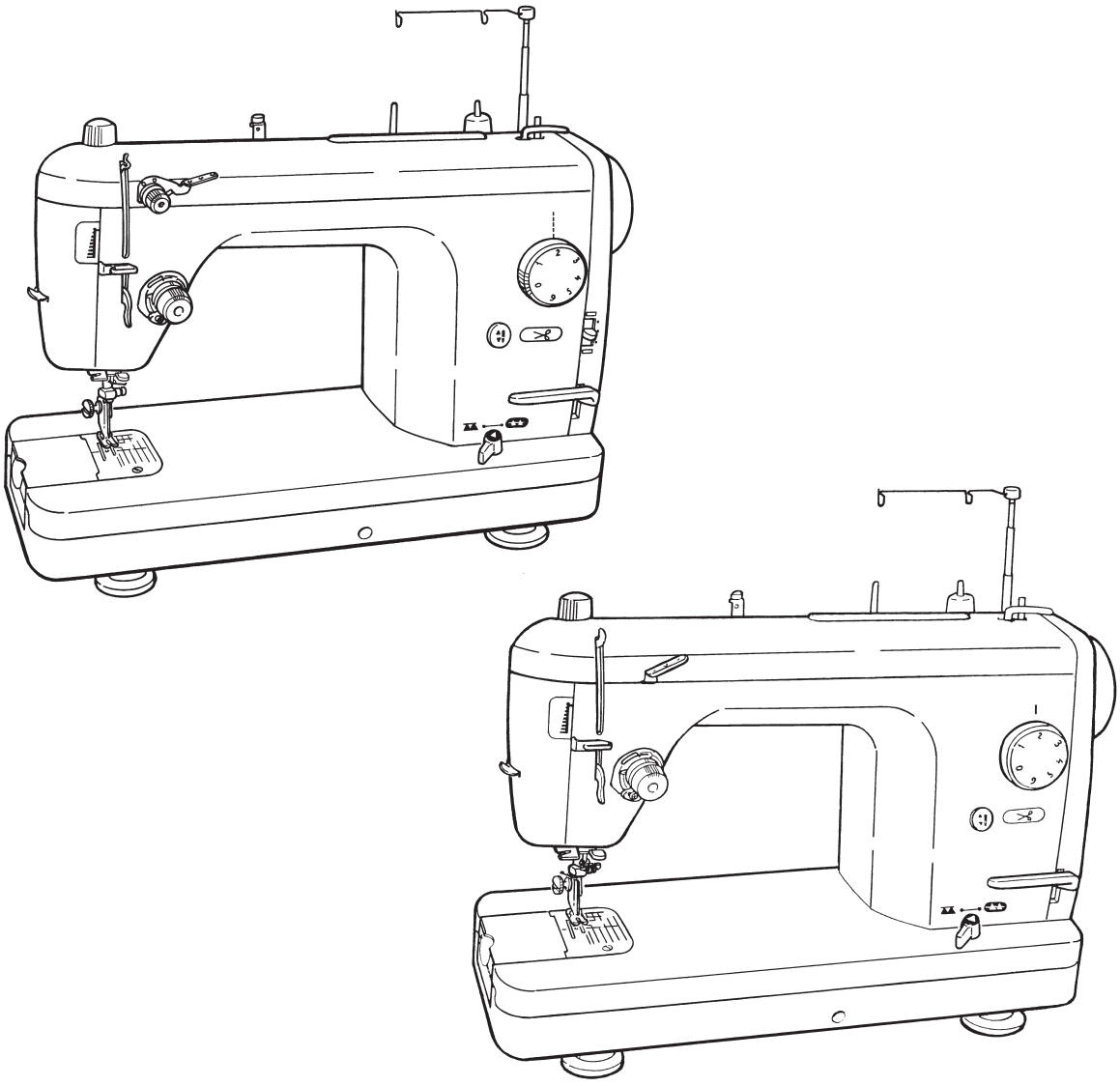
JUKI®

1-NEEDLE LOCKSTITCH SEWING MACHINE WITH
AUTOMATIC THREAD TRIMMER FOR PROFESSIONAL

TL-2010Q/2000Qi

SERVICE MANUAL



CONTENTS

WARNING :
To avoid the risk of fire, electric shock, injury to persons or damage to components, especially keep the following :

- When disassembling, assembling or adjusting the sewing machine, remove the power plug.
- When assembling, be careful about the electrical cord being caught with other components, damage to the covered parts of the cord or miswiring.
- When replacing the part(s), use the genuine part(s).

[1] SPECIFICATIONS OF TL-2010Q/2000Qi

(1) Power switch

ON•OFF 2-step changeover switch (common to lamp) located at the belt cover section of the right-hand side of main unit.

(2) Drive control components

Drive : Built-in motor timing belt method

Control : Foot pedal controller method 50 to 1,500 sti/min
Low speed rotation of 50 sti/min while needle up/down switch is ON

(3) Table, stand and handle components

Main unit : Portable type main unit with soft case (Case is folded in two and packed with main unit.)
One-touch type auxiliary table knee lifter is provided as standard. (Packed together)

Handle : Pull-up/down from machine main unit type

Table/stand: Separately sold fully-sunken type table and stand can be used.

(4) Arm and bed components

Material : Aluminum die casting arm and bed separate body type

Bed form : Flat bed portable type

(5) General mechanism

1. Thread take-up : Slit type link thread take-up for one-touch threading
2. Hook : DB type horizontal full-rotary hook
3. Pressing pressure adjustment : Stepless adjusting screw with pressing pressure indicator method
4. Lighting device : Built in face cover Switch : Slide type Lamp : Halogen lamp
5. Needle thread post : Two posts for small thread spool and large thread spool
   Thread guide of thread post is of draw-out type and capable of one-touch threading
6. Bobbin thread winder : One-touch action : Starting method by controller Automatic stop when bobbin thread winding completed
7. Needle thread threading : One-touch threading from thread spool to needle tip
8. Presser foot : Commercially-available presser foot for industrial sewing machine (SL2) can be used. (Setscrew type)
9. Lift of presser foot : By lever : 7 mm Max. by lever : 10 mm By knee lifter : 12 mm
10. Thread tension : Disk pressure adjusting type with simplified disk pressure scale
11. Drop feed : 2-step changeover by knob method (Feed dog : UP : DOWN)
12. Power switch : ON • OFF 2-step

(6) Feed mechanism

1. Feed amount adjustment : Dial method ..... Stepless 0 to 6 mm
2. Reverse feed stitch : Lever method .... Feed amount conforms to that of normal feed stitch.

(7) Special mechanism

1. Automatic thread trimming : Thread trimming switch is used in common for pushbutton type and for external foot pedal switch type.
   Switch fails to work even when pressing it within two seconds after the rotation of thread trimmer.
2. Needle bar stop position : Electric brake stop method
   Stop by controller : Down stop
   Stop by automatic thread trimming : UP stop
   Stop by bobbin winder : UP stop
3. Automatic needle hole threading : Hook section rotates and automatically returns by lowering threading lever.
4. Needle up/down switch : Switch is of pushbutton type and up/down stop can be performed by half rotation of main shaft when operating switch for a short period of time. When switch is continuously held ON, sewing machine continuously runs at a speed of 80 sti/min until switch is turned OFF.
5. Prevention of reverse setting of needle : Needle is attachable to normal direction only.
6. Motor protection
   Overcurrent : When motor is locked for 0.5 to 1 second due to sudden overload, motor power is automatically turned OFF and returns to the ON state immediately.
   Overheat : When motor temperature has abnormally risen, motor power is turned OFF(thermal cut) and returns to the ON state when temperature has fallen.

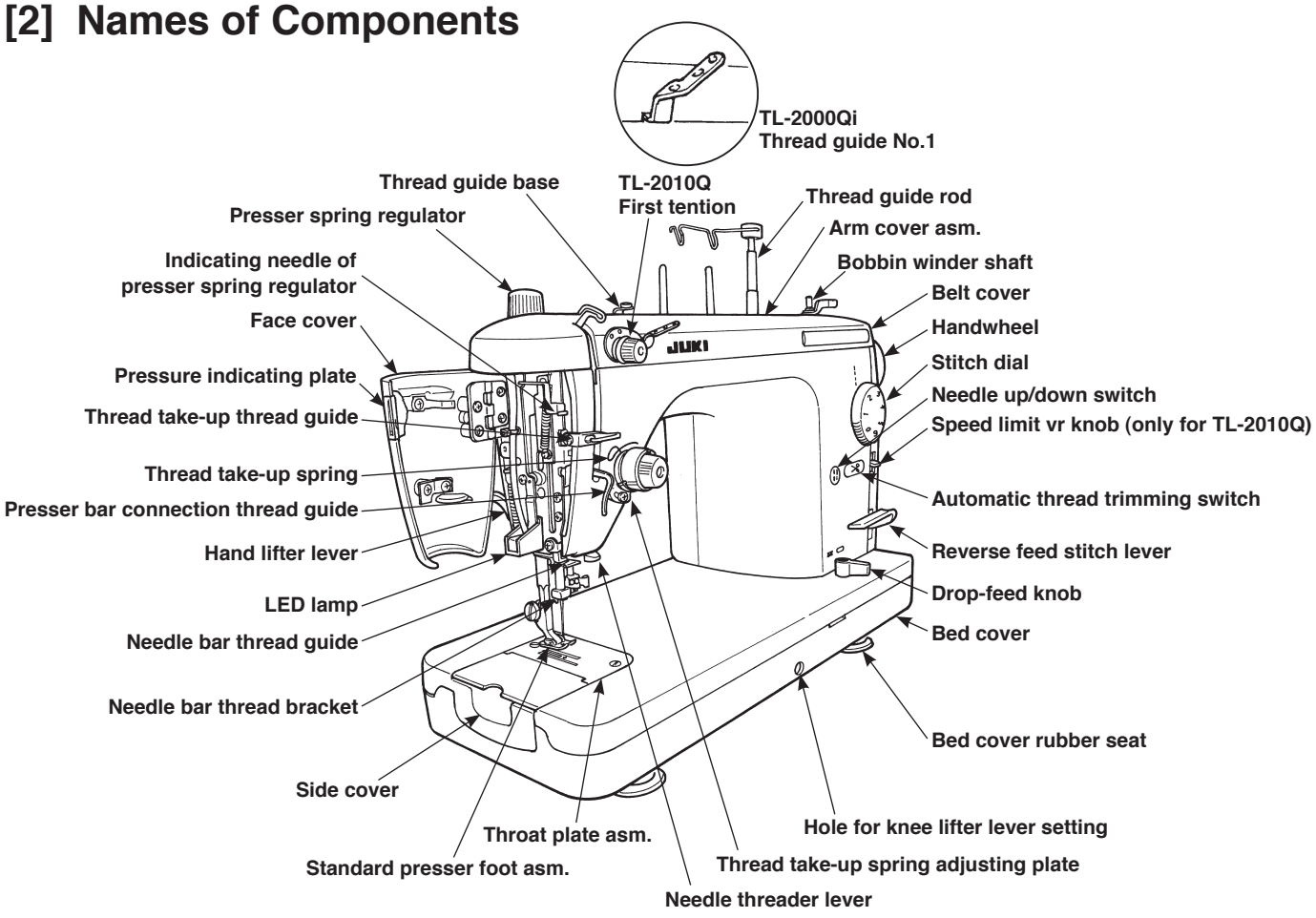
(8) Dimensions and weight

Main unit : 452W x 219L x 350H (mm)
Weight : 11.5kg

(9) Power consumption

Whole sewing machine : 120V 1.4A 60Hz

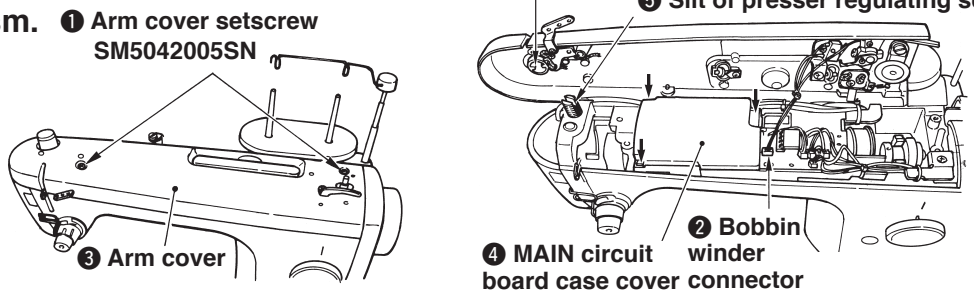
[2] Names of Components



[3] Disassembly/assembly

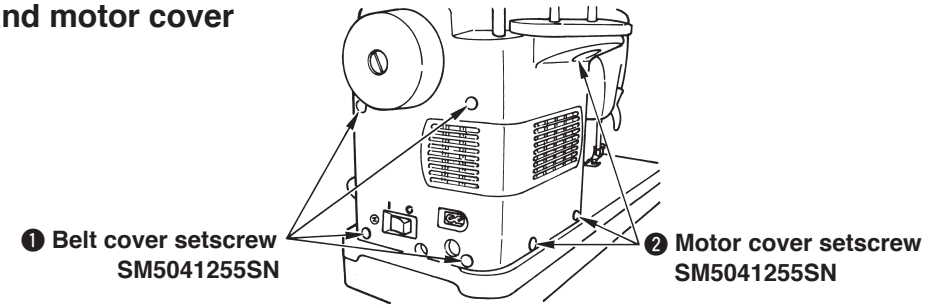
Outer Components

1. Arm cover asm.



Disassembly	Assembly	Point
○ Remove two ❶ setscrews. ○ Disconnect and remove ❷ connector.	○ Insert ❷ connector. ○ Align ❻ convex with ❺ slit and tighten the setscrew.	○ There should be no torsion or distorsion in presser spring regulator. ○ Align precisely slit portion with convex portion. ○ Do not press each lead wire.

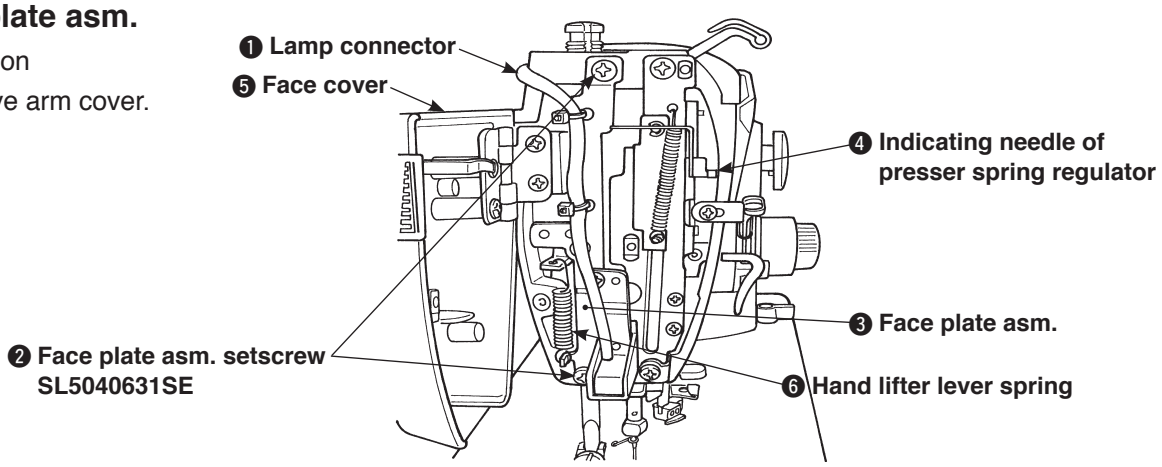
2. Belt cover and motor cover



Disassembly	Assembly	Point
○ Remove four ❶ setscrews and remove belt cover. ○ Remove three ❷ setscrews and remove motor cover.	○ Attach belt cover and tighten ❶ setscrews. ○ Attach motor cover and tighten ❷ setscrews.	○ There should be no difference in level between belt cover and front face of frame. ○ Make motor cover come closely contact with belt cover.

