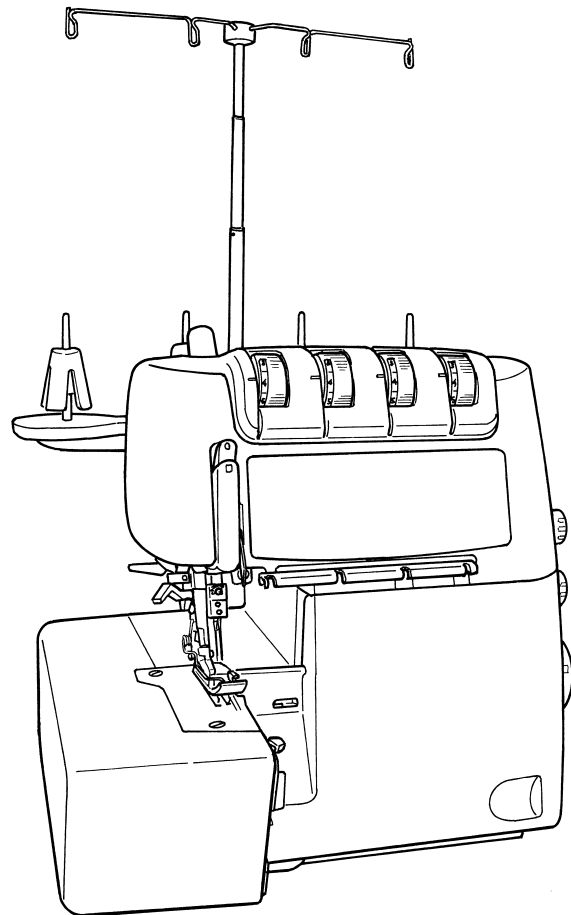
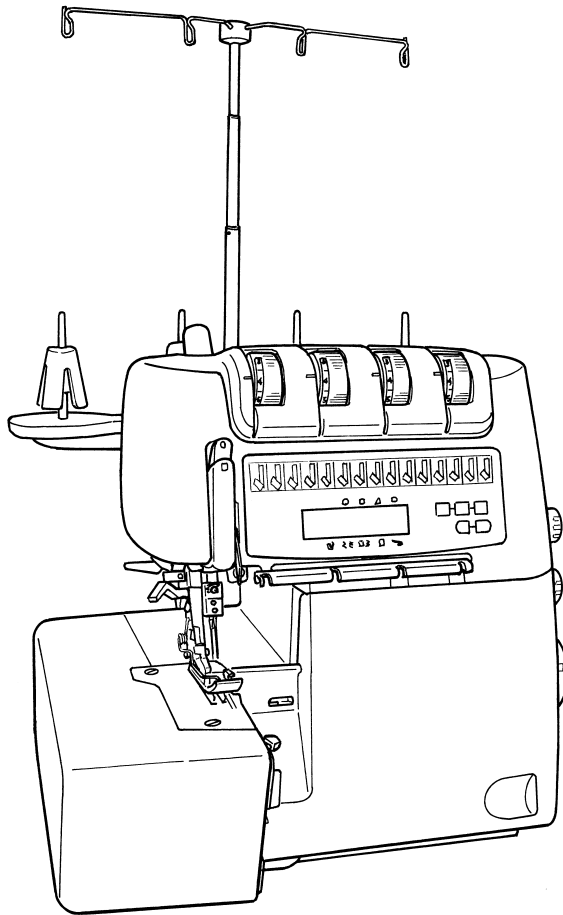


2-Needle, 2/3/4-Thread Overlock Sewing Machine

MO-1000 Series

SERVICE MANUAL



CONTENTS

1	SPECIFICATIONS.....	1
2	NAME OF EACH COMPONENT	2
1.	Appearance	2
2.	Inside of the cover.....	3
3	STANDARD ADJUSTMENT / DISASSEMBLY AND ASSEMBLY... 4	
1.	Removing order of covers	4
2.	Installation of the throat plate	8
3.	Height of the needle bar.....	10
4.	Position of the feed dog.....	12
5.	Adjusting the stroke of the sub feed dog.....	14
6.	Height of the feed dog.....	16
7.	Feed dog timing.....	18
8.	Position of the balance weights and the cams.....	20
9.	Projecting amount of the upper looper	22
10.	Radius of the lower looper	24
11.	Adjustment of the loop lift	26
12.	Timing between upper and lower looper.....	28
13.	Installation of the needle guards	30
14.	Adjusting the looper thread take-up.....	32
15.	Height and lateral position of the presser foot.....	34
16.	Adjusting the floating of the disk of the thread tension controller	36
17.	Adjusting the tension of the thread tension controller.....	38
18.	Position of the needle thread take-up thread guide.....	40
19.	Tension of the belt.....	42
20.	Adjusting the needle bar connection guide of the needle threader	44
21.	Adjusting the needle threader hook	46
22.	Adjusting the looper threader timing	48
23.	Adjusting the pump unit	50
24.	Position of the lower knife.....	52
25.	Engagement of the upper knife with the lower knife	54

26. Adjusting the timing of the upper knife.....	56
27. Adjusting the thread sliding segment	58
28. Adjusting the safety switch	60
29. Position of the cloth plate.....	62
4 CIRCUIT DIAGRAM	64
5 MAINTENANCE	66
1. Lubrication	66
2. Spraying grease.....	66
3. Looper threader	66
6 TROUBLES AND CORRECTIVE MEASURES	67



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

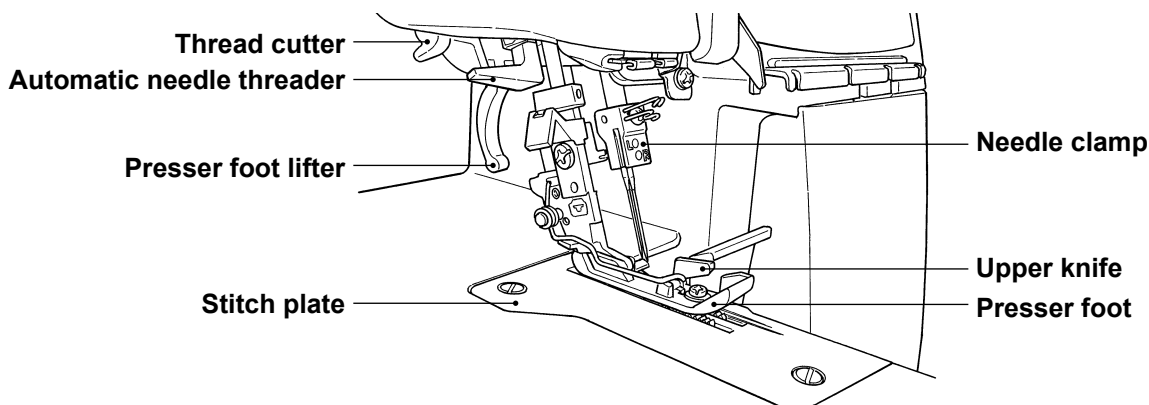
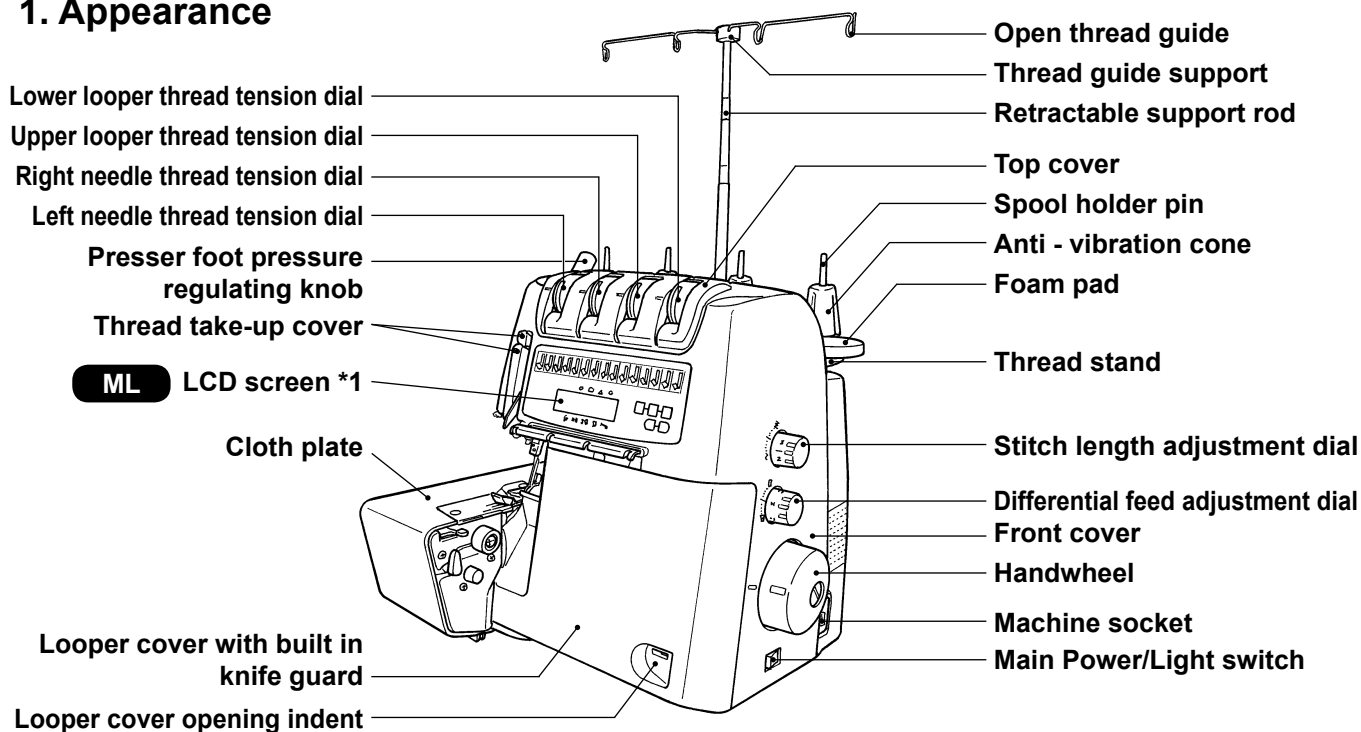
No.	Items	Description
1	Model name	2-Needle, 2/3/4-Thread Overlock Sewing Machine (with differential feed adjusting)
2	Stitch choice	2 needles, 4 thread overlock 2 needles, 3 thread overlock 1 needle, 3 thread overlock 1 needle, 2 thread overlock
3	Sewing speed	Up to 1,500 sti/min Rating 1,350±150 sti/min
4	Needle gauge	Overlocking: 2.2 mm
5	Overedge width	2 needles, 4 thread: 5.0 to 9.0 mm 1 needle, 3 thread (right hand needle): 3.0 to 7.0 mm 1 needle, 3 thread (left hand needle): 5.0 to 9.0 mm Roll hemming: 2.0 mm
	Knife width	2.5 to 6.5 mm
6	Thread sliding segment (*1) M/ML	It is in synchronism with the lower knife from scale marks "1" to "5" of the knife adjusting knob. The amount of travel of the thread sliding segment can be finely adjusted with the MTC knob.
7	Stitch length	1.0 to 4.0 mm (Standard 2.5 mm)
8	Differential feed	1 : 0.7 to 2
9	Needle bar stroke	29.41 mm
10	Presser foot height	4.8 mm to 5.0 mm
11	Feed dog height	1.3 mm (This side end of the sub feed dog P = 2.5 mm; differential feed ratio: 1:1)
12	Needle system (Japan)	ORGAN needle HA×1 # 11 (Standard) to # 14
	Needle system (Overseas)	SCHMETZ (130/705H 15X1H) # 80
13	Number of needles	Max. 2
14	Number of threads to be used	Max. 4
15	Needle threader	Operated by the manual lever
16	Looper threader	Automatic threading by the air pump
17	Air pump	Piston pump driven by the motor Motor: DC 12V
18	Liquid crystal display (*2) ML	Display section: 63.0 mm (W) × 17.5 mm (H)
19	Power switch	Rocker switch
20	Light	LED 5V x 2
21	Motor	100V : 120W 115/120V : 120W 230V ~ : 130W
22	Foot control	No-heat method (semi-conductor control type)
23	Driving system	Timing belt drive
24	Machine size	330 mm (W) × 280 mm (D) × 310 mm (H)
25	Machine weight	9 kg

* 1: Only for ML type

* 2: Only for M/ML types

2 NAME OF EACH COMPONENT

1. Appearance

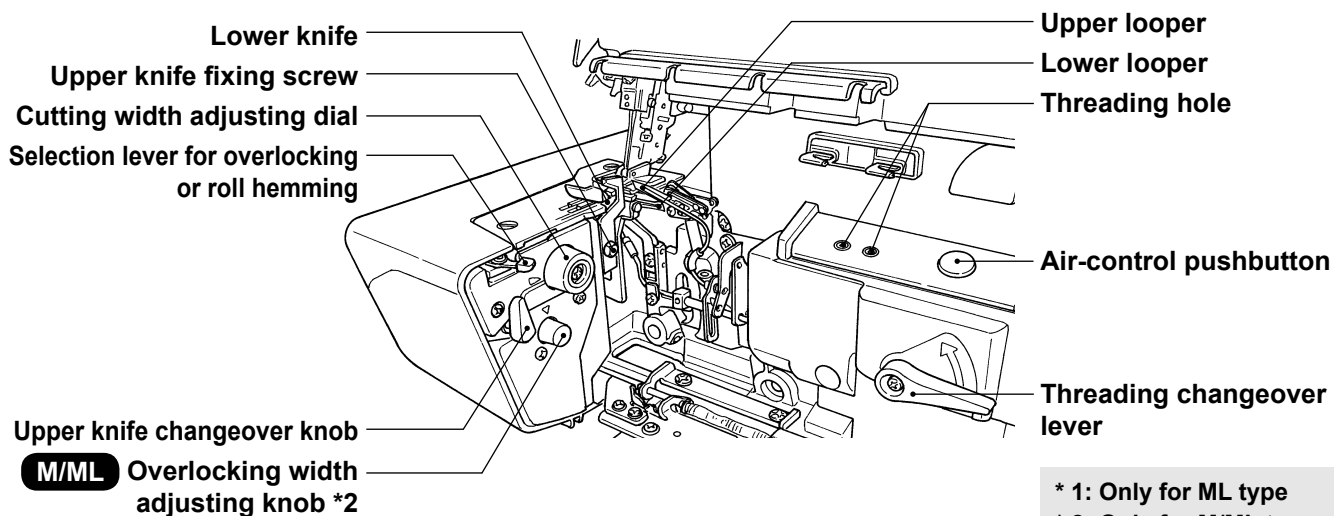


■ View with looper cover open



Caution:

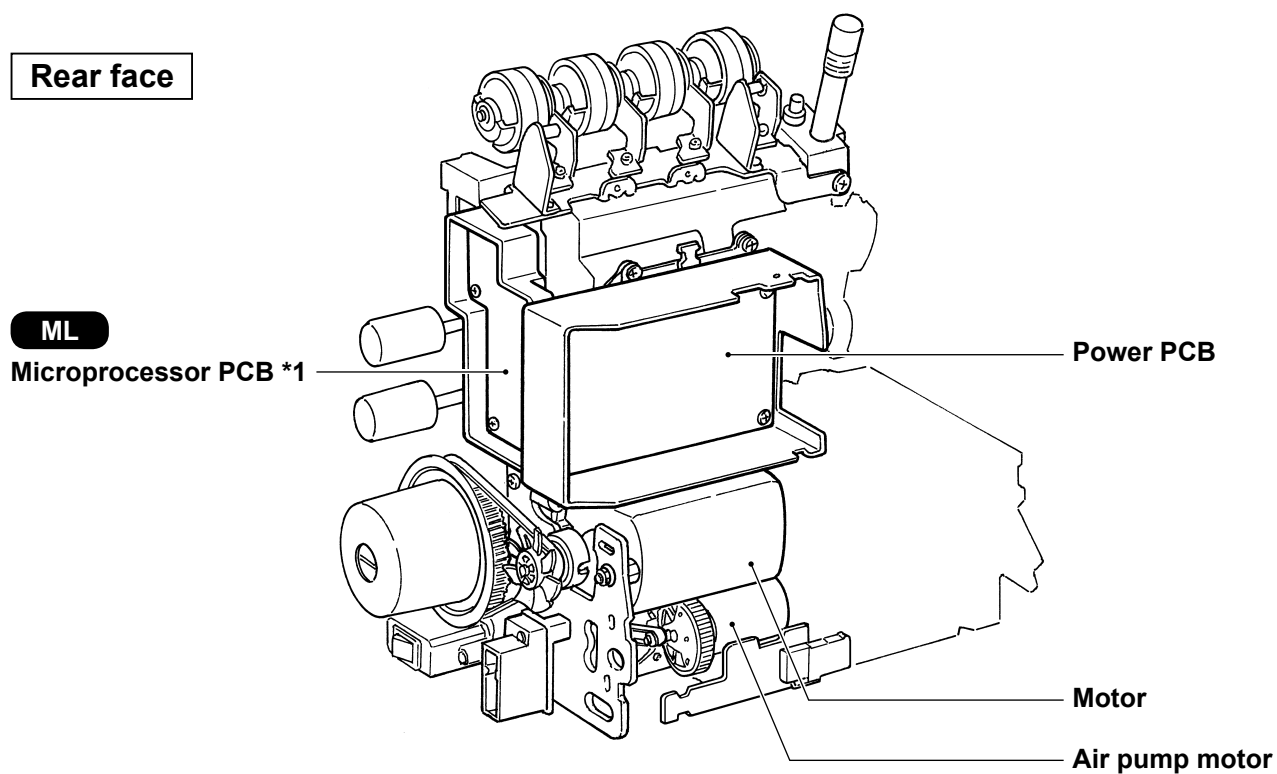
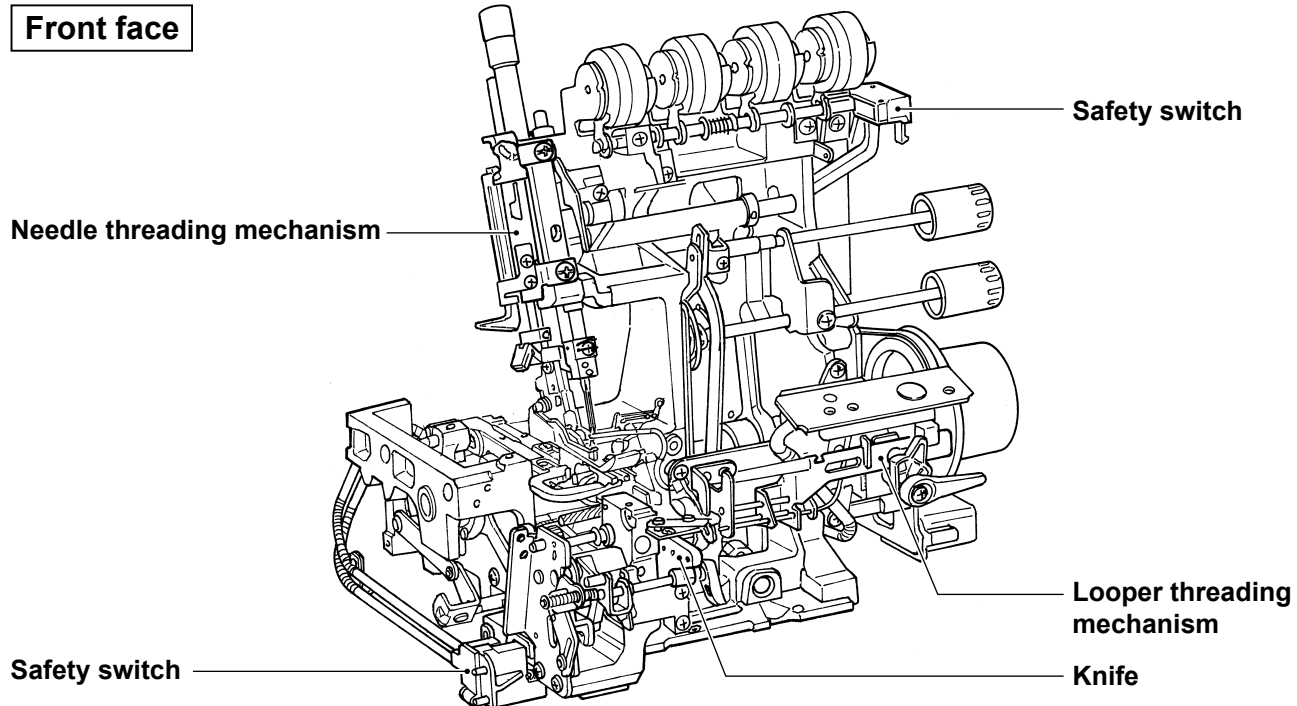
Be sure to turn off the power switch before opening the looper cover.



