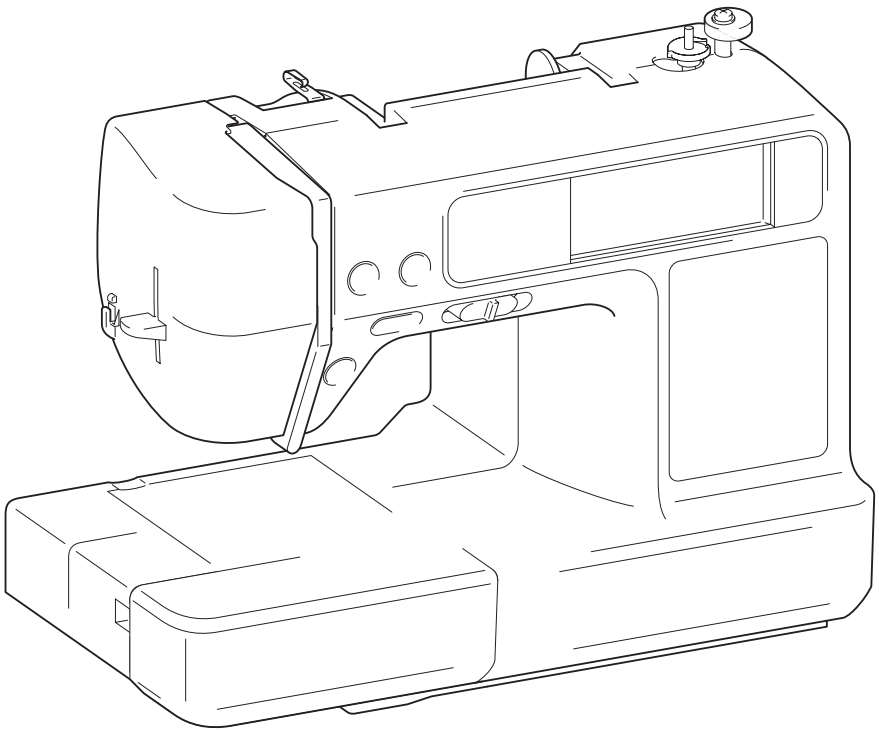
brother

SERVICE MANUAL FOR COMPUTERIZED SEWING MACHINE



NV950D/NV950/NV955
NV980

CONFIDENTIAL

3.2010
11.2012

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.

Brother Industries, Ltd.
Nagoya, Japan

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.

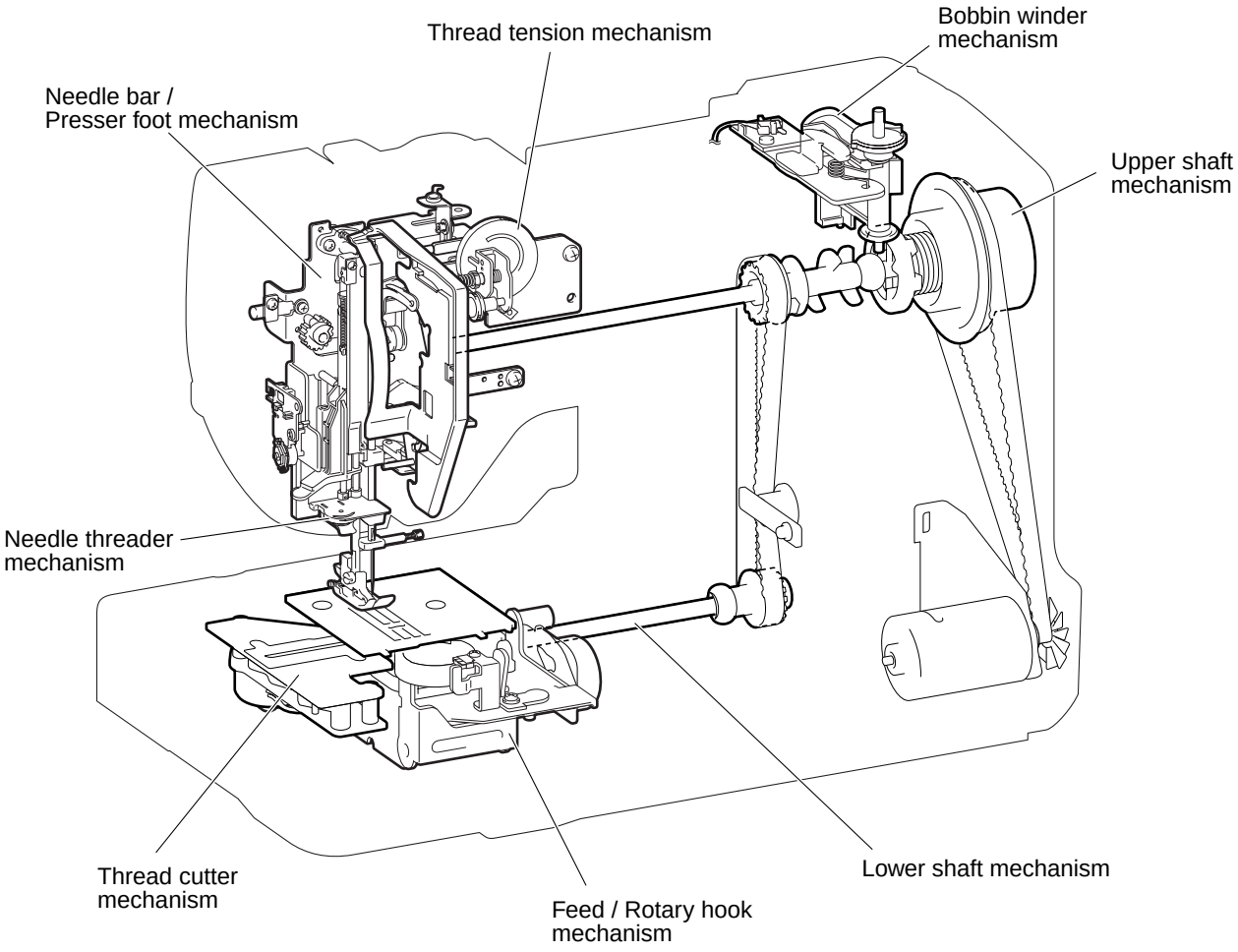
LIST of UPDATE RECORD

Date	Added Models	Contents
6.2010	NV950	–
5.2012	–	Added 5-28, 29
6.2012	NV955	–
11.2012	NV980	–

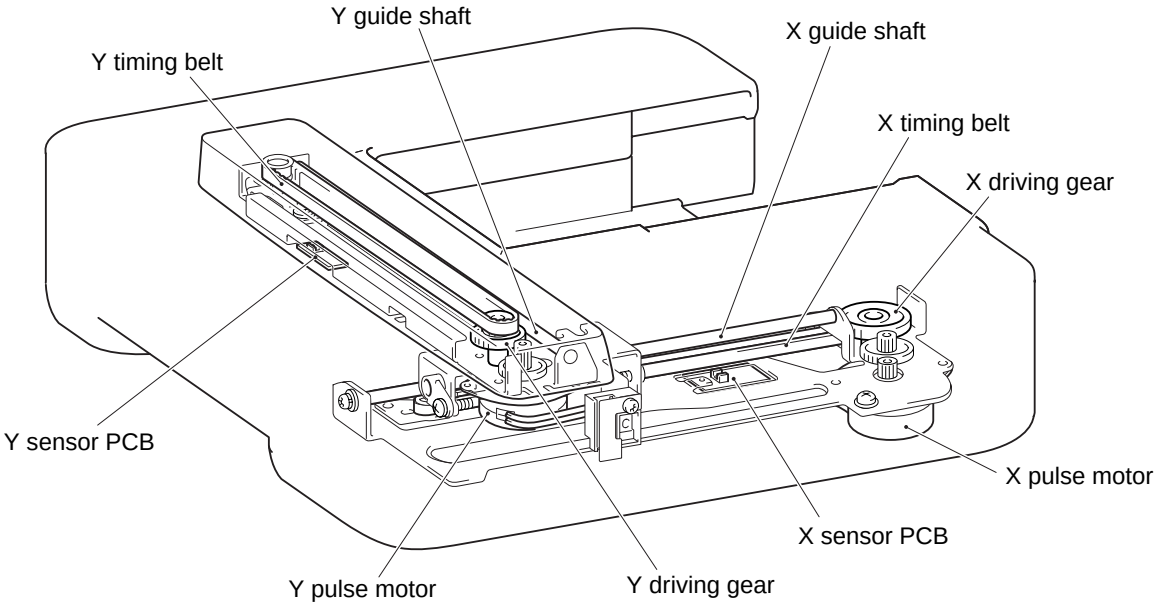
1 Outline of Mechanism

Outline of Mechanism

Sewing machine

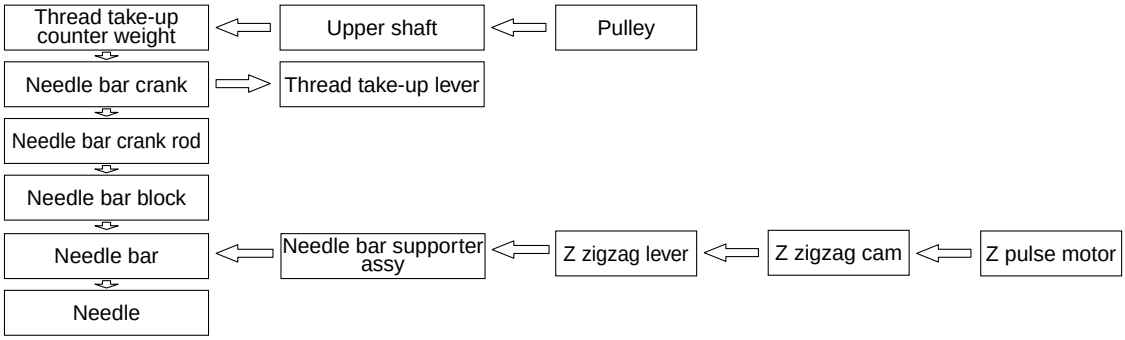


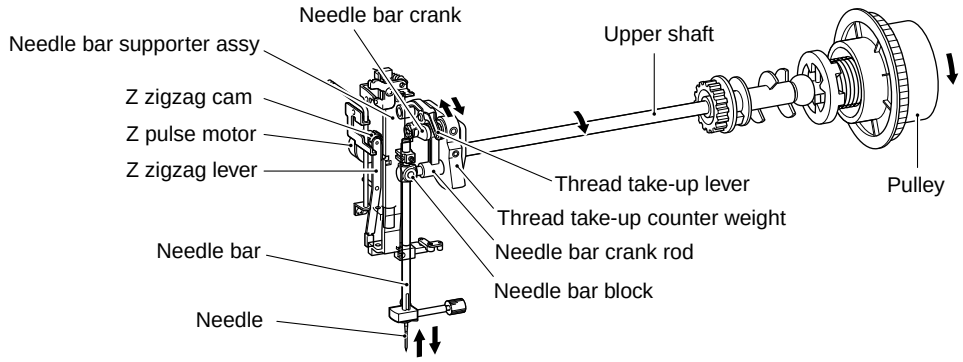
Embroidery unit



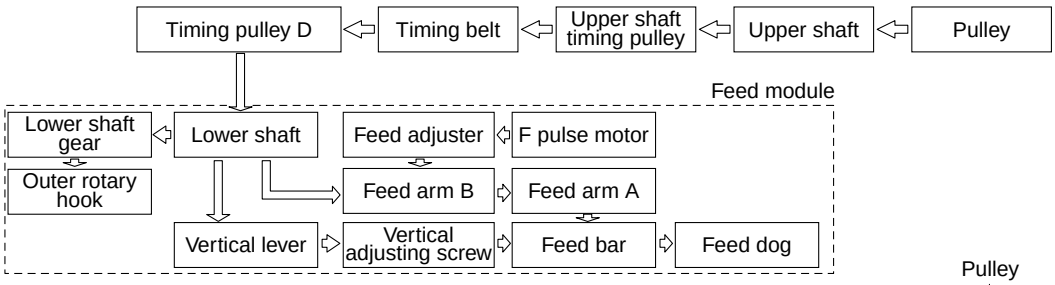
Outline of Mechanism

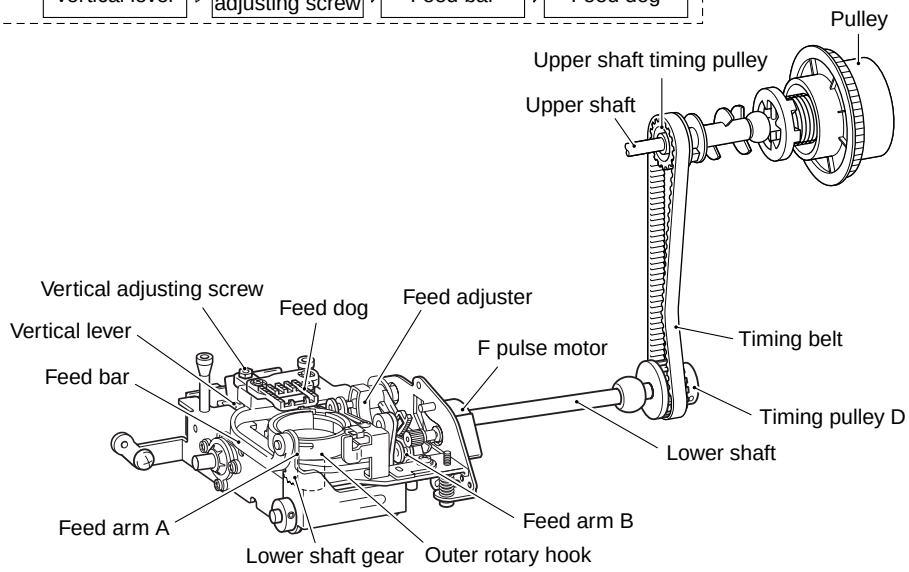
A) Up and down movement of needle bar, movement of thread take-up lever and zigzag movement of needle bar mechanism



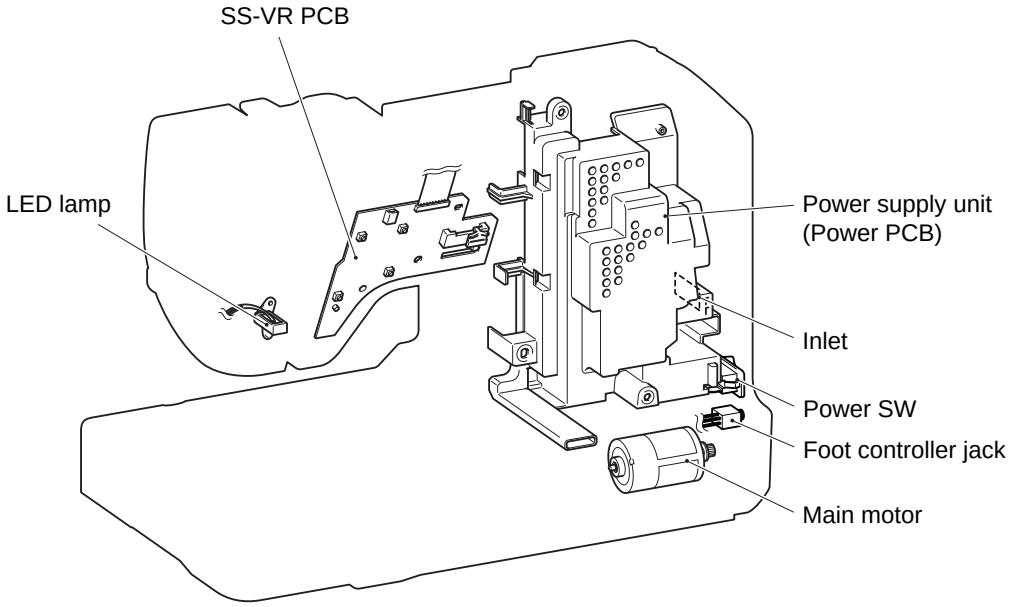


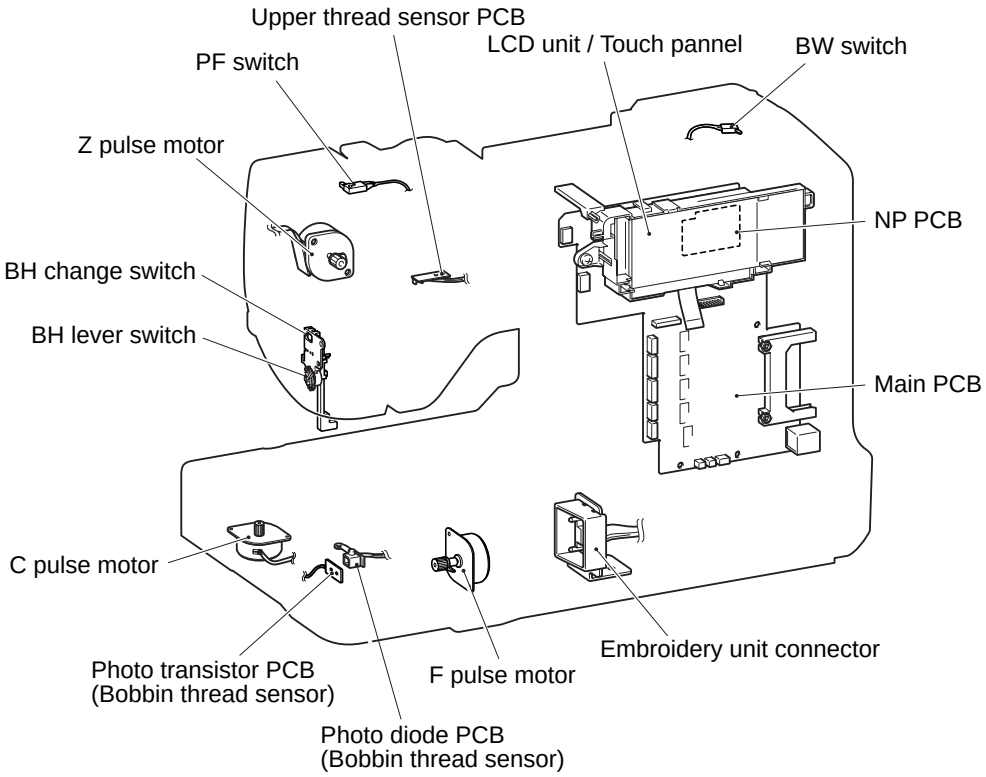
B) Movement of feed dog and rotary hook

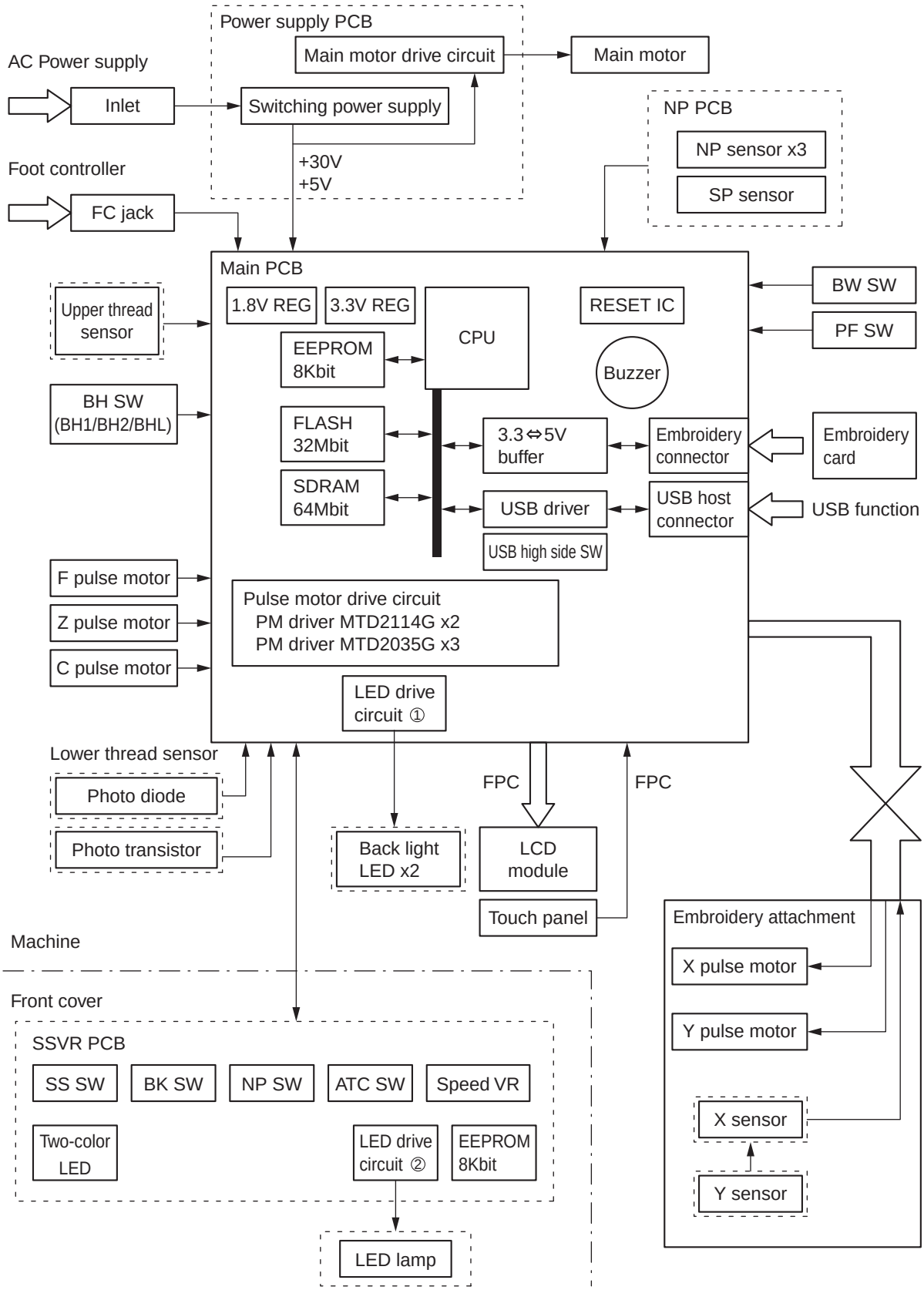




Outline of Mechanism



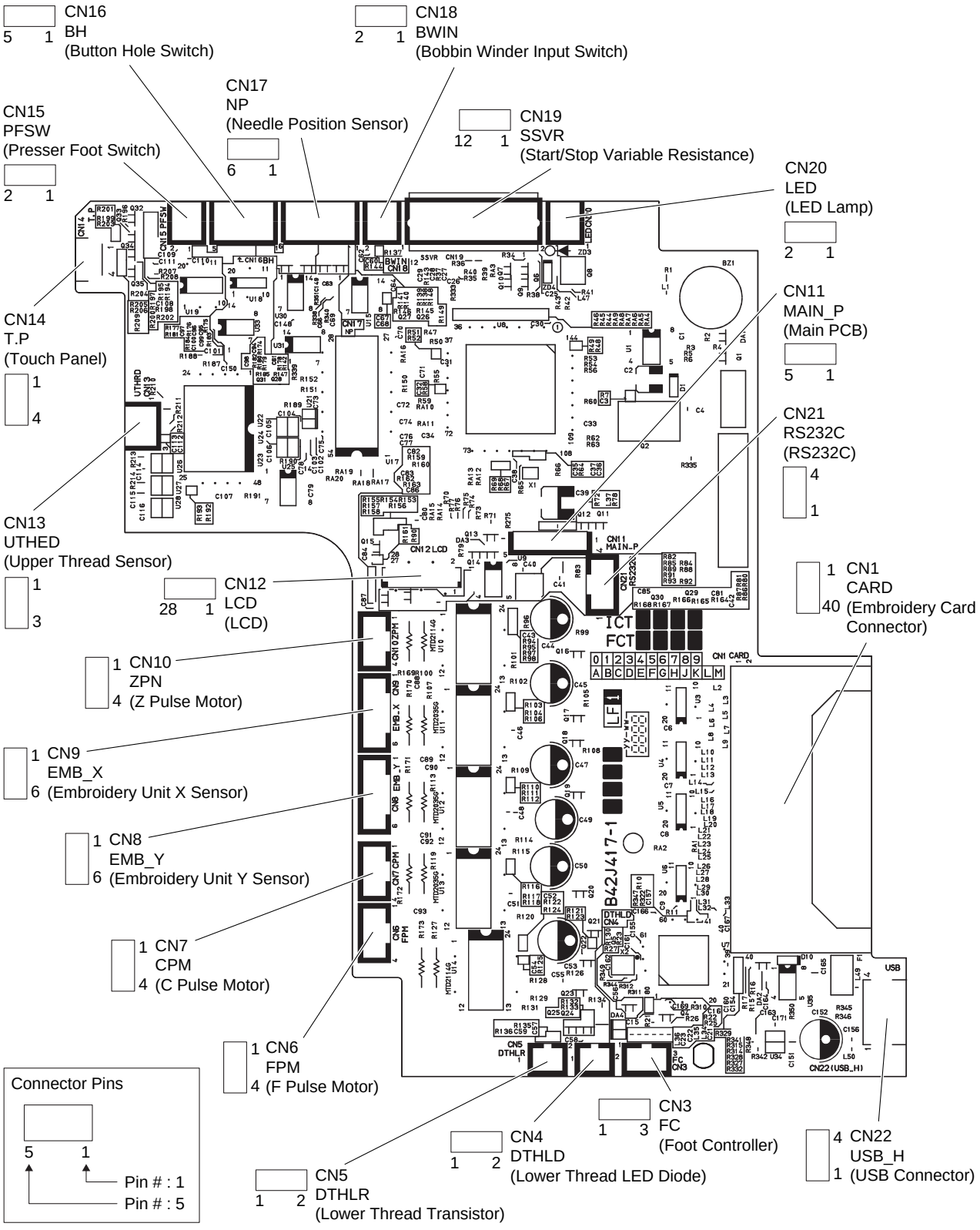



Power supply PCB
Main motor drive circuit
Main motor
AC Power supply
Inlet
Switching power supply
NP PCB
NP sensor x3
SP sensor
+30V
+5V
Foot controller
FC jack
Main PCB
Upper thread sensor
1.8V REG
3.3V REG
CPU
RESET IC
BW SW
PF SW
EEPROM 8Kbit
Buzzer
BH SW (BH1/BH2/BHL)
FLASH 32Mbit
3.3⇔5V buffer
Embroidery connector
Embroidery card
SDRAM 64Mbit
USB driver
USB host connector
USB function
USB high side SW
F pulse motor
Z pulse motor
C pulse motor
Pulse motor drive circuit
PM driver MTD2114G x2
PM driver MTD2035G x3
LED drive circuit ①
Lower thread sensor
Photo diode
Photo transistor
FPC
FPC
Back light LED x2
LCD module
Touch panel
Embroidery attachment
X pulse motor
Y pulse motor
X sensor
Y sensor
Machine
Front cover
SSVR PCB
SS SW
BK SW
NP SW
ATC SW
Speed VR
Two-color LED
LED drive circuit ②
EEPROM 8Kbit
LED lamp

Outline of Mechanism

The illustration below shows layout for Printed Board connectors.

■ Main P.C.B.



Outline of Mechanism

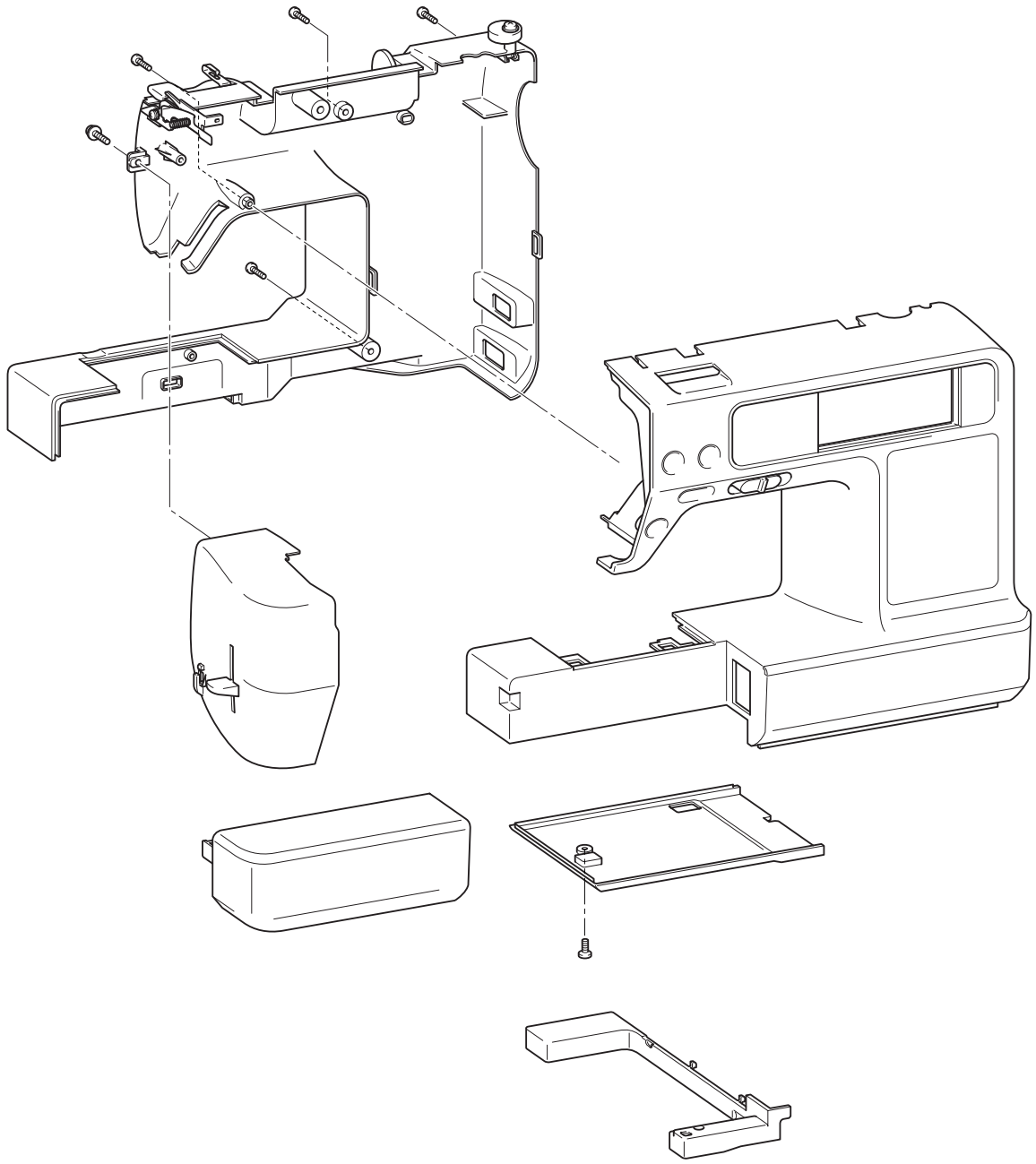
Start/Stop (SS) button	Button for starting and stopping the sewing machine. The machine operates at a slow speed while the button is being held down.
Reverse/Reinforcement stitch button	This button is for reverse stitching or ending a seam. If the button is pushed, it makes three to four stitches in 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.
Operation panel keys	Input for pattern selection and conditions necessary for sewing.
Speed control lever	This lever controls the speed of sewing.
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.
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 operation for selecting the desired pattern and number.
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 optical 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.
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 lamp for illuminating the work space.
Upper thread sensor	Detects the presence or absence of the upper thread and whether it is cut or not.
Photo diode, photo transistor	These sensors detect the bobbin thread is low.
X sensor, Y sensor (Embroidery unit)	These sensors detect the initial position of X pulse motor and Y pulse motor.

2 Basic of Disassembly/Assembly

When repair and replace the part of the unit, refer to “CHAPTER 3: Application of Disassembly/assembly”.

Basic

Main frame/Covers location diagram



Basic

1 Removal of Accessory table assy

1. Remove the accessory table assy ①.

2 Removal of Face plate assy

1. Remove the screw ❶, and then remove the face plate assy ①.

→Refer to 3 - 3 of the Disassembly.

3 Removal of Needle plate B assy

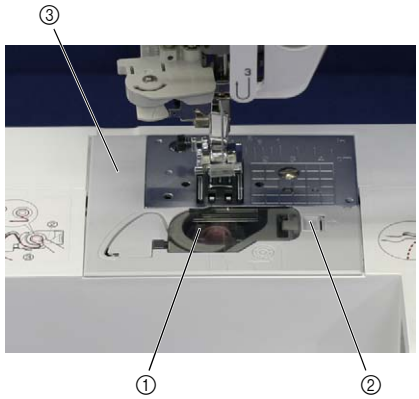
1. Remove the needle plate cover ①.

***Key point**

- Slide the slide button ②, and then remove it.

2. Remove the needle plate B assy ③.

→Refer to 3 - 3 of the Disassembly.

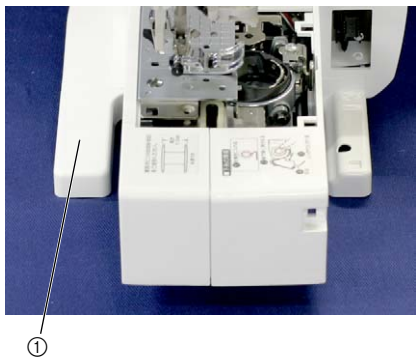


4 Removal of Bottom cover

1. Remove the screw ❶, and then remove the bottom cover ① from the arm bed.

5 Removal of Base foot cover

1. Remove the base foot cover ① from the base plate.



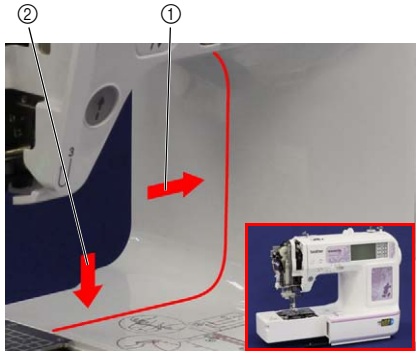
Basic

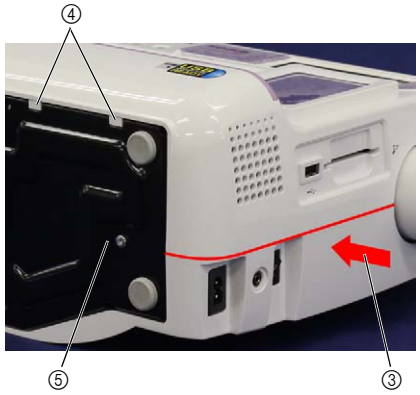
6 Removal of Front cover assy

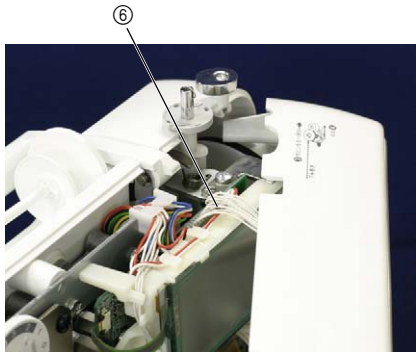
1. Remove the 2 screws ❶ and the 2 screws ❷.
2. Remove the hooks (2 locations) of the front cover assy while pushing the part which showed with the arrows of the ①, ② of the side of the rear cover. And then remove the hook of the front cover assy while pushing the part which showed with arrow of the ③ of the side of the rear cover.

   ***Key point**
   - Be careful not to damage the hooks.
3. Remove the hook ④ (2 locations) of the bottom side of the front cover assy from the base plate ⑤.
4. Remove the connector ⑥ from the main PCB assy, and then remove the front cover assy.

→Refer to 3 - 4 of the Disassembly.







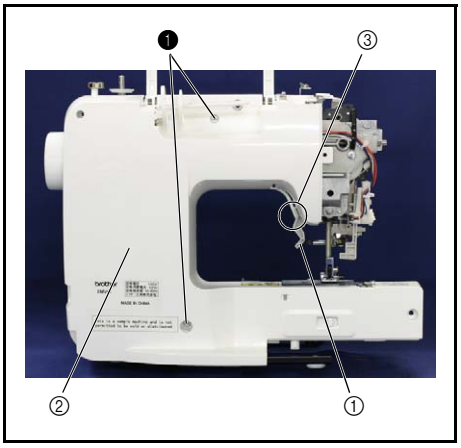
7 Removal of Rear cover

1. Remove the 2 screws ❶.
2. Lower the presser foot lifter ①.
3. Remove the rear cover ② from the arm bed.

***Key point**

- Check that the section ③ get over the presser foot lifter ①.

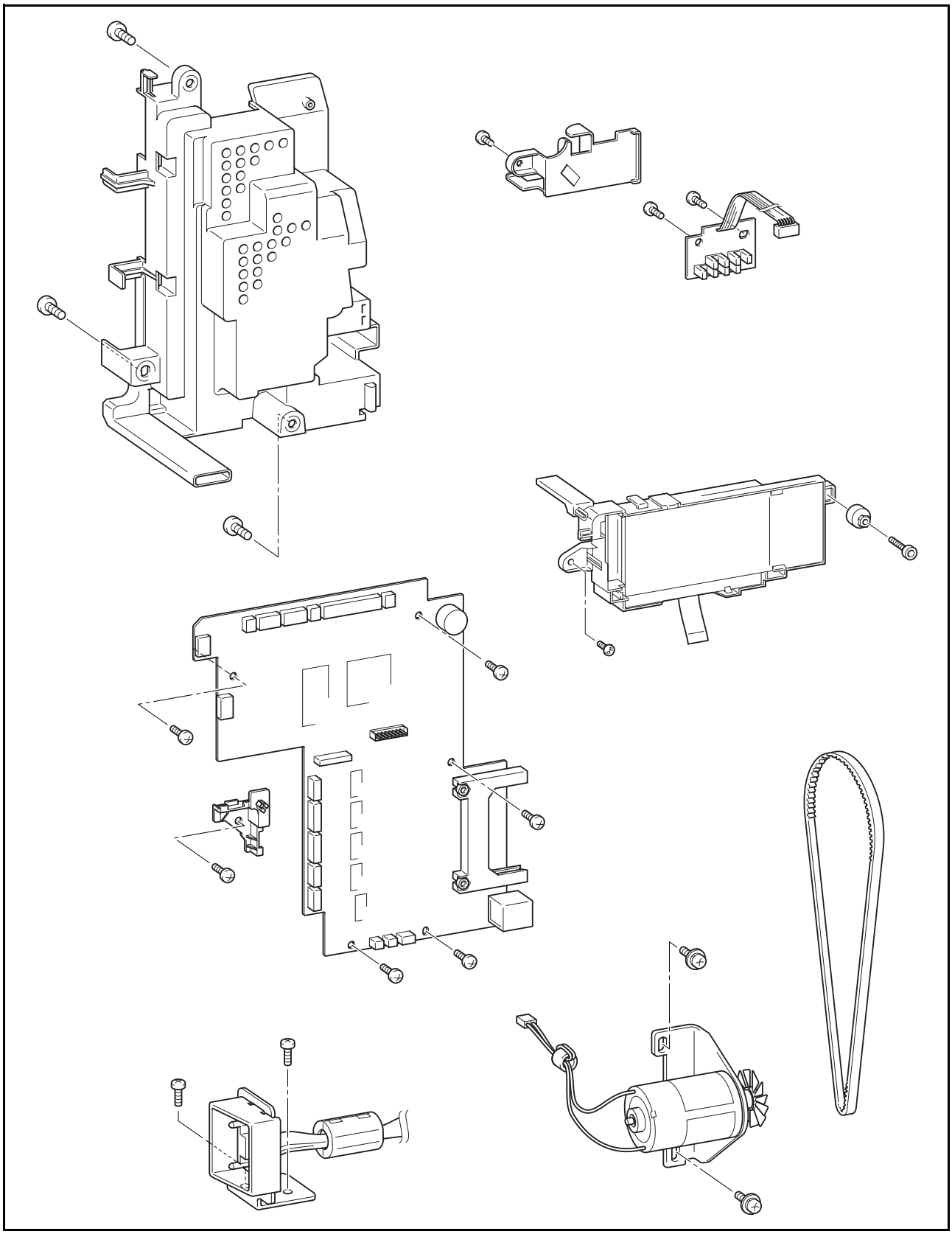
→**Refer to 3 - 7 of the Disassembly.**



Basic

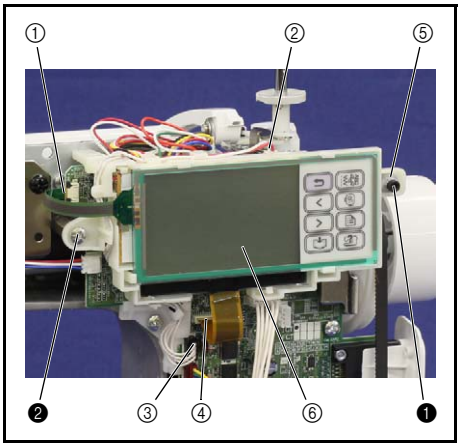
Basic

Electrical parts and main motor unit location diagram



Basic

1 Removal of LCD unit



1. Remove the FFC ① of the touch panel assy from the main PCB assy.

   ***Key point**
   - Release the lock of the main PCB assy.

2. Remove the connector ② of the back light PCB assy from the main PCB assy.

   ***Key point**
   - Remove the lead wire of the back light PCB assy from the guide part of the light plate assy.

3. Remove the connector ③ of the ZPM lead wire and the FFC ④ of the LCD supply assy from the main PCB assy.

   ***Key point**
   - Remove the ZPM lead wire from the guide part of the LCD supporter and LCD supply assy.

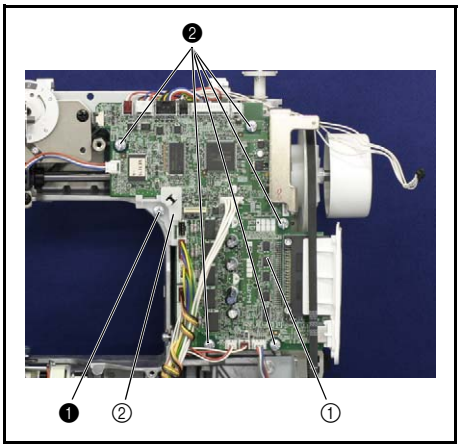
4. Remove the screw ❶, and then remove the zigzag adjusting nut ⑤.

   ***Key point**
   - The adjustment of the position of the LCD unit ⑥ is easy when add the mach mark to the zigzag adjusting nut ⑤ and the light plate assy with the pencils when re-assembly it before remove the screw ❶.

5. Remove the screw ❷, and then remove the LCD unit ⑥ from the arm bed.

→**Refer to 3 - 13 of the Disassembly.**

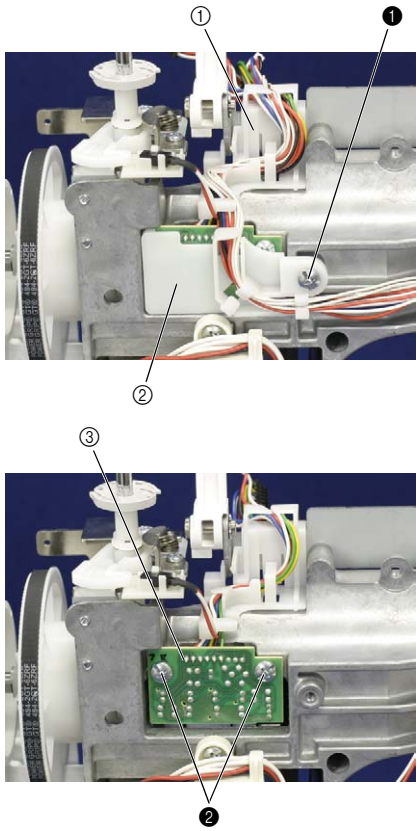
2 Removal of Main PCB assy



1. Remove the all connectors from the main PCB assy ①.
2. Remove the screw ❶, and then remove the supporter main PCB ② from the arm bed.
3. Remove the 5 screws ❷, and then remove the main PCB assy ① from the arm bed.

3 Removal of NP PCB assy

1. Remove the all lead wires from the cord guide ① and the cord guide A ②.
2. Remove the screw ❶, and then remove the cord guide A ② from the arm bed.
3. Remove the 2 screws ❷, and then remove the NP PCB assy ③ from the arm bed.

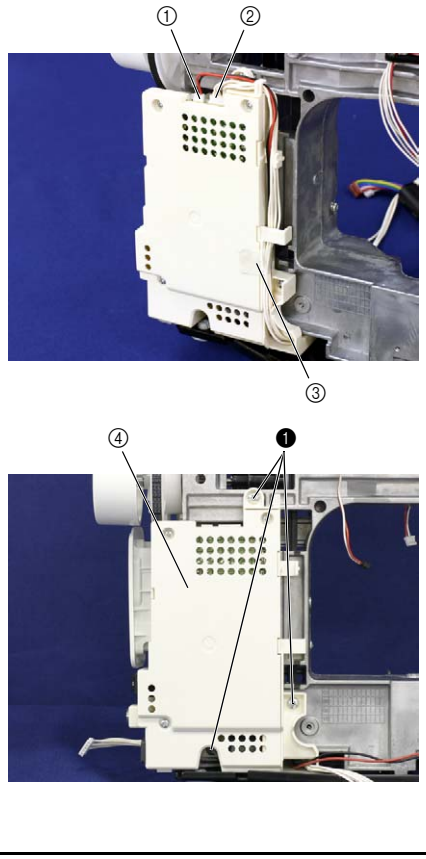


4 Removal of Power supply unit

1. Remove the main motor sub assy lead wire connector ① and the power lead wire assy connector ② from the power PCB supply assy.
2. Remove the fixed tape ③ from the insulation cover.

   ***Key point**
   - Remove the each lead wire from the guide part of the insulation cover.
3. Remove the 3 screws ❶, and then remove the power supply unit ④ from the arm bed.

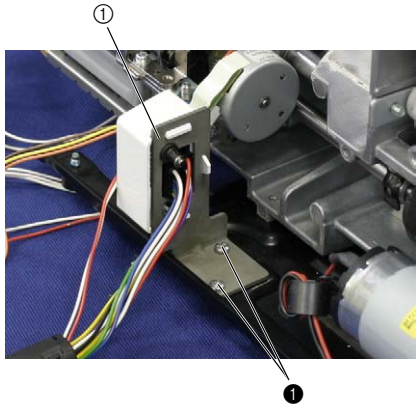
→Refer to 3 - 14 of the Disassembly.



5 Removal of Embroidery connector assy

1. Remove the 2 screws ❶, and then remove the embroidery connector assy ① from the base plate.

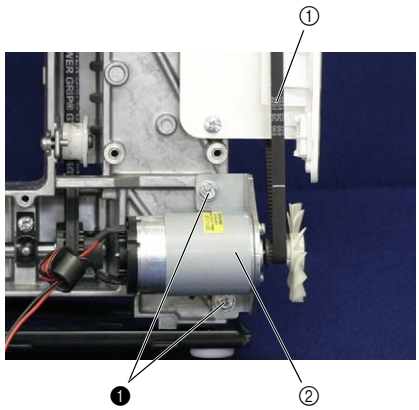
→**Refer to 3 - 16 of the Disassembly.**



6 Removal of Main motor sub assy

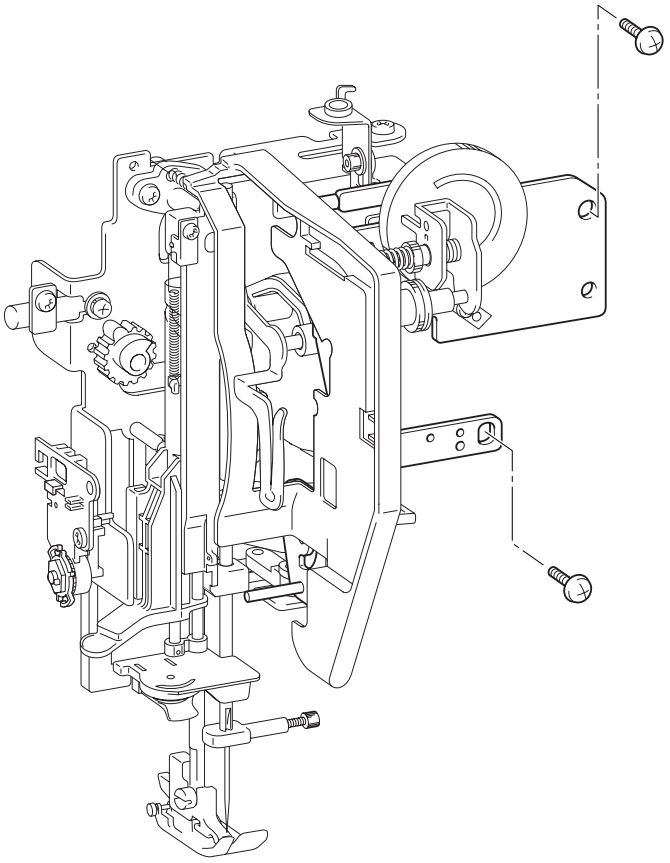
1. Remove the T belt ①.
2. Remove the 2 screws ❶, and then remove the main motor sub assy ② from the arm bed.

→**Refer to 3 - 16 of the Disassembly.**



Basic

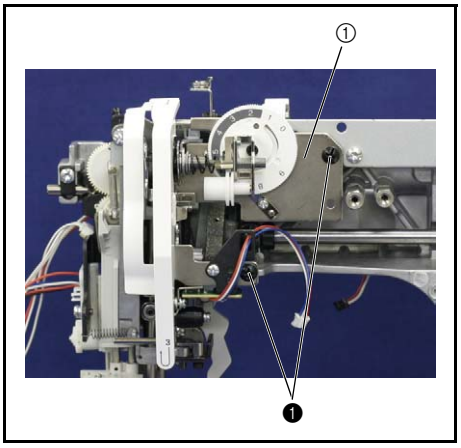
Thread tension mechanism location diagram



1 Removal of Thread unit

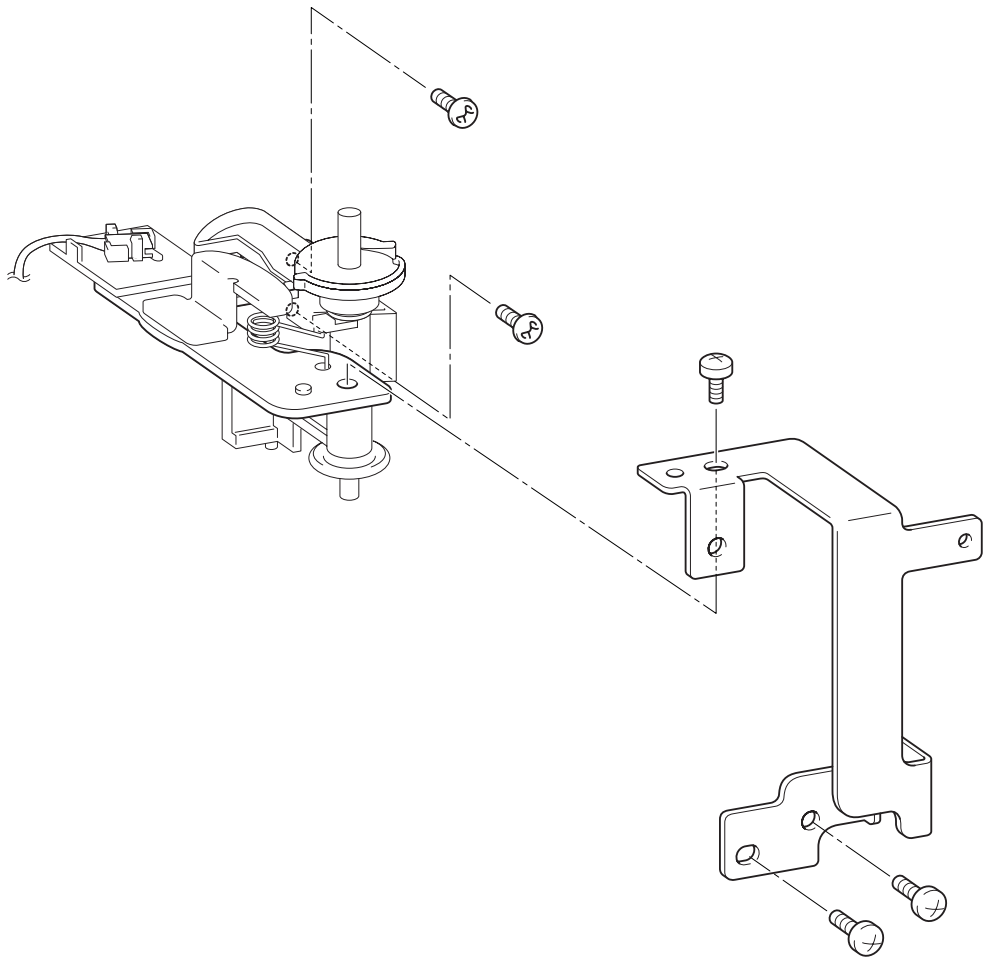
1. Remove the 2 screws ❶, and then remove the thread unit ① from the arm bed.

→**Refer to 3 - 17 of the Disassembly.**



Basic

Bobbin winder mechanism location diagram

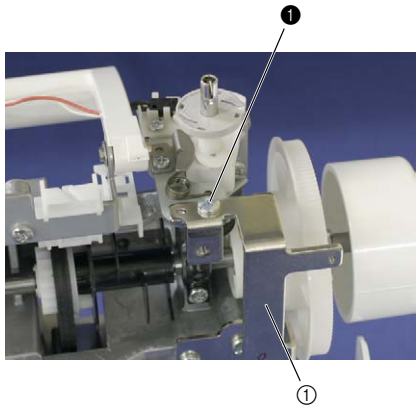


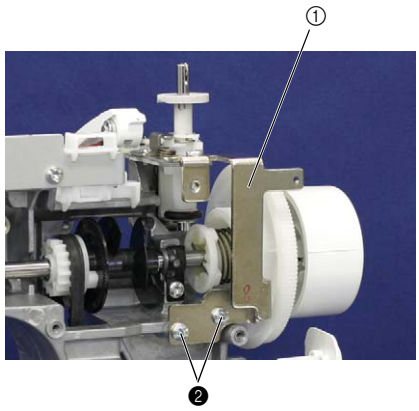
Basic

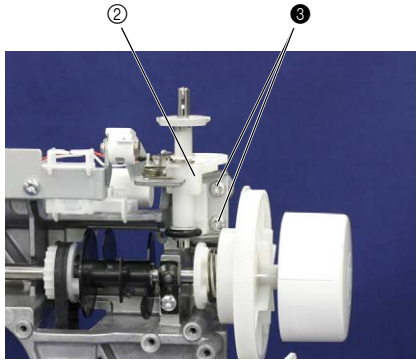
1 Removal of Bobbin winder assy

1. Remove the screw ❶ and the 2 screws ❷, and then remove the LCD supporter ① from the arm bed.
2. Remove the 2 screws ❸, and then remove the bobbin winder assy ② from the arm bed.

→Refer to 3 - 22 of the Disassembly.



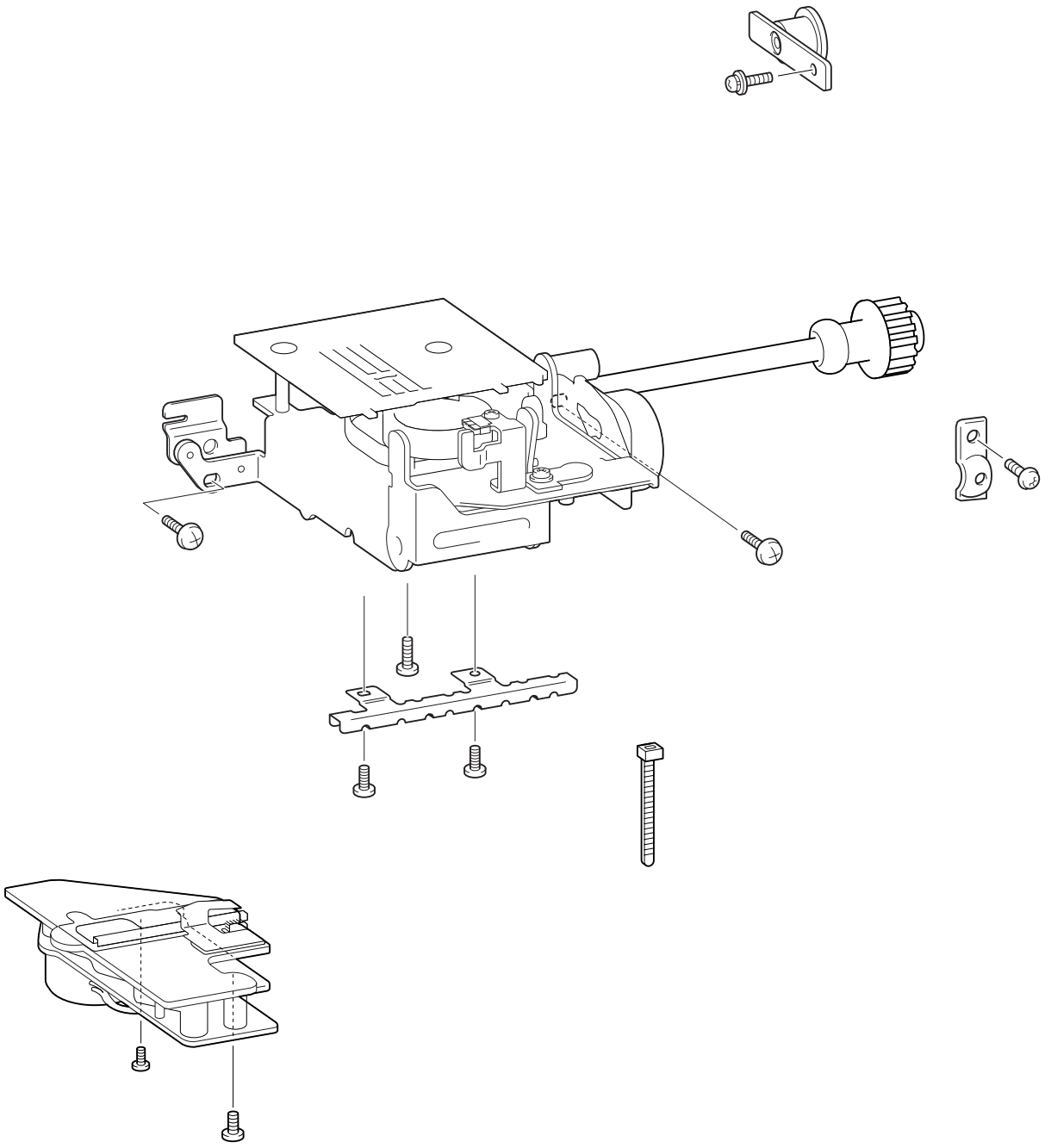




Basic

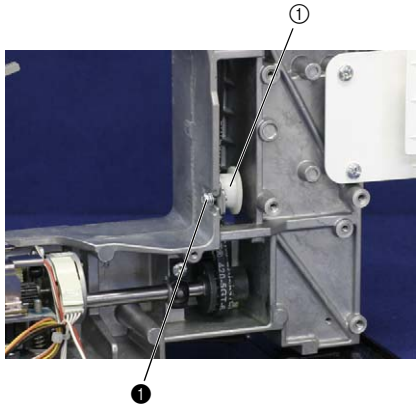
Basic

Feed/Rotary hook unit and Thread cutter unit location diagram



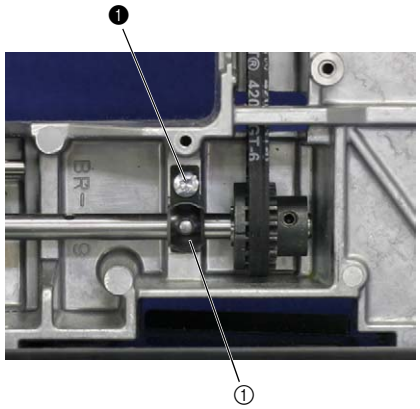
1 Removal of Tension pulley assy

1. Remove the screw ❶, and then remove the tension pulley assy ① from the arm bed.



2 Removal of Bushing presser (for lower shaft)

1. Remove the screw ❶, and then remove the bushing presser ① from the arm bed.



Basic

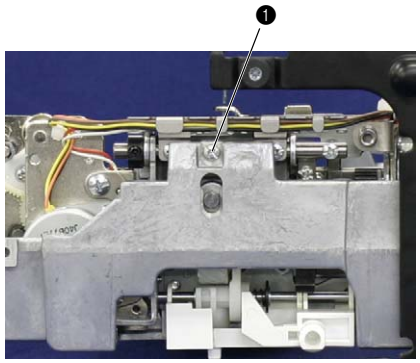
3 Removal of Feed/rotary hook module

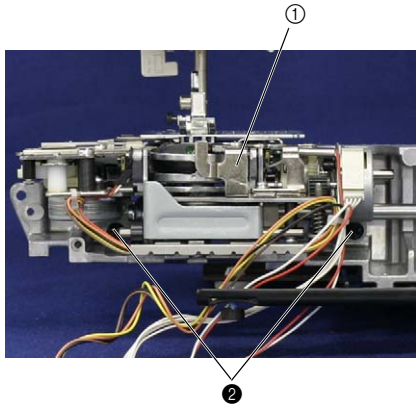
1. Remove the screw ❶ and the 2 screws ❷, and then remove the feed/rotary hook module ① from the arm bed.

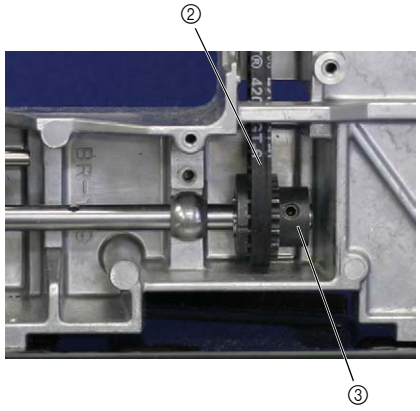
***Key point**

- Remove the T belt ② from the timing pulley D ③.

→Refer to 3 - 35 of the Disassembly.





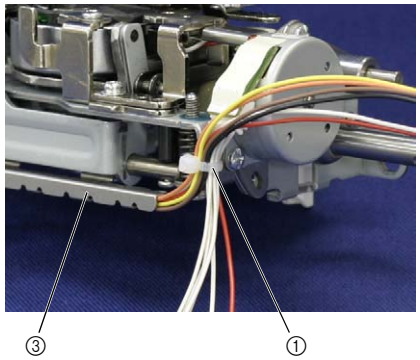


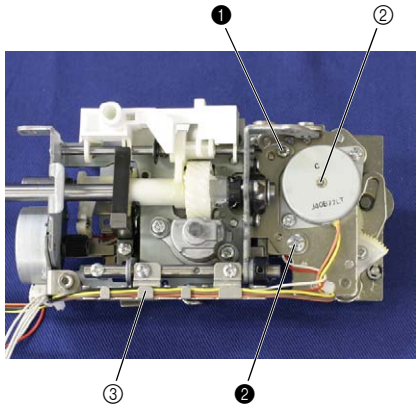
Basic

4 Removal of Thread cutter module

1. Cut the band ①.
2. Remove the lead wire of the thread cutter module ② from the lead wire guide holder ③.
3. Remove the screw ❶ and ❷, and then remove the thread cutter module ② from the feed/rotary hook module.

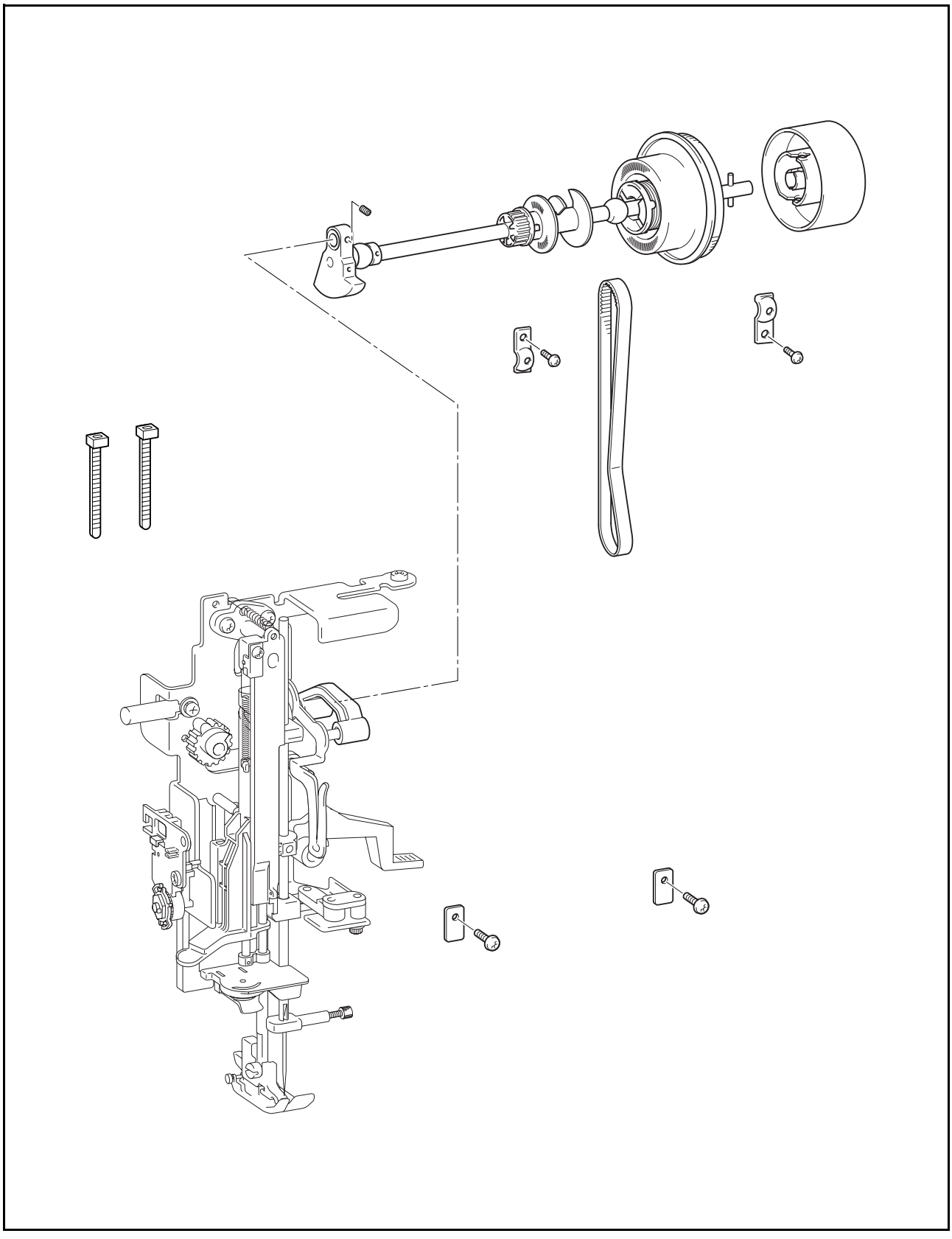
→Refer to 3 - 47 of the Disassembly.





Basic

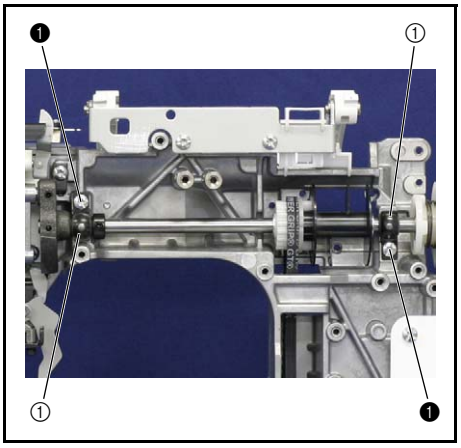
Needle bar/Presser foot unit and Upper shaft mechanism location diagram



Basic

1 Removal of Bushing presser (for upper shaft)

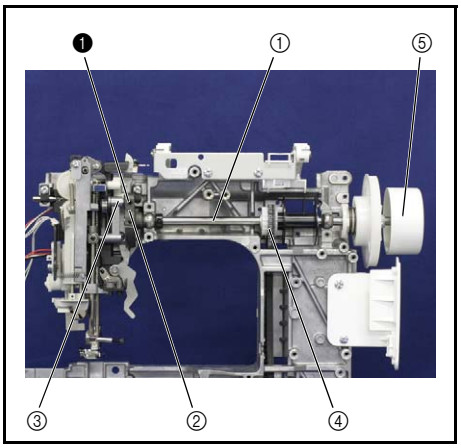
1. Remove the 2 screws ❶, and then remove the 2 bushing pressers ① from the arm bed.



2 Removal of Upper shaft assy

1. Remove the screw ❶, and then remove the upper shaft assy ① from the arm bed.

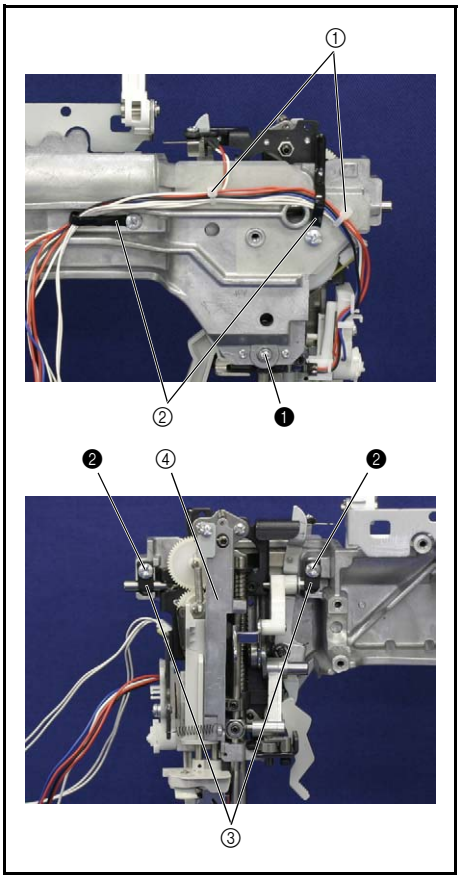
   ***Key point**
   - Remove the thread take-up counter weight ② from the needle bar crank rod assy ③.
2. Remove the T belt ④ from the upper shaft assy ①.
3. Remove the pulley ⑤ from the upper shaft assy ①.



3 Removal of Needle bar, presser module

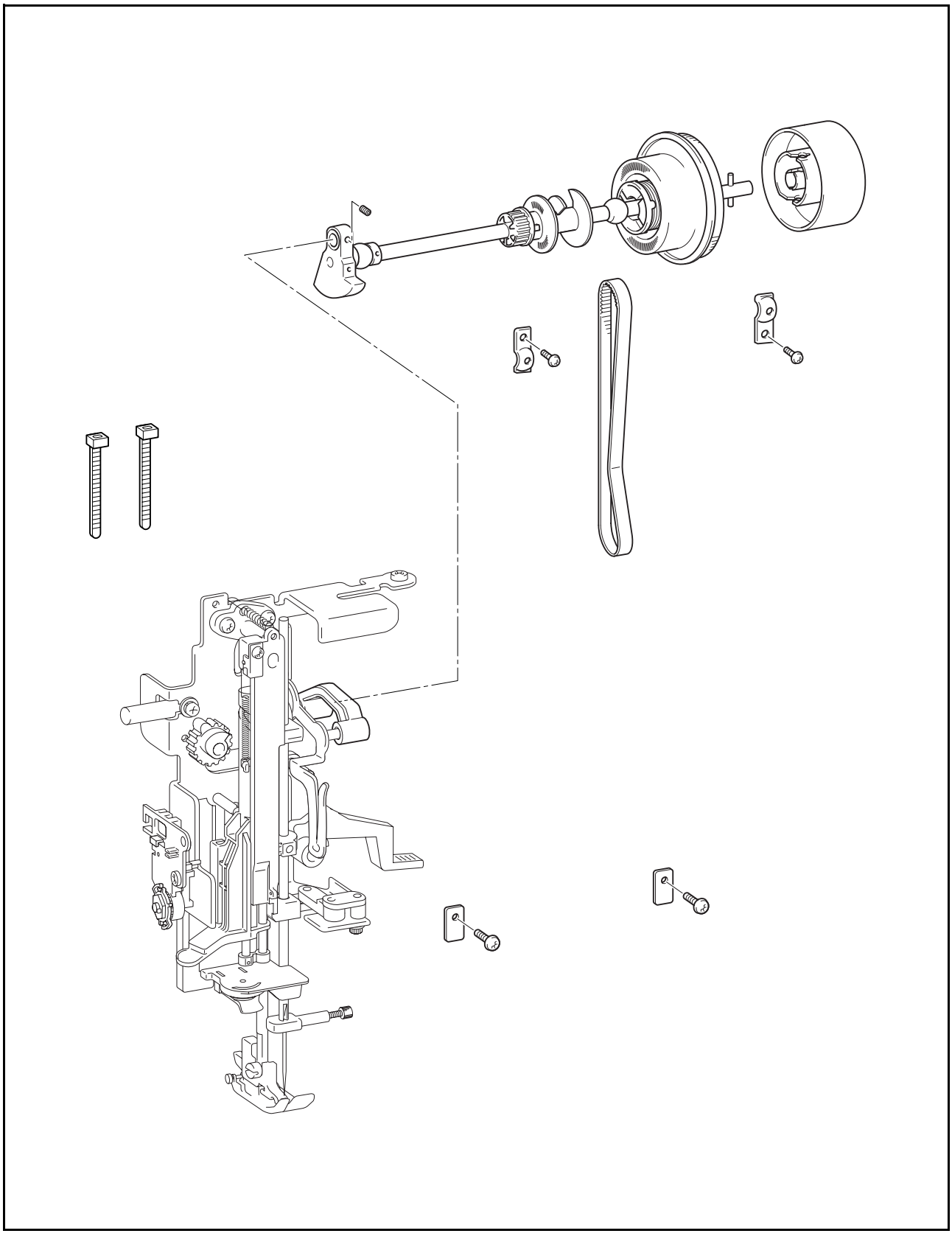
1. Cut the 2 bands ①.
2. Remove the lead wire from the coaching clip ② (2 locations) of the back side of the arm bed.
3. Remove the screw ❶.
4. Remove the 2 screws ❷, and then remove the 2 presser plates ③ from the arm bed.
5. Remove the needle bar, presser module ④ from the arm bed.

→Refer to 3 - 25 of the Disassembly.



Basic

Needle bar/Presser foot unit and Upper shaft mechanism location diagram



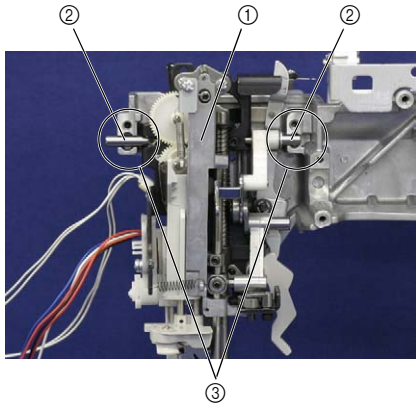
1 Attachment of Needle bar, presser module

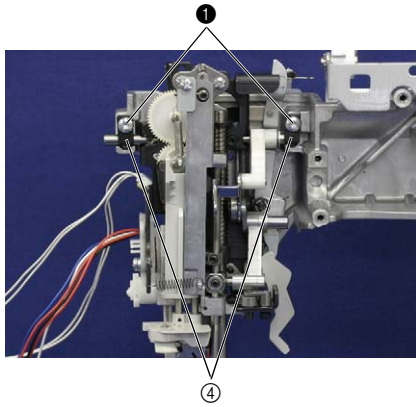
1. Attach the needle bar, presser module ① from the arm bed.

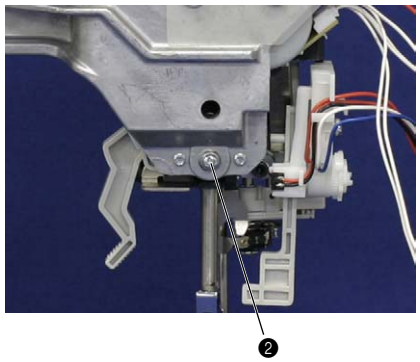
   ***Key point**
   - Set in the take-up support shaft ② to the groove ③ (2 locations) of the arm bed.
2. Attach the 2 presser plates ④ with the 2 screws ❶.
3. Tighten the screw ❷ temporarily.

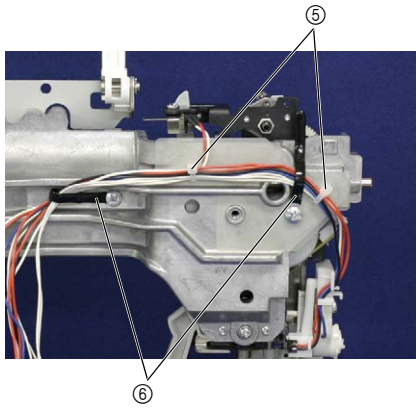
   ***Key point**
   - Fully tighten the screw after performing "4-13 Clearance between needle and rotary hook point".
4. Bind up the lead wires with the 2 bands ⑤.
5. Attach the lead wires with the 2 coaching clips ⑥.

→Refer to 3 - 88 of the Assembly.









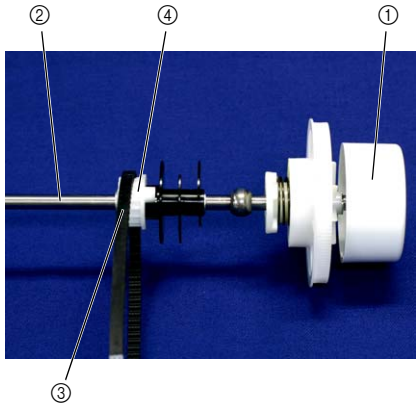
❶	Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m
❷	Screw, Pan (S/P washer) M3X18A	Torque Free tighten

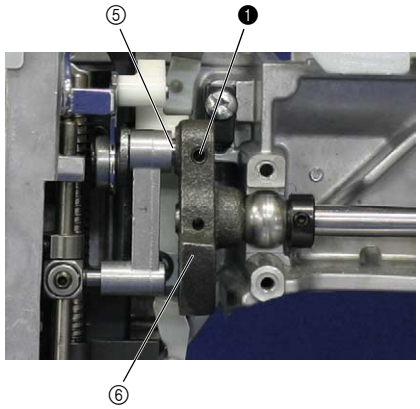
2 Attachment of Upper shaft assy

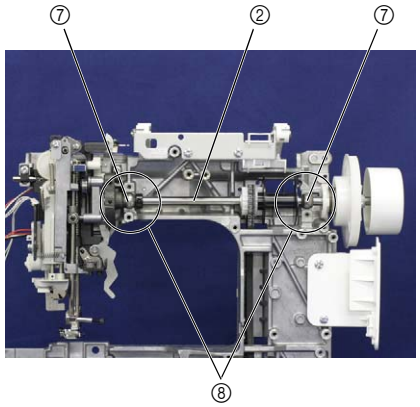
1. Attach the pulley ① to the upper shaft assy ②.
2. Hang the T belt ③ on the upper shaft pulley ④.
3. Insert the shaft of the needle bar crank ⑤ into the thread take-up counter weight ⑥, and then attach the upper shaft assy ② to the arm bed.

   ***Key point**
   - Check that the 2 lower shaft bushings ⑦ engaged with the attaching part ⑧ (2 locations) of the arm bed.
4. Attach the screw ❶.

   ***Key point**
   - Check that the screw ❶ with the D cut surface of the needle bar crank ⑤.



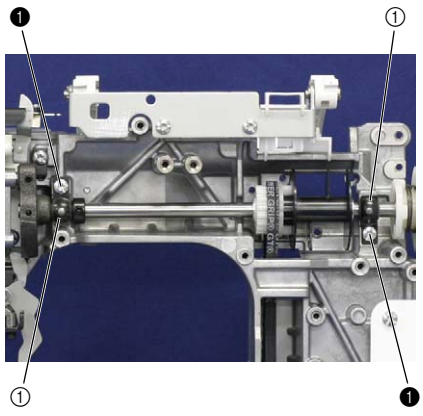




❶	Set Screw, Socket (FT) M5X5	Torque 1.18 – 1.57 N·m

3 Attachment of Bushing presser (for upper shaft)

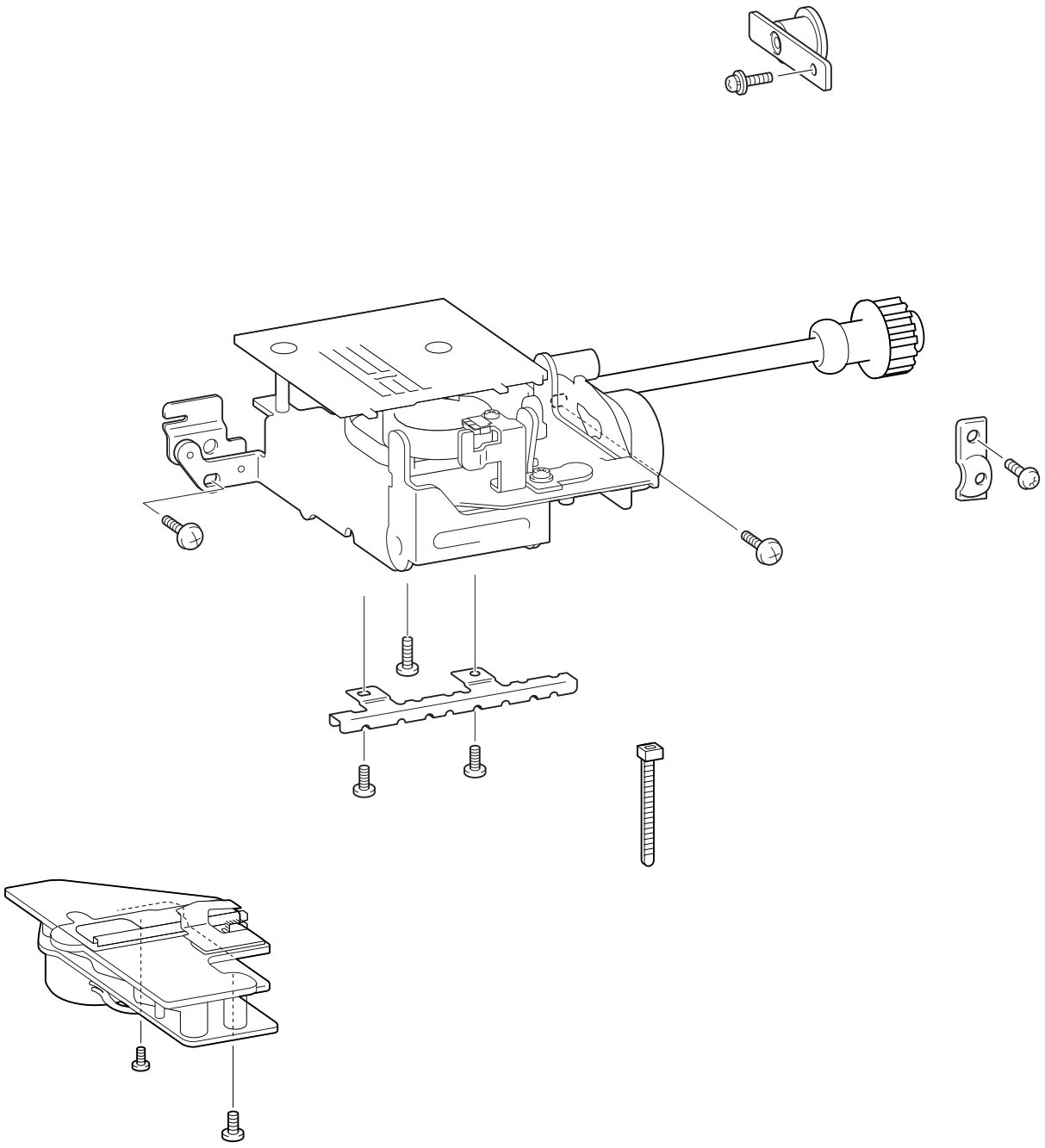
1. Attach the 2 bushing pressers ① to the arm bed with the 2 screws ❶.



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

Basic

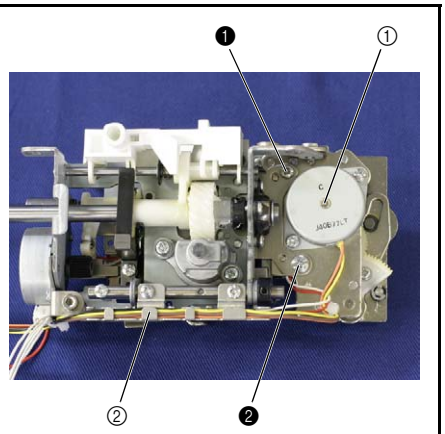
Feed/Rotary hook unit and Thread cutter unit location diagram

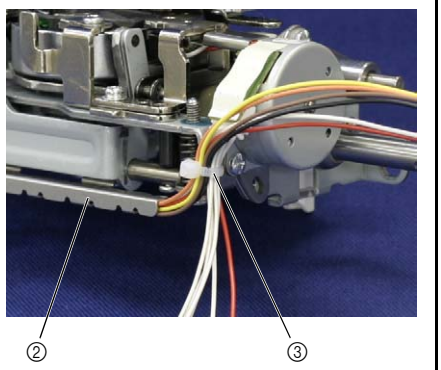


1 Attachment of Thread cutter module

1. Attach the thread cutter module ① to the feed/rotary hook module with the screw ❶ and ❷.
2. Insert the lead wire of the thread cutter module ① into the lead wire guide holder ②.
3. Bind up the lead wires with the band ③.

→Refer to 3 - 117 of the Assembly.





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

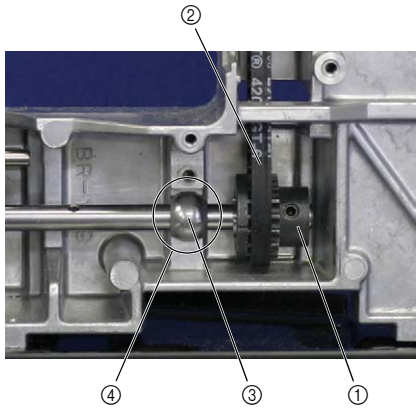
2 Attachment of Feed/rotary hook module

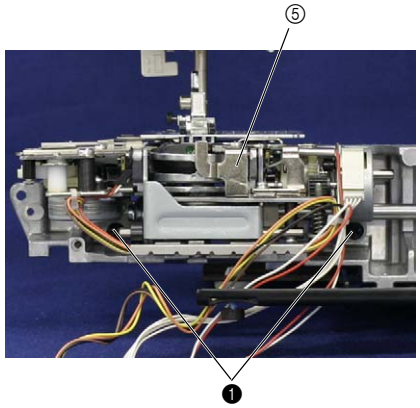
1. Hang the timing pulley D ① on the T belt ②.
2. Set in the lower shaft bushing ③ to the attaching part ④ of the arm bed.
3. Attach the feed module ⑤ to the arm bed with the 2 screws ❶ and ❷.

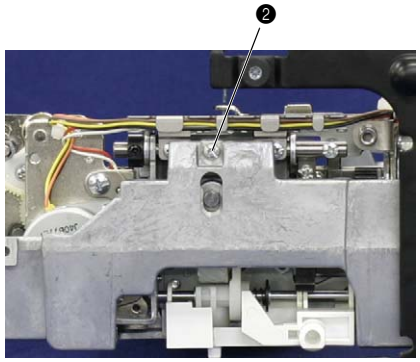
***Key point**

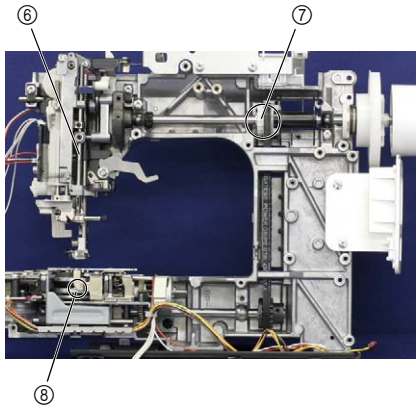
- Check that there is the gullet ⑦ of the upper shaft pulley and the reference point ⑧ of the outer rotary hook assy in the front side, when the needle bar ⑥ is the highest point.

→Refer to 3 - 102 of the Assembly.





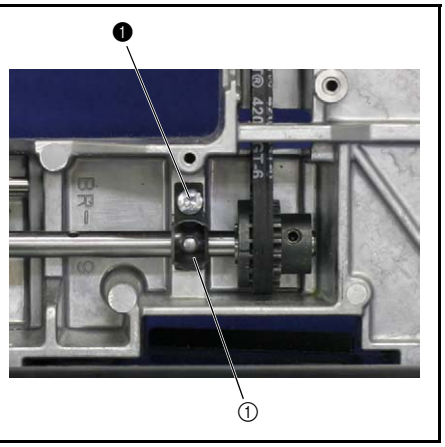




❶	Stud screw M4	Torque 1.18 – 1.57 N·m
❷	Screw, Bind M3X12	Torque 0.59 – 0.78 N·m

3 Attachment of Bushing presser (for lower shaft)

1. Attach the lower shaft bushing ① to the arm bed with the screw ❶.



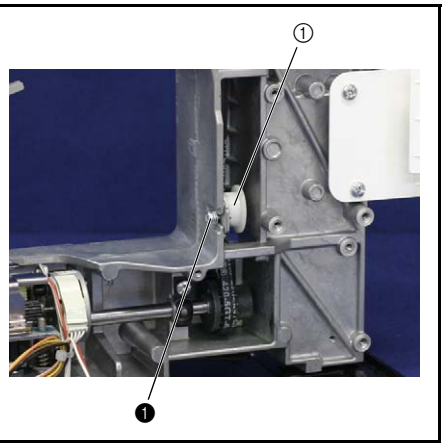
❶	Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m

4 Attachment of Tension pulley assy

1. Set the tension pulley assy ① to the arm bed, and then tighten the screw ❶ temporarily.

***Key point**

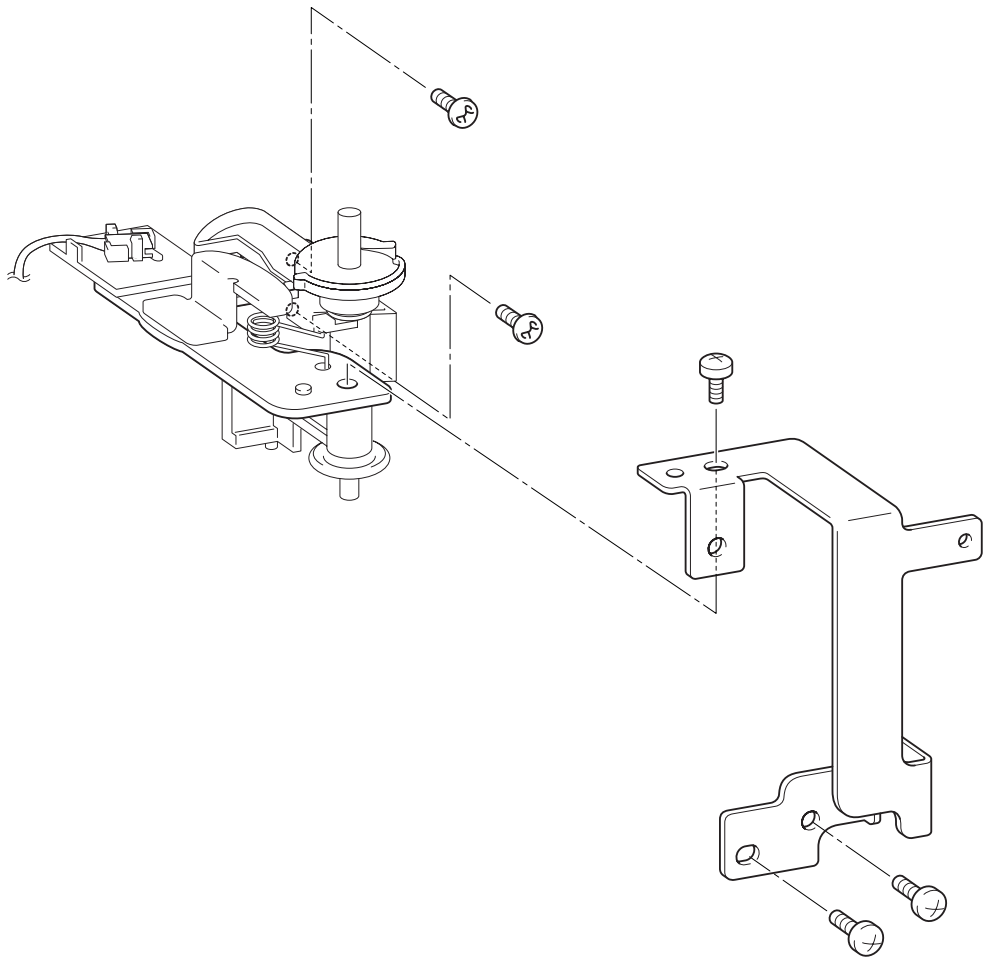
- Fully tighten the screw after performing "4-6 Timing belt tension".



