

COMPUTER SEWING MACHINE

HZL-NX7

SERVICE MANUAL

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CAUTION:

Be sure to observe the following to protect against a fire, electrical shock, injury or damaged components.

- * Be sure to unplug the machine before disassembly, assembly or adjustment of the machine.
- * Be sure to carefully prevent electric cords from being caught, coated surfaces from being damaged as well as wrong wiring during assembly.
- * Be sure to use the proper genuine parts when changing any of the machine parts.

[1] Specifications of HZL-NX7

(1) Power switch

- 220-240V AC common to 50/60 Hz
- 120V AC common to 60 Hz

(2) Power consumption

- 85 W

(3) Dimensions and weight

- Dimensions Main unit: 575 (width) × 240 (depth) × 310 (height) (mm)
- Weight Main unit: 14.8 kg

(4) Revolution control

- Slide style speed control
 - Straight stitch 80 to 1,050 sti/min (SPM)
 - Pattern stitch 80 to 750 sti/min (SPM)
 - Reverse stitch 80 to 1,050 sti/min (SPM)
(Sewing speed other than the specified range can be set optionally.)
80 to 1,050 sti/min (SPM) (when the speed controller is used.)
 - Bobbin winding 1,500 to 3,000 sti/min (SPM)
 - Low-speed start 80 to 110 sti/min (SPM) (approx. 1 second only when the power switch is turned ON.)
- Foot controller
 - Even when the foot controller is used, the speed control function by means of the slider is effective.
 - To stop the machine, either release the foot controller or press start/stop button.
 - The number of revolutions is controlled in the way same with the case of the slide speed control.
 - Toe-up pedaling function can be set optionally.
- Safety control
 - When the motor shaft of the sewing machine is accidentally constrained, the power supply to the motor is stopped within two seconds.
 - When the motor is overheated, the built in thermal switch stops the power to the motor.
 - Note that the machine can be restarted once the motor spontaneously cools down.

(5) Stop position

- Upon finishing sewing, the machine stops according to the preset needle stop position (with its needle up or down).
- Upon finishing reverse stitching, the machine stops with its needle down.
- Needle moves down when the machine has preset so that the needle stops at its up position and needle up/down button is pressed.
- Needle moves up when the machine has preset so that the needle stops at its down position and needle up/down button is pressed.
- In the case of fault, the machine stops immediately (stop position varies).

(6) Zigzag width

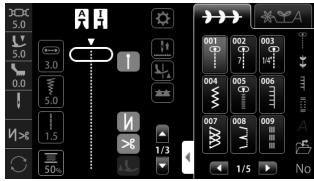
- Max. 7 mm depending on the pattern selected

(7) Amount of feed

- The amount of feed is changed in increments of 0.2 mm by the stitch length adjusting dial (or button).
(For the parallel parts of a buttonhole and satin stitches, the amount feed is changed in increments of 0.1 mm.)
Default setting: 2.4 mm (for straight stitching)

(8) Pattern selection

- Selection is made on the touch panel



(9) Number of patterns that can be selected

- Max. 70 patterns

(10) Number of patterns

- 351

(11) Automatic threading device

- The hook section makes a turn by lowering the threading lever, and automatically returns to its original position after completion of threading.

(12) Automatic lock stitch

When the backtacking switch is turned ON:

- Straight stitch: Three stitches are sewn in normal direction and three stitches are sewn in reverse direction at the beginning and end (the reverse switch is turned ON) of sewing.
Amount of feed: Same with the preset amount of feed
- Other patterns: Zero-feed is inserted and one each stitch is sewn in the normal and reverse directions at the beginning and end (the reverse switch is turned ON) of sewing.
Amount of feed: Fixed at 0.4 mm

(13) Buttonholing

Auto-return type full automatic buttonholing

Buttonholing size detection

(14) Save and call patterns

Selected patterns and pattern settings can be stored in memory.

In addition, the pattern can be called up from memory for sewing.

Number of patterns that can be stored in memory: 10 (folders)

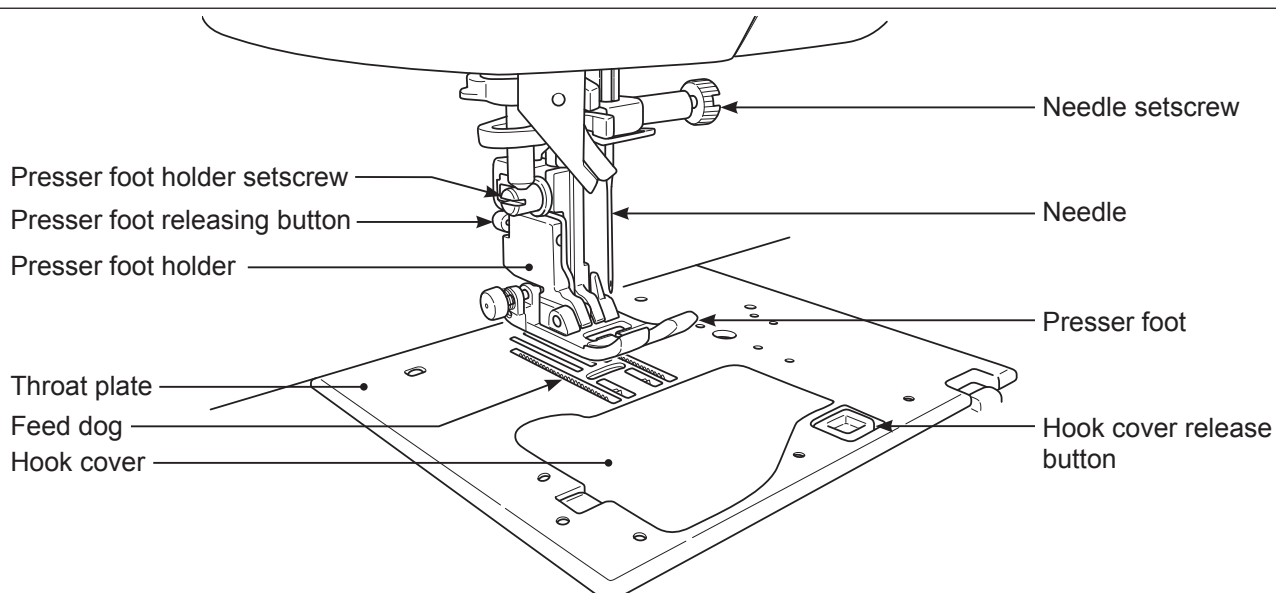
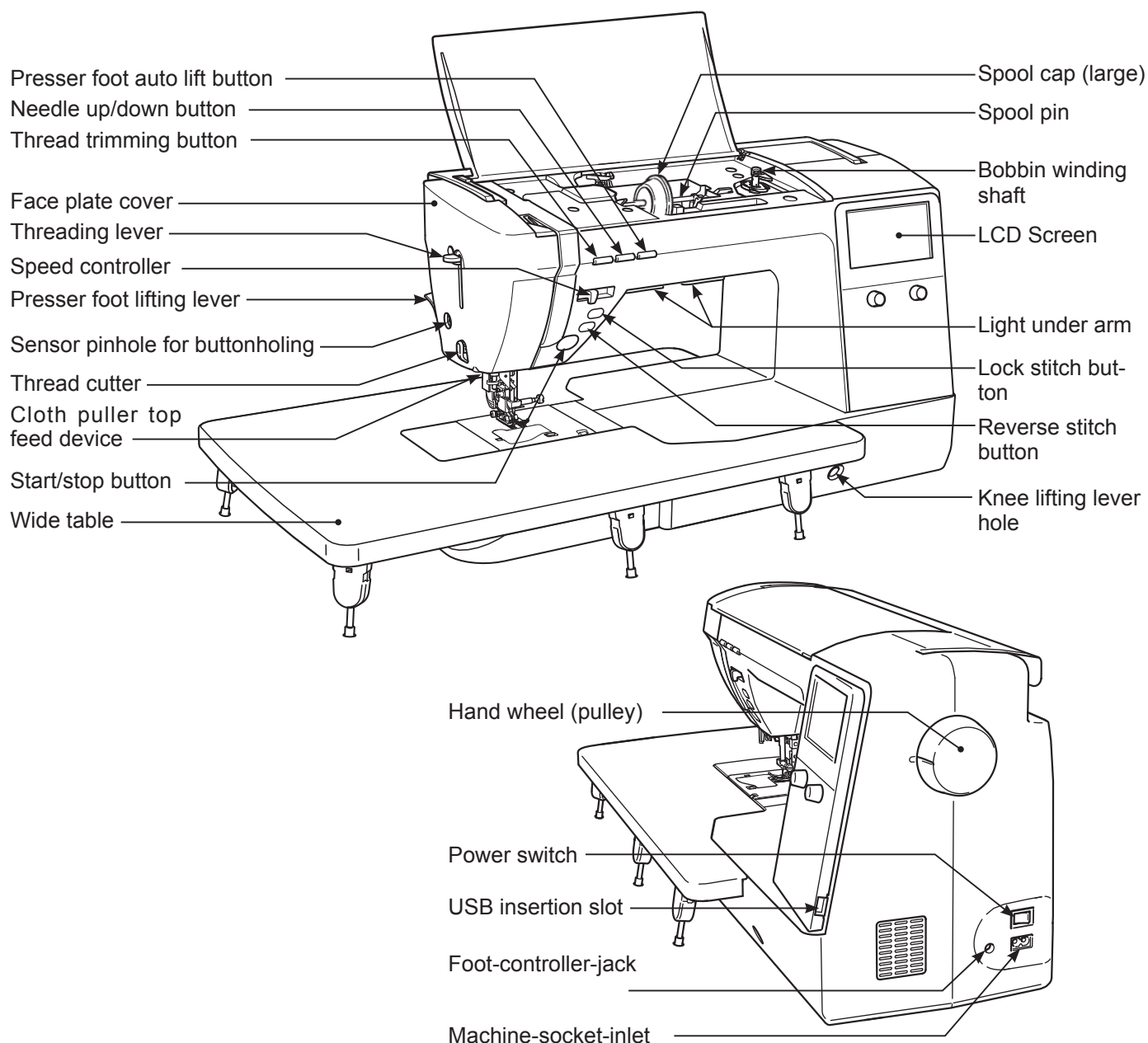
(15) Helpful messages

- Presser foot lifting lever
- Buttonholing foot
- Display of pattern storage limitation
- Pattern clear prompt
- Memory storage
- Acceptance of setting change
- 2-needle setting
- Motor lock
- Straight stitch selection
- Throat plate has come off
- Top feed

[2] Search by trouble (related to mechanical components)

Phenomenon	Item to be checked
Faulty thread tension	6-10: Position of the hook rotation stopper plate 6-11: Adjusting the bobbin thread tension 6-12: Adjusting the needle thread tension
Stitch skipping	6-1: Adjusting the needle bar height 6-2: Adjusting the needle entry point 6-5: Feed timing 6-8: Timing between the needle and the hook 6-9: Clearance between the needle and the blade point of hook
Thread breakage	6-1: Adjusting the needle bar height 6-8: Timing between the needle and the hook 6-10: Position of the hook rotation stopper plate
Hitch stitch	6-2: Adjusting the needle entry point
Faulty material feed	6-3: Feed dog height 6-16: Adjusting the presser bar height 6-22: Position of the automatic DF motor
Contact between needle and throat plate or hook	6-2: Adjusting the needle entry point 6-5: Feed timing 6-8: Timing between the needle and the hook
Faulty pattern shape	6-3: Feed dog height 6-18: Longitudinal feed
Faulty automatic thread trimming	6-6: Adjusting the shield 6-20-1: Attaching/removing the thread trimmer unit 6-20-2: Adjusting the thread trimming switch
Faulty operating noise	6-4: Timing belt 6-17: Motor belt
Needle threader	6-13: Vertical position of the needle threading hook
Fails to start sewing	6-19-2: Adjusting the height of the auto-lifter
Faulty automatic presser foot lifting height	6-19-2: Adjusting the height of the auto-lifter

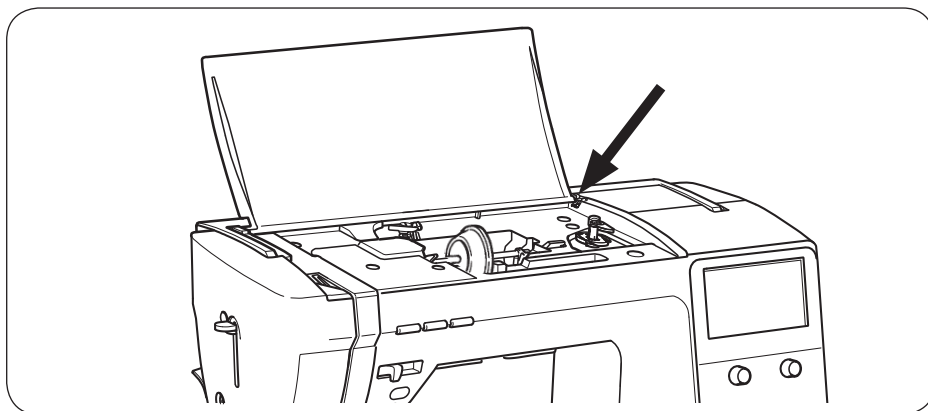
[3] Principal parts



[4] Disassembling the machine covers

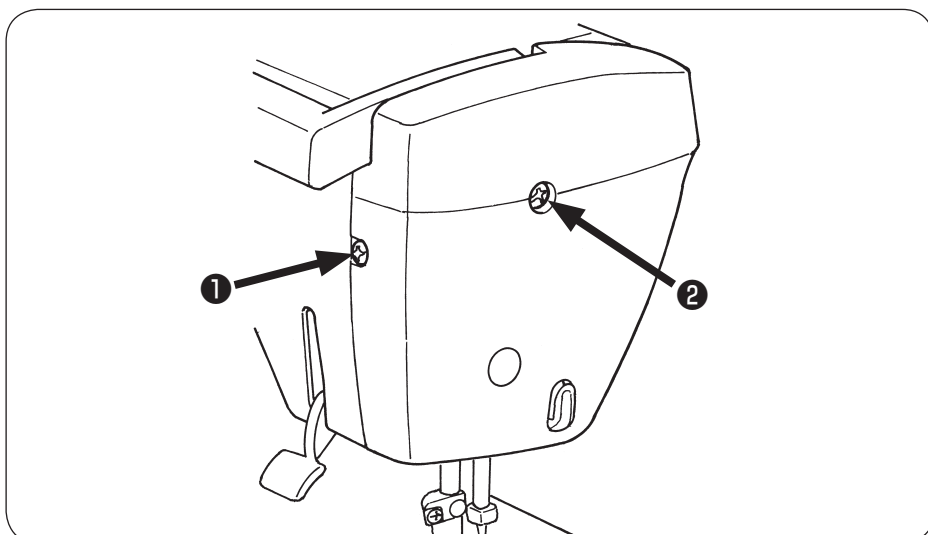
1) Top cover

- To remove the top cover, bow the hinge section of the right side of the cover.



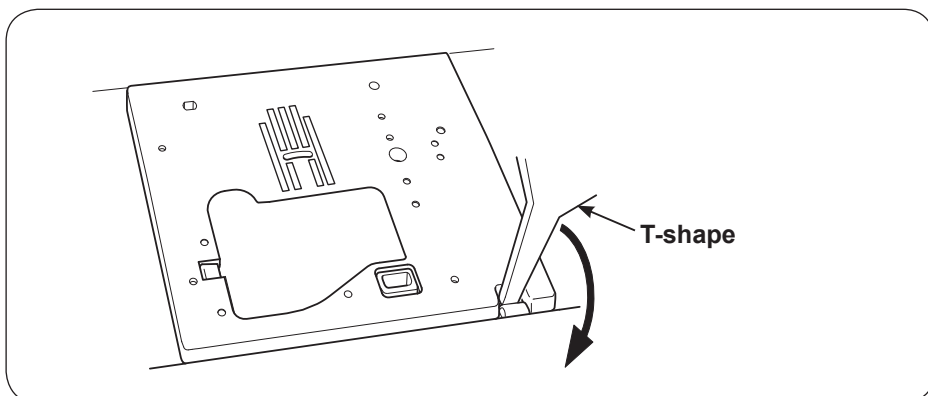
2) Face cover

- Remove setscrews ① and ② from the face cover.
Then, remove the face cover.



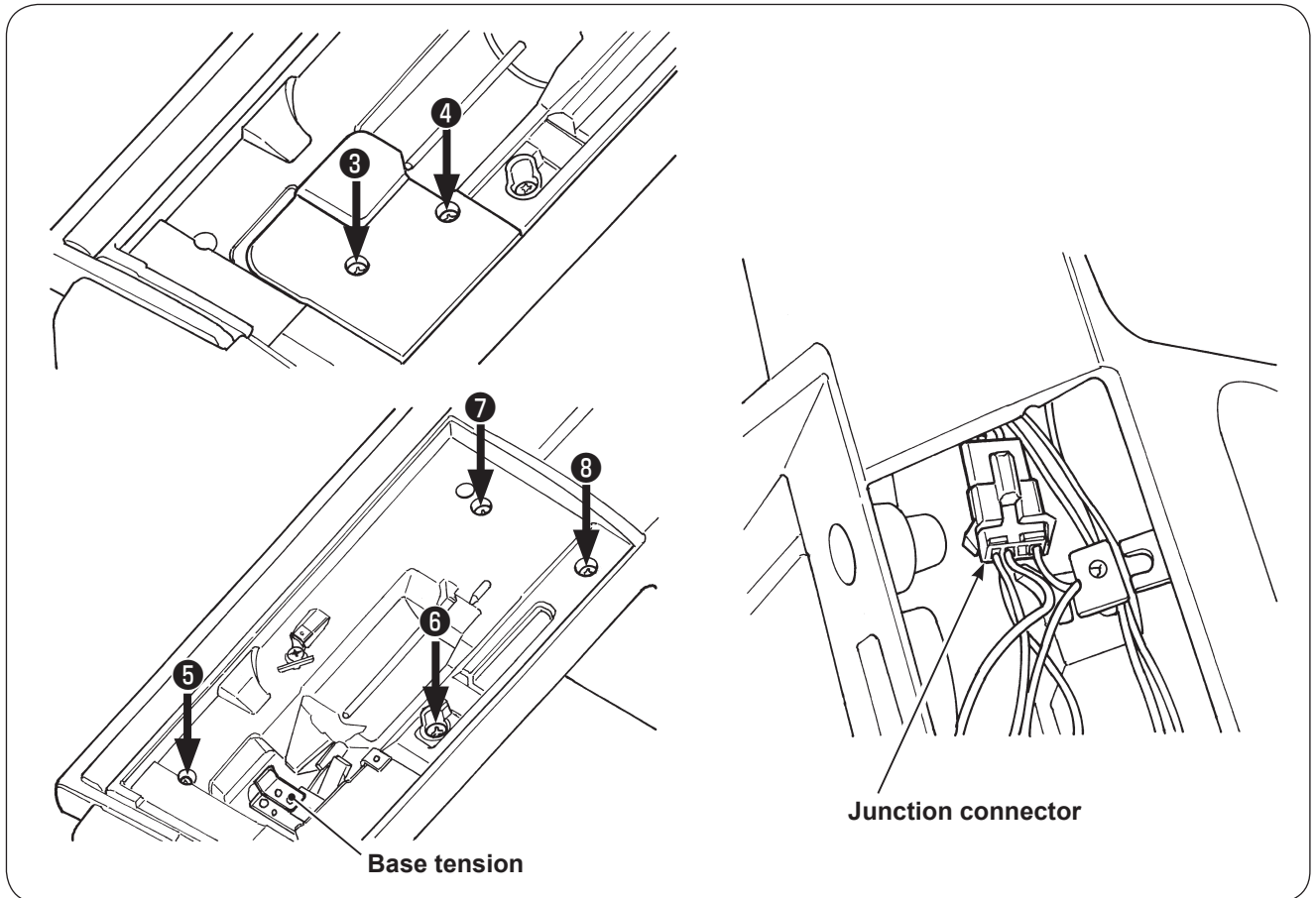
3) Throat plate

- Fitting a flat-blade screwdriver (T-shape) in the nearest slot in the throat plate, push up the throat plate with the screwdriver until it comes off.
Then remove the throat plate.