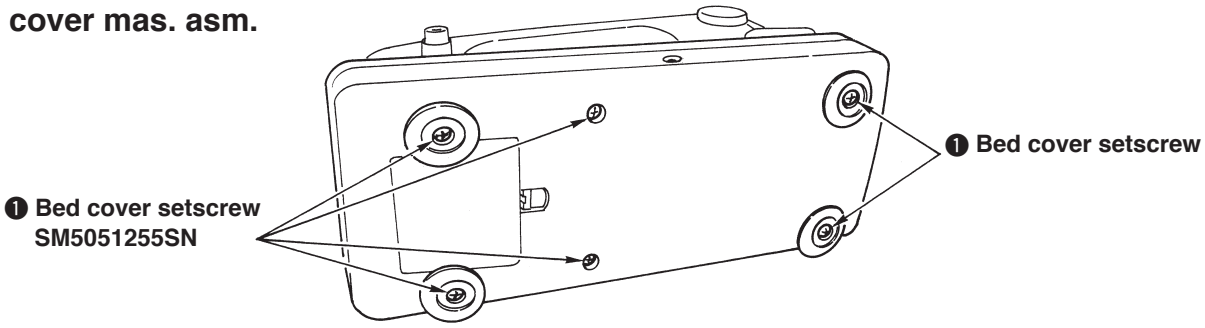
3. Face plate asm.

Preparation
○ Remove arm cover.



Disassembly	Assembly	Point
○ Disconnect ❶ connector and ❻ remove. ○ Remove ❷ setscrews and remove ❸ face plate asm. (together with face cover).	○ Attach ❸ face plate asm., tighten it with face plate asm. ❷ setscrews, and attach ❻ hand lifter lever spring. ○ Insert ❶ connector.	○ There should be no difference in level around the cover when face cover is closed. ○ ❺ should not come in contact with ❹ indicating needle.

4. Bed cover mas. asm.

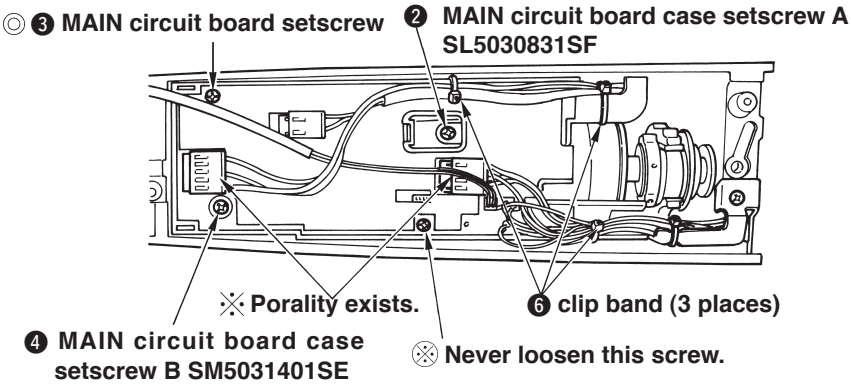


Disassembly	Assembly	Point
○ Remove six ❶ setscrews and remove bed cover.	○ Attach bed cover and tighten setscrews.	

5. MAIN circuit board asm.

Preparation
- ○ Remove arm cover asm.
- ○ Remove MAIN circuit board case cover and lamp connector.

Note) ◎ **❸ Setscrew to set the circuit board and cover to circuit board case**
- ※ **Do not insert in the reverse direction. (See page 15.)**
- ※ **Do not loosen this screw.**



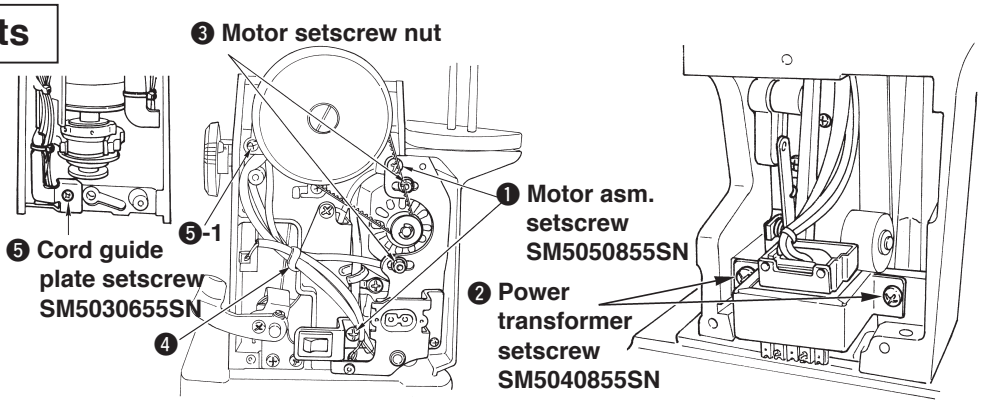
Disassembly	Assembly	Point
○ Remove 7 connectors of each lead wire. ○ Cut ❻ clip bands (3 places). ○ Remove ❷ setscrews and ❹ setscrew, and remove circuit board.	○ Press play of circuit board to attach circuit board to the front side and tighten two setscrews. ○ Insert each lead wire into connectors.	○ Read the note and understand it. ○ Ther are color indications on the circuit board for inserting connectors.

Function Components

1. Motor asm. and transformer asm.

Preparation
- ○ Remove arm cover asm.
- ○ Remove belt cover and motor cover respectively.

※ Make a memorandum of cord wiring.



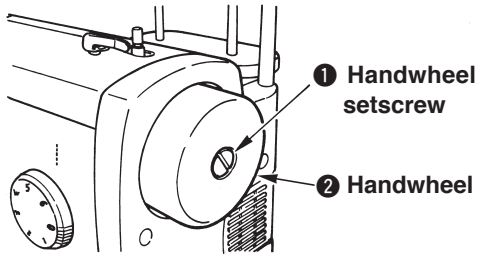
Disassembly	Assembly	Point
○ Remove cord guide plate ❺ setscrews and ❺-1 in previous item, and cut ❻ clip band. ○ Loosen ❹ cord presser. ○ Remove two ❶ setscrews and remove motor asm. ○ Remove two ❷ setscrews and remove transformer asm. ※ Make sure of wiring route.	○ Attach transformer and tighten ❸ setscrews. ○ Attach motor asm. and tighten ❶ setscrews. ○ Fix it with ❹ cord presser. ○ Attach cord guide plate asm. and tighten ❺ and ❺-1 setscrew. ○ Connect cord guide plate and cord.	○ Loosen ❸ nuts to adjust motor tension. ○ Belt tension : the belt should sag 3 to 4 mm when center of belt is applied with 1.96N load.

2. Handwheel and clutch

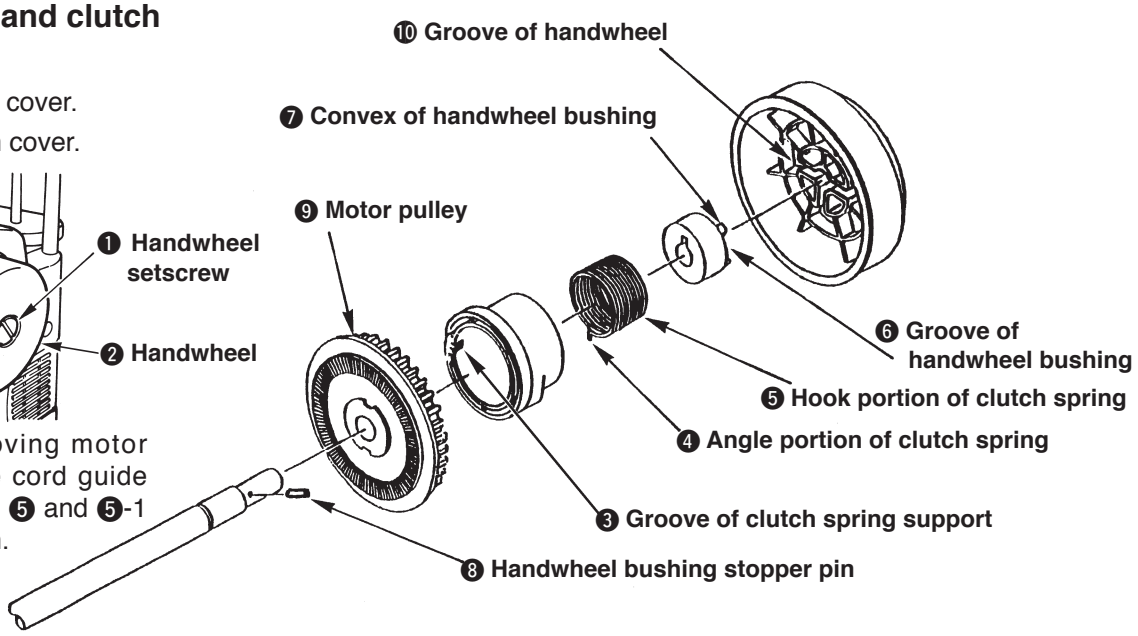
Preparation

○ Remove belt cover.

○ Remove arm cover.

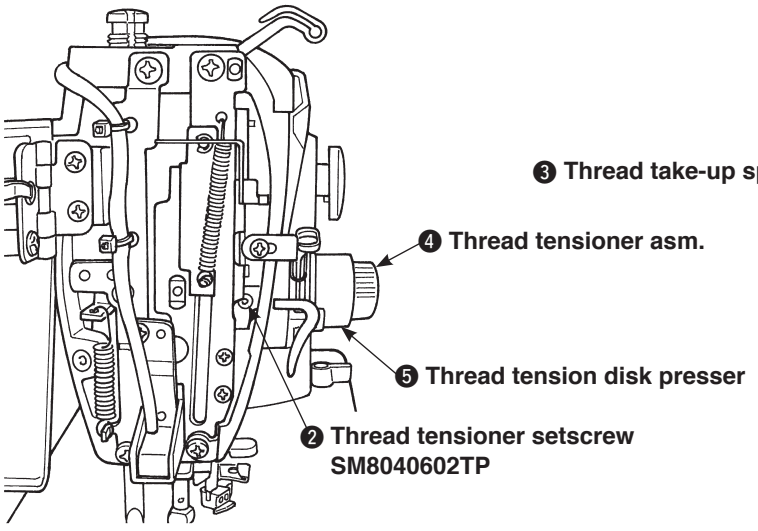


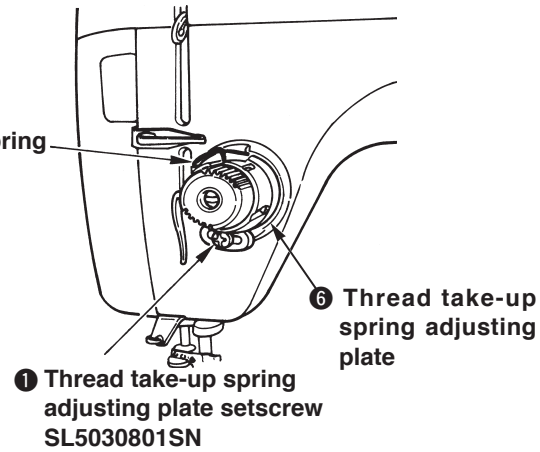
※ When removing motor pulley, remove cord guide plate setscrews ❺ and ❺-1 in previous item.



Disassembly	Assembly	Point
○ Remove ❶ setscrew. ○ Remove cord guide plate setscrew and remove cord guide plate asm. ○ Remove ❸ spring support. ○ Move ❹ in the direction where clutch spring is released and remove clutch spring. ○ Face ❻ to motor side and ❽ is hard to drop. ○ Draw out ❽ and remove ❾.	○ Attach ❾ and enter ❽. ○ Enter ❻ groove of bushing to ❽ stopper pin and attach bushing. ○ Enter ❺ hook portion of spring to slit in the center of handwheel bushing ○ Enter ❺ clutch spring to ❸ groove of spring support and attach cord guide plate asm. Then tighten setscrew.	○ Align ❼ convex of bushing with ⑩ groove of handwheel and attach handwheel. Then tighten setscrew. ○ Clearance provided between convex of ❸ clutch spring support and clutch plate is 2 ± 0.5 mm. ○ See item 12 on page 19 for adjustment.

3. Thread tensioner asm.



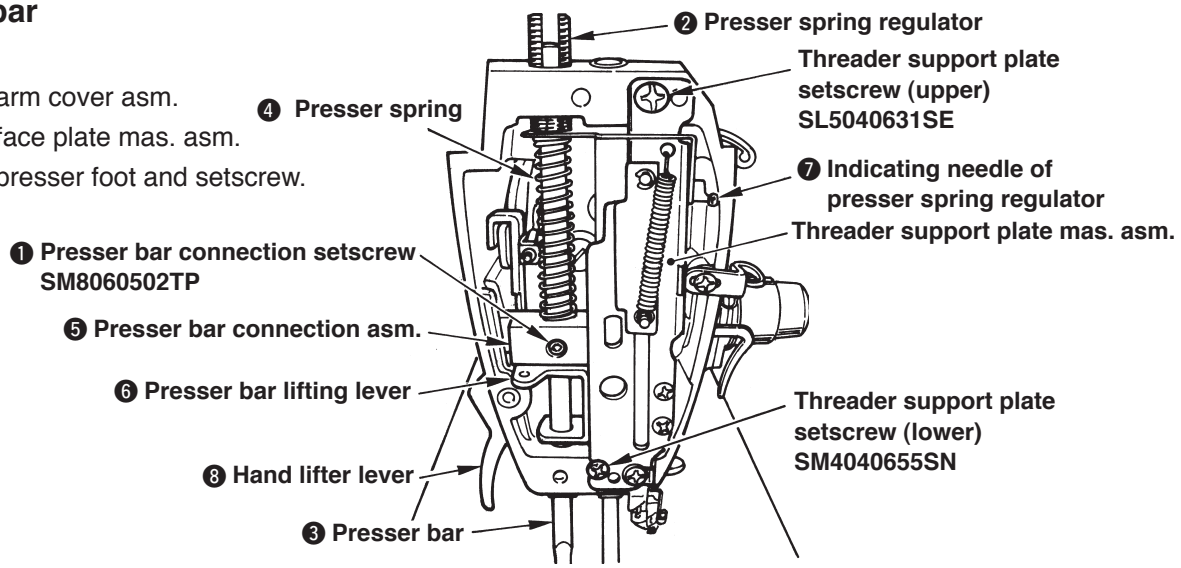


Disassembly	Assembly	Point
○ Remove ❶ setscrew. ○ Lower presser foot and remove ❷ setscrew. ○ Remove ❸ spring together with ❹ thread tensioner asm. and adjusting plate.	○ Attach ❻ adjusting plate and ❸ spring to thread tensioner asm. and attach it to frame. Then fix it with ❷ setscrew. ○ Tighten ❶ adjusting plate setscrew.	○ Place upward the scale of ❺ thread tension disk presser. ○ See items 9 and 10 on page 19 for adjustment of pressure and thread take-up spring of stroke.

4. Presser bar

Preparation

- ○ Remove arm cover asm.
- ○ Remove face plate mas. asm.
- ○ Remove presser foot and setscrew.