❶	Screw, Pan (S/P washer) M4X10	Torque Free tighten

Basic

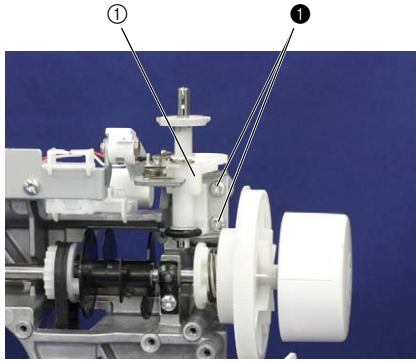
Bobbin winder mechanism location diagram

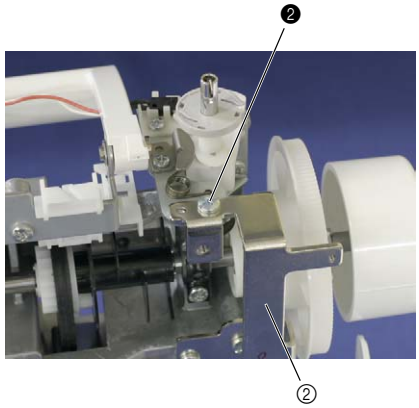


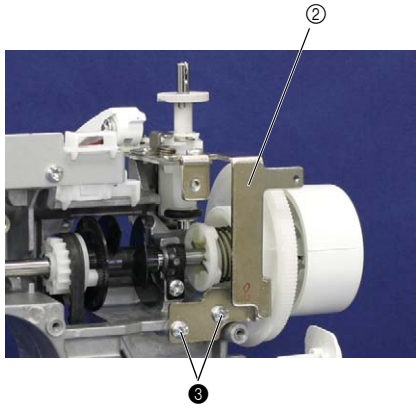
1 Attachment of Bobbin winder assy

1. Attach the bobbin winder assy ① to the arm bed with the 2 screws ❶.
2. Attach the LCD supporter ② to the arm bed with the screw ❷ and the 2 screws ❸.

→Refer to 3 - 85 of the Assembly.



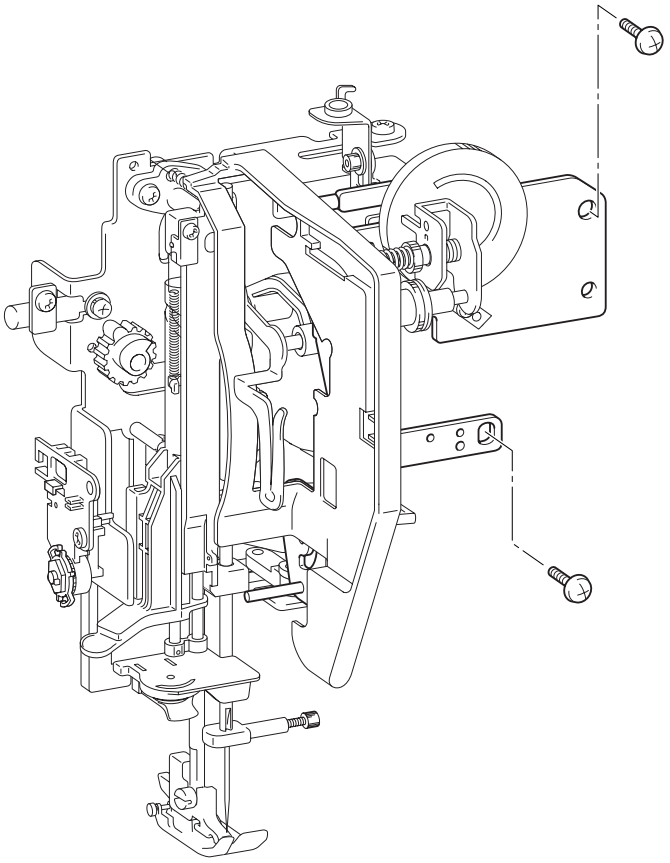




❶	Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m
❷	Screw, Bind M4X5	Torque 1.18 – 1.57 N·m
❸	Screw, Bind M4X8	Torque 1.18 – 1.57 N·m

Basic

Thread tension mechanism location diagram



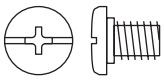
1 Attachment of Thread unit

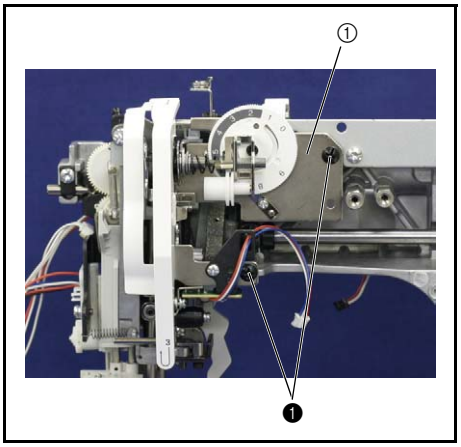
1. Attach the thread unit ① to the arm bed with the 2 screws ❶.

***Key point**

- Refer to "4-8 Upper thread tension".

→Refer to 3 - 79 of the Assembly.

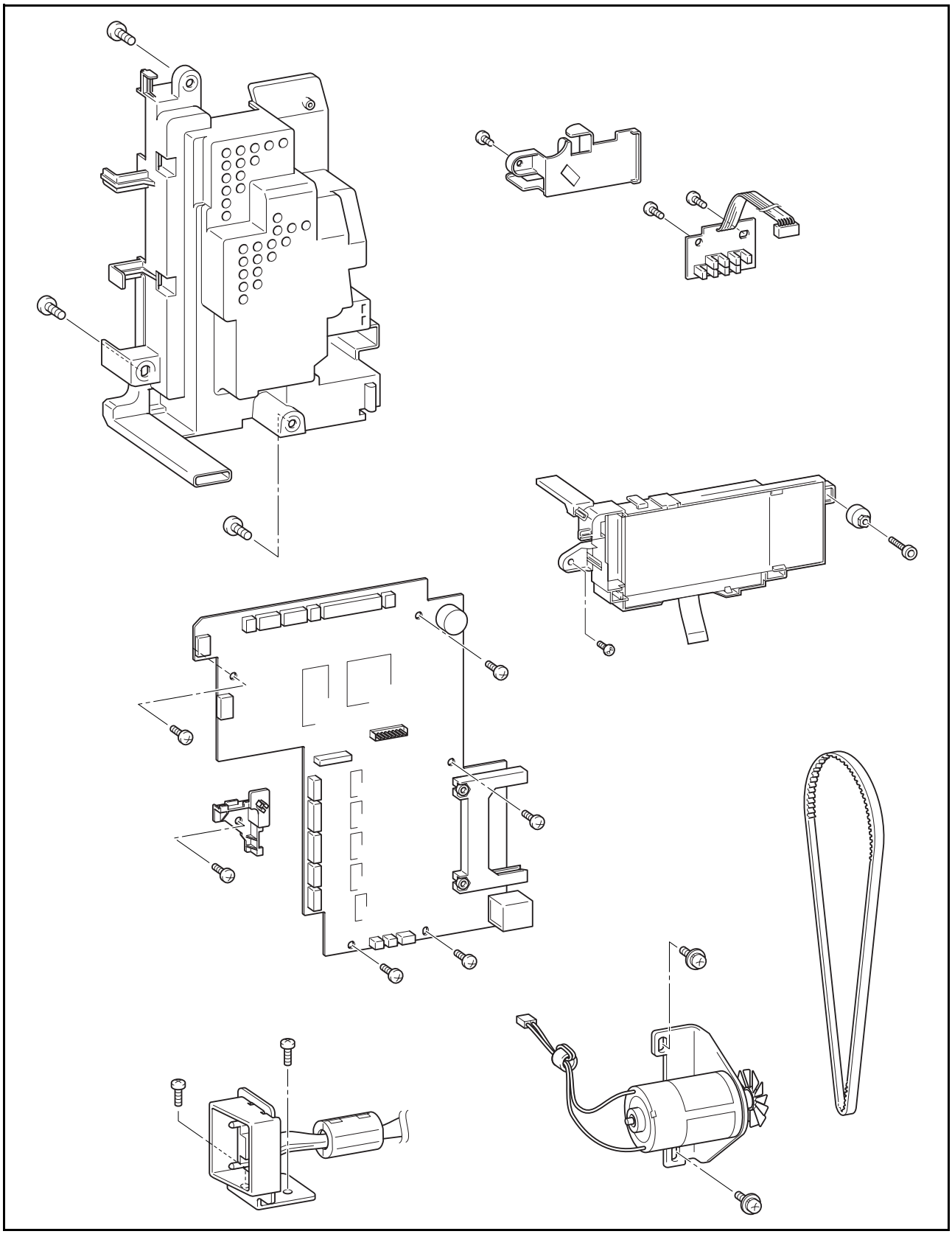
❶		Stud screw M4	Torque 1.18 – 1.57 N·m



Basic

Basic

Electrical parts and main motor unit location diagram

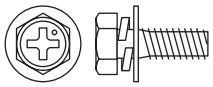


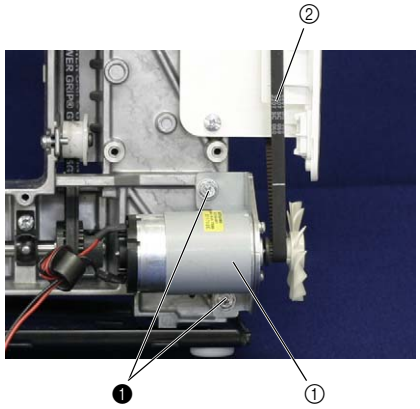
1 Attachment of Main motor sub assy

1. Set the main motor sub assy ① to the arm bed, and then tighten the 2 screws ❶ temporarily.

   ***Key point**
   - Fully tighten the screw after performing "4-7 Motor belt tension".
2. Hand the T belt ② on the T pulley and the gear for the main motor sub assy ①.

→Refer to 3 - 75 of the Assembly.

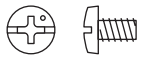
❶		Upset 4X12DB	Torque Free tighten

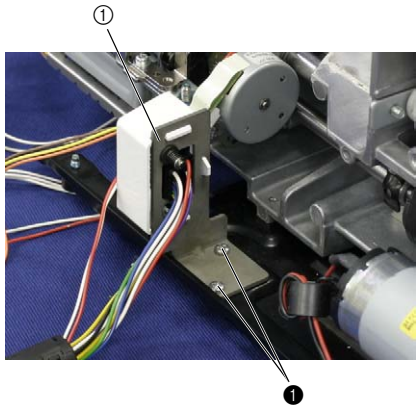


2 Attachment of Embroidery connector assy

1. Attach the embroidery connector assy ① to the base plate with the 2 screws ❶.

→Refer to 3 - 75 of the Assembly.

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

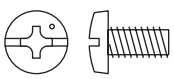


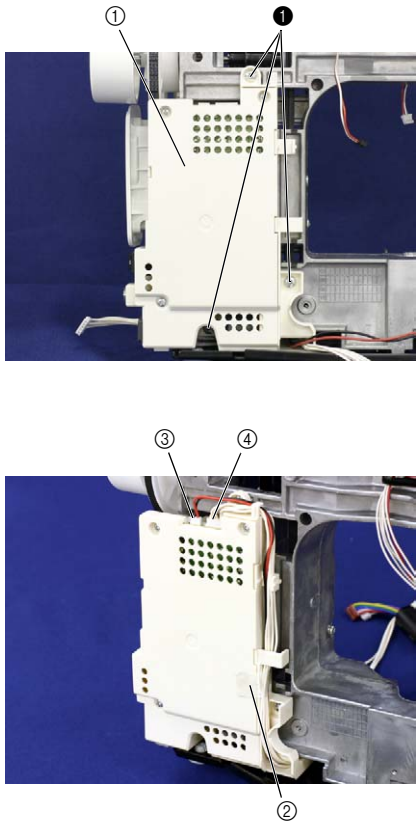
3 Attachment of Power supply unit

1. Attach the power supply unit ① to the arm bed with the 3 screws ❶.
2. Insert the lead wire of the main motor sub assy and the power lead wire assy into the guide part of the power supply unit ①, and then secure them with the fixed tape ②.
3. Attach the main motor sub assy lead wire connector ③ and the power lead wire assy connector ④ to the power PCB supply assy.

   ***Key point**
   - Refer to "Special Instructions of Wiring".

→Refer to 3 - 76 of the Assembly.

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

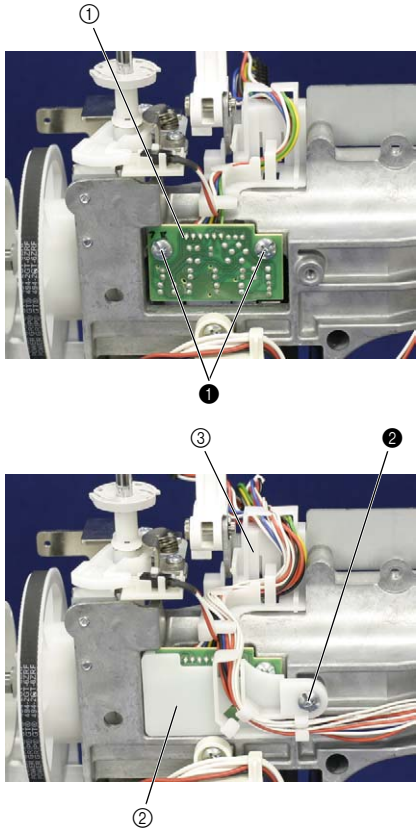


4 Attachment of NP PCB assy

1. Attach the NP PCB assy ① to the arm bed with the 2 screws ❶.
2. Attach the cord guide A ② to the arm bed with the screw ❷.
3. Insert the lead wire into the cord guide A ② and the cord guide ③.

***Key point**

- Refer to "Special Instructions of Wiring".



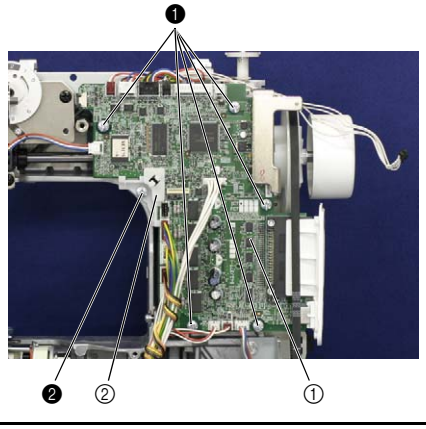
❶ ❷	Screw, Bind M4X8	Torque 0.78 – 1.18 N·m

5 Attachment of Main PCB assy

1. Attach the main PCB assy ① to the arm bed with the 5 screws ❶.
2. Attach the remove the supporter main PCB ② to the arm bed with the screw ❷.
3. Attach the connector to the main PCB assy ①.

***Key point**

- Refer to "Special Instructions of Wiring".



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

6 Attachment of LCD unit

1. Attach the LCD unit ① to the arm bed with the screw ❶.
2. Attach the zigzag adjusting nut ② with the screw ❷.

   ***Key point**
   - Attach the zigzag adjusting nut as shown the photograph. (When add the mach mark to the zigzag adjusting nut and the light plate assy, matches it.)
   - When the LCD is not parallel for the sash of the front cover before attach the front cover, refer to "4-28 LCD unit position". And then adjust the tilt of the LCD unit.
3. Insert the ZPM lead wire into the guide part of the light plate assy and the LCD supporter assy, attach the main PCB to the connector ③ of the ZPM lead wire.

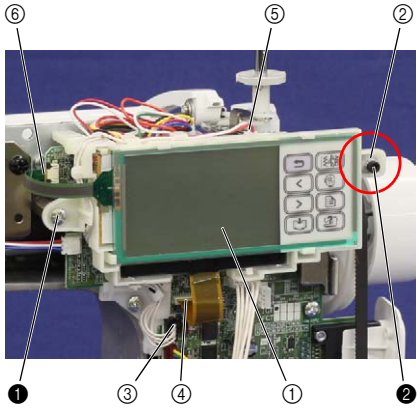
   ***Key point**
   - Refer to "Special Instructions of Wiring".
4. Attach the FFC ④ of the LCD supply assy to the main PCB.
5. Insert the lead wire of the back light PCB assy into the guide part of the light plate assy, attach the connector ⑤ of the back light PCB assy.

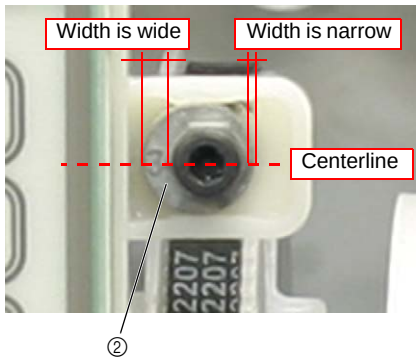
   ***Key point**
   - Refer to "Special Instructions of Wiring".
6. Attach the FFC ⑥ of the touch panel assy to the main PCB assy.

   ***Key point**
   - Check that the connector is locked.

→Refer to 3 - 78 of the Assembly.

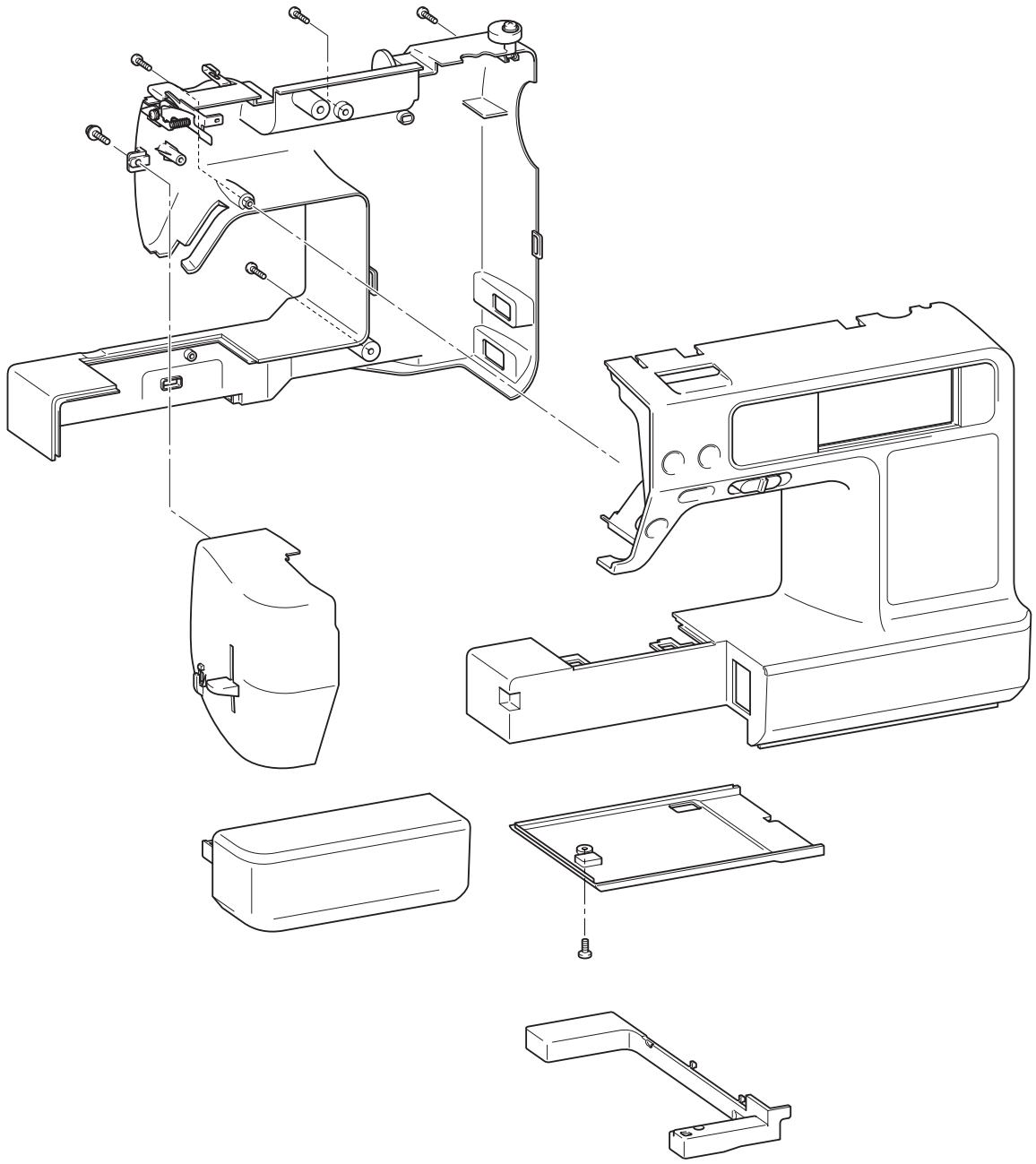
❶	Screw, Bind M4X5	Torque 0.78 – 1.18 N·m
❷	Bolt, Socket M3X12	Torque 0.78 – 1.18 N·m





Basic

Main frame/Covers location diagram

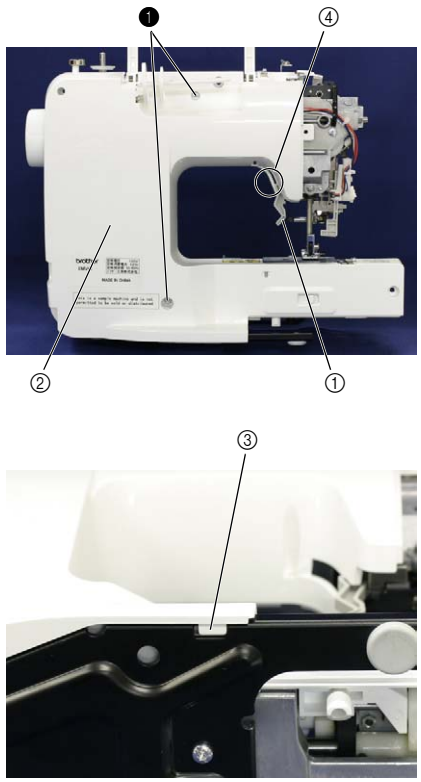


1 Attachment of Rear cover

1. Lower the presser foot lifter ①.
2. Attach the rear cover ② to the arm bed, and then hang the hook ③ on the base plate.

   ***Key point**
   - Check that the section ④ get over the presser foot lifter ①.
   - Check that the 2 bosses of the rear cover ② engaged with the 2 positioning holes of the arm bed.
3. Attach the rear cover ② with the 2 screws ❶.

→Refer to 3 - 67 of the Assembly.



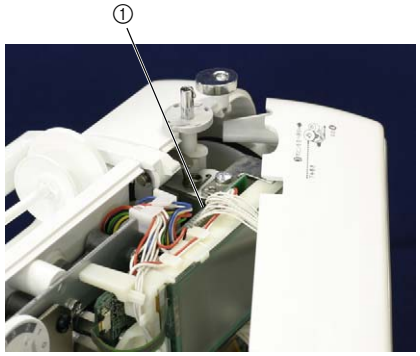
❶	Screw, Bind M4X8	Torque 1.18 – 1.57 N·m

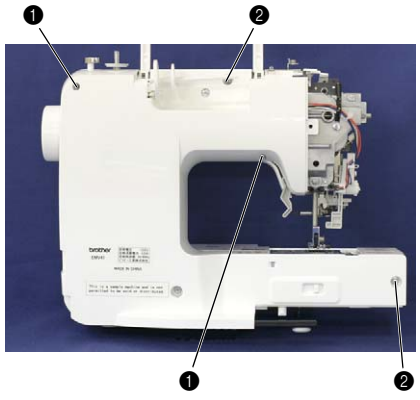
2 Attachment of Front cover assy

1. Attach the connector ① of the SSVR PCB assy to the main PCB assy.
2. Attach the front cover assy ②.

   ***Key point**
   - Check that the hook ③ (2 locations) hang on the base plate ④ and the hook ⑤ (3 locations) hang on the attaching part of the hook.
3. Attach the front cover assy ② with the 2 screws ❶ and the 2 screws ❷.

→Refer to 3 - 69 of the Assembly.

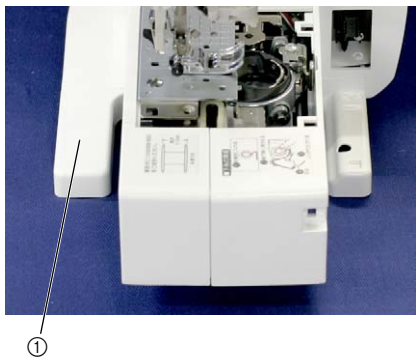




❶	Taptite, Bind P M3X16	Torque 0.59 – 0.78 N·m
❷	Taptite, Cup B M4X14	Torque 0.78 – 1.18 N·m

3 Attachment of Base foot cover

1. Attach the base foot cover ①.



4 Attachment of Bottom cover

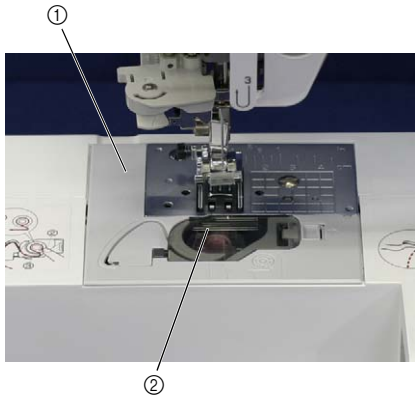
1. Set the bottom cover ① to the arm bed with the screw ❶.

❶	Screw, Bind M4X8	Torque 0.59 – 0.78 N·m

5 Attachment of Needle plate B assy

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

→Refer to 3 - 72 of the Assembly.



6 Attachment of Face plate assy

1. Attach the face plate assy ① with the screw ❶.

→Refer to 3 - 73 of the Assembly.

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

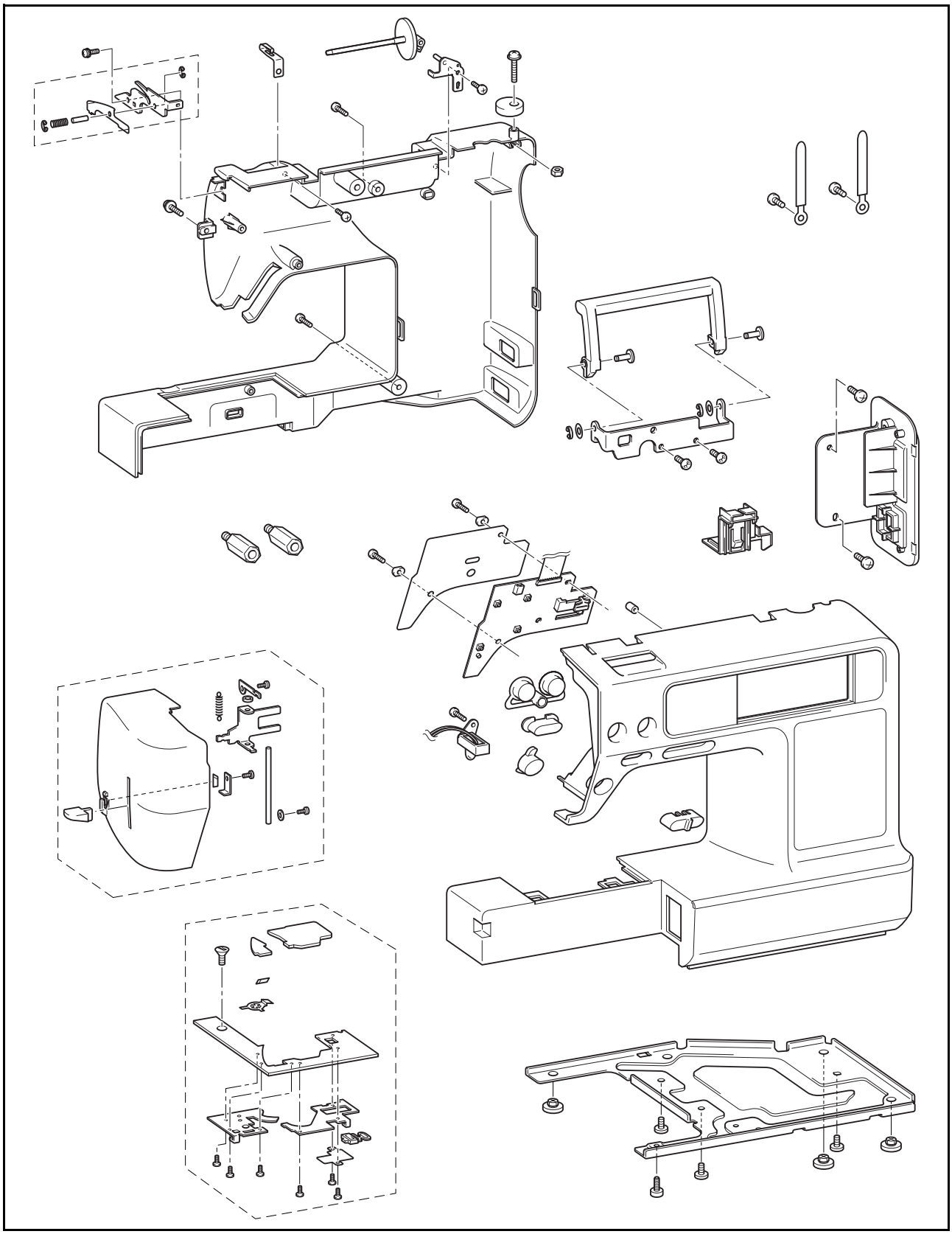
7 Attachment of Accessory table assy

1. Attach the accessory table assy ①.

Basic

3 Application of Disassembly/Assembly

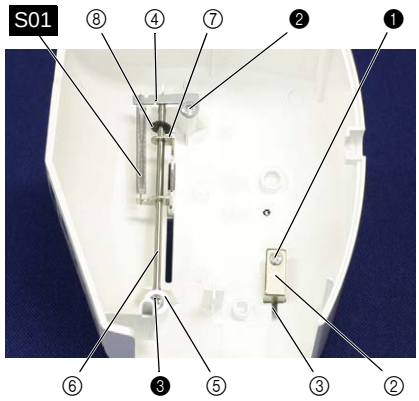
Main frame/Covers location diagram



Application

1 Disassembly of Face plate

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

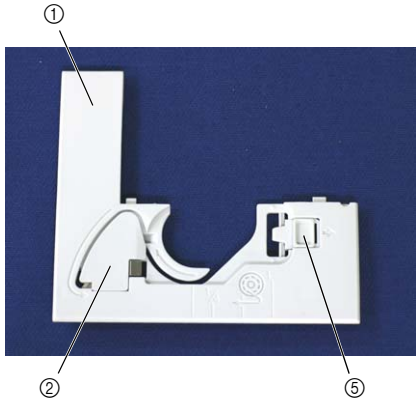


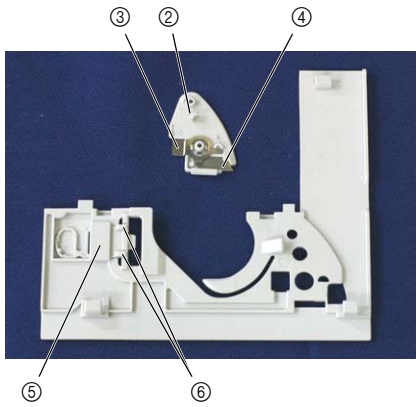
2 Disassembly of Needle plate B assy

1. Remove the cutter cover ② from the needle plate B assy ①.
2. Remove the needle plate cover spring ③ from the cutter cover ②, and then remove the NT lower thread cutter ④.
3. Remove the slide button ⑤ from the needle plate B assy ①.

***Key point**

- Remove the hooks ⑥ (2 locations) from the backside of the needle plate B assy ①.

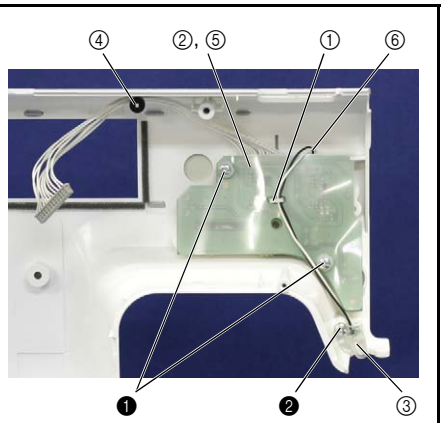




3-1 Disassembly of Front cover assy (Removal of SSVR PCB assy)

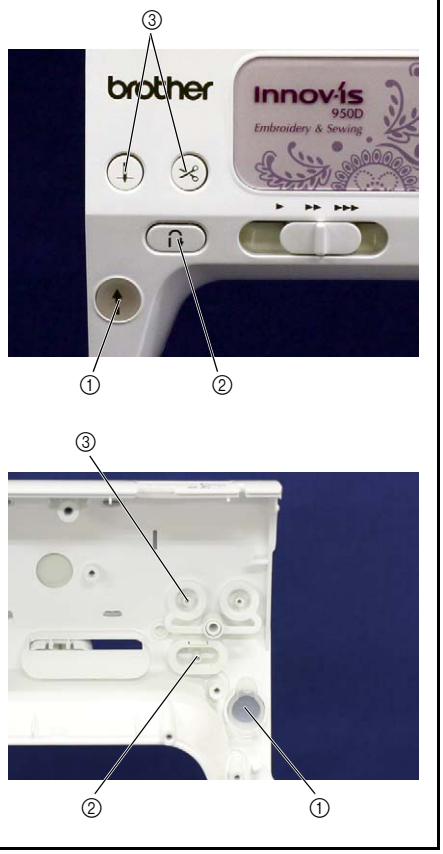
1. Remove the mini clamp ① from the SSVR PCB assy ②.

   ***Key point**
   - Remove the lead wire of the LED lamp right assy ③ from the mini clamp ①.
2. Remove the rubber ④.
3. Remove the 2 screws ❶, and then remove the 2 board pressers, the insulator sheet ⑤ and the SSVR PCB assy ②.
4. Remove the connector ⑥ of the LED lamp right assy ③ from the SSVR PCB assy ②.
5. Remove the screw ❷, and then remove the LED lamp right assy ③.



3-2 Disassembly of Front cover assy (Removal of Buttons)

1. Remove the SS button ①, the reverse button ② and the NP button ③.



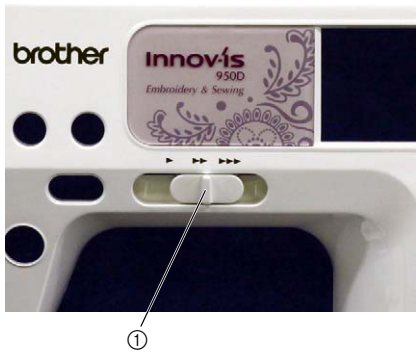
Application

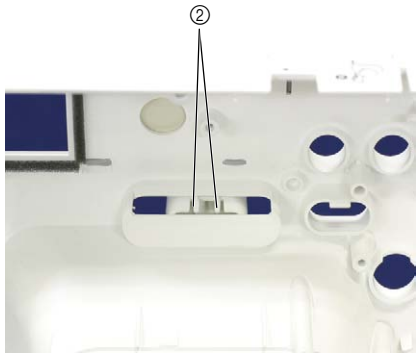
3-3 Disassembly of Front cover assy (Removal of SV key top)

1. Remove the SV key top ①.

***Key point**

- Undo the hooks ② (2 locations) from the backside of the front cover assy.

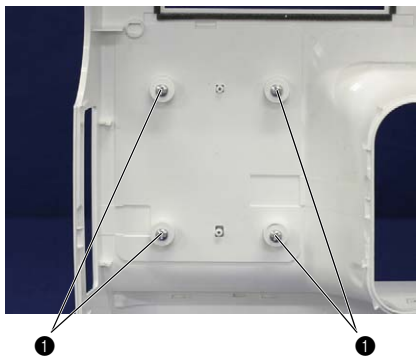


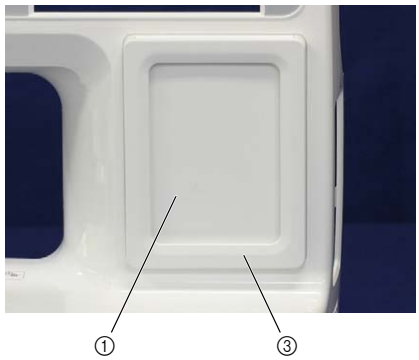


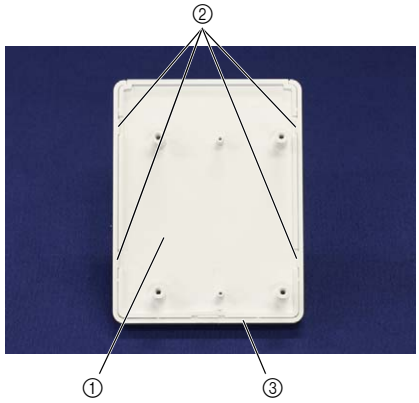
Application

3-4 Disassembly of Front cover assy (Removal of Photo frame base for models equipped with the photo frame)

1. Remove the 4 screws ❶, and then remove the photo frame base ①.
2. Remove the 4 hooks ②, and then remove the photo frame ③ from the photo frame base ①.



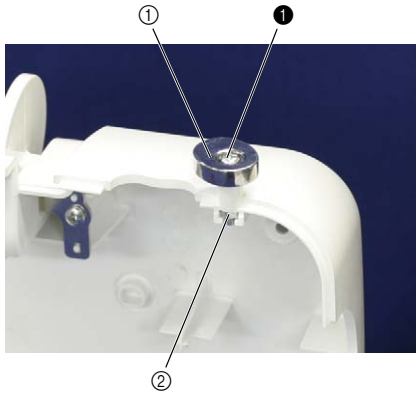




Application

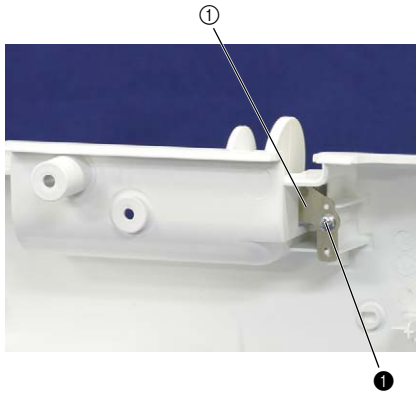
4-1 Disassembly of Rear cover assy (Removal of bobbin presser)

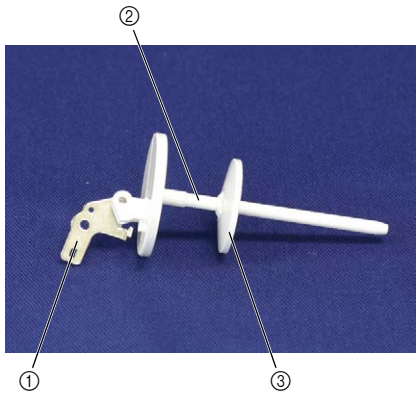
1. Remove the screw ❶, and then remove the bobbin presser ① and the nut 1 M3 ②.



4-2 Disassembly of Rear cover assy (Removal of Spool pin)

1. Remove the screw ❶, and then remove the spool pin holder assy ① from the rear cover assy.
2. Remove the spool pin ② from the shaft of the spool pin holder assy①.
3. Remove the spool presser ③ from the spool pin ②.

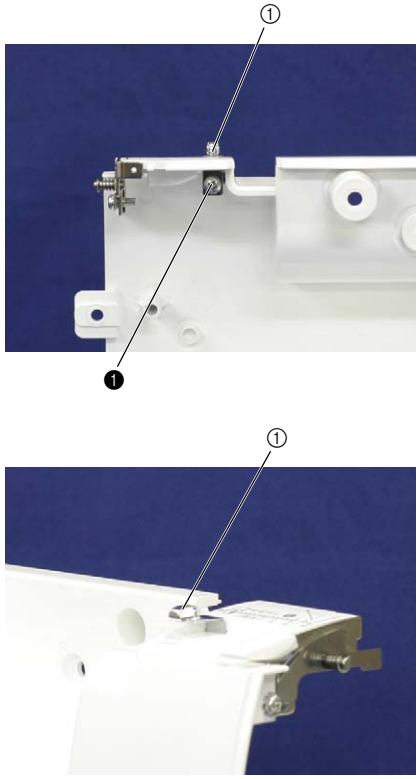




Application

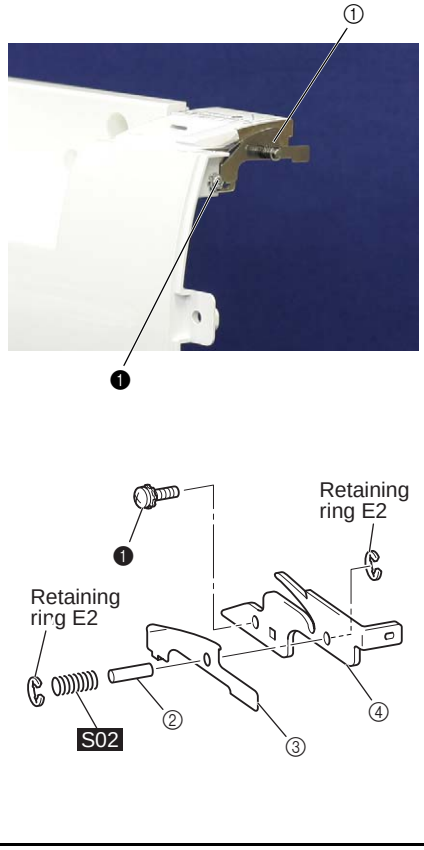
4-3 Disassembly of Rear cover assy (Removal of Thread guide supporting plate)

1. Remove the screw ❶, and then remove the thread guide supporting plate ① from the rear cover assy.



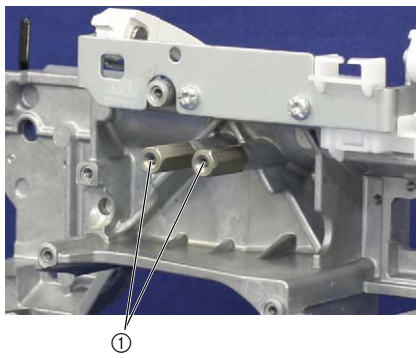
4-4 Disassembly of Rear cover assy (Removal of thread guide plate assy)

1. Remove the screw ❶, and then remove the thread guide plate assy ① from the rear cover assy.
2. Remove the retaining ring E2.
3. Pull out the shaft ②, and then remove spring S02 and the thread guide spring ③ from the thread guide plate ④.
4. Remove the retaining ring E2 from the shaft ②.



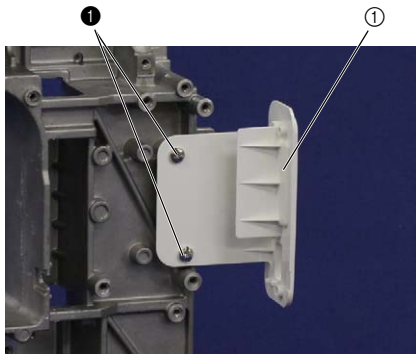
5 Removal of Stud

1. Remove the 2 studs ① from the arm bed.



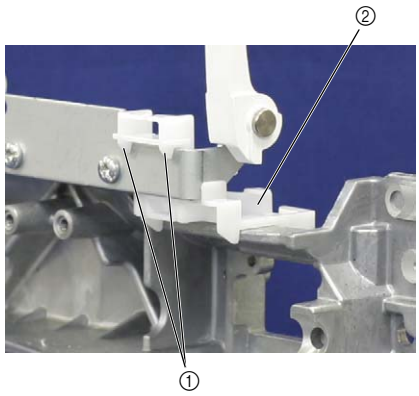
6 Removal of Card cover

1. Remove the 2 screws ❶, and then remove the card cover ① from the arm bed.



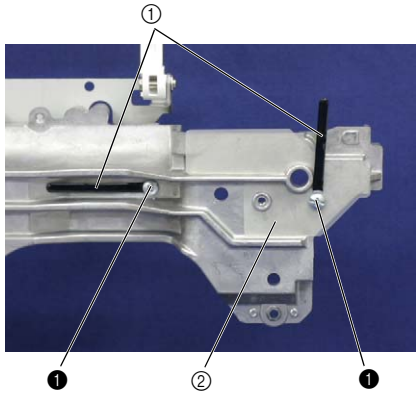
7 Removal of Cord guide

1. Remove the 2 hooks ①, and then remove the cord guide ② from the handle holder.



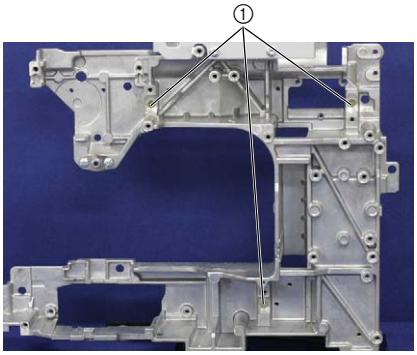
8 Removal of Wire clip

1. Remove the 2 screws ❶, and then remove the 2 wire clips ① and the insulate sheet back ② from the arm bed.



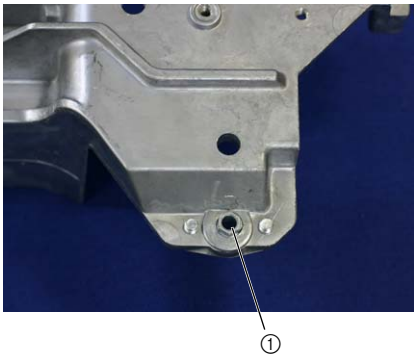
9 Removal of Felt

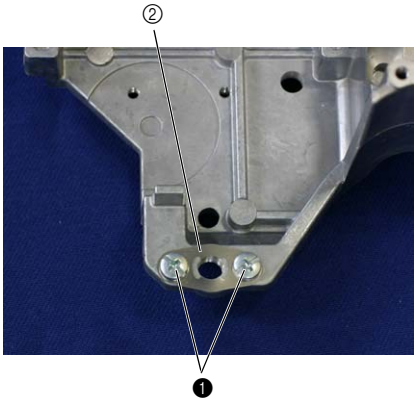
1. Remove the 3 felts ① from the arm bed.



10 Removal of Plate spring

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

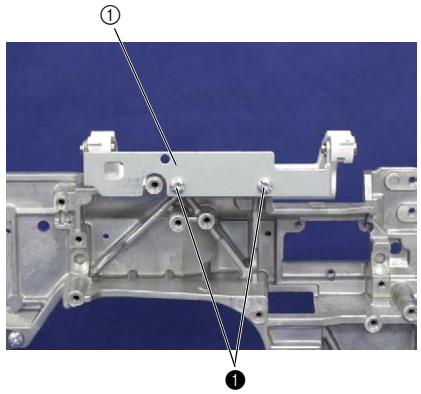


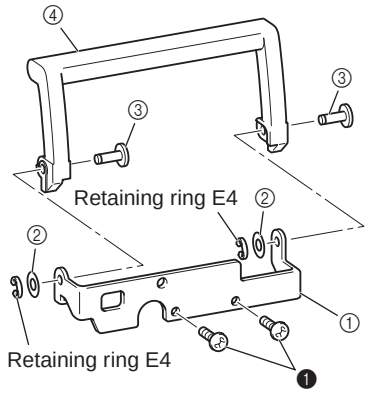


Application

11 Removal of Handle

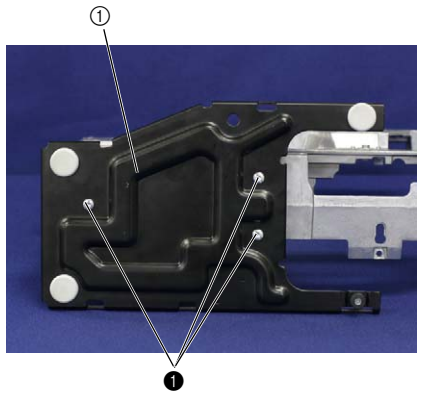
1. Remove the 2 screws ❶, and then remove the handle holder ① from the arm bed.
2. Remove the 2 retaining rings E4, and then remove the 2 polyester sliders ②.
3. Remove the 2 handle shafts ③, and then remove the handle ④ from the handle holder ①.





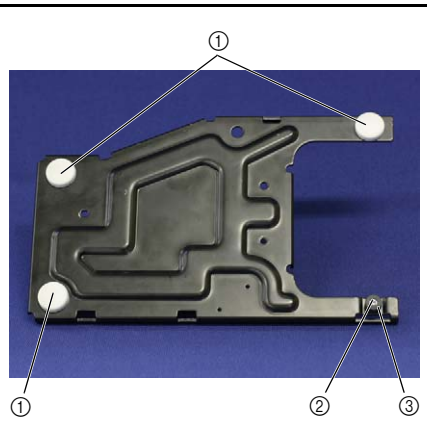
12 Removal of Base plate assy

1. Remove the 3 screws ❶, and then remove the base plate assy ① from the arm bed.

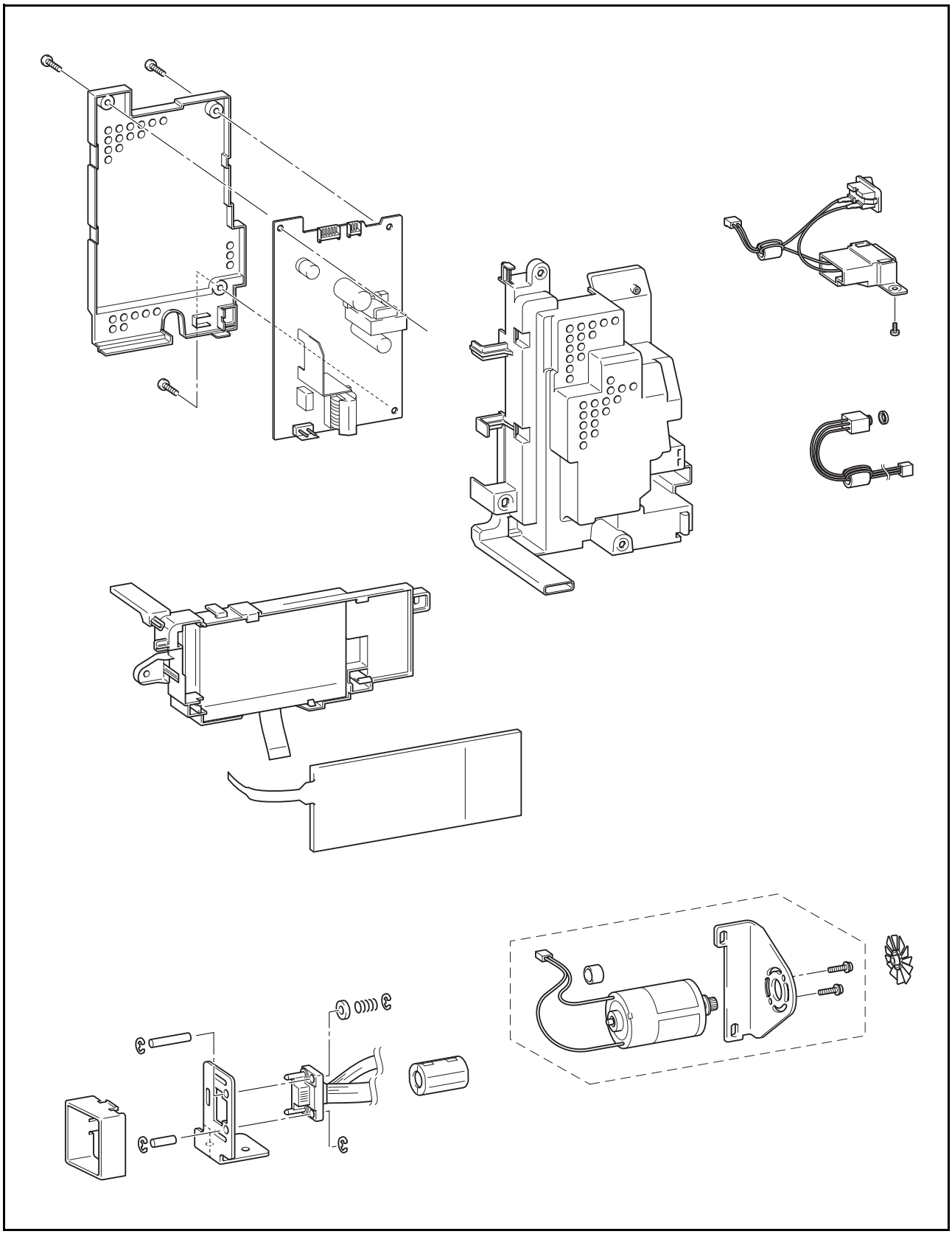


12-1 Disassembly of Base plate assy

1. Remove the 3 base rubbers A ① from the base plate.
2. Remove the adjusting screw ② from the base plate.
3. Remove the base plate rubber ③ from the adjusting screw ①.



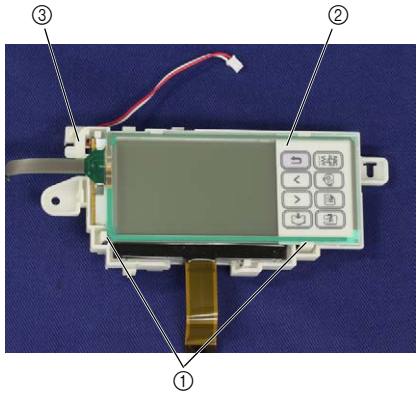
Electrical parts and main motor unit location diagram



Application

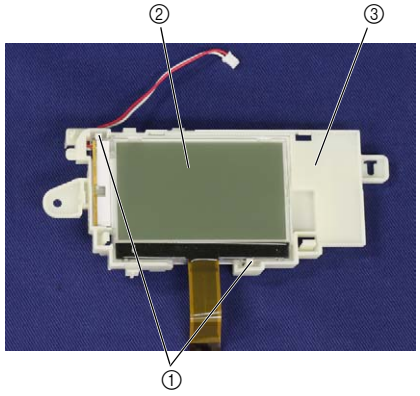
1-1 Disassembly of LCD unit (Removal of Touch panel assy)

1. Remove the 2 hooks ①, and then remove the touch panel assy ② from the light plate assy ③.



1-2 Disassembly of LCD unit (Removal of LCD supply assy)

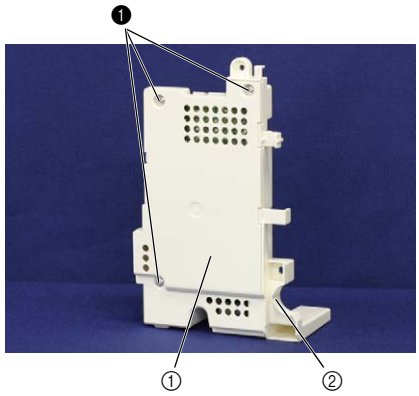
1. Remove the 2 hooks ①, and then remove the LCD supply assy ② from the light plate assy ③.



Application

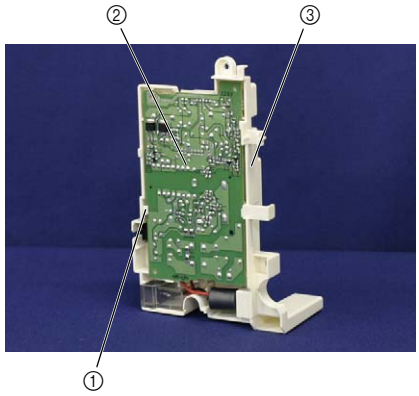
2-1 Disassembly of Power supply unit (Removal of Insulation plate)

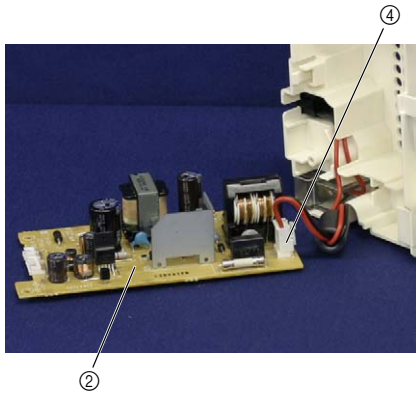
1. Remove the 3 screws ❶, and then remove the insulation plate ① from the insulation cover ②.



2-2 Disassembly of Power supply unit (Removal of Power PCB supply assy)

1. Remove the hook ①, and then remove the power PCB supply assy ② from the insulation cover ③.
2. Remove the connector ④ of the inlet assy from the power PCB supply assy ②.

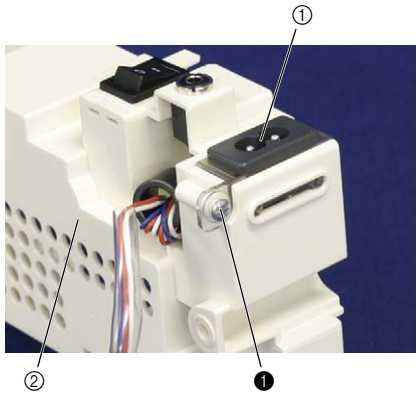


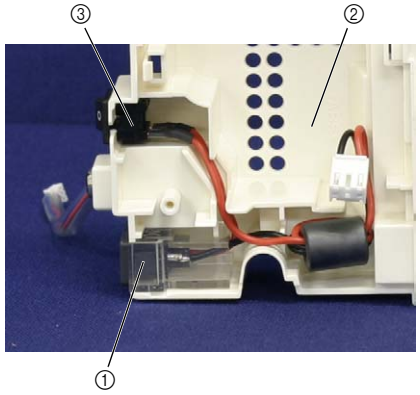


Application

2-3 Disassembly of Power supply unit (Removal of Inlet assy)

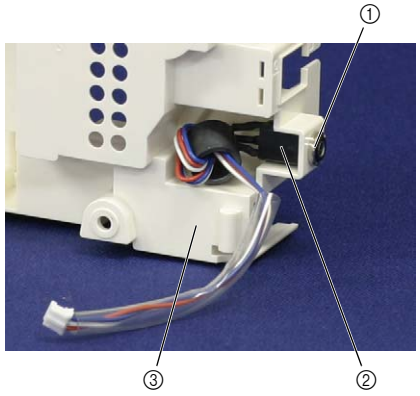
1. Remove the screw ❶, and then remove the inlet holder ① of the inlet assy from the insulation cover ②.
2. Remove the power SW ③ of the inlet assy from the insulation cover ②.





2-4 Disassembly of Power supply unit (Removal of FC jack supply assy)

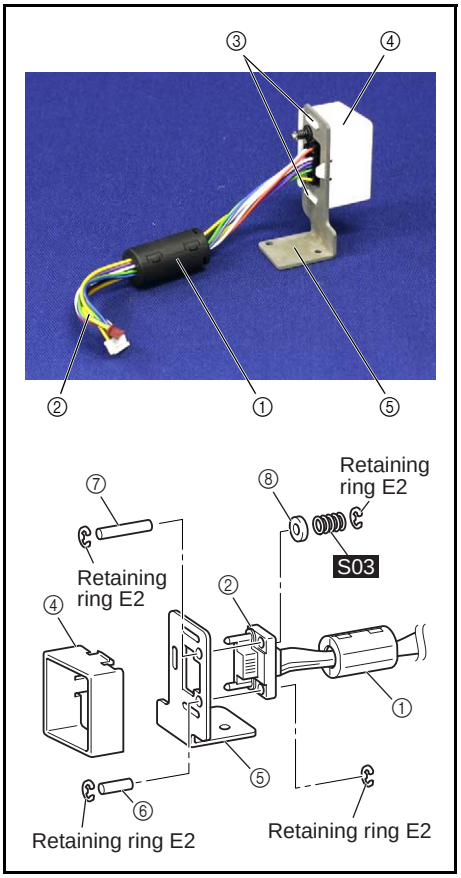
1. Remove the nut F ① from the FC jack supply assy ②.
2. Remove the FC jack supply assy ② from the insulation cover ③.



3 Disassembly of Embroidery connector assy

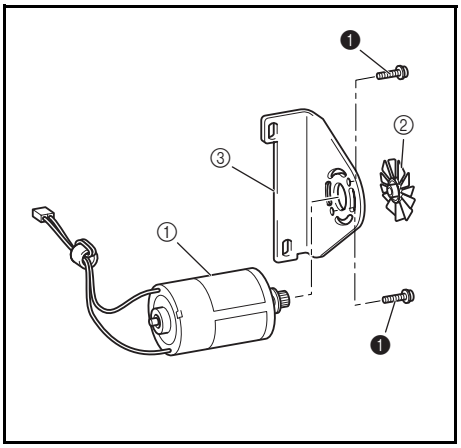
1. Remove the ferrite core ① from the lead wire assy main body ②.

   ***Key point**
   - Remove the 2 locks of the ferrite core ①.
2. Remove the 2 hooks ③, and then remove the connector holder cover ④ from the connector holder ⑤.
3. Remove the 2 retaining rings E2, and then remove the lead wire assy main body ② from the connector holder ⑤.
4. Pull out the ES pin F-A ⑥ from the connector holder ⑤.
5. Remove the retaining ring E2 from the ES pin F-A ⑥.
6. Pull out the ES pin F-B ⑦ from the connector holder ⑤, and then remove the spring S03 and the feed bar spacer ⑧.
7. Remove the retaining ring E2 from the ES pin F-B ⑦.



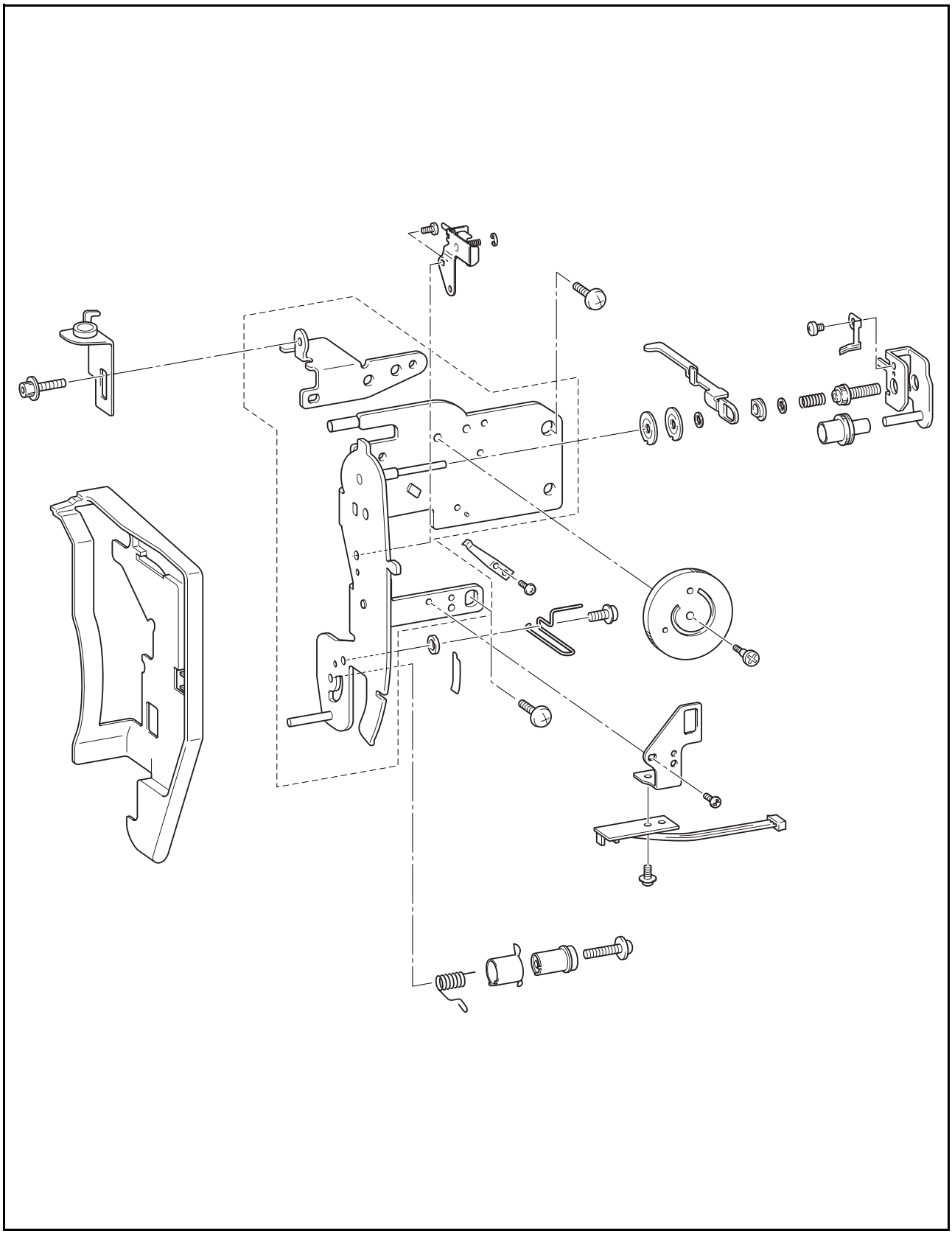
4 Disassembly of Main motor sub assy

1. Remove the motor fan ② from the main motor sub assy ①.
2. Remove the 2 screws ❶, and then remove the main motor sub assy ① from the motor holder ③.



Application

Thread tension mechanism location diagram



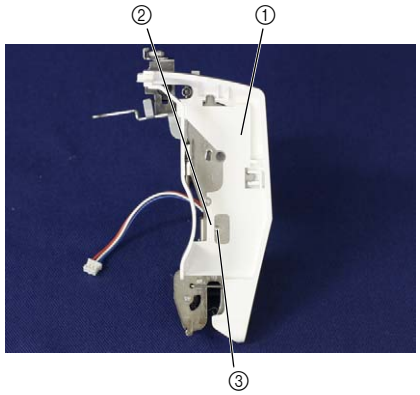
Application

1 Removal of Thread guard cover

1. Remove the thread guard cover ① from the thread unit .

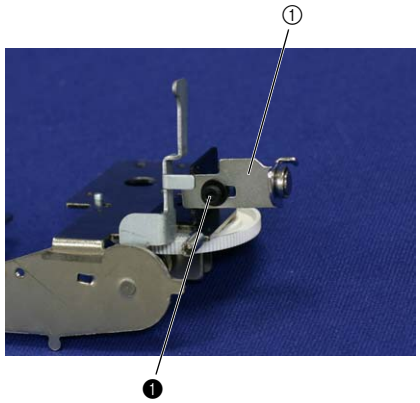
***Key point**

- Remove it while lifting the section ② of the thread guard cover ① to get over the boss ③ of the thread unit .



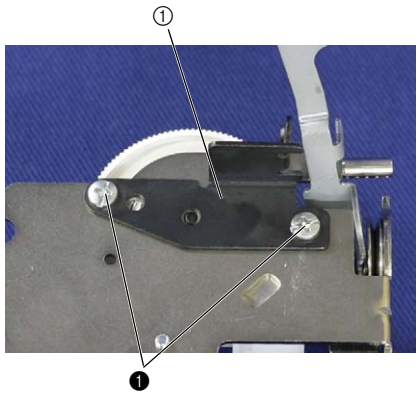
2 Removal of Bobbin winder guide assy

1. Remove the screw ❶, and then remove the bobbin winder guide assy ① from the thread unit.



3 Removal of Thread guard holder S

1. Remove the 2 screws ❶, and then remove the thread guard holder S ① from the thread unit.

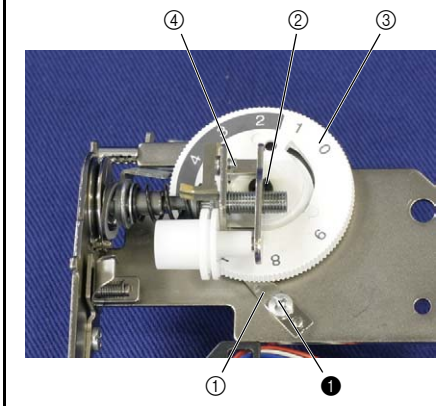


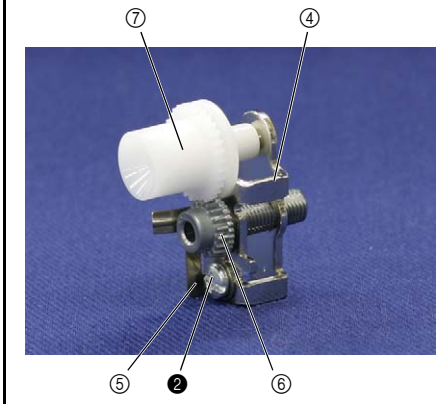
Application

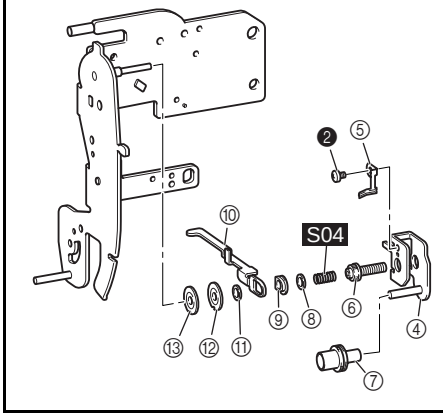
4 Removal of Thread tension dial

1. Remove the screw ❶, and then remove the notched spring ① from the thread unit.
2. Remove the tension dial shaft ②, and then remove the thread tension dial ③ and the thread tension plate assy ④ from the thread unit.

   ***Key point**
   - Turn the thread tension dial ③ to the right, and slide the thread tension plate assy ④ to the left to see the tension dial shaft ②.
3. Remove the screw ❷, and then remove the adjusting screw spring plate ⑤ from the thread tension plate assy ④.
4. Remove the thread tension adjusting screw ⑥, and then remove the thread tension adjusting gear ⑦ from the thread tension plate assy ④.
5. Remove in order of the spring S04, the washer ⑧, the tension disc washer ⑨, the thread release plate ⑩, the washer ⑪, the tension disc B ⑫ and the tension disc A ⑬ from the shaft of the thread unit.

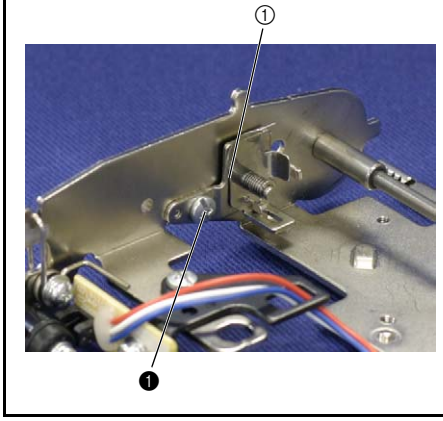






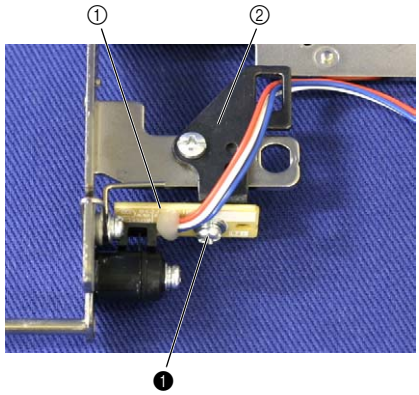
5 Removal of Plate assy

1. Remove the screw ❶, and then remove the plate assy ① from the thread unit.



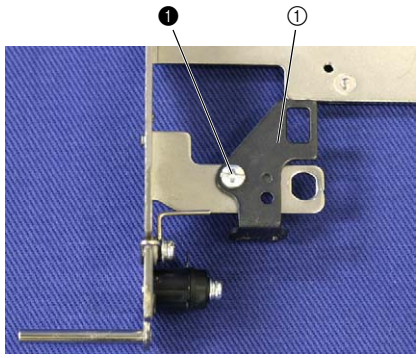
6 Removal of Up thread PCB assy

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



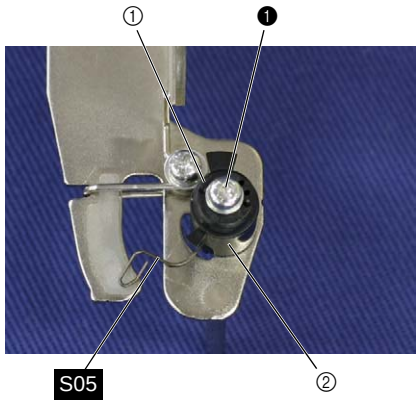
7 Removal of Thread sensor holder

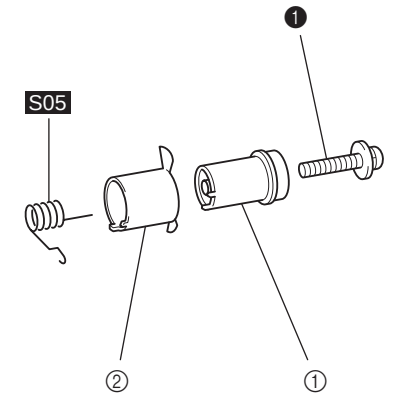
1. Remove the screw ❶, and then remove the thread sensor holder ① from the thread unit.



8 Removal of Thread catching spring case

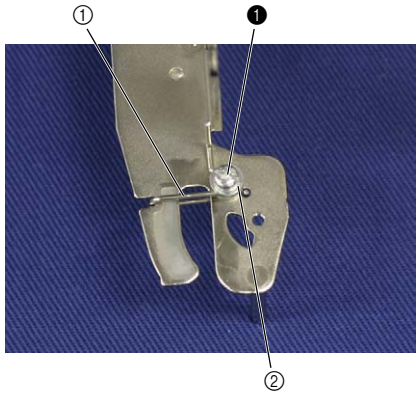
1. Remove the screw ❶, and then remove the thread catching spring case ①, thread cutting shutter ② and the spring S05 from the thread unit.





9 Removal of Thread guide wire

1. Remove the screw ❶, and then remove the thread guide wire ① and the washer, plain ② from the thread unit.

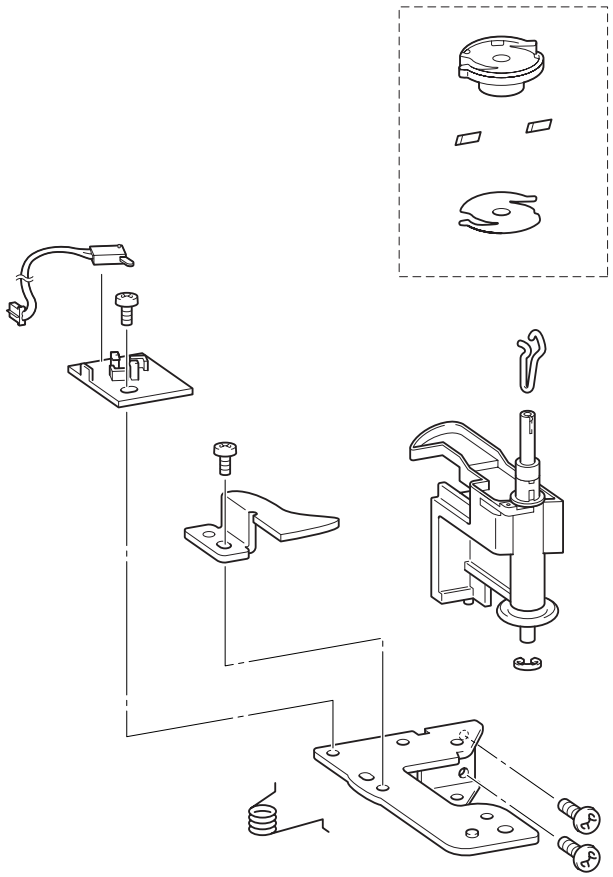


10 Removal of Spring tape

1. Remove the spring tape ① from the thread unit.

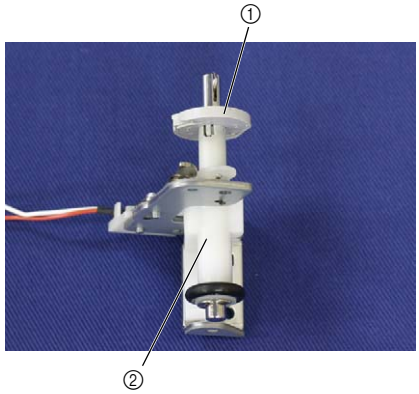
Application

Bobbin winder mechanism location diagram



1 Removal of Bobbin base assy

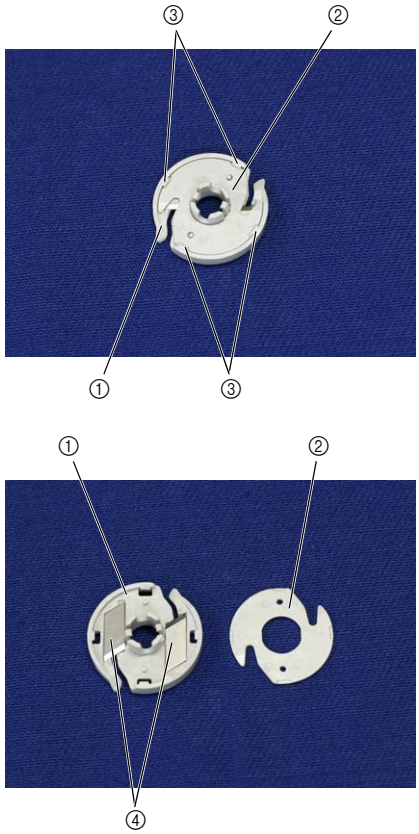
1. Remove the bobbin base assy ① from the bobbin winder assy ②.



1-1 Disassembly of Bobbin base assy

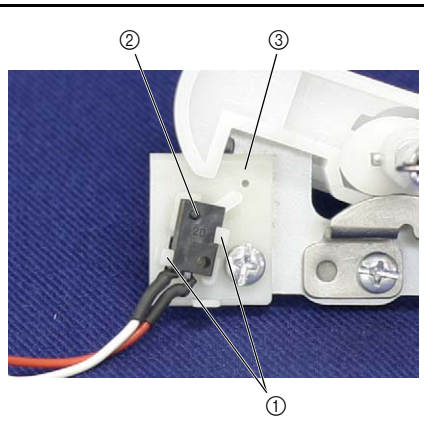
1. Remove the bobbin thread cutter holder ② from the bobbin base assy ①.

   ***Key point**
   - Be careful not to damage the hooks ③ (4 locations).
2. Remove the NT lower thread cutter ④ from the bobbin base assy ①.



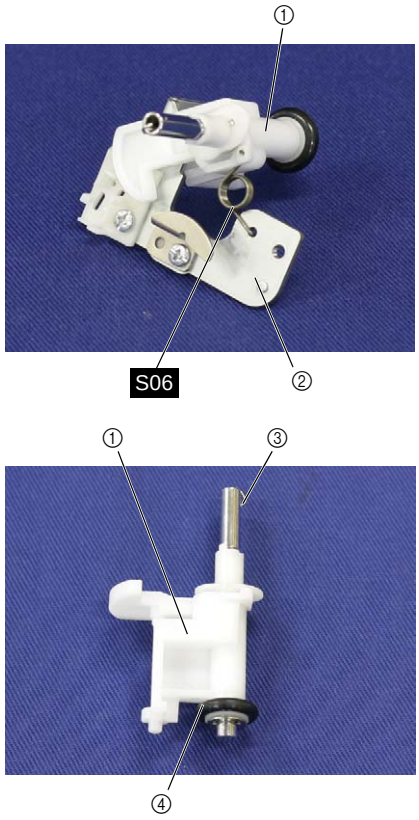
2 Removal of SW assy: BW-F

1. Undo the hooks ① (2 locations), and then remove SW assy: BW-F ② from the bobbin winder assy ③.



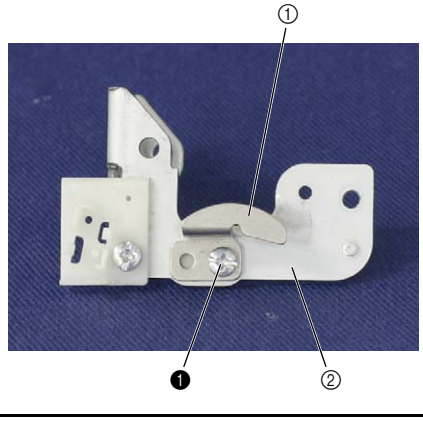
3 Removal of BW shaft holder assembly

1. Open the bobbin winder assy.
2. Remove the spring S06.
3. Remove the BW shaft holder assembly ① from the bobbin winder assy holder ②.
4. Remove the bobbin winder shaft spring ③ from the BW shaft holder assembly ①.
1. Remove the rubber ring ④ from the BW shaft holder assembly ①.



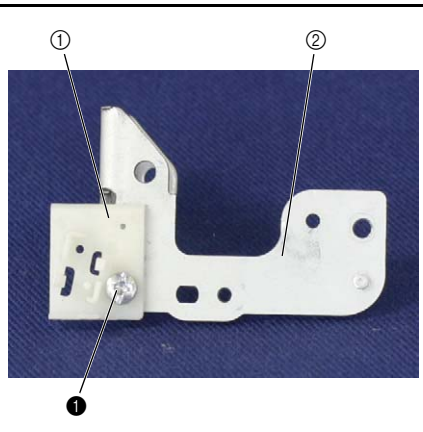
4 Removal of Bobbin winder shaft stopper

1. Remove the screw ❶, and then remove the bobbin winder shaft stopper ① from the bobbin winder assembly holder ②.

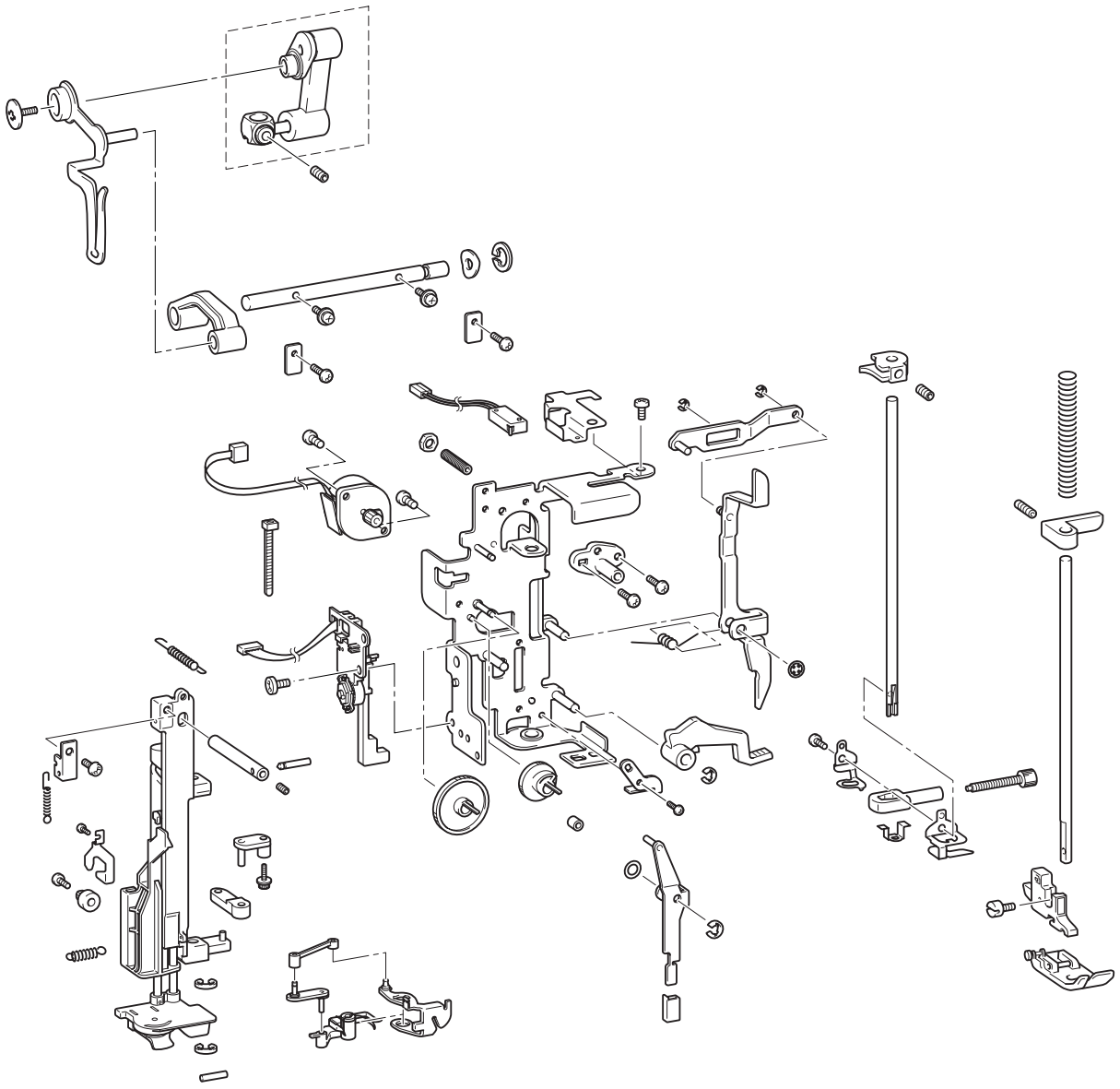


5 Removal of SW adjust plate

1. Remove the screw ❶, and then remove the SW adjust plate ① from the bobbin winder assembly holder ②.



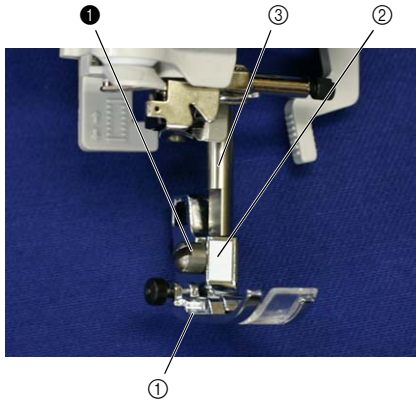
Needle bar/Presser foot unit location diagram



Application

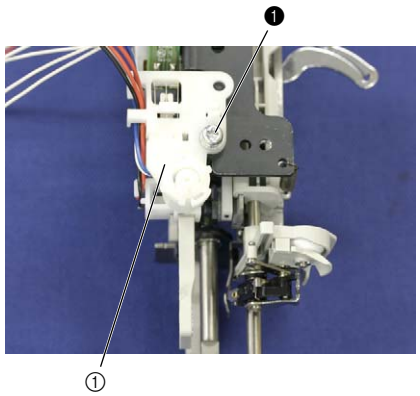
1 Removal of Presser feed holder assy

1. Remove the Z foot ①.
2. Remove the screw ❶, and then remove the presser feed holder assy ② from the presser bar ③.



2 Removal of BH switch assy

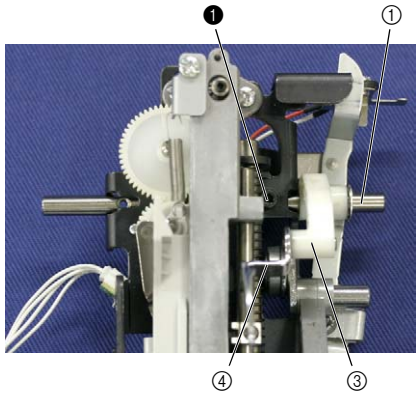
1. Remove the screw ❶, and then remove the BH switch assy ①.

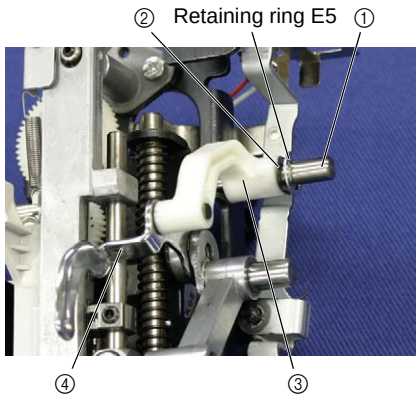


3 Removal of Thread take-up lever link

1. Remove the screw ❶, and then pull the take-up support shaft ①, and then remove the washer, spring ② and the thread take-up lever link ③.

   ***Key point**
   - Pull the thread take-up lever link ③ from the shaft of the thread take-up lever ④.
2. Remove the retaining ring E5 from the take-up support shaft ①.





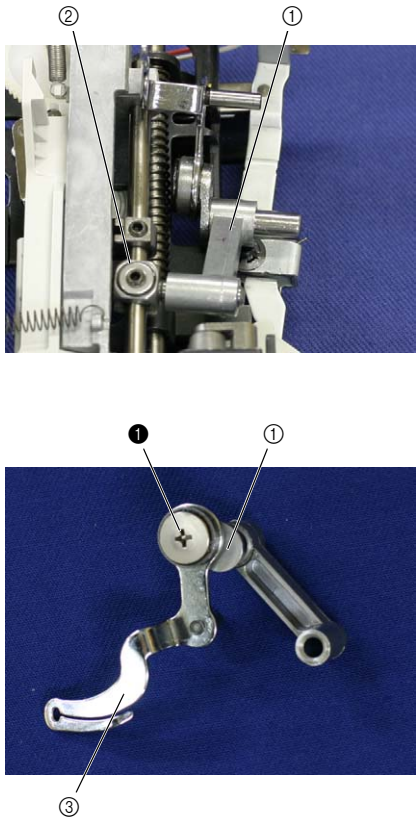
Application

4 Removal of Needle bar crank rod assy

1. Remove the needle bar crank rod assy ① from the needle bar block ②.
2. Remove the screw ❶, and then remove the thread take-up lever ③ from the needle bar crank rod assy ①.

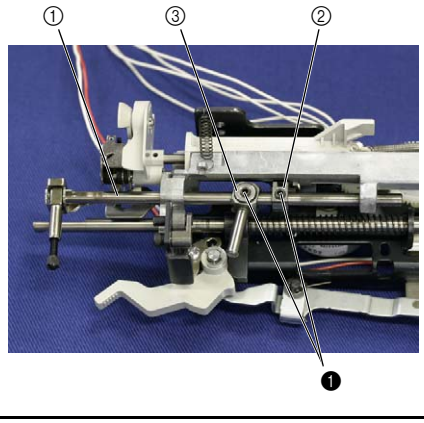
***Key point**

- The screw is reverse threaded.



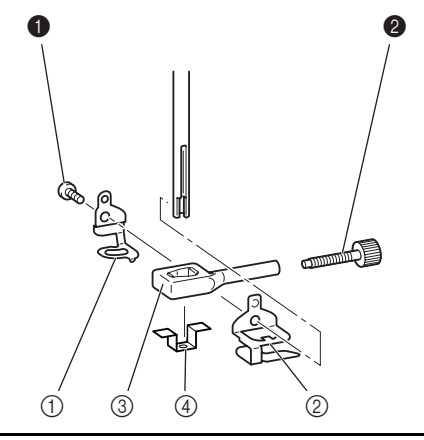
5 Removal of Needle bar assy

1. Remove the 2 screws ❶, and then pull the needle bar assy ① from the needle bar supporter assy, and then remove the needle thread block ② and the needle bar block ③.



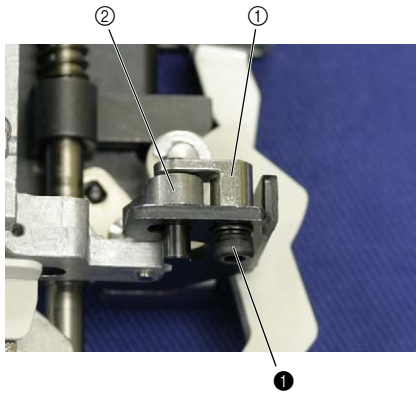
5-1 Disassembly of Needle bar assy

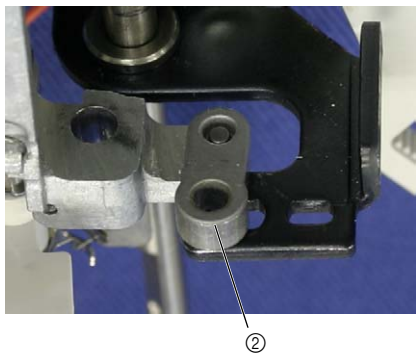
1. Remove the screw ❶, and then remove the needle thread guide spring ① from the needle bar assy.
2. Remove the screw ❷, and then remove the needle bar thread guide ② and the needle block ③ from the needle bar assy.
3. Remove the needle thread plate ④ from the needle block ③.



6 Removal of Shaft assy

1. Remove the screw ❶, and then remove the shaft assy ① from the base holder assy.
2. Remove the needle holder block ② from the shaft of the needle bar supporter assy.



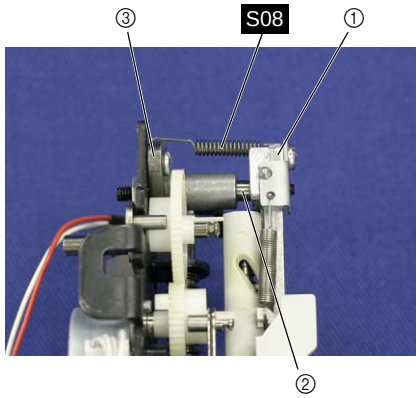


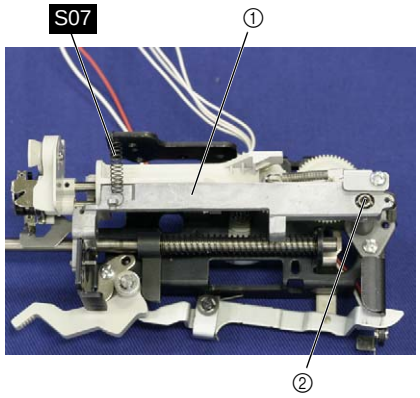
7 Removal of Needle bar supporter assy

1. Remove the spring S07 and the spring S08, and then remove the needle bar supporter assy ① from the base holder assy.

***Key point**

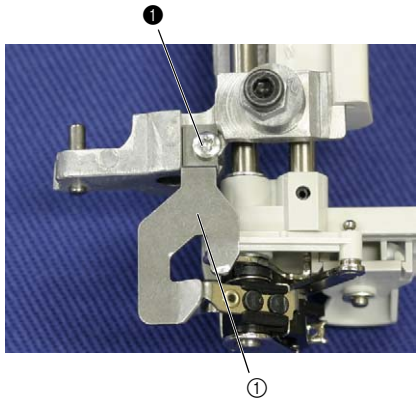
- Pull the shaft ② of the needle bar supporter assy ① from the shaft bushing ③, and then remove it from the upper side.





