

JUKI®

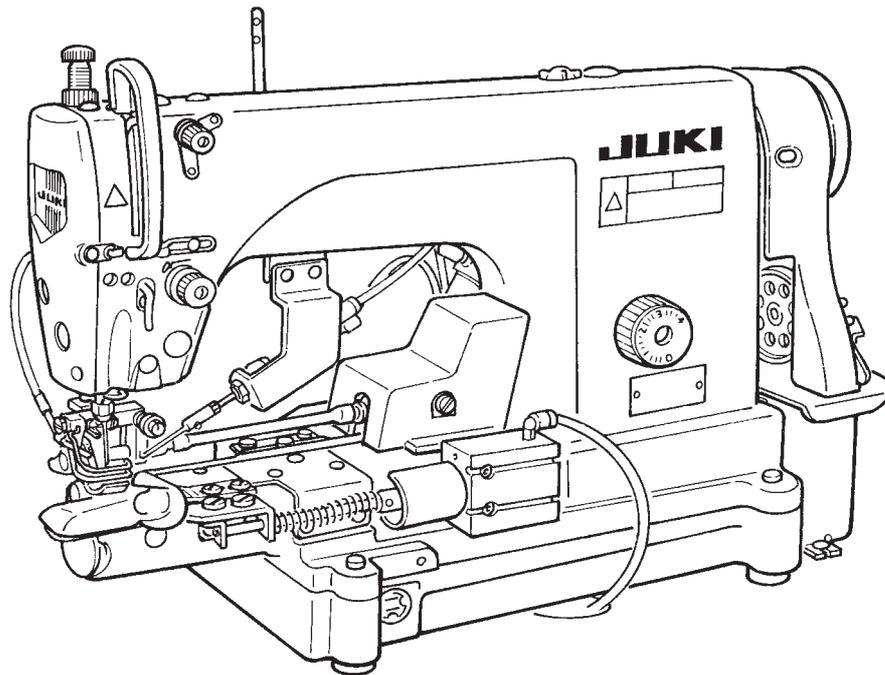
High-speed, 1-needle, Cylinder-bed, Needle-feed, Lockstitch
Machine with Large Hook

DLN-6390

High-speed, 1-needle, Cylinder-bed, Needle-feed, Lockstitch
Machine with Automatic Thread Trimmer and Large Hook

DLN-6390-7

ENGINEER'S MANUAL



40011375
No.E356-00

PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine.

The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual.

It is advisable to use the relevant Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

In addition, for the motor for the sewing machine with thread trimmer, refer to the separate Instruction Manual or Engineer's Manual for the motor. And for the control panel, refer to the Instruction Manual for the control panel.

This manual gives the "Standard Adjustment" on the former page under which the most basic adjustment value is described, and on the latter page "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures are described together with the "Adjustment Procedures".

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1. OUTLINE

(1) Features

- 1) The machine incorporates the mechanical horizontal thread trimming system that has achieved with JUKI lockstitch machines and the thread trimming performance has improved as compared with the conventional models.
- 2) The forced lubrication system of JUKI lockstitch machine system is incorporated in the face plate section and the hook, and the reliability is improved by stable lubrication. In addition, the forced lubrication mechanism by the plunger pump is equipped to the face plate section and the hook section, and oil leakage is prevented at the time of sewing.
- 3) In order to improve the sewing environment and to reduce the operator's burden, vibration and noise at the time of sewing are reduced as compared with the conventional machines.
- 4) Scales are added to the respective adjustment sections of thread tension knob, presser spring regulator, etc., and simplification of adjustment work is considered as well.
- 5) For the roller feed mechanism, the structure of the conventional machine which is highly appreciated in the market has been succeeded, and the smooth feed at step section has been realized.
- 6) Common use of presser foot, roller, hemming binder, pitch changeover gear, etc. with the conventional machines is attempted, and the exchangeability of gauges is secured.
- 7) A thread trimming blow device is equipped as standard and thread trimming failure due to the thread trimming section clogged with dust is prevented.
- 8) The stepless dial adjustment system is incorporated for the adjustment of needle feed amounts, and the needle feed amounts can be adjusted without using tools.
- 9) Workability in the process of sewing thick denim or multi-layered sections is improved since the needle bar stroke is 35 mm and max. 14 mm of the lift of the roller is secured.

(2) Specifications

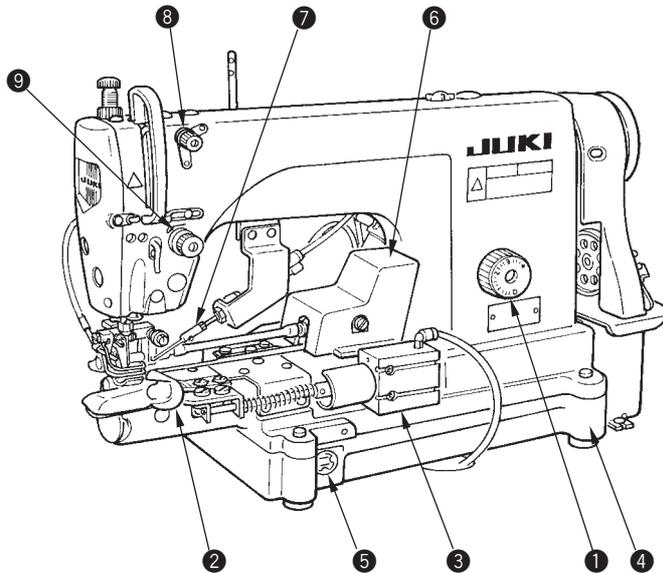
No.	Item	Model	DLN-6390	DLN-6390-7
1	Application		Bottom hemming, waist band attaching (lockstitch type), hemming (lockstitch type)	
2	Max. sewing speed		When stitch length is less than 3.6 mm : 5,000 rpm	
			When stitch length is not less than 3.6 mm : 4,500 rpm	
3	Stitch pitch		2.1 mm, 2.3 mm, 2.5 mm, 2.8 mm, 3.2 mm (standard), 3.6 mm, 4.2 mm	
4	Needle		SCHMETZ UY180GVS Standard Nm140 (shank diameter ø1.84) Range of use : Nm75 to Nm150 (equivalent to #11 to #22.5)	
5	Needle bar stroke		35mm	
6	Thread take-up stroke		123mm	
7	Hook		Exclusive automatic lubricating full-rotary 1.7 fold hook (standard hook can be used.)	
8	Lift of presser foot (Throat plate to bottom surface of presser foot)		Presser lifting lever : 4.5 mm	
			Knee lifter (by manual) : 12.5 mm	Auto-lifter : 12.5 mm
9	Feed method		Upper/lower roller continuous feed method	
10	Hemmer opener type		By manual	Air cylinder drive
11	Lubrication oil		New Defrix Oil No. 1 (equivalent to ISO VG7)	
12	Stitch length adjusting method		Gear replacement method	
13	Needle clamp method		Nut clamp method	
14	Motor		400W or higher power clutch motor can be used.	SC-380

(3) Application

- 1) The machine comes standard with the binder of rolled hemming width of 1/2" for jeans at the time of delivery. However, the machine can be used for the broad range of materials such as chinos, corduroy, etc. by replacing optional binder (1"), presser foot (3/8", 1") and upper/lower rollers.
- 2) An edge guide is supplied with the machine as standard accessory and it is possible to sew lining.

2. OPERATION

(1) Names of each components



- ① Needle feed dial
- ② Hemming binder
- ③ Hemming binder cylinder
- ④ Oil reservoir
- ⑤ Oil gauge
- ⑥ Gear cover
- ⑦ Wiper
- ⑧ Thread tension No. 1
- ⑨ Thread tension controller (asm.)

(2) Matters to be checked before operation and trial run

(Matters to be checked)

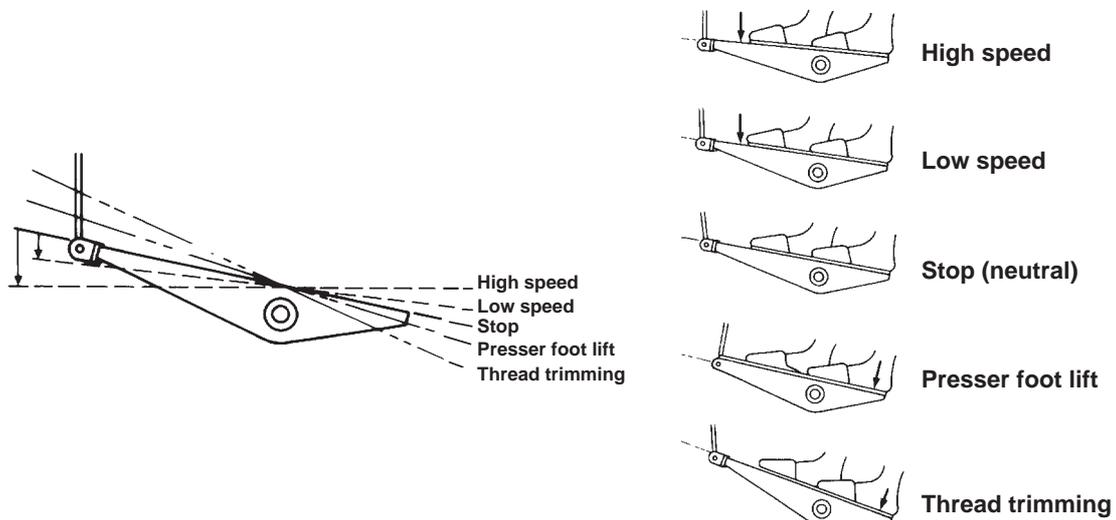
- 1) Check whether wiring is securely performed to the control box.
- 2) Check whether the oil reservoir is filled with oil.
- 3) First, run the sewing machine at low speed and check whether there is any noise.

(Trial run)

1. Pedal operation

The pedal is operated in the following 5 steps.