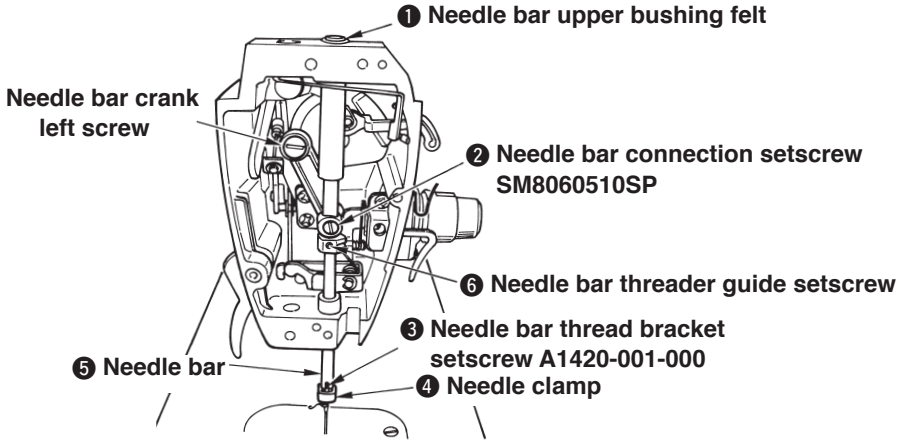


Disassembly	Assembly	Point
○ Lower ❽ lever and loosen ❶ setscrew. ○ Drawing ❸ upward, remove ❹ spring. ○ Remove ❺ connection and ❻ lever. ○ Remove regulator ❷ screw. ○ Do not remove ❼ indicating needle. ※ ❸ is hard to remove since secrew mark is attached.	○ Attach regulator ❷ screw. ○ Set ❻ lever to frame, and then set ❺ connection. ○ Attach ❹ spring when setting ❸ presser bar from upper side.	○ Set ❹ spring under ❼ indicating needle. ○ Lower ❽ lever and temporarily tighten it at the position where top end of ❸ protrudes approximately 4 mm from frame. ※ For the adjustment, see item 3 on page 17. ○ Needle should not interfere with presser foot.

5. Needle bar

Preparation

- ○ Remove arm cover asm.
- ○ Remove face plate mas. asm.
- ○ Remove presser bar.
- ○ Remove needle bar threading guide as well.

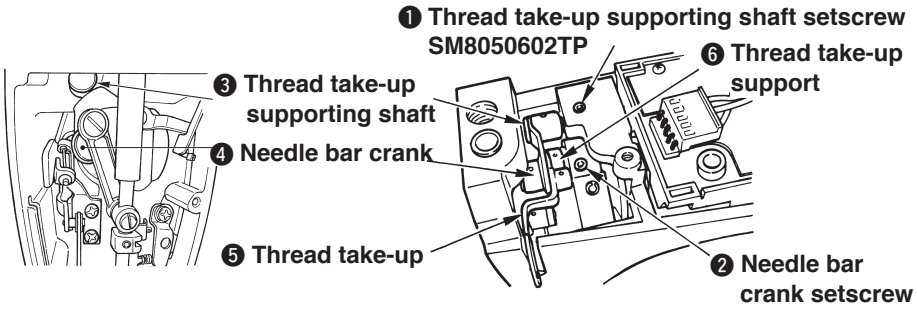


Disassembly	Assembly	Point
○ Remove ❸ and ❹. ○ Remove ❶ felt. (Push up needle bar upper bushing ❶ felt with ❺ and draw it out.) ○ Loosen setscrew of ❷ and ❻. (Pushing needle bar ❺ upward is acceptable.) ○ Draw out ❺ upward. ○ Remove left ❻ screw and remove crank rod.	○ Attach crank rod and tighten it with ❻. ○ Perform positioning of needle bar and tighten needle bar connection ❷ setscrew. ○ Set needle bar and attach ❹ and ❸. ○ Insert ❶ into hole. ○ Temporarily tighten ❻, and perform adjustment of vertical height after attaching threader support plate asm.	○ Position of needle bar is the place where upper engraved line of needle bar is aligned with lower end face of needle bar bushing at the needle lower dead point. ※ See item 2 on page 17 for the adjustment. ○ See item 15 on page 22 for height adjustment of threader hook of threader support plate mas. asm.

6. Thread take-up

Preparation

- ○ Remove arm cover asm.
- ○ Remove face plate mas. asm.
- ○ Remove presser bar.
- ○ Remove needle bar.

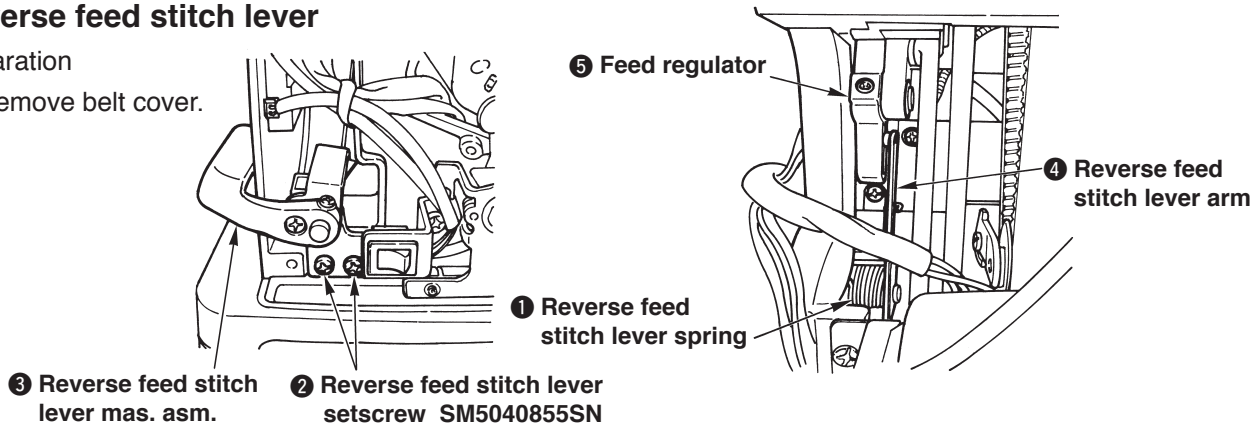


Disassembly	Assembly	Point
○ Loosen ❶ setscrew. ○ Loosen two ❷ setscrews. ○ Draw out thread ❸ take-up supporting shaft. ○ Remove ❺ and ❻ together with ❹ needle bar crank.	○ Set needle bar crank to thread take-up, attach it onto main unit and tighten setscrews (2 pcs.). ○ Set ❻ to ❺, enter thread take-up supporting shaft ❸ to ❻, attach it onto frame and tighten ❶ setscrew.	○ Tighten setting portion (flat portion) of needle bar crank with screw No. 1. ○ Press ❸ shaft to frame side while viewing the torque and tighten ❶ setscrew.

7. Reverse feed stitch lever

Preparation

- ○ Remove belt cover.

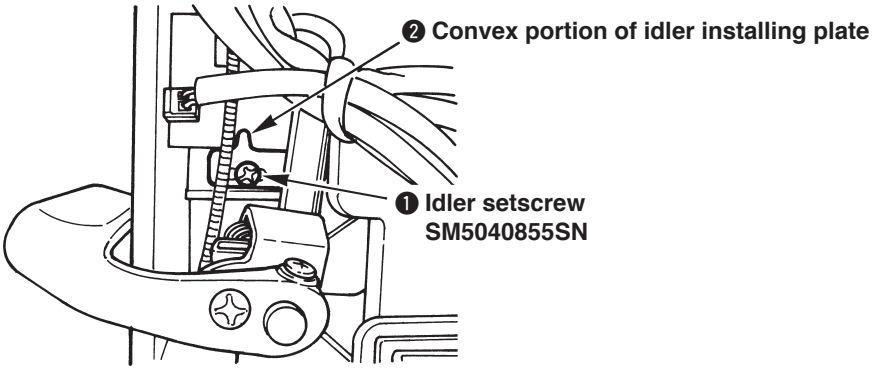


Disassembly	Assembly	Point
○ Remove ❶ spring from arm. ○ Remove two ❷ setscrews. ○ Remove ❹ lever arm from the slot of ❺ regulator when removing ❸.	○ Attach ❸ lever and set with ❷ setscrews. ○ Hook lever spring ❶ to lever arm ❹.	○ Set ❹ lever arm to the slot of ❺ regulator.

8. Idler

Preparation

- ○ Remove belt cover.

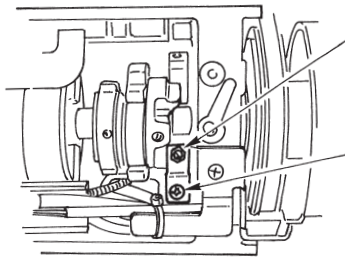


Disassembly	Assembly	Point
○ Remove ❶ setscrew and remove idler asm.	○ Assemble idler and tighten it with ❶ setscrew. ○ Belt tension : Belt sags 6 to 7 mm when center of the belt is applied with a 1.96N load.	○ Belt tension can be changed only by removing belt cover. Move ❷ convex portion to the left or right.

9. Stitch dial

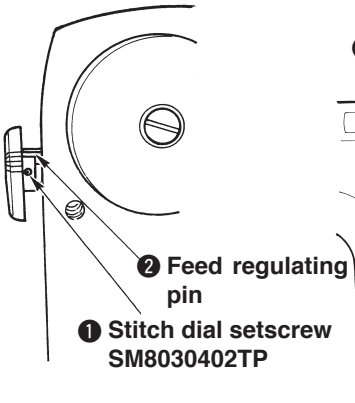
Preparation

○ Remove arm cover asm.



❺ Feed regulating screw
・Stopper screw
・Stopper nut

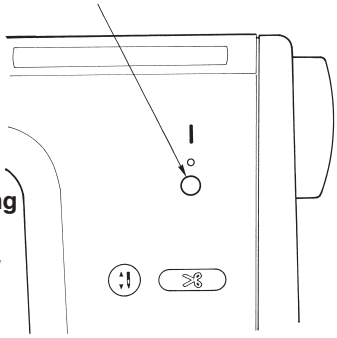
❸ Feed regulating screw stopper asm. setscrew



❹ Feed regulating screw

❷ Feed regulating pin

❶ Stitch dial setscrew SM8030402TP



Disassembly	Assembly	Point
○ Loosen two ❶ setscrews and remove the dial. ○ Be careful since ❷ pin jumps. ○ ❸ may not be removed. (Stopper screw SM8031400TP)	○ Turn regulating ❹ screw full to the right. ○ Assemble stitch dial with its scale 0 up and tighten ❶ screw (2 pcs.).	○ There should be no play in feed regulator when operating lever. (When scale is 0.) ○ Loosen ❺ stopper nut. Make stopper screw strike against regulating ❹ screw and tighten nut.

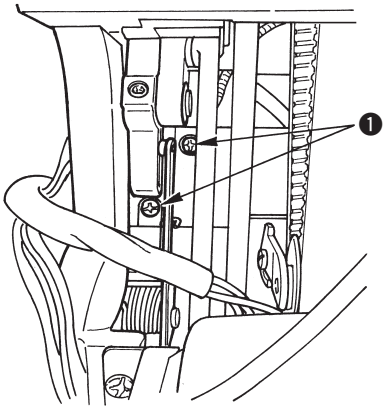
10. Thread trimming switch case

Preparation

○ Remove arm cover asm.

○ Remove motor cover and belt cover.

○ Remove motor mas. asm.



❶ Thread trimming switch circuit board case setscrew SL4040655SN

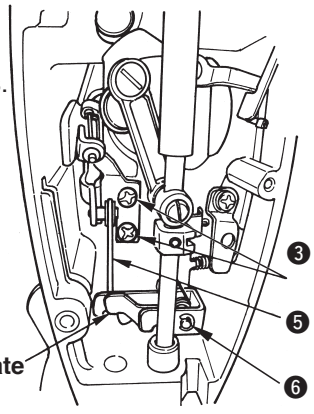
Disassembly	Assembly	Point
○ Remove two ❶ setscrews in thread trimming switch case. ○ Remove thread trimming switch case.	○ Attach the switch case to frame and tighten with ❶ setscrews.	○ There should not be no torsion between switch and frame.

11. Wire holder

Preparation

○ Remove outer components. (Excluding belt cover and motor cover)

○ Remove presser bar.



❹ Thread release plate

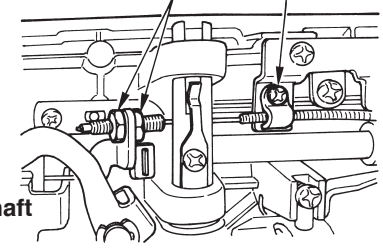
❸ Wire holder setscrew SM5040855SN

❺ Disk pressure release connecting link

❻ Thread release plate shaft

❷ Wire tube presser setscrew SM4040655SN

❶ Nut of setscrew (opposite side 9 mm) NS6620310SP



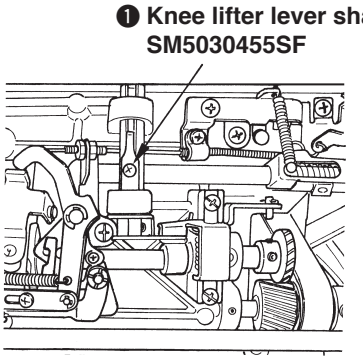
Disassembly	Assembly	Point
○ Remove ❶ nut (left side only). ○ Remove ❷ setscrew and remove tube presser. ○ Remove ❸ setscrews and remove wire holder mas. asm. ○ Remove setscrew in thread release ❻ plate shaft and remove thread release ❹ plate. ※ When removing the wire from frame, make sure of wire route in frame.	○ Lay wire in frame. ○ Connect thread release ❹ plate with disk pressure release connecting ❺ link. ○ Assemble wire holder mas. asm. and tighten with ❸ setscrews. ○ Fix ❷ and ❶ in the reverse side of machine bed.	○ Pass the wire through full reverse side of stitch dial. ○ Contact ❹ and ❺ with each other. ○ For ❷, tube has to come out by 13 mm from tube presser. ○ Tube presser and tube regarding ❷ should be on the same face. See item 5 on page 27 for ❶.

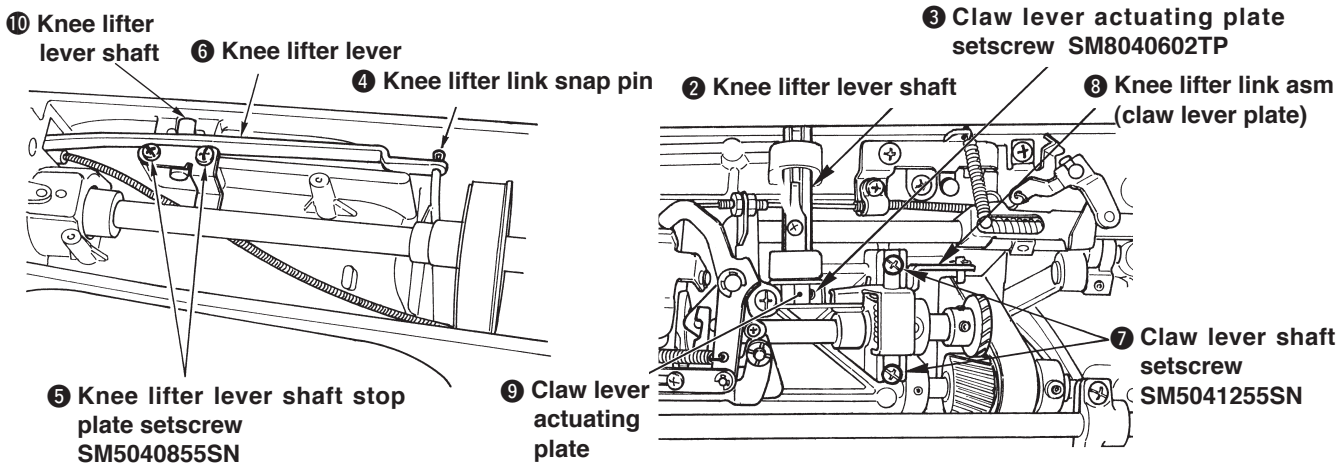
12. Knee lifter lever

Preparation

○ Remove outer components.
(Excluding belt cover and motor cover)

○ Raise presser foot.





