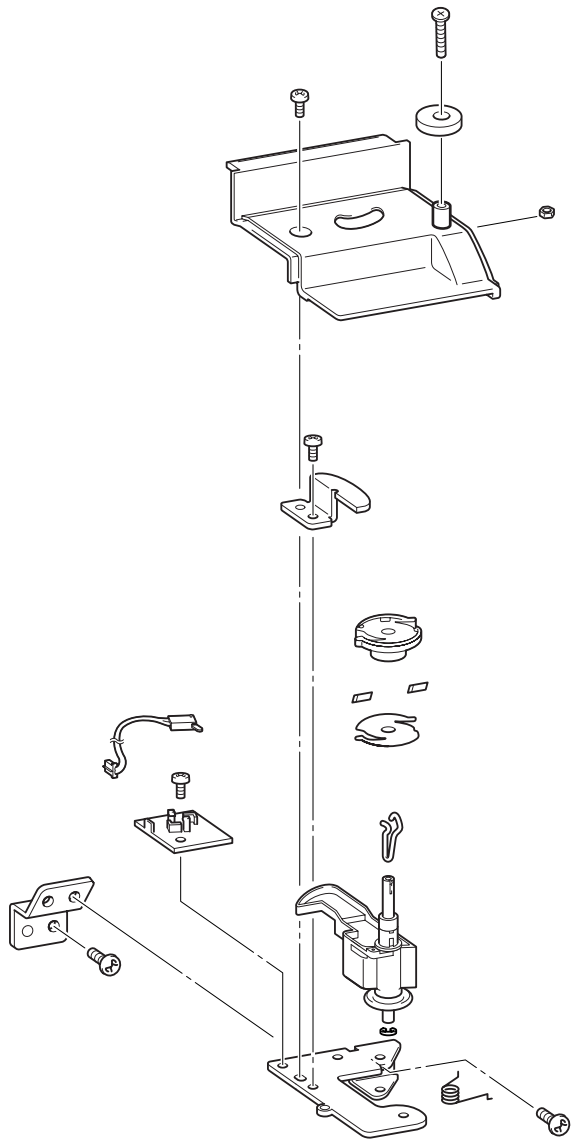
7 Leading guide attachment

1. Attach the leading guide ① with the screw ❶.



❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

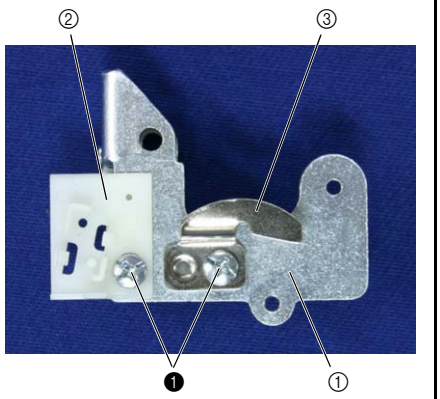
Bobbin winder mechanism location diagram



1 Bobbin winder shaft stopper (bobbin winder assembly holder) assembly

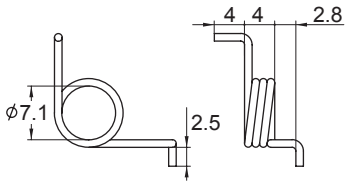
1. Attach the bobbin winder shaft stopper ① and SW adjust plate ② to the bobbin winder assembly holder ③, and hand start the 2 screws ❶.
   (Fully tighten after 3 - 13 "5 Bobbin winder holder assembly attachment.")

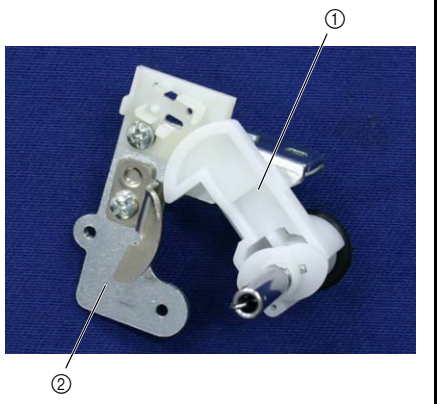
❶		Taptite, Bind B M3X6	Torque Hand tighten

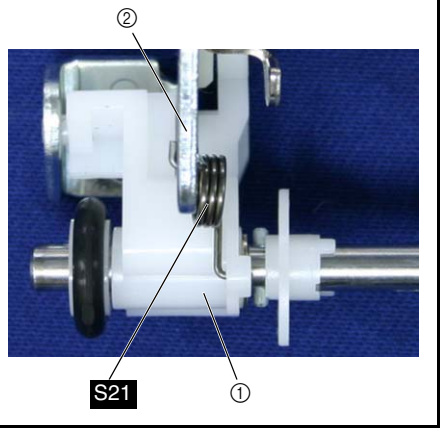


2 BW shaft holder assembly attachment

1. Attach the BW shaft holder assembly ① to the bobbin winder assembly holder ②.
2. Attach the spring S21 to the BW shaft holder assembly ① and bobbin winder assembly holder ②.

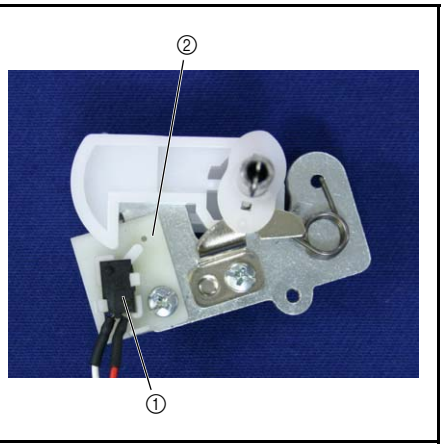
S21		BOBBIN WINDER SPRING XZ0070***





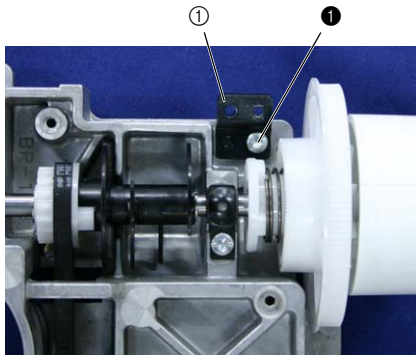
3 BW-F SW assy. attachment

1. Attach the BW-F SW assy ① to the SW adjust plate ②.



4 BW holder supporter attachment

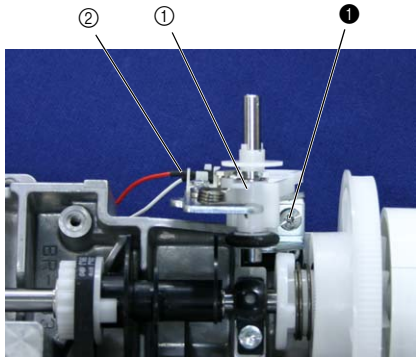
1. Attach the BW holder supporter ① using the screw ❶.

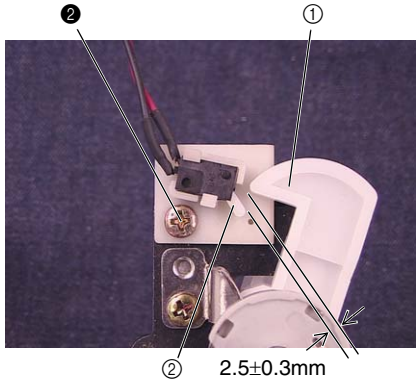


❶	Taptite, Bind S M4X10	Torque 1.18 – 1.57 N·m

5 Bobbin winder holder assembly attachment

1. Attach the bobbin winder assembly ① using the screw ❶.
2. With the bobbin winder OFF, adjust the SW adjust plate left or right so that the gap between the BW shaft holder assembly ① and the BW-F SW assy ② is 2.5 ±0.3 mm, and fully tighten the screw ❷.





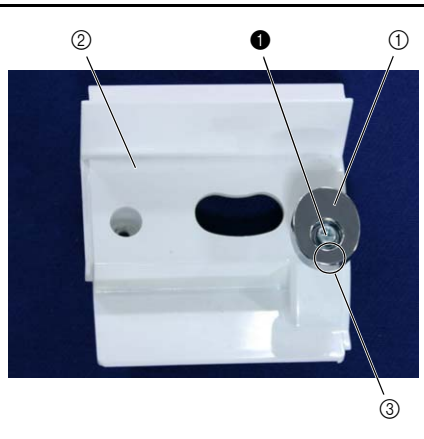
❶	Screw, Bind M4X8	Torque 1.18 – 1.57 N·m
❷	Screw, Bind M3X6	Torque 0.78 – 1.18 N·m

6 Bobbin presser assembly

1. Attach the bobbin presser ① to the bobbin winder cover ② using the screw ❶ and a M3 nut.

***Key point**

- Set the side of the bobbin presser ① with the least eccentricity to the near side ③ (see figure to the right).

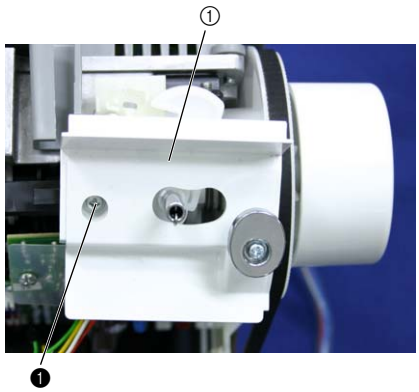


❶	Screw, Pan (S/P washer) M3X20DA	Torque 1.18 – 1.57 N·m

7 Bobbin winder cover attachment

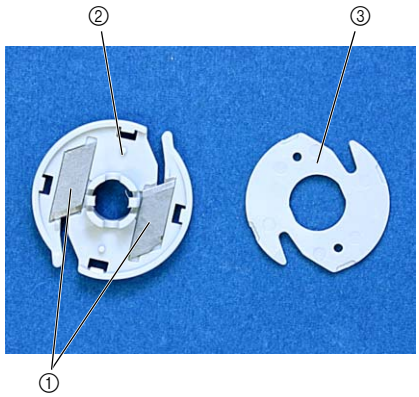
1. Attach the bobbin winder cover ① using the screw ❶.

❶		Screw, Bind M3X6	Torque 0.78 – 1.18 N·m



8 Bobbin base assembly

1. Attach the 2 NT lower thread cutters ① and the bobbin thread cutter holder ② to the bobbin base ③.

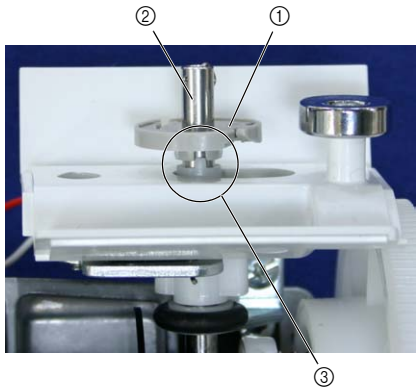


9 Bobbin base attachment

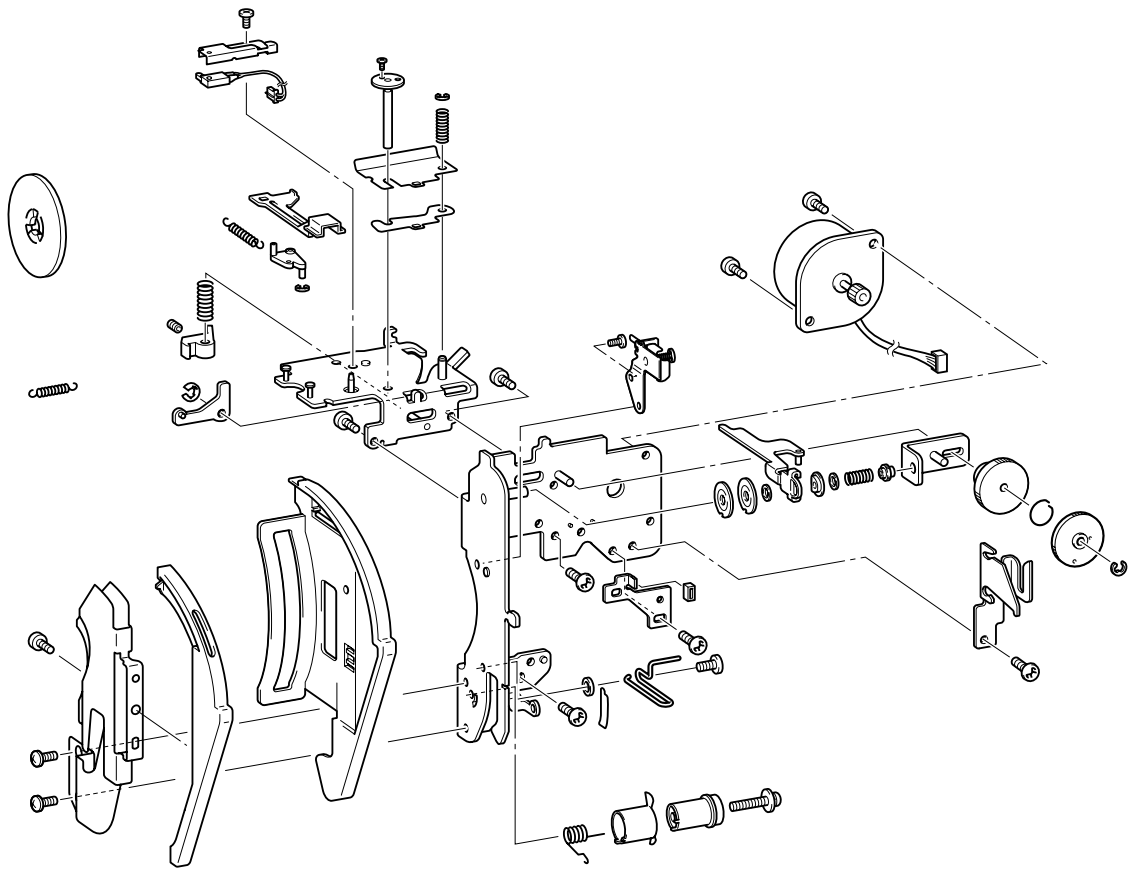
1. Attach the bobbin base ① to the bobbin winder shaft ②.

***Key point**

- Attach the bobbin base ① to position ③.



Thread tension mechanism location diagram

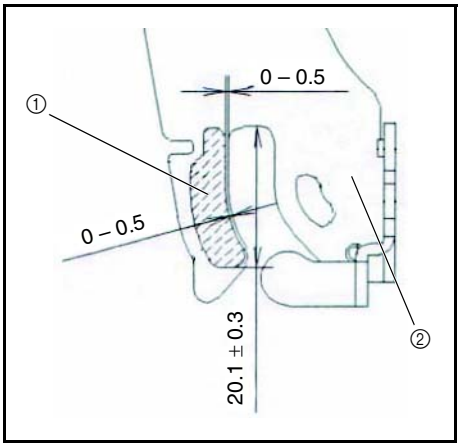


1 Spring tape attachment

1. Attach the spring tape ① to the thread guard assembly ②.

***Key point**

- See the figure to the right for positioning.



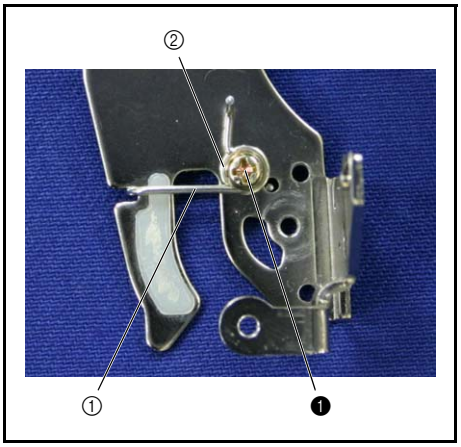
2 Thread guide wire attachment

1. Attach the thread guide wire ① and the washer ② using the screw ❶.

***Key point**

- While holding the thread guide wire ① up, tighten the screw ❶.

❶		Screw, Pan (S/P washer) M3X6	Torque 0.78 – 1.18 N·m



3 Thread take up spring attachment

1. Attach the spring S11 to the thread catching spring case ①.

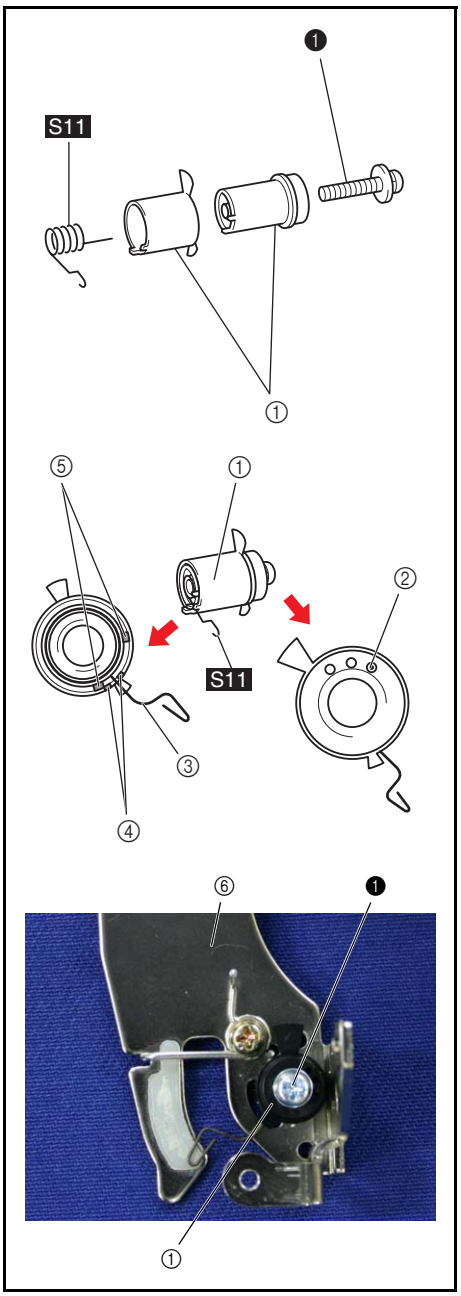
   ***Key point**

   - Insert the tip ② of the spring S11 into the right-most hole of the three spring tension positioning holes.
   - Insert the bent end ③ of the spring S11 between the two tabs ④ of the thread catching spring case, and then engage it with the spring groove ⑤.

2. Attach the thread catching spring case ① to the thread guard assembly ⑥ using the screw ❶

   ***Key point**

   - Align the protrusions ⑤ (two) on the bottom of the thread catching spring case ① with the oval hole in the thread guard assembly ④, and turn clockwise to the end of the hole to attach.



❶	Screw, Pan (S/P washer) M3X18DA	Torque 0.78 – 1.18 N·m
S11	ϕ7.4, 15.6	THREAD TAKE UP SPRING XZ0145***

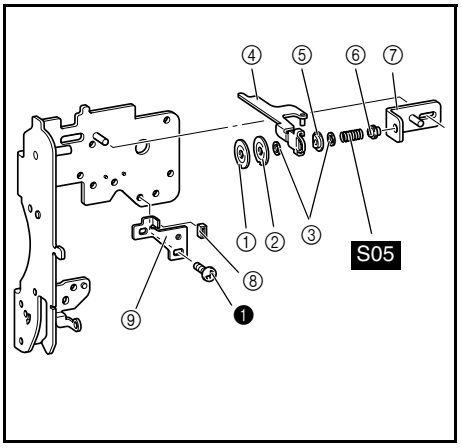
4 Tension disk attachment

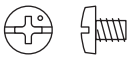
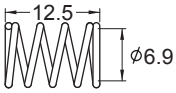
1. Attach the tension disc A ①, tension disc B ②, washer ③, thread tension plate A ④, the tension disc washer ⑤, washer ③, spring S05 and tension adjusting screw ⑥ to the thread tension disk shaft.
2. Attach the tension plate assy ⑦ to the thread tension gear shaft, and screw the tension adjusting screw ⑥ into the tension plate assy.

***Key point**

- The tension adjusting screw ⑥ should be screwed in so that the tip protrudes approximately 0.5 mm from the right of the tension plate assy. ⑦.

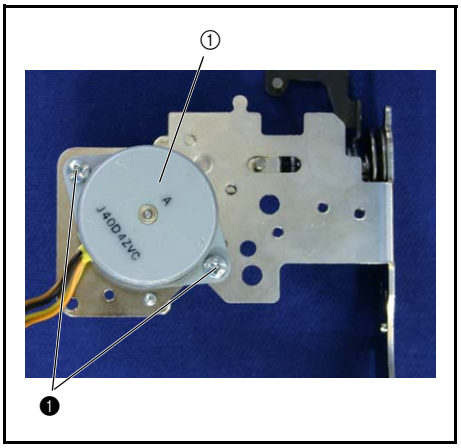
3. Attach the rubber ⑧ to the initial adjusting plate ⑨.
4. Install the screw ❶ into the initial adjusting plate ⑨.

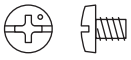


❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m
S05		THREAD TENSION SPRING XA9900***	

5 AT pulse motor attachment

1. Attach the AT pulse motor ① using the 2 screws ❶.



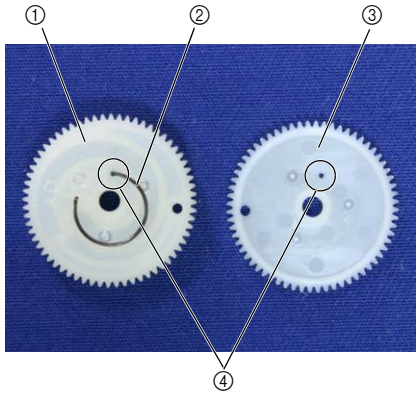
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

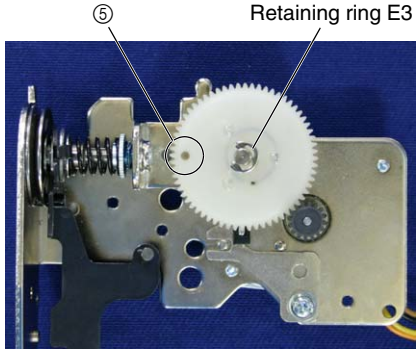
6 Thread tension gear attachment

1. Attach the thread tension gear ①, spring ② and thread tension gear cover ③ and attach the retaining washer E3.

***Key point**

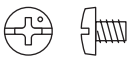
- Attach the spring ② to the small holes ④ in the thread tension gear ① and the thread tension gear cover ③.
- Turn the thread tension gear cover ③ clockwise until the large holes ⑤ in the thread tension gear ① and the thread tension gear cover ③ are on top of each other, and attach the thread tension gear assembly.

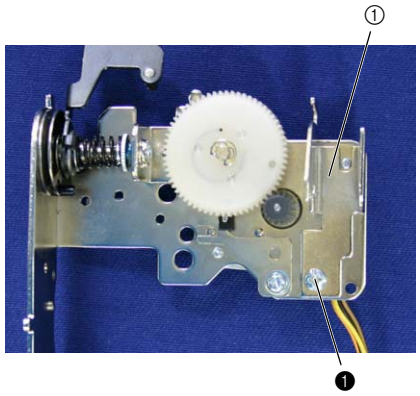




7 Thread guide attachment

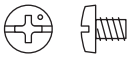
1. Attach the thread guide ① using the screw ❶.

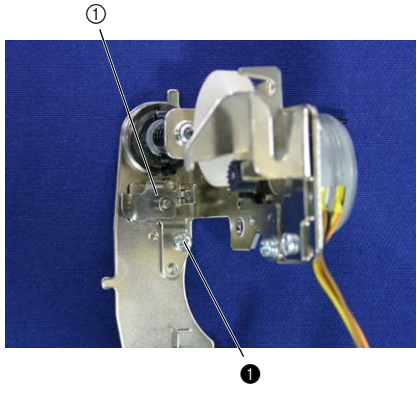
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m



8 Plate assembly attachment

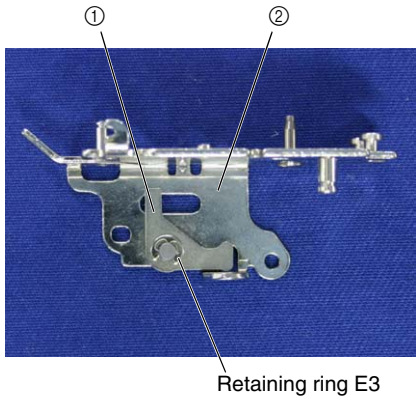
1. Attach the plate assembly ① using the screw ❶.

❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m



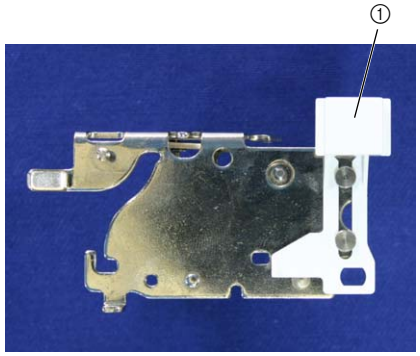
9 Tension releaser link attachment

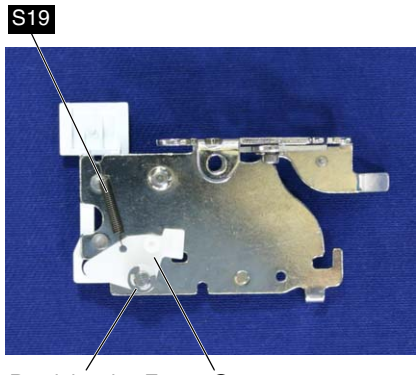
1. Attach the tension releaser link ① to the thread release holder assy ②, and the attach retaining ring E3.



10 Thread guide shutter assembly

1. Attach the thread guide shutter ① to the tension release holder assy.
2. Attach the thread guide shutter link ② to the tension release holder assy, and the attach the retaining ring E3.
3. Attach the spring S19 to the thread guide shutter link ② and the tension release holder assy.





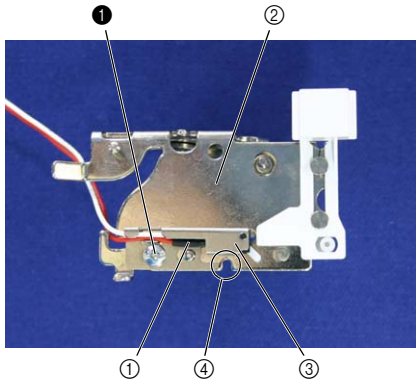
S19	16	SPRING XC2650***

11 PF-F SW assy. assembly

1. Attach the PF-F SW assy ① and the presser switch holder ③ to the thread release holder assy ② using the screw ❶.

***Key point**

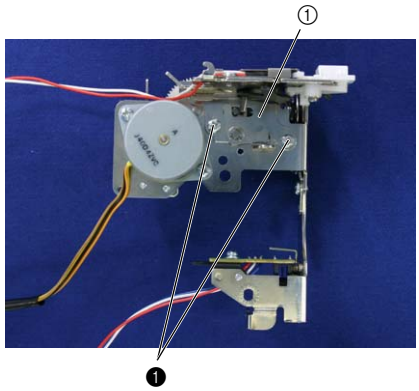
- Align the edge ④ of the thread release holder assy ② and the presser switch holder ③.



❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

12 Thread release holder assy. attachment

1. Attach the tension release holder assy ① to the thread guard assembly using the 2 screws ❶.



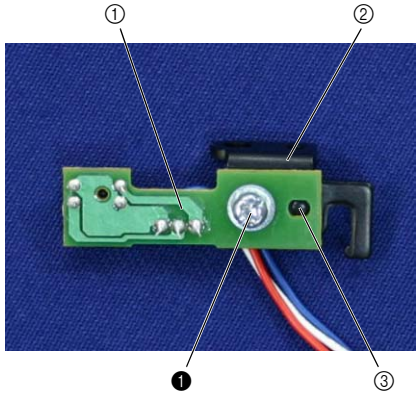
❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

13 Upper thread PCB unit assembly

1. Attach the upper thread PCB assembly ① to the thread sensor holder ② with the screw ❶.

***Key point**

- Align the positioning tab on the thread sensor holder ② with the center of the oval positioning hole ③ on the upper thread PCB assembly ①.



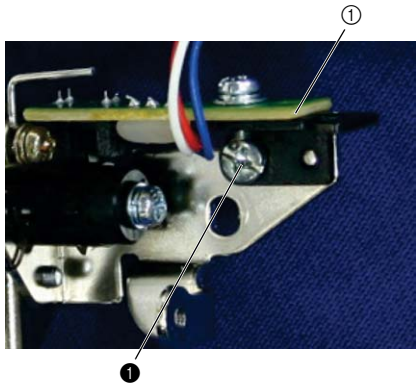
❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

14 Upper thread PCB unit attachment

1. Attach the upper thread PCB unit ① to the thread guide assembly with the screw ❶.

***Key point**

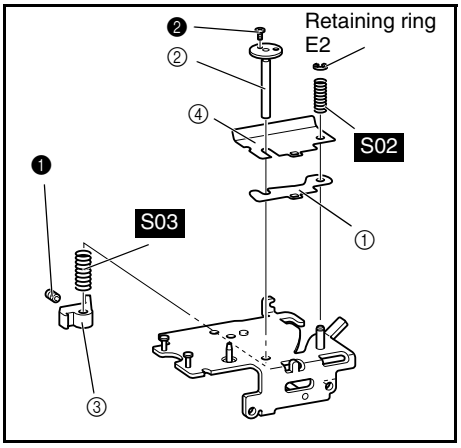
- Engage the positioning tab on the thread guide assembly with the positioning hole on the upper thread PCB unit ①.
- Check that the thread cutting shutter is positioned at the center relative to the sensor of the upper thread PCB unit ①.



❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

15 Tension plate attachment

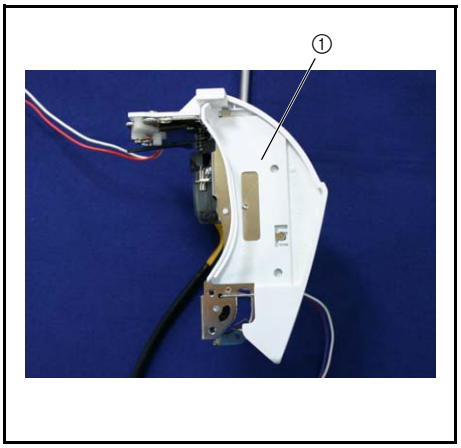
1. Attach the spacer ① to the tension release holder assy.
2. Attach the tension pressure assy ②, the spring S02 and tension release cam ③.
3. Attach the tension plate ④.
4. Install the screw ❶ in the tension release cam ③.
5. Hand start the screw ❷ in the tension pressure assy. ②
   (after assembly, perform 4 - 8 "Fine tension").
6. Attach the spring S03 to the tension release holder assy shaft, and attach the retaining washer E2.



❶	Set Screw, Socket (FT) M3X4	Torque 0.78 – 1.18 N·m
❷	Power Lock 2X3	Amount screw should be tightened Screw head should protrude 0.2 - 5.0 mm
S02	9, ϕ3.7	SPRING X57605***
S03	13.2, ϕ4.1	SPRING XA9577***

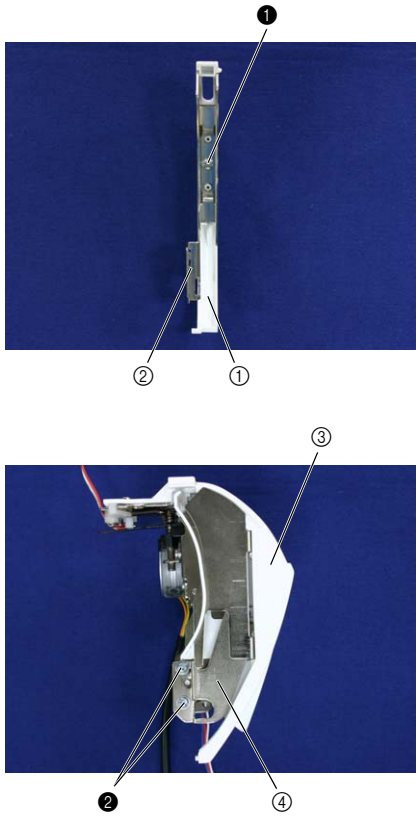
16 Thread guide cover attachment

1. Attach the thread guide cover ① to the thread guard assembly.



17 Thread guide cover assembly

1. Attach the thread guide cover ① to the thread guide assy ② using the screw ❶.
2. Attach the thread guide cover assembly ③ to the thread guard assembly ④ using the 2 screws ❷.

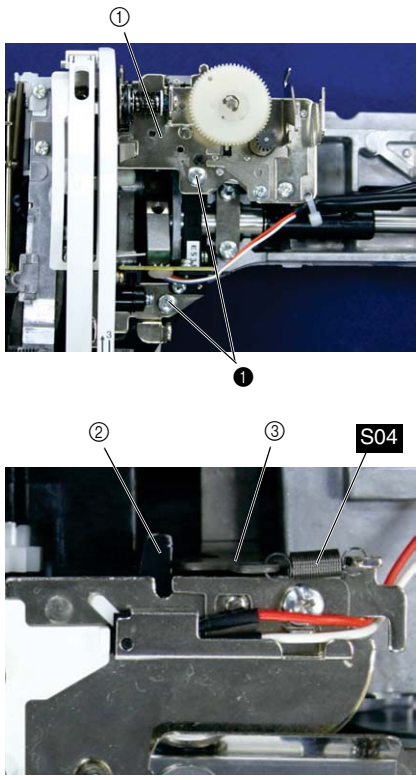


❶	Taptite, Bind B M3X6	Torque 0.78 – 1.18 N·m
❷	Screw, Pan (S/P washer) M3X6	Torque 0.78 – 1.18 N·m

18 Thread tension assy. attachment

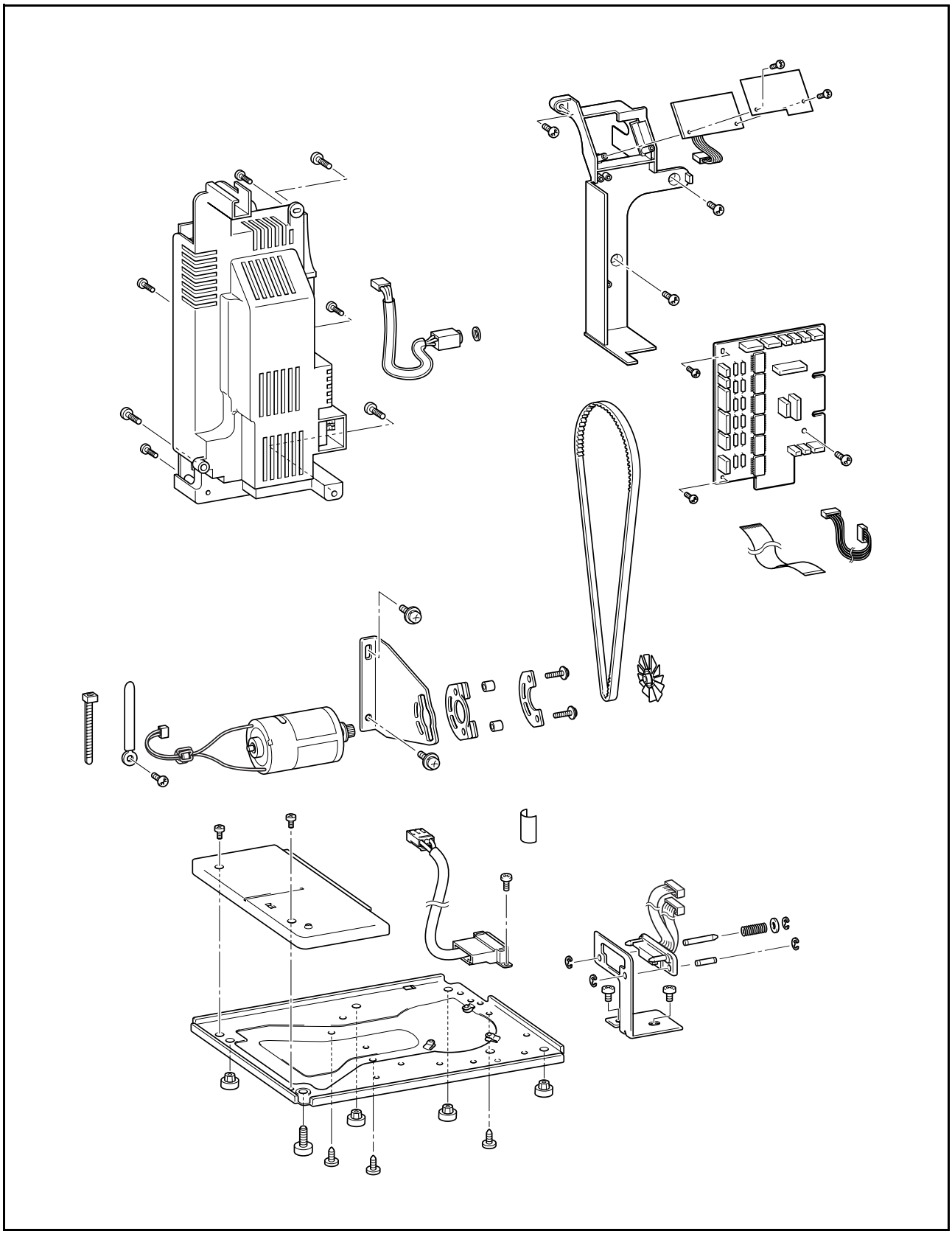
1. Attach the thread tension assy ① using the 2 screws ❶.

   ***Key point**
   - For the position of the thread release lever assy A ②, see the diagram to the right.
2. Attach the spring S04 to the tension release holder shaft and tension release plate C ③ on the needle-presser module.



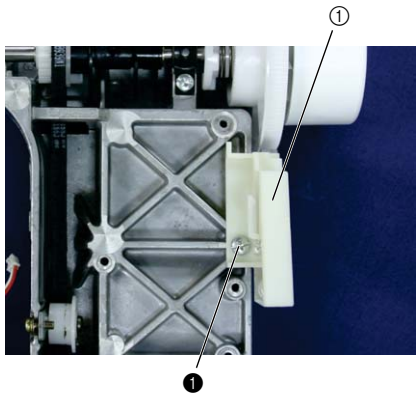
❶	Taptite, Bind B M4X10	Torque 1.18 – 1.57 N·m
S04	14, ϕ4	SPRING XA9787***

Electrical parts and motors location diagram



1 Belt guard attachment

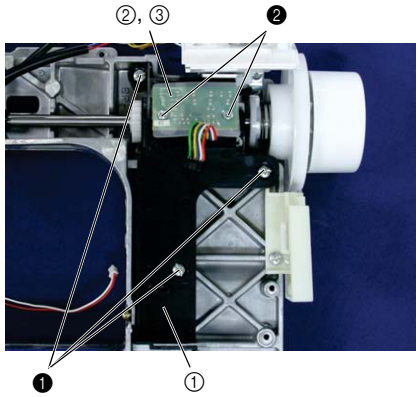
1. Attach the belt guard ① to the arm bed with the screw ❶.



❶	Screw, Bind M4X8	Torque 0.78 – 1.18 N·m

2 NP PCB assy. attachment

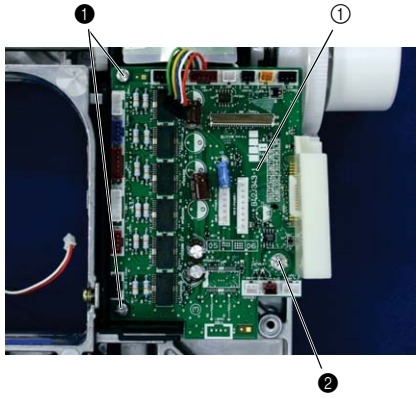
1. Attach the PCB holder ① to the arm bed using the 3 screws ❶.
2. Attach NP PCB assy ② and the insulation sheet ③ to the PCB holder ① using the 2 screws ❷.



❶	Taptite, Bind B M3X8	Torque 0.59 – 0.78 N·m
❷	Screw, Bind M4X8	Torque 0.78 – 1.18 N·m

3 Motor PCB assy. attachment

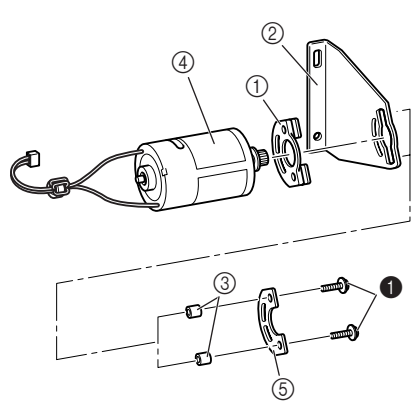
1. Attach the motor PCB assy ① to the PCB holder and arm bed using the 2 screws ❶ and the screw ❷.



❶	Taptite, Bind B M3X8	Torque 0.59 – 0.78 N·m
❷	Screw, Bind M4X8	Torque 0.78 – 1.18 N·m

4 Assembly of main motor assembly

1. Attach the fender rubber ① to the motor holder ②.
2. Engage the 2 spacers (4 x 6) ③ with the 2 round holes on the fender rubber ①.
3. Attach the main motor ④ and the motor spacer presser ⑤ to the motor holder ② with the 2 screws ❶.

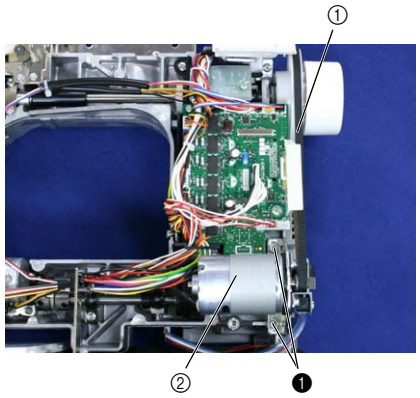


❶	Screw, Pan (S/P washer) M4X14	Torque 1.18 – 1.57 N·m

5 Main motor assembly attachment

1. Attach the timing belt ① to the upper shaft timing pulley and the motor pulley, align the main motor assembly ② with the arm bed and hand start the 2 screws ❶.
   (Fully tighten after 4 - 7 "Motor belt tension").

❶		Upset 4X12DB	Torque Hand tighten

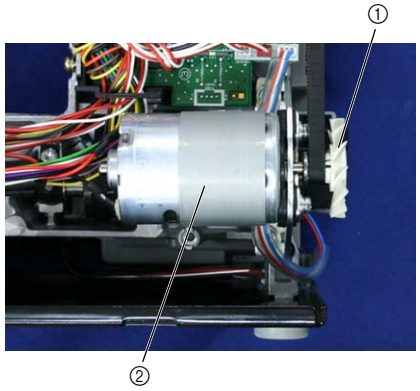


6 Motor fan attachment

1. Attach the motor fan ① to the main motor assembly ②.

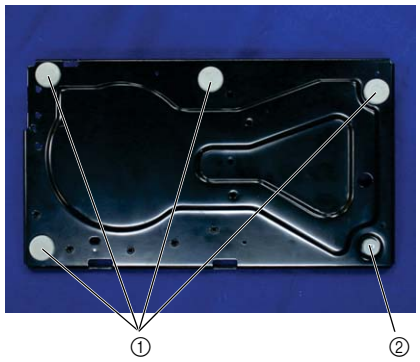
***Key point**

- Be careful removing the motor fan ① because the wings of the fan are very fragile.



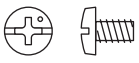
7 Base plate rubber attachment

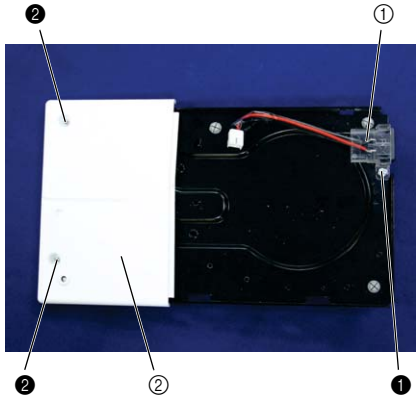
1. Attach the 4 base plate rubbers ① to the base plate.
2. Attach the adjusting screw assembly ②.



8 Inlet assy. and base plate cover attachment

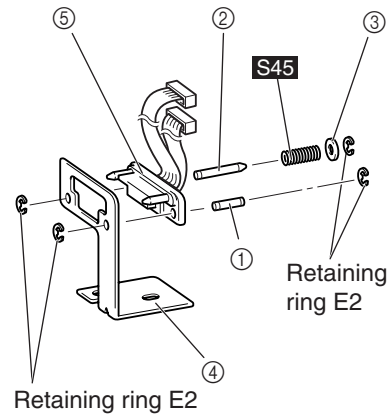
1. Attach the inlet assy ① to the base plate using the screws the screw ❶.
2. Attach the base plate cover ② to the base plate with the 2 screws ❷.

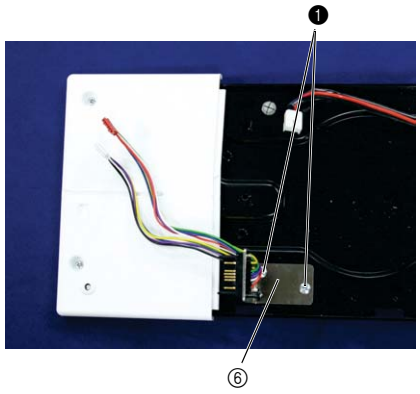
❶		Screw, Bind M4X6	Torque 1.18 – 1.57 N·m
❷		Screw, Bind M3X5	Torque 0.78 – 1.18 N·m

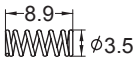


9 Connector holder ASSY assembly and attachment

1. Attach the retaining ring (E2) to ES pin F-A ①.
2. Attach the retaining ring (E2) to the sharper end of ES pin F-B ②, and then insert the feed bar spacer ③ and the spring S45.
3. Attach the lead wire assembly ⑤ to the connector holder ④.
4. Insert ES pin F-A ① into the lead wire assembly ⑤, and then attach the retaining ring (E2).
5. Insert ES pin F-B ② into the lead wire assembly ⑤, and then attach the retaining ring (E2).
6. Attach the connector holder assembly ⑥ to the base plate with the 2 screws ❶.

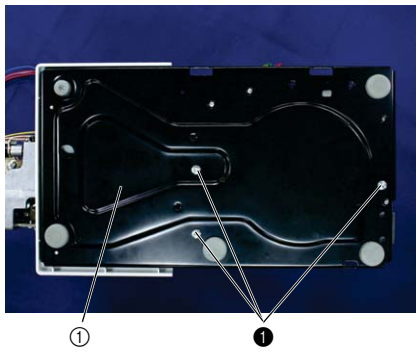


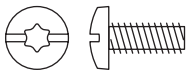


❶		Screw, Bind M4X6	Torque 1.47 – 1.96 N·m
S45		8.9, ϕ3.5	SPRING XD0967***

10 Base plate attachment

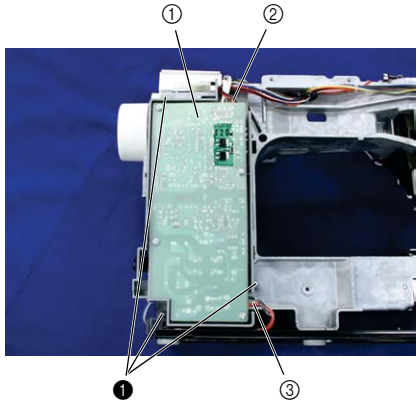
1. Attach the base plate assembly ① to the arm bed using the 3 screws ❶.

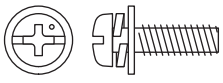


❶		Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m

11 Power supply unit F attachment

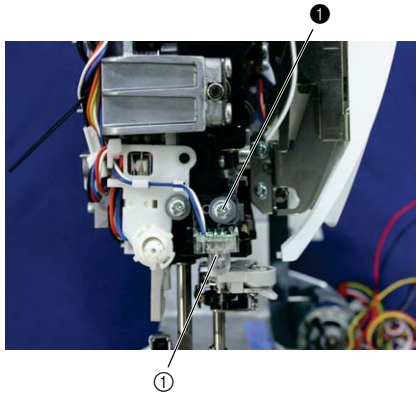
1. Attach the power supply unit ① to the arm bed with the 3 screws ❶.
2. Connect the inlet assembly lead wirefs connector ② to the power supply unit.
3. Connect the main motor assemblyfs connector ③ to the power supply unit.

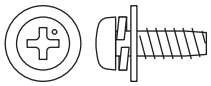


❶		Screw, Pan (S/P washer) M4X14	Torque 0.78 – 1.18 N·m

12 PBC unit LED lamp-FL attachment

1. Attach the PBC unit LED lamp-FL ① to the needle-presser module using the screw ❶.



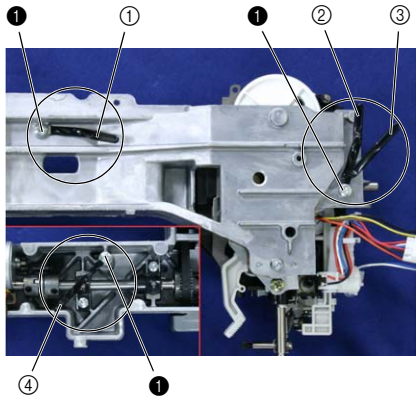
❶		Taptite,Pan B M4X12	Torque 0.78 – 1.18 N·m

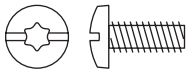
13 Wire clip attachment

1. Attach the 4 wire clips ① to ④ with the 3 screws ❶.

***Key point**

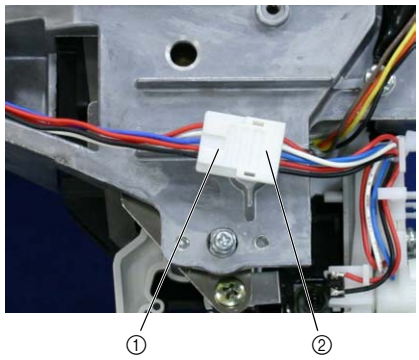
- Secure wire clips ② and ③ with one screw ❶.



❶		Taptite, Bind S M4X10	Torque 1.47 – 1.98 N·m

14 Lead assembly (BH-cable-F) attachment

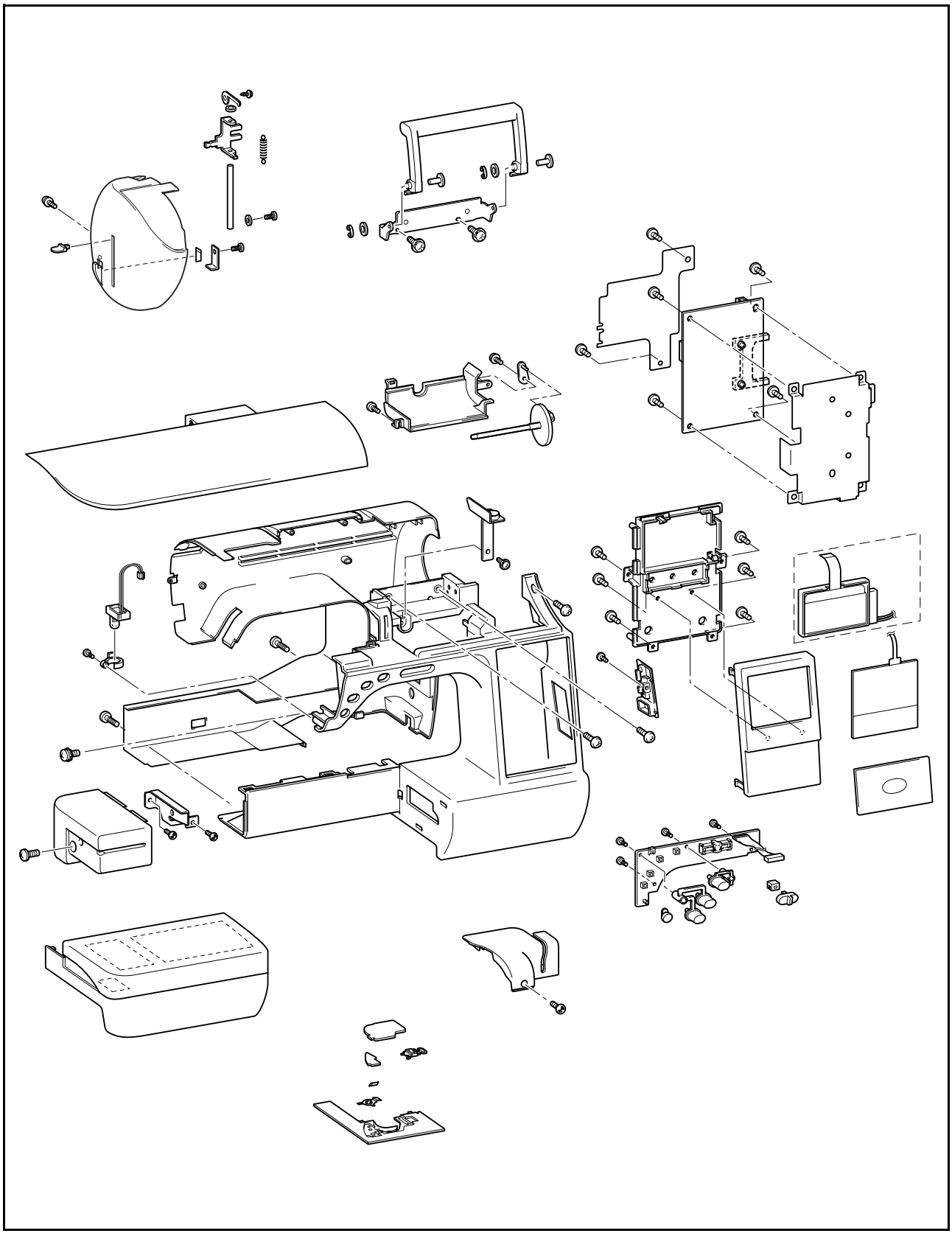
1. Attach the lead assembly (BH-cable-F) ① to the connector on the BH switch assembly ②.



15 Cord treatment

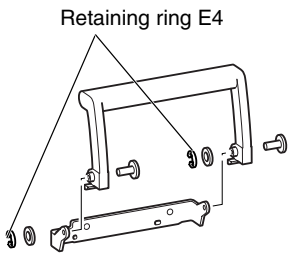
1. Refer to chapter 7 [Special Instructions of Wiring] for cord treatment of each section.

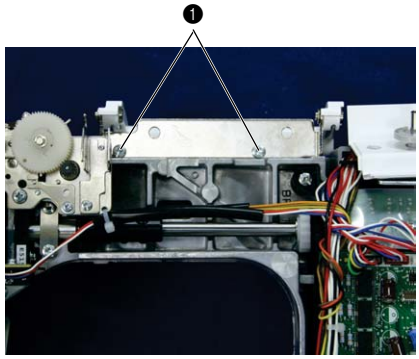
Main parts location diagram

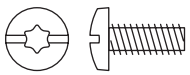


1 Handle assembly and attachment

1. Attach the handle, handle holder and polyester slider to the handle shafts, and attach 2 retaining rings E4.
2. Attach the handle to the arm bed using the 2 screws ❶.

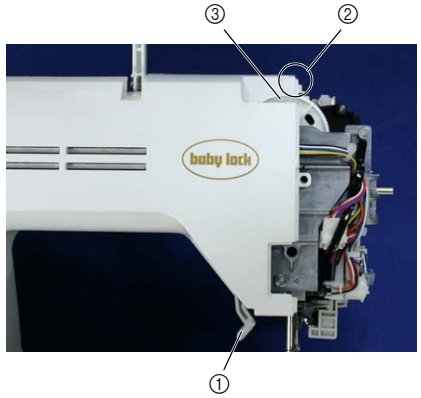


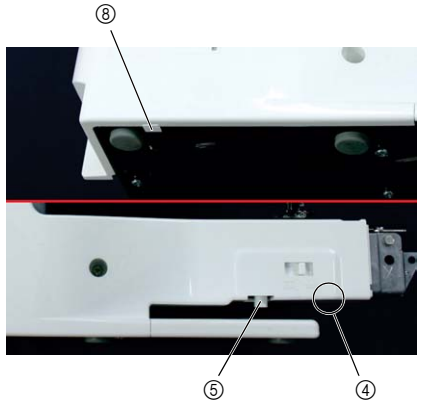


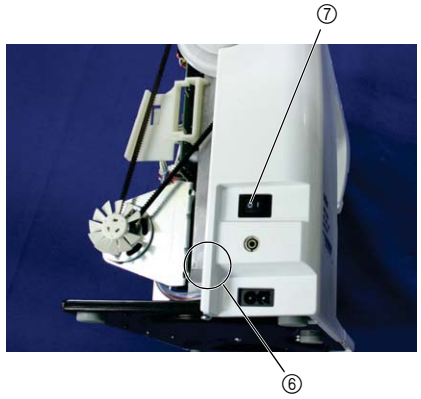
❶		Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m

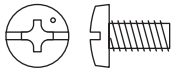
2 Rear cover attachment

1. Lower the presser lever ①.
2. Attach the rear cover, being careful to avoid the presser dial ③ being caught in section ②.
3. Attach the rear cover, being careful to avoid the drop lever ⑤ being caught in section ④.
4. Attach the rear cover, being careful to avoid the switch ⑦ being caught in section ⑥, and then attach the hook ⑧ to the base plate.
5. Attach the rear cover, being careful to avoid the presser lever ① being caught in section ⑨.
6. Secure the rear cover to the arm bed with the screw ❶.



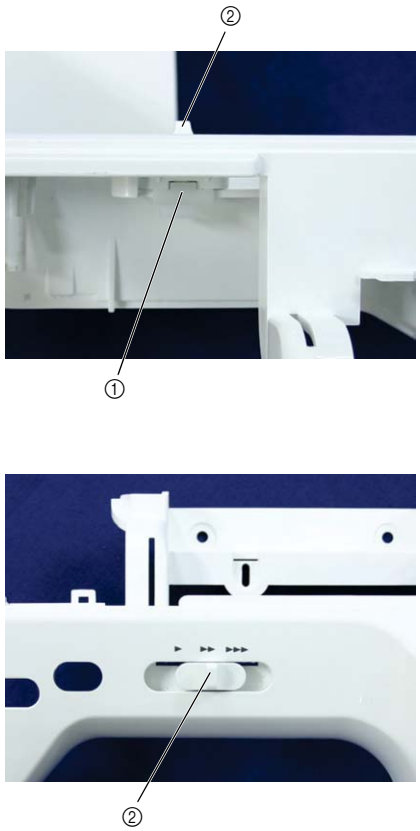




❶		Screw, Bind M4X8	Torque 0.78 – 1.18 N·m

3 Front cover assembly (SV keytop attachment)

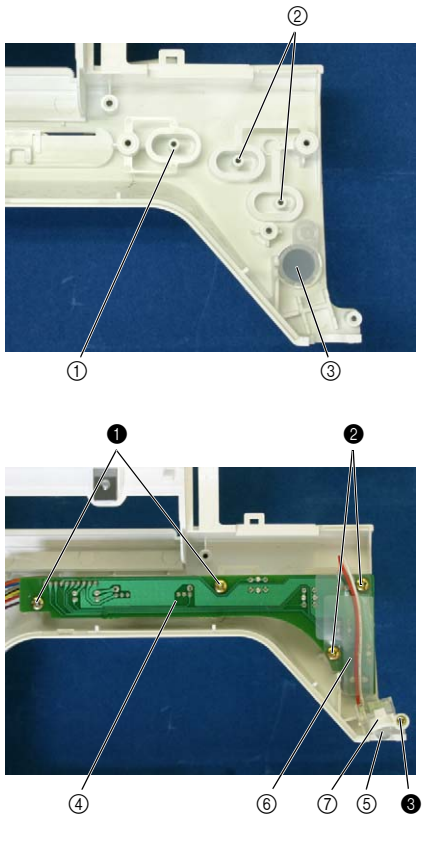
1. Attach the SV joint plate ① to the speed control key part of the front cover.
2. Attach the SV keytop ② to the SV joint plate ①.



4 Front cover assembly (SS-VR F PCB assy. attachment)

1. Attach the thread cut button ①, reverse button ②, and SS button ③.
2. Attach the SS-VR PCB assembly ④ to the front cover with the 2 screws ❶.

   ***Key point**
   - Align VR1 on the SS-VR PCB assembly with the SV joint plate.
3. Connect the connector of the PCB unit LED lamp (FR) ⑤ to the SS-VR PCB assembly ④.
4. Cover the cord of the PCB unit LED lamp (FR) ⑤ with the insulation sheet ⑥. Secure the SS-VR PCB assembly ④ and the SS-VR insulation sheet ⑥ with the 2 screws ❷, and then attach these to the front cover.
5. Pass the lamp of the PCB unit LED lamp (FR) ⑤ through the lamp holder support ⑦, and then attach the lamp holder support ⑦ to the front cover with the screw ❸.



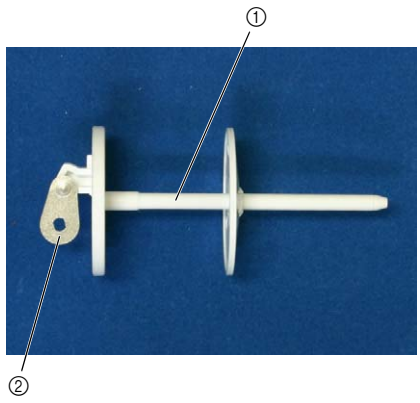
❶ ❷	Taptite, Bind B M3X8	Torque 0.57 – 0.78 N·m
❸	Taptite, Pan B M2.6X8	Torque 0.29 – 0.49 N·m

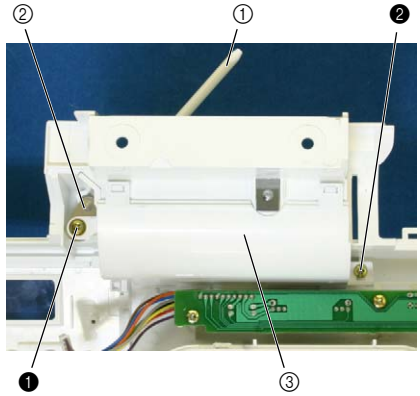
5 Front cover assembly (spool pin attachment)

1. Attach the spool pin ① to the spool pin holder assembly ②.
2. Attach the thread bobbin cover ③ and the spool pin holder assembly ② with the screws ❶ and ❷.

***Key point**

- Secure both the spool pin holder assembly ② and the thread bobbin cover ③ with the screw ❶.

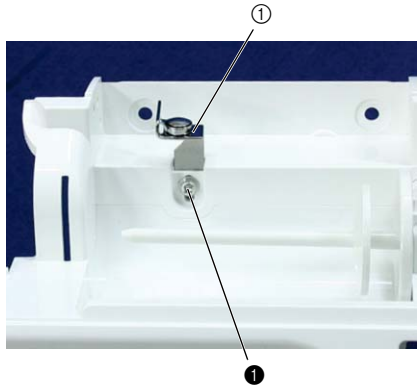




❶	Taptite, Cup B M3X10	Torque 0.29 – 0.49 N·m
❷	Taptite, Bind B M3X8	Torque 0.29 – 0.49 N·m

6 Front cover assembly (assembling bobbin winder guide assembly)

1. Attach the bobbin winder guide assembly ① to the front cover.
2. Hand start the screw ❶.
   (Fully tighten after 4 - 22 "Bobbin winder")



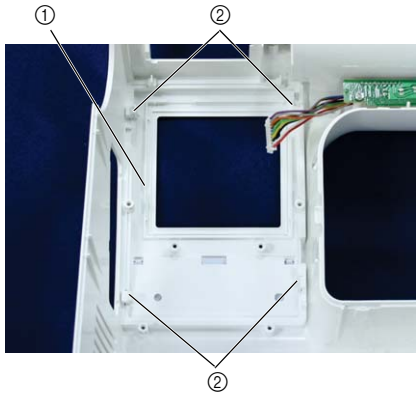
❶	Screw, Pan (S/P washer) M3X8DA	Torque 0.57 – 0.78 N·m

7 Indication panel attachment

1. Attach the indication panel ① to the front cover.

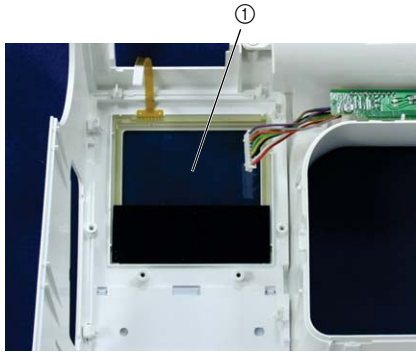
***Key point**

- Insert the indication panel ① from the top of the front cover to set it on the front side of the front cover, and then attach the 4 hooks ② to the inside of the front cover.