* 1: Only for ML type

* 2: Only for M/ML types

2. Inside of the cover



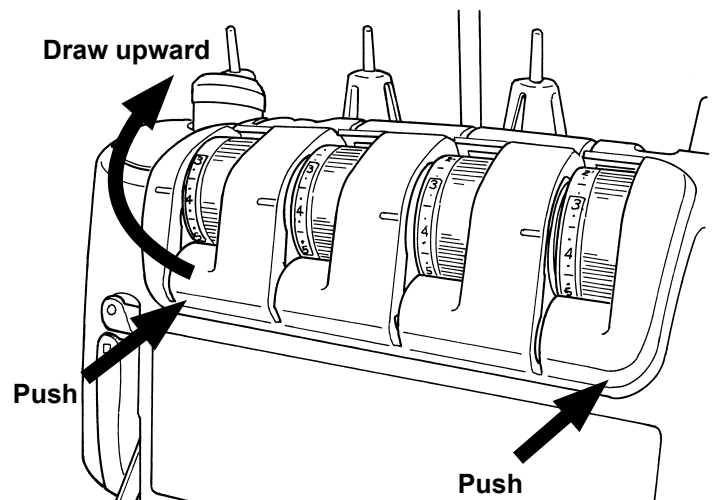
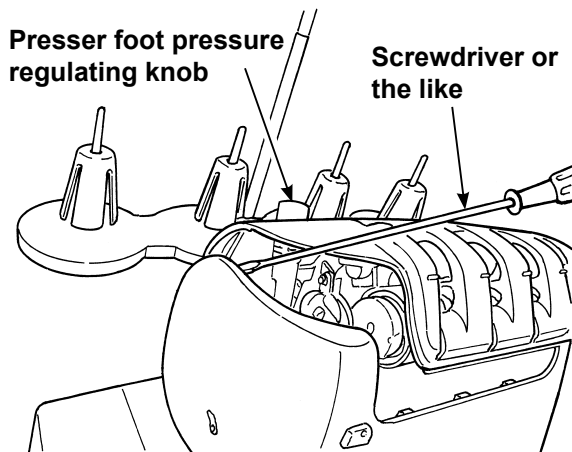
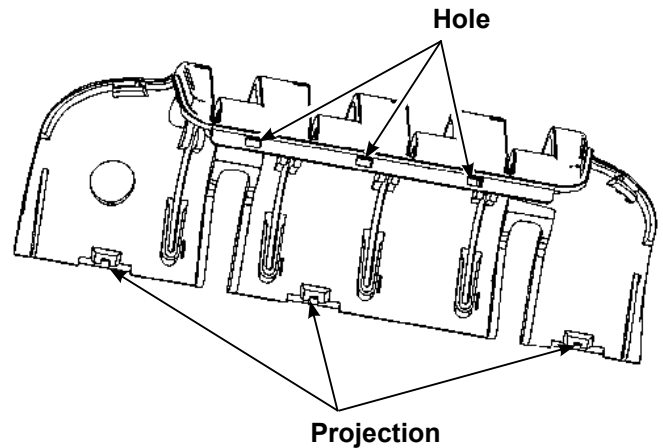
3 STANDARD ADJUSTMENT / DISASSEMBLY AND ASSEMBLY

1. Removing order of covers

1-1. The top cover

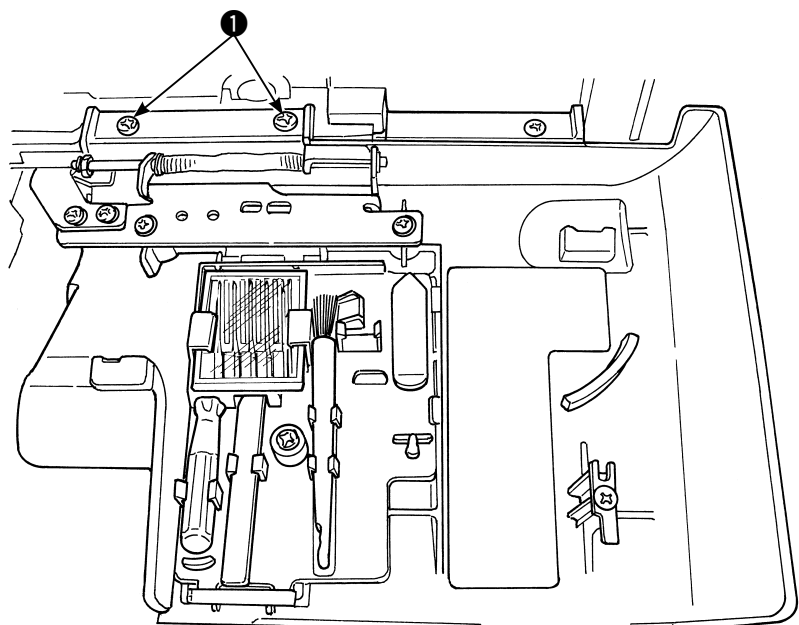
- Pushing the arrowed section in the figure by both hands (i.e., removing the projections of the front cover from the holes in the top cover), draw this side upward.
- If it is not easy to detach the rear projection from the corresponding hole, detach it with a screwdriver or the like.

In the case the rear projection cannot be easily removed since its left side comes in contact with the presser spring regulating knob, detach the presser spring regulator knob first. Then, the rear projection will be detached smoothly.



1-2. The looper cover

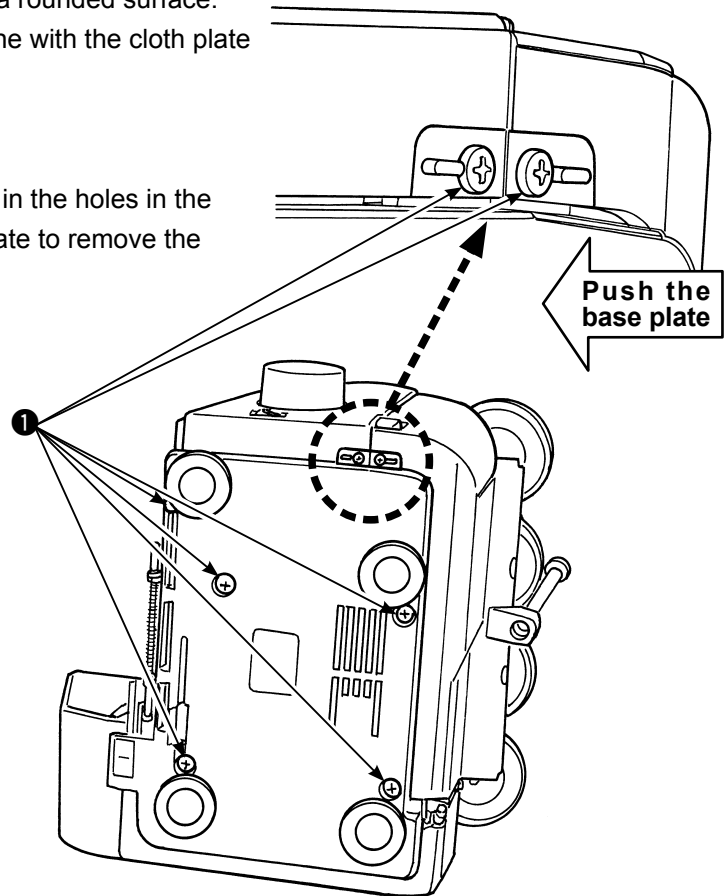
- Loosen and remove the set-screws ①.



1-3. The base plate

If the sewing machine is tilted away from you, the sewing machine will not be stabilized since the rear cover has a rounded surface. It is recommended to place the sewing machine with the cloth plate down on the table.

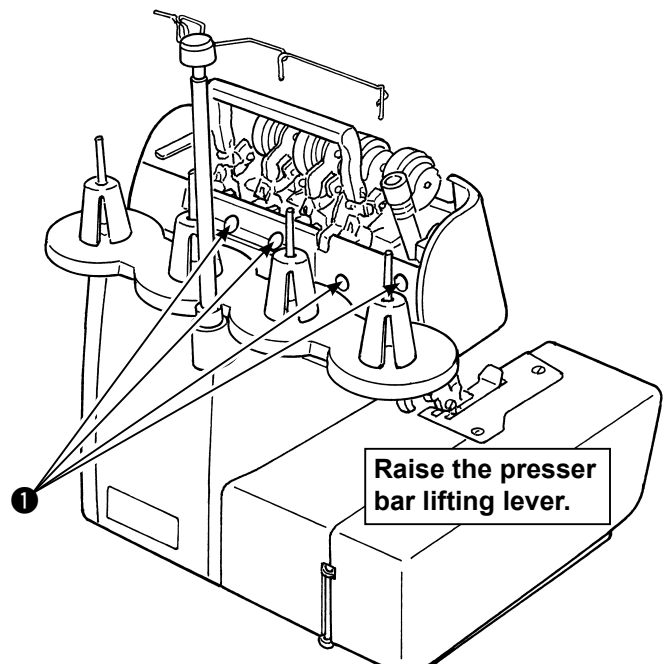
- Loosen and remove the setscrews ❶.
- The projections of the base plate are fitted in the holes in the front and rear covers. Push up the base plate to remove the projections from the holes.



1-4. The rear cover

- Raise the presser bar lifting lever.
- Loosen and remove the setscrews ❶.
- Remove the rear cover.

Caution: If you remove the rear cover forcibly by moving it to the right and left, the claws between the rear cover and the front cover can break.



1-5. The front cover

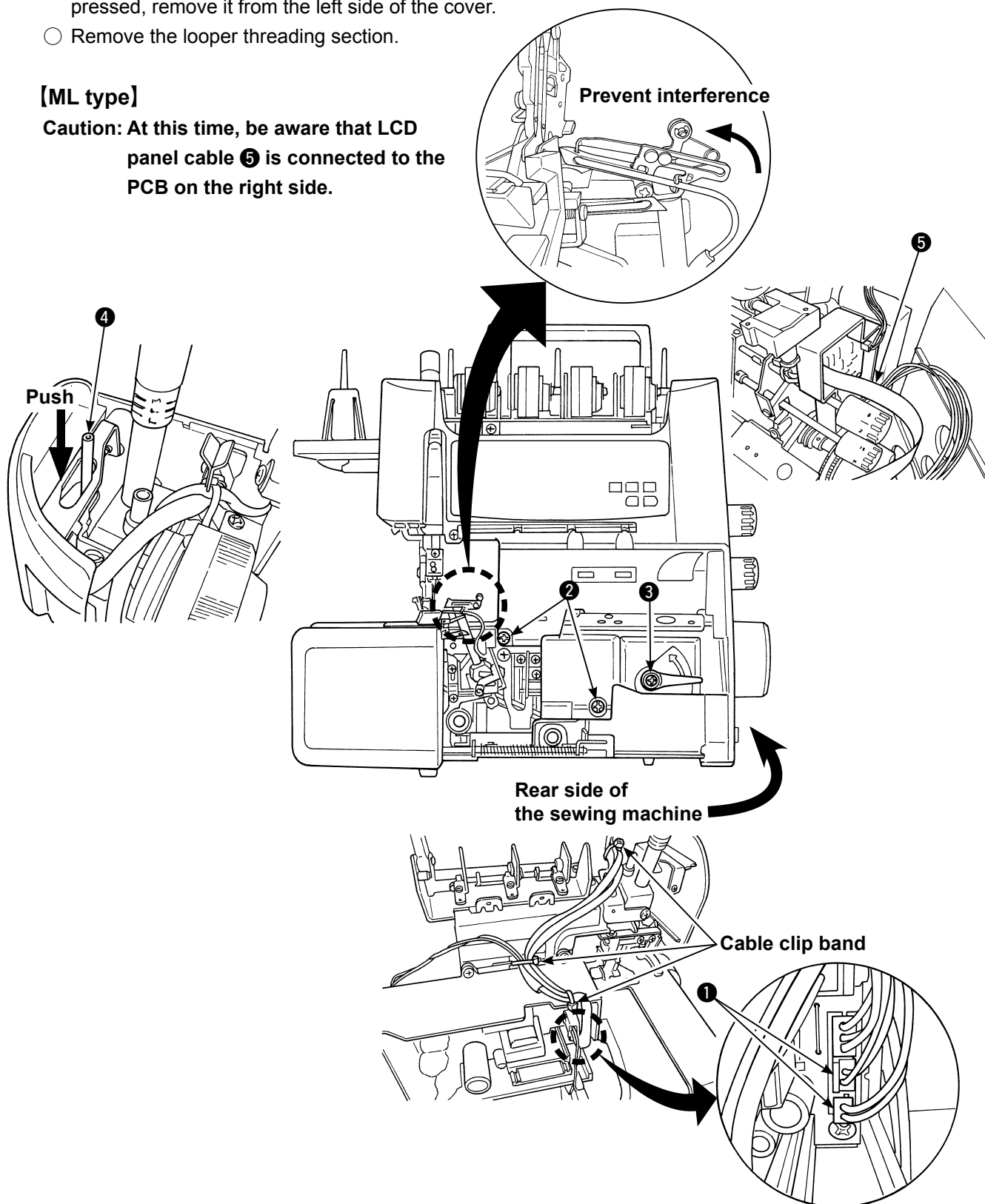
- Turn the pulley to retract the looper to the position indicated in the figure.

Caution: Be sure to retract the looper without exceptions. Be aware that the 2/3 thread changeover lever can break if the looper is not retracted.

- Remove two connectors ❶ (CN3 and CN4) of LED lamp from the power PCB. Cut the cable clip band.
- Loosen and remove the setscrews ❷.
- Remove looper threading lever screw ❸ to remove the lever.
- While keeping needle threader shaft ❹ held pressed, remove it from the left side of the cover.
- Remove the looper threading section.

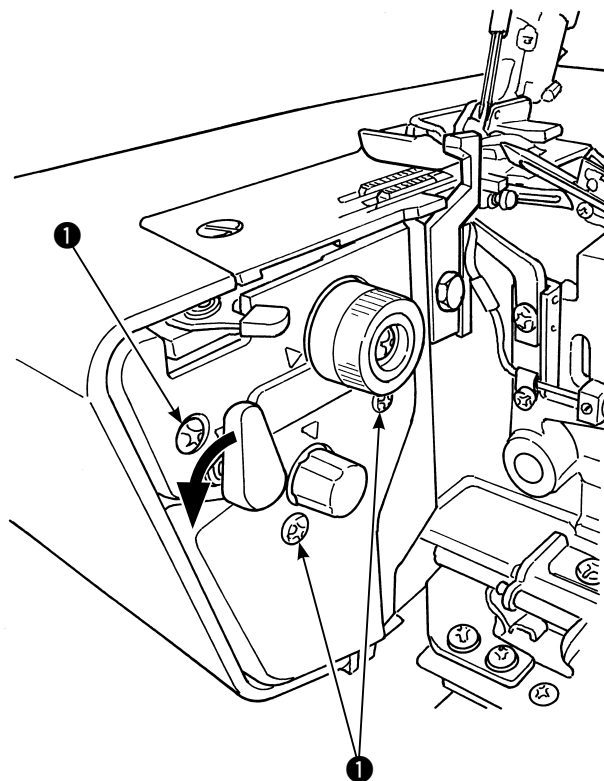
[ML type]

Caution: At this time, be aware that LCD panel cable ❺ is connected to the PCB on the right side.



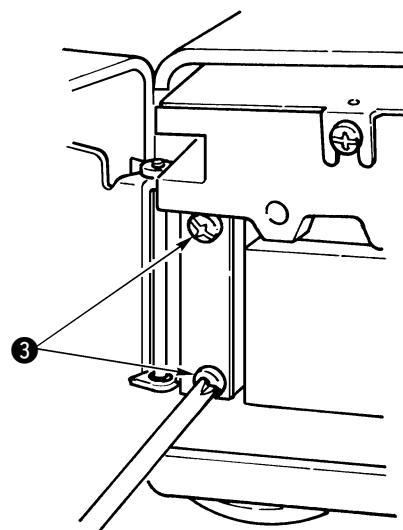
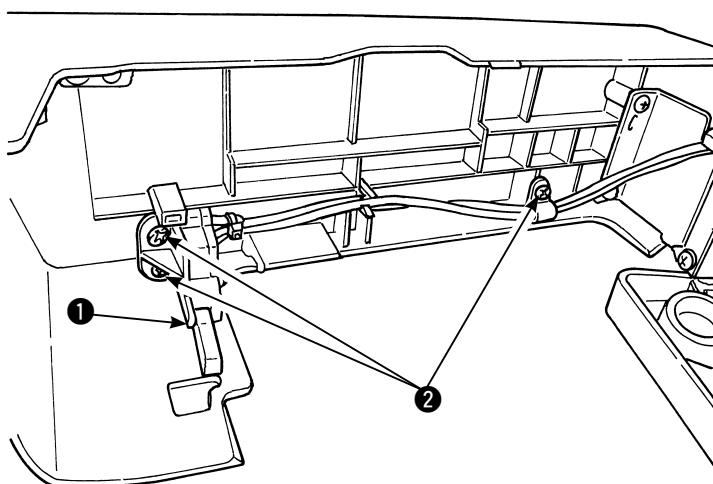
1-6. Looper cover guide

- Loosen and remove the setscrews ❶.
- Remove the cover with the knife changeover lever aligned with the position of notch on the cover.



1-7. The cloth plate cover

- Open the cloth plate. Remove three screws ❷ to remove safety switch ❶.
- Loosen and remove the setscrews ❸.
- Remove the cloth plate.



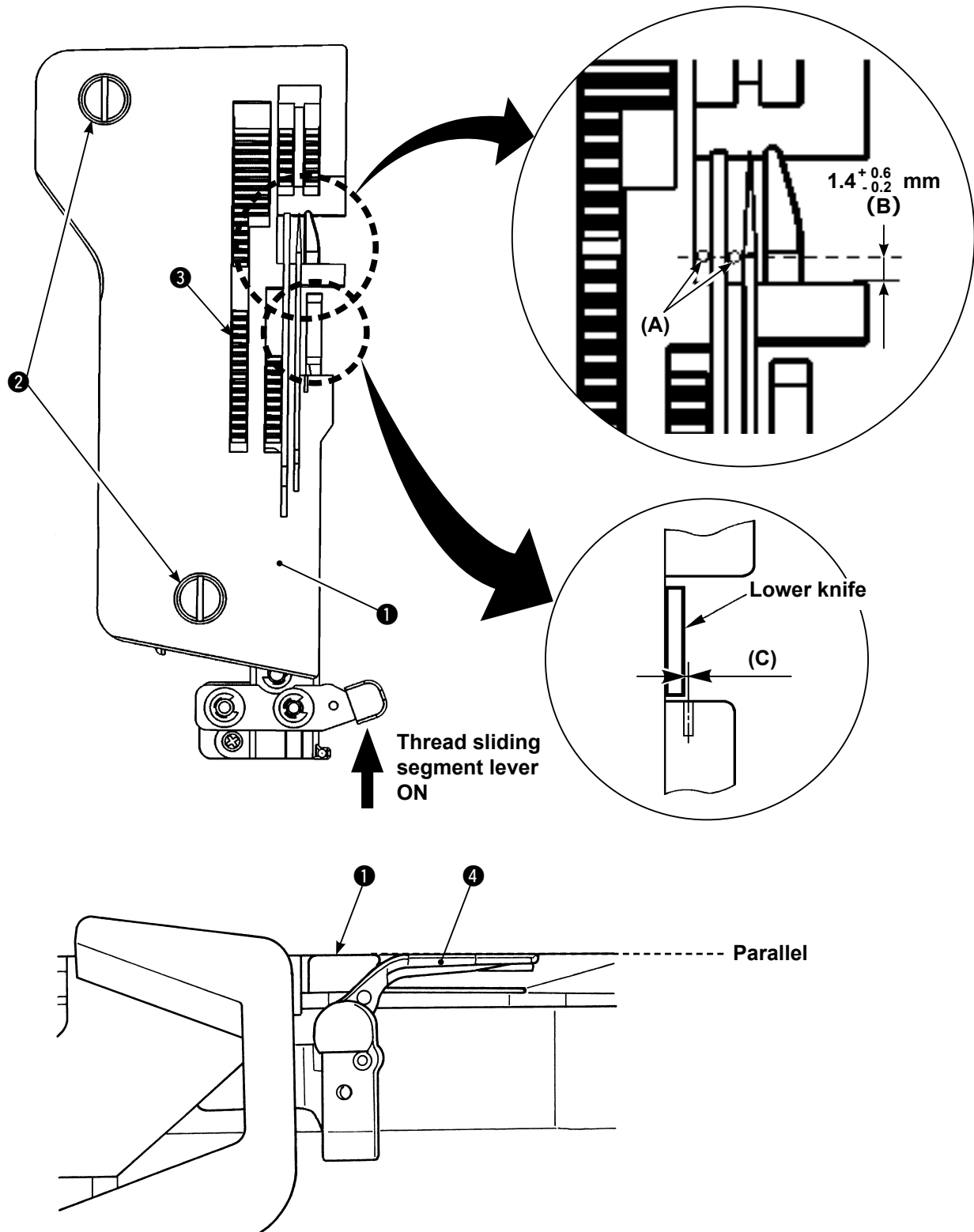
2. Installation of the throat plate



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate ❷ Setscrew ❸ Feed dog ❹ Thread sliding segment * Check that all needles are laterally equidistant with respect to the throat plate slot (A). * Check that the distance between the needle center and the front edge of the throat plate slot is $1.4 \begin{smallmatrix} +0.6 \\ -0.2 \end{smallmatrix}$ mm (B). * Check to be sure that the lower knife (right end face) is positioned between the left end and center (C) of the marker dot on throat plate ❶ when the lower knife adjustment knob is set at the scale mark 1. Or, check to be sure that the lower knife (right end face) is spaced 2.5 mm away from the right needle. How to perform adjustment: ○ Loosen setscrew ❷. Carry out the adjustment by moving throat plate ❶ as described below: a) The feed dog ❸ teeth are parallel to the slots in the throat plate ❶. b) The needles are spaced equidistantly with respect to the slots in the throat plate (A). c) The distance between the needle center and the front edge of the throat plate ❶ slot is $1.4 \begin{smallmatrix} +0.6 \\ -0.2 \end{smallmatrix}$ mm (B). ○ Retighten the setscrews ❷. ○ After the completion of the adjustment, set the thread sliding segment lever in the ON position to check the parallelism between the throat plate and thread sliding segment ❹. If they are not in parallel to each other, carry out adjustment referring to "27. Adjusting the thread sliding segment".	If the feed dog comes in contact with the throat plate, abnormal noise or breakage can be caused. If the thread sliding segment is improperly positioned, stitching failures such that the material is caught or thread breaks can be caused.