Disassembly	Assembly	Point
○ Remove snap ❹ pin. ○ Remove ❺ setscrews and remove ❻. ○ Remove ❶ setscrew and take out lever spring. ○ Lower ❷ and turn it to the position where ❸ can be removed. ○ Remove ❸, remove claw lever actuating plate, and draw out ❷. ○ Remove claw lever shaft ❼ setscrew. ○ Remove ❽ link asm..	○ Attach ❽ to frame and tighten ❼ setscrews. ○ Set ❷ lever shaft, attach ❾ claw lever actuating plate and tighten it with ❸. ○ Attach lever spring and tighten with ❶. ○ Raise frame, attach ❻ knee lifter lever to knee lifter lever ❿ shaft, and tighten it with ❺. ○ Enter ❹ snap pin.	○ There should not be a play in the axial direction of ❷ knee lifter lever shaft.

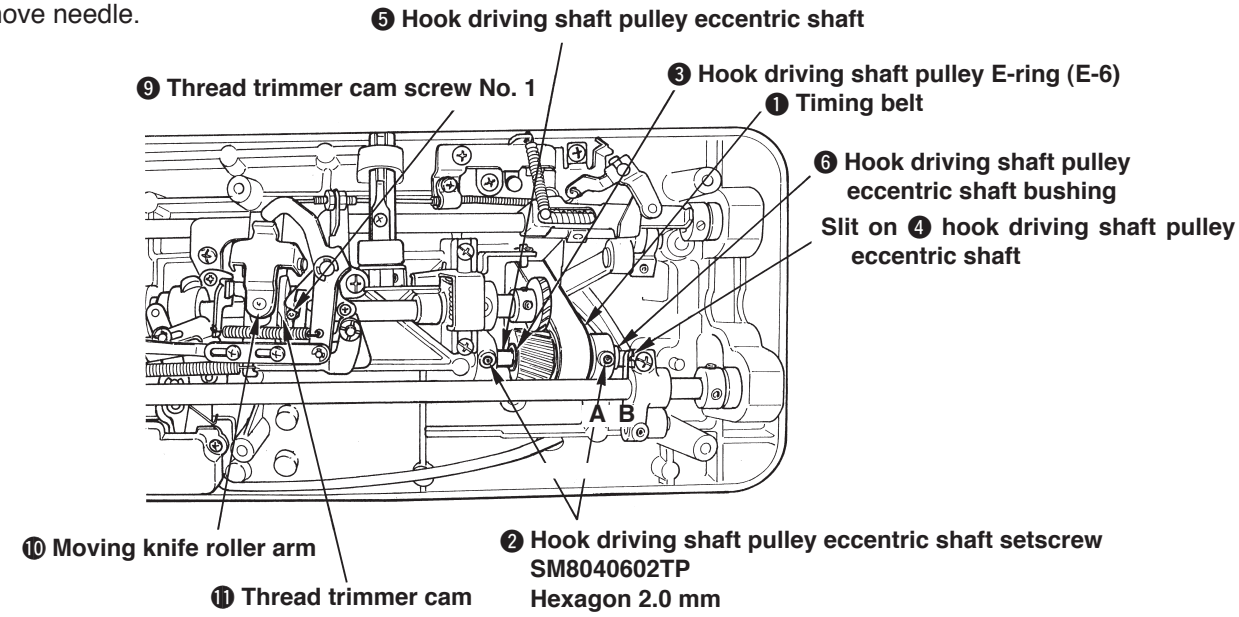
13. Hook driving shaft pulley

Preparation

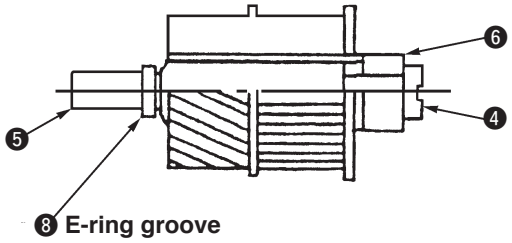
○ Remove outer components.
(Excluding stop solenoid)

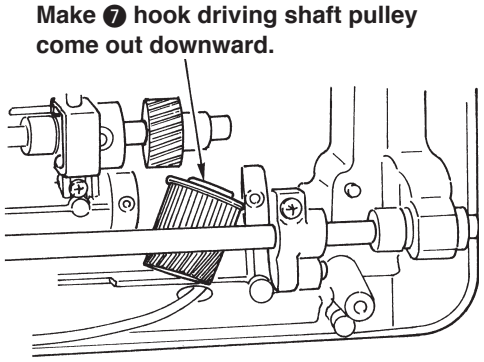
○ Loosen idler.

○ Remove needle.



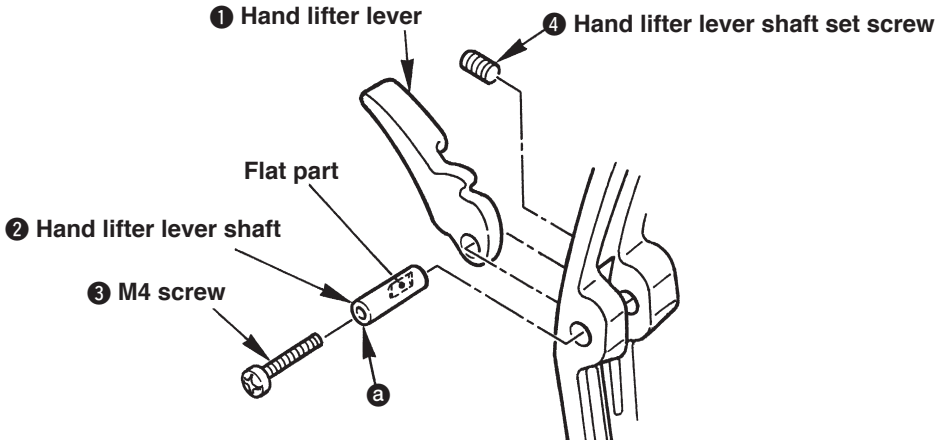
(Illustration of hook driving shaft pulley)





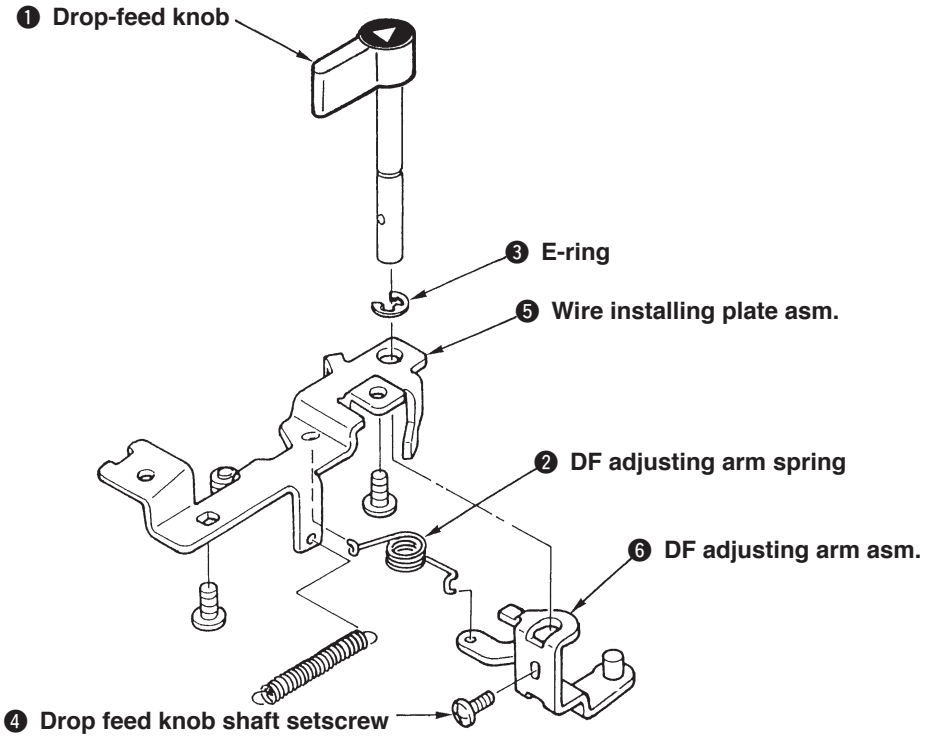
Disassembly	Assembly	Point
○ Remove timing belt from main shaft pulley. ○ Remove ❶ belt and loosen two ❷ setscrews. ○ Remove ❸ E-ring and turn ❹ to find a place where backlash in hook driving shaft pulley is large. ○ Press ❺ and push out ❻ bushing to the right side. ○ Draw out ❺ and ❻, and remove ❼ following the point of ❼. ※ Do not make a flaw on ❽ E-ring groove when removing ❸ E-ring.	○ Enter hook driving shaft ❼ pulley. ○ Enter eccentric ❺ shaft and ❻. ○ Set ❸ E-ring. ○ Remove the play in hook driving shaft with ❻ and tighten ❷ setscrew B. ○ Turn ❹ shaft slit to adjust backlash in pulley and tighten ❷ setscrew A. ○ Set ❶ belt. ※ Adjust backlash in eccentric shaft by right rotation.	※ When setting ❻ bushing, do not make a flaw on the end face of bushing. ◎ When setting belt onto main shaft, refer to thread trimming timing. (Simple method) ○ Lower needle bar 1.95 mm from its upper dead point. ○ Turn hook driving shaft and orient ❾ screw No. 1 to this side (just front). ○ Enter contact of ⓾ roller arm to groove of ⓫ cam. ○ Turn hook driving shaft in the reverse direction and set belt at the position where it stops.

14. Hand lifter lever



Disassembly	Assembly	Point
○ Loosen hand lifter lever shaft set-screw ❹. ○ Insert M4 screw ❸ into tapped hole in hand lifter lever shaft ❷ by 3 to 4 screw threads. ○ Hold screw head and draw out the screw. ○ At the same time, also draw out hand lifter lever shaft. ○ Remove hand lifter lever ❶.	○ Put hand lifter lever shaft ❷ into the hole in the frame. ○ Secure hand lifter lever shaft ❷ by tightening hand lifter lever shaft setscrew ❹ in such a way that the tip of setscrew ❹ comes in contact with the flat part on hand lifter lever shaft ❷.	○ End face ⓐ of hand lifter lever shaft ❷ should not jut out from the frame surface.

15. Drop-feed knob



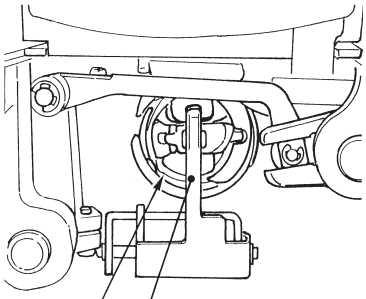
Disassembly	Assembly	Point
○ Set ❶ drop-feed knob to "NOT FEED", remove ❹ drop feed knob shaft setscrew, and remove ❸ E-ring of drop feed knob. ○ Remove ❷ DF adjusting arm spring while removing ❻ DF adjusting arm asm..	○ Pass ❶ drop feed knob through ❺ wire installing plate. ○ Assemble ❷ DF adjusting arm spring while assembling ❻ DF adjusting arm asm.. ○ Place ❸ E-ring to ❶ drop feed knob. ○ Assemble drop feed knob shaft with ❹ setscrew.	○ It is easy to remove ❷ spring when ❶ drop-feed knob is set to “NOT FEED” side.

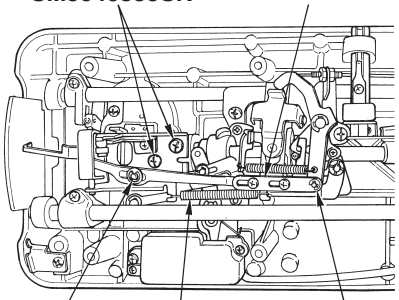
Automatic Thread Trimming Components

1. Looper mas. asm.

Preparation

○ Remove bed cover.





Disassembly	Assembly	Point
○ Remove ❶ E-ring. ○ Remove E-ring and washer of ❷. ○ Remove looper link asm of ❸. ○ Remove moving knife arm spring of ❹. ○ Remove setscrews of ❺ and remove looper mas. asm.	○ Attach looper mas. asm. and tighten ❺ setscrews. (Adjust looper link B shaft to hole.) ○ Hook moving knife arm ❹ spring. ○ Set looper link and attach E-ring, washer, etc.	○ Place ❻ looper in the center ❼ of inner hook and securely tighten ❺. ※ See item 4-2 on page 27 for adjustment of looper moving amount.

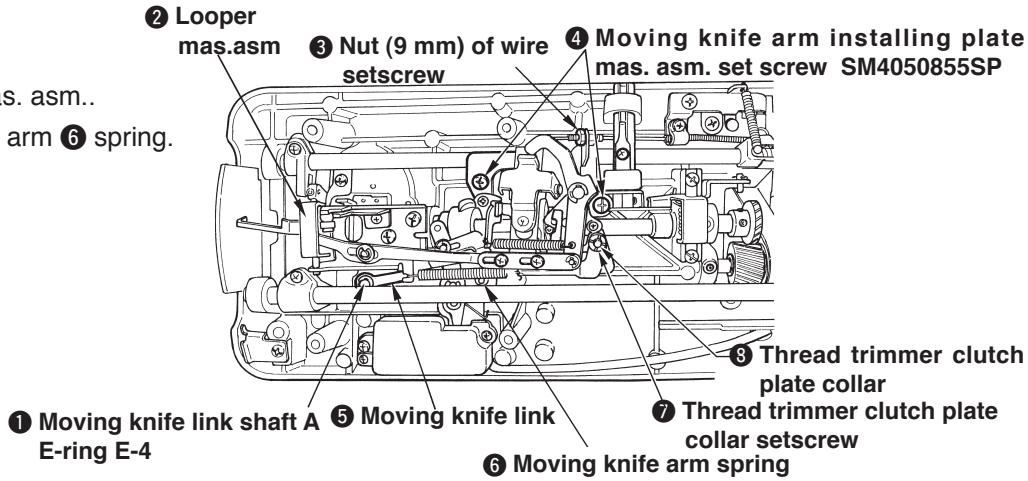
2. Moving knife arm installing plate mas. asm.

Preparation

○ Remove bed cover.

○ Remove ❷ looper mas. asm..

○ Remove moving knife arm ❻ spring.

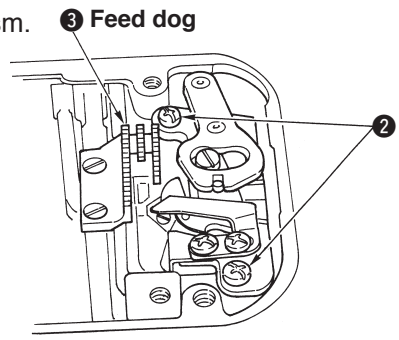


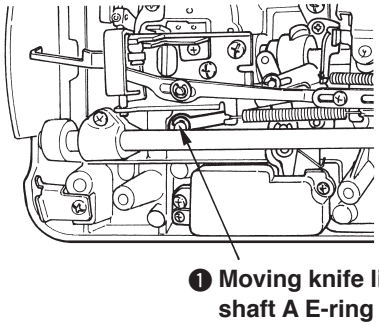
Disassembly	Assembly	Point
○ Remove ❶ E-ring. ※ Do not remove ❺ moving knife link. (Remove together with moving knife arm installing plate.) ○ Remove ❸ nut on the left side only. ○ Remove thread trimmer clutch plate ❼ collar setscrew and ❽ thread trimmer clutch plate collar. ○ Remove two ❹ screws and remove installing plate mas. asm. ◎ At this time, simultaneously remove moving knife link. (※ To prevent moving knife link from warping)	○ Attach moving knife arm installing plate mas. asm. Note : See the point on the right side. ○ Temporarily tighten ❹ setscrews. ○ Attach ❶ E-ring of link shaft. ○ Temporarily tighten ❷ looper mas. asm.. ○ Attach ❻ moving knife arm spring. ○ Determine position of moving knife and securely tighten ❹. Note : Refer to assembling of moving knife and looper mas. asm.	○ Set ❶ moving knife link and wire ❸ setscrew. ○ Position of moving knife Remove hook and see from the reverse side of bed. (See item 1 on page 23.) ○ See item 5 on page 27 for adjustment of ❸ nut of wire.

