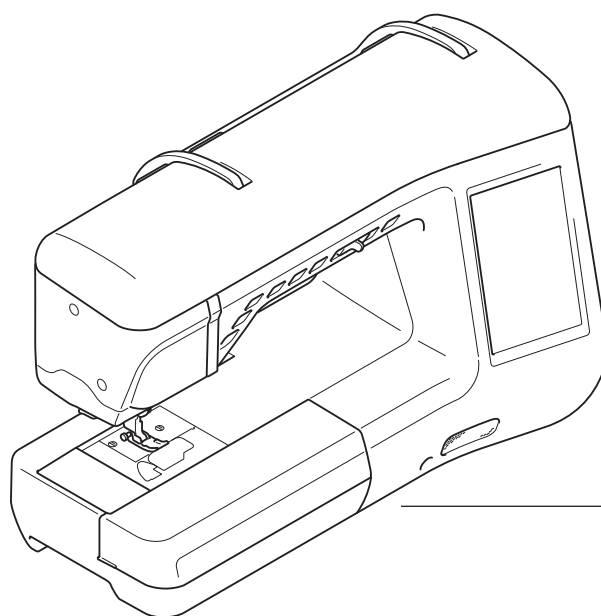


Home Sewing Machine

SERVICE MANUAL

MODEL :

BLTY/BLJY/BLAE



CONFIDENTIAL

Published : Oct.,2012
Revised : May,2019

GENERAL INFORMATION

This service manual has been compiled for explaining repair procedures of this MODEL.

This was produced based on up-to-date product specifications at the time of issue, but there may have been changes of specifications for the purpose of improvements.

Contact manufacturer or local sales company for information concerning such changes.

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

1. Do the adjustment and the repair according to operation procedure of this service manual.
2. When you attach or remove parts, turn off a power switch and then pull out a power supply plug from outlet.
3. When you replace parts, use regular parts.
4. Do not remodel a sewing machine.
5. Always use earth band when handling printed circuit boards to exclude damage of printed circuit boards by static electricity.
6. Pack printed circuit boards in antistatic packaging and avoid subjecting them to any form 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
Dec.,2012	-	Changed 3-69,3-141,4-3,4-5,4-7,4-8,4-12,6-2,7-12 Added 4-9
Dec.,2012	-	Correction of some typographical errors
Jun.,2013	BLJY	-
Jul.,2014	-	Added 3-92 to 94, 193 to 195, 7-28
Oct.,2015	-	Added 4-41 to 4-54
May,2018	-	Changed 4-15
Jan.,2019	-	Changed ix to x
May,2019	BLAE	-

REGULATION ix

SAFETY INFORMATION xi

1. Outline of Mechanism 1 - 1

Main mechanisms 1 - 2

Driveline 1 - 3

Positions of electronic components 1 - 5

Control system block diagram 1 - 7

Layout for PCB connectors 1 - 8

Operation of other electronic components 1 - 10

2. Basic of Disassembly/Assembly 2 - 1

Disassembly

Preparation 2 - 2

 Disconnecting cables and removing accessories 2 - 2

Main frame and covers 2 - 3

 Removal of Top cover unit assy and Accessory table assy 2 - 4

 Removal of Needle plate B assy, Free arm cover and Free arm front cover assy 2 - 5

 Removal of Face plate assy and Front thread guard cover 2 - 6

 Removal of Belt cover 2 - 7

 Removal of Bobbin winder unit cover assy 2 - 8

 Removal of Front cover assy 2 - 9

 Removal of Rear cover assy 2 - 10

 Removal of Free arm plate and Base plate cover 2 - 11

 Removal of Knee lifter assembly, Connector holder assy and UW pen connector PCB assy 2 - 12

 Removal of LED PCB holder A/B 2 - 13

 Removal of Upper unit relay PCB assy 2 - 14

Electric parts and Main motor unit 2 - 15

 Removal of Main PCB assy 2 - 16

 Removal of Main motor assembly 2 - 17

 Removal of Power unit 2 - 18

 Removal of Spiral tube 2 - 19

 Removal of Extension IF PCB assy 2 - 20

Needle threading mechanism 2 - 21

 Removal of LED lamp holder L assy 2 - 22

 Removal of Thread unit assy 2 - 23

Lower driving mechanism 2 - 24

 Removal of Side feed assy 2 - 25

 Removal of Drop unit assy, Feed module and Thread cutter module 2 - 26

 Removal of Lower shaft A assy 2 - 27

LED lamp / Upper driving mechanism 2 - 28

 Removal of Tension pulley assy 2 - 29

 Removal of Upper shaft cover 2 - 30

 Removal of Upper shaft assy 2 - 31

 Removal of Laser module assy 2 - 32

Removal of LED lamp holder R assy	2 - 33
Removal of Thread drive unit assy	2 - 34
Removal of Needle-presser module	2 - 36

Assembly

LED lamp / Upper driving mechanism	2 - 37
Lubrication	2 - 38
Attachment of Needle-presser module	2 - 39
Attachment of Thread drive unit assy	2 - 40
Attachment of LED lamp holder R assy	2 - 42
Attachment of Laser module assy	2 - 43
Attachment of Upper shaft assy	2 - 44
Attachment of Upper shaft cover	2 - 45
Attachment of Tension pulley assy	2 - 46
Lower driving mechanism	2 - 47
Lubrication	2 - 48
Attachment of Lower shaft A assy	2 - 49
Attachment of Thread cutter module, Feed module and Drop unit assy	2 - 50
Attachment of Side feed assy	2 - 51
Needle threading mechanism	2 - 52
Attachment of Thread unit assy	2 - 53
Attachment of LED lamp holder L assy	2 - 54
Electric parts and Main motor unit	2 - 55
Attachment of Extension IF PCB assy	2 - 56
Attachment of Spiral tube	2 - 57
Attachment of Power unit	2 - 58
Attachment of Main motor assembly	2 - 59
Attachment of Main PCB assy	2 - 60
Main frame and covers	2 - 61
Attachment of Upper unit relay PCB assy	2 - 62
Attachment of LED PCB holder A/B	2 - 63
Attachment of UW pen connector PCB assy, Connector holder assy and Knee lifter assembly	2 - 64
Attachment of Base plate cover and Free arm plate	2 - 65
Attachment of Rear cover assy	2 - 66
Attachment of Front cover assy	2 - 67
Attachment of Bobbin winder unit cover assy	2 - 68
Attachment of Belt cover	2 - 69
Attachment of Front thread guard cover and Face plate assy	2 - 70
Attachment of Free arm front cover assy, Free arm cover and Needle plate B assy	2 - 71
Attachment of Accessory table assy and Top cover unit assy	2 - 72

3. Application of Disassembly/Assembly 3 - 1

Disassembly

Main frame and covers	3 - 2
Disassembly of Accessory table assy	3 - 3
Disassembly of Needle plate B assy	3 - 3
Disassembly of Face plate assy	3 - 4
Disassembly of Belt cover	3 - 4
Disassembly of Front cover assy	3 - 5
Removal of VR PCB assy and SV keytop assy	3 - 5
Removal of Threader switch PCB assy, SS PCB assy and Buttons	3 - 6
Removal of Lead wire assy main-panel and Speaker assy	3 - 7

Removal of USB cover, MFFC jack PCB assy and Ground plate USB holder	3 - 8
Removal of Panel PCB assy	3 - 9
Removal of LCD unit assy	3 - 10
Removal of Lamp cover A	3 - 13
Disassembly of Rear cover assy	3 - 14
Disassembly of Connector holder assy	3 - 15
Removal of Sensor connector holder D	3 - 15
Removal of Connecting PCB holder and Extension connector holder U	3 - 16
Removal of Handle assy	3 - 17
Removal of Base plate sub assy	3 - 18
Bobbin winding mechanism	3 - 19
Disassembly of Bobbin winder unit cover assy	3 - 20
Electric parts and main motor unit	3 - 23
Removal of Main PCB holder plate A/B	3 - 24
Disassembly of Main motor assembly	3 - 24
Disassembly of Power unit	3 - 25
Needle threading mechanism	3 - 26
Removal of Thread guide and Thread guard plate B	3 - 27
Removal of Thread guide cover assy	3 - 28
Removal of Uphread PCB assy and Thread guide wire	3 - 29
Removal of Thread guide, AT INIT PCB assy, ATPM sensor plate and Plate assembly	3 - 30
Removal of Thread catching case A/B and Thread cutting shutter	3 - 31
Removal of ATPM insulation assy and Tension release unit	3 - 32
Removal of Thread guide shutter link A/B/C	3 - 33
Lower driving mechanism	3 - 34
Removal of Reversal link assy, Pull link and Reversal link plate assy	3 - 35
Removal of Lead wire guide holder and Needle plate B switch assy	3 - 36
Removal of Joint	3 - 37
Removal of Sheet	3 - 37
LED light / Upper driving mechanism	3 - 38
Disassembly of Upper shaft cover	3 - 39
Disassembly of Upper shaft assy	3 - 39
Disassembly of LED lamp holder L assy	3 - 40
Disassembly of LED lamp holder R assy	3 - 40
Removal of Adjusting screw and Plate spring	3 - 41
Removal of Tension pulley holder B assy	3 - 41
Feed module	3 - 42
Removal of Needle plate A assy, Inner rotary hook assy and Inner rotary hook bracket assy	3 - 43
Removal of Outer rotary hook assy, Feed bar assy and Lock nut	3 - 44
Removal of Vertical feed bush and Drop lever Q	3 - 46
Removal of Lower shaft B assy and Drop assy	3 - 47
Removal of FPM holder assy, F INIT PCB assy and Feed adjuster gear assy	3 - 49
Removal of Feed arm assy and Stopper plate block assy	3 - 51
Thread cutter module	3 - 52
Removal and disassembly of Thread cutter assy	3 - 53
Removal of Thread cutter lever, Photo transistor PCB assy, PF pulse motor assy and Gears	3 - 54
Needle-presser module	3 - 56
Removal of Presser foot holder assy and BH switch assy	3 - 57
Removal of PT holder assembly and PF switch assy	3 - 58
Removal of PFFM insulation assy, PF INIT PCB assy and Presser PM holder	3 - 59
Removal of Presser dial, Presser dial gear and Lock nut	3 - 60

Removal of Adjusting plate assy and Lift lever	3 - 61
Removal of Z INIT PCB assy and Pulse motor Z	3 - 62
Removal of Spring guard and Release guide plate	3 - 63
Removal of Needle bar assy, Needle bar hook stand assy and Needle thread block	3 - 64
Removal of W presser adjust plate, Needle holder block assy, Presser bar support plate and Needle holder block base	3 - 65
Removal of Zigzag adjusting nut	3 - 66
Removal of Springs	3 - 67
Removal of Needle bar supporter assy and Thread guide plate	3 - 68
Removal of Threader hook assy	3 - 69
Removal of Lever AB	3 - 70
Removal of Z zigzag release cam, Z zigzag lever sub assy and Release plate assy	3 - 71
Removal of Needle bar crank rod assy, Thread take-up lever assy, Thread take-up counter weight and Unit shaft	3 - 73
Removal of Thread take-up lever link, Presser bar and Presser bar clamp assy	3 - 74
Embroidery unit	3 - 75
Removal of YPM cover and X carriage cover	3 - 76
Removal of E hoop stay plate assy	3 - 77
Disassembly of E hoop stay plate assy	3 - 78
Removal of ES main cover assy	3 - 79
Removal of EMB relay PCB assy	3 - 80
Removal of ES base cover unit	3 - 81
Removal of X carriage unit	3 - 82
Removal of Y relay PCB assy	3 - 85
Removal of XY pulse motor assy and Y INIT PCB assy	3 - 86
Removal of Flexible flat cable:SML2CD-6 and Hole cover	3 - 87
Removal of Y carriage assy	3 - 89
Removal of Y slider and Timing belt	3 - 90
Disassembly of Main frame assy	3 - 91
Dual feed assy	3 - 92
Disassembly of Dual feed assy	3 - 93
Assembly	
LED light / Upper driving mechanism	3 - 95
Attachment of Tension pulley holder B assy	3 - 96
Attachment of Plate spring and Adjusting screw	3 - 96
Assembly of LED lamp holder R assy	3 - 97
Assembly of LED lamp holder L assy	3 - 97
Assembly of Upper shaft assy	3 - 98
Assembly of Upper shaft cover	3 - 98
Lower driving mechanism	3 - 99
Attachment of Sheet	3 - 100
Attachment of Joint	3 - 100
Attachment of Needle plate B switch assy and Lead wire guide holder	3 - 101
Attachment of Reversal link plate assy, Pull link and Reversal link assy	3 - 102
Needle threading mechanism	3 - 103
Lubrication	3 - 104
Attachment of Thread guide shutter link A/B/C	3 - 105
Attachment of Tension release unit and ATPM insulation assy	3 - 106
Attachment of Thread cutting shutter and Thread catching case A/B	3 - 107
Attachment of Plate assembly, ATPM sensor plate, AT INIT PCB assy and Thread guide	3 - 108
Attachment of Thread guide wire and Upthread PCB assy	3 - 109
Attachment of Thread guide cover assy	3 - 110
Attachment of Thread guard plate B and Thread guide	3 - 111

Electric parts and main motor unit	3 - 112
Assembly of Power unit	3 - 113
Assembly of Main motor assembly	3 - 113
Attachment of Main PCB holder plate A/B	3 - 114
Bobbin winding mechanism	3 - 115
Assembly of Bobbin winder unit cover assy	3 - 116
Main frame and covers	3 - 119
Attachment of Base plate sub assy	3 - 120
Attachment of Handle assy	3 - 121
Attachment of Extension connector holder U and Connecting PCB holder	3 - 122
Attachment of Sensor connector holder D	3 - 123
Assembly of Connector holder assy	3 - 123
Assembly of Rear cover assy	3 - 124
Assembly of Front cover assy	3 - 125
Attachment of Lamp cover A	3 - 125
Attachment of LCD unit assy	3 - 126
Attachment of Panel PCB assy	3 - 129
Attachment of Ground plate USB holder, MFFC jack PCB assy and USB cover	3 - 130
Attachment of Speaker assy and Lead wire assy main-panel	3 - 131
Attachment of Buttons, SS PCB assy and Threader switch PCB assy	3 - 132
Attachment of SV keytop assy and VR PCB assy	3 - 133
Assembly of Belt cover	3 - 134
Assembly of Face plate assy	3 - 134
Assembly of Needle plate B assy	3 - 135
Assembly of Accessory table assy	3 - 135
Needle-presser module	3 - 136
Lubrication	3 - 137
Attachment of Presser bar clamp assy, Presser bar and Thread take-up lever link	3 - 139
Attachment of Unit shaft, Thread take-up counter weight, Thread take-up lever assy and Needle bar crank rod assy	3 - 140
Attachment of Release plate assy, Z zigzag lever sub assy and Z zigzag release cam	3 - 141
Attachment of Lever AB	3 - 143
Attachment of Threader hook assy	3 - 144
Attachment of Thread guide plate and Needle bar supporter assy	3 - 145
Attachment of Springs	3 - 146
Attachment of Zigzag adjusting nut	3 - 147
Attachment of Needle holder block base, Presser bar support plate, Needle holder block assy and W presser adjust plate	3 - 148
Attachment of Needle thread block, Needle bar hook stand assy and Needle bar assy	3 - 149
Attachment of Release guide plate and Spring guard	3 - 150
Attachment of Pulse motor Z and Z INIT PCB assy	3 - 151
Attachment of Lift lever and Adjusting plate assy	3 - 152
Attachment of Lock nut, Presser dial gear and Presser dial	3 - 153
Attachment of Presser PM holder, PF INIT PCB assy and PFPM insulation assy	3 - 154
Attachment of PF switch assy and PT holder assembly	3 - 155
Attachment of BH switch assy and Presser foot holder assy	3 - 156
Thread cutter module	3 - 157
Lubrication	3 - 158
Attachment of Gears, PF pulse motor assy, Photo transistor PCB assy and Thread cutter lever ..	3 - 159
Assembly and Attachment of Thread cutter assy	3 - 161
Feed module	3 - 162
Lubrication	3 - 163
Attachment of Stopper plate block assy and Feed arm assy	3 - 165

Attachment of Feed adjuster gear assy, F INIT PCB assy and FPM holder assy	3 - 166
Attachment of Drop assy and Lower shaft B assy	3 - 168
Alignment of Feed adjuster gear assy and F initial shutter position	3 - 170
Attachment of Drop lever Q and Vertical feed bush	3 - 171
Attachment of Lock nut, Feed bar assy and Outer rotary hook assy	3 - 172
Attachment of Inner rotary hook bracket assy, Inner rotary hook assy and Needle plate A assy	3 - 174
Embroidery unit	3 - 175
Lubrication	3 - 176
Assembly of Main frame assy	3 - 177
Attachment of Timing belt and Y slider	3 - 178
Attachment of Y carriage assy	3 - 179
Attachment of Hole cover and Flexible flat cable:SML2CD-6	3 - 180
Attachment of Y INIT PCB assy and XY pulse motor assy	3 - 182
Attachment of Y relay PCB assy	3 - 183
Attachment of X carriage unit	3 - 184
Attachment of ES base cover unit	3 - 187
Attachment of EMB relay PCB assy	3 - 188
Attachment of ES main cover assy	3 - 189
Assembly of E hoop stay plate assy	3 - 190
Attachment of E hoop stay plate assy	3 - 191
Attachment of X carriage cover and YPM cover	3 - 192
Dual feed assy	3 - 193
Assembly of Dual feed assy	3 - 194
4. Adjustment	4 - 1
Needle point damage	4 - 2
Start test mode (with front cover)	4 - 3
Contents	4 - 4
Touch panel	4 - 10
Timing belt tension	4 - 11
Timing belt and belt support upper/lower clearance	4 - 12
Motor belt tension	4 - 13
Fine tension	4 - 14
Upper thread tension	4 - 15
Upper shaft shutter angle	4 - 16
Upper shaft cover position	4 - 17
Front/back position of needle and presser foot	4 - 18
Left base line needle drop	4 - 19
Needle clearance left/right	4 - 20
Needle bar rising	4 - 21
Needle bar height	4 - 22
Needle clearance	4 - 23
Needle threader	4 - 24
Presser bar height	4 - 25

Fabric thickness setting	4 - 26
Knee lifter position	4 - 27
Feed dog height and parallelism	4 - 28
Front/back and left/right position of feed dog	4 - 30
Feed forward/backward	4 - 31
Side feed straight stitch	4 - 33
One point	4 - 34
BH lever switch position	4 - 35
Inner rotary hook bracket position	4 - 37
Lower thread tension (standard inner rotary hook assy)	4 - 38
Guide line marker position	4 - 39
Sensor Pen Calibration (for software Ver. 2.0 or later)	4 - 41
LED pointer position (embroidery foot with LED pointer)	4 - 45
Feed length of dual feed foot	4 - 46
Belt tension (embroidery unit)	4 - 47
X carriage height (embroidery unit)	4 - 48
Embroidery center position (embroidery unit)	4 - 49
F, Z pulse motor phase	4 - 51
Thread take up spring tension	4 - 52

5. Failure Investigation for Electronic Parts	5 - 1
Error message list	5 - 2
Power does not come on	5 - 3
Pulse motors do not return to original position	5 - 5
Touch panel does not work	5 - 7
Main motor does not turn	5 - 8
Main motor rotation error	5 - 10
Cannot sew pattern normally	5 - 11
Cannot sew button holes normally	5 - 12
Stitch length and zigzag width cannot be adjusted manually	5 - 13
Problems with vertical needle movement and reverse stitching	5 - 14
Does not operate with foot controller	5 - 15
Needle bar release does not work normally	5 - 16
Thread tensioning does not go well	5 - 17
Thread cutter does not work normally	5 - 18
Bobbin winder motor does not rotate	5 - 19
LED lamp does not light	5 - 20

Lower thread detection does not work normally	5 - 22
Upper thread sensor does not work normally	5 - 23
Automatic needle threader does not work correctly	5 - 24
Presser foot lifter does not work correctly	5 - 26
USB host does not work properly	5 - 29
USB function does not work properly	5 - 30
Sound does not work	5 - 31
Embroidery unit does not operate normally	5 - 32
Unable to detect or lock frame	5 - 34
Line marker does not operate normally	5 - 36
Sensor pen does not operate normally	5 - 37
Dual feed foot does not operate normally	5 - 39
Embroidery pointer does not operate normally	5 - 41
Error is displayed	5 - 43
Replacement of main PCB assy or panel PCB assy	5 - 47
Correspondence table of “Model” and “Printed-circuit board”	5 - 48
6. Maintenance	6 - 1
How to reset counter of the maintenance	6 - 2
Necessary grease & oil	6 - 3
Maintenance point	6 - 4
7. Special Instructions of Wiring	7 - 1
Module wiring	7 - 2
Main body wiring	7 - 6
Front cover wiring	7 - 19
Embroidery unit wiring	7 - 23
Dual feed assy wiring	7 - 28

REGULATION

■ LASER SAFETY (For U.S.A. only)

This sewing machine is certified as a Class 1 laser product under the US Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the sewing machine does not produce hazardous laser radiation.

The laser beam emitted by the laser unit installed in this machine is restricted to an output at a safe level.

■ FDA REGULATIONS (For U.S.A. only)

The US Food and Drug Administration (FDA) has implemented regulations for laser products manufactured on and after August 2, 1976. Compliance is mandatory for products marketed in the United States. One of the following labels on the back of the sewing machine indicates compliance with the FDA regulations and must be attached to laser products marketed in the United States.

The label for TAIWAN manufactured products

Tacony Corporation
1760 Gilsinn Lane Fenton, Missouri 63026, U.S.A.

This product complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

■ IEC 60825-1:2007 and IEC 60825-1:2014

This sewing machine is a Class 1 laser product as defined in IEC 60825-1:2007 and IEC 60825-1:2014 specifications.



Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

■ **IEC 60825-1:2007 and IEC 60825-1:2014 (For countries except U.S.A.)**

This sewing machine is a Class 1 laser product as defined in IEC 60825-1:2007 and IEC 60825-1:2014 specifications.



This sewing machine has a laser diode which emits visible laser radiation in the Laser module. Do not disassemble the Laser module. Since the variable resistor in the laser module is adjusted in accordance with the standards, never touch it.

Caution

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

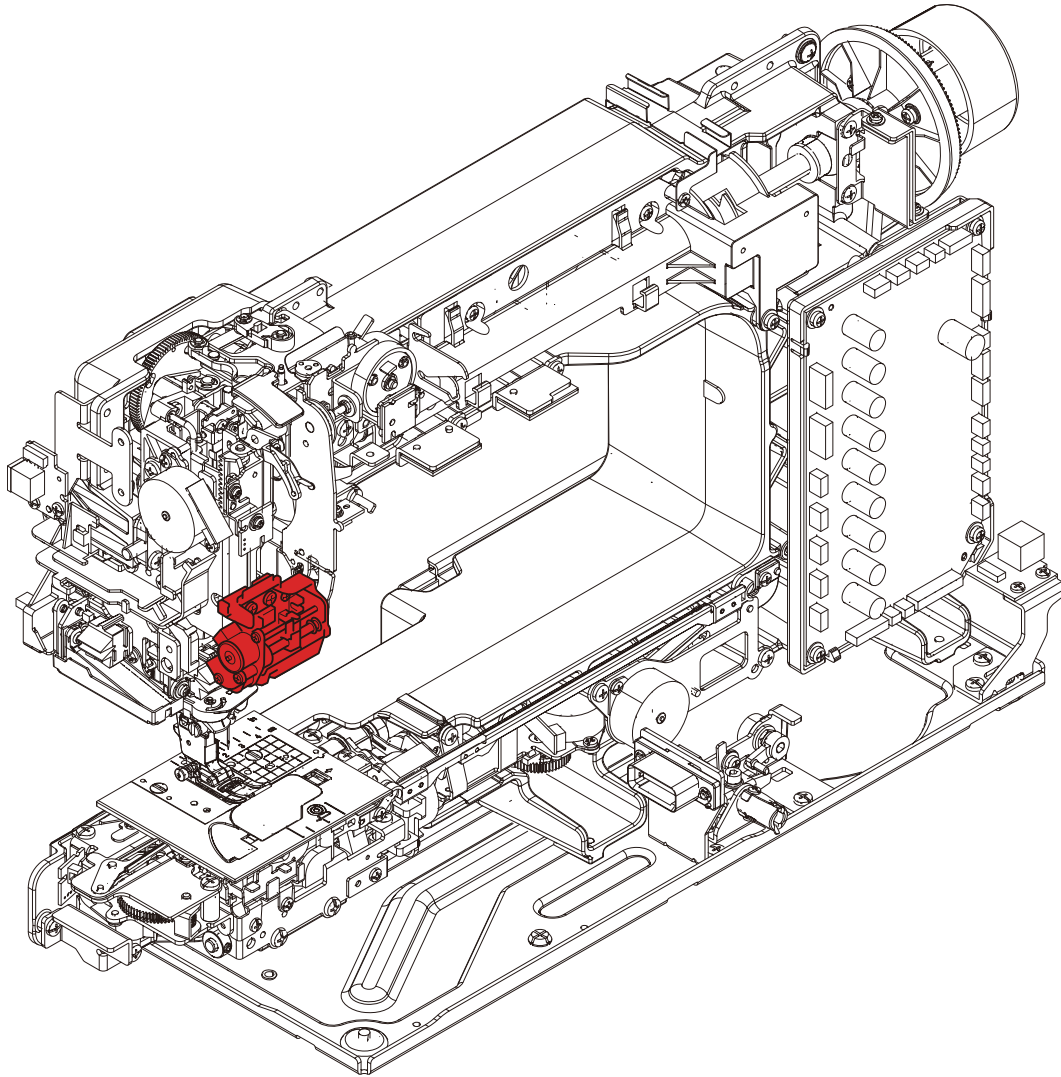
SAFETY INFORMATION

■ CAUTION FOR LASER PRODUCT

CAUTION: When the machine during servicing is operated with the cover open, the regulations of VBG 93 and the performance instructions for VBG 93 are valid.

CAUTION: In case of any trouble with the Laser module, replace the Laser module itself. To prevent direct exposure to the laser beam, do not try to disassemble the Laser module.

<Location of the Laser module>



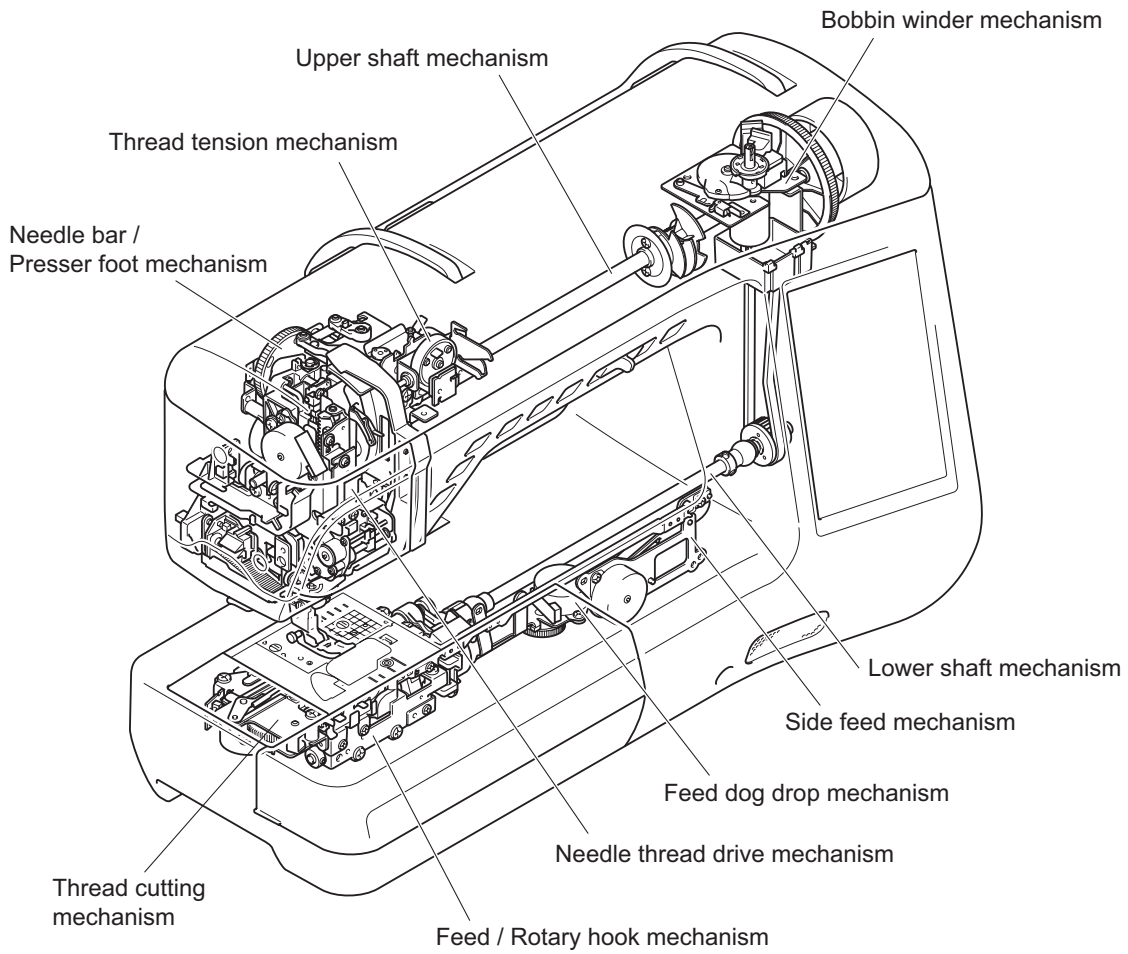
■ ADDITIONAL INFORMATION

When replacing the Laser module or adjusting it, be careful not to enter the laser beam into your eyes.

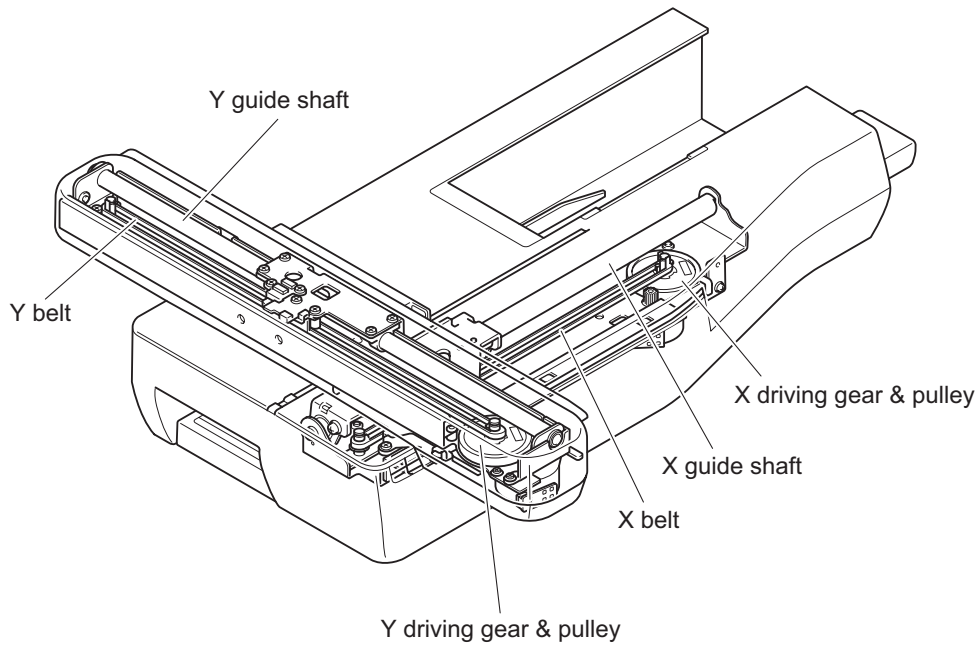
1 Outline of Mechanism

Main mechanisms	1 - 2
Driveline	1 - 3
Positions of electronic components.....	1 - 5
Control system block diagram.....	1 - 7
Layout for PCB connectors	1 - 8
Operation of other electronic components	1 - 10

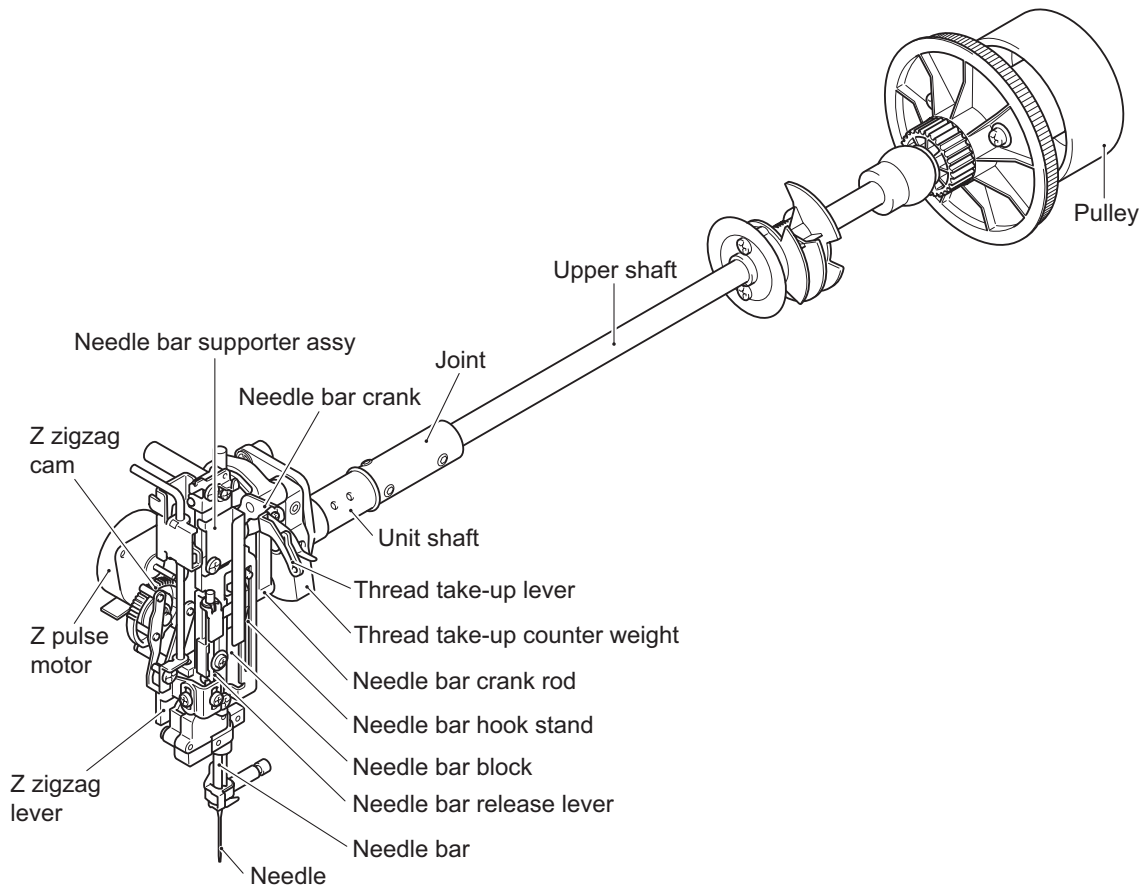
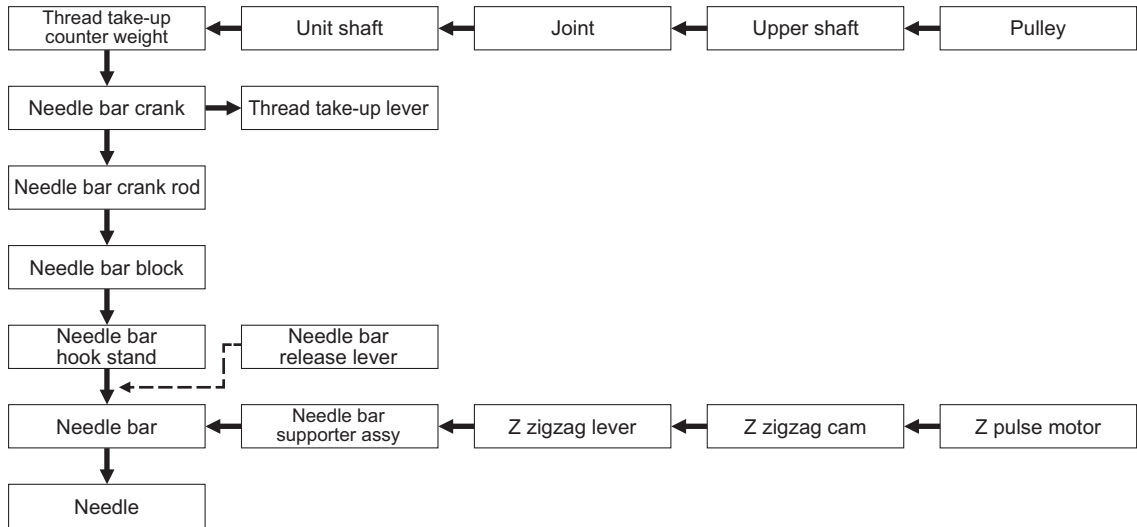
Main body



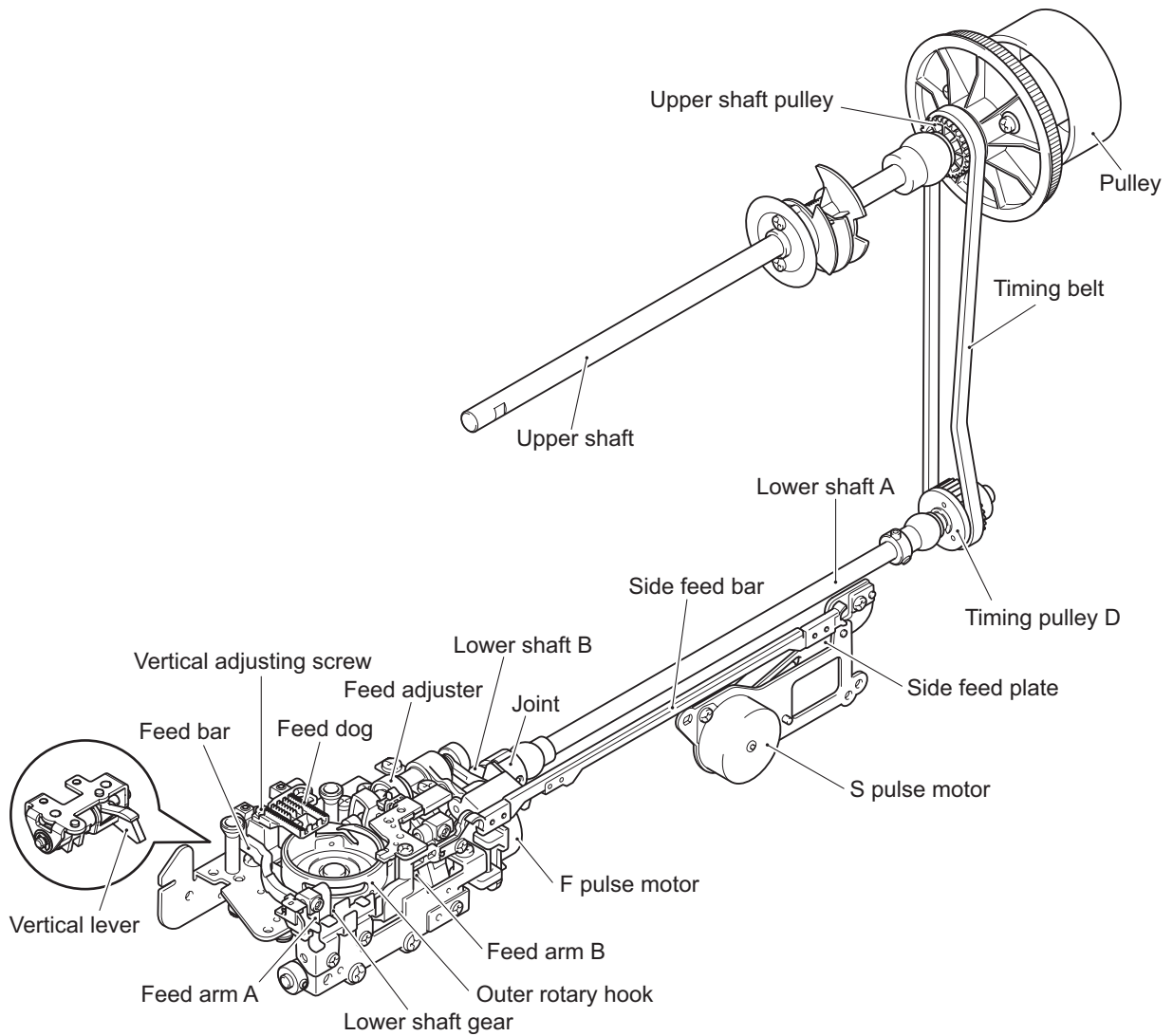
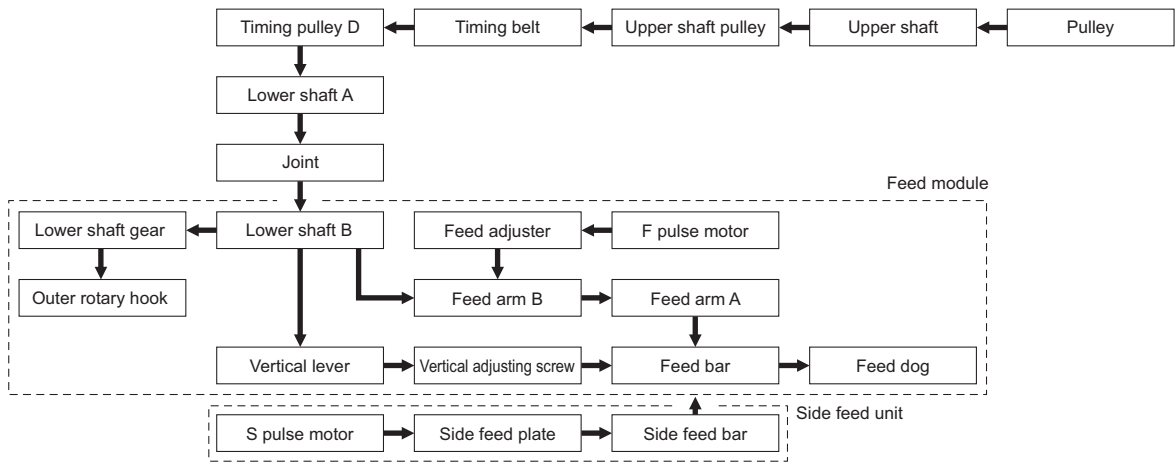
Embroidery unit



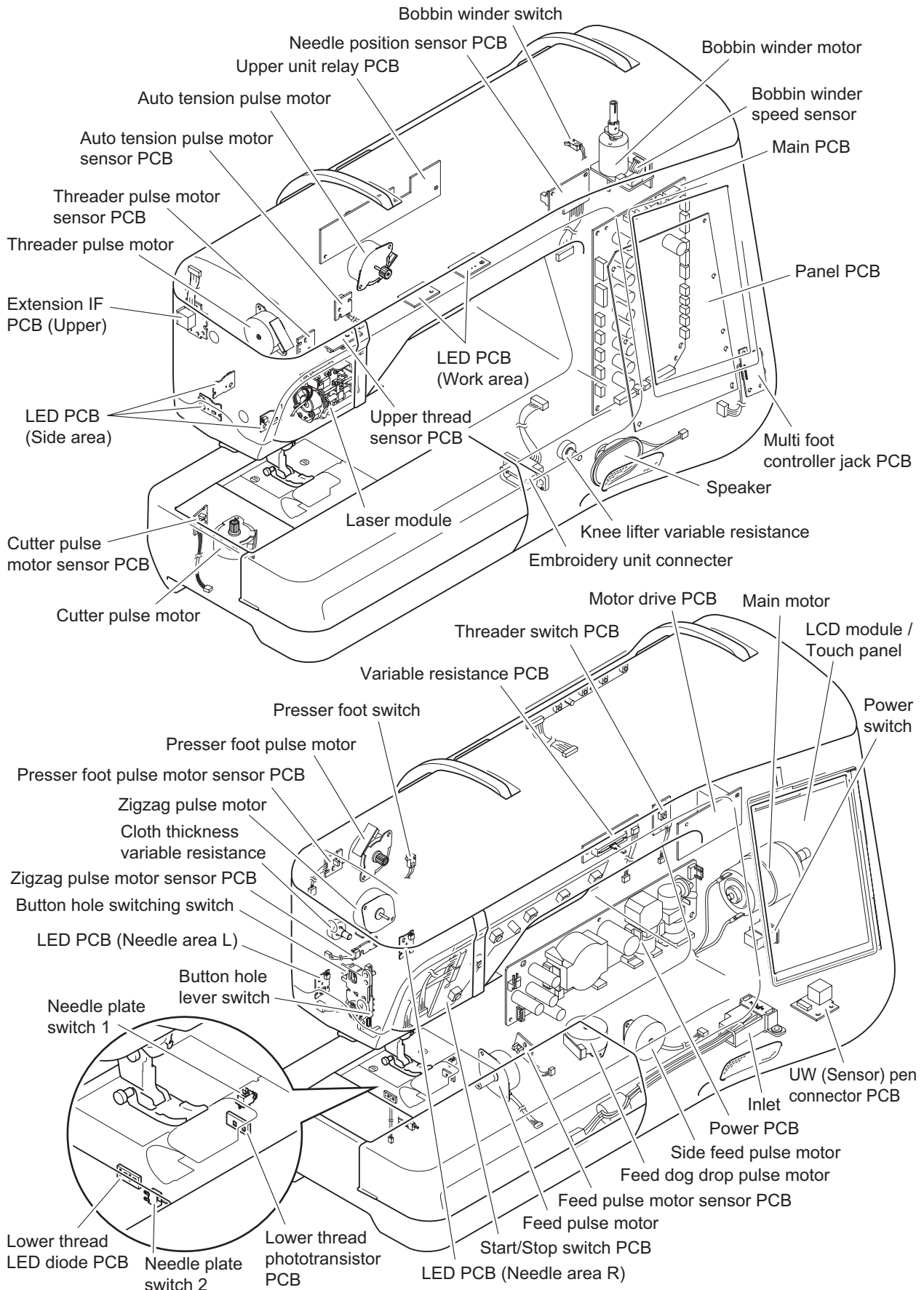
(A) Up and down movement of needle bar, movement of thread take-up lever and zigzag movement of needle bar mechanism



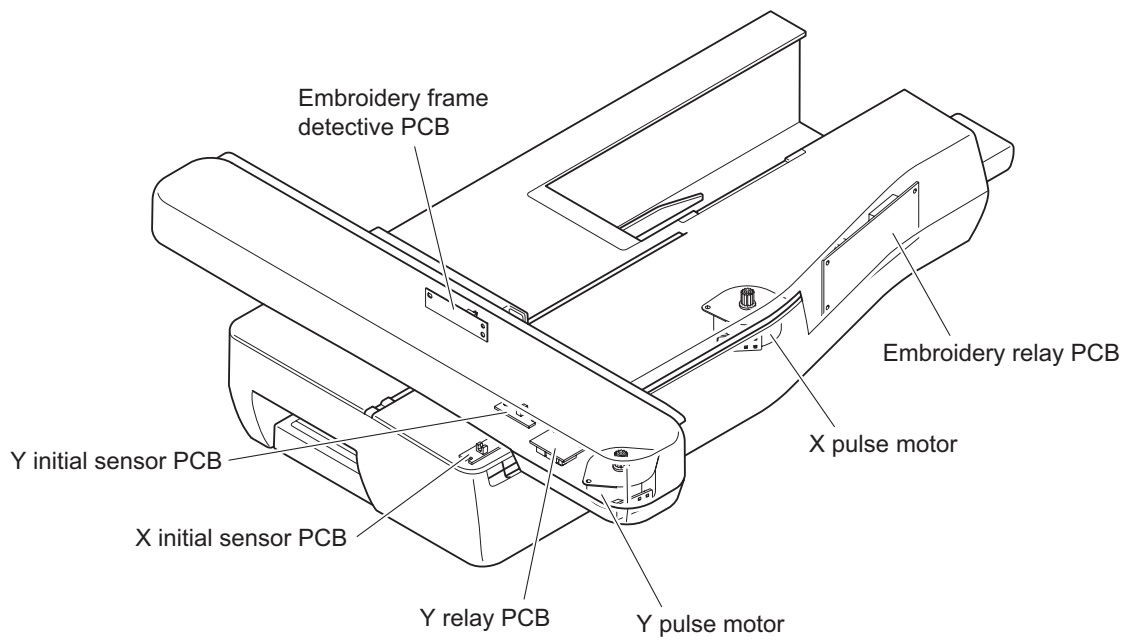
(B) Movement of feed dog and rotary hook

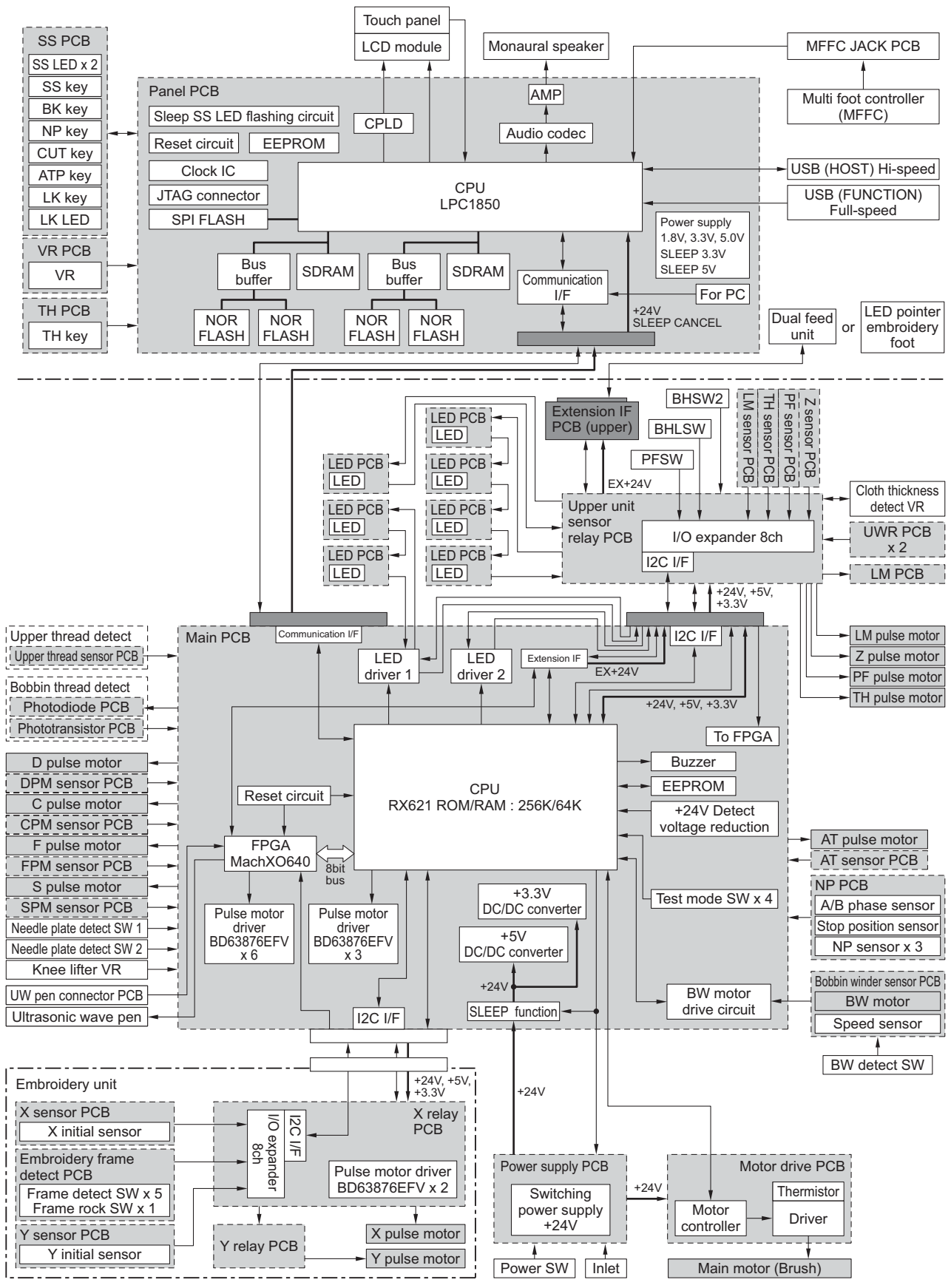


Main body



Embroidery unit

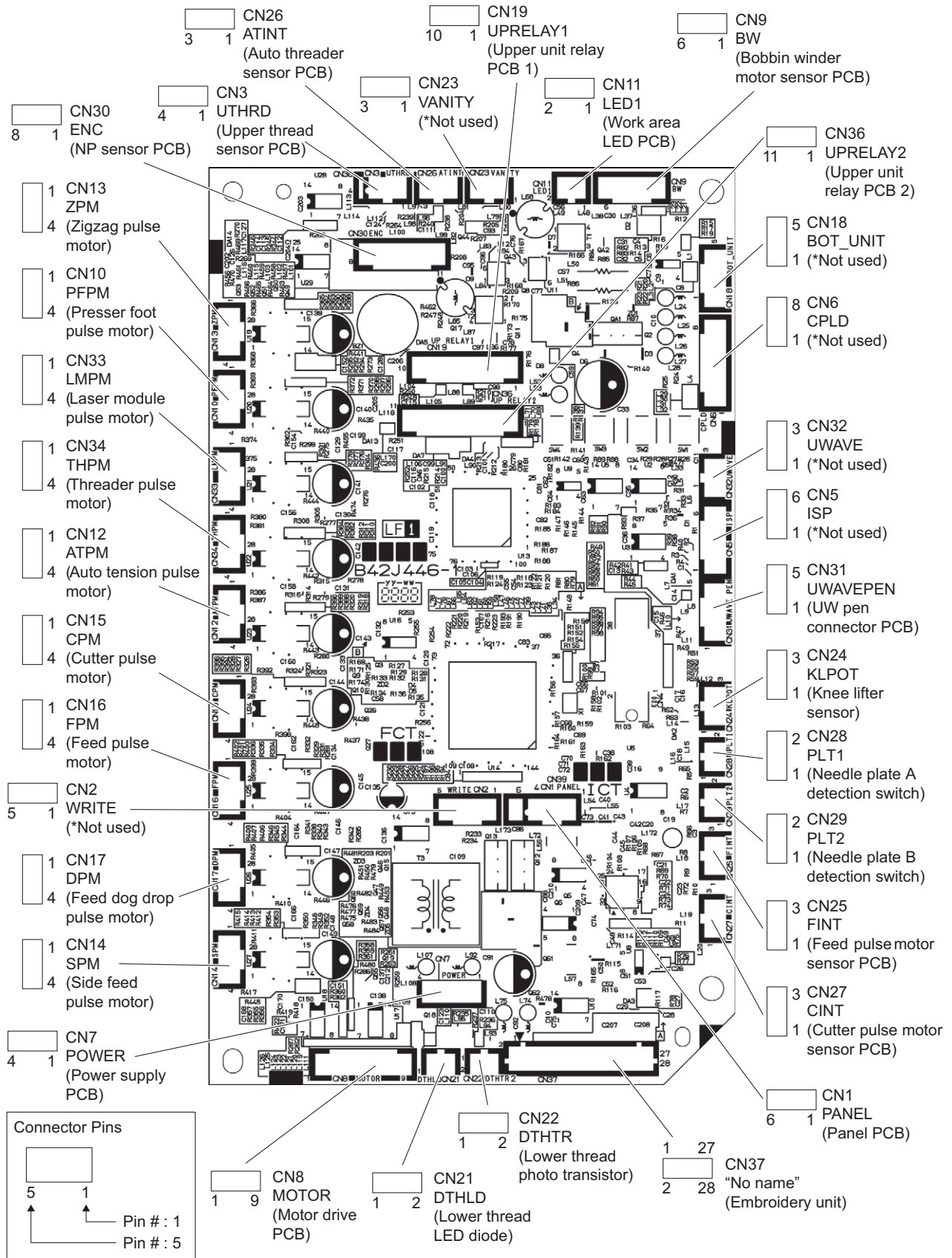




Outline of Mechanism Layout for PCB connectors

The illustration below shows layout for Printed Board connectors.

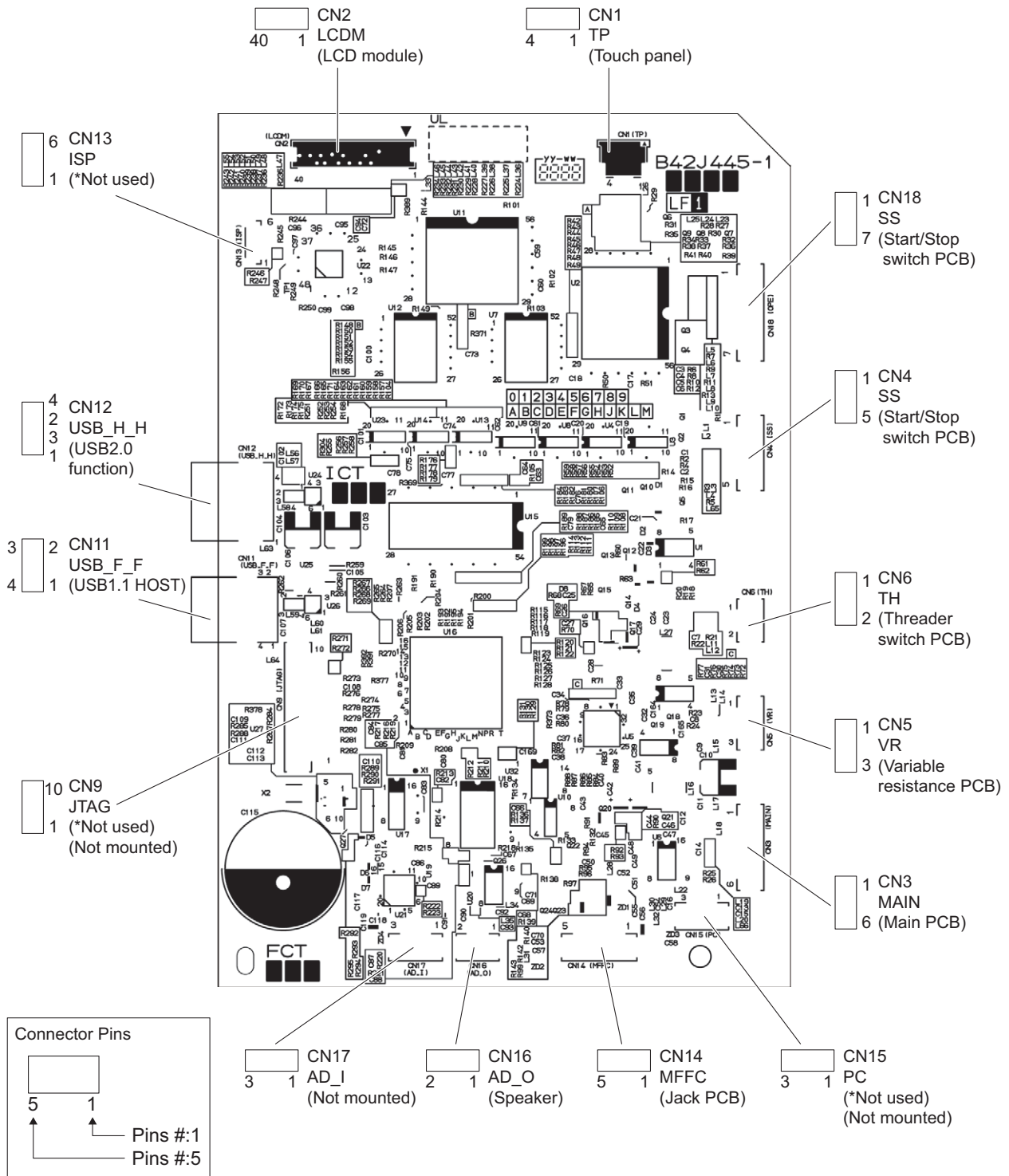
■ Main PCB



■ Panel PCB

Outline of Mechanism

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.
Reinforcement stitch button	This button is for automatic reinforcement stitches. The LED next to the button lights when the button is pushed, and it goes out automatically when the stitching is finished.
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.
Presser foot lifter button	This button toggles the presser foot between the up and down positions.
Speed control lever	This lever controls the speed of sewing.
Needle thread button	Press this button the machine automatically thread the needle.
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) switch	This switch is for detecting the forward and rear ends of the button hole according to the BH presser and lever.
BH (button hole) lever switch	This switch detects whether the BH lever is up or down.
Needle position (NP) sensor	This sensor detects the drive timing of each pulse motor and the vertical stop of the needle position. It detects the upper shaft angle of rotation by using a shutter attached to the upper shaft and an 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.
Cloth thickness sensor	This sensor detects the thickness of cloth.
Knee lifter sensor	This sensor detects the knee lifter movement.

Presser switch	This switch detects the vertical position of the presser foot lifter.
BW (bobbin winder) switch	This switch detects whether the bobbin is set for winding or not, when the bobbin thread is wound.
Needle plate switch	This switch detects normal needle plate or straight stitch needle plate.
Foot controller jack	This is the jack for plugging in the foot controller in use.
LED lamp PCB assy.	White LED lamps for illuminating the work space.
Up thread sensor PCB assy	Detects the presence or absence of the upper thread and whether it is cut or not.
Initial sensor PCB assy.	Detects the original position of each pulse motor.
Photo diode PCB assy, photo transistor PCB assy	This assy detects the bobbin thread is low.
Laser drive PCB assy	This PCB assy irradiates line focused laser for the laser guide line marker and detects initial position of the laser module pulse motor.
UWR (ultrasonic wave receiving) PCB assy . .	This PCB assy receives ultrasonic wave from the sensor pen.
UW (sensor) pen connector PCB assy	This PCB assy is for connecting the sensor pen to the machine.
Extension I/F PCB assy	This PCB assy is for connecting extensions.
LED pointer drive PCB assy (in embroidery foot "W+" with LED pointer) . .	This PCB assy creates point focused LED light for embroidery pointer.
DF (dual feed) PCB assy (in dual feed foot) . . .	This PCB assy controls pulse motor on dual feed and detects vertical motion of the dual feed.
UW (sensor) pen connector PCB assy (in sensor pen)	This PCB assy sends ultrasonic wave to detect target position.

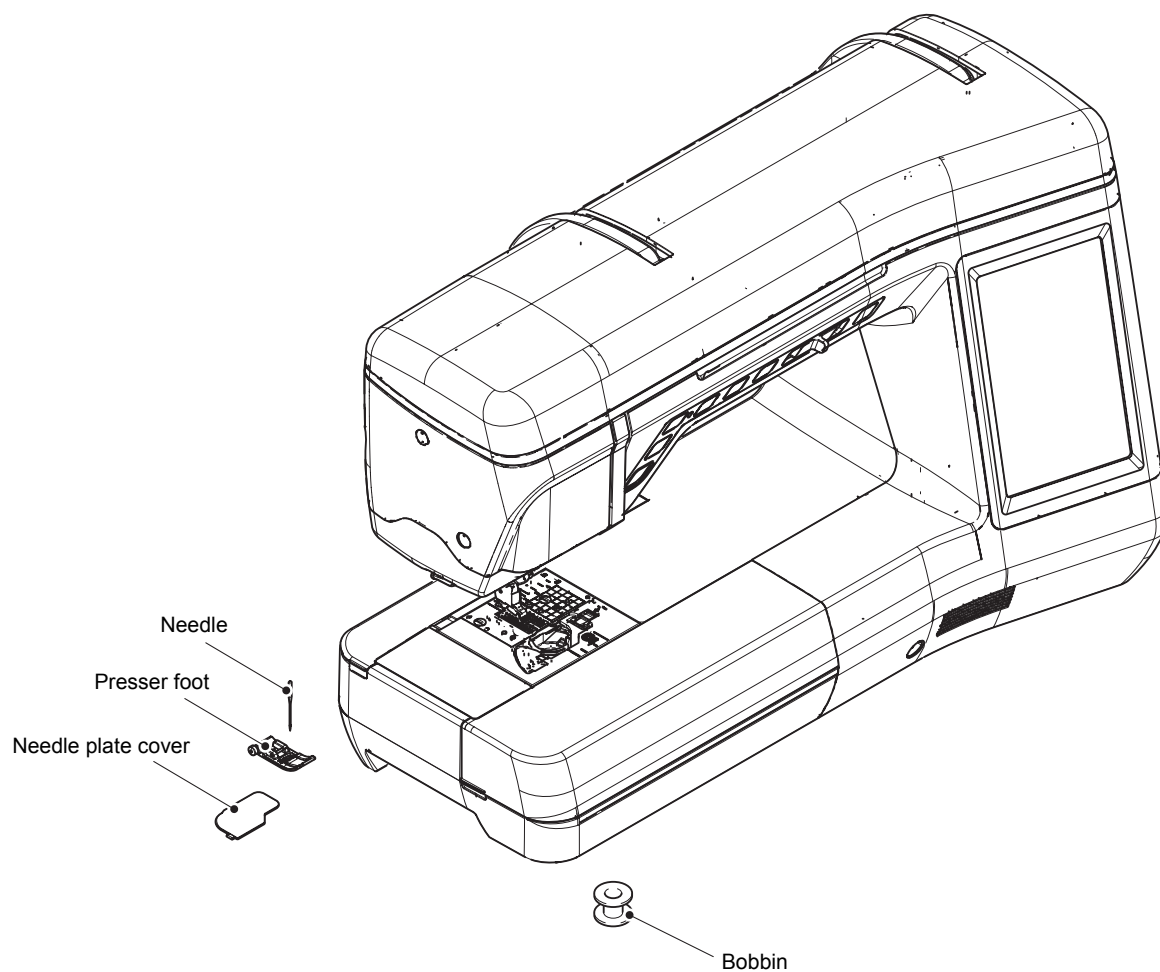
2 Basic of Disassembly/Assembly

For repairing or replacing parts of this machine, refer to “CHAPTER 3: Application of Disassembly/Assembly”.

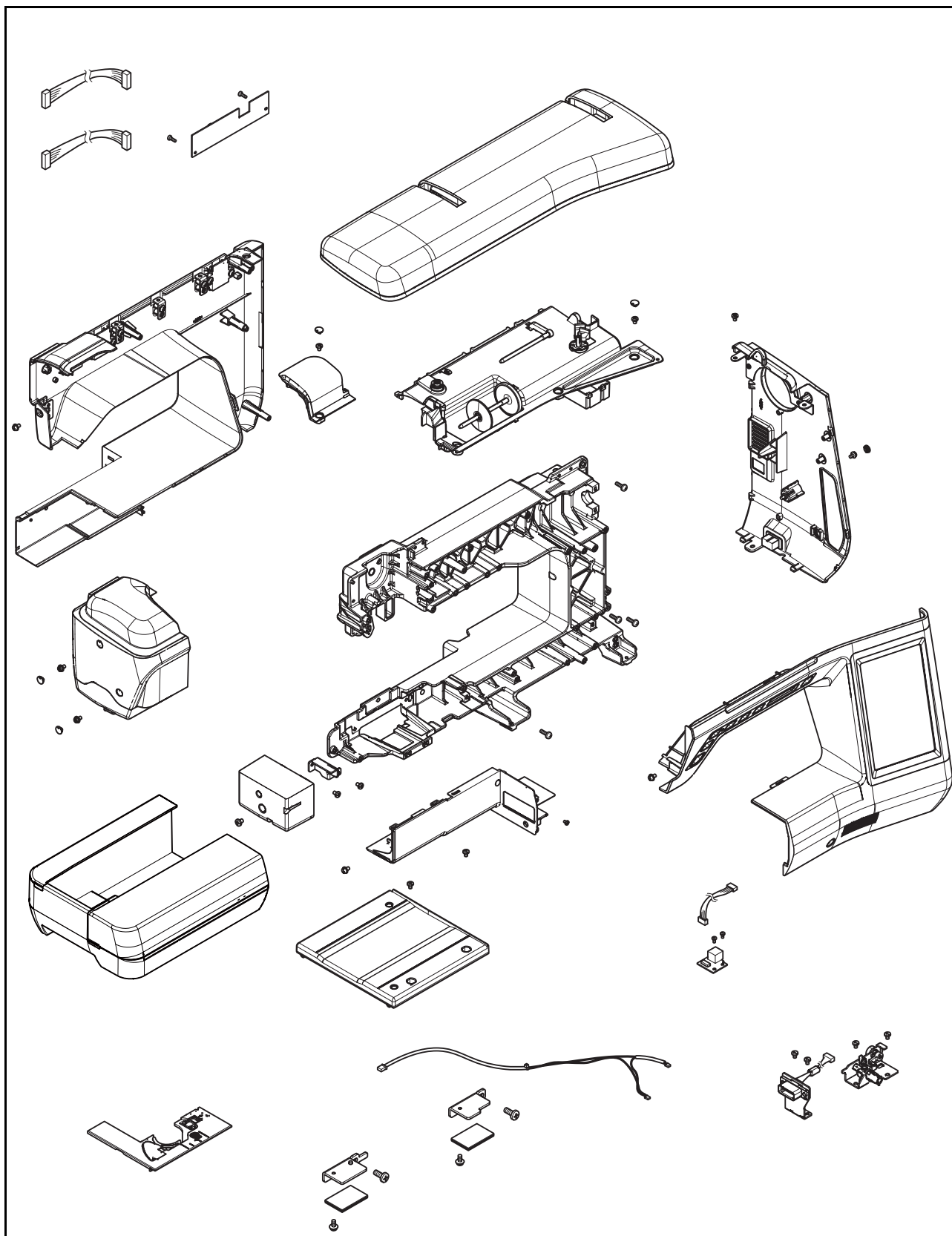
Disassembly	Preparation	2 - 2
	Main frame and covers	2 - 3
	Electric parts and Main motor unit...	2 - 15
	Needle threading mechanism	2 - 21
	Lower driving mechanism	2 - 24
	LED lamp / Upper driving mechanism ..	2 - 28
Assembly	LED lamp / Upper driving mechanism ..	2 - 37
	Lower driving mechanism	2 - 47
	Needle threading mechanism	2 - 52
	Electric parts and Main motor unit...	2 - 55
	Main frame and covers	2 - 61

1 Disconnecting cables and removing accessories

- Needle
- Presser foot
- Needle plate cover
- Bobbin
- Power cord (if connected)
- USB I/F core cable (if connected)
- UW (sensor) pen (if connected)
- Foot controller (if connected)



Main frame and covers location diagram



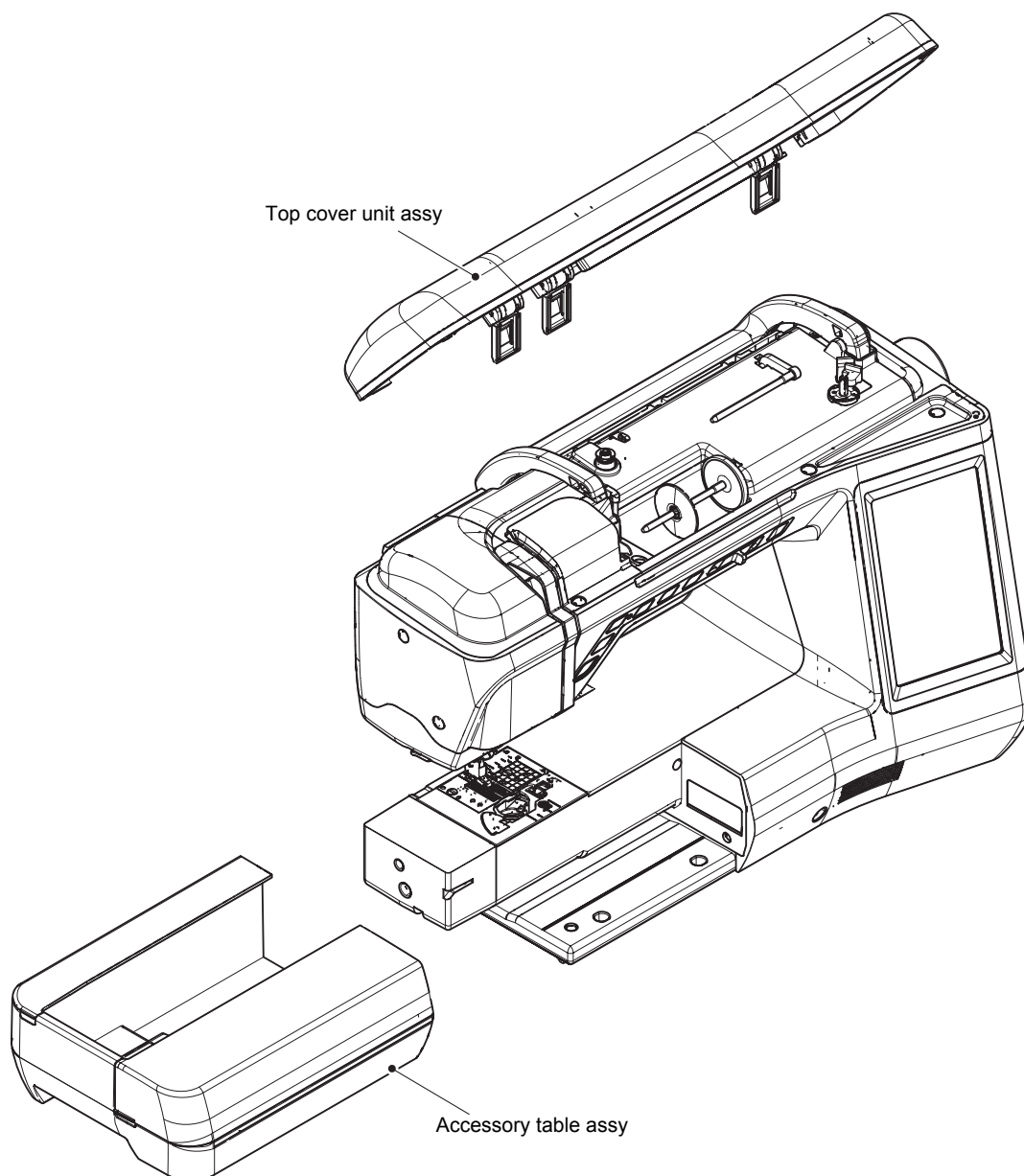
Basic of Disassembly

Basic of Disassembly

1 Removal of Top cover unit assy and Accessory table assy

1. Remove the top cover unit assy from the machine.
2. Remove the accessory table assy from the machine.

→Refer to 3 - 3 "Disassembly of Accessory table assy".



2 Removal of Needle plate B assy, Free arm cover and Free arm front cover assy

1. Remove the needle plate B assy.

→Refer to 3 - 3 "Disassembly of Needle plate B assy".

2. Remove the screw (screw, bind M4x6), and then remove the free arm cover.

3. Remove the screw (screw, pan (T washer) M3x6) and screw (screw, bind M3x6), release the hook from the hook tray, and remove the free arm front cover assy from the machine.

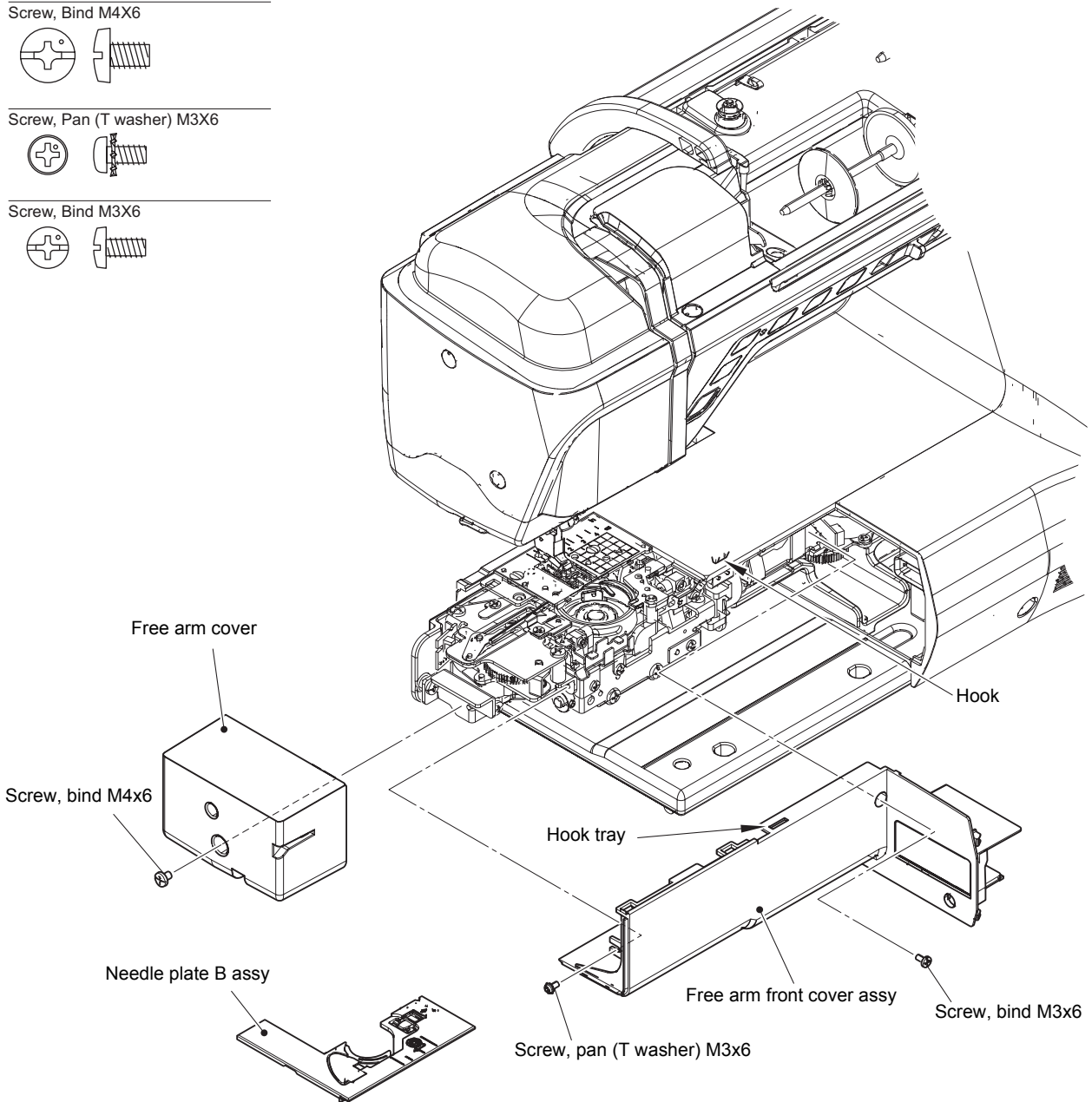
Screw, Bind M4X6



Screw, Pan (T washer) M3X6



Screw, Bind M3X6



3 Removal of Face plate assy and Front thread guard cover

1. Remove the two screw caps and the two screws (screw, pan (S/P washer) M4x8) from the face plate assy to remove it from the machine.

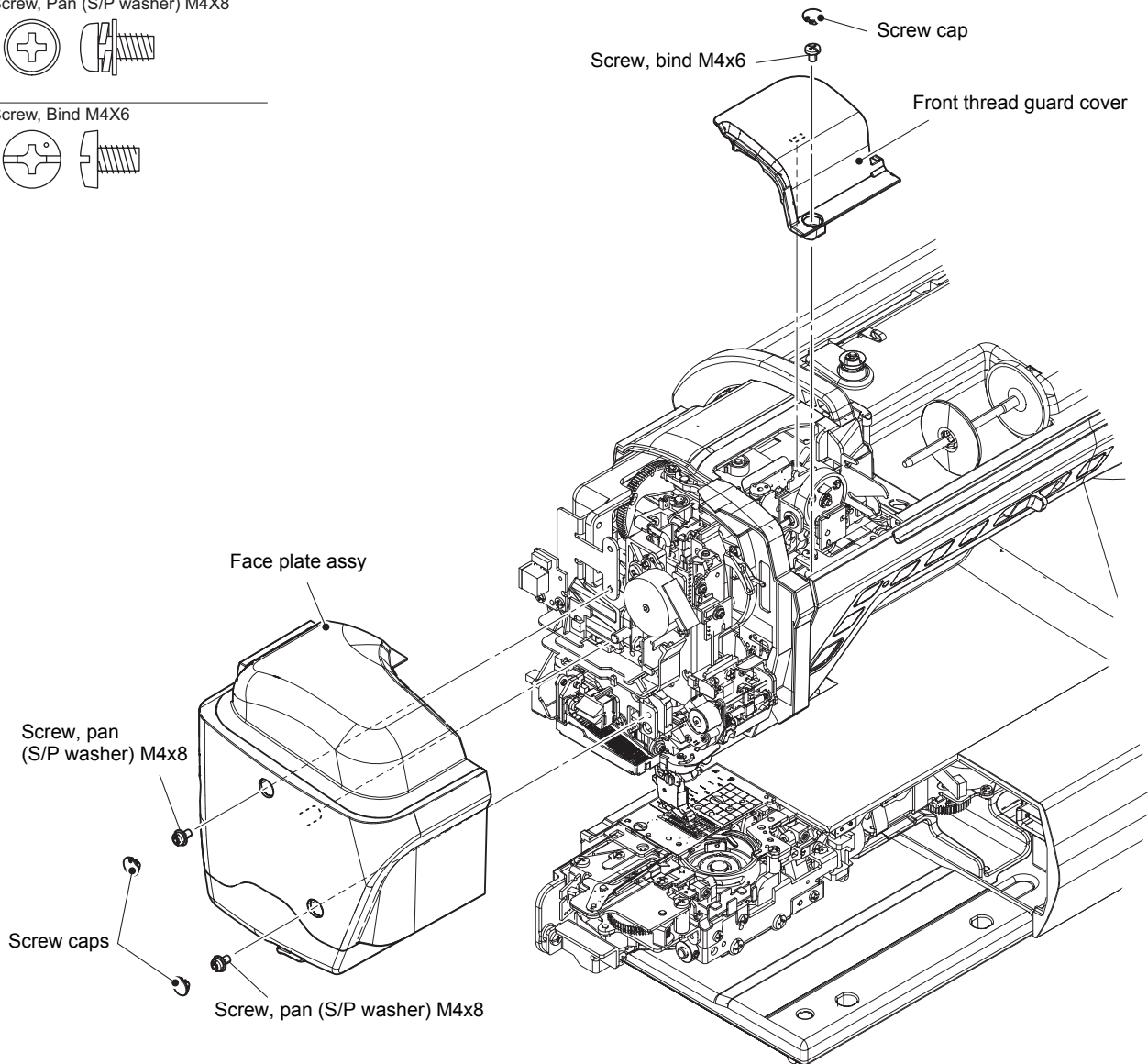
→Refer to 3 - 4 "Disassembly of Face plate assy".

2. Remove the screw cap and the screw (screw, bind M4x6) from the front thread guard cover to remove it from the machine.

Screw, Pan (S/P washer) M4X8



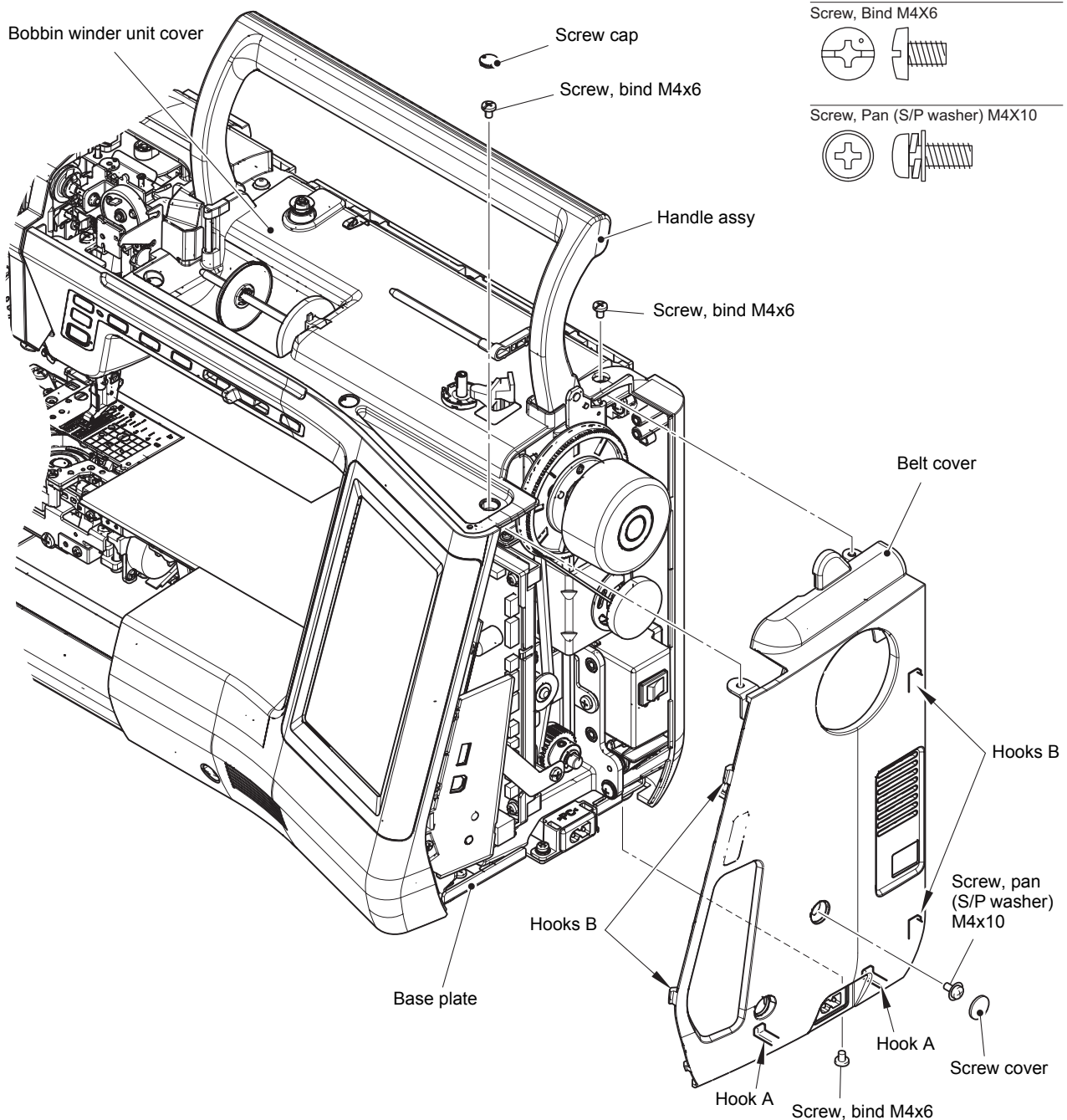
Screw, Bind M4X6



4 Removal of Belt cover

1. Remove the screw cover from the belt cover, and remove the screw cap from the bobbin winder unit cover.
2. Pull up the handle assy.
3. Remove the three screws (screw, bind M4x6) and screw (screw, pan (S/P washer) M4x10). Release the two hooks A from the base plate and four hooks B from the each cover to remove the belt cover.

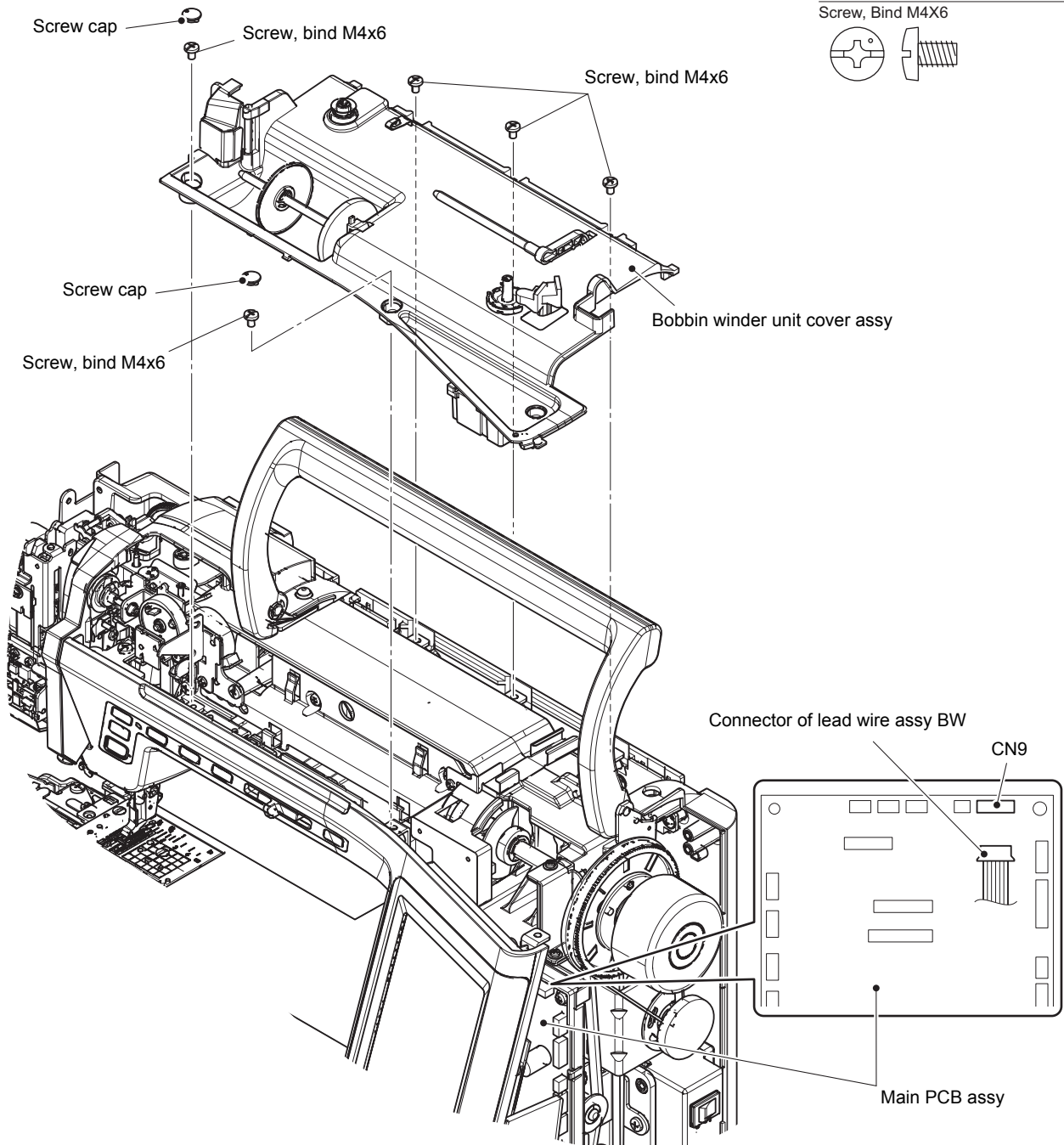
→Refer to 3 - 4 "Disassembly of Belt cover".



5 Removal of Bobbin winder unit cover assy

1. Remove the two screw caps from the bobbin winder unit cover assy, and remove the five screws (screw, bind M4x6) from the bobbin winder unit cover assy.
2. Disconnect the connector of lead wire assy BW from the main PCB assy.
3. Remove the bobbin winder unit cover assy from the machine.

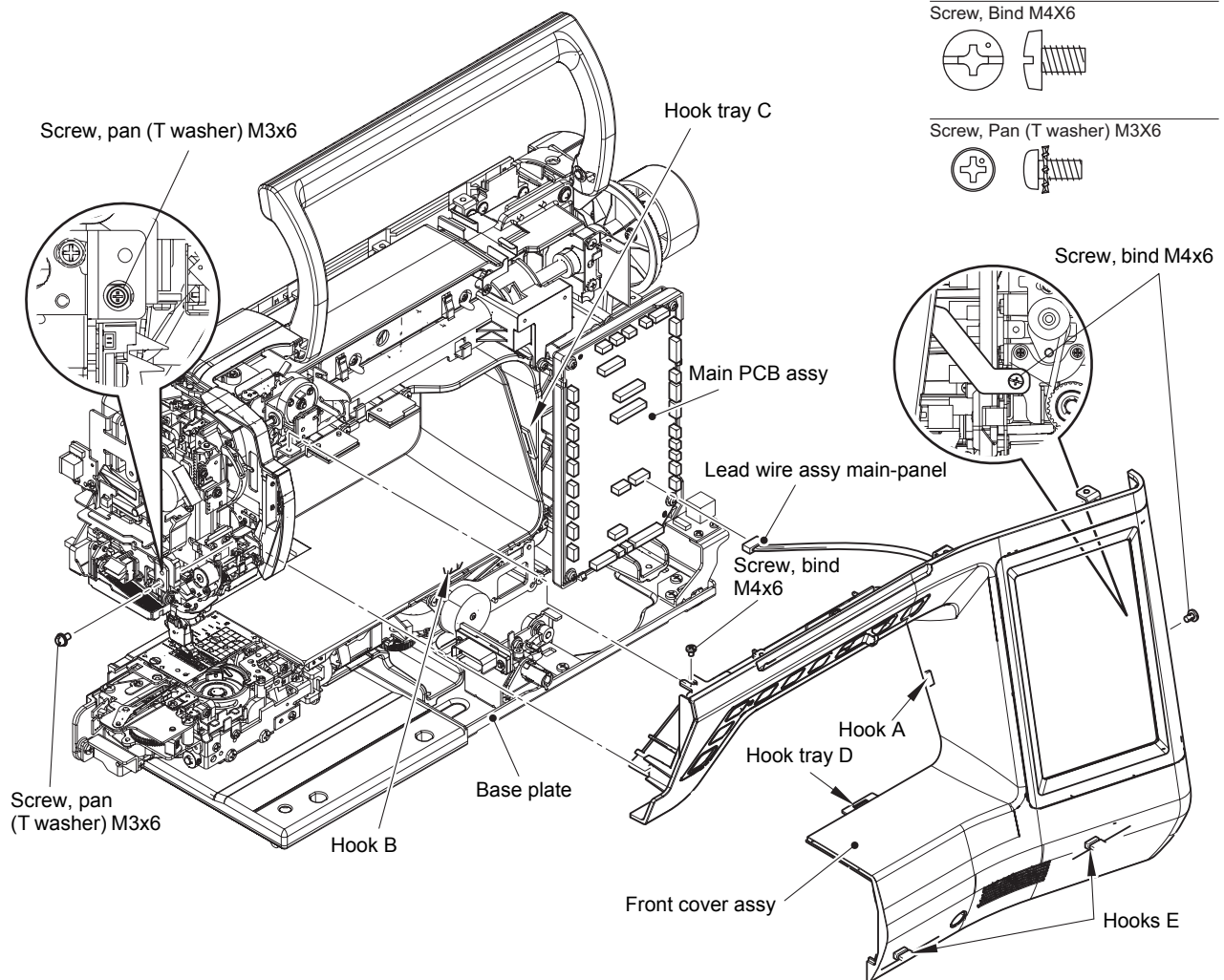
→Refer to 3 - 20 "Disassembly of Bobbin winder unit cover assy".



6 Removal of Front cover assy

1. Remove the two screws (screw, bind M4x6) and screw (screw, pan (T washer) M3x6) from the front cover assy.
2. Release the hook A (front cover side) and B (rear cover side) from the hook tray C (rear cover side) and D (front cover side) respectively, to open the upper side of front cover assy, and release the two hooks E from the base plate to remove the front cover assy.
3. Disconnect the lead wire assy main-panel from the main PCB assy.

→Refer to 3 - 5 "Disassembly of Front cover assy".

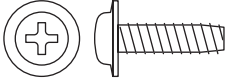


7 Removal of Rear cover assy

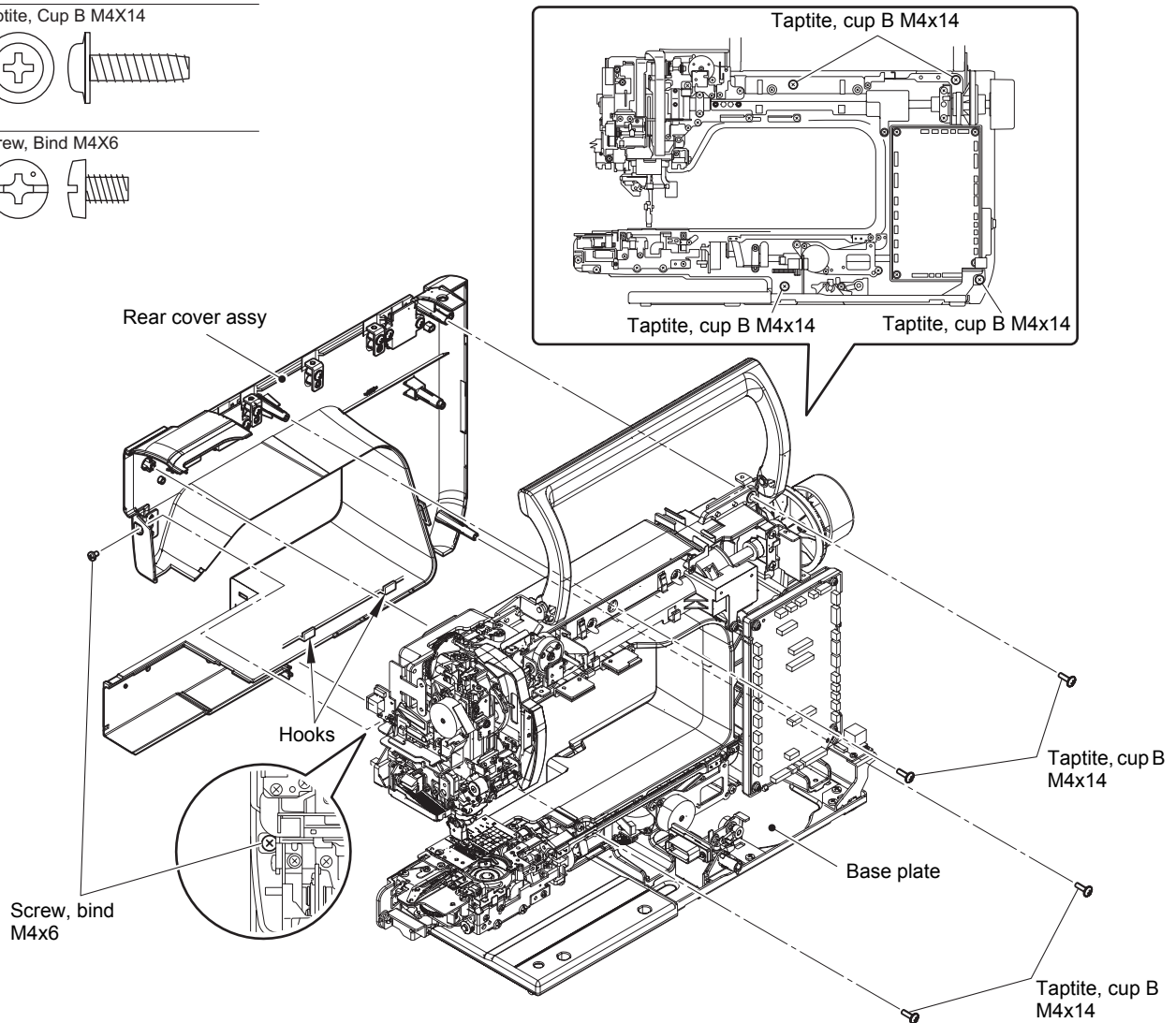
1. Remove the four screws (taptite, cup B M4x14) and screw (screw, bind M4x6) from the rear cover assy.
2. Release the two hooks from the base plate to remove the rear cover assy.

→Refer to 3 - 14 "Disassembly of Rear cover assy".

Taptite, Cup B M4X14

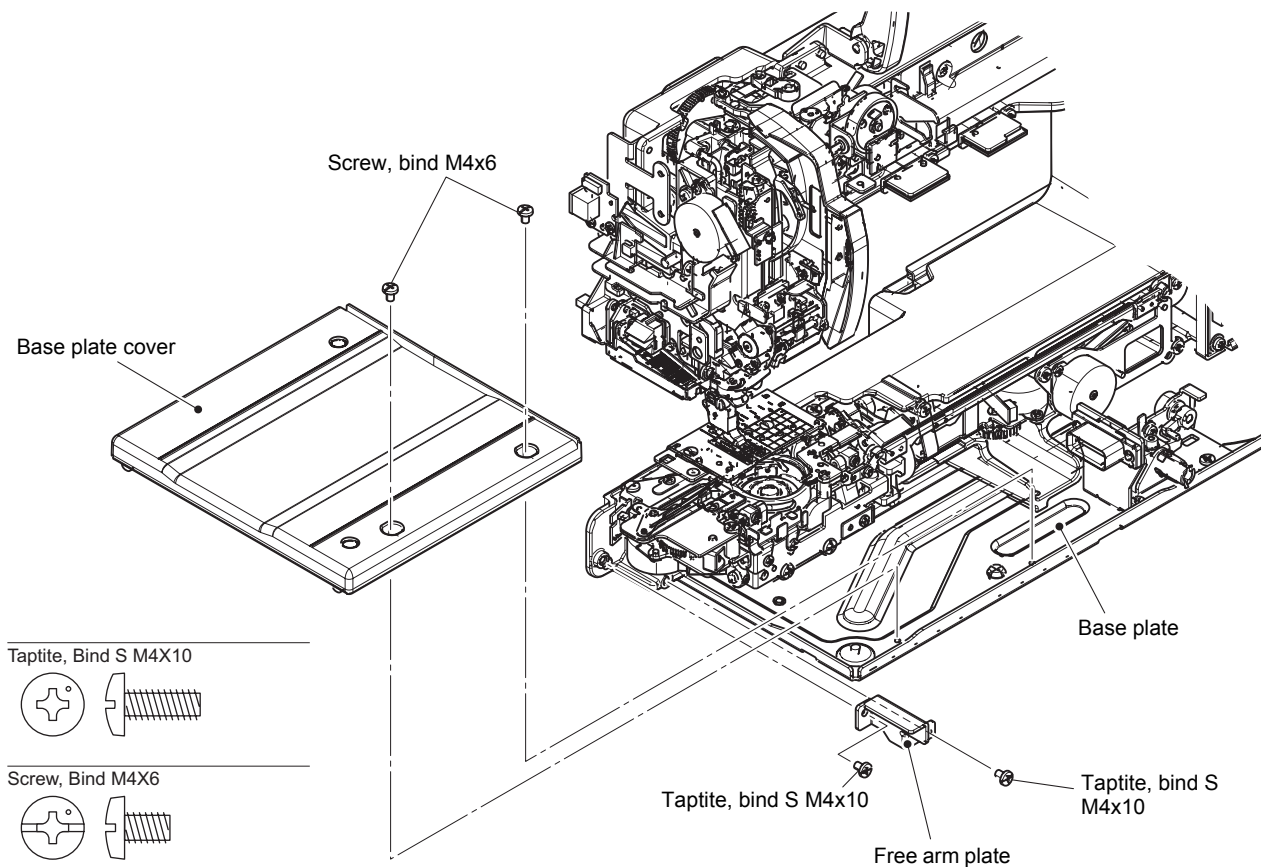


Screw, Bind M4X6



8 Removal of Free arm plate and Base plate cover

1. Remove the two screws (taptite, bind S M4x10) to remove the free arm plate from the arm bed.
2. Remove the two screws (screw, bind M4x6) to remove the base plate cover from the base plate.

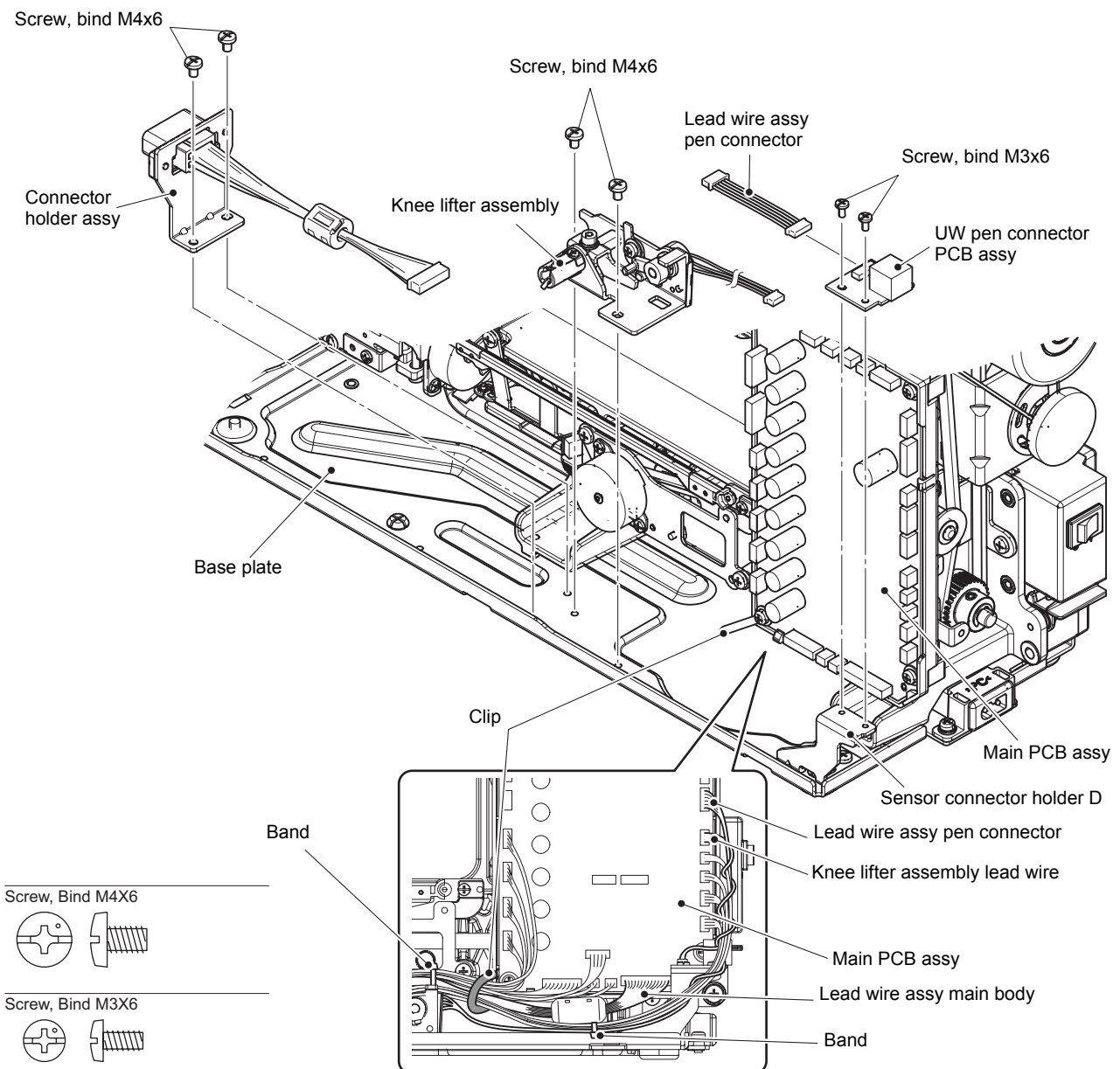


9 Removal of Knee lifter assembly, Connector holder assy and UW pen connector PCB assy

1. Cut the band and disconnect the knee lifter assembly lead wire from the main PCB assy. Remove the two screws (screw, bind M4x6) to remove the knee lifter assembly from the base plate.
2. Release the clip to unbind the lead wires. Cut the band and disconnect the lead wire assy main body from the main PCB assy. Remove the two screws (screw, bind M4x6) to remove the connector holder assy from the base plate.

→Refer to 3 - 15 "Disassembly of Connector holder assy".

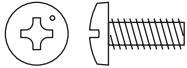
3. Disconnect the lead wire assy pen connector from the main PCB assy and UW pen connector PCB assy.
4. Remove the two screws (screw, bind M3x6) to remove the UW pen connector PCB assy from the sensor connector holder D.



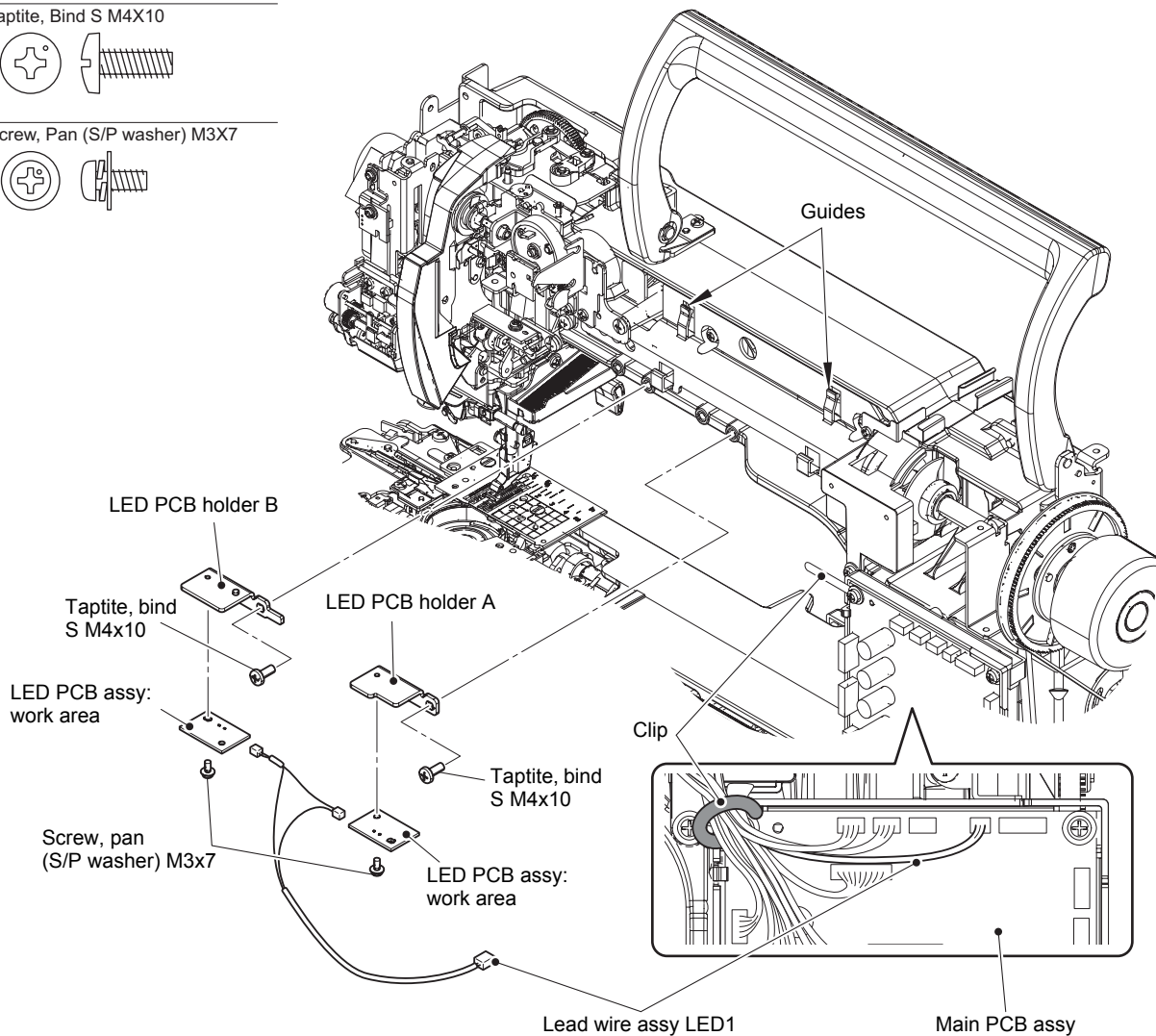
10 Removal of LED PCB holder A/B

1. Release the clip to unbind the lead wires. Disconnect the lead wire assy LED1 from the main PCB assy and release the lead wire assy LED1 from the two guides. Then disconnect the two connectors of lead wire assy LED1 from the two LED PCB assy:work areas.
2. Remove the screw (taptite, bind S M4x10) to remove the LED PCB holder A. Remove the screw (screw, pan (S/P washer) M3x7) to remove the LED PCB assy:work area from the LED PCB holder A.
3. Remove the screw (taptite, bind S M4x10) to remove the LED PCB holder B. Remove the screw (screw, pan (S/P washer) M3x7) to remove the LED PCB assy:work area from the LED PCB holder B.

Taptite, Bind S M4X10

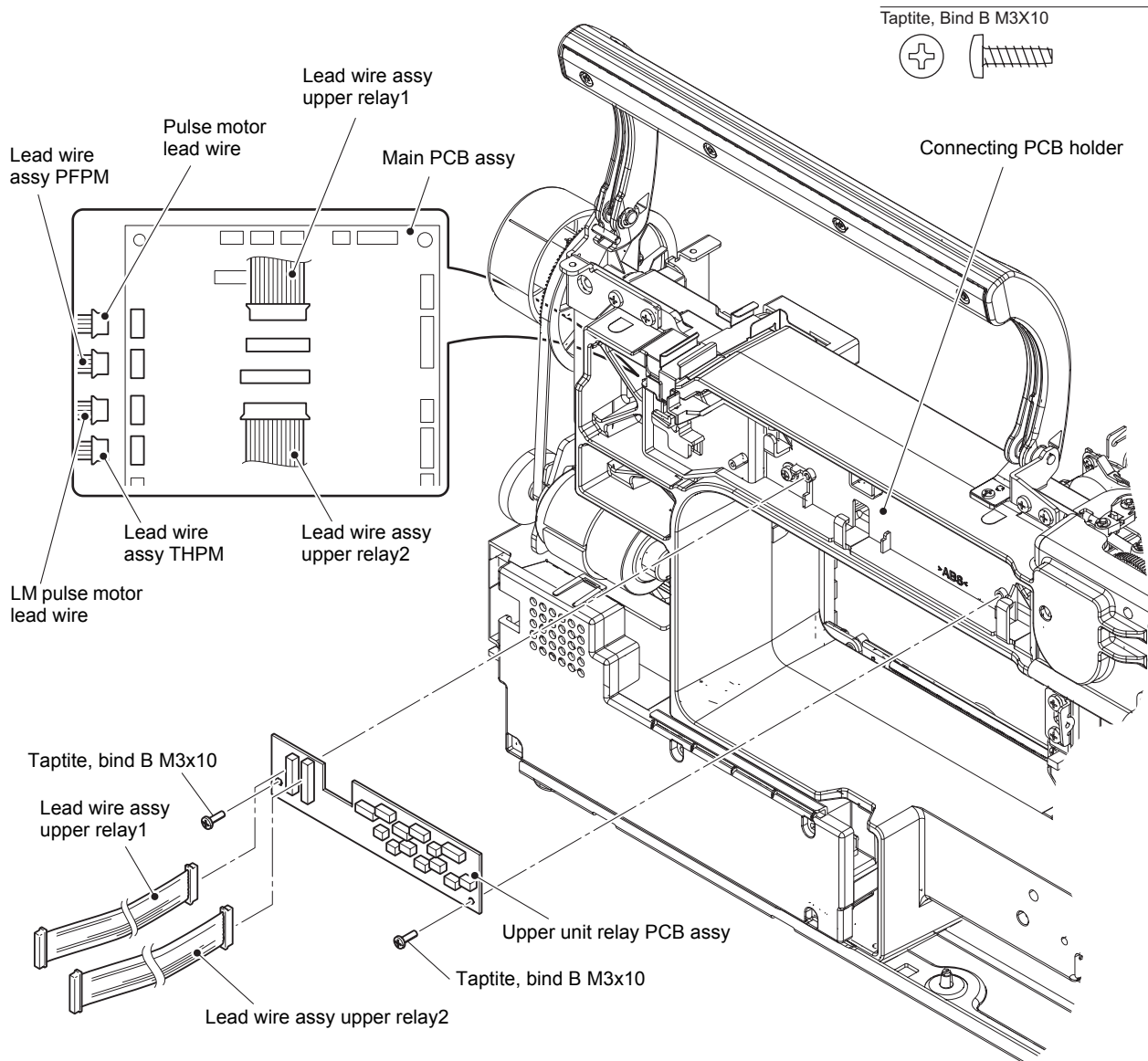


Screw, Pan (S/P washer) M3X7

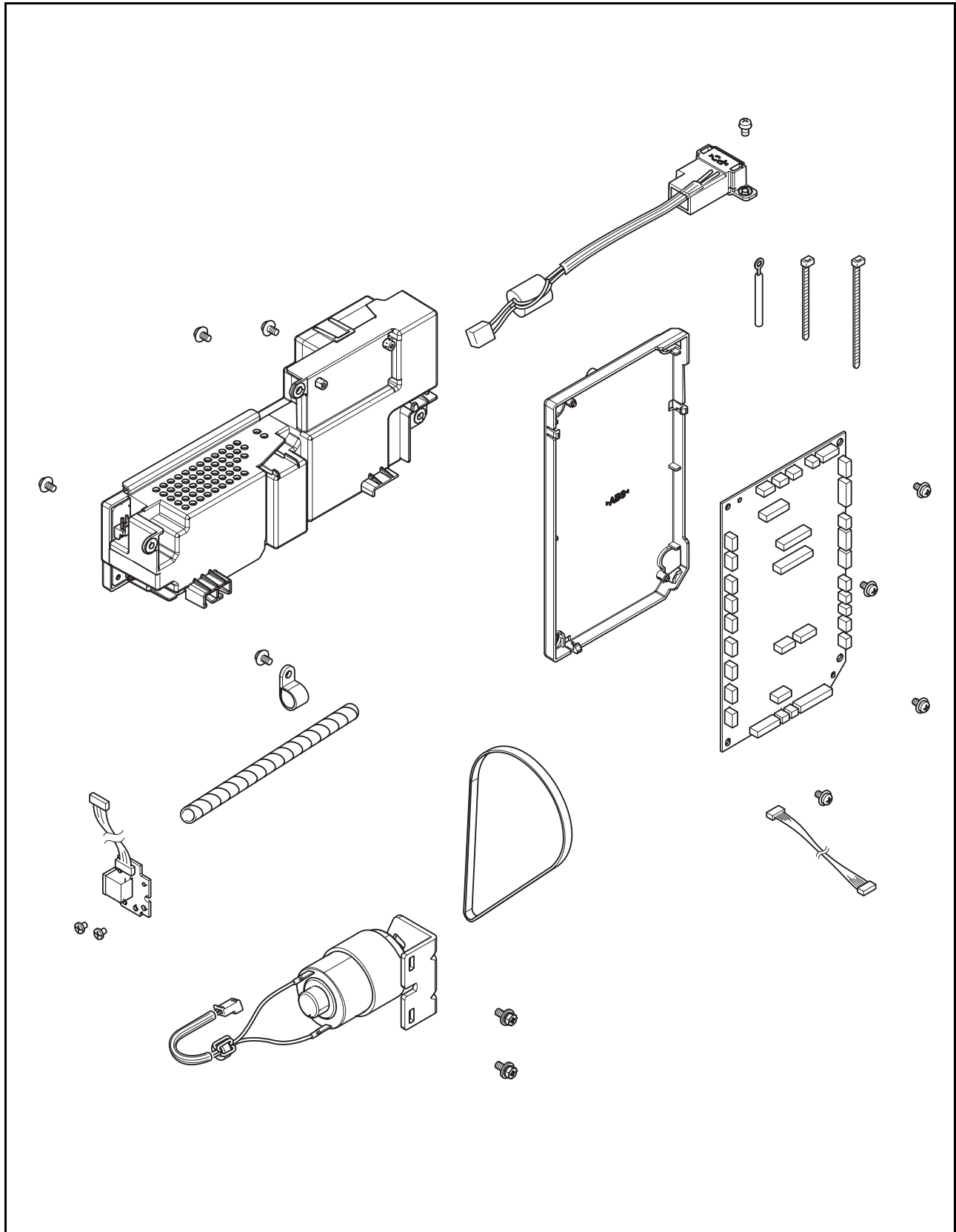


11 Removal of Upper unit relay PCB assy

1. Disconnect the lead wire assy upper relay1 and the lead wire assy upper relay2 from the main PCB assy, and release them from securing fixtures, and disconnect them from the upper unit relay PCB assy.
2. Disconnect the LM pulse motor lead wire, the lead wire assy THPM, the pulse motor lead wire and the lead wire assy PFFM from the main PCB assy, and release them from securing fixtures.
3. Disconnect all the connector connected to the upper unit relay PCB assy.
4. Remove the two screws (taptite, bind B M3x10) to remove the upper unit relay PCB assy from the connecting PCB holder.



Electric parts and Main motor unit location diagram

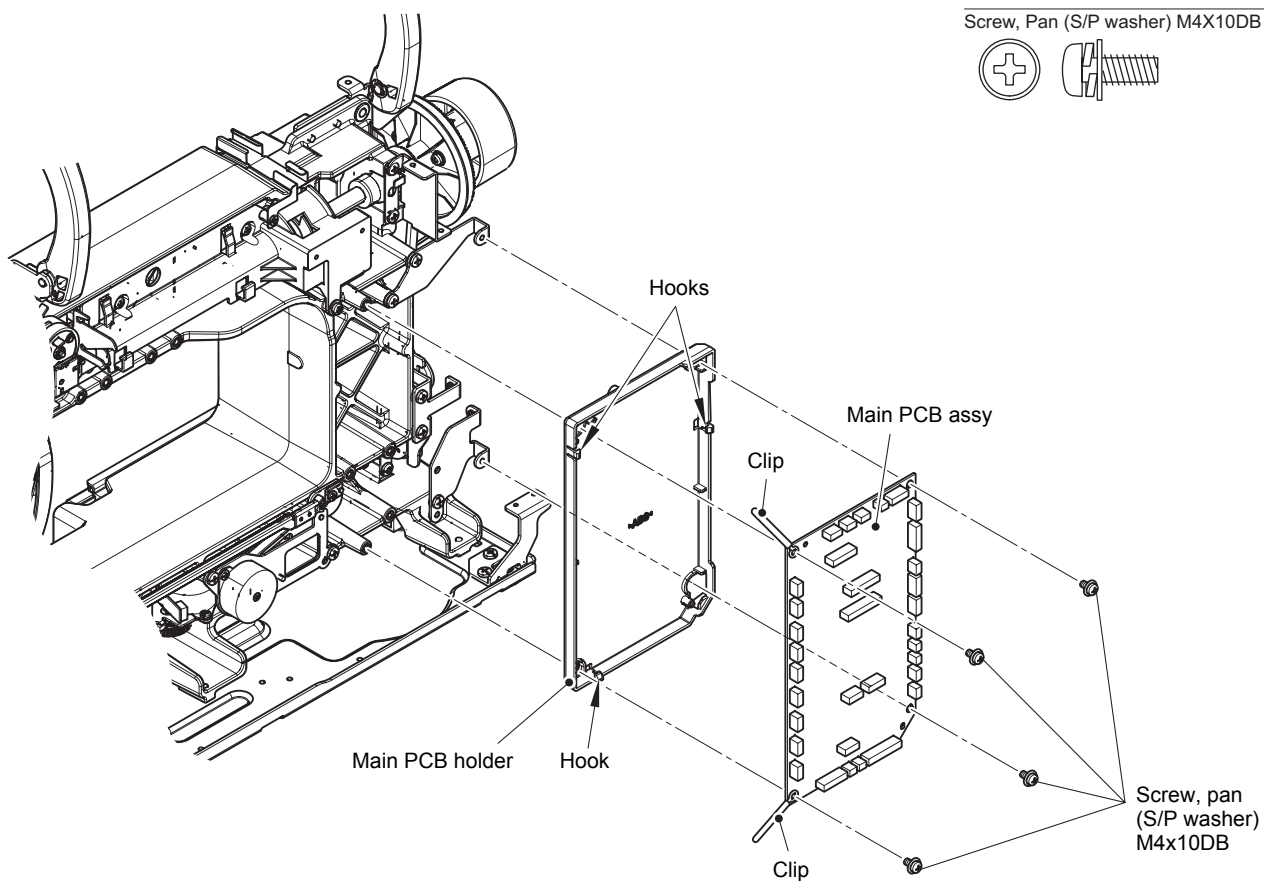


Basic of Disassembly

Basic of Disassembly

1 Removal of Main PCB Assy

1. Disconnect all the connector connected to the main PCB Assy.
2. Remove the four screws (screw, pan (S/P washer) M4x10DB) to remove the two clips and the main PCB Assy.
3. Release the three hooks to remove the main PCB Assy from the main PCB holder.

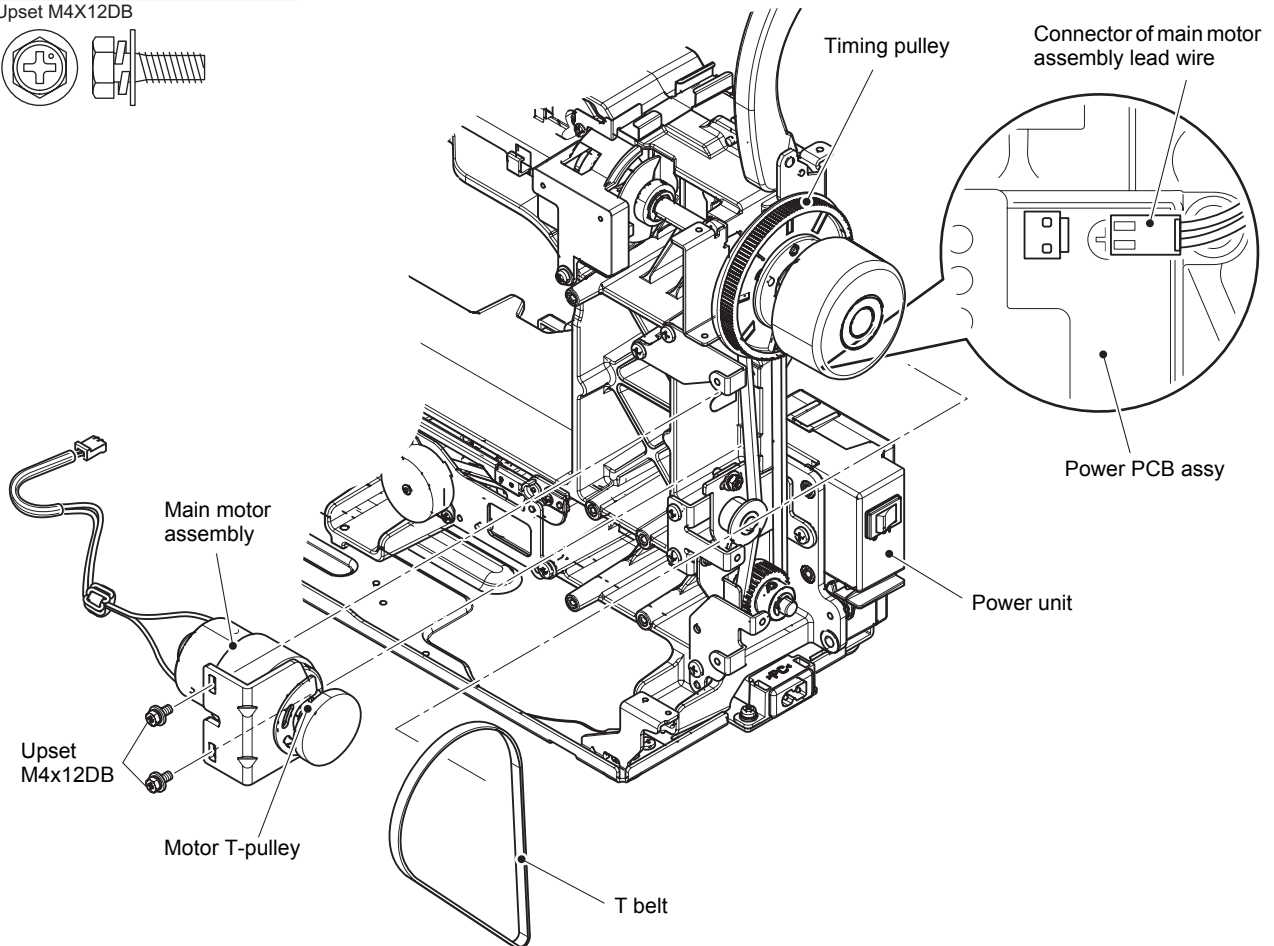


2 Removal of Main motor assembly

1. Remove the T belt from the timing pulley of upper shaft assy and the motor T-pulley of main motor assembly.
2. Disconnect the connector of main motor assembly lead wire from the power PCB assy of power unit.
3. Remove the two screws (upset M4x12DB) to remove the main motor assembly.

→Refer to 3 - 24 Disassembly of Main motor assembly.

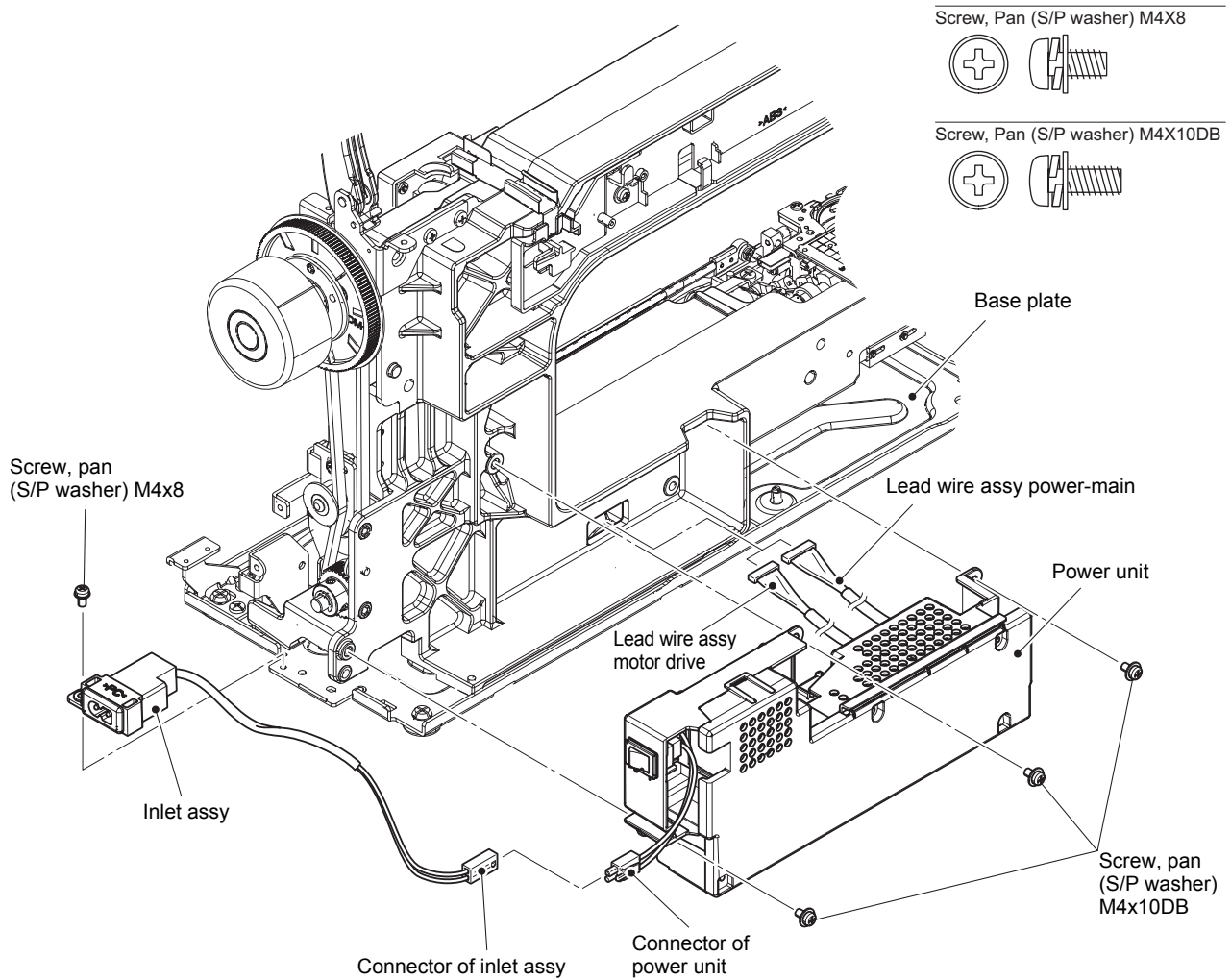
Upset M4X12DB



3 Removal of Power unit

1. Remove the screw (screw, pan (S/P washer) M4x8) to remove the inlet assy from the base plate. Remove the three screws (screw, pan (S/P washer) M4x10DB) to remove the power unit, and pull out the lead wire assy power-main and the lead wire assy motor drive from the hole of arm bed.
2. Release the lead wire of inlet assy from the securing fixtures of power unit, and then unlock the connector of inlet assy to disconnect it from the connector of power unit.

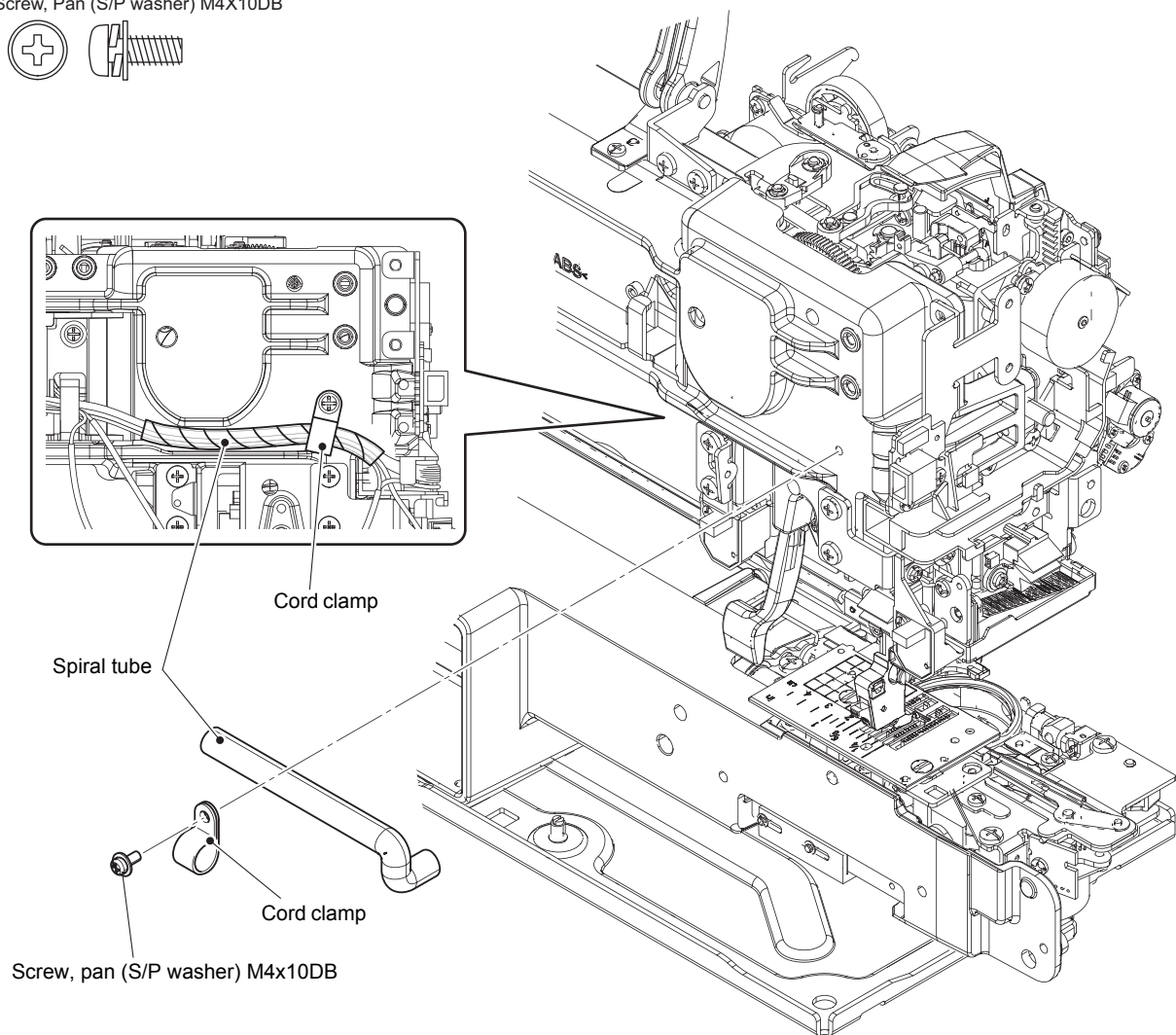
→Refer to 3 - 25 Disassembly of Power unit.



4 Removal of Spiral tube

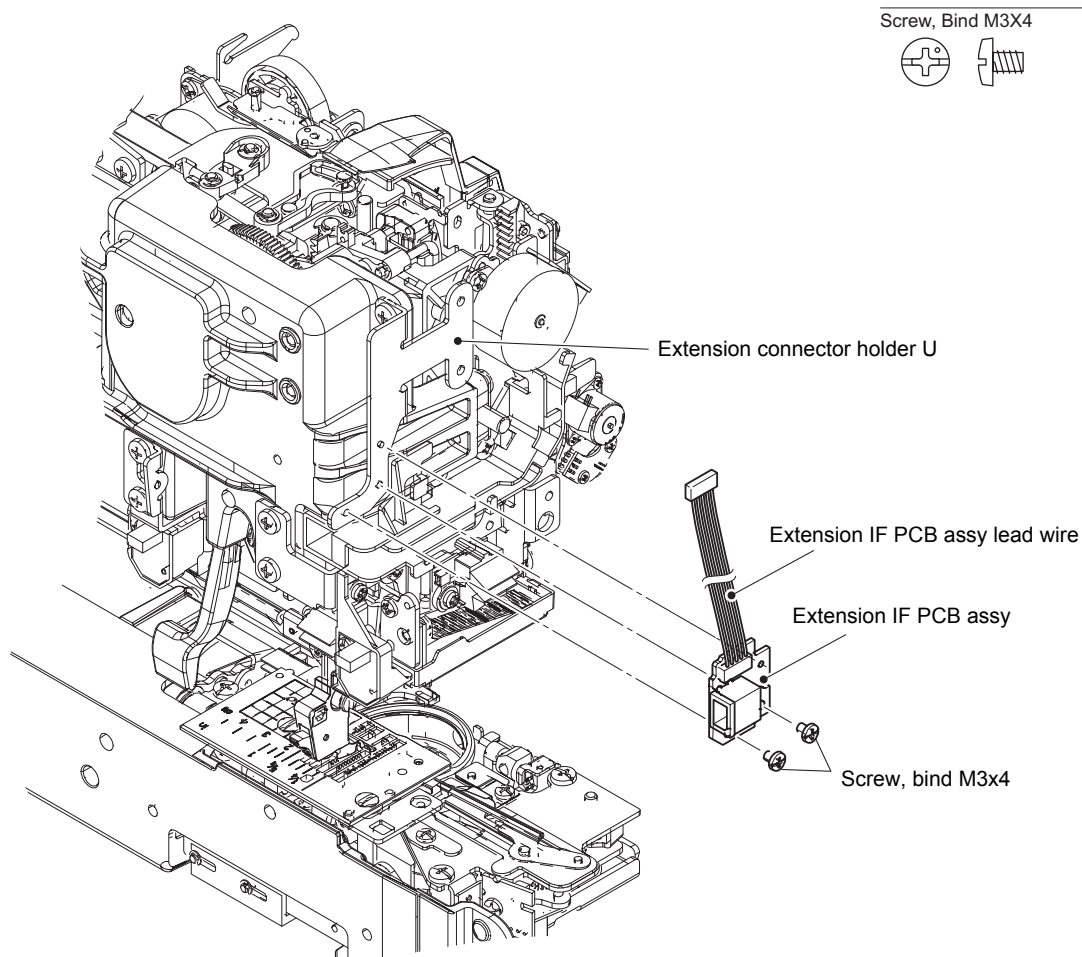
1. Release the each lead wire from the securing fixtures.
2. Remove the screw (screw, pan (S/P washer) M4x10DB) to remove the cord clamp, and then remove it from the spiral tube.
3. Release the spiral tube to unwind the each lead wire.

Screw, Pan (S/P washer) M4X10DB

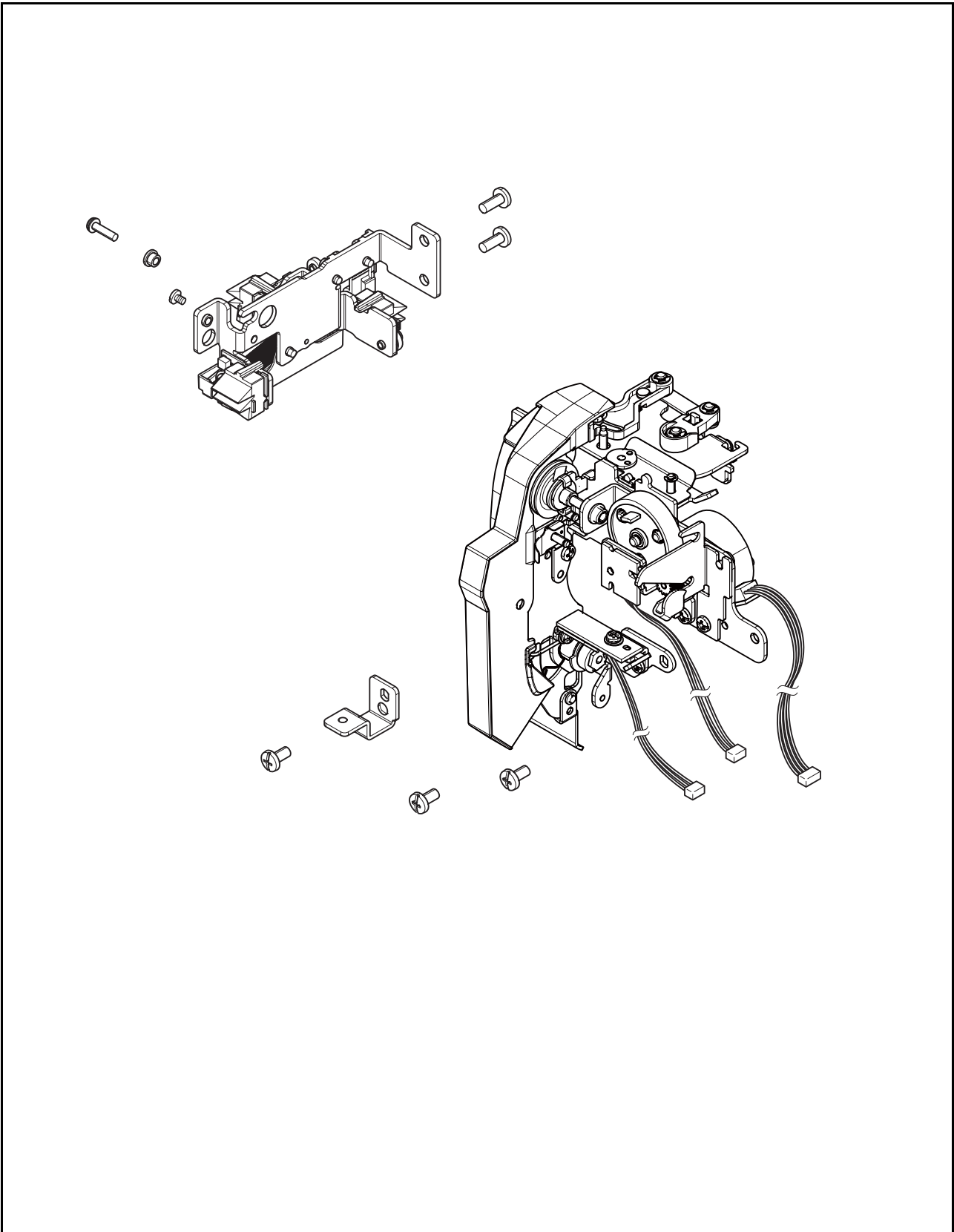


5 Removal of Extension IF PCB assy

1. Release the extension IF PCB assy lead wire from the securing fixtures.
2. Remove the two screws (screw, bind M3x4) to remove the extension IF PCB assy from the extension connector holder U.



Needle threading mechanism location diagram



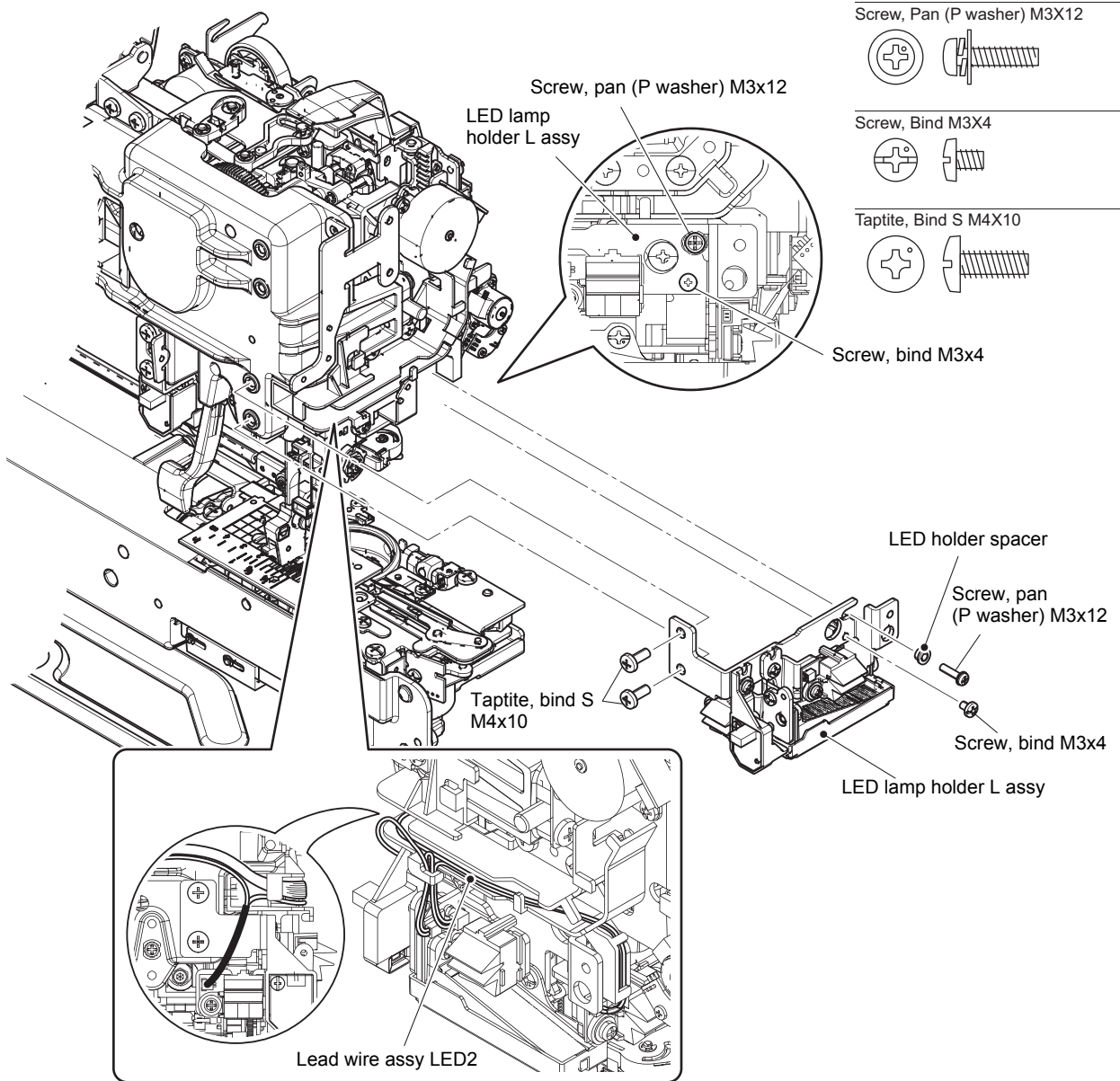
Basic of Disassembly

Basic of Disassembly

1 Removal of LED lamp holder L assy

1. Release the lead wire assy LED2 from the securing fixtures.
2. Remove the screw (screw, pan (P washer) M3x12) to remove the LED holder spacer from the LED lamp holder L assy.
3. Remove the screw (screw, bind M3x4) and two screws (taptite, bind S M4x10) to remove the LED lamp holder L assy from the arm bed.

→Refer to 3 - 40 Disassembly of LED lamp holder L assy.

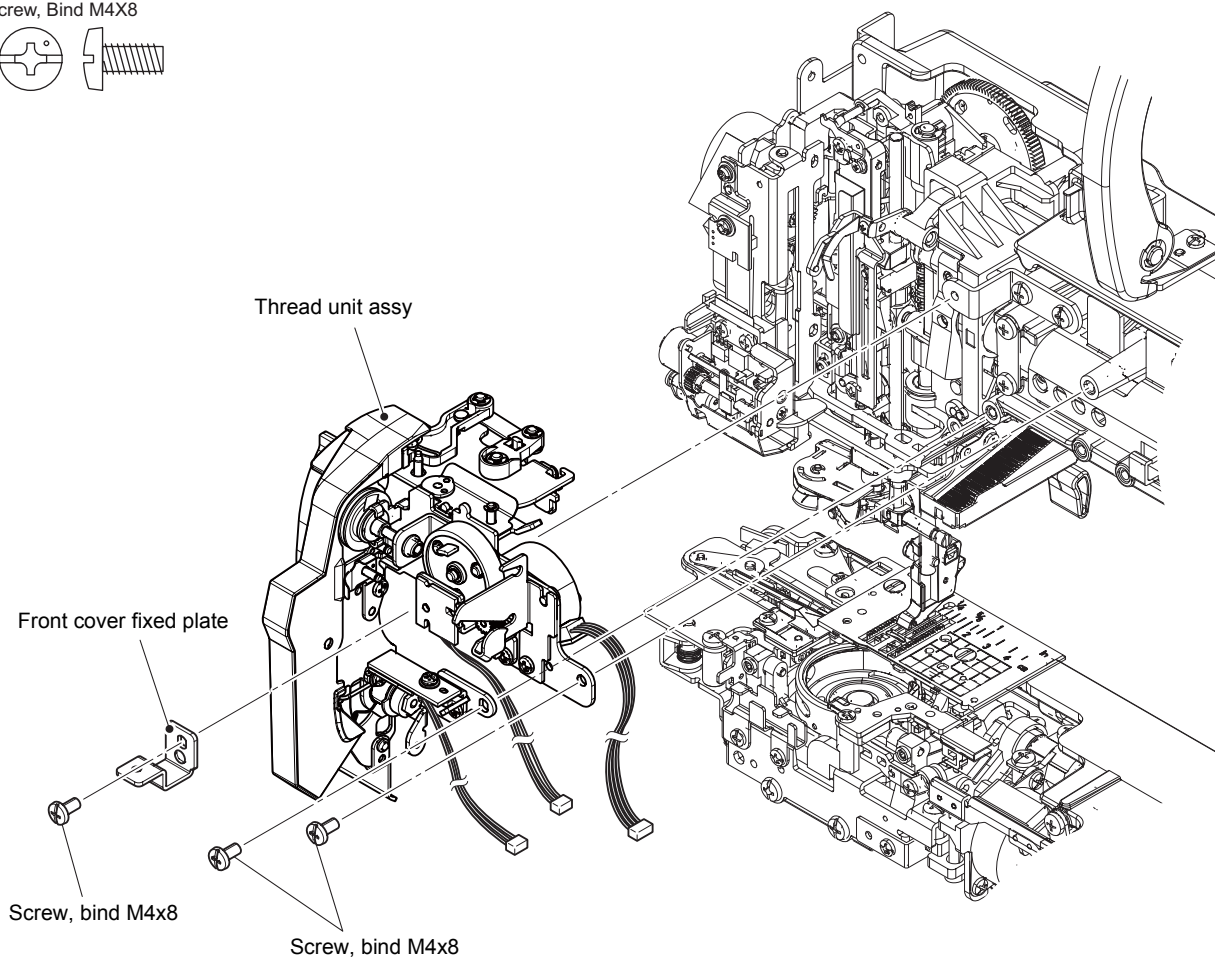


2 Removal of Thread unit assy

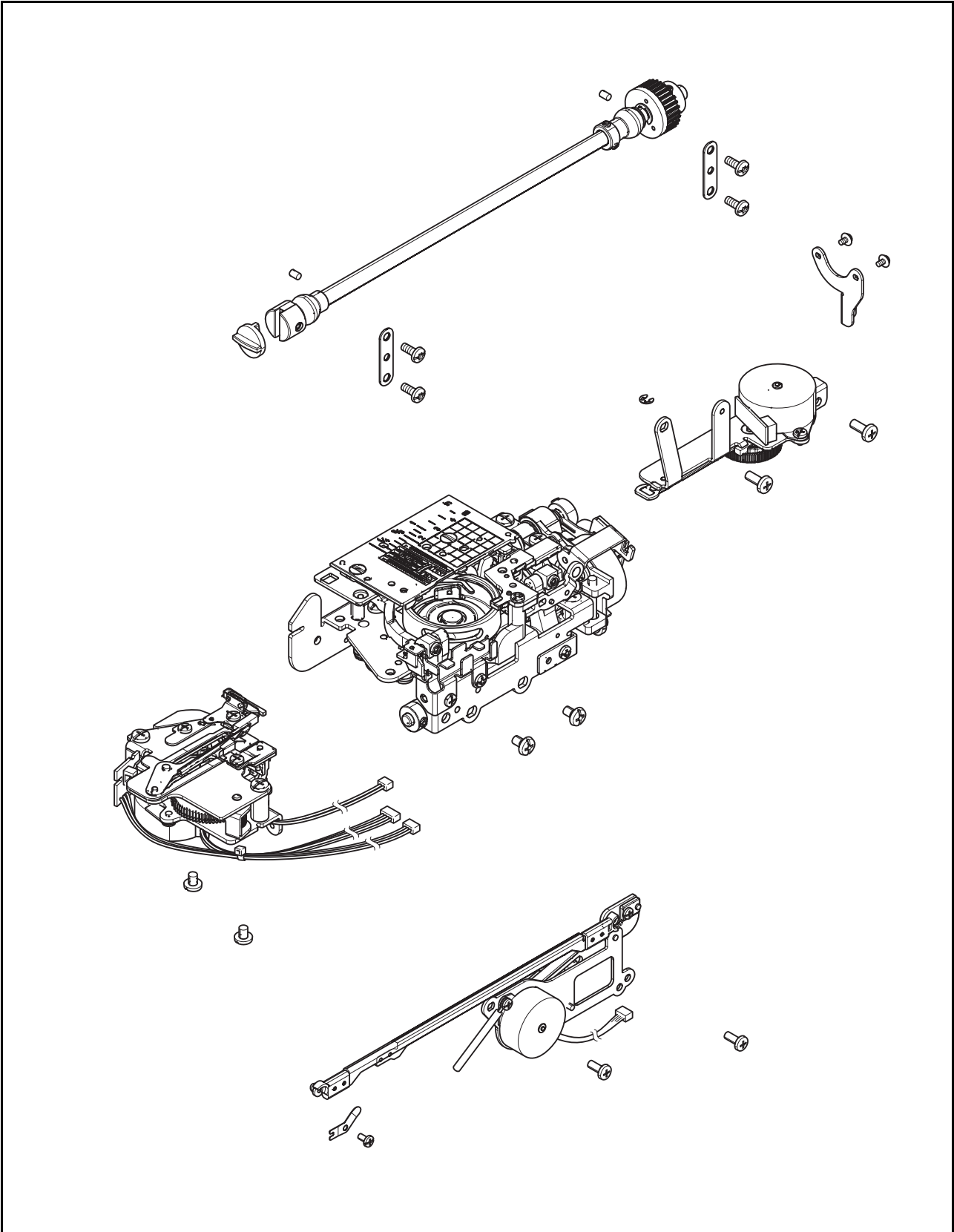
1. Release the each lead wire of thread unit assy from the securing fixtures.
2. Remove the screw (screw, bind M4x8) to remove the front cover fixed plate from the thread unit assy.
3. Remove the two screws (screw, bind M4x8) to remove the thread unit assy from the arm bed.

→Refer to 3 - 26 Needle threading mechanism.

Screw, Bind M4X8



Lower driving mechanism location diagram

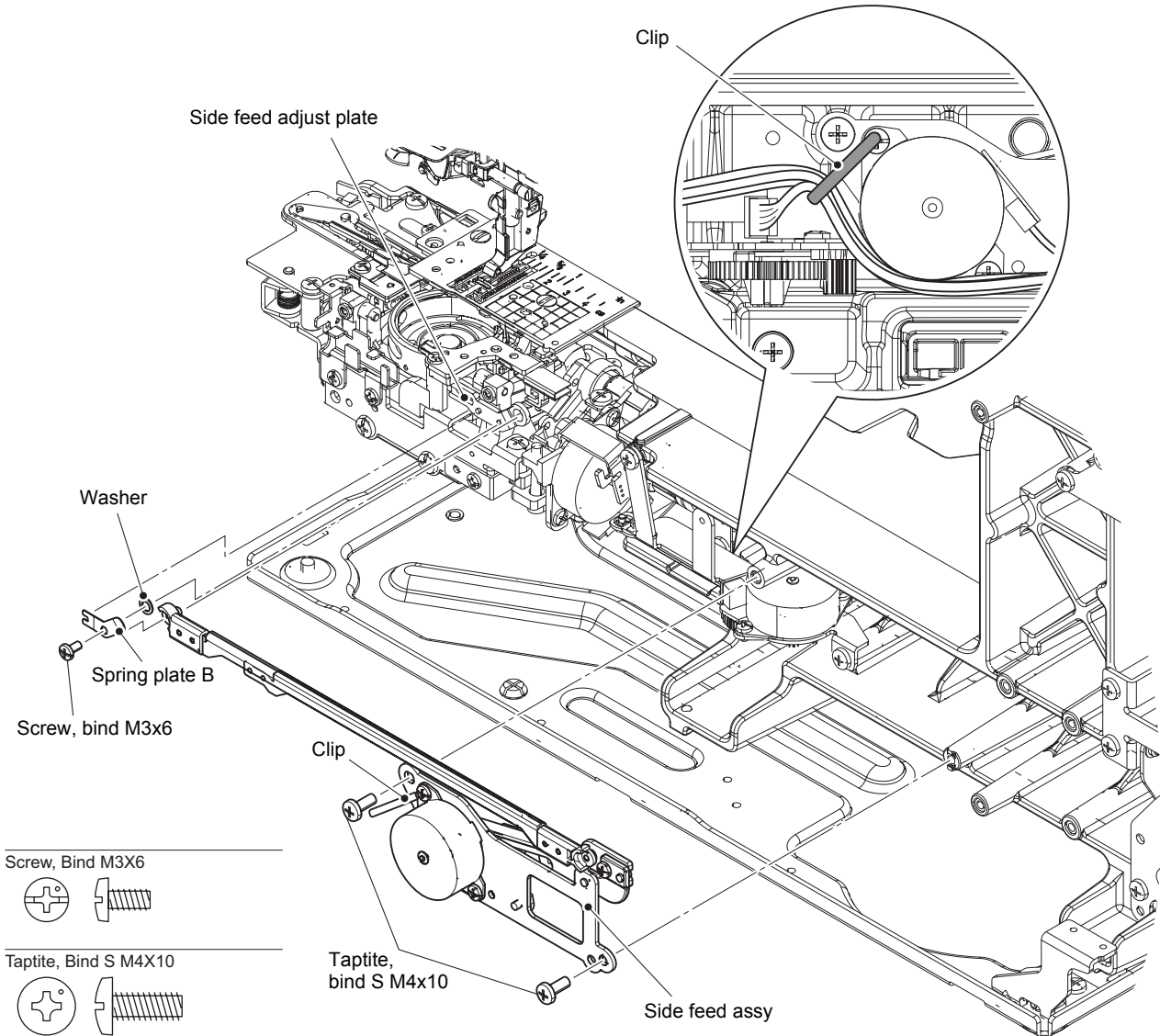


Basic of Disassembly

Basic of Disassembly

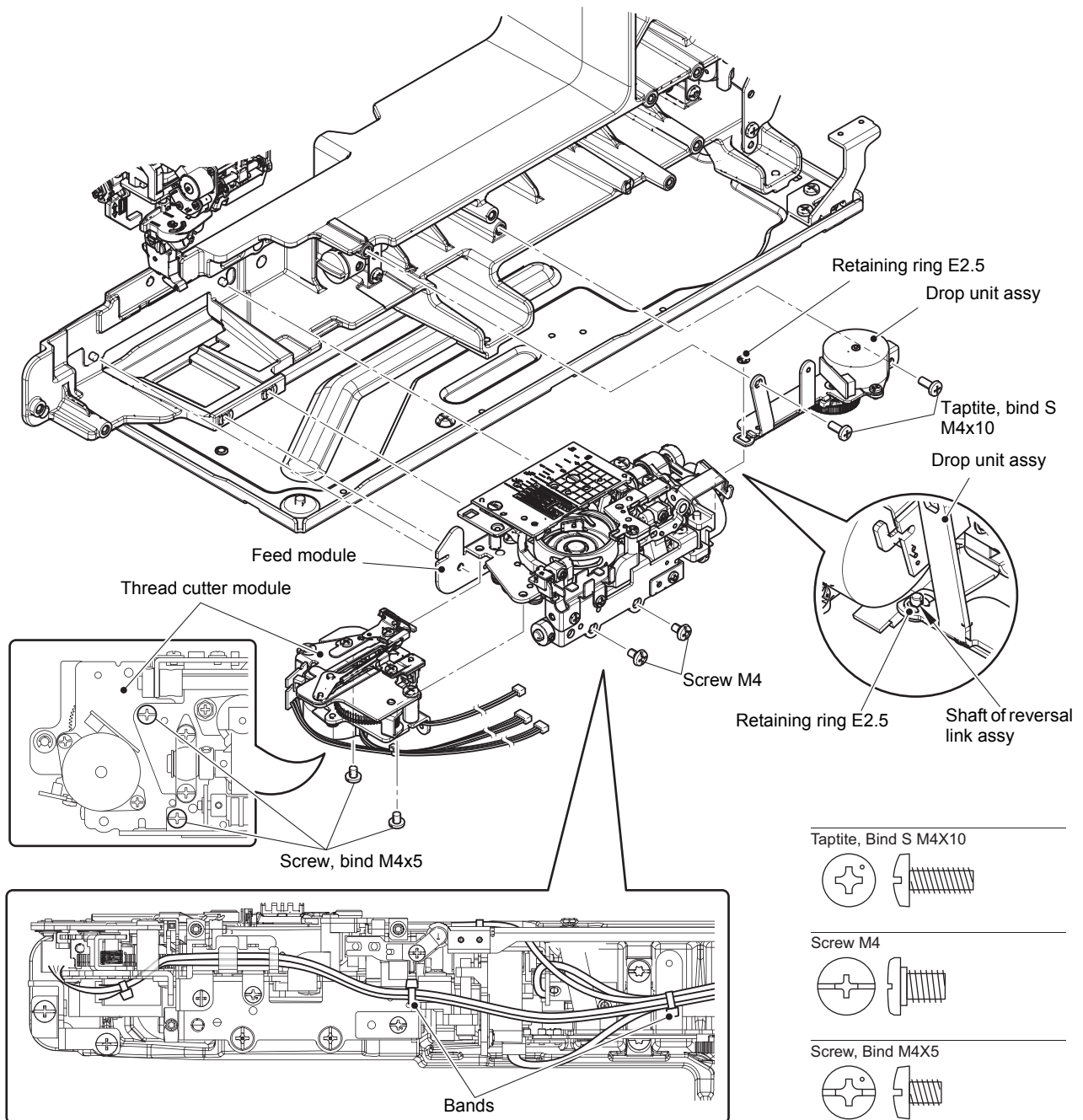
1 Removal of Side feed assy

1. Release the clip to unbind the each lead wire.
2. Remove the screw (screw, bind M3x6) to remove the spring plate B and the washer from the side feed adjust plate.
3. Remove the two screws (taptite, bind S M4x10) to remove the side feed assy from the arm bed.



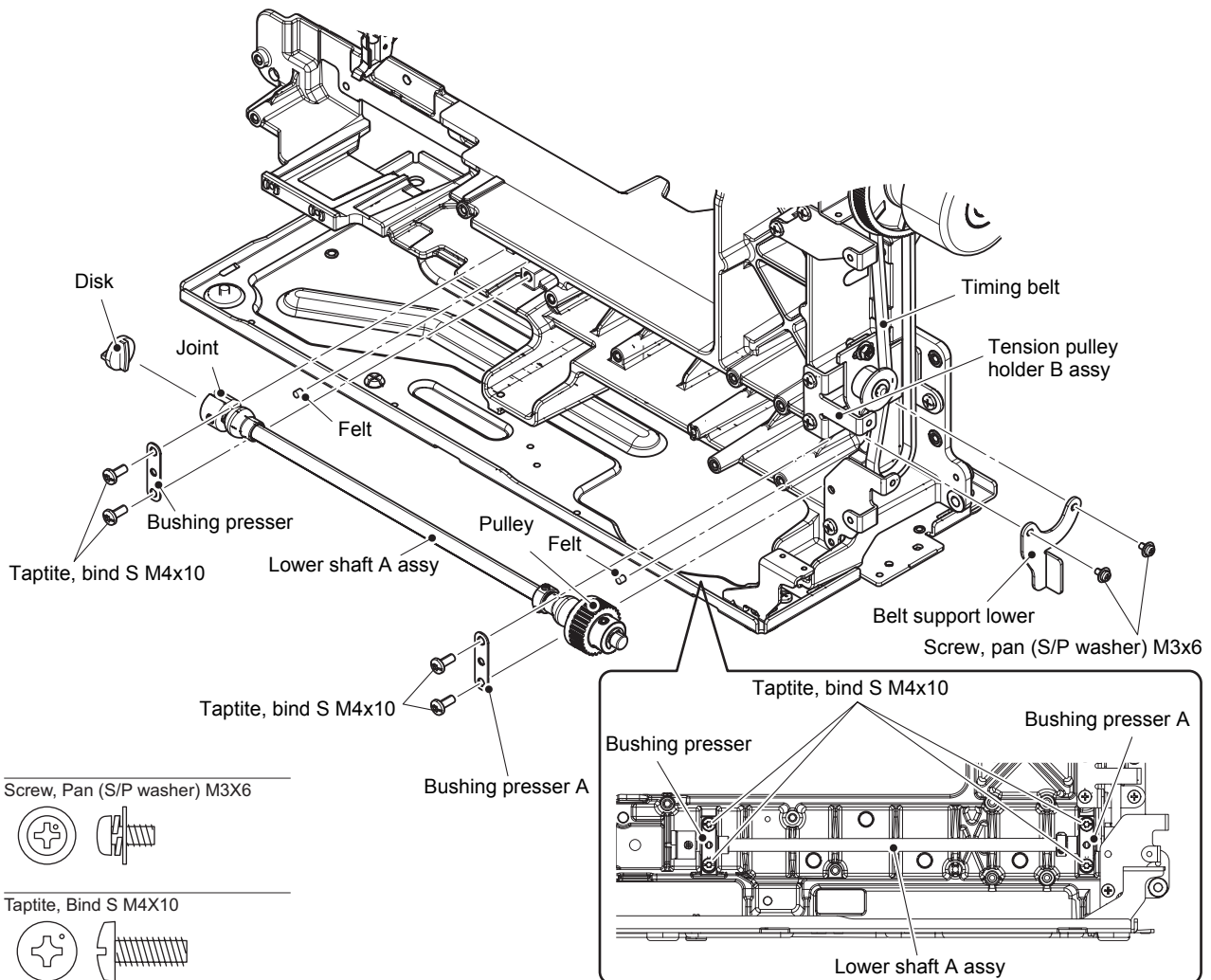
2 Removal of Drop unit assy, Feed module and Thread cutter module

1. Remove the retaining ring E2.5 from the shaft of reversal link assy and two screws (taptite, bind S M4x10) to remove the drop unit assy from the arm bed.
2. Remove the two screws (screw M4) to remove the feed module from the arm bed.
→Refer to 3 - 42 Feed module.
3. Cut the two bands and release the each lead wire from the securing fixtures.
4. Remove the two screws (screw, bind M4x5) to remove the thread cutter module from the feed module.
→Refer to 3 - 52 Thread cutter module.



3 Removal of Lower shaft A assy

1. Remove the two screws (screw, pan (S/P washer) M3x6) to remove the belt support lower from the tension pulley holder B assy.
2. Remove the disk from the joint of lower shaft A assy.
3. Remove the timing belt from the pulley of lower shaft A assy.
4. Remove the two screws (taptite, bind S M4x10) to remove the bushing presser from the arm bed.
5. Remove the two screws (taptite, bind S M4x10) to remove the bushing presser A from the arm bed.
6. Remove the lower shaft A assy from the arm bed.
7. Remove the two felts from the arm bed.



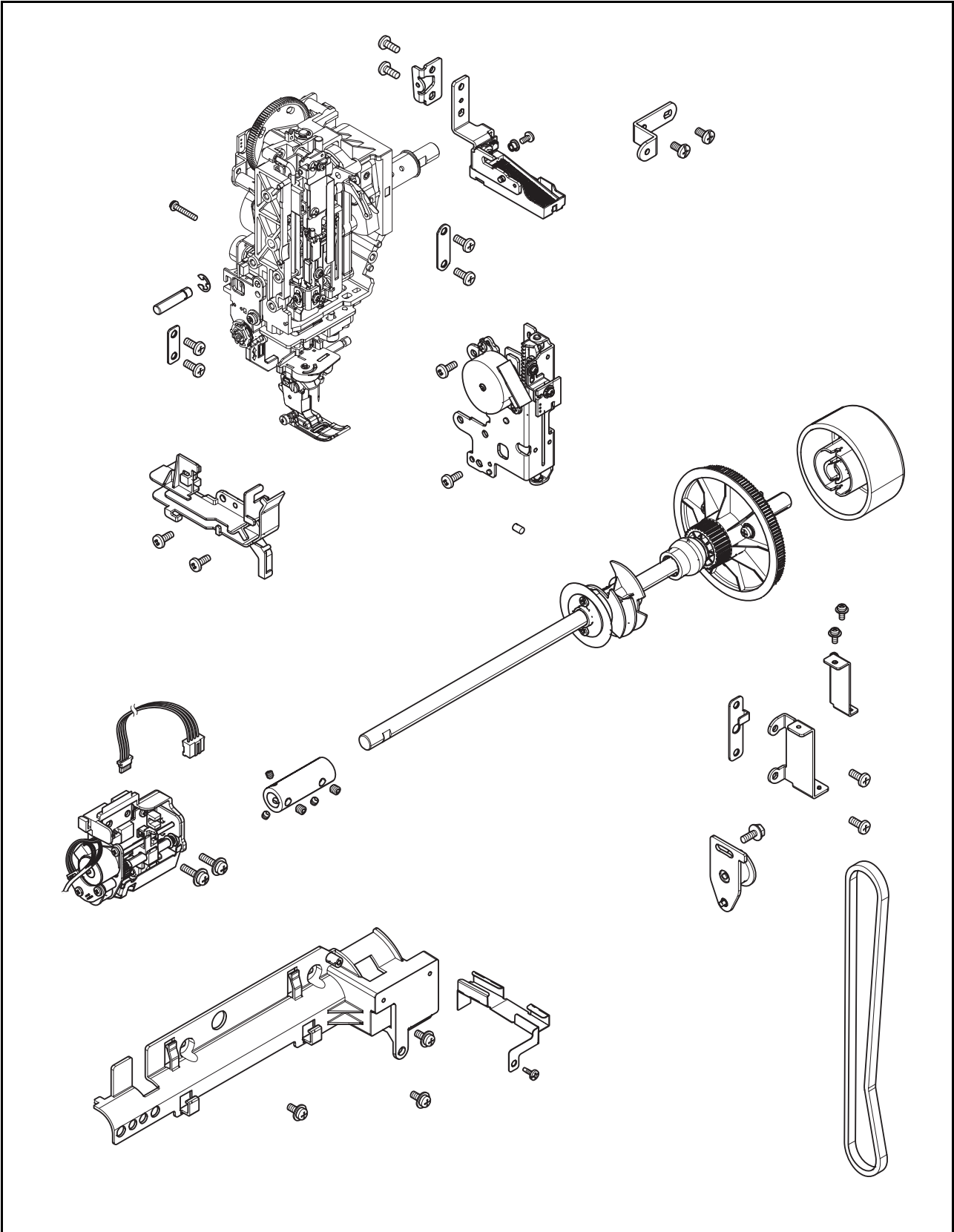
Screw, Pan (S/P washer) M3X6



Taptite, Bind S M4X10



LED lamp / Upper driving mechanism location diagram

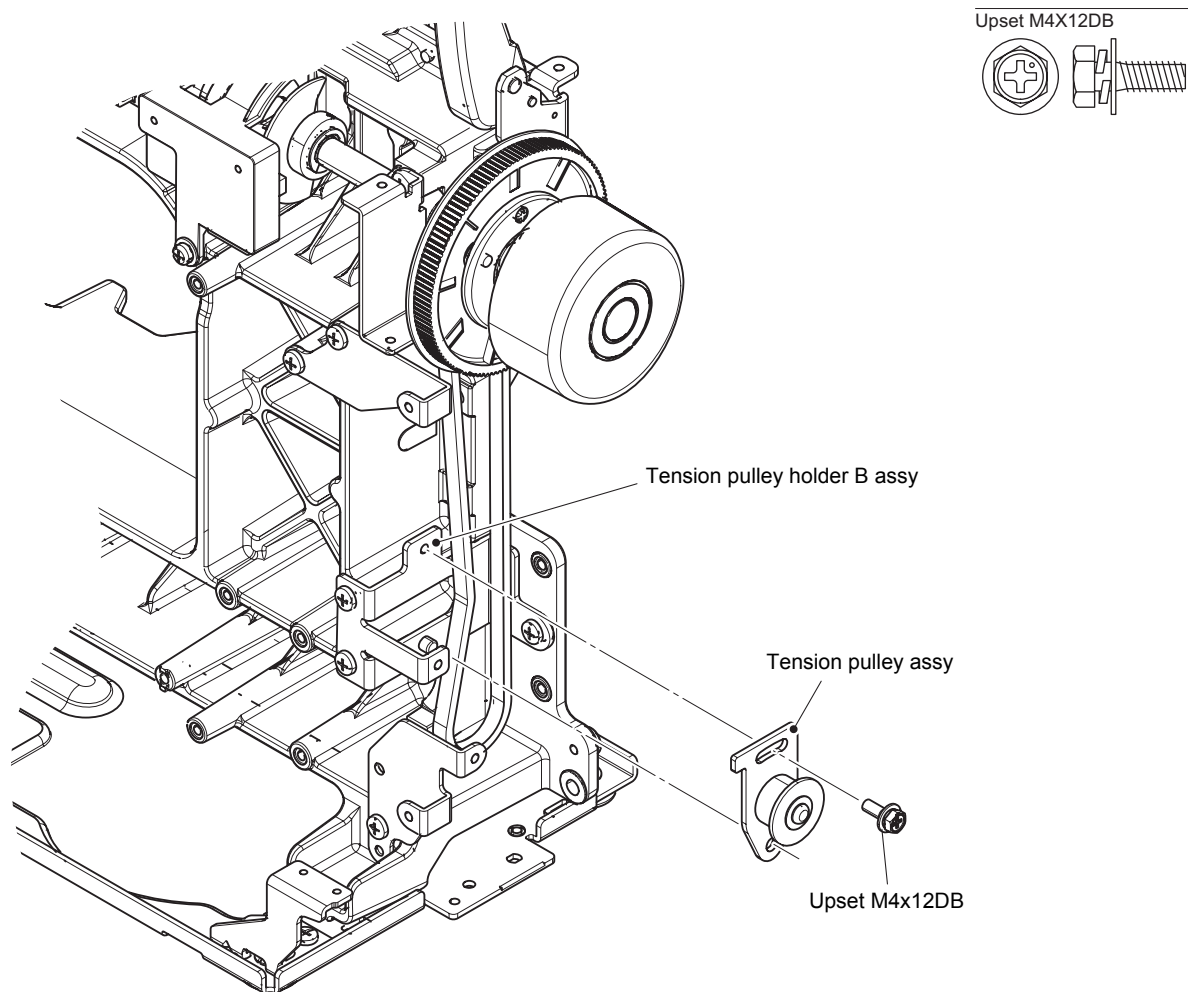


Basic of Disassembly

Basic of Disassembly

1 Removal of Tension pulley assy

1. Remove the screw (upset M4x12DB) to remove the tension pulley assy from the tension pulley holder B assy.

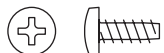


2 Removal of Upper shaft cover

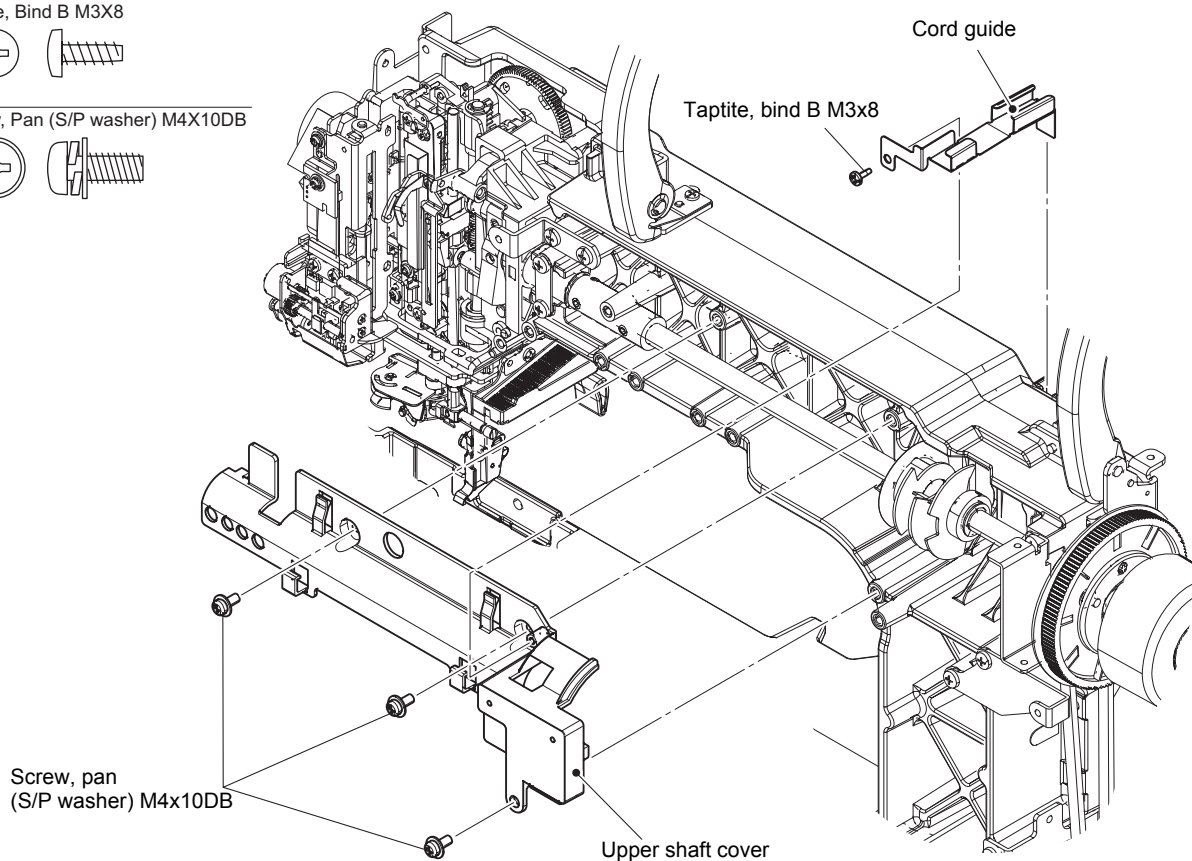
1. Remove the screw (taptite, bind B M3x8), and then remove the cord guide from the upper shaft cover.
2. Remove the three screws (screw, pan (S/P washer) M4x10DB) to remove the upper shaft cover from the arm bed.

→Refer to 3 - 39 Disassembly of Upper shaft cover.

Taptite, Bind B M3X8



Screw, Pan (S/P washer) M4X10DB



Screw, pan
(S/P washer) M4x10DB

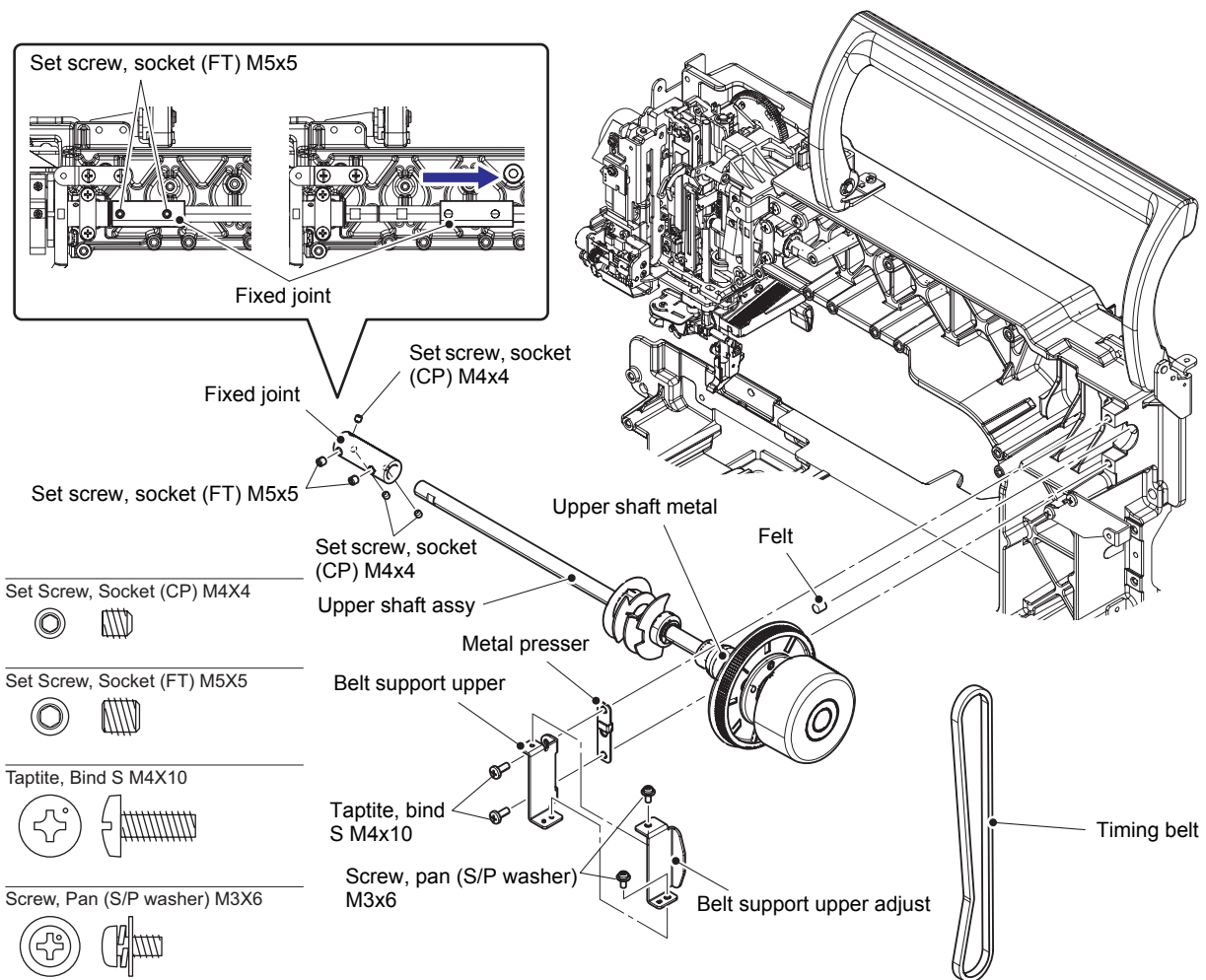
Upper shaft cover

3 Removal of Upper shaft assy

1. Remove the three screws (set screw, socket (CP) M4x4) and two screws (set screw, socket (FT) M5x5) from the fixed joint. Slide the fixed joint to the direction of the arrow, and then remove the upper shaft assy.

→Refer to 3 - 39 Disassembly of Upper shaft assy.

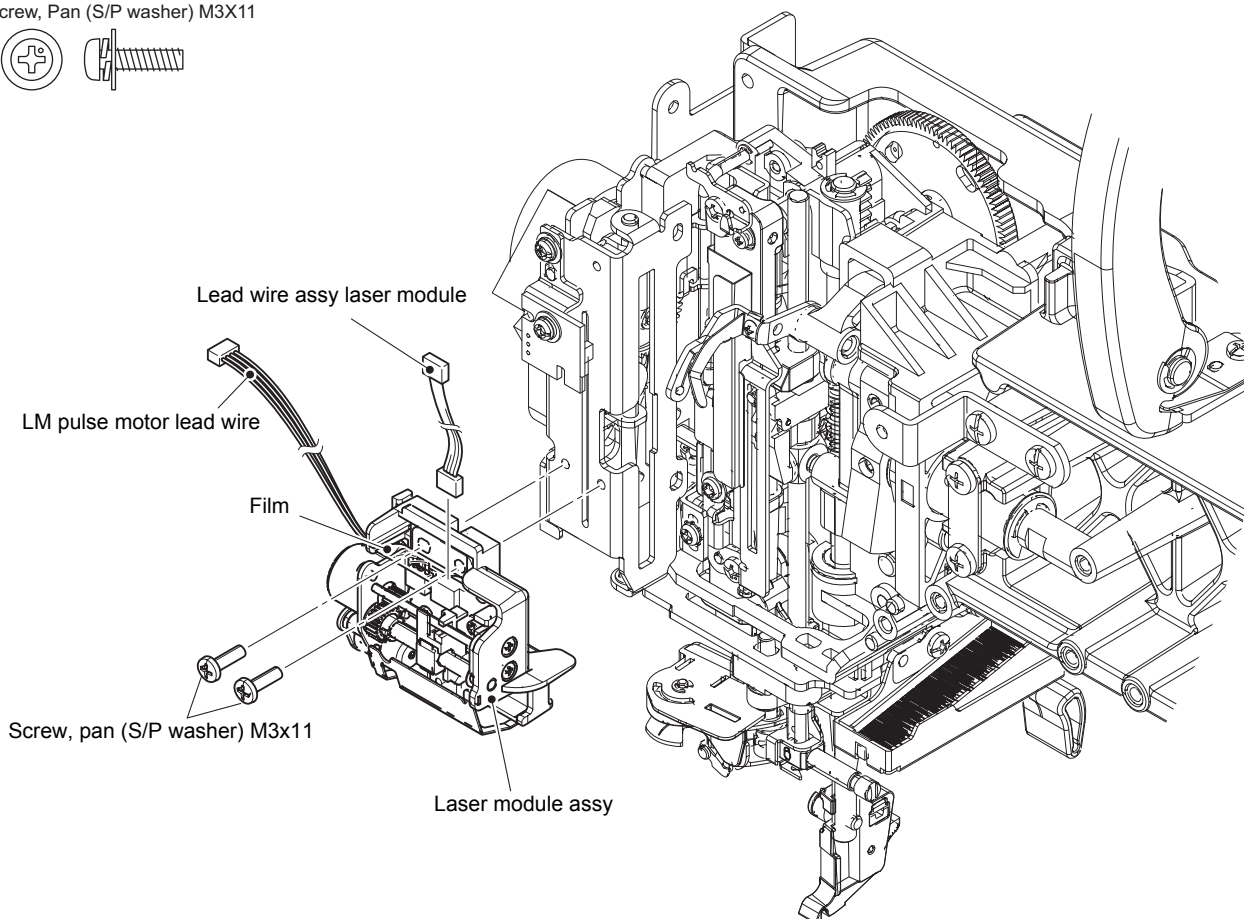
2. Remove the two screws (taptite, bind S M4x10) to remove the belt support upper and the metal presser. Remove the two screws (screw, pan (S/P washer) M3x6) to remove the belt support upper adjust from the belt support upper.
3. Remove the fixed joint and timing belt from the upper shaft assy.
4. Remove the felt from the arm bed.



4 Removal of Laser module assy

1. Release the LM pulse motor lead wire and the lead wire assy laser module from the securing fixtures.
2. Remove the two screws (screw, pan (S/P washer) M3x11) to remove the laser module assy while pulling the film down.
3. Disconnect the lead wire assy laser module from the laser module assy.

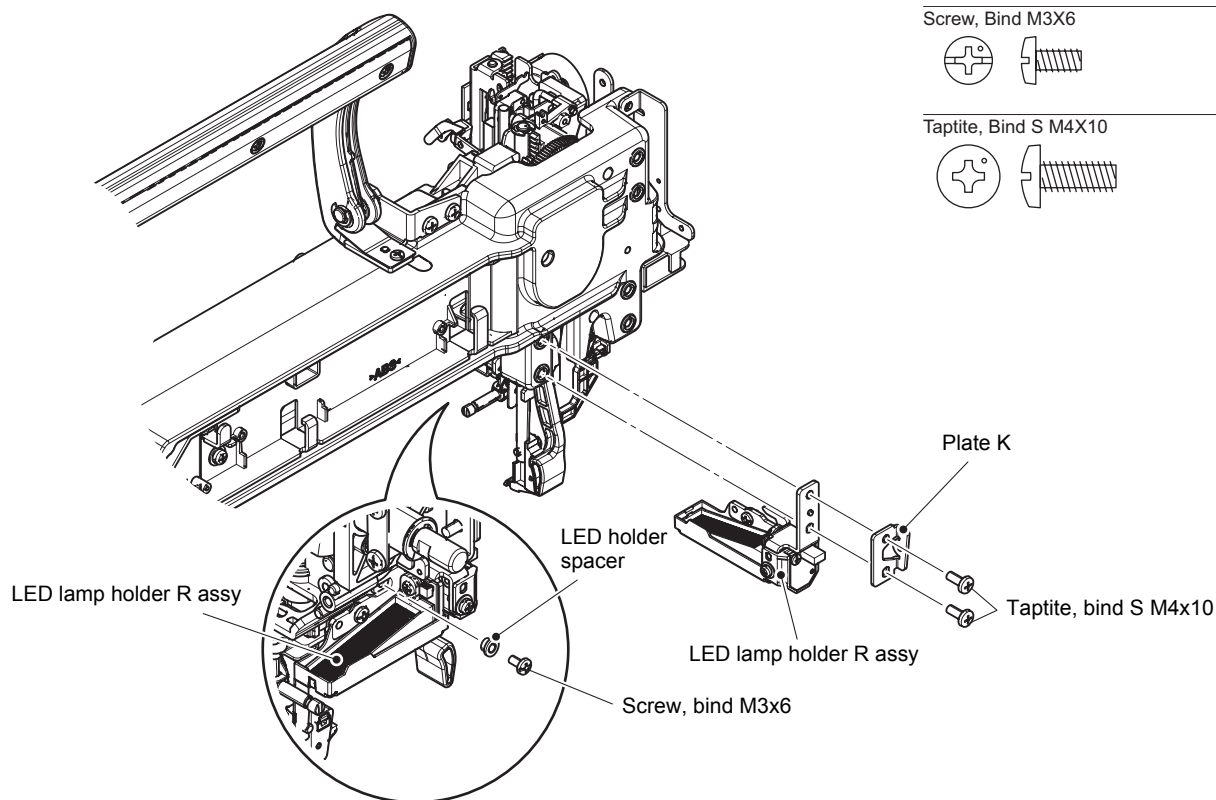
Screw, Pan (S/P washer) M3X11



5 Removal of LED lamp holder R Assy

1. Remove the screw (screw, bind M3x6) to remove the LED holder spacer.
2. Remove the two screws (taptite, bind S M4x10) to remove the plate K and the LED lamp holder R Assy from the arm bed.

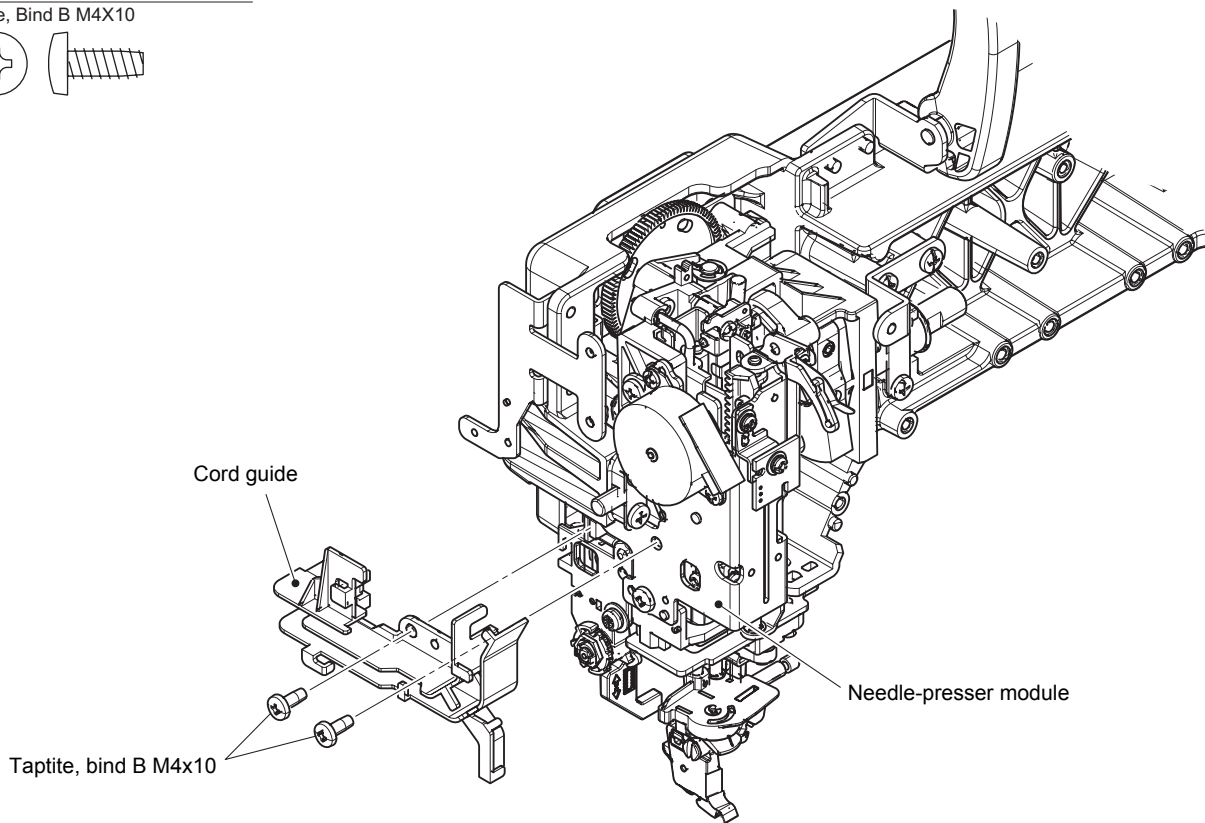
→Refer to 3 - 40 Disassembly of LED lamp holder R Assy.



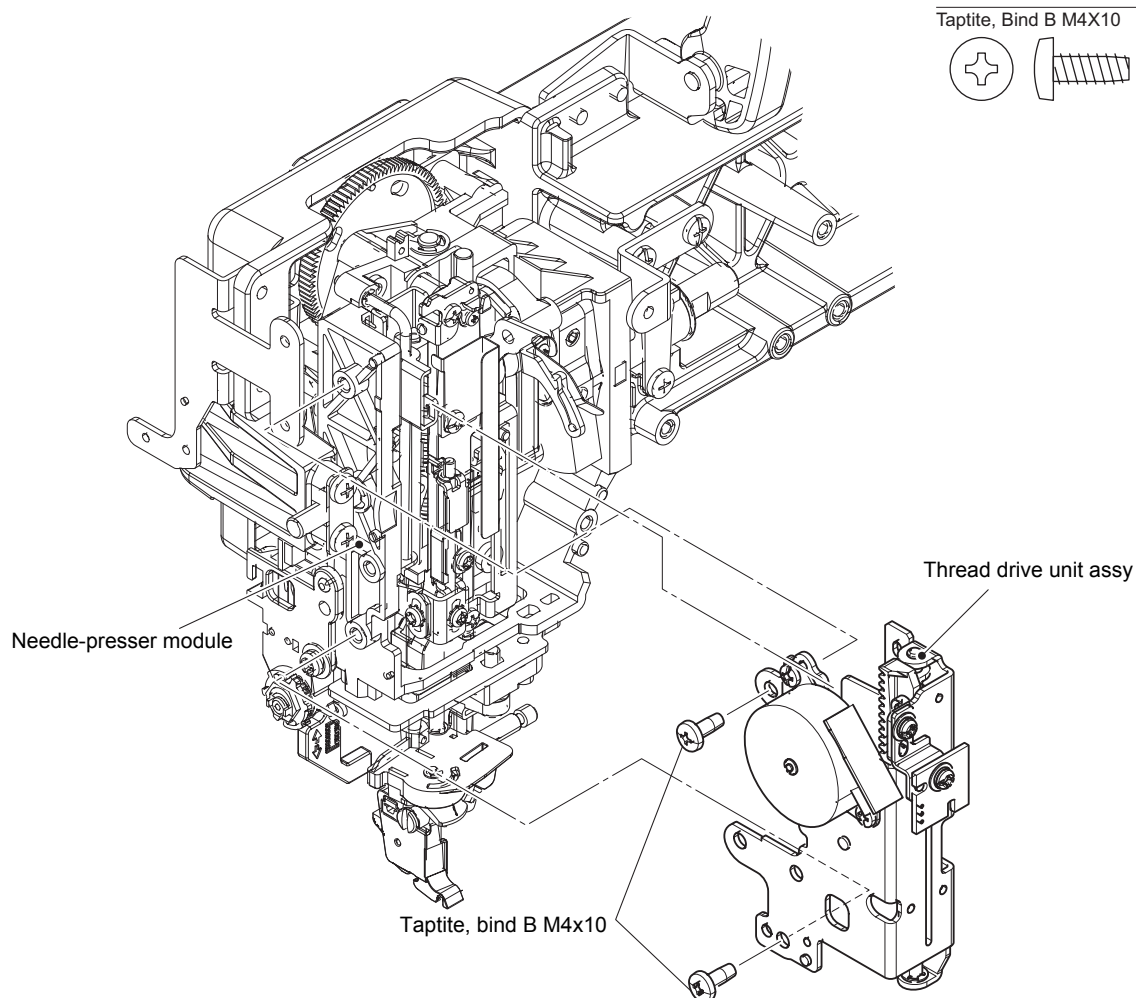
6 Removal of Thread drive unit assy

1. Release the two lead wires of thread drive unit assy and seven lead wires of needle-presser module from the securing fixtures.
2. Remove the two screws (taptite, bind B M4x10) to remove the cord guide from the needle-presser module.

Taptite, Bind B M4X10

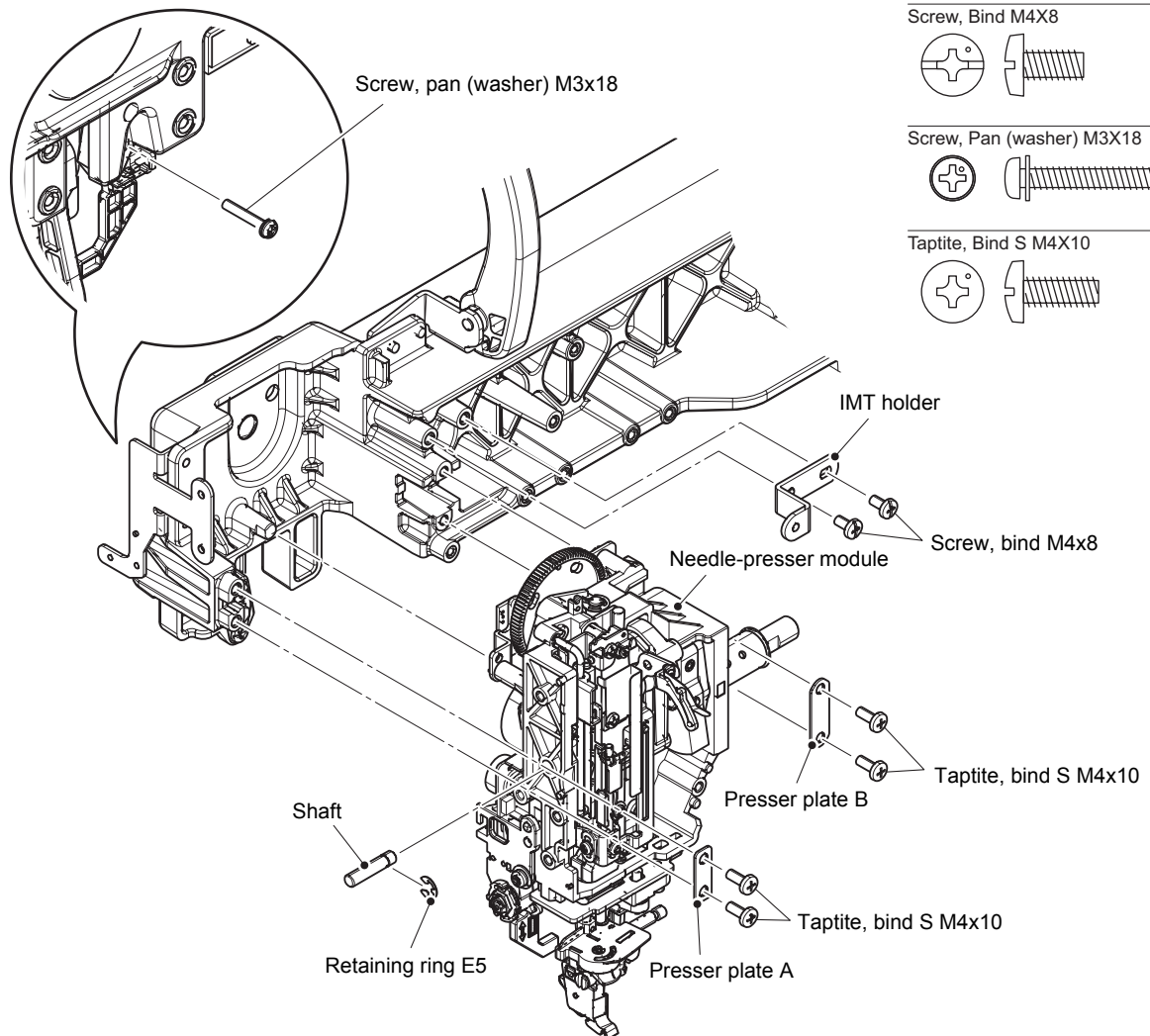


3. Remove the two screws (taptite, bind B M4x10), and then remove the thread drive unit assy from the needle-presser module.

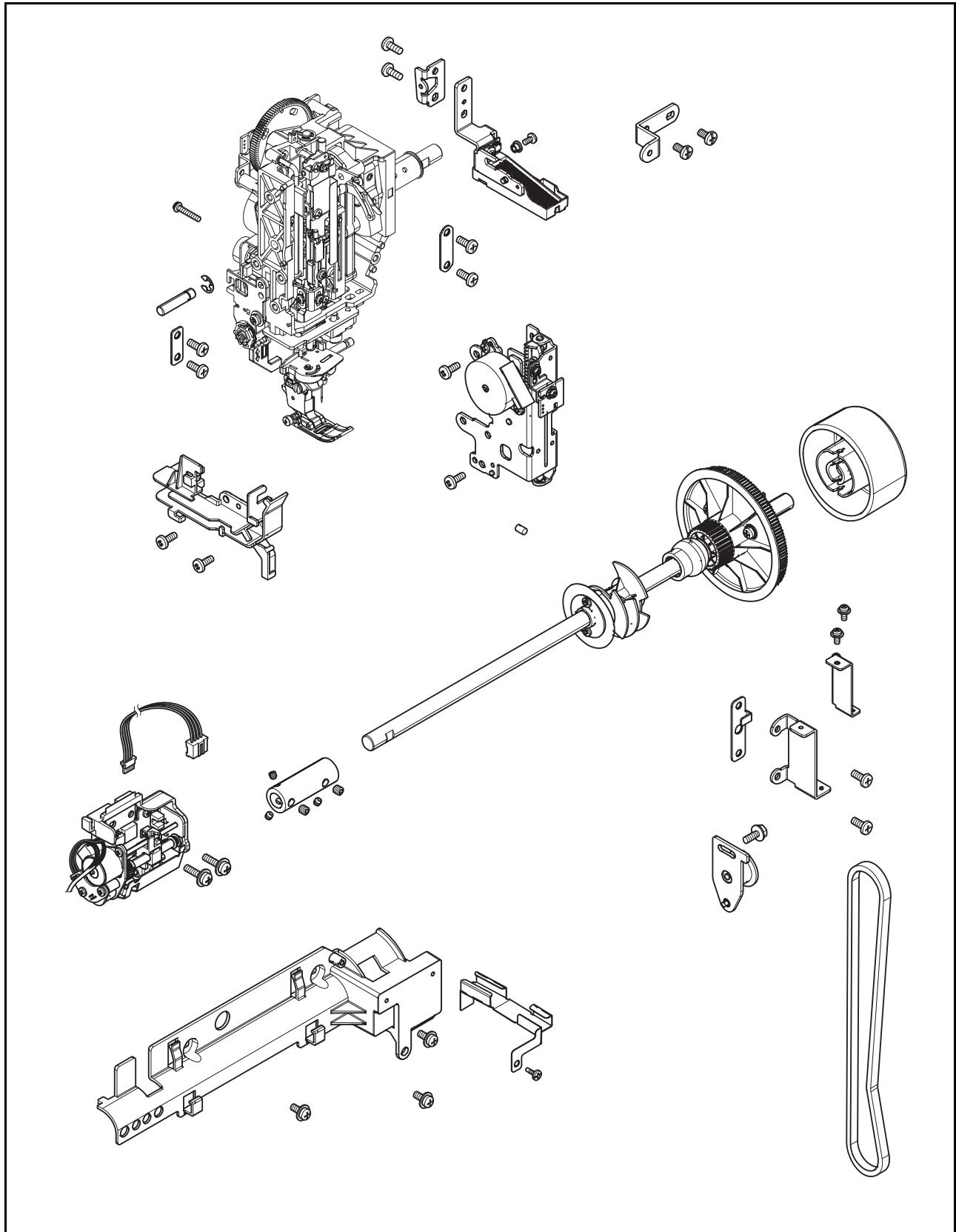


7 Removal of Needle-presser module

1. Remove the two screws (screw, bind M4x8) to remove the IMT holder.
2. Remove the screw (screw, pan (washer) M3x18) from the needle-presser module.
3. Remove the two screws (taptite, bind S M4x10) to remove the presser plate A, and then remove the two screws (taptite, bind S M4x10) to remove the presser plate B. Remove the needle-presser module from the arm bed.
4. Remove the shaft from the needle-presser module, and remove the retaining ring E5 from the shaft.
→Refer to 3 - 56 Needle-presser module.