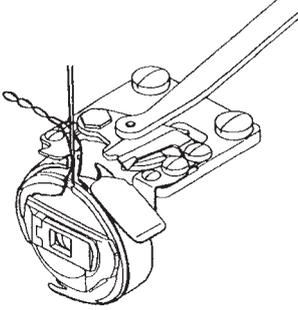
- ① The machine runs at low sewing speed when you lightly depress the front part of the pedal.
- ② The machine runs at high sewing speed when you further depress the front part of the pedal.
- ③ The machine stops when you return the pedal to stop (neutral) position.
- ④ The presser foot goes up when you lightly depress the back part of the pedal.
- ⑤ Presser foot comes down → thread trimmer is actuated → needle stops at UP position → wiper is actuated → presser foot goes up when you fully depress the back part of the pedal.



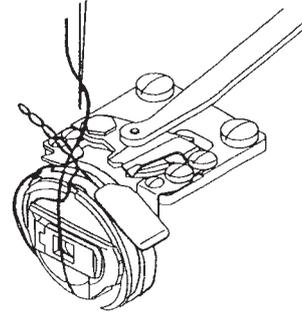
3. THREAD TRIMMING

(1) Principle of thread trimming

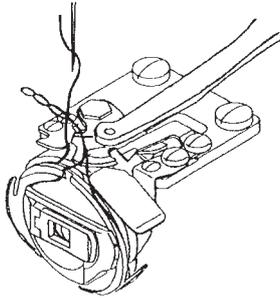
1. Blade point of the hook scoops needle thread.



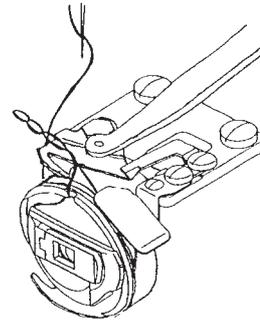
2. Needle thread crosses over the hook.



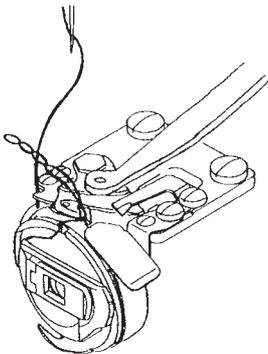
3. Moving knife handles needle thread (travels backward).



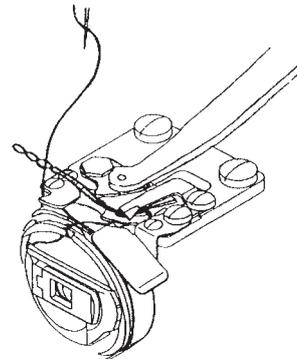
4. Needle thread is caught with the thread draw-out plate (moving knife travels backward up to the end).



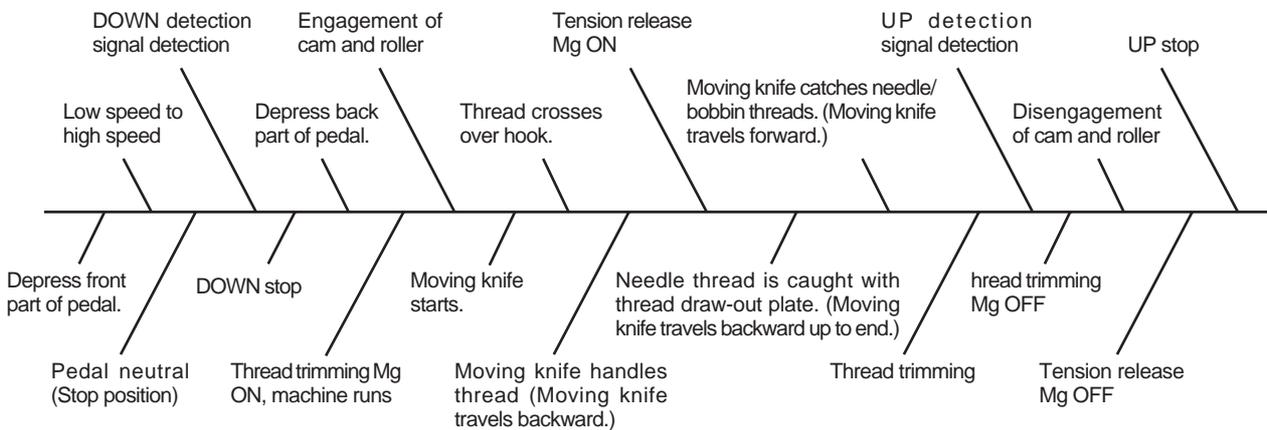
5. Moving knife catches needle /bobbin threads (travels forward).