8 Touch panel assembly attachment

1. Attach the touch panel assembly ① to the front cover.

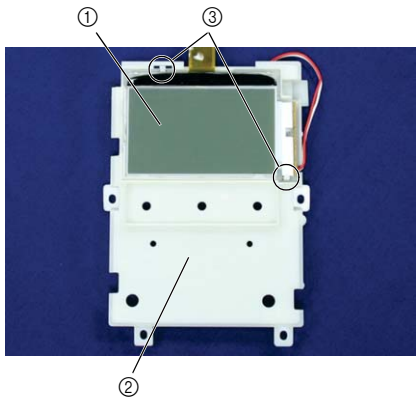


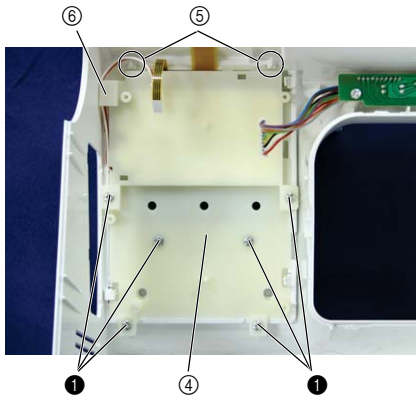
9 Main PCB holder assembly attachment

1. Attach the light plate assembly ① to the main PCB holder ② using the 2 hooks ③ on the main PCB holder ②.
2. Attach the main PCB holder assembly ④ to the front cover with the 6 screws ❶.

***Key point**

- Hang the main PCB holder assembly ④ over the 2 hooks ⑤ at the upper section of the front cover.
- Check that the lead wire of the light plate assembly ① passes under the left upper guide ⑥ of the main PCB holder assembly ④.





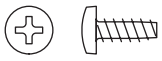
❶		Taptite, Bind B M3X8	Torque 0.39 – 0.79 N·m

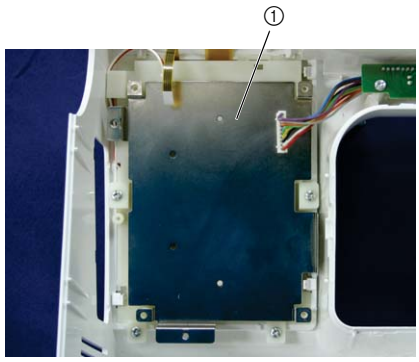
10 Main PCB assembly attachment

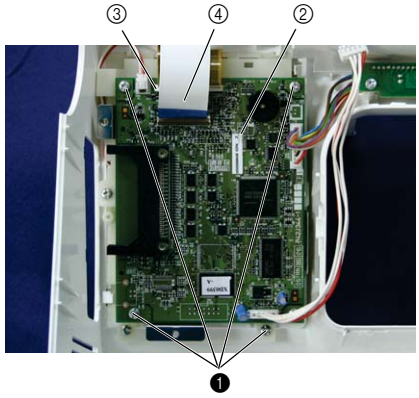
1. Position the PCB plate B ① and then the main PCB assembly ②, and then attach these to the front cover with the 4 screws ❶.
2. Connect the lead wirefs connectors and FFC cords (3 each) to the main PCB assembly ②.

***Key point**

- Pull up the lock of the connector on the main PCB to release it, insert the FFC cord ③, and then push down the lock to secure the cord.
- Move the lock of the connector on the main PCB to the upright position to release it, insert the FFC cord ④ with the blue surface facing down, and then press the lock down to secure the cord.
- After connection, check that the three FFC cords are connected to the connectors on the main PCB correctly.

❶		Taptite, Bind B M3X8	Torque 0.39 – 0.79 N·m





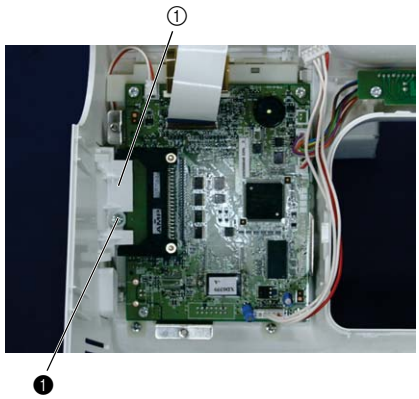
11 Card cover attachment

1. Attach the card cover ① to the front cover with the screw ❶.

***Key point**

- Check that the hook on the card cover ① is attached to the backside of the front cover.

❶		Taptite, Bind B M3X8	Torque 0.39 – 0.79 N·m

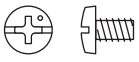


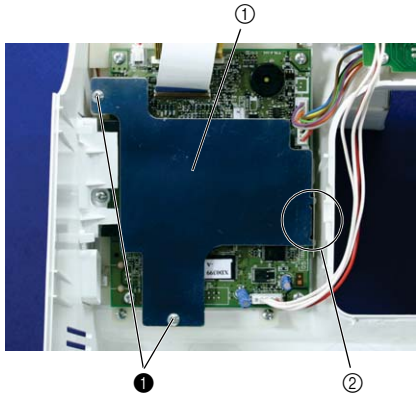
12 Board plate A attachment

1. Attach the board plate A ① to the front cover with the 2 screws ❶.

***Key point**

- Engage the 2 tabs on the right side of board plate A ① with the 2 slots on the right side of board plate B ②.

❶		Screw, Bind M3X5	Torque 0.39 – 0.79 N·m



13 Front cover attachment

1. Connect the FFC cord ① and the lead wirefs connector to the main PCB ②.

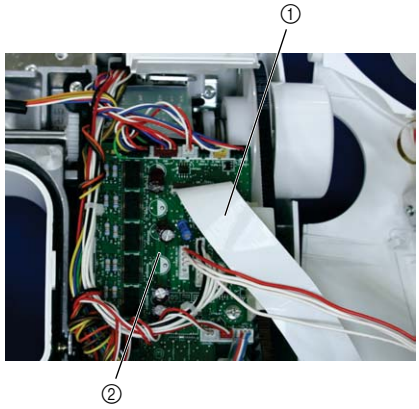
   ***Key point**
   - Move the lock of the connector on the main PCB ② to the upright position to release it, insert the FFC cord ① with the blue surface facing up, and then press the lock down to secure the cord.

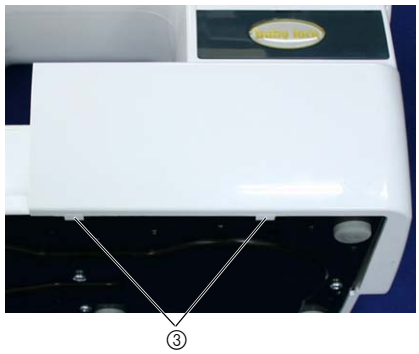
2. Engage the 2 hooks ③ with the bottom plate and 2 hooks ④ with the rear cover, and then secure the front cover with the 3 screws ❶.

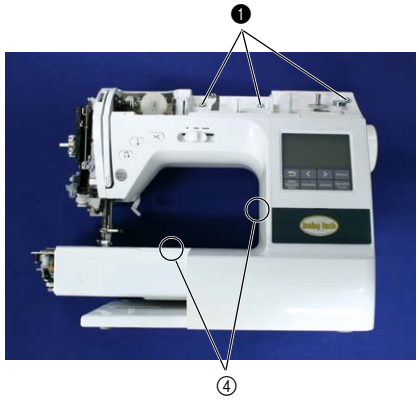
   ***Key point**
   - Check that the bobbin winder cover is at the upper section of the front cover.

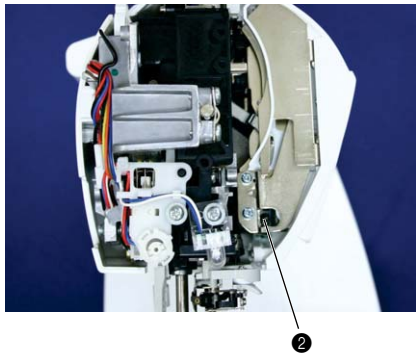
3. Tighten the screw ❷.

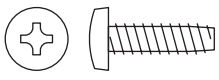
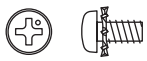
   ***Key point**
   - Secure both the thread guard assembly and the groove on the front cover with the screw ❷.





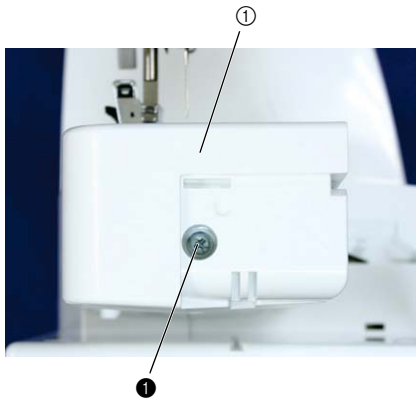




❶		Taptite, Bind B M4X14	Torque 0.78 – 1.18 N·m
❷		Screw, Pan (T washer) M3X6	Torque 0.57 – 0.78 N·m

14 Free arm cover attachment

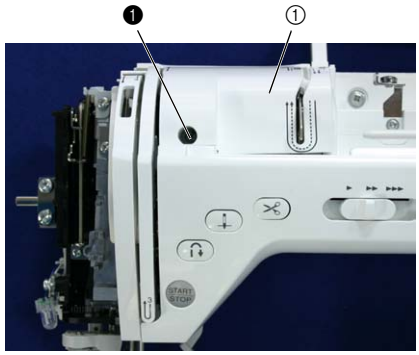
1. Attach the free arm cover ① to the arm bed with the screw ❶.



❶	Screw, Pan (S/P washer) M4X8	Torque 0.78 – 1.18 N·m

15 Front thread guide cover attachment

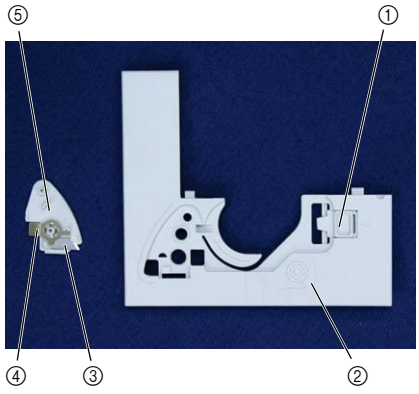
1. Attach the front thread guide cover ① using the screw ❶.



❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

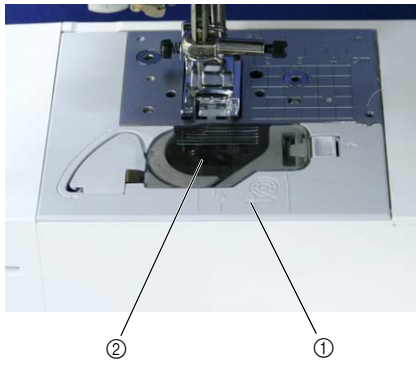
16 Assembling needle plate B assy

1. Attach the slide button ① to the needle plate B ②.
2. Attach the NT lower thread cutter ③ and the spring plate ④ to the cutter cover ⑤.
3. Attach the cutter cover ⑤ to the needle plate B ②.



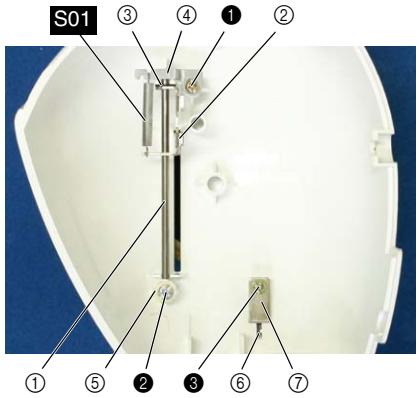
17 Needle plate B assy. attachment

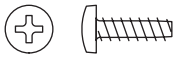
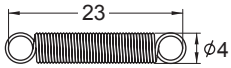
1. Attach the needle plate B assy ① to the main unit.
2. Attach the needle plate cover ② to the needle plate B assy ①.



18 Face plate assembly

1. Attach the needle thread lever shaft ①, needle thread lever ②, and rubber washer ③ to the face plate.
2. Attach the shaft presser plate ④ to the face plate with the screw ❶.
3. Attach the screw ❷ and the washer ⑤.
4. Attach the spring S01 to the needle thread lever ② and the shaft presser plate ④.
5. Attach the NT lower thread cutter ⑥ to the face plate, and then attach the face plate cutter holder with the screw ❸.
6. Attach the needle thread lever knob ⑧.



❶ ❸		Taptite, Pan B M3X6	Torque 0.29 – 0.34 N·m
❷		Taptite, Bind B M3X10	Torque 0.29 – 0.34 N·m
S01		THREAD THROUGH LEVER SPRING 138260***	

19 Face plate assy. attachment

1. Secure the face plate assy ① to the arm bed with the screw ❶.

***Key point**

- Align and attach the hole in the center on the inside of the face plate assy ① to the shaft on the needle-presser module.

❶		Screw, Pan (S/P washer) M4X14	Torque 0.78 – 1.18 N·m

20 Top cover attachment

1. Attach the top cover ① to the front cover.

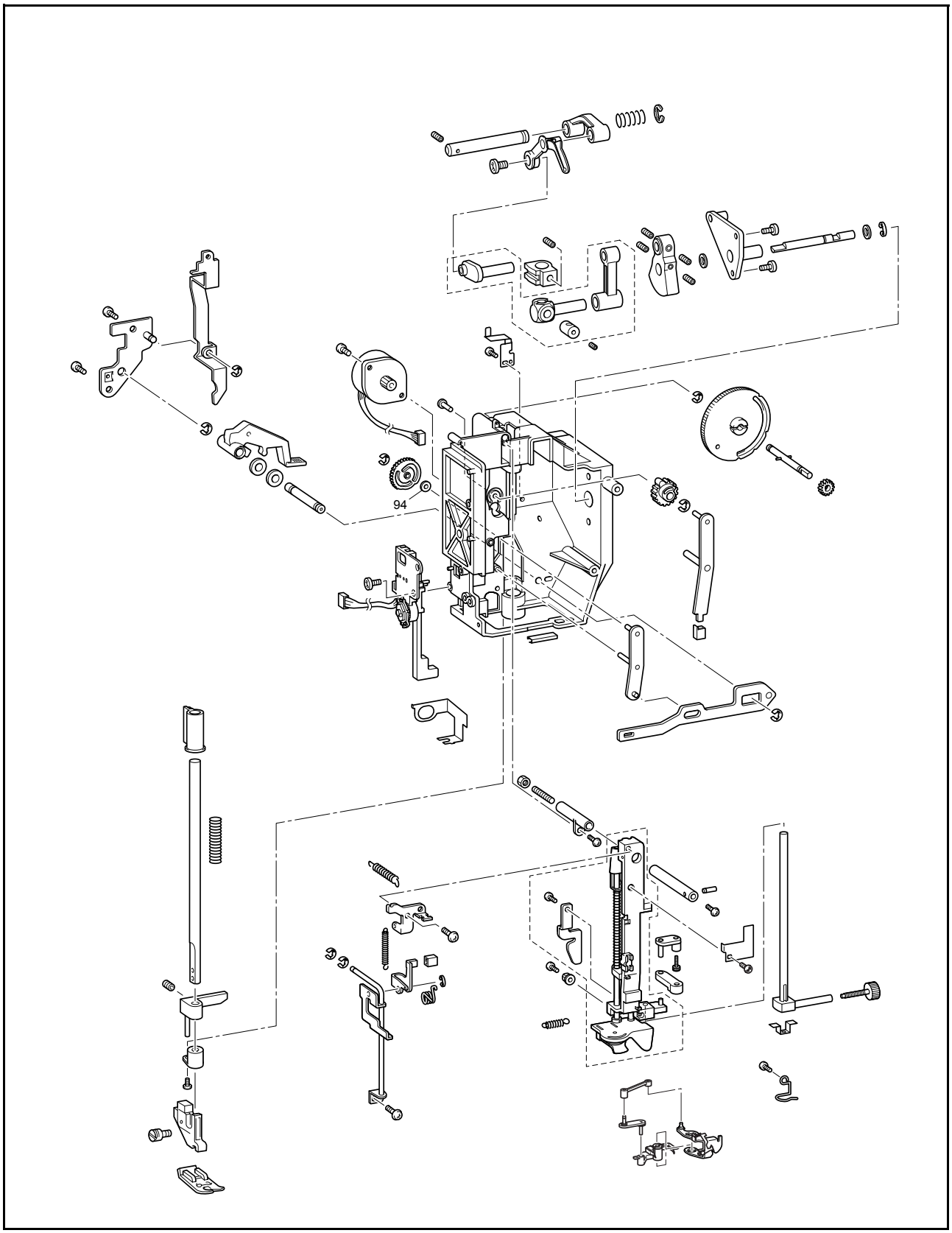
***Key point**

- The attachments (two, left and right) for the top cover ① fall to the inside.

21 Accessory table assembly and attachment

1. Attach the accessory table door to the accessory table ①.
2. Attach the accessory table ① to the main unit.

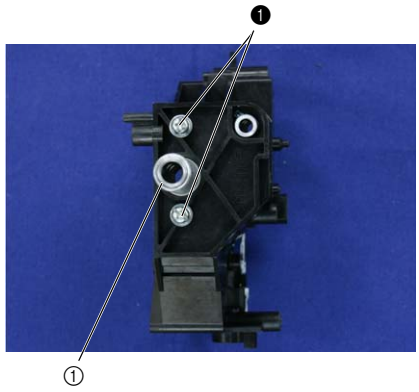
Needle-presser module breakout diagram



1 Shaft bushing assembly attachment

1. Using the 2 screws ❶, attach the shaft bushing assembly ① to the upper unit holder.

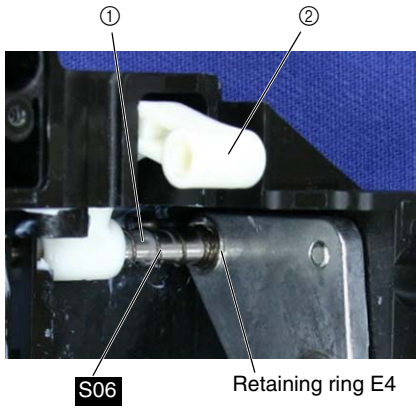
❶	Screw, Pan (S/P washer) M4X14DB	Torque 1.18 – 1.57 N·m

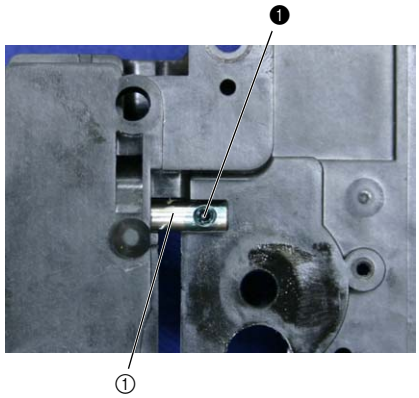


2 Thread take-up lever link assembly

1. Apply a small amount of MOLYKOTE EM30L to the shaft hole in the thread take-up lever link.
2. Attach the shaft ①, spring S06 and thread take-up lever link ② to the upper unit holder, and attach retaining ring E4.
3. Install the screw ❶ in the shaft ①.

Apply MOLYKOTE EM30L all the way around the shaft hole in the thread take-up lever link.	small amount XC8385





❶	Set Screw, Socket (CP) M3X5	Torque 0.49 N·m
S06	20.7, ϕ5.2	SPRING XC2441***

3 Presser bar attachment

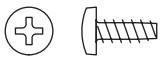
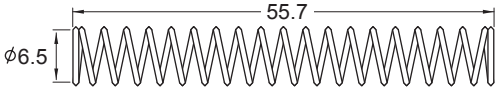
1. Insert the presser bar bushing ① into the shaft hole on the bottom of the unit holder.
2. Attach the plate spring ② to the unit holder with the screw ❶.

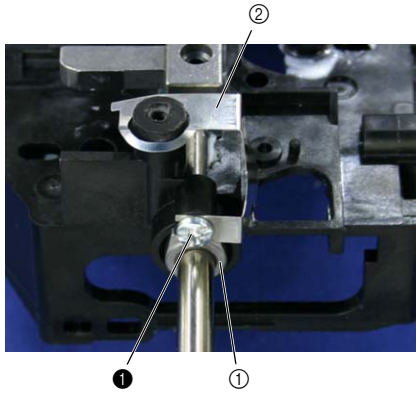
   ***Key point**
   - Press the presser bar bushing with the plate spring.
3. Dip the tip of the presser bar ③ (opposite end from the retaining ring) in FBK OIL RO 100.
4. Insert the presser bar ③ into the presser foot rack ④.
5. Temporarily attach the screw ❷ to the presser bar clamp ⑤.
6. Adjust the presser bar height and parallel alignment, and then fully tighten the screw ❷.

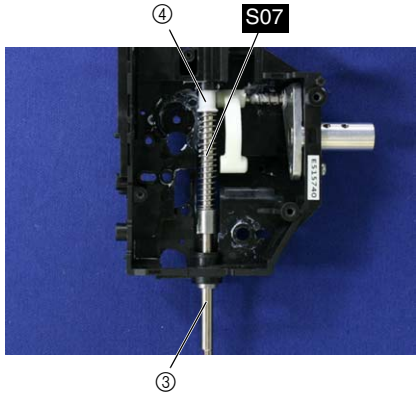
   ***Key point**
   - Refer to "Presser bar height and parallelism" on page 4 - 16 for the adjustment procedure.
7. Apply a bead of MOLYKOTE EM30L to the groove on the stopper pin of the unit holder.
8. Insert spring S07 and the presser bar clamp ⑤ into the presser bar ③.

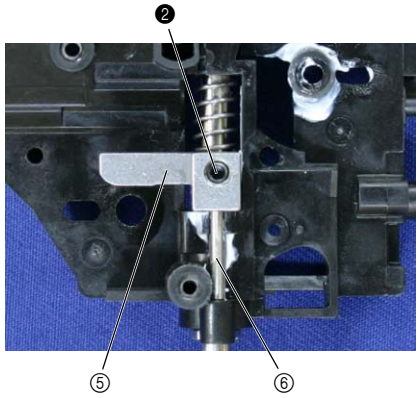
   ***Key point**
   - Engage the stopper pin ⑥ of the presser bar clamp ⑤ with the groove on the stopper pin of the unit holder.
9. Pass the presser bar ③ through to the presser bar bushing ①.

Dip the tip of the presser bar (opposite end from the retaining ring) in FBK OIL RO 100.	Dipping XC8388***
Apply MOLYKOTE EM30L to the groove on the stopper pin of the unit holder.	Bead XC8385***

❶		Taptite, Bind B M3X8	Torque 0.78 – 1.18 N·m
❷		Set Screw, Socket (CP) M5X10	Torque Hand tighten
S07			SPRING XC4457***



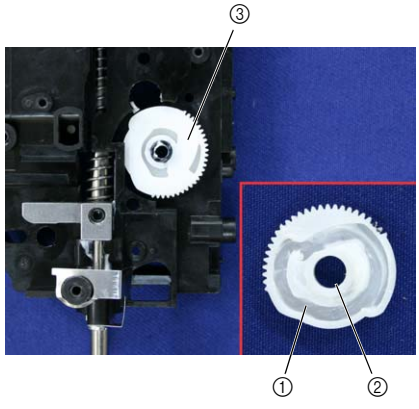




4 T cam attachment

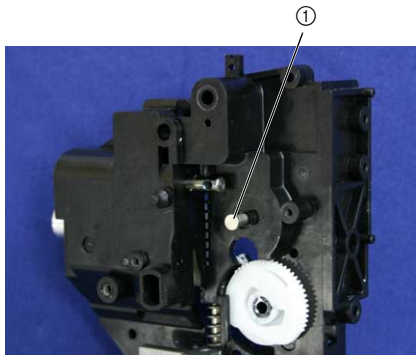
1. Apply a small amount of MOLYKOTE EM30L to the cam groove ① and shaft hole ② of the T cam.
2. Attach the T cam ③ to the upper unit holder.
3. Apply a small amount of MOLYKOTE EM30L to the gear for the T cam ③.

Apply MOLYKOTE EM30L to the entire cam groove in the T cam	Small amount XC8385***
Apply MOLYKOTE EM30L to the shaft hole in the T cam	Small amount XC8385***
Apply MOLYKOTE EM30L to the entire surface of the gear for the T cam	Small amount XC8385***



5 Shaft attachment

1. Attach the shaft ①.



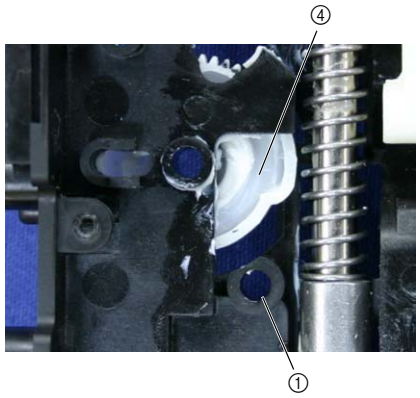
6 Thread release lever assy. attachment

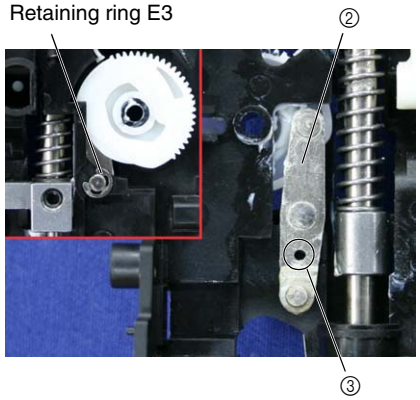
1. Apply a small amount of MOLYKOTE EM30L to the thread release lever assy hole ① in the upper unit holder.
2. Attach the thread release lever assy ② and polyester slider to the upper unit holder, and attach retaining ring E3.

***Key point**

- The side of the thread release lever assy ② with the hole ③ is the bottom.
- Align the pin on the thread release lever assy ② with the cam groove ④ in the T cam.

Apply MOLYKOTE EM30L to the thread release attachment hole	Small amount XC8385***
Apply MOLYKOTE EM30L to thread release assembly shaft	Small amount XC8385***



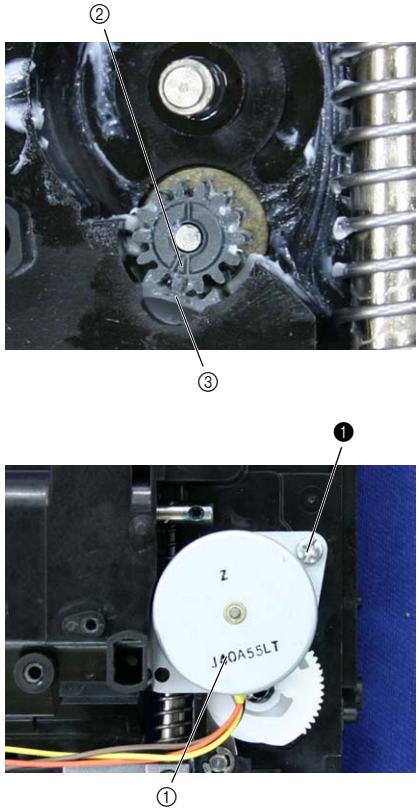


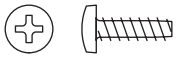
7 Z pulse motor attachment

1. Attach the Z pulse motor (ZPMSMJ-35-4840-A) ① to the upper unit holder using the screw ❶.

***Key point**

- Align the match mark ② on the Z pulse motor gear and the match mark ③ on the T cam gear.



❶		Taptite, Bind B M3X10	Torque 0.78 – 1.18 N·m

8 Z zigzag cam attachment

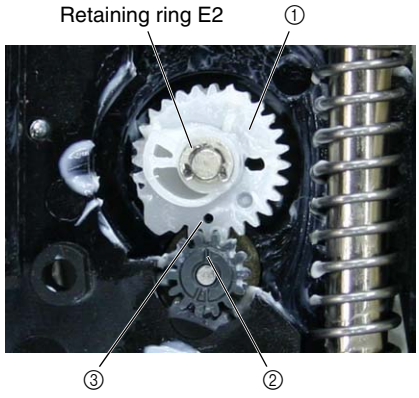
1. Install the Z zigzag cam ① on the Z zigzag cam shaft, and attach the retaining washer E2.

***Key point**

- Align the match mark ② on the Z pulse motor gear and the match mark ③ on the Z zigzag cam.

2. Apply a small amount of MOLYKOTE EM30L to the Z zigzag cam ① gear part and cam part.

Apply MOLYKOTE EM30L to all of the sliding part of the Z zigzag cam pin	Small amount XC8385***
Apply MOLYKOTE EM30L to all of the Z zigzag cam	Small amount XC8385***
Apply MOLYKOTE EM30L all around the Z zigzag cam gear	Small amount XC8385***



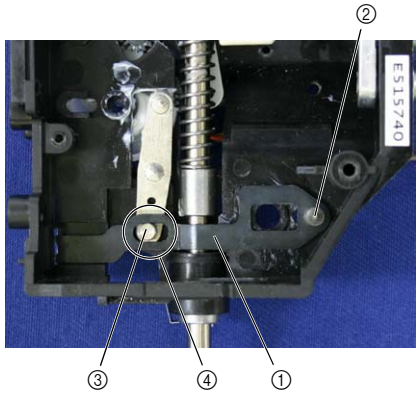
9 Thread releaser assy. attachment

1. Apply MOLYKOTE EM30L to the thread releaser assy ①.
2. Attach the thread releaser assy ① to the upper unit holder.

***Key point**

- Align the thread releaser assy ①, pin ② and upper unit holder hole as well as the thread release lever pin ③ and the round hole ④ in the thread releaser assy ①.

Apply MOLYKOTE EM30L to all of the sliding part of the thread releaser assy.	Small amount XC8385***



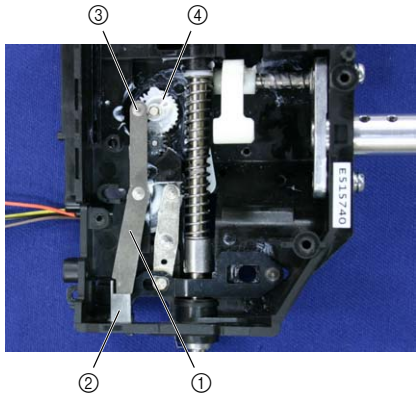
10 Z zigzag lever assy. attachment

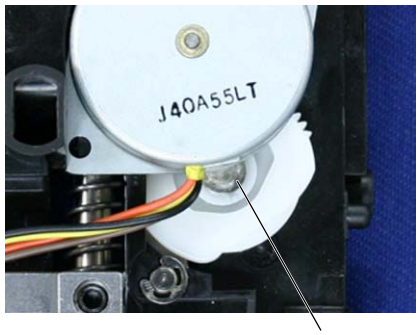
1. Attach the cap ② to the Z zigzag lever assy ①.
2. Apply a small amount of MOLYKOTE EM30L to the 2 Z zigzag lever assy ① pins.
3. Attach the Z zigzag lever assy ① to the upper unit holder, and the attach retaining ring E3.

***Key point**

- The end ③ of the Z zigzag lever ① is the left side of the Z zigzag cam ④.

Apply MOLYKOTE EM30L to the two pins on the Z zigzag lever	Small amount XC8385***





Retaining ring E3

11 Thread take-up counter weight attachment

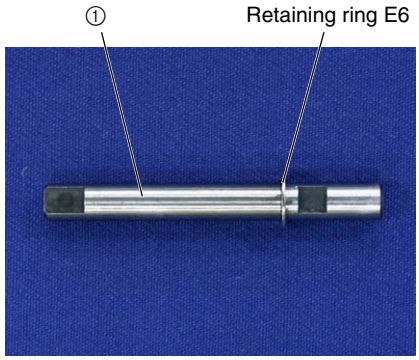
1. Attach the retaining ring E6 to the unit shaft ①.
2. Attach the thrust washer ②, unit shaft ①, thrust washer ② to the shaft bushing assembly ③.
3. Attach the thread take-up counter weight ④ using the 2 screws ❶.

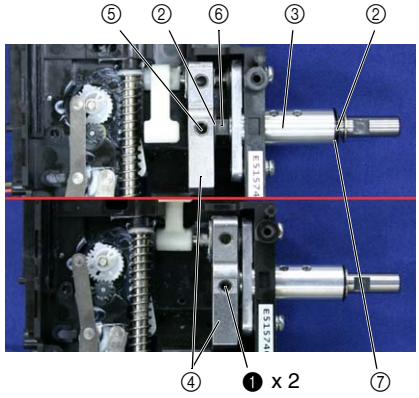
***Key point**

- Align the screw hole ⑤ in the thread take-up counter weight ④ and the unit shaft D cut surface ⑥.

4. Lubricate part ⑦ of the shaft bushing assembly ③ with one to two drops of OILER B ASSY.

Lubricate the unit shaft with OILER B ASSY.	1 – 2 drops XZ0206***
Lubricate the inside of the shaft bushing with OILER B ASSY	1 – 2 drops XZ0206***





❶		Set Screw, Socket (FT) M5X5	Torque 1.37 – 1.77 N·m

12 Thread take-up lever assy. attachment

1. Apply a bead of MOLYKOTE EM30L to the 2 calking shafts of the needle bar crank ①.
2. Apply a bead of MOLYKOTE EM30L to the calking shaft of the thread take-up lever assembly ②.
3. Insert the needle bar crank ③ rod (end with the larger diameter) into the calking shaft (longer) of the needle bar crank ①.
4. Apply a bead of MOLYKOTE EM30L to the screw attachment face of the needle bar crack ① (tip of the shorter calking shaft).
5. Insert the calking shaft (longer) of the needle bar crank ③ into the thread take-up counter weight ④.

***Key point**

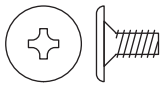
- Align the D-cut face ⑤ of the needle bar crank calking shaft with the screw hole ⑥ on the thread take-up counter weight.

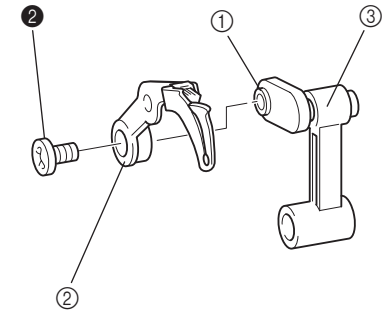
6. Fully tighten the 2 screws ❶ temporarily attached to the thread take-up counter weight ④.
7. Insert the calking shaft of the thread take-up lever assembly ② into the shaft hole on the thread take-up lever link ⑦.
8. Insert the calking shaft (shorter) of the needle bar crank ① into the shaft hole on the thread take-up lever assembly ②, and then tighten the screw ❷.

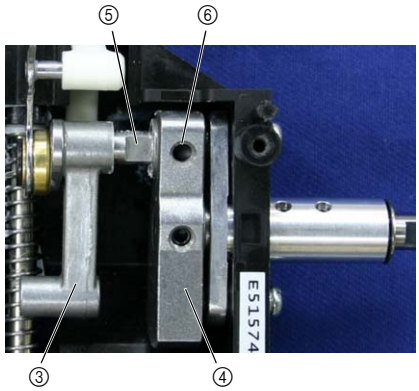
***Key point**

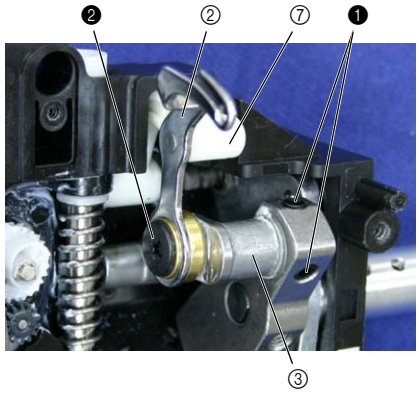
- The screw ❷ has a reverse helical flute thread.

Apply MOLYKOTE EM30L to the 2 calking shafts of the needle bar crank.	Bead XC8385***
Apply MOLYKOTE EM30L to the calking shaft of the thread take-up lever assembly.	Bead XC8385***
Apply MOLYKOTE EM30L to the screw attachment face of the needle bar crack (tip of the shorter calking shaft).	Bead XC8385***

❶		Set Screw, Socket (FT) M5X5	Torque 1.37 – 1.77 N·m
❷		Screw, Flat SM3.57-40X7 L	Torque 1.18 – 1.57 N·m



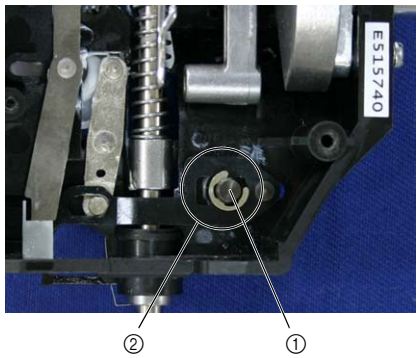


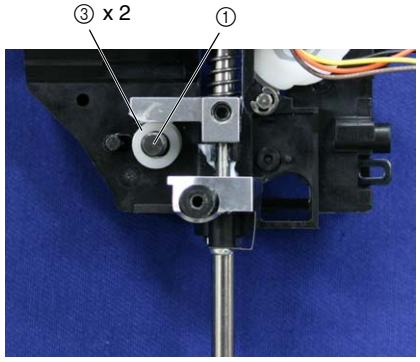


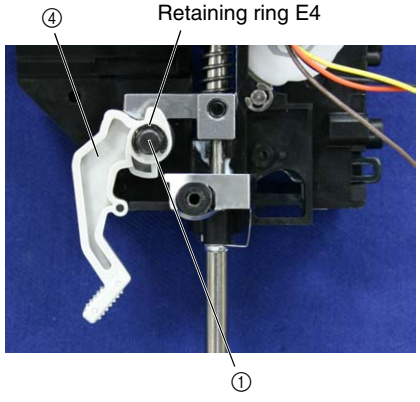
13 Presser foot lifter attachment

1. Attach the retaining ring E4 to the presser lift shaft ①.
2. Apply a small amount of MOLYKOTE EM30L to the presser lift shaft ①.
3. Insert the presser lift shaft ① into the hole ② in the thread releaser assy, and attach the 2 washer ③ and presser foot lifter ④.
4. Attach the retaining ring E4 to the presser lift shaft ①.

Apply MOLYKOTE EM30L to the operating surface of the presser lifter shaft presser foot lifter.	Small amount XC8385***
Apply MOLYKOTE EM30L to the operating surface of the presser foot lifter presser bar clamp	Small amount XC8385***





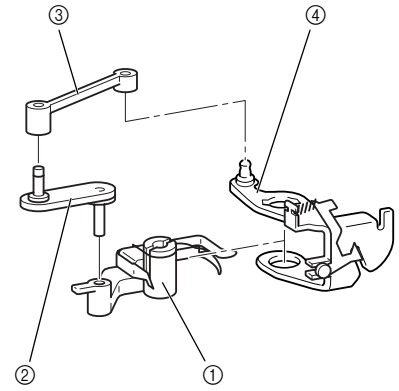


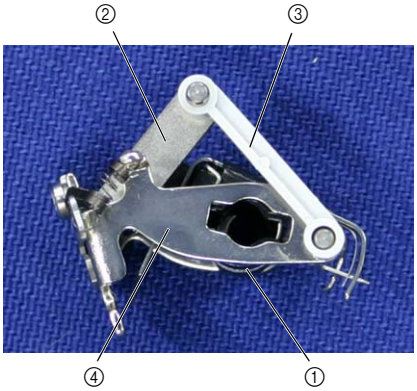
14 Threader hook assy. attachment

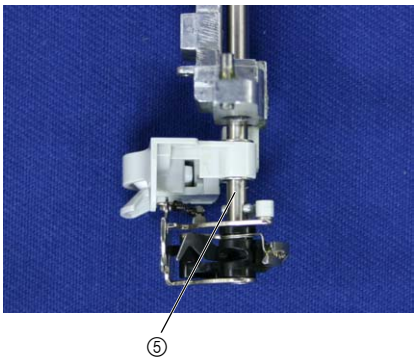
1. Assemble the threader hook assy ①, link A assy ②, link B ③ and thread guide assy ④.
2. Align the needle thread shaft A ⑤ to the shape of the threader hook assy ① shaft hole, and attach the threader hook assy ① to the needle thread shaft A ⑤.

***Key point**

- Assemble the link A assembly ②, link B assembly ③, and thread guide assembly ④ so that a triangle is formed.



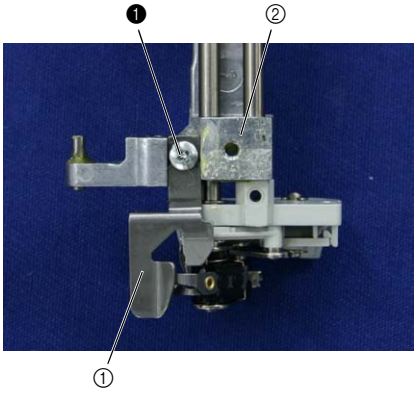




15 Hook release plate attachment

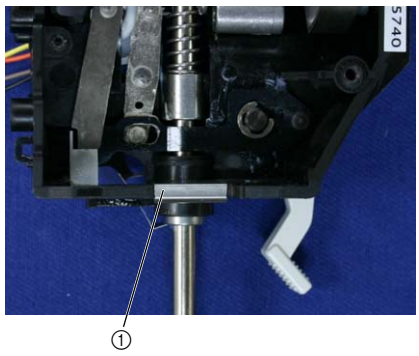
1. Attach the hook release plate ① to the needle bar supporter assy ② the screw ❶.

❶		Screw, Bind M2.6X5	Torque 0.29 – 0.49 N·m



16 Thread guide plate attachment

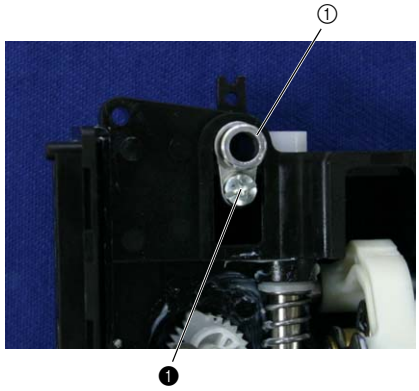
1. Attach the thread guide plate ① to the upper unit holder.



17 Shaft bushing A attachment

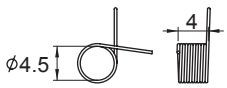
1. Attach the shaft bushing A ① to the upper unit holder using the screw ❶.

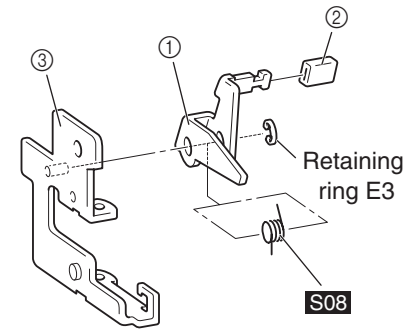
❶		Taptite, Bind B M3X8	Torque 0.78 – 1.18 N·m



18 Assembling the Lever AB assy

1. Attach the cap ② to the lever B ①.
2. Attach the lever B ① and the spring S08 to the lever A assembly ③, and then attach the retaining ring E3.

S08		TORSION SPRING XC2460***

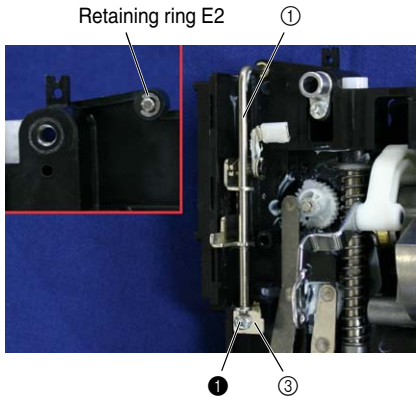


19 Lever AB assy. attachment

1. Attach the retaining ring E2 to the lever guide shaft ①.
2. Apply a small amount of EPNOC AP(N)0 to the lever guide shaft ①.
3. Apply a small amount of MOLYKOTE EM30L to the upper unit holder slide groove.
4. Attach the lever AB assy ② to the lever guide shaft ①.
5. Attach the lever guide shaft assy ① to the upper unit holder, and attach the lever presser plate ③ using the screw ❶.
6. Attach the retaining ring E2 to the lever guide shaft ①.

Apply EPNOC AP(N)0 to the lever guide shaft	Small amount XC8387***
Apply MOLYKOTE EM30L to the full width of the slide lever groove	Small amount XC8385***
Apply MOLYKOTE EM30L to the operating surfaces of the lever B cap and the thread guide slider.	Small amount XC8385***

❶		Taptite, Bind B M3X6	Torque 0.78 – 1.18 N·m

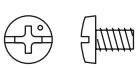


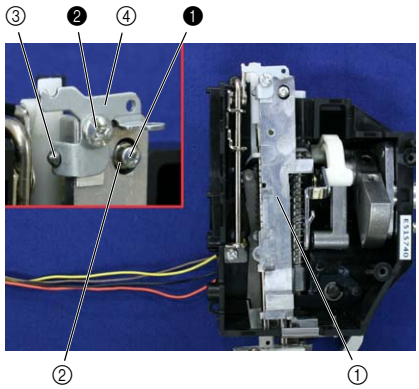
20 Needle bar supporter assy. attachment

1. Attach the needle bar supporter assy ① to the upper unit holder.

   ***Key point**
   - Move the lever AB assy up.
   - Turn the T cam, and move the lower end of the Z zigzag lever to the left.
2. Attach the shaft ②.
3. Attach the shaft ③, and install the screw ❶.
4. Attach the plate ④ using the screw ❷.

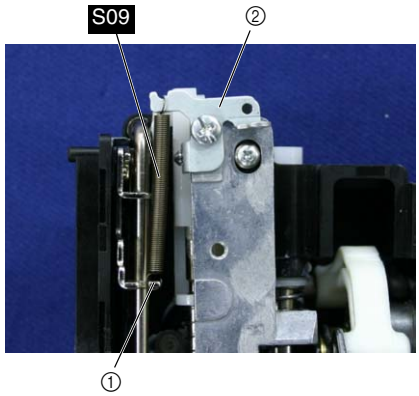
Lubricate the shaft with FBK OIL RO 100.	1 – 2 drops XC8388***

❶		Set Screw, Socket (FT) M4X4	Torque 0.78 – 1.18 N·m
❷		Screw, Bind M3X5	Torque 0.78 – 1.18 N·m



21 Lever A spring attachment

1. Attach the spring S09 to the lever AB assy ① and the plate ②.



S09	30.1 ϕ3.2 A decided hook form is the same.	SPRING XC2461***

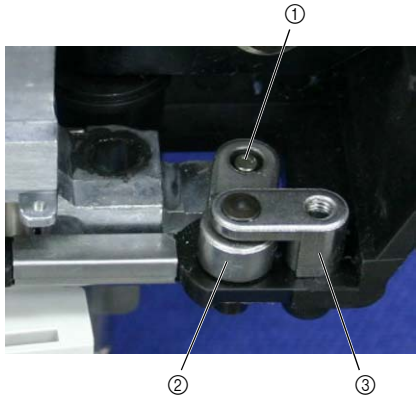
22 Shaft assy. attachment

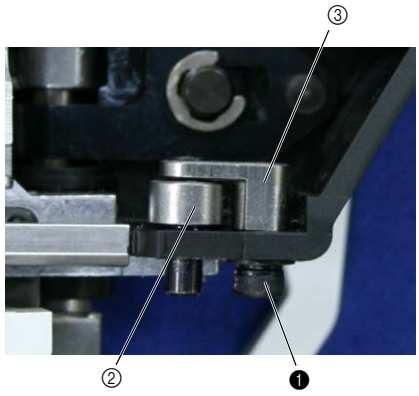
1. Apply a small amount of EPNOC AP(N)0 to the needle bar supporter assy needle roller ①.
2. Attach the needle holder block ② to the needle bar supporter assy needle roller ①.

***Key point**

- The flat surface of the needle holder block is the bottom.

3. Apply a small amount of EPNOC AP(N)0 to the shaft assy ③ shaft.
4. Attach the shaft assy ③ to the needle holder block ② and upper unit holder, and hand start an the screw ❶.
(Fully tighten after 4 - 11 "Needle clearance left/right")





Apply EPNOC AP(N)0 to the upper unit holder needle roller			Small amount XC8387***
Apply EPNOC AP(N)0 to the shaft assy. shaft.			Small amount XC8387***

❶		Screw 3X10	Torque 0.78 – 1.18 N·m

23 Needle bar assembly

1. Attach the needle thread plate ① to the needle block ②.
2. Attach the needle block ② to the needle bar ③ using the screw ❶.

***Key point**

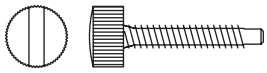
- With the needle bar groove facing forward, the screw ❶ is on the right side.

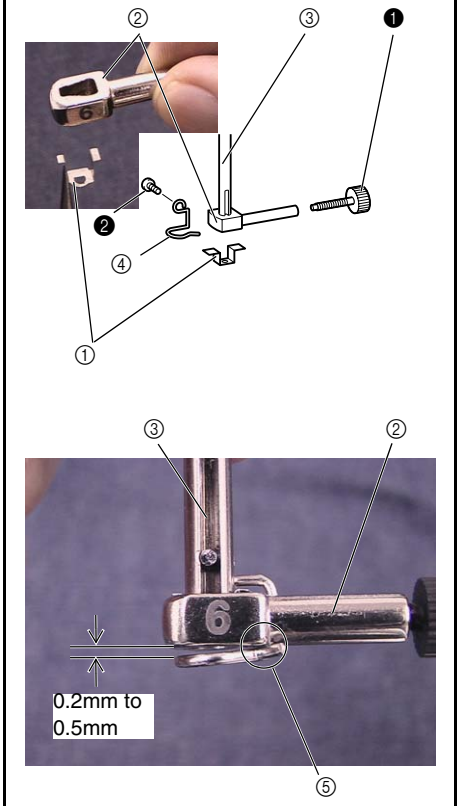
3. Attach the needle bar thread guide ④ to the needle bar ③ using the screw ❷.

***Key point**

- There should be no gap ⑤ on the right side of the needle bar thread guide ④ and needle block ②.
- There should be a 0.2 mm – 0.5 mm gap on the left side of the needle bar thread guide ④ and needle block ②.

Gap on right side of needle bar thread guide and needle block	None
Gap on left side of needle bar thread guide and needle block	0.2 mm – 0.5 mm

❶		Needle Clamp Screw	–
❷		Screw SM2.38	Torque 0.39 – 1.78 N·m

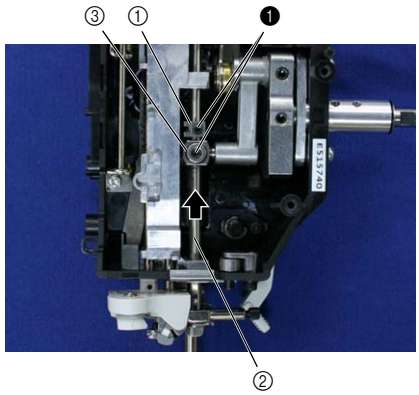


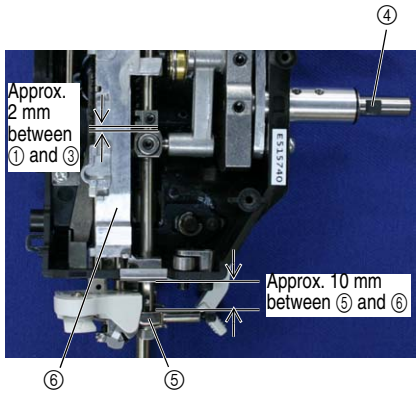
24 Needle bar assembly attachment

1. Apply a small amount of EPNOC AP(N)0 to the needle thread block ①.
2. Hand tighten the needle bar ②, needle thread block ① and needle bar hook stand assy ③ using the 2 screws ❶.
   (Fully tighten after 4 - 13 "Needle bar height," and 4 - 15 "Needle threader.")

***Key point**

- With the unit shaft D cut ④ facing forward, the upper surface of the needle block ⑤ and the needle bar supporter assy ⑥ should be adjusted to approximately 10 mm separation.
- Adjust the space between the needle thread block ① and the needle bar hook stand assy ③ to approximately 2 mm.
- When the needle thread block ① is viewed from the front, it is secured in a position turned slightly counterclockwise (see 4 - 13 "Needle bar height")





Lubricate the needle bar crank joint area with MOLYKOTE (OILER B ASSY 90% + MOLYKOTE DISPERSION).		1 – 2 drops XZ0206*** XC8385***
Apply EPNOC AP(N)0 to the sliding pin part of the needle thread block.		Small amount XC8387***
Lubricate the needle bar supporter assy. needle operating area with OILER B ASSY.		1 – 2 drops XZ0206***

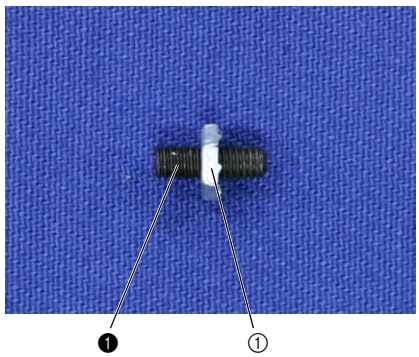
❶		Set Screw, Socket (FT) M4X4	Torque Hand tighten

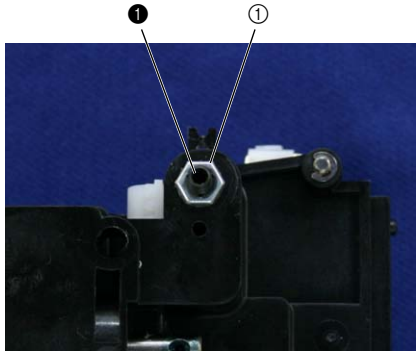
25 Lock nut attachment

1. Attach the screw ❶ to the lock nut ①.

   ***Key point**
   - The screw ❶ in approximately half its length.
2. Install the screw ❶ in the upper unit holder.

   ***Key point**
   - Tighten until the lock nut ① hits the upper unit holder.
3. Tighten the lock nut ①.



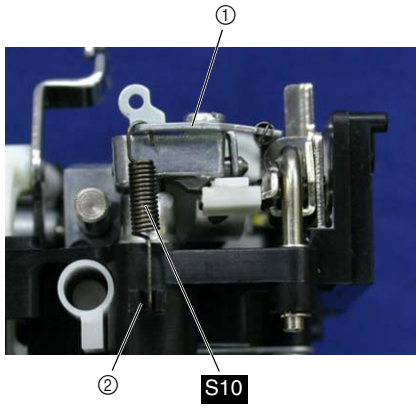


❶	Set Screw, Socket (CP) M4X12	Torque 0.39 – 0.49 N·m

26 Spring (for needle bar supporter assy.) attachment

1. Attach the spring S10 to the needle bar supporter assy plate ① and the upper unit holder ②.

   ***Key point**
   - Connect the side with the short hook to the needle bar supporter assy plate ① and the long side to the upper unit holder ②.



S10	24.5	SPRING XC2429***

27 Presser dial attachment

1. Attach the presser dial shaft assy ① to the presser dial ②, and attach the retaining ring E4.

   ***Key point**
   - See the figure to the right for the presser dial shaft assy ① D cut ③ and presser dial ② hole ③.

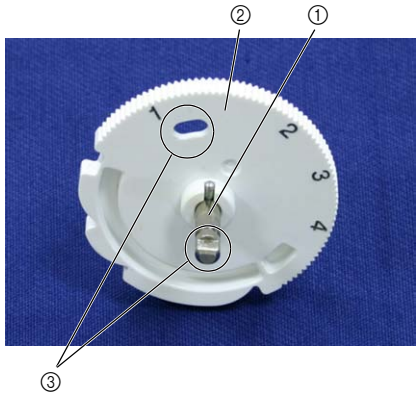
2. Attach the presser dial gear ④.

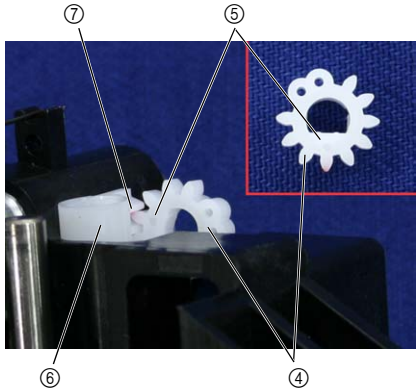
   ***Key point**
   - Align the presser dial gear ④ match mark ⑤ and the first indentation ⑦ from the top in the tension spring receiving gear ⑥ .

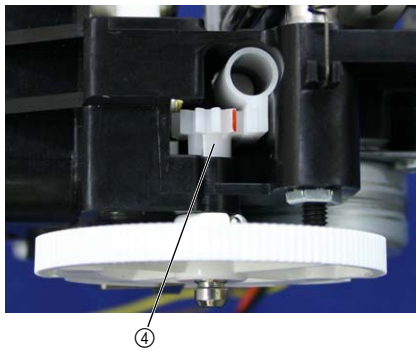
3. Attach the presser dial assy.

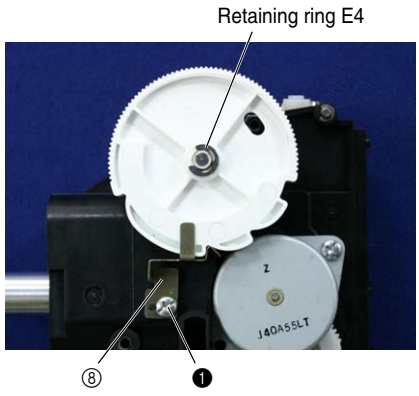
   ***Key point**
   - Align the presser dial shaft assy ① D cut ③ and the presser dial gear ④ D cut.

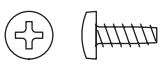
4. Attach the spring plate ⑧ to the upper unit holder using the screw ❶.









❶		Taptite, Bind B M3X8	Torque 0.78 – 1.18 N·m

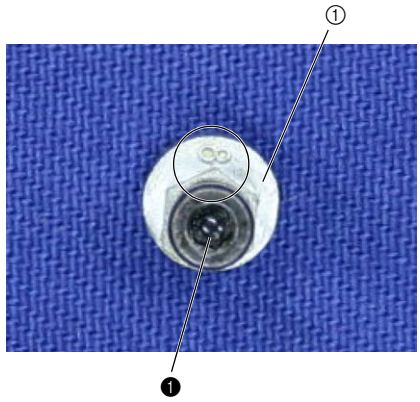
28 Zigzag adjusting nut attachment

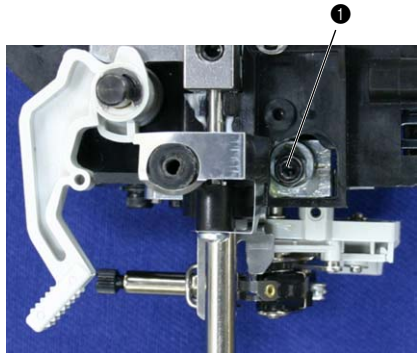
1. Apply a small amount of EPNOC AP(N)0 to the zigzag adjusting nut ①.
2. Hand tighten the zigzag adjusting nut ① on the needle bar supporter assy using the screw ❶.
   (Fully tighten after 4 - 10 "Left base line needle drop.")

***Key point**

- Set the side of the zigzag adjusting nut ① with the greatest eccentricity toward the top (see figure at the right).

Apply EPNOC AP(N)0 to the zigzag adjusting nut Z zigzag lever contact surface	Small amount XC8387***

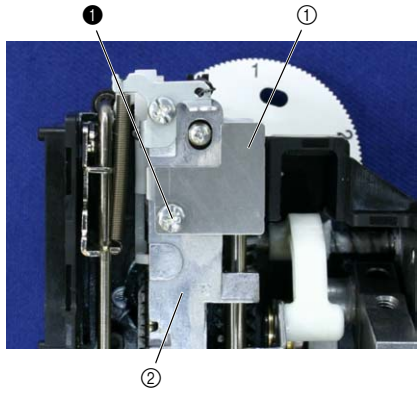




❶	Bolt, Socket M4X25	Torque 0.78 – 1.18 N·m

29 Thread take-up lever back plate attachment

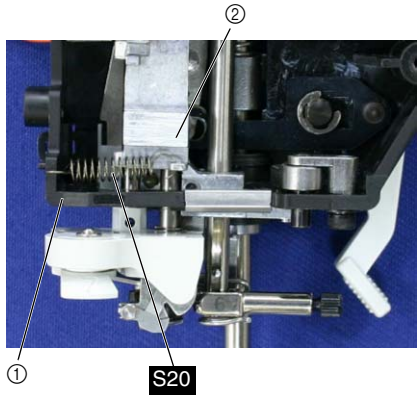
1. Attach the thread take-up lever back plate ① to the needle bar supporter assembly ② with the screw ❶.

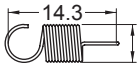


❶	Screw, Bind M3X5	Torque 0.78 – 1.18 N·m

30 Spring-Z attachment

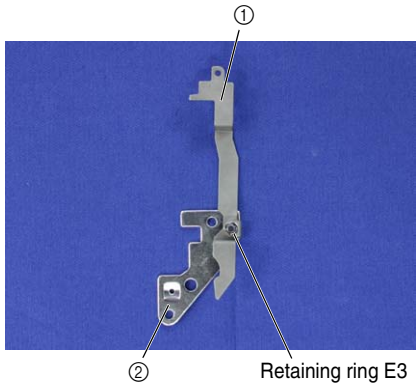
1. Attach the spring S20 to the upper unit holder ① and the needle bar supporter assy ②.



S20	 A decided hook form is the same.	SPRING-Z XC2748***

31 Adjusting plate ASSY assembly

1. Attach the tension releaser C ① to the adjusting plate assembly ②, and then attach the retaining ring E3.

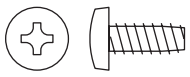


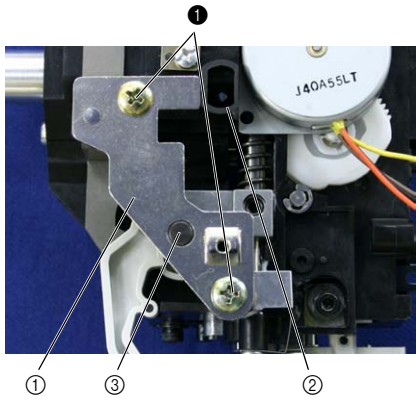
32 Adjusting plate assy. attachment

1. Attach the adjusting plate assy ① to the upper unit holder using the 2 screws ❶.

***Key point**

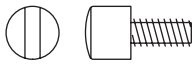
- Hold the adjusting plate assy ① against the right stopper ② and attach.
- Align the presser lifter shaft and the adjusting plate assy hole ③.

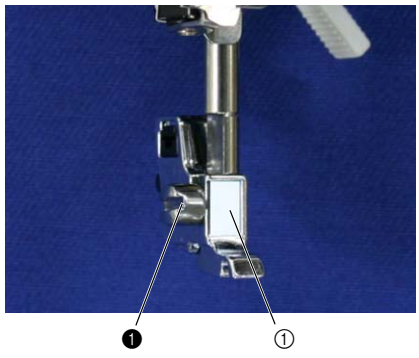
❶		Taptite, Bind B M4X10	Torque 1.18 – 1.57 N·m



33 Presser feed holder assy. attachment

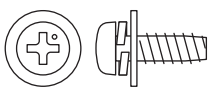
1. Attach the presser feed holder assy ① to the presser bar using the screw ❶.