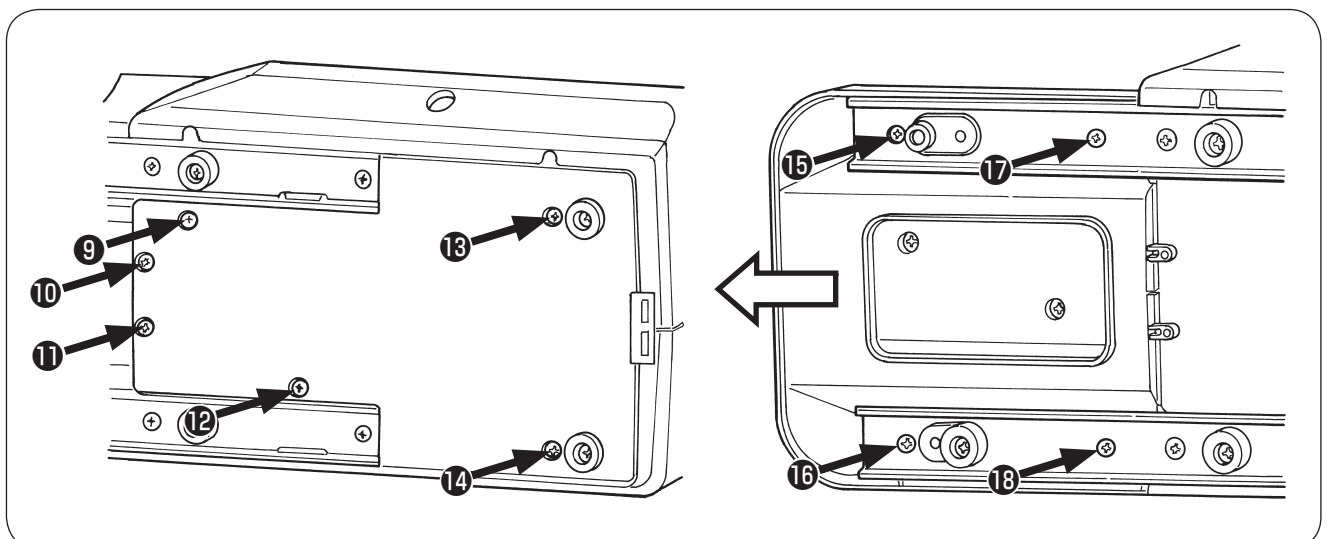
4) Spool cover

- Remove setscrews **4** and **5** from the thread tension cover.
Remove the thread tension cover.
- Remove setscrews **6** to **10** from the spool cover.
- Remove the bobbin winding motor junction cable from the junction connector.
- Remove the spool cover from the main unit of the machine, paying attention to the base tension.



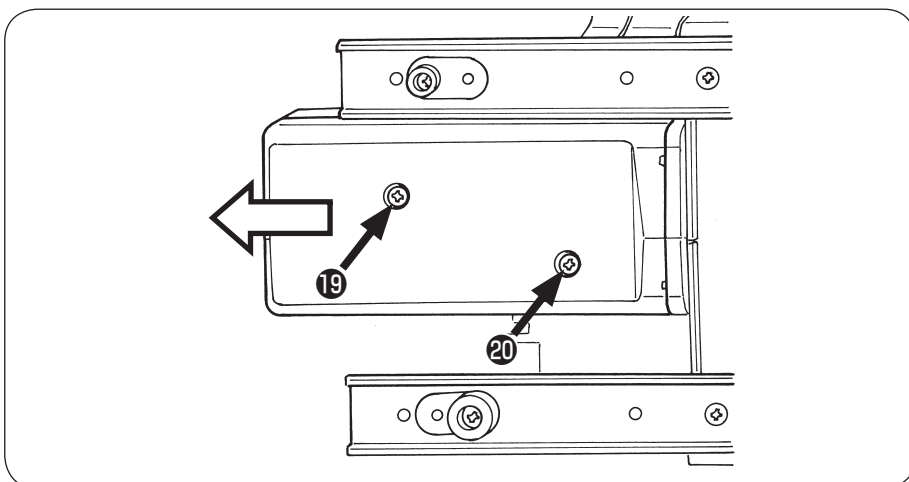
5) Bottom cover

- Remove setscrews **9** to **14** of the bottom cover B (on the handwheel side) to detach the bottom cover B.
- Remove setscrews **15** to **18** of the bottom cover A (on the frame side). Draw out the bottom cover A in the direction of the arrow while pushing up the tip of the cover.



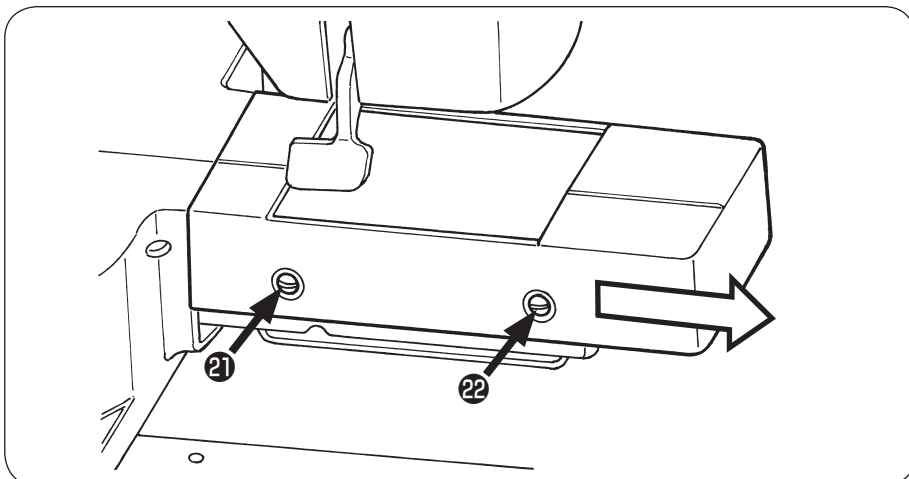
6) Bottom cover of the free arm

- Remove free-arm lower bottom cover setscrews **19** and **20** . Pull out the bottom cover of the free arm in the direction of the arrow.



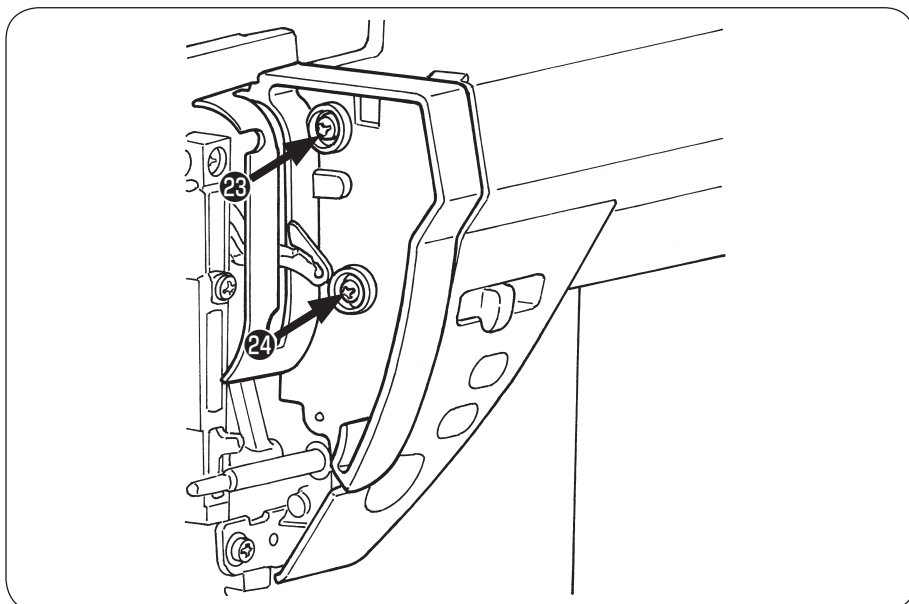
7) Upper cover of the free arm

- Remove free-arm upper cover setscrews **21** and **22** . Pull out the upper cover of the free arm in the direction of the arrow.



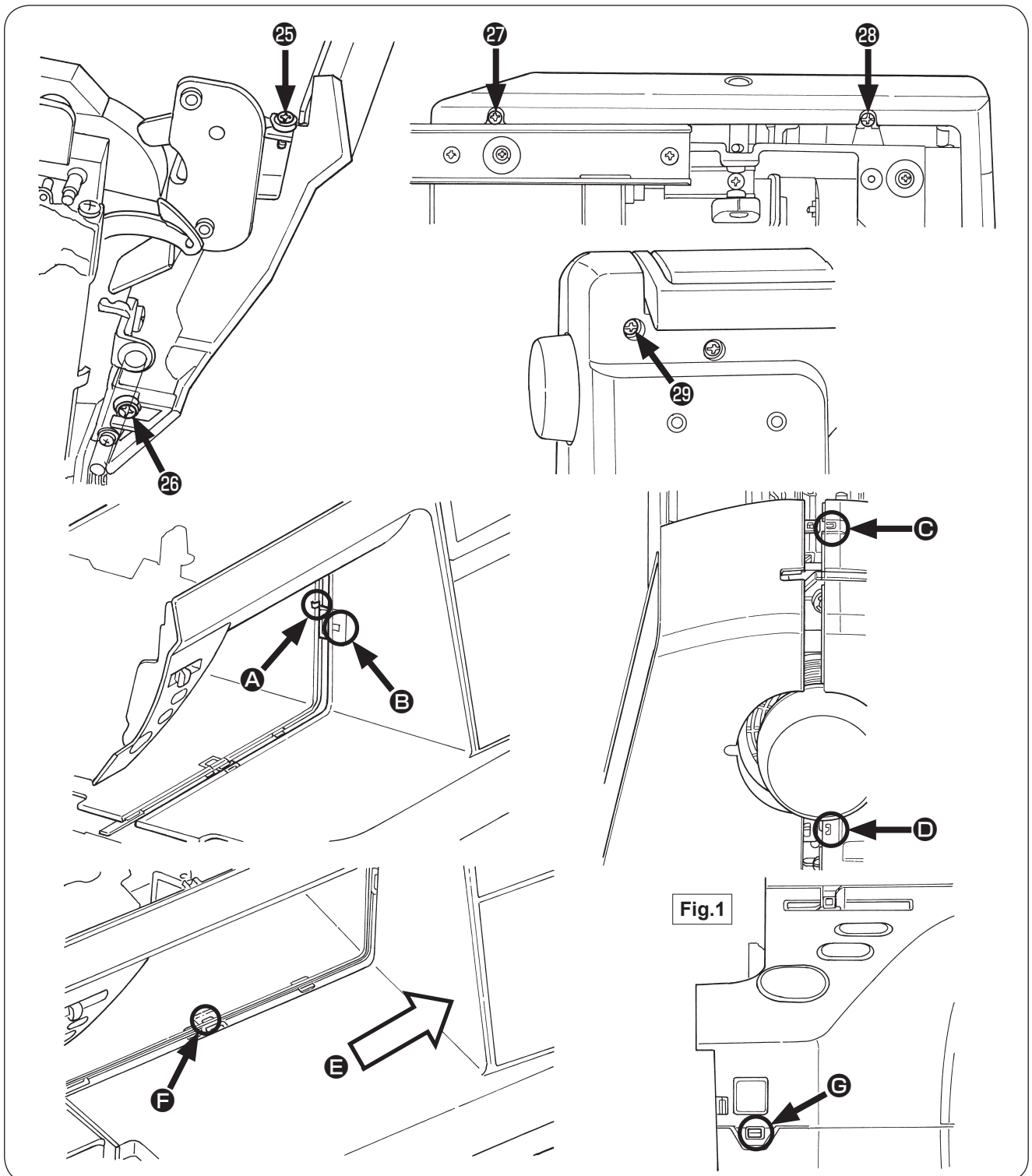
8) Face plate cover

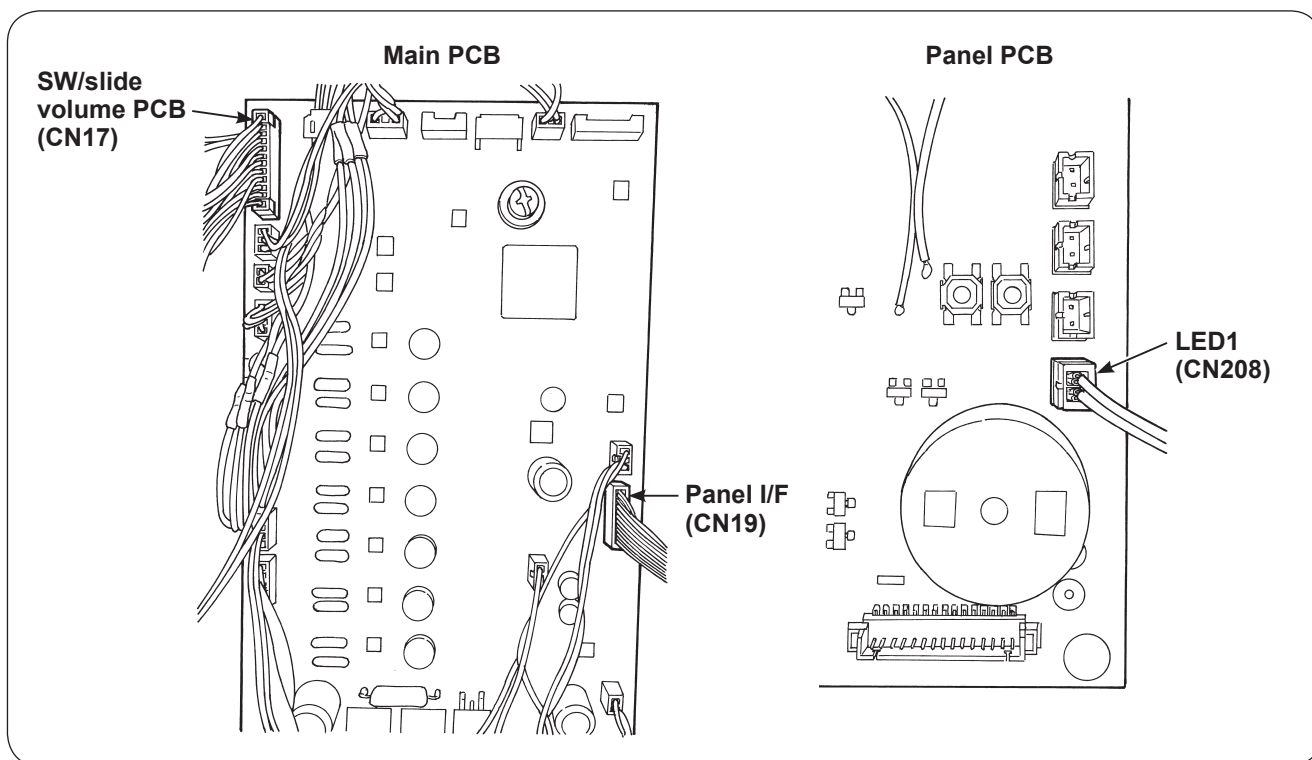
- Remove setscrews **23** and **24** from the face plate cover.
Remove the face plate cover.



9) Front panel

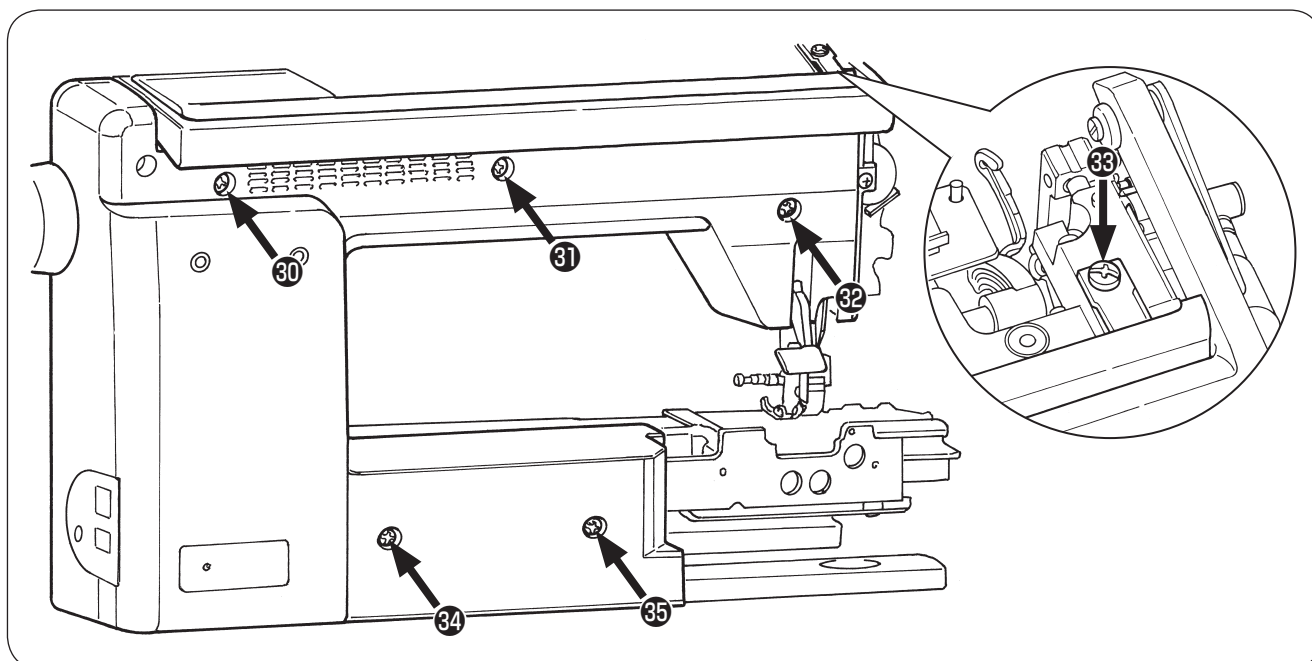
- Remove setscrews 25 to 29 from the front panel.
- Put a thin screwdriver in the notch A in the rising section under the arm and pry off the front panel and hook B of the rear panel. (Fig 1)
- Detach clinch nails (C and D) of the front panel and rear panel, while pushing down the front panel.
- Opening the right side of the front panel in the direction of the arrow, tap E section with your hand to remove hook F located at the bed surface.
- Lastly, remove hook G located at the lower side of the machine jaw.
- If needed, remove the switch/slide VR connector (CN17) and panel I/F connector (CN19) from the main PCB. Then, remove the LED1 connector (CN208).