8 Removal of Hook release plate

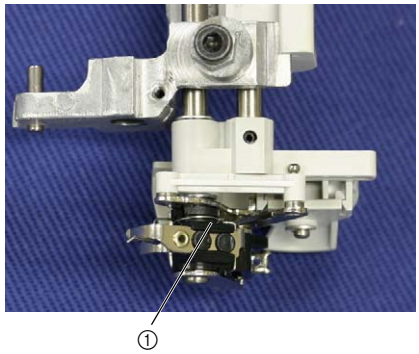
1. Remove the screw ❶, and then remove the hook release plate ① from the needle bar supporter assy.

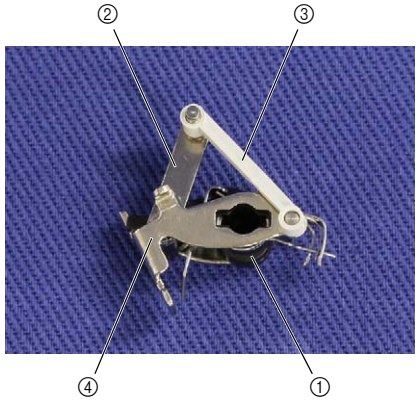


9 Removal of Threader hook assy

1. Remove the threader hook assy ① from the needle bar holder assy.

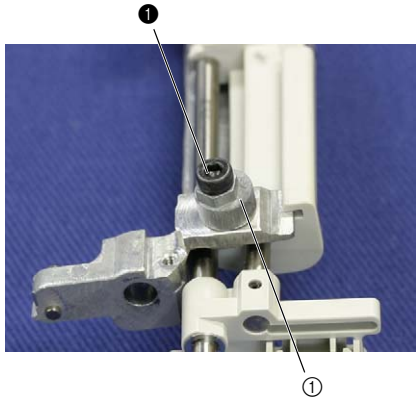
   ***Key point**
   - Pull the threader hook assy ① to the lower side.
2. Disassemble the threader hook assy ①, the link A assy ②, the link B ③ and the thread guide assy ④.





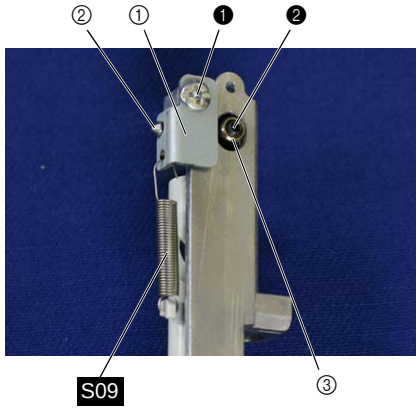
10 Removal of Zigzag adjusting nut

1. Remove the screw ❶, and then remove the zigzag adjusting nut ① from the needle bar supporter assy.



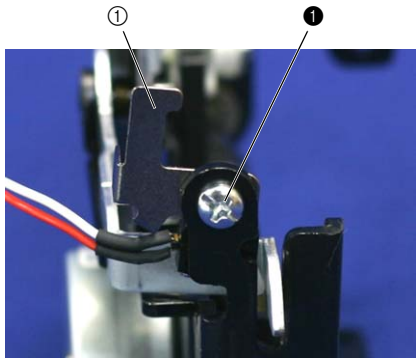
11 Removal of Needle holder shaft A

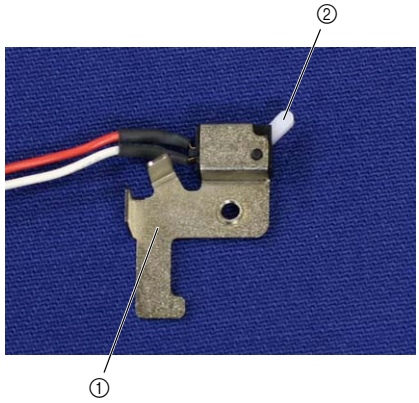
1. Remove the spring S09.
2. Remove the screw ❶, and then remove the plate ① from the needle bar supporter assy.
3. Remove the screw ❷, and then pull the shaft ②, and then remove the needle holder shaft A ③ from the needle bar supporter assy.



12 Removal of PF switch assy

1. Remove the screw ❶, and then remove the presser switch holder ① from the base holder assy.
2. Remove the PF switch assy ② from the presser switch holder ①.

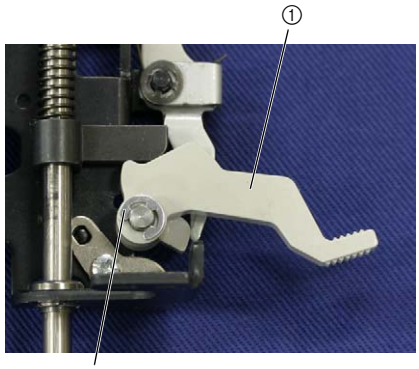




Application

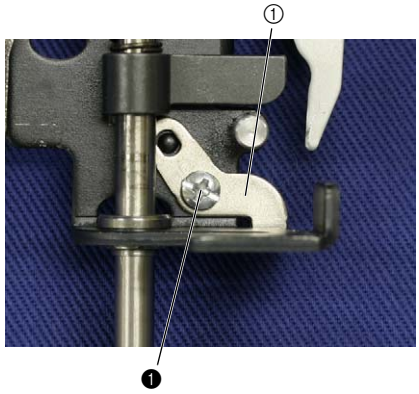
13 Removal of Presser foot lifter

1. Remove the retaining ring E4, and then remove the presser foot lifter ①.



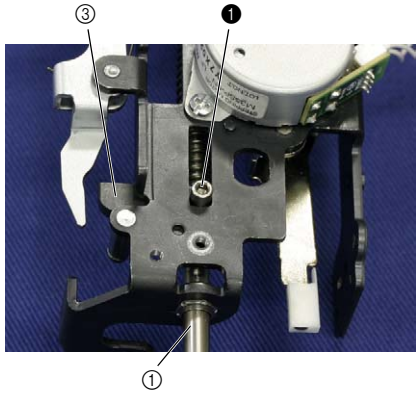
14 Removal of Embroidery presser stopper

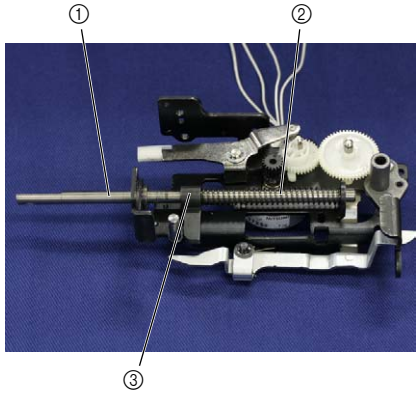
1. Remove the screw ❶, and then remove the embroidery presser stopper ① from the base holder assy.



15 Removal of Presser bar

1. Remove the screw ❶, and then pull the presser bar ① from the base holder assy, and then remove the spring ② and the presser bar clamp ③.

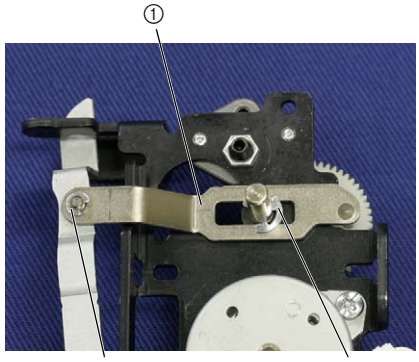




Application

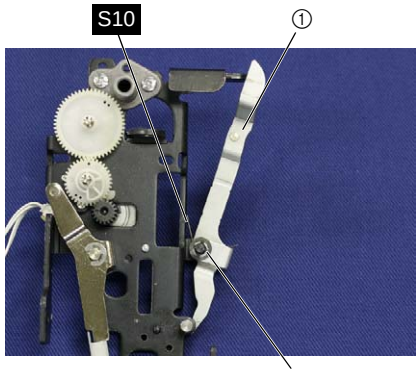
16 Removal of Thread releaser assy

1. Remove the retaining ring E2 and retaining ring E4.
2. Remove the thread releaser assy ① and the polyester slider from the base holder assy.



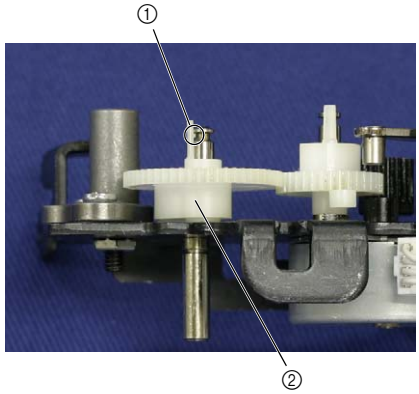
17 Removal of Thread release lever assy

1. Remove the retaining ring CS4, and then remove the thread release lever assy ① and the spring S10 from the base holder assy.



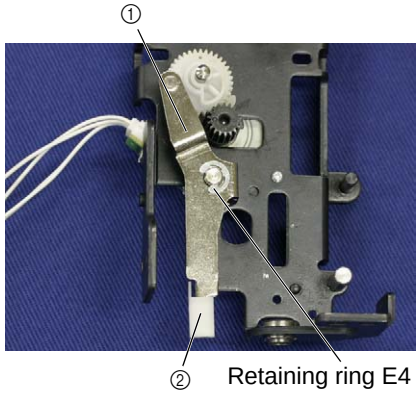
18 Removal of T cam

1. Remove the hook ①, and then remove the T cam ② from the base holder assy.



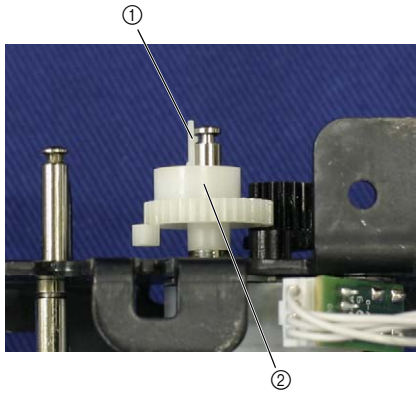
19 Removal of Z zigzag lever assy

1. Remove the Z lever cap ② from the Z zigzag lever assy ①.
2. Remove the retaining ring E4, and then remove the Z zigzag lever assy ① and the polyester slider from the base holder assy.



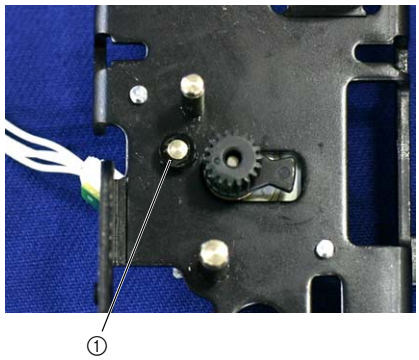
20 Removal of Z zigzag cam

1. Remove the hook ①, and then remove the Z zigzag cam ② from the base holder assy.



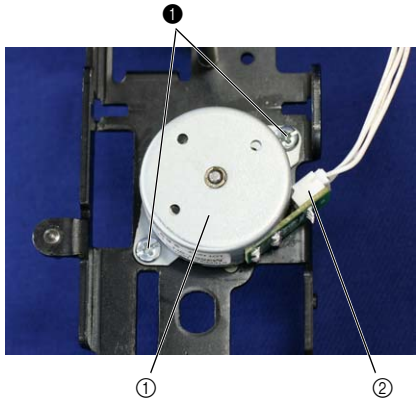
21 Removal of Rubber

1. Remove the rubber ①.



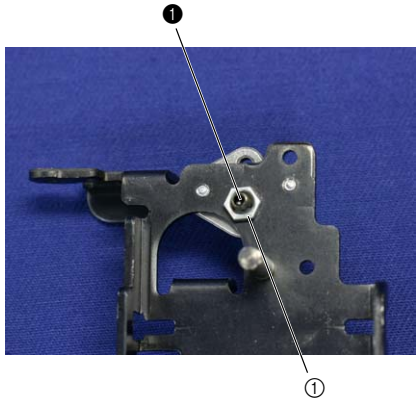
22 Removal of Z pulse motor

1. Remove the 2 screws ❶, and then remove the Z pulse motor ① from the base holder assy.
2. Remove the lead wire assy ② from the Z pulse motor ①.



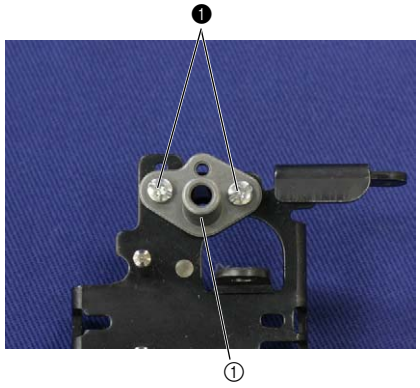
23 Removal of Lock nut

1. Remove the lock nut ① from the base holder assy.
2. Remove the screw ❶.



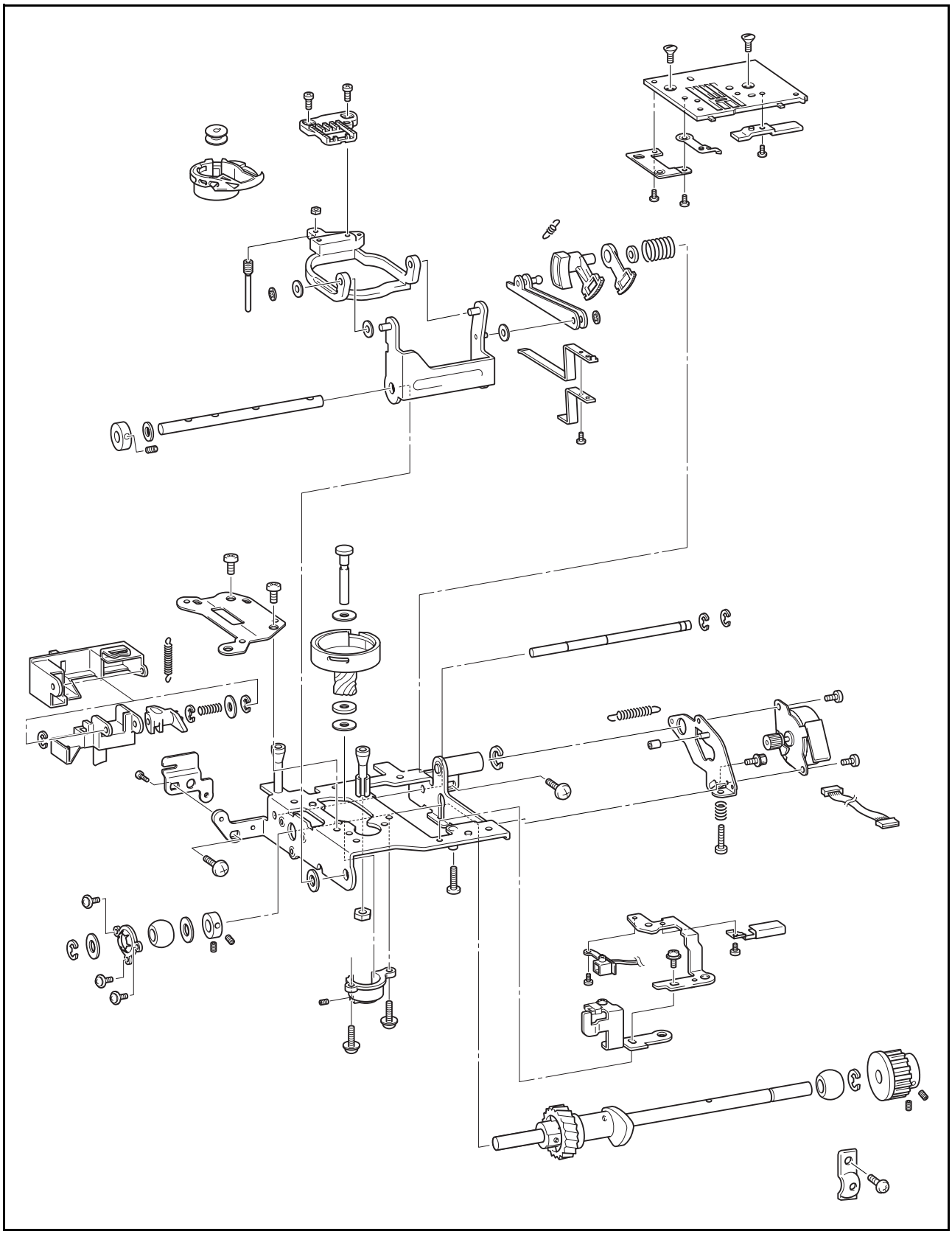
24 Removal of Shaft bushing

1. Remove the 2 screws ❶, and then remove the shaft bushing ① from the base holder assy.



Application

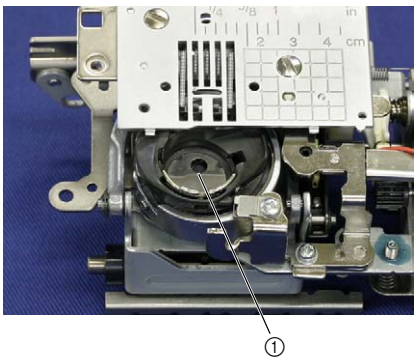
Feed/Rotary hook unit location diagram



Application

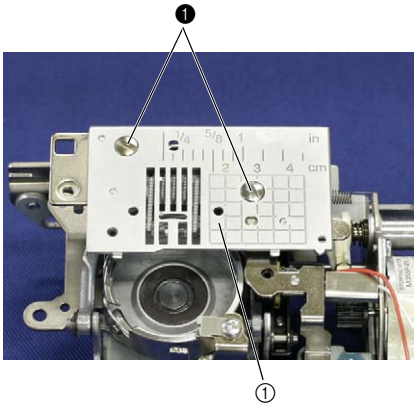
1 Removal of Inner rotary hook assy

1. Remove the inner rotary hook assy ①.



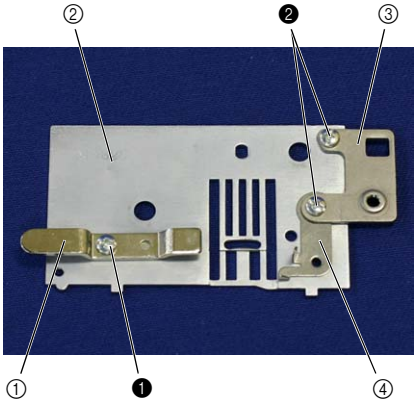
2 Removal of Removal of Needle plate A assy

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



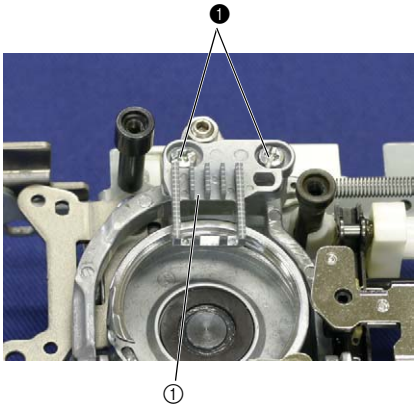
2-1 Disassembly of Needle plate A assy

1. Remove the screw ❶, and then remove the F gear stopper plate ① from the needle plate A ②.
2. Remove the 2 screws ❷, and then remove the needle plate B support plate ③ and the stopper plate ④ from the needle plate A ②.



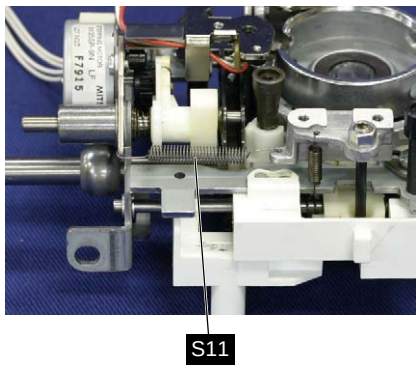
3 Removal of Feed dog

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



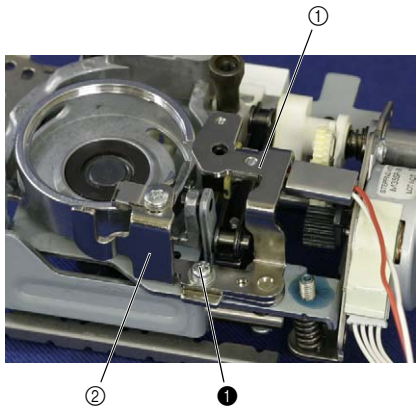
4 Removal of Spring

1. Remove the spring S11.



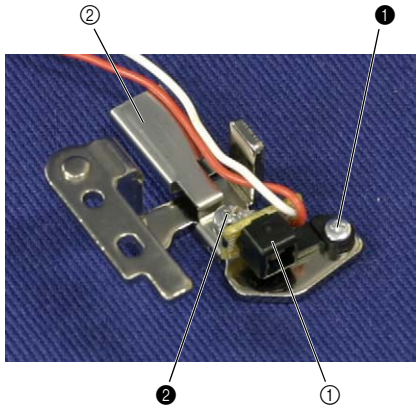
5 Removal of Photo diode holder assy/Inner rotary hook bracket assy

1. Remove the screw ❶, and then remove the photo diode supporter ① and the inner rotary hook bracket assy ② from the base plate assy.



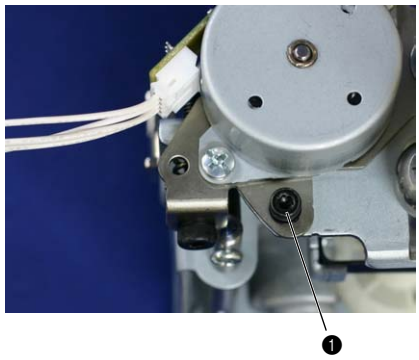
5-1 Disassembly of Photo diode holder assy

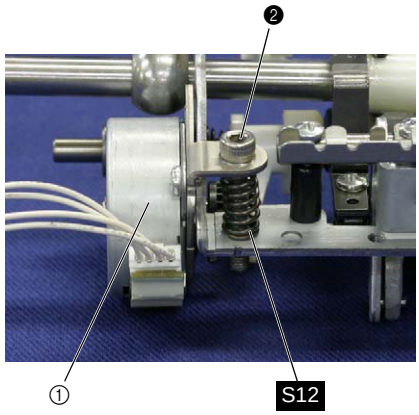
1. Remove the screw ❶, and then remove the photo diode holder assy ①.
2. Remove the screw ❷, and then remove the cord holder ②.

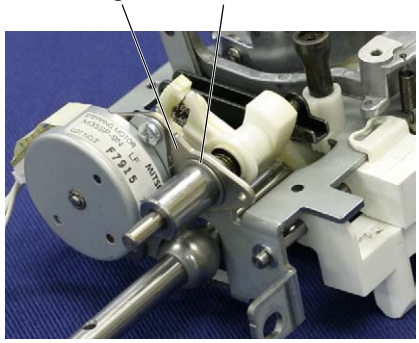


6 Removal of FPM holder sub assy

1. Remove the screw ❶.
2. Remove the screw ❷, and then remove the spring S12.
3. Remove the retaining ring CRS-10, and then remove the FPM holder sub assy ① from the base plate assy.



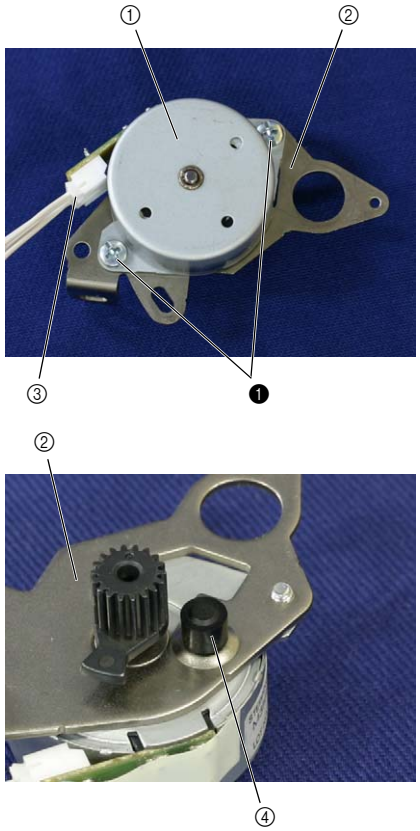




Application

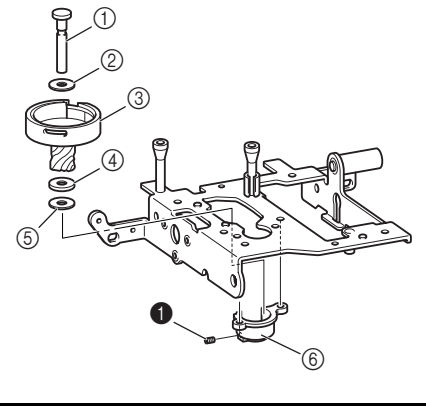
7 Removal of F pulse motor

1. Remove the 2 screws ❶, and then remove the F pulse motor ① from the FPM holder sub assy ②.
2. Remove the lead wire assy FPM-LE ③ from the F pulse motor ①.
3. Remove the rubber ④ from the FPM holder sub assy ②.



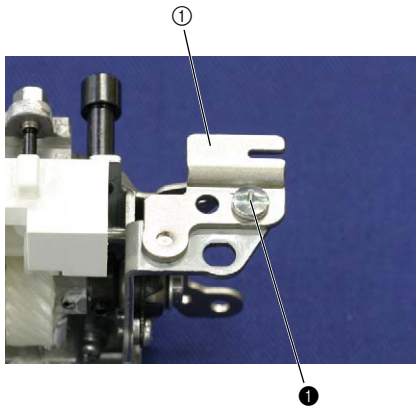
8 Removal of Outer rotary hook assy

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



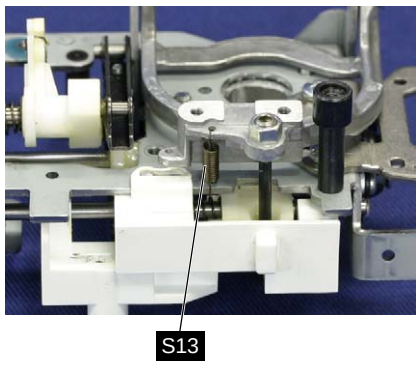
9 Removal of Thread cutter module supporter

1. Remove the screw ❶, and then remove the thread cutter module supporter ①.



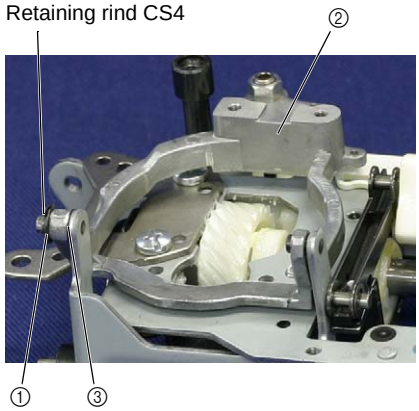
10 Removal of Spring

1. Remove the spring S13.



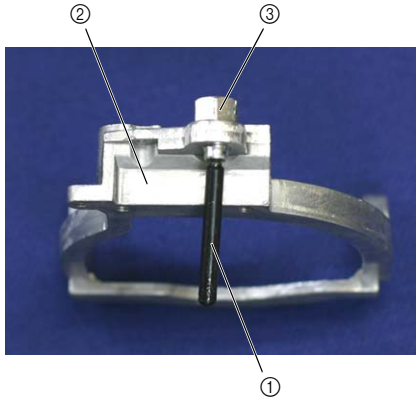
11 Removal of Feed bar

1. Remove the retaining rind CS4, and then remove the polyester slider ①, the feed bar ② and the polyester slider ③ from the feed arm A assy.



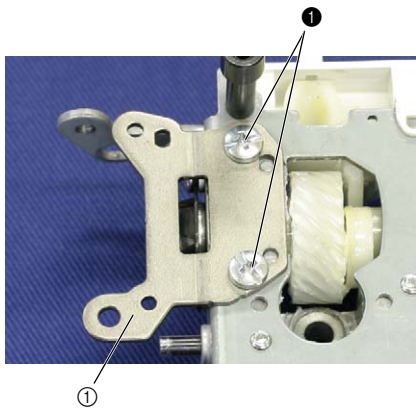
12 Removal of Vertical adjuster screw assy

1. Remove the vertical adjuster screw assy ① from the feed bar ②.
2. Remove the M5 nut ③ from the vertical adjuster screw assy ①.



13 Removal of Thread cutter module supporter

1. Remove the screw ❶, and then remove the thread cutter module supporter ①.

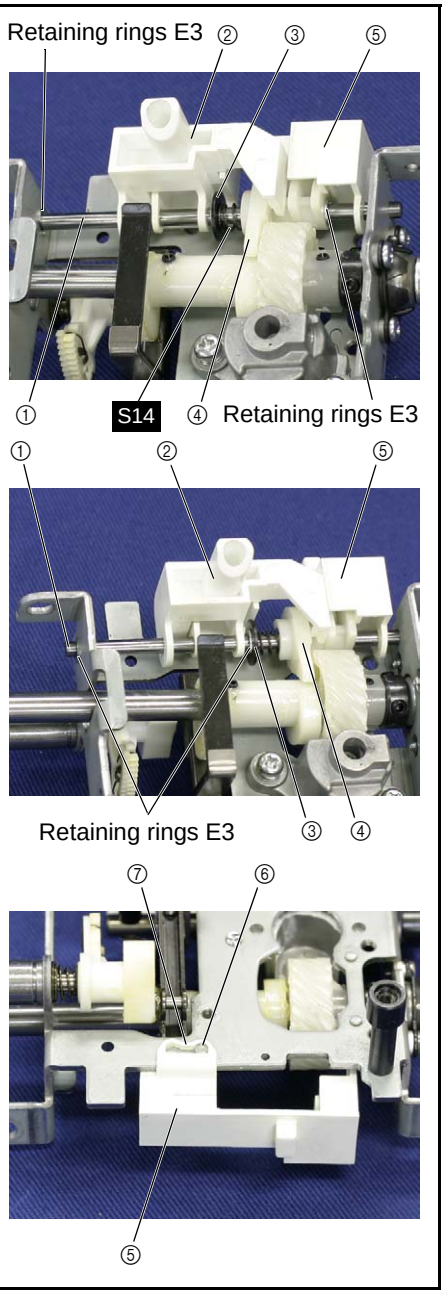


14 Removal of Drop knob / drop lever

1. Remove the 3 retaining rings E3.
2. Remove the vertical feed shaft ①, and then remove the drop lever ②, the washer plain L4 ③, the spring S14 and the vertical lever ④.
3. Remove the retaining ring E3 from the vertical feed shaft ①.
4. Remove the drop knob ⑤ from the base plate assy.

***Key point**

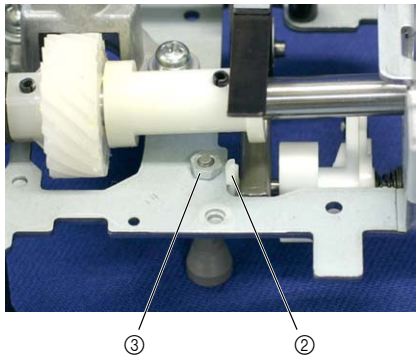
- Remove it while lifting the section ⑦ of the drop knob ⑤ to get over the boss part ⑥ of the base plate assy.

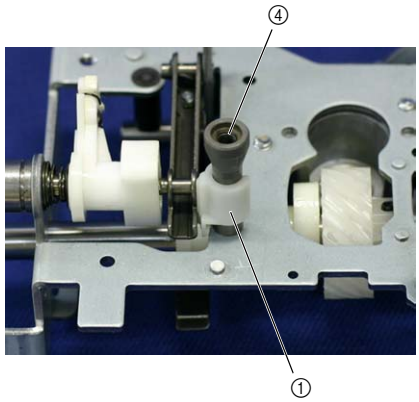


Application

15 Removal of Needle plate supporter shaft B

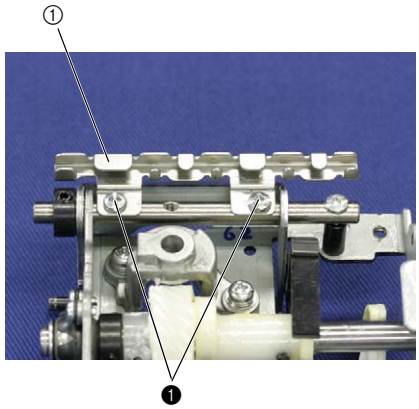
1. Remove the hook ② of the feed arm supporter ①.
2. Remove the nut 1 M3 ③.
3. Remove the needle plate supporter shaft B ④ from the base plate assy.
4. Remove the feed arm supporter ① from the needle plate supporter shaft B ④.





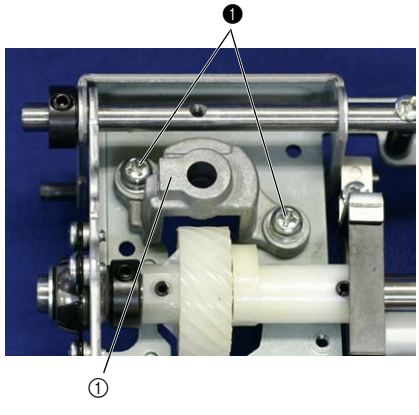
16 Removal of Lead wire guide holder

1. Remove the 2 screws ❶, and then remove the lead wire guide holder ① from the base plate assy.



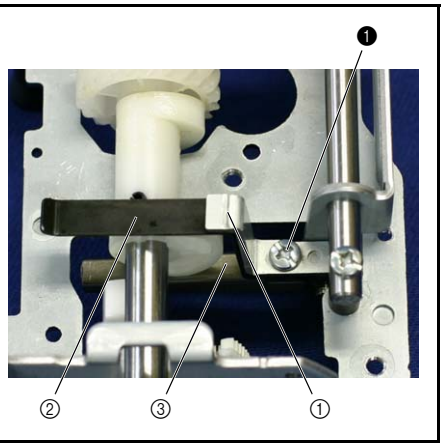
17 Removal of Shaft supporter

1. Remove the 2 screws ❶, and then remove the shaft supporter ① from the base plate assy.



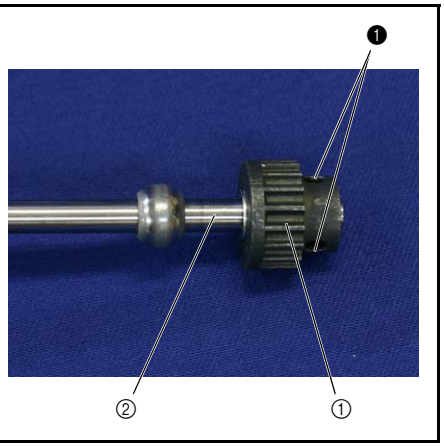
18 Removal of Feed supporting plate

1. Remove the screw ❶, and then remove the feed supporting plate B ① and the feed supporting plate ② from the feed arm assy ③.



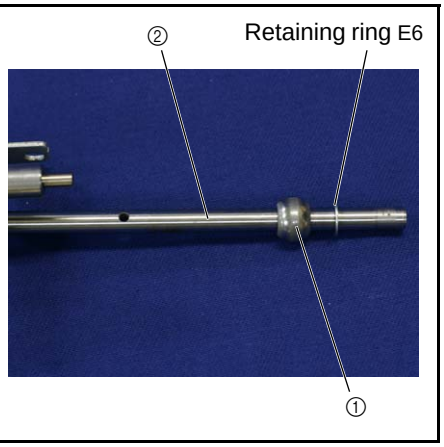
19 Removal of Timing pulley D

1. Remove the 2 screws ❶, and then remove the timing pulley D ① from the lower shaft assy ②.



20 Removal of Lower shaft bushing

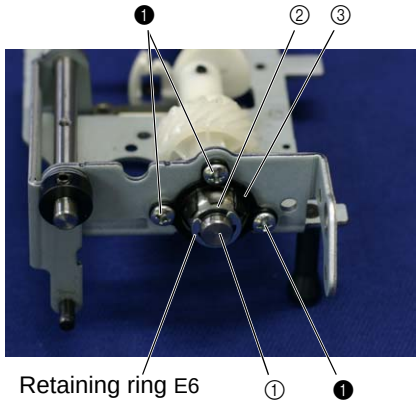
1. Remove the retaining ring E6, and then lower shaft bushing ① from the lower shaft assy ②.

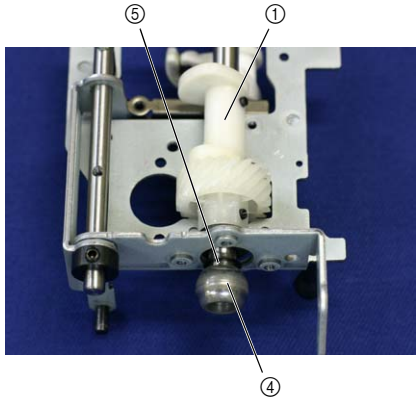


Application

21 Removal of Bushing presser B

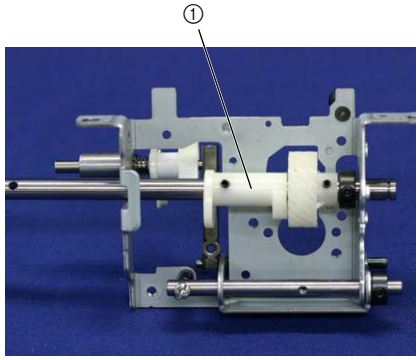
1. Remove the retaining ring E6, and then remove the “washer, thrust ②” from the lower shaft assy ①.
2. Remove the 3 screws ❶, and then remove the bushing presser B ③ from the base plate assy.
3. Remove the lower shaft bushing ④ and the “washer, thrust ⑤” from the lower shaft assy ①.

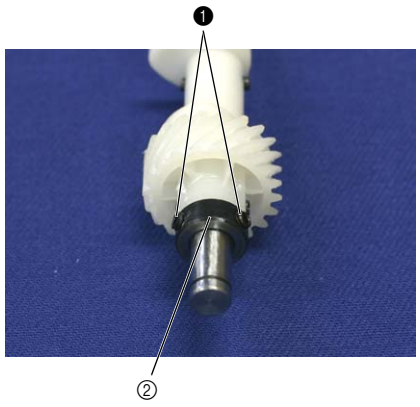




22 Removal of Lower shaft assy

1. Remove the lower shaft assy ① from the base plate assy.
2. Remove the 2 screws ❶, and then remove the set collar ②.



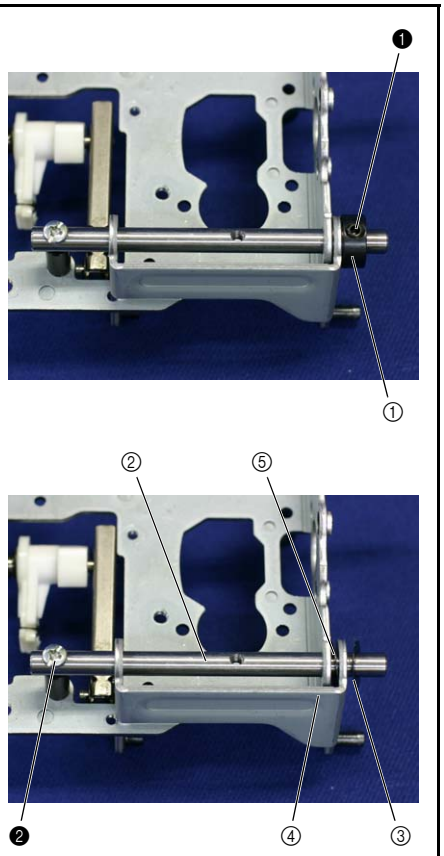


23 Removal of Feed arm A assy

1. Remove the screw ❶, and then remove the set collar ①.
2. Remove the screws ❷, and then pull the horizontal feed shaft ②, and then remove the "washer, thrust ③", the feed arm A assy ④ and the "washer, thrust ⑤".

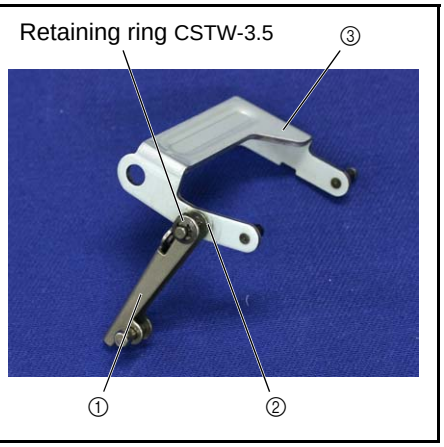
***Key point**

- Remove the feed regulator slide shaft of the feed arm B assy from the feed adjuster.



24 Removal of Feed arm B assy

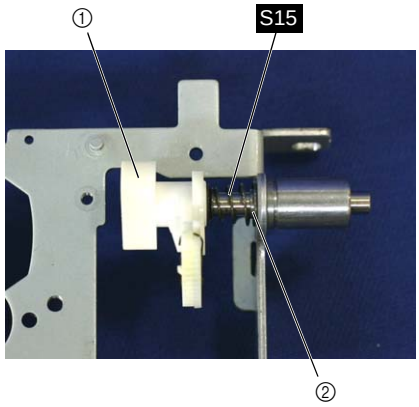
1. Remove the retaining ring CSTW-3.5, and then remove the feed arm B assy ① and the polyester slider ② from the feed arm A assy ③.



Application

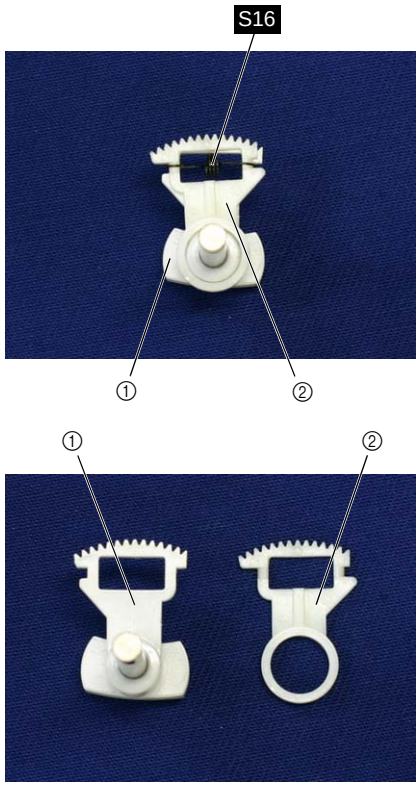
25 Removal of Feed adjuster assy

1. Pull the feed adjuster ① from the base plate assy and then remove the spring S15 and the polyester slider ②.



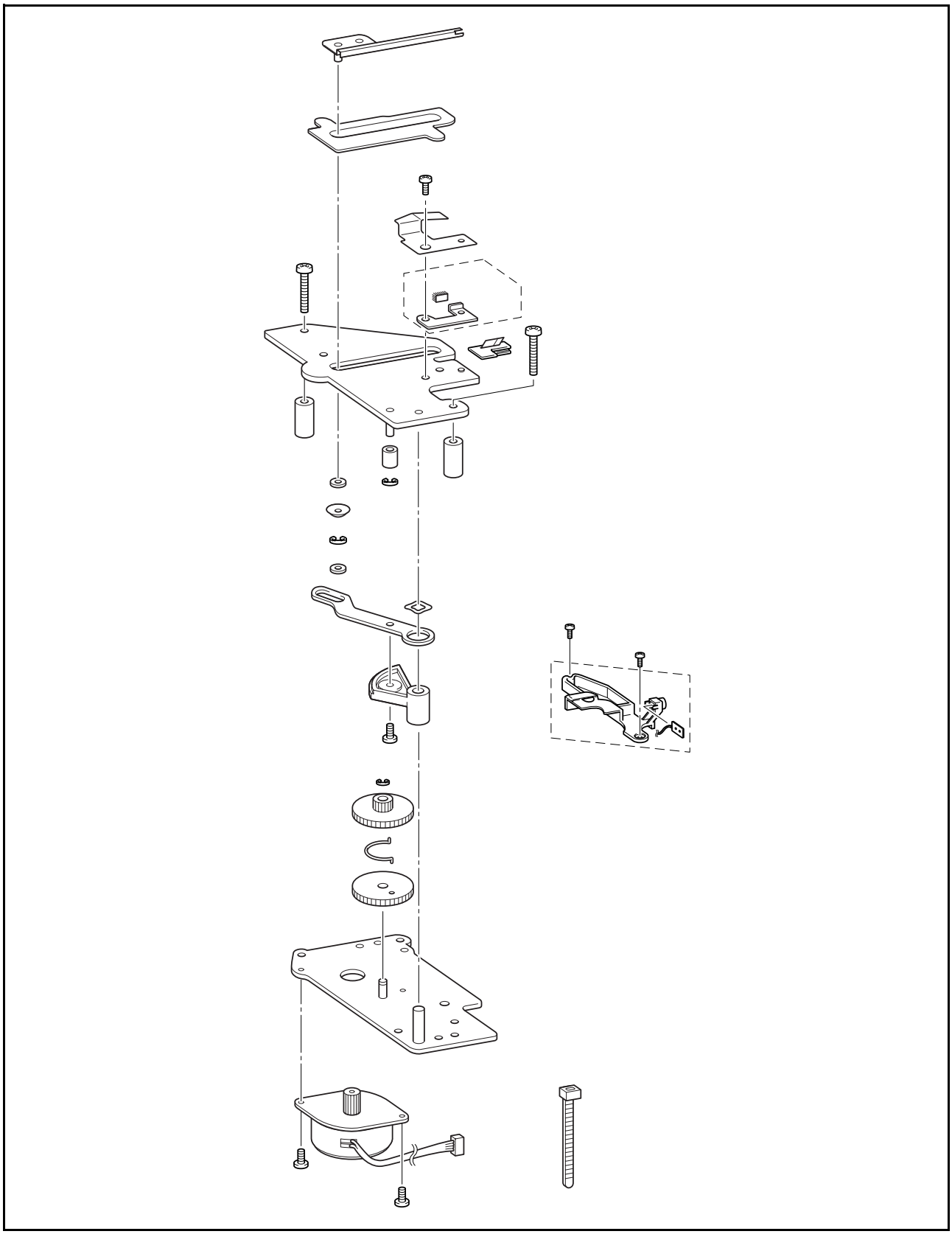
26 Disassembly of Feed adjuster assy

1. Remove the spring S16, and then remove the F gear ② from the feed adjuster ①.



Application

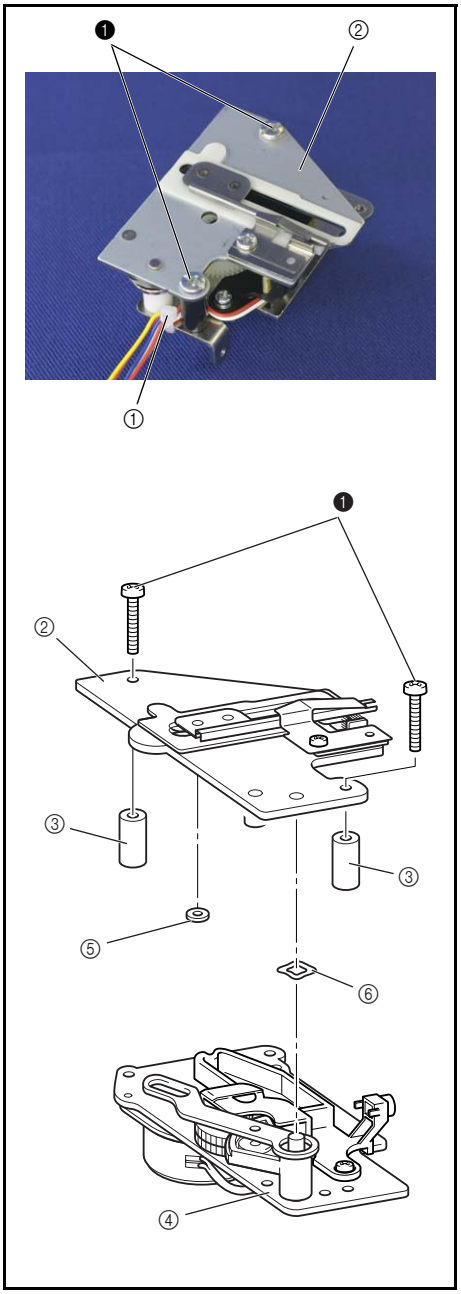
Thread cutter unit location diagram



Application

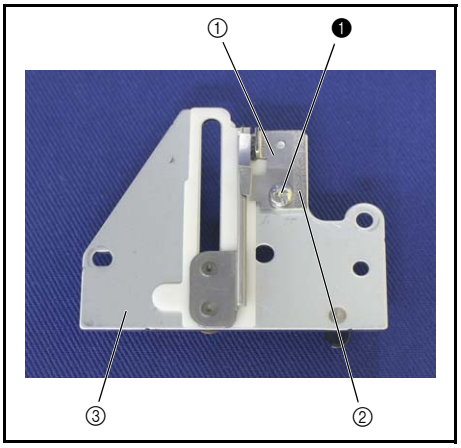
1 Removal of Thread cutter frame assy

1. Cut the band ①.
2. Remove the 2 screws ❶, and then remove the thread cutter frame assy ② and the 2 collars ③ from the motor holder assy ④.
3. Remove the polyester slider ⑤ from the thread cutter frame assy ②.
4. Remove the wave-shape spring washer ⑥ from the motor holder assy ④.



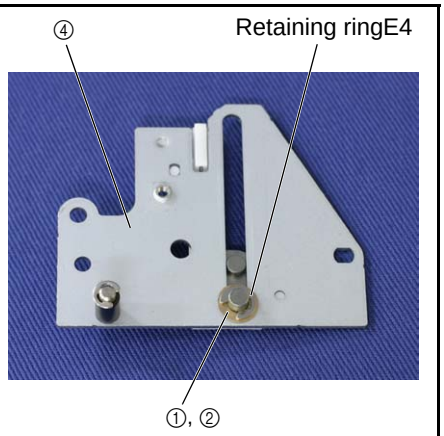
2 Removal of Presser plate assy

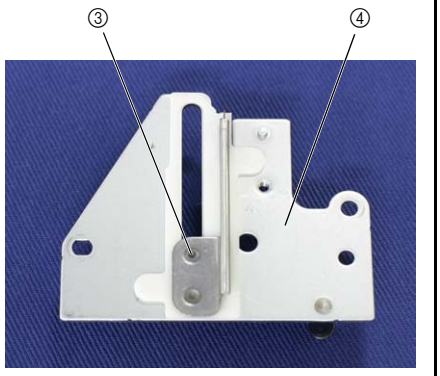
1. Remove the screw ❶, and then remove the spring plate ① and the presser plate assy ② from the thread cutter frame assy ③.



3 Removal of Tread hook assy

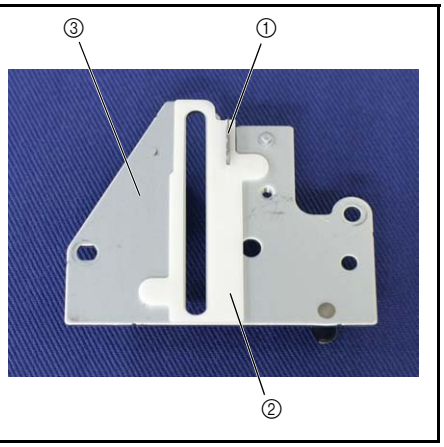
1. Remove the retaining ring E4, and then remove the washer ① and the polyester slider ②.
2. Remove the thread hook assy ③ from the thread cutter frame assy ④.





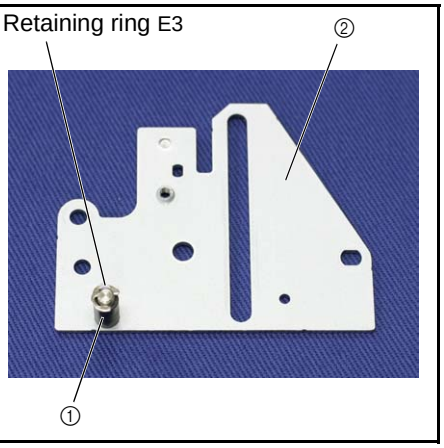
4 Removal of Spacer

1. Remove the NT lower thread cutter ① from the spacer ②.
2. Remove the spacer ② from the thread cutter frame assy ③.



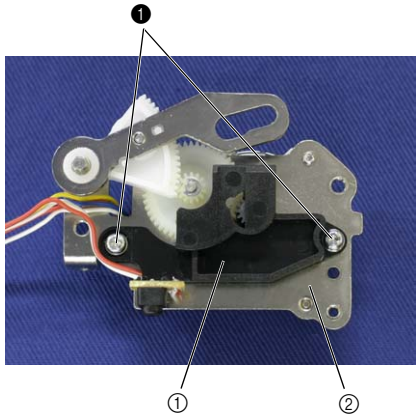
5 Removal of Rubber

1. Remove the retaining ring E3, and then remove the rubber ① from the thread cutter frame assy ②.



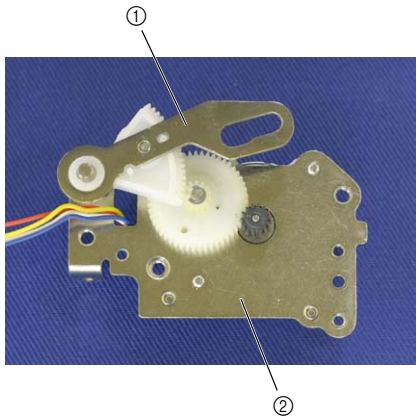
6 Removal of Photo transistor assy

1. Remove the 2 screws ❶, and then remove the photo transistor ① from the motor holder assy ②.



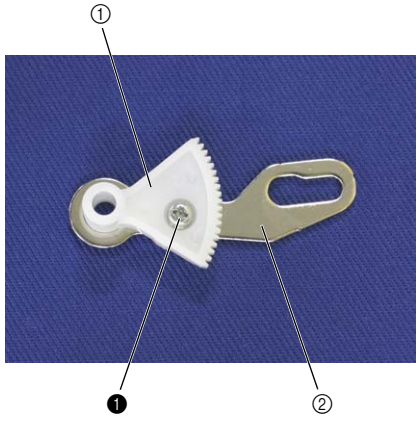
7 Removal of Thread cutter lever assy

1. Remove the thread cutter lever assy ① from the motor holder assy ②.



7-1 Disassembly of Thread cutter lever assy

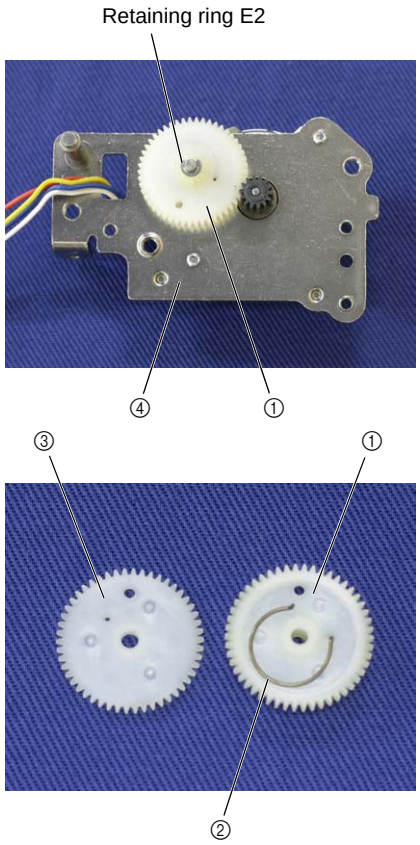
1. Remove the screw ❶, and then remove the thread cutter lever gear ① from the thread cutter lever ②.



Application

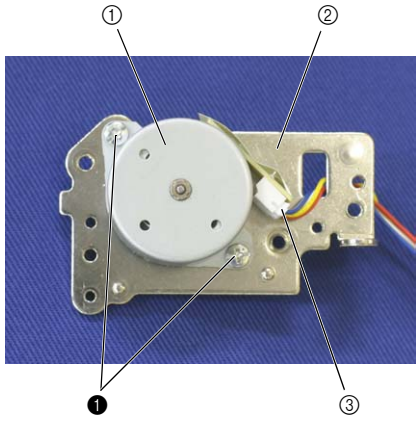
8 Removal of Idle gear A/B

1. Remove the retaining ring E2, and then remove the idle gear A ①, the spring ② and the idle gear B ③ from the motor holder assy ④.

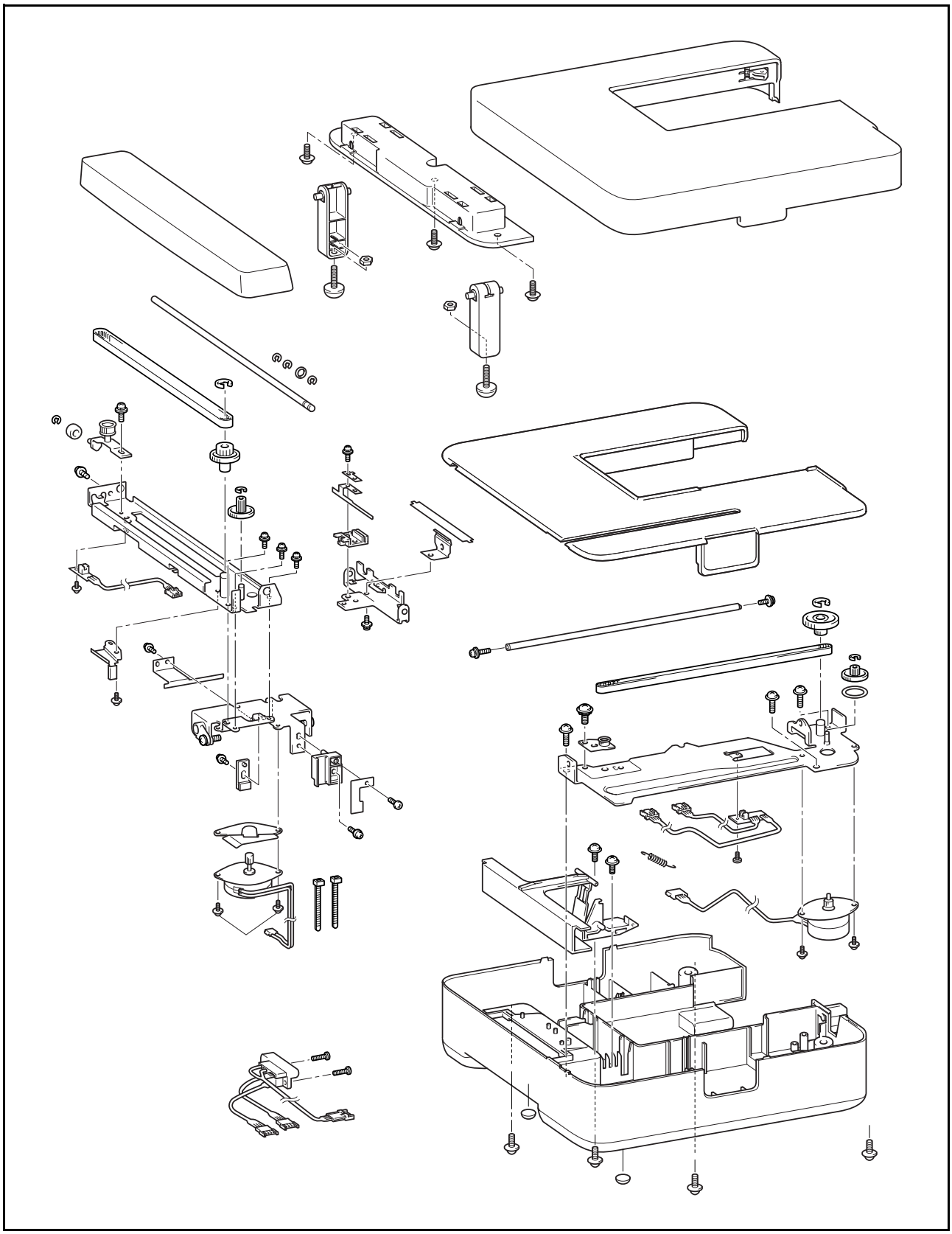


9 Removal of Motor pulse

1. Remove the 2 screws ❶, and then remove the motor pulse ① from the motor holder assy ②.
2. Remove the CPM lead wire assy ③ from the motor pulse ①.



Embroidery unit location diagram



Application

1 Removal of ES top cover

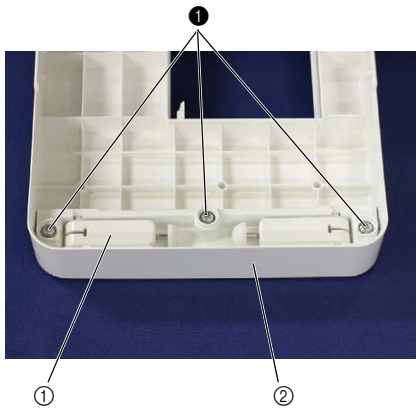
1. Remove the ES top cover ① from the embroidery.

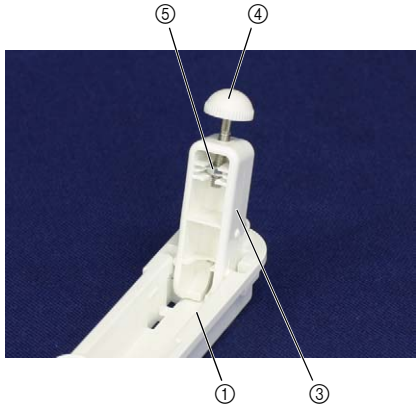
***Key point**

- Remove the hooks (2 locations), and then remove the ES top cover.

2 Removal of ES foot cover

1. Remove the 3 screws ❶, and then remove the ES foot cover ① from the ES top cover ②.
2. Remove the 2 ES foot ③ from the ES foot cover ①.
3. Remove the 2 adjusting foot ④ from the 2 ES foot ③.
4. Remove the 2 nut 2 M4 ⑤ from the 2 ES foot ③.





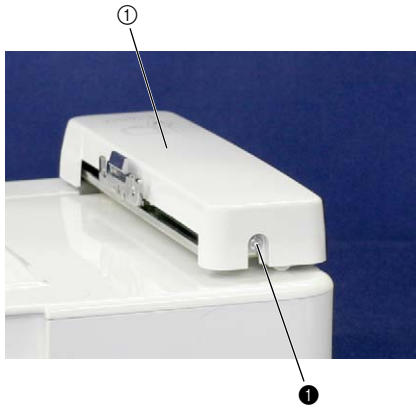
3 Removal of Carriage cover

1. Move the X carriage assy to the right side.

***Key point**

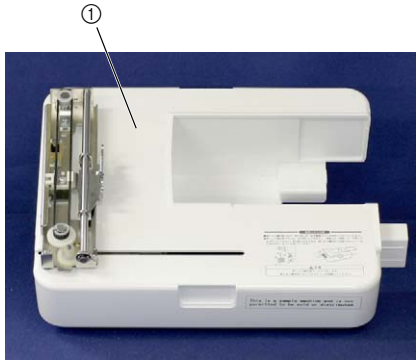
- Set the embroidery as shown in the right figure.

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



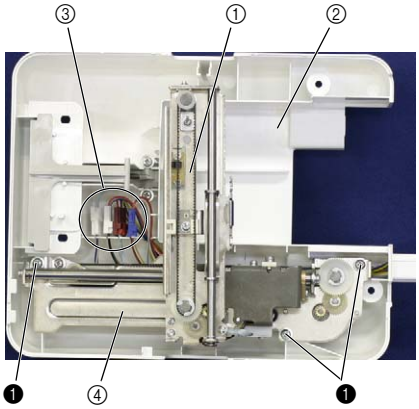
4 Removal of ES cover U

1. Remove the 4 screws ❶, and then remove the ES cover U ①.
2. Set the embroidery as shown in the right figure, and then slide the ES cover U ① to the right side. And remove it.



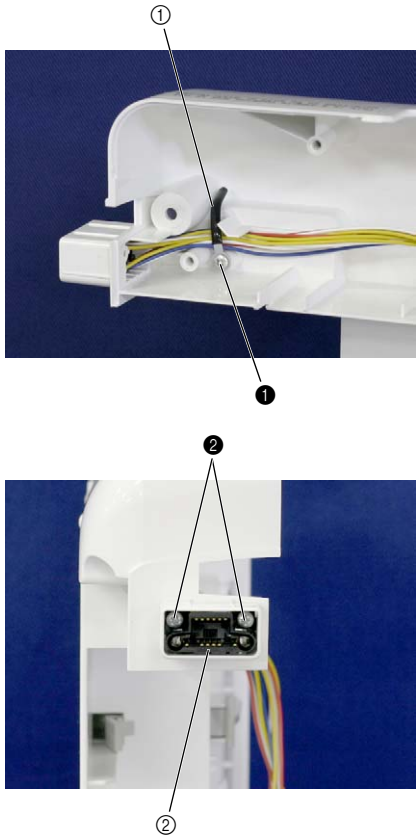
5 Removal of Main frame assy

1. Move the X carriage assy ① to the position where the screw is seen.
2. Remove the 4 lead wires assy from the guide part ③ of the ES cover D, and then remove the 4 connectors.
3. Remove the 3 screws ❶, and then remove the ES cover D ② from the main frame assy ④.



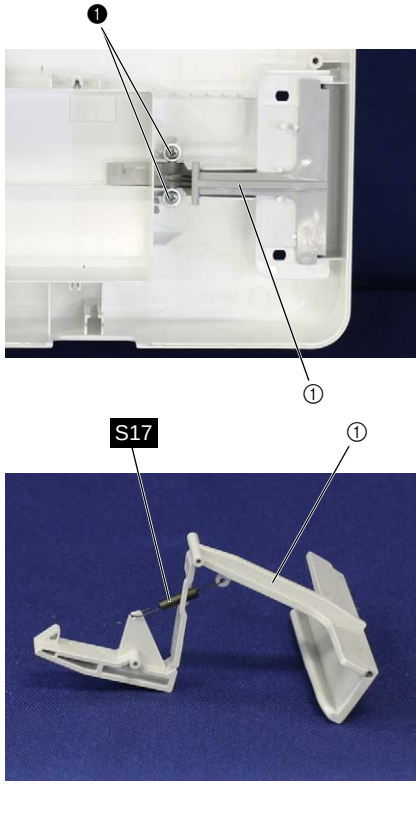
6 Removal of lead wire assy: EMB unit

1. Remove the screw ❶, and then remove the coaching clip ①.
2. Remove the 2 screws ❷, and then remove the lead wire assy: EMB unit ② from the ES cover D.



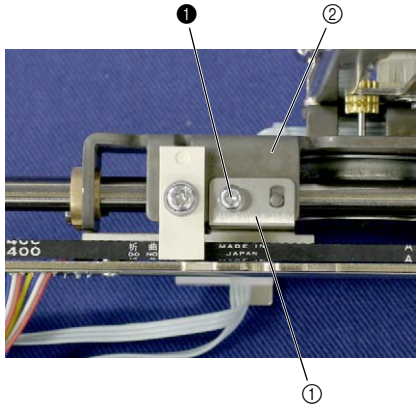
7 Removal of Handle

1. Remove the 2 screws ❶, and then remove the handle ① from the ES cover D.
2. Remove the spring S17 from the handle ①.



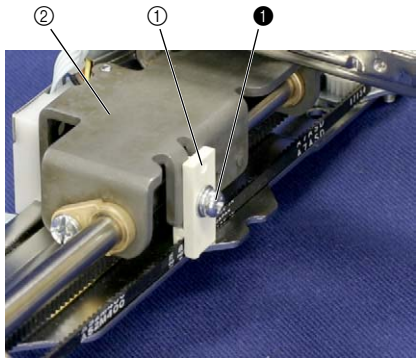
8 Removal of X shutter

1. Remove the screw ❶, and then remove the X shutter ① from the X carriage guide plate assy ②.



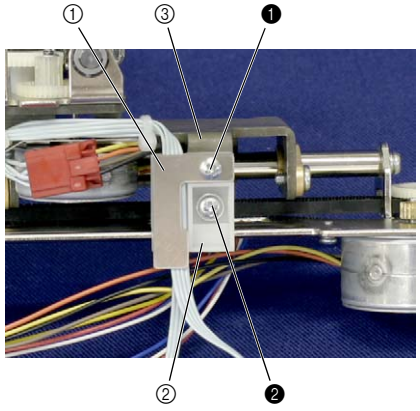
9 Removal of X belt presser

1. Remove the screw ❶, and then remove the X belt presser ① from the X carriage guide plate assy ②.



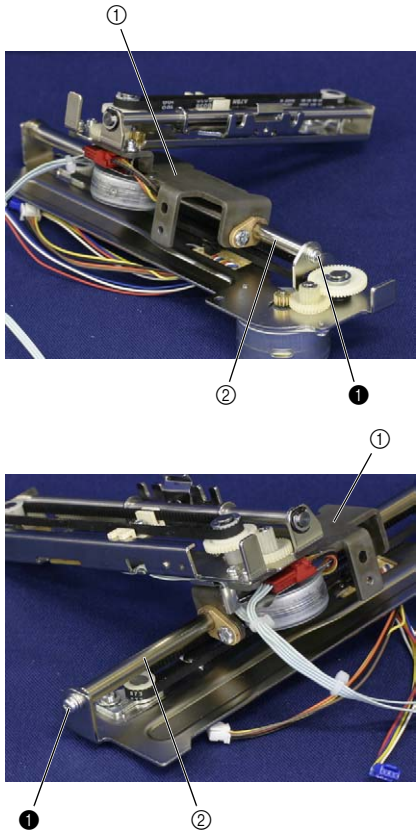
10 Removal of X slider

1. Remove the screw ❶, and then remove the cord presser ① from the X slider ②.
2. Remove the screw ❷, and then X slider ② from the X carriage guide plate assy ③.



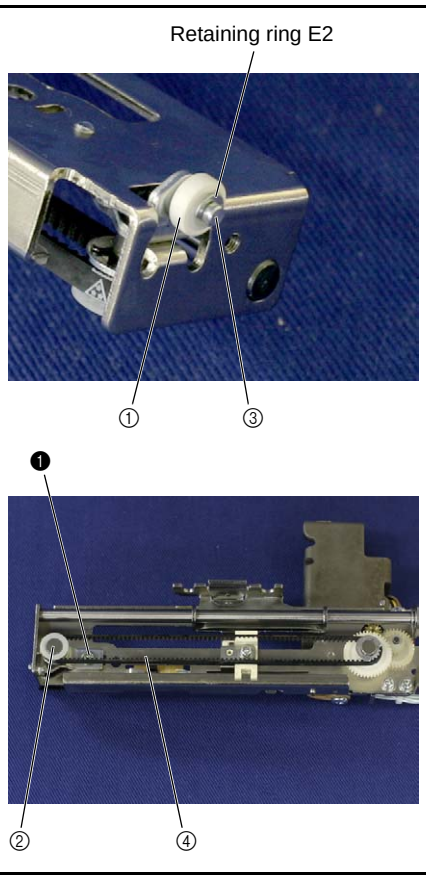
11 Removal of X carriage guide plate assy / X guide shaft

1. Remove the 2 screws ❶, and then remove the X carriage guide plate assy ① and the X guide shaft ② from the main frame assy.
2. Remove the X guide shaft ② from the X carriage guide plate assy ①.



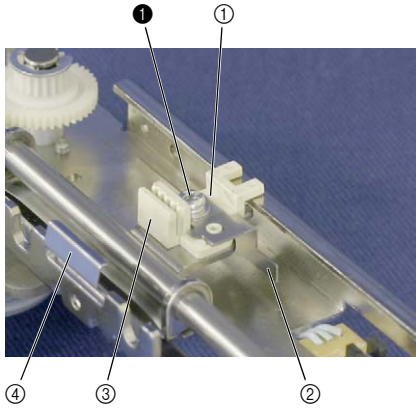
12 Removal of Y tension pulley assy

1. Remove the retaining ring E2, and then remove the roller assy ① from the shaft ③ of the Y tension pulley assy ②.
2. Remove the screw ❶, and then remove the Y tension pulley assy ② from the X carriage assy.
3. Remove the T belt 40S2M316. ④.



13 Removal of Y slider

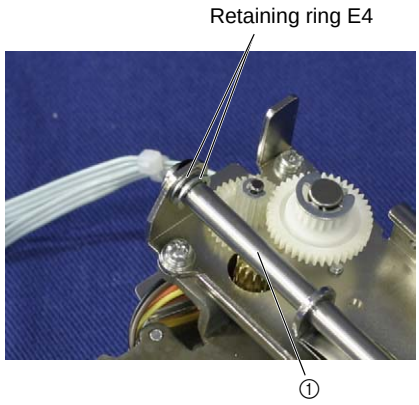
1. Remove the screw ❶, and there move the shutter presser plate ①, the Y shutter ② and the Y slider ③ from the Y carriage ④.

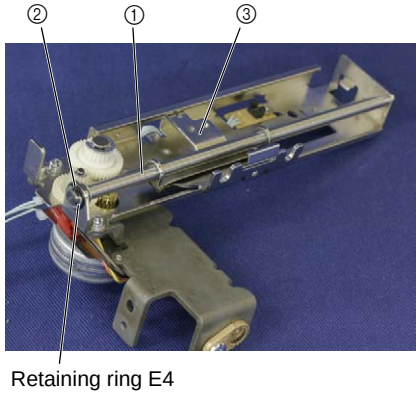


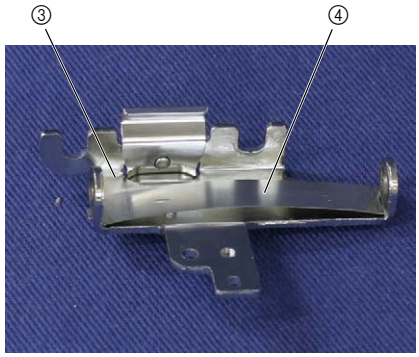
Application

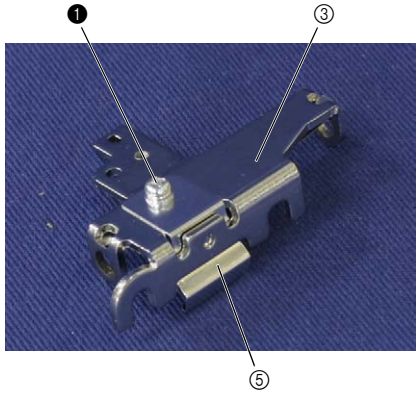
14 Removal of Y carriage

1. Remove the 2 retaining rings E4, and then remove the Y guide shaft ① and remove the washer, wave spring ② and the Y carriage ③ from the X carriage assy.
2. Remove the retaining ring E4 from the Y guide shaft ①.
3. Remove the Y presser plate ④ from the Y carriage ③.
4. Remove the screw ❶, and then remove the notched spring ⑤ from the Y carriage ③.





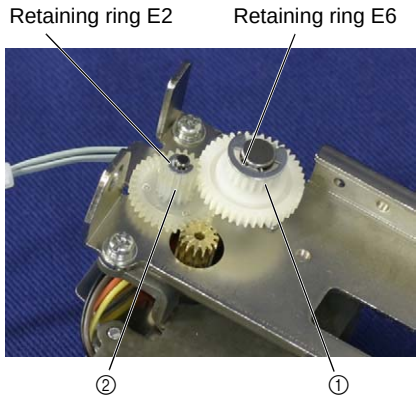




Application

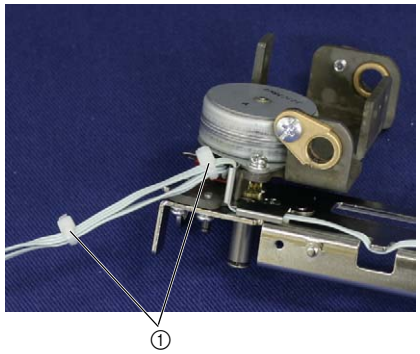
15 Removal of Y driving gear / Y gear

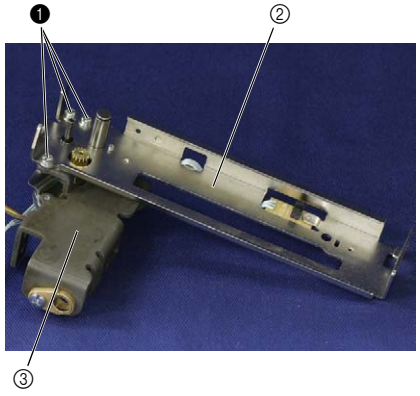
1. Remove the retaining ring E6, and then remove the Y driving gear ① from the X carriage assy.
2. Remove the retaining ring E2, and then remove the Y gear ② from the X carriage assy.



16 Removal of X carriage assy

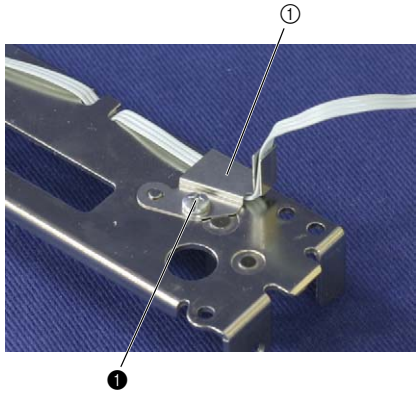
1. Cut the 2 bands ①.
2. Remove the 3 screws ❶, and then remove the X carriage assy ② from the X carriage guide plate assy ③.





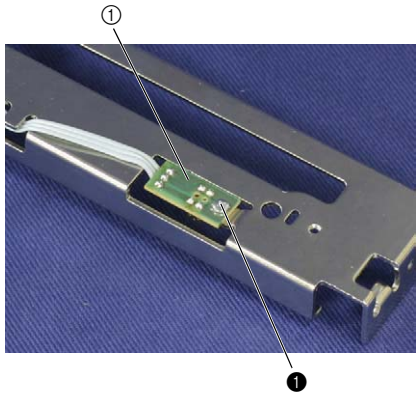
17 Removal of Cord holder

1. Remove the screw ❶, and then remove the cord holder ① from the X carriage assy.



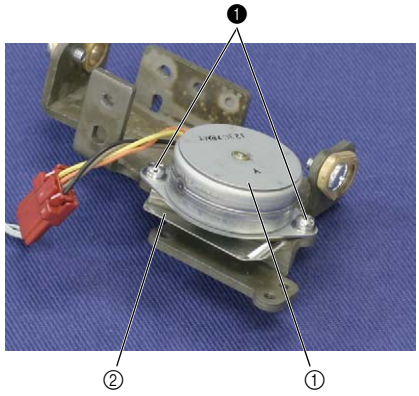
18 Removal of YSENS PCB assy

1. Remove the screw ❶, and then remove the YSENS PCB assy, ① from the X carriage.



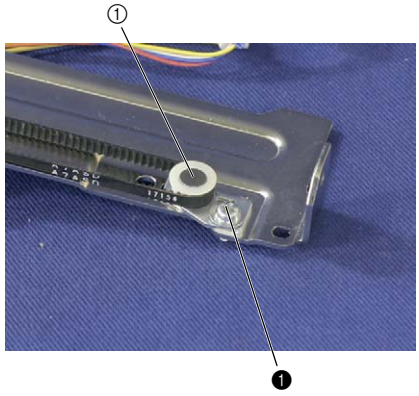
19 Removal of YPM

1. Remove the 2 screws ❶, and then remove the YPM ① and the cord guide ② from the X carriage guide plate assy.



20 Removal of X tension pulley assy

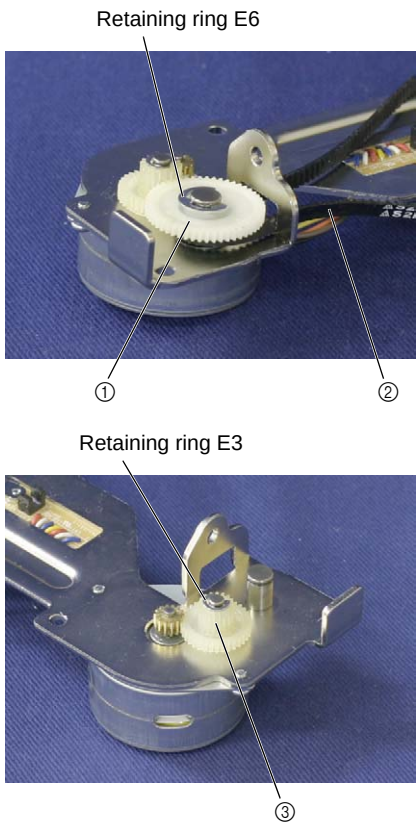
1. Remove the screw ❶, and then remove the X tension pulley assy ① from the main frame assy.



Application

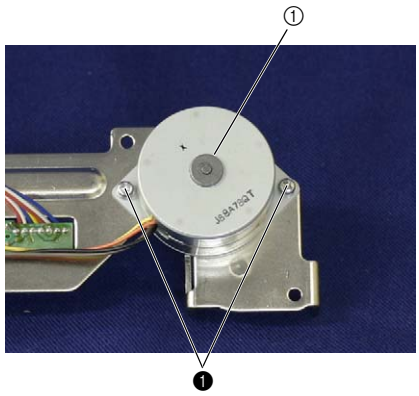
21 Removal of X gear / X driving gear

1. Remove the retaining ring E6, and then remove the X driving gear ①, the T belt 40S2M400 ② and the washer from the main frame assy.
2. Remove the retaining ring E3, and then remove the X gear ③ from the main frame assy.



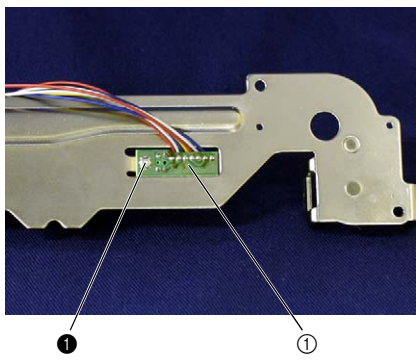
22 Removal of XPM

1. Remove the 2 screws ❶, and then remove the XPM ① from the main frame assy.

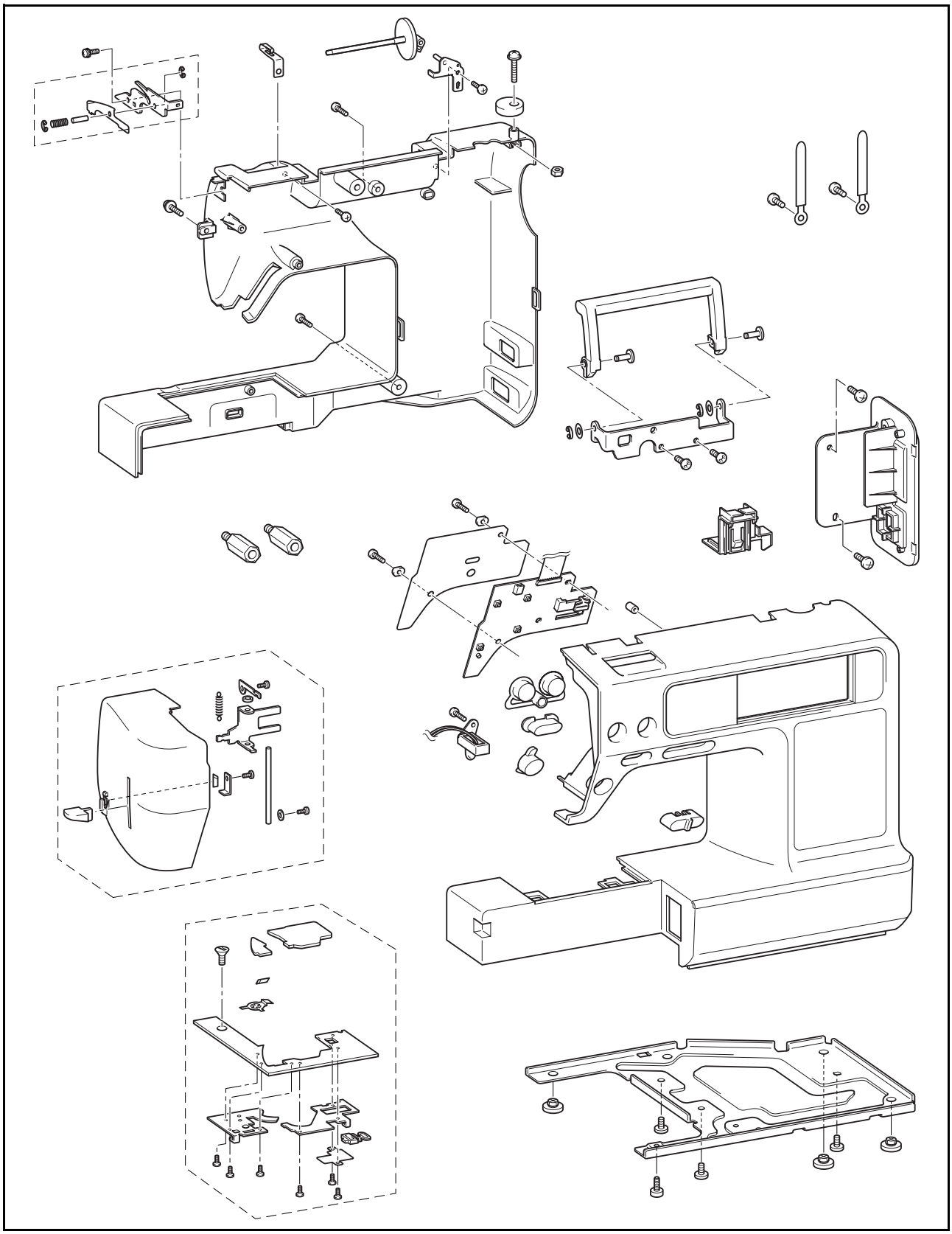


23 Removal of XSENS PCB assy

1. Remove the screw ❶, and then remove the XSENS PCB assy ① from the main frame assy.



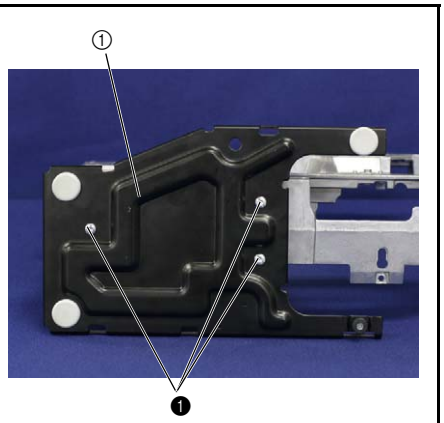
Main frame/Covers location diagram



Application

1 Attachment of Base plate assy

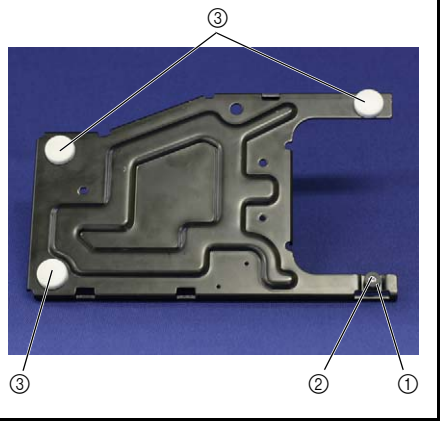
1. Attach the base plate assy ① to the arm bed with the 3 screws ❶.



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

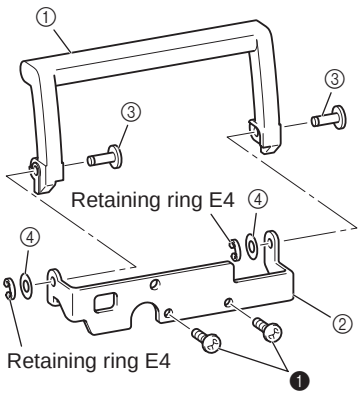
1-1 Attachment of Base plate

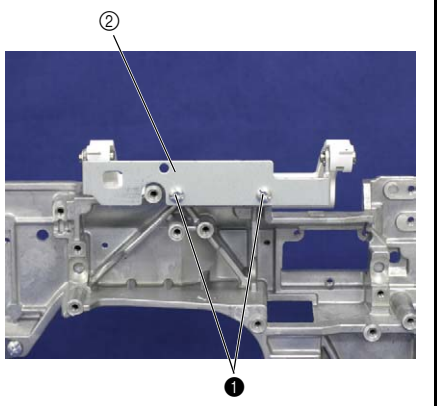
1. Attach the base plate rubber ① to the adjusting screw ②.
2. Attach the adjusting screw ② to the base plate.
3. Attach 3 base rubbers A ③ to the base plate.



2 Attachment of Handle

1. Set the handle ① to the handle holder ②, and then insert the 2 handle shafts ③.
2. Insert the 2 polyester sliders ④ into the handle shaft ③, and then attach the retaining ring E4.
3. Attach the handle holder ② to the arm bed with the 2 screws ❶.





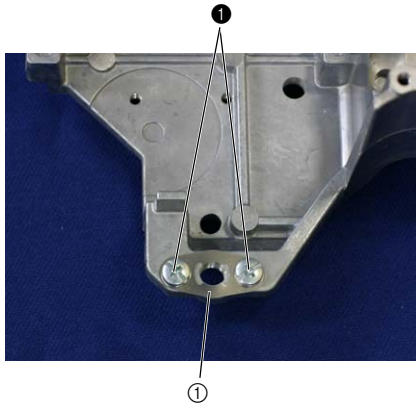
❶	Taptite, Bind S M4X10	Torque 1.47 – 1.96 N·m

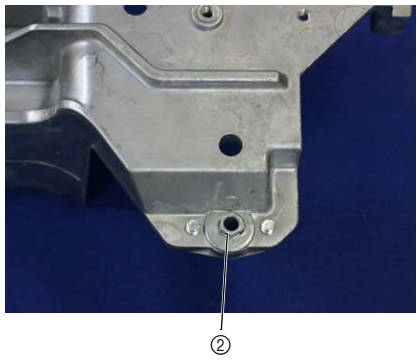
3 Attachment of Plate spring

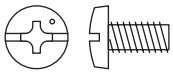
1. Attach the plate spring ① to the front of the arm bed with the 2 screws ❶.
2. Attach the adjusting screw ② to the back of the arm bed.

***Key point**

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

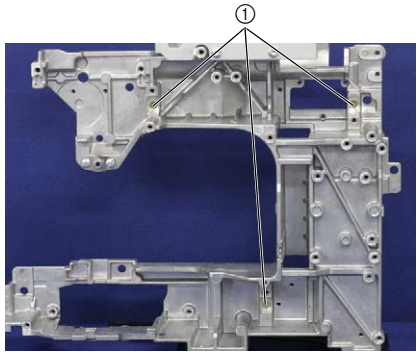




❶		Screw, Bind M4X8	Torque 1.18 – 1.57 N·m

4 Attachment of Felt

1. Attach the 3 felts ① to the arm bed.



5 Attachment of Wire clip

1. Attach the insulate sheet back ① and the wire clip ② to the arm bed with the screw.

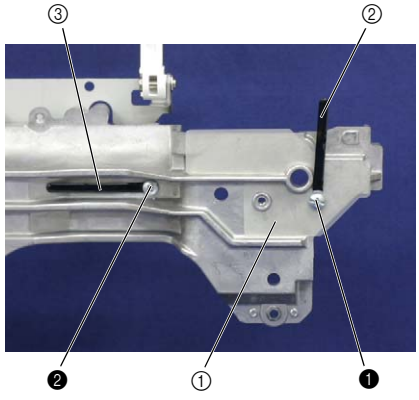
***Key point**

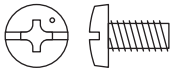
- Set the tip of the coaching clip on the upward.

2. Attach the wire clip ③ to the arm bed with the arm bed.

***Key point**

- Set the tip of the coaching clip on the left-pointing.



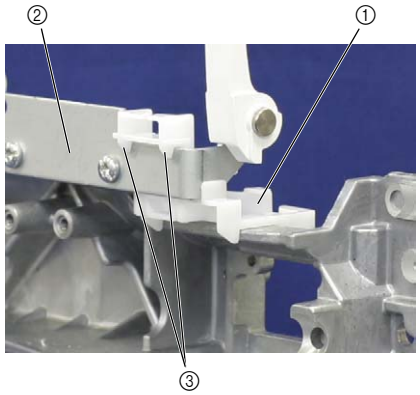
❶		Screw, Bind M4X8	Torque 1.18 – 1.57 N·m

6 Attachment of Cord guide

1. Attach the cord guide ① to the handle holder ②.

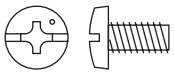
***Key point**

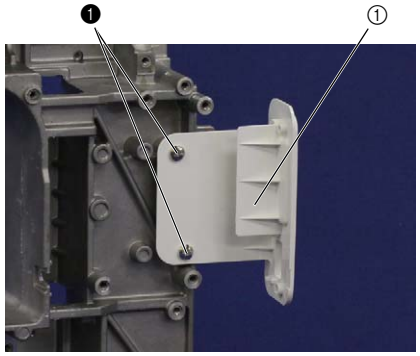
- Check that the groove of the cord guide ① engaged with the handle holder ② and hang on the 2 hooks ③.



7 Attachment of Card cover

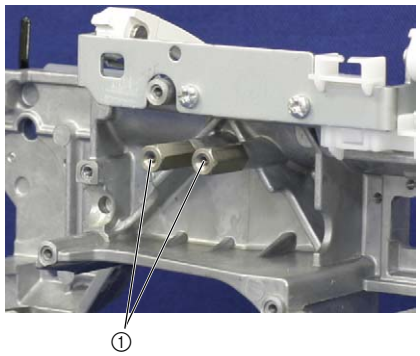
1. Attach the card cover ① to the arm bed with the 2 screws ❶.