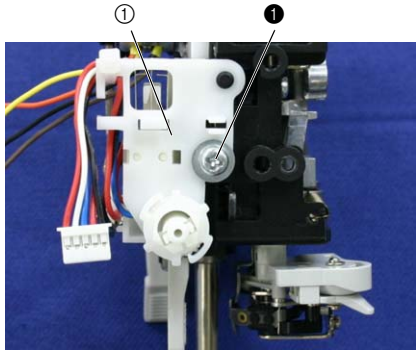
❶		Screw 3.57	Torque 1.18 – 1.57 N·m



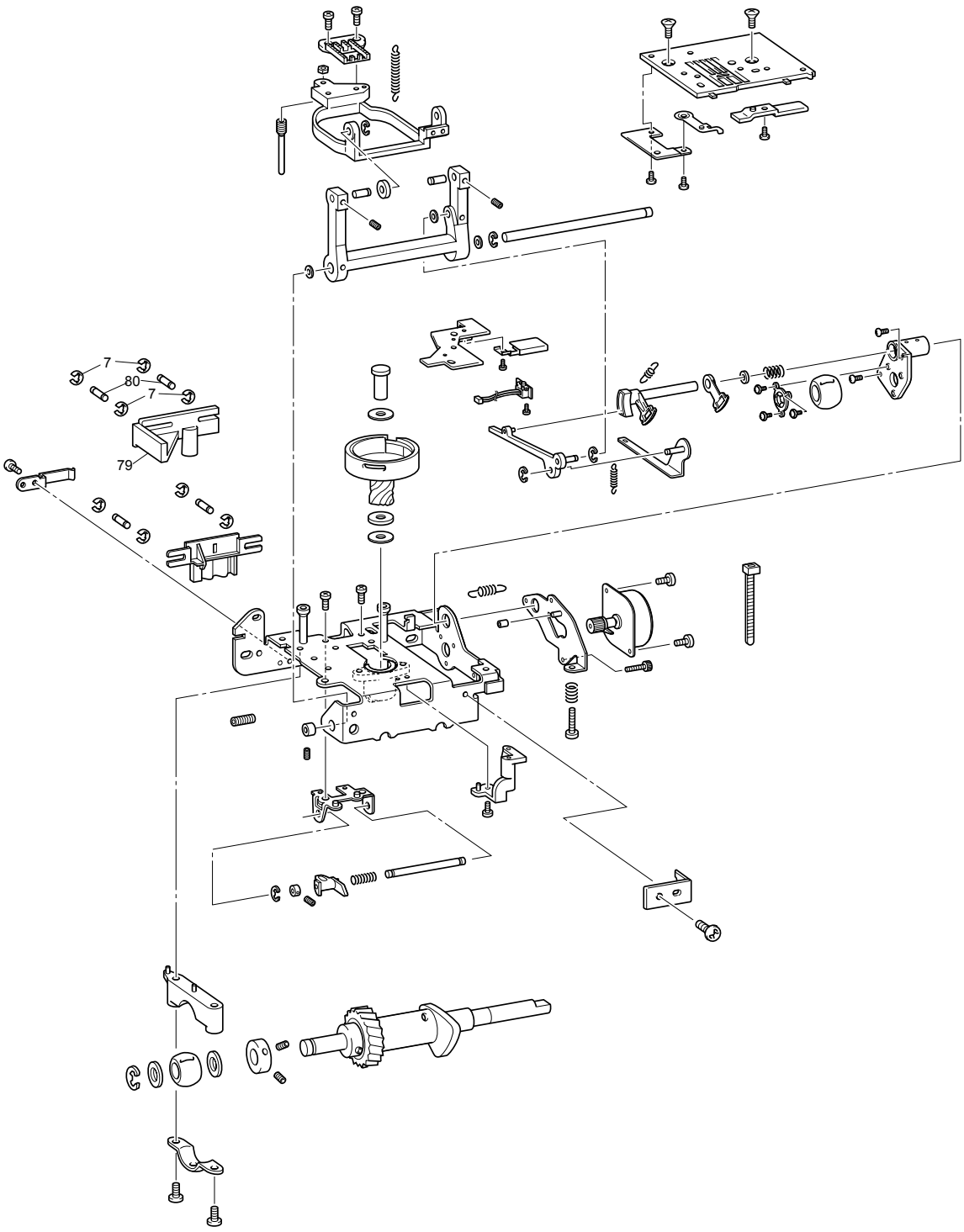
34 BH switch assy. attachment

1. Attach the BH switch assy ① to the upper unit holder using the screw ❶.

❶		Taptite,Pan B M4X12	Torque 1.18 – 1.57 N·m

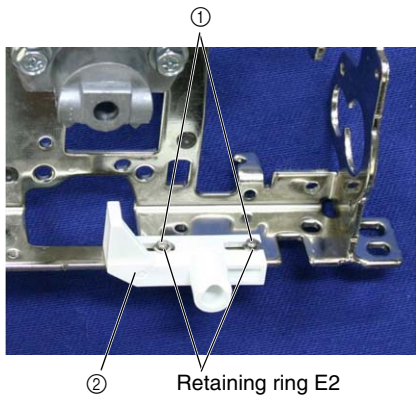


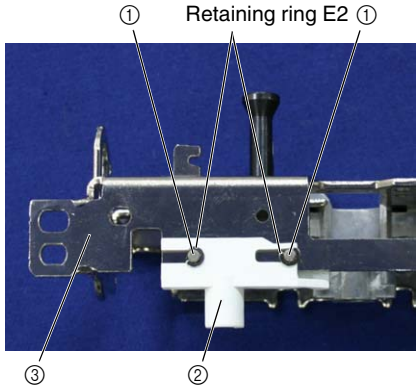
Feed module breakout diagram



1 Drop lever FE attachment

1. Attach the 2 retaining rings (E6) to 2 slide shafts A ①.
2. Attach 2 slide shafts ① and the drop lever FE ② to the feed base ③, and then attach the 2 retaining rings (E6).

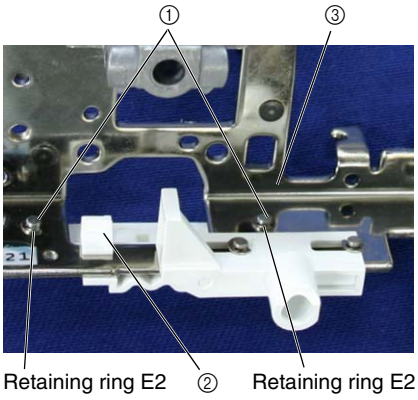


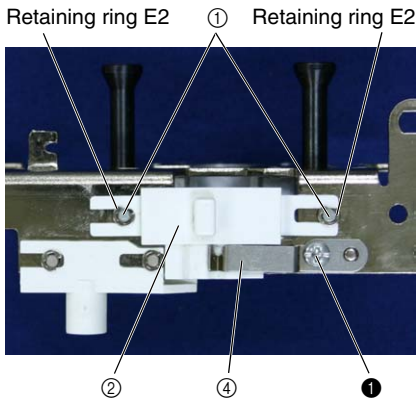


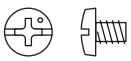
2 Drop knob attachment

1. Attach the 2 retaining rings E2 to the 2 slide shafts B ①.
2. Attach the drop knob ② and to the 2 slide shaft B assembly ① to the feed base ③, and the 2 attach retaining rings E2.
3. Apply a small amount of Molykote EM30L to the drop knob ②.
4. Attach the spring plate ④ using the screw ❶.

Apply MOLYKOTE EM30L to the sliding parts of the drop knob and spring plate	Small amount XC8385***





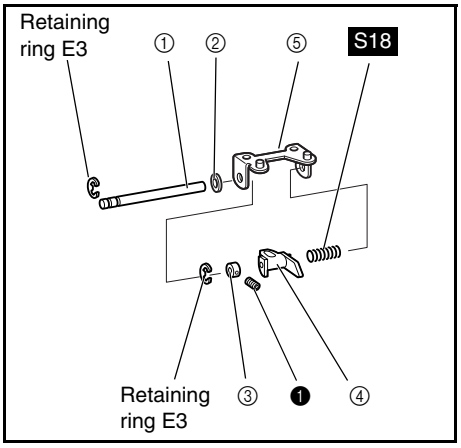
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

3 Drop assy. assembly

1. Attach the retaining ring E3 to the vertical feed shaft ①.
2. Attach the vertical feed shaft assy ①, polyester slider ②, set screw collar 4 ③, vertical lever ④, and spring S18 to the vertical supporting plate ⑤, and attach retaining ring E3.
3. Hand start the screw ❶ in the set screw collar 4 ③.
   (Fully tighten after 3 - 65 "11. Lower shaft B assy. attachment.")
4. Apply 1 – 2 drops of OILER B ASSY to the vertical feed shaft assy. ①.

Lubricate the vertical feed shaft with OILER B ASSY.	1 – 2 drops XZ0206***

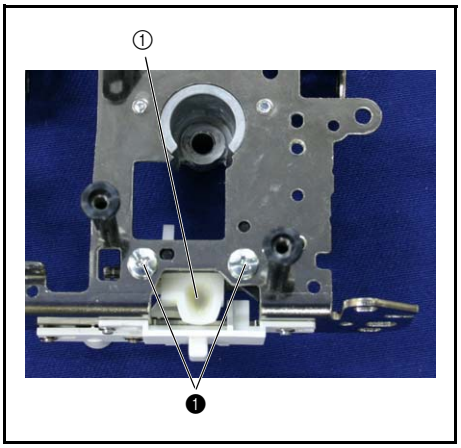
❶		Set Screw, Socket (CP) M4X4	Torque Hand tighten
S18	11, ϕ5.7		SPRING XC2550***



4 Drop assy. attachment

1. Attach the drop assy ① using the 2 screws ❶.

❶		Screw, Bind M4X5	Torque 1.18 – 1.57 N·m

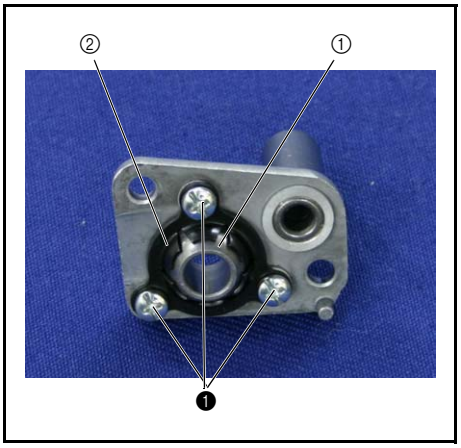


5 Bushing supporter assy. assembly

1. Attach the lower shaft bushing ① and the bushing presser B ② to the bushing supporter assy ③ using the 3 screws ❶.
2. Lubricate the lower shaft bushing ① with 1 – 2 drops of FBK OIL RO 100.

Lubricate the lower shaft bushing round surface with FBK OIL RO 100.	1 – 2 drops XC8388***

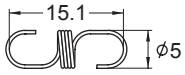
❶		Screw, Bind M4X5	Torque 0.78 – 1.18 N·m

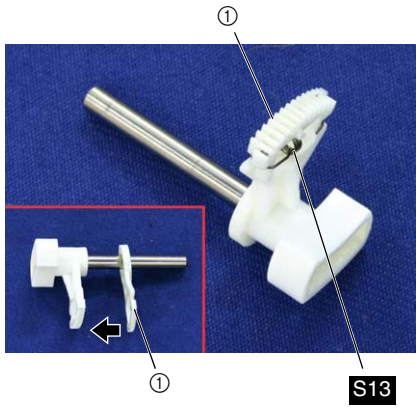


6 Feed adjuster assembly

1. Apply a small amount of EPNOC AP(N)0 to the F gear ①.
2. Align the F gear ① and the feed adjuster assy. ② and attach spring S13.

Apply EPNOC AP(N)0 to the entire operating surface of the feed adjuster assy. F gear	Small amount XC8387***

S13		SPRING XC2530***

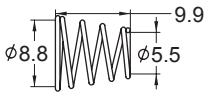


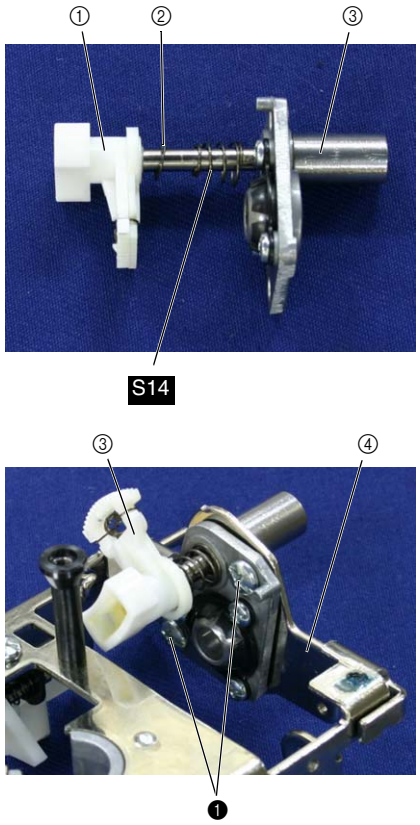
7 Feed adjuster assembly attachment

1. Attach the feed adjuster assy. ①, polyester slider ② and spring S14 to the bushing supporter assy. ③.

   ***Key point**
   - Attach spring S14 to the feed adjuster assy. ② starting with the side having the smaller spring diameter.
2. Attach the bushing supporter assy. ③ and feed adjuster assy. ② to the feed base ④ using the screws ❶ (two).

Lubricate the feed adjuster assembly shaft with FBK OIL RO 100	1 – 2 drops XC8388***
Apply EPNOC AP(N)0 to the entire operating part of the feed adjuster feed regulator slide block.	Small amount XC8387***

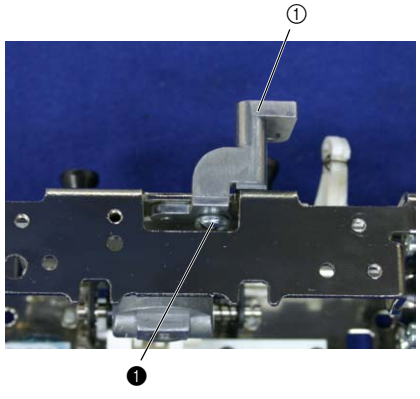
❶	 Screw, Bind M4X6	Torque 1.18 – 1.57 N·m
S14		SPRING XC2531***



8 Stopper plate block assy. attachment

1. Attach the stopper plate block assy. ① using the screw ❶.

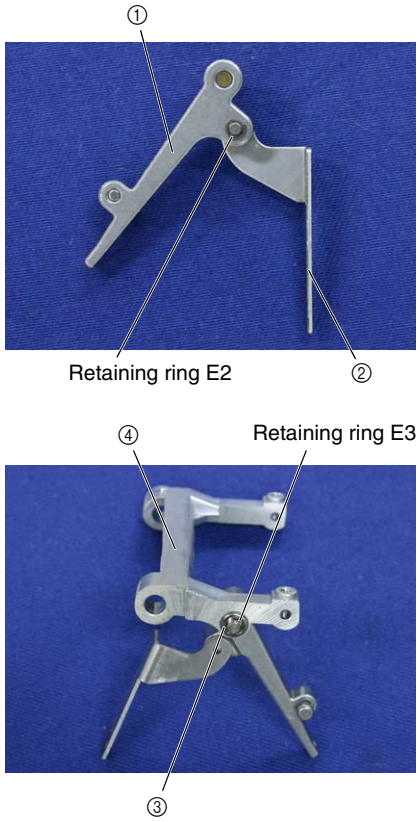
❶	 Screw, Bind M4X5	Torque 1.18 – 1.57 N·m



9 Assembling the feed arm assy

1. Attach the feed arm B assy ① to the feed supporting plate assy ②, and attach the retaining ring E2.
2. Lubricate the feed supporting plate assy ② shaft with 1 – 2 drops of FBK OIL RO 100.
3. Attach the feed arm B assy ① and the polyester slider ③ to the feed arm A ④, and the attach retaining ring E3.
4. Lubricate the feed arm B assy ① with 1 – 2 drops of FBK OIL RO 100.

Lubricate the feed supporting plate assy. shaft with FBK OIL RO 100	1 – 2 drops XC8388***
Lubricate the feed arm B assy. with FBK OIL RO 100	1 – 2 drops XC8388***



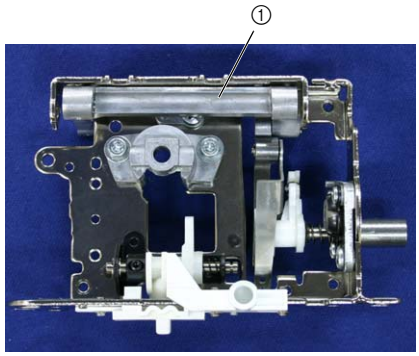
10 Feed arm assembly attachment

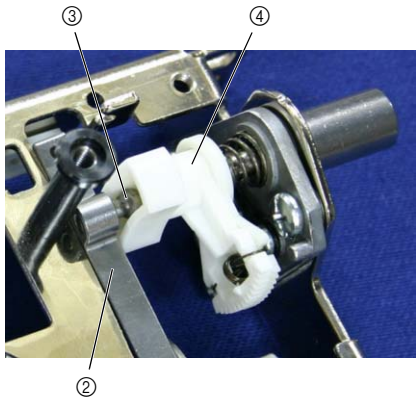
1. Insert the feed arm assembly ① from the bottom.

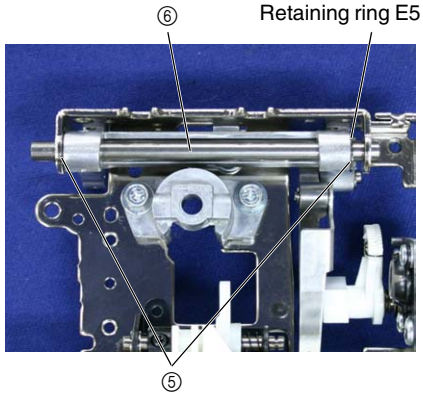
   ***Key point**
   - Insert the feed rectangular side shaft ③ of the feed arm B ② into the feed adjuster ④ on the top side.
2. Place the thrust washer ⑤ between the left base plate and feed arm A.
3. Insert the grooved end of the horizontal feed shaft ⑥ from the left base plate.
4. Pass the horizontal feed shaft ⑥ through to the left feed arm A.
5. Place the thrust washer ⑤ between right feed arm A and the base plate.
6. Pass the horizontal feed shaft ⑥ through to the right base plate.
7. Attach the retaining ring (E5) between right feed arm A and the base plate.

   ***Key point**
   - Move the retaining ring (E5) to feed arm A so that it can secure the thrust washer ⑤.
8. Apply 1 or 2 drops of sewing lubricant to the 2 sections ⑥ where the horizontal feed shaft is inserted in feed arm A.

Apply OILER B ASSYto the 2 sections where the horizontal feed shaft is inserted in feed arm A.	1 - 2 drops each XZ0206***





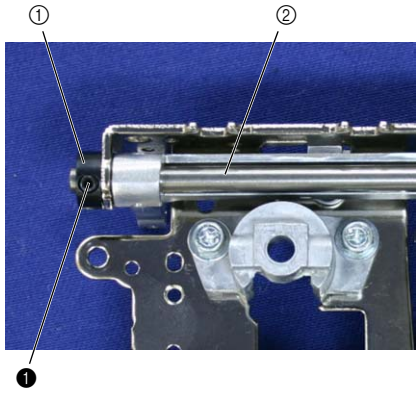


11 Set screw collar attachment

1. Attach the set screw collar ① to the horizontal feed shaft ② with the screw ❶.

   ***Key point**
   - Move the horizontal feed shaft ② in the direction of the set screw collar ① to eliminate backlash, and then press the set screw collar ① to the base plate.

❶		Set Screw, Socket (CP) M4X4	Torque 1.18 – 1.57 N·m

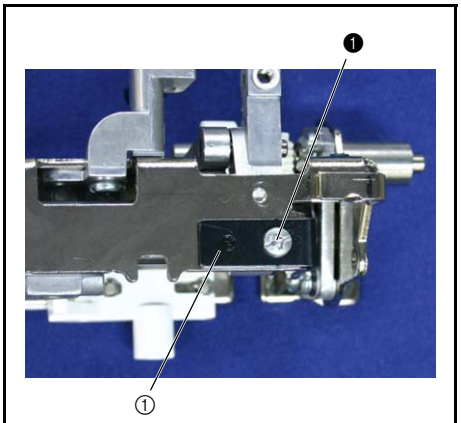


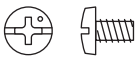
12 Shaft stopper plate attachment

1. Attach the shaft support plate ① to the base plate with the screw ❶.

***Key point**

- Engage the positioning tab on the shaft support plate ① with the positioning hole on the base plate.



❶		Screw, Bind M3X5	Torque 1.18 – 1.57 N·m

13 Assembling the lower shaft B assy

1. Attach the set screw collar ①, thrust washer ②, lower shaft bushing ③ and thrust washer ② to the lower shaft B assy. ④, and attach retaining ring E6.

***Key point**

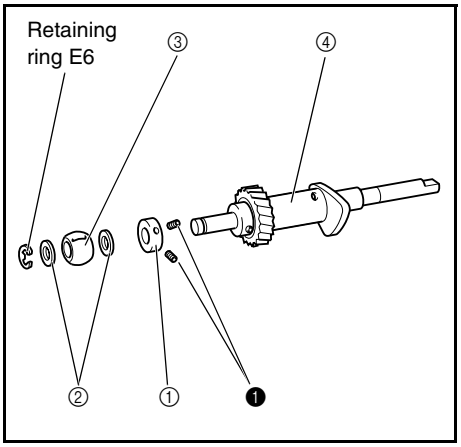
- Attach the set screw collar ① with the ground surface facing the lower shaft bushing ③.

2. Install the 2 screws ❶ in the set screw collar ①.

***Key point**

- Attach the set screw collar ① in a position that allows the lower shaft bushing ③ to turn smoothly.

3. Lubricate the lower shaft bushing ③ with 1 – 2 drops of OILER B ASSY.



Lubricate the lower shaft bushing with OILER B ASSY	1 – 2 drops XZ0206***

❶		Set Screw, Socket (CP) M4X4	Torque 0.78 – 1.18 N·m

14 Lower shaft B assy. attachment

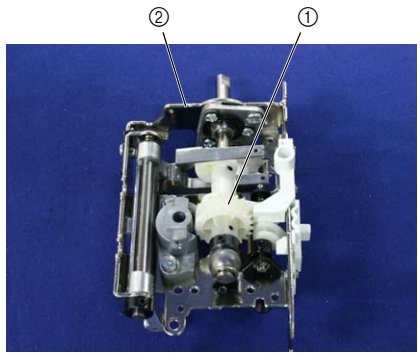
1. Attach the lower shaft B assy ① to the feed base ②.
2. Attach the bushing supporter A ③ to the feed base ②.
3. Attach the bushing presser A ④ using the 2 screws ❶.
4. Attach the joint ⑤ using the 2 screws ❷.

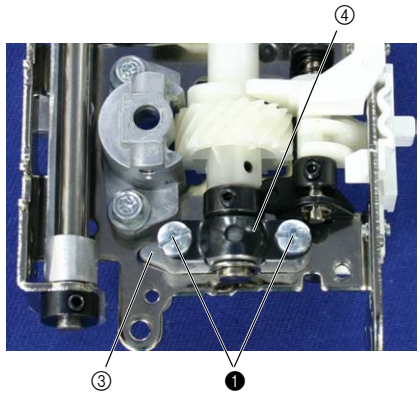
***Key point**

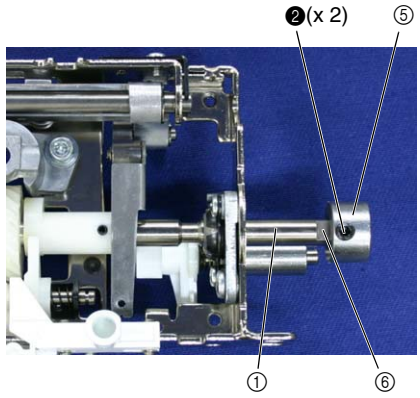
- Align the screw hole in the joint ⑤ and the D cut surface ⑥ in the lower shaft B assy ①.

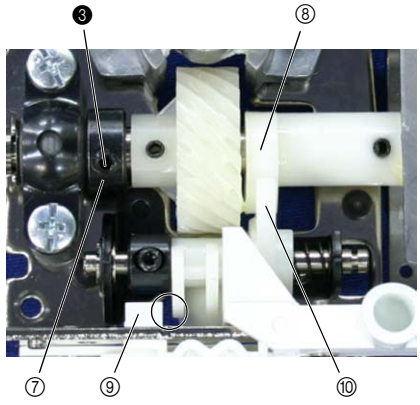
5. Adjust the right-left position of the set screw collar 4 ⑦ so that there is a gap between the vertical lever ⑧ and the drop knob ⑨ and so that the contact area of the vertical lever ⑧ does not come off of the vertical feed cam ⑩ of the vertical lever ⑧, and fully tighten the screw ❸.

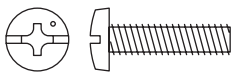
Lubricate the lower shaft (inserted side of bushing supporter assy.) with OILER B ASSY.	1 – 2 drops XZ0206***





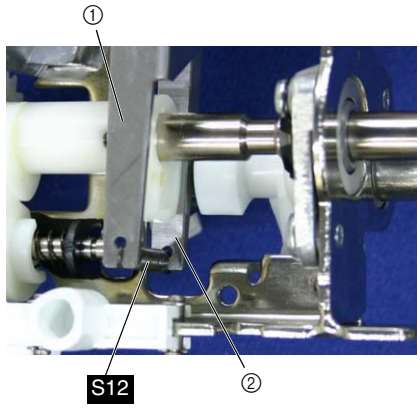


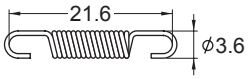


❶		Screw, Bind M4X16	Torque 1.18 – 1.57 N·m
❷		Set Screw, Socket (FT) M5X5	Torque 1.18 – 1.57 N·m
❸		Set Screw, Socket (CP) M4X4	Torque 0.78 – 1.18 N·m

15 Supporting plate spring attachment

1. Attach the spring S12 to the feed supporting plate assy ① and the feed arm B assy ②.

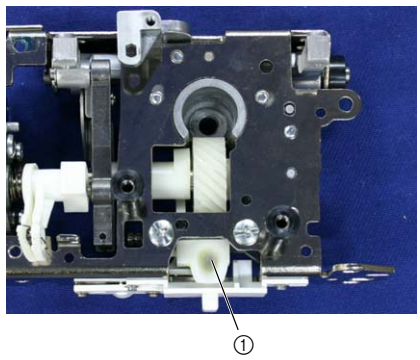


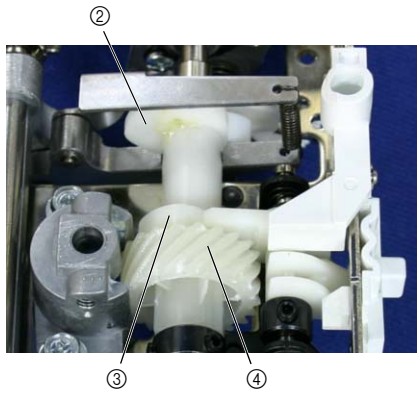
S12		SPRING XC2524***

16 Grease applications

1. Apply a small amount of EPNOC AP(N)0 to the vertical rod seat ① on the vertical lever, the lower shaft horizontal feed cam surface ② and the vertical feed cam surface ③.
2. Apply a small amount of MOLYKOTE EM30L to the lower shaft gear ④.

Apply EPNOC AP(N)0 to the vertical rod seat	Small amount XC8387***
Apply EPNOC AP(N)0 to the vertical feed cam surface	Small amount XC8387***
Apply EPNOC AP(N)0 to the horizontal feed cam surface	Small amount XC8387***
Apply MOLYKOTE EM30L to all of the teeth around the lower shaft gear	Small amount XC8385***



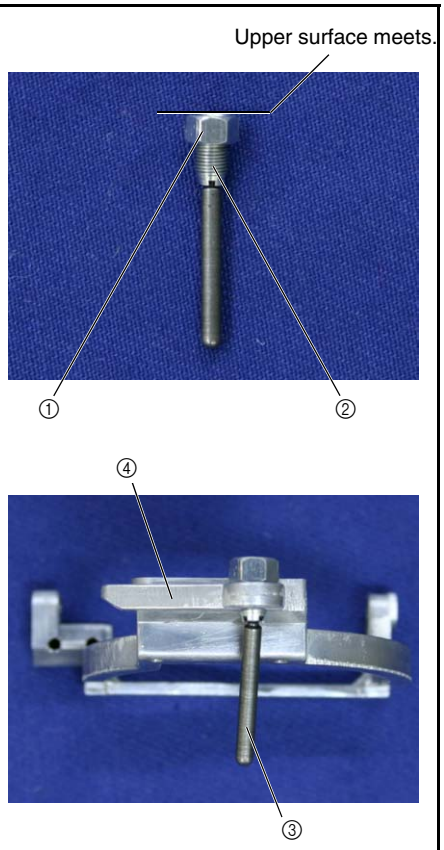


17 Vertical adjusting screw attachment

1. Attach the M5 nut ① to the vertical adjusting screw ②.

   ***Key point**
   - Tighten the M5 nut ① until the M5 nut ① and the upper surface of the vertical adjusting screw ② meet.
2. Attach the vertical adjusting screw assembly ③ to the feed bar ④.

   ***Key point**
   - Tighten until the bottom of the M5 nut ① touches the feed bar ④.



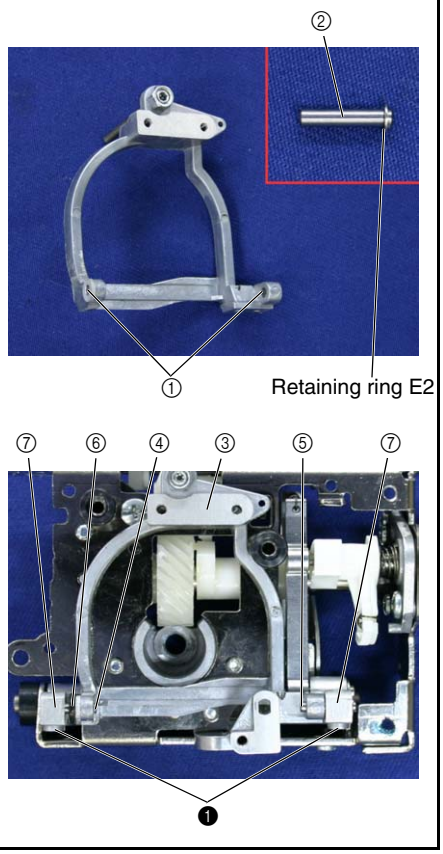
18 Feed bar attachment

1. Apply a small amount Molykote EM30L to the 2 shaft holes ① in the feed bar.
2. Attach the retaining ring E2 to the feed bar shaft B ②.
3. Attach the feed bar ③, feed bar shaft A ④, feed bar shaft B ⑤ and the feed bar spacer ⑥ to the feed arm A ④ using the 2 screws ❶.

   ***Key point**
   - Feed bar shaft A ④ is attached from the inside of the feed bar ③.

Apply MOLYKOTE EM30L to feed shaft holes in the feed bar	Small amount XC8385***
Apply MOLYKOTE EM30L to feed bar shaft A	Small amount XC8385***
Apply MOLYKOTE EM30L to feed bar shaft B	Small amount XC8385***

❶		Set Screw, Socket (CP) M4X4	Torque 1.18 – 1.57 N·m

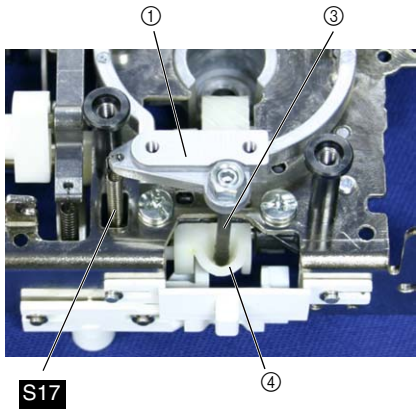


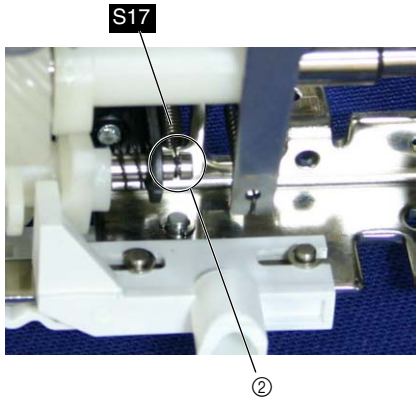
19 Feed bar spring attachment

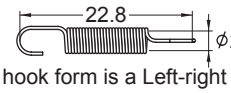
1. Attach the spring S17 to the feed bar ① and vertical feed shaft ②.

***Key point**

- Align the vertical rod ③ with the seat of the vertical lever ④.





S17	 A hook form is a Left-right object.	SPRING XC2547***

20 Outer rotary hook assy. attachment

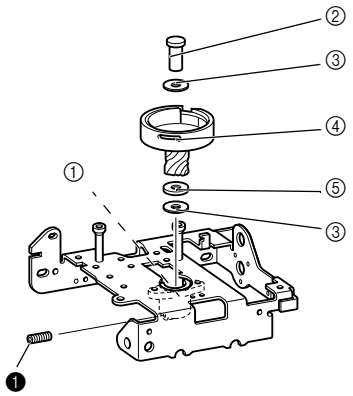
1. Apply a small amount of Molykote EM30L to the shaft supporter ①.
2. Install the outer rotary hook shaft ②, spacer (thin) ③, outer rotary hook assy ④, washer 6 (thick) ⑤ and the spacer (thin) ③.

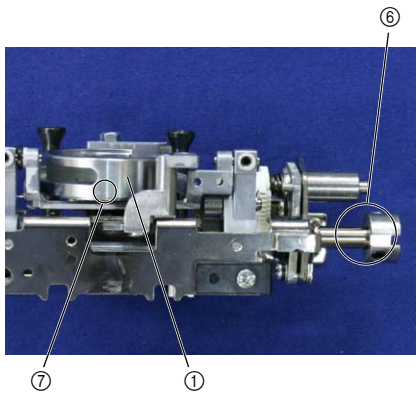
***Key point**

- With the D cut ⑥ in the lower shaft B facing upward, attach so that the solid dot ⑦ on the rotary hook assy faces forward.
  *Attach from a position where ⑦ is 45 deg. to the right.

3. Install the screw ❶ in the shaft supporter.

Apply MOLYKOTE EM30L to the shaft supporter surface	Small amount XC8385***
Lubricate the outer rotary hook shaft with OILER B ASSY	Apply liberally XZ0206***

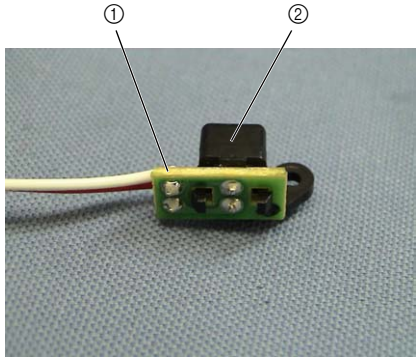




❶		Set Screw, Socket (CP) M4X6	Torque 1.18 – 1.57 N·m

21 Photo diode holder ASSY assembly

1. Engage the photo diode assembly ① with the 2 hooks on the photo diode holder ②.



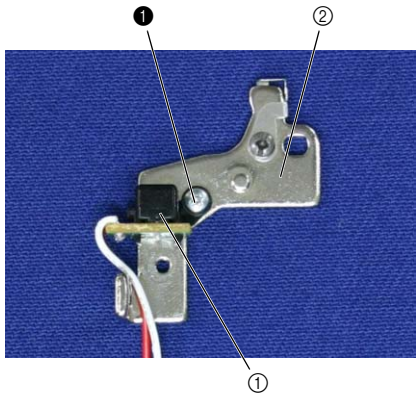
22 Photo diode holder assembly attachment

1. Attach the photo diode holder assembly ① to the inner rotary hook bracket ② with the screw ❶.

***Key point**

- Engage the positioning tab on the photo diode holder assembly ① with the positioning hole on the inner rotary hook bracket ②.

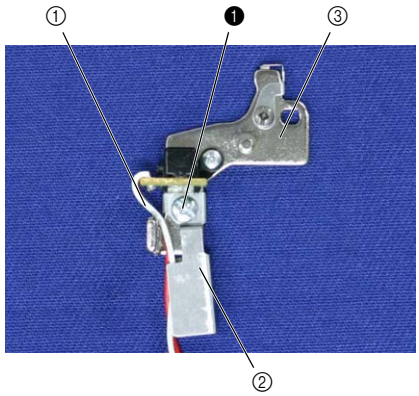
❶		Screw, Bind M2X4	Torque 0.29 – 0.49 N·m



23 Cord holder attachment

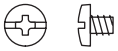
1. Pass the photo diode lead wire ① through the cord holder ②.
2. Attach the cord holder ② to the inner rotary hook bracket ③ with the screw ❶.

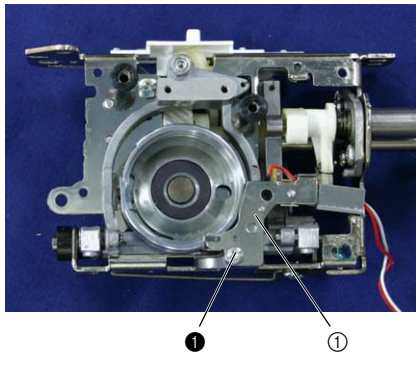
❶		Screw, Bind M2X3	Torque 0.29 – 0.49 N·m



24 Inner rotary hook bracket assy. attachment

1. Align the inner rotary hook bracket assy ① with the stopper plate block, and hand start the screw ❶
   (Fully tighten after 4 - 25"Inner rotary hook bracket position.")

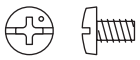
❶		Screw, Bind M2.6X3	Torque 0.78 – 1.18 N·m

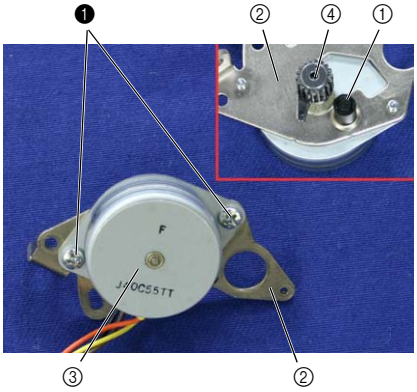


25 Assembling F pulse motor assembly

1. Attach the rubber ① to the FPM holder assy ②.
2. Attach the F pulse motor (FPM35SP-9N) ③ to the FPM holder assy ② using the screws the 2 screws ❶.
3. Lubricate bearing ④ of the F pulse motor (FPM35SP-9N) ② with FBK OIL RO 100.

Lubricate the FPM bearing with FBK OIL RO 100.	1 – 2 drops XC8388***

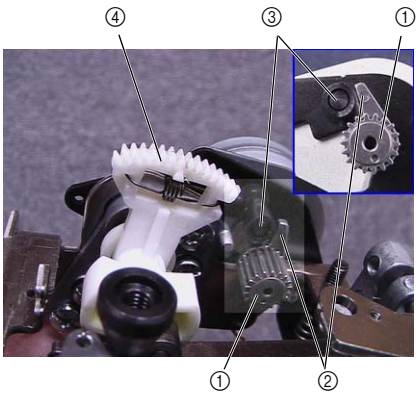
❶		Screw, Bind M3X5	Torque 0.78 – 1.18 N·m

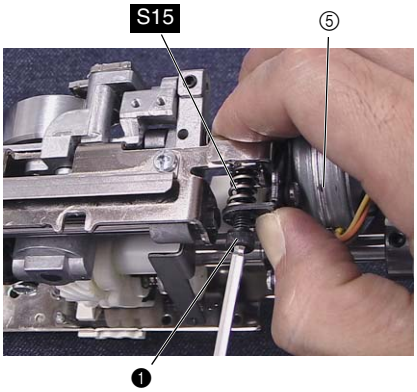


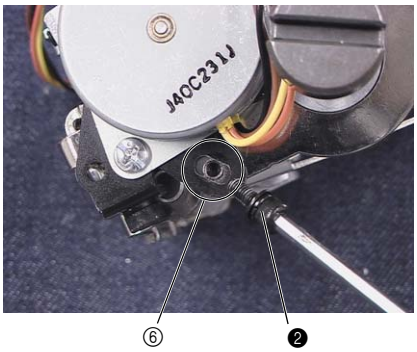
26 FPM holder assy. attachment

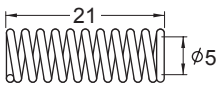
1. Turn the F pulse motor gear ① counterclockwise until the stopper ② on it touches the FPM holder assy shaft. ③.
2. Set the feed adjuster assy ④ to the position in the figure to the right.
3. Attach the F pulse motor assy ⑤.
4. Attach the spring S15 and the screw ❶.

   ***Key point**
   - To prevent the screw ❶ from being tightened into the spacer at an angle, tighten the screw ❶ with the spring S15 compressed.
   - Tighten the screw ❶ until the screw hole in the feed base comes approximately to the center of the hole ⑥ in the FPM holder assy.
5. Hand start the screw ❷.
   (Fully tighten after 4 - 19 "Forward and backward feed.")







❶		Bolt, Socket M4X25	—
❷		Screw M3X8	Torque 0.27 – 0.48 N·m
S15			SPRING XC2537***

27 F gear teeth alignment

1. Apply a small amount of EPNOC AP(N)0 to the feed adjuster assy F gear ①.
2. Turn the F pulse motor gear ② clockwise until the stopper ③ on it touches the bushing supporter assy shaft ④.
3. Turn the feed adjuster assy ⑤ until it touches ⑥ the F pulse motor gear ②.

***Key point**

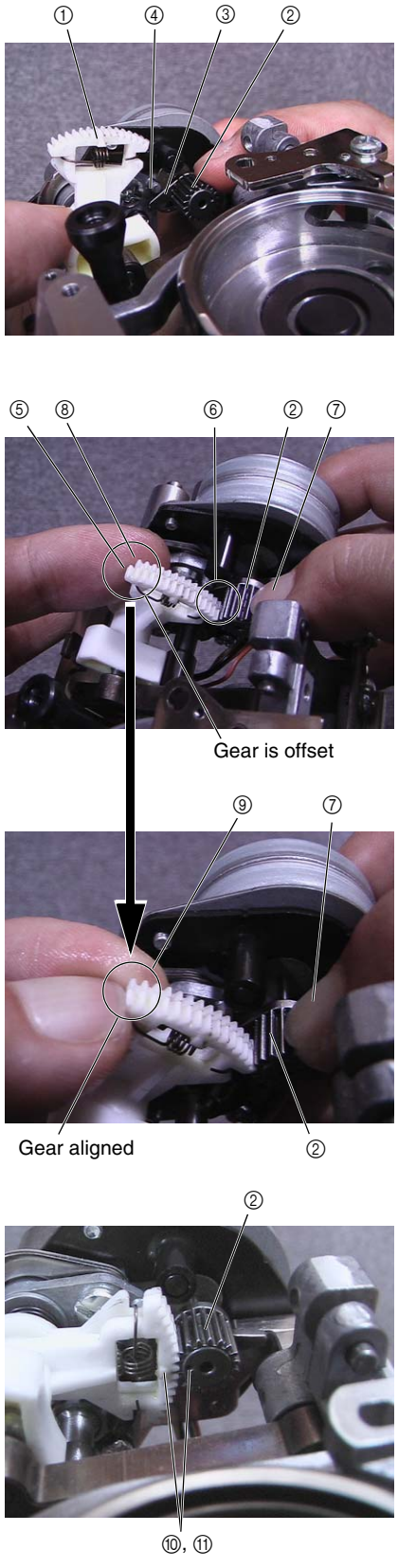
- Once the feed adjuster assy ⑤ and F pulse motor gear ② are touching, hold the F pulse motor gear ② with your finger ⑦ so that it does not turn.

4. Push the feed adjuster assy ⑤ until it and the F gear ⑧ have their gears aligned ⑨.
5. With the gears aligned ⑨, push them down, and mesh the feed adjuster assy ⑤ and F pulse motor gear ②.

***Key point**

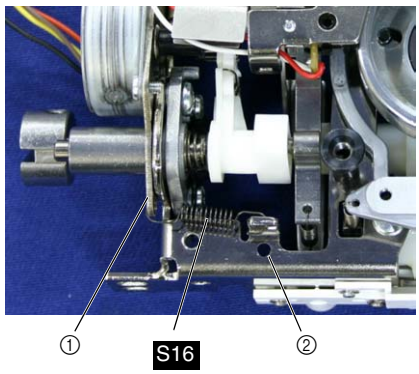
- Check that the feed adjuster assy ⑤ gear match mark ⑩ and the F pulse motor gear ② match mark ⑪ are together.

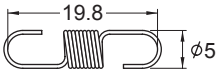
Apply EPNOC AP(N)0 to the all of the teeth on the feed adjuster assy. F gear	Small amount XC8387***



28 Spring attachment (for FPM holder assy.)

1. Attach the spring S16 to the feed base ① and FPM holder assy ②.



S16		SPRING XC2538***

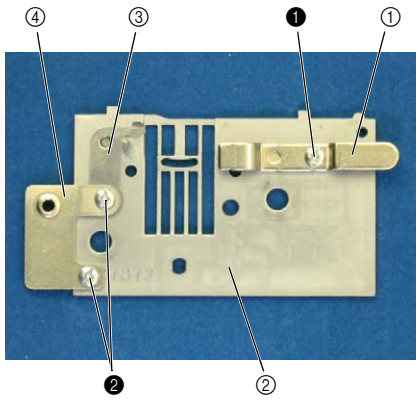
29 Needle plate A ASSY assembly

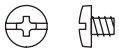
1. Attach the F gear stopper plate ① to the rear of the needle plate A ② with the screw ❶.

***Key point**
- Engage the positioning tab on the stopper plate with the positioning hole on the needle plate A ②.

2. Attach the stopper plate ③ and then the needle plate B support plate ④ to the rear of needle plate A ② with the 2 screws ❷.

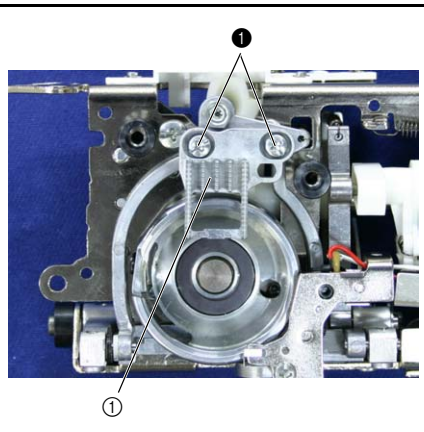
***Key point**
- Engage the positioning tab on the stopper plate with the positioning hole on needle plate A.

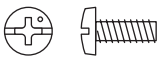


❶ ❷		Screw, Bind M2.6X3	Torque 0.57 – 1.78 N·m

30 Feed dog attachment

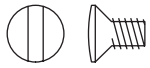
1. Attach the feed dog ① and hand start screws the 2 screws ❶.
(Fully tighten after 4 - 17 "Front/back and left/right position of feed dog.")

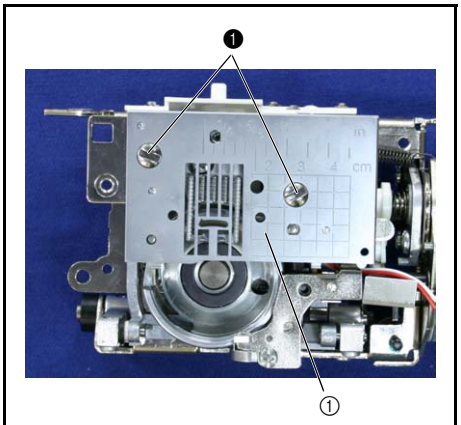


❶		Screw, Bind M3X8	Torque 0.78 – 1.18 N·m

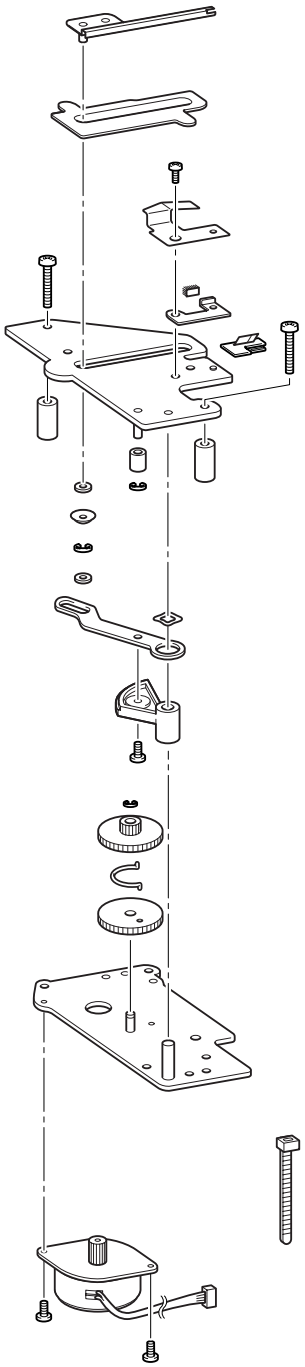
31 Needle plate A assy. attachment

1. Attach the needle plate A ① using the 2 screws ❶.

❶		Screw M4	Torque 1.18 – 1.57 N·m



Thread cutter module breakout diagram



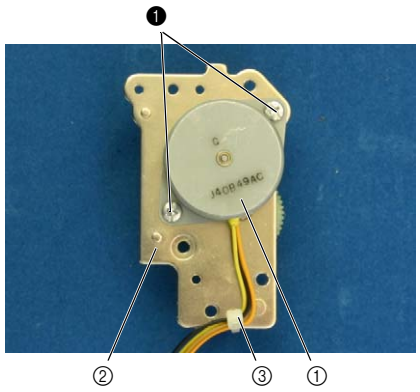
1 C pulse motor attachment

1. Attach the C pulse motor (ZPMM35SP-9N) ① to the motor holder assy ② using the 2 screws ❶.

   ***Key point**

   - Attach the band ③.
2. Lubricate the C pulse motor ① bearing with 1 – 2 drops of turbine oil # 100.

Lubricate the CPM bearing with FBK OIL RO 100.		1 – 2 drops XC8388***
❶	Screw, Bind M3X4	Torque 0.78 – 1.18 N·m



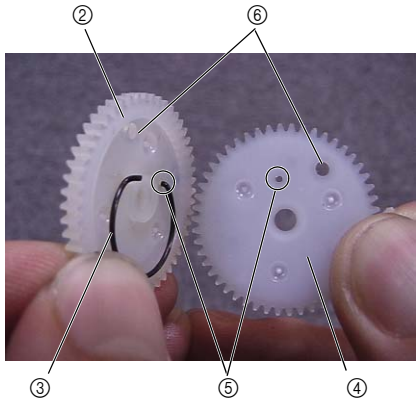
2 Idle gears A and B attachment

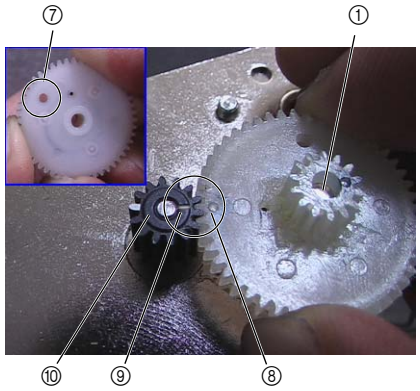
1. Apply a small amount of EPNOC AP(N)0 to the idle gear shaft ①.
2. Attach the idle gear A ②, spring ③ and idle gear B ④ to the idle gear shaft ①, and attach the retaining ring E2.

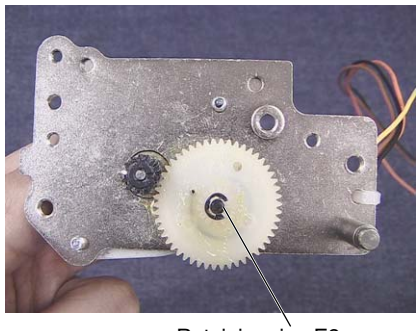
   ***Key point**

   - Insert the spring ③ into the small holes ⑤ in the idle gear A ② and the idle gear B ④, and turn the idle gear A ② clockwise until the large holes ⑥ in the idle gear A ② and the idle gear B ④ overlap ⑦.
   - With the large holes ⑥ aligned, align the match mark ⑧ on the idle gear assy and the match mark ⑨ on the C pulse motor gear ⑩, and attach the idle gear assy to the shaft ①.

Apply EPNOC AP(N)0 to the lever guide shaft	Small amount XC8387***





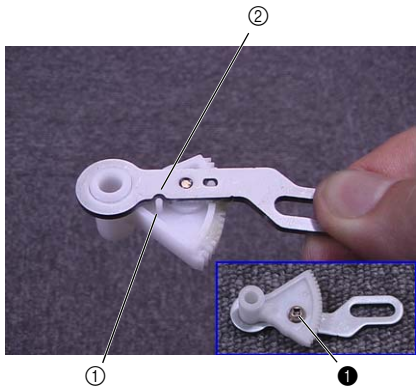


Retaining ring E2

3 Assembling the thread cutter lever assy

1. Attach the thread cutter lever gear ① to the thread cutter lever ② using the screw ❶.

❶		Screw, Pan (S/P washer) M3X6DA	Torque 0.78 – 1.18 N·m



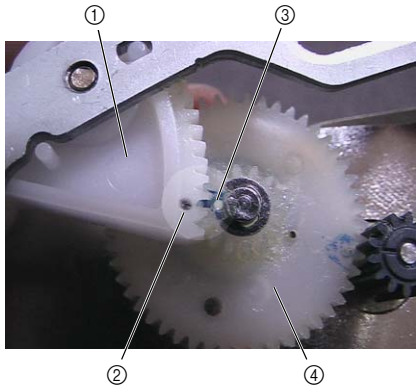
4 Thread cutter lever assy. attachment

1. Apply a small amount of EPNOC AP(N)0 to the thread cutter lever shaft.
2. Attach the thread cutter lever assy ① to the thread cutter lever shaft.

***Key point**

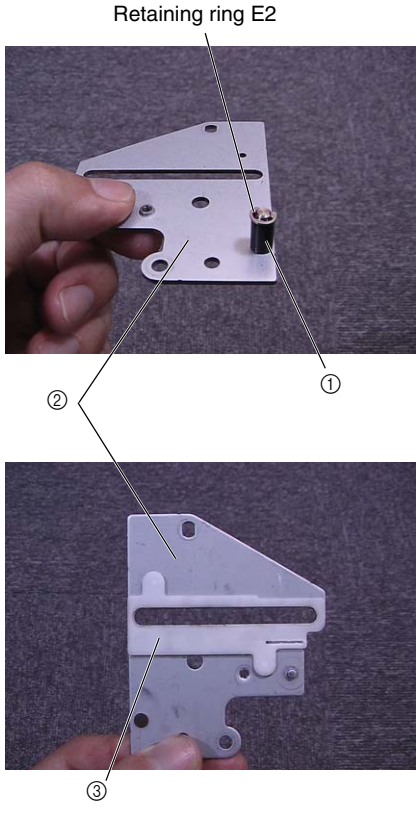
- Align the thread cutter lever assy ① match mark ② with the idle gear assy ④ match mark ③.

Apply a small amount of EPNOC AP(N)0 to the thread cutter lever shaft.	Small amount XC8387***



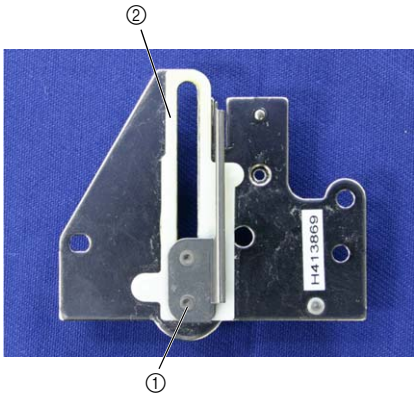
5 Rubber and spacer attachment

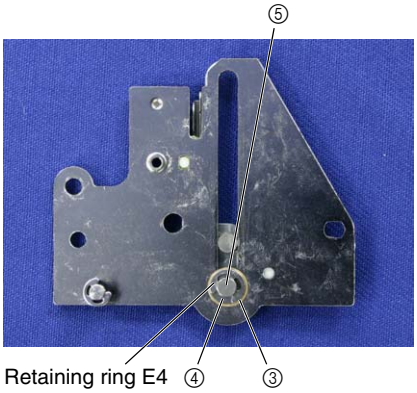
1. Attach the rubber ① to the thread cutter frame ② shaft, and attach retaining ring E2.
2. Attach the spacer ③ to the thread cutter frame ②.



6 Assembling the thread hook assy

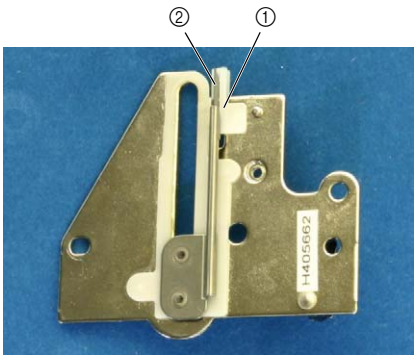
1. Attach the thread hook assembly ① to the spacer ②.
2. Attach the washer ③, polyester slider ④ to pin A ⑤, and then attach the retaining ring (E4).





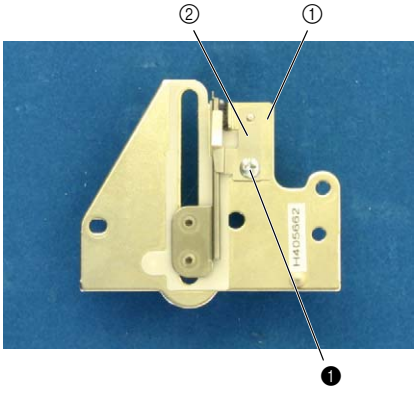
7 Cutter holder assembly attachment

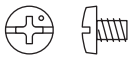
1. Attach the NT lower thread cutter ② to the cutter holder assembly ①.
2. Engage the cutter holder assembly ① with the thread cutter frame.



8 Presser plate assy. attachment

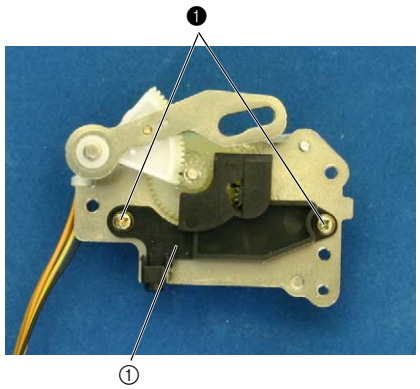
1. Attach the spring ① and the presser plate assembly ② to the thread cutter frame with the screw ❶.



❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m

9 Sensor holder attachment

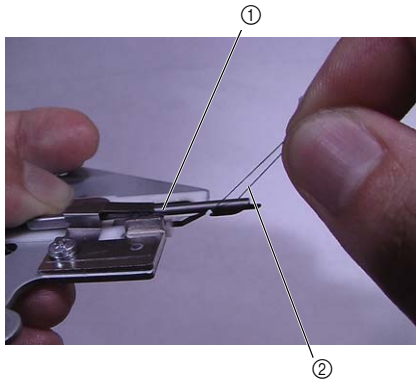
1. Attach the sensor holder ① with the 2 screws ❶.



❶		Screw, Pan (S/P washer) M3X6DA	Torque 0.78 – 1.18 N·m

10 Thread cutter check

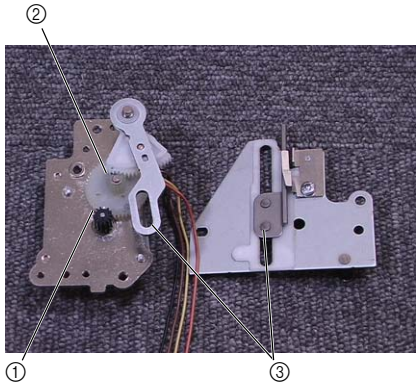
1. Pull the thread hook assy ① from the thread cutter frame assy.
2. Attach Schappe Spun Sewing Thread #30 ② to the end of the thread hook assy ①, and check that the thread is cut when the thread hook assy returns.



11 Grease applications

1. Apply a small amount of EPNOC AP(N)0 to the all of the operating surfaces ① of the idle gear assy. and C pulse motor gear.
2. Apply a small amount of EPNOC AP(N)0 to the all of the operating surfaces ② of the thread cutter lever gear and idle gear assy.
3. Apply a small amount of EPNOC AP(N)0 to the entire operating surface ③ of the thread cutter lever thread hook pin A.

Apply EPNOC AP(N)0 to the entire operating surfaces of idle gears A and B and the CPM gear.	Small amount XC8387***
Apply EPNOC AP(N)0 to the to the operating surfaces of the thread cutter lever gear and idle gears A and B	Small amount XC8387***
Apply EPNOC AP(N)0 to the operating surface of thread hook pin A	Small amount XC8387***

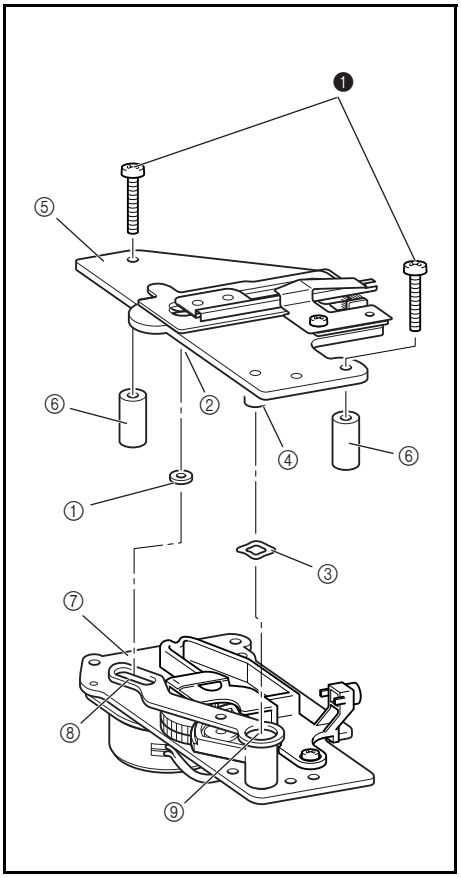


12 Thread cutter frame assembly attachment

1. Attach the polyester slider ① to thread hook pin A ②.
2. Attach the wave-shape spring washer ③ to the thread cutter lever shaft ④.
3. Attach the thread cutter frame assembly ⑤ and the 2 collars ⑥ to the motor holder assembly ⑦ with the 2 screws ❶.

***Key point**

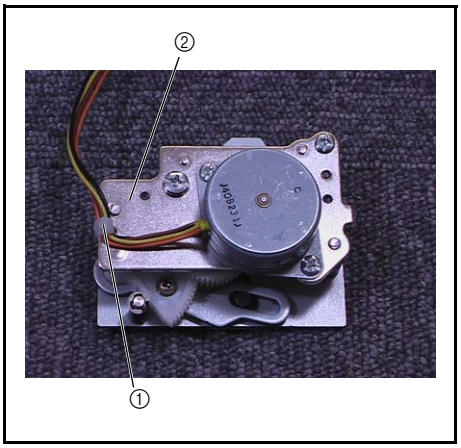
- Align the thread cutter lever shaft ⑧ with the reference hole ⑨ on thread cutter frame, and align thread hook pin A with the hole on the thread cutter lever.



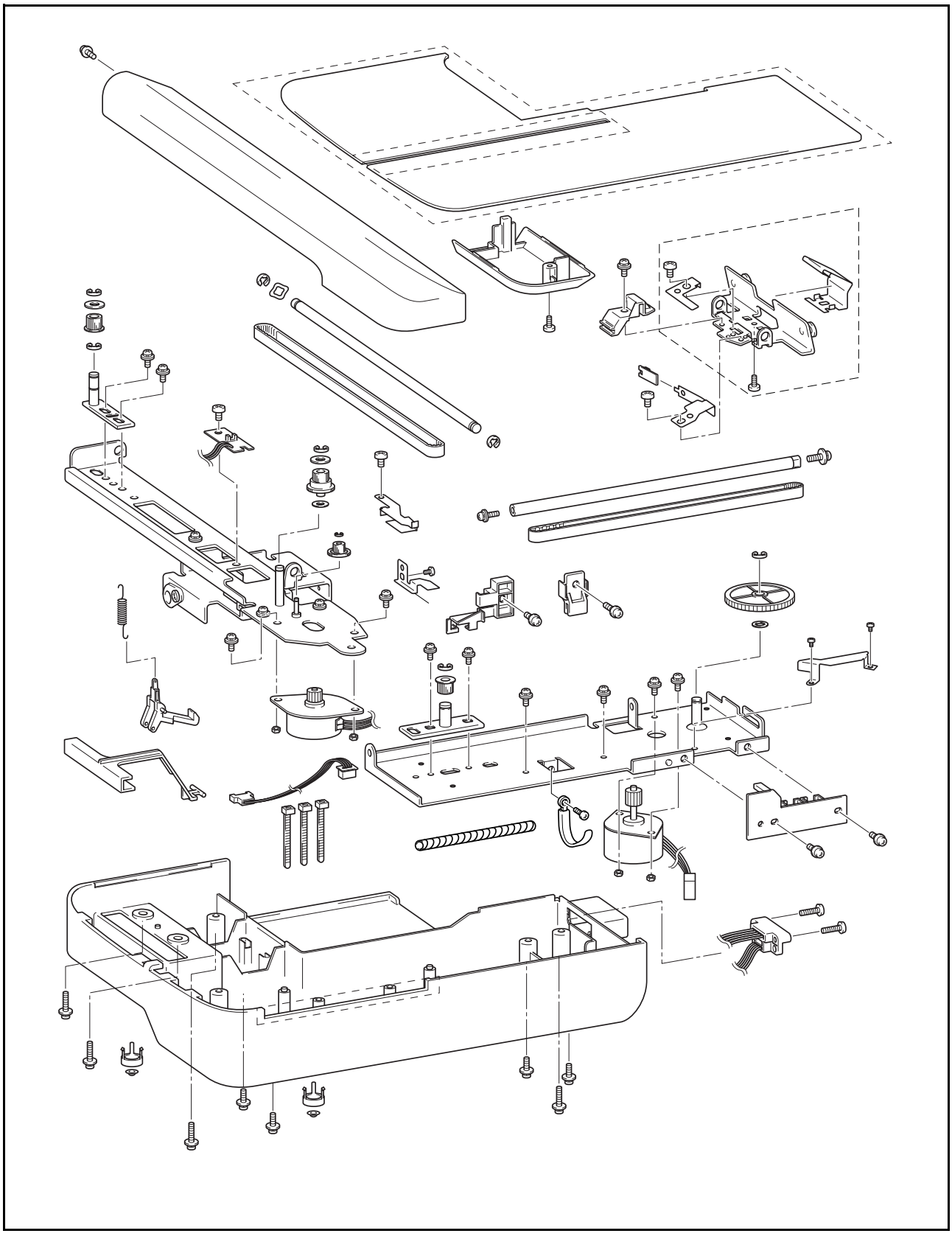
❶	Screw, Bind M4X20	Torque 1.18 – 1.57 N·m

13 CPM lead processing

1. Attach the CPM leads to the motor holder ② using a band ①.



Embroidery parts location diagram

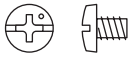


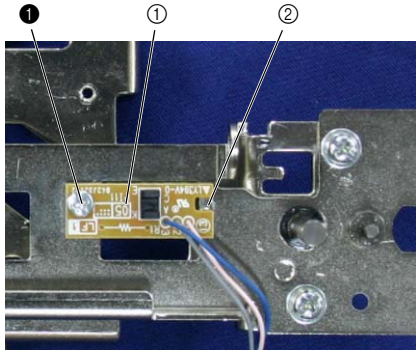
1 Y sensor PCB assembly attachment

1. Attach the Y sensor PCB assembly ① to the X carriage assembly with the screw ❶.

***Key point**

- Engage the tab ② on the X carriage assembly with the groove on the Y sensor PCB assembly ①.