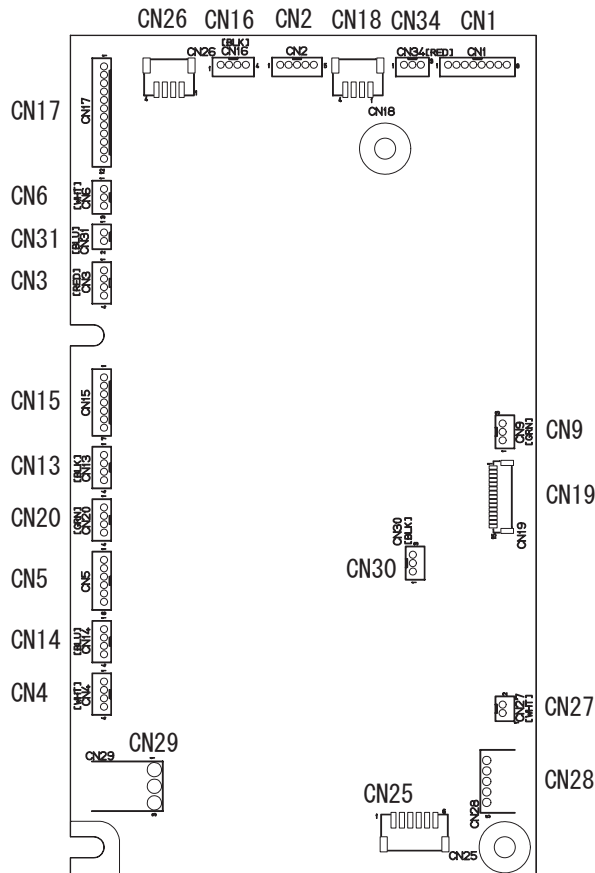
10) Rear panel

- Remove setscrews 30 to 35 from the rear panel.
- Remove the rear panel with the presser foot lifting lever raised.



[5] PCB connection diagram

• Main PCB



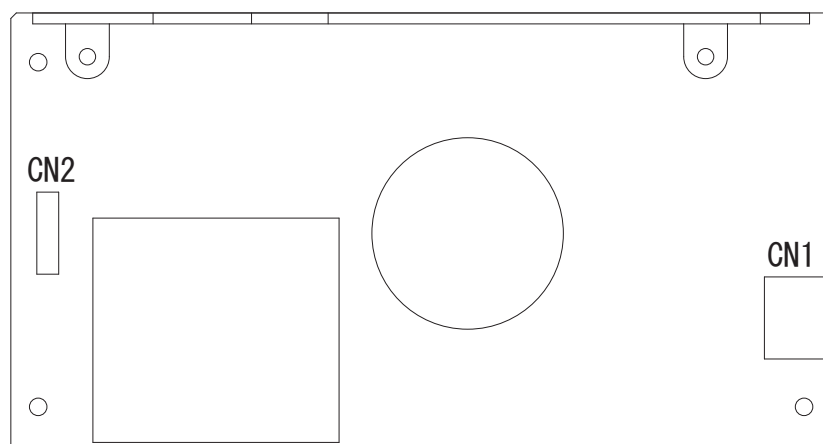
Connector No.	Destination	Terminal No.	
CN1	Debug (Unused)	1	3.3V
		6	GND
CN2	Flash memory interface	1	5V
		5	GND
CN3	Needle throwing STM	1	$\bar{A}$ 5.0Ω
		2	A 5.0Ω
		3	B
		4	$\bar{B}$
CN4	Feed STM	1	$\bar{A}$ 4.0Ω
		2	A 4.0Ω
		3	B 4.0Ω
		4	$\bar{B}$ 4.0Ω
CN5	Thread trimming STM	1	$\bar{A}$ 4.0Ω
		2	A 4.0Ω
		3	B 4.0Ω
		4	$\bar{B}$ 4.0Ω
		5	GND
		6	Origin detection signal
CN6	Potentiometer cable asm.	1	3.3V
		2	Position detection signal
		3	GND
CN9	Throat plate switch PCB	1	Throat plate switch 1
		2	Throat plate switch 2
		3	GND

Connector No.	Destination	Terminal No.	
CN13	Presser-lifter STM	1	$\bar{A}$ 4.0Ω
		2	A 4.0Ω
		3	B 4.0Ω
		4	$\bar{B}$ 4.0Ω
CN14	Top feed STM	1	$\bar{A}$ 4.0Ω
		2	A 4.0Ω
		3	B 4.0Ω
		4	$\bar{B}$ 4.0Ω
CN15	Thread tension STM	1	$\bar{A}$ 4.0Ω
		2	A 4.0Ω
		3	B 4.0Ω
		4	$\bar{B}$ 4.0Ω
		5	GND
		6	Origin detection signal
		7	5V
CN16	BH sensor	1	GND
		2	BHR SW
		3	BHS SW
		4	3.3V
CN17	SW/slide volume PCB	1	LED G
		2	LED R
		3	Reverse stitch switch
		4	S/S switch
		5	Thread trimming switch
		6	Needle up/down switch
		7	Auto-lifter switch
		8	Lock stitch switch
		9	GND
		10	Speed control variable resistor
		11	GND
		12	3.3V
CN18	Reserve (Unused)	2	GND
		4	GND
CN19	Panel I/F cable asm.	1	5V
		2	5V
		3	GND
		4	GND
		5	RXD
		6	TXD
		7	S.STATE
		8	UDET
		9	Reset
		10	5V
		11	5V
		12	Panel detection signal
		13	GND
		14	GND
		15	NC

Connector No.	Destination	Terminal No.		
CN20	Automatic DF STM	1	$\bar{A}$	4.0Ω
		2	A	
		3	B	4.0Ω
		4	$\bar{B}$	
CN25	Main shaft detection PCB	1	5V	
		2	Motor pulse	
		3	S1	
		4	S2	
		5	S3	
		6	GND	
CN26	Bobbin winding motor	1	Bobbin winder switch	
		2	GND	
		3	Bobbin winder motor (+) (29V)	
		4	Bobbin winder motor (-)	
CN27	Controller socket	1	GND	
		2	Controller	
CN28	Power supply relay lead wire	1	29V	
		2	29V	
		3	NC	
		4	GND	
		5	GND	
CN29	Motor filter PCB	1	Main motor (+) (29V)	
		2	Main motor (-)	
		3	FG	

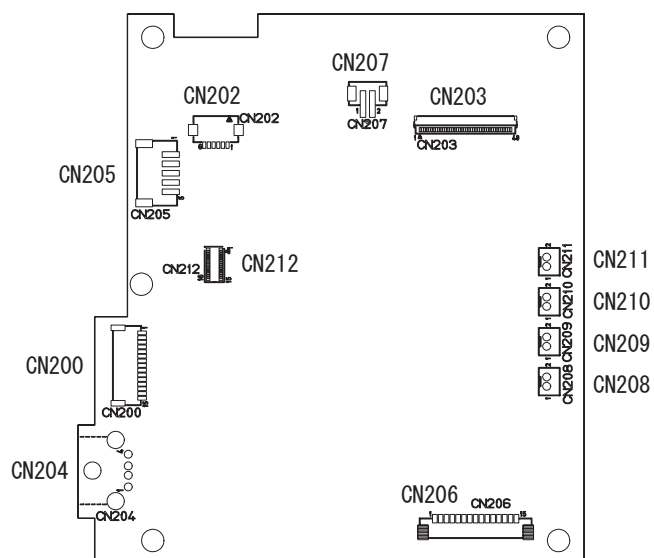
Connector No.	Destination	Terminal No.	
CN30	Knee lifter slide VR PCB	1	3.3V
		2	Knee lifter position detection signal
		3	GND
CN31	Presser foot lifting switch cable asm.	1	Presser foot lifting switch
		2	GND
CN34	Top feed detection PCB	1	3.3V
		2	Top feed detection signal
		3	GND

• Power PCB



Connector No.	Destination	Check
CN1	Power SW	AC input
CN2	Power supply relay lead wire	1-2PIN 29V, 4-5PIN GND (FG)

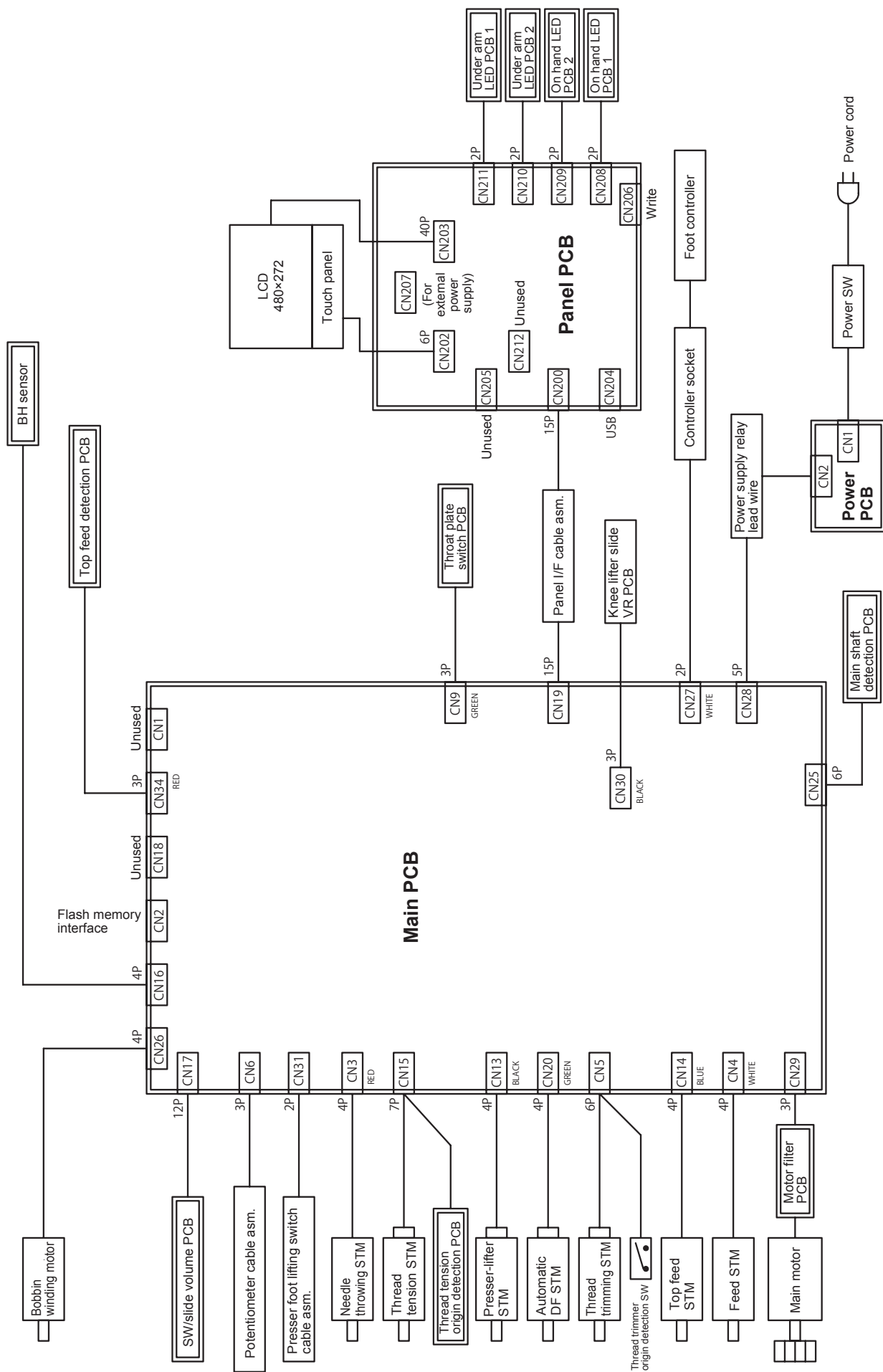
• Panel PCB



Connector No.	Destination	Terminal No.	
CN200	Panel I/F cable (asm.)	1	5V
		2	5V
		3	GND
		4	GND
		5	TXD
		6	RXD
		7	S.STATE
		8	UDET
		9	Reset
		10	5V
		11	5V
		12	Panel detection signal
		13	GND
		14	GND
		15	NC
CN202	Touch panel	1	3.3V
		2 - 5	Touch panel signal
		6	GND
CN203	LCD	1 - 4	NC
		5	GND
		6	NC
		7 - 36	LCD signal
		37	3.3V
		38	GND
		39	Backlight (+)
		40	Backlight (-)
CN204	USB	1	5V
		2 - 3	USB signal
		4	GND

Connector No.	Destination	Terminal No.	
CN205	Reserve (Unused)	1	5V
		5	GND
CN206	Write	10	GND
		11	3.3V
		12 - 14	GND
CN207	For external power supply	1	5V
		2	GND
CN208	On hand LED PCB 1	1	5V
CN209	On hand LED PCB 2	1	5V
CN210	Under arm LED PCB	1	5V
CN211	Under arm LED PCB	1	5V
CN212	Reserve (Unused)	5,8,22 - 24	3.3V
		16,19	GND

• Connection block diagram



[6] Adjustment

6-1 Adjusting the needle bar height

- Remove the face cover.

Adjustment value:

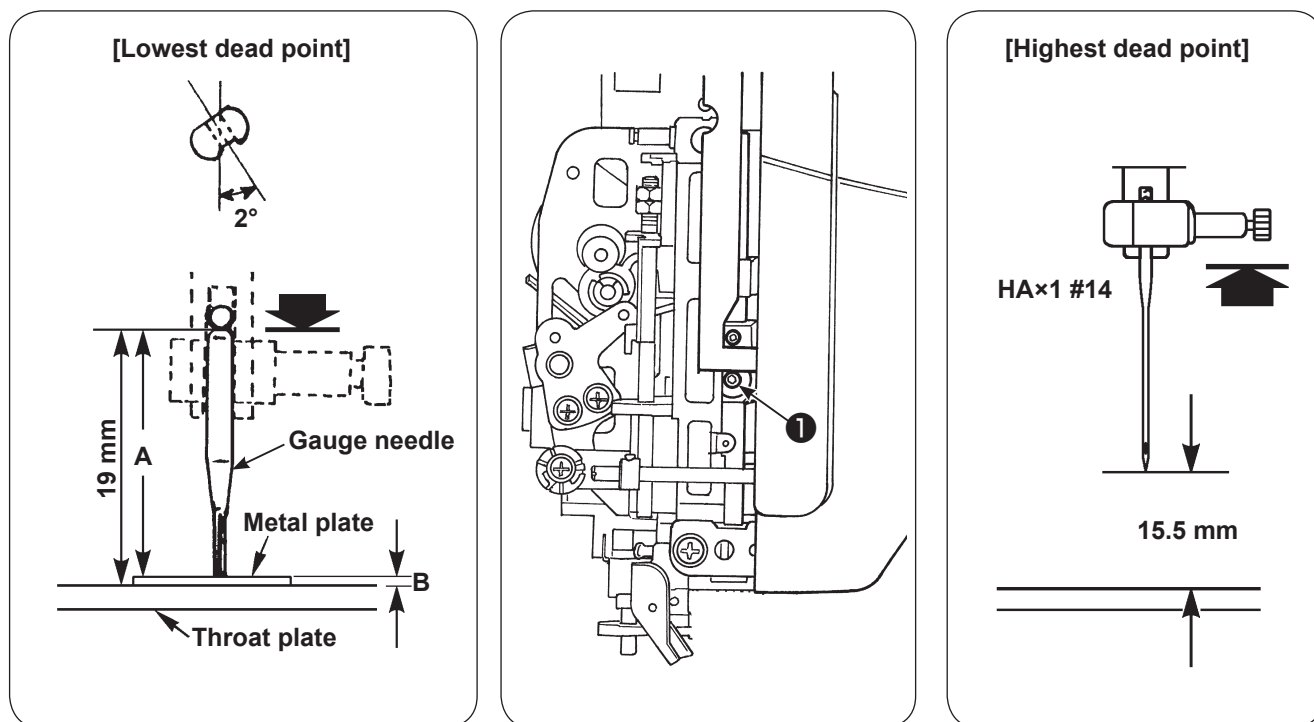
- Distance from the bottom end of the pin inside needle bar surface to the top surface of the throat plate: 19 mm
- When the needle is mounted, the needle eye tilts rightward by 2 degrees.

Adjustment procedure 1.

1. Select the straight stitch using the pattern selecting button. Choose center needle position.
2. Make a gauge needle by cutting a household needle HA×1 to dimension A. Fit the gauge needle into the needle bar.
3. Prepare an appropriate metal plate of thickness B. ($A = 19 \text{ mm} - B$)
4. Bring the needle bar to its lowest dead point. Slightly loosen needle bar connecting stud setscrew ❶ as long as the needle does not slip off from the connecting stud.
5. Place the metal plate on the throat plate. Move the needle bar up and down by hand to adjust so that the cut surface of the gauge needle aligns with the top surface of the metal plate. Then, turn the needle bar by two degrees of an angle as illustrated in the sketch below.
6. Temporarily tighten needle bar connecting stud setscrew ❶ and reconfirm that the needle bar is correctly adjusted. Then, securely tighten the setscrew.