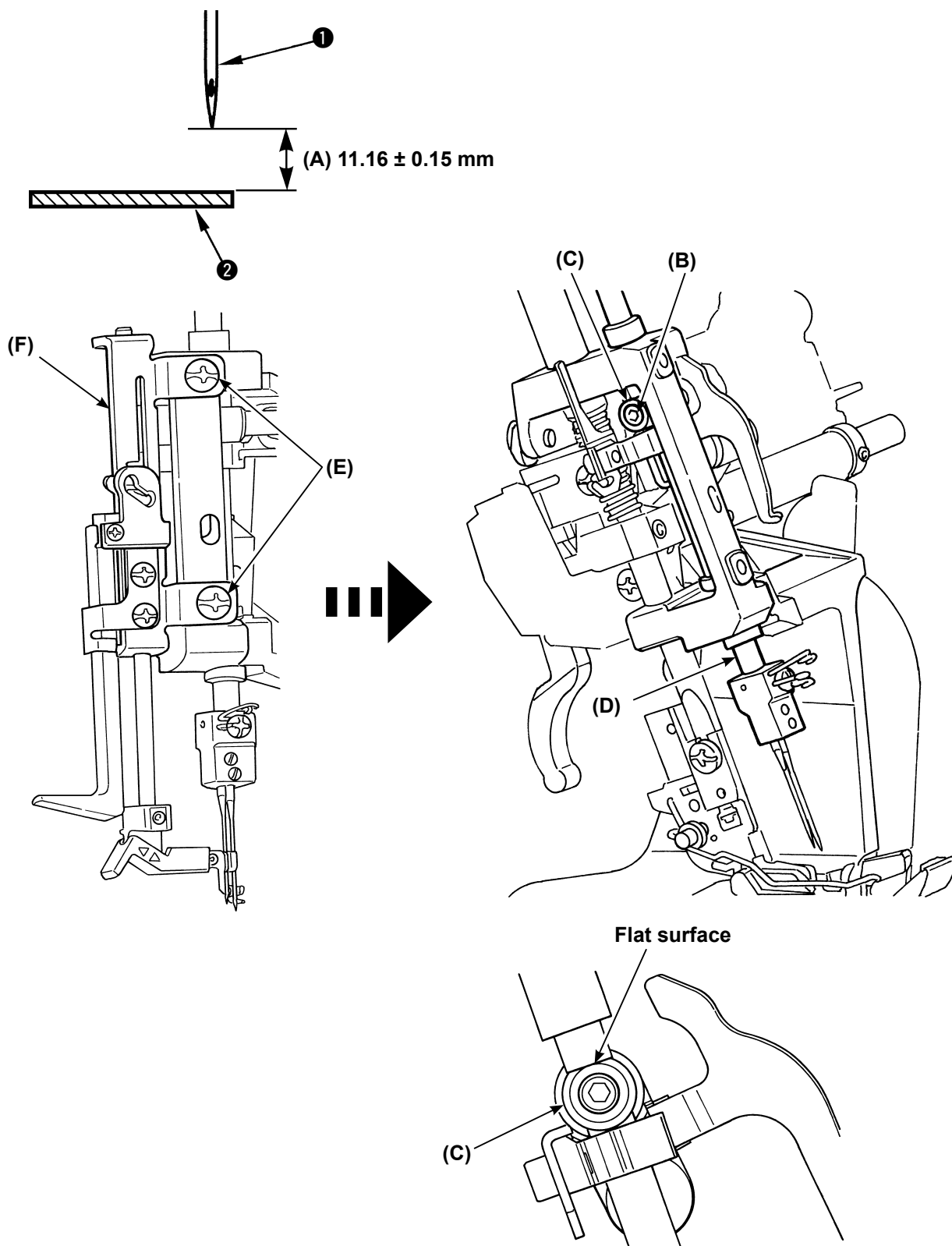
3. Height of the needle bar



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ① Right hand needle ② Throat plate * Check that the distance between the throat plate surface and the OL right hand needle point with the needle bar at the highest point of its stroke is 11.16 ± 0.15 mm (A) when using needle system 130/705H. How to perform adjustment: ○ Remove screw (E) of the needle threader to remove needle threader unit (F). ○ Loosen the setscrew (B) of the needle bar connection (C) slightly. (The needle bar should not slip down. If the needle bar slips off, refer to the orientation of the needle bar connection.) ○ Allow the needle bar (D) to reach its highest position. ○ Move needle bar (D) up and down by hand to adjust dimension (A) is obtained. ○ Retighten the setscrew (B). ○ After the completion of the adjustment, adjust the needle threader. Refer to "20. Adjusting the needle bar connection guide of the needle threader" and "21. Adjusting the needle threader hook". Orientation of needle bar connection (C) ○ The needle bar connection should be placed with its flat surface up.	If the height of the needle bar differs from the standard adjustment, stitching failures such as stitch skipping and thread fraying can be caused. If the orientation of the needle bar connection is wrong, the needle bar connection can interfere with the needle bar bushing, disabling rotation of the sewing machine.

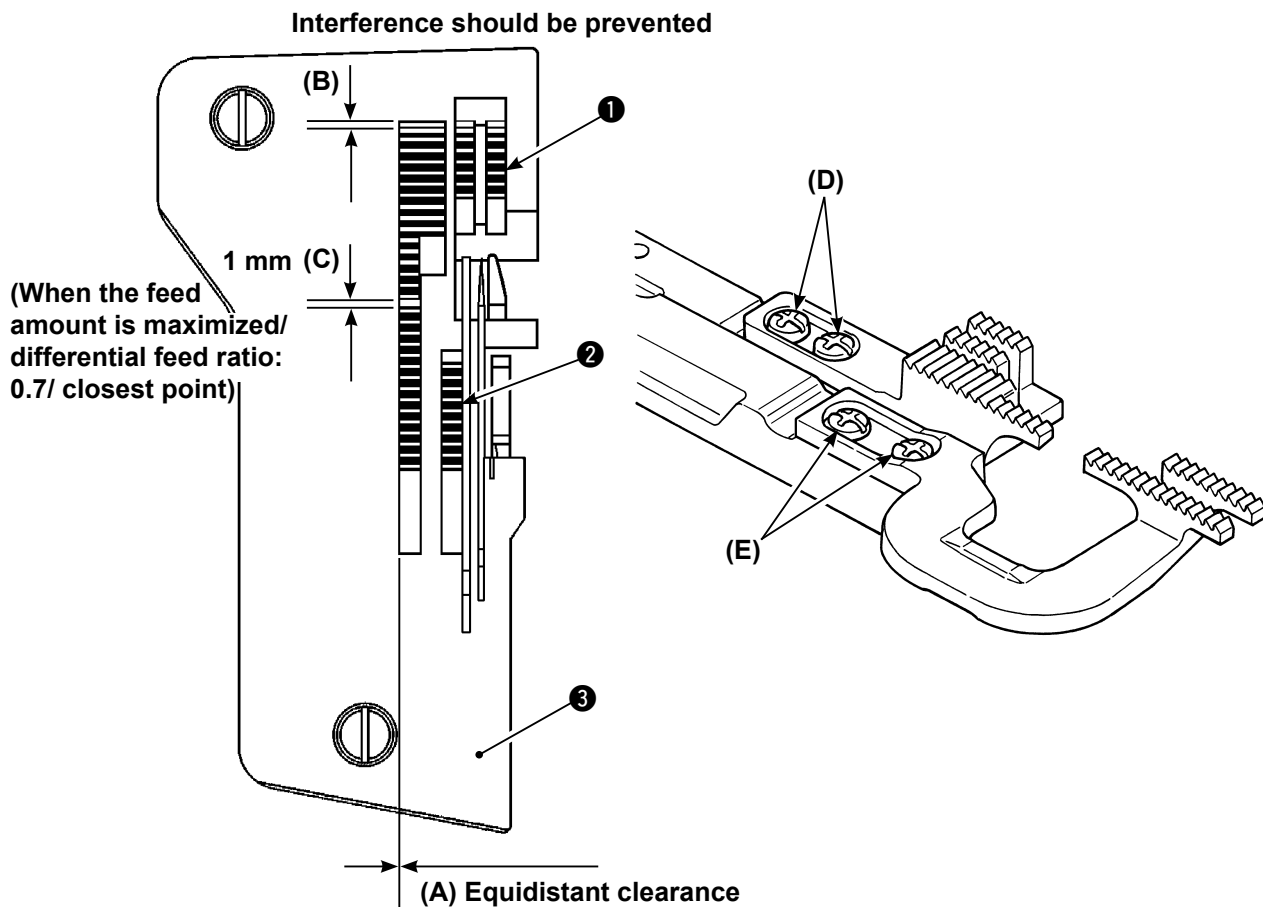
4. Position of the feed dog



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Main feed dog ❷ Sub feed dog ❸ Throat plate * Check that the feed dog and the slot in the throat plate ❸ are parallel with each other, that the clearances on the right and left side of the feed dog are equal (A). * Maximize the feed amount (scale mark: 4). In this state, check to be sure that the main feed dog ❶ is at the most retracted position and main feed dog ❶ does not interfere with throat plate ❸ (B). * Check at the most-advanced position in max. main feed and min. sub-feed the clearance between the main feed dog ❶ and the sub-feed dog ❷ is 1 mm (C). How to perform adjustment: ○ Maximize the feed amount (scale mark: 4). Move main feed dog ❶ to the most retracted position. ○ Loosen the setscrews (D) of the main feed dog ❶. ○ Move main feed dog ❶ to adjust so that it does not interfere with throat plate ❸. ○ Retighten the setscrews (D). ○ Maximize the feed amount (scale mark: 4). Adjust the differential feed ratio to 0.7. Bring main feed dog ❶ and sub feed dog ❷ to the position where they are closest to each other. ○ Loosen the setscrews of the sub-feed dog (E). ○ At the most-advanced position in max. main feed and min. sub-feed, move the sub-feed dog back and forth, to perform adjustment so that the clearance between the main feed dog ❶ and the sub-feed dog ❷ is to be 1 mm (C). ○ Retighten the setscrews (E).	If the clearances on the right side and left side of the feed dog are not equal, the feed dog can interfere with the throat plate. In addition, irregular feed and wrinkles on the material can be caused.

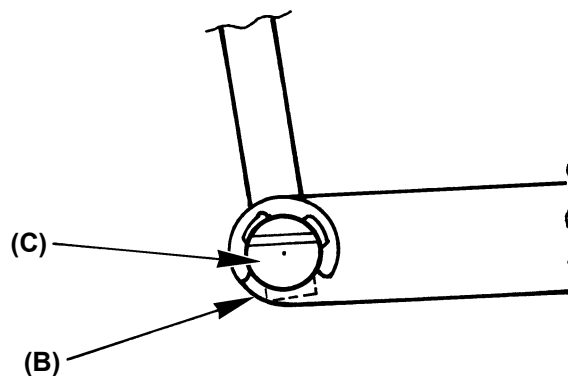
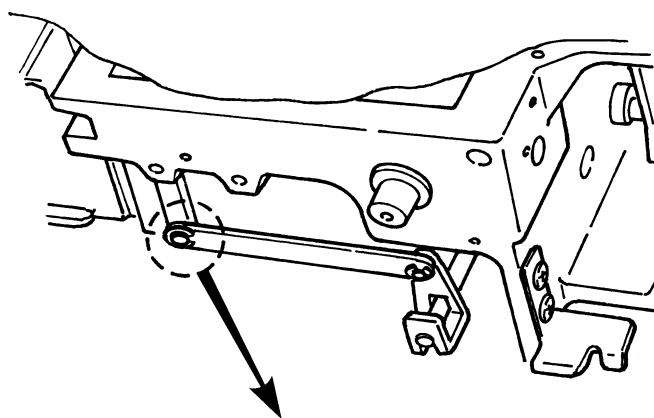
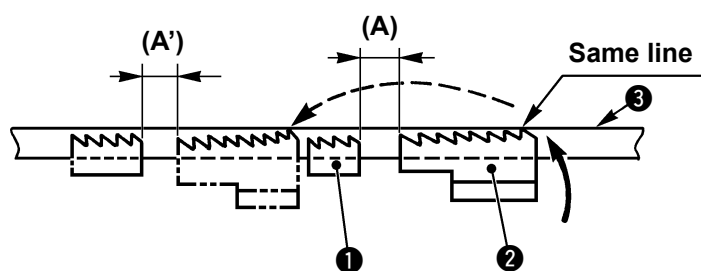
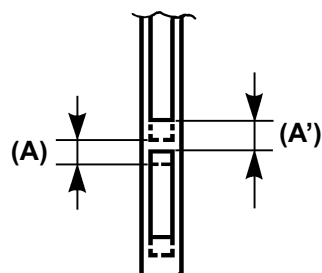
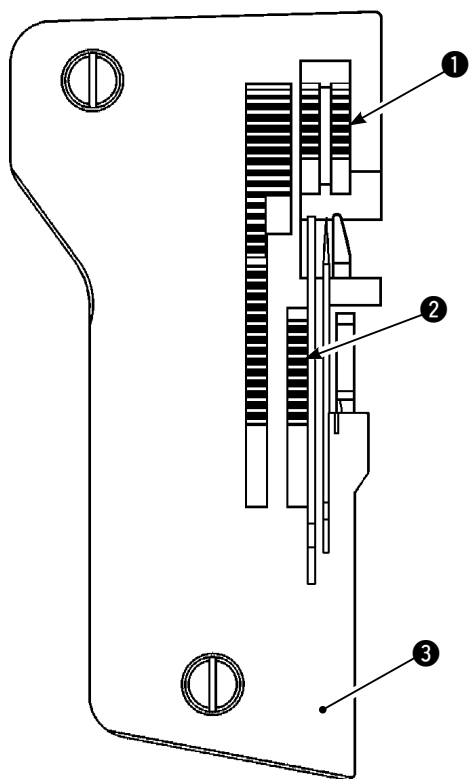
5. Adjusting the stroke of the sub feed dog



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Main feed dog ❷ Sub feed dog ❸ Throat plate * Adjust the stitch length to 4 mm. * Set the differential feed ratio at "N". * Turn the handwheel to move the feed dog up and down. Measure the clearance provided between main feed dog ❶ and sub feed dog ❷ when the tip of feed dog teeth is aligned with the top surface of throat plate ❸ both in the ascending and descending operations. The difference between these two measurement values (A - A') has to be 0 ± 0.1 mm. How to perform adjustment: ☐ Loosen the setscrew (B) of the eccentric stud (C). ☐ Turn the eccentric stud (C) to perform adjustment. ☐ Retighten the setscrew (B).	If the difference in the aforementioned clearances deviates from the standard adjustment, the stitch length in the actual sewing will differ from the indicated stitch length shown on the knob.

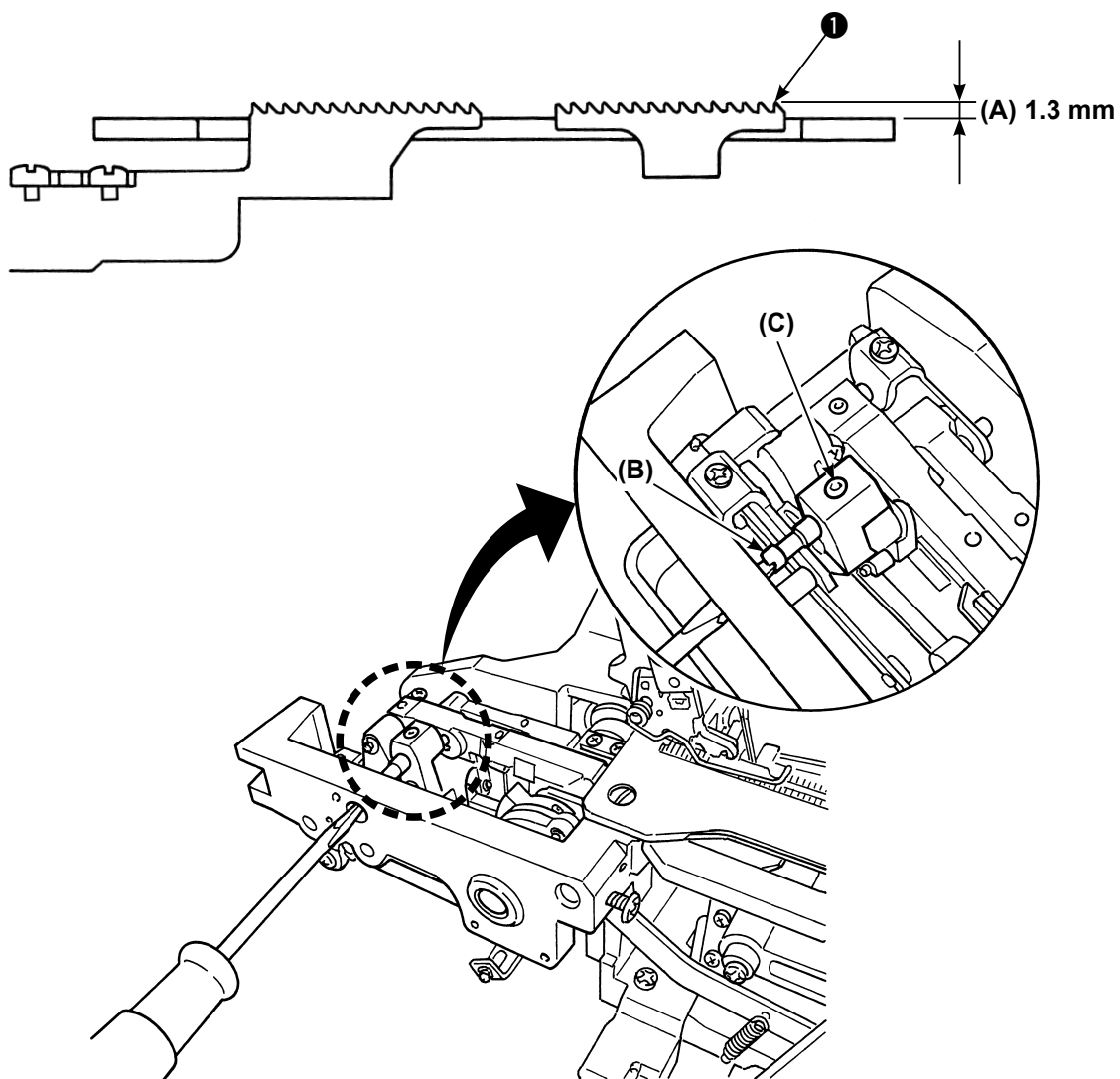
6. Height of the feed dog



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Front end of feed dog * Adjust the stitch length to 2.5 mm. Set the differential feed ratio at "N". Bring the sub feed dog to its highest position. At this time, check that the height of foremost section ❶ of the sub feed dog with respect to the top surface of the throat plate is 1.3 mm (A). How to perform adjustment: ○ Set the feed dog in its highest position. ○ Loosen the setscrew (B) from the eccentric stud (C). ○ Turn the eccentric stud (C) to perform adjustment. ○ Retighten the setscrew (B).	○ If the sub feed dog height is larger than the standard adjustment value, the needle can sway or break when sewing a heavy-weight material. In addition, the feed dog marks can be left on the material or puckering is likely to occur when sewing a light-weight material. ○ If the sub feed dog height is smaller than the standard adjustment value, the efficiency of feed can be reduced. ○ If the sub feed dog is positioned too high, chain-off thread can be excessively tensed. ○ If the height of the main feed dog and that of the sub feed dog are not equal, the expected differential feed effect cannot be achieved.

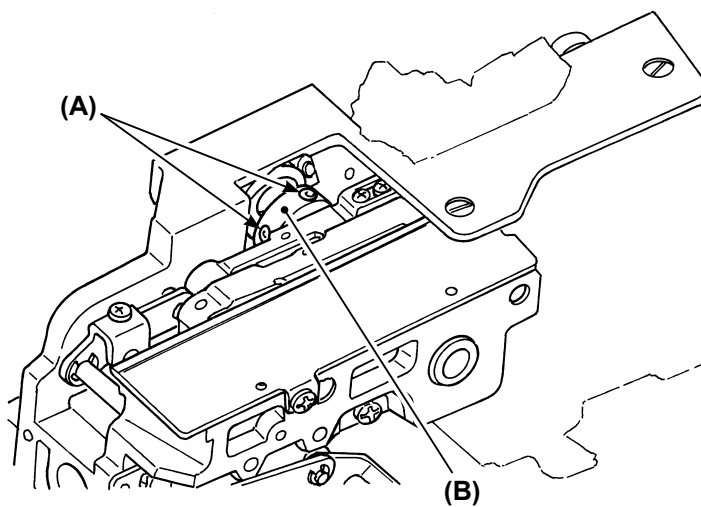
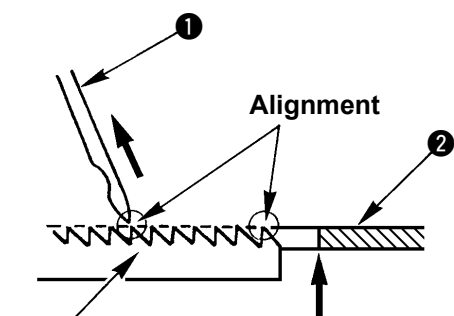
7. Feed dog timing



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Right hand needle ❷ Throat plate ❸ Sub feed dog * Adjust the stitch length to 2.5 mm. Set the differential feed ratio at "N". When sub feed dog ❸ and right needle ❶ go up, check that the tip of right needle ❶ and tip of the teeth of sub feed dog ❸ are simultaneously aligned with the top surface of throat plate ❷. How to perform adjustment: ☐ Loosen the setscrews (A). ☐ Rotate the feed excenter cam (B) to make adjustment. ☐ Retighten the setscrews (A).	If this timing is not properly adjusted, needle breakage, puckering and incorrect feed amount can be caused.

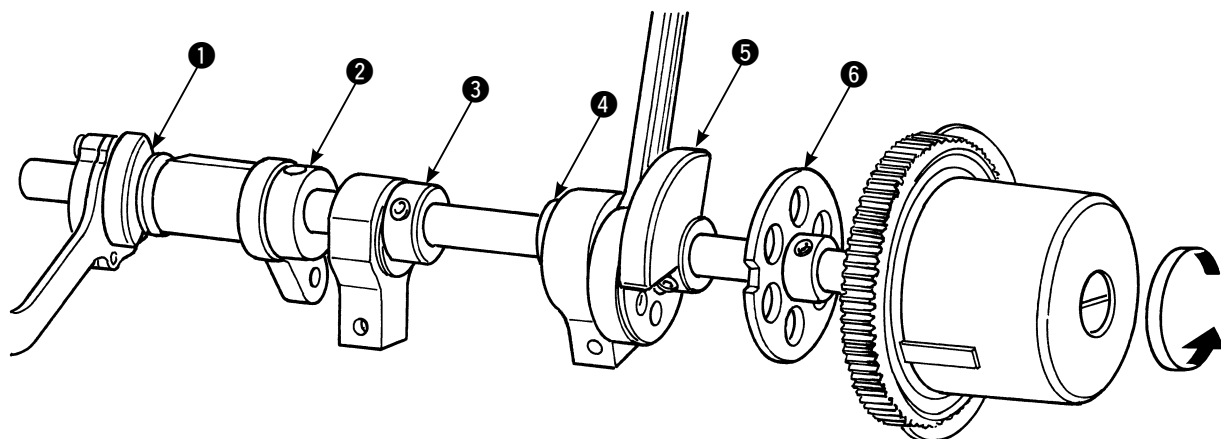
8. Position of the balance weights and the cams



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
① Knife driving cam ② Feed cam ③ Upper looper cam ④ Lower looper cam ⑤ Needle driving cam ○ Screw No. 1 is tightened in the flat section of the main shaft (the figure below). ⑥ Positioning collar ⑦ Marker on the handwheel ○ The marker is aligned with the marker on the side face of the cover at the upper dead point of the needle. The diagram illustrates the adjustment of the needle driving cam. It shows a cross-section of the main shaft with a positioning collar (6) and a needle driving cam (5). A curved arrow indicates the rotation of the handwheel. A line points to the marker on the handwheel (7). A line points to the marker on the side face of the cover (5). A line points to the screw No. 1 (1). Screw No. 1	If the marker on the handwheel cannot be aligned with the marker on the cover: Deviation by 180°: The handwheel is installed in the wrong manner. Remove the handwheel and re-install it with turned by 180°. Deviation by approximately 120°: The screw No. 1 of needle driving cam ⑤ is incorrectly positioned.