LED lamp / Upper driving mechanism location diagram

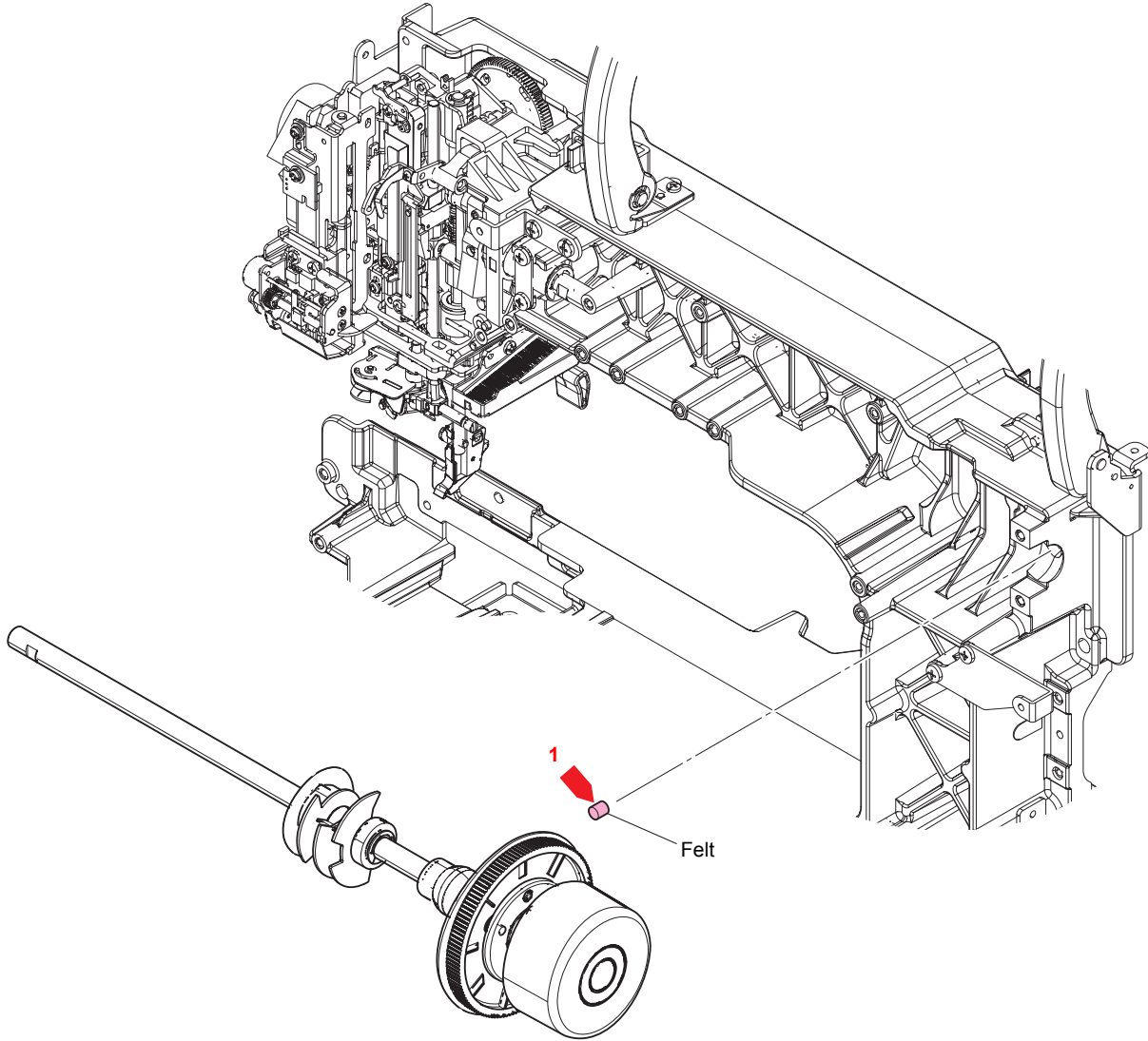


Basic of Assembly

Basic of Assembly

1 Lubrication

Lubrication point		Lubricating oil type	Quantity of lubrication
1	Felt	FBK OIL RO 100	1 to 2 drops



Basic of Assembly

Basic of Assembly

2 Attachment of Needle-presser module

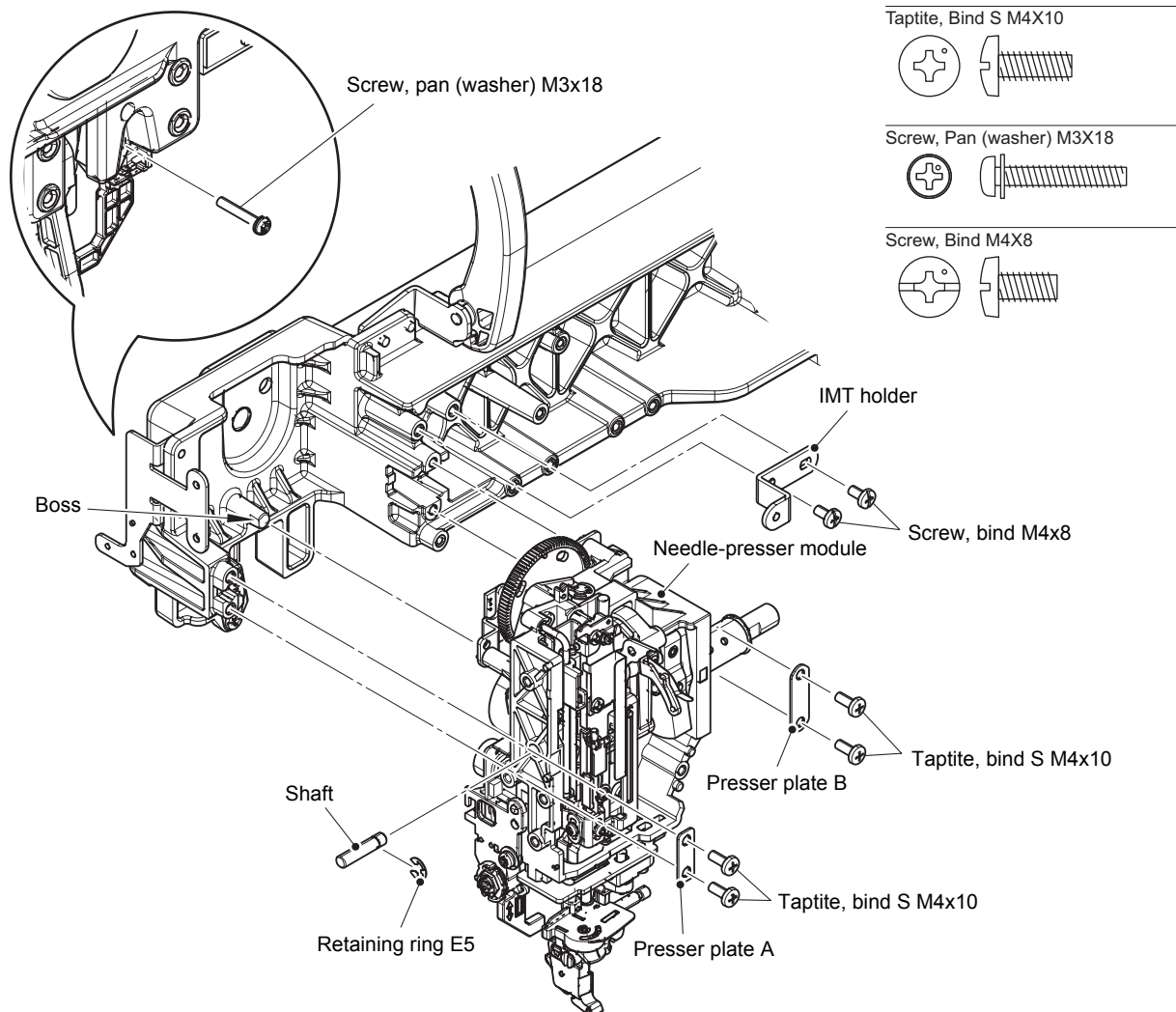
1. Attach the retaining ring E5 to the shaft, and then attach the shaft to the needle-presser module.
2. Set the needle-presser module to the mounting position of arm bed, and align the positioning hole of adjusting plate assy with the boss of arm bed. Attach the presser plate A to the arm bed with the two screws (taptite, bind S M4x10), and then attach the presser plate B to the arm bed with the two screws (taptite, bind S M4x10).
3. Tighten the screw (screw, pan (washer) M3x18) temporarily to the needle-presser module.

***Key point**

- Fully tighten the screw after performing "Adjustment of Needle clearance".

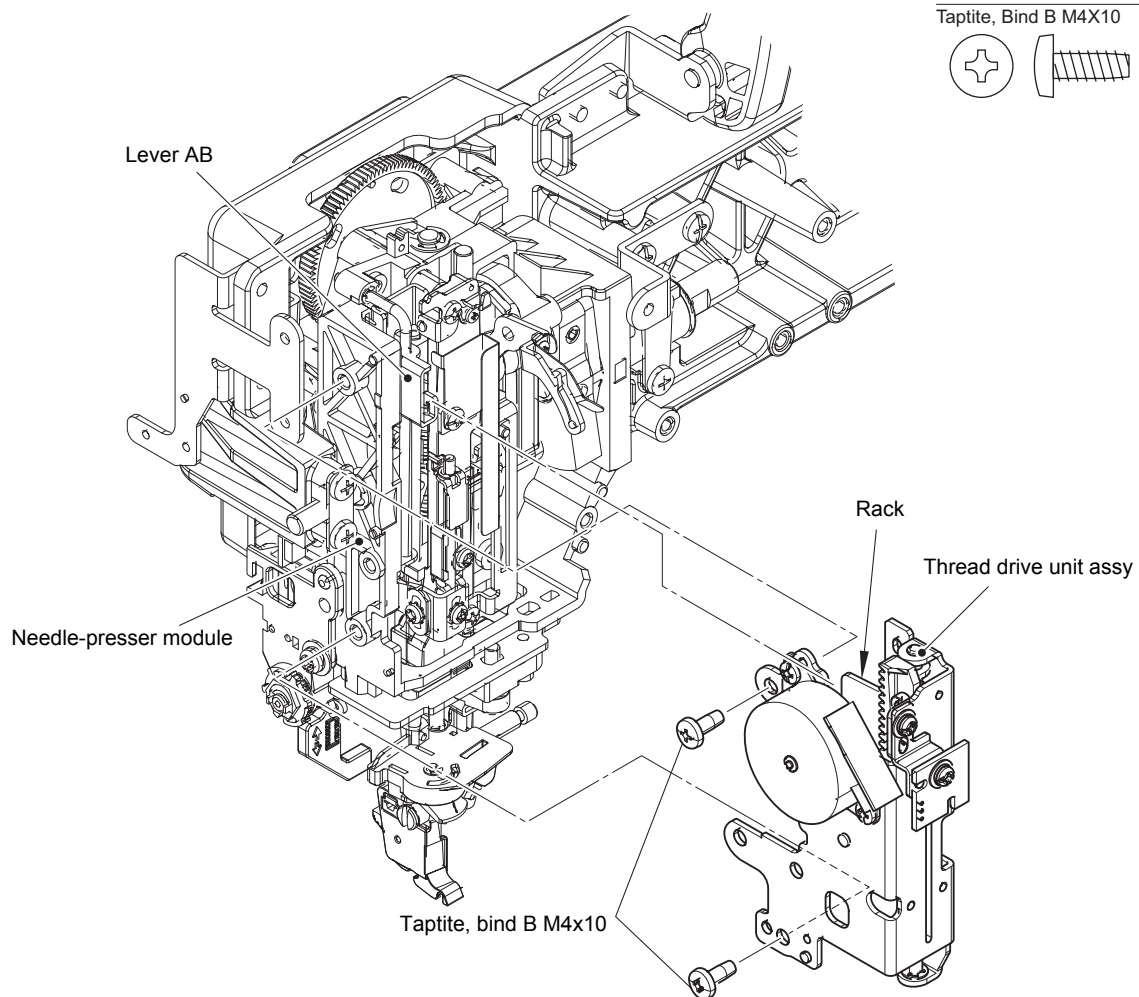
4. Attach the IMT holder to the arm bed with the two screws (screw, bind M4x8).

→Refer to 3 - 133 Needle-presser module.



3 Attachment of Thread drive unit assy

1. Set the rack to the lever AB, and attach the thread drive unit assy to the needle-presser module with the two screws (taptite, bind B M4x10).

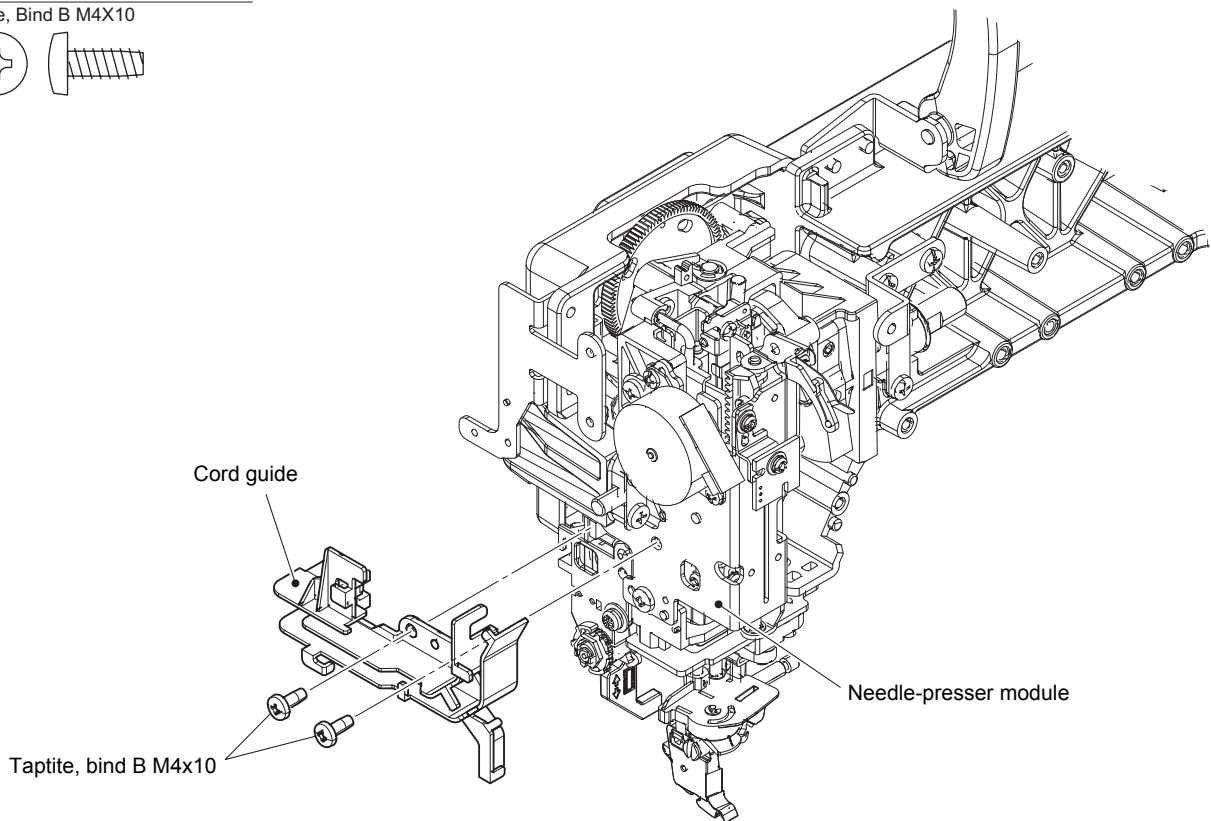


2. Pass the Z INIT PCB assy lead wire through the guide hole of cord guide, and pass the PT holder assembly lead wire, the pulse motor lead wire, and the BH switch assy lead wire through the securing fixtures. Attach the cord guide to the needle-presser module with the two screws (taptite, bind B M4x10).
3. Pass the lead wire assy PFFM, the PF INIT PCB assy lead wire, the PF switch assy lead wire, the lead wire assy THPM and the TH INIT PCB assy lead wire to the securing fixtures.

***Key point**

- Refer to "Wiring of Cord guide".

Taptite, Bind B M4X10

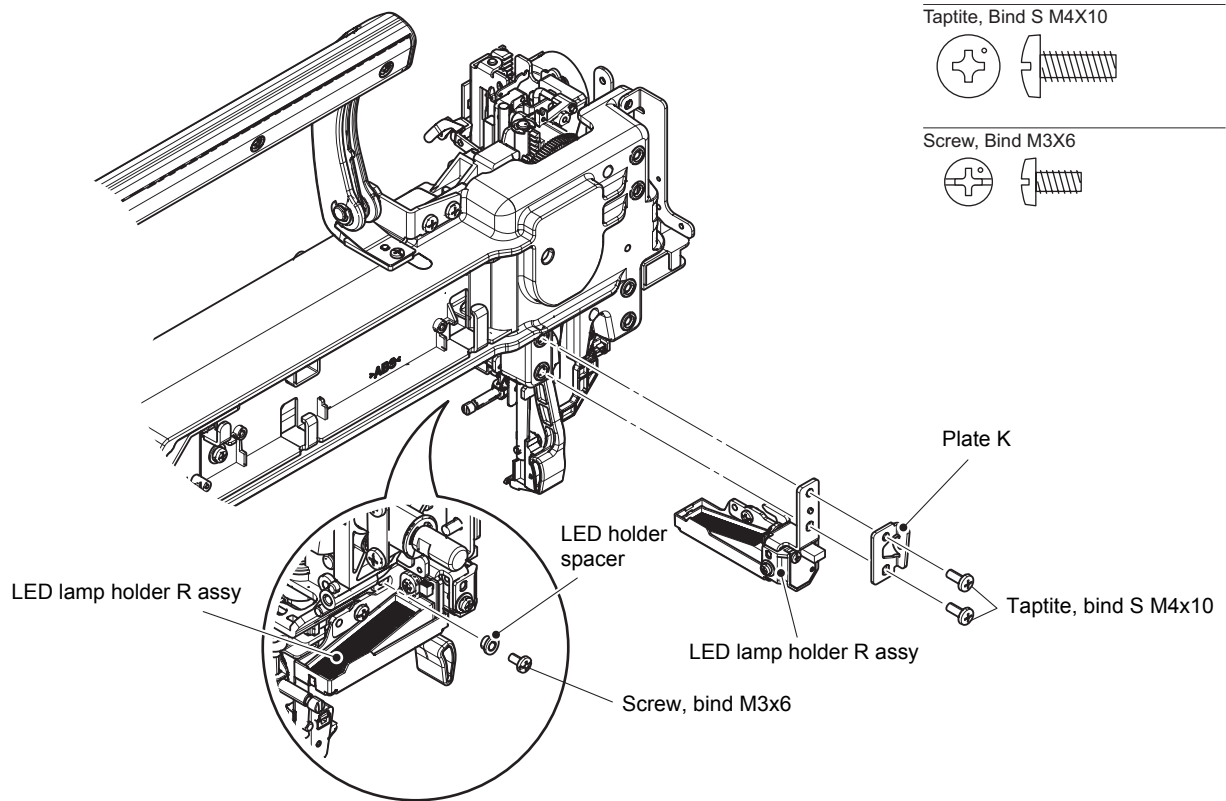


4 Attachment of LED lamp holder R Assy

1. Attach the LED lamp holder R Assy and the plate K to the arm bed with the two screws (taptite, bind S M4x10).

→Refer to 3 - 94 Assembly of LED lamp holder R Assy.

2. Attach the LED holder spacer to the needle-presser module with the screw (screw, bind M3x6).



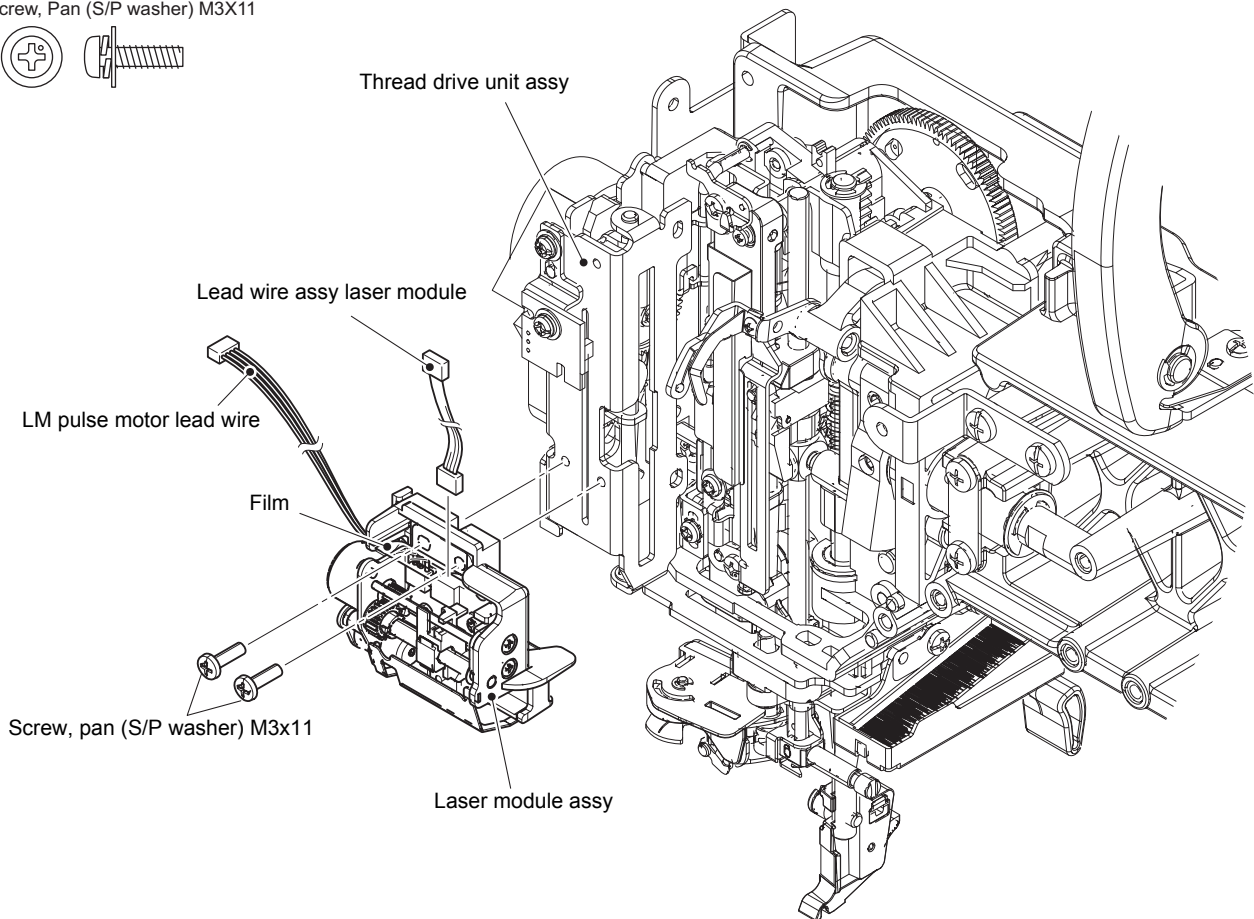
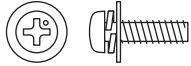
5 Attachment of Laser module assy

1. Connect the lead wire assy laser module to the laser module assy.
2. Attach the laser module assy to the thread drive unit assy with the two screws (screw, pan (S/P washer) M3x11) while pulling the film down.
3. Pass the lead wire assy laser module and the LM pulse motor lead wire through the securing fixtures.

***Key point**

- Refer to "[Wiring of Laser module assy](#)".

Screw, Pan (S/P washer) M3X11



6 Attachment of Upper shaft assy

1. Set the felt to the arm bed.
2. Hang the timing belt on the upper shaft assy. Insert the fixed joint to the upper shaft assy.
3. Set the upper shaft metal to the mounting position of arm bed, then attach the metal presser and the belt support upper to the arm bed with the two screws (taptite, bind S M4x10).

*Key point

- Be careful not to damage the rotation shutter of the upper shaft assy.

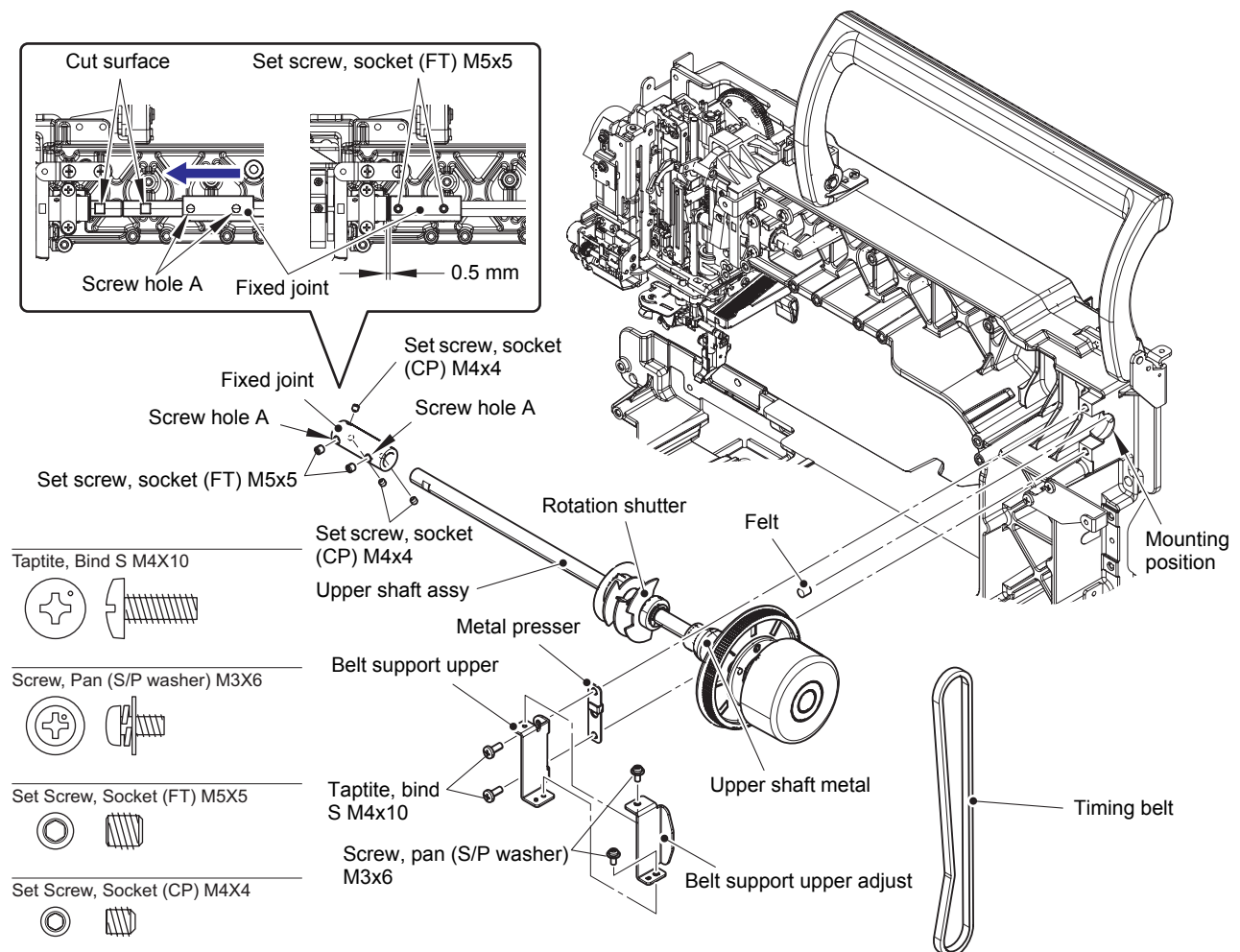
4. Set the belt support upper adjust to the belt support upper, and tighten the two screws (screw, pan (S/P washer) M3x6) temporarily.

*Key point

- Fully tighten the screw after performing "[Adjustment of Timing belt and belt support upper/lower clearance](#)".

5. Turn the cut surface of unit shaft and the cut surface of upper shaft assy to the front side.
6. Turn the fixed joint with two screw holes A to the front side, slide the fixed joint to the direction of the arrow, and insert it into the unit shaft. Be sure to make 0.5 mm gap between the retaining ring and the fixed joint.
7. Tighten the two screws (set screw, socket (FT) M5x5) to the fixed joint.
8. Turn the fixed joint with two screw holes to the front side, and tighten the two screws (set screw, socket (CP) M4x4). Turn the fixed joint with the screw hole to the front side, and tighten the screw (set screw, socket (CP) M4x4).

→Refer to [3 - 95 Assembly of Upper shaft assy](#).



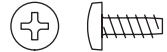
7 Attachment of Upper shaft cover

1. Attach the upper shaft cover to the arm bed with the three screws (screw, pan (S/P washer) M4x10DB).
→Refer to 3 - 95 Assembly of Upper shaft cover.
2. Set the cord guide to the upper shaft cover and the connecting PCB holder, then secure it with the screw (taptite, bind B M3x8).

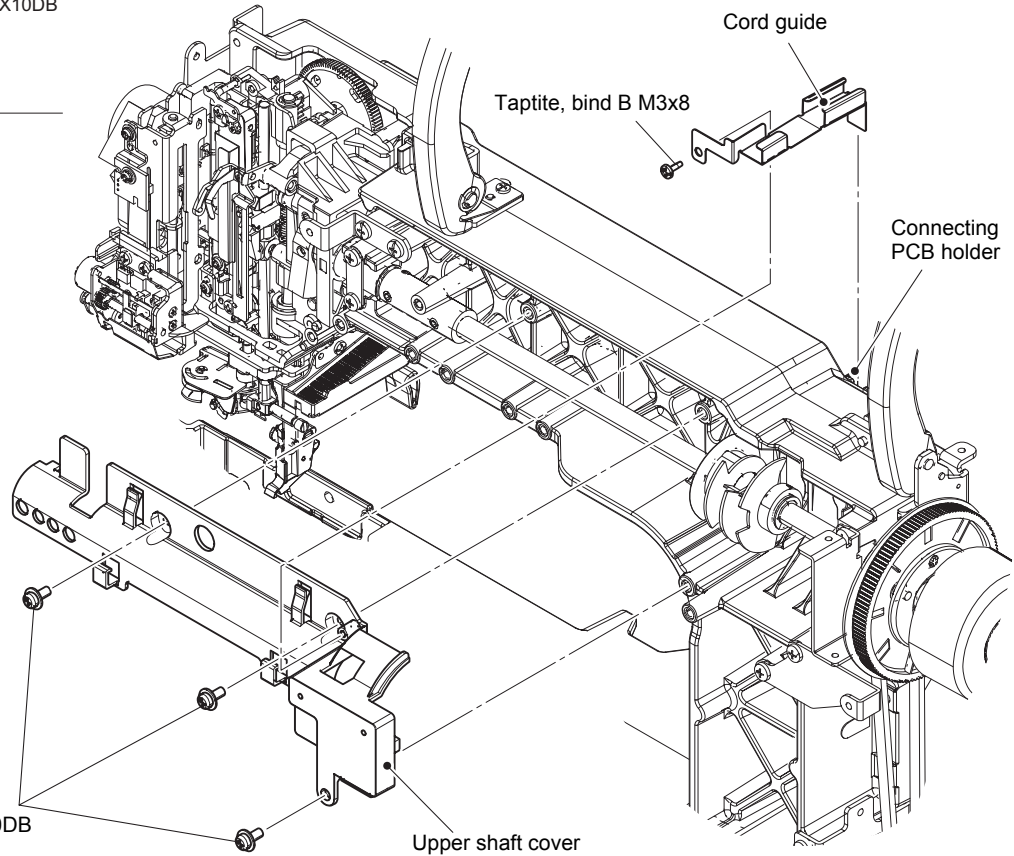
Screw, Pan (S/P washer) M4X10DB



Taptite, Bind B M3X8



Screw, pan
(S/P washer) M4x10DB

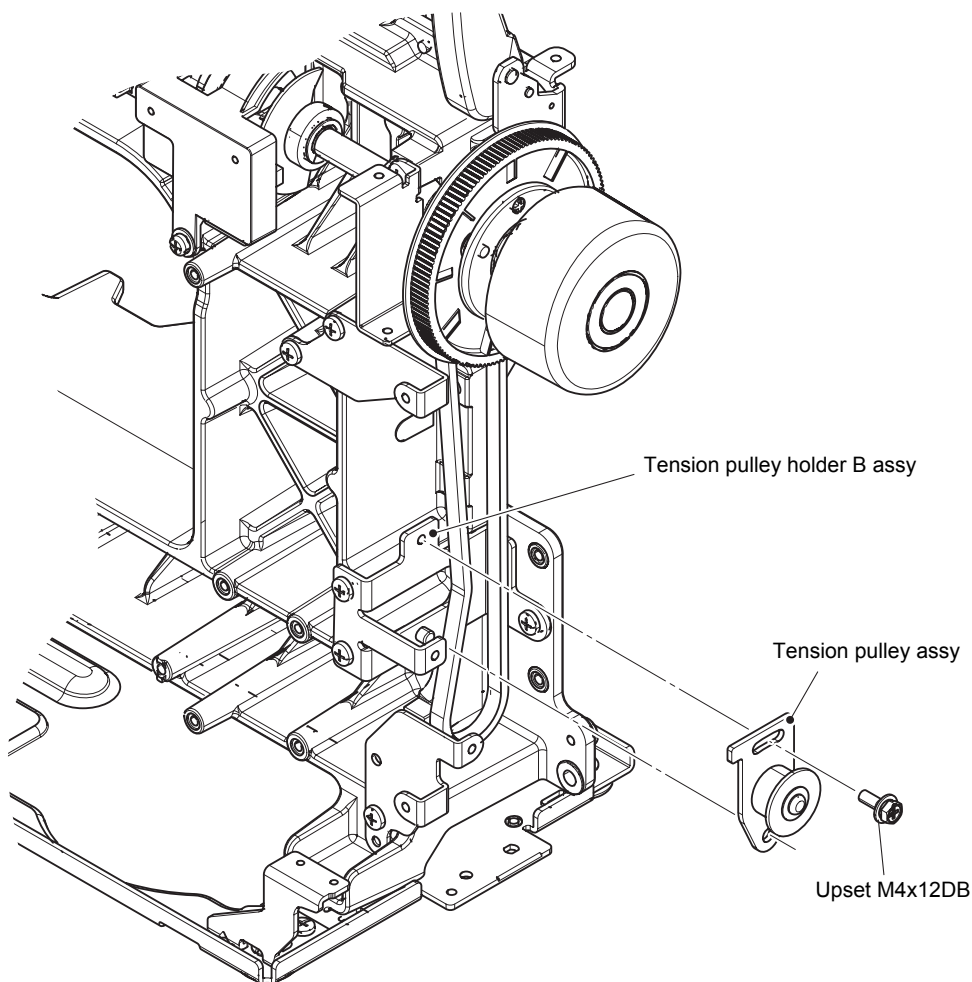


8 Attachment of Tension pulley assy

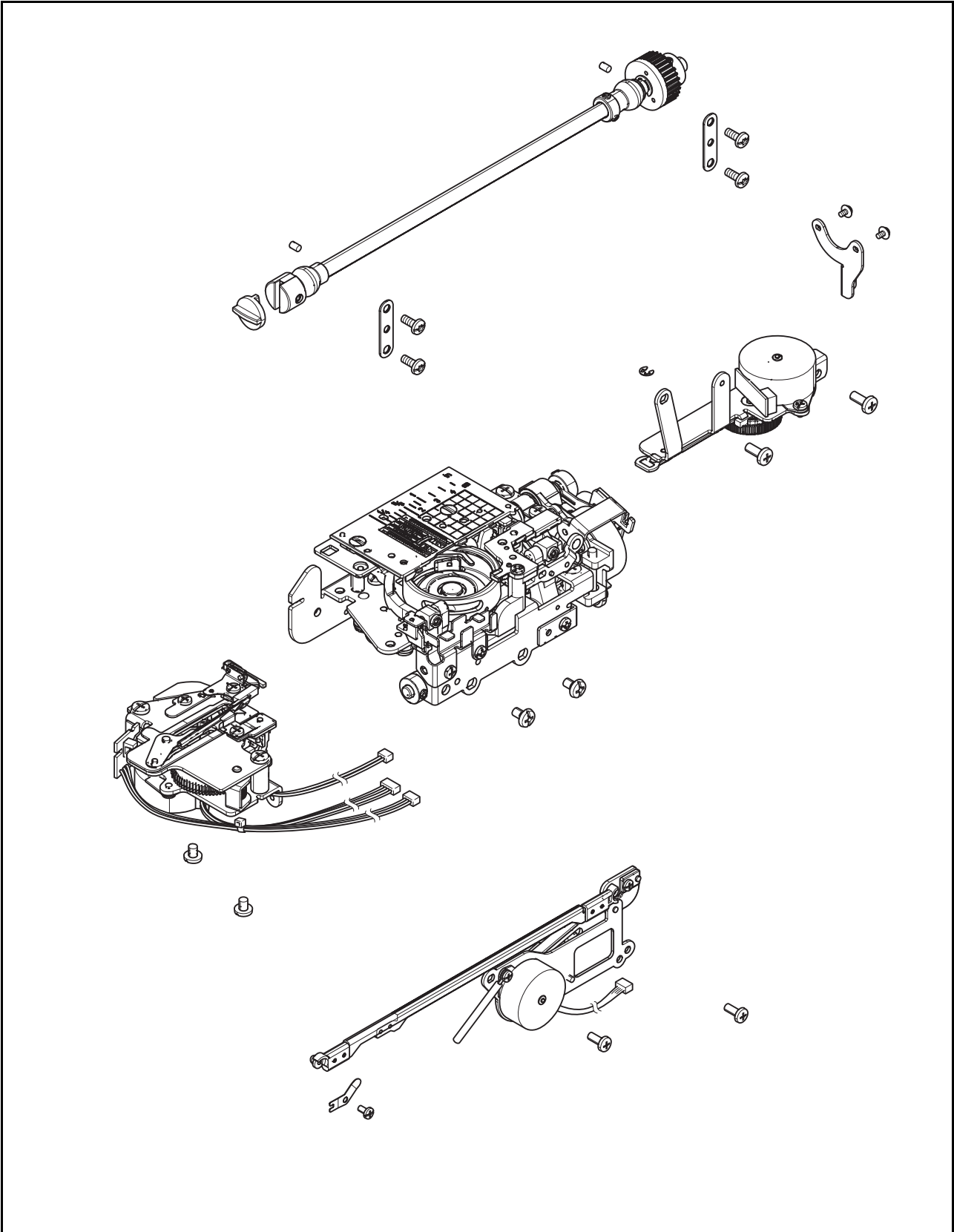
1. Align the positioning hole of tension pulley assy with the boss of tension pulley holder B assy, set the tension pulley assy to the tension pulley holder B assy, and tighten the screw (upset M4x12DB) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Timing belt tension".



Lower driving mechanism location diagram

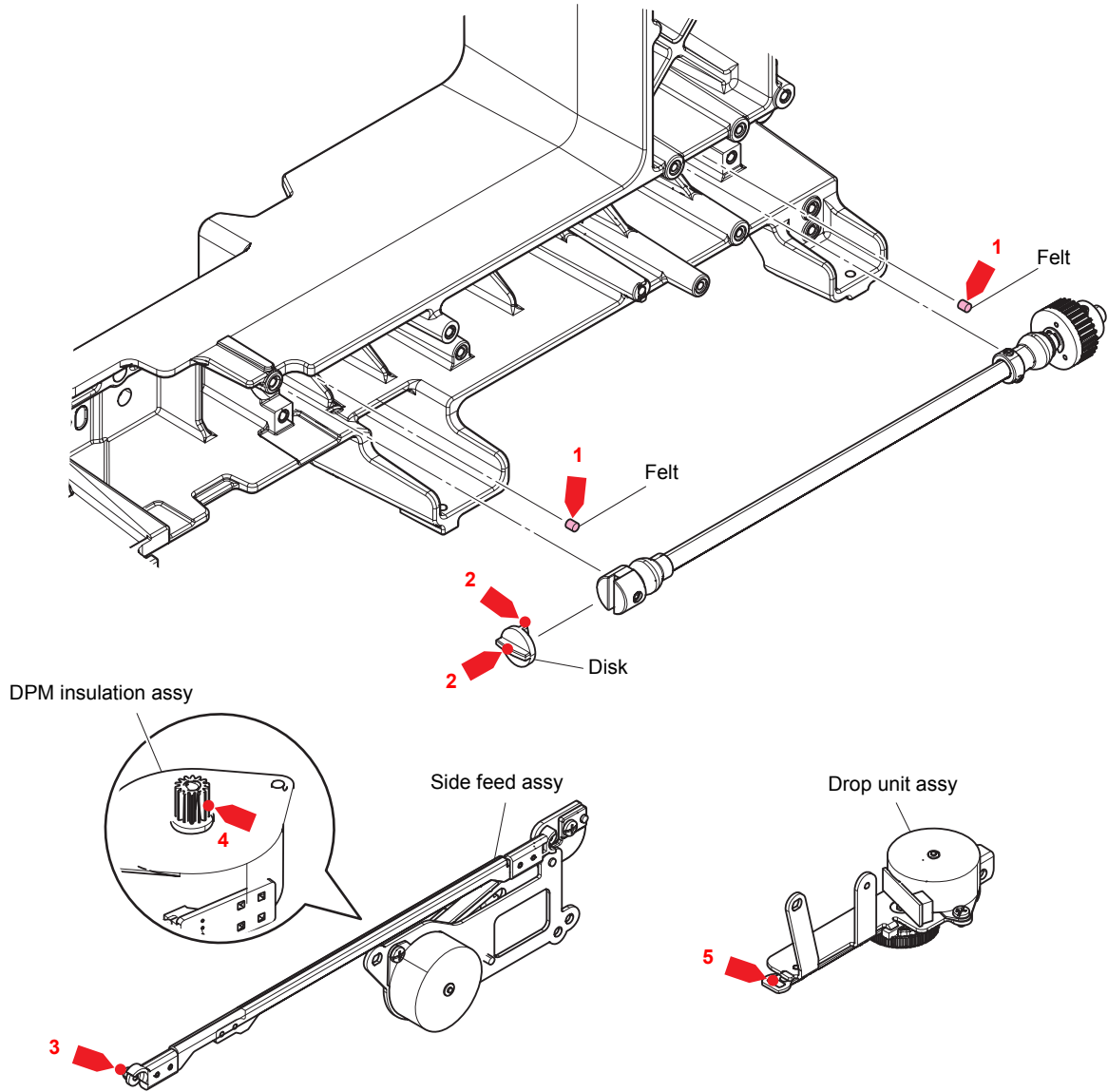


Basic of Assembly

Basic of Assembly

1 Lubrication

Lubrication point			Lubricating oil type	Quantity of lubrication
1	Felt	2 places	FBK OIL RO 100	1 to 2 drops
2	Disk	2 places	EPNOC AP (N) 0	Rice-grain size
3	Side feed assy	1 place	MOLYKOTE EM30L	Small amount
4	DPM insulation assy	1 place	EPNOC AP (N) 0	Small amount
5	Drop unit assy	1 place	EPNOC AP (N) 0	Bead



Basic of Assembly

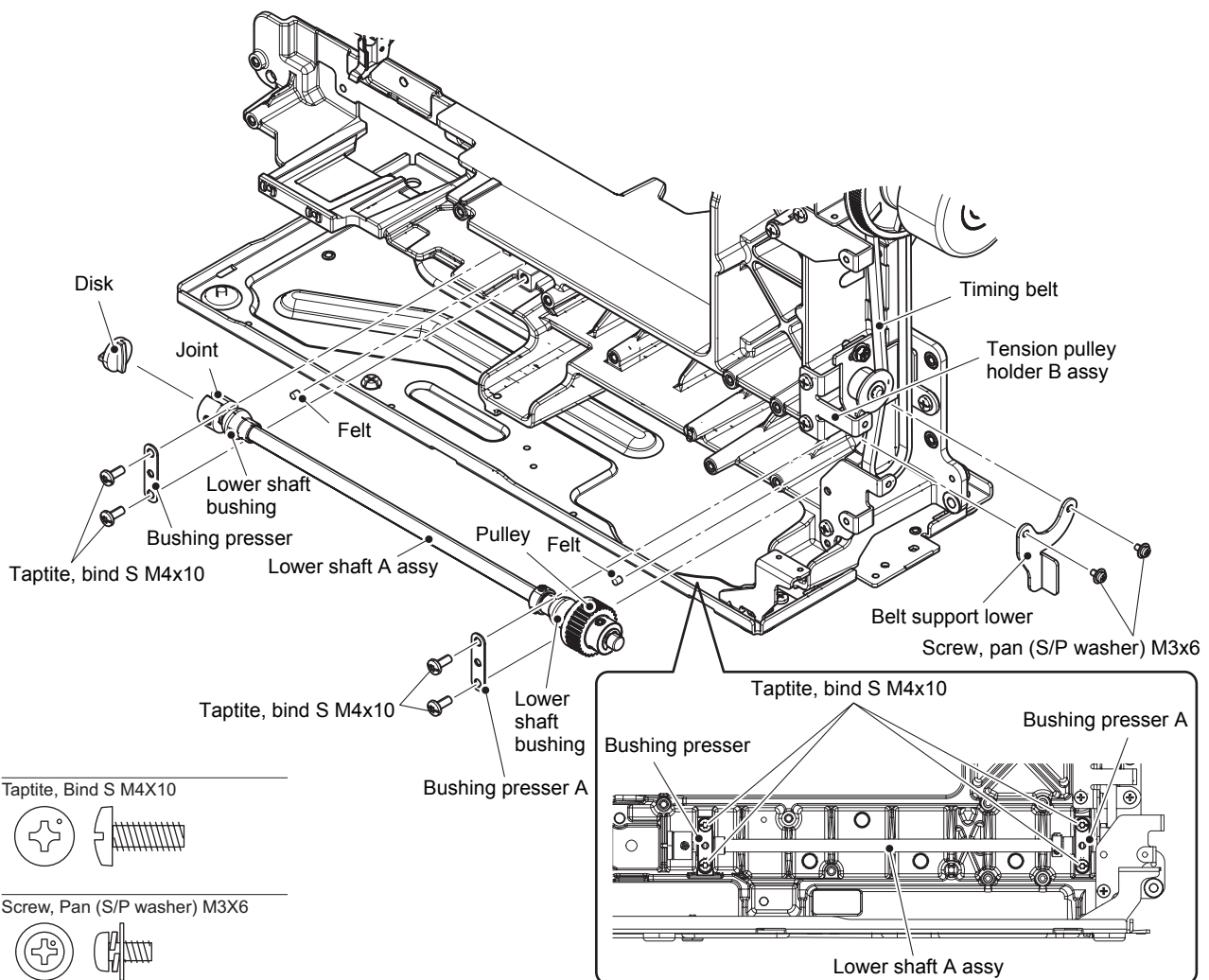
Basic of Assembly

2 Attachment of Lower shaft A assy

1. Set the two felts to the mounting position of arm bed.
2. Set the two lower shaft bushings to the two mounting positions of arm bed.
3. Attach the bushing presser A to the arm bed with the two screws (taptite, bind S M4x10).
4. Attach the bushing presser to the arm bed with the two screws (taptite, bind S M4x10).
5. Hang the timing belt on the pulley of lower shaft A assy.
6. Set the disk to the joint of lower shaft A assy.
7. Set the belt support lower to the tension pulley holder B assy, and tighten the two screws (screw, pan (S/P washer) M3x6) temporarily.

*Key point

- Fully tighten the screw after performing "Adjustment of Timing belt and belt support upper/lower clearance".



3 Attachment of Thread cutter module, Feed module and Drop unit assy

1. Align the boss of thread cutter module with the positioning hole of feed module, and attach the thread cutter module to the feed module with the two screws (screw, bind M4x5).

→Refer to 3 - 154 Thread cutter module.

2. Pass the each lead wire of thread cutter module through the securing fixtures. Bind up the each lead wire to the feed module with the band A.

***Key point**

- Refer to "Wiring of Thread cutter module / Feed module / Side feed assy".

3. Align the groove of joint with the disk, align the two positioning holes of feed module with the two pins of arm bed, and set the feed module to the arm bed with the two screws (screw M4).

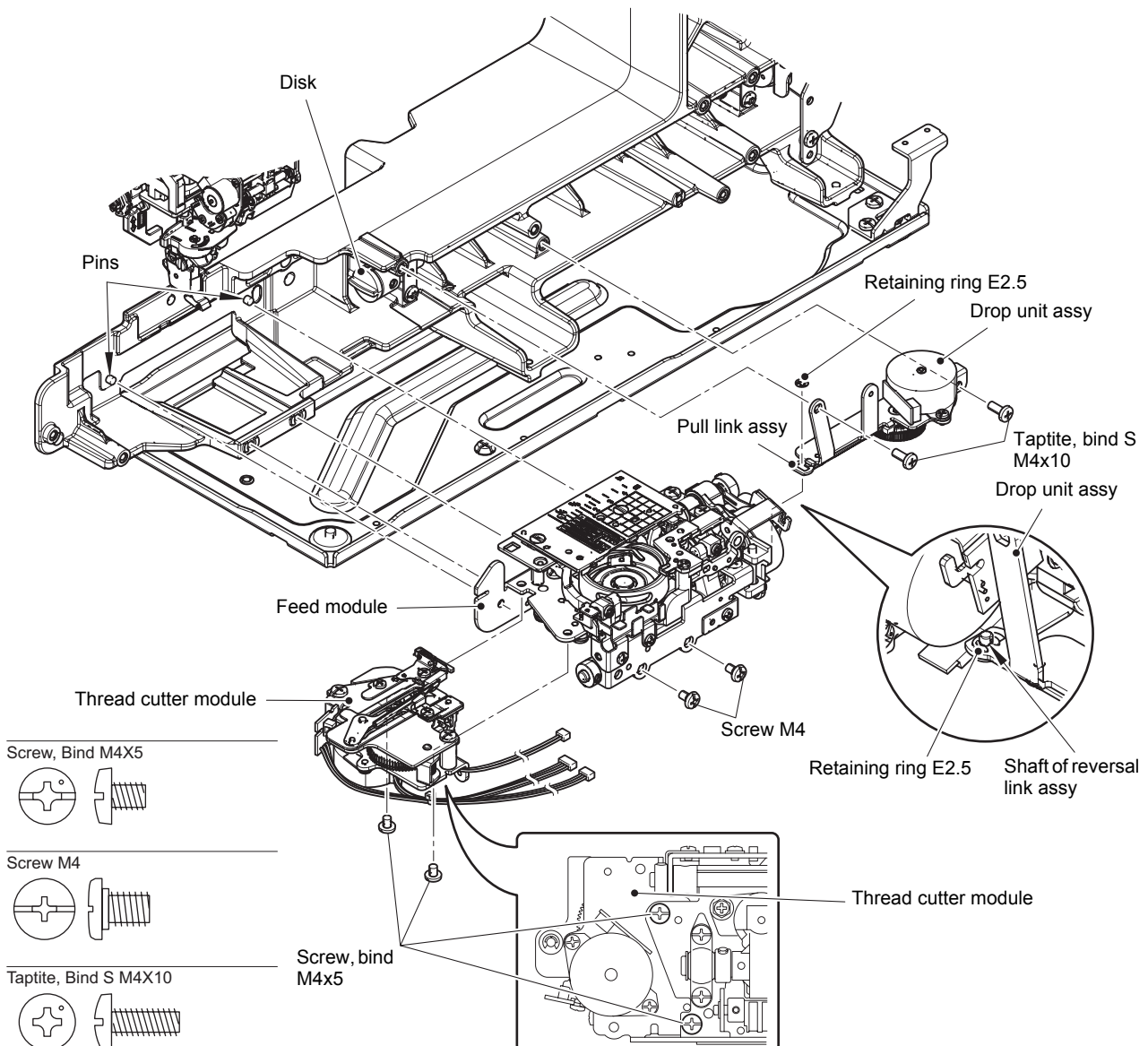
→Refer to 3 - 159 Feed module.

4. Set the pull link assy of drop unit assy to the shaft of reversal link assy, attach the drop unit assy to the arm bed with the two screws (taptite, bind S M4x10), and then attach the retaining ring E2.5 to the shaft of reversal link assy.

5. Bind up the each lead wire with the band B.

***Key point**

- Refer to "Wiring of Thread cutter module / Feed module / Side feed assy".

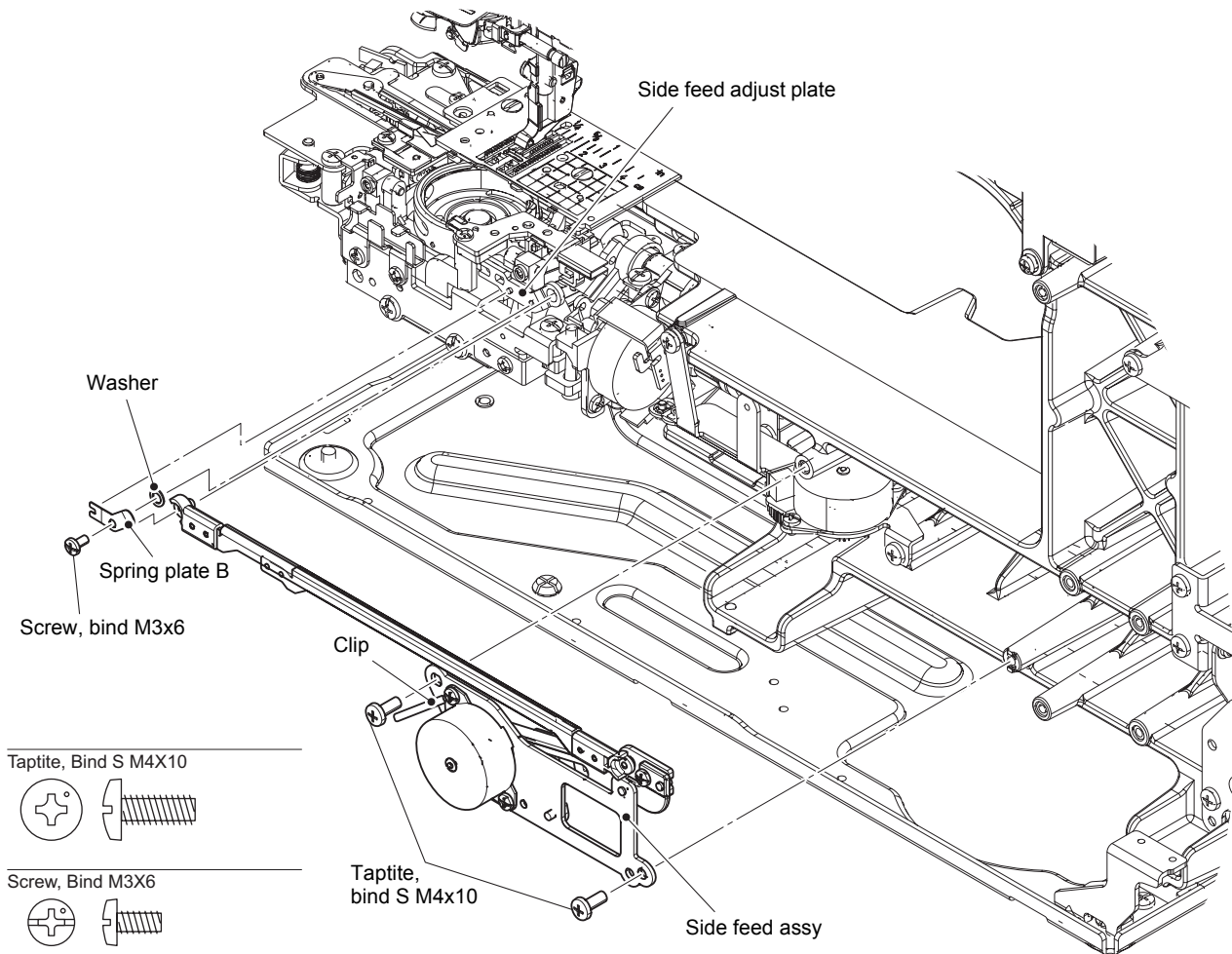


4 Attachment of Side feed assy

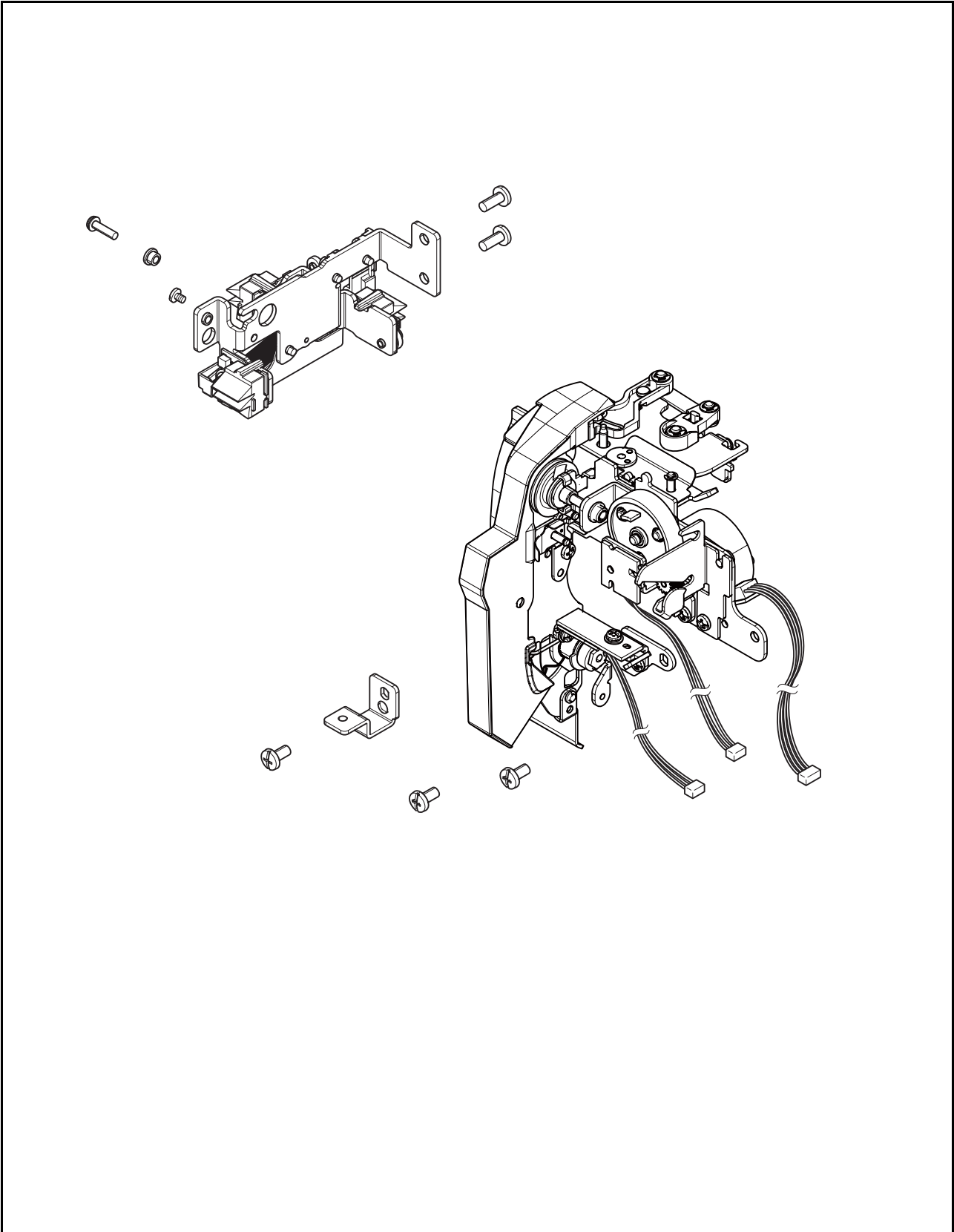
1. Attach the side feed assy to the arm bed with the two screws (taptite, bind S M4x10).
2. Set the boss of side feed assy to the side feed adjust plate, set the washer to the side feed adjust plate, align the notch of spring plate B with the boss, and attach the spring plate B to the side feed adjust plate with the screw (screw, bind M3x6).
3. Clip the each lead wire together.

***Key point**

- Refer to "Wiring of Thread cutter module / Feed module / Side feed assy".



Needle threading mechanism location diagram



Basic of Assembly

Basic of Assembly

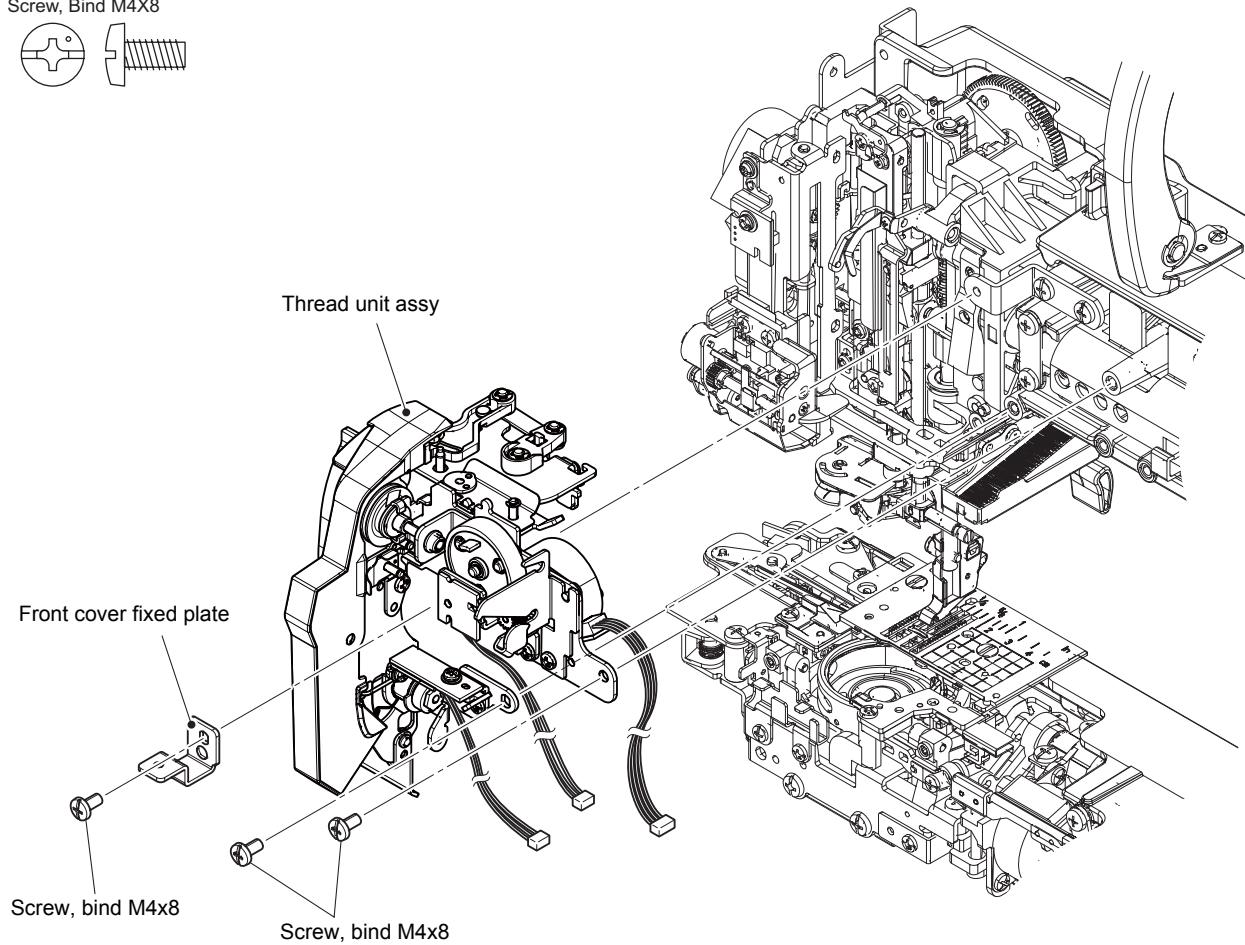
1 Attachment of Thread unit assy

1. Attach the thread unit assy to the arm bed with two screws (screw, bind M4x8).
→Refer to 3 - 100 Needle threading mechanism.
2. Align the boss of front cover fixed plate with the positioning hole of thread unit assy, and attach the front cover fixed plate to the thread unit assy with the screw (screw, bind M4x8).
3. Pass the each lead wire of thread unit assy through the securing fixtures.

***Key point**

- Refer to "Wiring of Thread unit".

Screw, Bind M4X8



2 Attachment of LED lamp holder L assy

1. Attach the LED lamp holder L assy to the arm bed with the two screws (taptite, bind S M4x10), and tighten the screw (screw, bind M3x4) to the LED lamp holder L assy.

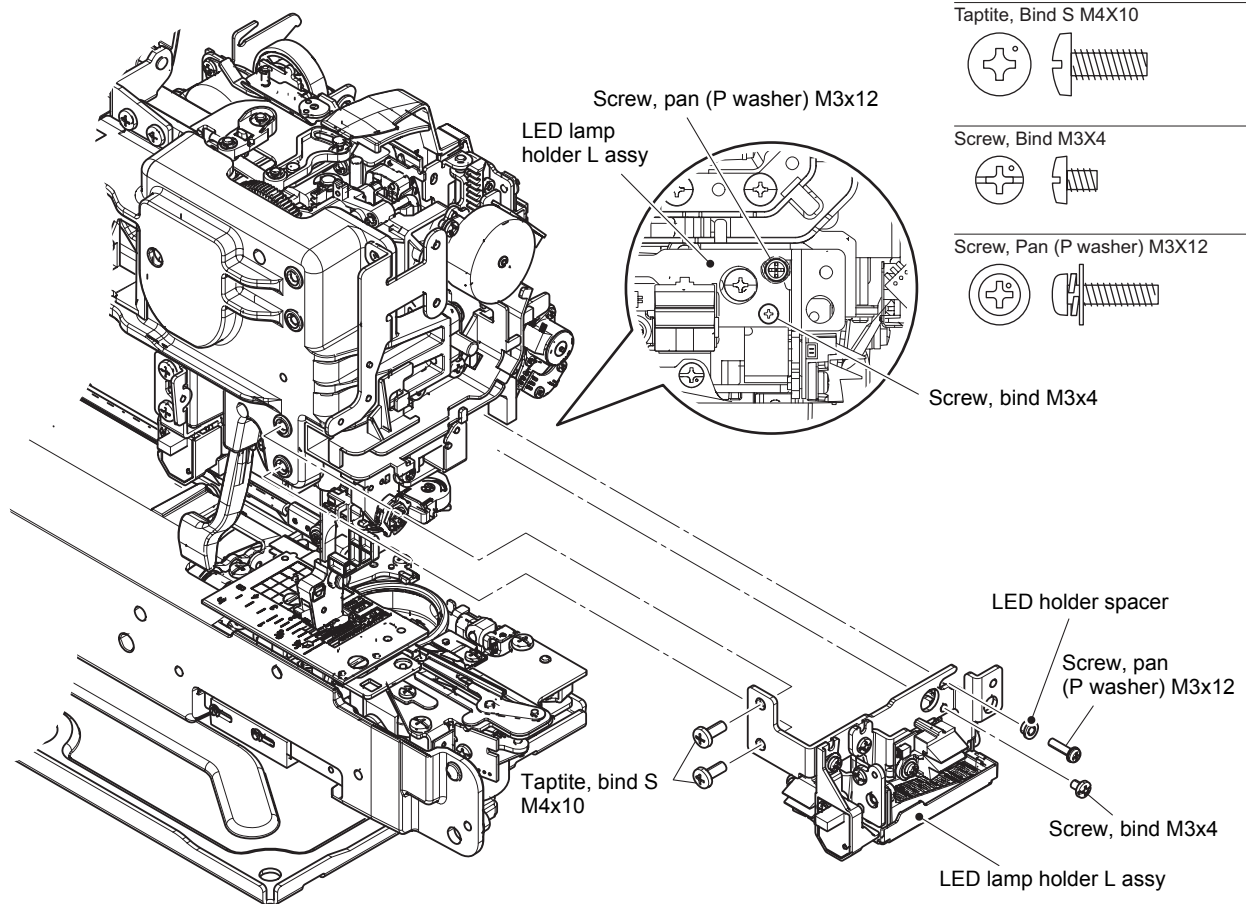
→Refer to 3 - 94 Assembly of LED lamp holder L assy.

2. Attach the LED holder spacer to the LED lamp holder L assy with the screw (screw, pan (P washer) M3x12).

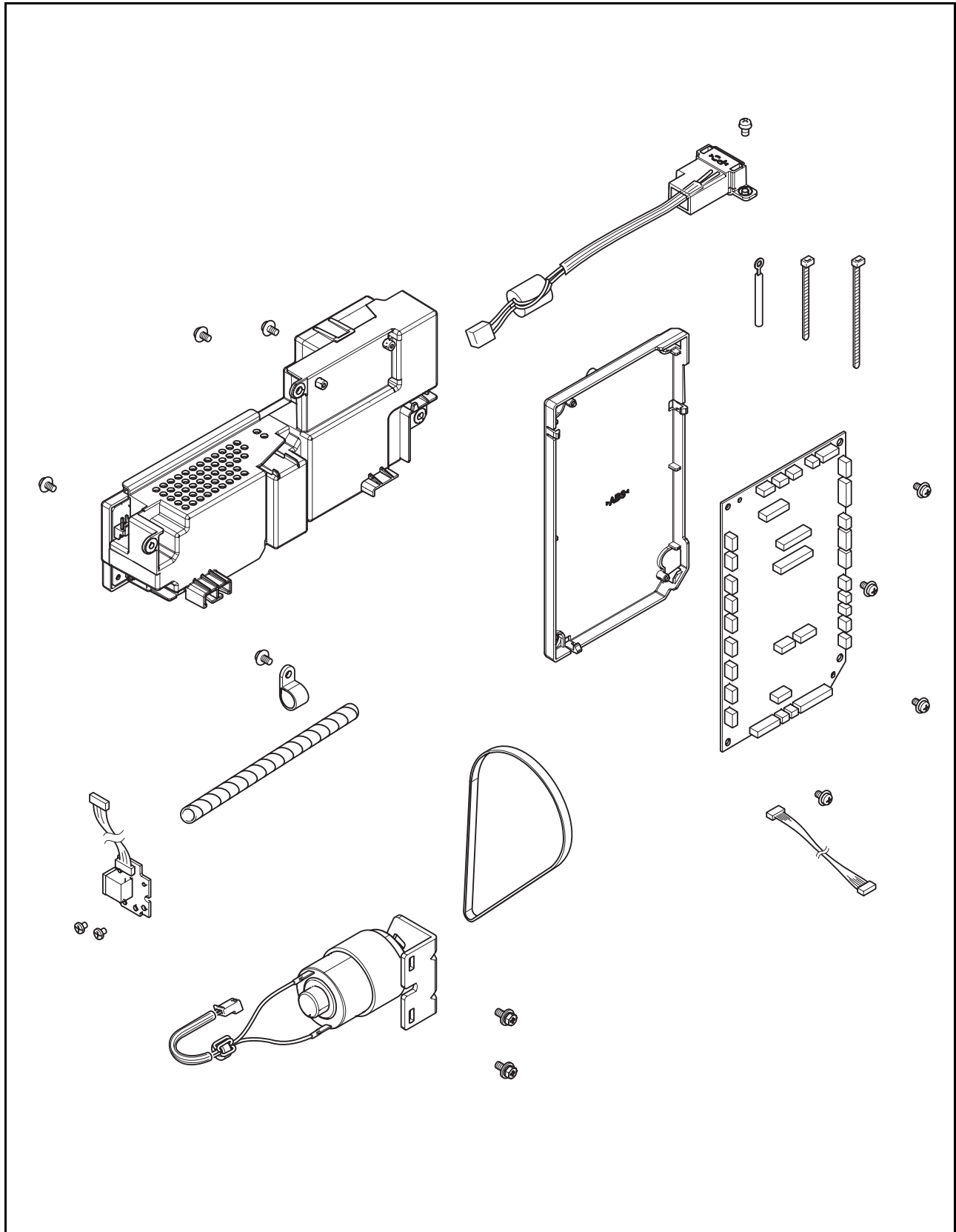
3. Pass the lead wire assy LED2 through the securing fixtures.

*Key point

- Refer to "Wiring of Lead wire assy LED2".



Electric parts and Main motor unit location diagram



Basic of Assembly

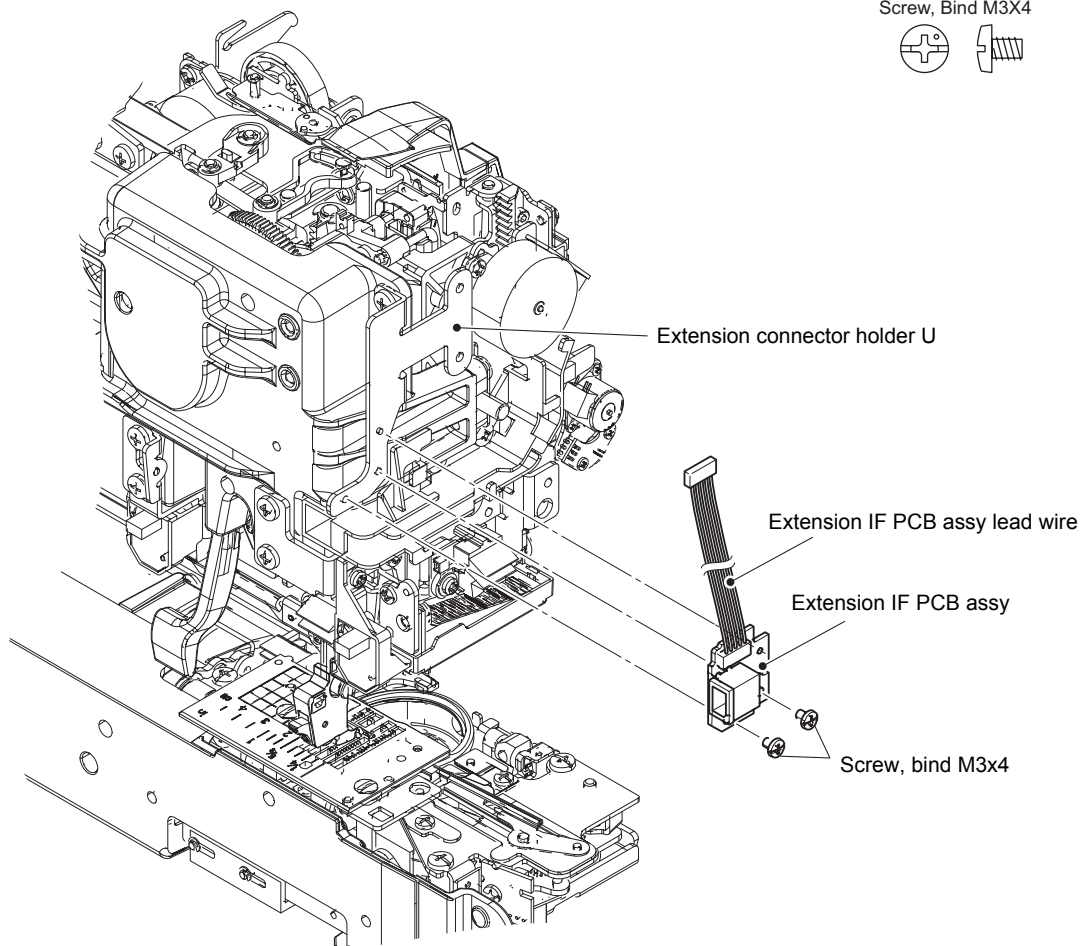
Basic of Assembly

1 Attachment of Extension IF PCB assy

1. Align the positioning hole of extension IF PCB assy with the boss of extension connector holder U, and attach the extension IF PCB assy to the extension connector holder U with the two screws (screw, bind M3x4).
2. Pass the extension IF PCB assy lead wire through the securing fixtures.

***Key point**

- Refer to "Wiring of Cord guide".



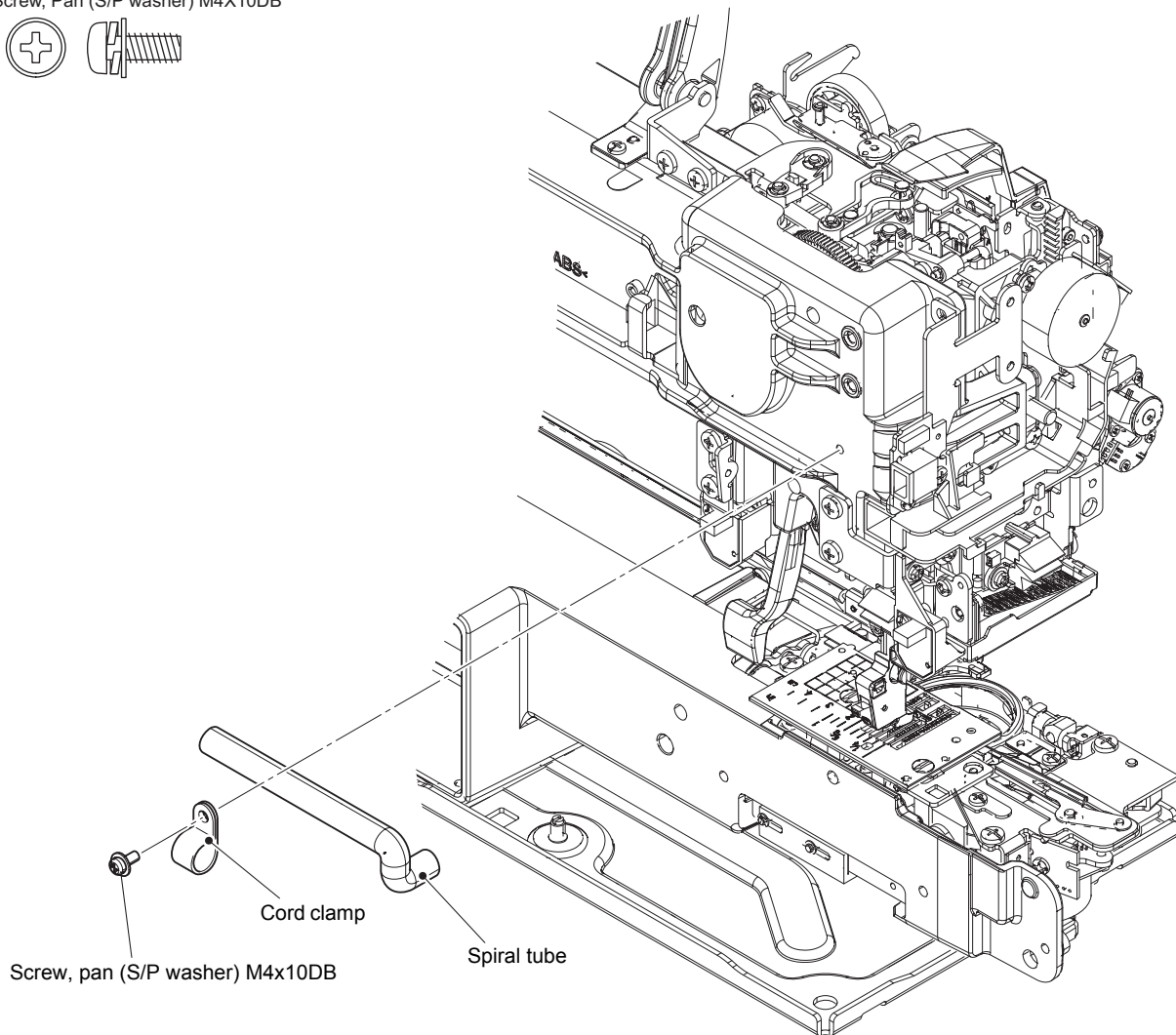
2 Attachment of Spiral tube

1. Bind up the each lead wire with the spiral tube.
2. Set the cord clamp to the spiral tube, and then attach the cord clamp to the arm bed with the screw (screw, pan (S/P washer) M4x10DB).
3. Pass the each lead wire through the securing fixtures.

***Key point**

- Refer to "Wiring of Bind up lead wires with Spiral tube".

Screw, Pan (S/P washer) M4X10DB



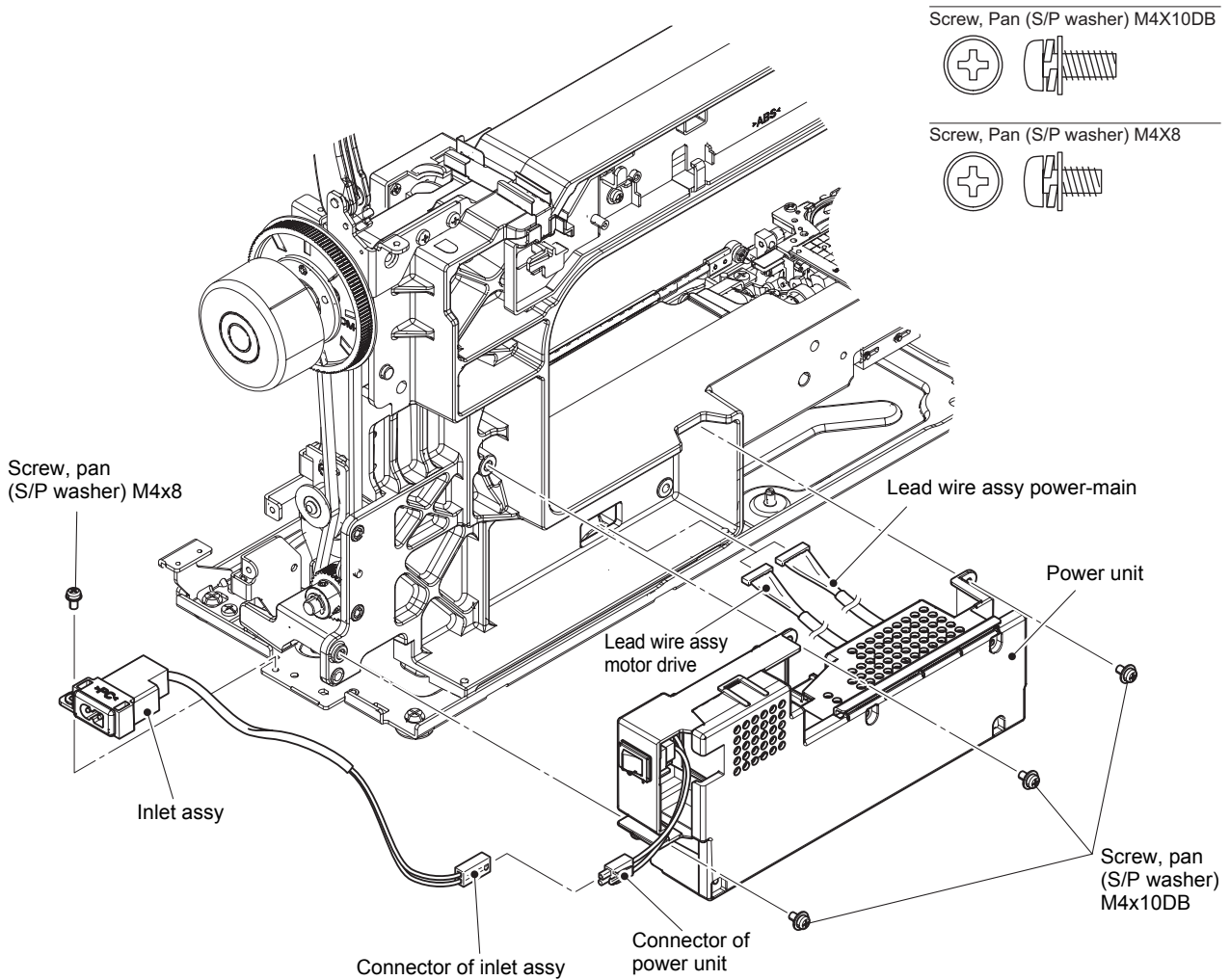
3 Attachment of Power unit

1. Connect the connector of inlet assy to the connector of power unit, and pass the lead wire of inlet through the securing fixtures of power unit.
2. Pass the lead wire assy power-main and the lead wire assy motor drive through the hole of arm bed. Attach the power unit to the arm bed with the three screws (screw, pan (S/P washer) M4x10DB), align the boss of the inlet assy with the positioning hole of arm bed, and attach the inlet assy with the screw (screw, pan (S/P washer) M4x8).

***Key point**

- Refer to "Wiring of Power unit".

→Refer to 3 - 110 Assembly of Power unit.



4 Attachment of Main motor assembly

1. Set the main motor assembly to the arm bed, and then tighten the two screws (upset M4x12DB) temporarily.

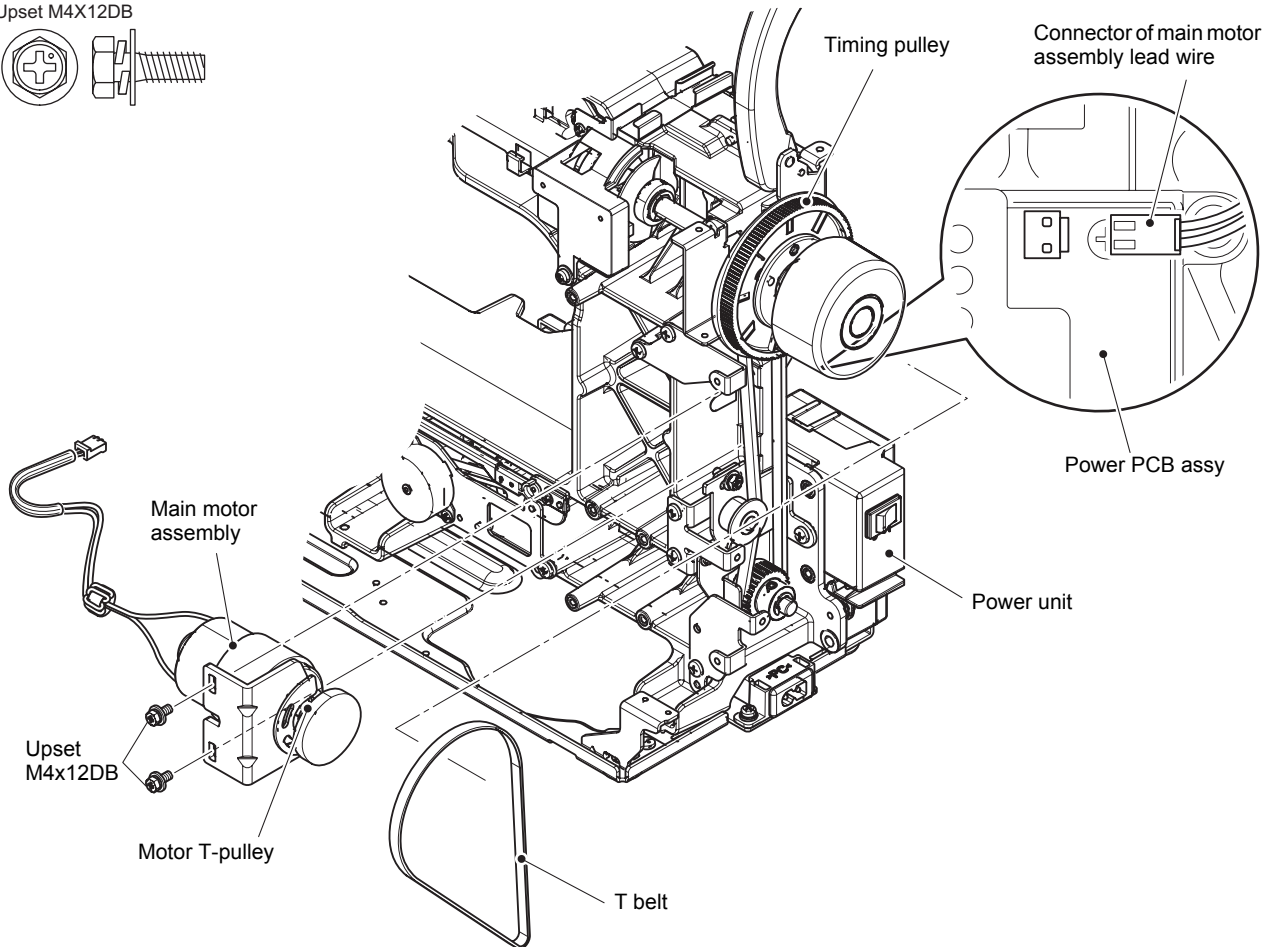
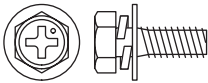
***Key point**

- Fully tighten the screw after performing "Adjustment of Motor belt tension".

→Refer to 3 - 110 Assembly of Main motor assembly.

2. Connect the connector of main motor assembly lead wire to the power PCB assy of power unit.
3. Hang the T belt on the timing pulley of upper shaft assy and the motor T-pulley of main motor assembly.

Upset M4X12DB

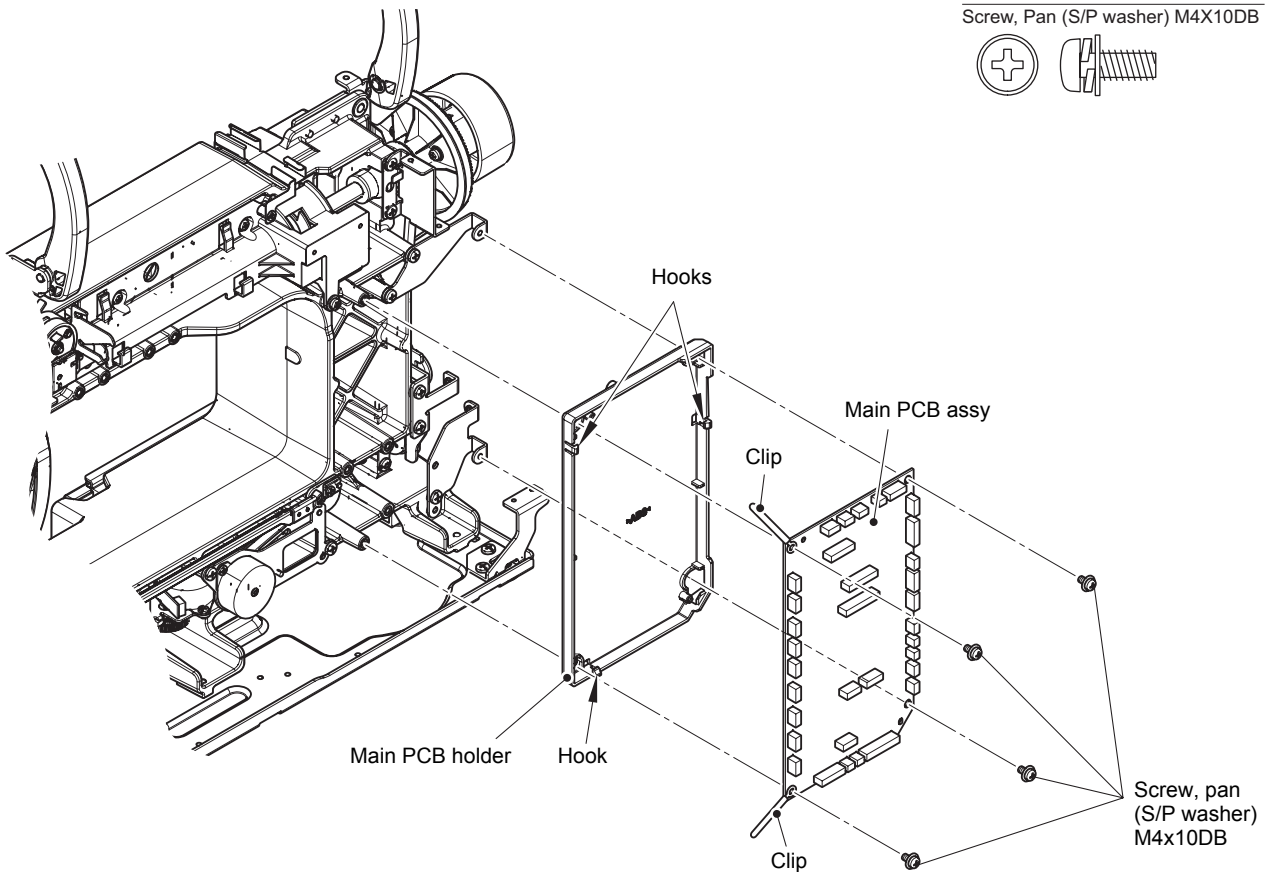


5 Attachment of Main PCB assy

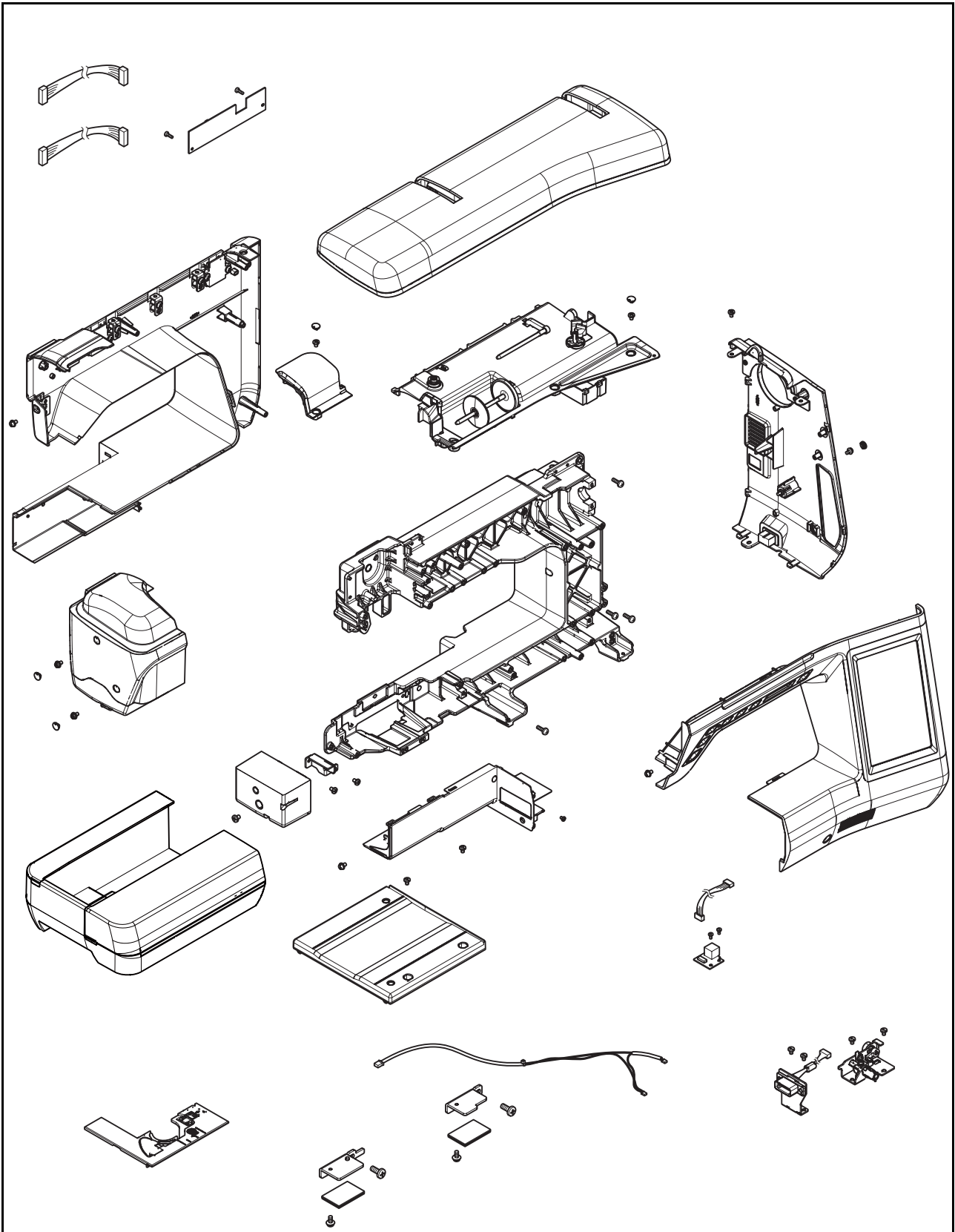
1. Set the main PCB assy to the main PCB holder, and secure it with the three hooks.
2. Attach the main PCB assy and the two clips to the arm bed with the four screws (screw, pan (S/P washer) M4x10DB).
3. Connect the each connector to the lower side of main PCB assy.

***Key point**

- Refer to "Wiring of Lower side of Main PCB".



Main frame and covers location diagram



Basic of Assembly

Basic of Assembly

1 Attachment of Upper unit relay PCB assy

1. Attach the upper unit relay PCB assy to the connecting PCB holder with the two screws (taptite, bind B M3x10).
2. Connect the each connector to the upper unit relay PCB assy.

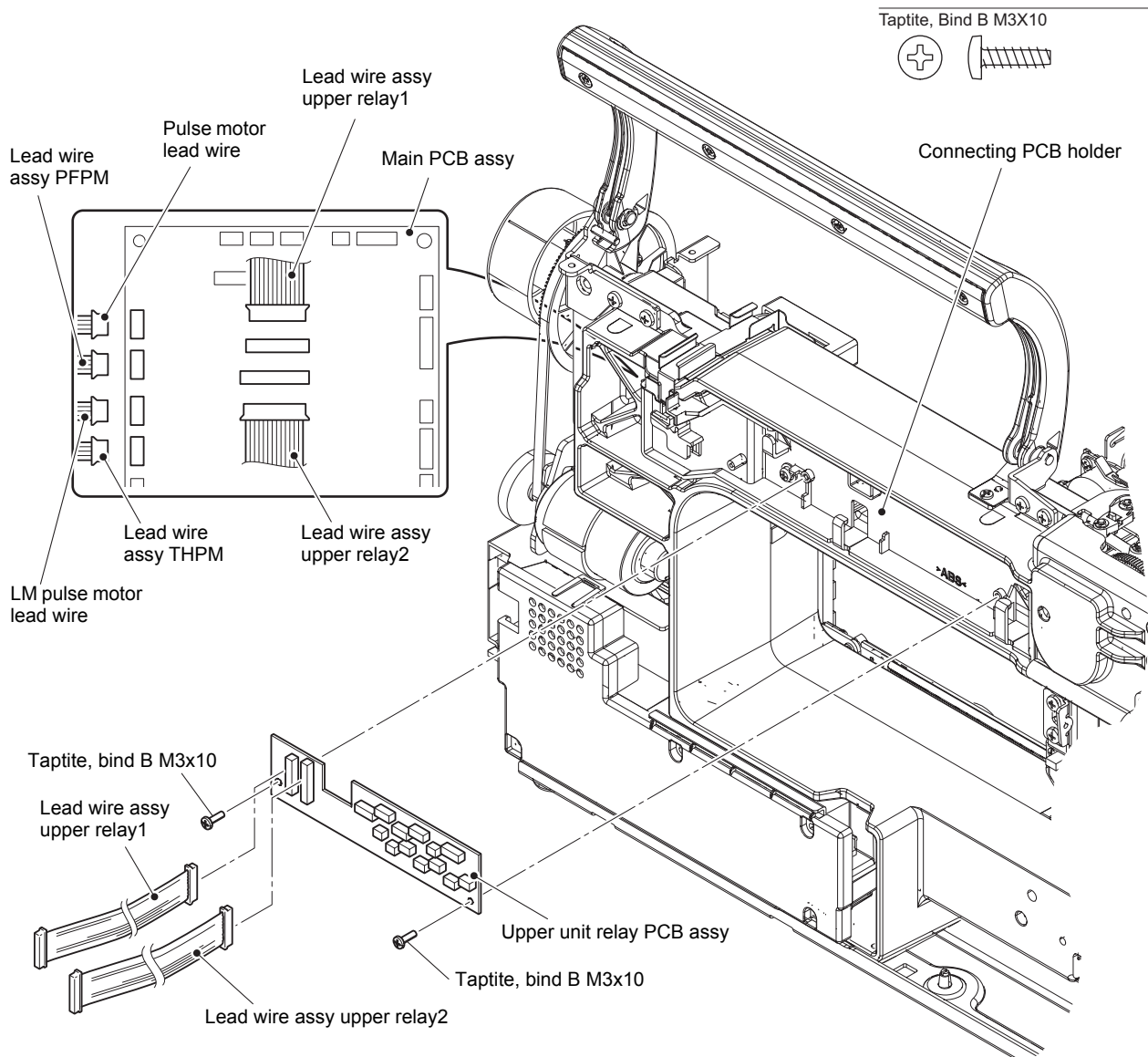
***Key point**

- Refer to "Wiring of Upper unit relay PCB assy".

3. Pass the LM pulse motor lead wire, the lead wire assy THPM, the pulse motor lead wire and the lead wire assy PFFM through the securing fixtures, and connect them to the main PCB assy.
4. Connect the lead wire assy upper relay1 and the lead wire assy upper relay2 to the upper relay PCB assy, pass them through the securing fixtures, and connect them to the main PCB assy.

***Key point**

- Refer to "Wiring of Upper side of Main PCB".



2 Attachment of LED PCB holder A/B

1. Align the positioning hole of LED PCB assy: work area with the boss of LED PCB holder A, and attach the LED PCB assy: work area with the screw (screw, pan (S/P washer) M3x7). Attach the LED PCB holder A to the arm bed with the screw (taptite, bind S M4x10).
2. Align the positioning hole of LED PCB assy: work area with the boss of LED PCB holder B, and attach the LED PCB assy: work area with the screw (screw, pan (S/P washer) M3x7). Attach the LED PCB holder B to the arm bed with the screw (taptite, bind S M4x10).
3. Connect the two connectors of lead wire assy LED1 to the two LED PCB assy: work areas. Pass the lead wire assy LED1 through the two guides.

***Key point**

- Refer to "Wiring of Lead wire assy LED1".

4. Connect the each lead wire to the main PCB assy, and clip them together.

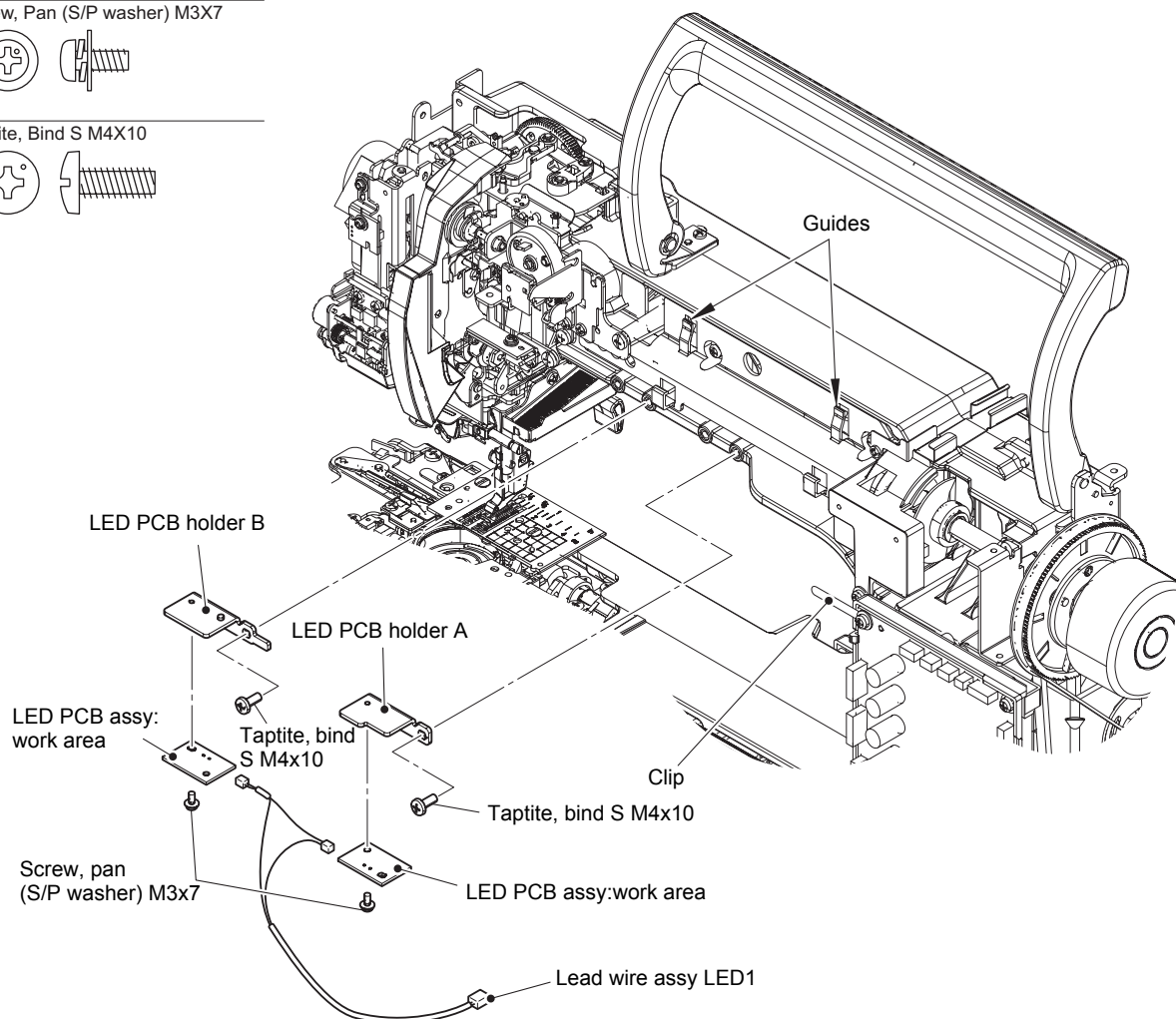
***Key point**

- Refer to "Wiring of Upper side of Main PCB".

Screw, Pan (S/P washer) M3X7



Taptite, Bind S M4X10



3 Attachment of UW pen connector PCB assy, Connector holder assy and Knee lifter assembly

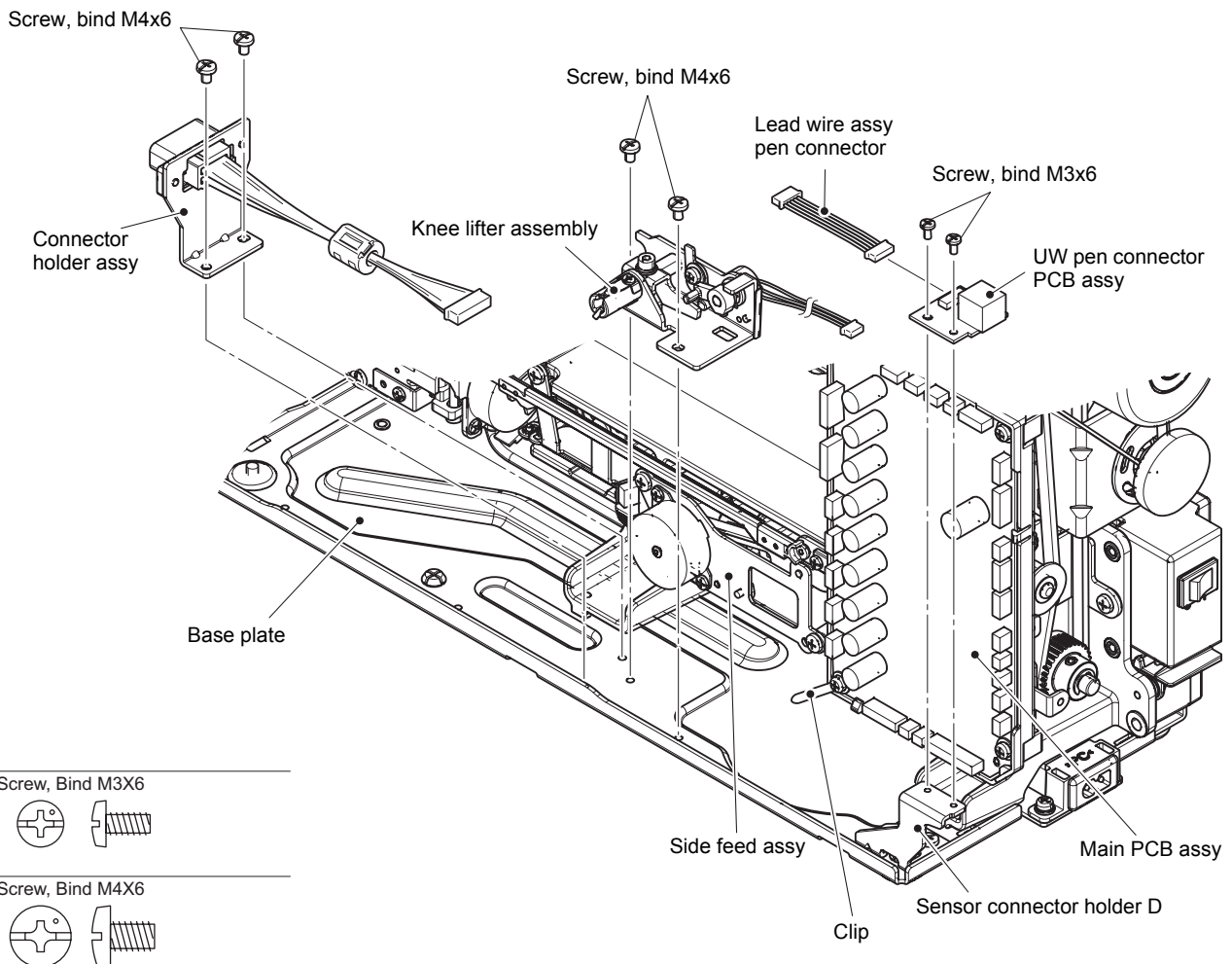
1. Attach the UW pen connector PCB assy to the sensor connector holder D with the two screws (screw, bind M3x6). Connect the lead wire assy pen connector to the UW pen connector PCB assy and the main PCB assy.
2. Attach the connector holder assy to the base plate with the two screws (screw, bind M4x6). Connect the lead wire assy main body to the main PCB assy, bind up the each lead wire to the side feed assy with the band A, and clip them together.

→Refer to 3 - 120 Assembly of Connector holder assy.

3. Attach the knee lifter assembly to the base plate with the two screws (screw, bind M4x6). Bind up the each lead wire with the band B. Connect the knee lifter assembly lead wire to the main PCB assy.

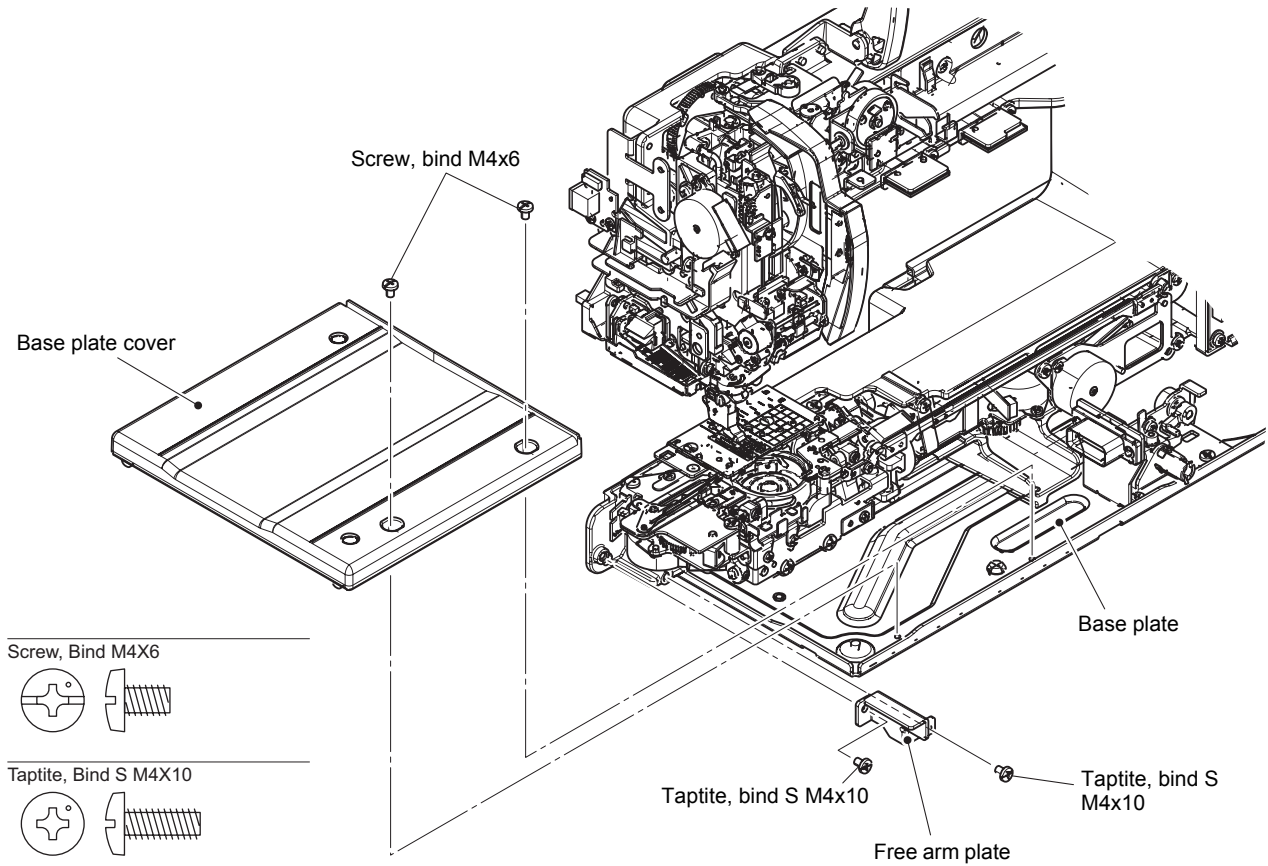
***Key point**

- Refer to "Wiring of Lower side of Main PCB".



4 Attachment of Base plate cover and Free arm plate

1. Set the base plate cover to the base plate, and secure it with the two screws (screw, bind M4x6).
2. Attach the free arm plate to the arm bed with the two screws (taptite, bind S M4x10).



5 Attachment of Rear cover assy

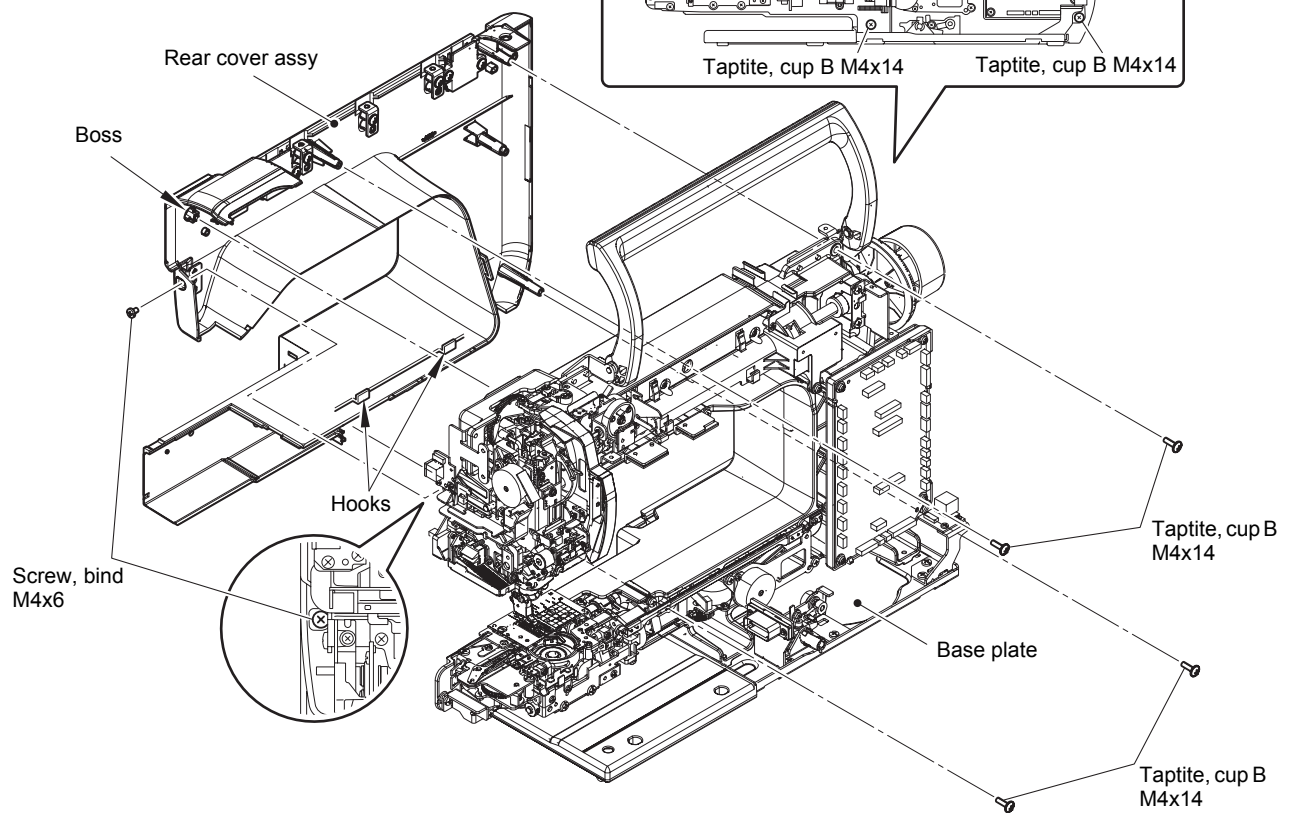
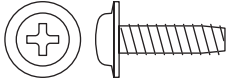
1. Set the rear cover assy to the arm bed, hang the two hooks of rear cover assy on the base plate, and align the boss of rear cover assy with the positioning hole of arm bed. Secure the rear cover assy to the arm bed with the screw (screw, bind M4x6) and four screws (taptite, cup B M4x14).

→Refer to 3 - 121 Assembly of Rear cover assy.

Screw, Bind M4X6



Taptite, Cup B M4X14



6 Attachment of Front cover assy

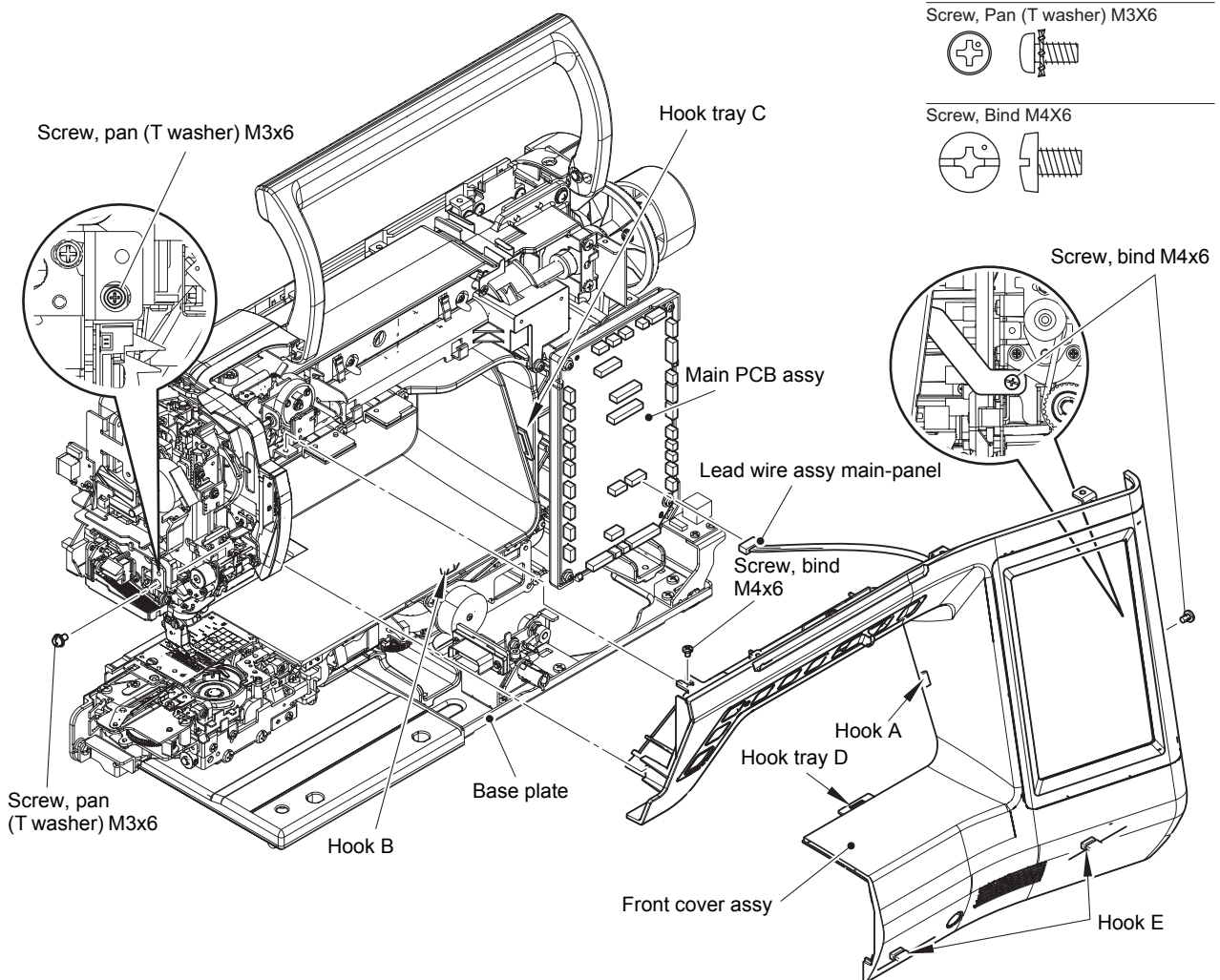
1. Connect the lead wire assy main-panel to the main PCB assy.
2. Set the front cover assy to the arm bed, hang the hook A (front cover side) and B (rear cover side) to the hook tray C (rear cover side) and D (front cover side) respectively, and hang the two hooks E to the base plate.

*Key point

- Be careful not to get each lead wire caught in the front cover and rear cover.

3. Secure the front cover assy to the arm bed with the screw (screw, pan (T washer) M3x6) and two screws (screw, bind M4x6).

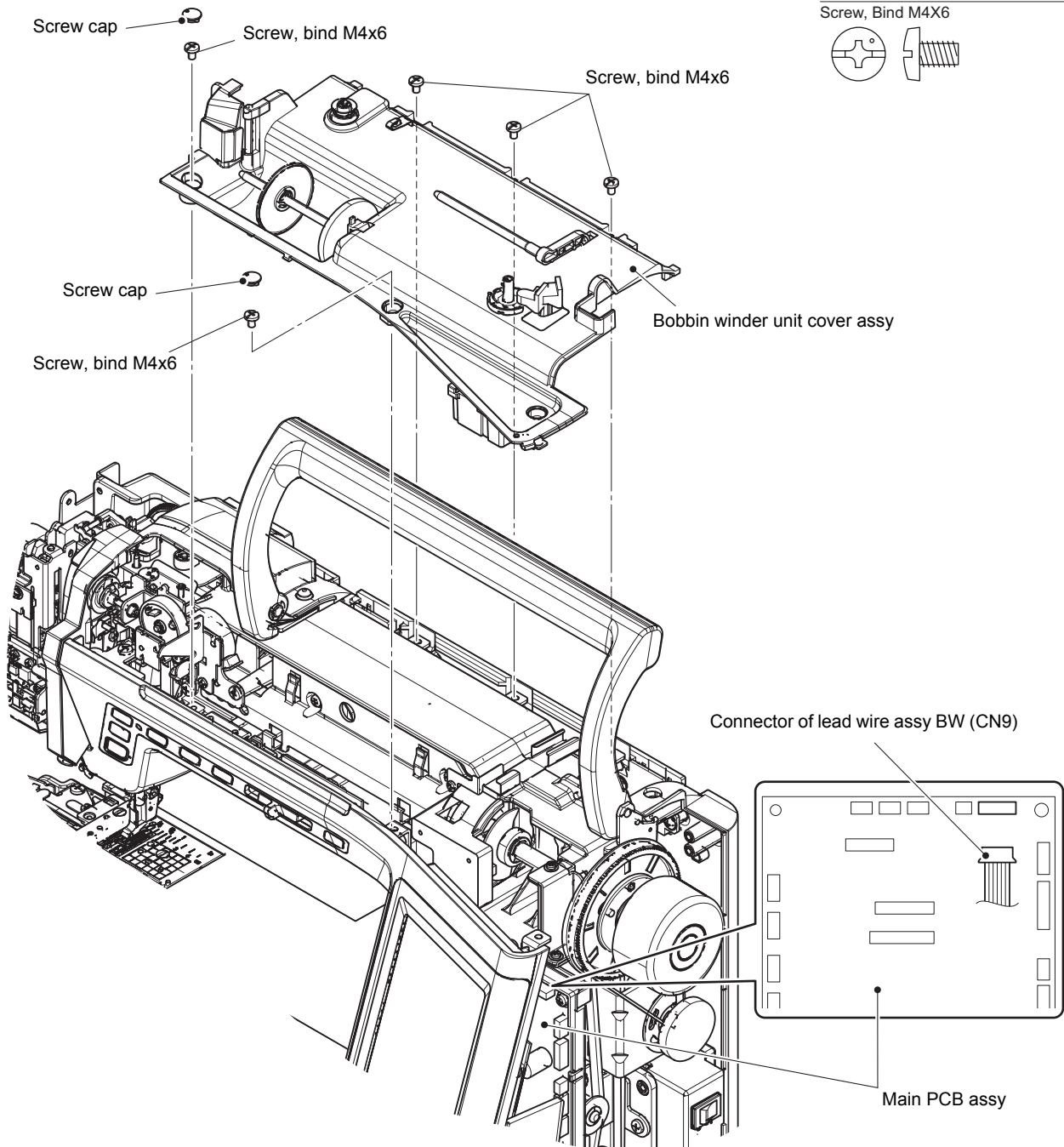
→Refer to 3 - 122 Assembly of Front cover assy.



7 Attachment of Bobbin winder unit cover assy

1. Set the bobbin winder unit cover assy to the machine, and secure it with the five screws (screw, bind M4x6).
2. Attach the two screw caps to the bobbin winder unit cover assy.
3. Connect the lead wire assy BW to the main PCB assy.

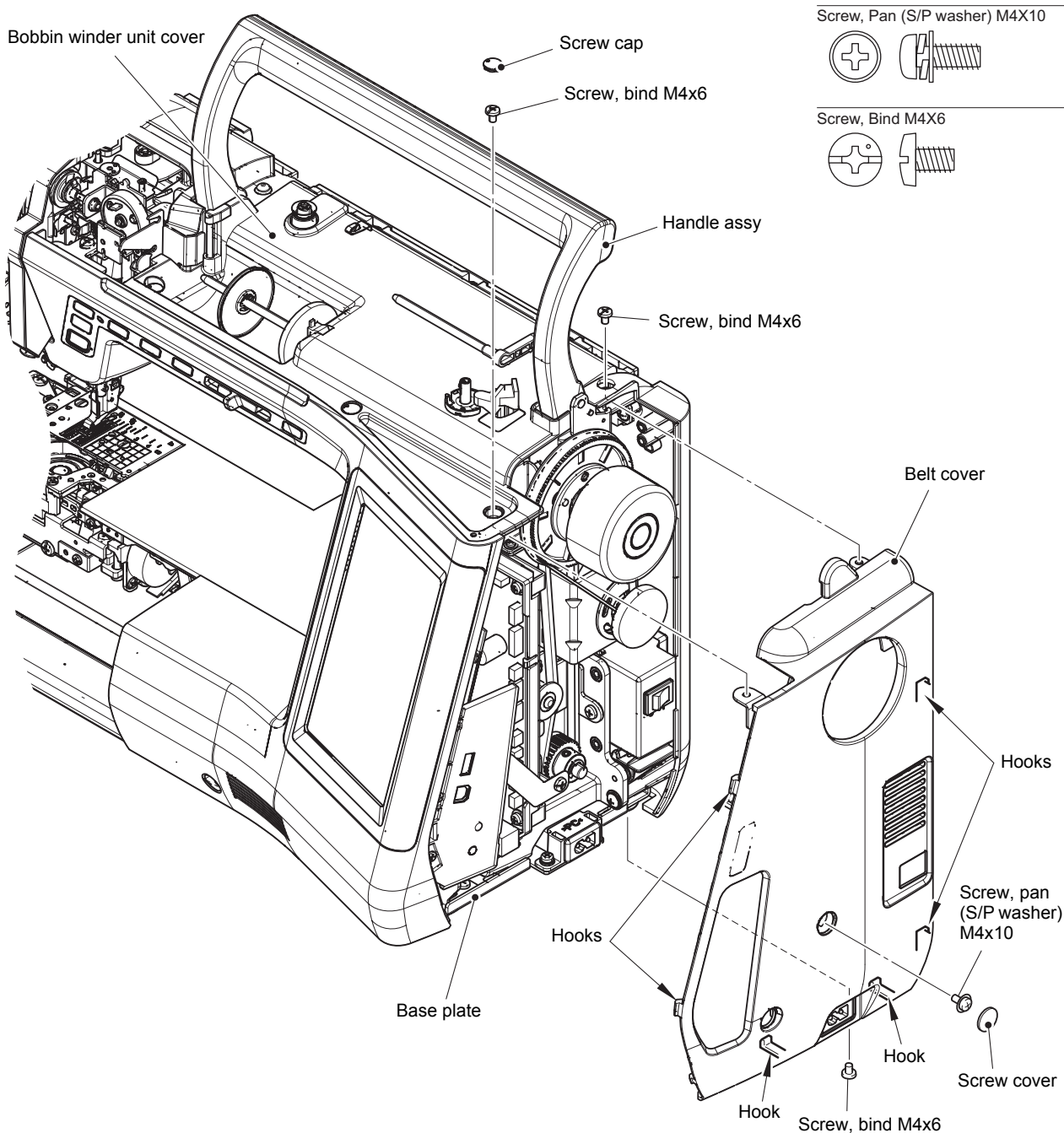
→Refer to 3 - 113 Assembly of Bobbin winder unit cover assy.



8 Attachment of Belt cover

1. Pull up the handle assy.
2. Set the belt cover to the main body, and hang the six hooks on the each cover and the base plate.
3. Secure the belt cover with the screw (screw, pan (S/P washer) M4x10) and three screws (screw, bind M4x6).
4. Attach the screw cover to the belt cover, and attach the screw cap to the bobbin winder unit cover.

→Refer to 3 - 131 Assembly of Belt cover.



9 Attachment of Front thread guard cover and Face plate assy

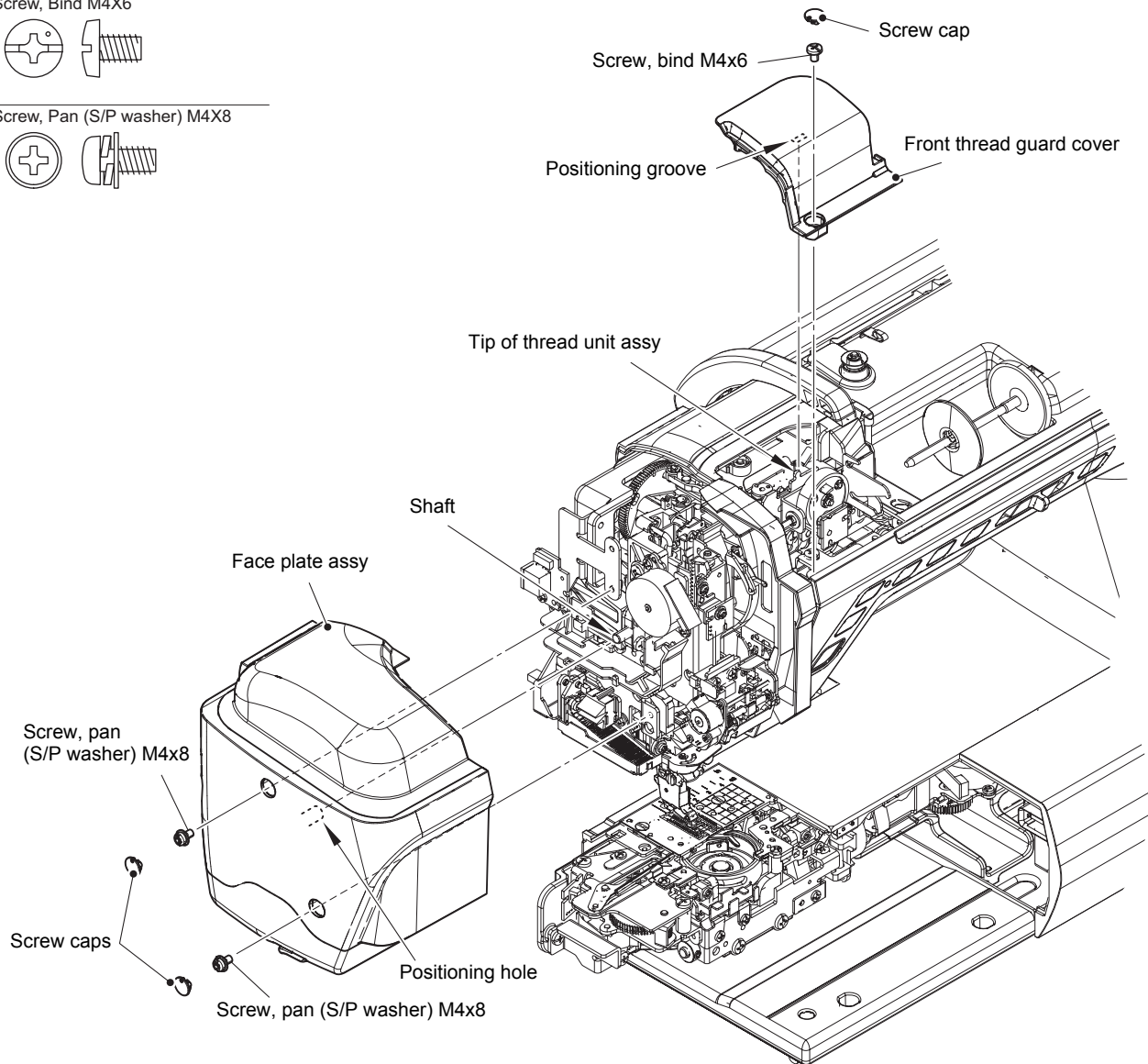
1. Fit the positioning groove to the tip of thread unit assy, attach the thread guard cover with the screw (screw, bind M4x6), and attach the screw cap to the front thread guard cover.
2. Insert the shaft into the positioning hole, attach the face plate assy with the two screws (screw, pan (S/P washer) M4x8), and attach the two screw caps to the face plate assy.

→Refer to 3 - 131 Assembly of Face plate assy.

Screw, Bind M4X6



Screw, Pan (S/P washer) M4X8



10 Attachment of Free arm front cover assy, Free arm cover and Needle plate B assy

1. Set the free arm front cover, hang the two hooks A on the front cover assy and hook B on the hook tray, then attach the free arm front cover assy to the machine with the screw (screw, pan (T washer) M3x6) and screw (screw, bind M3x6).
2. Attach the free arm cover to the machine with the screw (screw, bind M4x6).
3. Attach the needle plate B assy to the machine.

→Refer to 3 - 132 Assembly of Needle plate B assy.

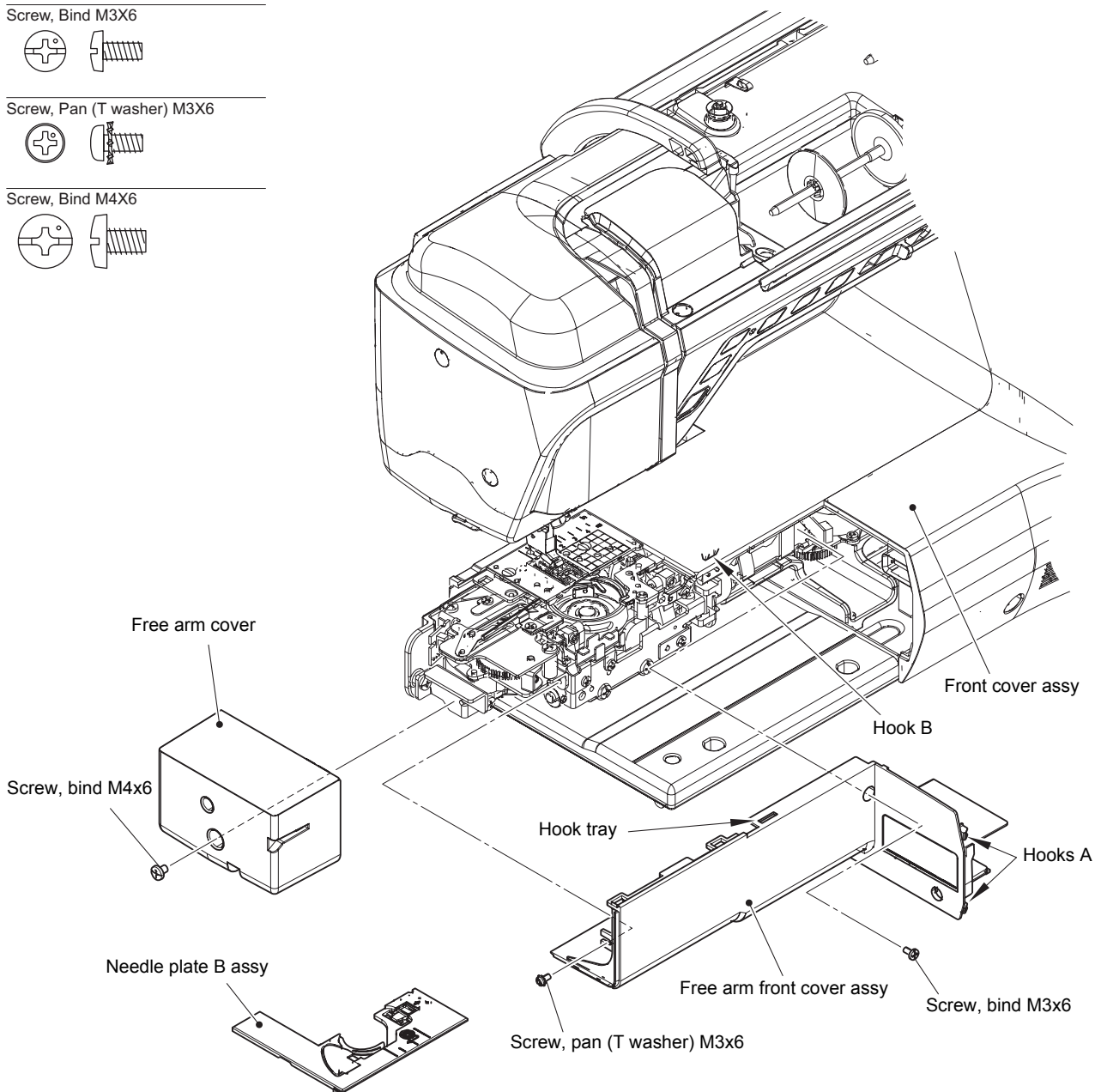
Screw, Bind M3X6



Screw, Pan (T washer) M3X6

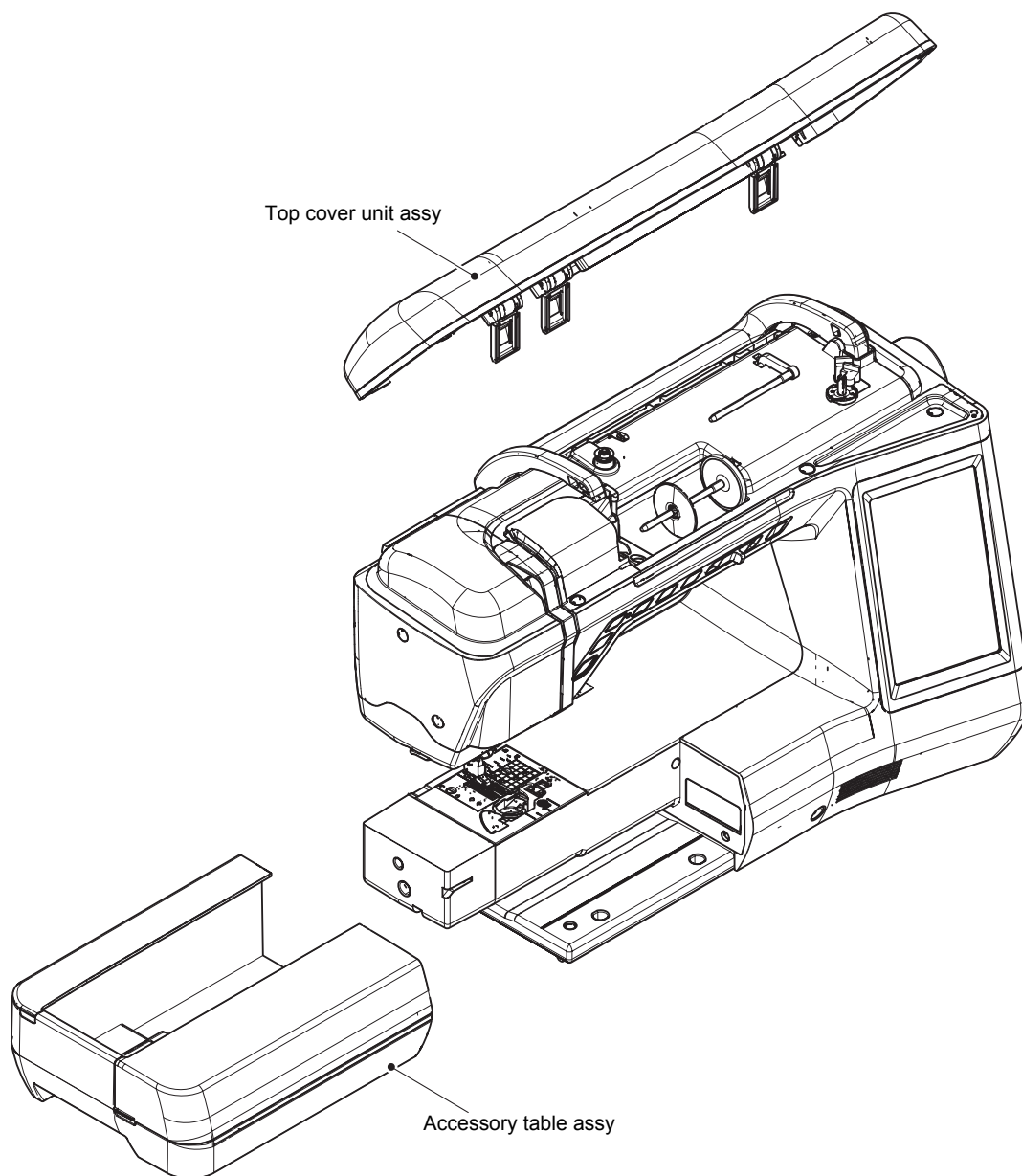


Screw, Bind M4X6



11 Attachment of Accessory table assy and Top cover unit assy

1. Attach the accessory table assy to the machine.
→Refer to 3 - 132 Assembly of Accessory table assy.
2. Attach the top cover unit assy to the machine.



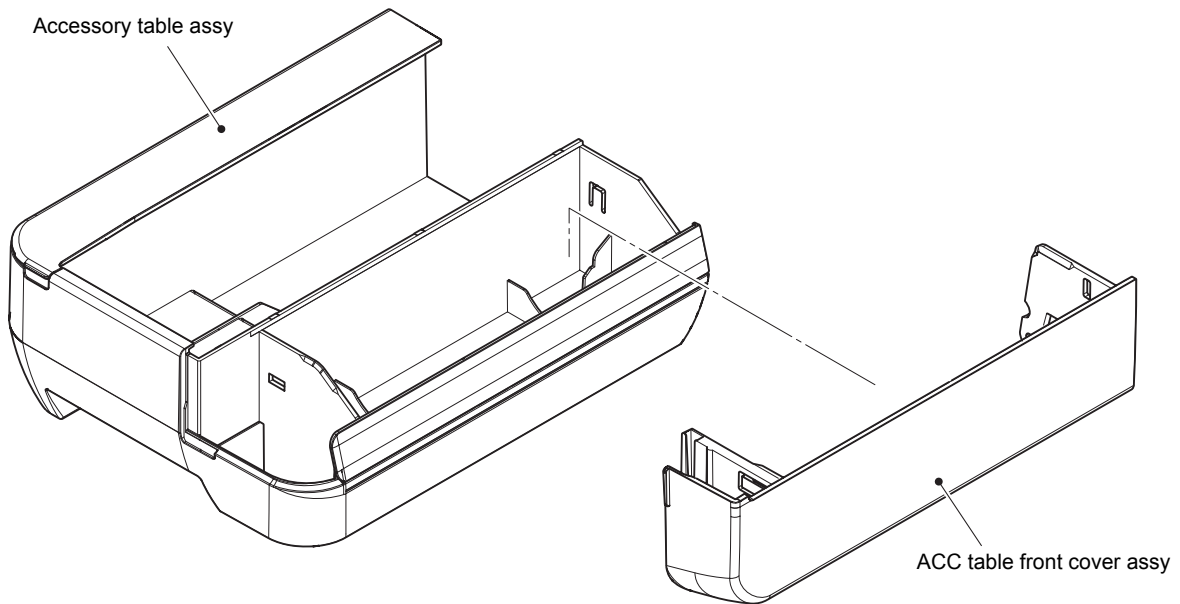
3 Application of Disassembly/Assembly

This chapter explains how to disassemble or assemble each module. Refer to this chapter for fixing and replacing each module.

Disassembly	Main frame and covers	3 - 2
	Bobbin winding mechanism	3 - 19
	Electric parts and main motor unit ...	3 - 23
	Needle threading mechanism	3 - 26
	Lower driving mechanism	3 - 34
	LED light / Upper driving mechanism ..	3 - 38
	Feed module.....	3 - 42
	Thread cutter module	3 - 52
	Needle-presser module	3 - 56
	Embroidery unit	3 - 75
Dual feed assy	3 - 92	
Assembly	LED light / Upper driving mechanism ..	3 - 95
	Lower driving mechanism	3 - 99
	Needle threading mechanism	3 - 103
	Electric parts and main motor unit ..	3 - 112
	Bobbin winding mechanism	3 - 115
	Main frame and covers	3 - 119
	Needle-presser module	3 - 136
	Thread cutter module	3 - 157
	Feed module.....	3 - 162
Embroidery unit	3 - 175	
Dual feed assy	3 - 193	

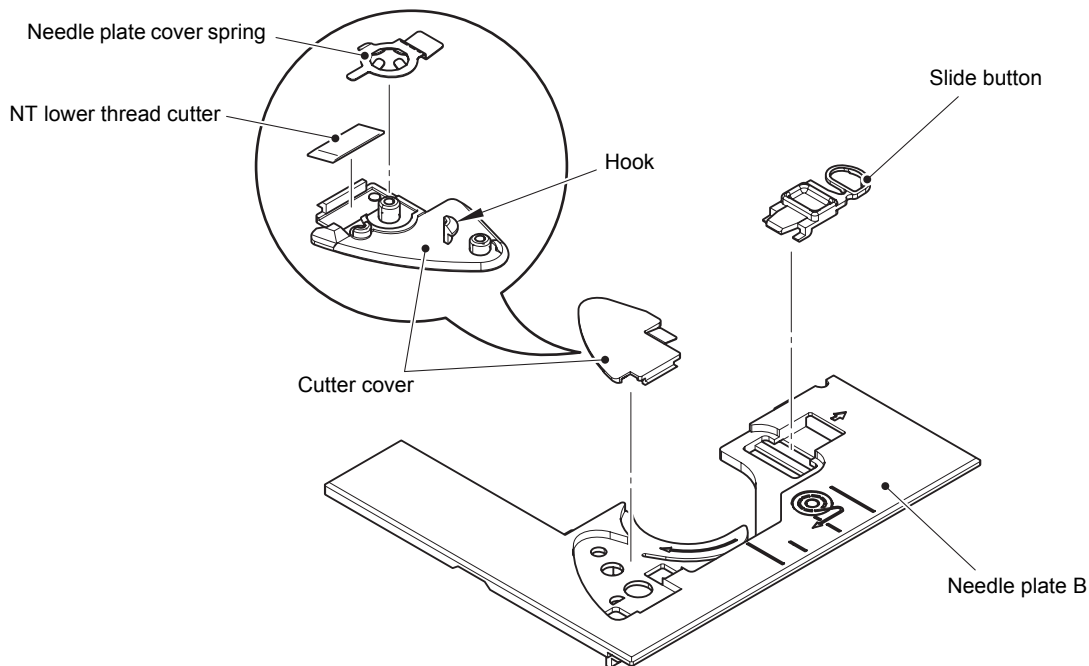
1 Disassembly of Accessory table assy

1. Remove the ACC table front cover assy from the accessory table assy.



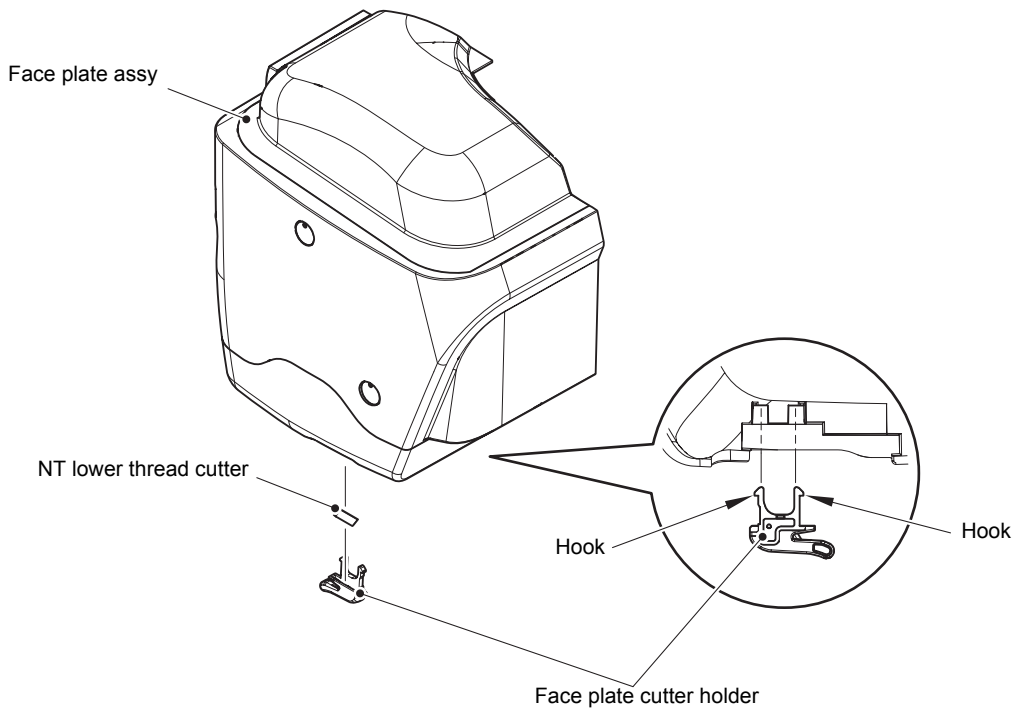
2 Disassembly of Needle plate B assy

1. Remove the slide button from the needle plate B.
2. Release the hook to remove the cutter cover from the needle plate B. Remove the needle plate cover spring and the NT lower thread cutter from the cutter cover.



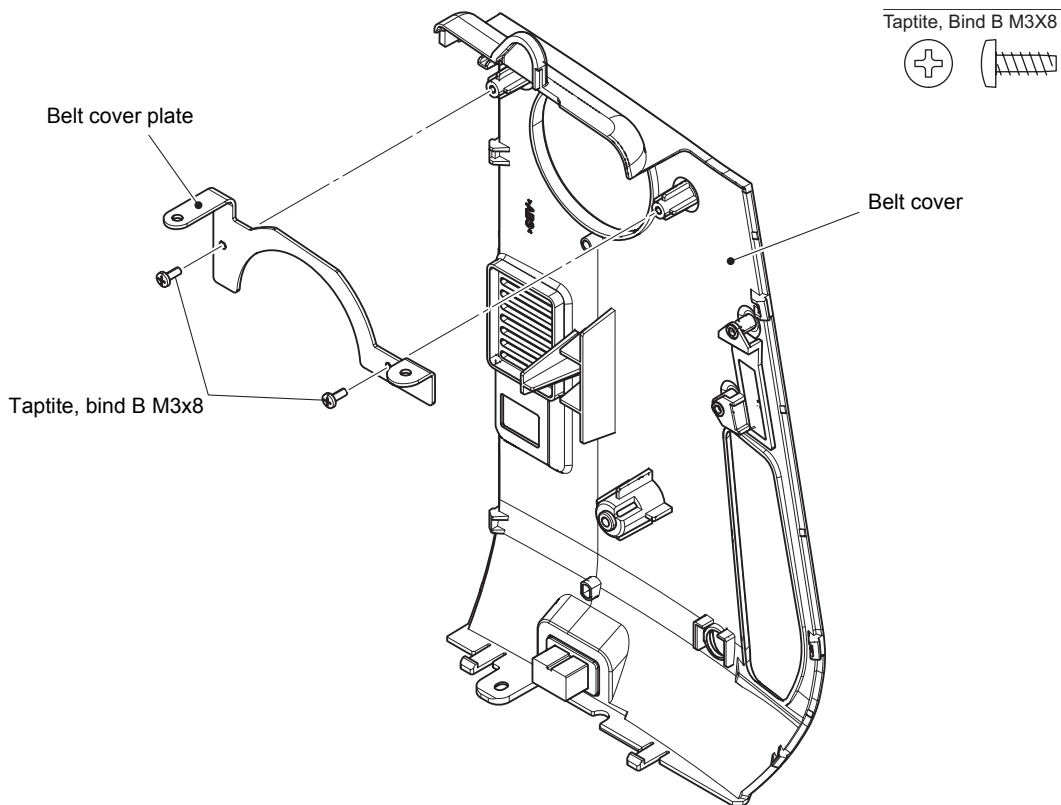
3 Disassembly of Face plate assy

1. Release the two hooks to remove the face plate cutter holder from the face plate assy. Remove the NT lower thread cutter from the face plate cutter holder.



4 Disassembly of Belt cover

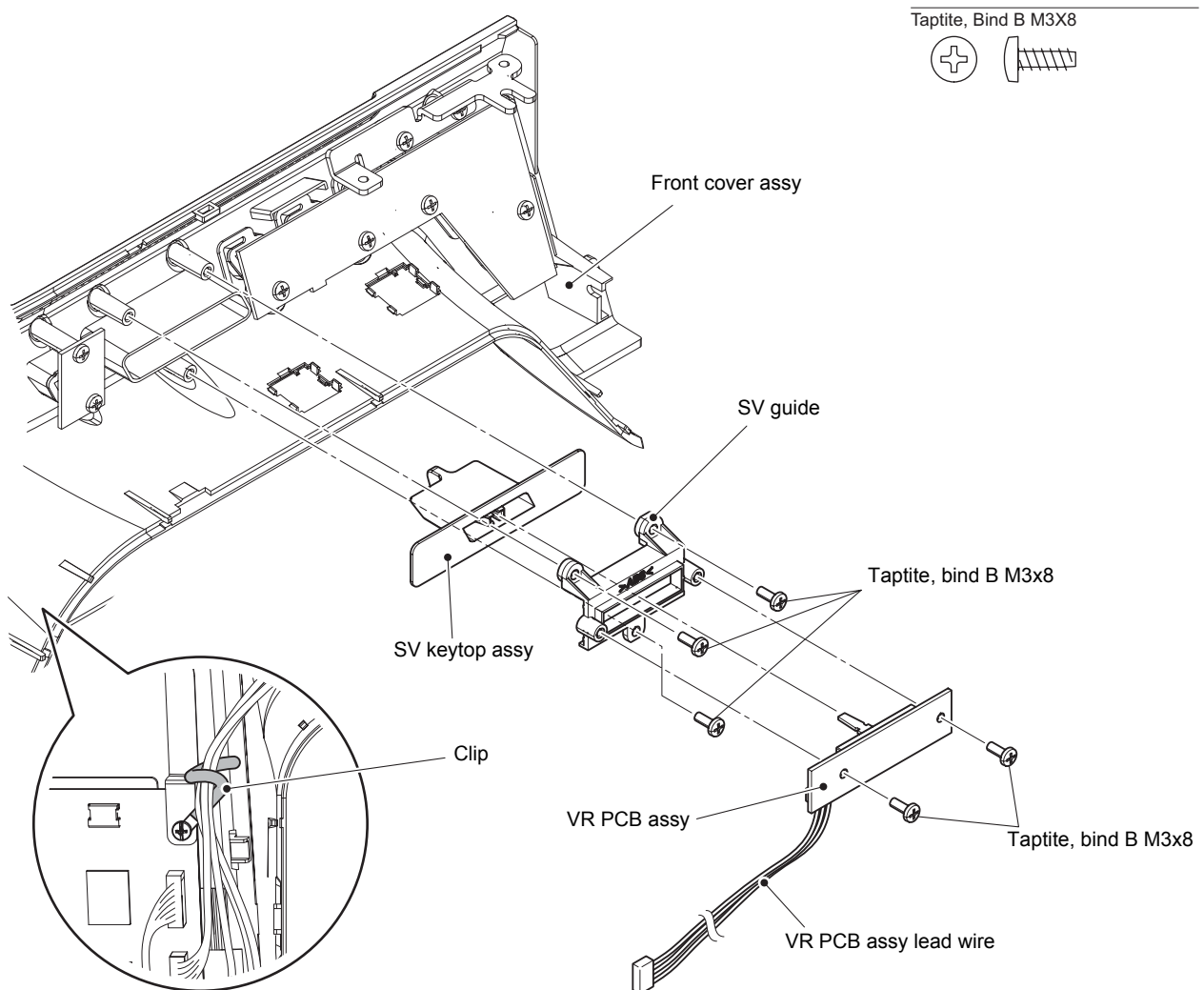
1. Remove the two screws (taptite, bind B M3x8) to remove the belt cover plate from the belt cover.



5 Disassembly of Front cover assy

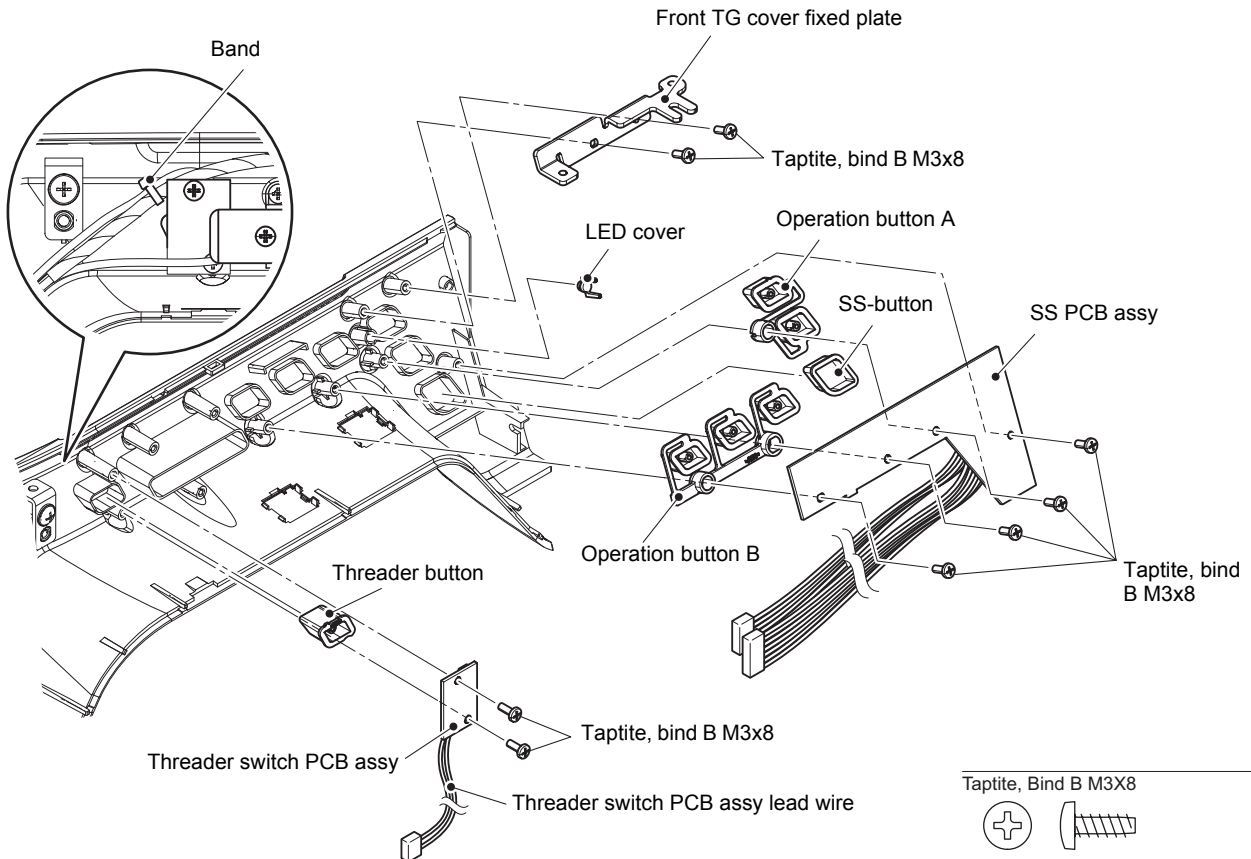
5-1 Removal of VR PCB assy and SV keytop assy

1. Release the clip to unbind the any lead wire.
2. Disconnect the VR PCB assy lead wire from the panel PCB assy.
3. Remove the two screws (taptite, bind B M3x8) to remove the VR PCB assy from the SV guide.
4. Remove the three screws (taptite, bind B M3x8) to remove the SV guide and SV keytop assy from the front cover assy.



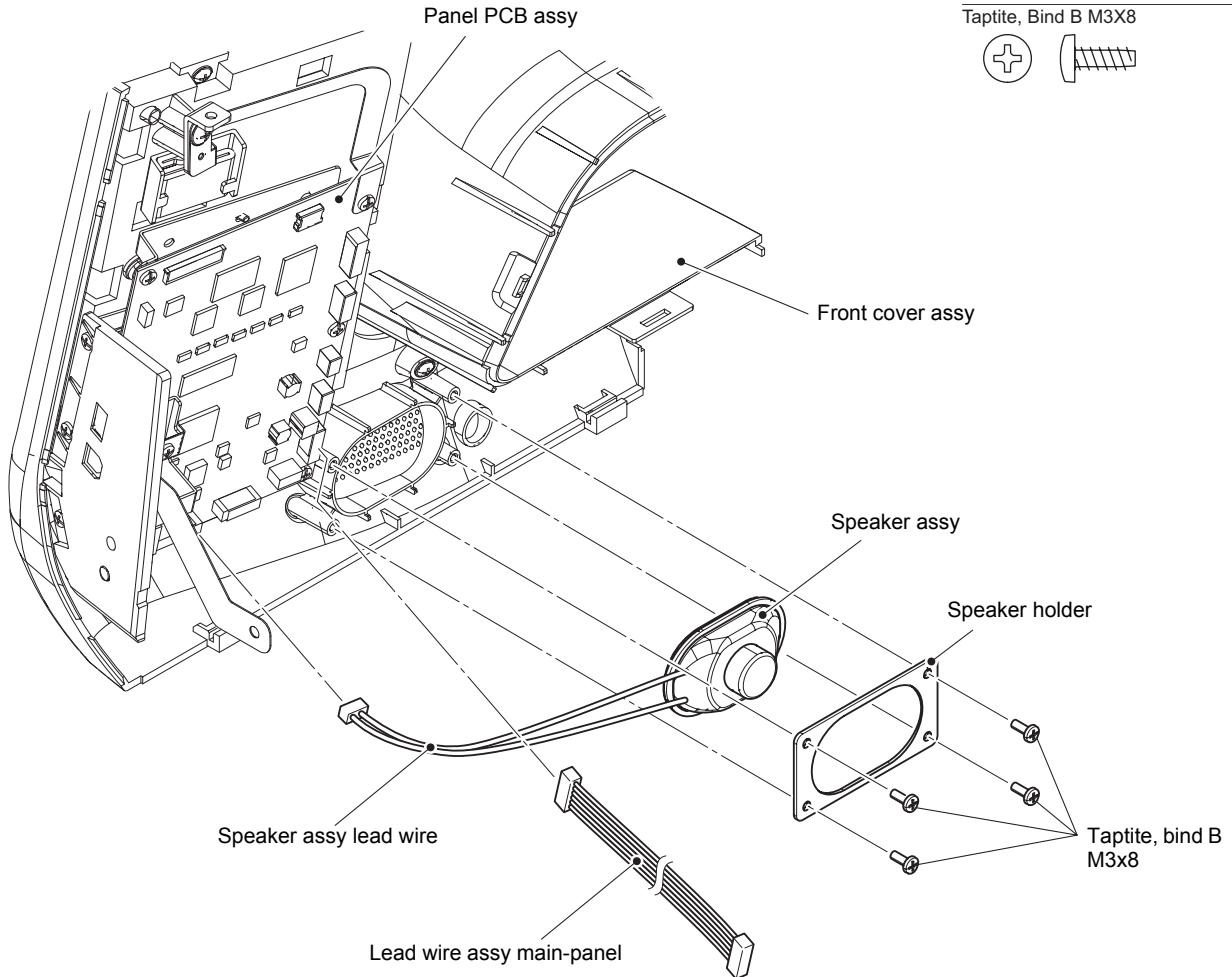
5-2 Removal of Threader switch PCB assy, SS PCB assy and Buttons

1. Disconnect the connector of threader switch PCB assy lead wire and two connectors of SS PCB assy from the panel PCB assy, and cut the band.
2. Remove the two screws (taptite, bind B M3x8) to remove the front TG cover fixed plate from the front cover assy.
3. Remove the two screws (taptite, bind B M3x8) to remove the threader switch PCB assy and threader button.
4. Remove the four screws (taptite, bind B M3x8) to remove the SS PCB assy, SS-button, operation button A, operation button B and LED cover from the front cover assy.



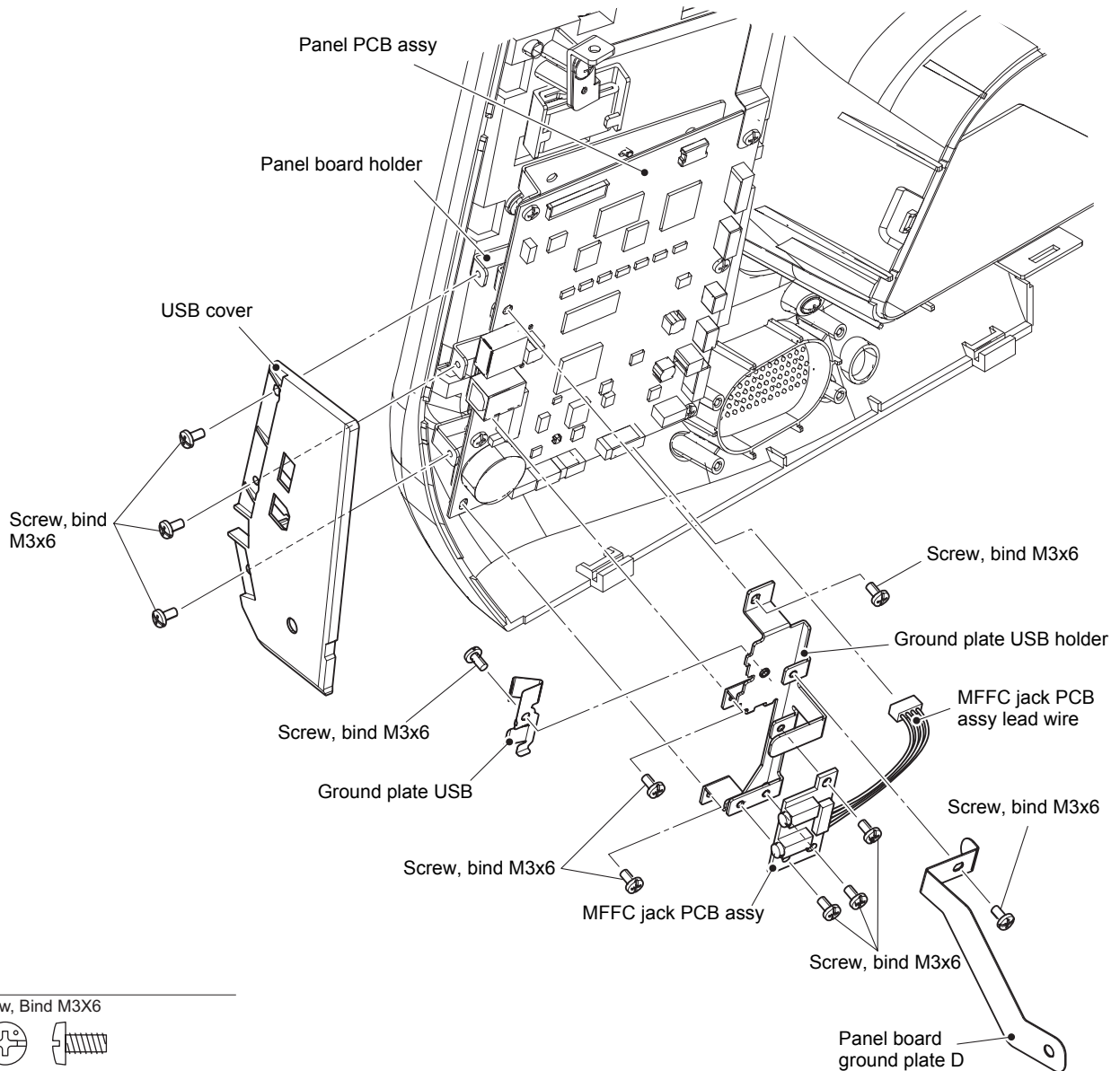
5-3 Removal of Lead wire assy main-panel and Speaker assy

1. Disconnect the lead wire assy main-panel from the panel PCB assy.
2. Disconnect the speaker assy lead wire from the panel PCB assy and remove the four screws (taptite, bind B M3x8) to remove the speaker holder and speaker assy.



5-4 Removal of USB cover, MFFC jack PCB assy and Ground plate USB holder

1. Remove the three screws (screw, bind M3x6) to remove the USB cover from the panel board holder.
2. Disconnect the MFFC jack PCB assy lead wire and remove the three screws (screw, bind M3x6) to remove the MFFC jack PCB assy from the ground plate USB holder.
3. Remove the screw (screw, bind M3x6) to remove the panel board ground plate D from the ground plate USB holder.
4. Remove the three screws (screw, bind M3x6) to remove the ground plate USB holder, and remove the screw (screw, bind M3x6) to remove the ground plate USB from the ground plate USB holder.



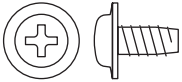
Application of
Disassembly

Application of
Disassembly

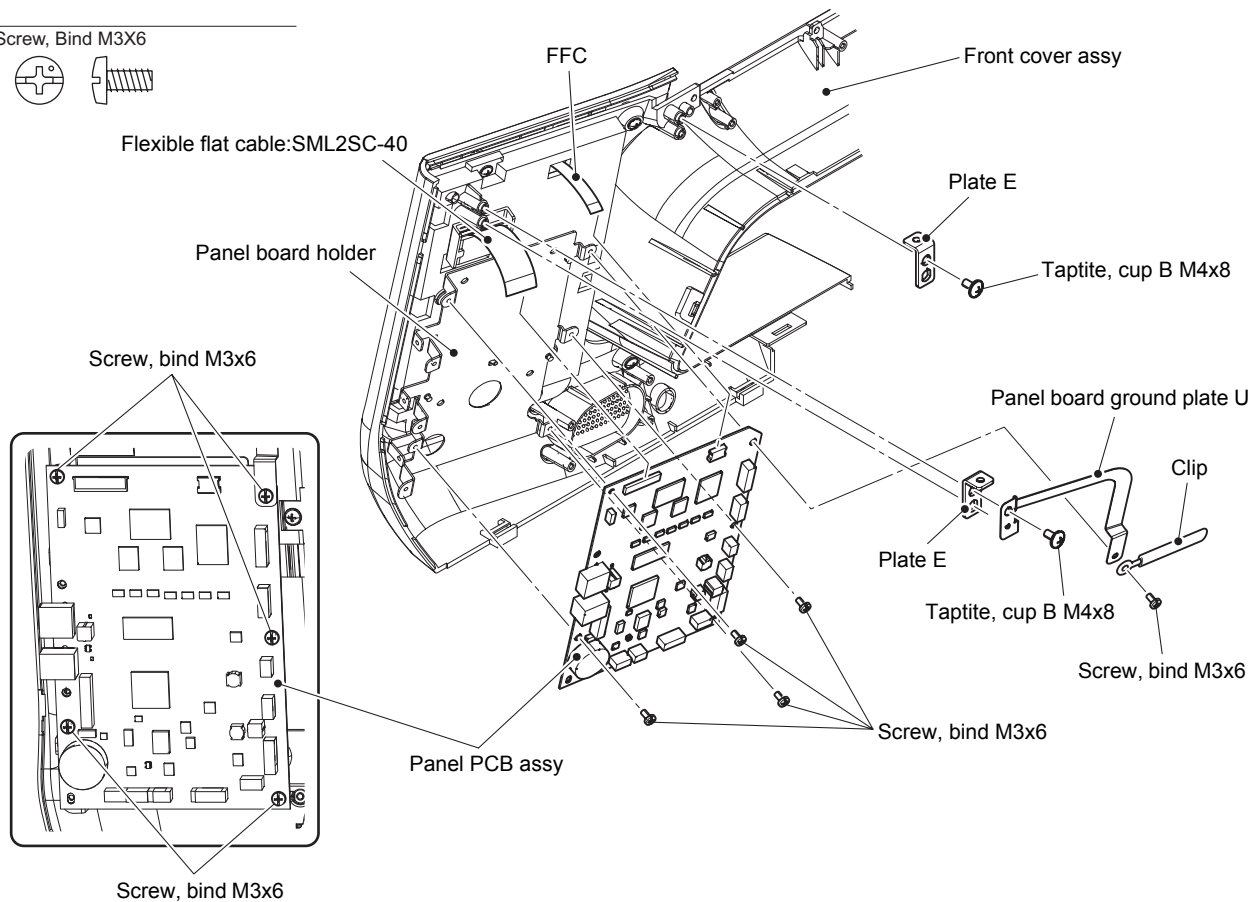
5-5 Removal of Panel PCB assy

1. Remove the screw (taptite, cup B M4x8) to remove the plate E.
2. Remove the screw (taptite, cup B M4x8) and screw (screw, bind M3x6) to remove the clip, panel board ground plate U and plate E.
3. Release the lock to disconnect the flexible flat cable:SML2SC-40 from the panel PCB assy. Release the lock to disconnect the FFC of touch panel from the panel PCB assy.
4. Remove the four screws (screw, bind M3x6) to remove the panel PCB assy from the panel board holder.

Taptite, Cup B M4X8



Screw, Bind M3X6

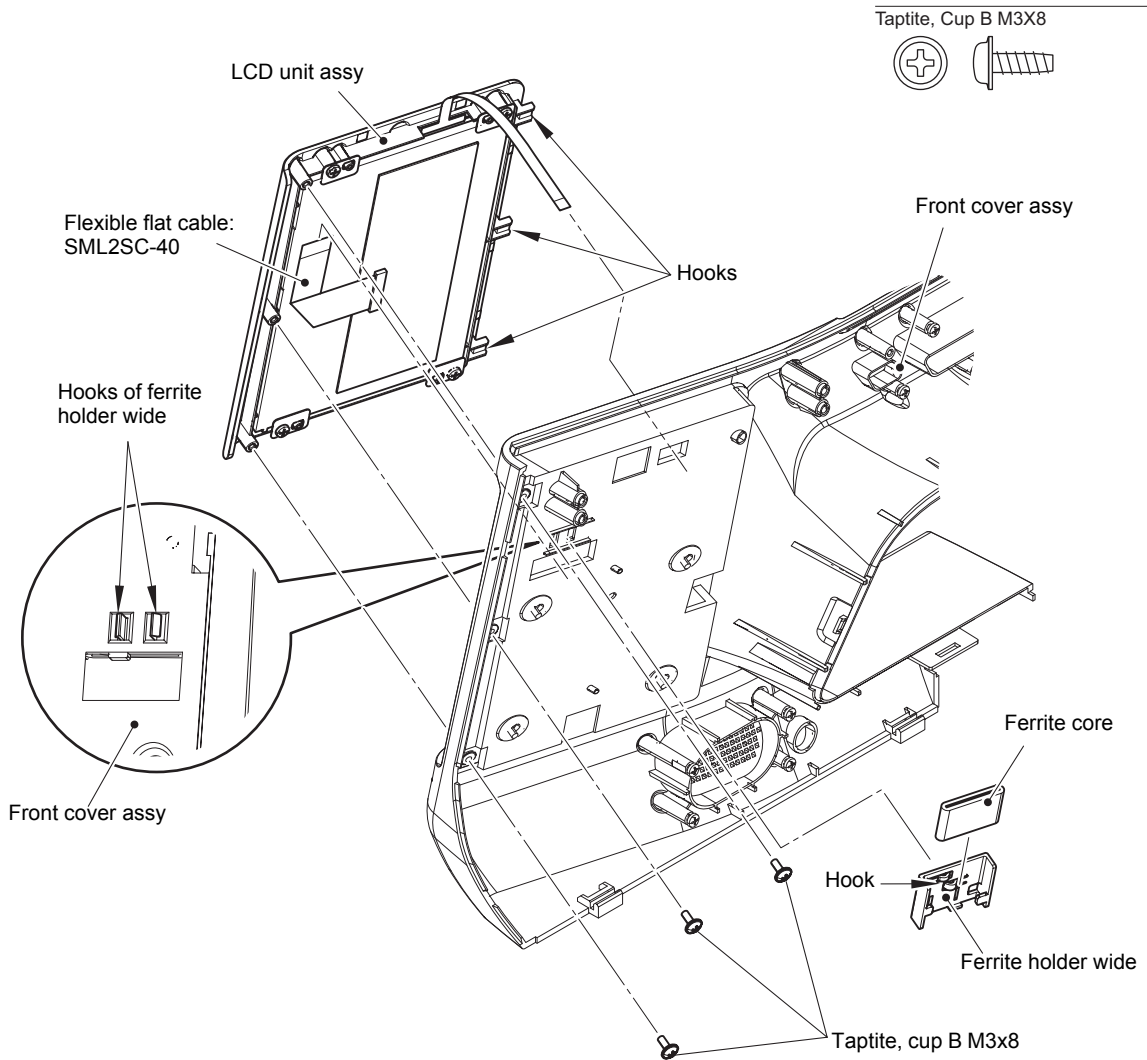


Application of
Disassembly

Application of
Disassembly

5-6 Removal of LCD unit assy

1. Pull out the flexible flat cable:SML2SC-40 from the ferrite core, and remove the three screws (taptite, cup B M3x8) to remove the LCD unit assy.
2. Release the two hooks to remove the ferrite holder wide, and release the hook to remove the ferrite core from the ferrite holder wide.

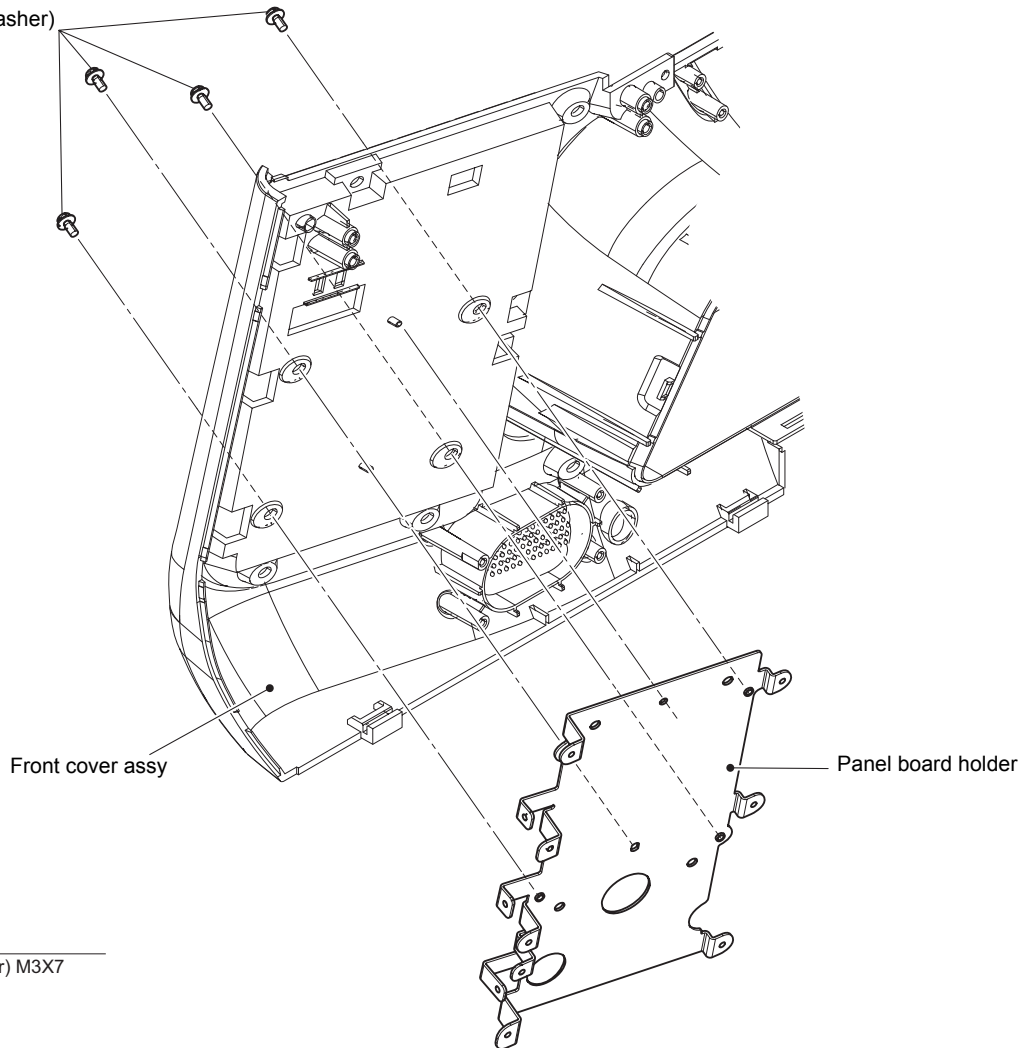


Application of
Disassembly

Application of
Disassembly

3. Remove the four screws (screw, pan (S/P washer) M3x7) to remove the panel board holder from the front cover assy.

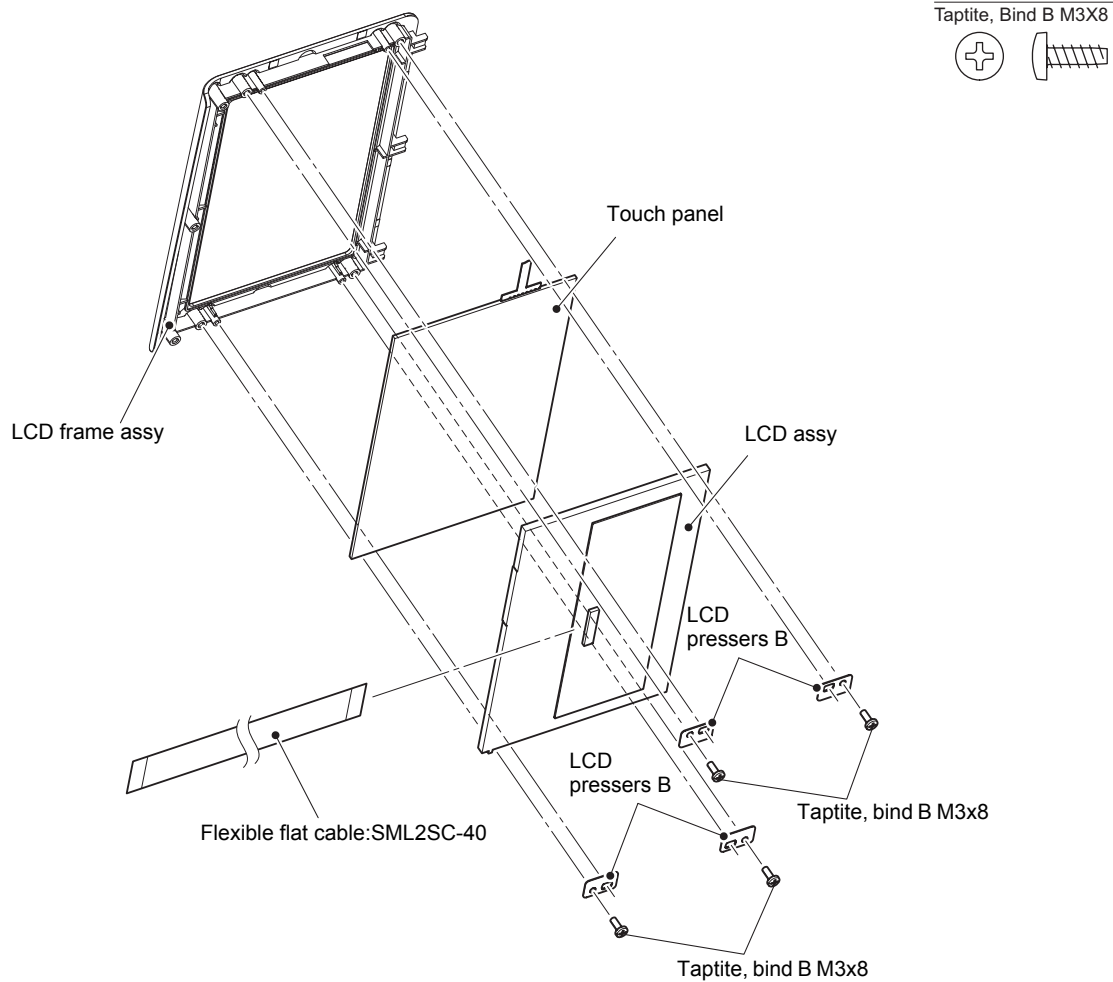
Screw, pan (S/P washer)
M3x7



Screw, Pan (S/P washer) M3X7

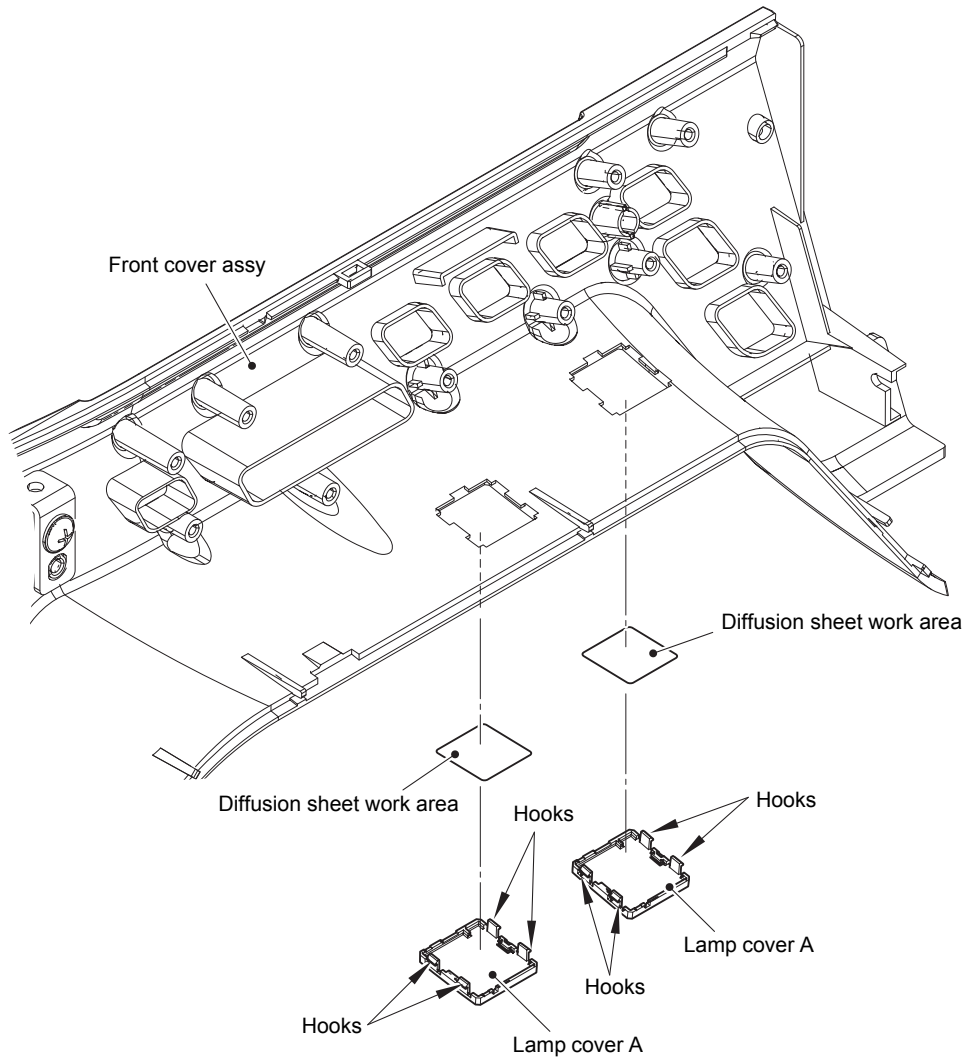


4. Remove the four screws (taptite, bind B M3x8) to remove the four LCD pressers B from the LCD frame assy. Remove the LCD assy and touch panel from the LCD frame assy.
5. Release the lock to disconnect the flexible flat cable:SML2SC-40 from the LCD assy.



5-7 Removal of Lamp cover A

1. Release the four hooks to remove the lamp cover A from the front cover assy, and remove the diffusion sheet work area from the lamp cover A. (two locations)

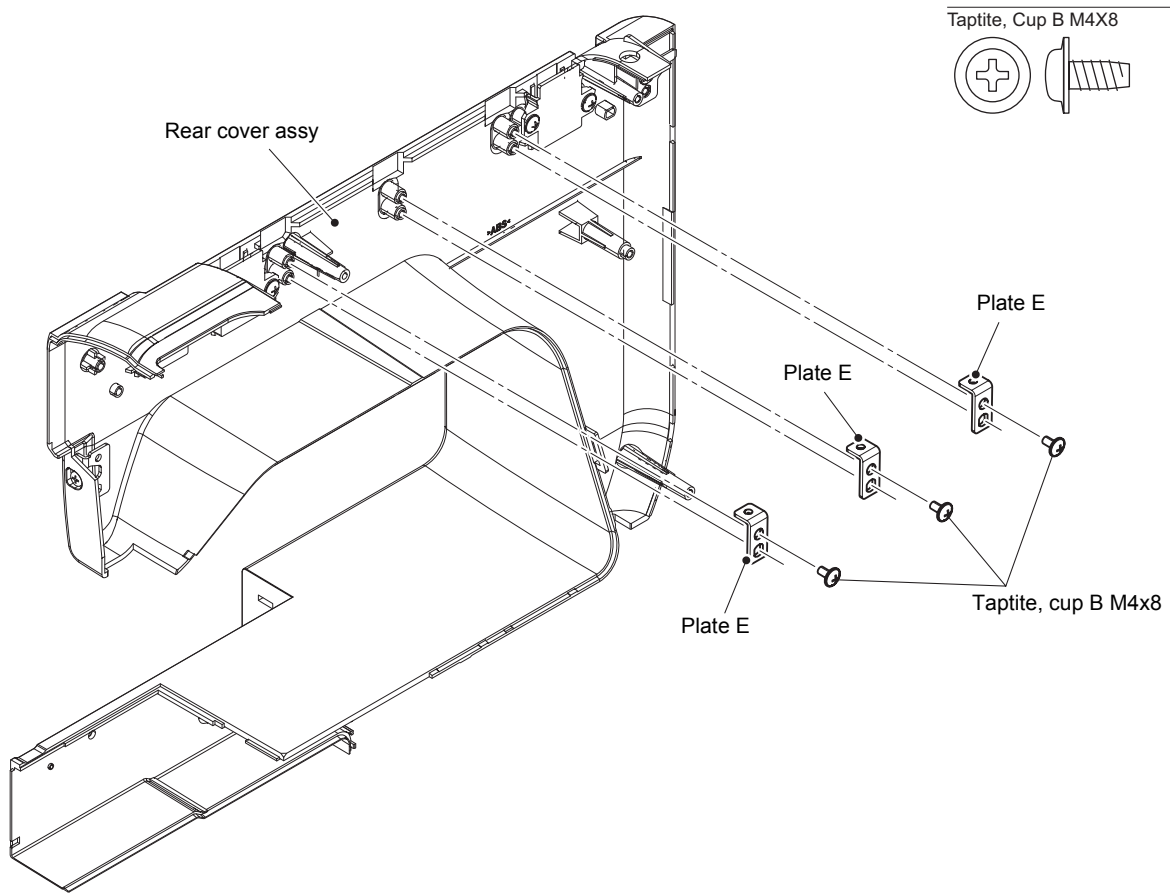


Application of
Disassembly

Application of
Disassembly

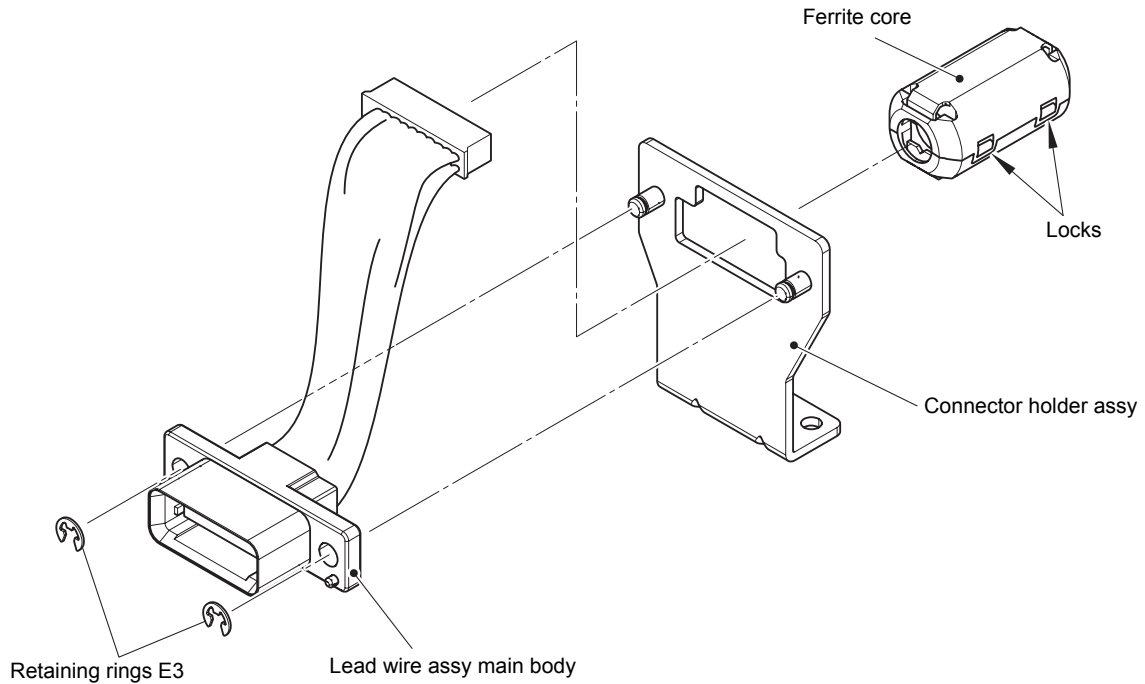
6 Disassembly of Rear cover assy

1. Remove the three screws (taptite, cup B M4x8) to remove the three plates E from the rear cover assy.



7 Disassembly of Connector holder assy

1. Unlock the two locks to open the ferrite core, and remove the ferrite core from the lead wire assy main body.
2. Remove the two retaining rings E3 to remove the lead wire assy main body from the connector holder assy.

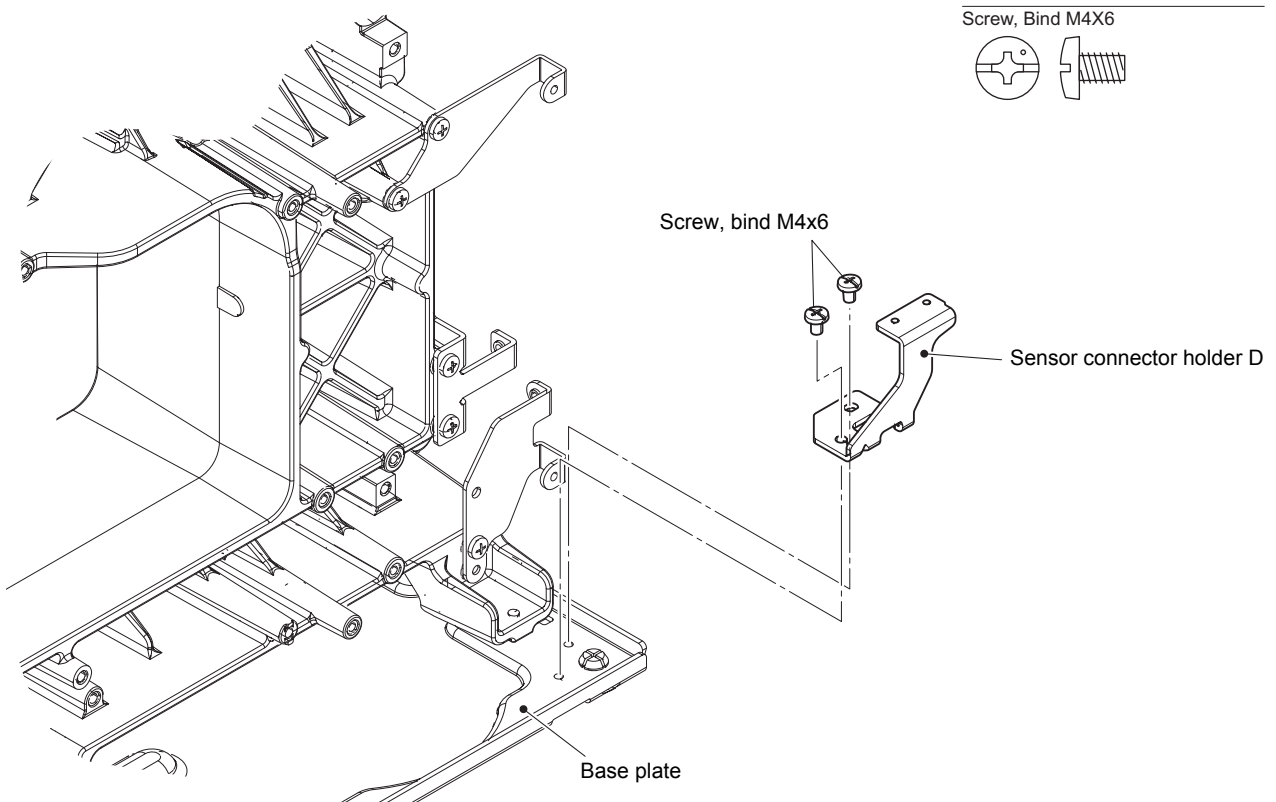


Application of
Disassembly

Application of
Disassembly

8 Removal of Sensor connector holder D

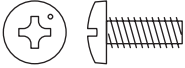
1. Remove the two screws (screw, bind M4x6) to remove the sensor connector holder D from the base plate.



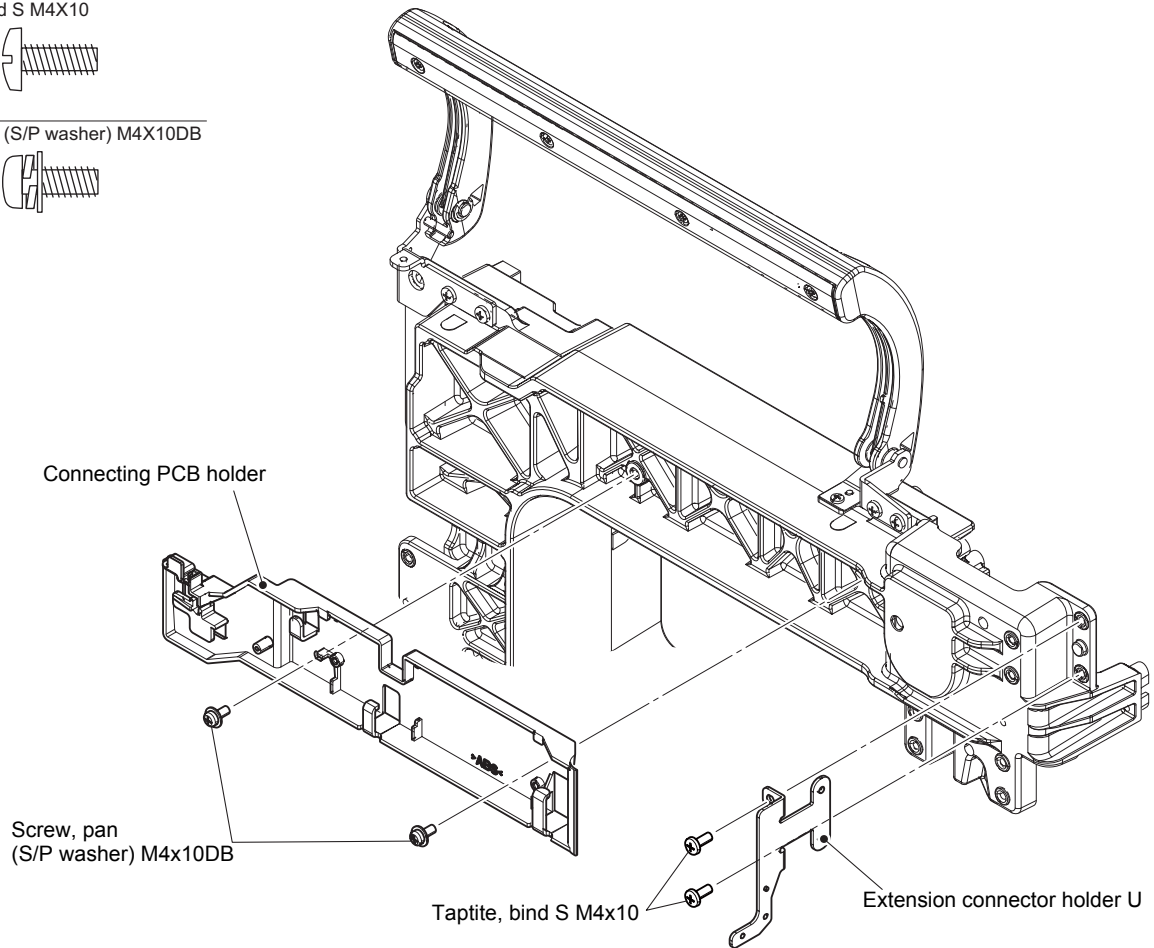
9 Removal of Connecting PCB holder and Extension connector holder U

1. Remove the two screws (taptite, bind S M4x10) to remove the extension connector holder U.
2. Remove the two screws (screw, pan (S/P washer) M4x10DB) to remove the connecting PCB holder.