Adjustment procedure 2.

1. Assemble a household HA×1 needle #14 into the needle bar, bring the needle bar to its highest dead point. Move the needle bar in the same way as described in procedure 1 to adjust the needle bar height so that the needle tip is spaced 15.5 mm from the top surface of the throat plate.

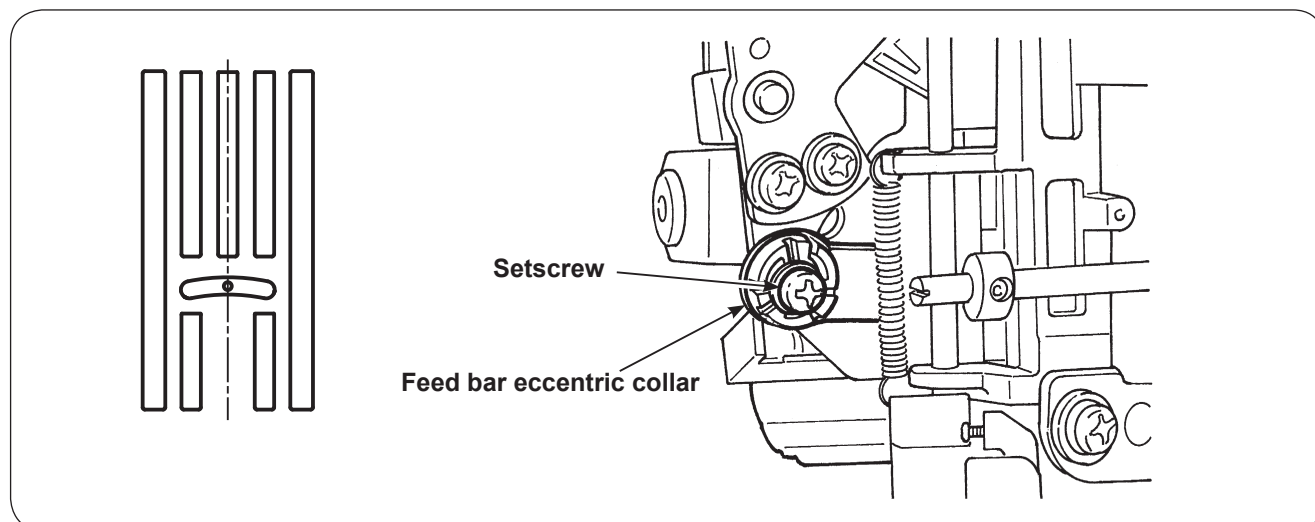


6-2 Adjusting the needle entry point

- Remove the face cover.

Adjustment procedure

1. Select the straight stitch using the pattern selecting button. Choose center needle position.
2. Assemble a needle #14 into the needle bar, loosen the setscrew in the eccentric collar and adjust the feed bar eccentric collar so that the needle meets the center of the needle slot in the throat plate when it reaches the top surface of the throat plate by turning the hand wheel.



6-3 Feed dog height

- Remove the throat plate, the bottom cover of the free arm and the upper cover of the free arm.

Adjustment procedure

1. Attach the throat plate after you have removed the cover. (Fig. 1)
2. Set the feed to "0" (zero).
3. Turn the handwheel to bring the feed dog to its highest point.
4. Adjust the front end of the feed dog by turning the adjustment shaft, with a thin flatblade screwdriver, from the top surface of the throat plate. (Fig. 2) To adjust the rear end of the feed dog, loosen the setscrew, and adjust the height of the feed dog, with a flatblade screwdriver or the like, by inserting the screwdriver into the adjustment hole. After the adjustment, tighten the setscrew. (Fig. 3)
5. Adjust the feed dog height both at its front and rear ends so that it juts out from the top surface of the throat plate by 1.0 ± 0.1 mm. (Fig. 4)

Front end of feed dog

Fig.1

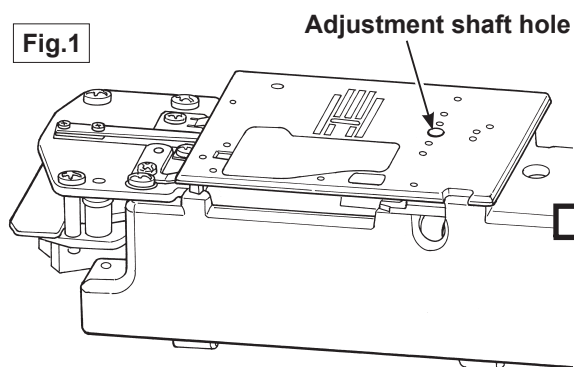
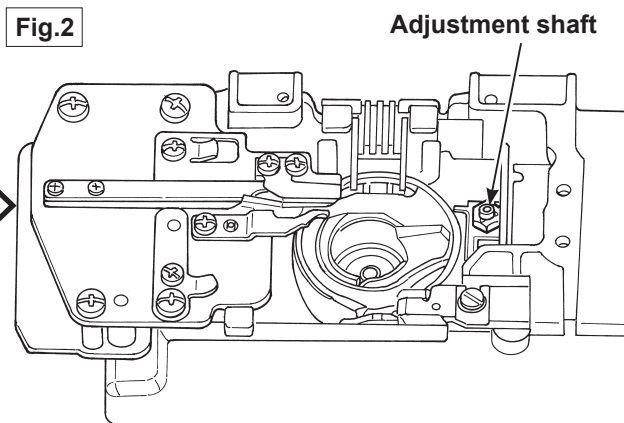


Fig.2



Rear end of feed dog

Fig.3

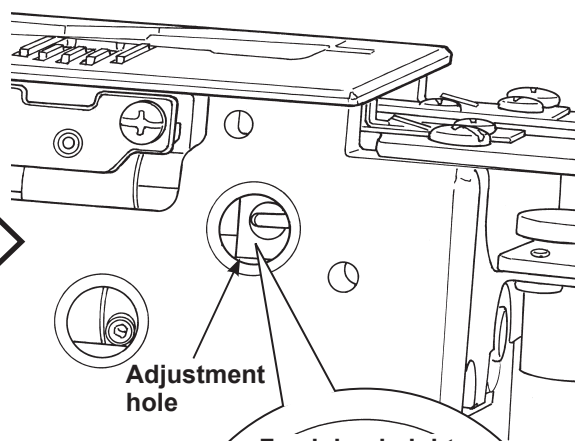
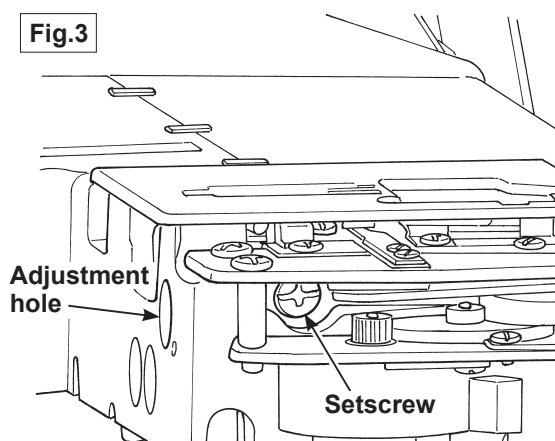
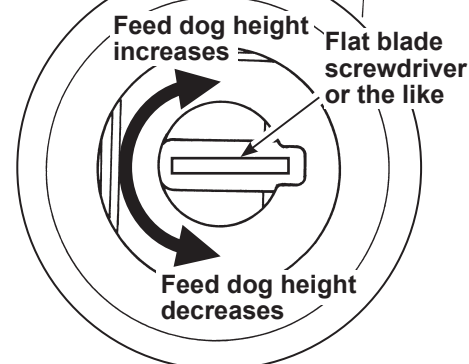
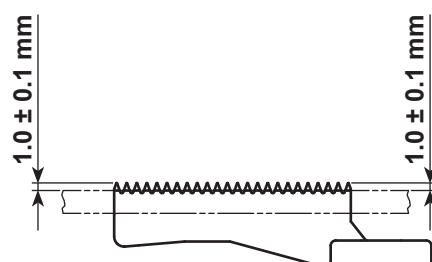


Fig.4

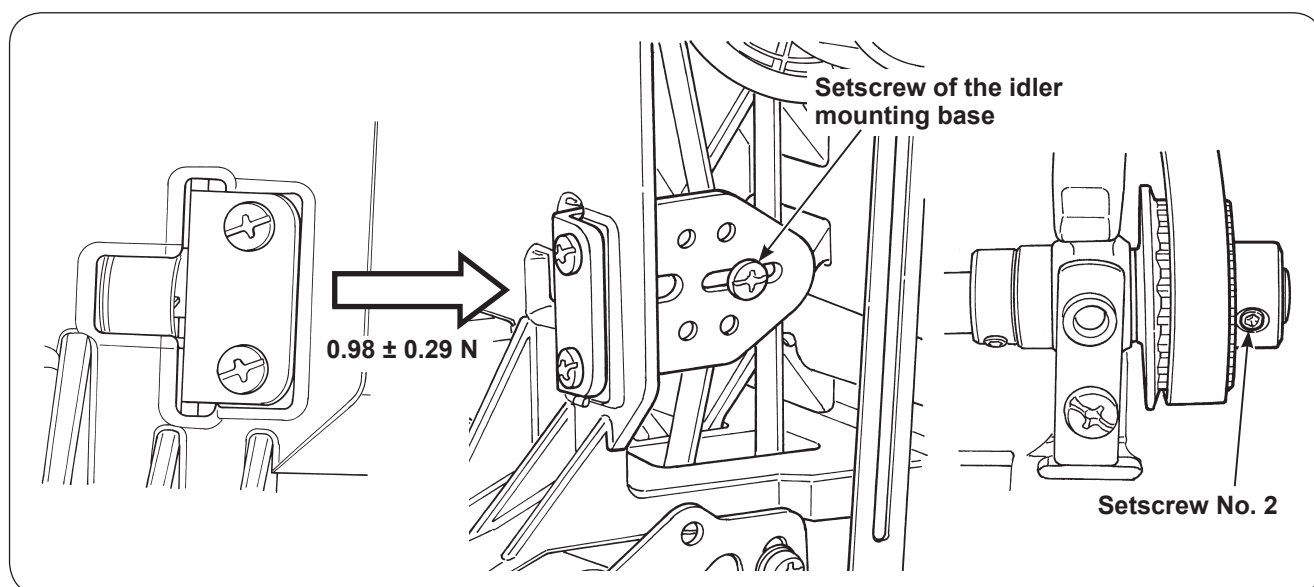


6-4 Timing belt

- Remove the front panel and the main PCB.

Adjustment procedure

1. Loosen the setscrew in the idler mounting base and loosen the timing belt.
2. Turn the hand wheel to bring the needle bar to its lowest dead point.
3. Turn the hook driving shaft to bring the feed dog to its lowest dead point.
4. Carefully keeping the condition described in steps 2 and 3, set the timing belt on the hook driving shaft pulley (by temporarily tightening the setscrew in the idler mounting base) so that the setscrew No. 2 in the pulley is brought to just underside of the pulley.
5. Applying 0.98 ± 0.29 N force to the idler by means of a spring scale, securely tighten the setscrew.

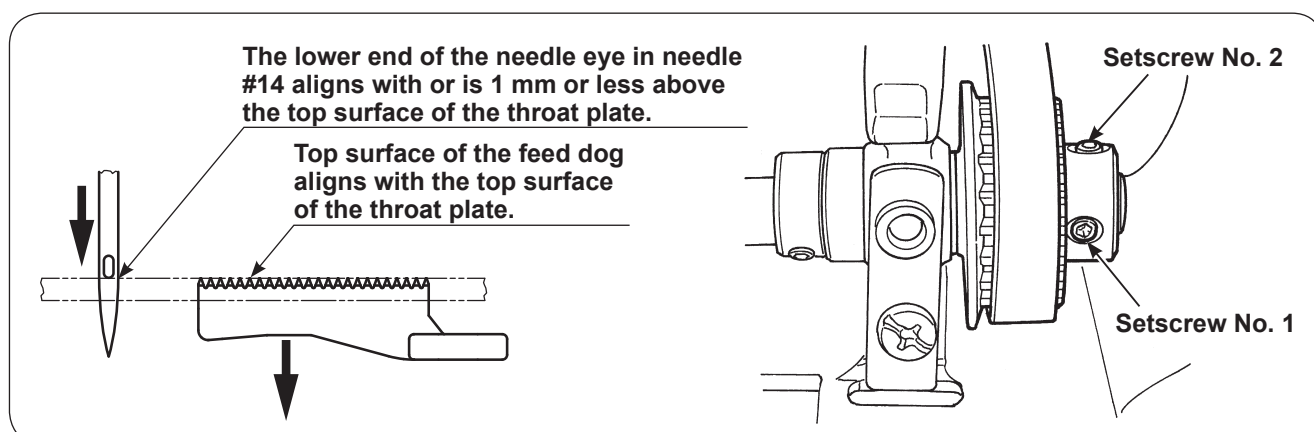


6-5 Feed timing

- After checking the feed dog height and the needle bar height, carry out adjustment of the feed timing.

Adjustment procedure

1. Assemble a HA×1 needle #14 into the needle bar.
2. Loosen setscrew No. 2 in the hook driving shaft pulley.
3. Loosen setscrew No. 1 in the hook driving shaft pulley. Adjust the pulley so that the lower end of the needle eye in the descending needle #14 is aligned with the top surface of the throat plate when the top surface of the descending feed dog is aligned with the top surface of the throat plate by turning the hand wheel toward you. After adjustment, tighten the setscrew No. 2.
4. Turn the main shaft by one revolution to confirm the timing.



6-6 Adjusting the shield

- Carry out the adjustment of the shield after you have checked the feed timing.

Adjustment procedure

1. Loosen the setscrew of the shield collar. (Fig. 1)
2. Turn the hand wheel to bring the needle bar to its lowest dead point.
3. In the aforementioned state, adjust so that the marking hole in the shield is brought to the lowest position.

Then, tighten the setscrew of the collar. (Fig. 2)

(Caution) After tightening the setscrew, check to make sure that the shield does not come in contact with the sensor.

If the former comes in contact with the latter, loosen the sensor setscrew and adjust the lateral position of the sensor.

Fig.1 Install the shield while eliminating the lateral backlash by pressing it in the direction of the arrow.

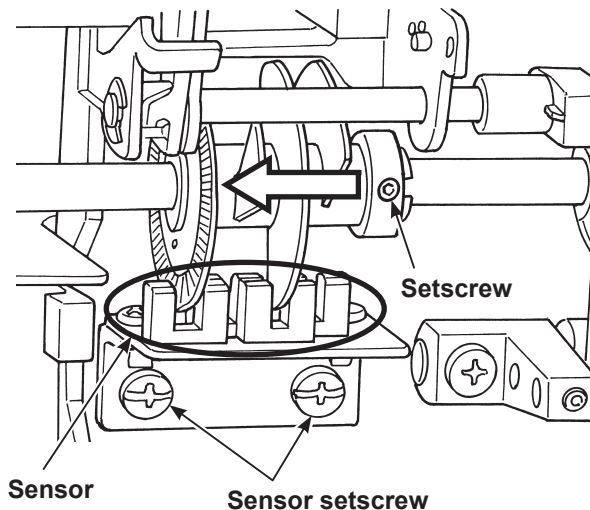
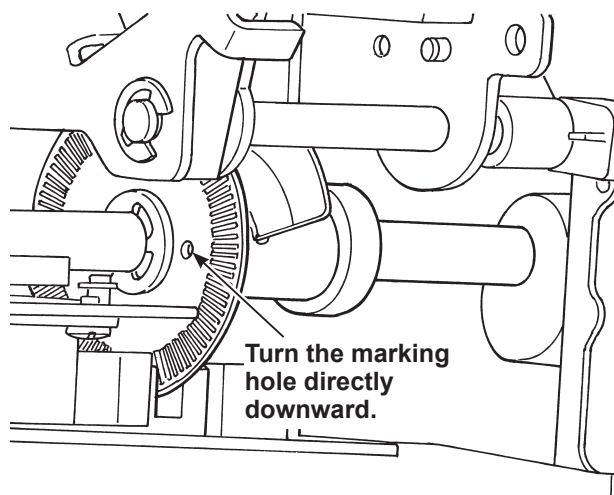


Fig.2 When the needle bar is brought to its lower dead point



6-7 Hook driving shaft coupling and the lateral timing of the hook driving shaft

Adjustment procedure

1. Position the flat section of the hook driving shaft setscrew and the groove in the coupling so that they are in parallel with each other. (Fig. 1)
(Right and left couplings (Fig. 2))
2. When installing the hook driving cams, adjust the timing of the right and left hook driving shafts so that the timing between the right and left feed rock cams is opposite to each other. (Fig. 3)
3. At the center of the right and left hook driving shafts, tighten the coupling setscrew so that there is no backlash in the thrust direction of the coupling. (Fig. 4)

(Caution) When tightening the setscrew, take care not to allow the coupling to move out of alignment from the flat section of the shaft. In addition, carefully confirm the timing of the right and left hook driving shafts.