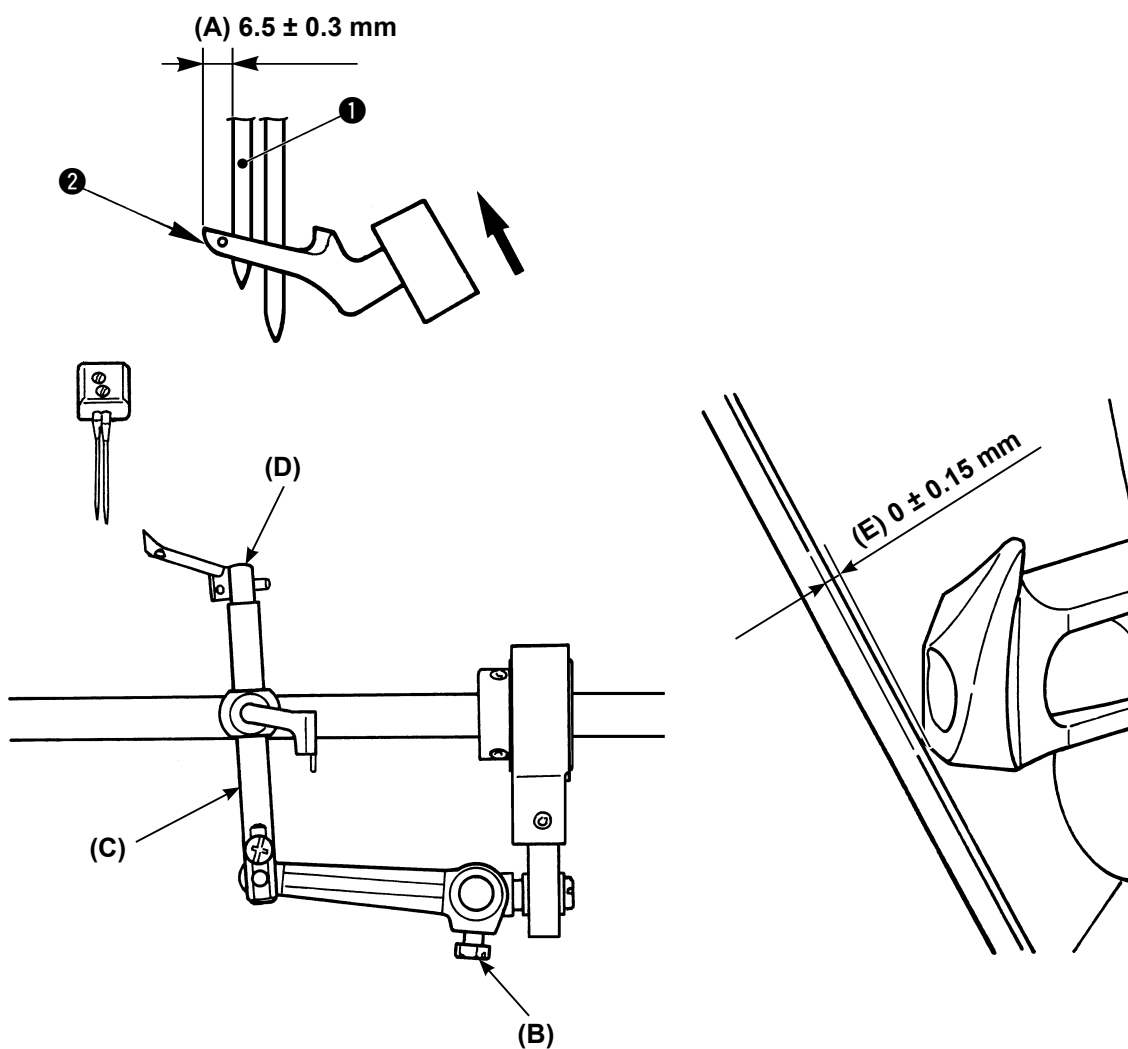
9. Projecting amount of the upper looper



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ① Left hand needle ② Upper looper * Check that distance (projecting amount) A from the left end of left hand needle ① to the blade point of upper looper ② is 6.5 ± 0.3 mm when the upper looper is in its leftmost position. How to perform adjustment: ☐ Bring upper looper ② to its leftmost position. ☐ Loosen setscrew (B) of the upper looper arm. ☐ Adjust the projecting amount of the upper looper by moving upper looper siding shaft (C) up and down. ☐ Tighten setscrew (B) of the upper looper arm. ☐ Turn the handwheel to check whether the rotation torque is increased. ☐ Loosen screw (D). Adjust so that a clearance of 0 ± 0.15 mm (E) is provided between the needle and the upper looper.	If the standard adjustment value is exceeded, stitch skipping can be caused.

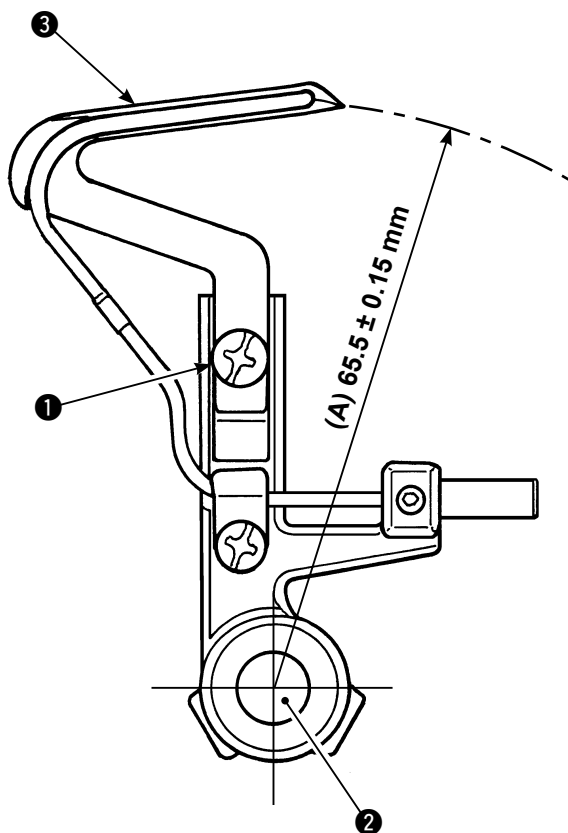
10. Radius of the lower looper



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Lower looper setscrew ❷ Lower looper shaft ❸ Lower looper * Check that the distance from the center of the lower looper shaft ❷ to the lower blade point is 65.5 ± 0.15 mm (A). How to perform adjustment: ☐ Loosen the setscrew ❶ of the lower looper ❸. ☐ Move the lower looper ❸ up or down to make adjustment. ☐ Retighten the setscrew ❶.	

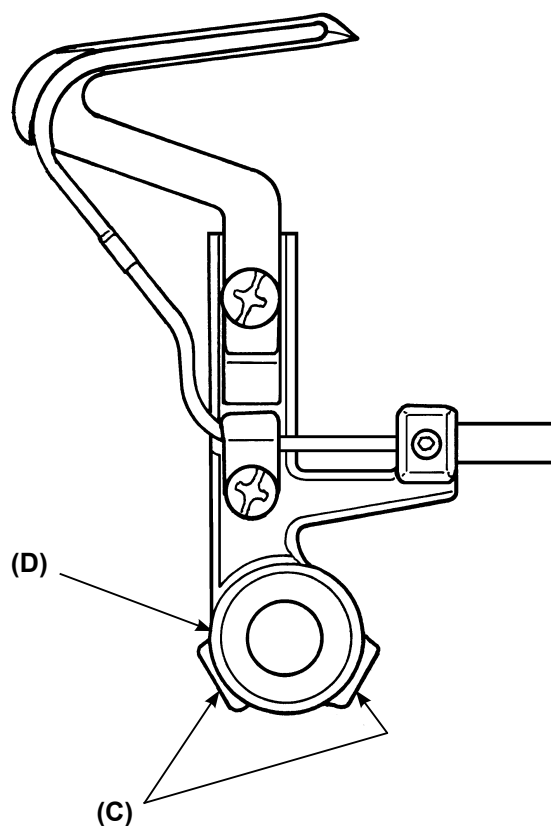
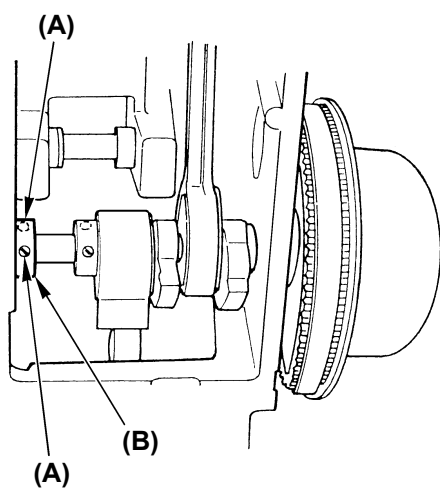
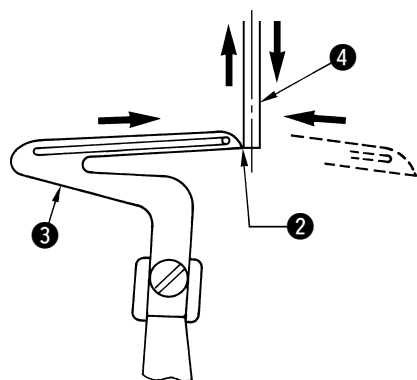
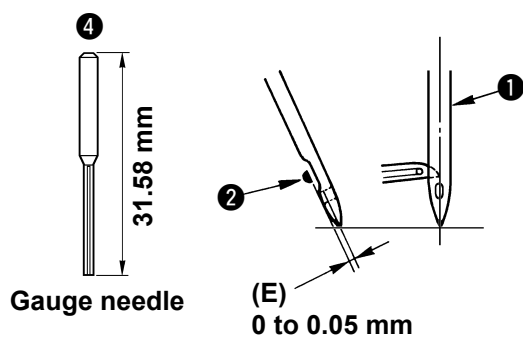
11. Adjustment of the loop lift



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Right hand needle ❷ Lower looper blade point ❸ Lower looper ❹ Gauge needle (Cut the top end of needle for use. L = 31.58 mm) * Check that the clearance between the needle ❶ and the lower looper blade point ❷ is 0 to 0.05 mm (E). * Turn the handwheel and check that the lower looper blade point ❷ meets with the left side of gauge needle ❹ when lower looper ❸ goes and back. (Insert the gauge needle into the needle hole for the right needle.) How to perform adjustment: ○ Loosen the setscrews (C) of the lower looper support arm (D). ○ Move the lower looper support arm (D) back or forth and adjust the clearance between the needle ❶ and the lower looper blade point ❷. ○ Retighten the setscrews (C). ○ Adjustment of the lower looper cam timing. · Loosen the setscrews (A) of the lower looper cam (B). · Check the position of the lower looper blade point ❷ and the gauge needle ❹ while turning the lower looper cam (B). Change the position of the cam little by little so that the left side of gauge needle ❹ can meet with the lower looper blade point ❷ on both ways of going and back. · Retighten the setscrews (A).	If the clearance between the needle and the lower looper is larger than the standard adjustment value, needle thread skipping can be caused. If the clearance between the needle and the lower looper is smaller than the standard adjustment value, the needle comes in contact with the looper, resulting in needle breakage or needle thread skipping can be caused. In addition, the looper blade point can be damaged, resulting in thread fraying and thread breakage.

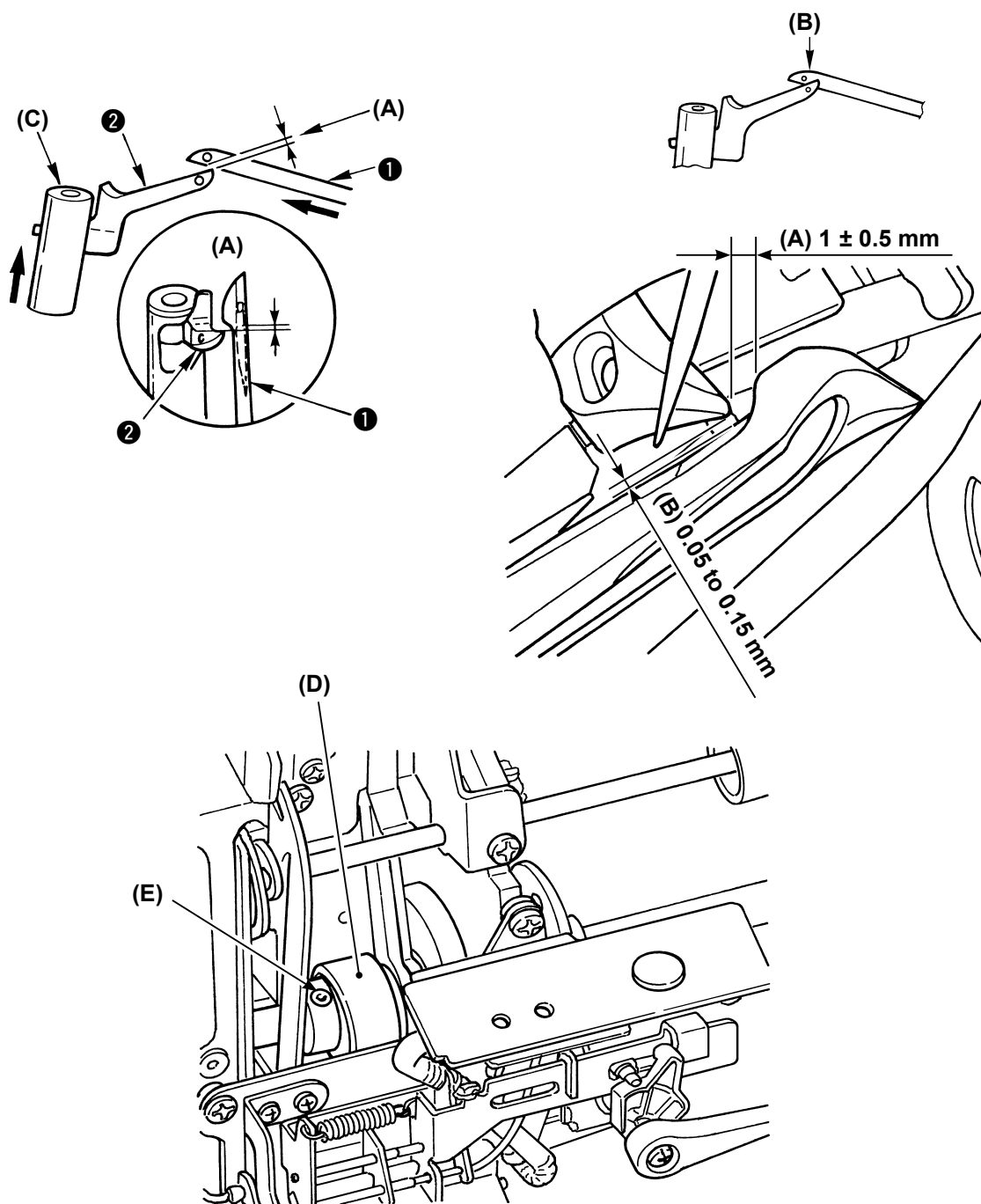
12. Timing between upper and lower looper



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Lower looper ❷ Upper looper * Check that the clearance between the projecting part of the lower looper ❶ and the blade point of the upper looper ❷ is 1 ± 0.5 mm (A) when the upper looper goes up and the upper looper blade point meets the lower looper. * Check that the front-to-back clearance between the upper looper blade point and the lower looper ❶ is 0.05 to 0.15 mm (B). How to perform adjustment: ☐ Loosen the setscrews (E) of the upper looper cam. ☐ Rotate the upper looper cam (D) to make adjustment (A). ☐ Retighten the setscrews (E). ☐ Loosen the setscrew (C) of the upper looper ❷. ☐ Move the upper looper ❷ front back to make adjustment (B). ☐ Retighten the setscrew (C).	If the clearance is larger than the standard adjustment value, stitch skipping can be caused. If the clearance is smaller than the standard adjustment value, the relevant parts can come in contact with each other, resulting in abnormal noise and abrasion.

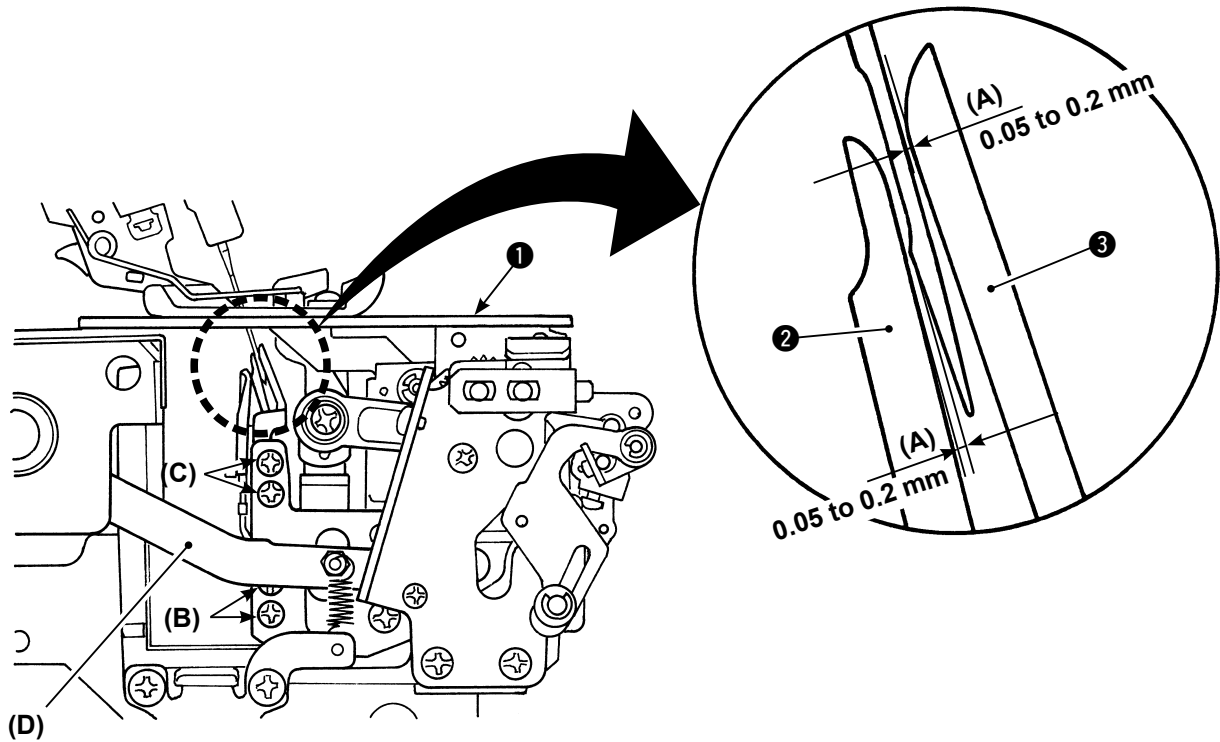
13. Installation of the needle guards



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate ❷ Rear movable needle guard ❸ Front needle guard * Check that the clearance between the needle and the front needle guard and that between the needle and the rear movable needle guard are respectively 0.05 mm to 0.2 mm (A). How to perform adjustment: ○ If the knife driving rod (D) is in its lower position (as shown in the figure), operate the knife changeover lever to lower the knife. ○ Set the needle bar in its lowest position of the stroke. ○ Loosen the setscrews (B) of the rear movable needle guard ❷. ○ Move the rear needle guard ❷ to make adjustment. ○ Retighten the setscrews (B). ○ Loosen the setscrews (C) of the front needle guard ❸. ○ Move the front needle guard ❸ to make adjustment. ○ Retighten the setscrews (C).	○ Clearance between front needle guard ❸ and the needle: · If this clearance is larger than the standard adjustment value.... The looper blade point and the needle come in contact with each other, resulting in needle breakage and blade point breakage. · If this clearance is smaller than the standard adjustment Needle bending and stitch skipping can be caused. ○ Clearance between rear movable needle guard ❷ and the needle: · If this clearance is larger than the standard adjustment value.... The needle can sway resulting in stitch skipping. · If this clearance is smaller than the standard adjustment The needle can be caught between the both needle guards to cause the needle guards to wear out and to be damaged by the needle.

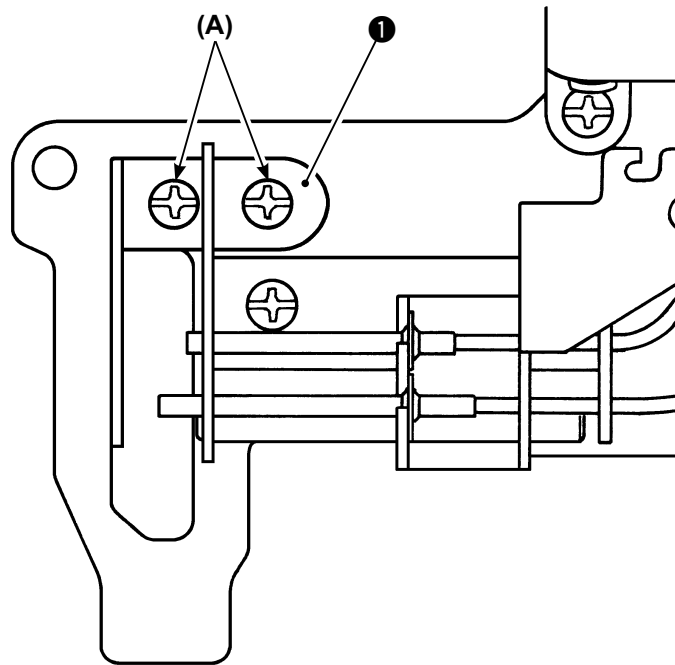
14. Adjusting the looper thread take-up



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Looper thread take-up thread guide * The standard position of the looper thread take-up is the center of the slot. How to perform adjustment: ☐ Loosen the setscrews (A). ☐ Move thread guide ❶ to the right and left. ☐ Tighten screw (A). In this state, operate the looper threader while preventing the pipe from interfering with the thread guide.	☐ If the thread guide is moved to the right, the amount of slack of the looper thread will be reduced. ☐ If the thread guide is moved to the left, the amount of slack of the looper thread will be increased.