Taptite, Bind S M4X10

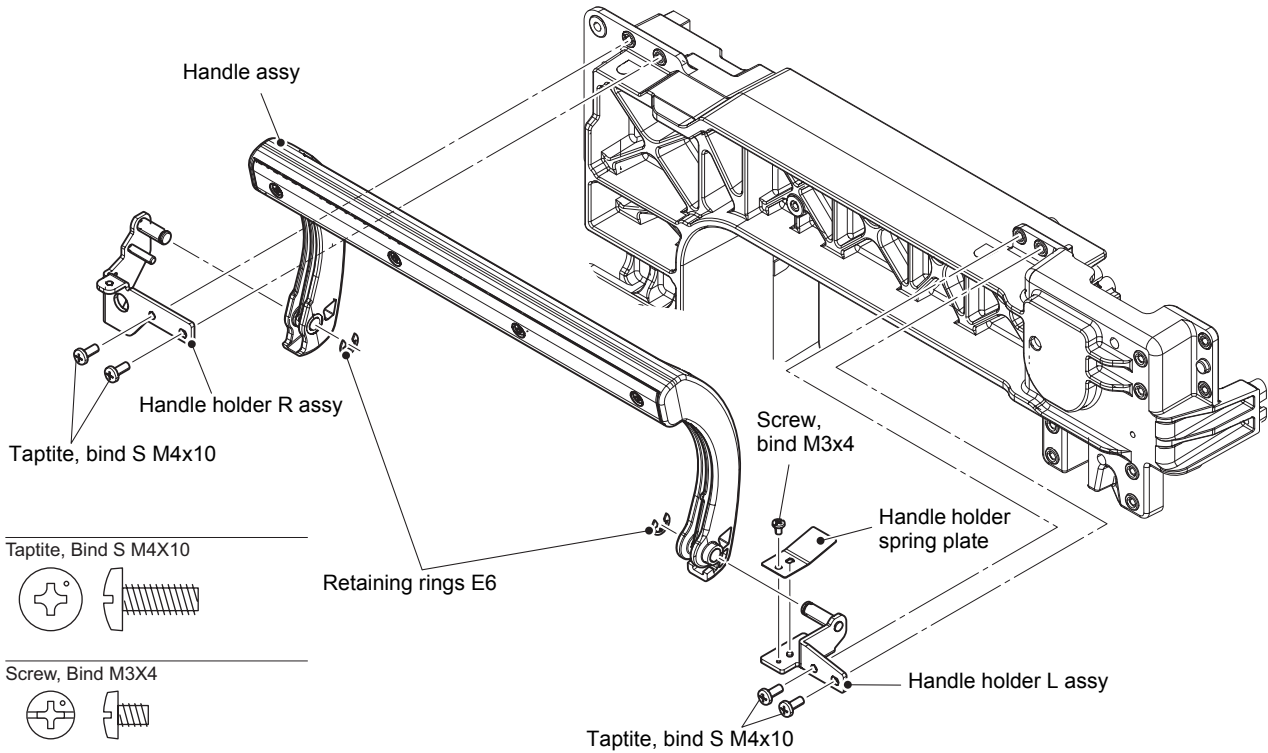


Screw, Pan (S/P washer) M4X10DB



10 Removal of Handle assy

1. Remove the four screws (taptite, bind S M4x10) to remove the handle assy.
2. Remove the retaining ring E6 to remove the handle holder R assy from the handle assy.
3. Remove the retaining ring E6 to remove the handle holder L assy from the handle assy, and remove the screw (screw, bind M3x4) to remove the handle holder spring plate from the handle holder L assy.



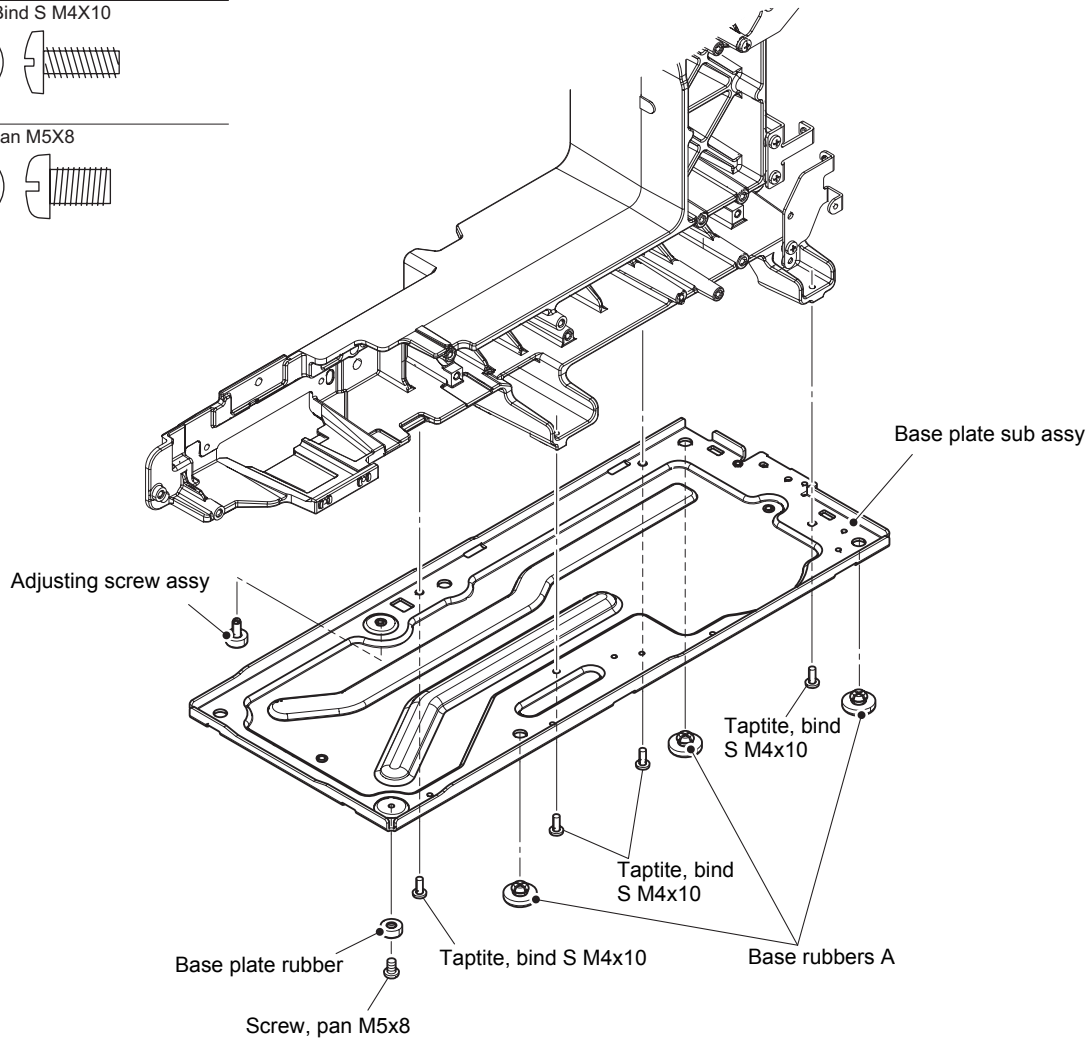
11 Removal of Base plate sub assy

1. Remove the four screws (taptite, bind S M4x10) to remove the base plate sub assy.
2. Remove the three base rubbers A from the base plate sub assy.
3. Remove the adjusting screw assy from the base plate sub assy.
4. Remove the screw (screw, pan M5x8) to remove the base plate rubber.

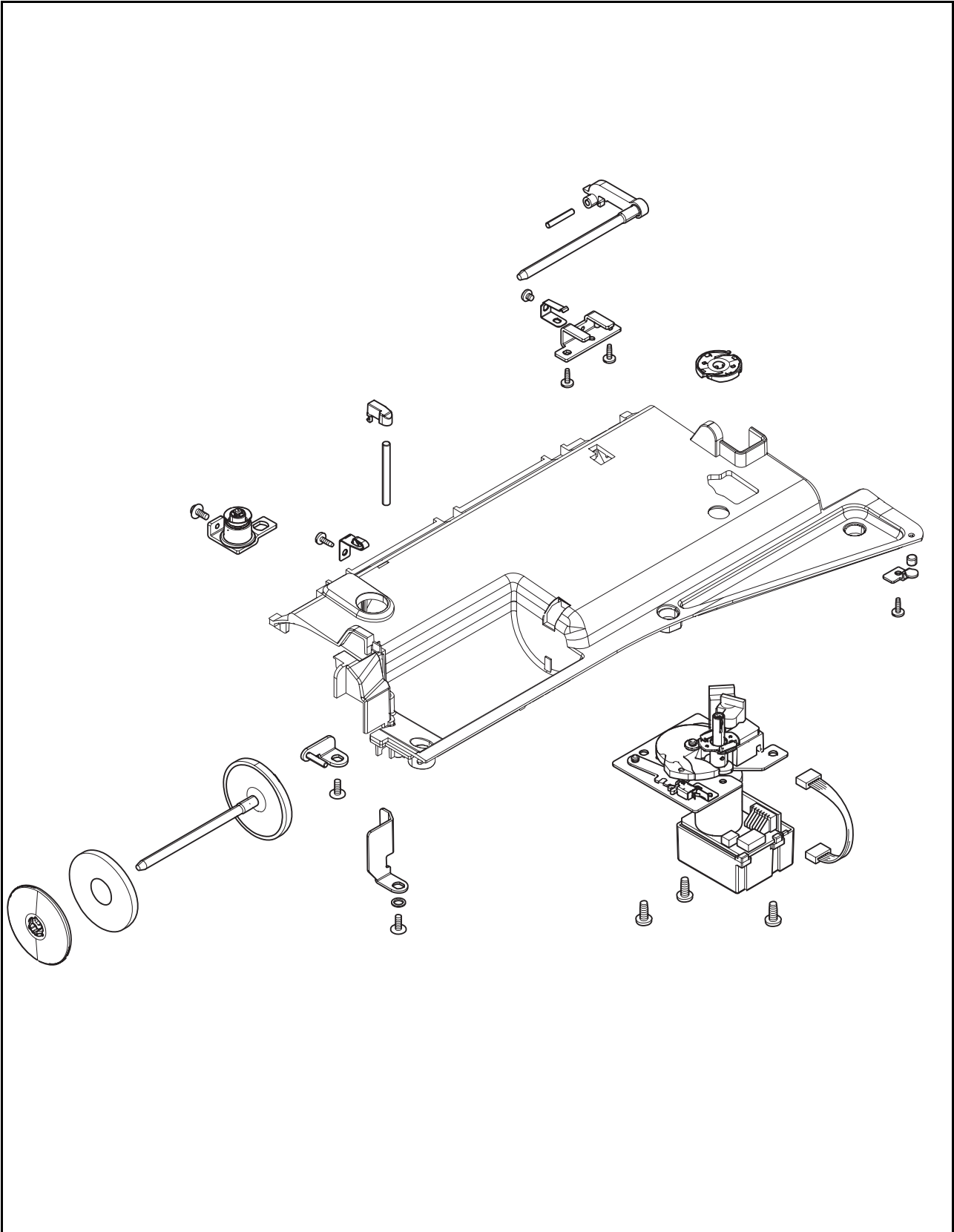
Taptite, Bind S M4X10



Screw, Pan M5X8



Bobbin winding mechanism location diagram

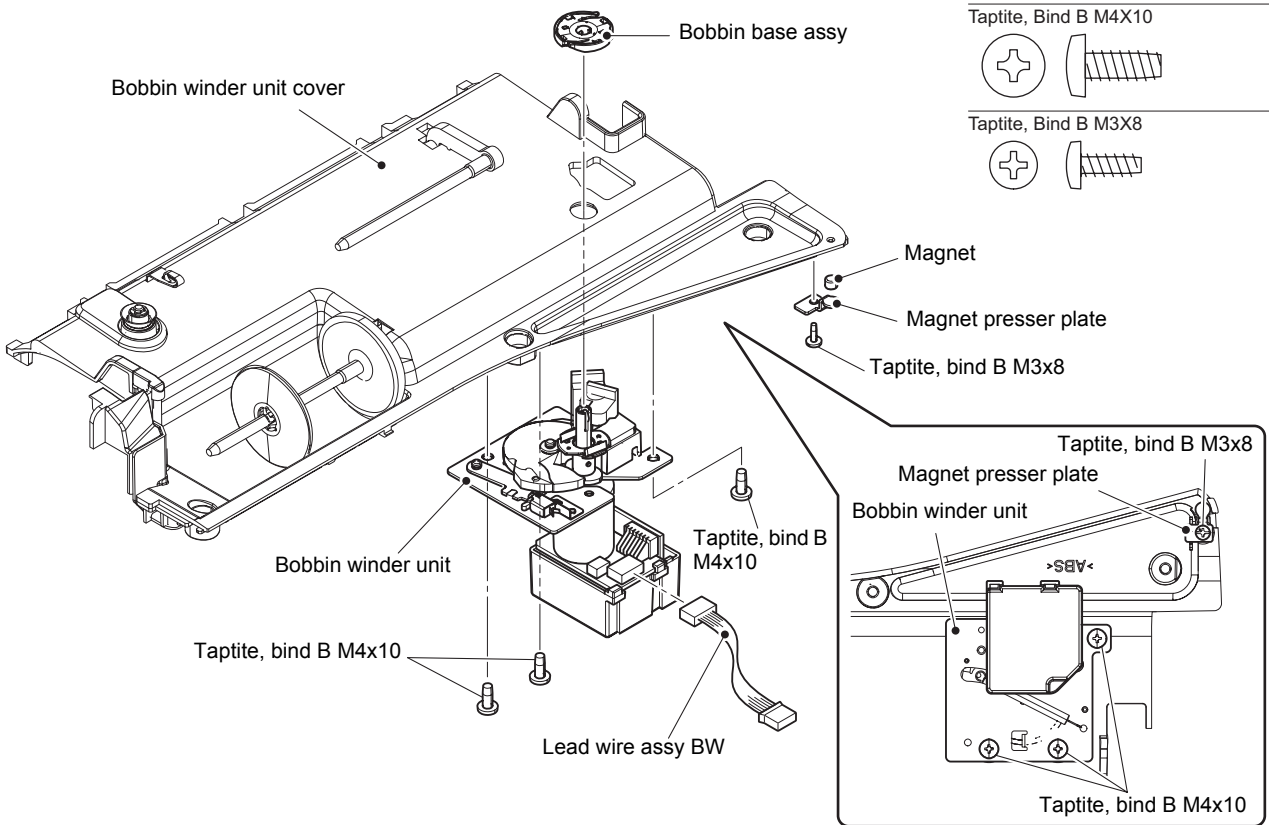


Application of Disassembly

Application of Disassembly

1 Disassembly of Bobbin winder unit cover assy

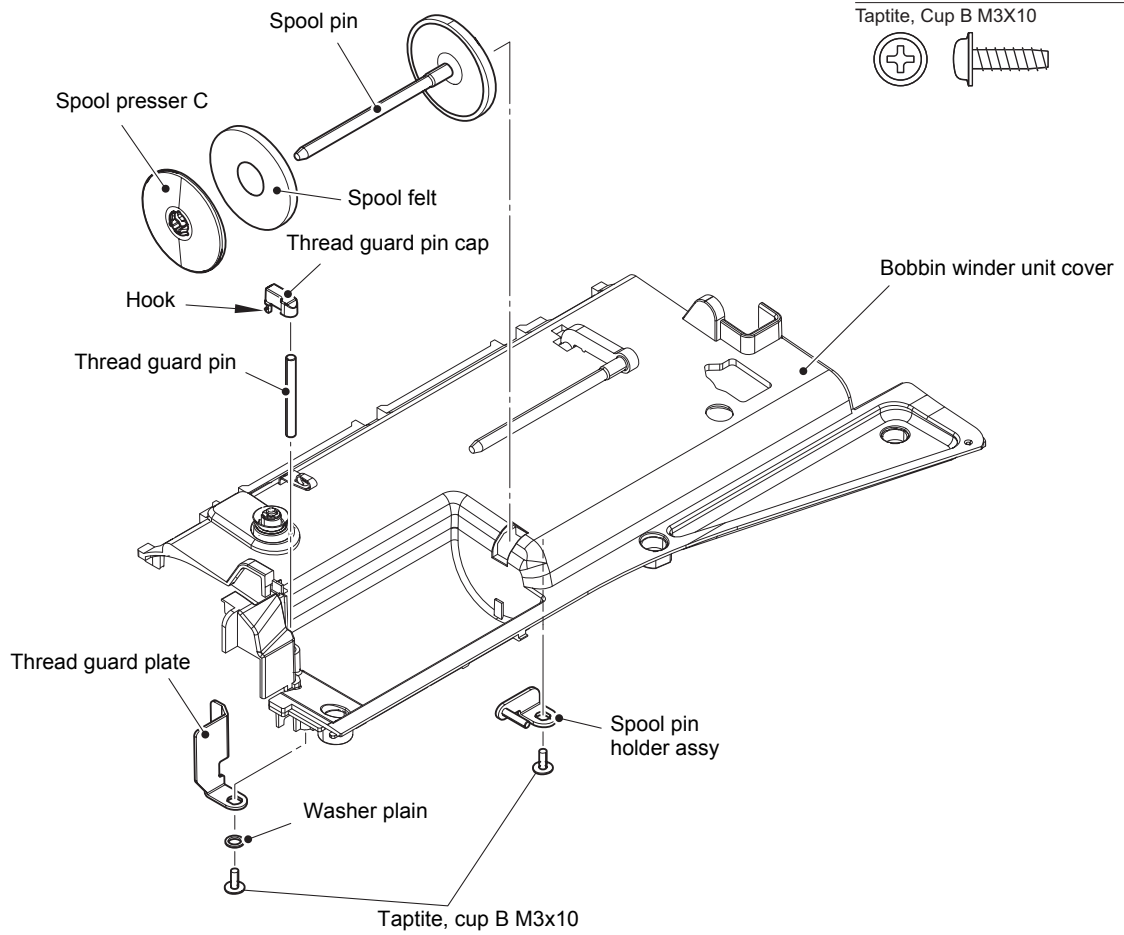
1. Remove the bobbin base assy from the shaft of bobbin winder unit. Remove the three screws (taptite, bind B M4x10) to remove the bobbin winder unit, and disconnect the lead wire assy BW from the bobbin winder unit.
2. Remove the screw (taptite, bind B M3x8) to remove the magnet presser plate and magnet.



Application of
Disassembly

Application of
Disassembly

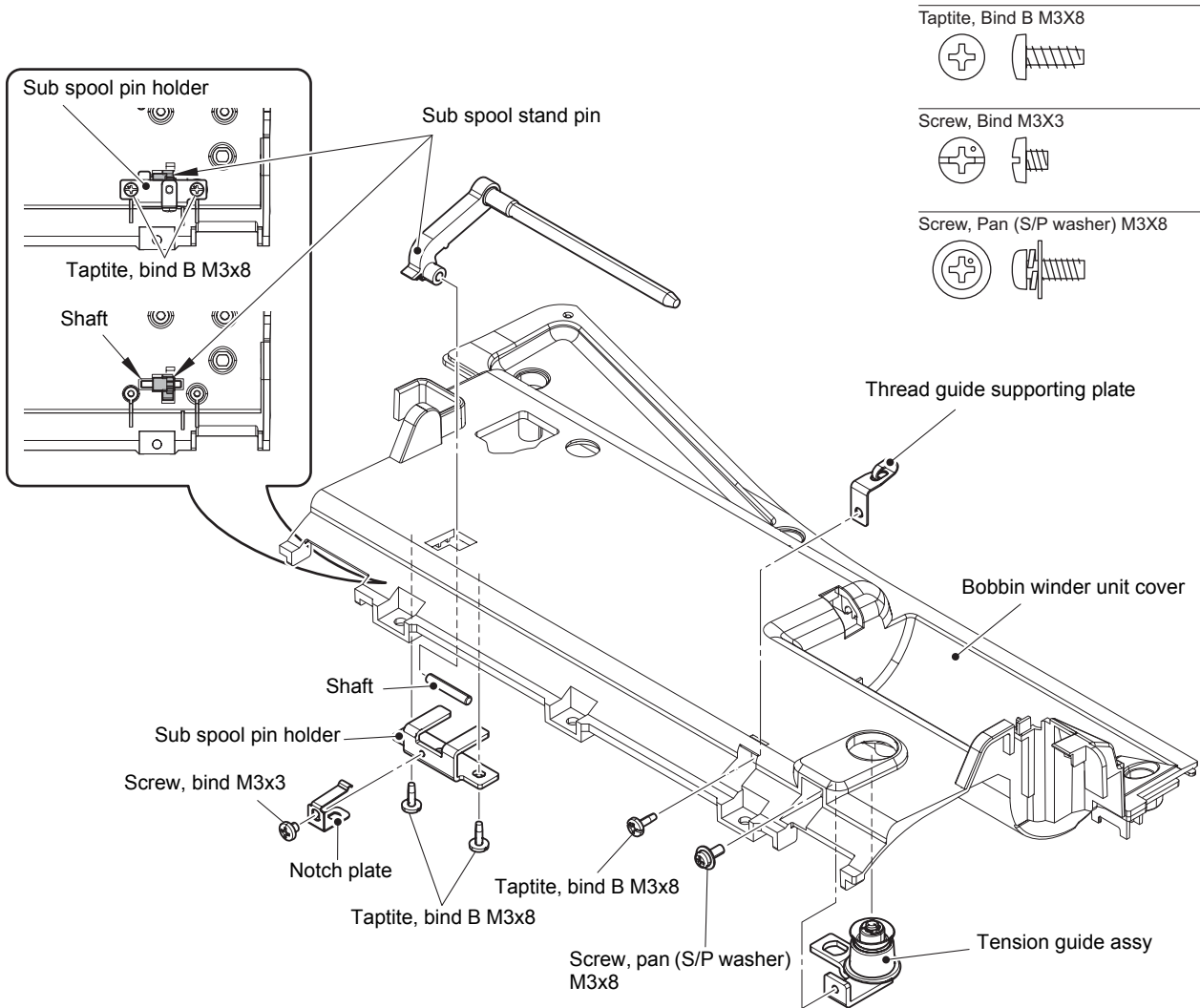
3. Remove the spool presser C and spool felt from the spool pin. Remove the screw (taptite, cup B M3x10) and pull out the spool pin holder assy from the spool pin to remove the spool pin.
4. Remove the screw (taptite, cup B M3x10) to remove the washer plain and thread guard plate.
5. Release the hook to remove the thread guard pin cap, and then pull out the thread guard pin.



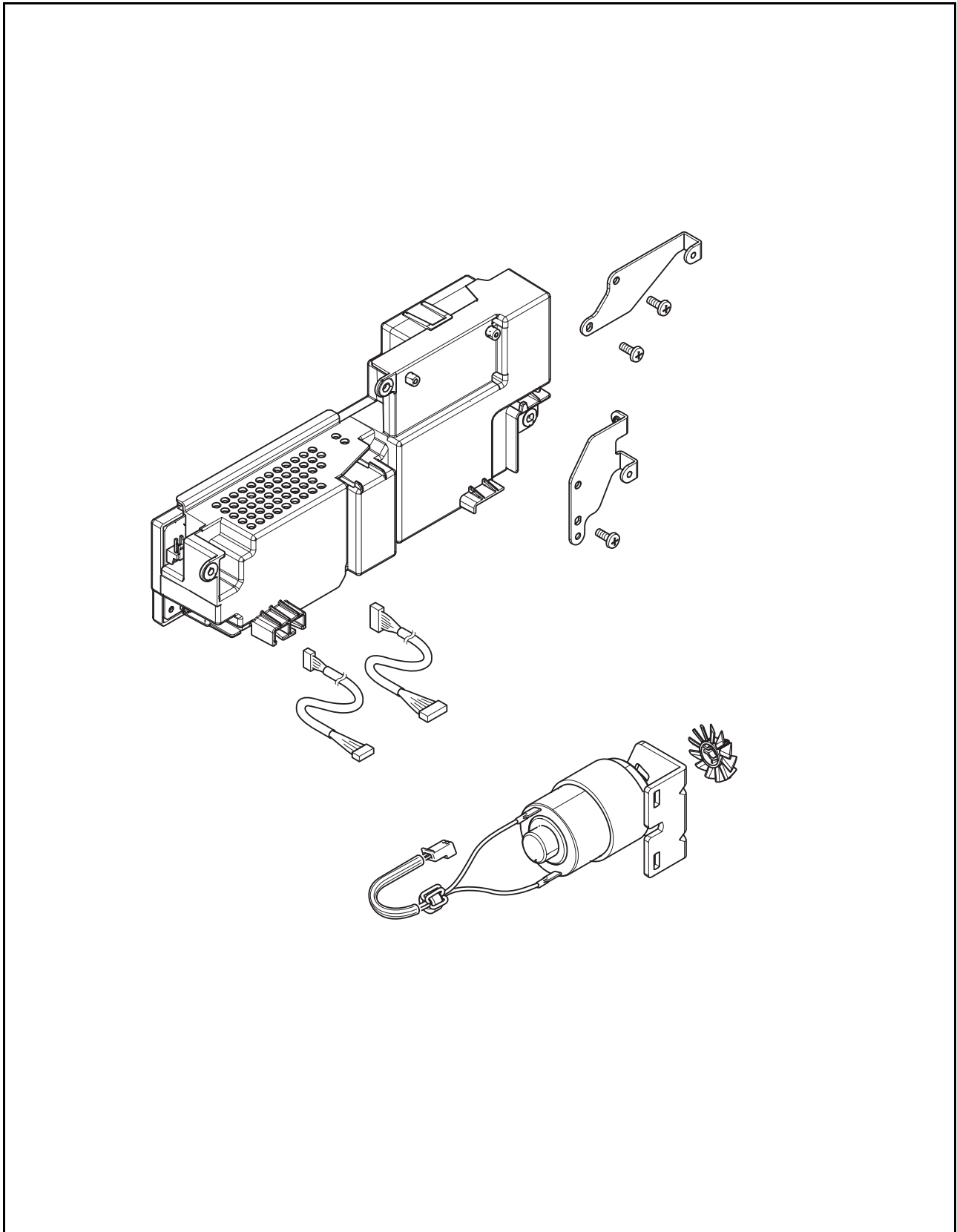
Application of
Disassembly

Application of
Disassembly

6. Remove the two screws (taptite, bind B M3x8) to remove the sub spool pin holder. Remove the screw (screw, bind M3x3) to remove the notch plate from the sub spool pin holder.
7. Pull out the shaft from the sub spool stand pin, and remove the sub spool stand pin.
8. Remove the screw (screw, pan (S/P washer) M3x8) to remove the tension guide assy.
9. Remove the screw (taptite, bind B M3x8), and pull out the thread guide supporting plate.



Electric parts and main motor unit location diagram

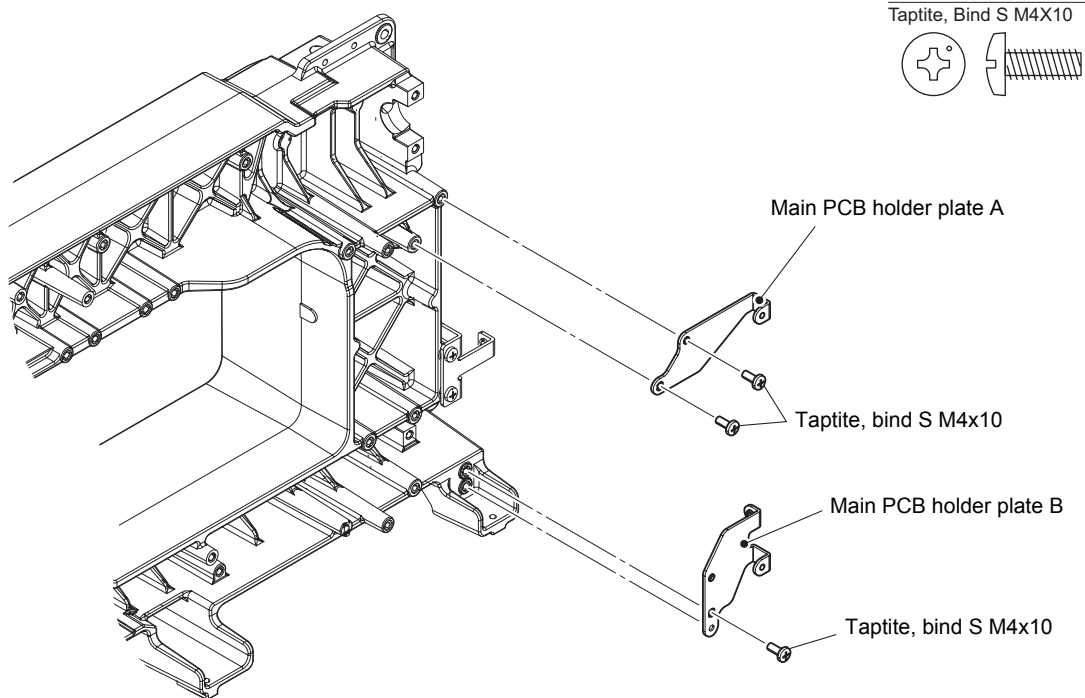


Application of
Disassembly

Application of
Disassembly

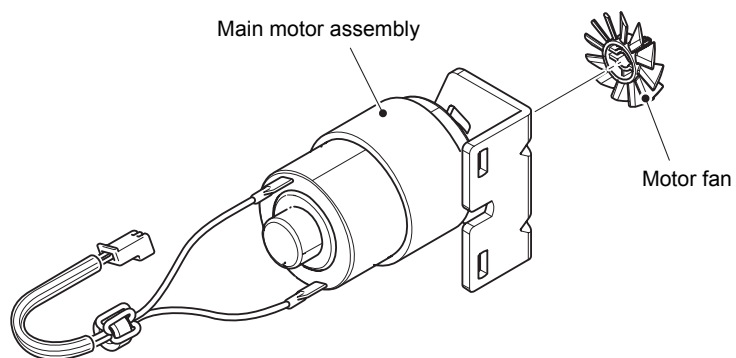
1 Removal of Main PCB holder plate A/B

1. Remove the two screws (taptite, bind S M4x10) to remove the main PCB holder plate A.
2. Remove the screw (taptite, bind S M4x10) to remove the main PCB holder plate B.



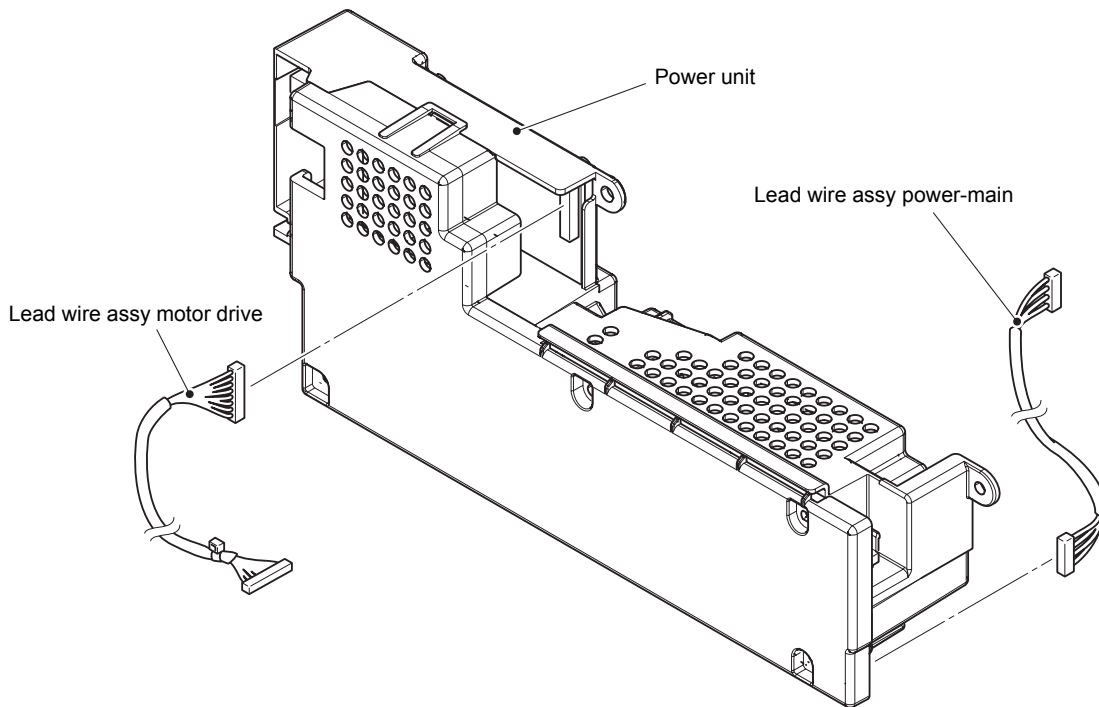
2 Disassembly of Main motor assembly

1. Remove the motor fan from the T-pulley of main motor assembly.

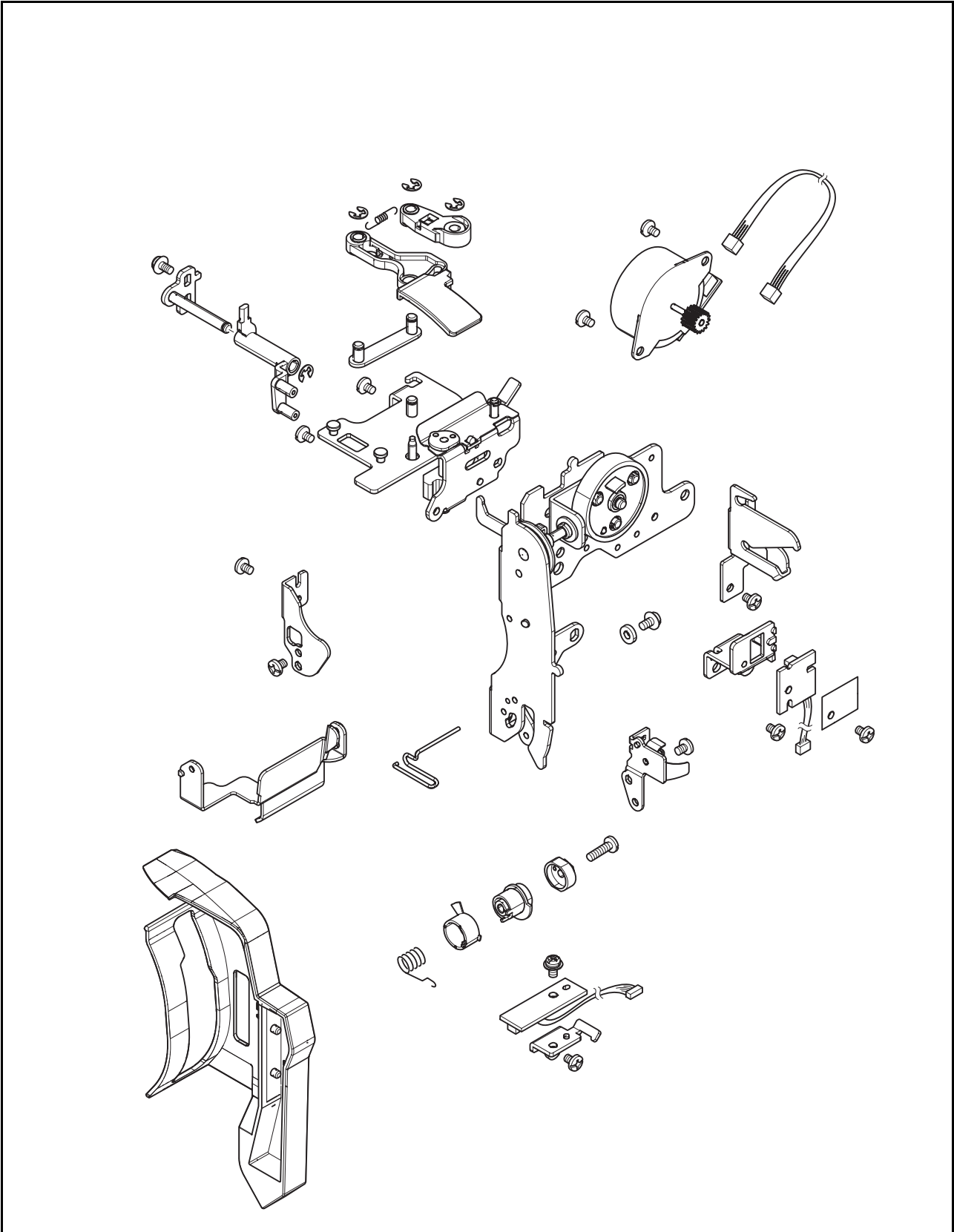


3 Disassembly of Power unit

1. Release the lead wire assy power-main and lead wire assy motor drive from the securing fixtures. Disconnect the lead wire assy power-main and lead wire assy motor drive.



Needle threading mechanism location diagram



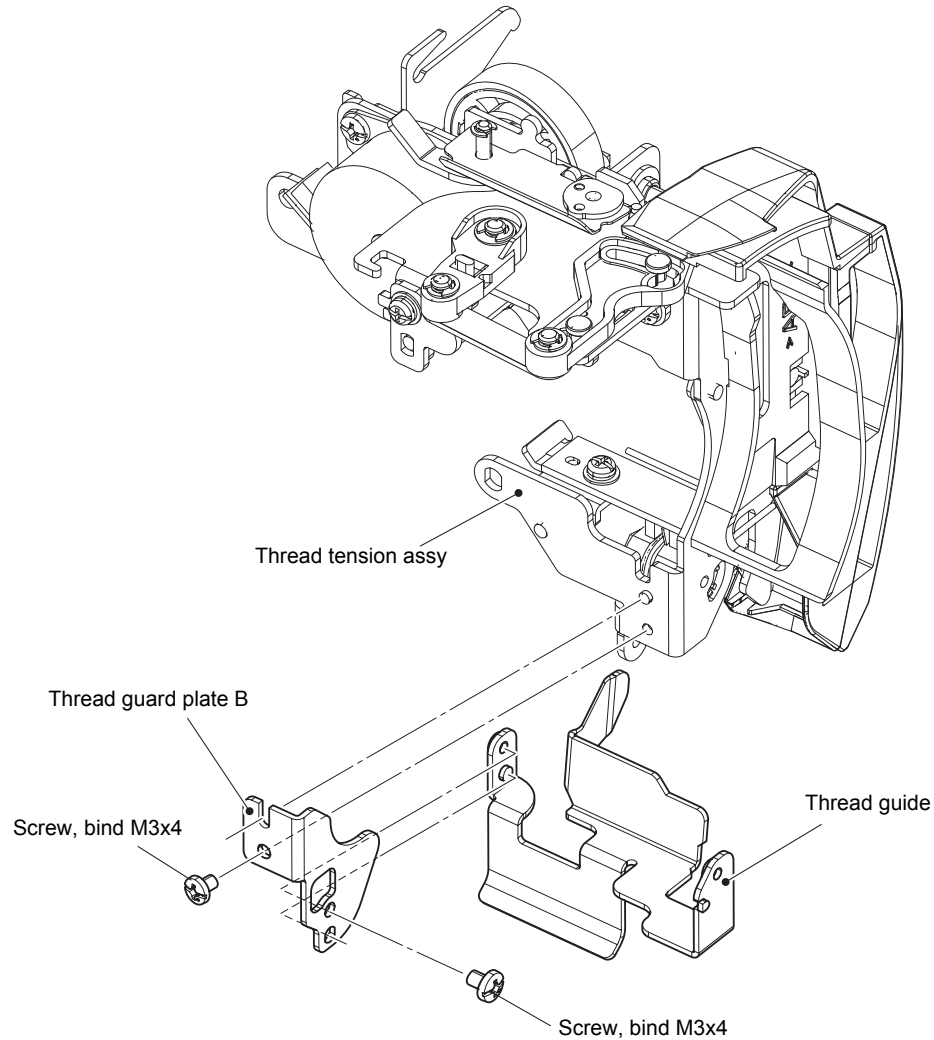
Application of Disassembly

Application of Disassembly

1 Removal of Thread guide and Thread guard plate B

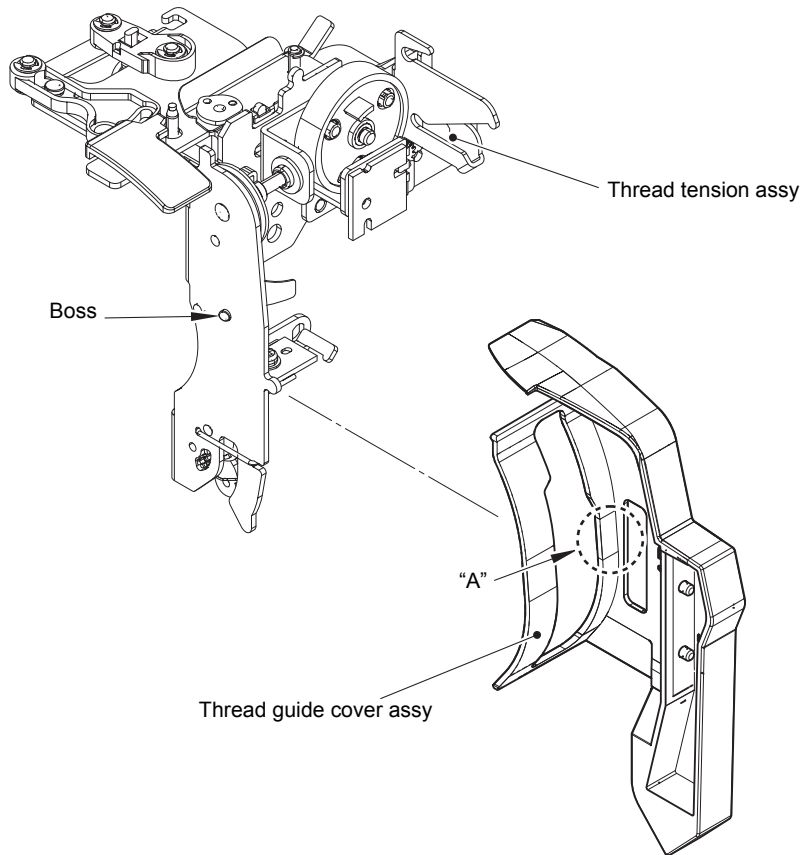
1. Remove the screw (screw, bind M3x4) to remove the thread guide from the thread guard plate B.
Remove the screw (screw, bind M3x4) to remove the thread guard plate B from the thread tension assy.

Screw, Bind M3X4



2 Removal of Thread guide cover assy

1. Remove the thread guide cover assy while lifting the section "A" of thread guide cover assy to get over the boss of thread tension assy.



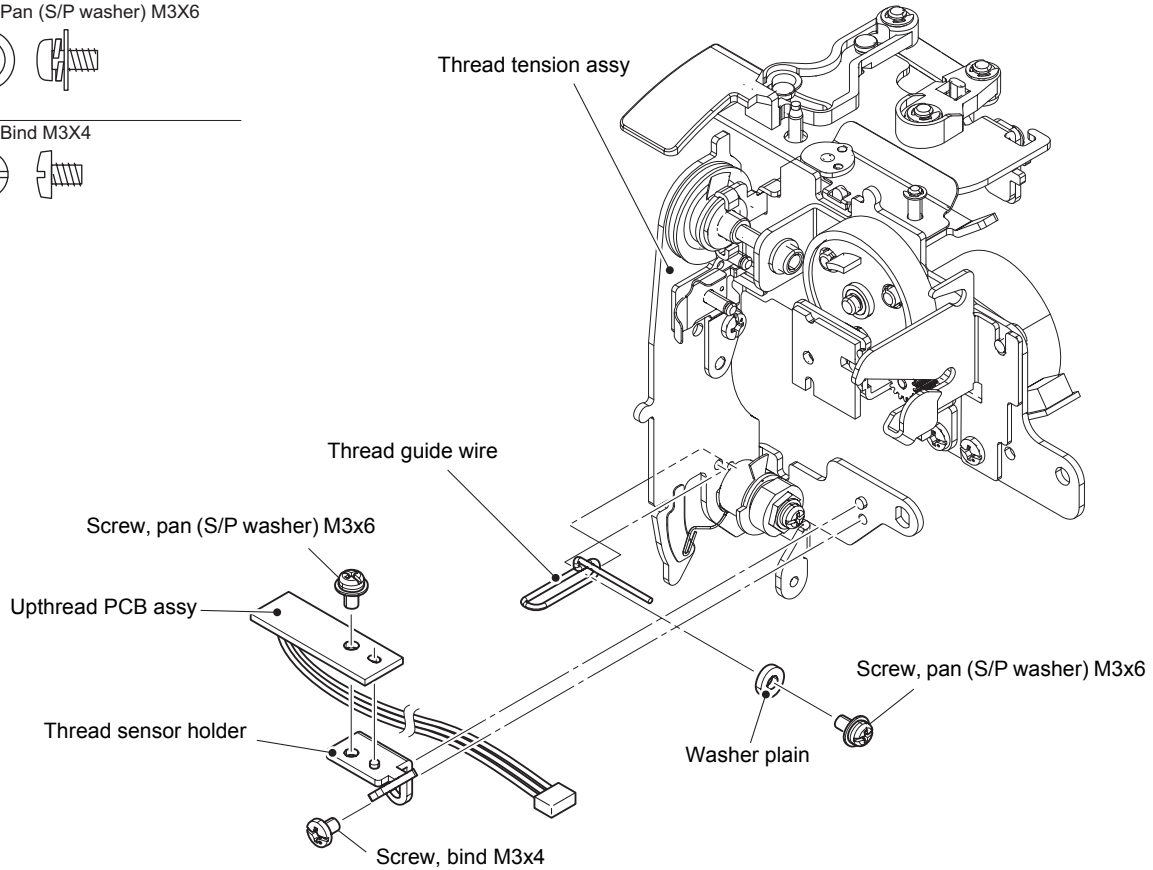
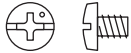
3 Removal of Upthread PCB assy and Thread guide wire

1. Remove the screw (screw, pan (S/P washer) M3x6) to remove the upthread PCB assy from the thread sensor holder, then remove the screw (screw, bind M3x4) to remove the thread sensor holder.
2. Remove the screw (screw, pan (S/P washer) M3x6) to remove the thread guide wire and washer plain.

Screw, Pan (S/P washer) M3X6



Screw, Bind M3X4



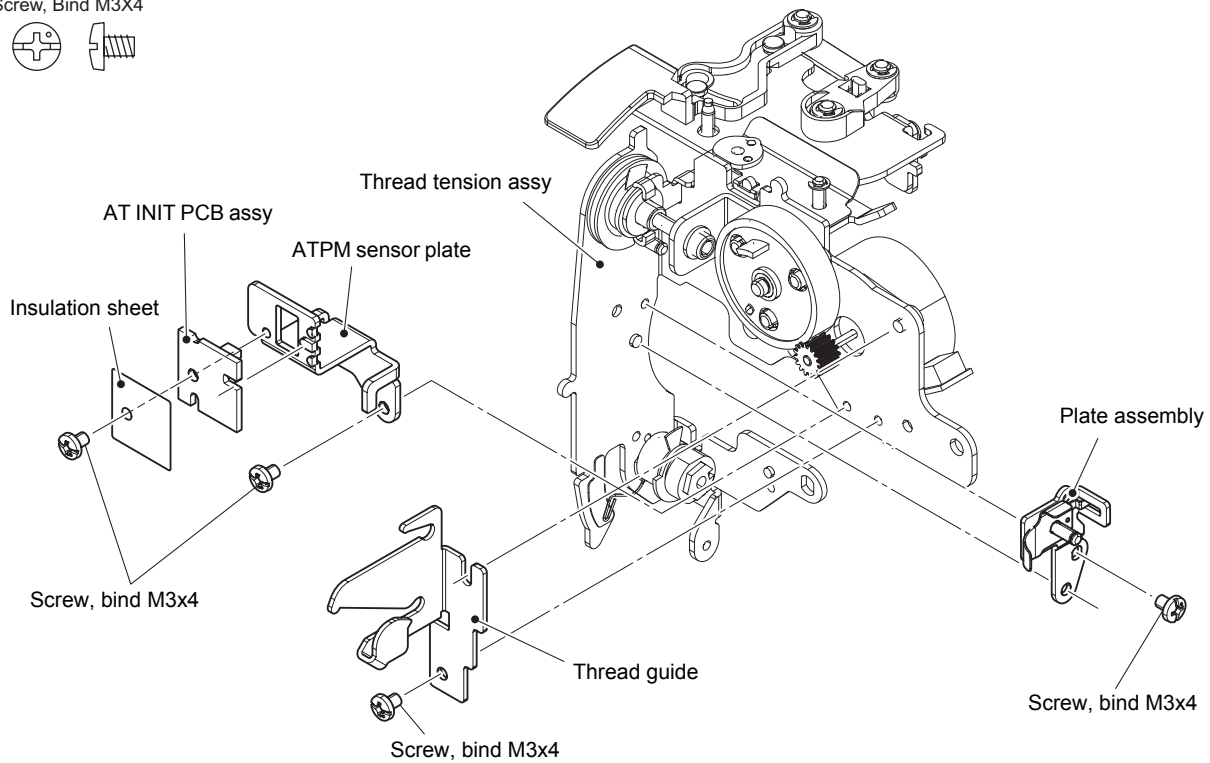
Application of
Disassembly

Application of
Disassembly

4 Removal of Thread guide, AT INIT PCB assy, ATPM sensor plate and Plate assembly

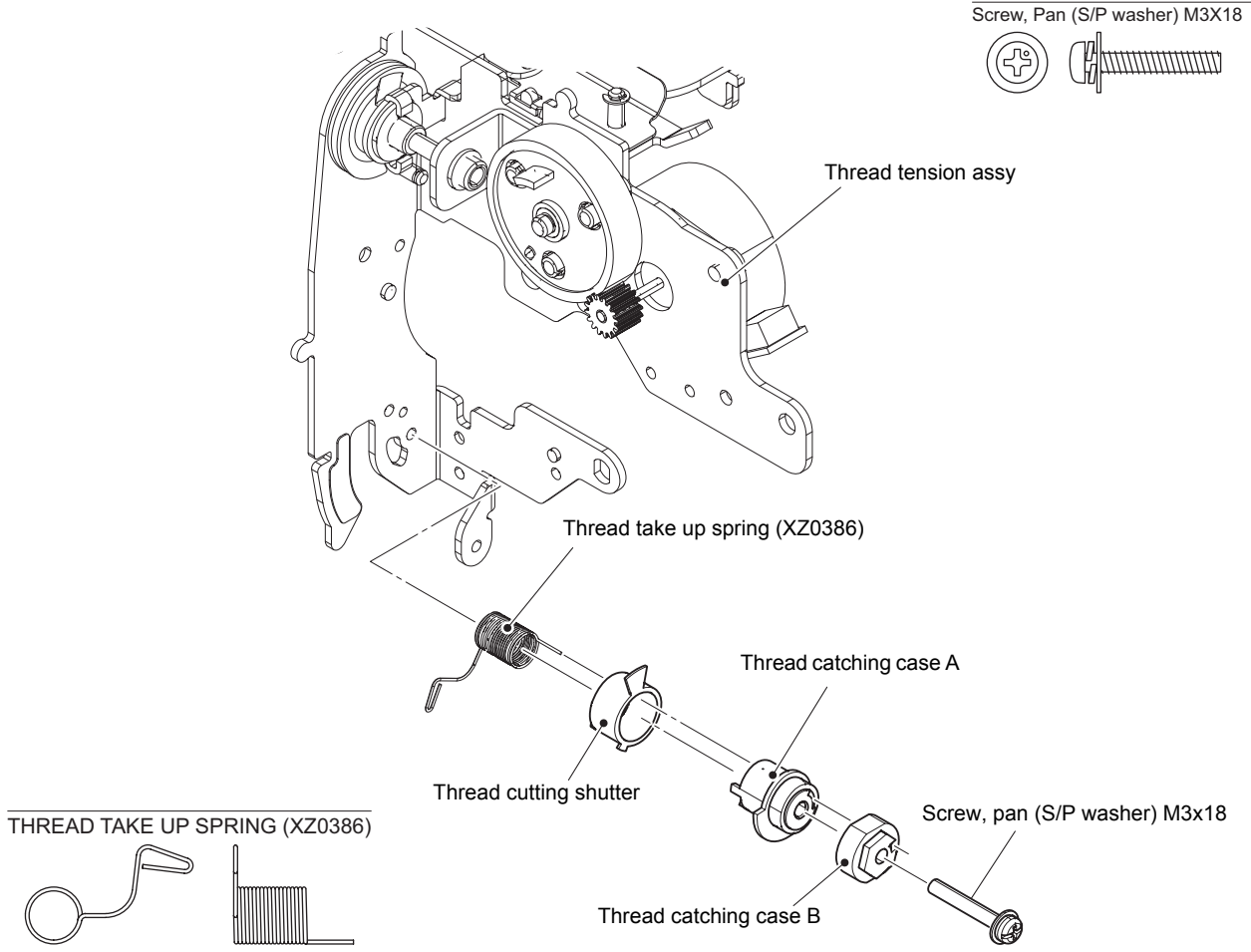
1. Remove the screw (screw, bind M3x4) to remove the thread guide.
2. Remove the screw (screw, bind M3x4) to remove the insulation sheet and AT INIT PCB assy from the ATPM sensor plate.
3. Remove the screw (screw, bind M3x4) to remove the ATPM sensor plate.
4. Remove the screw (screw, bind M3x4) to remove the plate assembly.

Screw, Bind M3X4



5 Removal of Thread catching case A/B and Thread cutting shutter

1. Remove the screw (screw, pan (S/P washer) M3x18) to remove the thread catching case B, thread catching case A, thread cutting shutter and thread take up spring (XZ0386) from the thread tension assy.

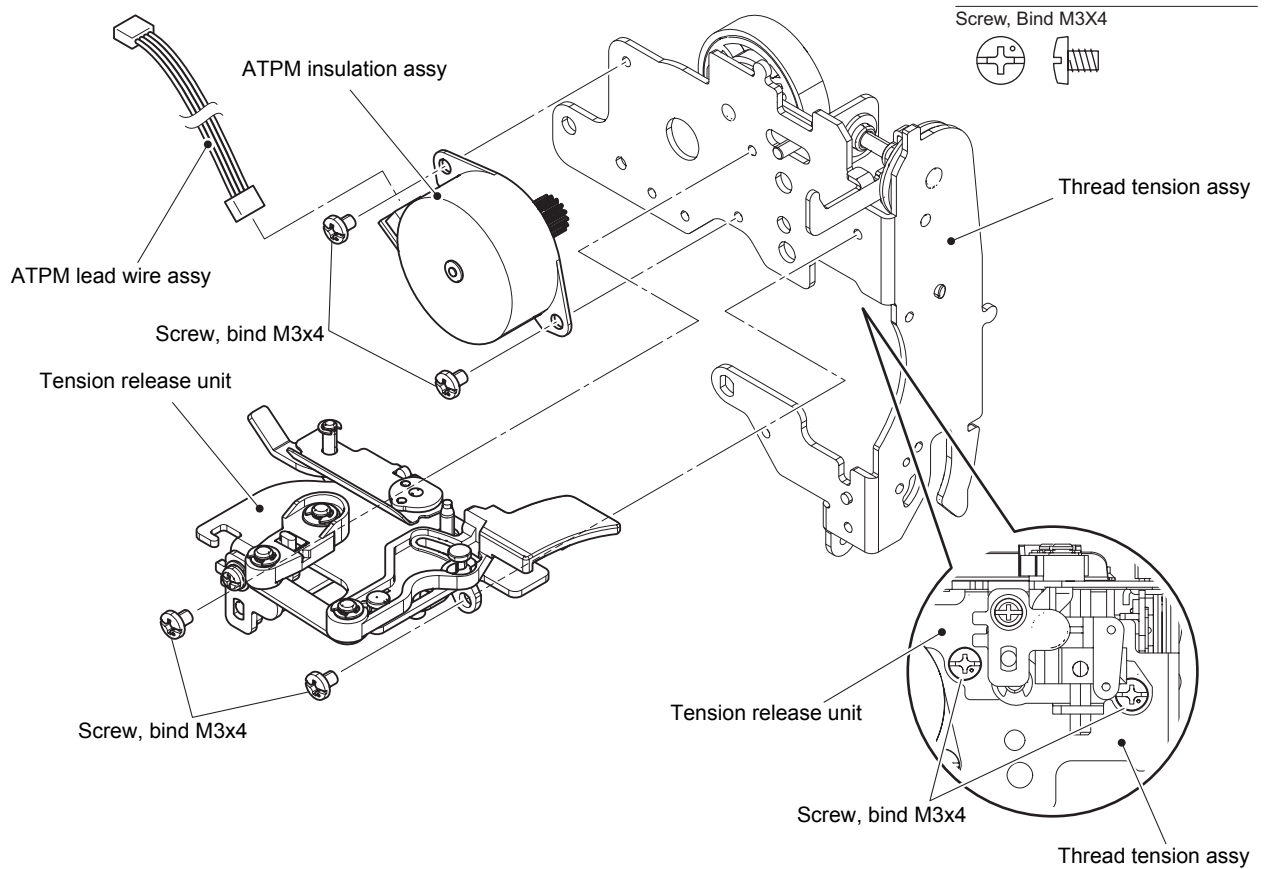


Application of Disassembly

Application of Disassembly

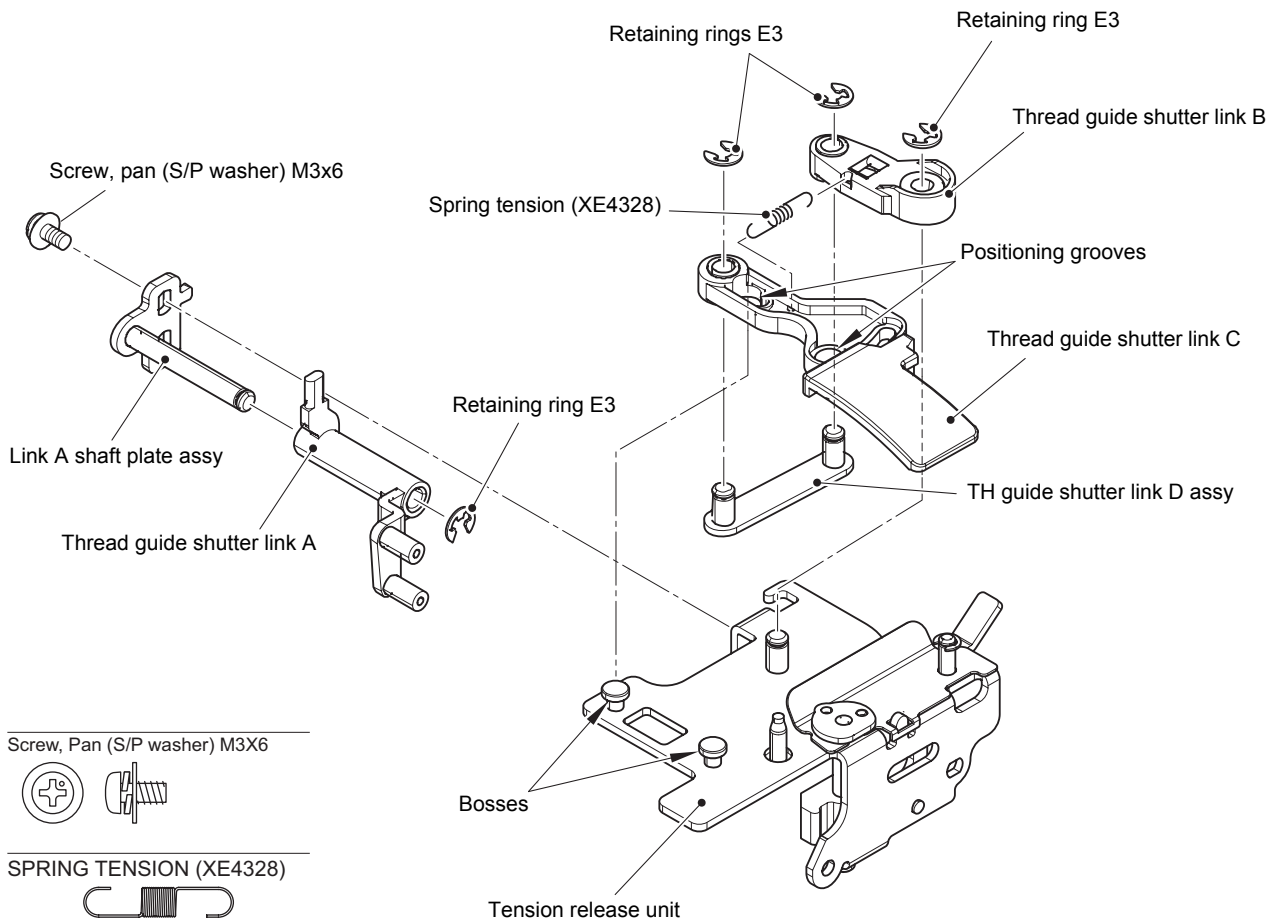
6 Removal of ATPM insulation assy and Tension release unit

1. Remove the two screws (screw, bind M3x4) to remove the ATPM insulation assy from the thread tension assy, and disconnect the ATPM lead wire assy from the ATPM insulation assy.
2. Remove the two screws (screw, bind M3x4) to remove the tension release unit from the thread tension assy.

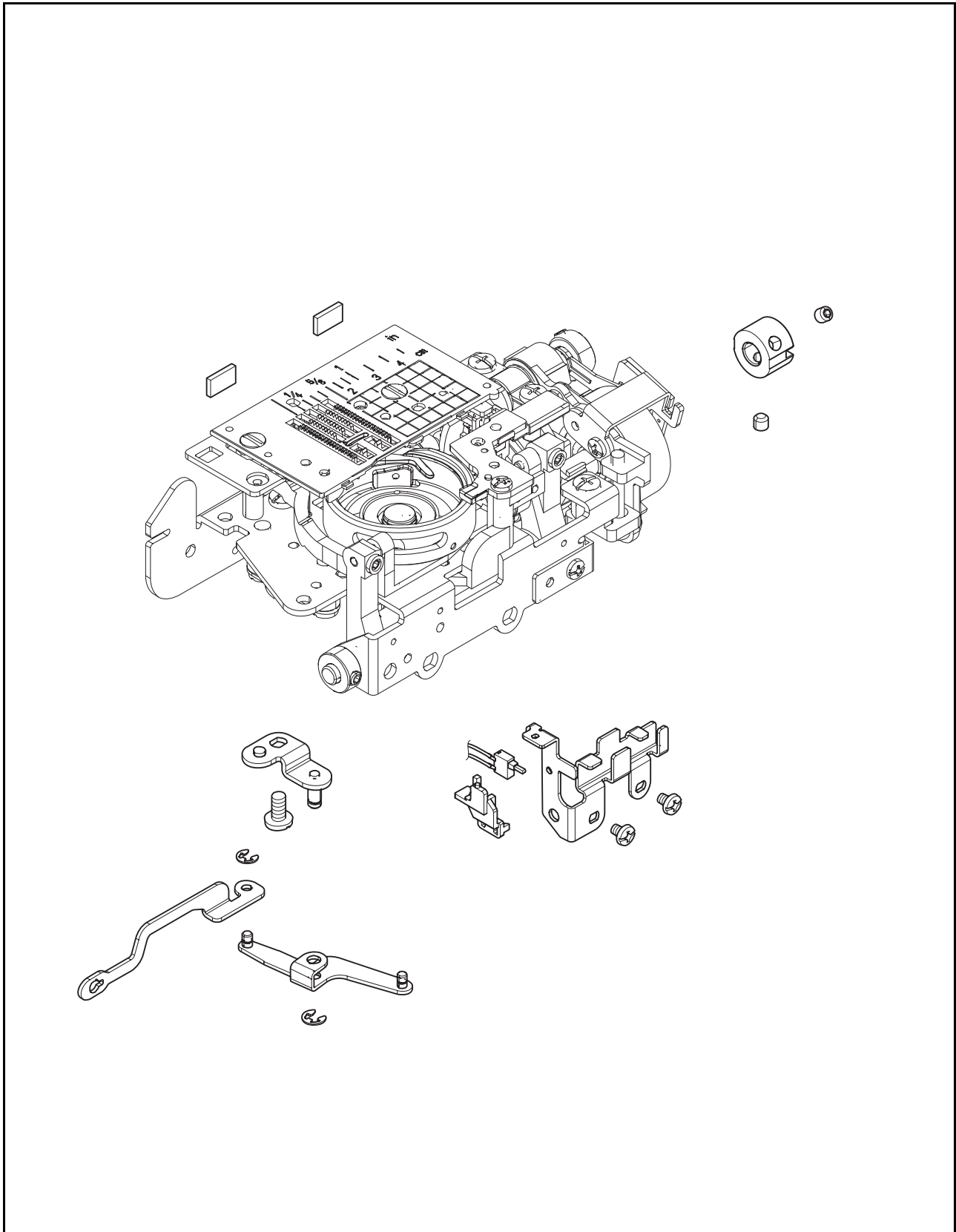


7 Removal of Thread guide shutter link A/B/C

1. Remove the spring tension (XE4328) from the thread guide shutter link B and thread guide shutter link C.
2. Remove the two retaining rings E3 to remove the TH guide shutter link D assy from the thread guide shutter link B and thread guide shutter link C.
3. Align the two positioning grooves with the two bosses, and remove the thread guide shutter link C from the tension release unit.
4. Remove the retaining ring E3 to remove the thread guide shutter link B from the tension release unit.
5. Remove the screw (screw, pan (S/P washer) M3x6) to remove the link A shaft plate assy from the tension release unit. Remove the retaining ring E3 to remove the thread guide shutter link A from the link A shaft plate assy.



Lower driving mechanism location diagram

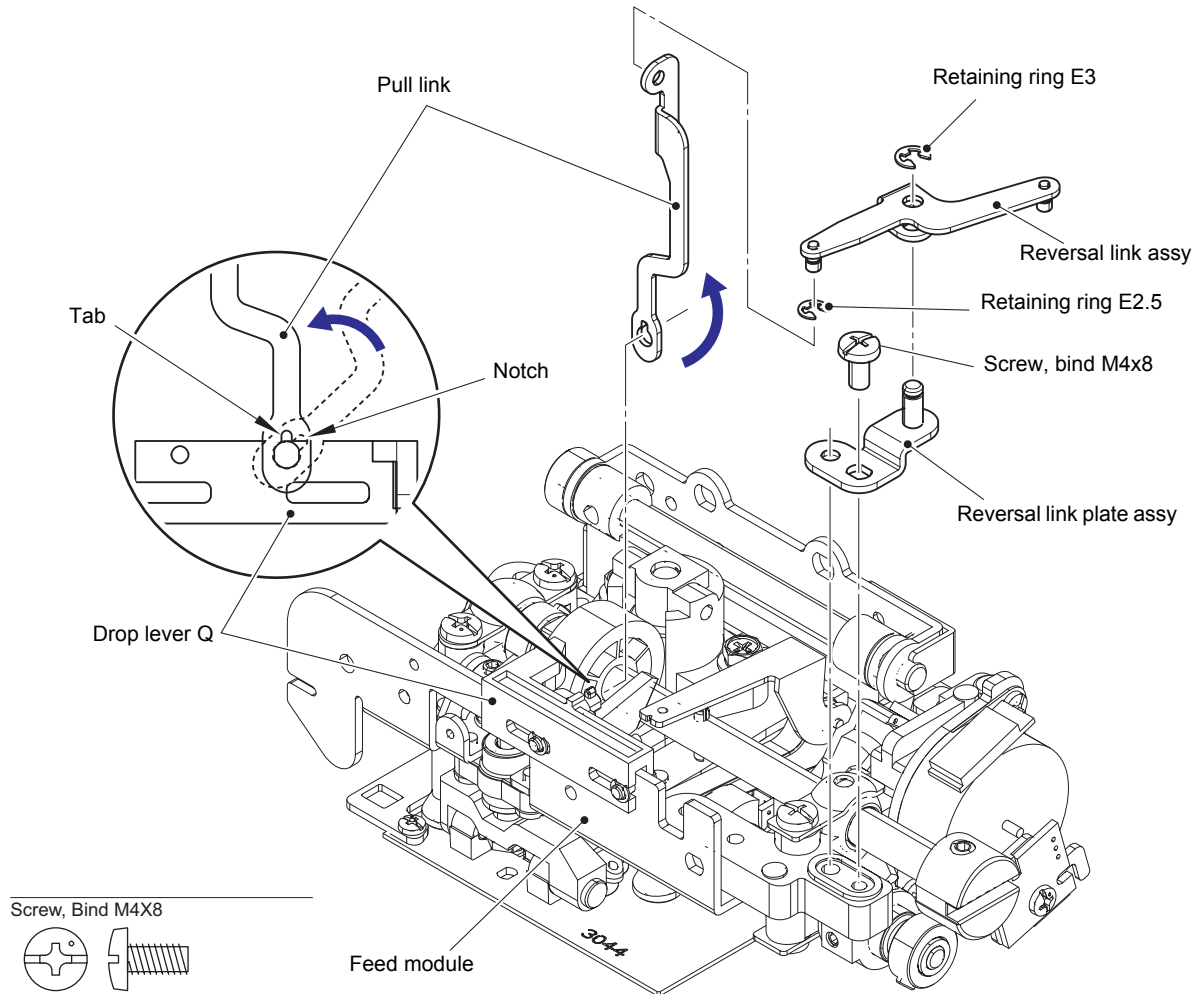


Application of
Disassembly

Application of
Disassembly

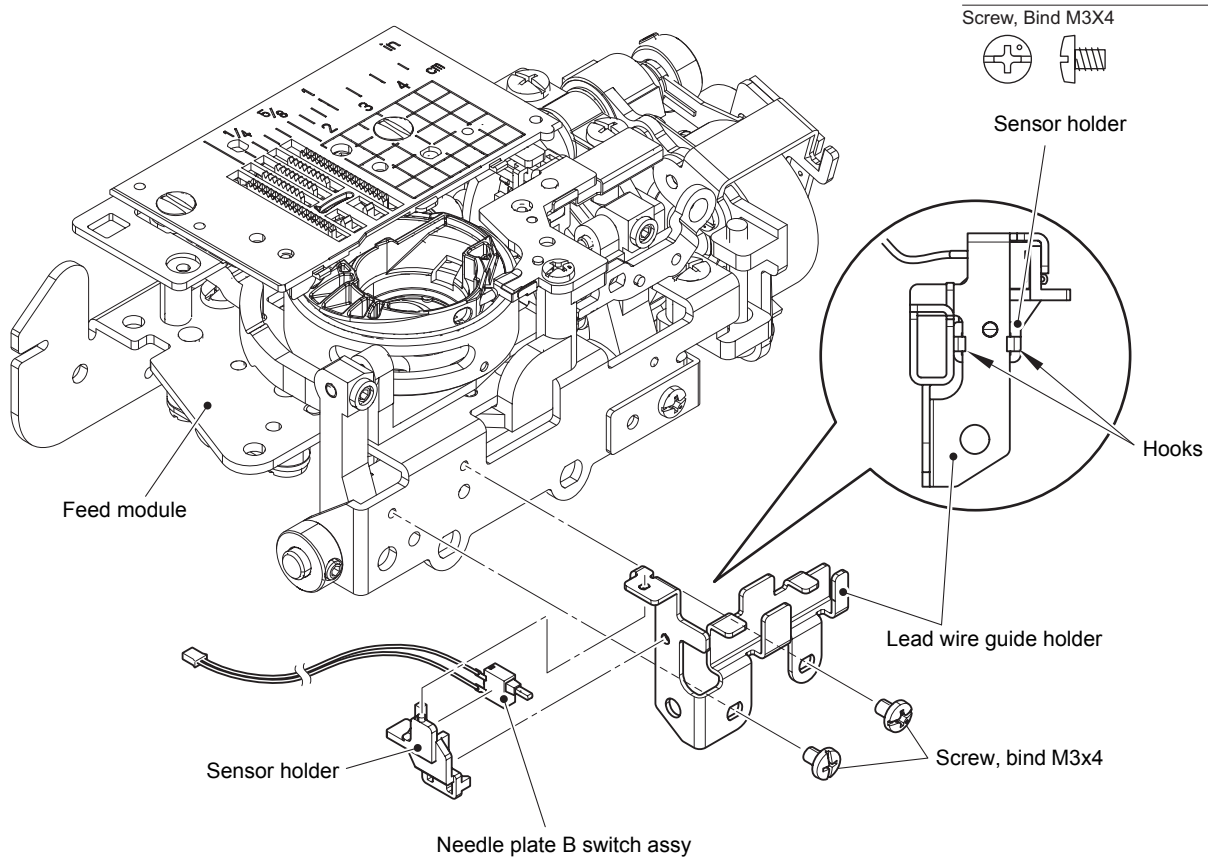
1 Removal of Reversal link assy, Pull link and Reversal link plate assy

1. Remove the retaining ring E3 from the shaft of reversal link plate assy, remove the retaining ring E2.5 from the shaft of reversal link assy, and then remove the reversal link assy from the reversal link plate assy.
2. Turn the pull link 90 degrees to align the notch with the tab of drop lever Q, and remove the pull link from the drop lever Q.
3. Remove the screw (screw, bind M4x8) to remove the reversal link plate assy from the feed module.



2 Removal of Lead wire guide holder and Needle plate B switch assy

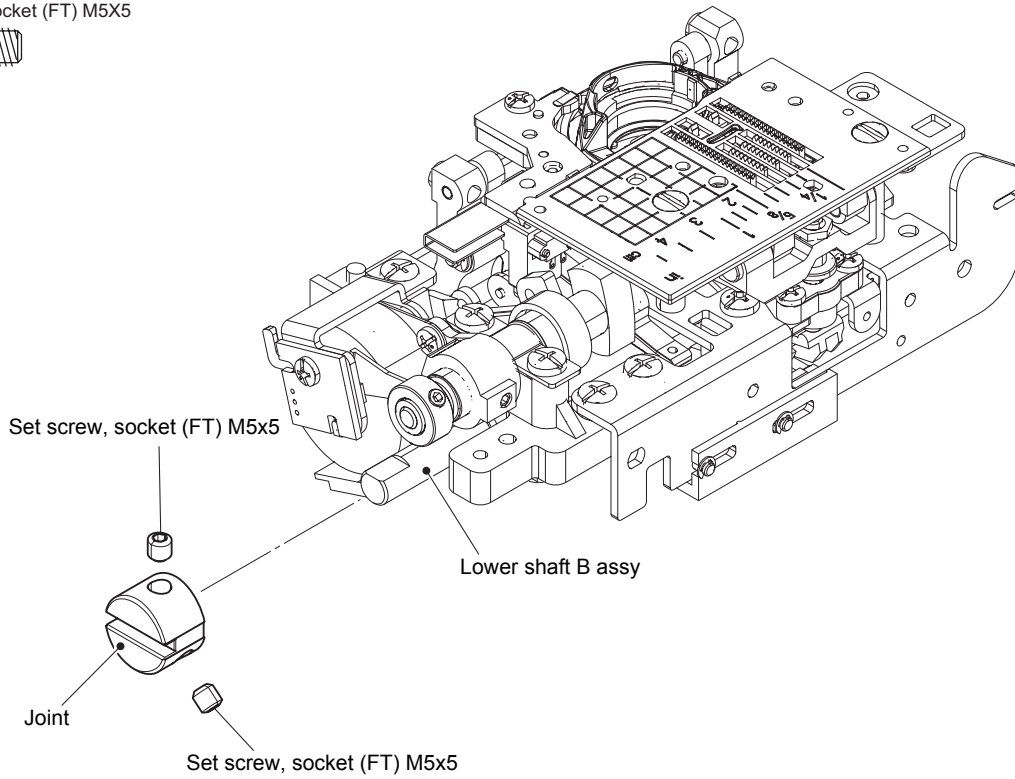
1. Remove the two screws (screw, bind M3x4) to remove the lead wire guide holder from the feed module.
2. Release the two hooks to remove the sensor holder from the lead wire guide holder, and remove the needle plate B switch assy from the sensor holder.



3 Removal of Joint

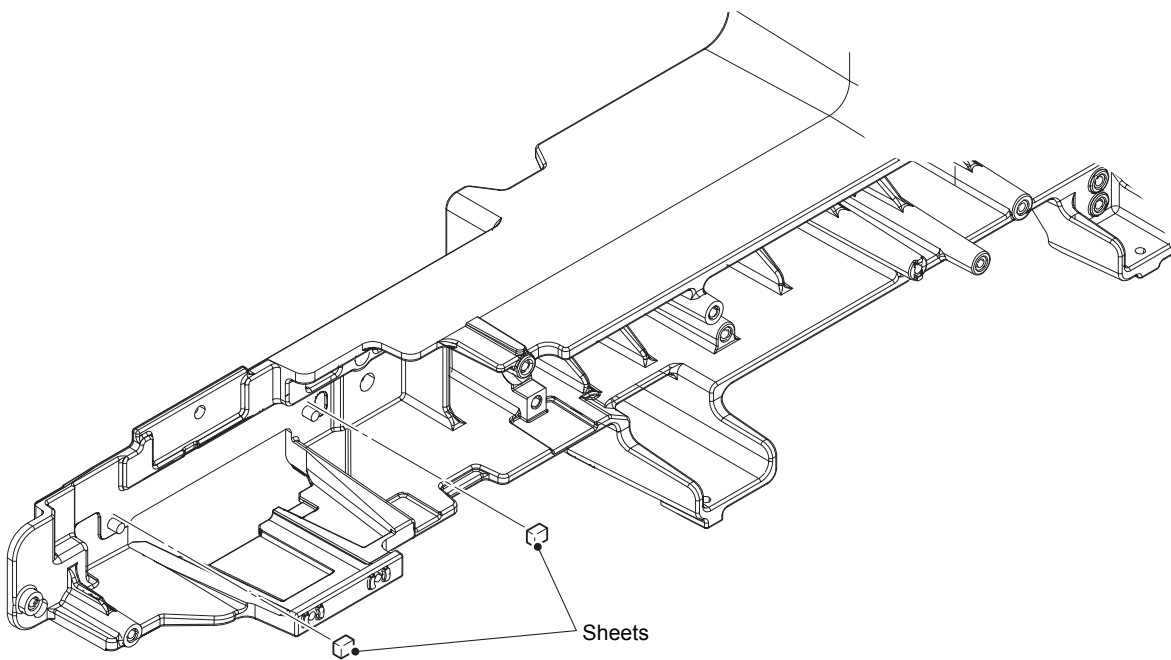
1. Remove the two screws (set screw, socket (FT) M5x5), and then pull out the joint from the lower shaft B assembly.

Set Screw, Socket (FT) M5X5

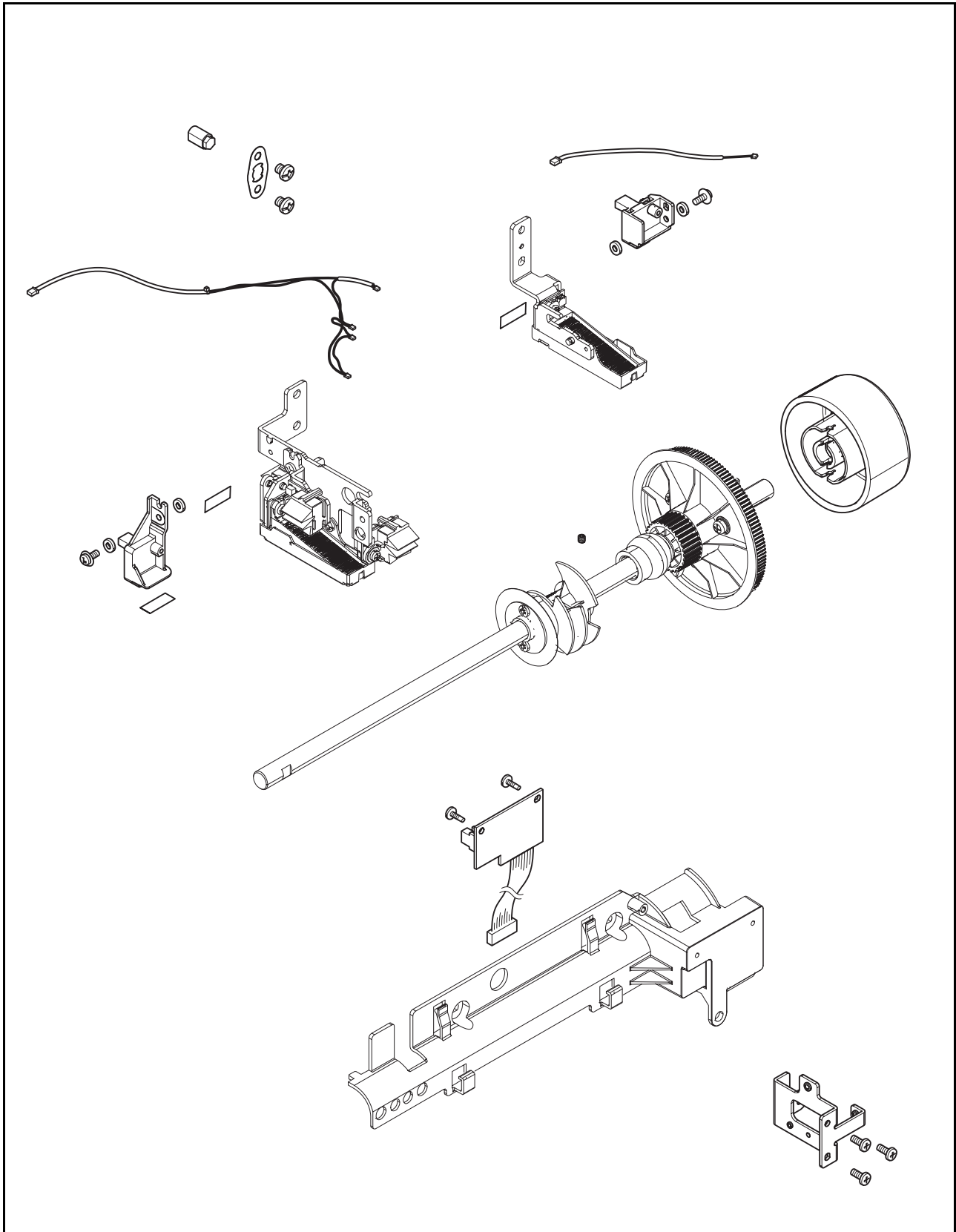


4 Removal of Sheet

1. Remove the two sheets from the arm bed.



LED light / Upper driving mechanism location diagram



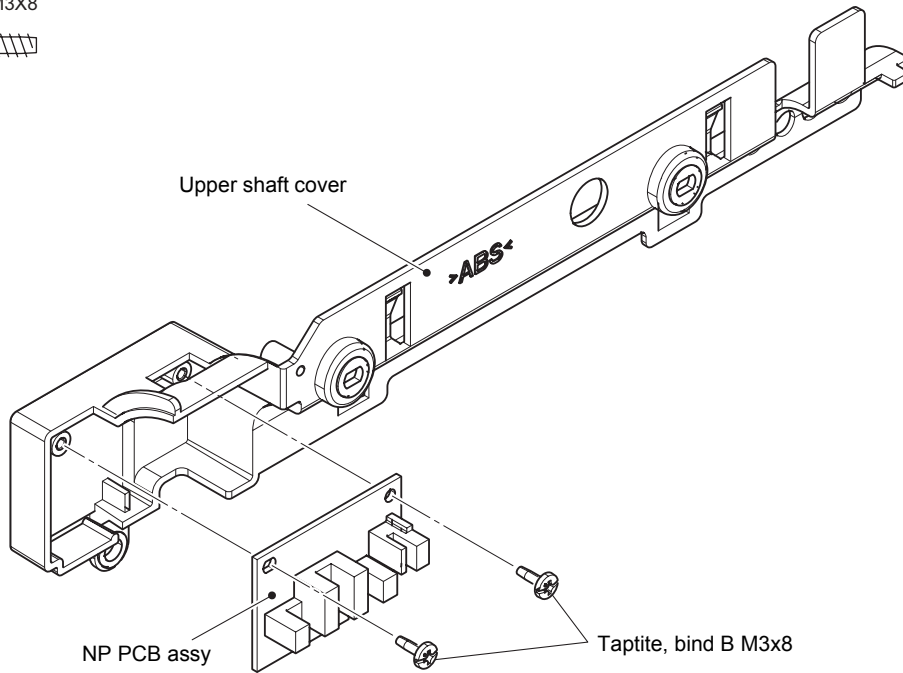
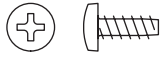
Application of Disassembly

Application of Disassembly

1 Disassembly of Upper shaft cover

1. Remove the two screws (taptite, bind B M3x8) to remove the NP PCB Assy.

Taptite, Bind B M3X8

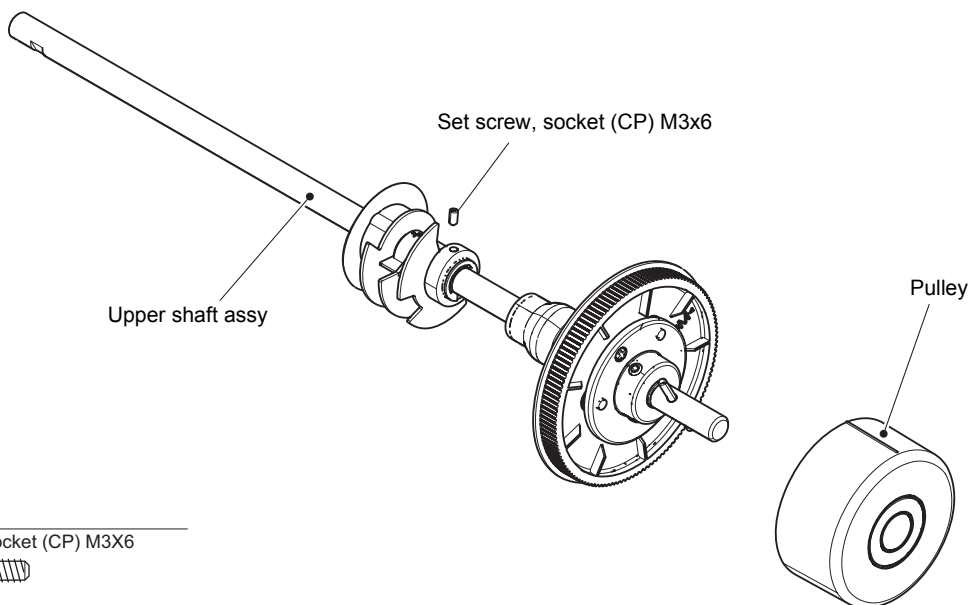


Application of
Disassembly

Application of
Disassembly

2 Disassembly of Upper shaft assy

1. Remove the pulley from the upper shaft assy.
2. Remove the screw (set screw, socket (CP) M3x6) from the upper shaft assy.

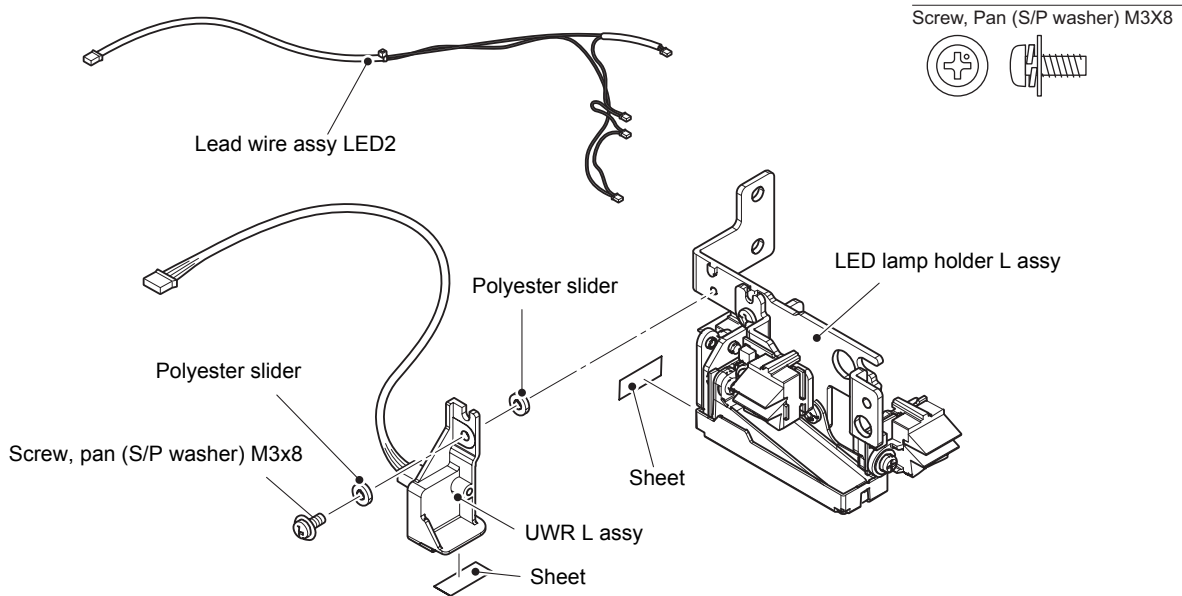


Set Screw, Socket (CP) M3X6



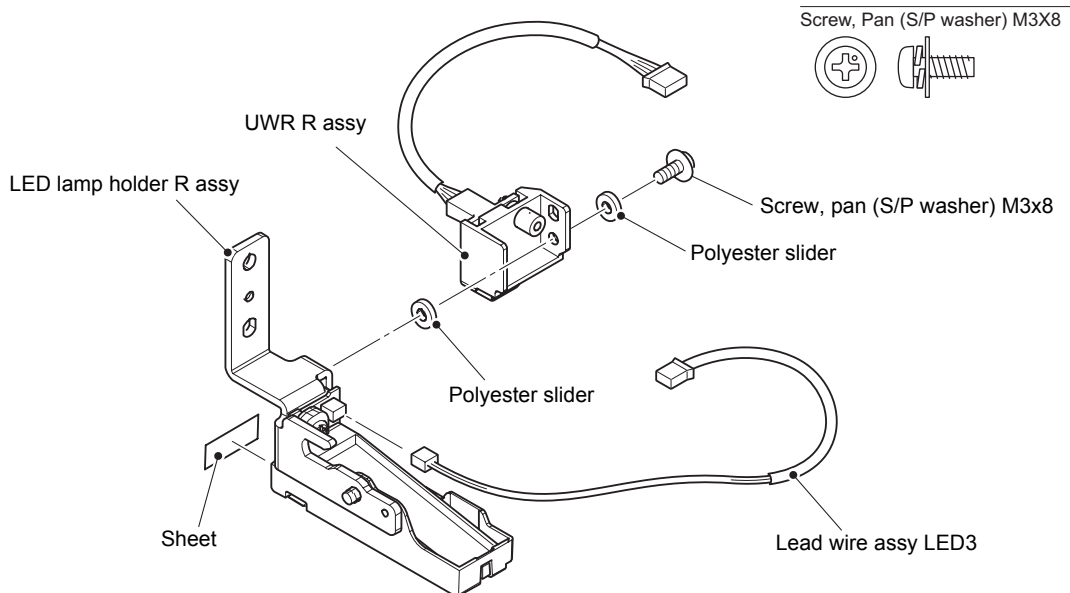
3 Disassembly of LED lamp holder L assy

1. Disconnect the four connectors of lead wire assy LED2 from the LED lamp holder L assy.
2. Remove the screw (screw, pan (S/P washer) M3x8) to remove the polyester slider, UWR L assy and another polyester slider, and remove the sheet from the LED lamp holder L assy.
3. Remove the sheet from the UWR L assy.



4 Disassembly of LED lamp holder R assy

1. Disconnect the lead wire assy LED3 from the LED lamp holder R assy.
2. Remove the screw (screw, pan (S/P washer) M3x8) to remove the polyester slider, UWR R assy and another polyester slider, and remove the sheet from the LED lamp holder R assy.



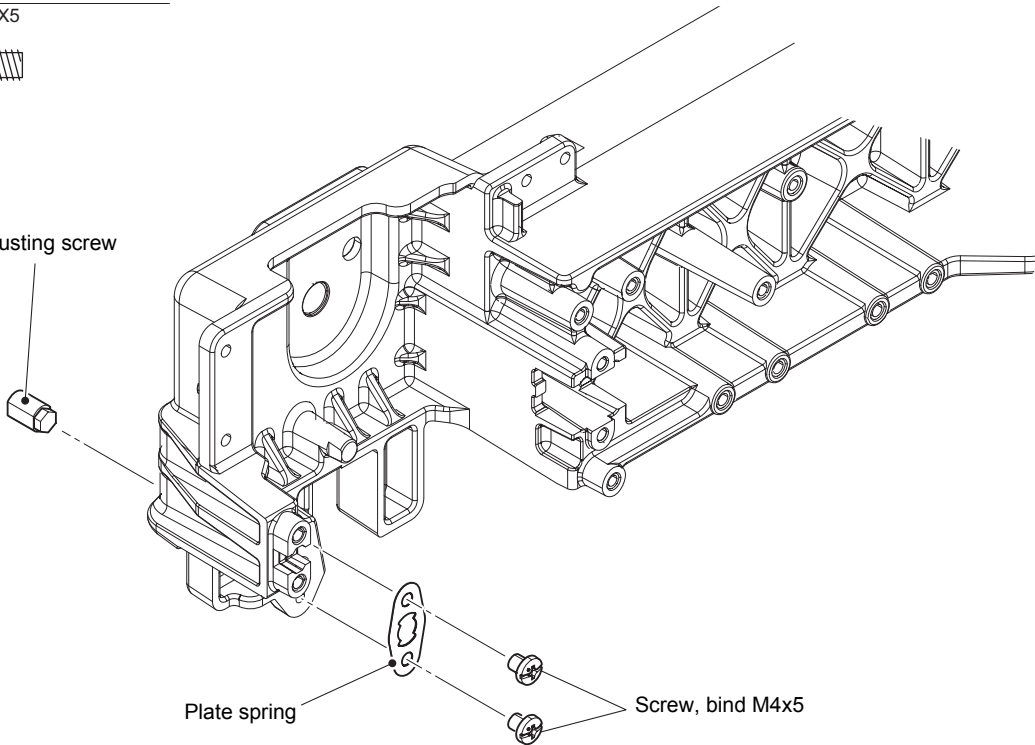
5 Removal of Adjusting screw and Plate spring

1. Remove the adjusting screw from the arm bed.
2. Remove the two screws (screw, bind M4x5) to remove the plate spring from the arm bed.

Screw, Bind M4X5



Adjusting screw



6 Removal of Tension pulley holder B assy

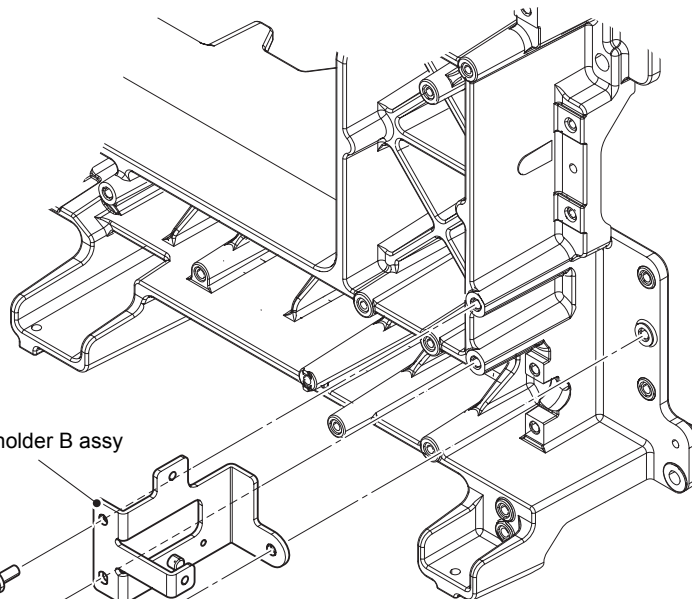
1. Remove the three screws (taptite, bind S M4x10) to remove the tension pulley holder B assy from the arm bed.

Taptite, Bind S M4X10

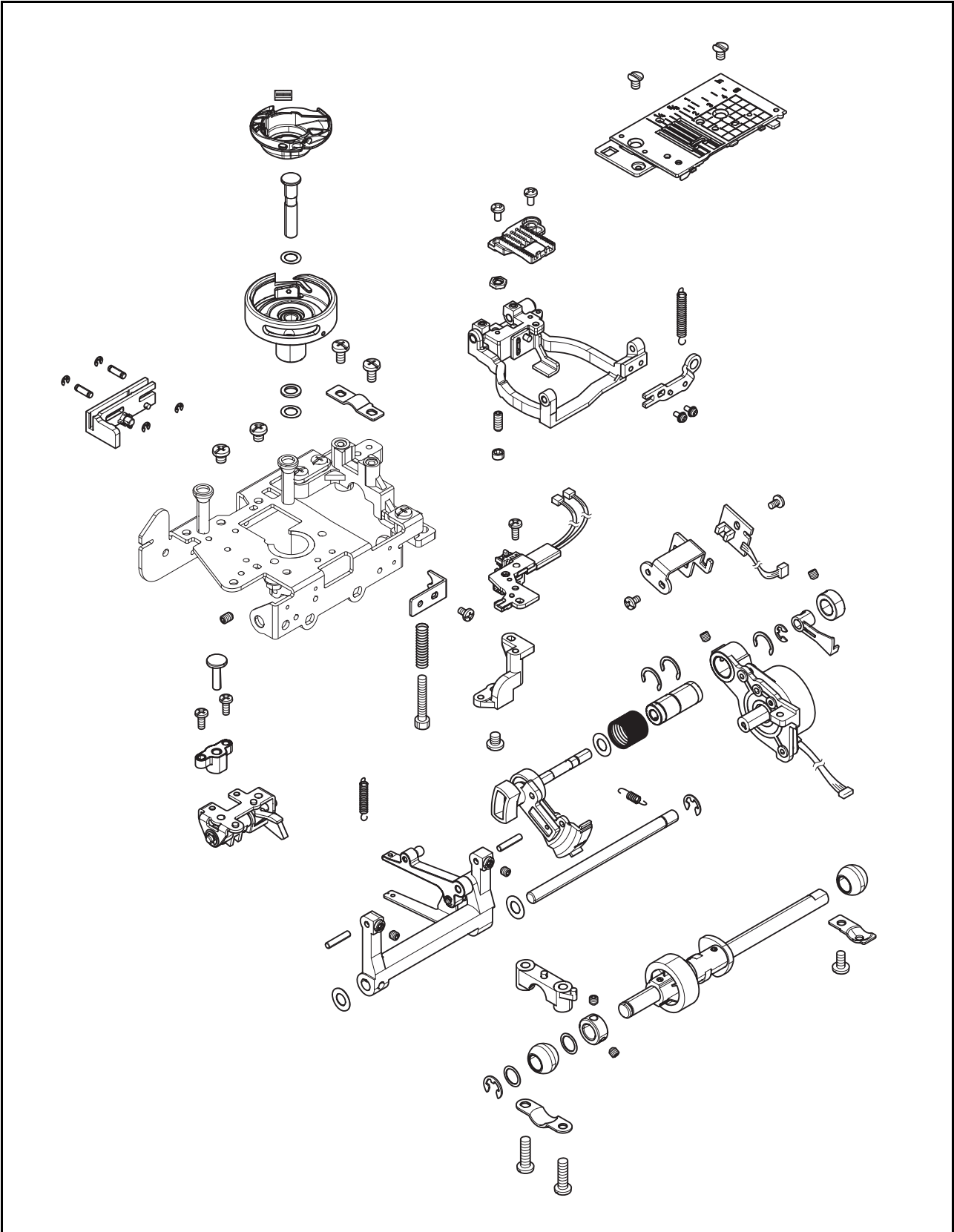


Tension pulley holder B assy

Taptite, bind S M4x10



Feed module location diagram



Application of
Disassembly

Application of
Disassembly

1 Removal of Needle plate A assy, Inner rotary hook assy and Inner rotary hook bracket assy

1. Remove the two screws (screw M4) to remove the needle plate A assy.
2. Remove the inner rotary hook assy, and remove the pile from it.
3. Cut the band, and remove the screw (screw, bind M3x8) to remove the inner rotary hook bracket assy.
4. Remove the two screws (screw, pan (S/P washer) M3x7) to remove the side feed adjust plate.

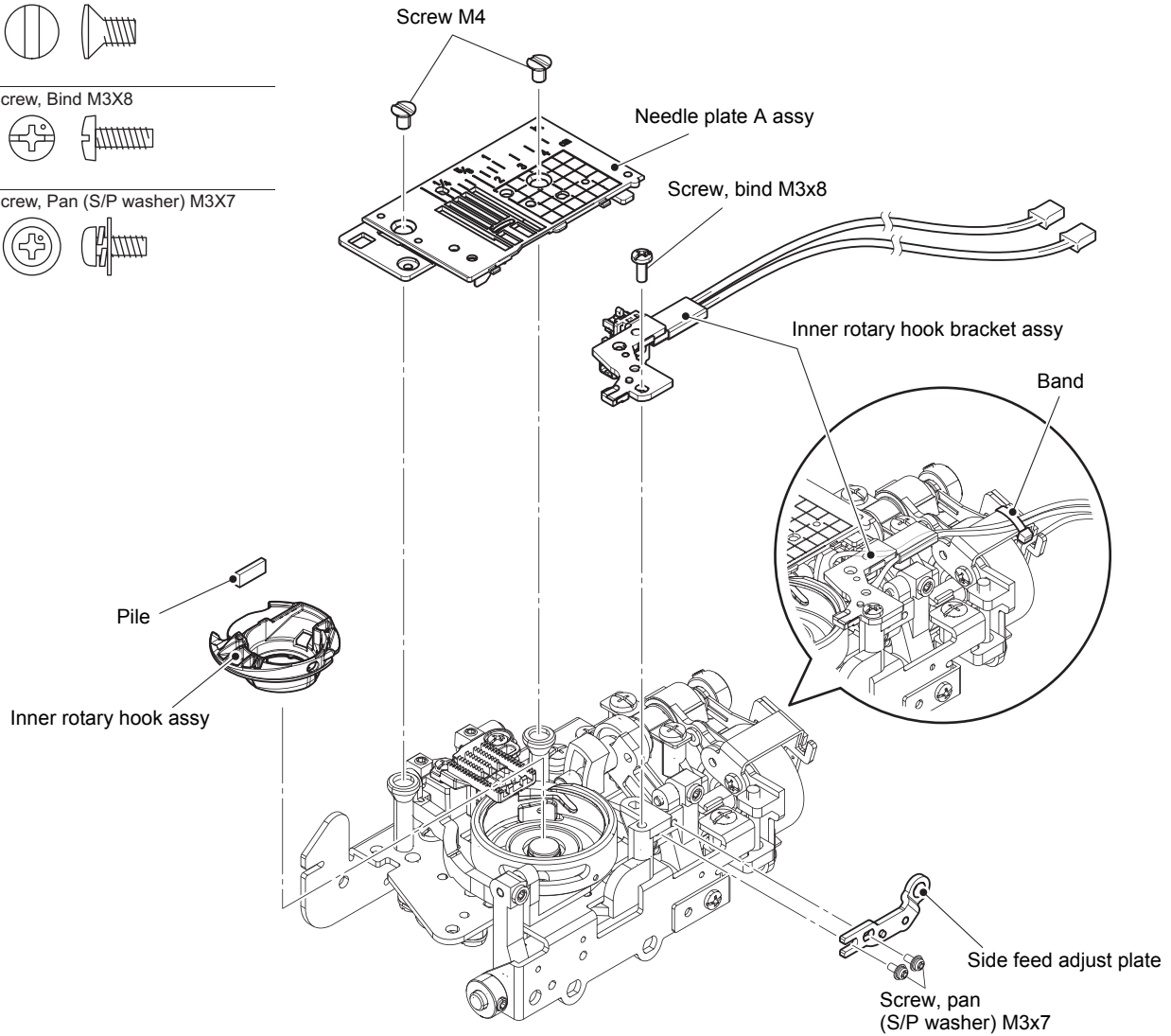
Screw M4



Screw, Bind M3x8



Screw, Pan (S/P washer) M3x7



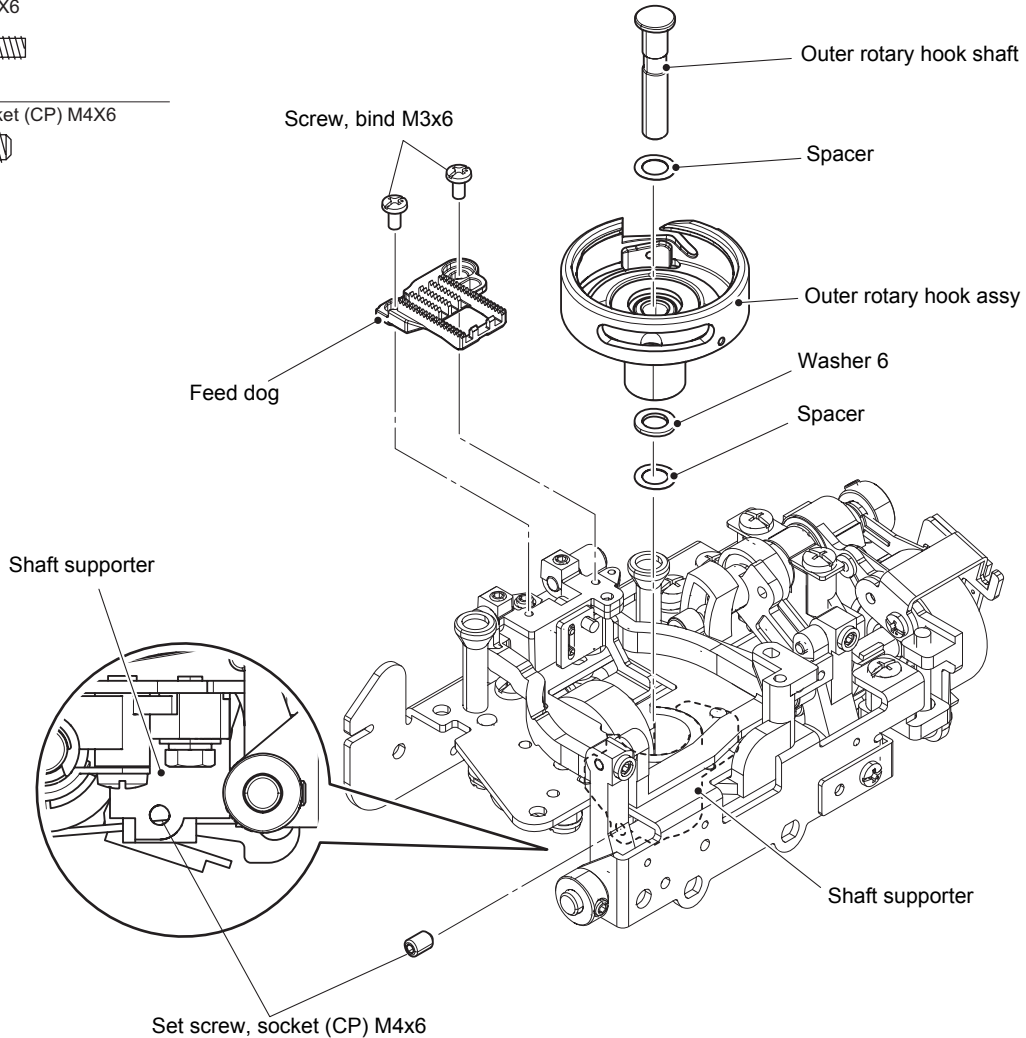
2 Removal of Outer rotary hook assy, Feed bar assy and Lock nut

1. Remove the two screws (screw, bind M3x6) to remove the feed dog.
2. Remove the screw (set screw, socket (CP) M4x6), and then pull out the outer rotary hook shaft to remove the spacer, outer rotary hook assy, washer 6 and another spacer.

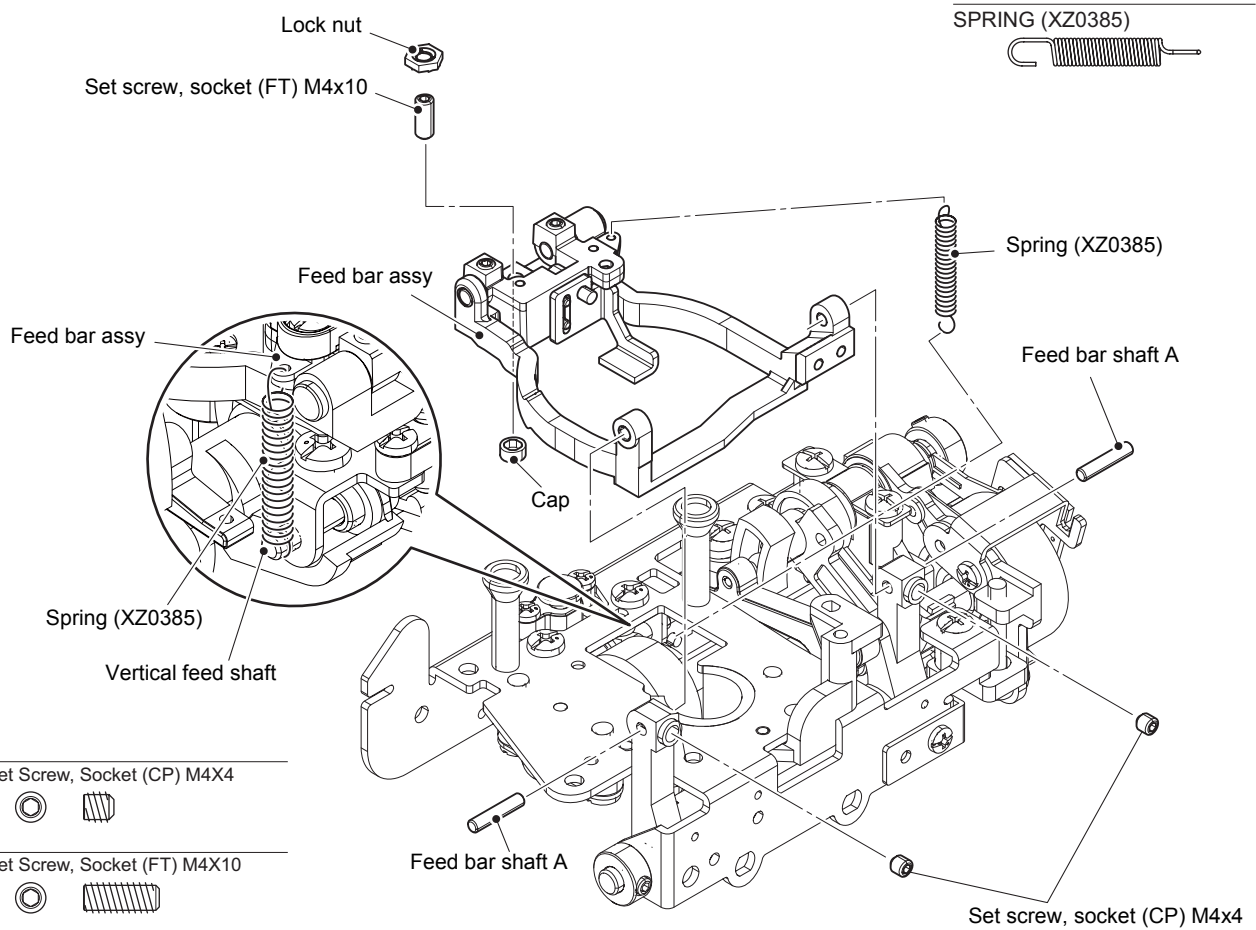
Screw, Bind M3X6



Set Screw, Socket (CP) M4X6



3. Remove the spring (XZ0385) from the feed bar assy and vertical feed shaft of drop assy.
4. Remove the two screws (set screw, socket (CP) M4x4), and then remove the two feed bar shafts A to remove the feed bar assy.
5. Remove the cap, lock nut and screw (set screw, socket (FT) M4x10).



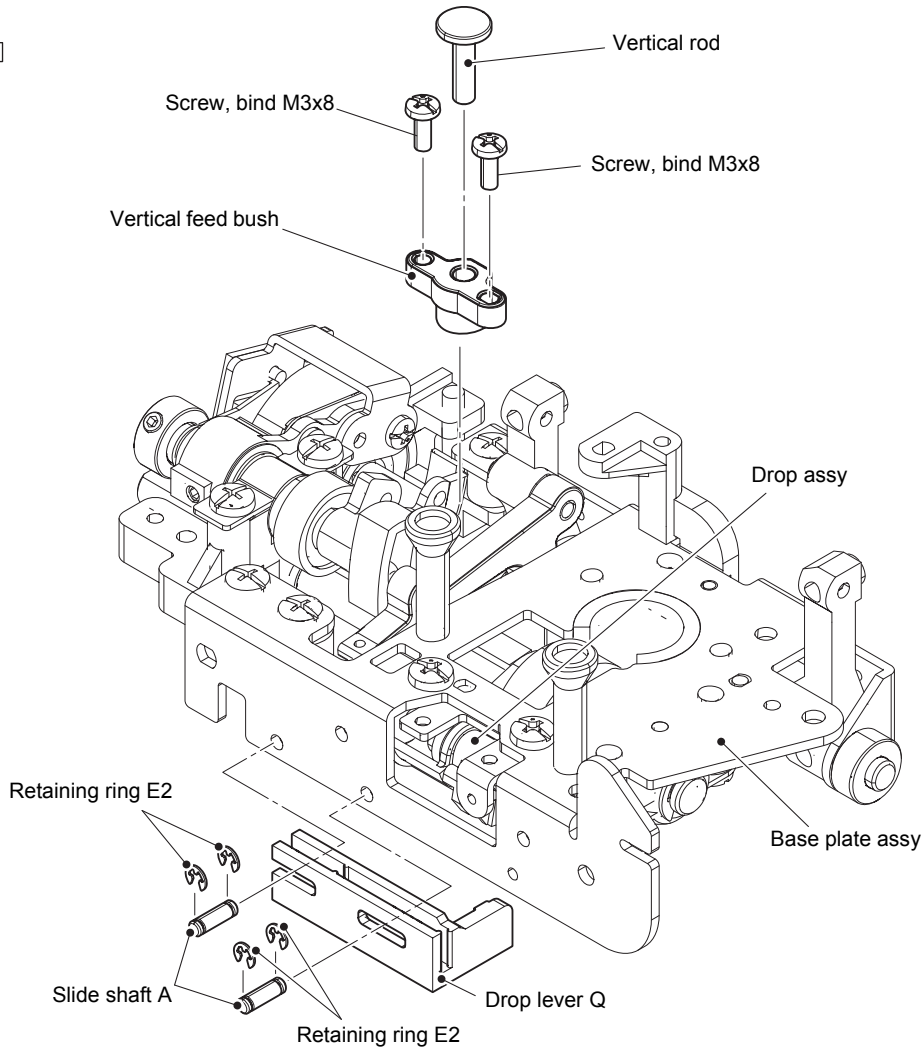
Application of
Disassembly

Application of
Disassembly

3 Removal of Vertical feed bush and Drop lever Q

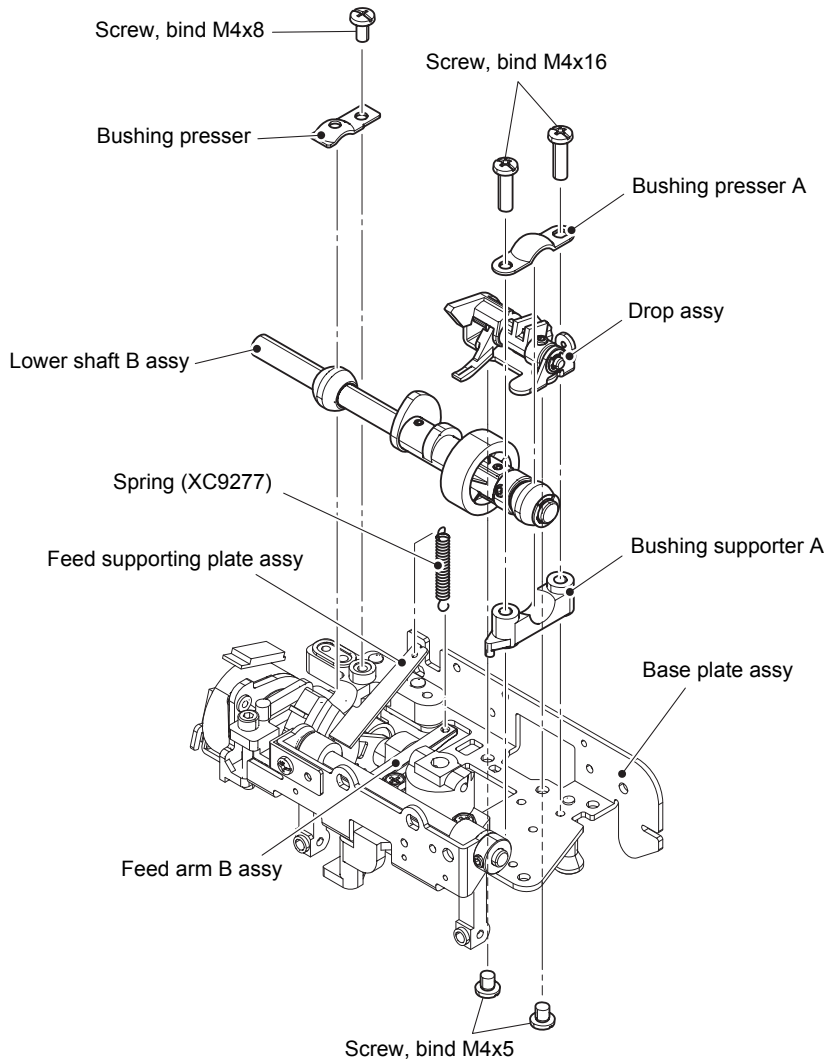
1. Pull out the vertical rod, and then remove the two screws (screw, bind M3x8) to remove the vertical feed bush.
2. Remove the two retaining rings E2 from the two slide shafts A. Pull out the two slide shafts A to remove the drop lever Q from the base plate. Remove the two retaining rings E2 from the two slide shafts A.

Screw, Bind M3X8



4 Removal of Lower shaft B assy and Drop assy

1. Remove the spring (XC9277) from the feed arm B assy and feed supporting plate assy.
2. Remove the screw (screw, bind M4x8) to remove the bushing presser.
3. Remove the two screws (screw, bind M4x16) to remove the bushing presser A, and then remove the lower shaft B assy and bushing supporter A.
4. Remove the two screws (screw, bind M4x5) to remove the drop assy.



SPRING (XC9277)



Screw, Bind M4X8



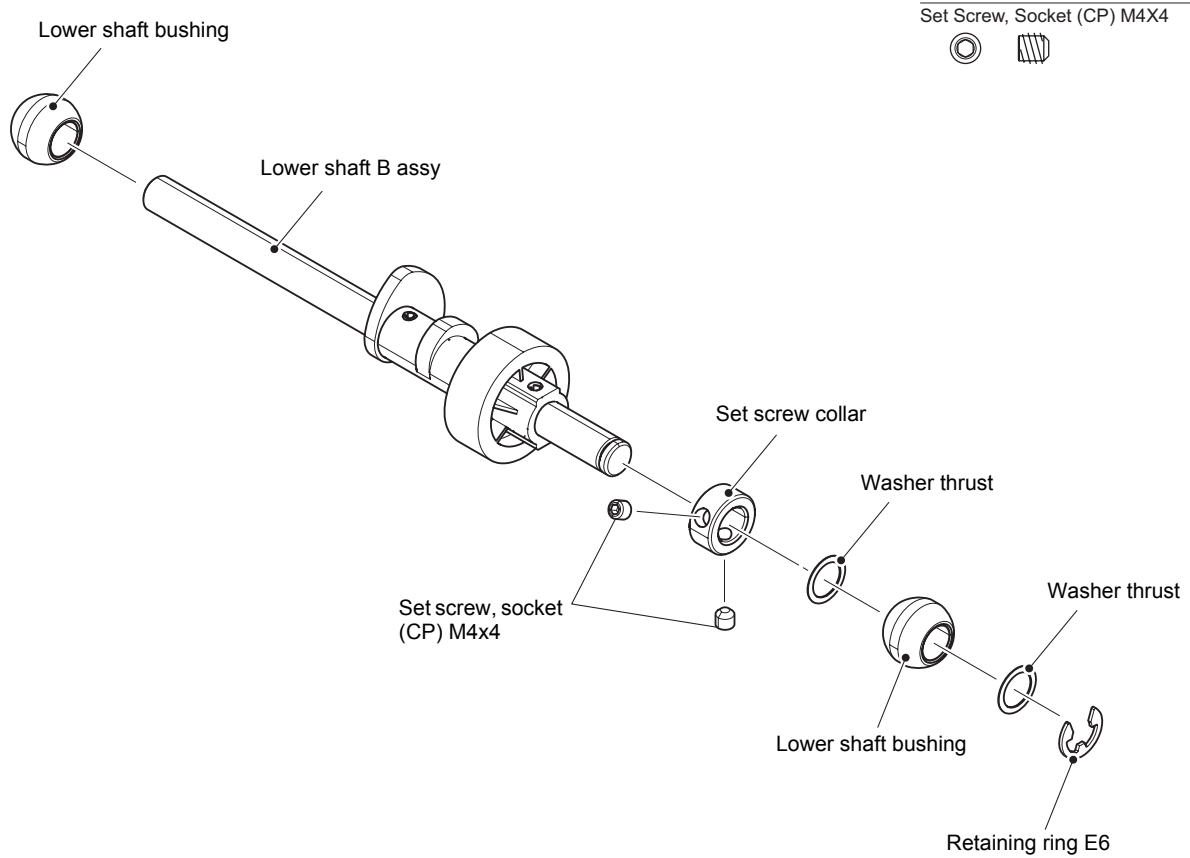
Screw, Bind M4X16



Screw, Bind M4X5



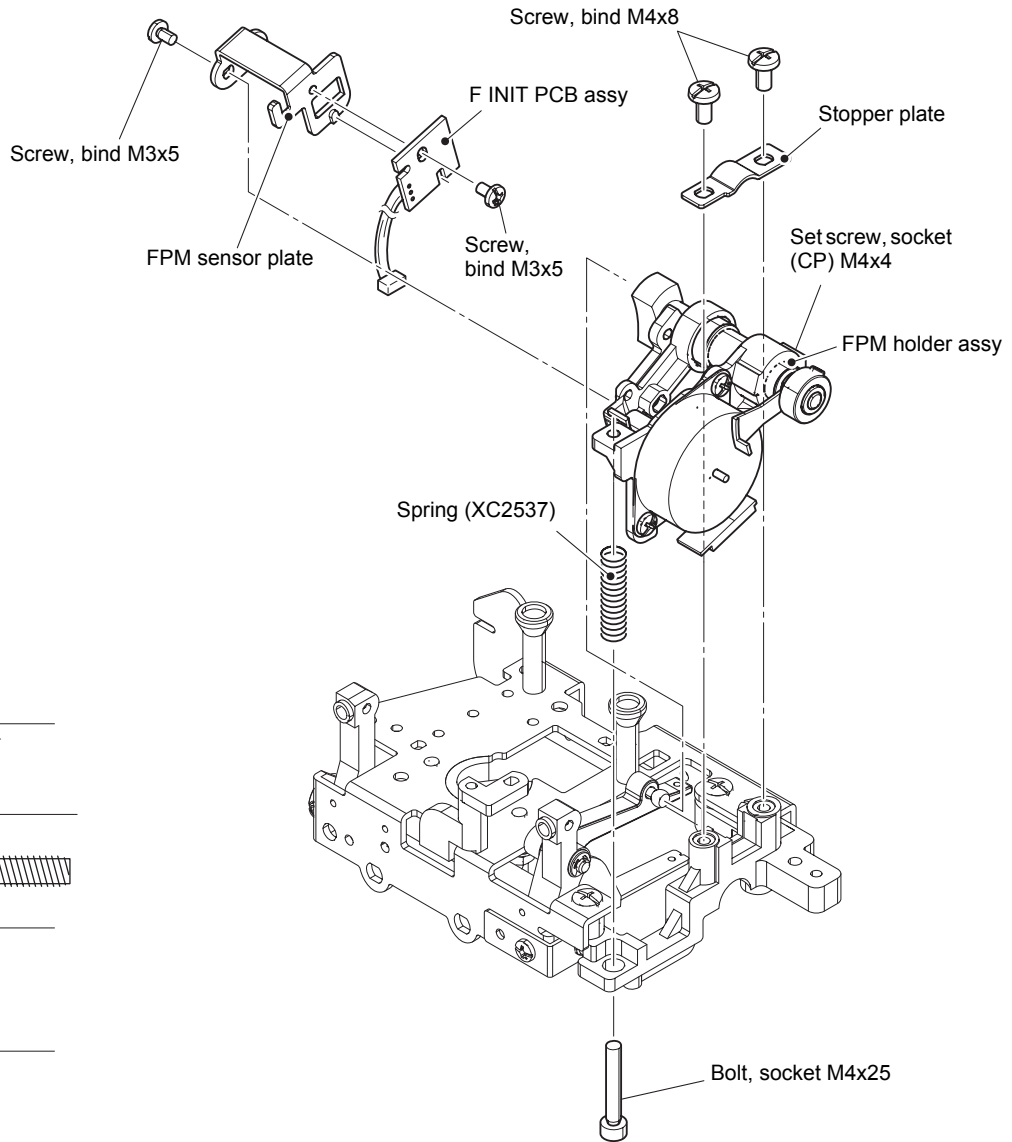
- Remove the lower shaft bushing from the lower shaft B Assy.
- Remove the retaining ring E6 to remove the washer thrust, lower shaft bushing and another washer thrust from the lower shaft B Assy, and then remove the two screws (set screw, socket (CP) M4x4) to remove the set screw collar from the lower shaft B Assy.



5 Removal of FPM holder assy, F INIT PCB assy and Feed adjuster gear assy

1. Loosen the screw (set screw, socket (CP) M4x4), and remove the screw (bolt, socket M4x25) to remove the spring (XC2537). Remove the two screws (screw, bind M4x8) to remove the stopper plate, and then remove the FPM holder assy.
2. Remove the screw (screw, bind M3x5) to remove the F INIT PCB assy from the FPM sensor plate. Remove the screw (screw, bind M3x5) to remove the FPM sensor plate from the FPM holder assy.

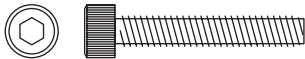
SPRING (XC2537)



Set Screw, Socket (CP) M4X4



Bolt, Socket M4X25



Screw, Bind M4X8



Screw, Bind M3X5



3. Remove the screw (set screw, socket (CP) M4x4) to remove the set collar and F initial shutter from the shaft of feed adjuster gear assy.
4. Remove the retaining ring E4 from the shaft of feed adjuster gear assy, and then pull out the feed adjuster gear assy from the FPM holder assy. Remove the spring (XE4082) and washer from the feed adjuster gear assy.
5. Remove the spring (XC2530) from the feed adjuster and feed gear.
6. Remove the retaining ring 10 from the right side of shaft bushing.
7. Remove the screw (set screw, socket (CP) M4x4) to pull out the shaft bushing from the FPM holder assy. Remove the two retaining rings 10 from the shaft bushing.

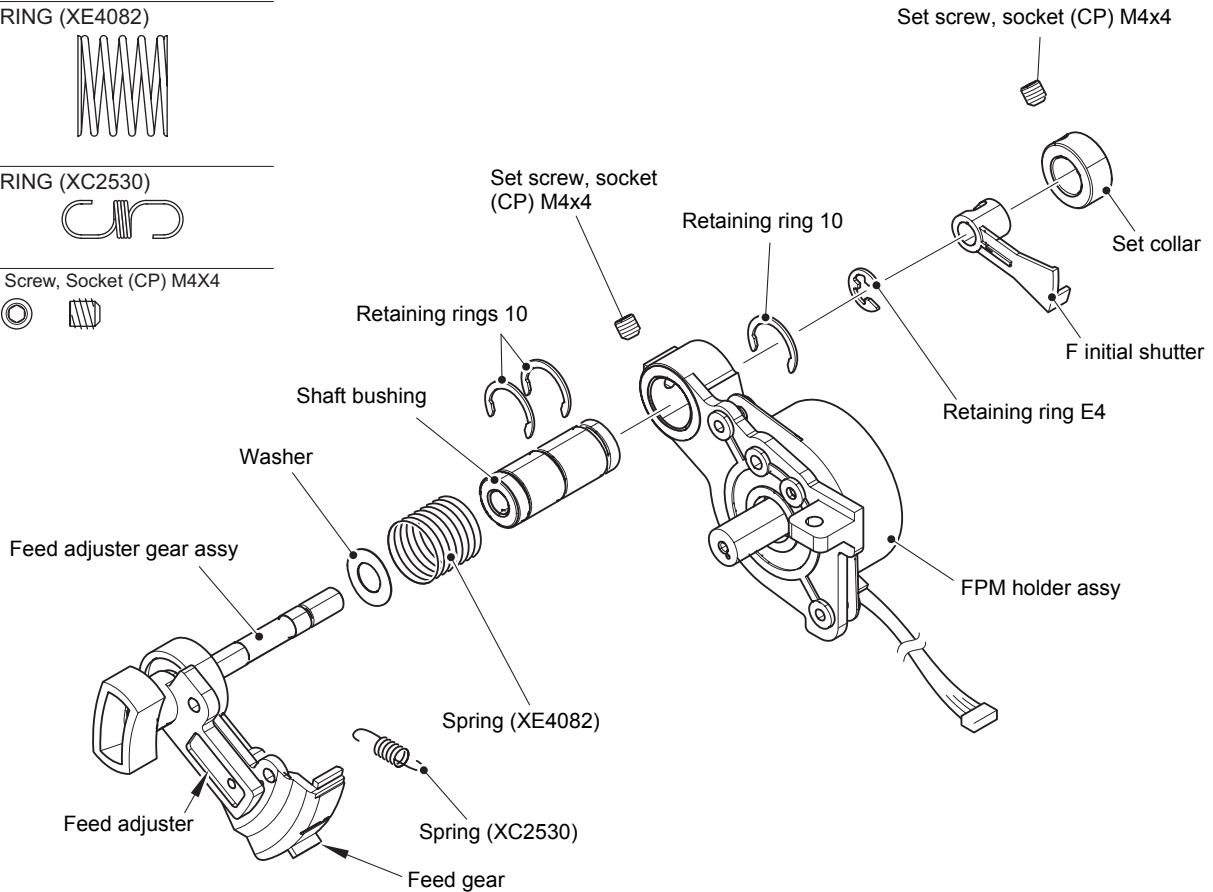
SPRING (XE4082)



SPRING (XC2530)

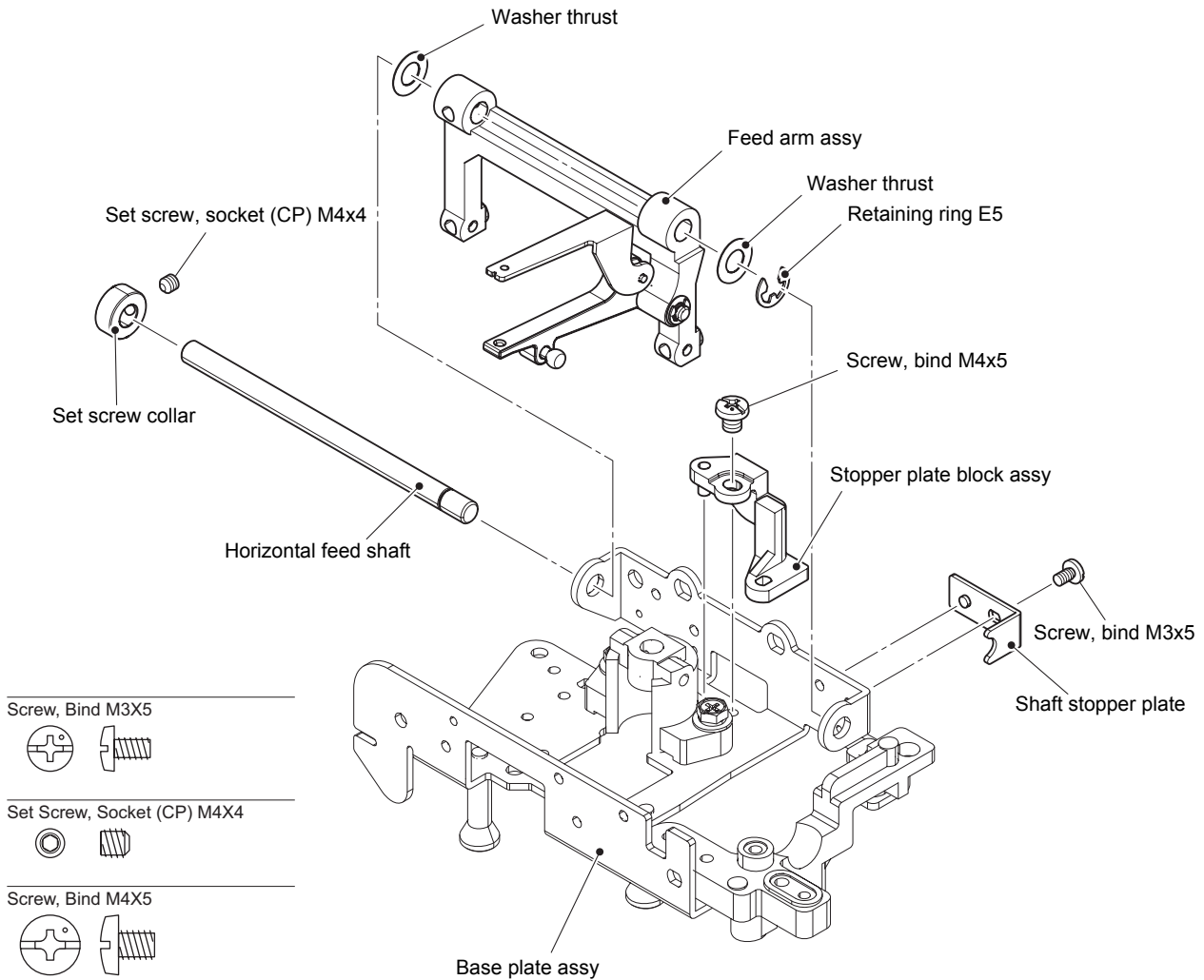


Set Screw, Socket (CP) M4X4



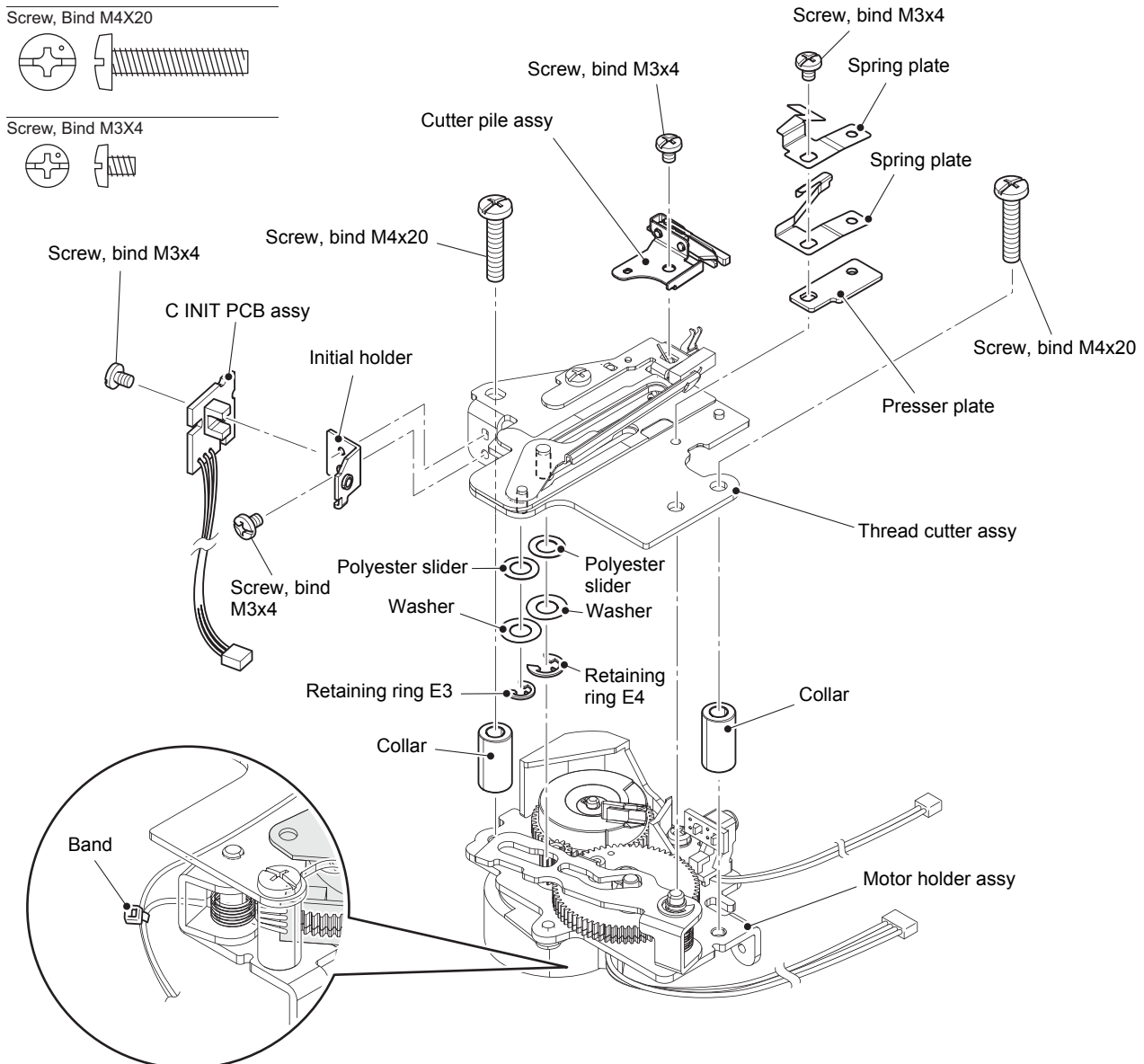
6 Removal of Feed arm assy and Stopper plate block assy

1. Remove the screw (screw, bind M3x5) to remove the shaft stopper plate.
2. Remove the screw (set screw, socket (CP) M4x4) to remove the set screw collar from the horizontal feed shaft.
3. Remove the retaining ring E5 from the horizontal feed shaft, and then pull out the horizontal feed shaft to remove the washer thrust, feed arm assy and another washer thrust.
4. Remove the screw (screw, bind M4x5) to remove the stopper plate block assy.



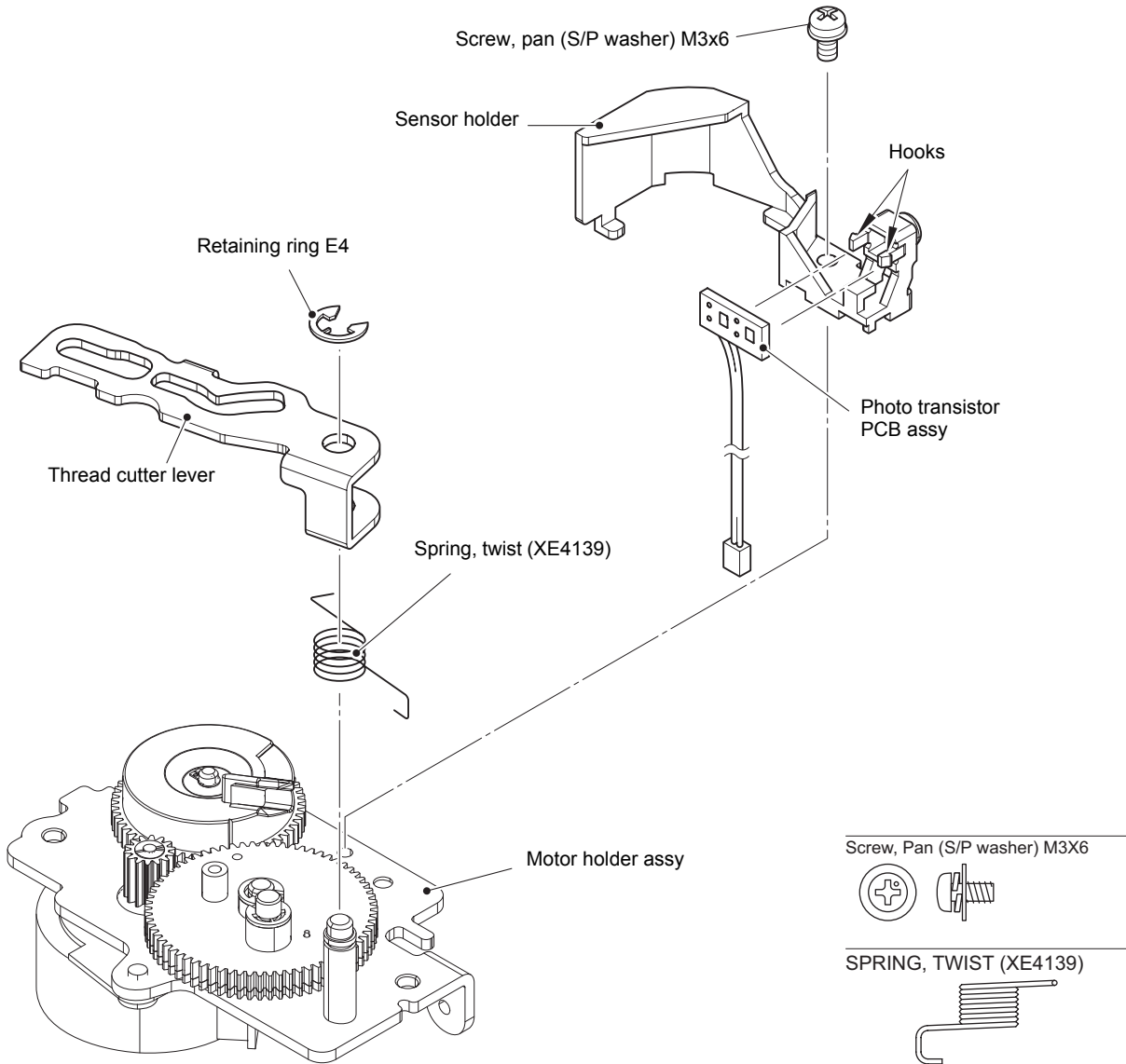
1 Removal and disassembly of Thread cutter assy

1. Cut the band.
2. Remove the two screws (screw, bind M4x20) to remove the thread cutter assy and two collars from the motor holder assy.
3. Remove the screw (screw, bind M3x4) to remove the C INIT PCB assy from the initial holder. Remove the screw (screw, bind M3x4) to remove the initial holder from the thread cutter assy.
4. Remove the screw (screw, bind M3x4) to remove the spring plate, spring plate and presser plate from the thread cutter assy.
5. Remove the screw (screw, bind M3x4) to remove the cutter pile assy from the thread cutter assy.
6. Remove the retaining ring E4 to remove the washer and the polyester slider from the shaft of thread cutter assy. Remove the retaining ring E3 to remove the washer and polyester slider from the shaft of thread cutter assy.



2 Removal of Thread cutter lever, Photo transistor PCB assy, PF pulse motor assy and Gears

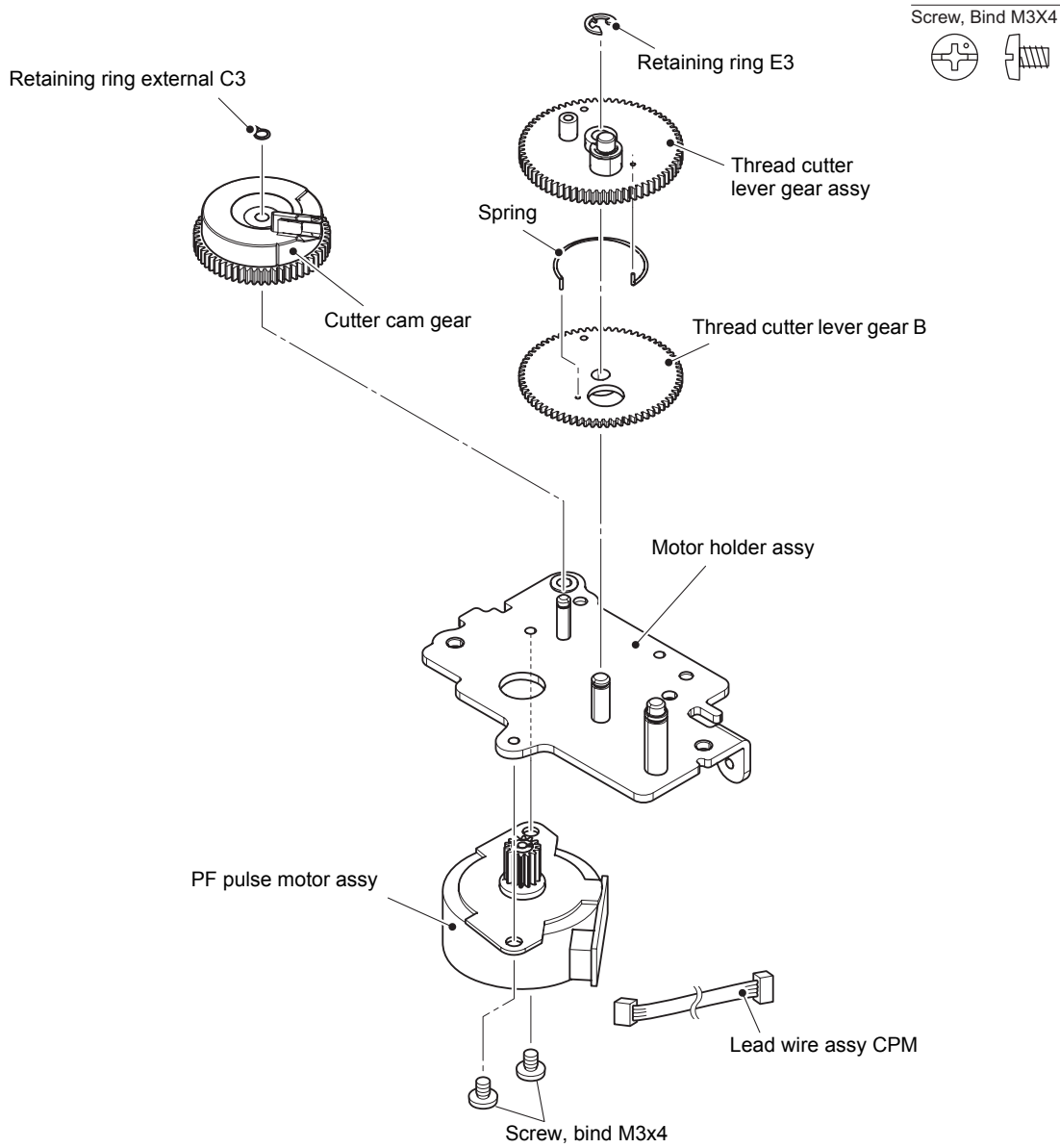
1. Release the hook part of spring, twist (XE4139) from the motor holder assy, and remove the retaining ring E4 to remove the thread cutter lever and the spring, twist.
2. Remove the screw (screw, pan (S/P washer) M3x6) to remove the sensor holder, and release the two hooks to remove the photo transistor PCB assy from the sensor holder.



Application of
Disassembly

Application of
Disassembly

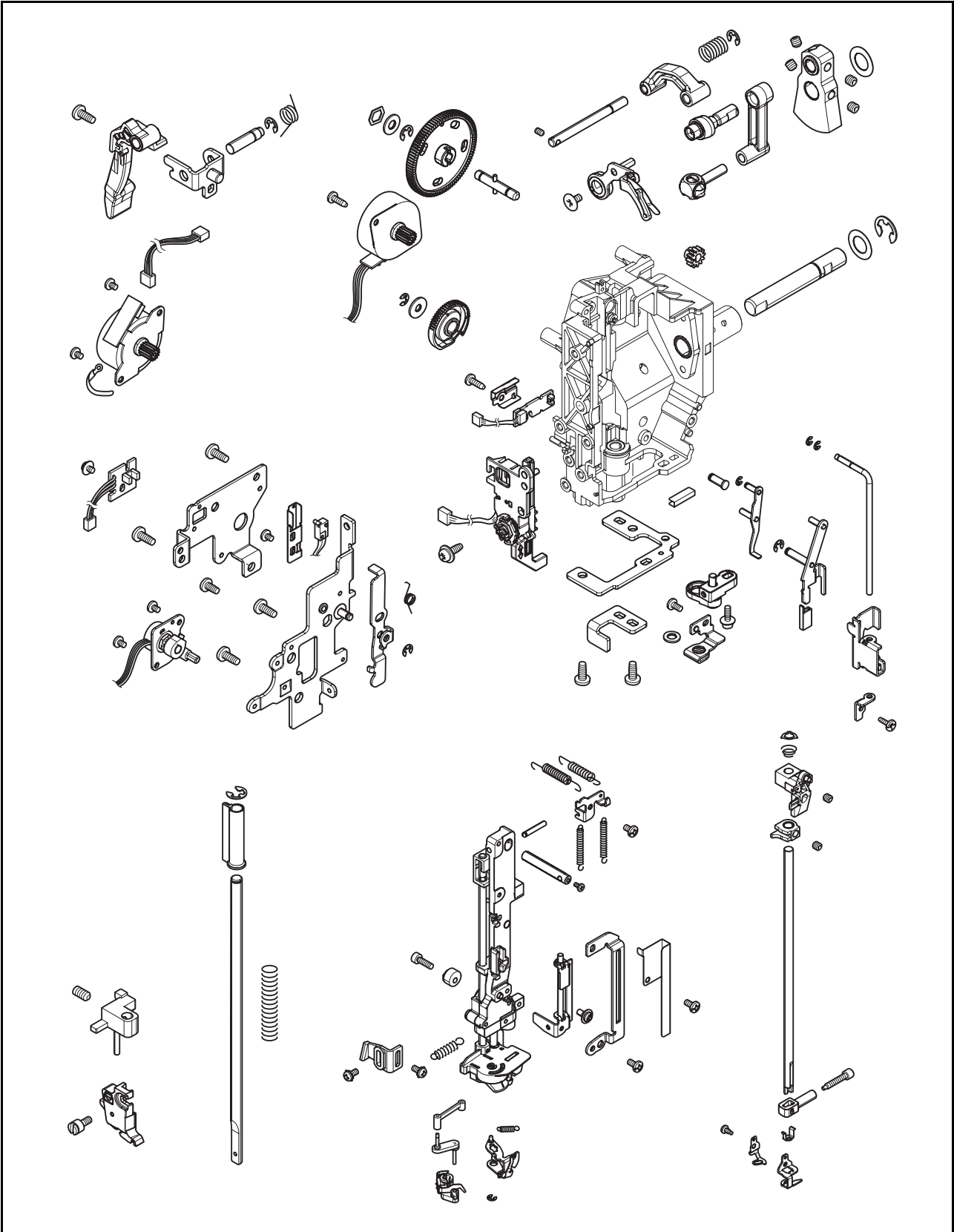
3. Remove the two screws (screw, bind M3x4) to remove the PF pulse motor assy, and disconnect the lead wire assy CPM from the PF pulse motor assy.
4. Remove the retaining ring E3 to remove the thread cutter lever gear assy, spring and thread cutter lever gear B from the motor holder assy.
5. Remove the retaining ring external C3 to remove the cutter cam gear from the motor holder assy.



Application of Disassembly

Application of Disassembly

Needle-presser module location diagram



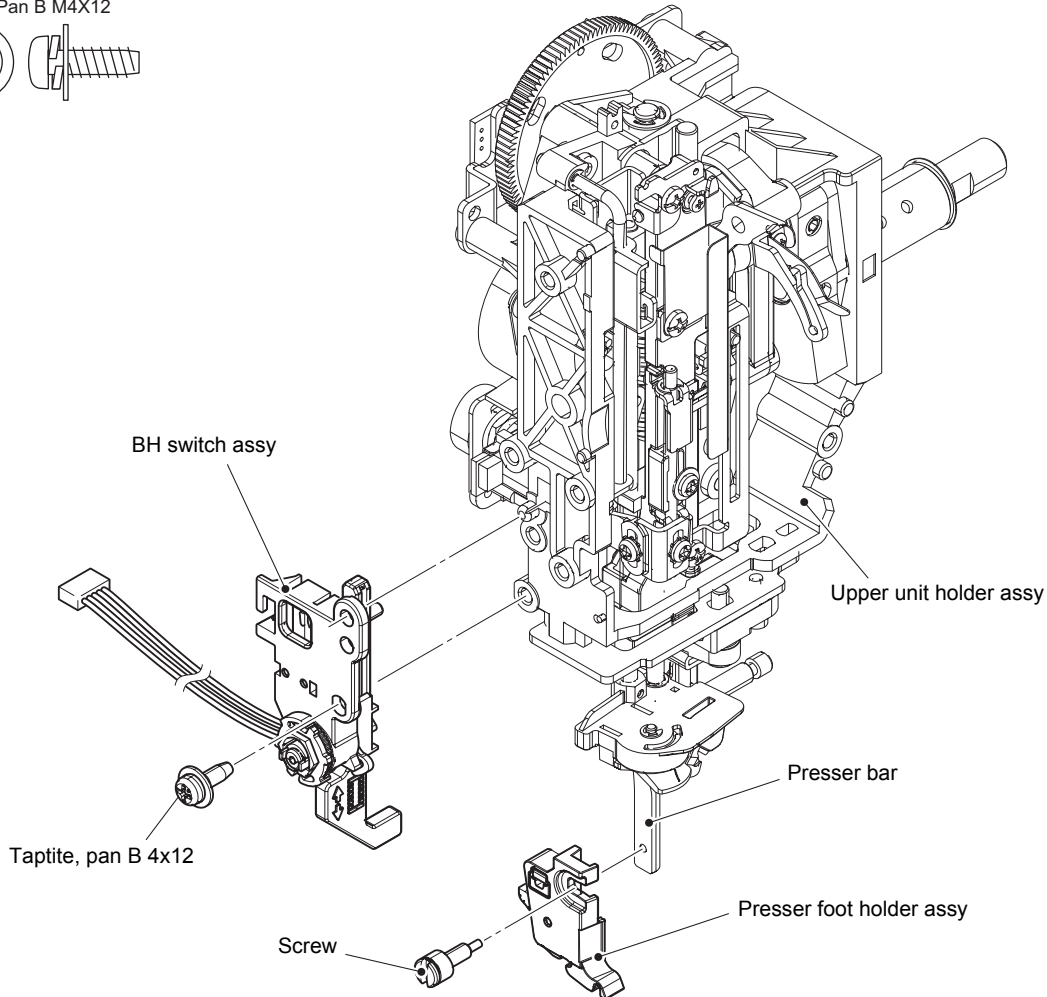
Application of Disassembly

Application of Disassembly

1 Removal of Presser foot holder assy and BH switch assy

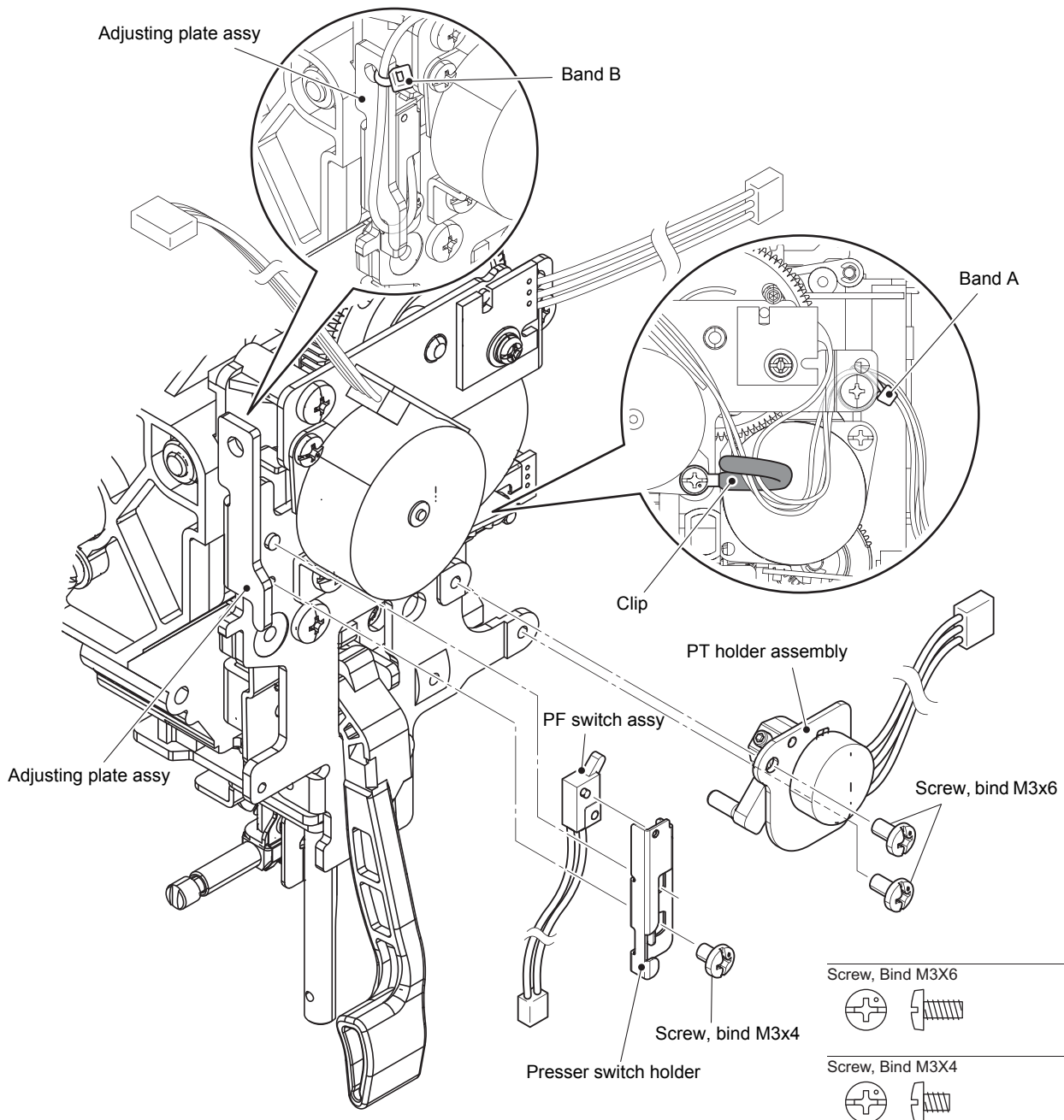
1. Remove the screw to remove the presser foot holder assy from the presser bar.
2. Remove the screw (taptite, pan B 4x12) to remove the BH switch assy from the upper unit holder assy.

Taptite, Pan B M4X12



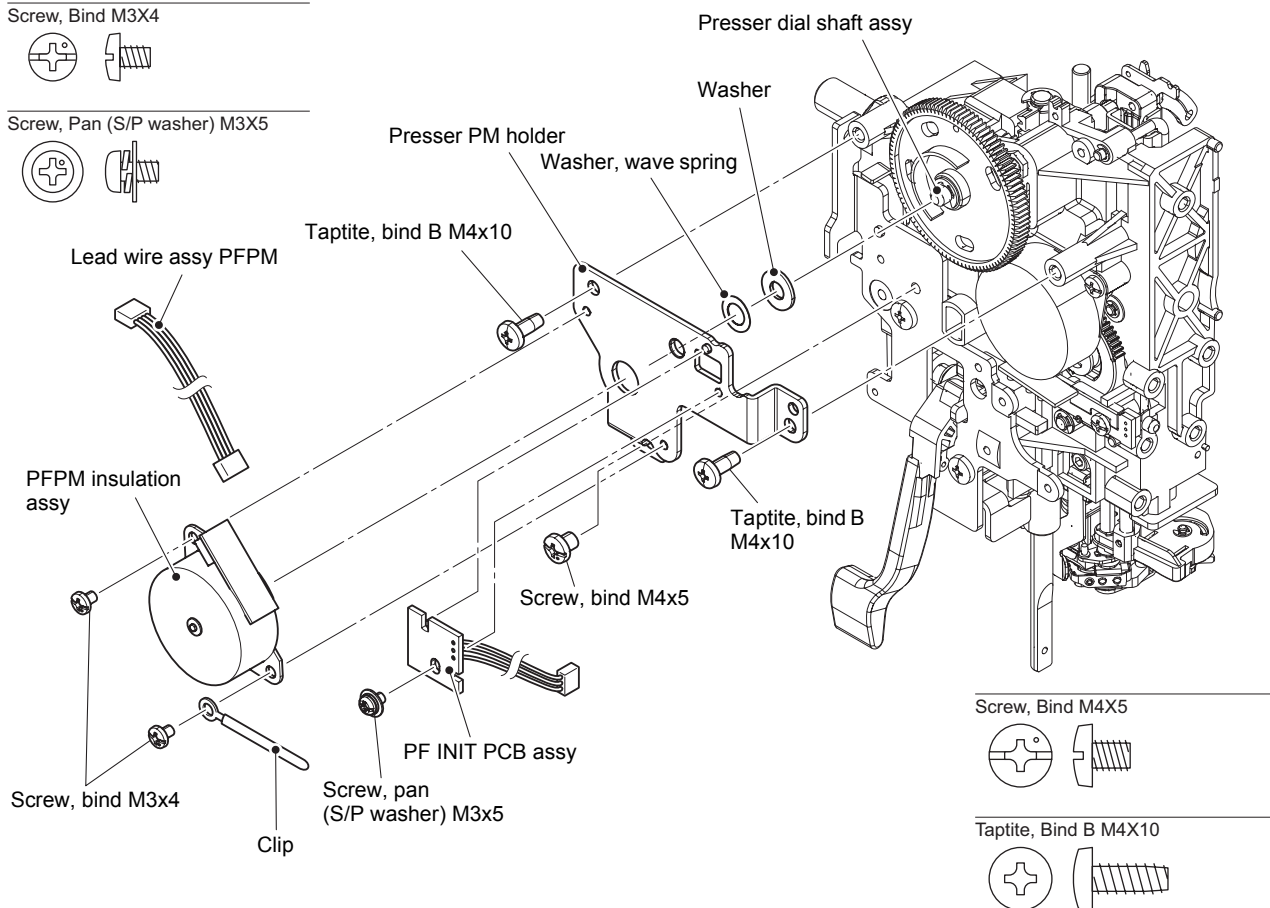
2 Removal of PT holder assembly and PF switch assy

1. Remove the two screws (screw, bind M3x6) to remove the PT holder assembly.
2. Cut the band A, and then release the clip to unbind the lead wires.
3. Cut the band B, remove the screw (screw, bind M3x4) to remove the presser switch holder and PF switch assy from the adjusting plate assy, and remove the PF switch assy from the presser switch holder.



3 Removal of PFPM insulation assy, PF INIT PCB assy and Presser PM holder

1. Remove the two screws (screw, bind M3x4) to remove the clip and PFPM insulation assy from the presser PM holder, then disconnect the lead wire assy PFPM from the PFPM insulation assy.
2. Remove the screw (screw, pan (S/P washer) M3x5) to remove the PF INIT PCB assy from the presser PM holder.
3. Remove the screw (screw, bind M4x5) and two screws (taptite, bind B M4x10) to remove the presser PM holder, and remove the washer, wave spring and washer from the presser dial shaft assy.



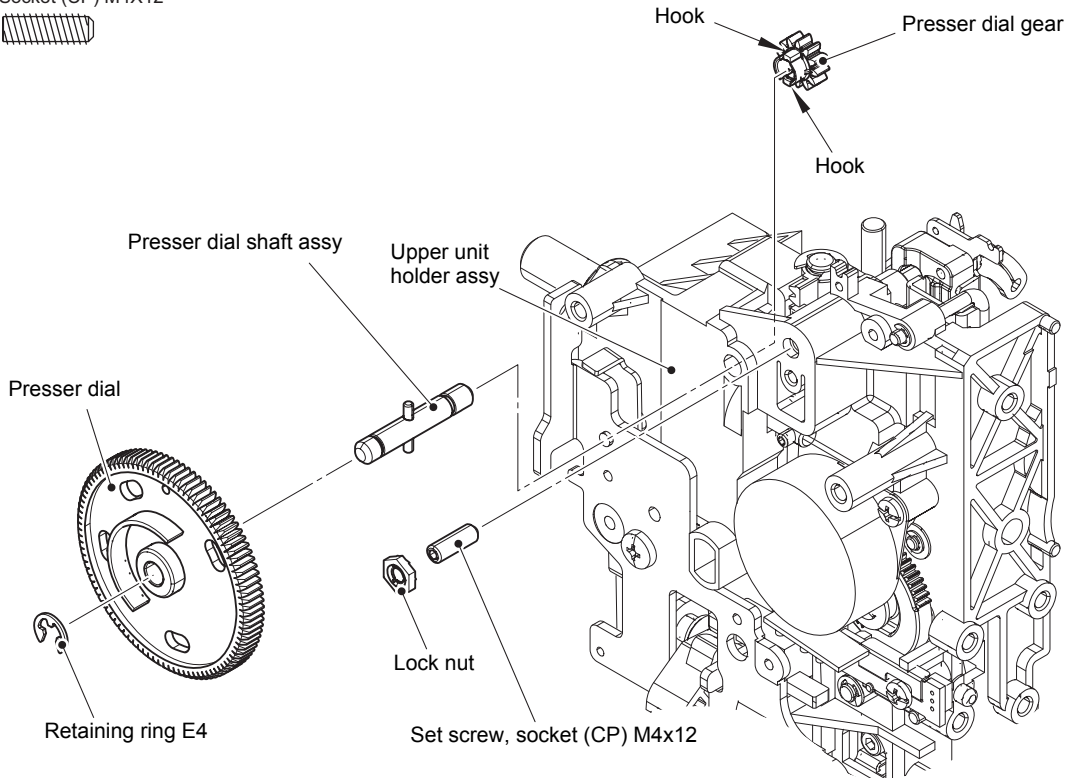
Application of
Disassembly

Application of
Disassembly

4 Removal of Presser dial, Presser dial gear and Lock nut

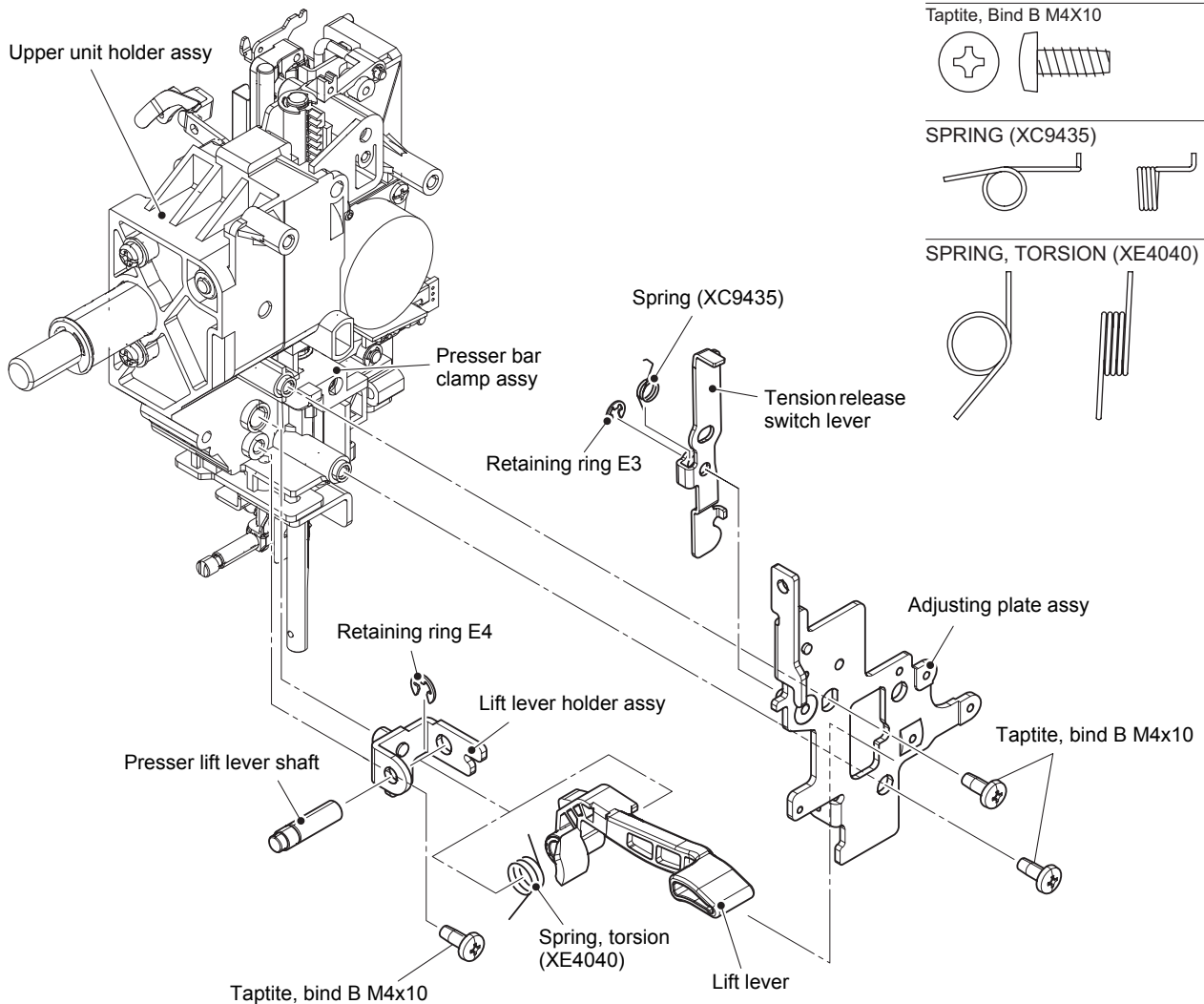
1. Remove the retaining ring E4, and remove the presser dial from the presser dial shaft assy.
2. Release the two hooks of presser dial gear to pull out the presser dial shaft assy, and remove the presser dial gear.
3. Loosen the lock nut, remove the screw (set screw, socket (CP) M4x12), and remove the lock nut from the screw (set screw, socket (CP) M4x12).

Set Screw, Socket (CP) M4X12



5 Removal of Adjusting plate assy and Lift lever

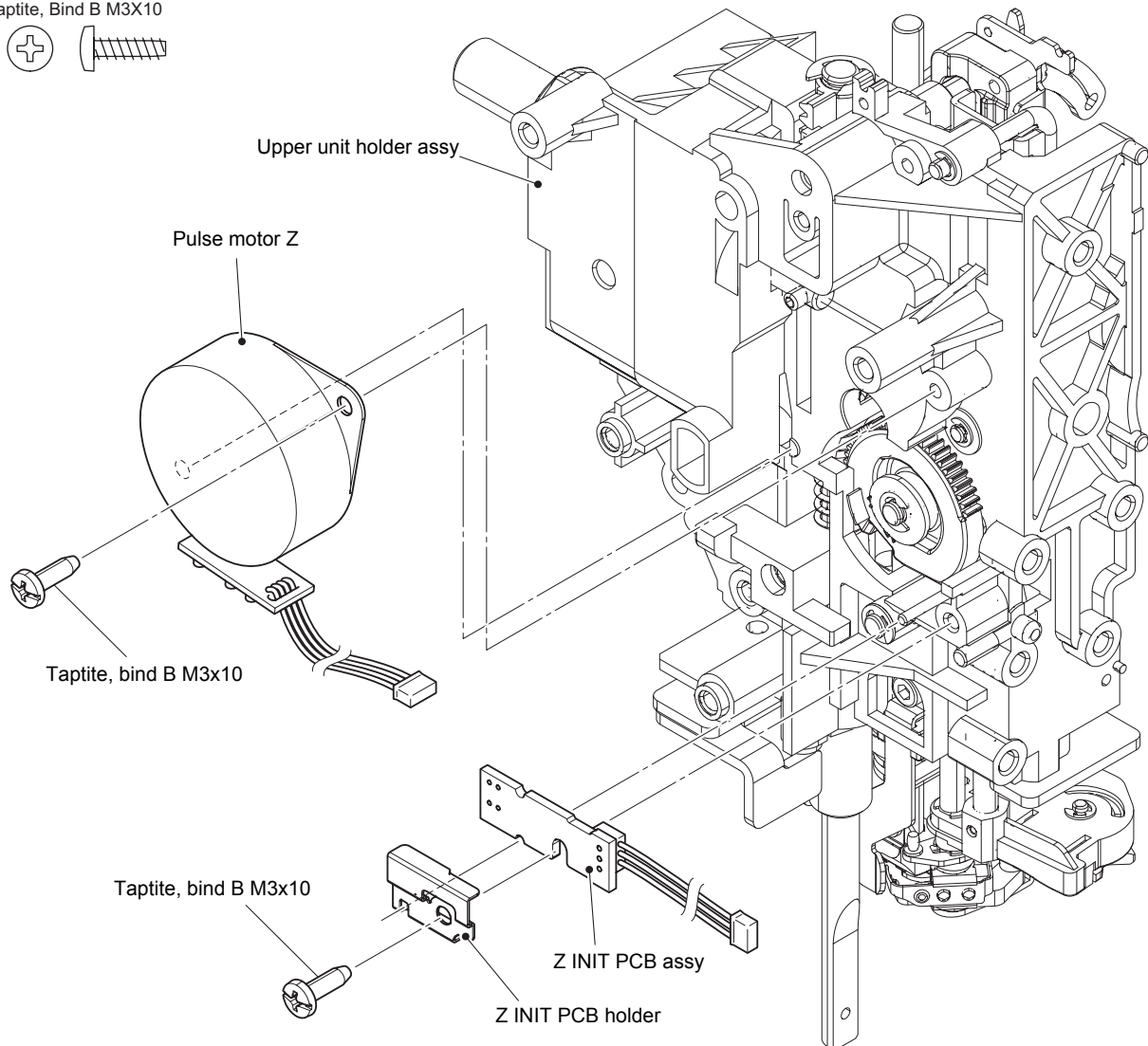
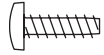
1. Remove the two screws (taptite, bind B M4x10), and then remove the adjusting plate assy while pulling up the lift lever. Remove the retaining ring E3, and then remove the tension release switch lever and spring (XC9435) from the shaft of adjusting plate assy.
2. Remove the screw (taptite, bind B M4x10) to remove the lift lever holder assy while pulling up the lift lever. Remove the retaining ring E4, and then pull out the presser lift lever shaft to remove the spring, torsion (XE4040) and lift lever from the lift lever holder assy.



6 Removal of Z INIT PCB assy and Pulse motor Z

1. Remove the screw (taptite, bind B M3x10) to remove the Z INIT PCB holder and Z INIT PCB assy.
2. Remove the screw (taptite, bind B M3x10) to remove the pulse motor Z.

Taptite, Bind B M3X10



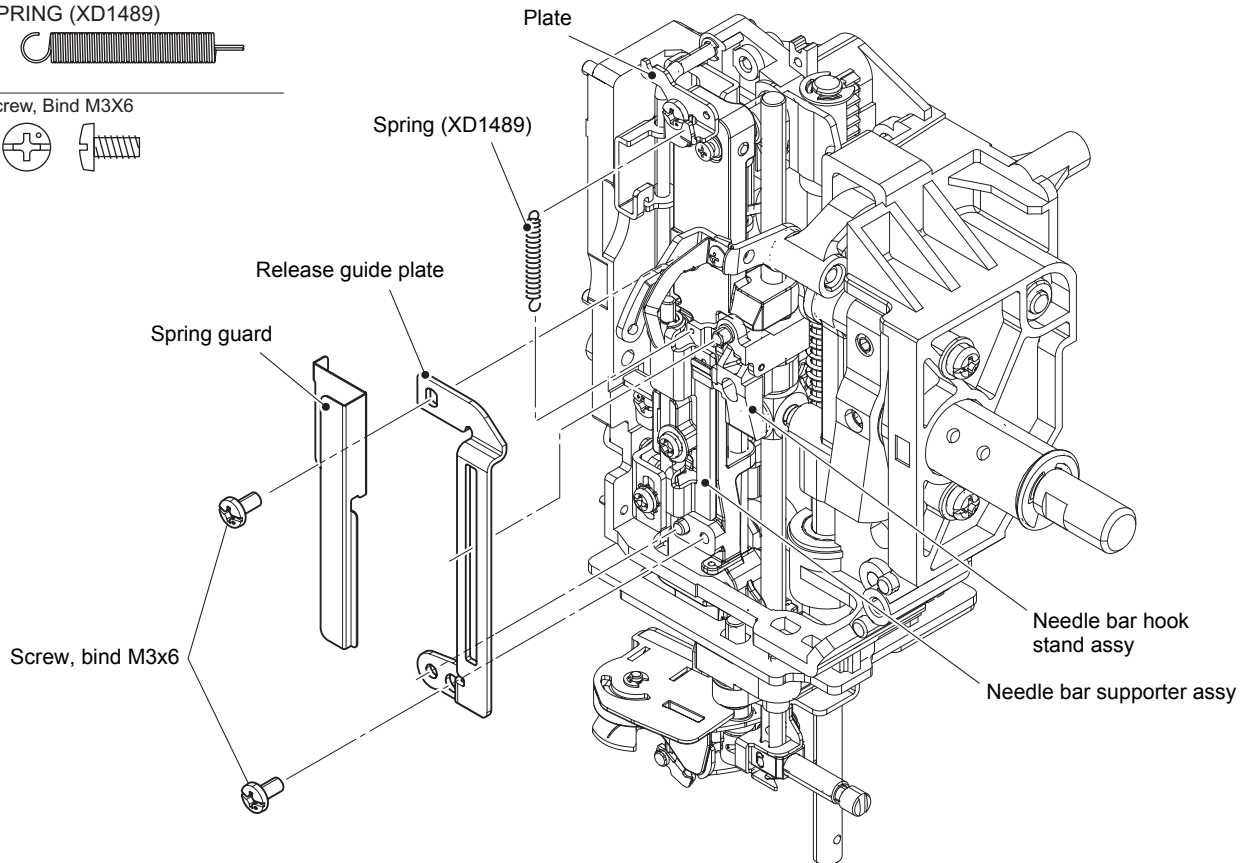
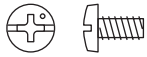
7 Removal of Spring guard and Release guide plate

1. Remove the two screws (screw, bind M3x6) to remove the spring guard and release guide plate from the needle bar supporter assy.
2. Remove the spring (XD1489) from the plate and needle bar hook stand assy.

SPRING (XD1489)

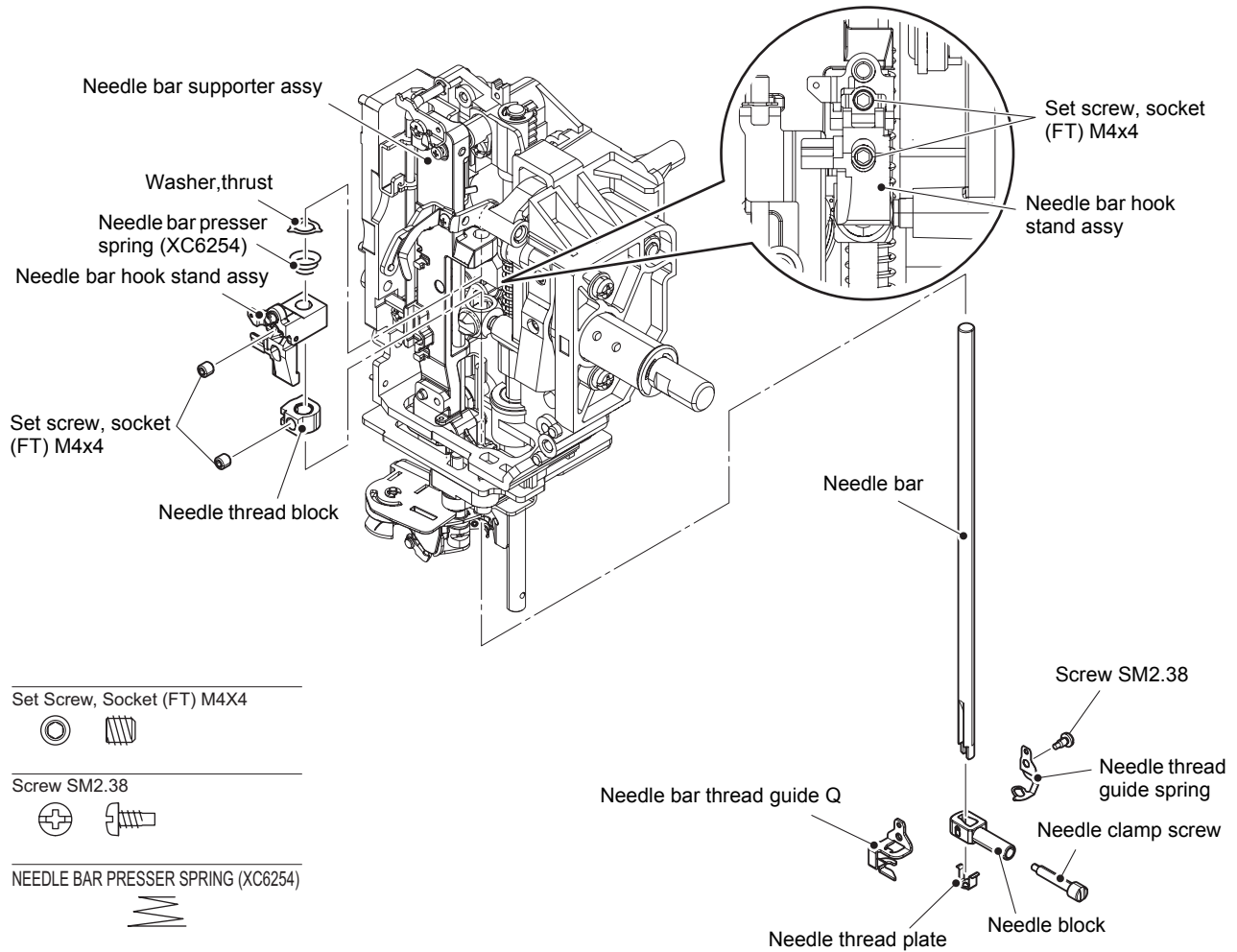


Screw, Bind M3X6



8 Removal of Needle bar assy, Needle bar hook stand assy and Needle thread block

1. Remove the screw (set screw, socket (FT) M4x4) from the needle thread block, and then remove the screw (set screw, socket (FT) M4x4) from the needle bar hook stand assy. Pull out the needle bar to remove the washer, thrust, needle bar presser spring (XC6254), needle bar hook stand assy and needle thread block.
2. Remove the needle clamp screw from the needle block. Remove the screw (screw SM2.38) to remove the needle thread guide spring and needle bar thread guide Q, then remove the needle thread plate and needle block from the needle bar.

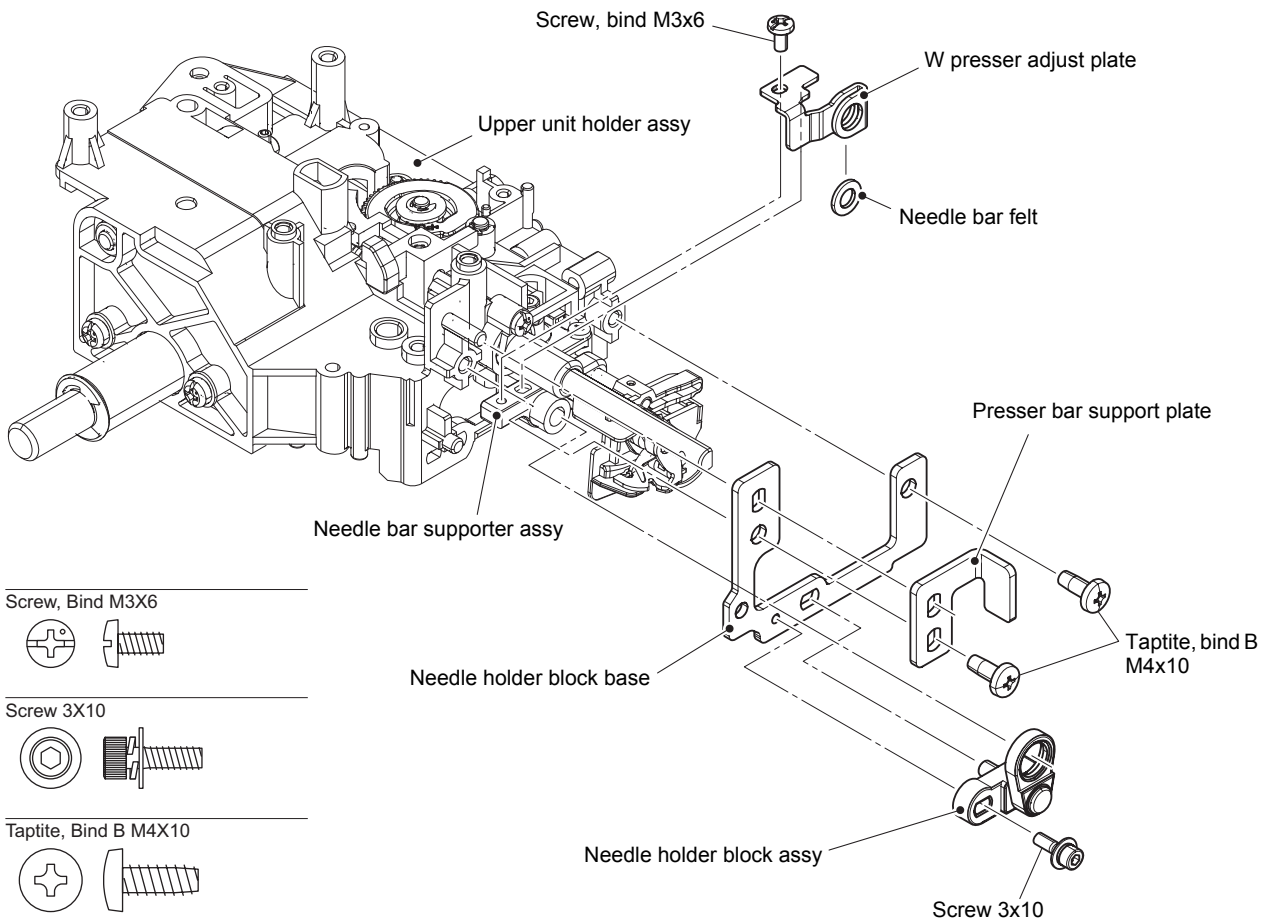


Application of
Disassembly

Application of
Disassembly

9 Removal of W presser adjust plate, Needle holder block assy, Presser bar support plate and Needle holder block base

1. Remove the screw (screw, bind M3x6) to remove the W presser adjust plate from the needle bar supporter assy, and remove the needle bar felt from the W presser adjust plate.
2. Remove the screw (screw 3x10) to remove the needle holder block assy from the needle holder block base.
3. Remove the screw (taptite, bind B M4x10) to remove the presser bar support plate, and then remove the screw (taptite, bind B M4x10) to remove the needle holder block base.



10 Removal of Zigzag adjusting nut

1. Remove the screw (bolt, socket M3x10) to remove the zigzag adjusting nut from the needle bar supporter assy.

Bolt, Socket M3X10



Zigzag adjusting nut

Bolt, socket M3x10

Zigzag adjusting nut

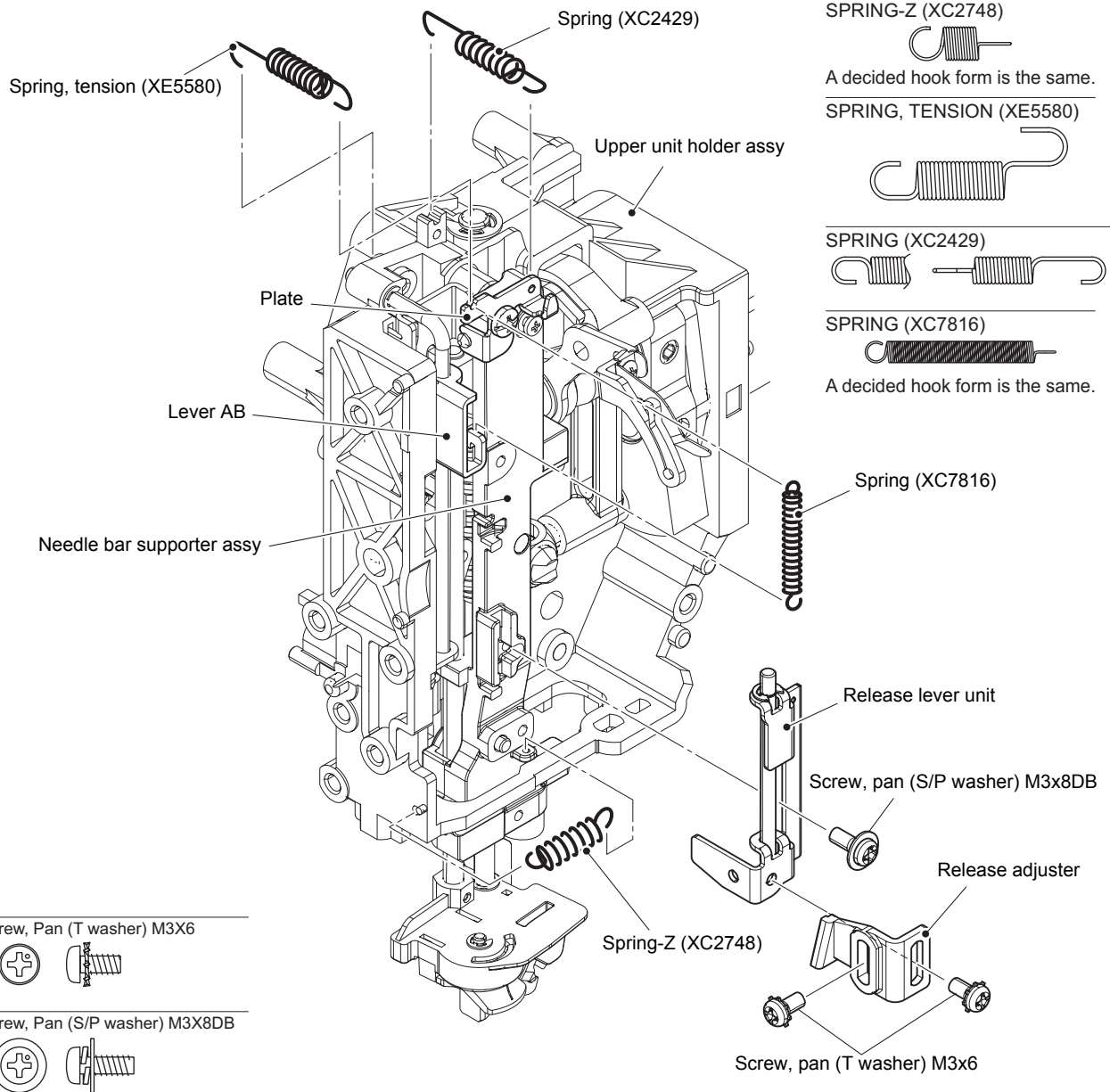
Needle bar supporter assy

Application of
Disassembly

Application of
Disassembly

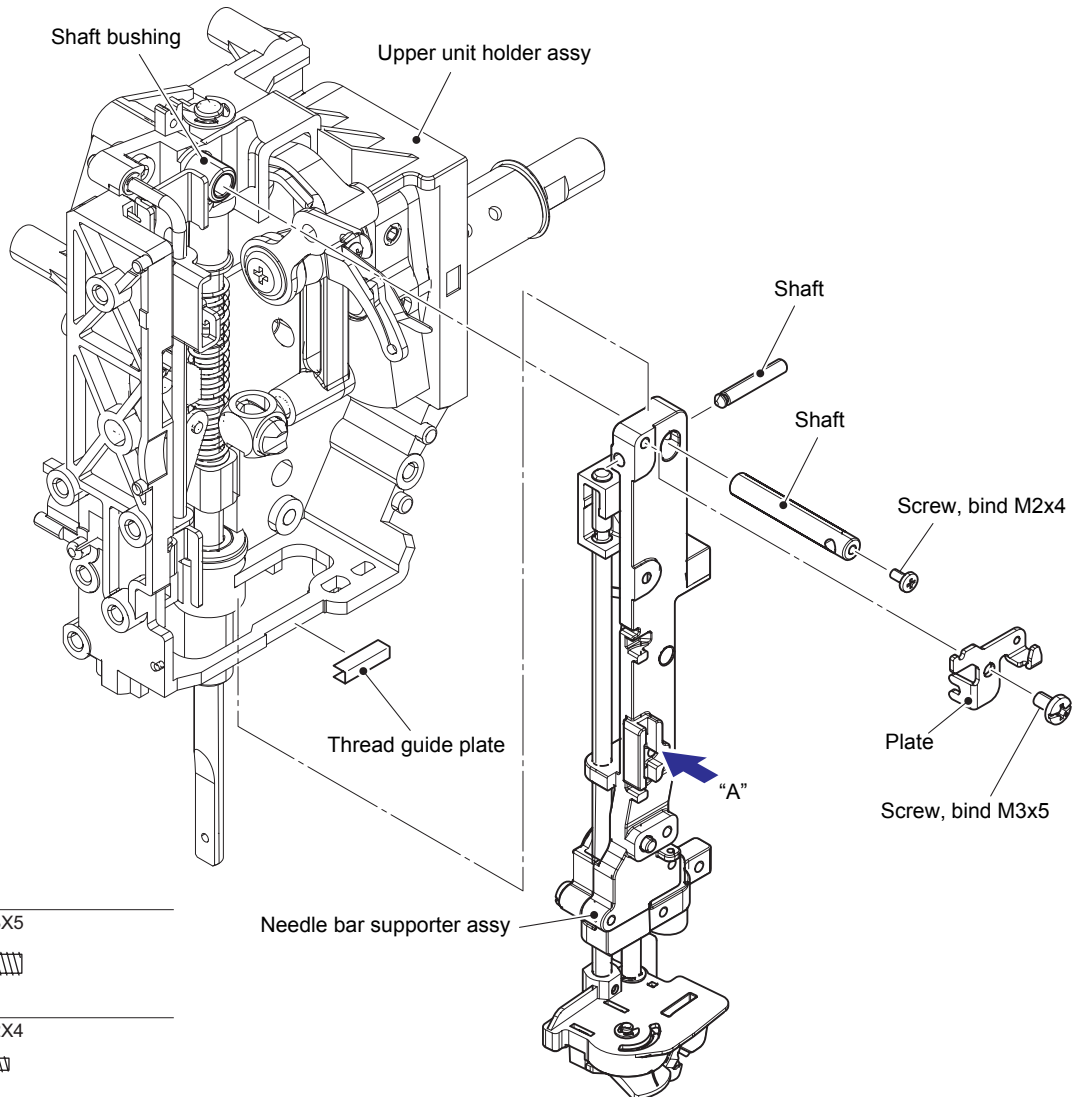
11 Removal of Springs

1. Remove the two screws (screw, pan (T washer) M3x6) to remove the release adjuster from the release lever unit. Remove the screw (screw, pan (S/P washer) M3x8DB), and then remove the release lever unit from the needle bar supporter assy.
2. Remove the spring-Z (XC2748) from the upper unit holder assy and needle bar supporter assy. Remove the spring, tension (XE5580) from the upper unit holder assy and plate. Remove the spring (XC2429) from the upper unit holder assy and plate, and remove the spring (XC7816) from the plate and the lever AB.



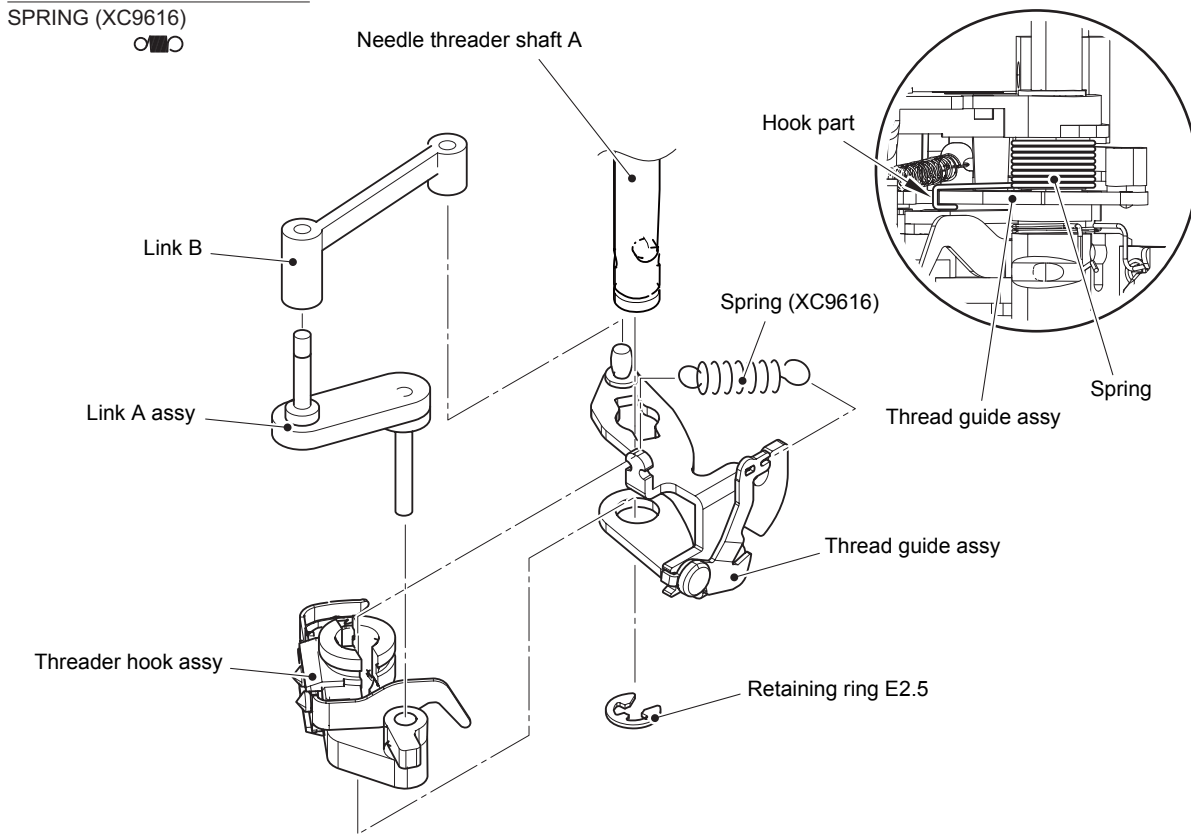
12 Removal of Needle bar supporter assy and Thread guide plate

1. Remove the screw (screw, bind M3x5) to remove the plate from the needle bar supporter assy. Remove the screw (screw, bind M2x4) from the shaft, and then pull out the shaft from the needle bar supporter assy. Pull out the shaft from the shaft bushing on the upper unit holder assy.
2. Pull out the needle bar supporter assy from the upper unit holder assy while pushing the position "A".
3. Remove the thread guide plate.



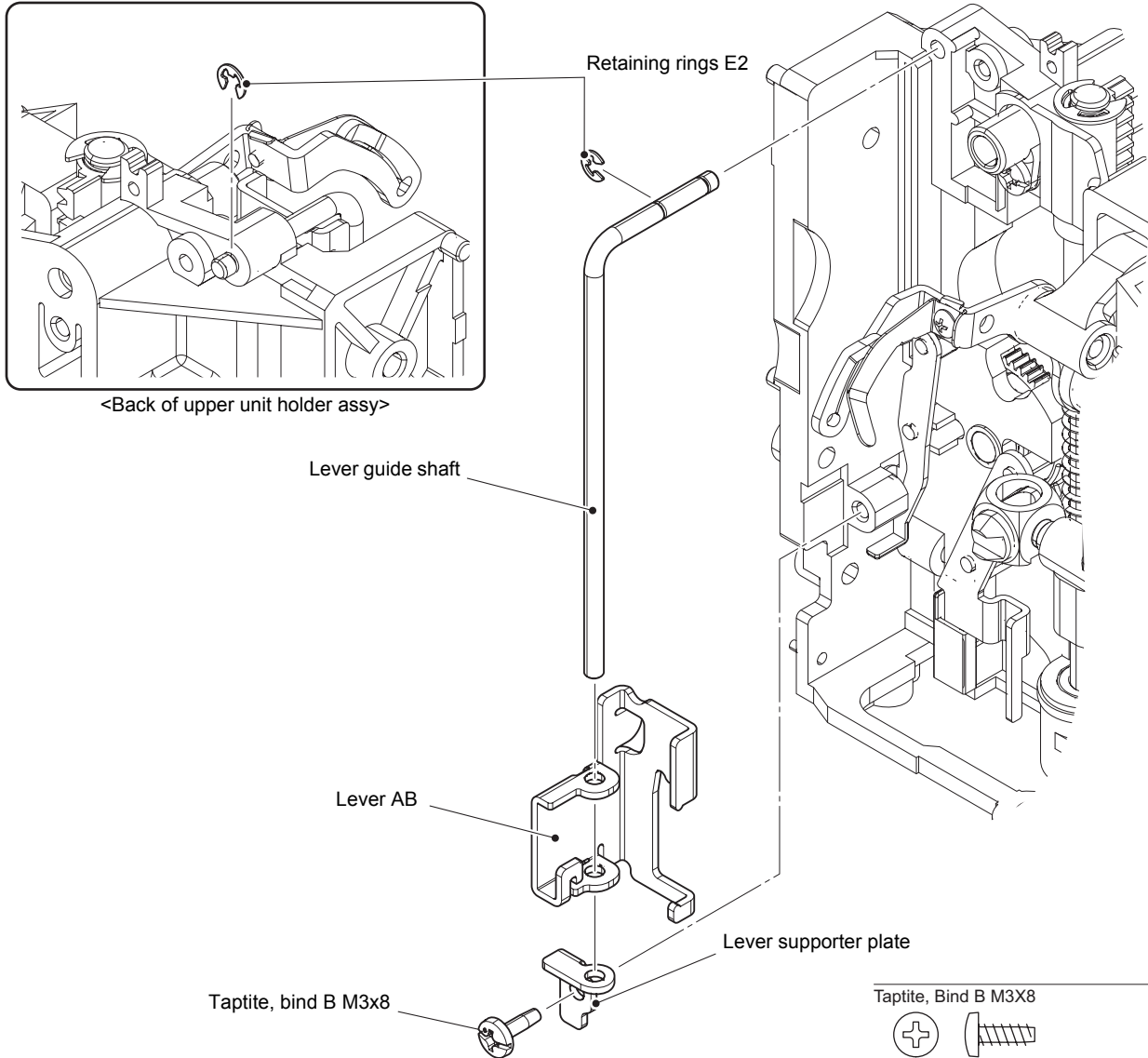
13 Removal of Threader hook assy

1. Remove the retaining ring E2.5 from the needle threader shaft A of needle bar supporter assy, release the hook part of spring from the thread guide assy, and then pull out the threader hook assy. Disassemble the threader hook assy, link A assy, link B and thread guide assy, and remove the spring (XC9616) from the thread guide assy.



14 Removal of Lever AB

1. Remove the screw (taptite, bind B M3x8) to remove the lever supporter plate, and then pull out the lever AB from the lever guide shaft. Remove the retaining ring E2 to remove the lever guide shaft, and remove the retaining ring E2 from the lever guide shaft.

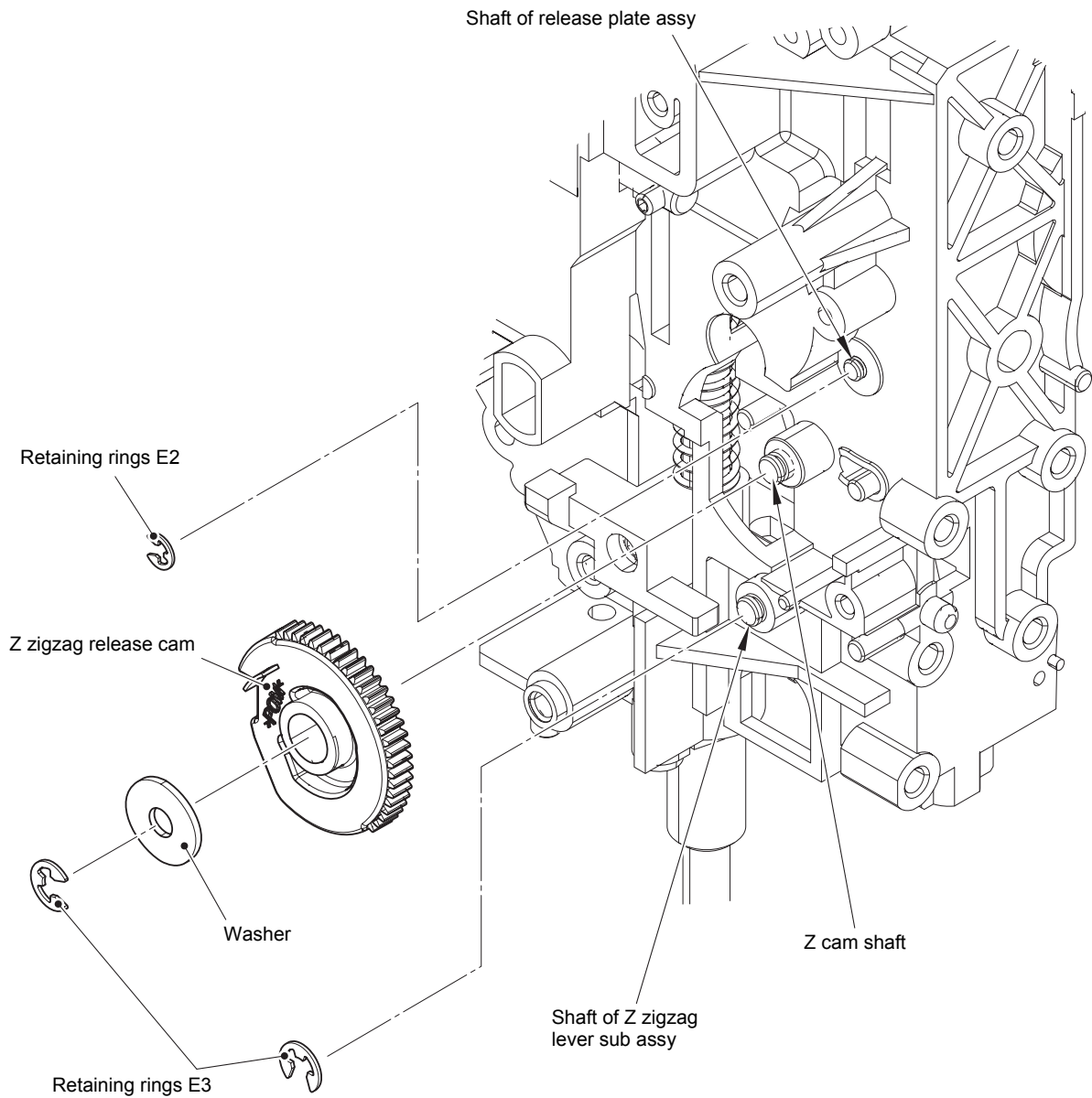


Application of
Disassembly

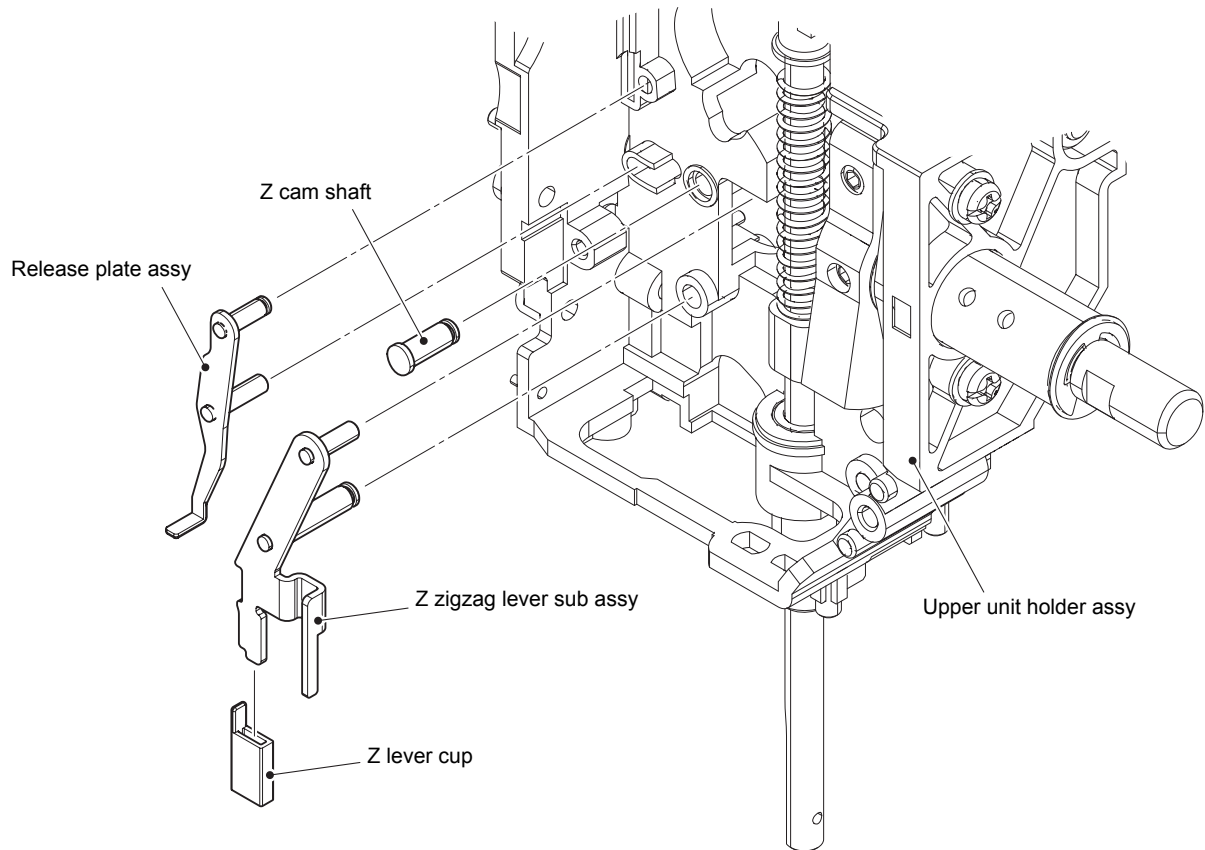
Application of
Disassembly

15 Removal of Z zigzag release cam, Z zigzag lever sub assy and Release plate assy

1. Remove the retaining ring E3 from the Z cam shaft to remove the washer and Z zigzag release cam.
2. Remove the retaining ring E3 from the shaft of Z zigzag lever sub assy.
3. Remove the retaining ring E2 from the shaft of release plate assy.