Fig.1

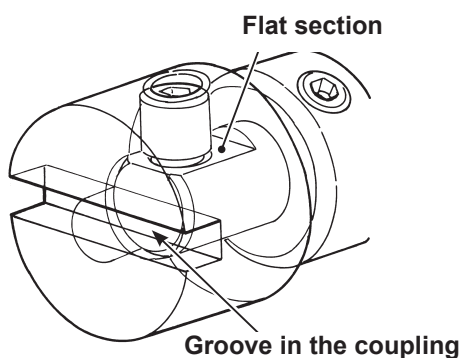


Fig.2

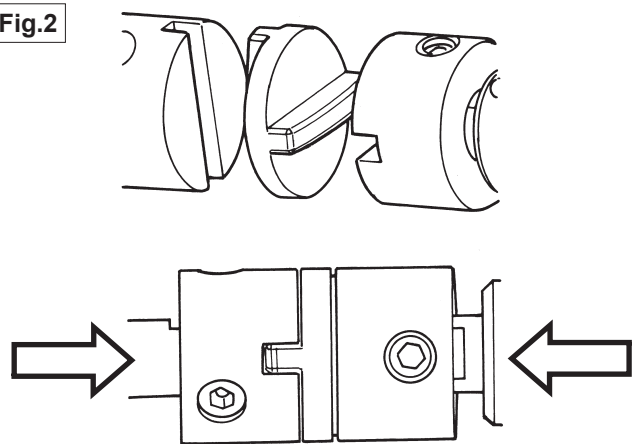


Fig.3

Install so that the timing between the cams becomes opposite.
(To correctly position the cams, place pin on the hook driving shafts)

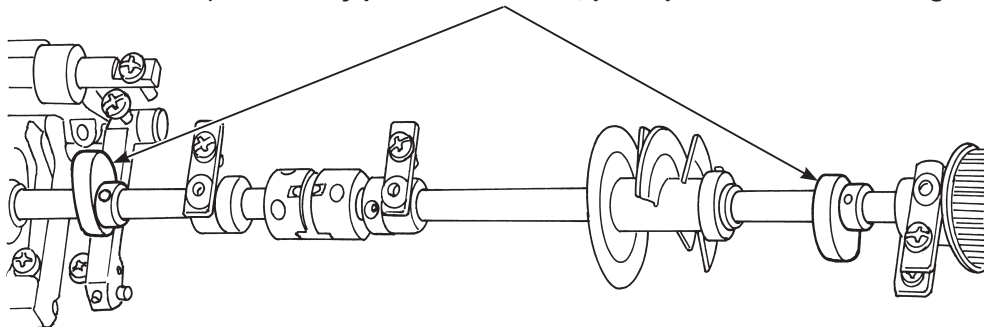
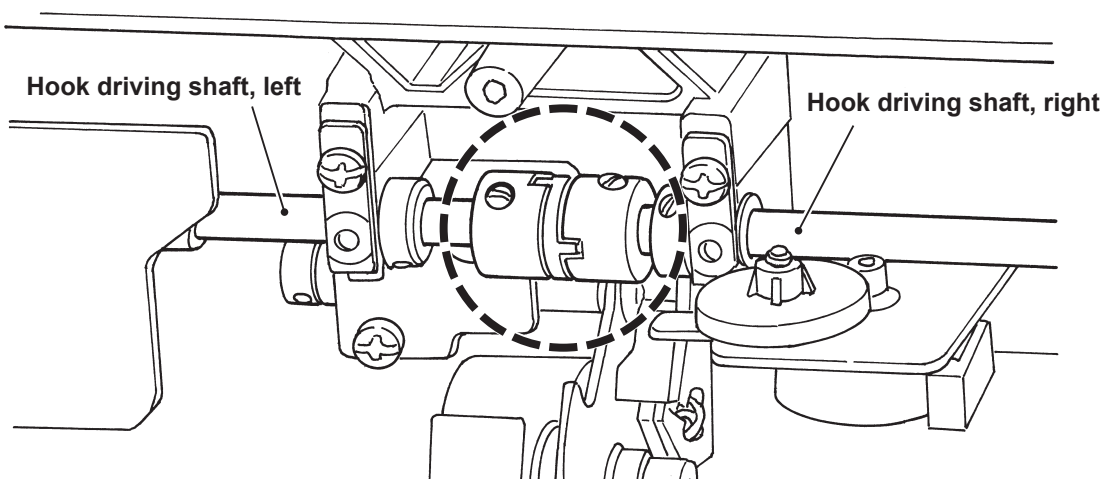


Fig.4



6-8 Timing between the needle and the hook

- Remove the throat plate, the bottom cover A/B and the bottom cover of the free arm.

Method for checking

1. Check to be sure that the needle entry point and needle bar height are correct.
2. Select the straight stitch. Select the right needle position by using the zigzag width adjusting dial.
(The needle entry point is shifted to the rightmost side.)
3. Now, turn the hand wheel by hand to bring the needle bar to its lowest dead point.
4. Turn the hand wheel further to gradually lift the needle bar until point **C** where the needle center is aligned with the tip of blade point of the hook is reached.
5. At this time, check to be sure that the distance **D** from the tip of blade point of the hook to the upper end of the needle eye is 3.1 to 3.3 mm. If this distance is not correctly provided, carry out the following adjustment.

Adjustment procedure

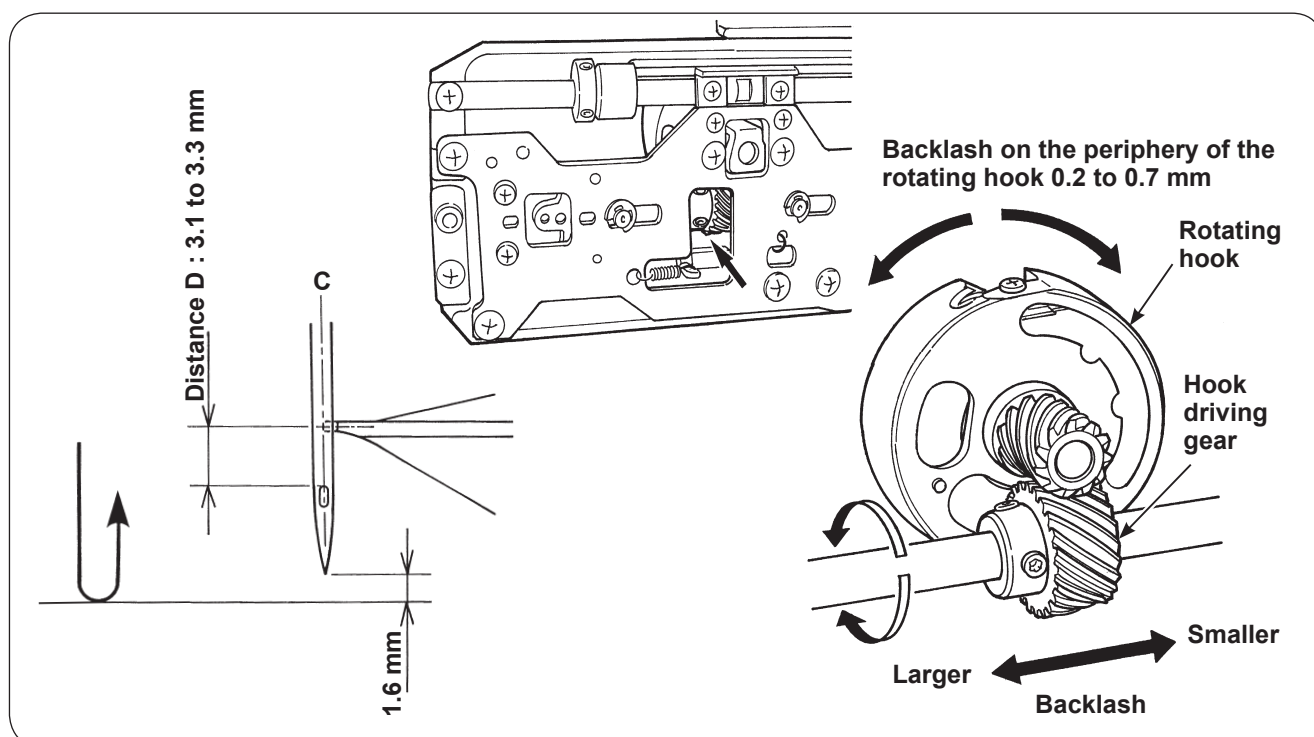
1. Loosen the setscrew in the hook driving gear which is not visible from underside of the sewing machine when the needle center aligns with the tip of blade point of the hook.
2. Select the straight stitch and the right needle position. Move the hook driving gear in the rotational direction to adjust distance **D** of 3.1 to 3.3 mm is provided between the tip of blade point of the hook and the upper end of the needle eye when the needle bar is lifted by 1.6 mm from the lowest dead point by turning the hand wheel by hand.

At this time, the backlash between the hook driving gear and the gear on the hook side may change depending on the location of the hook driving gear on the hook driving shaft. Adjustment should, therefore, be carried out with the visible setscrew temporarily tightened, while carefully observing the hook driving gear in both the rotational direction and axial direction. Adjust the backlash to 0.2 to 0.7 mm on the periphery of the rotating hook.

3. After confirming the timing between the needle and hook is correctly adjusted, securely tighten both setscrews.

(Caution) After adjustment of the hook, the hook race surface and the bobbin case holder may be stained with dirt, oil or grease. Wipe them off with alcohol where necessary.

If those parts are left stained, chattering or thread slip-off noise of the bobbin case holder can occur.

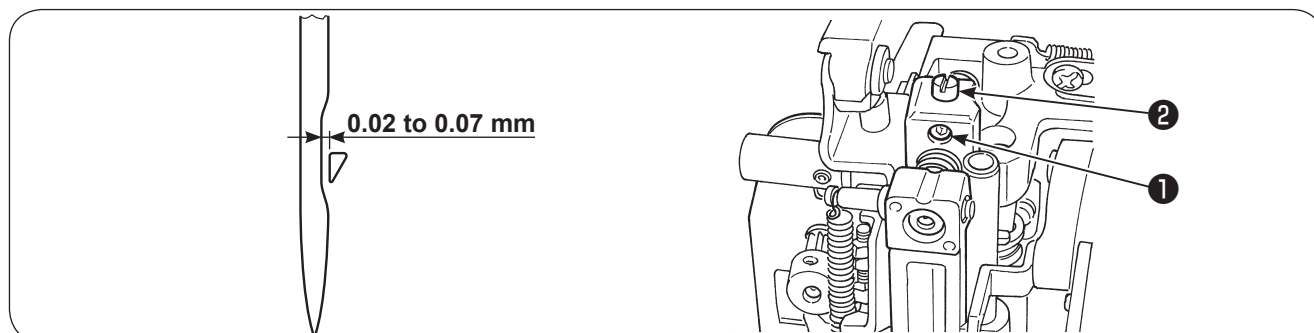


6-9 Clearance between the needle and the blade point of hook

- Remove the face cover and the throat plate.

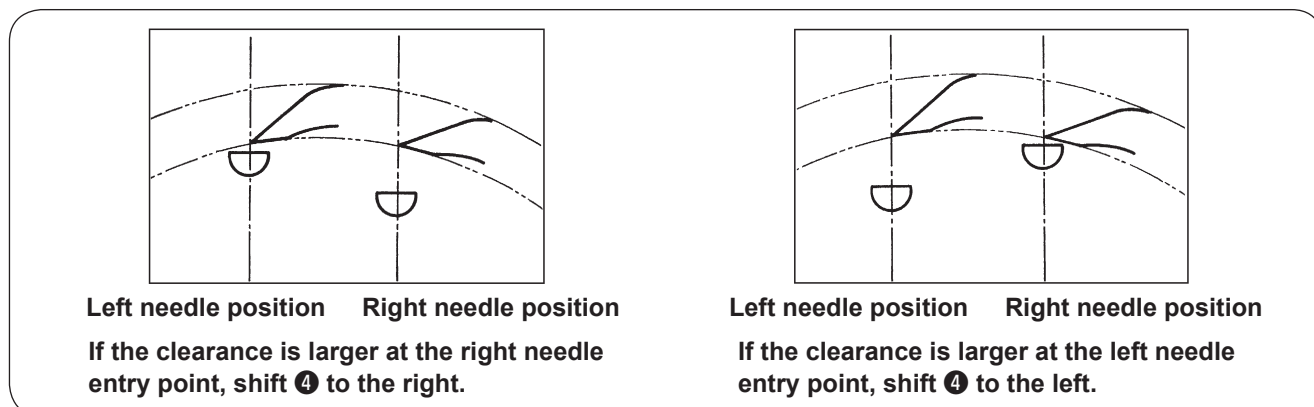
Adjustment procedure

1. Loosen screw ❶. Adjust the clearance between the needle and the blade point of the hook to 0.02 to 0.07 mm by turning adjusting shaft ❷.



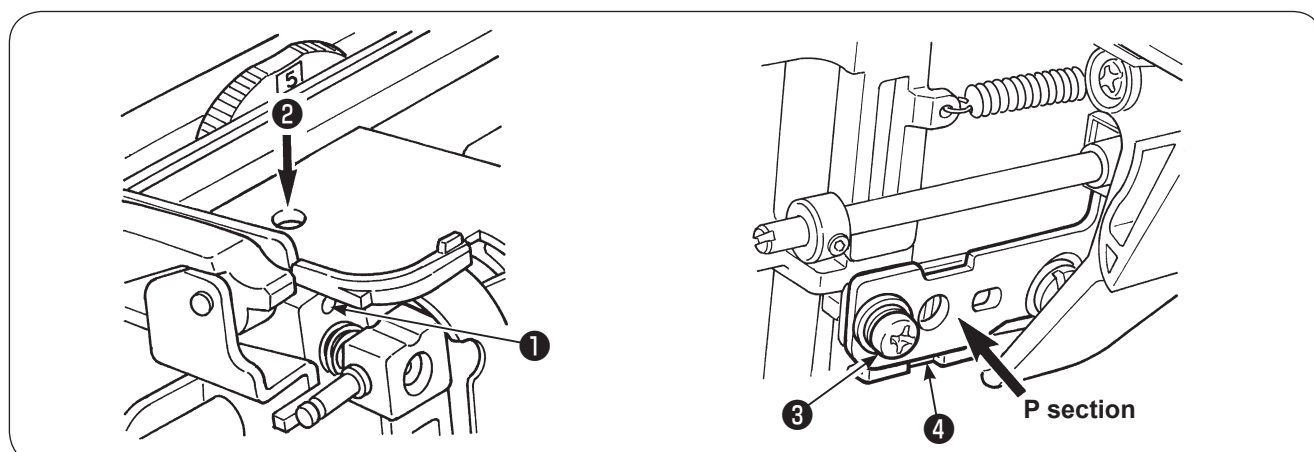
Adjusting the balance of the clearances at the right and left needle entry points

1. Select the zigzag pattern and set the zigzag width to 7 mm. Adjust the balance of the clearances provided between the needle and the blade point of the hook at the right and left needle entry points.



Adjustment procedure

1. Select No. 2: FAGOTT of the service mode.
2. Gradually turn adjusting shaft ❷ to find a position where the needle deviates slightly. Now, temporarily tighten screw ❶.
3. Slightly loosen setscrew ❸. Adjust the lateral balance of the needle bar by slightly moving right-left adjuster ❹ while carefully listening to the noise produced when the needle deviates at the right and left needle entry points. Then, securely tighten setscrew ❸.
4. Additionally turn shaft ❷ and securely tighten screw ❶ at the position where the needle does not deviate.
5. Lightly tap P section with fingers. If you hear a needle deviation noise at the right and left needle entry points, the optimum clearance is provided between the needle and the hook.



6-10 Position of the hook rotation stopper plate

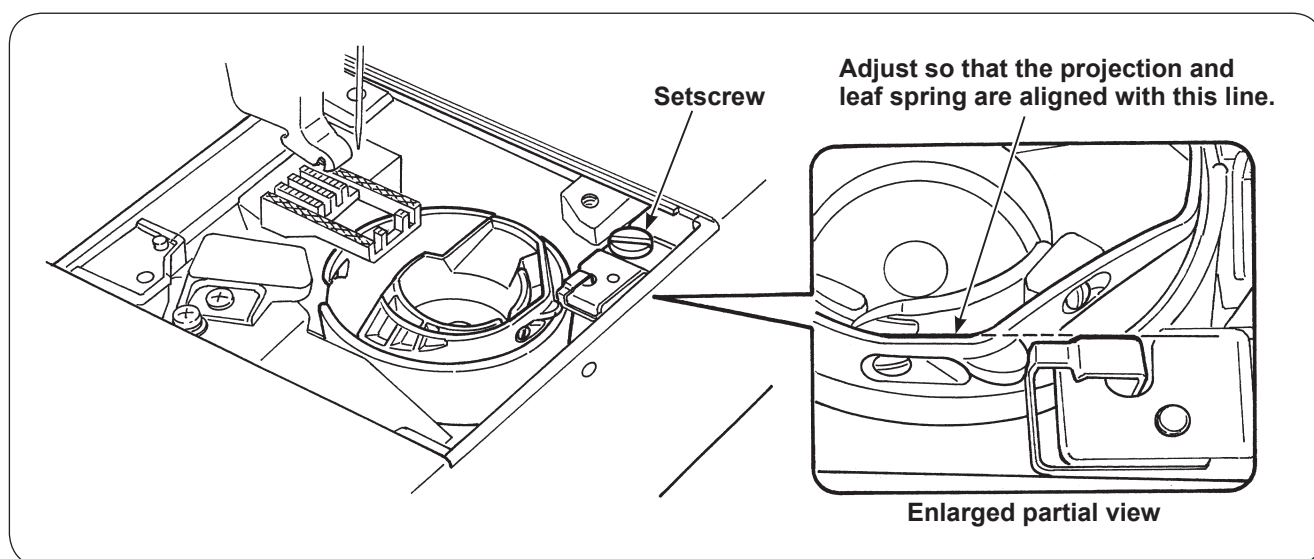
- Remove the throat plate.

Adjustment procedure

1. When the bobbin case holder is placed inside the rotating hook, loosen the setscrew and determine the longitudinal position of the rotation stopper plate so that the projection of the bobbin case holder and the leaf spring of the rotation stopper plate are located as illustrated in the enlarged partial view. To adjust the lateral position of the rotation stopper plate, press the plate in the right direction by the amount of play and secure with the setscrew.

* The hook race surface and the bobbin case holder may be stained with dirt, oil or grease. Wipe them off with an alcohol-soaked cloth where necessary.

If those parts are left stained, chattering or thread slip-off noise of the bobbin case holder can occur.

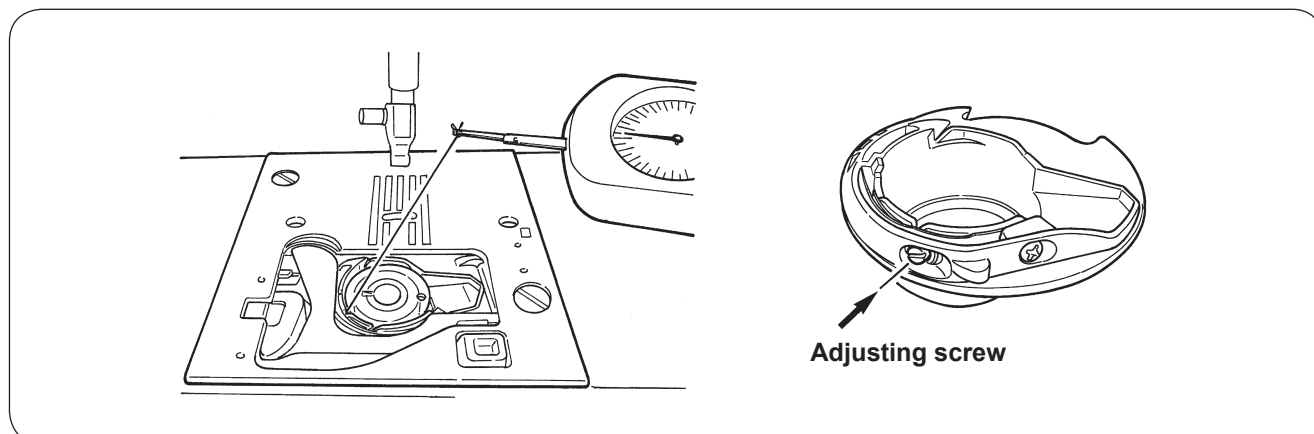


6-11 Adjusting the bobbin thread tension

- Remove the throat plate.