3. Moving knife base mas. asm.

Preparation

- ○ Remove bed cover.
- ○ Remove throat plate asm.



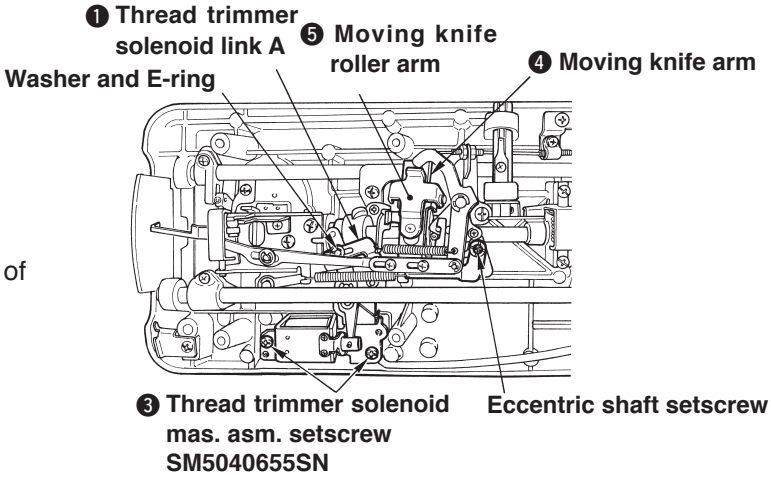


Disassembly	Assembly	Point
○ Remove ❶ E-ring and raise frame. ○ Remove two ❷ setscrews. ○ Bring ❸ feed dog to its highest position. ○ Raising moving knfe base by hand, lightly press moving knife link A from upper side. (Release coupling.)	○ Attach moving knife base to frame while setting moving knife base to moving knife link shaft A. ○ Temporarily tighten ❷ setscrews. ○ Push moving knife base in the direction of right rear 45˚ and securely tighten it. ○ Tilt frame, set moving knife link shaft A and enter ❶ E-ring.	○ When assembling, it is better to raise by finger moving knife link A from below.

4. Thread trimmer solenoid mas. asm.

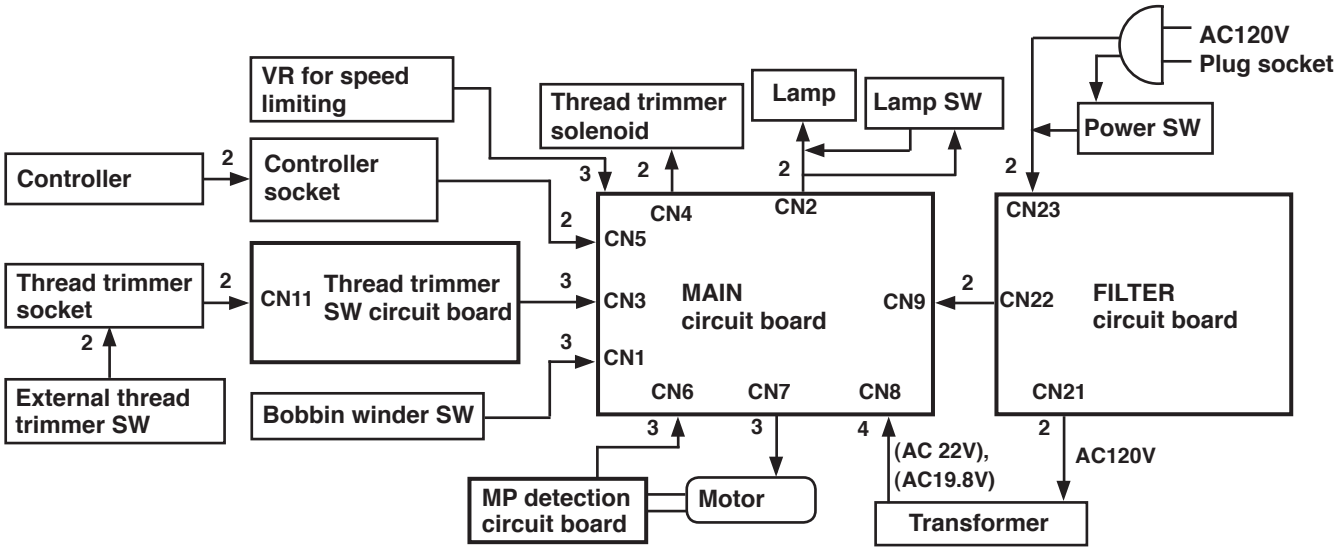
Preparation

- ○ Remove outer components. (Remove arm cover asm., belt cover, motor cover and cord guide.)
- ○ Remove solenoid cover.
- ○ Remove washer, E-ring and eccentric shaft of thread trimmer solenoid link A.



Disassembly	Assembly	Point
○ Remove washer, E-ring, eccentric shaft and setscrews of ❶ thread trimmer solenoid link A. ○ Remove ❶ thread trimmer solenoid link A. ○ Remove three setscrews in thread trimmer solenoid asm. to take it out. * It is easy to remove setscrews when top end of thread trimmer auxiliary link is moved to the right-hand side of thread trimmer auxiliary cam.	○ Attach thread trimmer solenoid and temporarily tighten it with ❸ setscrews. ○ Adjust clearance between pin at top end of thread trimmer auxiliary link and thread trimmer auxiliary cam to 0.5 to 1.0 mm and securely tighten ❸ setscrews. ○ Fix ❶ thread trimmer solenoid link A with eccentric shaft, washer and E-ring. (See item 2 on page 23 and item 3-5 on page 24 for the adjustment.)	○ Move thread trimmer solenoid asm. to the left and right so that pin at top end of thread trimmer auxiliary link comes in contact with thread trimmer auxiliary cam when the solenoid performs suction and securely tighten setscrews. * Solenoid has to properly work when the solenoid performs suction.

[4] PRINTED CIRCUIT BOARD DIAGRAM (CONNECTOR LAYOUT)



Description	MAIN circuit board		Cord color
	Terminal	Pin	
Motor	CN7	1	Blue
		3	Brown
		5	Black
Power connecting wire	CN9	1	Blue
		2	Brown
Transformer secondary side (AC 22V, 19.8V)	CN8	1	Yellow
		2	Yellow
		3	Red
		4	Red
Lamp	CN2	1	Gray
		2	Gray
Bobbin winder SW	CN1	1	Purple
		2	-
		3	Gray
MP detection circuit board	CN6	1	Black
		2	-
		3	Red
Thread trimmer SW circuit board	CN3	1	Orange
		2	-
		3	Brown

Description	MAIN circuit board		Cord color
	Terminal	Pin	
Controller socket	CN5	1	Yellow
		2	White
Thread trimmer solenoid	CN4	1	Blue
		2	Blue
VR for speed limiting	CN10	1	Red
		2	Yellow
		3	Black

Description	FILTER circuit board		Cord color
	Terminal	Pin	
Transformer Primary side (AC 120V)	CN21	1	White
		2	Blue
Power connecting wire	CN22	1	Brown
		2	Blue
Power input (AC 120V)	CN23	1	Blue
		2	Yellow

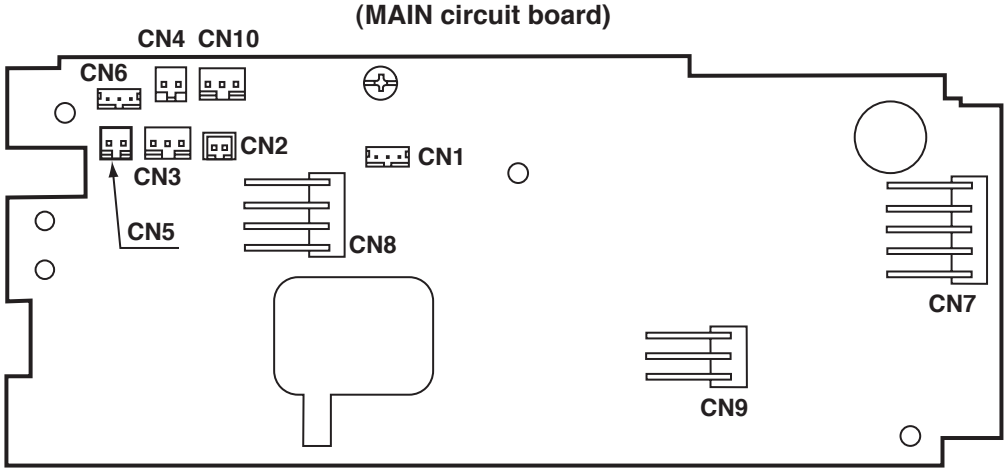
Description	Thread trimmer SW circuit board		Cord color
	Terminal	Pin	
External thread trimmer socket	CN11	1	Black
		2	Brown

(Caution) 1. CN Nos. in frame of MAIN circuit board denote connector Nos. in MAIN circuit board.

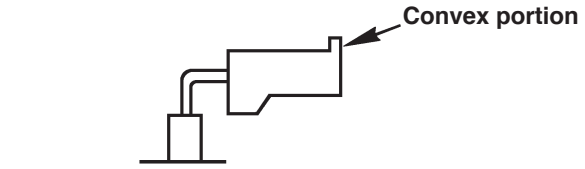
2. Portions enclosed with thick lines denote circuit boards.

3. Numerals outside of frame of MAIN circuit board denote number of lead wires.

(MAIN circuit board)

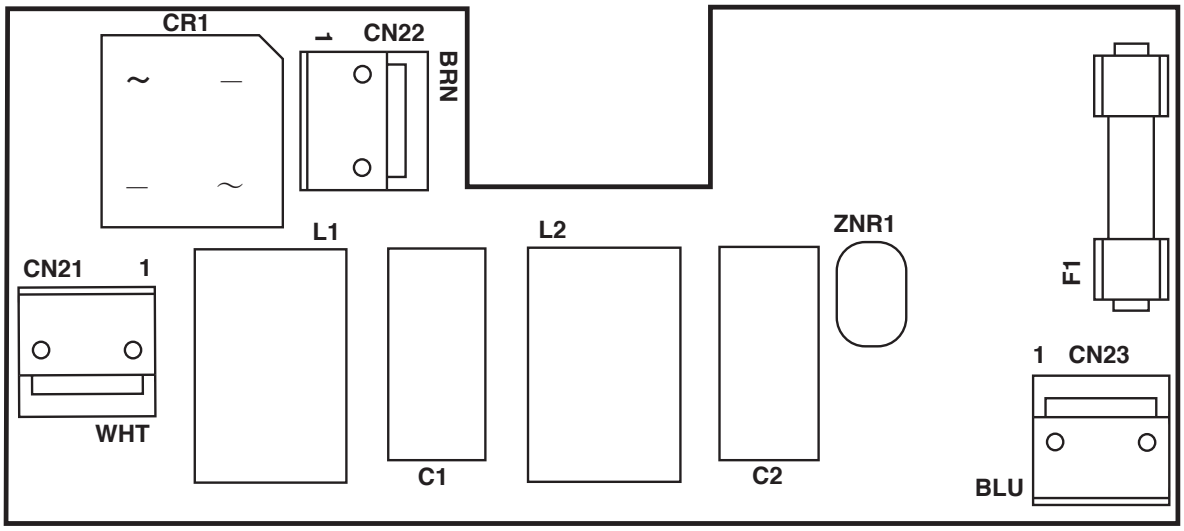


(Caution) Convex portion of connectors, CN7, CN8 and CN9 should be placed up.



Connector insertion diagram

(FILTER circuit board)



[5] ADJUSTMENT OF COMPONENTS

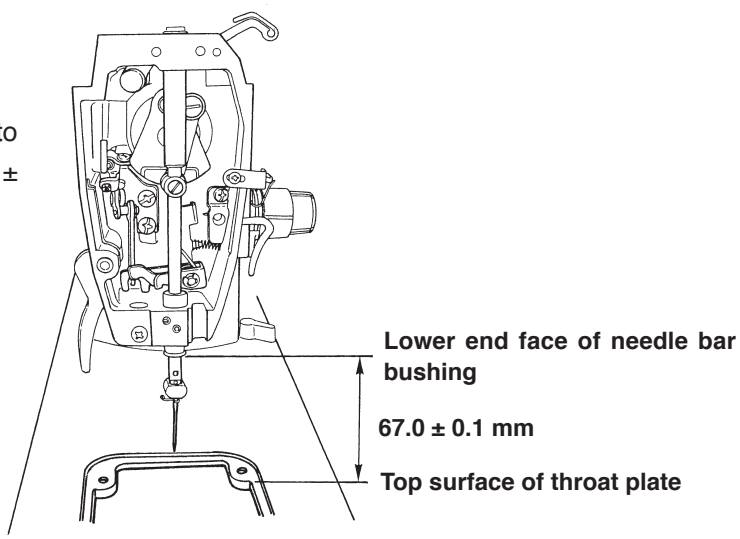
General mechanism

Automatic thread trimmer mechanism

General Mechanism

1. Height of needle bar bushing

○ Set dimension from top surface of throat plate to lower end face of needle bar bushing to 67.0 ± 0.1mm. (bushing : driving fit)



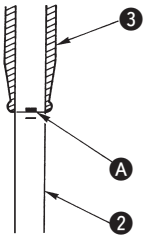
2. Height of needle bar

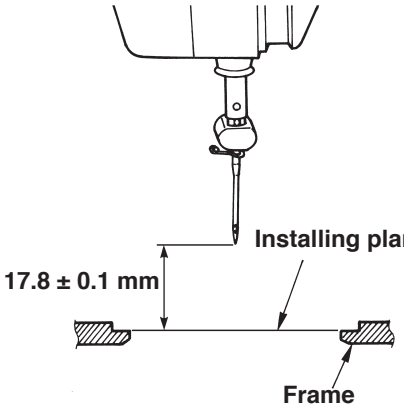
○ Lower dead point of needle bar.

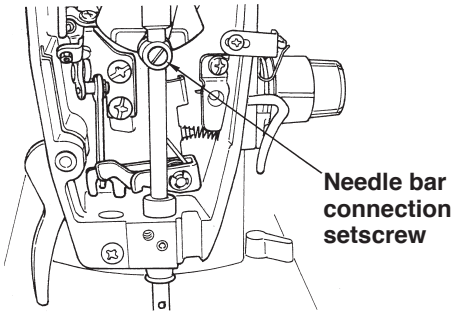
○ Attach length gauge (needle) of #14 needle to needle bar, and adjust dimension from tip of needle to installing plane of throat plate on frame to 17.8 ± 0.1 mm.

○ Perform adjustment with needle bar connection setscrew.

◎ Position of standard
Upper engraved line Ⓐ on needle bar aligns with bottom end of ❸ needle bar bushing when needle bar is at lower dead point.





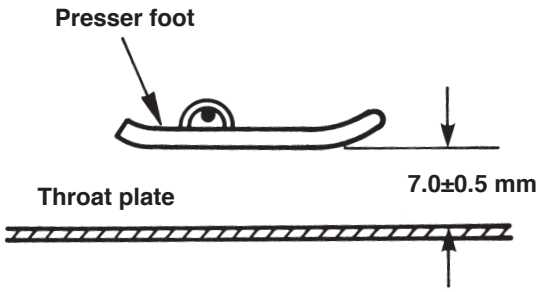


3. Height of presser foot

○ Adjust the height in the state that hand lifter lever is raised.

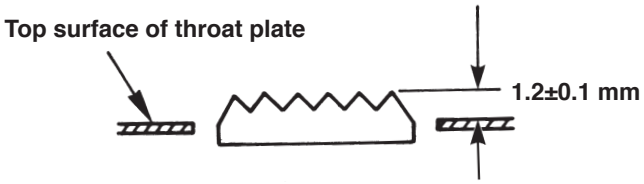
○ Clearance provided between top surface of throat plate and lower face of presser foot is 7.0±0.5 mm.