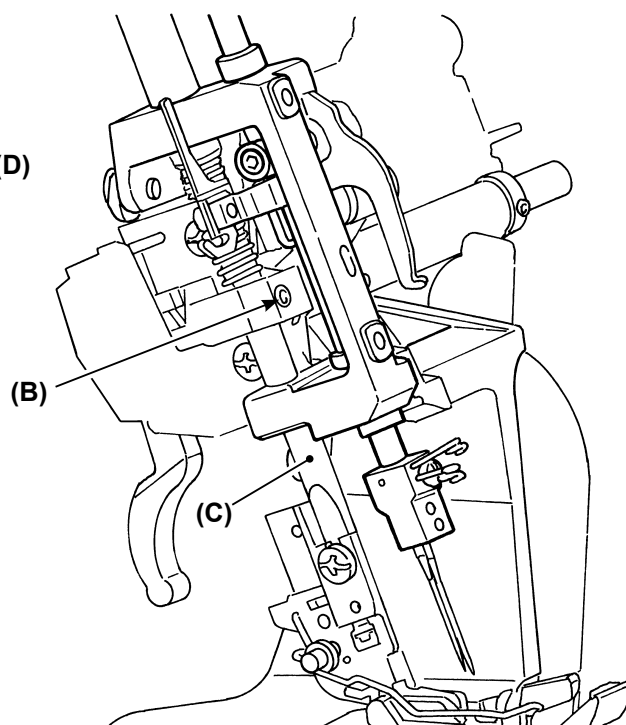
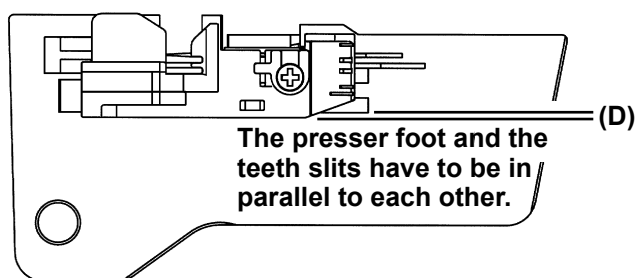
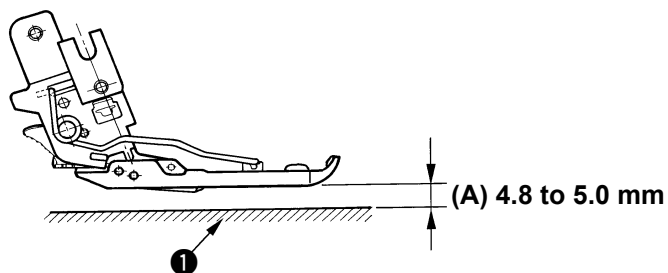
15. Height and lateral position of the presser foot



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate * Raise the presser foot using the lifting lever and check that the distance between the throat plate surface and the presser foot sole is 4.8 to 5.0 mm (A). * Check that the presser foot is parallel to the feed dog slot (D) in the throat plate ❶. How to perform adjustment: ○ Raise the presser foot by lifting the lever. ○ Loosen the setscrew (B) of the presser bar guide bracket. ○ Move the presser bar (C) up or down and turn it to make adjustment. ○ Retighten the setscrew (B).	If the height of the presser foot is excessively high, the needle threader cannot enter the presser foot when the presser foot is raised. If the height of the presser foot is inadequate, operability such as the ease of material setting can be affected. If the presser foot is not in parallel to the teeth slits, irregular stitches can be caused.

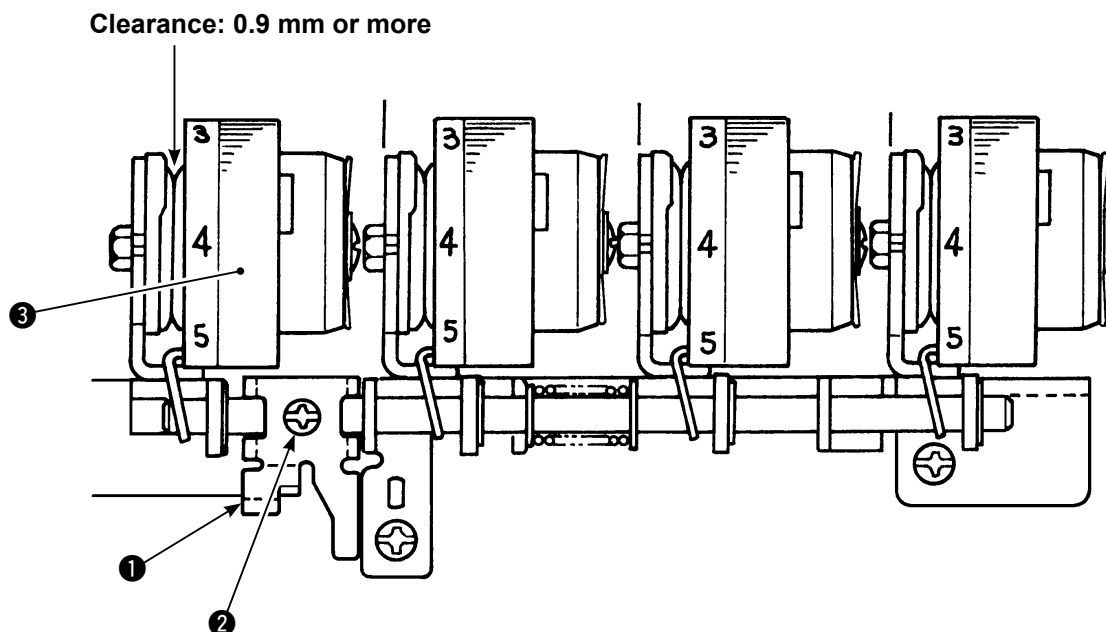
16. Adjusting the floating of the disk of the thread tension controller



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Tension release actuating bracket ❷ Setscrew ❸ Thread tension adj. knob * Lift the presser foot. Set the thread tension adjustment knob at "4". At this time, check that the needle thread (left needle thread) tension is released. * Check that a clearance of 0.9 mm or more is provided between the needle thread (left needle thread) tension disks (clearance between two disks). How to perform adjustment: ☐ Loosen the setscrew ❷ of the tension release actuating bracket ❶. ☐ Move the tension release actuating bracket ❶ left or right to perform adjustment. ☐ Retighten the setscrew ❷.	If the releasing amount of the disks is inadequate, thick thread cannot pass between them smoothly.

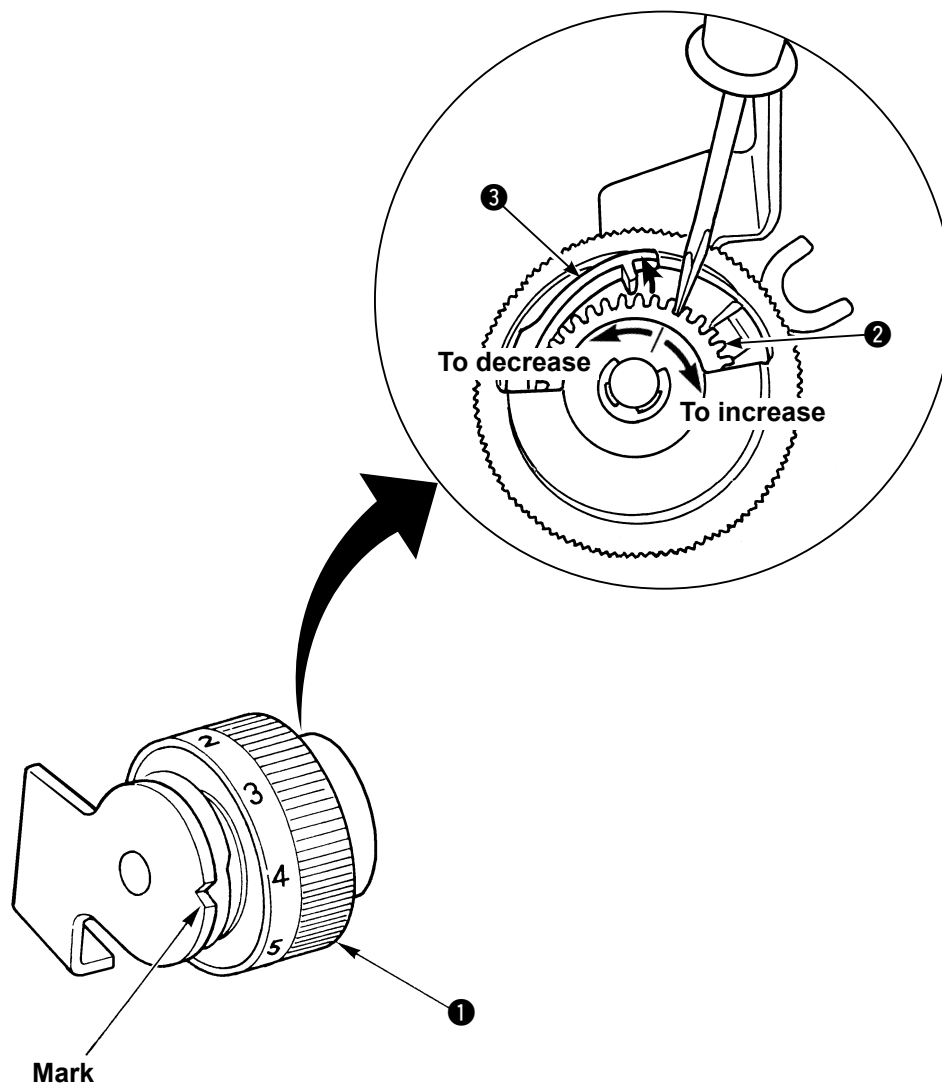
17. Adjusting the tension of the thread tension controller



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment										
Checking items: ❶ Thread tension adj. knob ❷ Thread tension gear * Using Junior Spun thread #90, check that the thread tensions are the numeric values shown below. (Scale mark on the knob "4") Standard tension table <table><tr><th></th><th>Left-hand needle thread</th><th>Right-hand needle thread</th><th>Upper looper thread</th><th>Lower looper thread</th></tr><tr><td>Scale mark on the knob "4"</td><td>0.39±0.05N (40±5g)</td><td>0.15±0.03N (15±3g)</td><td>0.11±0.03N (11±3g)</td><td>0.10±0.05N (10±5g)</td></tr></table> How to perform adjustment: ○ Set thread tension adjustment knob ❶ at scale mark "4" (position of the mark on the left side). ○ Lift the thread tension gear fixing claw ❸. Adjust the thread tension by moving thread tension gear ❷ with a Phillips screwdriver. The tension is increased by turning the gear clockwise. It is decreased by turning the gear counterclockwise. Caution: If thread tension gear fixing claw ❸ is lifted excessively, the claw can break.		Left-hand needle thread	Right-hand needle thread	Upper looper thread	Lower looper thread	Scale mark on the knob "4"	0.39±0.05N (40±5g)	0.15±0.03N (15±3g)	0.11±0.03N (11±3g)	0.10±0.05N (10±5g)	If the thread tension deviates from the standard adjustment value, sewing failures can be caused when carrying out sewing with the thread tension described in the Instruction Manual. If the thread tension is excessively high, thread breakage can be caused.
	Left-hand needle thread	Right-hand needle thread	Upper looper thread	Lower looper thread							
Scale mark on the knob "4"	0.39±0.05N (40±5g)	0.15±0.03N (15±3g)	0.11±0.03N (11±3g)	0.10±0.05N (10±5g)							

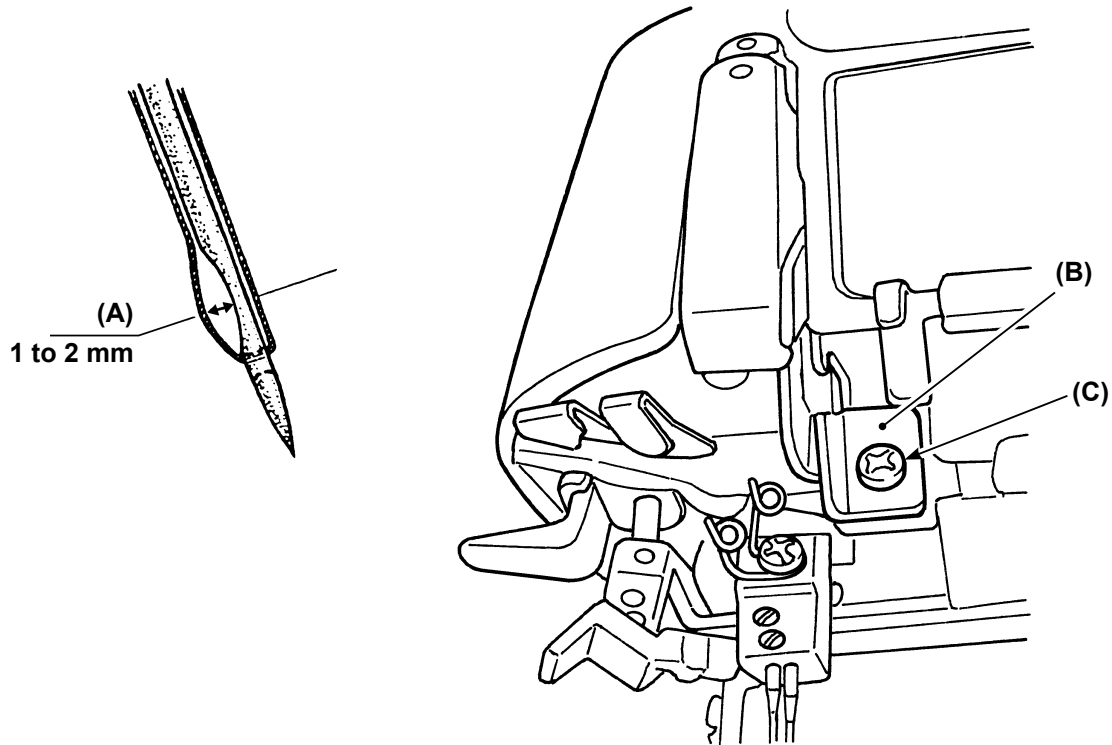
18. Position of the needle thread take-up thread guide



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: * Check that the size of the needle thread loop is 1 to 2 mm (A) when the lower looper blade point meets the needle center when sewing two plies of cotton broad cloth with No. 90 spun thread. How to perform adjustment: ○ Loosen the setscrew (C) of the needle thread guide (B). ○ Move the needle thread guide (B) up or down to make adjustment. (The higher the needle thread take-up guide is raised, the larger the needle thread loops will become.) ○ Retighten the setscrew (C). (As the needle thread guide is moved up, the needle thread loop will be larger.)	If the needle thread loops are excessively large, the loops will fall down to disable the lower looper to scoop the loops, causing stitch skipping. In addition, the looper blade point prongs the needle thread, resulting in needle thread fraying. (In particular, filament thread which is likely to untwine) If the needle thread loops are excessively small, stitch skipping and needle thread fraying can be caused. (In particular, the material which cannot be fed smoothly)

19. Tension of the belt

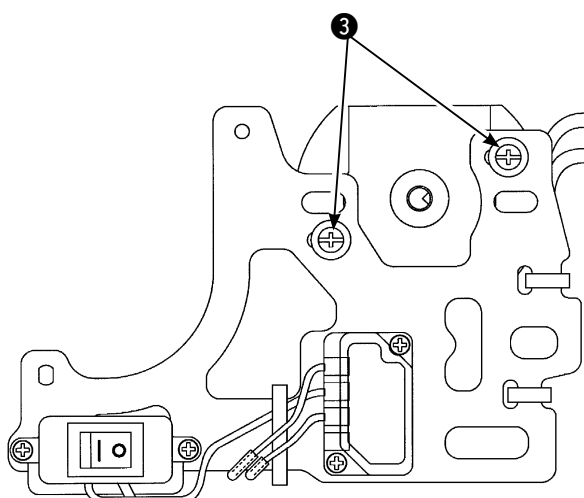
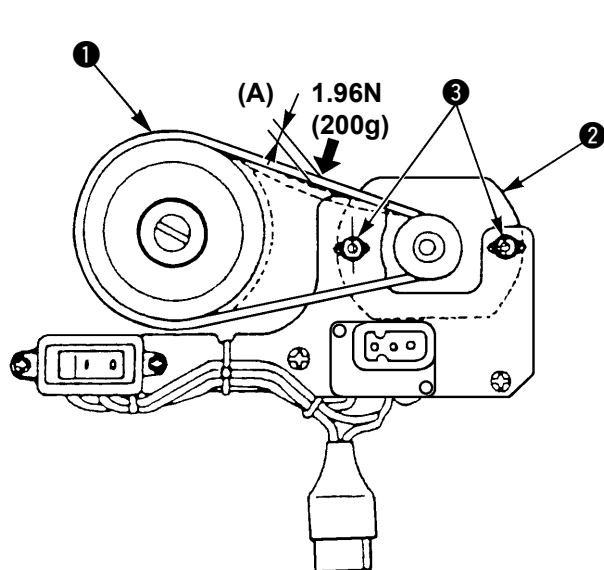


WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment

- * The motor comes in three different types according to the destination. They are different in the screw locations, etc. However, the standard adjustment value is same.



Motor for CE

Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Belt ❷ Motor ❸ Nuts * Sewing speed: Up to 1,350 ± 150 sti/min * The belt should slacken approx. 3 to 4 mm under a 200 gr. load (A). How to perform adjustment: ☐ Loosen the nuts ❸ of the motor ❷. ☐ Carry out adjustment by moving motor ❷. ☐ Retighten the nuts ❸. * For the motor destined for CE (export in general), nut ❸ is substituted by a cross slot screw. In addition, the location of the screw is different from the other motors. However, the standard adjustment value is same.	When the tension is excessively increased, the load applied to the motor is increased to cause reduction in the number of revolutions and motor heating. When the tension is excessively decreased, irregular rotation due to the belt teeth skipping or abnormal noise due to the belt vibration can occur.

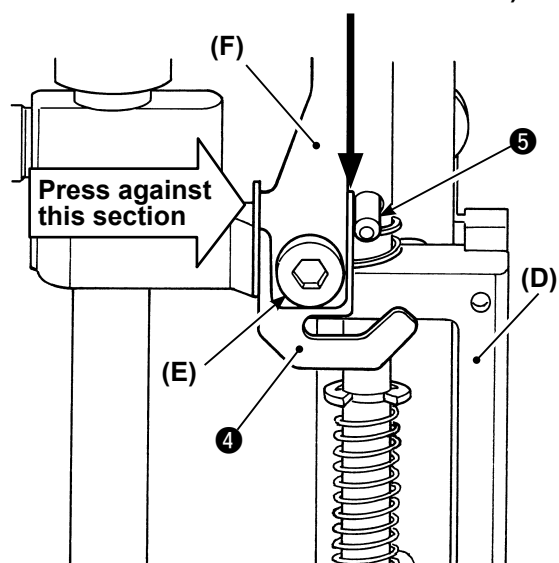
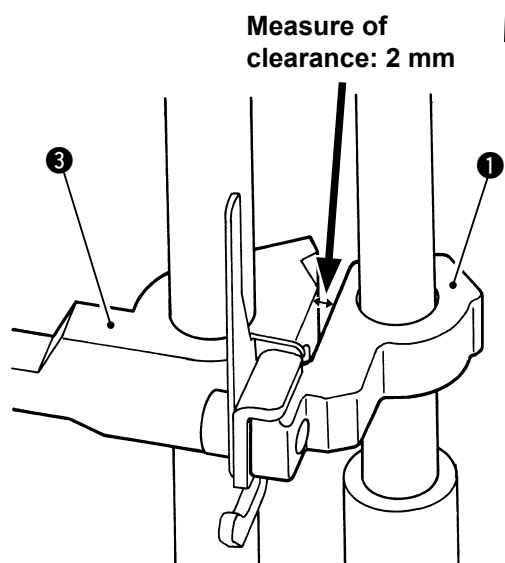
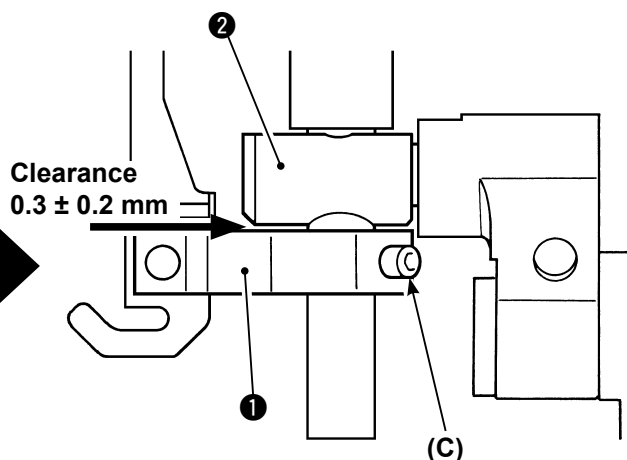
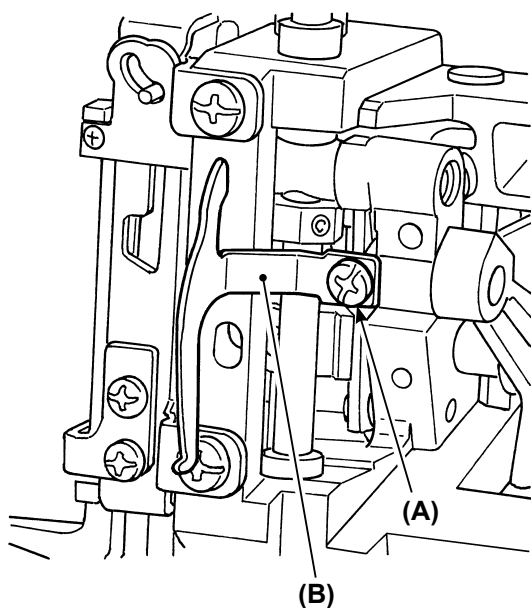
20. Adjusting the needle bar connection guide of the needle threader



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Needle bar connection guide ❷ Needle bar connection ❸ Presser bar connection ❹ Needle bar connection guide plate ❺ Needle threader shaft pin * A clearance of 0.3 ± 0.2 mm has to be provided between needle bar connection ❷ and needle bar connection guide ❶. * There has to be a clearance between presser bar connection ❸ and needle bar connection guide ❶. (Measure of clearance: 2 mm) * There has to be a clearance between needle bar connection guide plate ❹ and needle threader shaft pin ❺. How to perform adjustment: Caution: Adjust the height of the needle first. When the needle bar connection is adjusted, the adjustment value of the needle bar height changes due to the change in positional relation between the needle bar connection and the needle eyelet. As a result, the hook fails to enter the needle eyelet. 1. Remove screw (A). Remove needle thread take-up (B). 2. Loosen screw (C). Adjust the position of needle bar connection guide ❶. The distance from the guide to needle bar connection ❷ is 0.3 ± 0.2 mm. At this time, fix the needle bar connection at the position where it does not interfere with presser bar connection ❸. A measure of the clearance provided between needle bar connection guide ❶ and needle bar connection ❸ is 2 mm. 3. Tighten screw (C). 4. Adjust the lateral position of connection guide plate ❹. Move operation lever (D) and observe the clearance provided between connection guide plate ❹ and needle threader shaft pin ❺. Loosen screw (E) and carry out adjustment by moving the connection guide plate to the right and left. At this time, press stopper (F) against the section shown with an arrow. Reference: In the case the hook is to be adjusted in the next clause, the needle bar connection guide has to be re-adjusted after the adjustment of the hook. The needle bar connection guide, in this clause, should be adjusted so that it does not interfere with the needle bar connection. 5. After the completion of the adjustment, install needle thread take-up (B) with screw (A).	If the clearance exceeds the standard adjustment value, the needle bar connection guide can interfere with the frame or other parts, causing abnormal noise and breakage. If there is no clearance between the needle bar connection guide and the presser bar connection, the needle threader cannot operate since those two parts interfere with each other.