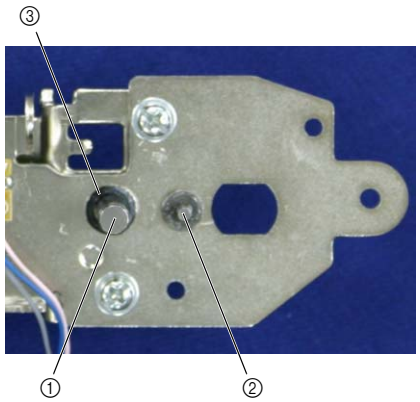
❶		Screw, Bind M3X4	Torque 0.59 – 0.79 N·m

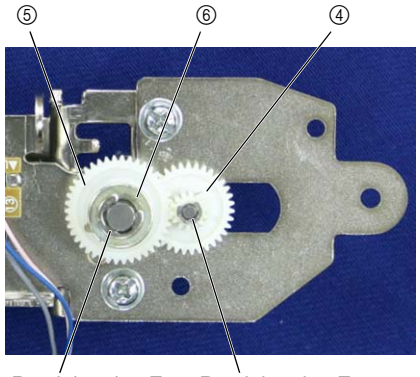


2 Y driving gear pulley assembly attachment

1. Apply a bead of EPNOC AP (N)0 to the 2 shafts ①② of the X carriage assembly.
2. Set the washer ③ onto the shaft ① of the X carriage assembly.
3. Set the gear ④ onto the shaft ② of the X carriage assembly, and then attach the retaining ring (E2).
4. Set the Y driving gear pulley ⑤ and then the plain washer (M6) ⑥ onto the shaft ① of the X carriage assembly, and then attach the retaining ring (E4).

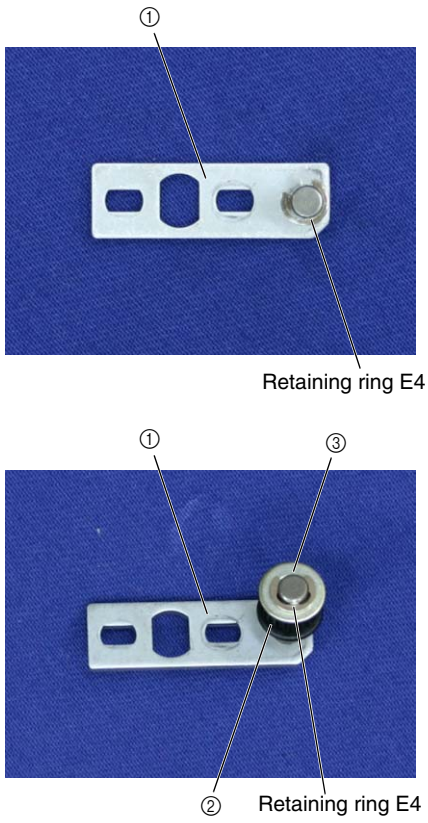
Apply EPNOC AP (N)0 to the 2 shafts of the X carriage assembly.	Bead XC8387***





3 Y tension pulley assembly

1. Attach the retaining ring (E4) to the shaft (lower groove) of the Y tension pulley assembly ①.
2. Set the tension pulley ② and the plain washer (M6) ③ onto the shaft of the Y tension pulley assembly ①, and then attach the retaining ring (E4).

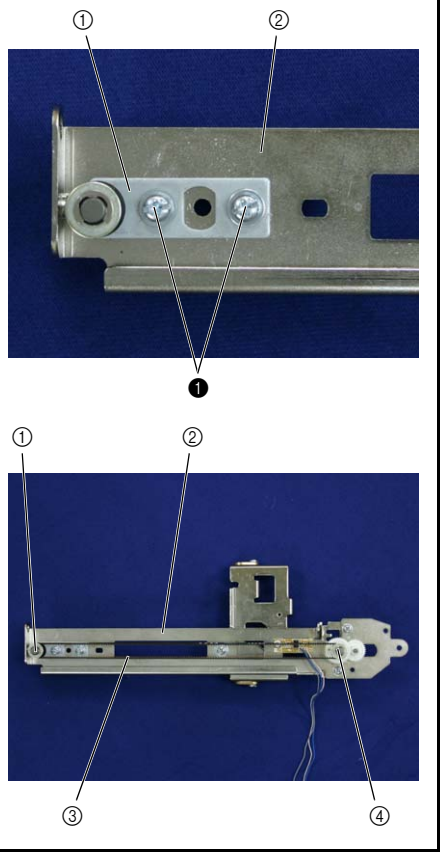


4 Y tension pulley assembly attachment

1. Temporarily attach the Y tension pulley assembly ① to the X carriage assembly ② with the 2 screws ❶.
2. Hang one end of the timing belt ③ over the Y driving gear pulley ④, and the other end over the Y tension pulley assembly ①.

***Key point**

- Fully tighten the screws after adjustment.



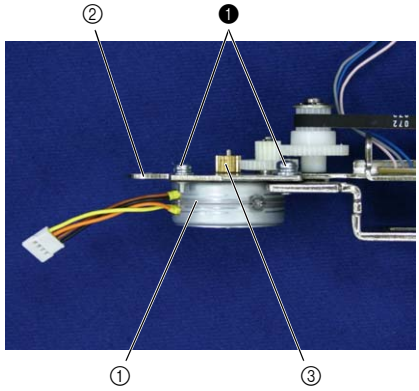
❶		Screw, Pan (S/P washer) M4X8	Torque Hand tighten

5 Y pulse motor assembly attachment

1. Apply 1 or 2 drops of FBK OIL RO 100 to the shaft of the Y pulse motor assembly ①.
2. Attach the Y pulse motor assembly ① to the X carriage assembly ② with the 2 screws ❶.

***Key point**

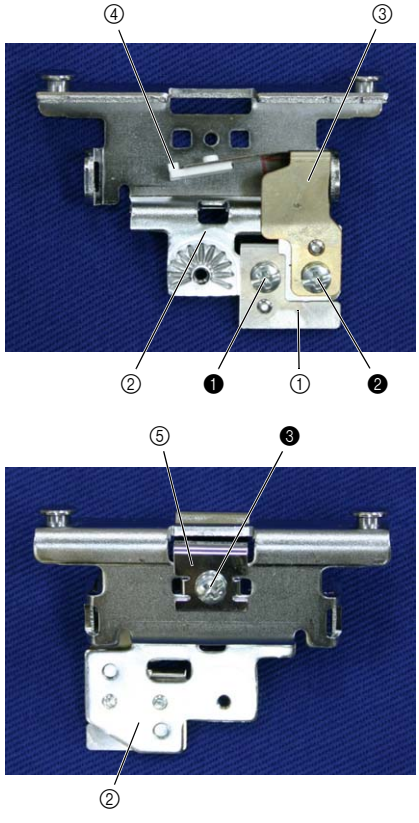
- Position the X carriage assembly ② as shown in the photo on the right, and attach the Y pulse motor assembly ① with the gear ③ on the top.
- Check that the lead wire of the Y pulse motor assembly ① is on the left side.

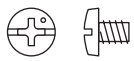


Apply FBK OIL RO 100 to the shaft of the Y pulse motor assembly.			1 - 2 drops XC8388***
❶		Screw, Pan (S/P washer) M3X7	Torque 0.79 – 1.18 N·m

6 Y carriage ASSY assembly

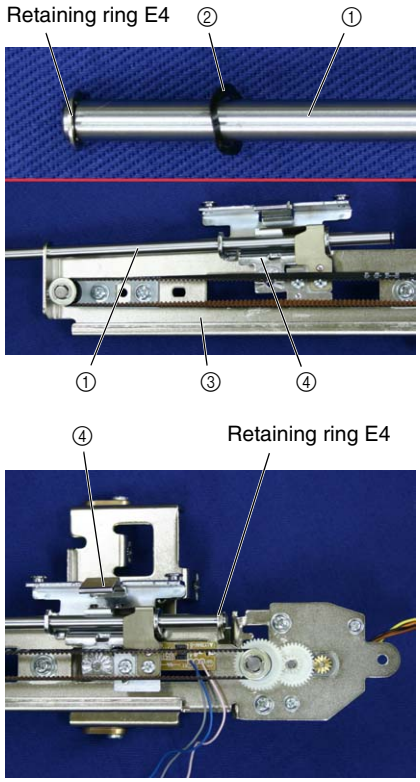
1. Attach the Y initial shutter ① to the Y carriage unit ② with the screw ❶.
2. Attach the Y guide shaft presser ④ to the Y guide shaft presser plate ③, and then secure these to the Y carriage unit ② with the screw ❷.
3. Attach the hoop fixed spring ⑤ to the Y carriage unit ② with the screw ❸.



❶ ❷ ❸		Screw, Bind M3X4	Torque 0.59 – 0.79 N·m

7 Y carriage unit attachment

1. Attach the retaining ring (E4) to the Y guide shaft ①, and then attach the wave spring washer ② to the Y guide shaft ①.
2. Insert the Y guide shaft ① from the Y tension pulley assembly side of the X carriage assembly ③.
3. Set the Y carriage assembly ④ onto the Y guide shaft ①, and then push it to the YPM motor. Attach the retaining ring (E4).

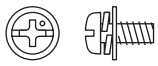


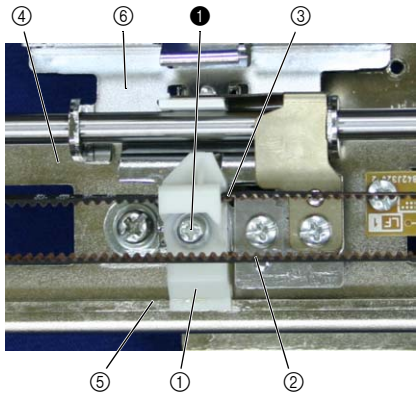
8 Y slider attachment

1. Insert the Y slider ① into the gear ③ of the timing belt ②.
2. Engage the groove on the Y slider ① with the rail ⑤ of the X carriage unit ④.
3. Slide the Y carriage unit ⑥ to align the Y slider ① with the screw hole on the Y carriage unit, and then secure these with the screw ❶.

***Key point**

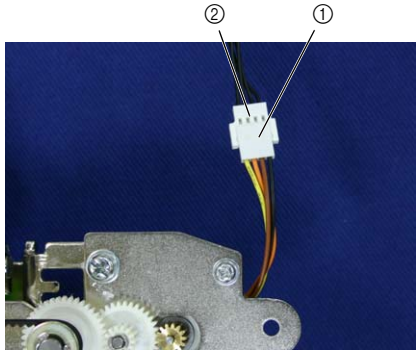
- Move the Y carriage unit ⑥ left and right to check that the timing belt ② moves accordingly.

❶		Screw, Pan (S/P washer) M3X7	Torque 0.79 – 0.98 N·m



9 Lead wire assembly YPM relay attachment

1. Connect the lead wire assembly YPM relay ② to the lead wire connector on the Y pulse motor assembly ①.

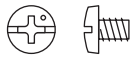


10 Cord guide attachment

1. Insert the lead wire assembly YPM relay ① and then the lead wire of the Y sensor PCB assembly ② into the groove on the cord guide ③, and then secure these with the screw ❶.

***Key point**

- Check that the lead wire assembly YPM relay ① and the lead wire of the Y sensor PCB assembly ② are routed as shown in the photo on the right.

❶		Screw, Bind M3X4	Torque 0.79 – 1.18 N·m

11 X slider attachment

1. Align the boss on the X slider ① with the oval hole on the bent section at the lower section of the X carriage assembly.
2. Temporarily tighten the screw ❶.

***Key point**

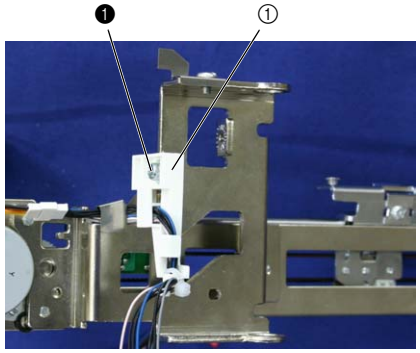
- Fully tighten the screw after the XY carriage unit has been attached.

3. Pass the lead wire through the guide of the X slider ①.

***Key point**

- Attach the band.

❶		Screw, Pan (S/P washer) M4X8	Torque Hand tighten

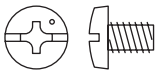


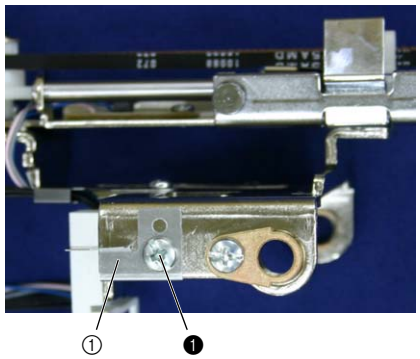
12 X initial shutter attachment

1. Attach the X initial shutter ① with the screw ❶.

***Key point**

- The X initial shutter has sharp edges. Be careful when handling it.

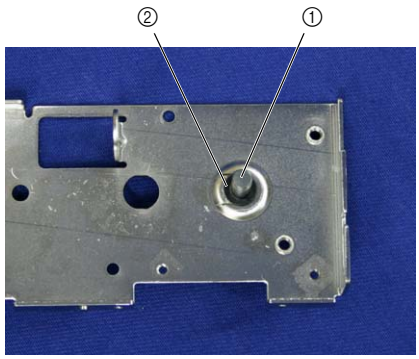
❶		Screw, Bind M4X6	Torque 1.18 – 1.57 N·m

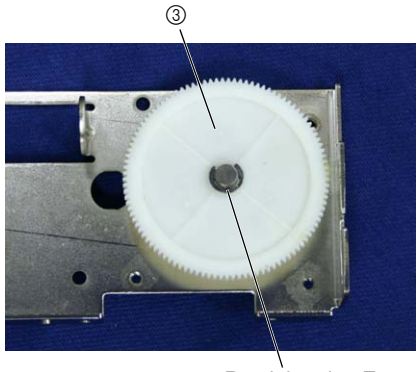


13 X driving gear pulley attachment

1. Apply a bead of EPNOC AP (N)0 to the shaft ① of the main frame subassembly.
2. Set the washer ② and the X driving gear pulley ③ onto the shaft ①, and then attach the retaining ring (E4).

Apply EPNOC AP (N)0 to the shaft of the main frame subassembly.	bead XC8387***

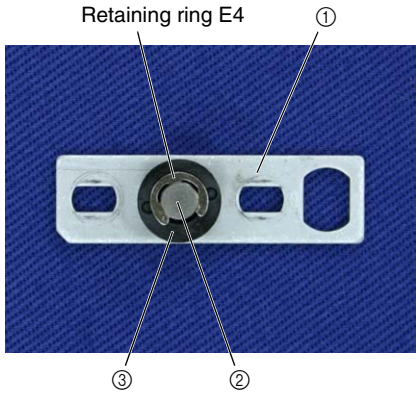




Retaining ring E4

14 X tension pulley ASSY assembly

1. Set the tension pulley ③ onto the shaft ② of the X tension pulley assembly ①, and then attach the retaining ring (E4).

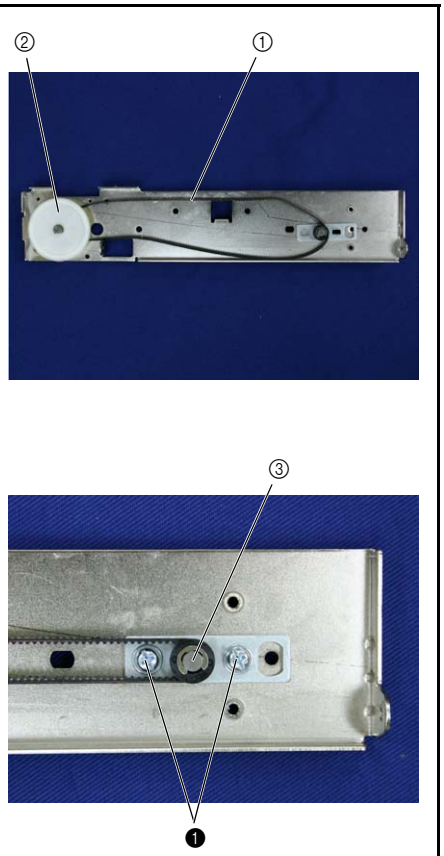


15 X tension pulley ASSY attachment

1. Hang one end of the timing belt ① over the X driving gear pulley ②, and the other end over the X tension pulley assembly ③.
2. Move the X tension pulley assembly ③ to the right, and then temporarily tighten the 2 screws ❶.

***Key point**

- Fully tighten the screws after adjustment.



❶	Screw, Pan (S/P washer) M4X8	Torque Hand tighten

16 X pulse motor assembly attachment

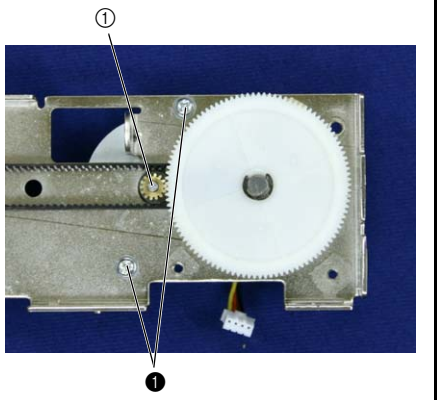
1. Apply 1 or 2 drops of FBK OIL RO 100 to the X pulse motor assembly.
2. Position the main frame unit as shown in the photo on the right, and then attach the X pulse motor assembly ① from the rear of the main frame unit with the gear on the top. Secure these with the 2 screws ❶.

***Key point**

- Check that the lead wire of the X pulse motor assembly ① is at the lower right .

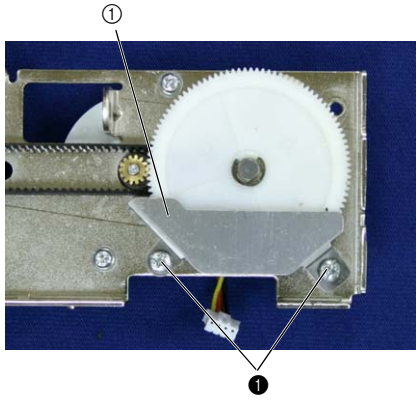
Apply FBK OIL RO 100 to the X pulse motor assembly.	1 - 2 drops XC8388***

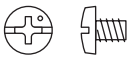
❶	Screw, Pan (S/P washer) M3X7	Torque 0.79 – 1.18 N·m



17 Oil guard plate attachment

1. Attach the oil guard plate ① to the main frame unit with the 2 screws ❶.



❶		Screw, Bind M3X4	Torque 0.79 – 1.18 N·m

18 XY carriage unit removal

1. Position the XY carriage unit ① as shown in the photo on the right, and then insert the X guide shaft ②.

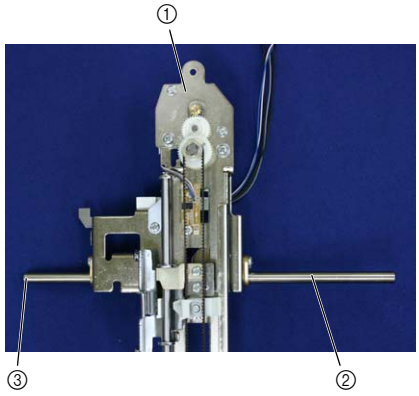
   ***Key point**
   - Check that the cut face end ③ of the X guide shaft ② is on the left side.

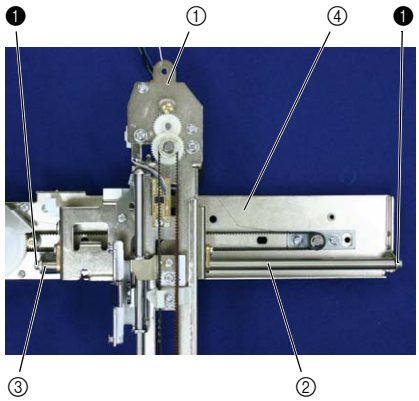
2. Position the main frame unit ④ and the XY carriage unit ① as shown in the photo on the right.

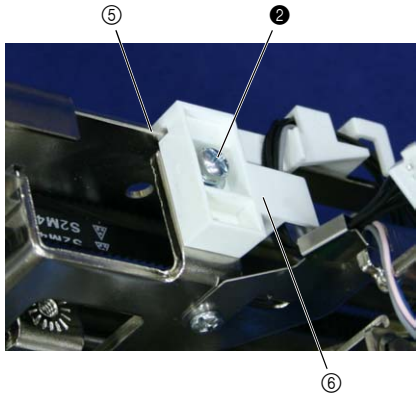
   ***Key point**
   - Check that the cut face end ③ of the X guide shaft ② is on the left side.
   - Check that the rail ⑤ of the main frame unit ④ is engaged with the groove on the X slider ⑥.

3. Attach the X guide shaft ② to the main frame unit ④ with the 2 screws ❶.

   ***Key point**
   - Fully tighten the X slider securing screw ❷.







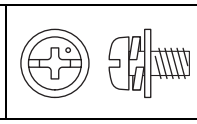
❶		Screw, Pan (S/P washer) M4X8	Torque 1.18 – 1.57 N·m
❷		Screw, Pan (S/P washer) M4X8	Torque 0.79 – 0.98 N·m

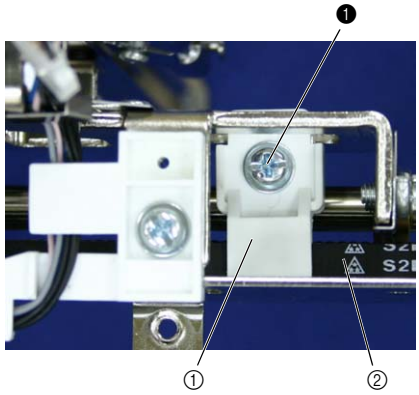
19 X belt presser removal

1. Insert the X belt presser ① into the gear of the timing belt ②.
2. Slide the XY carriage unit to align the round hole on the X belt presser ① with the screw hole on the XY carriage unit, and then secure these with the screw ❶.

***Key point**

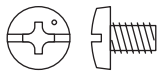
- Move the XY carriage unit left and right to check that the timing belt ② moves accordingly.

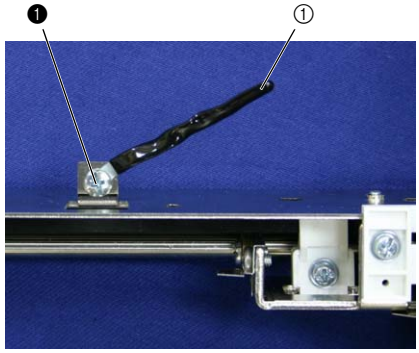
❶		Screw, Pan (S/P washer) M4X8	Torque 0.79 – 0.98 N·m



20 Coating clip removal

1. Engage the coating clip ① with the bent section at the lower section of the main frame subassembly, and secure it with the screw ❶.

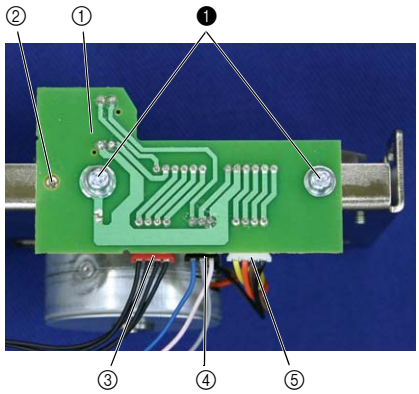
❶		Screw, Bind M4X6	Torque 0.79 – 0.98 N·m



21 EMB relay PCB assembly attachment

1. Align the hole on the EMB relay PCB assembly ① with the boss ② on the main frame unit, and then secure these with the 2 screws ❶.
2. Attach the lead wire assembly YPM relay ③, Y sensor PCB assembly lead wire ④, and XPM lead wire ⑤ to the EMB relay PCB assembly ①.

❶		Screw, Pan (S/P washer) M3X7	Torque 0.79 – 0.98 N·m

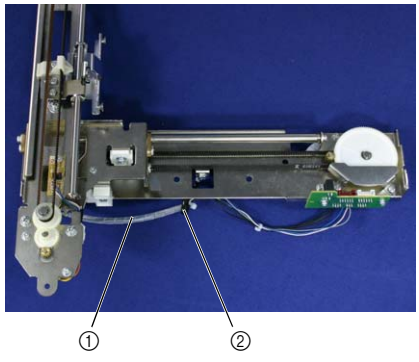


22 Cord treatment

1. Slide the XY carriage assembly of the main frame assembly to the left as far as possible.
2. Attach the spiral tube to the lead wire of the X sensor PCB assembly.
3. Attach the lead wire of the X sensor OCB assembly to the coating clip with the band.
4. Attach the band to the lead wire of the X sensor PCB assembly so that the distance between the band and the right edge of the coating clip should be 55 to 60mm.

***Key point**

- Refer to [6.Special Instruction of Wiring].

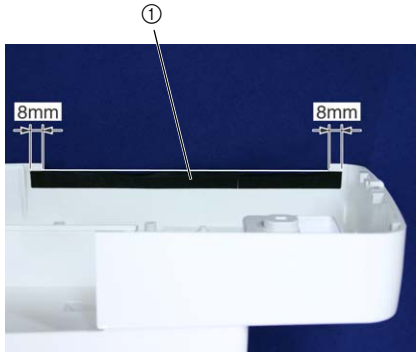


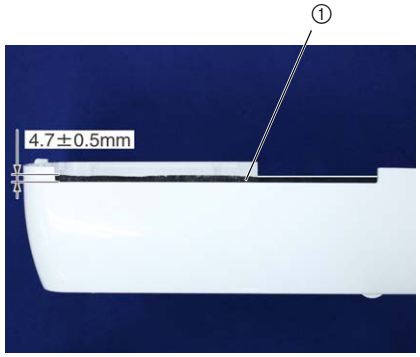
23 Groove cover attachment

1. Attach the groove cover ① to the ES base cover.

***Key point**

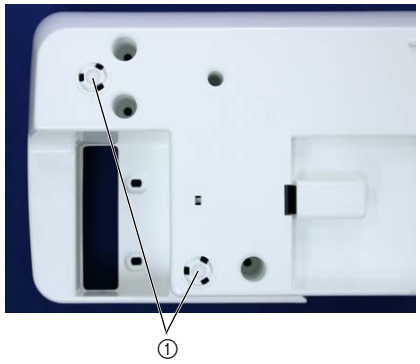
- Refer to the two photos on the right for attachment of the groove cover ①.

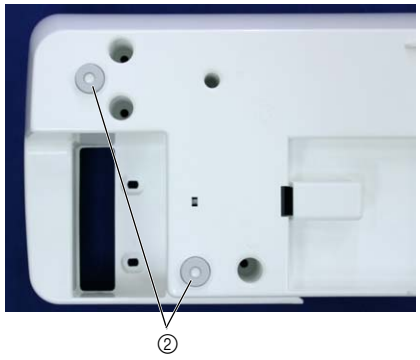




24 Rubber cushion and rubber cushion cover attachment

1. Attach the 2 rubber cushions ① to the ES base cover.
2. Insert the 2 rubber cushion covers ② into the attachment groove.



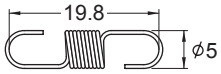


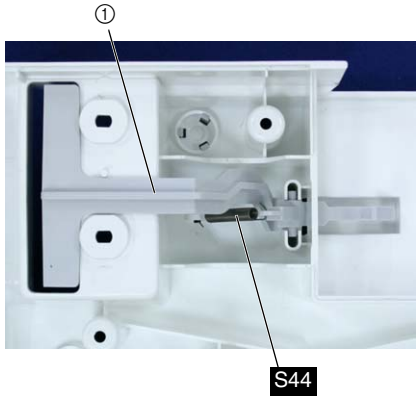
25 Lock release lever ASSY assembly

1. Attach the lock finger ② to the lock release lever ①.

26 Lock release lever assembly attachment

1. Attach the lock release lever assembly ① to the ES base cover unit.
2. Attach the spring S44.

S44		SPRING XC8096***

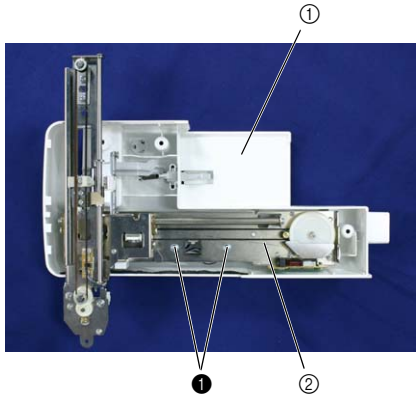


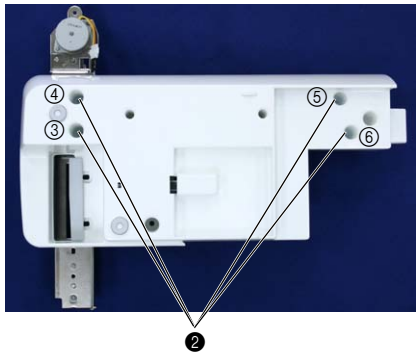
27 ES base cover unit attachment

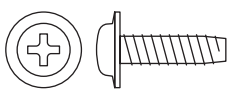
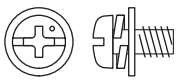
1. Align the 2 positioning holes on the main frame unit ② with the 2 bosses at the center of the ES base cover unit ①.
2. Secure the ES base cover unit ① to the main frame unit ② with the 6 screws (❶x2, ❷x4).

***Key point**

- Attach the 4 screws ❷ in the following sequence: ③ → ④ → ⑤ → ⑥.





❶		Taptite, Cup B M4X14	Torque 0.79 – 1.18 N·m
❷		Screw, Pan (S/P washer) M4X8	Torque 0.79 – 1.18 N·m

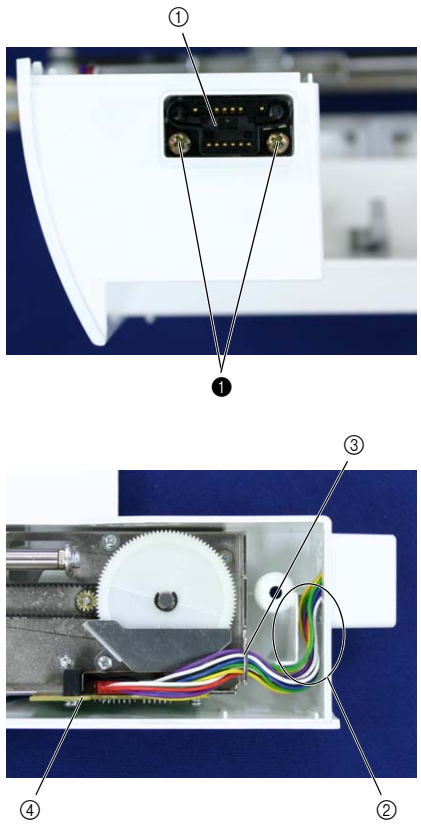
28 Lead wire assembly (EMB unit FCOMB) attachment

1. Pass the lead wires of the lead wire assembly EMB unit FCOMB ① through the hole on the ES base cover unit.
2. Attach the lead wire assembly ① to the ES base cover unit with the 2 screws ❶.

***Key point**

- Route the lead wires ① as shown in section ② in the photo, and then hang the lead wires onto the guide ③ of the main frame unit.

3. Attach the 2 connectors of the lead wire assembly ① to the EMB relay PCB assembly ④.



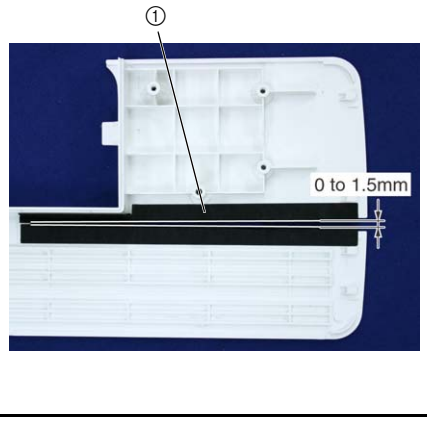
❶	Taptite, Bind P M3X16	Torque 0.59 – 0.79 N·m

29 Groove cover attachment

1. Attach the groove cover ① to the ES main cover.

***Key point**

- Refer to the photo on the right for attachment of the groove cover ①.

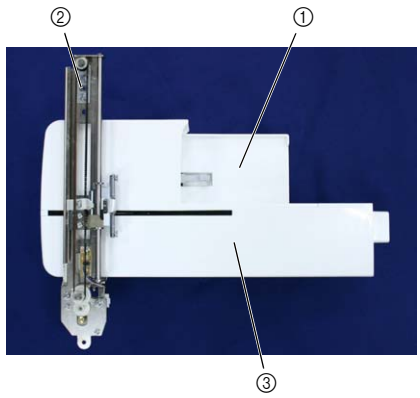


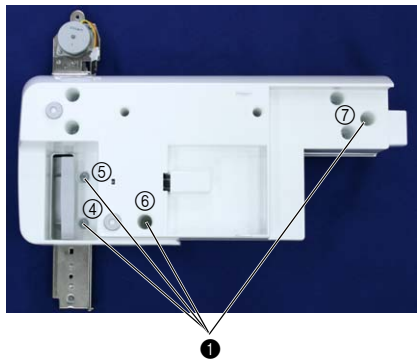
30 ES main cover assembly attachment

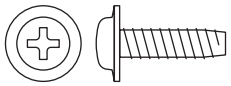
1. Position the ES base cover unit ① as shown in the photo on the right, and then slide the X carriage assembly ② to the left.
2. Slide the X carriage assembly ② along the slit on the ES main cover assembly ③ so that the X carriage assembly is fully engaged with the ES main cover assembly.
3. Secure the ES main cover assembly ③ with the 4 screws ❶.

***Key point**

- Attach the 4 screws ❶ in the following sequence: ④ → ⑤ → ⑥ → ⑦.
- Arrows are engraved on the outer surface of the base cover to indicate the locations of the 4 screws ❶.





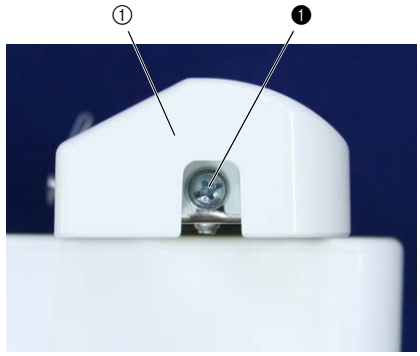
❶		Taptite, Cup B M4X14	Torque 0.79 – 1.18 N·m

31 X carriage cover attachment

1. Position the X carriage cover ① so that it covers the X carriage assembly, and then temporarily tighten the screw ❶.

***Key point**

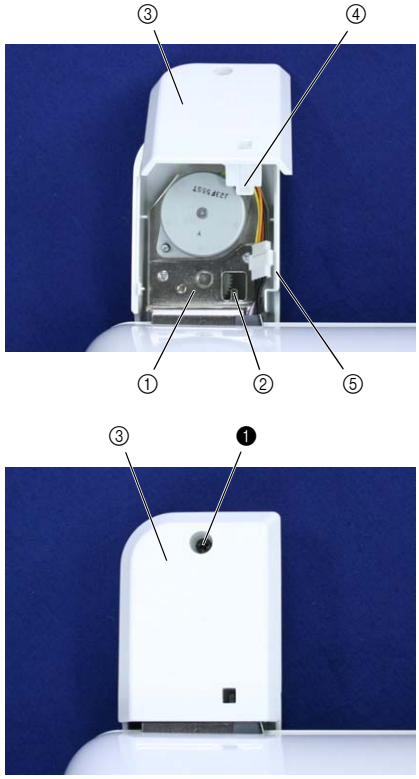
- Fully tighten the screw after the YPM cover has been attached.



❶		Screw, Pan (S/P washer) M4X8	Torque 0.79 – 1.18 N·m

32 YPM cover attachment

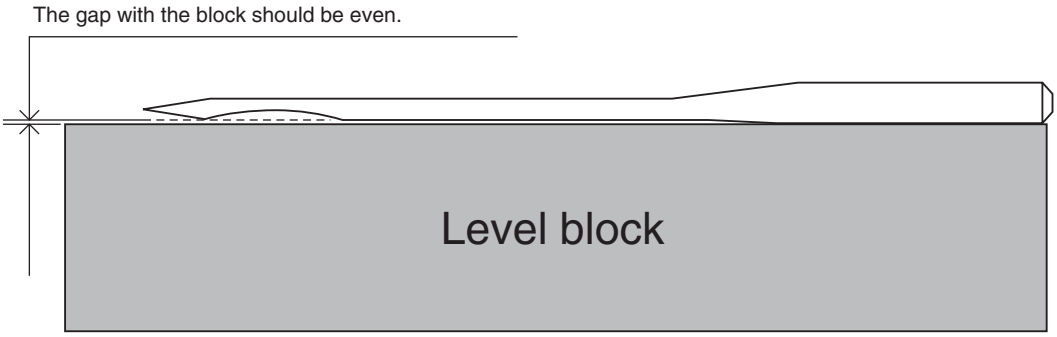
1. Align the tab ② on the X carriage assembly ① with the slot ④ on the YPM cover ③.
2. Secure the YPM cover ③ via the X carriage cover ⑤ to the X carriage assembly with the screw ❶.



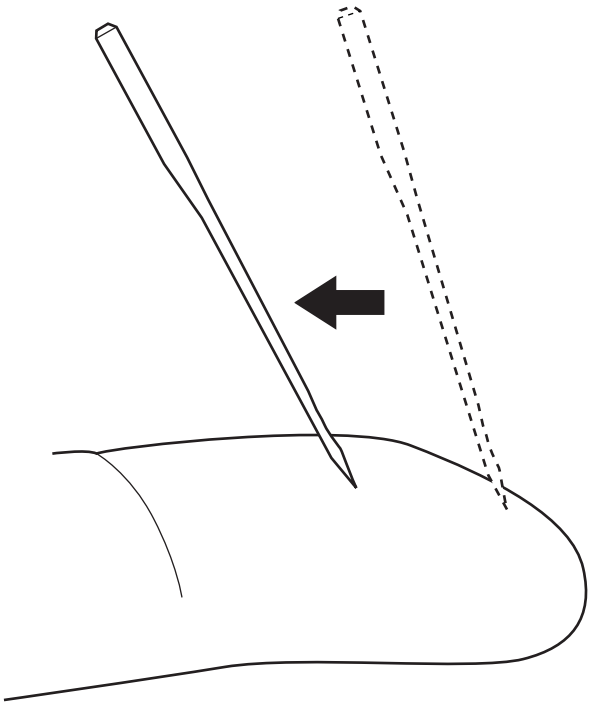
❶	Taptite, Bind P M3X10	Torque 0.59 – 0.79 N·m

4 Adjustment

1. Put needle on a level block, and check a needle is not bent.

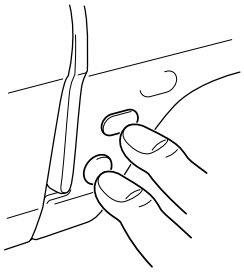


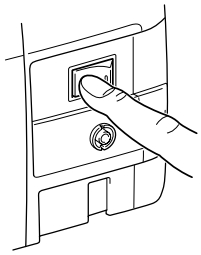
2. Slide a needle on your finger and check it moves smoothly (no damage on needle point).



1. Starting test mode

   Turn on the power while pressing the (START/STOP) (Start/Stop button) and (Reverse stitch button), then test mode starts (test mode selection screen is displayed).





2. Starting and stopping operation

   Press the (START/STOP) (Start/Stop button) on the front cover.

3. Return to test mode selection screen.

   When the test mode stops, press the (Back key) on the touch panel.

Test mode selection screen

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

Test Mode No.	Mode	Contents of test mode	Ref. page
1	Serial Numbers/Product ID	Serial number/Product ID and software version are displayed.	–
2	Embroidery position	Correct the initial position of embroidery by the 4 keys X direction (right and left) and Y direction (up and down). (-20 to +20)	4 - 29
3	Pattern adjustment	Test pattern is sewn, and set up the correction value of the vertical and horizontal. (-9 to +9)	4 - 21
4	3-point needle drop	Change needle position (left, center, right)	4 - 10
5	Needle clearance	Turn while moving the needle bar horizontally 0.5mm by 0.5mm.	–
6	Feed dog position	Feed dog is moves to front/center/left/right.	4 - 17
7	LCD contrast	Adjust the contrast of the LCD. (-10 to +10)	–
8	BH Forward/Backward count	Count the number of the needle of the BH Forward/ Backward.	–
10	Error display	Display the error message on the screen.	–
11	Sidefeed adjustment	Test pattern is sewn, and set up the correction value of the horizontal. (-9 to +9)	4 - 20
12	Upper thread 1	Disable detection function of upper thread/lower thread. (Effective once when turning on at the next time.)	–
13	Forwerd and reverse feed	Sewing 100 forward stitches (left base line), and 100 reverse stitches (right base line).	4 - 19
14	Speed	Running the machine with the maximum speed.	–
15	Power	Running the machine with the maximum electric power.	–
16	Switch monitoring	Check ON/OFF of each switch with buzzer. (PF-SW, BH Lever-SW, BH Front/Back-SW, BW-SW)	4 - 23
19	Crearing memory/Clearing counter	When press the OK key of "CLEARING FLASH", the pattern that saved at sewing is deleted. When press the OK key of "CLEARING COUNTER", the service stitch counter is reset.	–
20	Stitch count	Display the total stitch count on the screen.	–
21	Input check	Display the each switch and sensor state on the screen. (+1: ON, 00: OFF)	–
22	NP sensor	Check upper shaft angle with buzzer ON/OFF	–
23	Embroidery max position	Trace the maximum size of embroidery.	–
24	LCD check	Check display state of LCD.	–
25	Tension adjustment	When the utility sewing, set up the correction value of the thread tension. (-8 to +8) When the embroidery sewing, set up the correction value of the thread tension. (-8 to +8)	–
27	VR AD check	Display speed VR and foot controller AD value. Display target and actual rotation speed of upper shaft.	–
28	EEPROM USB HOST write	Not used	–

[Adjustment standard]

Touch the 5 point in order from 1 to 5, and then “SUCCESS” is displayed.

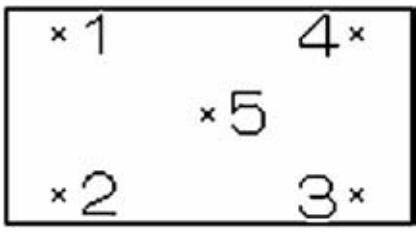
[Adjustment procedure]

1. Turn the power on while pressing the (START/STOP) (Start/Stop button), (Reverse stitch button) and (Needle position button).
2. Touch the point “x” in order from 1 to 5.

   ***Key point**
   - Adjustment finishes when “SUCCESS” is displayed after pressing “5”.
   - Adjust again when “ERROR” is displayed after pressing “5”.

   ***Note**
   - Use included touch pen.
     Do not use acute hard tip one, otherwise touch panel will be damaged.
3. Turn the power off and on again. Check touch panel work correctly.

Touch panel position adjustment screen



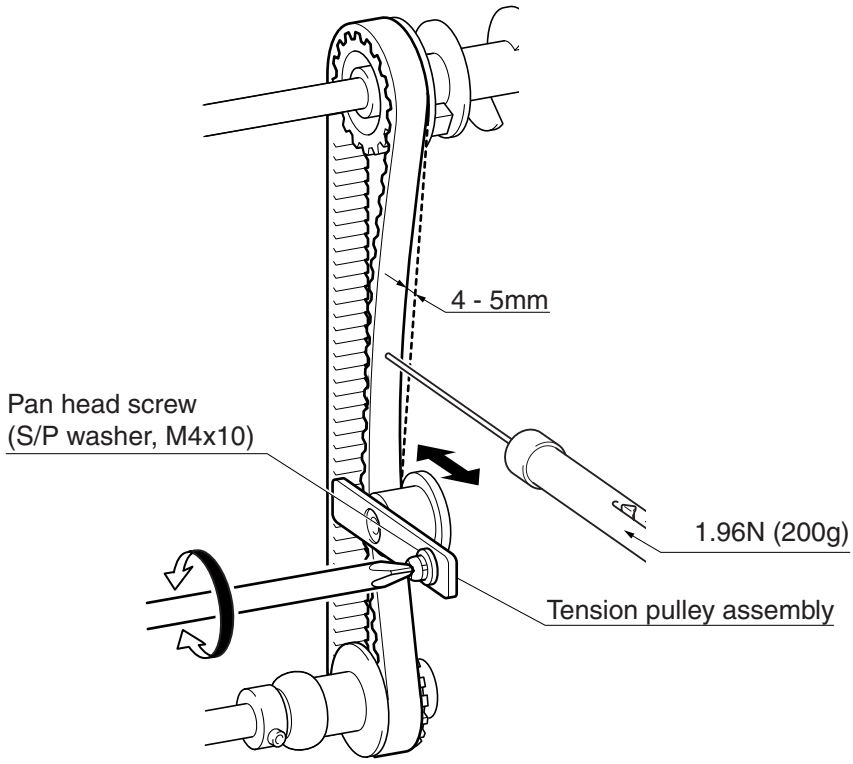
[Adjustment standard]

4 to 5mm slack by pushing the center of the belt with a force of 1.96N (200g).

[Adjustment procedure]

1. Remove the covers, the motor PCB and PCB holder.
2. Loosen the pan head screw (S/P washer, M4x10) of the tension pulley assembly.
3. Adjust the tension pulley assy. forward and back so that there should be 4 to 5mm slack in the timing belt when the center of the belt is pressed with a force of 1.96N (200g).
4. Tighten the pan head screw (S/P washer, M4x10) of the tension pulley assembly. (tightening torque: 1.18 to 1.57N·m)

XC2277001	Push-pull gauge (3N)



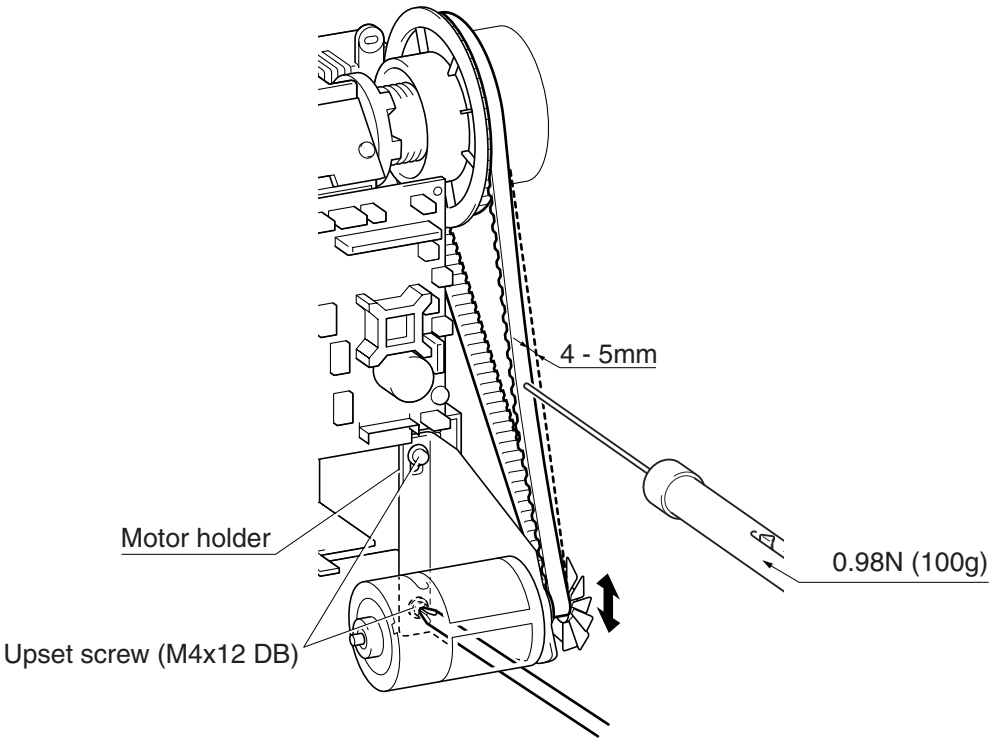
[Adjustment standard]

4 to 5mm slack by pushing the center of the belt with a force of 0.98N (100g).

[Adjustment procedure]

1. Remove the front cover assy..
2. Loosen the 2 upset screws (M4x12 DB) of the motor holder.
3. Adjust the motor holder up and down so that there should be 4 to 5mm slack in the timing belt when the center of the belt is pressed with a force of 0.98N (100g).
4. Tighten the 2 upset screws (M4x12 DB) of the motor holder. (tightening torque: 1.18 to 1.57N·m)

XC2277001	Push-pull gauge (3N)



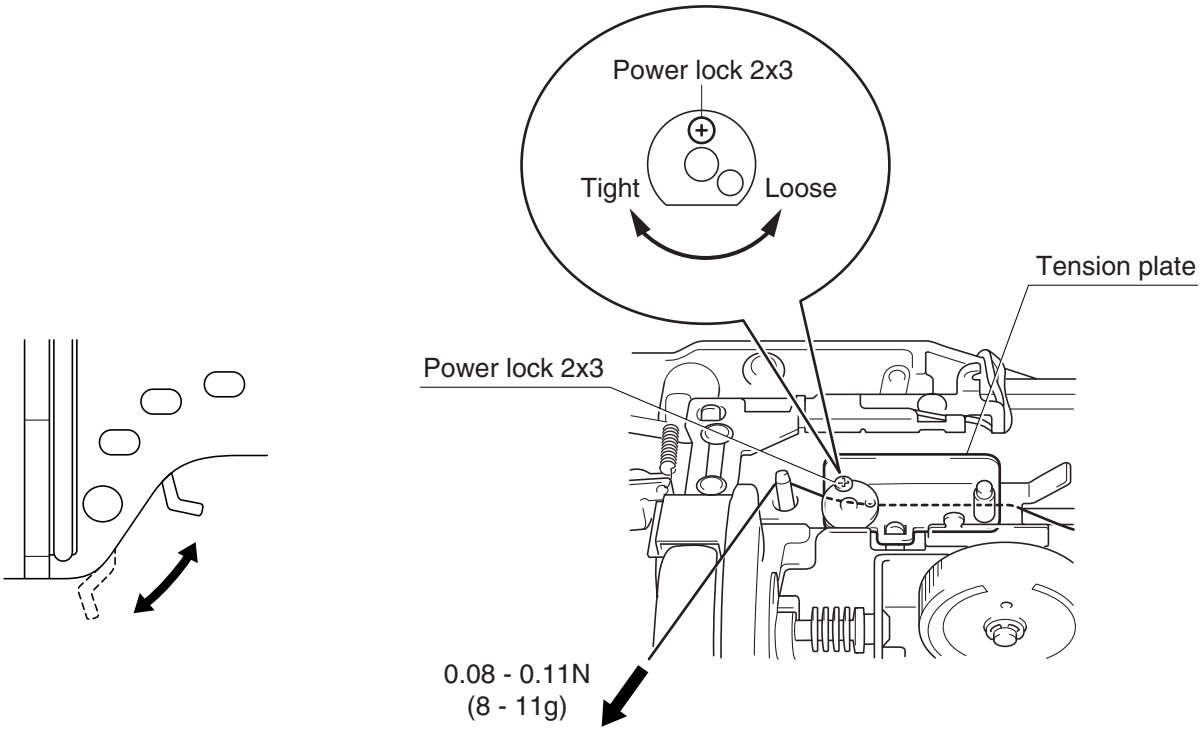
[Adjustment standard]

Pass the schappe spun thread #60 through tension plate and pull it by tension gauge, then adjust tension must be in 0.08 to 0.11N (8 to 11g).

[Adjustment procedure]

1. Remove the front thread guard cover.
2. Raise the presser foot lever.
3. Pass the schappe spun thread #60 through the thread guide and then tension plate.
4. Lower the presser foot lever.
5. Pull the thread by a tension gauge, and turn the power lock (2x3) and adjust the tension to 0.08 to 0.11N (8 to 11g).

XA9153001	Tension gauge 30 (0.3N)



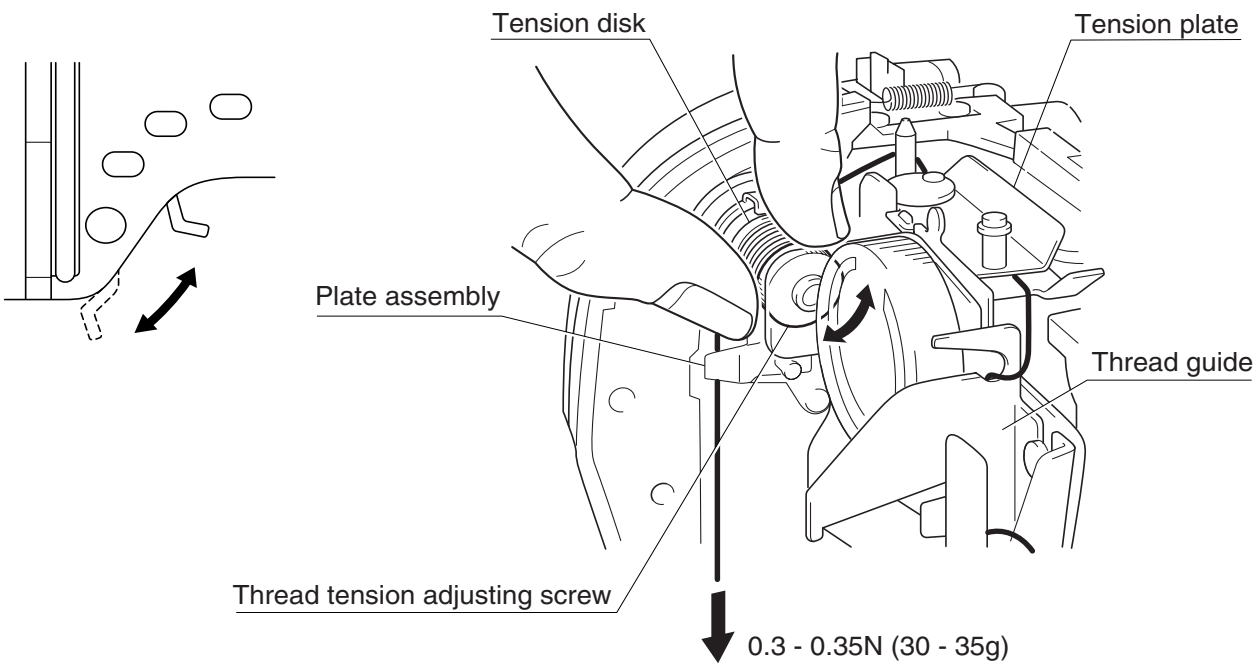
[Adjustment standard]

Start test mode, pass the schappe spun thread #60 through the thread guide, tension plate, tension disk and plate assembly, and pull it by tension gauge, then adjust tension must be in 0.3 to 0.35N (30 to 35g).

[Adjustment procedure]

1. Remove the embroidery unit from the machine.
2. Remove the front thread guard cover.
3. Start the test mode (AT pulse motor initializes).
4. Raise the presser foot lever.
5. Pass the schappe spun thread #60 through the thread guide, tension plate, tension disk and plate assembly in this order.
6. Lower the presser foot lever.
7. Pull the thread by a tension gauge, and turn the thread tension adjusting screw, and adjust the tension to 0.3 to 0.35N (30 to 35g).
8. Apply a small amount of thread locker to thread tension adjusting screw.

Thread locker for thread tension adjusting screw	Small amount
XA9154001	Tension gauge 50 (0.5 N)



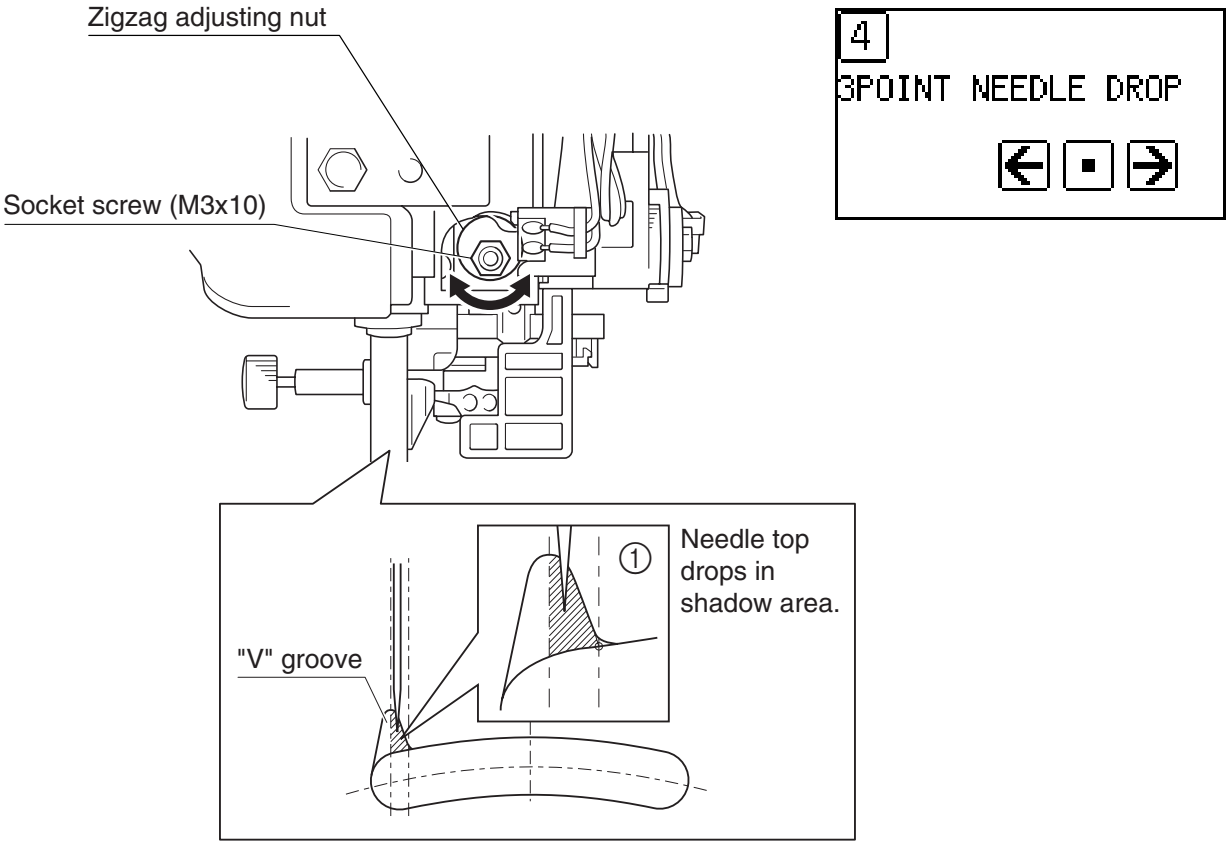
[Adjustment standard]

The needle top (left base line) must drop in the right side of "V" groove on the needle plate A. (See ① below)

[Adjustment procedure]

1. Remove the face plate assy., and the presser foot.
2. Attach the size 75/11 needle.
3. Start the test mode, and then select the "4" (3-point needle drop mode).
4. Press the [←] button on the screen, then the needle moves to the left, and turn the power off.
5. Turn the pulley by hand, until the needle top comes to the needle plate surface.
6. Loosen the socket screw (M3x10).
7. Turn the zigzag adjusting nut and adjust needle top drops in the right side of "V" groove on the needle plate A.
8. Tighten the socket screw (M3x10). (tightening torque: 0.78 to 1.18N· m)

XE2395001	Box driver 6

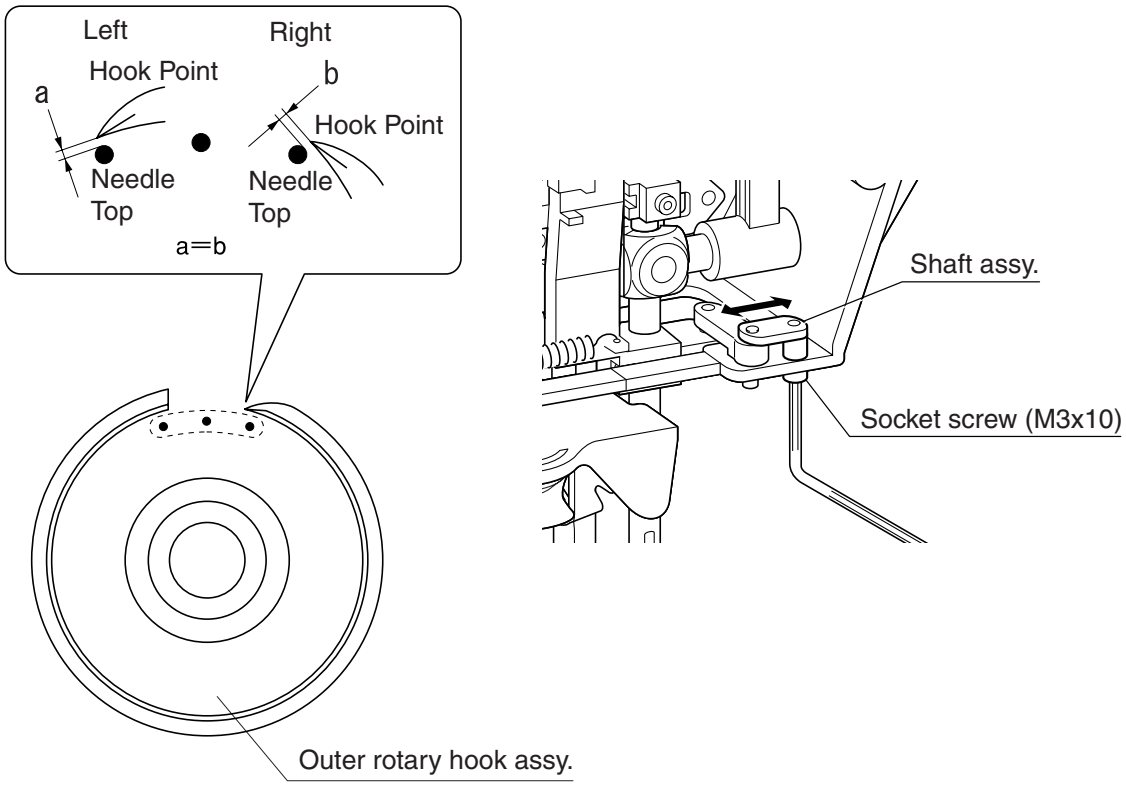


[Adjustment standard]

The clearance between the needle top and the outer rotary hook point is same at the base line of both left and right.