4. Pull out the Z cam shaft from the upper unit holder assy.
5. Remove the Z zigzag lever sub assy from the upper unit holder assy, and remove the Z lever cup from the Z zigzag lever sub assy.
6. Remove the release plate assy from the upper unit holder assy.



16 Removal of Needle bar crank rod assy, Thread take-up lever assy,
Thread take-up counter weight and Unit shaft

1. Remove the two screws (set screw, socket (FT) M5x5) to remove the needle bar crank rod assy and thread take-up lever assy from the thread take-up lever link and thread take-up counter weight.
2. Remove the screw (screw, flat SM3.57-40X7L), and remove the thread take-up lever assy from the needle bar crank rod assy.

***Key point**

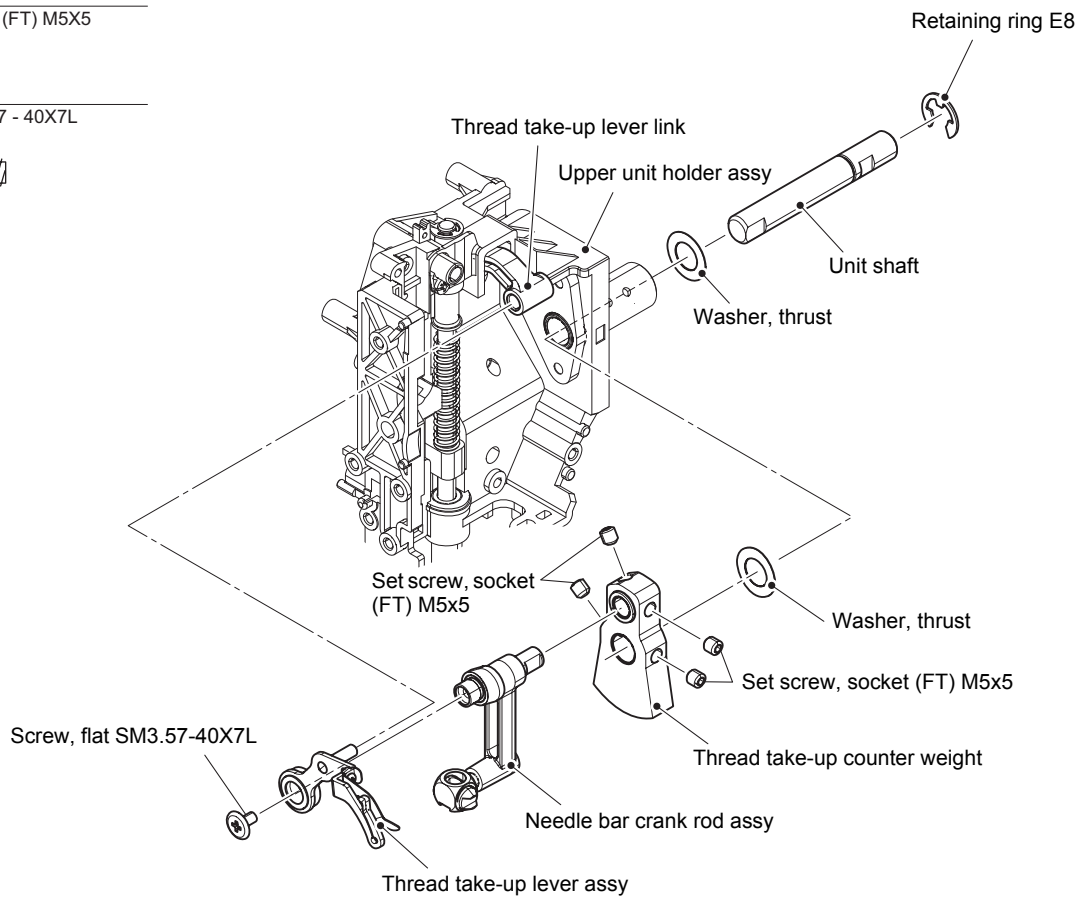
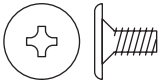
- Tighten the screw by turning it anti-clockwise.

3. Remove the two screws (set screw, socket (FT) M5x5) to remove the thread take-up counter weight and washer, thrust from the unit shaft. Pull out the unit shaft, and then remove the washer, thrust and retaining ring E8 from the unit shaft.

Set Screw, Socket (FT) M5X5

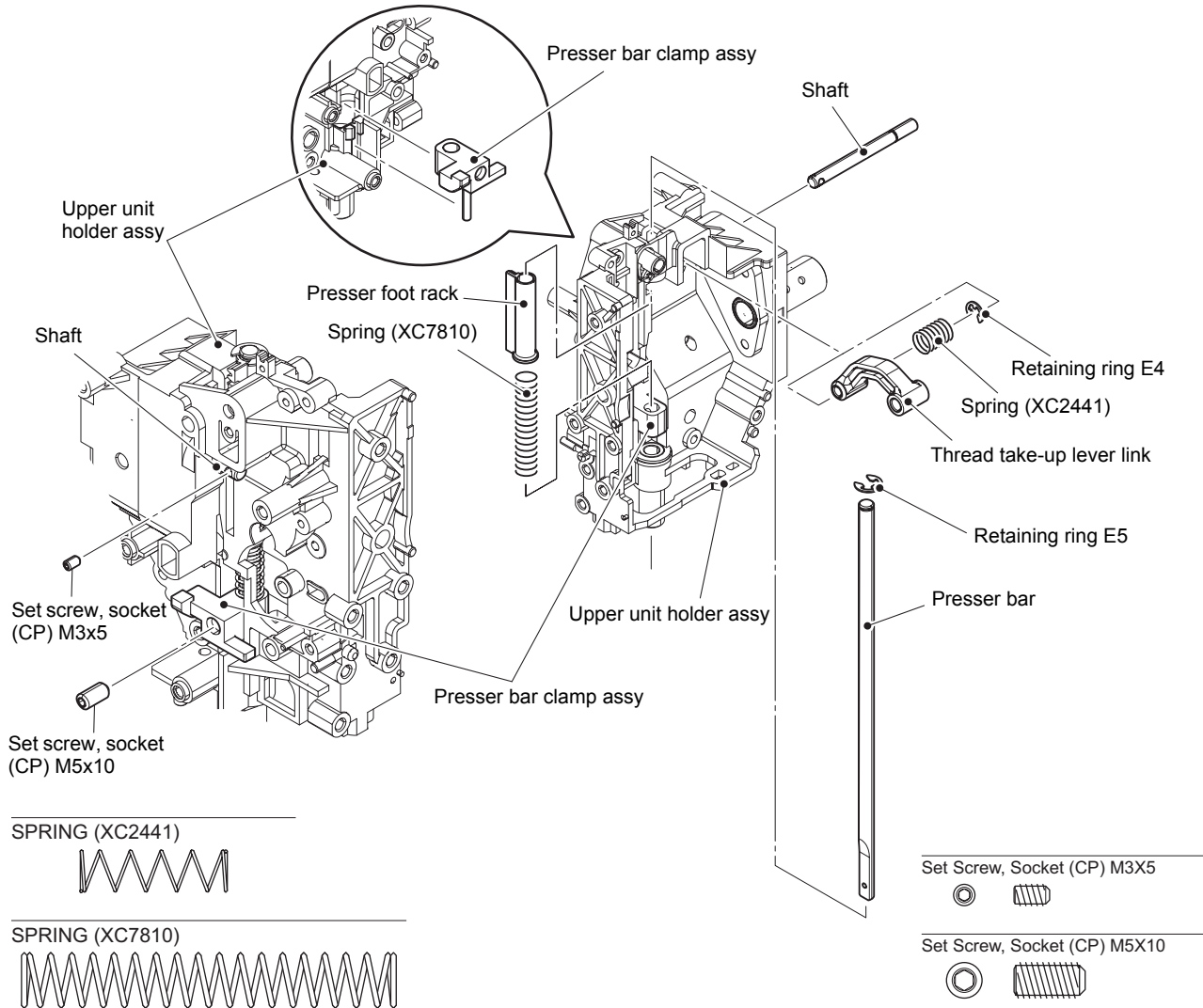


Screw, Flat SM3.57 - 40X7L



17 Removal of Thread take-up lever link, Presser bar and Presser bar clamp assy

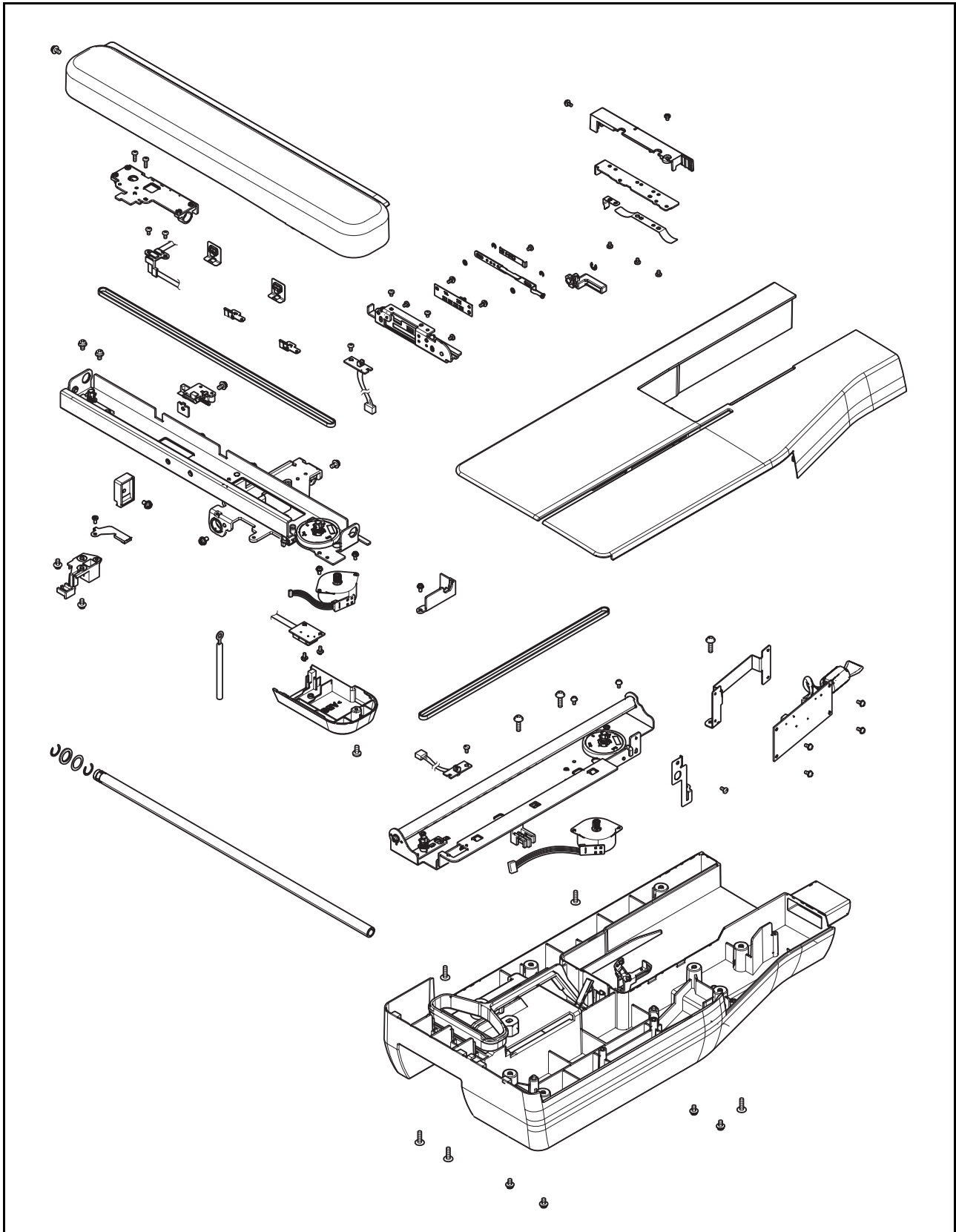
1. Remove the screw (set screw, socket (CP) M3x5) from the shaft. Remove the retaining ring E4 from the shaft, and then pull out the shaft to remove the thread take-up lever link and spring (XC2441).
2. Remove the screw (set screw, socket (CP) M5x10) from the presser bar clamp assy, and then pull out the presser bar to remove the presser bar clamp assy and spring (XC7810). Remove the retaining ring E5 from the presser bar.
3. Remove the presser foot rack.



Application of
Disassembly

Application of
Disassembly

Embroidery unit location diagram

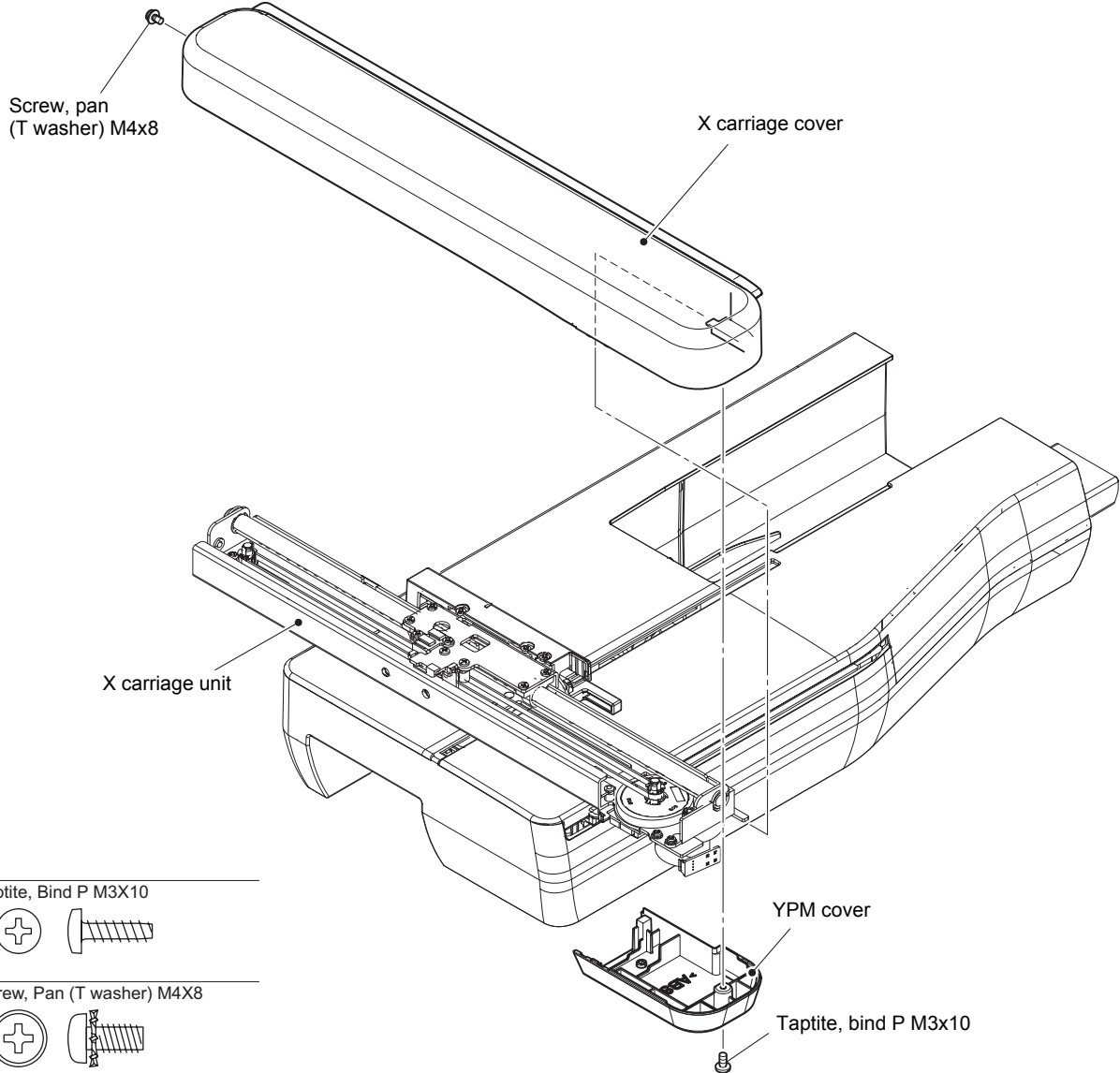


Application of Disassembly

Application of Disassembly

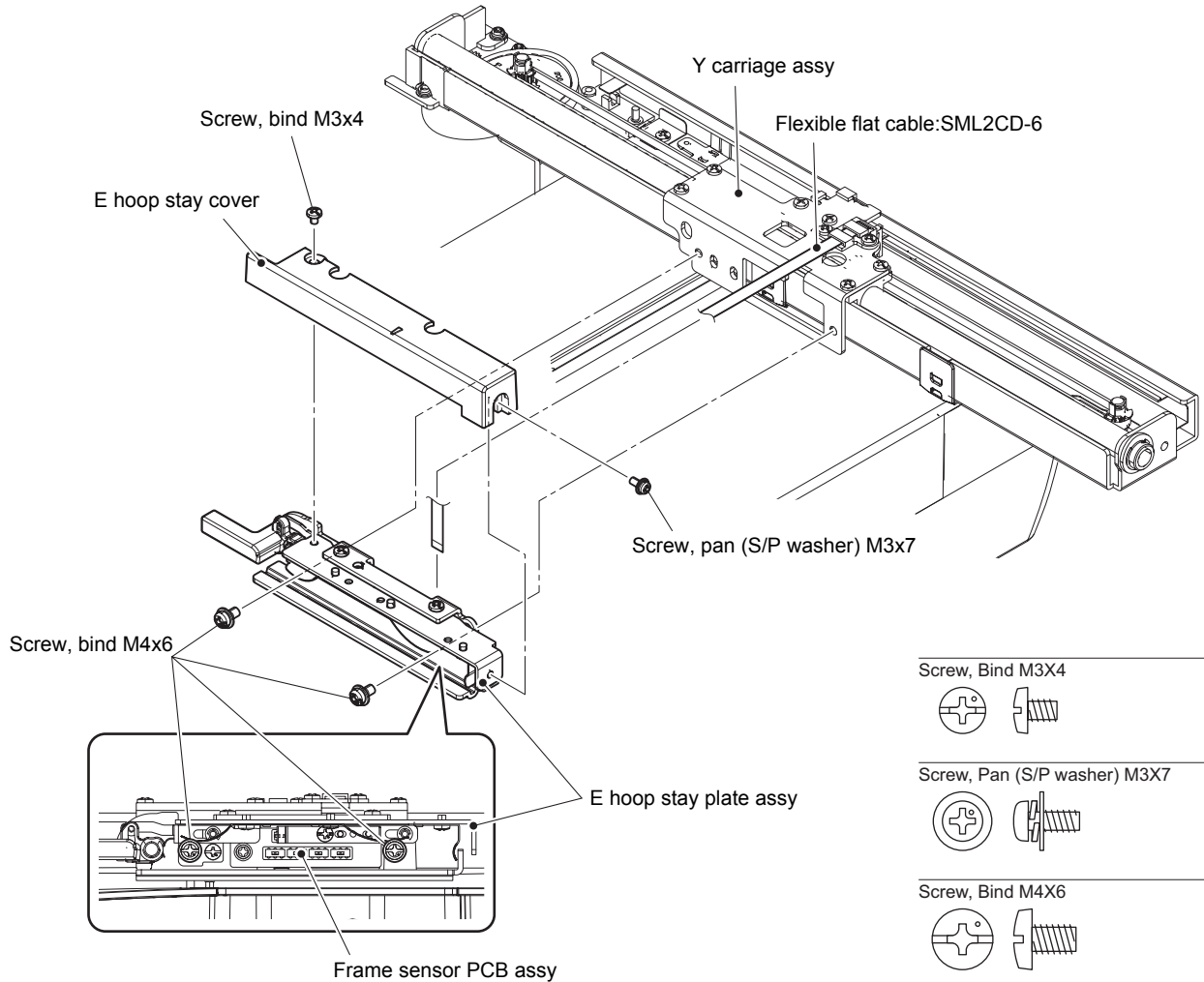
1 Removal of YPM cover and X carriage cover

1. Remove the screw (taptite, bind P M3x10) to remove the YPM cover from the X carriage cover.
2. Remove the screw (screw, pan (T washer) M4x8) to remove the X carriage cover from the X carriage unit.



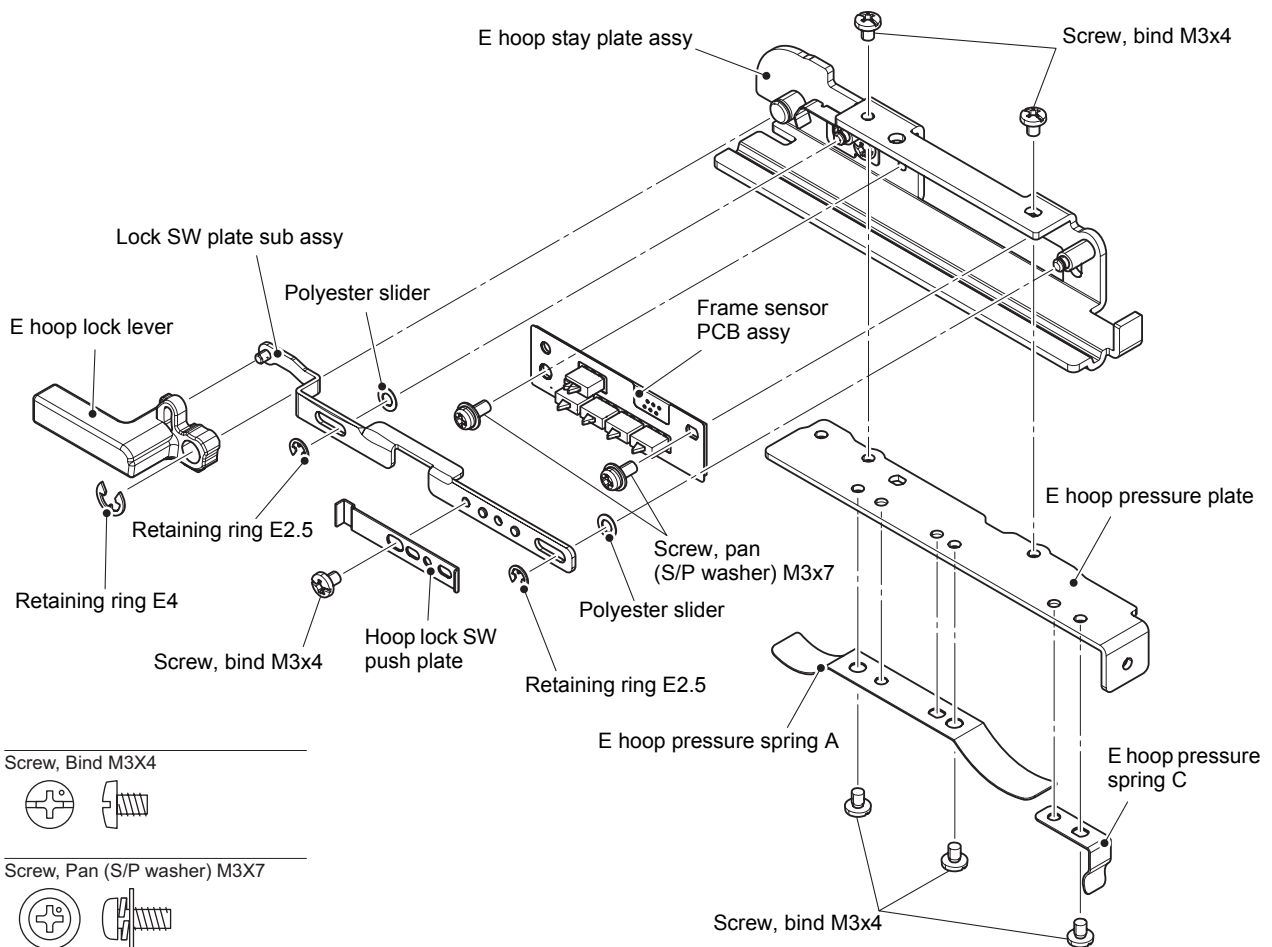
2 Removal of E hoop stay plate assy

1. Remove the screw (screw, bind M3x4) and screw (screw, pan (S/P washer) M3x7) to remove the E hoop stay cover.
2. Remove the two screws (screw, bind M4x6) to remove the E hoop stay plate assy, and disconnect the flexible flat cable:SML2CD-6 from the frame sensor PCB assy.



3 Disassembly of E hoop stay plate assy

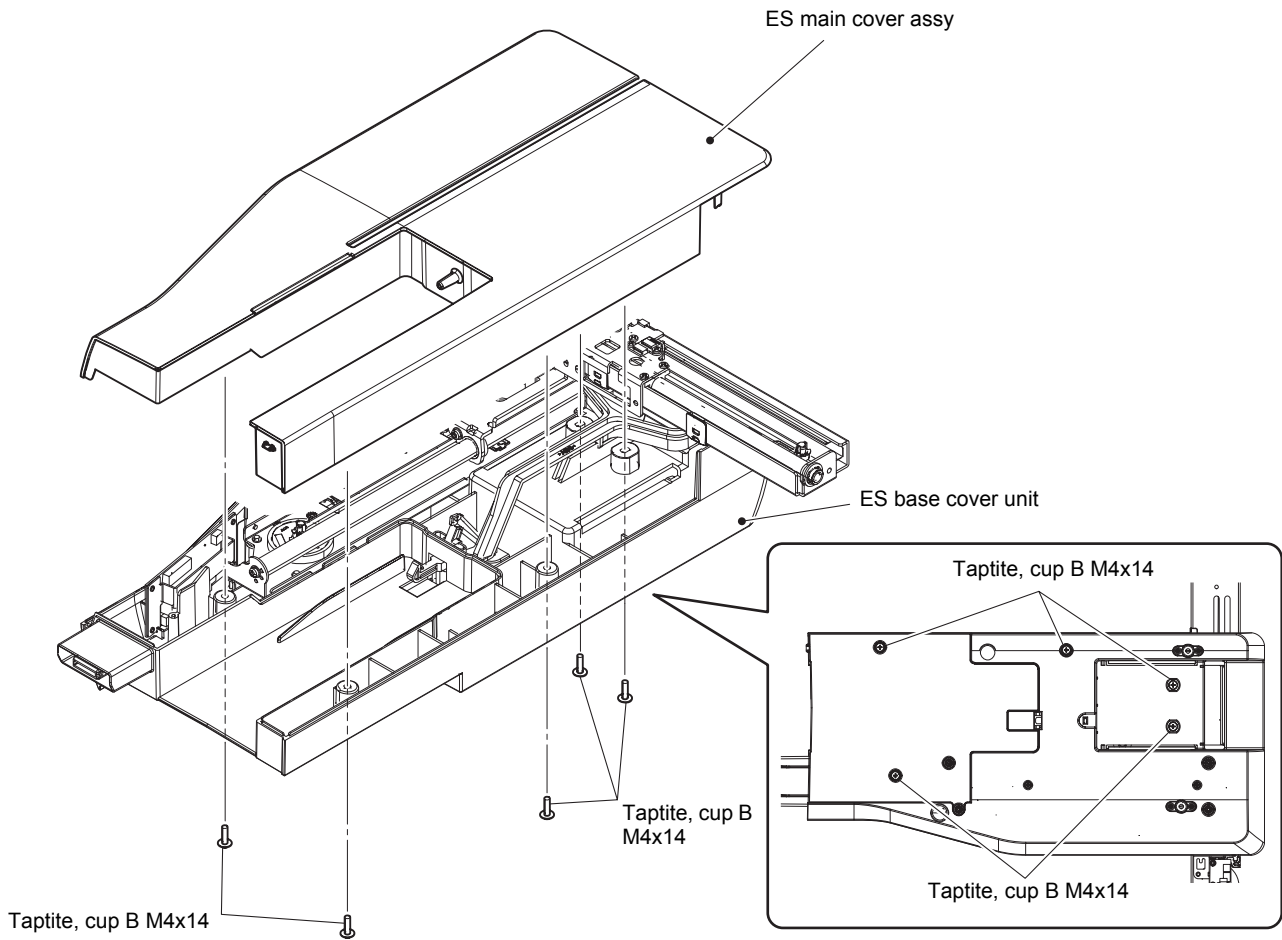
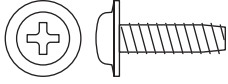
1. Remove the two screws (screw, bind M3x4) to remove the E hoop pressure plate from the E hoop stay plate assy. Remove the two screws (screw, bind M3x4) to remove the E hoop pressure spring A from the E hoop pressure plate. Remove the screw (screw, bind M3x4) to remove the E hoop pressure spring C from the E hoop pressure plate.
2. Remove the screw (screw, bind M3x4) to remove the hoop lock SW push plate from the lock SW plate sub assy.
3. Remove the retaining ring E4, and remove the E hoop lock lever from the E hoop stay plate assy.
4. Remove the two retaining rings E2.5, then remove the lock SW plate sub assy and two polyester sliders from the E hoop stay plate assy.
5. Remove the two screws (screw, pan (S/P washer) M3x7) to remove the frame sensor PCB assy from the E hoop stay plate assy.



4 Removal of ES main cover assy

1. Remove the five screws (taptite, cup B M4x14) from the back side of ES base cover unit. Slide the ES main cover assy to the left side, and remove it from the ES base cover unit.

Taptite, Cup B M4X14

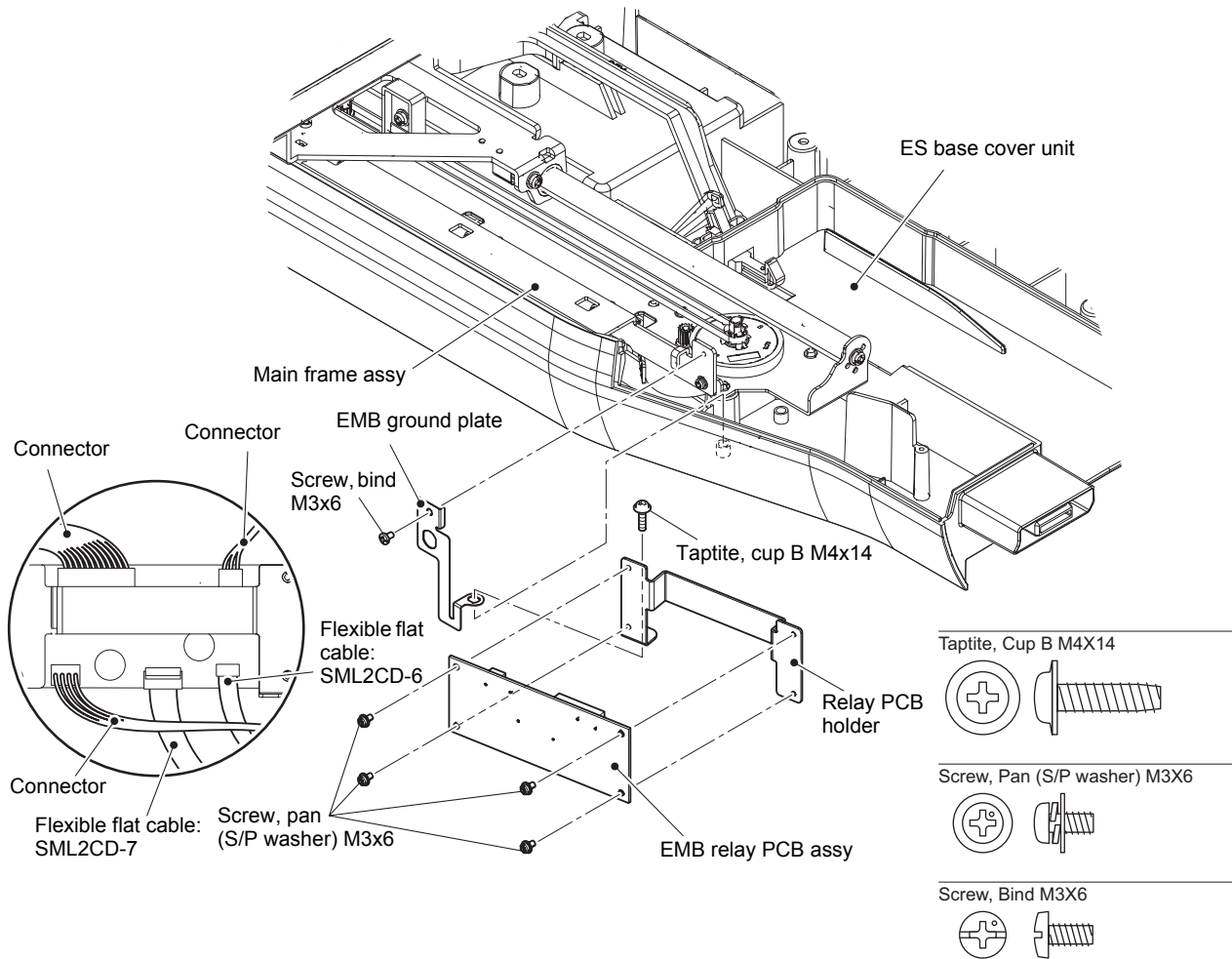


Application of
Disassembly

Application of
Disassembly

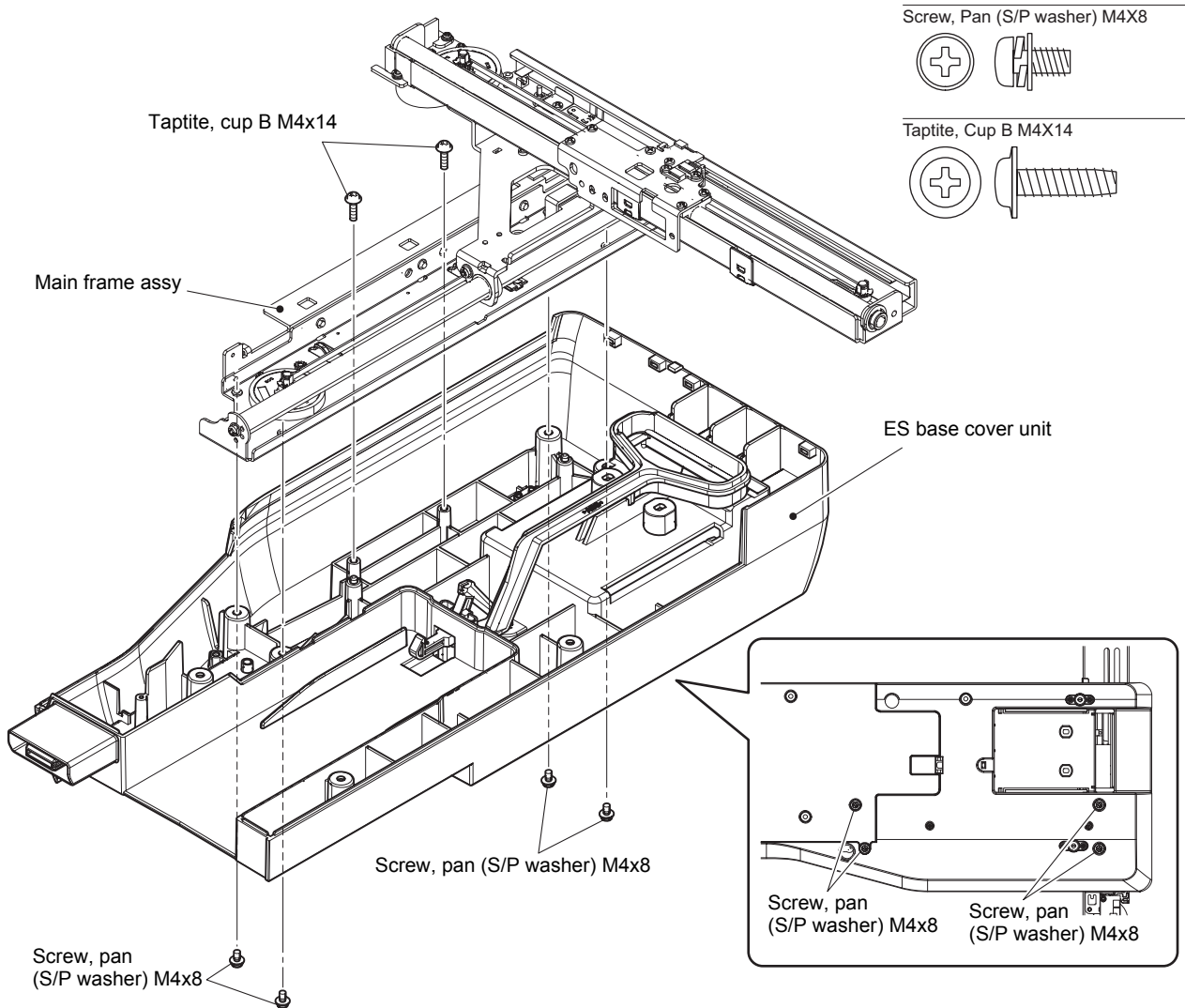
5 Removal of EMB relay PCB assy

1. Remove the screw (taptite, cup B M4x14) to remove the relay PCB holder from the ES base cover unit. Release the lock to disconnect the flexible flat cable:SML2CD-7. Disconnect the flexible flat cable:SML2CD-6 and three connectors from the EMB relay PCB assy.
2. Remove the four screws (screw, pan (S/P washer) M3x6) to remove the EMB relay PCB assy from the relay PCB holder.
3. Remove the screw (screw, bind M3x6) to remove the EMB ground plate from the main frame assy.



6 Removal of ES base cover unit

1. Remove the four screws (screw, pan (S/P washer) M4x8) from the back side of ES base cover unit. Remove the two screws (taptite, cup B M4x14) to remove the ES base cover unit from the main frame assy.



7 Removal of X carriage unit

1. Release the flexible flat cable:SML2CD-6 and flexible flat cable:SML2CD-7 from the E code supporter.
2. Remove the screw (screw, pan (S/P washer) M4x8) to remove the X belt presser from the X carriage unit.

Screw, Pan (S/P washer) M4X8



X belt presser

Screw, pan (S/P washer) M4x8

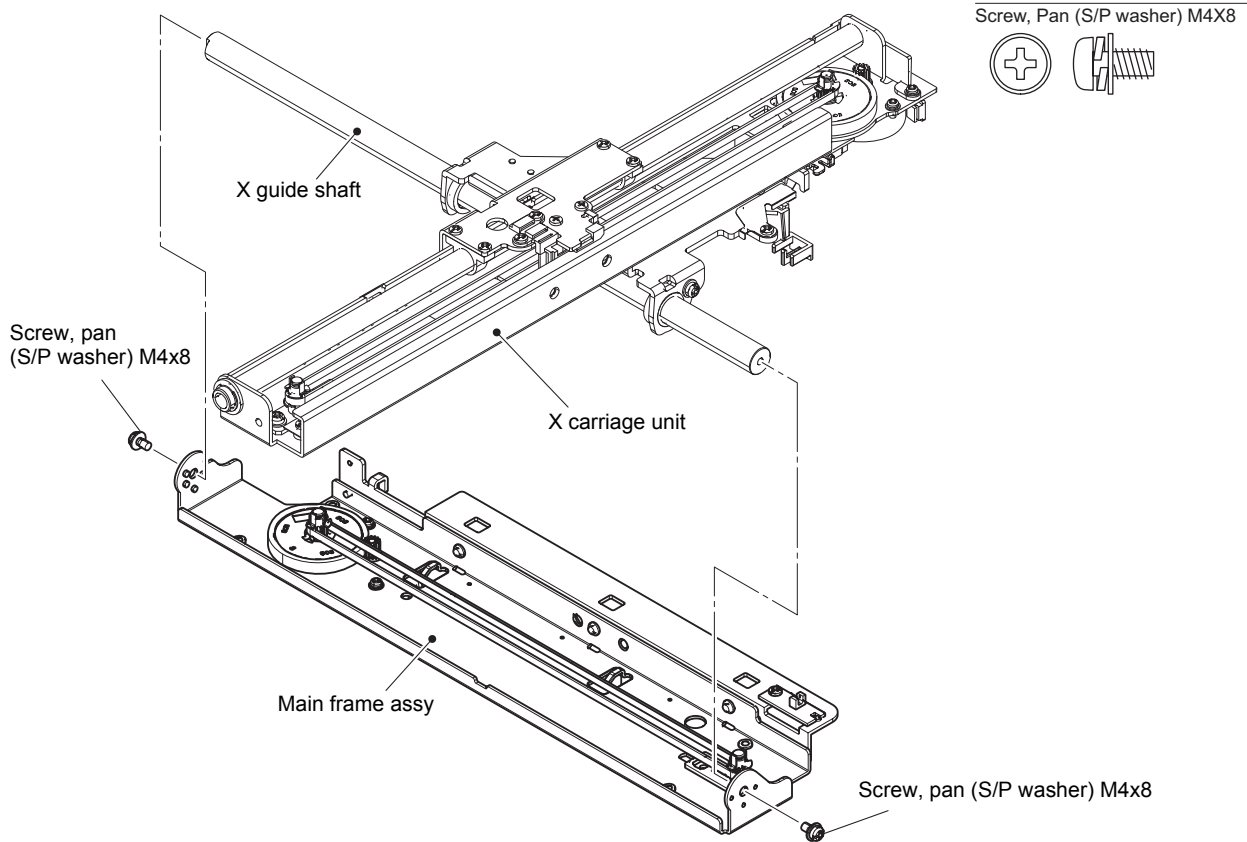
X carriage unit

Flexible flat cable:SML2CD-6

Flexible flat cable:SML2CD-7

E code supporter

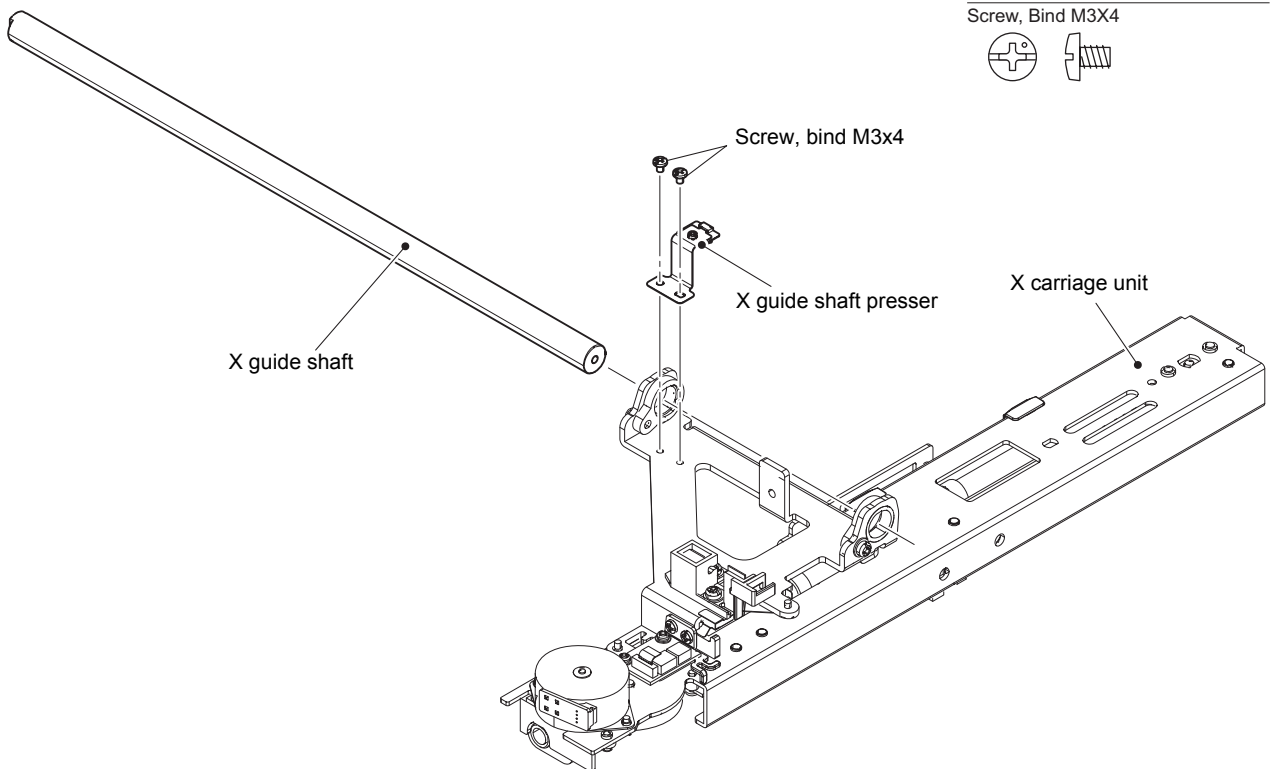
3. Remove the two screws (screw, pan (S/P washer) M4x8) to remove the X carriage unit and X guide shaft from the main frame assy.



Application of
Disassembly

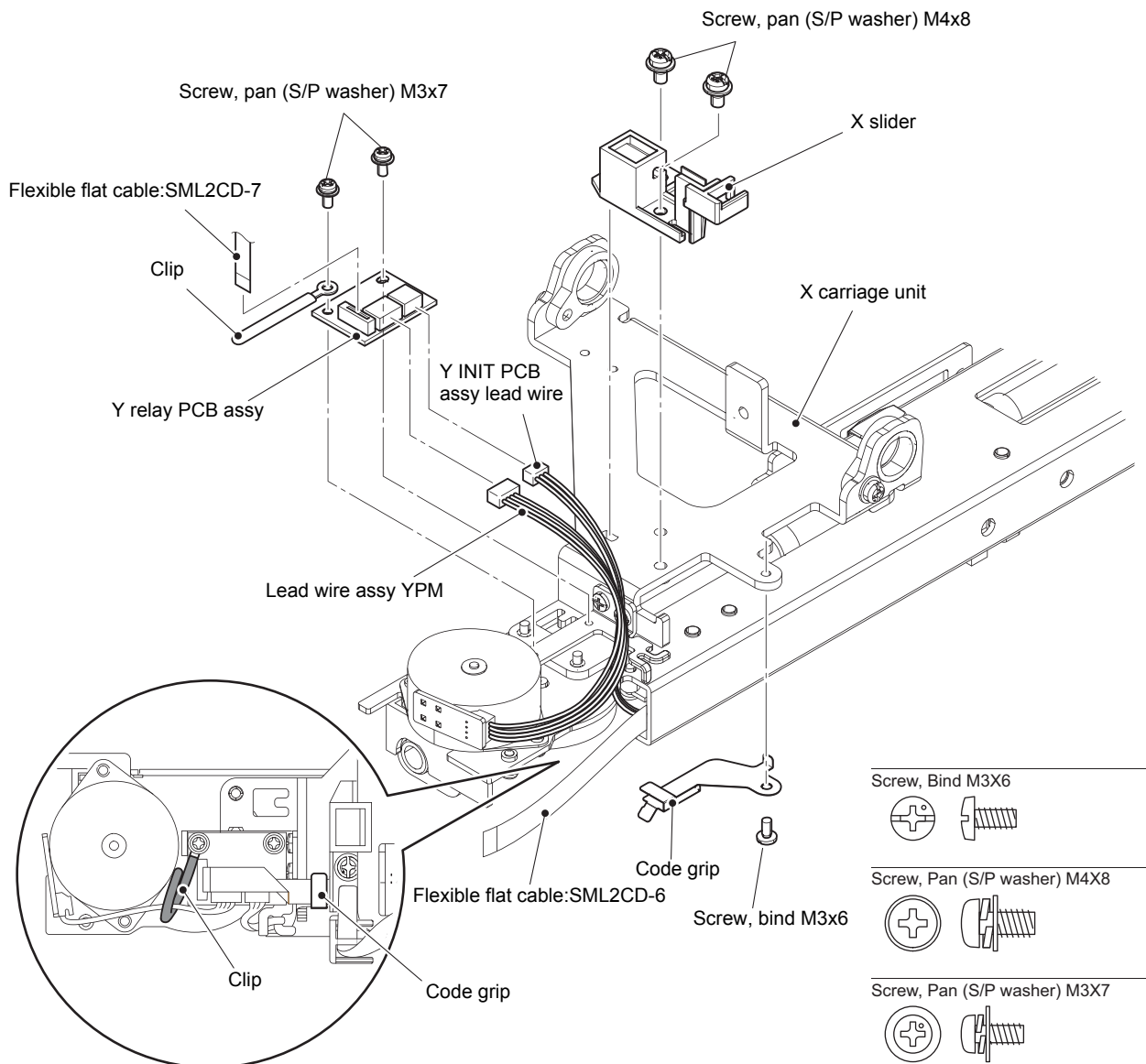
Application of
Disassembly

4. Remove the two screws (screw, bind M3x4) to remove the X guide shaft presser, and pull out the X guide shaft from the X carriage unit.



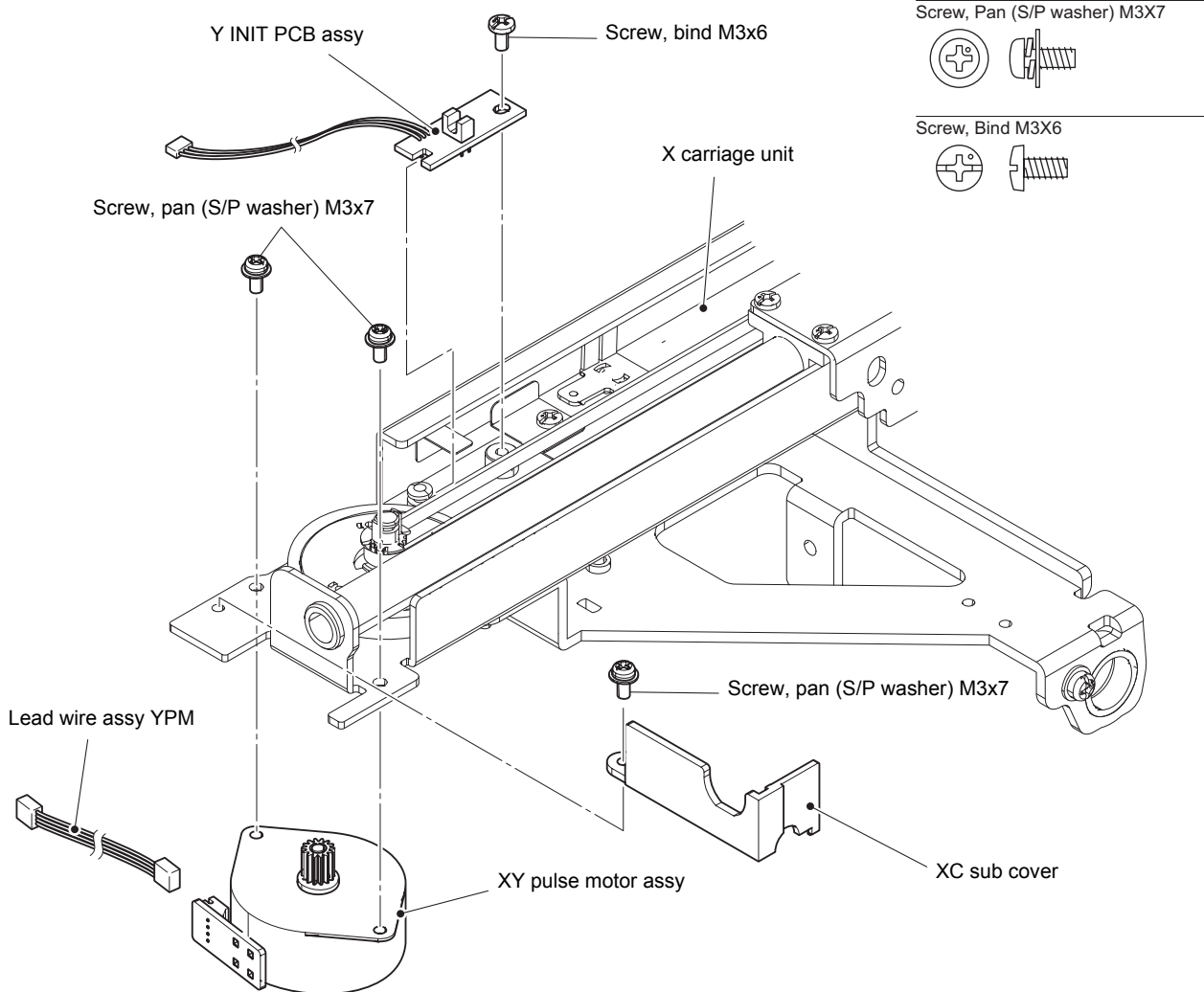
8 Removal of Y relay PCB assy

1. Remove the screw (screw, bind M3x6) to remove the code grip from the X carriage unit. Release the flexible flat cable:SML2CD-6 and flexible flat cable:SML2CD-7 from the securing fixtures.
2. Remove the two screws (screw, pan (S/P washer) M4x8) to remove the X slider from the X carriage unit.
3. Release the lock to disconnect the flexible flat cable:SML2CD-7 from the Y relay PCB assy.
4. Release the clip to unbind the lead wire assy YPM, and disconnect the lead wire assy YPM from the Y relay PCB assy.
5. Disconnect the Y INIT PCB assy lead wire from the Y relay PCB assy.
6. Remove the two screws (screw, pan (S/P washer) M3x7) to remove the clip and Y relay PCB assy from the X carriage unit.



9 Removal of XY pulse motor assy and Y INIT PCB assy

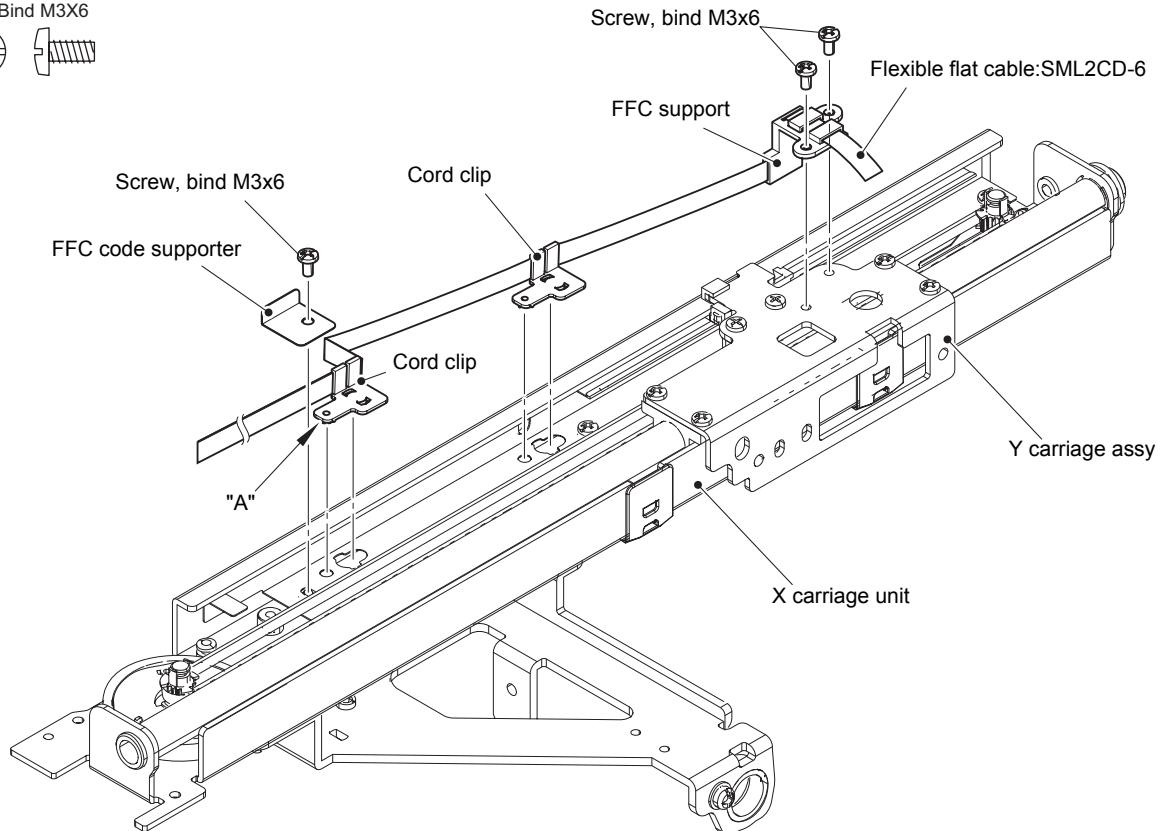
1. Remove the screw (screw, pan (S/P washer) M3x7) to remove the XC sub cover from the X carriage unit.
2. Remove the two screws (screw, pan (S/P washer) M3x7) to remove the XY pulse motor assy from the X carriage unit. Disconnect the lead wire assy YPM from the XY pulse motor assy.
3. Release the Y INIT PCB assy lead wire from the securing fixtures, and remove the screw (screw, bind M3x6) to remove the Y INIT PCB assy from the X carriage unit.



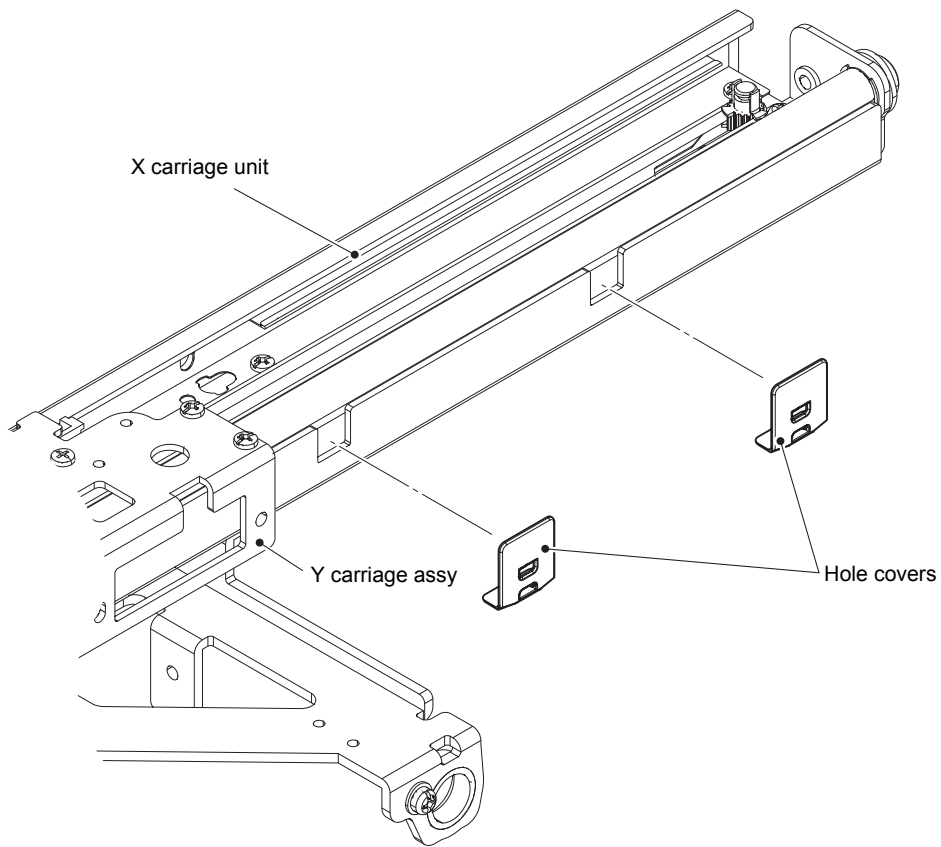
10 Removal of Flexible flat cable:SML2CD-6 and Hole cover

1. Slide the Y carriage assy to come in sight of the two cord clips.
2. Remove the screw (screw, bind M3x6) to remove the FFC code supporter from the X carriage unit.
3. Release the flexible flat cable:SML2CD-6 from the securing fixtures.
4. Slide the cord clip to the left side to remove the cord clip from the X carriage unit while pulling up the position "A". (two locations)
5. Remove the cord clip from the flexible flat cable:SML2CD-6.
6. Remove the two screws (screw, bind M3x6) to remove the FFC support from the Y carriage assy, and remove the FFC support from the flexible flat cable:SML2CD-6.

Screw, Bind M3X6

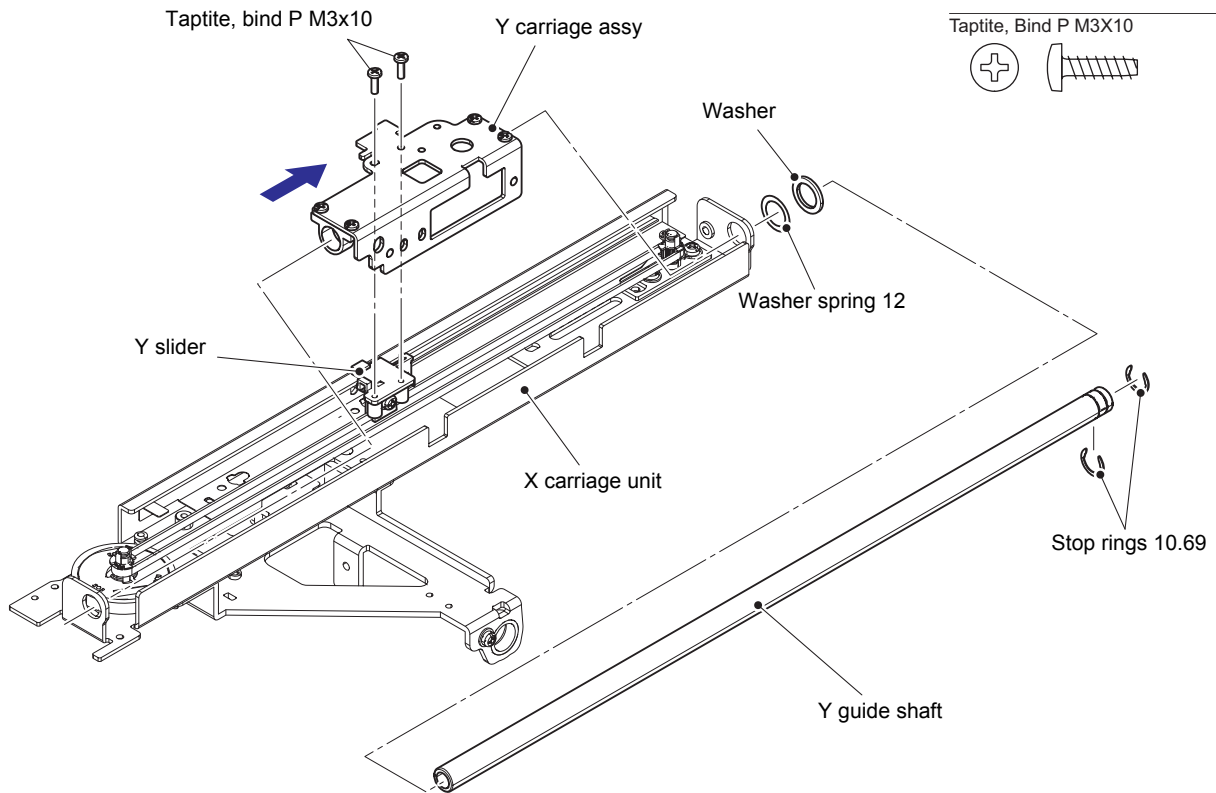


7. Slide the Y carriage assy to come in sight of the two hole covers.
8. Release the hook to remove the hole cover from the X carriage unit. (two locations)



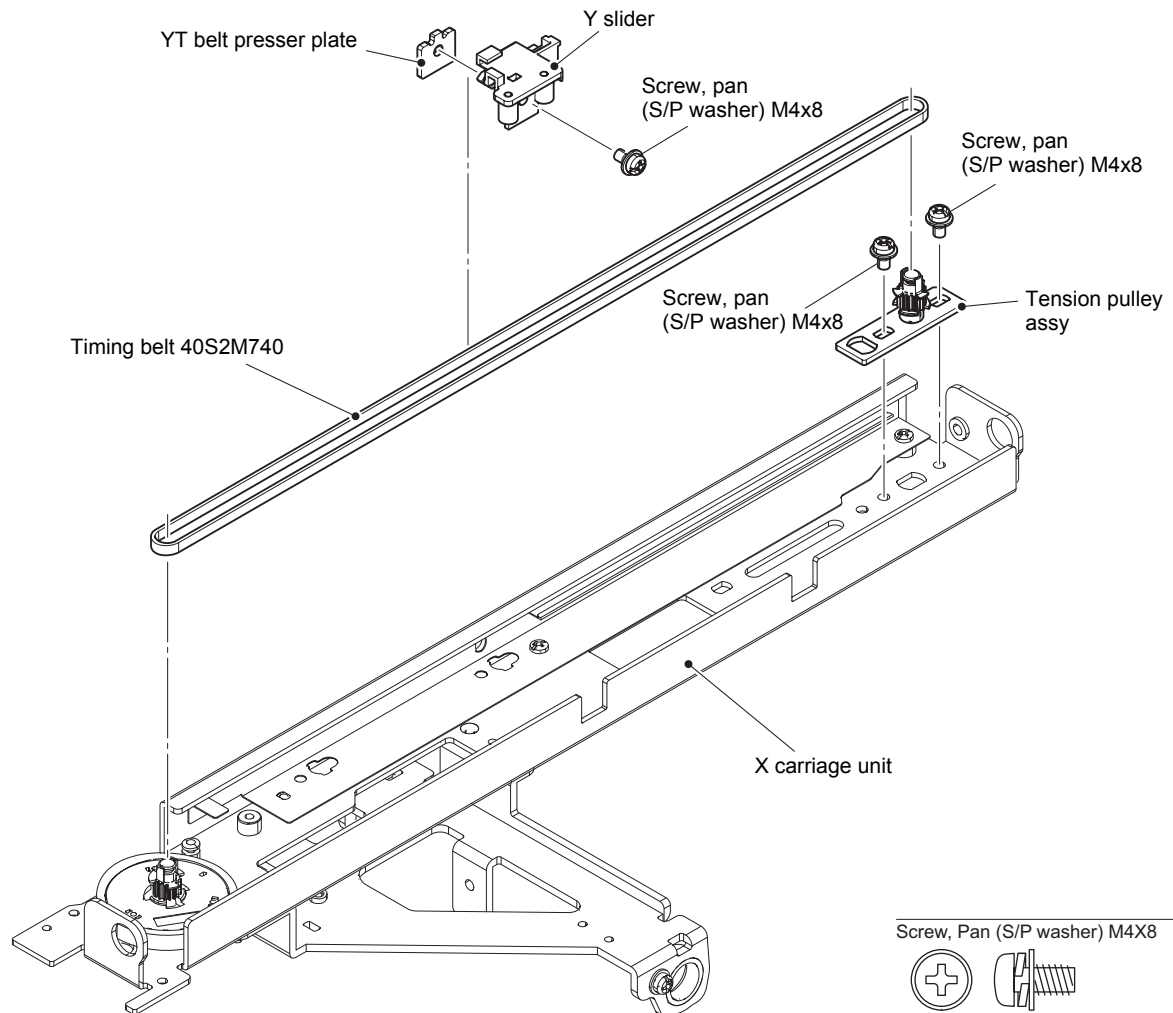
11 Removal of Y carriage assy

1. Remove the two screws (taptite, bind P M3x10), and slide the Y carriage assy to the direction of the arrow to remove it from the Y slider.
2. Remove the stop ring 10.69, and pull out the Y guide shaft to remove the Y carriage assy, the washer spring 12 and washer from the X carriage unit. Remove the stop ring 10.69 from the Y guide shaft.



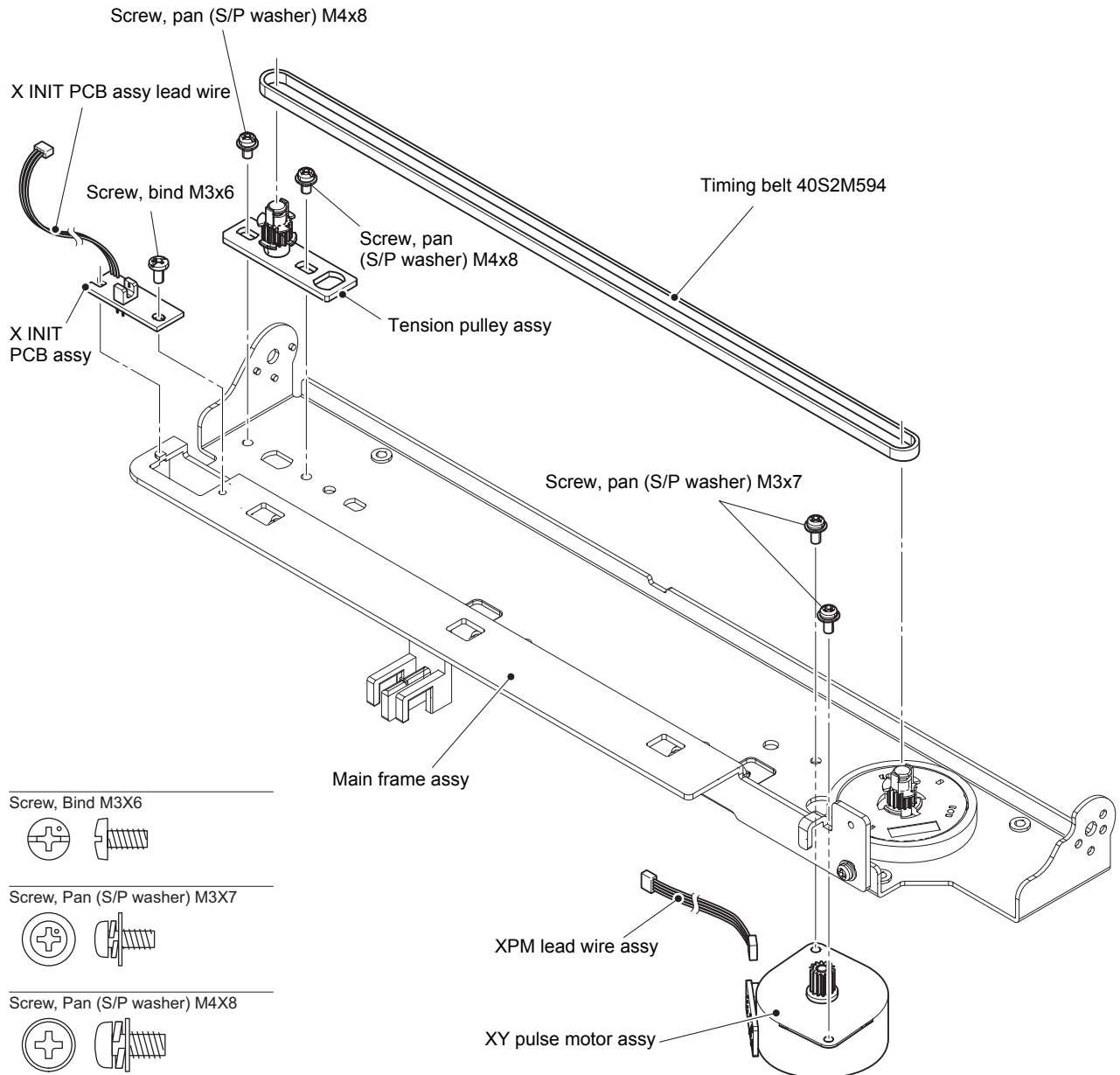
12 Removal of Y slider and Timing belt

1. Slide the Y slider to come in sight of the screw. Remove the screw (screw, pan (S/P washer) M4x8) to remove the YT belt presser plate and Y slider from the timing belt 40S2M740.
2. Remove the two screws (screw, pan (S/P washer) M4x8) to remove the tension pulley assy from the X carriage unit, and remove the timing belt 40S2M740.



13 Disassembly of Main frame assy

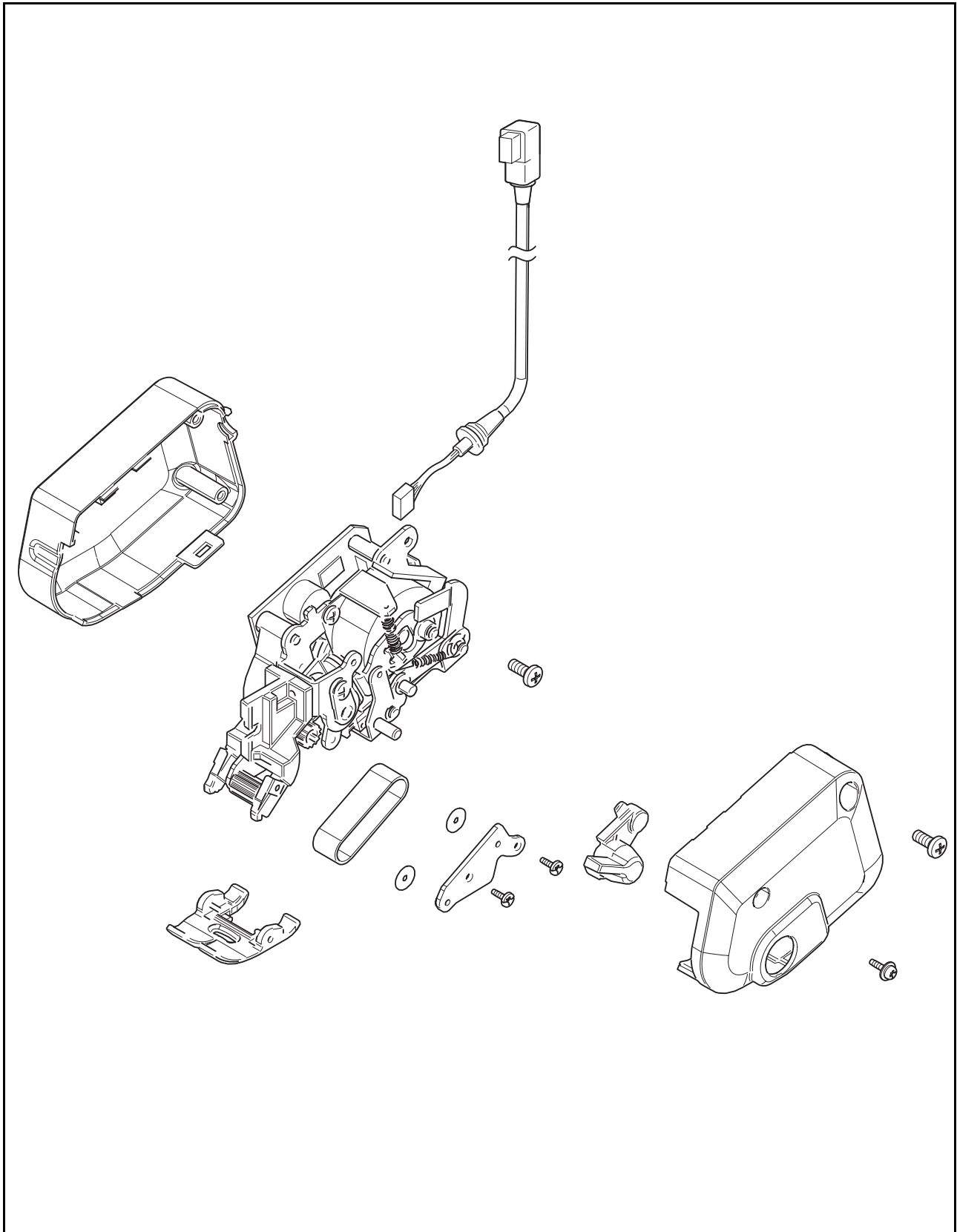
1. Release the X INIT PCB assy lead wire from the securing fixtures. Remove the screw (screw, bind M3x6) to remove the X INIT PCB assy from the main frame assy.
2. Remove the two screws (screw, pan (S/P washer) M3x7) to remove the XY pulse motor assy from the main frame assy. Disconnect the XPM lead wire assy from the XY pulse motor assy.
3. Remove the two screws (screw, pan (S/P washer) M4x8) to remove the tension pulley assy from the main frame assy, and remove the timing belt 40S2M594.



Application of
Disassembly

Application of
Disassembly

Dual feed assy location diagram



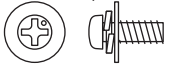
Application of
Disassembly

Application of
Disassembly

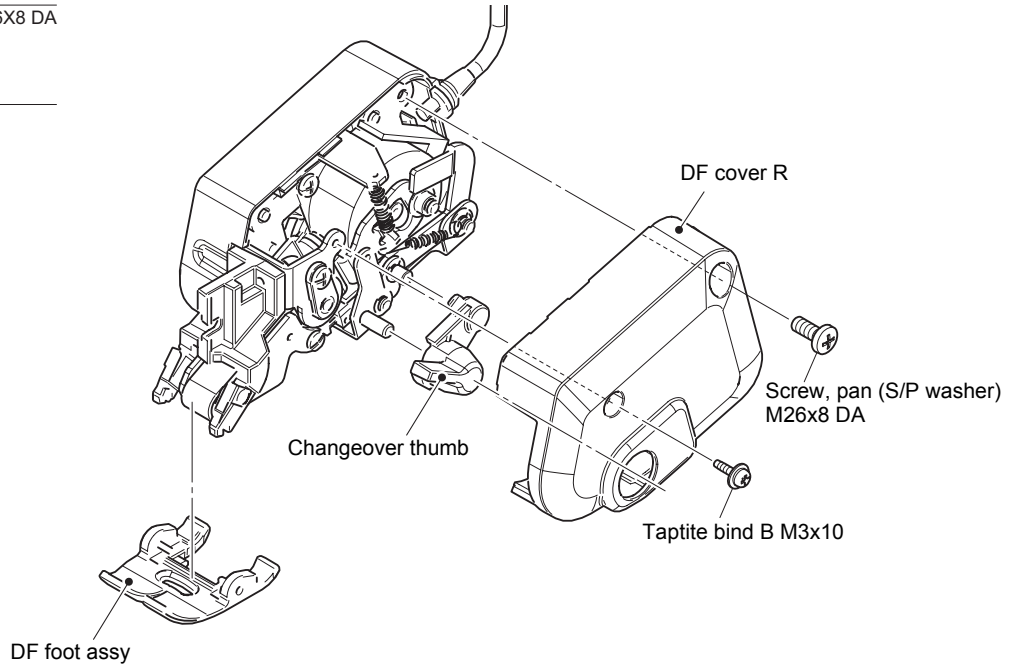
1 Disassembly of Dual feed assy

1. Remove the DF foot assy.
2. Remove the screw (screw, pan (S/P washer) M26x8 DA) and screw (taptite, bind B M3x10) to remove the DF cover R and changeover thumb.

Screw, Pan (S/P washer) M26X8 DA



Taptite, Bind B M3X10

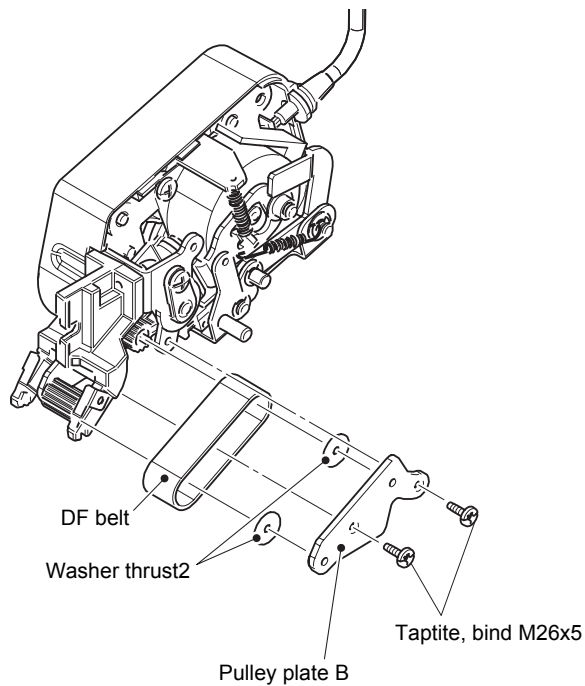


3. Remove the two screws (taptite, bind M26x5) to remove the pulley plate B, washer thrust2 (two location), and DF belt.

***Key point**

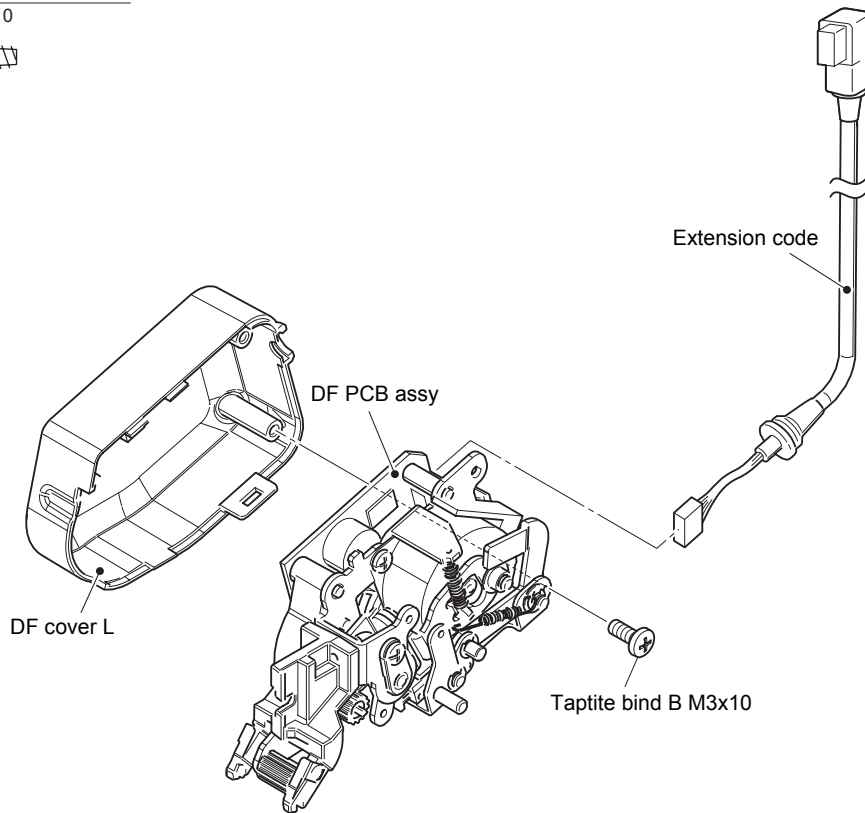
- When removing the pulley plate B, remove it from the two bushings while keeping a horizontal state.

Taptite, Bind M26X5

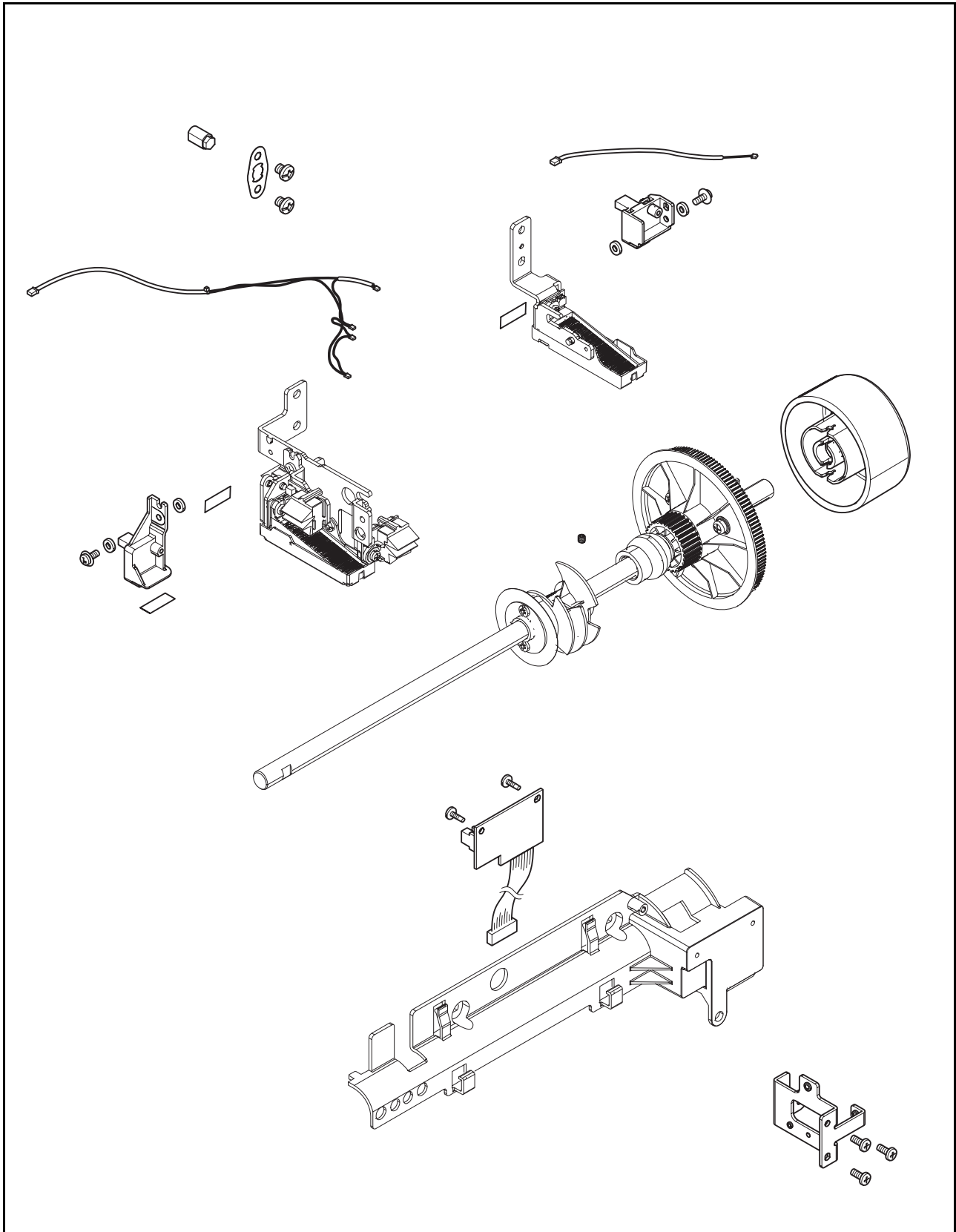


4. Remove the screw (taptite, bind B M3x10) to remove the DF cover L.
5. Release the extension code from the guide to disconnect the extension code connector from the DF PCB assy.

Taptite, Bind B M3X10



LED light / Upper driving mechanism location diagram



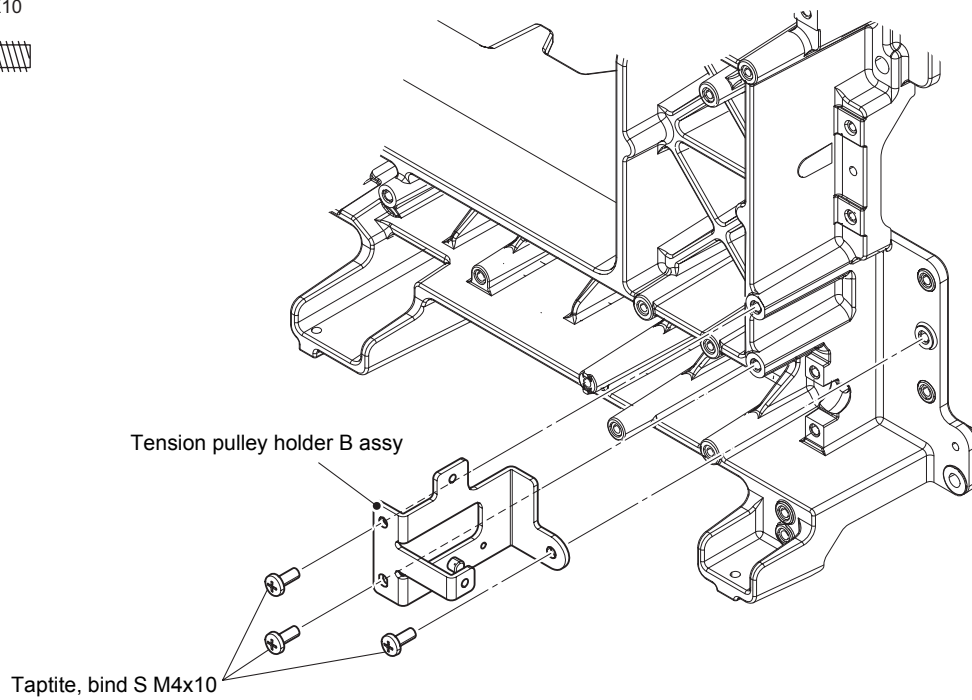
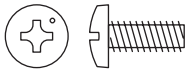
Application of
Assembly

Application of
Assembly

1 Attachment of Tension pulley holder B assy

1. Attach the tension pulley holder B assy to the arm bed with the three screws (taptite, bind S M4x10).

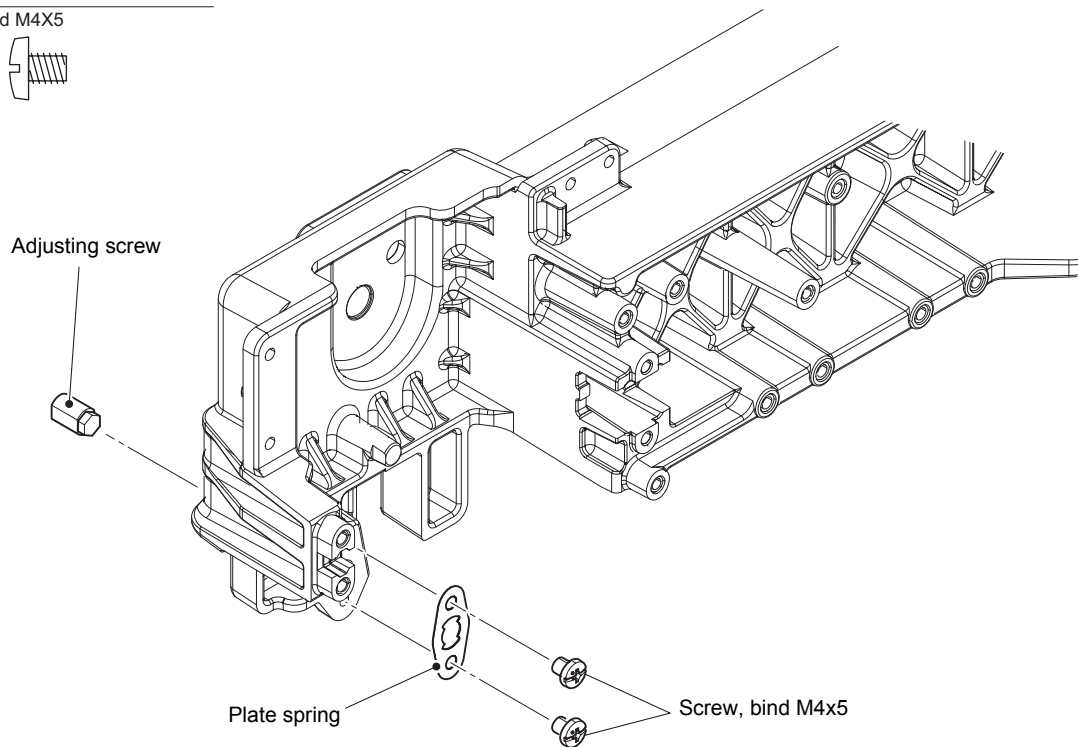
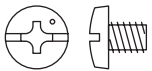
Taptite, Bind S M4X10



2 Attachment of Plate spring and Adjusting screw

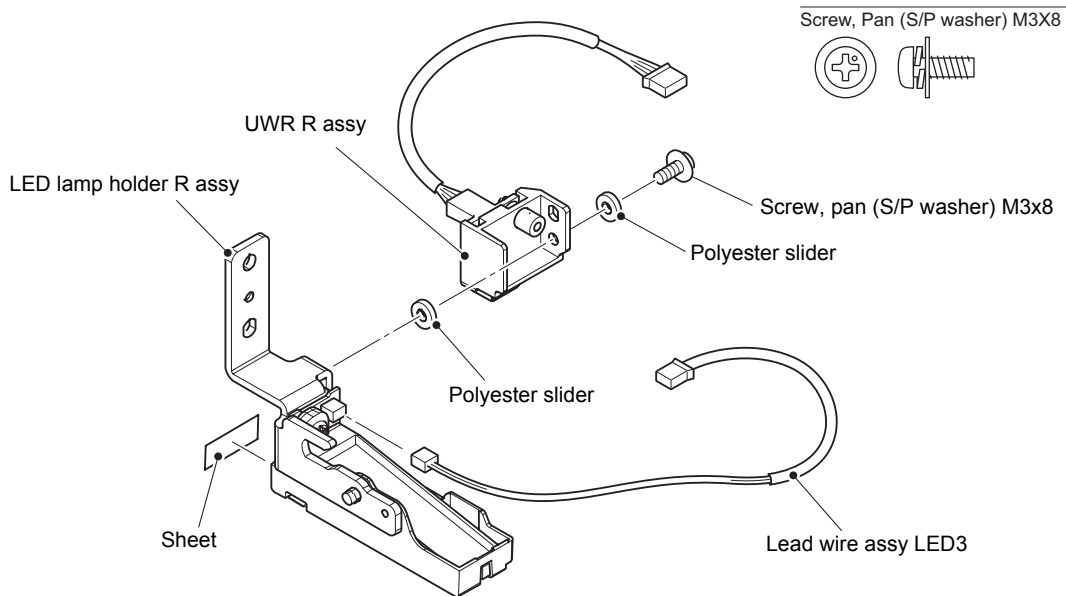
1. Attach the plate spring to the arm bed with the two screws (screw, bind M4x5).
2. Tighten the adjusting screw to the arm bed.

Screw, Bind M4X5



3 Assembly of LED lamp holder R assy

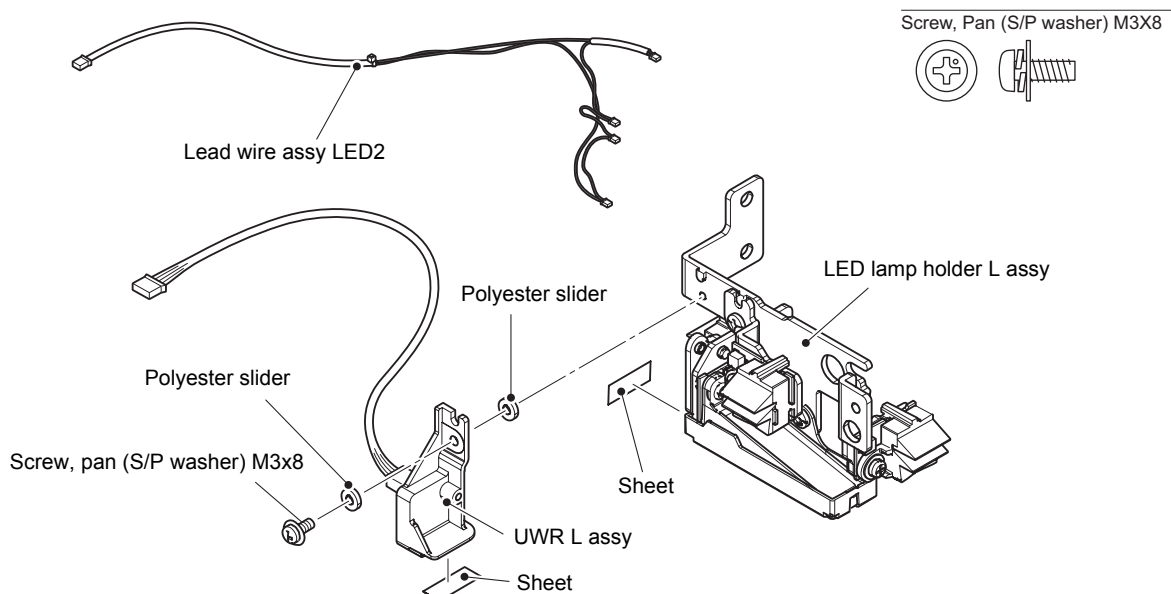
1. Attach the sheet to the LED lamp holder R assy.
2. Attach the polyester slider, UWR R assy and polyester slider to the LED lamp holder R assy with the screw (screw, pan (S/P washer) M3x8).
3. Connect the lead wire assy LED3 to the LED lamp holder R assy.

**4** Assembly of LED lamp holder L assy

1. Attach the sheet to the LED lamp holder L assy.
2. Attach the polyester slider, UWR L assy and polyester slider to the LED lamp holder L assy with the screw (screw, pan (S/P washer) M3x8), and attach the sheet to the UWR L assy.
3. Connect the four connector of lead wire assy LED2 to the LED lamp holder L assy.

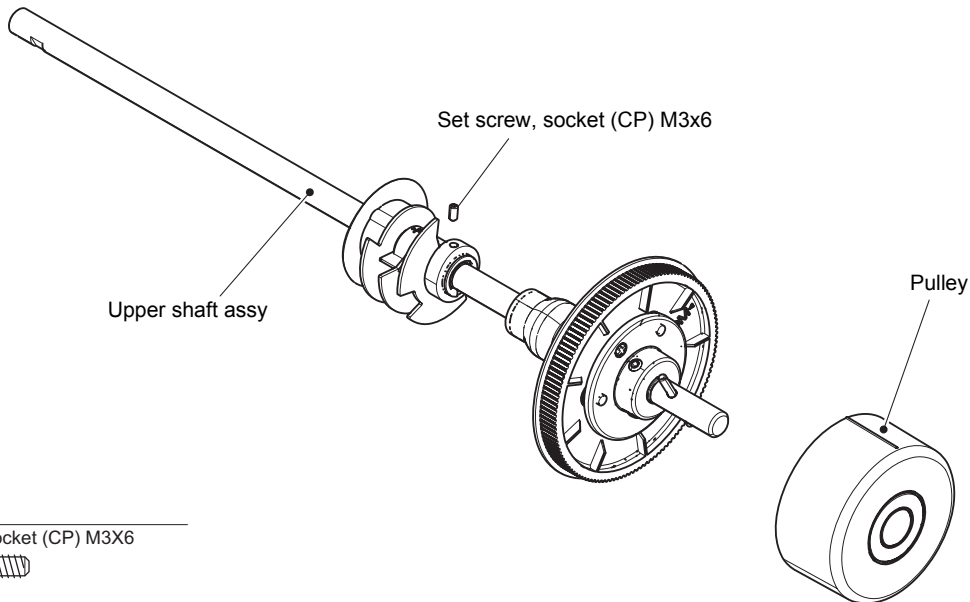
***Key point**

- Refer to "[Wiring of Lead wire assy LED2](#)".



5 Assembly of Upper shaft assy

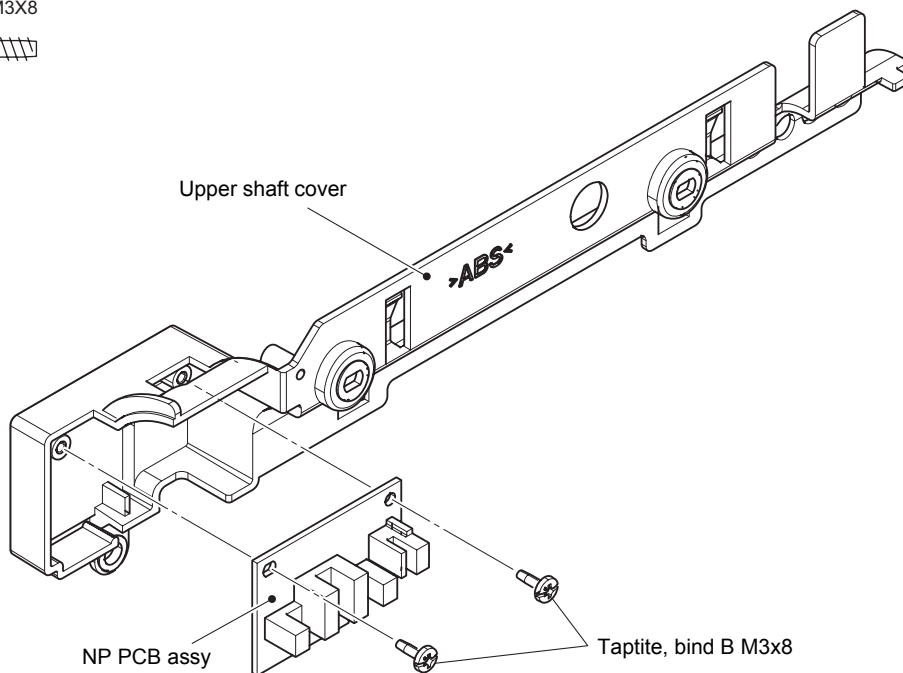
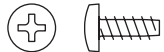
1. Tighten the screw (set screw, socket (CP) M3x6) to the upper shaft assy.
2. Attach the pulley to the upper shaft assy.



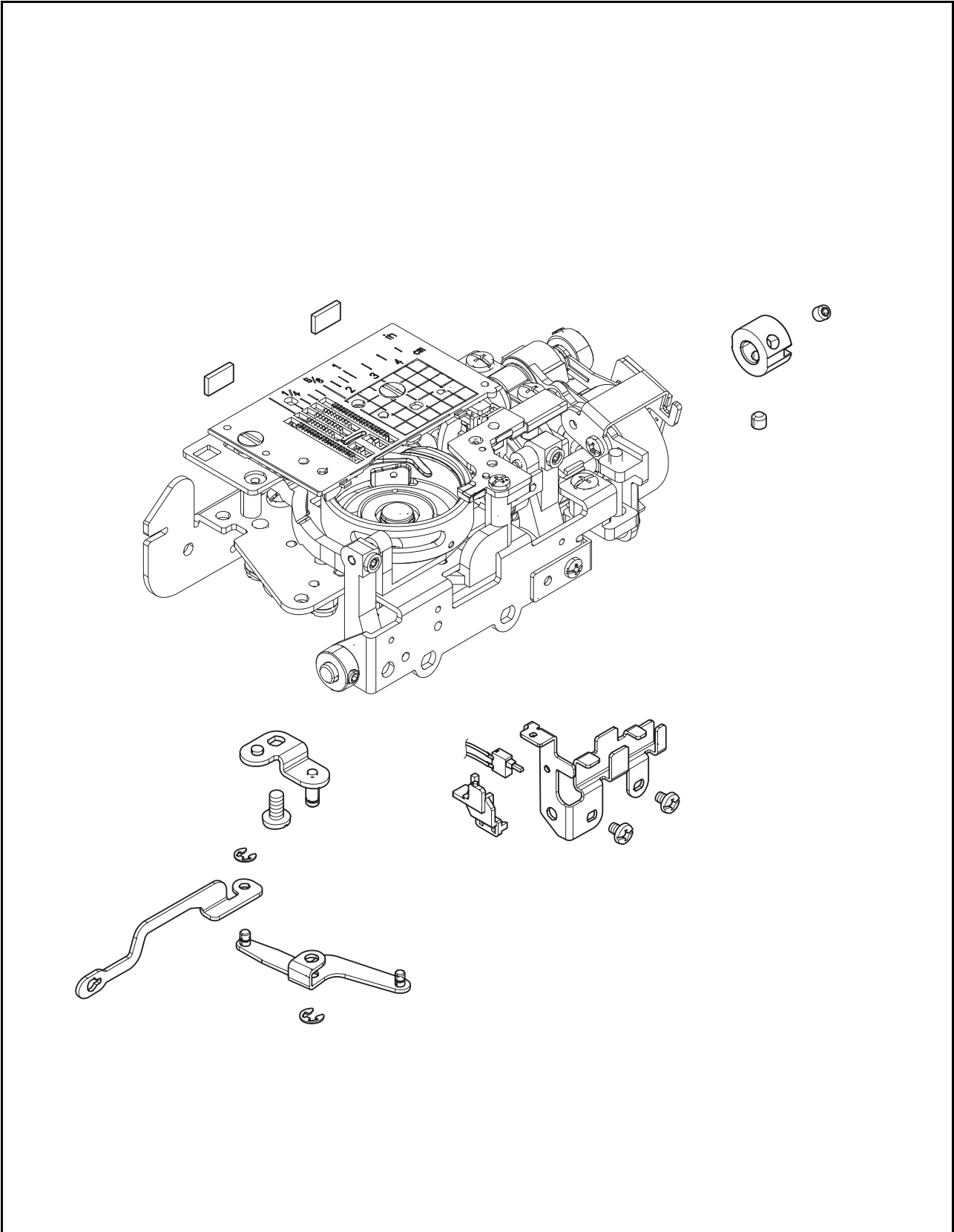
6 Assembly of Upper shaft cover

1. Attach the NP PCB assy to the upper shaft cover with the two screws (taptite, bind B M3x8).

Taptite, Bind B M3X8



Lower driving mechanism location diagram

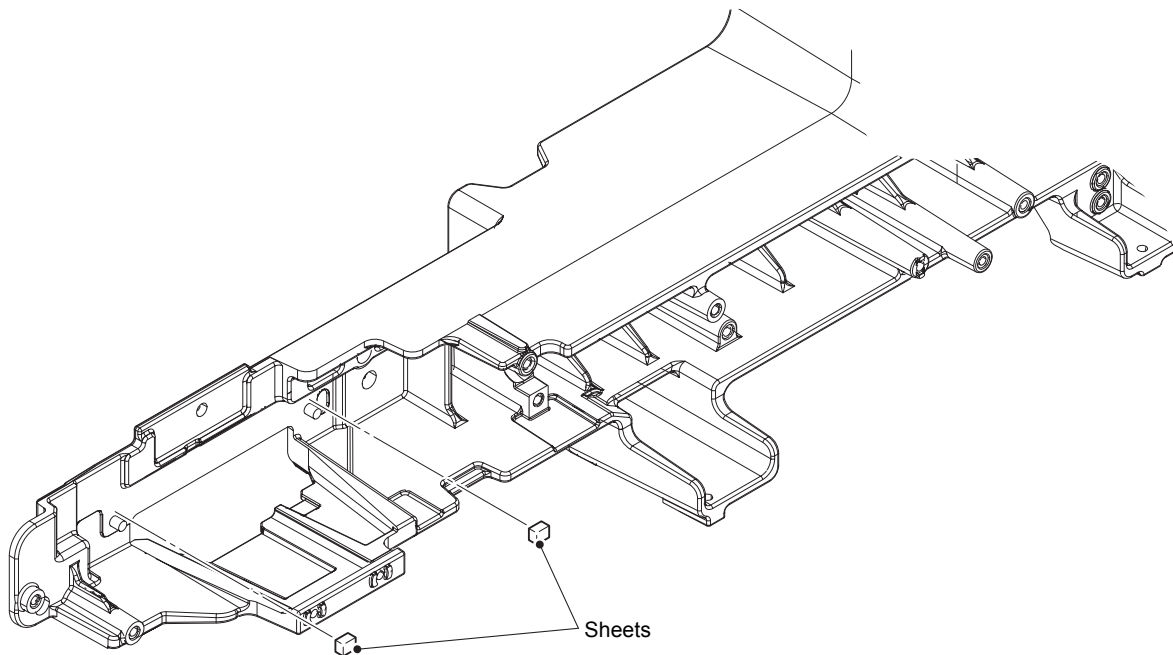


Application of
Assembly

Application of
Assembly

1 Attachment of Sheet

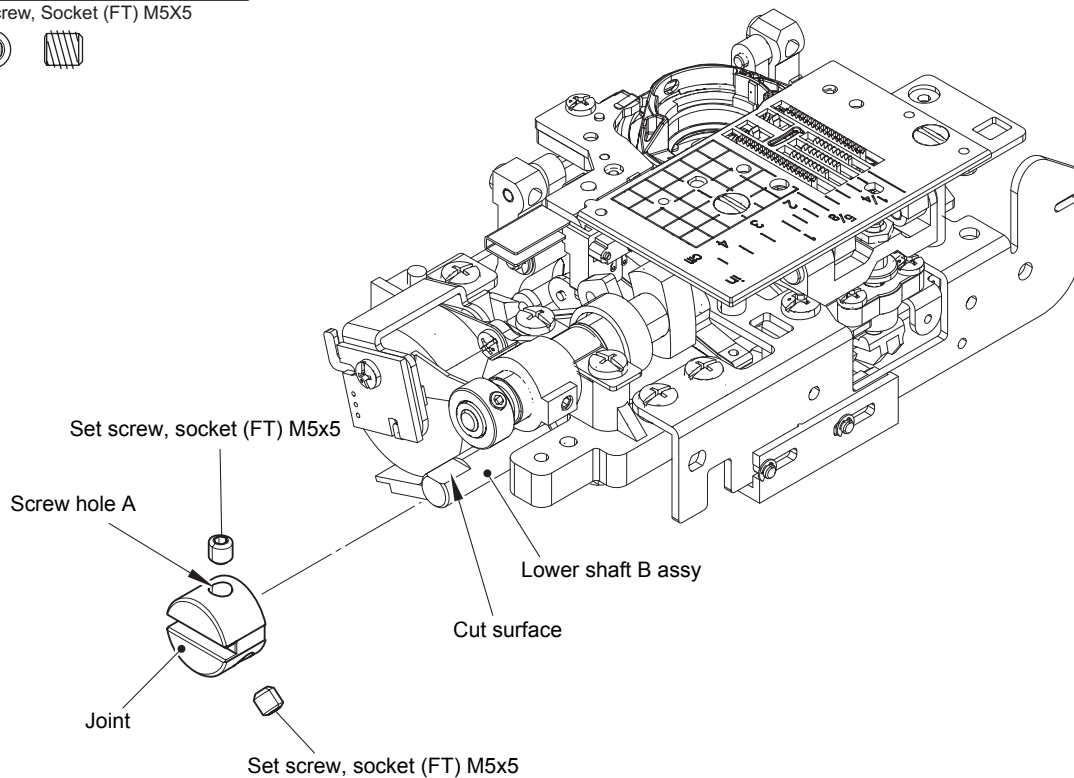
1. Attach the two sheets to the arm bed.



2 Attachment of Joint

1. Align the screw hole A of joint with the cut surface of lower shaft B assy, and attach the joint to the lower shaft B assy with the two screws (set screw, socket (FT) M5x5).

Set Screw, Socket (FT) M5x5



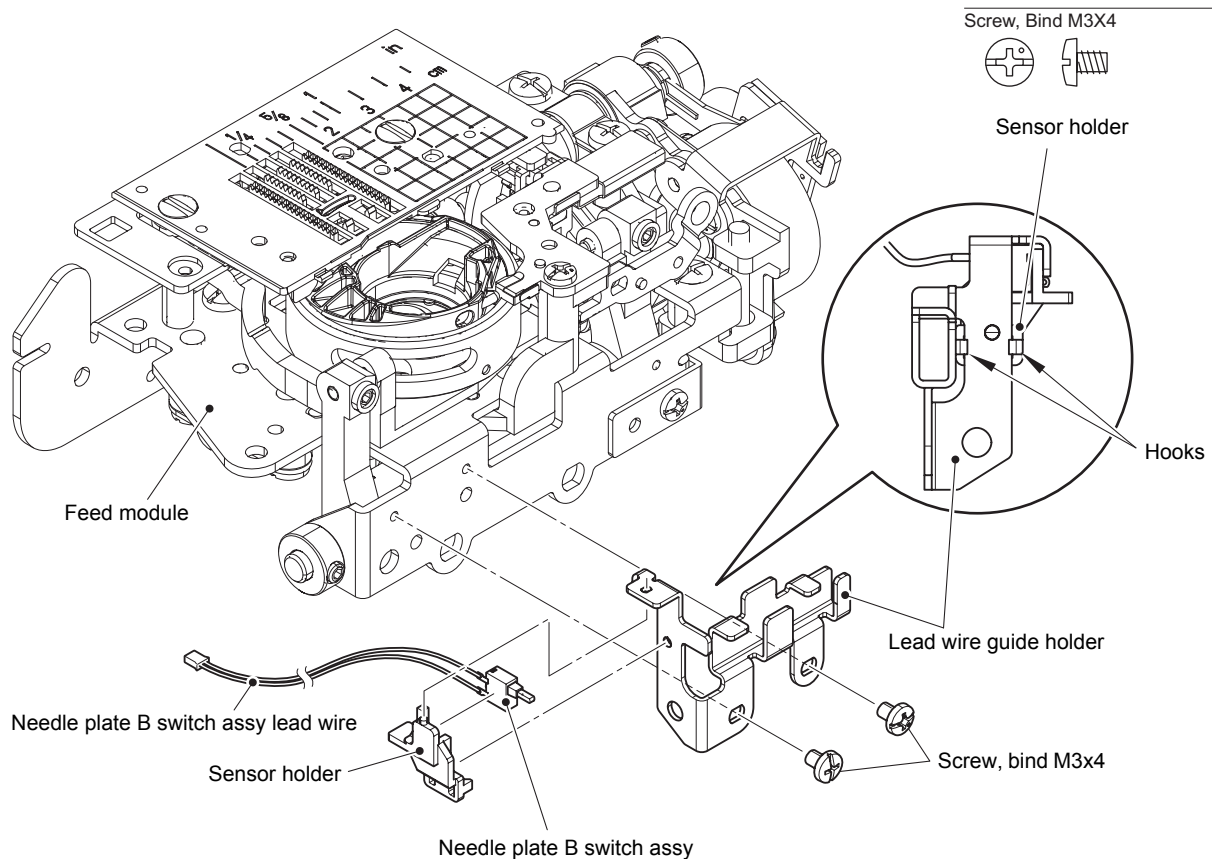
3 Attachment of Needle plate B switch assy and Lead wire guide holder

1. Set the needle plate B switch assy to the sensor holder. Align the two bosses of sensor holder with the two positioning holes of lead wire guide holder, and attach the sensor holder to the lead wire guide holder with the two hooks. Pass the needle plate B switch assy lead wire through the securing fixtures.

***Key point**

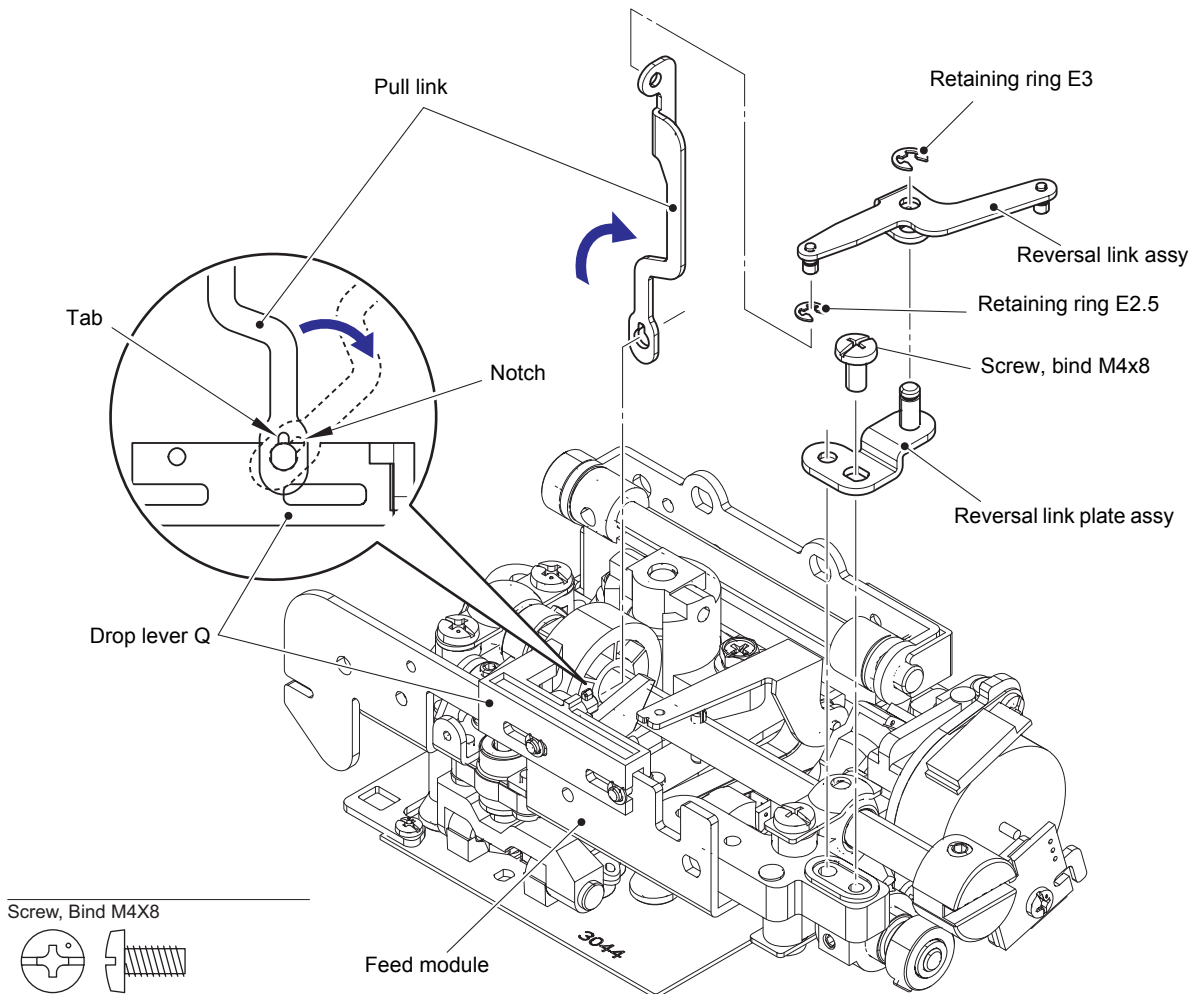
- Refer to "Wiring of Needle plate B switch assy".

2. Attach the lead wire guide holder to the feed module with the two screws (screw, bind M3x4).

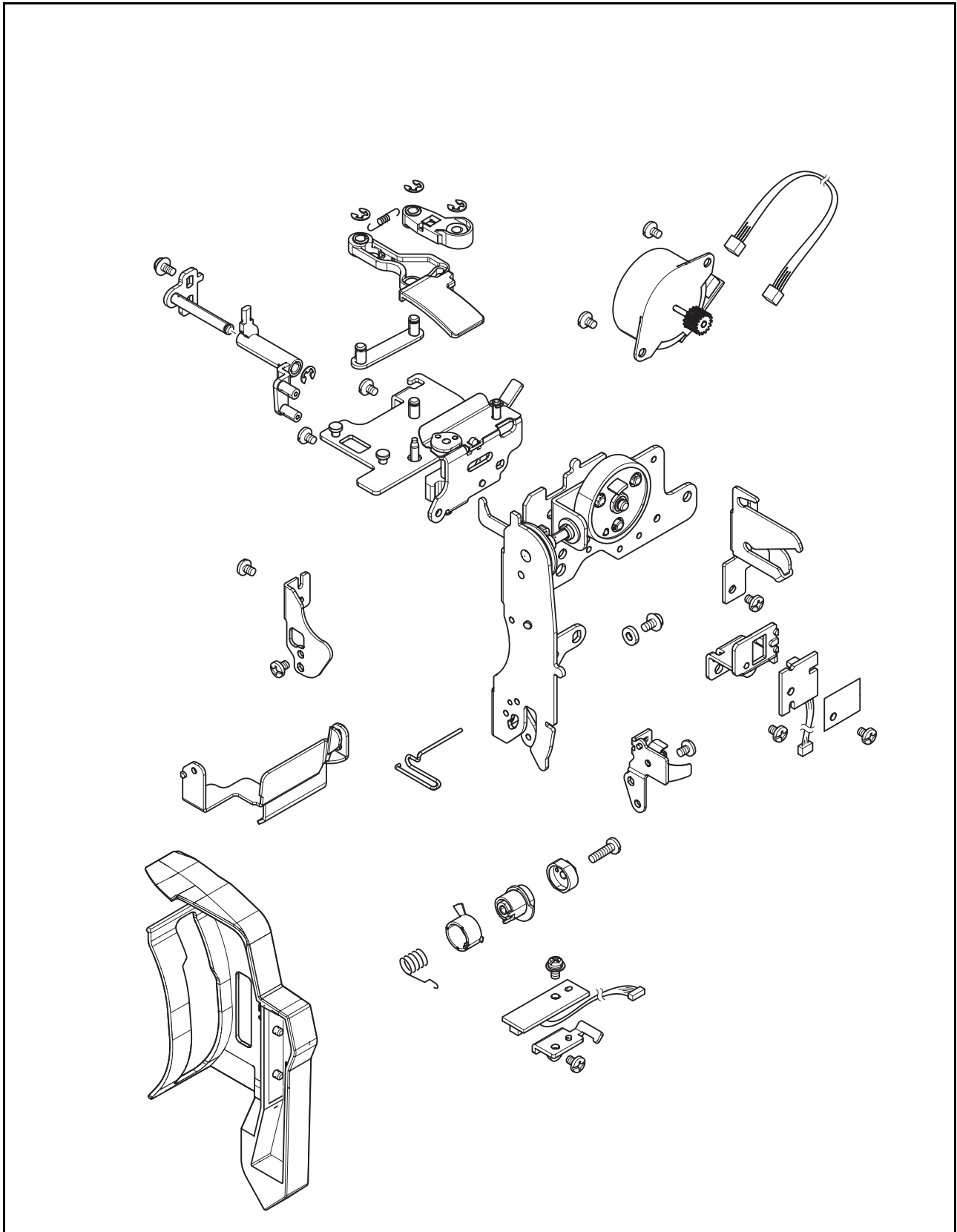


4 Attachment of Reversal link plate assy, Pull link and Reversal link assy

1. Align the boss of the reversal link plate assy with the positioning hole of feed module, and attach the reversal link plate assy to the feed module with the screw (screw, bind M4x8).
2. Align the notch of pull link with the tab of drop lever Q, set the pull link to the drop lever Q, and turn the pull link to the direction of the arrow.
3. Set the reversal link assy to the shaft of reversal link plate assy, and attach the retaining ring E3 to the shaft. Set the pull link to the shaft of reversal link assy, and attach the retaining ring E2.5 to the shaft.



Needle threading mechanism location diagram

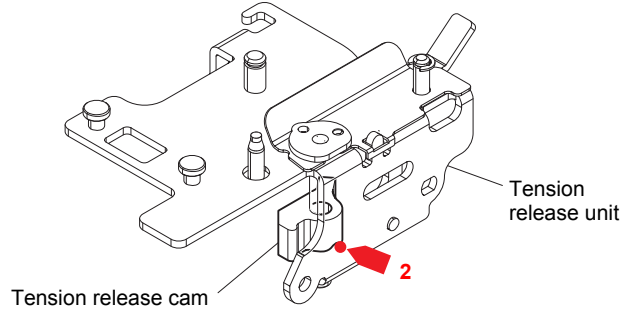
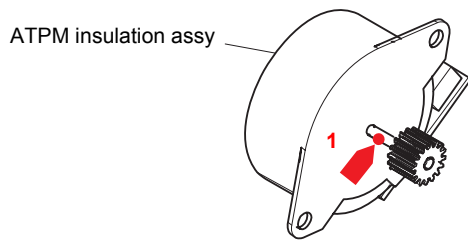


Application of
Assembly

Application of
Assembly

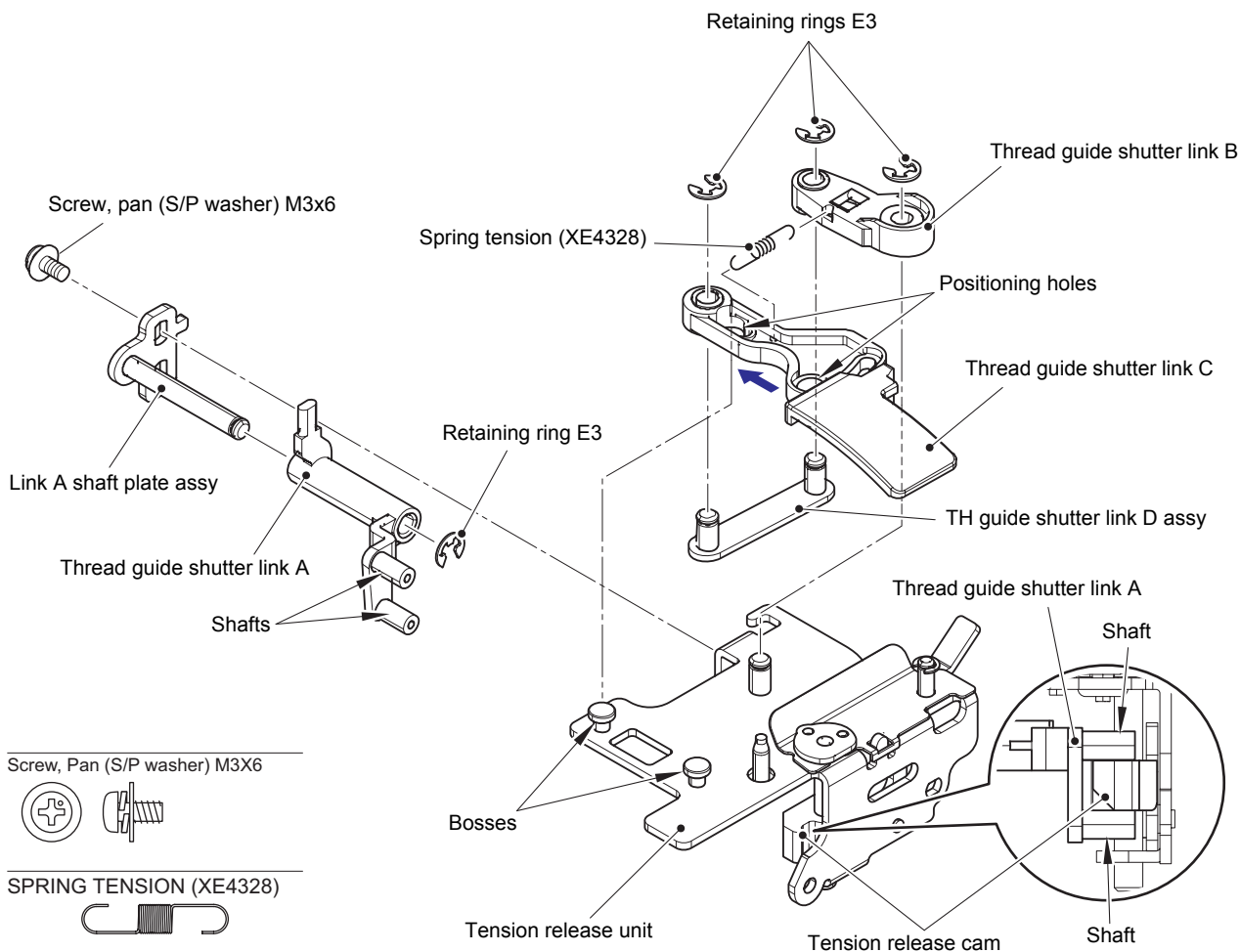
1 Lubrication

Lubrication point			Lubricating oil type	Quantity of lubrication
1	ATPM insulation assy	1 place	FBK OIL RO 100	1 to 2 drops
2	Tension release cam	1 place	EPNOC AP (N) 0	Rice-grain size



2 Attachment of Thread guide shutter link A/B/C

1. Insert the link A shaft plate assy into the thread guide shutter link A, and attach the retaining ring E3.
2. Set the tension release cam between the two shafts of thread guide shutter link A. Align the positioning hole of link A shaft plate assy with the boss of tension release unit, and attach the link A shaft plate assy to the tension release unit with the screw (screw, pan (S/P washer) M3x6).
3. Set the thread guide shutter link B to the shaft of tension release unit, and attach the retaining ring E3.
4. Align the two positioning holes of thread guide shutter link C with the two bosses of tension release unit, set the thread guide shutter link C to the tension release unit, and slide it to the direction of the arrow.
5. Insert the two shafts of TH guide shutter link D assy into the thread guide shutter link B and thread guide shutter link C, then attach the two retaining rings E3.
6. Attach the spring tension (XE4328) to the thread guide shutter link B and the thread guide shutter link C.



Screw, Pan (S/P washer) M3X6

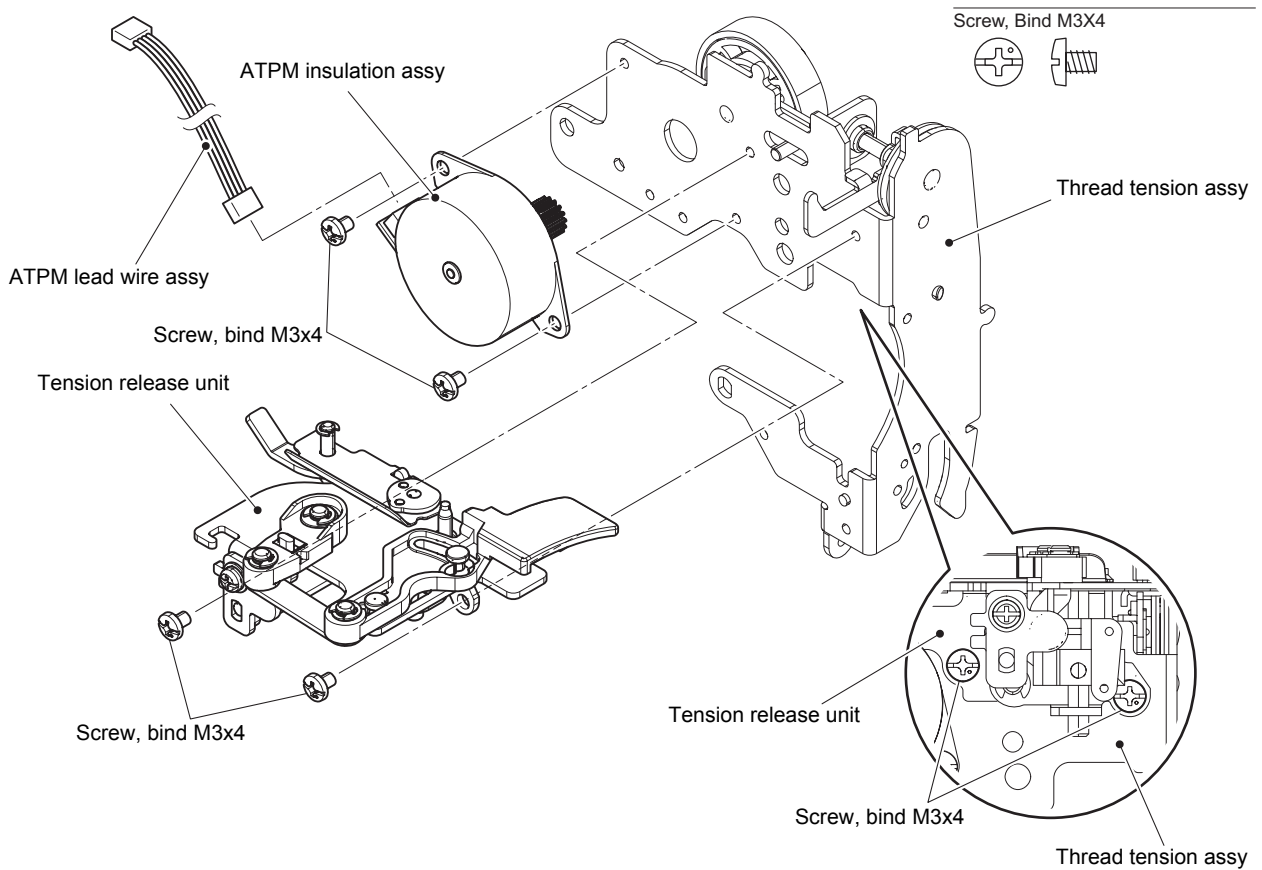


SPRING TENSION (XE4328)



3 Attachment of Tension release unit and ATPM insulation assy

1. Attach the tension release unit to the thread tension assy with the two screws (screw, bind M3x4).
2. Connect the ATPM lead wire assy to the ATPM insulation assy, and attach the ATPM insulation assy to the thread tension assy with the two screws (screw, bind M3x4).



Application of
Assembly

Application of
Assembly

4 Attachment of Thread cutting shutter and Thread catching case A/B

1. Set the thread cutting shutter to the thread catching case A. Insert the tip of thread take up spring (XZ0386) into the hole of thread catching case A, set the thread take up spring (XZ0386) to the thread catching case A, and hang the thread take up spring to the spring groove of thread cutting shutter.

***Key point**

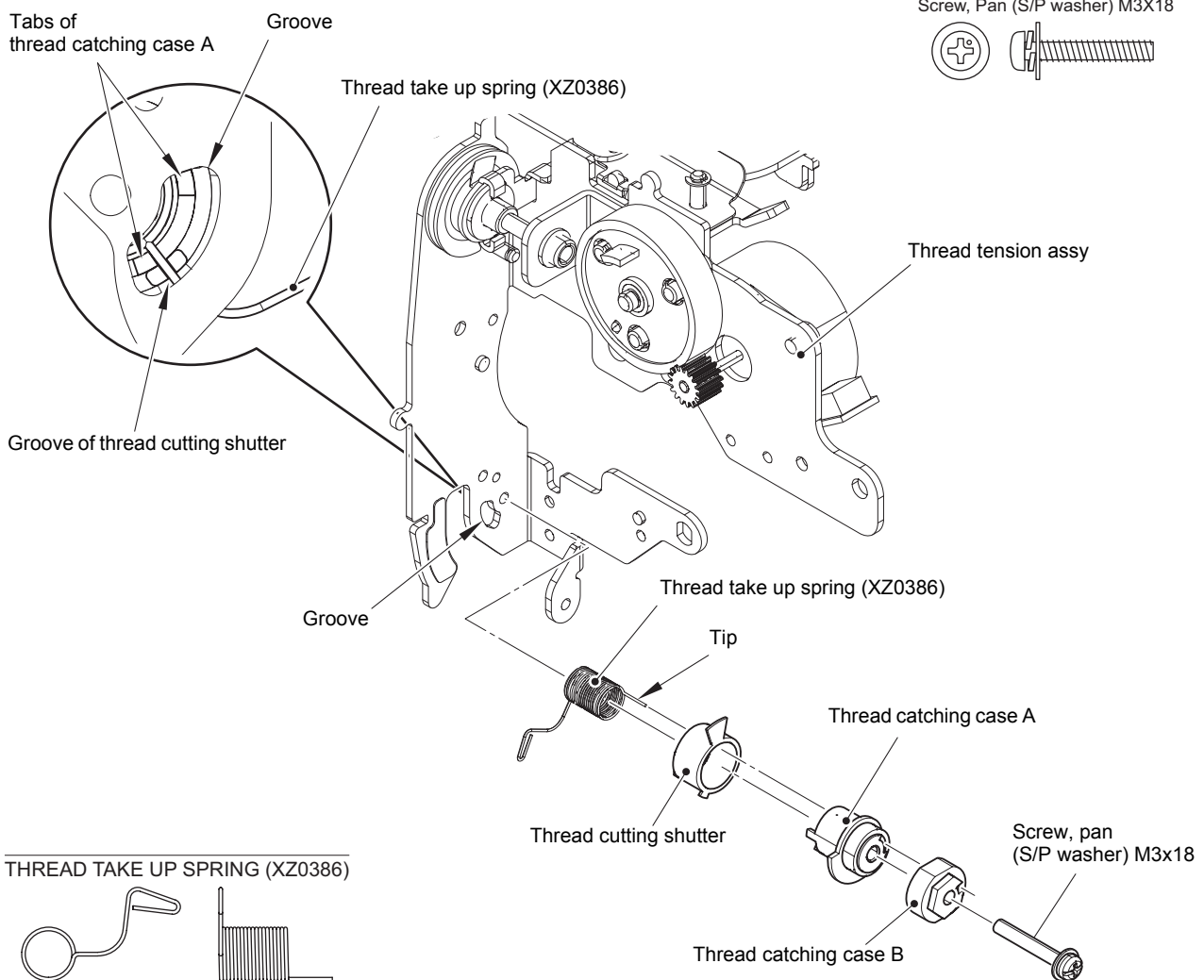
- Check that there is the spring groove of thread cutting shutter between the two tabs of thread catching case A.

2. Insert the tip of thread take up spring (XZ0386) into the hole of thread catching case B, and set the thread catching case B to the thread catching case A.

3. Align the two tabs of thread catching case A with the groove of thread tension assy, then set the thread catching case A to the thread tension assy, and tighten the screw (screw, pan (S/P washer) M3x18) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Thread take up spring tension".



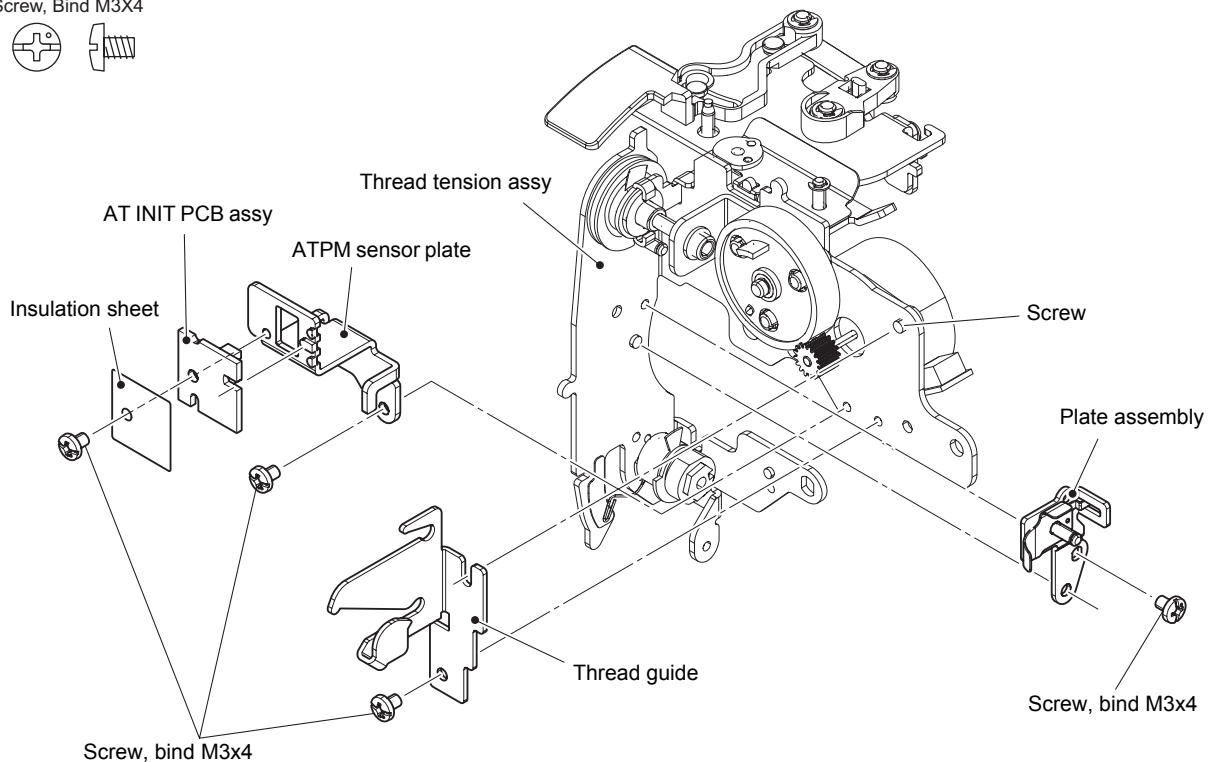
5 Attachment of Plate assembly, ATPM sensor plate, AT INIT PCB assy and Thread guide

1. Align the positioning hole of plate assembly with the boss of thread tension assy, then set the plate assembly to the thread tension assy, and tighten the screw (screw, bind M3x4) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Thread take up spring tension".
2. Align the positioning groove of ATPM sensor plate with the boss of thread tension assy, and attach the ATPM sensor plate to the thread tension assy with the screw (screw, bind M3x4). Align the positioning notch of AT INIT PCB assy with the boss of ATPM sensor plate, then attach the AT INIT PCB assy and the insulation sheet to the ATPM sensor plate with the screw (screw, bind M3x4).
 3. Align the notch of thread guide with the screw, and attach the thread guide to the thread tension assy with the screw (screw, bind M3x4).

Screw, Bind M3X4



6 Attachment of Thread guide wire and Upthread PCB assy

1. Hang the bent part of thread guide wire on the notch of thread tension assy, and insert the tip of thread guide wire into the positioning hole of thread tension assy. Set the washer plain between the thread guide wire and thread tension assy. Attach the thread guide wire and the washer plain to the thread tension assy with the screw (screw, pan (S/P washer) M3x6).
2. Align the positioning hole of thread sensor holder with the boss of thread tension assy, and attach the thread sensor holder to the thread tension assy with the screw (screw, bind M3x4). Align the positioning hole of upthread PCB assy with the boss of thread sensor holder, and attach the upthread PCB assy to the thread sensor holder with the screw (screw, pan (S/P washer) M3x6). Pass the upthread PCB assy lead wire through the securing fixtures.

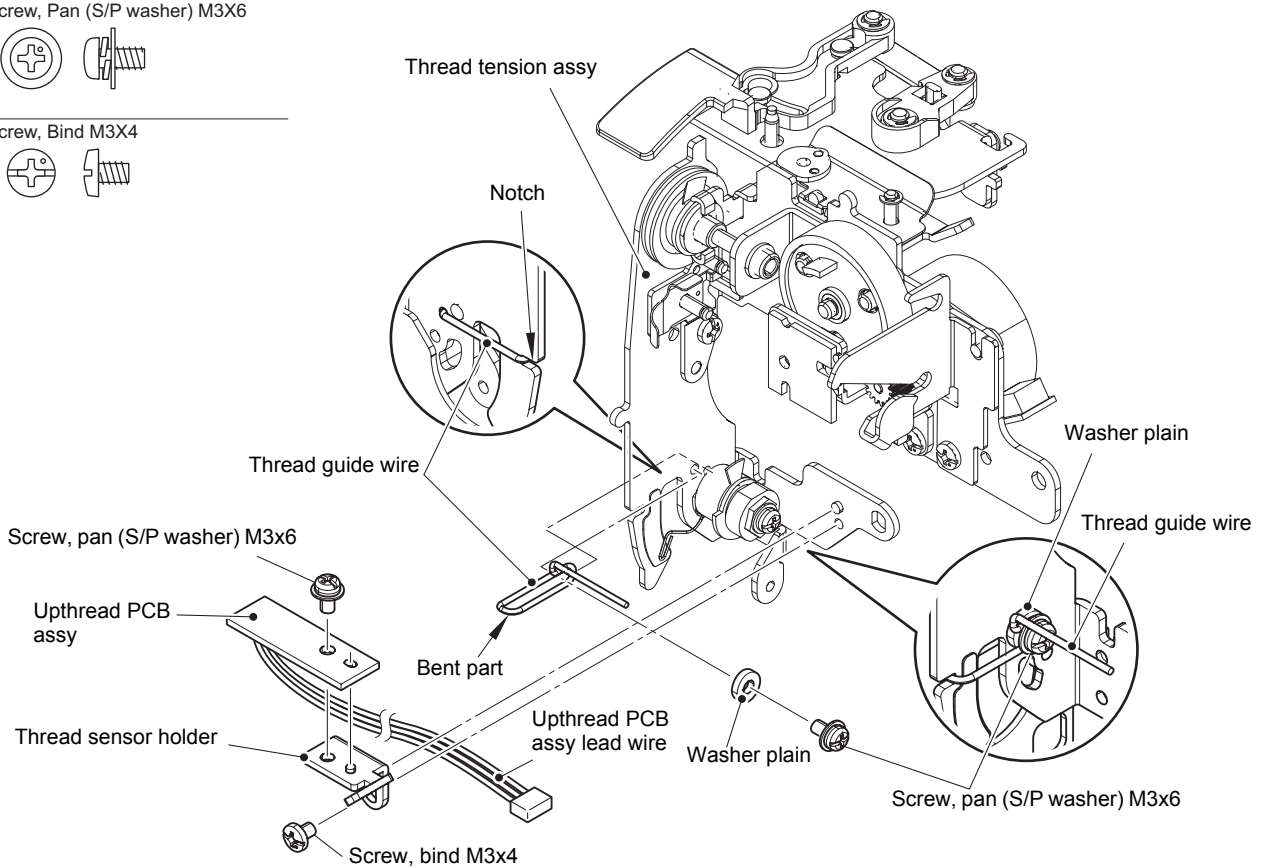
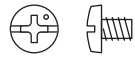
***Key point**

- Refer to "Wiring of Needle thread module".

Screw, Pan (S/P washer) M3X6

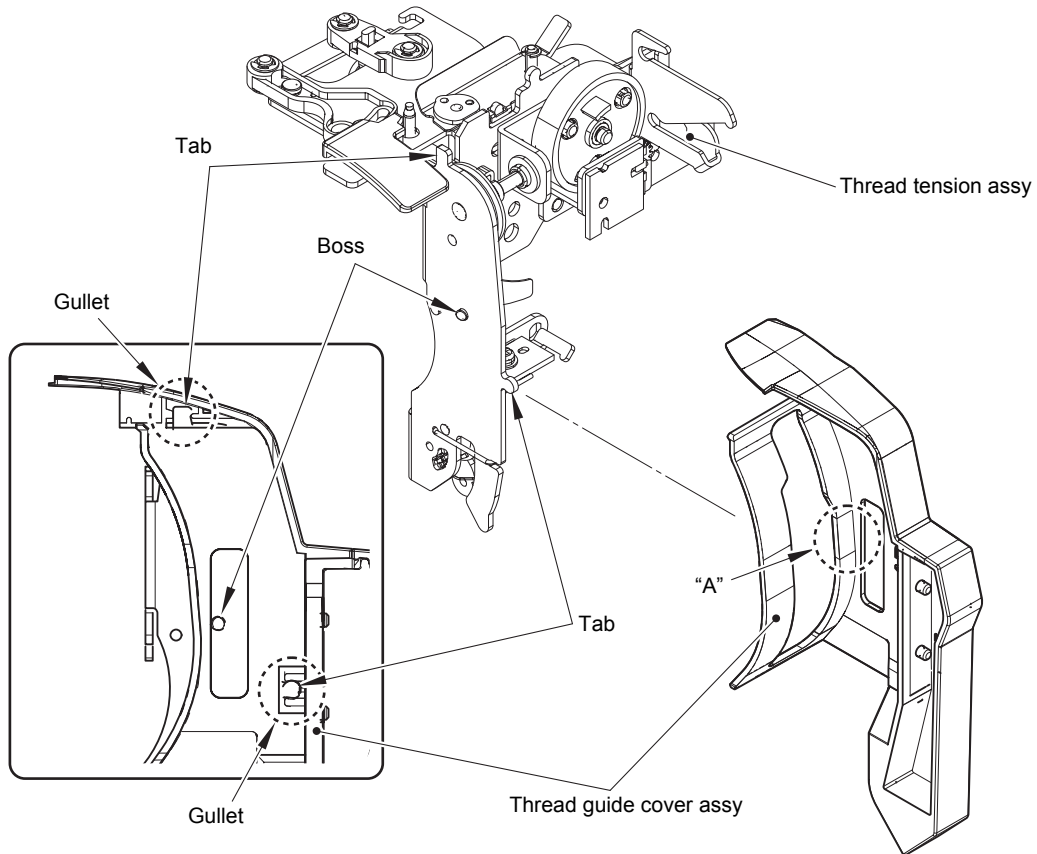


Screw, Bind M3X4



7 Attachment of Thread guide cover assy

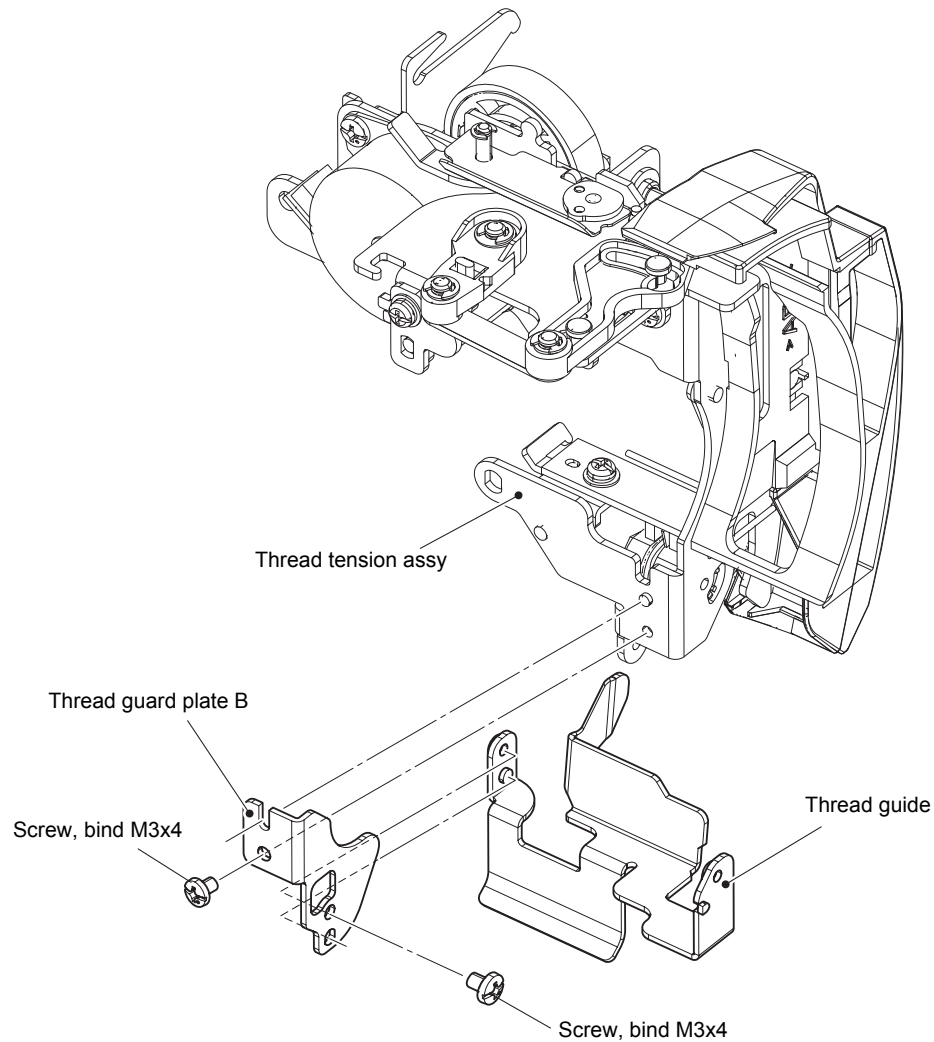
1. Align the two tabs of thread tension assy with the two gullets of thread guide cover assy, and attach the thread guide cover assy to the thread tension assy while lifting the section "A" of thread guide cover assy to get over the boss of thread tension assy.



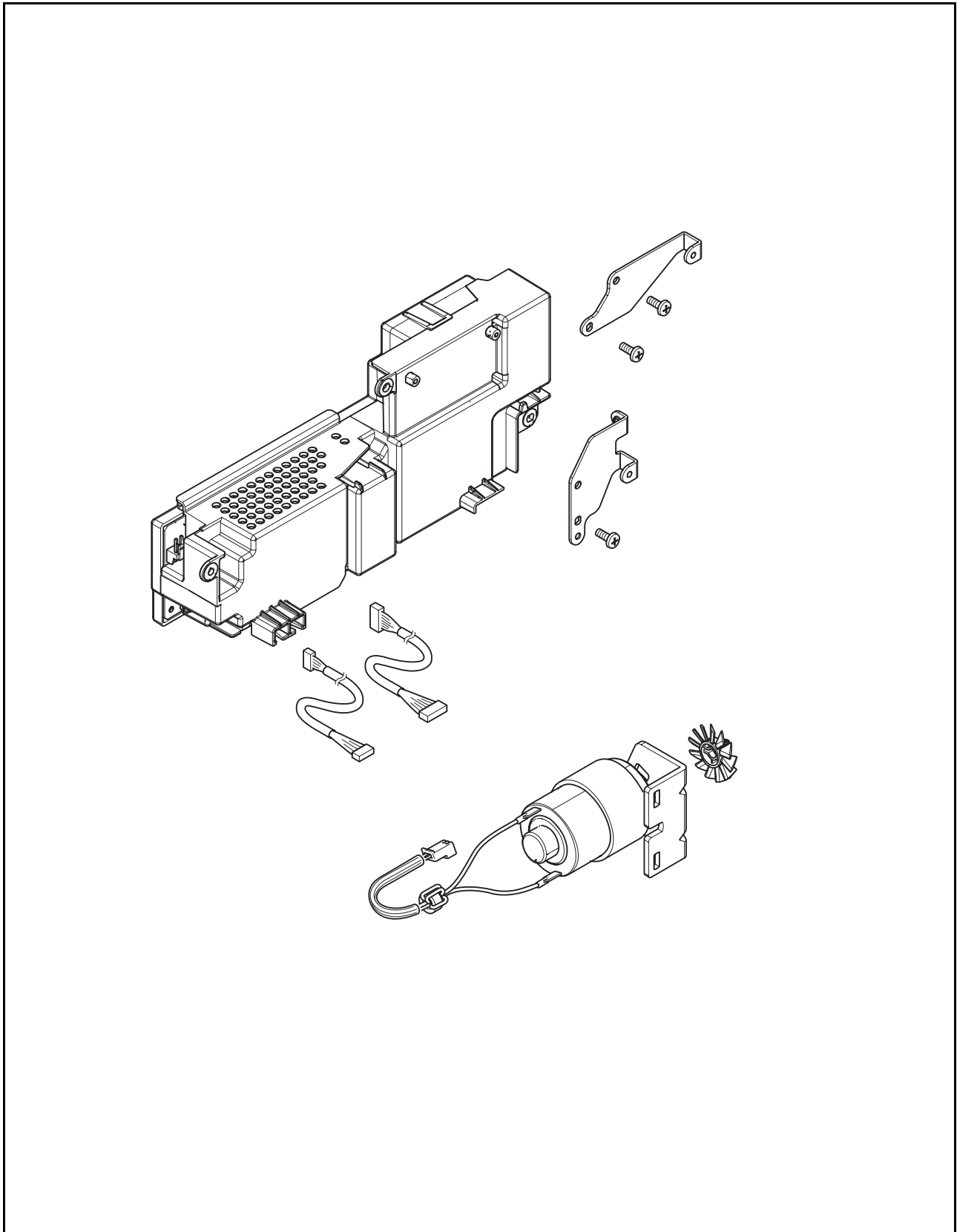
8 Attachment of Thread guard plate B and Thread guide

1. Align the positioning notch of thread guard plate B with the boss of thread tension assy, and attach the thread guard plate B to the thread tension assy with the screw (screw, bind M3x4). Align the positioning hole of thread guide with the boss of thread guard plate B, and attach the thread guide to the thread guard plate B with the screw (screw, bind M3x4).

Screw, Bind M3X4



Electric parts and main motor unit location diagram



Application of
Assembly

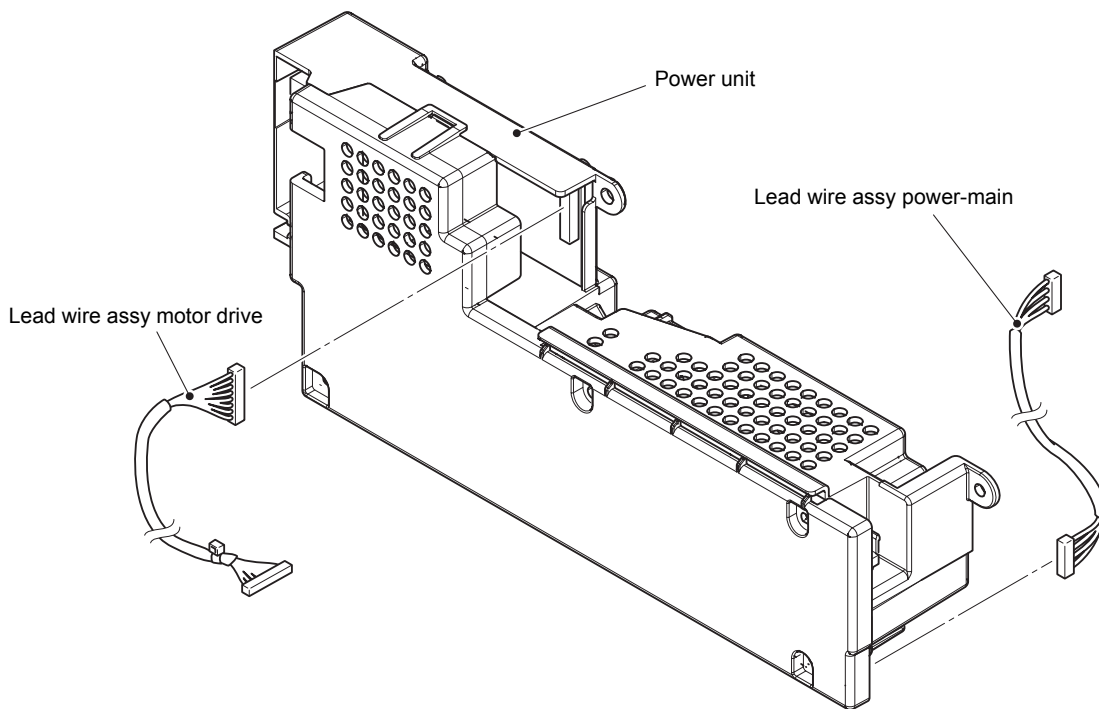
Application of
Assembly

1 Assembly of Power unit

1. Connect the lead wire assy power-main to the power unit, and pass the lead wire assy power-main through the securing fixtures.
2. Connect the lead wire assy motor drive to the power unit, and pass the lead wire assy motor drive through the securing fixtures.

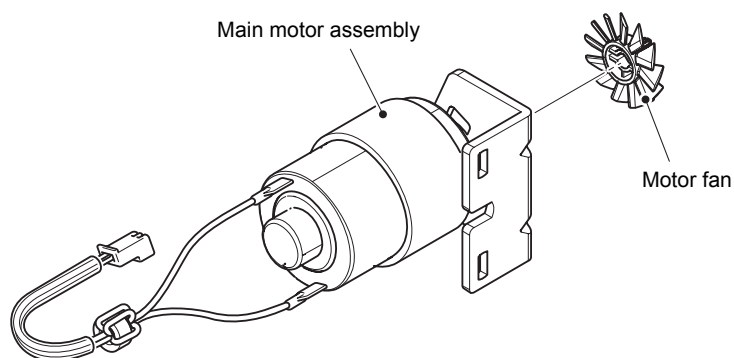
***Key point**

- Refer to "Wiring of Power unit".



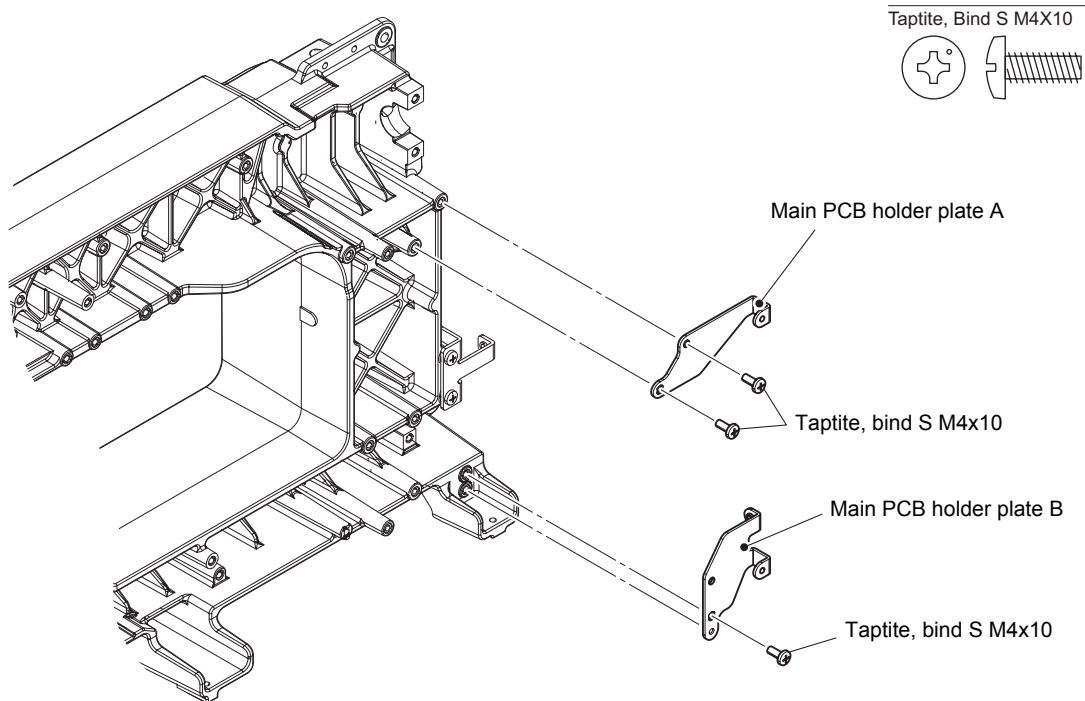
2 Assembly of Main motor assembly

1. Attach the motor fan to the T-pulley of main motor assembly.

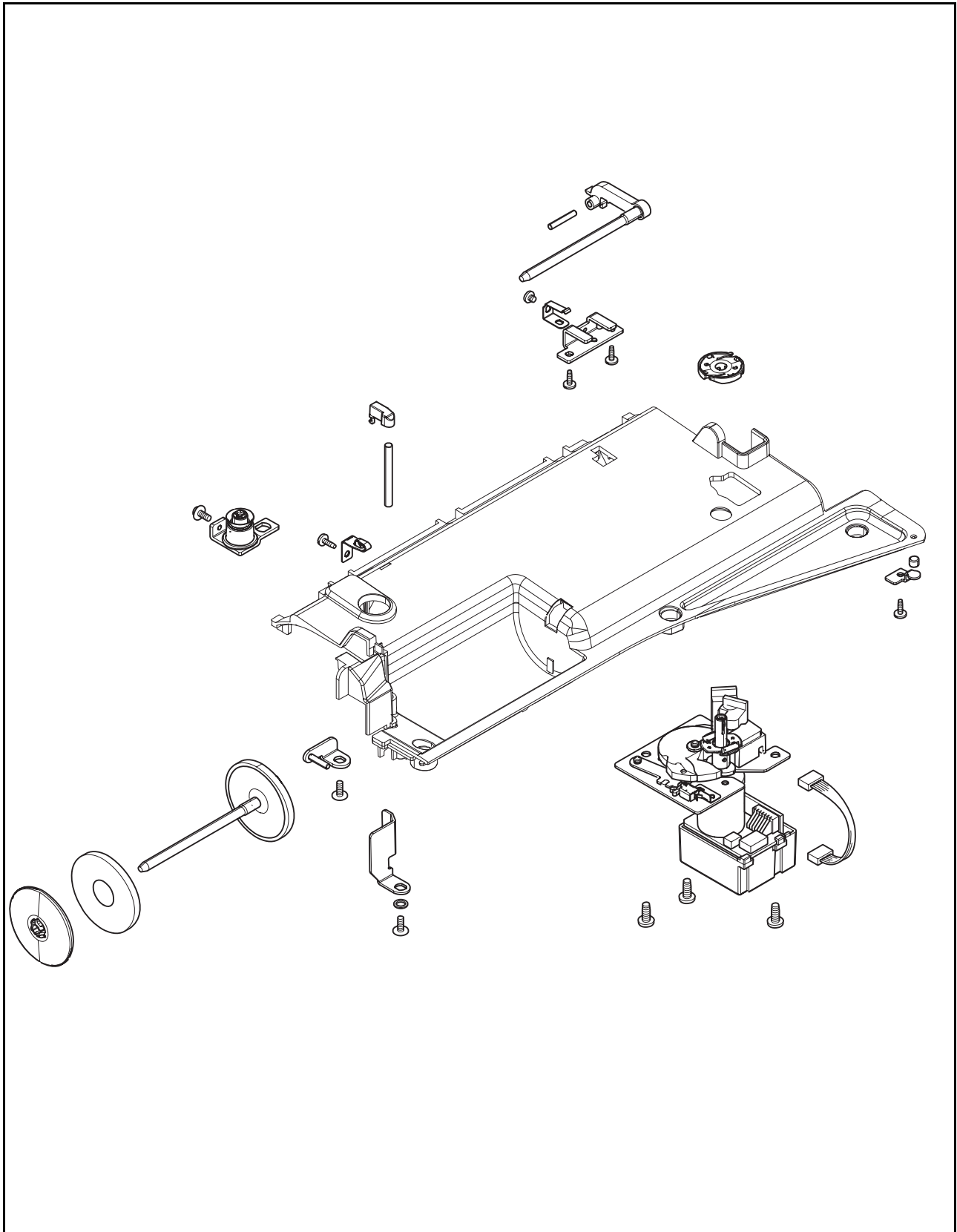


3 Attachment of Main PCB holder plate A/B

1. Attach the main PCB holder plate A to the arm bed with the two screws (taptite, bind S M4x10).
2. Align the boss of main PCB holder plate B with the positioning hole of arm bed, and attach the main PCB holder plate B to the arm bed with the screw (taptite, bind S M4x10).



Bobbin winding mechanism location diagram

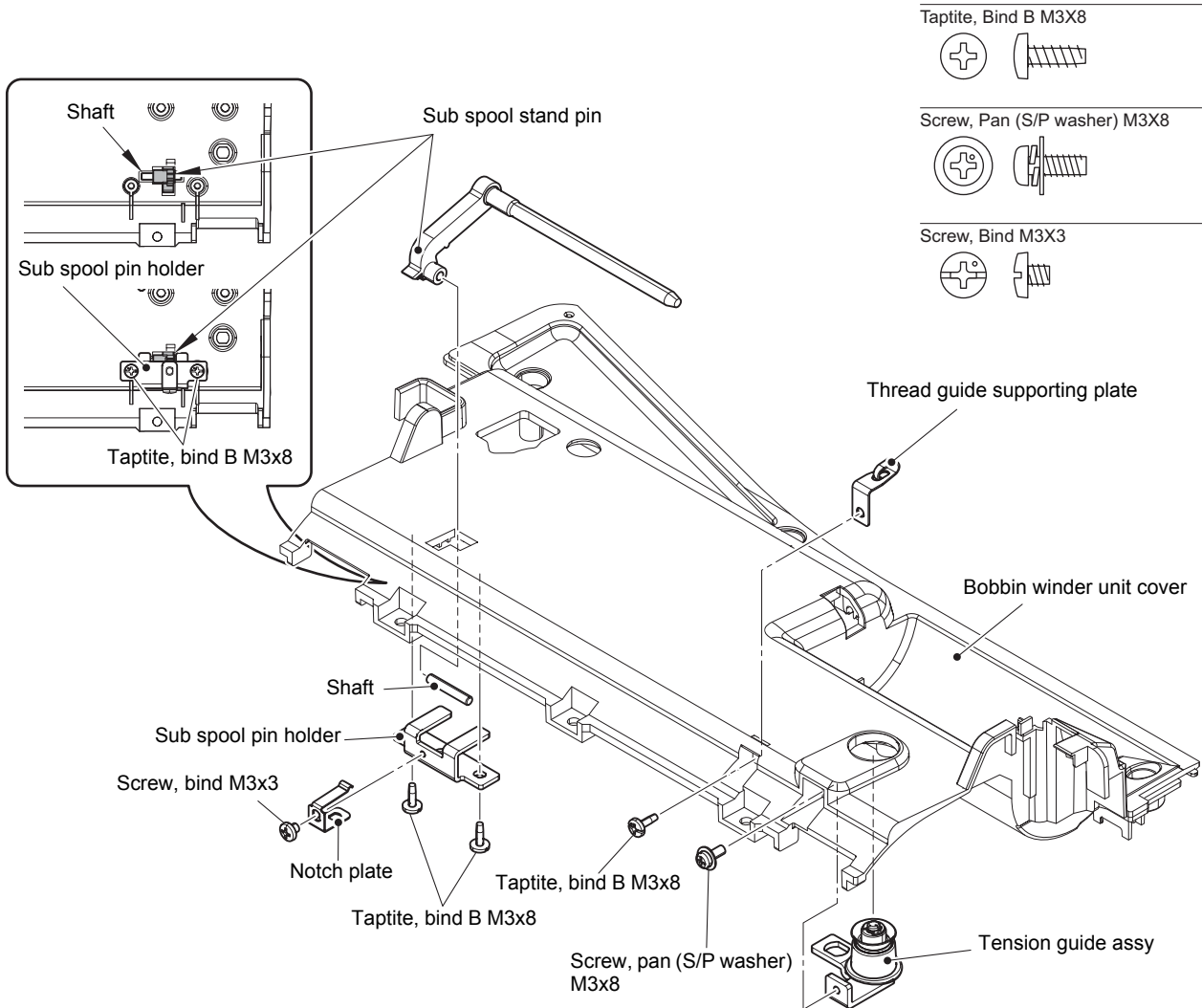


Application of
Assembly

Application of
Assembly

1 Assembly of Bobbin winder unit cover assy

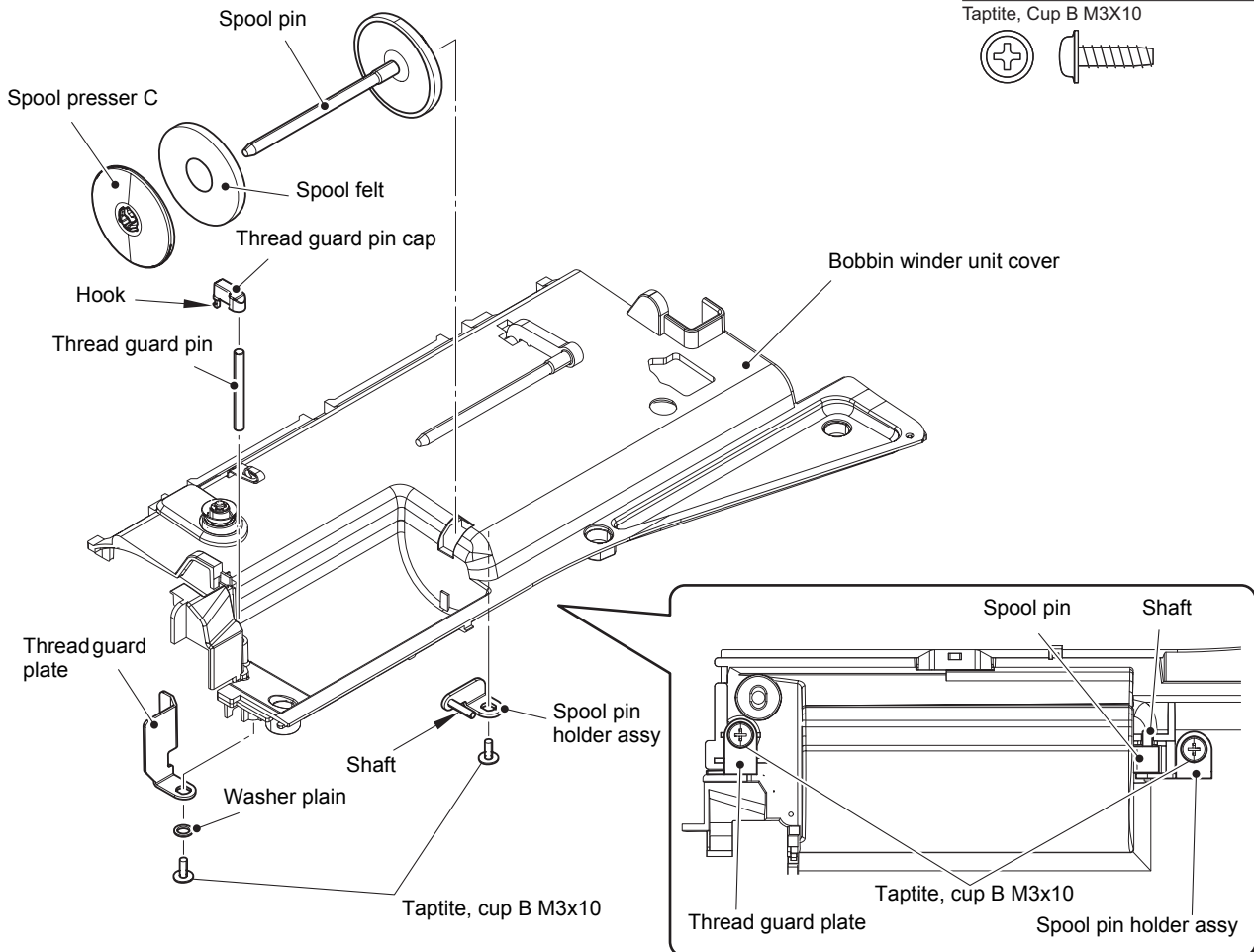
1. Set the thread guide supporting plate to the bobbin winder unit cover, and then tighten the screw (taptite, bind B M3x8).
2. Align the positioning hole of tension guide assy with the boss of bobbin winder unit cover, and attach the tension guide assy to the bobbin winder unit cover with the screw (screw, pan (S/P washer) M3x8).
3. Align the positioning hole of notch plate with the boss of sub spool pin holder, and attach the notch plate to the sub spool pin holder with the screw (screw, bind M3x3).
4. Set the sub spool stand pin to the bobbin winder unit cover, insert the shaft into the sub spool stand pin, and set the shaft on the mounting position. Attach the sub spool pin holder to the bobbin winder unit cover with the two screws (taptite, bind B M3x8).



Application of
Assembly

Application of
Assembly

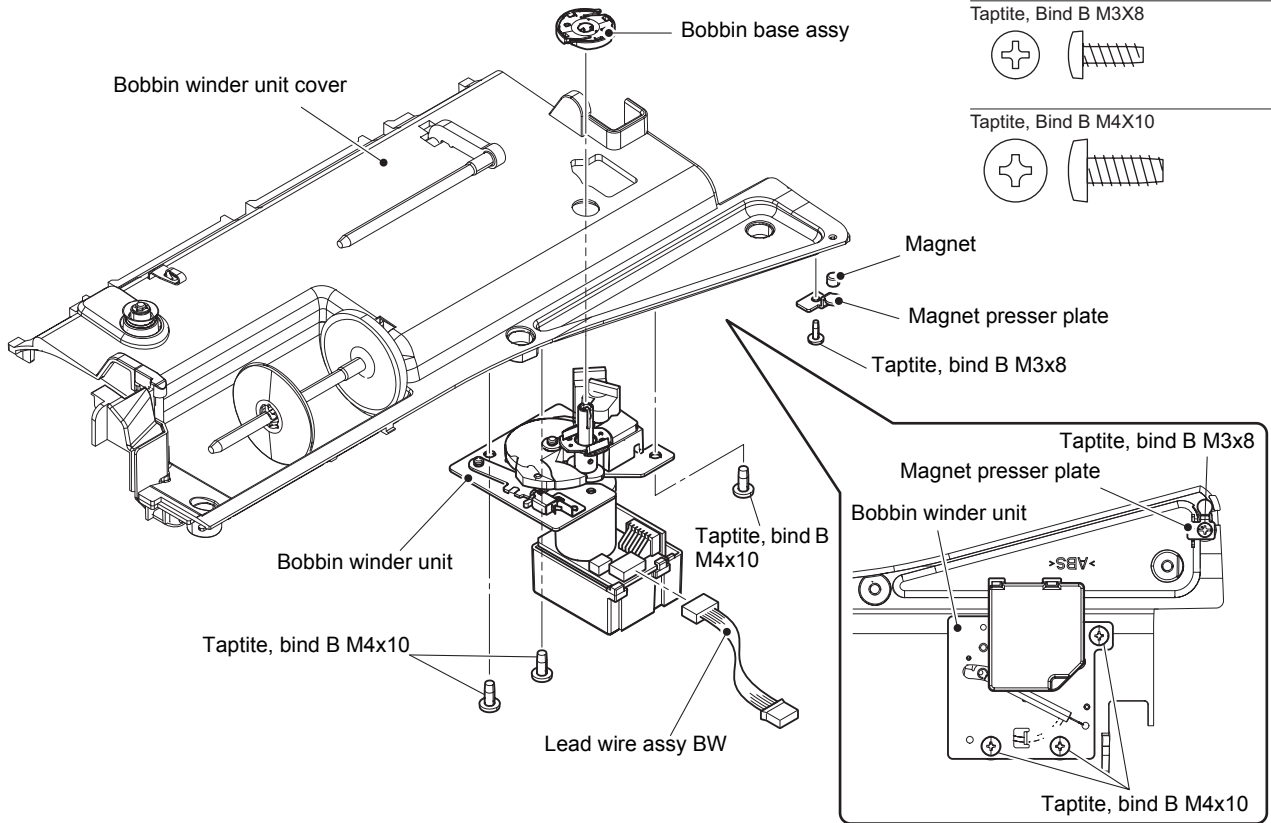
5. Set the thread guard pin and the thread guard pin cap to the bobbin winder unit cover, and secure them with the hook.
6. Attach the thread guard plate and the washer plain to the bobbin winder unit cover with the screw (taptite, cup B M3x10).
7. Set the spool pin to bobbin winder unit cover, insert the shaft of spool pin holder assy into the spool pin, and secure the spool pin holder assy to the bobbin winder unit cover with the screw (taptite, cup B M3x10). Set the spool felt and the spool presser C to the spool pin.



Application of
Assembly

Application of
Assembly

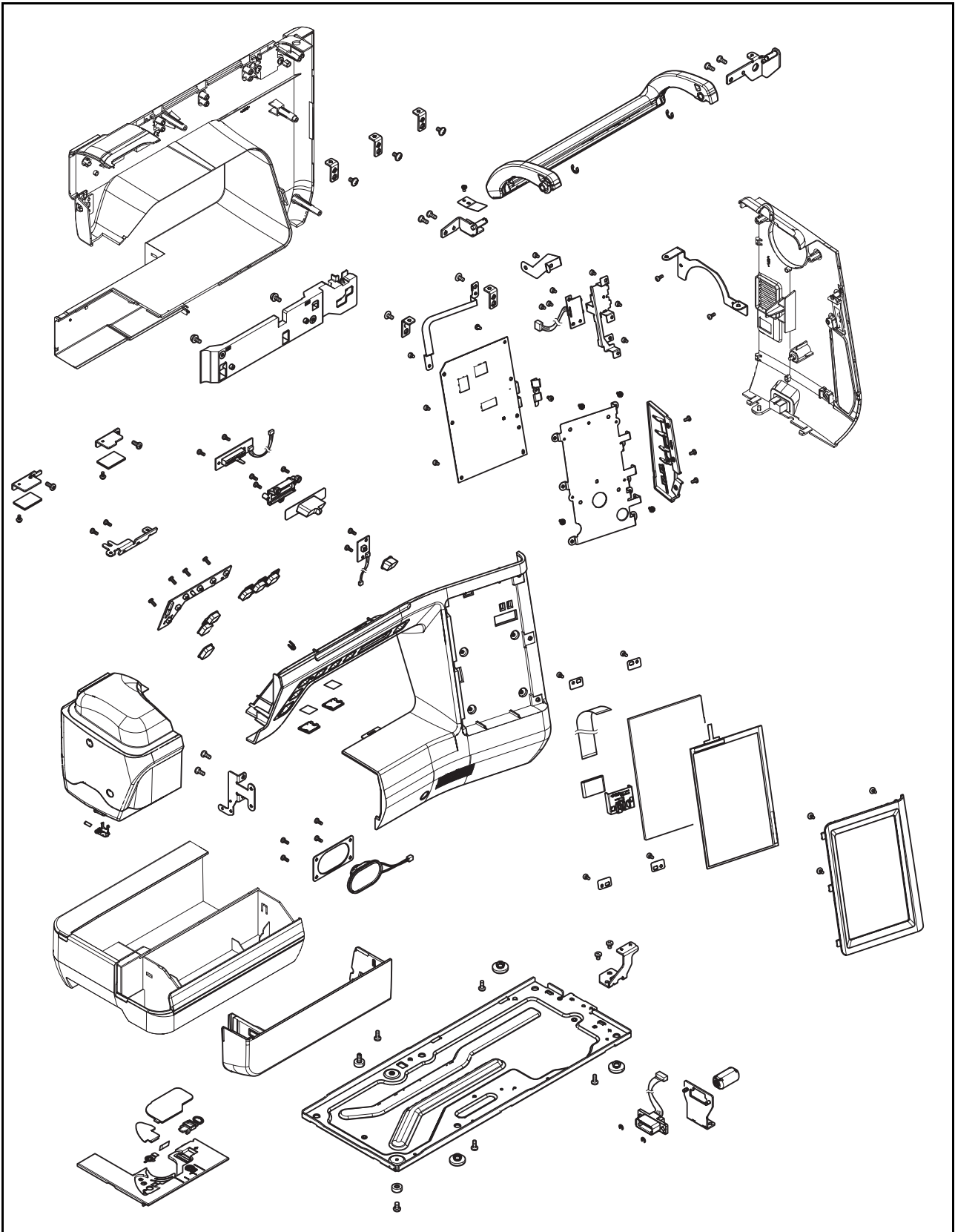
8. Set the magnet to the mounting position of bobbin winder unit cover, and attach the magnet presser plate with the screw (taptite, bind B M3x8).
9. Connect the lead wire assy BW to the PCB of bobbin winder unit. Attach the bobbin winder unit to the bobbin winder unit cover with the three screws (taptite, bind B M4x10), and set the bobbin base assy to the bobbin winder unit.



Application of
Assembly

Application of
Assembly

Main frame and covers location diagram



Application of
Assembly

Application of
Assembly

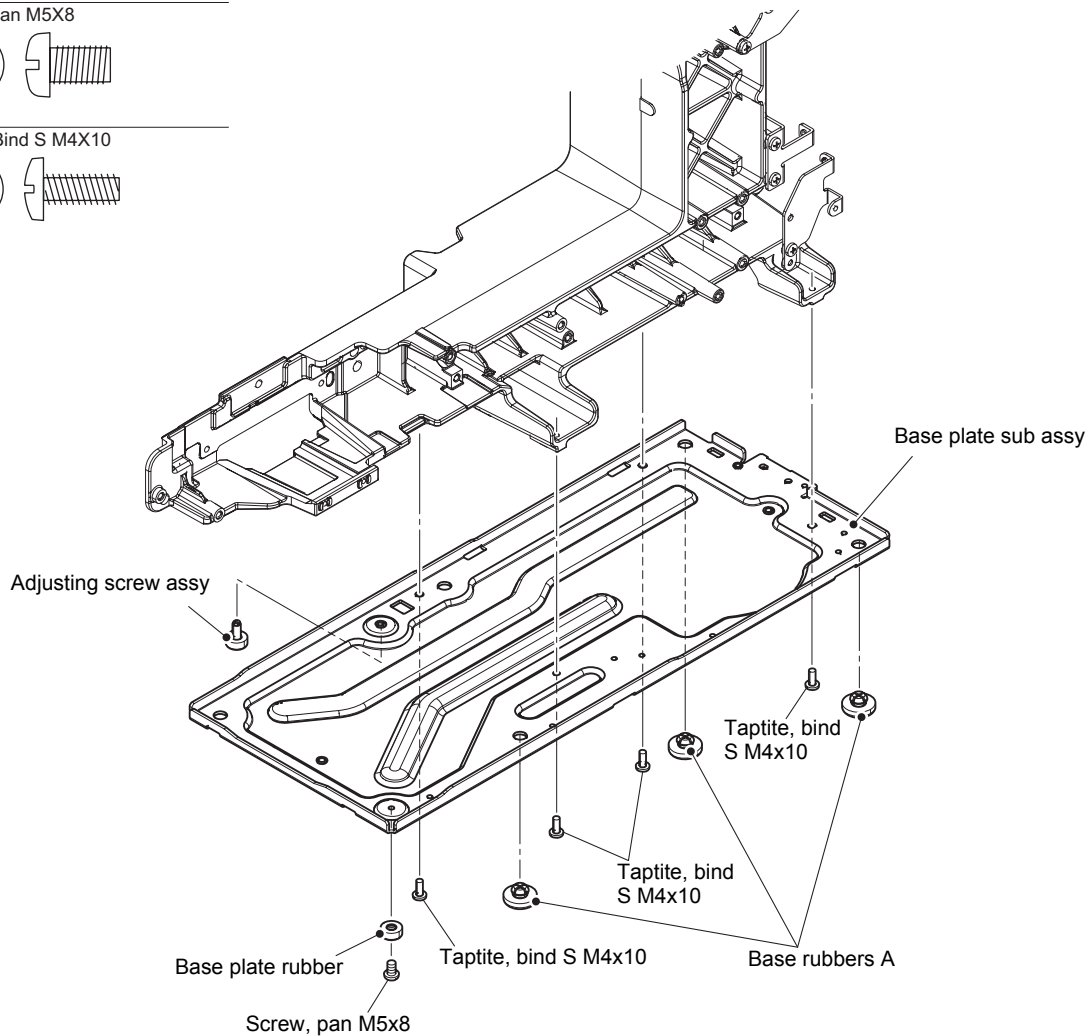
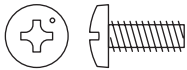
1 Attachment of Base plate sub assy

1. Attach the base plate rubber to the base plate sub assy with the screw (screw, pan M5x8).
2. Attach the adjusting screw assy to the base plate sub assy.
3. Attach the three base rubbers A to the base plate sub assy.
4. Attach the base plate sub assy to the arm bed with the four screws (taptite, bind S M4x10).

Screw, Pan M5X8

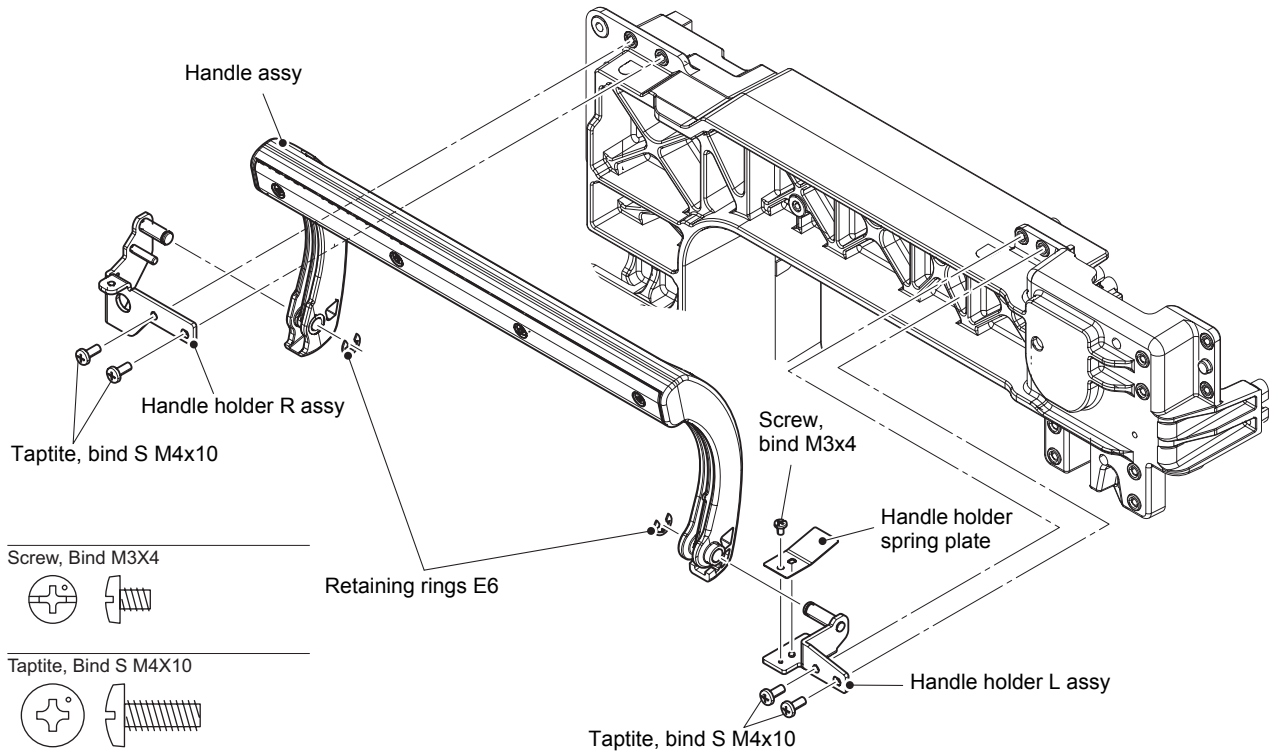


Taptite, Bind S M4X10



2 Attachment of Handle assy

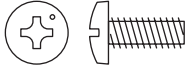
1. Align the positioning hole of handle holder spring plate with the boss of handle holder L assy, and attach the handle holder spring plate to the handle holder L assy with the screw (screw, bind M3x4). Set the handle holder L assy to the handle assy, and attach the retaining ring E6.
2. Set the handle holder R assy to the handle assy, and attach the retaining ring E6.
3. Set the handle assy to the arm bed with the four screws (taptite, bind S M4x10).



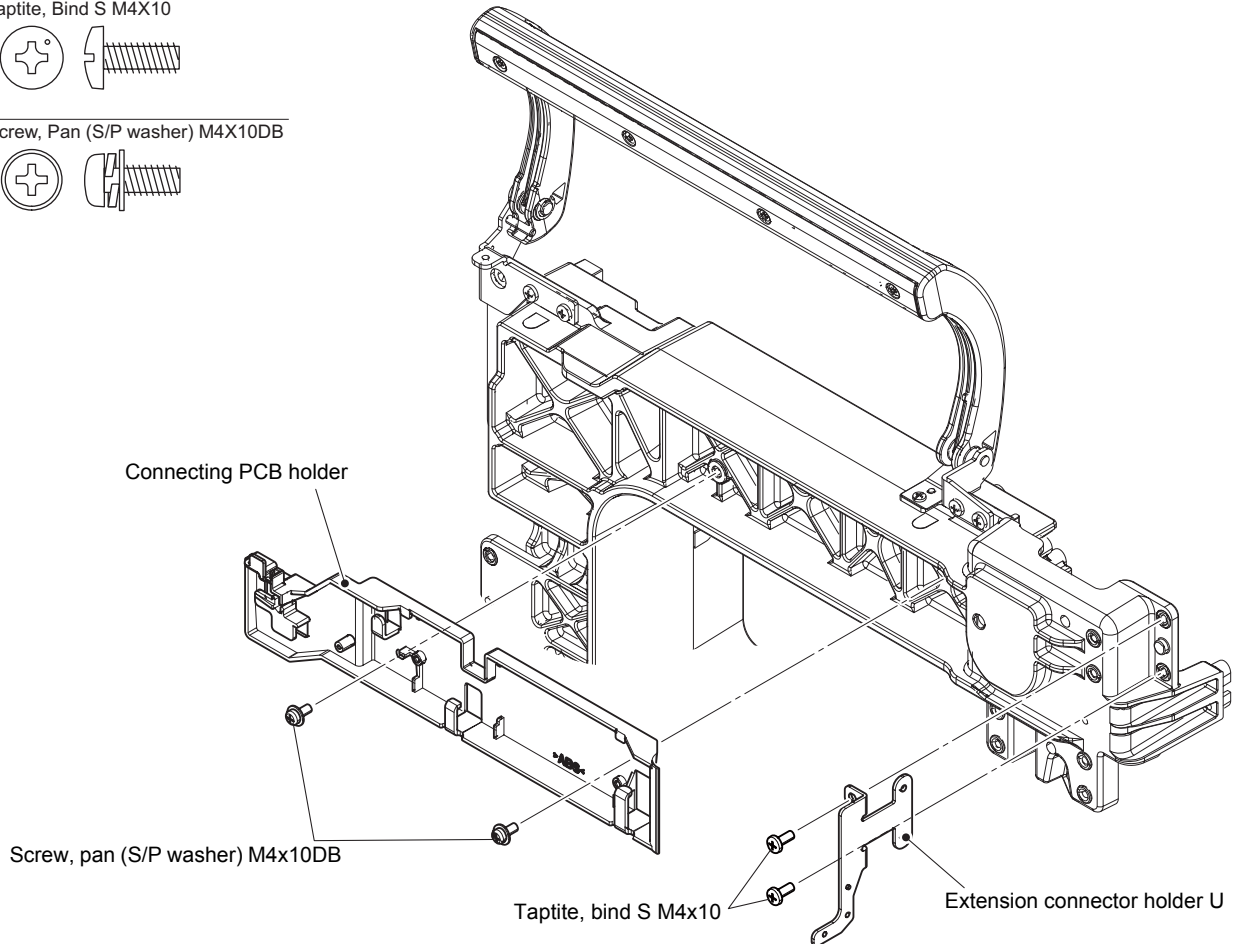
3 Attachment of Extension connector holder U and Connecting PCB holder

1. Attach the extension connector holder U to the arm bed with the two screws (taptite, bind S M4x10).
2. Attach the connecting PCB holder to the arm bed with the two screws (screw, pan (S/P washer) M4x10DB).

Taptite, Bind S M4X10

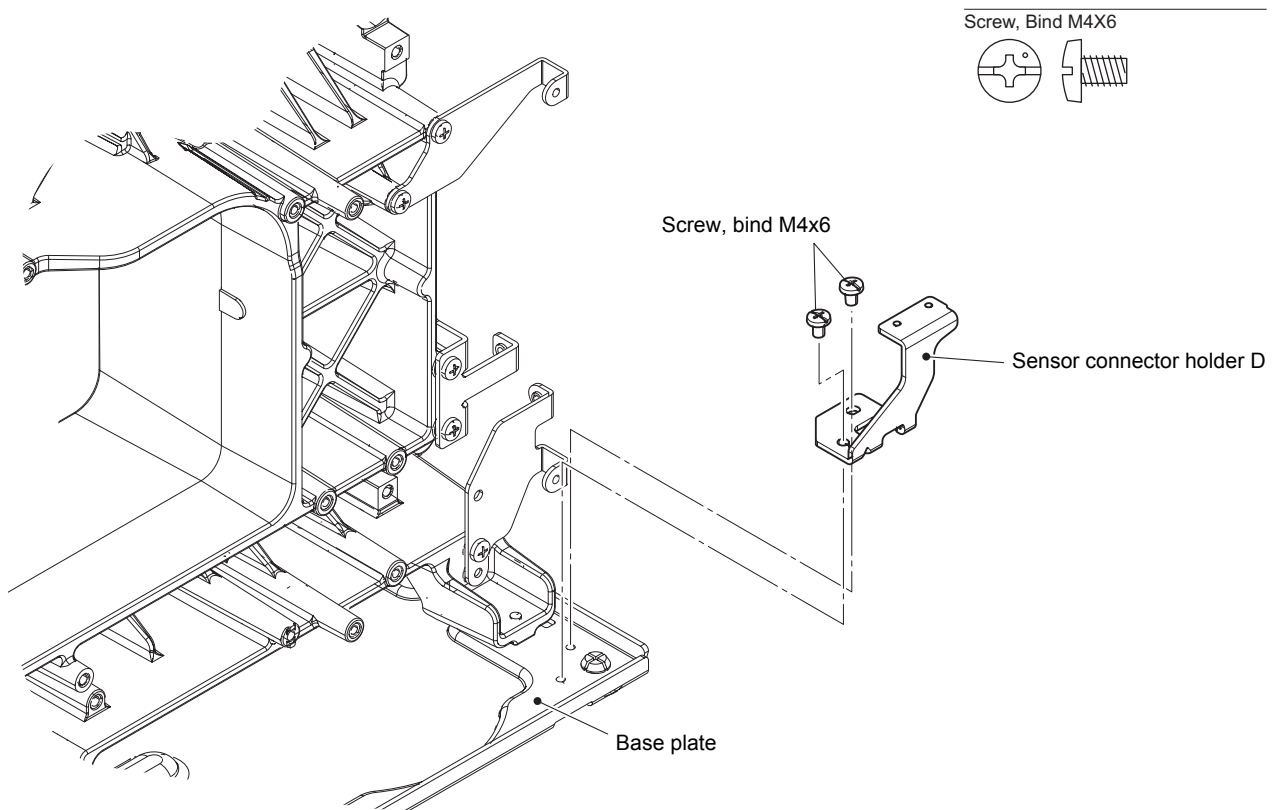


Screw, Pan (S/P washer) M4X10DB



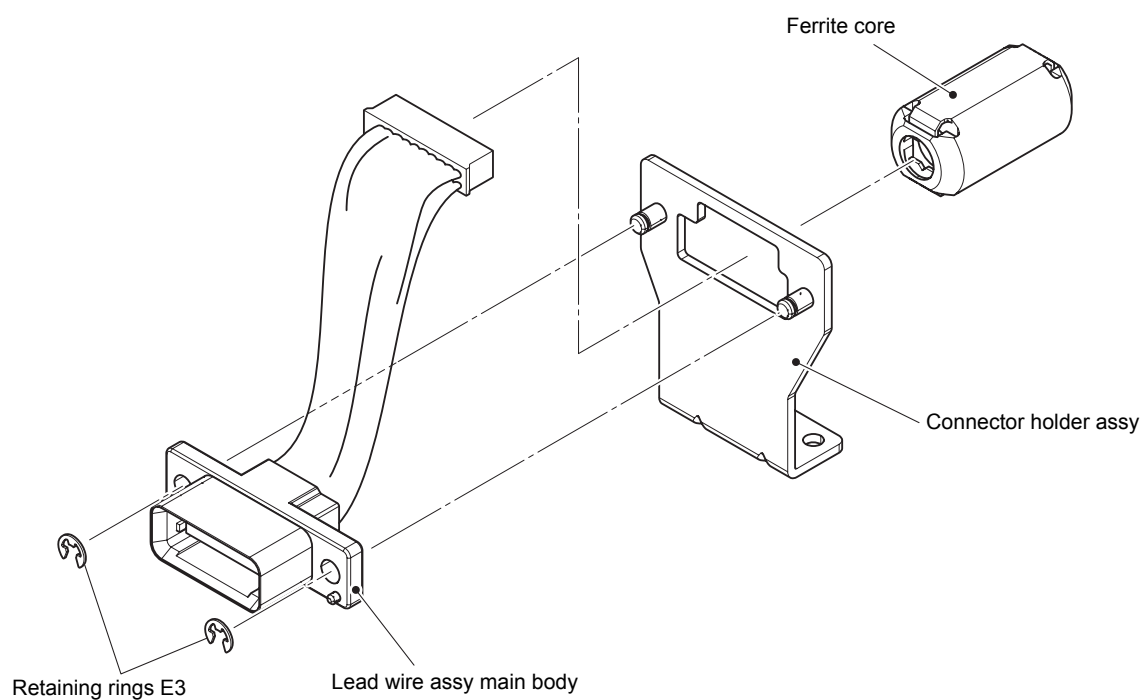
4 Attachment of Sensor connector holder D

1. Attach the sensor connector holder D to the base plate with the two screws (screw, bind M4x6).



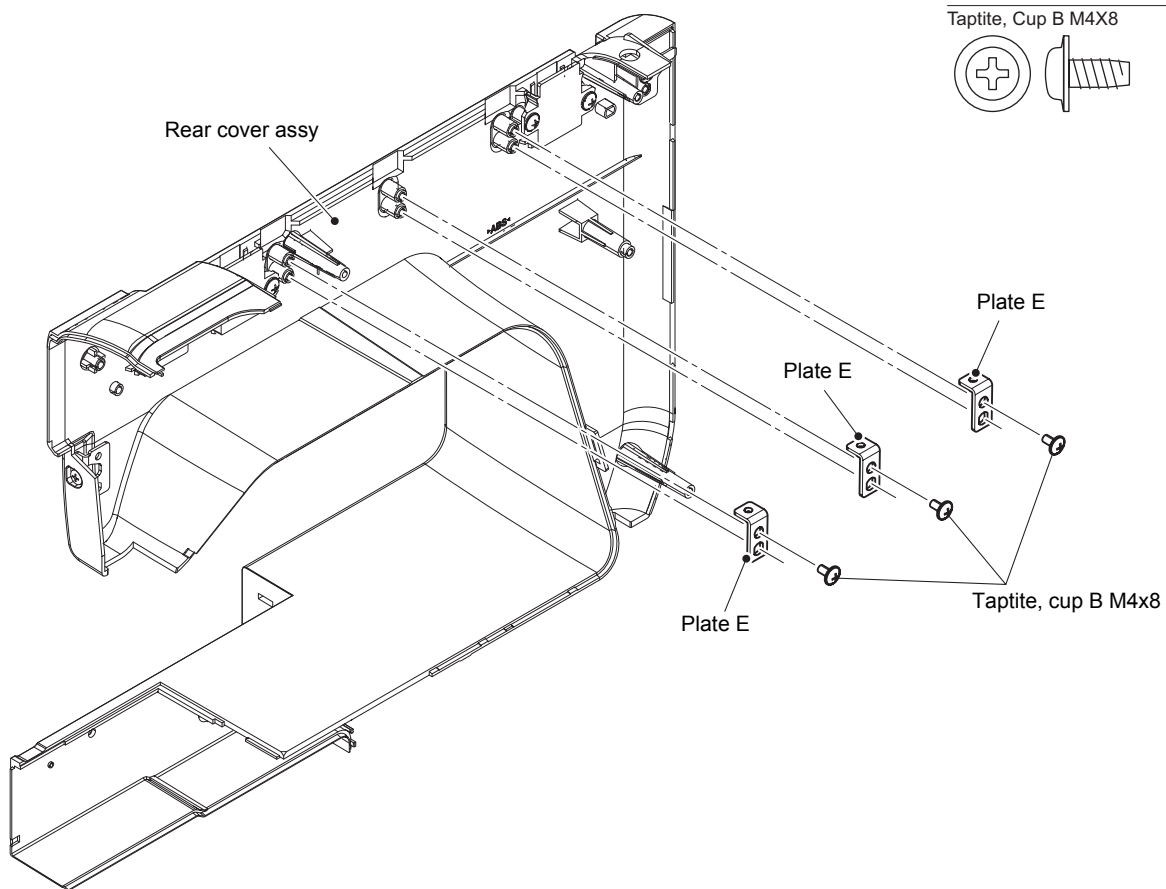
5 Assembly of Connector holder assy

1. Set the lead wire assy main body to the two shafts of connector holder assy, and attach the two retaining rings E3 to the two shafts.
2. Attach the ferrite core to the lead wire assy main body.