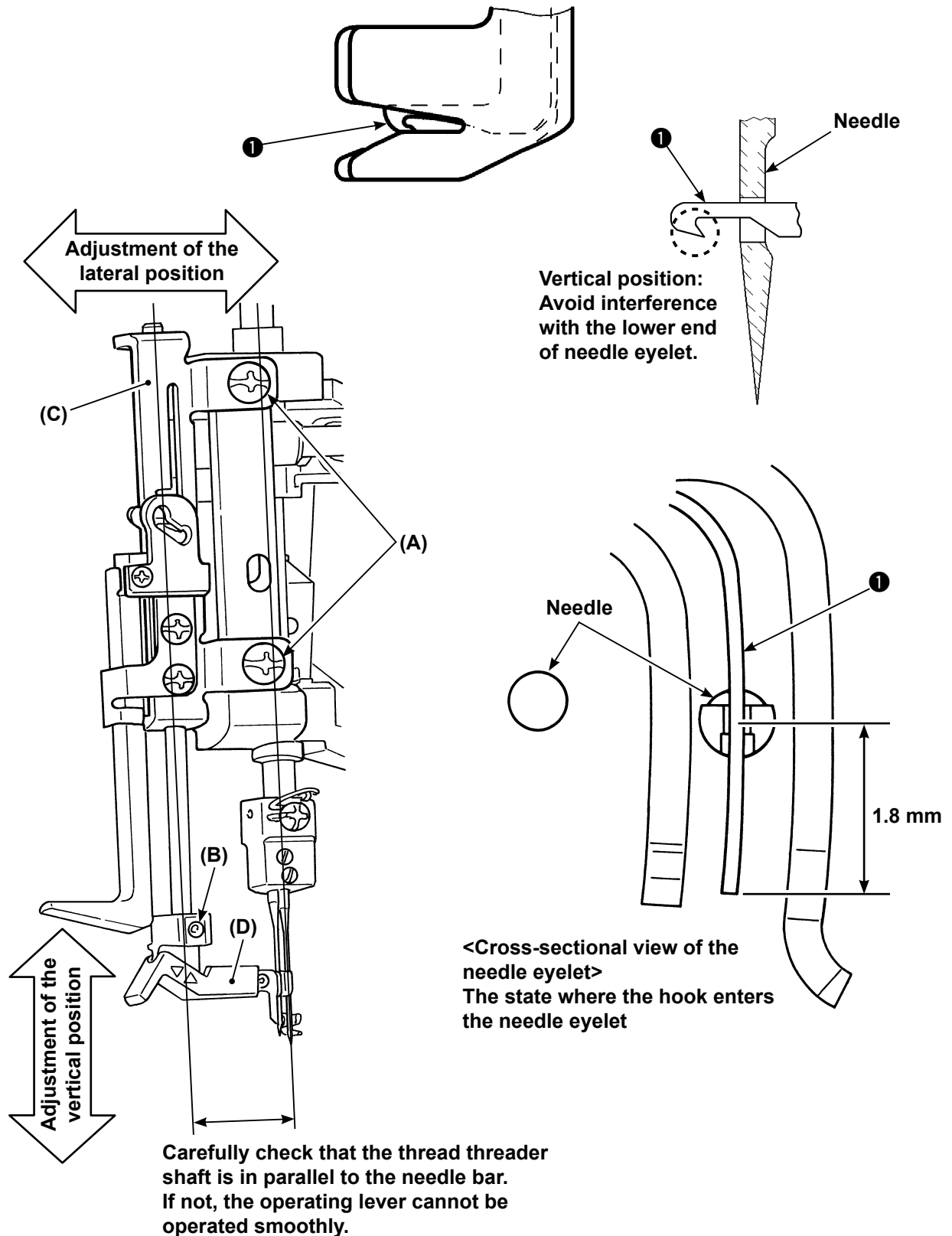
21. Adjusting the needle threader hook



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ① Hook * Hook ① has no vertical/lateral bend. It has to be equidistantly spaced from the right and left guide plates. * Check that hook ① enters the eyelets in the right and left needles to thread the needles. (The needle threader supports needle counts #1 to #4.) * Check whether the lower end of hook ① interferes with the needle. If there is interference between them and cannot be corrected, replace the needle threader with a new one. How to perform adjustment: 1. Loosen the setscrews (A) and (B). 2. Adjust the lateral position of the hook by moving base (C) to the right and left. Move the operating lever downward until the threading position is reached. Adjust the lateral position of base (C) by turning hook asm. (D) so that the hook enters the right needle eyelet. Then, fix base by tightening screw (A). At this time, fix the threading shaft so that it is in parallel to the needle bar. (It is accepted to visually check the parallelism.) 3. Adjust the vertical position of hook asm. (D) by moving it in axial direction. Bring the hook to the position where the lower end of the hook does not interfere with the lower end of the needle eyelet and fix the hook at that position with screw (B). The jutting amount of the hook from the needle eyelet is 1.8 mm. After the adjustment, lift the operating lever. At this time, check whether the hook does not interfere with the presser bar and the needle clamp.	If the threader shaft is not in parallel to the needle bar, the operating resistance of the operating lever can increase when the lever is lifted from the threading position. If the jutting amount of the hook from the needle eyelet deviates substantially from the standard adjustment value, interference between the hook and the needle clamp and needle bar can occur.

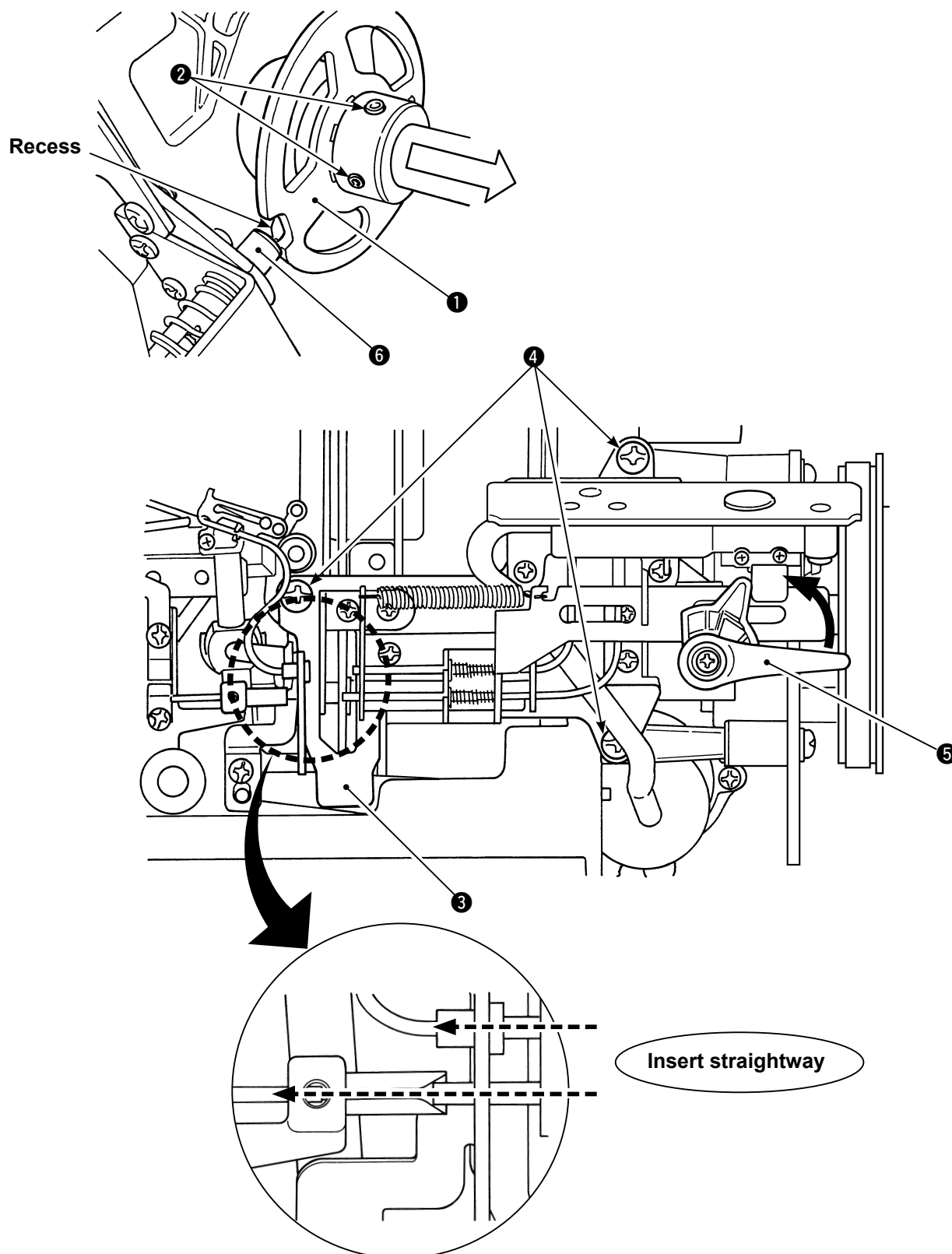
22. Adjusting the looper threader timing



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Positioning collar ❷ Positioning collar screw ❸ Thread inlet bracket ❹ Thread inlet bracket screw ❺ Changeover lever ❻ Positioning shaft How to perform adjustment: Adjustment is to be carried out with the cover removed. It is recommended to attach changeover lever ❺ to facilitate adjustment. 1. Loosen two screws ❷ of positioning collar ❶. Move positioning collar ❶ so that it can be detached from positioning shaft ❻. 2. Loosen three screws ❹ of thread inlet bracket ❸. Turn the pulley to the angle at which the looper is brought to the position shown in the figure. (So that the pipe and the pipe cradle bushing are aligned in a straight line) Move the lever to the threading state. At this time, adjust the position of thread inlet bracket ❸ and the angle of the main shaft so that the pipe enters the pushing straightway. * Deviation as large as approximately 0.5 mm is permitted. 3. Tighten thread inlet bracket screw ❹. 4. Keeping the threading state, fit positioning shaft ❻ in the recess in positioning collar ❶ and fix them with positioning collar screw ❷.  WARNING : If you check that the looper can be threaded in this state, carefully check that the controller does not malfunction.	Threading failure due to incorrect positioning of the thread inlet bracket can be caused.

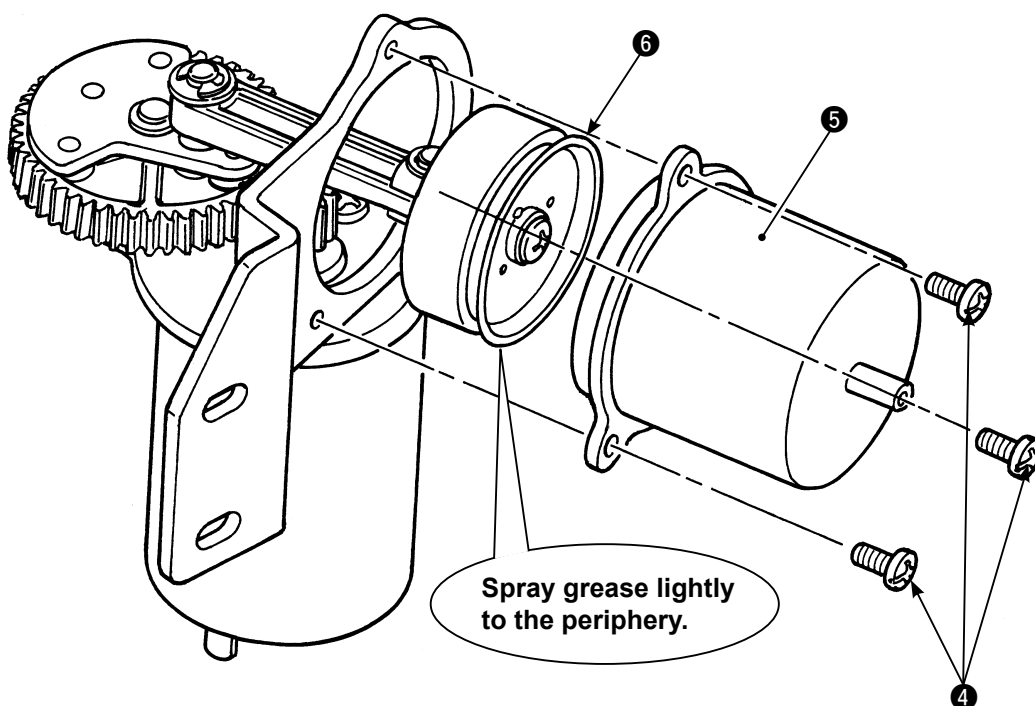
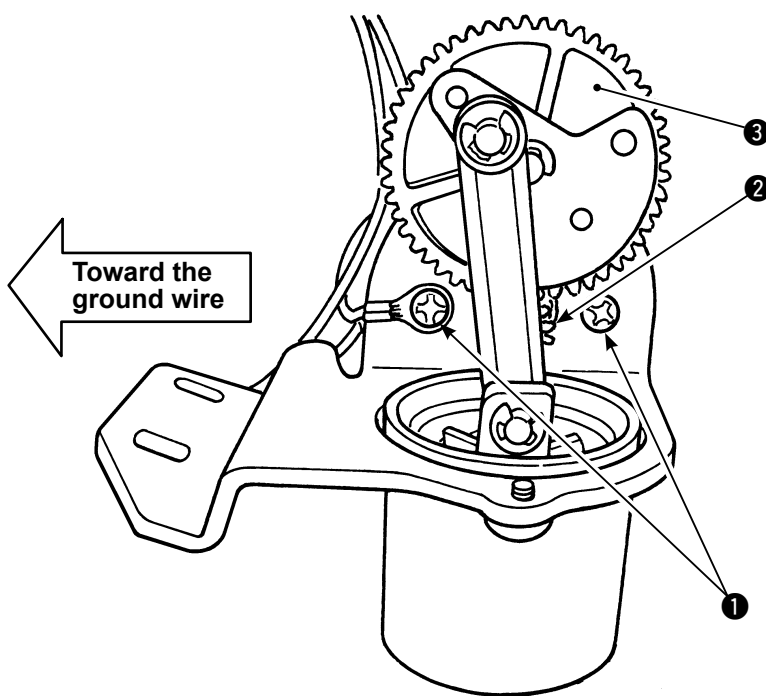
23. Adjusting the pump unit



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Motor screw ❷ Motor gear ❸ Piston gear ❹ Cylinder screw ❺ Cylinder ❻ Piston lip * The backlash between motor gear ❷ and piston gear ❸ is approximately 0 to 0.5 mm. * Check to be sure that piston lip ❻ and cylinder ❺ smoothly slide. If not, abnormal noise can be produced. How to perform adjustment: Adjusting the backlash - Loosen motor screw ❶. - Press motor gear ❷ against piston gear ❸. Adjust the backlash between them to approximately 0 to 0.5 mm. Carefully prevent a partial increase in torque which can occur in the case the motor is excessively pressed against the piston gear. - Tighten motor screw ❶. At this time, place the ground wire so that its orientation is as shown in the figure. Applying grease to the piston lip - Remove three cylinder screws ❹. Remove cylinder ❺. - Spray grease lightly to the periphery of piston lip ❻. If the lip periphery has a damage, replace it with a new one. - Mount cylinder ❺ with three cylinder screws ❹.	If the backlash is larger than the standard adjustment value, abnormal noise can be caused. Increase in torque which occur the case the motor is excessively pressed against the piston gear can result in threading failure and motor heating. If the piston lip periphery is not applied with an adequate amount of grease, an increase in the operating resistance of the cylinder can increase causes the air pressure reduction, resulting in threading failure. If the amount of grease is excessive, grease can be mixed into the air in the cylinder to cause thread to be stained with grease.

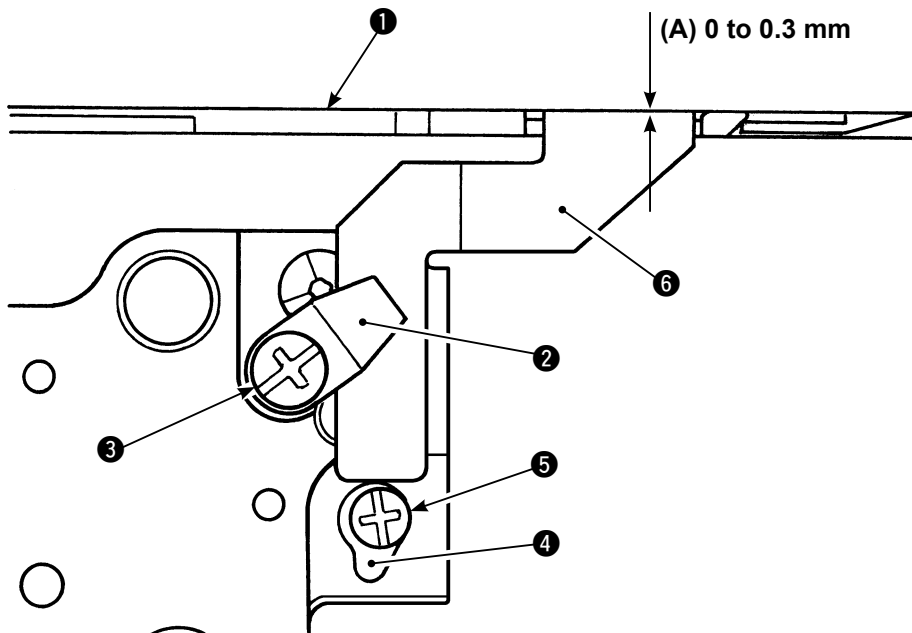
24. Position of the lower knife



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate ❷ Lower knife presser plate ❸ Setscrew ❹ Lower knife support plate ❺ Setscrew ❻ Lower knife * Check that the distance between throat plate ❶ surface and lower knife ❻ is 0 - 0.3 mm (A). How to perform adjustment: ☐ Loosen the setscrews of the lower knife presser plate and the support plate (❸, ❺). ☐ Move the lower knife ❻ up or down to make adjustment. ☐ Move the lower knife support plate ❹ to the underside of the lower knife ❻. ☐ Retighten the setscrews ❸ and ❺.	If the knife juts out from the throat plate, the material can be caught by the jugged section to cause irregular feed, needle breakage and material puckering. If the knife position is too low, the material jamming and material cutting failure can occur.

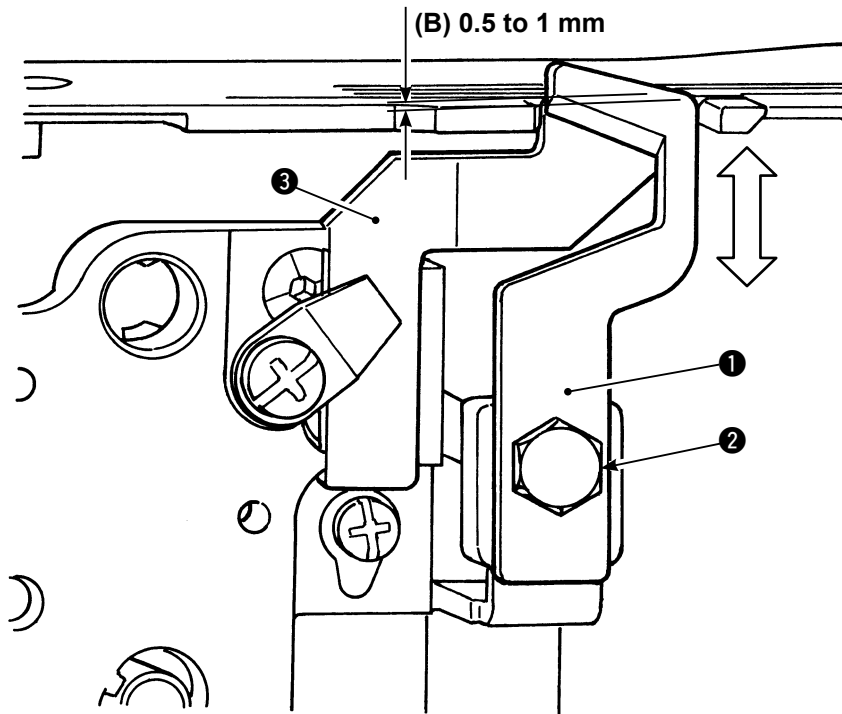
25. Engagement of the upper knife with the lower knife



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Upper knife ❷ Upper knife screw ❸ Lower knife * Check the engagement of the upper knife ❶ with the lower knife ❸ when the upper knife ❶ is in the lowest position. · Vertical engagement: 0.5 to 1 mm (B). How to perform adjustment: ○ Set the upper knife ❶ in its lowest position. ○ Loosen upper knife screw ❷. Adjust the position of upper knife ❶ by moving it up and down. ○ Tighten upper knife screw ❷.	If the depth of mesh of the knives is smaller than the standard adjustment value, material cutting failure can occur. If the depth of mesh of the knives is larger than the standard adjustment value, the correct timing between the knives and the feed cannot be achieved to cause irregular feed and material puckering.