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



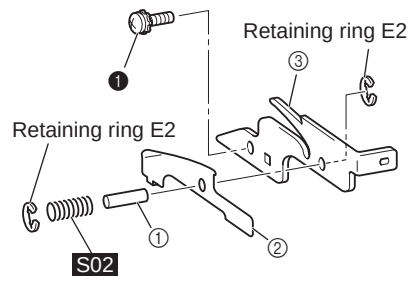
8 Attachment of Stud

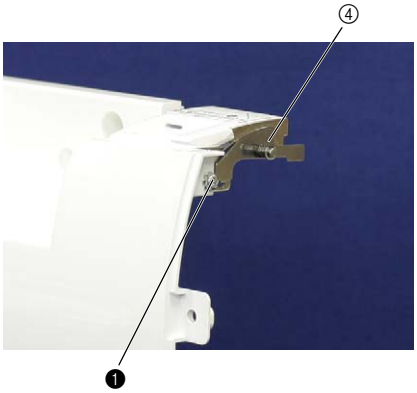
1. Attach the 2 studs ① to the arm bed.



9-1 Assembly of Rear cover assy (Attachment of Thread guide plate assy)

1. Attach the retaining ring E2 to the shaft ①.
2. Insert the shaft ① into the spring S02, the thread guide spring ② and the thread guide plate ③, and then attach the retaining ring E2.
3. Set the thread guide plate assy ④ to the rear cover assy, and then tighten the screw ❶.

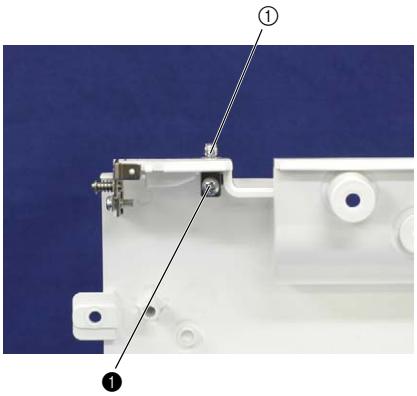


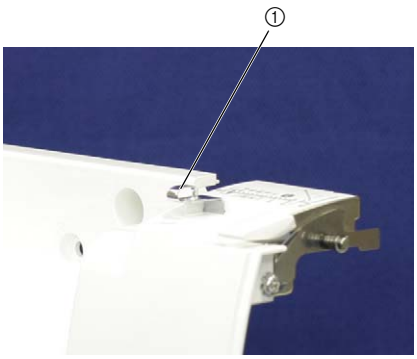


❶	Screw M3X8	Torque 0.59 – 0.78 N·m
S02	9.0, ϕ3.7	Spring X57605***

9-2 Assembly of Rear cover assy (Attachment of Thread guide supporting plate)

1. Attach the thread guide supporting plate ① to the rear cover assy with the screw ❶.





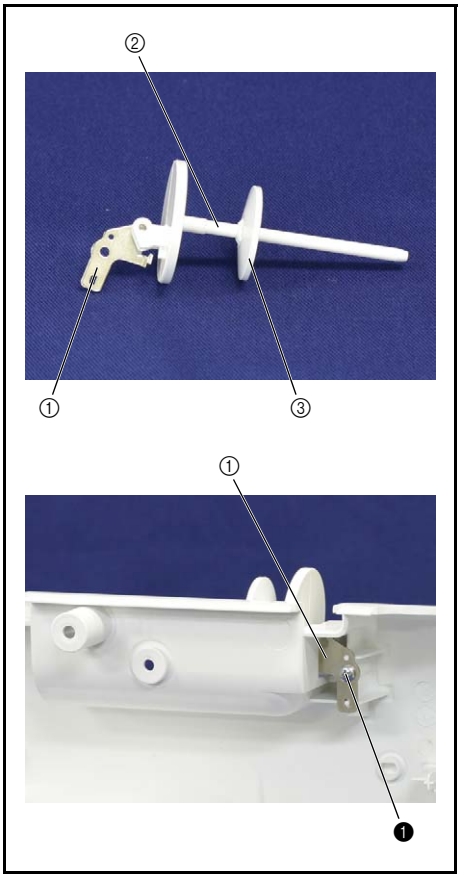
❶	Taptite, Bind B M3X12	Torque 0.59 – 0.78 N·m

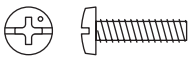
9-3 Assembly of Rear cover assy (Attachment of Spool pin)

1. Attach the spool pin ② to the shaft of the spool pin holder assy ①.
2. Attach the spool presser ③ to the spool pin ②.
3. Set the spool pin holder assy ① to the rear cover, and then attach it with the screw ❶.

***Key point**

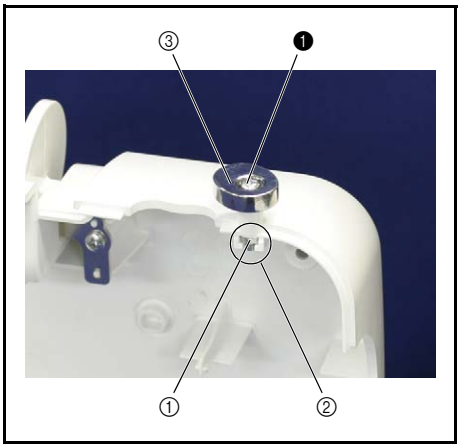
- Check that the 2 bosses of the rear cover engaged with the 2 positioning holes of the spool pin holder assy ①.



❶		Screw, Bind M3X12	Torque 0.59 – 0.78 N·m

9-4 Assembly of Rear cover assy (Attachment of Bobbin presser)

1. Set the nut 1 M3 ① to the attaching part ② of the rear cover assy.
2. Attach the bobbin presser ③ with the screw ❶.

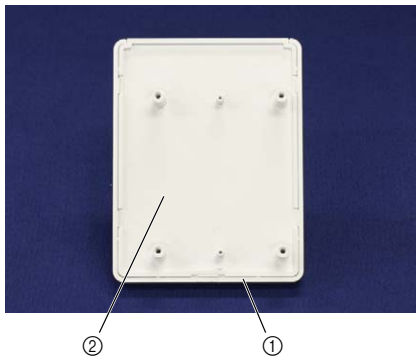


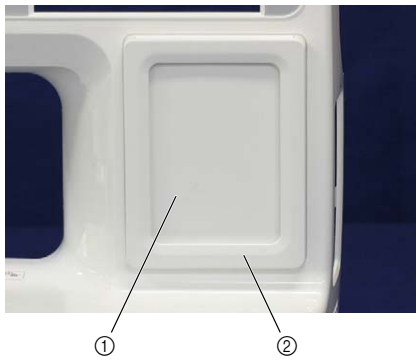
❶		Screw, Pan (S/P washer) M3X20	Torque 0.59 – 0.78 N·m

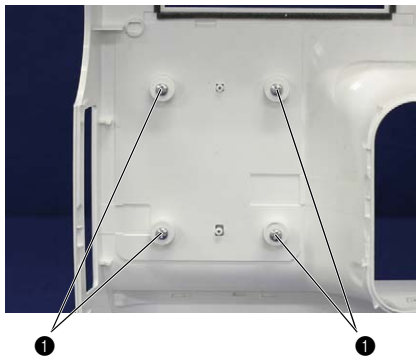
10-1 Assembly of Front cover assy

(Attachment of Photo frame base for models equipped with the photo frame)

1. Attach the photo frame ① to the photo frame base ②.
2. Attach the photo frame base ② to the front cover assy.
3. Attach the 4 screws ❶.







❶		Taptite, Bind B M3X6	Torque 0.59 – 0.78 N·m

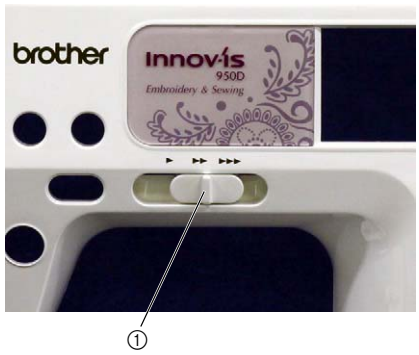
Application

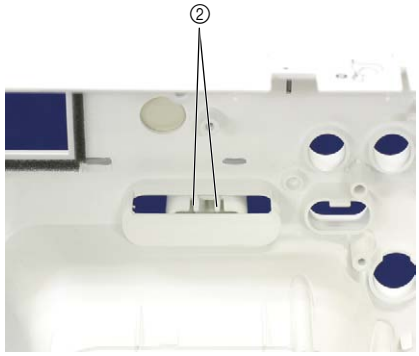
10-2 Assembly of Front cover assy (Attachment of SV key top)

1. Attach the SV key top ① to the front cover assy.

***Key point**

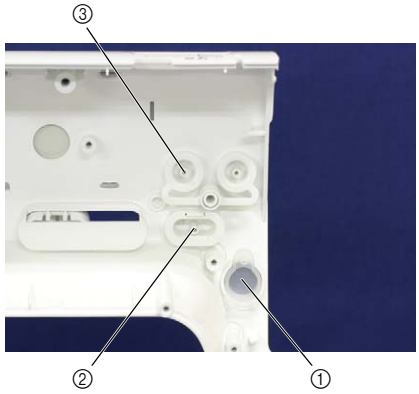
- Check that the hooks ② (2 locations) of the SV key top ① is the upper side and it hang on the front cover assy.

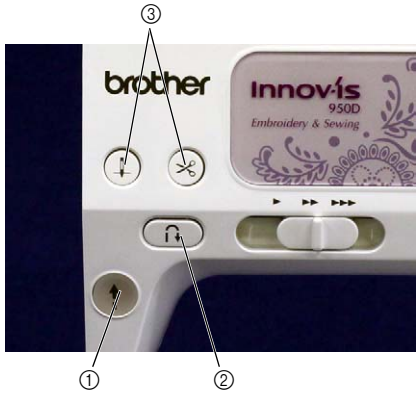




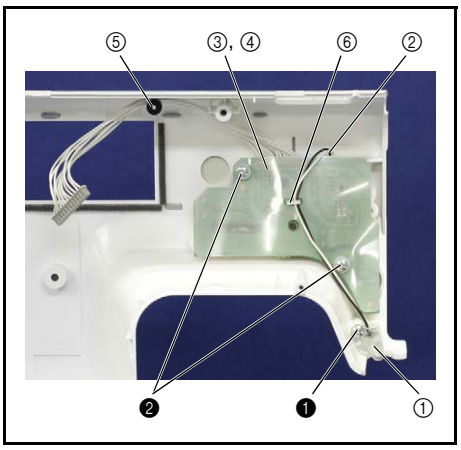
10-3 Assembly of Front cover assy (Attachment of Buttons)

1. Attach the SS button ①, the reverse button ② and the NP button ③ to the font cover assy.





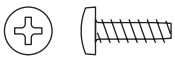
10-4 Assembly of Front cover assy (Attachment of SSVR PCB assy)



1. Attach the LED lamp right assy ① to the front cover assy with the screw ❶.
2. Attach the connector ② of the LED lamp right assy ① to the SSVR PCB assy ③.
3. Attach the SSVR PCB assy ③, the insulator sheet ④ and the 2 board pressers to the front cover assy with the 2 screws ❷.

   ***Key point**
   - Check that the slide volume lever of the SSVR PCB assy ③ engaged with the groove of SV key top.
   - Check that the switch parts (3 locations) of the SSVR PCB assy ③ with the each button (3 locations).
4. Attach the rubber ⑤.

   ***Key point**
   - Secure the lead wire of the SSVR PCB assy ③ with the rubber ⑤ and front cover assy.
5. Attach the mini clamp ⑥ to the SSVR PCB assy ③.
6. Hang the lead wire of the LED lamp right assy ① on the mini clamp ⑥.

❶ ❷		Taptite, Bind B M3X10	Torque 0.59 – 0.78 N·m

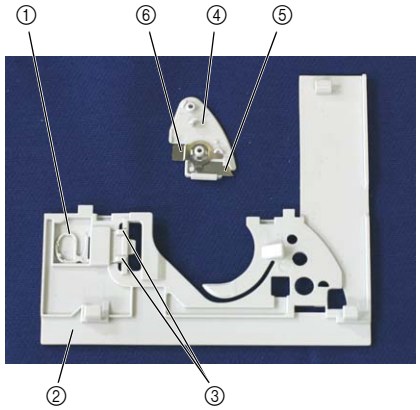
Application

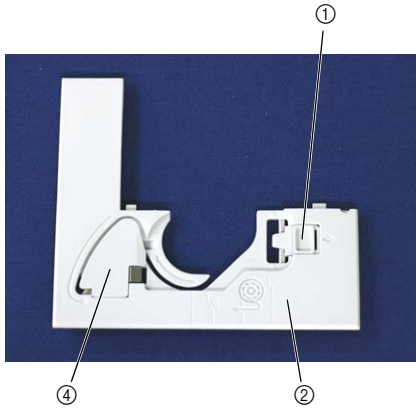
11 Assembly of Needle plate B assy

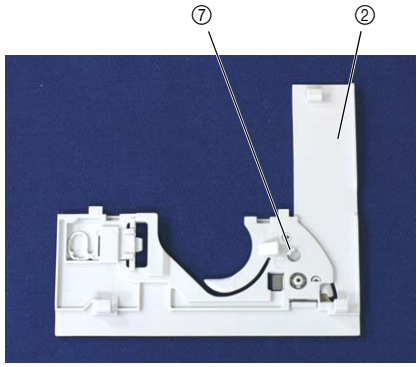
1. Attach the slide button ① to the needle plate B assy ②.

   ***Key point**
   - Check that the hooks ③ (2 locations) hang on the needle plate B assy ②.
2. Attach the NT lower thread cutter ⑤ and the needle plate cover spring ⑥ to the cutter cover ④.
3. Attach the cutter cover ④ to the needle plate B assy ②.

   ***Key point**
   - Check that the hook ⑦ hang on the needle plate B assy ②.



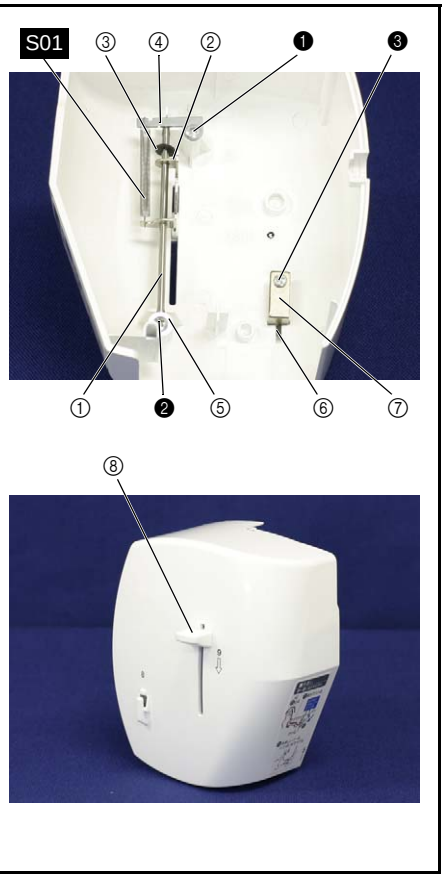




Application

12 Assembly of Face plate

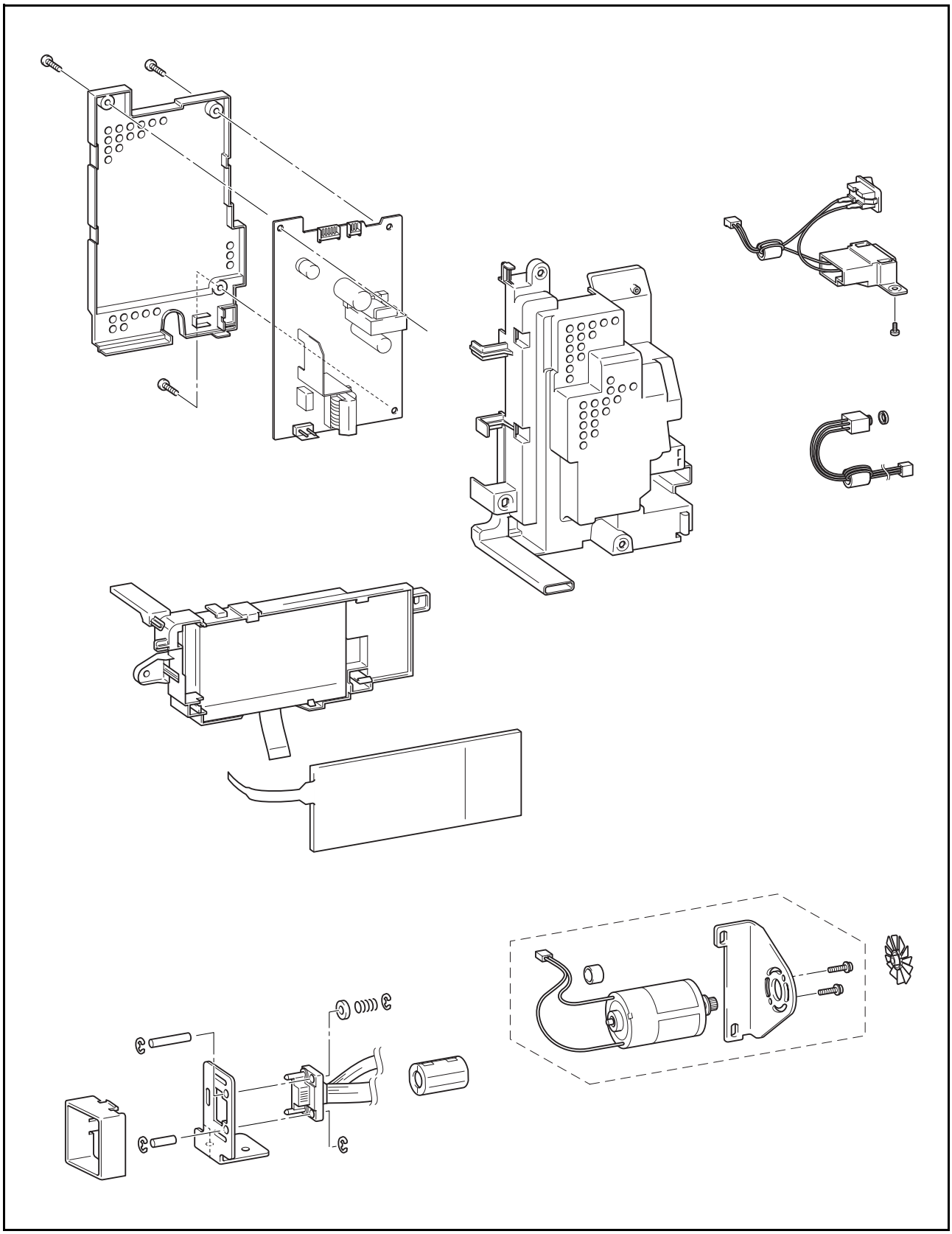
1. Attach the needle thread lever shaft ①, needle thread lever ②, and rubber washer ③ to the face plate.
1. Attach the shaft presser plate ④ to the face plate with the screw ❶.
2. Attach the screw ❷ and the washer ⑤.
3. Attach the spring S01 to the needle thread lever ② and the shaft presser plate ④.
4. Attach the NT lower thread cutter ⑥ to the face plate, and then attach the face plate cutter holder ⑦ with the screw ❸.
5. Attach the needle thread lever knob ⑧.



❶ ❷	Taptite, Bind B M3X10	Torque 0.29 – 0.34 N·m
❸	Taptite, Pan B M3X6	Torque 0.29 – 0.34 N·m
S01	23, ϕ4	THREAD THROUGH LEVER SPRING 138260***

Application

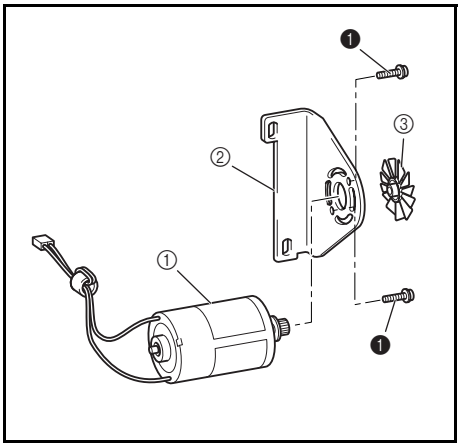
Electrical parts and main motor unit location diagram



1 Assembly of Main motor sub assy

1. Attach the main motor sub assy ① to the motor holder ② with the 2 screws ❶.
2. Attach the motor fan ③ to the gear for main motor sub assy ①.

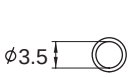
❶		Screw, Pan (S/P washer) M3X8DB	Torque 0.59 – 0.78 N·m

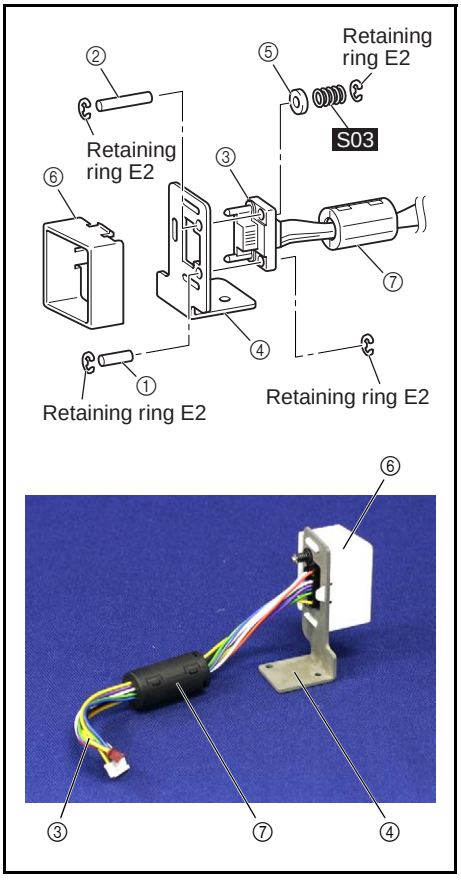


2 Assembly of Embroidery connector assy

1. Attach the retaining ring E2 to the ES pin F-A ① and the ES pin F-B ②.
2. Insert the ES pin F-A ① and the ES pin F-B ② into the lead wire assy main body ③ and connector holder ④.

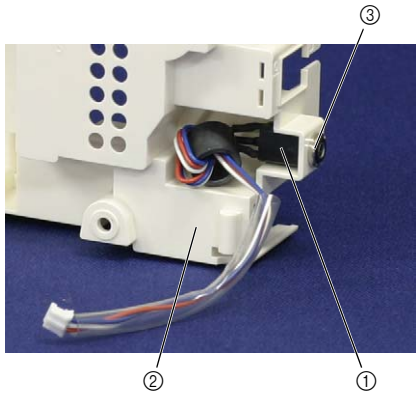
   ***Key point**
   - Check that there is the ES pin F-A ① in the lower side and there is the ES pin F-B ② in the upper side.
3. Attach the 2 retaining rings E2 to the ES pin F-A ①.
4. Insert the feed bar spacer ⑤ and the spring S03 into the ES pin F-B ②, and then attach the retaining ring E2.
5. Attach the connector holder cover ⑥ to the connector holder ④.
6. Attach the ferrite core ⑦ to the lead wire assy main body ③.

S03			Spring, compression XD0967***



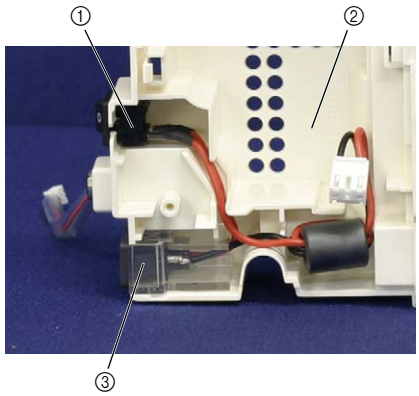
3-1 Assembly of Power supply unit (Attachment of FC jack supply assy)

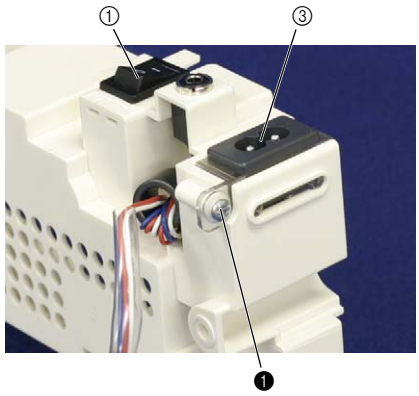
1. Insert the FC jack supply assy ① to the insulation cover ②, and then attach the nut F ③.

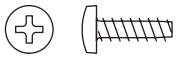


3-2 Assembly of Power supply unit (Attachment of Inlet assy)

1. Attach the power SW ① of the inlet assy to the insulation cover ②.
2. Set the inlet holder ③ of the inlet assy to the insulation cover ②, and then tighten the screw ❶.





❶		Taptite, Bind B M3X10	Torque 0.59 – 0.78 N·m

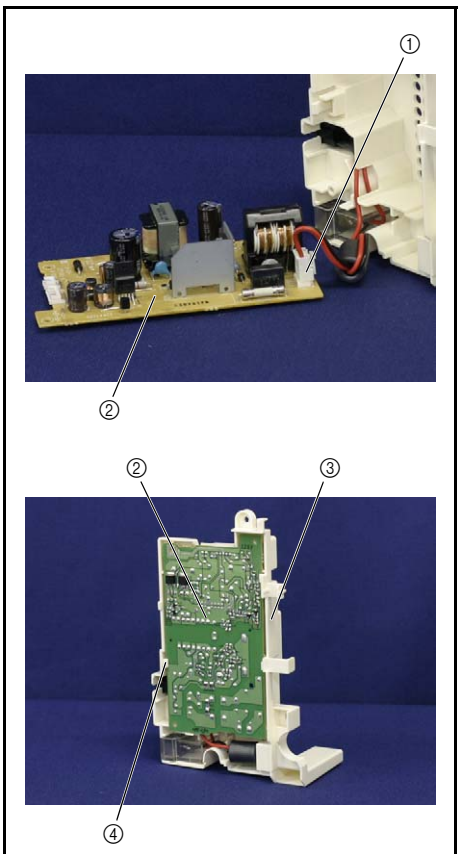
Application

3-3 Assembly of Power supply unit (Attachment of Power PCB supply assy)

1. Attach the connector of the inlet assy ① to the power PCB supply assy ②.
2. Attach the power PCB supply assy ② to the insulation cover ③.

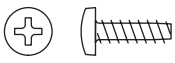
***Key point**

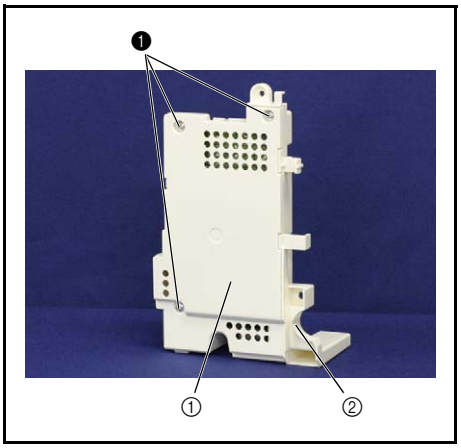
- Check that the hook ④ hang on the power PCB supply assy ②.



3-4 Assembly of Power supply unit (Attachment of Insulation plate)

1. Attach the insulation plate ① to the insulation cover ② with the 3 screws ❶.

❶		Taptite, Bind B M3X10	Torque 0.59 – 0.78 N·m

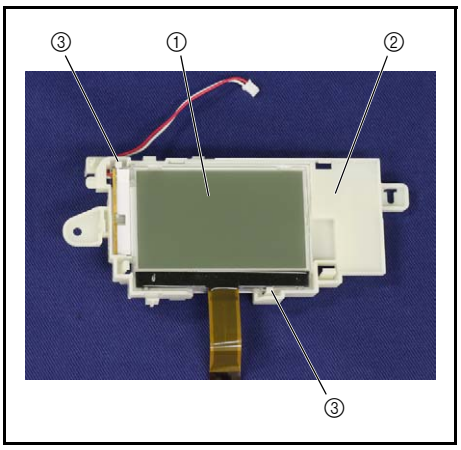


4-1 Assembly of LCD unit (Attachment of LCD supply assy)

1. Attach the LCD supply assy ① to the light plate assy ②.

***Key point**

- Check that the hooks ③ (2 locations) hang on it.

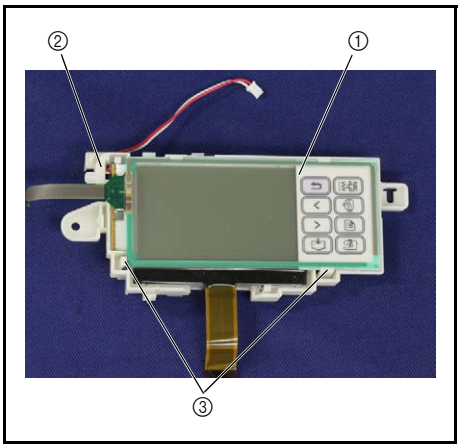


4-2 Assembly of LCD unit (Attachment of Touch panel assy)

1. Attach the touch panel assy ① to the light plate assy ②.

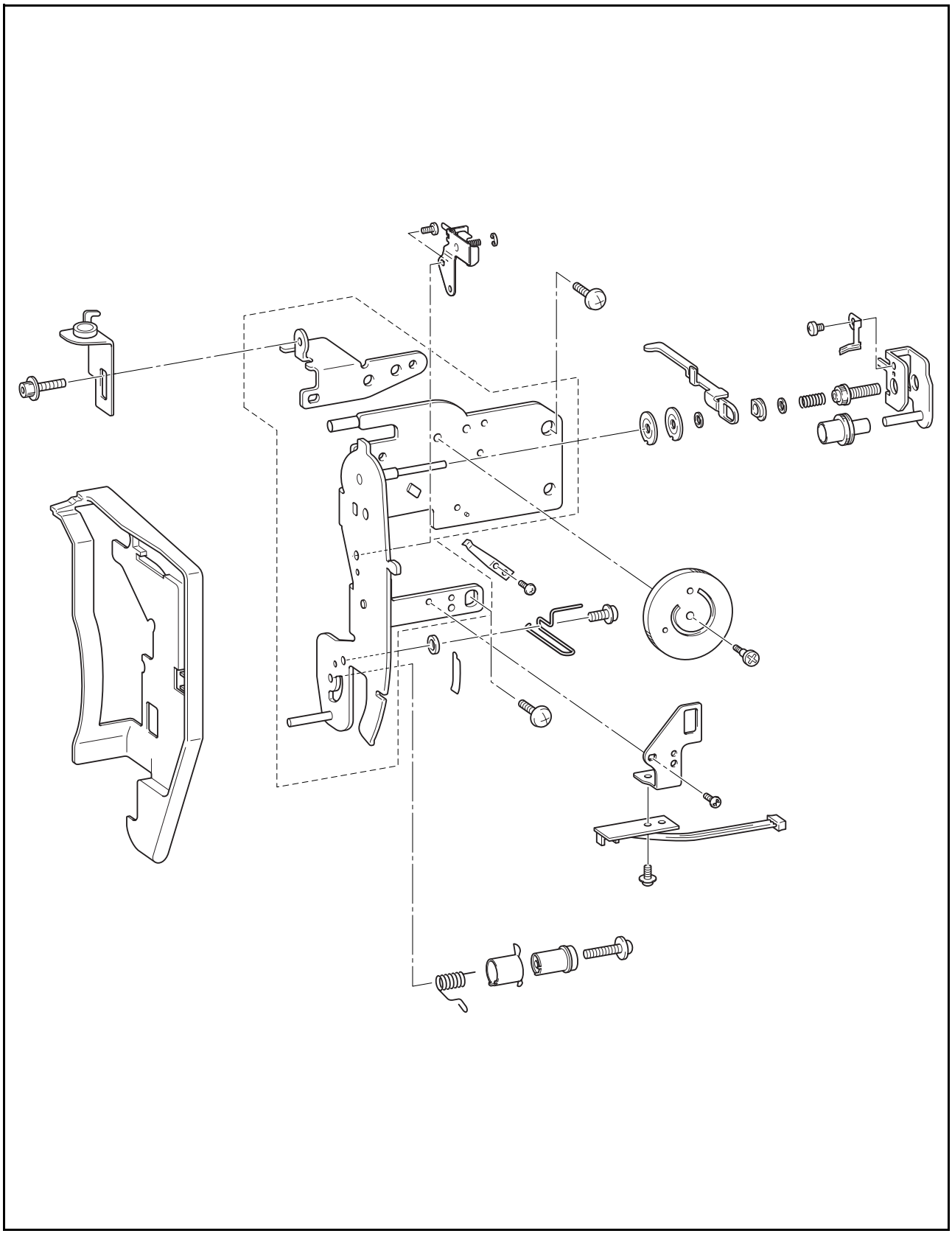
***Key point**

- Check that the hooks ③ (2 locations) hang on it.



Application

Thread tension mechanism location diagram



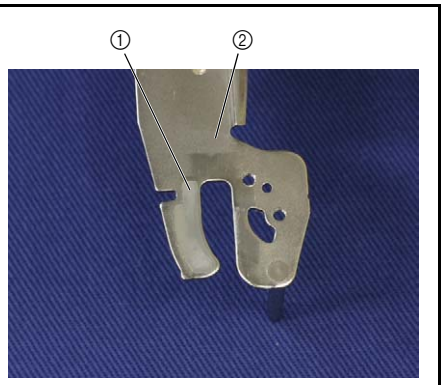
Application

1 Attachment of Spring tape

1. Attach the spring tape ① to the thread unit ②.

***Key point**

- Attach it on the position of the right figure.



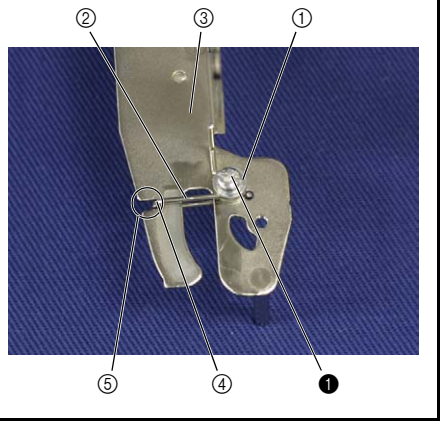
2 Attachment of Thread guide wire

1. Attach the washer, plain ① and the thread guide wire ② to the thread unit ③ with the screw ❶.

***Key point**

- Check that the section ④ of the thread guide wire ② engaged with the notch part ⑤ of the thread unit ③.

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



Application

3 Attachment of Thread catching spring case

1. Attach the thread cutting shutter ② to the thread catching spring case ①.
2. Attach the spring S05 to the thread catching spring case ①.

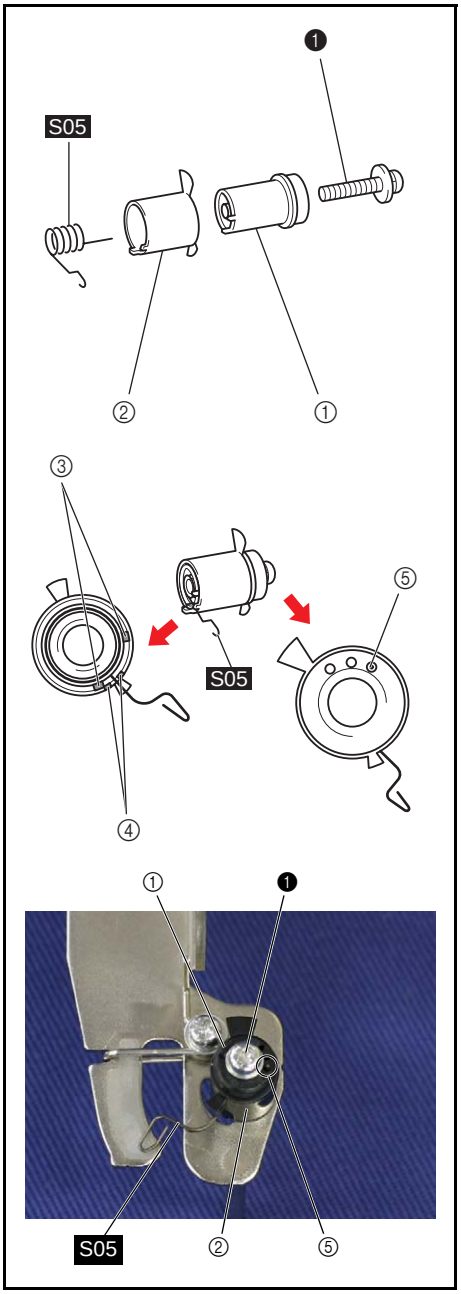
***Key point**

- Check that there is the groove ④ of the bottom of the thread cutting shutter ② between the tabs ③ (2 locations) of the bottom of the thread catching spring case ①. and then hang on the spring.
- Insert the spring into the right-most hole ⑤ of the upper side of the thread catching spring case ①.

3. Attach the thread catching spring case ① to the thread unit with the screw ❶.

***Key point**

- Check that the tabs (2 locations) of the thread catching spring case ① engaged with the groove of the thread guard assy.



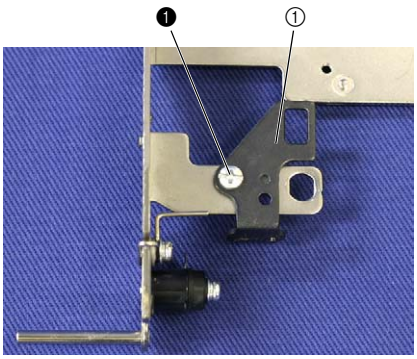
❶	Screw, Pan (S/P washer) M3X18	Torque 0.29 – 0.49 N·m
S05	ϕ7.4, 15.6	Tread take up spring XC6957***

4 Attachment of Thread sensor holder

1. Attach the thread sensor holder ① to the thread unit with the screw ❶.

***Key point**

- Check that the boss of the thread sensor holder ① engaged with the positioning hole of the thread unit.



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

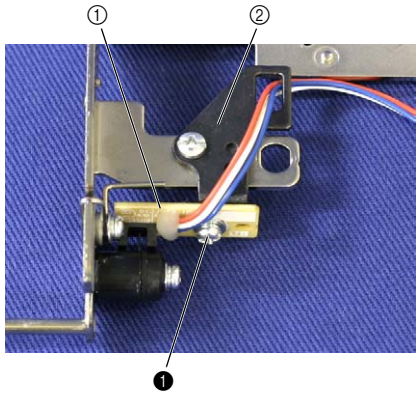
5 Attachment of Up thread PCB assy

1. Attach the up thread PCB assy ① to the thread sensor holder ② with the screw ❶.

***Key point**

- Check that the positioning hole of the up thread PCB assy ① engaged with the boss of the thread sensor holder ②.

❶		Screw, Pan (S/P washer) M3X6	Torque 0.59 – 0.78 N·m

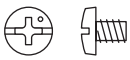


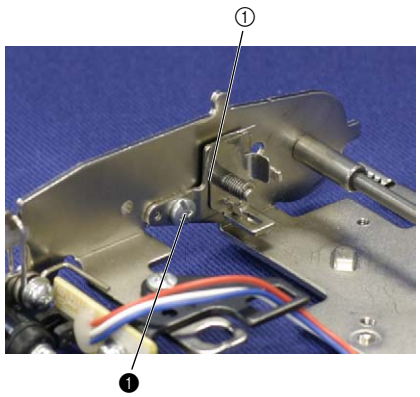
6 Attachment of Plate assy

1. Attach the plate assy ① to the thread unit with the screw ❶.

***Key point**

- Check that the positioning hole of the plate assy ① engaged with the boss of the thread unit.

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



Application

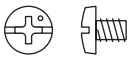
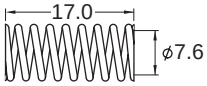
7 Attachment of Thread tension dial

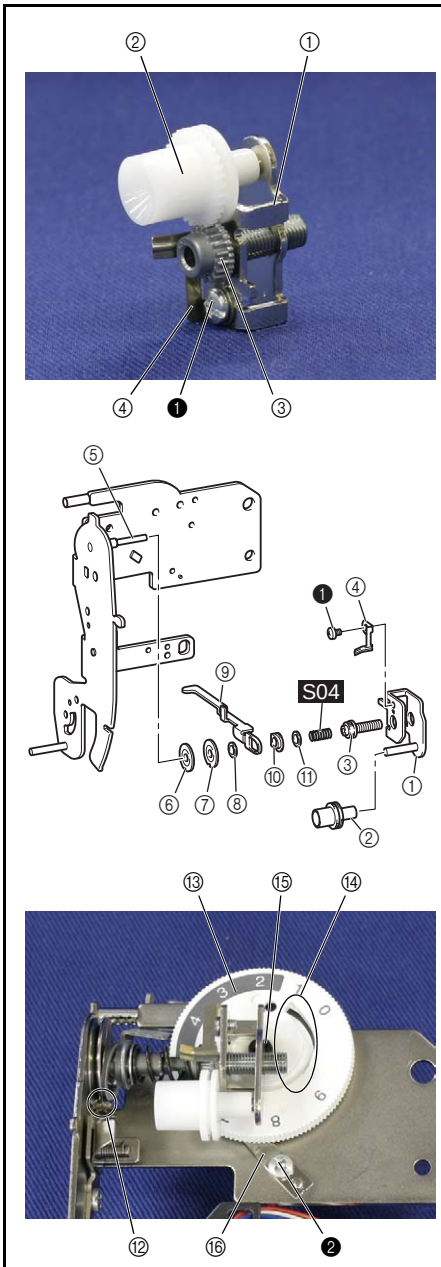
1. Insert the thread tension adjusting gear ② into the shaft of the thread tension plate assy ①, and then attach the thread tension adjusting screw ③.
2. Attach the adjusting screw spring plate ④ to the thread tension plate assy ① with the screw ❶.
3. Insert in order of the tension disc A ⑥, the tension disc B ⑦, the washer ⑧, the thread release plate ⑨, the tension disc washer ⑩, the washer ⑪, and the spring S04 into the shaft ⑤ of the thread unit.

   ***Key point**
   - Check that the notch part of the tension disc A ⑥ and the tension disc B ⑦ align the protrusion ⑫ of the thread unit.
4. Attach the protrusion of the thread tension plate assy ① to the groove ⑭ of the thread tension dial ⑬, and then insert the thread tension adjusting screw ③ into the shaft of the thread unit, and then attach the thread tension dial ⑬ to the thread unit with the tension dial shaft ⑮.

   ***Key point**
   - Attach the tension dial shaft ⑮ to the thread tension dial ⑬ in the state that “9” of the scale of the thread tension dial ⑬ is the top.
5. Attach the notched spring ⑯ to the thread unit with the screw ❷.

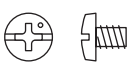
   ***Key point**
   - Insert the tip of notched spring ⑯ into the bottom of the thread tension dial ⑬.
   - Check that the boss part of the thread unit engaged with the positioning hole of the notched spring ⑯.

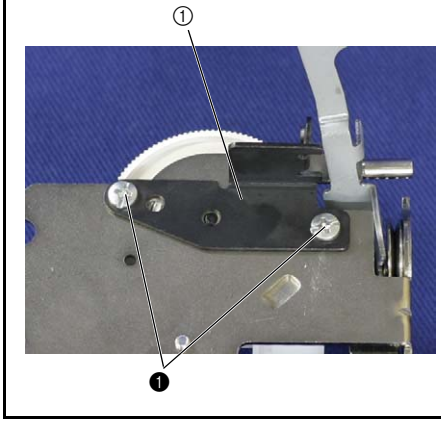
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m
❷		Screw, Pan M3X4	Torque 0.78 – 1.18 N·m
S04			Spring XE3014***



8 Attachment of Thread guard holder S

1. Attach the thread guard holder S ① to the thread unit with the 2 screws ❶.

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

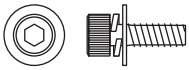


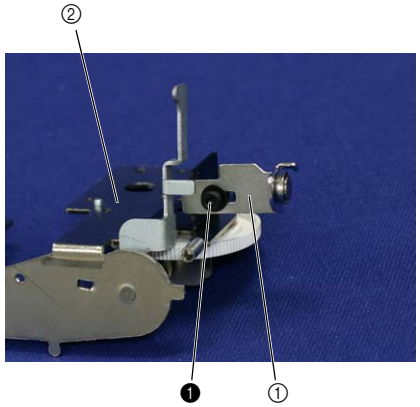
9 Attachment of Bobbin winder guide assy

1. Attach the bobbin winder guide assy ① to the thread unit ② with the screw ❶.

***Key point**

- Fully tighten the screw after performing "4-17 Bobbin winder (uneven bobbin winding and bobbin winding amounts)".

❶		Screw 3X10	Torque Free tighten

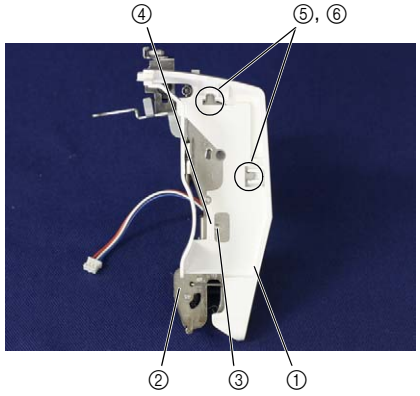


10 Attachment of Thread guard cover

1. Attach the thread guard cover ① to the thread unit ②.

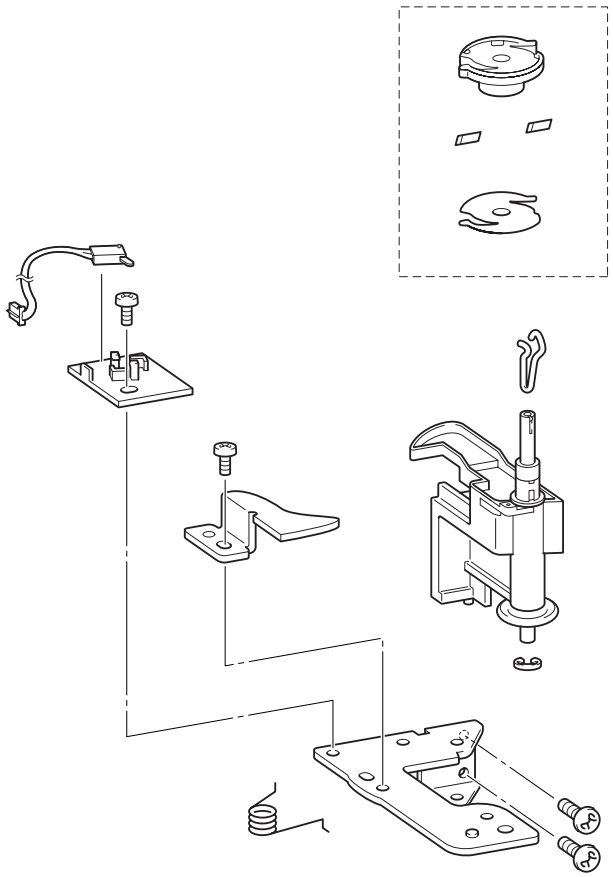
***Key point**

- Attach it while lifting the section ④ of the thread guard cover ① to get over the boss ③ of the thread unit ②.
- Check that the protrusions ⑤ (2 locations) of the thread unit ② engaged with the gullets ⑥ (2 locations) of the thread guard cover ①.



Application

Bobbin winder mechanism location diagram



Application

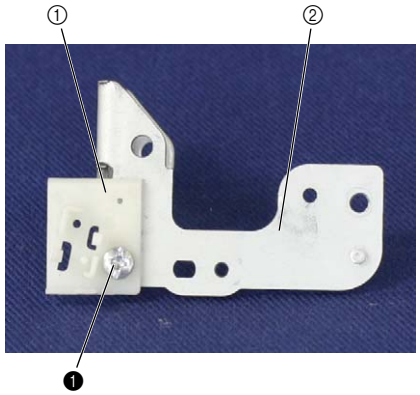
1 Attachment of SW adjust plate

1. Align the boss part of the SW adjust plate ① with the positioning hole of the bobbin winder assembly holder ②, and then tighten the screw ❶ temporarily.

***Key point**

- Fully tighten the screw after performing "4-18 BW switch position".

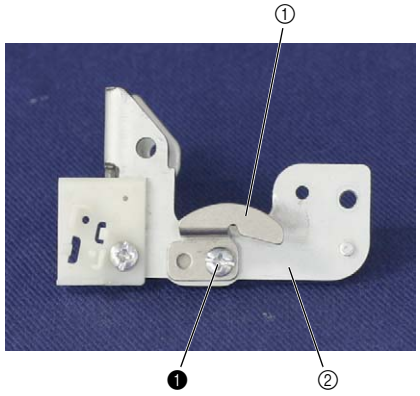
❶		Screw, Bind M3X6	Torque Free tighten



2 Attachment of Bobbin winder shaft stopper

1. Align the boss part of the bobbin winder shaft stopper ① with the positioning hole of the bobbin winder assembly holder ② with the screw ❶.

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



3 Attachment of BW shaft holder assembly

1. Attach the rubber ring ② to the BW shaft holder assembly ①.
2. Attach the bobbin winder shaft spring ③ to the top position of the BW shaft holder assembly ①.
3. Attach the BW shaft holder assembly ① to the bobbin winder assy holder ④.

***Key point**

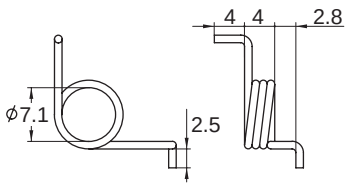
- Check that the 2 boss parts of the BW shaft holder assembly ① engaged with the 2 positioning holes of the bobbin winder assy holder ④.

4. Attach the spring S06 to the BW shaft holder assembly ① and the bobbin winder assy holder ④.

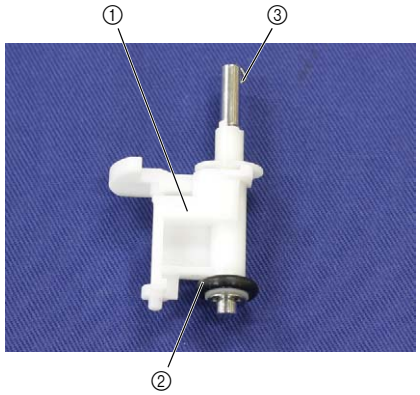
***Key point**

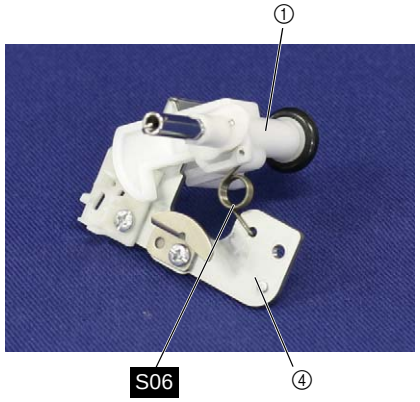
- Attach the side where the hook part of the spring is twisted in the right angle to the BW shaft holder assembly ①.

S06



BOBBIN WINDER SPRING
125928***



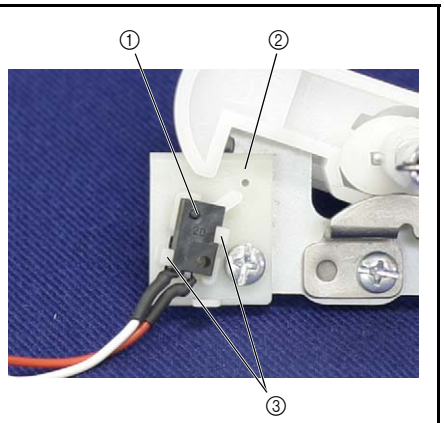


4 Attachment of SW assy: BW-F

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

***Key point**

- Check that the hooks ③ (2 locations) of the SW adjust plate ② hang on the SW assy : BW-F ①.

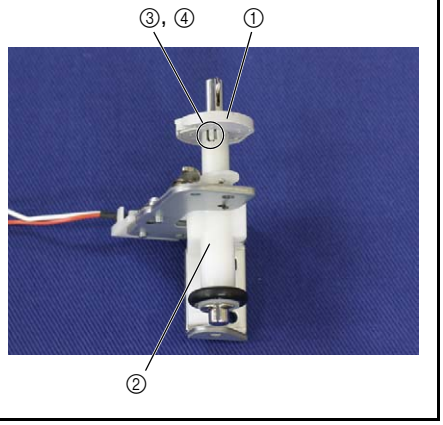


5 Attachment of Bobbin base assy

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

***Key point**

- Check that the 2 gullets ③ of the bobbin base assy ① engage with the 2 protrusions ④ of the bobbin winder.

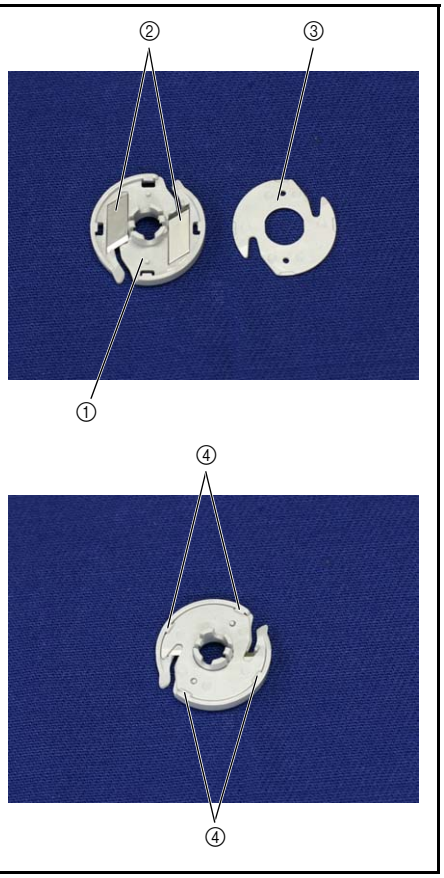


5-1 Assembly of Bobbin base assy

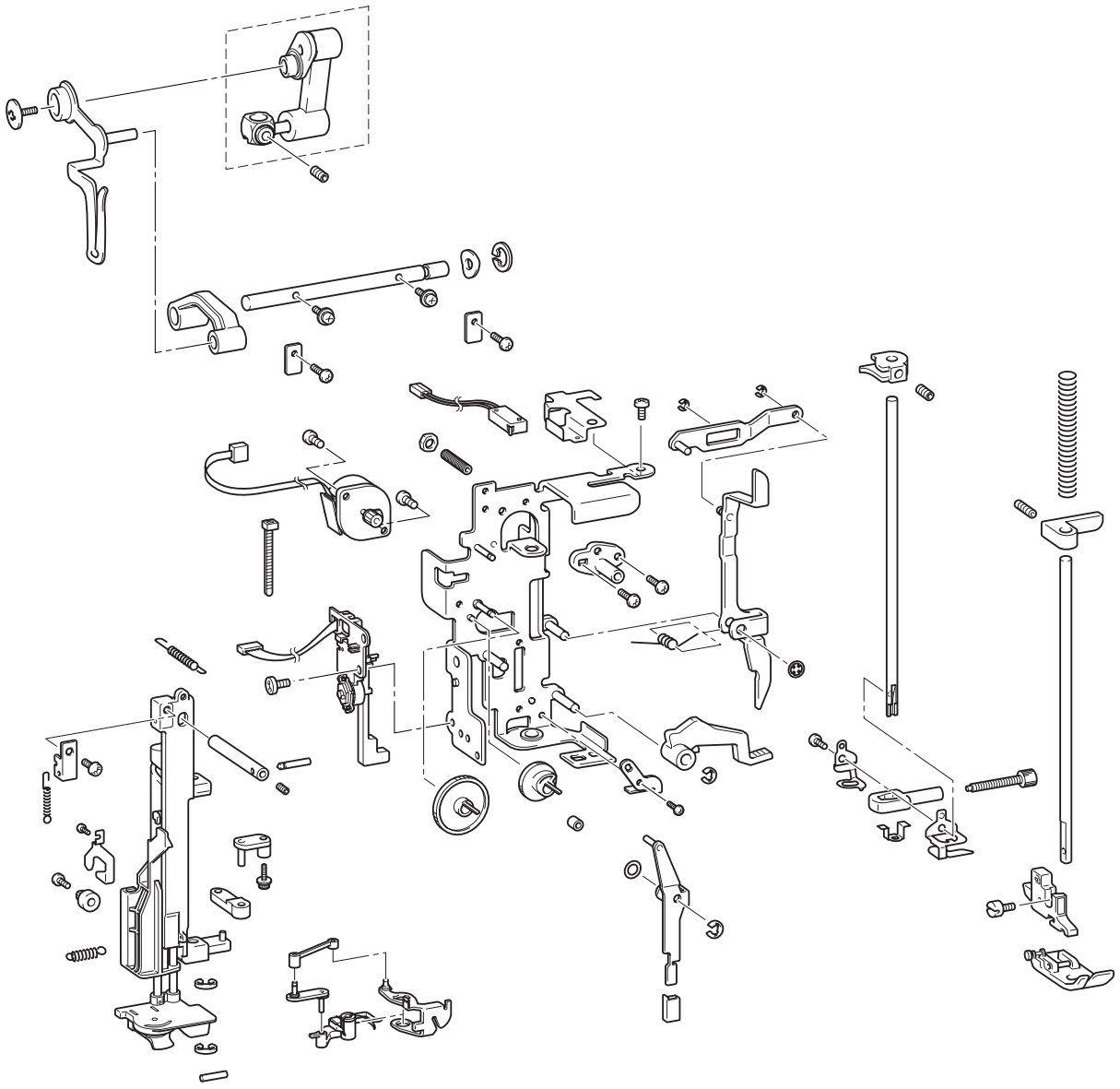
1. Attach the NT lower thread cutter ② to the bobbin base assy ①.
2. Attach the bobbin thread cutter holder ③ to the bobbin base assy ①.

***Key point**

- Be careful not to damage the hooks ④ (4 locations).



Needle bar/Presser foot unit location diagram

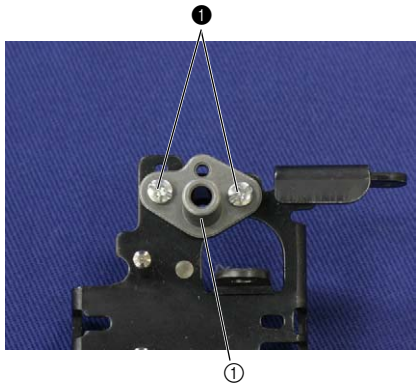


Application

1 Attachment of Shaft bushing

1. Attach the shaft bushing ① to the base holder assy with the 2 screws ❶.

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



2 Attachment of Lock nut

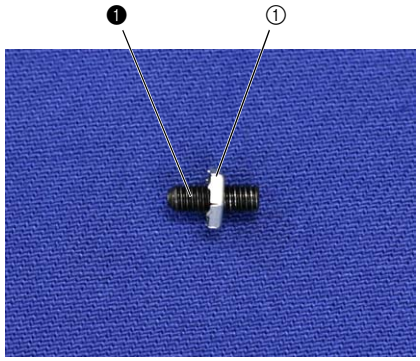
1. Attach the lock nut ① with the screw ❶.

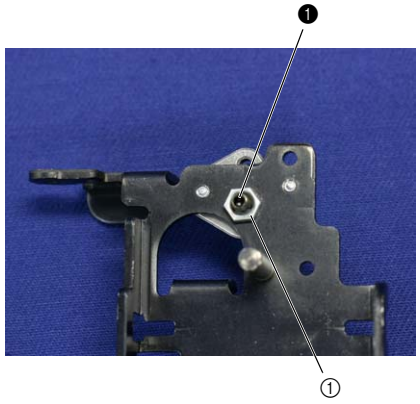
   ***Key point**
   - Tighten the lock nut ① to about half of the screw ❶.

2. Attach the screw ❶ to the base holder assy.

   ***Key point**
   - Tighten it until the lock nut ① hit the base holder assy.
   - Refer to "4-20 Needle and presser foot front/back position".

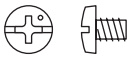
❶		Set Screw, Socket (CP) M4X12	Torque —

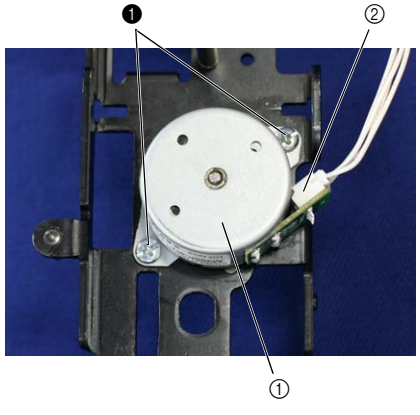




3 Attachment of Z pulse motor

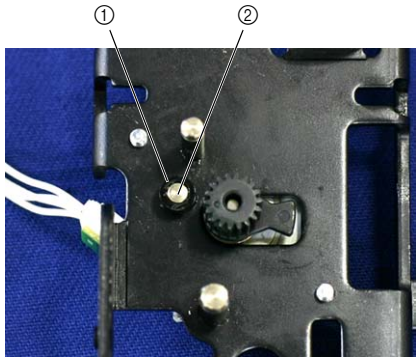
1. Attach the Z pulse motor ① to the base holder assy with the 2 screws ❶.
2. Attach the lead wire sub assy ② to the Z pulse motor ①.

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



4 Attachment of Rubber

1. Attach the rubber ① to the shaft ② of the base holder assy.



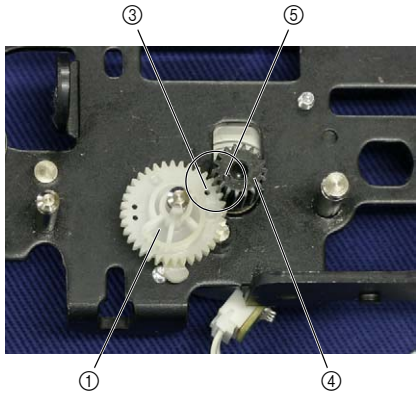
5 Attachment of Z zigzag cam

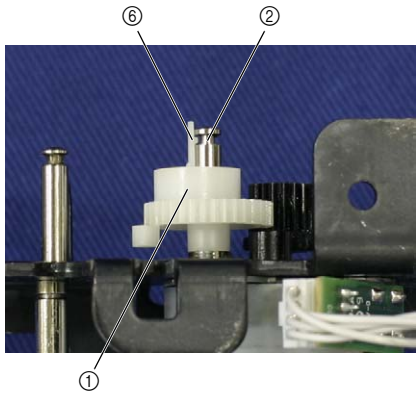
1. Attach the Z zigzag cam ① to the shaft ② of the base holder assy.

***Key point**

- Check that the match mark ③ on the Z zigzag cam ① align the match mark ⑤ on the Z pulse motor gear ④.
- Check that the hook ⑥ of the Z zigzag cam ① align the groove the shaft ②.

Apply EPNOC AP (N) 0 to all of the sliding part of the Z zigzag cam pin.	Bead XC8387***
Apply EPNOC AP (N) 0 to all of the Z zigzag cam.	Bead XC8387***
Apply EPNOC AP (N) 0 to the teeth around the Z zigzag cam gear.	Bead XC8387***





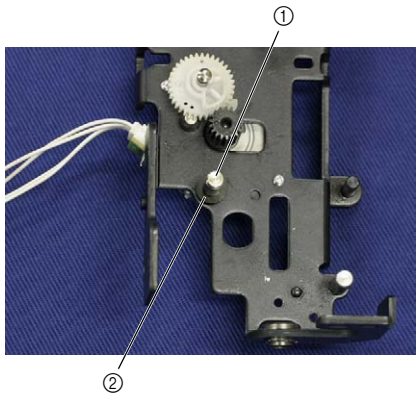
Application

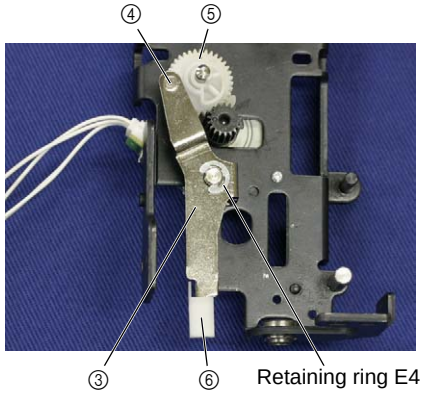
6 Attachment of Z zigzag lever assy

1. Attach the polyester slider ② and the Z zigzag lever assy ③ to the shaft ① of the base holder assy, and then attach the retaining ring E4.

   ***Key point**
   - Check that the shaft ④ of the Z zigzag lever assy ③ is at the left of the Z zigzag cam ⑤.
2. Attach the Z lever cap ⑥ to the Z zigzag lever assy ③.

Apply EPNOC AP (N) 0 to the shaft of the base holder assy.	Bead XC8387***
Apply EPNOC AP (N) 0 to the shaft of the Z zigzag lever.	Bead XC8387***

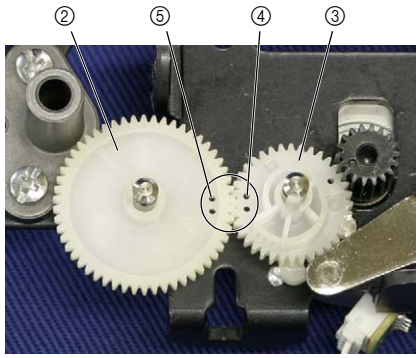


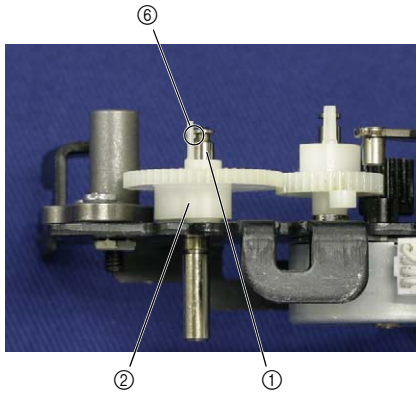


7 Attachment of T cam

1. Attach the T cam ② to the shaft ① of the base holder assy.

   ***Key point**
   - Check that the match mark ④ on the Z zigzag cam ③ align the match mark ⑤ on the T cam ②.
   - Check that the hook ⑥ of the T cam ② align the groove the shaft ①.





8 Attachment of Thread release lever assy

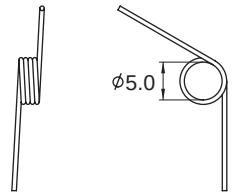
1. Attach the thread release lever assy ② and the spring S10 to the shaft ① of the base holder assy, and then attach the retaining ring CS4.

***Key point**

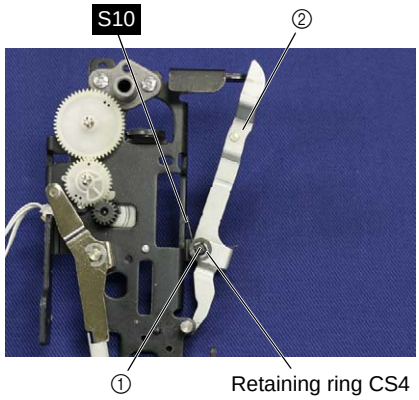
- Check that the hook of the spring is the upper side, when set it as shown in the right figure.

Apply EPNOC AP (N) 0 to the shaft of the base holder assy.	Small amount XC8387***

S10

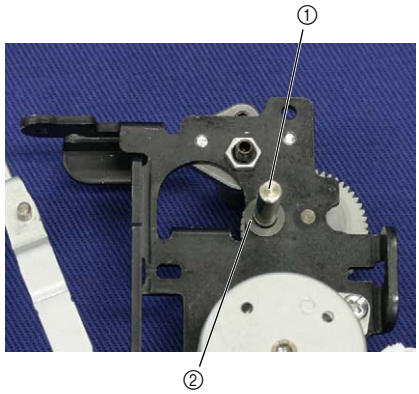


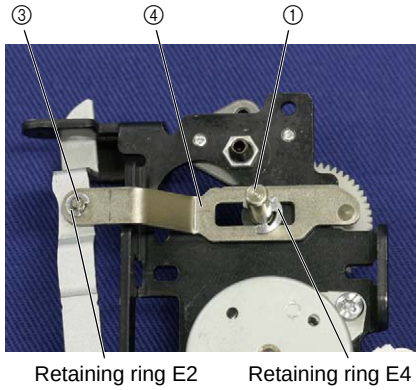
SPRING
XC2460***



9 Attachment of Thread releaser assy

1. Attach the polyester slider ② to the shaft ① of the base holder assy.
2. Attach the thread releaser assy ④ to the shaft ① of the base holder assy and the shaft ③ of the thread release lever.
3. Attach the retaining ring E4 to the shaft ①.
4. Attach the retaining ring E2 to the shaft ③.





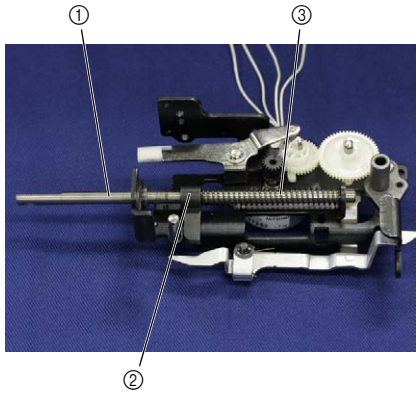
10 Attachment of Presser bar

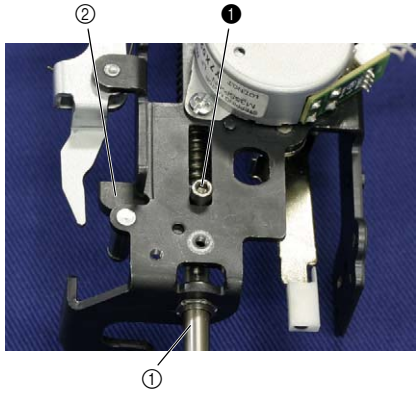
1. Insert the base holder assy, the presser bar clamp ②, the spring ③, and the base holder assy from the bottom of the presser bar ①, and then tighten the screw ❶ temporarily.

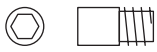
***Key point**

- Fully tighten the screw after performing "4-15 Presser bar height and parallelism".

Apply FBK OIL RO 100 to the tip of the presser bar.	Apply liberally XC8388***





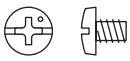
❶		Screw stud M5	Torque Free tighten

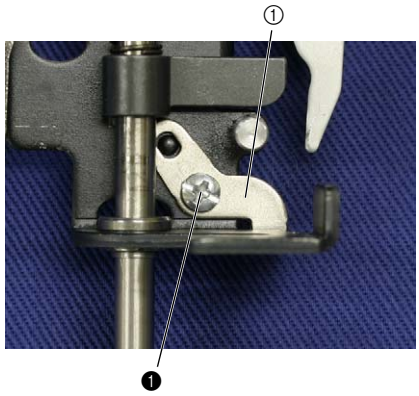
11 Attachment of Embroidery presser stopper

1. Attach the embroidery presser stopper ① to the base holder assy with the screw ❶.

***Key point**

- Check that the positioning hole of the embroidery presser stopper ① align the boss of the base holder assy.

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



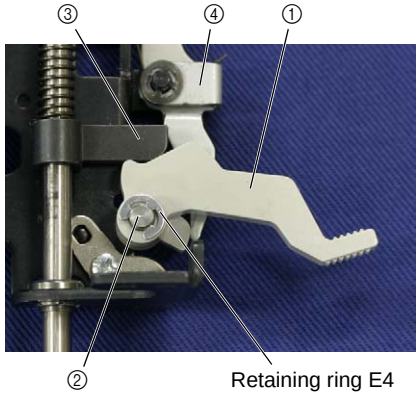
12 Attachment of Presser foot lifter

1. Attach the presser foot lifter ① to the shaft ② of the base holder assy, and then attach the retaining ring E4.

***Key point**

- Push the presser bar clamp ③ to the upper side, and then attach it while pushing the bottom side of the thread release lever assy ④.

Apply EPNOC AP (N) 0 to the shaft of the base holder assy.	Small amount XC8387***
Apply EPNOC AP (N) 0 to the operating surface of the presser bar lifter presser bar clamp.	Small amount XC8387***



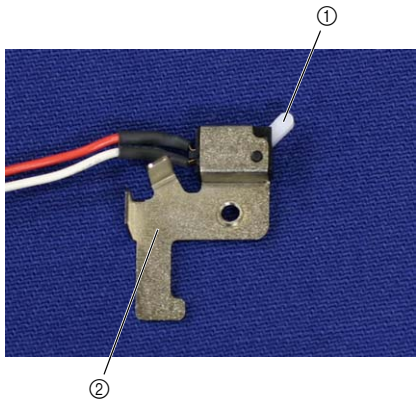
13 Attachment of PF switch assy

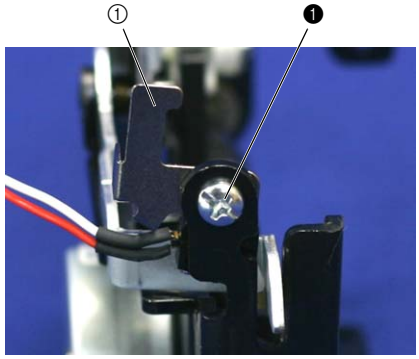
1. Attach the PF switch assy ① to the presser switch holder ②.

   ***Key point**
   - Check that the boss part of the PF switch assy ① align the positioning hole of the presser switch holder ②.

2. Attach the presser switch holder ② to the base holder assy with the screw ❶.

   ***Key point**
   - Check that the boss part of the PF switch assy ① align the notch part of the base holder assy.





❶	Screw, Bind M3X6	Torque 0.59 – 0.78 N·m

Application

14 Attachment of Needle holder shaft A

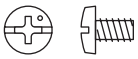
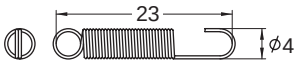
1. Insert the needle holder shaft A ① to the upper side hole of the needle bar supporter assy, and then insert the shaft ② into the needle bar supporter assy, the needle holder shaft A ① and the needle bar supporter assy.

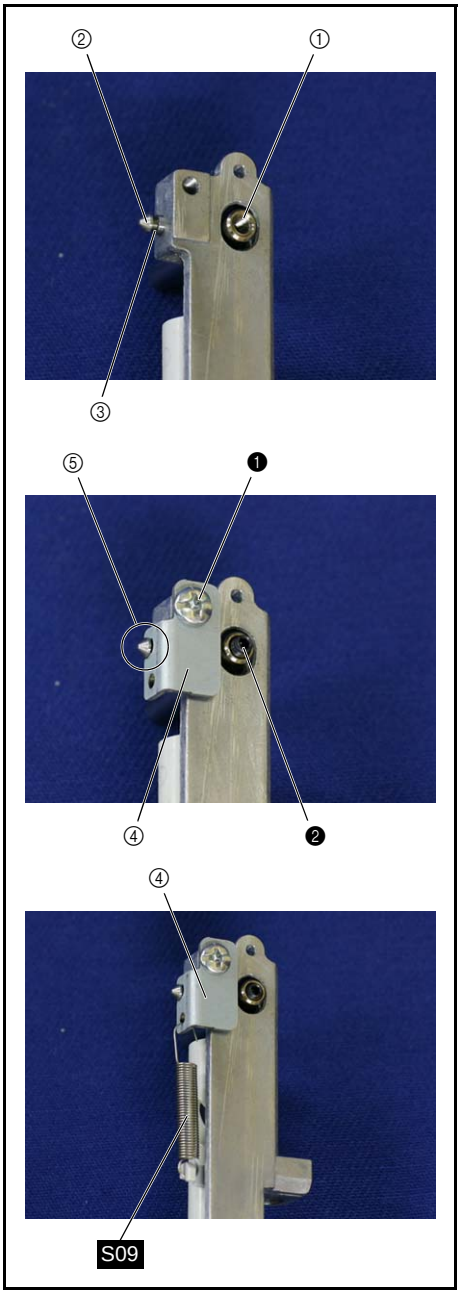
   ***Key point**
   - Check that the groove ③ of the shaft ② is the left side, when set the needle bar supporter assy as shown in the right figure.
2. Attach the plate ④ to the needle bar supporter assy with the screw ❶.

   ***Key point**
   - Check that the groove ③ of the shaft ② engaged with the notch part ⑤ of the plate ④.
3. Attach the screw ❷ to the needle holder shaft A ①.
4. Attach the spring S09 to the plate ④ and the needle bar supporter assy.

   ***Key point**
   - Attach the hook side of the spring to the plate ④.

Apply FBK OIL RO 100 to the needle holder shaft A.	1-2 drops XC8388***

❶		Screw, Bind M3X5	Torque 0.59 – 0.78 N·m
❷		Set Screw, Socket (CP) M3X5	Torque 0.59 – 0.78 N·m
S09			SPRING X5047***



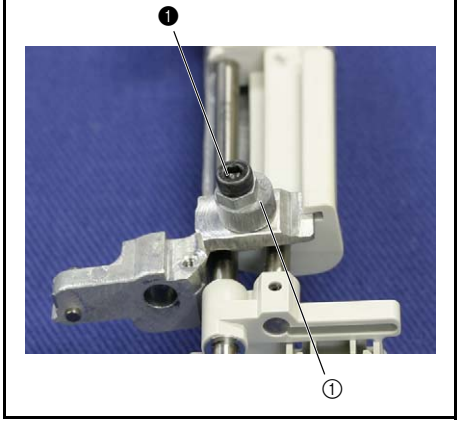
15 Attachment of Z zigzag adjusting nut

1. Set the Z zigzag adjusting nut ① to the needle bar supporter assy, and then tighten the screw ❶ temporarily.

   ***Key point**
   - Check that the side of the zigzag adjusting nut ① with the greatest eccentricity toward the top (see figure at the right).
   - Fully tighten the screw after performing "4-9 Left base line needle drop".

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

❶		Bolt, Socket M3X10	Torque Free tighten

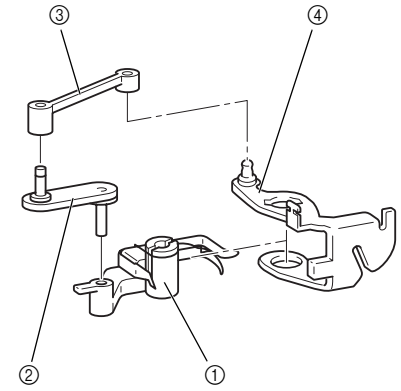


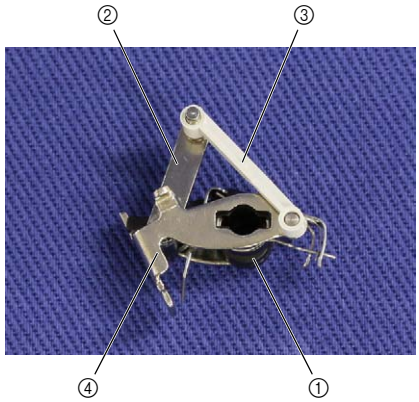
16 Attachment of Threader hook assy

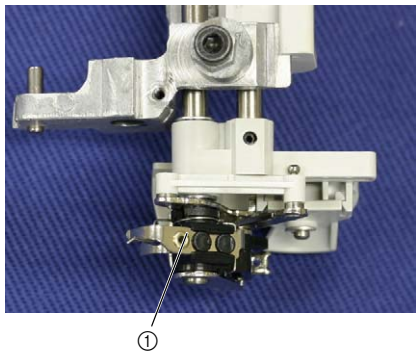
1. Assemble the threader hook assy ①, the link A assy ②, the link B ③ and the thread guide assy ④.

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

2. Align the shaft hole of the thread hook assy ① with the pin on the shaft of the needle bar supporter assy, and then attach the threader hook assy ① to the shaft of the needle bar supporter assy.

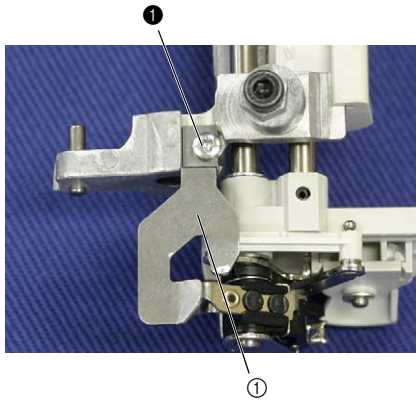






17 Attachment of Hook release plate

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

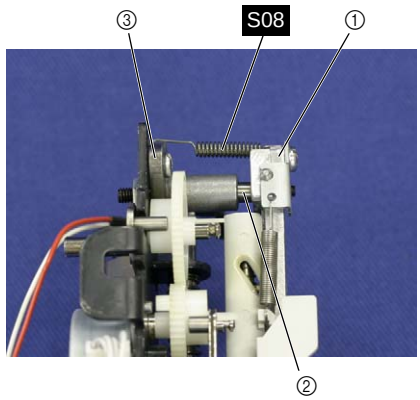


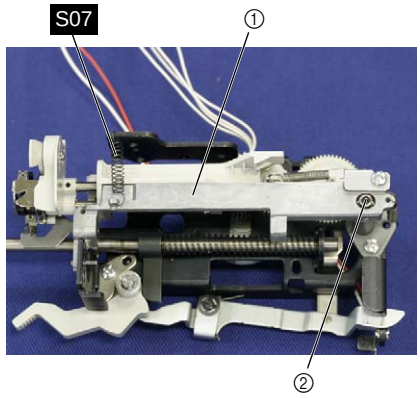
❶		Screw, Bind M2X4	Torque 0.39 – 0.59 N·m

18 Attachment of Needle bar supporter assy

1. Insert the needle holder shaft A ② of the needle bar supporter assy ① into the shaft bushing ③ of the base holder assy, and then attach the needle bar supporter assy ① to the base holder assy.
2. Attach the spring S08 to the needle bar supporter assy ① and the base holder assy.

   ***Key point**
   - Attach the long side of the hook of the spring to the shaft bushing.
3. Attach the spring S07 to the needle bar supporter assy ① and the base holder assy.





S07	14.3, ϕ5 A decided hook form is same	SPRING-Z XC2748***
S08	24.5, ϕ4	SPRING XC2429***

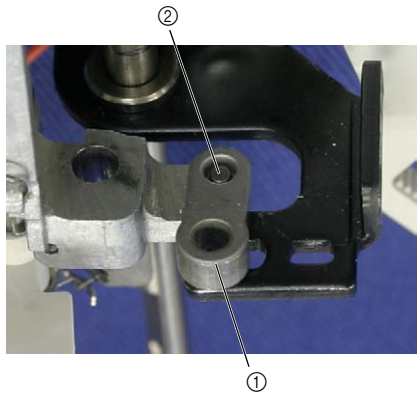
19 Attachment of Shaft assy

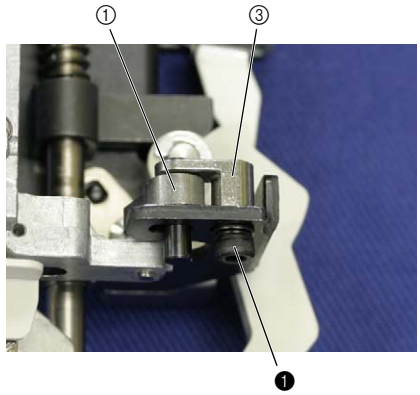
1. Attach the needle holder block ① to the needle roller ② of the needle bar supporter assy.

   ***Key point**
   - Flat surface of the needle holder block ① is the lower side.
2. Attach the shaft assy ③ to the needle holder block ① and the base holder assy, and then tighten the screw ❶ temporarily.

   ***Key point**
   - Fully tighten the screw after performing "4-10 Needle clearance left/right".

Apply EPNOC AP (N) 0 to the needle roller.	Bead XC8387***
Apply EPNOC AP (N) 0 to the shaft of the shaft assy.	Bead XC8387***





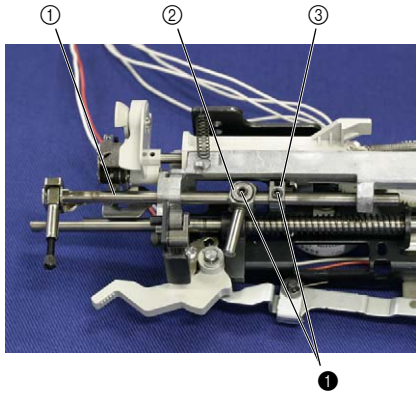
❶		Screw M3X10	Torque Free tighten

20 Attachment of Needle bar assy

1. Insert the needle bar supporter assy, the needle bar block ②, the needle thread block ③ and the needle bar supporter assy from the lower side of the needle bar assy ①, and then tighten the 2 screws ❶ temporarily.

***Key point**

- When the needle thread block ③ is viewed from the front, it is secured in a position turned slightly counterclockwise.
- Fully tighten the screw after performing "4-12 Needle bar height"and "4-14 Needle threader".



Lubricate the needle bar crank joint area with MOLYKOTE (OILER 90% + MOLYKOTE M DISPERSION).	1-2 drops XZ0206*** XC8386***
Apply EPNOC AP (N) 0 to the sliding pin part of the needle thread block.	Bead XC8387***
Lubricate the needle bar supporter assy needle operating area with OILER.	1-2 drops XZ0206***

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

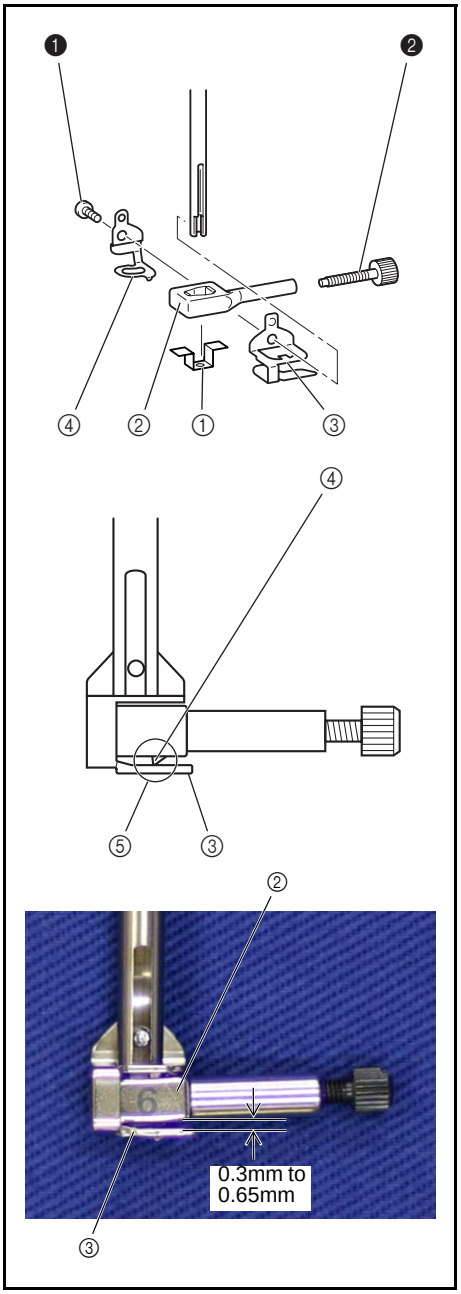
Application

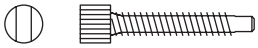
20-1 Assembly of Needle bar assy

1. Attach the needle thread plate ① to the needle block ②.
2. Attach the needle bar thread guide ③, the needle block ② and the needle thread guide spring ④ to the needle bar ③ with the screw ❶.
3. Attach the screw ❷ to the needle block ②.

***Key point**

- Check that there should no gap ⑤ between the needle bar thread guide ③ and the tip of the needle thread guide spring ④.
- Check that there should be a 0.3 mm – 0.65 mm gap between the needle block ② and the right side of the needle bar thread guide ③.



❶		Screw SM2.38	Torque 0.29 – 0.49 N·m
❷		Needle Clamp Screw	—

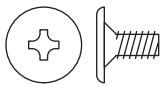
Application

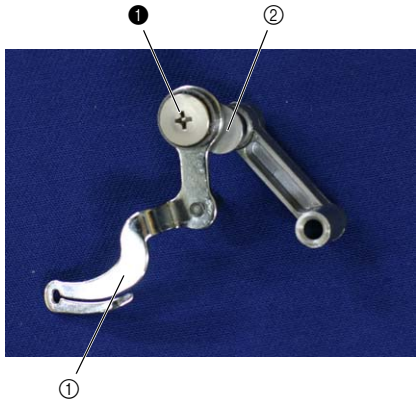
21 Attachment of Needle bar crank rod assy

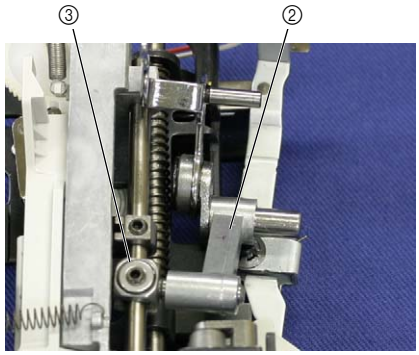
1. Attach the thread take-up lever ① to the needle bar crank rod assy ② with the screw ❶.

   ***Key point**
   - The screw is reverse threaded.
2. Attach the needle bar crank rod assy ② to the needle bar block ③.

Apply EPNOC AP (N) 0 to the shaft of the needle bar crank.	Small amount XC8387***
Apply EPNOC AP (N) 0 to the shaft of the thread take-up lever.	Small amount XC8387***
Apply EPNOC AP (N) 0 to the thread take-up lever attachment face (left screw attachment face) of the needle bar crank.	Small amount XC8387***

❶		Screw, Flat SM3.57 - 40X7L	Torque 1.18 – 1.57 N·m



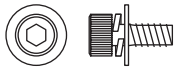


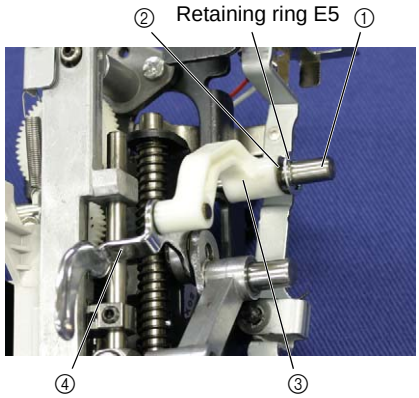
22 Attachment of Thread take-up lever link

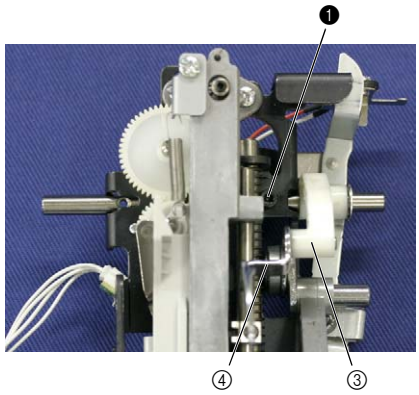
1. Attach the retaining ring E5 to the take-up support shaft ①.
2. Set the base holder assy as shown in the right figure, and then insert the take-up support shaft ① into the washer, spring ②, the thread take-up lever link ③ and the base holder assy from the right side, and then attach it with the screw ❶.

   ***Key point**
   - Insert the shaft of the thread take-up lever ④ into the thread take-up lever link ③.

Apply EPNOC AP (N) 0 to the all around the take-up support shaft hole.	Small amount XC8385***

❶		Screw 3X8	Torque 1.18 – 1.57 N·m





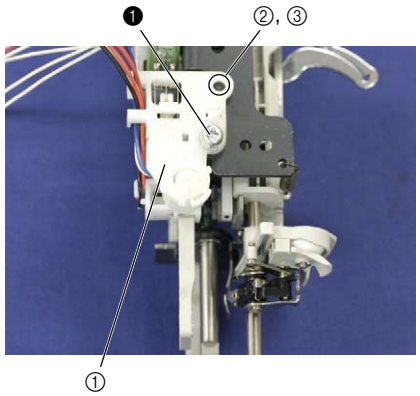
23 Attachment of BH switch assy

1. Attach the BH switch assy ① to the base holder assy with the screw ❶.

***Key point**

- Check that the boss part ③ of the BH switch holder assy engaged with the positioning hole ② of the BH switch assy ①.
- Refer to "4-19 BH lever switch position".