6 Assembly of Rear cover assy

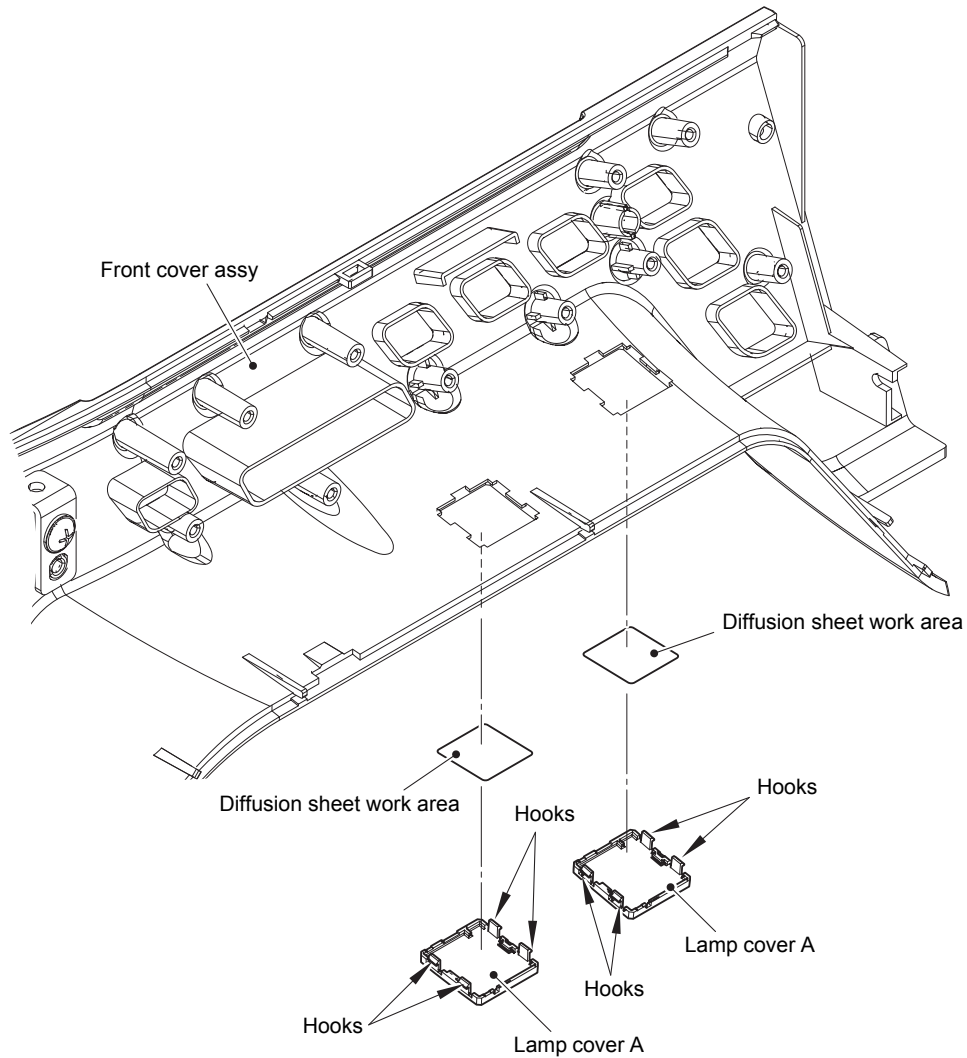
1. Align the positioning hole of plate E with the boss of rear cover assy, and attach the plate E to the rear cover assy with the screw (taptite, cup B M4x8). (three locations)



7 Assembly of Front cover assy

7-1 Attachment of Lamp cover A

1. Set the diffusion sheet work area to the lamp cover A, and attach the lamp cover A to the front cover assy with the four hooks. (two locations)



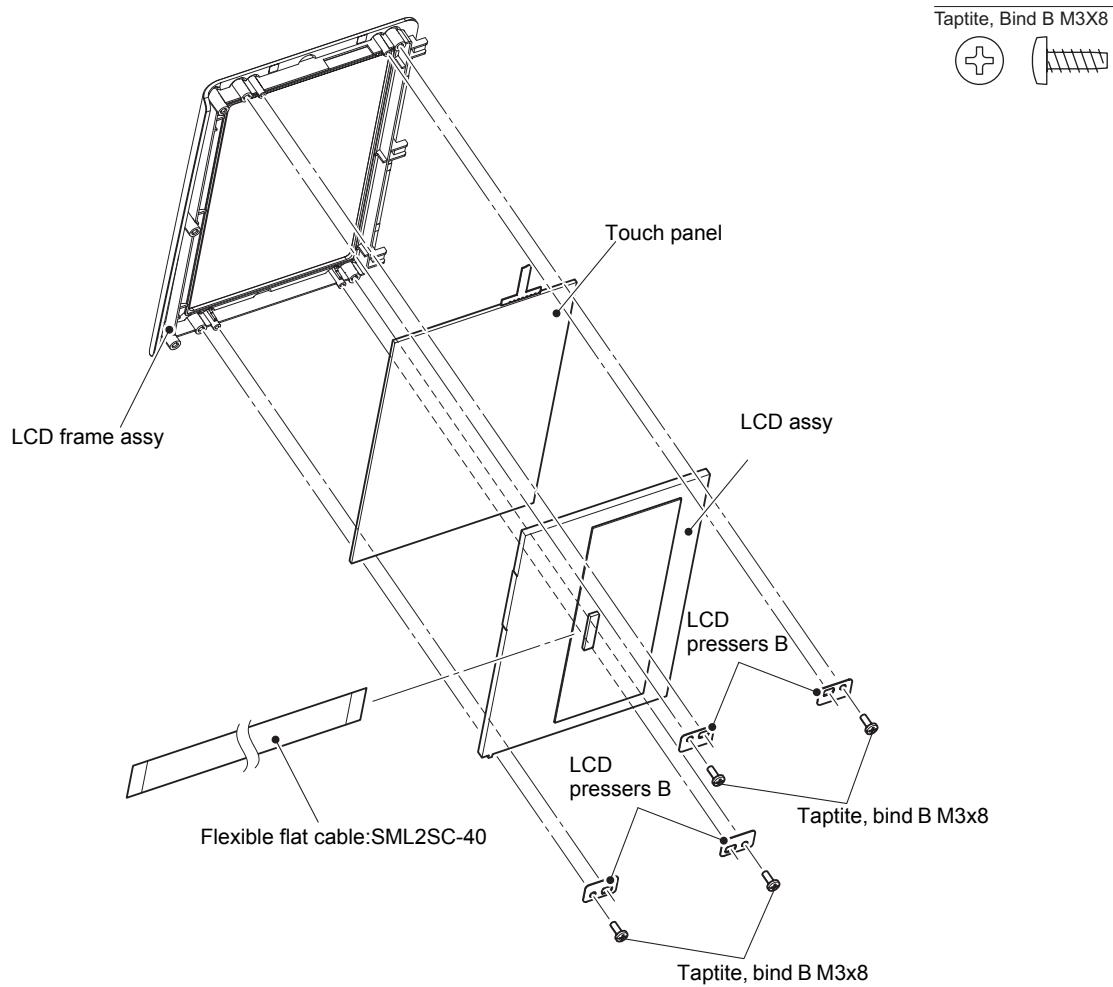
7-2 Attachment of LCD unit assy

1. Connect the flexible flat cable:SML2SC-40 to the LCD assy, and lock it.

***Key point**

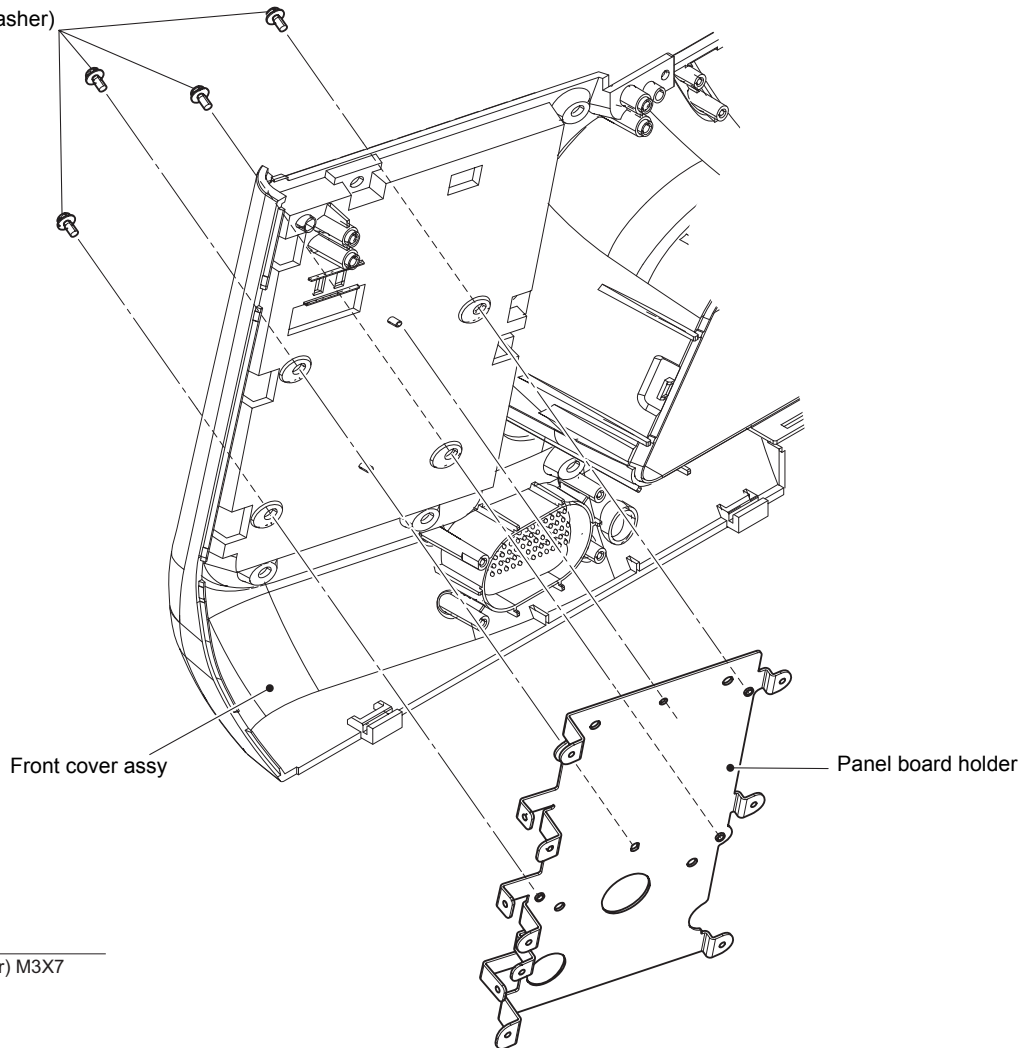
- Refer to "Wiring of LCD assy".

2. Set the touch panel and the LCD assy to the LCD frame assy. Align the positioning hole of LCD presser B with the boss of LCD frame assy, and attach the LCD presser B to the LCD frame assy with the screw (taptite, bind B M3x8). (four locations)



3. Align the two positioning holes of panel board holder with the two bosses of front cover assy, and attach the panel board holder to the front cover assy with the four screws (screw, pan (S/P washer) M3x7).

Screw, pan (S/P washer)
M3x7



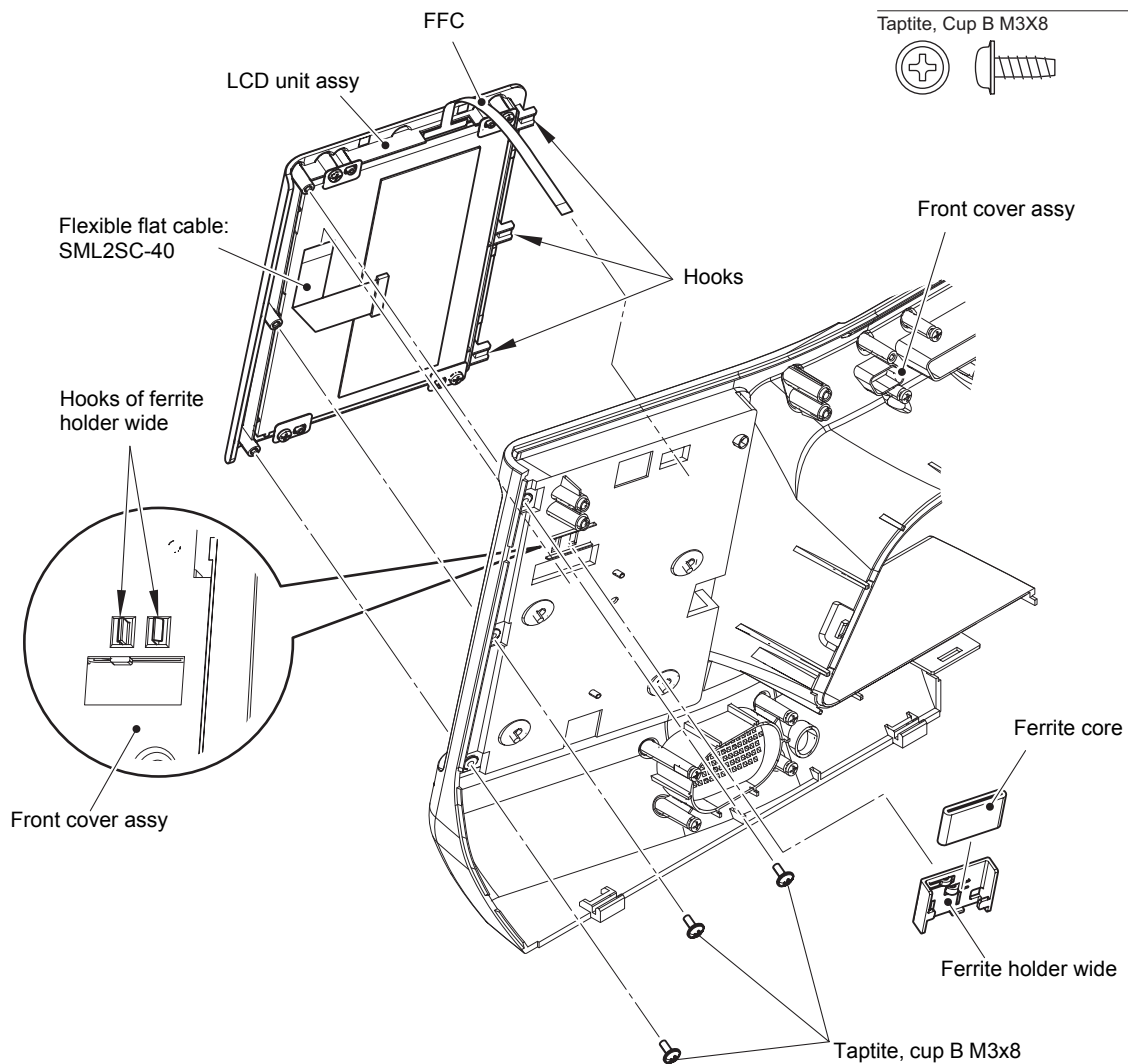
Screw, Pan (S/P washer) M3X7



4. Set the ferrite core to the ferrite holder wide, and attach the ferrite holder wide to the front cover assy with the two hooks.
5. Pass the flexible flat cable:SML2SC-40 through the hole of front cover assy, and FFC of touch panel through the hole of front cover assy. Hang the three hooks of LCD unit assy on the front cover assy, and attach the LCD unit assy to the front cover assy with the three screws (taptite, cup B M3x8).
6. Pass the flexible flat cable:SML2SC-40 through the ferrite core.

***Key point**

- Refer to "Wiring of Left side of Front cover assy".



7-3 Attachment of Panel PCB assy

1. Attach the panel PCB assy to the panel board holder with the four screws (screw, bind M3x6).
2. Connect the FFC of touch panel to the CN1 on the panel PCB assy, and lock it. Connect the flexible flat cable:SML2SC-40 to the CN2 on the panel PCB assy, and lock it.

***Key point**

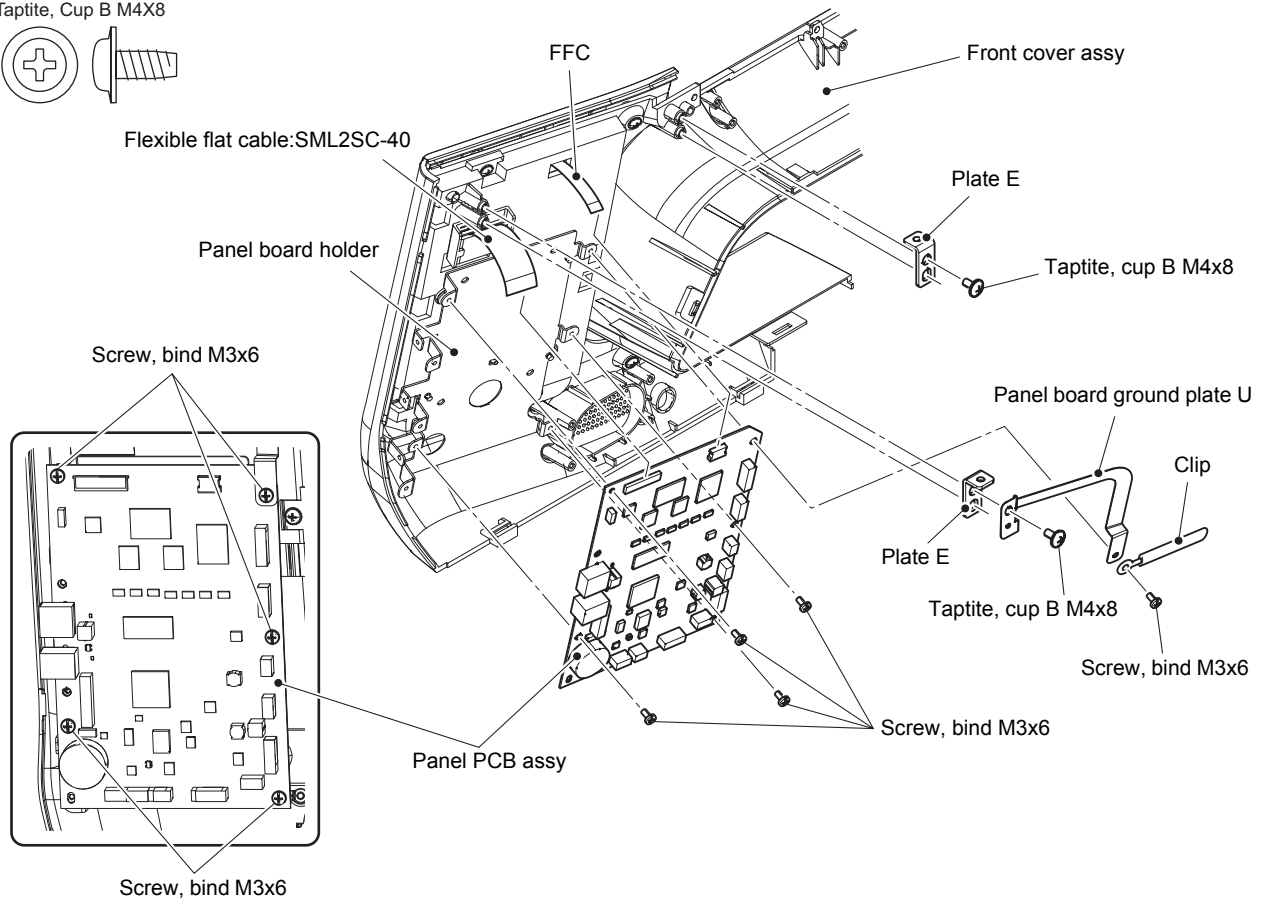
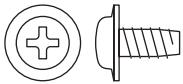
- Refer to "Wiring of Panel PCB assy".

3. Align the positioning hole of plate E with the boss of front cover assy, and attach the plate E and the panel board ground plate U to the front cover assy with the screw (taptite, cup B M4x8). Attach the panel board ground plate U and the clip to the panel board holder with the screw (screw, bind M3x6).
4. Align the positioning hole of plate E with the boss of front cover assy, and attach the plate E to the front cover assy with the screw (taptite, cup B M4x8).

Screw, Bind M3X6



Taptite, Cup B M4X8



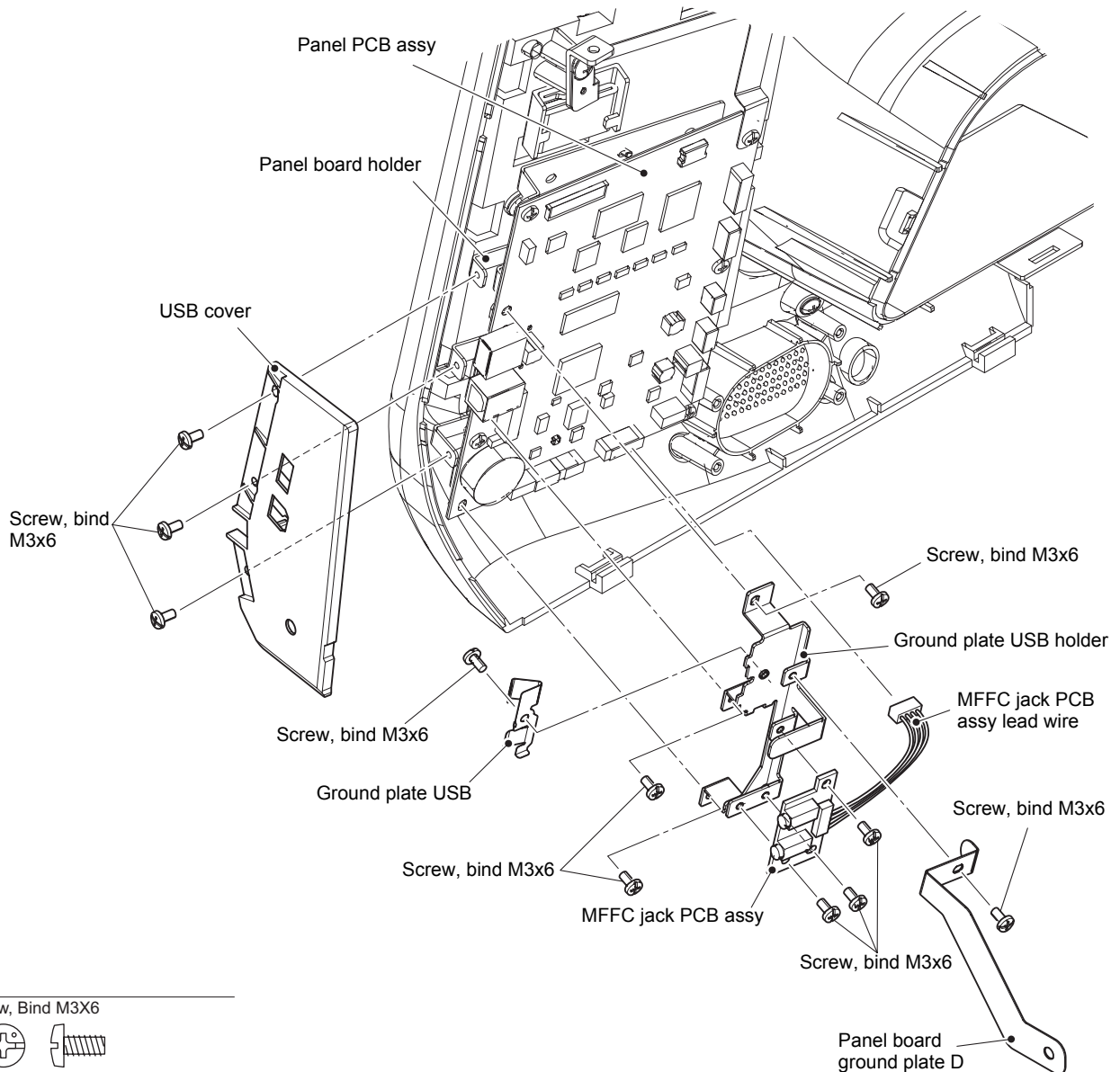
7-4 Attachment of Ground plate USB holder, MFFC jack PCB assy and USB cover

1. Attach the ground plate USB to the ground plate USB holder with the screw (screw, bind M3x6). Attach the ground plate USB holder to the panel board holder with the three screws (screw, bind M3x6).
2. Attach the panel board ground plate D to the ground plate USB holder with the screw (screw, bind M3x6).
3. Attach the MFFC jack PCB assy to the ground plate USB holder with the three screws (screw, bind M3x6). Connect the MFFC jack PCB assy lead wire to the CN14 on the panel PCB assy.

***Key point**

- Refer to "Wiring of Panel PCB assy".

4. Attach the USB cover to the panel board holder with the three screws (screw, bind M3x6).



Screw, Bind M3X6



Application of
Assembly

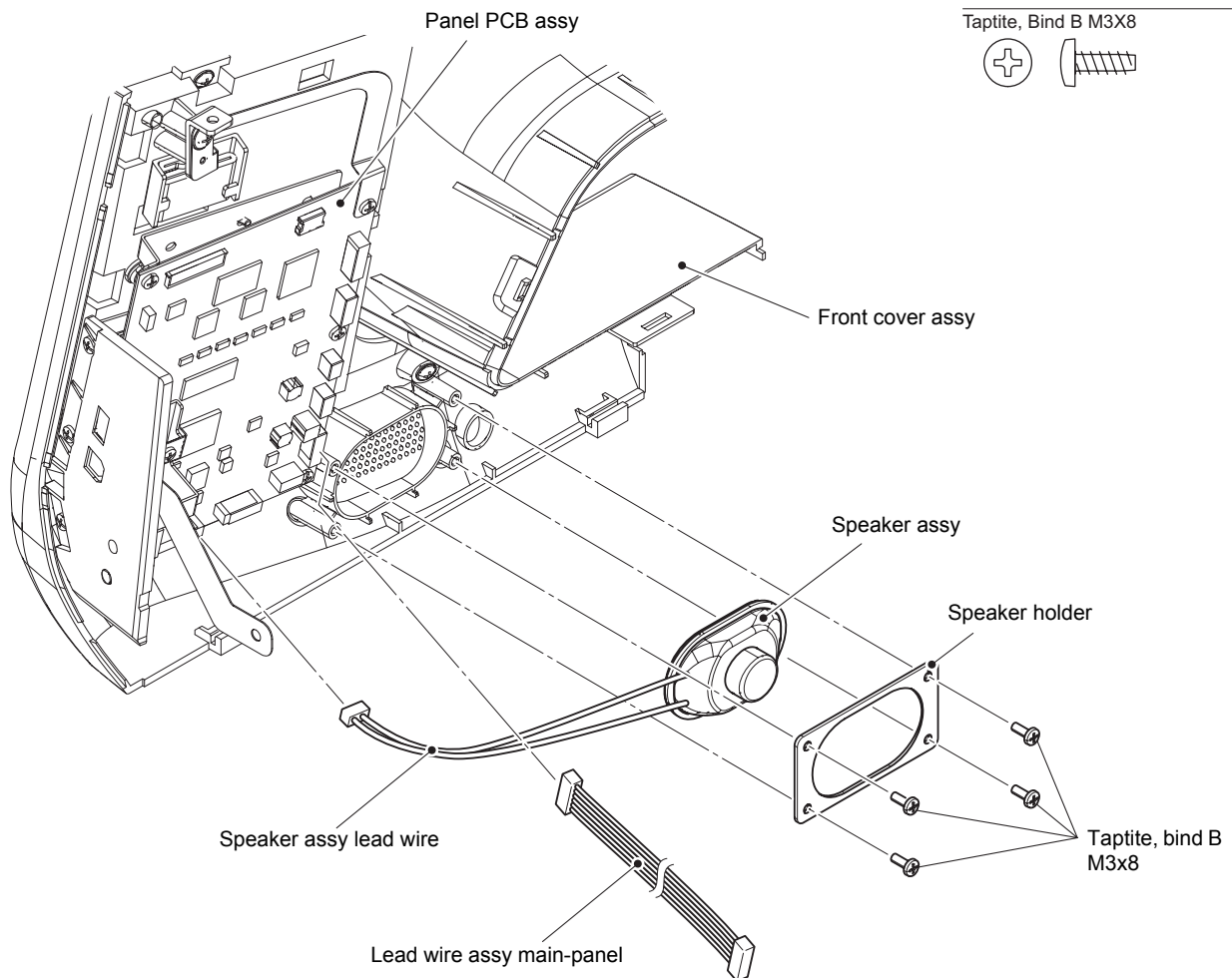
Application of
Assembly

7-5 Attachment of Speaker assy and Lead wire assy main-panel

1. Attach the speaker assy and the speaker holder to the front cover assy with the four screws (taptite, bind B M3x8). Connect the speaker assy lead wire to the CN16 on the panel PCB assy.
2. Connect the lead wire assy main-panel to the CN3 on the panel PCB assy.

***Key point**

- Refer to "Wiring of Panel PCB assy".

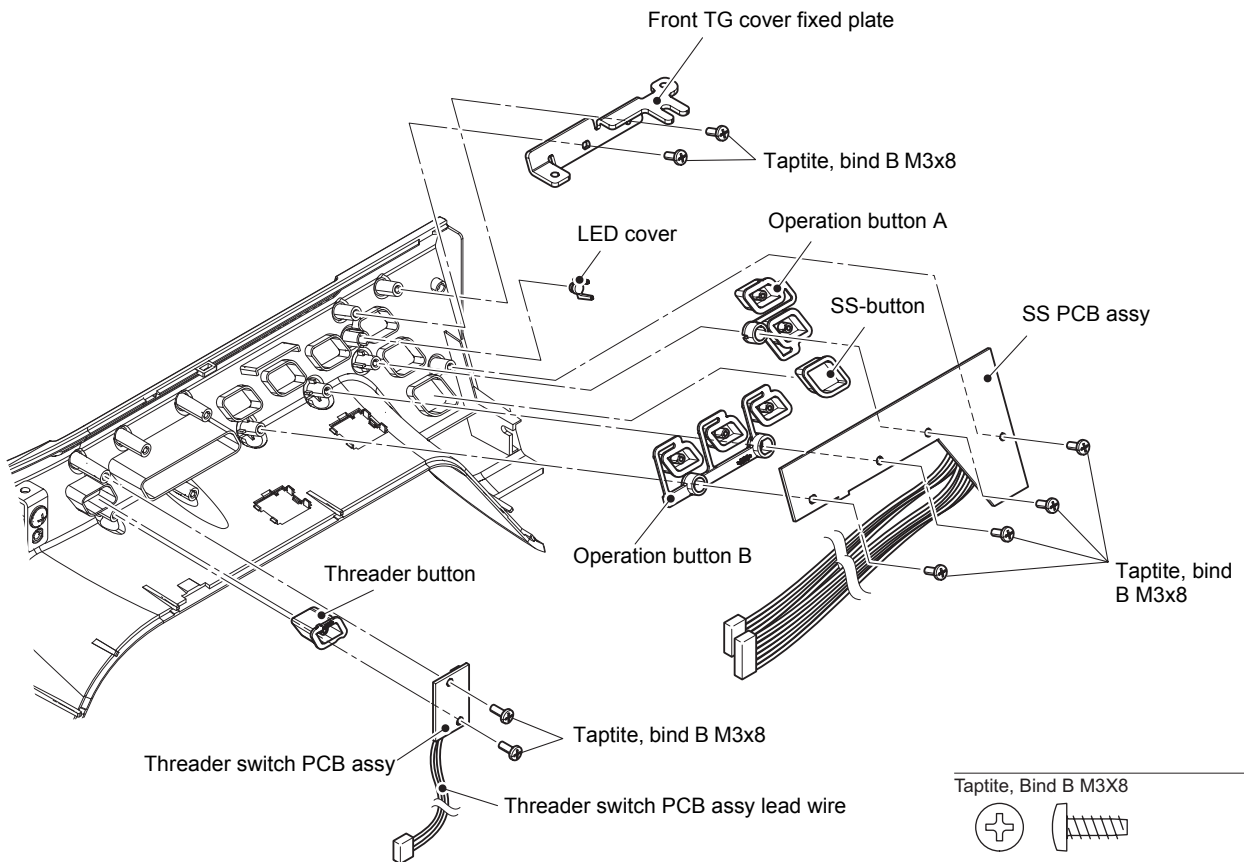


7-6 Attachment of Buttons, SS PCB assy and Threader switch PCB assy

1. Set the LED cover, operation button A, operation button B, SS-button and SS PCB assy to the front cover assy, and secure them with the four screws (taptite, bind B M3x8).
2. Set the threader button and threader switch PCB assy to the front cover assy, and secure them with the two screws (taptite, bind B M3x8).
3. Attach the front TG cover fixed plate to the front cover assy with the two screws (taptite, bind B M3x8).
4. Connect the two connector of SS PCB assy lead wire to the CN4 and CN18 on the panel PCB assy.
5. Connect the connector of threader switch PCB assy lead wire to the CN6 on the panel PCB assy.
6. Pass the each lead wire through the securing fixtures, and bind up them with the band.

***Key point**

- Refer to "Wiring of Right side of Front cover assy".

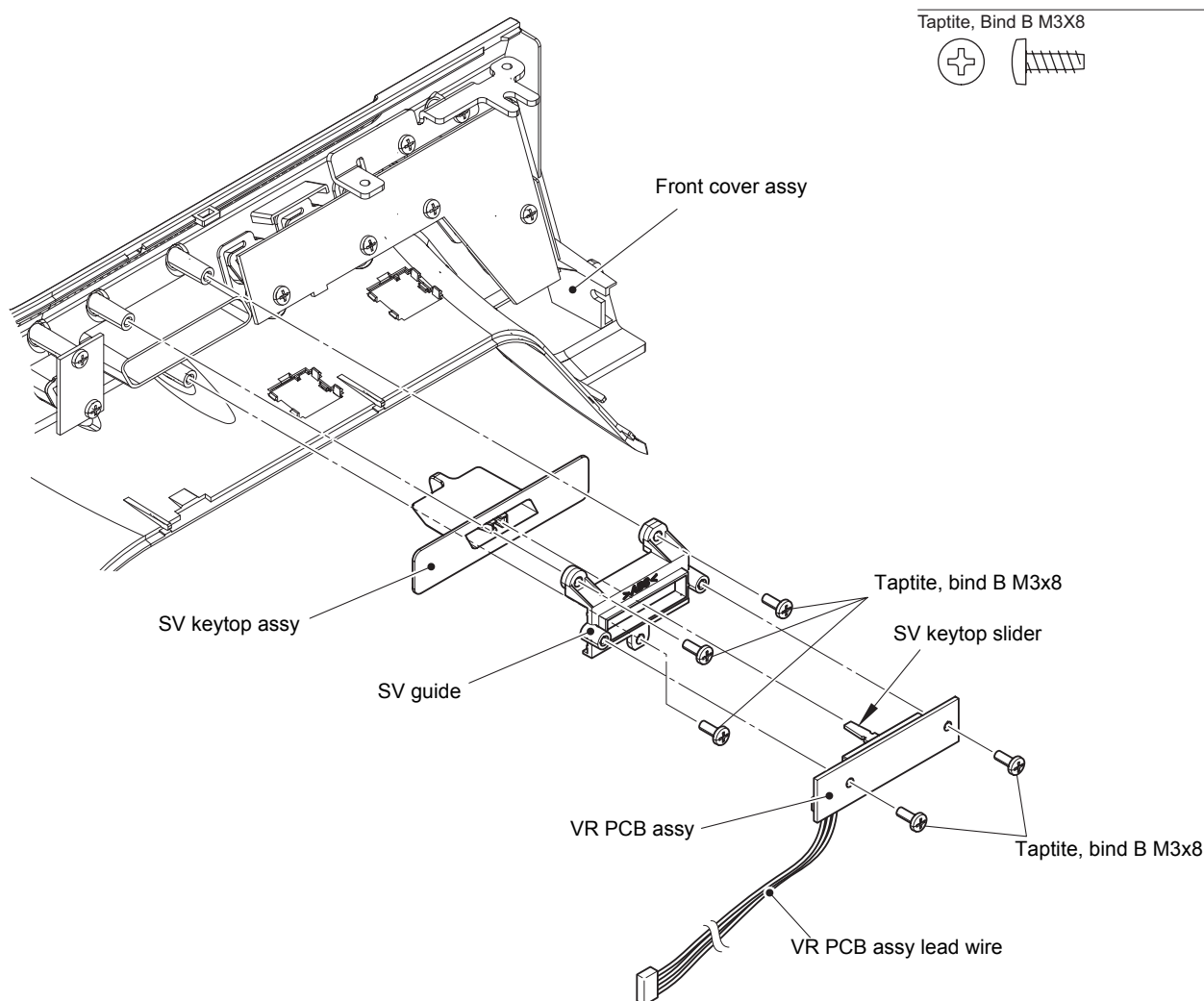


7-7 Attachment of SV keytop assy and VR PCB assy

1. Set the SV keytop assy and SV guide to the front cover assy, and secure them with the two screws (taptite, bind B M3x8).
2. Insert the SV keytop slider into the positioning hole of SV keytop assy, and attach the VR PCB assy to the SV guide with the two screws (taptite, bind B M3x8).
3. Connect the connector of VR PCB assy lead wire to the CN5 on the panel PCB assy, and clip the each lead wire together.

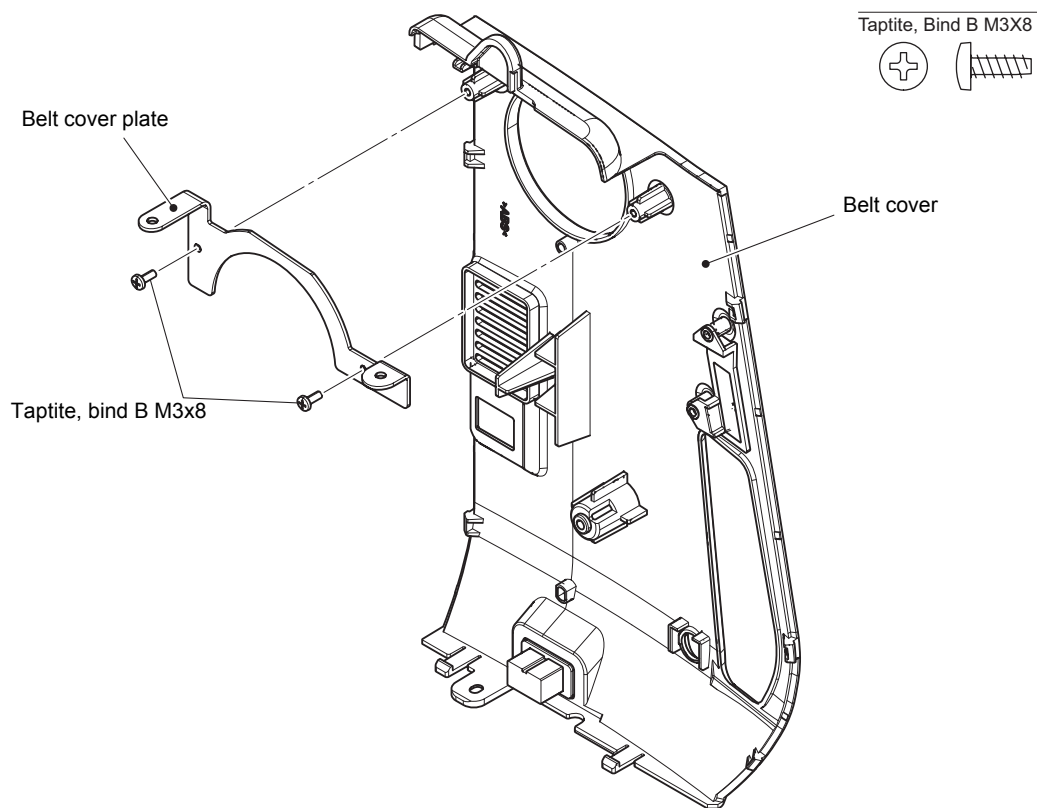
***Key point**

- Refer to "Wiring of Right side of Front cover assy".

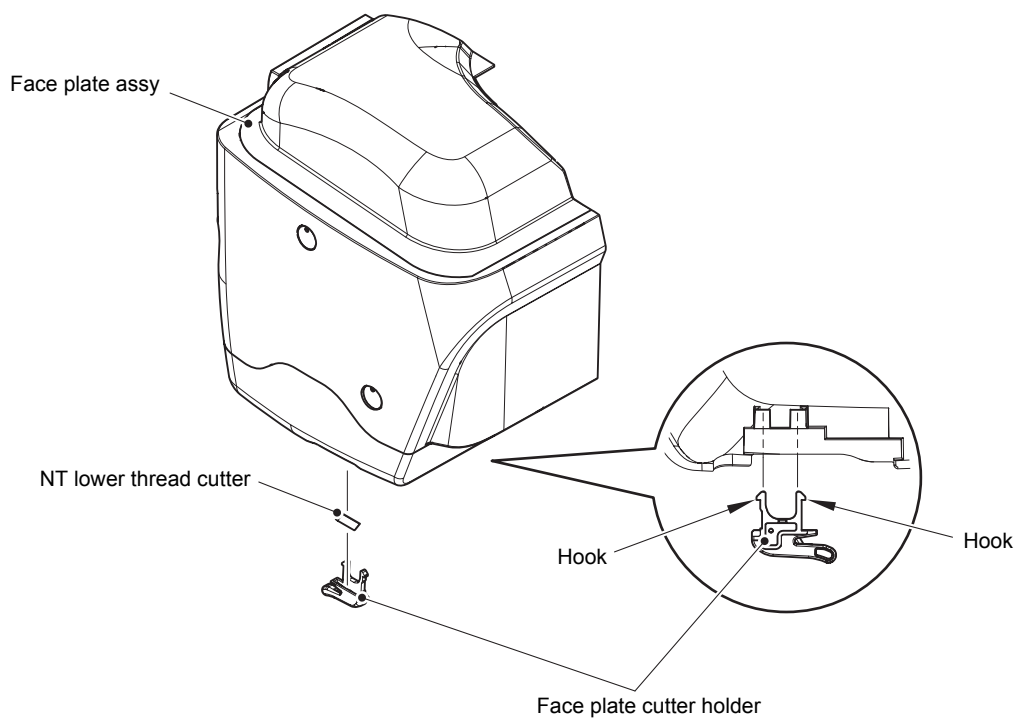


8 Assembly of Belt cover

1. Attach the belt cover plate to the belt cover with the two screws (taptite, bind B M3x8).

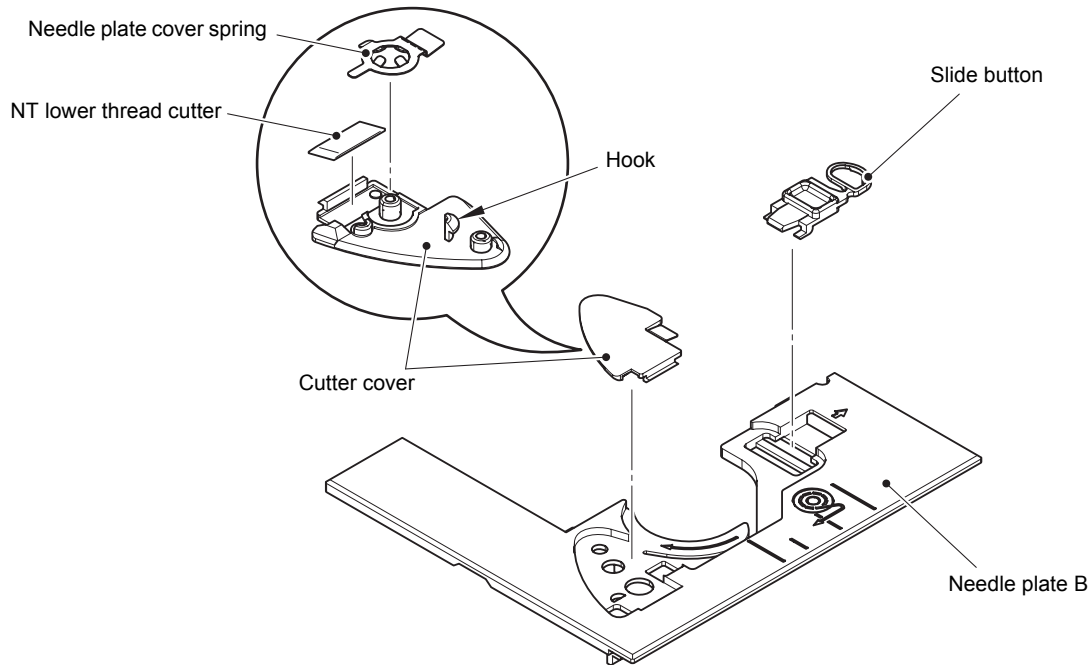
**9** Assembly of Face plate assy

1. Set the NT lower thread cutter to the face plate cutter holder, and attach the face plate cutter holder to the face plate assy with the two hooks.

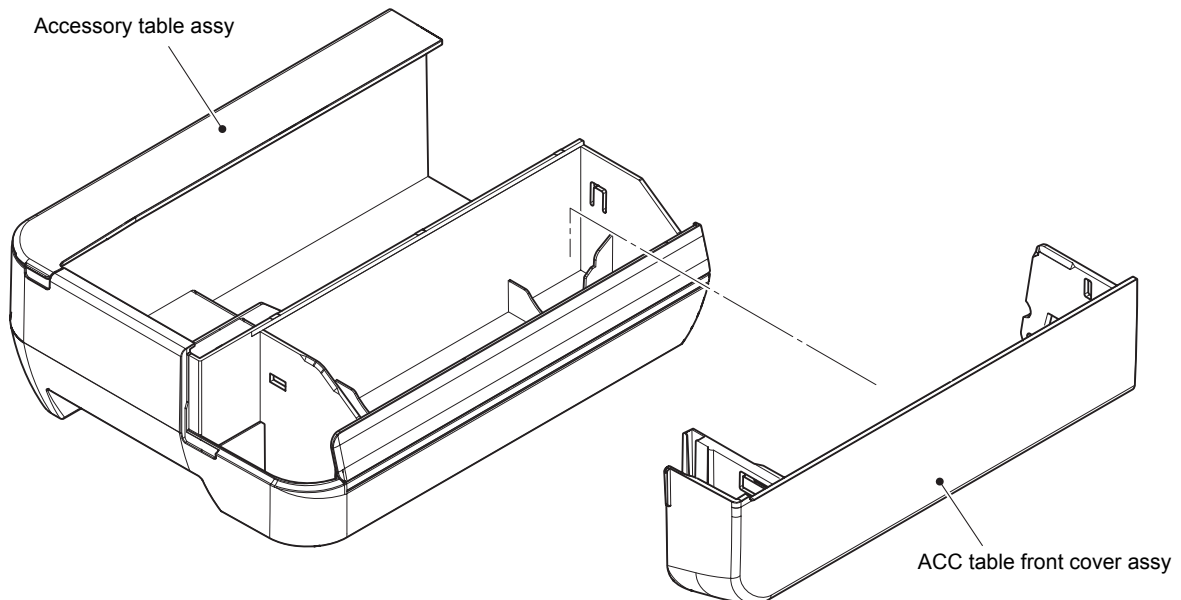


10 Assembly of Needle plate B assy

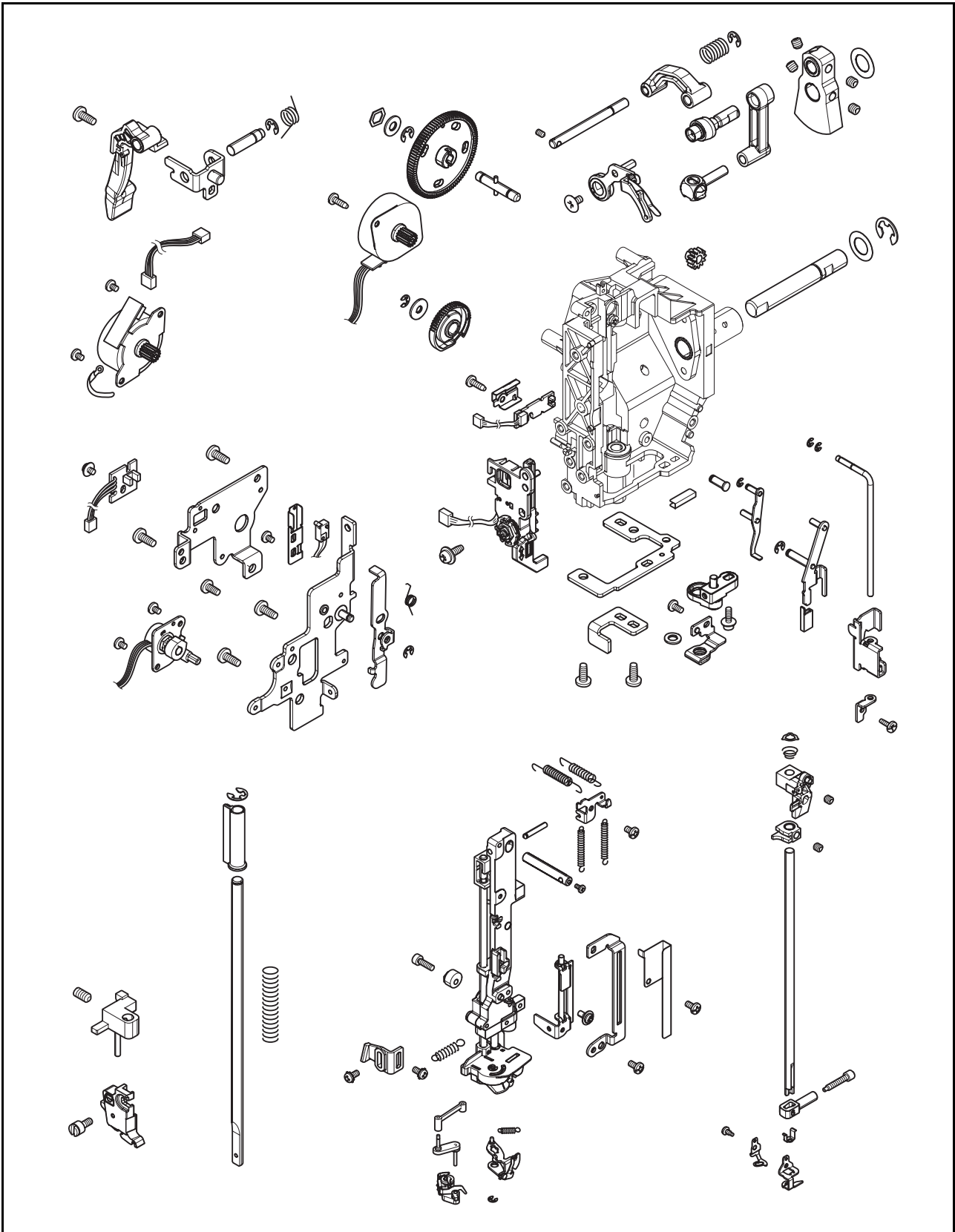
1. Attach the NT lower thread cutter and the needle plate cover spring to the cutter cover. Attach the cutter cover to the needle plate B with the hook.
2. Attach the slide button to the needle plate B.

**11** Assembly of Accessory table assy

1. Attach the ACC table front cover assy to the accessory table assy.



Needle-presser module location diagram

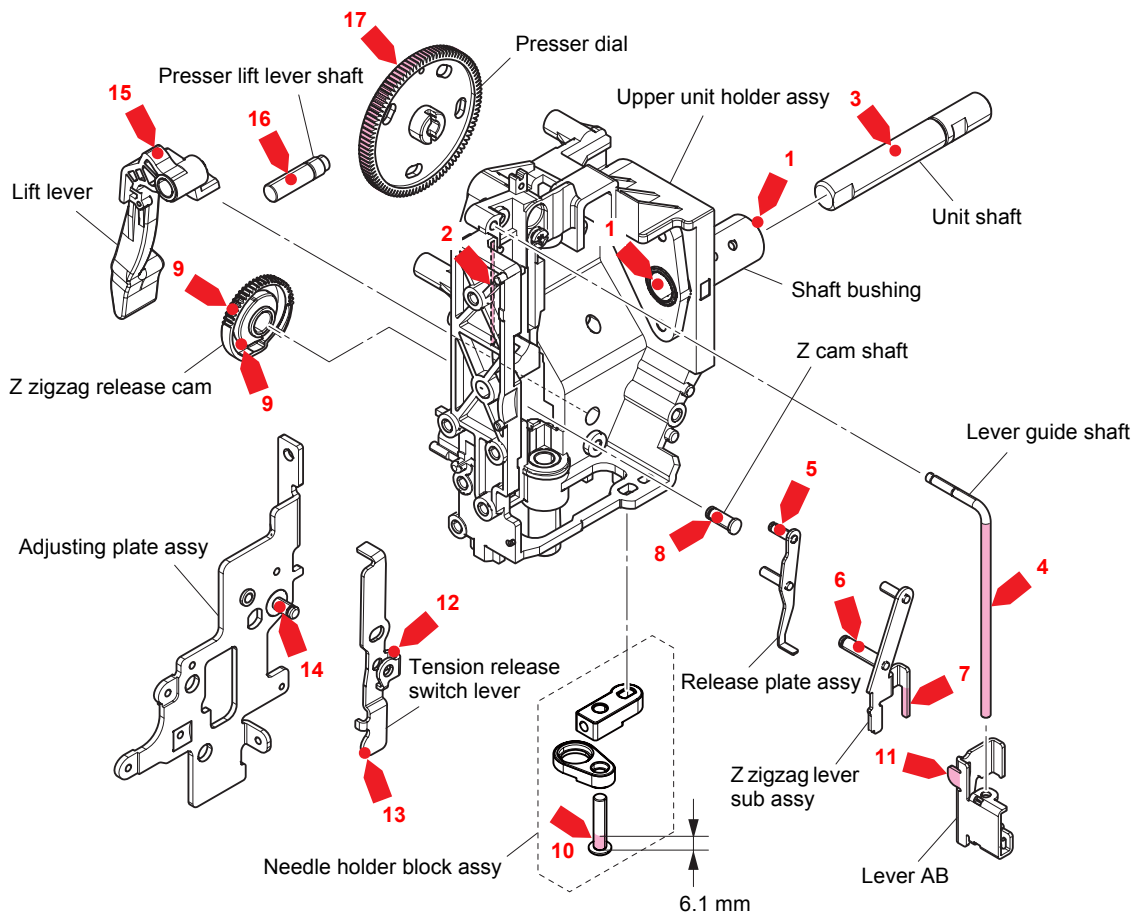


Application of
Assembly

Application of
Assembly

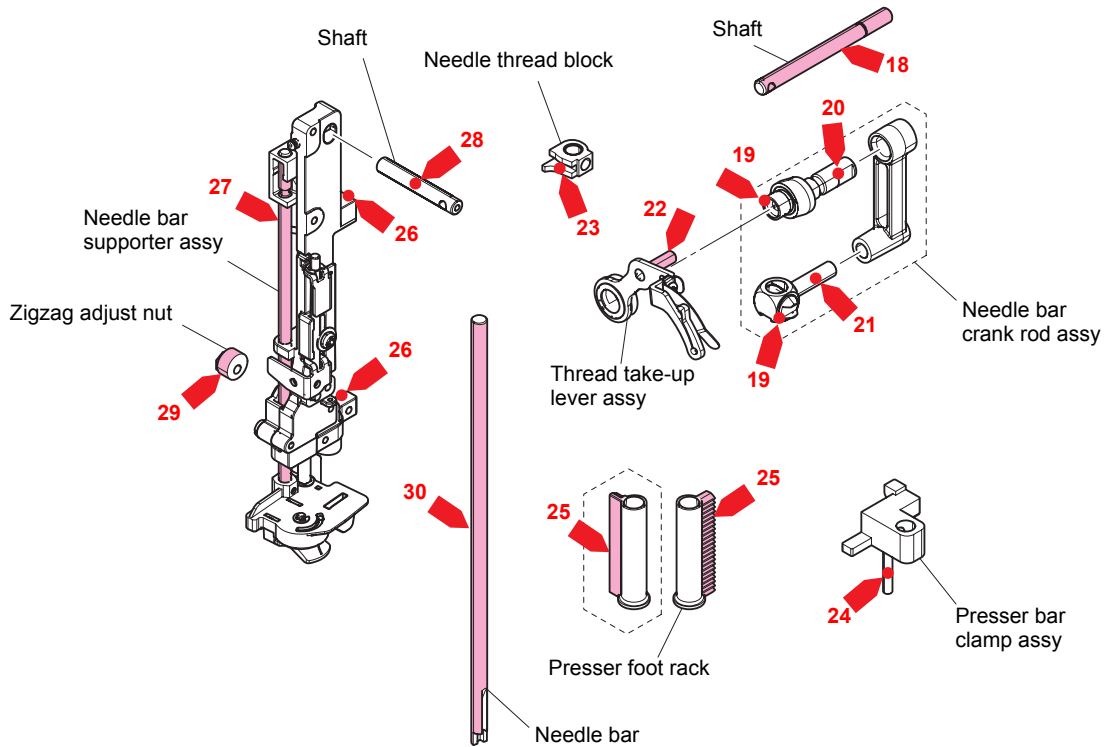
1 Lubrication

Lubrication point			Lubricating oil type	Quantity of lubrication
1	Shaft bushing	2 places	FBK OIL RO 100	1 to 2 drops
2	Upper unit holder assy	1 place	EPNOC AP (N) 0	Light covering
3	Unit shaft	1 place	FBK OIL RO 100	1 to 2 drops
4	Lever guide shaft	1 place	EPNOC AP (N) 0	Thinly all surface
5	Release plate assy	1 place	MOLYKOTE EM30L	Rice-grain size
6	Z zigzag lever sub assy	1 place	MOLYKOTE EM30L	Rice-grain size
7		1 place	EPNOC AP (N) 0	Light covering
8	Z cam shaft	1 place	MOLYKOTE EM30L	Rice-grain size
9	Z zigzag release cam	2 places	MOLYKOTE EM30L	Rice-grain size
10	Needle holder block assy	1 place	EPNOC AP (N) 0	Light covering
11	Lever AB	1 place	MOLYKOTE EM30L	Light covering
12	Tension release switch lever	1 place	EPNOC AP (N) 0	Rice-grain size
13		1 place	MOLYKOTE EM30L	Rice-grain size
14	Adjusting plate assy	1 place	EPNOC AP (N) 0	Rice-grain size
15	Lift lever	1 place	EPNOC AP (N) 0	Thinly all surface
16	Presser lift lever shaft	1 place	MOLYKOTE EM30L	Small amount
17	Presser dial	1 place	MOLYKOTE EM30L	Light covering



Lubrication point			Lubricating oil type	Quantity of lubrication
18	Shaft	1 place	MOLYKOTE M DISPERSION	Thinly all surface
19	Needle bar crank rod assy	2 places	MOLYKOTE EM30L	Small amount
20		1 place	MOLYKOTE M DISPERSION*	1 to 2 drops
21		1 place	MOLYKOTE M DISPERSION	1 to 2 drops
22	Thread take-up lever assy	1 place	MOLYKOTE M DISPERSION	Thinly all surface
23	Needle thread block	1 place	MOLYKOTE EM30L	Rice-grain size
24	Presser bar clamp assy	1 place	MOLYKOTE EM30L	Small amount
25	Presser foot rack	2 places	MOLYKOTE EM30L	Light covering
26	Needle bar supporter assy	2 places	Oiler	1 to 2 drops
27		1 place	MOLYKOTE EM30L	Thinly all surface
28	Shaft	1 place	FBK OIL RO 100	1 to 2 drops
29	Zigzag adjusting nut	1 place	EPNOC AP (N) 0	Light covering
30	Needle bar	1 place	Oiler	Thinly all surface

*Mix the MOLYKOTE M DISPERSION in the following ratios. MOLYKOTE M DISPERSION 10% : OILER 90%



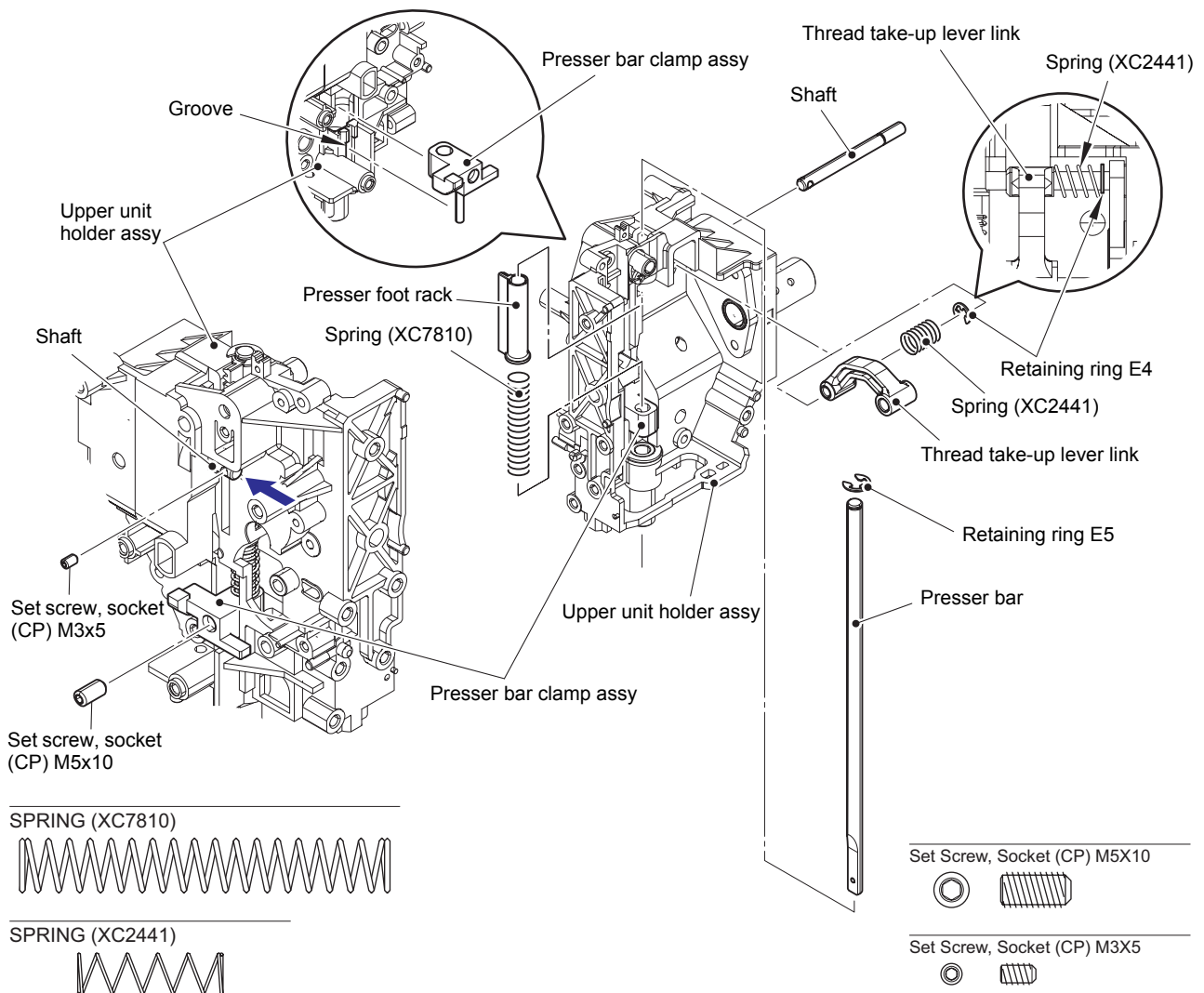
2 Attachment of Presser bar clamp assy, Presser bar and Thread take-up lever link

1. Set the presser foot rack to the upper unit holder assy.
2. Set the presser bar clamp assy to the back of upper unit holder, and fit the shaft of presser bar clamp assy into the groove on upper unit holder. Attach the retaining ring E5 to the presser bar, and insert the presser bar into the presser foot rack, spring (XC7810), presser bar clamp assy and upper unit holder assy. Tighten the screw (set screw, socket (CP) M5x10) temporarily to the presser bar clamp assy.

*Key point

- Fully tighten the screw after performing "Adjustment of Presser bar height".

3. Insert the shaft into the upper unit holder assy, spring (XC2441), thread take-up lever link and upper unit holder assy, then attach the retaining ring E4 to the shaft. Tighten the screw (set screw, socket (CP) M3x5) to the shaft while pushing the shaft to the direction of the arrow.



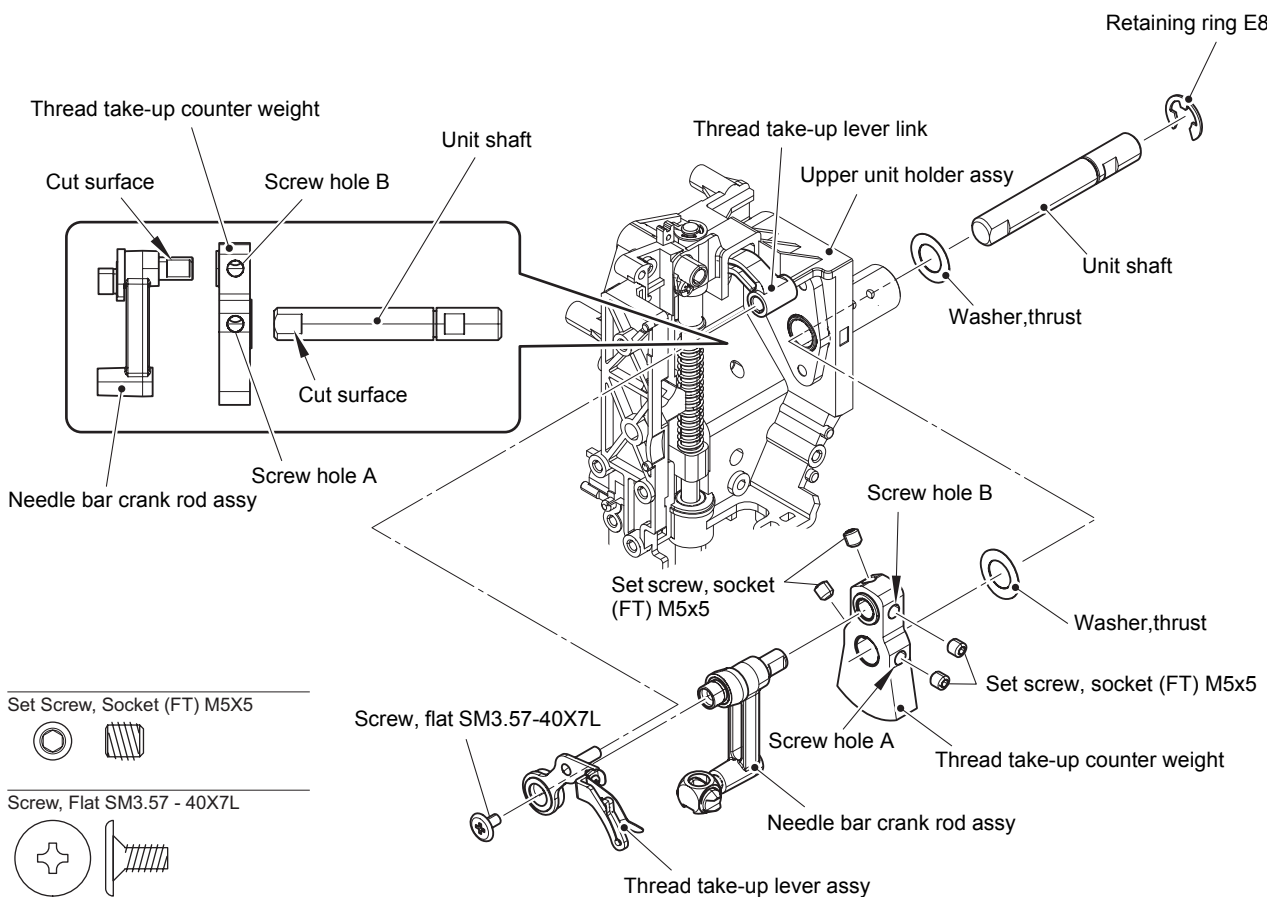
3 Attachment of Unit shaft, Thread take-up counter weight, Thread take-up lever assy and Needle bar crank rod assy

1. Attach the retaining ring E8 to the unit shaft. Insert the unit shaft into the washer, thrust, upper unit holder assy, another washer, thrust and thread take-up counter weight. Align the screw hole A of thread take-up counter weight with the cut surface of unit shaft, and secure the thread take-up counter weight to the unit shaft with the two screws (set screw, socket (FT) M5x5).
2. Set the thread take-up lever assy to the needle bar crank rod assy, and secure it with the screw (screw, flat SM3.57-40X7L).

***Key point**

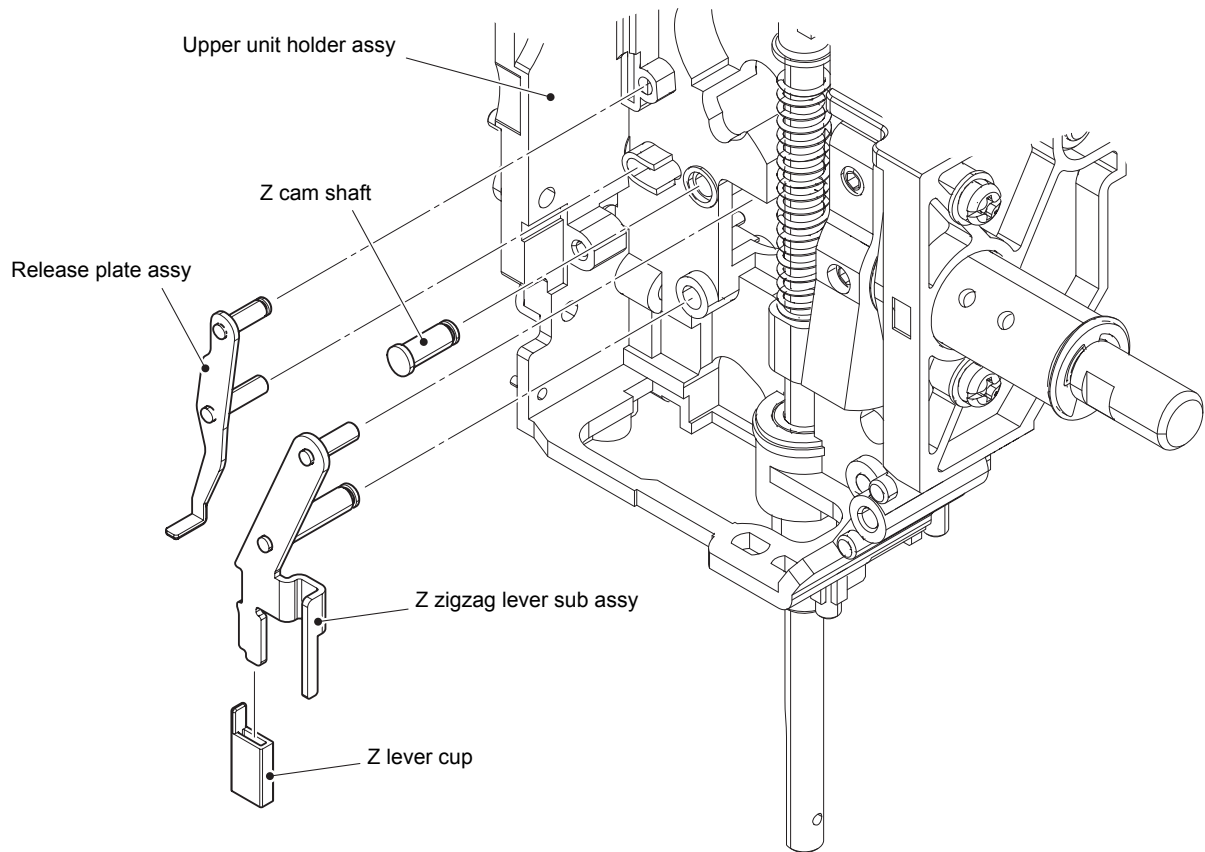
- Loosen the screw by turning it clockwise.

3. Insert the shaft of thread take-up lever assy into the thread take-up lever link, and insert the shaft of needle bar crank rod assy into the thread take-up counter weight. Align the screw hole B of thread take-up counter weight with the cut surface of shaft of needle bar crank rod assy, and secure the shaft of needle bar crank rod assy with the two screws (set screw, socket (FT) M5x5).

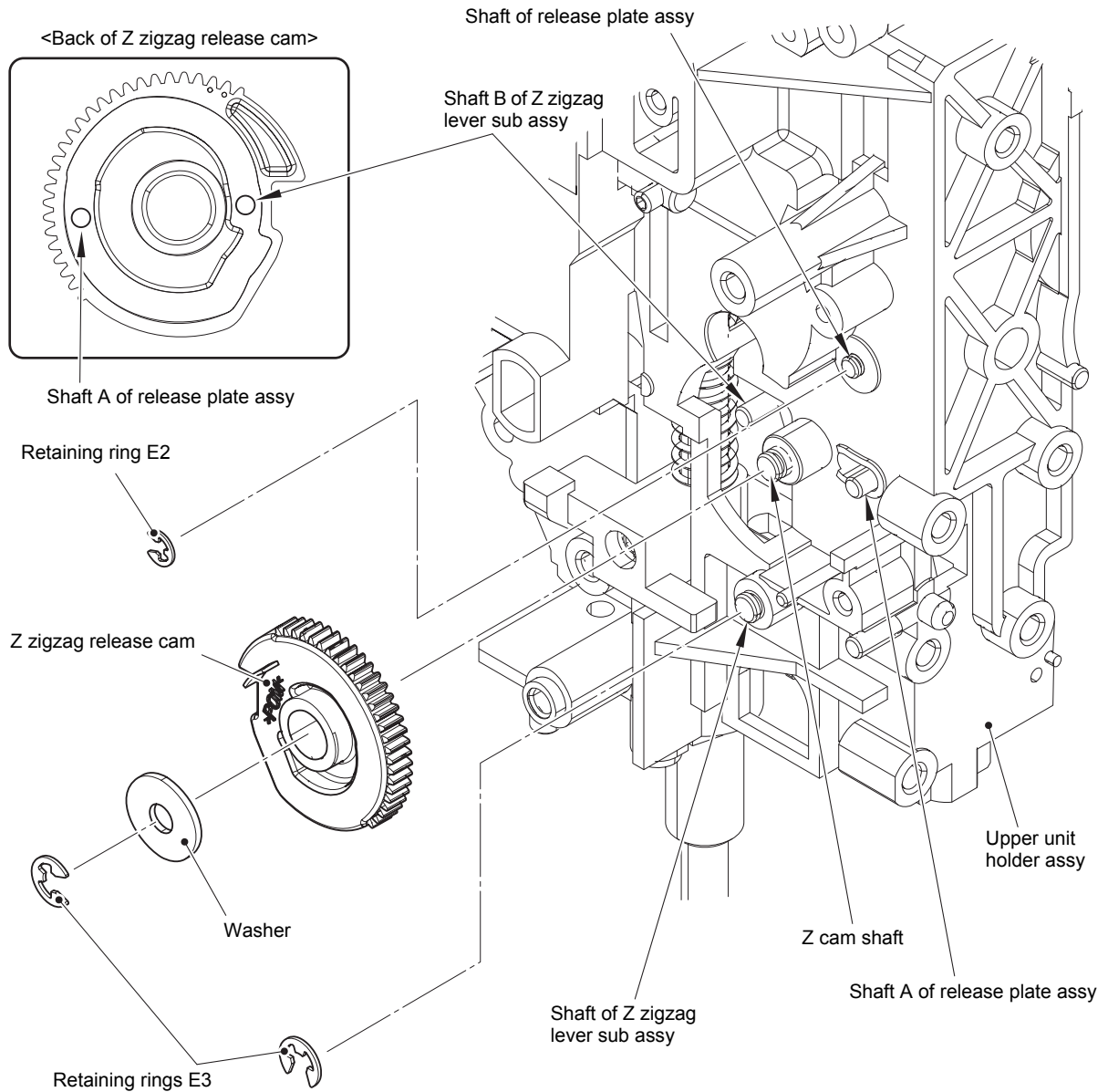


4 Attachment of Release plate assy, Z zigzag lever sub assy and Z zigzag release cam

1. Set the release plate assy to the upper unit holder assy.
2. Attach the Z lever cup to the Z zigzag lever sub assy. Set the Z zigzag lever sub assy to the upper unit holder assy.
3. Insert the Z cam shaft into the upper unit holder assy.



4. Attach the retaining ring E2 to the shaft of release plate assy.
5. Attach the retaining ring E3 to the shaft of Z zigzag lever sub assy.
6. Align the groove of Z zigzag release cam with the shaft A of release plate assy and shaft B of Z zigzag lever sub assy, and set the Z zigzag release cam to the upper unit holder assy.
7. Set the washer to the Z cam shaft, and attach the retaining ring E3 to the Z cam shaft.

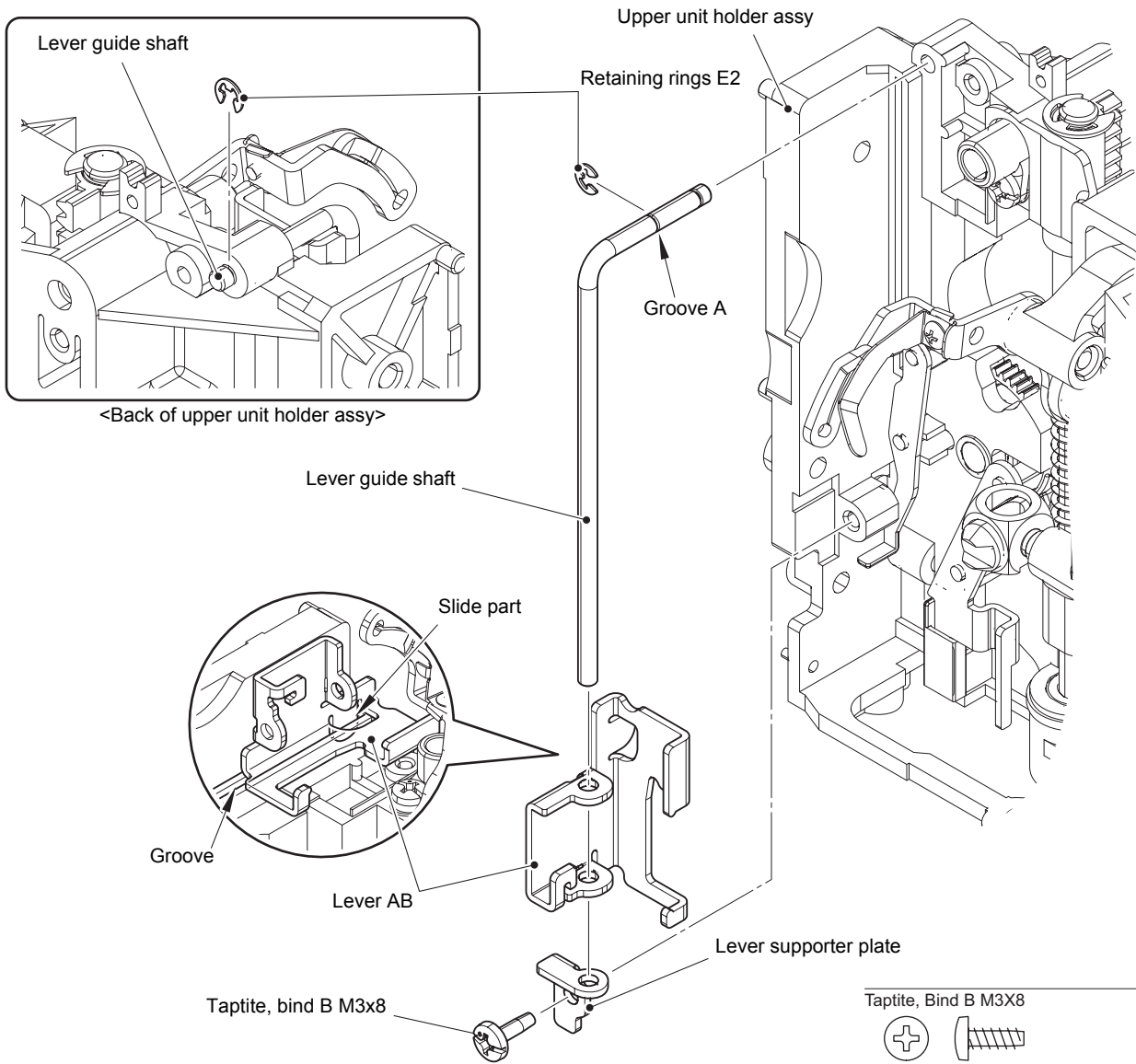


Application of
Assembly

Application of
Assembly

5 Attachment of Lever AB

1. Attach the retaining ring E2 to the groove A on lever guide shaft. Attach the lever guide shaft to the upper unit holder assy, and attach the retaining ring E2 to the lever guide shaft.
2. Set the lever AB to the lever guide shaft, and put the sliding part of lever AB on the groove of upper unit holder assy. Set the lever supporter plate to the lever guide shaft, and attach the lever supporter plate to the upper unit holder assy with the screw (taptite, bind B M3x8).



Application of
Assembly

Application of
Assembly

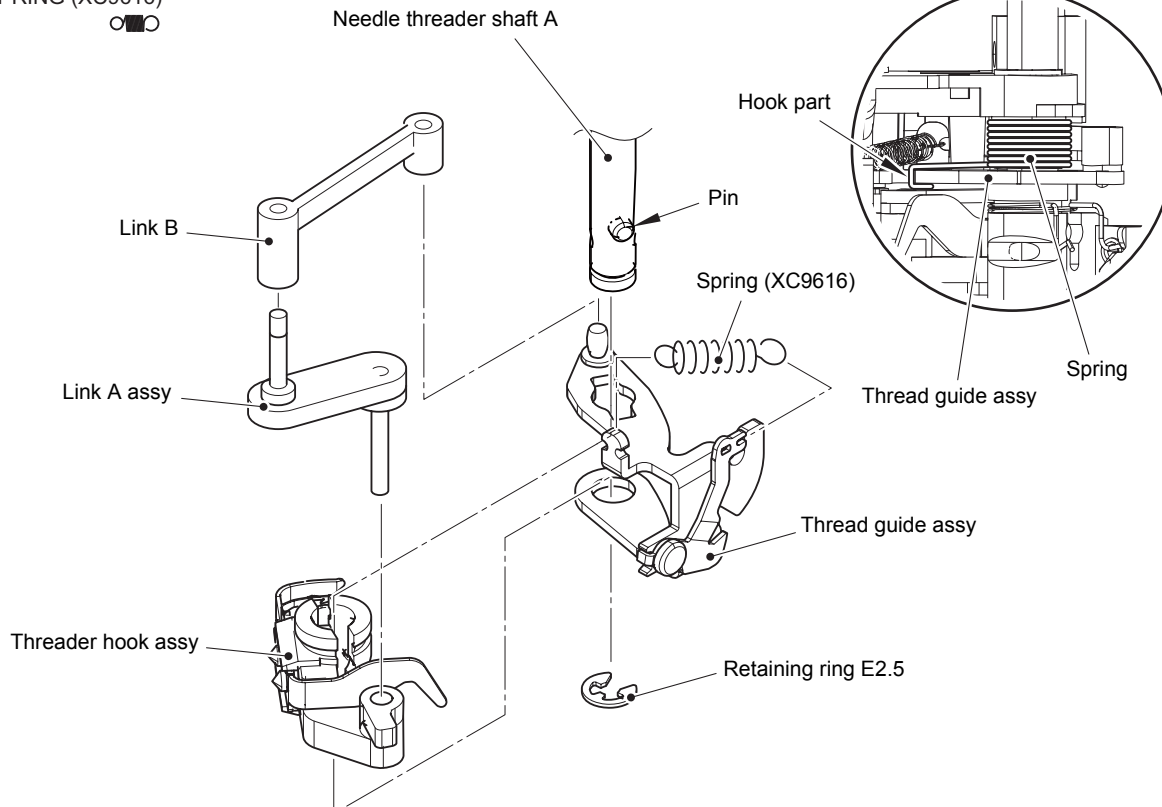
6 Attachment of Threader hook assy

1. Set the spring (XC9616) to the thread guide assy, and assemble the threader hook assy, link A assy, link B and thread guide assy.

***Key point**

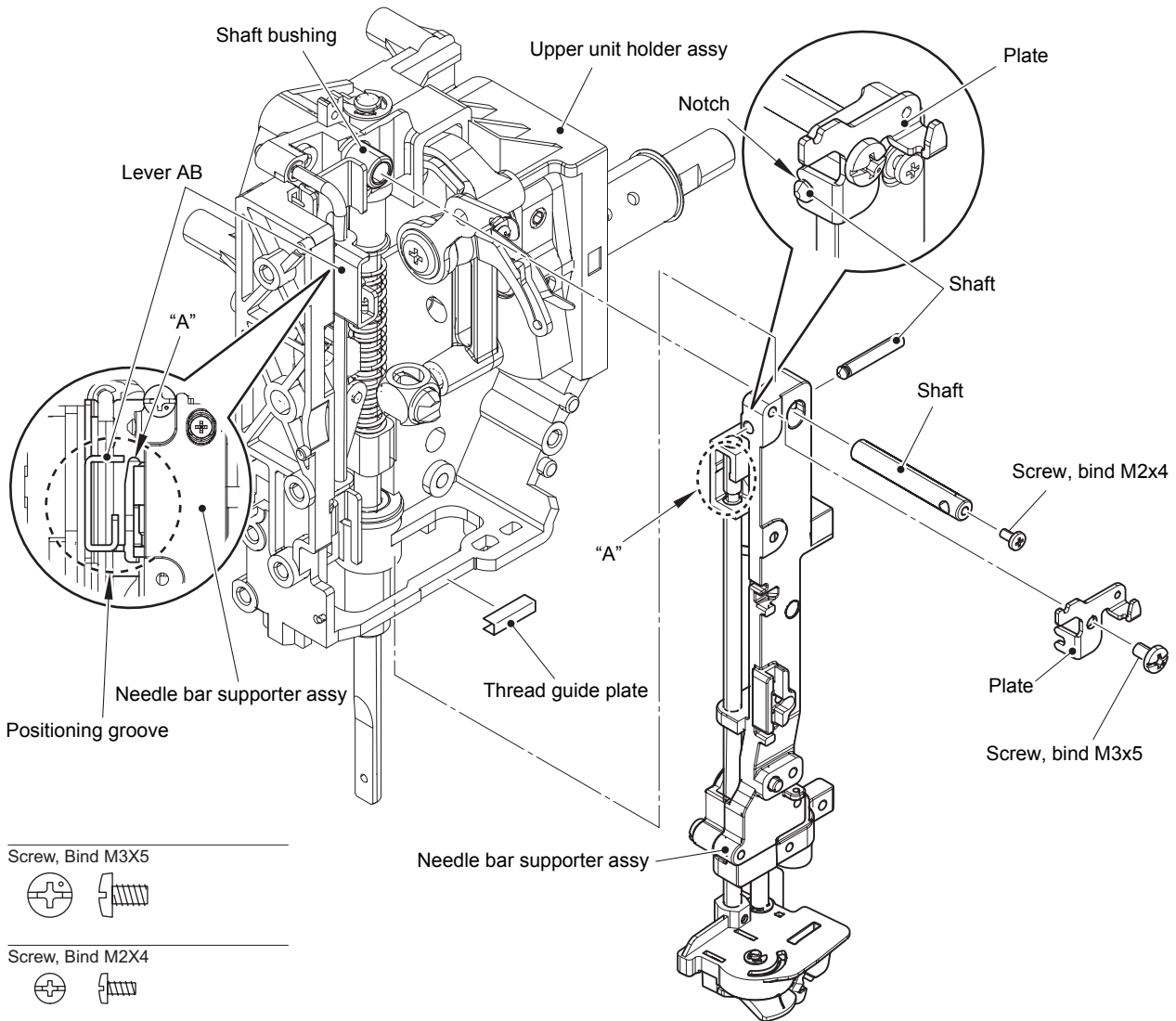
- Assemble the threader hook assy so that a triangle is formed.
2. Align the shaft hole of threader hook assy with the pin of needle threader shaft A of needle bar supporter assy, attach the threader hook assy to the needle threader shaft A, and then hang the hook part of spring on the thread guide assy. Attach the retaining ring E2.5 to the needle threader shaft A.

SPRING (XC9616)



7 Attachment of Thread guide plate and Needle bar supporter assy

1. Attach the thread guide plate to the upper unit holder assy.
2. Insert the needle bar supporter assy into the upper unit holder assy, and set the position "A" of needle bar supporter assy to the positioning groove of lever AB.
3. Insert the shaft into the positioning hole of needle bar supporter assy and the shaft bushing. Insert the shaft into the needle bar supporter assy, shaft and needle bar supporter assy. Align the notch of plate with the groove on shaft, and attach the plate to the needle bar supporter assy with the screw (screw, bind M3x5). Tighten the screw (screw, bind M2x4) to the shaft.

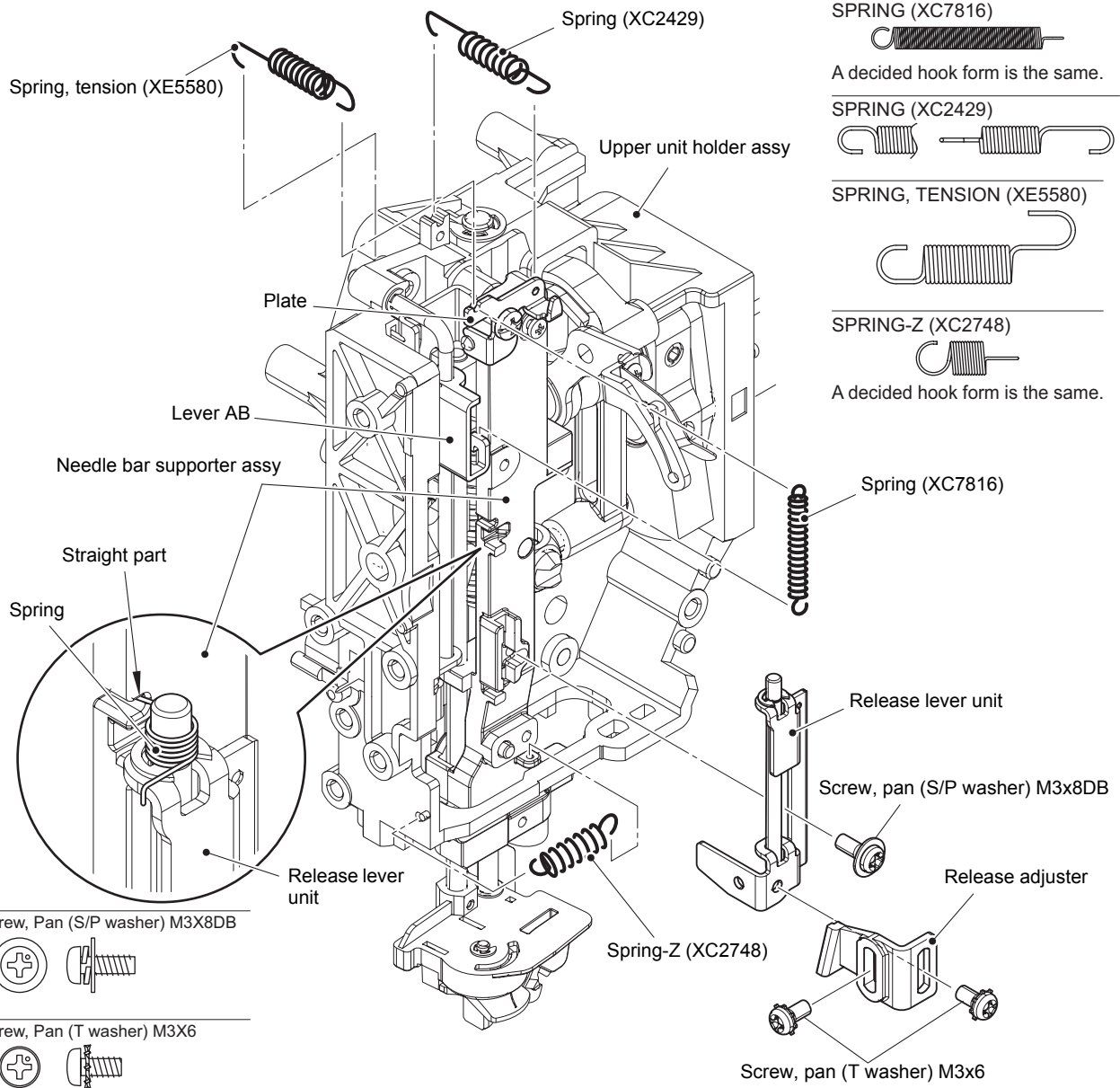


Application of
Assembly

Application of
Assembly

8 Attachment of Springs

1. Attach the spring (XC7816) to the plate and lever AB. Attach the spring (XC2429) to the upper unit holder assy and plate. Attach the spring, tension (XE5580) to the upper unit holder assy and plate. Attach the spring-Z (XC2748) to the upper unit holder assy and needle bar supporter assy.
2. Hang the straight part of spring of release lever unit on the groove of needle bar supporter assy, and attach the release lever unit to the needle bar supporter assy with the screw (screw, pan (S/P washer) M3x8DB). Attach the release adjuster to the release lever unit with the two screws (screw, pan (T washer) M3x6).



Application of
Assembly

Application of
Assembly

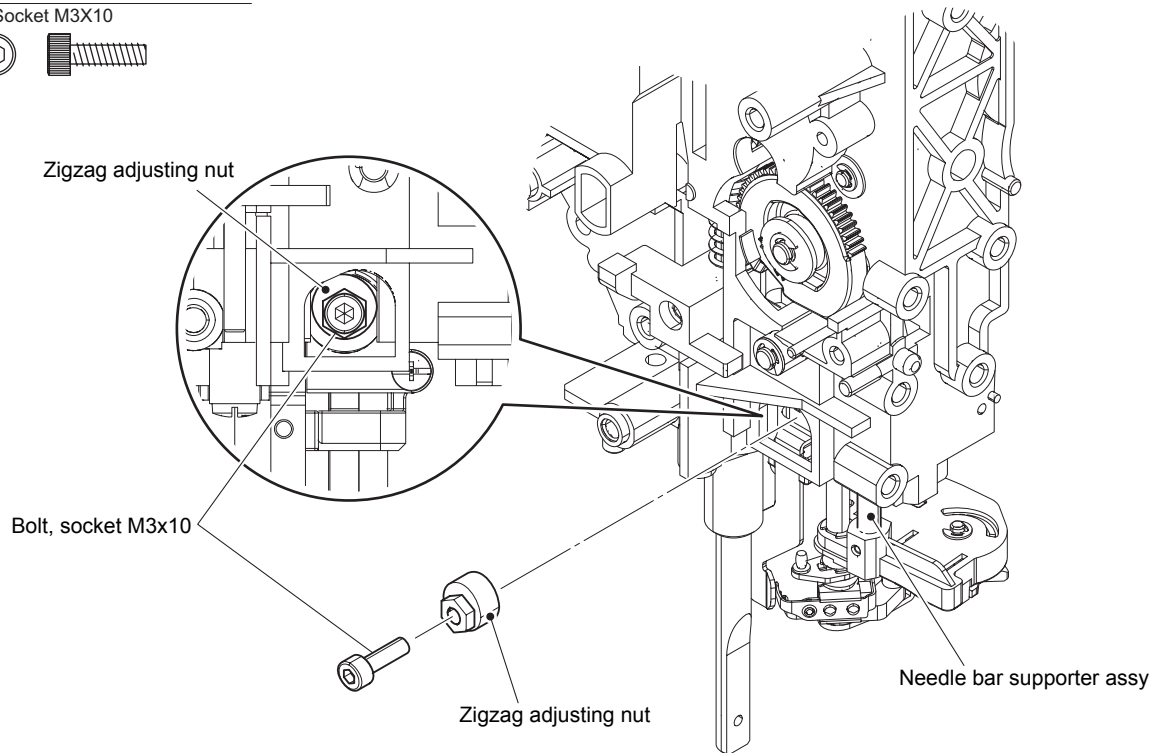
9 Attachment of Zigzag adjusting nut

1. Set the zigzag adjusting nut to the needle bar supporter assy, and tighten the screw (bolt, socket M3x10) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Left base line needle drop".

Bolt, Socket M3X10



10 Attachment of Needle holder block base, Presser bar support plate, Needle holder block assy and W presser adjust plate

1. Align the two positioning holes of needle holder block base with the two bosses of upper unit holder assy, and attach the needle holder block base to the upper unit holder assy with the screw (taptite, bind B M4x10). Align the positioning hole of presser bar support plate with the boss of upper unit holder assy, and attach the presser bar support plate to the upper unit holder assy with the screw (taptite, bind B M4x10).

2. Insert the shaft of needle holder block assy into the positioning hole of needle holder block base, and set the needle holder block assy to the boss of the needle bar supporter assy, then set the needle holder block assy to the needle holder block base, and tighten the screw (screw 3x10) temporarily.

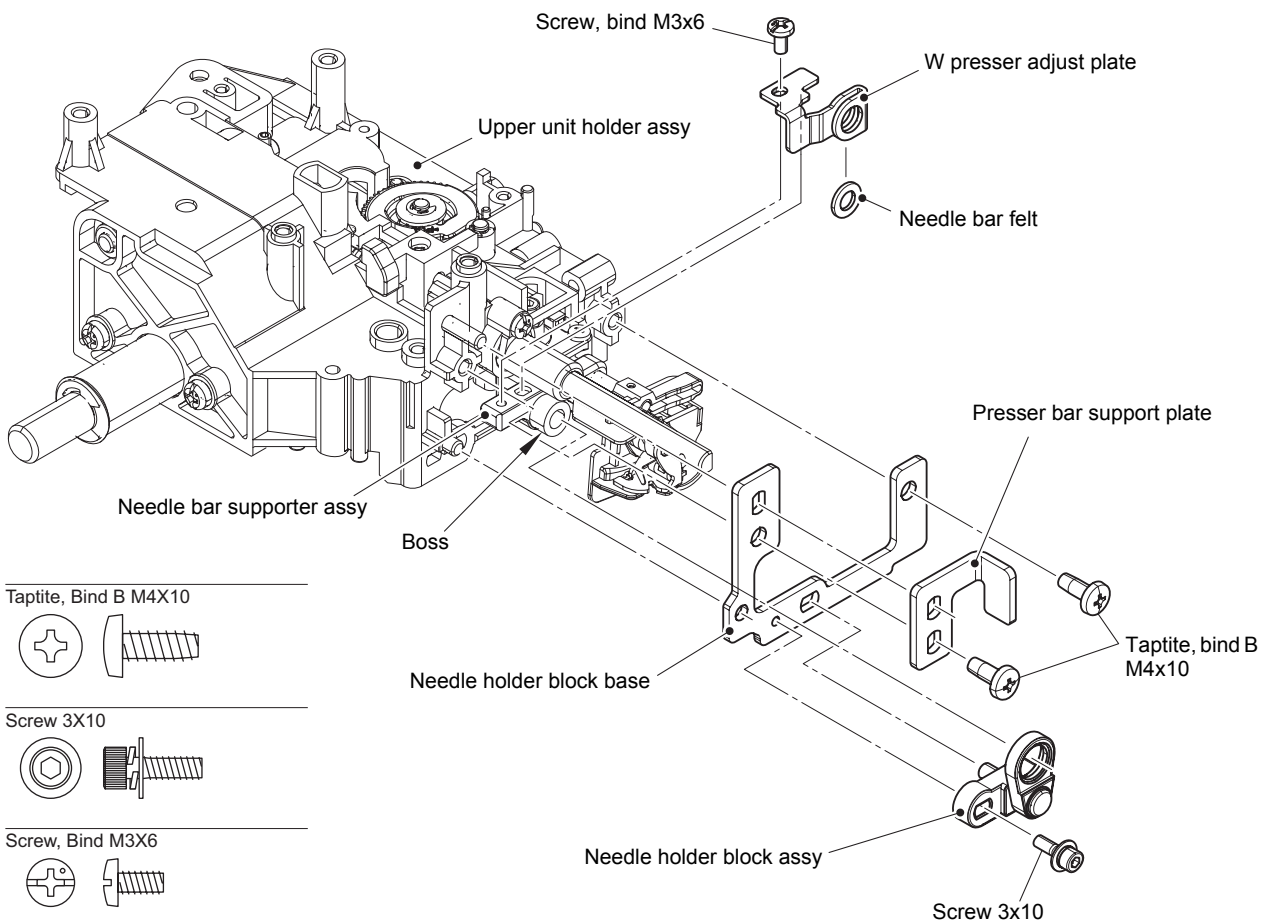
***Key point**

- Fully tighten the screw after performing "Adjustment of Needle clearance left/right".

3. Set the needle bar felt to the W presser adjust plate. Align the boss of W presser adjust plate with the positioning hole of needle bar supporter assy, set the W presser adjust plate to the needle bar supporter assy, and tighten the screw (screw, bind M3x6) temporarily.

***Key point**

- Fully tighten the screw after the needle bar attachment.



11 Attachment of Needle thread block, Needle bar hook stand assy and Needle bar assy

1. Set the needle thread plate to the needle block. Attach the needle bar thread guide Q, needle block and needle thread guide spring to the needle bar with the screw (screw SM2.38). Tighten the needle clamp screw to the needle block.

***Key point**

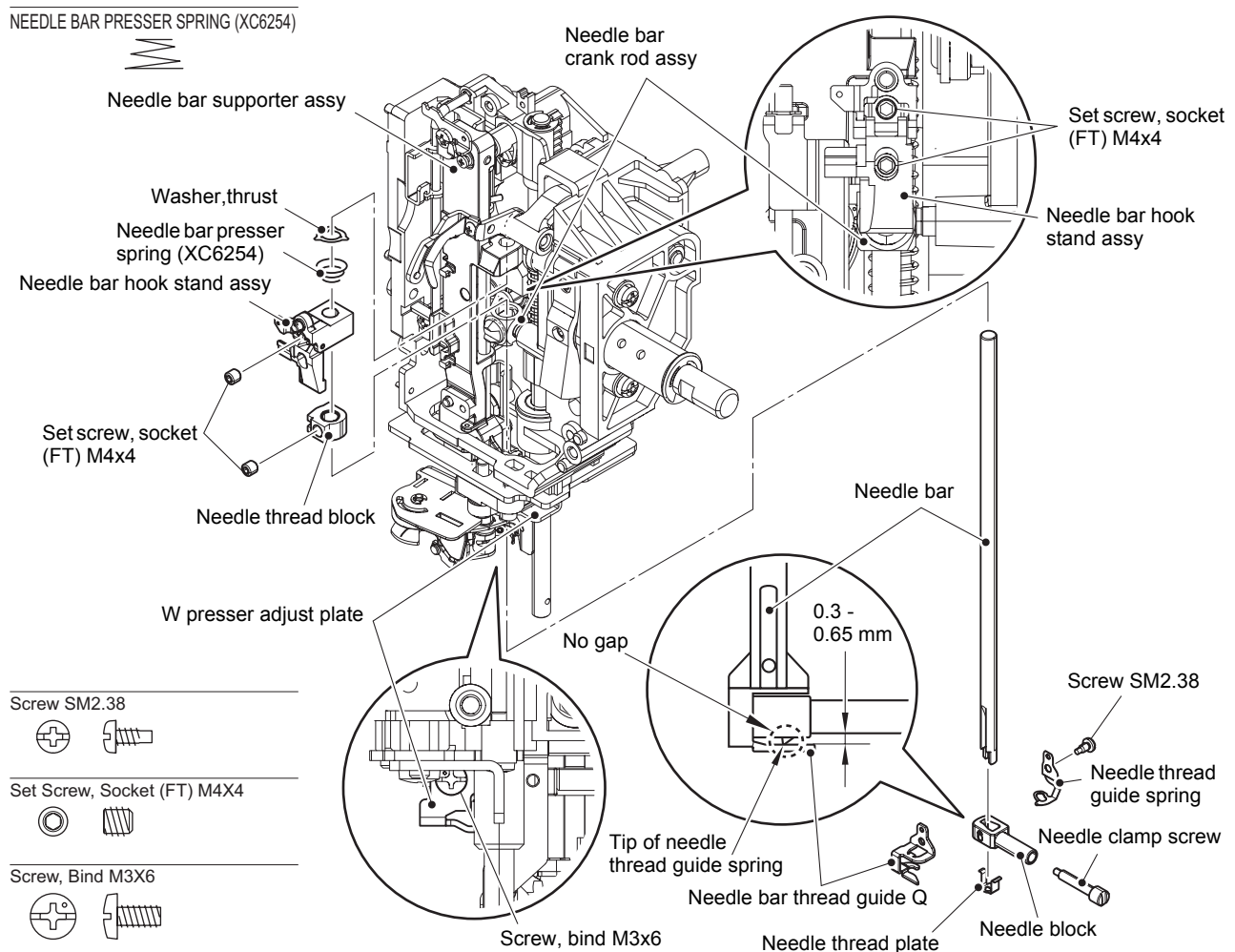
- Make sure that there is no gap between the needle bar thread guide Q and the tip of needle thread guide spring.
- Make sure that there is 0.3 to 0.65 mm gap between the needle block and the right side of needle bar thread guide Q.

2. Insert the needle bar into the W presser adjust plate, needle bar supporter assy, needle bar crank rod assy, needle thread block, needle bar hook stand assy, needle bar presser spring (XC6254), washer, thrust and needle bar supporter assy, then tighten the two screws (set screw, socket (FT) M4x4) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Needle bar height".

3. Fully tighten the screw (screw, bind M3x6) of W presser adjust plate.



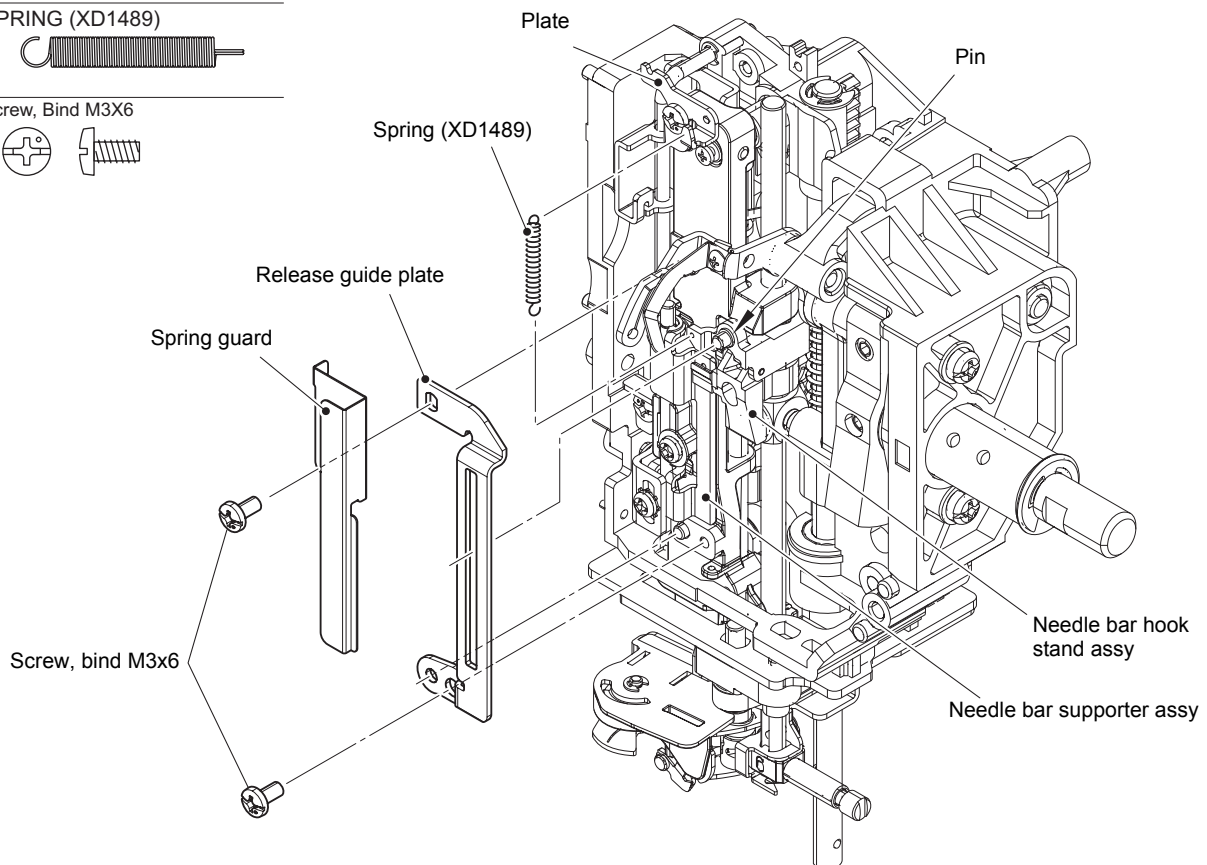
12 Attachment of Release guide plate and Spring guard

1. Attach the spring (XD1489) to the plate and needle bar hook stand assy.
2. Align the positioning hole of release guide plate with the boss of needle bar supporter assy, and insert the pin of needle bar hook stand assy into the groove of release guide plate, then set the release guide plate and the spring guard to the needle bar supporter assy with the two screws (screw, bind M3x6).

SPRING (XD1489)



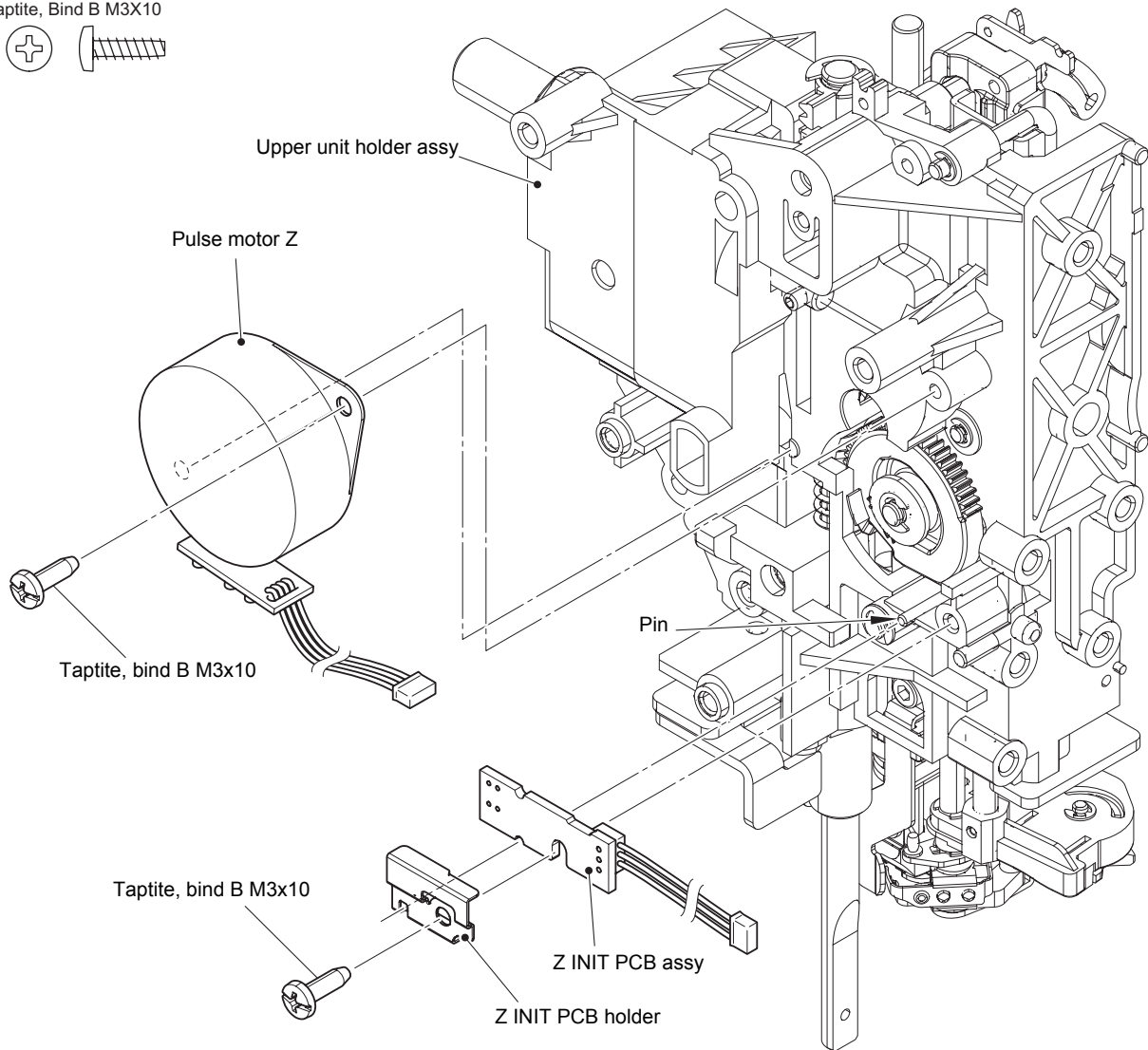
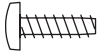
Screw, Bind M3x6



13 Attachment of Pulse motor Z and Z INIT PCB assy

1. Attach the pulse motor Z to the upper unit holder assy with the screw (taptite, bind B M3x10).
2. Align the notch of Z INIT PCB assy with the pin of upper unit holder assy, set the Z INIT PCB assy, align the positioning hole of Z INIT PCB holder with the pin of upper unit holder assy, set the Z INIT PCB holder, and then secure them to the upper unit holder assy with the screw (taptite, bind B M3x10).

Taptite, Bind B M3X10



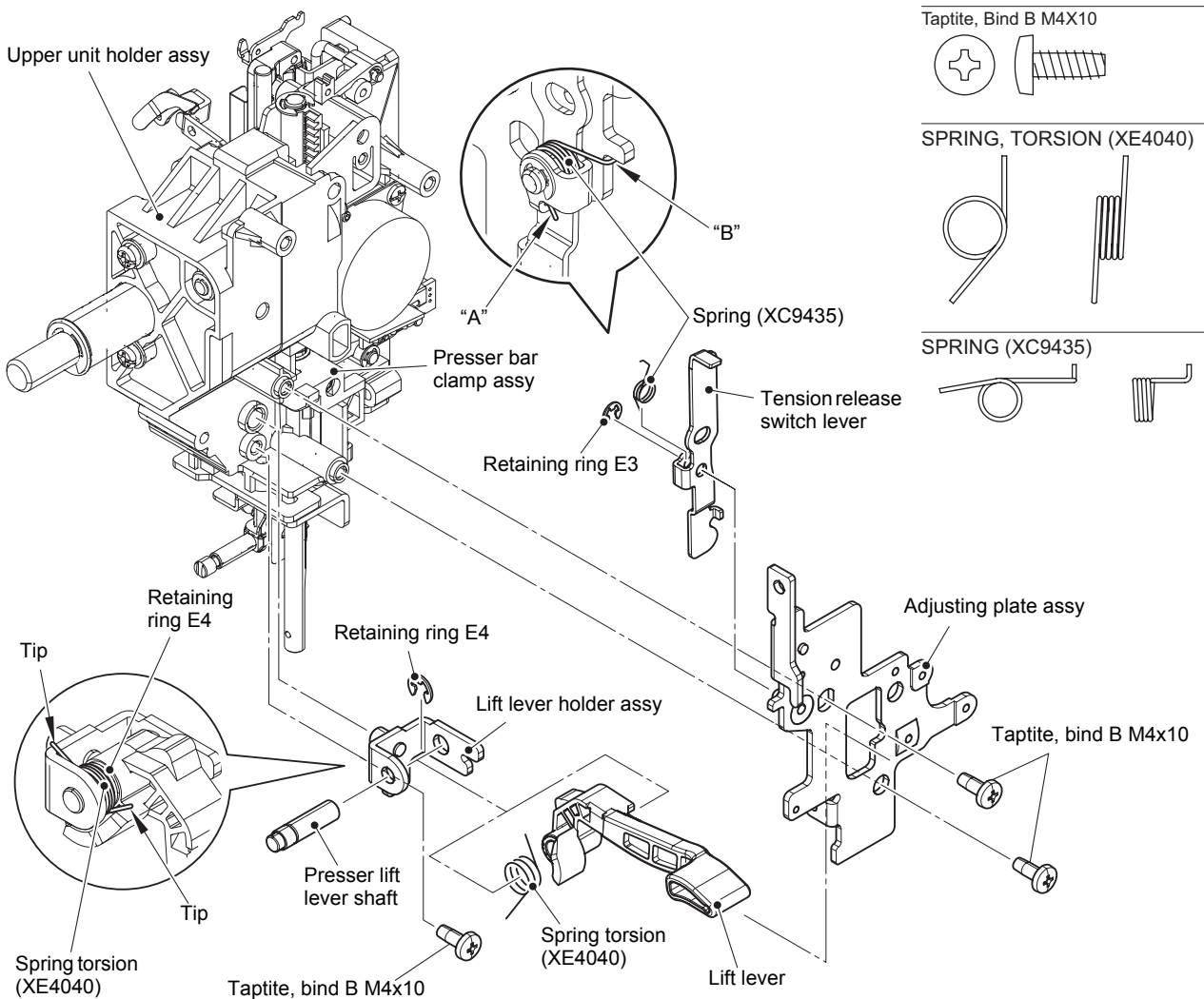
14 Attachment of Lift lever and Adjusting plate assy

1. Insert the presser lift lever shaft into the lift lever holder assy, spring torsion (XE4040), lift lever and lift lever holder assy, then attach the retaining ring E4 to the presser lift lever shaft. Attach the lift lever holder assy to the upper unit holder assy with the screw (taptite, bind B M4x10) while pulling up the lift lever.

***Key point**

- Be sure to hang both ends of spring on the lift lever holder assy and lift lever.
- Make sure that the presser bar clamp assy is on the upper side of lift lever.

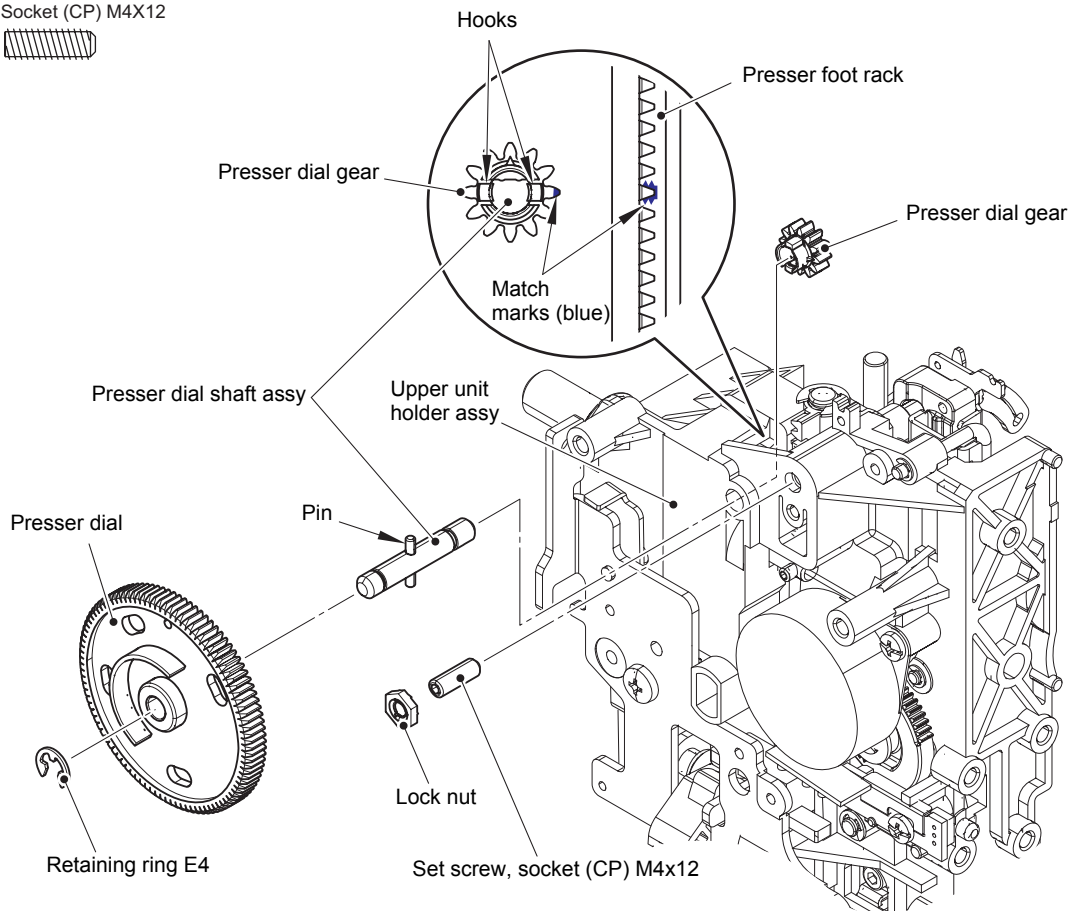
2. Set the spring (XC9435) to the tension release switch lever, and set it to the shaft of adjusting plate assy, then attach the retaining ring E3. Hang the tip end "A" of spring (XC9435) on the tension release switch lever, and hang the tip end "B" of spring (XC9435) on the adjusting plate assy. Pass the lift lever through the hole of adjusting plate assy, and attach the adjusting plate assy to the upper unit holder assy with the two screws (taptite, bind B M4x10).



15 Attachment of Lock nut, Presser dial gear and Presser dial

1. Tighten the lock nut until it comes to the middle of the screw (set screw, socket (CP) M4x12). Tighten the screw (set screw, socket (CP) M4x12) to the upper unit holder assy until the lock nut comes in contact with the upper unit holder assy.
2. Align and set the match mark (blue) of presser dial gear to the match mark (blue) of presser foot rack. Align the D cut surface of presser dial shaft assy with the D shape hole of presser dial gear, set the presser dial shaft assy to the upper unit holder assy and the presser dial shaft assy, and lock it with the two hooks.
3. Align the groove on the back of presser dial with the pin of presser dial shaft assy, set the presser dial to the presser dial shaft assy, and attach the retaining ring E4.

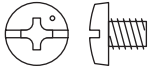
Set Screw, Socket (CP) M4X12



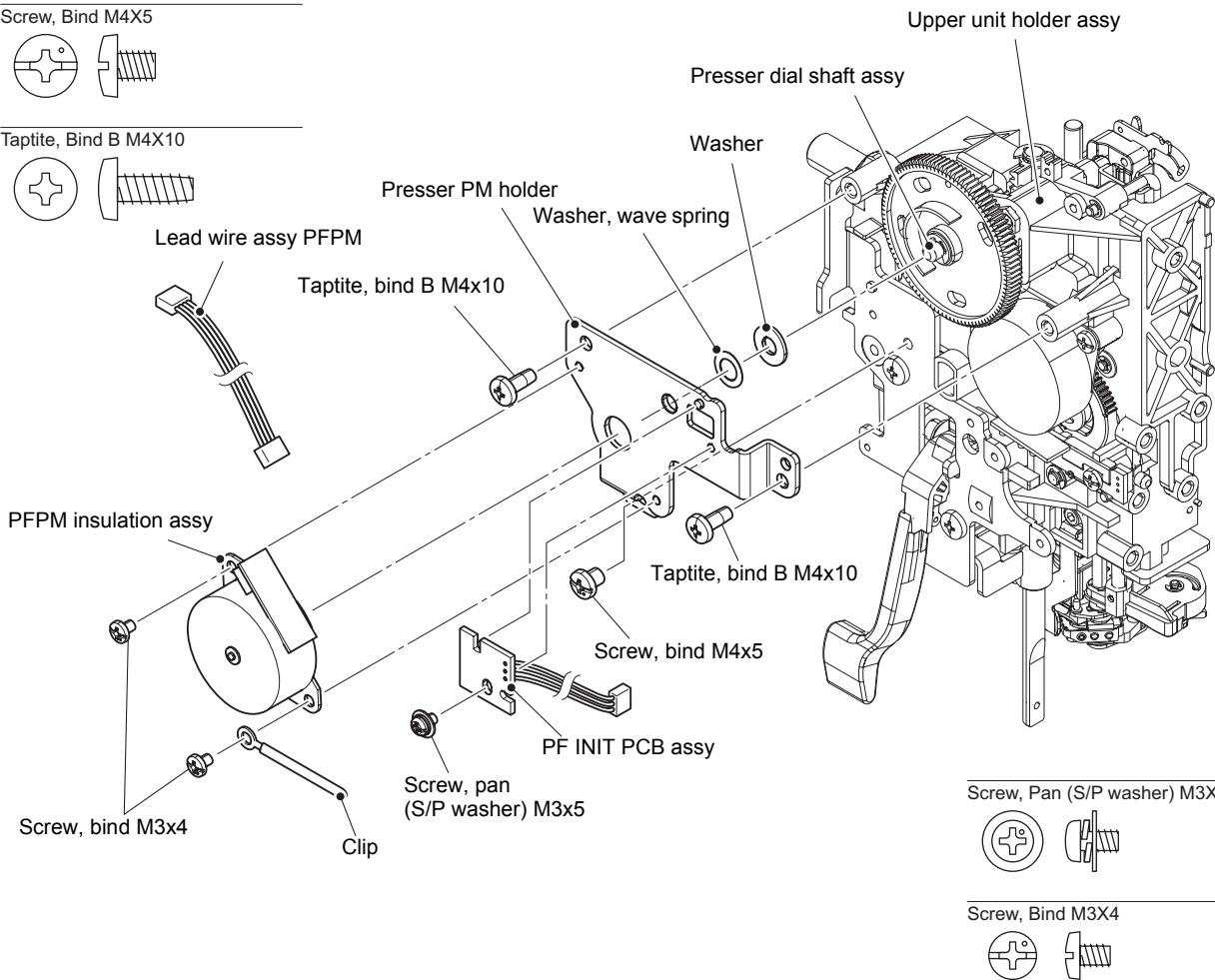
16 Attachment of Presser PM holder, PF INIT PCB assy and PFPM insulation assy

1. Set the washer, washer, wave spring and presser PM holder to the presser dial shaft assy, and secure them to the upper unit holder assy with the screw (screw, bind M4x5) and two screws (taptite, bind B M4x10).
2. Align the positioning notch of PF INIT PCB assy with the boss of presser PM holder, and attach the PF INIT PCB assy to the presser PM holder with the screw (screw, pan (S/P washer) M3x5).
3. Connect the lead wire assy PFPM to the PFPM insulation assy. Attach the PFPM insulation assy and the clip to the presser PM holder with two screws (screw, bind M3x4).

Screw, Bind M4X5



Taptite, Bind B M4X10



Application of
Assembly

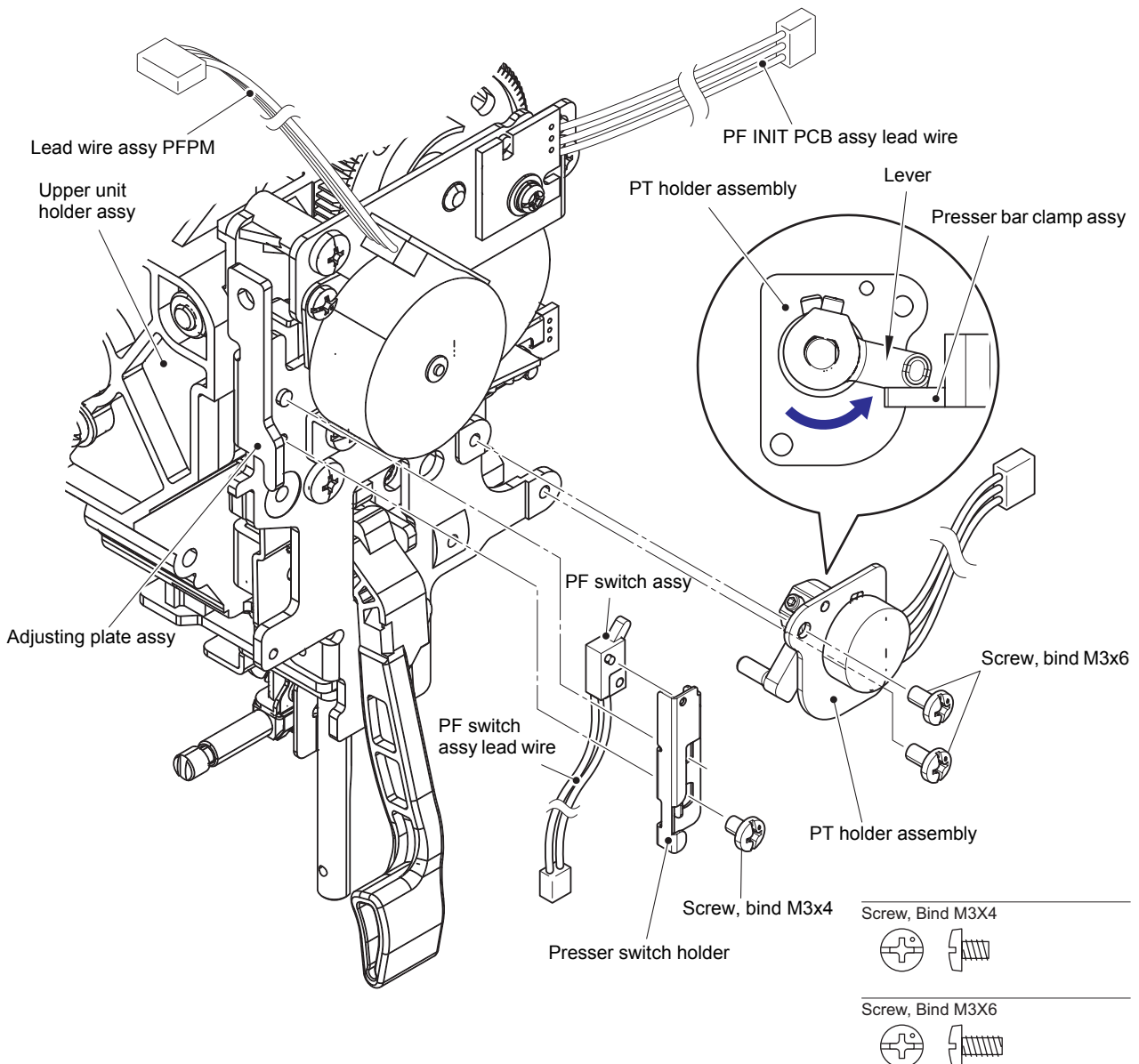
Application of
Assembly

17 Attachment of PF switch assy and PT holder assembly

1. Align the boss of PF switch assy with the positioning hole of presser switch holder, and set the PF switch assy to the presser switch holder. Align the positioning hole of PF switch assy with the boss of adjusting plate assy, and attach the presser switch holder to the adjusting plate assy with the screw (screw, bind M3x4). Bind up the PF switch assy lead wire to the adjusting plate assy with the band.
2. Turn the lever of PT holder assembly to the direction of the arrow, put the lever on the presser bar clamp assy, and then attach the PT holder assembly to the adjusting plate assy with the two screws (screw, bind M3x6).
3. Bind up the lead wire assy PFFM, PF INIT PCB assy lead wire and PF switch assy lead wire with the clip, and then bind up them to the shaft of upper unit holder assy with the band.

***Key point**

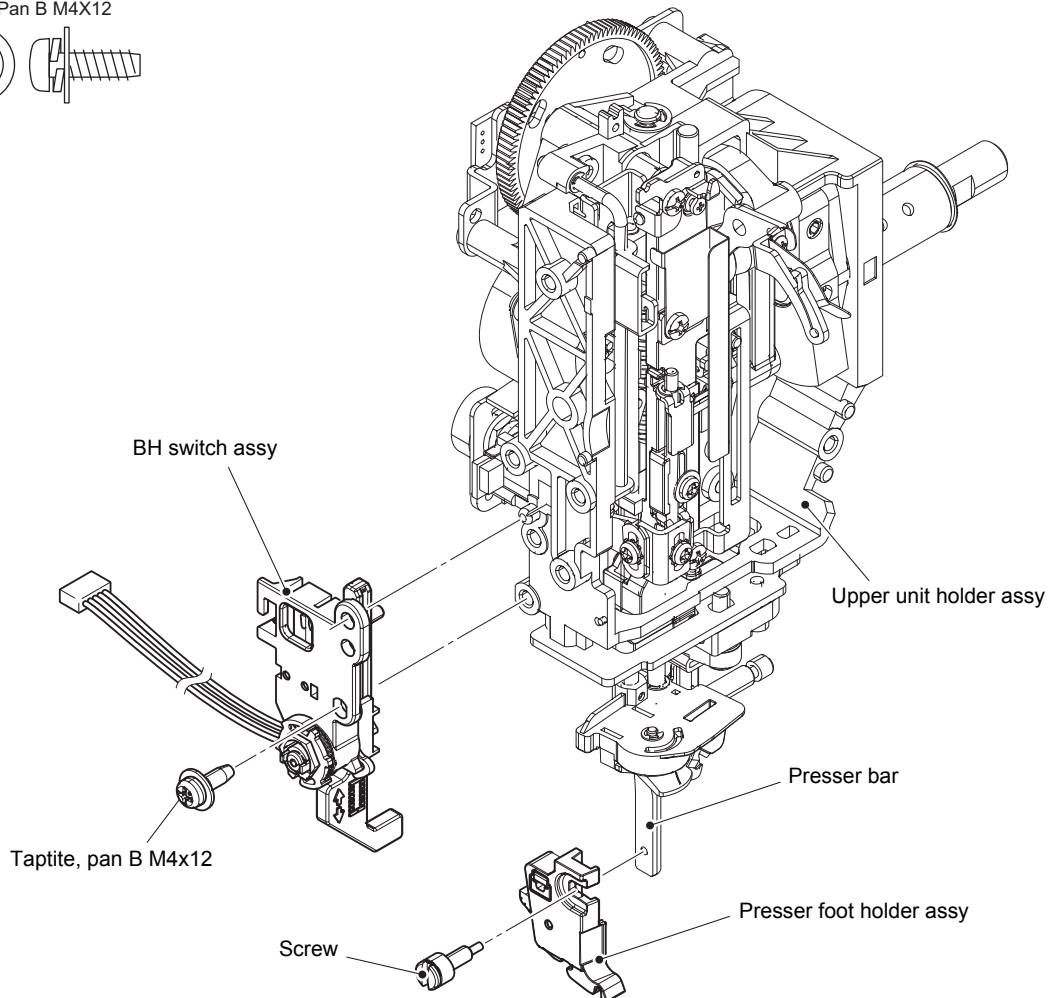
- Refer to "Wiring of Needle bar / Presser foot module".



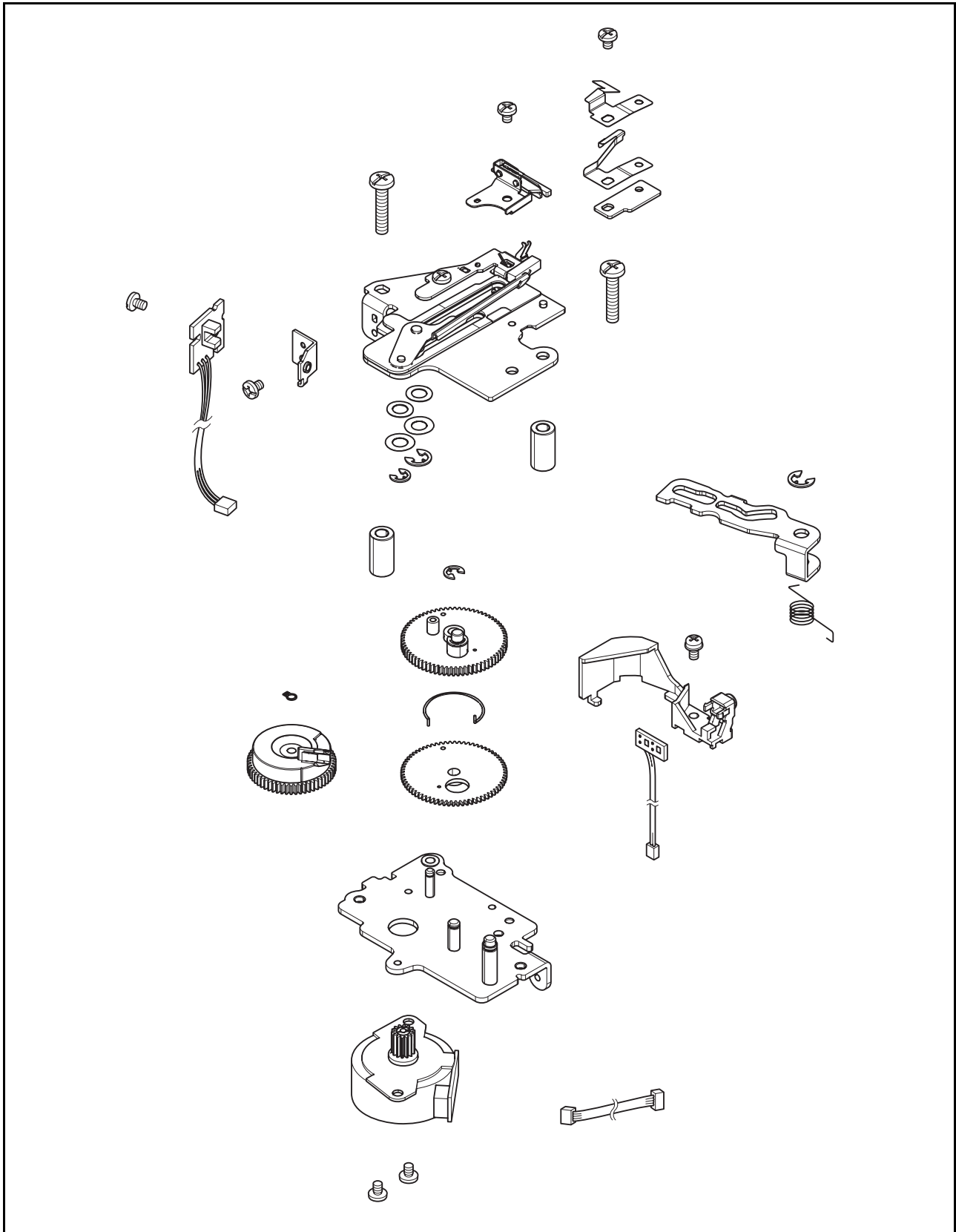
18 Attachment of BH switch assy and Presser foot holder assy

1. Align the positioning hole of BH switch assy with the boss of upper unit holder assy, and attach the BH switch assy to the upper unit holder assy with the screw (taptite, pan B M4x12).
2. Attach the presser foot holder assy to the presser bar with the screw.

Taptite, Pan B M4X12



Thread cutter module location diagram

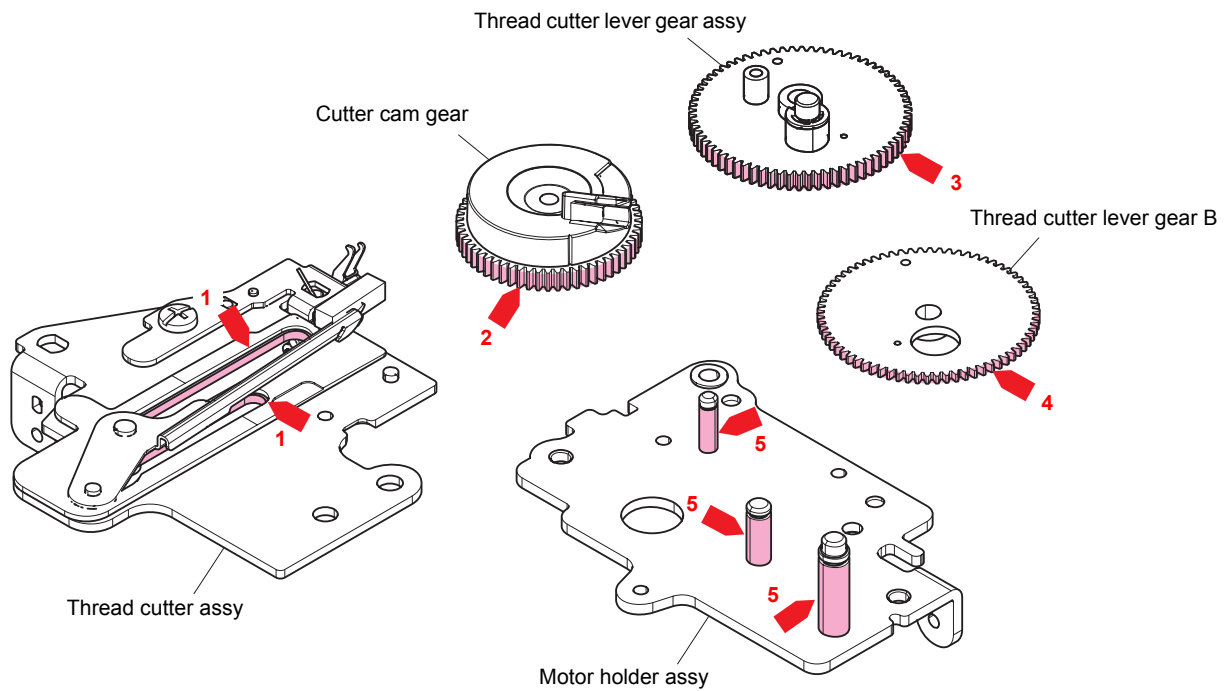


Application of
Assembly

Application of
Assembly

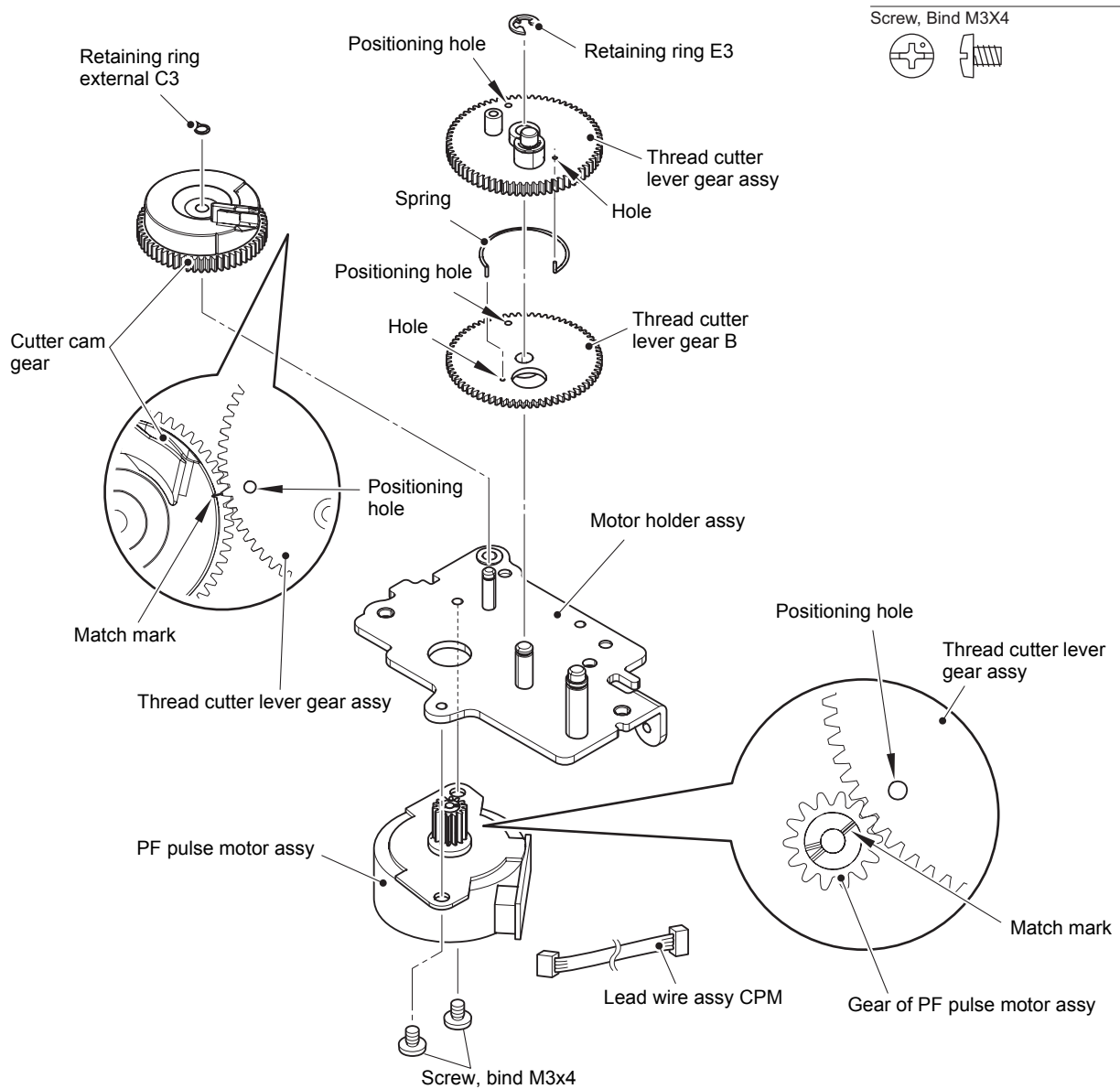
1 Lubrication

Lubrication point			Lubricating oil type	Quantity of lubrication
1	Groove of thread cutter assy	2 places	EPNOC AP (N) 0	Light covering
2	Cutter cam gear	1 place	EPNOC AP (N) 0	Light covering
3	Thread cutter lever gear assy	1 place	EPNOC AP (N) 0	Light covering
4	Thread cutter lever gear B	1 place	EPNOC AP (N) 0	Light covering
5	Motor holder assy	3 places	EPNOC AP (N) 0	Light covering



2 Attachment of Gears, PF pulse motor assy, Photo transistor PCB assy and Thread cutter lever

1. Set the cutter cam gear to the shaft of motor holder assy, and then secure it with the retaining ring external C3.
2. Insert the hook of the spring into the hole of the thread cutter lever gear assy, and then insert another hook of the spring into the hole of the thread cutter lever gear B. Assemble the thread cutter lever gear assy, spring and thread cutter lever gear B.
3. Align the positioning hole of the thread cutter lever gear assy and positioning hole of thread cutter lever gear B with the match mark on cutter cam gear, insert them into the shaft of motor holder assy, and then secure them with the retaining ring E3.
4. Connect the lead wire assy CPM to the PF pulse motor assy.
5. Align the positioning hole of thread cutter lever gear assy and positioning hole of thread cutter lever gear B with the match mark on gear of PF pulse motor assy, and then attach the PF pulse motor assy to the motor holder assy with the two screws (screw, bind M3x4).

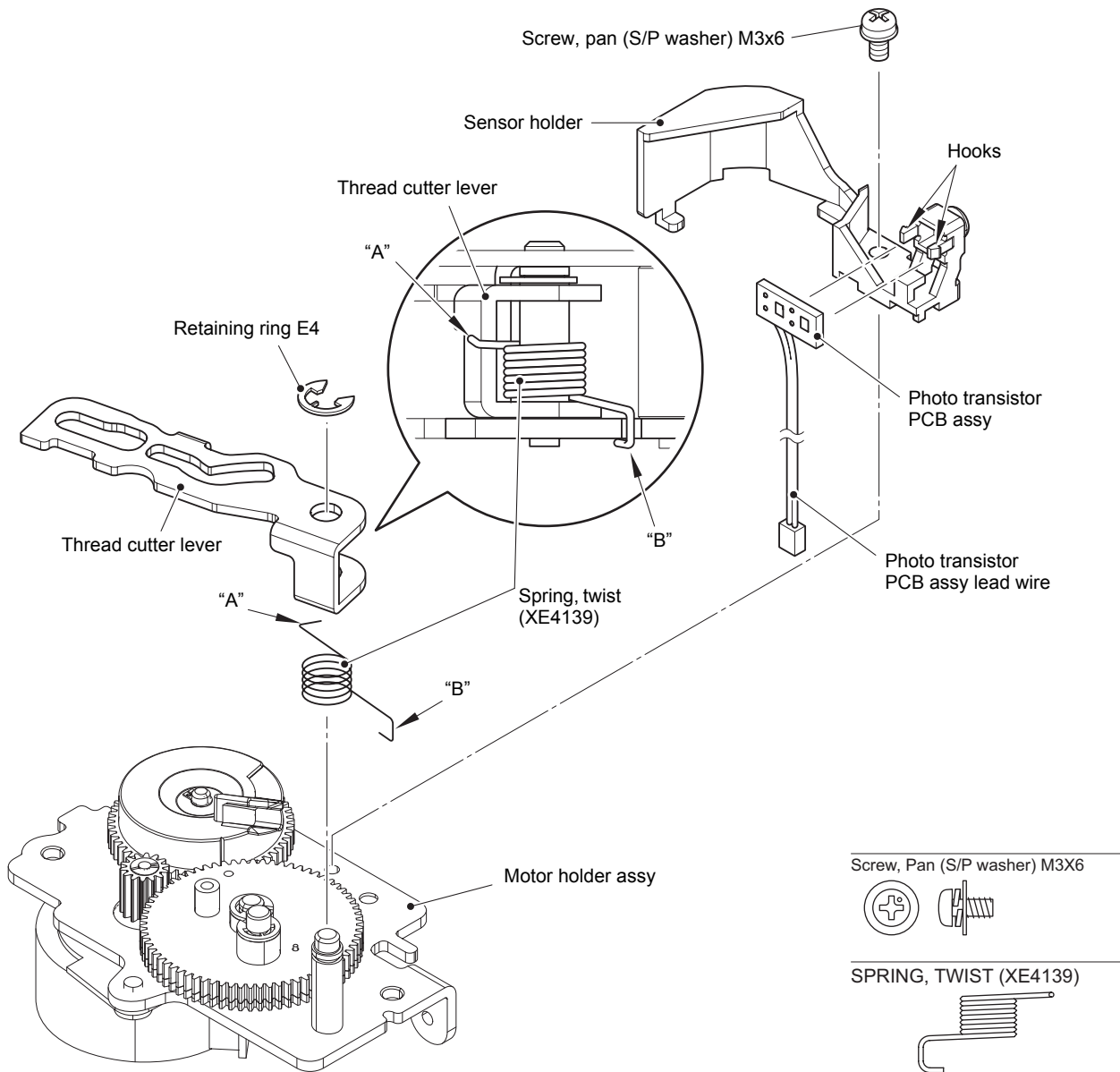


- Set the photo transistor PCB assy to the sensor holder, and then hang the two hooks on the photo transistor PCB assy. Pass the photo transistor PCB assy lead wire through the securing fixtures. Attach the sensor holder to the motor holder assy with the screw (screw, pan (S/P washer) M3x6).

***Key point**

- Refer to "Wiring of Thread cutter module".

- Assemble the thread cutter lever and spring, twist (XE4139), hang the end "A" of spring, twist (XE4139) on the thread cutter lever, attach them to the shaft of motor holder assy, and then secure them with the retaining ring E4. Hang the end "B" of spring, twist (XE4139) on the notch of motor holder assy.

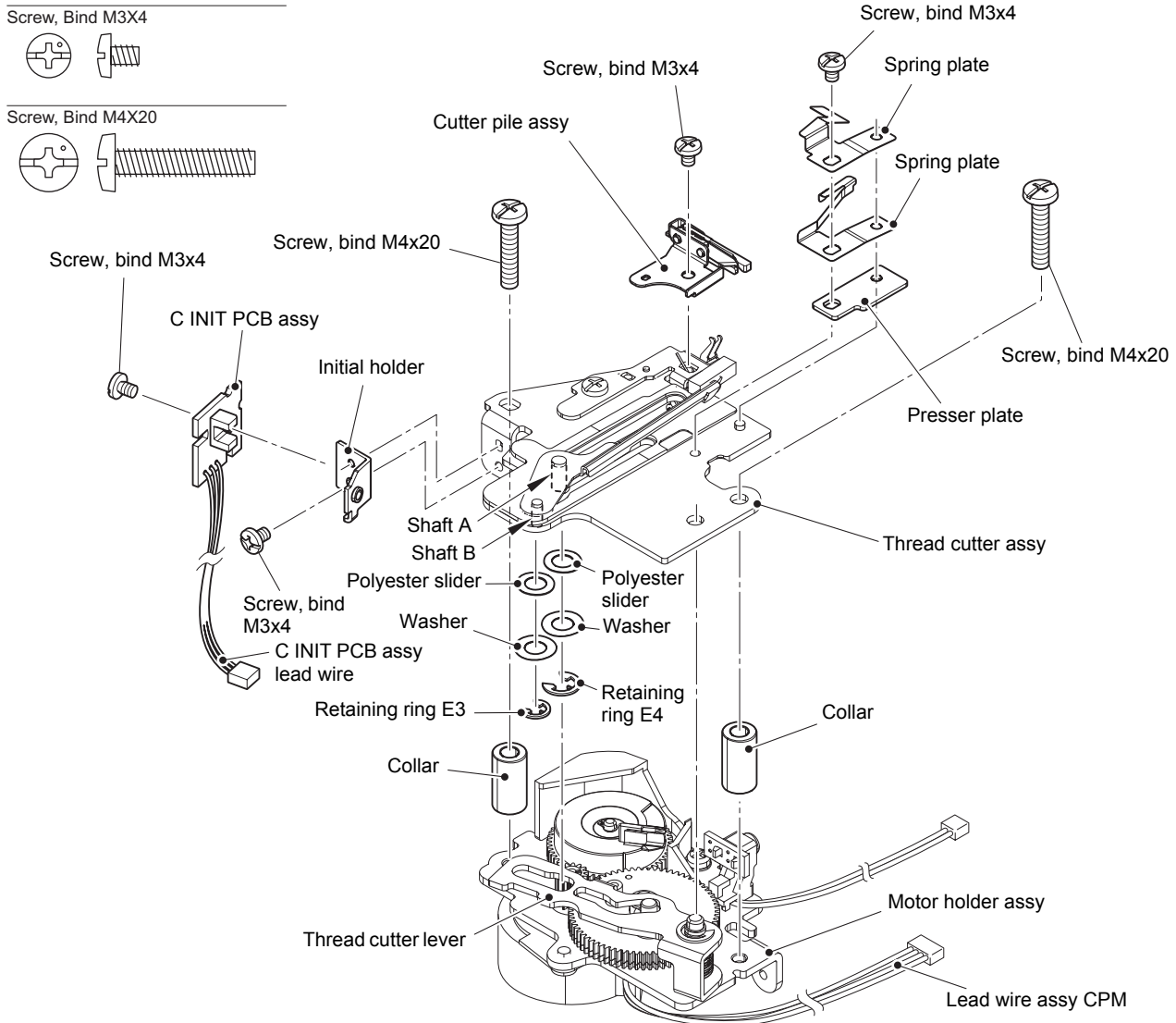


3 Assembly and Attachment of Thread cutter assy

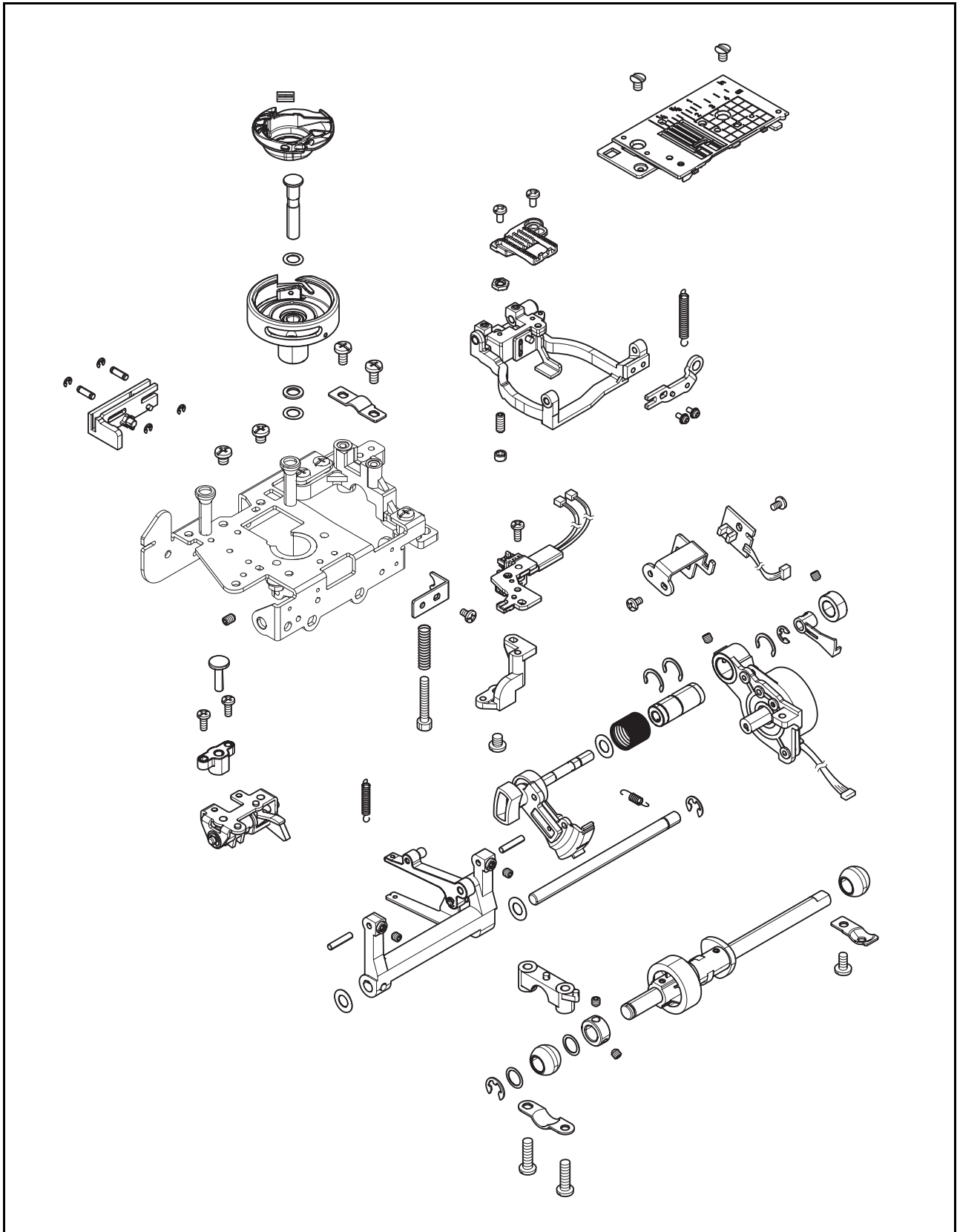
1. Align the positioning hole of cutter pile assy with the boss of thread cutter assy, and attach the cutter pile assy to the thread cutter assy with the screw (screw, bind M3x4).
2. Align the positioning holes of presser plate, spring plate and spring plate with the boss of thread cutter assy, then attach the presser plate, spring plate and spring plate to the thread cutter assy with the screw (screw, bind M3x4).
3. Align the boss of initial holder with the positioning hole of thread cutter assy, and attach the initial holder to the thread cutter assy with the screw (screw, bind M3x4). Align the notch of C INIT PCB assy with the tab of initial holder, and attach the C INIT PCB assy to the initial holder with the screw (screw, bind M3x4).
4. Set the polyester slider and washer to the shaft A, and secure them with the retaining ring E4. Set the polyester slider and washer to the shaft B, and secure them with the retaining ring E3.
5. Insert the shaft of motor holder assy into the positioning hole of thread cutter assy and shaft A into the groove of thread cutter lever, and then attach the two collars and the thread cutter assy to the motor holder assy with the two screws (screw, bind M4x20).
6. Bind up the lead wire assy CPM and the C INIT PCB assy lead wire with the band.

***Key point**

- Refer to "Wiring of Thread cutter module".



Feed module location diagram

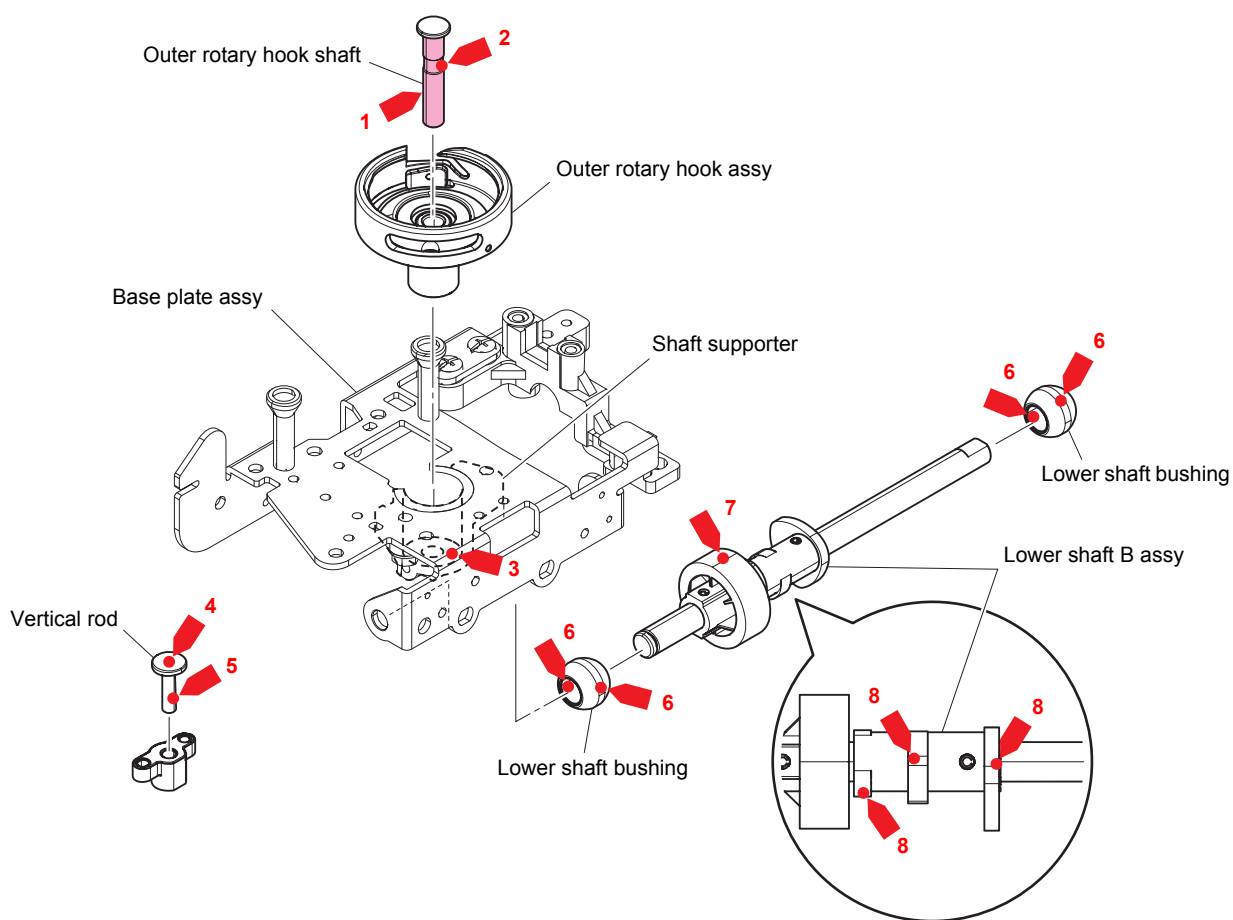


Application of
Assembly

Application of
Assembly

1 Lubrication

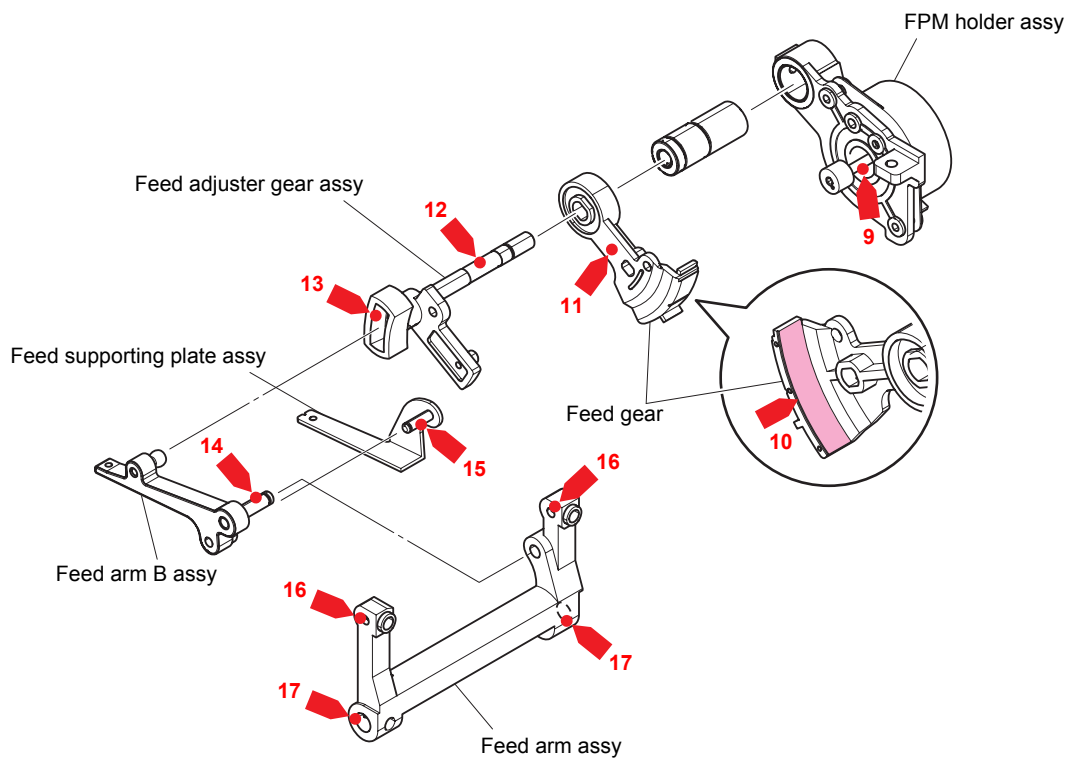
Lubrication point		Lubricating oil type		Quantity of lubrication
1	Outer rotary hook shaft	1 place	Oiler	Apply liberally
2		1 place	EPNOC AP (N) 0	Rice-grain size
3	Shaft supporter	1 place	MOLYKOTE EM30L	Small amount
4	Vertical rod	1 place	MOLYKOTE EM30L	Small amount
5		1 place	Oiler	1 to 2 drops
6	Lower shaft bushing	4 places	FBK OIL RO 100	1 to 2 drops
7	Lower shaft B assy	1 place	MOLYKOTE EM30L	Small amount
8		3 places	EPNOC AP (N) 0	Small amount



Application of Assembly

Application of Assembly

Lubrication point			Lubricating oil type	Quantity of lubrication
9	FPM holder assy	1 place	FBK OIL RO 100	1 to 2 drops
10	Feed gear	1 place	EPNOC AP (N) 0	Rice-grain size
11		1 place	EPNOC AP (N) 0	Bead
12	Feed adjuster gear assy	1 place	FBK OIL RO 100	1 to 2 drops
13		1 place	EPNOC AP (N) 0	Rice-grain size
14	Feed arm B assy	1 place	FBK OIL RO 100	1 to 2 drops
15	Feed supporting plate assy	1 place	FBK OIL RO 100	1 to 2 drops
16	Feed arm assy	2 places	MOLYKOTE EM30L	Rice-grain size
17		2 places	Oiler	1 to 2 drops

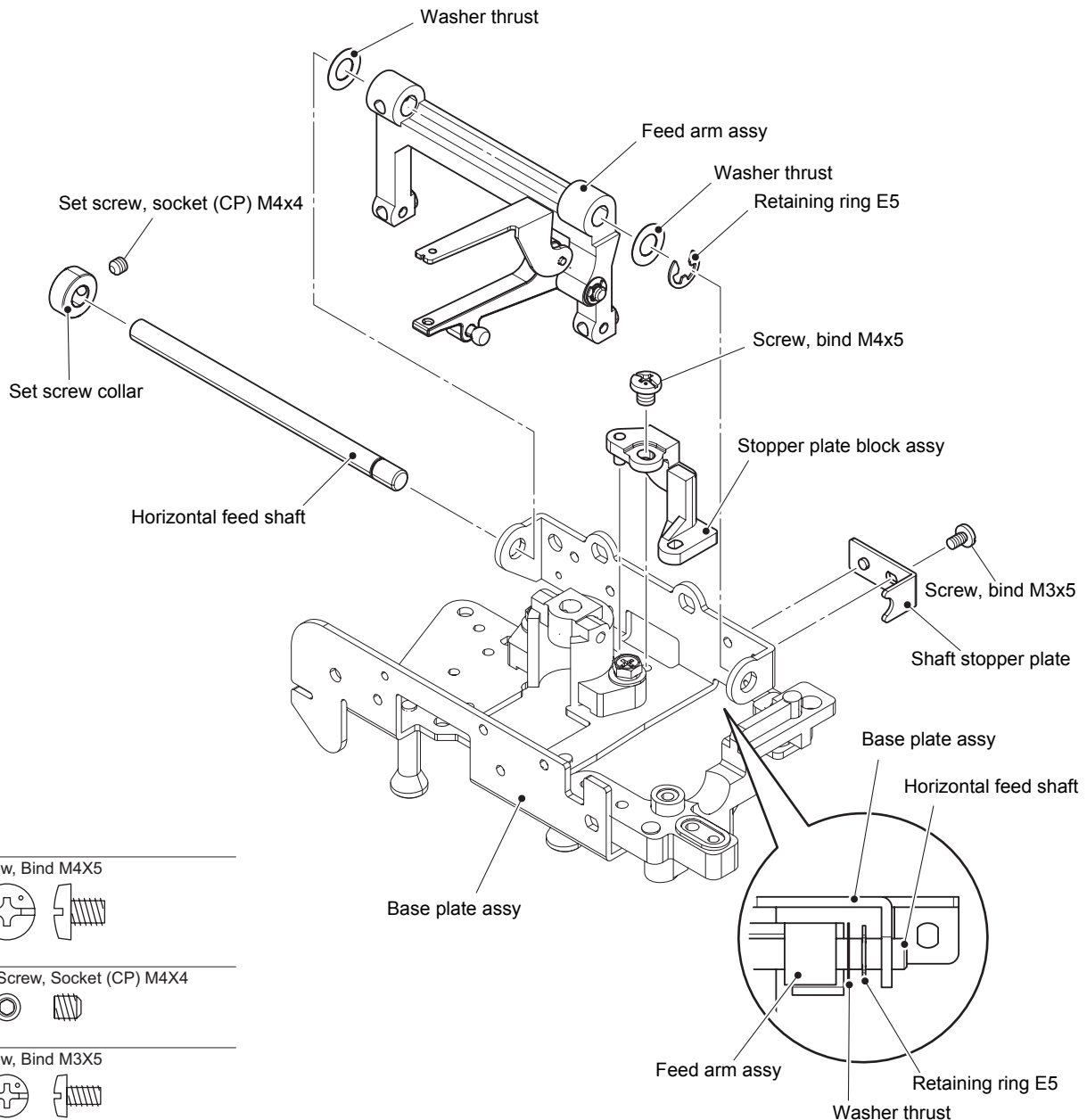


Application of Assembly

Application of Assembly

2 Attachment of Stopper plate block assy and Feed arm assy

1. Align the shaft of stopper plate block assy with the positioning hole of base plate assy, and attach the stopper plate block assy to the base plate assy with the screw (screw, bind M4x5).
2. Set the feed arm assy to the base plate assy, and insert the horizontal feed shaft into the base plate assy, washer thrust, feed arm assy, washer thrust and base plate assy, then attach the retaining ring E5. Set the set screw collar to the horizontal feed shaft, and secure it with the screw (set screw, socket (CP) M4x4) while pushing the horizontal feed shaft to the left side.
3. Align the boss of shaft stopper plate with the positioning hole of base plate assy, and attach the shaft stopper plate to the base plate assy with the screw (screw, bind M3x5).

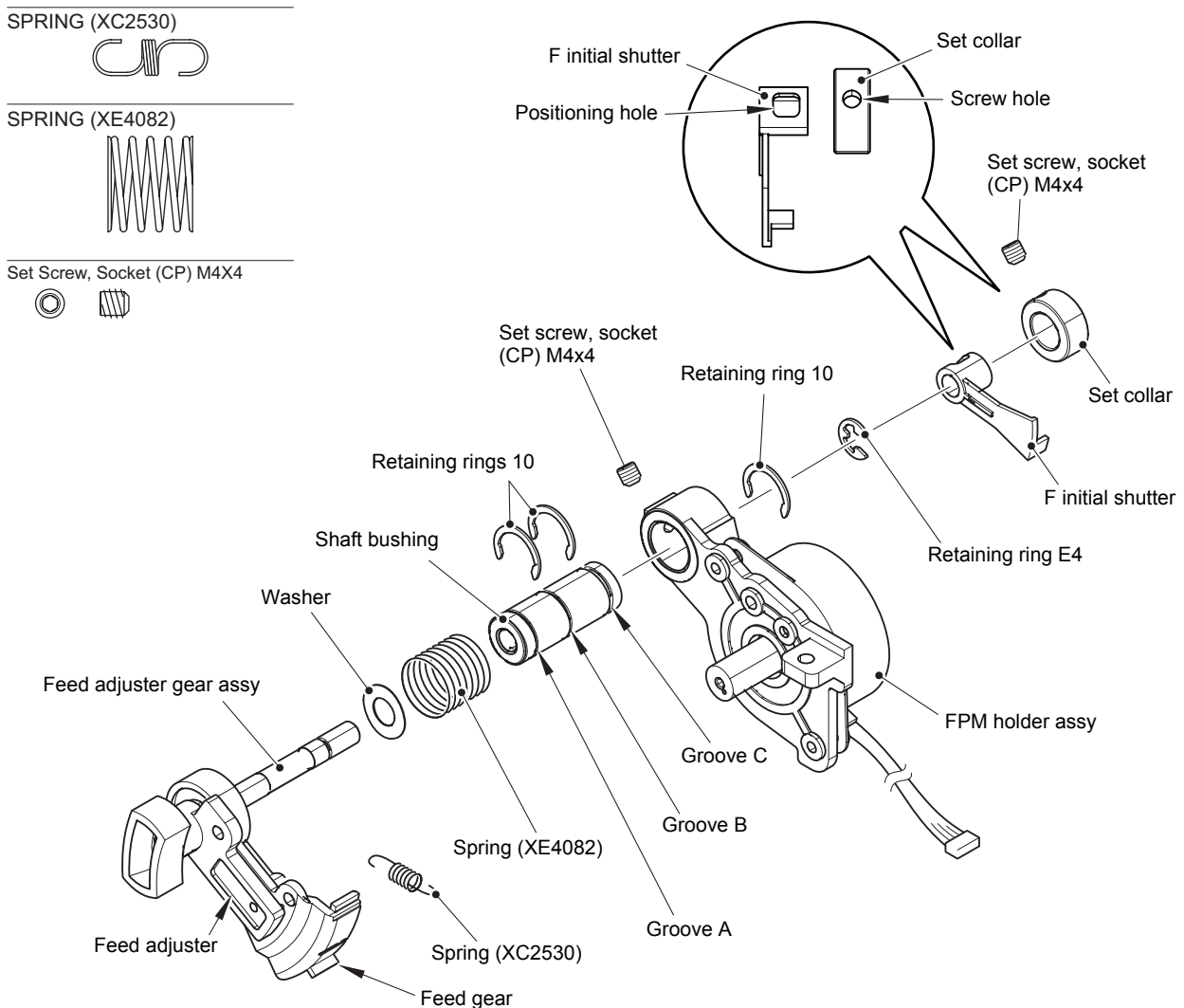


3 Attachment of Feed adjuster gear assy, F INIT PCB assy and FPM holder assy

1. Attach the two retaining rings 10 to the groove A and B on shaft bushing.
2. Insert the shaft bushing to the FPM holder assy, tighten the screw (set screw, socket (CP) M4x4) temporarily, and attach the retaining ring 10 to the groove C on shaft bushing.
3. Attach the spring (XC2530) to the feed adjuster and feed gear.
4. Set the washer and spring (XE4082) to the feed adjuster gear assy. Insert the feed adjuster gear assy to the shaft bushing, and then attach the retaining ring E4 to the shaft of feed adjuster gear assy while pushing it to the right side.
5. Set the set collar to the F initial shutter, and set them to the shaft of feed adjuster gear assy. Align the screw hole of set collar with the positioning hole of F initial shutter, and tighten the screw (set screw, socket (CP) M4x4) temporarily.

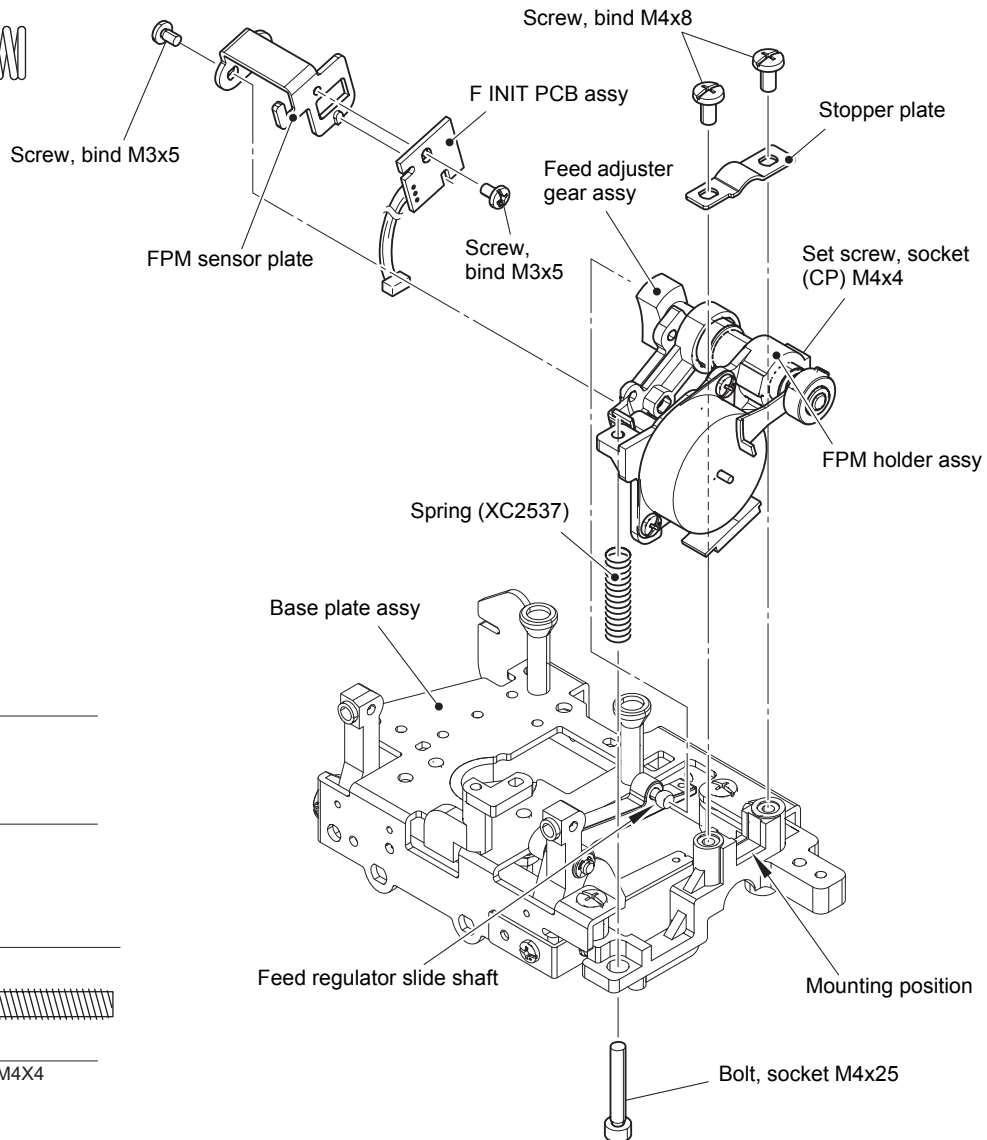
***Key point**

- Fully tighten the screw after performing "Alignment of Feed adjuster gear assy and F initial shutter position".



6. Align the boss of FPM sensor plate with the positioning hole of FPM holder assy, and attach the FPM sensor plate to the FPM holder assy with the screw (screw, bind M3x5). Align the notch of F INIT PCB assy with the boss of FPM sensor plate, and attach the F INIT PCB assy to the FPM sensor plate with the screw (screw, bind M3x5).
7. Insert the feed regulator slide shaft into the groove of feed adjuster gear assy, and then set the shaft bushing of FPM holder assy to the mounting position of base plate assy. Attach the stopper plate to the base plate assy with the two screws (screw, bind M4x8).
8. Set the spring (XC2537) between the FPM holder assy and the base plate assy, and tighten the screw (bolt, socket M4x25).
9. Fully tighten the screw (set screw, socket (CP) M4x4).

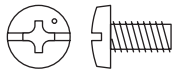
SPRING (XC2537)



Screw, Bind M3X5



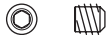
Screw, Bind M4X8



Bolt, Socket M4X25



Set Screw, Socket (CP) M4X4

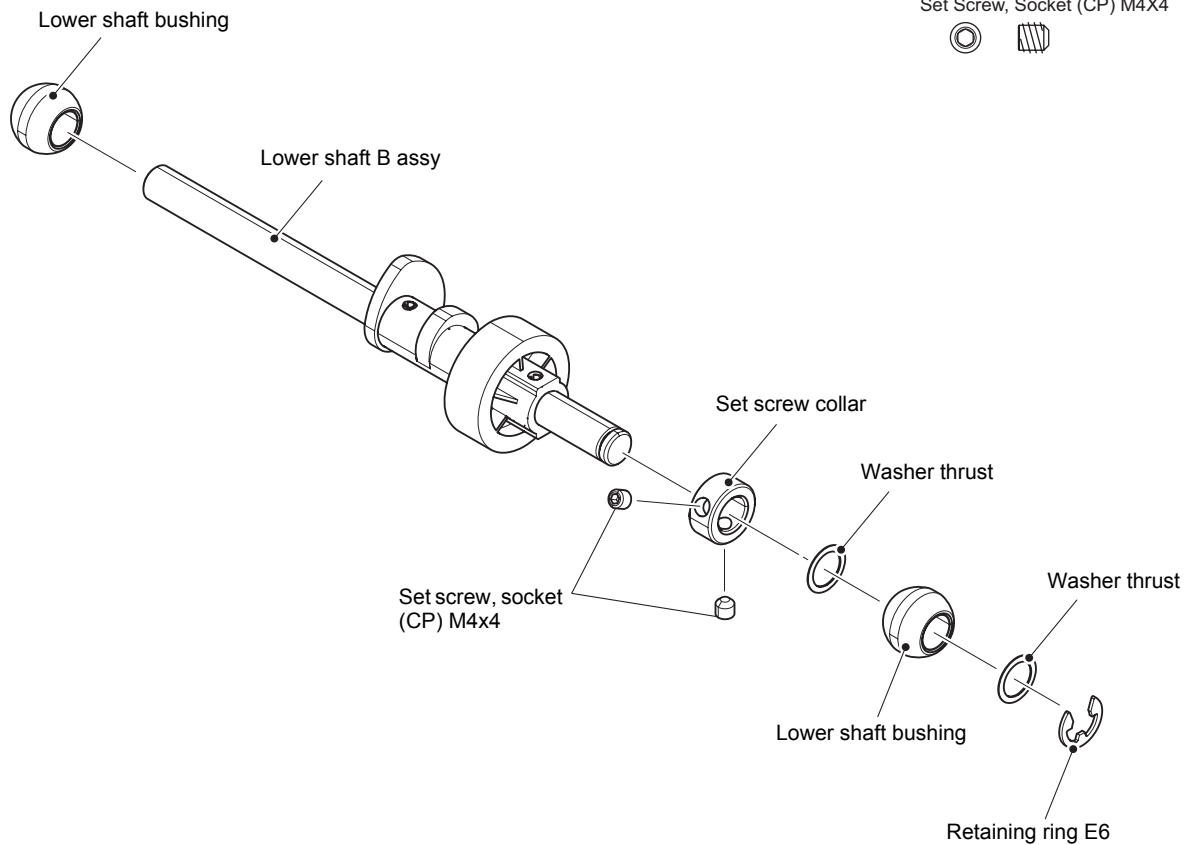


4 Attachment of Drop assy and Lower shaft B assy

1. Set the set screw collar, washer thrust, lower shaft bushing and another washer thrust to the lower shaft B assy, and attach the retaining ring E6.
2. Tighten the two screws (set screw, socket (CP) M4x4) while pushing the set screw collar to the left side.
3. Set the lower shaft bushing to the lower shaft B assy.

***Key point**

- Check that the set screw collar is the outside of the cut surface.
- Check that the lower shaft bushing is not wobbled, and it moves smoothly.



- Align the two bosses of bushing supporter A with the two positioning holes of base plate assy, and set the bushing supporter A to the base plate assy. Set the two lower shaft bushings of lower shaft B assy to the mounting position of bushing supporter A and the mounting position of base plate assy. Attach the bushing presser A to the bushing supporter A with the two screws (screw, bind M4x16). Attach the bushing presser to the base plate assy with the screw (screw, bind M4x8).

***Key point**

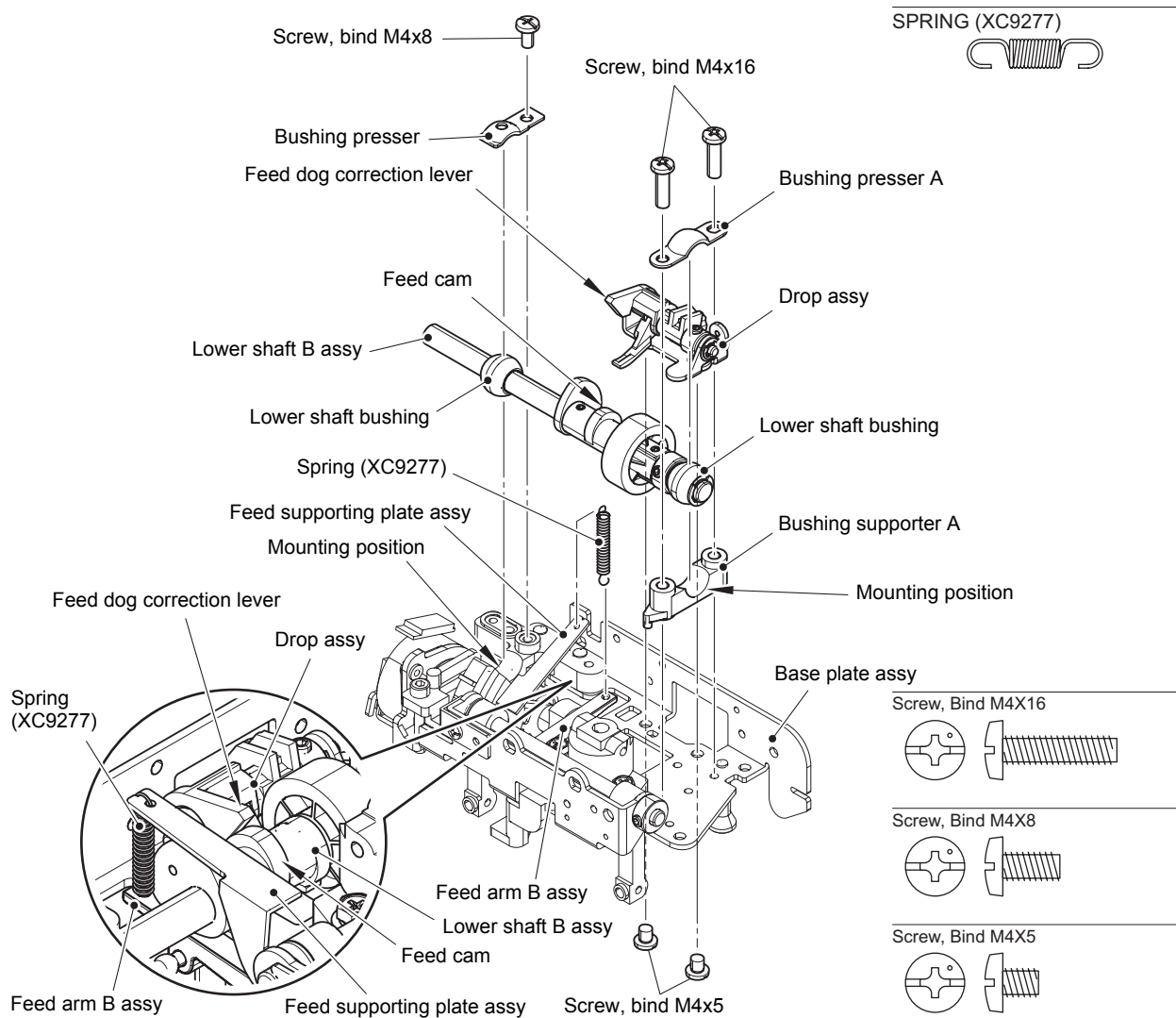
- Check that the feed cam is set between the feed arm B assy and feed supporting plate assy.

- Align the two bosses of drop assy with the two positioning hole of base plate assy, and attach the drop assy to the base plate assy with the two screws (screw, bind M4x5).

***Key point**

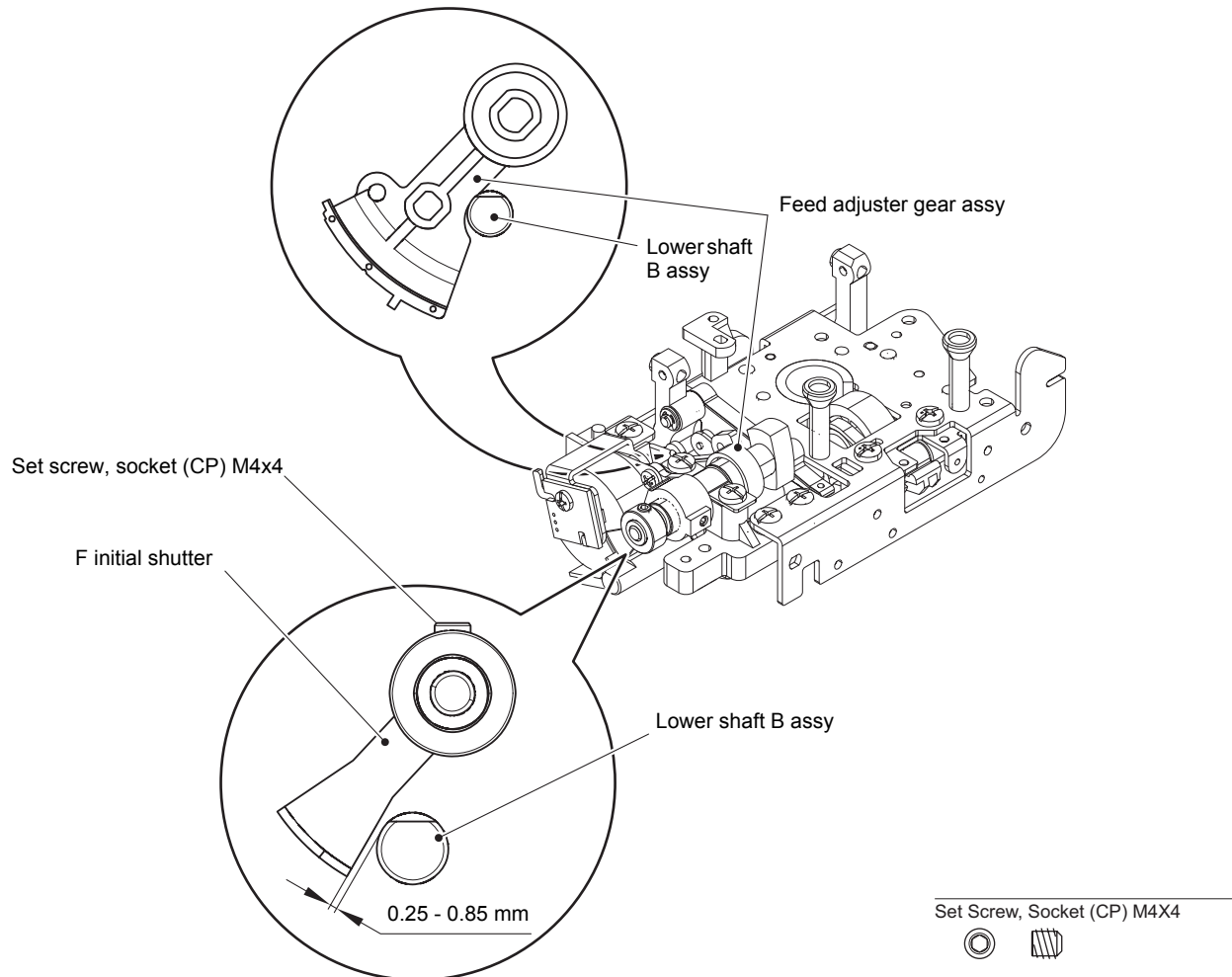
- Check that the feed dog correction lever is on the upper side of feed cam.

- Attach the spring (XC9277) to the feed arm B assy and feed supporting plate assy.



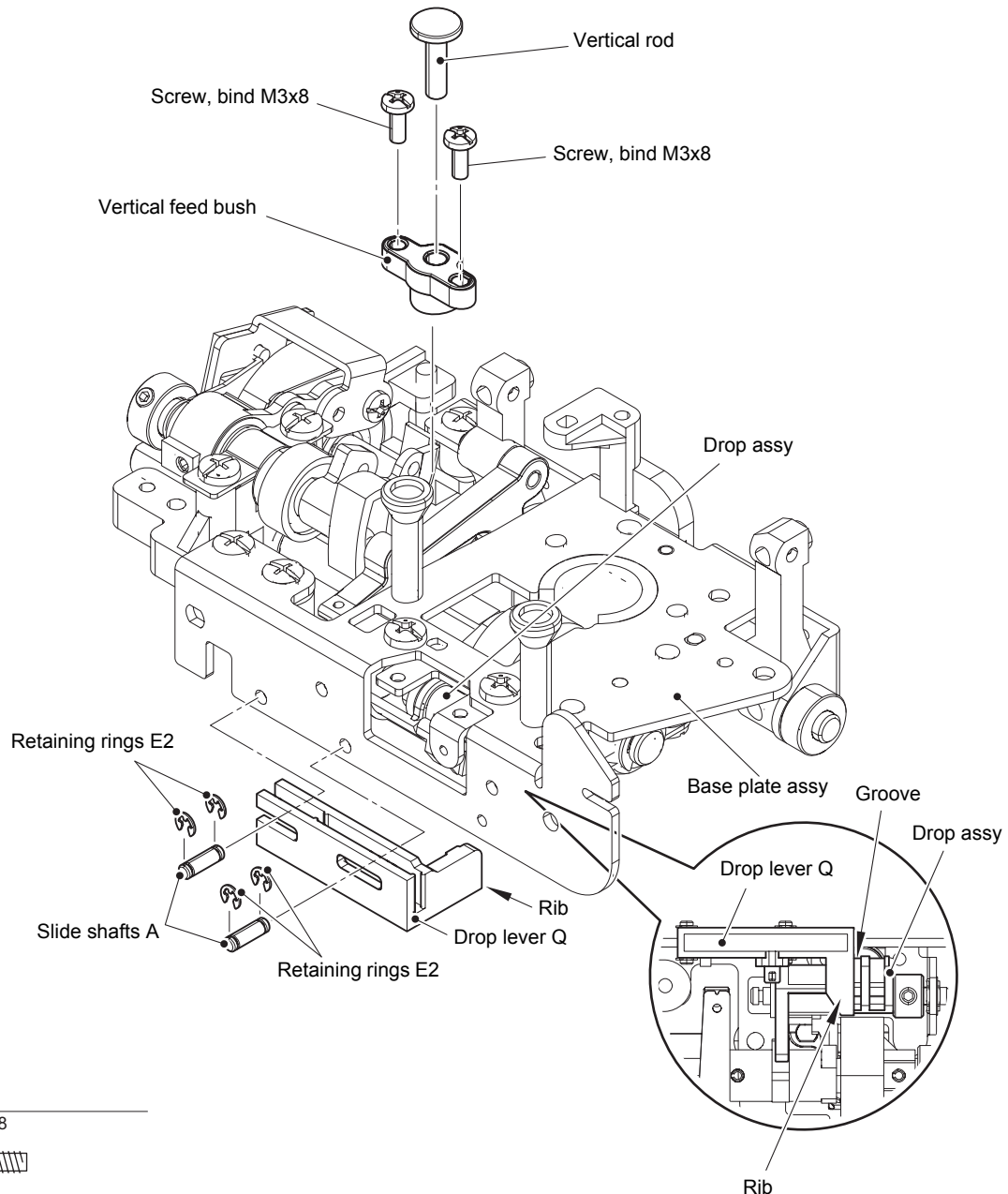
5 Alignment of Feed adjuster gear assy and F initial shutter position

1. When the feed adjuster gear assy comes in contact with the lower shaft B assy and the gap between the F initial shutter and lower shaft B assy is 0.25 to 0.85 mm, fully tighten the screw (set screw, socket (CP) M4x4).



6 Attachment of Drop lever Q and Vertical feed bush

1. Attach the two retaining rings E2 to the slide shafts A. Align the rib of drop lever Q with the groove of drop assy, and set the drop lever Q to the base plate assy. Insert the two slide shafts A into the drop lever Q, base plate assy and drop lever Q, then attach the two retaining rings E2 to the two slide shafts A.
2. Attach the vertical feed bush to the base plate assy with the two screws (screw, bind M3x8), and insert the vertical rod into the vertical feed bush.



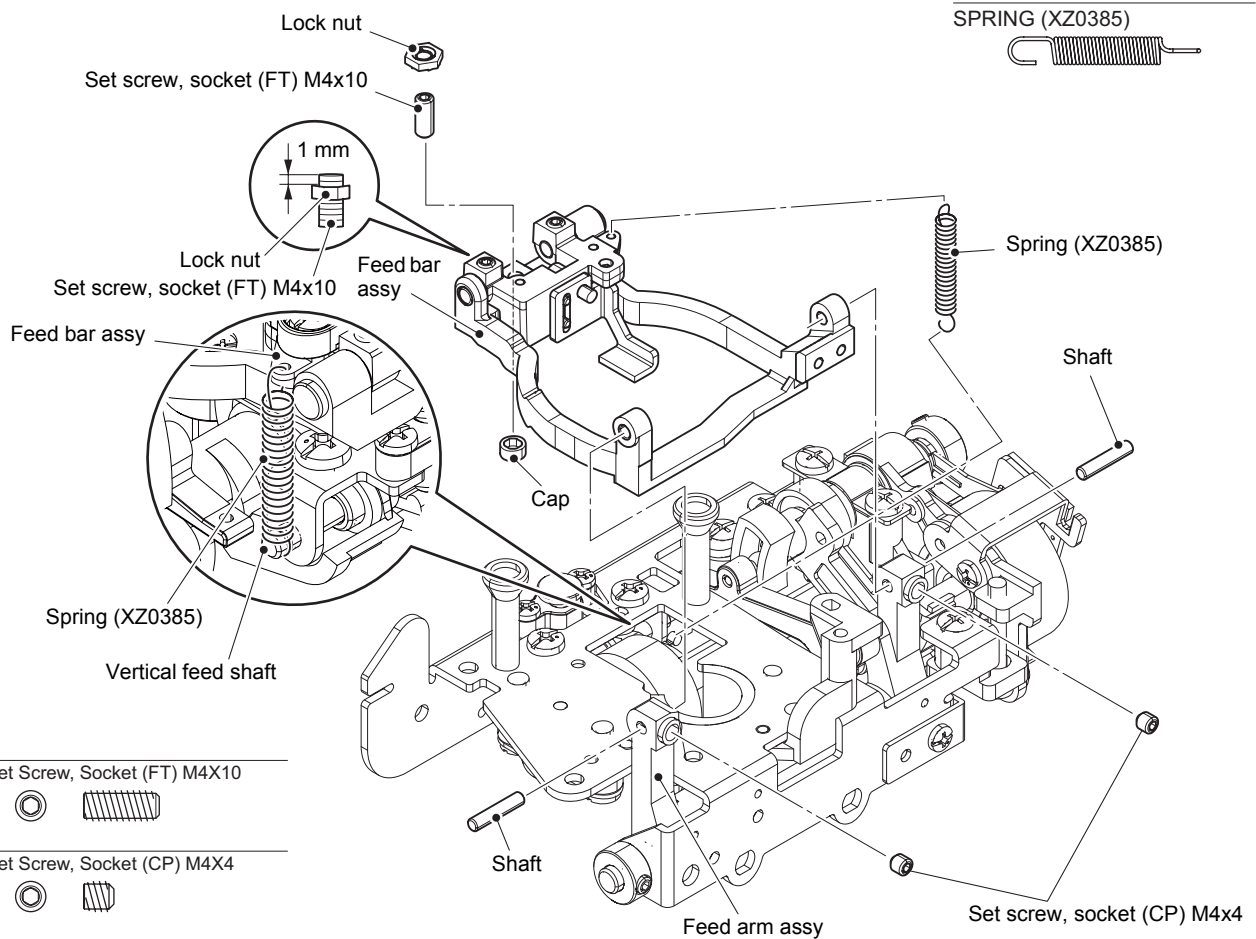
7 Attachment of Lock nut, Feed bar assy and Outer rotary hook assy

1. Tighten the screw (set screw, socket (FT) M4x10) until the screw end comes to 1 mm above the lock nut head. Attach the screw to the feed bar assy, and then attach the cap to the screw.
2. Attach the feed bar assy to the feed arm assy with the two shafts, and secure them with the two screws (set screw, socket (CP) M4x4).

***Key point**

- Make sure that there is no gap at the right and left end of feed arm assy.

3. Attach the spring (XZ0385) to the feed bar assy and vertical feed shaft of drop assy.



Application of
Assembly

Application of
Assembly

4. Insert the outer rotary hook shaft into the spacer, outer rotary hook assy, washer 6, spacer and shaft supporter, and then tighten the screw (set screw, socket (CP) M4x6) temporarily.
5. Set the feed dog to the feed bar assy, and then tighten the two screws (screw, bind M3x6) temporarily.

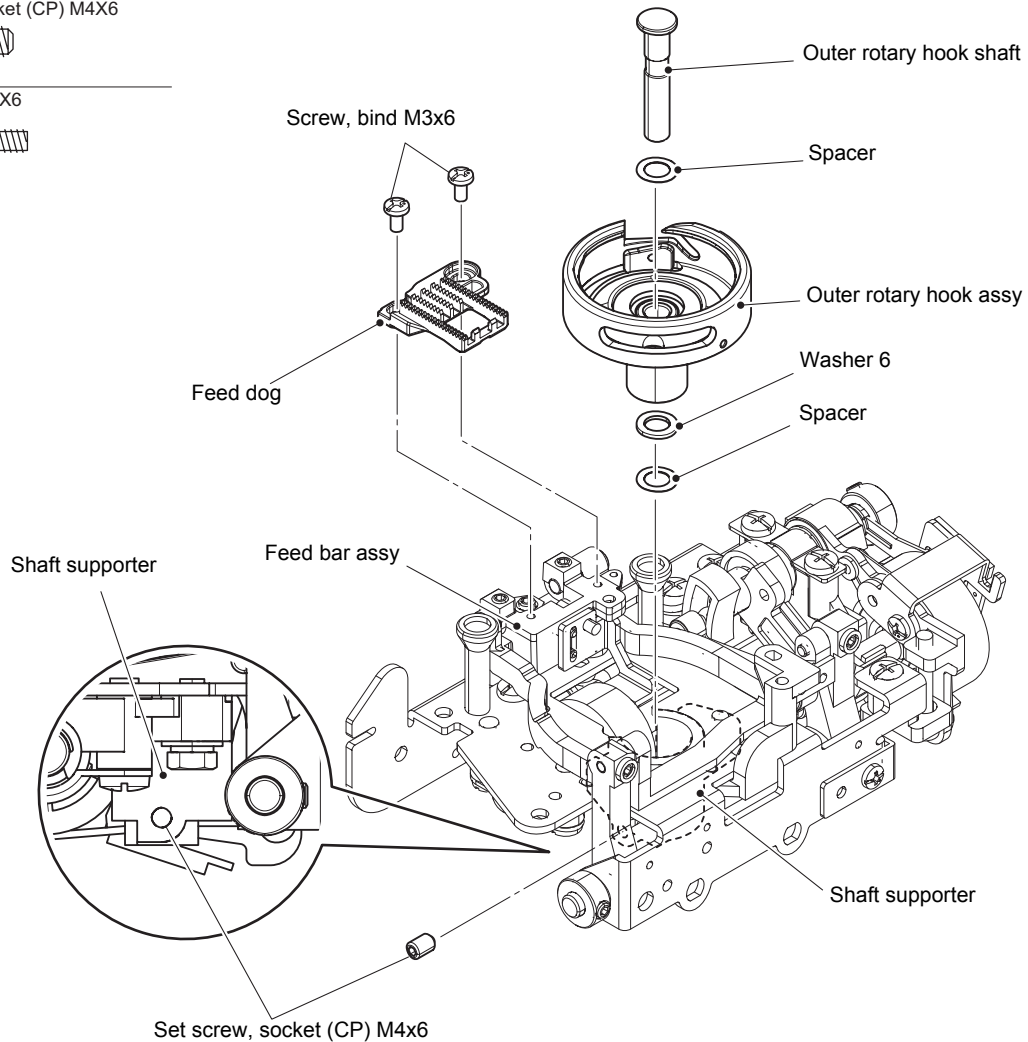
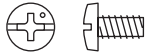
***Key point**

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

Set Screw, Socket (CP) M4X6



Screw, Bind M3X6



8 Attachment of Inner rotary hook bracket assy, Inner rotary hook assy and Needle plate A assy

1. Set the side feed adjust plate to the feed bar assy, and then tighten the two screws (screw, pan (S/P washer) M3x7) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Side feed straight stitch".

2. Align the boss of inner rotary hook bracket assy with the positioning hole of stopper plate block assy, and set the inner rotary hook bracket assy to the stopper plate block assy, and then tighten the screw (screw, bind M3x8) temporarily.

***Key point**

- Fully tighten the screw after performing "Adjustment of Inner rotary hook bracket position".

3. Attach the pile to the inner rotary hook assy, and set the inner rotary hook assy to the outer rotary hook assy.

4. Attach the needle plate A assy to the base plate assy with the two screws (screw M4).

5. Bind up the PLTW lead wire and the photo diode holder lead wire to the FPM sensor plate with the band.

***Key point**

- Refer to "Wiring of Feed module".