6. Thread is trimmed.

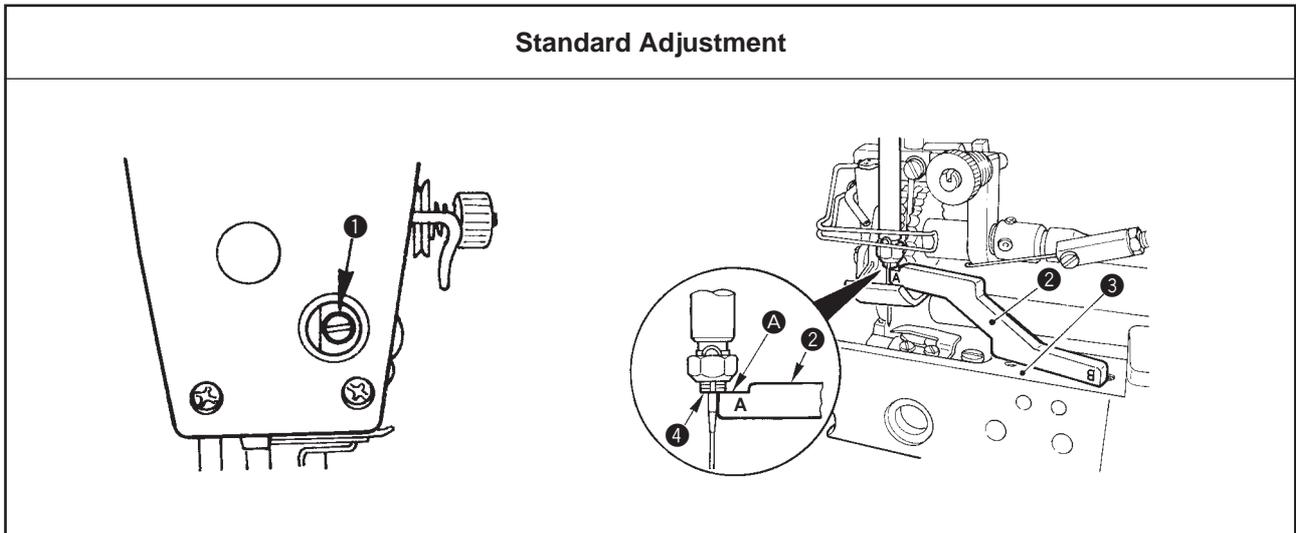


(2) Sequence of thread trimming

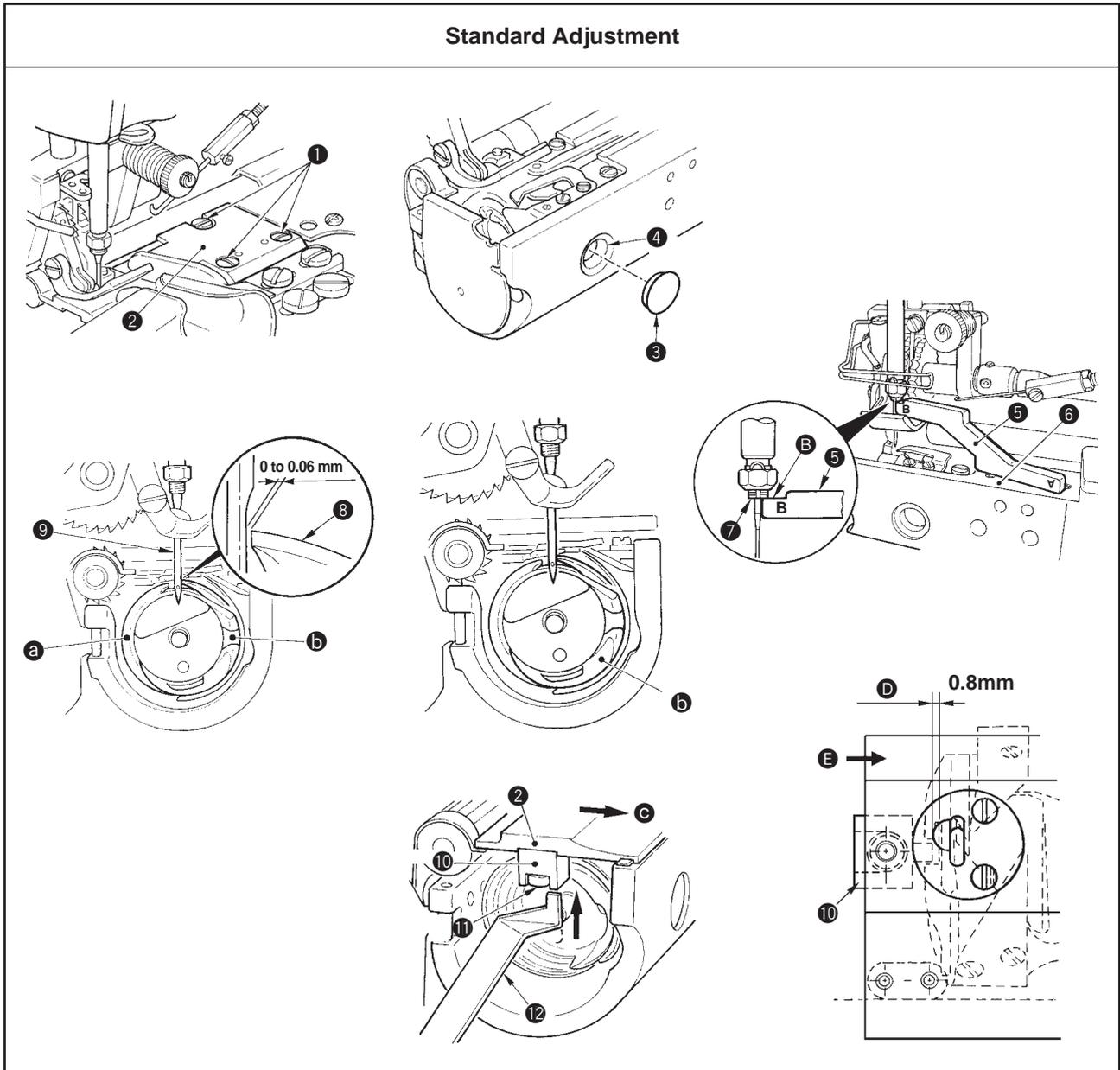


4. STANDARD ADJUSTMENT

(1) Adjusting the height of the needle bar



(2) Hook timing

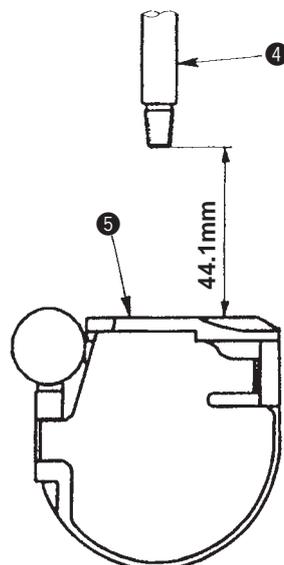
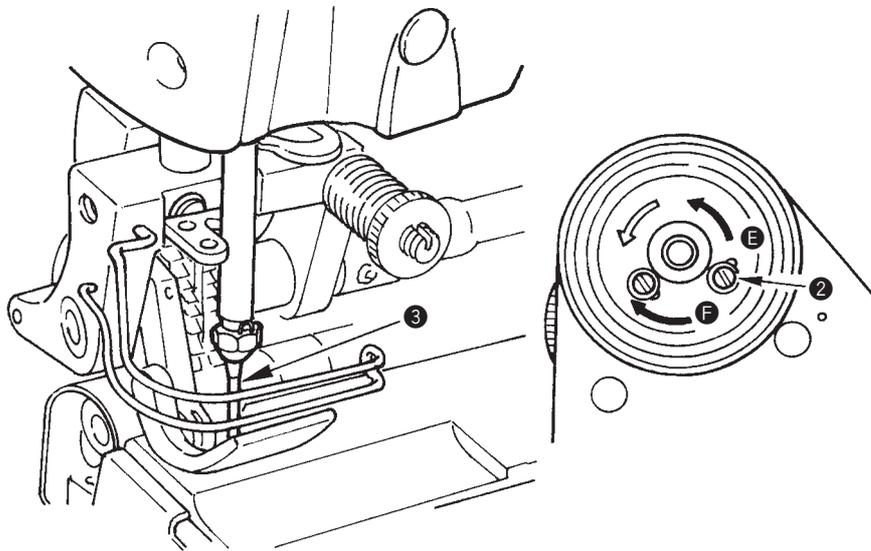
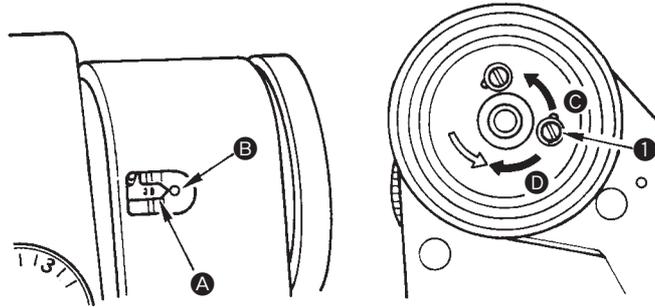


Adjustment Procedures	Results of Improper Adjustment
<p>1) Turn the handwheel to bring the needle bar to the lowest position of its stroke, and loosen setscrew ① in the needle bar bracket.</p> <p>2) Set needle bar height gauge ② supplied with the machine as accessories to installing plane ③ of the throat plate as shown in the figure, and make bottom end ④ of the needle bar come in contact with plane A (engraved A marking) of needle bar height gauge ②. Then tighten setscrew ① in the needle bar bracket.</p>	<ul style="list-style-type: none"> ○ Thread breakage will be caused even when the height of the needle is excessively high or low.

Adjustment Procedures	Results of Improper Adjustment
<p>1) Remove setscrews ① and remove throat plate ②.</p> <p>2) Remove cap ③, and put a screwdriver from hole ④ to loosen three setscrews in the hook. Turn the handwheel in the direction where needle bar goes up, set needle bar height gauge ⑤ to installing plane ⑥ of the throat plate as shown in the figure, and adjust the position so that plane B (engraved B marking) of needle bar height gauge ⑤ enters bottom end ⑦ of the needle bar.</p> <p>3) Adjust blade point ⑧ of hook a to the center of needle ⑨. Then adjust so that the clearance provided between the needle and the hook is 0 to 0.06 mm (standard), and securely tighten three setscrews in the hook. (Tightening torque : 2 to 4N.m)</p> <p>* Adjust inner hook b at the position as shown in the figure.</p> <p>4) Install cap ③ and throat plate ②, and securely tighten setscrews ①. (Tightening torque : 1.5 to 3N.m)</p> <p>* Adjust the convex of bobbin case holder ⑩ to the concave of inner hook b when installing the throat plate.</p> <p>* Tighten setscrews ① and install throat plate ② while pushing throat plate ② by hand in the direction of arrow mark C when installing throat plate ②.</p> <p>5) Adjust clearance D provided between the convex of the bobbin case holder and the concave of the inner hook with gauge ⑫ supplied with the sewing machine as accessories. (Standard : 0.8 mm)</p> <p>* Put gauge ⑫ supplied as accessories in clearance D and tighten setscrew ⑪ while lightly pushing bobbin case holder ⑩ in the direction E. (Tightening torque : 1.5 to 2.5N.m)</p> <p>* Check that gauge ⑫ can go in clearance D and come out from it with light resistance.</p>	<ul style="list-style-type: none"> ○ When hook timing is excessively retarded (return amount is large) Contact of the blade point of the hook with the belly of needle is increased resulting in stitch skipping or thread breakage at the time of sewing of overlapped section. ○ When hook timing is excessively advanced (return amount is small) Thread loop becomes smaller resulting in stitch skipping or thread breakage at the time of sewing of overlapped section.

(3) Adjusting the needle stop position

Standard Adjustment

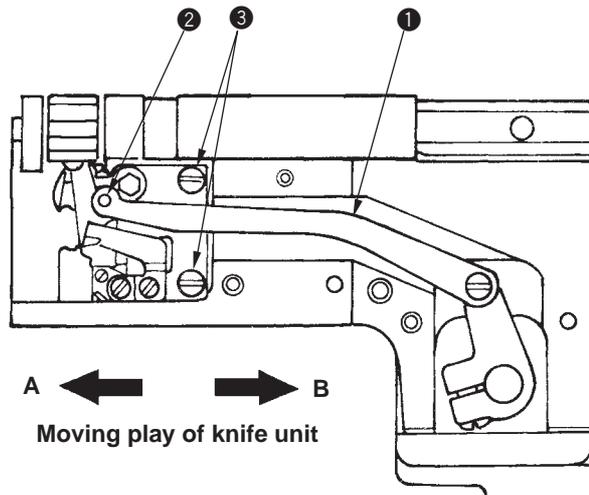


Adjustment Procedures	Results of Improper Adjustment
<p>1. Stop position after thread trimming</p> <p>1) The standard needle stop position is the position where pointer A on the machine arm aligns with white marker dot B on the handwheel. (Main shaft timing : 57.5°)</p> <p>2) Stop the needle at UP position, and loosen screw 1 to perform adjustment within the range of the slot.</p> <ul style="list-style-type: none"> ○ To advance UP stop position ➔ direction of C ○ To retard UP stop position ➔ direction of D <p>2. DOWN stop position</p> <p>1) The needle DOWN stop position when the pedal is returned to the neutral position after the front part of the pedal is depressed can be adjusted within the range of the slot by loosening screw 2 after making needle 3 stop at DOWN stop position.</p> <ul style="list-style-type: none"> ○ To advance DOWN stop position ➔ direction of E ○ To retard DOWN stop position ➔ direction of F <p>(Caution) 1. Do not operate the machine with screws 1 and 2 loosened. In addition, just loosen the screws, and do not remove them.</p> <p>2. When the UP stop position is excessively advanced, the sewing machine stops before completion of the thread trimming motion, and there is a possibility of the occurrence that thread is not trimmed. In addition, when it is excessively retarded, there is a possibility that the needle tip projects the bottom surface of the presser foot or the sewing machine overruns at the time of UP stop.</p> <p>Use the sewing machine at the position where pointer A on the machine arm aligns with white marker dot B on the handwheel.</p> <p>3. Do not move the pointer on the arm since it has been factory-adjusted according to the base of the height of the needle bar at the time of delivery. In case it has been moved, adjust the needle feed dial to “P = 0”, and precisely adjust the distance from the top end of needle bar 4 to the top surface of throat plate 5 to 44.1 mm when the needle comes down. In this state, make white marker dot B on the handwheel align with pointer A on the machine arm.</p> <p>4. When the UP stop position is adjusted, check whether the needle comes in contact with the wiper.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Make sure that the power to the sewing machine is turned OFF.</p> <p>2) Remove setscrews ①, setscrews ② and setscrews ③. Then remove hemming binder ④, auxiliary throat plate ⑤ and throat plate ⑥.</p> <p>3) Replace the connectors.</p> <ul style="list-style-type: none"> ○ Disconnect connector ② from SC-380. ○ Disconnect connector ④ and connect connector ④ to the detector of SC-380 to which connector ② was connected. (Refer to the wiring diagram of pneumatic and electrical components.) <p>4) Turn ON the power to the sewing machine.</p> <p>5) Turn handwheel ⑦ by hand in the normal direction of rotation ① of the sewing machine.</p> <p>(Normal direction of rotation ① of the sewing machine is the counterclockwise direction as observed from the handwheel side.)</p> <p>6) When the needle bar goes up and the top end of needle comes higher than the moving knife, depress the back part of pedal ⑧ in the direction ②.</p> <p>(Caution) Never depress the front part of pedal ⑧ in the direction ③. (By depressing the back part of the pedal, the thread trimmer magnet is turned ON and the roller enters the thread trimmer cam in the sewing machine.)</p> <p>7) Then turn handwheel ⑦ by hand in the normal direction of rotation of the sewing machine.</p> <p>8) Moving knife lever ⑨ turns counterclockwise in the direction ④ and moving knife ⑩ starts receding in the direction ⑤.</p> <p>9) When moving knife ⑩ has fully receded, the position where convex ⑥ of moving knife ⑩ aligns with end ⑦ of the thread draw-out plate is the correct position of moving knife receding position.</p> <p>(Caution) The power switch has been turned ON during the operation of steps 4) through 9). Never depress the front part of pedal ⑧ in the direction ③.</p> <p>10) If the receding amount is not proper, be sure to turn OFF the power switch of the sewing machine, loosen moving knife lever tightening screw ⑪, and tighten moving knife lever tightening screw ⑪ (tightening torque : 3 to 4 N.m) so that convex ⑥ of moving knife ⑩ aligns with end ⑦ of the thread draw-out plate to adjust again the moving knife to the correct receding position.</p> <p>* The work of checking and adjusting the fully receding position of the moving knife is completed in steps 1) through 10). Be sure to return the connector which has been replaced in step 3) to the home place, and return the components which have been removed in steps 1) and 2) to the home places as well. Then securely tighten the setscrews.</p> <p>* When installing the throat plate, push it in the direction of arrow mark ① and tighten setscrews ③ in the state that stopper ⑭ comes in contact with the frame.</p> <p>* When adjusting the receding position of the moving knife, adjust the position in the state that the backlash is drawn in the direction of ①.</p>	<ul style="list-style-type: none"> ○ Thread trimming failure will occur when the receding position of the moving knife is larger or smaller than the correct position.