[Adjustment procedure]

1. Remove the presser foot, the needle plate A and the needle plate B, and then remove the inner rotary hook.
2. Attach the size 75/11 needle.
3. Start the test mode, and then select the “4” (3-point needle drop mode).
4. Turn the pulley by hand until the needle aligns with the outer rotary hook point.
5. Press the [←] [→] buttons, and check that the clearance between the needle top and the outer rotary hook point is same at the base line of both left and right.
6. Loosen the socket screw (M3x10) of the shaft assy..
7. Move the shaft assy. to the left and right and adjust the clearance between the needle top and the outer rotary hook point must be same at the base line of left and right.
8. Tighten the socket screw (M3x10) of the shaft assy.. (tightening torque: 0.78 to 1.18N· m)

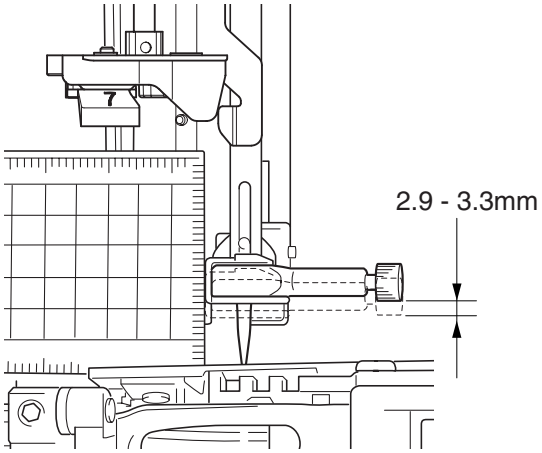


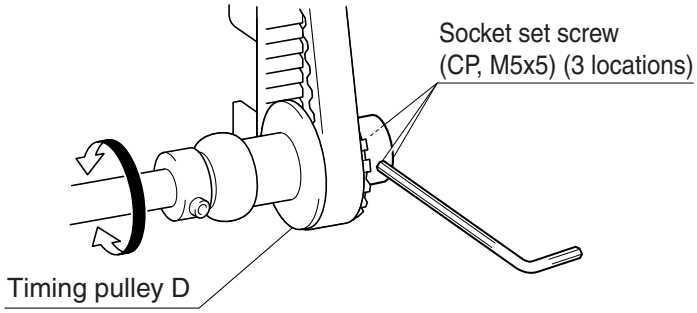
[Adjustment standard]

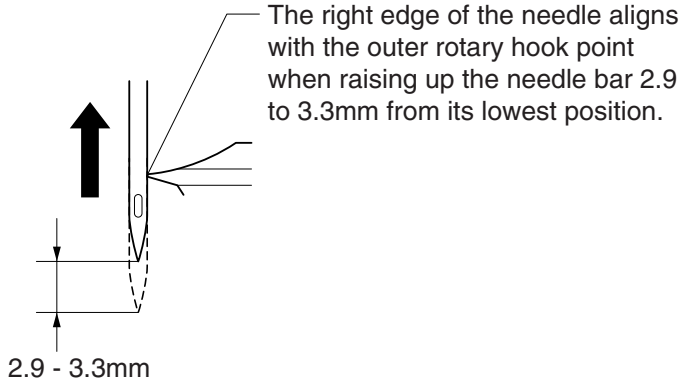
The right edge of the needle aligns with the outer rotary hook point when raising up the needle bar 2.9 to 3.3mm from its lowest position.

[Adjustment procedure]

1. Start the test mode, and then select the “4” (3-point needle drop mode).
2. Press the [←] button on the screen, then the needle moves to the left, and turn the power off.
3. Remove the front cover assy..
4. Remove the presser foot, the needle plate B and the needle plate A, and then remove the inner rotary hook assy..
5. Attach the size 75/11 needle.
6. Turn the pulley by hand and move the needle to its lowest position.
7. Loosen the 3 socket set screws (CP, M5x5) of the timing pulley D.
8. Turn the outer rotary hook by hand and adjust the right edge of the needle aligns with the outer rotary hook point when raising up the needle bar 2.9 to 3.3mm from its lowest position.
9. Tighten the 3 socket set screws (CP, M5x5) of the timing pulley D. (tightening torque: 1.37 to 1.79N· m)







[Adjustment standard]

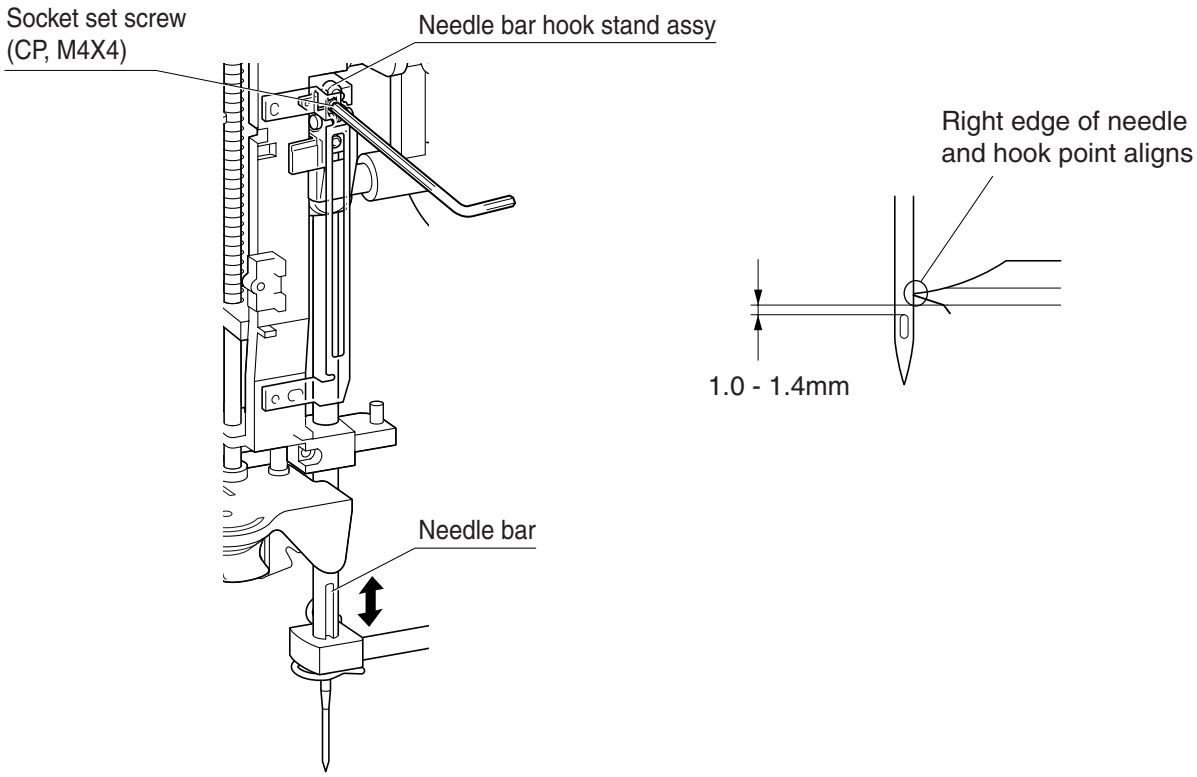
When turn the pulley by hand until the right edge of the needle aligns with the outer rotary hook point, the clearance between the top of the needle eye and the outer rotary hook point is 1.0 to 1.4mm.

[Adjustment procedure]

1. Start the test mode, and then select the “4” (3-point needle drop mode).
2. Press the [←] button on the screen, then the needle moves to the left, and turn the power off.
3. Remove the face plate assy. and the thread guide.
4. Remove the presser foot, the needle plate B and the needle plate A, and then remove the inner rotary hook assy..
5. Attach the size 75/11 needle.
6. Turn the pulley by hand until the right edge of the needle aligns with the outer rotary hook point.
7. Loosen the socket set screw (CP, M4x4) of the needle bar hook stand assy..
8. Move the needle bar up and down, and adjust the clearance between the upper edge of the needle eye and the outer rotary hook point to 1.0 to 1.4mm.

   ***Note**
   - Check the socket set screw (CP, M4x4) faces front.
9. Tighten the socket set screw (CP, M4x4) of the needle bar hook stand assy.. (tightening torque: 0.78 to 1.18N· m)

   ***Key point**
   - Need to adjust “4-15 Needle threader” after this adjustment.



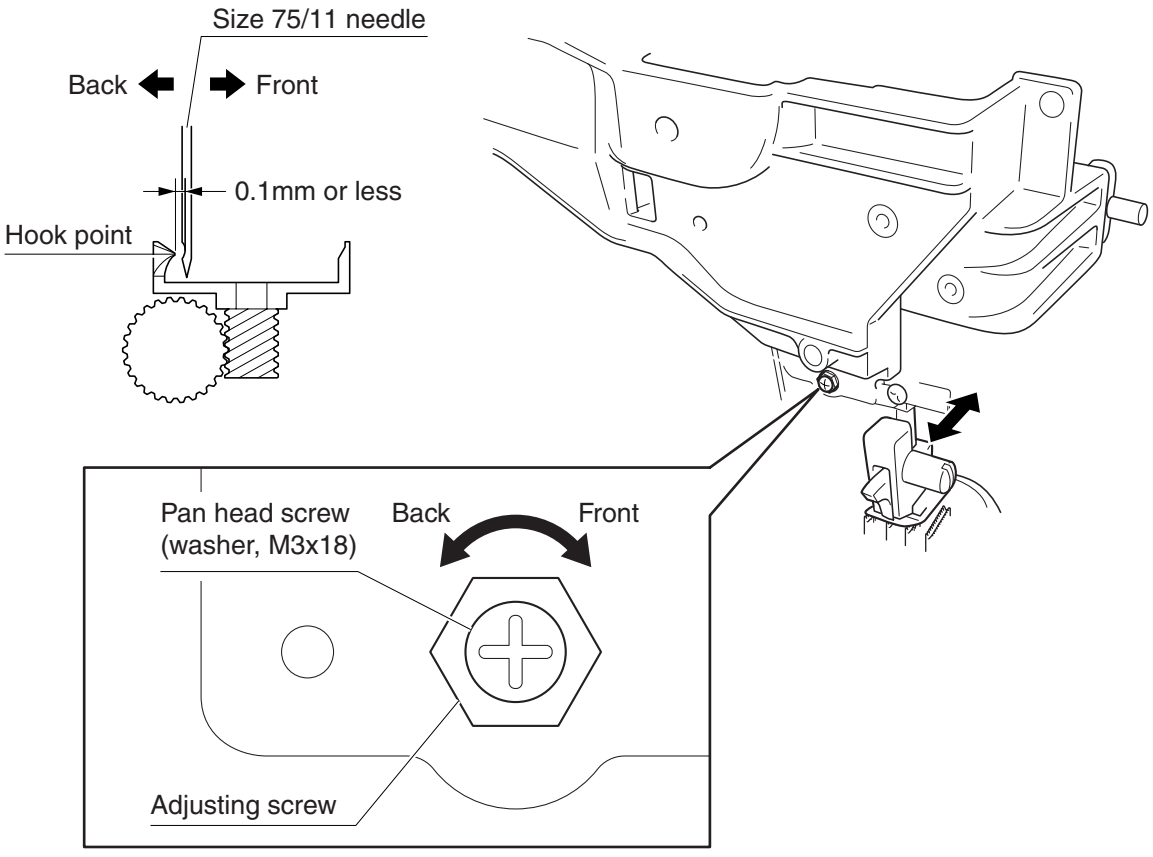
[Adjustment standard]

The clearance between the needle and the outer rotary hook point (front and back) is 0.1mm or less on the left base line.

[Adjustment procedure]

1. Start the test mode, and then select the “4” (3-point needle drop mode).
2. Move the needle to the left with the [←] button, and then turn the power off.
3. Remove the face plate assy..
4. Remove the presser foot, the needle plate B and the needle plate A, and then remove the inner rotary hook assy..
5. Attach the size 75/11 needle.
6. Loosen the pan head screw (washer, M3x18).
7. Turn the pulley by hand until the right edge of the needle aligns with the outer rotary hook point.
8. Turning the adjusting screw, adjust the clearance between the needle and the outer rotary hook point (front and back) to 0.1mm or less on the left base line.
9. Tighten the pan head screw (washer, M3x18). (tightening torque: 0.78 to 1.18N· m)

XE2395001	Box driver 6



[Adjustment standard]

When passing the hook into the needle eye, the clearance between the upper edge of the hook and the upper edge of the needle eye is 0mm.

[Adjustment procedure]

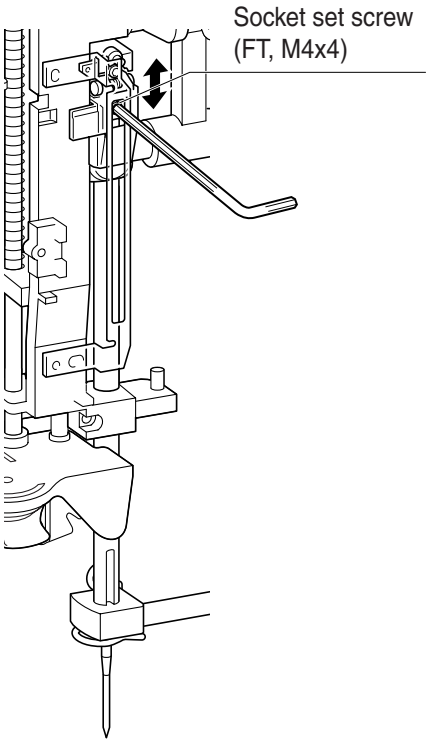
1. Remove the face plate assy..
2. Attach the size 75/11 needle.
3. Turn the pulley by hand to raise the needle bar to its highest position.
4. Loosen the socket screw (FT, M4x4), then move the needle thread block up and down and adjust the clearance between the upper edge of hook and the upper edge of the needle eye is 0mm. After that, tighten the socket set screw (FT, M4x4). (tightening torque: 0.78 to 1.18N· m)

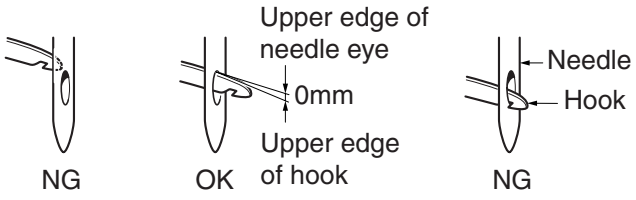
***Key point**

- Tighten the socket set screw (FT, M4x4) at the position slightly to the left when viewed from the front of the machine. (Fig.2)

***Note**

- In case the position of the socket set screw (FT, M4x4) is too left, the hook doesn't turn. (Fig.1)
- In case the position of the socket set screw (FT, M4x4) is too right, the needle thread block contacts the needle bar supporter assy., and get damaged. (Fig.3)





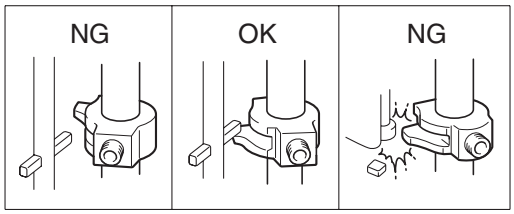


Fig. 1 Fig. 2 Fig. 3

[Adjustment standard]

The clearance between the needle plate A and bottom surface of the presser foot is 6 to 6.5mm.

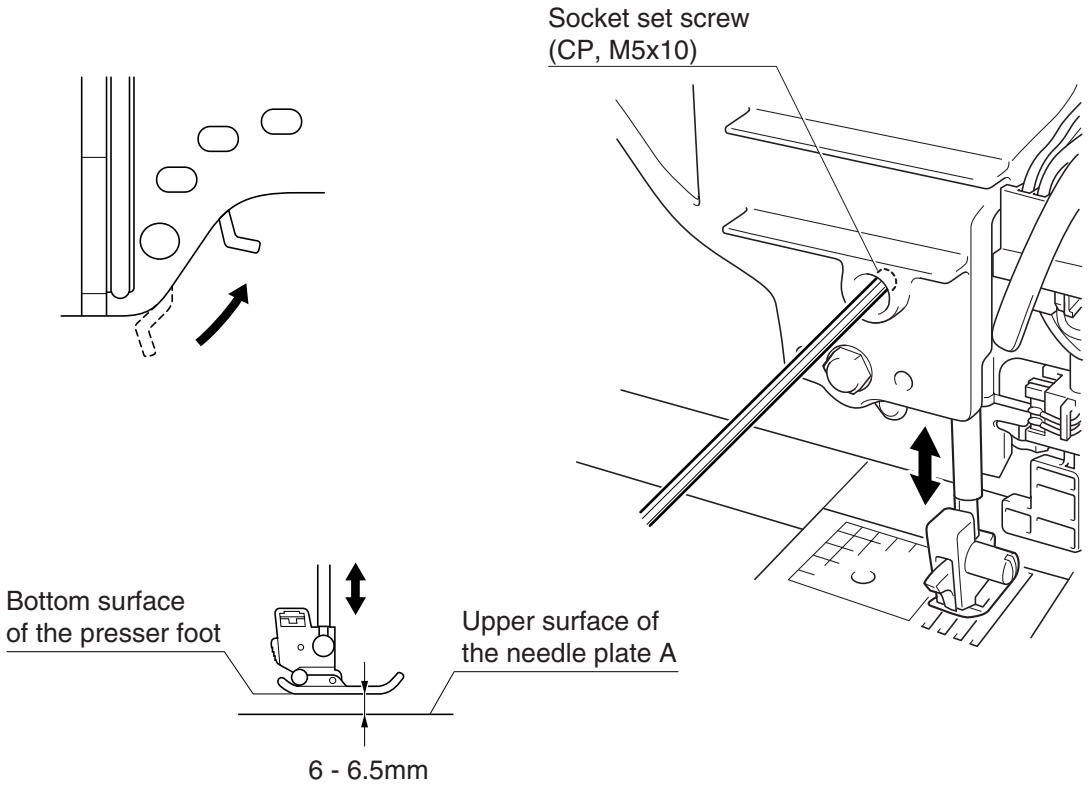
The presser foot parallel with the feed dog hole.

[Adjustment procedure]

1. Remove the face plate assy..
2. Attach the J presser foot.
3. Raise the presser foot lever.
4. Turn the pulley by hand and down the feed dog lower than the needle plate A.
5. Loosen the socket set screw (CP, M5x10) of the needle presser bar block.
6. Adjust the needle presser bar height, the clearance between the needle plate A and the bottom surface of the presser foot to 6 to 6.5mm.
7. Tighten the socket set screw (CP, M5x10) of the needle presser bar block (tightening torque: 1.37 to 1.77N· m).

***Key point**

- Check the presser foot parallel with the feed dog hole of the needle plate A after adjust the presser bar height.



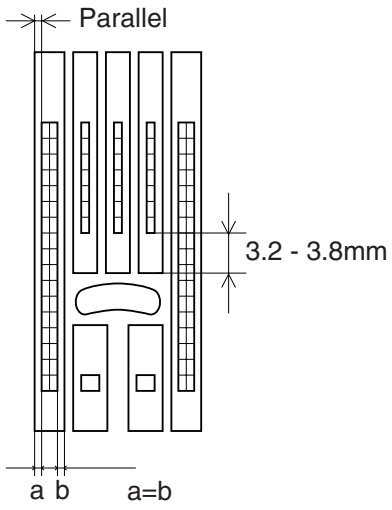
[Adjustment standard]

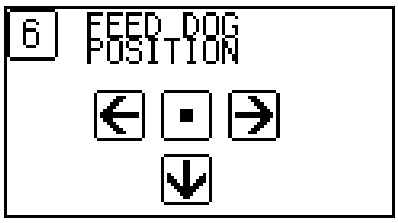
The clearance (front/back) between the forward edge of the feed dog middle tooth and needle plate A is 3.2 to 3.8mm, and the clearance (left/right) between the feed dog and needle plate A must be equal.

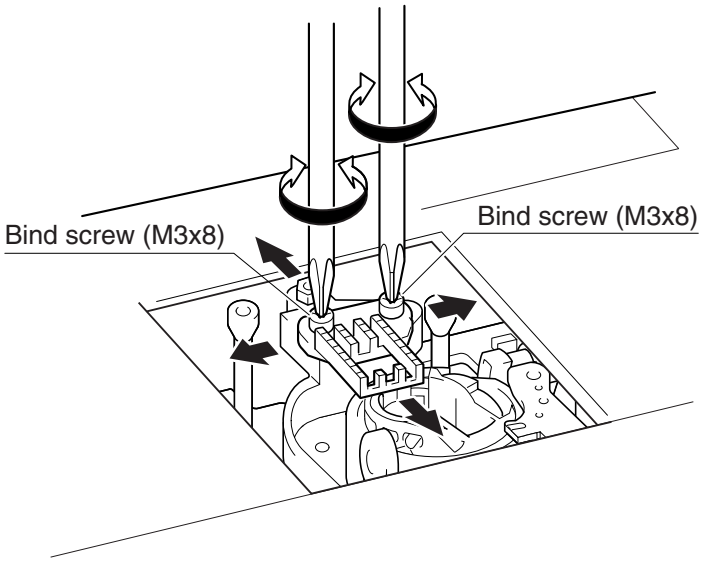
[Adjustment procedure]

1. Remove the needle plate B, the presser foot, the presser foot holder and the needle.
2. Start the test mode, and then select the “6” (Feed dog position mode).
3. Press the [■] button. (the feed dog comes to center)
4. Remove the 2 flat screws (M4) of the needle plate A, and then remove the needle plate A.
5. Loosen the 2 bind screws (M3x8) of the feed dog, temporarily attach the needle plate A, and adjust the front/back and left/right position of the feed dog.

   ***Key point**
   - Adjust the clearance (front/back) between the forward edge of the feed dog middle tooth and the needle plate A is 3.2 to 3.8mm.
   - Adjust the clearance (left/right) between the feed dog and the needle plate A must be equal.
   - Do not assemble feed dog to diagonally to the needle plate A.
6. Secure the feed dog with the 2 bind screws (M3x8). (tightening torque: 0.78 to 1.18N· m)
7. Fully tighten the 2 flat screws (M4) of the needle plate A.







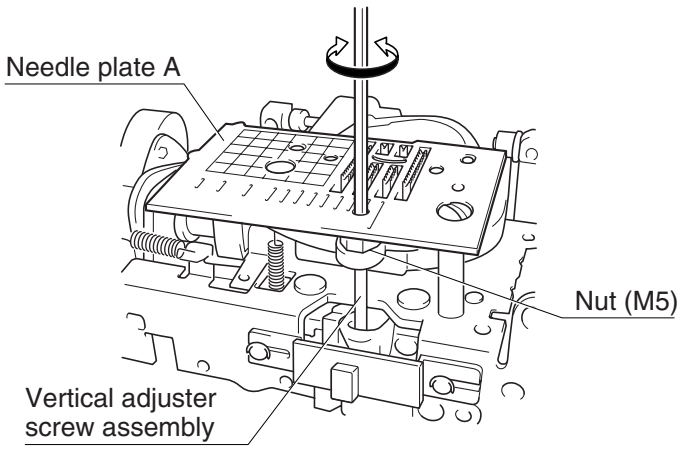
[Adjustment standard]

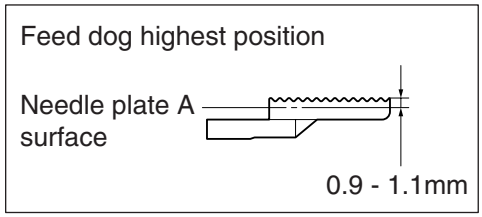
When the feed dog is in highest position, the feed dog height from the needle plate A surface is 0.9 to 1.1mm. The feed dog parallel with the needle plate A.

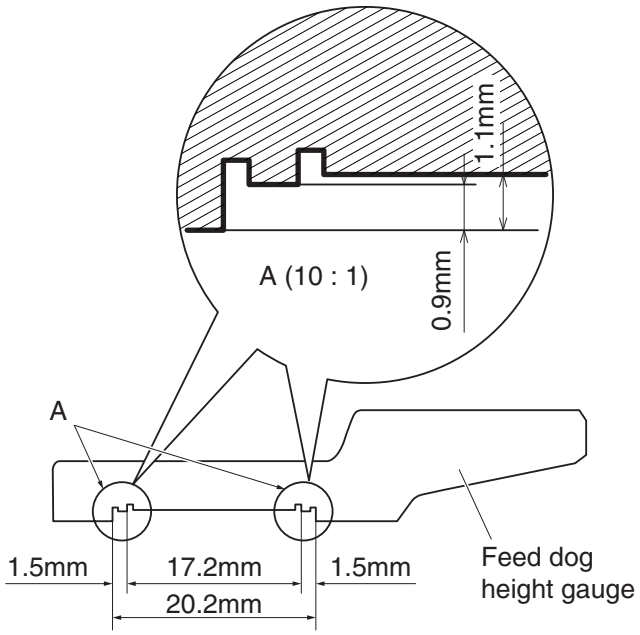
[Adjustment procedure]

1. Remove the needle plate B, the presser foot, the presser foot holder and the needle.
2. Turn the pulley by hand to raise the feed dog to its highest position.
3. Remove the 2 flat screws (M4) of the needle plate A, and then remove the needle plate A.
4. Loosen the nut (M5).
5. Temporarily attach the needle plate A, turn the vertical adjuster screw assembly and adjust the feed dog height from the needle plate A surface to 0.9 to 1.1mm.
6. Tighten the nut (M5) (Do not turn the vertical adjuster screw assembly).
7. Fully tighten the 2 flat screws (M4) of the needle plate A.

XC2278001	Feed dog height gauge







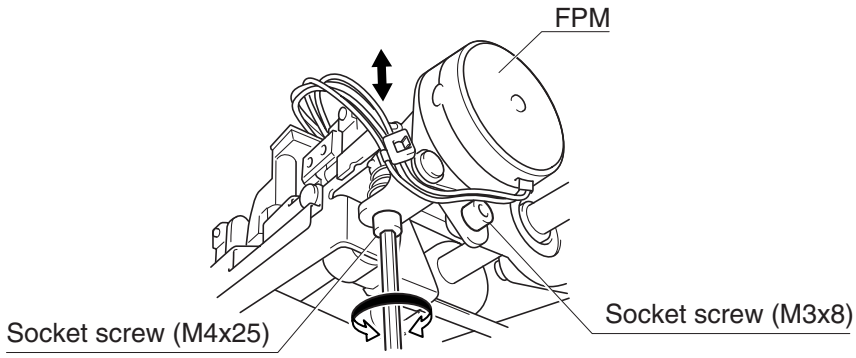
[Adjustment standard]

In the test mode “13”, sewing 100 forward stitches and 100 reverse stitches without thread, the length between forward and backward feed is less than 5mm.

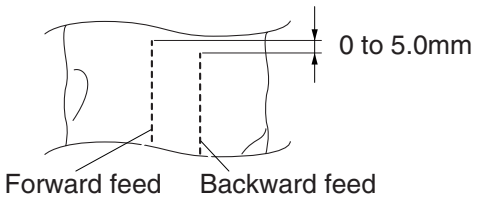
[Adjustment procedure]

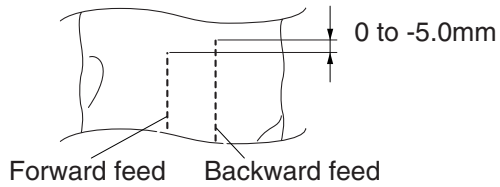
1. Attach the J presser foot.
2. Remove the front cover assy..
3. Start the test mode, and select the “13” (Forward and reverse feed mode).
4. Insert a paper between folded broadcloth, and press the (START/STOP) (Start/Stop button), then 100 forward stitches and 100 reverse stitches starts without thread.
5. Check the forward and backward feed length.
6. Loosen the socket screw (M3x8) of the FPM holder assy..
7. Adjust the forward and backward feed length turning the socket screw (M4x25) of the FPM holder assy..

   ***Key point**
   - Adjust the length of the forward and backward feed is less than 5mm.
   - Tightening the socket screw (M4x25) the backward feed shorter.
   - Loosening the socket screw (M4x25) the backward feed longer.
8. Tighten the socket screw (M3x8) of the FPM holder assy.. (tightening torque: 0.59 - 0.78N· m)
9. Apply a small amount of thread locker to the socket screw (M4x25) of the FPM holder assy..



Feed module lower right





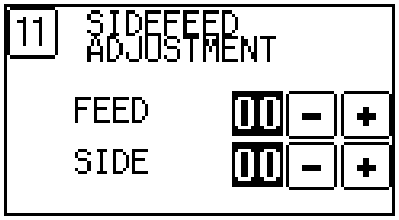
[Adjustment standard]

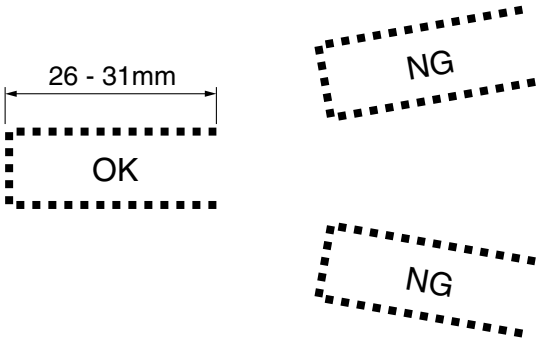
In the test mode “11”, the pattern must be in the standard (length and angle).

[Adjustment procedure]

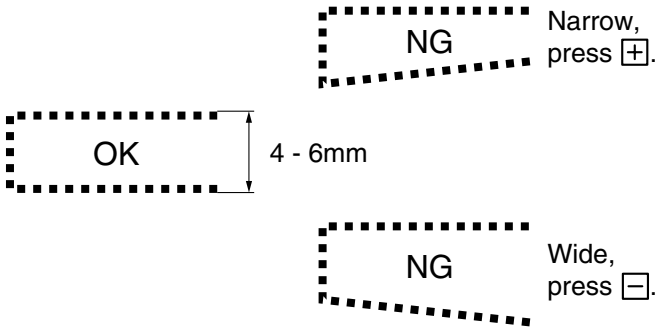
1. Attach the N presser foot.
2. Start the test mode, and then select the “11” (Side Feed Adjustment mode).
3. Sew the pattern with the schappe spun thread #60.
4. Press [−], [+] to adjust pattern shape is like “OK” below.

① Pattern should be horizontal, in case not horizontal, go to “4-17 Front/back and left/right position of feed dog” and “4-18 Feed dog height” so that the direction of the adjusting pattern is near-horizontal and the sewing length at the upper section is 26 to 31mm.

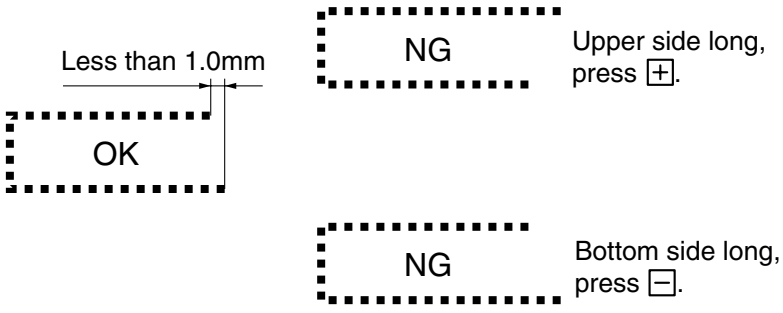




② Pattern height must be 4.0 to 6.0mm, adjusting by “FEED” [−], [+].



③ Pattern length upper and bottom side must be less than 1.0mm, adjusting by “SIDE” [−], [+].

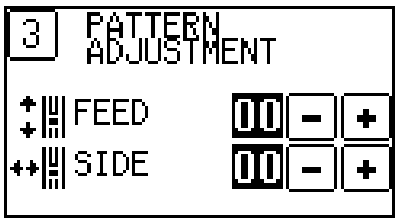


[Adjustment standard]

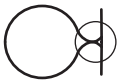
In the test mode “3”, sewing one point pattern, and no overlapping, opening, shifting.

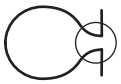
[Adjustment procedure]

1. Attach the N presser foot.
2. Start the test mode, and the select the “3” (Pattern Adjustment mode).
3. Sewing one point pattern with the schappe spun thread #60.
4. Press [−], [+] to adjust pattern shape is like “OK” below.



OK  No overlapping, opening and shifting.

NG: 1  Overlapping (vertical way), press “FEED” [+].

NG: 2  Opening (vertical way), press “FEED” [−].

NG: 3  Shifting (not align horizontal way), press “SIDE” [+].

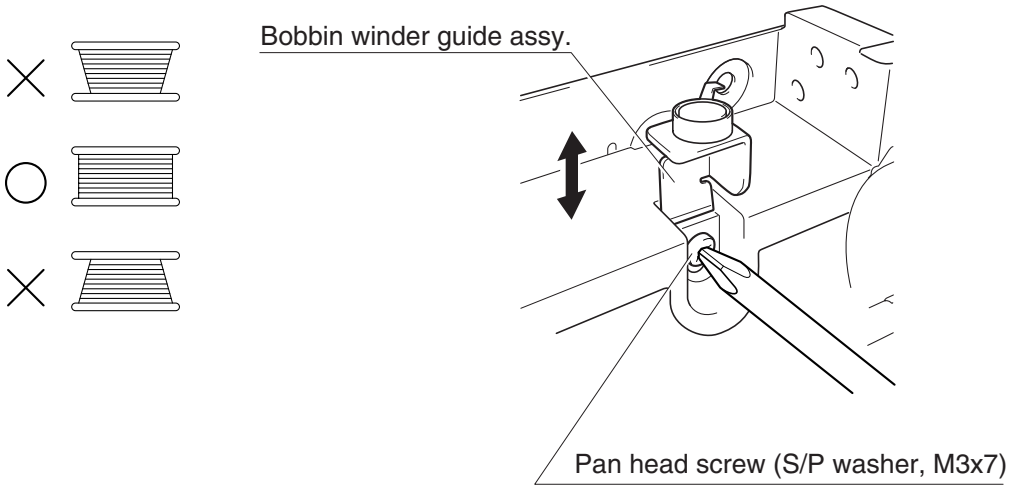
NG: 4  Shifting (not align horizontal way) press “SIDE” [−].

[Adjustment standard]

The bobbin should be wound evenly, and up to 80 - 90% of the outer diameter of the bobbin.

[Adjustment procedure]

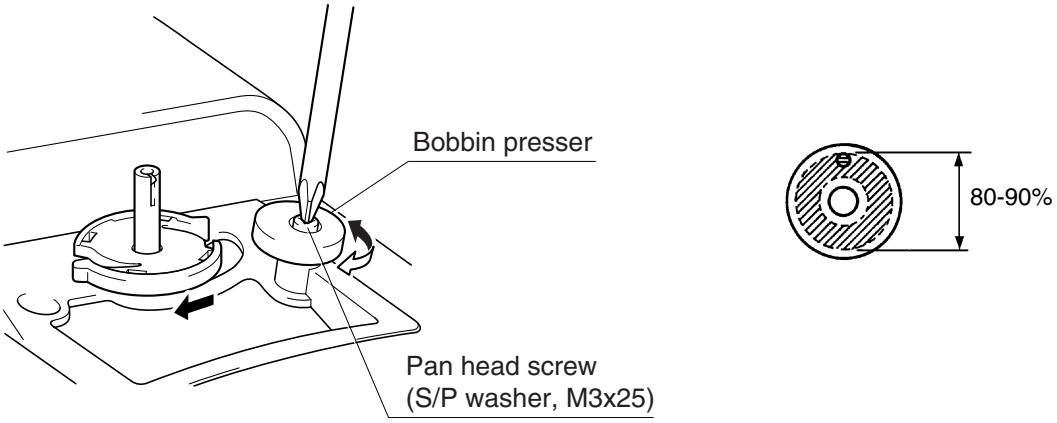
1. Loosen the pan head screw (S/P washer, M3x7) of the bobbin winder guide assy.
2. Move the bobbin winder guide assy. up and down, and adjust uneven bobbin winding.
3. Tighten the pan head screw (S/P washer, M3x7) of the bobbin winder guide assy.
   (tightening torque: 0.59 - 0.78N · m)



4. Loosen the pan head screw (S/P washer, M3x25).
5. Turn the bobbin presser left and right, and adjust the winding quantity.
6. Tighten the pan head screw (S/P washer, M3x25) of the bobbin winder guide assy.
   (tightening torque: 0.59 - 0.78N · m)

***Key point**

- The target for the bobbin winding quantity is filling 80 - 90% of the diameter.



[Adjustment standard]

Raising up the presser foot lever, and extend the BH presser foot maximum, back it 2 clicks.

① Pull the BH presser foot forward as much as possible, and the BH 0 touches the BH 2 and the BH 2 bows a little bit (Fig.4).

② Push the BH presser foot back as much as possible, and the BH 0 touches the BH 1 and that BH 1 bows a little bit (Fig.5).

[Adjustment procedure]

1. Remove the face plate assy..
2. Raise the presser foot lever.
3. Extend the BH presser foot maximum, back it 2 clicks. (Fig. 1)
4. Attach the BH presser foot.
5. Turn the pulley by hand, and down the feed dog lower than the needle plate.
6. Lower the presser foot lever after checking the clearance between the BH presser A and the BH presser B is 0.5mm. (Fig. 2)
7. Lower the BH lever, and set it to the BH presser foot.
8. Start the test mode, and then select the "16" (Switch monitoring mode).
9. Rotate the BH eccentric shaft and adjust the BH 0 touches the BH 1 (The buzzer sounds continuously). (Fig. 3)

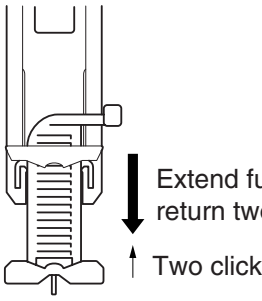


Fig. 1

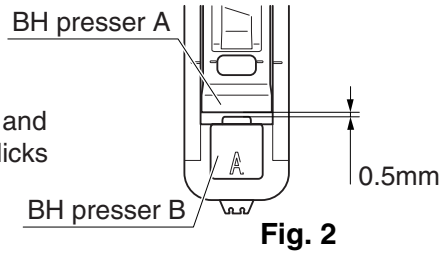


Fig. 2

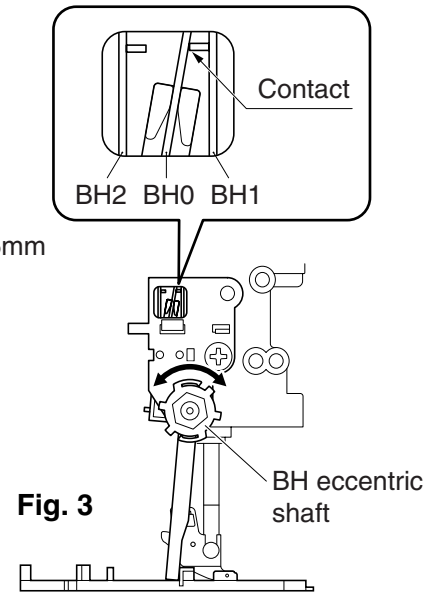
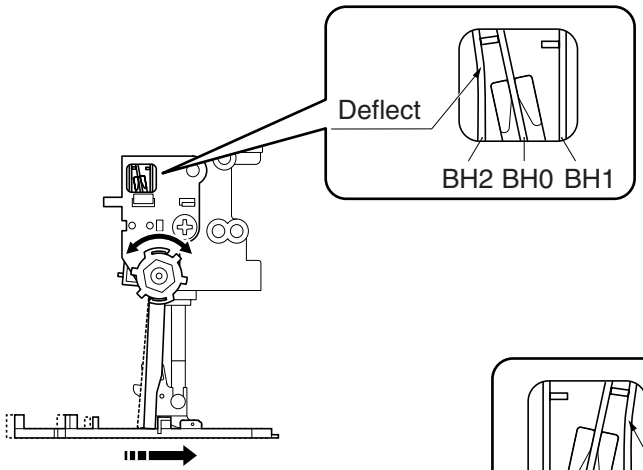


Fig. 3



When pulled to the
fullest forward

Fig. 4

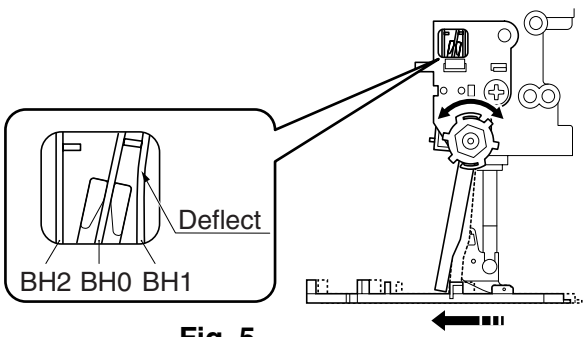


Fig. 5

When pushed to the
fullest backward

[Adjustment standard]

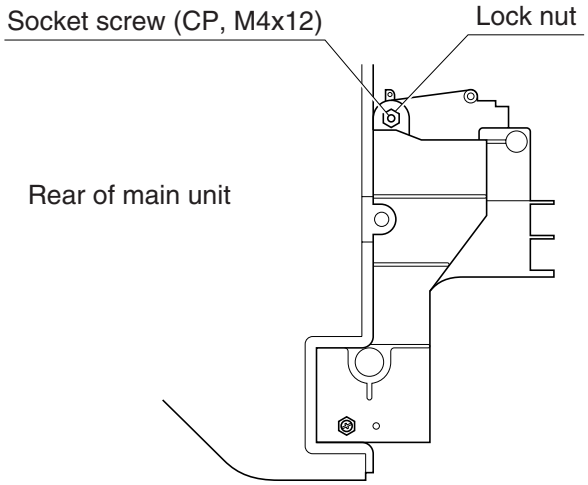
The needle top drops in the center position (front/back) of the presser foot hole.

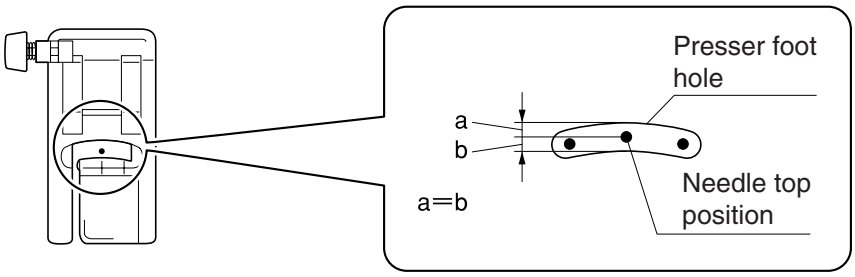
[Adjustment procedure]

1. Remove the face plate assy..
2. Attach the J presser foot, and then lower the presser foot lever.
3. Turn the pulley by hand, and drop the needle top into the presser foot hole.
4. Loosen the lock nut.
5. Adjust the needle top to the center position (front/back) of the needle hole using the socket screw (CP, M4x12).
6. Tighten the lock nut. (tightening torque: 0.39 to 0.49N·m)

***Key point**

- Need to adjust “4-14 Clearance between needle and rotary hook point” after this adjustment.



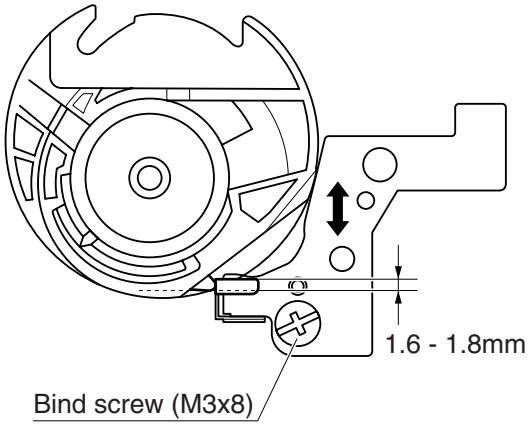


[Adjustment standard]

The clearance (overlap) between the inner rotary hook point and the bracket spring must be 1.6 to 1.8mm.

[Adjustment procedure]

1. Remove the needle plate B.
2. Set the inner rotary hook in the outer rotary hook assy..
3. Loosen the bind screw (M3x8) of the inner rotary hook bracket assy..
4. Move the position of the inner rotary hook bracket assy. (forward and back), and adjust the clearance is in standard (1.6 to 1.8mm).
5. Tighten the bind screw (M3x8) of the inner rotary hook bracket assy.. (Tightening torque: 0.78 to 1.18N· m)



■ Standard bobbin case (green marking on the screw)

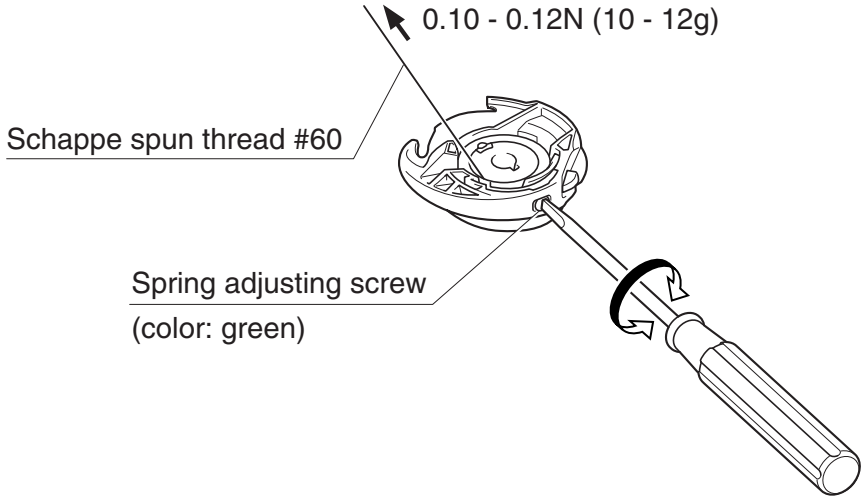
[Adjustment standard]

Inner rotary hook assy. (lower thread) tension is 0.10 to 0.12N (10 to 12g).

[Adjustment procedure]

1. Set the bobbin (the schappe spun thread #60) in the inner rotary hook assy..
2. Pull thread with the tension gauge, and turn the spring adjusting screw, adjust the tension to 0.10 to 0.12N (10 to 12g).
3. After adjustment, apply a small amount of the thread locker to the spring adjusting screw.

XA9153001	Tension gauge 30 (0.3N)



■ Alternate bobbin case (no color on the screw, for embroidery)

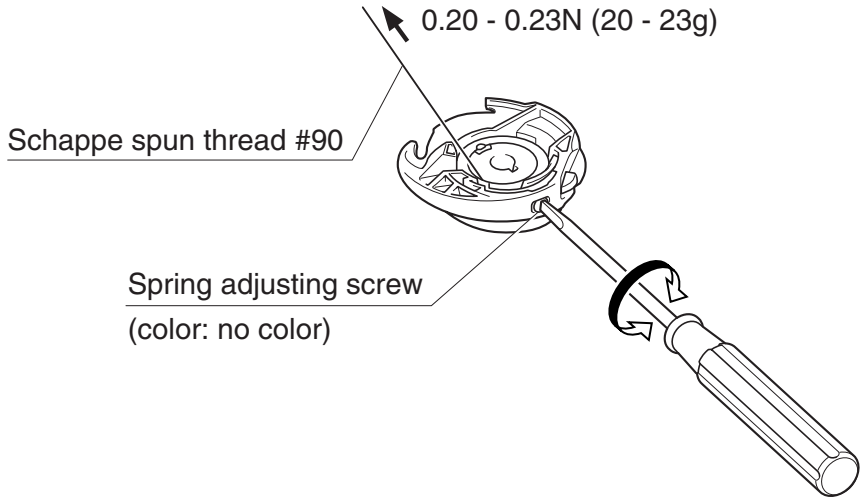
[Adjustment standard]

Inner rotary hook assy. (lower thread) tension is 0.20 to 0.23N (20 to 23g).

[Adjustment procedure]

1. Set the bobbin (the schappe spun thread #90) in the inner rotary hook assy..
2. Pull thread with the tension gauge, and turn the spring adjusting screw, adjust the tension to 0.20 to 0.23N (20 to 23g).

XA9153001	Tension gauge 30 (0.3N)

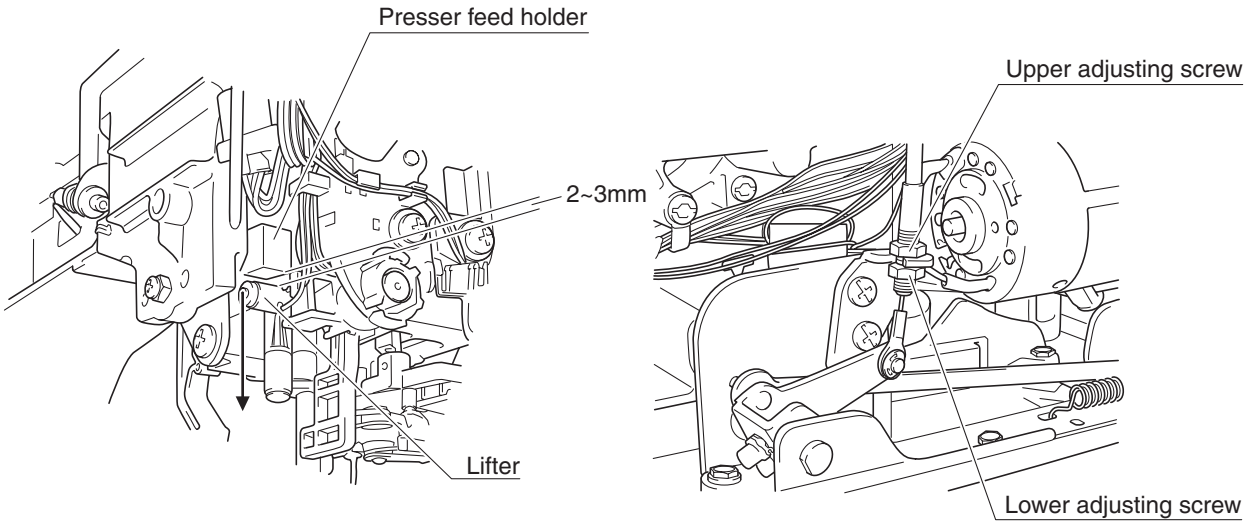


[Adjustment standard]

The clearance between the presser feed folder and the lifter is 2 to 3mm.

[Adjustment procedure]

1. Lower the presser foot lever.
2. Loosen the 2 adjusting screws.
3. While pushing the lifter downward, turn the upper adjusting screw and adjust the clearance between the presser feed folder and the lifter to 2 to 3mm.
4. Tighten the lower adjusting screw.



■ X timing belt

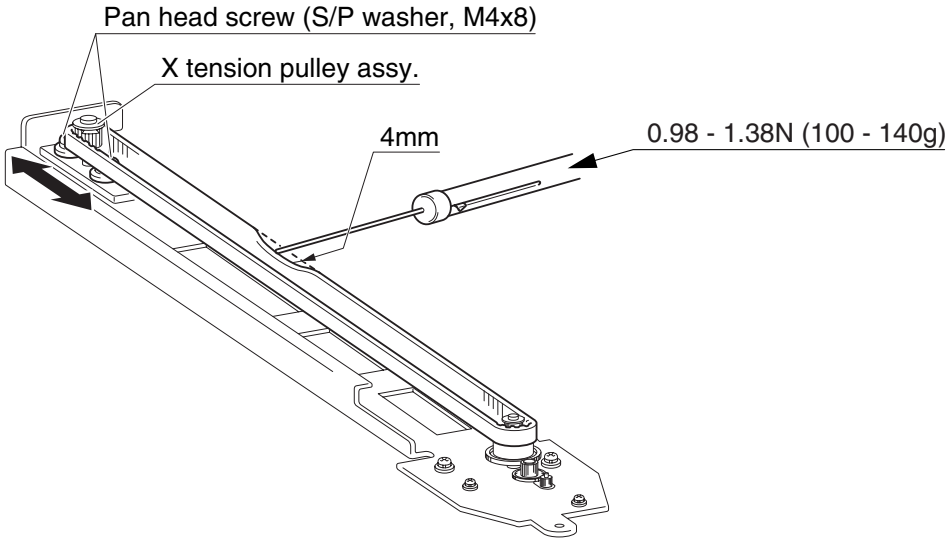
[Adjustment standard]

4mm slack by pushing the center of the belt with a force of 0.98 to 1.38N (100 to 140g).

[Adjustment procedure]

1. Loosen the 2 pan head screws (S/P washer, M4x8).
2. Move the X tension pulley assy. right and left to adjust the X belt tension.
3. Tighten the 2 pan head screws (S/P washer, M4x8). (tightening torque: 1.17 to 1.57N·m)

XC2277001	Push-pull gauge (3N)



■ Y timing belt

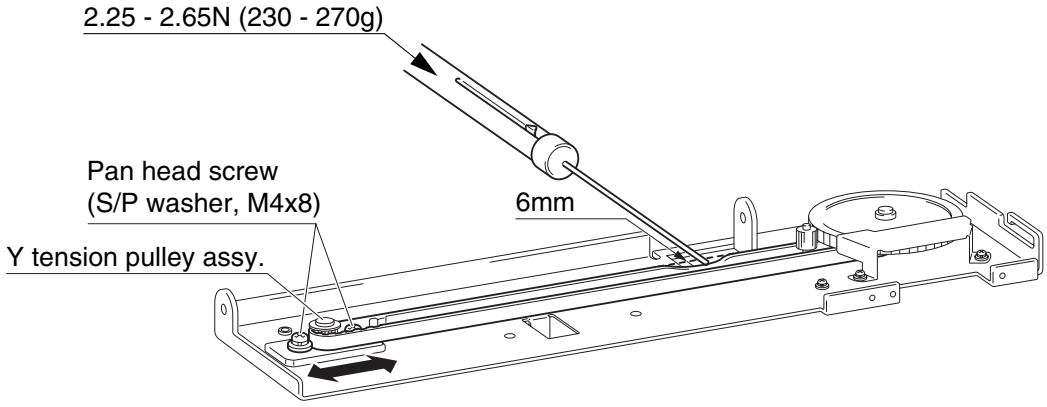
[Adjustment standard]

6.0mm slack by pushing the center of the belt with a force of 2.25 to 2.65N (230 to 270g).

[Adjustment procedure]

1. Loosen the 2 pan head screws (S/P washer, M4x8).
2. Move the Y tension pulley assy. right and left to adjust the Y belt tension.
3. Tighten the 2 pan head screws (S/P washer, M4x8). (tightening torque: 1.17 to 1.57N·m)

XC2277001	Push-pull gauge (3N)



Repairing or adjusting the embroidery unit, check this adjustment.

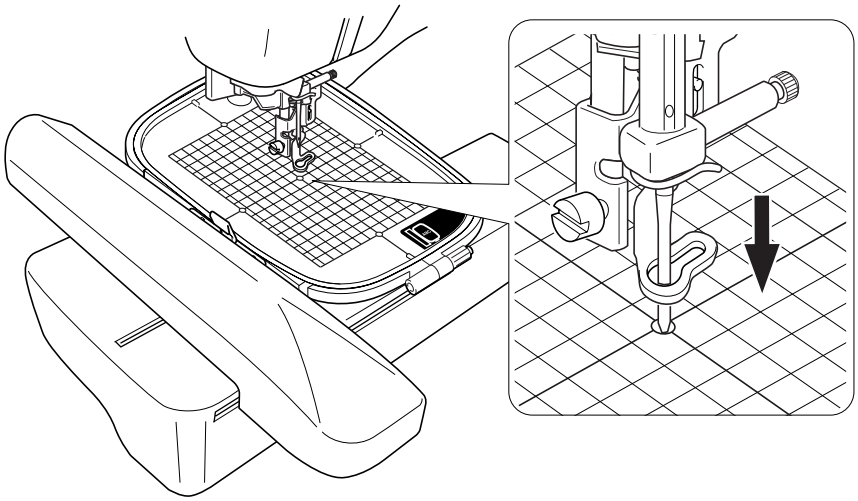
[Adjustment standard]

The needle drops in the center of embroidery sheet hole.

[Adjustment procedure]

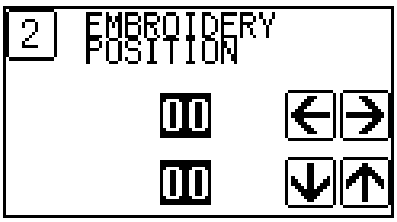
■ Checking the embroidery unit center position

1. Remove the presser foot.
2. Attach the embroidery unit to the machine. (Remove embroidery hoop.)
3. Turn on the power, and press the [OK] button on the screen (Move the carriage).
4. Put the embroidery sheet on the embroidery hoop.
5. Attach the embroidery hoop to the embroidery unit.
6. Turn the pulley by hand and check the needle drops in the center of the embroidery sheet hole.



■ In case the needle does not drop in the center of the embroidery sheet hole.

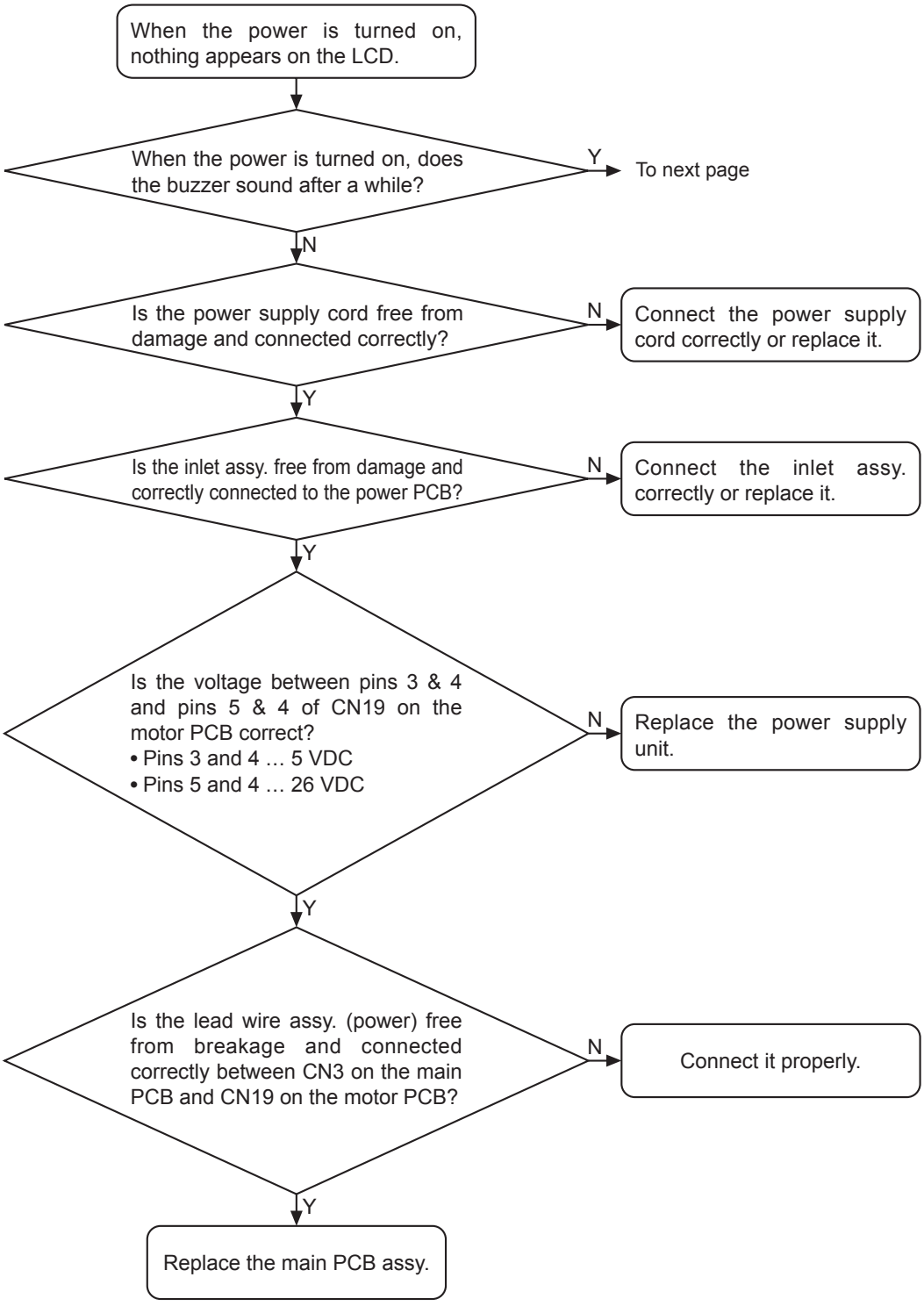
1. Select the test mode “2” (Embroidery Position Adjust mode).
2. Adjust the needle position by pressing the button on the screen for the needle to drop in the center of the embroidery sheet hole.
3. After adjustment, turn the power off (adjusting value is memorised automatically)

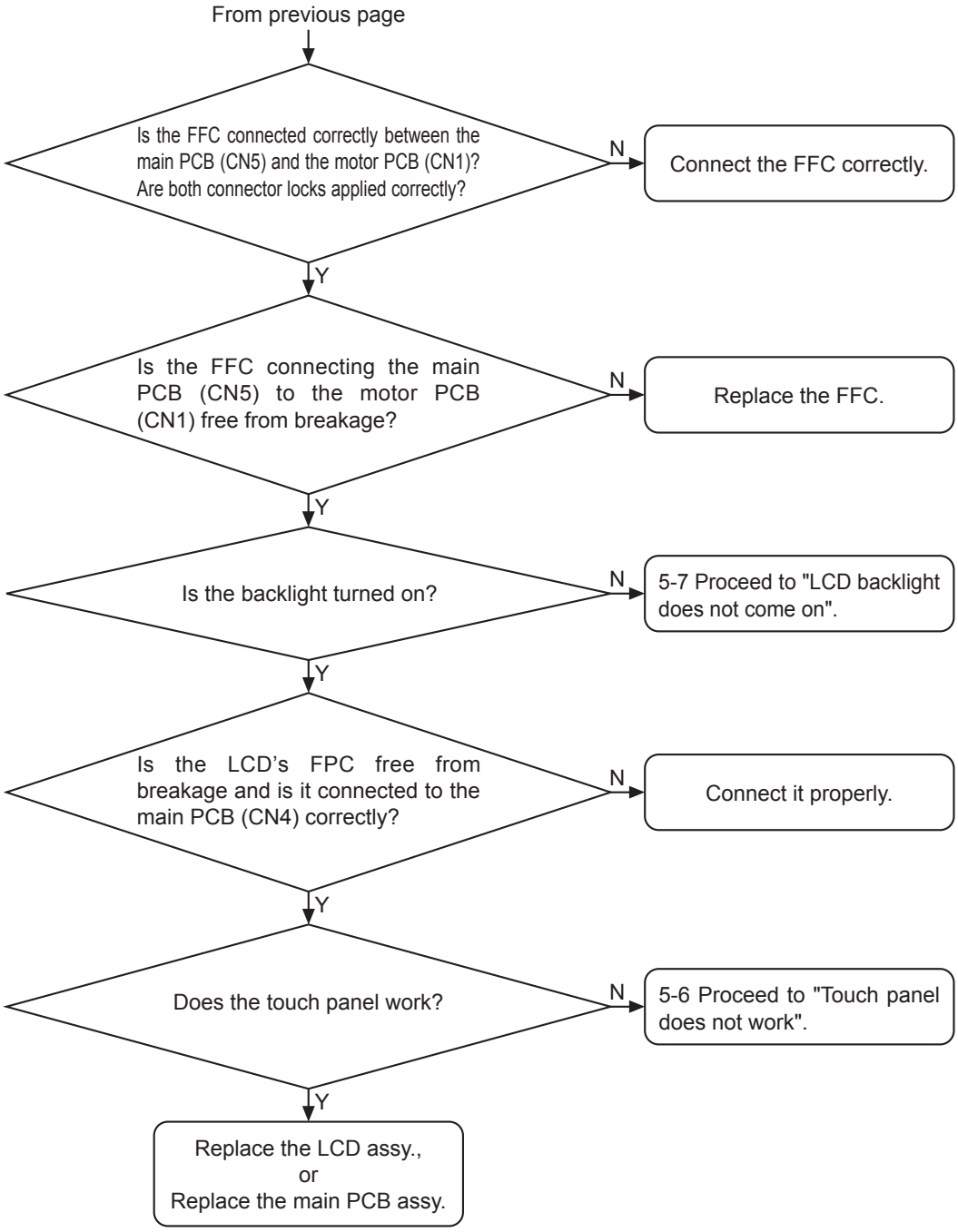


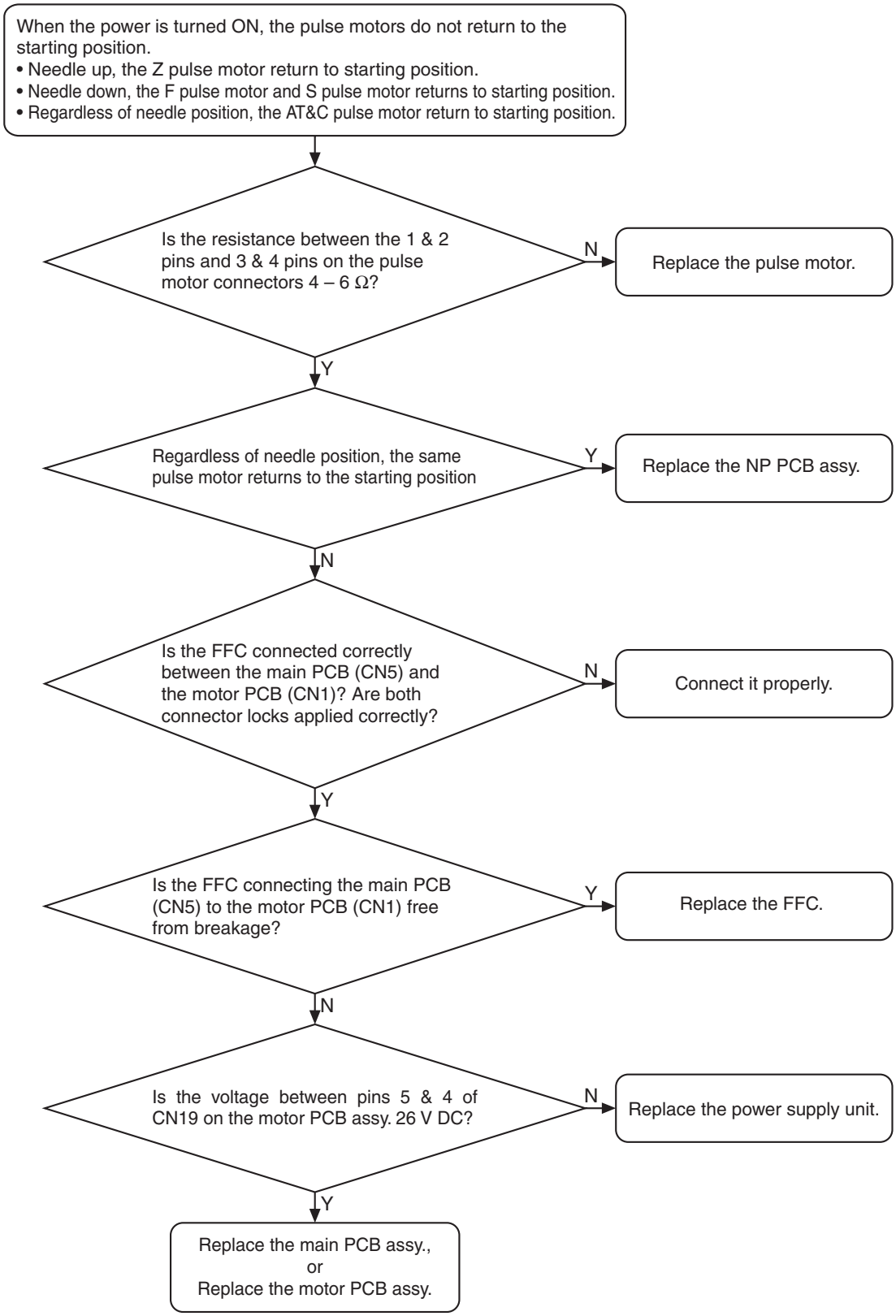
5 Failure Investigation for Electronic Parts

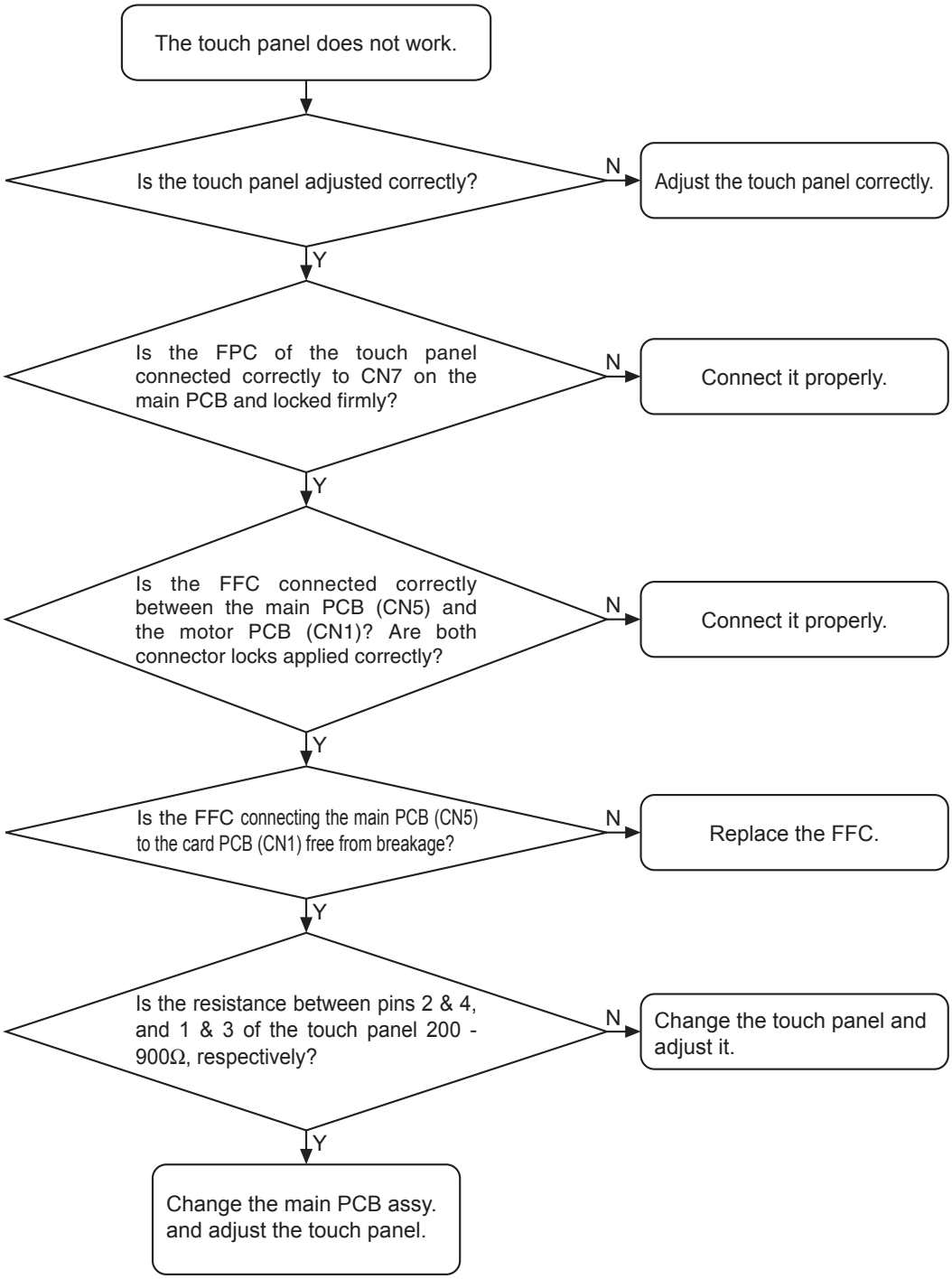
* Perform resistance measurements after turning off the power, and detaching the connectors to be measured from the PCB.