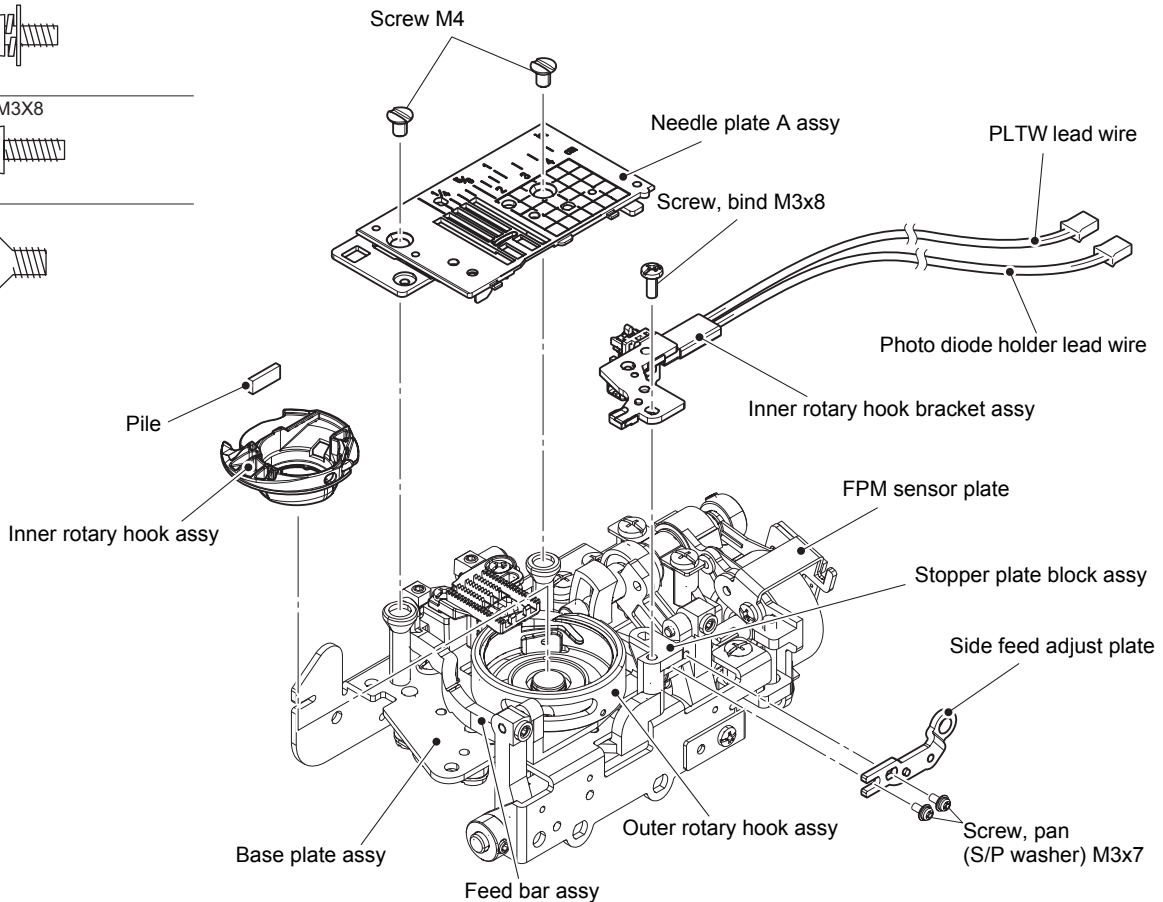
Screw, Pan (S/P washer) M3X7



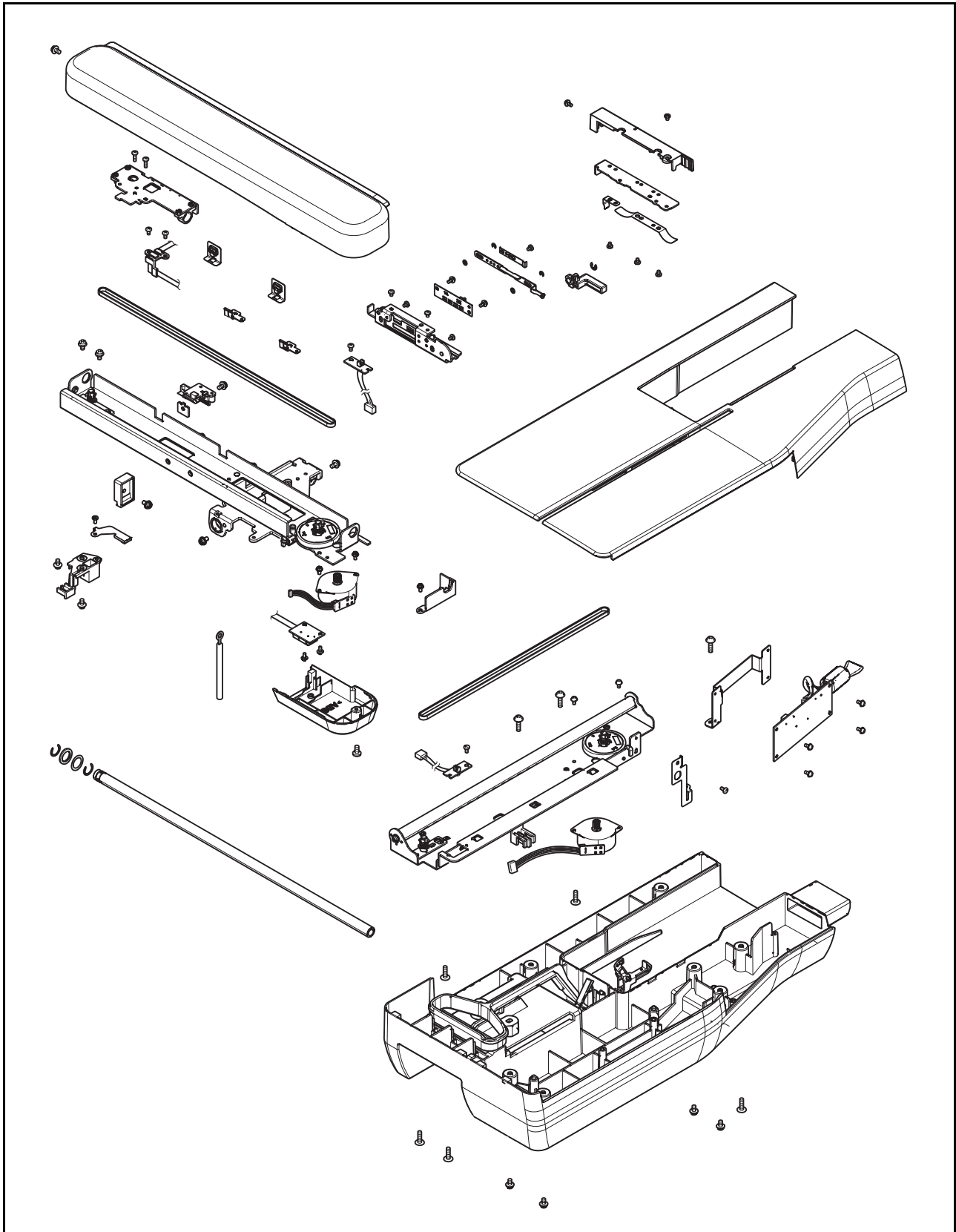
Screw, Bind M3X8



Screw M4



Embroidery unit location diagram

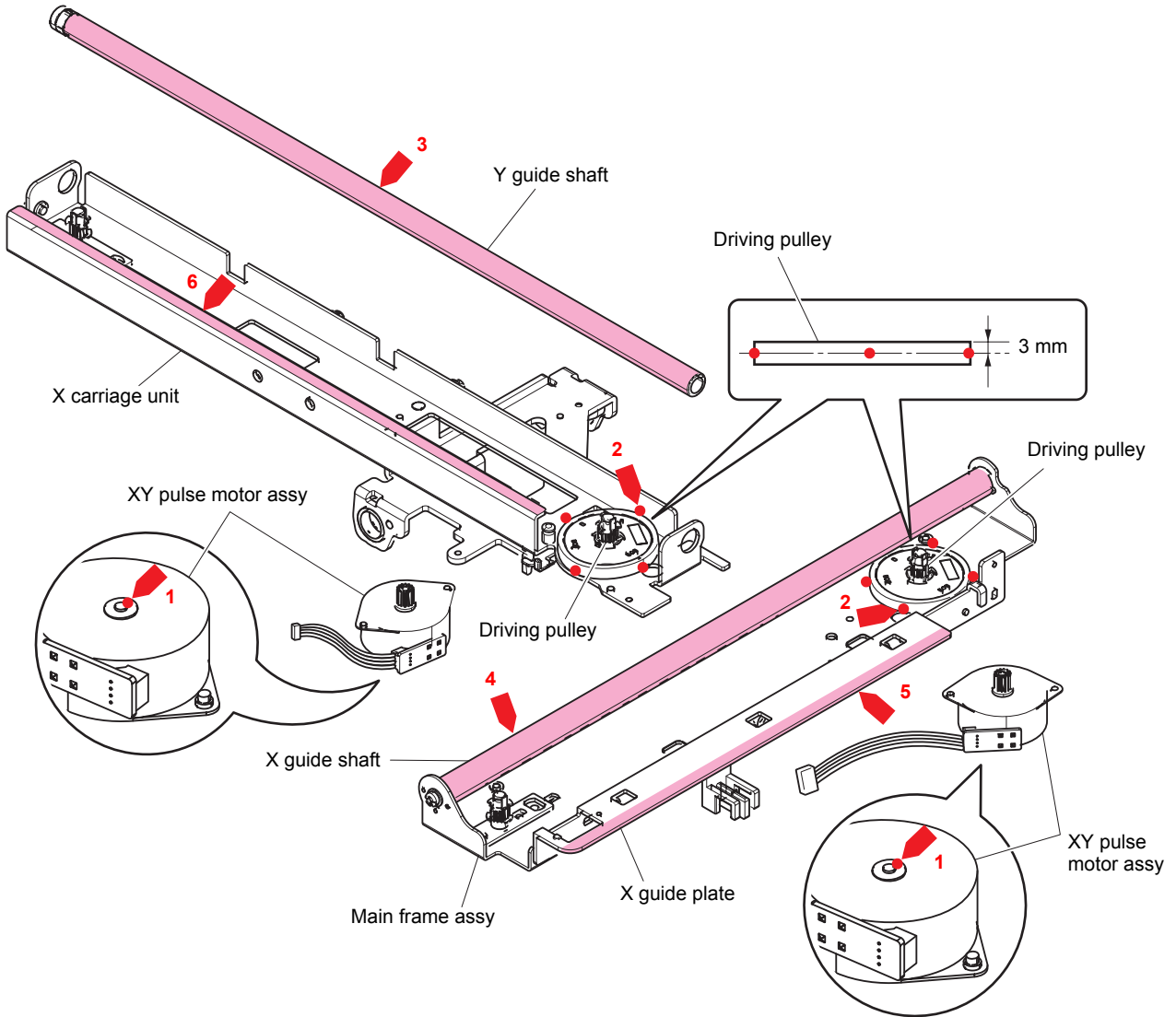


Application of
Assembly

Application of
Assembly

1 Lubrication

Lubrication point			Lubricating oil type	Quantity of lubrication
1	XY pulse motor assy	2 places	FBK OIL RO 100	1 to 2 drops
2	Driving pulley	8 places	EPNOC AP (N) 0	Small amount
3	Y guide shaft	1 place	MOLYKOTE M DISPERSION	Thinly all surface
4	X guide shaft	1 place	MOLYKOTE M DISPERSION	Thinly all surface
5	X guide plate	1 place	EPNOC AP (N) 0	Thinly all surface
6	X carriage unit	1 place	EPNOC AP (N) 0	Thinly all surface



2 Assembly of Main frame assy

1. Set the tension pulley assy to the main frame assy, and tighten the two screws (screw, pan (S/P washer) M4x8) temporarily. Hang the timing belt 40S2M594 on the tension pulley assy and the driving pulley.

***Key point**

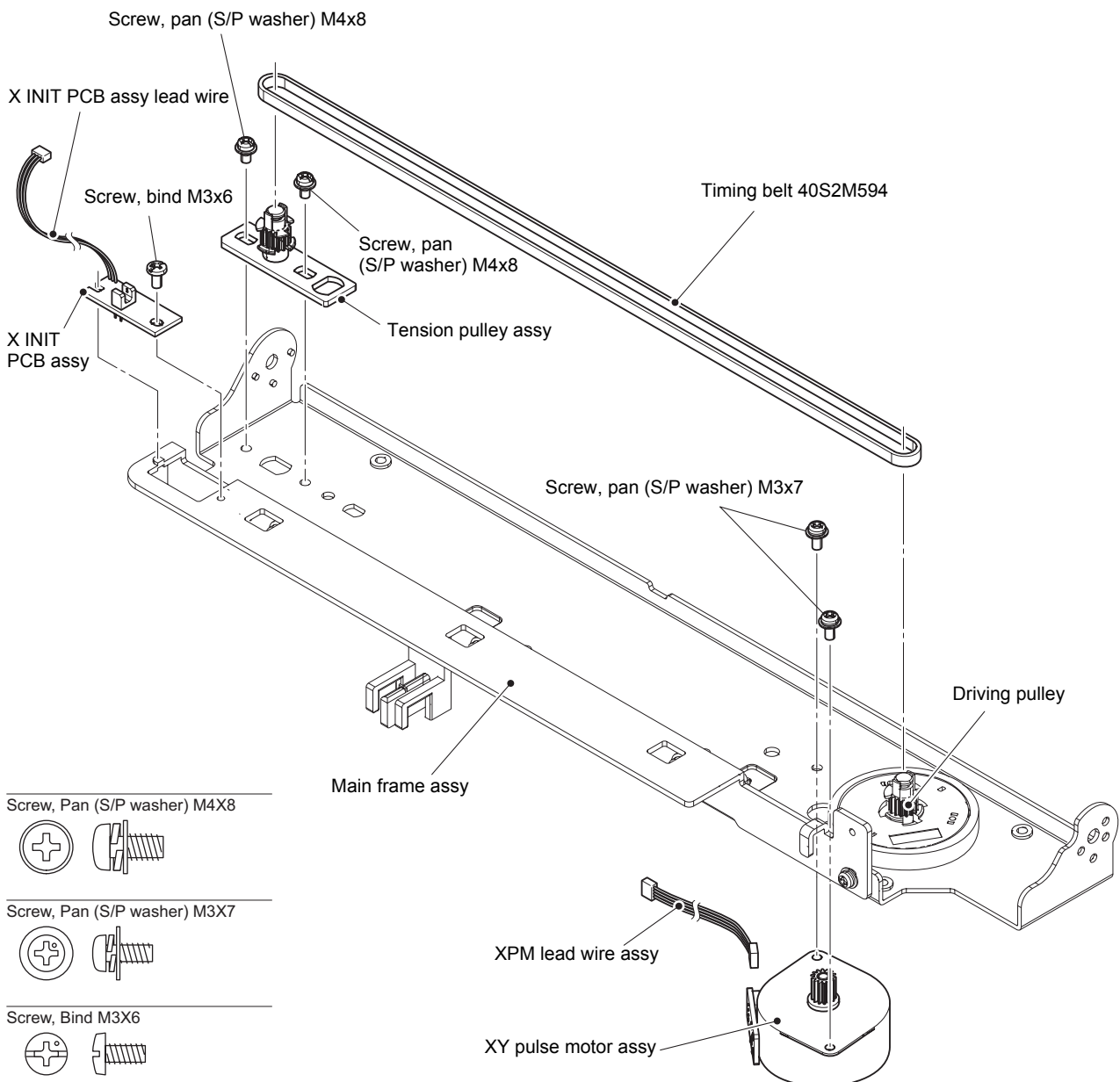
- Fully tighten the screw after performing "Adjustment of Belt tension (embroidery unit)".

2. Connect the XPM lead wire assy to the XY pulse motor assy, and attach the XY pulse motor assy to the main frame assy with the two screws (screw, pan (S/P washer) M3x7).

3. Align the notch of X INIT PCB assy with the boss of main frame assy, and attach the X INIT PCB assy to the main frame assy with the screw (screw, bind M3x6). Pass the X INIT PCB assy lead wire through the securing fixtures.

***Key point**

- Refer to "Wiring of Main frame assy".



3 Attachment of Timing belt and Y slider

1. Set the tension pulley assy to the X carriage unit, and tighten the two screws (screw, pan (S/P washer) M4x8) temporarily. Hang the timing belt 40S2M740 on the tension pulley assy and driving pulley.

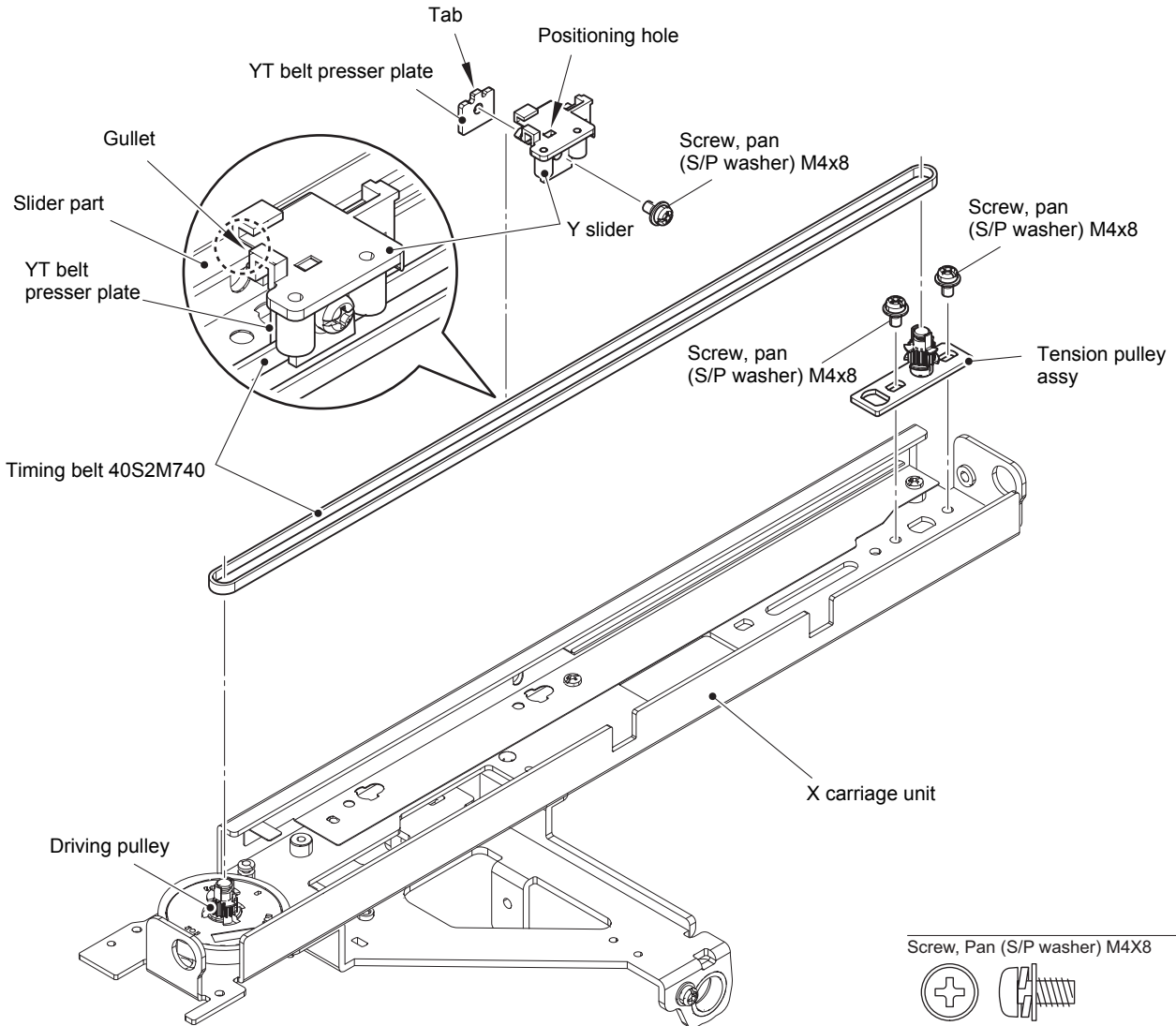
***Key point**

- Fully tighten the screw after performing "Adjustment of Belt tension (embroidery unit)".

2. Set the YT belt presser plate and Y slider to the timing belt 40S2M740 with the screw (screw, pan (S/P washer) M4x8), then engage the gullet of Y slider with the slider part of X carriage unit.

***Key point**

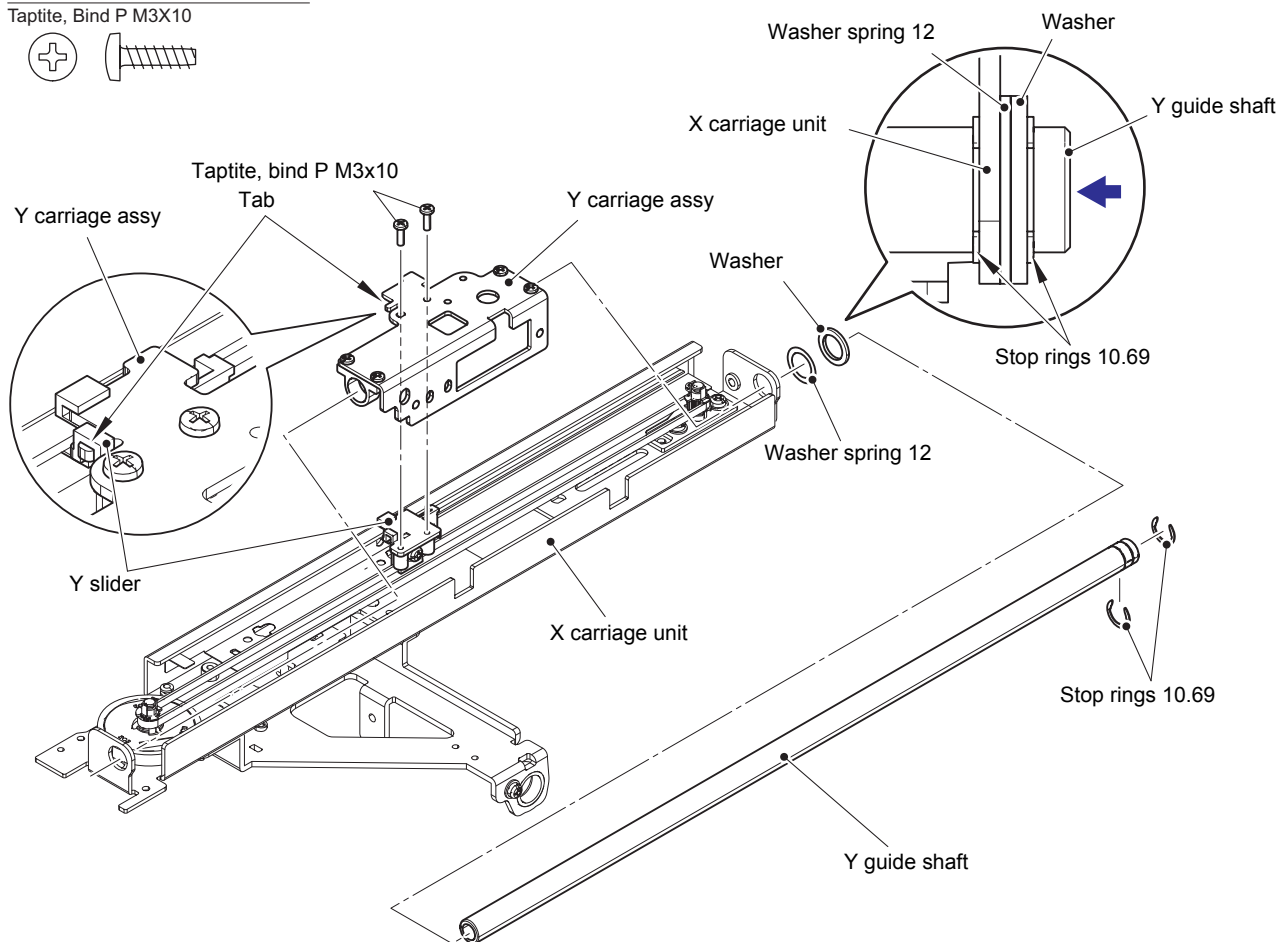
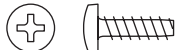
- Check that the tab of YT belt presser plate is inserted into the positioning hole of Y slider.
- Check that the gear teeth of Y slider is engaged with the gear teeth of timing belt 40S2M740.



4 Attachment of Y carriage assy

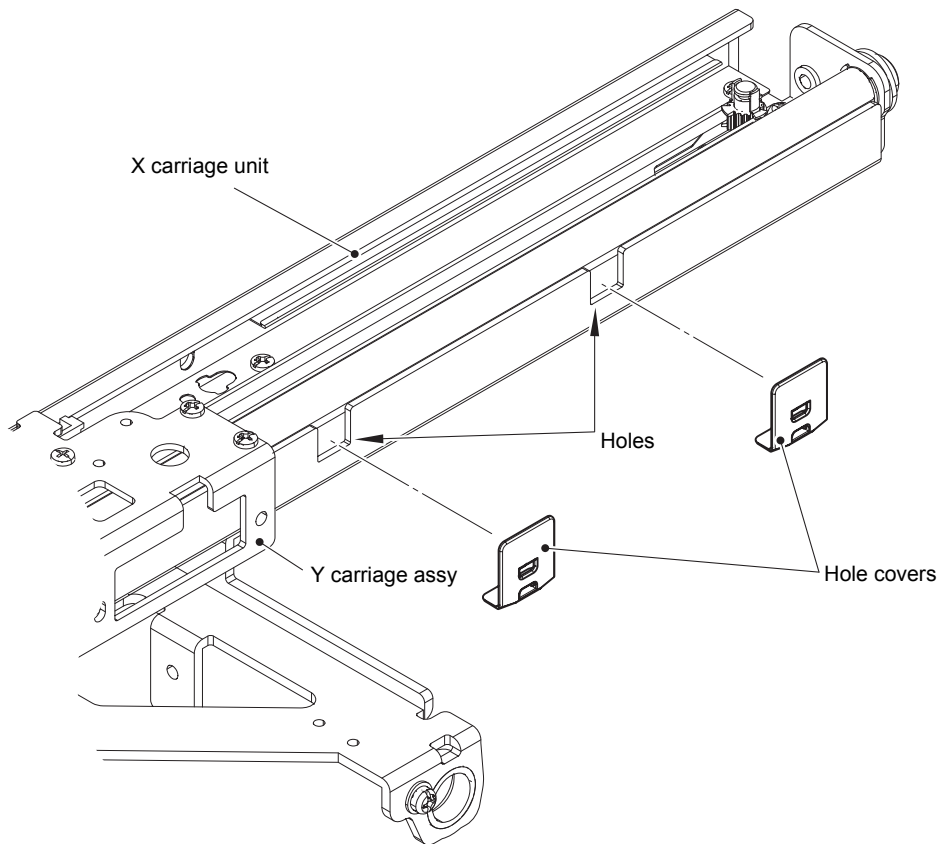
1. Attach the stop ring 10.69 to the groove on outside of Y guide shaft. Insert the Y guide shaft into the washer, washer spring 12, X carriage unit, Y carriage assy and X carriage unit, then attach the stop ring 10.69 to the Y guide shaft while pushing the Y guide shaft to the direction of the arrow.
2. Slide the Y carriage assy to insert the tab of Y carriage assy into the positioning hole of Y slider, and secure it with the two screws (taptite, bind P M3x10).

Taptite, Bind P M3X10



5 Attachment of Hole cover and Flexible flat cable:SML2CD-6

1. Slide the Y carriage assy to come in sight of the two holes. Attach the hole cover to the X carriage unit. (two locations)



Application of
Assembly

Application of
Assembly

- Slide the Y carriage assy to come in sight of the two positioning holes.
- Set the FFC support to the flexible flat cable:SML2CD-6, and attach the FFC support to the Y carriage assy with the two screws (screw, bind M3x6).

***Key point**

- Refer to "[Wiring of Bending of Flexible flat cable:SML2CD-6](#)".

- Set the cord clip "A" to the flexible flat cable:SML2CD-6, attach the cord clip "A" to the X carriage unit, and set the cord clip "B" to the X carriage unit.

***Key point**

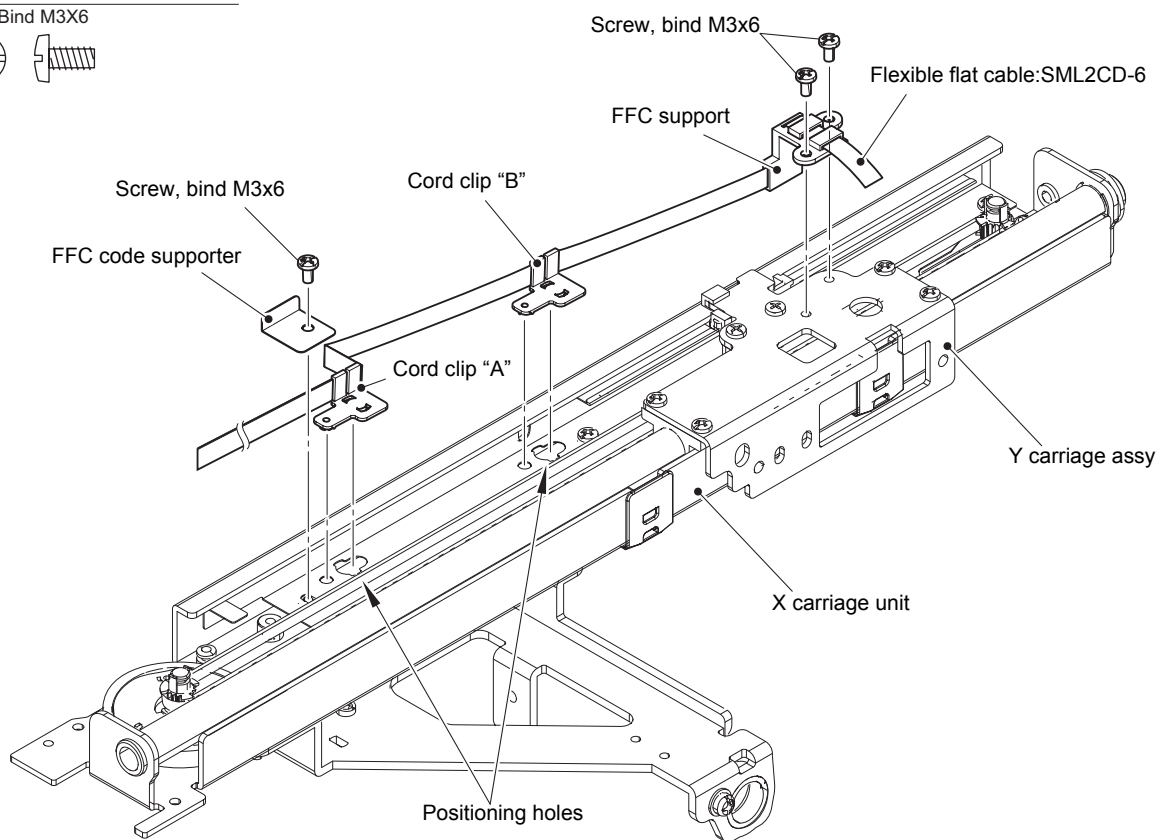
- Be sure to press down the flexible flat cable:SML2CD-6 by the code clip "B".

- Attach the FFC code supporter to the X carriage unit with the screw (screw, bind M3x6).

***Key point**

- Be sure to press down the flexible flat cable:SML2CD-6 by the FFC code supporter.
- Refer to "[Wiring of X carriage unit \(Frame sensor PCB assy\)](#)".

Screw, Bind M3X6



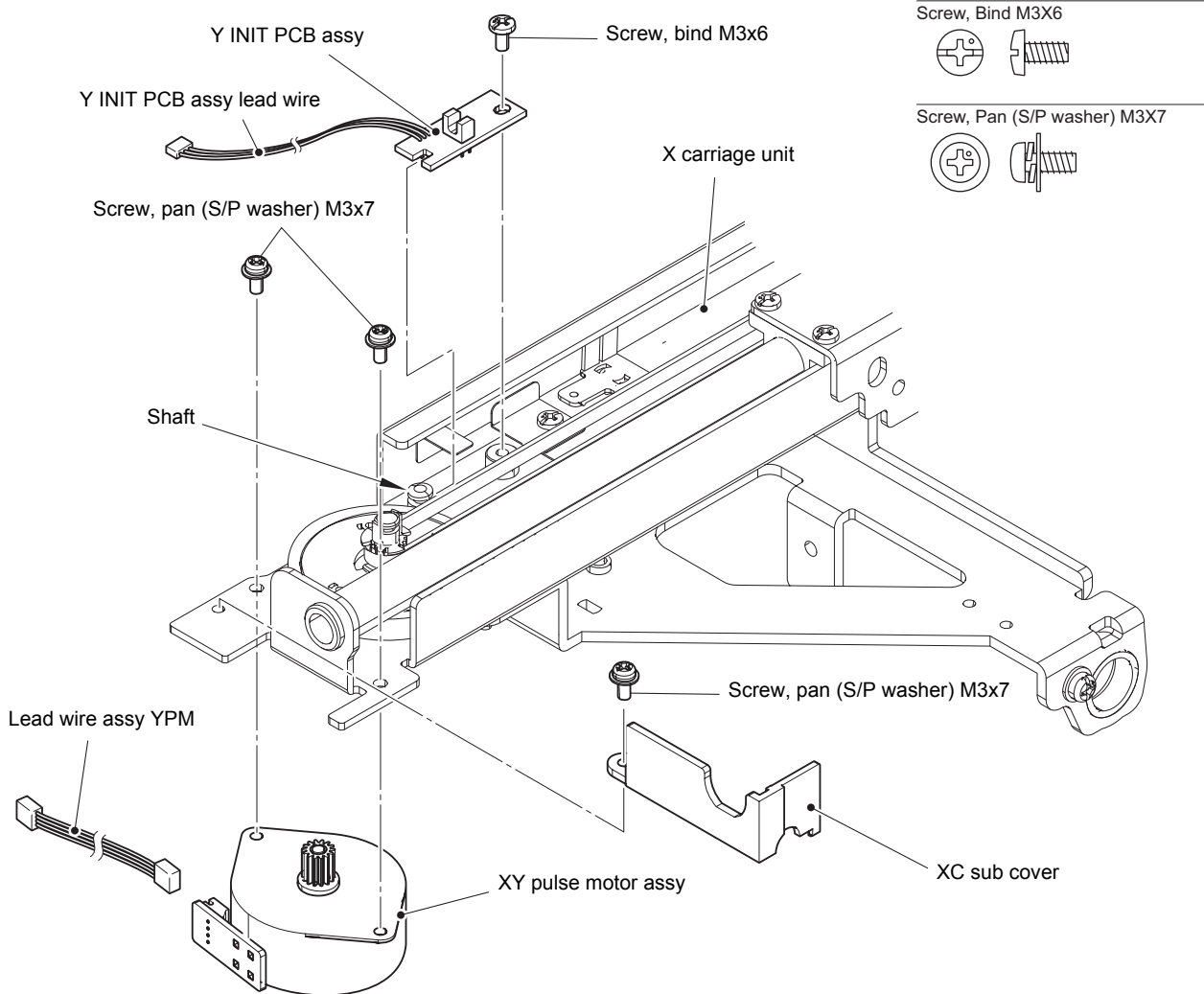
6 Attachment of Y INIT PCB assy and XY pulse motor assy

1. Set the notch of Y INIT PCB assy to the shaft of X carriage unit, and attach the Y INIT PCB assy to the X carriage unit with the screw (screw, bind M3x6). Pass the Y INIT PCB assy lead wire through the securing fixtures.
2. Connect the lead wire assy YPM to the XY pulse motor assy, and attach the XY pulse motor assy to the X carriage unit with the two screws (screw, pan (S/P washer) M3x7).

***Key point**

- Refer to "[Wiring of X carriage unit \(Y relay PCB assy\)](#)".

3. Attach the XC sub cover to the X carriage unit with the screw (screw, pan (S/P washer) M3x7).



7 Attachment of Y relay PCB assy

1. Attach the Y relay PCB assy and clip to the X carriage unit with the two screws (screw, pan (S/P washer) M3x7).
2. Connect the Y INIT PCB assy lead wire to the Y relay PCB assy. Connect the lead wire assy YPM to the Y relay PCB assy, and clip the lead wire assy YPM together.
3. Connect the flexible flat cable:SML2CD-7 to the Y relay PCB assy, and lock it.

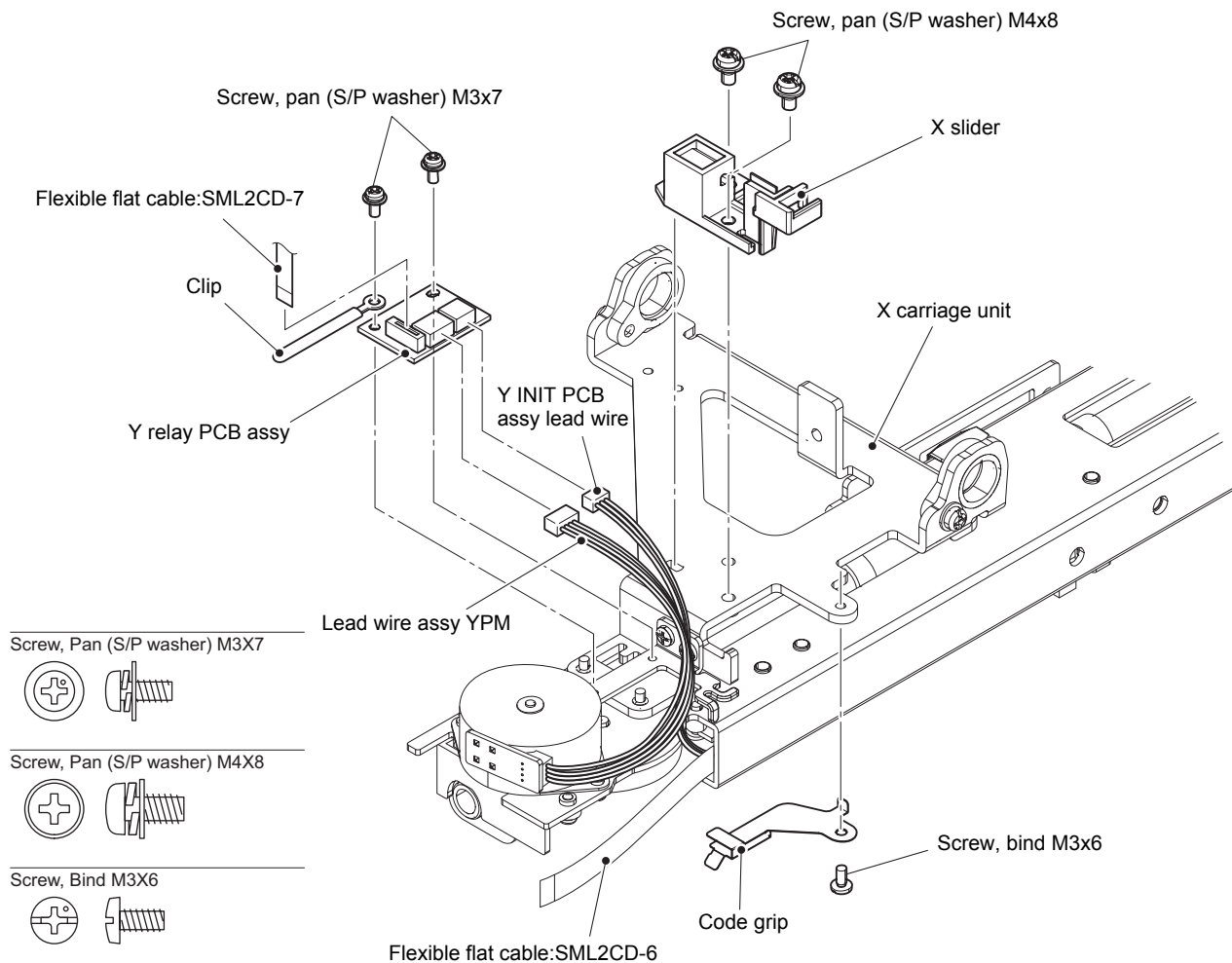
***Key point**

- Refer to "Wiring of Bending of Flexible flat cable:SML2CD-7" and "Wiring of X carriage unit (Y relay PCB assy)".

4. Align the boss of X slider with the positioning hole of X carriage unit, and attach the X slider to the X carriage unit with the two screws (screw, pan (S/P washer) M4x8).
5. Pass the flexible flat cable:SML2CD-6 and flexible flat cable:SML2CD-7 through the securing fixtures, set the code grip to them, and attach the code grip to the X carriage unit with the screw (screw, bind M3x6).

***Key point**

- Refer to "Wiring of X carriage unit (Y relay PCB assy)".

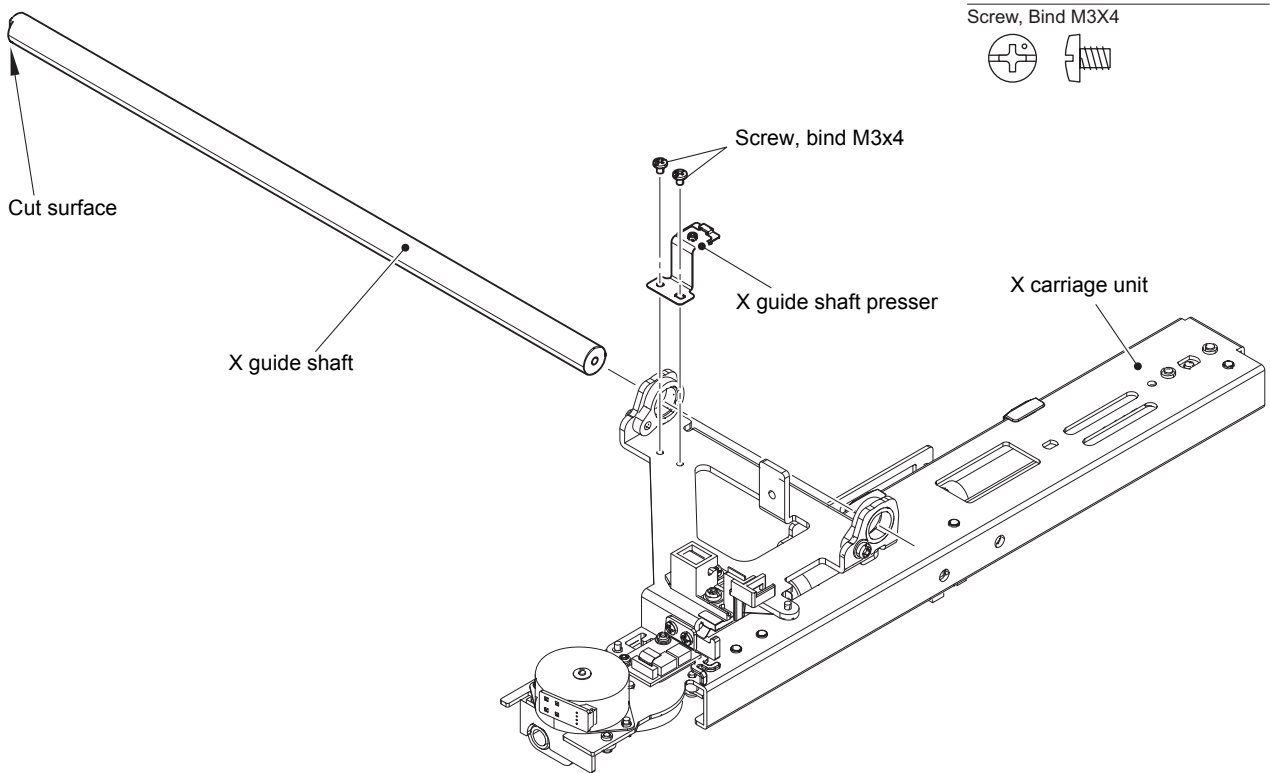


8 Attachment of X carriage unit

1. Insert the X guide shaft into the attachment holes of X carriage unit, and attach the X guide shaft presser to the X carriage unit with the two screws (screw, bind M3x4).

***Key point**

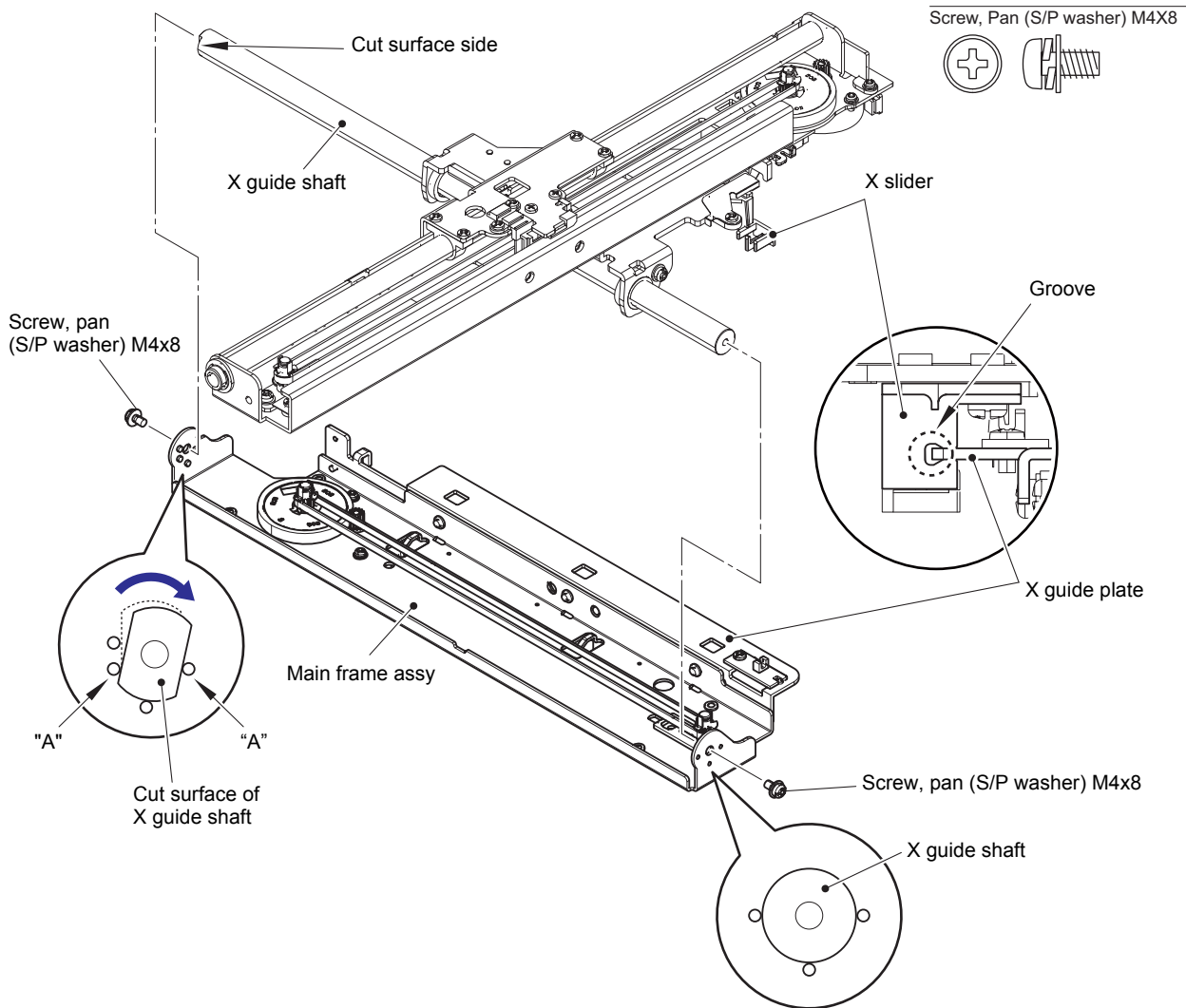
- Make sure that the cut surface of X guide shaft is on the left side as shown in the figure below.



2. Set the groove of X slider to the X guide plate.
3. Set the X guide shaft to the main frame assy, and then secure it with the two screws (screw, pan (S/P washer) M4x8).

***Key point**

- Make sure that the cut surface of X guide shaft is aligned with four bosses on the main frame assy, and it comes in contact with the two of those bosses shown as "A".
- Make sure that the another side of X guide shaft is in between three bosses on the main frame assy.



Application of
Assembly

Application of
Assembly

- Attach the X belt presser to the X carriage unit with the screw (screw, pan (S/P washer) M4x8).

***Key point**

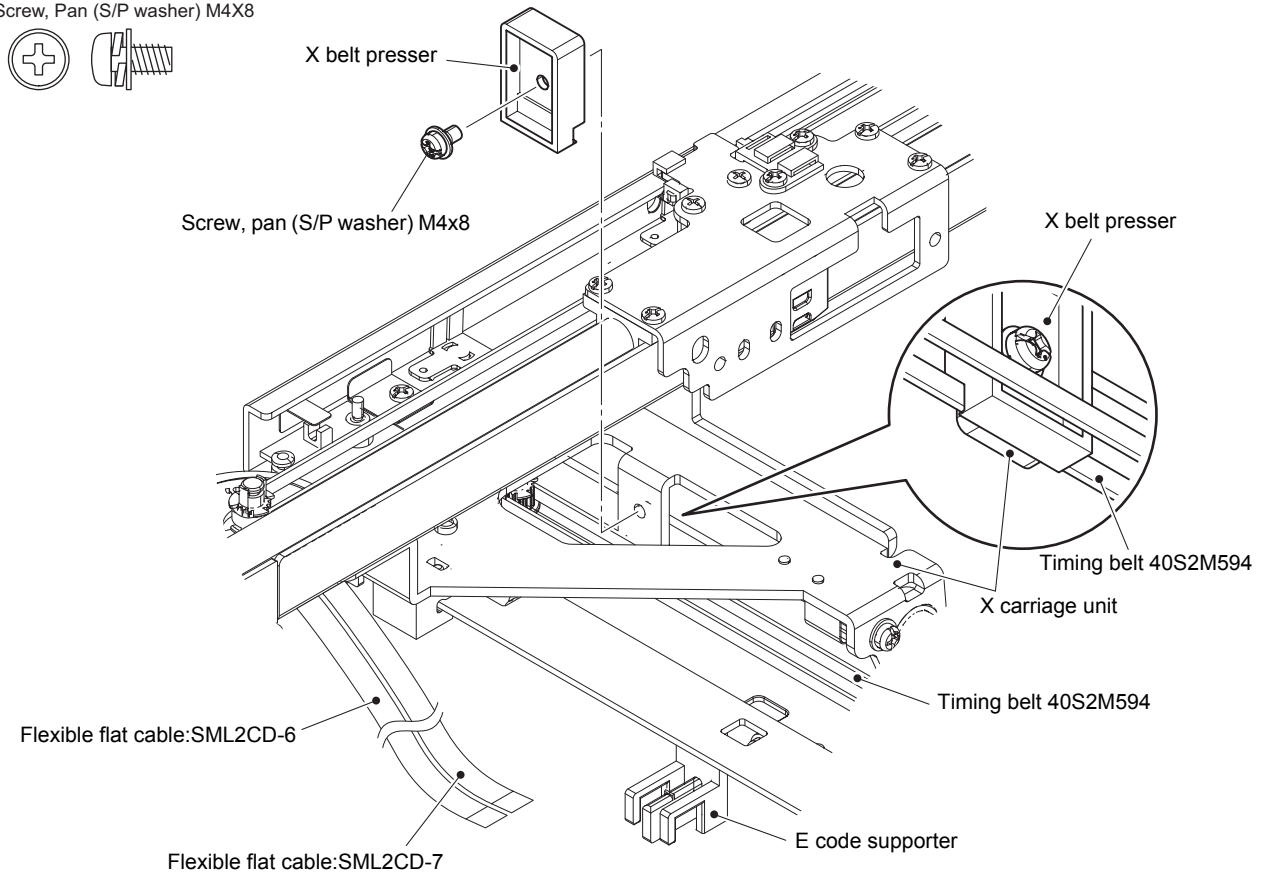
- Press the timing belt 40S2M594 with the X belt presser, and then check that the gear teeth of X belt presser is engaged with the gear teeth of timing belt 40S2M594.

- Set the flexible flat cable:SML2CD-6 and flexible flat cable:SML2CD-7 to the E code supporter.

***Key point**

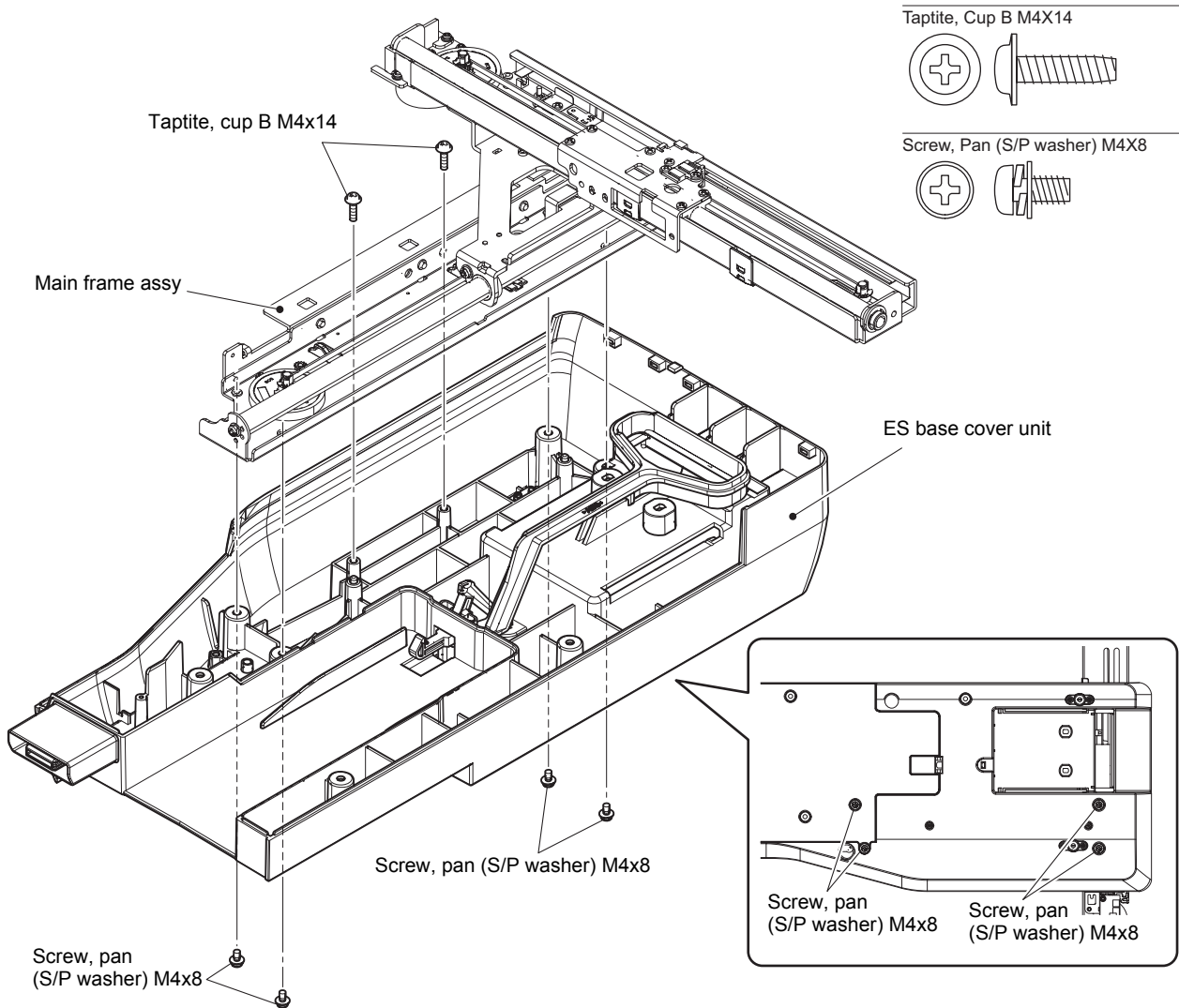
- Refer to "Wiring of E code supporter".

Screw, Pan (S/P washer) M4X8



9 Attachment of ES base cover unit

1. Attach the ES base cover unit to the main frame assy with the two screws (taptite, cup B M4x14).
Tighten the four screws (screw, pan (S/P washer) M4x8) to the back of ES base cover unit.



Application of
Assembly

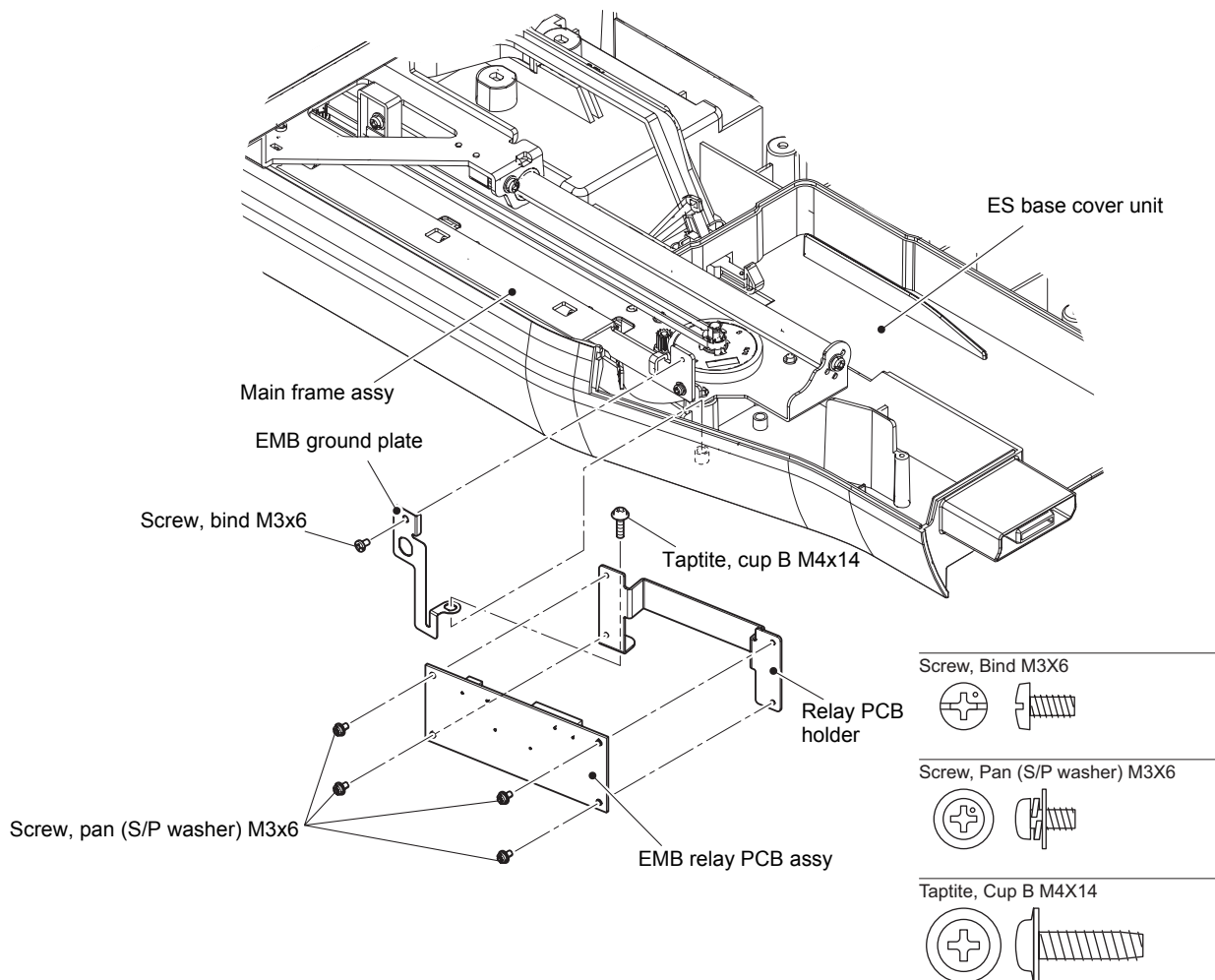
Application of
Assembly

10 Attachment of EMB relay PCB assy

1. Attach the EMB ground plate to the main frame assy with the screw (screw, bind M3x6).
2. Attach the EMB relay PCB assy to the relay PCB holder with the four screws (screw, pan (S/P washer) M3x6).
3. Connect the flexible flat cable:SML2CD-7 to the CN5 on the EMB relay PCB assy and lock it. Connect the flexible flat cable:SML2CD-6 to the CN2, X INIT PCB assy lead wire to the CN4, XPM lead wire to the CN3 and lead wire assy EMB unit to the CN1. Attach the relay PCB holder to the ES base cover unit with the screw (taptite, cup B M4x14).

***Key point**

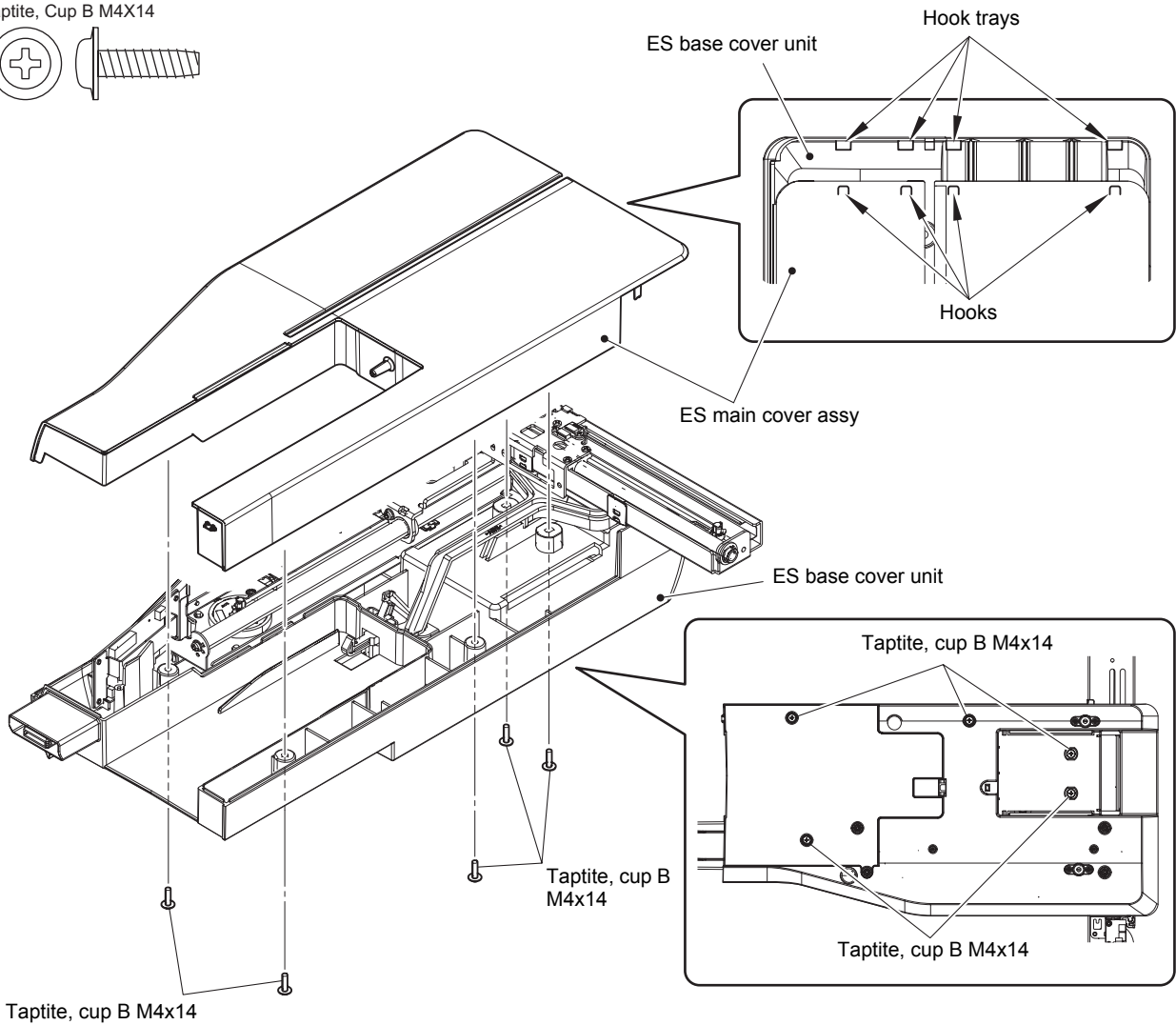
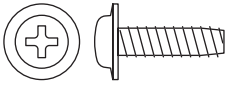
- Refer to "Wiring of EMB relay PCB assy".



11 Attachment of ES main cover assy

1. Insert the four hooks of ES main cover assy into the four hook trays of ES base cover unit, and set the ES main cover assy to the ES base cover unit. Tighten the five screws (taptite, cup B M4x14) to the back of ES base cover unit.

Taptite, Cup B M4X14



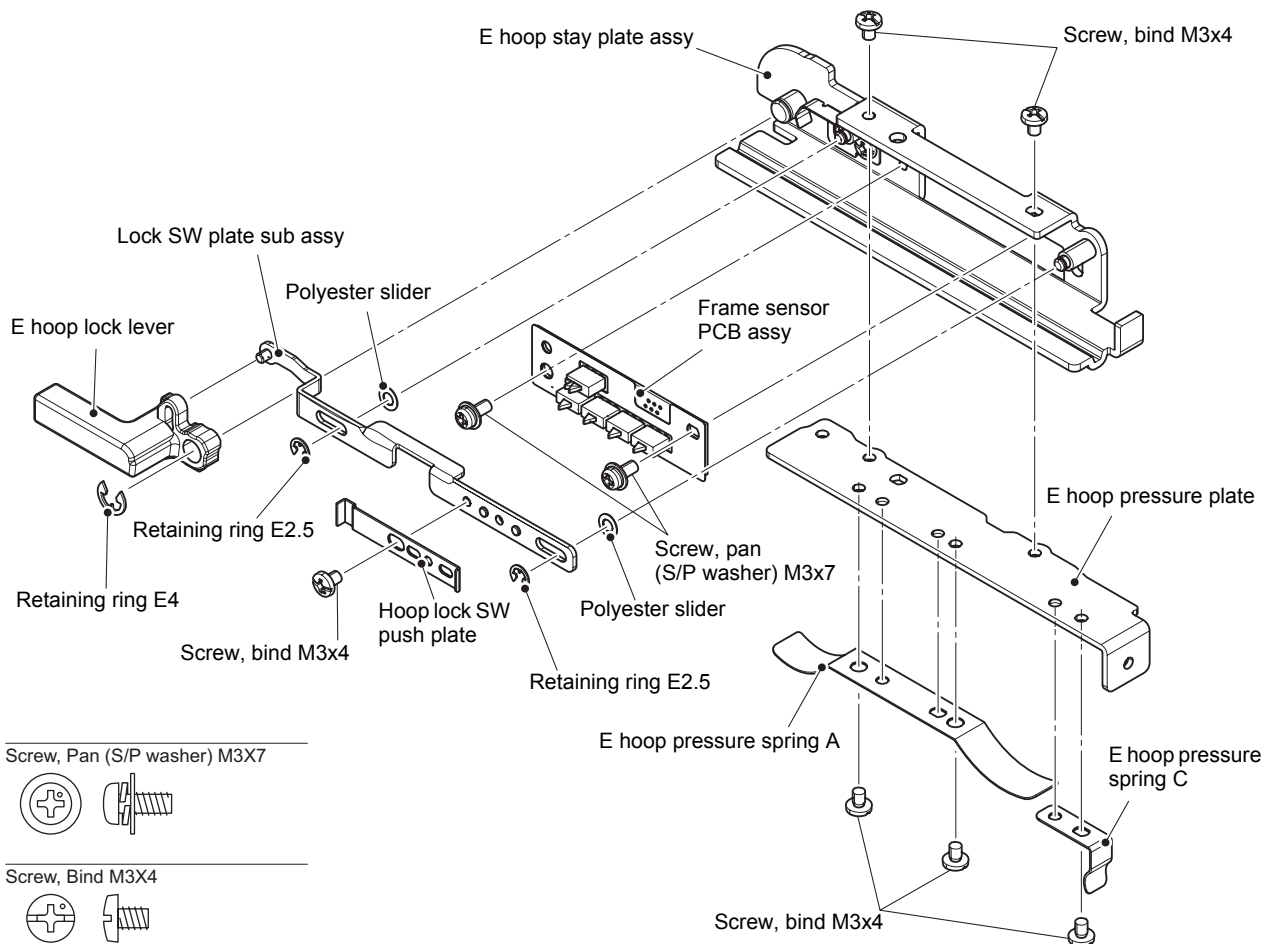
12 Assembly of E hoop stay plate assy

1. Align the positioning hole of frame sensor PCB assy with the boss of E hoop stay plate assy, and attach the frame sensor PCB assy to the E hoop stay plate assy with the two screws (screw, pan (S/P washer) M3x7).
2. Set the two polyester sliders and lock SW plate sub assy to the two shafts of E hoop stay plate assy, and attach the two retaining rings E2.5.
3. Align the positioning groove of E hoop lock lever with the pin of lock SW plate sub assy, set the E hoop lock lever to the E hoop stay plate assy, and attach the retaining ring E4.
4. Attach the hoop lock SW push plate to the lock SW plate sub assy with the screw (screw, bind M3x4).

*Key point

- Check if the switch of frame sensor PCB assy works by moving E hoop lock lever.

5. Align the positioning hole of E hoop pressure spring C with the boss of E hoop pressure plate, and attach the E hoop pressure spring C to the E hoop pressure plate with the screw (screw, bind M3x4). Align the two positioning holes of E hoop pressure spring A with the two bosses of E hoop pressure plate, and attach the E hoop pressure spring A to the E hoop pressure plate with the two screws (screw, bind M3x4). Attach the E hoop pressure plate to the E hoop stay plate assy with the two screws (screw, bind M3x4).



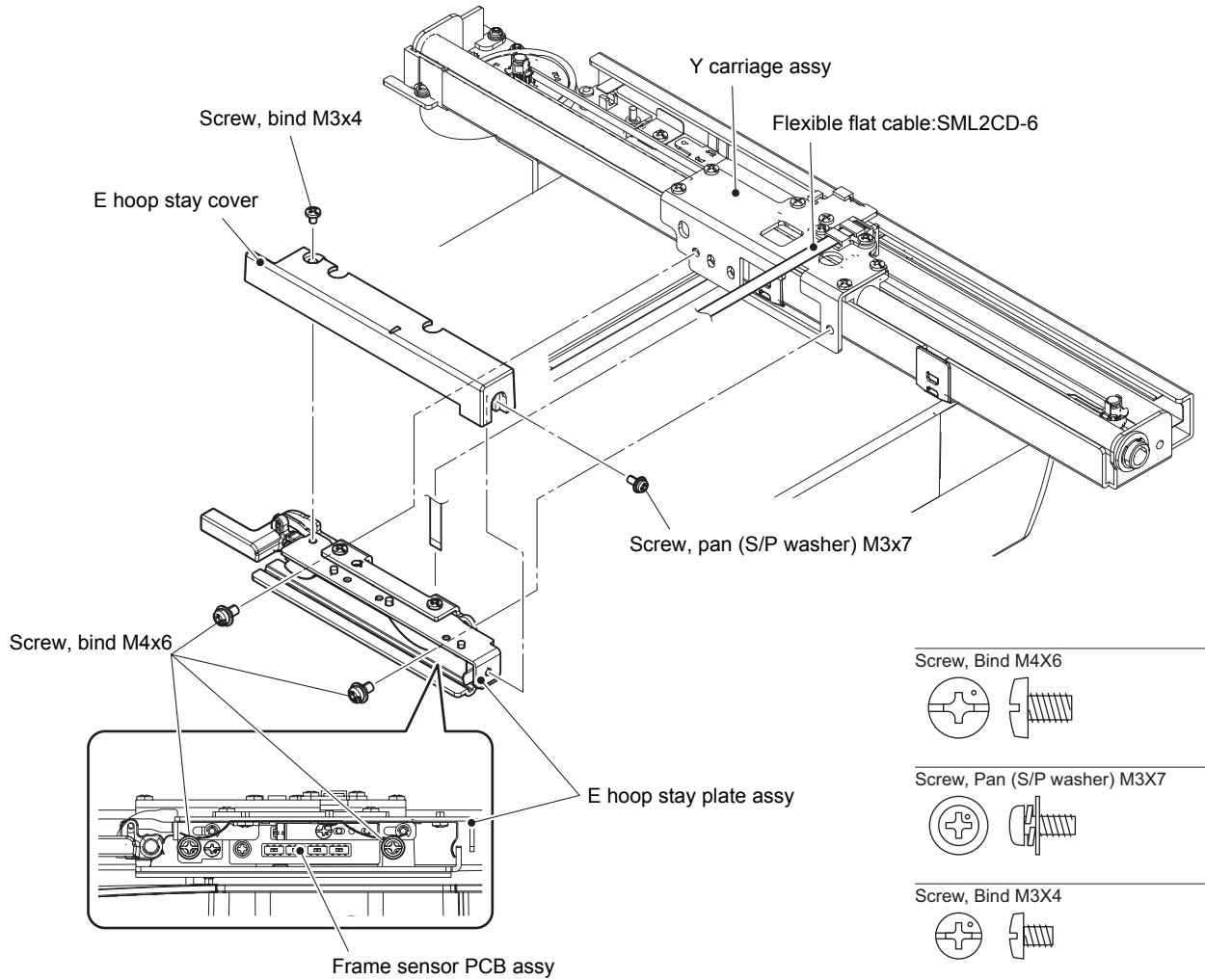
13 Attachment of E hoop stay plate assy

1. Connect the flexible flat cable:SML2CD-6 to the frame sensor PCB assy of E hoop stay plate assy, and then attach the E hoop stay plate assy to the Y carriage assy with the two screws (screw, bind M4x6).

***Key point**

- Refer to "Wiring of X carriage unit (Frame sensor PCB assy)".

2. Set the E hoop stay cover to the E hoop stay plate assy, and secure it with the screw (screw, pan (S/P washer) M3x7) and screw (screw, bind M3x4).

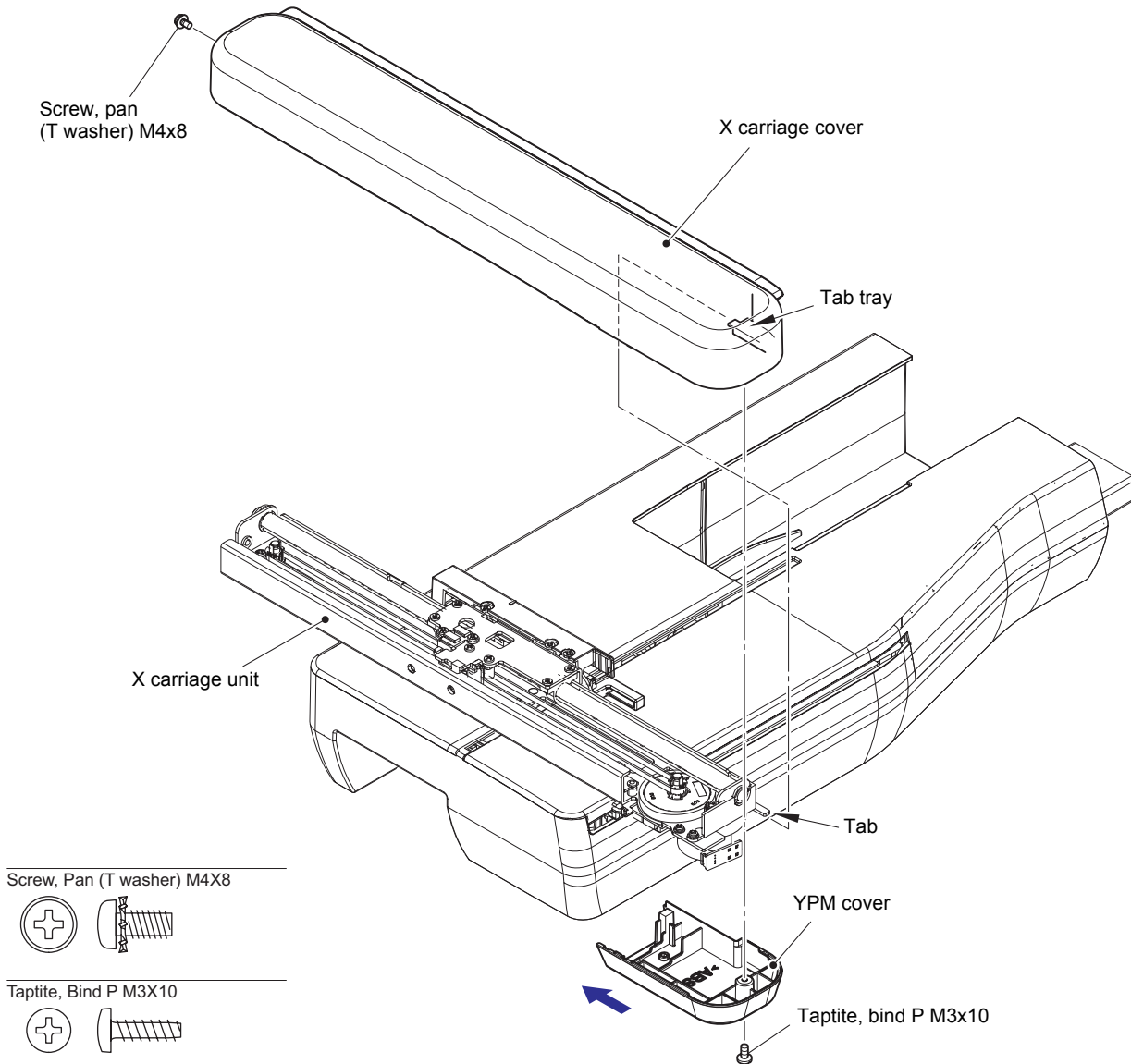


Application of
Assembly

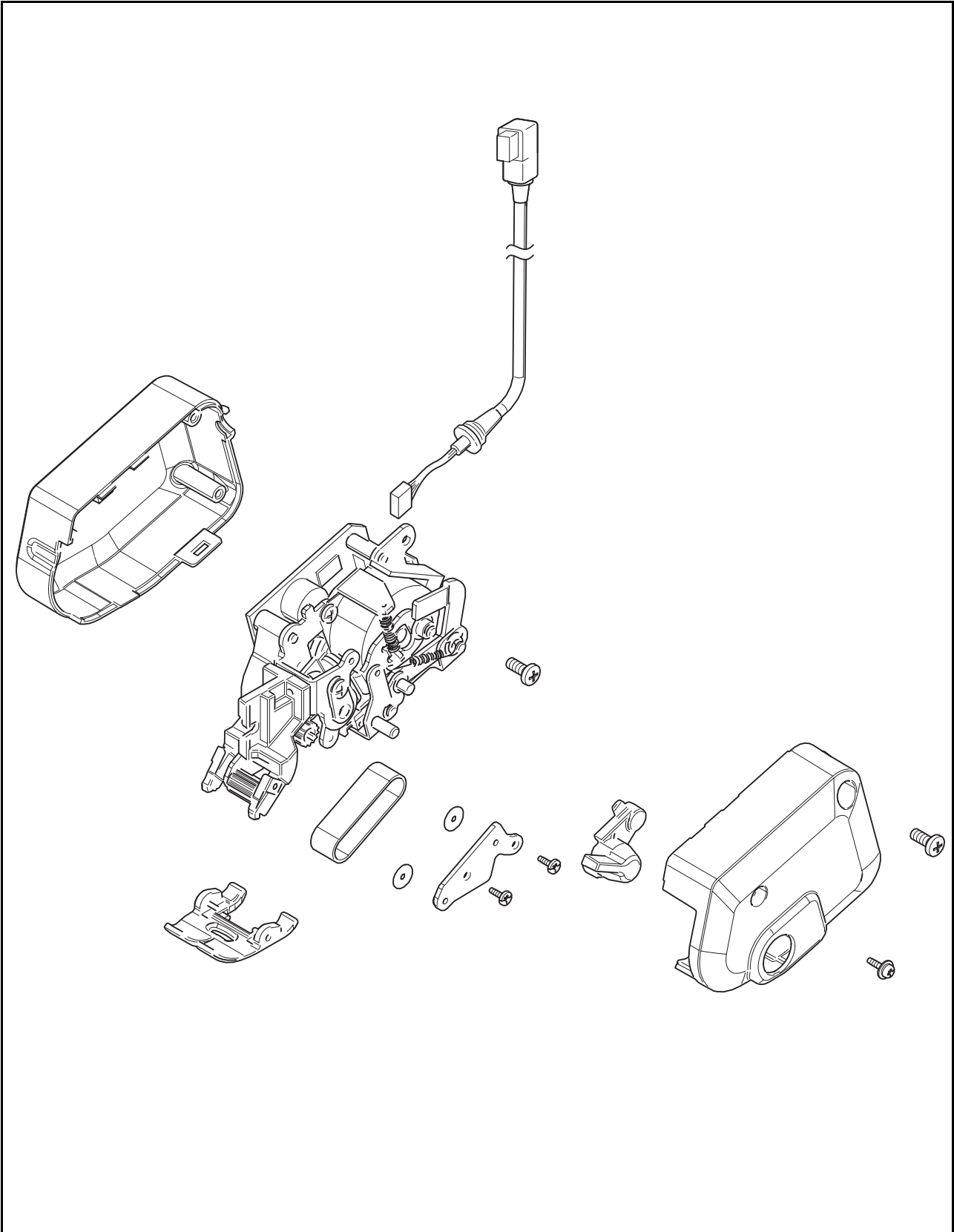
Application of
Assembly

14 Attachment of X carriage cover and YPM cover

1. Insert the tab of X carriage unit into the tab tray of X carriage cover, and attach the X carriage cover to the X carriage unit with the screw (screw, pan (T washer) M4x8).
2. Set the YPM cover to the X carriage cover, slide the YPM cover to the direction of the arrow, and secure it with the screw (taptite, bind P M3x10).



Dual feed assy location diagram



Application of
Assembly

Application of
Assembly

1 Assembly of Dual feed assy

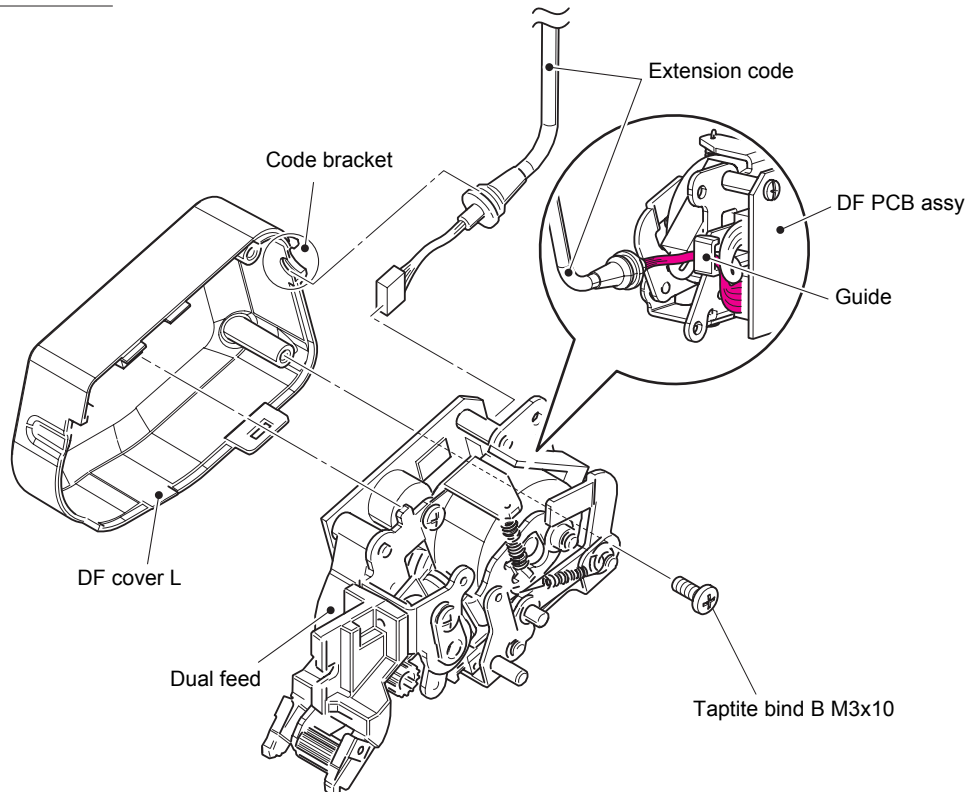
1. Connect the extension code connector to the DF PCB assy and hook the extension code to the guide.

***Key point**

- Refer to "Wiring of Dual feed assy".

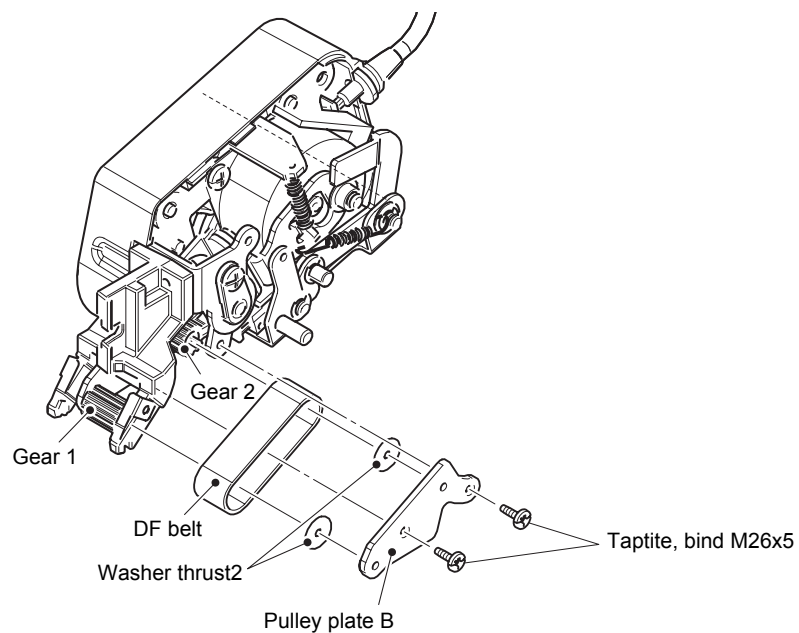
2. Set the DF cover L to the dual feed and secure it with the screw (taptite, bind B M3x10). Set the extension code to the code bracket of the DF cover L.

Taptite, Bind B M3X10



3. Put the DF belt on the gear 1 and 2 in this order and set the washer thrust2 (two locations) to the bushing (2 locations). Set the pulley plate B so that its two holes are matched to the two bushings, and secure them with the two screws (taptite, bind M26x5).

Taptite, Bind M26X5



- Keep holding the tub of the changeover thumb at the section "B" (DF belt gets lowered) of the DF cover R and set it to the dual feed. Secure it with the screw (screw, pan (S/P washer) M26x8 DA) and screw (taptite, bind B M3x10). (Refer to the section "A" below)

***Key point**

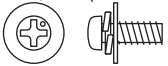
- Make sure that the joint bushing is lifted. If it's at the bottom, lift it up. (Refer to the section "C" below)
- After assembling the DF cover R, make sure that the belt end moves up and down by moving the changeover thumb.

- Attach the DF foot assy.

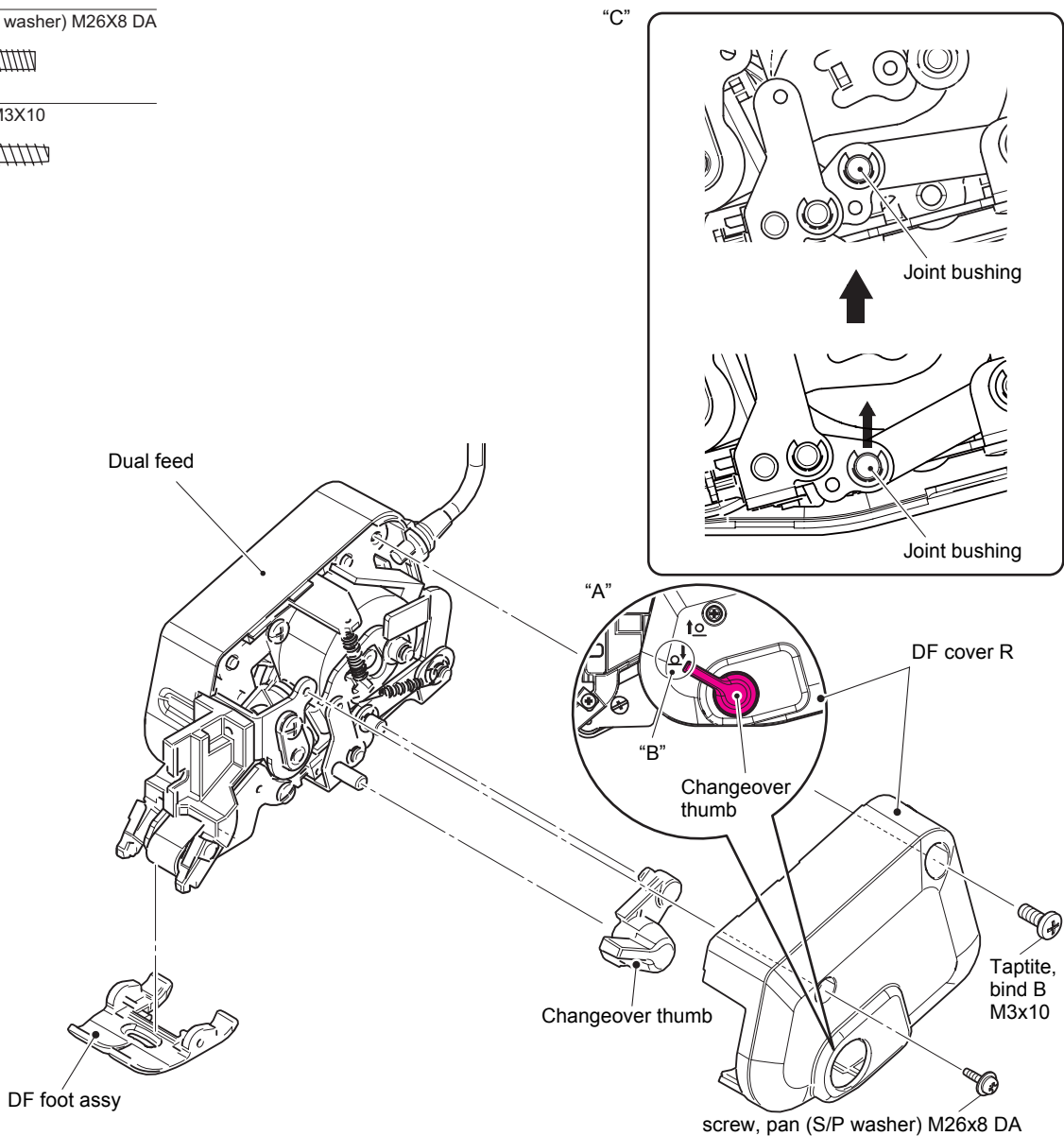
***Key point**

- After assembling, perform "Feed length of dual feed foot".

Screw, Pan (S/P washer) M26X8 DA



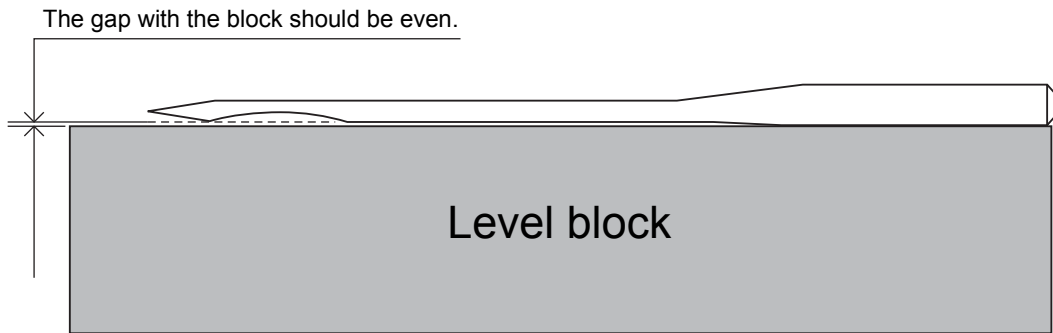
Taptite, Bind B M3X10



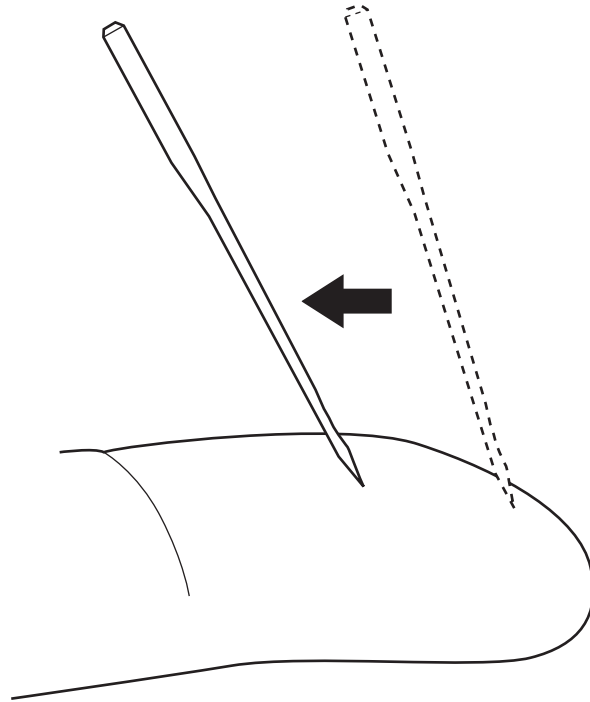
4 Adjustment

Inspection	Needle point damage	4 - 2
Test Mode	Start test mode (with front cover)	4 - 3
	Contents	4 - 4
Adjustment	Touch panel.....	4 - 10
	Timing belt tension	4 - 11
	Timing belt and belt support upper/lower clearance ...	4 - 12
	Motor belt tension	4 - 13
	Fine tension	4 - 14
	Upper thread tension	4 - 15
	Upper shaft shutter angle	4 - 16
	Upper shaft cover position.....	4 - 17
	Front/back position of needle and presser foot	4 - 18
	Left base line needle drop	4 - 19
	Needle clearance left/right.....	4 - 20
	Needle bar rising	4 - 21
	Needle bar height	4 - 22
	Needle clearance	4 - 23
	Needle threader.....	4 - 24
	Presser bar height.....	4 - 25
	Fabric thickness setting	4 - 26
	Knee lifter position	4 - 27
	Feed dog height and parallelism	4 - 28
	Front/back and left/right position of feed dog	4 - 30
	Feed forward/backward	4 - 31
	Side feed straight stitch	4 - 33
	One point.....	4 - 34
	BH lever switch position	4 - 35
	Inner rotary hook bracket position	4 - 37
	Lower thread tension (standard inner rotary hook assy) ...	4 - 38
	Guide line marker position.....	4 - 39
	Sensor Pen Calibration (for software Ver. 2.0 or later) ...	4 - 41
	LED pointer position (embroidery foot with LED pointer) ...	4 - 45
	Feed length of dual feed foot.....	4 - 46
	Belt tension (embroidery unit)	4 - 47
	X carriage height (embroidery unit)	4 - 48
	Embroidery center position (embroidery unit)	4 - 49
	F, Z pulse motor phase	4 - 51
	Thread take up spring tension.....	4 - 52

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





2. Slide a needle on your finger and check it moves smoothly.

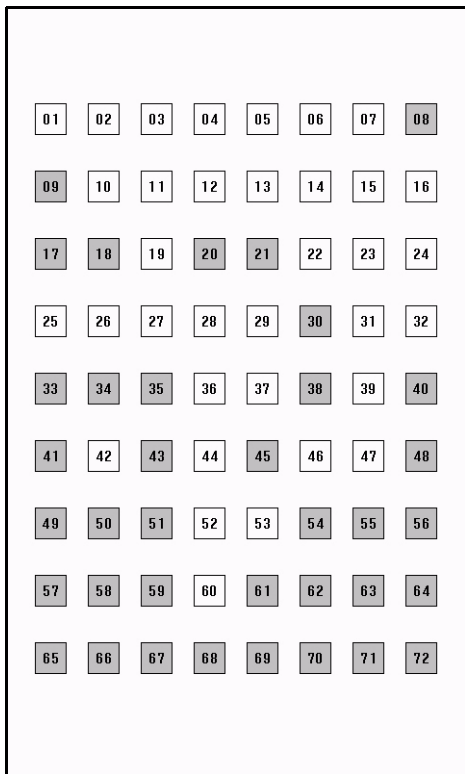
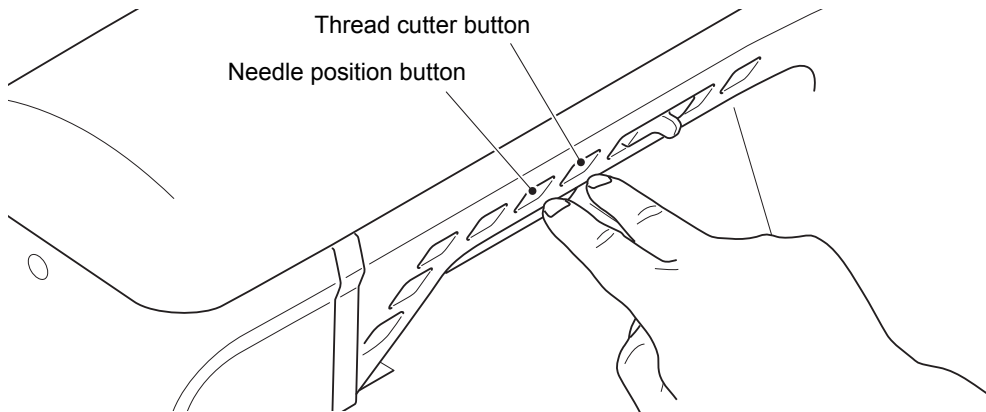


Adjustment

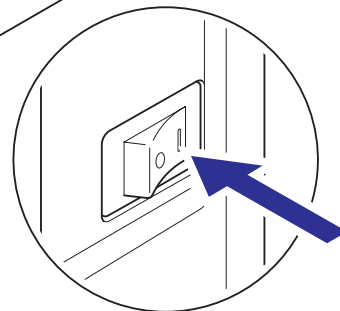
Adjustment

■ With front cover

Turn on the machine while pressing  (Needle position button) and  (Thread cutter button) to start (test mode selection screen appears).



Test mode selection screen



Adjustment

Adjustment

#01. Serial numbers display

This mode displays serial number, product ID, and program version stored in the machine.

#02. Fabric thickness setting (Used in Adjustment “4-26” / “4-27”)

This mode is used for:

storing A/D value of potentiometer when the fabric thickness is 0 mm / 3 mm.

storing A/D value of potentiometer when the knee lifter is moved at maximum or minimum.

#03. Pattern adjustment (Used in Adjustment “4-34”)

This mode operates test pattern stitching. Correction value for the feeding is set based on the stitching result.

#04. 3-point needle drop (Used in some adjustments.)

This mode changes needle position to left / center / right.

#05. Needle clearance

This mode operates side feeding by 0.5 mm.

#06. Feed dog position (Used in Adjustment “4-28” / “4-30”)

This mode moves the feed dog to center, front, left, right, and drop position.

#07. Presser foot height

This mode displays presser foot height. Use this mode to check the highest / lowest position of the pivot presser foot.

#08 and #09. Not used.**#10. Lower thread**

This mode is used for checking operation of the lower thread detection sensor. (+.+ : lower thread remained, 0.0 : lower thread empty)

***Key point**

- Turn the pulley by hand until the machine shows 0.0 (lower thread empty) when checking operation of the sensor.

#11. Upper thread

This mode is used for checking operation of the upper thread detection sensor. (+.+ : upper thread remained, 0.0 : upper thread empty)

***Key point**

- Check if the machine displays +.+ when the set upper thread is pulled up by hand.

#12. Upper thread 1

This mode disables detection of upper / lower thread and needle plate A / B.

* Effective only once when the machine is turned on again after selecting test mode #12.

#13. Forward and reverse feed (Used in Adjustment “4-31”)

This mode operates 100 forward stitches (left base line) and 100 backward stitches (right base line).

#14. Speed

This mode displays target and actual rotation speed of the upper shaft.

#15. Power

This mode operates the machine with the maximum electric power.

#16. Switch monitoring (Used in Adjustment “4-35”)

This mode makes buzzer sound when particular switches* go on / off.

* Presser foot switch, button hole lever up/down switch, button hole lever back/forth switch, bobbin winder switch, and embroidery frame detection switch.

#17 and #18. Not used.

#19. Clearing memory/Clearing counter (Used in Maintenance “6-2”)

This mode is used for:

- displaying total / service stitch count for embroidery pattern sewing and utility stitch sewing.
- displaying total / service stitch time.
- clearing memory area.
- resetting service stitch count for embroidery pattern sewing and utility stitch sewing.
- resetting service stitch time.
- displaying number of needle threading operated.

#20 and #21. Not used.

#22. NP sensor (Used in Adjustment “4-16”)

This mode displays upper shaft angle with value and buzzer.

#23. Embroidery max position (Used in Adjustment “4-46”)

This mode is used for:

- tracing the maximum embroidery range for set embroidery frame.
- moving embroidery carriage to embroidery frame evacuation position.

#24. LCD check

This mode is used for checking LCD.

#25. Tension adjustment

This mode is used for setting thread tension for stitches*.

- * For straight line utility stitch sewing, other stitches, and embroidery pattern sewing.

#26. Not used.

#27. Line marker position check (Used in Adjustment “4-39”)

This mode is used for:

- checking the line marker brightness.
- setting the correction value for the line marker position.

#28. Threading check (Used in Adjustment “4-24”)

This mode is used for checking the needle threading operation.

#29. Input check

This mode displays status of switches and sensors.

[State]: displays current status of switch / sensor.

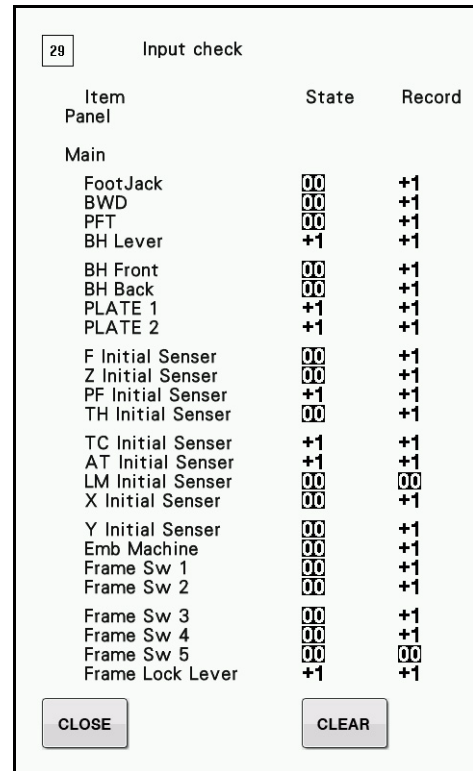
[Record]: displays switch / sensor status history.

[Clear] button: clears record.

+1	ON
00	OFF

Item:

Foot Jack	Foot controller jack
BWD	Bobbin winder SW
PFT	Presser foot SW
BH lever	Button hole Lever SW
BH Front	Button hole front SW
BH Back	Button hole back SW
PLATE 1	Needle plate A SW
PLATE 2	Needle plate B SW
F Initial Sensor	F-pulse motor initial sensor
Z Initial Sensor	Z-pulse motor initial sensor
PF Initial Sensor	Presser foot-pulse motor initial sensor
TH Initial Sensor	Threader-pulse motor initial sensor
TC Initial Sensor	Thread cut-pulse motor initial sensor
AT Initial Sensor	Auto tension-pulse motor initial sensor
LM Initial Sensor	Line marker-pulse motor initial sensor
X Initial Sensor	X carriage initial sensor
Y Initial Sensor	Y carriage initial sensor
Emb Machine	Embroidery unit connector
Frame SW 1	Embroidery frame PCB assy. SW 1
Frame SW 2	Embroidery frame PCB assy. SW 2
Frame SW 3	Embroidery frame PCB assy. SW 3
Frame SW 4	Embroidery frame PCB assy. SW 4
Frame SW 5	Embroidery frame PCB assy. SW 5
Frame Lock Lever	Embroidery frame Lock Lever SW



#30 and #31. Not used.

#32. AD

This mode displays:
 speed volume and A/D value of the foot controller.
 target and actual rotation speed of the main motor.

#33 to #35. Not used.

#36. Side feed adjustment (Used in Adjustment "4-33")

This mode operates test pattern stitching. Correction value for the feeding is set based on the stitching result.

#37. LED pointer adjustment (Used in Adjustment "4-42")

This mode is used for setting correction value for height of the embroidery foot with LED pointer .

#38. Not used.

#39. DF check (Used in Adjustment "4-43")

This mode is used for:
 operating 100 forward stitches and 100 backward stitches.
 setting correction value for dual feeding volume.

#40 and #41. Not used.

#42. Embroidery position adjust (Used in Adjustment “4-46”)

This mode is used for setting correction value for initial position of embroidery.

#43. Not used.

#44. Parameter default check

When all the displayed parameter is default, “OK” is displayed.

When there is any parameter that is not default, “NG” will be displayed and the parameter will be highlighted.


[CLEAR]: All the displayed parameter will be changed to default value.


At the same time, all the stored sewing pattern in flash memory of the machine will be cleared.

#45. Not used.

#46. Error list





This mode stores up to 30 latest error messages displayed during the machine was in operation.

When the  button is pressed, the previous error message appears.

When the  button is pressed, the latest error message appears.

***Key point**

- The list number of the latest error message is “1”.

  : You can change the language of the error message by pressing the  button or  button.

***Key point**

- The function to change the language will be effective until the machine is turned off.

[COUNT]: Counts number of times an error found in stored 10 errors if applicable.

***Key point**

- When the error was found only once, “1” is displayed.

[Maintenance Stitch Count]: Displays the total stitch count at the time of previous maintenance.

[Error Stitch Count]: Displays the total stitch count at the time of current error appeared.



#47 to #51. Not used.

#52. LED check

This mode is used for checking LED / Speaker operation.

#53. Extend unit check (Used only in production line.)

#54 to #59. Not used.

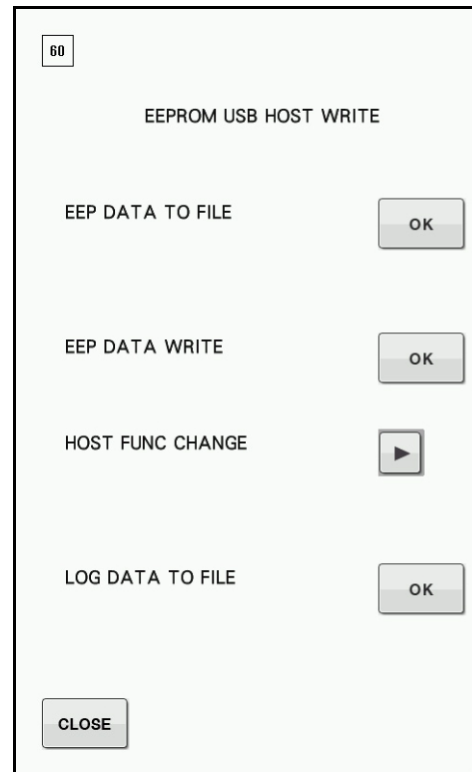
#60. EEPROM use host write

Plug the USB flash memory into a USB port on your machine and press the button next to "LOG DATA TO FILE". Log information in the machine will be stored in USB flash memory.

***Key point**

- Refer to "4-9" for log information

#61 to #72. Not used.



Log Sample

Specification	SPEC	0x00(SPEC VCOMB L FULL / DISNEY US)	0x00: VCOMB L FULL
Serial Number	SERIAL NUMBER	S: F2B114671	0x01: VCOMB L BASIC
Product ID	PRODUCT ID	P: 2281512064	0x02: VEMB FULL
Language Setting	LANGUAGE	0x00	0x03: VEMB BASIC
Panel PCB Program Version	PANEL VERSION	V8.03	0x04: VSEW H FULL
Main PCB Program Version	MAIN VERSION	V1.04	Others: SPEC ERROR
Boot Program Version	BOOT VERSION	V1.00	
Embroidery Pattern Stitching Count (Service)	Emb Service Stitch Count	14444 count	0x00: English
Embroidery Pattern Stitching Count (Total)	Emb Total Stitch Count	14444 count	0x01: German
Utility Stitching Count (Service)	Utl Service Stitch Count	2424994 count	0x02: French
Utility Stitching Count (Total)	Utl Total Stitch Count	2424994 count	0x03: Italian
Stitching Time (Service)	Service Stitch Time	100 h	0x04: Dutch
Stitching Time (Total)	Total Stitch Time	200 h	0x05: Spanish
Threading Count	Thread Count	124 count	0x06: Japanese
			0x07: Danish
			0x08: Norwegian
			0x09: Finnish
			0x0A: Swedish
			0x0B: Portuguese
			0x0C: Russian
			0x0D: Chinese
ERROR LIST1	kind = 15	code = 1 29314 count	Total stitching count at the time of error message
ERROR LIST2	kind = 2	code = 144 28799 count	
ERROR LIST3	kind = 0	code = 133 25307 count	For error message detail, refer to the table below.
ERROR LIST4	kind = 3	code = 144 8967 count	
ERROR LIST5	kind = 15	code = 1 1422 count	
ERROR LIST6	kind = 15	code = 1 1422 count	
ERROR LIST7	kind = 15	code = 2 495 count	
ERROR LIST8	kind = 15	code = 2 468 count	
ERROR LIST9	kind = 15	code = 2 441 count	
ERROR LIST10	kind = 0	code = 0 0 count	
ERROR LIST11	kind = 0	code = 0 0 count	
ERROR LIST12	kind = 0	code = 0 0 count	
ERROR LIST13	kind = 0	code = 0 0 count	
ERROR LIST14	kind = 0	code = 0 0 count	
ERROR LIST15	kind = 0	code = 0 0 count	
ERROR LIST16	kind = 0	code = 0 0 count	
ERROR LIST17	kind = 0	code = 0 0 count	
ERROR LIST18	kind = 0	code = 0 0 count	
ERROR LIST19	kind = 0	code = 0 0 count	
ERROR LIST20	kind = 0	code = 0 0 count	
ERROR LIST21	kind = 0	code = 0 0 count	
ERROR LIST22	kind = 0	code = 0 0 count	
ERROR LIST23	kind = 0	code = 0 0 count	
ERROR LIST24	kind = 0	code = 0 0 count	
ERROR LIST25	kind = 0	code = 0 0 count	
ERROR LIST26	kind = 0	code = 0 0 count	
ERROR LIST27	kind = 0	code = 0 0 count	
ERROR LIST28	kind = 0	code = 0 0 count	
ERROR LIST29	kind = 0	code = 0 0 count	
ERROR LIST30	kind = 0	code = 0 0 count	
ERROR LIST31	kind = 0	code = 0 0 count	
ERROR LIST32	kind = 0	code = 0 0 count	
ERROR LIST33	kind = 0	code = 0 0 count	
ERROR LIST34	kind = 0	code = 0 0 count	
ERROR LIST35	kind = 0	code = 0 0 count	
ERROR LIST36	kind = 0	code = 0 0 count	
ERROR LIST37	kind = 0	code = 0 0 count	
ERROR LIST38	kind = 0	code = 0 0 count	
ERROR LIST39	kind = 0	code = 0 0 count	
ERROR LIST40	kind = 0	code = 0 0 count	
Touch Panel Coordinate (AD)	EEP_ADRW_TOUCH_PANEL_MIN_X	121	
	EEP_ADRW_TOUCH_PANEL_DEN_X	798	
	EEP_ADRW_TOUCH_PANEL_MIN_Y	969	
	EEP_ADRW_TOUCH_PANEL_DEN_Y	64637	
Presser Bar Height (AD)	EEP_ADRB_SETTINGS_PFT_0mm	41	
	EEP_ADRB_SETTINGS_PFT_0mm,3mm	47	
PF Pulse Motor Offset (AD)	EEP_ADRB_PF_PM_OFFSET	251	
Knee Lifter Position (AD)	EEP_ADRB_SETTINGS_KL_MIN_AD	65	
	EEP_ADRB_SETTINGS_KL_MAX_MIN_AD	116	
One Point Pattern Adjustment: Feeding Offset (Vertical)	EEP_ADRB_SETTINGS_VERTICAL_PLUS	0	
One Point Pattern Adjustment: Feeding Offset (Horizontal)	EEP_ADRB_SETTINGS_HORIZONTAL_PLUS	-4	
Side-feed Straight Stitch Adjustment: Feeding Offset (Vertical)	EEP_ADRB_VERTICAL_FOR_SIDE	2	
Side-feed Straight Stitch Adjustment: Feeding Offset (Horizontal)	EEP_ADRB_SETTINGS_HORIZONTAL_PLUS	-4	
Utility Straight Stitching: Thread Tension Offset	EEP_ADRB_AT_PM_WIDTH_UTL_STRAIGHT	0	
Utility Pattern Stitching: Thread Tension Offset	EEP_ADRB_AT_PM_WIDTH_UTL_ETC	0	
Embroidery Pattern Stitching: Thread Tension Offset	EEP_ADRB_AT_PM_WIDTH_EMB	0	
F Pulse Motor: Initial Phase Number	EEP_ADRB_INITIAL_PHASE_F_NO	0	
Z Pulse Motor: Initial Phase Number	EEP_ADRB_INITIAL_PHASE_Z_NO	4	
Embroidery Foot with LED Pointer: Height Offset*	EEP_ADRB_LED_PT_HEIGHT	0x14(5)	
Sensor Pen: Counter Offset (Left)	EEPROM_ULTR_SNIC_SENSOR_OFFSET_LEFT	0x0391	
Sensor Pen: Counter Offset (Right)	EEPROM_ULTR_SNIC_SENSOR_OFFSET_RIGHT	0x039C	
Sensor Pen: Calculated Coordinate Offset (X)	EEPROM_ULTR_SNIC_POSITION_OFFSET_X	0x01E4	
Sensor Pen: Calculated Coordinate Offset (Y)	EEPROM_ULTR_SNIC_POSITION_OFFSET_Y	0x01EA	
Line Marker: Original Position Offset*	EEP_ADRB_LM_ORIGINAL_ADJUST_TESTMODE	0x0A(0)	
Dual Feed: Feeding Offset (Front)*	EEP_ADRB_DF_CORRECT_PULSE_NUM_TESTMODE_FW	0x0F(-5)	
Dual Feed: Feeding Offset (Back)*	EEP_ADRB_DF_CORRECT_PULSE_NUM_TESTMODE_BA	0x14(0)	

* Value in brackets will be shown on test mode.

Error Message List

code	kind	Error Message	Note
1	15	The safety device has been activated. Is the thread tangled? Is the needle bent?	
2	15	Check the upper thread and try again.	
37	15	The safety device for lower thread has been activated. Is the thread tangled?	
133	0	There is something wrong with the machine. Turn OFF the machine and turn ON again. PF-PM	PF (presser foot) pulse motor error
	1	There is something wrong with the machine. Turn OFF the machine and turn ON again. TH-PM	TH (threading) pulse motor error
	2	There is something wrong with the machine. Turn OFF the machine and turn ON again. D-PM	D (feed dog drop) pulse motor error
	3	There is something wrong with the machine. Turn OFF the machine and turn ON again. TC-PM	TC (thread cutter) pulse motor error
	4	There is something wrong with the machine. Turn OFF the machine and turn ON again. Z-PM	Z (zigzag) pulse motor error
	5	There is something wrong with the machine. Turn OFF the machine and turn ON again. F-PM	F (feeding) pulse motor error
	6	There is something wrong with the machine. Turn OFF the machine and turn ON again. S-PM	S (side-feed) pulse motor error
	7	There is something wrong with the machine. Turn OFF the machine and turn ON again. AT-PM	AT (auto tension) pulse motor error
	8	There is something wrong with the machine. Turn OFF the machine and turn ON again. X-PM	X pulse motor error (embroidery unit)
	9	There is something wrong with the machine. Turn OFF the machine and turn ON again. Y-PM	Y pulse motor error (embroidery unit)
	10	There is something wrong with the machine. Turn OFF the machine and turn ON again. LM-PM	LM (guide line marker) pulse motor error
144	1	F01 MAIN MOTOR SPEED	Main motor rotation failure
	2	F02 S/S SW ON	Start/Stop button kept depressed at the time of switch ON
	3	F02 NP SW ON	Needle position button kept depressed at the time of switch ON
	4	F02 REV SW ON	Reverse stitch button kept depressed at the time of switch ON
	5	F02 TC SW ON	Thread cutter button kept depressed at the time of switch ON
	6	F02 PFT SW ON	Presser foot lifter button kept depressed at the time of switch ON
	7	F02 TH SW ON	Threading button kept depressed at the time of switch ON
	8	F02 LOCK SW ON	Reinforcement stitch button kept depressed at the time of switch ON
	11	F05 SPEED SENSOR	Dirty speed sensor
	12	F06 NP SENSOR BREAK	Needle position sensor breakage
	13	F07 SPEED VR BREAK	Speed variable resistance breakage

[Standard]

“SUCCESS” should be displayed after touching five “+” on touch panel setting screen by touch pen in numerical order.

[Adjustment]

1. Turn off the machine.
2. Turn on the machine while touching screen by touch pen or fingers.

***Key point**

- Keep touching the screen until touch panel setting screen appears.

3. Touch five “+” on screen by touch pen in numerical order.
 - Setting is completed once “SUCCESS” appears on the screen. Go to procedure 4.
 - Try procedure 3 again if “ERROR” appears on the screen.

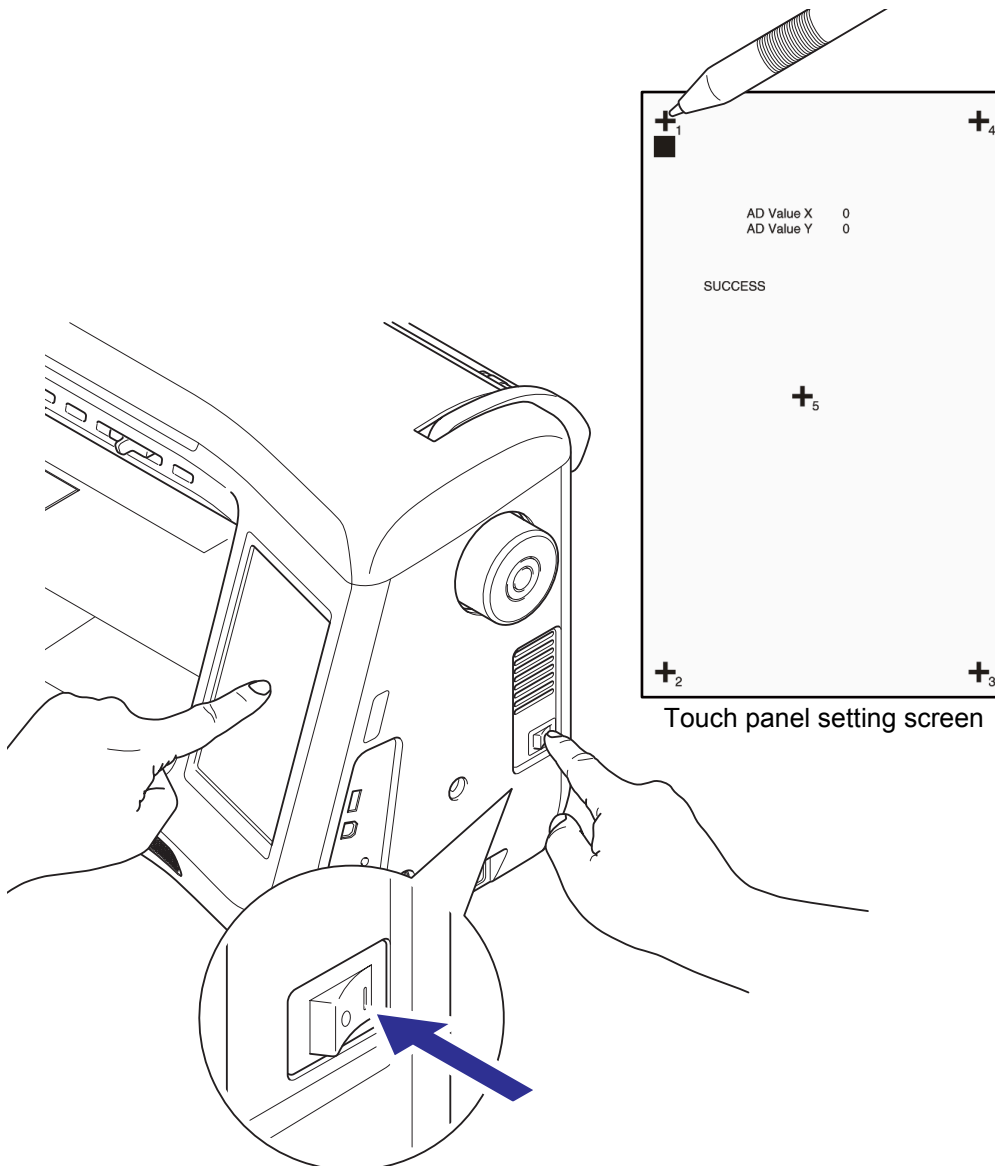
***Note**

- Use the provided touch pen when you press marks on the screen.
Do not use sharp or hard objects to avoid scratch on the touch panel.

4. Turn off the machine.

***Key point**

- Turn on the machine after adjustment to check if the position touched by touch pen is properly recognized by the machine.

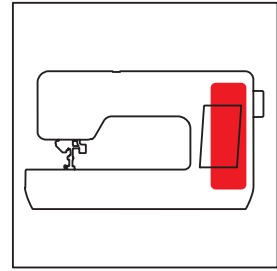


[Standard]

2 ± 0.5 mm (1.5 to 2.5 mm) slack should be made by pushing the timing belt at the middle of timing pulley shaft and tension pulley shaft with a force of 1.96 N (200 gf).

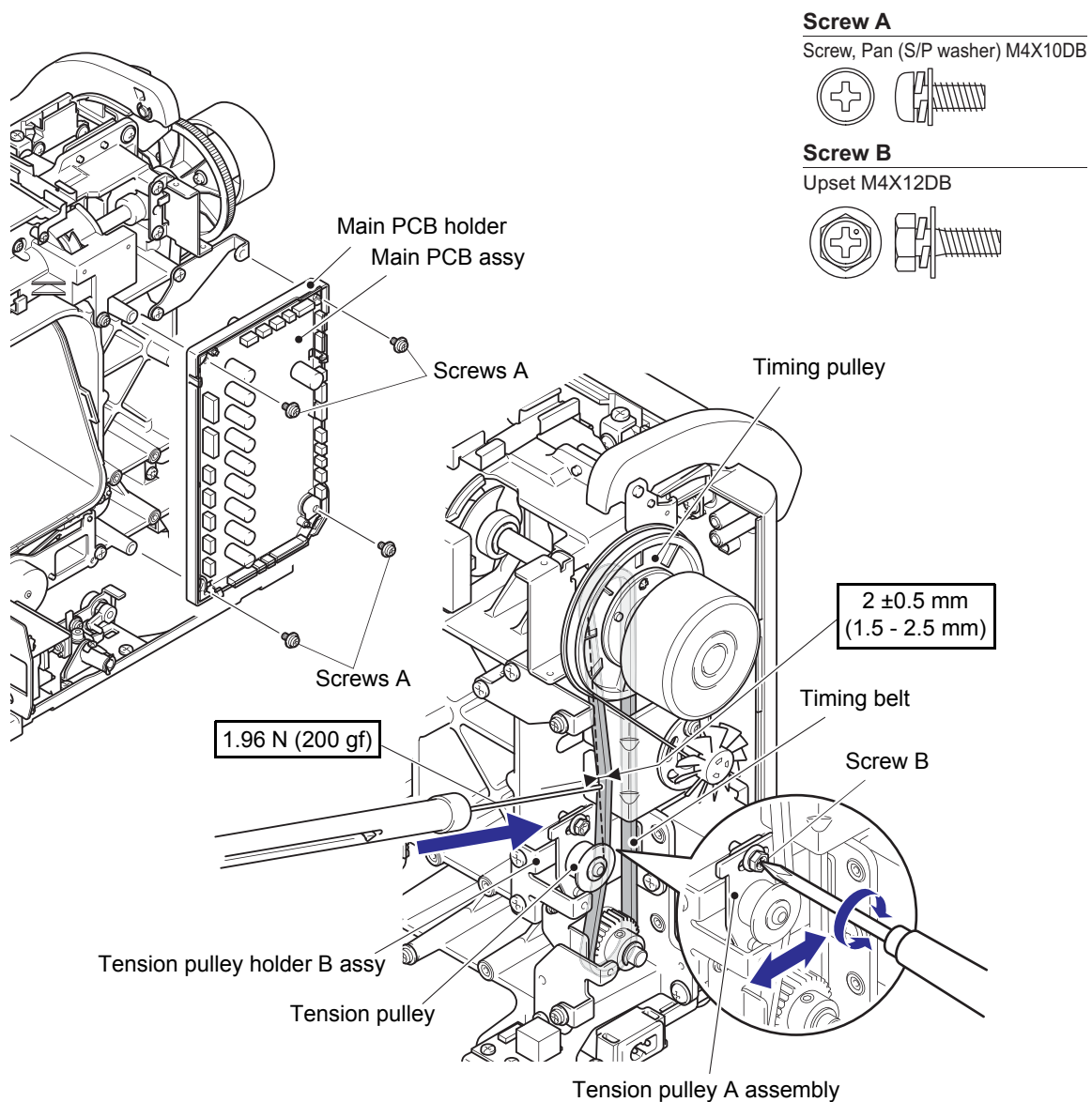
[Adjustment]

1. Remove the front cover assy and the belt cover. (Refer to “2-9” / “2-69”.)
2. Remove the 4 screws A of the main PCB assy to remove the main PCB assy and the main PCB holder.
3. Loosen the screw B of the tension pulley A assembly.
4. Move the tension pulley A assembly back and forth to adjust the tension of the timing belt.
5. Tighten the screw B of the tension pulley A assembly to secure the tension pulley A assembly to the tension pulley holder B assy.



XC2277001

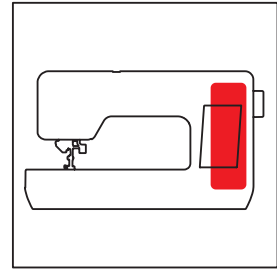
Push pull gauge (5N)



[Standard]

The clearance between the timing belt and the belt support upper adjust of belt support upper should be 0.1 to 0.3 mm.

The clearance between the timing belt and the belt support lower should be 0.3 to 0.5 mm.

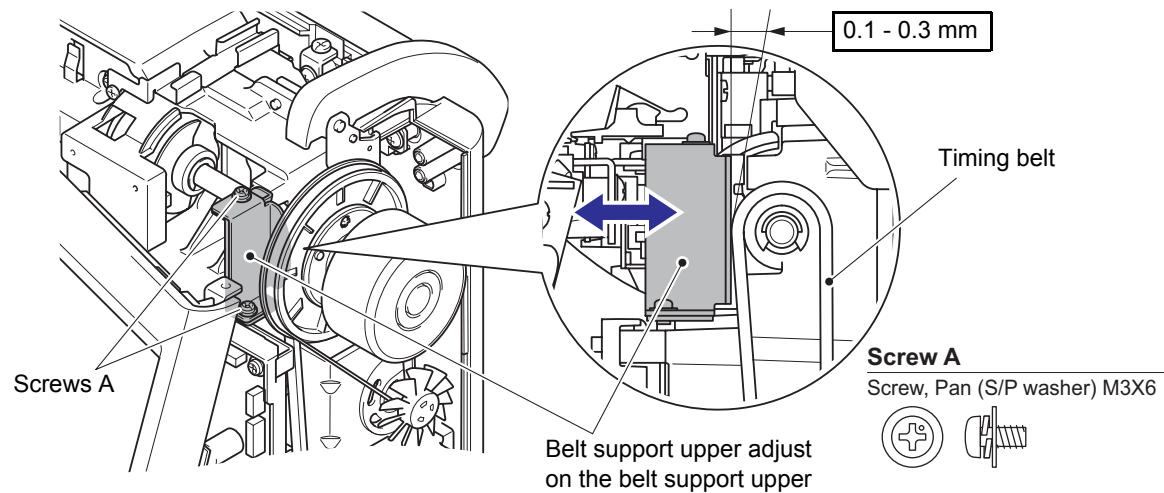


[Adjustment]

1. Remove the bobbin winder unit cover assy and the belt cover.
(Refer to "2-8" / "2-69".)
2. Loosen the 2 screws A of the belt support upper adjust on the belt support upper.
3. Move the belt support upper adjust on the belt support upper back and forth to adjust the clearance between the timing belt and the belt support upper adjust on the belt support upper.

***Key point**

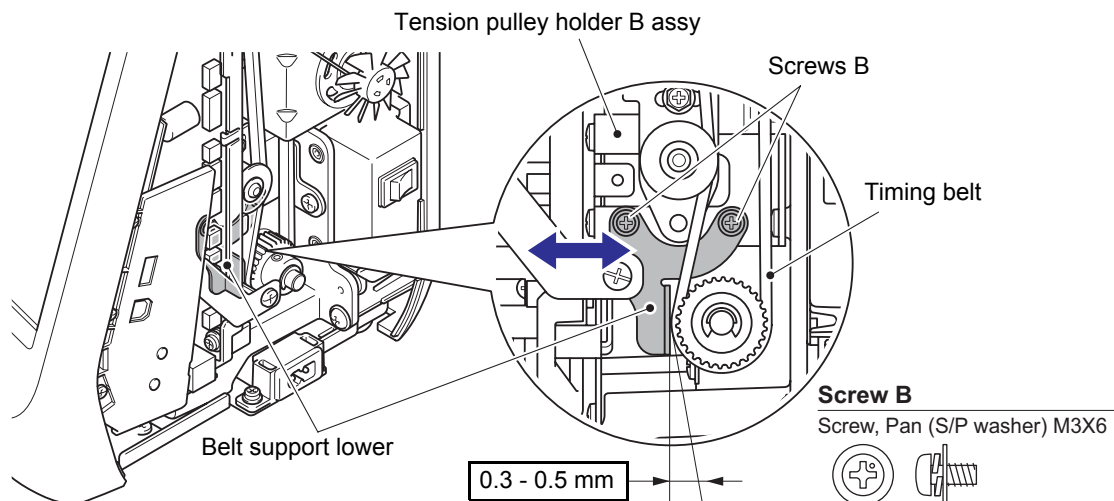
- The clearance between the timing belt and the belt support upper adjust of belt support upper should be 0.1 to 0.3 mm.
4. Tighten the 2 screws A of the belt support upper adjust on the belt support upper to secure the belt support upper adjust on the belt support upper to the belt support upper.



5. Loosen the 2 screws B of the belt support lower.
6. Move the belt support lower back and forth to adjust the clearance between the timing belt and the belt support lower.

***Key point**

- The clearance between the timing belt and the belt support lower should be 0.3 to 0.5 mm.
7. Tighten the 2 screws B of the belt support lower to secure the belt support lower to the tension pulley holder B assy.

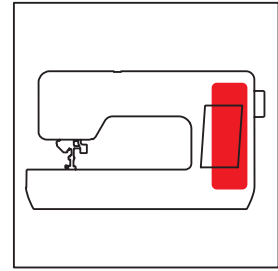


[Standard]

2.5 ± 1 mm (1.5 to 3.5 mm) slack should be made by pushing the motor belt at the middle of timing pulley shaft and motor T-pulley shaft with a force of 0.98 N (100 gf).

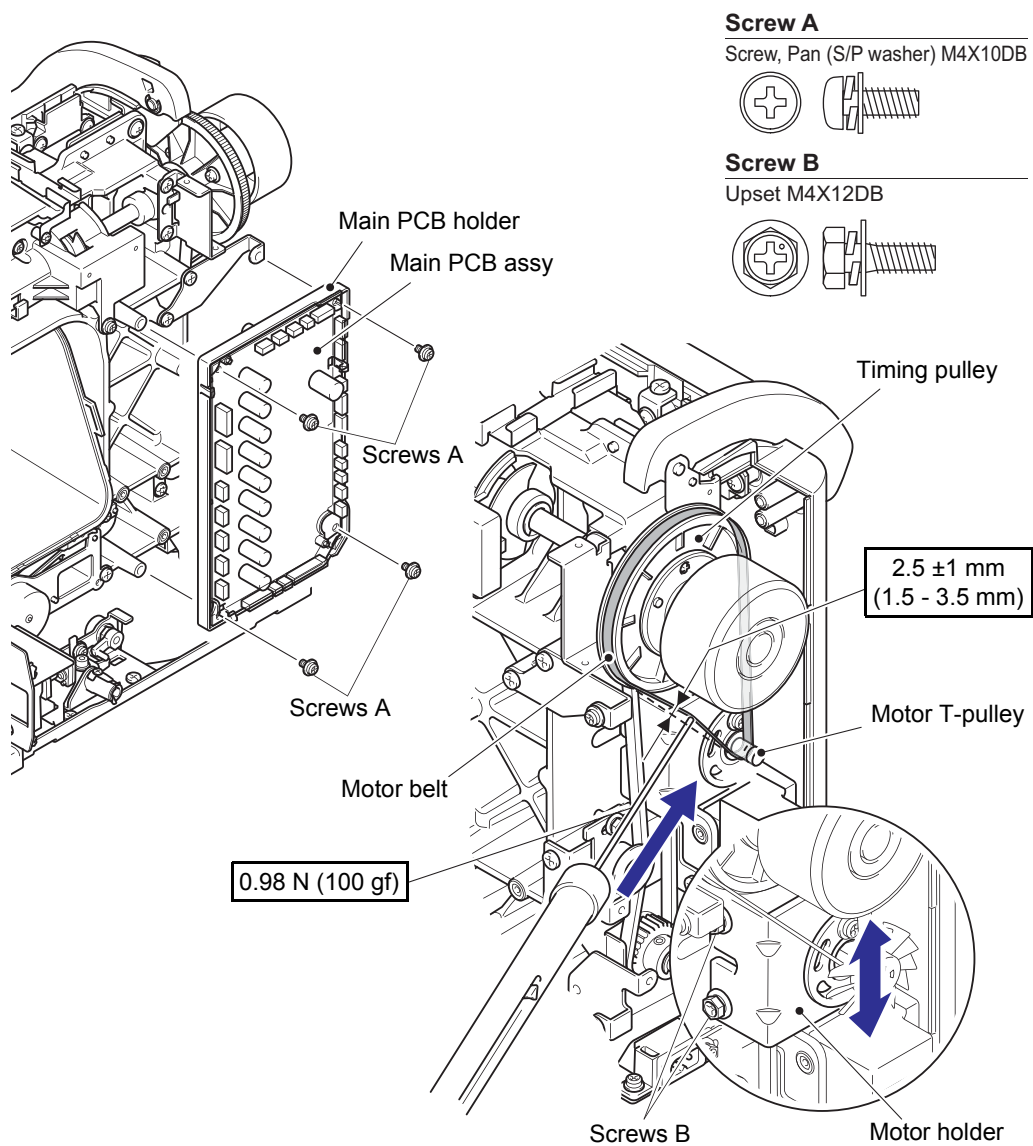
[Adjustment]

1. Remove the front cover assy and the belt cover. (Refer to "2-9" / "2-7".)
2. Remove the 4 screws A of the main PCB assy to remove the main PCB assy and the main PCB holder.
3. Loosen the 2 screws B of the motor holder.
4. Move the motor holder up and down to adjust the tension of the motor belt.
5. Tighten the 2 screws B of the motor holder to secure the motor holder to the arm bed assy.



XC2277001

Push pull gauge (5N)



[Standard]

Start test mode, pass the schappe spun thread #60 through tension plate from thread guide and pull it slowly by tension gauge. The tension should be adjusted in 0.06 to 0.09 N (6 to 9 gf).

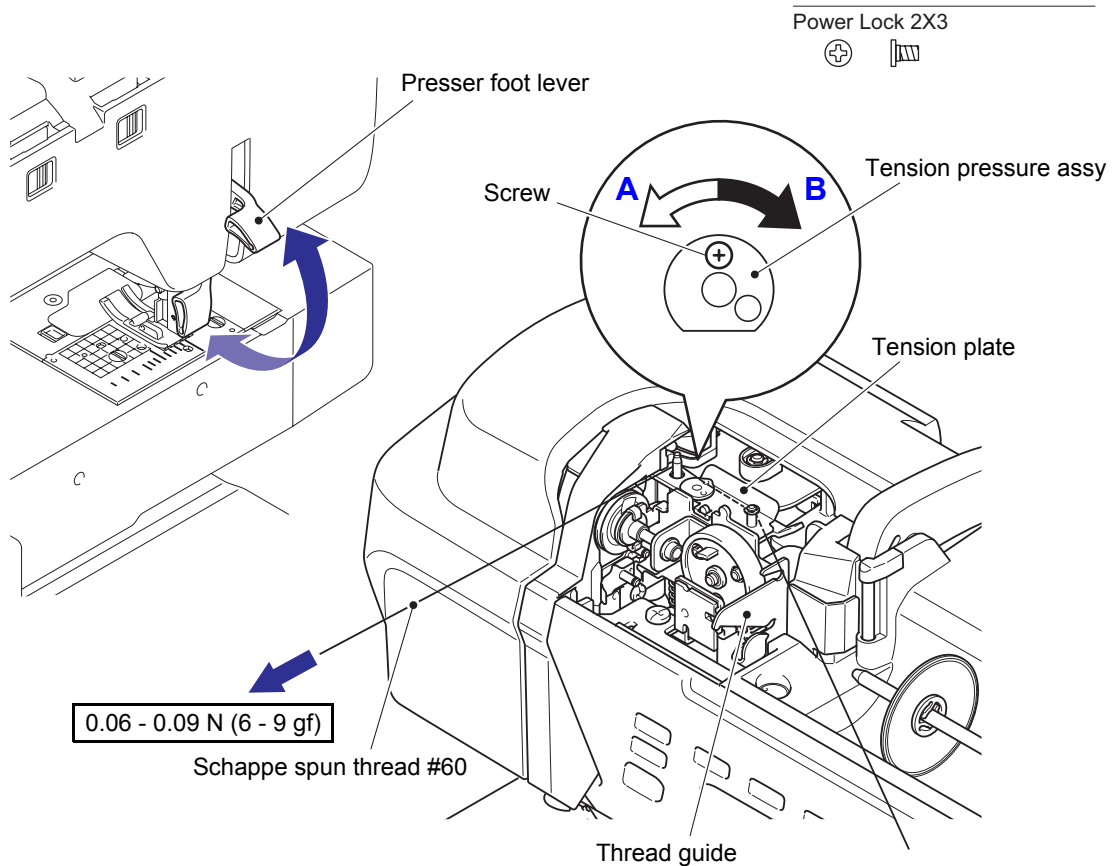
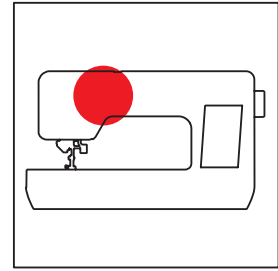
[Adjustment]

1. Remove the front thread guard cover. (Refer to "2-6".)
2. Start the test mode.
3. Raise the presser foot lever.
4. Pass the schappe spun thread #60 through the thread guide and then tension plate.
5. Lower the presser foot lever.
6. Pull the thread slowly by the tension gauge, and check the thread tension.
7. Adjust the thread tension by turning the screw of the tension pressure assy.

***Key point**

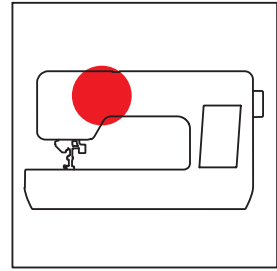
- Loosen the screw (turn to the direction of "A"). → The thread tension gets looser.
- Tighten the screw (turn to the direction of "B"). → The thread tension gets tighter.

XA9152001	Tension gauge 10 (0.1N)
-----------	-------------------------



[Standard]

Start test mode, pass the schappe spun thread #60 through the thread guide, tension plate, tension disk A/B and plate assembly, and pull it slowly by tension gauge. The tension should be adjusted in 0.34 to 0.44 N (35 to 45 gf).



[Adjustment]

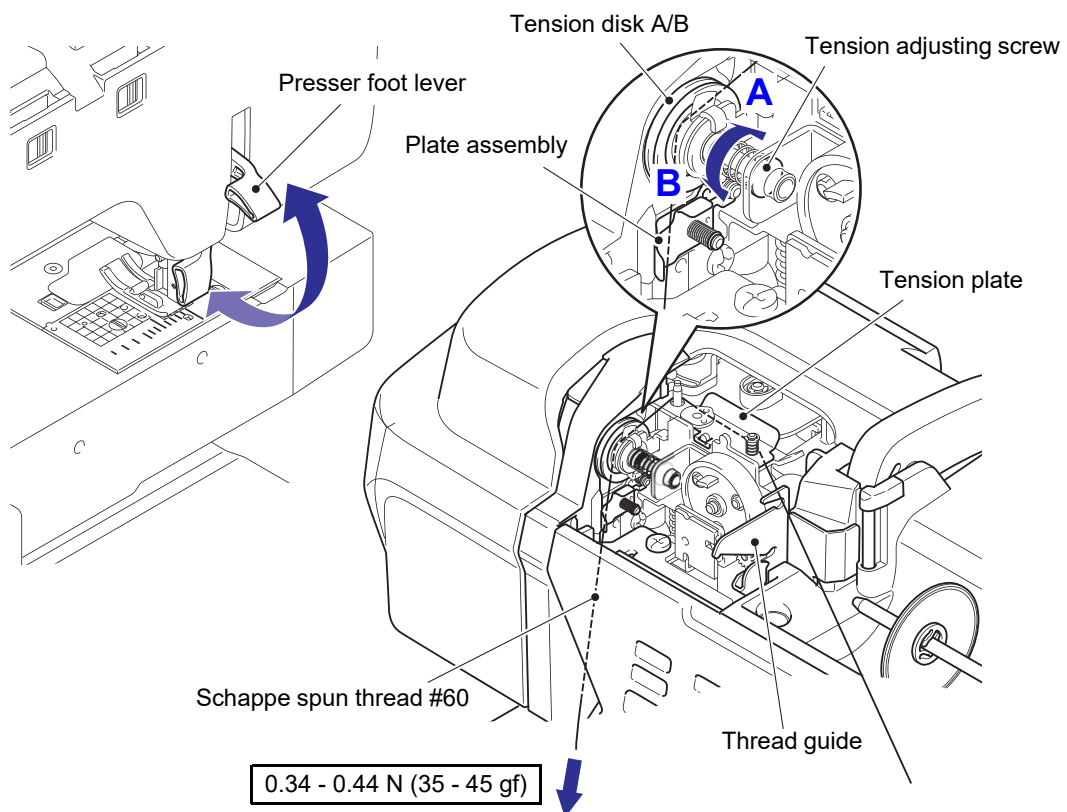
1. Remove the front thread guard cover. (Refer to "2-6".)
2. Start the test mode.
3. Raise the presser foot lever.
4. Pass the schappe spun thread #60 through the thread guide, tension plate, tension disk A/B and plate assembly in this order.
5. Lower the presser foot lever.
6. Pull the thread slowly by the tension gauge, and check the thread tension.
7. Adjust the thread tension by turning the tension adjusting screw.

***Key point**

- Loosen the tension adjusting screw (turn to the direction of "A"). → The thread tension gets tighter.
 - Tighten the tension adjusting screw (turn to the direction of "B"). → The thread tension gets looser.
8. After adjustment, apply a small amount of the thread locker to tension adjusting screw.

XC2276001

Tension gauge (1.0N)



[Standard]

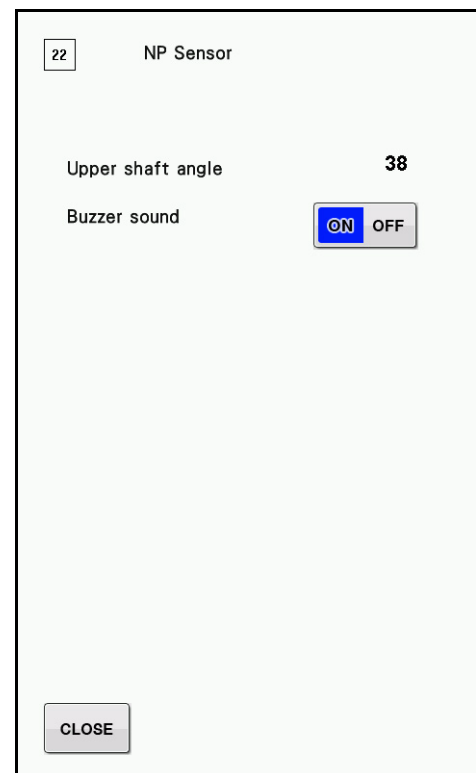
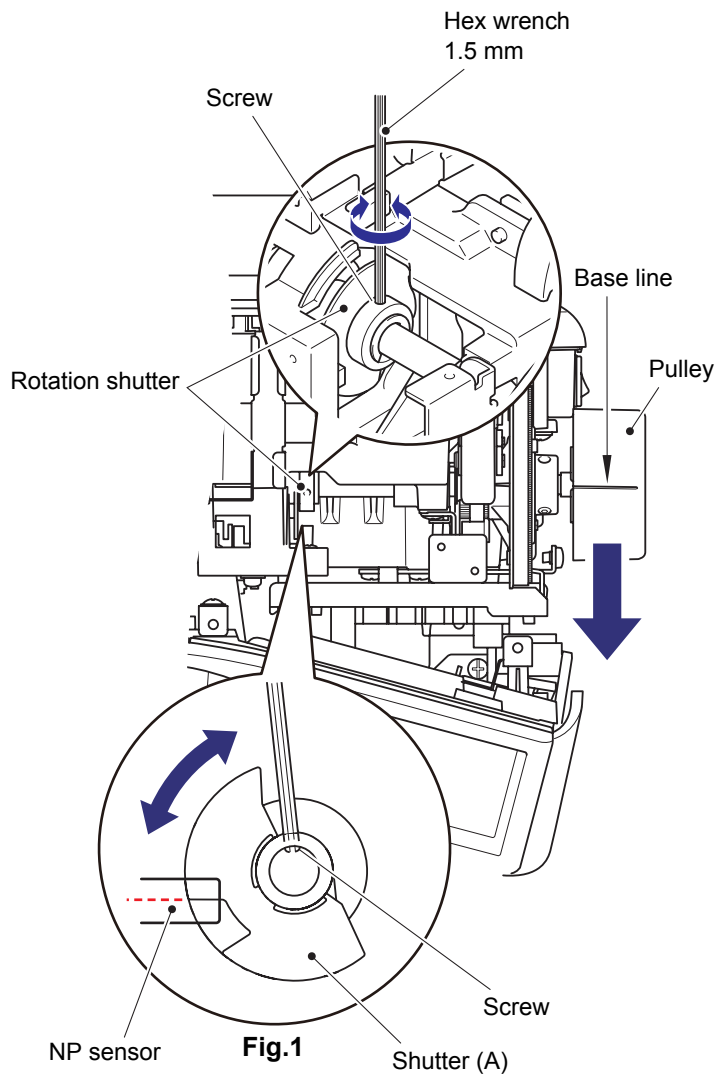
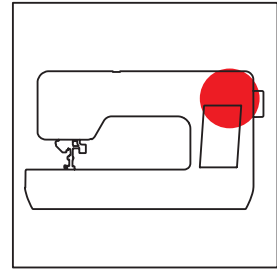
In the test mode #22, the buzzer sound should be stopped by turning the pulley until its base line comes to top position.

[Adjustment]

1. Remove the bobbin winder unit cover assy. (Refer to “2-8”.)
2. Start the test mode, and then select the #22 (NP sensor mode).
3. Turn the pulley by hand to the front, and set the base line of the pulley to the top.
4. Loosen the screw of the rotation shutter.
5. Rotate the rotation shutter, tighten the screw of the rotation shutter to stop the buzzer sound, and secure the rotation shutter to the upper shaft.

***Key point**

- Make sure that the shutter (A) is at the position described in Fig.1.



Set Screw, Socket (CP) M3X6



Be sure to operate this adjustment when the upper shaft cover is replaced or reassembled.

[Standard]

The sensor of the NP PCB Assy mounted on the upper shaft cover is not contacted by the speed shutter of the upper shaft Assy.

* Positioning the speed shutter at the center of the depression is recommended.

[Adjustment]

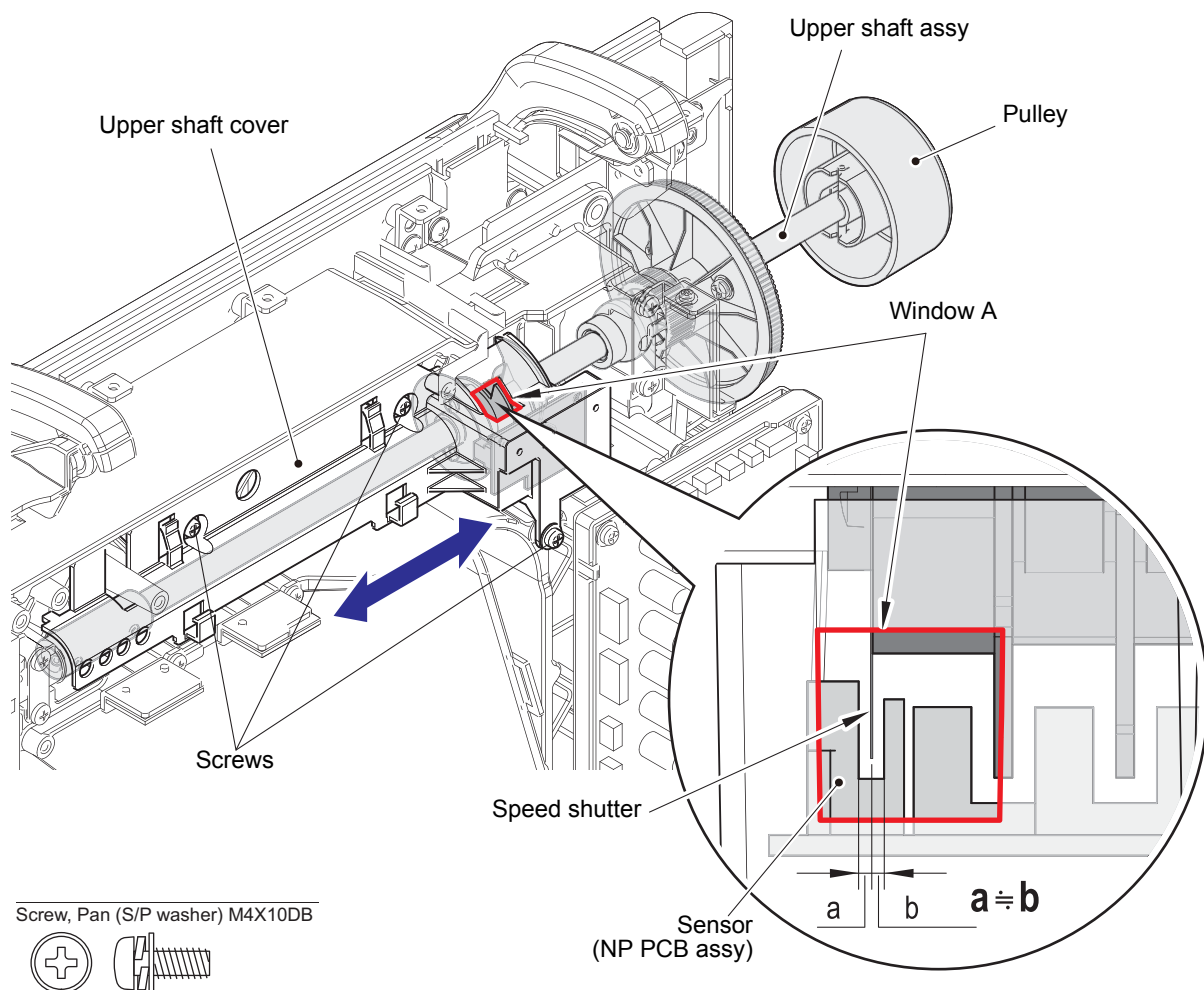
1. Loosen the three screws of the upper shaft cover.
2. Move the upper shaft cover left or right to avoid the sensor of the NP PCB Assy and the speed shutter of the upper shaft Assy contacting each other.

***Key point**

- Look through the window A of the upper shaft cover when adjusting its position.

3. Tighten the three screws of the upper shaft cover to secure the upper shaft cover to the arm bed.
4. Check that the sensor of the NP PCB Assy is not contacted by the speed shutter of the upper shaft Assy by turning the pulley by hand.




<Adjustment completed>

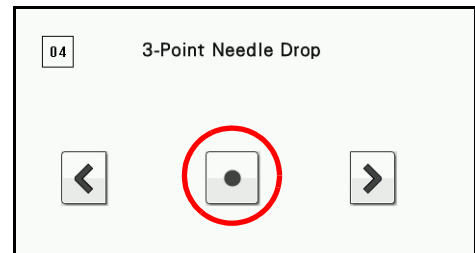
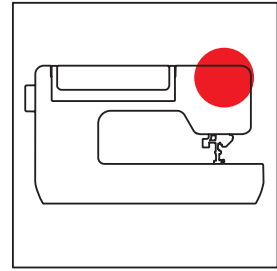


[Standard]

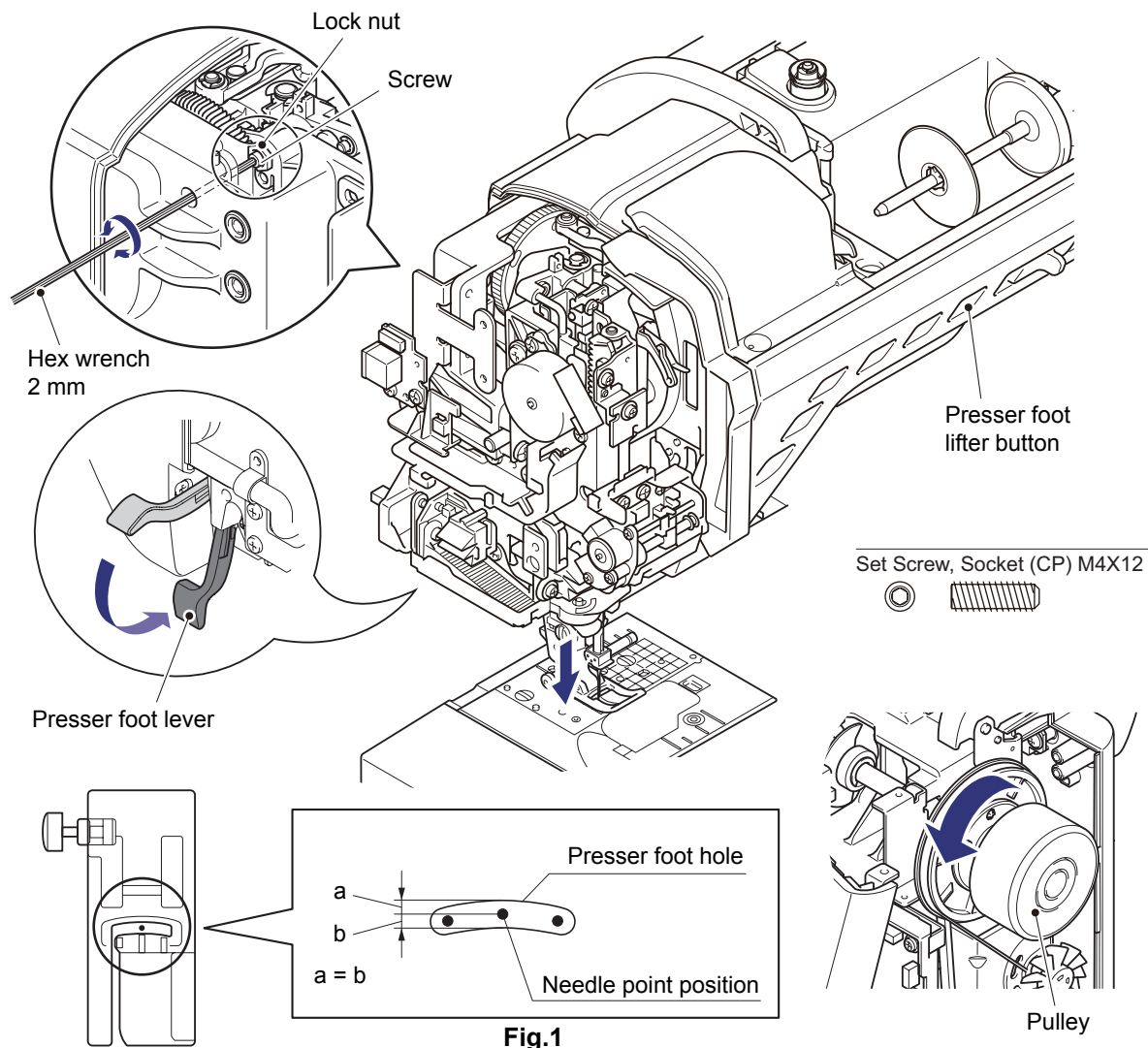
The needle point should be dropped in the center of the presser foot hole.

[Adjustment]

1. Remove the face plate assy. (Refer to "2-6").
2. Attach the presser foot "J".
3. Attach the size 75/11 needle.
4. Start the test mode, and then select the #04 (3-point needle drop mode).
5. Press the  button on the screen to move the needle bar to the center base line.
6. Lower the presser foot lever.
7. Turn the pulley by hand, put the needle point into presser foot "J" hole, and check the position of the needle point.
8. Press  (Presser foot lifter button) to raise the presser foot.
9. Adjust the position of the needle point by turning the screw. (Fig.1)
10. Press  (Presser foot lifter button) to lower the presser foot, and check the position of the needle point.

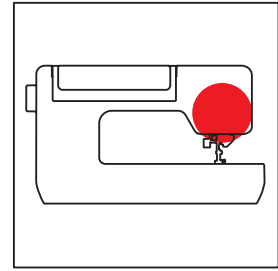
***Key point**

- If the lock nut is loosened after adjustment, tighten the lock nut to secure the screw.




[Standard]

In the test mode #04, needle point (left base line) should be drop in the right side of “V” groove on needle plate A assy.



[Adjustment]

1. Remove the face plate assy. (Refer to “2-6”).
2. Remove the presser foot.
3. Attach the size 75/11 needle.
4. Start the test mode, and then select the #04 (3-point needle drop mode).
5. Press the  button on the screen to move the needle bar to the left base line.
6. Turn the pulley by hand to put the needle point into the needle hole on the needle plate A assy.
7. Loosen the screw of the zigzag adjusting nut.
8. Turn the zigzag adjusting nut to adjust the position of the needle point. (Fig.1)
 - *Key point**
 - Adjust it so that the larger side of zigzag adjusting nut comes to upper side.
9. Tighten the screw of the zigzag adjusting nut to secure the zigzag adjusting nut.
 - *Key point**
 - When tightening the screw of the zigzag adjusting nut, keep the zigzag adjusting nut from moving.

XE2395001

Box screw driver 6

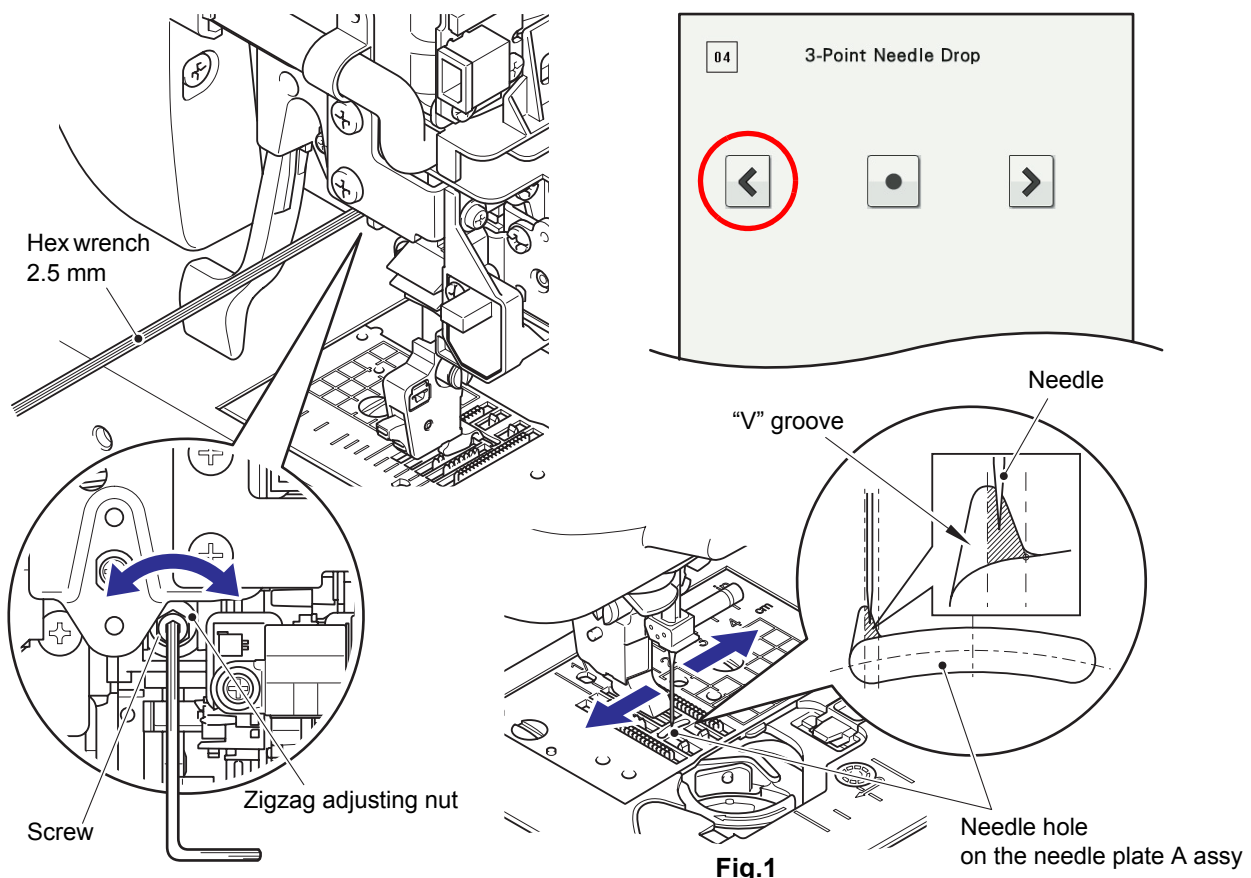


Fig.1



Bolt, Socket M3X10

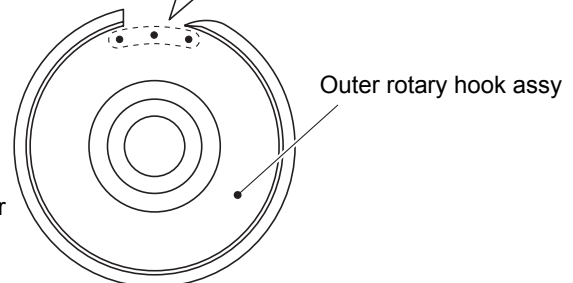
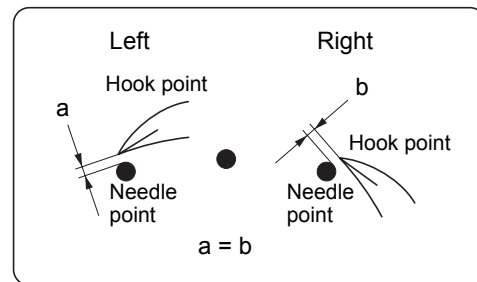
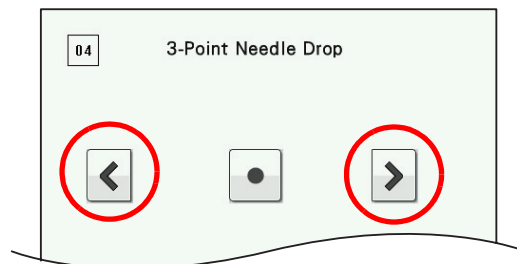
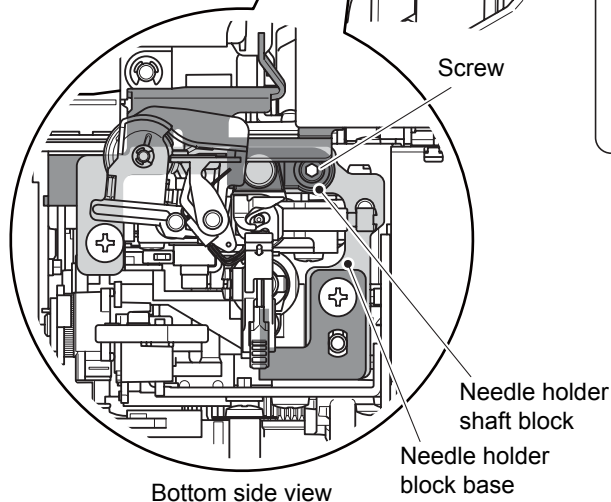
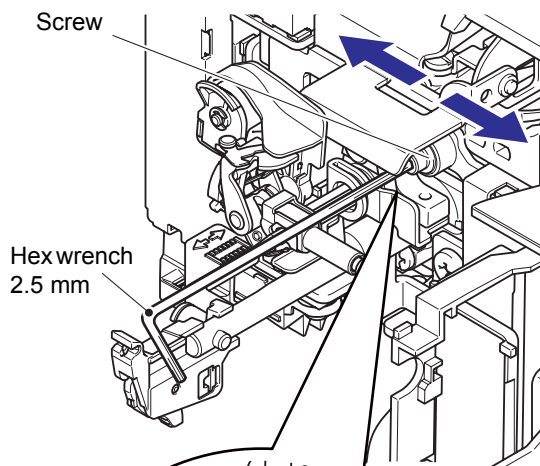
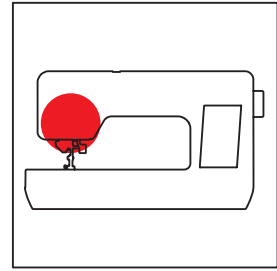


[Standard]

In the test mode #04, clearance between the needle point and the outer rotary hook point should be same at the base line of both left and right.

[Adjustment]

1. Remove the face plate assy. (Refer to "2-6").
2. Remove the presser foot.
3. Remove the needle plate B assy, the needle plate A assy and the inner rotary hook assy.
4. Attach the size 75/11 needle.
5. Start the test mode, and then select the #04 (3-point needle drop mode).
6. Turn the pulley by hand to coincide the needle with the outer rotary hook point.
7. Press the  or  button, and check that clearance between the needle point and the outer rotary hook point is same at the base line of both left and right.
8. Loosen the screw of the needle holder shaft block.
9. Move the needle holder shaft block to the left and right and adjust clearance between the needle top and the outer rotary hook point to be same at the base line of left and right.
10. Tighten the screw of the needle holder shaft block to secure the needle holder shaft block to the needle holder block base.




Screw 3X10



[Standard]

The right edge of the needle should be coincided with the outer rotary hook point when raising needle bar 3.1 ± 0.2 mm (2.9 to 3.3 mm) up from its lowest position at the left base line.

[Adjustment]

1. Remove the belt cover. (Refer to "2-7".)
2. Remove the presser foot.
3. Remove the needle plate B assy, the needle plate A assy and the inner rotary hook assy.
4. Attach the size 75/11 needle.
5. Start the test mode, and then select the #04 (3-point needle drop mode).
6. Press the  button on the screen to move needle bar to the left base line.
7. Turn the pulley by hand to the front, and raise the needle bar 3.1 mm up from its lowest position. (Fig.1)
8. Loosen the 3 screws of the T pulley collar. (Fig.2)
9. Turn the timing pulley by hand to the front, and adjust the right edge of the needle to be coincide with the outer rotary hook point. (Fig.3)

***Key point**

- Make sure that the larger side of feed cam faces to the front when the right edge of the needle is coincided with the outer rotary hook point. (Fig.4)

10. Tighten the 3 screws of the T pulley collar to secure the T pulley collar and the timing pulley to the upper shaft.

[Confirmation]

When the needle is lowered to the lowest point by turning the pulley by hand, check that the feed dog is under the needle plate A assy.

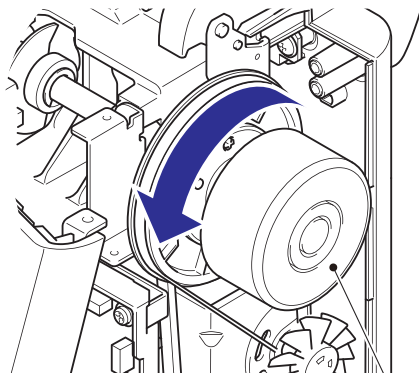
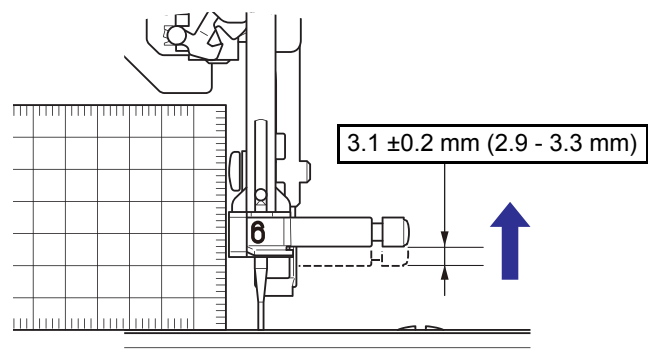


Fig.1

Pulley



Needle bar

Set Screw, Socket (CP) M5X8

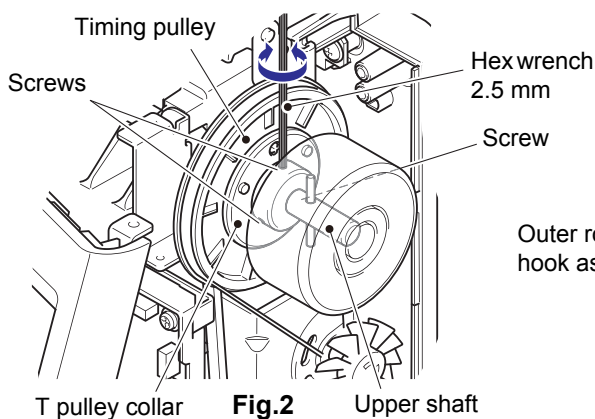


Fig.2

Upper shaft

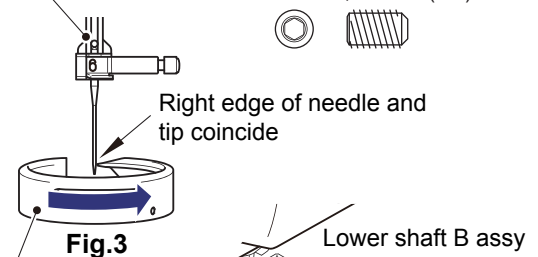


Fig.3

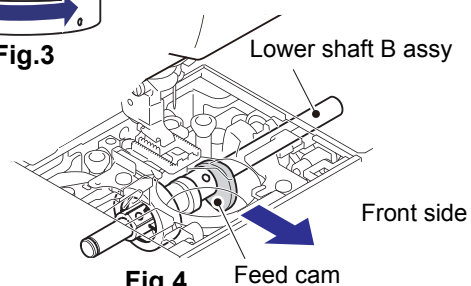
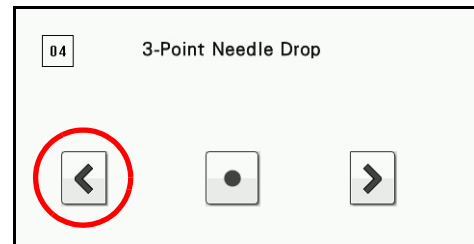
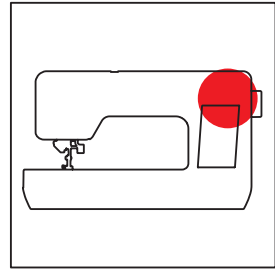
Outer rotary
hook assy

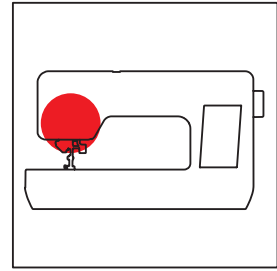
Fig.4

Feed cam




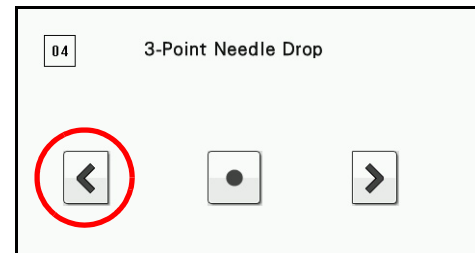
[Standard]

The gap between the top of needle eye and the lower end of the outer rotary hook point should be 1.2 ± 0.2 mm (1 to 1.4 mm) when the right edge of the needle is coincided with the outer rotary hook point at the left base line.

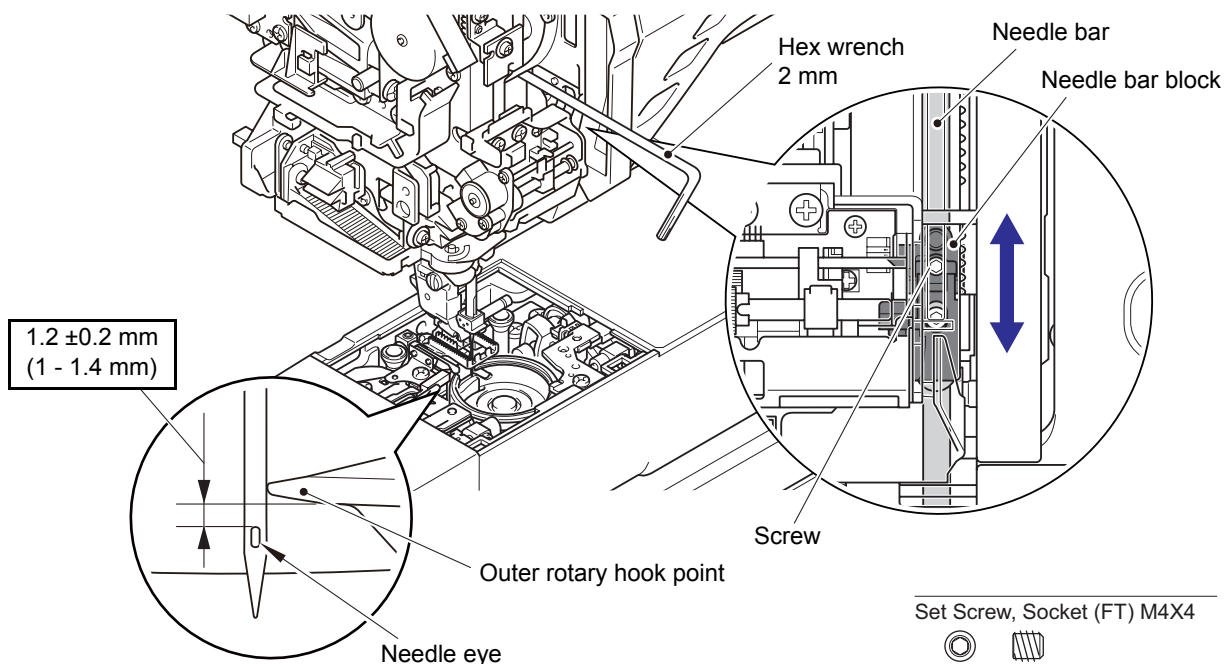
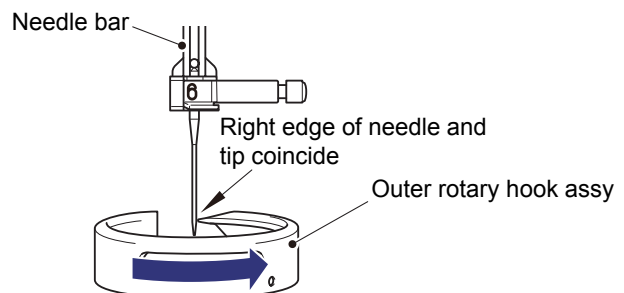
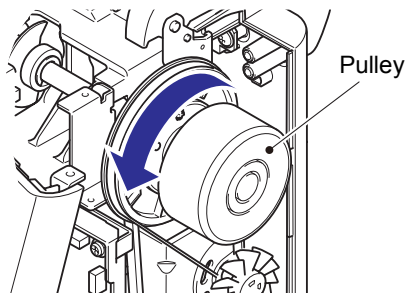


[Adjustment]

1. Remove the face plate assy. (Refer to "2-6").
2. Remove the presser foot.
3. Remove the needle plate B assy, the needle plate A assy and the inner rotary hook assy.
4. Attach the size 75/11 needle.
5. Start the test mode, and then select the #04 (3-point needle drop mode).
6. Press the  button on the screen to move the needle bar to the left base line.
7. Turn the pulley by hand to the front, and adjust the right edge of the needle to be coincided with the outer rotary hook point.
8. Loosen the screw of the needle bar block.
9. Move the needle bar assy up and down, and adjust the gap between the top of needle eye and the lower end of the outer rotary hook point.
10. Tighten the screw of the needle bar block to secure the needle bar block to the needle bar.

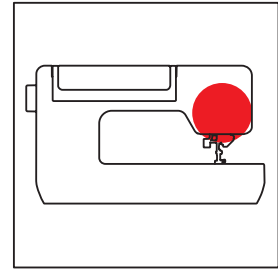
***Key point**

- Be sure to operate "4-24 Needle threader" adjustment after this adjustment.




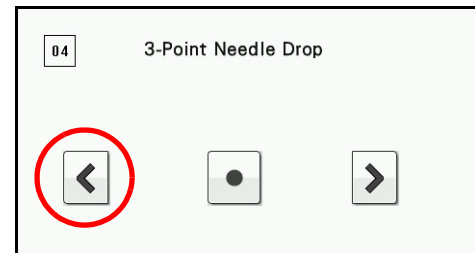
[Standard]

The clearance between the scarf of the needle and the outer rotary hook point should be 0.25 mm or less when the rear side of the needle is coincided with the outer rotary hook point at the left base line.



[Adjustment]

1. Remove the face plate assy. (Refer to "2-6".)
2. Remove the presser foot.
3. Remove the needle plate B assy, the needle plate A assy and the inner rotary hook assy.
4. Attach the size 75/11 needle.
5. Start the test mode, and then select the #04 (3-point needle drop mode).
6. Press the  button on the screen to move the needle bar to the left base line.
7. Turn the pulley by hand until the outer rotary hook point coincides with the rear side of the needle.
8. Loosen the screw of the adjusting screw.
9. Adjust the clearance between the scarf of the needle and the outer rotary hook point by turning the adjusting screw.

***Key point**

- Loosen the adjusting screw (turn to the direction of "A"). → Move the needle to rear side. (needle clearance gets smaller.)
- Tighten the adjusting screw (turn to the direction of "B"). → Move the needle to front side. (needle clearance gets larger.)

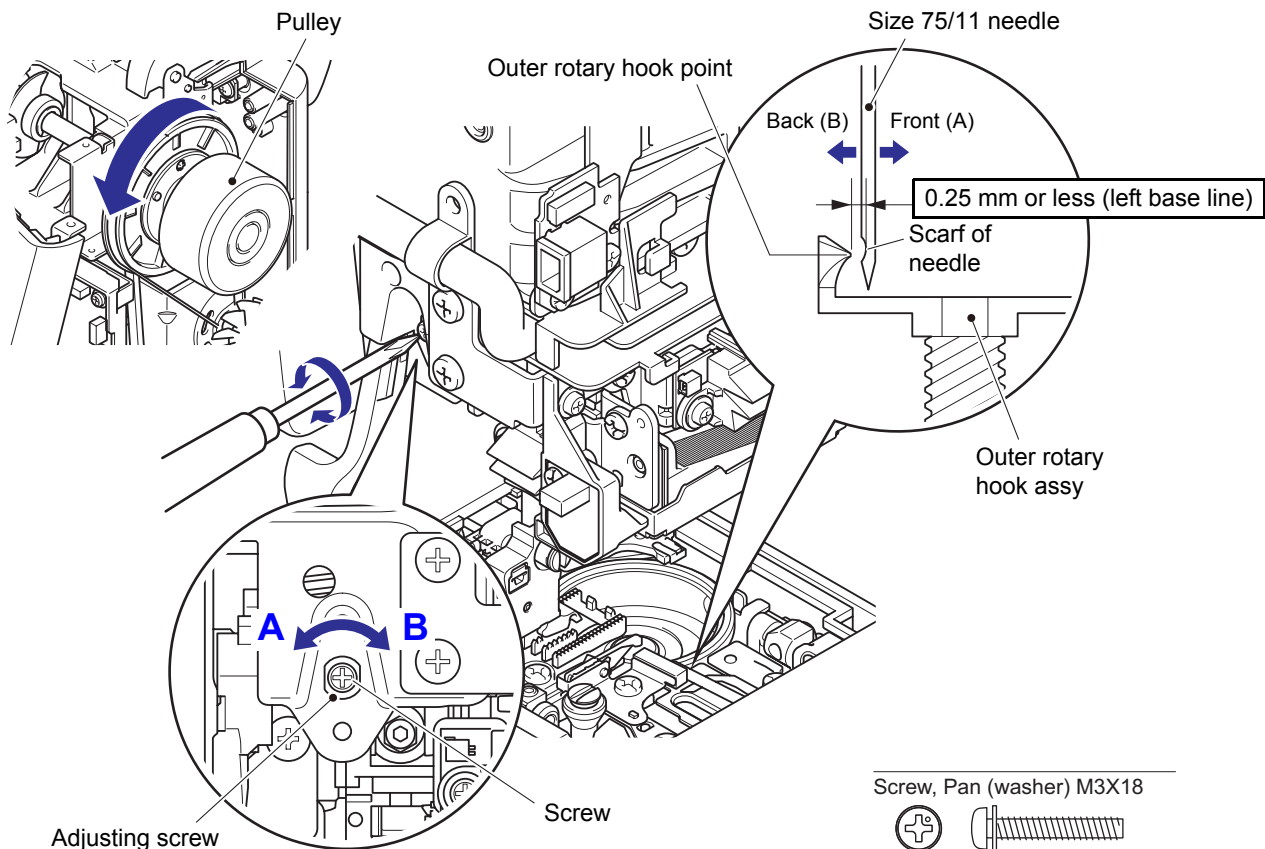
10. Tighten the screw of the adjusting screw to secure the adjusting screw.

***Key point**

- When tightening the screw of the adjusting screw, keep the adjusting screw from moving.

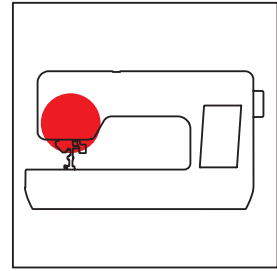
XE2395001

Box screw driver 6






[Standard]

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

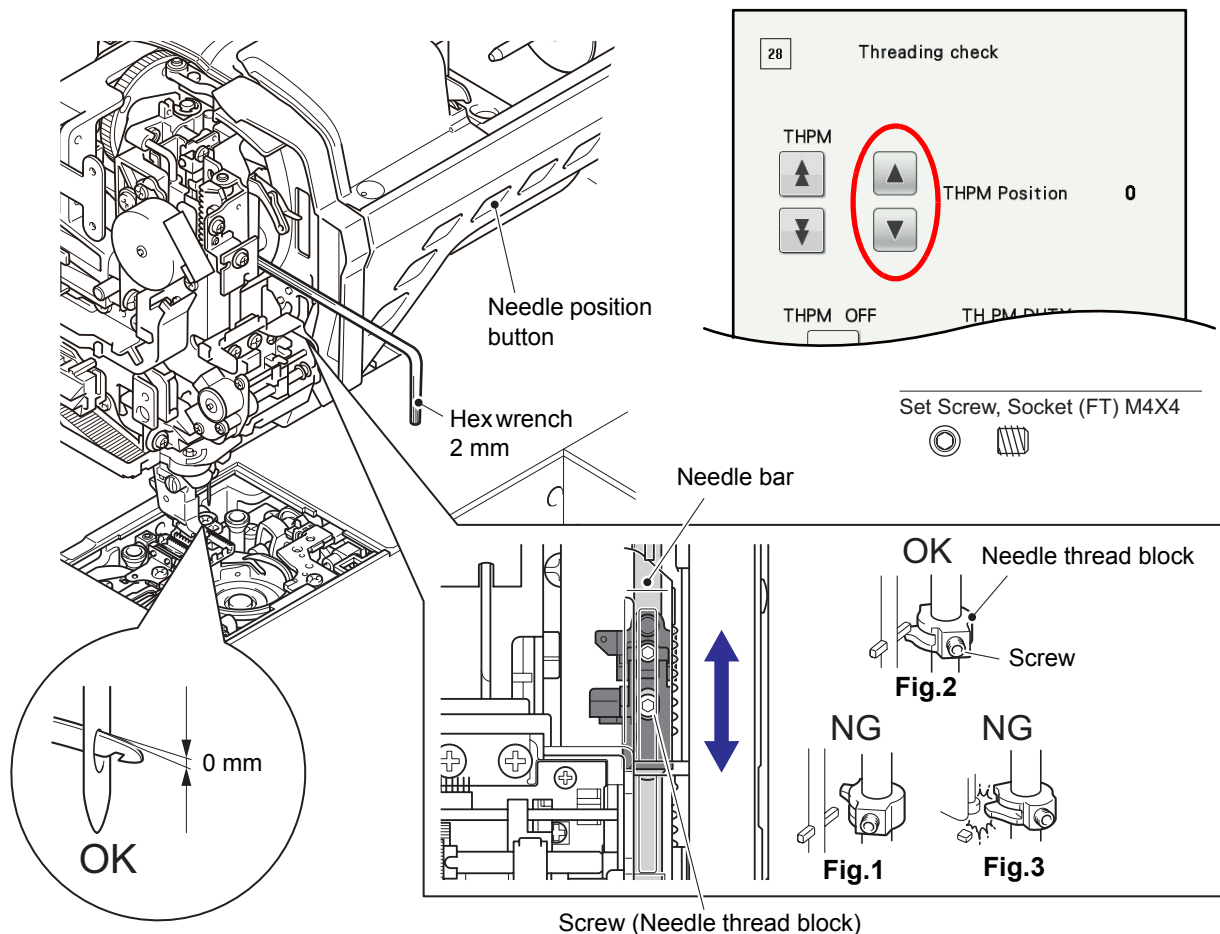


[Adjustment]

1. Remove the face plate assy. (Refer to "2-6".)
2. Attach the size 75/11 needle.
3. Start the test mode, and then select the #28 (Threading check mode).
4. Press  (Needle position button) to raise the needle bar to its highest position.
5. Press the  button on screen several times to pass the threader hook into the needle eye and check the clearance between the upper edge of the threader hook and the upper edge of the needle eye. After checking the clearance, press the  button on screen several times to return the threader hook to its initial position.
6. Loosen the screw of the needle thread block.
7. Adjust the clearance between the upper edge of the threader hook and the upper edge of the needle eye by moving the needle thread block up and down.
8. Tighten the screw of the needle thread block to secure the needle thread block to the needle bar.
9. After adjusting the clearance, pass the threader hook into the needle eye and check the clearance between the upper edge of the threader hook and the upper edge of the needle eye.

***Key point**

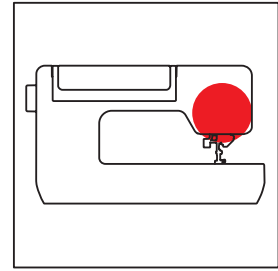
- Be sure to tighten the screw of the needle thread block slightly to the left when it is seen from the front. (Fig.2)
- In case the position of the screw is too left, the hook doesn't turn. (Fig.1)
- In case the position of the screw is too right, the needle thread block contacts the needle bar supporter assy and get damaged. (Fig.3)



[Standard]

When raising the presser foot, clearance between the upper surface of the needle plate A assy and bottom surface of the presser foot should be 7 to 7.5 mm.

The presser foot should be in parallel with the feed dog hole of the needle plate A assy.

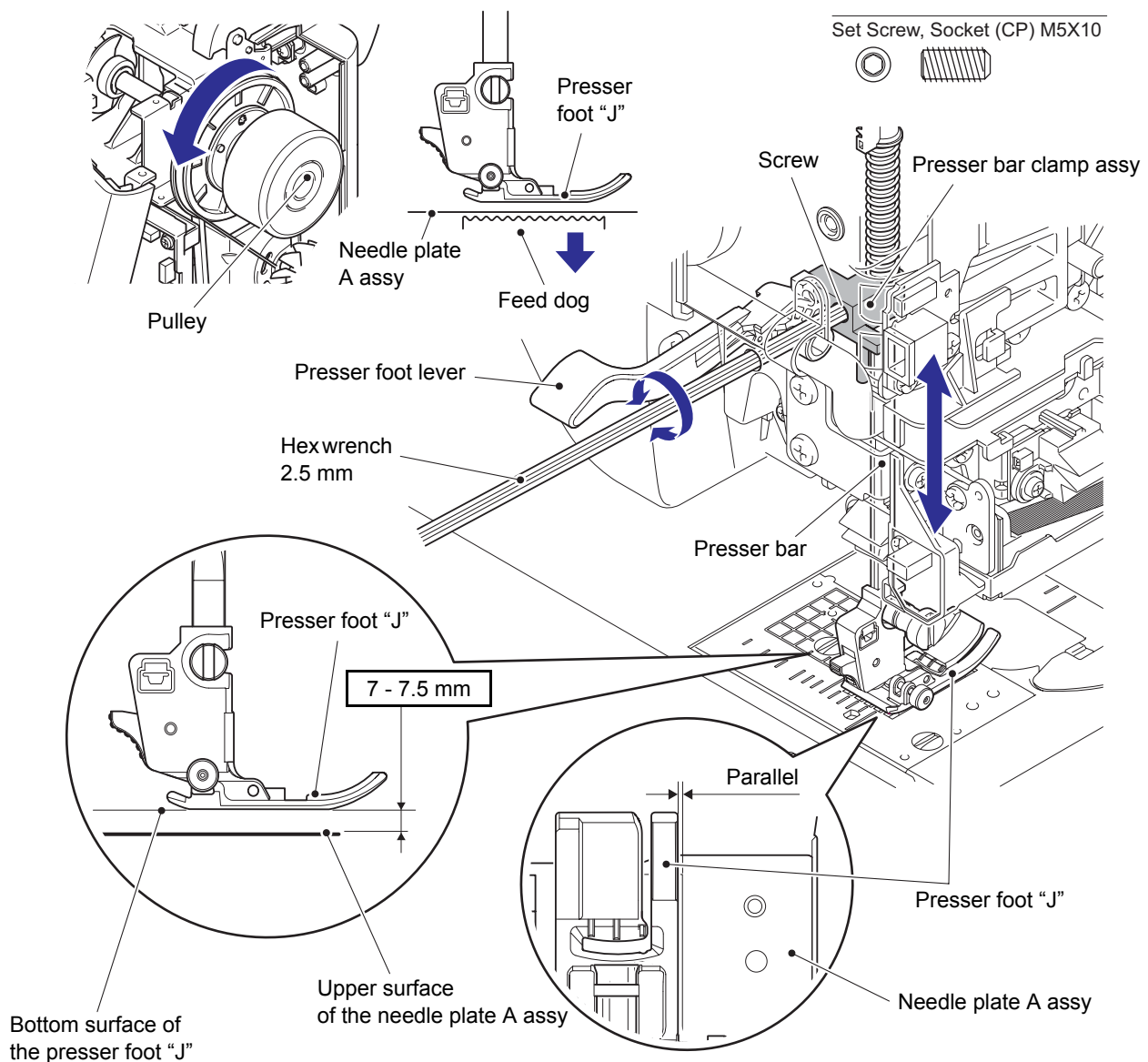


[Adjustment]

1. Remove the face plate assy. (Refer to "2-6".)
2. Attach the presser foot "J".
3. Start the test mode.
4. Raise the presser foot lever.
5. Turn the pulley by hand to set the feed dog lower than the needle plate A assy.
6. Loosen the screw of the presser bar clamp assy.
7. Adjust the clearance between the upper surface of the needle plate A assy and the bottom surface of the presser foot "J" by moving the presser bar up and down.

***Key point**

- Make sure that the presser foot "J" is in parallel with the feed dog hole of needle plate A assy.
8. Tighten the screw of the presser bar clamp assy to secure the presser bar clamp assy to the presser bar.

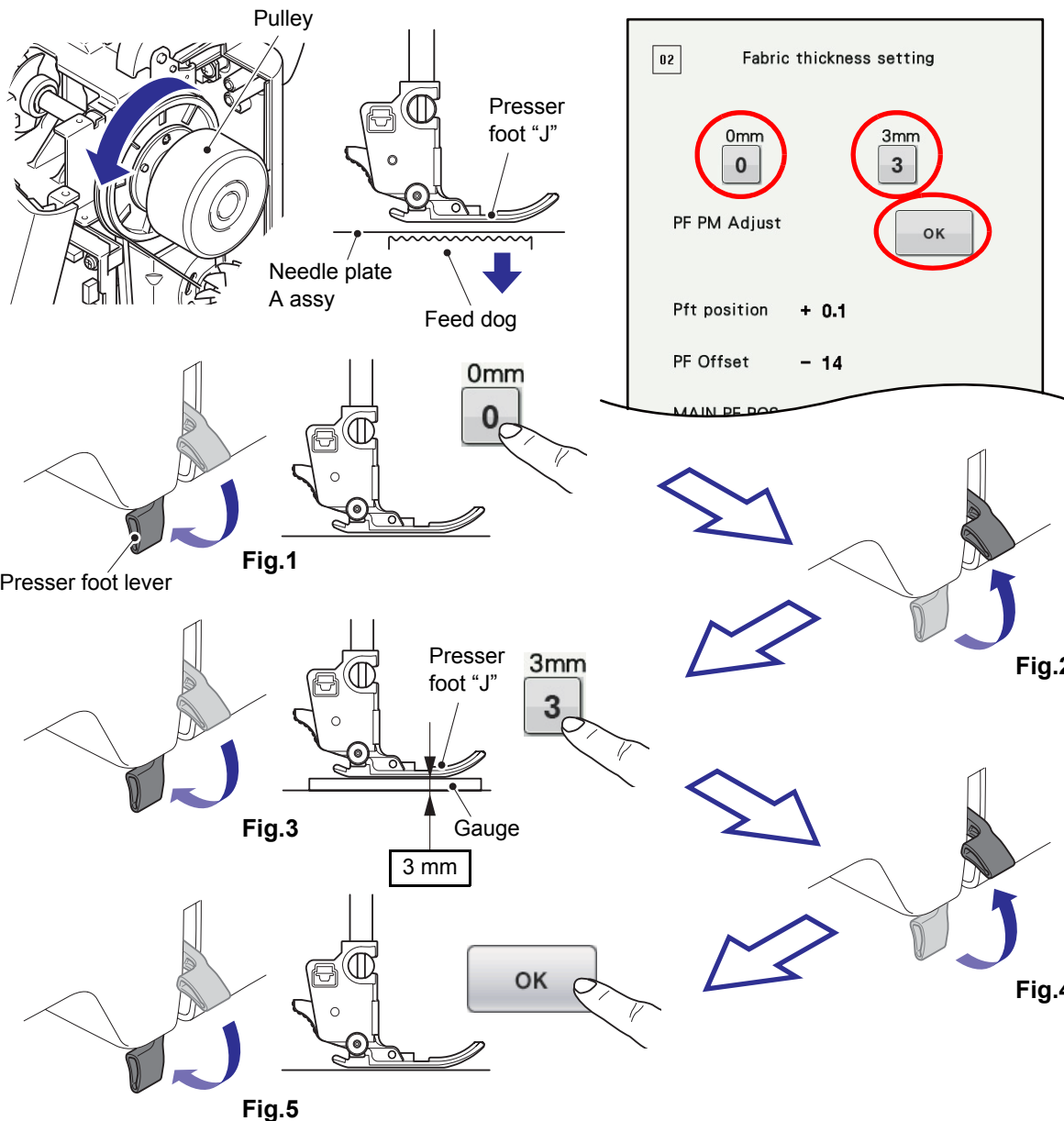
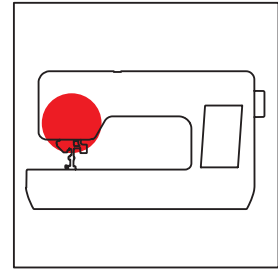


[Standard]

In the test mode #02, set the fabric thickness: 0 mm and 3 mm.

[Adjustment]

1. Attach the presser foot "J".
2. Start the test mode, and then select the #02 (Fabric thickness setting mode).
3. Turn the pulley by hand to set the feed dog lower than the needle plate A assy.
4. Lower the presser foot lever, and press the **0** button under the "0mm" on the screen. (Fig.1)
5. Raise the presser foot lever. (Fig.2)
6. Insert the gauge (3 mm) under the presser foot "J".
7. Lower the presser foot lever, and press the **3** button under the "3mm" on the screen. (Fig.3)
8. Raise the presser foot lever. (Fig.4)
9. Remove the gauge.
10. Lower the presser foot lever, and press the **OK** button next to the "PF PM Adjust" on the screen. (Fig.5)




[Standard]


In the test mode #02, set the maximum and minimum knee lifter position.

[Adjustment]

1. Start the test mode, and then select the #02 (Fabric thickness setting mode).
2. Turn the pulley by hand to set the feed dog lower than the needle plate A assy.

3. Lower the presser foot lever, and press the  button under the "Knee lifter setting" on the screen. (Fig.1)

4. Attach the knee lifter. (Fig.2)

5. Turn the knee lifter fully to the right side and hold it at the position. Press the  button under the "Knee lifter setting" on the screen. (Fig.3)

6. Remove the knee lifter.

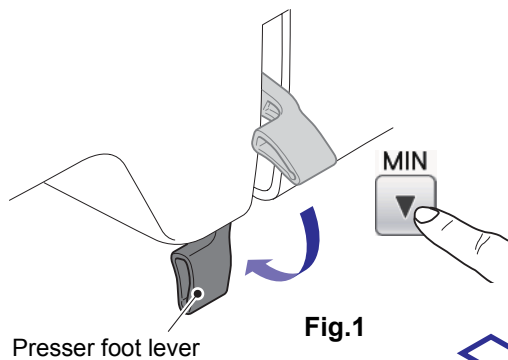
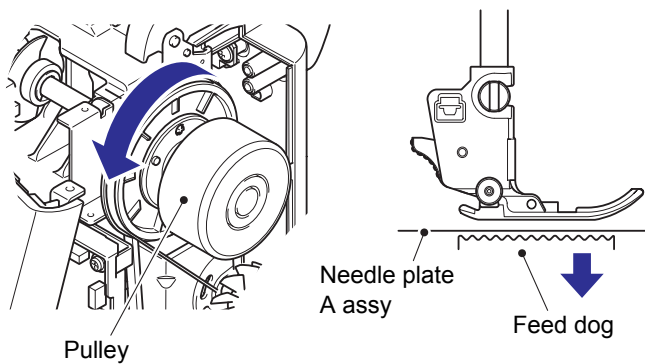
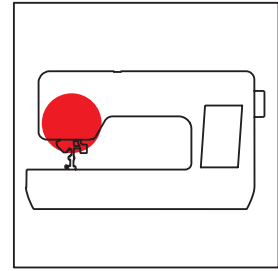


Fig.1

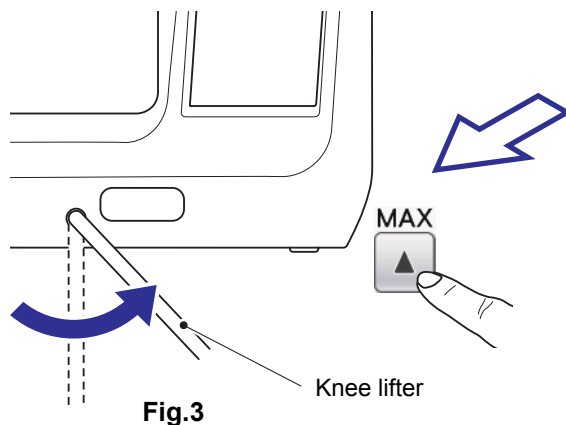
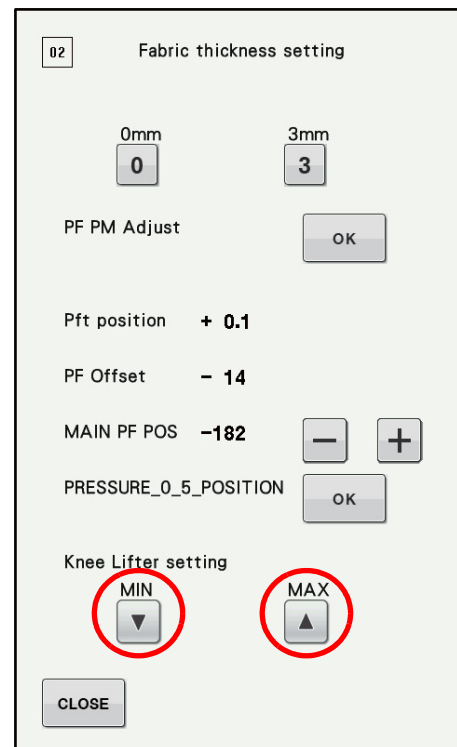


Fig.3

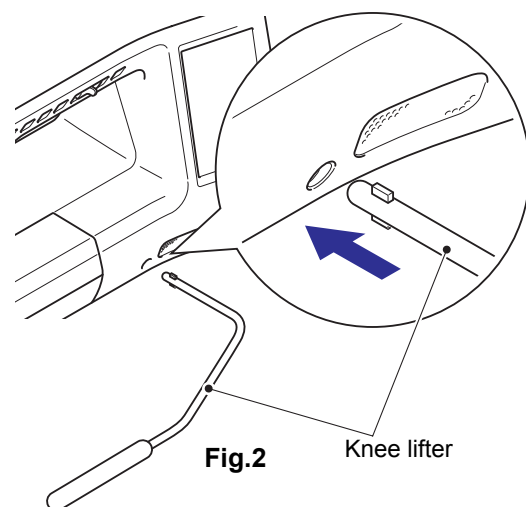
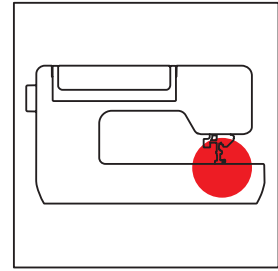


Fig.2

[Standard]

- When the feed dog is at its highest position, the feed dog height from the surface of the needle plate A assy should be 1 ± 0.1 mm (0.9 to 1.1 mm).
- When the feed dog is at its lowest position, the feed dog should be lowered more than 0.3 mm from the surface of the needle plate A assy.
- The feed dog should be in parallel with the needle plate A assy.



[Adjustment]

1. Remove the presser foot, the presser foot holder and the needle.
2. Start the test mode, and then select the #06 (Feed dog position mode).
3. Turn the pulley several times by hand (the feed dog moves to center position).
4. Turn the pulley by hand to raise the feed dog to its highest position.
5. Turn the screw A of the feed bar assy, and adjust the height from needle plate A assy surface to back tooth of the feed dog. (Fig.1)

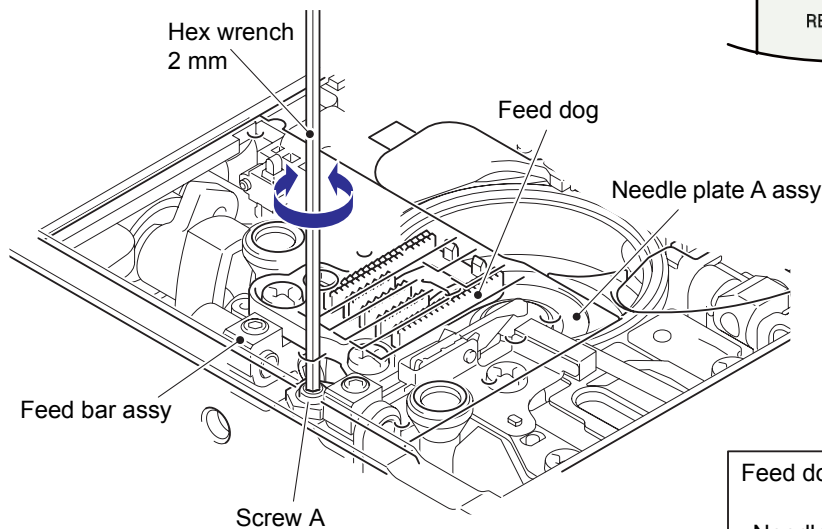
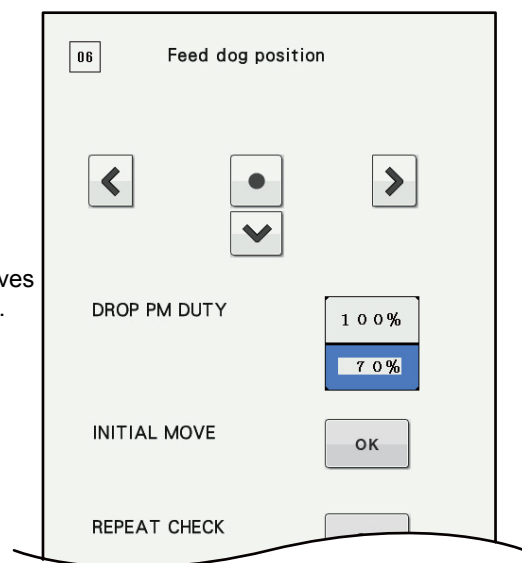
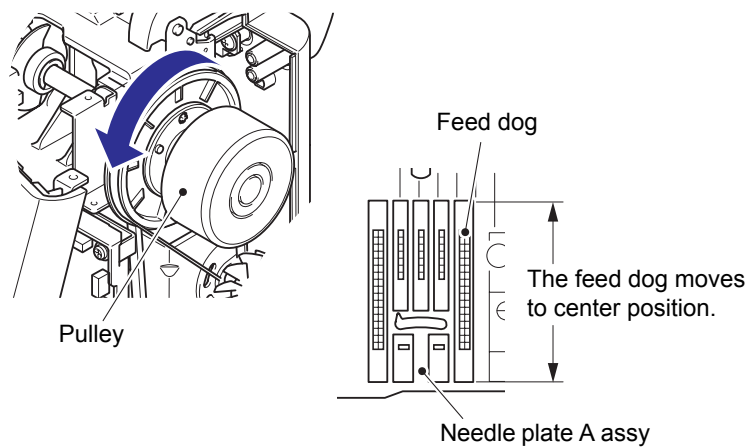
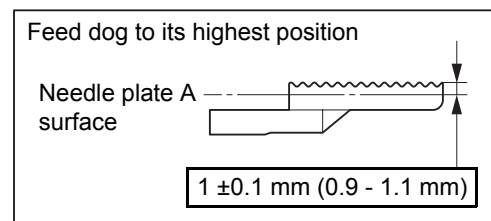


Fig.1

Screw A
Set Screw, Socket (FT) M4X10



<To next page>

Adjustment

Adjustment

<From previous page>

6. Loosen the screw B of the feed dog correction plate. (Fig.2)
7. Turn the screw C of the feed bar assy to adjust the parallelism of the feed dog and the needle plate A assy surface. (Fig.3)

***Key point**

- Make sure that the height of closest tooth and farthest tooth of the feed dog are same.