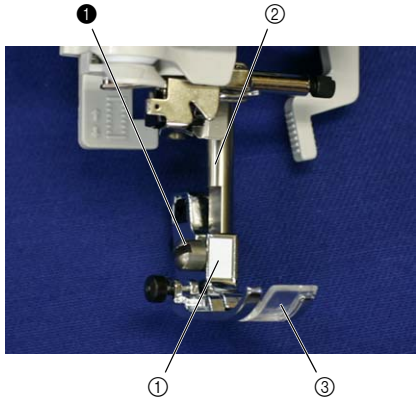
❶	Screw, Pan (S/P washer) M4X8	Torque 0.78 – 1.18 N·m



24 Attachment of Presser feed holder assy

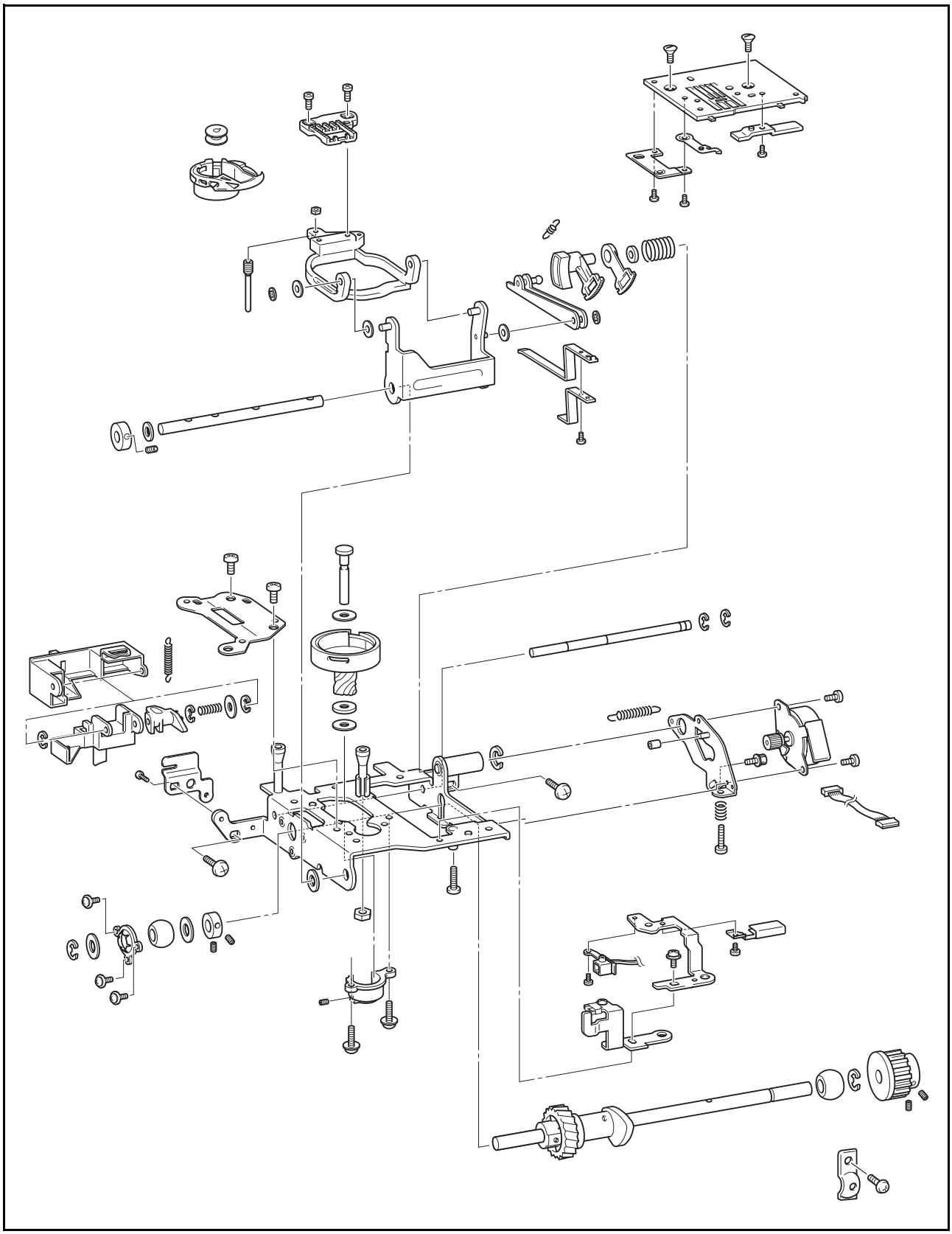
1. Attach the presser feed holder assy ① to the presser bar ② with the screw ❶.
2. Attach the Z foot ③ to the presser feed holder assy ①.

❶	Screw 3.57	Torque 0.78 – 1.18 N·m



Application

Feed/Rotary hook unit location diagram



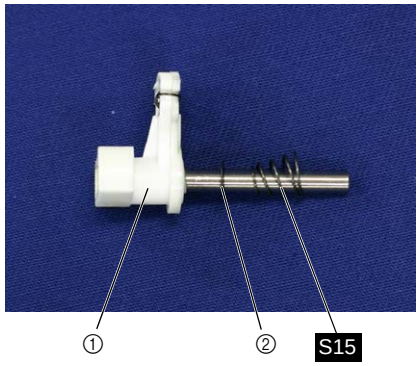
Application

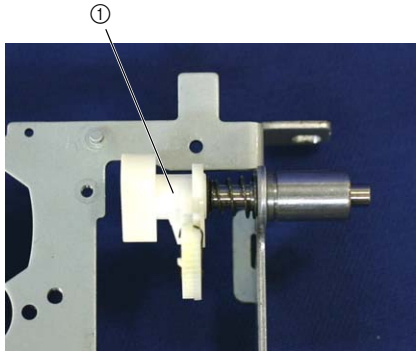
1 Attachment of Feed adjuster assy

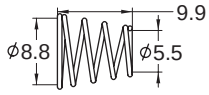
1. Insert the polyester slider ② and the spring S15 into the shaft of the feed adjuster assy ①.

   ***Key point**
   - Insert the spring starting with the side having the smaller spring diameter.
2. Attach the feed adjuster assy ① to the base plate assy.

Lubricate the feed adjuster 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***





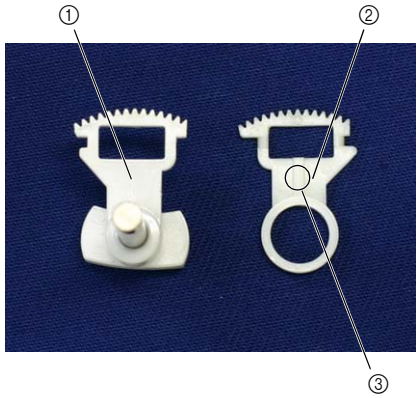
S15		SPRING XC2531***

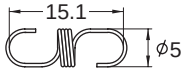
1-1 Assembly of Feed adjuster assy

1. Attach the F gear ② to the feed adjuster ①.

   ***Key point**
   - When set it as shown in the right figure, check that the protrusion ③ of the F gear ② is the upper side.
2. Attach the spring S16.

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

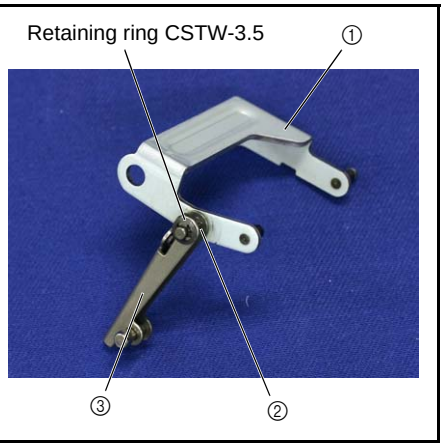


S16		SPRING XC2530***

2 Attachment of Feed arm B assy

1. Attach the polyester slider ② and the feed arm B assy ③ to the shaft of the feed arm A assy ①, and then attach the retaining ring CSTW-3.5.

Apply EPNOC AP (N) 0 to the feed arm A assy shaft.	Small amount XC8387***
Apply EPNOC AP (N) 0 to the feed arm B assy shaft.	Small amount XC8387***



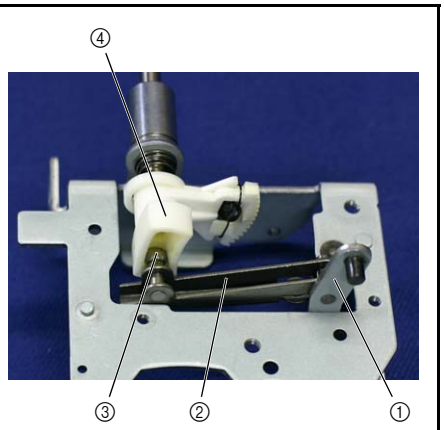
3 Attachment of Feed arm A assy

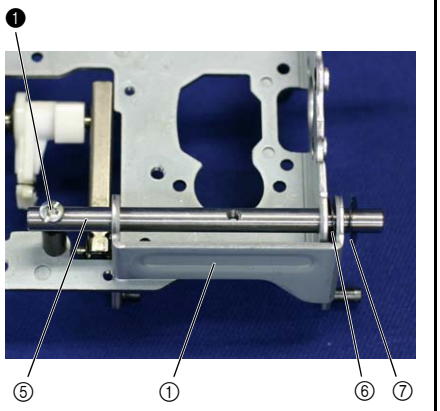
1. Insert the feed arm A assy ① from the back side of the base plate assy, and then attach the feed regulator slide shaft ③ of the feed arm B assy ② to the groove of the feed adjuster ④.
2. Insert the horizontal feed shaft ⑤ into the feed arm A assy ①, the washer, thrust ⑥ and the base plate assy from the right side, and then align the positioning hole on the feed arm supporter shaft, and then attach it with the screw ❶.
3. Insert the washer, thrust ⑦ and the set collar ⑧ into the horizontal feed shaft ⑤, and then attach it with the screw ❷.

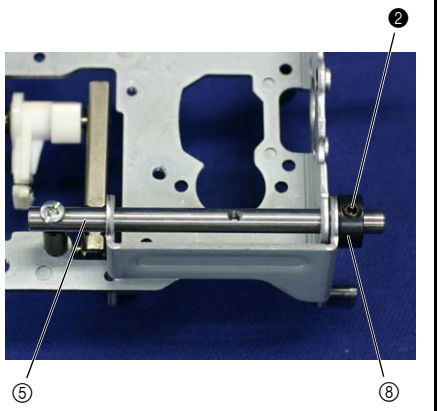
***Key point**

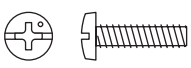
- Attach the feed arm A assy ①, the washer, thrust ⑥ and the washer, thrust ⑦ so that it can sandwich with the base plate assy and the set collar ⑧.
- Check that it is not a wobble, and it moves smoothly.

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







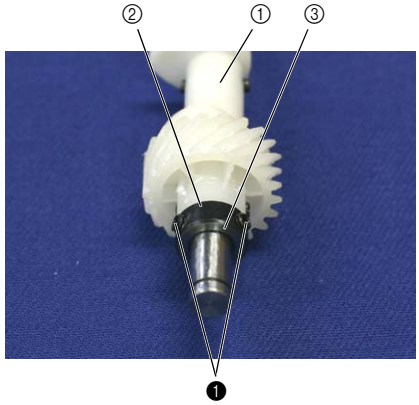
❶		Screw, Bind M3X12	Torque 0.78 – 1.18 N·m
❷		Set Screw, Socket (CP) M4X4	Torque 0.78 – 1.18 N·m

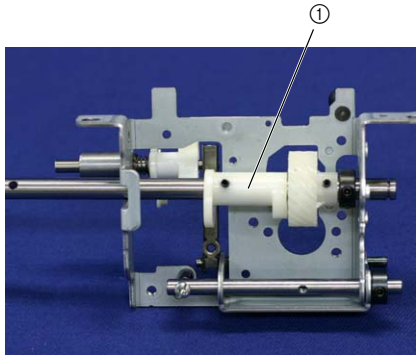
Application

4 Attachment of Lower shaft assy

1. Insert the set collar ② to the lower shaft assy ①, and then tighten the 2 screws ❶ temporarily.

   ***Key point**
   - Check that the cut surface ③ of the set collar ② is the out side.
   - Fully tighten the screw after performing "3-106 Attachment of Bushing presser B".
2. Set the lower shaft assy ① to the base plate assy.





❶		Set Screw, Socket (CP) M4X4	Torque Free tighten

Application

5 Attachment of Bushing presser B

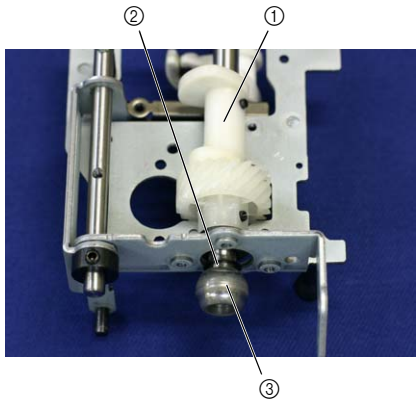
1. Insert the washer, thrust ② and the lower shaft bushing ③ into the lower shaft assy ①.
2. Attach the bushing presser B ④ to the base plate assy with the 3 screws ❶.
3. Insert the washer, thrust ② into the lower shaft assy ①, and then attach the retaining ring E6.
4. Sandwich the lower shaft bushing ③ with the retaining ring E6 and the set collar ⑤ and then tighten the 2 screws ❷.

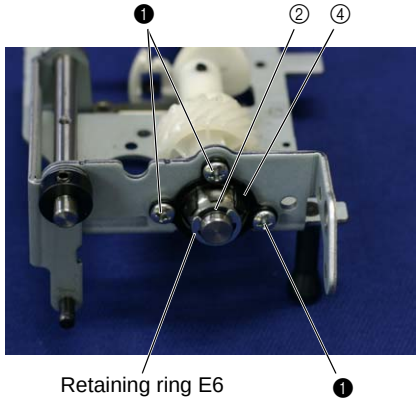
***Key point**

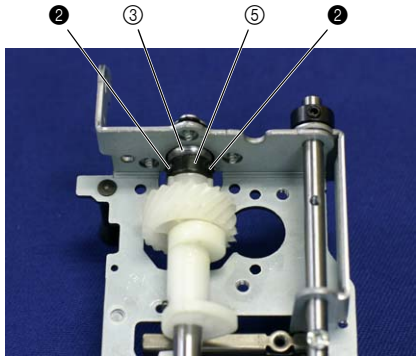
- Check that the lower shaft assy ① is not a wobble, and it moves smoothly.

Lubricate the lower shaft bushing round surface with FBK OIL RO 100.	1-2 drops XC8388***
Apply MOLYKOTE EM30L to all of the teeth around the lower shaft gear.	Small amount XC8385***

❶		Taptite, Bind B M3X6	Torque 0.39 – 0.78 N·m
❷		Set Screw, Socket (CP) M4X4	Torque 0.78 – 1.18 N·m



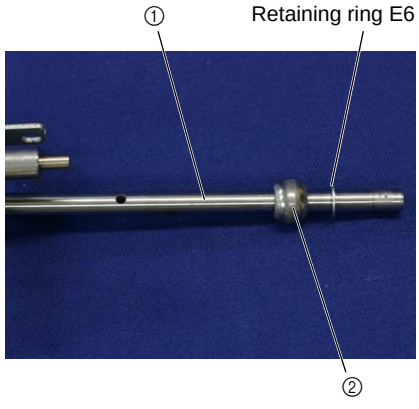




6 Attachment of Lower shaft bushing

1. Insert the lower shaft bushing ② into the lower shaft assy ①, and then attach the retaining ring E6.

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



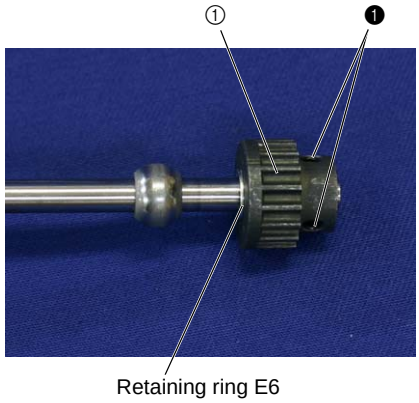
7 Attachment of Timing pulley D

1. Insert the timing pulley D ① into the lower shaft assy and then tighten the 2 screws ❶ temporarily.

***Key point**

- Insert it until the timing pulley D ① hits the retaining ring E6.
- Fully tighten the screw after performing "4-11 Needle bar rising".

❶		Set Screw, Socket (CP) M5X5	Torque Free tighten



Retaining ring E6

8 Attachment of Feed supporting plate

1. Set the feed supporting plate ① to the feed arm B assy ②.

***Key point**

- Check that the protrusion ③ of the feed supporting plate ① engaged with the groove ④ of the feed arm B assy ②.

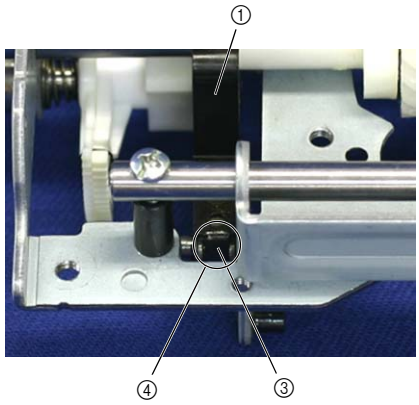
2. Set the feed supporting plate B ⑤ to the feed supporting plate ①, attach the feed arm B assy ② with the screw ❶.

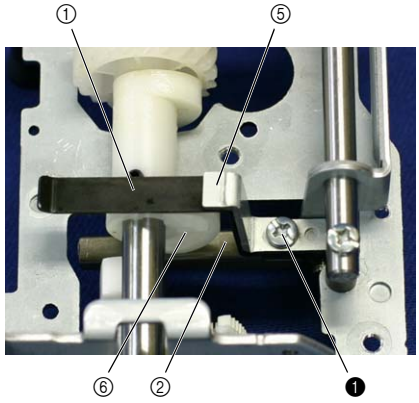
***Key point**

- Check that the boss of the feed supporting plate B ⑤ engaged with the positioning hole of the feed supporting plate ①.
- Check that sandwich the feed cam ⑥ with the feed supporting plate ① and the feed arm B assy ②.

Apply EPNOC AP (N) 0 to the horizontal feed cam surface.	Small amount XC8387***

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

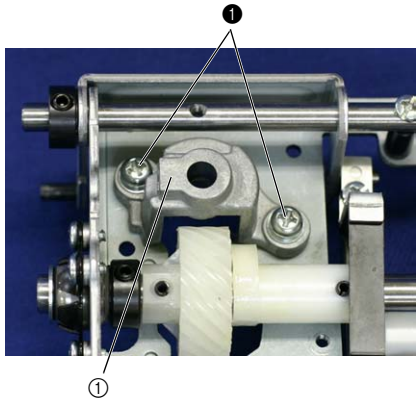




9 Attachment of Shaft supporter

1. Attach the shaft supporter ① to the base plate assy with the 2 screws ❶.

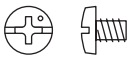
❶		Screw, Pan (S/P washer) M4X10DA	Torque 1.18 – 1.57 N·m

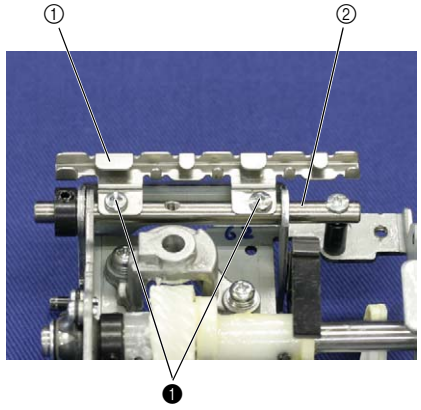


Application

10 Attachment of Lead wire guide holder

1. Attach the lead wire guide holder ① to the horizontal feed shaft ② with the 2 screws ❶.

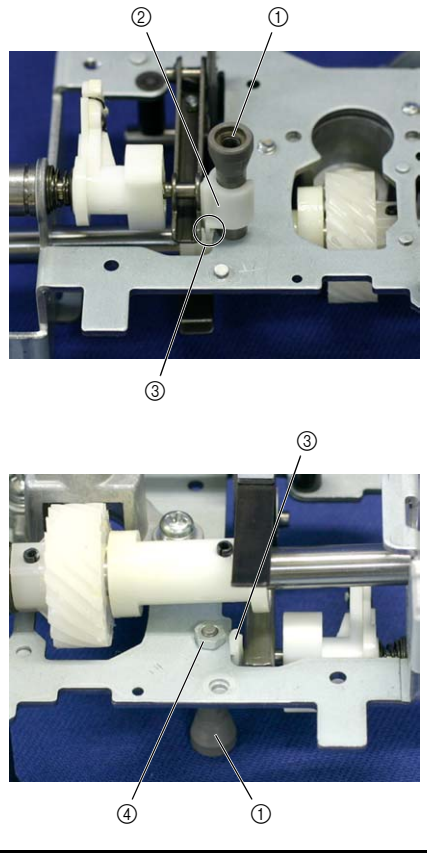
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m



11 Attachment of Needle plate supporter shaft B

1. Attach the feed arm supporter ② to the needle plate supporter shaft B ①.

   ***Key point**
   - Check that the hook part ③ of the feed arm supporter ② is the lower side.
2. Attach the needle plate supporter shaft B ① to the base plate assy.
3. Attach the nut 1 M3 ④ to the needle plate supporter shaft B ①.
4. Hang the hook part ③ of the feed arm supporter ② on the base plate assy.



Application

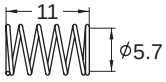
12 Attachment of Drop knob

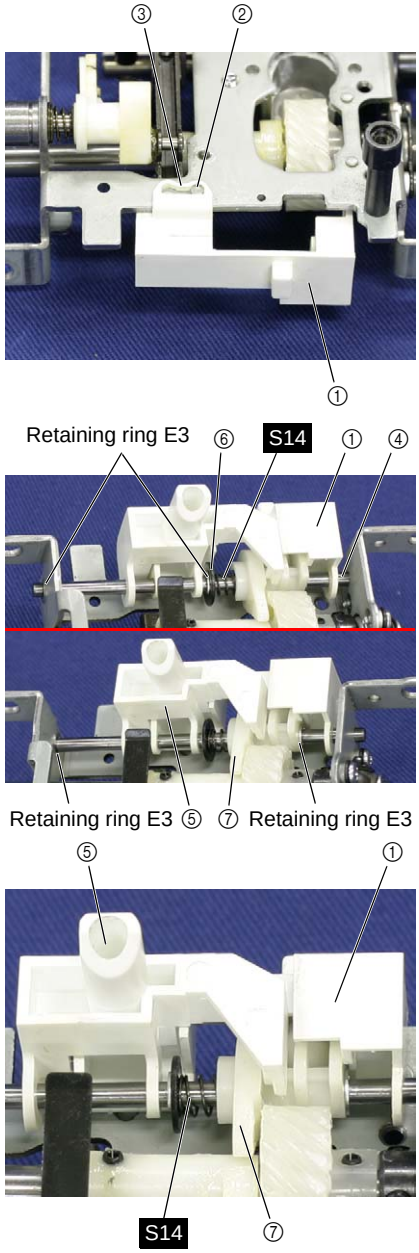
1. Attach the drop knob ① to the base plate assy.

   ***Key point**
   - Attach it while lifting the section ③ to get over the boss part ② of the base plate assy.
2. Attach the retaining ring E3 to the vertical feed shaft ④.
3. Set the base plate assy as shown in the right figure, and then insert the vertical feed shaft ④ into the base plate assy, the drop lever ⑤, the drop knob ①, the washer plain ⑥, the spring S14, the vertical lever ⑦, the drop knob ① and the base plate from the left side.

   ***Key point**
   - Insert it until the retaining ring hit the base plate assy.
4. Attach the 3 retaining rings E3 to the grooves (3 locations) of the vertical feed shaft ④.

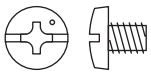
Apply EPNOC AP (N) 0 to the sliding parts of the drop knob and the base plate assy.	Bead XC8387***
Apply EPNOC AP (N) 0 to the vertical feed shaft.	Small amount XC8387***
Apply EPNOC AP (N) 0 to the vertical feed cam surface Ⓐ.	Small amount XC8387***

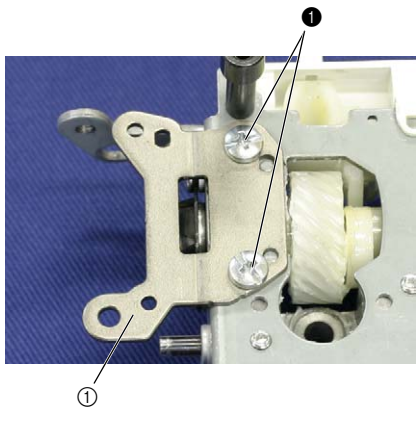
S14		SPRING XC2550***



13 Attachment of Thread cutter module supporter

1. Attach the thread cutter module supporter ① to the base holder assy with the 2 screws ❶.

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

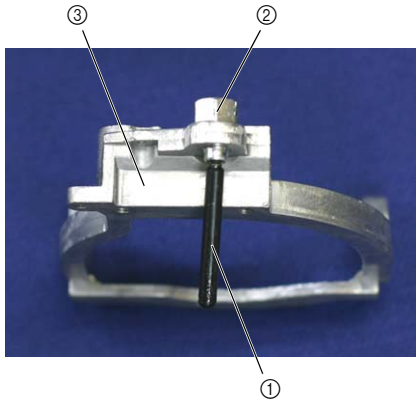


14 Attachment of Vertical adjuster screw assy

1. Attach the M5 nut ② to the vertical adjuster screw assy ①.
2. Attach the vertical adjuster screw assy ① to the feed bar ③.

***Key point**

- Refer to "4-22 Feed dog height".



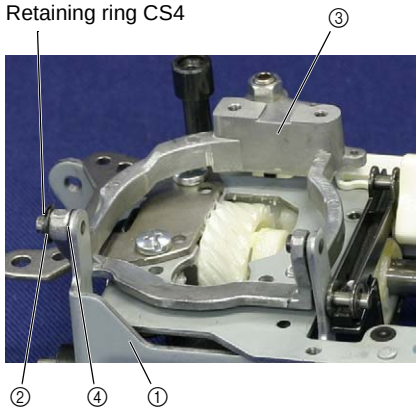
15 Attachment of Feed bar

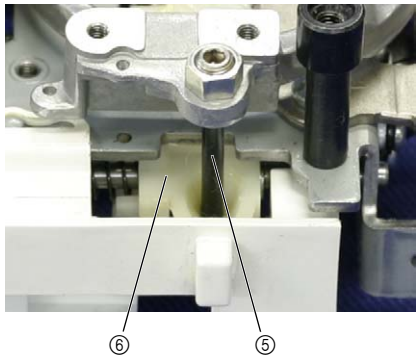
1. Insert the polyester slider ②, the feed bar ③ and the polyester slider ④ into the feed arm A assy ①, and then attach the retaining ring CS4.

***Key point**

- Check that the vertical adjusting screw ⑤ engaged with the groove of the vertical lever ⑥.
- Check that there should no gap between the retaining ring CS4 and the feed bar ③.

Apply EPNOC AP (N) 0 to the feed shaft hole in the feed bar.	Bead XC8387***
Apply EPNOC AP (N) 0 to the feed arm A assy.	Bead XC8387***
Apply EPNOC AP (N) 0 to the groove of the vertical lever.	Small amount XC8387***

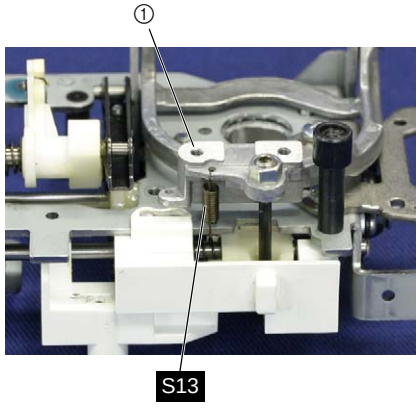




16 Attachment of Spring

1. Attach the spring S13 to the feed bar ① and the base plate assy.

S13	15.2	SPRING XC1940***

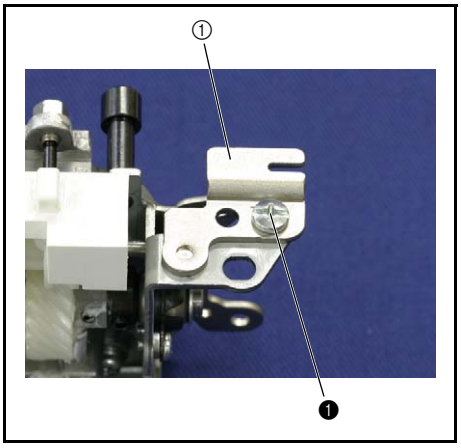


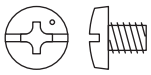
17 Attachment of Thread cutter module supporter

1. Attach the thread cutter module supporter ① to the base holder assy with the screw ❶.

***Key point**

- Check that the boss of the thread cutter module supporter ① align the positioning hole of the base holder assy.



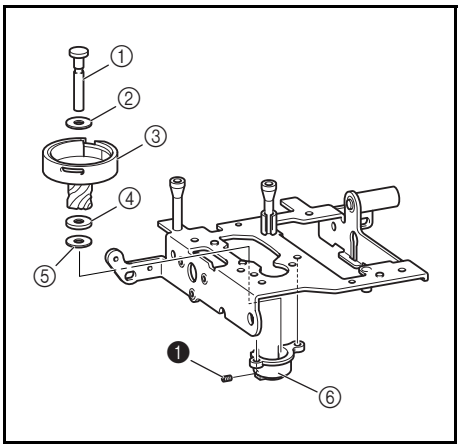
❶		Screw, Bind M4X5	Torque 1.18 – 1.57 N·m

18 Attachment of Outer rotary hook assy

1. Insert the outer rotary hook shaft ① into the spacer ②, the outer rotary hook assy ③, the washer 6 ④, the spacer ⑤ and the shaft supporter ⑥, and then attach it with the screw ❶.

***Key point**

- Turn the lower shaft so that the large one of the feed cam is depth and the hole of the lower shaft is the upper side, and then attach so that the match mark on the rotary hook faces forward.



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

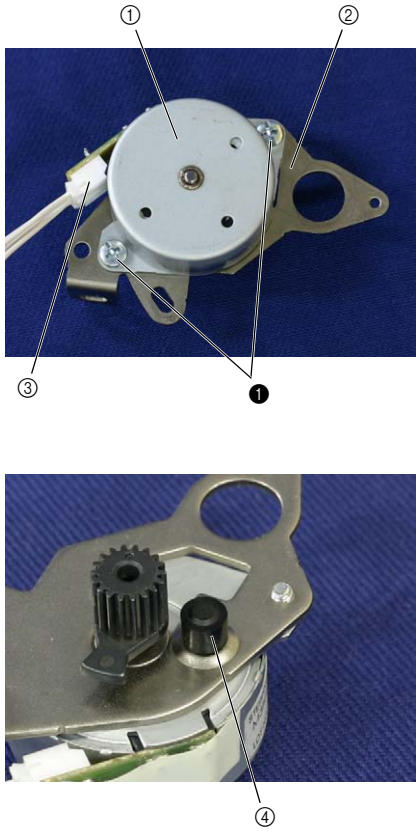
❶		Set Screw, Socket (CP) M4X6	Torque 0.78 – 1.18 N·m

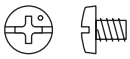
Application

19 Attachment of F pulse motor

1. Attach the F pulse motor ① to the FPM holder sub assy ② with the 2 screws ❶.
2. Attach the lead wire assy ③ to the F pulse motor ①.
3. Attach the rubber ④ to the shaft of the FPM holder sub assy ②.

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



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

Application

20 Attachment of FPM holder sub assy

1. Attach the FPM holder sub assy ① to the shaft ② of the base plate assy, and then attach the retaining ring CRS-10.

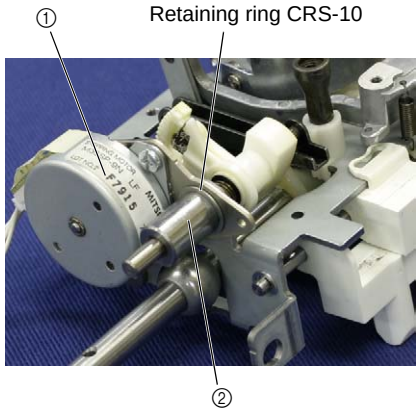
   ***Key point**
   - Check that the feed adjusting is the upper side of the FPM gear.

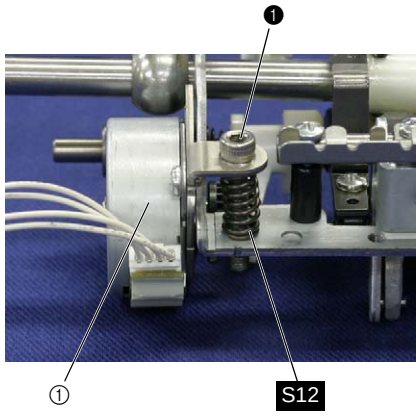
2. Sandwich the spring S12 between the FPM holder sub assy ① and the base plate assy, and then attach the screw ❶.

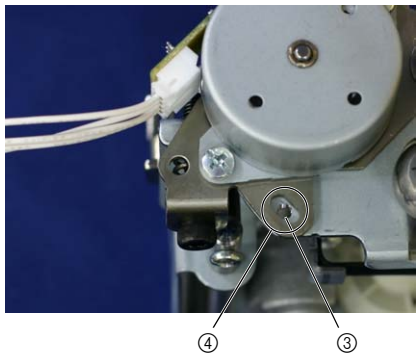
   ***Key point**
   - Tighten the screw ❶ until the screw hole ③ in the base plate assy comes approximately to the center of the positioning hole ④ in the FPM holder sub assy ①.

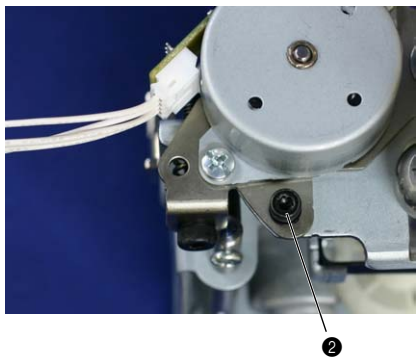
3. Tighten the screw ❷ temporarily.

   ***Key point**
   - Fully tighten the screw after performing "4-16 Feed forward/ backward".









❶	Bolt, Socket M4X25	—
❷	Screw 3X8	Torque Free tighten
S12	21, ϕ5	SPRING XC2537***

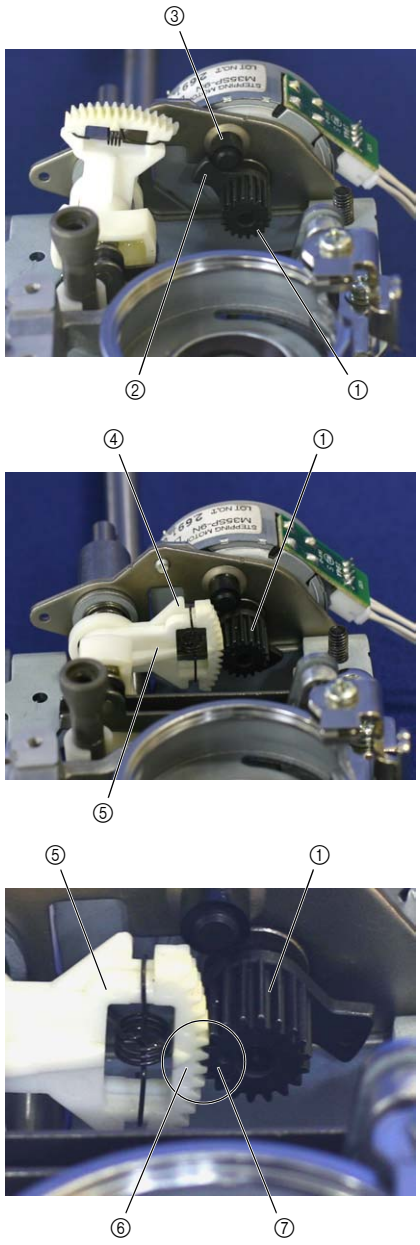
21 Attachment of F gear teeth alignment

1. Turn the F pulse motor gear ① clockwise until the stopper ② of the F pulse motor gear ① on it touches the rubber ③.
2. Align the teeth of the feed adjuster ④ with the teeth of the F gear ⑤, and then mesh it and the F pulse motor gear ①.

***Key point**

- Check that the match mark ⑥ of the F gear ⑤ and the match mark ⑦ of the F pulse motor gear ① are together.

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



Application

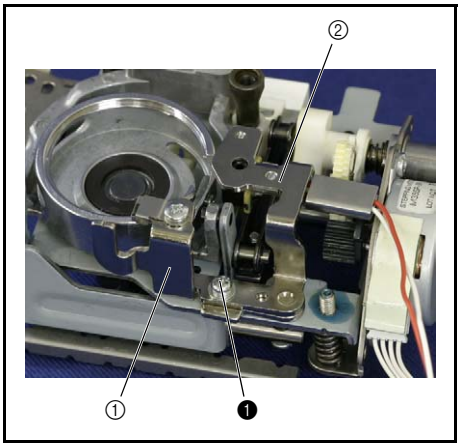
22 Attachment of Photo diode holder assy/Inner rotary hook bracket assy

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

***Key point**

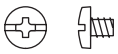
- Check that the positioning hole of the inner rotary hook bracket assy ① align the boss of the base holder assy.
- Check that the boss of the photo diode holder assy ② align the positioning hole of the inner rotary hook bracket assy ①.
- Refer to "4-23 Inner rotary hook bracket position".

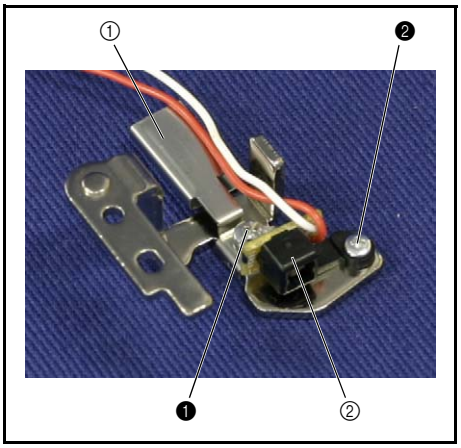
❶		Screw, Pan (S/P washer) M3X8DB	Torque Free tighten



22-1 Assembly of Photo diode holder assy

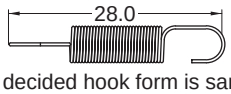
1. Attach the cord holder ① to the photo diode supporter with the screw ❶.
2. Attach the photo diode holder assy ② to the photo diode supporter with the screw ❷.

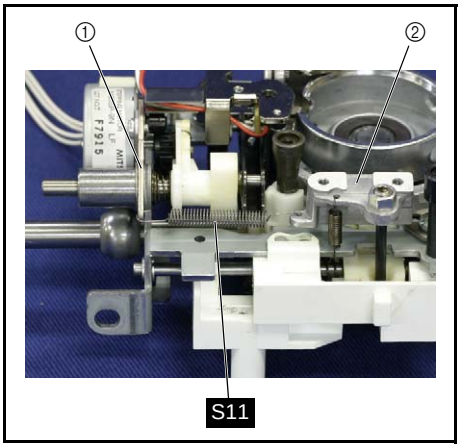
❶		Screw, Bind M2.6X3	Torque 0.58 – 0.78 N·m
❷		Screw, Bind M2X4	Torque 0.29 – 0.49 N·m



23 Attachment of Spring

1. Attach the spring S11 to the FPM holder assy ① and the feed bar ②.

S11	 28.0 A decided hook form is same	SPRING XE1478***



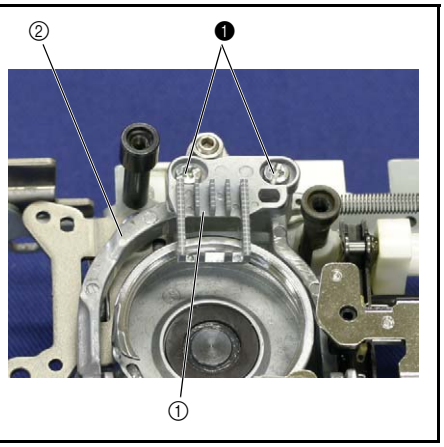
24 Attachment of Feed dog

1. Set the feed dog ① to the feed bar ②, and then tighten the 2 screws ❶ temporarily.

***Key point**

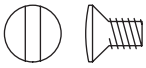
- Fully tighten the screw after performing "4-21 Front/back and left/right position of feed dog".

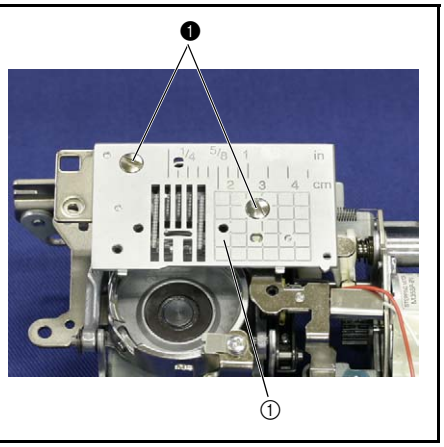
❶		Screw, Bind M3X6	Torque Free tighten



25 Attachment of Needle plate A assy

1. Attach the needle plate A assy ① with the 2 screws ❶.

❶		Screw M4	Torque 0.78 – 1.18 N·m



25-1 Assembly of Needle plate A assy

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

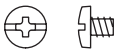
***Key point**

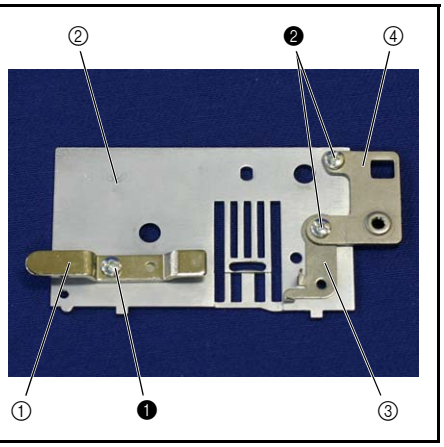
- Check that the boss part of the F gear stopper plate ① engaged with the positioning hole of the needle plate A ②.

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

***Key point**

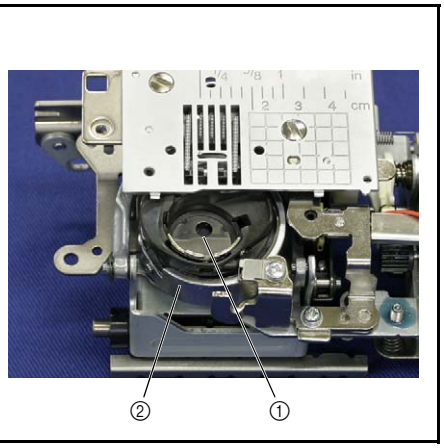
- Check that the boss of the stopper plate ③ engaged with the positioning hole of the needle plate A ②.

❶ ❷		Screw, Bind M2.6X3	Torque 0.59 – 0.78 N·m

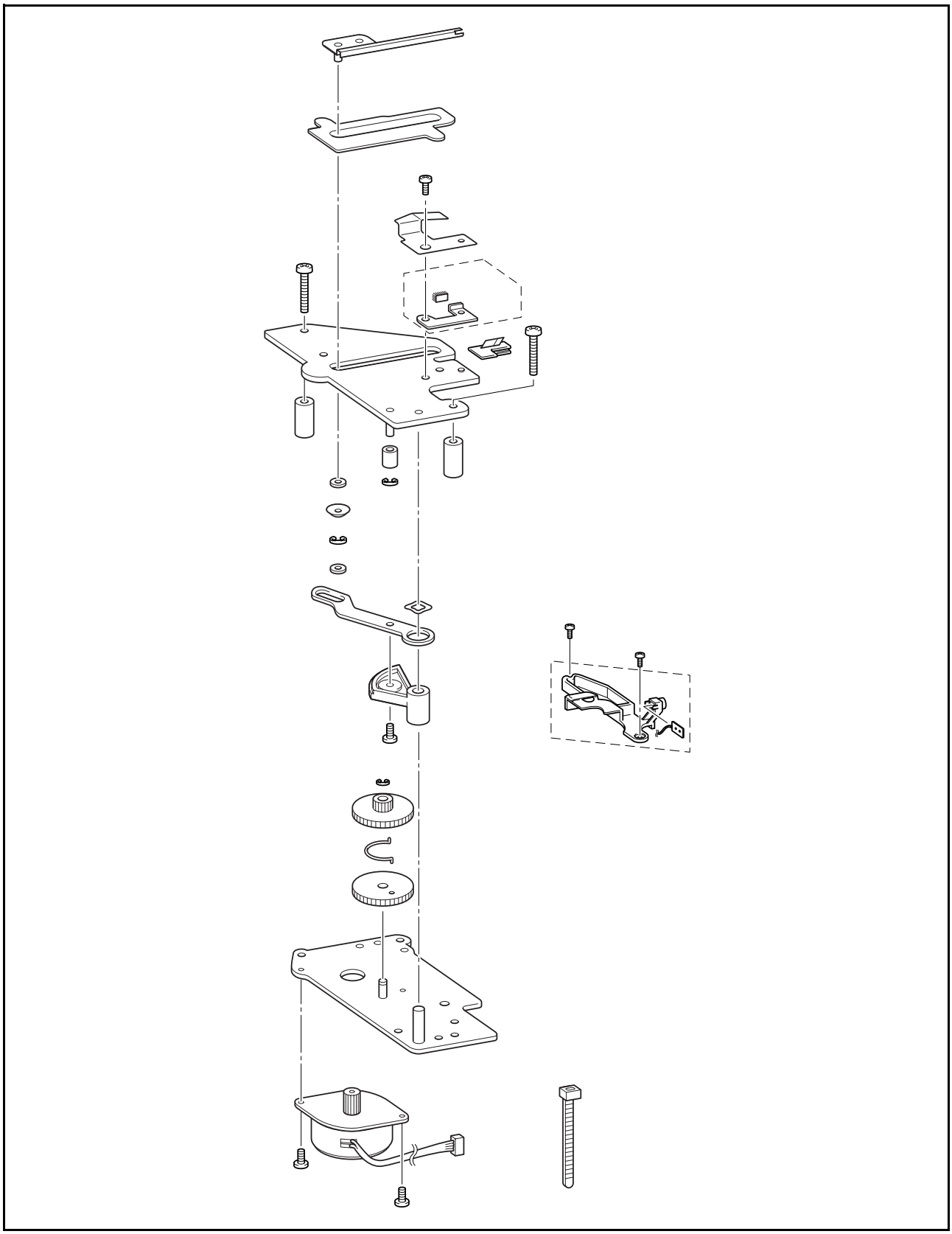


26 Attachment of Inner rotary hook assy

1. Attach the inner rotary hook assy ① to the outer rotary hook assy ②.



Thread cutter unit location diagram

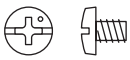


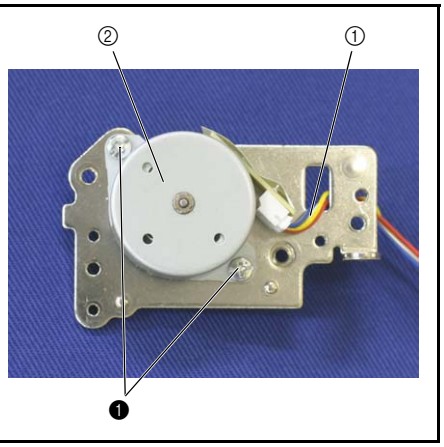
Application

1 Attachment of Motor pulse

1. Attach the CPM lead wire assy ① to the motor pulse ②.
2. Attach the motor pulse ② to the motor holder assy with the 2 screws ❶.

Lubricate the ZPM bearing with FBK OIL RO 100.	1-2 drops XC8388***

❶		Screw, Bind M3X4	Torque 0.59 – 0.78 N·m



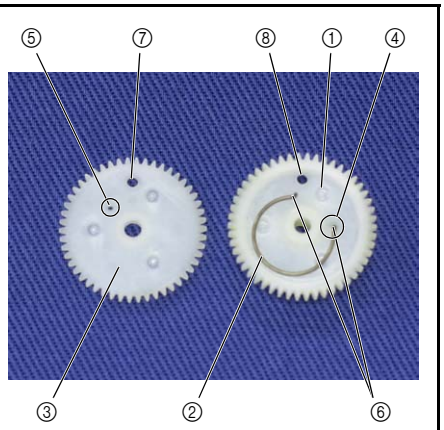
2 Attachment of Idle gear A/B

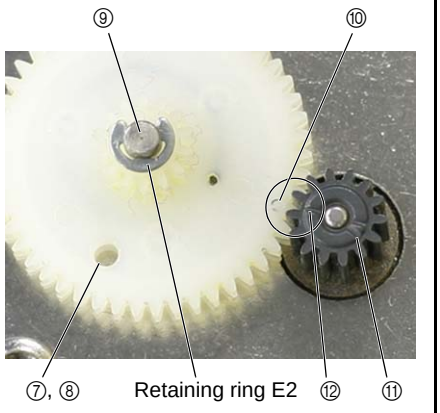
1. Assemble the idle gear A ①, the spring ② and the idle gear B ③.

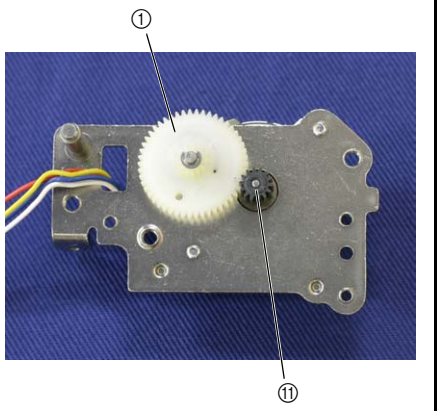
   ***Key point**
   - Insert the hook ⑥ (2 locations) of the spring ② into the attaching hole ④ of the idle gear A ① and the attaching hole ⑤ of the idle gear B ③.
   - Check that the positioning hole ⑦ of the idle gear A ① align the positioning hole ⑧ of the idle gear B ③.
2. Attach the idle gear B ③, the spring ② and the idle gear A ① to the idle gear shaft ⑨, and then attach the retaining ring E2.

   ***Key point**
   - Check that the match mark ⑩ of the idle gear A ① align the match mark ⑫ of the ZPM gear ⑪.

Apply a small amount of EPNOC AP(N)0 to the idle gear shaft.	Small amount XC8387***
Apply a small amount of EPNOC AP(N)0 to all of the teeth around the idle gear shaft A·B	Small amount XC8387***
Apply a small amount of EPNOC AP(N)0 to all of the teeth around the ZPM gear.	Small amount XC8387***







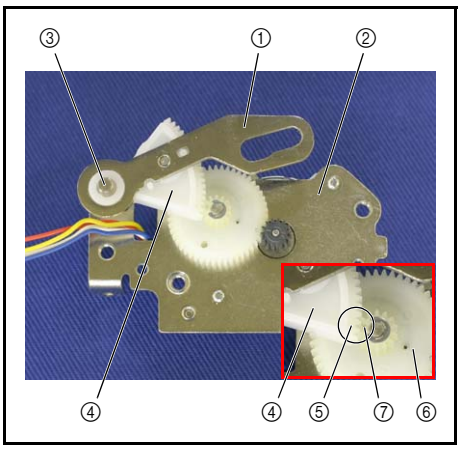
3 Attachment of Thread cutter lever assy

1. Attach the thread cutter lever assy ① to the thread cutter lever shaft ③ of the motor holder assy ②.

***Key point**

- Align the thread cutter gear ④ match mark ⑤ with the idle gear A ⑥ match mark ⑦.

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



3-1 Assembly of Thread cutter lever assy

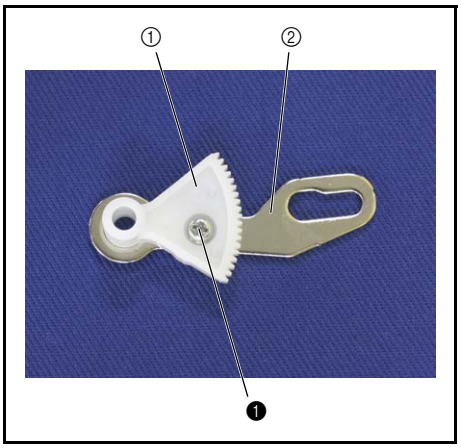
1. Attach the thread cutter lever gear ① to the thread cutter lever ② with the screw ❶.

***Key point**

- Align the boss part of thread cutter lever gear ① to the notch part of the thread cutter lever ②.

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

❶		Screw, Pan (S/P washer) M3X6DA	Torque 0.59 – 0.78 N·m



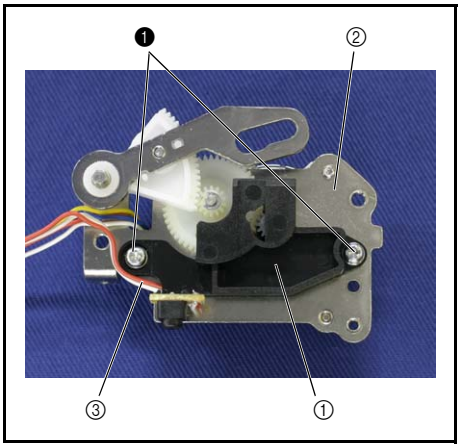
4 Attachment of Photo transistor assy

1. Attach the photo transistor assy ① to the motor holder assy ② with the 2 screws ❶.

***Key point**

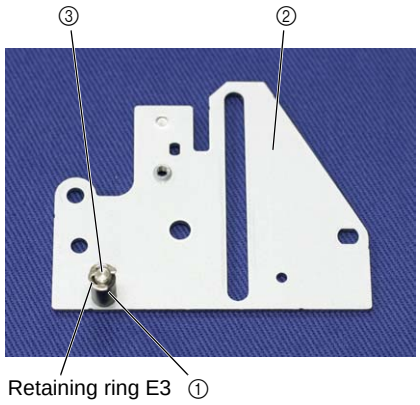
- Check that the CPM lead wire assy ③ through the lower side of the photo transistor assy ①.

❶		Screw, Pan (S/P washer) M3X6DA	Torque 0.59 – 0.78 N·m



5 Attachment of Rubber

1. Attach the rubber ① to the shaft ③ of the thread cutter frame assy ②, and then attach the retaining ring E3.



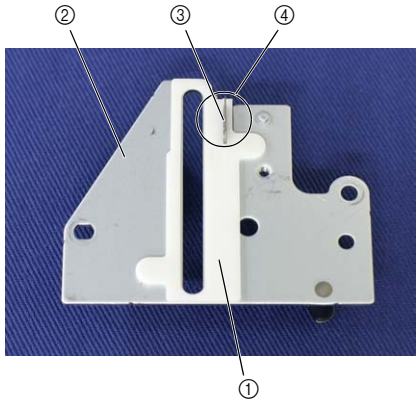
6 Attachment of Spacer

1. Attach the spacer ① to the thread cutter frame assy ②.

   ***Key point**
   - Check that the boss (2 locations) of the spacer ① align the positioning hole of the thread cutter frame assy ②.

2. Set the NT lower thread cutter ③ to the attaching groove of the thread cutter frame assy ②.

   ***Key point**
   - Check that the cutting part ④ of the NT lower thread cutter ③ is the outside.

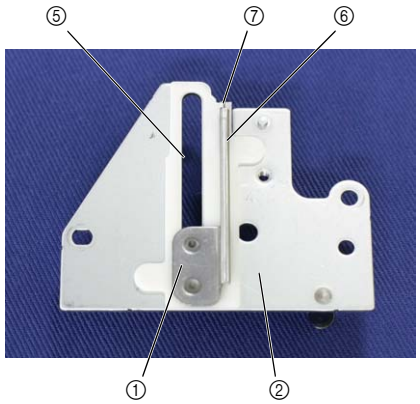


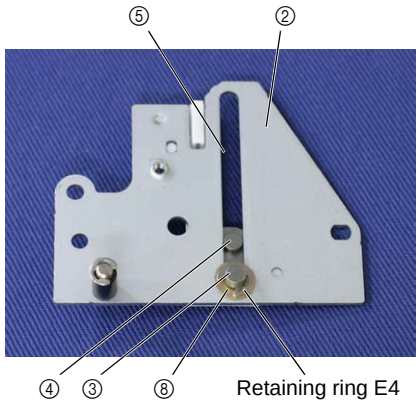
7 Attachment of Tread hook assy

1. Attach the thread hook assy ① to the thread cutter frame assy ②.

   ***Key point**
   - Insert the shaft ③ and the shaft ④ of the thread hook assy ① into the groove ⑤ of the thread cutter frame assy ②.
   - Put the thread hook part ⑥ of the thread hook assy ① on NT lower thread cutter ⑦.

2. Attach the washer ⑧ to the shaft ③ of the thread hook assy ①, and then attach the retaining ring E4.



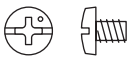


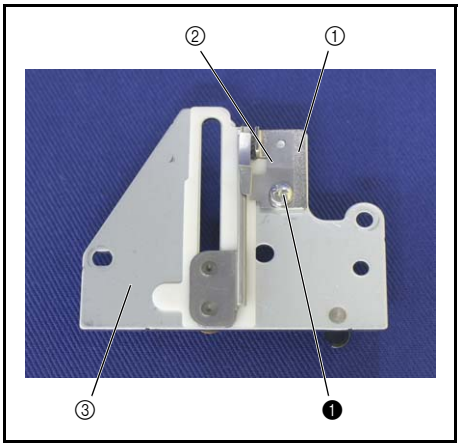
8 Attachment of Presser plate assy

1. Attach the presser plate assy ① and the spring plate ② to the thread cutter frame assy ③ with the screw ❶.

***Key point**

- Check that the boss part of the thread cutter frame assy ③ align the positioning hole of the presser plate assy ① and the spring plate ②.

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



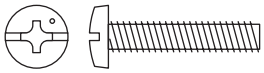
9 Attachment of Thread cutter frame assy

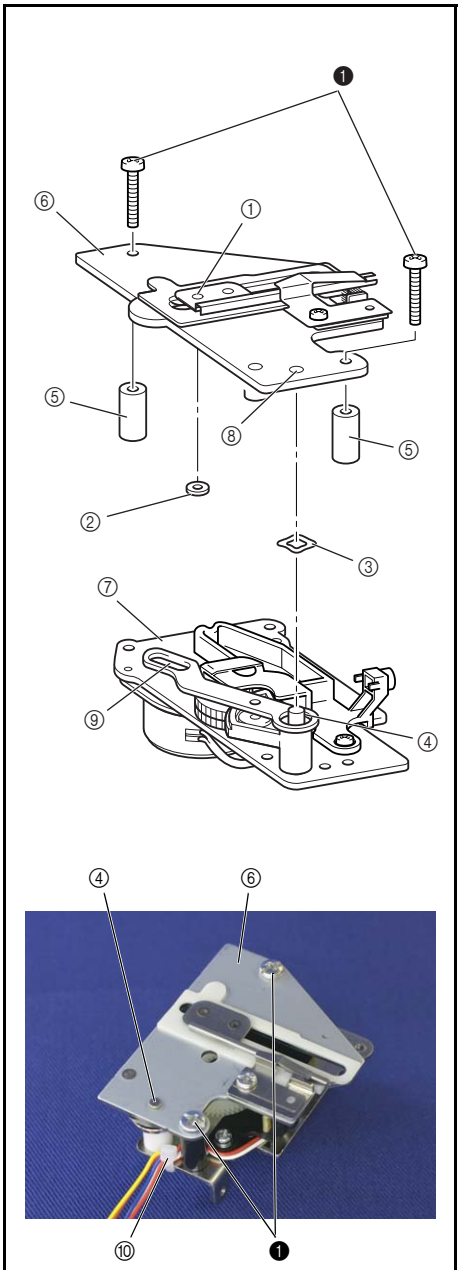
1. Attach the polyester slider ② to the shaft of the thread hook assy ①.
2. Attach the wave-shape spring washer ③ to the thread cutter lever shaft ④.
3. Attach the 2 collars ⑤ and the thread cutter frame assy ⑥ to the motor holder assy ⑦ with the 2 screws ❶.

***Key point**

- Check that insert the thread cutter lever shaft ④ into the positioning hole ⑧ of the thread cutter frame assy ⑥.
- Check that insert the shaft of the thread hook assy ① into the positioning hole of the thread cutter lever assy ⑨.

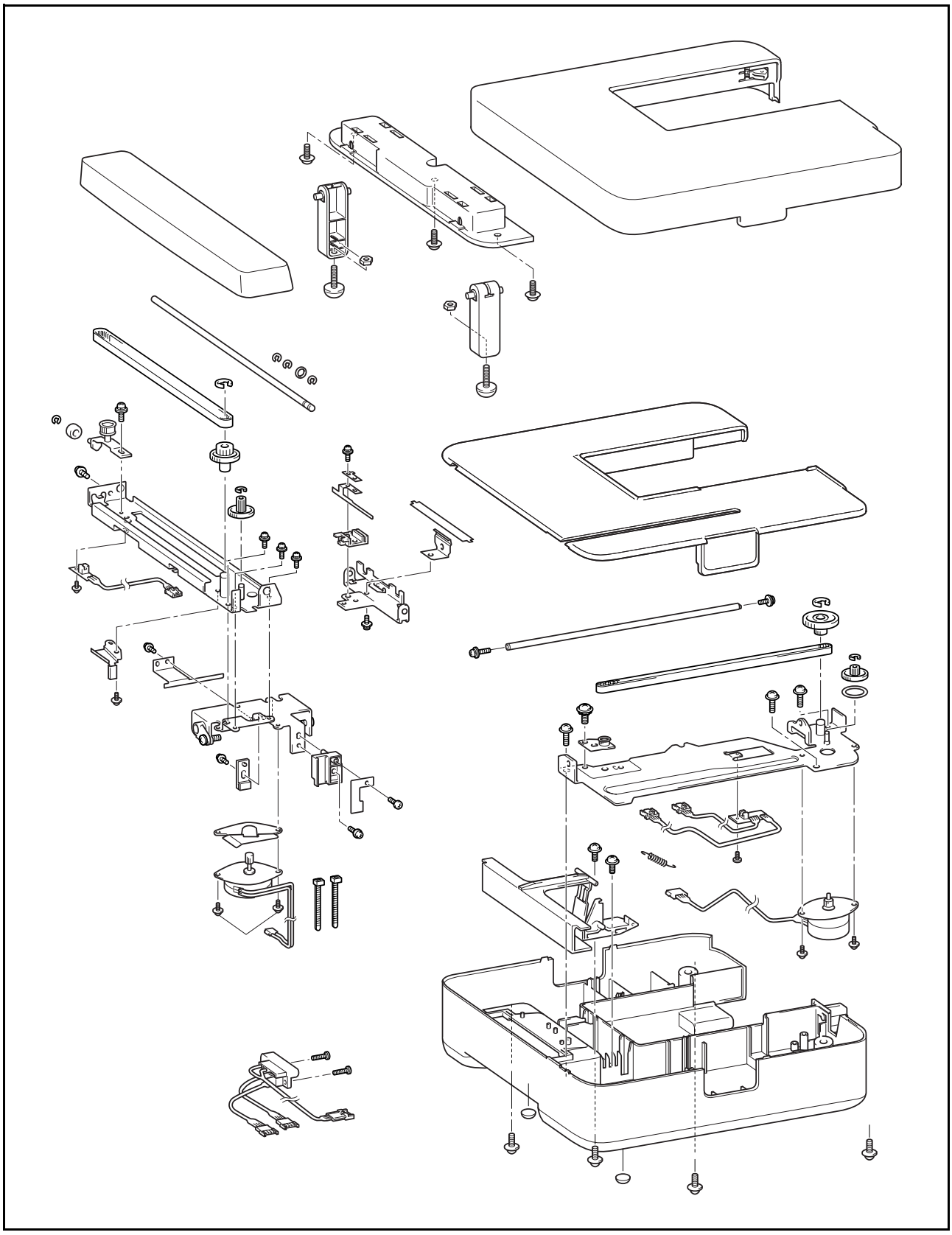
4. Attach the lead wire to the motor holder assy ⑦ with the band ⑩.

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



Application

Embroidery unit location diagram

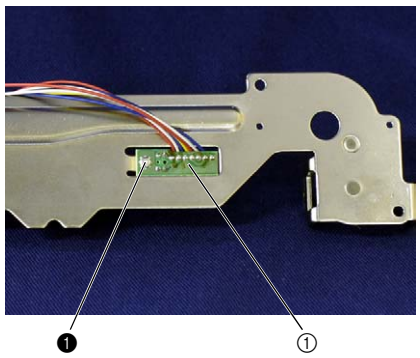


Application

1 Attachment of XSENS PCB assy

1. Attach the XSENS PCB assy ① to the main frame assy with the screw ❶.

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

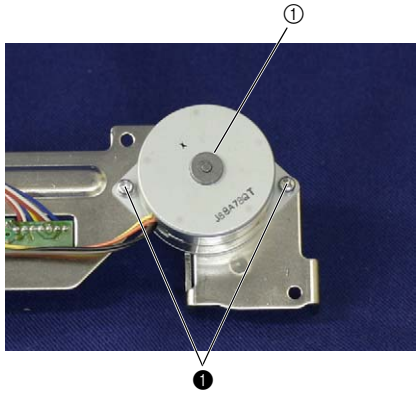


2 Attachment of XPM

1. Attach the XPM ① to the main frame assy with 2 screws ❶.

Lubricate the XPM bearing with FBK OIL RO 100	1-2 drops XC8388***

❶		Screw, Pan (S/P washer) M3X5DA	Torque 0.79 – 1.18 N·m



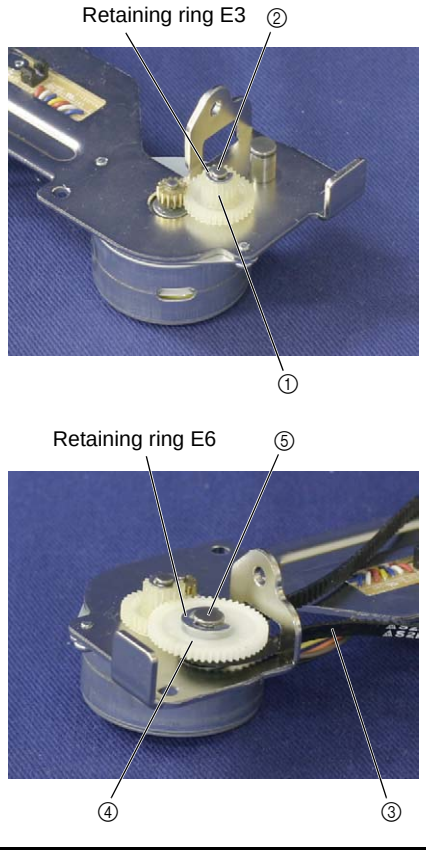
3 Attachment of X gear / X driving gear

1. Attach the X gear ① to the shaft ② of the main frame assy, and then attach the retaining ring E3.
2. Attach the washer, the T belt 40S2M400 ③ and the X driving gear ④ to the shaft ⑤ of the main frame assy, and then attach the retaining ring E6.

***Key point**

- Check the T belt 40S2M400 ③ hang on the gear of the bottom side of the X driving gear ④.

Apply EPNOC AP(N)O to the shaft of the ② and ⑥.	Bead XC8387***
Apply EPNOC AP(N)O to the gear part of the X driving gear, the X gear and the XPM gear.	Thinly all surface XC8387***

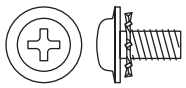


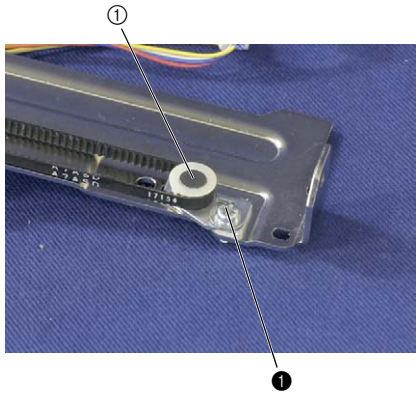
4 Attachment of X tension pulley assy

1. Set the X tension pulley assy ① to the main frame assy, and then tighten the screw ❶ temporarily.

***Key point**

- Check that the positioning hole of the X tension pulley assy ① engaged with the boss part of the main frame assy.
- Fully tighten the screw after performing "4-26 Timing belt tension (embroidery unit)".

❶		Screw 4X8F	Torque Free tighten

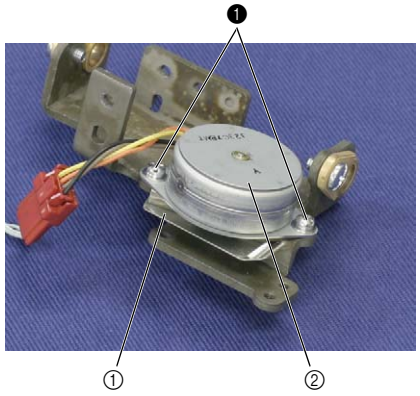


5 Attachment of YPM

1. Attach the cord guide ① and the YPM ② to the X carriage guide plate assy with the 2 screws ❶.

Lubricate the YPM bearing with FBK OIL RO 100.	1-2 drops XC8387***

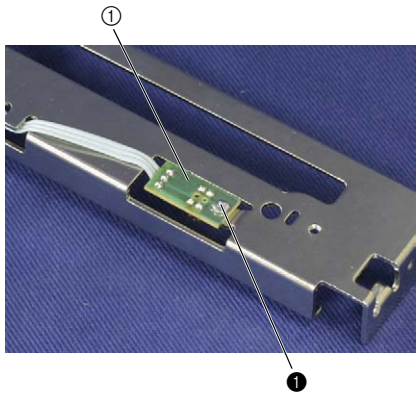
❶		Screw, Pan (S/P washer) M3X6	Torque 0.78 – 1.18 N·m



6 Attachment of YSENS PCB assy

1. Attach the YSENS PCB assy ① to the X carriage with the screw ❶.

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

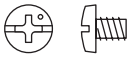


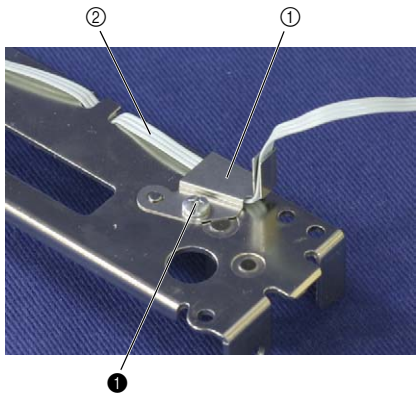
7 Attachment of Cord holder

1. Attach the cord holder ① to the X carriage assy with the screw ❶.

***Key point**

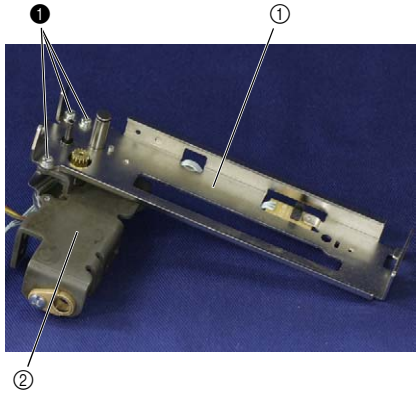
- Check that the positioning hole of the cord holder ① engaged with the boss part of the X carriage assy.
- Check that the lead wire of the YSENS PCB assy ② go through the bottom side of the cord holder ①.

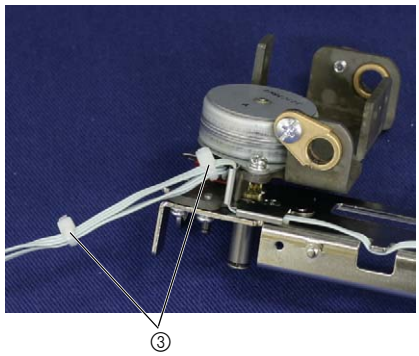
❶		Screw, Bind M3X4	Torque 0.78 – 1.18 N·m



8 Attachment of X carriage assy

1. Attach the X carriage assy ① to the X carriage guide plate assy ② with the 3 screws ❶.
2. Bind up the 2 lead wires with the 2 bands ③.



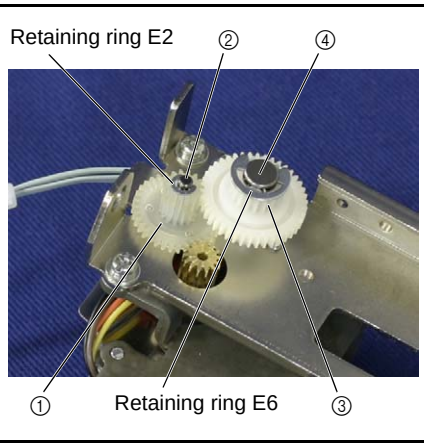


❶		Screw, Pan (S/P washer) M3X6	Torque 0.78 – 1.18 N·m

9 Attachment of Y driving gear / Y gear

1. Attach the Y gear ① to the shaft ② of the X carriage assy, and then attach the retaining ring E2.
2. Attach the Y driving gear ③ to the shaft ④ of the X carriage assy, and then attach the retaining ring E6.

Apply EPNOC AP(N)O to the shaft of the ② and ④.	Bead XC8387***
Apply EPNOC AP(N)O to the gear part of the Y driving gear, the Y gear and the YPM gear.	Thinly all surface XC8387***



10 Attachment of Y carriage

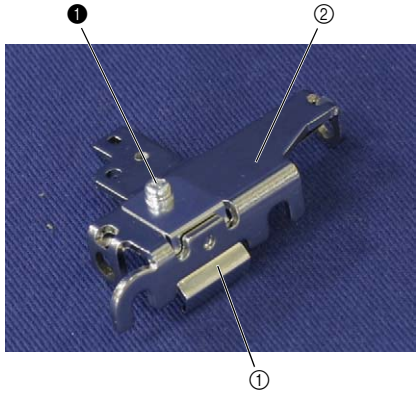
1. Attach the notched spring ① to the Y carriage with the screw ❶.

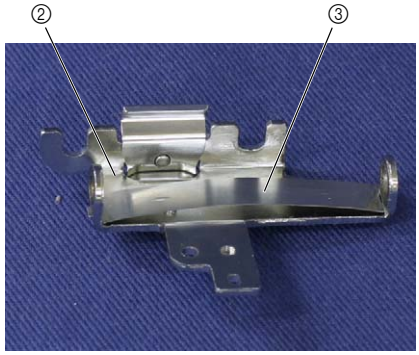
   ***Key point**
   - Check that the positioning hole of the notched spring ① engaged with the boss part of the Y carriage ②.
2. Attach the Y presser plate ③ to the Y carriage ②.
3. Attach the retaining ring E4 to the groove of the outside of the Y guide shaft ④.
4. Insert the Y guide shaft ④ in order of the washer, wave spring ⑤, the X carriage assy, the Y carriage ②, X carriage assy, and then attach the 2 retaining ring E4.

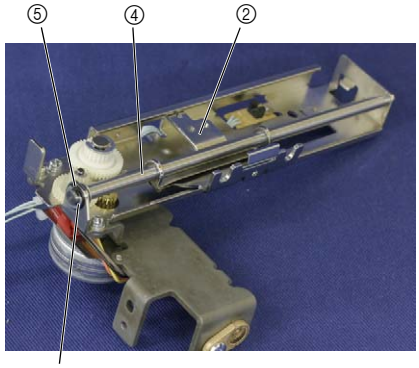
   ***Key point**
   - Set the X carriage assy as shown in the right figure, and then Insert the Y guide shaft ④ from the left side.

Apply EPNOC AP(N)O to the Y guide shaft.	Small amount XC8387***
Apply EPNOC AP(N)O to the sliding part of the Y slider.	Small amount XC8387***

❶		Screw, Pan (S/P washer) M3X5DA	Torque 1.18 – 1.57 N·m

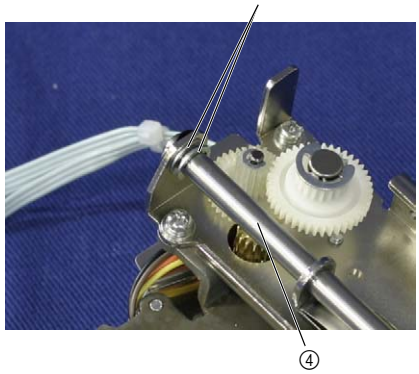






Retaining ring E4

Retaining ring E4

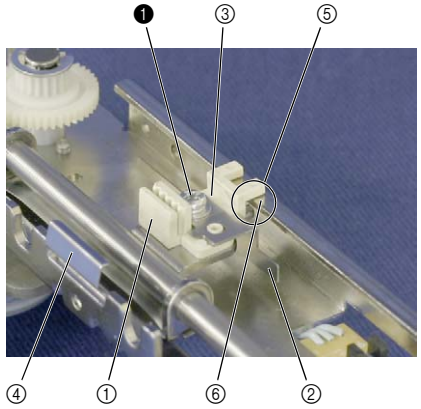


11 Attachment of Y slider

1. Attach the Y slider ①, the Y shutter ② and the shutter presser plate ③ to the Y carriage ④ with the screw ❶.

***Key point**
- Check that the groove ⑤ of the Y slider ① engaged with the rib ⑥ of the X carriage assy.
- Check that the boss part of the Y slider ① engaged with the positioning hole of the Y shutter ② and the shutter presser plate ③.

❶		Screw, Pan (S/P washer) M3X7	Torque 0.78 – 1.18 N·m



12 Attachment of Y tension pulley assy

1. Set the Y tension pulley assy ① to the X carriage assy, and then tighten the screw ❶ temporarily.

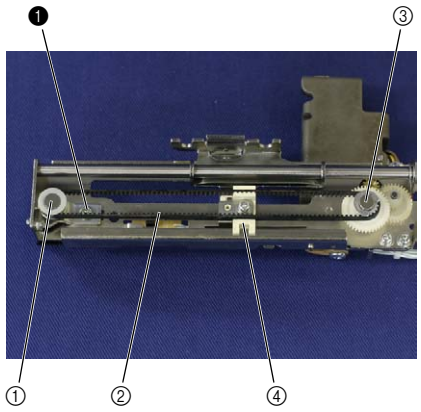
***Key point**
- Fully tighten the screw after performing "4-26 Timing belt tension (embroidery unit)".

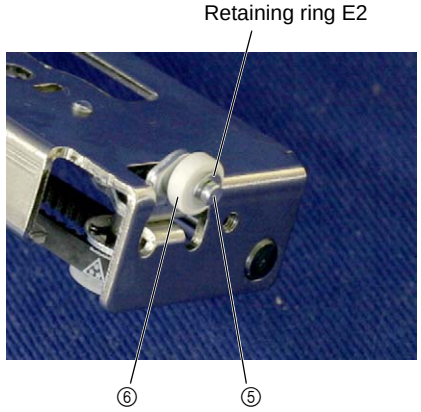
2. Hang the T belt ② on the Y tension pulley assy ① and the Y driving gear ③.

***Key point**
- Check that the tooth engaged, when attach the T belt to the Y slider ④.

3. Insert the roller assy ⑥ into the shaft ⑤ of the Y tension pulley assy ②, and then attach the retaining ring E2.

❶		Screw, Pan (S/P washer) M3X6	Torque Free tighten





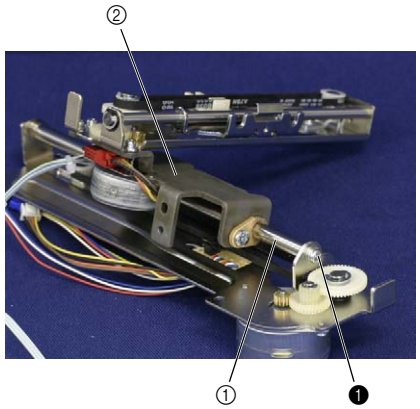
Application

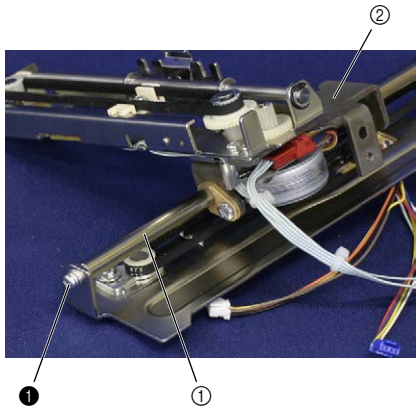
13 Attachment of X carriage guide plate assy / X guide shaft

1. Insert the X guide shaft ① into the X carriage guide plate assy ②.
2. Attach the X guide shaft ① to the main frame assy with the 2 screws ❶.

Apply EPNOC AP(N)O to the X guide shaft.	Small amount XC8387***

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





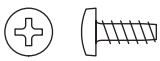
14 Attachment of X slider

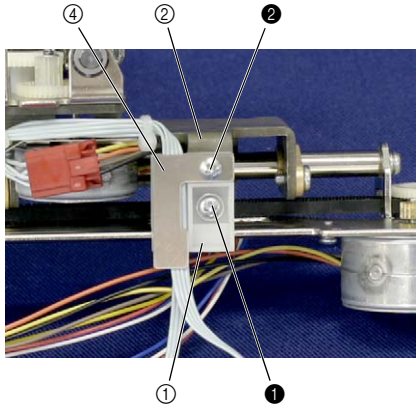
1. Attach the X slider ① to the X carriage guide plate assy ② with the screw ❶.

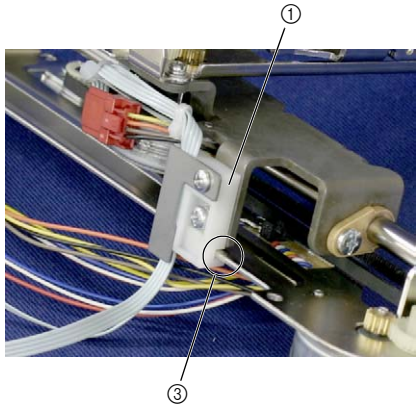
   ***Key point**
   - Check that the boss part of the X slider ① engaged with the positioning hole of the X carriage guide plate assy ②.
   - Check that the groove ③ of the X slider ① engaged with the rib of the main frame assy.
2. Attach the cord presser ④ to the X slider ① with the screw ❷.

   ***Key point**
   - Check that the 2 cords is between the X slider ① and the cord presser ④.

Apply EPNOC AP(N)O to the sliding part of the X slider.	Small amount XC8387***

❶		Screw, Pan (S/P washer) M4X8	Torque 0.78 – 1.18 N·m
❷		Taptite, Bind P M3X8	Torque 0.59 – 0.78 N·m





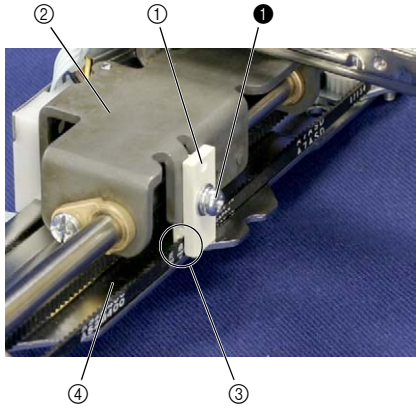
15 Attachment of X belt presser

1. Attach the X belt presser ① to the X carriage guide plate assy ② with the screw ❶.

***Key point**

- Check that the tooth engaged, when Insert the T belt 40S2M400 ④ into the groove ③ of the X belt presser ①.

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



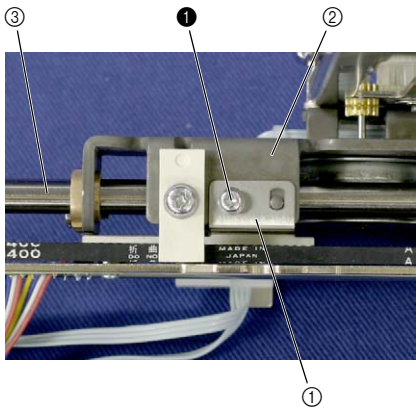
16 Attachment of X shutter

1. Attach the X shutter ① to the X carriage guide plate assy ② with the screw ❶.

***Key point**

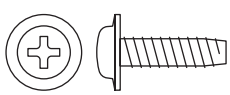
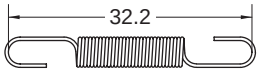
- Check that the positioning hole of the X shutter ① engaged with the boss part of the X carriage guide plate assy ②.
- Check that the X shutter ① is parallel to the X guide shaft ③.

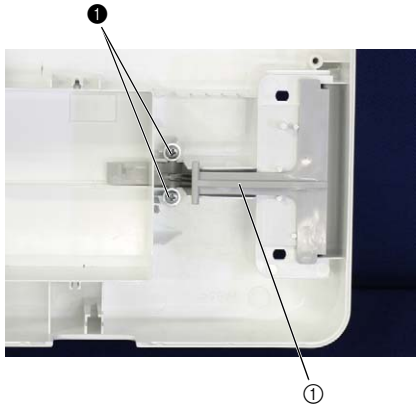
❶		Screw, Pan (S/P washer) M3X5DA	Torque 0.78 – 1.18 N·m



17 Attachment of Handle

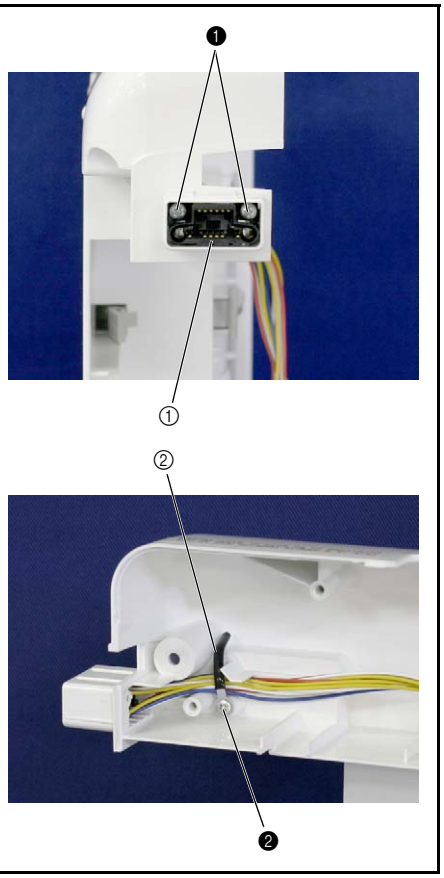
1. Attach the spring S17 to the handle ①.
2. Attach the handle ① to the ES cover D with the 2 screws ❶.

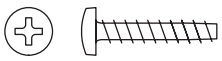
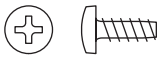
❶		Taptite, Cup B M4X14	Torque 0.59 – 0.78 N·m
S17			Spring XA1988***



18 Attachment of lead wire assy: EMB unit

1. Attach the lead wire assy: EMB unit ① to the ES cover D with the 2 screws ❶.
2. Attach the coaching clip ② to the ES cover D with the screw ❷.
3. Hold on the lead wire with the coaching clip ②.



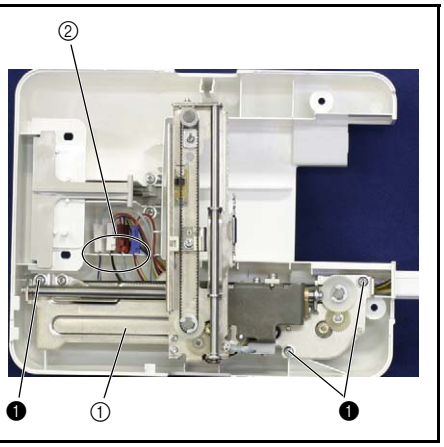
❶		Taptite, Bind P M3X16	Torque 0.59 – 0.78 N·m
❷		Taptite, Bind P M3X8	Torque 0.78 – 1.18 N·m

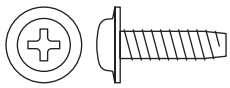
19 Attachment of Main frame assy

1. Attach the main frame assy ① to the ES cover D with the 3 screws ❶.

   ***Key point**
   - Set the embroidery as shown in the right figure, and then move the X carriage assy to the right side.
2. Connect the 4 connectors, and then hang the 4 lead wires on the guide part ② of the ES cover D.

   ***Key point**
   - Refer to "Special Instructions of Wiring".



❶		Taptite, Cup B M4X14	Torque 0.78 – 1.18 N·m

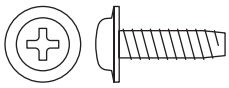
20 Attachment of ES cover U

1. Set the ES cover U ① to the ES cover D.

***Key point**

- Set the embroidery as shown in the right figure, and then move the X carriage assy to the left side.

2. Attach the ES cover U with the 4 screws ❶.

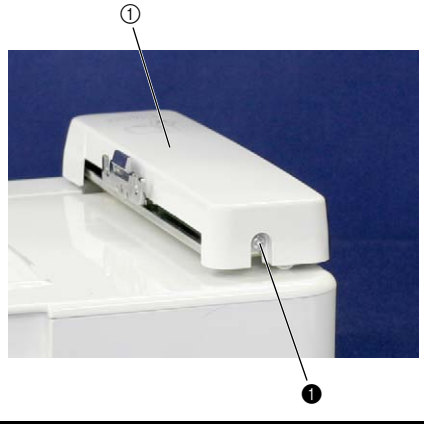
❶		Taptite, Cup B M4X14	Torque 0.78 – 1.18 N·m

21 Attachment of Carriage cover

1. Set the carriage cover ① to the X carriage assy with the screw ❶.

***Key point**

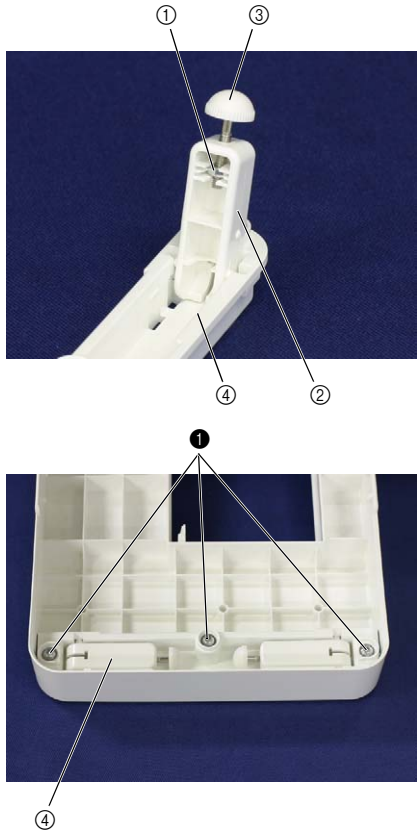
- Check that the attaching groove of the carriage cover ① engaged with the rib of the X carriage assy.

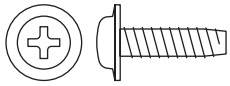


❶		Screw, Pan (S/P washer) M3X6	Torque 0.78 – 1.18 N·m

22 Attachment of ES foot cover

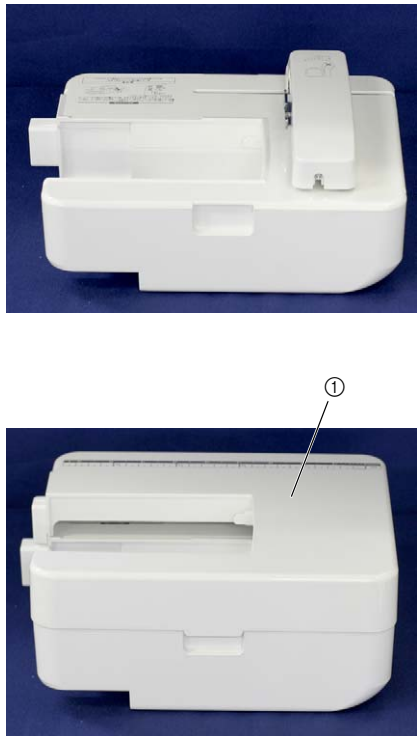
1. Attach the 2 nut 2 M4 ① to the 2 ES foot ②.
2. Attach the 2 adjusting foot ③ to the 2 ES foot ②.
3. Attach the 2 ES foot ② to the ES foot cover ④.
4. Attach the ES foot cover ④ to the ES top cover with the 3 screws ❶.



❶		Taptite, Cup B M4X14	Torque 0.78 – 1.18 N·m

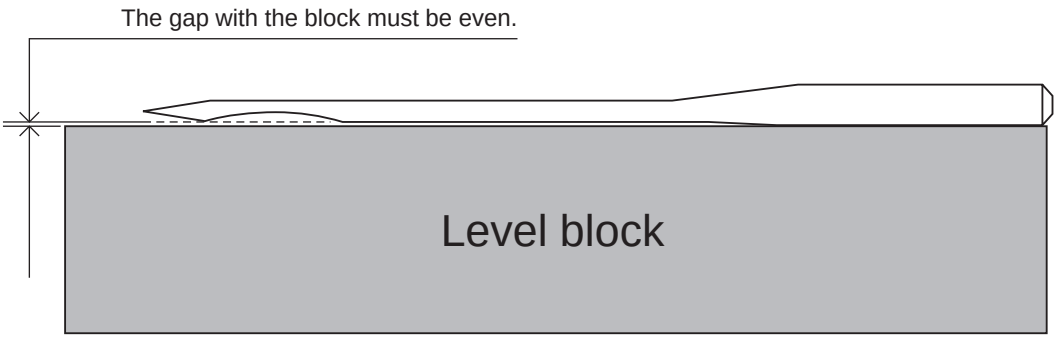
23 Attachment of ES top cover

1. Set the embroidery as shown in the right figure, and then set the Y carriage assy from the left side at the position of around 40mm.
2. Attachment the ES top cover ① to the embroidery.

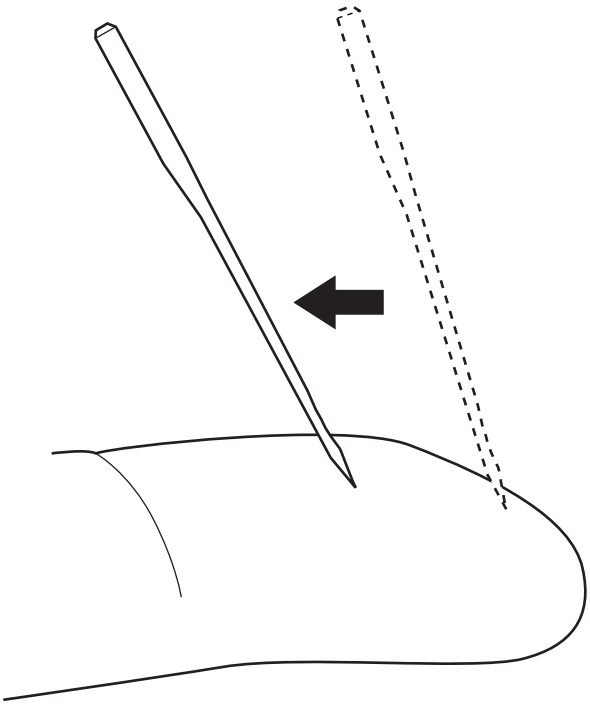


4 Adjustment

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



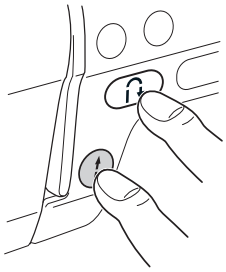
2. Slide a needle on your finger and check it moves smoothly (no damage on needle point).