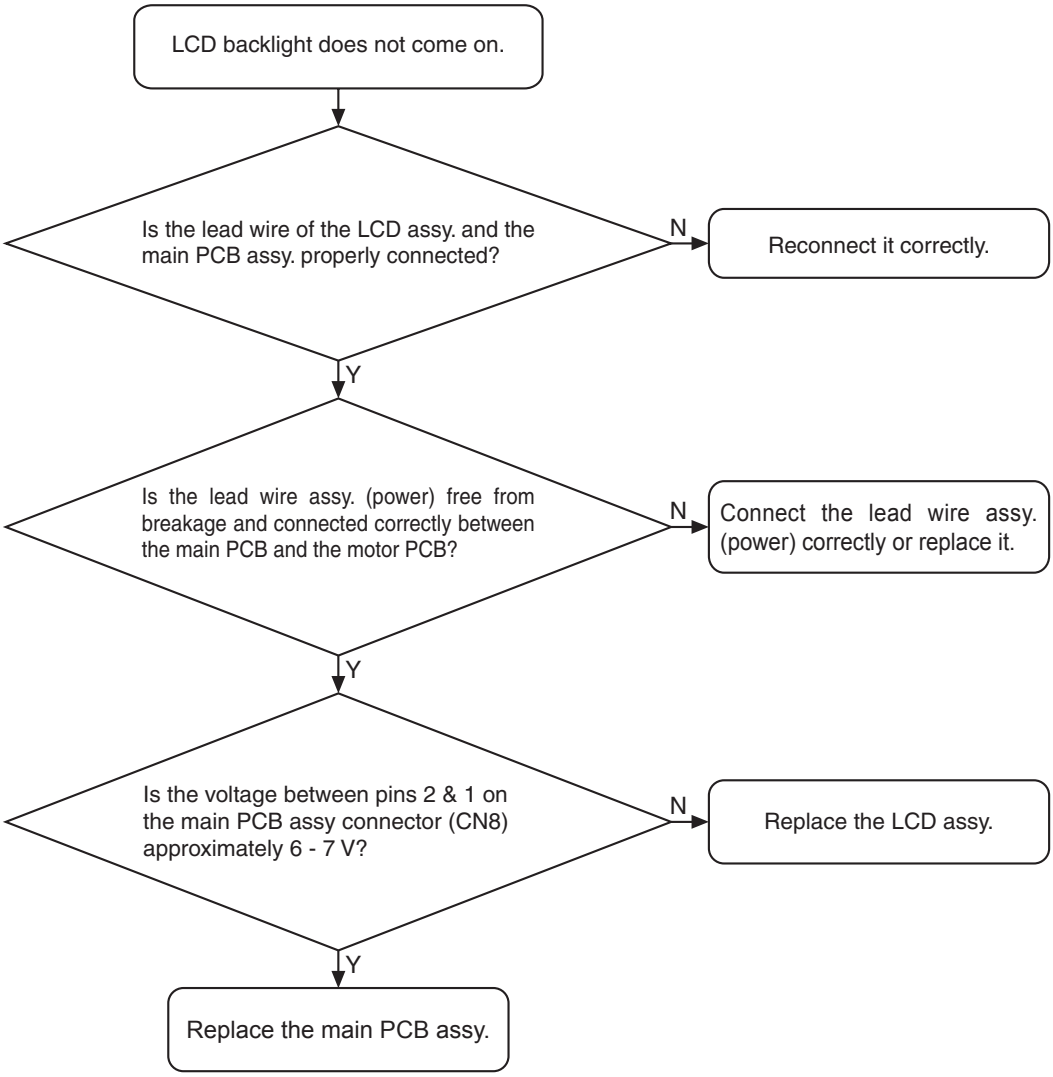
Error display	Cause
F01 (5 - 29)	Abnormal rotation in main motor.
F02 (5 - 29)	Key pressed continually with power ON (operation system SW).
F04 (5 - 30)	FC disconnect
F05 (5 - 31)	Dirty speed sensor
F06 (5 - 31)	NP sensor disconnect
F07 (5 - 32)	Speed VR disconnect
The safety device has been activated.	No rotation in main motor.
A malfunction occurred. Turn the machine off, then on again *-PM	Each pulse motor has not returned to its original position.

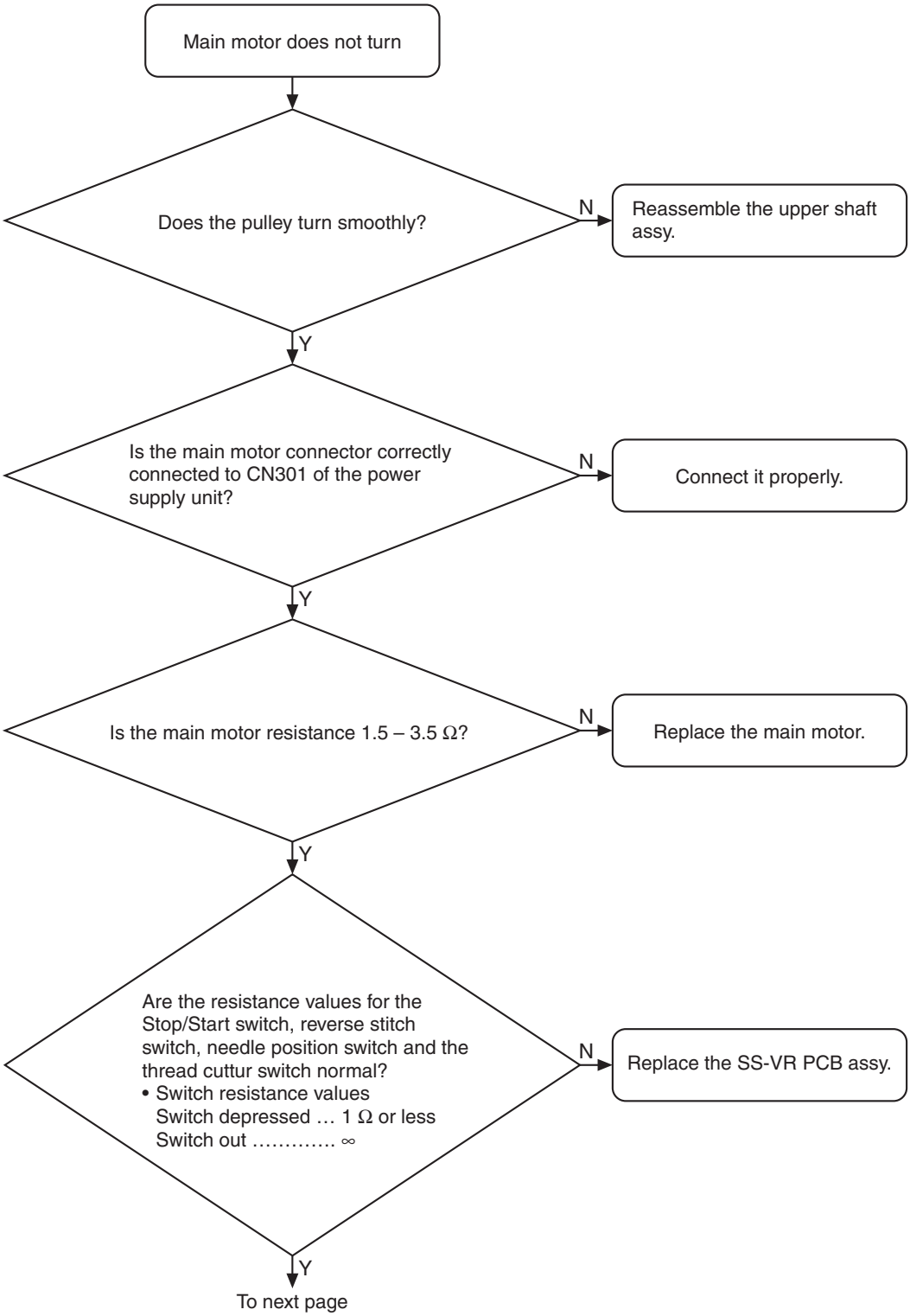

When the power is turned on, nothing appears on the LCD.
When the power is turned on, does the buzzer sound after a while?
Y
To next page
N
Is the power supply cord free from damage and connected correctly?
N
Connect the power supply cord correctly or replace it.
Y
Is the inlet assy. free from damage and correctly connected to the power PCB?
N
Connect the inlet assy. correctly or replace it.
Y
Is the voltage between pins 3 & 4 and pins 5 & 4 of CN19 on the motor PCB correct?
• Pins 3 and 4 ... 5 VDC
• Pins 5 and 4 ... 26 VDC
N
Replace the power supply unit.
Y
Is the lead wire assy. (power) free from breakage and connected correctly between CN3 on the main PCB and CN19 on the motor PCB?
N
Connect it properly.
Y
Replace the main PCB assy.

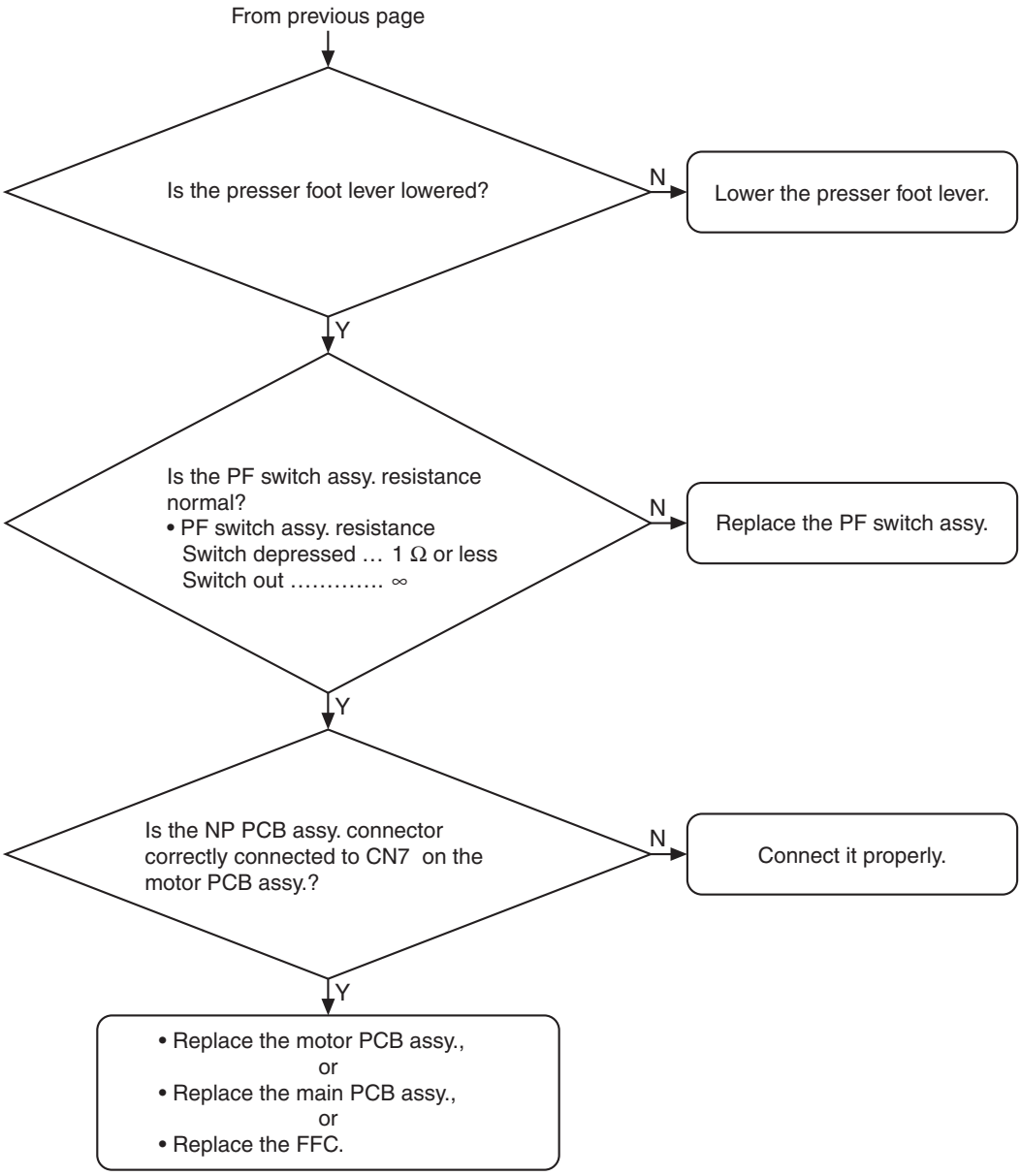

From previous page
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly?
N
Connect the FFC correctly.
Y
Is the FFC connecting the main PCB (CN5) to the motor PCB (CN1) free from breakage?
N
Replace the FFC.
Y
Is the backlight turned on?
N
5-7 Proceed to "LCD backlight does not come on".
Y
Is the LCD's FPC free from breakage and is it connected to the main PCB (CN4) correctly?
N
Connect it properly.
Y
Does the touch panel work?
N
5-6 Proceed to "Touch panel does not work".
Y
Replace the LCD assy.,
or
Replace the main PCB assy.

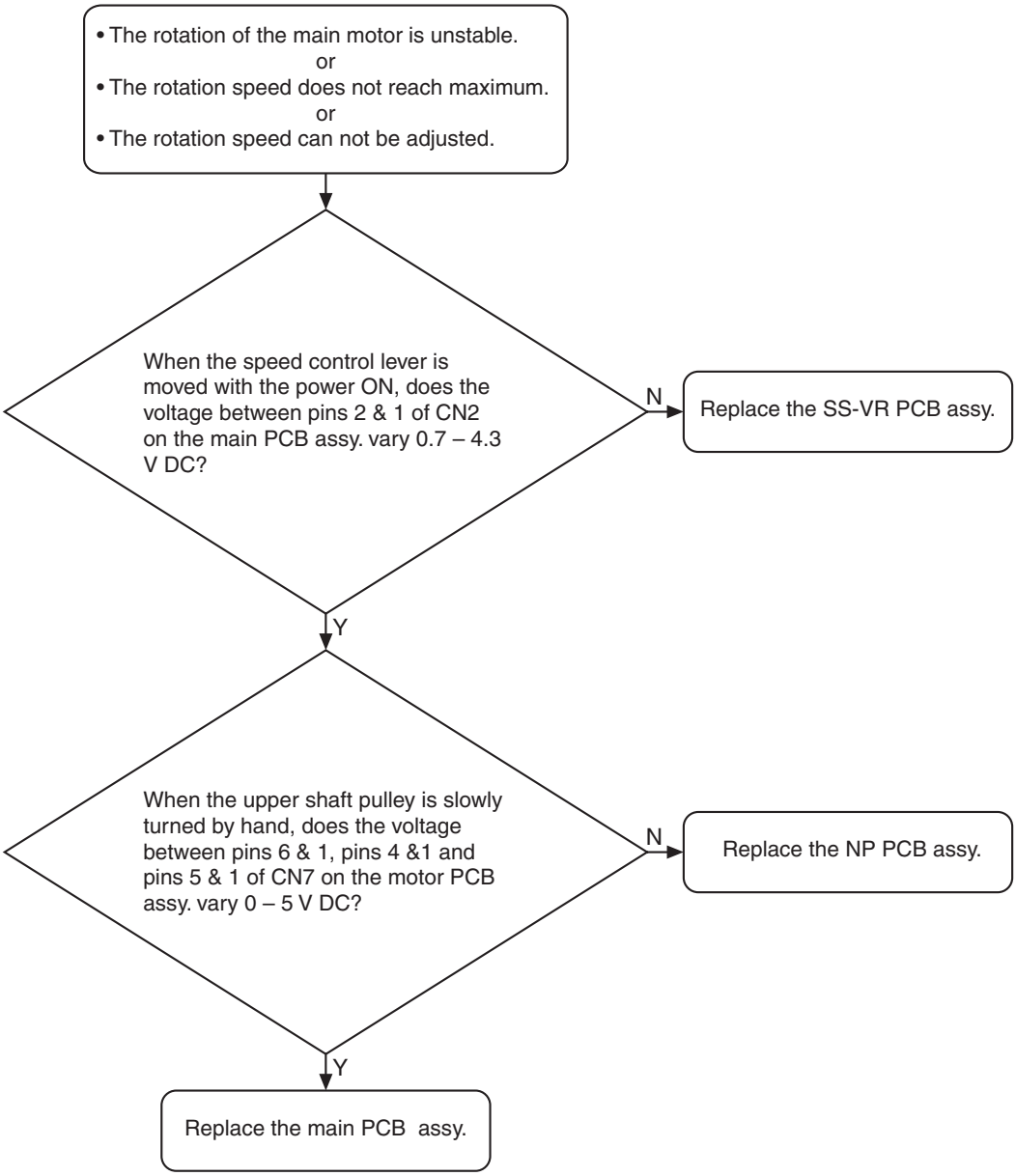

When the power is turned ON, the pulse motors do not return to the starting position.
• Needle up, the Z pulse motor return to starting position.
• Needle down, the F pulse motor and S pulse motor returns to starting position.
• Regardless of needle position, the AT&C pulse motor return to starting position.
Is the resistance between the 1 & 2 pins and 3 & 4 pins on the pulse motor connectors 4 – 6 Ω?
N
Replace the pulse motor.
Y
Regardless of needle position, the same pulse motor returns to the starting position
Y
Replace the NP PCB assy.
N
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly?
N
Connect it properly.
Y
Is the FFC connecting the main PCB (CN5) to the motor PCB (CN1) free from breakage?
Y
Replace the FFC.
N
Is the voltage between pins 5 & 4 of CN19 on the motor PCB assy. 26 V DC?
N
Replace the power supply unit.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.

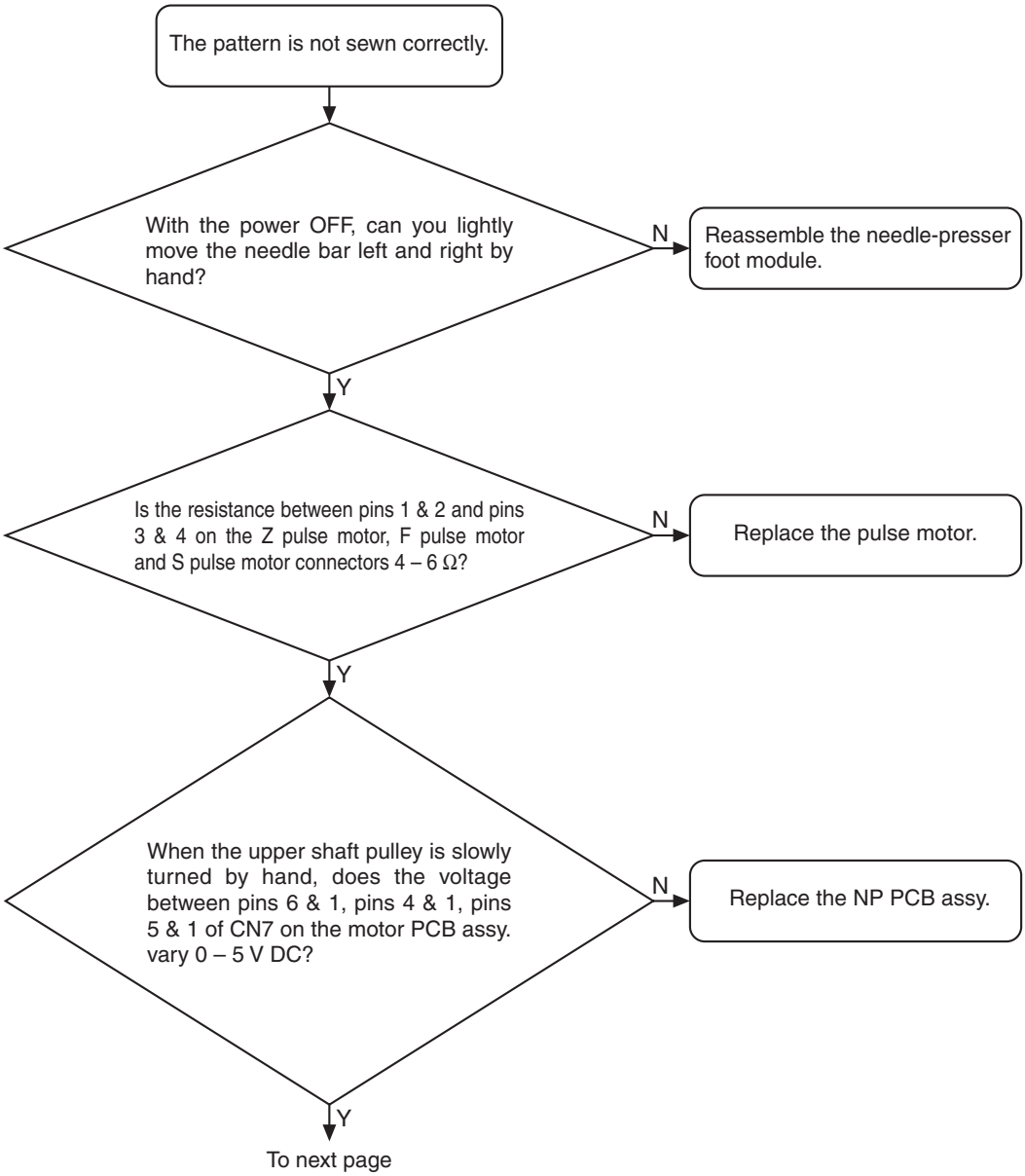

The touch panel does not work.
Is the touch panel adjusted correctly?
N
Adjust the touch panel correctly.
Y
Is the FPC of the touch panel connected correctly to CN7 on the main PCB and locked firmly?
N
Connect it properly.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly?
N
Connect it properly.
Y
Is the FFC connecting the main PCB (CN5) to the card PCB (CN1) free from breakage?
N
Replace the FFC.
Y
Is the resistance between pins 2 & 4, and 1 & 3 of the touch panel 200 - 900Ω, respectively?
N
Change the touch panel and adjust it.
Y
Change the main PCB assy. and adjust the touch panel.

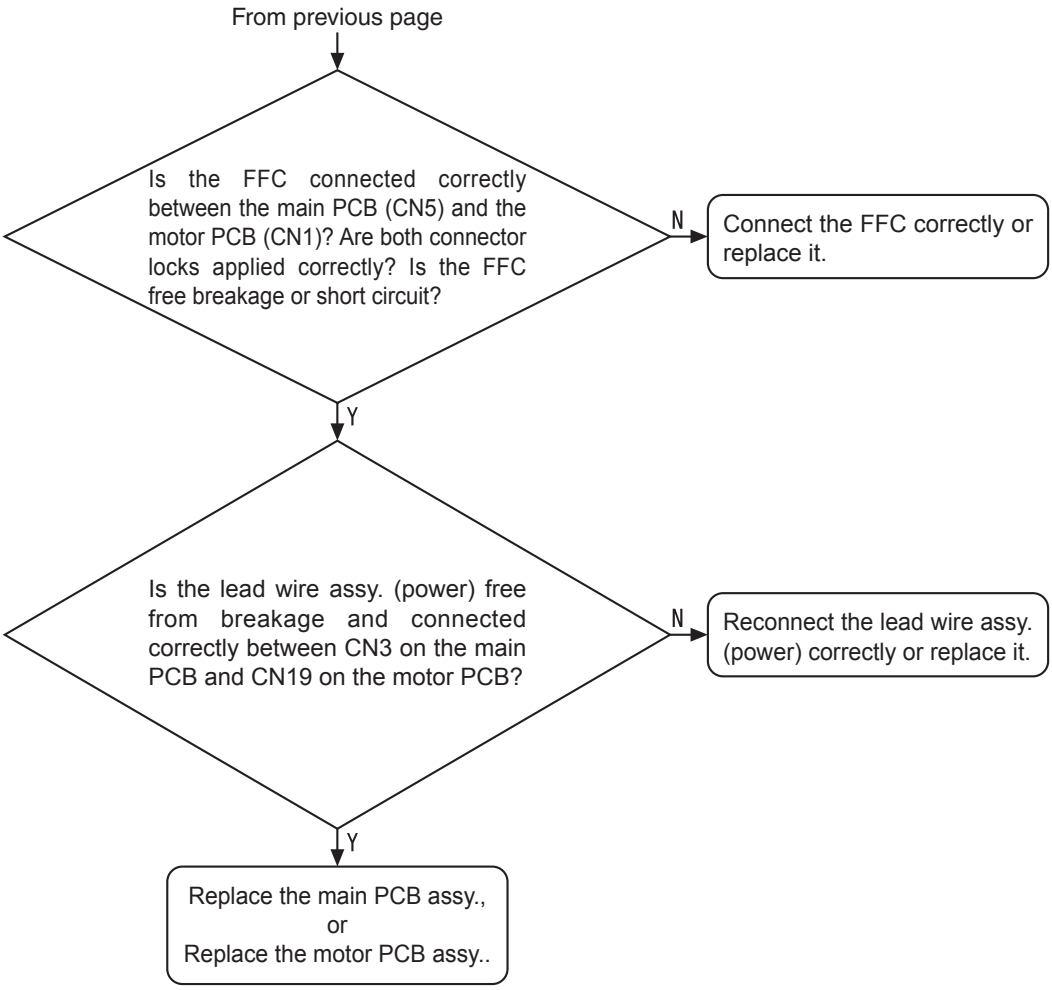

LCD backlight does not come on.
Is the lead wire of the LCD assy. and the main PCB assy. properly connected?
N
Reconnect it correctly.
Y
Is the lead wire assy. (power) free from breakage and connected correctly between the main PCB and the motor PCB?
N
Connect the lead wire assy. (power) correctly or replace it.
Y
Is the voltage between pins 2 & 1 on the main PCB assy connector (CN8) approximately 6 - 7 V?
N
Replace the LCD assy.
Y
Replace the main PCB assy.

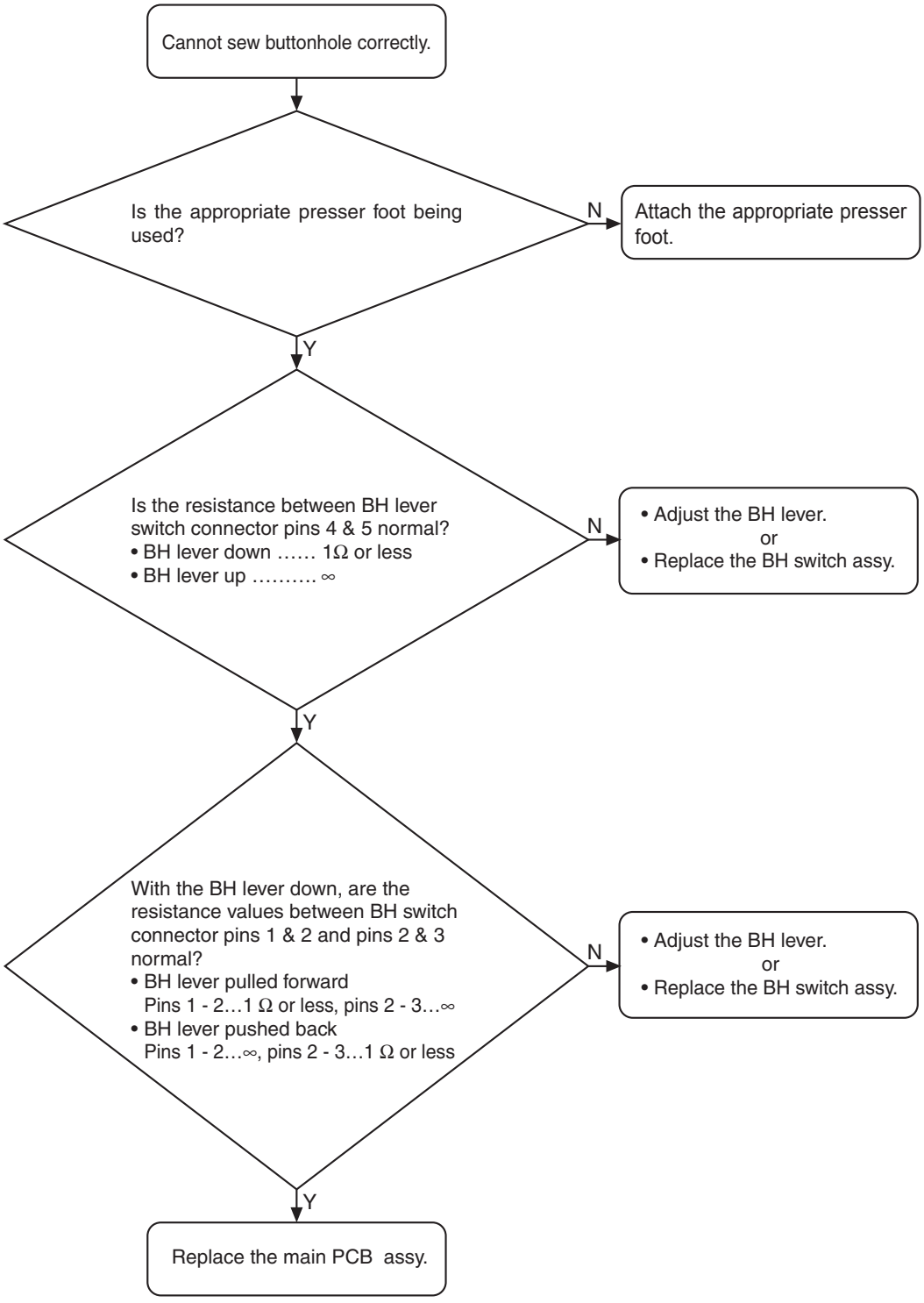

Main motor does not turn
Does the pulley turn smoothly?
N
Reassemble the upper shaft assy.
Y
Is the main motor connector correctly connected to CN301 of the power supply unit?
N
Connect it properly.
Y
Is the main motor resistance 1.5 – 3.5 Ω?
N
Replace the main motor.
Y
Are the resistance values for the Stop/Start switch, reverse stitch switch, needle position switch and the thread cuttur switch normal?
• Switch resistance values
Switch depressed … 1 Ω or less
Switch out ……. ∞
N
Replace the SS-VR PCB assy.
Y
To next page

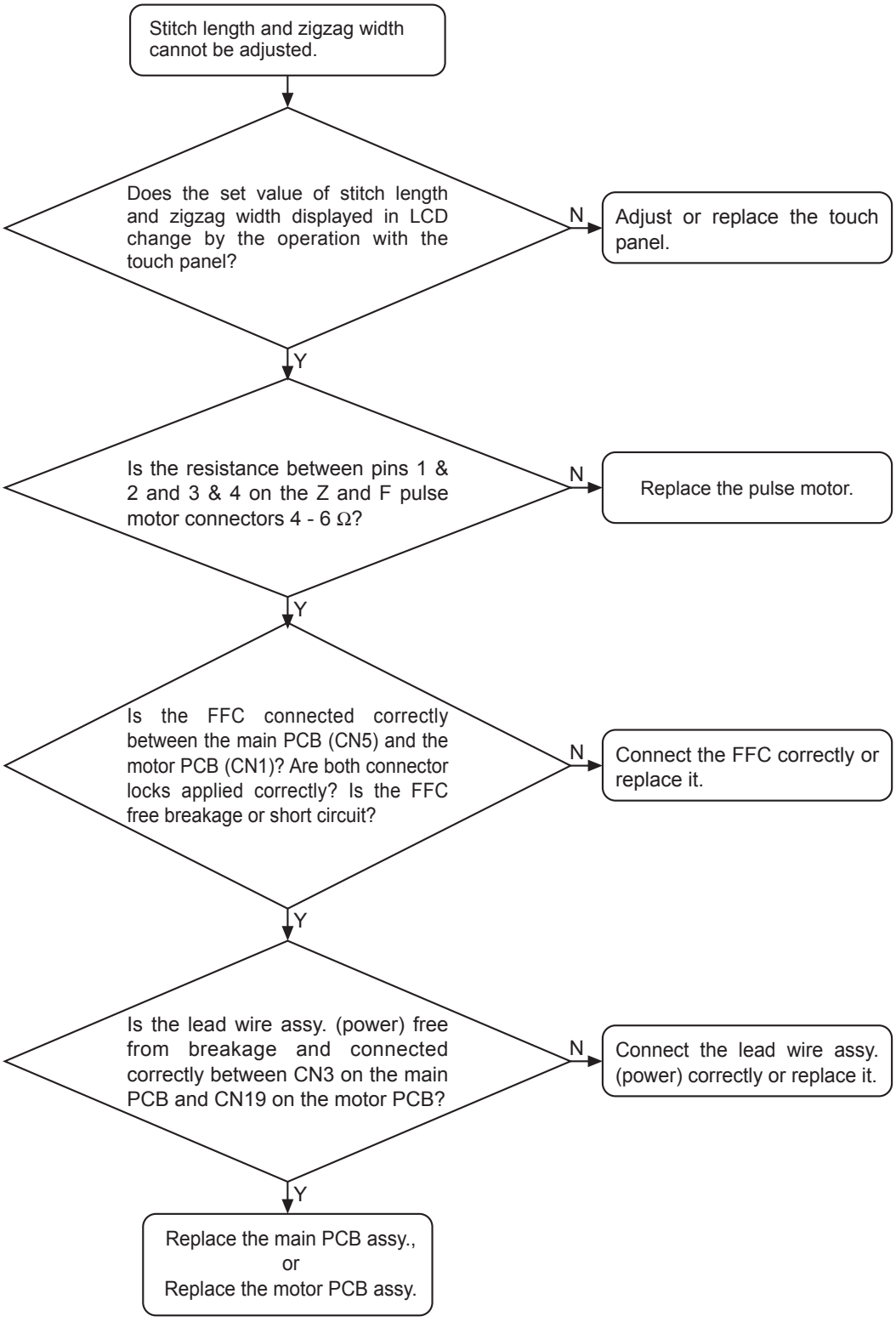

From previous page
Is the presser foot lever lowered?
N
Lower the presser foot lever.
Y
Is the PF switch assy. resistance normal?
• PF switch assy. resistance
Switch depressed … 1 Ω or less
Switch out ……. ∞
N
Replace the PF switch assy.
Y
Is the NP PCB assy. connector correctly connected to CN7 on the motor PCB assy.?
N
Connect it properly.
Y
• Replace the motor PCB assy.,
or
• Replace the main PCB assy.,
or
• Replace the FFC.

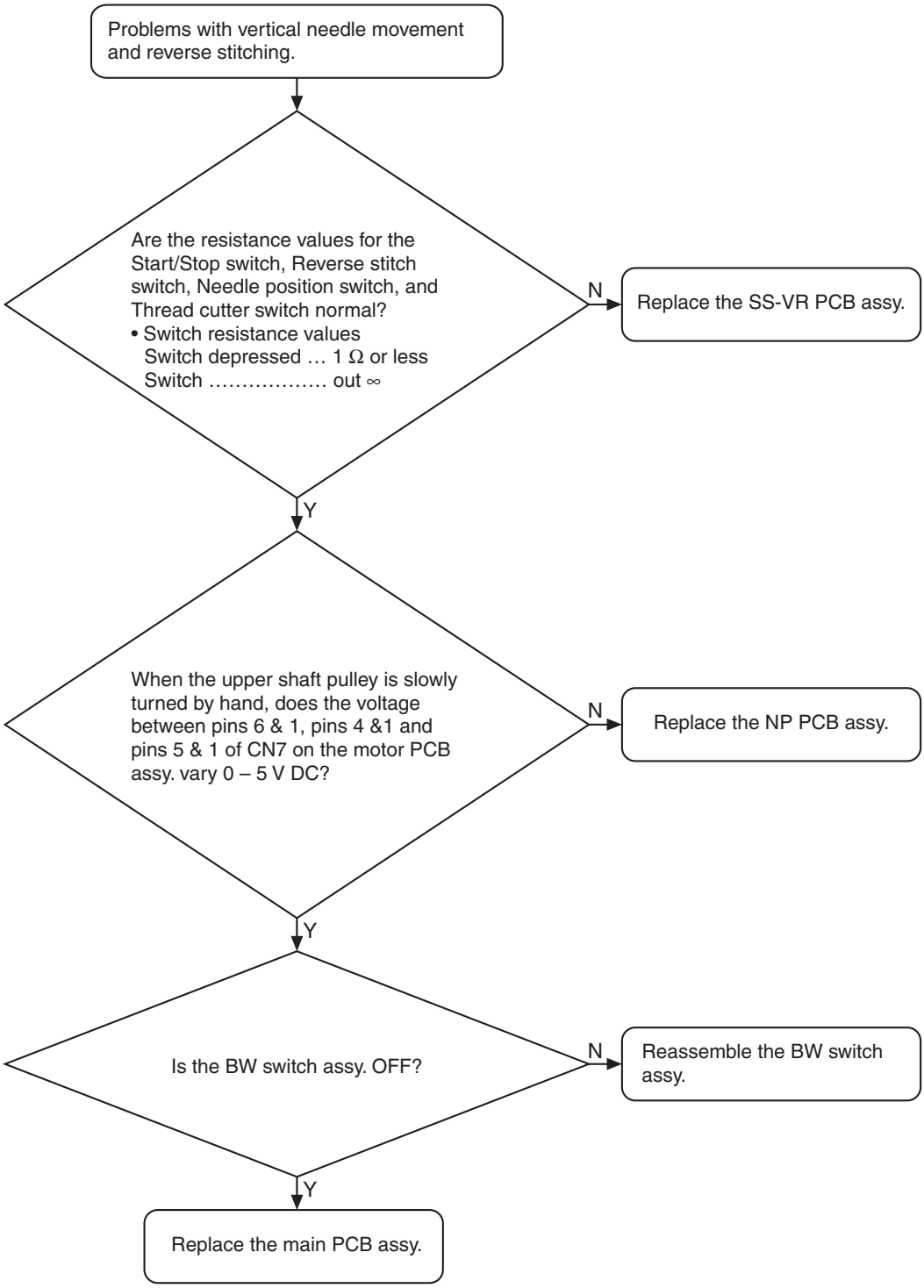

• The rotation of the main motor is unstable.
or
• The rotation speed does not reach maximum.
or
• The rotation speed can not be adjusted.
When the speed control lever is moved with the power ON, does the voltage between pins 2 & 1 of CN2 on the main PCB assy. vary 0.7 – 4.3 V DC?
N
Replace the SS-VR PCB assy.
Y
When the upper shaft pulley is slowly turned by hand, does the voltage between pins 6 & 1, pins 4 &1 and pins 5 & 1 of CN7 on the motor PCB assy. vary 0 – 5 V DC?
N
Replace the NP PCB assy.
Y
Replace the main PCB assy.

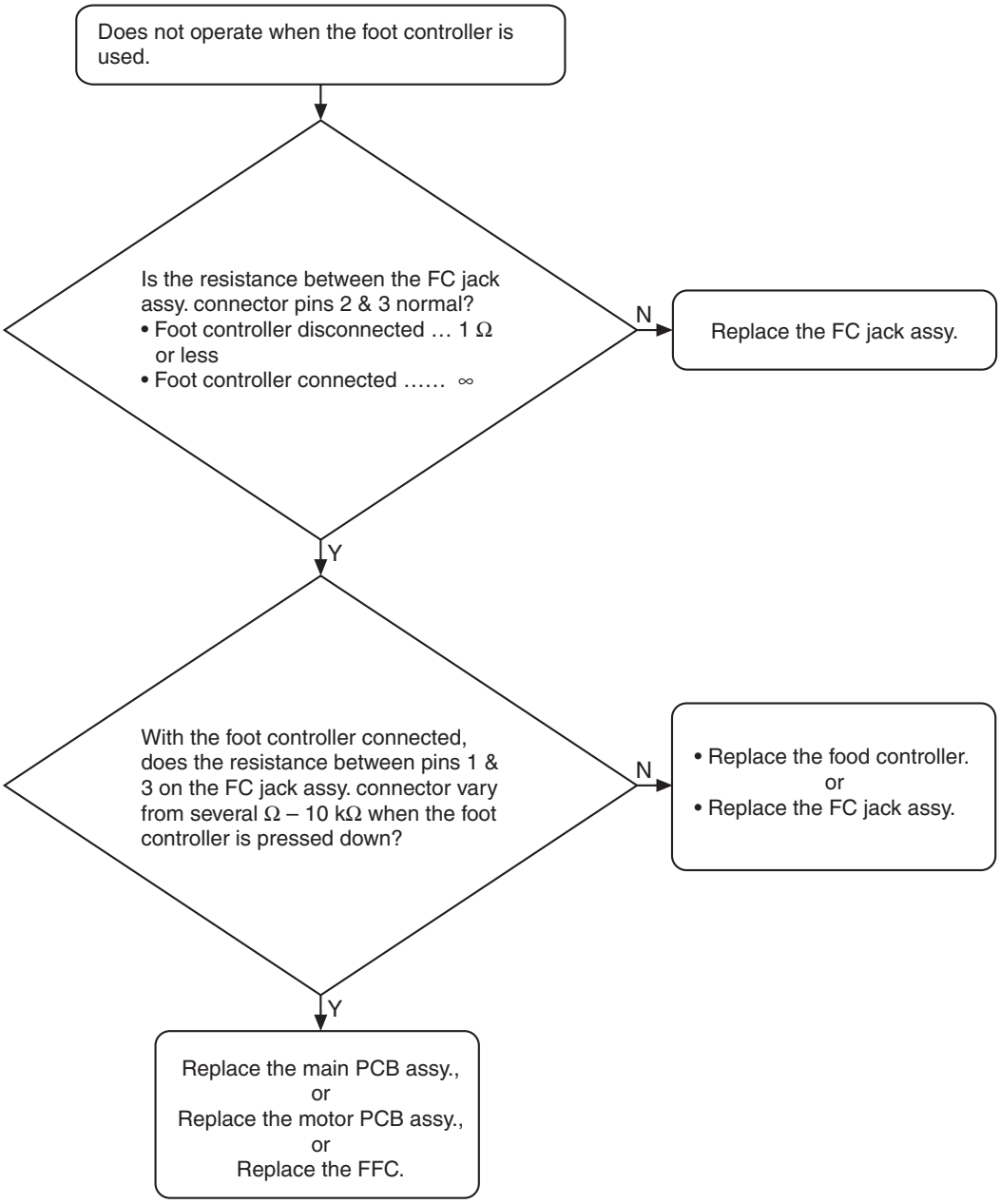

The pattern is not sewn correctly.
With the power OFF, can you lightly move the needle bar left and right by hand?
N
Reassemble the needle-presser foot module.
Y
Is the resistance between pins 1 & 2 and pins 3 & 4 on the Z pulse motor, F pulse motor and S pulse motor connectors 4 – 6 Ω?
N
Replace the pulse motor.
Y
When the upper shaft pulley is slowly turned by hand, does the voltage between pins 6 & 1, pins 4 & 1, pins 5 & 1 of CN7 on the motor PCB assy. vary 0 – 5 V DC?
N
Replace the NP PCB assy.
Y
To next page

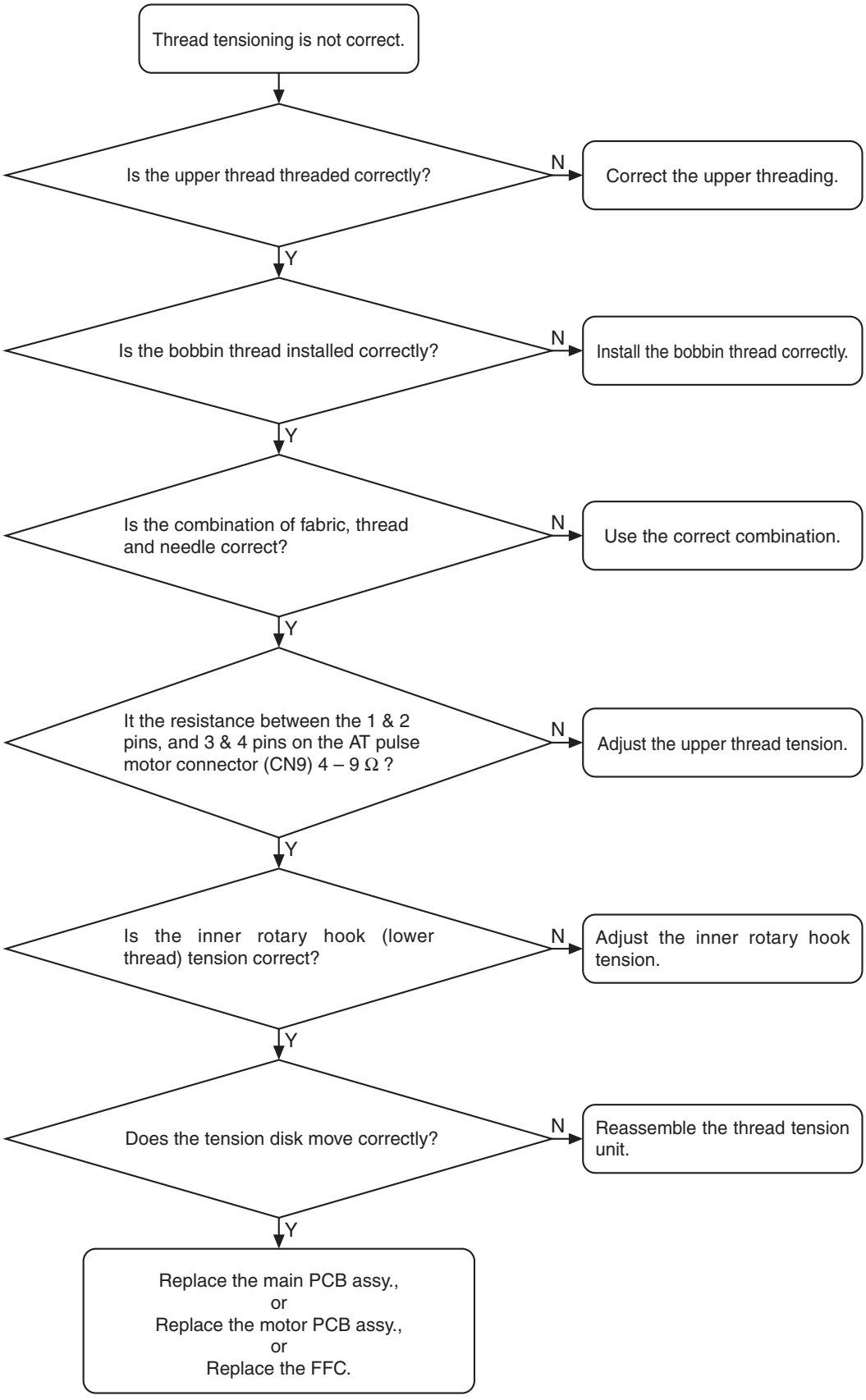

From previous page
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
N
Connect the FFC correctly or replace it.
Y
Is the lead wire assy. (power) free from breakage and connected correctly between CN3 on the main PCB and CN19 on the motor PCB?
N
Reconnect the lead wire assy. (power) correctly or replace it.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy..

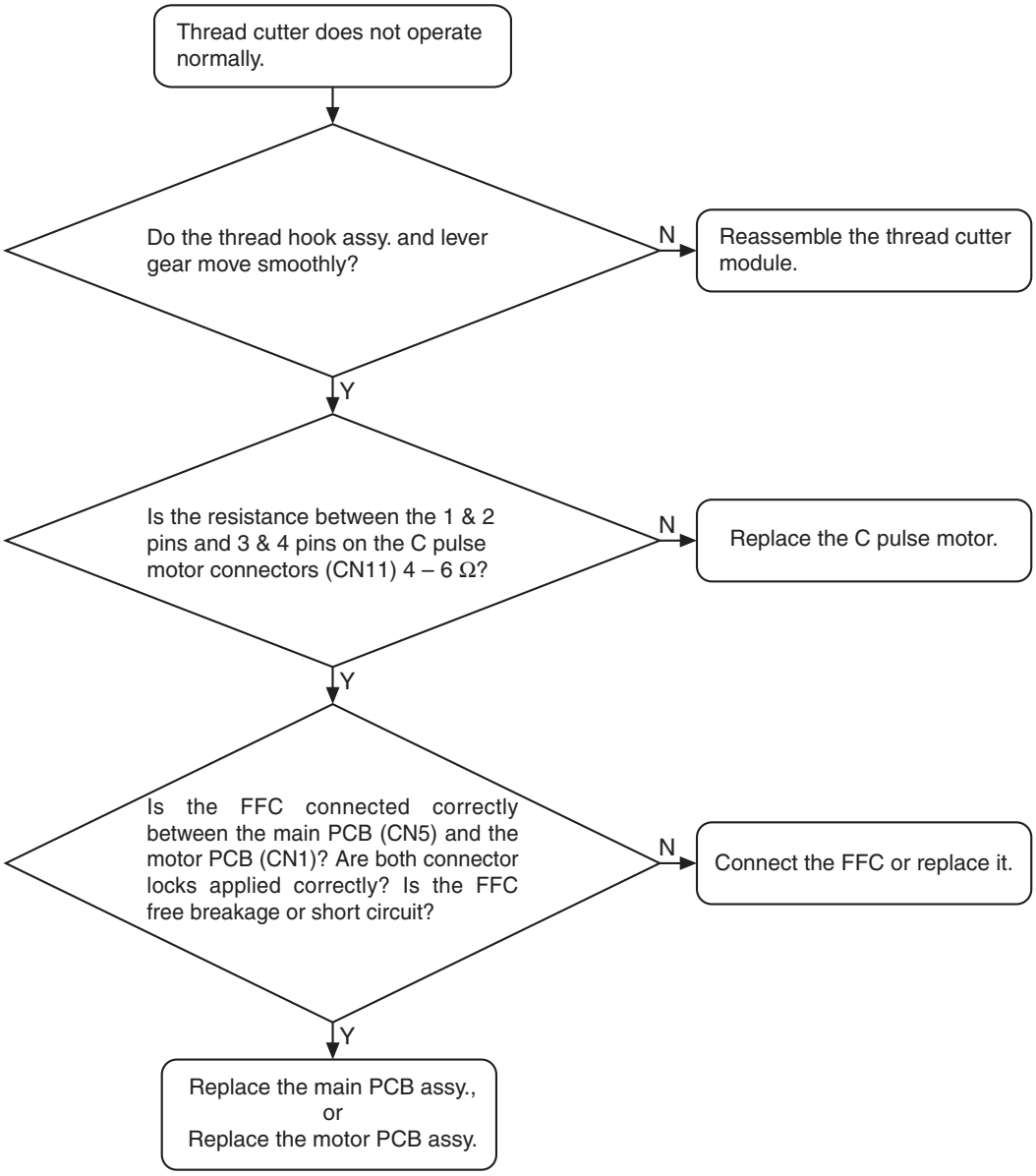

Cannot sew buttonhole correctly.
Is the appropriate presser foot being used?
N
Attach the appropriate presser foot.
Y
Is the resistance between BH lever switch connector pins 4 & 5 normal?
• BH lever down …… 1Ω or less
• BH lever up ……. ∞
N
• Adjust the BH lever.
or
• Replace the BH switch assy.
Y
With the BH lever down, are the resistance values between BH switch connector pins 1 & 2 and pins 2 & 3 normal?
• BH lever pulled forward
Pins 1 - 2…1 Ω or less, pins 2 - 3…∞
• BH lever pushed back
Pins 1 - 2…∞, pins 2 - 3…1 Ω or less
N
• Adjust the BH lever.
or
• Replace the BH switch assy.
Y
Replace the main PCB assy.

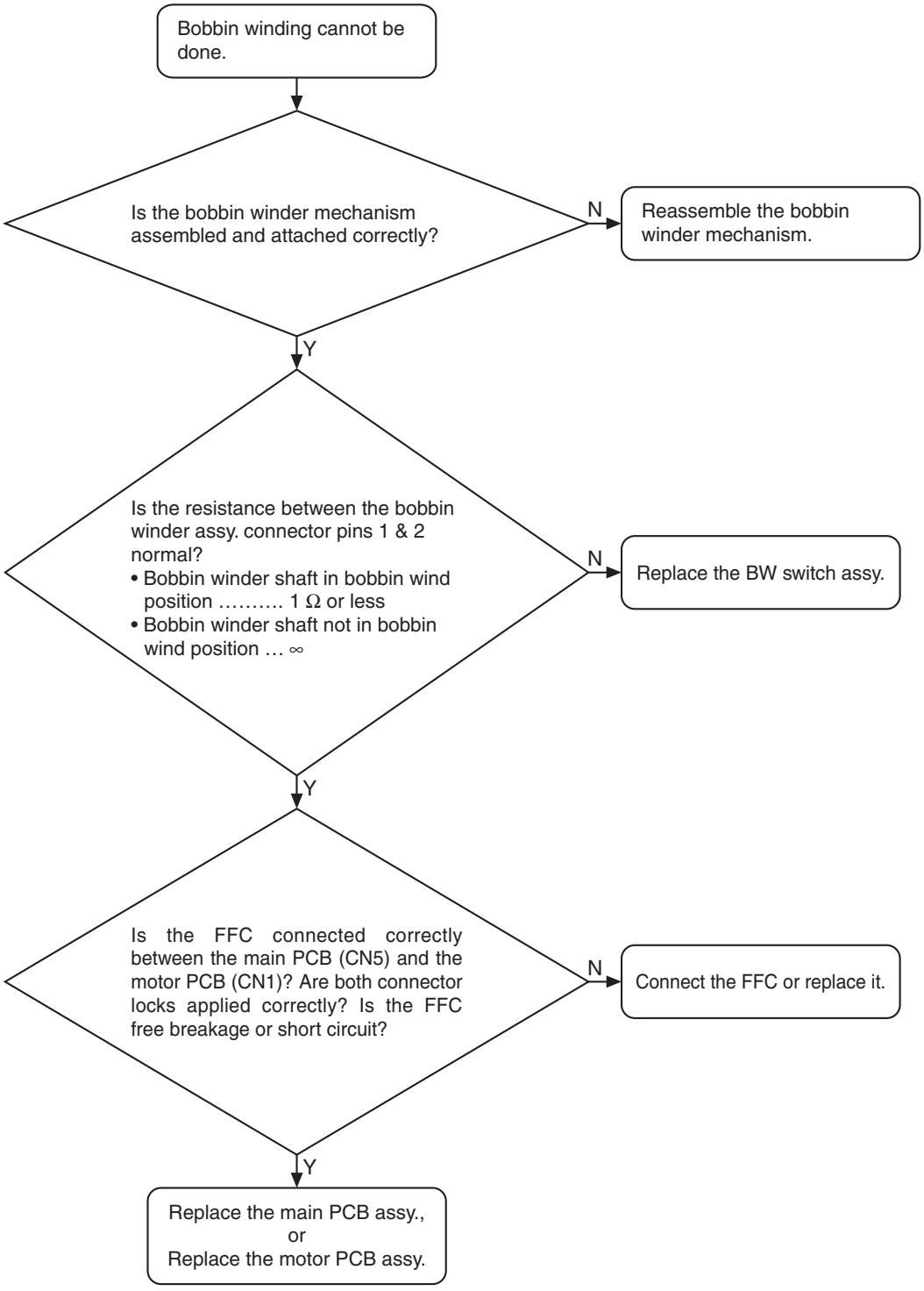

Stitch length and zigzag width cannot be adjusted.
Does the set value of stitch length and zigzag width displayed in LCD change by the operation with the touch panel?
N
Adjust or replace the touch panel.
Y
Is the resistance between pins 1 & 2 and 3 & 4 on the Z and F pulse motor connectors 4 - 6 Ω?
N
Replace the pulse motor.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
N
Connect the FFC correctly or replace it.
Y
Is the lead wire assy. (power) free from breakage and connected correctly between CN3 on the main PCB and CN19 on the motor PCB?
N
Connect the lead wire assy. (power) correctly or replace it.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.

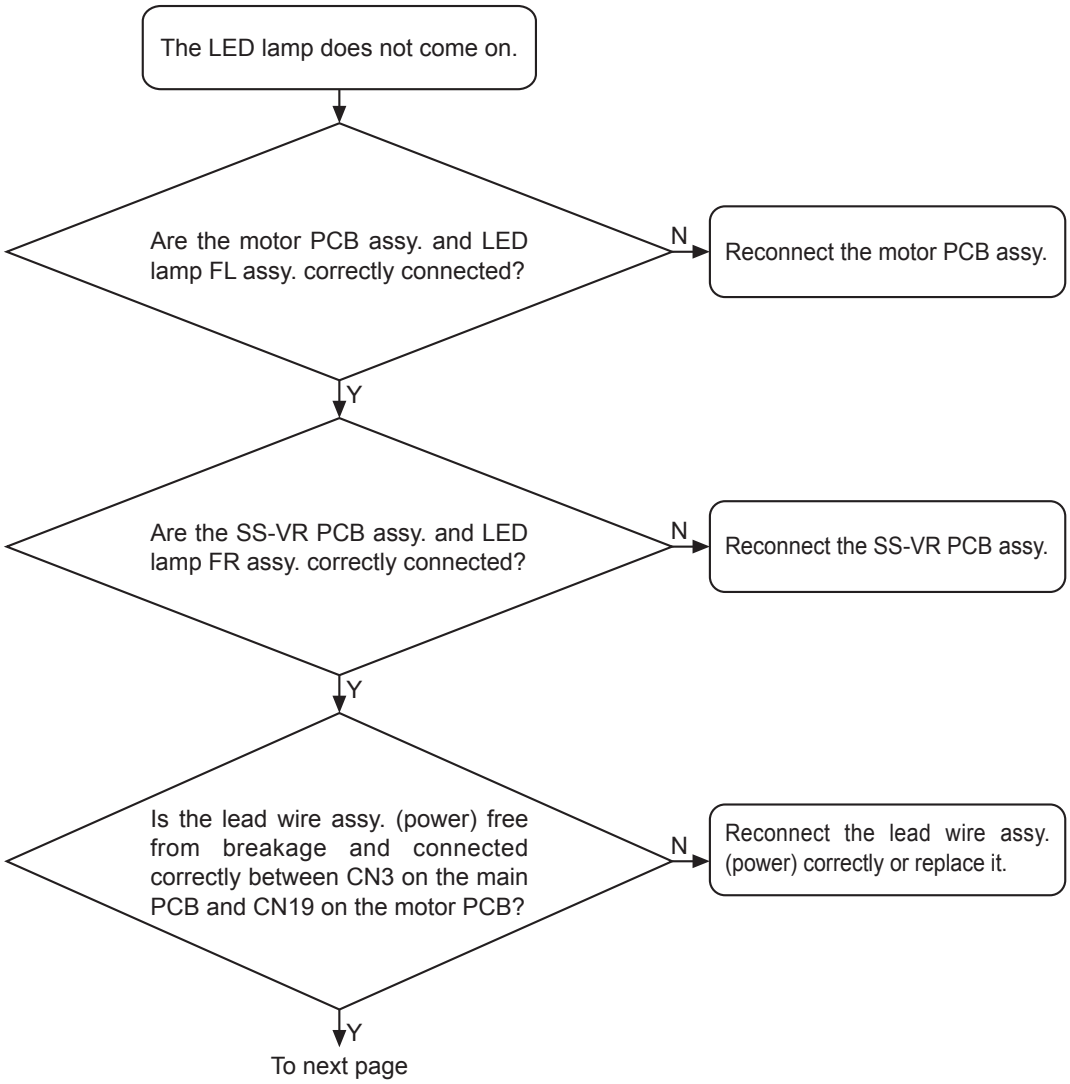

Problems with vertical needle movement and reverse stitching.
Are the resistance values for the Start/Stop switch, Reverse stitch switch, Needle position switch, and Thread cutter switch normal?
• Switch resistance values
Switch depressed … 1 Ω or less
Switch …… out ∞
N
Replace the SS-VR PCB assy.
Y
When the upper shaft pulley is slowly turned by hand, does the voltage between pins 6 & 1, pins 4 &1 and pins 5 & 1 of CN7 on the motor PCB assy. vary 0 – 5 V DC?
N
Replace the NP PCB assy.
Y
Is the BW switch assy. OFF?
N
Reassemble the BW switch assy.
Y
Replace the main PCB assy.