8. Tighten the screw B of the feed dog correction plate to secure the feed dog correction plate to the feed bar assy. (Fig. 2)

XC2278001

Feed gauge

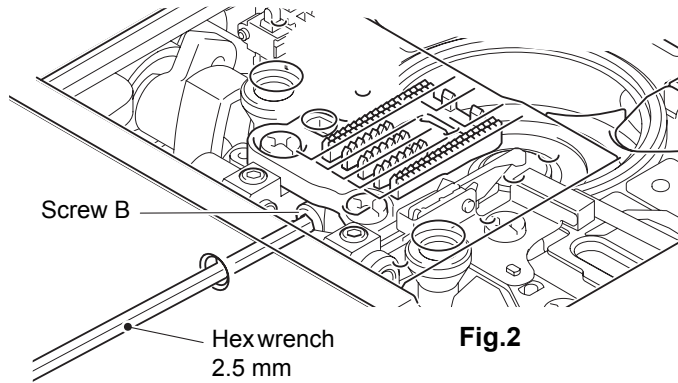


Fig.2

Screw B

Screw 3X8

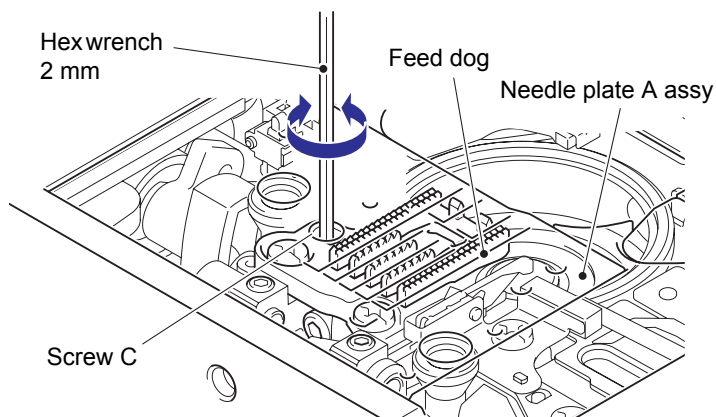
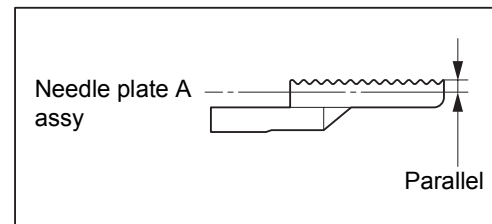
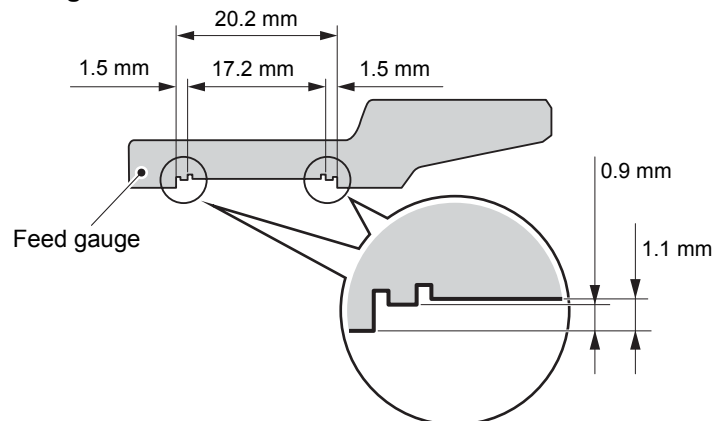


Fig.3



Screw C

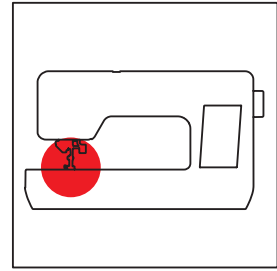
Set Screw, Socket (FT) M4X4



[Standard]

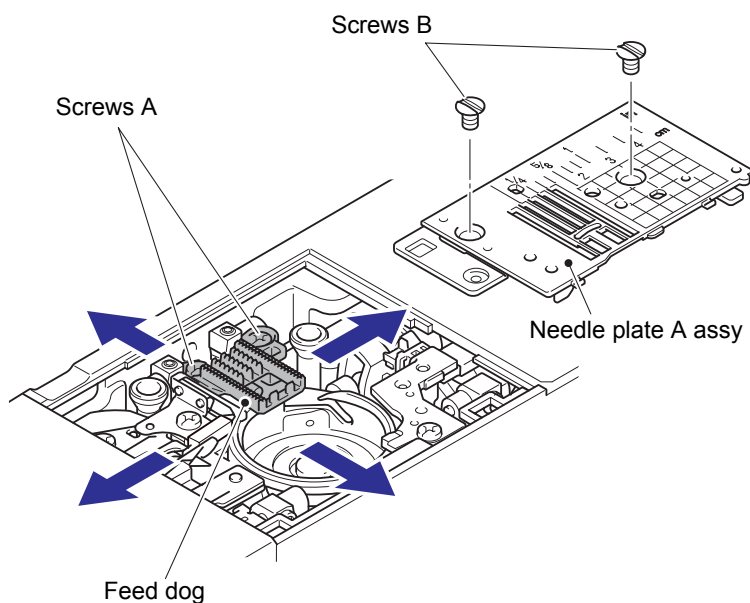
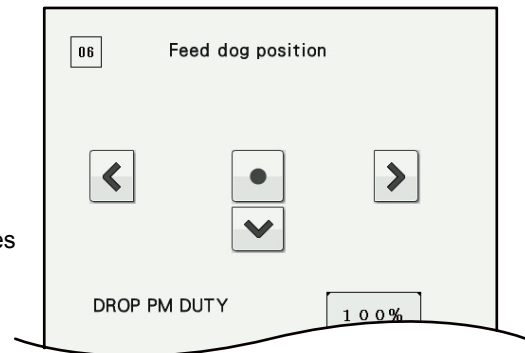
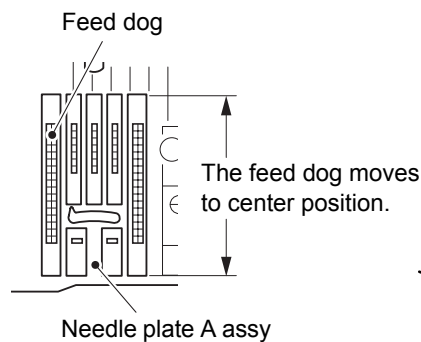
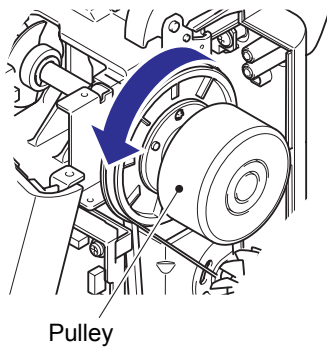
When the feed dog is located in the center position and the test mode #06 is operated:

- The clearance (front to back) between the forward edge of the feed dog middle tooth and the needle plate A assy should be 3.5 ± 0.3 mm (3.2 to 3.8 mm).
- The clearance (right to left) between the feed dog and the feed dog hole of needle plate A assy should be equal.



[Adjustment]

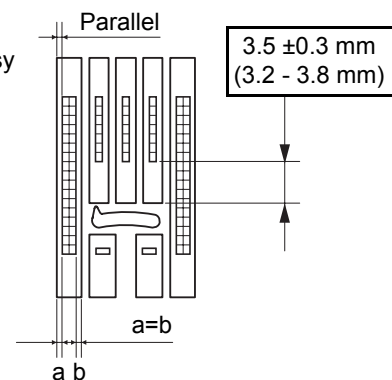
1. Remove the presser foot, the presser foot holder and the needle.
2. Remove the needle plate B assy and the needle plate A assy.
3. Start the test mode, and then select the #06 (Feed dog position mode).
4. Turn the pulley several times by hand (the feed dog moves to center position).
5. Loosen the 2 screws A of the feed dog.
6. Temporarily attach the needle plate A assy with the 2 screws B, and adjust the position of the feed dog.
7. Tighten the 2 screws A of the feed dog to secure the feed dog to the feed bar assy.
8. Attach the needle plate A assy, and check the clearance between the feed dog and the needle plate A assy.

**Screw A**

Screw, Bind M3X6

**Screw B**


Screw M4

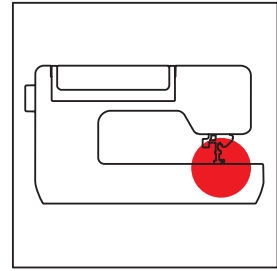


[Standard]

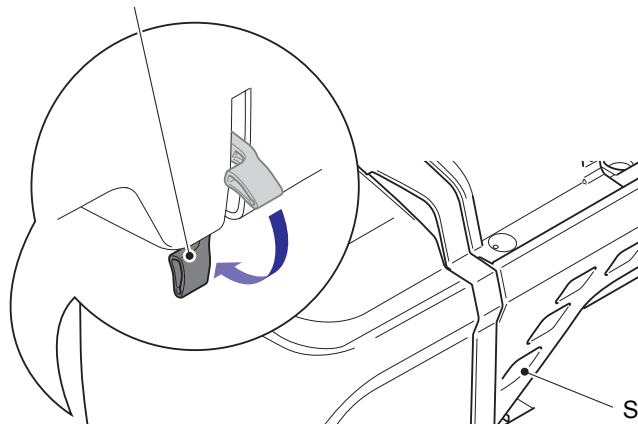
The difference in length of 100 forward stitches and 100 backward stitches should be within ± 5 mm when test mode #13 is operated.

[Adjustment]

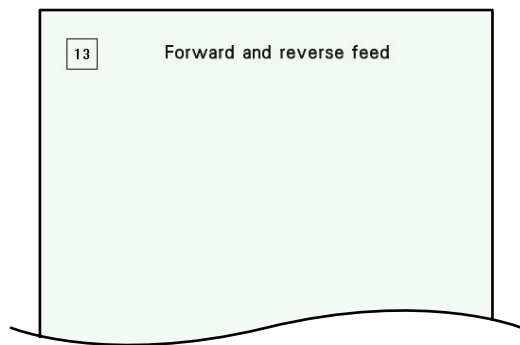
1. Remove the needle plate B Assy, the free arm cover and the free arm front cover Assy. (Refer to "2-5".)
2. Attach the presser foot "J".
3. Start the test mode, and then select the #13 (Forward and reverse feed mode).
4. Set the folded broadcloth with a piece of a paper in between to the machine.
5. Lower the presser foot lever, and press  (Start/Stop button). (100 forward stitches and 100 backward stitches starts automatically.)
6. Check the total length of 100 forward stitches and 100 backward stitches.



Presser foot lever



Start/Stop button

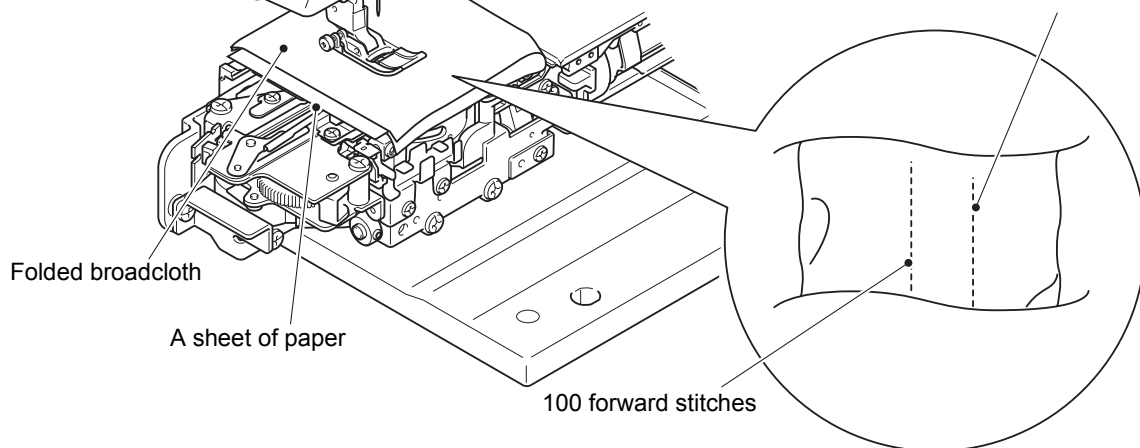


Folded broadcloth

A sheet of paper

100 forward stitches

100 backward stitches



<To next page>

<From previous page>

7. Insert the hex wrench (2 mm) into the hole of rear cover, and then loosen the screw A of the FPM holder assy. (Fig.1)

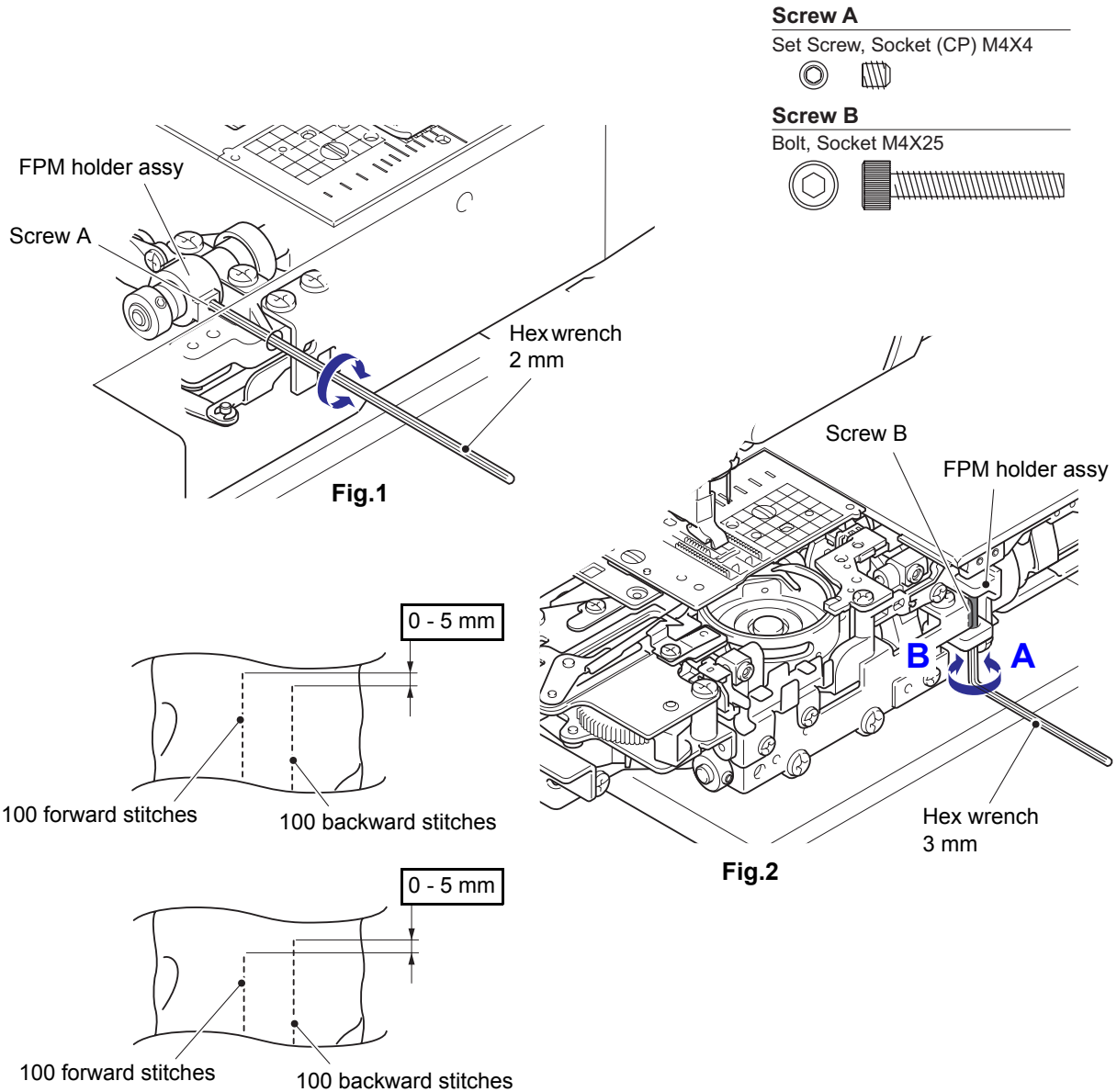
8. Adjust the total length of 100 backward stitches by turning the screw B of the FPM holder assy. (Fig. 2)

***Key point**

- Loosen the screw B (turn to the direction of "A"). → Total length of 100 backward stitches gets longer.
- Tighten the screw B (turn to the direction of "B"). → Total length of 100 backward stitches gets shorter.

9. After adjustment, apply a small amount of the thread locker to the screw B.

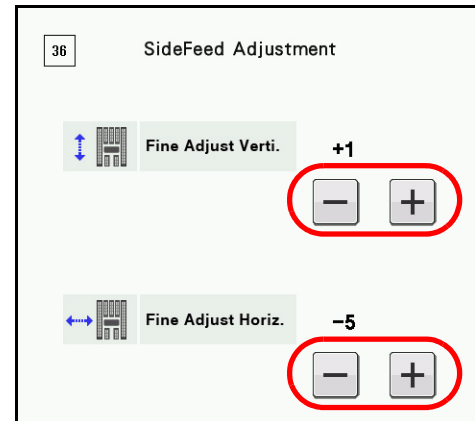
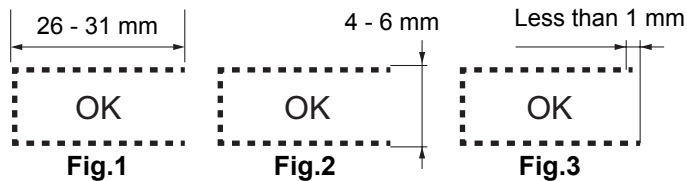
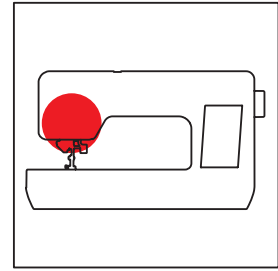
10. Insert the hex wrench (2 mm) into the hole of rear cover, and then tighten the screw A of the FPM holder assy. (Fig.1)



[Standard]

In the test mode #36,

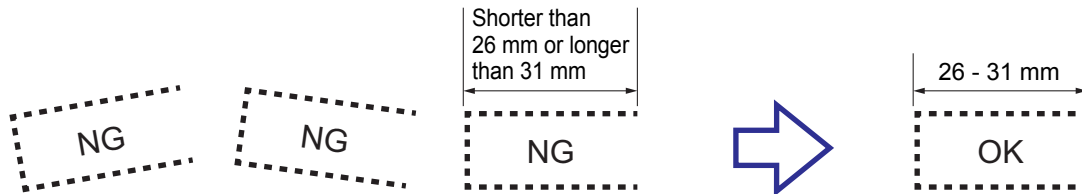
- (1) Pattern should be horizontal and the sewing length at the upper section should be 26 to 31 mm. (Fig.1)
- (2) Right top margin of the pattern should be 4 to 6 mm. (Fig.2)
- (3) The deviation of sewing length for upper line and lower line should be less than 1 mm. (Fig.3)



[Adjustment]

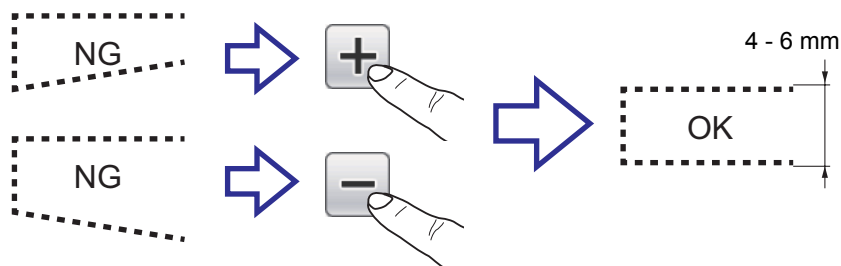
1. Attach the presser foot "N".
2. Start the test mode, and then select the #36 (SideFeed Adjustment mode).
3. Sew the pattern with the schappe spun thread #60.
4. Check the sewn pattern, and perform following adjustments.

- (1) Test pattern doesn't go horizontal, or upper line is shorter than 26 mm or longer than 31 mm.
Perform the "4-28 Feed dog height and parallelism" adjustment again.



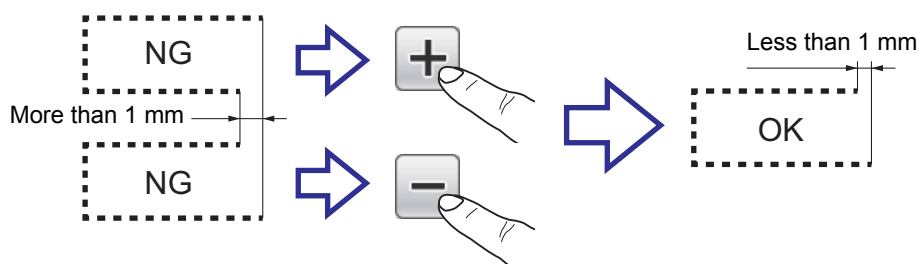
- (2) Pattern height is not within 4 to 6 mm.

Adjust the height by pressing the **-** or **+** button under "Fine Adjust Vert.":



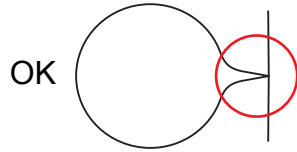
- (3) The gap between upper line length and bottom line length is not less than 1 mm.

Adjust the length by pressing the **-** or **+** button under "Fine Adjust Horiz.":



[Standard]

One point pattern sewn by the test mode #3 should not be overlapped, opened, or shifted.

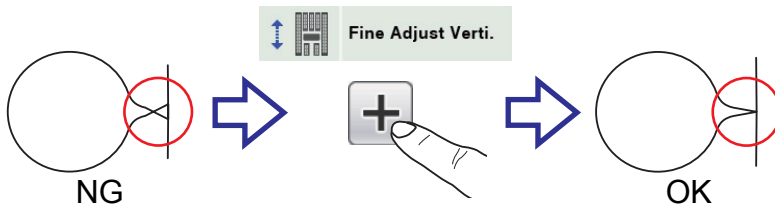


[Adjustment]

1. Attach the presser foot "N".
2. Start the test mode, and then select the #03 (Pattern Adjustment mode).
3. Sew the pattern with the schappe spun thread #60.
4. Check the sewn pattern, and perform following adjustments.

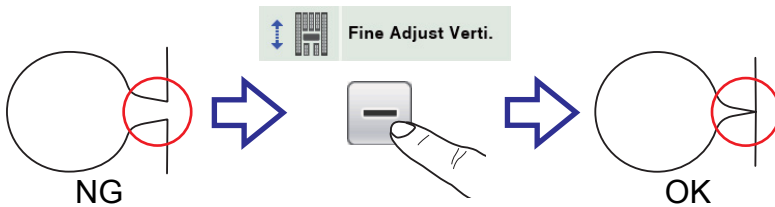
(1) The pattern is vertically overlapped.

→ Press the **+** button under "Fine Adjust Verti."



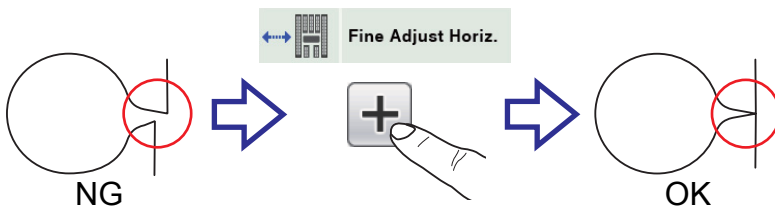
(2) The pattern is vertically separated.

→ Press the **-** button under "Fine Adjust Verti."



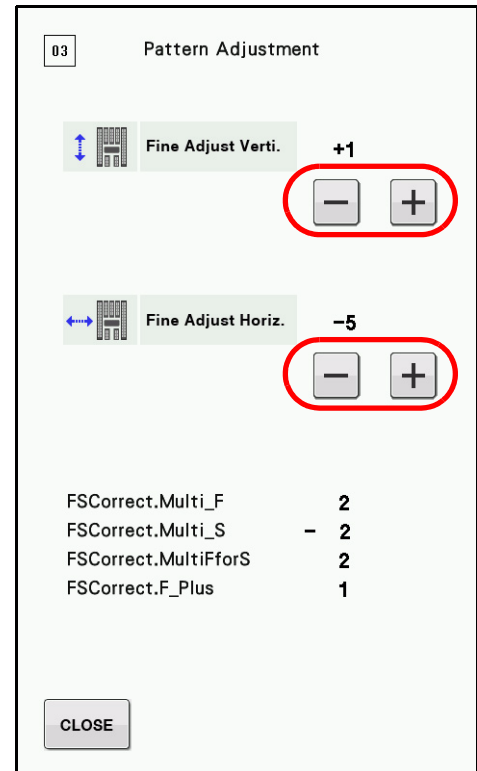
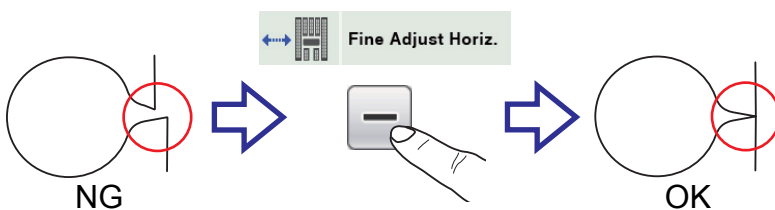
(3) The lower pattern is horizontally shortened.

→ Press the **+** button under "Fine Adjust Horiz."



(4) The lower pattern is horizontally extended.

→ Press the **-** button under "Fine Adjust Horiz."

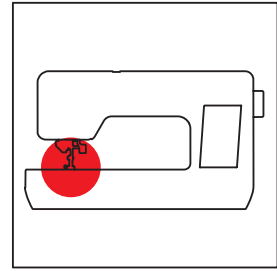


[Standard]

In the test mode #16, fully pull the BH presser foot forward and push it back for 2 notches.

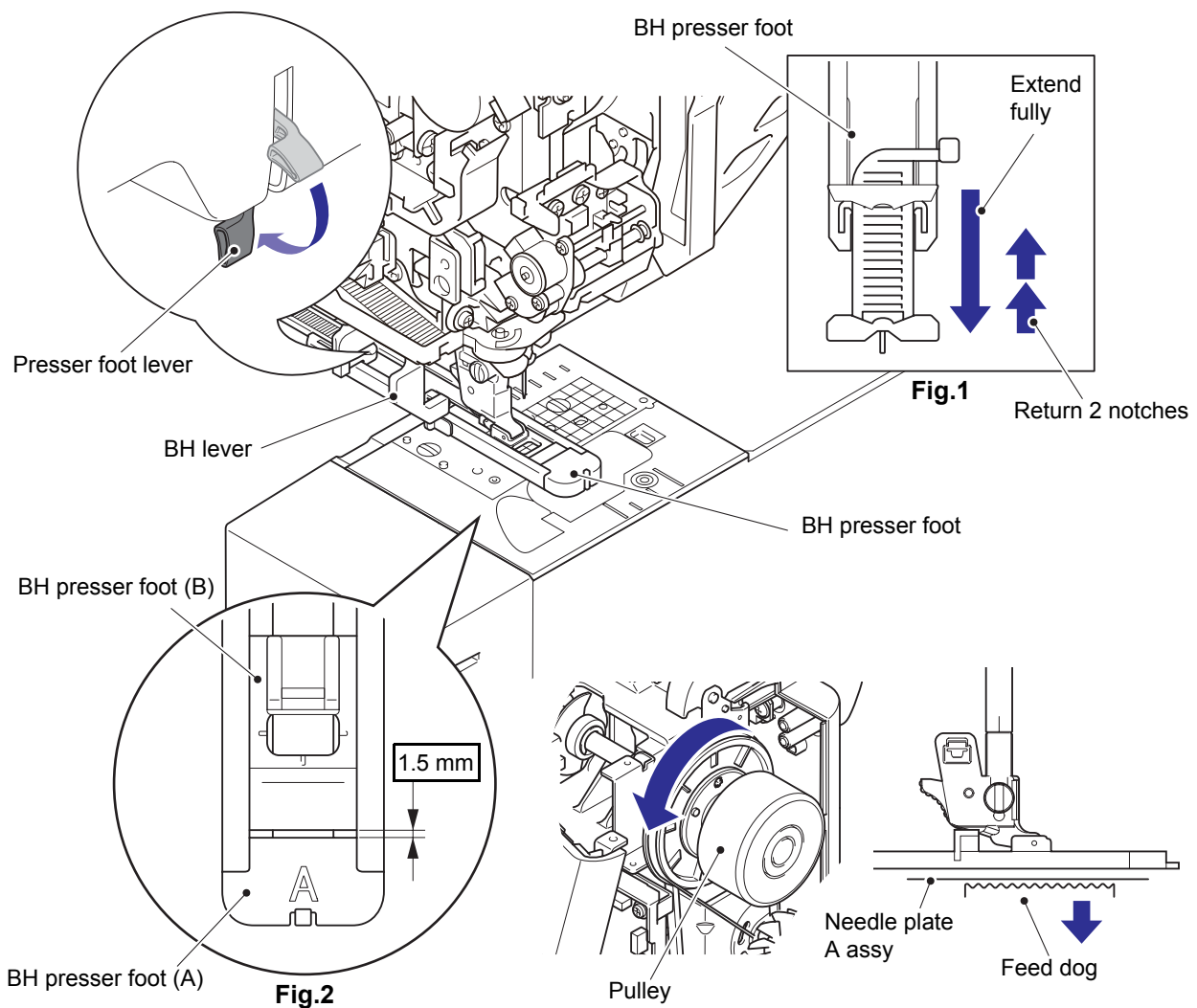
Make sure that:

- Buzzer sound starts when BH presser foot (A) and BH presser foot (B) are attached in clearance of 1.5 mm. (Fig.2 / Fig.4)
- Buzzer sound is made continuously when the BH presser foot is fully pulled forward. (Fig.5)
- Buzzer sound is made continuously when the BH presser foot is fully pushed backward. (Fig.6)



[Adjustment]

1. Remove the face plate assy. (Refer to "2-6".)
2. Start the test mode.
3. Raise the presser foot lever.
4. Fully pull the BH presser foot forward and push it back for 2 notches. (Fig.1)
5. Attach the BH presser foot.
6. Turn the pulley by hand to set the feed dog lower than the needle plate A assy.
7. Lower the presser foot lever after checking clearance between the BH presser foot (A) and the BH presser foot (B) is 1.5 mm. (Fig.2)
8. Lower the BH lever, and set it to the BH presser foot.



<To next page>

<From previous page>

9. Start the test mode, and then select the #16 (Switch monitoring mode).

10. Turn the BH eccentric shaft left to stop the buzzer sound. (Fig.3)

11. Turn the BH eccentric shaft right to return it to the position starts buzzer sound.

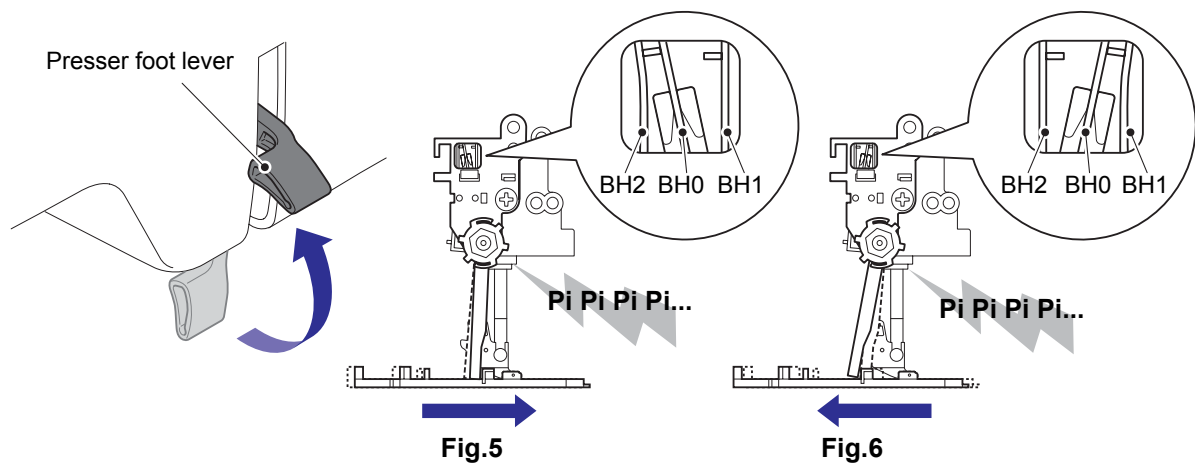
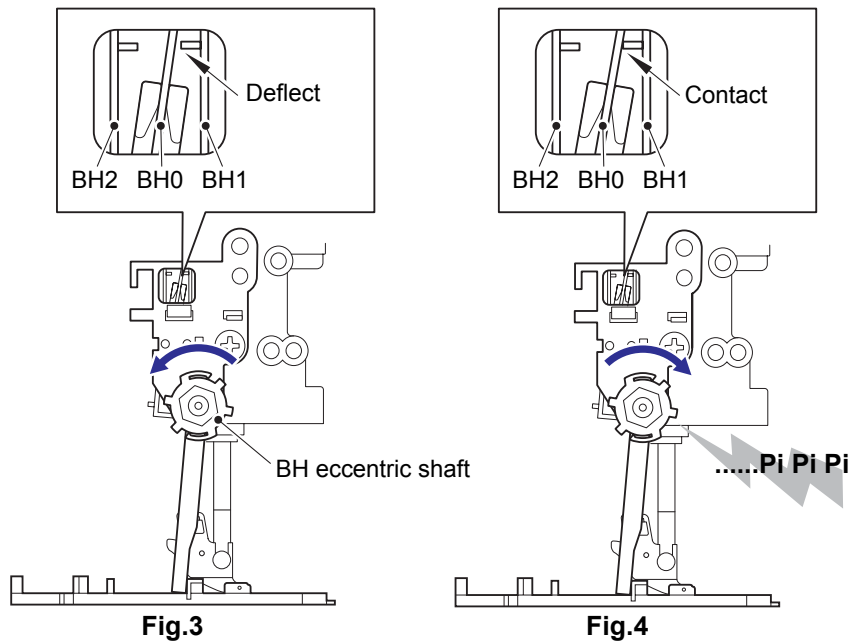
***Key point**

- Buzzer sound starts when BH0 contacts with BH1. (Fig.4)

12. Raise the presser foot lever.

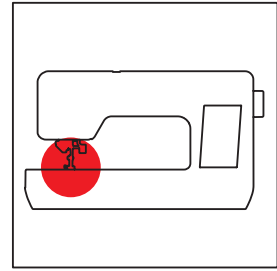
13. Check if continuous buzzer sound starts when the BH presser foot is fully pulled forward by hand. (Fig.5)

14. Check if continuous buzzer sound starts when the BH presser foot is fully pushed backward by hand. (Fig.6)



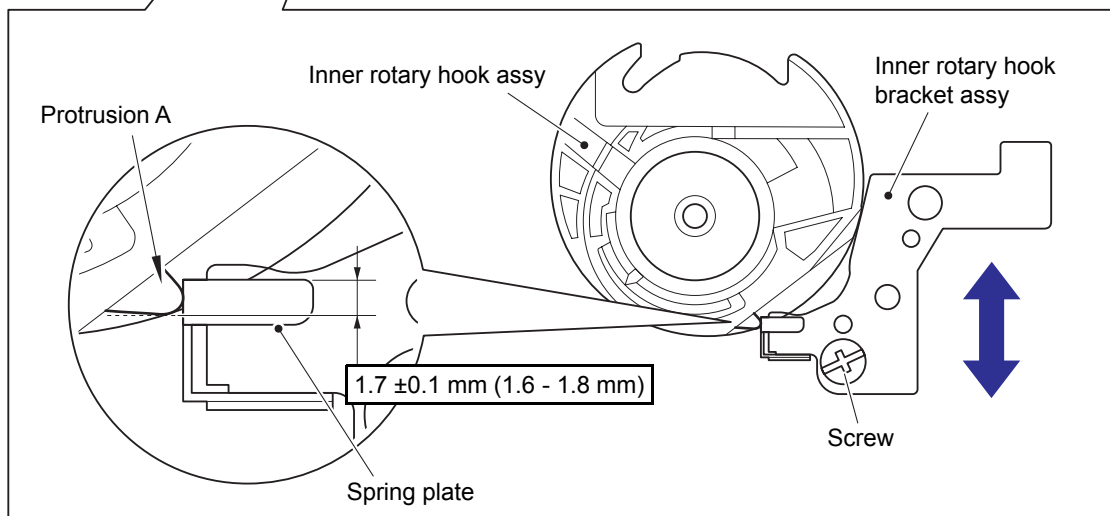
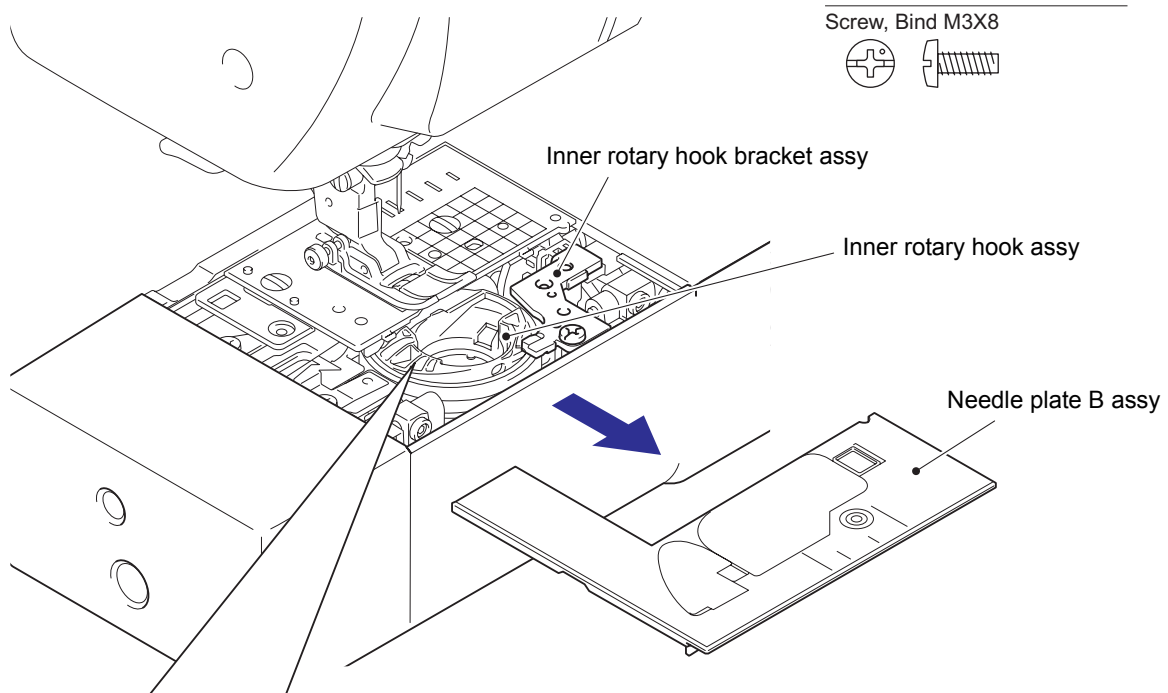
[Standard]

The overlap between the spring plate of the inner rotary hook bracket assy and the protrusion A of the inner rotary hook assy in the front/back direction should be 1.7 ± 0.1 mm (1.6 to 1.8 mm).



[Adjustment]

1. Remove the needle plate B assy.
2. Set the inner rotary hook assy into the outer rotary hook assy.
3. Loosen the screw of the inner rotary hook bracket assy.
4. Move the position of the inner rotary hook bracket assy (forward and back), and adjust the overlap between the spring plate of the inner rotary hook bracket assy and the protrusion A of the inner rotary hook assy.
5. Tighten the screw of the inner rotary hook bracket assy to secure the inner rotary hook bracket assy to the stopper plate block assy.



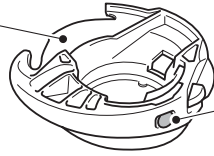
[Standard]

When the schappe spun thread #60 is pulled from the standard inner rotary hook assy* slowly with the tension gauge, the thread tension should be 0.1 to 0.12 N (10 to 12 gf).

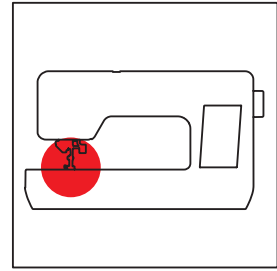
* Standard inner rotary hook assy:

Inner rotary hook assy for utility stitching with green paint on tension adjusting screw head.

Standard inner rotary hook assy



Tension adjusting screw
* Green paint on screw head

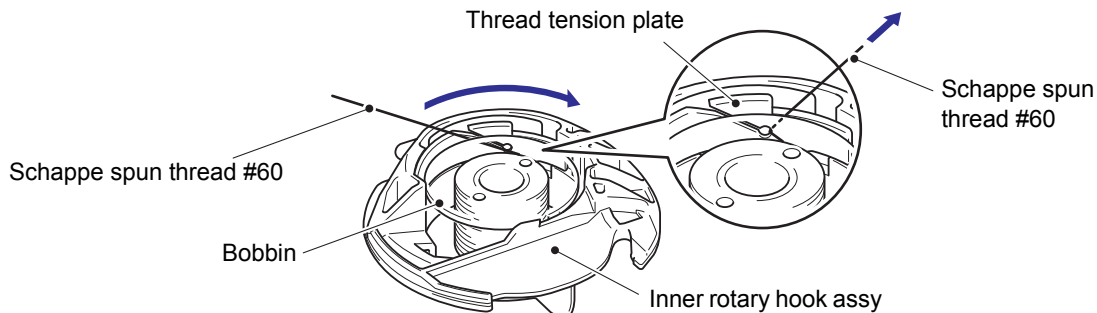


[Adjustment]

1. Remove the needle plate B assy.
2. Remove the inner rotary hook assy.
3. Set the bobbin (with the schappe spun thread #60) in the inner rotary hook assy, and pass the thread through the groove of the thread tension plate.

***Key point**

- Pass the thread fully into the back of the groove of the thread tension plate.



4. Pull the thread slowly from the inner rotary hook assy with the tension gauge, and check the thread tension.
5. Adjust the thread tension by turning the tension adjusting screw of the inner rotary hook assy.

***Key point**

- The tension adjusting screw is secured with the thread locker.

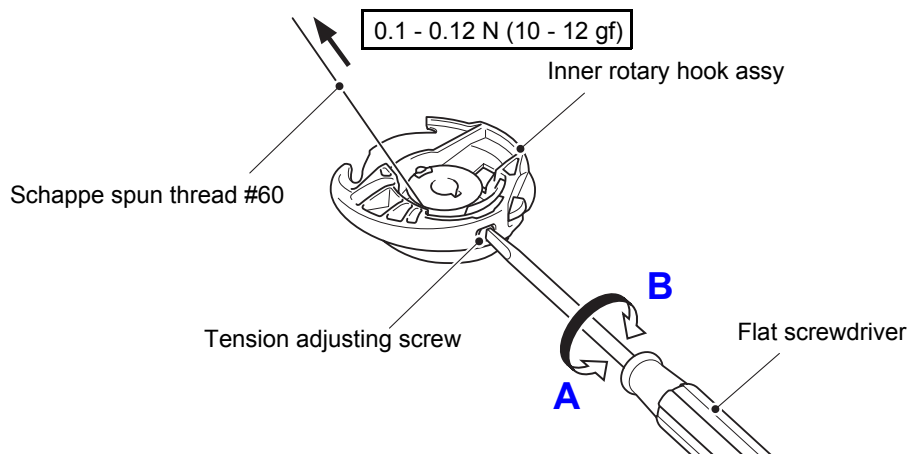
***Key point**

- Loosen the screw (turn to the direction of "A"). → The thread tension gets looser.
- Tighten the screw (turn to the direction of "B"). → The thread tension gets tighter.

6. Secure the tension adjusting screw to the inner rotary hook assy by applying a small amount of the thread locker to the tension adjusting screw.

XA9153001

Tension gauge 30 (0.3N)



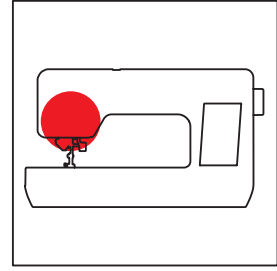
[Standard]

The guide line marker should be in parallel with the feed dog hole on the needle plate A assy.

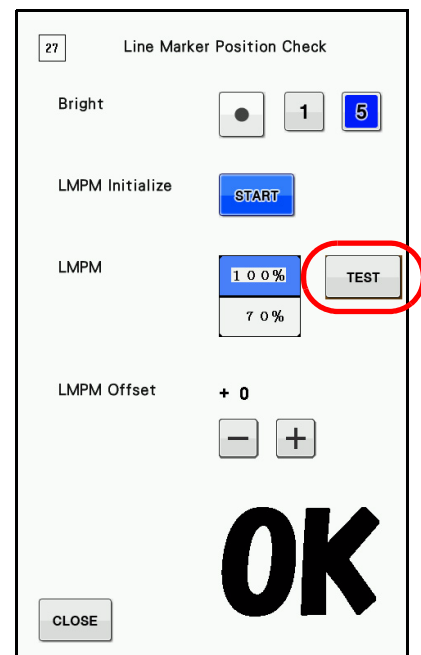
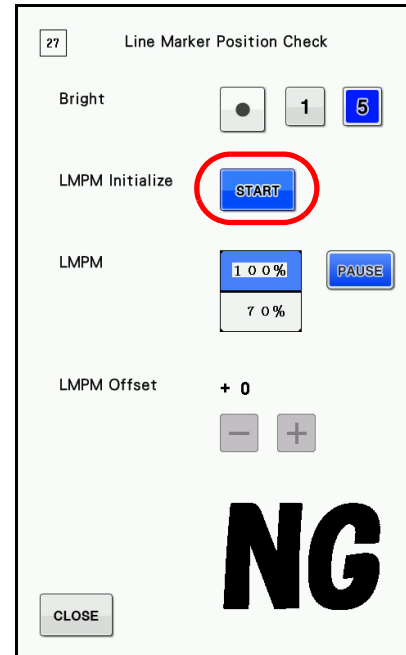
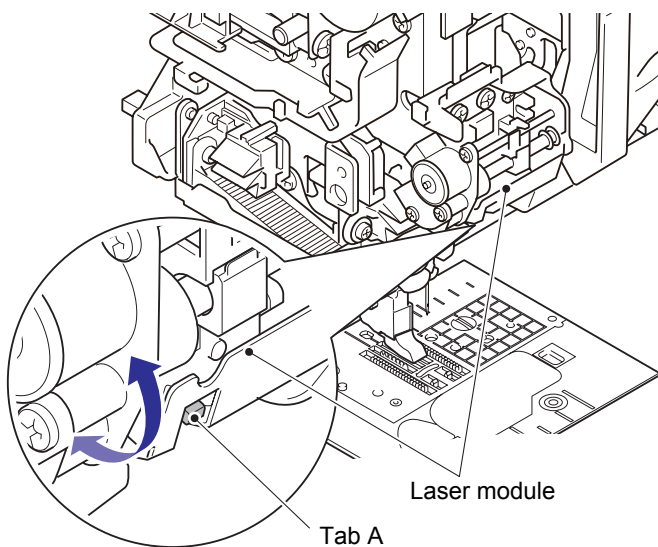
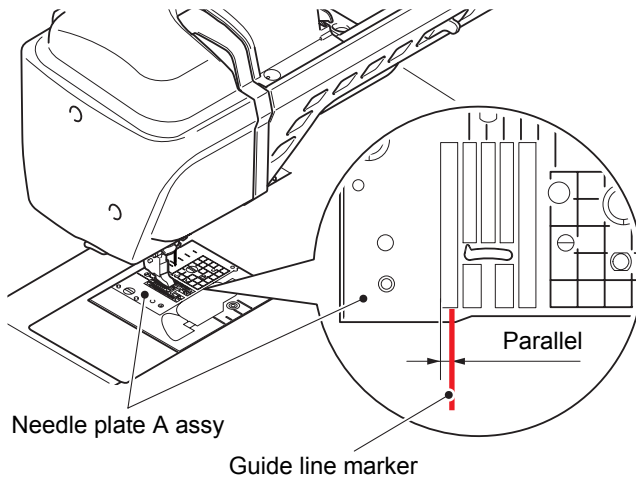
Also center position of the guide line marker and center base line should be coincided.

[Adjustment]

1. Remove the presser foot.
2. Start the test mode, and then select the #27 (Line Marker Position Check mode).
3. Press the **START** button next to "LMPM Initialize" on the screen.
4. Press the **TEST** button next to "LMPM" on the screen (the guide line marker moves to left).
5. Check if the guide line marker is in parallel with the feed dog hole on the needle plate A assy.

**How to adjust the angle of the guide line marker:**

- Remove the face plate assy and moves the tab A on laser module up and down to adjust the angle of the guide line marker.



<To next page>

<From previous page>

6. Press the **START** button next to “LMPM Initialize” on the screen (the guide line marker moves to center position).
7. Drop the needle point into the needle hole of the needle plate A assy to check positions of the guide line marker and the needle point.

***Key point**

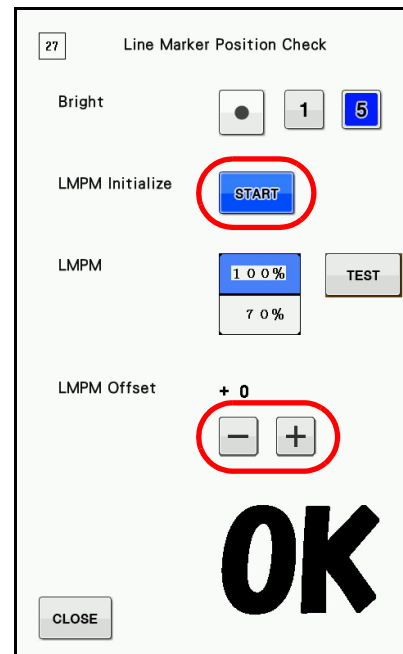
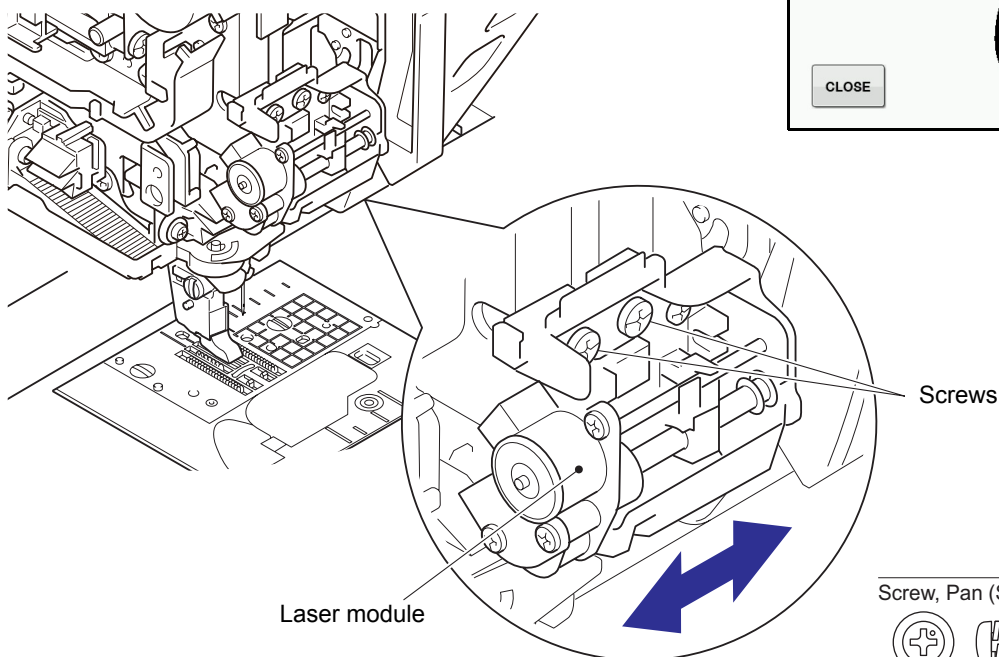
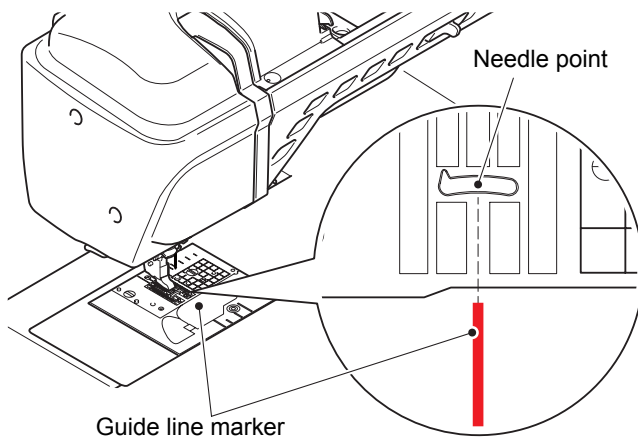
- Make sure that the center position of the guide line marker is coincided with the needle point position on the center base line.

How to adjust the position of the guideline marker:

- Press the **-** or **+** button under “LMPM Offset” on the screen to adjust the position of the guide line marker.

***Note**

- Be sure to adjust the position by setting “LMPM Offset” value within ± 5 .
- If it is not adjustable with the **-** or **+** button, remove the face plate assy and loosen 2 screws on the laser module to adjust the position of the guide line marker.



Screw, Pan (S/P washer) M3X11



Be sure to operate this adjustment when the UWR L ASSY or UWR R ASSY is replaced or reassembled.

[Standard]

When the sensor pen vertically presses three calibration points in certain order on the calibration sheet in test mode #66, "OK" appears on the screen.

[Preparation]

1. Print the calibration sheet (4-*) inserted after the next page on A4 or Letter size standard blank paper.

***Key point**

- When you print the pattern sheet, print it in full size. Do not enlarge or shrink the page.
ex.) For English Adobe Reader, set "None" for "Page Scaling". (Fig.1)
- After printing, check that the distance between the cross "A" and "B" is 240 mm. (Fig.2)

***Note**

- Do not use gloss paper.
- Make sure that there is no dirt, tear, nor wrinkle on paper.
- Make sure that there is no bleed nor blur on the printed dot pattern.

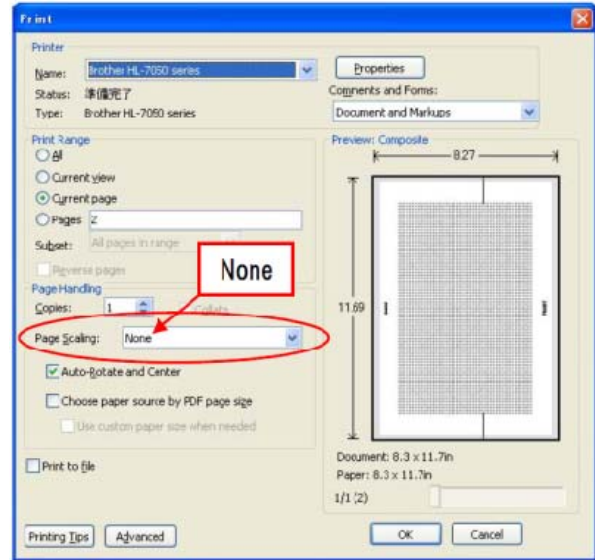
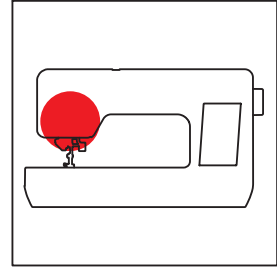


Fig.1: Print setting example for Adobe Reader

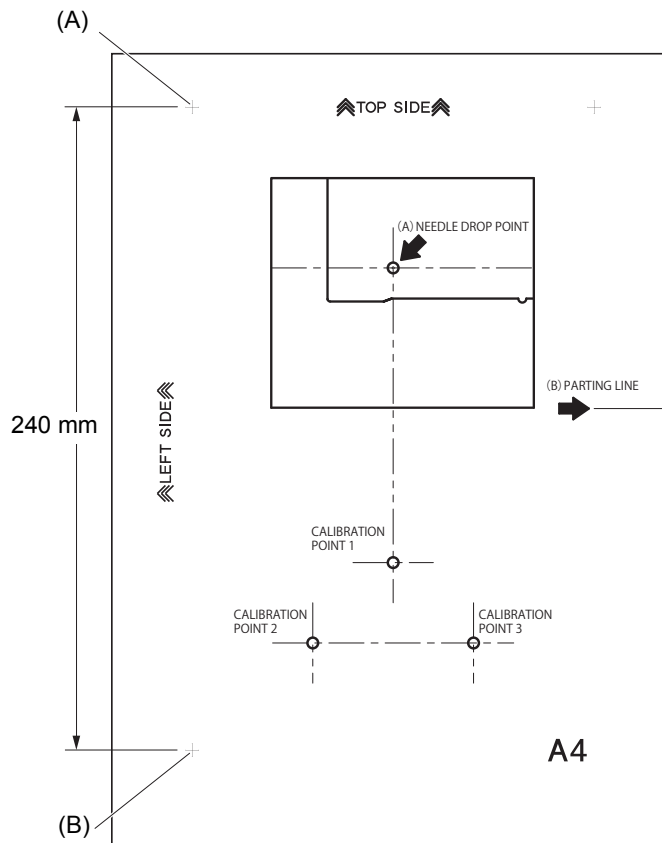


Fig.2: Calibration sheet (for sensor pen)

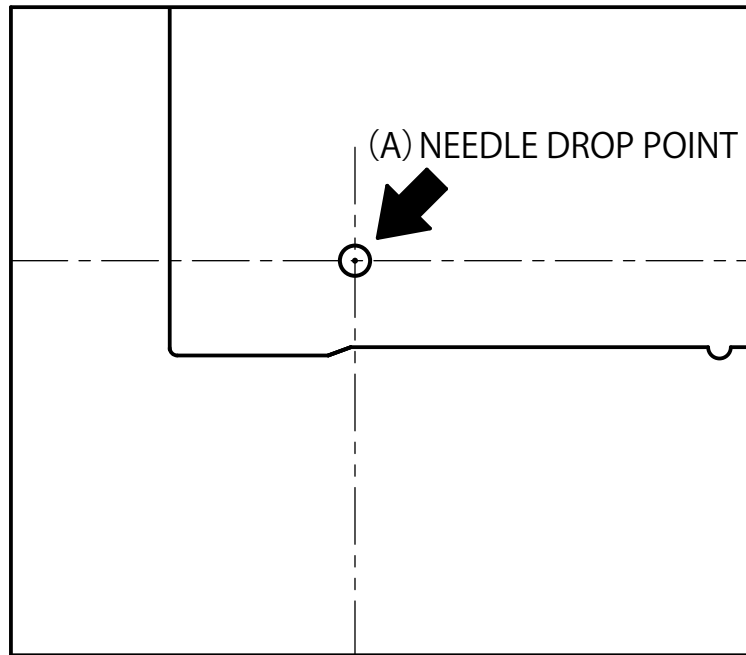
<To the next page>



TOP SIDE



LEFT SIDE



CALIBRATION
POINT 1

CALIBRATION
POINT 2

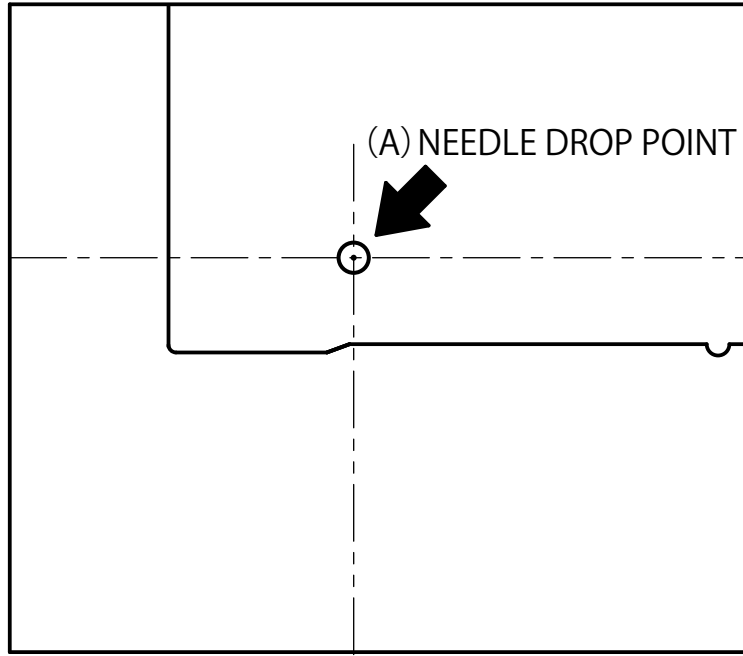
CALIBRATION
POINT 3



A4



TOP SIDE



(B) PARTING LINE



LEFT SIDE

CALIBRATION POINT 1



CALIBRATION POINT 2



CALIBRATION POINT 3

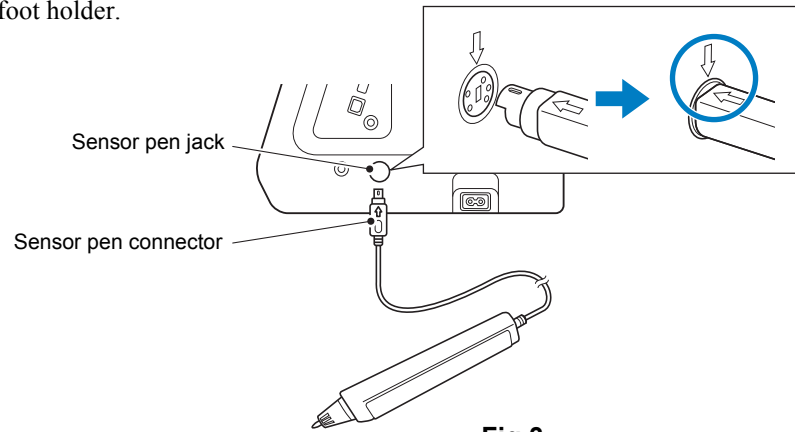


LTR

<From previous page>

[Adjustment procedures]

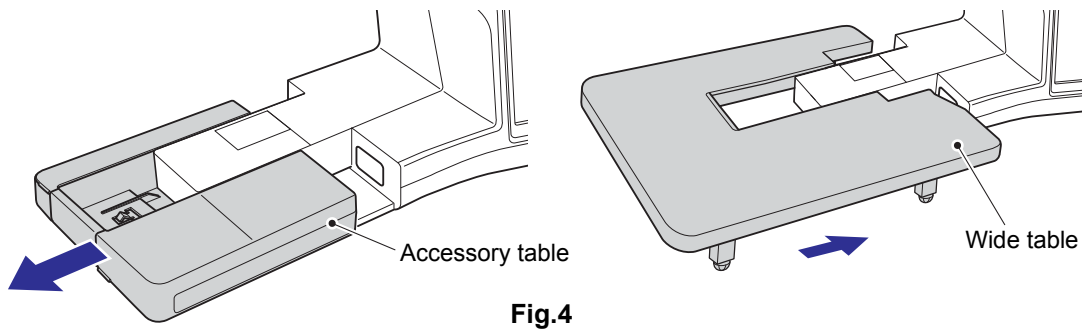
1. Remove the presser foot and presser foot holder.
2. Attach the 75/11 size needle.
3. Attach the sensor pen. (Fig.3)



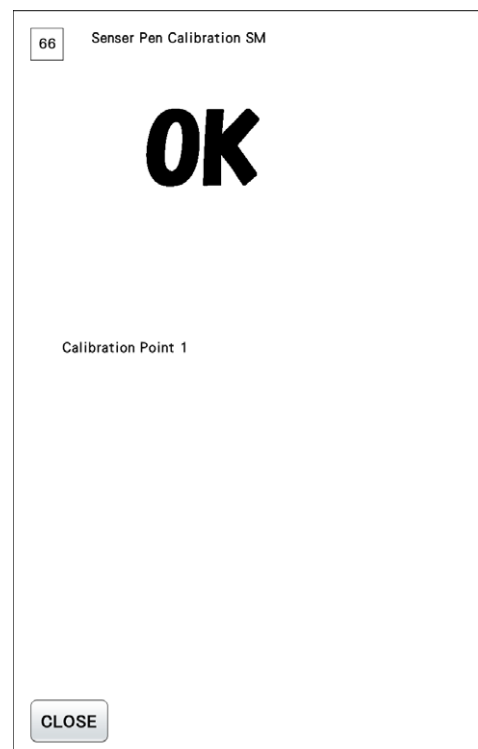
4. Remove the Accessory table assy and attach the wide table. (Fig.4)

***Key point**

- Wide table is an optional accessory.
- Part code: SAWT6200D (for U.S.A.) / SAWT6200DC (for Canada) / WT10_XF4184-001 (for other countries)



5. Start the test mode and select the #66. (Fig.5)



<To the next page>

<From previous page>

6. Put the calibration sheet on the needle plate. (Fig.6)

***Key point**

- Put the calibration sheet on the right side.

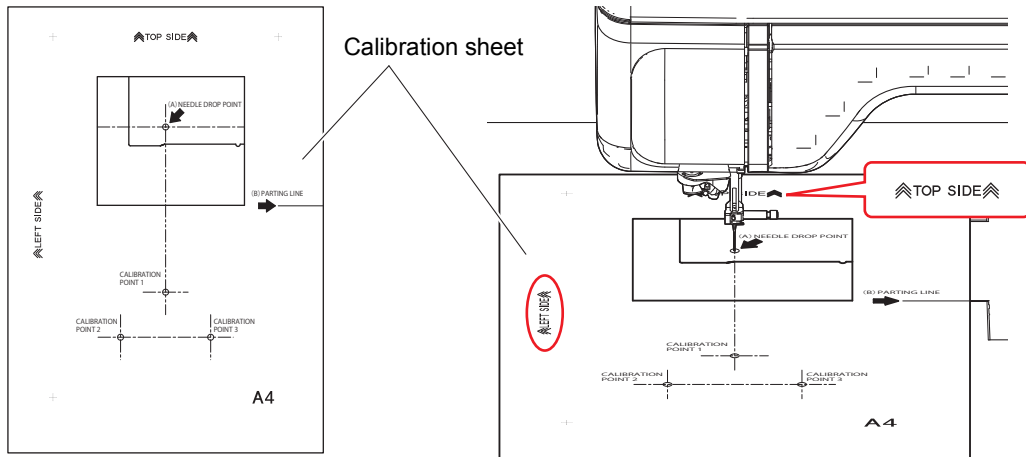


Fig.6

7. Turn the pulley by hand to put the needle top into point A of the calibration sheet. (Fig.7)

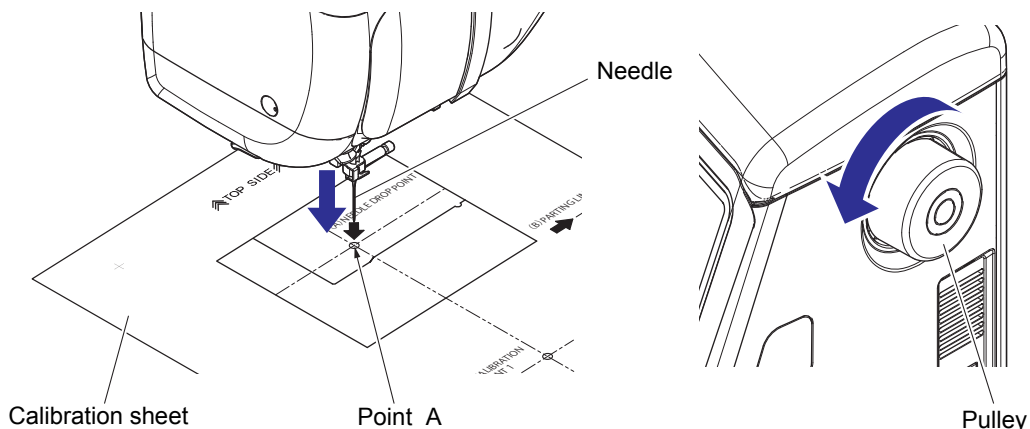


Fig.7

8. Arrange the calibration sheet with the needle top in so as to be parallel with the machine. (Fig.8)

***Key point**

- Align the line B of the calibration sheet with the parting line of the outer cover.

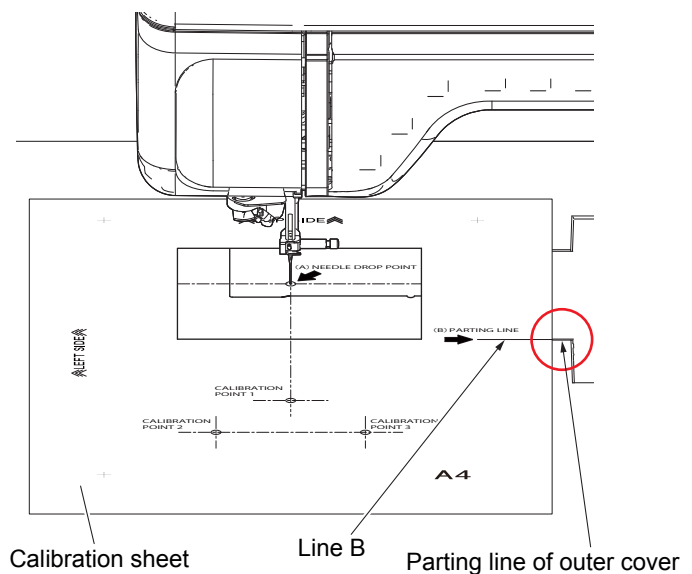


Fig.8

<To the next page>

<From previous page>

9. Press the calibration point 1 to 3 in this order with the sensor pen on the calibration sheet. (Fig.9)

***Key point**

- Calibration is completed when "OK" appears on the screen after the third point has been pressed. (Fig.10)
- Each calibration point must be pressed in the state of standing the sensor pen vertically. If the sensor pen is inclined when each calibration point is pressed, calibration may not be performed properly. (Fig.11)

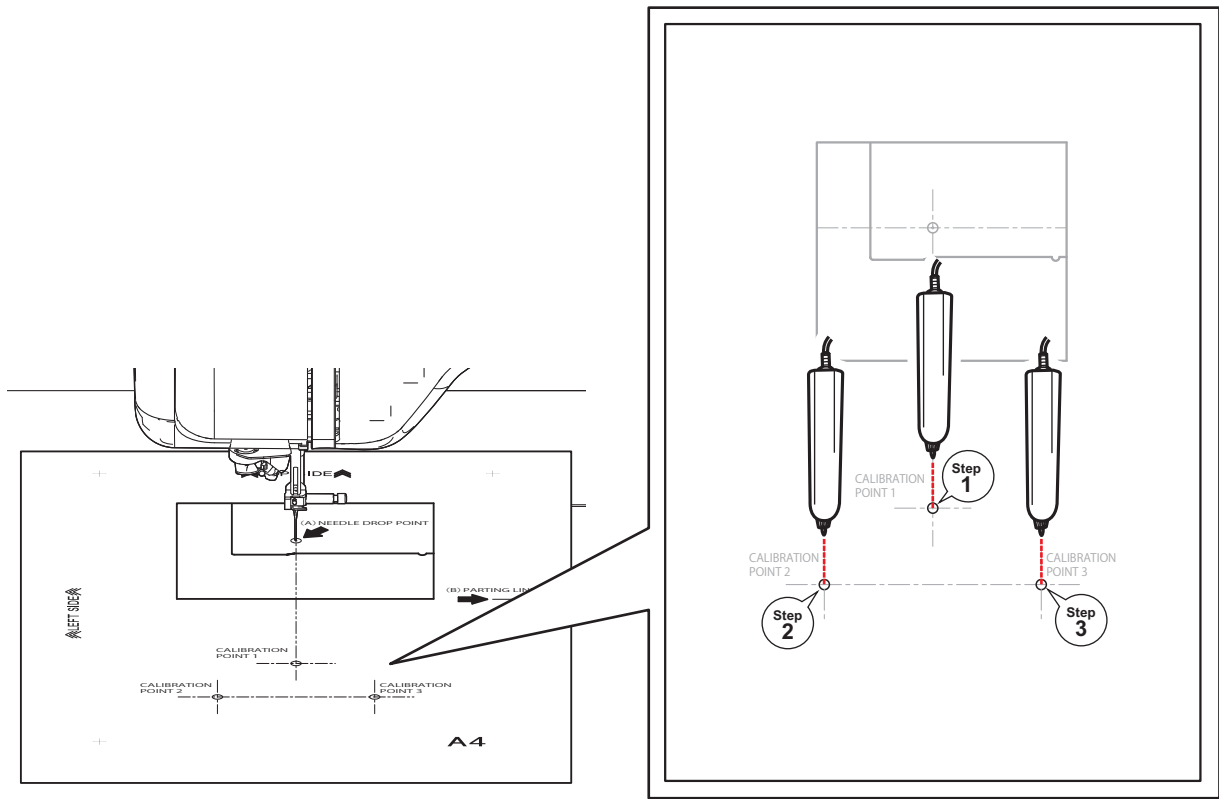


Fig.9

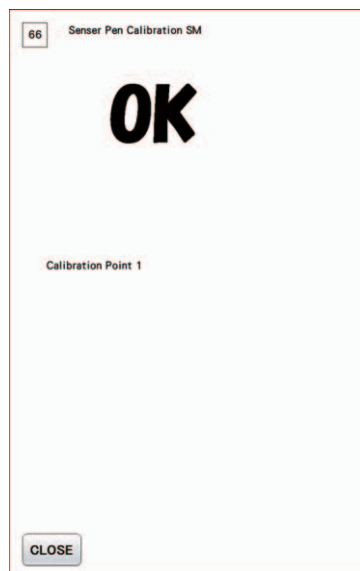


Fig.10

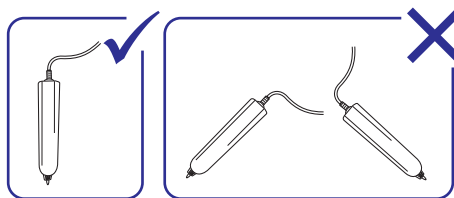


Fig.11

10. After the calibration, check that the sensor pen is working properly by using the sensor pen for stitching in the standard mode.

<Adjustment completed>

[Standard]

The needle drop point should be within a radius of the pointer beam.

[Adjustment]


1. Attach the embroidery foot with LED pointer.


***Key point**



- Be sure to attach embroidery foot with LED pointer by pushing its bottom backward.

2. Set a piece of paper to the machine.

3. Start the test mode, and then select the #37 (Led Pointer Adjustment mode).

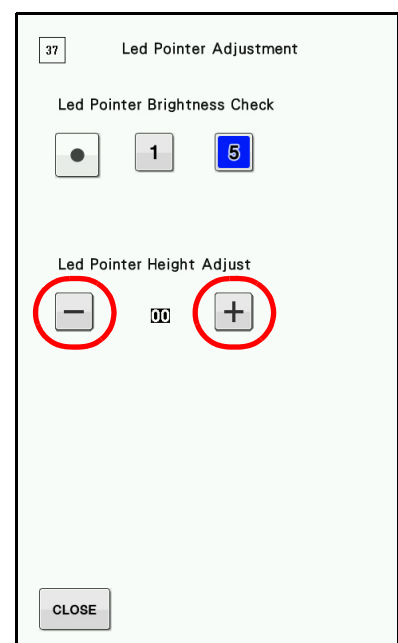
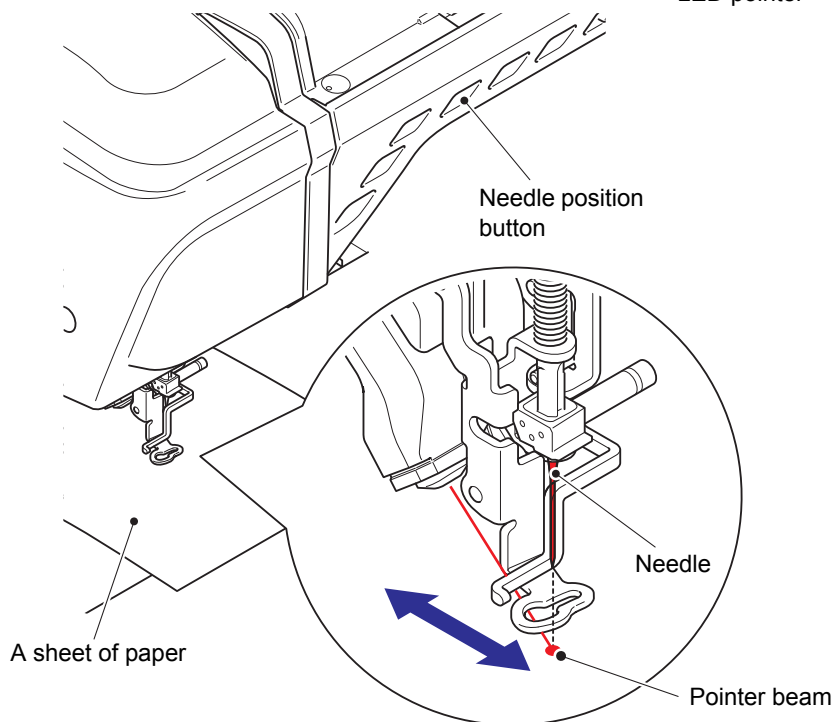
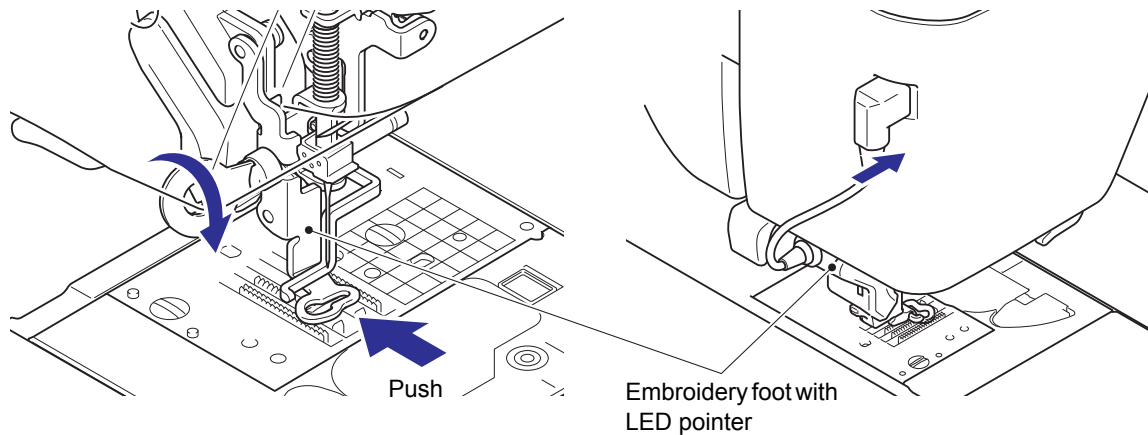
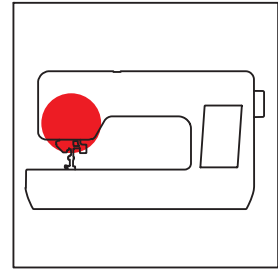
4. Press  (Needle position button) to lower the needle, and make a hole on paper with it.

5. Lift the needle by pressing  (Needle position button) while holding down the paper with a hand.

6. Move pointer beam back and forth by pressing the  or  button under the “Led Pointer Height Adjust” on the screen to adjust the pointer beam position.

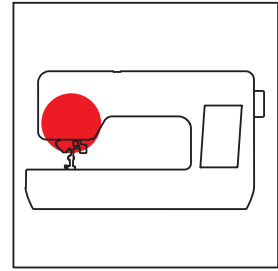
***Key point**

- Be sure to adjust the position by setting “Led Pointer Height Adjust” value within ± 10 .




[Standard]


The length of 100 forward stitches should be 130 mm to 150 mm when operates test mode #39 with dual feed foot attached. Also, the difference in length of 100 forward stitches and 100 backward stitches should be within 5 mm.





[Adjustment]

1. Attach the dual feed foot.
2. Start the test mode, and then select the #39 (DF Check mode).
3. Remove the DF foot assy on the dual feed foot and lower the lever (the belt drops).
4. Set a piece of paper to the machine.
5. Lower the presser foot lever and press  (Start/Stop button). (The machine operates 100 forward stitches and 100 backward stitches.)

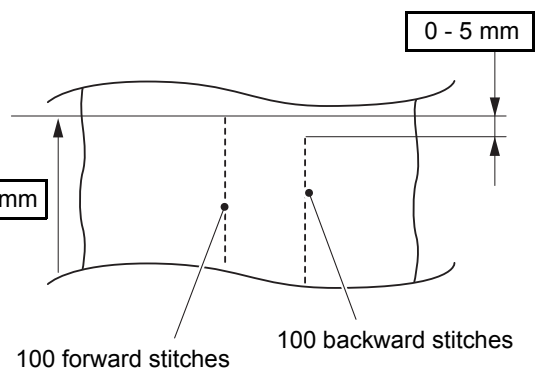
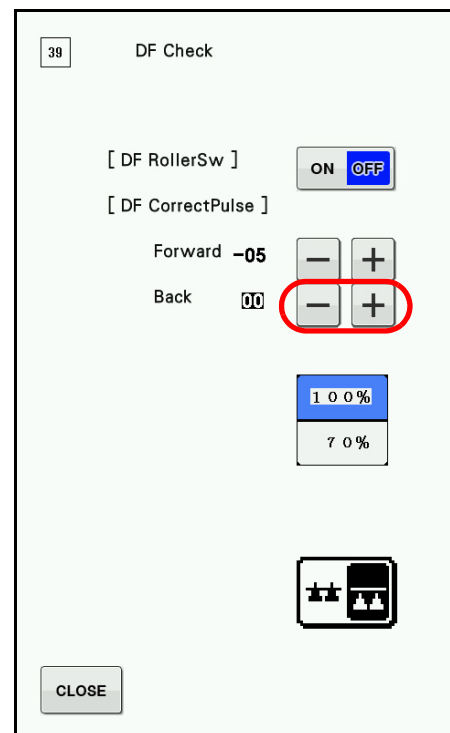
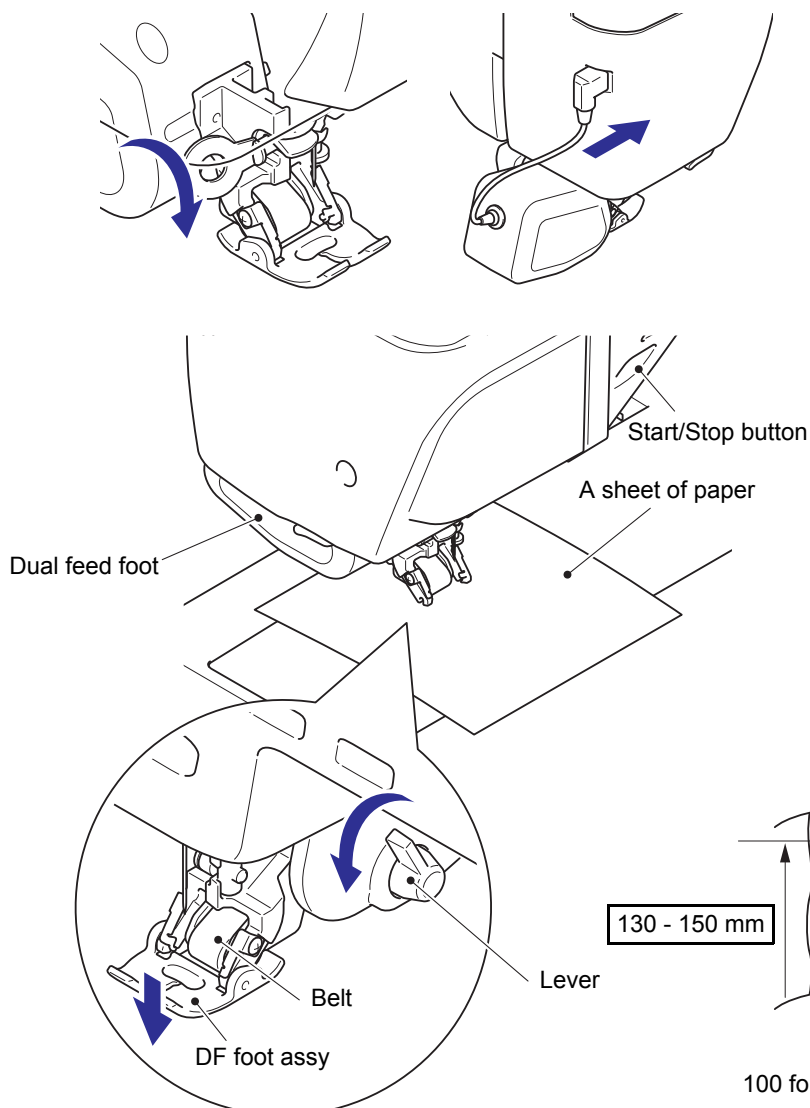
***Note**

- Do not change the feed dog position by pressing the  button (feed dog must stay down).

6. Check the total length of 100 forward stitches and 100 backward stitches.
7. Adjust the length of 100 backward stitches by pressing the  or  button next to "Back" on the screen.

***Note**

- Do not change the setting value for "Forward" from "-05".



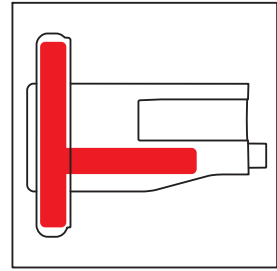
■ X timing belt

[Standard]

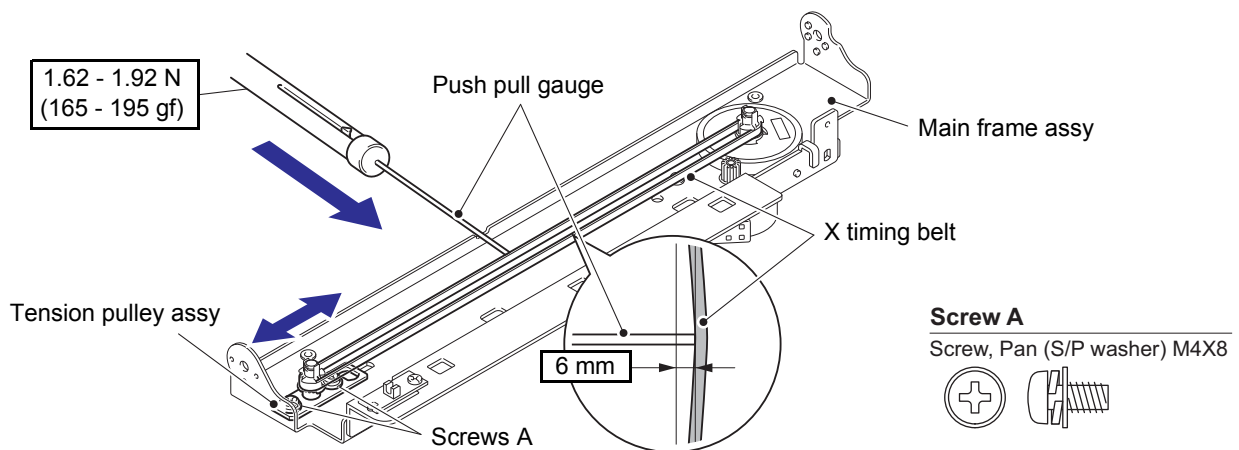
The pushing force to make 6 mm slack at the center of the X timing belt should be 1.62 to 1.92 N (165 to 195 gf).

[Adjustment]

1. Loosen the 2 screws A of the tension pulley assy.
2. Move the tension pulley assy right and left to adjust the X timing belt tension.
3. Tighten the 2 screws A of the tension pulley assy to secure the tension pulley assy to the main frame assy.



XC2277001	Push pull gauge (5N)
-----------	----------------------



■ Y timing belt

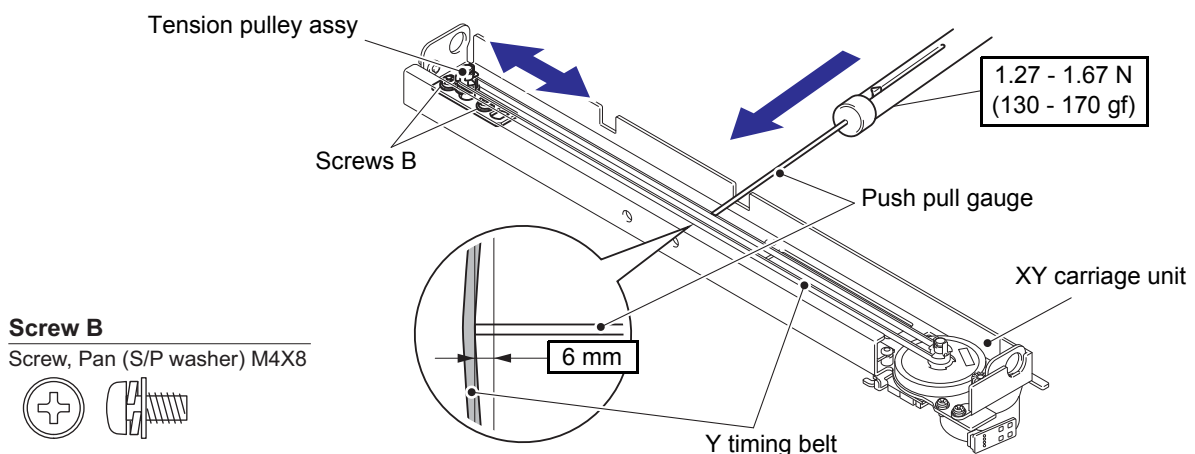
[Standard]

The pushing force to make 6 mm slack at the center of the Y timing belt should be 1.27 to 1.67 N (130 to 170 gf).

[Adjustment]

1. Loosen the 2 screws B of the tension pulley assy.
2. Move the tension pulley assy right and left to adjust the Y timing belt tension.
3. Tighten the 2 screws B of the tension pulley assy to secure the tension pulley assy to the XY carriage unit.

XC2277001	Push pull gauge (5N)
-----------	----------------------



[Standard]


The clearance between the ES main cover assy and the E hoop stay plate assy should be 3.5 ± 0.2 mm (3.3 to 3.7 mm).

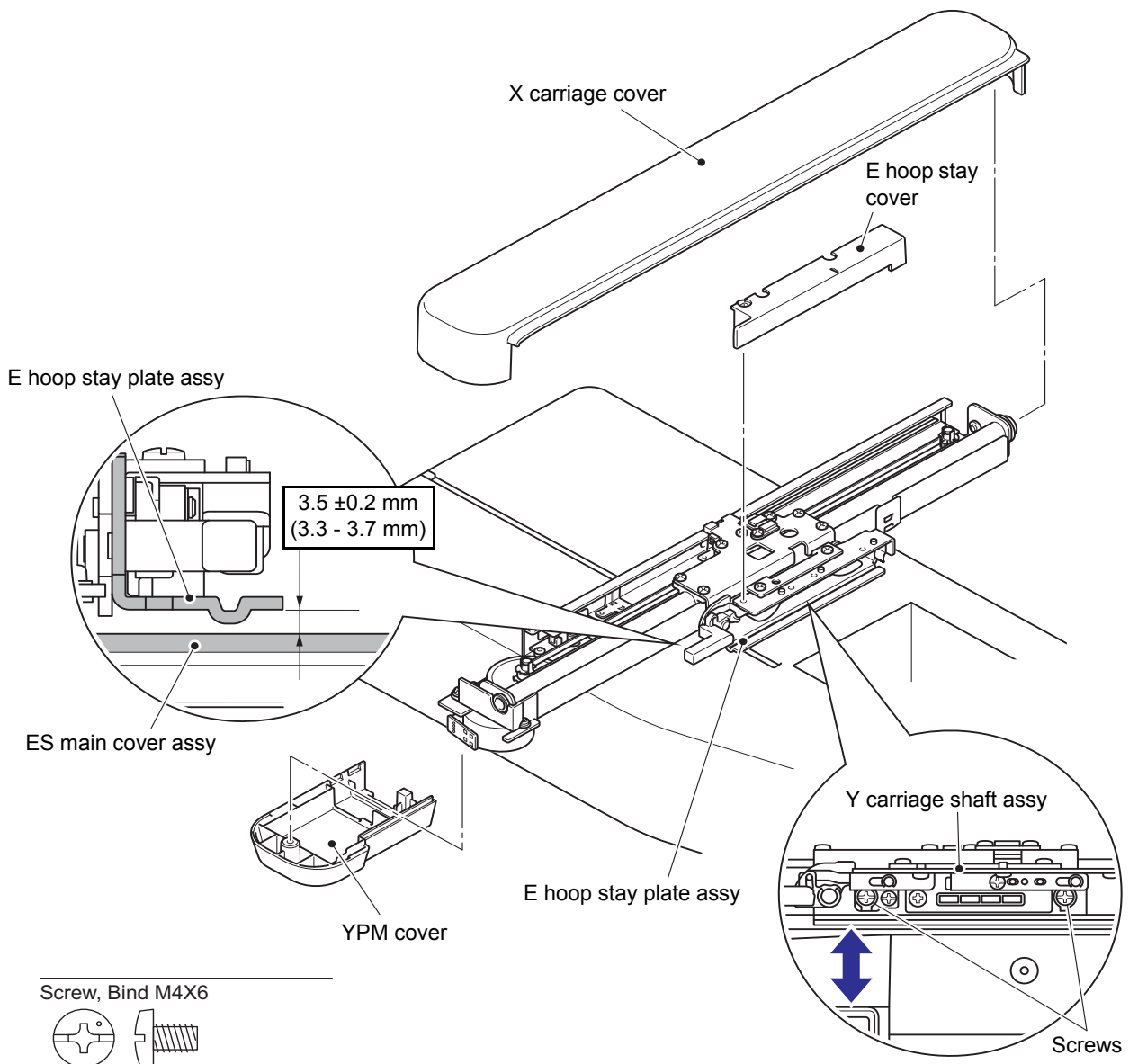
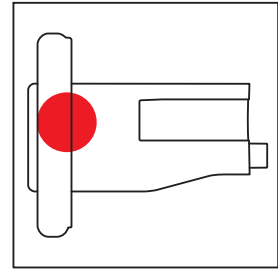
[Adjustment]

1. Attach the embroidery unit to the machine.


***Note**

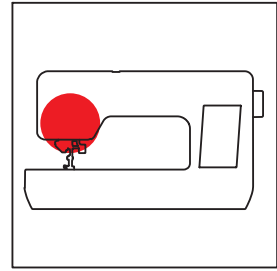
- Be sure to remove the embroidery frame from the embroidery unit.

2. Turn on the machine, and press the  button on the screen (carriage moves automatically).
3. Turn off the machine.
4. Remove the embroidery unit from the machine.
5. Remove the X carriage cover and the YPM cover from the embroidery unit. (Refer to "3-76".)
6. Remove the E hoop stay cover from the embroidery unit. (Refer to "3-77".)
7. Loosen the 2 screws of the E hoop stay plate assy.
8. Adjust the clearance between the ES main cover assy and the E hoop stay plate assy by moving the E hoop stay plate assy up and down.
9. Tighten the 2 screws of the E hoop stay plate assy to secure the E hoop stay plate assy to the Y carriage shaft assy.



[Standard]

In the test mode #23, the needle point should drop into the center of embroidery sheet hole when the needle is lowered by pressing the  button.





[Adjustment]

1. Remove the presser foot.
2. Attach the size 75/11 needle.
3. Turn off the machine, and then attach the embroidery unit to the machine.

***Note**

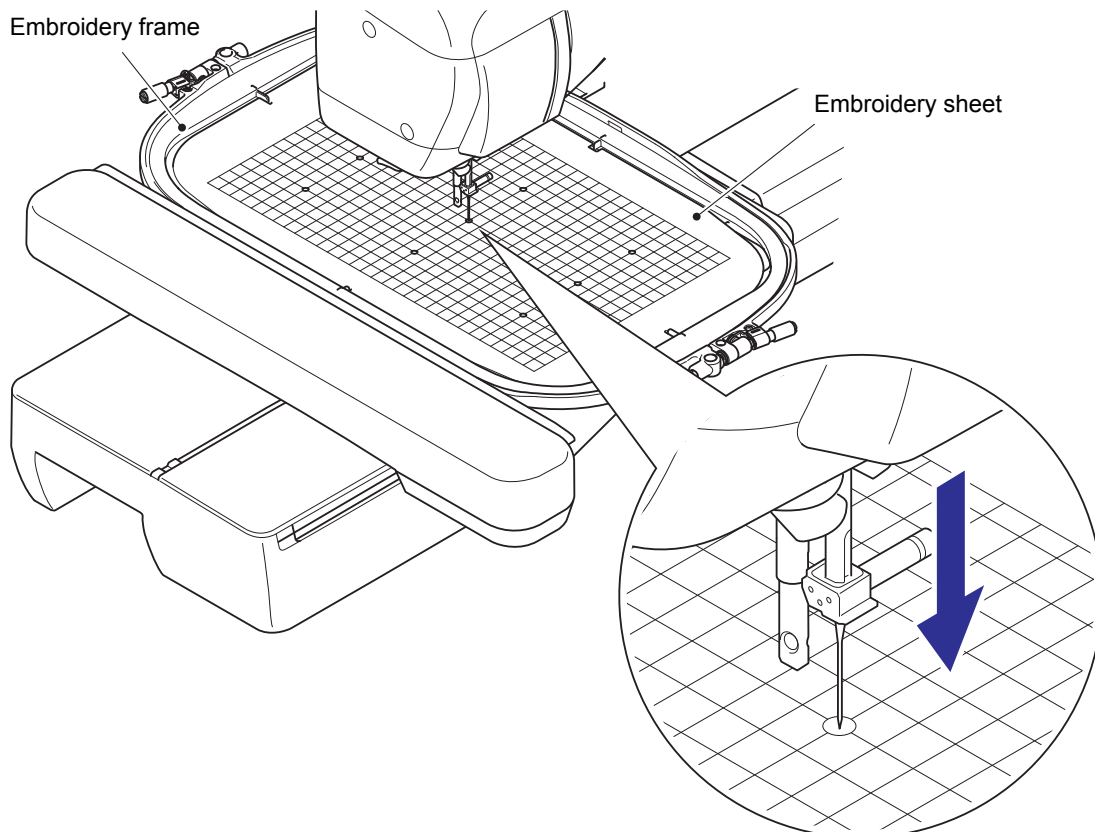
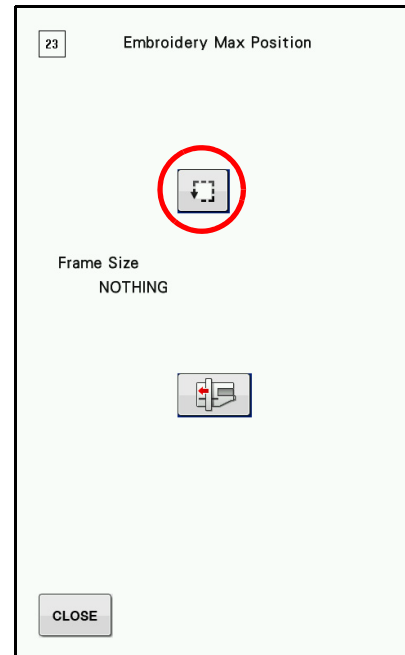
- Be sure to remove the embroidery frame from the embroidery unit beforehand.

4. Start the test mode, and then select the #23 (Embroidery Max Position mode).
5. Attach the extra large embroidery frame (300 x 180 mm, 12 x 7 inch) to the embroidery unit.
6. Put the embroidery sheet on the embroidery frame.
7. Press the  button on the screen (carriage moves automatically).
8. Turn the pulley by hand to drop the needle point to the embroidery sheet and check the position of the needle point.
9. Press the  button on the screen to close the test mode #23.

(Adjustment completed)

***Key point**

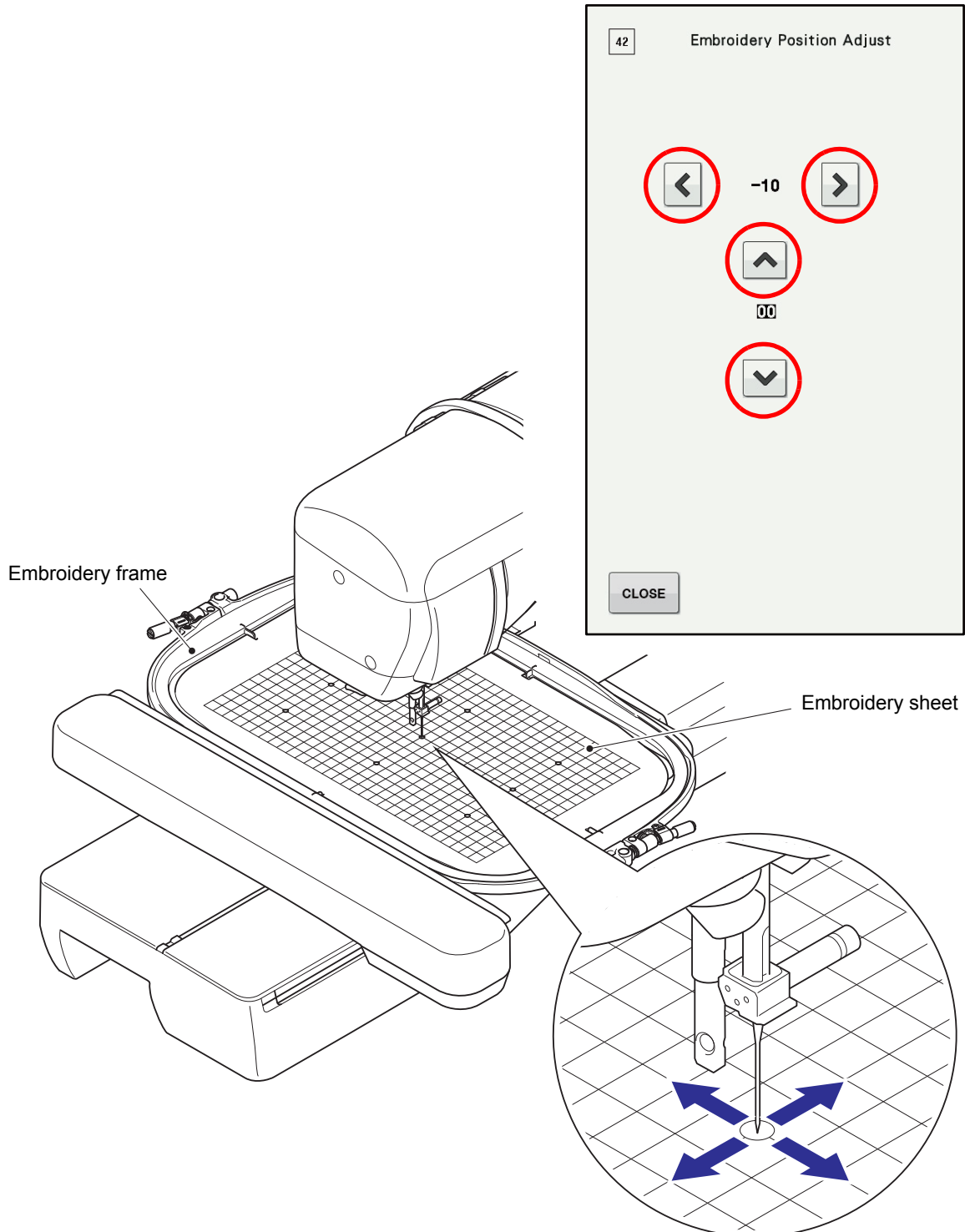
- To adjust the needle point position, refer to the next page.



<To next page>

<From previous page>

- If the needle point doesn't drop into the hole on the center of the embroidery sheet, adjust the needle point position according to procedures below.
1. Select the #42 (Embroidery Position Adjust mode).
 2. Press the position adjustment button on the screen to adjust the needle point position.
 3. Turn off the machine to input the set value to the machine.
 4. Remove the embroidery frame.
 5. Go back to procedure 4 on the previous page and check the needle point position.



This adjustment must be operated when:

- Feed module or needle-presser module is replaced.
- F INIT PCB Assy or Z INIT PCB Assy is replaced or reassembled.

[Standard]

In the test mode without front cover, F and Z pulse motor phase should be automatically adjusted by pressing switch #3 and #4 on the main PCB Assy.

[Adjustment]

1. Remove the front cover. (Refer to “2-9”.)
2. Turn on the machine while pushing the switch #2 on the main PCB Assy (machine starts buzzer sound twice).

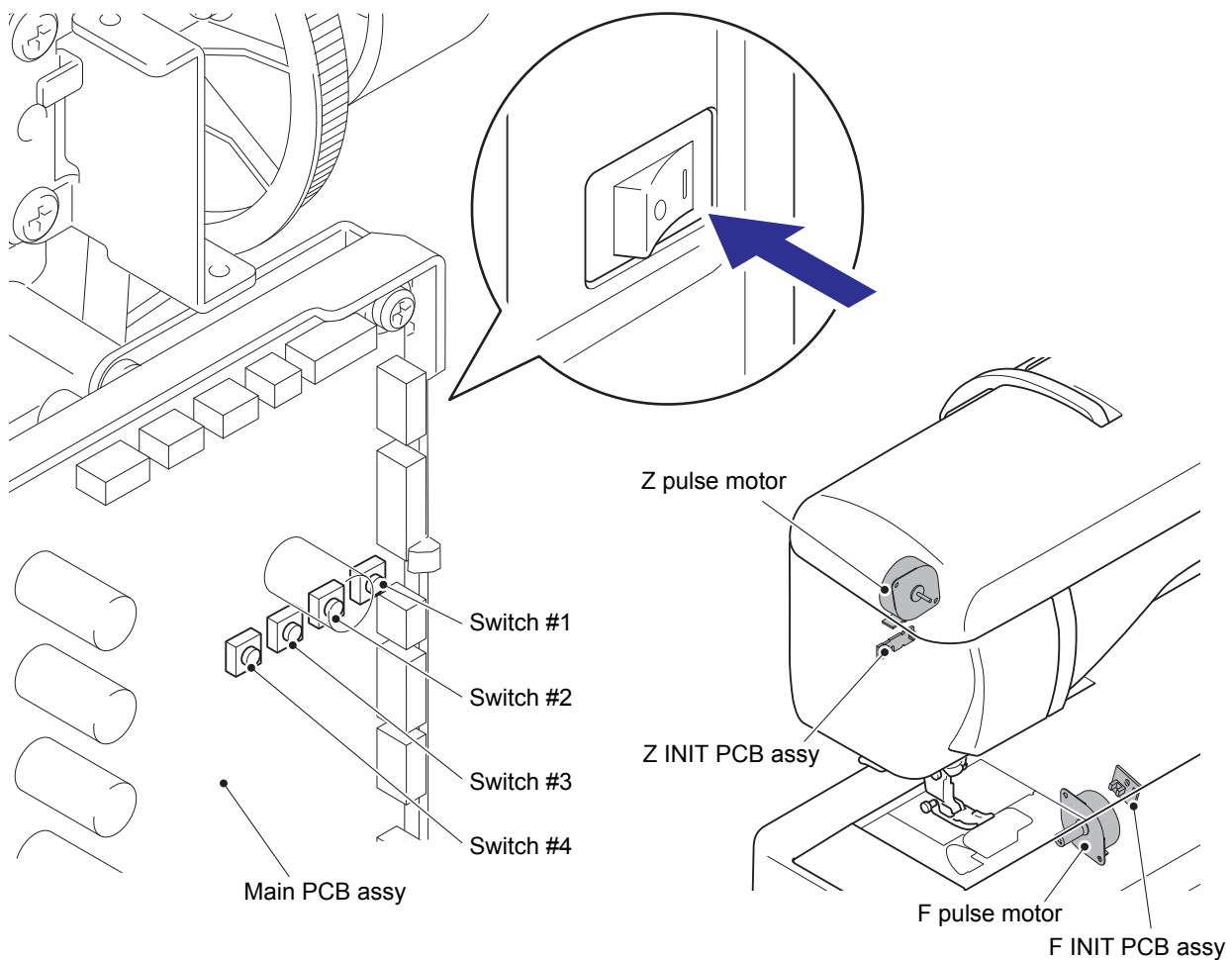
*Key point

- If it starts the buzzer sound continuously, stop the sound by pressing any switch on the main PCB Assy.

3. Press the switch #1 on the main PCB Assy several times to lower the needle bar.
4. Press the switch #3 on the main PCB Assy (machine automatically adjust F pulse motor phase).
5. Press the switch #1 on the main PCB Assy to raise the needle bar.
6. Press the switch #4 on the main PCB Assy (machine automatically adjust Z pulse motor phase).
7. Press the switch #1 on the main PCB Assy.
8. Turn off the machine.
9. Attach the front cover. (Refer to “2-67”.)

*Note

- Be sure to operate “4-31 Feed forward/backward” and “4-19 Left base line needle drop” adjustments after this adjustment.



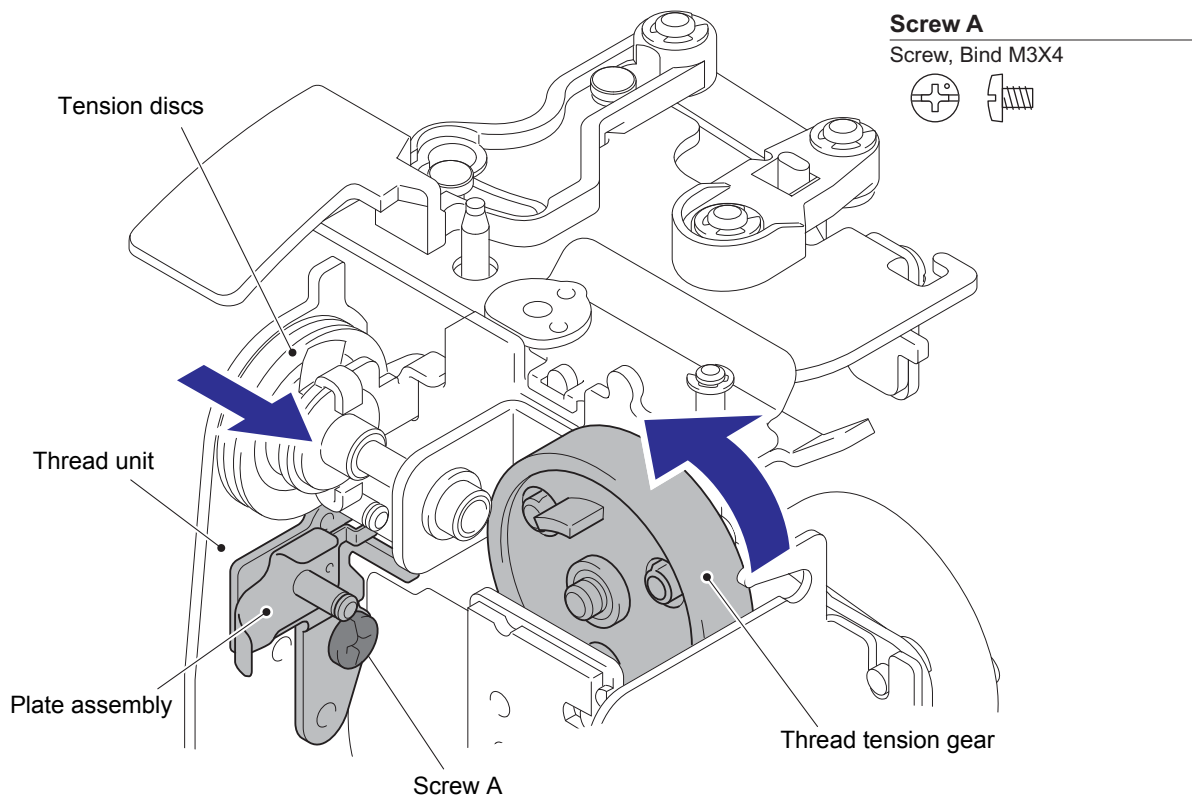
Be sure to operate this adjustment when the thread take up spring or thread catching case A / B is replaced.

[Standard]

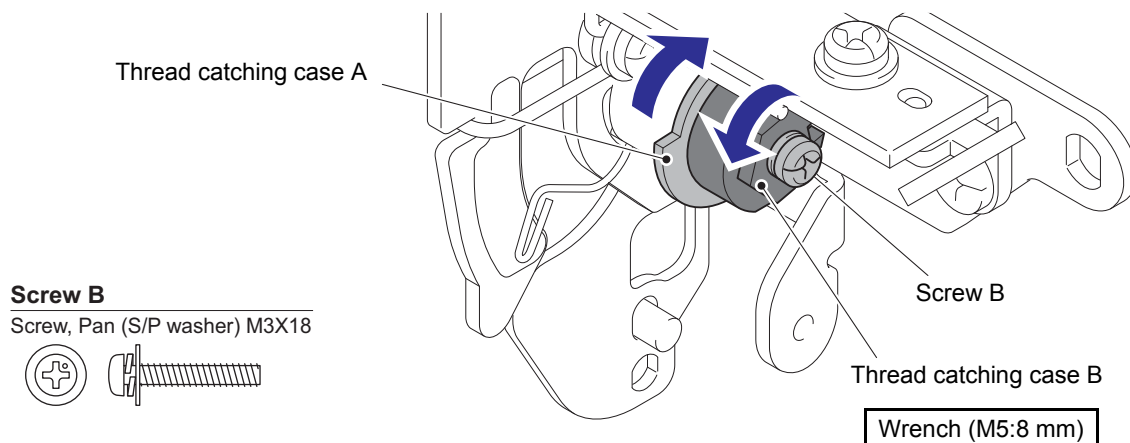
The thread take up spring tension should be 0.15 to 0.19 N (15 to 19 gf) when the thread take up spring is pulled straight up by thread.

[Adjustment]

1. Remove the thread unit from the arm bed. (Refer to "2-23".)
2. Remove the screw A of the plate assembly, and then remove the plate assembly from the thread unit.
3. Turn the thread tension gear in anti-clockwise direction to open the tension discs.



4. Loosen the screw B of the thread catching case B.
5. While holding the protrusion of the thread catching case A in clockwise direction, fully turn the thread catching case B with wrench (M5:8 mm) in anti-clockwise direction.



<To next page>

<From previous page>

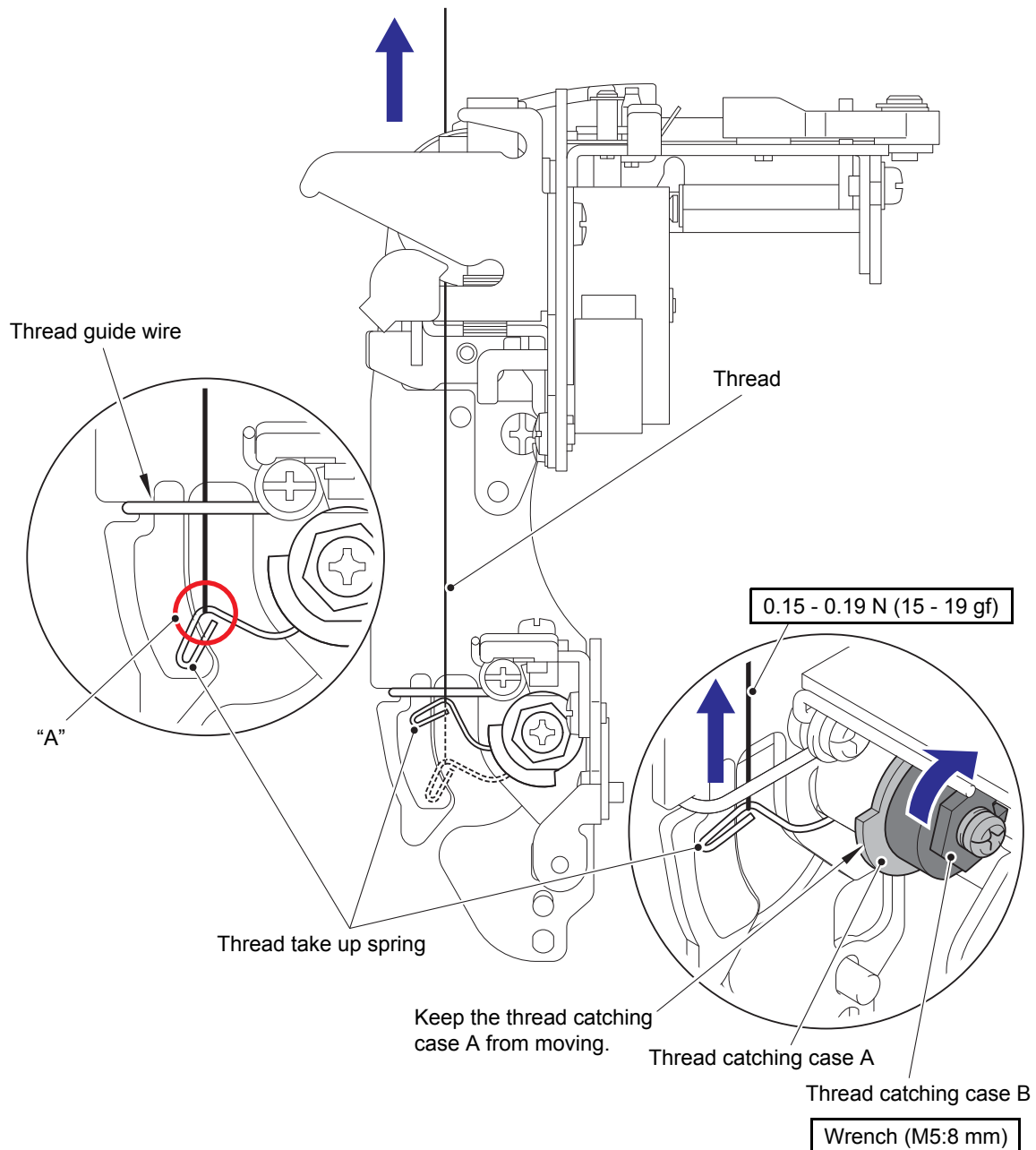
6. Tie thread at the point "A" of the thread take up spring and pass the thread into the thread guide wire.
7. Pull thread straight up with the tension gauge, and check tension when the thread take up spring is moved to the position of the thread guide wire.
8. While holding down the thread catching case A protrusion, turn the thread catching case B in clockwise direction with wrench to adjust the thread take up spring tension.

***Key point**

- When adjusting the tension, always turn the thread catching case B in clockwise direction.
- In case the tension gets lower than 0.15 N (15 gf), adjust again by fully turning the thread catching case B with wrench in anti-clockwise direction while holding the protrusion at thread catching case A in clockwise direction.

XA9153001

Tension gauge 30 (0.3N)



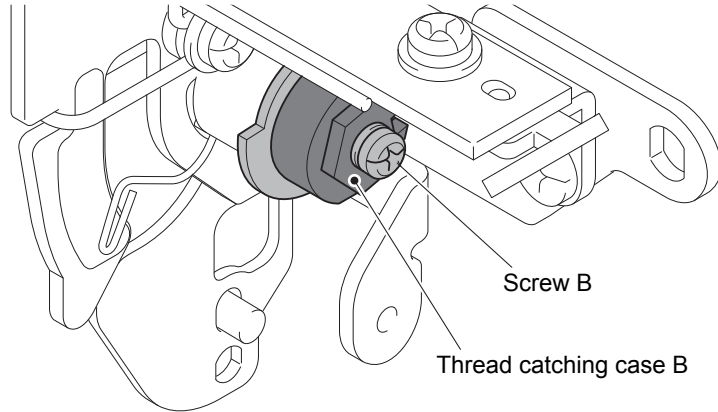
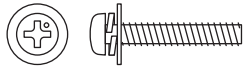
<To next page>

<From previous page>

9. Tighten the screw B of the thread catching case B to secure the thread catching case B.
10. Attach the plate assembly to the thread unit with the screw A.
11. Attach the thread unit to the arm bed. (Refer to "2-53".)

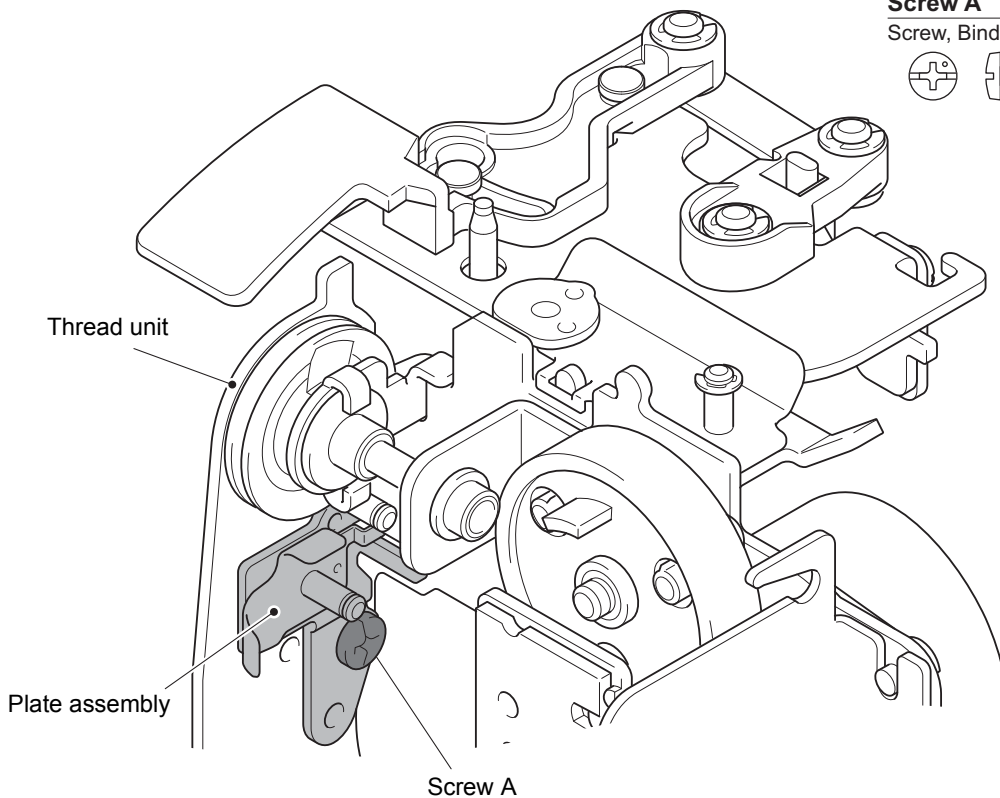
Screw B

Screw, Pan (S/P washer) M3X18



Screw A

Screw, Bind M3X4

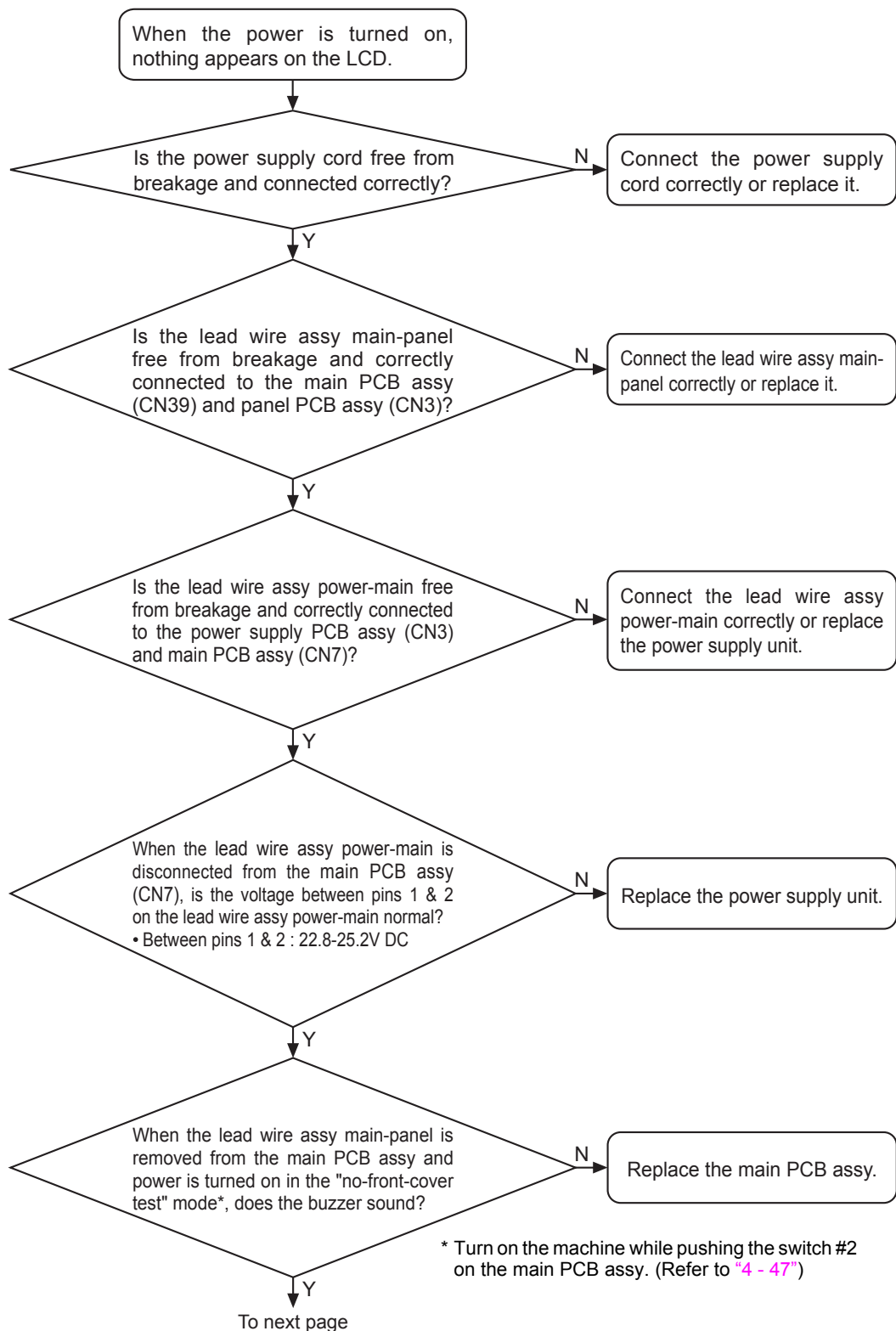


5 Failure Investigation for Electronic Parts

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

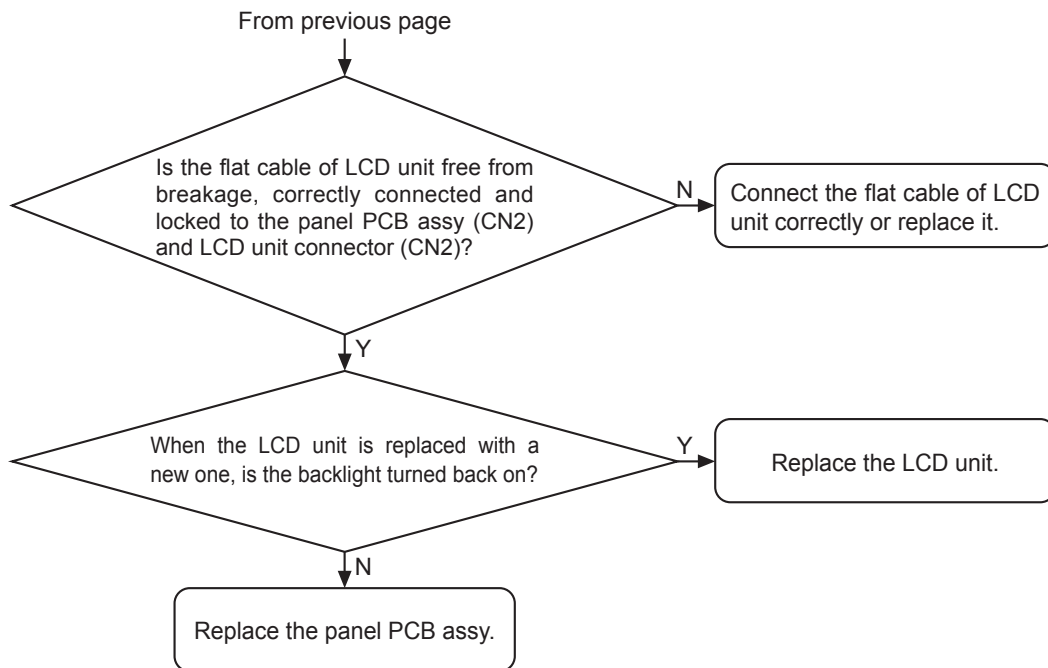
Error message list	5 - 2
Power does not come on	5 - 3
Pulse motors do not return to original position	5 - 5
Touch panel does not work	5 - 7
Main motor does not turn	5 - 8
Main motor rotation error	5 - 10
Cannot sew pattern normally	5 - 11
Cannot sew button holes normally	5 - 12
Stitch length and zigzag width cannot be adjusted manually ...	5 - 13
Problems with vertical needle movement and reverse stitching	5 - 14
Does not operate with foot controller	5 - 15
Needle bar release does not work normally	5 - 16
Thread tensioning does not go well	5 - 17
Thread cutter does not work normally	5 - 18
Bobbin winder motor does not rotate	5 - 19
LED lamp does not light	5 - 20
Lower thread detection does not work normally	5 - 22
Upper thread sensor does not work normally	5 - 23
Automatic needle threader does not work correctly	5 - 24
Presser foot lifter does not work correctly	5 - 26
USB host does not work properly	5 - 29
USB function does not work properly	5 - 30
Sound does not work	5 - 31
Embroidery unit does not operate normally	5 - 32
Unable to detect or lock frame	5 - 34
Line marker does not operate normally	5 - 36
Sensor pen does not operate normally	5 - 37
Dual feed foot does not operate normally	5 - 39
Embroidery pointer does not operate normally	5 - 41
Error is displayed	5 - 43
Replacement of main PCB assy or panel PCB assy	5 - 47
Correspondence table of “Model” and “Printed-circuit board”	5 - 48

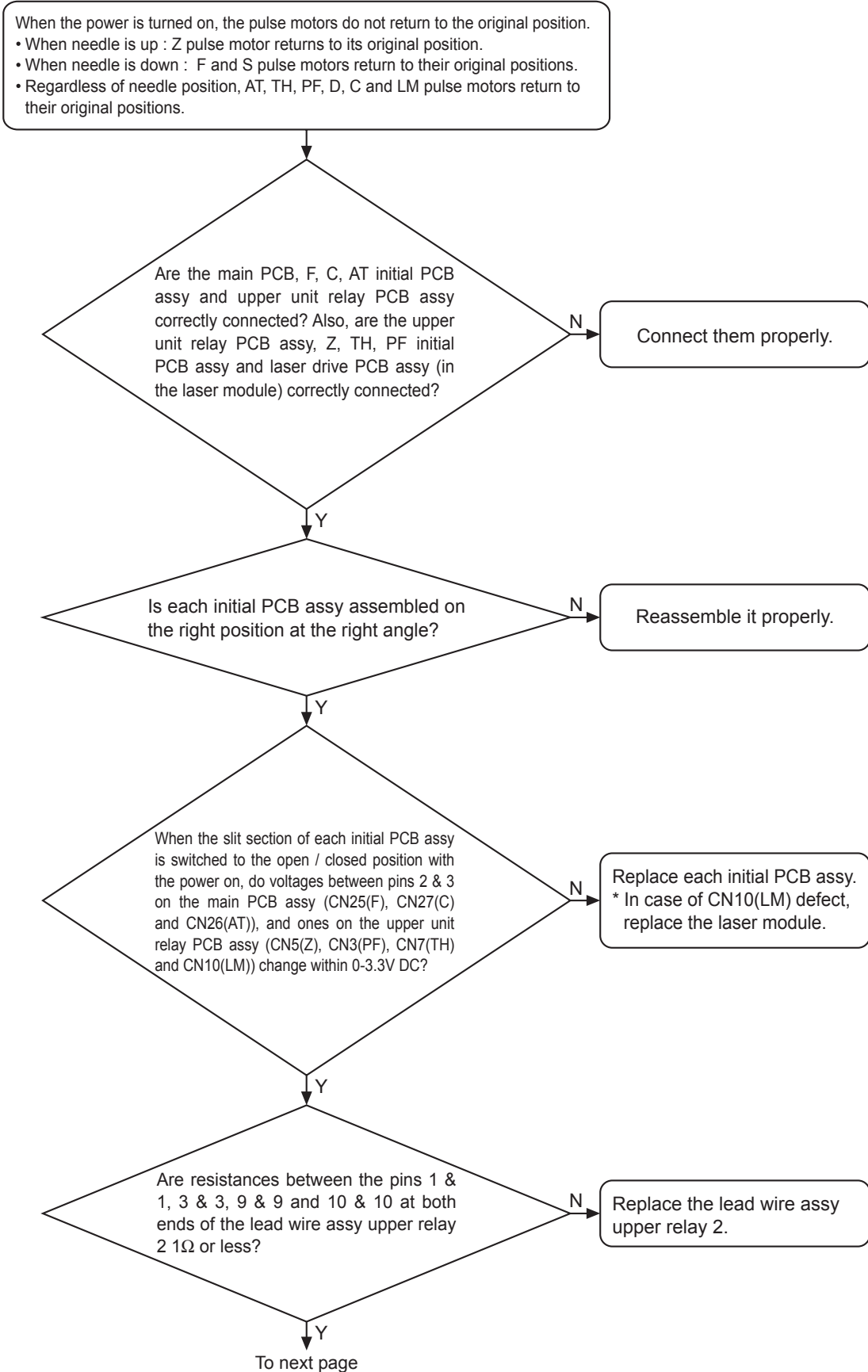
Error display	Cause		Remedy
F01	Abnormal rotation in main motor.		(5 - 43)
F02	Key stuck in the pressed position with power on (operation system SW).		(5 - 44)
F05	Dirty speed sensor.		(5 - 45)
F06	NP sensor disconnected.		(5 - 45)
F07	Speed VR disconnected.		(5 - 46)
The safety device has been activated. Is the thread tangled? Is the needle bent?	Main motor does not rotate.		(5 - 8)
A malfunction occurred. Turn the machine off, the on again *-PM	Each pulse motor has not returned to its original position.		(5 - 5)
A malfunction occurred. Turn the machine off, the on again IIC_*_UNIT	Error in each IIC unit	• Each pulse motor has not returned to its original position.	(5 - 5)
		• Unable to detect or lock frame.	(5 - 34)
		• Embroidery pointer does not operate normally.	(5 - 41)
		• Dual feed foot does not operate normally.	(5 - 39)



Failure Investigation
for Electronic Parts

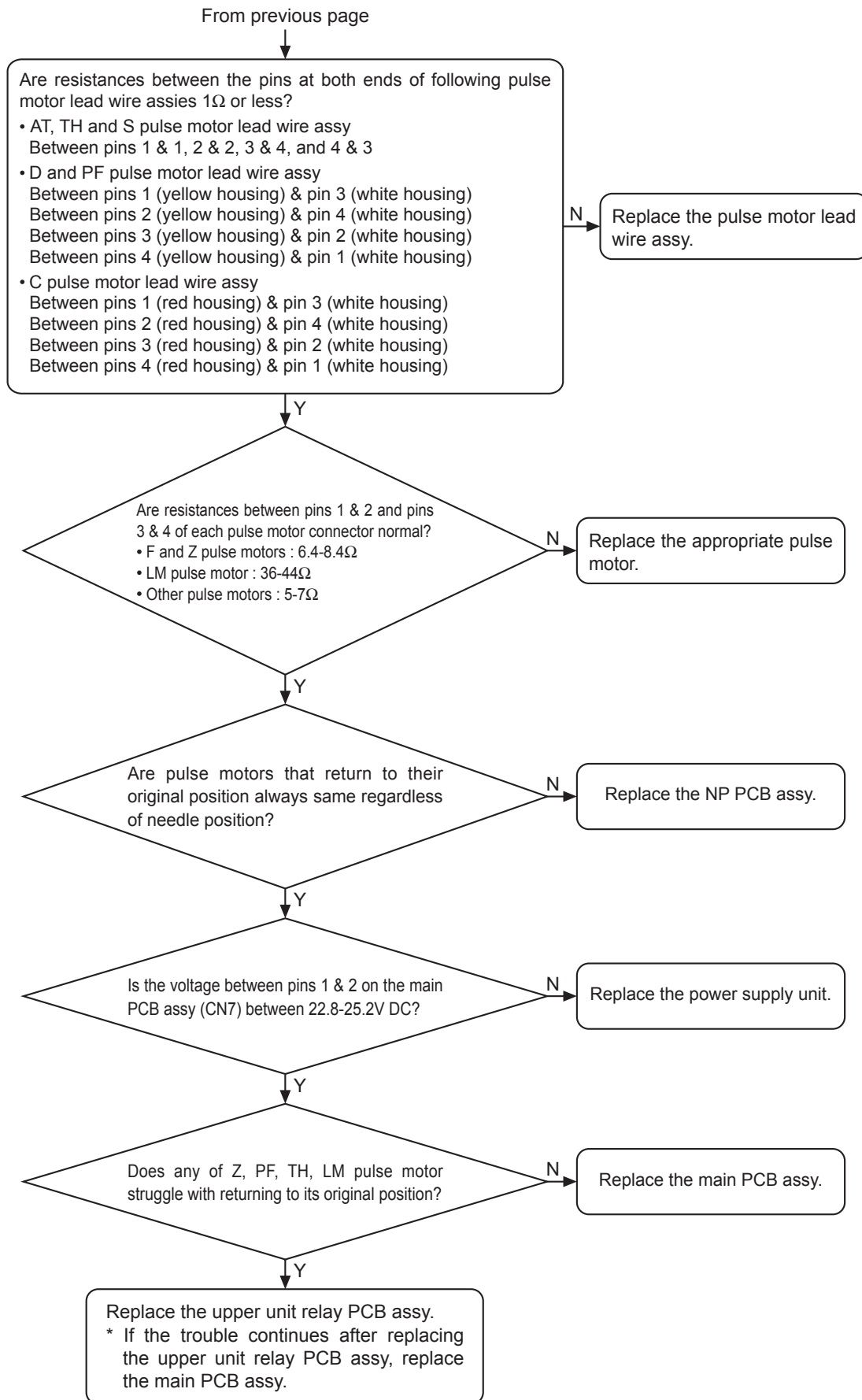
Failure Investigation
for Electronic Parts





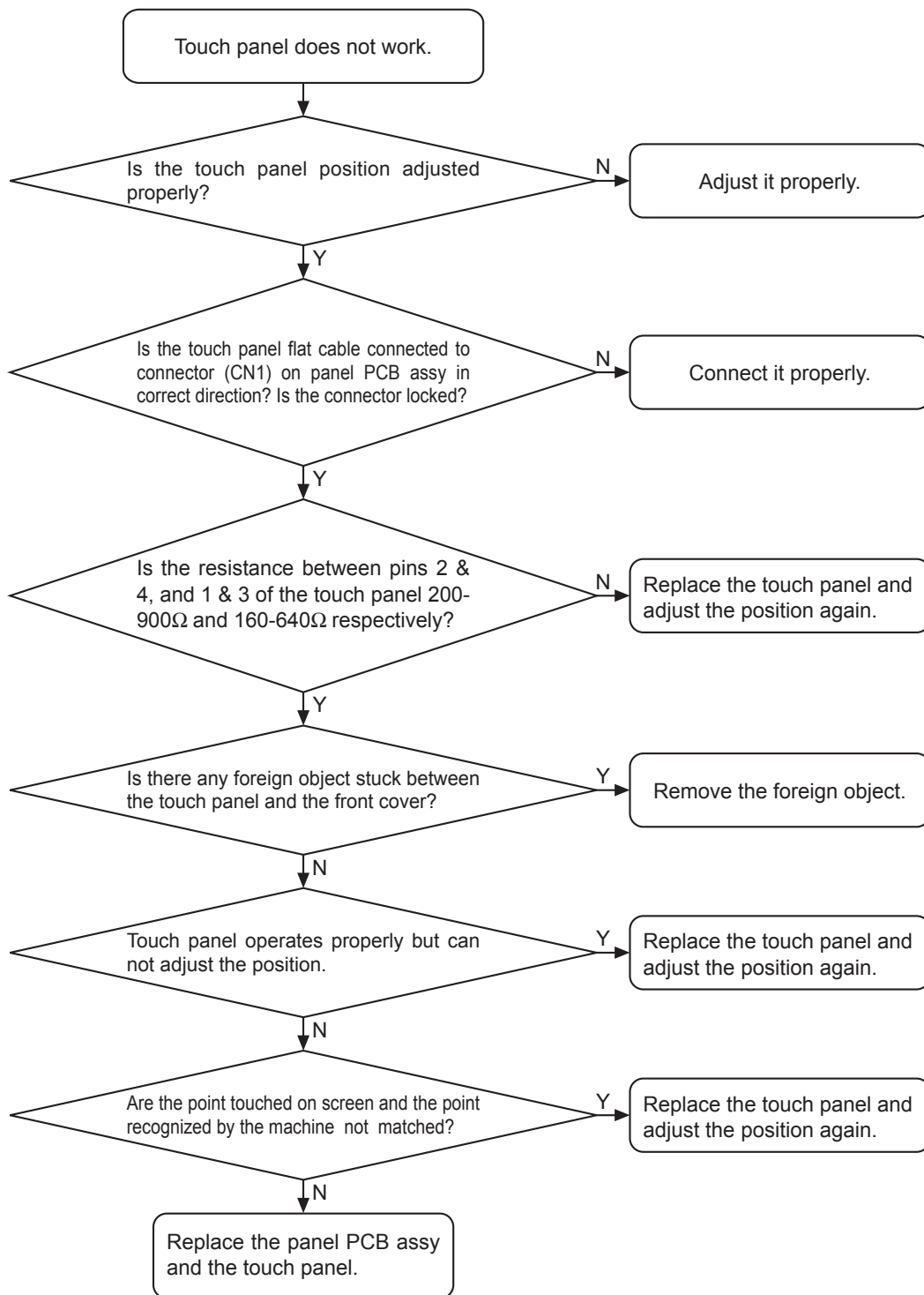
Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts



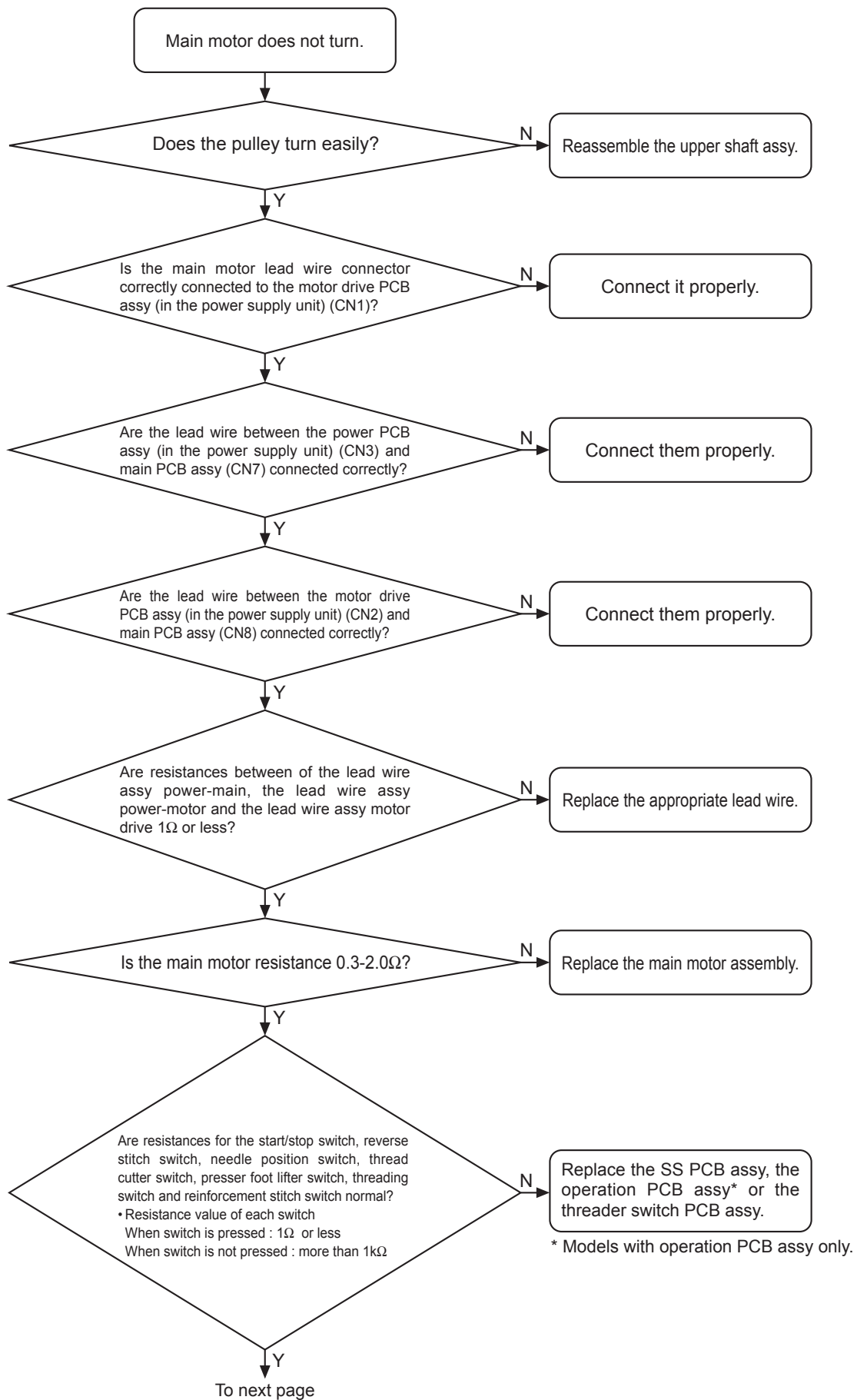
Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts



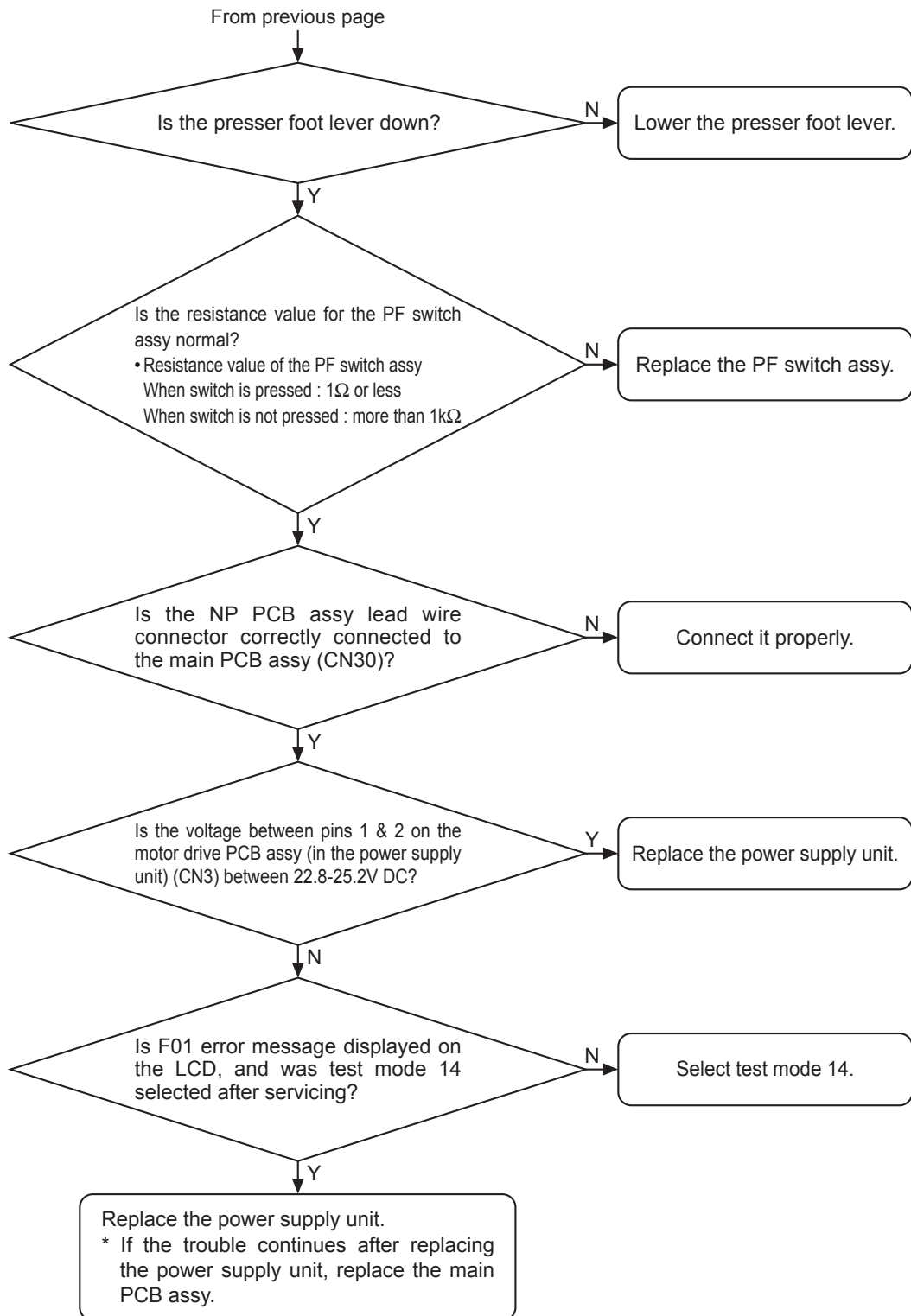
Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts



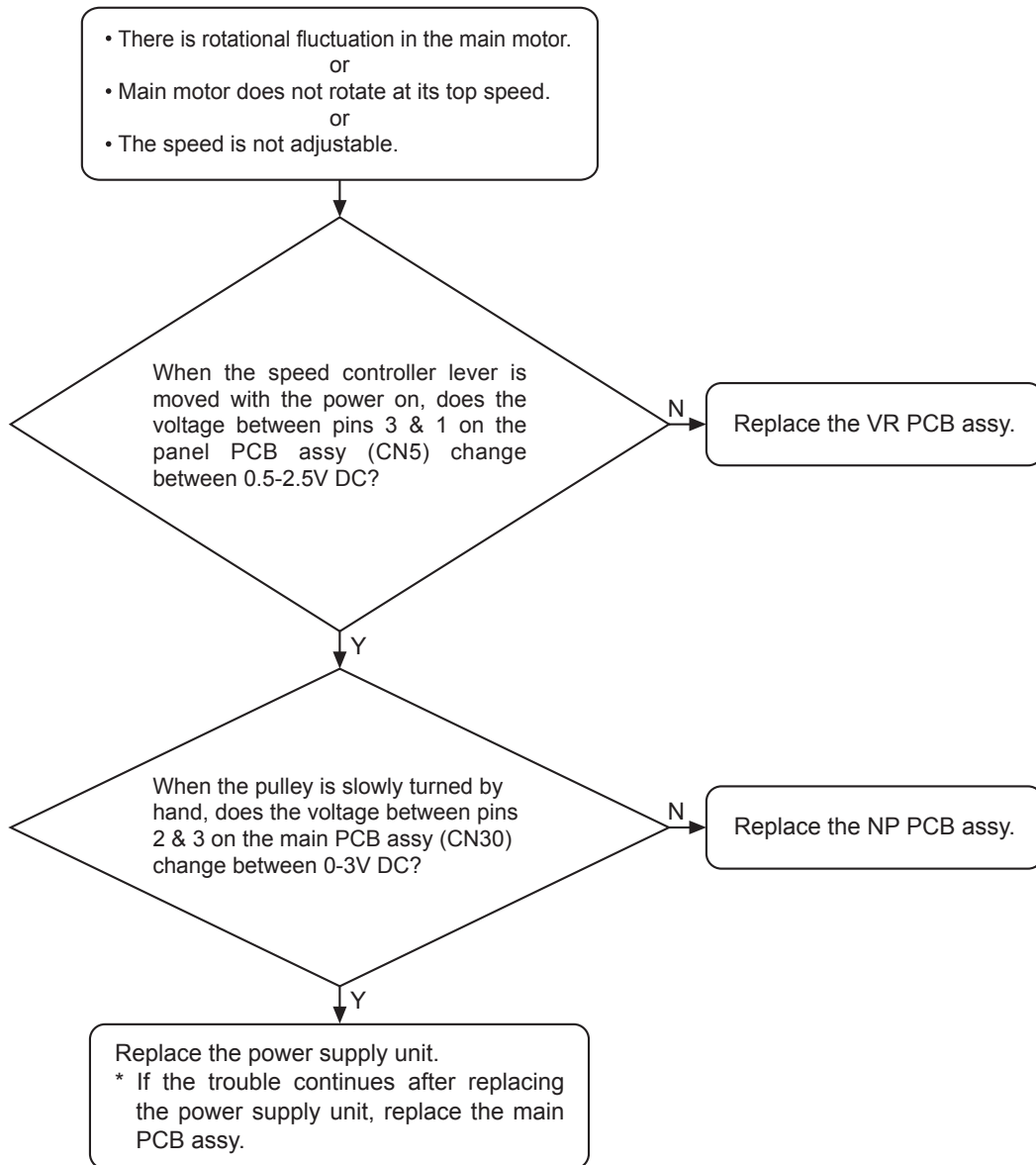
Failure Investigation
for Electronic Parts

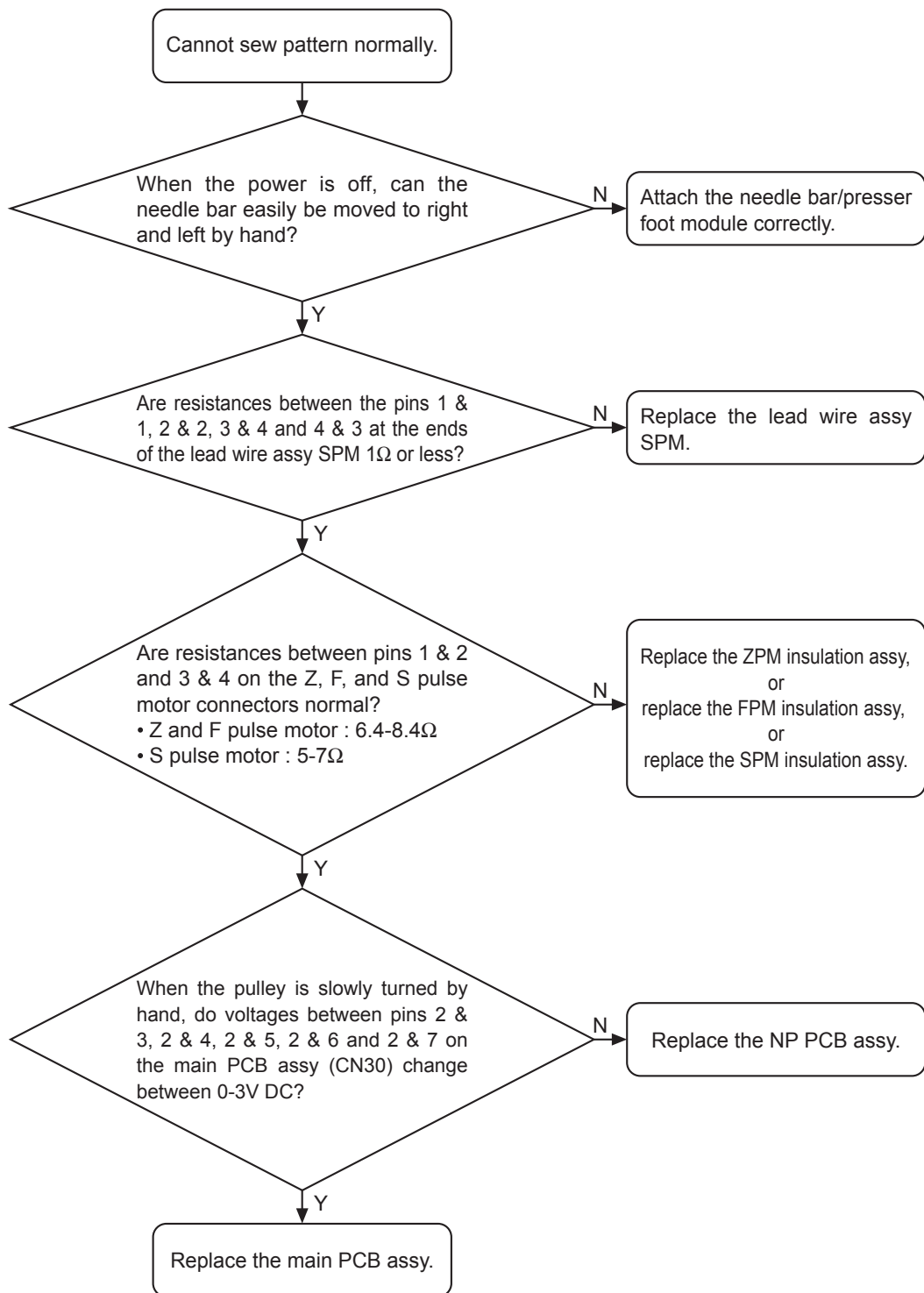
Failure Investigation
for Electronic Parts



Failure Investigation
for Electronic Parts

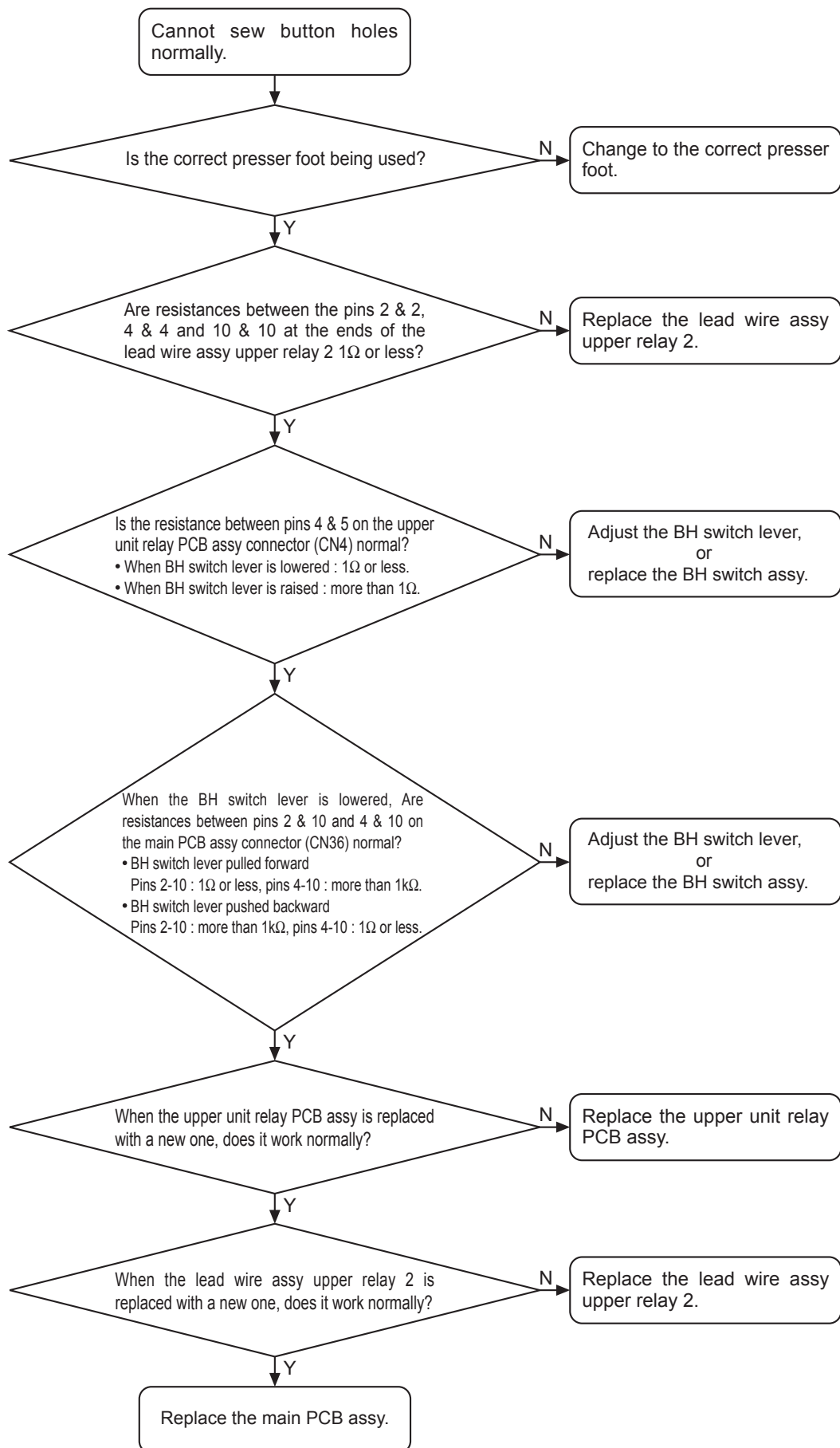
Failure Investigation
for Electronic Parts





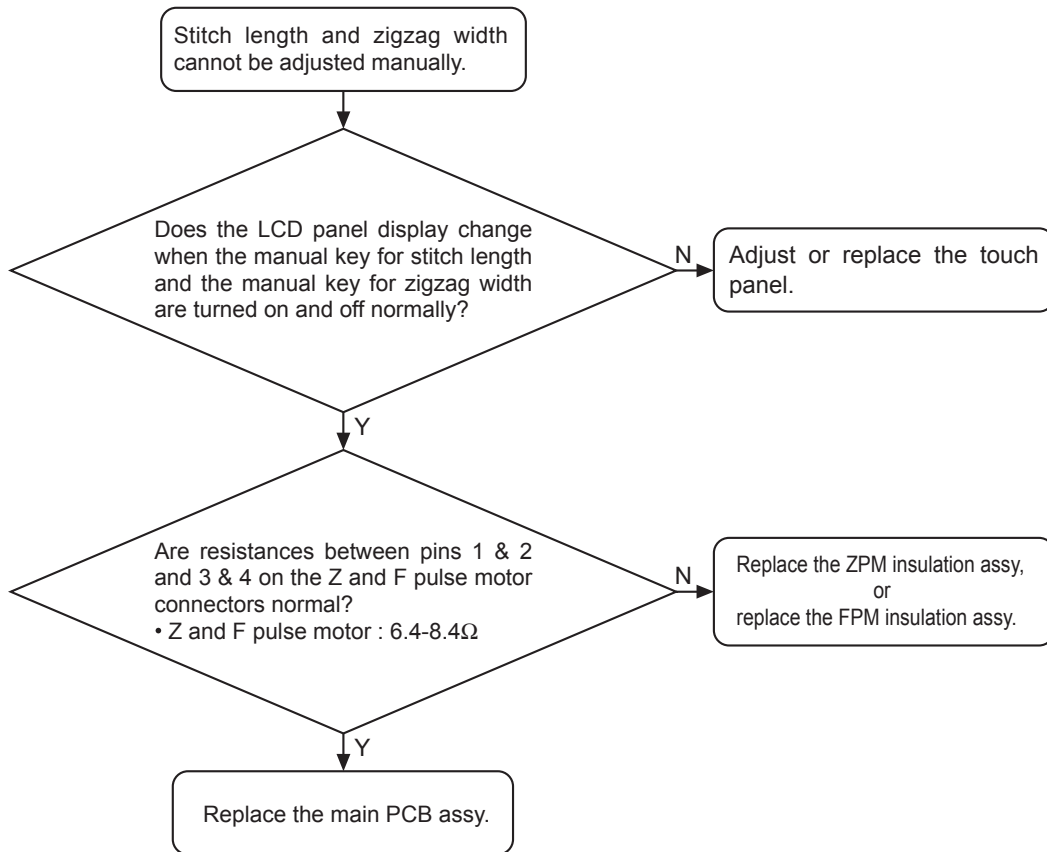
Failure Investigation
for Electronic Parts

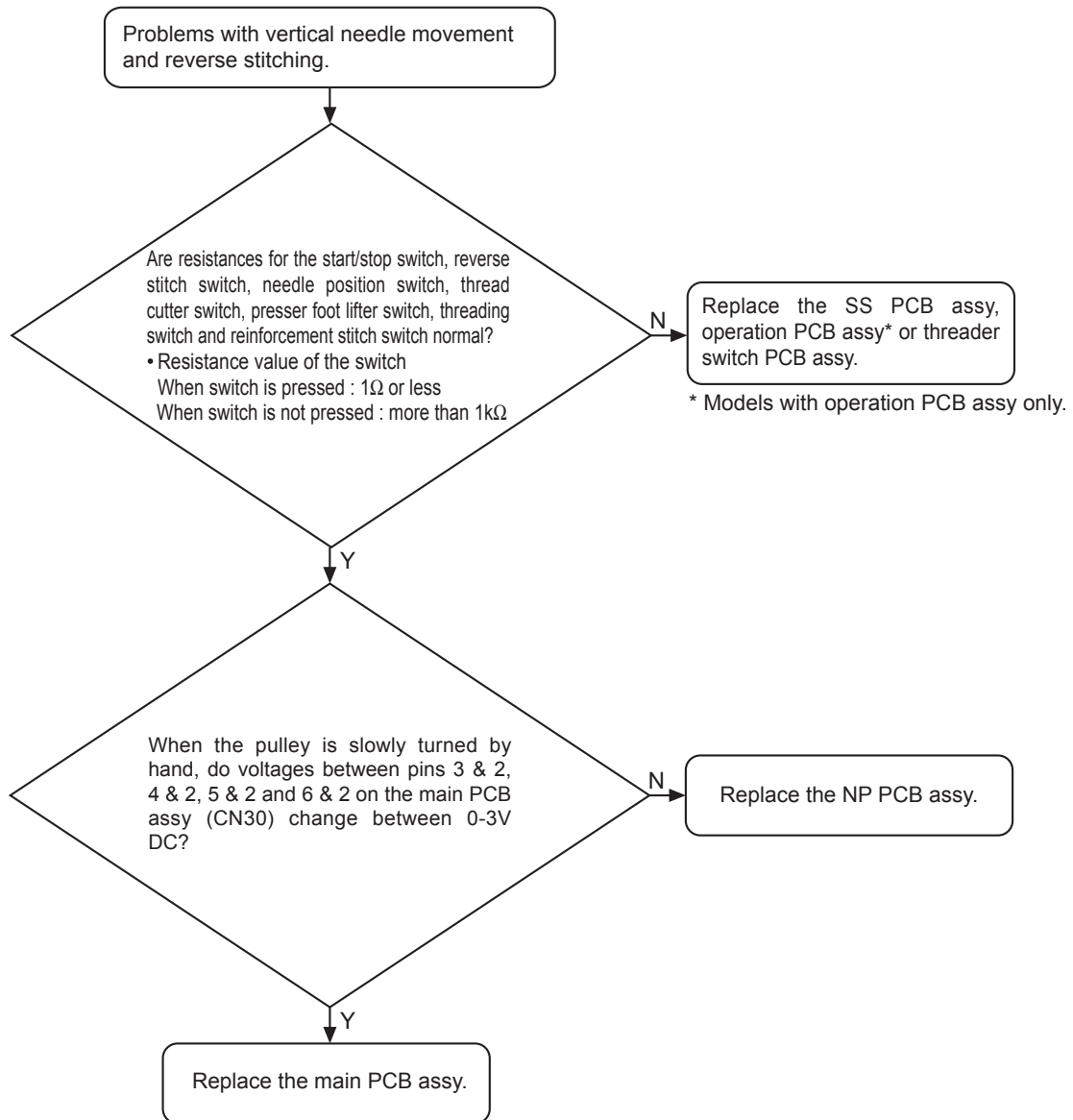
Failure Investigation
for Electronic Parts

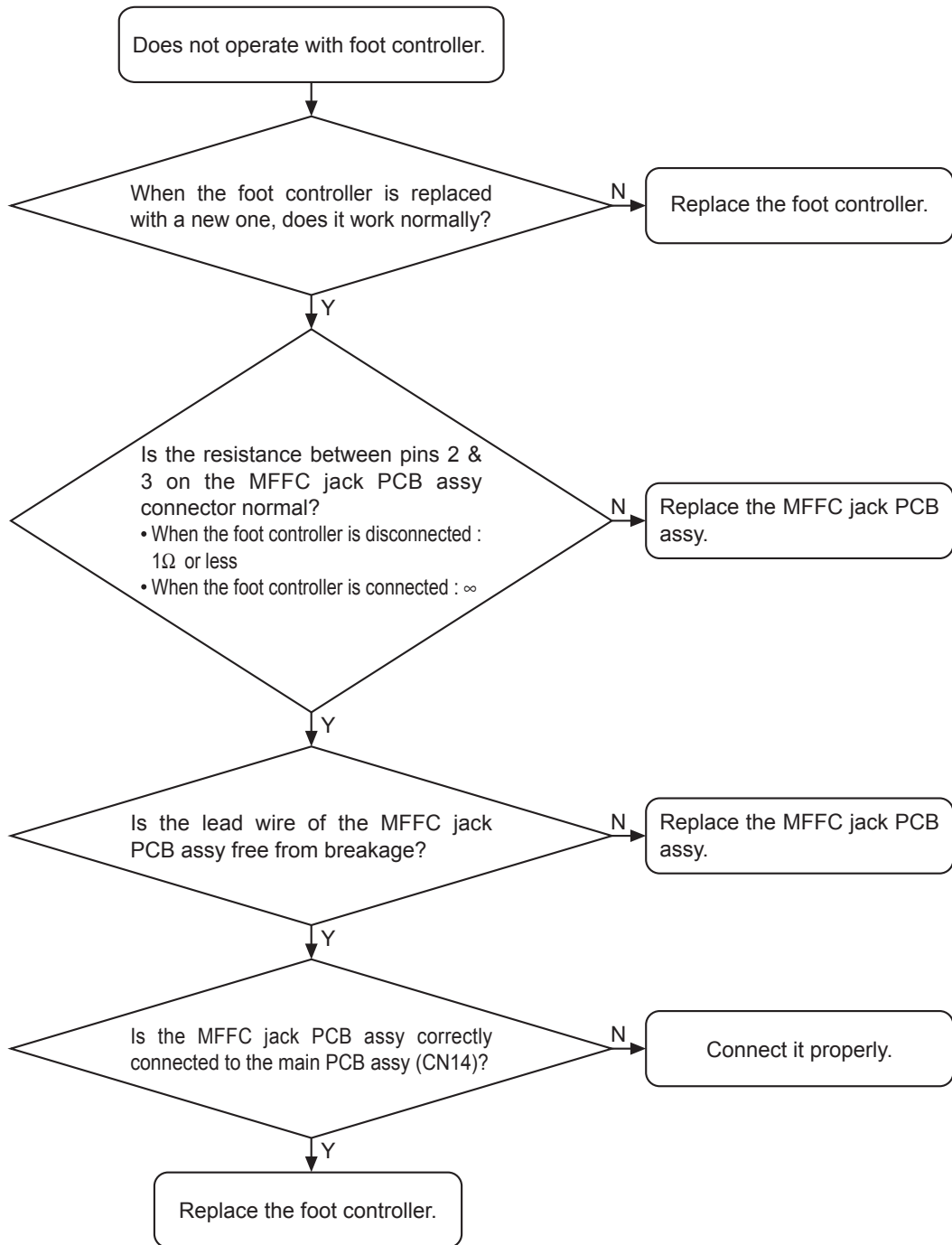


Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts

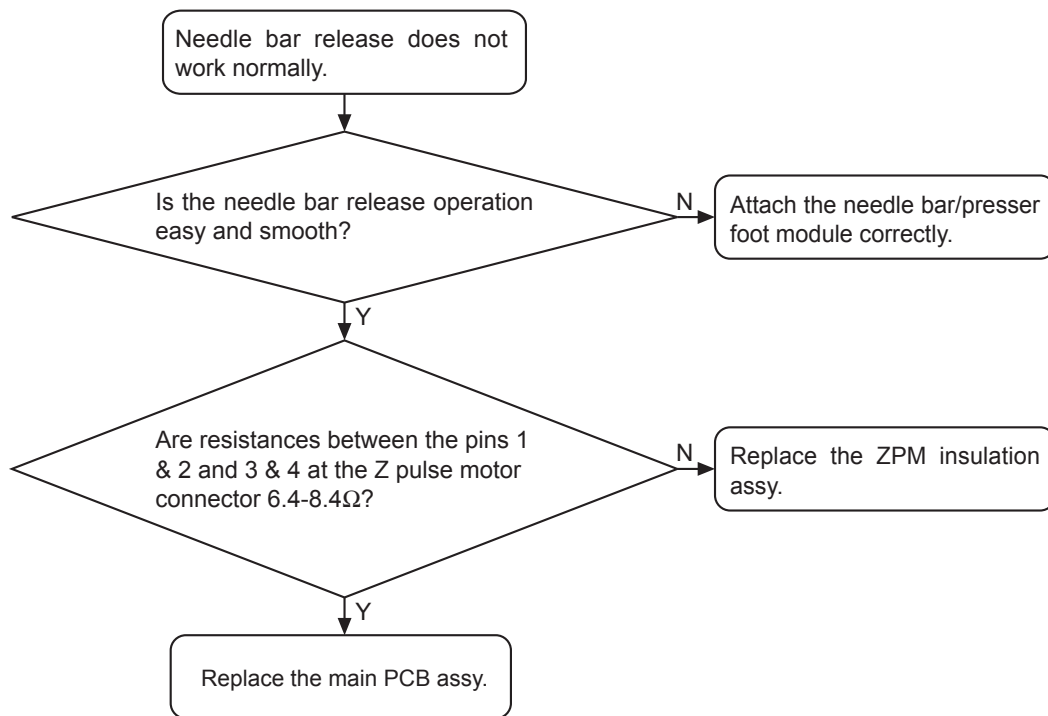


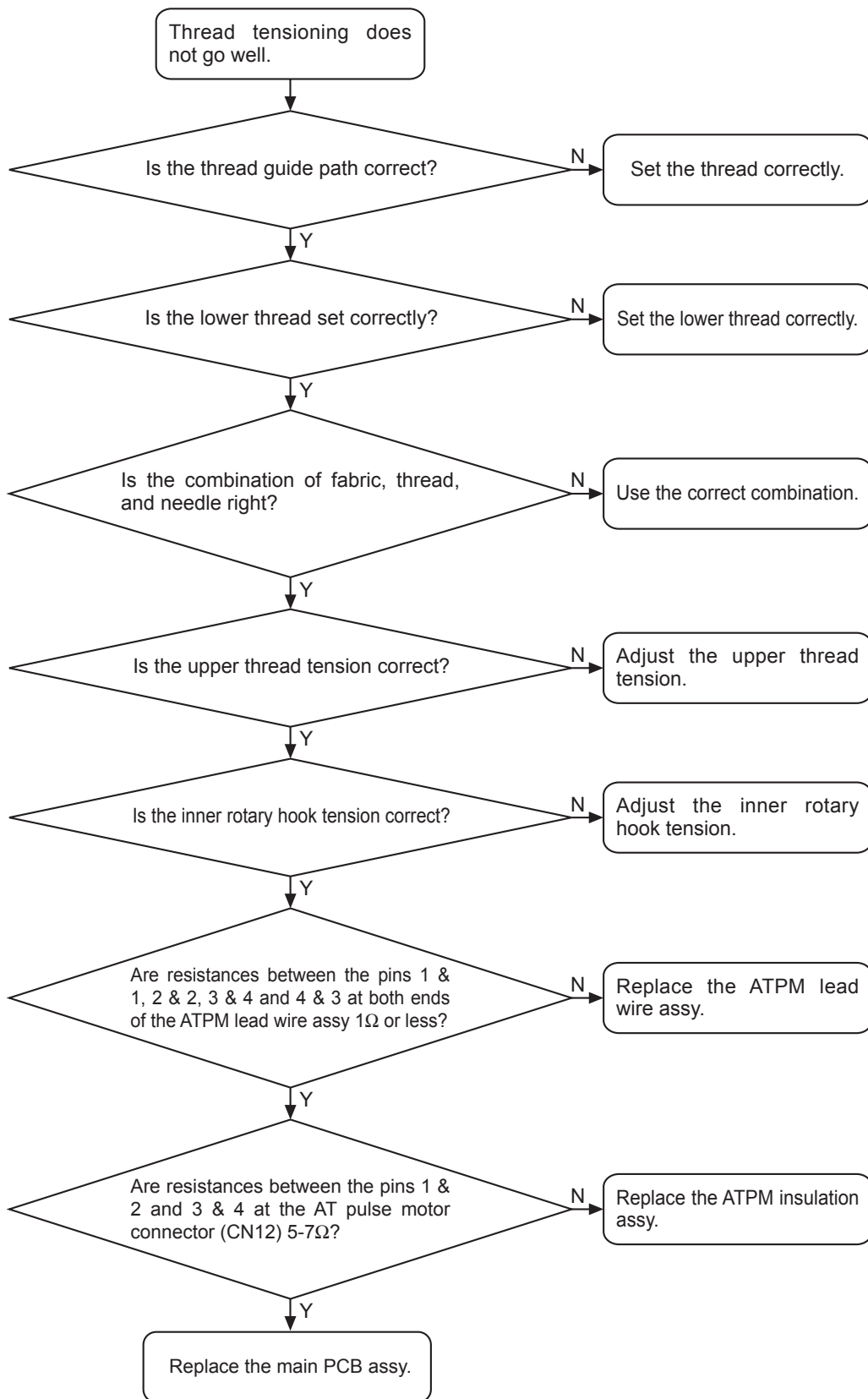




Failure Investigation
for Electronic Parts

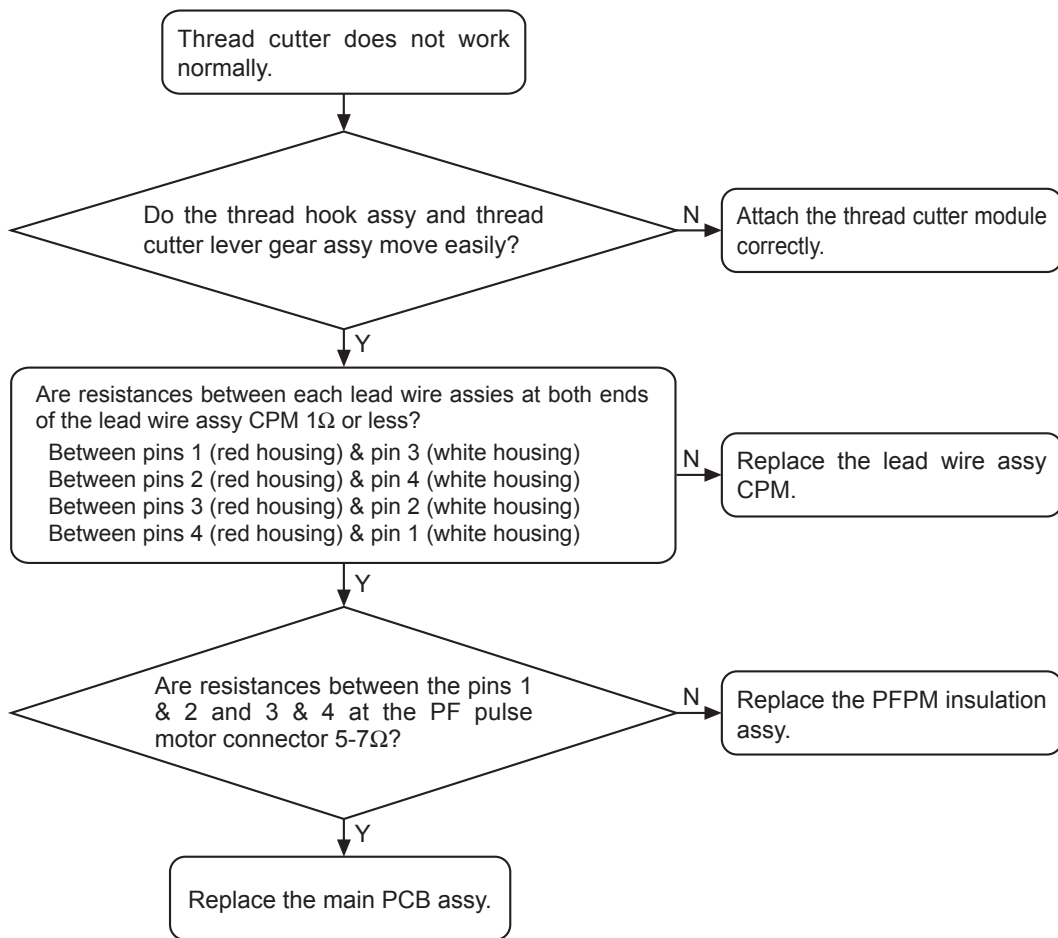
Failure Investigation
for Electronic Parts

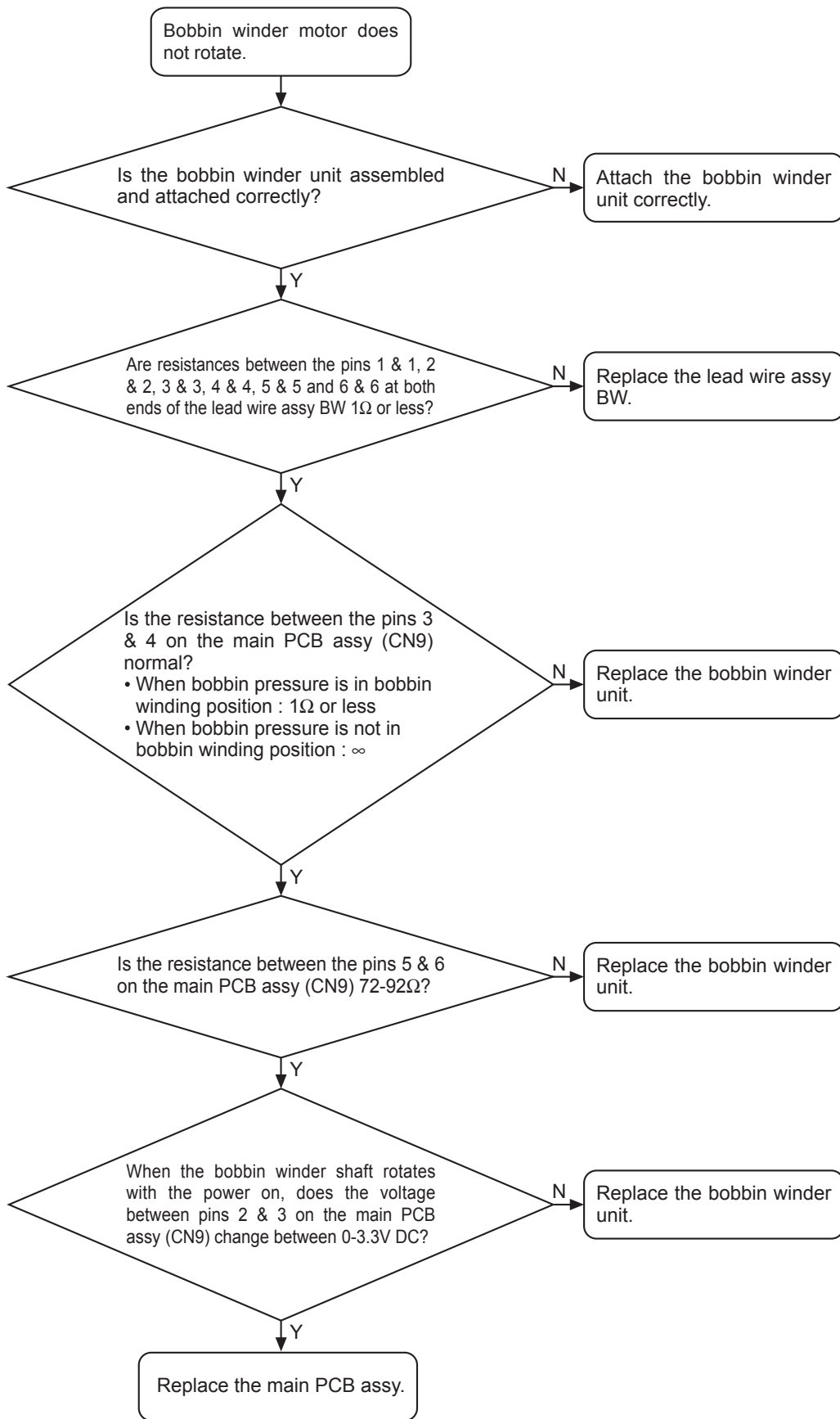




Failure Investigation
for Electronic Parts

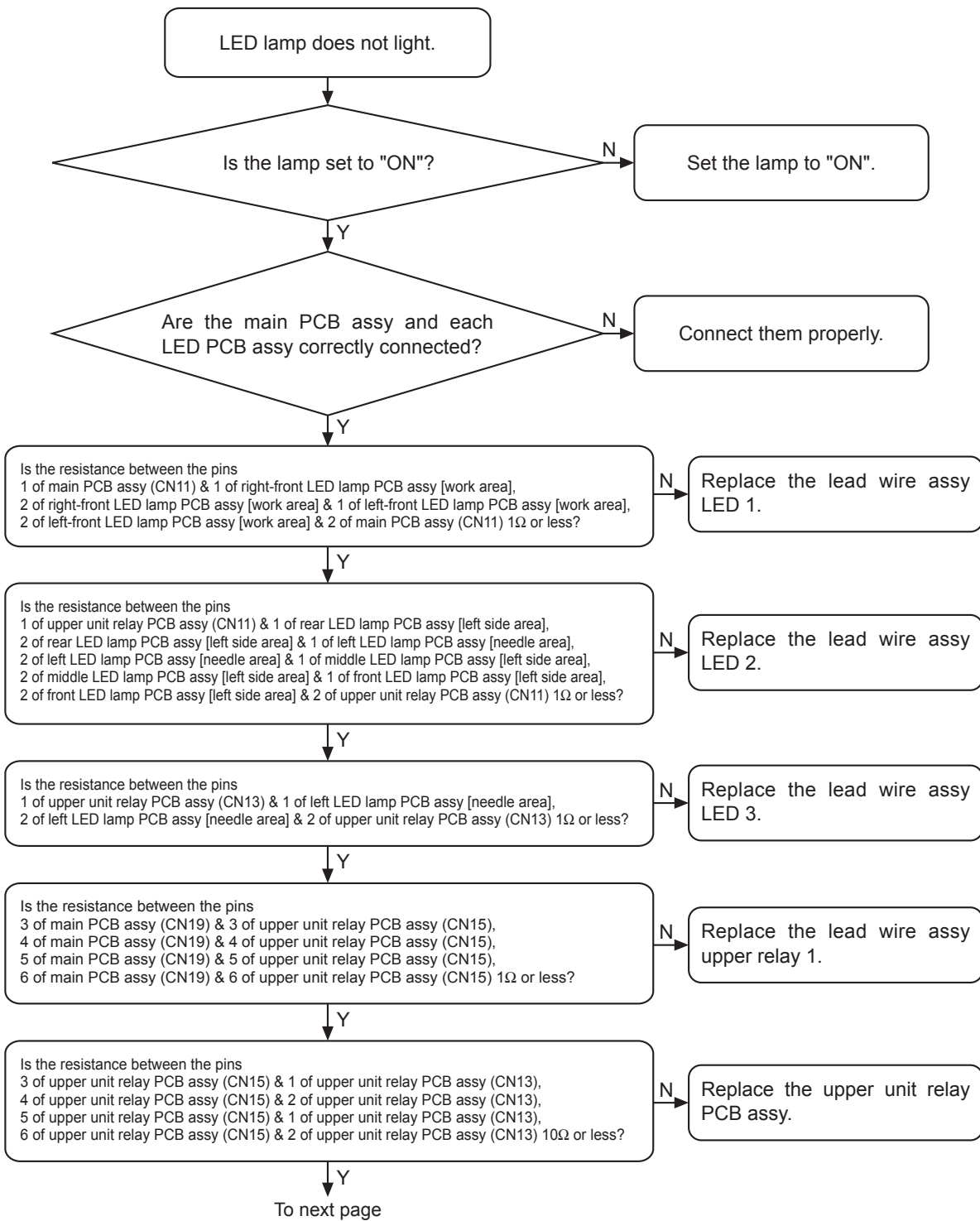
Failure Investigation
for Electronic Parts





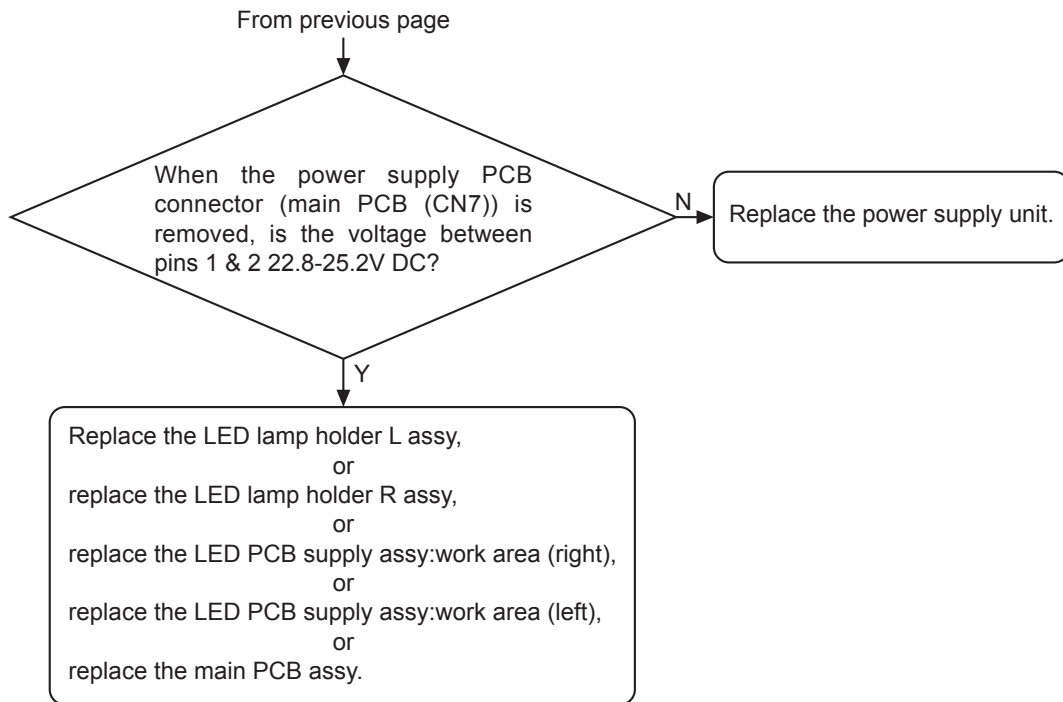
Failure Investigation for Electronic Parts

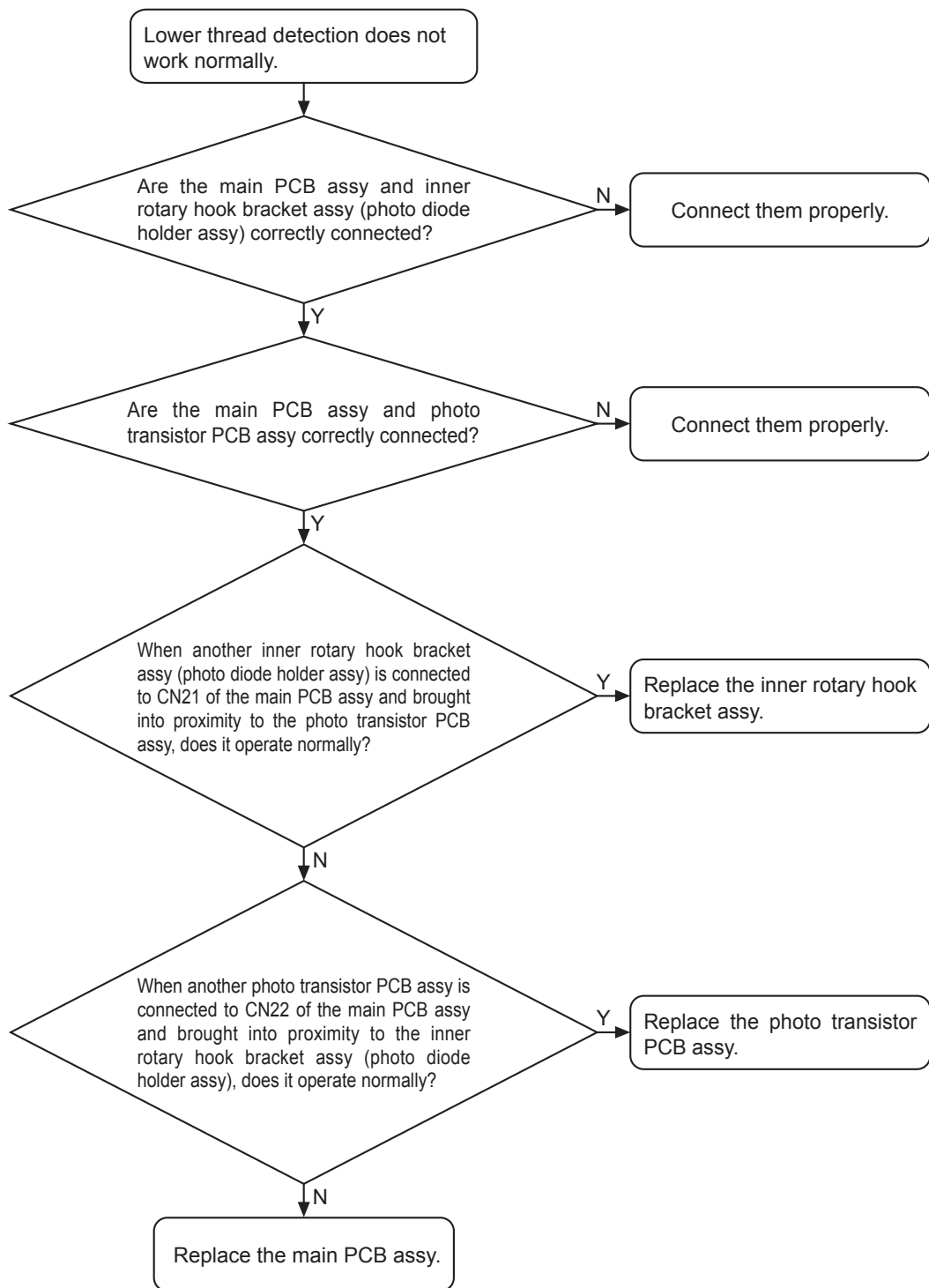
Failure Investigation for Electronic Parts



Failure Investigation
for Electronic Parts

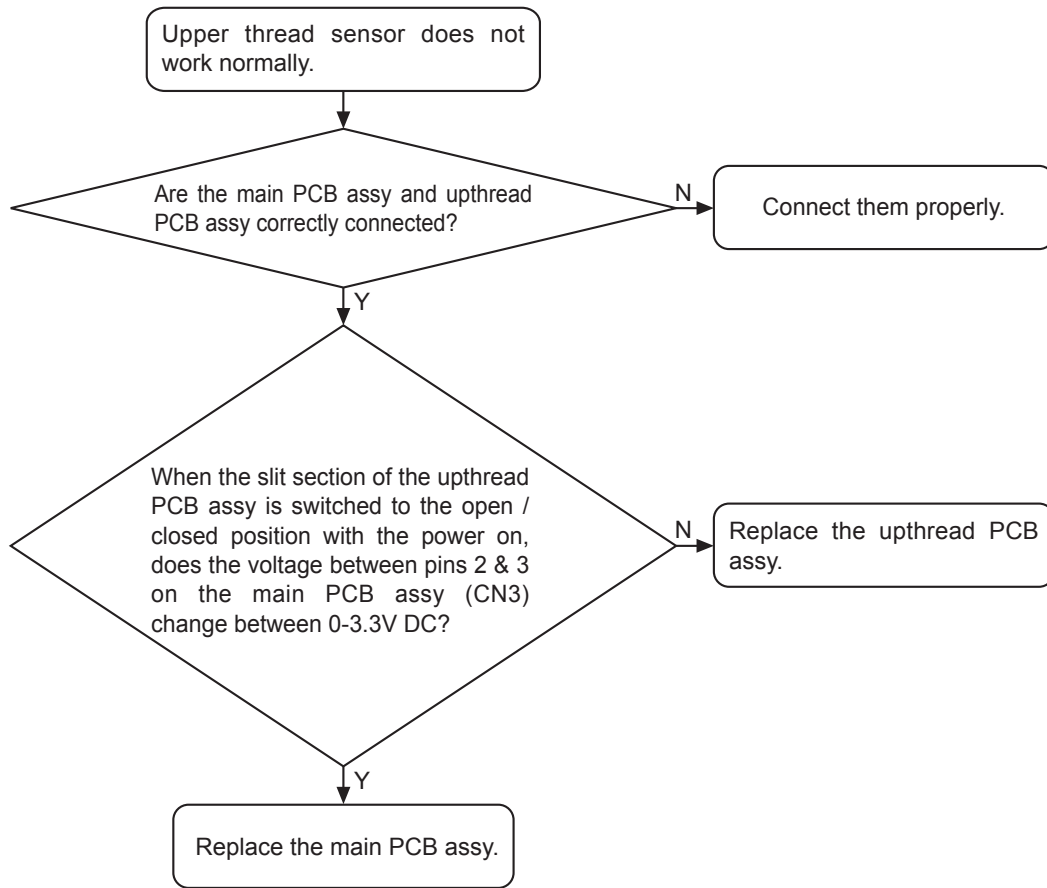
Failure Investigation
for Electronic Parts

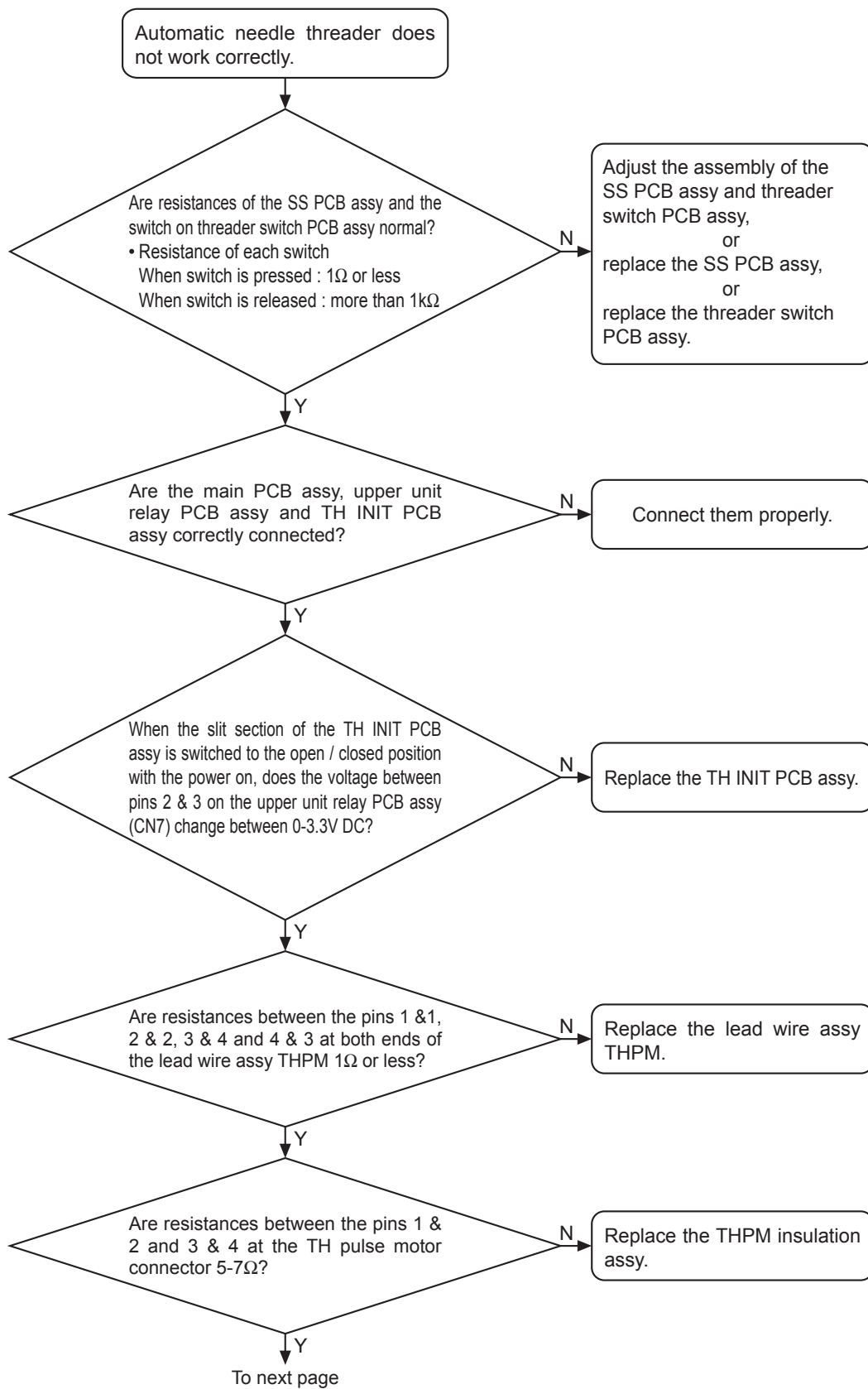




Failure Investigation
for Electronic Parts

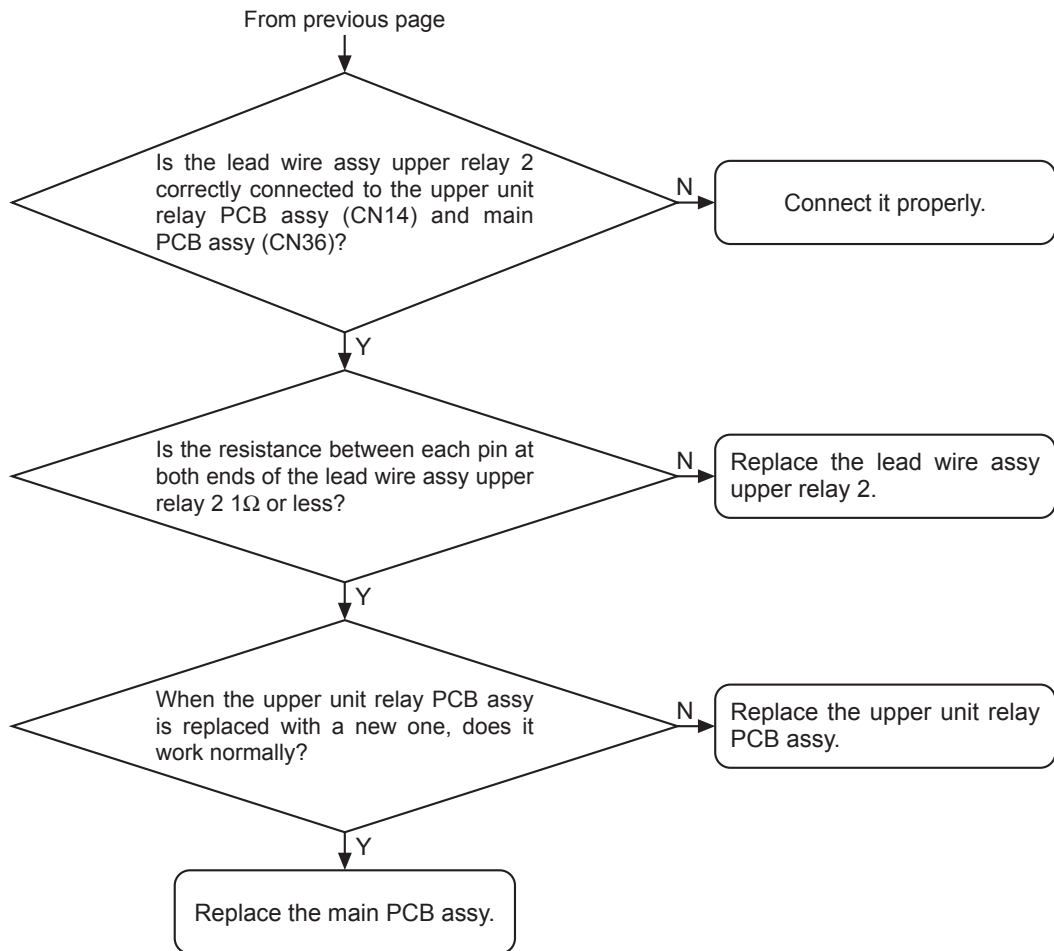
Failure Investigation
for Electronic Parts