Adjustment procedure

1. Position the bobbin case holder and a tension gauge as illustrated in the sketch below. Using SHAPPE Span thread #60, adjust the bobbin thread tension to 0.13 ± 0.02 N with the adjusting screw. At this time, carefully prevent the bobbin thread from coming in contact with the throat plate or other related parts.

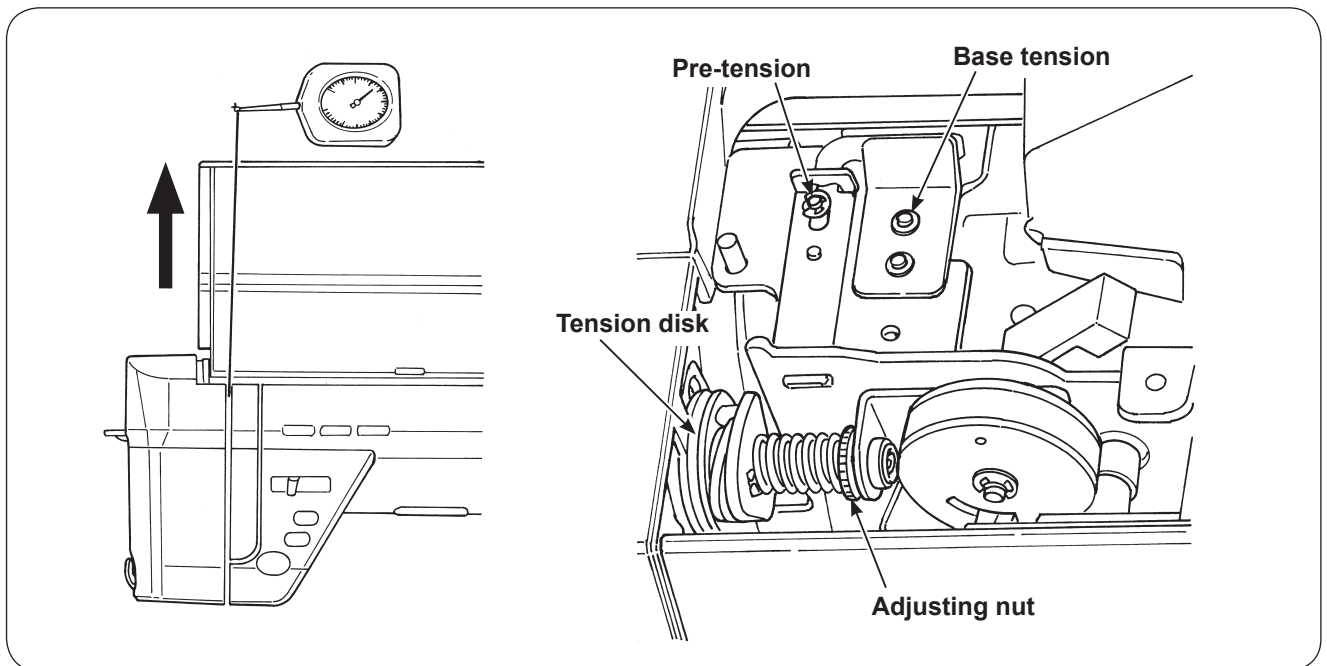


6-12 Adjusting the needle thread tension

- Remove the thread tension cover.

Adjustment procedure

1. Turn the power ON. Select pattern No. 001 (straight stitch). Set the thread tension to the default value (0.0).
2. Lift the presser foot. Prepare polyester thread (Schappe Spun #60) and a tension gauge. Pass the thread through the base tension, pre-tension and tension disk.
4. Lower the presser foot. Turn the adjusting nut to adjust the tension so that the tension gauge gives a reading of 0.49 to 0.59 N.



6-13 Vertical position of the needle threading hook

- Remove the face cover.

Adjustment procedure

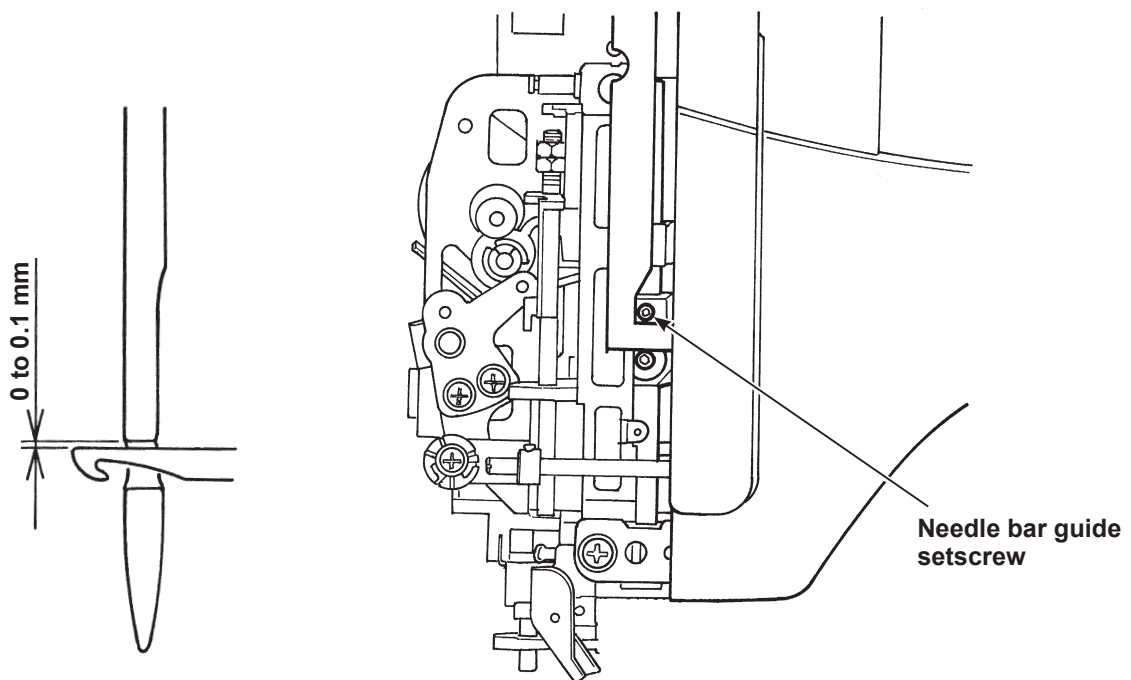
1. Assemble a household HA×1 needle #11 into the needle bar.
2. Turn the hand wheel to bring the needle bar near its highest dead point and stop the hand wheel when the needle bar reaches the location where the setscrew in the needle bar guide is visible.
3. Lower the threading lever to its lowest dead point. Check whether a clearance of 0 to 0.1 mm is provided between the top end of the needle threading hook and the upper end of the needle eye. (If the clearance is not 0 to 0.1 mm, the needle may not be threaded depending on the size of the needle used.)
4. Fit a hexagonal wrench on the needle bar guide setscrew to loosen it slightly.
 - If the needle threading hook position is too low → Move the needle bar guide upward and temporarily tighten the setscrew.
 - If the needle threading hook position is too high → Move the needle bar guide downward and temporarily tighten the setscrew.

Adjust the needle threading hook carefully, checking its position with respect to the needle eye.

When the needle threading hook enters and exits from the needle eye, the needle should never be bent by the hook.

If the needle threading hook position deviates to the right or left, correct the bend in the needle threading hook with the tip of a thin screwdriver or change the needle threading hook with a new one.

5. When the needle threading hook is correctly positioned, fully tighten the setscrew.

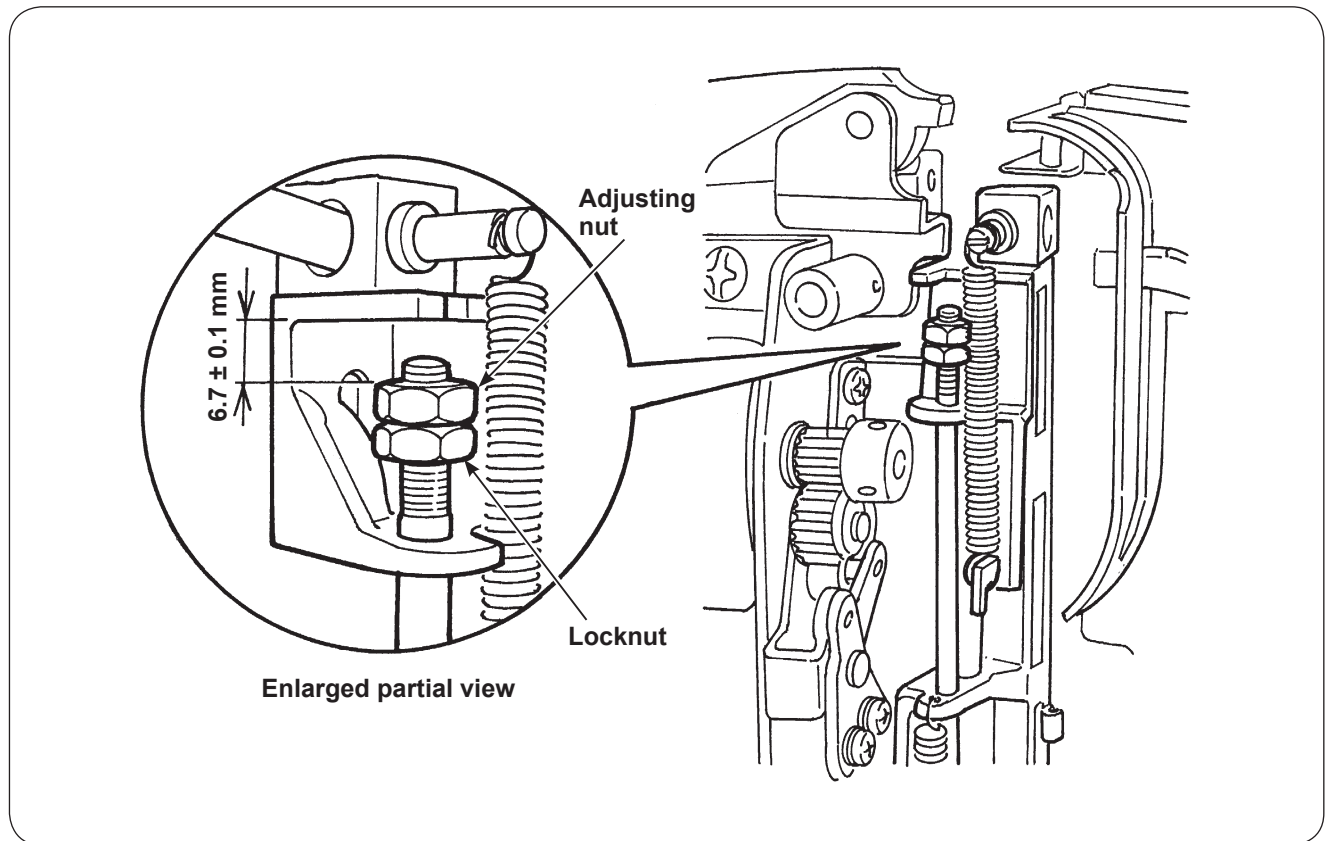


6-14 Adjusting the auxiliary hook height

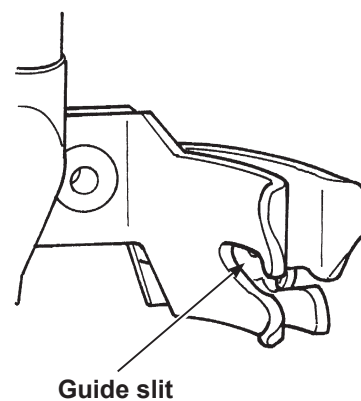
- Remove the face cover.

Adjustment procedure

1. Loosen the locknut. Adjust the adjusting nut so that the distance shown in the enlarged partial view is obtained.
2. Tighten the locknut to fix the adjusting nut.



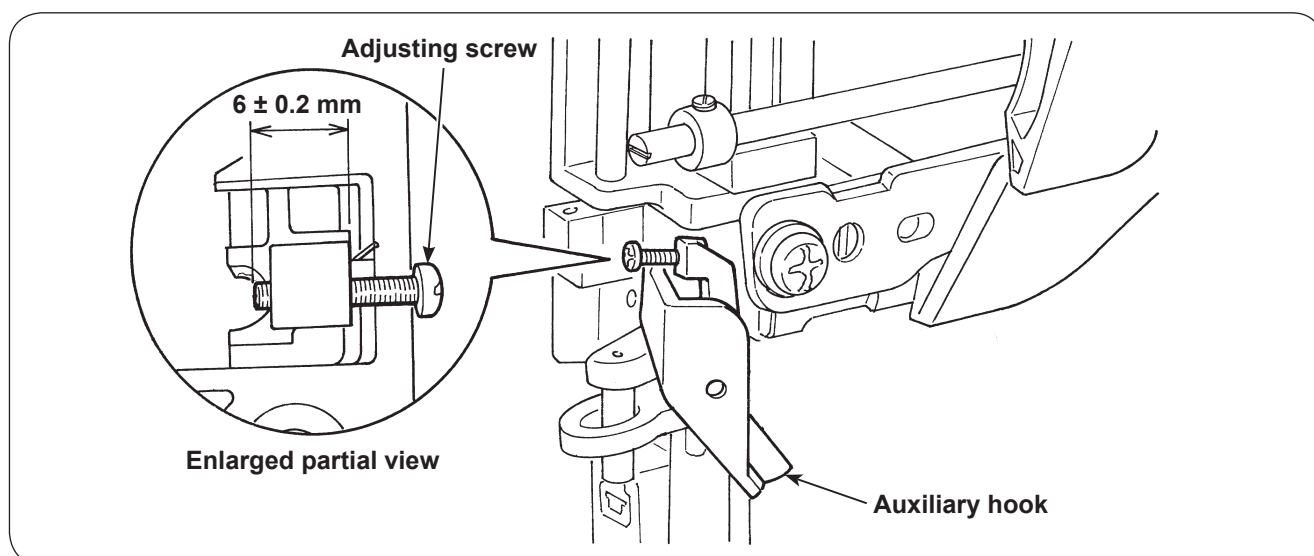
(Caution) If the thread does not enter the guide slit of the needle threading hook when threading the needle, check the distance and adjust it correctly.



6-15 Adjusting the opening amount of auxiliary hook

Adjustment procedure

1. Adjust the adjusting screw to the distance shown in the enlarged partial view.



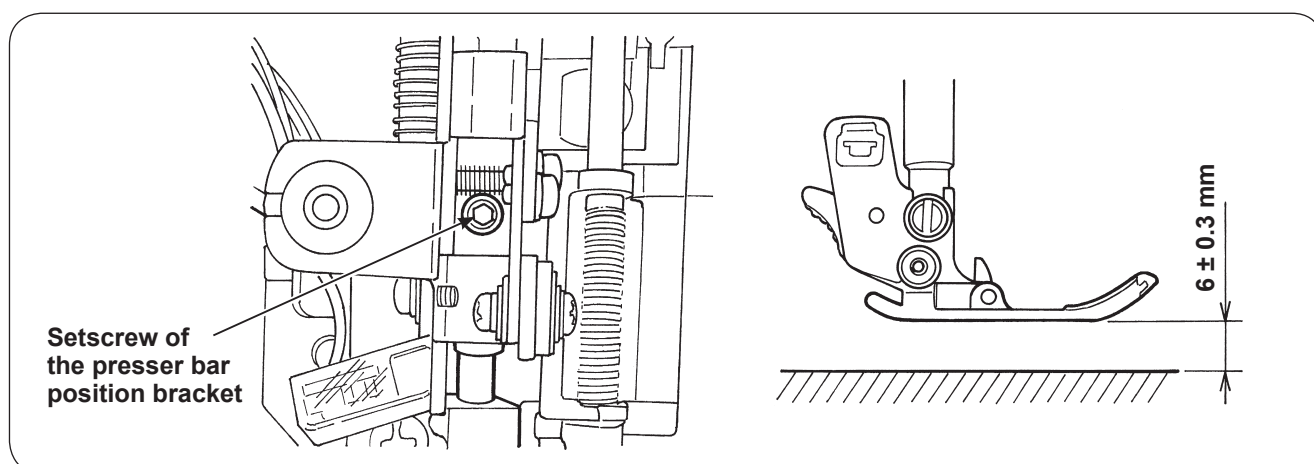
(Caution) If the auxiliary hook still keeps the thread after completion of needle threading, or if the auxiliary hook releases the thread before the needle threading hook catches the thread, adjust the adjusting screw. (The amount and timing of opening can be adjusted.)

6-16 Adjusting the presser bar height

- Remove the face cover.

Adjustment procedure

1. Assemble the standard presser foot in the presser foot holder. Raise the presser foot lifting lever.
2. Loosen the setscrew of the presser bar position bracket. Adjust the distance from the top surface of the throat plate to the bottom face of the standard presser foot to 6 ± 0.3 mm. At this time, check the direction of the presser bar so that the standard presser foot is in parallel to the feed dog groove and so that the needle slot in the throat plate is nearly aligned with the slot in the standard presser foot.