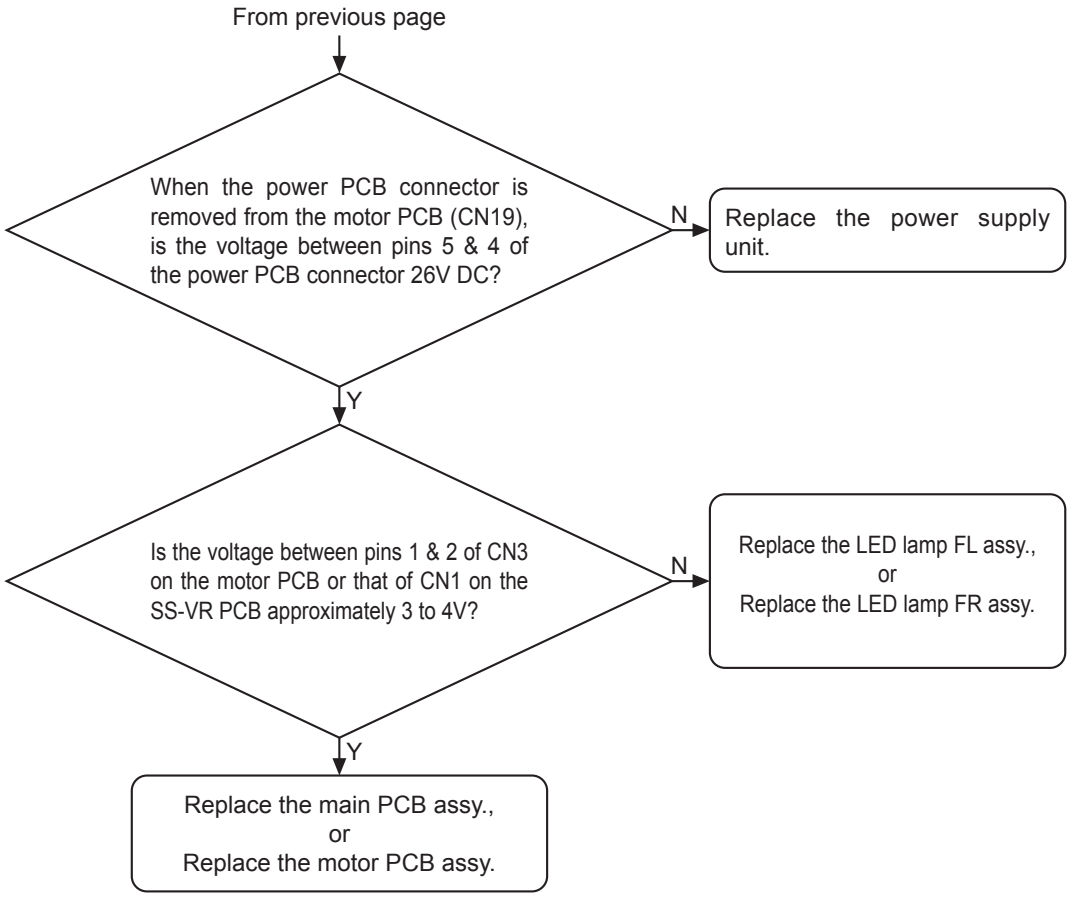

Does not operate when the foot controller is used.
Is the resistance between the FC jack assy. connector pins 2 & 3 normal?
• Foot controller disconnected … 1 Ω or less
• Foot controller connected …… ∞
N
Replace the FC jack assy.
Y
With the foot controller connected, does the resistance between pins 1 & 3 on the FC jack assy. connector vary from several Ω – 10 kΩ when the foot controller is pressed down?
N
• Replace the food controller.
or
• Replace the FC jack assy.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.,
or
Replace the FFC.

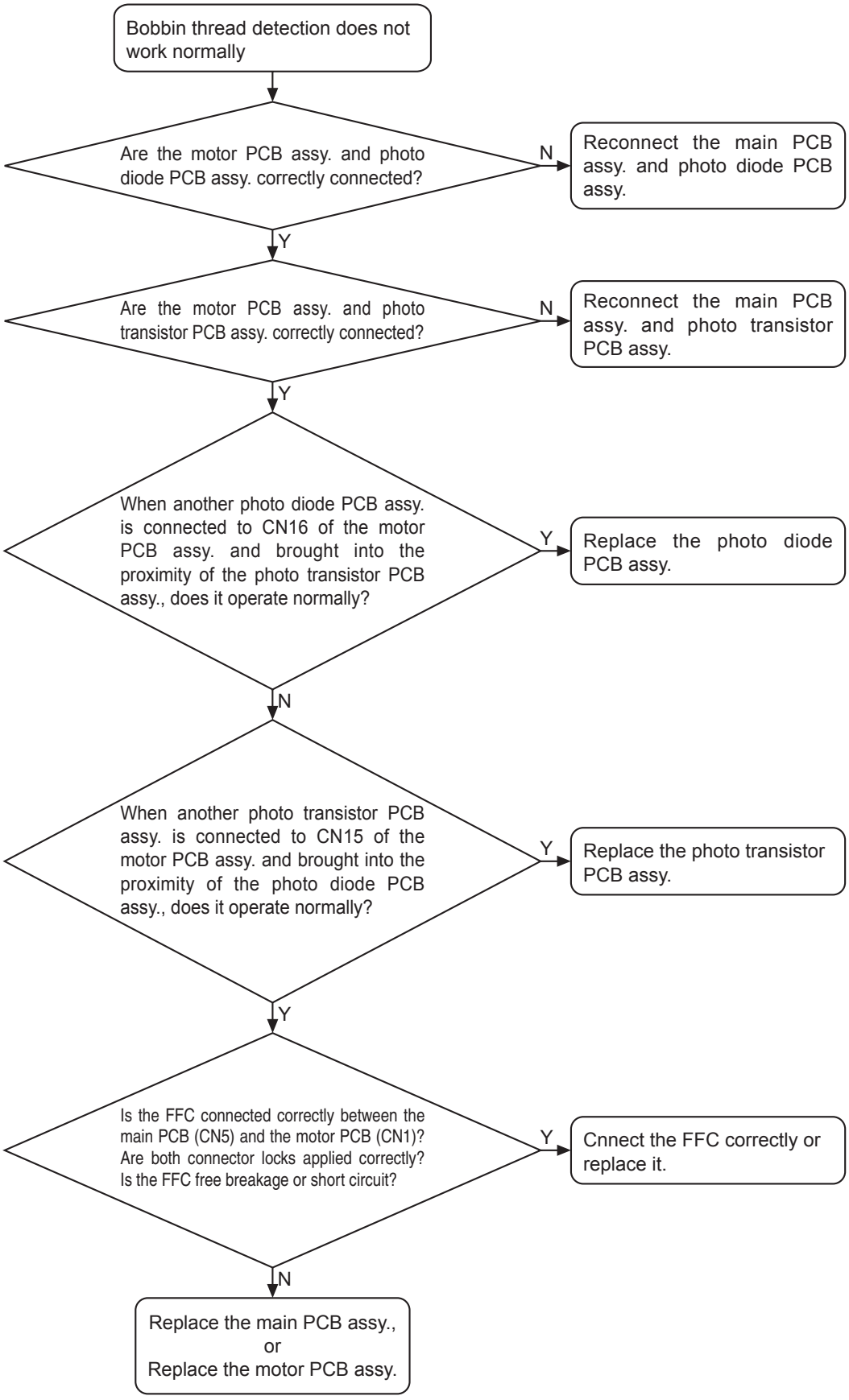

Thread tensioning is not correct.
Is the upper thread threaded correctly?
N
Correct the upper threading.
Y
Is the bobbin thread installed correctly?
N
Install the bobbin thread correctly.
Y
Is the combination of fabric, thread and needle correct?
N
Use the correct combination.
Y
It the resistance between the 1 & 2 pins, and 3 & 4 pins on the AT pulse motor connector (CN9) 4 – 9 Ω ?
N
Adjust the upper thread tension.
Y
Is the inner rotary hook (lower thread) tension correct?
N
Adjust the inner rotary hook tension.
Y
Does the tension disk move correctly?
N
Reassemble the thread tension unit.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.,
or
Replace the FFC.

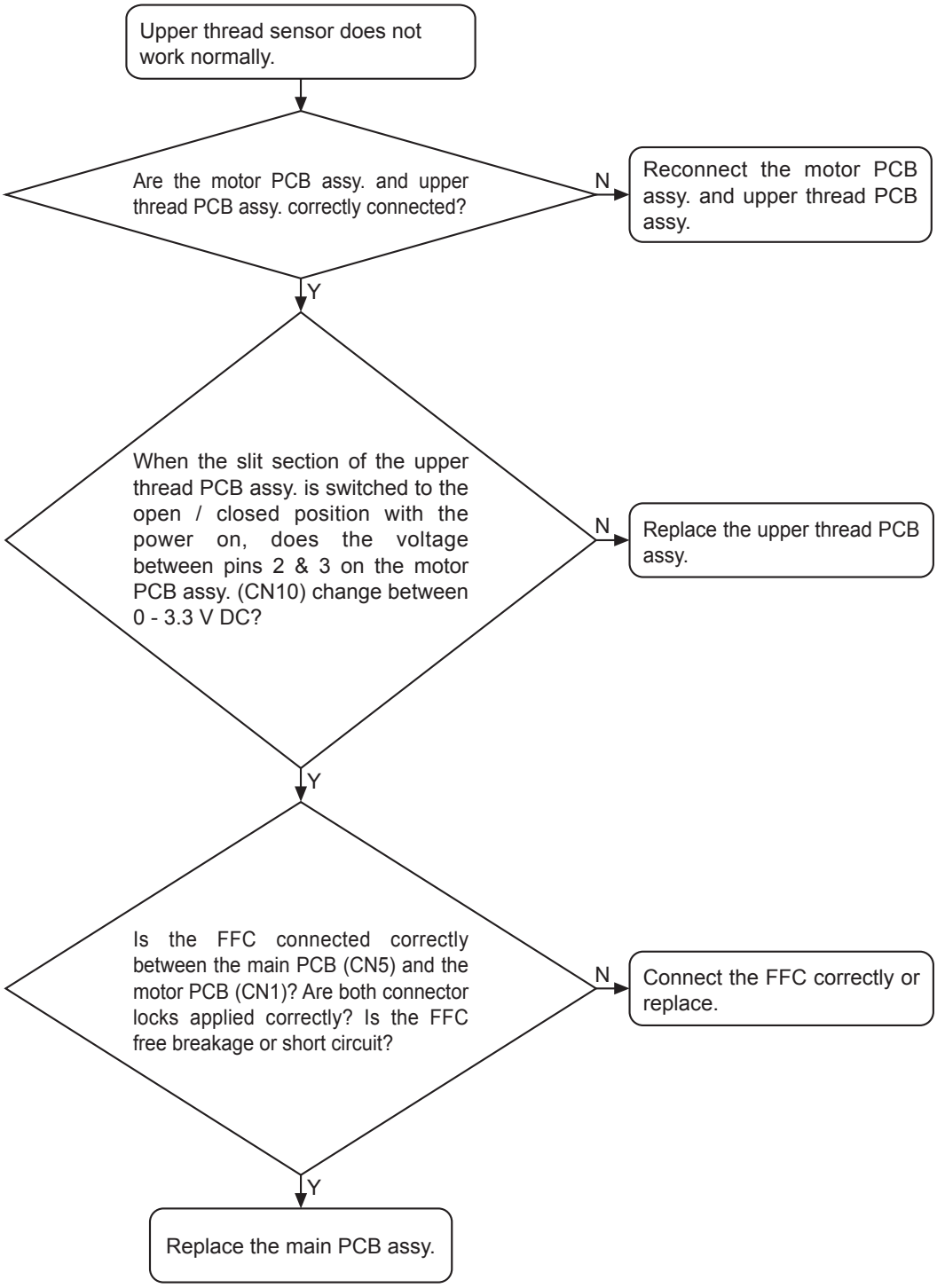

Thread cutter does not operate normally.
Do the thread hook assy. and lever gear move smoothly?
N
Reassemble the thread cutter module.
Y
Is the resistance between the 1 & 2 pins and 3 & 4 pins on the C pulse motor connectors (CN11) 4 – 6 Ω?
N
Replace the C pulse motor.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
N
Connect the FFC or replace it.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.

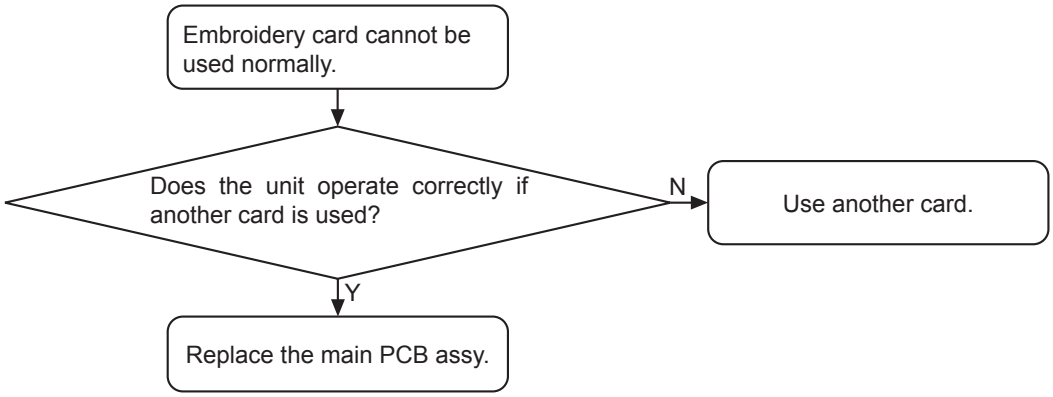

Bobbin winding cannot be done.
Is the bobbin winder mechanism assembled and attached correctly?
N
Reassemble the bobbin winder mechanism.
Y
Is the resistance between the bobbin winder assy. connector pins 1 & 2 normal?
• Bobbin winder shaft in bobbin wind position ……. 1 Ω or less
• Bobbin winder shaft not in bobbin wind position … ∞
N
Replace the BW switch assy.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
N
Connect the FFC or replace it.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.

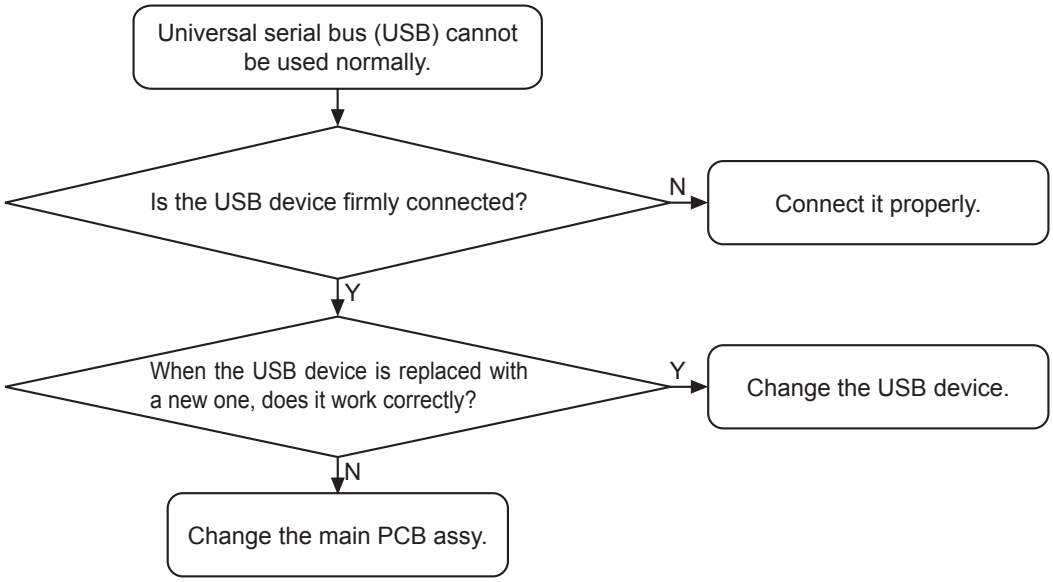

The LED lamp does not come on.
Are the motor PCB assy. and LED lamp FL assy. correctly connected?
N
Reconnect the motor PCB assy.
Y
Are the SS-VR PCB assy. and LED lamp FR assy. correctly connected?
N
Reconnect the SS-VR PCB assy.
Y
Is the lead wire assy. (power) free from breakage and connected correctly between CN3 on the main PCB and CN19 on the motor PCB?
N
Reconnect the lead wire assy. (power) correctly or replace it.
Y
To next page

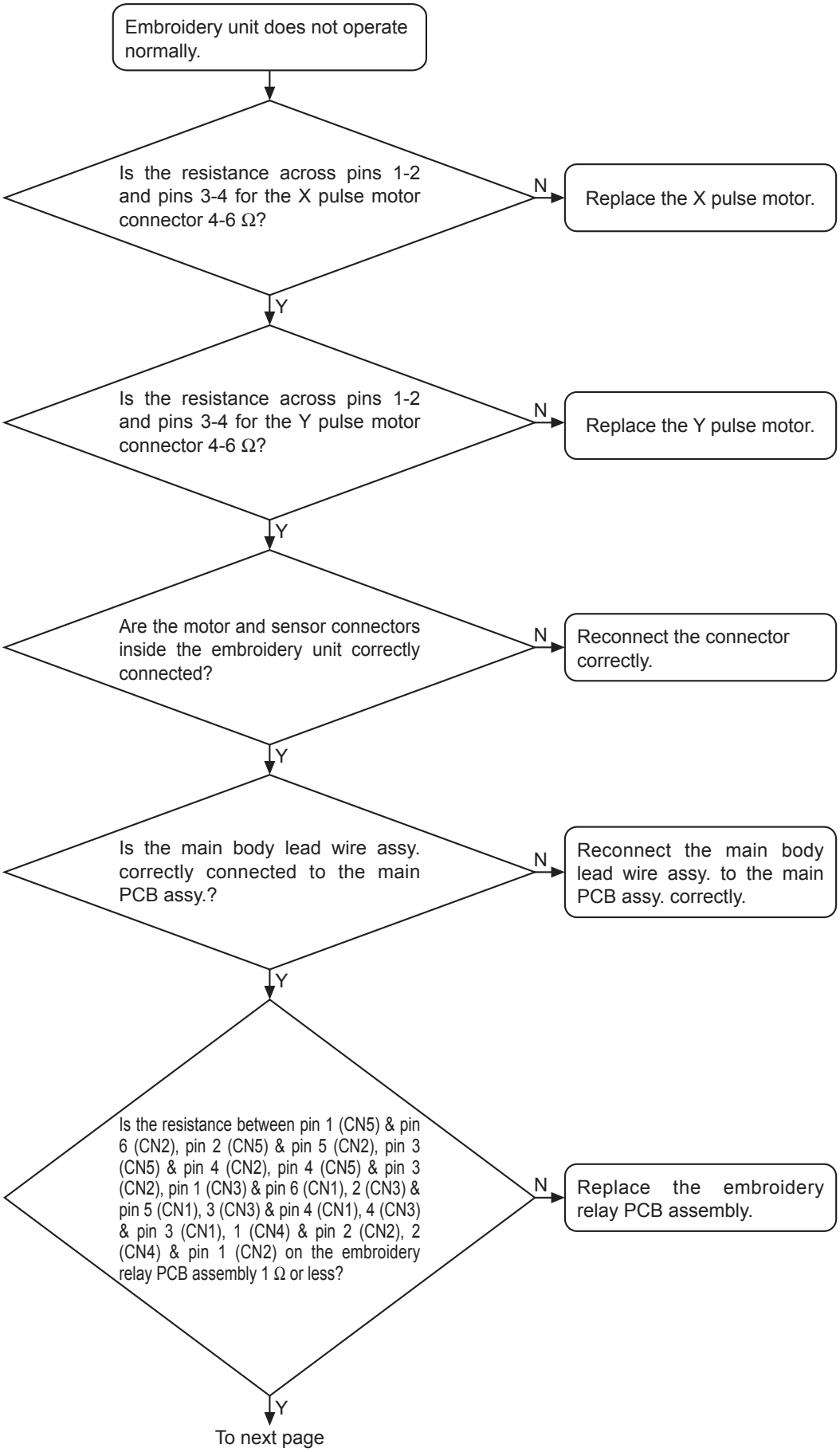

From previous page
When the power PCB connector is removed from the motor PCB (CN19), is the voltage between pins 5 & 4 of the power PCB connector 26V DC?
N
Replace the power supply unit.
Y
Is the voltage between pins 1 & 2 of CN3 on the motor PCB or that of CN1 on the SS-VR PCB approximately 3 to 4V?
N
Replace the LED lamp FL assy.,
or
Replace the LED lamp FR assy.
Y
Replace the main PCB assy.,
or
Replace the motor PCB assy.

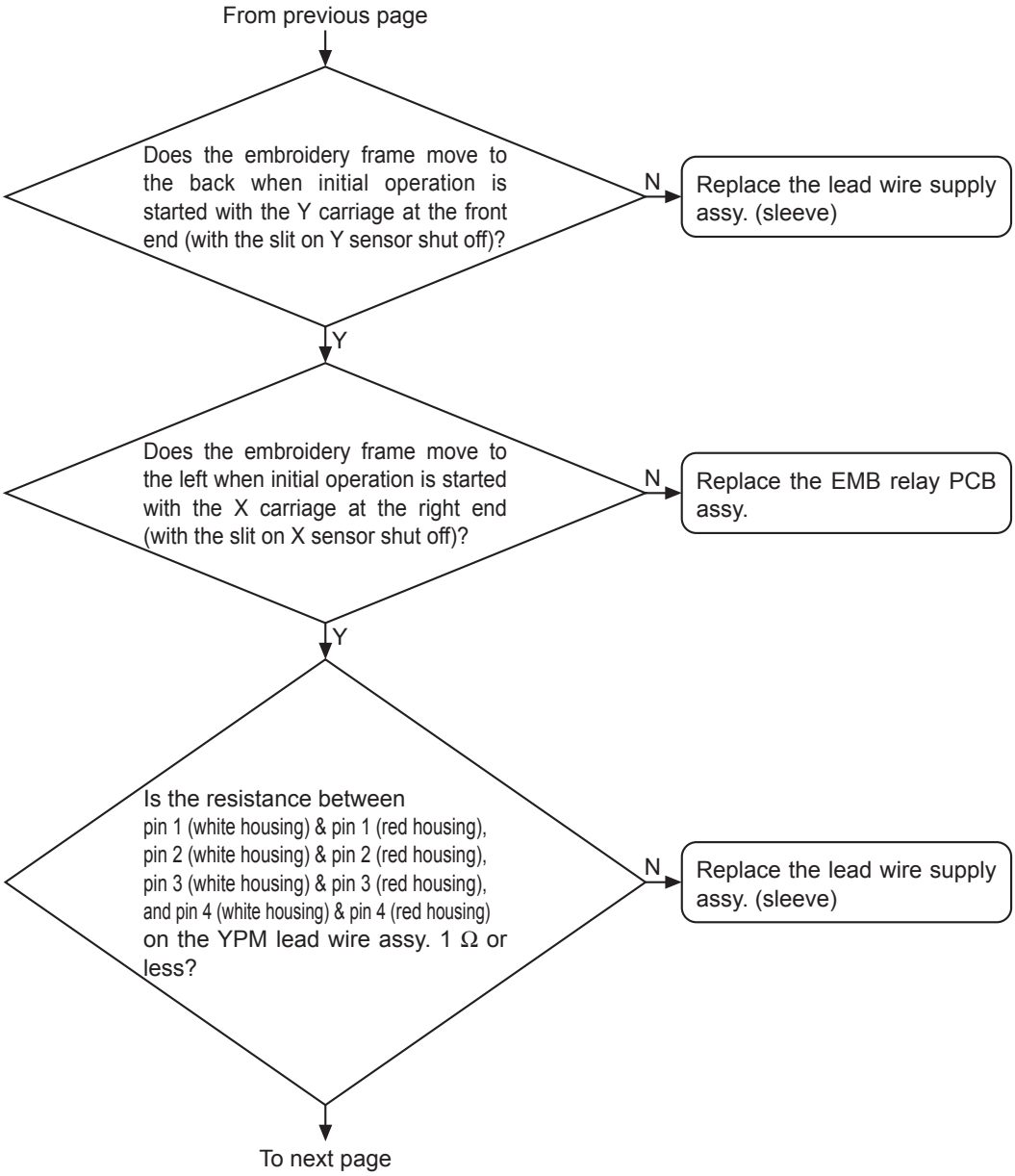

Bobbin thread detection does not work normally
Are the motor PCB assy. and photo diode PCB assy. correctly connected?
N
Reconnect the main PCB assy. and photo diode PCB assy.
Y
Are the motor PCB assy. and photo transistor PCB assy. correctly connected?
N
Reconnect the main PCB assy. and photo transistor PCB assy.
Y
When another photo diode PCB assy. is connected to CN16 of the motor PCB assy. and brought into the proximity of the photo transistor PCB assy., does it operate normally?
Y
Replace the photo diode PCB assy.
N
When another photo transistor PCB assy. is connected to CN15 of the motor PCB assy. and brought into the proximity of the photo diode PCB assy., does it operate normally?
Y
Replace the photo transistor PCB assy.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
Y
Cnnect the FFC correctly or replace it.
N
Replace the main PCB assy.,
or
Replace the motor PCB assy.

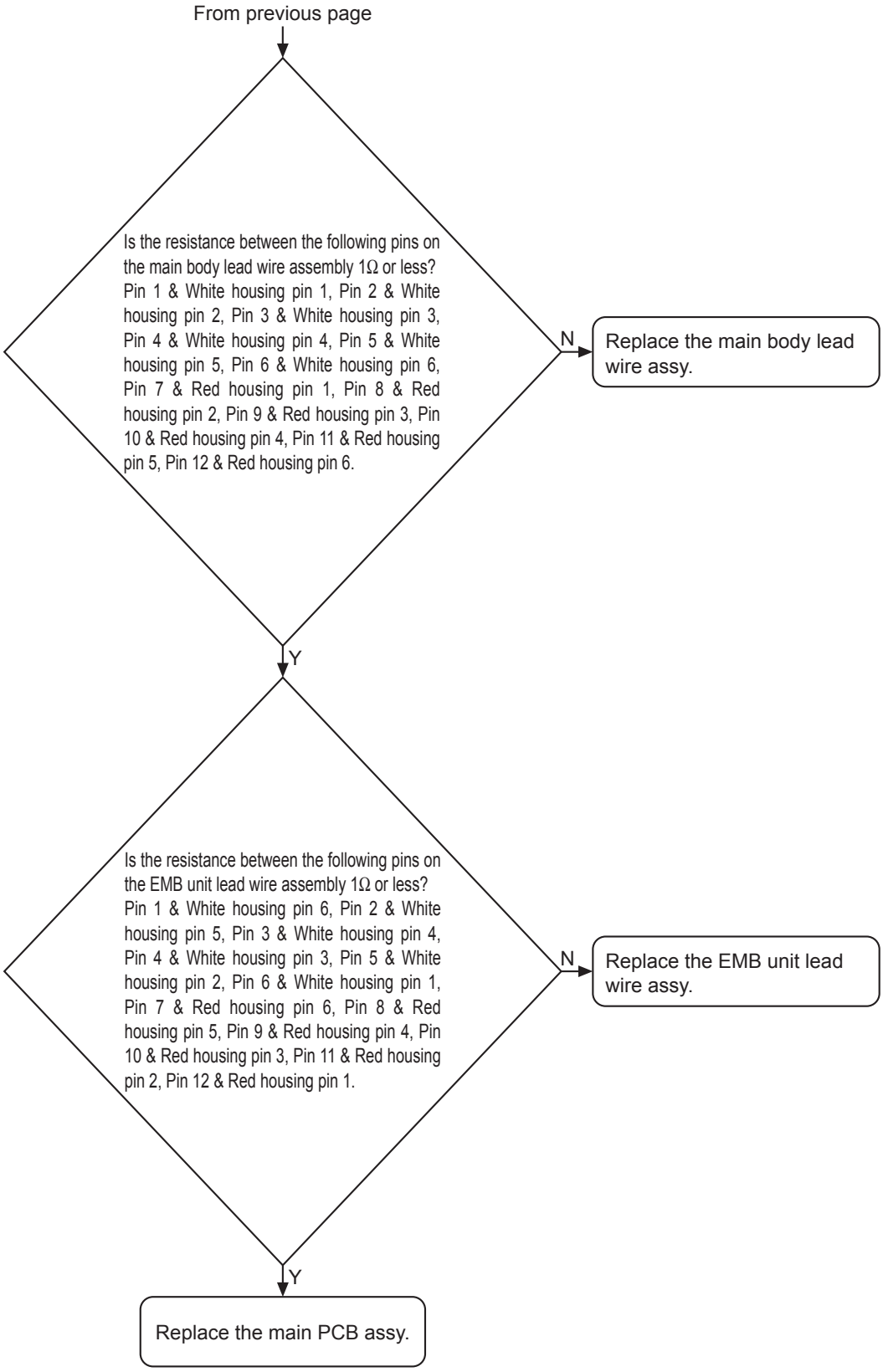

Upper thread sensor does not work normally.
Are the motor PCB assy. and upper thread PCB assy. correctly connected?
N
Reconnect the motor PCB assy. and upper thread PCB assy.
Y
When the slit section of the upper thread PCB assy. is switched to the open / closed position with the power on, does the voltage between pins 2 & 3 on the motor PCB assy. (CN10) change between 0 - 3.3 V DC?
N
Replace the upper thread PCB assy.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly? Is the FFC free breakage or short circuit?
N
Connect the FFC correctly or replace.
Y
Replace the main PCB assy.


Embroidery card cannot be used normally.
Does the unit operate correctly if another card is used?
N
Use another card.
Y
Replace the main PCB assy.


Universal serial bus (USB) cannot be used normally.
Is the USB device firmly connected?
N
Connect it properly.
Y
When the USB device is replaced with a new one, does it work correctly?
Y
Change the USB device.
N
Change the main PCB assy.


Embroidery unit does not operate normally.
Is the resistance across pins 1-2 and pins 3-4 for the X pulse motor connector 4-6 Ω?
N
Replace the X pulse motor.
Y
Is the resistance across pins 1-2 and pins 3-4 for the Y pulse motor connector 4-6 Ω?
N
Replace the Y pulse motor.
Y
Are the motor and sensor connectors inside the embroidery unit correctly connected?
N
Reconnect the connector correctly.
Y
Is the main body lead wire assy. correctly connected to the main PCB assy.?
N
Reconnect the main body lead wire assy. to the main PCB assy. correctly.
Y
Is the resistance between pin 1 (CN5) & pin 6 (CN2), pin 2 (CN5) & pin 5 (CN2), pin 3 (CN5) & pin 4 (CN2), pin 4 (CN5) & pin 3 (CN2), pin 1 (CN3) & pin 6 (CN1), 2 (CN3) & pin 5 (CN1), 3 (CN3) & pin 4 (CN1), 4 (CN3) & pin 3 (CN1), 1 (CN4) & pin 2 (CN2), 2 (CN4) & pin 1 (CN2) on the embroidery relay PCB assembly 1 Ω or less?
N
Replace the embroidery relay PCB assembly.
Y
To next page


From previous page
Does the embroidery frame move to the back when initial operation is started with the Y carriage at the front end (with the slit on Y sensor shut off)?
N
Replace the lead wire supply assy. (sleeve)
Y
Does the embroidery frame move to the left when initial operation is started with the X carriage at the right end (with the slit on X sensor shut off)?
N
Replace the EMB relay PCB assy.
Y
Is the resistance between pin 1 (white housing) & pin 1 (red housing), pin 2 (white housing) & pin 2 (red housing), pin 3 (white housing) & pin 3 (red housing), and pin 4 (white housing) & pin 4 (red housing) on the YPM lead wire assy. 1 Ω or less?
N
Replace the lead wire supply assy. (sleeve)
To next page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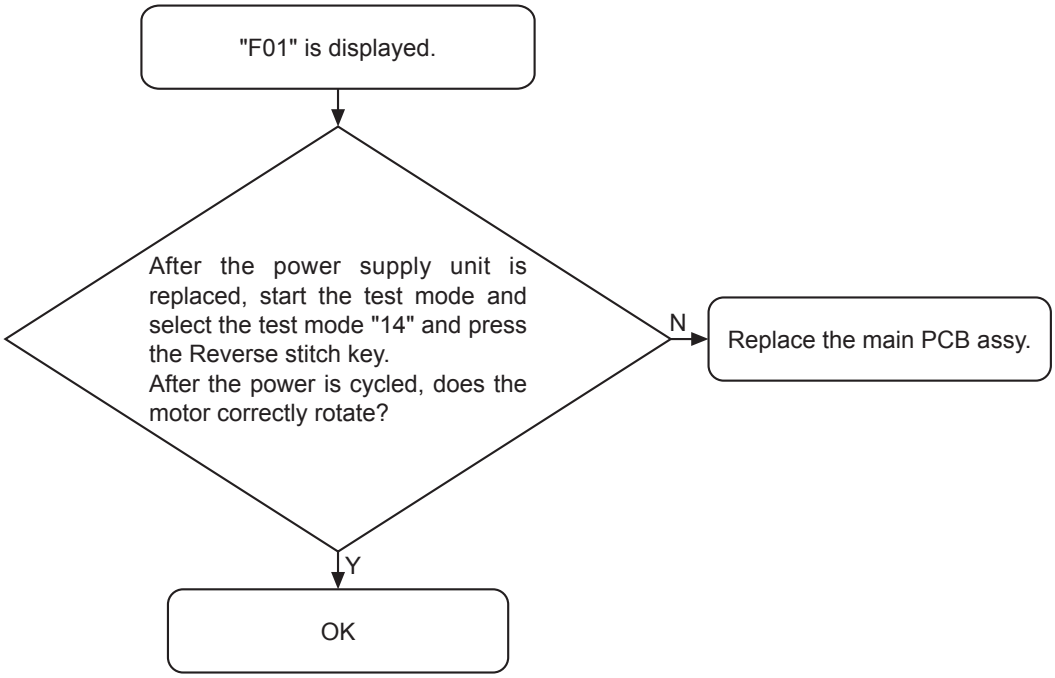
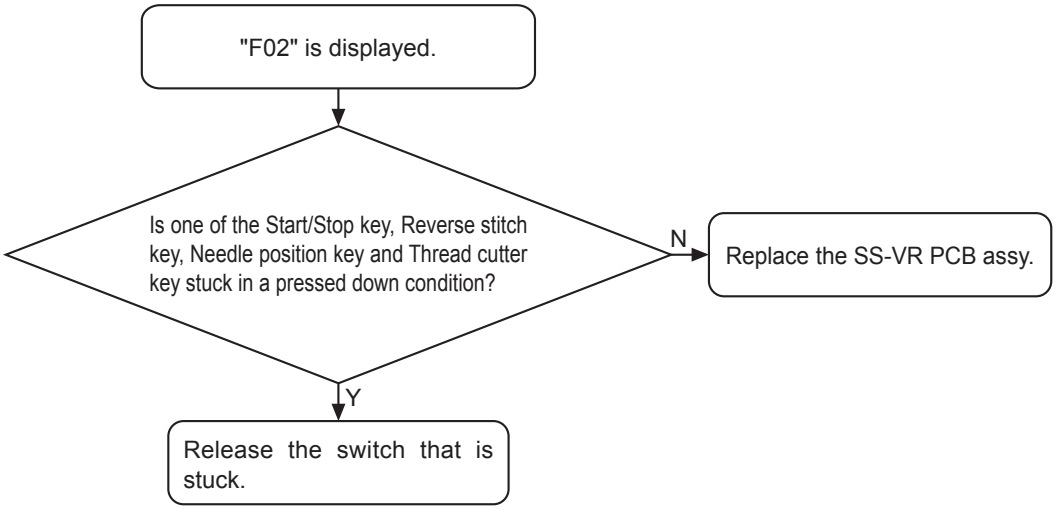
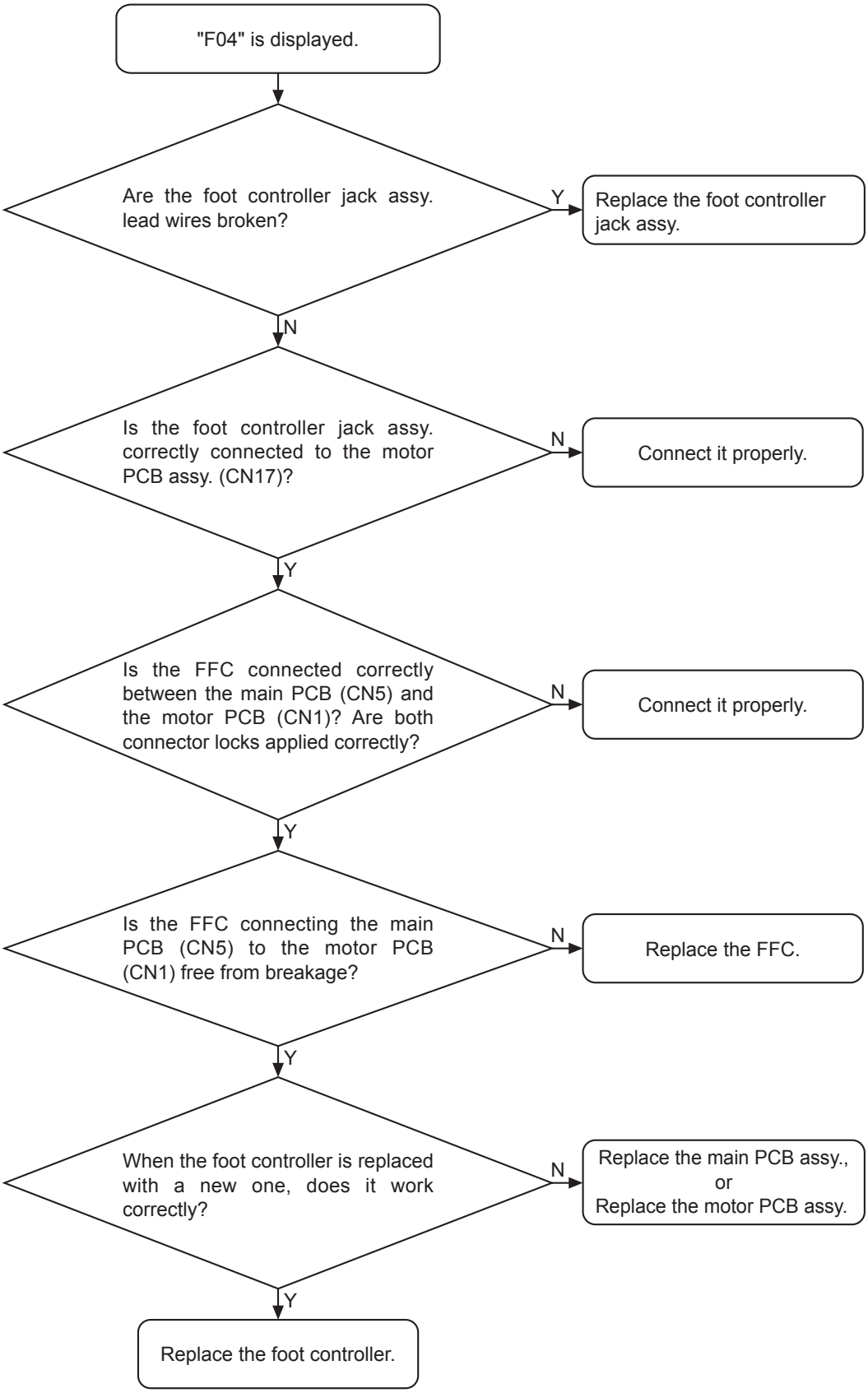
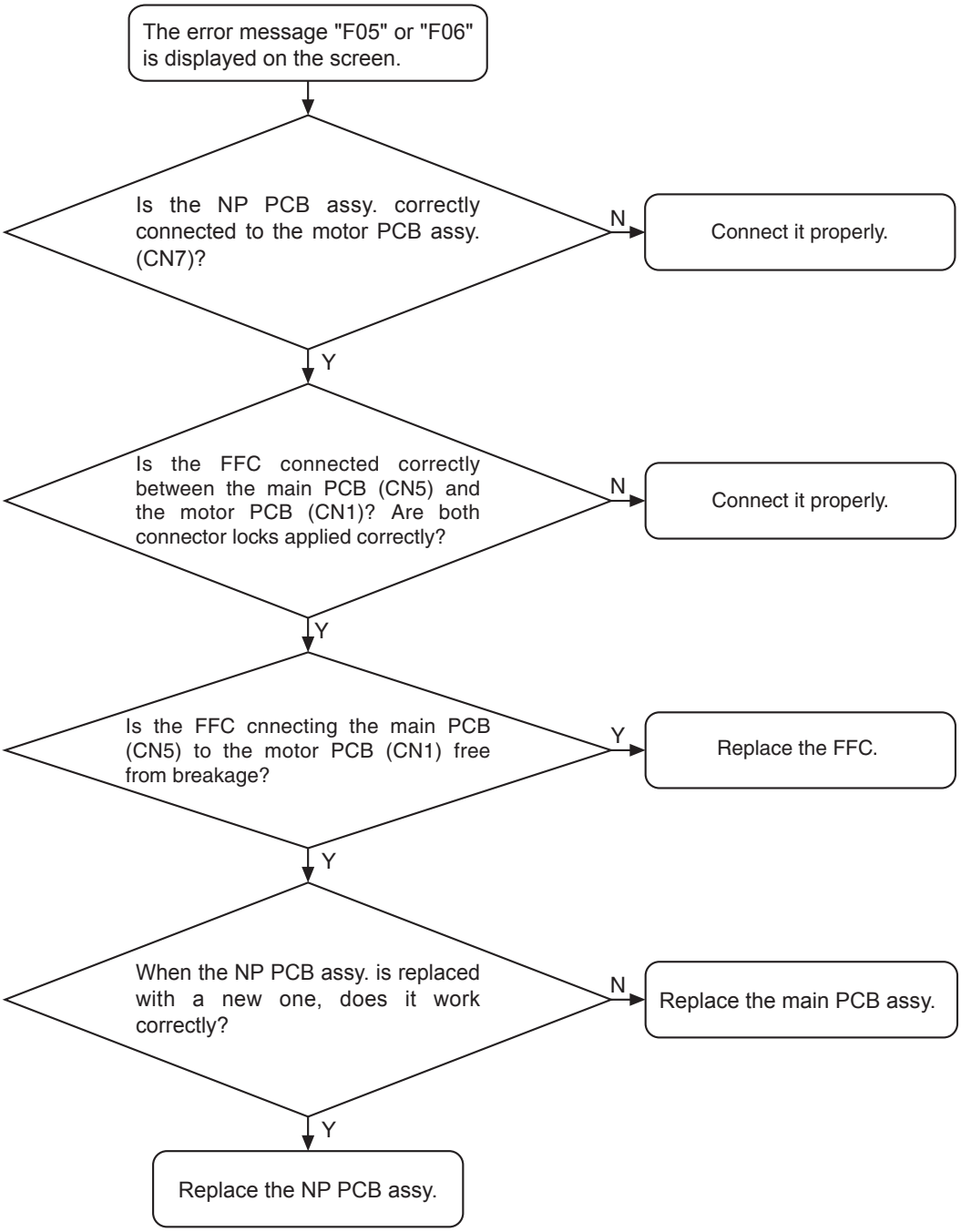
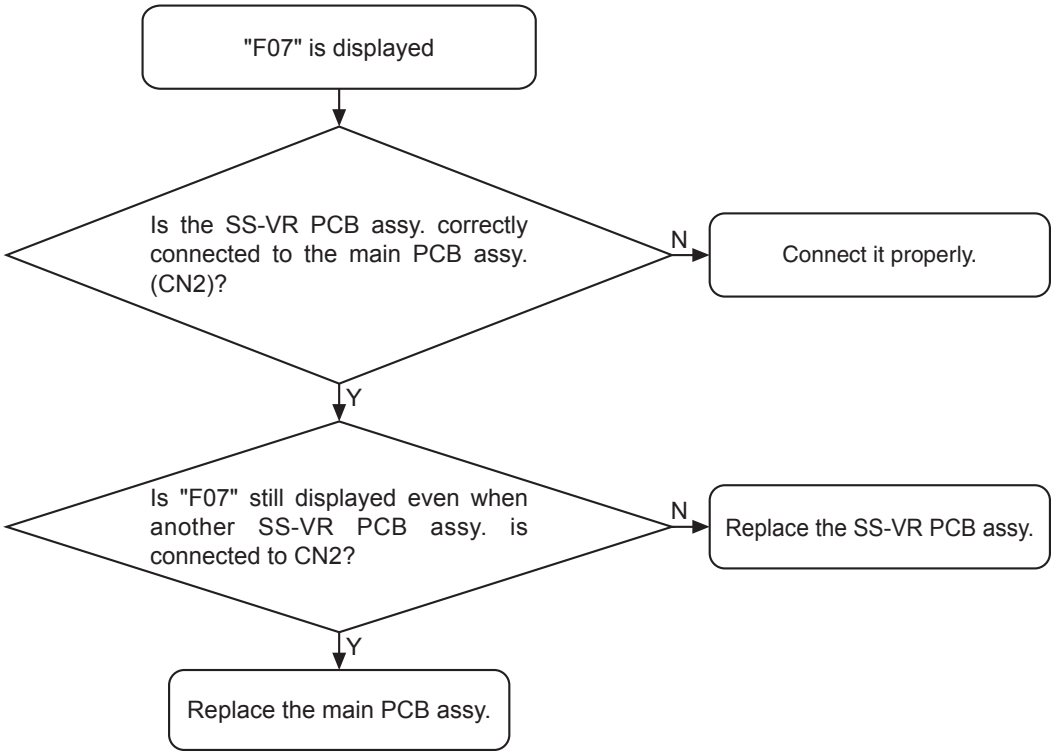
Is the resistance between the following pins on the main body lead wire assembly 1Ω or less?
Pin 1 & White housing pin 1, Pin 2 & White housing pin 2, Pin 3 & White housing pin 3, Pin 4 & White housing pin 4, Pin 5 & White housing pin 5, Pin 6 & White housing pin 6, Pin 7 & Red housing pin 1, Pin 8 & Red housing pin 2, Pin 9 & Red housing pin 3, Pin 10 & Red housing pin 4, Pin 11 & Red housing pin 5, Pin 12 & Red housing pin 6.
N
Replace the main body lead wire assy.
Y
Is the resistance between the following pins on the EMB unit lead wire assembly 1Ω or less?
Pin 1 & White housing pin 6, Pin 2 & White housing pin 5, Pin 3 & White housing pin 4, Pin 4 & White housing pin 3, Pin 5 & White housing pin 2, Pin 6 & White housing pin 1, Pin 7 & Red housing pin 6, Pin 8 & Red housing pin 5, Pin 9 & Red housing pin 4, Pin 10 & Red housing pin 3, Pin 11 & Red housing pin 2, Pin 12 & Red housing pin 1.
N
Replace the EMB unit lead wire assy.
Y
Replace the main PCB assy.


"F01" is displayed.
After the power supply unit is replaced, start the test mode and select the test mode "14" and press the Reverse stitch key.
After the power is cycled, does the motor correctly rotate?
N
Replace the main PCB assy.
Y
OK


"F02" is displayed.
Is one of the Start/Stop key, Reverse stitch key, Needle position key and Thread cutter key stuck in a pressed down condition?
N
Replace the SS-VR PCB assy.
Y
Release the switch that is stuck.


"F04" is displayed.
Are the foot controller jack assy. lead wires broken?
Y
Replace the foot controller jack assy.
N
Is the foot controller jack assy. correctly connected to the motor PCB assy. (CN17)?
N
Connect it properly.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly?
N
Connect it properly.
Y
Is the FFC connecting the main PCB (CN5) to the motor PCB (CN1) free from breakage?
N
Replace the FFC.
Y
When the foot controller is replaced with a new one, does it work correctly?
N
Replace the main PCB assy., or Replace the motor PCB assy.
Y
Replace the foot controller.


The error message "F05" or "F06" is displayed on the screen.
Is the NP PCB assy. correctly connected to the motor PCB assy. (CN7)?
N
Connect it properly.
Y
Is the FFC connected correctly between the main PCB (CN5) and the motor PCB (CN1)? Are both connector locks applied correctly?
N
Connect it properly.
Y
Is the FFC cnnecting the main PCB (CN5) to the motor PCB (CN1) free from breakage?
Y
Replace the FFC.
Y
When the NP PCB assy. is replaced with a new one, does it work correctly?
N
Replace the main PCB assy.
Y
Replace the NP PCB assy.


"F07" is displayed
Is the SS-VR PCB assy. correctly connected to the main PCB assy. (CN2)?
N
Connect it properly.
Y
Is "F07" still displayed even when another SS-VR PCB assy. is connected to CN2?
N
Replace the SS-VR PCB assy.
Y
Replace the main PCB assy.

6 Repair Manual

In this chapter, projects the cause from contents of the malfunction of the products, and explains the method of the fix and the maintenance. When do not understand the cause of the malfunction and the method of the fix and the maintenance, use this chapter.

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
1	Stitch skipping Thread abrasion Thread breakage Seam unevenness Needle breaks	Needle tip damaged while sewing Needle catches and bends before or after sewing	Needle replacement	Tip damage to needle	Touch the needle tip with your finger, be sure that it is not damaged. (4-2)
				Needle curvature	Remove the needle, place on level block (horizontal block) and be sure there is no curvature. (4-2)
2	Power supply enter, but LCD display nothing	FFC (FFCSFBNCD-50) and main PCB assy. connector disconnected	Lock FFC after plug FFC in connector (3-35)	Sewing machine runs when switched on	When power is switched ON, conform that the LCD screen light.
		FFC (FFCSFBNCD-50) and motor PCB assy. connector disconnected	Lock FFC after plug FFC in connector (3-36)		
		Lead wire assy. power and main PCB assy. connector disconnected	Plug connector in (3-35)		
		Lead wire assy. power and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		LCD and main PCB assy. FPC disconnected	FPC plug connector in (3-35)		
		Power supply unit and motor PCB assy. connector disconnected	Plug connector in (3-27)		
		Inlet assy. and power supply unit connector disconnected	Plug connector in (3-27)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad LCD	Replace LCD (2-7) (3-34)		
		Bad power supply PCB assy.	Replace power supply unit (2-13) (3-27)		
		Bad inlet assy.	Replace inlet assy. (2-14) (3-26)		
		Bad power supply cord	Replace power supply cord (2-13) (3-27)		
	Sewing machine lamp (LED lamp) does not light (machine operation normal)	PCB unit: LED lamp-FL and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		PCB unit: LED lamp-FR and SSVR PCB assy. connector disconnected	Plug connector in (3-32)		
		Bad PCB unit: LED lamp-FL	Replace PCB unit: LED lamp-FL (2-13) (3-28)		
		Bad PCB unit: LED lamp-FR	Replace PCB unit: LED lamp-FR (2-9) (3-32)		
		Bad SSVR PCB assy.	Replace SSVR PCB assy. (2-9) (3-32)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
	START/STOP lamp does not light	SSVR PCB assy. and main PCB assy. connector disconnected	Plug connector in (3-32) (3-35)		
		Bad SSVR PCB assy.	Replace SSVR PCB assy. (2-9) (3-32)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
3	Even when the presser foot is raised with a straight line pattern, the sewing machine will not work (SS LAMP does not change green)	Bad PF switch assy. attachment position PF switch assy. and motor PCB assy. connector connected Bad PF switch assy.	Adjust PF switch assy. attachment position (2-21) (3-20) Plug connector in (3-36) Replace PF switch assy. (2-21) (3-20)	Presser switch function	When the lift lever is lifted up and down, color of SS lamp change. • When the lift lever is raised: Red • When the lift lever is lowered: Green
4	Straight left base line stitch unevenness (pitch)	Bad left base line needle drop adjustment Loose zigzag adjusting nut	Adjust left base line needle drop (4-10)	Left base line needle drop	Refer to Left base line needle drop. (4-10)
5	Stitch skipping Thread abrasion Thread breakage	Bad needle interference adjustment Loose needle interference adjustment screw	Adjust needle interference (4-14)	Needle and tip gap	Refer to Clearance between needle and rotary hook point. (4-14)
		Bad front-back needle drop adjustment Bad needle plate A attachment position	Adjust back-front needle drop (4-24) Reattach needle plate A (3-72)	Back-front needle drop position	Refer to Needle and presser foot front/back position. (4-24)
		Bad needle bar rise adjustment Loose timing adjustment screws	Adjust needle bar rise (4-12)	Needle interference Needle and needle tip coincide	Refer to Needle bar rising. (4-12)
		Bad needle bar height adjustment Loose timing adjustment screws	Adjust needle bar height (4-13)	Needle bar height	Refer to Needle bar height. (4-13)
6	Does not start sewing (When press SS-button, electronic sounds)	main motor assy. and power supply unit connector disconnected Bad main motor assy. Bad power supply PCB assy.	Plug connector in (3-27) Replace main motor assy. (2-15) (3-26) Replace power supply unit (2-13) (3-27)	Sewing machine runs when SS-button is pushed	Check that the sewing machine starts and stops when SS-button is pushed.
	Does not start sewing (When press SS-button, no electronic sounds)	SSVR PCB assy. and main PCB assy. connector disconnected NP PCB assy. and motor PCB assy. connector disconnected Bad SSVR PCB assy. Bad NP PCB assy. Bad foot controller jack assy. Bad main PCB assy. Bad motor PCB assy.	Plug connector in (3-35) Plug connector in (3-27) Replace SSVR PCB assy. (2-9) (3-32) Replace NP PCB assy. (2-16) (3-25) Replace foot controller jack assy. (2-13) Replace main PCB assy. (2-6) (3-35) Replace motor PCB assy. (2-15) (3-25)		

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
7	Irregular rotation (rotation slow / fast / unstable)	Grease or dust adhering to speed shutter	Remove grease or dust	Machine operation while rotating	Check that it switches to fast, middle and slow speed when the speed control lever is operated and that at high speed there is no rotational variation.
		Grease or dust adhering to NP sensor	Remove grease or dust		
		Bad NP PCB assy.	Replace NP PCB assy. (2-16) (3-25)		
		Interference between NP PCB assy. and speed shutter	Eliminate cause of interference		
		• Damage to speed shutter	Replace upper shaft assy. (2-32) (3-5)		
		• Damage to NP PCB assy.	Replace NP PCB assy. (2-16) (3-25)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
8	Even if the drop knob is returned to the left, the feed dog stays down and does not return (no material feed)	Drop knob broken	Replace drop knob (2-56) (3-59)	Drop function	With the needle bar in the top position and the drop lever to the right, check that the feed dog is down, and moving the drop lever to the left and turning the pulley one turn by hand, that the feed dog returns to the original height.
		Operation trouble of vertical lever	Adjust vertical lever operation (3-60)		
		Bad vertical feed shaft	Replace vertical feed shaft (2-56) (3-60)		
		Vertical feed shaft disconnected	Adjust vertical feed shaft (2-56) (3-60)		
		Grease exhaustion of feed cam surface	Apply grease to cam of lower shaft B assy.		
9	Bad pattern shape • Blocked by satin pattern • Fine BH stitches • Straight line feed too small • Stitches uneven	Vertical rattle in feed dog		Back/front rattle in feed dog	With the feed dog up, check that there is no rattle when the feed dog is lightly moved back and forth.
		• Loose feed dog attachment screw	Adjust feed dog attachment screw (4-17)		
		• Vertical rattle in feed bar	Reattach feed bar (2-51) (3-67)		
		Damage to horizontal feed cam	Replace lower shaft B assy. (2-52) (3-65)		
		Rattle in feed adjuster	Reattach feed adjuster (2-55) (3-61)		
		Horizontal rattle in feed dog		Left-right rattle in feed dog	With the feed dog up, check that there is no rattle when the feed dog is lightly moved left and right.
		• Loose feed dog attachment screw	Adjust feed dog attachment screw (4-18)		
		• Horizontal rattle in feed bar	Reattach feed bar (2-51) (3-67)		
		Bad feed dog height adjustment	Adjust feed dog height (4-18)	Feed dog height	Refer to Feed dog height. (4-18)
		Bad feed dog front-back position adjustment	Adjust feed dog front-back position (4-17)	Feed dog front-back position	Refer to Front/back and left/right position of feed dog. (4-17)
		Bad feed dog left-right position adjustment	Adjust feed dog left-right position (4-17)	Feed dog left-right position	Refer to Front/back and left/right position of feed dog. (4-17)
		Bad feed adjustment	Adjust feed (4-19)	Feed	Refer to Forward and backward feed. (4-19)
		Bad presser foot height and parallel adjustment	Adjust presser bar height and parallel (4-16)	Presser foot height and parallelism	Refer to Presser bar height and parallelism. (4-16)

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
10	Sewing sounds Inappropriate sounds			Operating noise	Check that there is no abnormal noise at fast, middle and slow speed in 3 point drop (test mode 4).
	• Thread take-up noise	Shaft noise • Loose screws	Retighten screws (2-42) (3-46)		
	• Outer rotary hook noise	Outer rotary hook vertical rattle	Reattach outer rotary hook (2-50) (3-68)		
	• Upper shaft noise	Upper shaft bushing out of oil	Lubricate upper shaft bushing (3-5)		
		Rattle along the thread take-up counter weight shaft	Reattach thread take-up counter weight (2-43) (3-45)		
	• Motor noise	Belt too tight	Adjust motor belt (4-7)		
		Motor brush noise	Replace main motor assy. (2-15) (3-26)		
	• Lower shaft noise	Lower shaft bushing out of oil	Lubricate lower shaft bushing (3-60)		
		Lower shaft axial rattle	Reattach lower shaft B assy. (2-52) (3-65)		
	• Feed cam noise	Feed cam out of oil	Lubricate feed cam (3-66)		
	• Feed arm noise	Bad feed arm	Replace feed arm assy. (2-53) (3-63)		
	• Noise from contact between needle plate and feed dog	Back/front and left/right rattle in feed dog	Reattach feed dog (2-48) (3-72)		
		Bad feed dog front-back position adjustment	Adjust feed dog front and back position (4-17)		
		Bad feed dog left-right adjustment	Adjust feed dog left and right position (4-17)		
		Needle plate A assy. attachment position slippage	Reattach needle plate A assy. (2-48) (3-73)		
	• Needle contact noise	Noise of contact between needle and outer rotary hook			
		• Bad needle interference adjustment	Adjust needle interference (4-11)		
		• Loose needle interference adjustment screw			

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
11	Threading not possible	Thread pushed out at the hook end		Threading function	Con firm that the threading lever moves smoothly and that threading through the needle hole is possible.
		• Vertical slippage in needle thread block	Adjust needle thread (4-15)		
		Hook extends right of the needle hole			
		• Wide gap between right side of needle and hook guide	Replace threader hook assy. (2-41) (3-48)		
		• Needle curvature	Replace needle		
		• Needle slant (hole slant with slanted attachment of needle block)	Replace needle bar (2-39) (3-53)		
		• Threader hook assy. slippage	Replace threader hook assy. (2-41) (3-48)		
		Does not go into needle hole because of hook tip curvature	Replace threader hook assy. (2-41) (3-48)		
	When the threader lever returns, it stops part way through.	Threader shaft tangling	Replace needle bar supporter assy. (2-40) (3-50)		
		Bad thread guide shape	Replace hook assy. (2-41) (3-48)		
		Needle thread shaft and top gap too small	Replace needle bar supporter assy. (2-40) (3-50)		
	Needle thread lever operation catches part way through.	Bad needle stop position			
		• Bad NP PCB assy.	Replace NP PCB assy. (2-16) (3-25)		
		• Grease or dust adhering to NP PCB assy.	Remove grease or dust		
		• Rotation shutter damage	Replace upper shaft assy. (2-32) (3-5)		
		• Bad needle thread block rotational position	Adjust needle thread block (2-39) (3-53)		
12	Either upper thread tension or lower thread tension	Upper thread tension is tight/ loose	Adjust upper thread tention (4-9)	Upper thread tension	Check that the thread tension is good during actual sewing.
		Lower thread tension is too tight/ loose	Adjust lower thread tension (4-26)	Lower thread tension	
		Upper thread or lower thread unsuitable	Replace upper thread or lower thread		

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
13	Utility sewing • Needle breakage	Needle contacts outer rotary hook	Adjust clearance between needle and rotary hook point. (4-14)	Utility sewing (straight line / zigzag)	Check that the needle does not break during actual sewing and that there are no abnormal sounds during actual sewing.
		Inner rotary hook release • Inner rotary hook and inner rotary hook bracket assy. horizontal overlap is small	Adjust inner rotary hook bracket assy. position (4-25)		
		• Inner rotary hook and inner rotary hook bracket assy. vertical overlap is small	Check the presence or absence of washer and spacer under the outer rotary hook shaft (2-50) (3-68)		
		Thread catches on spool presser (scratches on spool presser)	Replace spool presser		
		Needle bends or needle tip breaks	Replace needle		
	• Thread breakage stitch skipping	Bad needle bar rising adjustment	Adjust needle bar rising (4-12)	Utility sewing (straight line / zigzag)	Check that the thread does not break during actual sewing.
		Bad needle bar height adjustment	Adjust needle bar height (4-13)		
		Thread catches on spool presser (scratches on spool presser)	Replace spool presser		
		Scratches on outer rotary hook	Replace outer rotary hook assy. (2-50) (3-68)		
		Miss thread guide pathway	Rethread		
	• Seam unevenness	Presser foot inclines	Adjust presser bar height and parallelism (4-16)	Utility sewing (straight line / zigzag)	Check that stitches are not uneven during actual sewing.
		Presser foot position is high (does not hold material completely)	Adjust presser bar height and parallelism (4-16)		
		Scratches on inner rotary hook	Replace inner rotary hook		
		Scratches on outer rotary hook	Replace outer rotary hook (2-50) (3-68)		
		Scratches around needle plate A needle hole	Replace needle plate A (2-48) (3-73)		
		Scratches on needle plate A surface			
		Scratches around presser foot needle hole	Replace presser foot (2-42) (3-47)		
		Burrs and scratches in thread guide pathway	Replace parts with burrs and scratches		
		Lower thread slippage from thread tension spring of inner rotary hook	Reset lower thread		
	• Stops during sewing	No gap for BW switch	Adjust BW switch assy. position (2-27) (3-12)	Utility sewing (straight line / zigzag)	Check that it does not stop during actual sewing.
		No gap for BH switch lever	Adjust BH lever switch position (4-23)		
		No play in SS-button, reverse button or vertical stop button	Reassemble SSVR PCB assy. (2-9) (3-32)		