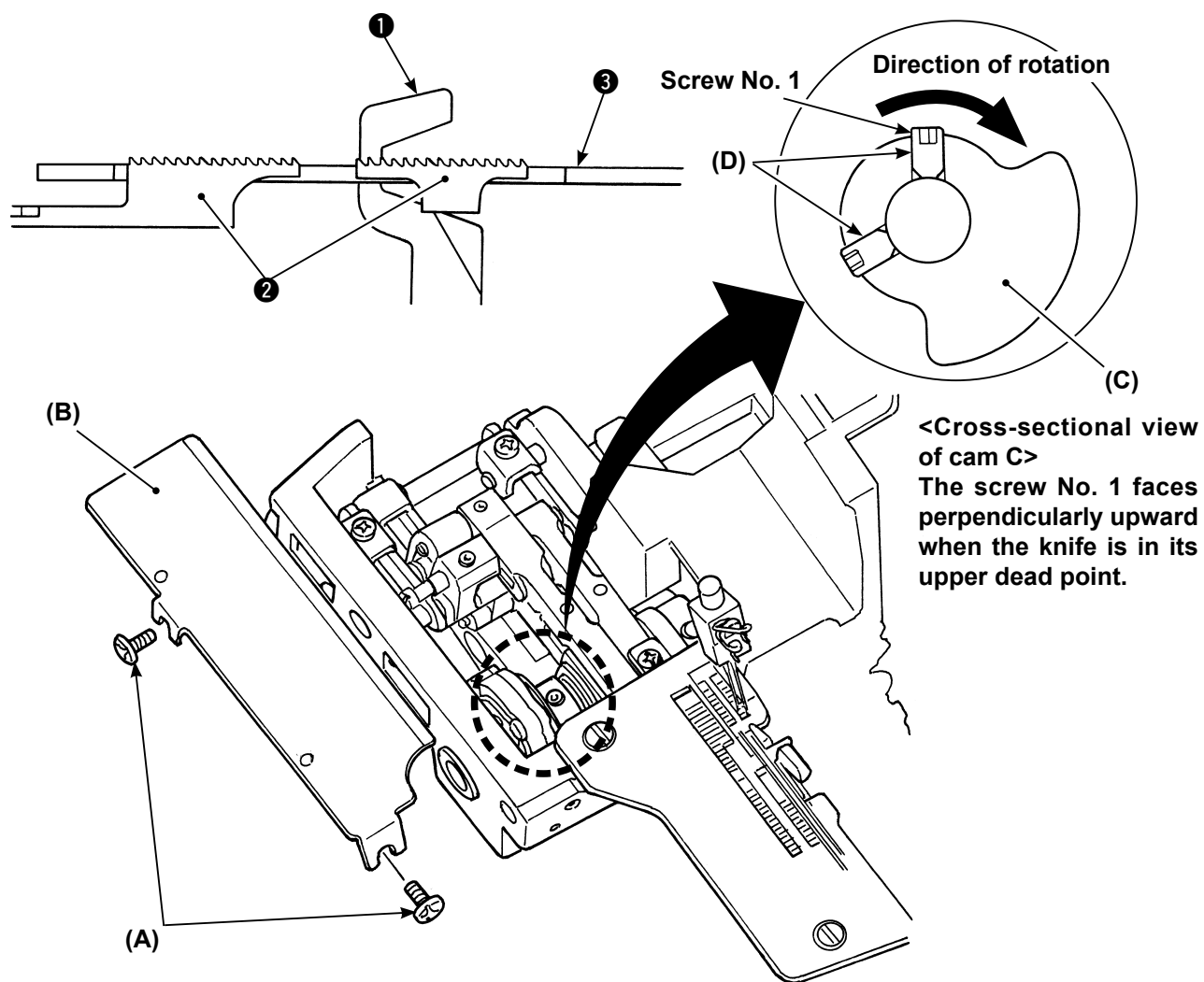
26. Adjusting the timing of the upper knife



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Upper knife ❷ Feed dog ❸ Throat plate * The standard timing is achieved in the case the upper knife is brought to its upper dead point when the feed dog starts coming down. (The upper dead point of the needle bar is approximately aligned with the upper dead point of the knife.) (The knife cuts the material when the feed is positioned below the throat plate.) How to perform adjustment: ○ Loosen screws (A). Remove cover (B). ○ Loosen screws (D) of cam (C). ○ Turn the main shaft while keeping the screw No. 1 of the cam held perpendicularly until the position where feed dog starts coming down is reached. When that position is reached, tighten screws (D). (The upper dead point of the needle is approximately aligned with the upper dead point of the knife.) ○ Turn the mains shaft to check that the shaft can be turned smoothly. ○ Install cover (B) with screws (A). Tighten the screw on the side of the cover first.	If the knife timing is not correct, the material can be fed while the upper knife is descending to cause puckering and irregular feed.

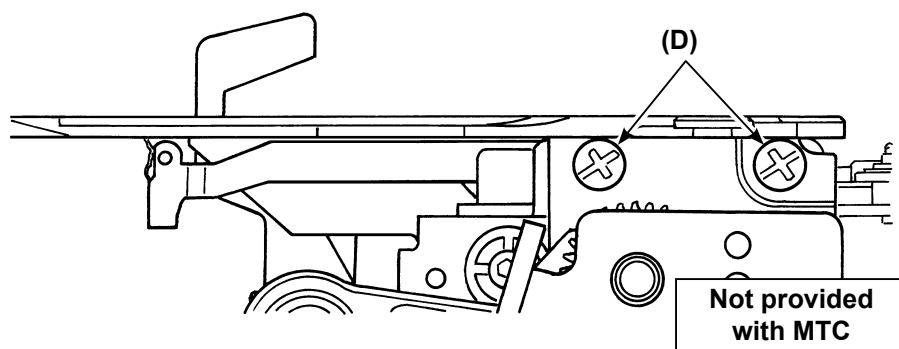
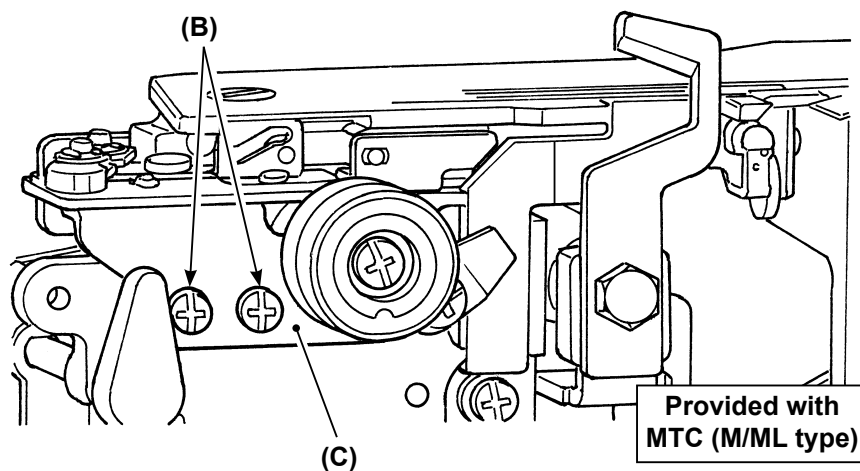
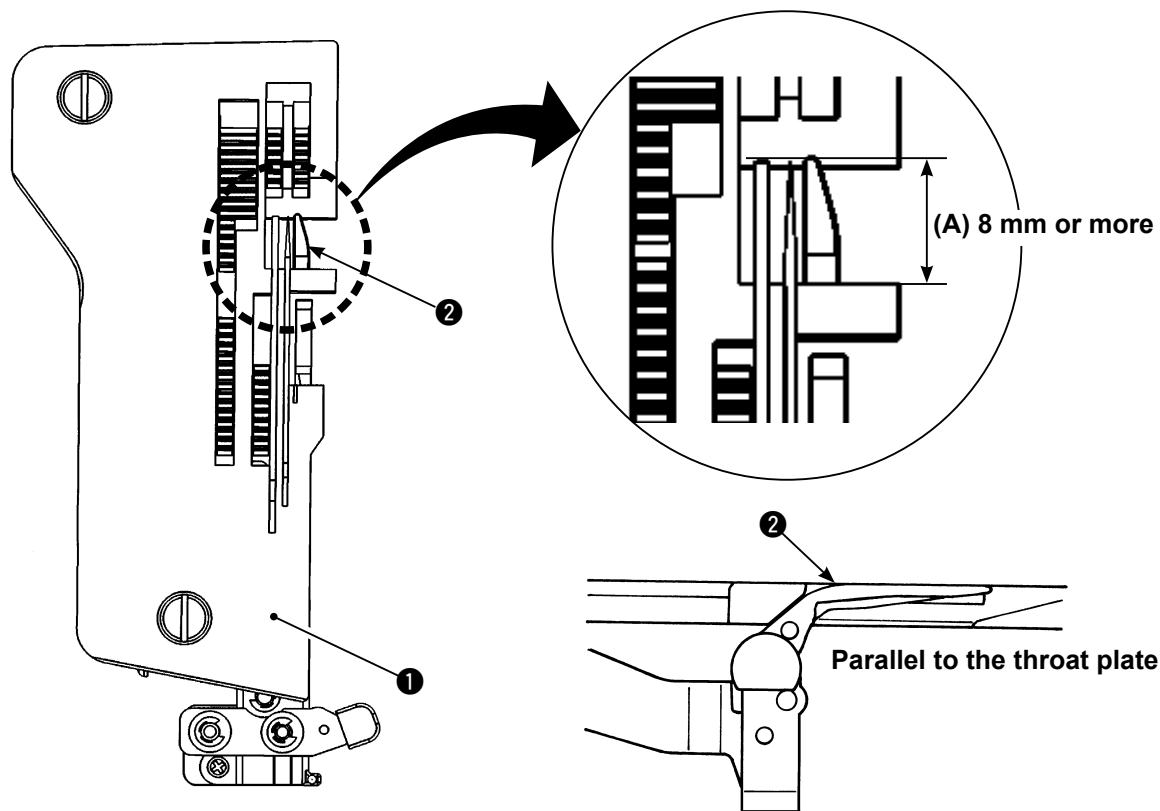
27. Adjusting the thread sliding segment



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate ❷ Thread sliding segment * The distance from the throat plate to the tip of the thread sliding segment is to be 8 mm or more (A). * The throat plate and the thread sliding segment have to be in parallel to each other. How to perform adjustment: The adjusting procedure (location of the screw) differs depending on with/without the MTC. [MO-1000M and ML (provided with the MTC)] ☐ Loosen the setscrews (B). ☐ Move thread sliding segment ❷ forward. In this state, adjust the position of the thread sliding segment by moving base (C) so that it is spaced 8 mm or more (A) from and is in parallel to throat plate ❶. ☐ Retighten the setscrews (B). [MO-1000 (not provided with the MTC)] ☐ Loosen screws (D) which are located on the opposite side. ☐ Move thread sliding segment ❷ forward. In this state, adjust the position of the thread sliding segment by moving base (C) so that it is spaced 8 mm or more (A) from and is in parallel to throat plate ❶. ☐ Retighten the setscrews (D).	If the thread sliding segment juts out of the throat plate, the material or thread can be caught by the juttred section.

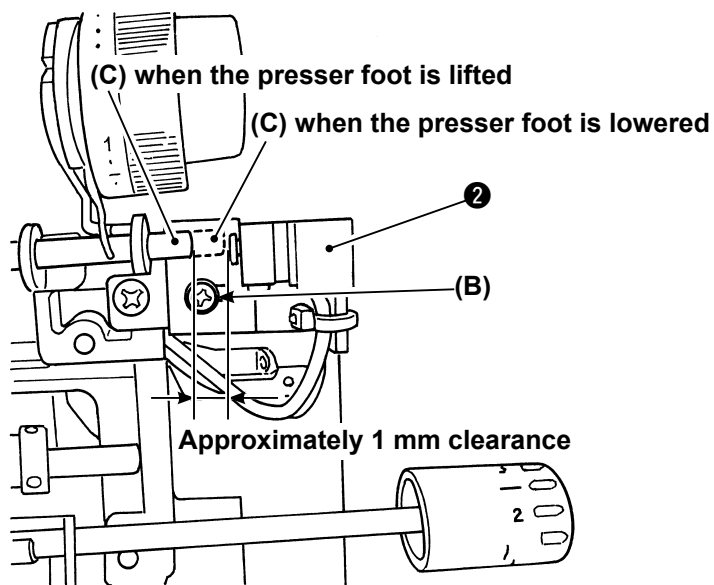
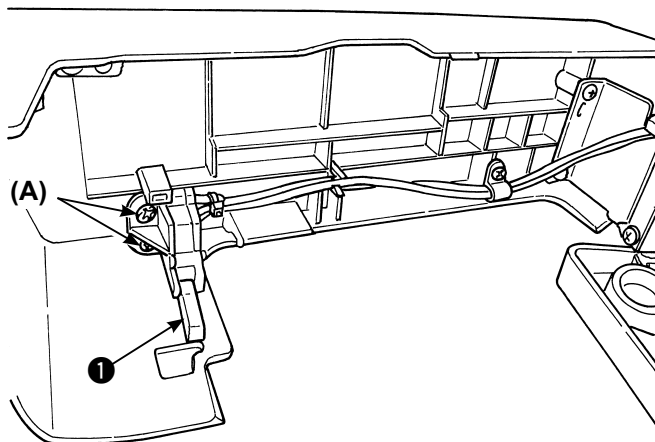
28. Adjusting the safety switch



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Standard adjustment



Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Cloth plate safety switch ❷ Presser foot lifter safety switch * Cloth plate safety switch ❶ has to return smoothly when it is pressed. * Presser foot lifter safety switch ❷ is to have a clearance when the presser foot is lifted. It should be remembered, however, that the presser foot lifter safety switch must not be excessively pressed when the presser foot is lowered. (If excessively pressed, a deformation of the cover, etc. can be caused.) How to perform adjustment: Adjusting the cloth plate switch ○ Loosen the setscrews (A). ○ Install the switch at the center of the slot with lightly pressed. ○ Tighten screw (A). Check to be sure that switch can be smoothly turned ON/OFF. Adjusting the presser foot lifter switch ○ Loosen the setscrews (B). ○ Adjust the presser foot lifter switch ❷ so that a clearance of approximately 1 mm is provided between the switch and the shaft (C) when the presser foot is lifted. ○ After the adjustment, tighten screws (B). Lower the presser foot to check that the shaft (C) does not excessively press the switch ❷.	○ Unexpected operation can occur due to a malfunction of the respective switches. ○ If the presser foot lifter safety switch is excessively pressed, it can break or malfunction.

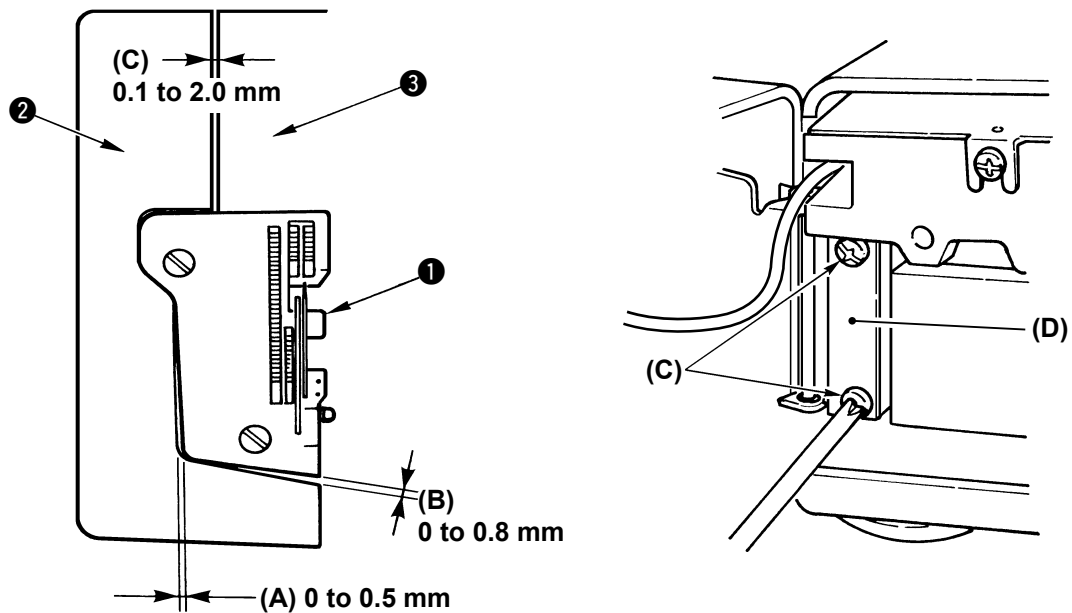
29. Position of the cloth plate



WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

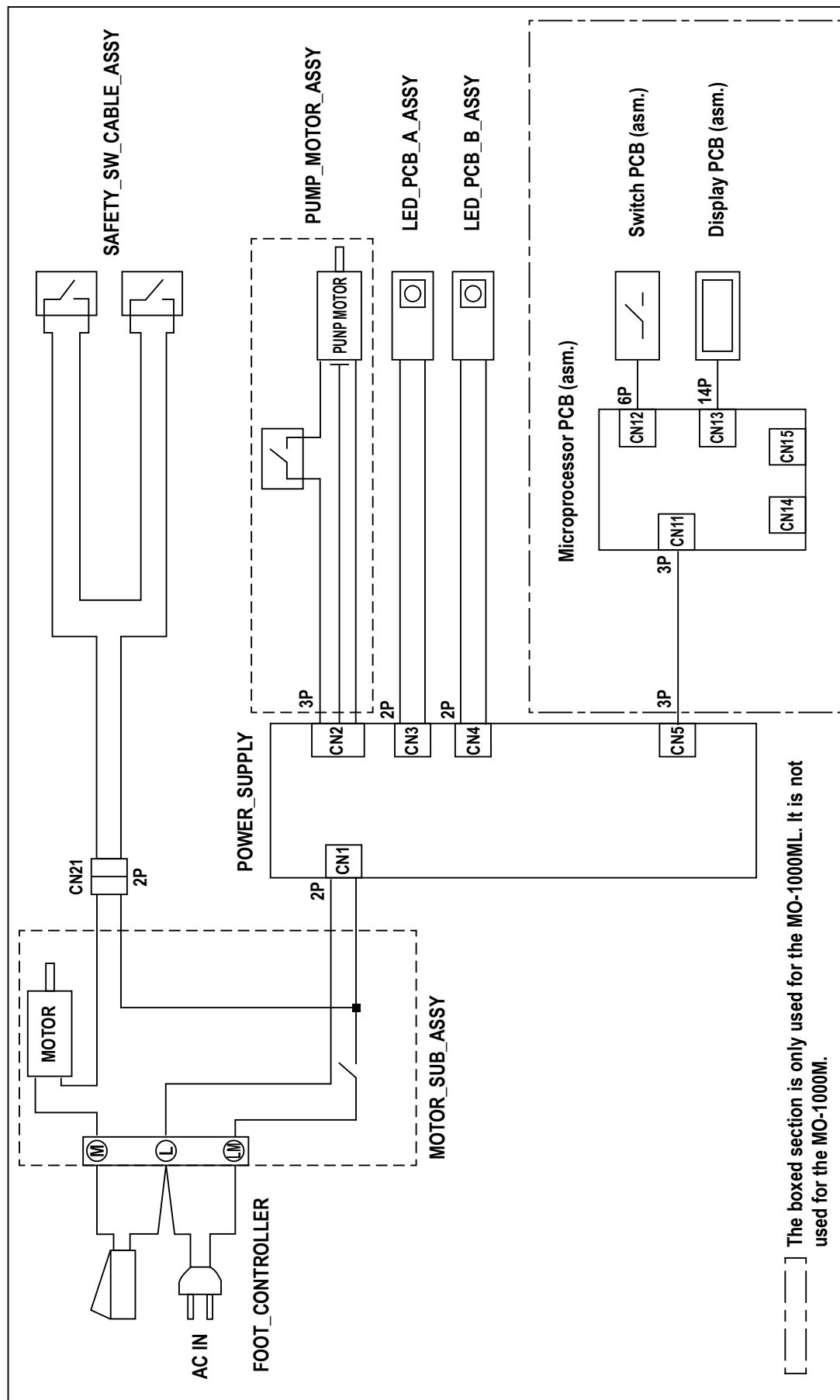
Standard adjustment



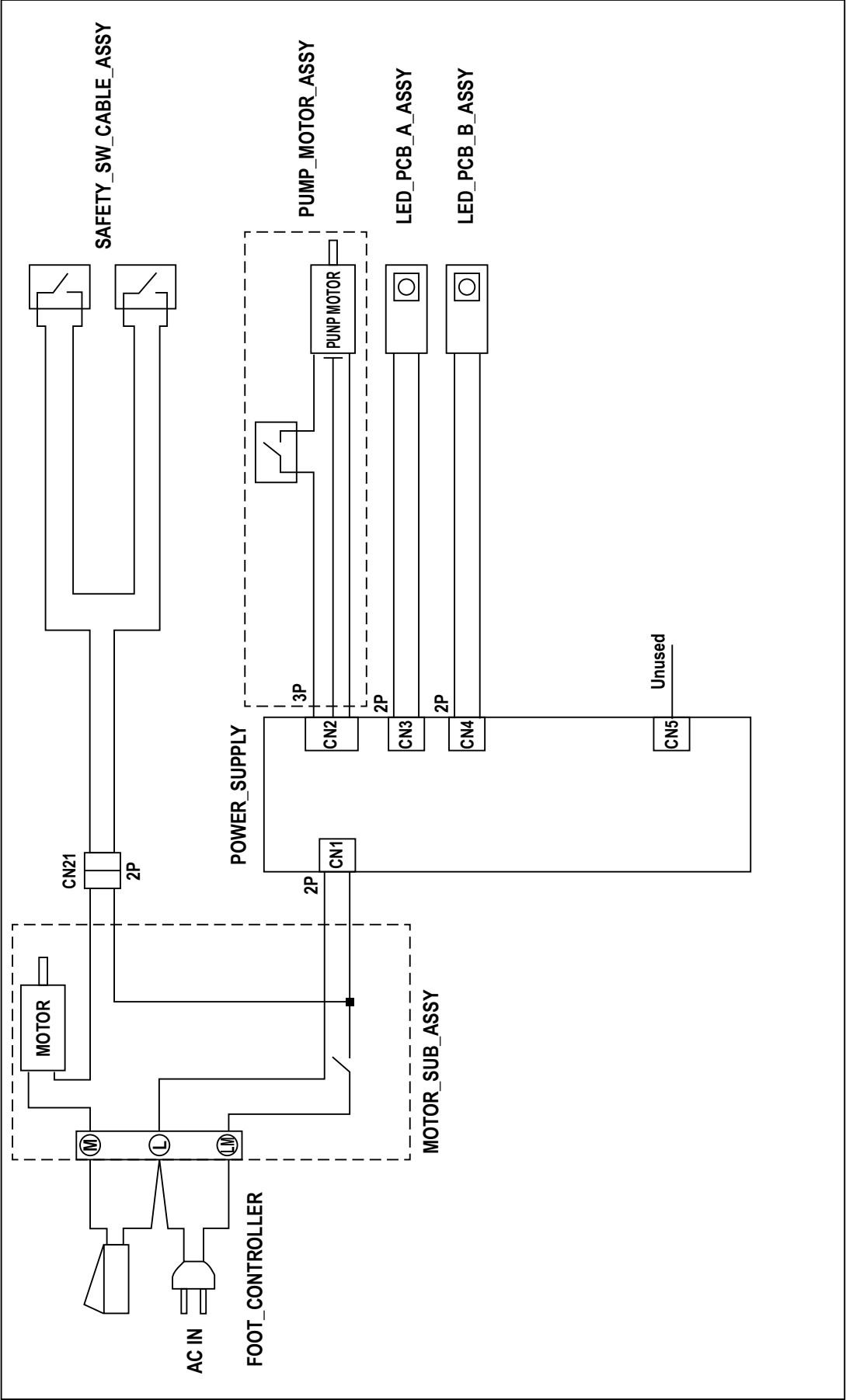
Adjustment Procedure	Results of Improper Adjustment
Checking items: ❶ Throat plate ❷ Cloth plate ❸ Rear cover * Check that the clearance between the cloth plate ❷ and the throat plate ❶ is 0 to 0.5 mm (A) and 0 to 0.8 mm (B). * Check that the clearance between the cloth plate ❷ and the rear cover ❸ is 0.1 to 2.0 mm (C). How to perform adjustment: ○ Loosen the setscrews (C) of the cloth plate hinge (D). ○ Move the cloth plate with the hinge (D) in its correct position. Pass the safety switch cable above the hinge. ○ Retighten the setscrews (C).	○ If there is no clearance between the cloth plate and the throat plate and between the cloth plate and the rear cover, abnormal noise can be produced during operation. ○ Assemble the relevant parts taking care not to allow the safety switch to be caught.