(5) Removing/installing the knife unit

Standard Adjustment

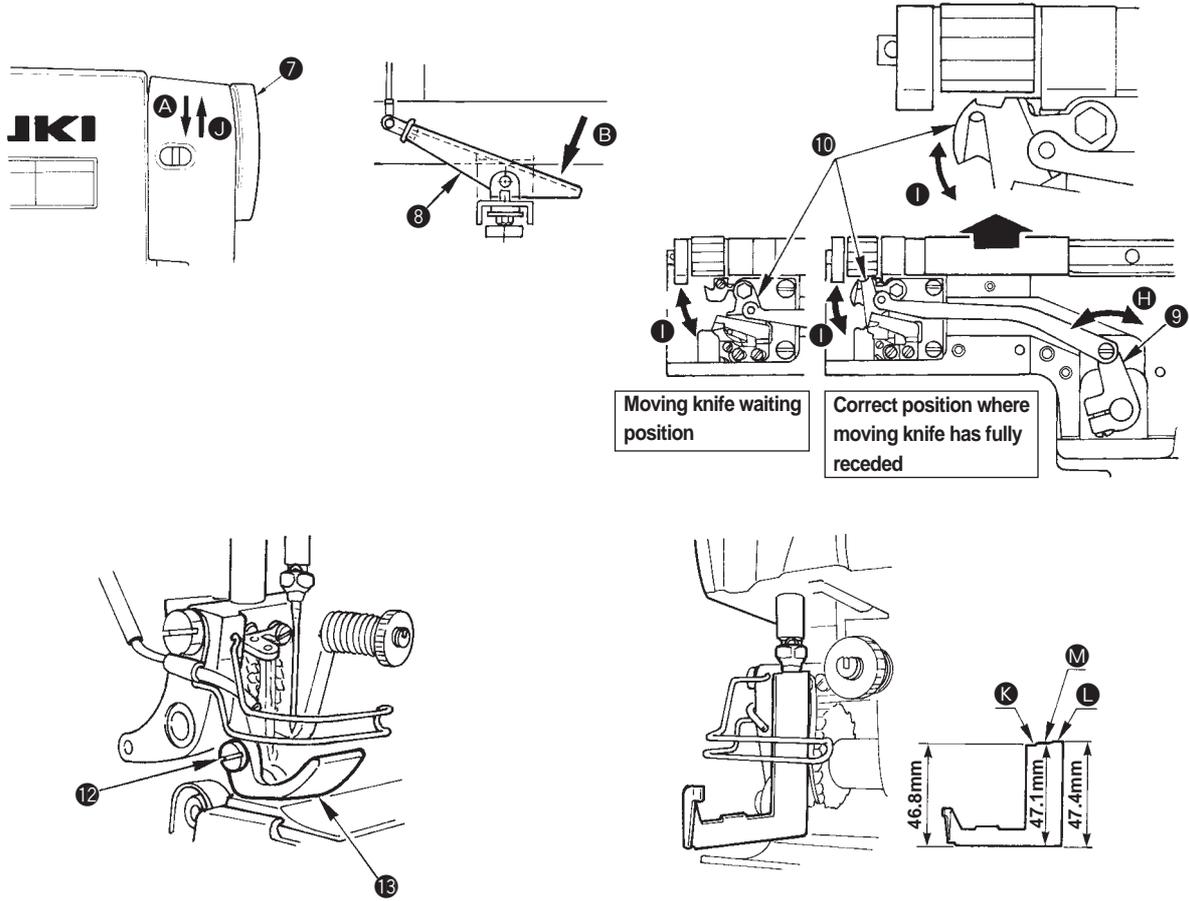


Adjustment Procedures	Results of Improper Adjustment
<p>Do not remove it unless it is necessary.</p> <p>And, along with the change of knife assembly position, the tail end of moving knife also moves to backward, when re-adjustment of positioning is necessary to make both the units work in conformity.</p> <p>Refer to "(4) Checking and adjusting the receding position of the moving knife."</p> <p>[Removing]</p> <ol style="list-style-type: none"> 1) Remove the throat plate. 2) Hold up moving knife connecting link ❶ and remove moving knife connecting link ❶ from pin ❷ of the moving knife. 3) Remove two setscrews ❸ in the knife unit and remove the knife unit. <p>[Installing]</p> <p>Installing can be performed by reversing the above removing order. However, when installing the knife unit, adjust the position of the knife unit by adjusting the part of play of the screw hole by the procedure below.</p> <ol style="list-style-type: none"> 1) Move the moving knife connecting link knife unit to the direction of face plate section (direction A ← in the figure) as much as the play at the installing hole and fix the unit. 2) When needle thread trimming failure occurs at the fixed position of moving knife connecting link ❶ at the time of thread trimming, move the knife unit to the direction of handwheel (direction B → in the figure) as much as the play and re-adjust it. 	

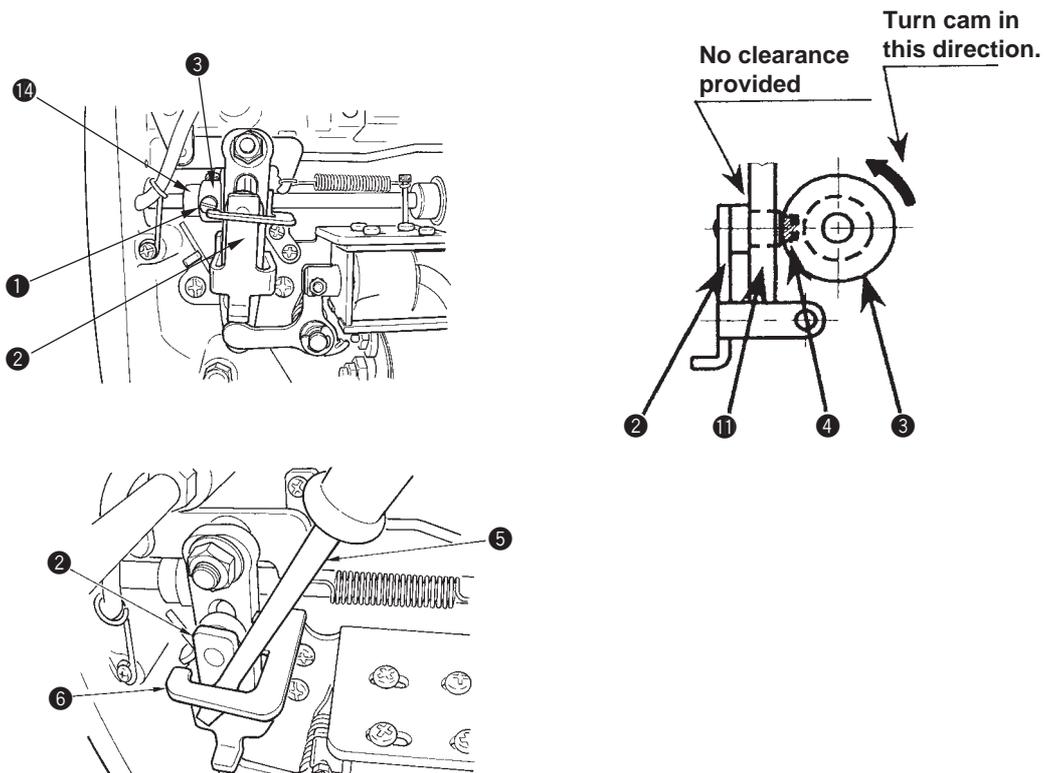
(6) Checking and adjusting the thread trimmer cam timing