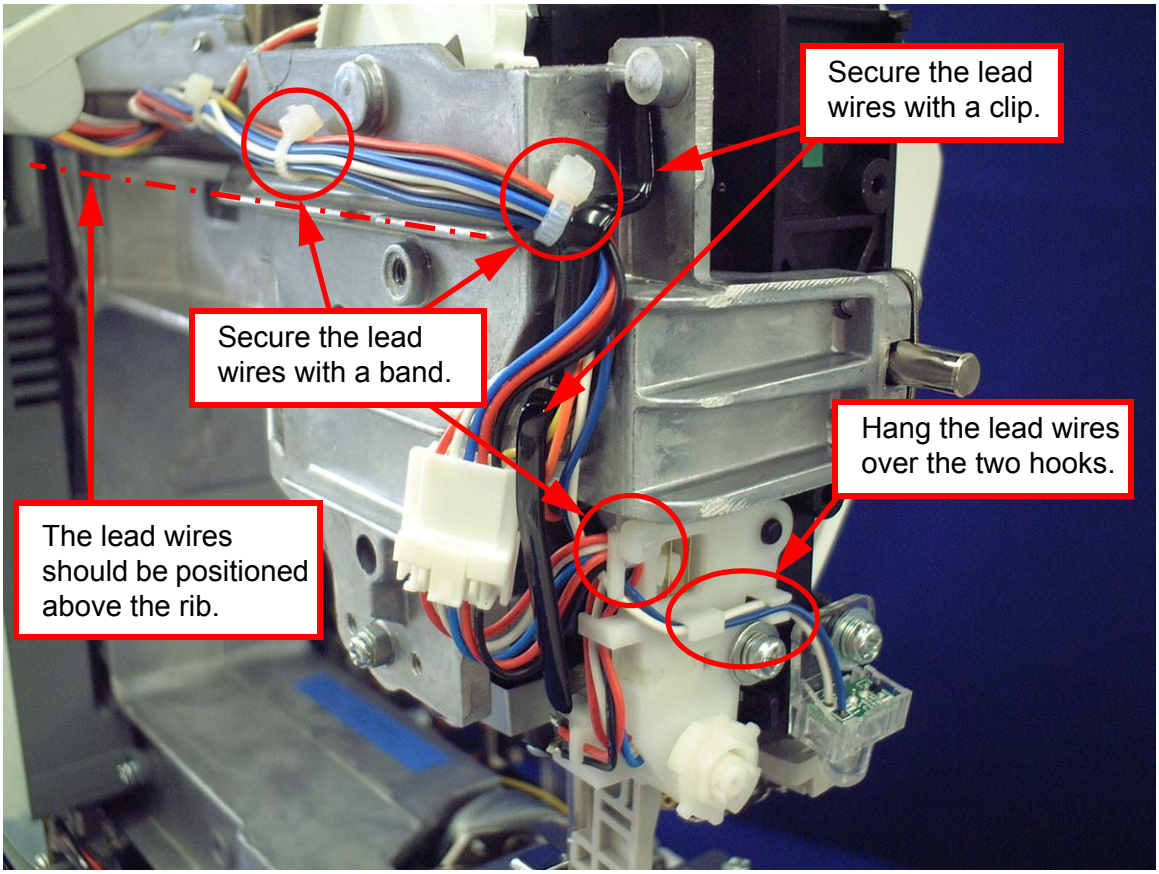
	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
14	Cannot sew BH • BH is blocked • BH cannot switch • BH switches part way through	Bad BH switch lever connecting point	Adjust BH lever switch position (4-23)	button hole	Check that there is no stitch skipping or clogging with BH pattern sewing. Refer to BH lever switch position. (4-23)
		Bad BH lever	Replace BH switch assy. (2-36) (3-57)		
		BH lever operation drags			
		BH presser foot button attachment holder is pulled out fully	Reset range for BH presser foot button attachment (More back two marks from maximum permissible range) (4-23)		
		BH switch assy. and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
	Cannot sew BH • Becomes straight line	Bad feed forward / reverse adjustment	Adjust feed forward / backward (4-19)		
15	Upper thread detect does not operate normally	Bad upper thread PCB assy.	Replace upper thread PCB assy. (2-19) (3-21)	Detecting upper thread function	When set the upper thread and sew, detect the presence or absence of the upper thread.
		Upper thread PCB assy. and main PCB assy. connecter disconnected	Plug connector in (3-35)		
		Bad thread cutting shutter operation or broken	Replace thread cutting shutter (2-29) (3-10)		
		Deformed thread take up spring or broken	Replace thread take up spring (2-23) (3-17)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
	Lower thread detect does not operate normally	Grease or dust adhering to lower thread sensor	Remove grease or dust from photo diode holder assy. (2-50) (3-69)	Detecting lower thread remaining amount function	When set the bobbin that roll the thread and sew, defect the presence or absence of the lower thread.
			Remove grease or dust from photo transistor assy. (2-58) (3-78)		
		Lower thread sensor and motor PCB assy. connector disconnected	Plug connector of photo diode holder assy. in (3-69)		
			Plug connector of photo transistor assy. in (3-78)		
		Bad lower thread sensor	Replace photo diode holder assy. (2-50) (3-69)		
			Replace photo transistor assy. (2-58) (3-78)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		

	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
16	Touch panel does not react	Bad touch panel adjustment	Adjust touch panel attachment position (4-5)	Selecting pattern function	Check to be able to select the pattern from the touch panel.
		Touch panel assy. and main PCB assy. FPC disconnected	Lock it after connect FPC to connector (3-35)		
		Bad touch panel assy.	Replace touch panel assy. (2-7) (3-34)		
		Bad panel PCB assy.	Replace panel PCB assy. (2-9) (3-32)		
17	Thread cutter does not operate, even if press thread cutter switch	Bad thread cutter pulse motor	Replace thread cutter pulse motor (2-60) (3-75)	Thread cutter function	Check that the thread is cut surely.
		Thread cutter pulse motor and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		Thread cutter lever gear operation is heavy.	Reattach part that operation is heavy.		
		Bad SSVR PCB assy.	Replace SSVR PCB assy. (2-9) (3-32)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
	Thread does not cut through thread cutter operate	Lint or dirt adhering to thread hook assy.	Remove lint or dirt		
		Bad timing to turn out of thread hook assy.			
		• Grease or dust adhering to NP sensor	Remove grease or dust		
		• Bad NP PCB assy.	Replace NP PCB assy. (2-16) (3-25)		
		• NP PCB assy. and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		• Timing shutter and NP PCB assy. interfere	Clear off cause of interference		
		Thread hook assy. does not scoop thread			
		• Bad thread hook assy. shape	Replace thread cutter assy. (2-29) (3-10)		
		• Float spring plate thread hook lever	Replace spring plate (2-29) (3-10)		
		Blunt lower thread cutter	Replace cutter pile assy. (2-4) (3-37)		

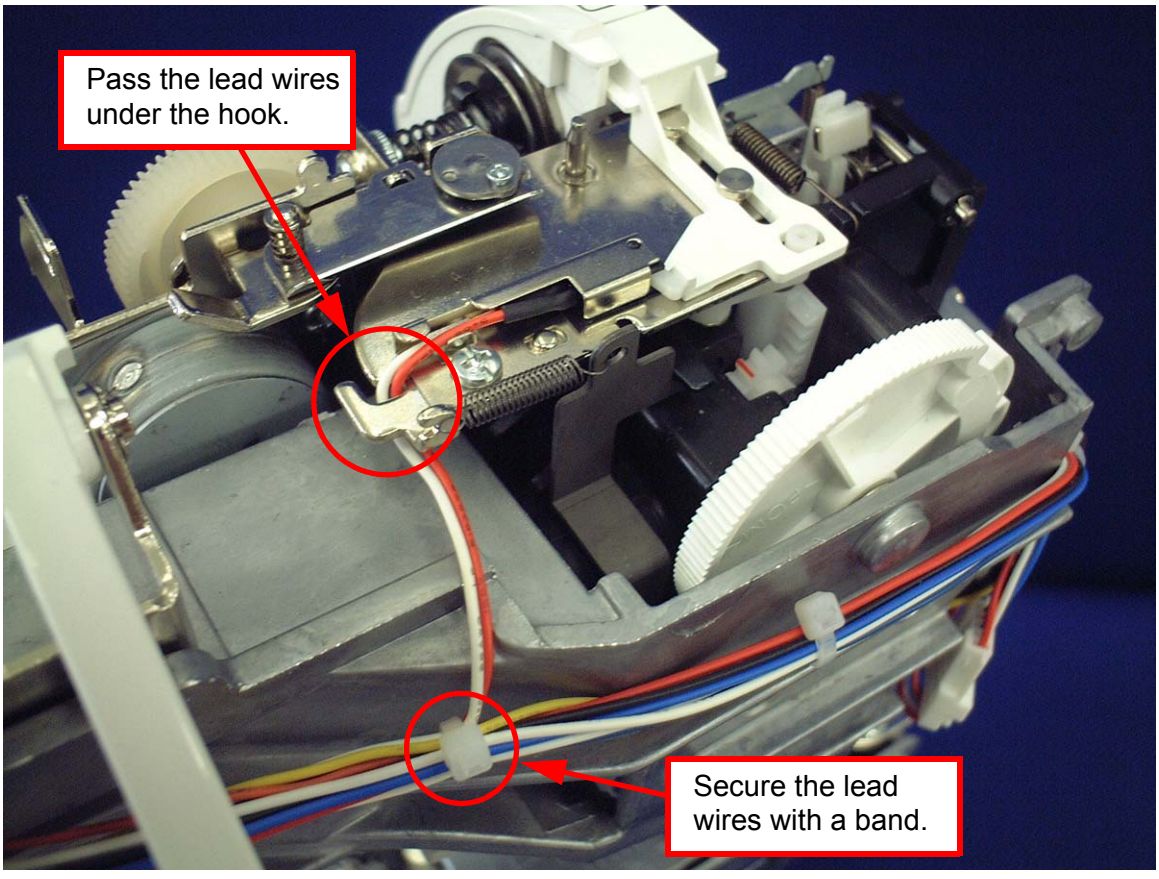
	Problem	Primary factors and causes	Repair method	Items for Inspection	Inspection method and standards
18	Bobbin winder shaft not turning	BW switch assy. and motor PCB assy. connector disconnected	Plug connector in (3-36)	Bobbin winder function	Operate the bobbin winder, and check that there is no uneven bobbin winder or abnormal noise. Check that the amount of thread wound onto the bobbin is 80-90% of the bobbin diameter.
		Bad BW switch assy.	Replace BW switch assy. (2-27) (3-12)		
		Bad BW switch assy. attachment position	Adjust BW switch attachment position (2-27) (3-12)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
	Bobbin winding amount unsuitable	Bad bobbin presser adjustment	Adjust bobbin presser position (4-22)		
		Loose bobbin presser attachment screw			
	Bobbin winder winds unevenly	Bad bobbin winder guide assy. height adjustment	Adjust bobbin winder guide assy. (4-22)		
		Loose bobbin winder guide assembly screw			
19	Foot controller not effective	Bad foot controller	Replace foot controller	Foot controller function	Run the sewing machine using the foot controller, and check that the sewing machine speed changes according to the amount it is pressed down.
		Foot controller jack assy. and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		Bad foot controller jack assy. contact point	Replace foot controller jack assy. (2-13)		
		Bad motor PCB assy.	Replace motor PCB assy. (2-15) (3-25)		
		Bad main PCB assy.	Replace main PCB assy. (2-6) (3-35)		
20	Embroidery machine does not oprate	X pulse motor and emb relay PCB assy. connector disconnected	Plug connector in (3-89)	Embroidery function	Check that the carriage moves surely.
		Y pulse motor and YPM lead wire connector disconnected	Plug connector in (3-84)		
		YPM lead wire and emb relay PCB assy. connector disconnected	Plug connector in (3-89)		
		Lead wire assy. and emb relay PCB assy. connector disconnected	Plug connector in (3-89)		
		Lead wire assy. and motor PCB assy. connector disconnected	Plug connector in (3-36)		
		Bad X pulse motor	Replace X pulse motor (2-67) (3-87)		
		Bad Y pulse motor	Replace Y pulse motor (2-71) (3-83)		
		Bad emb relay PCB assy.	Replace emb relay PCB assy. (2-66) (3-89)		
		Broken YPM lead wire	Replace lead wire supply assy: sleeve (2-69) (3-84)		
		Bad Y sensor PCB assy.			
		Broken lead wire assy.	Replace lead wire assy. (2-64) (3-92)		
		Broken lead wire assy.			
		Others	Replace motor PCB assy. (2-15) (3-25)		
			Replace main PCB assy. (2-6) (3-35)		

7 Special Instructions of Wiring

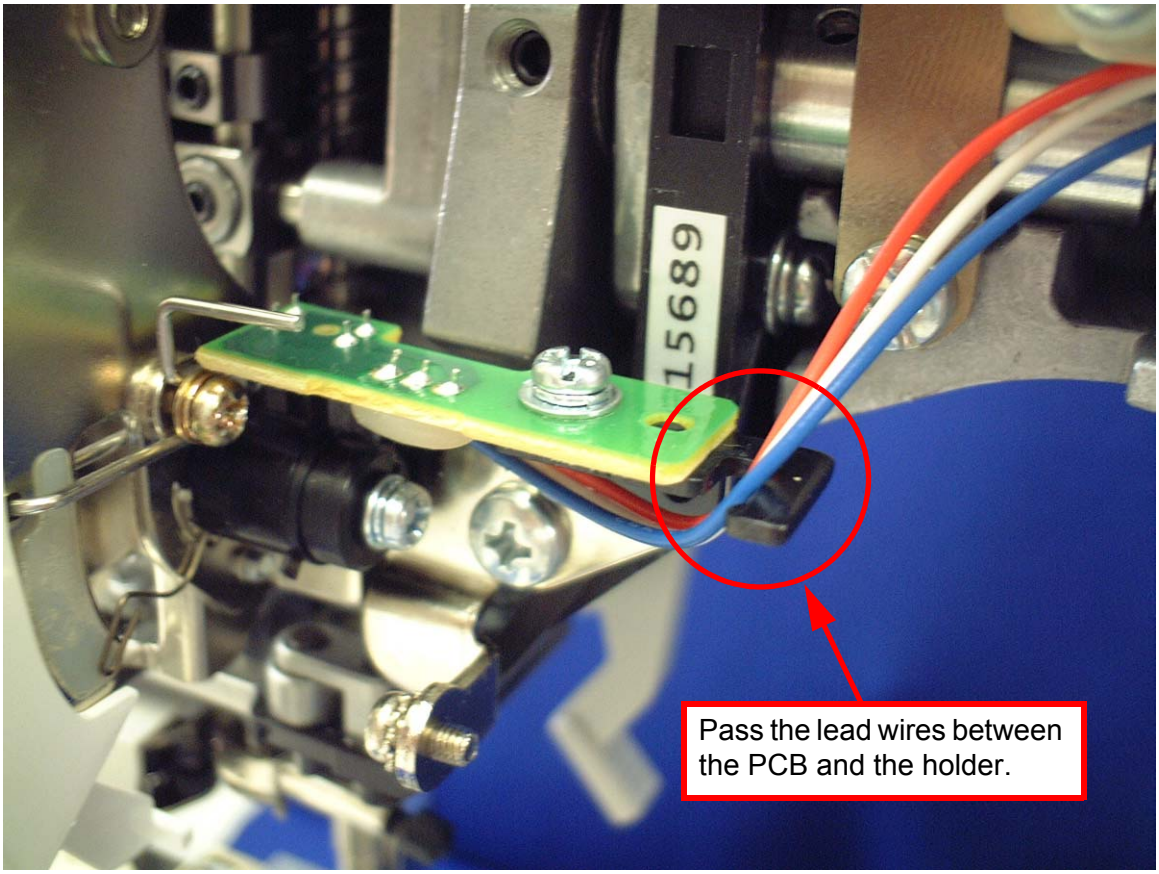
1. Wiring on left side of needle-presser module



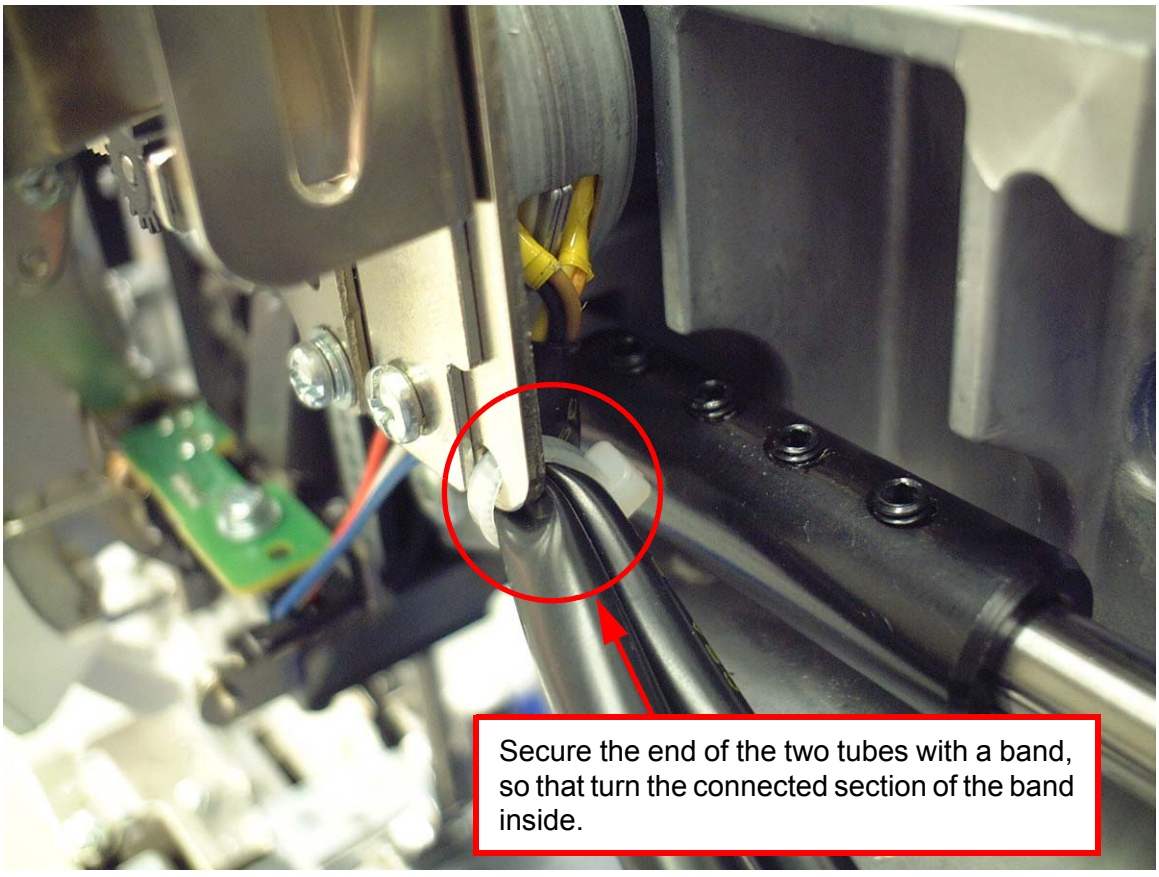
2. Wiring on upper side of needle-presser module



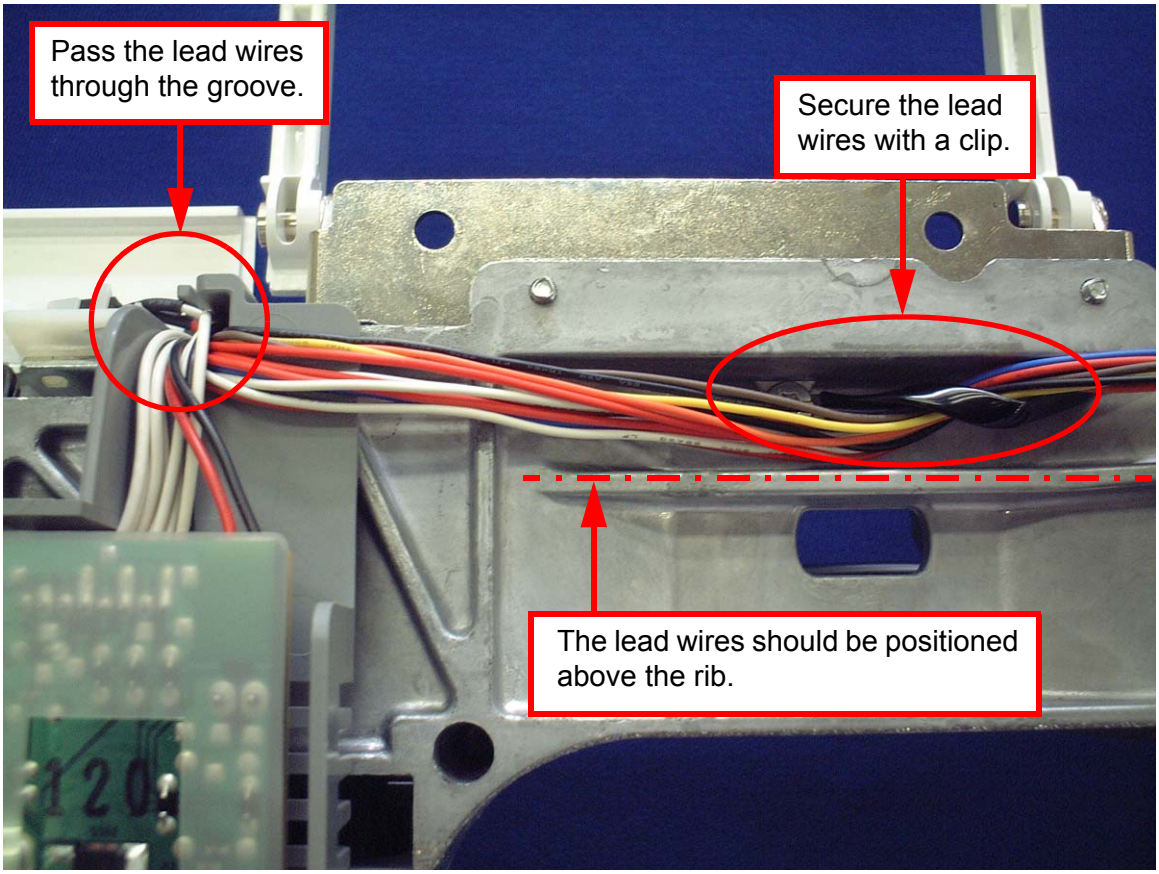
3. Wiring on lower side of needle-presser module



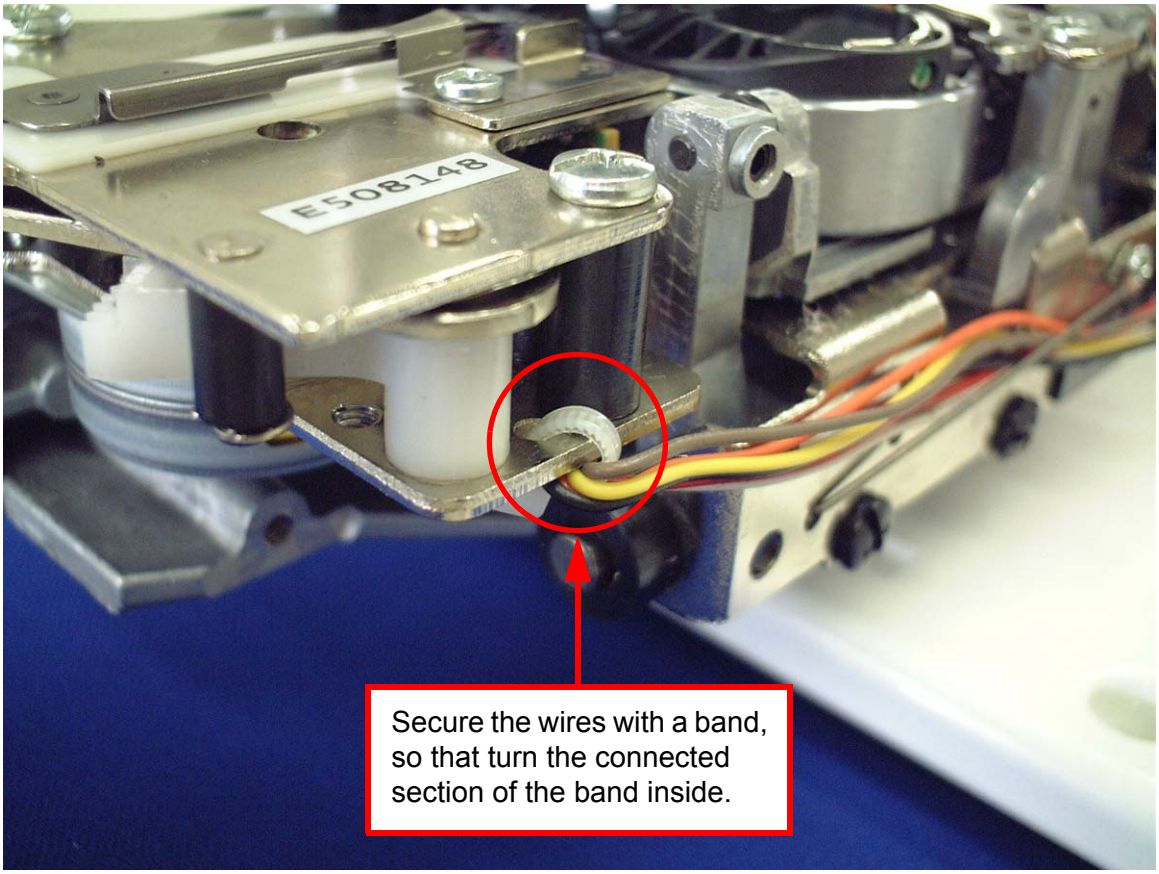
4. Wiring on right side of AT pulse motor assembly



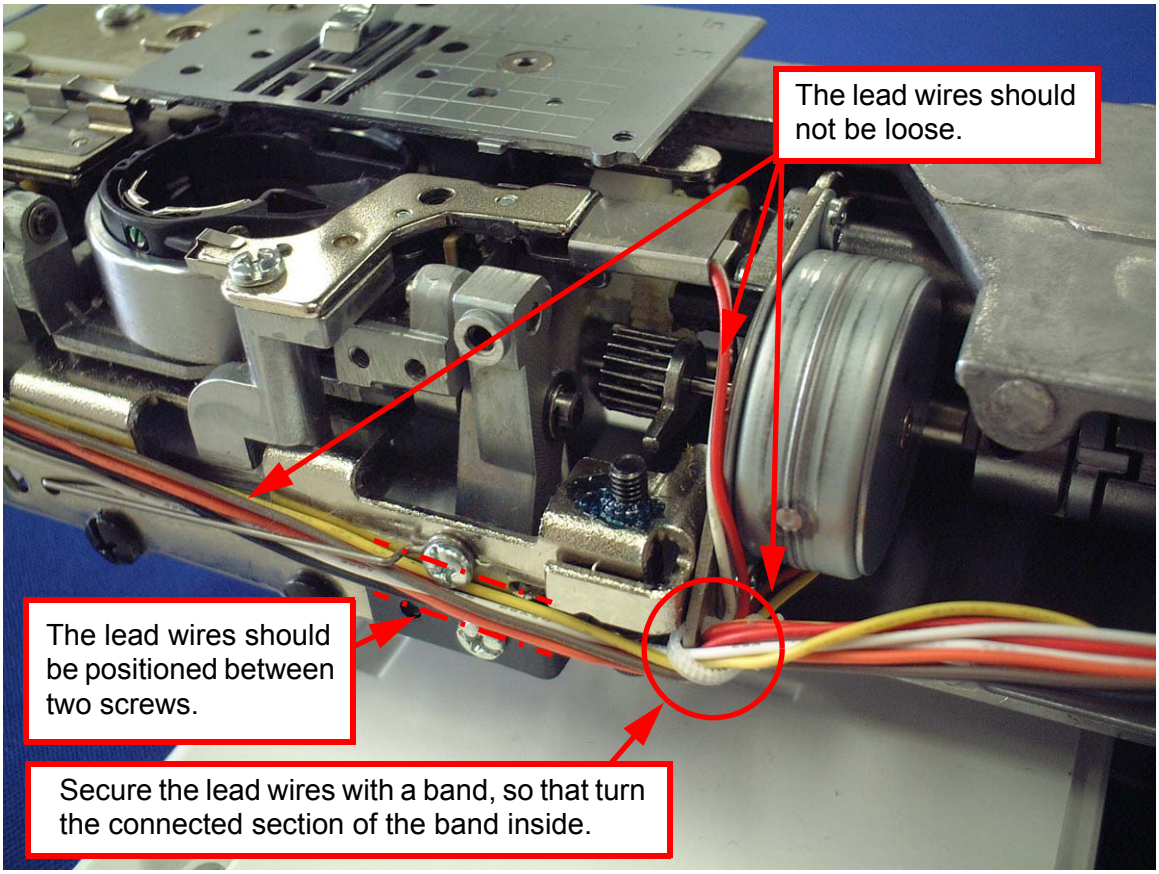
5. Wiring on back side of arm bed



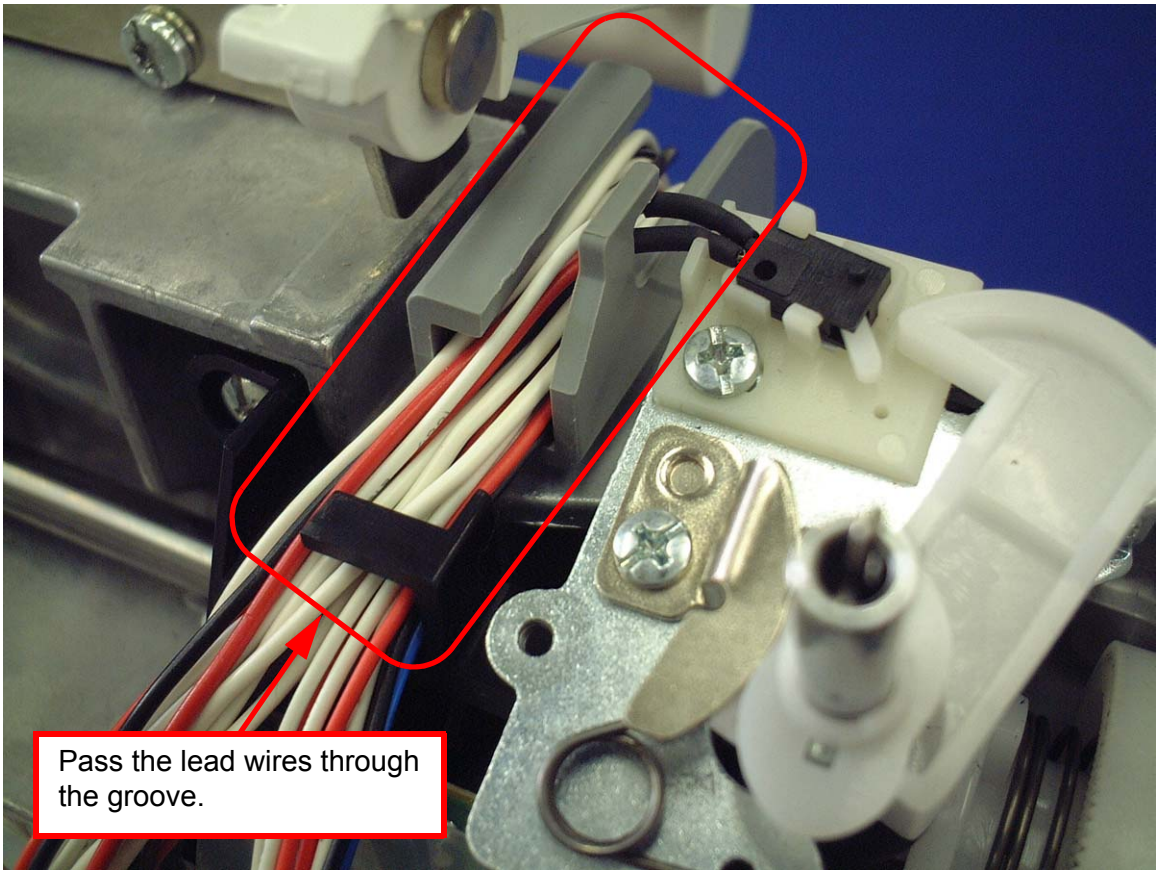
1. Wiring on front side of thred cutter module



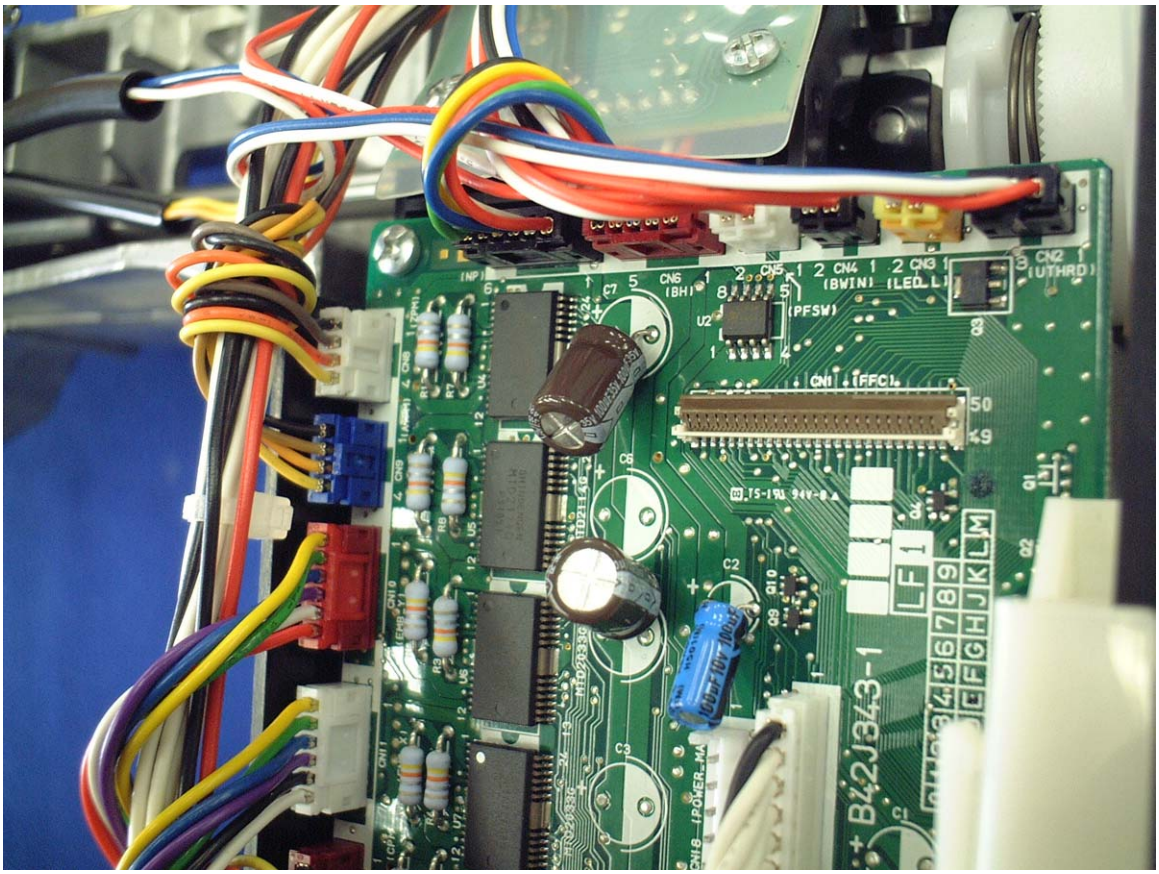
1. Wiring on front side of rotary hook module



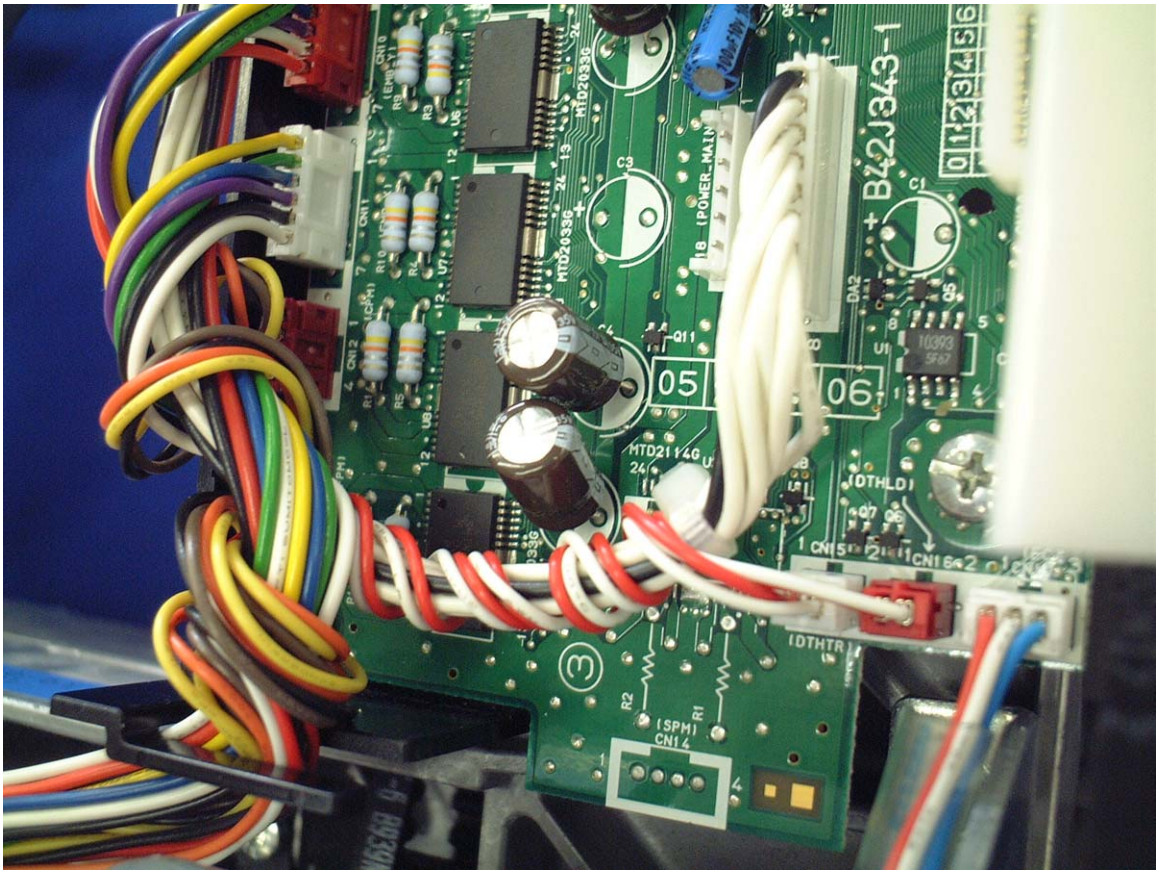
1. Wiring at top side of motor PCB



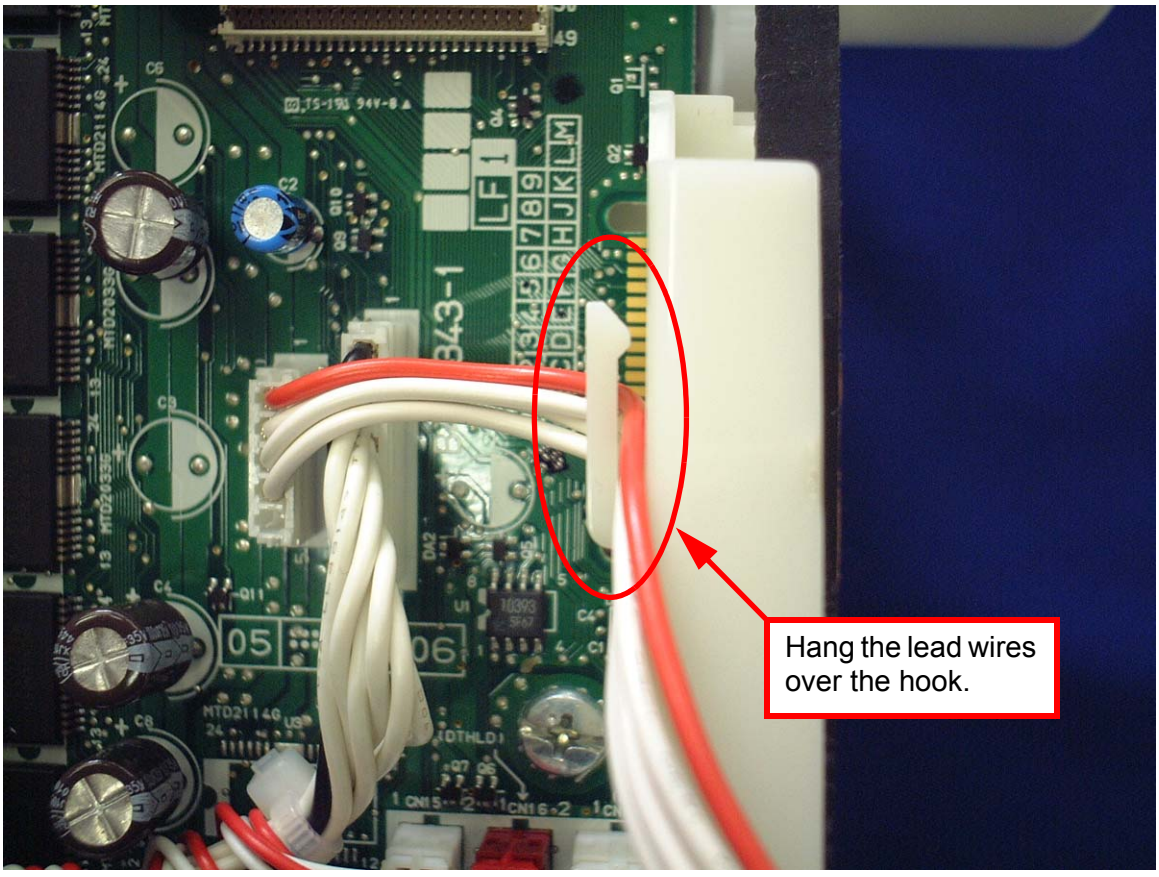
2. Wiring at upper section of motor PCB



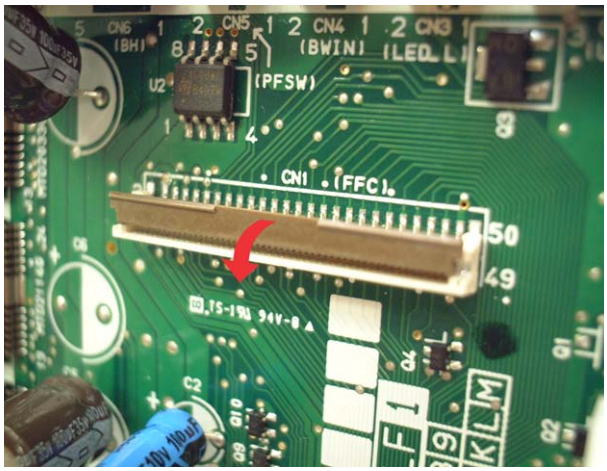
3. Wiring at lower section of motor PCB



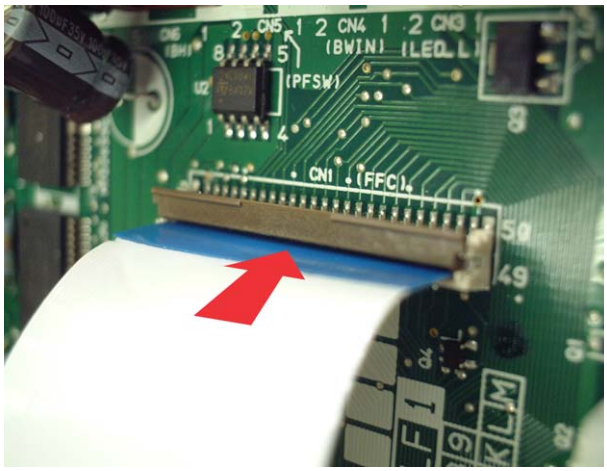
4. Wiring at middle section of motor PCB (Connecting the lead wire from front cover assembly)



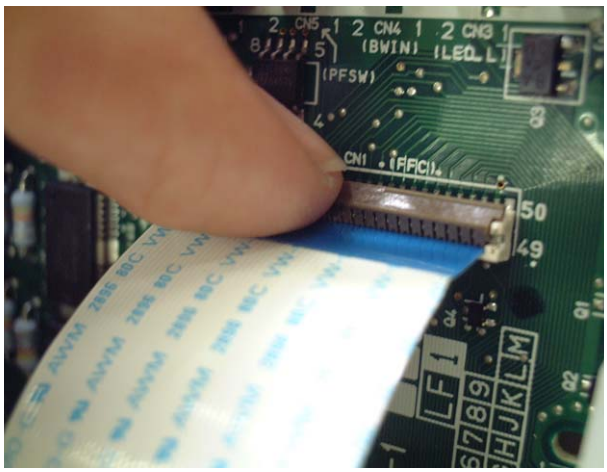
5. Wiring at middle section of motor PCB (Connecting the FFC from front cover assembly)



1. Raise the flap of the connector.

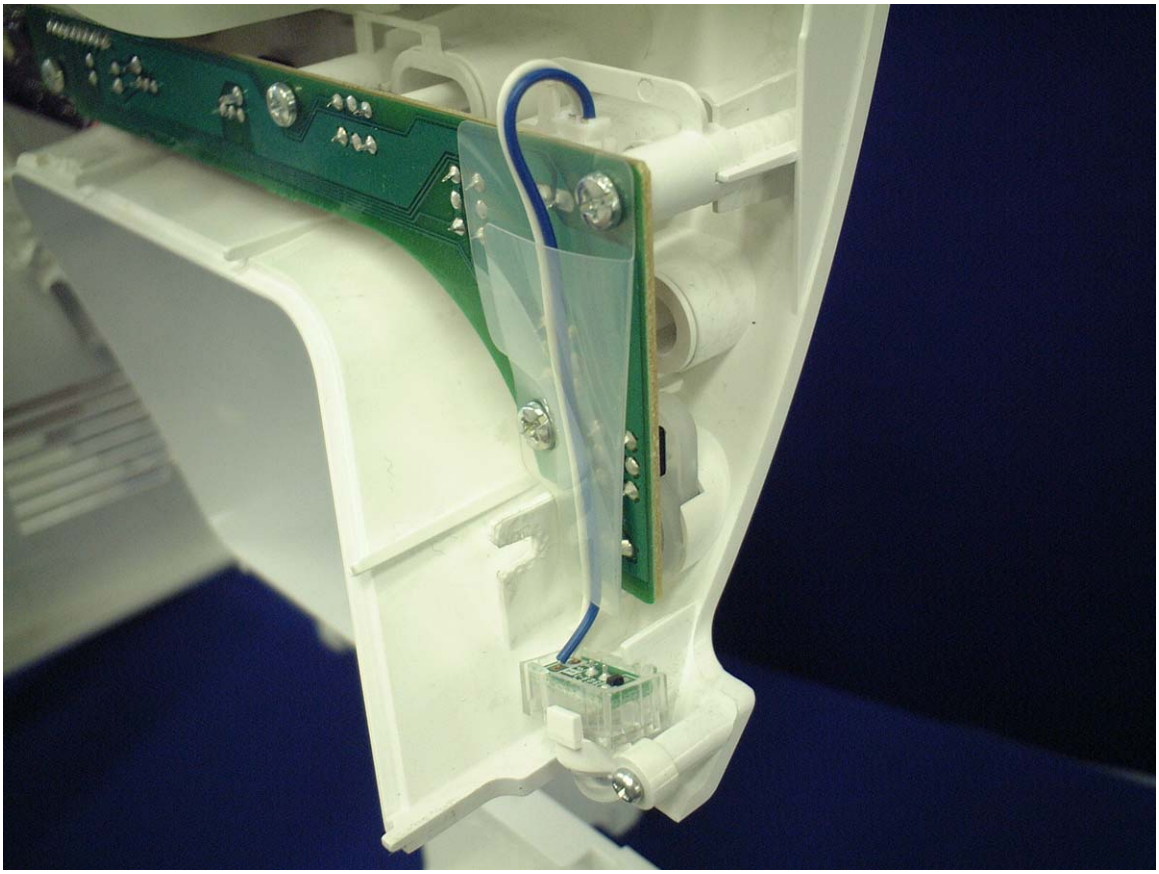


2. Insert the FFC in the connector.

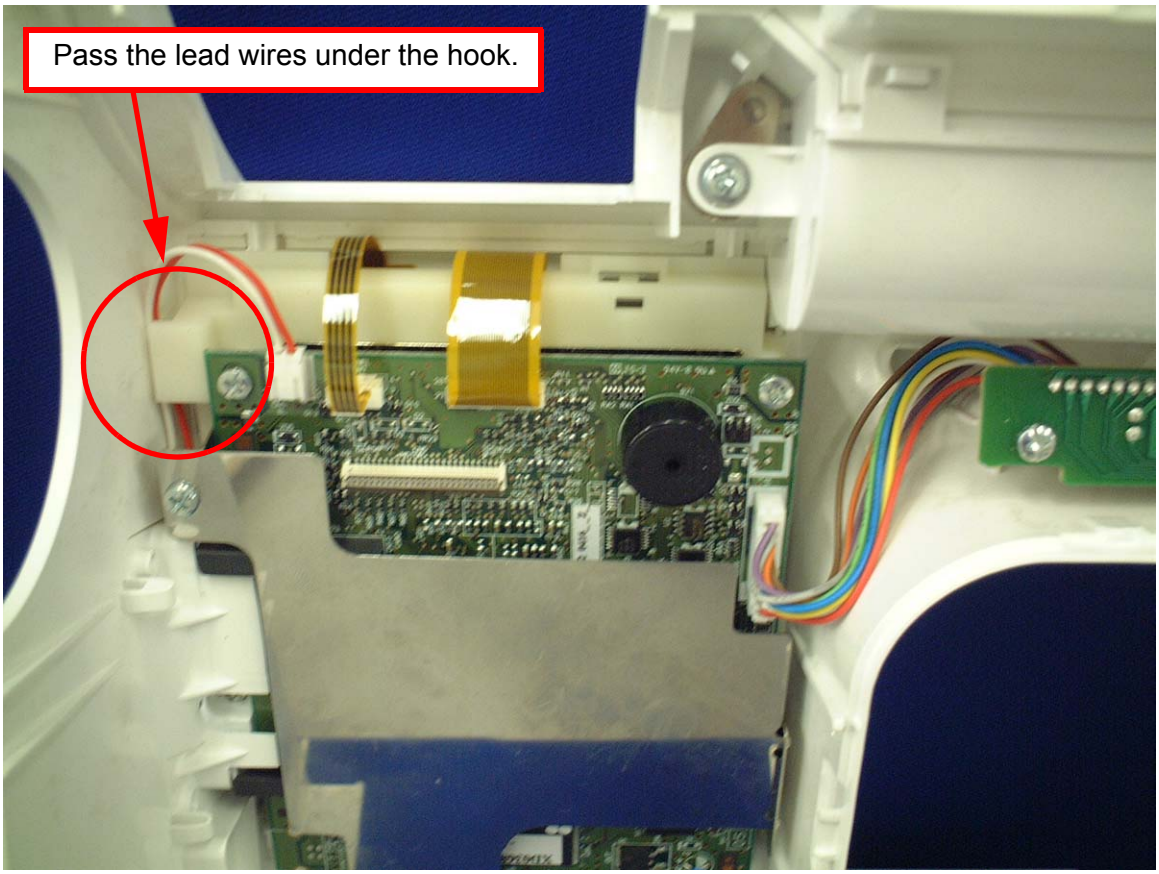


3. Push down the flap of the connector.

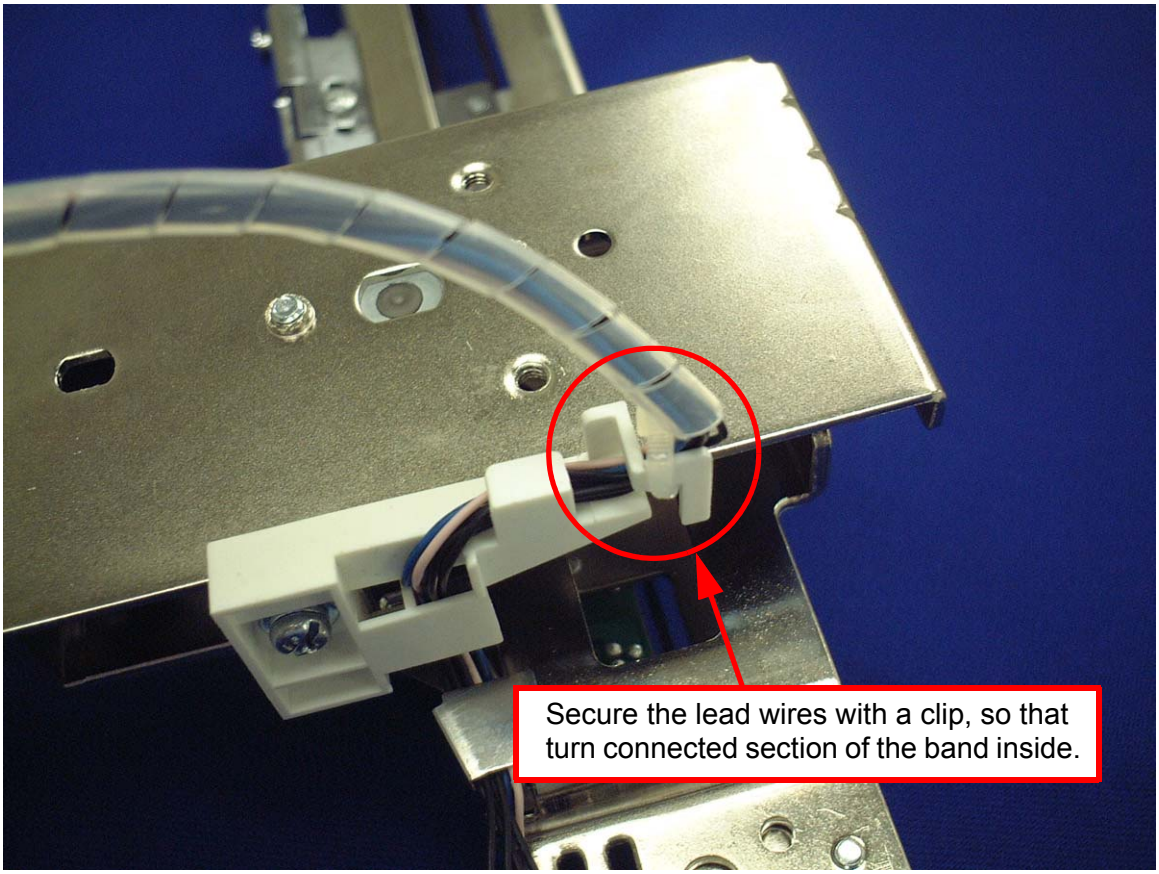
1. Wiring of LED lamp assembly

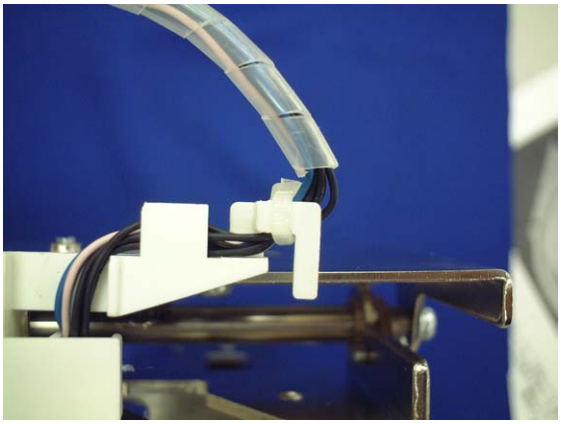


2. Wiring of main PCB assembly

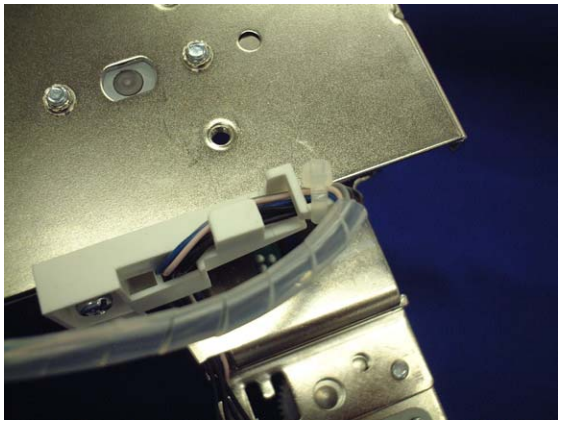


1. Wiring of X slider assembly



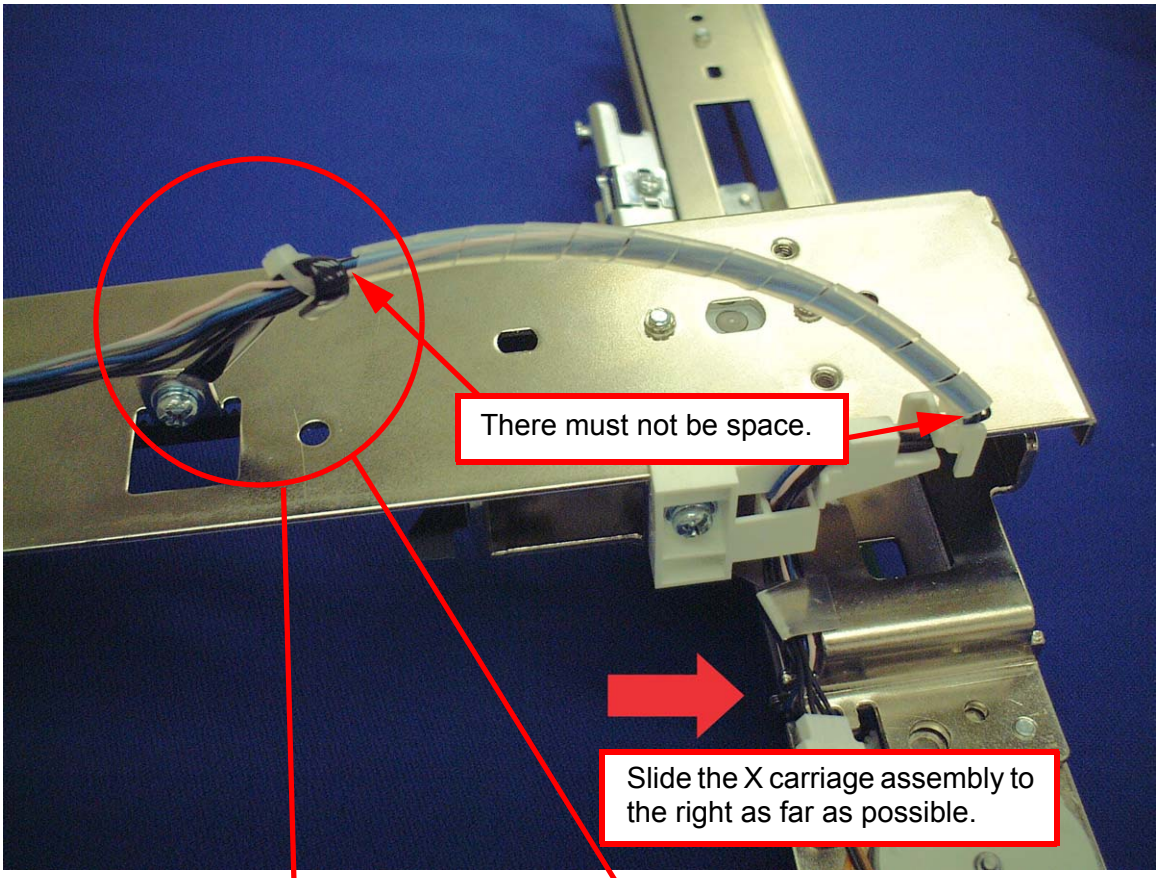


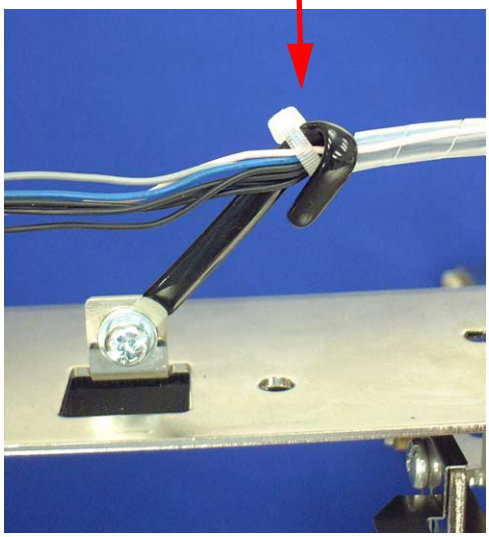
Front side view



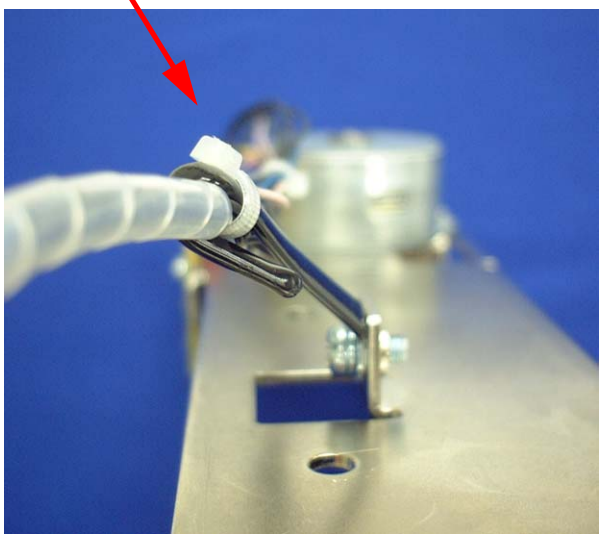
Upper side view

2-1. Wiring on lower side of embroidary driving assembly



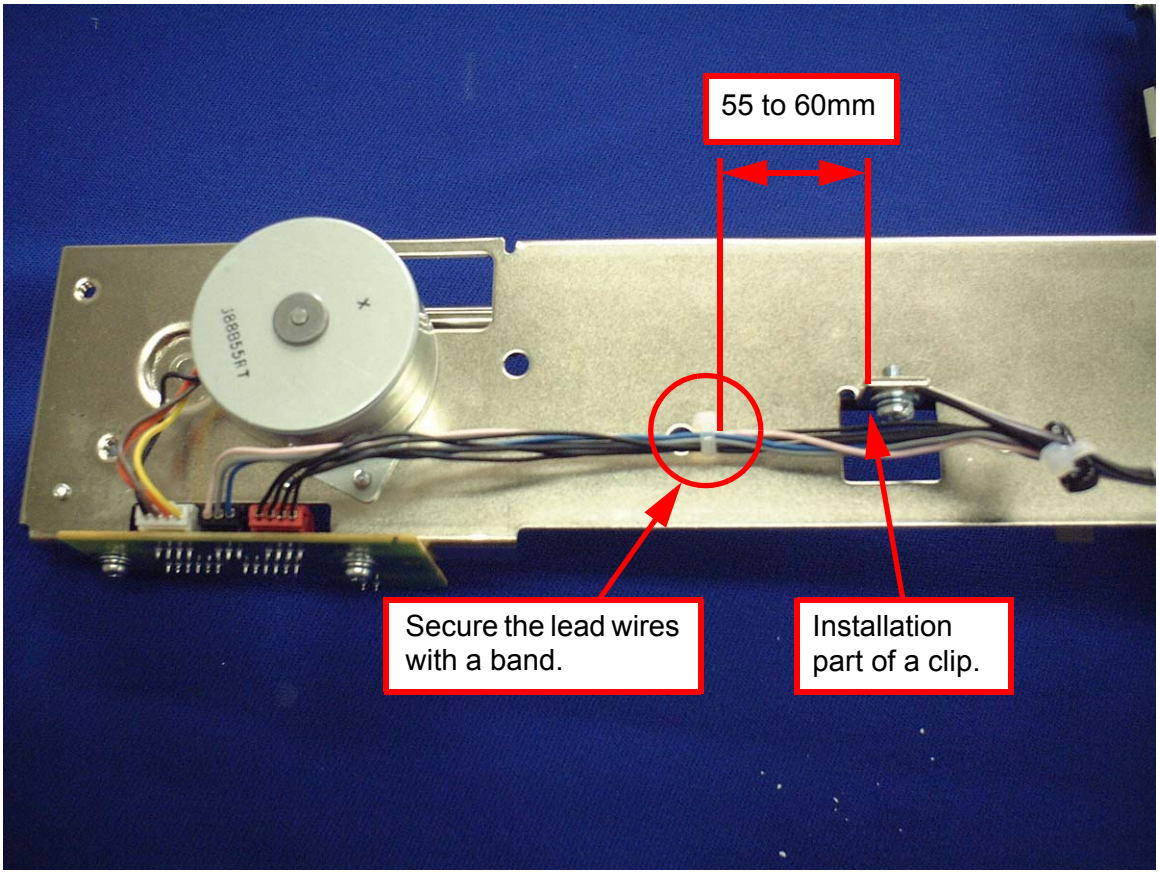


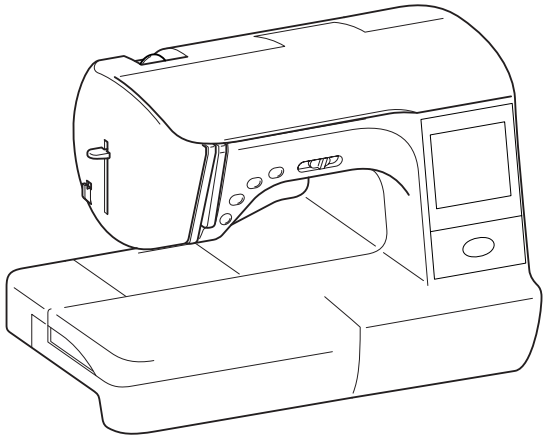
Front side view



Right side view

2-2. Wiring on lower side of embroidary driving assembly





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