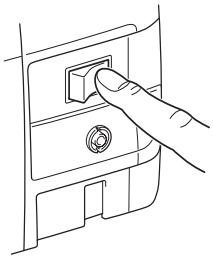


Inspection and Adjustment

1. How to start test mode

   Turn on the power while pressing (Start/stop button) and (Reverse stitch button), four beeps sound, then test mode starts.





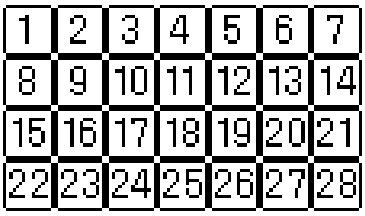
2. Starting and stopping test mode

   Press (Start/stop button).

3. Return to test mode selection screen

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

Test mode selection screen



Inspection and Adjustment

Test mode No.	Mode	Contents of test mode	Ref. page
1	Serial number/Product ID	Serial number/Product ID and software version are displayed.	—
2	Embroidery position	Adjust the center position of the embroidery area.	4 - 27
3	Pattern adjustment	Test pattern is sewn, and set up the correction value.	4 - 25
4	3-point needle drop	Change the needle position (left/center/right).	4 - 9 4 - 10 4 - 11 4 - 12 4 - 13
5	Needle clearance	Change the needle drop position horizontally while operate the machine.	—
6	Feed dog position	Change the feed dog position (center/front).	4 - 21
7	LCD contrast	Adjust the contrast of the LCD.	—
11	Upper thread/Lower thread	Check the upper/lower thread sensor.	—
12	Upper thread 1	Stop the function for upper/lower thread detection (only one time).	—
13	Forward and reverse feed	Sew 100 forward stitches (left base line), and 100 reverse stitches (right base line).	4 - 16
14	Speed	Run the machine with the maximum speed.	—
15	Power	Run 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 - 18 4 - 19
19	Clearing flash/Clearing counter	CLEARING FLASH : Clear memorized data. CLEARING COUNTER : Clear the service stitch count/ time.	4 - 29
20	Total count	Check the total stitch count/time.	—
21	Input check	Display the state of each switch and sensor 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 area of embroidery.	4 - 27
24	LCD check	Check the LCD state.	—
25	Error list	Display happened 10 error messages on the screen.	4 - 29
27	VR AD check	Display the speed/foot controller volume. Display target/current rotation speed of upper shaft.	—
28	EEPROM USB HOST write	Not used (factory use only).	—

Inspection and Adjustment

[Adjustment standard]

Touch the 5 points on the screen (touch panel) in order from 1 to 5, then “SUCCESS” is displayed.

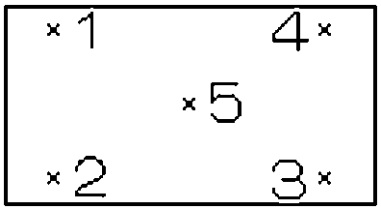
[Adjustment procedure]

1. Turn on the power while pressing (Start/stop button), (Reverse stitch button) and (Needle position button).
2. Touch the 5 points (×) on the screen (touch panel) in order from 1 to 5.

   ***Key point**
   - Touch the center of (×), otherwise fail in the adjustment.
   - 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



Inspection and Adjustment

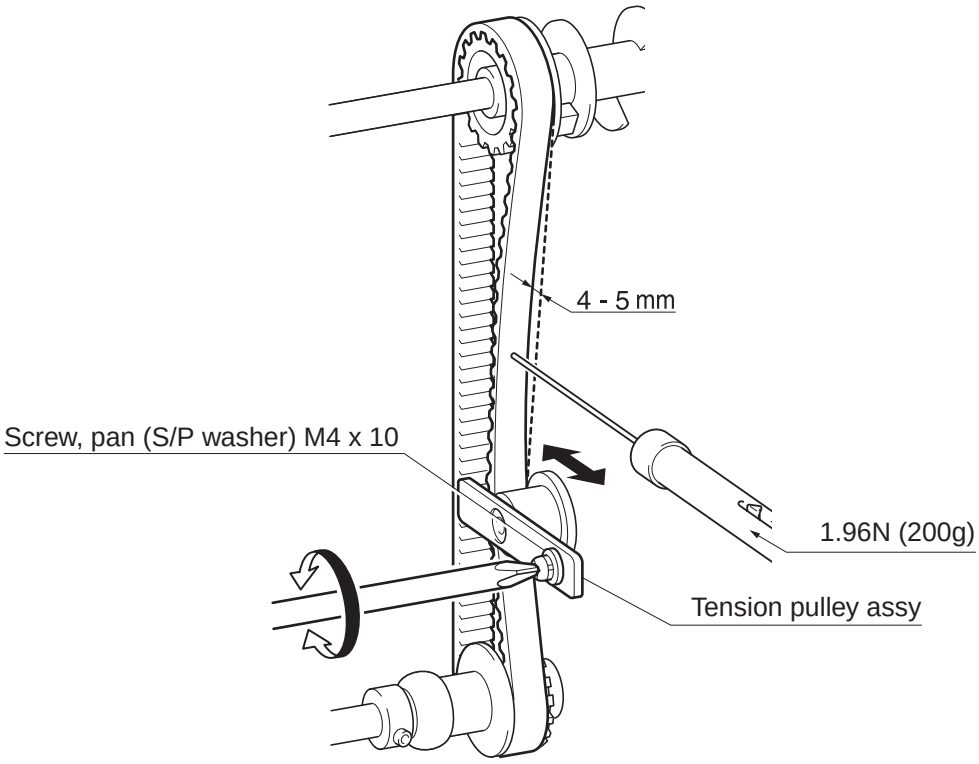
[Adjustment standard]

The belt deflection must be 4 to 5 mm when pushing the center of the timing belt with a force of 1.96N (200g).

[Adjustment procedure]

1. Remove the front cover.
2. Loosen the screw (screw, pan (S/P washer) M4 x 10) of the tension pulley assy.
3. Move tension pulley assy back and forth, to adjust the belt deflection to 4 to 5 mm when pushing the center of the timing belt with a force of 1.96N (200g).
4. Tighten the screw (screw, pan (S/P washer) M4 x 10) of the tension pulley assy.

XC2277001	Push-pull gauge (5N)



Inspection and Adjustment

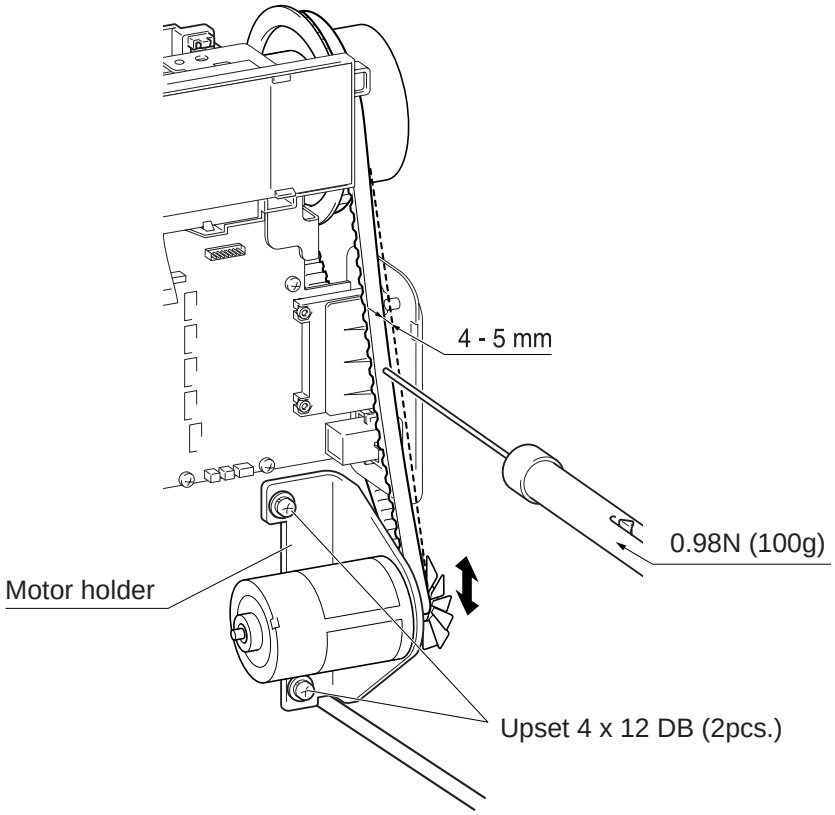
[Adjustment standard]

The belt deflection must be 4 to 5 mm when pushing the center of the motor belt with a force of 0.98N (100g).

[Adjustment procedure]

1. Remove the front cover.
2. Loosen the 2 screws (upset 4 x 12 DB) of the motor holder.
3. Move the motor holder up and down, to adjust the belt deflection is 4 to 5 mm when pushing the center of the motor belt with a force of 0.98N (100g).
4. Tighten the 2 screws (upset 4 x 12 DB) of the motor holder.

XC2277001	Push-pull gauge (5N)



Inspection and Adjustment

[Adjustment standard]

Pass the schappe spun thread #60 through thread guide path, and lower the presser foot lever, and pull the thread down slowly with the tension gauge, then adjust the thread tension must be 0.32 to 0.42N (33 to 43g).

[Adjustment procedure]

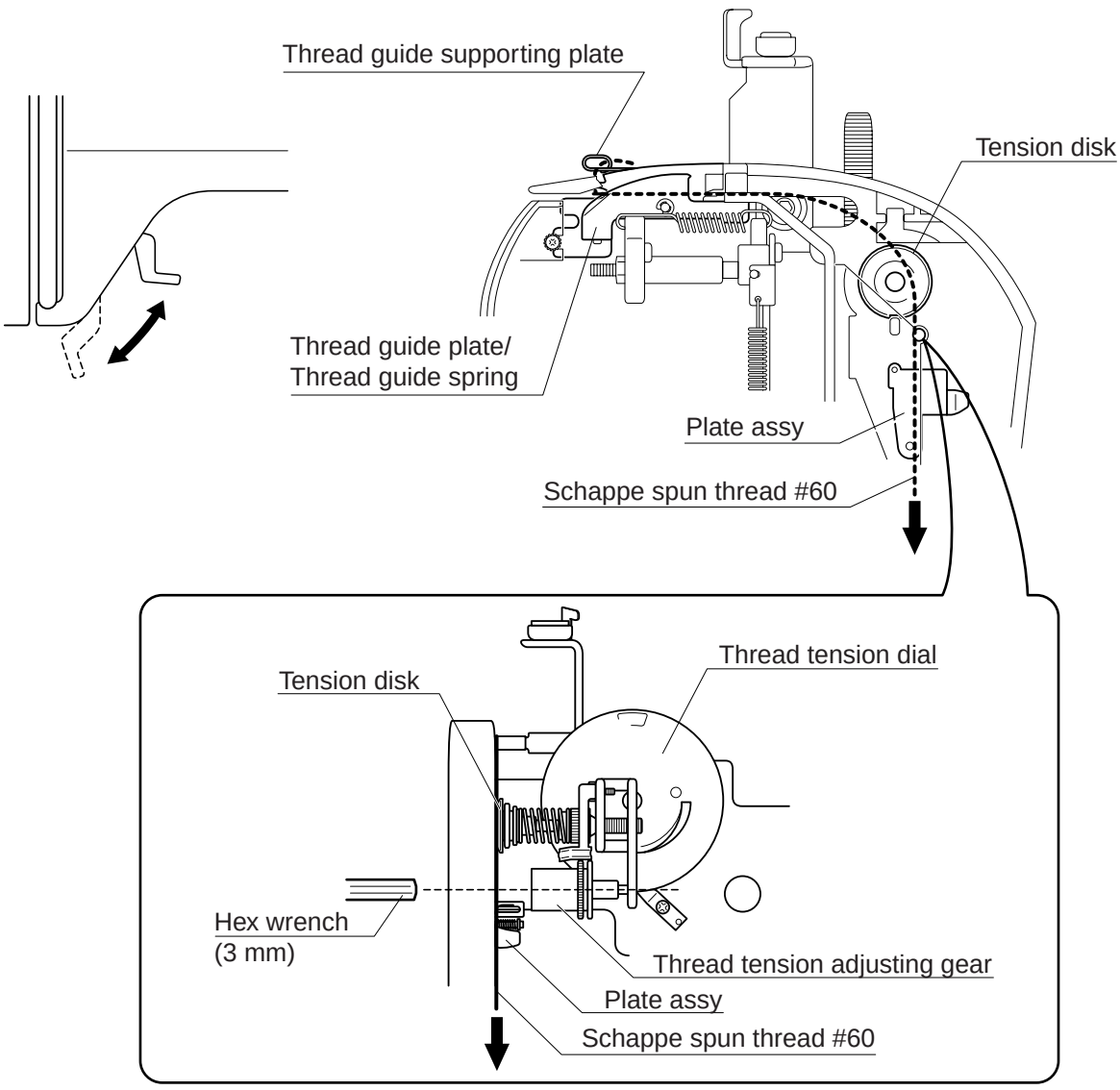
1. Remove the face plate.
2. Set the thread tension dial to the “4”.
3. Raise the presser foot lever.
4. Pass the schappe spun thread #60 through the thread guide supporting plate ⇒ thread guide plate / thread guide spring ⇒ tension disk ⇒ plate assy in this order.
5. Lower the presser foot lever.
6. Pull the thread down slowly with the tension gauge, and turn the thread tension adjusting gear with the hex wrench (3 mm), to adjust the thread tension to 0.32 to 0.42N (33 to 43g).

***Key point**

- Loosen the thread tension adjusting gear (turn to the left). ⇒ Tension larger
- Tighten the thread tension adjusting gear (turn to the right). ⇒ Tension smaller

XA9154001	Tension gauge 50 (0.5N)

Inspection and Adjustment



[Adjustment standard]

The needle top (left base line) must drop in the right side of “V” groove on the needle plate A.

[Adjustment procedure]

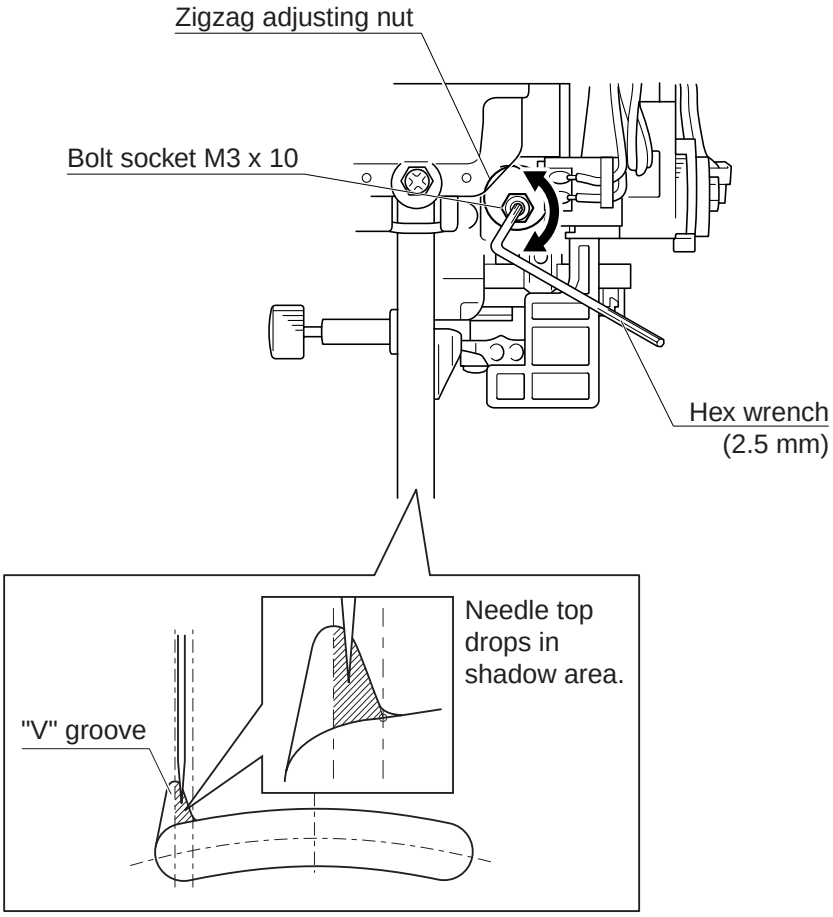
1. Remove the presser foot and the face plate.
2. Start the test mode.
3. Select the “4” (3-point needle drop mode).
4. Press (Reverse stitch button) and move the needle bar to the left base line, then turn off the power.
5. Turn the pulley by hand until the needle top comes to the needle plate A surface.
6. Loosen the screw (bolt socket M3 x 10) of the zigzag adjusting nut with the hex wrench (2.5 mm).
7. Turn the zigzag adjusting nut with the box screw driver (6 mm), to adjust the needle top drops in the right side of “V” groove on the needle plate A.
8. Tighten the screw (bolt socket M3 x 10) of the zigzag adjusting nut.

***Key point**

- Tighten it while fixing the zigzag adjusting nut by finger so that the zigzag adjusting nut does not turn.

XE2395001	Box screw driver 6

Inspection and Adjustment

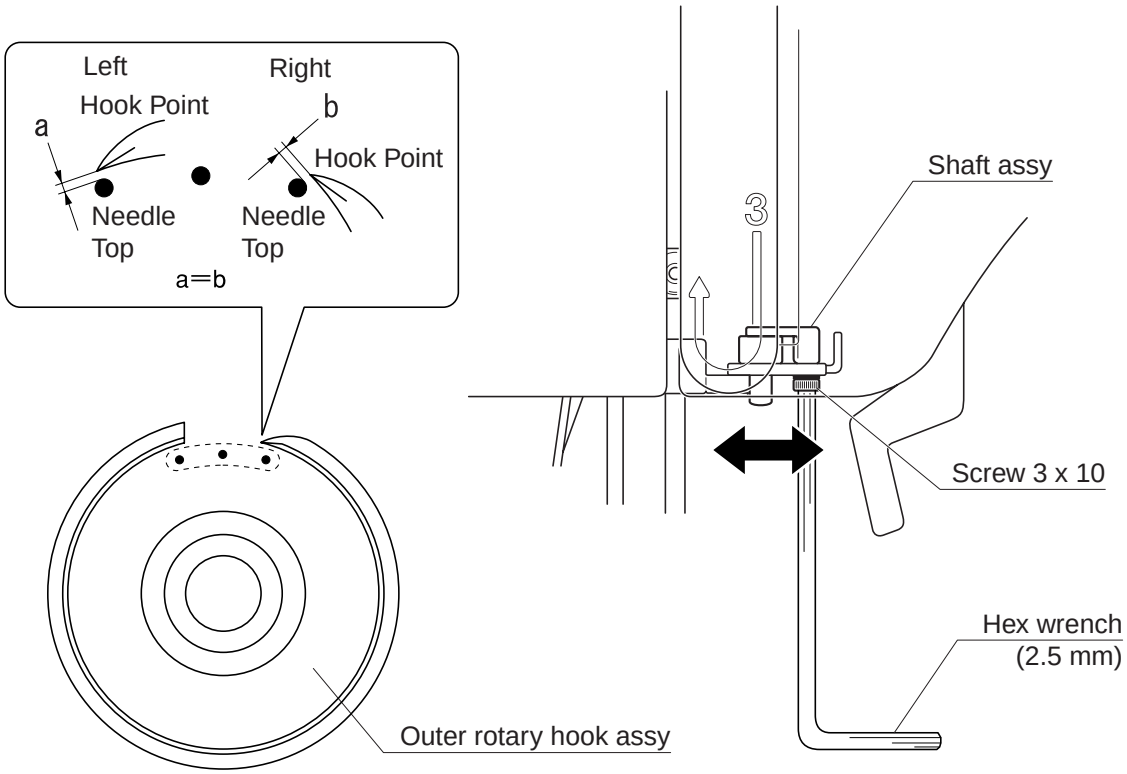


[Adjustment standard]

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

[Adjustment procedure]

1. Remove the presser foot, the needle plate B and the needle plate A, then remove the inner rotary hook assy.
2. Start the test mode.
3. 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. Loosen the screw (screw 3 x 10) of the shaft assy with the hex wrench (2.5 mm).
6. Move the shaft assy to the left and right, to adjust the clearance between the needle top and the outer rotary hook point is the same at the base line of both left and right.
7. Tighten the screw (screw 3 x 10) of the shaft assy.



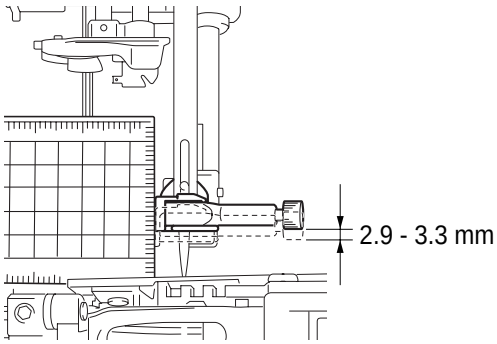
Inspection and Adjustment

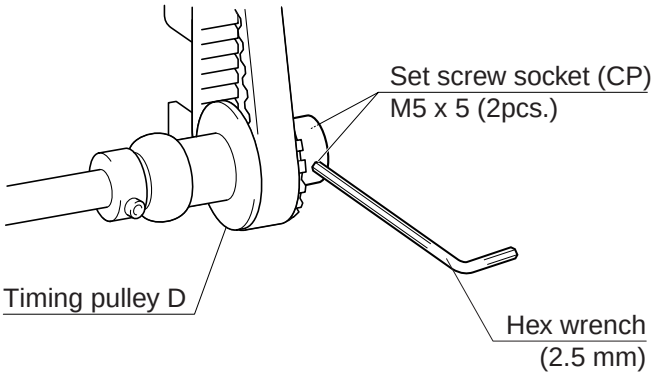
[Adjustment standard]

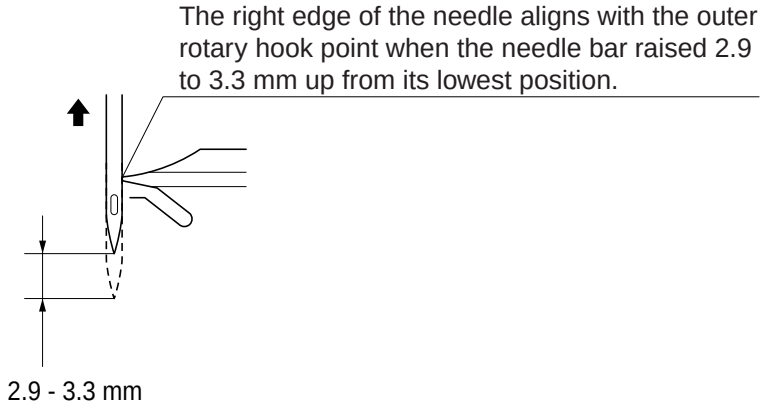
The right edge of the needle must align with the rotary hook point when the needle bar raised 2.9 to 3.3 mm up from its lowest position.

[Adjustment procedure]

1. Remove the presser foot, the needle plate B and the needle plate A, then remove the inner rotary hook assy.
2. Start the test mode.
3. Select the “4” (3-point needle drop mode).
4. Press (Reverse stitch button) and move the needle bar to the left base line, then turn off the power.
5. Turn the pulley by hand until the needle bar comes to its lowest position.
6. Remove the face plate and the front cover.
7. Loosen the 2 screws (set screw socket (CP) M5 x 5) of the timing pulley D with the hex wrench (2.5 mm).
8. Turn the pulley by hand and raise the needle bar 2.9 to 3.3 mm from its lowest position, then turn the outer rotary hook assy by hand and align the right edge of the needle with the outer rotary hook point.
9. Tighten the 2 screws (set screw socket (CP) M5 x 5) of the timing pulley D.







Inspection and Adjustment

[Adjustment standard]

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

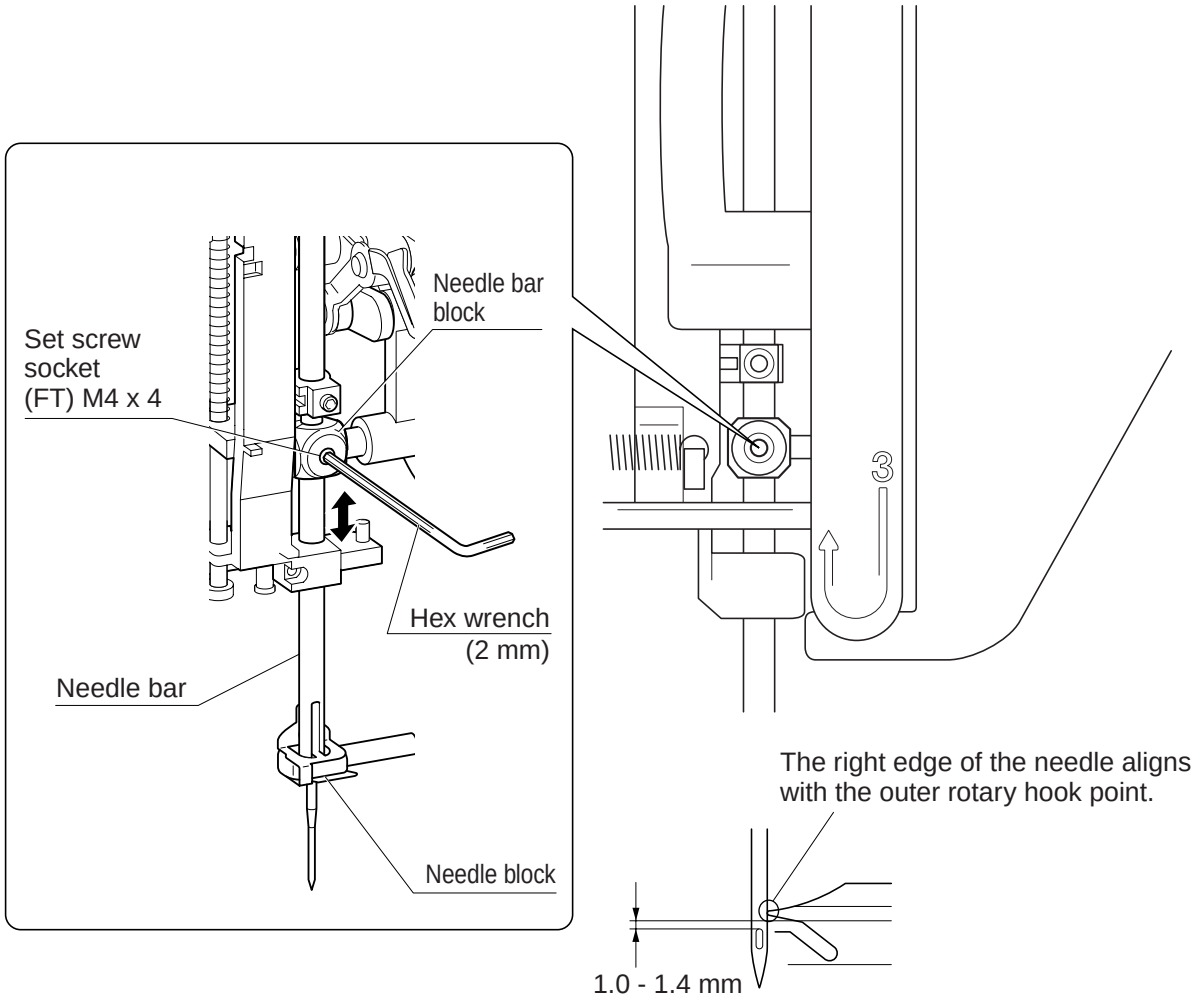
[Adjustment procedure]

1. Remove the presser foot, the needle plate B and the needle plate A, then remove the inner rotary hook assy.
2. Start the test mode.
3. Select the “4” (3-point needle drop mode).
4. Press (Reverse stitch button) and move the needle bar to the left base line, then turn off the power.
5. Remove the face plate and the front cover.
6. Turn the pulley by hand until the right edge of the needle aligns with the outer rotary hook point.
7. Loosen the screw (set screw socket (FT) M4 x 4) of the needle bar block with the hex wrench (2 mm).
8. Move the needle bar up and down, to adjust the distance between the top edge of the needle eye and the bottom edge of the outer rotary hook point to 1.0 to 1.4 mm.

   ***NOTE**
   - Check that the needle block faces front.
9. Tighten the screw (set screw socket (FT) M4 x 4) of the needle bar block.

   ***NOTE**
   - Need to adjust "4-14 Needle threader" after this adjustment.

Inspection and Adjustment



[Adjustment standard]

The clearance between the scarf of needle and the outer rotary hook point (front/back) must be 0.25 mm or less on the left base line.

[Adjustment procedure]

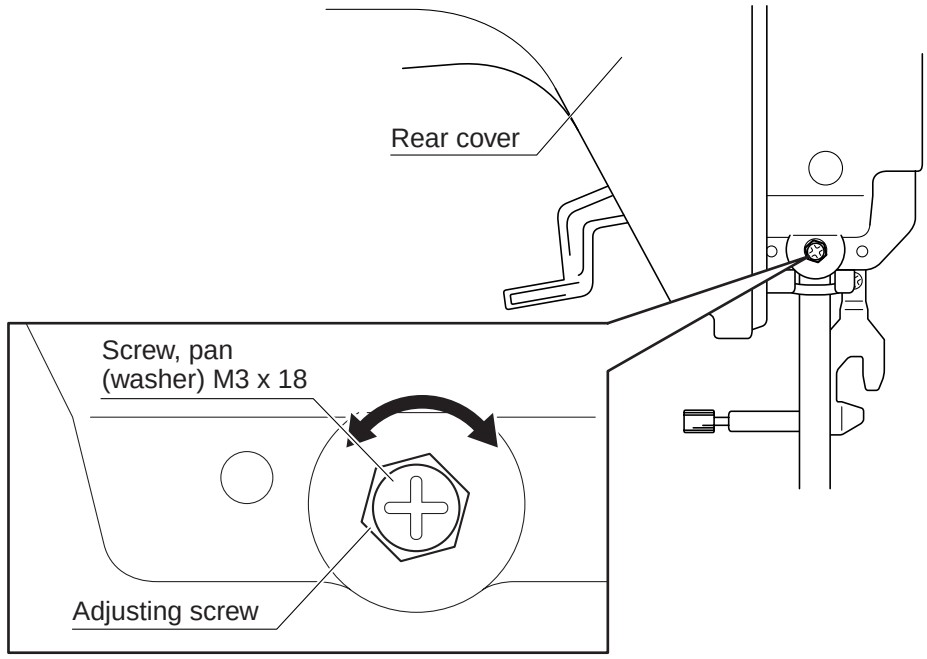
1. Remove the presser foot, the needle plate B and the needle plate A, then remove the inner rotary hook assy.
2. Attach the size 75/11 needle.
3. Start the test mode.
4. Select the “4” (3-point needle drop mode).
5. Press (Reverse stitch button) and move the needle bar to the left base line, then turn off the power.
6. Remove the face plate.
7. Loosen the fixing screw (screw, pan (washer) M3 x 18) of the adjusting screw.
8. Turn the pulley by hand until the right edge of the needle aligns with the outer rotary hook point.
9. Turning the adjusting screw with the box screw driver (6 mm), to adjust the clearance between the scarf of needle and the outer rotary hook point (front/back) to 0.25 mm or less on the left base line.

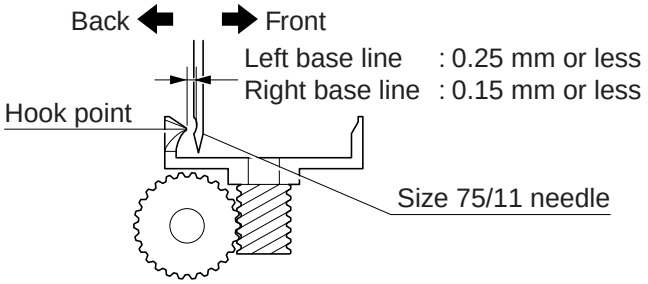
***Key point**

- Loosen the adjusting screw (turn to the left). ⇒ Needle moves to the rear side (clearance becomes smaller).
- Tighten the adjusting screw (turn to the right). ⇒ Needle moves to the front side (clearance becomes larger).

10. Tighten the fixing screw (screw, pan (washer) M3 x 18) of the adjusting screw.

XE2395001	Box screw driver 6





Inspection and Adjustment

[Adjustment standard]

When passing the hook into the needle eye, the clearance between the top edge of the hook and the top edge of the needle eye must be 0 to 0.1 mm.

[Adjustment procedure]

1. Remove the face plate.
2. Attach the size 75/11 needle.
3. Turn the pulley by hand until the needle comes to its highest point.
4. Loosen the screw (set screw socket (FT) M4 x 4) of the needle thread block with the hex wrench (2 mm).
5. Move the needle thread block up and down, to adjust the clearance between the top edge of the hook and the top edge of the needle eye to 0 to 0.1 mm. After that, tighten the screw (set screw socket (FT) M4 x 4) of the needle thread block.

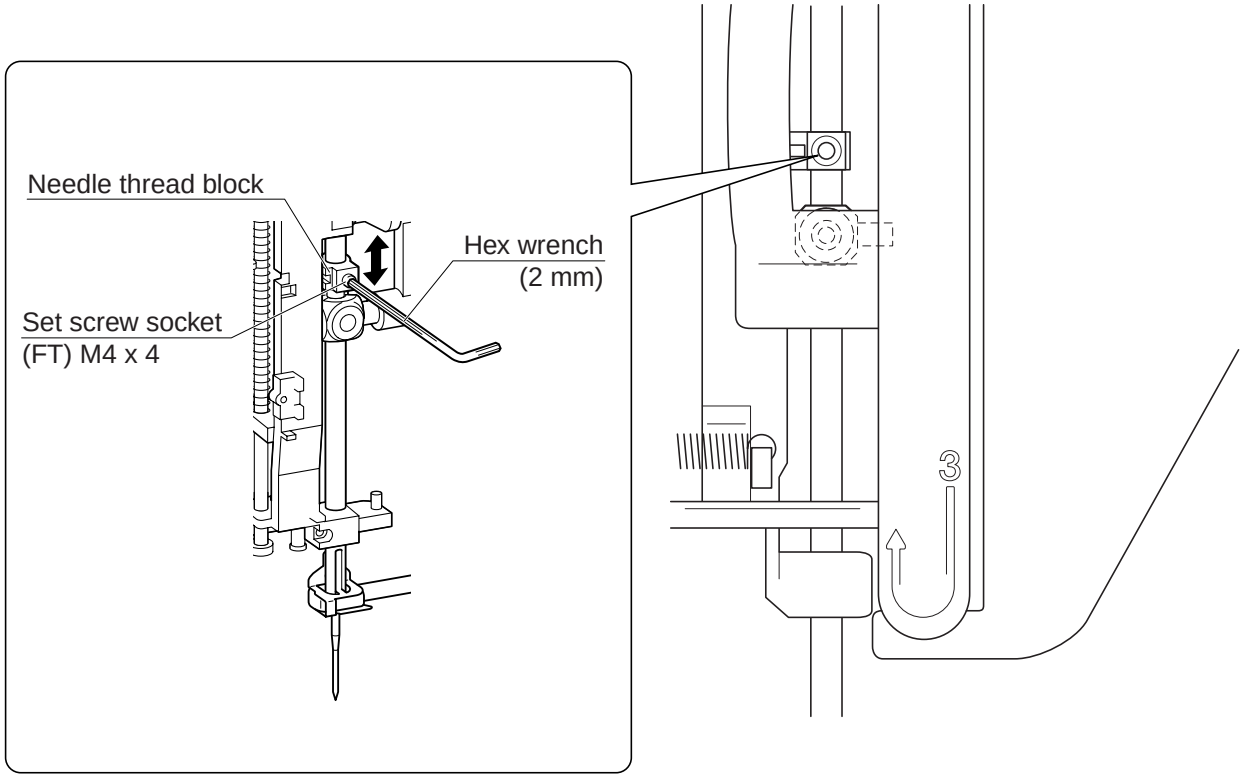
***Key point**

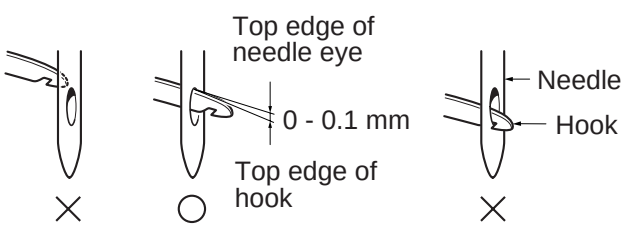
- Tighten the screw (set screw socket (FT) M4 x 4) at the position slightly to the left when viewed from the front of the machine.
- Adjust it so that the top edge of the hook and the top edge of the needle eye is the same height.

***NOTE**

- In case the position of the screw (set screw socket (FT) M4 x 4) is too left, the hook does not turn. (Fig.1)
- In case the position of the screw (set screw socket (FT) M4 x 4) is too right, the needle thread block contacts the needle bar supporter assy, and get damaged. (Fig.3)

Inspection and Adjustment





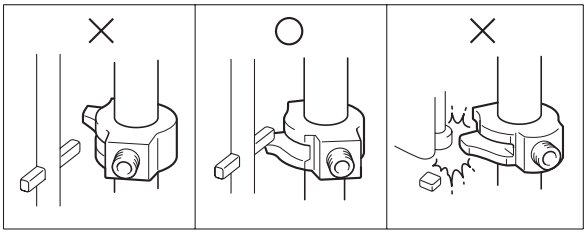


Fig. 1 Fig. 2 Fig. 3

[Adjustment standard]

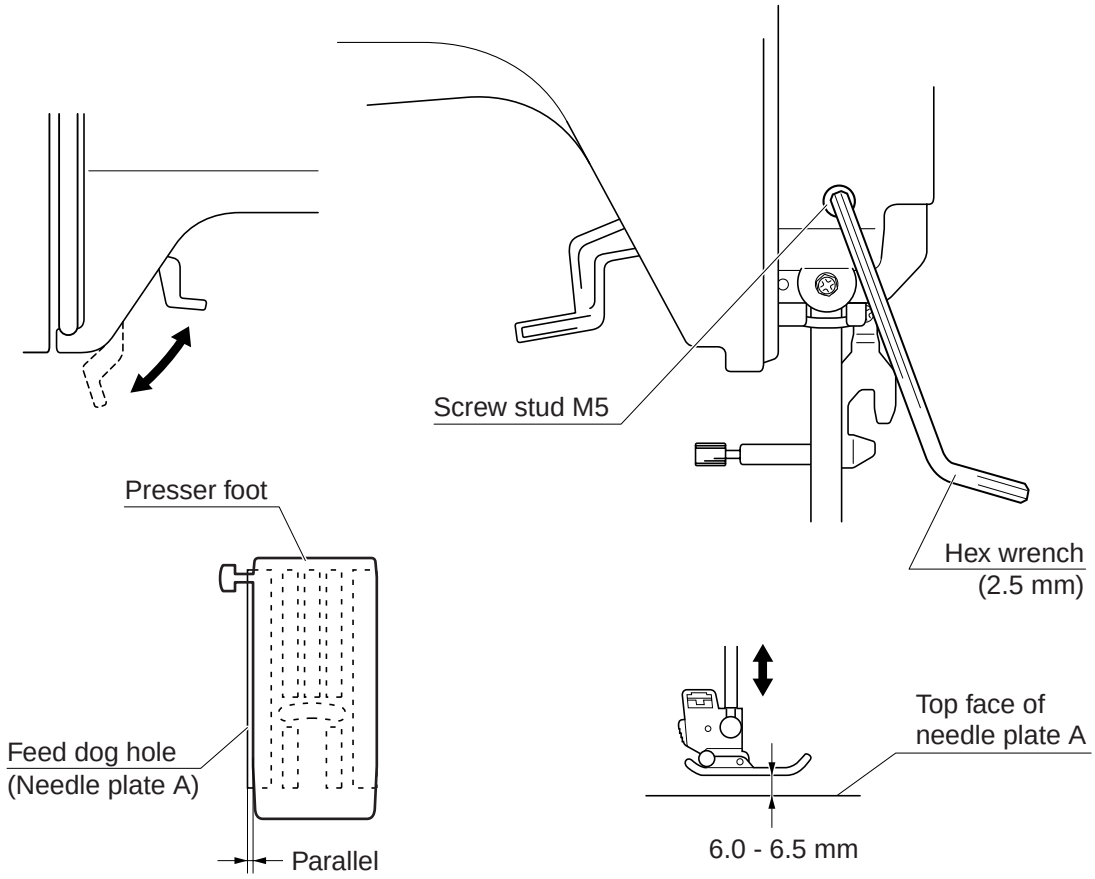
- The clearance between the needle plate A and bottom surface of the presser foot must be 6.0 to 6.5 mm.
- The presser foot must parallel with the feed dog hole of needle plate A.

[Adjustment procedure]

1. Remove the face plate.
2. Attach the J 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 screw (screw stud M5) of the presser bar clamp with the hex wrench (2.5 mm).
6. Move the needle presser bar up and down, to adjust the clearance between the needle plate A and the bottom surface of the presser foot to 6.0 to 6.5 mm.
7. Tighten the screw (screw stud M5) of the presser bar clamp.

***Key point**

- Check the presser foot parallel with the feed dog hole of needle plate A after adjusting presser bar height. (to prevent slanting during overcast stitch and damage to the needle.)



Inspection and Adjustment

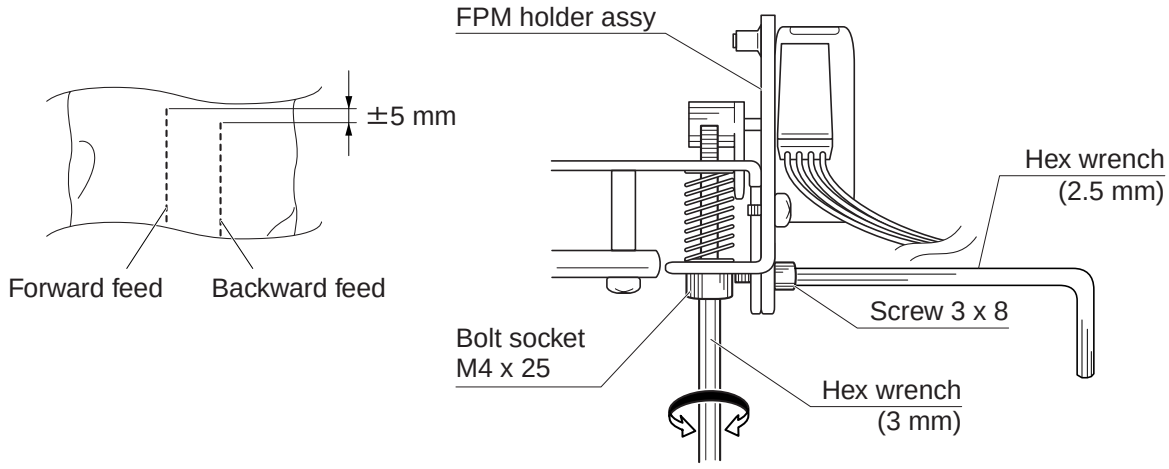
[Adjustment standard]

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

[Adjustment procedure]

1. Start the test mode.
2. Select the “13” (Forward and reverse feed mode).
3. Insert a paper between folded broadcloth.
4. Lower the presser foot lever.
5. Press (Start/stop button), then 100 forward stitches and 100 reverse stitches starts without thread.
6. Check the forward and backward feed length.
7. Remove the front cover.
8. Loosen the fixing screw (screw 3 x 8) of the FPM holder assy with the hex wrench (2.5 mm).
9. Turn the screw (bolt socket M4 x 25) of the FPM holder assy with the hex wrench (3 mm), to adjust that the difference between the forward and backward feed length is less than 5 mm.

   ***Key point**
   - Tighten the screw (bolt socket M4 x 25) (turn to the left). ⇒ Backward feed shorter
   - Loosen the screw (bolt socket M4 x 25) (turn to the right). ⇒ Backward feed longer
10. Apply a small amount thread locker to the screw (bolt socket M4 x 25).
11. Tighten the fixing screw (screw 3 x 8) of the FPM holder assy.



Feed module lower right

Inspection and Adjustment

[Adjustment standard]

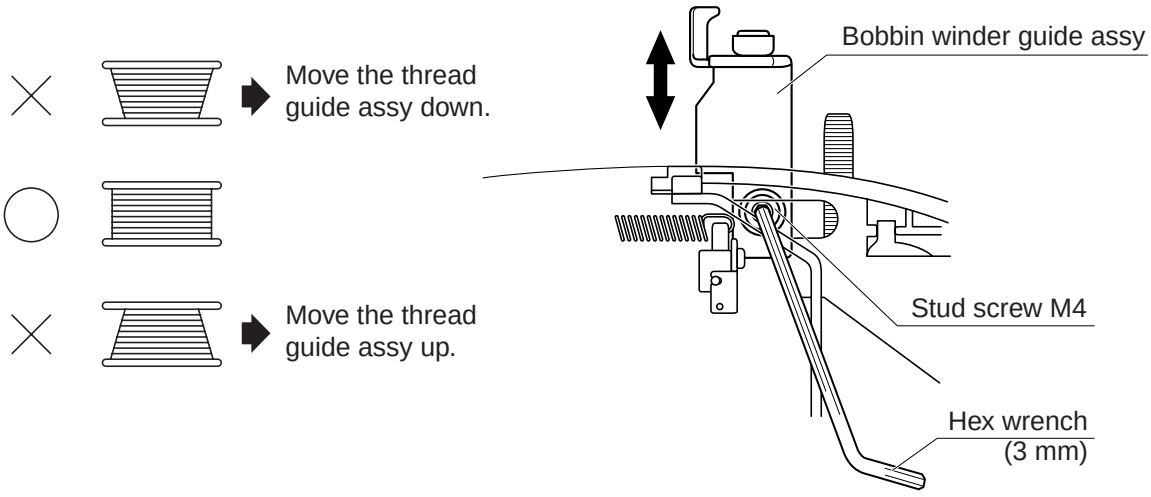
- No uneven bobbin winding.
- The target for the bobbin winding quantity must be filling 80 to 90% of the diameter.

[Adjustment procedure]

1. Remove the face plate.
2. Loosen the screw (stud screw M4) of the bobbin winder guide assy with the hex wrench (3mm).
3. Move the bobbin winder guide assy up and down, to adjust uneven bobbin winding.
4. Tighten the screw (stud screw M4) of the bobbin winder guide assy.

***Key point**

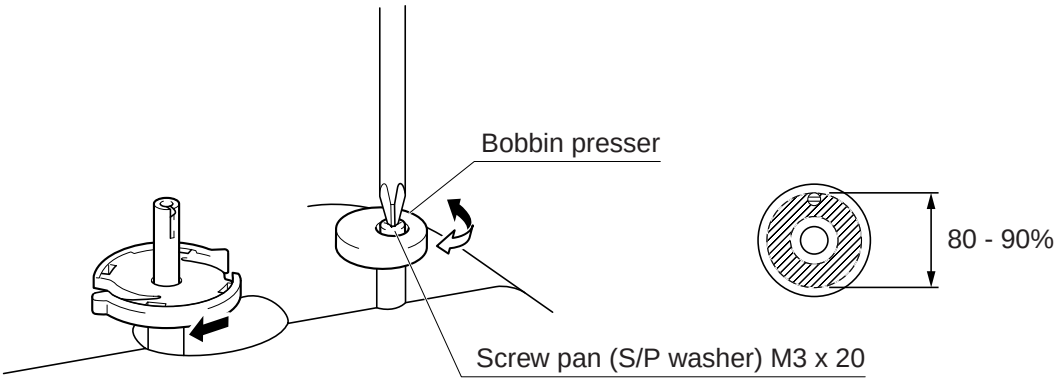
- When the uneven bobbin winding is upper side, move the bobbin winder guide assy down.
- When the uneven bobbin winding is lower side, move the bobbin winder guide assy up.



5. Loosen the screw (screw pan (S/P washer) M3 x 20) of the bobbin presser.
6. Turn the bobbin presser left and right, to adjust the winding quantity.
7. Tighten the screw (screw pan (S/P washer) M3 x 20) of the bobbin presser.

***Key point**

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



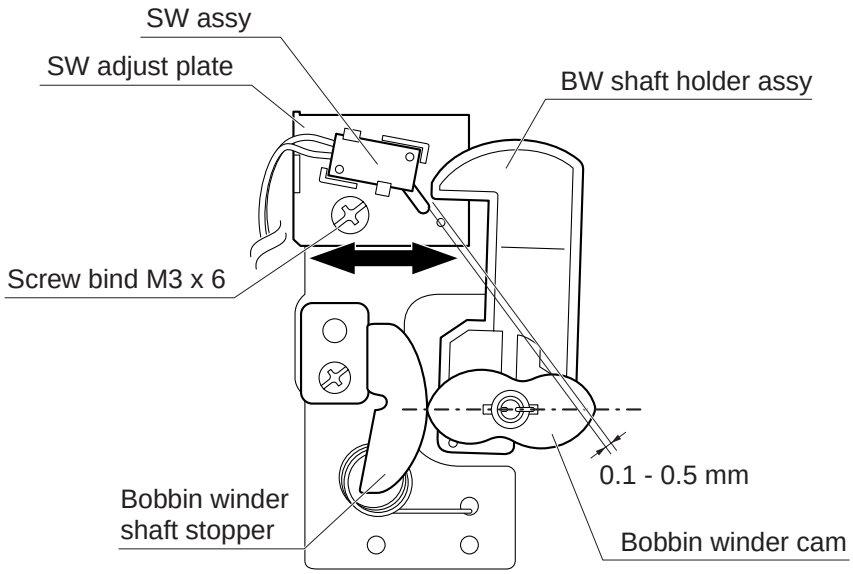
Inspection and Adjustment

[Adjustment standard]

The clearance between the SW assy and the BW shaft holder assy must be 0.1 to 0.5 mm.

[Adjustment procedure]

1. Remove the front /rear cover.
2. Loosen the screw (screw bind M3 x 6) of the SW adjust plate.
3. Turn the bobbin winder cam to adjust its position to a level (refer to the following figure).
4. Move the SW adjust plate to the left and right, to adjust the clearance between the SW assy and the BW shaft holder assy is 0.1 to 0.5 mm.
5. Tighten the screw (screw bind M3 x 6) of the SW adjust plate.



Inspection and Adjustment

[Adjustment standard]

- BH 0 touches the BH 1 in the state that the clearance between the BH presser foot A and the BH presser foot B is 0.5 mm.
- BH 0 does not touch the BH 1 in the state that the clearance between the BH presser foot A and the BH presser foot B is 1.0 mm.

[Adjustment procedure]

1. Start the test mode.
2. Raise the presser foot lever.
3. Attach the BH presser foot.
4. Press (Needle position button), to move the needle bar to its lowest position (down the feed dog lower than the needle plate A).
5. Lower the presser lever in the state that the clearance between the BH presser foot A and the BH presser foot B is 0.5 mm. (Fig. 1)
6. Lower the BH lever, and set to the BH presser foot.
7. Select the “16” (Switch monitor mode) on the screen.
8. Rotate the BH lever eccentric shaft in a clockwise, to adjust it at the position where the buzzer does not sound.
9. Rotate the BH lever eccentric shaft in a counterclockwise, to adjust it at the position where the buzzer begins to sound. (Fig. 2)

   ***Key point**
   - When the BH0 touches the BH1, the buzzer begins to sound.
10. When the clearance between the BH presser foot A and the BH presser foot B is 1.0 mm, check that the buzzer does not sound. (Fig. 3, Fig. 4)

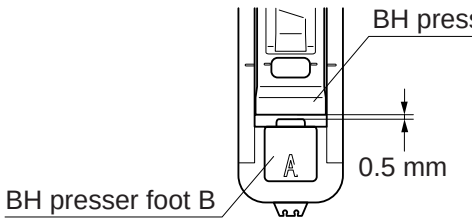


Fig. 1

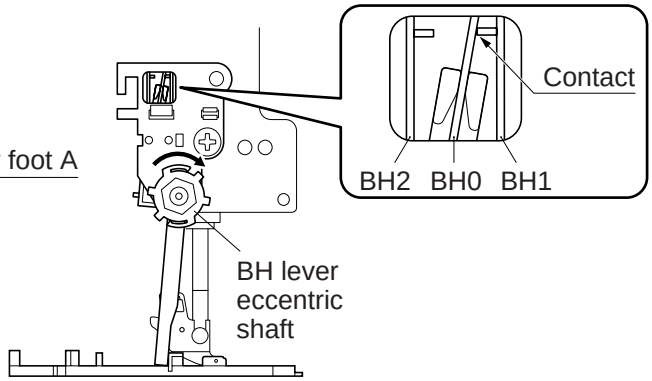


Fig. 2

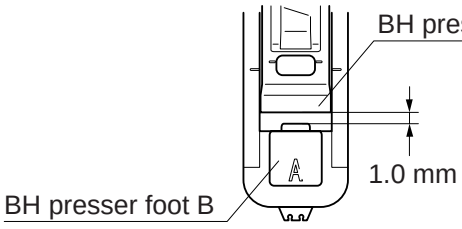


Fig. 3

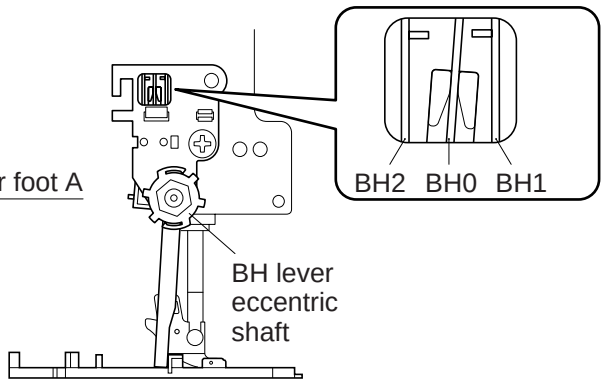


Fig. 4

Inspection and Adjustment

[Adjustment standard]

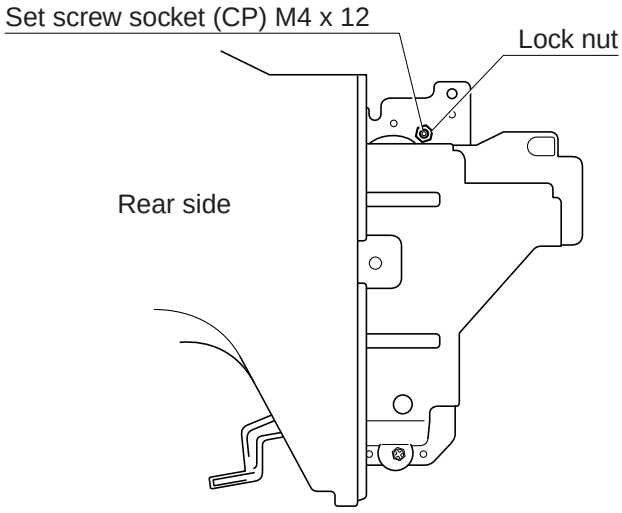
The needle top must drop in the center position (front/back) of the presser foot hole.

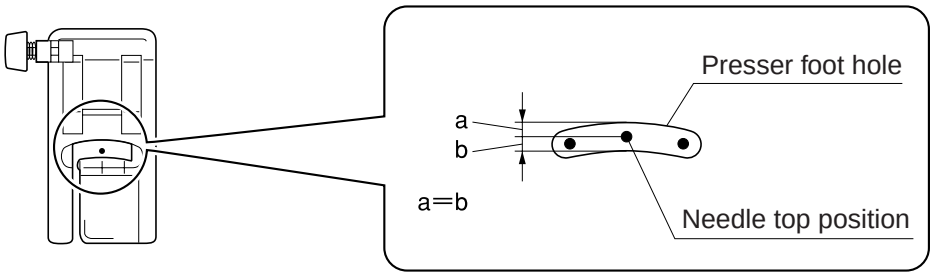
[Adjustment procedure]

1. Attach the J foot, and lower the presser foot lever.
2. Turn the pulley by hand and drop the needle top into the presser foot hole.
3. Loosen the lock nut.
4. Turn the screw (set screw socket (CP) M4 x 12) with the hex wrench (2 mm), to adjust the needle top to the center position (front/back) of the presser foot hole.
5. Tighten the lock nut.

***NOTE**

- Need to adjust "4-13 Clearance between needle and rotary hook point" after this adjustment.





Inspection and Adjustment

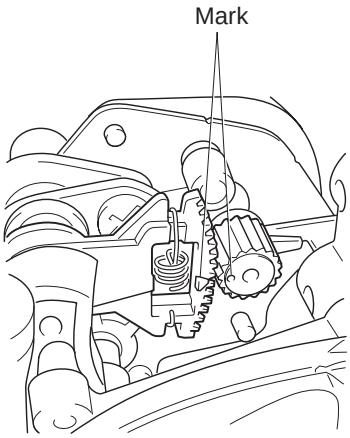
[Adjustment standard]

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

[Adjustment procedure]

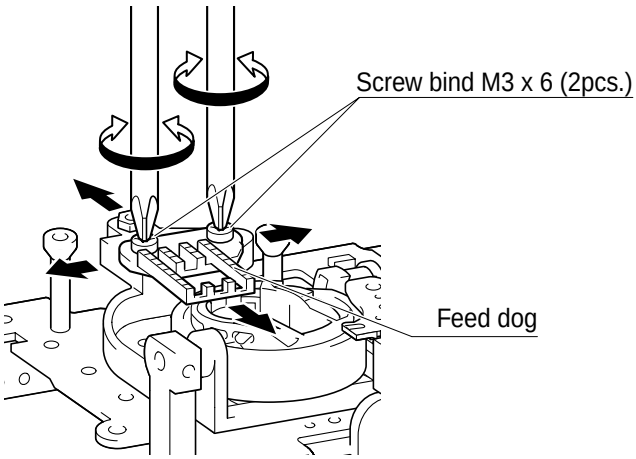
1. Remove the needle plate B, the presser foot and the needle.
2. Start the test mode.
3. Select the “6” (Feed dog position mode).
4. Remove the 2 screws (screw M4) of the needle plate A, then remove the needle plate A.
5. Press [▪] button on the screen, then the feed dog comes to the center position.

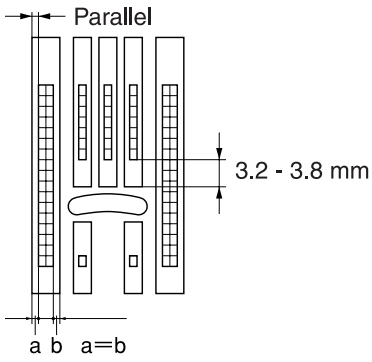
***Key point**
- Check that the mark on the feed adjusting gear aligns with the mark on the F pulse motor gear. (Feed length is 0 mm position)



6. Loosen the 2 screws (screw bind M3 x 6) of the feed dog, temporarily attach the needle plate A, to adjust the front/back and left/right position of the feed dog (refer to the following figure).

***Key point**
- Adjust the clearance (front/back) between the forward edge of the feed dog middle tooth and the feed dog hole of the needle plate A to 3.2 to 3.8 mm.
- Adjust the both clearance (left/right) between the feed dog and the feed dog hole to the same. (a=b)
- Assemble the feed dog parallel with the feed dog hole.





7. Secure the feed dog with the 2 screws (screw bind M3 x 6).
8. Fully tighten the 2 screws (screw M4) of the needle plate A.

[Adjustment standard]

When the feed dog is its highest position, the feed dog height from the needle plate A surface must be 0.9 to 1.1 mm.

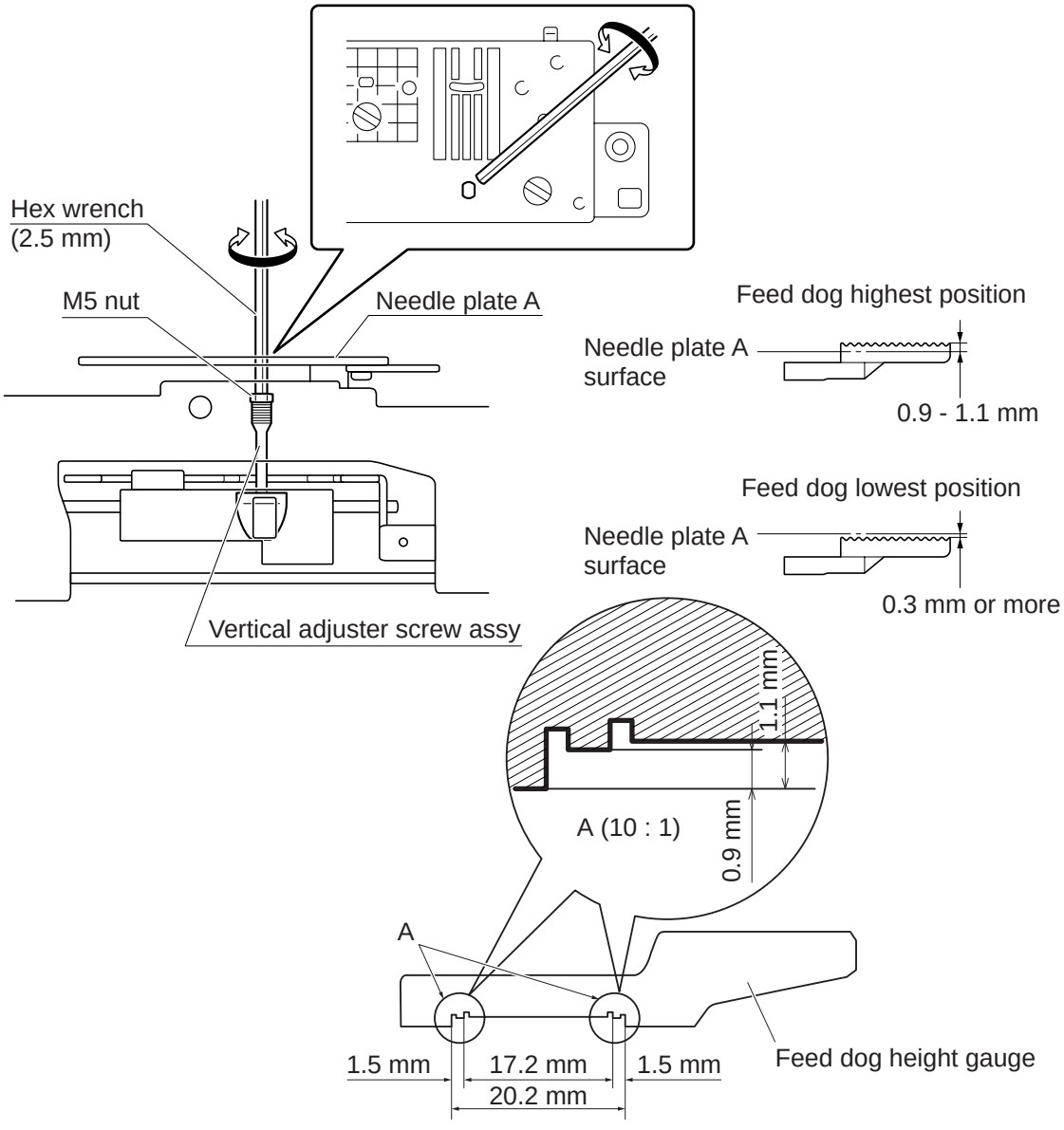
[Adjustment procedure]

1. Turn the pulley by hand until the feed dog comes to its highest position.
2. Remove the needle plate B, the needle plate A and the presser feed holder, then loosen the M5 nut.
3. Temporarily attach the needle plate A.
4. Turn the vertical adjuster screw assy with the hex wrench (2.5 mm), to adjust the feed dog height from the needle plate A surface to 0.9 to 1.1 mm.
5. Tighten the M5 nut (Do not turn the vertical adjuster screw assy).
6. When the feed dog is its lowest position, check that the feed dog is 0.3 mm or more below the upper surface of the needle plate A.

***NOTE**

- When the feed dog is too high/low, abnormal noise, feed problems may happen.

XC2278001	Feed dog height gauge

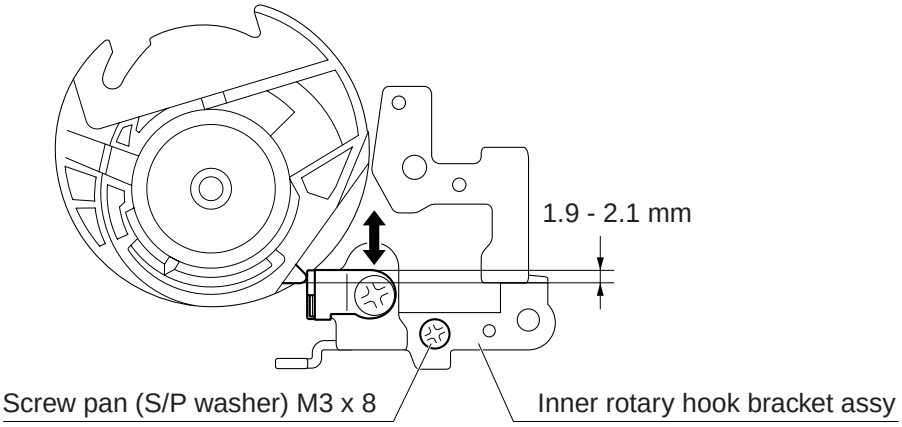


[Adjustment standard]

The clearance (overlap) between the inner rotary hook point and the bracket spring must be 1.9 to 2.1 mm.

[Adjustment procedure]

1. Remove the front cover.
2. Set the inner rotary hook assy in the outer rotary hook assy.
3. Loosen the screw (screw pan (S/P washer) M3 x 8) of the inner rotary hook bracket assy.
4. Move the inner rotary hook bracket assy back and forth, to adjust the clearance (overlap) between the inner rotary hook point and the bracket spring to 1.9 to 2.1 mm.
5. Tighten the screw (screw pan (S/P washer) M3 x 8) of the inner rotary hook bracket assy.



Inspection and Adjustment

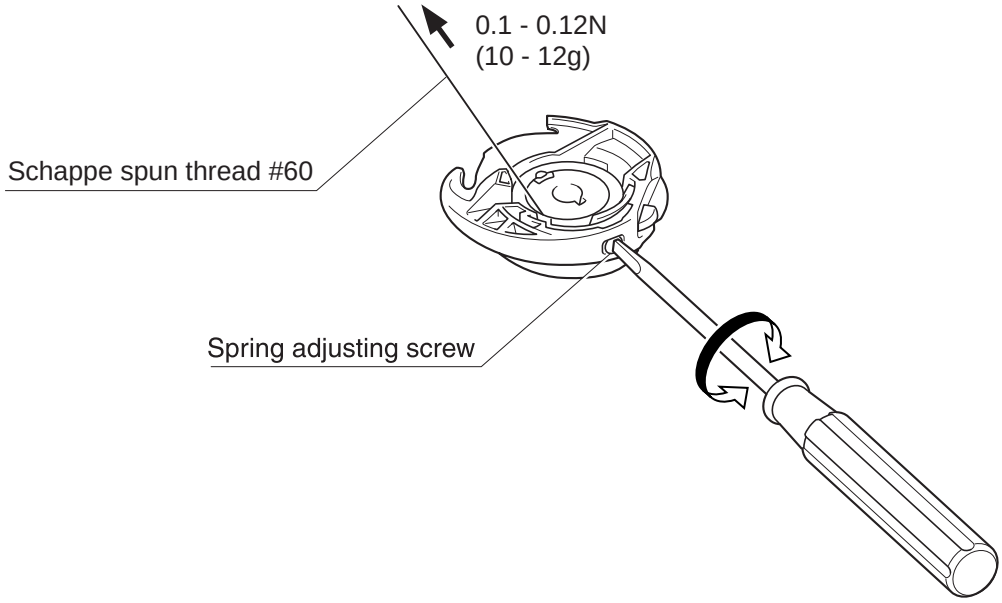
[Adjustment standard]

Inner rotary hook assy (lower thread) tension must be 0.1 to 0.12N (10 to 12g).

[Adjustment procedure]

1. Set the bobbin (schappe spun thread #60) in the inner rotary hook assy, and pass the thread.
2. Pull the thread with the tension gauge, and turn the spring adjusting screw, to adjust the tension to 0.1 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)



Inspection and Adjustment

[Adjustment standard]

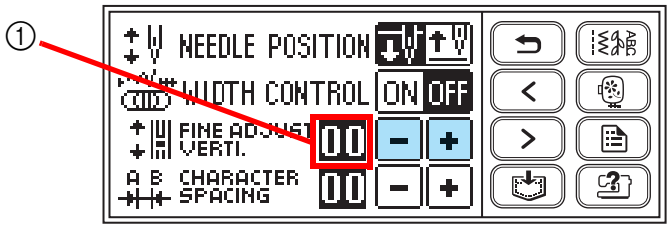
The length of A/B of sewn test pattern must be the same.

[Adjustment procedure]

1. Turn on the power, and press (Settings key) on the operation panel. Set the value of ① to “00” with and button.

***Key point**

- This operation is for NV950/NV950D series only.



2. Ready for sewing.

Presser foot	N presser foot
Upper thread / Lower thread	Schappe spun thread #60
Cloth	Two-ply broadcloth
Thread tension dial position	4

3. Start the test mode, then select the “3” (Pattern adjustment mode).

4. Lower the presser foot lever, and press (Start/stop button).

5. Press and button to adjust length of A and B to the same. (Fig.1)

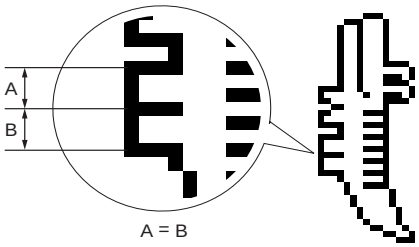
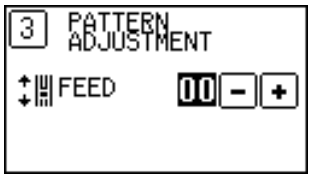


Fig.1



***Key point**

- Length of A is shorter than B. (Fig.2) ⇒ Press button (length of A becomes longer).
- Length of A is longer than B. (Fig.3) ⇒ Press button (length of A becomes shorter).

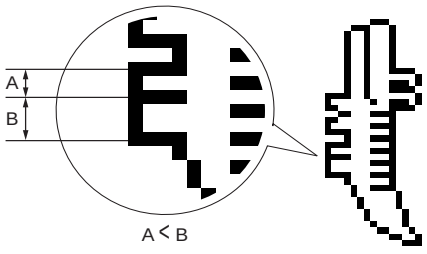


Fig.2

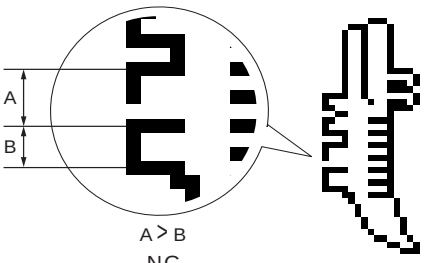


Fig.3

Inspection and Adjustment

■ X timing belt

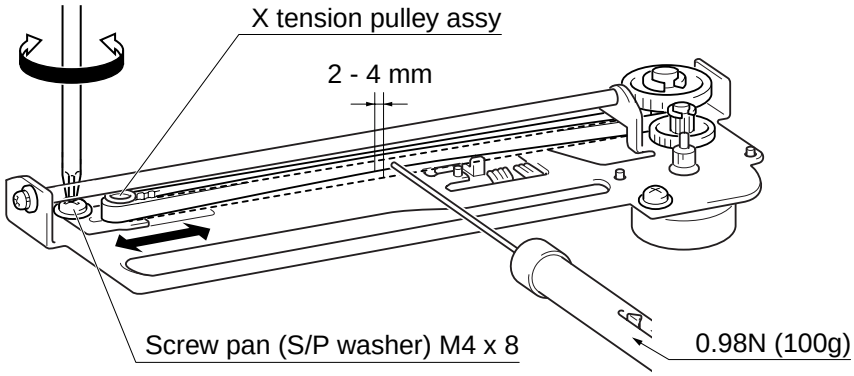
[Adjustment standard]

The belt deflection must be 2 to 4 mm when pushing the center of the timing belt with a force of 0.98N (100g).

[Adjustment procedure]

1. Loosen the screw (screw pan (S/P washer) M4 x 8).
2. Move the X tension pulley assy to the left and right, to adjust the belt deflection to 2 to 4 mm when pushing the center of the timing belt with a force of 0.98N (100g).
3. Tighten the screw (screw pan (S/P washer) M4 x 8).

XC2277001	Push-pull gauge (5N)



■ Y timing belt

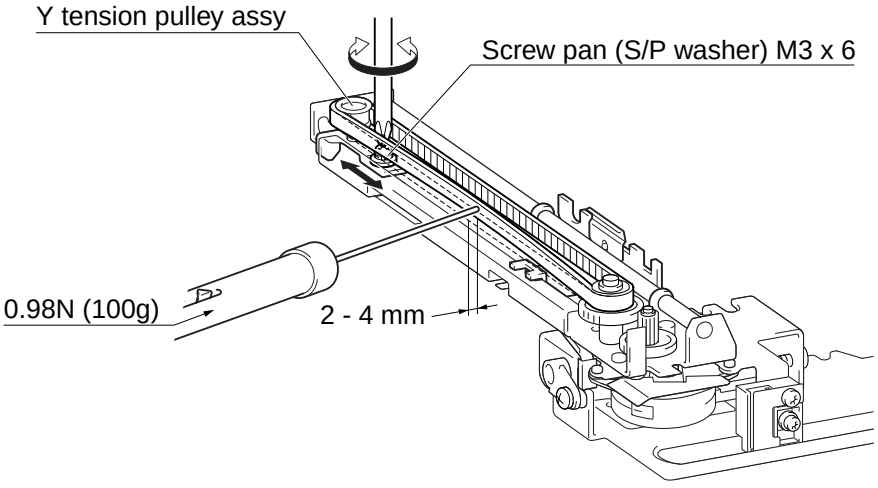
[Adjustment standard]

The belt deflection must be 2 to 4 mm when pushing the center of the timing belt with a force of 0.98N (100g).

[Adjustment procedure]

1. Loosen the screw (screw pan (S/P washer) M3 x 6).
2. Move the Y tension pulley assy to the left and right, to adjust the belt deflection to 2 to 4 mm when pushing the center of the timing belt with a force of 0.98N (100g).
3. Tighten the screw (screw pan (S/P washer) M3 x 6).

XC2277001	Push-pull gauge (5N)



Inspection and Adjustment

After embroidery unit repair, or main PCB replacing, check this adjustment.

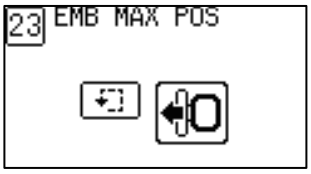
[Adjustment standard]

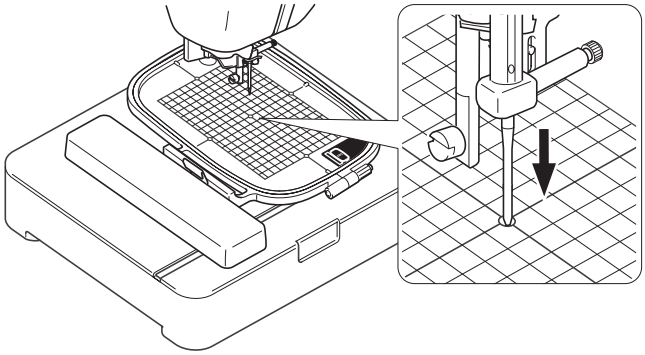
The needle drop position must be aligned with the center of the embroidery sheet hole.

[Adjustment procedure]

■ Checking the center of embroidery position

1. Remove the presser foot.
2. Attach the embroidery unit to the machine.
3. Start the test mode, then select the “23” (Embroidery max position mode).
4. Put the embroidery sheet on the embroidery hoop.
5. Attach the embroidery hoop to the embroidery unit.
6. Press [ ] button on the screen (move the carriage).
7. The carriage stops, then turn the pulley by hand until the needle top comes to the embroidery sheet surface, and check the needle top position aligned with the center of the embroidery sheet hole.
8. In case its fine, remove the embroidery hoop and press [ ] button (move the carriage), then turn off the power.
   In case its not fine, proceed to the following adjustment.



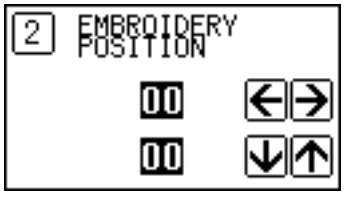


■ In case the needle does not drop in the center of the embroidery sheet hole.

1. Start the test mode, then select the “2” (Embroidery position adjust mode).
2. Turn the pulley by hand until the mark on the pulley comes to the top.
3. Adjust the needle position with ←→↓↑ button on the screen, to drop the needle in the center of the embroidery sheet hole.

   ***Key point**
   - Turn the pulley by hand to check the needle drop position.

   ***NOTE**
   - Do not use (Needle position button) to raise or lower the needle.
4. After adjustment, turn off the power (adjusted value is memorised automatically).
5. Start the test mode, then select the “23” (Embroidery max position mode) to check the needle drop position aligned with the center of the embroidery sheet hole again.



Inspection and Adjustment

In case the screen (LCD) is not parallel with the window of the front cover, perform this adjustment.

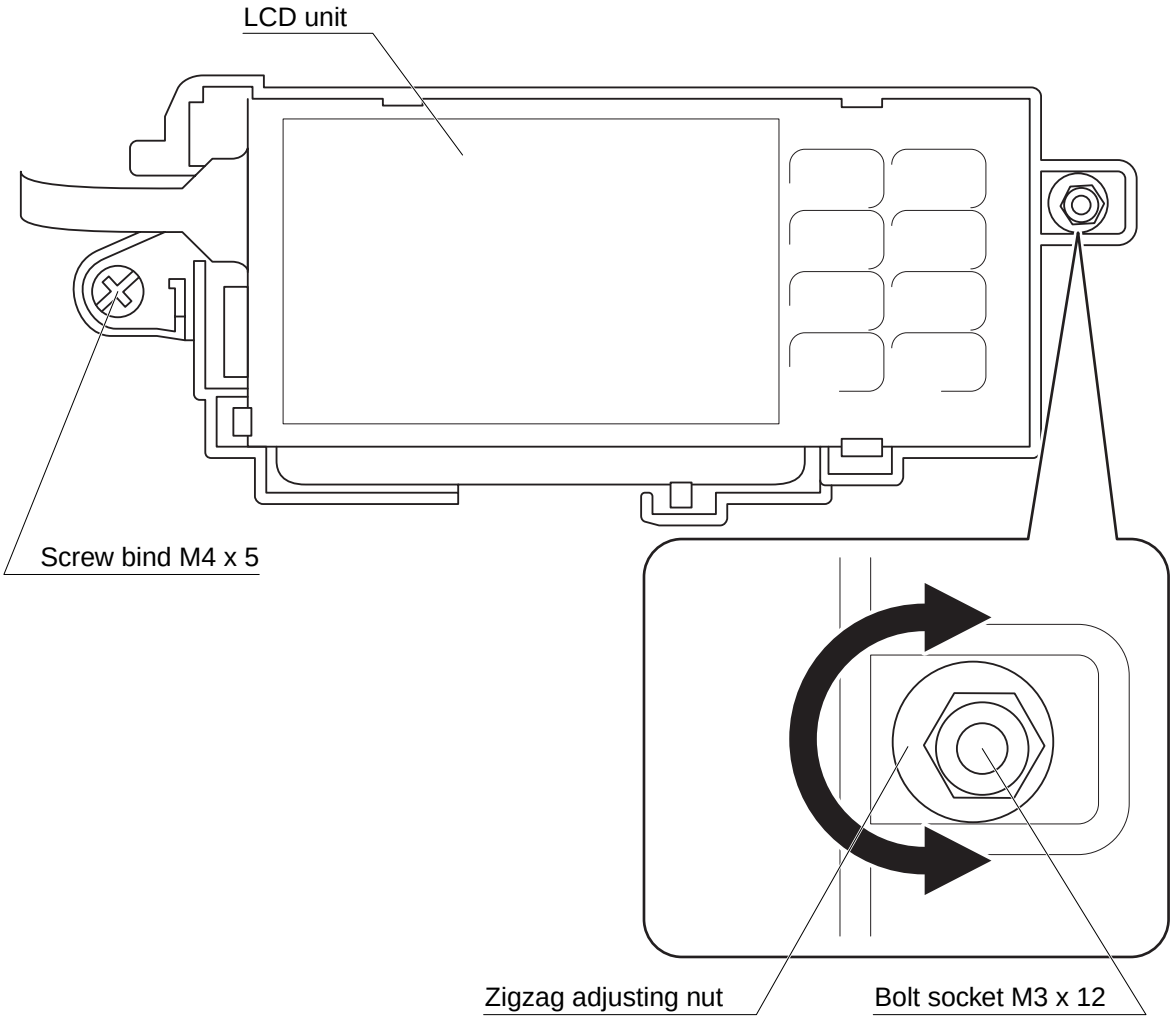
[Adjustment standard]

The screen (LCD) must be parallel with the window of the front cover.

[Adjustment procedure]

1. Remove the front cover.
2. Loosen the screw (screw bind M4 x 5) of the left side of the LCD unit.
3. Loosen the screw (bolt socket M3 x 12) of the zigzag adjusting nut.
4. Turn the zigzag adjusting nut to adjust the tilt of the LCD unit.

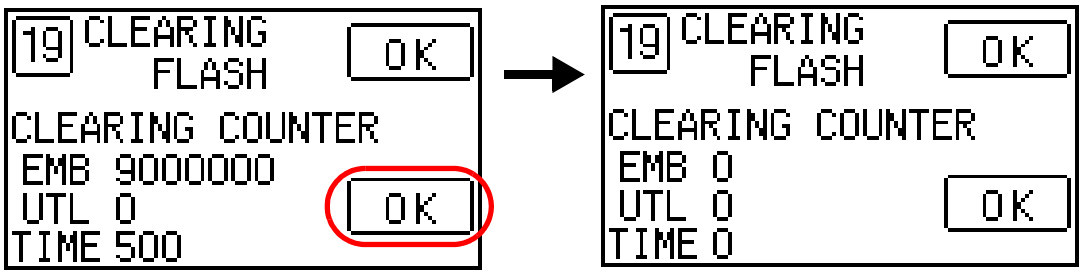
   ***Key point**
   - The screen (LCD) is parallel with the window of the front cover.
5. Tighten the screw (bolt socket M3 x 12) of the zigzag adjusting nut.
6. Tighten the screw (screw bind M4 x 5) of the left side of the LCD unit.



Inspection and Adjustment

■ How to reset service counter

1) Start the test mode, then select the “19” (Clearing flash / Clearing counter mode).
2) Press [OK] button of the “CLEARING COUNTER” on the screen, then service counter (embroidery /utility stitch count and stitch time) is reset.



■ How to check error message list

1) Start the test mode, then select the “25” (Error list mode).
2) Select the history number “A” with [—] [+] button.

***Key point**
- Memorize maximum 10 error messages.
- The error message of history number “01” is the latest one.
- If the number of memorized error messages exceed 10, the earliest one (history number “10”) will be deleted.

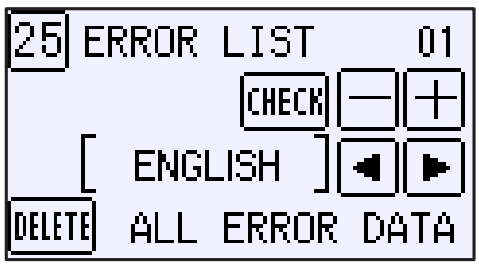
3) Press [CHECK] button, then error message is displayed.

***Key point**
- In case error message is not memorized, “NO DATA” is displayed.

4) Press [⮌] (Back key) on the operation panel, then return to the test mode “25” (Error list mode).

■ How to clear error message list

- Press [DELETE] button (or [🧹] button), then memorized error messages are all cleared.



Inspection and Adjustment

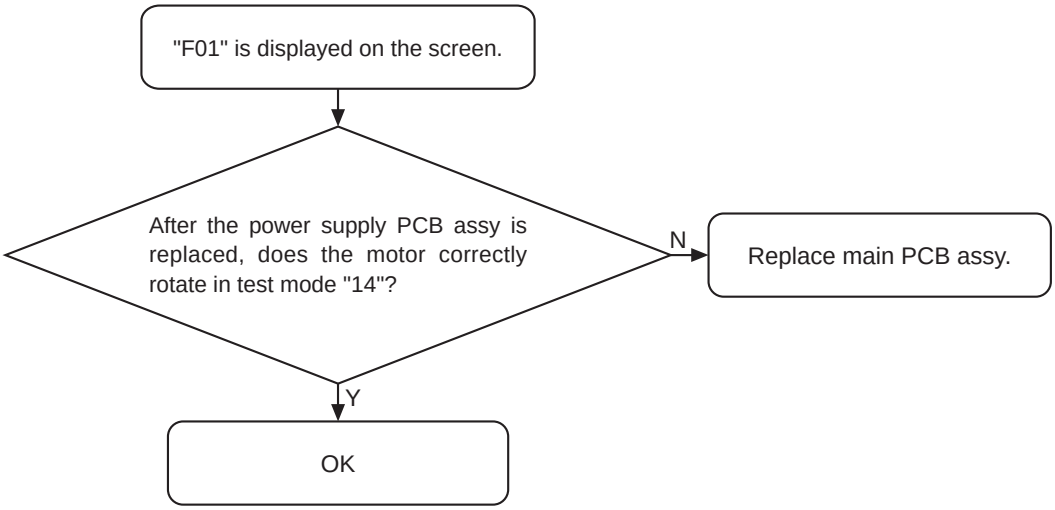
5 Failure Investigation for Electronic Parts

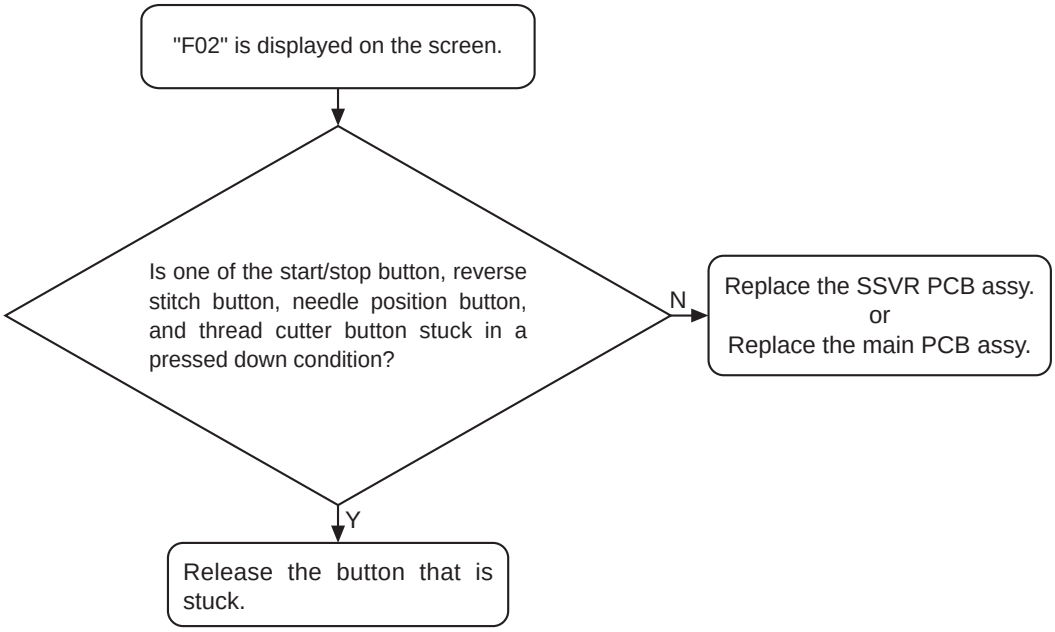
* Turn the power off and remove the connector from PCB, then measure resistance.

Error message list

Error message	Probable cause
F01 (5 - 3)	Rotation failure in main motor
F02 (5 - 3)	Button pressed continually with power ON. (Operation switch)
F04 (5 - 4)	Foot controller disconnection
F05 (5 - 4)	Dirty speed sensor
F06 (5 - 4)	NP sensor disconnection
F07 (5 - 5)	Speed VR disconnection
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 does not return to its initial position.