Standard Adjustment

1. Checking the thread trimmer cam timing

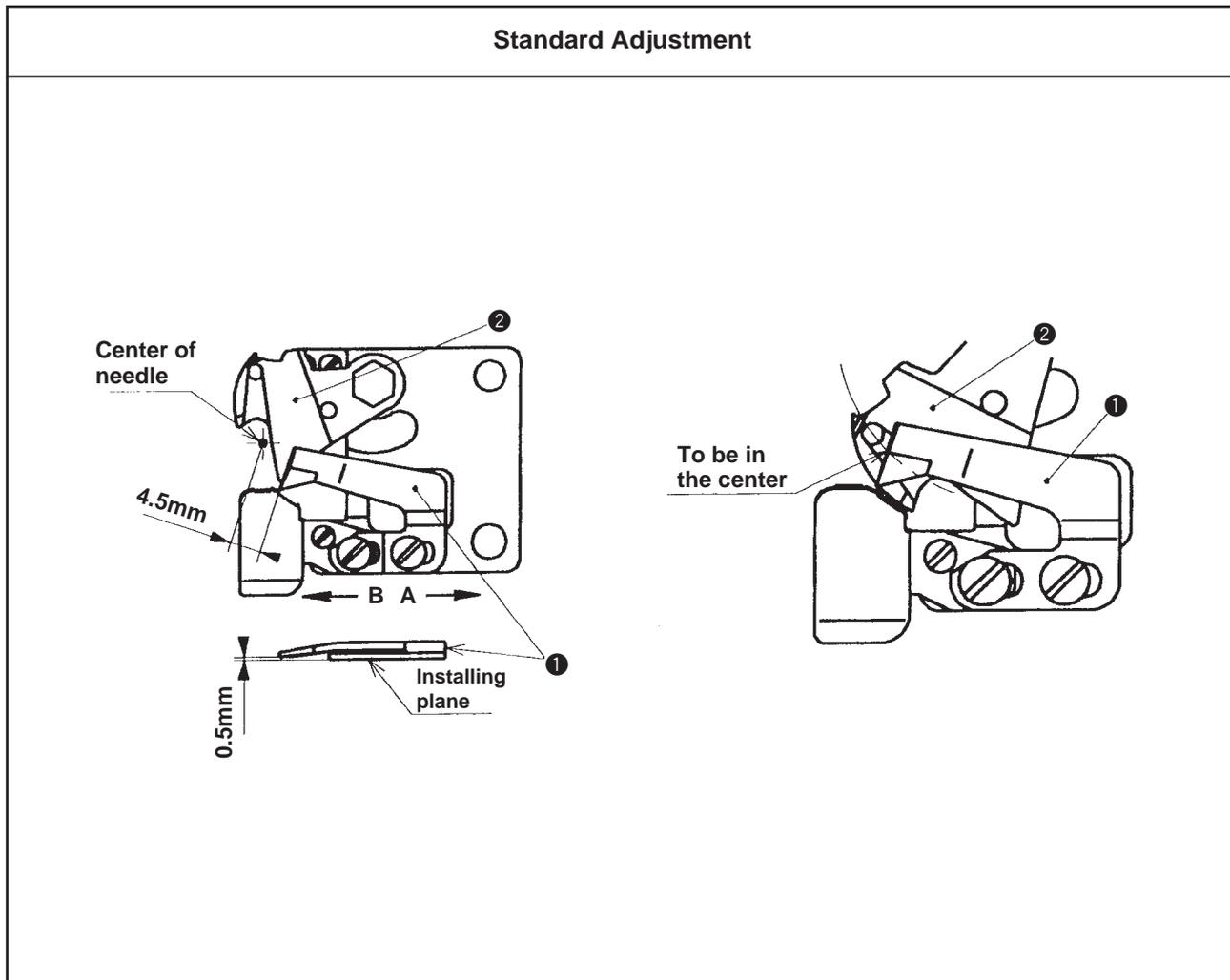


2. Adjusting the thread trimmer cam timing

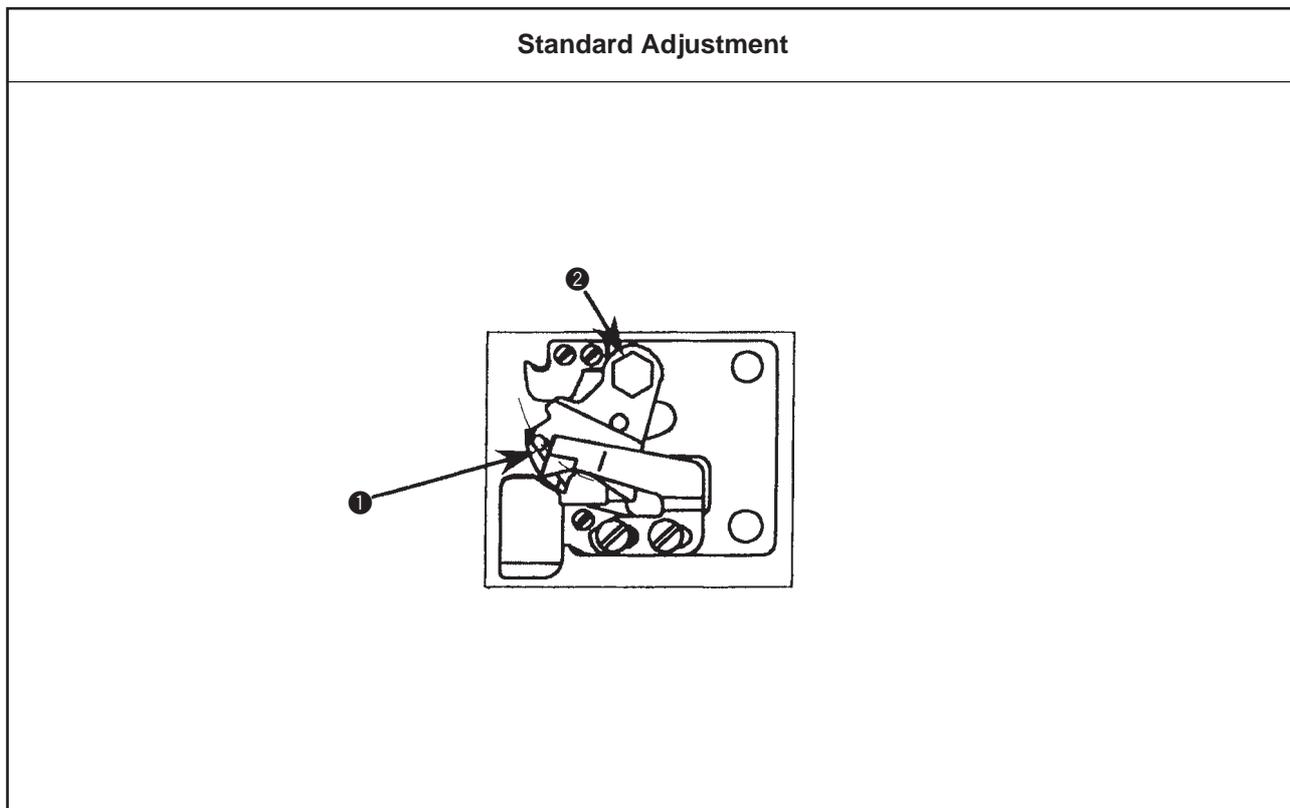


Adjustment Procedures	Results of Improper Adjustment
<p>1. Checking the thread trimmer cam timing The work up to steps 1) through 8) is the same as that of (4) Checking and adjusting the receding position of the moving knife. Execute the work up to steps 1) through 8).</p> <p>9) Then turn handwheel ⑦ in the normal direction of rotation of the sewing machine ① while depressing the back part of pedal ⑧ in the direction ③. (Moving knife lever ⑨ turns clockwise in the direction ④ after the moving knife has fully receded, and moving knife ⑩ starts moving in the direction ① to return to the waiting position.</p> <p>10) When turning handwheel ⑦ in the reverse direction of rotation of the sewing machine ① after the moving knife has returned to the waiting position, the handwheel cannot turn at a certain angle.</p> <p>(Caution) Be sure to turn OFF the power switch to the sewing machine after completion of the work of steps 4) through 10).</p> <p>11) When the height of the needle bar from the top surface of the throat plate is 46.8 to 47.4 mm, the thread trimmer cam timing is normal.</p> <p>12) It is easy to check the height when the gauge supplied as accessories is used. When section ① of the gauge enters between the throat plate and the bottom end of the needle bar and section ② does not enter, the height of the needle bar is within the range of 46.8 to 47.4 mm and the thread trimmer cam timing is normal.</p> <p>13) When entering the gauge in the bottom end of the needle bar, loosen setscrew ③ and remove presser foot ④. Return presser foot ④ to the home position after the completion of the work and securely tighten setscrew ③. (Tightening torque : 1.5 to 2N.m)</p> <p>14) When the height of the needle bar from the top surface of the throat plate is not 46.8 to 47.4 mm, the thread trimmer cam timing is not proper. Adjust the thread trimmer cam timing according to 2. Adjusting the thread trimmer cam timing below</p> <p>2. Adjusting the thread trimmer cam timing</p> <p>1) Loosen setscrews ① in the thread trimmer cam in the order of screw No. 1 to screw No. 2.</p> <p>2) Press down roller arm ② to make thread trimmer cam ③ and roller ④ engage with each other. * Workability is improved when medium-sized screwdriver ⑤ supplied as accessories or the like is inserted between roller arm ② and driving arm stopper ⑥.</p> <p>(Caution) Make the state that roller arm ② is fully pressed down so that the clearance is not provided between roller arm ② and knife driving arm ⑦.</p> <p>3) Turn the handwheel to the right direction, then stop it where the distance between of bottom end of needle bar and surface of the throat plate comes to meet the mark ⑧.</p> <p>4) Turn thread trimmer cam ③ only by fingertip in the reverse direction of rotation of the hook driving shaft without turning the hook driving shaft, lightly press thread trimmer cam ③ to roller ④ at the position where thread trimmer cam ③ does not turn, and tighten screw No. 2 of thread trimmer cam ③. * When cam collar ⑨ is not moved, press thread trimmer cam ③ to cam collar ⑨ and tighten thread trimmer cam ③.</p> <p>5) Draw out screwdriver ⑤ inserted between roller arm ② and driving arm stopper ⑥, and tighten screw No. 1 of thread trimmer cam ③.</p> <p>6) After adjusting the cam timing, check the timing described in the previous item. (Height of the needle bar is within the range of gauges ①, ② and ③.)</p>	<p>○ Thread trimmer cam timing is set in accordance with the standard value (return amount : 1.8 mm) of the hook timing. When the hook timing is excessively changed from the standard value, even when the thread trimmer cam timing is adjusted to the standard value (46.8 to 47.4 mm), thread trimming failure occurs. So, be careful.</p>