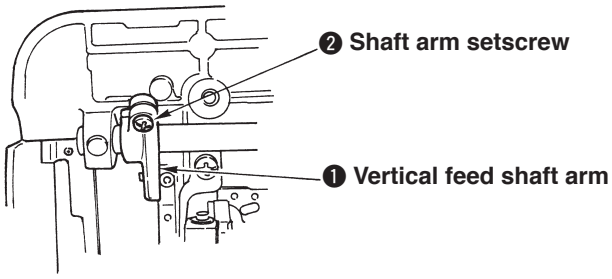
○ Perform adjustment with presser bar connection setscrew.



4. Height of feed dog

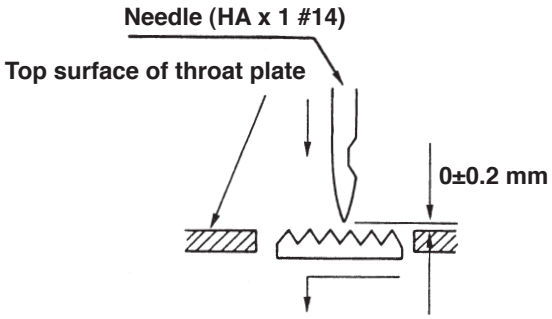
- ○ Set stitch dial to 2 and bring feed dog to its highest position.
- ○ See the height on the rear side of feed dog.
- ○ Bottom of tooth of feed dog should be aligned with top surface of throat plate.
  (Figure on the right side : protruding amount from top surface of throat plate is 1.2±0.1 mm.)
- ○ Perform adjustment with ❶ vertical feed shaft arm.

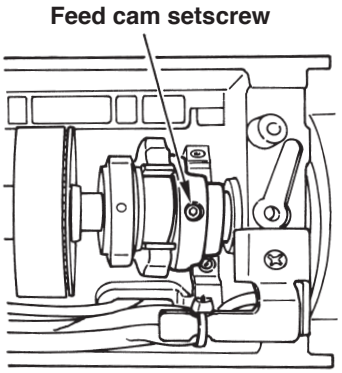




5. Feed timing

- ○ Set stitch dial to P=2.
- ○ Lower feed dog in the normal feed operation and align it with top surface of throat plate.
- ○ At this time, clearance provided between needle top and top surface of throat plate is 0±0.2 mm.
- ○ Perform adjustment with feed cam setscrew.



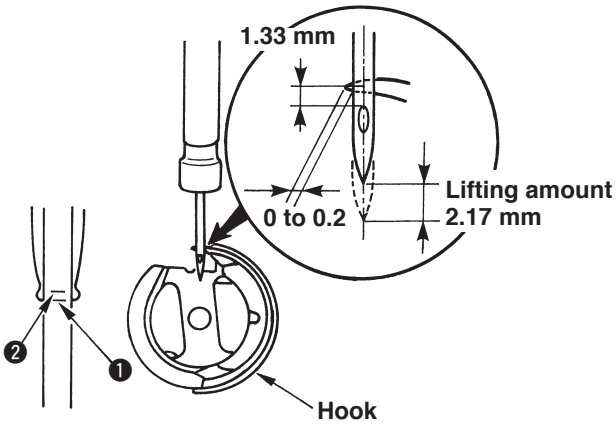


6. Needle-to-hook timing

- ○ Loosen three setscrews in hook.
- ○ Adjust blade point of hook and left edge of needle to 0 to 0.2 mm when needle bar lifts by 2.17 mm from its lower dead point.
- ○ Check clearance between needle and hook, and tighten setscrews.

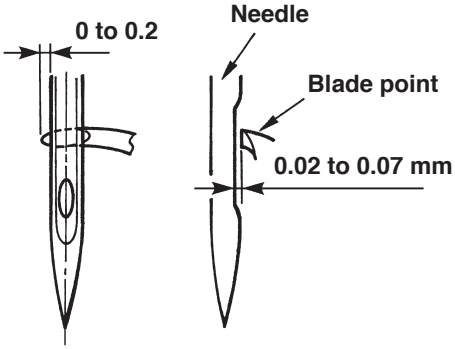
※ Remove bobbin case positioning finger to improve the work.

※ Standard of position of 2 mm from lower dead point of needle bar is that of engraved lines ❶ to ❷ on needle bar.
(❶ Lower dead point, ❷ Position of lifting 2 mm)



7. Clearance between needle and hook

- ○ Loosen three setscrews in hook.
- ○ Adjust blade point of hook to position of 0.2 mm from left edge of needle.
- ○ Adjust clearance between blade point of hook and needle to 0.02 to 0.07 mm.
- ○ Temporarily tighten setscrews, check timing, and securely tighten setscrews.

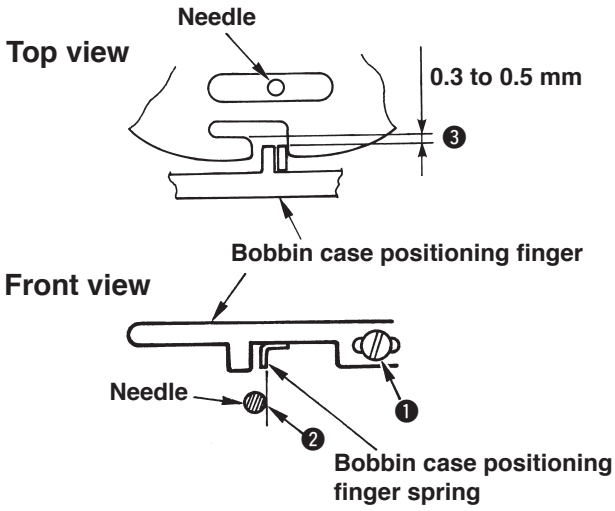


8. Position of bobbin case positioning finger

- ○ Loosen bobbin case positioning finger ❶ setscrew.
- ○ Make right-hand edge of convex portion of bobbin case positioning finger spring align with ❷ right-hand edge of needle.
- ○ Temporarily tighten setscrew, hold clearance of 0.3 to 0.5 mm between inner hook and bobbin case positioning finger, and securely tighten setscrew.

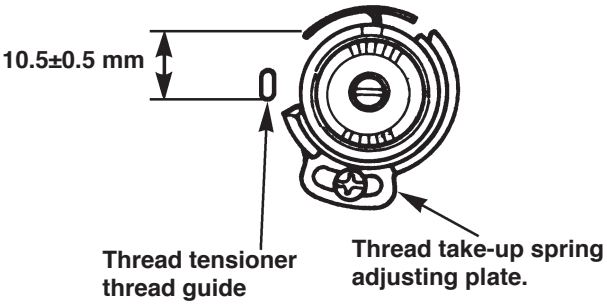
※ Bobbin case positioning finger should not come in contact with hook.

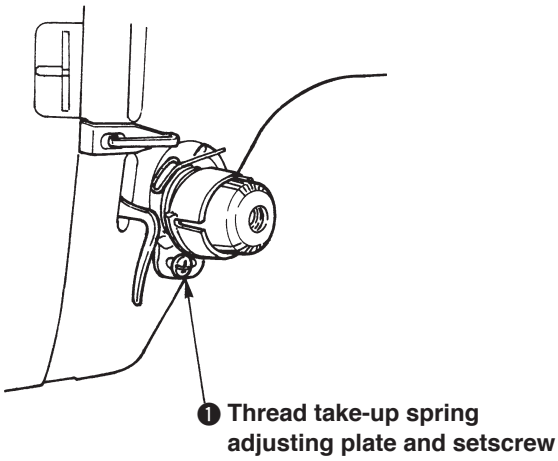
※ Bobbin case positioning finger should not interfere with hook.



9. Momentum of thread take-up spring (absorbing amount of thread)

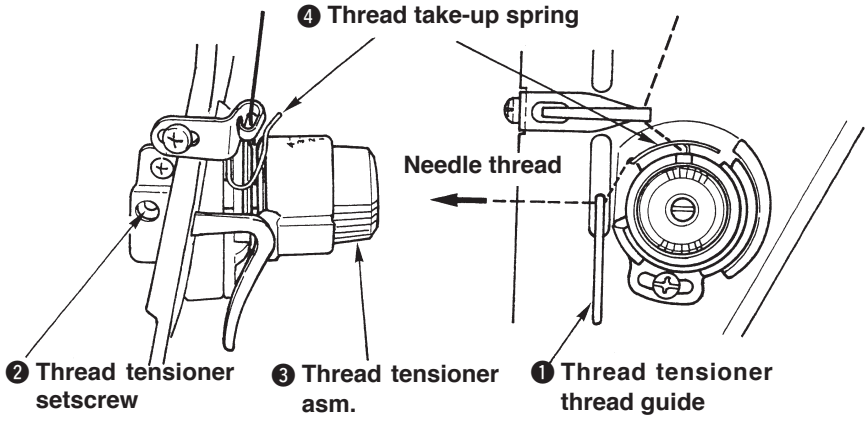
- ○ Thread take-up spring has to be installed at position of 10±0.5 mm from thread guide as shown in the figure below.
- ○ Perform adjustment with ❶ thread take-up spring adjusting plate.





10. Tension of thread take-up spring

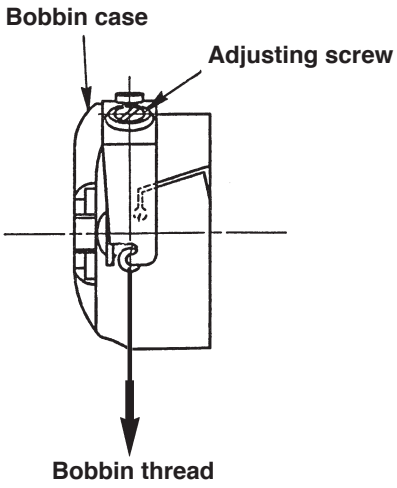
- ○ Pass needle thread up to ❶ thread tensioner thread guide.
- ○ Lower presser foot and draw needle thread.
- ○ Adjust tension of thread take-up spring to 0.176 to 0.245N when thread take-up spring starts lowering.
- ○ For adjustment, loosen thread tensioner setscrew and turn ❸ thread tensioner.
- ○ Turning clockwise = increasing tension of ❹ thread take-up spring.



11. Adjustment of bobbin thread tension

How to adjust

Adjust with adjusting screw so that bobbin thread tension when spun thread #60 is used becomes 0.176±0.02N.



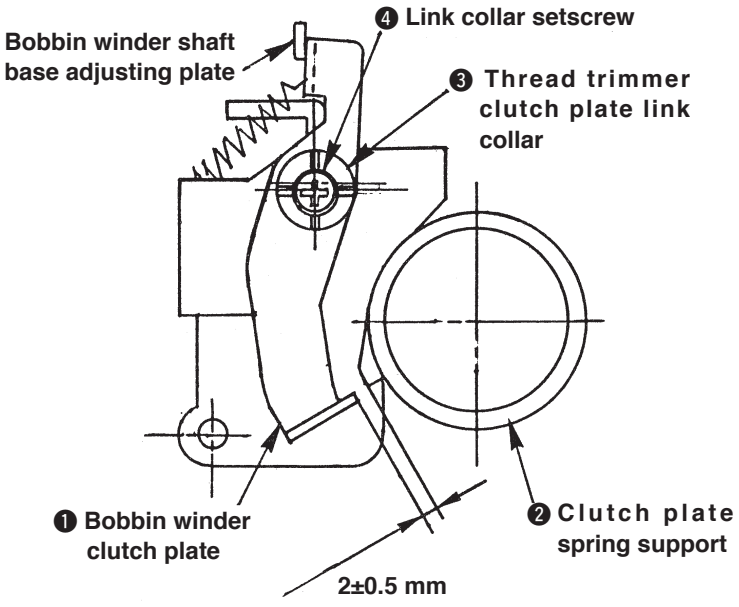
12. Position of bobbin winder clutch

○ Remove belt cover.

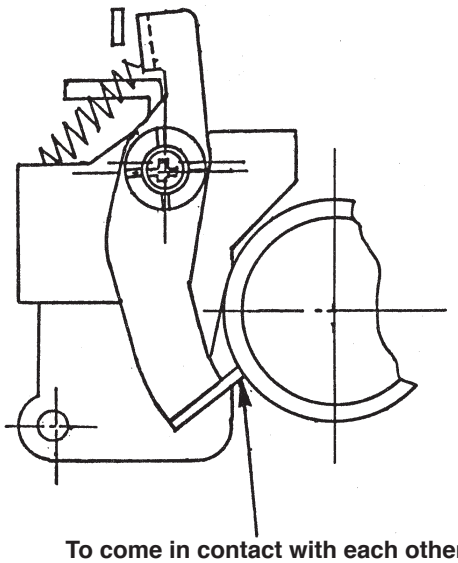
How to adjust

1. Bobbin winder OFF state
   Turn ❸ thread trimmer clutch plate link collar and adjust so that a clearance of 2±0.5 mm is provided between ❶ bobbin winder clutch plate and ❷ clutch plate spring support, and temporarily tighten ❹ setscrew.
2. Bobbin winder ON state
   Make sure that bobbin winder clutch plate comes in contact with inner ring of clutch plate spring support and securely tighten thread trimmer clutch plate link collar setscrew.

Bobbin winder OFF



Bobbin winder ON

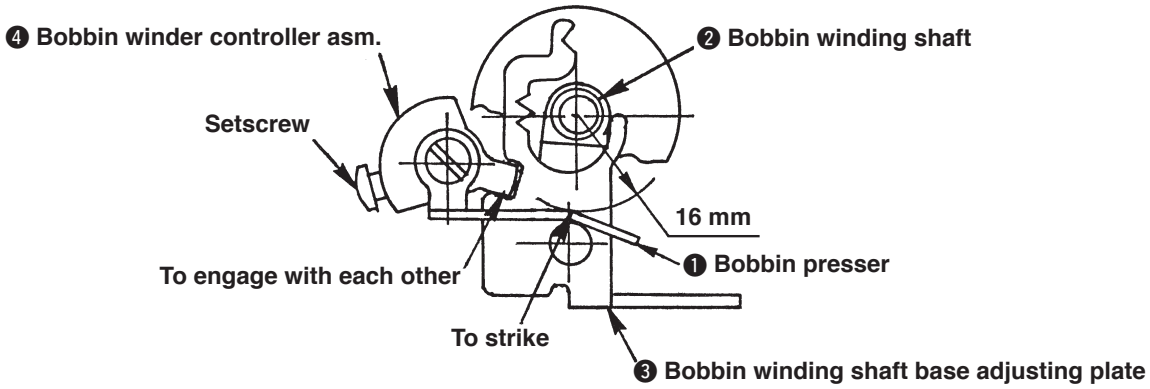


13. Adjustment of bobbin winder

[Position of disengaging bobbin winder]

How to adjust

1. Set ❶ bobbin presser to the position where it is 16 mm away from ❷ bobbin winding shaft.
2. Tighten ❹ bobbin winder controller asm. with setscrew when concave portion of ❸ bobbin winding shaft base adjusting plate is engaged with convex portion of ❹ bobbin winder controller asm..

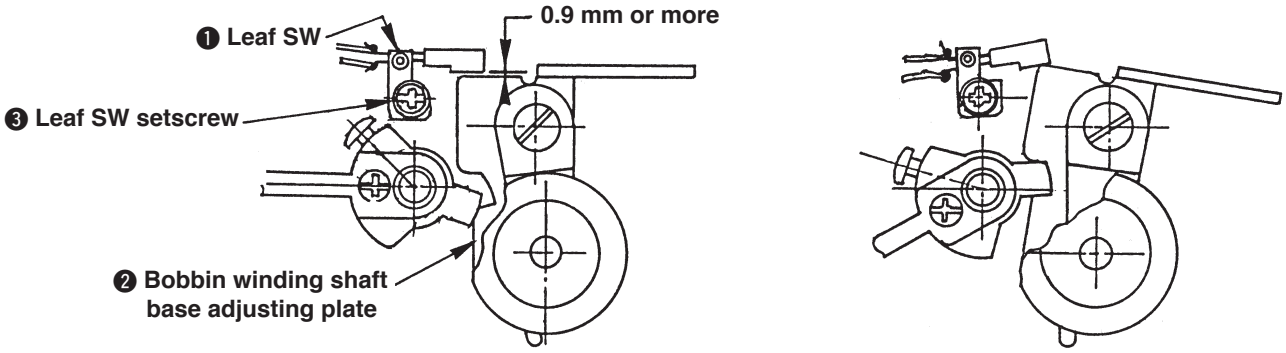


[Position of leaf switch]

How to adjust

1. Adjust so that a clearance of 0.9 mm or more should be provided between ❶ leaf switch and ❷ bobbin winding shaft base adjusting plate when bobbin winding shaft is ON and so that leaf switch is securely turned ON when bobbin winding shaft is OFF.
   Then tighten leaf ❸ switch setscrew.