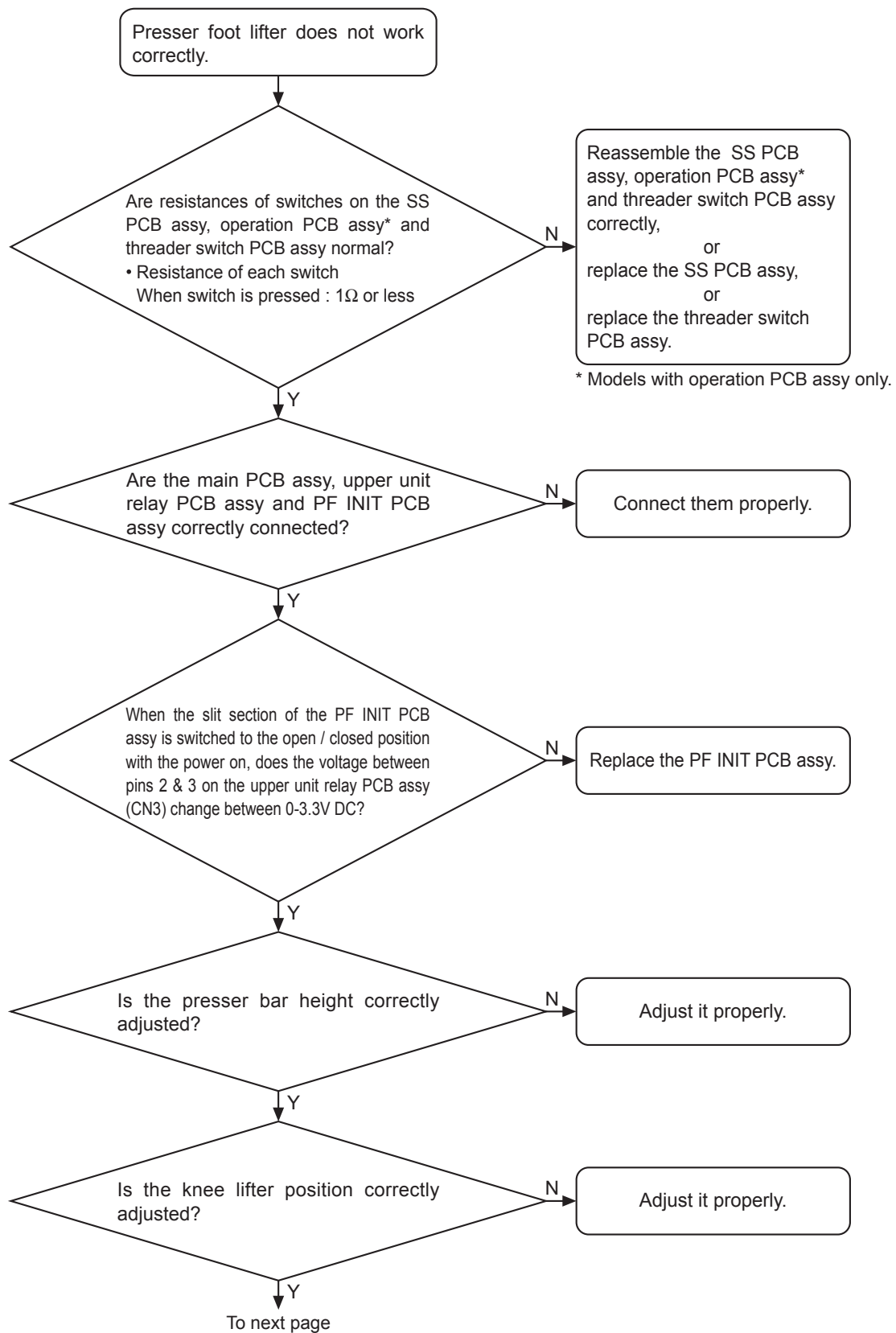




Failure Investigation
for Electronic Parts

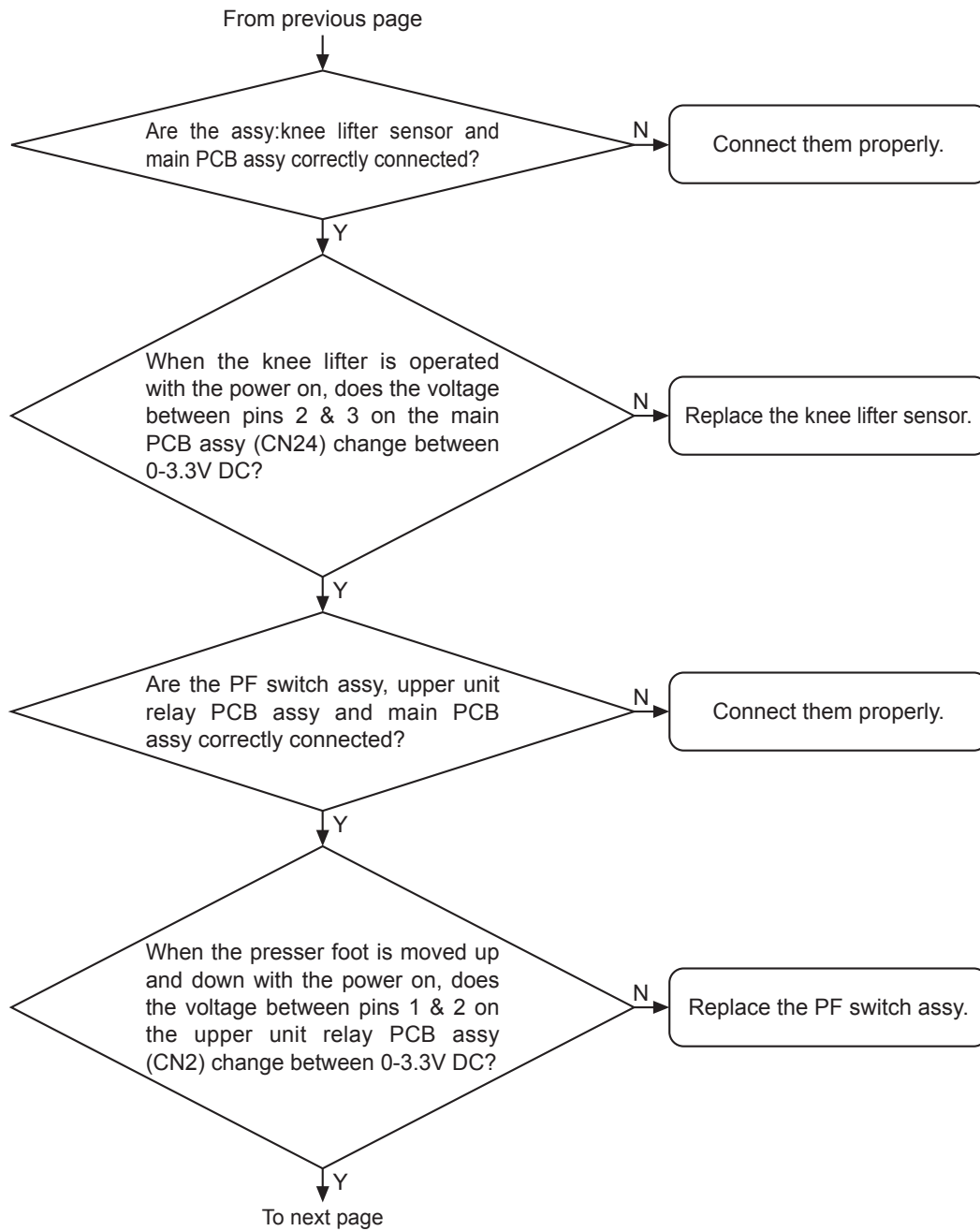
Failure Investigation
for Electronic Parts





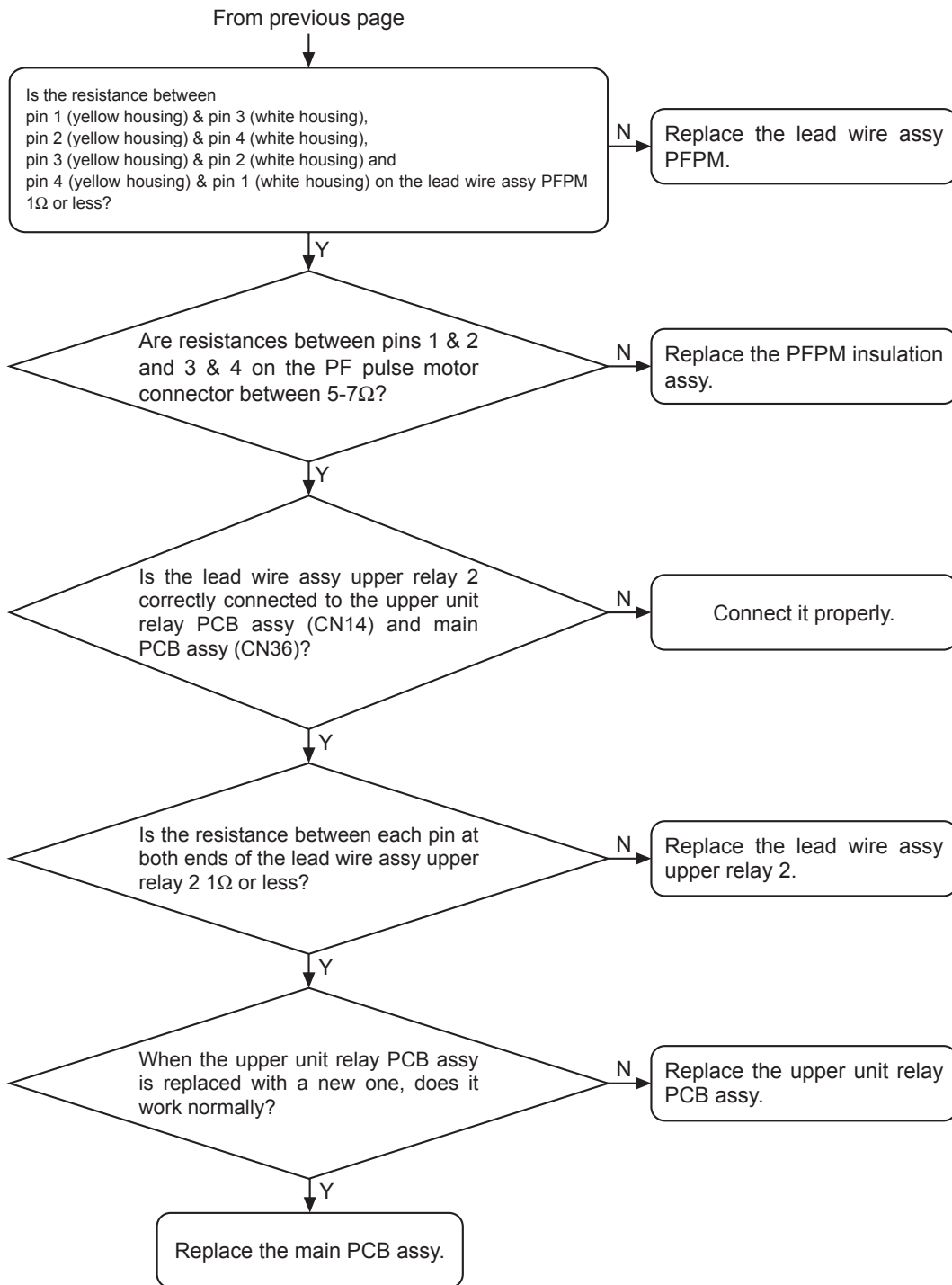
Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts



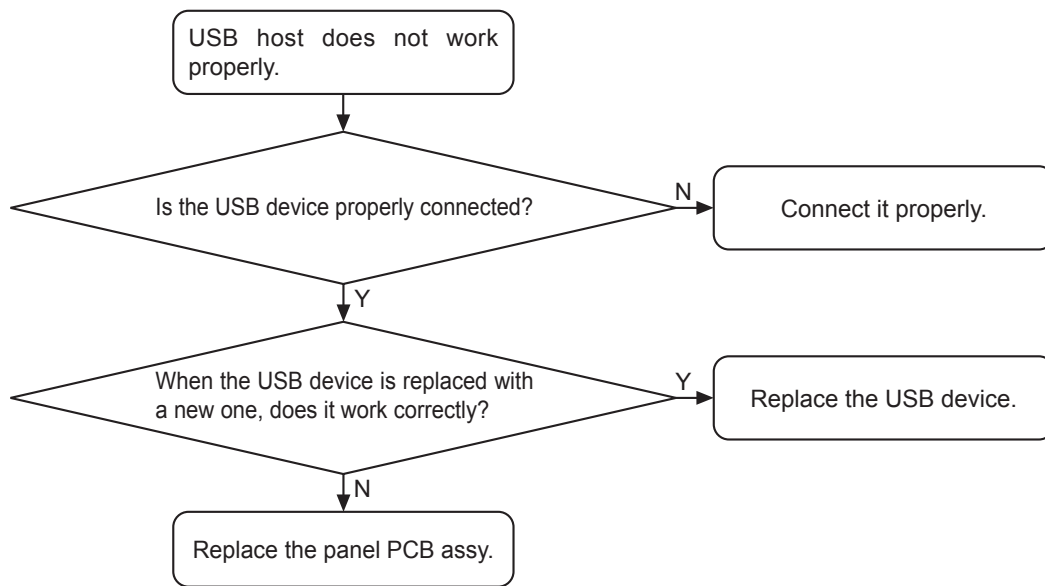
Failure Investigation
for Electronic Parts

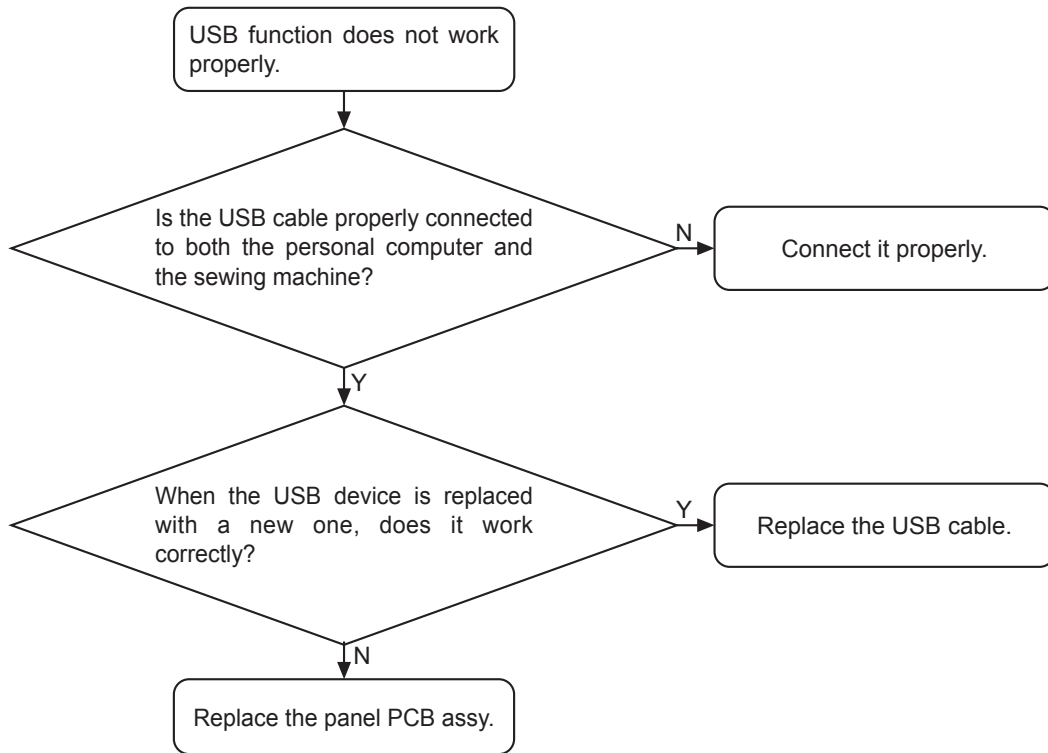
Failure Investigation
for Electronic Parts

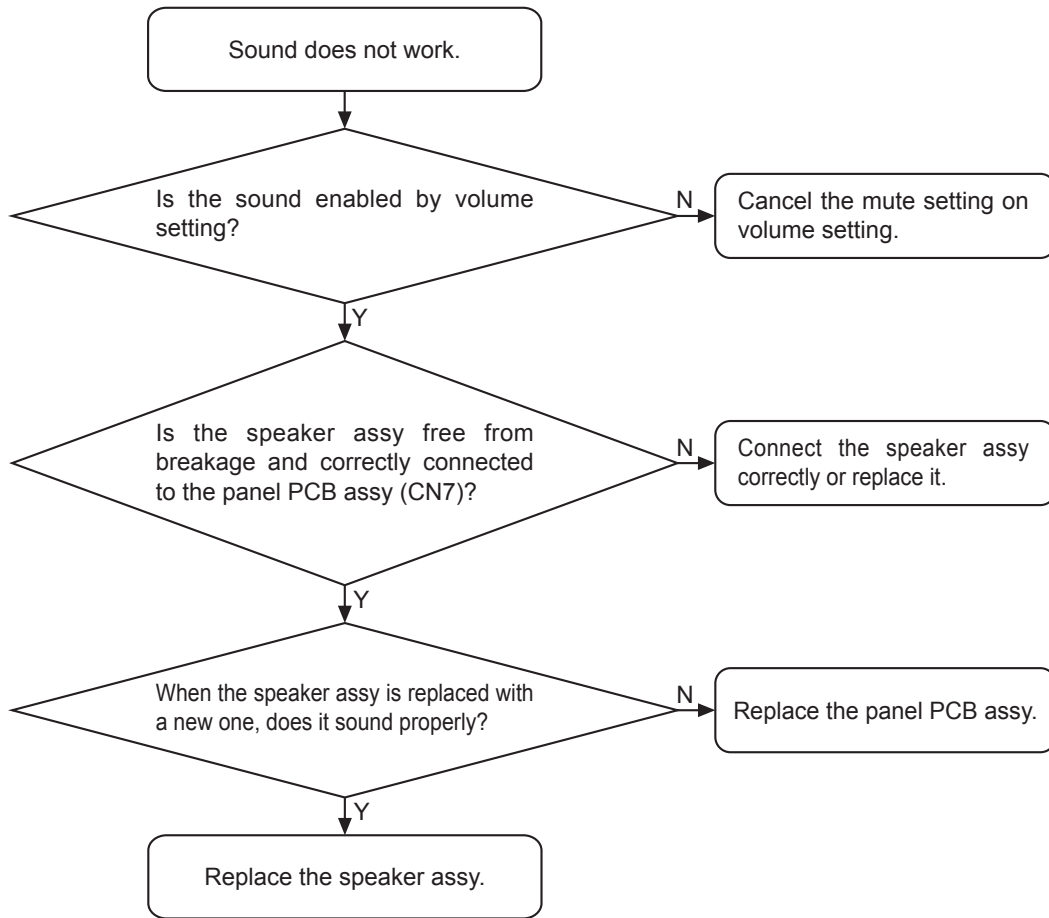


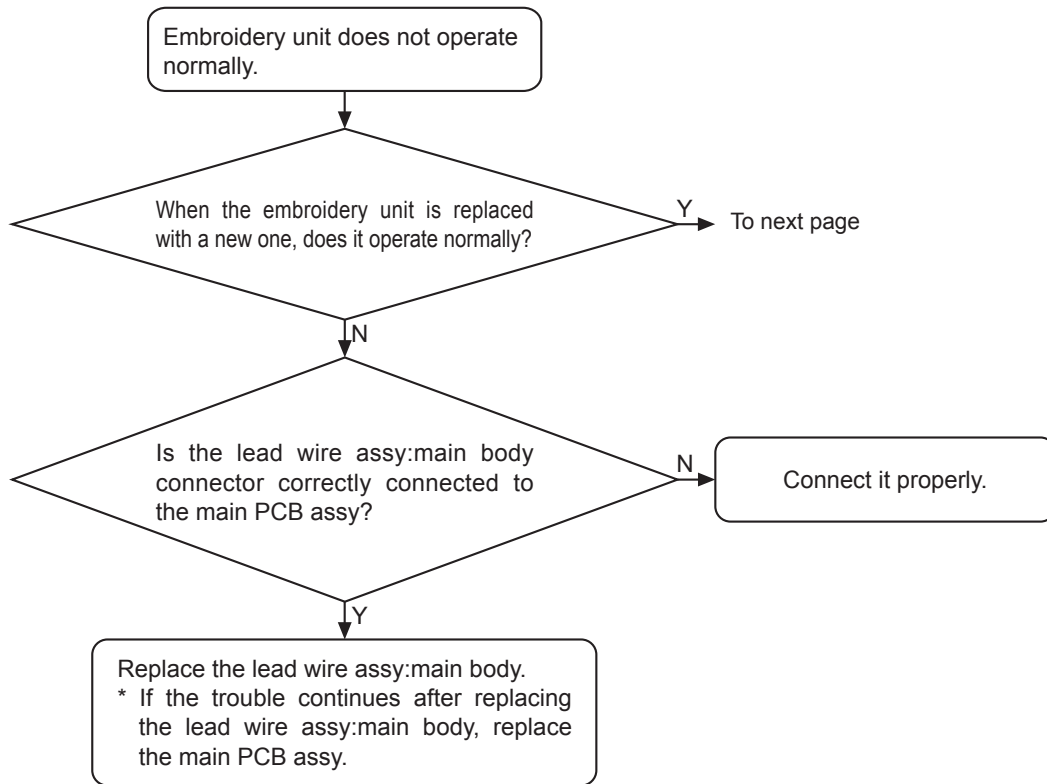
Failure Investigation
for Electronic Parts

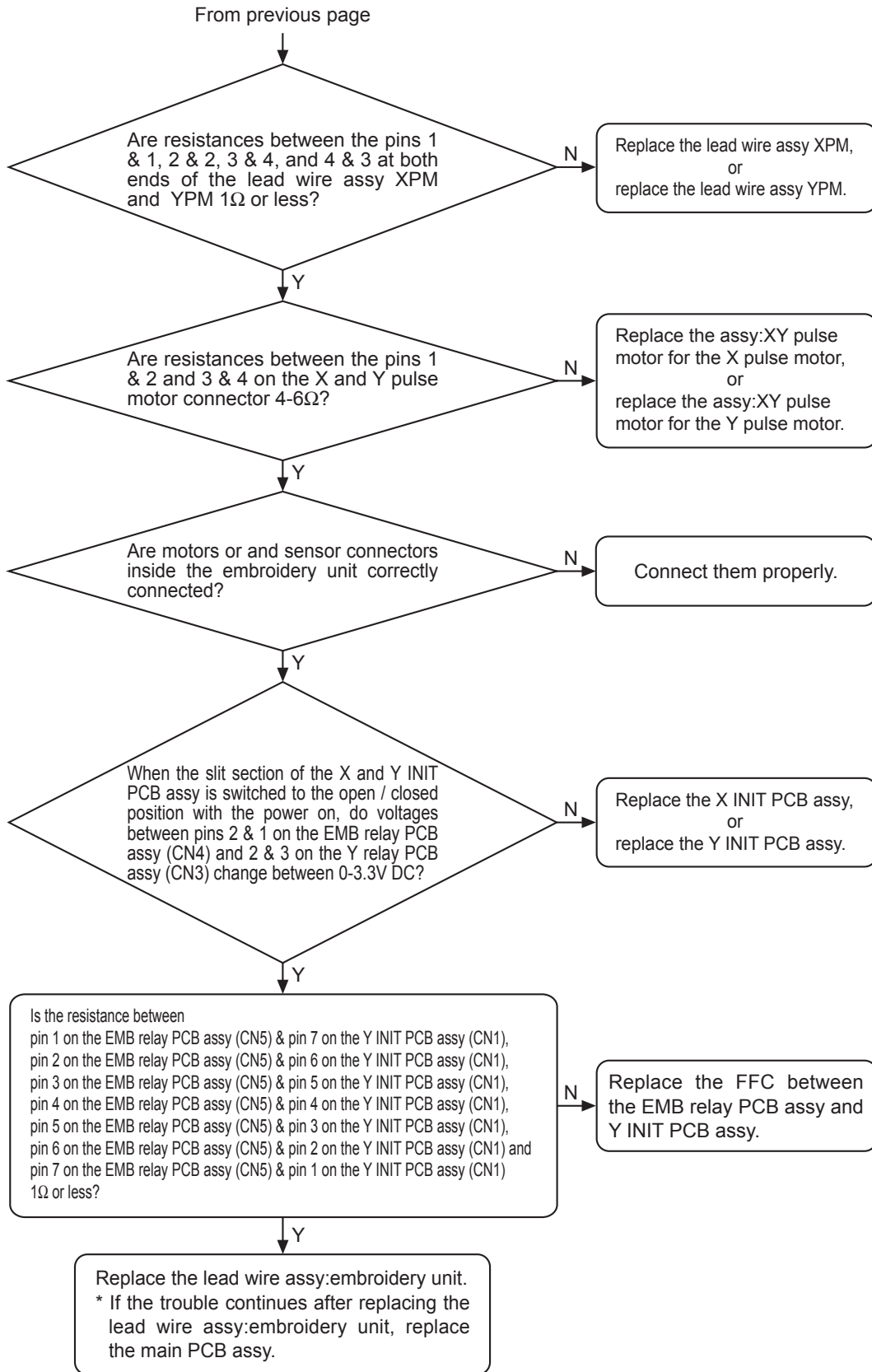
Failure Investigation
for Electronic Parts





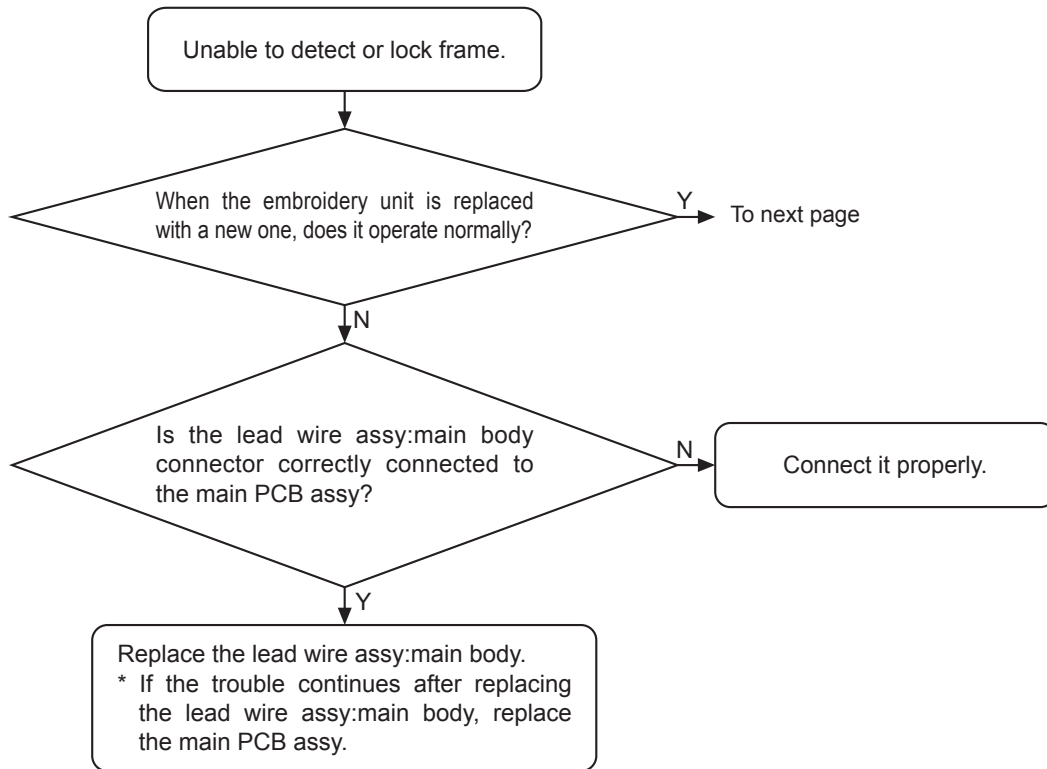


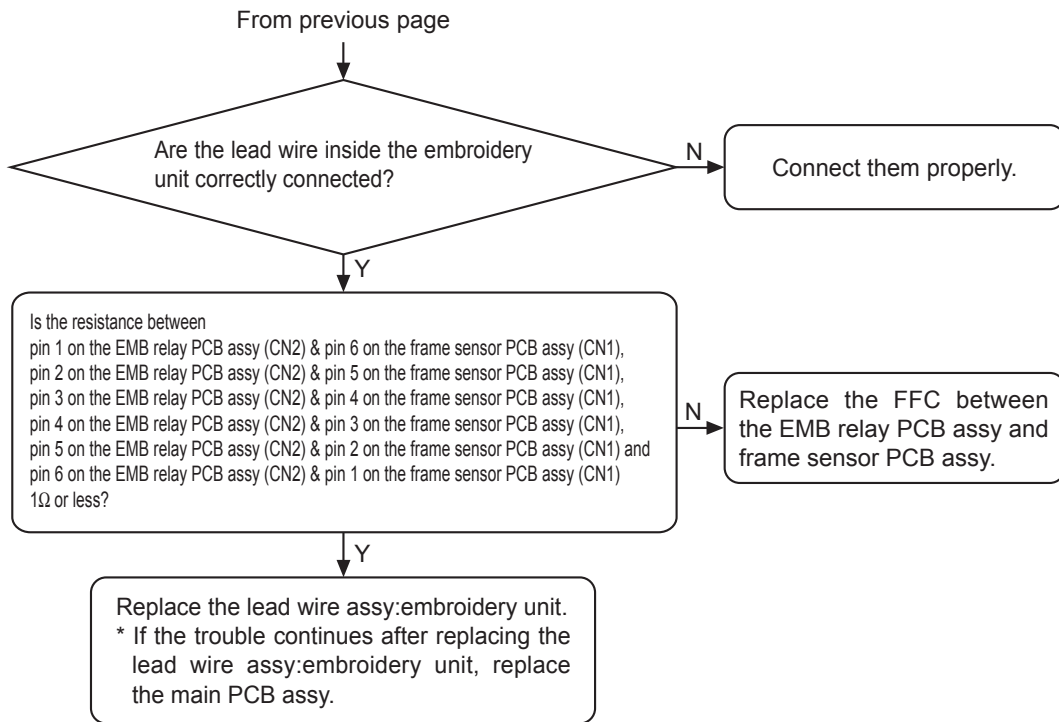


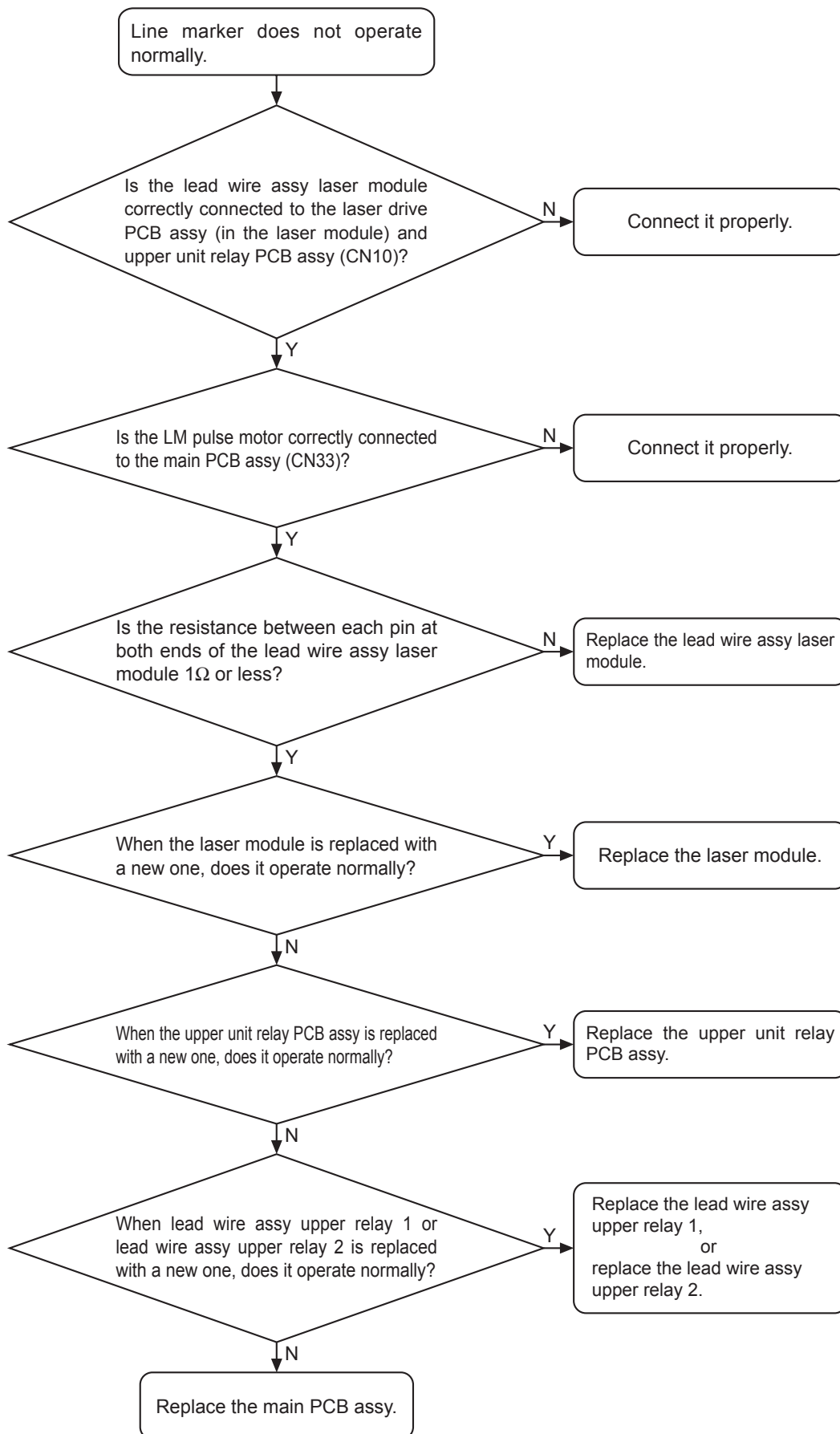


Failure Investigation
for Electronic Parts

Failure Investigation
for Electronic Parts

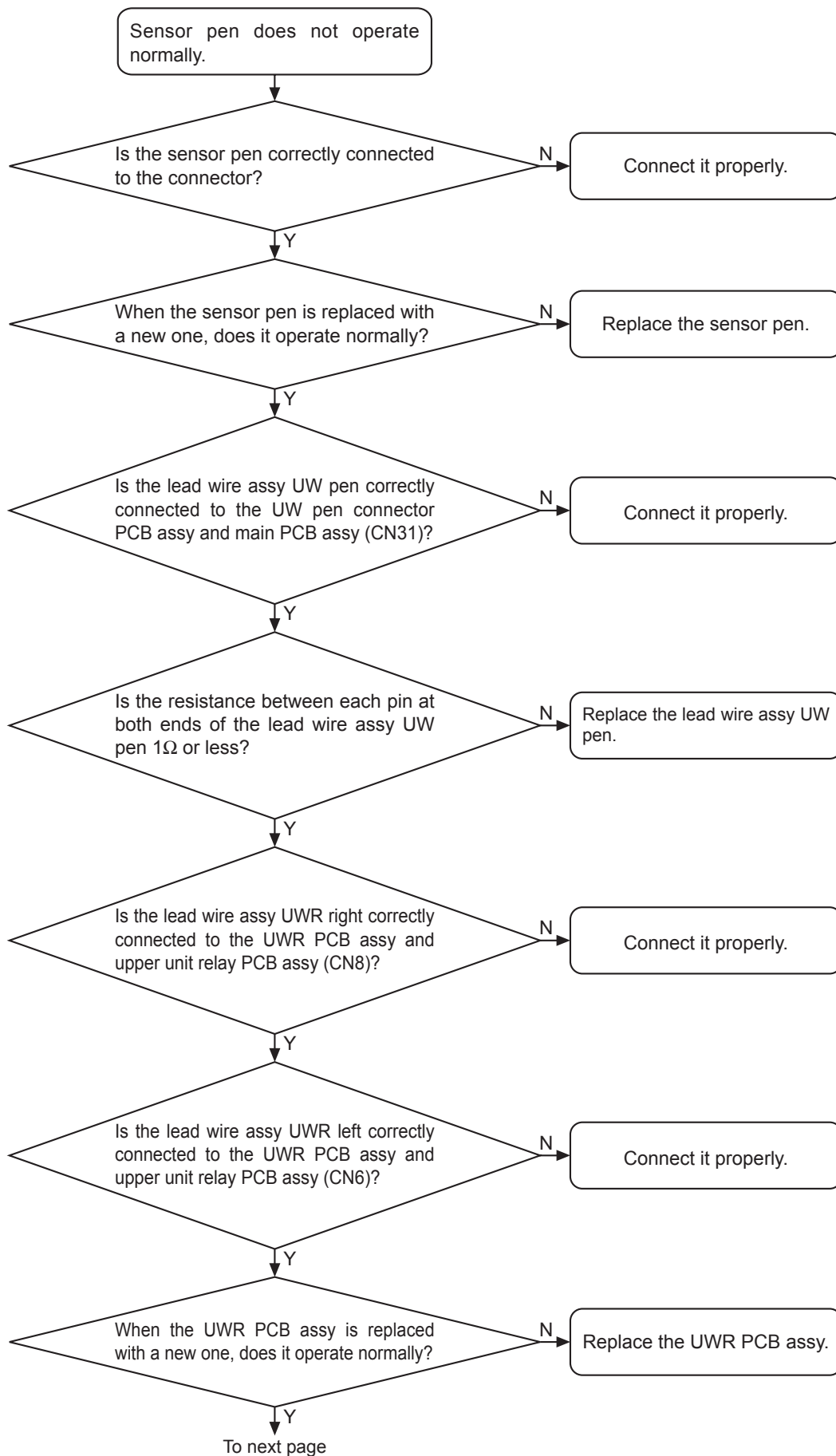






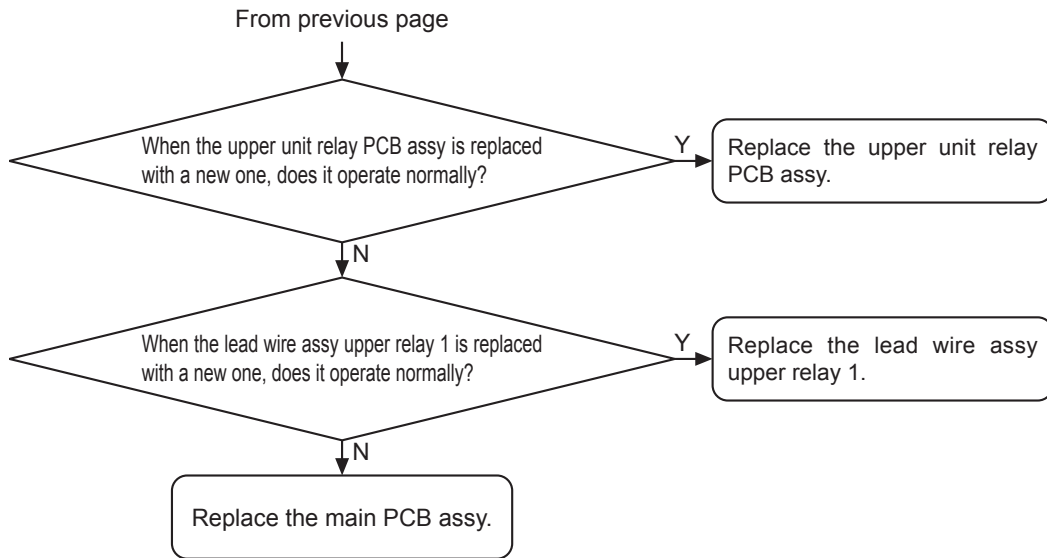
Failure Investigation
for Electronic Parts

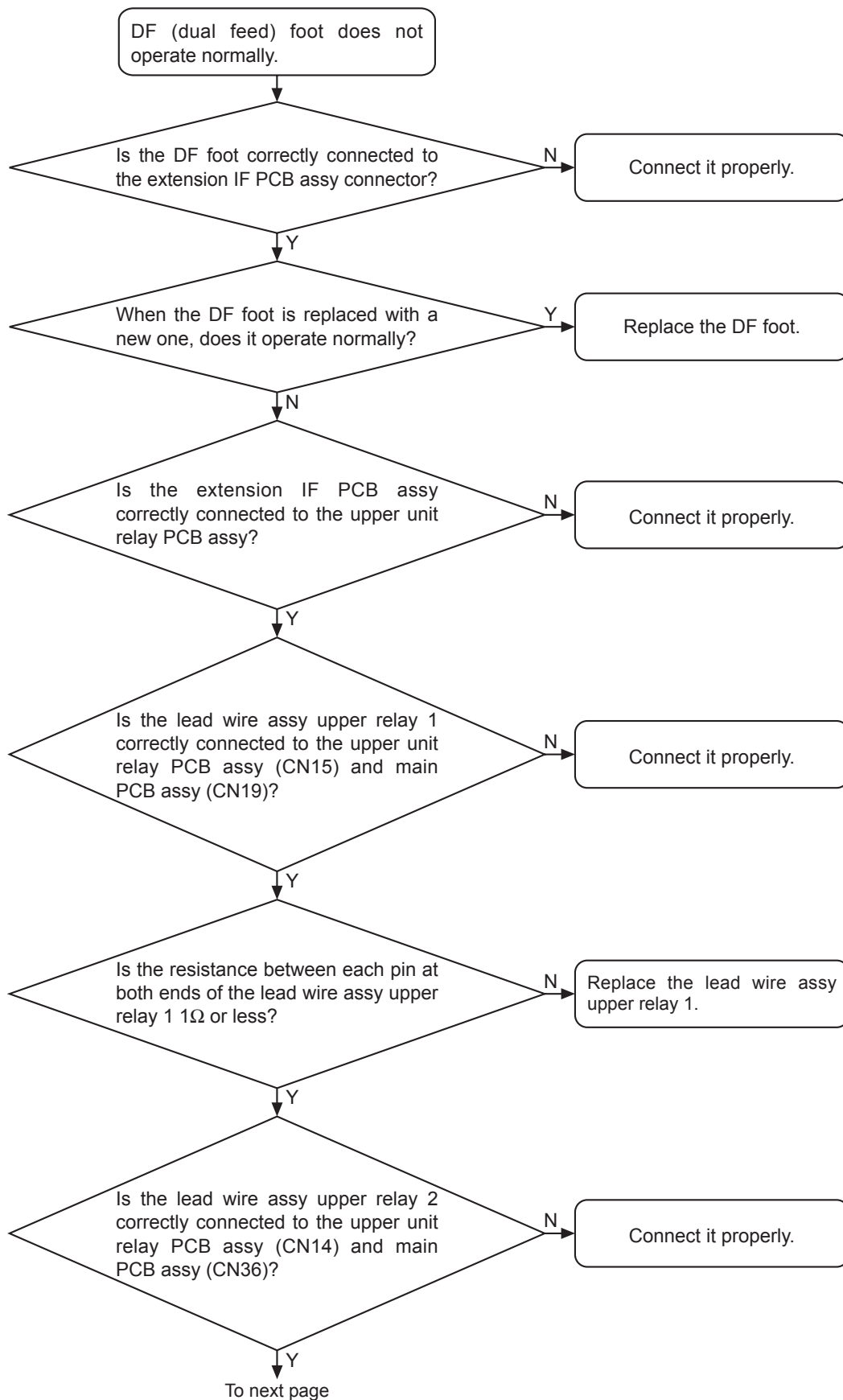
Failure Investigation
for Electronic Parts



Failure Investigation
for Electronic Parts

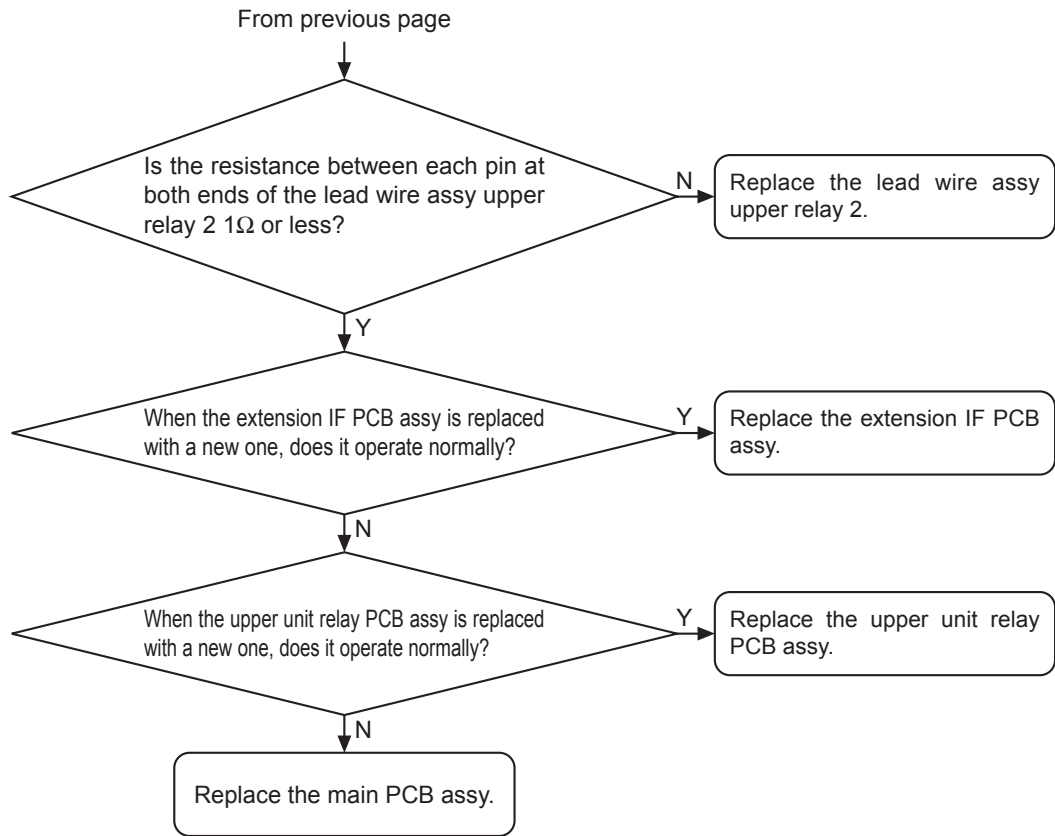
Failure Investigation
for Electronic Parts

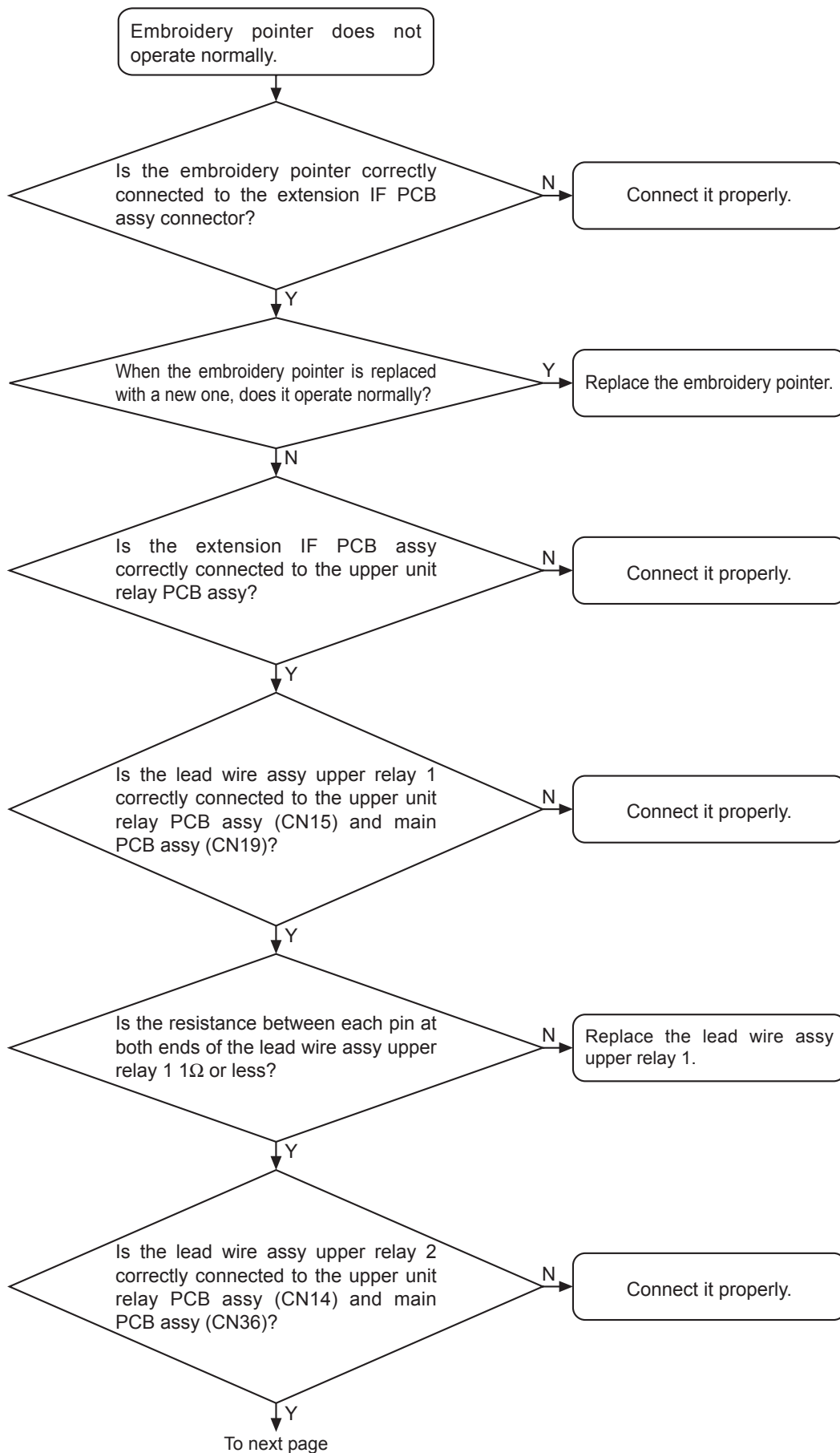




Failure Investigation
for Electronic Parts

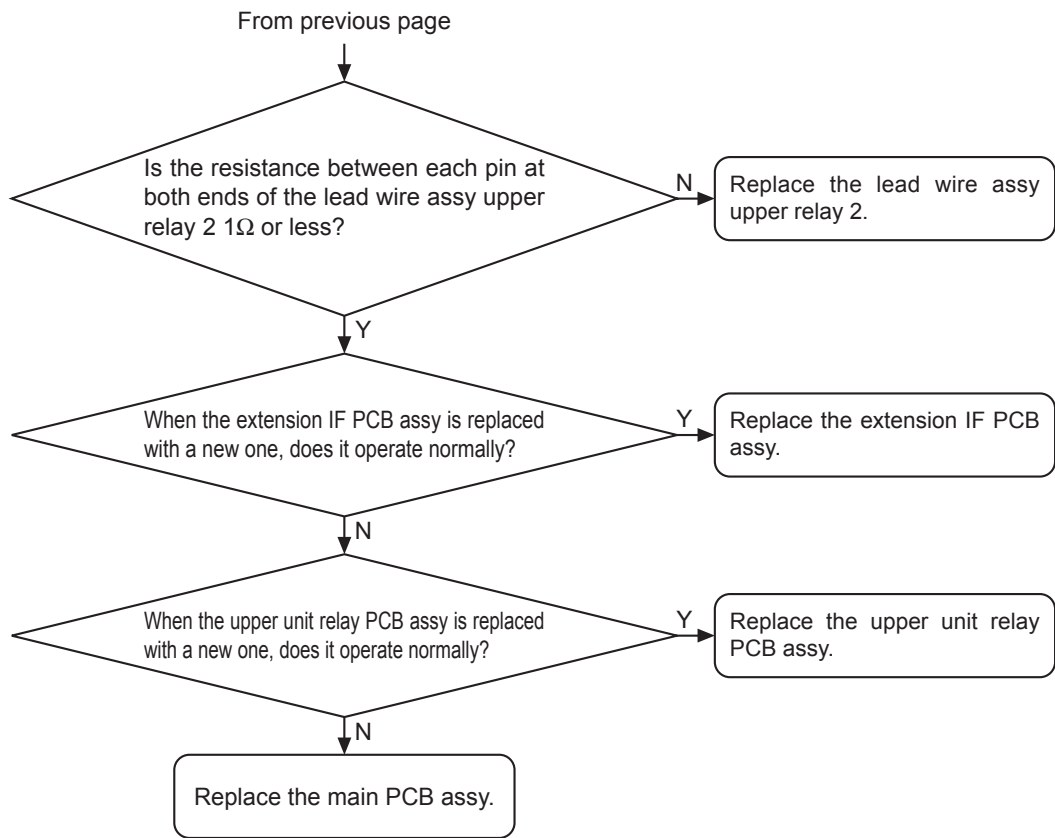
Failure Investigation
for Electronic Parts

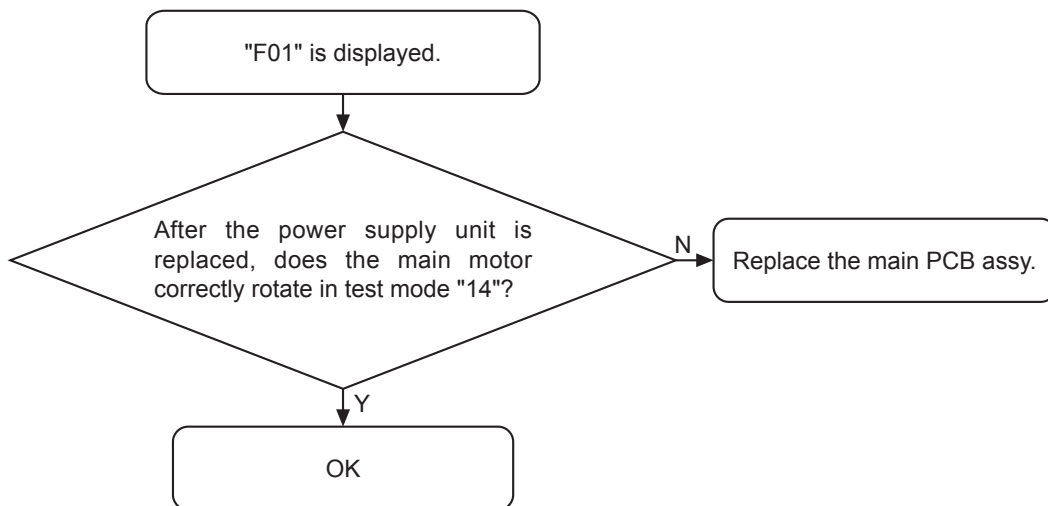


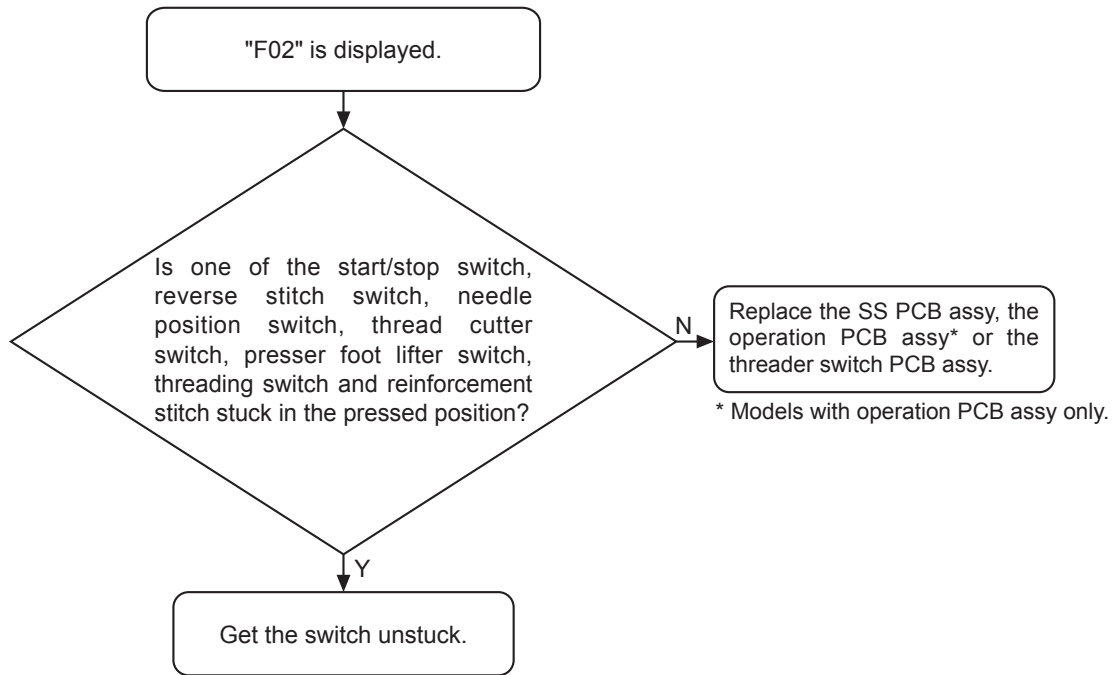


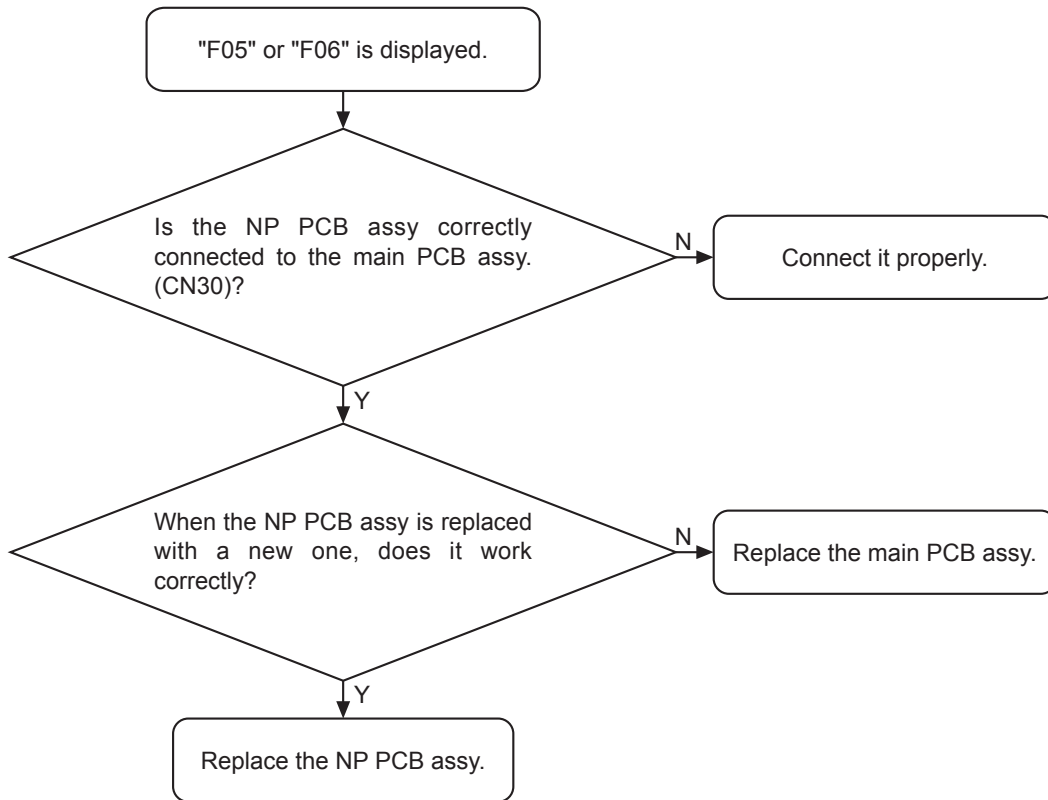
Failure Investigation
for Electronic Parts

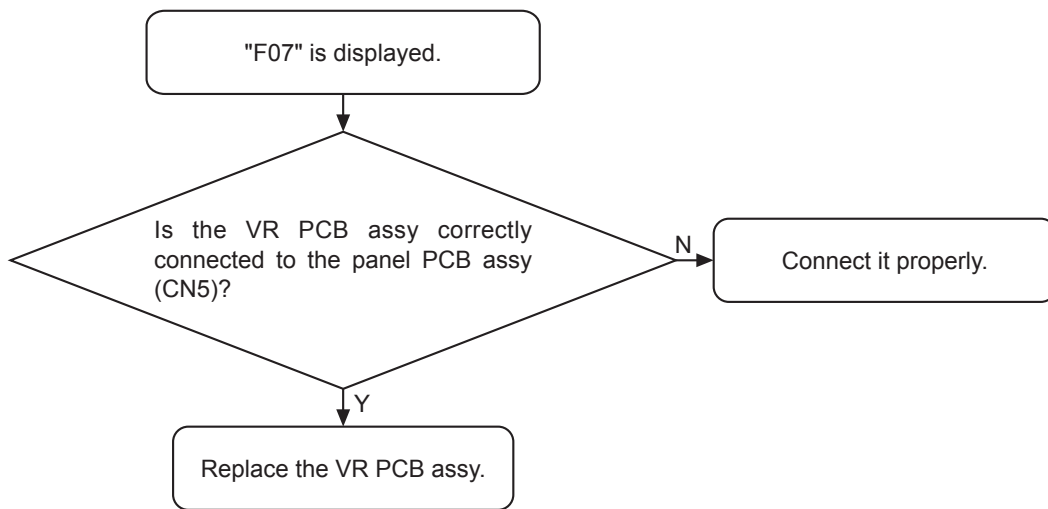
Failure Investigation
for Electronic Parts











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

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

If you replace the main PCB assy and panel PCB assy simultaneously, the setting data stored in the sewing machine cannot be copied to the new PCBs, resulting in malfunction of the sewing machine. When both PCB assies need to be replaced, be sure to replace them one at a time.

When the main PCB assy or panel PCB assy is replaced, the setting data stored in the sewing machine will be 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 “Panel PC Board” ② when the panel PCB assy was replaced. (Fig. 1)

Copying the setting data stored in the sewing machine automatically starts.

***Note 1**

- Do not select a PCB other than from the one that has been replaced. The setting data stored in the sewing machine cannot be copied correctly, resulting in malfunction of the sewing machine.

***Note 2**

- Do not turn off the power of the sewing machine while the setting data is being copied. Do not touch any button or touch panel of the sewing machine. The setting data stored in the sewing machine cannot be copied correctly, resulting in malfunction of the sewing machine.

2. When copying the setting data is completed, the sewing machine restarts automatically.

* 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.

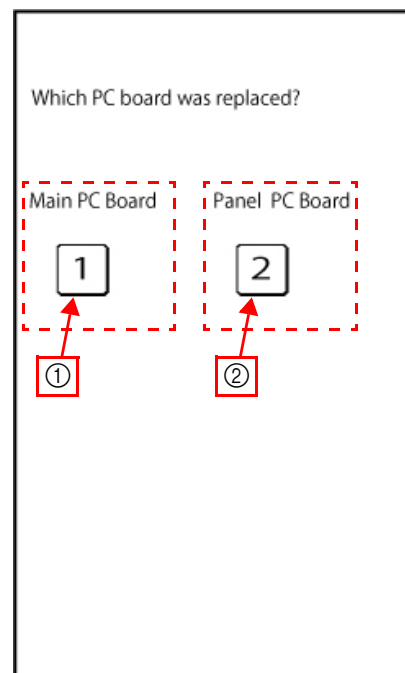
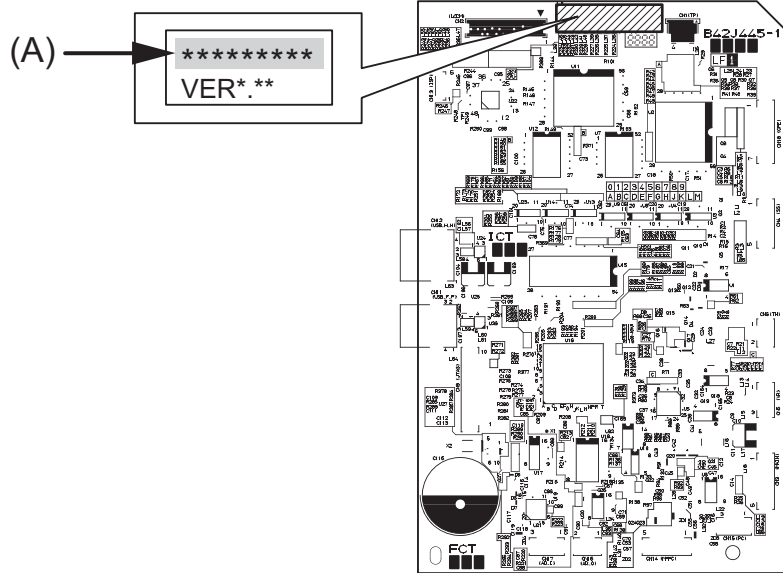


Fig. 1

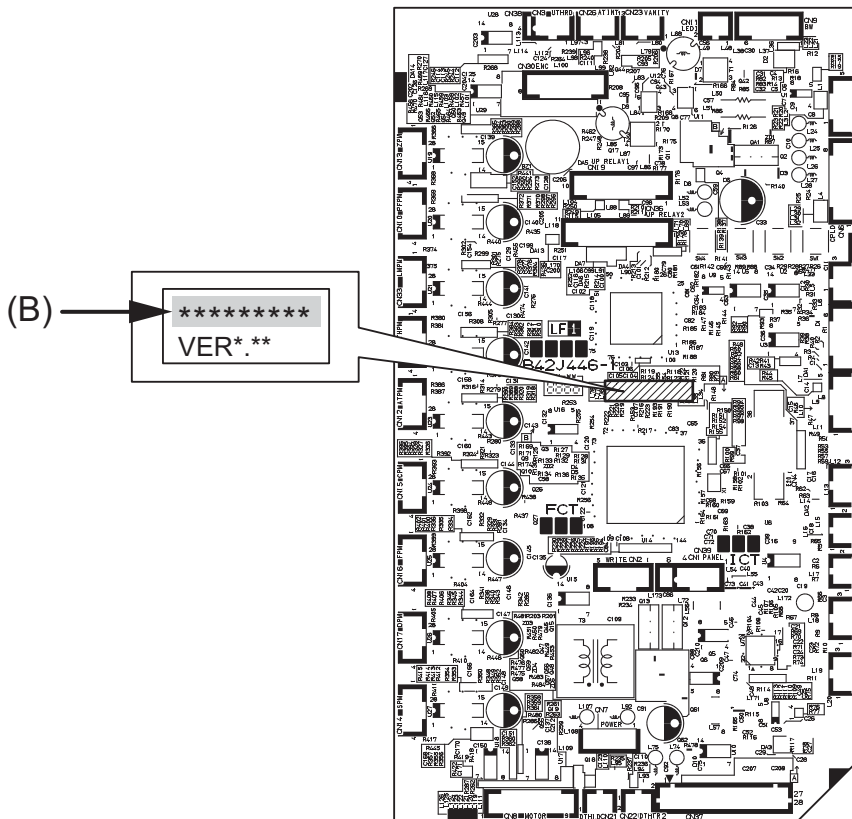
■ Panel PCB

Model	Specifications	Parts code	Marking character on (A)
BLTY	for all country	XF4820***	XF4820***



■ Main PCB

Model	Specifications	Parts code	Marking character on (B)
BLTY	for all country	XF4818***	XF4818***



6 Maintenance

How to reset counter of the maintenance	6 - 2
Necessary grease & oil	6 - 3
Maintenance point.....	6 - 4


When the operating time of the machine reaches 500 hours, the maintenance message (MSG) will be displayed on the LCD. And then do the maintenance according to the instructions of 6-4 to 6-7, and finally reset the hour counter according to the following instructions.

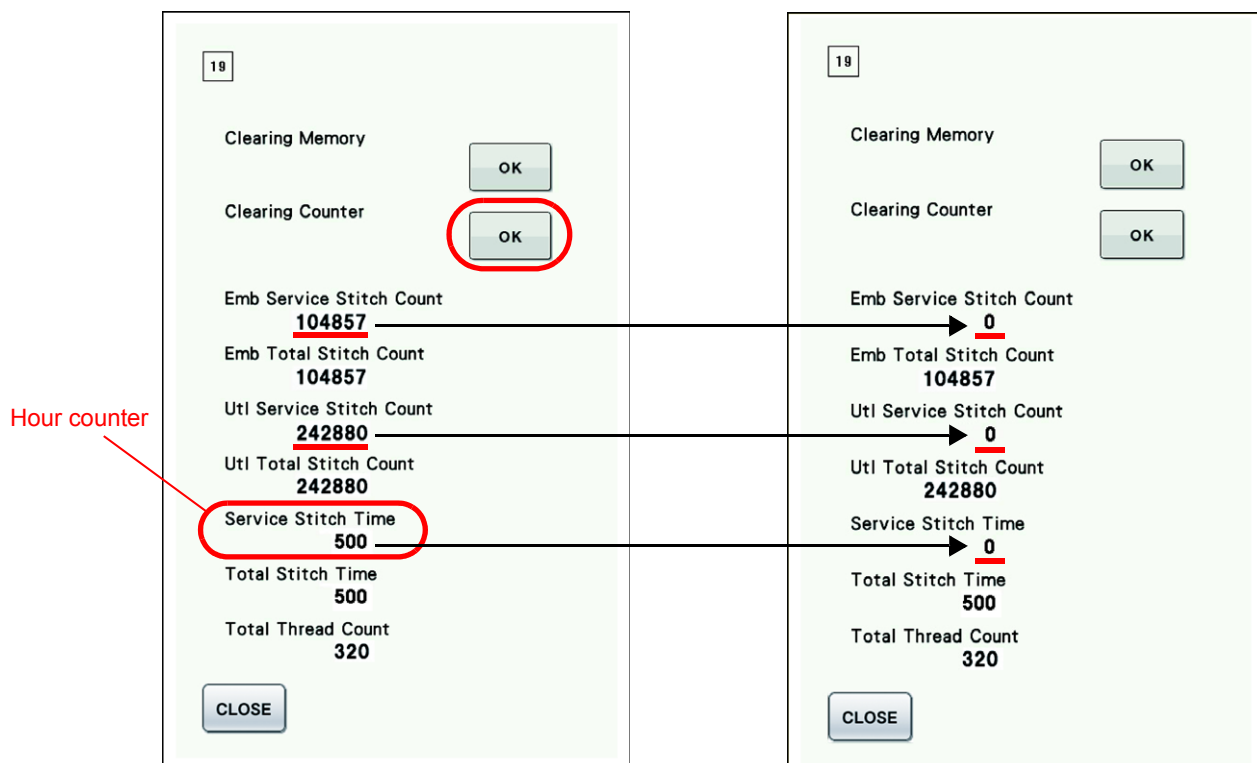
***Key point**

- The MSG (shown right) will appear on the LCD when the machine is turned on after an hour counter reaches 500 hours.
- The MSG appears up to 3 times, and will not come up when the machine is turned on from the 4th time.
- If an hour counter is still not reset (any maintenance has not been done) at 500 hours, the MSG will come up again at 600 hours and 700 hours (also up to 3 times each).
- If an hour counter reaches 1000 hours, the MSG will appear on the LCD every time when the machine is turned on until the hour counter is reset.



How to reset counter

1. Start the test mode, and then select the #19 (Clearing memory/Clearing counter mode).
2. Reset the “Emb Service Stitch Count”, “Utl Service Stitch Count” and “Service Stitch Time” by pressing the  button next to the “Clearing Counter” on the screen.



Grease



1) Name: MOLYKOTE EM30L
Part #: XC8385001



2) Name: EPNOC AP(N) 0
Part #: XC8387001

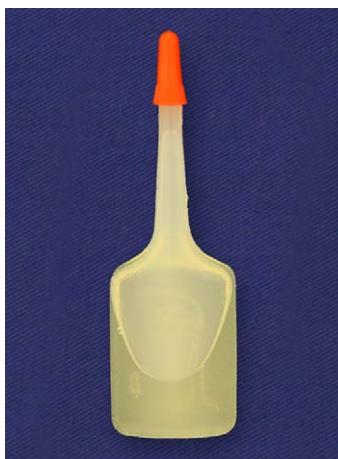


3) Name: MOLYKOTE M DISPERSION
Part #: XC8386001

Oil



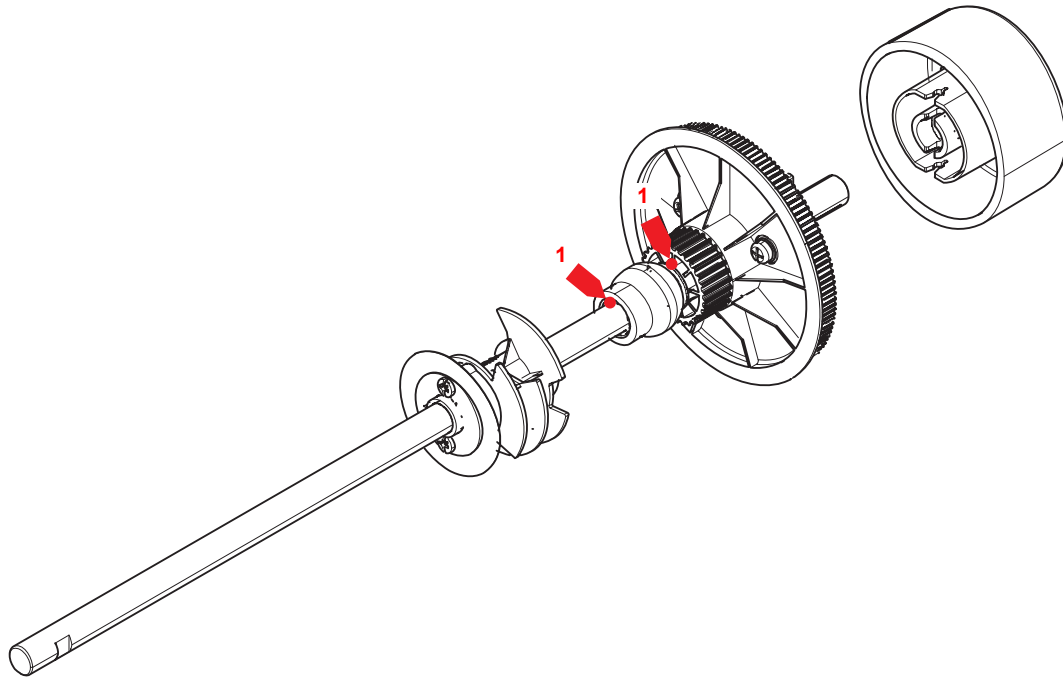
4) Name: FBK OIL RO 100
Part #: XC8388001



5) Name: OILER
Part #: XZ0206051

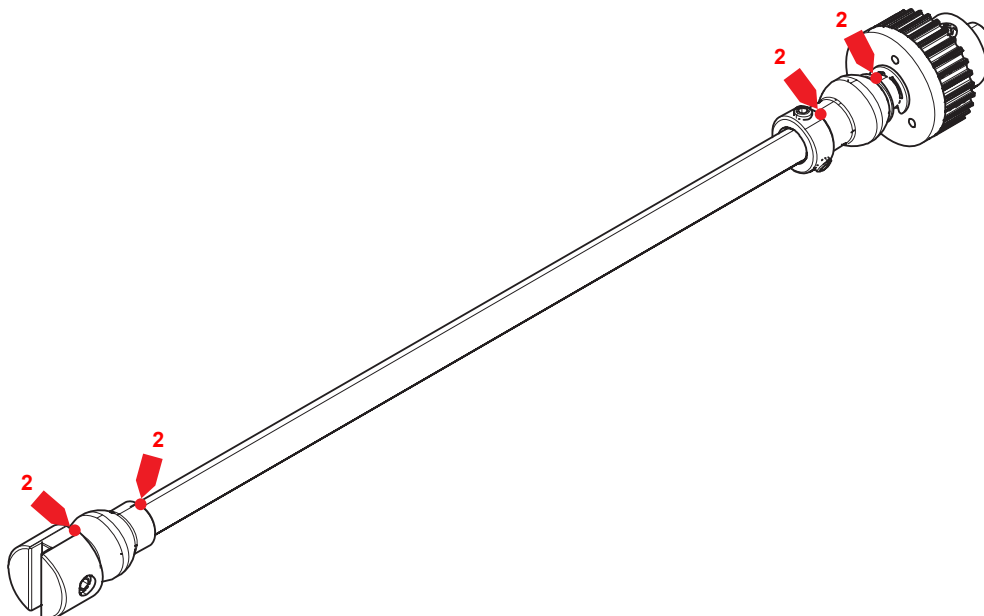
- The circle in the illustration of the below figure shows the lubrication area, and the arrow shows the lubrication position.

1. Upper shaft unit



	Grease/Oil (Parts code)	Spread	Comment
1	FBK OIL RO 100 (XC8388001)	1 - 2 drops	Lubricate from the both edge sides.

2. Lower shaft unit

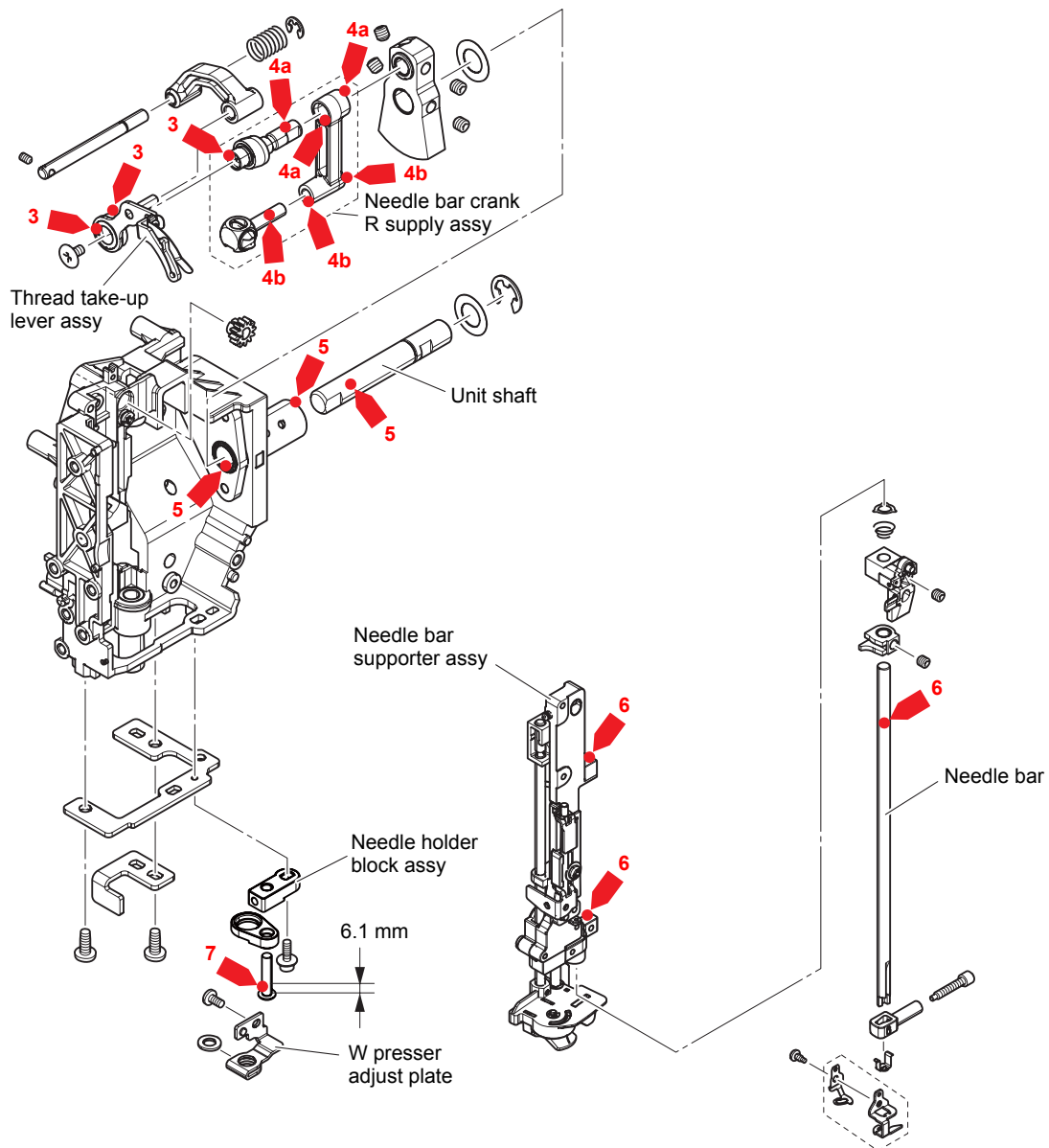


	Grease/Oil (Parts code)	Spread	Comment
2	FBK OIL RO 100 (XC8388001)	1 - 2 drops	Lubricate from the both edge sides.

Maintenance

Maintenance

3. Needle bar module

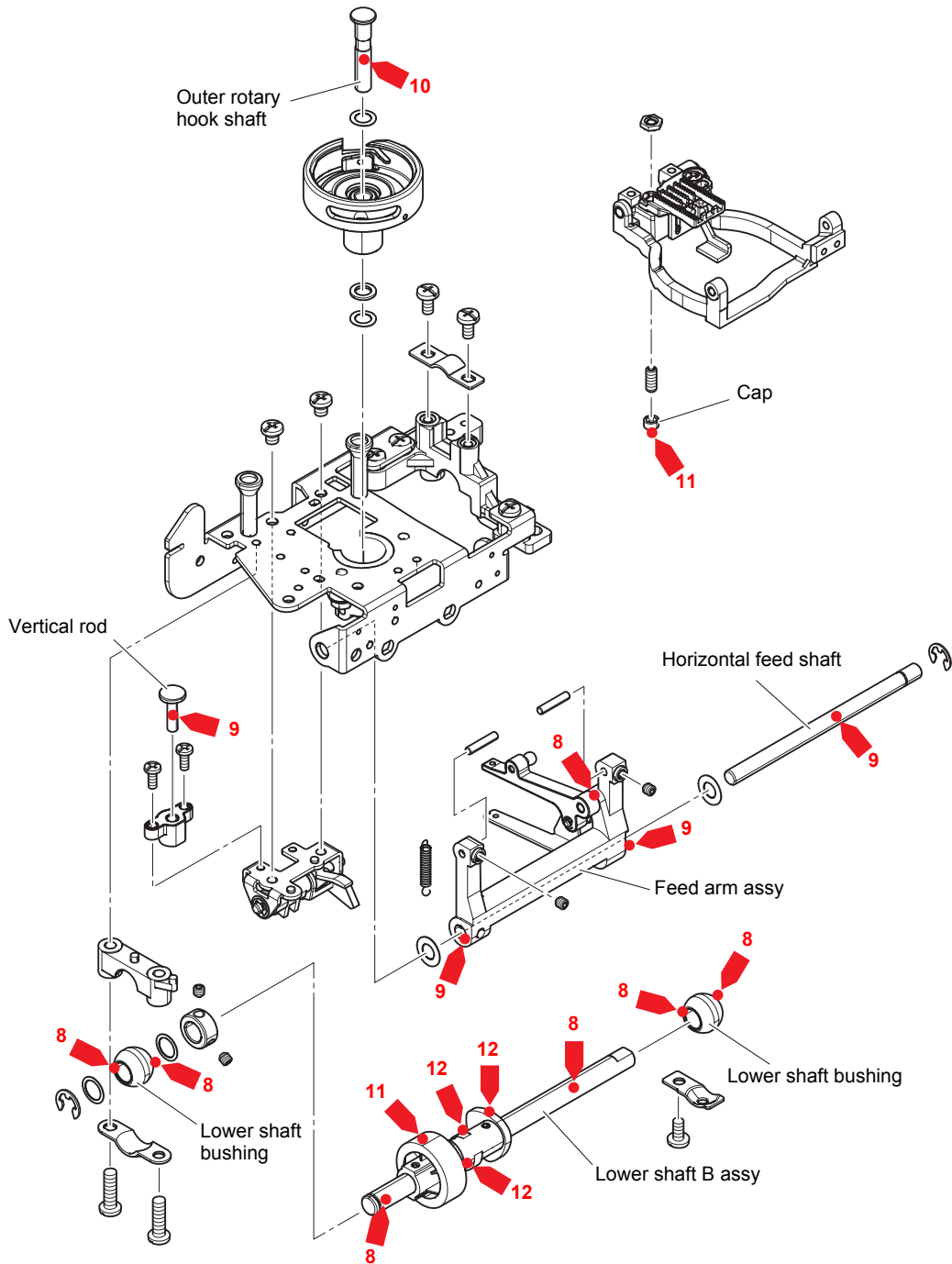


	Grease/Oil (Parts code)	Spread	Comment
3	MOLYKOTE EM30L (XC8385001)	Small bead	
4a	MOLYKOTE M DISPERSION (XC8386001)	1 - 2 drops	
4b	MOLYKOTE M DISPERSION (XC8386001)	1 - 2 drops	<ul style="list-style-type: none"> Mix the MOLYKOTE M DISPERSION in the following rations. MOLYKOTE M DISPERSION 10% : OILER (Part #: XZ0206051) 90%
5	FBK OIL RO 100 (XC8388001)	1 - 2 drops	
6	OILER (XZ0206051)	1 - 2 drops	
7	EPNOC AP(N) 0 (XC8387001)	Light covering	

Maintenance

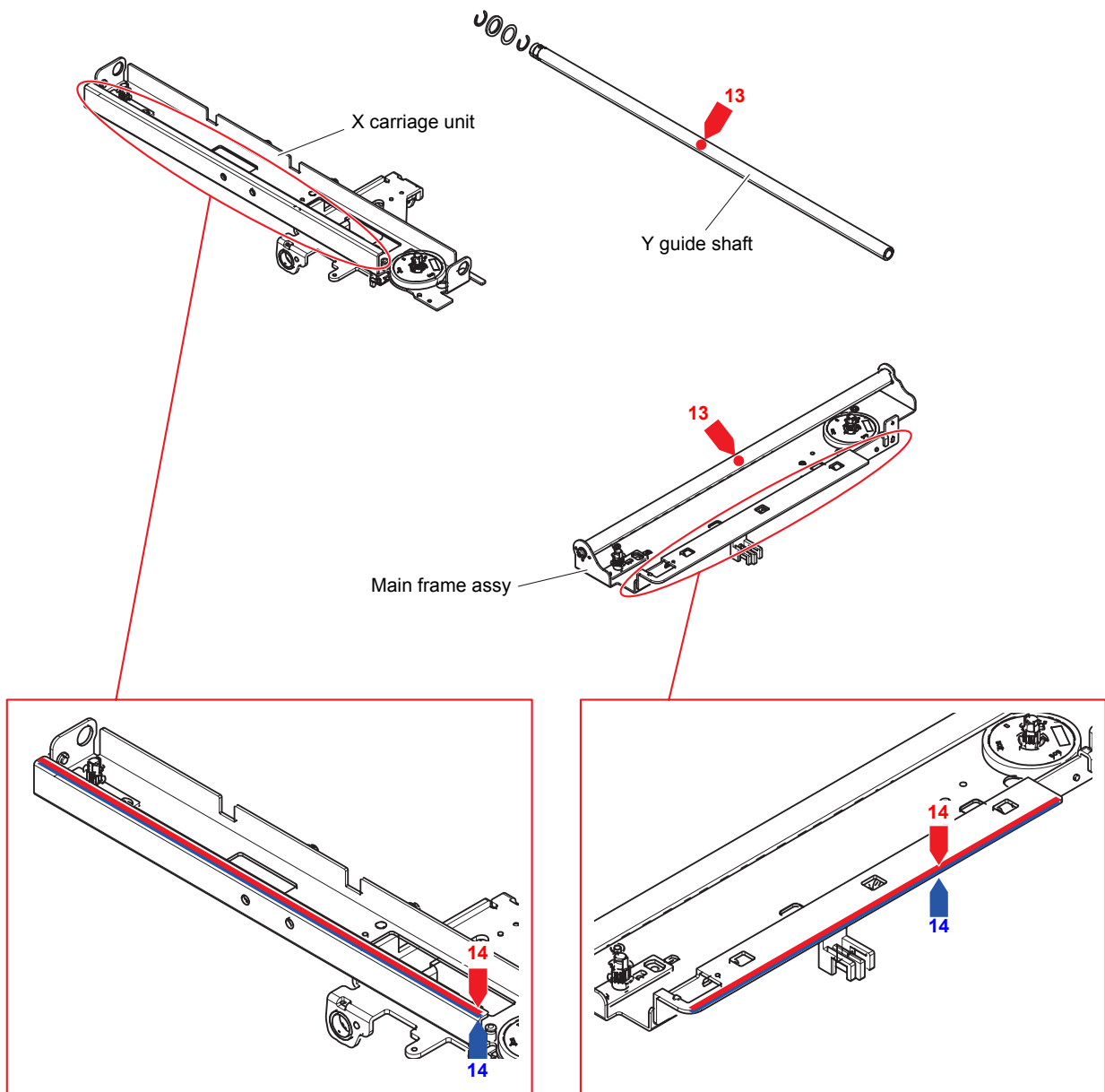
Maintenance

4. Feed module



	Grease/Oil (Parts code)	Spread	Comment
8	FBK OIL RO 100 (XC8388001)	1 - 2 drops	
9	OILER (XZ0206051)	1 - 2 drops	
10	OILER (XZ0206051)	1 - 2 drops	Loosen the screw that is fixation of outer rotary, and float about 1mm, and lubricate from the opened gap.
11	MOLYKOTE EM30L (XC8385001)	Small bead	
12	EPNOC AP(N) 0 (XC8387001)	Small bead	

5. Embroidery unit

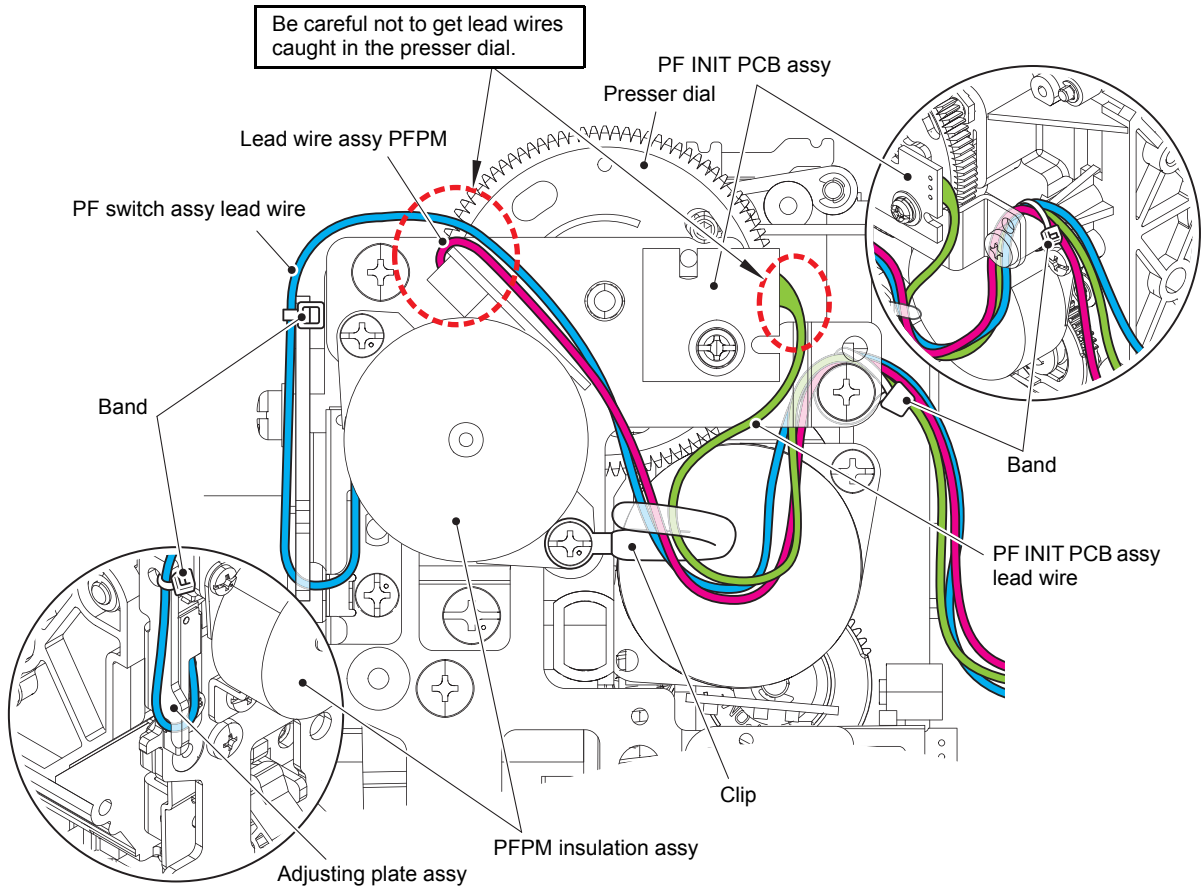


	Grease/Oil (Parts code)	Spread	Comment
13	MOLYKOTE M DISPERSION(XC8386001)	Light covering	
14	EPNOC AP(N) 0 (XC8387001)		Grease on the both sides.

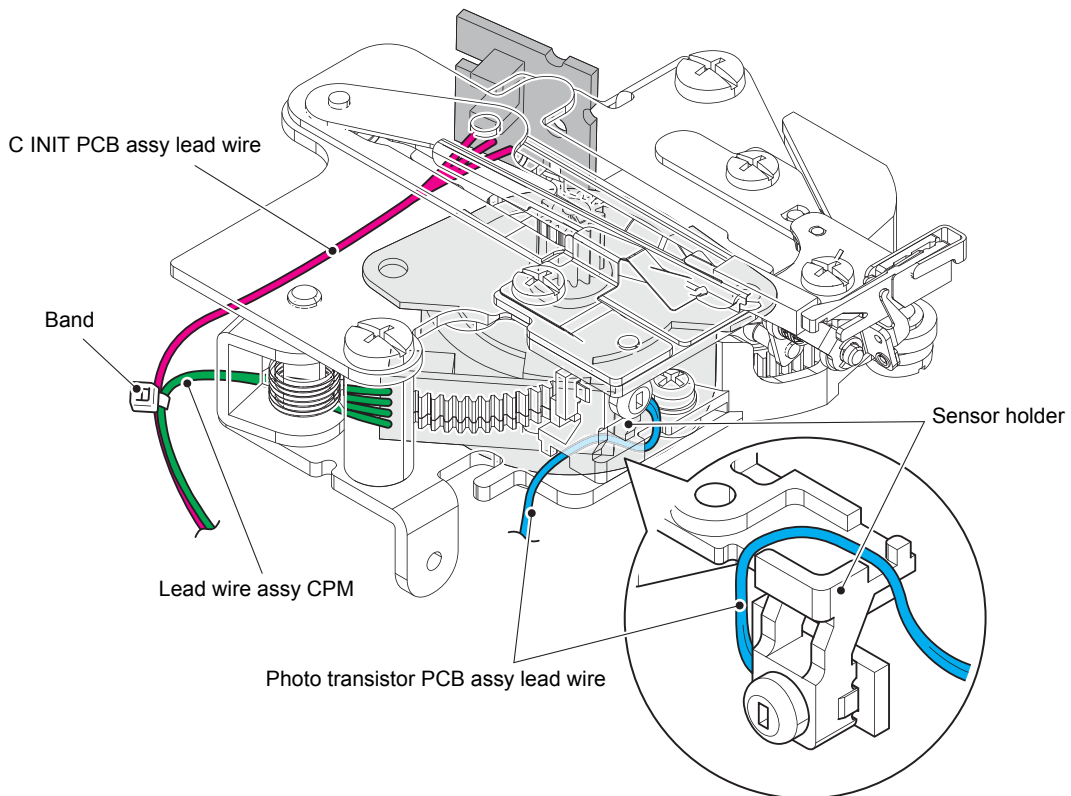
7 Special Instructions of Wiring

Module wiring	7 - 2
Main body wiring	7 - 6
Front cover wiring	7 - 19
Embroidery unit wiring	7 - 23
Dual feed assy wiring	7 - 28

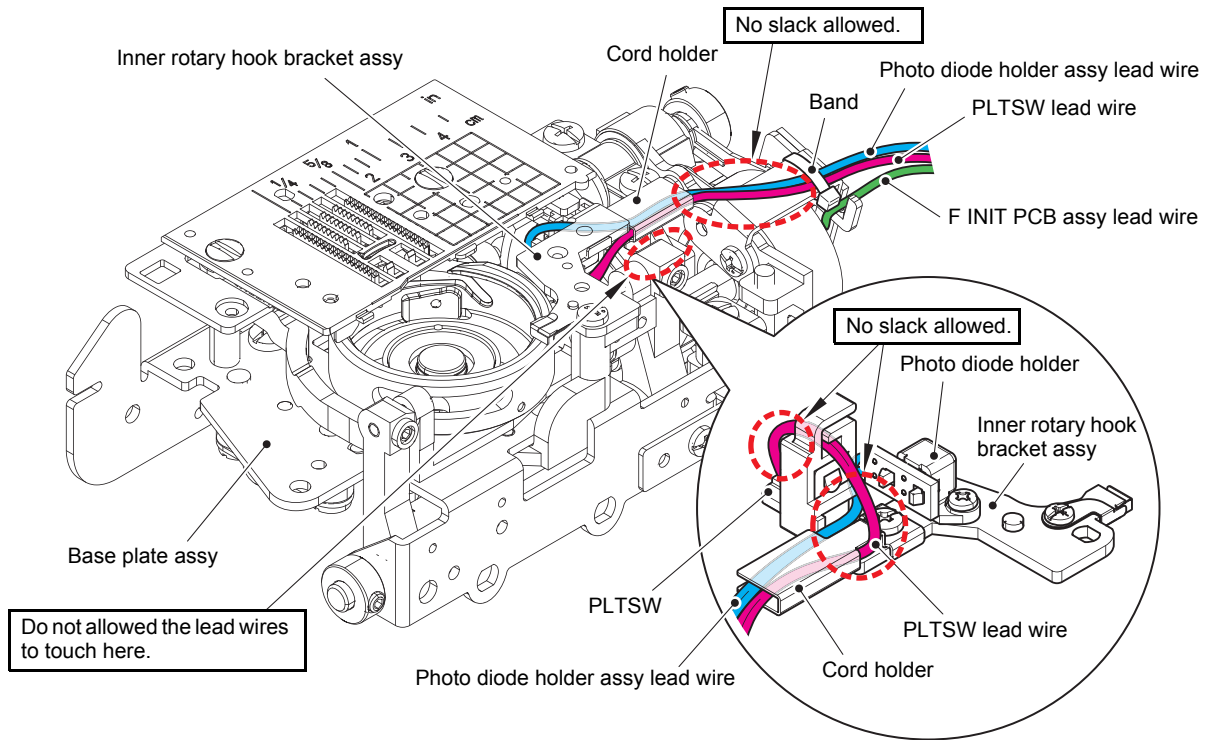
1. Needle bar / Presser foot module



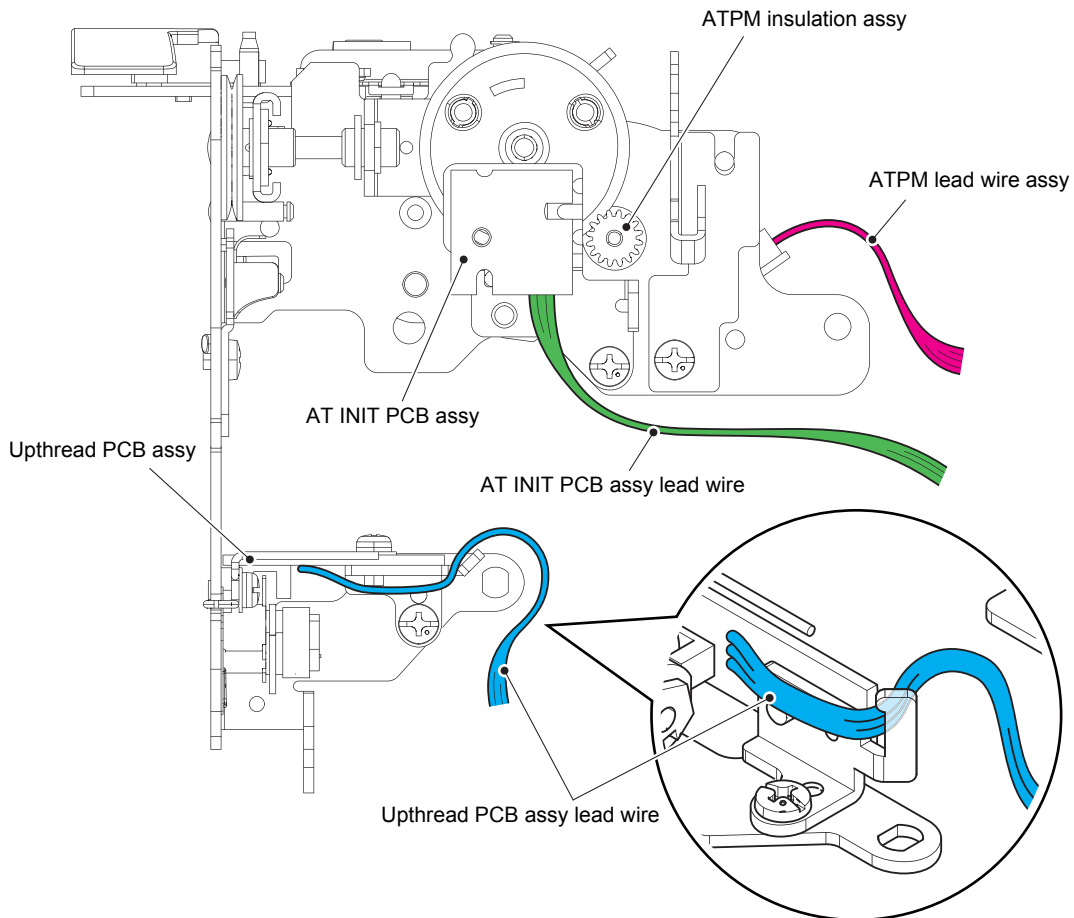
2. Thread cutter module



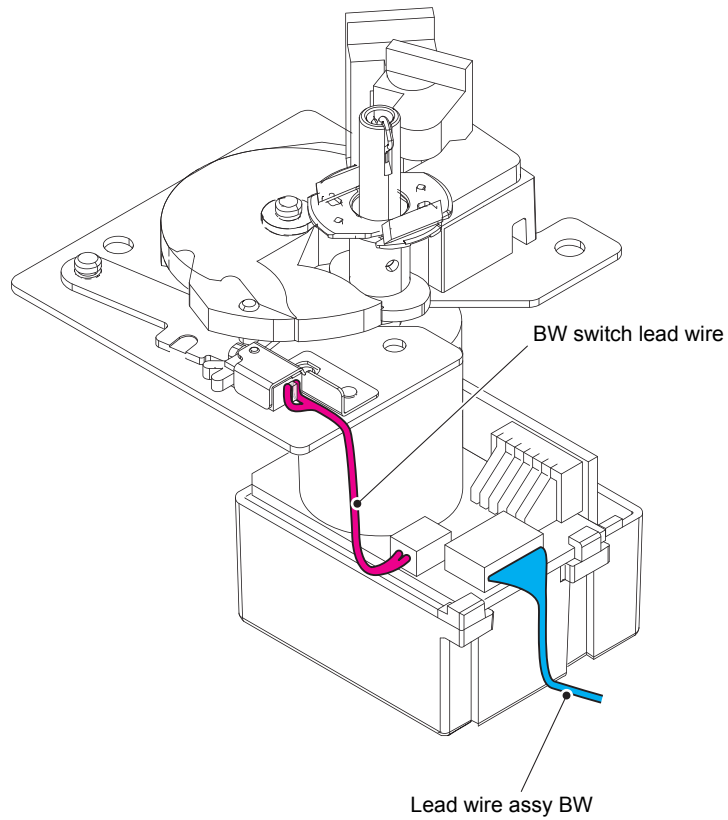
3. Feed module



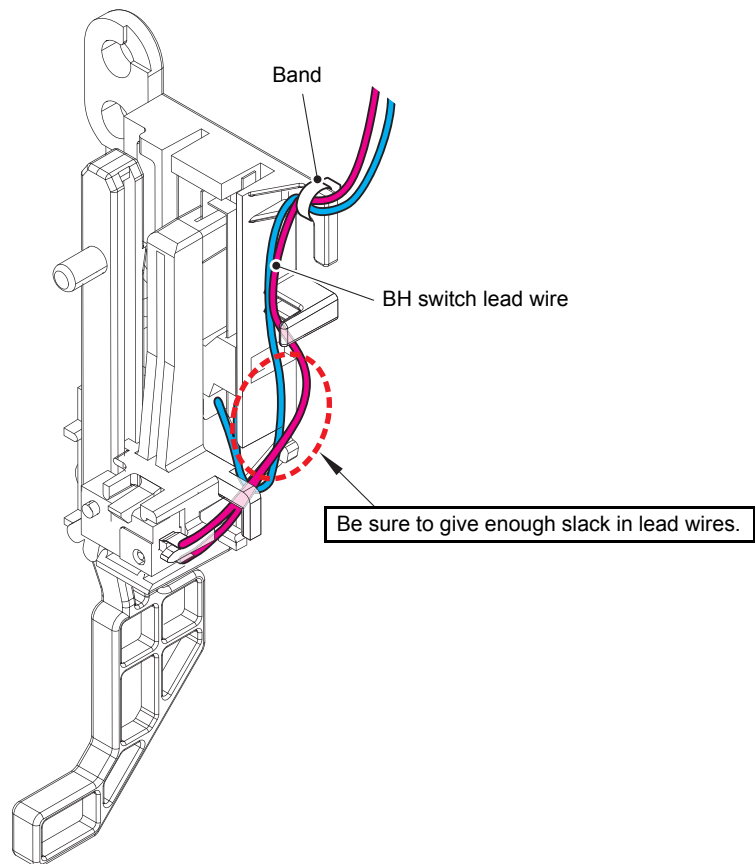
4. Needle thread module



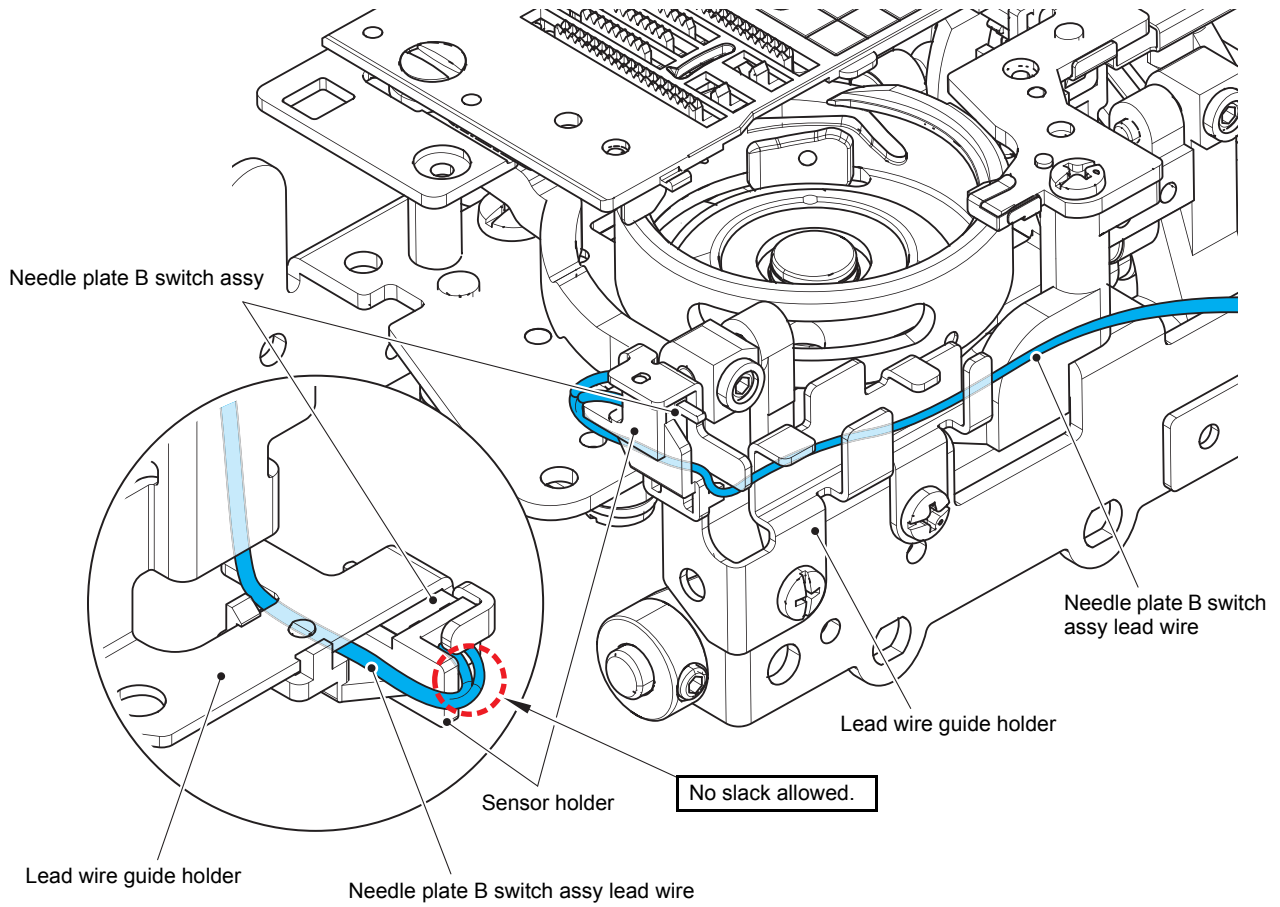
5. Bobbin winder unit



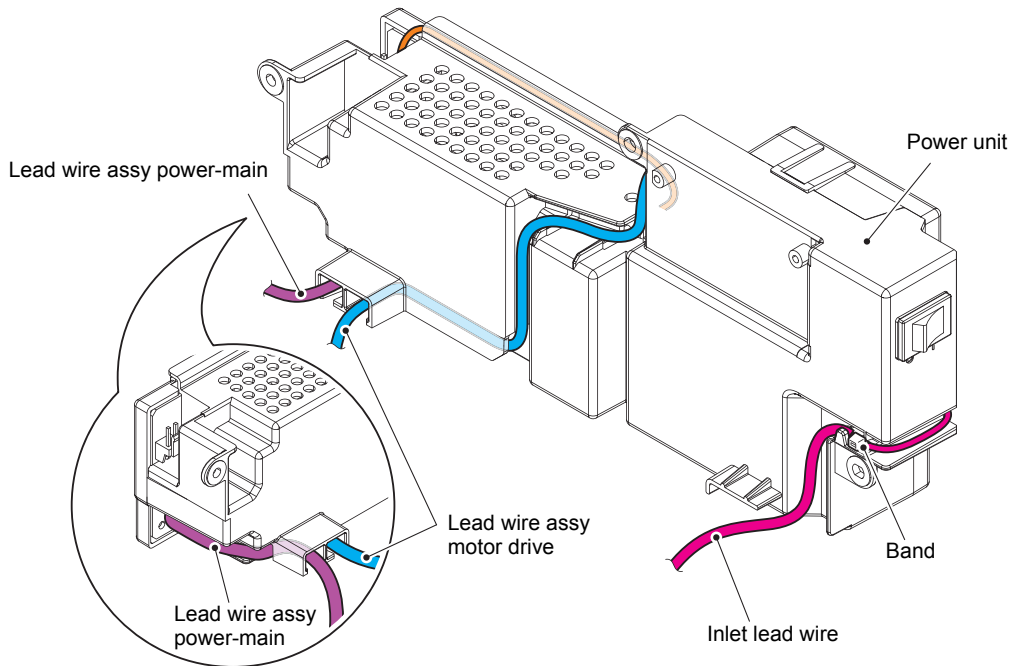
6. BH switch assy



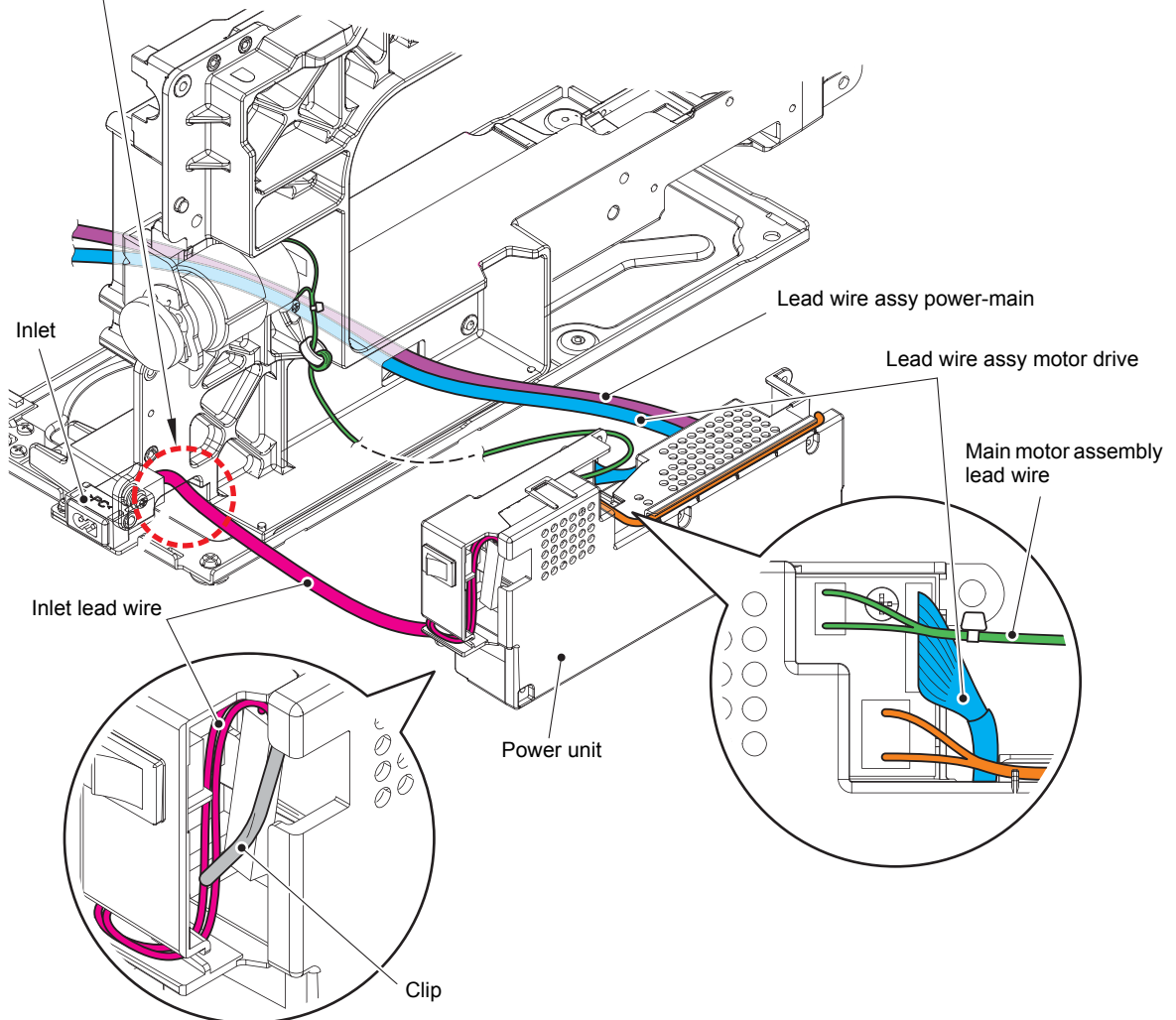
7. Needle plate B switch assy



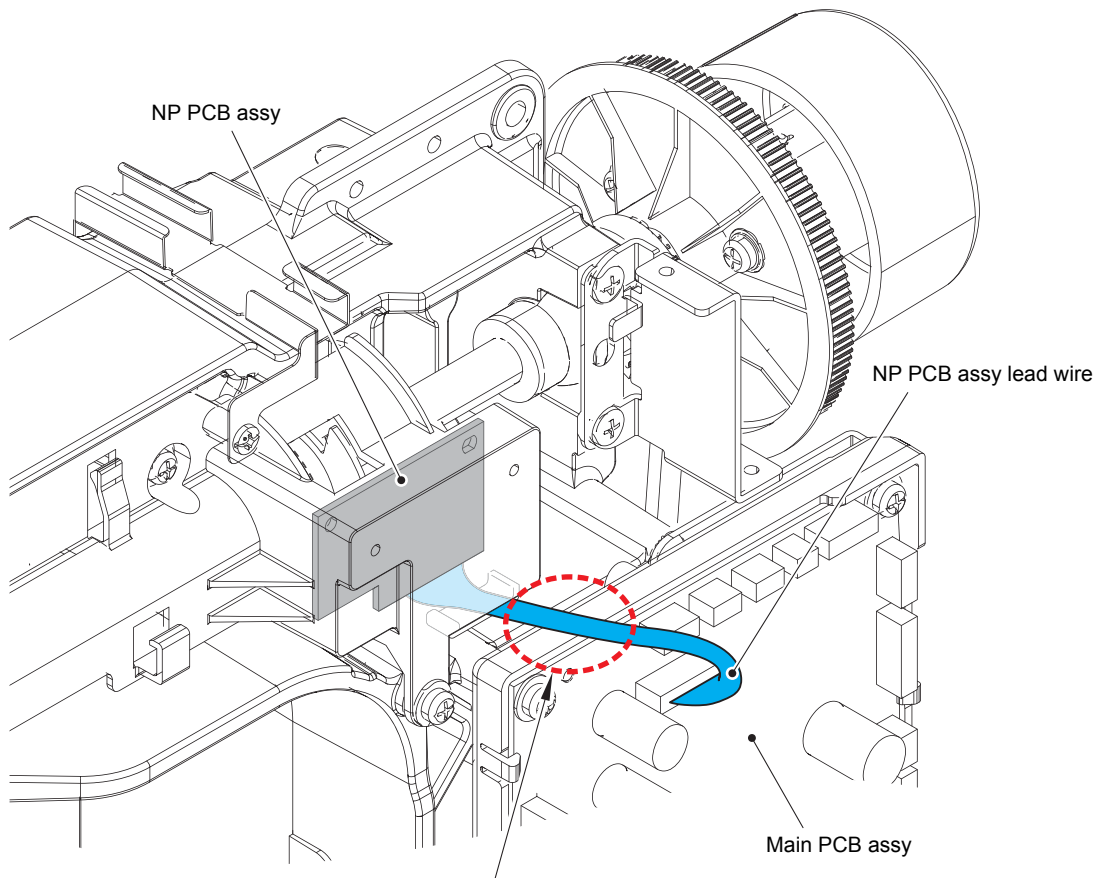
1. Power unit



Be careful not to get the inlet lead wire caught while attaching the power unit.

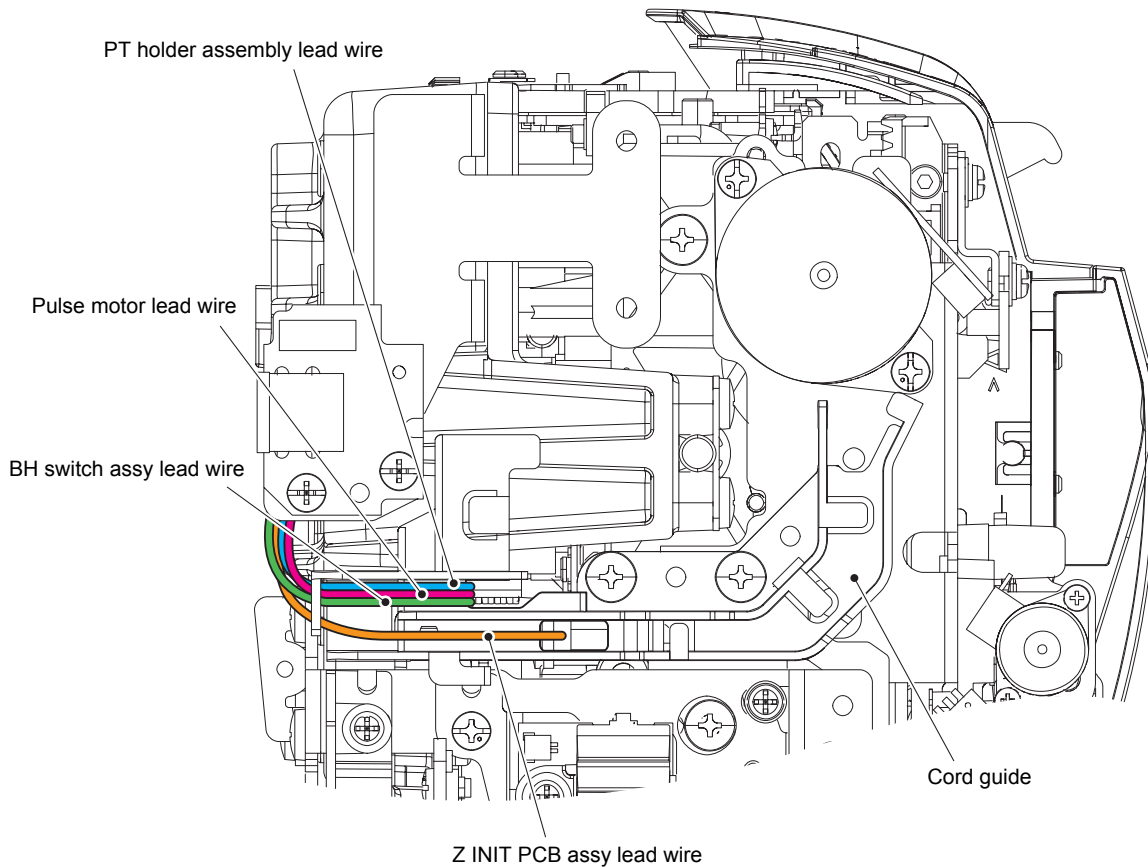


2. NP PCB assy

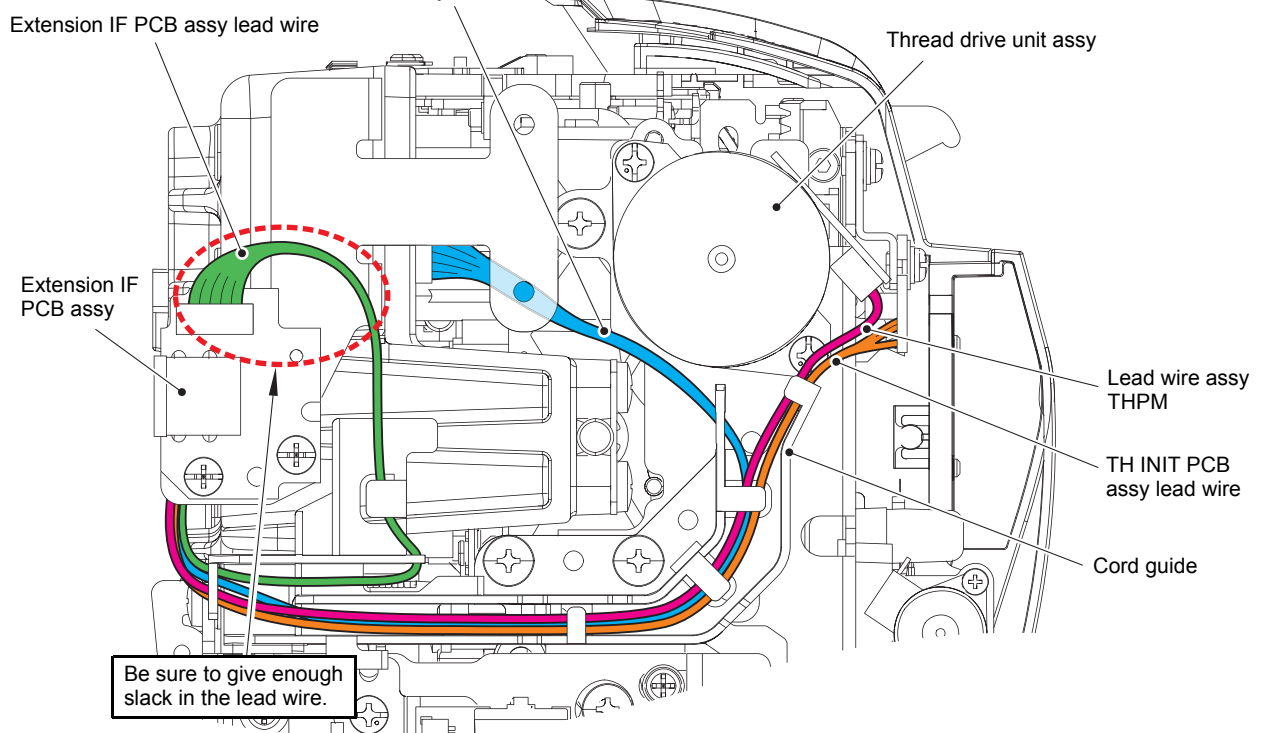


Be careful not to get the NP PCB assy lead wire caught while attaching the main PCB assy.

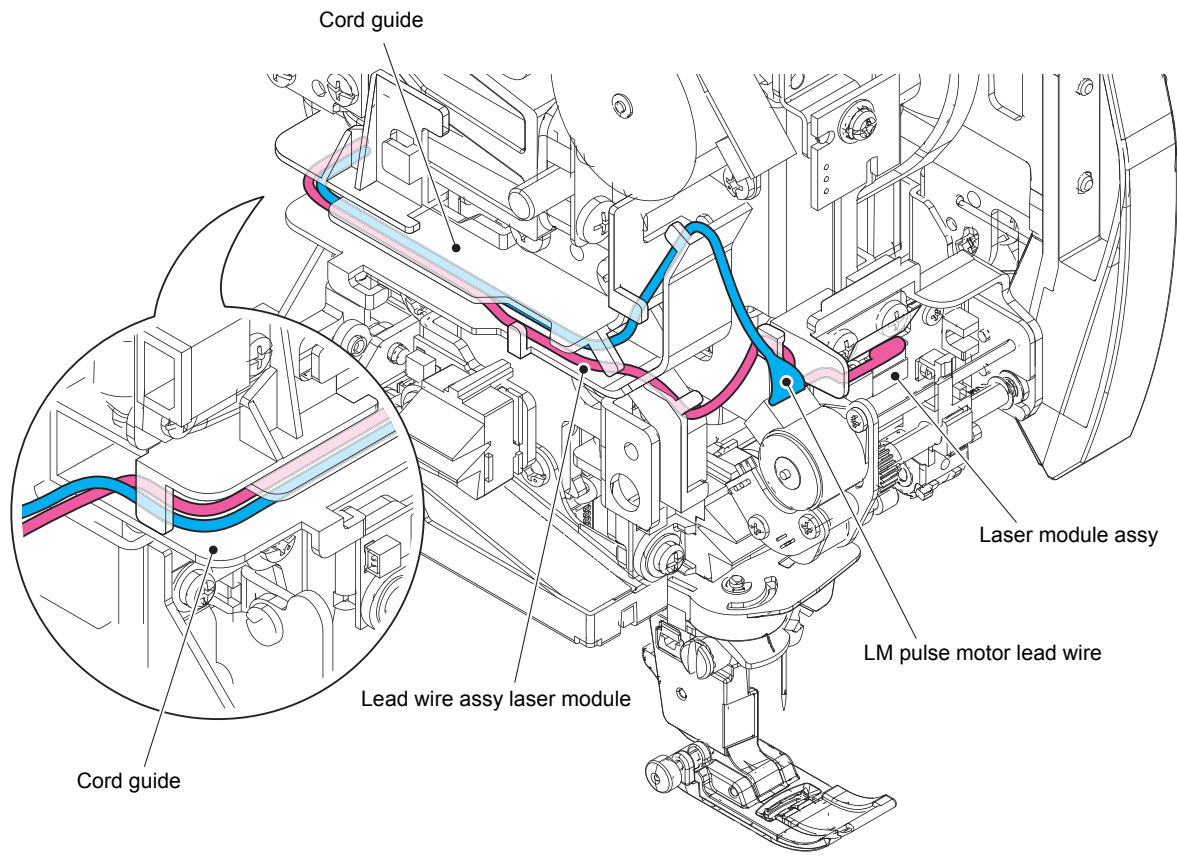
3. Cord guide



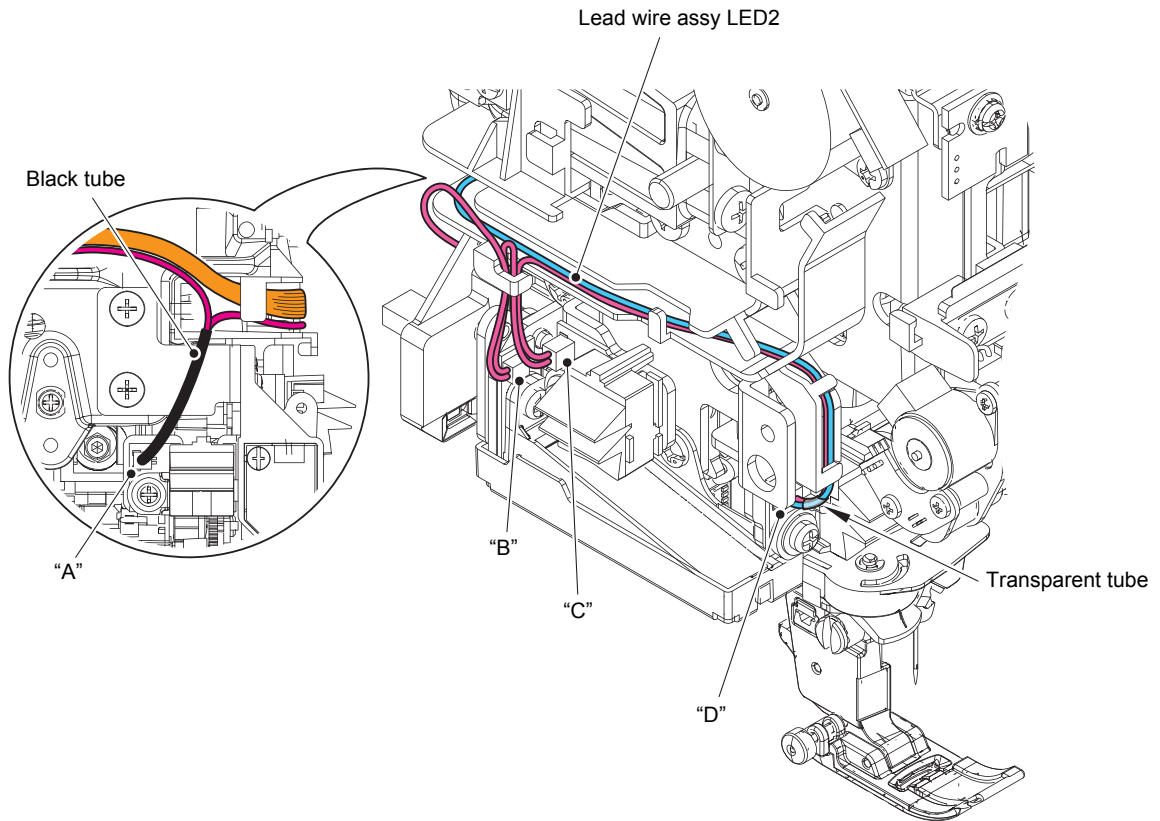
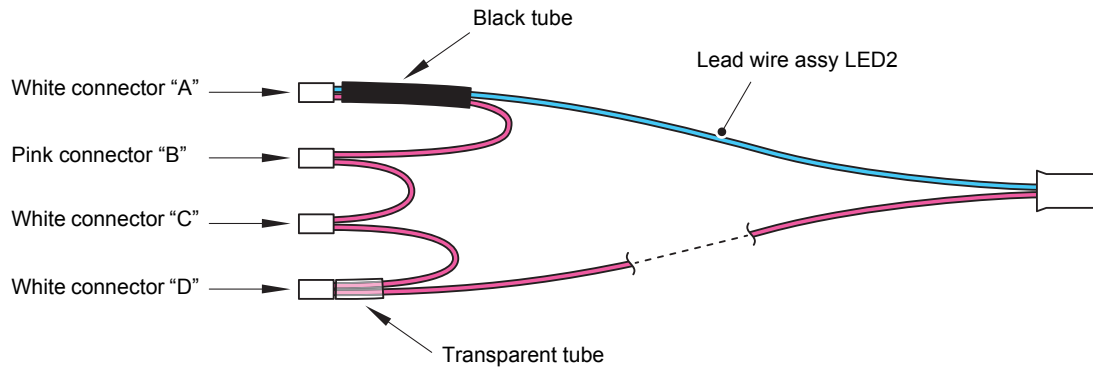
- Lead wire assy PFPM
- PF INIT PCB assy lead wire
- PF switch assy lead wire



4. Laser module assy



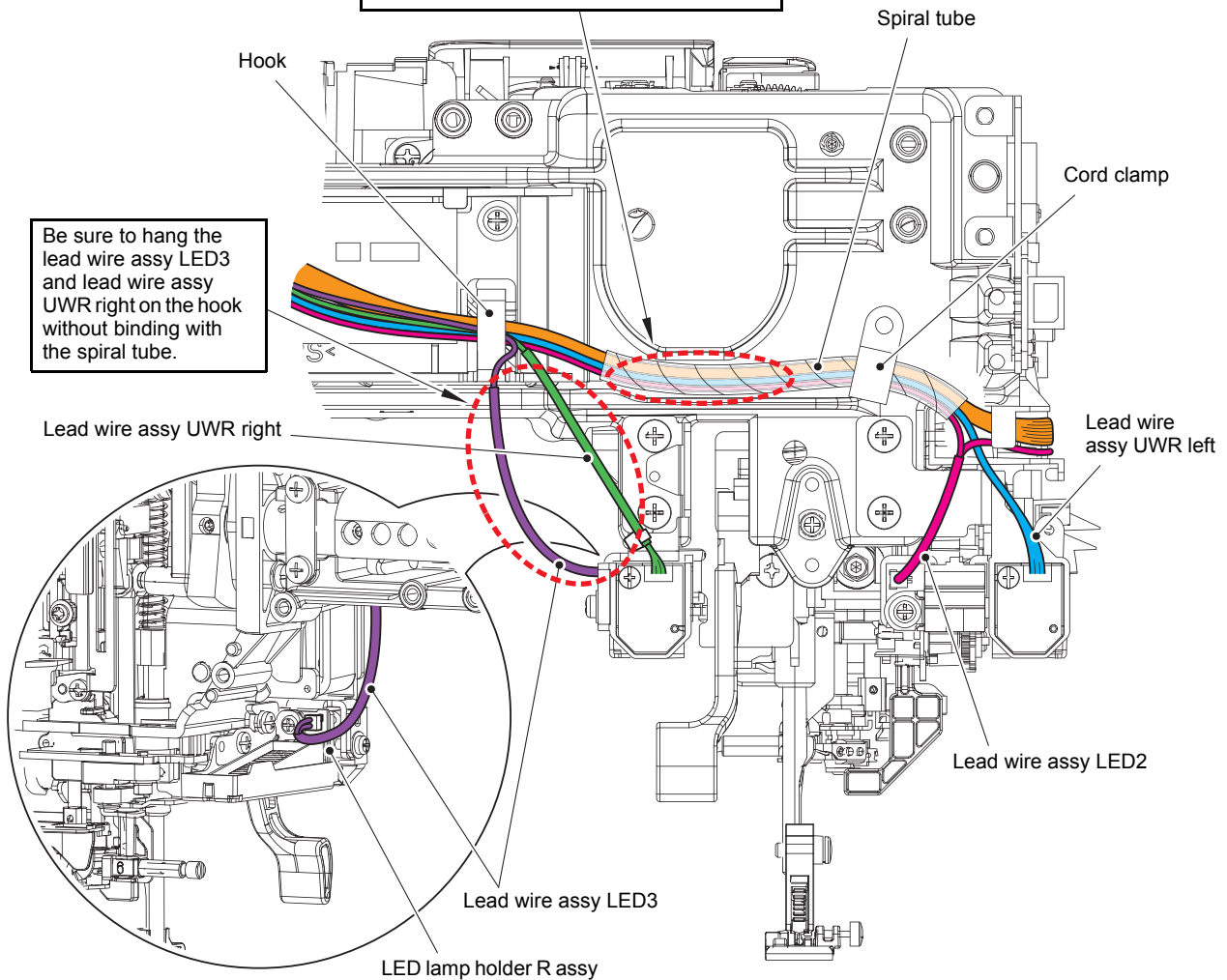
5. Lead wire assy LED2



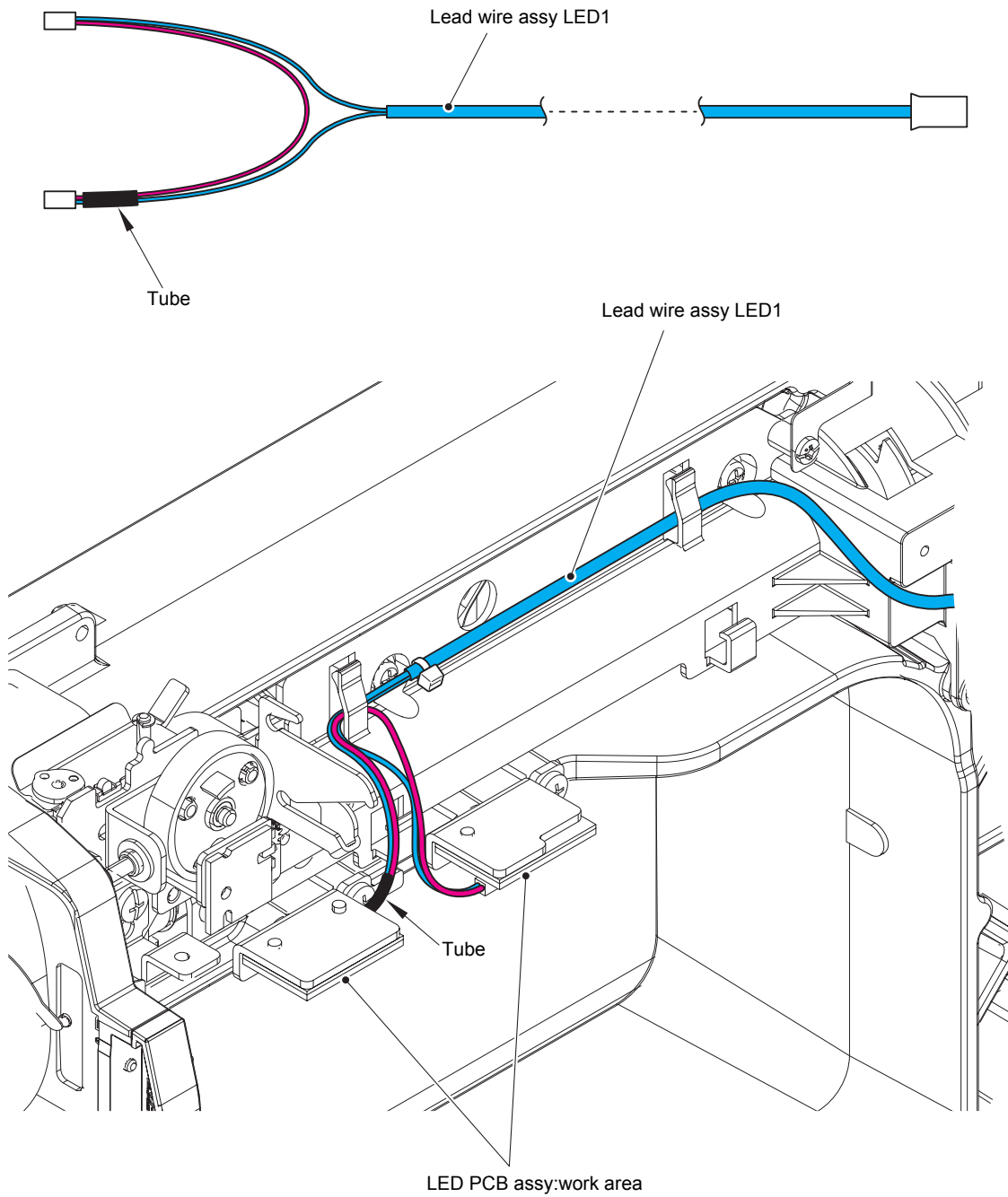
6. Bind up lead wires with Spiral tube

Lead wires to be bound with the spiral tube:

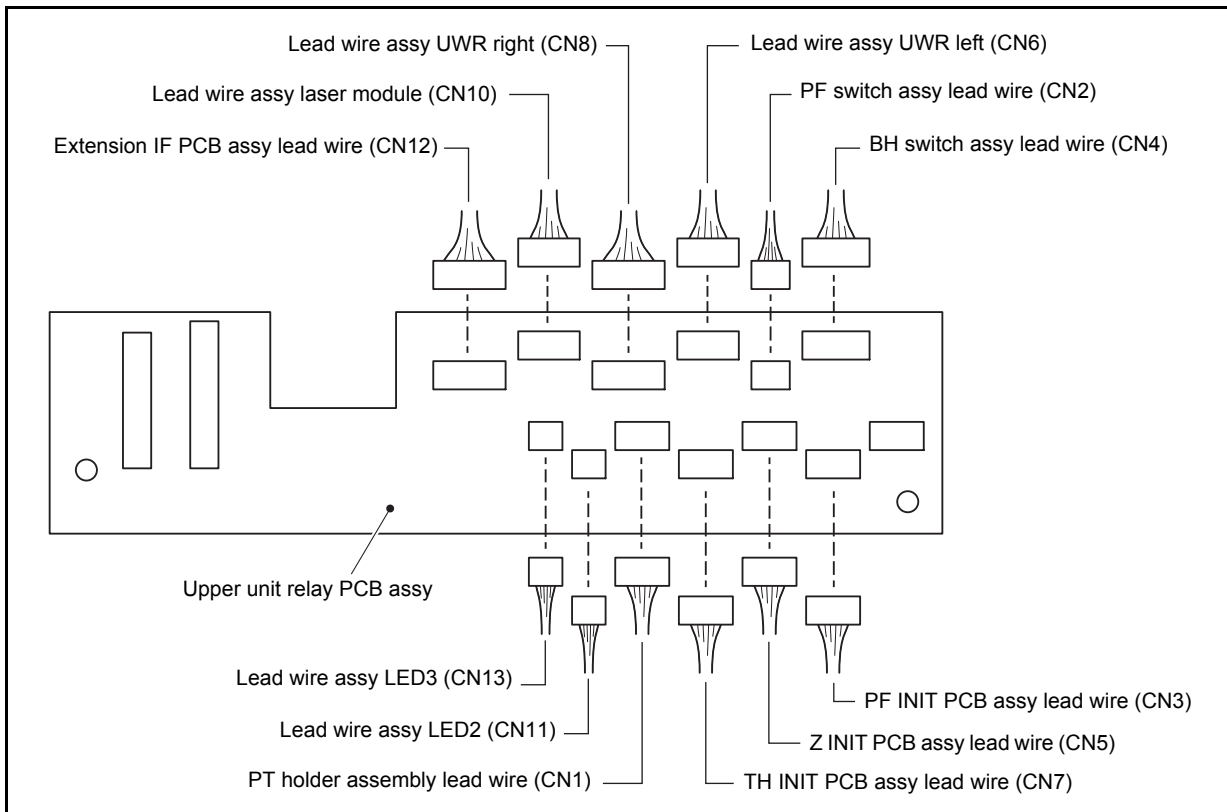
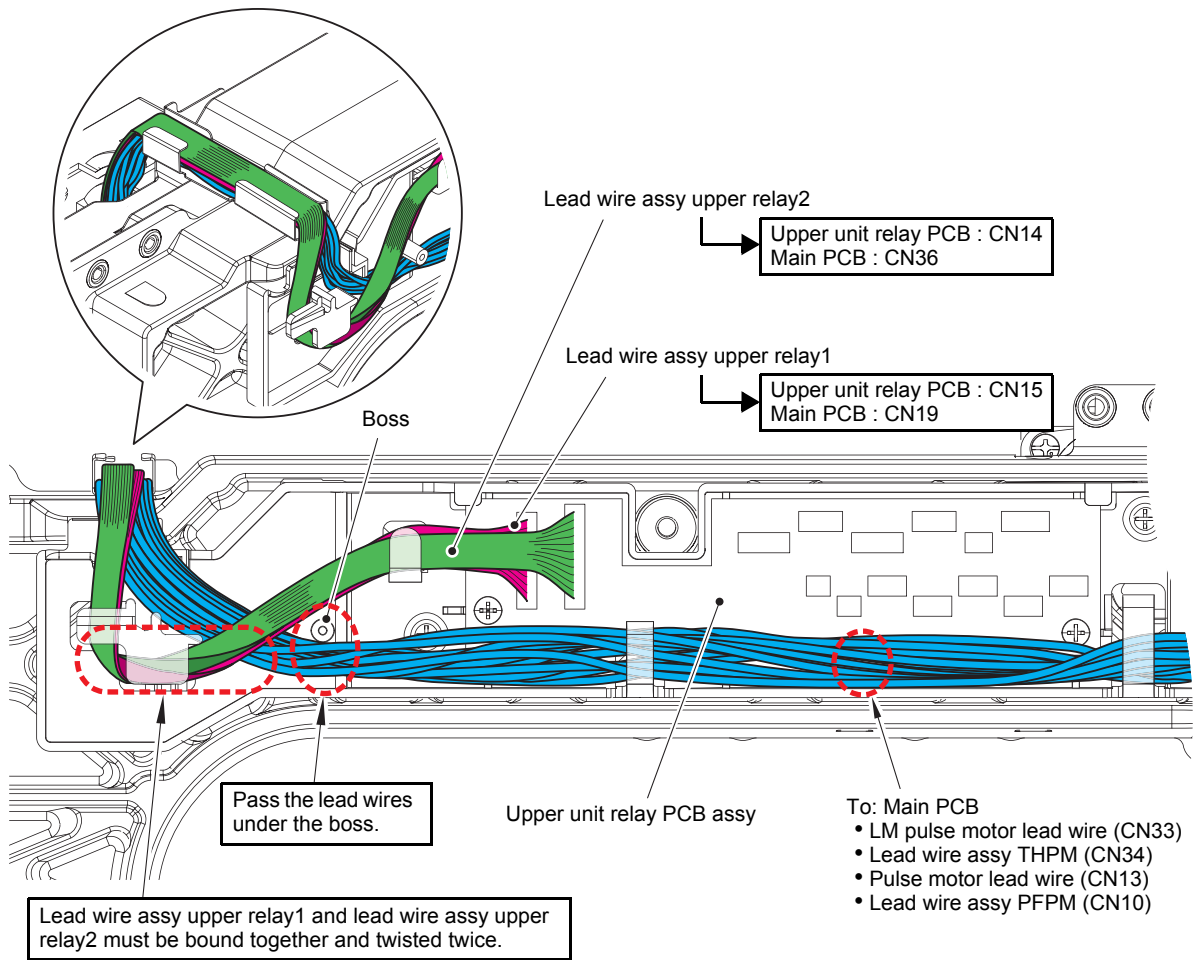
- PT holder assembly lead wire
- Pulse motor lead wire
- BH switch assy lead wire
- Z INIT PCB assy lead wire
- Lead wire assy UWR left
- Lead wire assy LED2
- Extension IF PCB assy lead wire
- Lead wire assy PFPM
- PF INIT PCB assy lead wire
- PF switch assy lead wire
- Lead wire assy laser module
- LM pulse motor lead wire
- Lead wire assy THPM
- TH INIT PCB assy lead wire



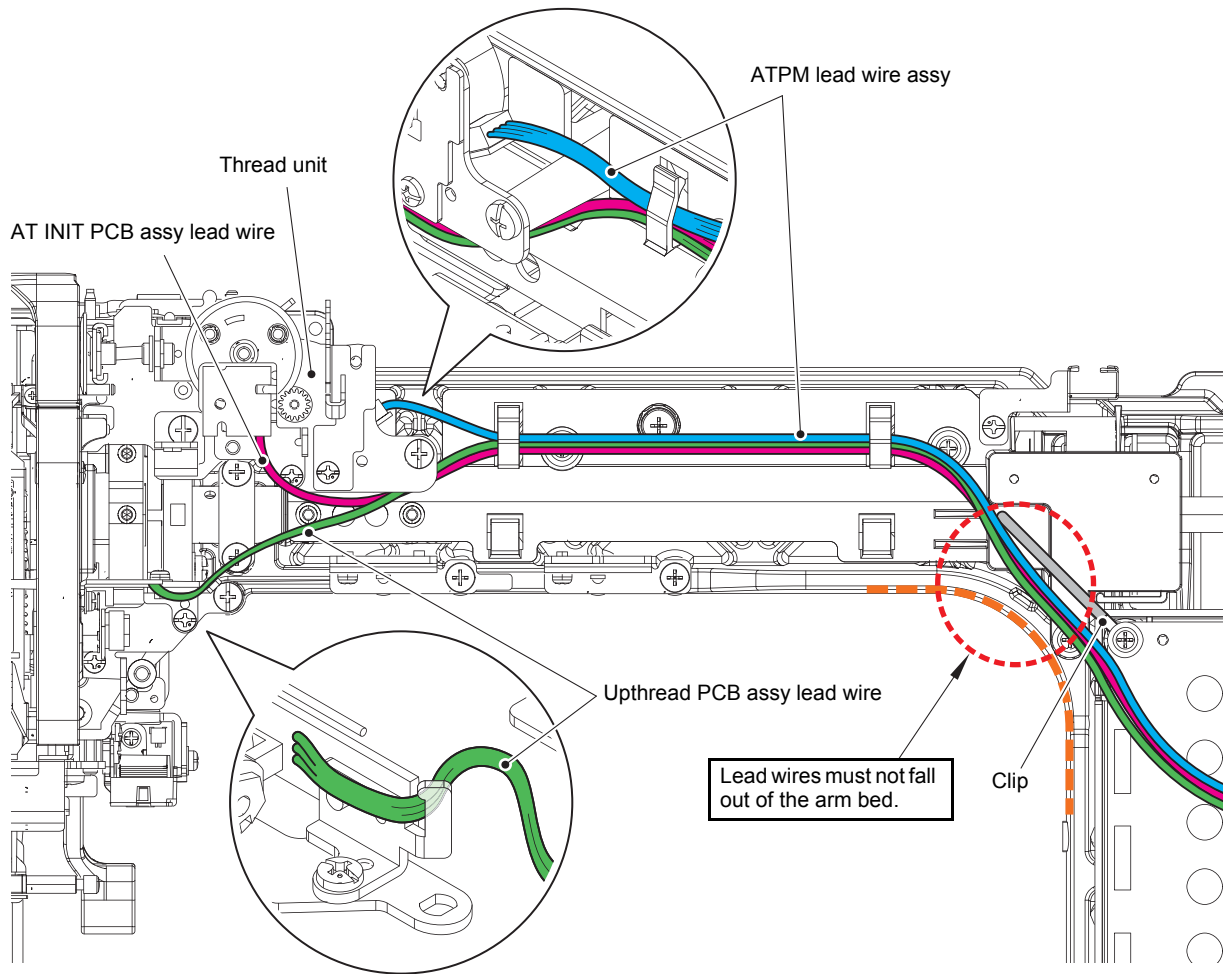
7. Lead wire assy LED1



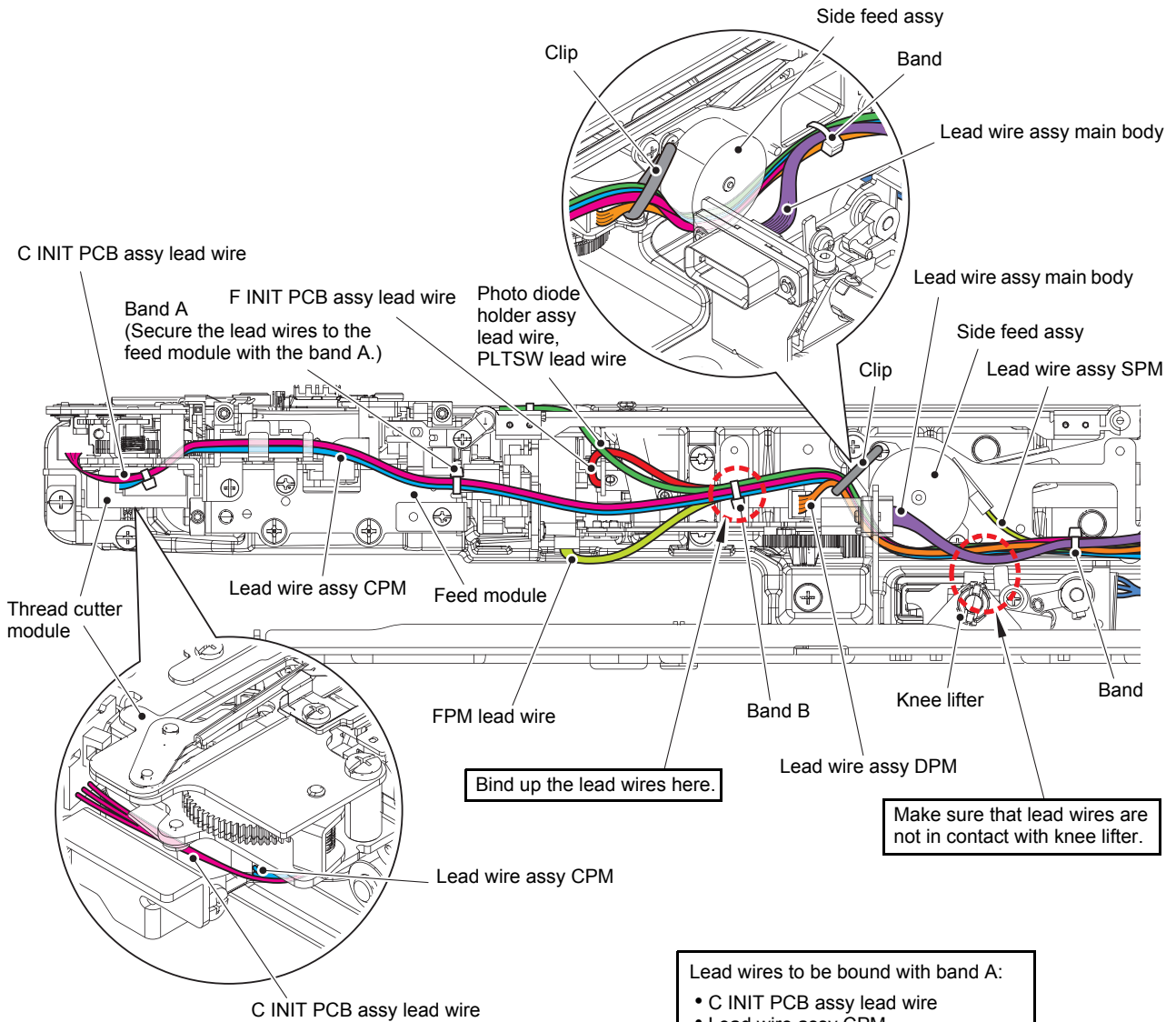
8. Upper unit relay PCB assy



9. Thread unit



10. Thread cutter module / Feed module / Side feed assy



- Lead wires to be bound with band A:
- C INIT PCB assy lead wire
 - Lead wire assy CPM
 - Photo transistor PCB assy lead wire
 - Needle plate B switch assy lead wire

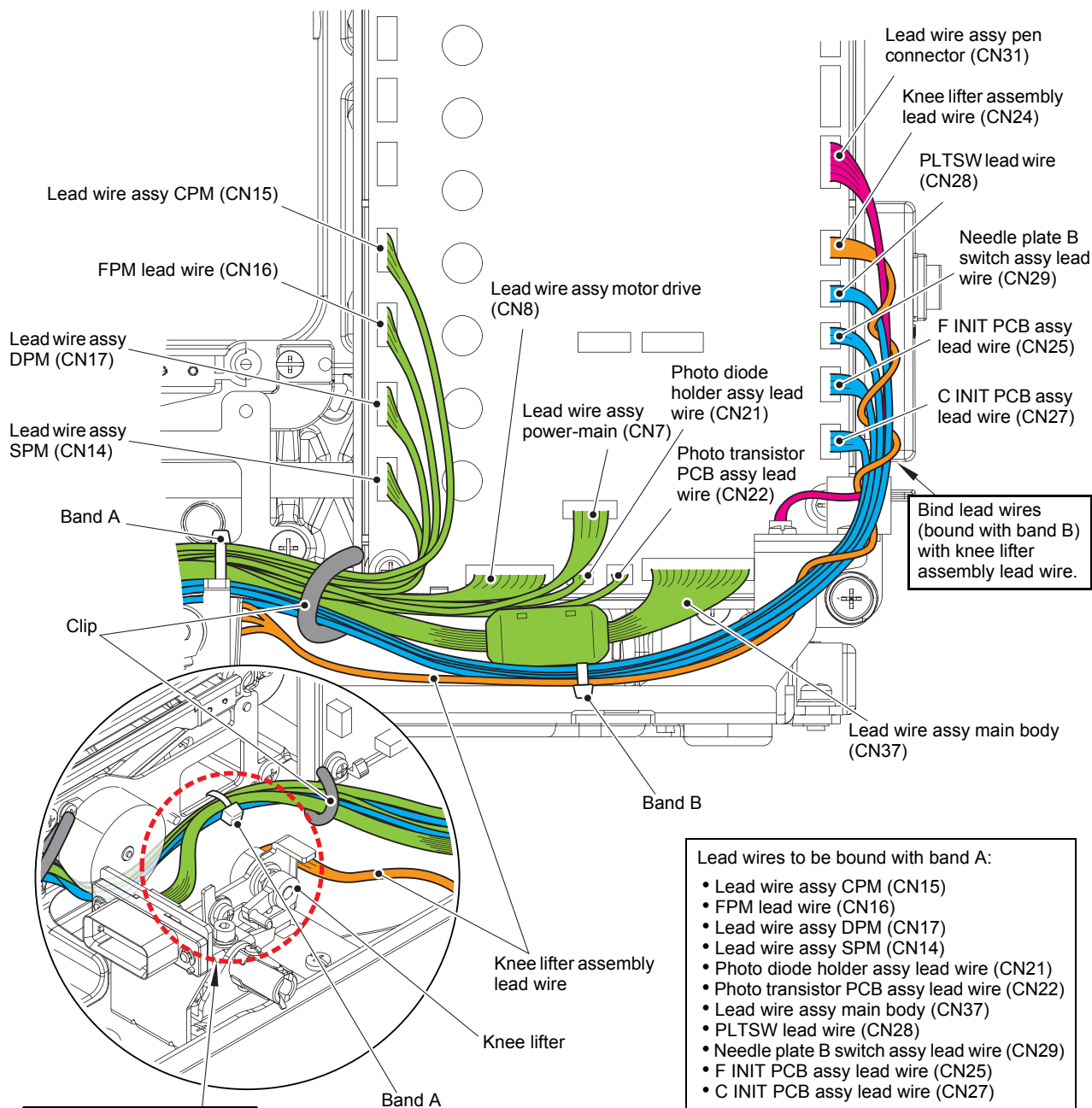
- Lead wires to be bound with band B:
- C INIT PCB assy lead wire
 - Lead wire assy CPM
 - Photo transistor PCB assy lead wire
 - Needle plate B switch assy lead wire
 - Photo diode holder assy lead wire
 - PLTSW lead wire
 - FPM lead wire
 - F INIT PCB assy lead wire

- Lead wires to be secured with clip:
- Lead wires bound with band A
 - Lead wires bound with band B
 - Lead wire assy DPM

Special Instructions
of Wiring

Special Instructions
of Wiring

11. Lower side of Main PCB



Make sure that lead wires are not in contact with the knee lifter.

- Lead wires to be secured with clip:
- Lead wire assy CPM (CN15)
 - FPM lead wire (CN16)
 - Lead wire assy DPM (CN17)
 - Lead wire assy SPM (CN14)
 - Lead wire assy motor drive (CN8)
 - Lead wire assy power-main (CN7)
 - Photo diode holder assy lead wire (CN21)
 - Photo transistor PCB assy lead wire (CN22)
 - Lead wire assy main body (CN37)
 - PLTSW lead wire (CN28)
 - Needle plate B switch assy lead wire (CN29)
 - F INIT PCB assy lead wire (CN25)
 - C INIT PCB assy lead wire (CN27)

- Lead wires to be bound with band A:
- Lead wire assy CPM (CN15)
 - FPM lead wire (CN16)
 - Lead wire assy DPM (CN17)
 - Lead wire assy SPM (CN14)
 - Photo diode holder assy lead wire (CN21)
 - Photo transistor PCB assy lead wire (CN22)
 - Lead wire assy main body (CN37)
 - PLTSW lead wire (CN28)
 - Needle plate B switch assy lead wire (CN29)
 - F INIT PCB assy lead wire (CN25)
 - C INIT PCB assy lead wire (CN27)

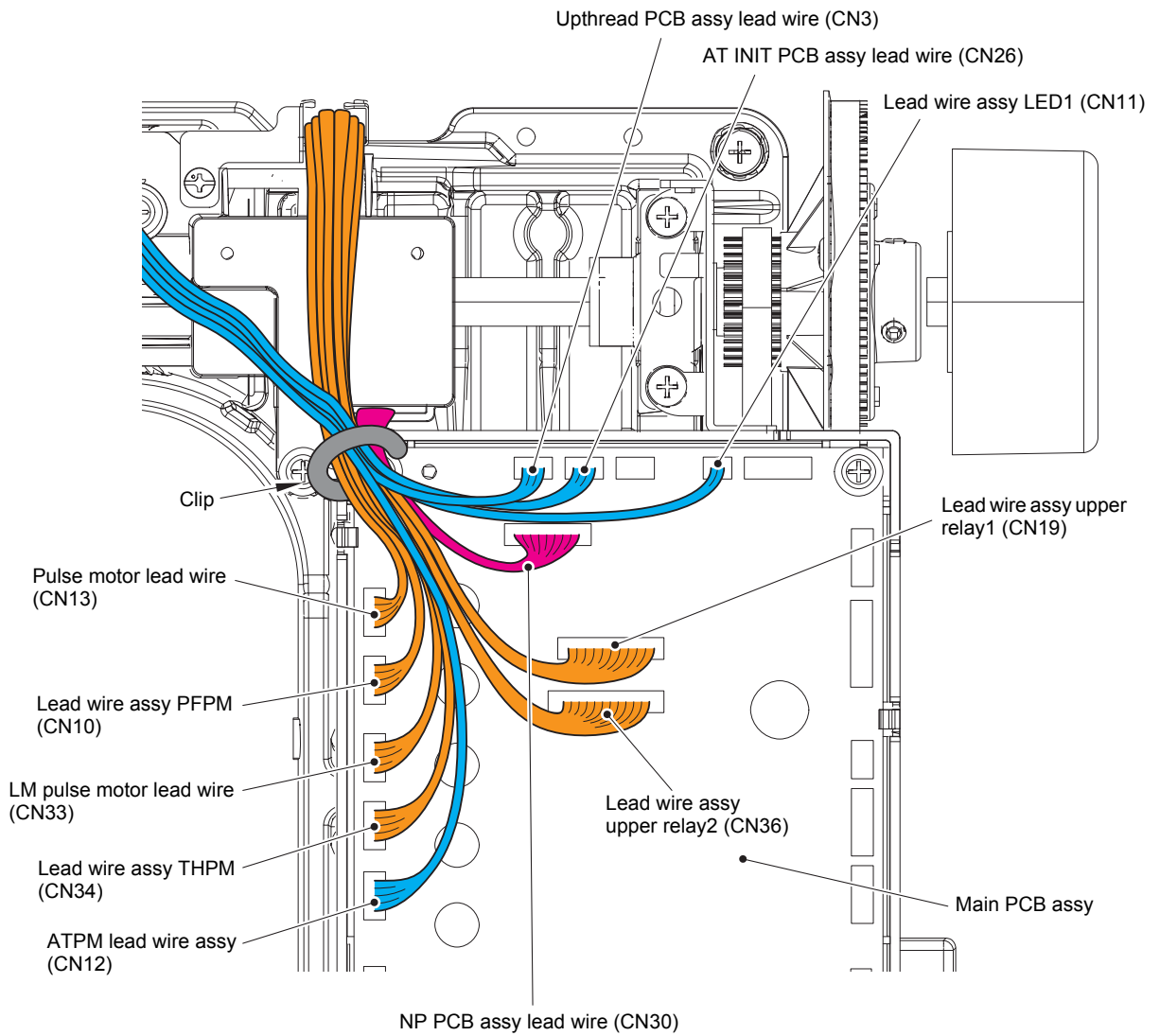
- Lead wires to be bound with band B:
- Knee lifter assembly lead wire (CN24)
 - PLTSW lead wire (CN28)
 - Needle plate B switch assy lead wire (CN29)
 - F INIT PCB assy lead wire (CN25)
 - C INIT PCB assy lead wire (CN27)

- Lead wires to be bound with CN24:
- Lead wire assy pen connector (CN31)
 - PLTSW lead wire (CN28)
 - Needle plate B switch assy lead wire (CN29)
 - F INIT PCB assy lead wire (CN25)
 - C INIT PCB assy lead wire (CN27)

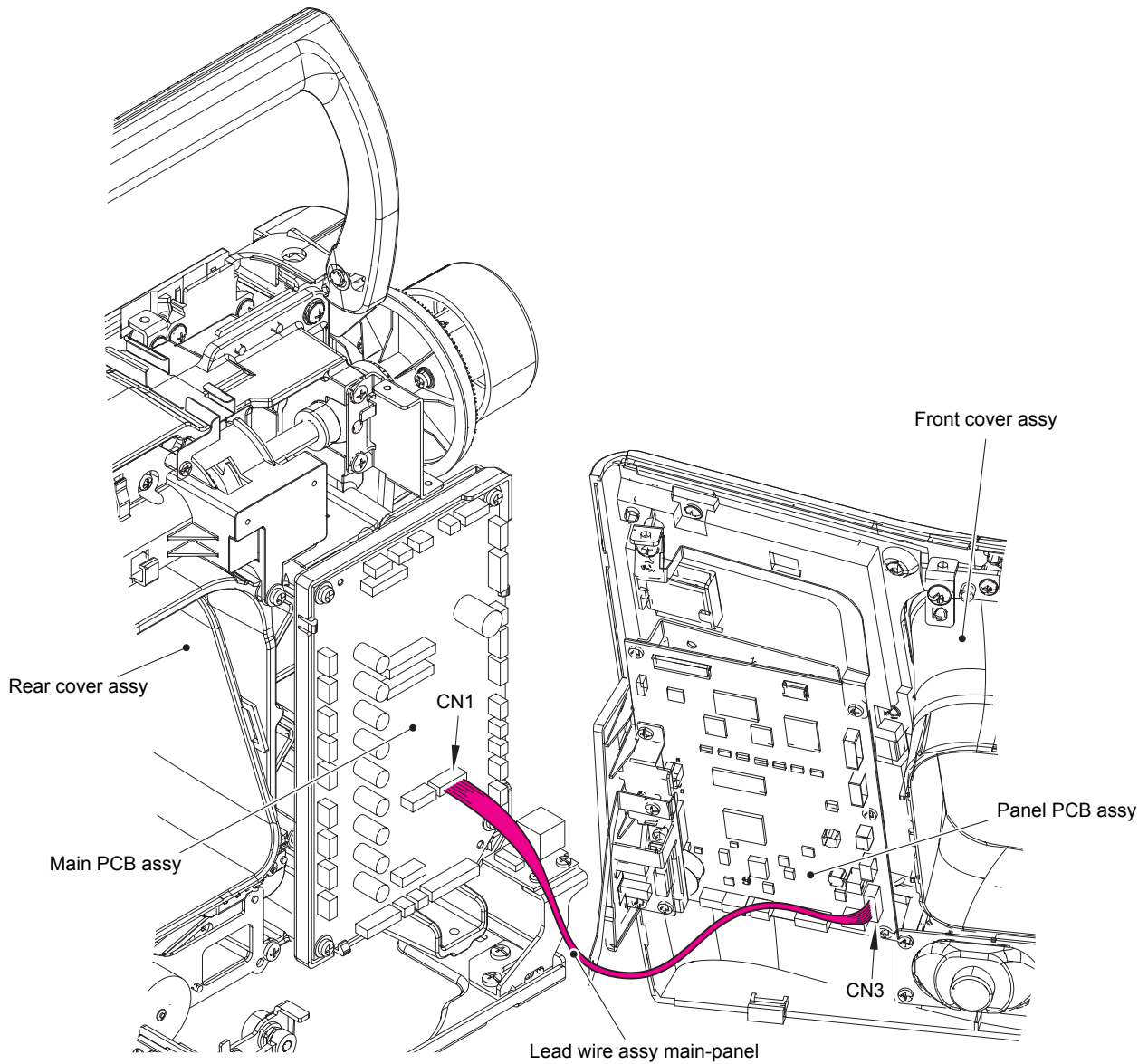
Special Instructions
of Wiring

Special Instructions
of Wiring

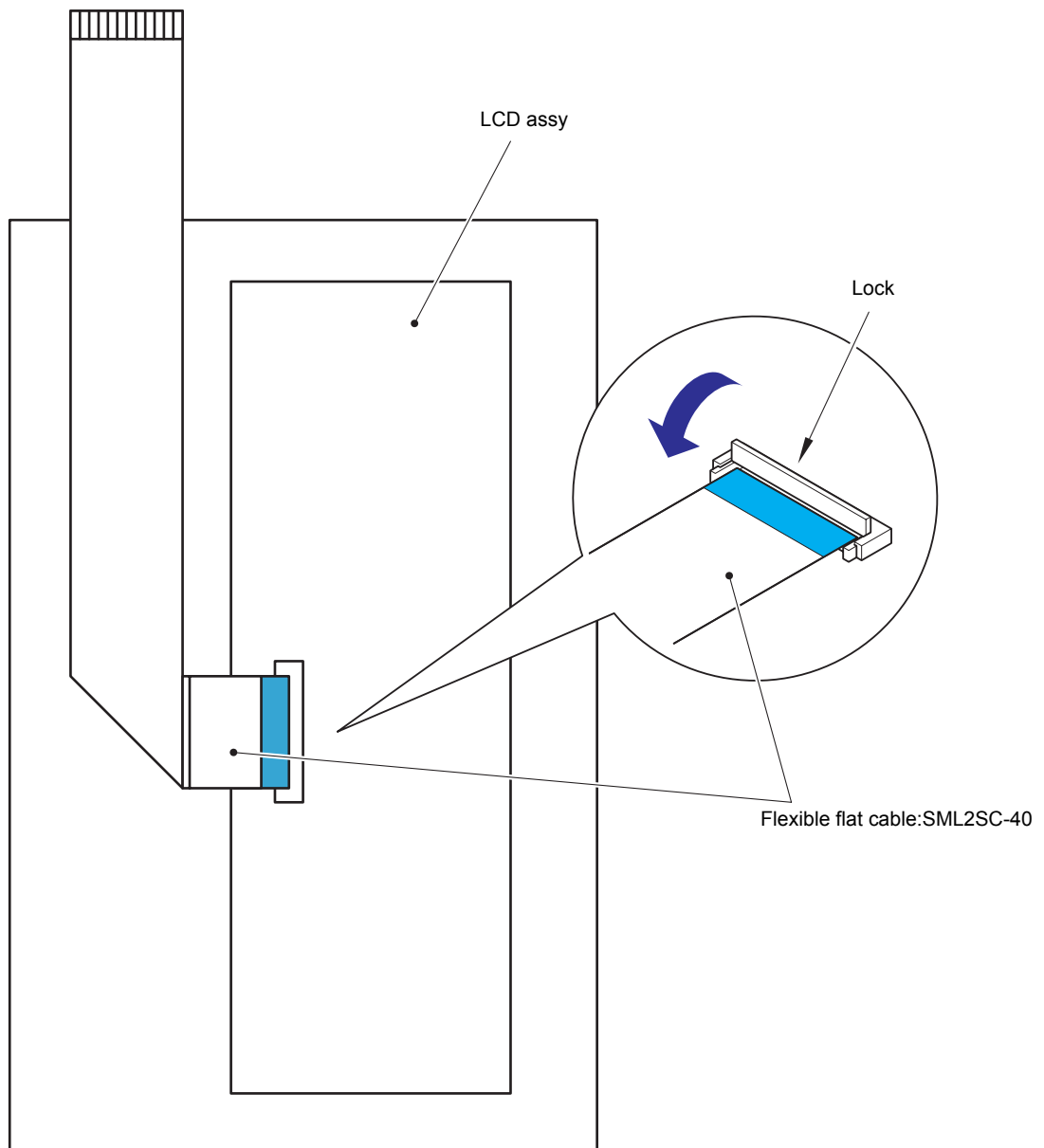
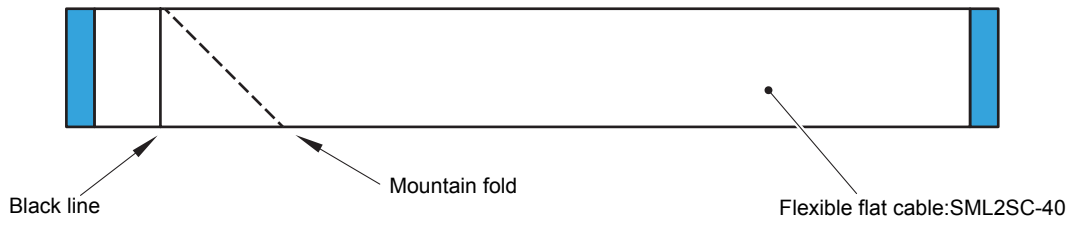
12. Upper side of Main PCB



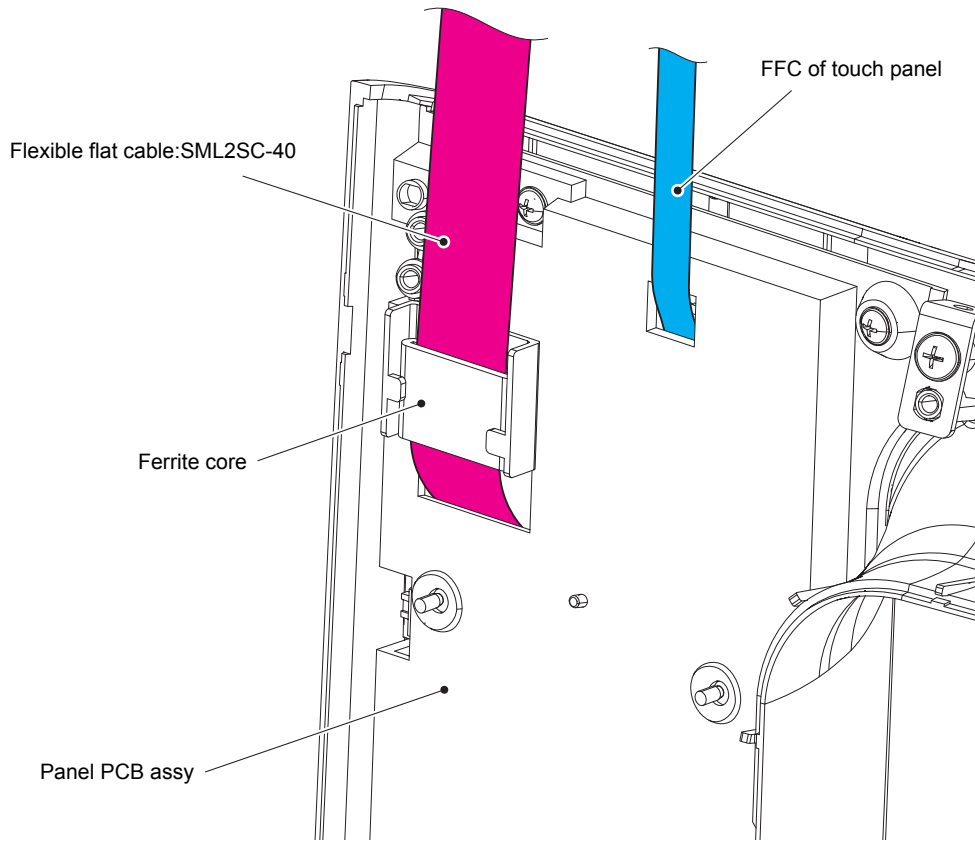
13. Lead wire assy main-panel



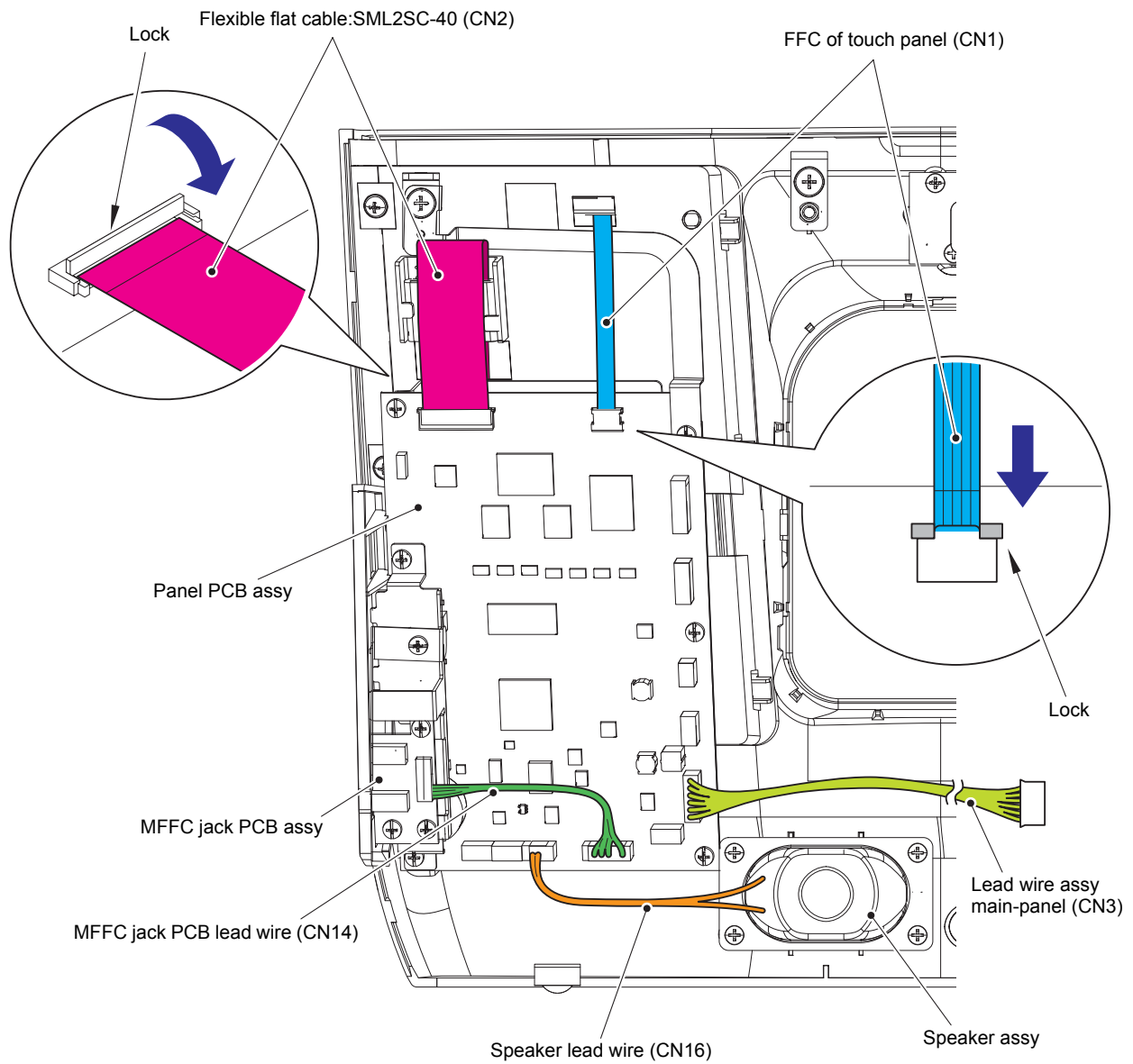
1. LCD assy



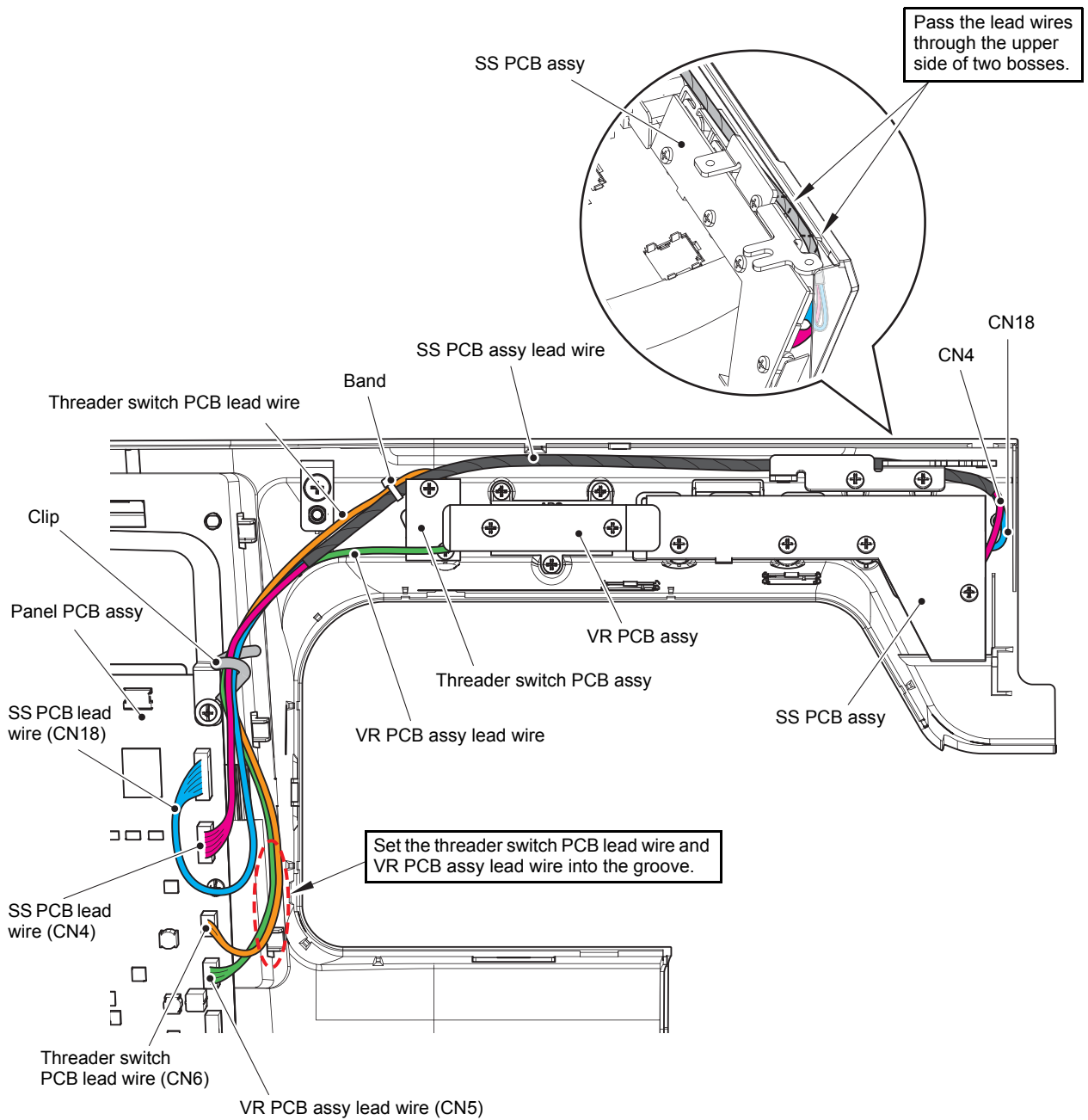
2. Left side of Front cover assy



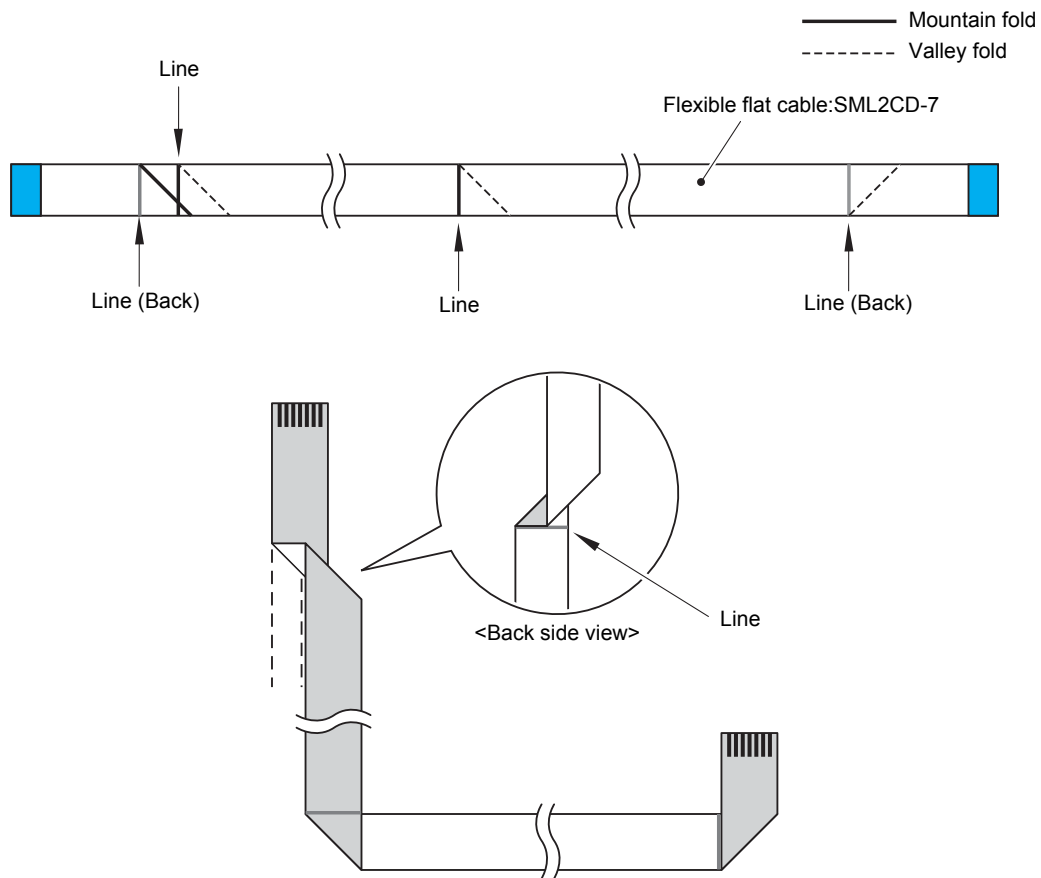
3. Panel PCB assy



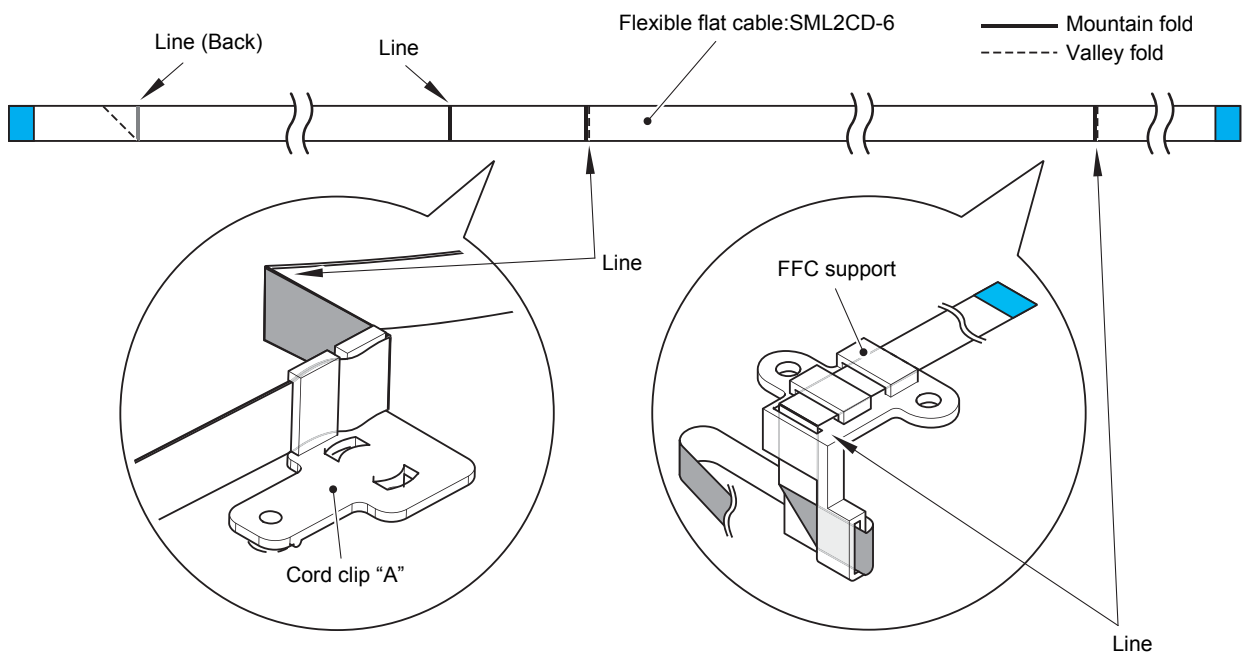
4. Right side of Front cover assy



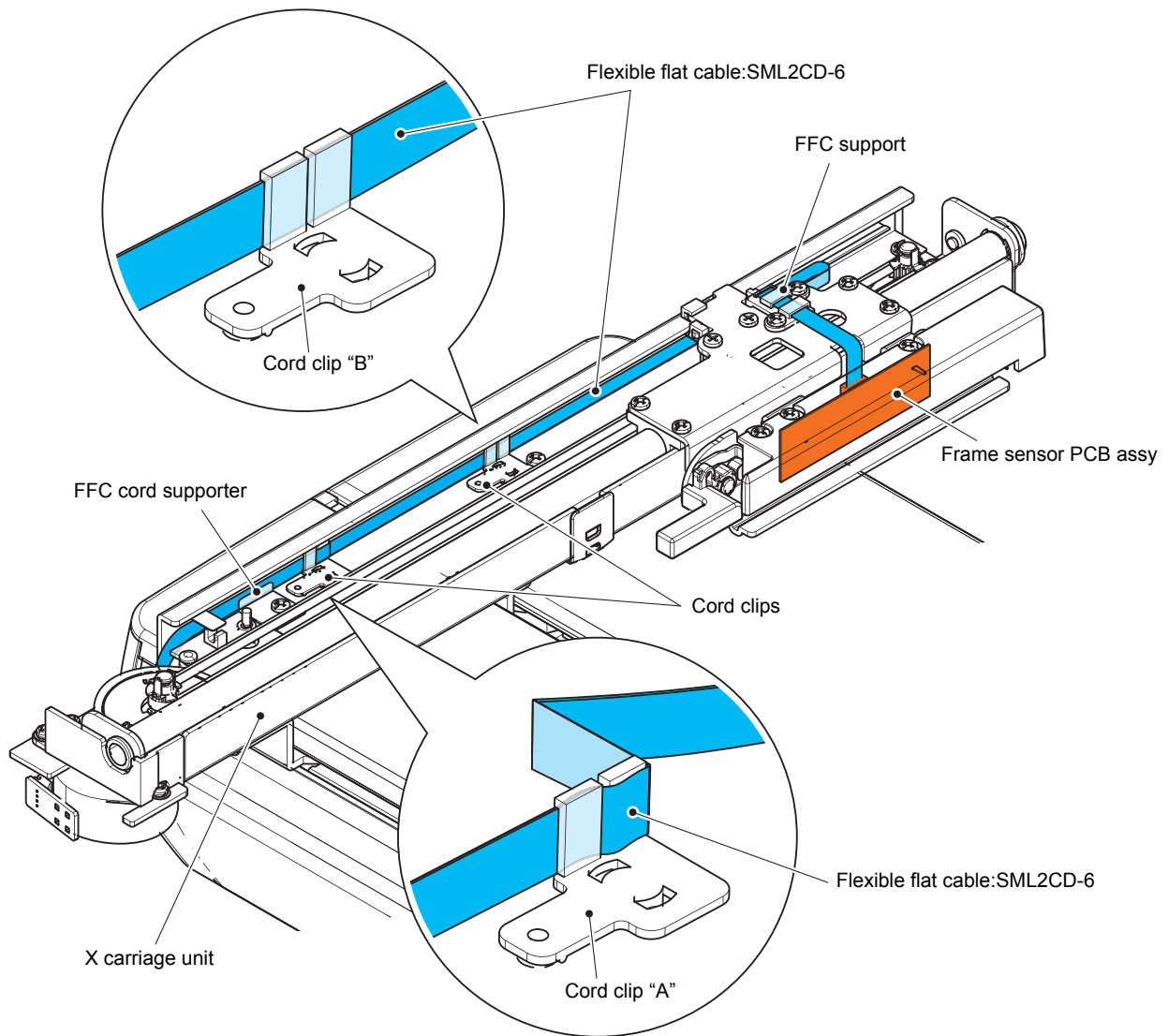
1. Bending of Flexible flat cable:SML2CD-7



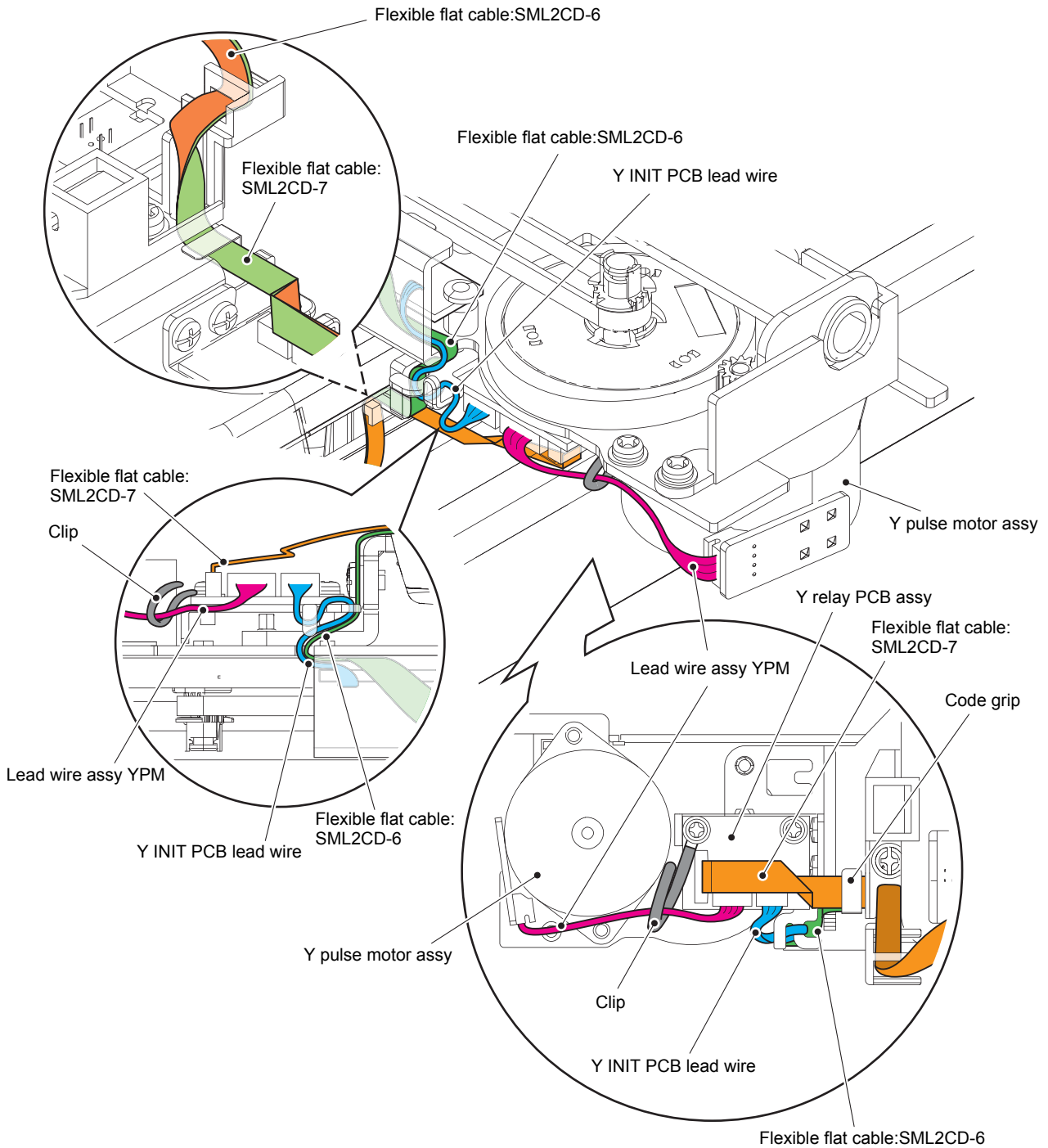
2. Bending of Flexible flat cable:SML2CD-6



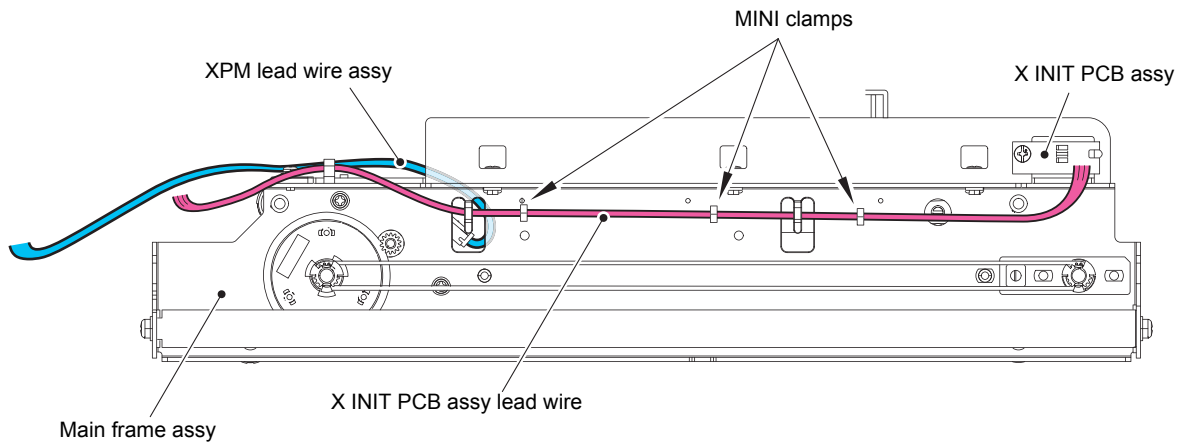
3. X carriage unit (Frame sensor PCB assy)



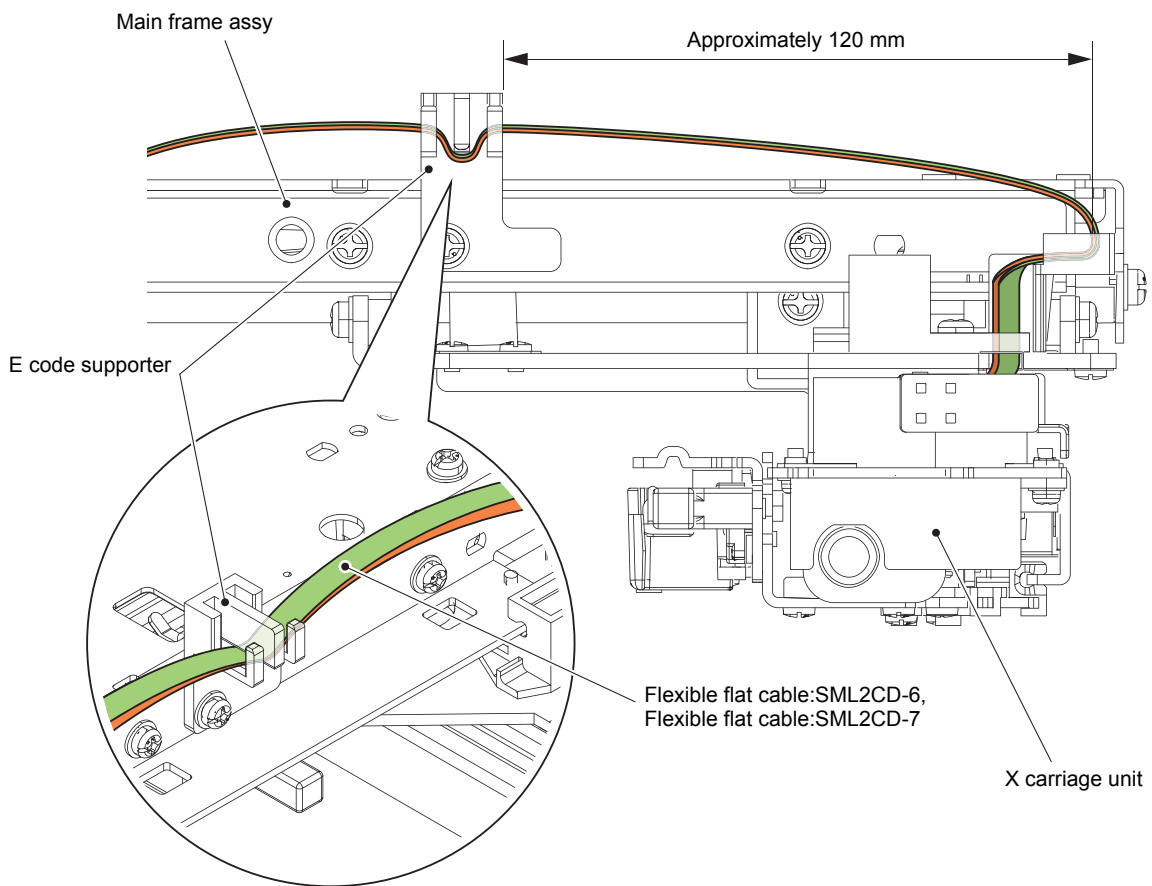
4. X carriage unit (Y relay PCB assy)



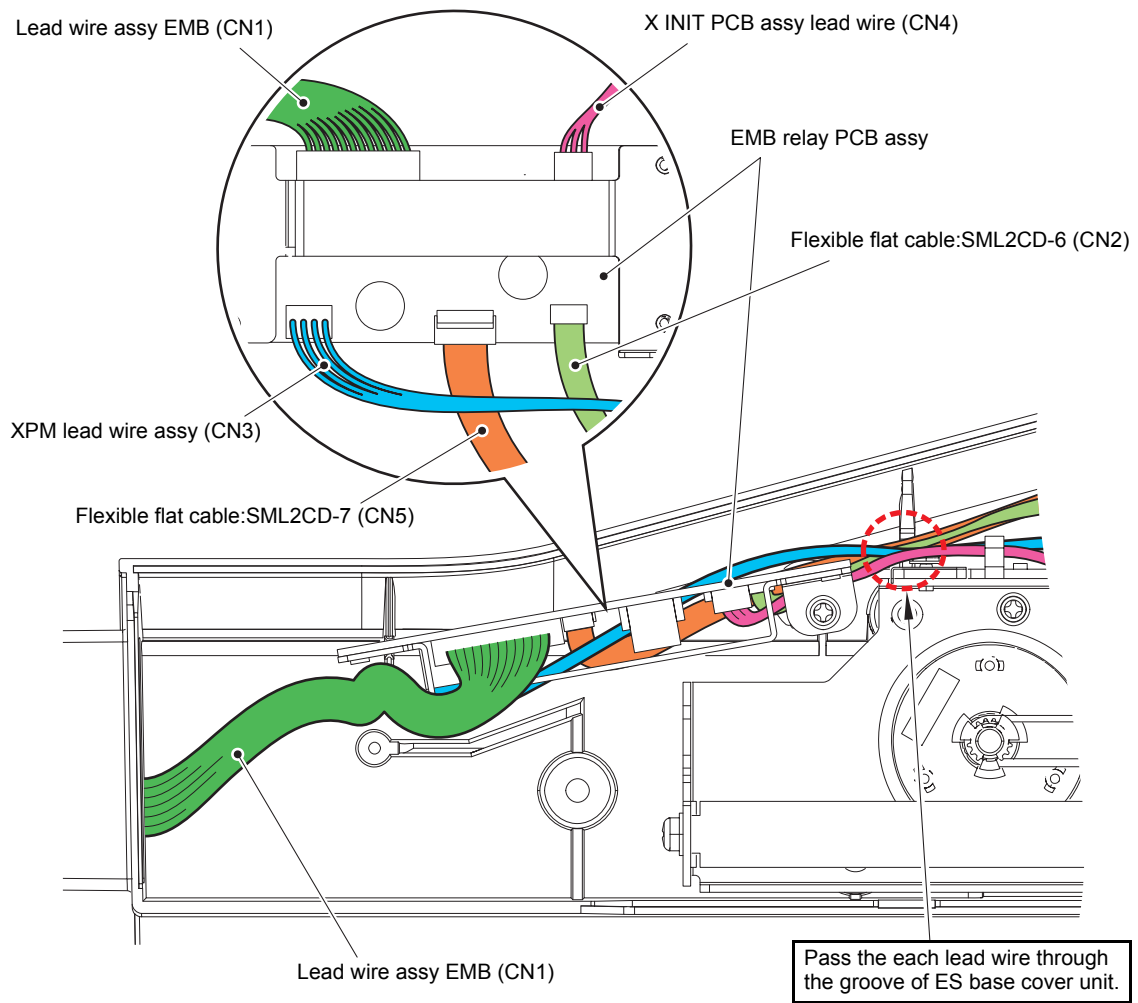
5. Main frame assy



6. E code supporter



7. EMB relay PCB assy



1. Dual feed assy