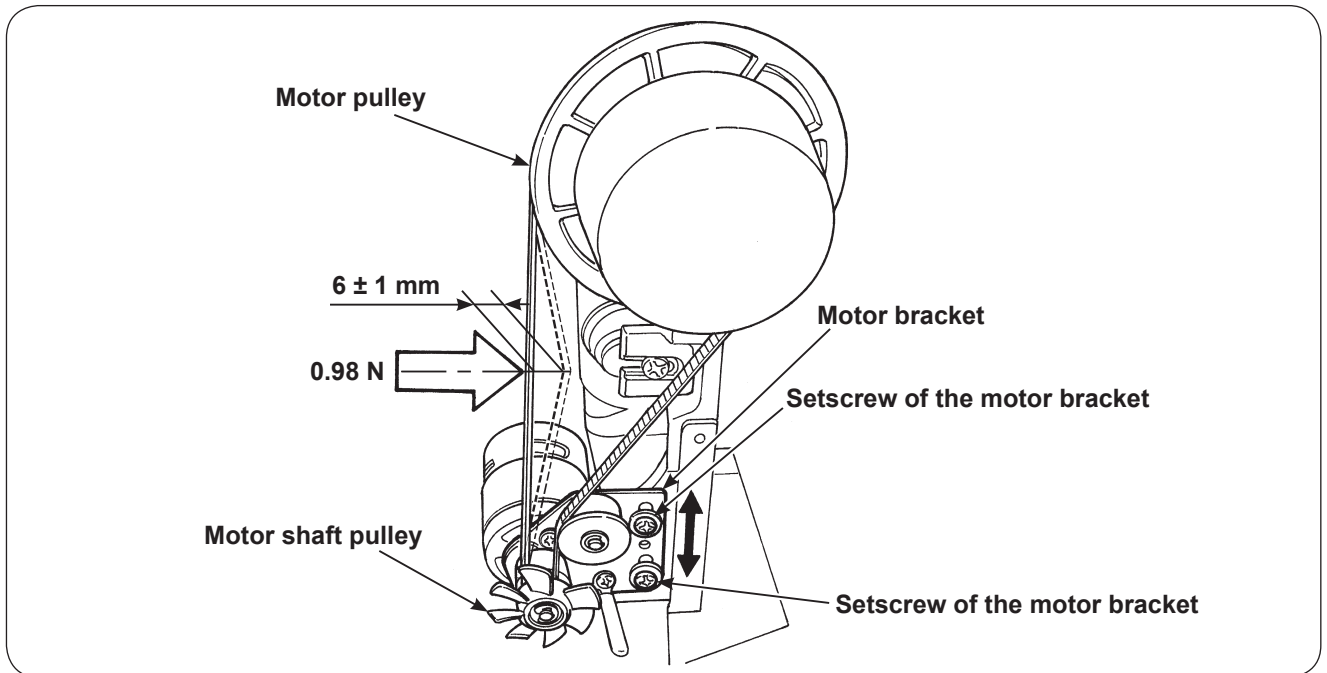


6-17 Motor belt

- Remove the front panel.

Adjustment procedure

1. Set the motor timing belt to the motor pulley and the motor shaft pulley.
2. Adjust the motor bracket so that the belt deflection amount becomes 6 ± 1 mm when pressing the center of the belt with a force of 0.98 N. After completion of adjustment, tighten the setscrew in the motor bracket.



6-18 Longitudinal feed

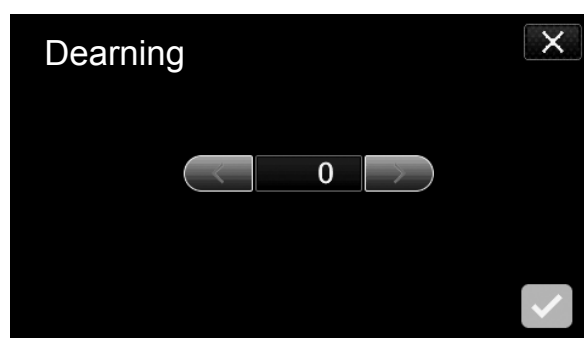
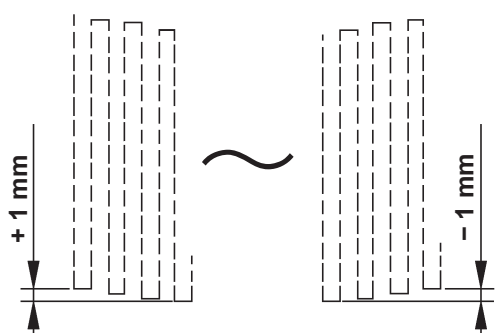
Preparation for adjustment

Turn OFF the power switch. Keep pressing both the reverse stitch button and thread trimming button simultaneously and turn ON the power switch. The service mode screen appears on the display. Select "DARNING" to change over the screen to the sewing pattern for adjusting darning.

Adjustment procedure

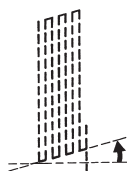
Carry out sewing of a darning pattern three times or more continuously in repetition.

Adjust, with  , so that the bottom end seam of the inner left row of a turn-back section of the darning pattern is on a line with the bottom end seam of the right row (rough indication of error: 0 ± 1 mm) third darning pattern seam is on a line, as illustrated in the figure, and confirm with .

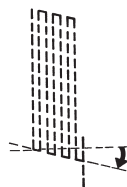


Direction of adjustment of lengthwise feed

- In the case the lower end of the right line is higher than the lower end the inner left line $\Rightarrow$ Adjust in "+" direction



- In the case the lower end of the right line is lower than the lower end the inner left line $\Rightarrow$ Adjust in "-" direction



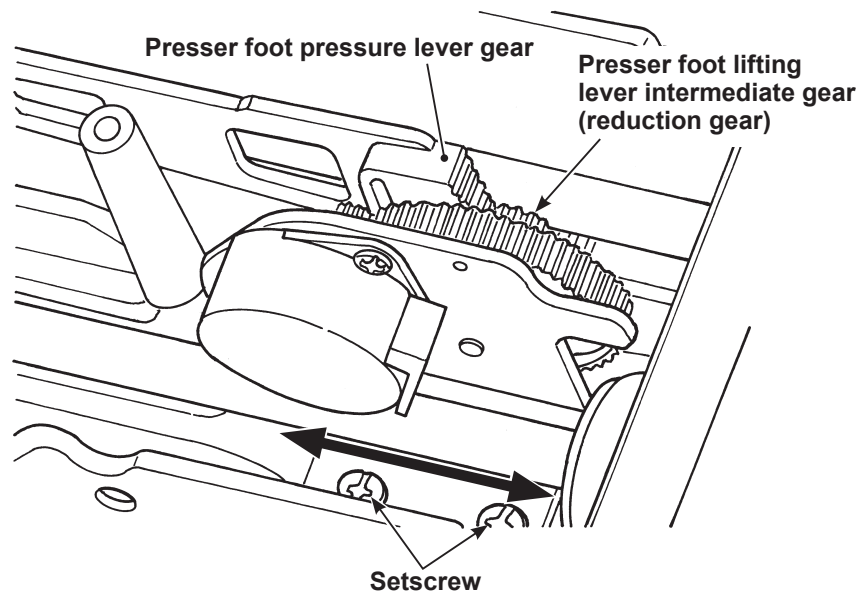
6-19 Presser foot lifting

6-19-1 Position of the presser foot lifting motor

- Remove the top cover, the spool cover and the front panel.

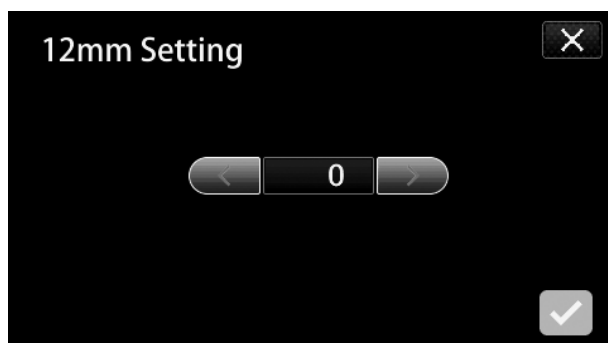
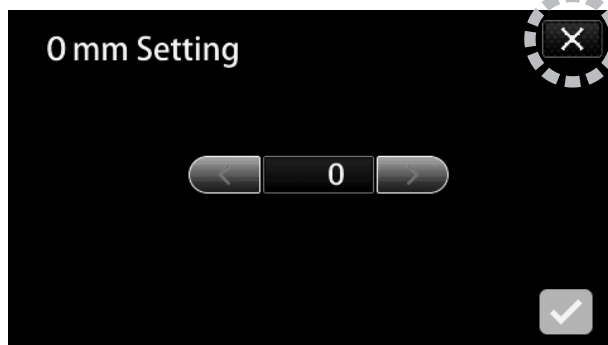
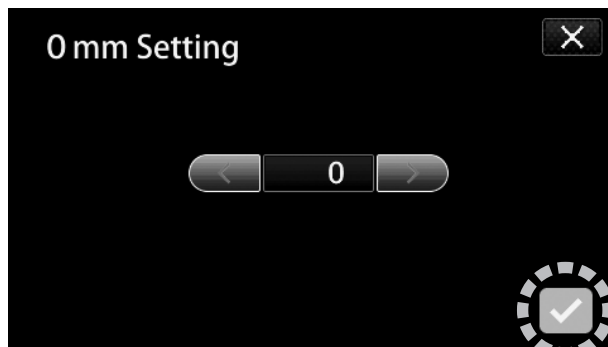
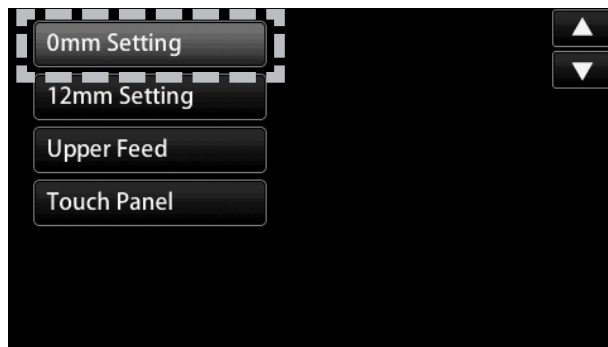
Adjustment procedure

1. Loosen the motor bracket setscrew.
2. Remove the backlash from the presser foot pressure lever gear and the presser foot lifting lever intermediate gear (reduction gear). Then, tighten the setscrew.



6-19-2 Adjusting the height of the auto-lifter

- Remove the needle.



1. In the state the power switch is turned OFF, keep the reverse feed stitching button and the thread trimming button held pressed simultaneously until the power switch is turned ON.

The Service mode screen is displayed. Proceed to the 2nd page screen and select "0mm Setting".

2. Turn the handwheel to lower the feed dog until it sinks under the throat plate.

3. Push down the presser foot holder until the sole of the basic presser foot comes in contact with the throat plate.

4. In the aforementioned state, press .

5. Press  to return the screen to the selection screen under the Service mode.

6. Select "12mm Setting".

7. Lift the presser foot with the presser foot lifting lever. Then, lower the basic presser foot with a 12-mm spacer placed under it.

* **Carefully check the position of the needle bar.**

*  is not used.

8. In the aforementioned state, press .

9. Press  to return the screen to the selection screen under the Service mode.

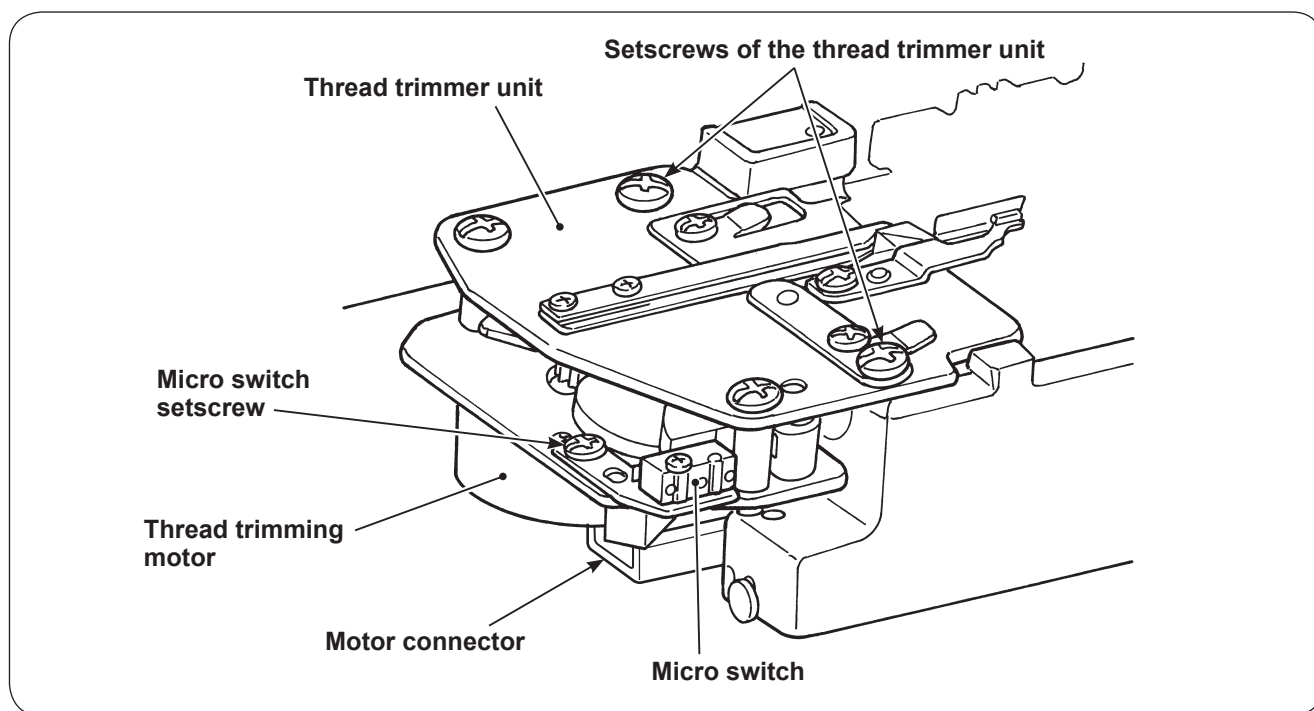
6-20 Thread trimming

○ Remove the throat plate, the bottom cover of the free arm and the upper cover of the free arm.

6-20-1 Attaching/removing the thread trimmer unit

How to remove the thread trimmer unit

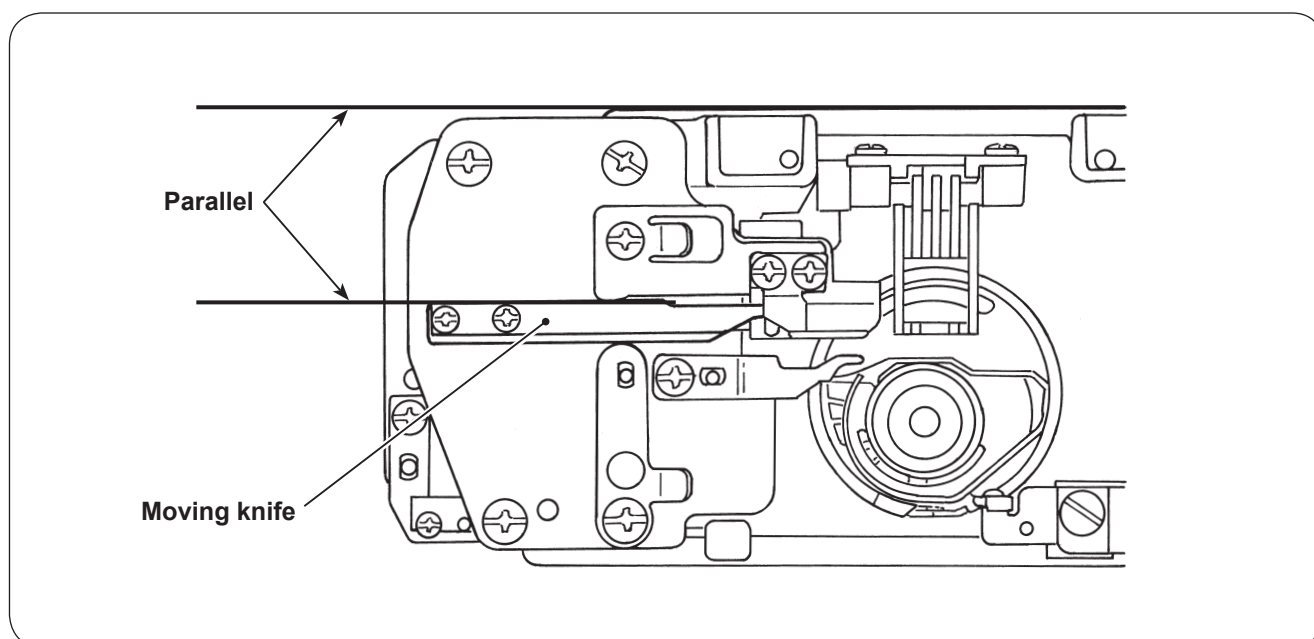
1. Remove the micro switch setscrew. Detach the micro switch.
2. Detach the connector of the thread trimming motor.
3. Remove two setscrews of the thread trimmer unit. Detach the thread trimmer unit.



How to attach the thread trimmer unit

Reversing the removal procedure, attach the thread trimmer unit.

(Caution) Attach the thread trimmer unit so that the moving knife is in parallel with the free arm.

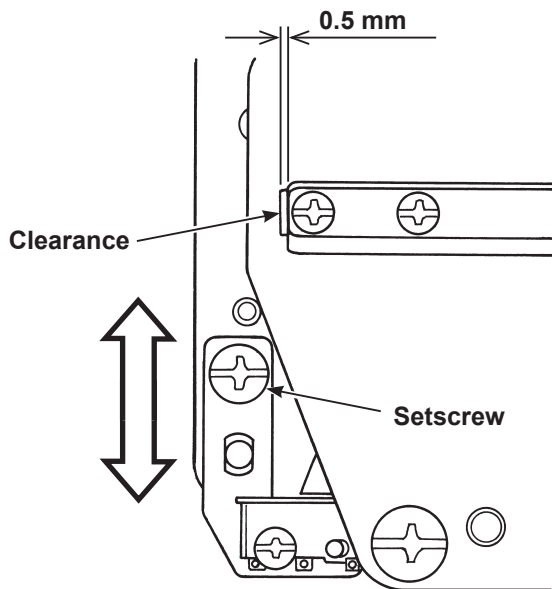


6-20-2 Adjusting the thread trimming switch

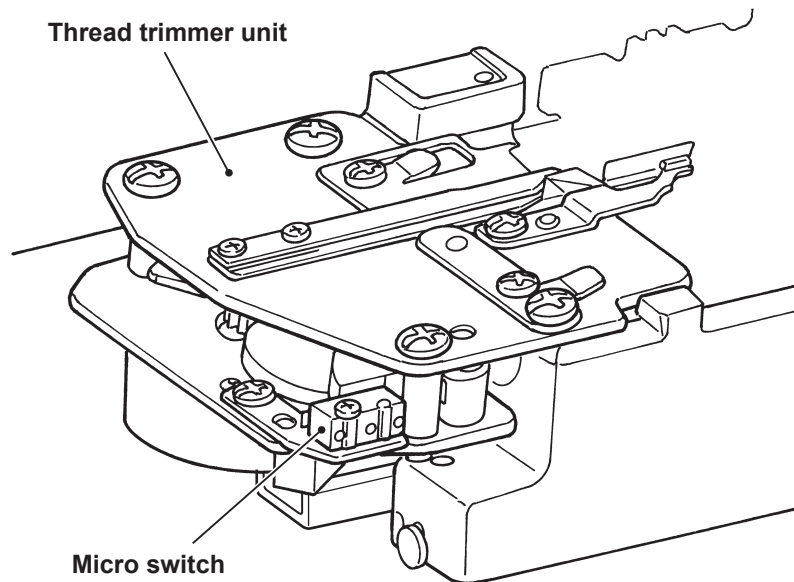
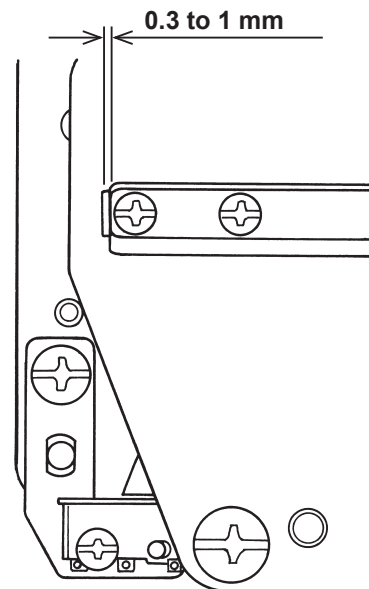
Adjustment procedure

1. Adjust so that the micro switch is turned ON when a clearance of 0.5 mm is provided between the rear end of the moving knife and the end of groove in the mechanism base. Then, tighten the setscrew.
2. Check to make sure that the aforementioned clearance becomes 0.3 mm to 1 mm or less when the thread trimmer operates and stops.