(7) Installing the counter knife



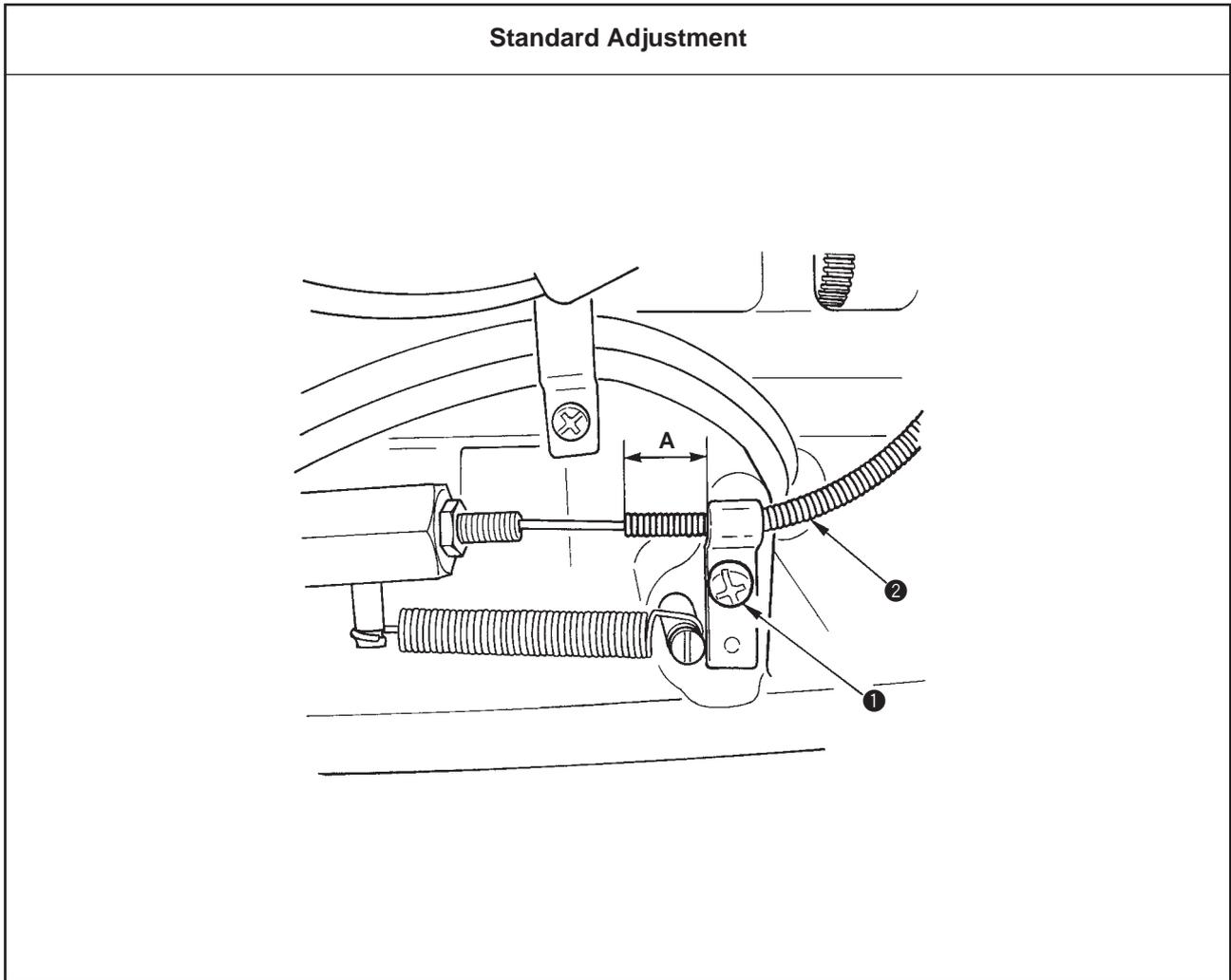
(8) Replacing the moving knife



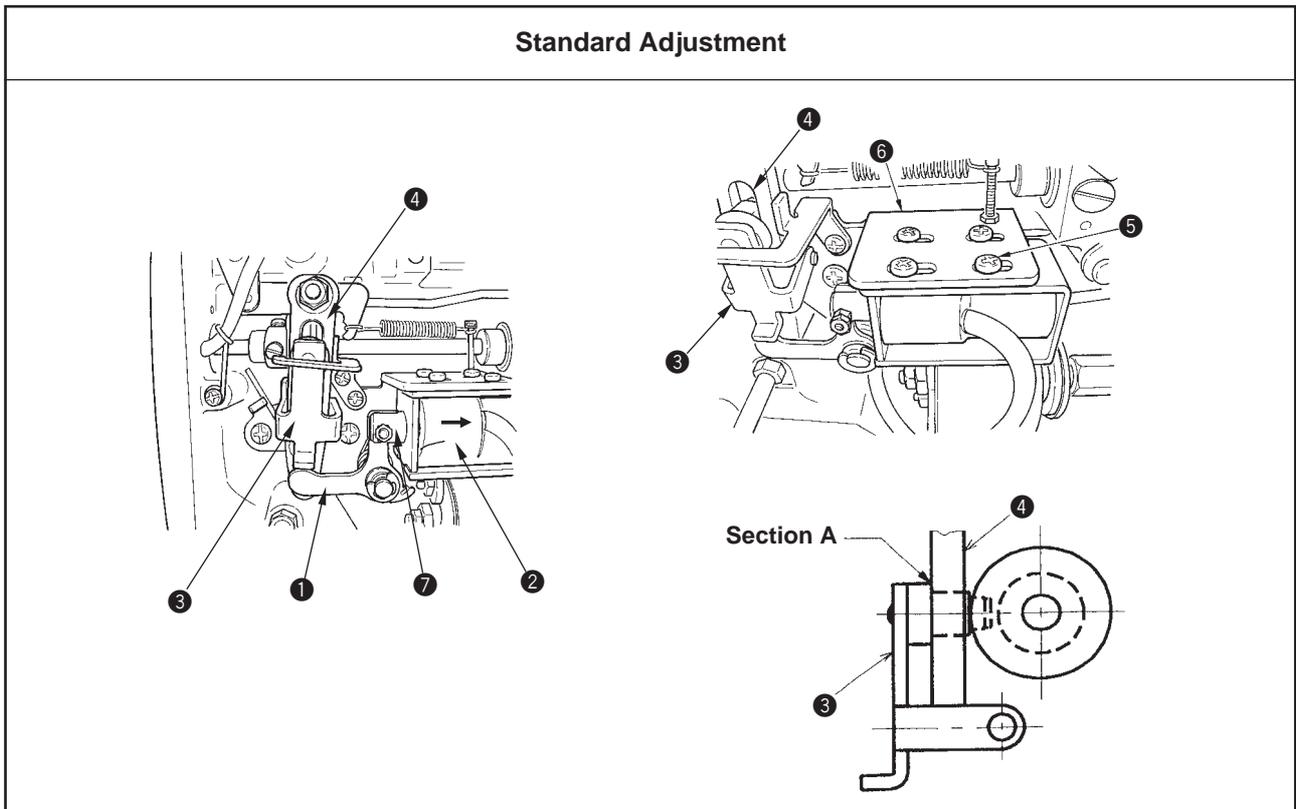
Adjustment Procedures	Results of Improper Adjustment
<p>1) The correct installing position of counter knife ❶ is that the distance from the center of the needle to the blade tip of counter knife ❶ is 4.5 mm and that the eyelet of moving knife ❷ is positioned so as to pass the center of the blade tip of counter knife ❶.</p> <p>2) It is the aim that the blade tip of counter knife ❶ is positioned at 0.5 mm above from the installing plane.</p> <p>3) When counter knife ❶ is moved in the direction A as shown in the figure, the length of remaining needle thread on the needle after thread trimming will be longer and when it is moved in the direction B, the length will be reversely shorter.</p> <p>* When adjusting or replacing counter knife ❶, be sure to check the sharpness and adjust the installing position of counter knife ❶.</p>	<p>○ When the position of counter knife ❶ is excessively moved to side B, thread trimming failure (slip-off of needle thread at the start of sewing or the like) may occur.</p>

Adjustment Procedures	Results of Improper Adjustment
<p>1) Replacement of moving knife ❶ can be performed with ease by removing moving knife hinge screw ❷ only. (Hexagon width : 6 mm)</p> <p>2) When moving knife ❶ is replaced, check that moving knife ❶ smoothly moves after tightening moving knife hinge screw ❷.</p>	

(9) Disk rising amount of the thread tension controller (asm.)