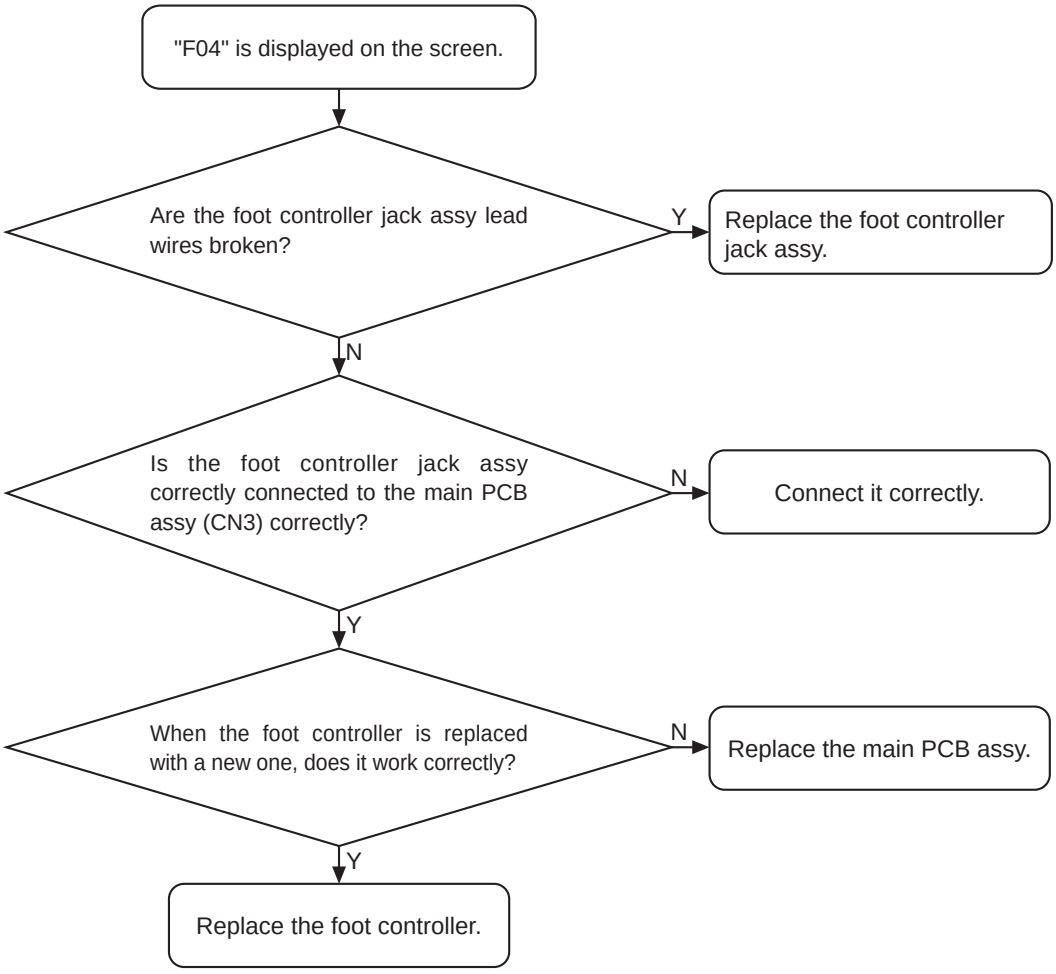
Electronic Parts

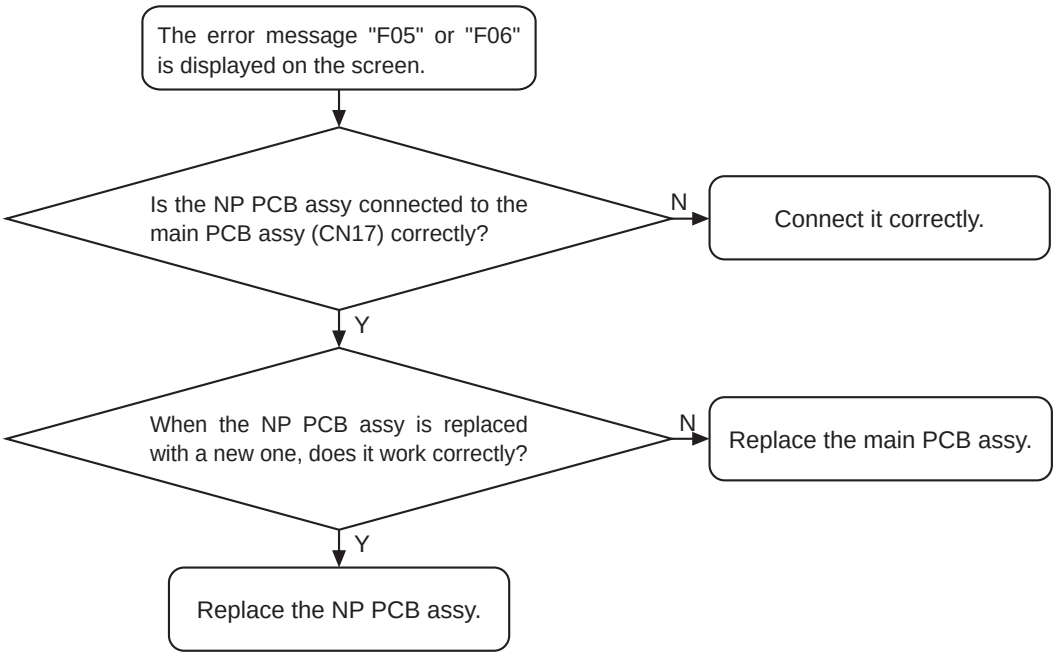




Electronic Parts

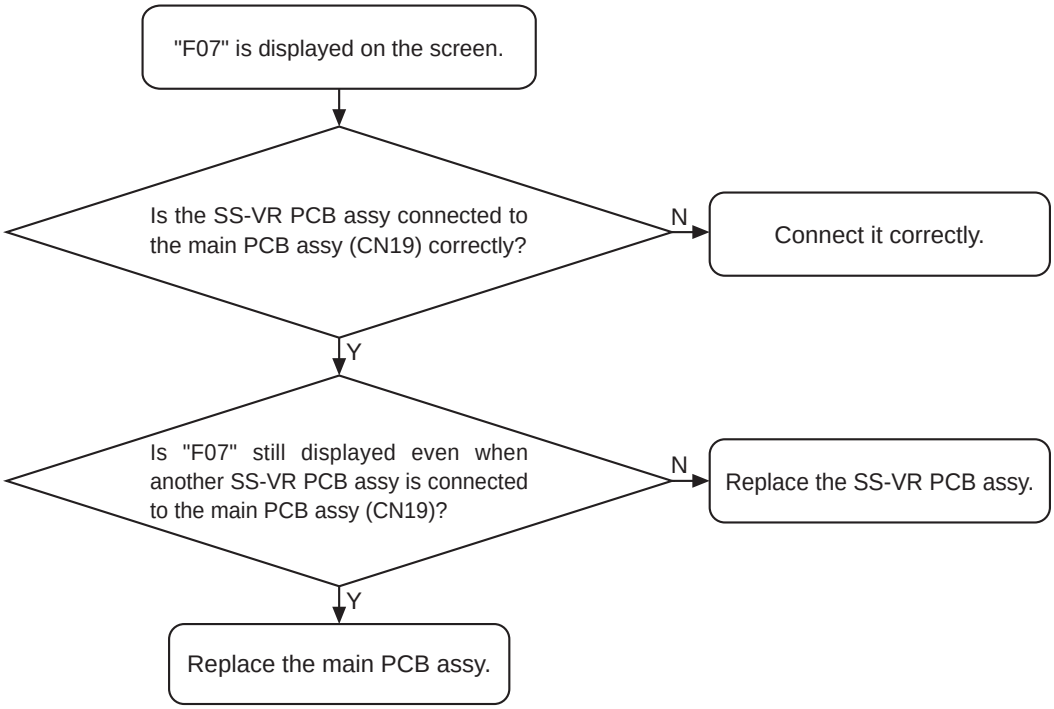
Error message is displayed





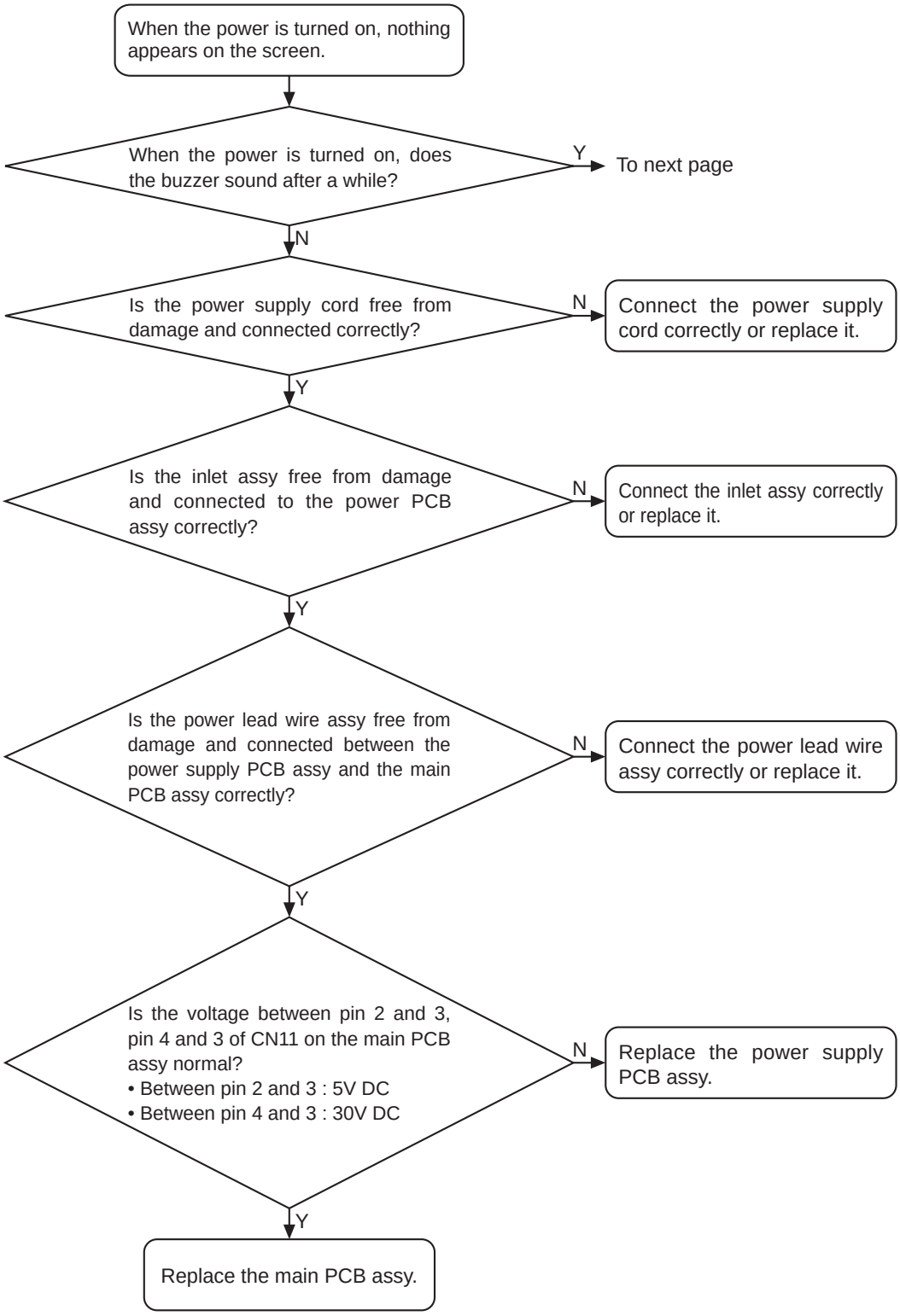
Electronic Parts

Error message is displayed



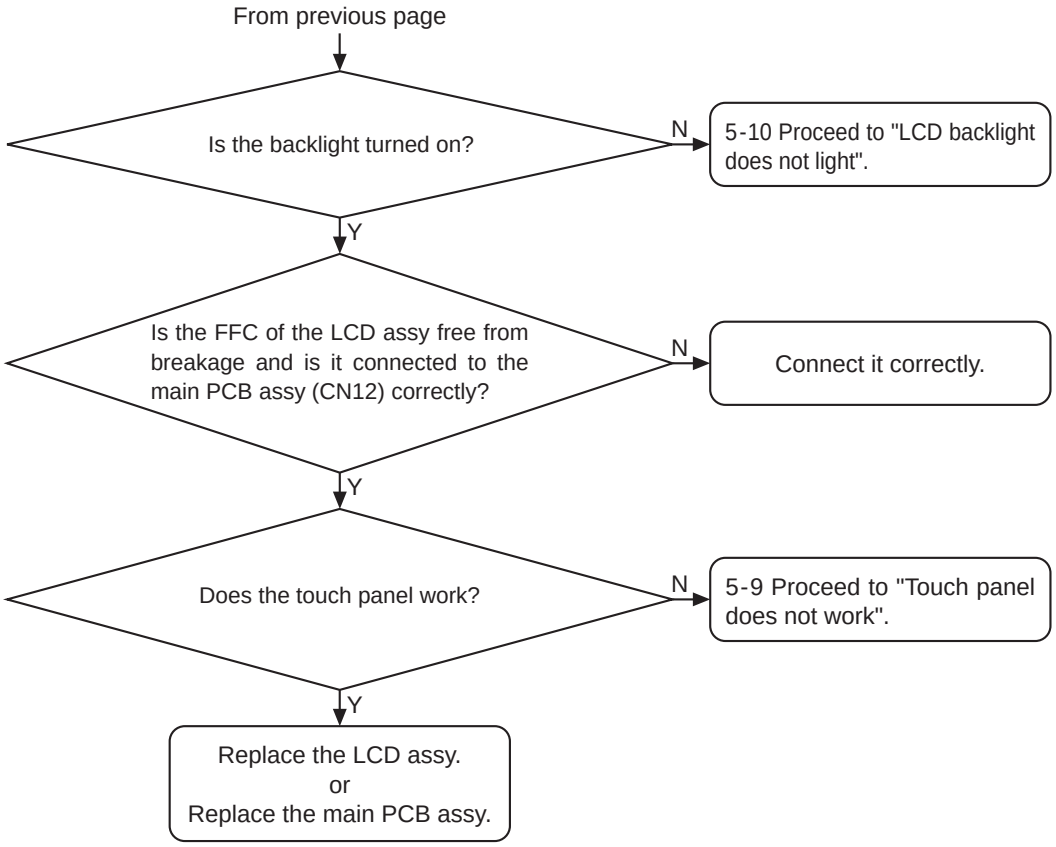
Electronic Parts

Power does not come on



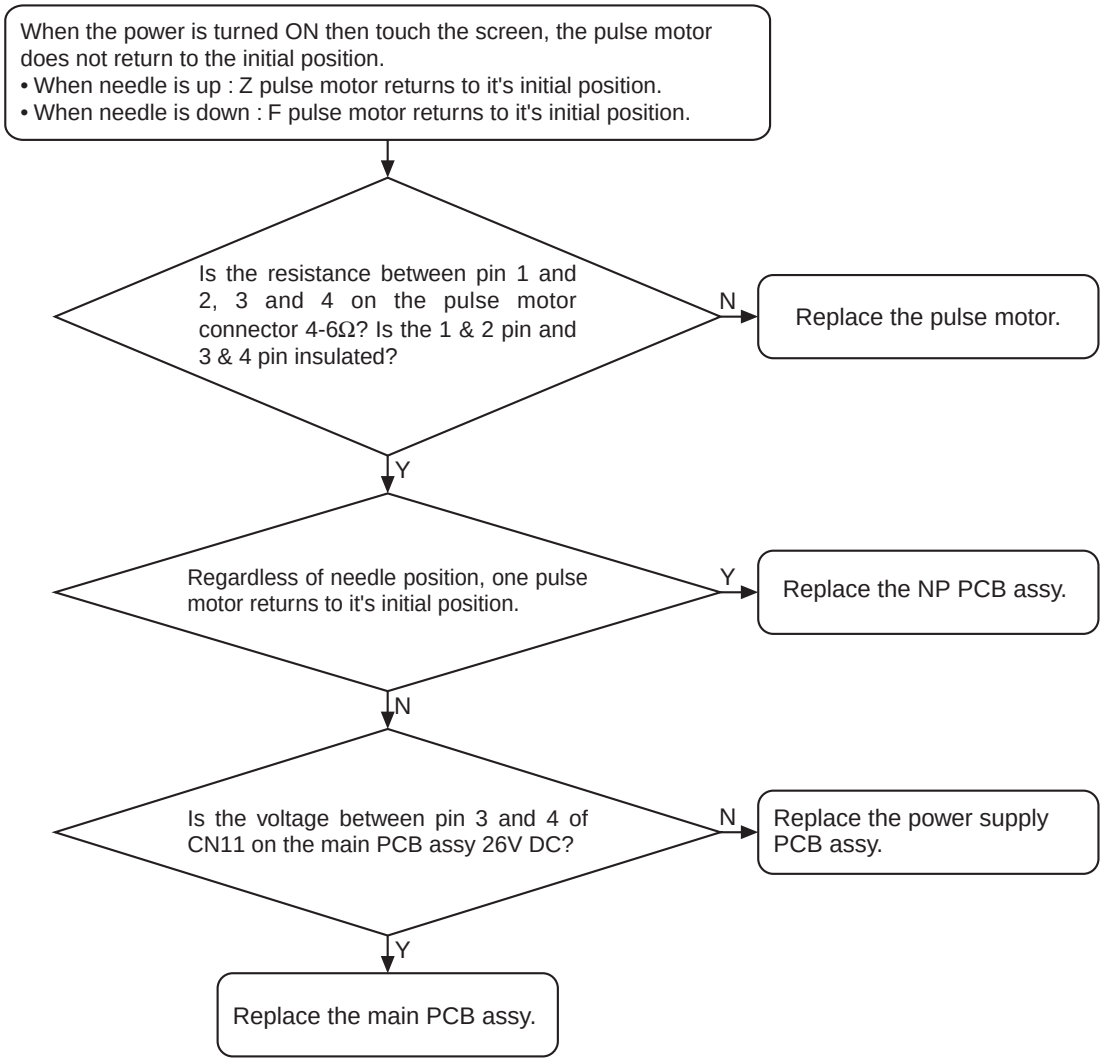
Electronic Parts

Power does not come on



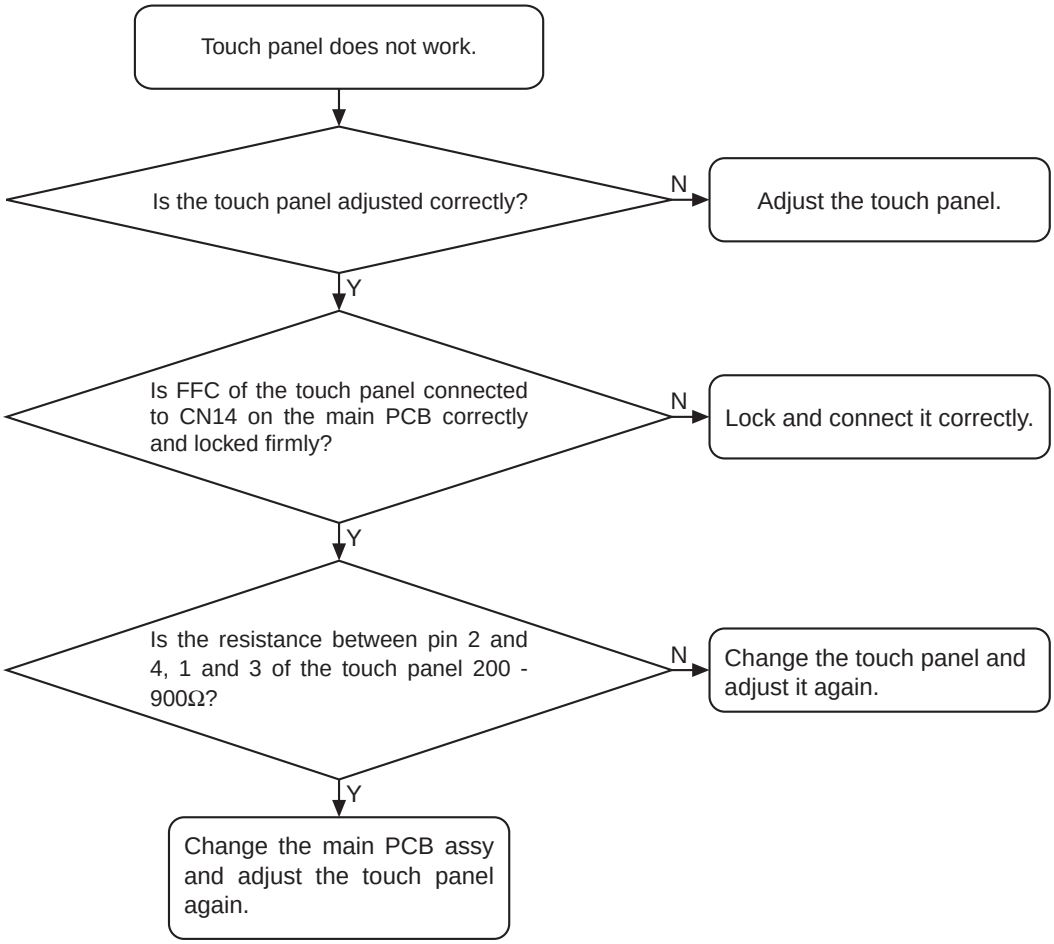
Electronic Parts

Pulse motor does not return to initial position



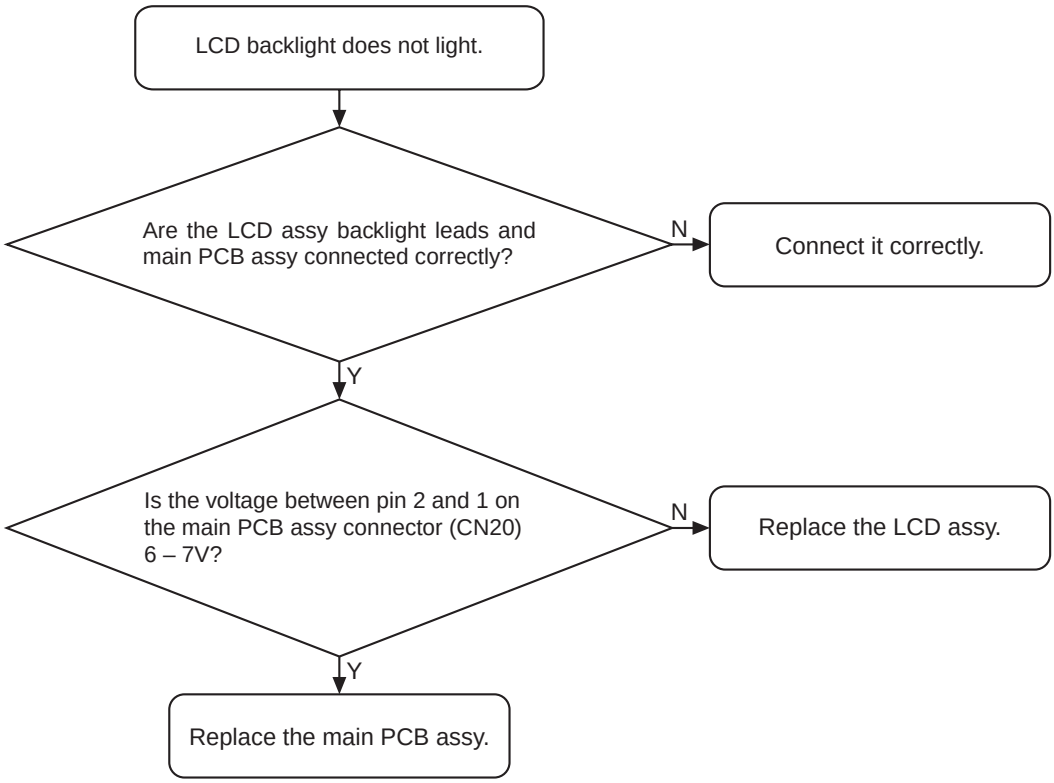
Electronic Parts

Touch panel does not work



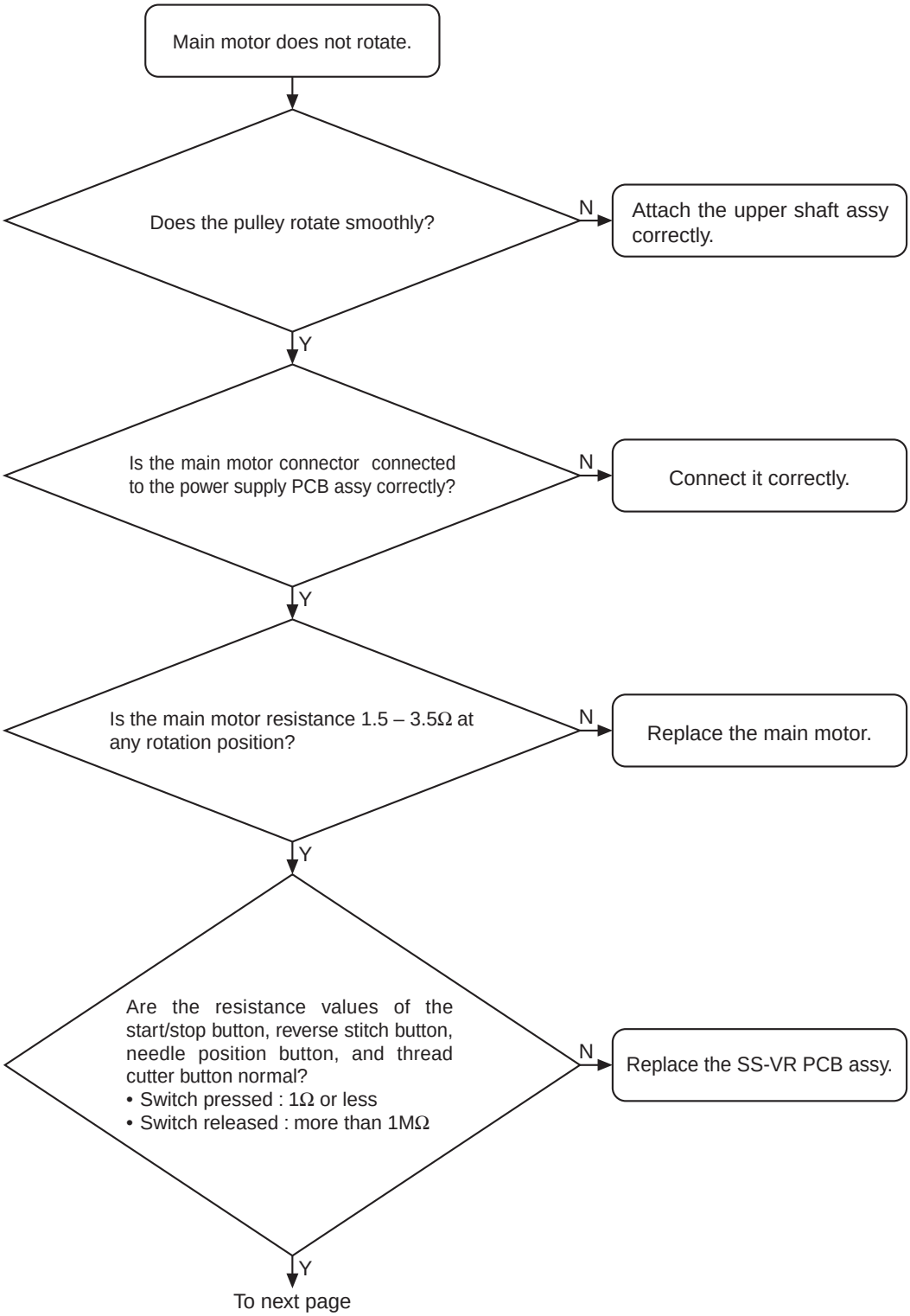
Electronic Parts

LCD backlight does not light

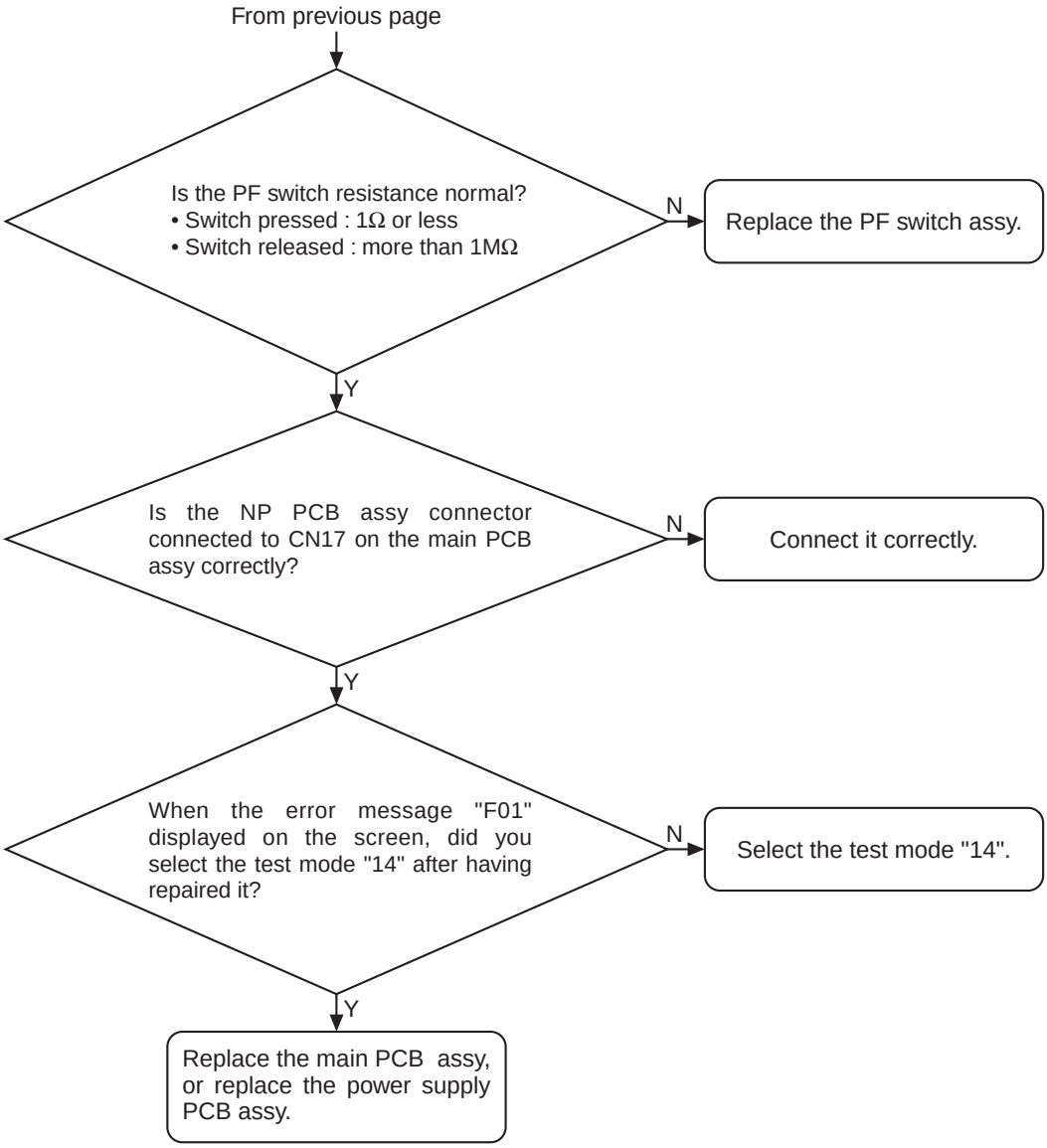


Electronic Parts

Main motor does not rotate

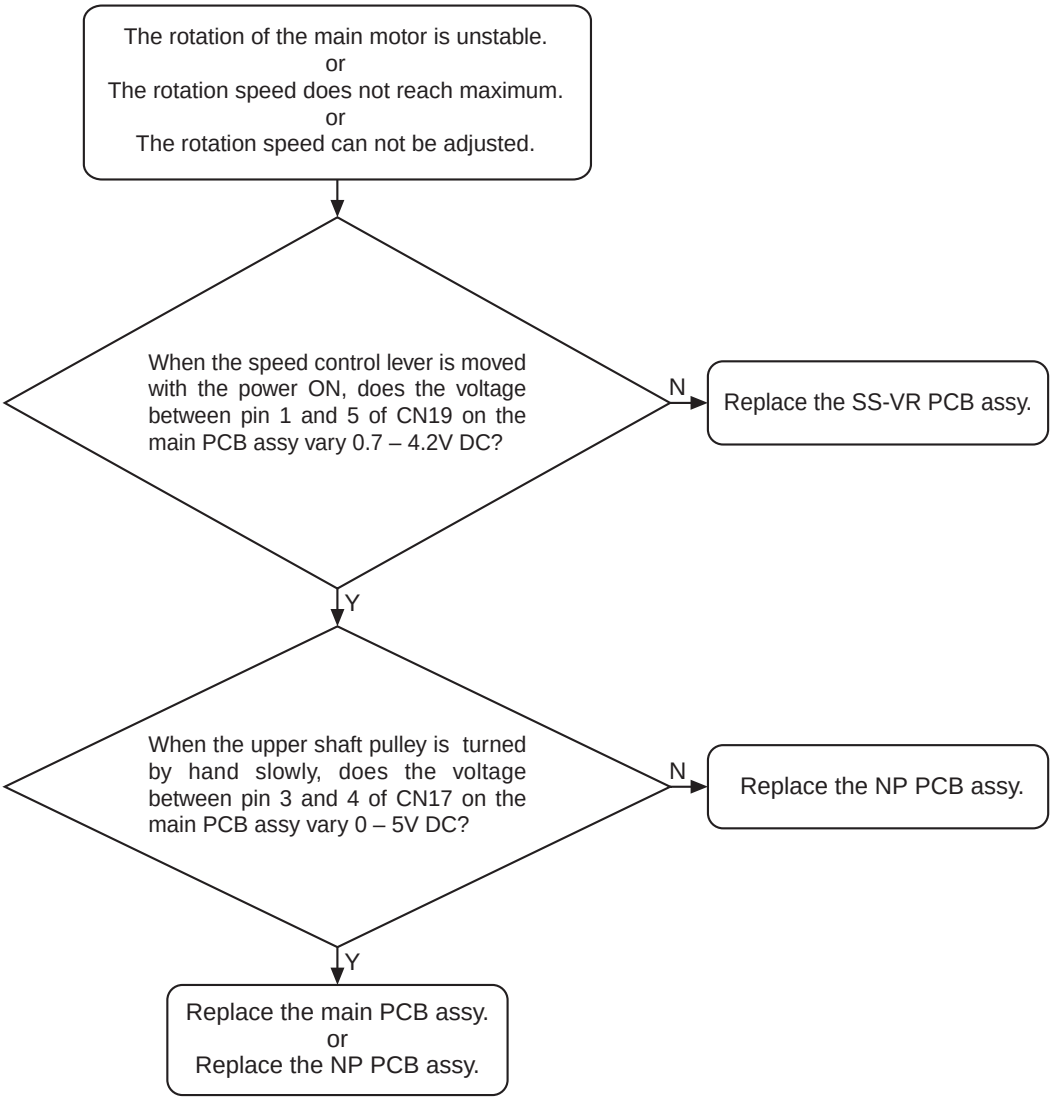


Electronic Parts



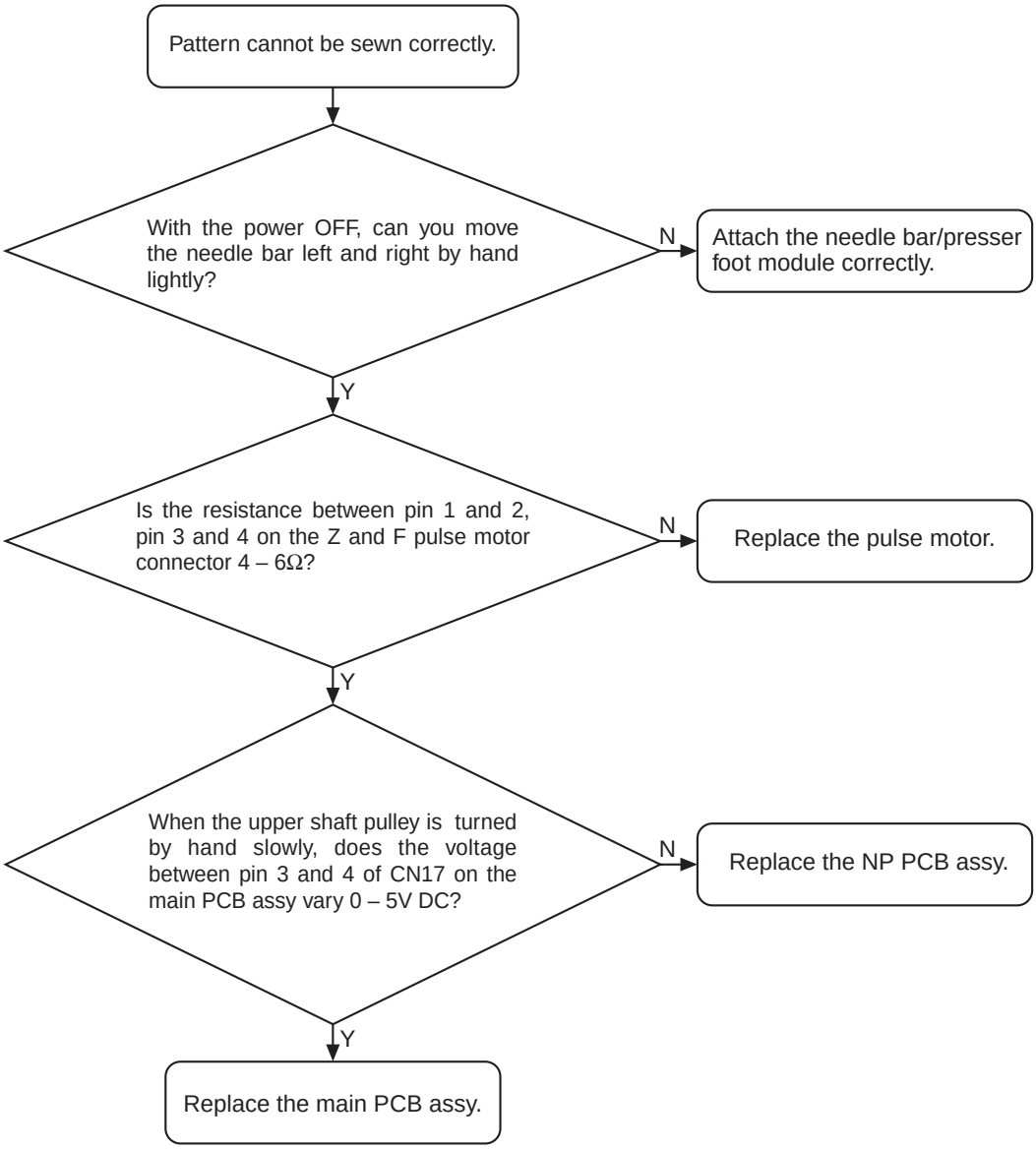
Electronic Parts

Main motor rotation is not normal



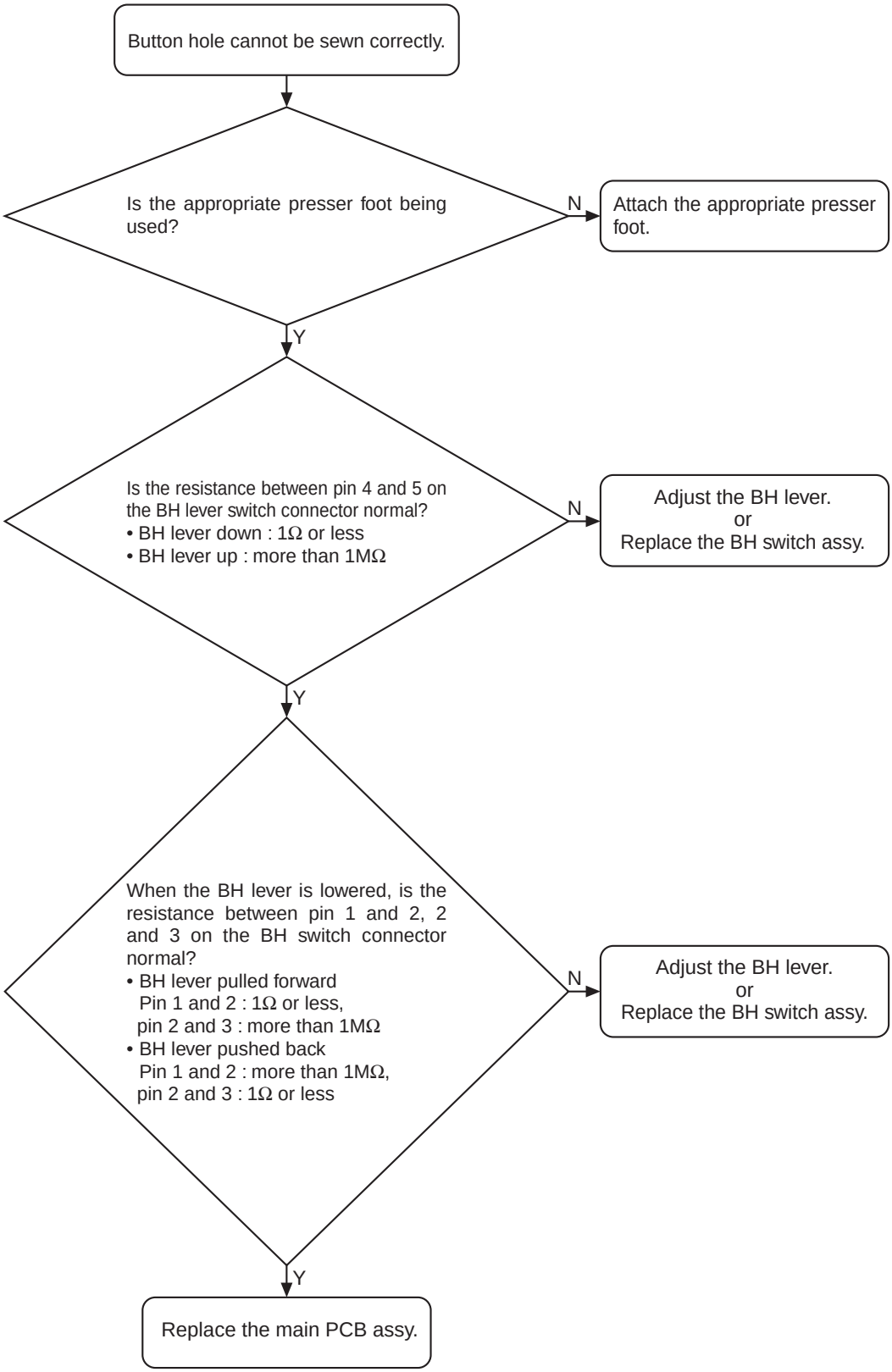
Electronic Parts

Pattern cannot be sewn correctly



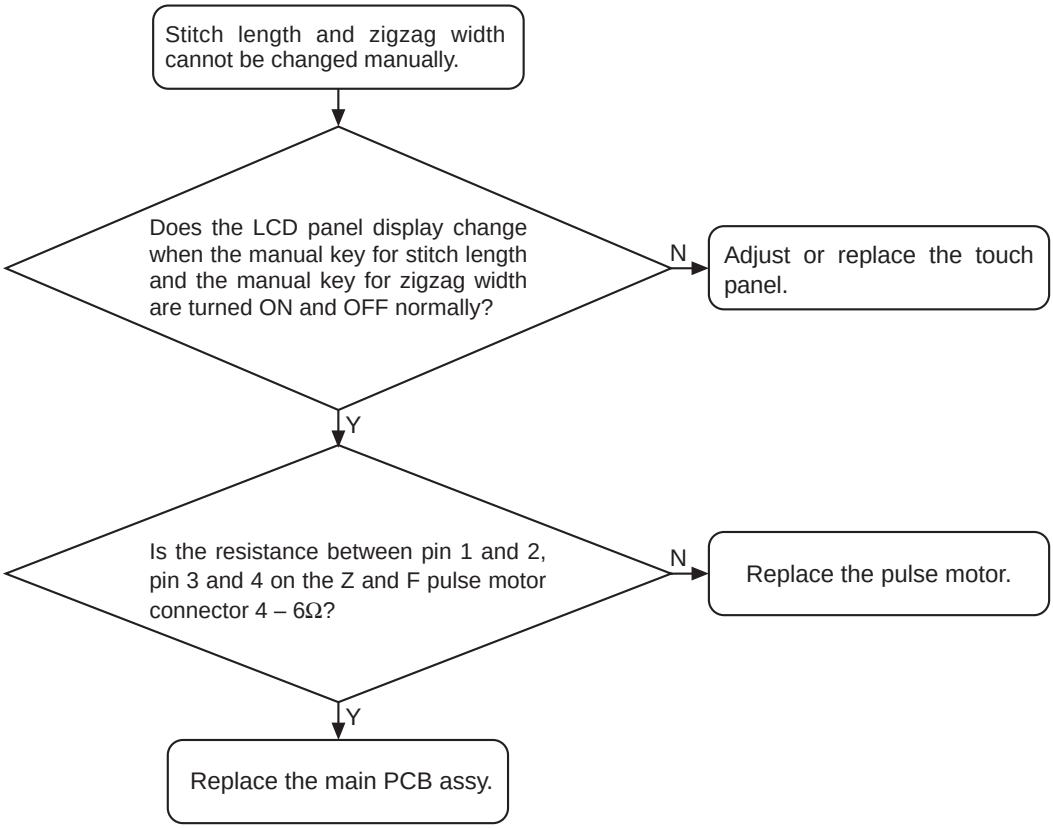
Electronic Parts

Button hole cannot be sewn correctly



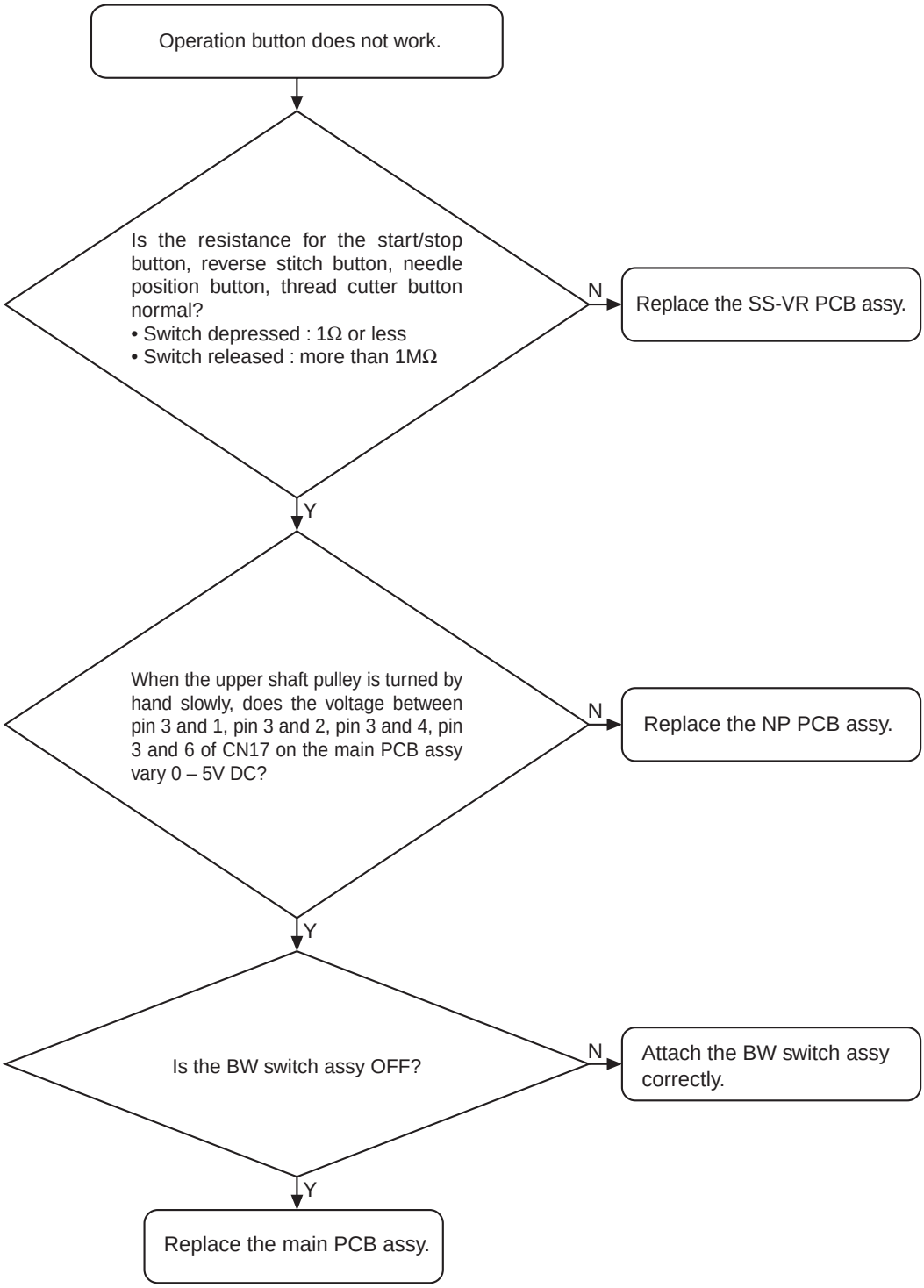
Electronic Parts

Stitch length and zigzag width cannot be changed manually



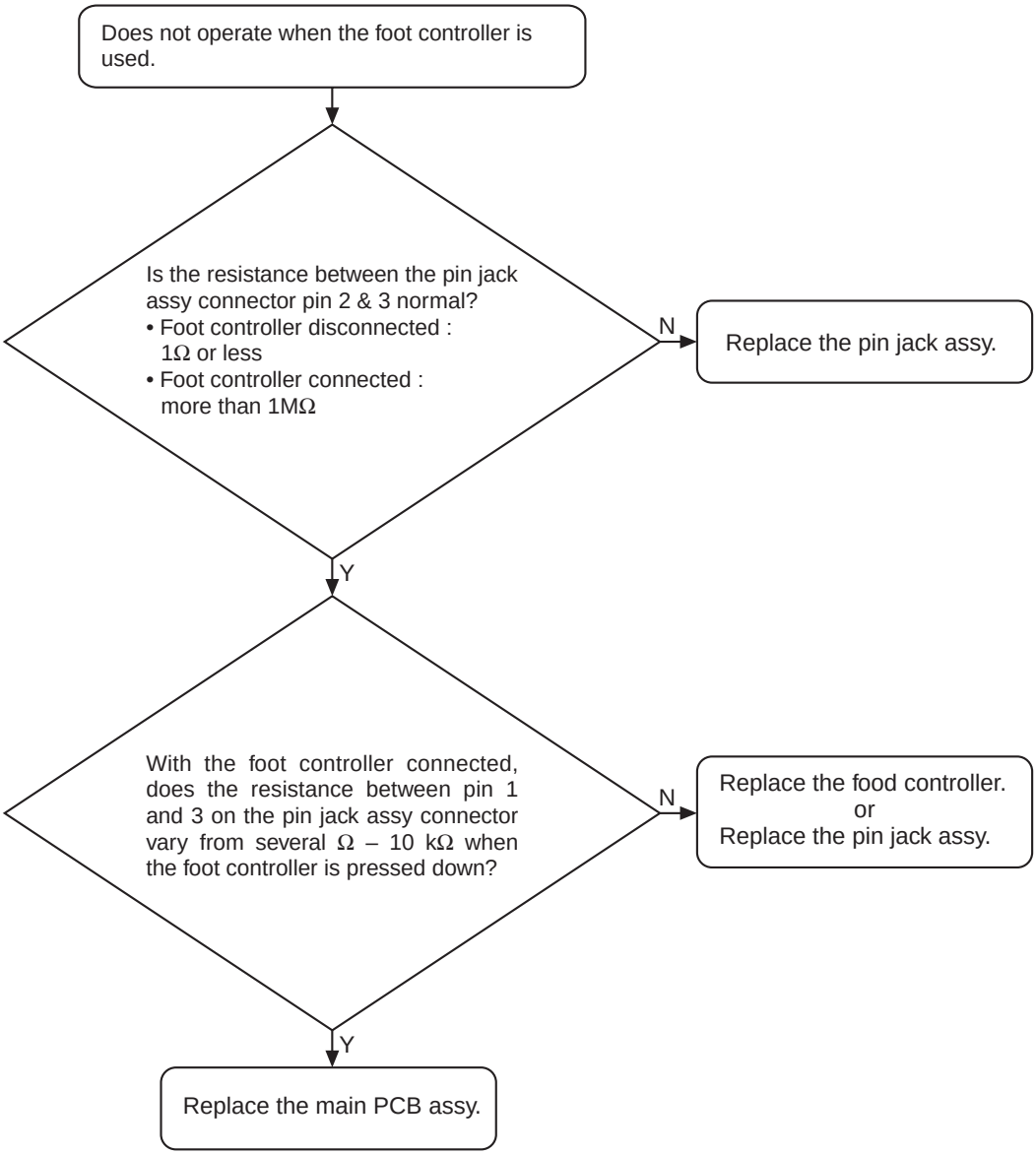
Electronic Parts

Operation button does not work



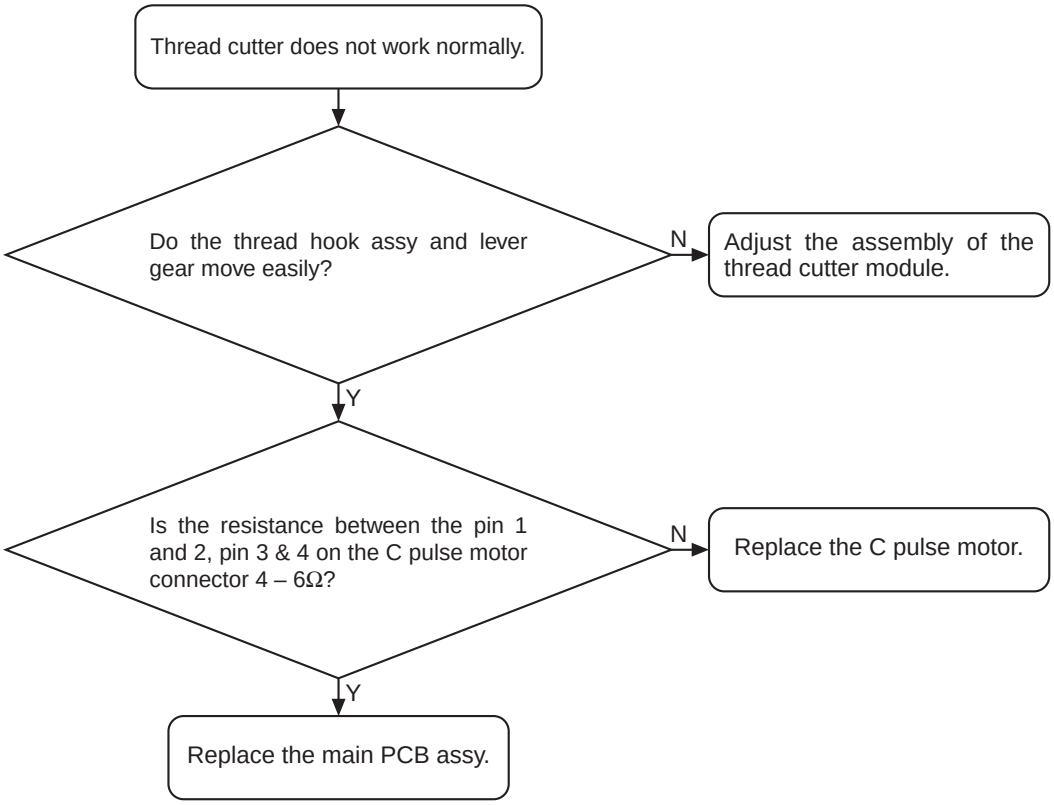
Electronic Parts

Does not operate when the foot controller is used



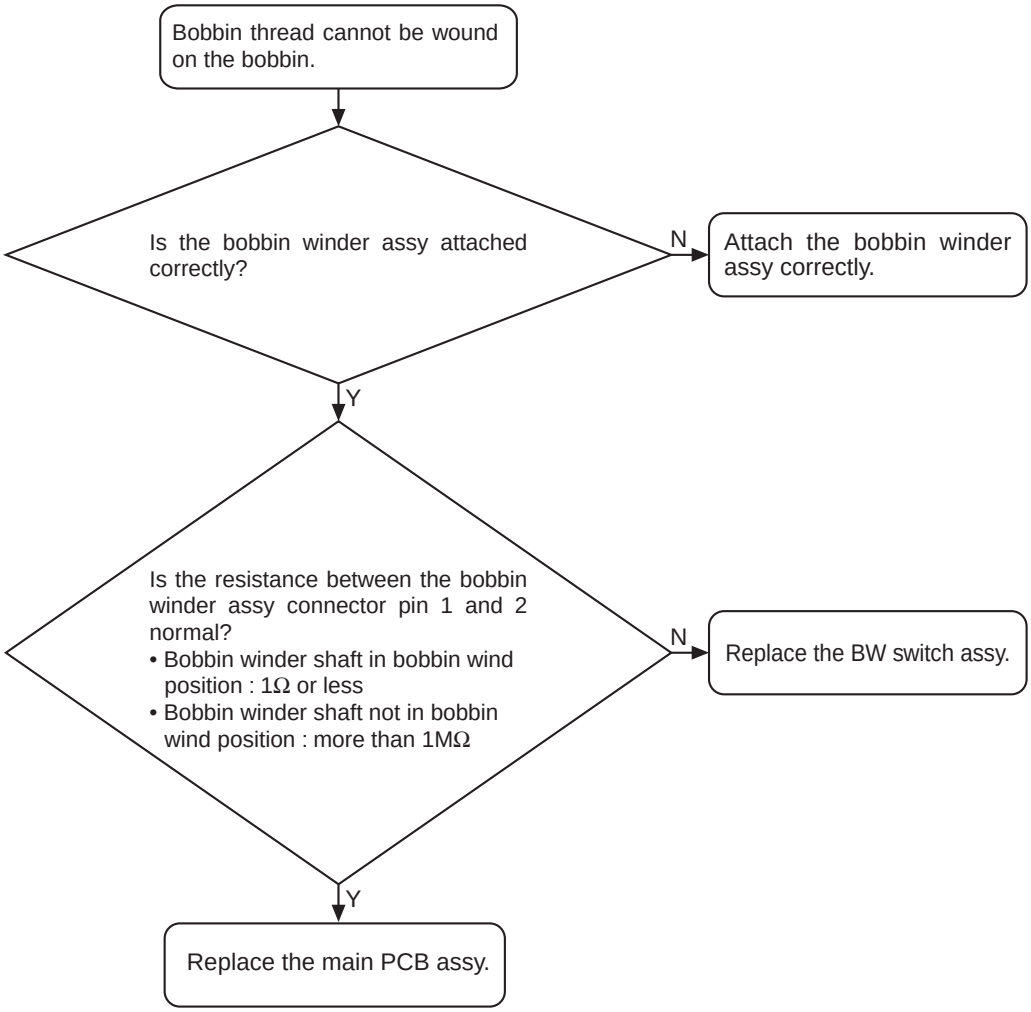
Electronic Parts

Thread cutter does not work normally



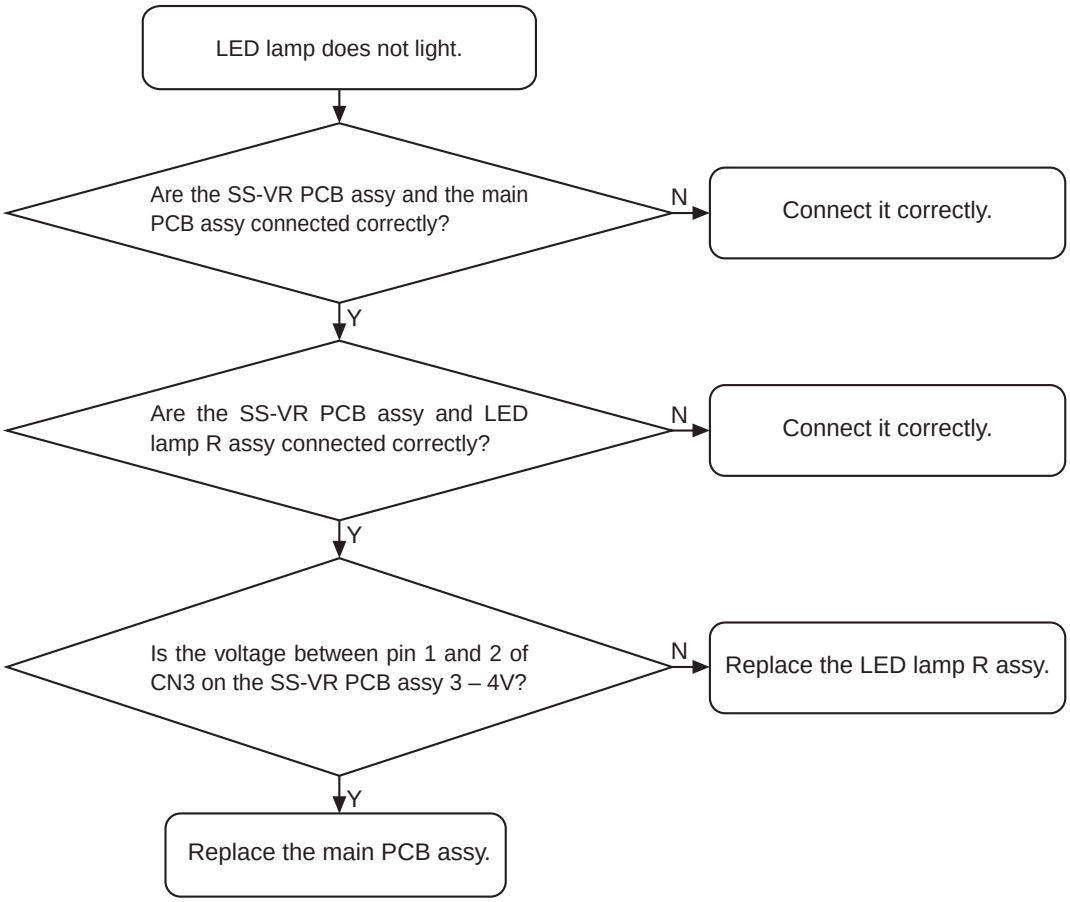
Electronic Parts

Bobbin thread cannot be wound on the bobbin



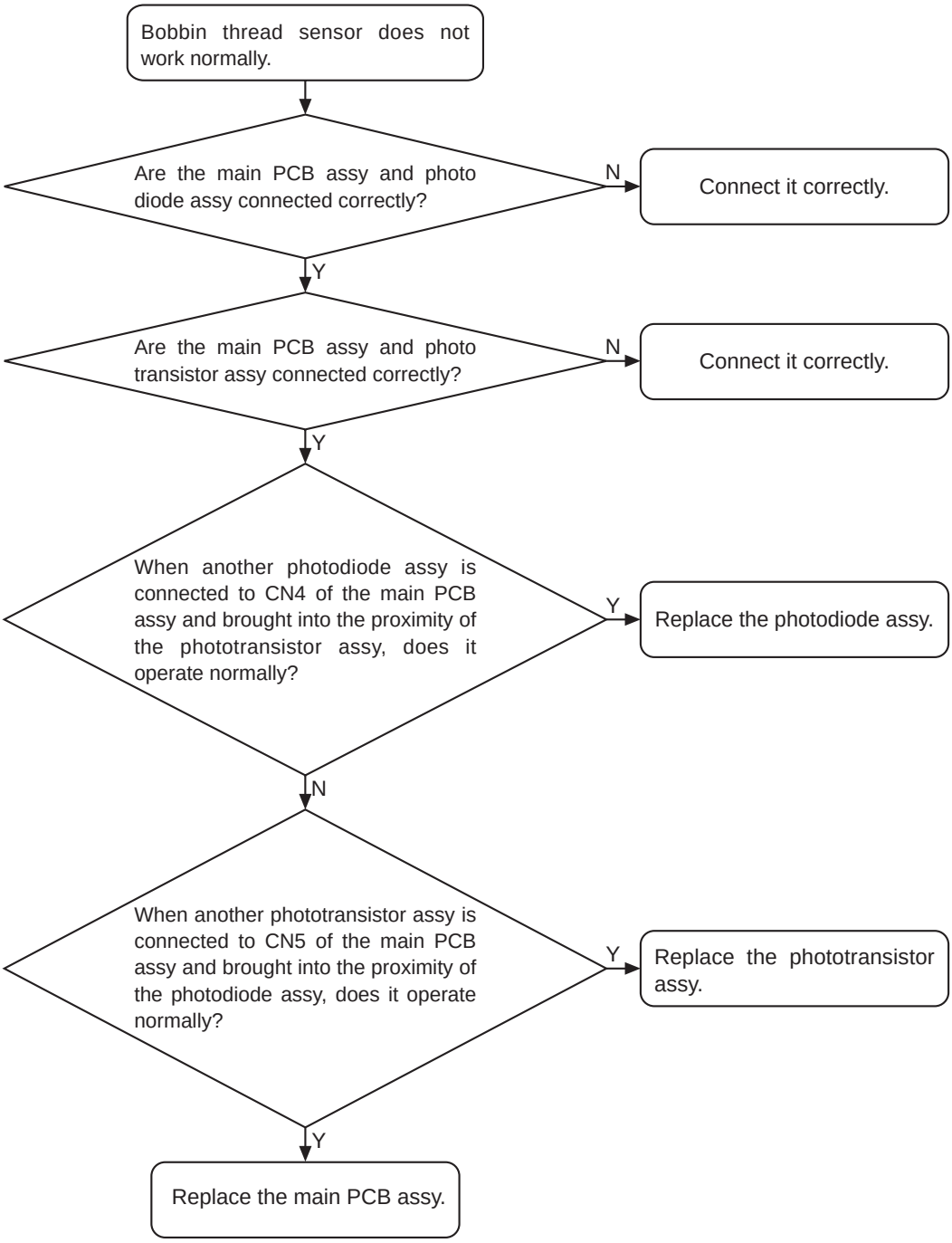
Electronic Parts

LED lamp does not light



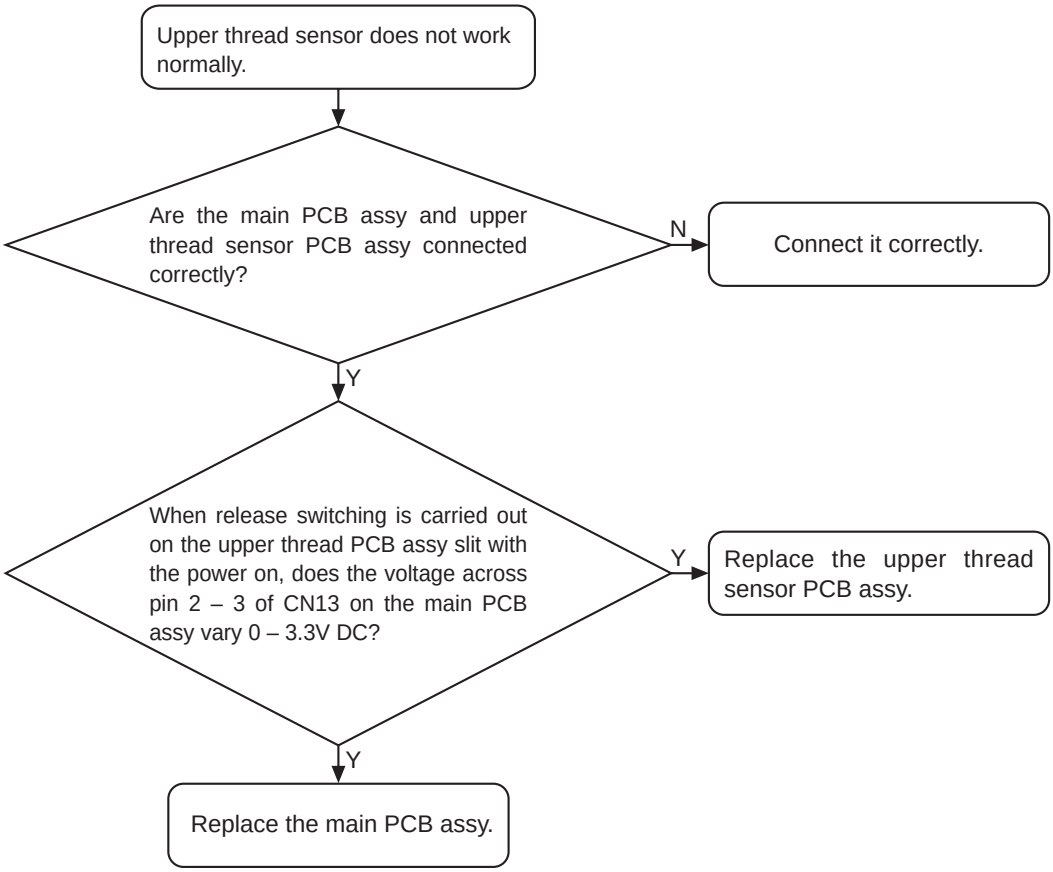
Electronic Parts

Bobbin thread sensor does not work normally



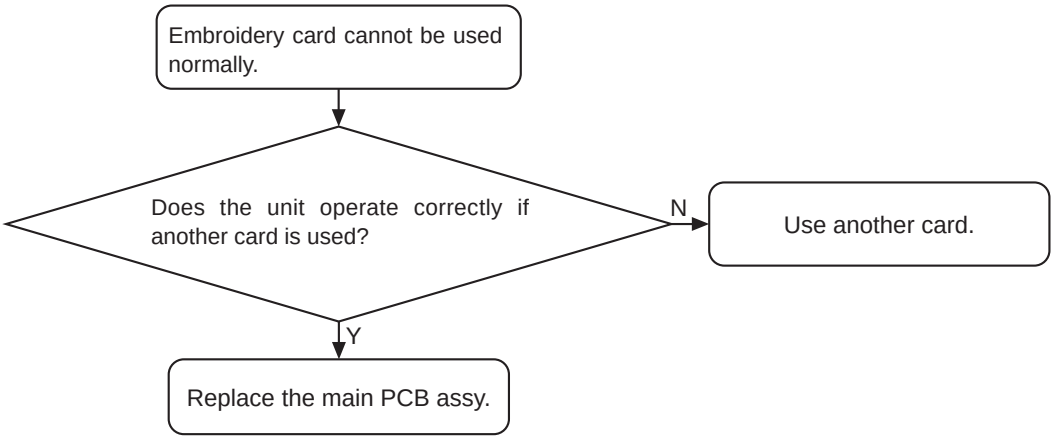
Electronic Parts

Upper thread sensor does not work normally



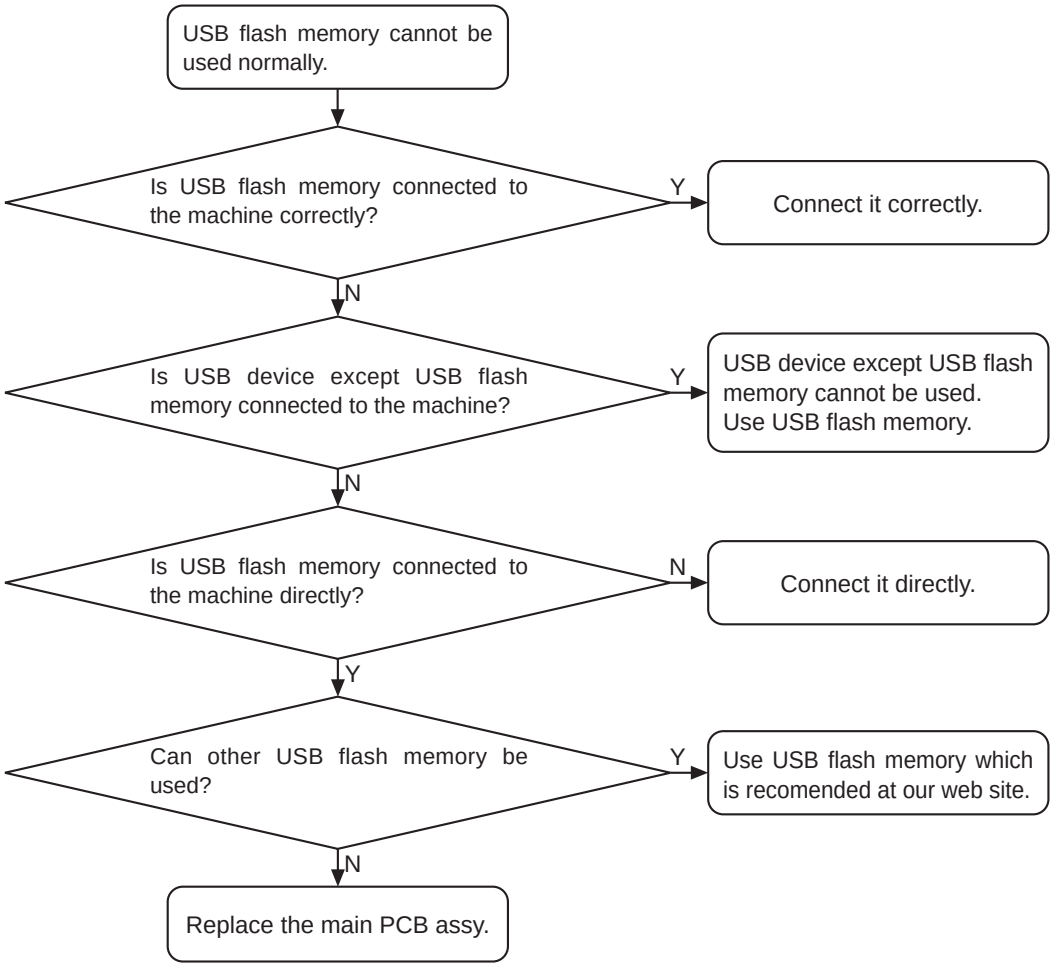
Electronic Parts

Embroidery card cannot be used normally



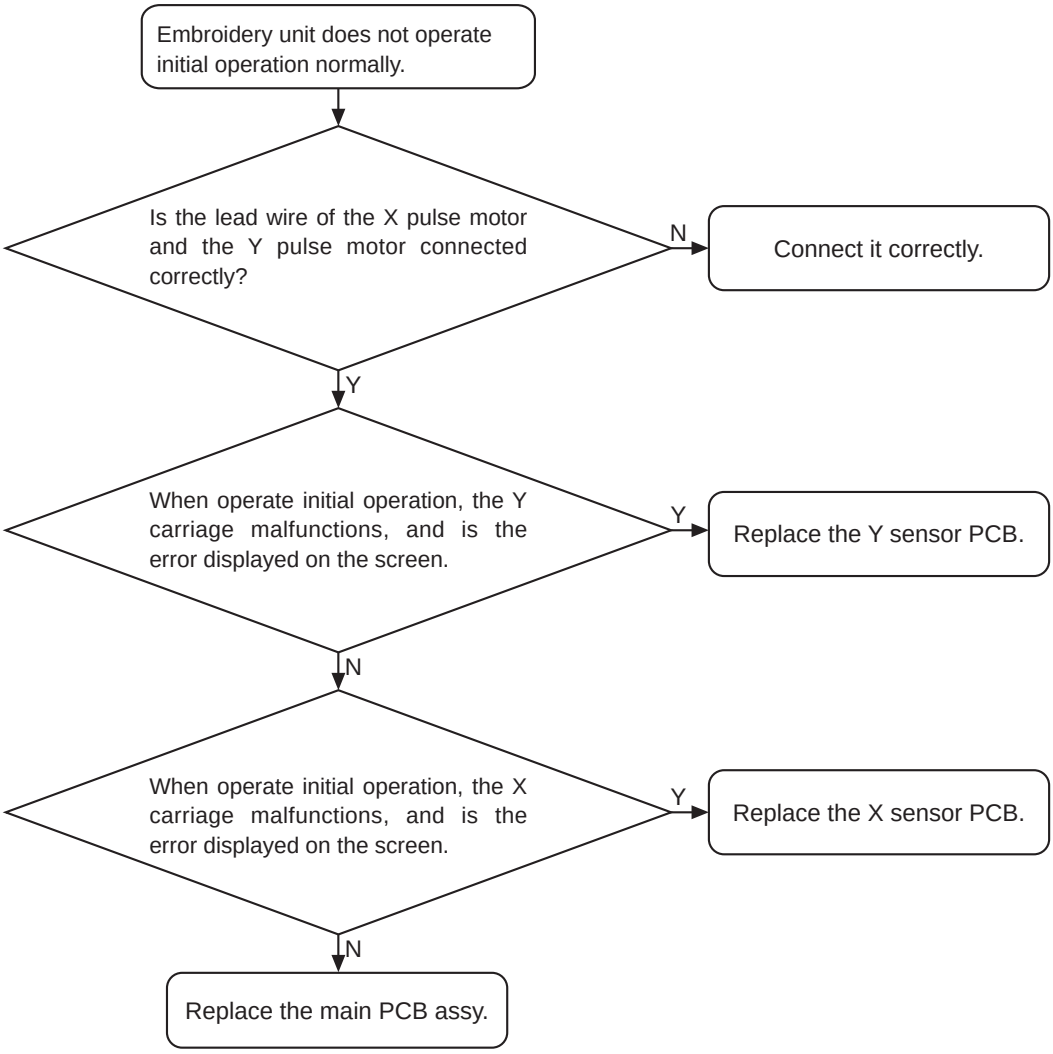
Electronic Parts

USB flash memory cannot be used normally



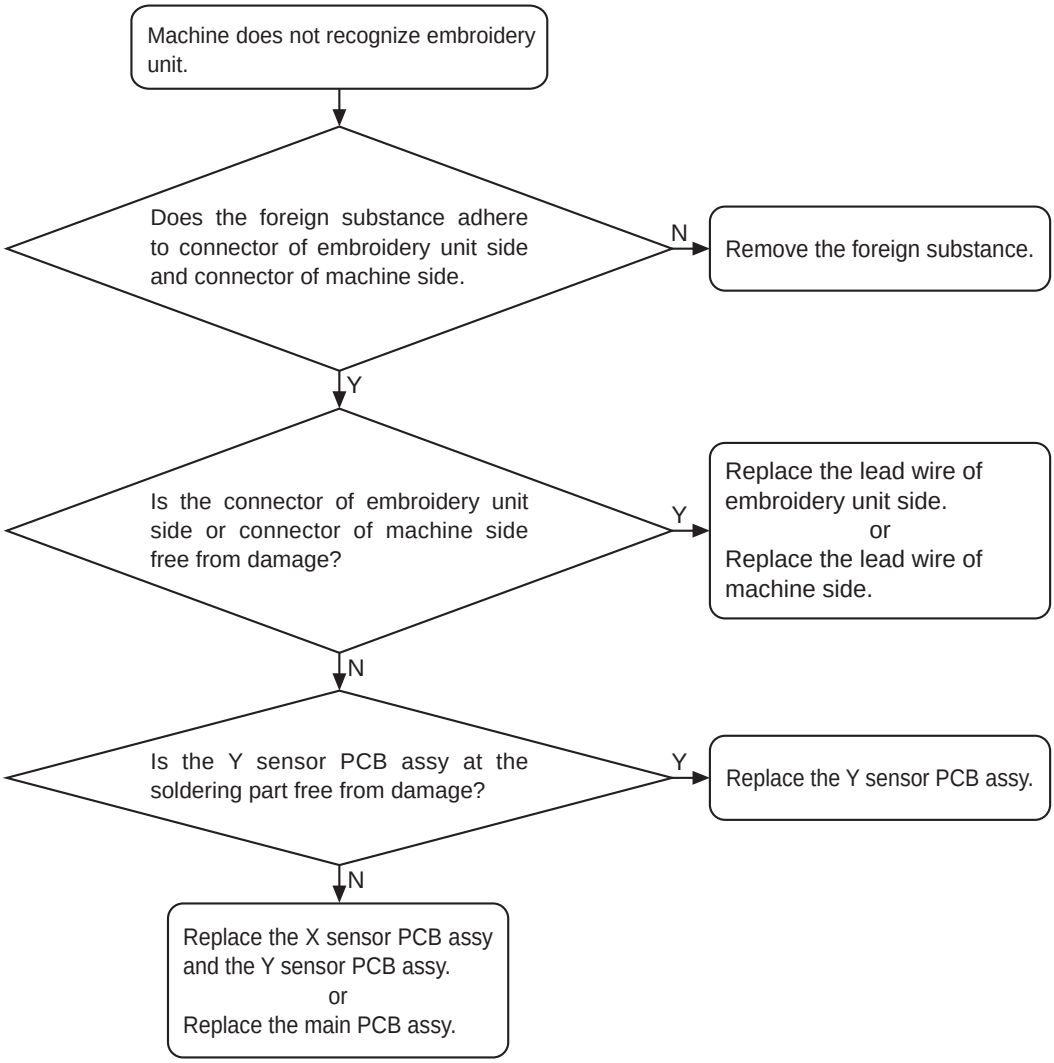
Electronic Parts

Embroidery unit does not operate initial operation normally



Electronic Parts

Machine does not recognize embroidery unit



Electronic Parts

Do not replace the main PCB assy and SSVR PCB assy simultaneously.

The setting data required to run the sewing machine correctly is stored in both the main PCB assy and the SSVR PCB assy. When either PCB assy is replaced, the setting data is automatically copied from the other to the new PCB assy.

If you replace the main PCB assy and SSVR PCB assy simultaneously, the setting data stored in the sewing machine cannot be copied to the new PCBs, causing the sewing machine to malfunction. When both PCB assys need replacing, be sure to replace them one at a time.

When the main PCB assy or SSVR PCB assy has been replaced, the setting data stored in the sewing machine is automatically copied to the new PCB. However, the screen shown in Fig. 1 may appear depending on the new PCB. In that event, follow the steps below to complete copying correctly.

1. Select “MAIN PC BOARD” ① when the main PCB assy was replaced, or select “SS PC BOARD” ② when the SSVR PCB assy was replaced. (Fig. 1)
   Copying the setting data stored in the sewing machine automatically starts.

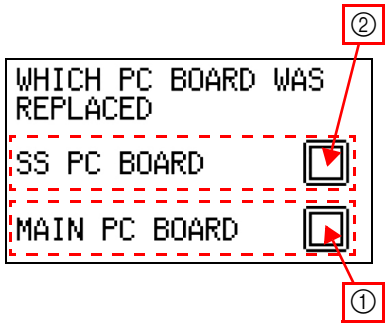


Fig. 1

***Note 1**
- Do not select a PCB different from the one that has been replaced. The setting data stored in the sewing machine cannot be copied correctly, causing the sewing machine to malfunction.

***Note 2**
- Do not turn OFF the power to the sewing machine while the setting data is being copied. Do not touch the sewing machine’s touch panel or any buttons. The setting data stored in the sewing machine cannot be copied correctly, causing the sewing machine to malfunction.

2. When copying the setting data is completed, the sewing machine is automatically restarted.
   * Replacement of the PCB assy is completed.

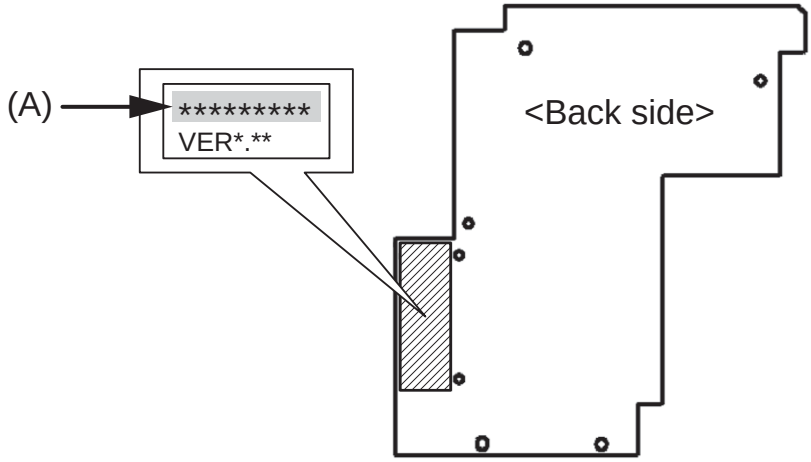
***Note**
- When copying the setting data is completed, upgrade the software of the sewing machine to the latest version. If the software is not the latest version, the sewing machine may not run correctly.

If "SPEC DIFFERENCE" is displayed on the screen, it means that the specifications of the PCB assy that has been replaced differ from the sewing machine. Replace with the PCB assy with the same specifications as the sewing machine.