4 CIRCUIT DIAGRAM

For the sewing machines for the Japanese market (MO-1000M, MO-1000ML)



For the sewing machines for overseas market (MO-1000)



5 MAINTENANCE

1. Lubrication

Apply oil to the section (near the upper looper shaft) described in the Instruction Manual.
Before lubrication, remove dust or cloth chips from the section to be applied with oil.

2. Spraying grease

After the disassembly of the section to/in which grease is applied or filled, re-apply or re-fill grease. The recommended grease is as described below:

JUKI Grease A

- Tube (10 g) JUKI part No.: 40006323
- Tube (100 g) JUKI part No.: 23640204

If you do not have a grease pump, it is recommended to fill a plastic oiler with grease or to use a syringe without a needle.

- Syringe specifically for grease application JUKI part No.: GDS01007000

3. Looper threader

Do not lubricate inside the pipe. If the inside of the pipe is contaminated with oil, thread cannot be passed through it.

In addition, thread cannot be passed through the pipe either after having passed a thread absorbed with silicon oil through it.

Should the pipe is lubricated
Remove oil from inside the pipe by passing a thick thread (cotton thread count of which is #20 or smaller) through the pipe. Or, blow away the oil from inside the pipe with high-pressure air. If the thread still cannot be passed smoothly through the pipe, other causes such that the mixture of lint and oil adheres near the pipe joints or thread inlet section should be considered. In such a case, detach the pipe and clean it up with degreaser or the like.

6 TROUBLES AND CORRECTIVE MEASURES

WARNING :

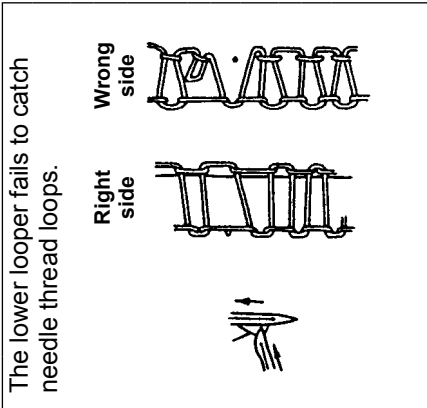


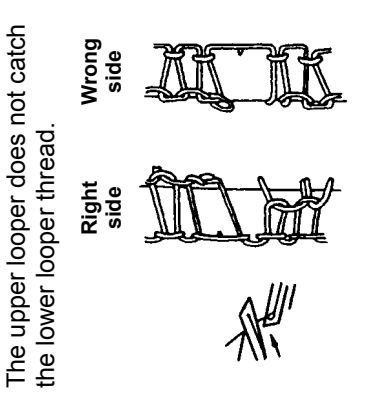
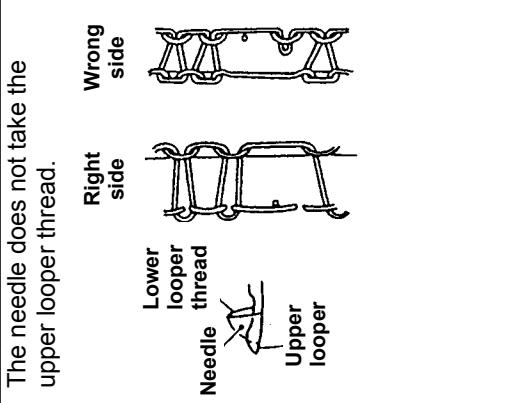
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

Trouble	Case (1)	Case (2)	Check and Corrective measures
1. Needle thread breakage	1-1) Threading	1-A) The thread is entangled with the thread guide, or the machine head has been incorrectly threaded.	Refer to the threading diagram. (Refer to the Instruction Manual)
	1-2) Thread path	2-A) Scratches, burrs or rust on the pawls or needle holes of the throat plate, stitch tongue, lower looper, needle thread take-up, needle thread presser spring, thread guide, or tension discs causes friction.	Remove such scratches, burrs, etc. and perform thread path finishing. Replace major components such as looper, which have been deformed, causing thread breakage.
		2-B) Bend or deformation of the thread path.	Correct the thread path or replace it with a new one.
	1-3) Needle guard	3-A) The needle hits the needle guard intensely, and sharp edges are produced on them, causing thread breakage.	Replace the needle and needle guard if they have worn.
	1-4) Needle	4-A) The needle is too thin for the thread.	Replace the needle by a proper one.
	1-5) Thread	5-A) The thread is weak because of its poor quality.	Replace the thread by one with good quality.
	1-6) Thread tension	6-A) The thread tension is too high.	Reduce the thread tension. Check whether the needle thread take-up guide and needle thread guide are positioned too high, causing such excessive thread tension.
		6-B) The thread tension controller is poorly adjusted.	Adjust the thread tension controller so that the standard thread tension is obtained.
	1-7) Contact	7-A) The lower looper has been improperly positioned and strikes the feed dog or throat plate.	Properly position the lower looper.

Trouble		Case (1)	Case (2)	Check and Corrective measures
2. Looper thread breakage	2-1) Thread path		1-A) Scratches, burrs, rust, etc, on the paw of the throat plate, stitch tongue, looper, looper thread take-up, thread guide, or tension discs causes friction.	Remove such scratches, burrs, etc. and carry out thread path finishing. Replace loopers or other components which have been deformed, causing thread breakage.
			1-B) Burrs and scratches on the end face of the thread path pipe.	Deburr or remove scratches from the end face of the pipe.
			1-C) Scratches on the inside of the pipe.	Pass the thread to the looper. Then, pull the thread by hand to check whether the thread is caught inside the pipe.
	2-1) Adjustment of the looper thread take-up		2-A) The looper thread take-up or thread guide has been improperly positioned, causing excessive thread tension.	Refer to the pertinent Standard Adjustment.
	2-3) Thread tension		3-A) The looper thread tension is too high.	Reduce the tension while checking the tension balance other looper thread.
			3-B) The thread tension controller is poorly adjusted.	Adjust the thread tension controller so that the standard thread tension is obtained.
	3-1) Needle entry		1-A) The needle entry has not been correctly adjusted, and the needle strikes the throat plate or presser foot.	Correct the needle entry.
3. Needle breakage	3-2) Upper looper position		2-A) The upper looper juts out too much or it is too low.	Refer to the pertinent Standard Adjustment.
	3-3) Contact with the looper		3-A) The needle strikes the looper, resulting in needle breakage.	Adjust the looper so that it does not strike the needle.
	3-4) Needle guards		4-A) A needle guard has been improperly positioned, causing the needle point to strike it.	Refer to the pertinent Standard Adjustment.
	3-5) Needle No.		5-A) The needle is too thin for the materials.	Replace the needle with a thicker one.
	3-6) Thread tension		6-A) The thread tension is too high.	Reduce the thread tension.
	3-7) Height of the feed dog or needle		7-A) The feed dog is too high, or the needle is too low, causing the needle to deflect with resultant needle breakage.	Refer to the pertinent Standard Adjustment.

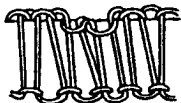
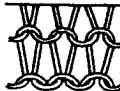
Trouble	Case (1)	Case (2)	Check and Corrective measures
4. The needle point is crushed	4-1) Needle guard	1-A) The needle guard is too low, or its longitudinal position is not correct.	Increase the height of the needle guard. Check the clearance between the needle and needle guard.
5. Stitch skipping (needle thread)	4-2) Contact with the looper	2-A) The clearance between the lower looper and the needle is not correct.	Increase the clearance between the lower looper and the needle.
	5-1) Lower looper	1-A) The blade point has defective shape and does not catch needle thread loops.	Replace the lower looper.
	5-2) Adjustment of the loopers	2-A) The clearance or the amount of return is not correct.	Refer to the pertinent Standard Adjustment.
	5-3) Needle thread presser	3-A) The duration in which the presser holds the needle thread is not correct, and unstable loop result.	If the needle thread presser has excessively deformed due to correction, etc., replace it with a new one.
	5-4) Needle	4-A) The needle is bent or improperly oriented.	Replace the bent needle. Correctly orient and attach the needle.
	5-5) Needle guards	5-A) Incorrect height or clearance prohibits correct guide for the needle. If a needle guard is too high, loops are crushed with consequent stitch skipping.	Refer to the pertinent Standard Adjustment.
	5-6) Height of needle	6-A) The needle has incorrect height and does not properly pick up loops even if the looper has a correct return.	Refer to the pertinent Standard Adjustment.
	5-7) Positioning of the needle thread take-up guide and needle thread guide	7-A) The needle thread take-up draws the thread excessively to produce smaller loops.	Refer to the pertinent Standard Adjustment.
5-8) Threading		8-A) The thread has been entangled with a thread guide. The reading has not been correctly done.	Refer to the threading diagram. (Refer to the Instruction Manual)



Trouble	Case (1)	Case (2)	Check and Corrective measures
6. Lower looper stitches are skipped 	6-1) Threading	1-A) The thread has been entangled with a thread guide. Threading has not been done correctly.	Refer to the threading diagram. (Refer to the Instruction Manual)
	6-2) Upper looper	2-A) The blade point has a bad shape, and fails to catch the loops.	Replace the upper looper with badly deformed blade point.
	6-3) Lower looper	3-A) The clearance between the needle and the back of lower looper are not correct.	Replace the lower looper having a deformed tip.
	6-4) Adjustment of the loopers	4-A) The feed amount of the lower looper, height of the upper looper, or clearance produced at time of crossing of the upper and lower loopers is not correct.	Refer to the pertinent Standard Adjustment.
	6-5) Thread amount	5-A) Too much lower looper thread is fed, giving slack of thread.	Shift the thread guide of the looper thread take-up to the right.
	7-1) Threading	1-A) The thread has been entangled with a thread guide. Threading has not been done correctly.	Refer to the threading diagram. (Refer to the Instruction Manual)
7. Upper looper thread stitches are skipped 	7-2) Needle height	2-A) The needle, if positioned too high or low, may fail to catch the upper looper thread.	Refer to the pertinent Standard Adjustment.
	7-3) Needle	3-A) The needle is bent or crushed, in its point.	Replace the needle. At this time, be sure to eliminate the cause for such needle bend or needle point crush.
	7-4) Adjustment of the upper looper	4-A) The height of the blade point is not correct, making the upper looper unable to properly pass the thread to the needle. The clearance between the needle and the back of the upper looper is not correct.	Refer to the pertinent Standard Adjustment.
	7-5) Amount of thread	5-A) Excessive upper looper thread is fed, producing slack of thread.	Shift the thread guide of the looper thread take-up to the right.
			If the thread tension is not enough, increase it.

Trouble	Case (1)	Case (2)	Check and Corrective measures
8. Faulty chain-off thread	8-1) Position of the throat plate	1-A) The throat plate has been improperly positioned longitudinally, and chain-off thread gets in between the main feed dog and throat plate, causing defective chain-off thread.	Correctly position the throat plate.
	8-2) Feed dog	2-A) The auxiliary feed dog is too high, and interferes with chain-off thread. The auxiliary feed dog is too low.	Refer to the pertinent Standard Adjustment.
		2-B) The auxiliary feed dog has scratch.	Repair or replace the auxiliary feed dog.
	8-3) Adjustment of looper	3-A) Adjustment of loopers for producing chain-off thread without materials requires higher accuracy.	Refer to the pertinent Standard Adjustment.
	8-4) Thread tension	4-A) The thread tension is too low.	Slightly increase the tension.
9. Overlocking needle thread is loose		4-B) The needle thread tension is too high, causing damaged balance with other thread tension.	Check whether the needle thread take-up guide or needle thread guide is positioned too high with consequent excessive needle thread tension. And if so, correct it.
	9-1) Position of the needle thread take-up guide and needle thread guide	1-A) They are positioned too high, and the threadtake-up draws out excessive needle thread.	Refer to the pertinent Standard Adjustment.
	9-2) Thread tension	2-A) The thread tension balance has been disturbed.	Refer to the Standard Adjustment for the looper thread take-up components, and increase the tension if necessary.
	9-3) Needle	3-A) The needle is too thin for the thread used.	Replace it with a proper one.

* Provided that no chain-off trouble occurred when sewing operation was done with materials set on the machine.

Trouble		Case (1)	Case (2)	Check and Corrective measures
10. Irregular stitches		10-1) Looper thread tension	1-A) The upper and lower looper thread tensions are not enough.	Slightly increase the upper and lower looper thread tensions.
The knotting position of the upper and lower looper threads varies as shown below. 		10-2) Knife width	2-A) The knife width is unsuited for the overedging width.	Make the overedging width slightly smaller than that given for the knife width.
		10-3) Thread path	3-A) Scratches on the thread path catch thread.	Check the thread path for scratches.
			3-B) The thread path parts have become loose (Instable).	Fix them with adhesive agent.
			3-C) The looper pipe is not securely inserted.	Insert the looper pipe until it will go no further.
		10-4) Presser foot	4-A) The presser foot cones into contact unevenly with the throat plate and feed dogs and tends to meander.	Make the presser foot come into contact with them evenly.
11. The looper thread bulges out		10-5) Thread stand	5-A) Thread dose not come out smoothly.	Make the thread come out smoothly.
		11-1) Knife width	1-A) The knife width is too small for the overedging width.	Use a knife having width suited to the overedging width.
		11-2) Looper thread take-up adjustment	2-A) The looper thread take-up draws out excessive looper thread.	Decrease the radius of the looper thread take-up (left) (reduction in dimension I). Raise the looper thread take-up (right) (increase in distance O).
		12-1) Knife width	1-A) The knife width is too large for the overedging width.	Use a knife having width suited to the overedging width.
12. Looper thread bite		13-1) Threading	1-A) Re-threading after thread breakage, etc. has been done erroneously.	Refer to the threading diagram. (Refer to the Instruction Manual)
13. Knotting position is not correct				
Right side  Knots are deflected to the upper looper side.				

Trouble	Case (1)	Case (2)	Check and Corrective measures
14. Uneven material feed	14-1) Presser foot pressure	1-A) The presser foot pressure is too high.	Reduce the presser foot pressure except for the uneven material feed due to puckering.
	14-2) Presser foot	2-A) The hinge is too stiff.	Remove the stiffness provided no hinge play is produced. Replace the presser foot with a new one.
		2-B) Scratches on or defective finish on the presserfoot sole produce friction between the presser foot and materials.	Buff the presser foot sole for good surface finish.
	14-3) Tilt of feed dogs	3-A) The front is too high.	Make the front down. However, be sure to align the differential feed dog with the main feed dog.
	14-4) Height of feed dogs	4-A) A different in level exists between the main feed dog and differential feed dog.	Eliminate the difference in level.
15. Puckering	14-5) Adjustment of differential feed	5-A) The differential feed has been improperly adjusted.	Provide differential feed suited to the material.
	15-1) Needle	1-A) The needle is too thick.	Use a thin needle as much as possible.
	15-2) Thread	2-A) The thread used is too thick.	Use a thin thread as far as possible.
	15-3) Thread tension	3-A) Both the needle thread and looper thread tensions are too high.	Reduce the both thread tensions to a minimum.
	15-4) Feed dogs	4-A) The leading edge of the feed dog teeth has been rounded off.	Replace the feed dog.
		4-B) A difference in level exists between the main feed dog and differential feed dog.	Eliminate such difference in level.
	15-5) Presser foot pressure	5-A) The presser foot pressure is not high enough, providing poor ironing effect.	Increase the presser foot pressure.
	15-6) Differential feed ratio	6-A) The differential feed ratio has been set for gathering.	Set it for stretching. When stretching lightweight materials, be careful not to cause the presser foot to contact unevenly with the materials.

Trouble	Case (1)	Case (2)	Check and Corrective measures
16. The loop thread cannot be passed.	16-1) Thread path pipe	1-A) The pipe is clogged with dust.	Remove dust with a threader supplied with the machine.
		1-B) Scratches inside the pipe	Pull the thread from the loop by hand to check whether it is caught by any part.
		1-C) The pipe is lubricated due to maloperation.	Pass a thick thread (cotton thread count of which is #20 or lower) through the pipe to remove oil.
		1-D) The piston lip of the pump is applied with an excessive amount of grease. As a result, the grease enters the pipe.	Take the aforementioned corrective measure.
	16-2) The pump pressure is too low. No air flows inside the pump.	2-A) The pump piston does not move smoothly.	Apply a small amount of grease to the periphery of the piston lip. If the piston lip has worn out, replace it with a new one.
17. Faulty needle threader		2-B) The air tube has crushed.	Pull out the tube from the pump. Twist it to correct the bend.
	16-3) The lever does not move if it is operated. (It does not move to the loop side.)	3-A) An extra force is applied to the lever to deform the sheet metal.	Correct the deformed part of the lever, or replace it with a new one.
	17-1) The needle cannot be threaded.	1-A) The hook has bent and lost its lateral center. As a result, the needle threader cannot enter the needle eyelet.	Correct the hook so that it is positioned equidistantly from the right and left needle guide plates. If this corrective measure cannot be taken, replace the needle threader with a new one.
		1-B) The hook radius has increased. As a result, the thread slips off the hook before the needle threader enters the needle eyelet.	Replace the needle threader with a new one.
		1-C) The hook has bent downward and prevents the needle from being passed to the end.	When the hook is correctly positioned, the lower side of the hook is aligned with the lower side of the needle guide plate. If the corrective measure is hard to be taken, replace the needle threader with a new one.



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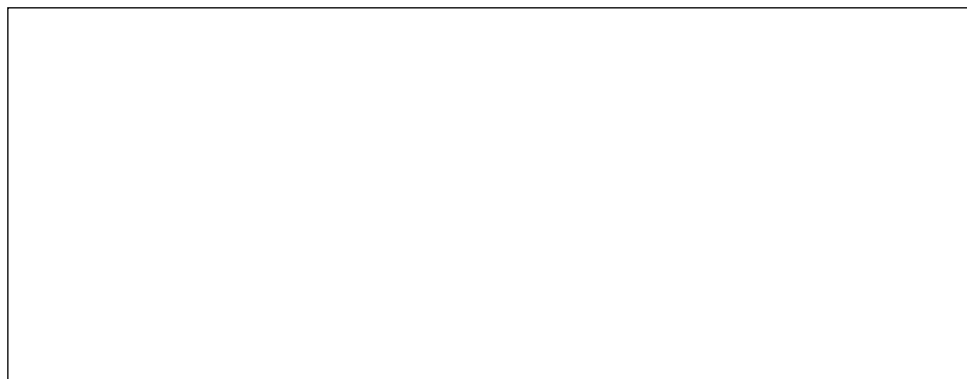
Trouble	Case (1)	Case (2)	Check and Corrective measures
	17-2) The needle threader fails to operate smoothly.	2-A) The base is not in parallel to the needle bar. 2-B) Dust has entered the space between the cam section of the operating lever and the base.	Install the needle threader so that it is in parallel to the needle bar. Remove dust. If the needle threader still fails to operate smoothly, apply grease to the needle threader.
18. Thread sliding segment	18-1) The thread sliding segment fails move forward.	1-A) The sliding section is clogged with dirt.	Remove dirt from the sliding section.
19. Abnormal noise	19-1) Area surrounding the needle bar	1-A) Contact between the needle clamp thread guide and the front cover. 1-B) Contact between the needle and the upper and lower loopers.	Correct the position of the thread guide. If it has deformed, correct the thread guide by bending it. Refer to the pertinent Standard Adjustment.
	19-2) Area surrounding the looper	2-A) Contact between the lower looper and the thread sliding segment. 2-B) The thread sliding segment comes in contact with the front cover due to bending of the 2/3 thread changeover attachment.	Refer to the pertinent Standard Adjustment. Correct the bent section. If it cannot be corrected, replace the thread sliding segment with a new one.
	19-3) Area surrounding the motor	3-A) Belt vibration	Adjust the belt so that it is properly tensed.
	19-4) The pulley produces noise when it is turned.	4-A) The cams assembled in the main shaft run out of oil.	Apply oil. If possible, remove the cams from the main shaft and clean them up and apply grease to them.



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* The description covered in this Service Manual, PartsList is subject to change for improvement of the commodity without notice.