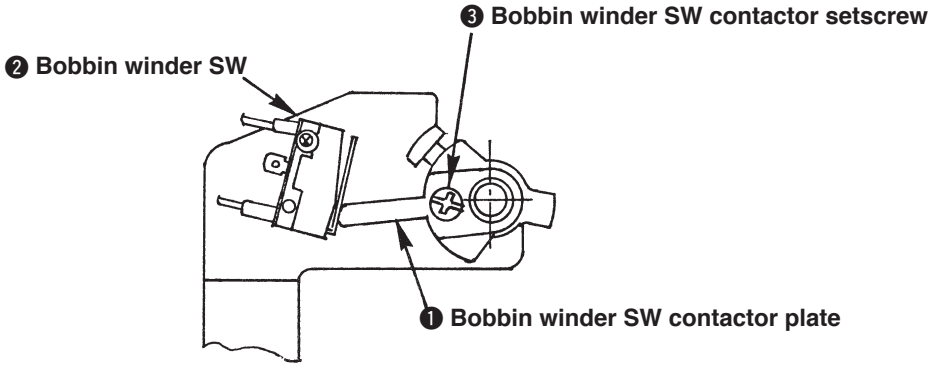
Bobbin winding shaft ON (leaf SW OFF) **Bobbin winding shaft OFF (leaf SW ON)**



[Adjustment of amount of bobbin thread wound round bobbin]

How to adjust

1. Tighten ❶ bobbin winder switch contactor plate with setscrew at the position where ❷ bobbin winder switch is turned OFF when amount of bobbin thread wound round bobbin becomes 18 mm in diameter.

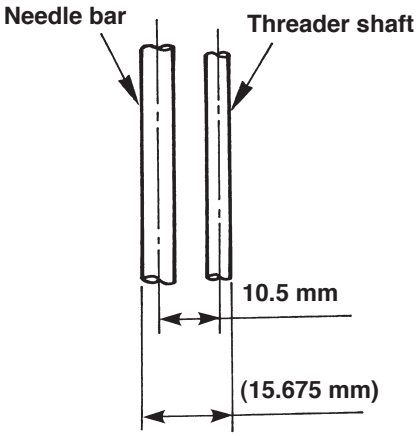


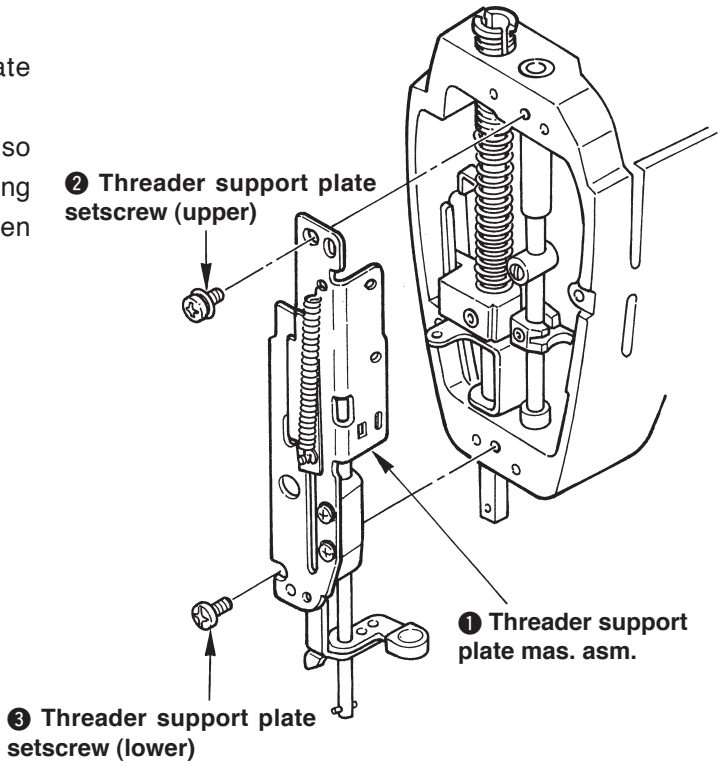
14. Position of threader support plate mas. asm.

How to adjust

○ Open face cover and remove arm cover asm.

1. Temporarily tighten ❶ threader support plate mas. asm. with setscrews.
2. Adjust ❶ threader support plate mas. asm. so that position of threader shaft is 10.5 mm, making needle bar as reference. Then securely tighten setscrews ❷ and ❸.



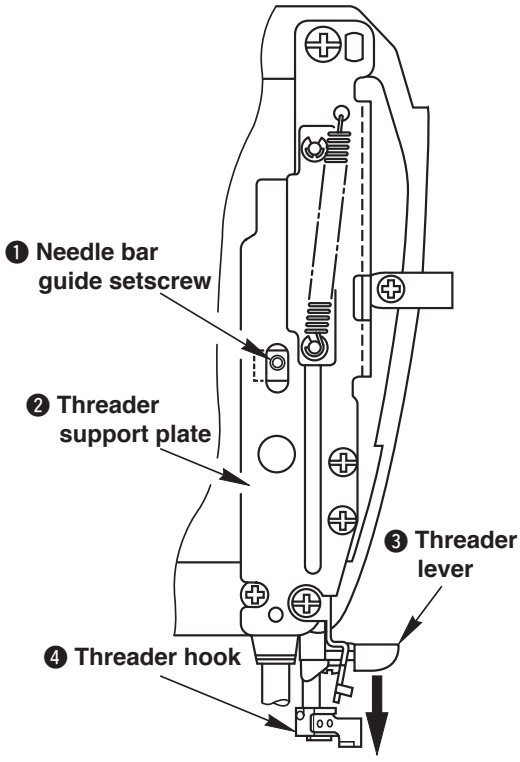


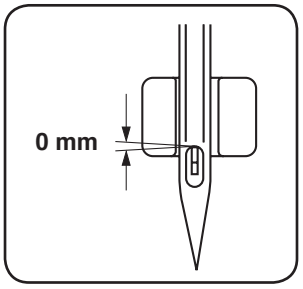
15. Vertical position of threader hook

How to adjust

○ Open face cover.
(Perform confirmation with HAX1 #14 needle.)

1. Turn handwheel by hand to bring needle bar near to highest point. Then stop needle bar at position where ❶ needle bar guide setscrew can be seen from adjustment hole of ❷ threader support plate.
2. Press down ❸ threader lever to lowest point and check that clearance between top end of ❹ threader hook and top end of needle eyelet is 0 to 0.1 mm when ❹ threader hook is turned.
3. Insert hexagonal wrench key (1.5 mm) from adjustment hole of ❷ threader support plate and slightly loosen ❶ needle bar guide setscrew.
   When hook is lower -> move needle bar guide upward and temporarily tighten it.
   When hook is higher -> move needle bar guide downward and temporarily tighten it.
   Perform adjustment while confirming position in terms of needle eyelet.
   When hook is out of place in lateral direction, perform correction of bend of hook with tip of a thin screwdriver or the like, or replace ❹ threader hook with a new one.
4. When hook is adjusted to aforementioned position, securely tighten setscrews.





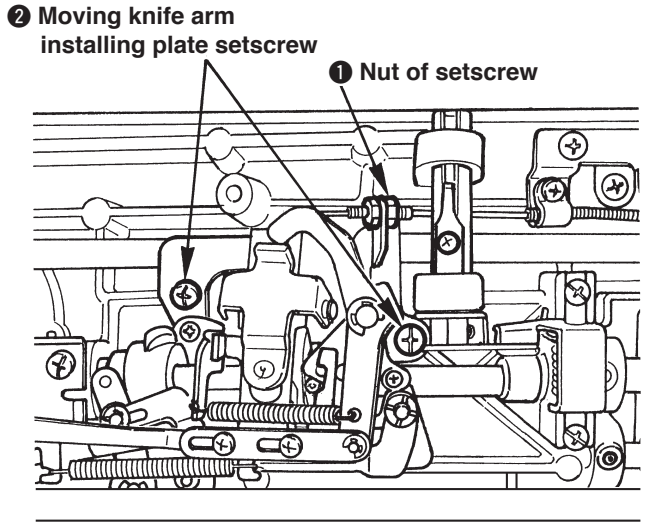
Caution : Hook has to smoothly pass needles HAX1 and HLX5 #11 to #16.

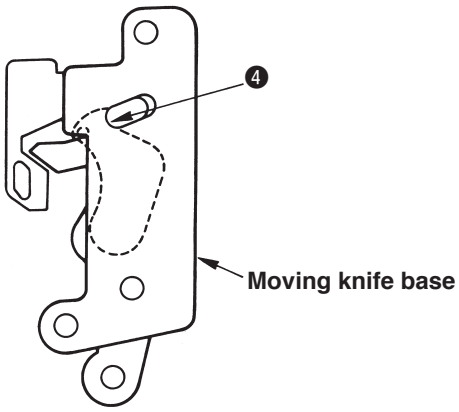
Automatic Thread Trimmer Mechanism

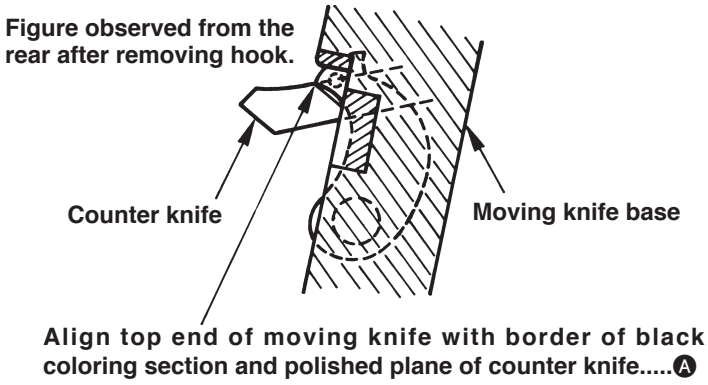
1. Positioning of moving knife arm installing plate (Adjustment of position of moving knife)

- ○ Loosen ❶ nut of setscrew
- ○ Loosen ❷ setscrews in installing plate and move installing plate to the right or left to obtain position Ⓐ.
- ○ Tighten ❷ setscrews in installing plate.

Reference (substitution)
Position of moving knife (see from under side of bed.)
Overlapping amount of slot ❹ of moving knife base with portion R of moving knife is 0 to 0.5 mm.
(To such an extent that portion R of moving knife is slightly seen from slot ❹)



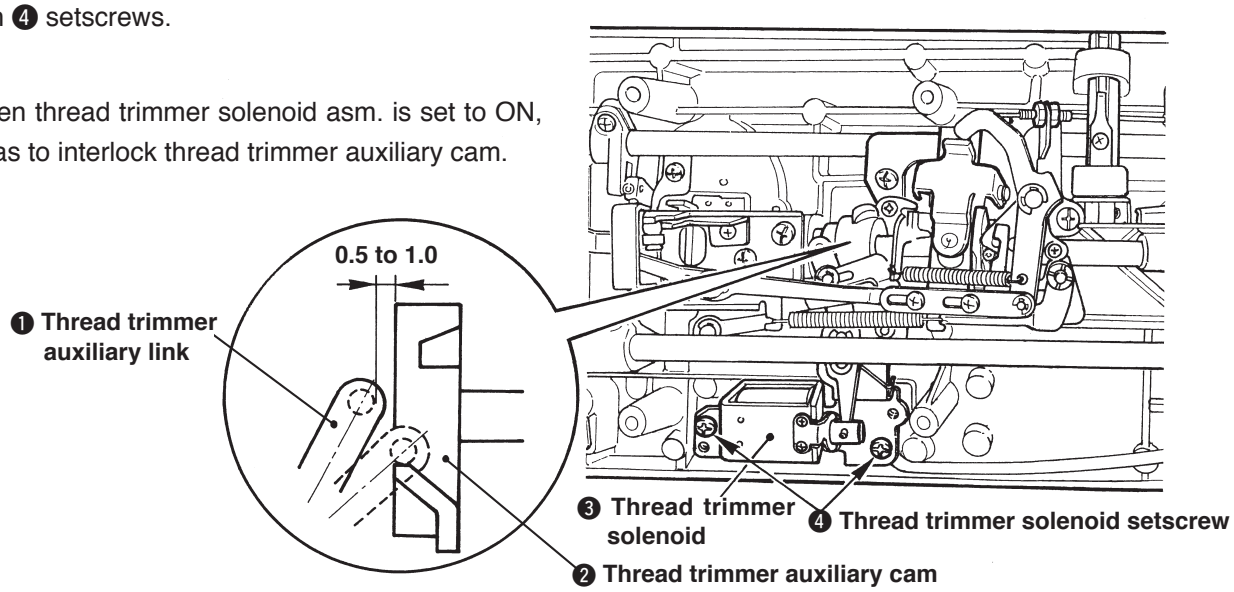




2. Installing position of thread trimmer SOL (solenoid)

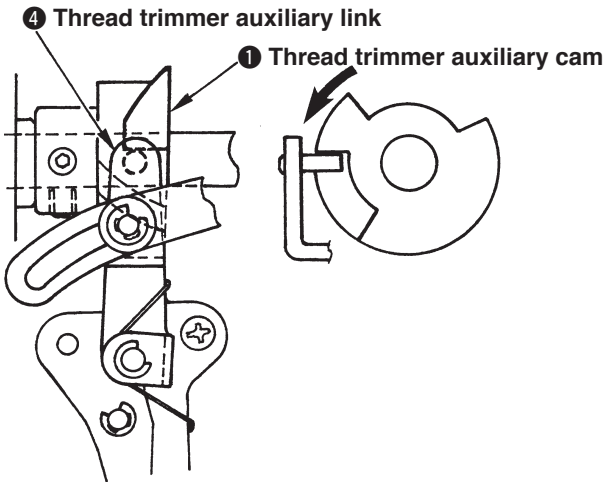
- ○ Move ❸ thread trimmer solenoid asm. to the right and left to adjust so that clearance between ❶ thread trimmer auxiliary link and ❷ thread trimmer auxiliary cam is 0.5 to 1.0 mm, and tighten it with ❹ setscrews.

※ When thread trimmer solenoid asm. is set to ON, it has to interlock thread trimmer auxiliary cam.



3. Thread trimmer cam timing (Needle-to-cam position)

- ○ Loosen setscrews in ❶ thread trimmer auxiliary cam, ❷ thread trimmer cam and ❸ roller holding cam.
- ○ Lower needle bar by 37˚ (1.95 mm) from its upper dead point.
- ○ In this state, fix hook driving shaft and perform positioning of cams of ❶, ❷ and ❸.

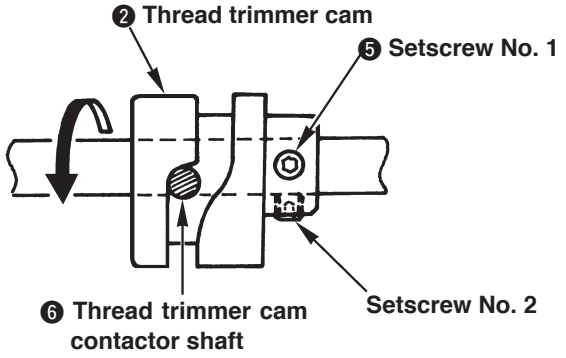


3-1 Positioning of [thread trimmer auxiliary cam]

- ○ Make shaft at top end of ❹ thread trimmer auxiliary link of solenoid asm. come in contact with ❶ thread trimmer auxiliary cam and tighten it with setscrew.