Electronic Parts

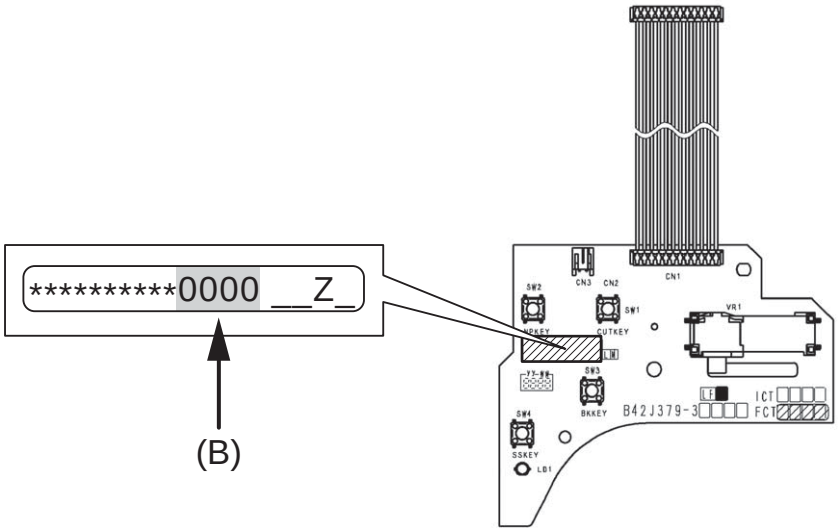
■ Main PCB

Model	Specifications	Parts code	Marking character on (A)
NV950D	for all country	XE8224***	XE8224***
NV950	for all country	XE8751***	XE8751***



■ SSVR PCB

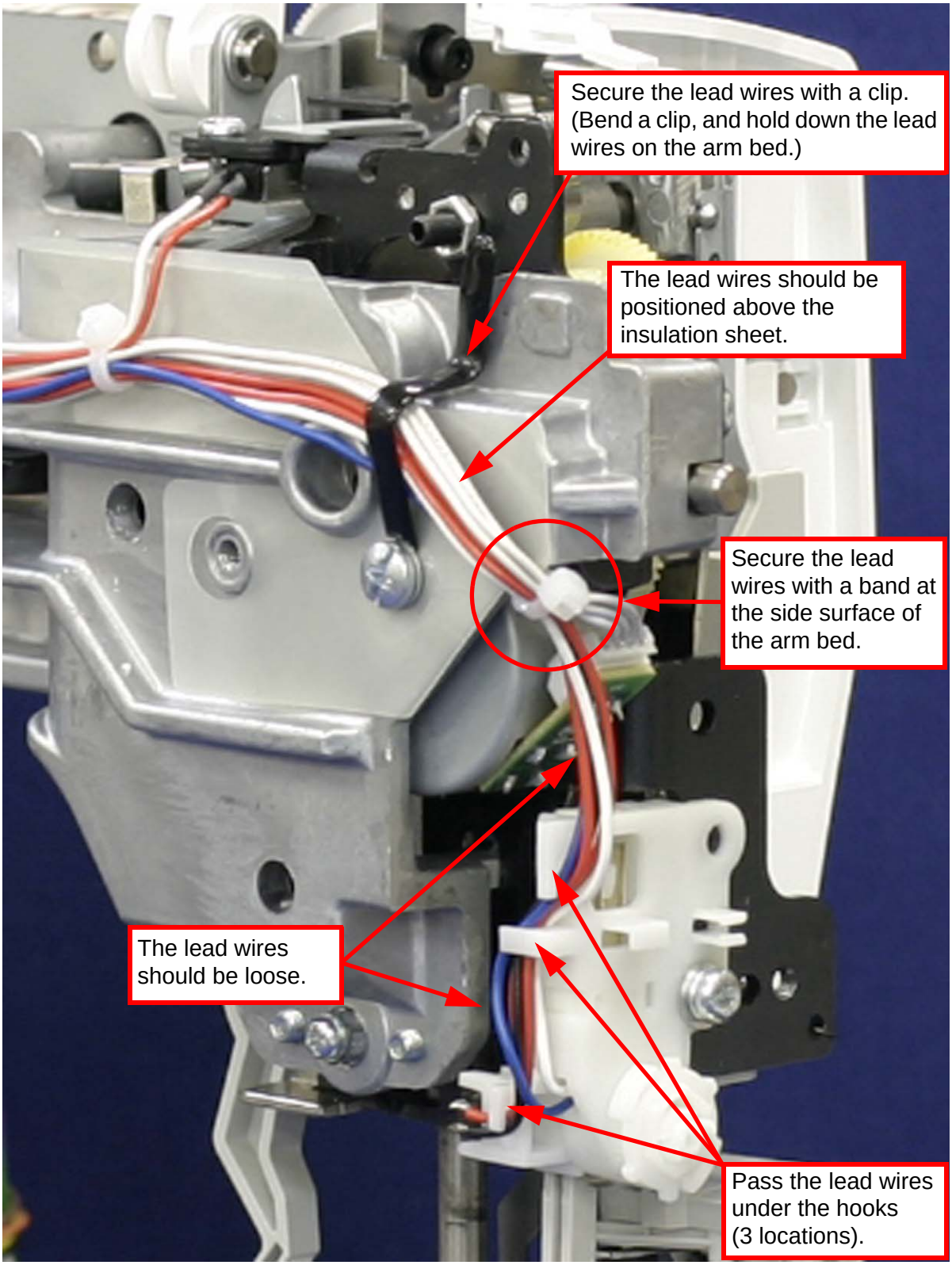
Model	Specifications	Parts code	Marking character on (B)
NV950D/NV950	for all country	XE2934***	2934



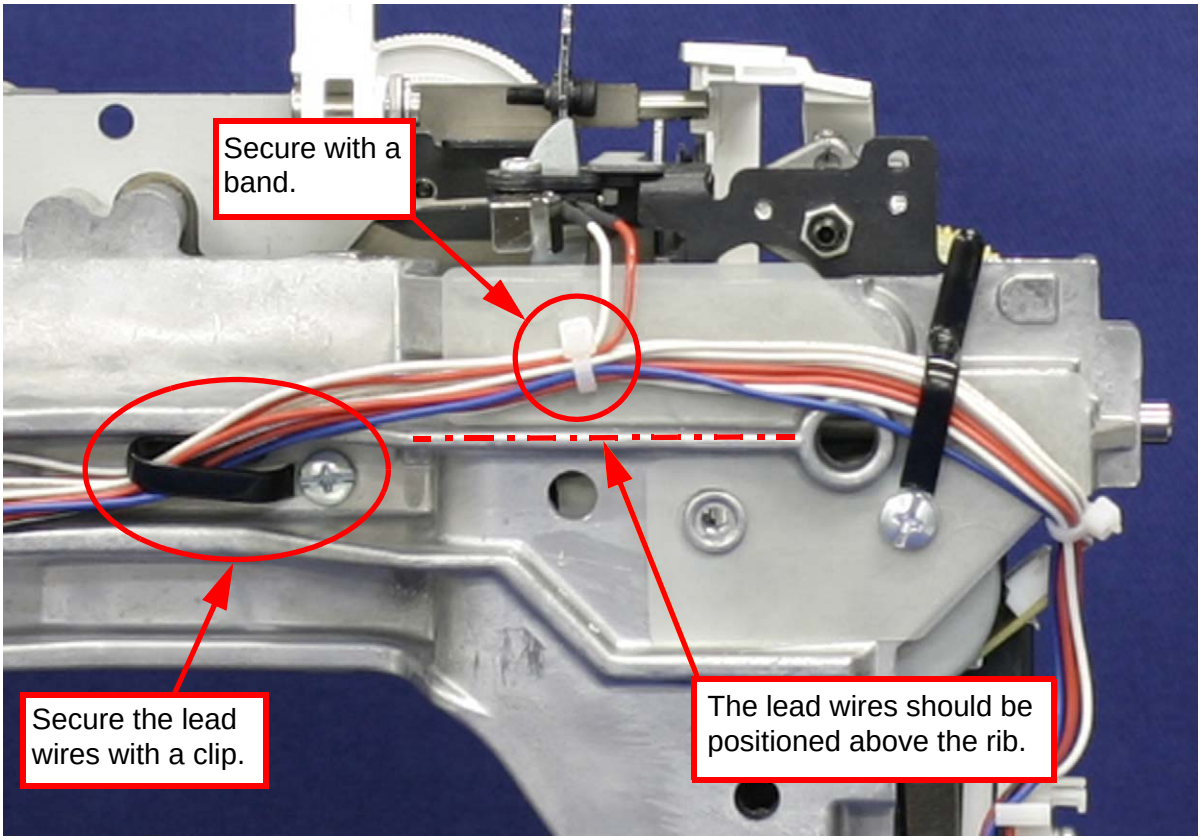
Electronic Parts

6 Special Instructions of Wiring

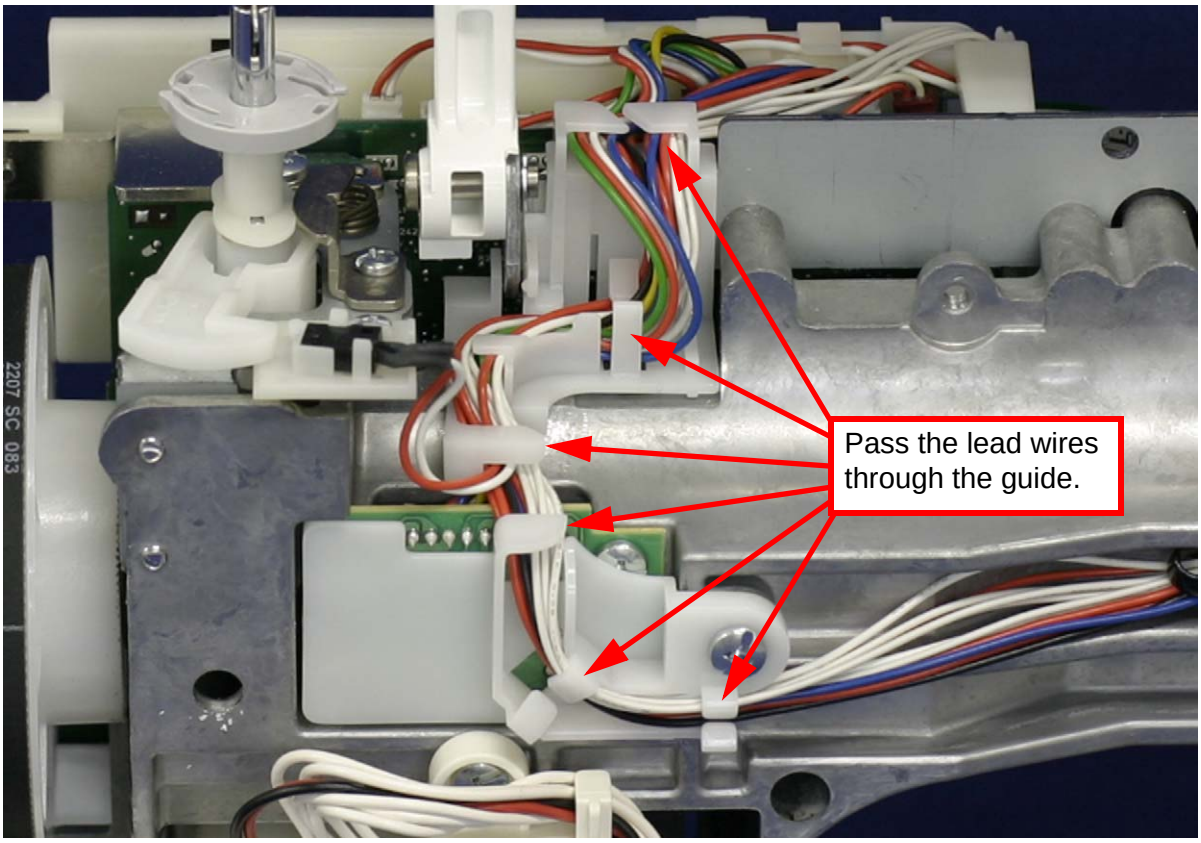
1. Wiring on left side of needle bar/presser foot module



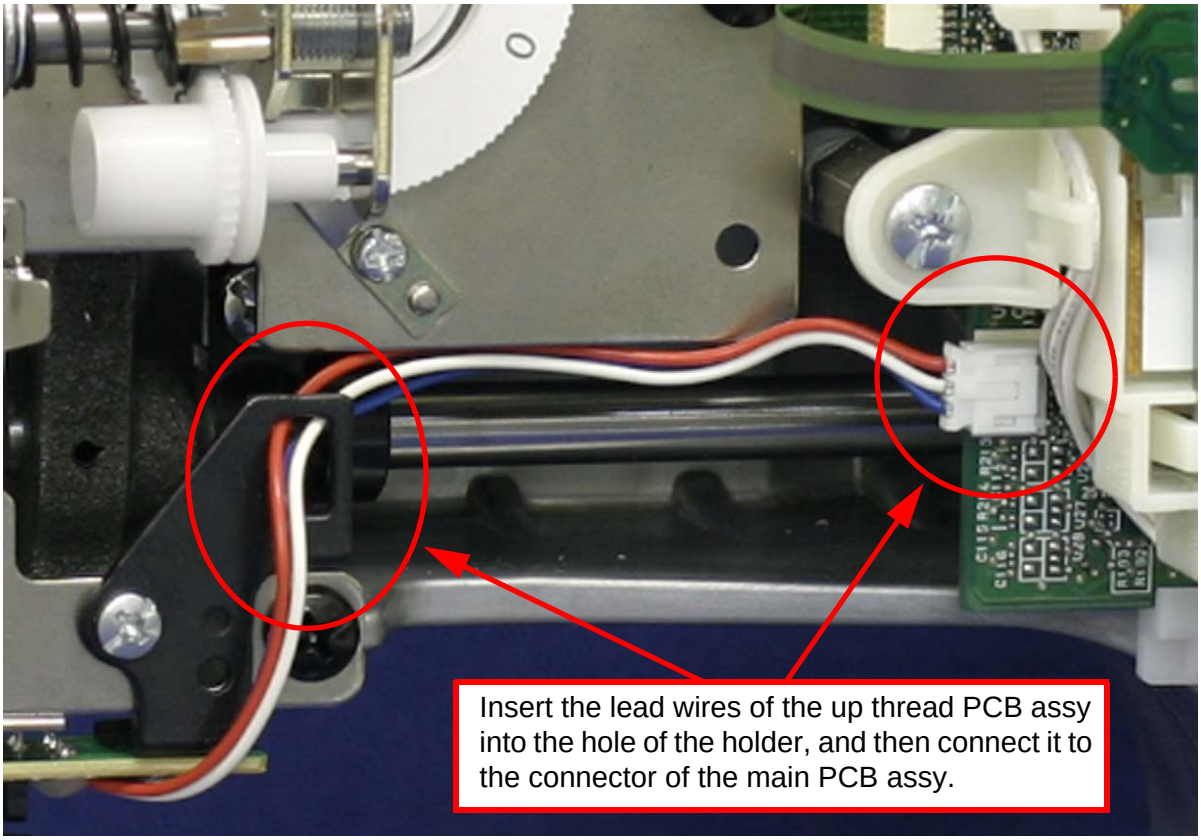
2. Wiring on back side of needle bar/presser foot module



3. Wiring on back side of arm bed

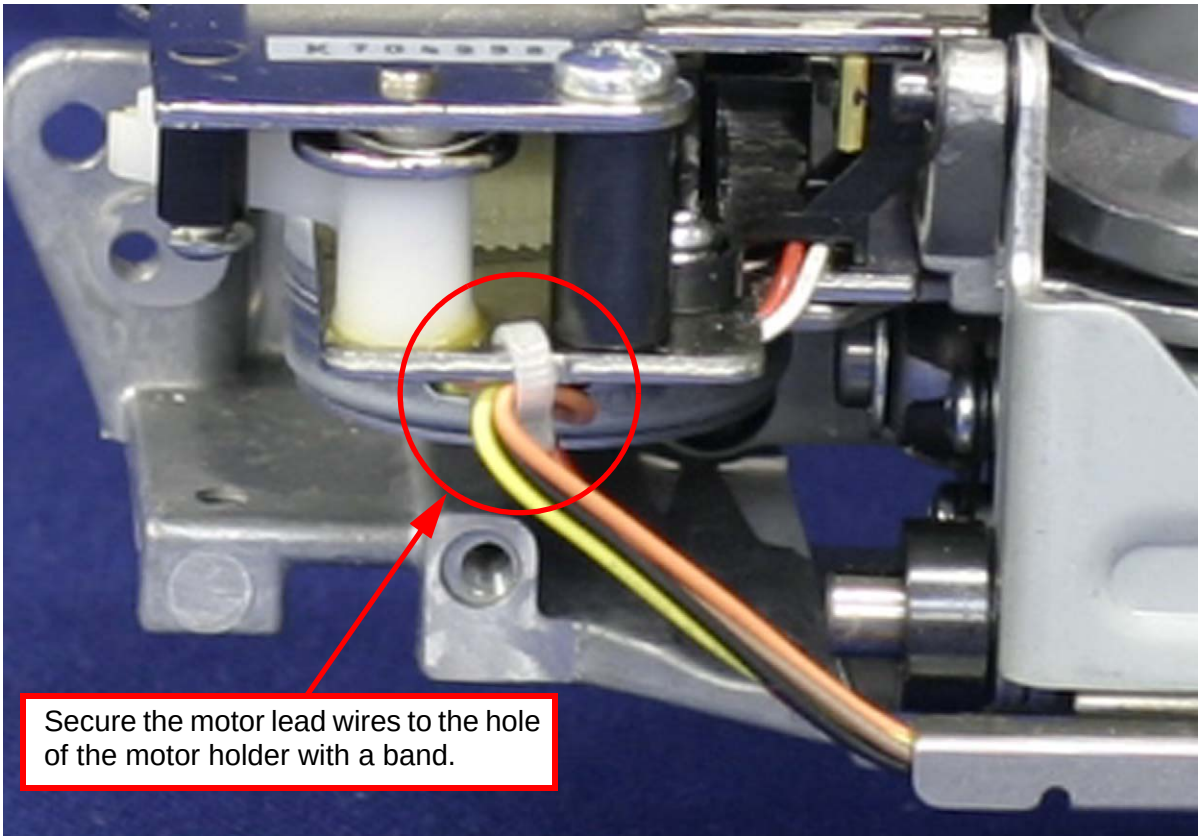


4. Wiring of right side of needle bar/presser foot module

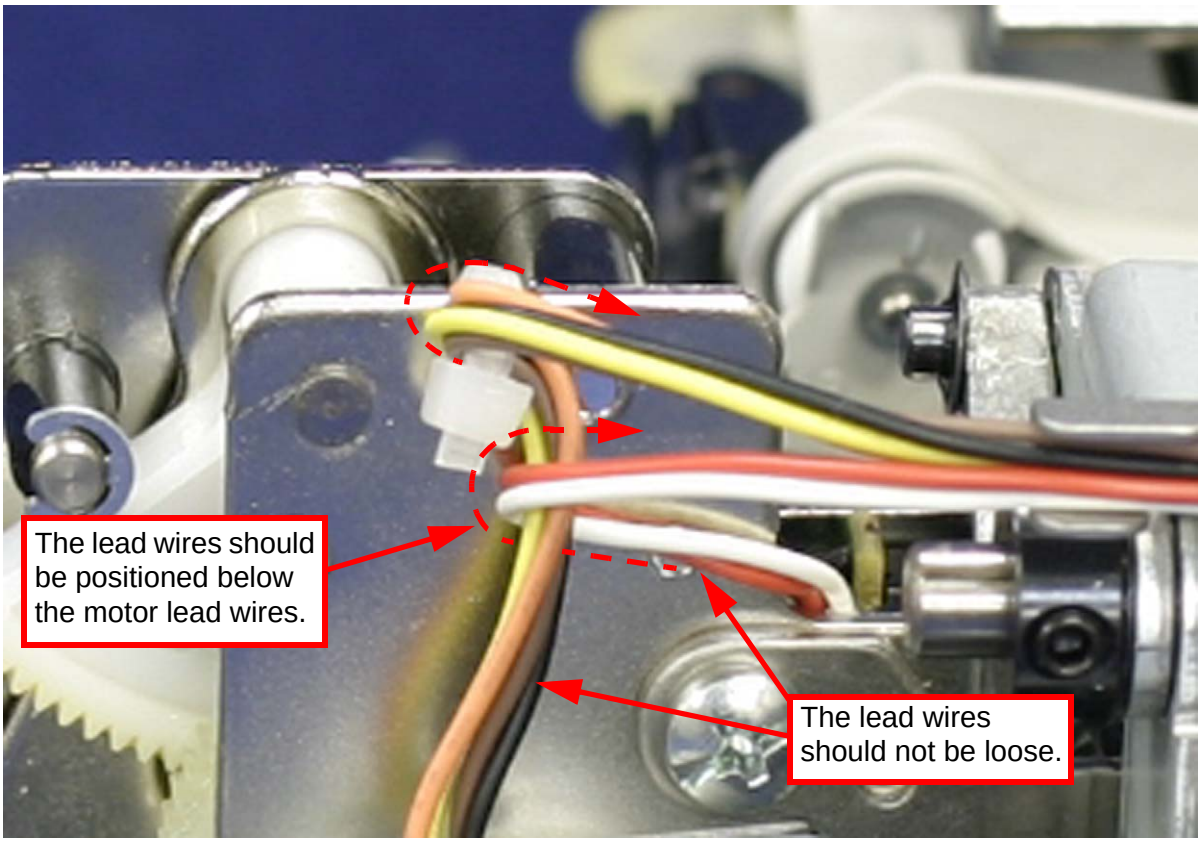


Special Instructions of Wiring

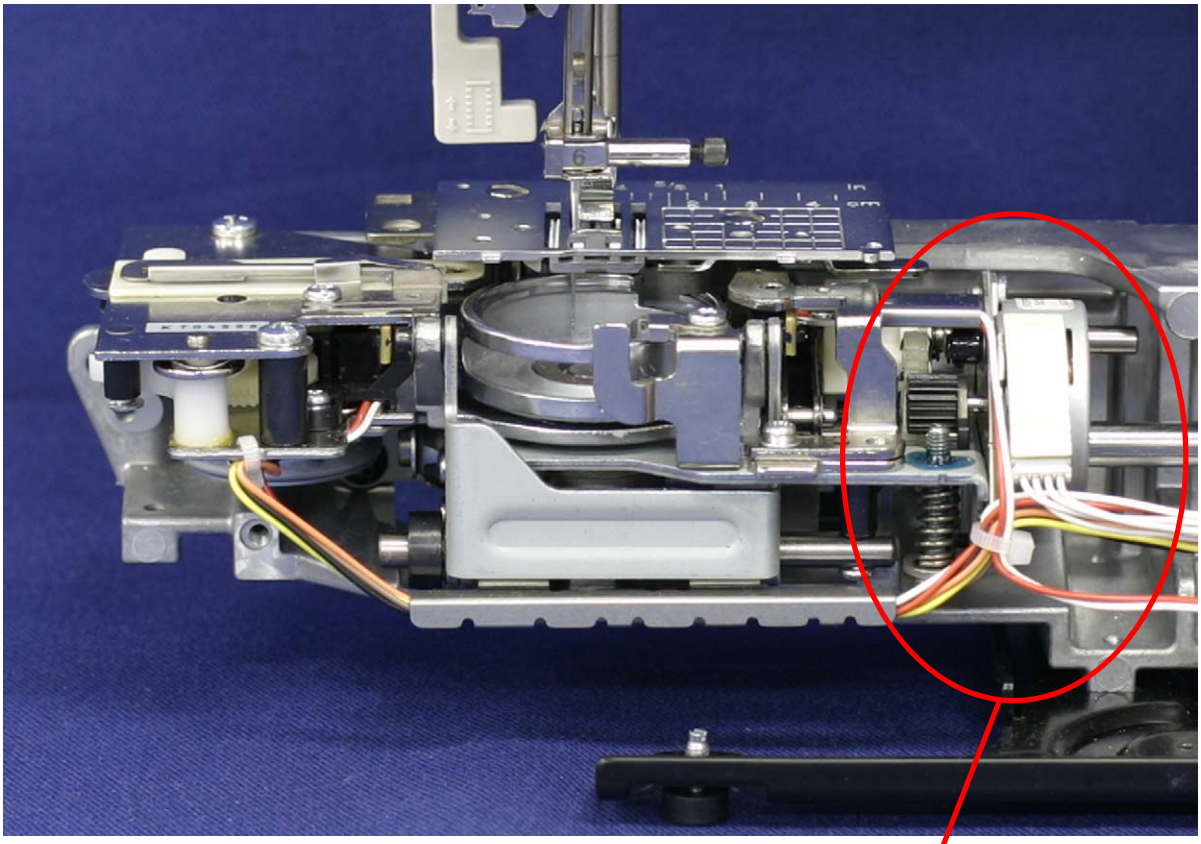
1. Wiring on front side of thread cutter module



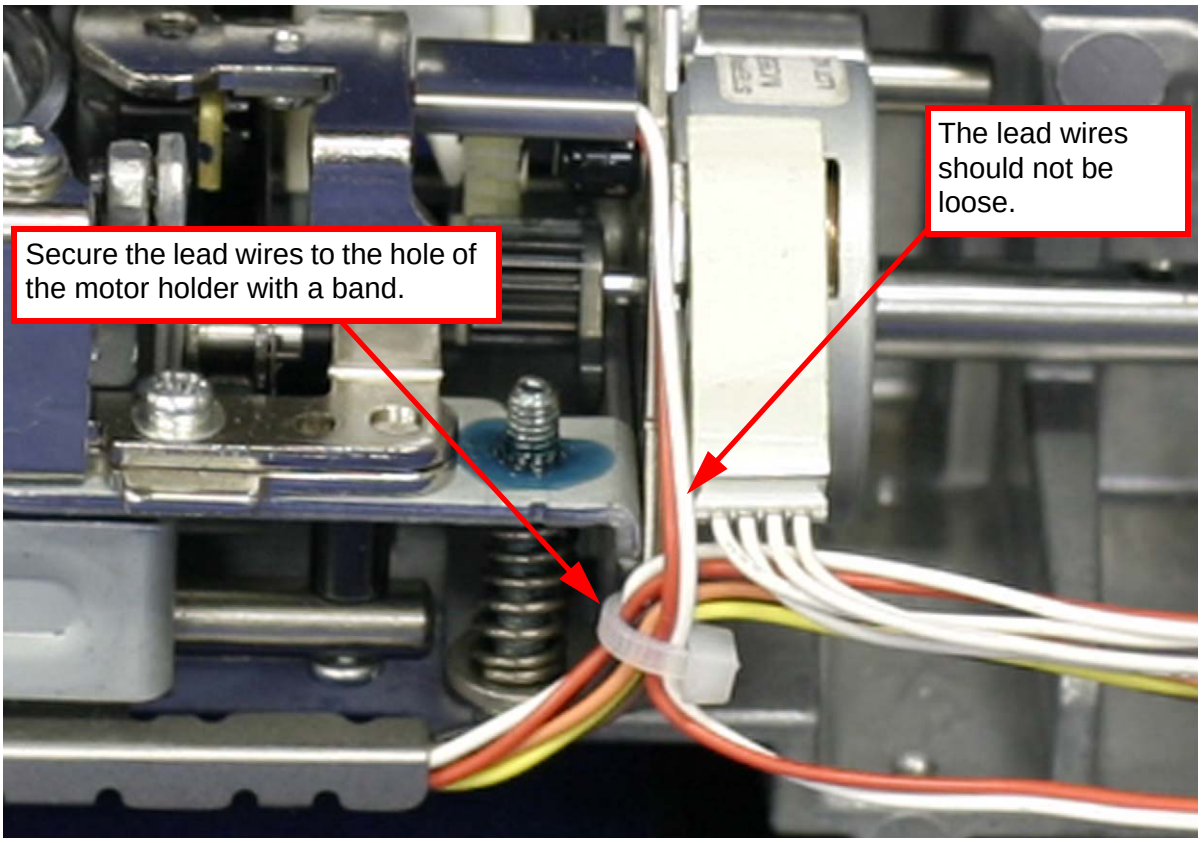
2. Wiring on back side of thread cutter module



1. Wiring on front side of feed/rotary hook module

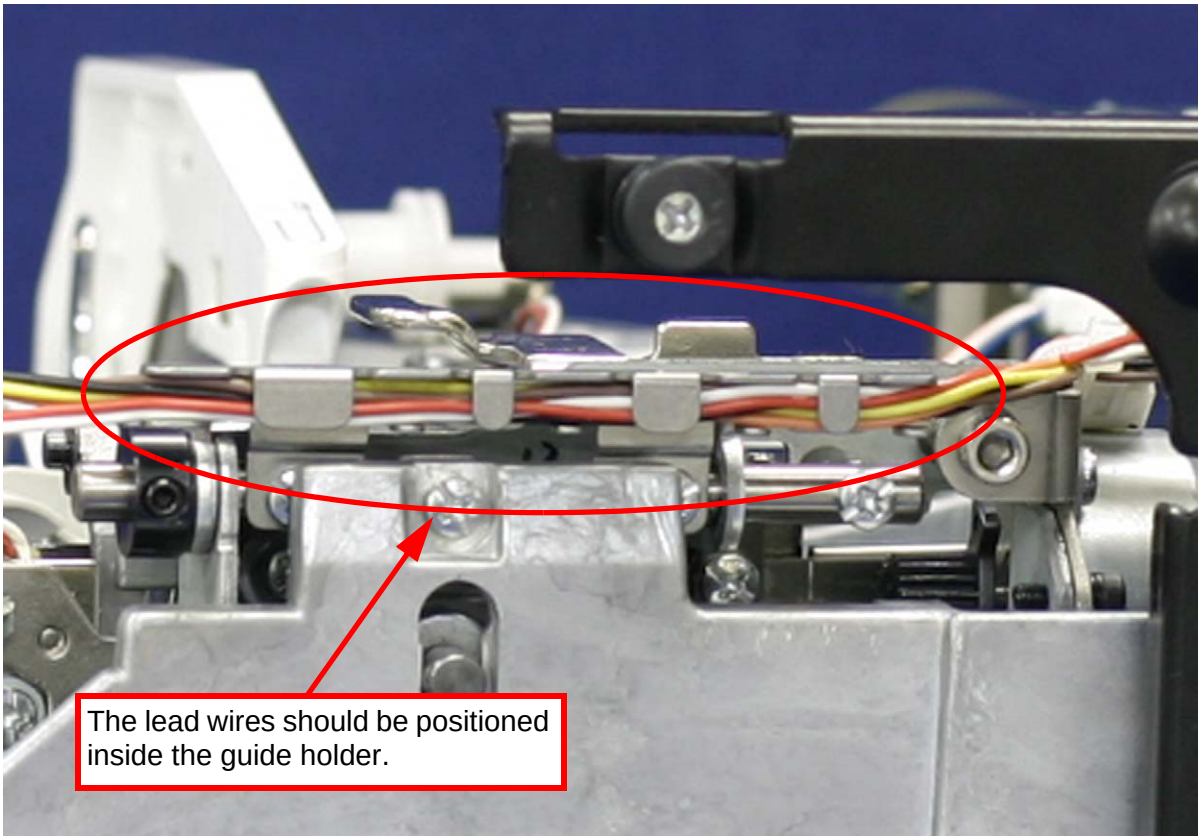


2. Wiring on right side of feed/rotary hook module



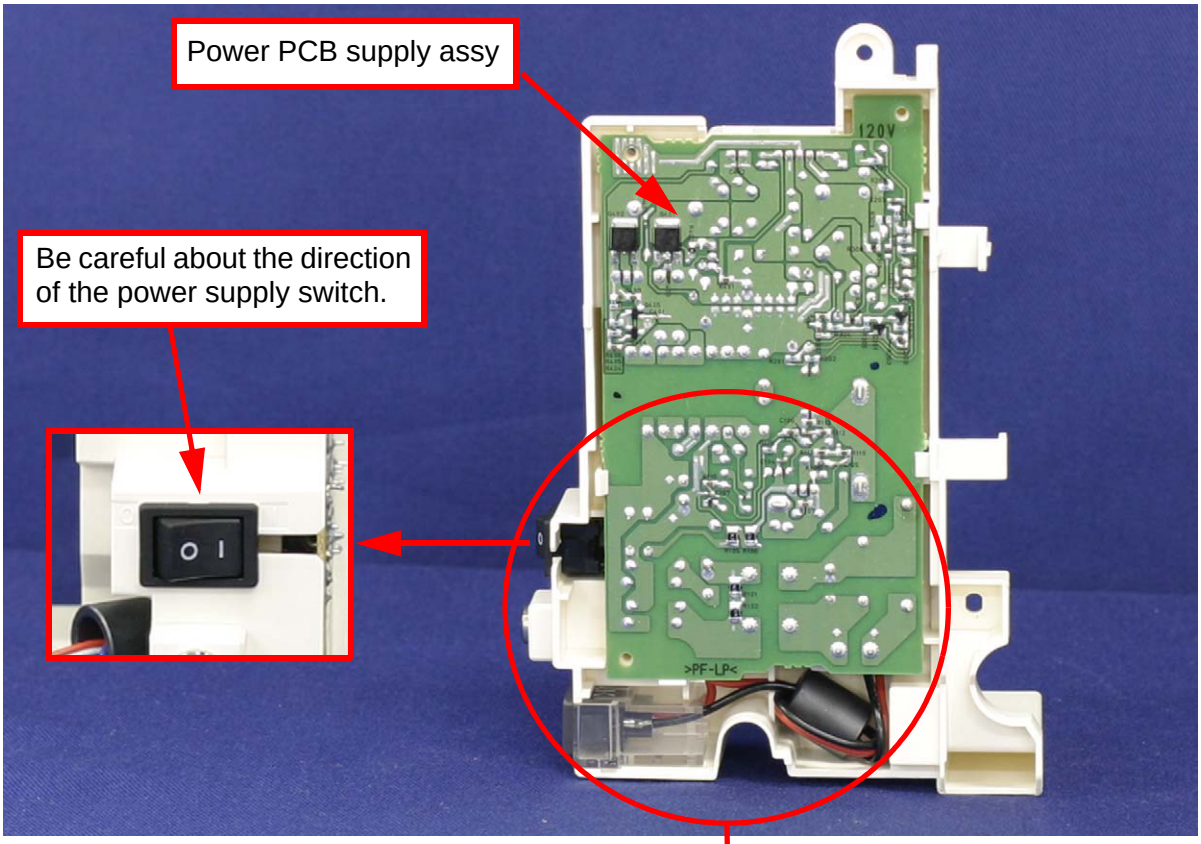
Special Instructions of Wiring

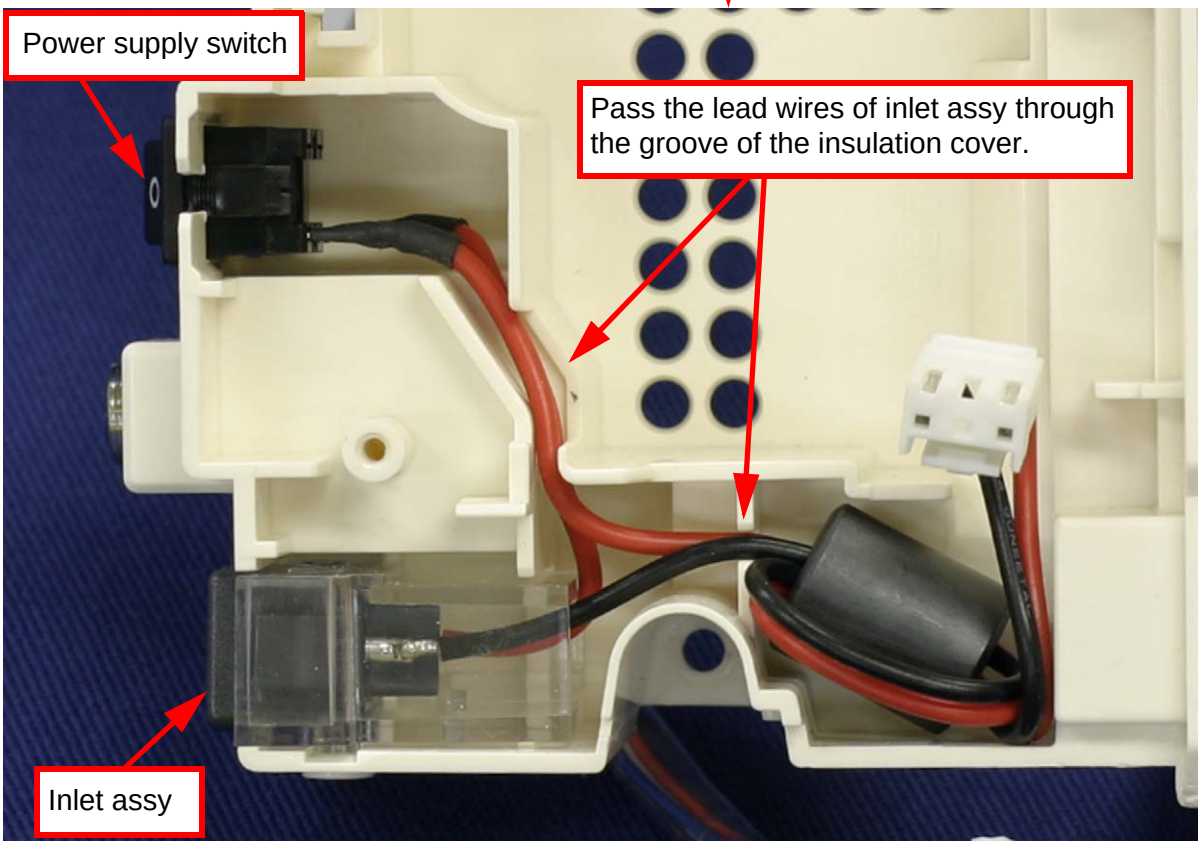
3. Wiring on back side of feed/rotary hook module



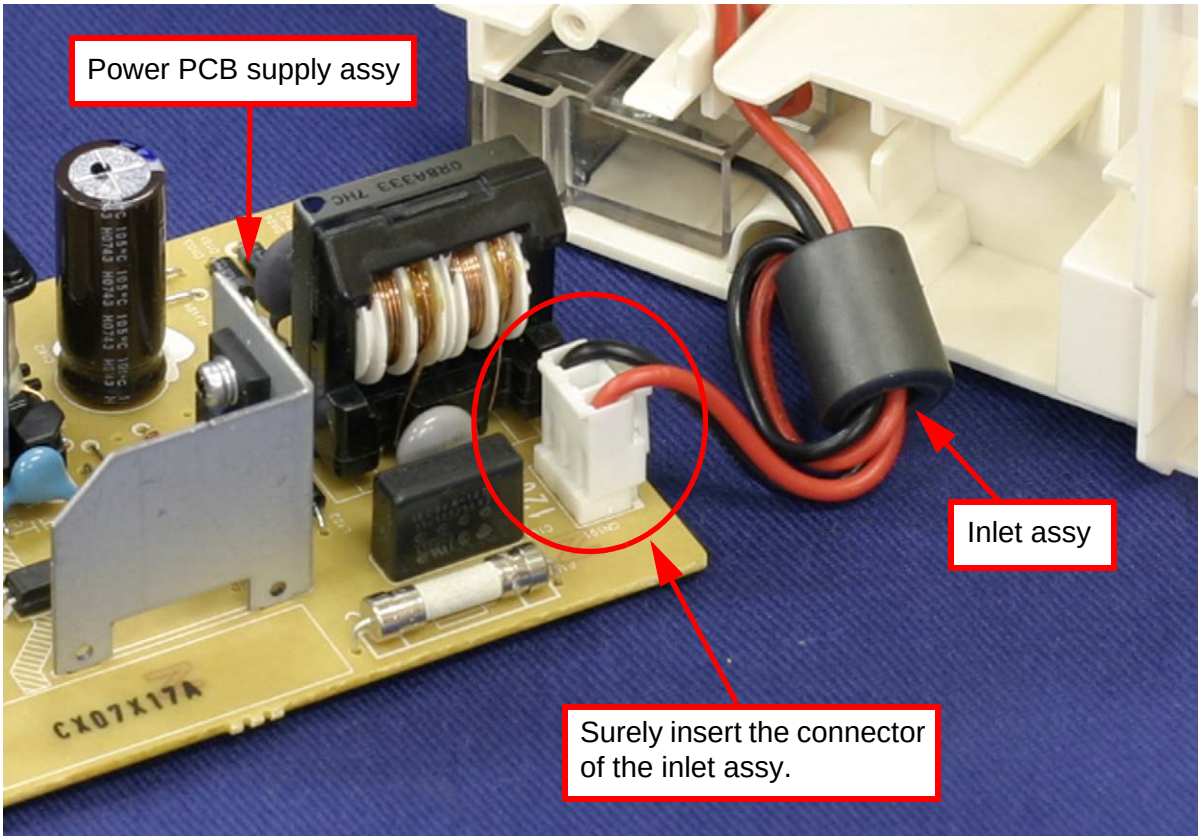
Special Instructions of Wiring

1. Wiring of inlet assy lead wires

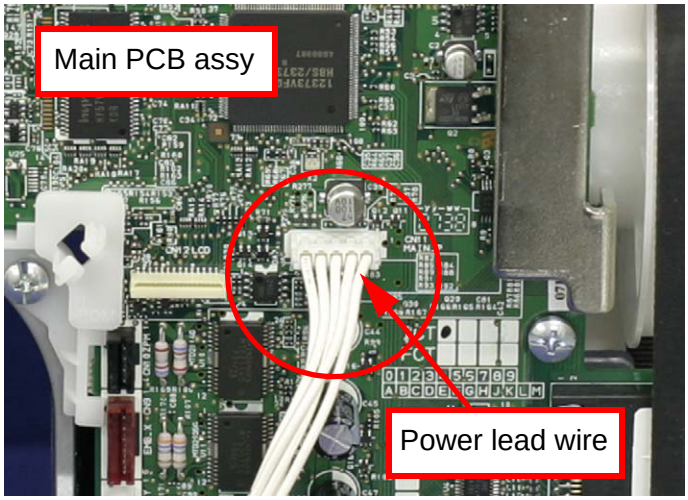




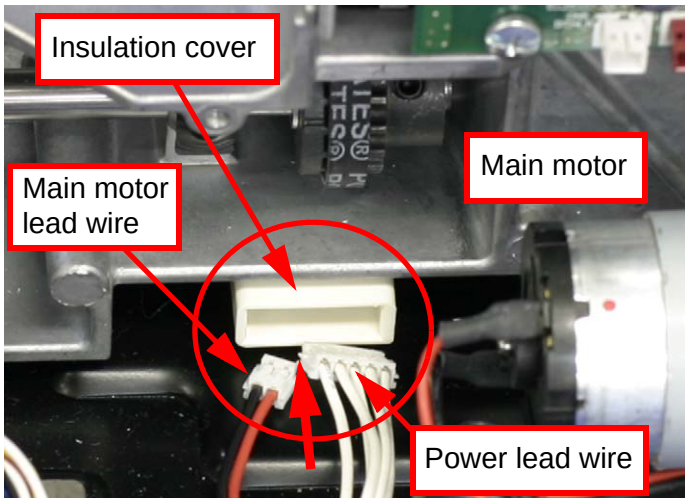
2. Wiring of power PCB supply assy and inlet assy lead wires.



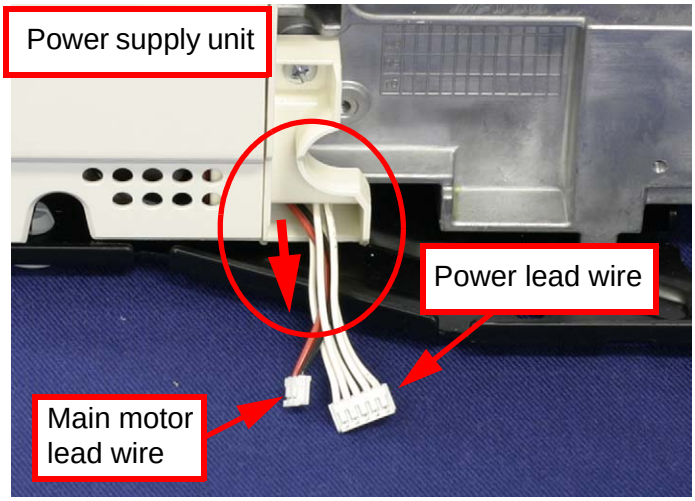
3. Wiring of power lead wire and main motor lead wire



1. Insert the connector of the power lead wire into the connector of the main PCB assy.



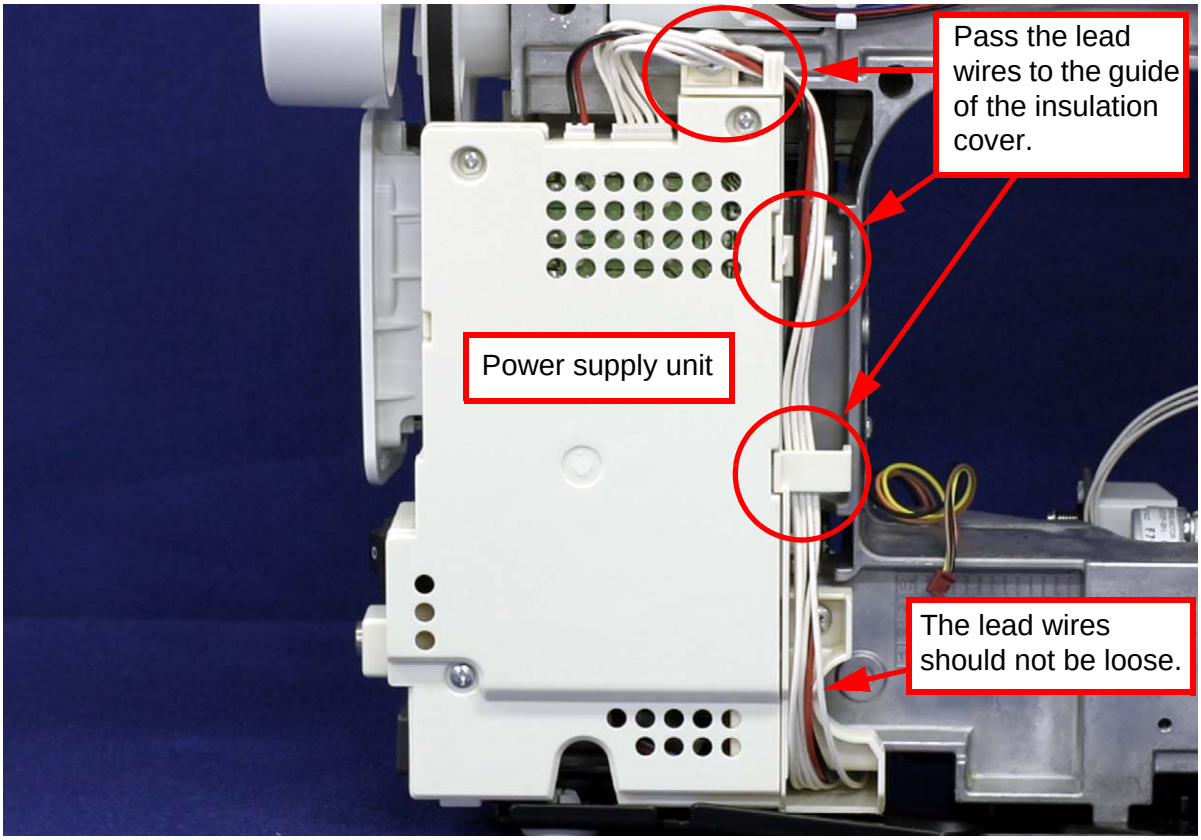
2. Pass the power lead wire and the main motor lead wire to the hole of the insulation cover.



3. Pull out the power lead wire and the main motor lead wire from the hole of the insulation cover.

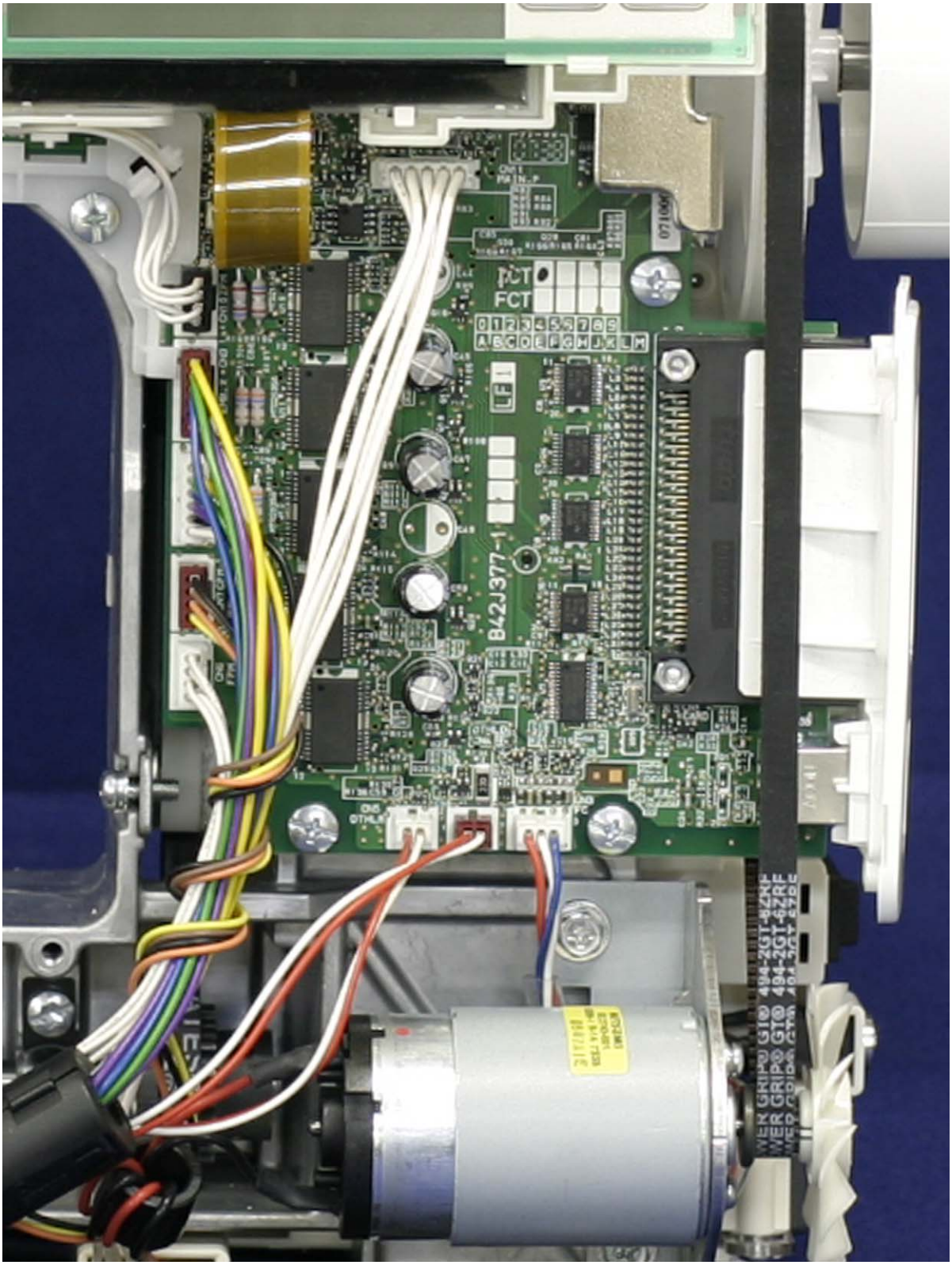
Special Instructions of Wiring

4. Wiring of the main motor lead wire and power lead wire

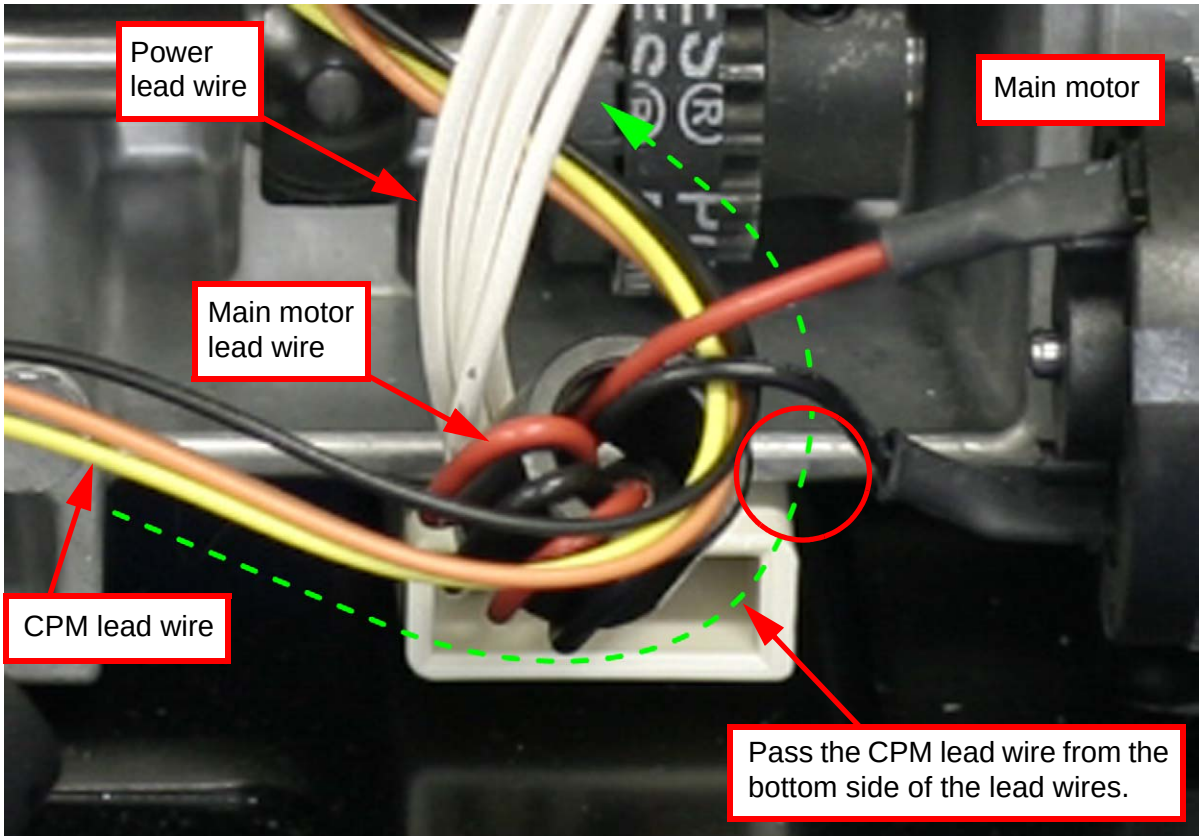


Special Instructions of Wiring

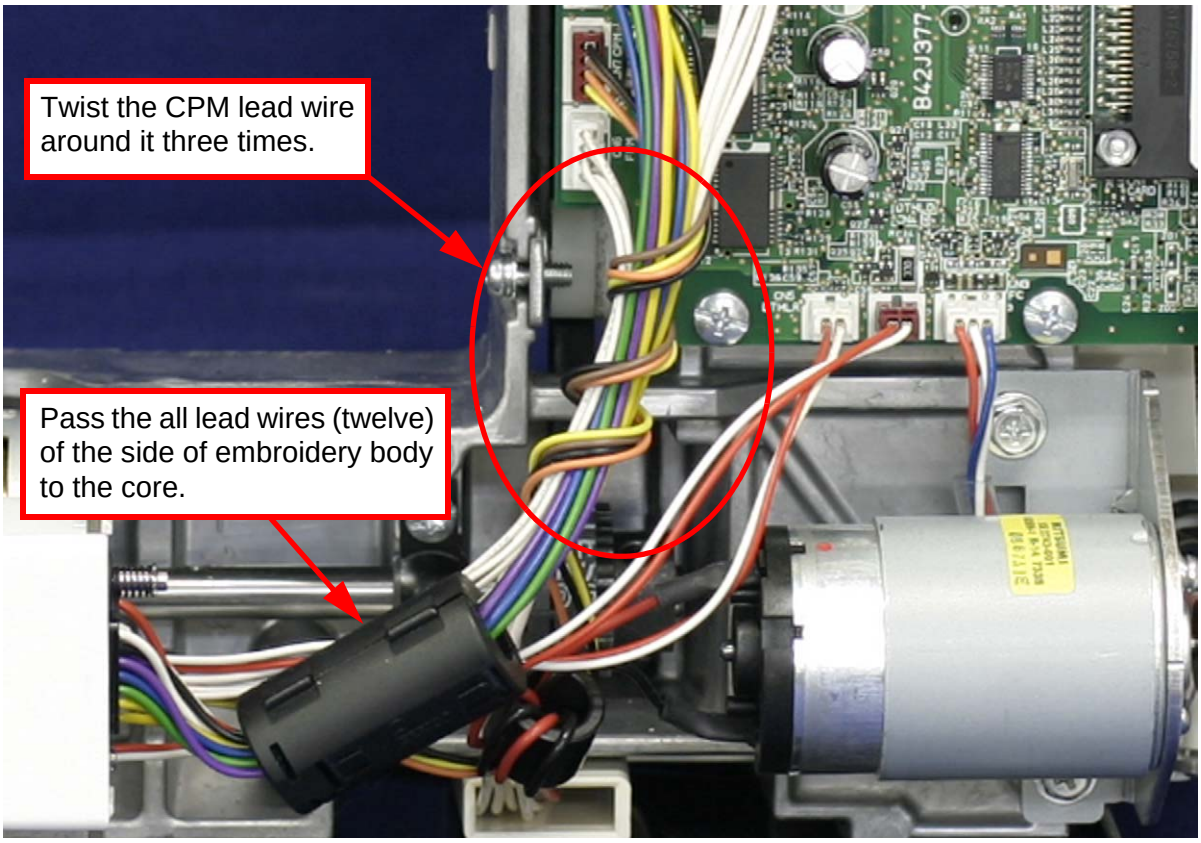
1. Front side of main PCB assy



2. Wiring of main motor lead wire and CPM lead wire

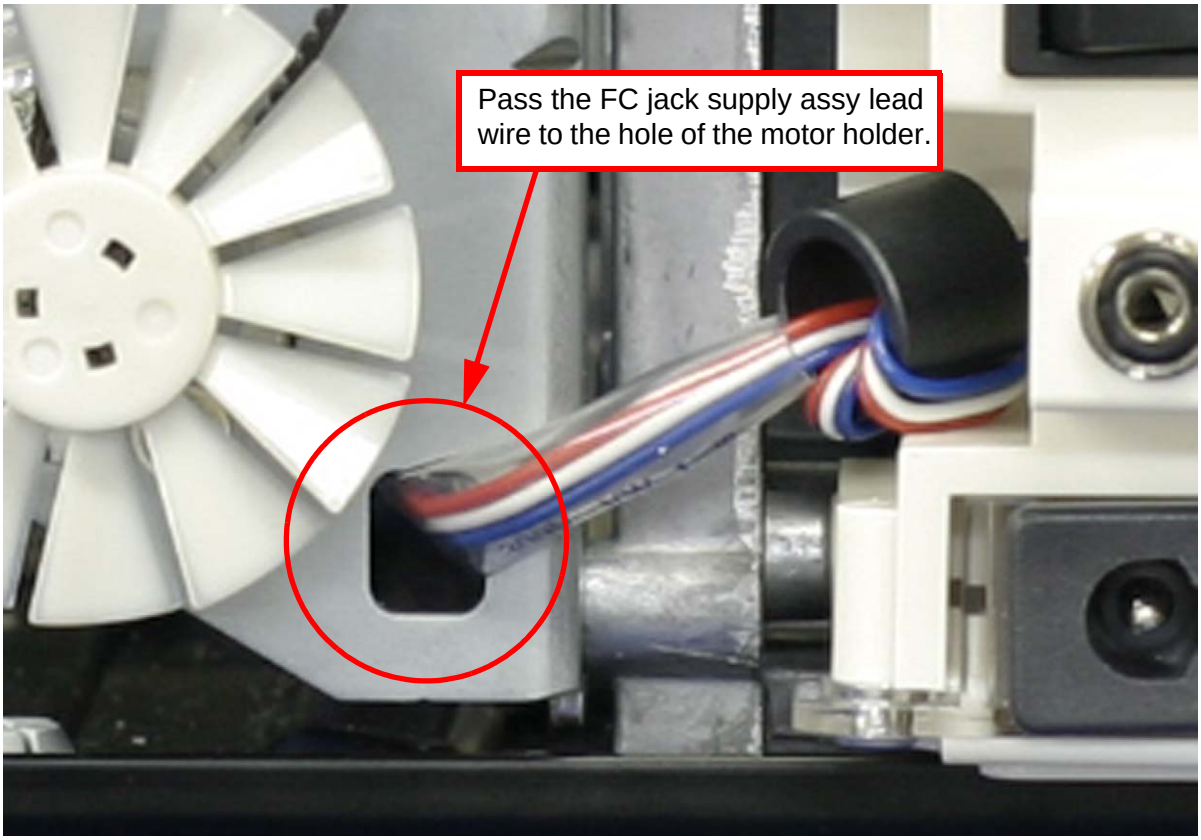


3. Lower side of main PCB assy

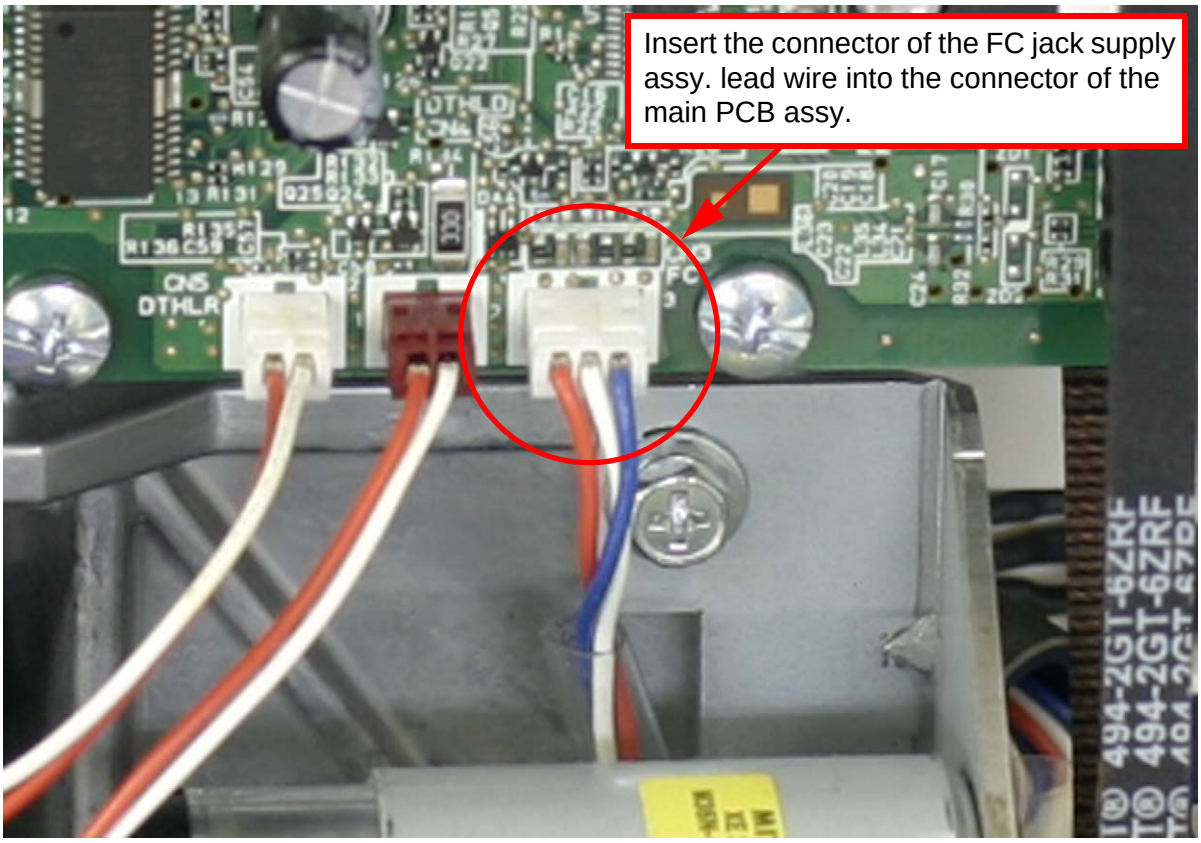


Special Instructions of Wiring

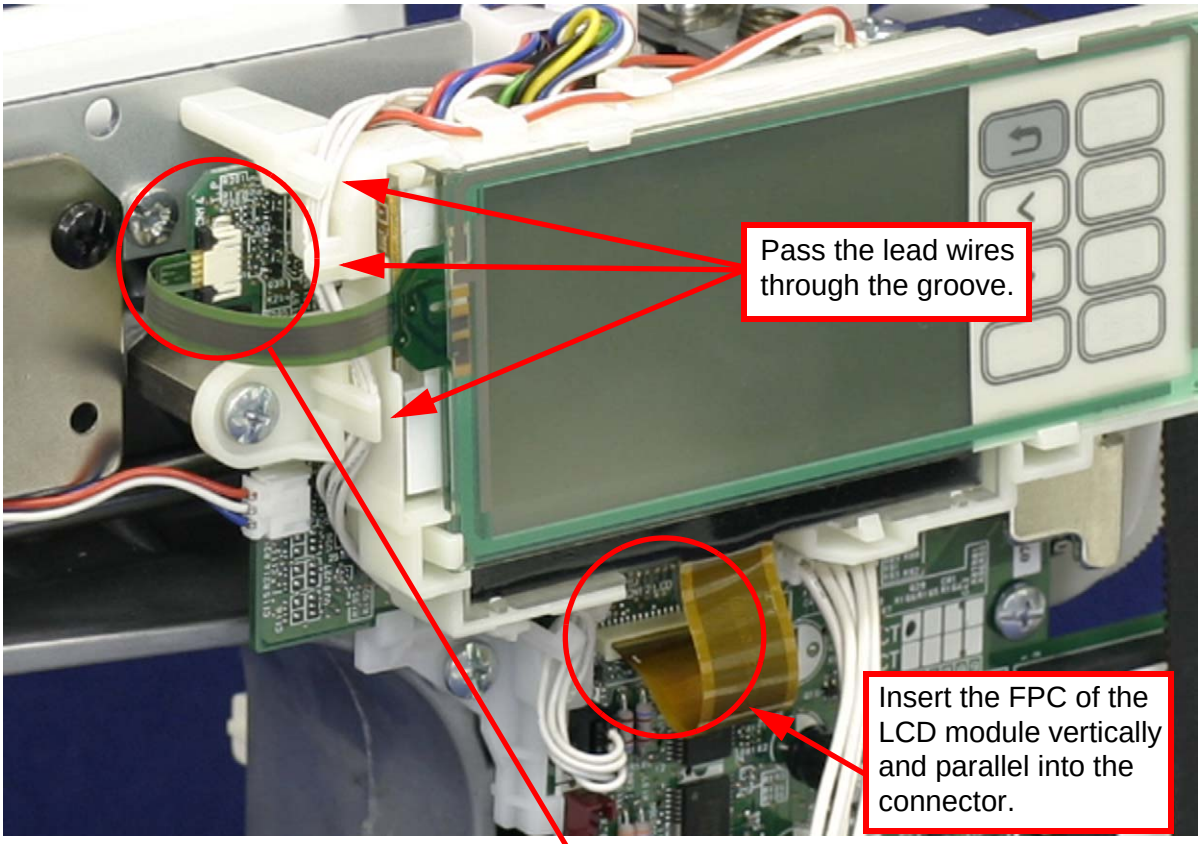
4. Right side of main motor (Wiring of FC jack supply assy lead wire)



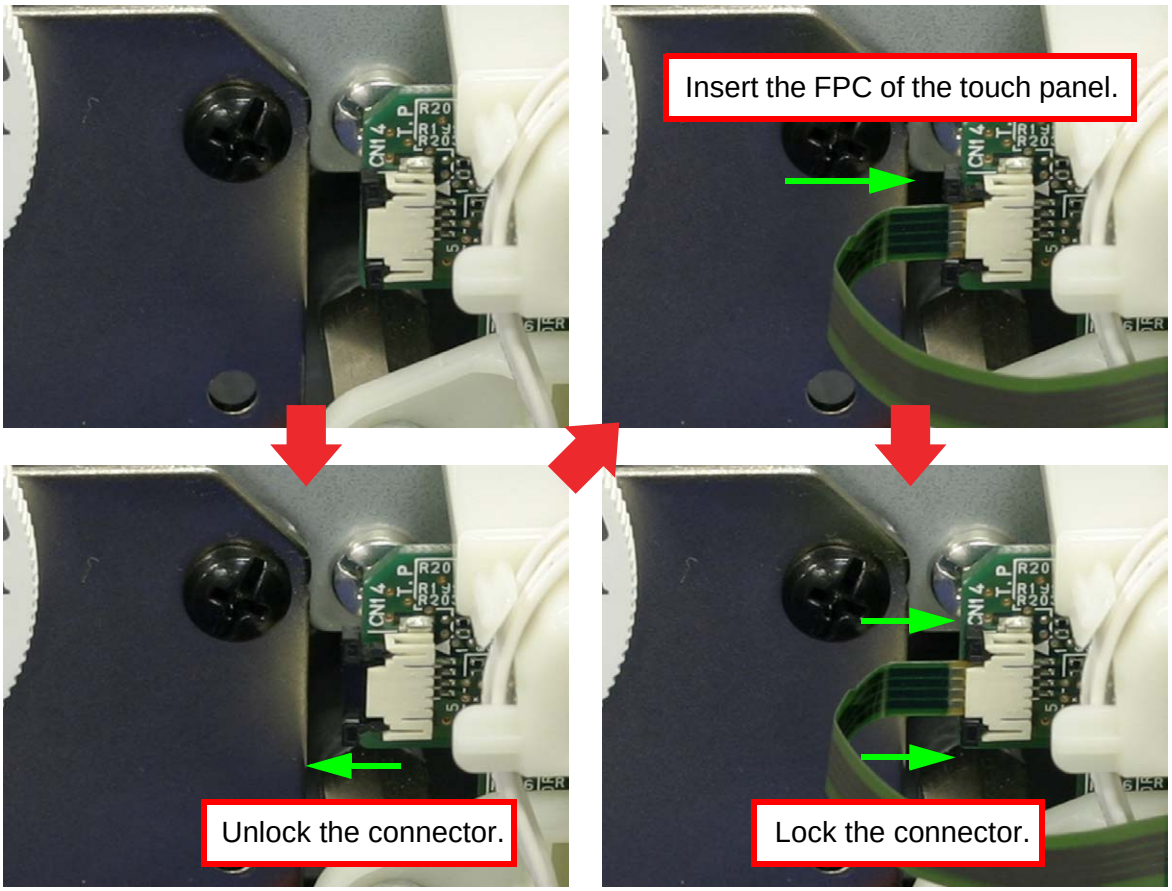
5. Lower side of main motor (Wiring of FC jack supply assy lead wire)



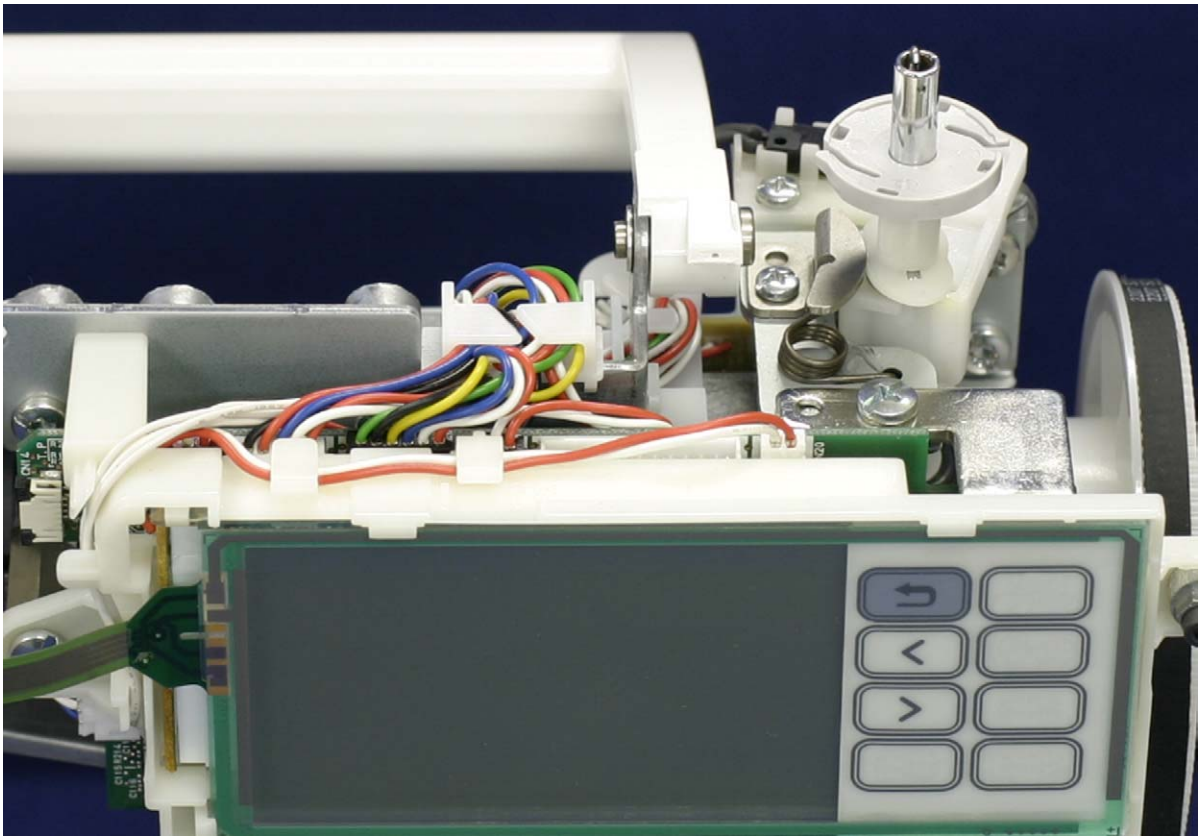
6. Upper side of main PCB assy (Right side of LCD unit)



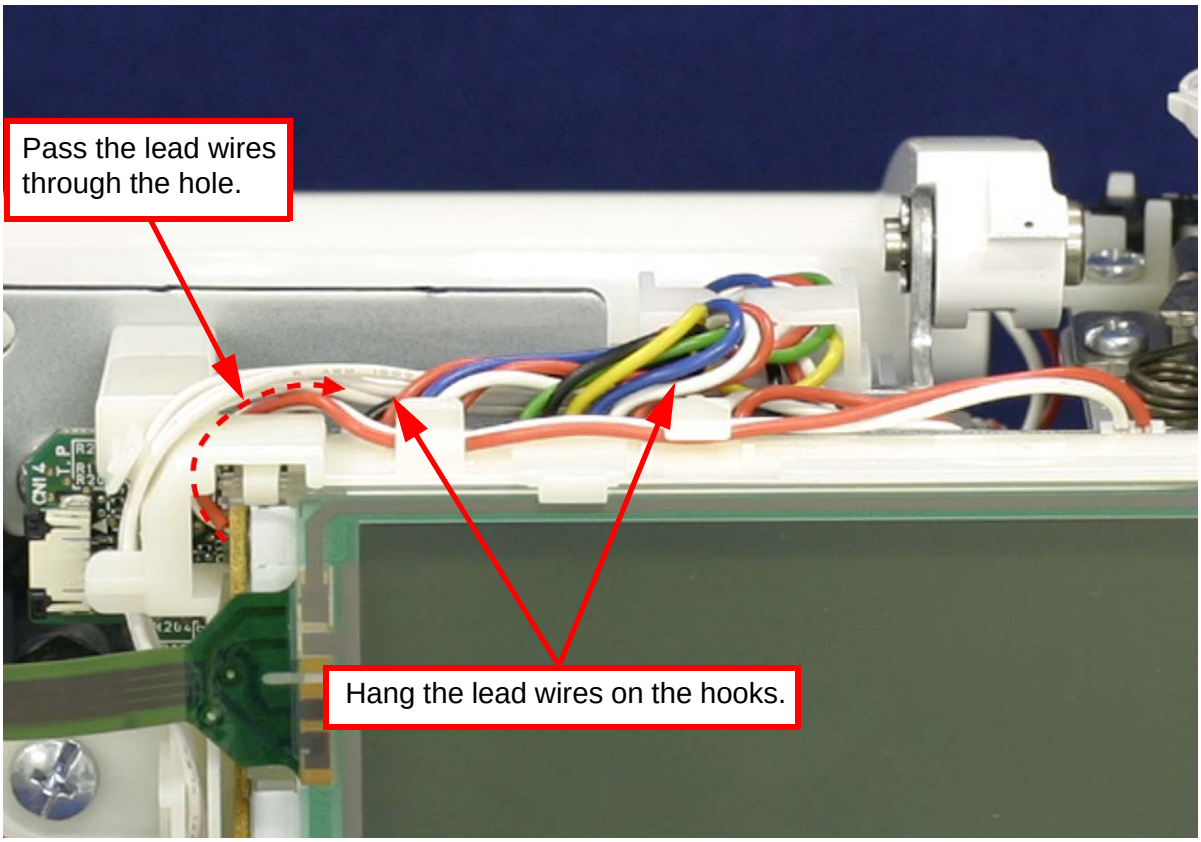
7. Wiring of FPC of touch panel



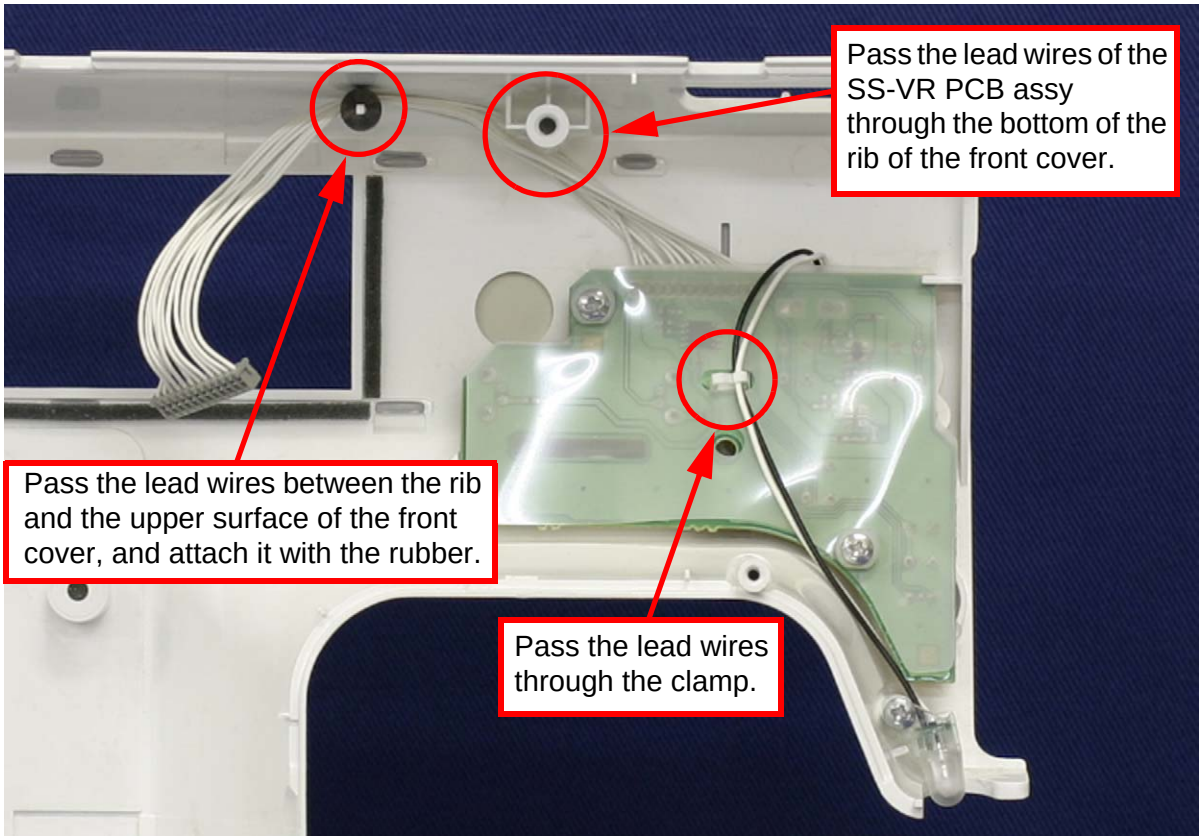
8. Upper side of main PCB (Upper side of LCD unit)



9. Wiring of LCD module lead wire

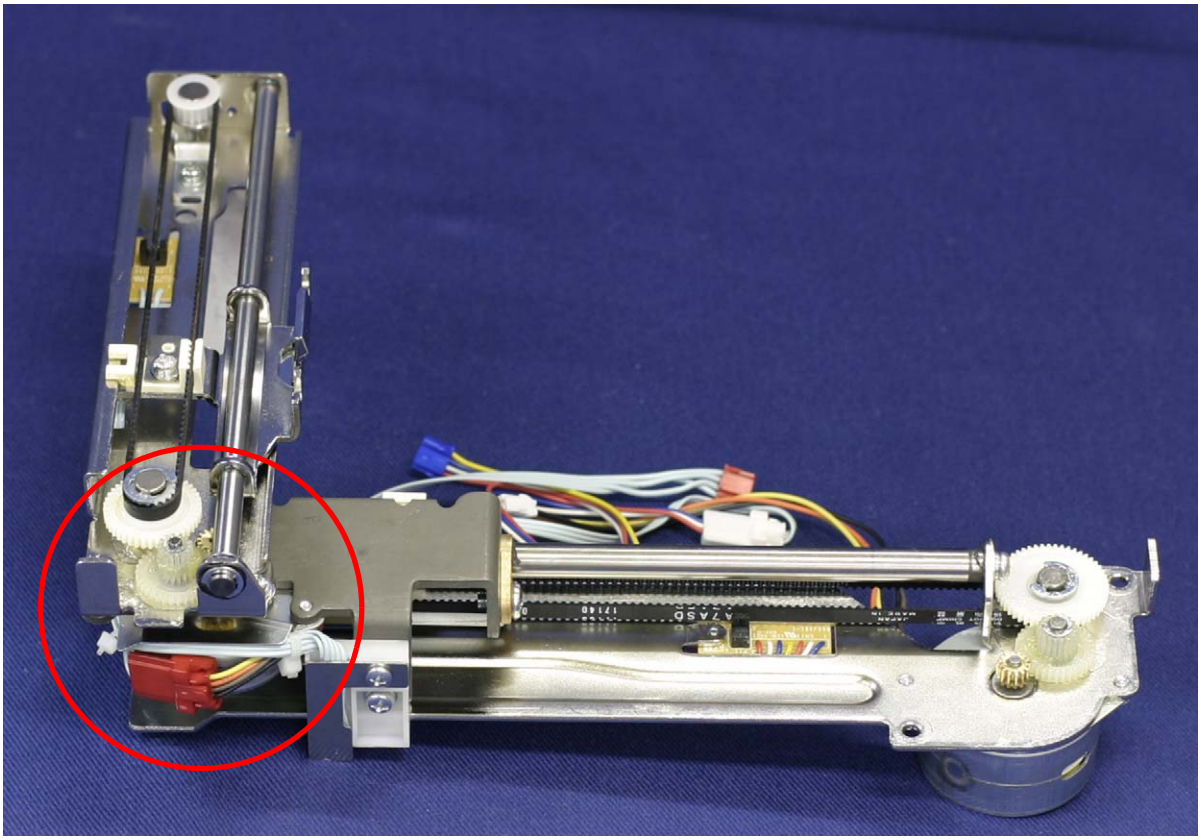


1. Inside of front cover

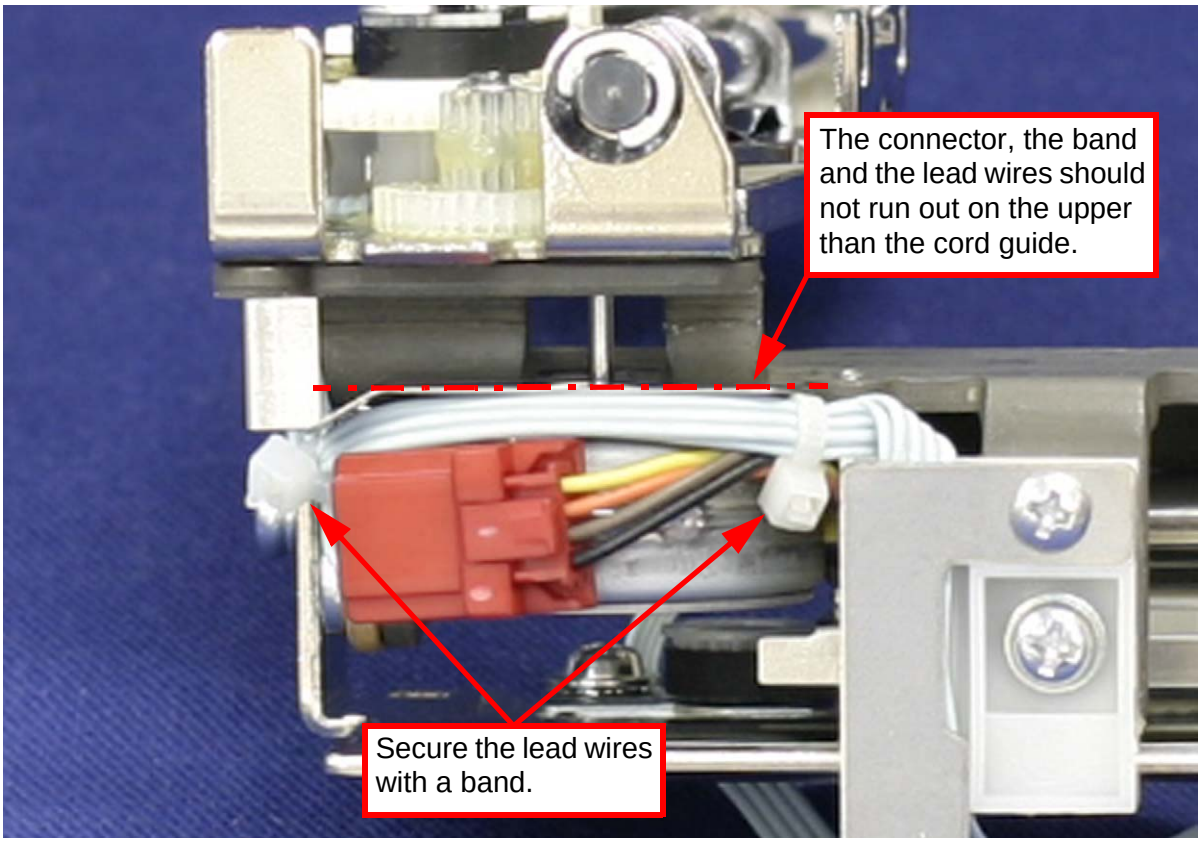


Special Instructions of Wiring

1. Upper surface of carriage

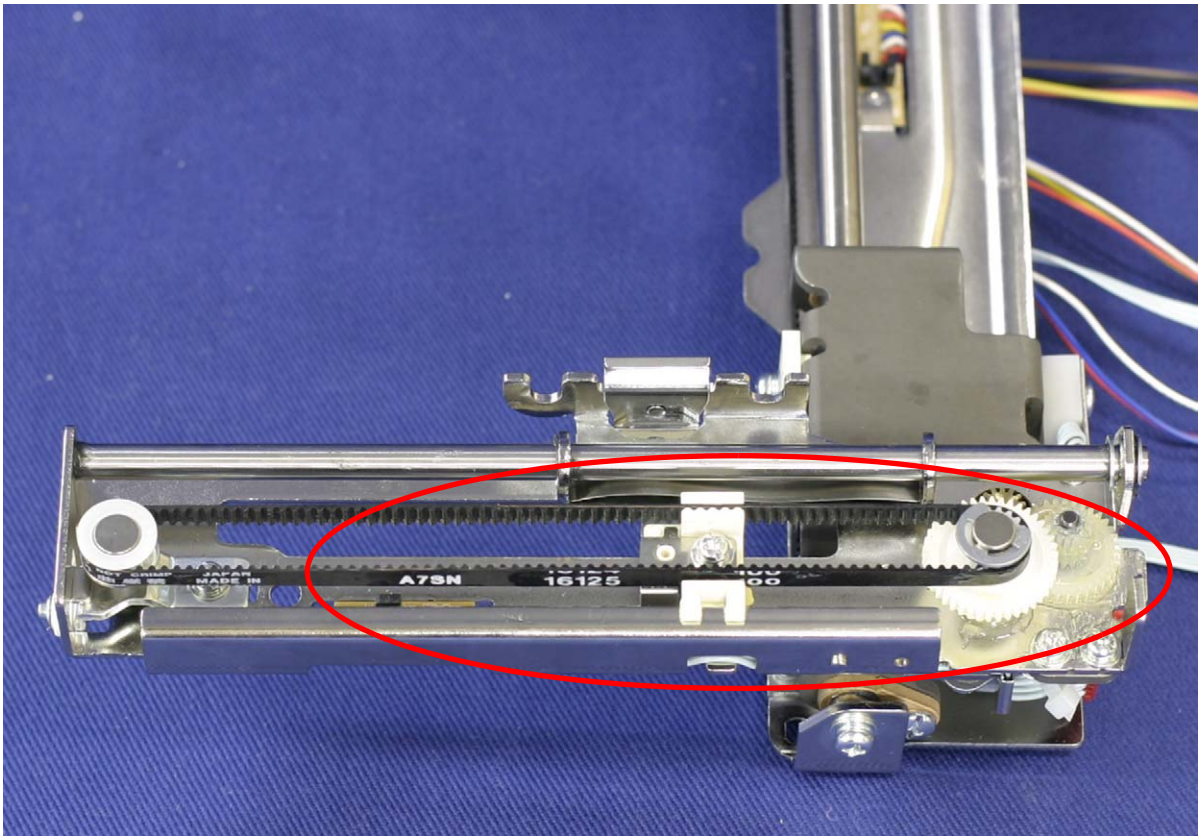


2. Around the Y pulse motor

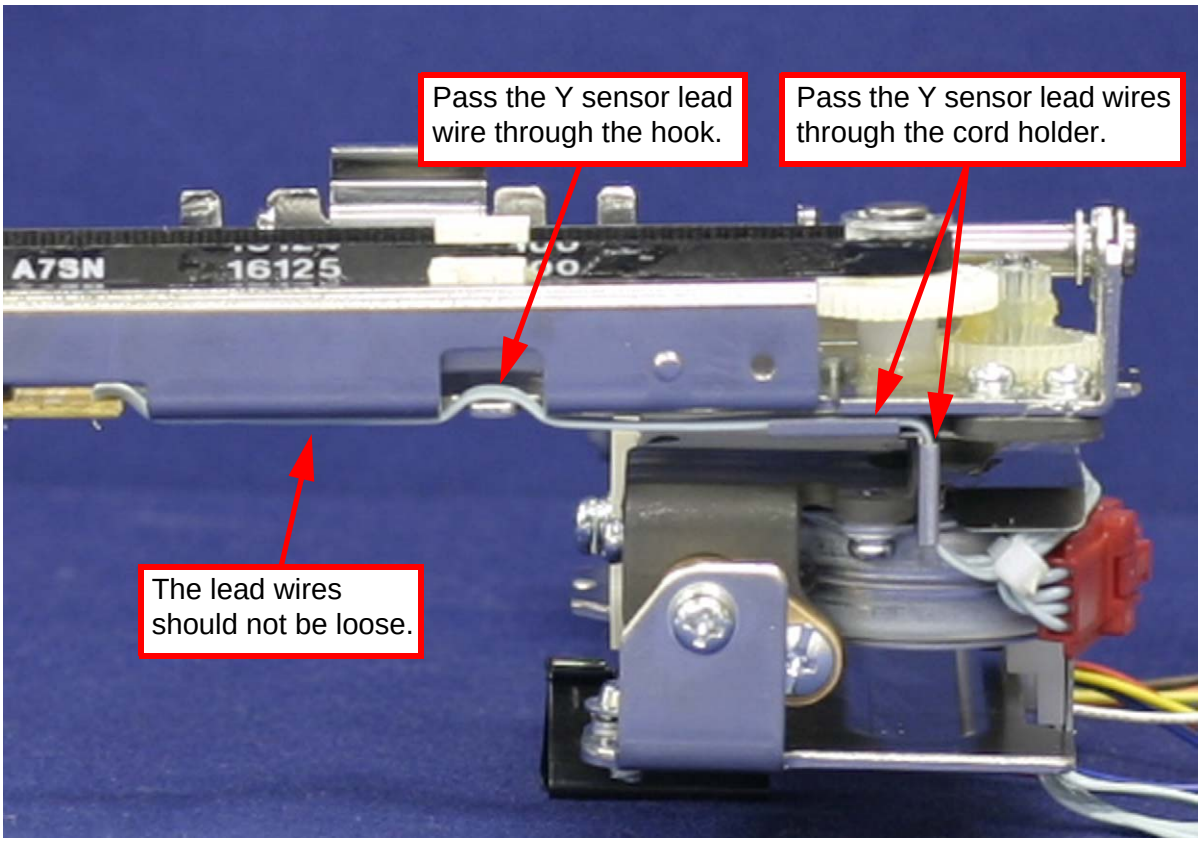


Special Instructions of Wiring

3. Upper surface of carriage

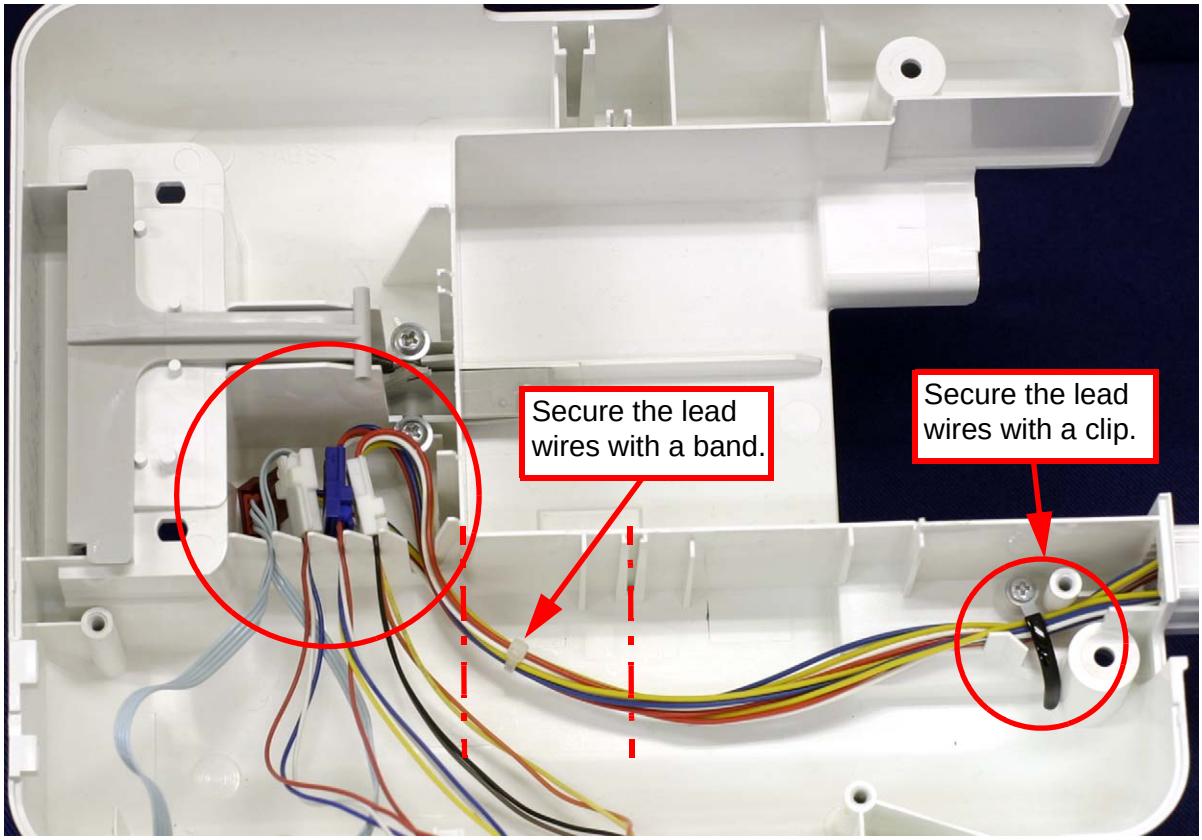


4. Wiring of Y sensor lead wire

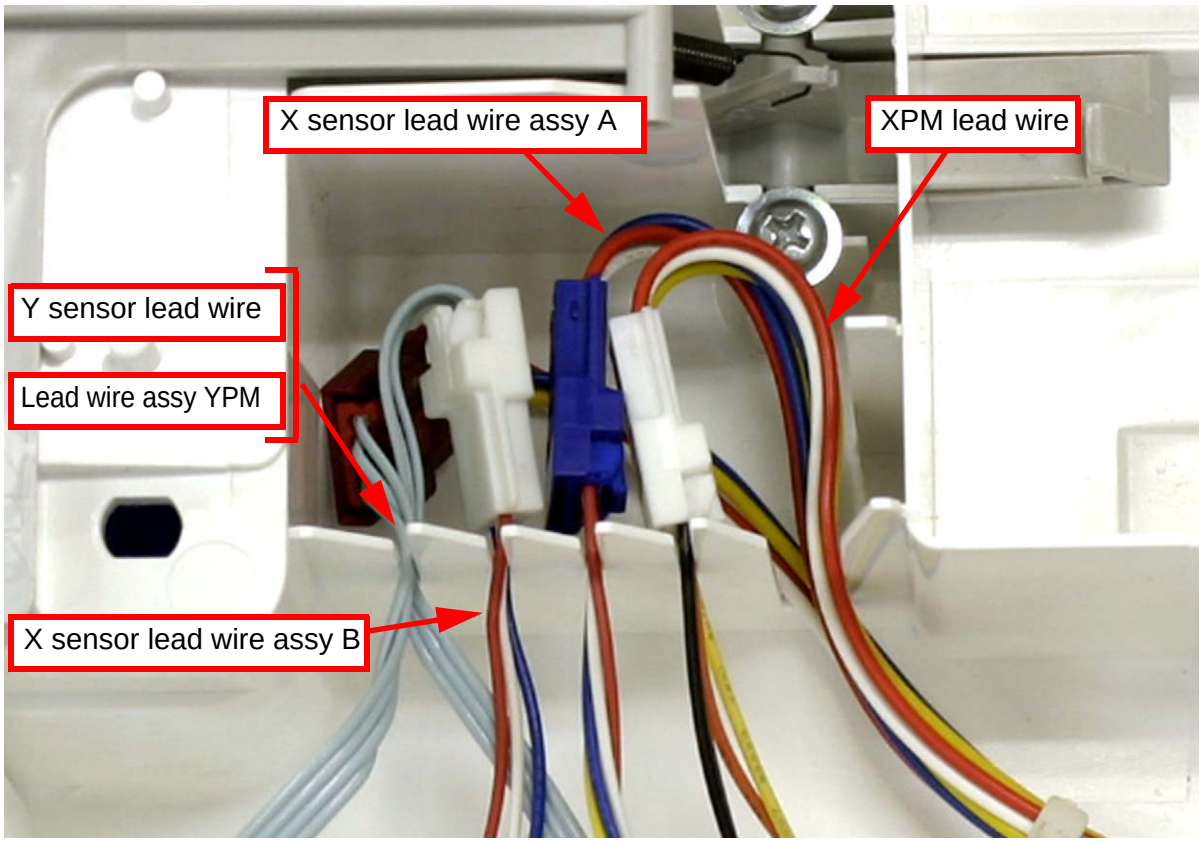


Special Instructions of Wiring

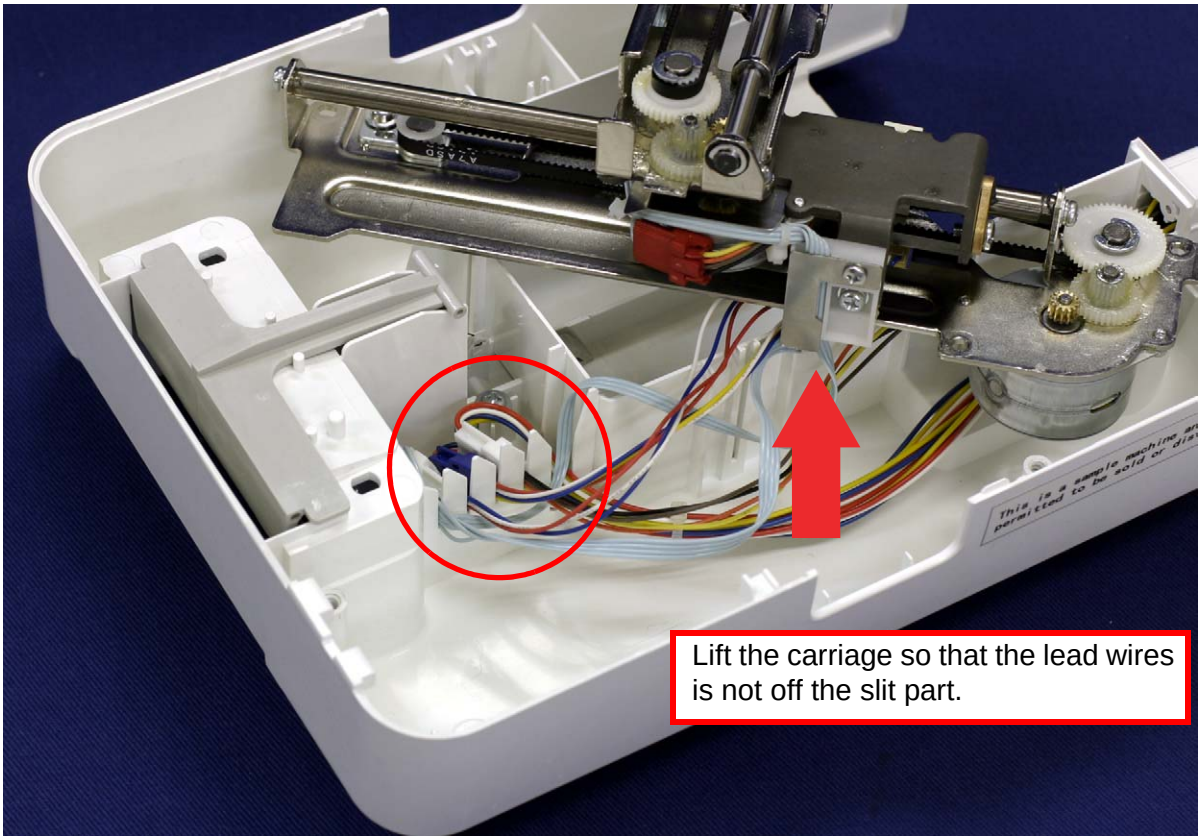
5. Inside of ES cover D



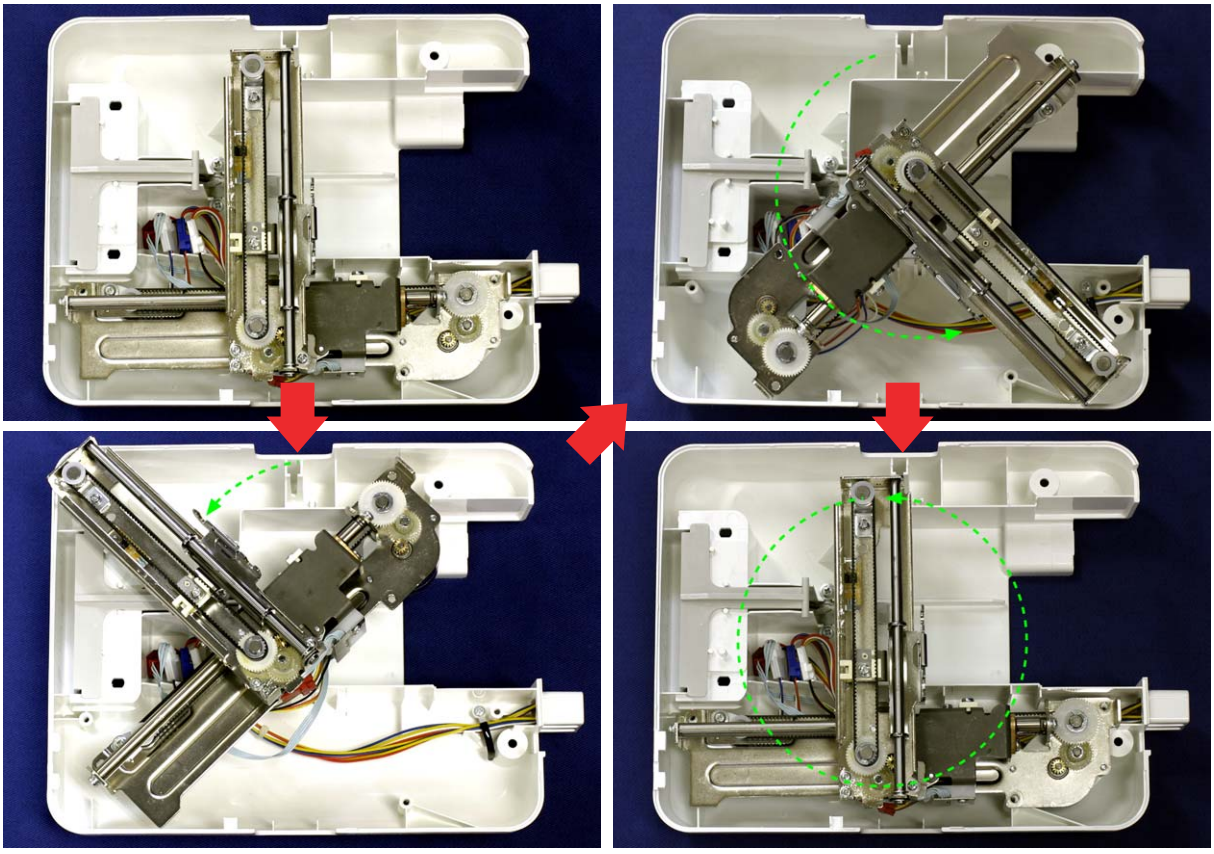
6. Slit part of ES cover D

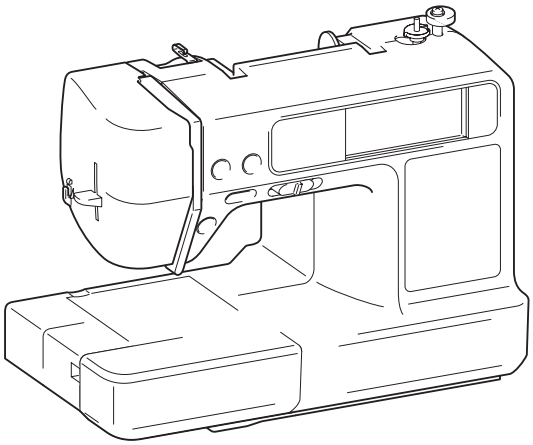


7. Wiring of carriage



Turn the carriage 360 degrees counterclockwise. (Stop the harness spread.)





NV950D/NV950/NV955
NV980

04C10HF885V95/V97