At the time of adjustment



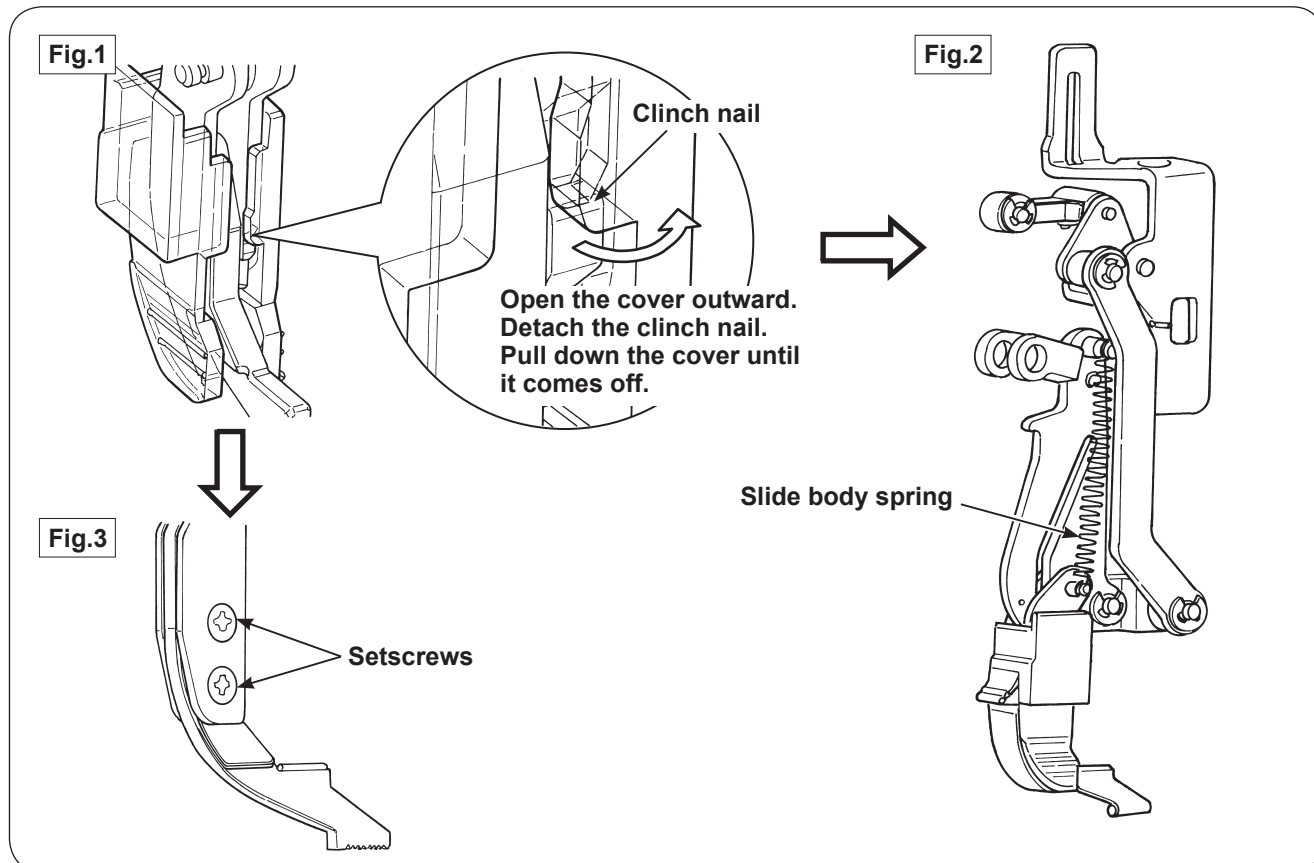
After the thread trimmer has operated



6-21 Attaching/removing the top feed dog

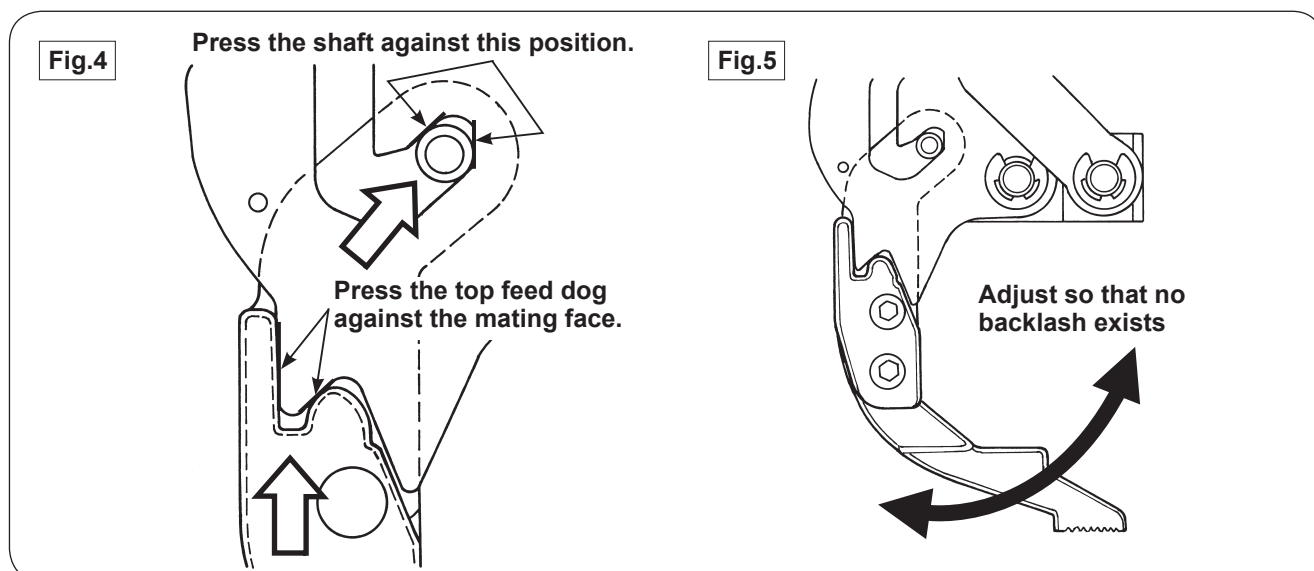
How to remove the thread trimmer unit

1. Remove the cover of the top feed dog. (Fig.1)
2. Remove the slide body spring. (Fig.2)
3. Remove two setscrews. Detach the top feed dog. (Fig.3)



How to attach the thread trimmer unit

1. Attach the top feed dog with two setscrews. At this time, temporarily tighten the setscrews.
2. Attach the slide body spring.
3. Place the top feed dog at its predetermined position. Securely tighten the setscrews while eliminating the backlash. (Fig.4, Fig.5)
4. Attach the top feed dog cover.



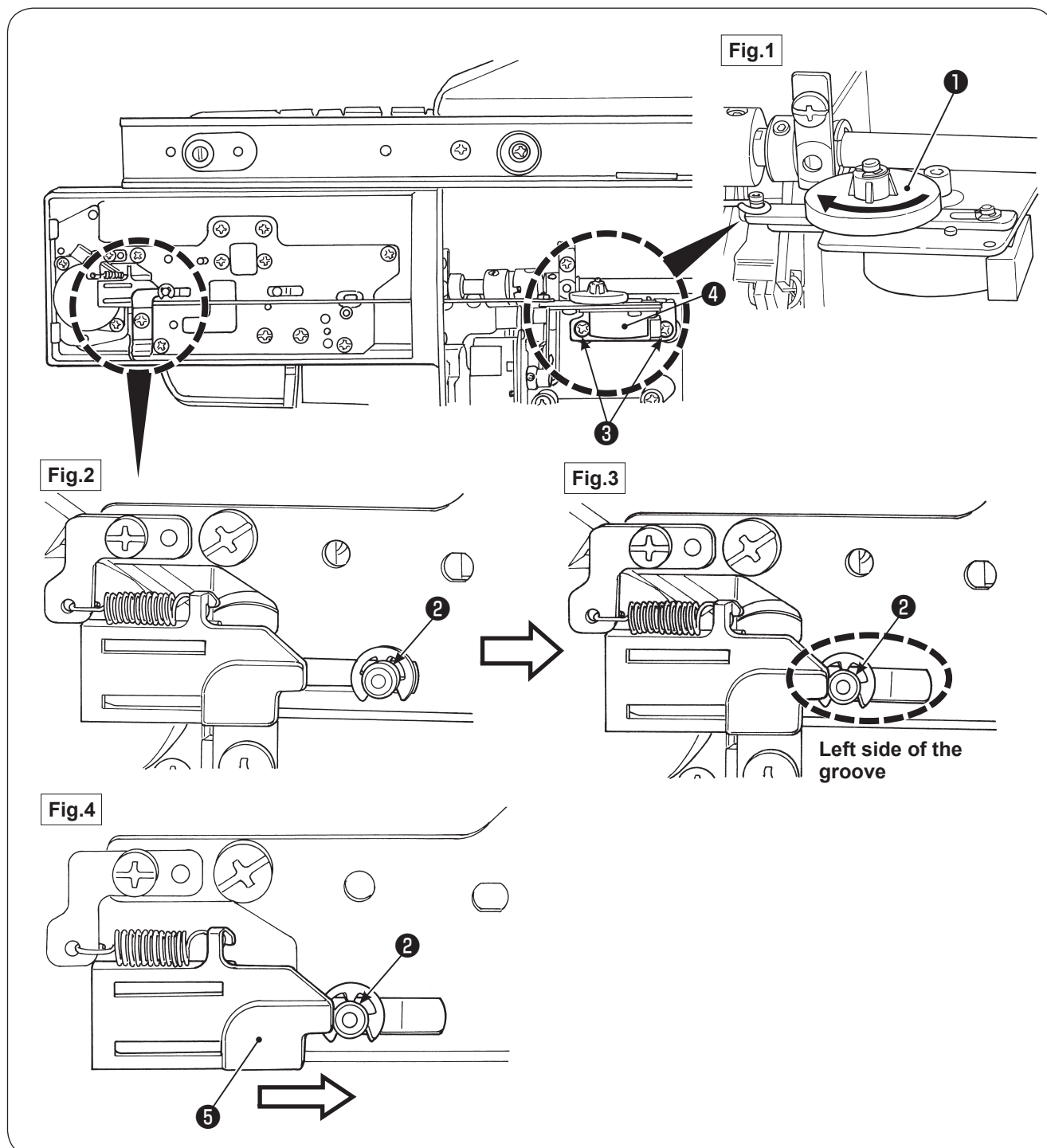
6-22 Position of the automatic DF motor

- Remove the the bottom cover A/B and the bottom cover of the free arm.

Adjustment procedure

1. Turn DF cam gear ❶ in the direction of the arrow in Fig. 1 until it will go no further.
2. When DF operating part ❷ is at the position as shown in Fig. 2, turn the handwheel to check that the DF operating part is brought to the position (left side of the groove) as shown in Fig. 3.
3. Loosen two setscrews ❸ of the DF motor. Adjust the lateral position of DF motor ❹. Then, tighten set-screws ❸ to secure the DF motor.

At this time, adjust the position of DF driving part ❺ by shifting it in the direction of the arrow so that its tip slightly comes in contact with the DF operating part ❷. (Fig.4)



6-23 Service mode

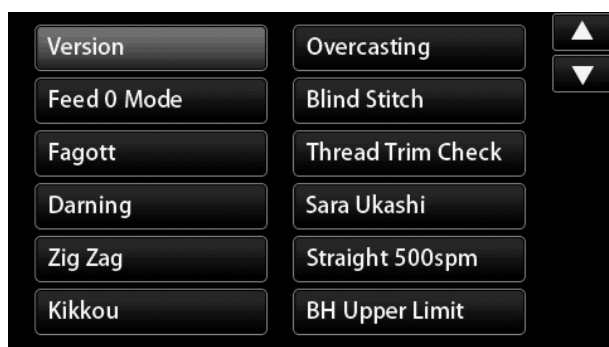
6-23-1 Service mode screen

Check with item numbers and items.

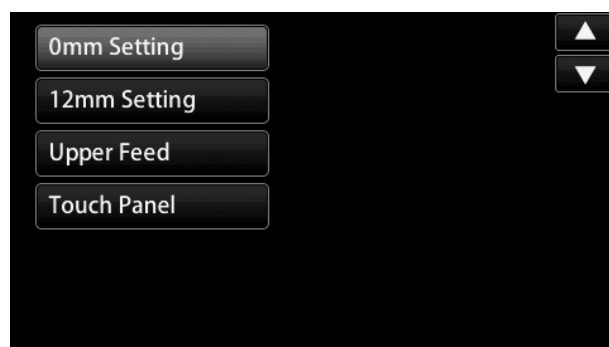
[How to select the service mode]

1. When the power switch stays off, keep pressing both the reverse feed button and the thread trimming button simultaneously to turn ON the power switch.
2. The Service mode screen is displayed. Select the item you want to check.

1st page



2nd page



* Changeover the pages with   shown at the upper right of the screen.

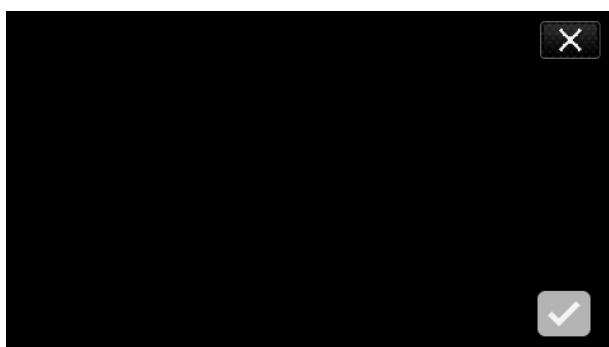
6-23-2 Service-mode items and descriptions

Item name	Description	Operation
Version	Software version is displayed.	
Feed 0 Mode	Select the straight stitch pattern and set the amount of feed at 0 (zero).	A
Fagott	Select the fagoting pattern. Set the zigzag width at 7.0 mm. The fagoting pattern can be sewn.	A
Darning	Select the darning pattern. Darning pattern can be sewn with the initial value.	Refer to the "longitudinal feed" (P28 6-18)
Zig Zag	Select the zigzag pattern. Zigzag pattern can be sewn with the initial value.	A
Kikkou	Select the Kikkou pattern. Kikkou pattern can be sewn with the initial value.	A
Overcasting	Adjust the needle entry point for overcasting. Slide the needle entry points toward the needle throwing direction entirely by the specified number of pulses. The adjustable range of the sliding amount is [-4 to 4]. Adjustment is made in increments of 1.	B

Item name	Description	Operation
Blind Stitch	Adjust the needle entry points on the left side of the blind stitch. Slide the needle entry points toward the needle throwing direction entirely by the specified number of pulses. The adjustable range of the sliding amount is [-4 to 4]. Adjustment is made in increments of 1.	B
Thread Trim Check	Not used	-
Sara Ukashi (Tension release)	Bring the disks to the floating condition.	A
STRAIGHT 500spm	The maximum sewing speed is 500spm(sti/min) when the straight stitch pattern is selected.	A
BH Upper Limit	The upper limit of the scaling factor employed at the feedback operation (the operation for sewing the buttonhole of the same size again) is adjusted. The adjustable range of scaling factor is [1.00 to 1.80]. (Default is 1.40. Adjustment is made in increments of 0.05.)	B
0mm Setting	Set the "0 (zero) mm position" of the auto-lifter.	Refer to the "Adjusting the height of the auto-lifter" (P30 6-19-2)
12mm Setting	Set the "12 mm position" of the auto-lifter.	Refer to the "Adjusting the height of the auto-lifter" (P30 6-19-2)
Upper Feed	Feed amount "0" (zero) of the top feed is adjusted. The adjustable range of the sliding amount is [-10 to 10]. Adjustment is made in increments of 1.	B
Touch Panel	The touch panel correction is carried out.	Touch four corners in the correct order

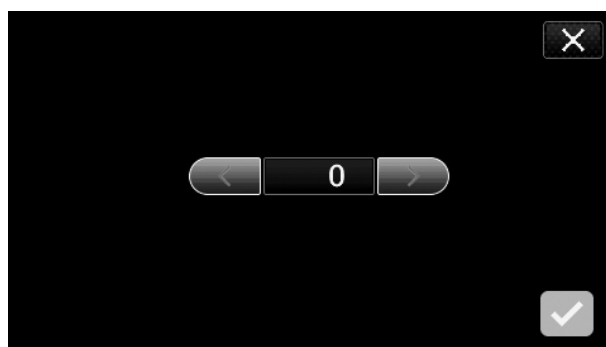
Operation A

- When you select the item, the Item is set.
- Press  to return the screen to the selection screen under the Service mode.



Operation B

- When you select the item, its adjustment screen is displayed.
- Adjust the item using   and confirm with .
- Press  to return the screen to the selection screen under the Service mode.





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