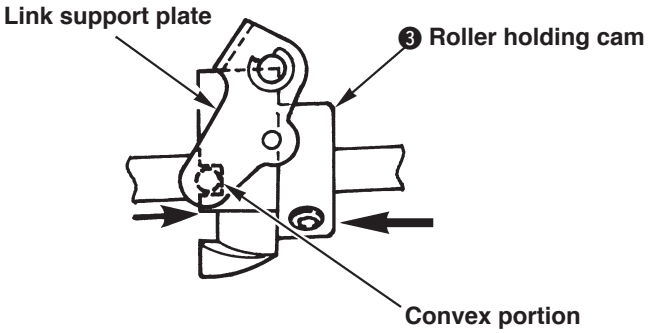
3-2 Positioning of [thread trimmer cam]

- ○ Face front ❺ setscrew No. 1 in thread trimmer cam.
- ○ Enter ❻ thread trimmer cam contactor shaft to groove in ❷ thread trimmer cam.
- ○ Slightly pressing thread trimmer cam to handwheel side, turn it in reverse direction.
- ○ Tighten thread trimmer cam with setscrews at place where idling term of cam groove (place where rotation is hindered) is finished.



3-3 Positioning of [roller holding cam]

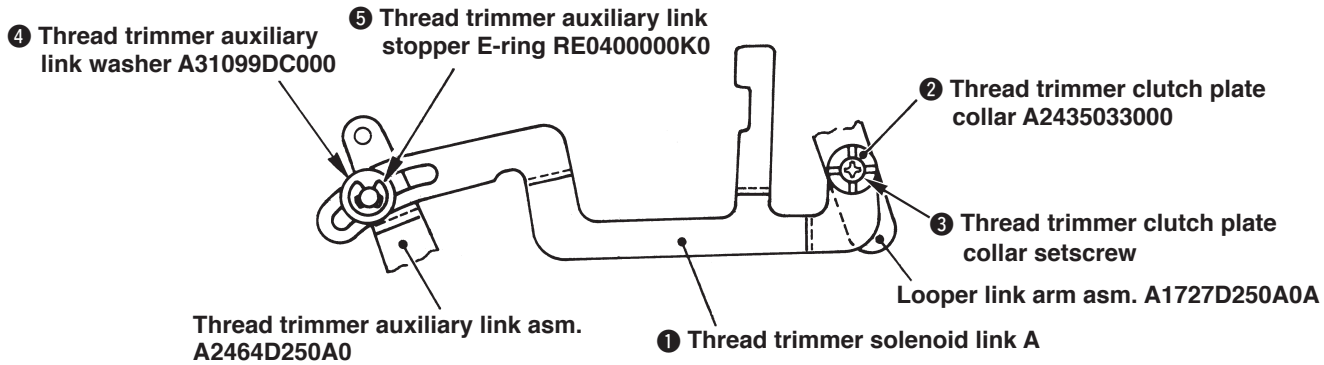
- ○ Turn pin of link support plate and make it come in contact with concave portion of ❸ roller holding cam.
- ○ For lateral position, make ❸ roller holding cam come in contact with ❶ thread trimmer auxiliary cam and tighten it with setscrew.



3-4 Securely tighten setscrews in respective cams

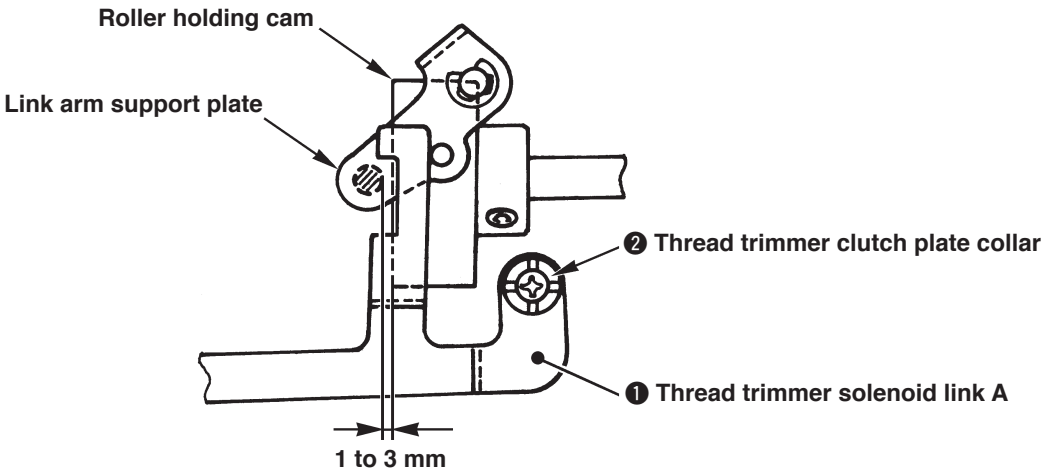
3-5 Adjustment of eccentric shaft of thread trimmer solenoid link A

- ○ Fix ❶ thread trimmer solenoid link A with ❷ thread trimmer clutch plate collar, ❸ thread trimmer clutch plate collar setscrew, ❹ thread trimmer auxiliary link washer and ❺ thread trimmer auxiliary link stopper E-ring.



3-6 Adjustment of thread trimmer clutch plate collar

○ After assembling ❶ thread trimmer solenoid link A, perform adjustment of eccentricity with ❷ thread trimmer clutch plate collar (adjustment of clearance between roller holding cam and link arm support plate) and adjust clearance to 1 to 3 mm.



3-7 Confirmation of working and positioning of link arm fixing plate (Timing of thread trimmer auxiliary cam, thread trimmer cam and thread trimmer holding cam)

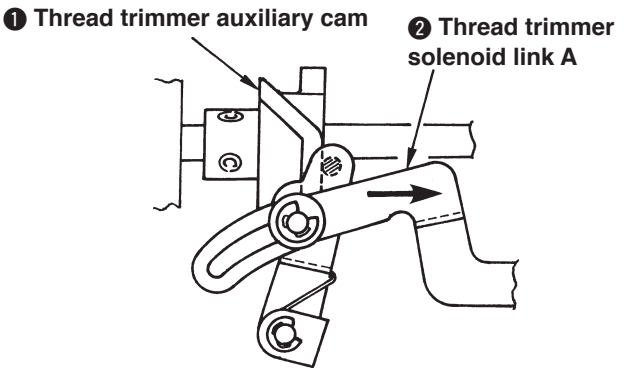
○ Set thread trimmer solenoid asm. to ON state, and make pin at top end of thread trimmer auxiliary link perfectly align with ❶ thread trimmer auxiliary cam.

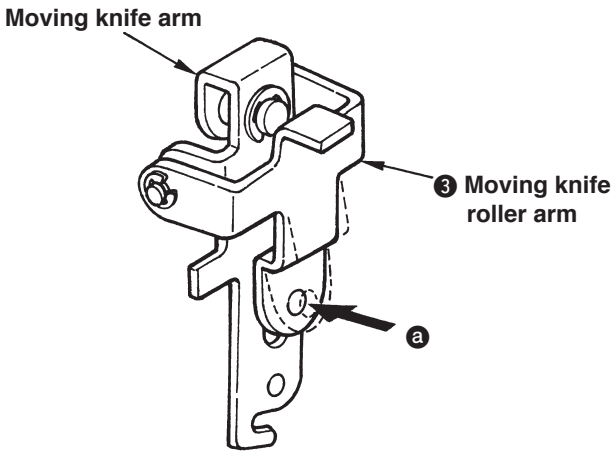
○ Rotate sewing machine by hand up to flat section of ❶ thread trimmer auxiliary cam (place where it moves to extreme right-hand side). At this time, ❷ thread trimmer solenoid link A moves to right-hand side.

○ Looper link arm works and presses moving knife roller arm since ❷ thread trimmer solenoid link A moves.
Turn handwheel and confirm time when link support plate pin rides on flat portion of roller holding cam.

○ Confirm that thread trimmer contactor shaft caulked in ❸ moving knife roller arm enters groove in thread trimmer cam.

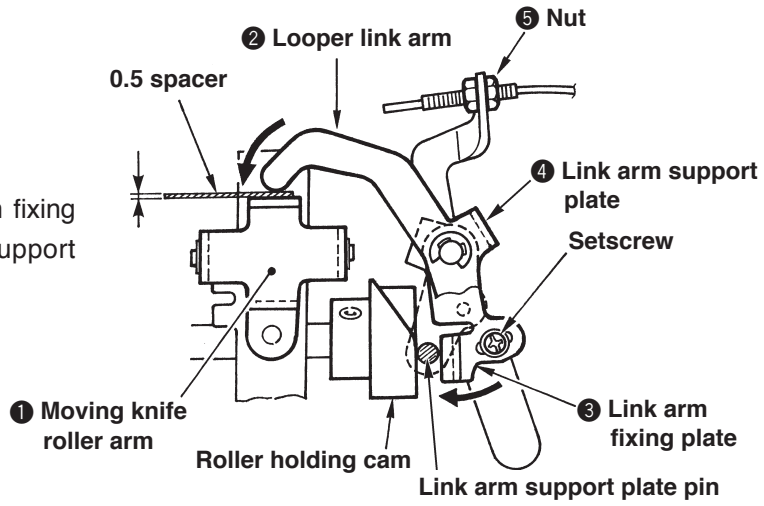
○ Press thread trimmer contactor shaft ⓐ section of ❷ moving knife roller arm to make it come in contact with moving knife arm asm.





○ Insert a clearance gauge of 0.5 mm to contact part of ❶ moving knife roller arm asm. and ❷ looper link arm asm. and press ❷ looper link arm asm. to ❶ moving knife roller arm asm.

○ In aforementioned state, make ❸ link arm fixing plate come in contact with ❹ link arm support plate pin, and fix it with setscrew.



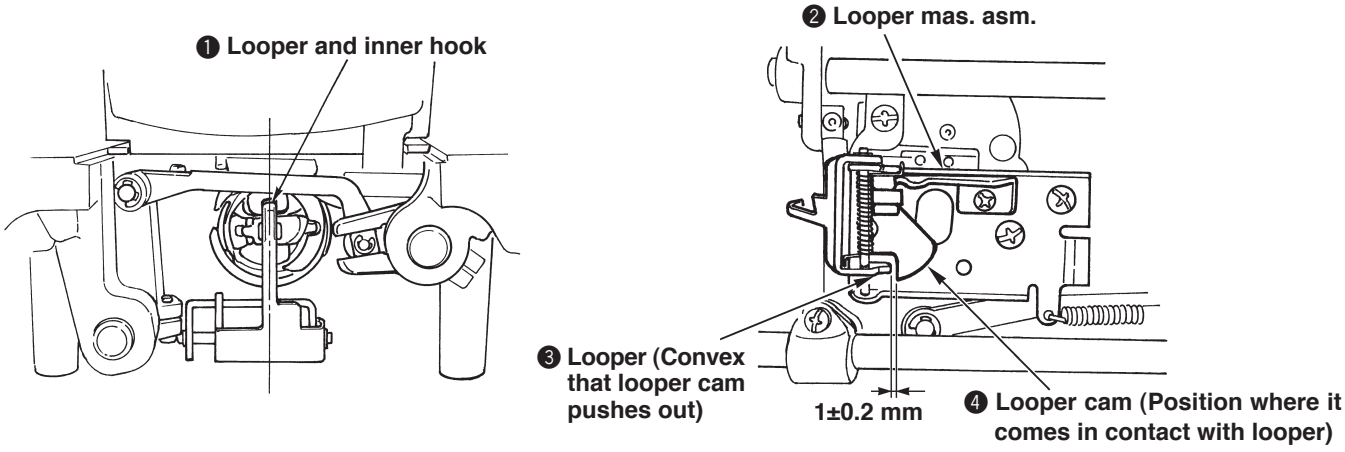
○ Adjustment of position of ❺ nut of wire setscrew (Refer to item 5 of adjustment of thread tension disk open/close, p.27.)

○ After adjustment of position of looper, tighten looper link setscrew. (Refer to item 4, p.27.)

4. Position and protruding amount of looper (Left/right position and moving amount)

4-1. Adjustment of left/right position of looper

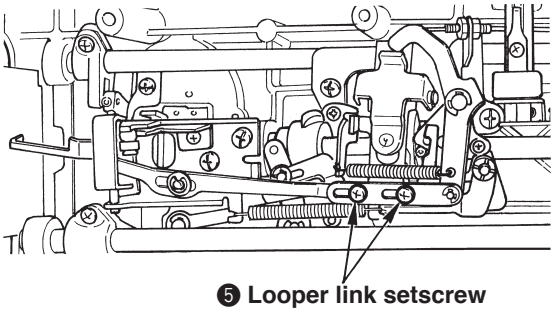
○ Adjust with looper mas. asm. ❷ so that center of inner hook is aligned with center of lopper ❶.



4-2. Adjustment of moving amount of looper

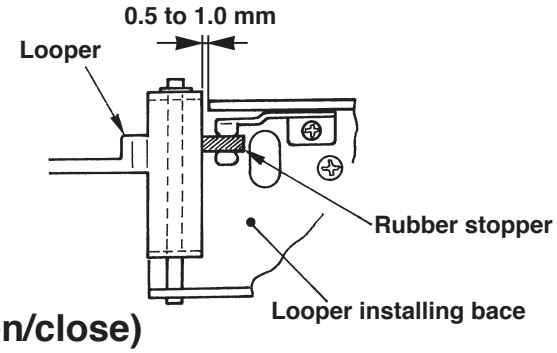
○ When thread trimmer solenoid is ON, top end of looper comes in contact with bobbin case.

○ Adjust clearance between convex ❸ of looper and ❹ looper cam to 1±0.2 mm. Loosen looper link ❺ setscrew to adjust clearance.



4-3. Installing position of looper stopper plate

○ Adjust installing position of stopper so that clearance between looper and looper installing base is 0.5 to 1.0 mm, and tighten stoper plate with setscrew.



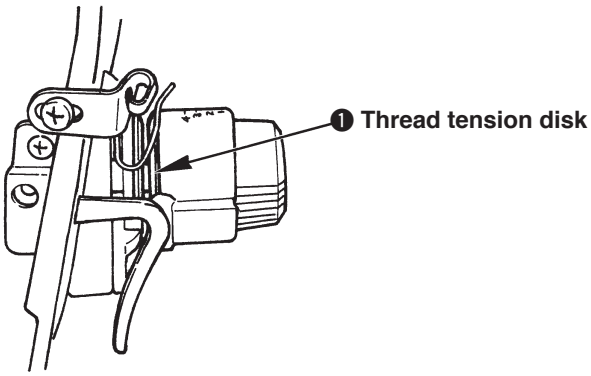
5. Position of nut of wire setscrew (Adjustment of thread tension disk open/close)

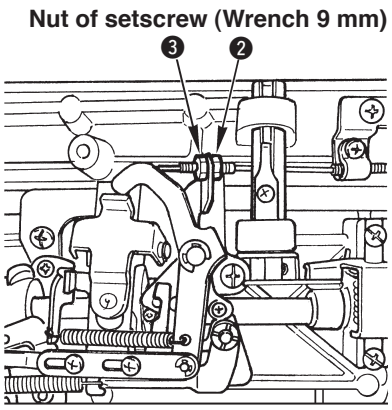
○ Lower presser foot.

○ Move thread trimmer solenoid link A with thread trimmer auxiliary cam, Thread tension disk has to open at the time when roller rides on thread trimmer auxiliary cam. (Disk rise of 0.5 to 0.7 mm at scale 3.5)

○ Perform adjustment with ❷ nut on left-hand side after loosening ❸ nut on right-hand side.

○ Perform fixing with nut located outside.





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