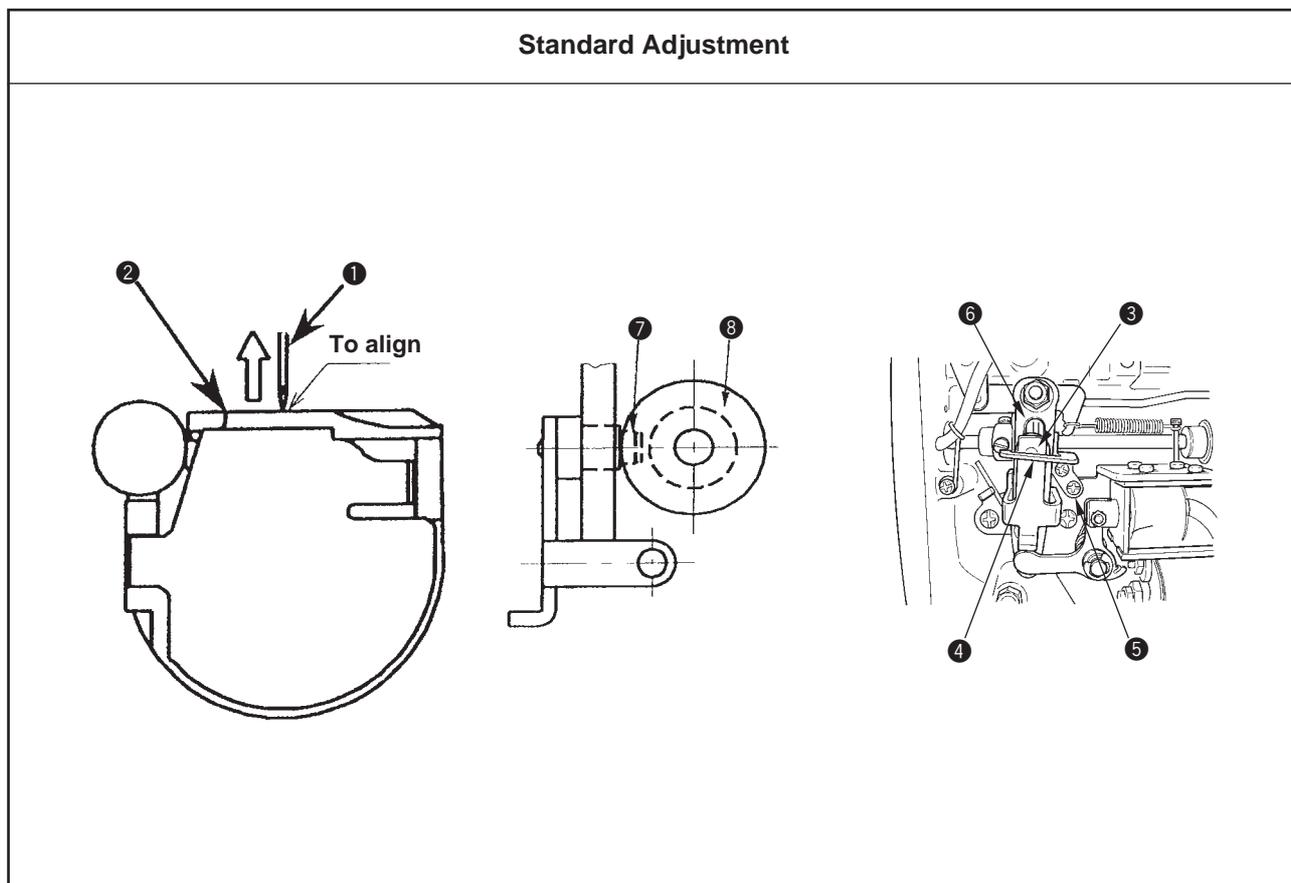
(10) Adjusting the clutch plate and the thread trimmer magnet



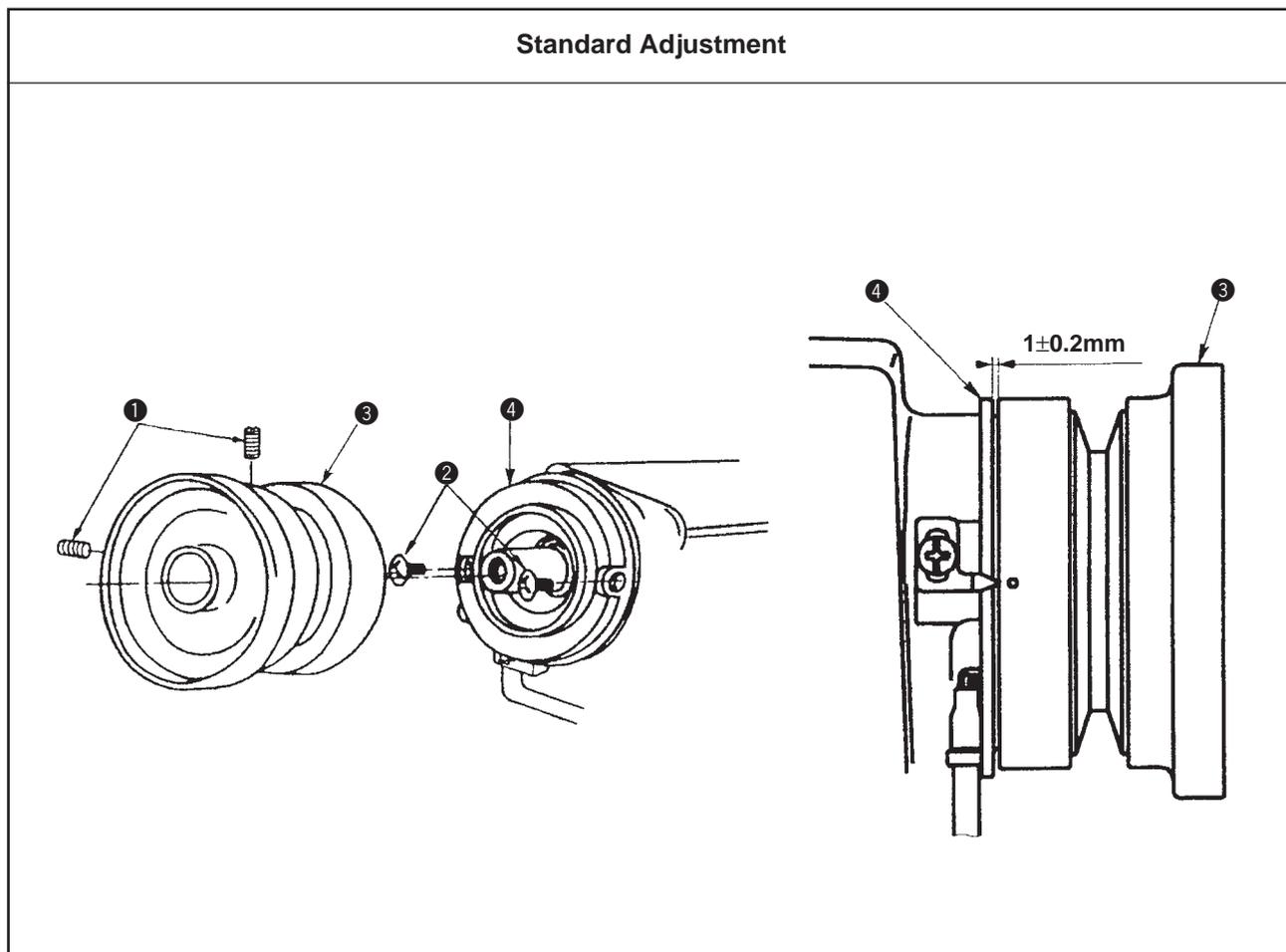
Adjustment Procedures	Results of Improper Adjustment
<p>1) How to check the floating amount of the disk of thread tension controller (asm.)</p> <p>When checking the receding amount of the moving knife and the cam timing in (4) Checking and adjusting the receding position of the moving knife, connector ④ (black cord) in the wiring diagram of pneumatic and electric components is inserted to the place of ②. However, when the gray connector located in the center of the wiring diagram is inserted to the place of ② and the back part of the pedal is depressed, the rising amount of the disk can be checked.</p> <p>Check whether the rising amount of the disk is 1.5 to 2.5 mm (aim : 2 mm).</p> <p>2) Adjusting the rising amount of the disk of thread tension controller (asm.)</p> <p>To adjust the rising amount, remove the oil reservoir, loosen outer presser setscrew ①, and adjust the protruding amount (dimension A in the figure) of outer ② of thread tension release wire. (Standard of protruding amount of dimension A : 15 to 20 mm)</p> <ul style="list-style-type: none"> ○ When increasing the rising amount Decrease the protruding amount of outer ②. ○ When decreasing the rising amount Increase the protruding amount of outer ②. 	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Positioning of clutch plate ① and solenoid for thread trimmer ② should be fixed by loosening and adjust four screws of magnet stopper ⑤ where a space (indicated by A) made between roller arm ③ and knife driving arm ④ comes to stay in the range of 0.1 to 0.5 mm when a load is provided by hand to the magnet plunger ⑦ in the direction an arrow in the figure indicates.</p> <p>2) Tighten four setscrews ⑤ in the thread trimmer magnet.</p> <ul style="list-style-type: none"> * Execute the adjustment of thread trimmer magnet ② in the state that base plate ⑥ is removed from the machine frame. * Reference ... The stroke of the thread trimmer magnet is 4 mm. 	

(11) Adjusting the driving arm stopper



(12) Replacing the synchronizer and adjusting the position of the handwheel

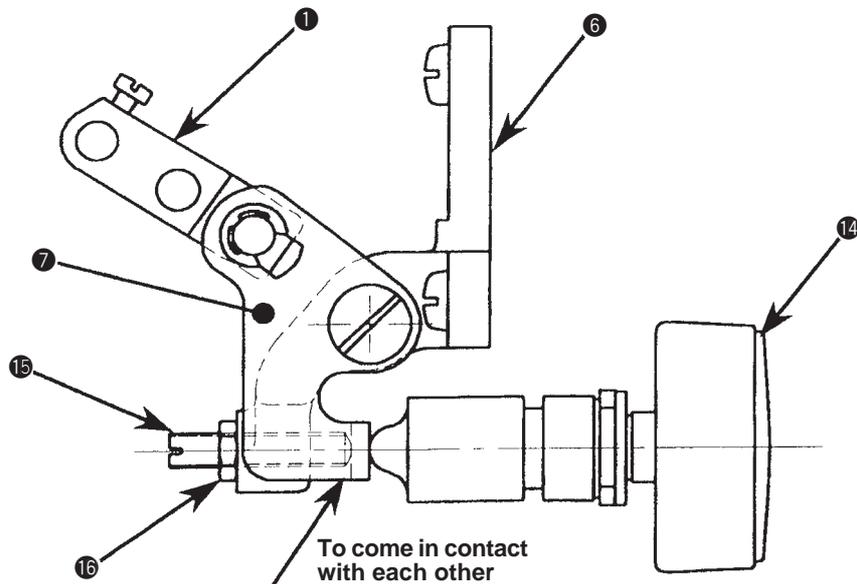
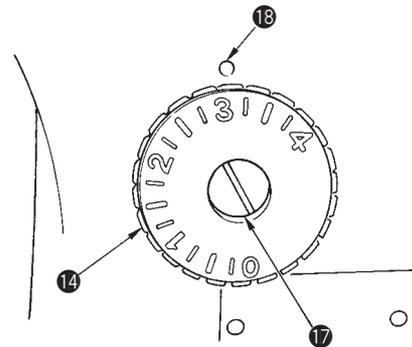
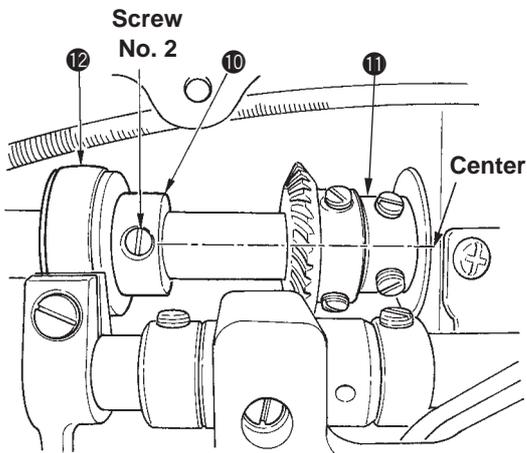
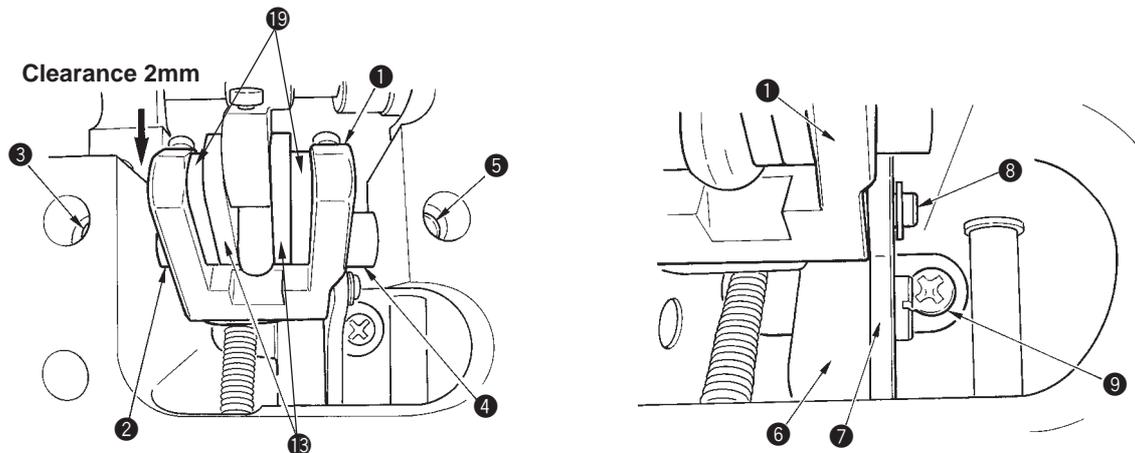


Adjustment Procedures	Results of Improper Adjustment
<p>1) Original position of the driving arm stopper</p> <p>① Press down the roller arm ③ at the timing when going up to the tip of needle ① almost aligns with top surface ② of the throat plate, to make roller ⑦ is tightly fixed with a thread trimmer cam ⑧.</p> <p>Then, when the roller ⑦ lightly enters into the thread trimmer cam, driving arm stopper ④ is fixed to the original position.</p> <p>② When roller ⑦ enters while roller ⑦ and the side of thread trimmer cam ⑧ are rubbing with each other, it is necessary to adjust the position of driving arm stopper ④ since the abnormal worn-up of roller ⑦ or thread trimming failure due to the loss of moving knife stroke occurs.</p> <p>2) Adjusting procedure of the driving arm stopper</p> <p>① Loosen setscrews ⑤ in the driving arm stopper, move the knife driving arm ⑥ to the left or right, and tighten setscrews ⑤ in the driving arm stopper at the position where roller ⑦ lightly enters without rubbing with thread trimmer cam ⑧.</p> <p>* Adjust the position of the driving arm stopper ④ and perform (4) Checking and adjusting the receding position of the moving knife.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>When the synchronizer is in trouble, UP/DOWN stop is not performed and the safety circuit works or the sewing machine continues running at high speed. Replace it with a new one in the following procedure.</p> <p>1) Remove the belt cover, loosen two setscrews ① in the handwheel and remove handwheel ③.</p> <p>2) Remove two setscrews ② in the stator installing base and remove stator ④.</p> <p>3) Fix a new stator ④ with two setscrews ②. tighten the setscrews with the tightening torque of approximately 1.5N.m since the stator installing base is made of the plastic.</p> <p>4) Assemble so that screw No. 1 of handwheel ③ comes in contact with the flat portion of the main shaft, and the clearance provided between the flange of stator ④ installing base and the end plane of handwheel ③ is 1±0.2 mm.</p> <p>5) Turn handwheel ③ by hand and check whether there is any place with which it rubs.</p> <p>6) Wire the cord, put the V belt, attach the belt cover, and check whether the cord, or the V belt comes in contact with the belt cover.</p> <p>7) Next, perform (3) Adjusting the position of the needle stop position.</p>	

(13) Adjusting and assembling the needle feed adjustment mechanism

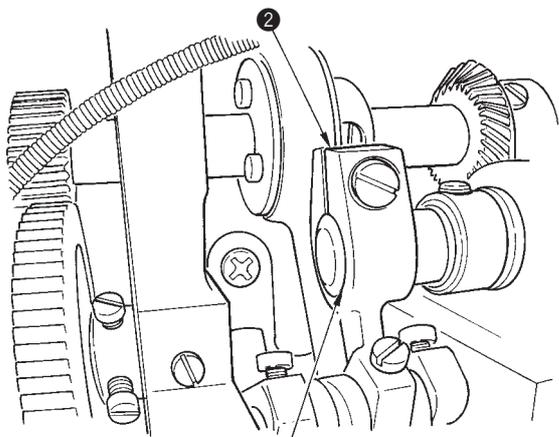
Standard Adjustment



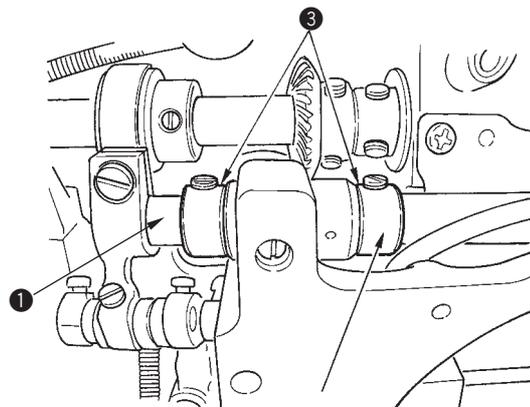
Adjustment Procedures	Results of Improper Adjustment
<p>1) Assembling the needle feed adjusting link</p> <p>① Fix fulcrum shaft ② on the handwheel side with setscrew ③ at the position where the clearance provided between the end plane on the handwheel side of needle feed adjusting link ① and the machine frame is 2 mm.</p> <p>② Make fulcrum shaft ④ on the face plate side come in contact with needle feed adjusting link ① and fix fulcrum shaft ④ on the face plate side with setscrew ⑤ so that needle feed adjusting link ① smoothly moves without play.</p> <p>(Caution) Perform with L-type wrench or the like for gathering the play at fulcrum shaft ④ on the face plate side</p> <p>2) Assembling the adjusting link plate installing base</p> <p>① Fix adjusting link plate installing base ⑥ with two setscrews ⑨ at the position where adjusting link plate ⑦ is located almost in the center (center between the needle feed adjusting link and E ring) of pin ⑧ of needle feed adjusting link ①.</p> <p>3) Assembling the needle feed cam</p> <p>① Tighten needle feed cam ⑩ so that screw No. 2 of needle feed cam ⑩ is in the center of the setscrews in main shaft thrust collar ⑪.</p> <p>(Caution) Be careful of the lateral position of the needle feed cam ⑩ so that needle feed rod ⑫ is not pinched.</p> <p>4) Adjusting zero position of the needle feed dial</p> <p>① Set the needle bar to its lower dead point.</p> <p>② Tighten needle feed dial ⑭ until the angle of four pieces of connecting links B ⑬ and connecting links A ⑰ is even.</p> <p>③ Tighten adjusting link plate stopper screw ⑮ until the top end comes in contact with adjusting link plate ⑦, and fix the screw with lock nut ⑯.</p> <p>④ In this state, loosen setscrew ⑰, adjust the scale "0" on needle feed dial ⑭ to engraved marker dot ⑱ on the machine arm, and tighten setscrew ⑰.</p>	

(14) Adjusting and assembling the needle feed mechanism

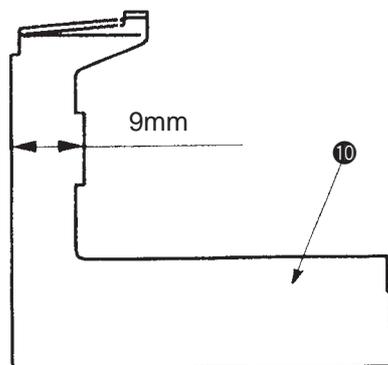
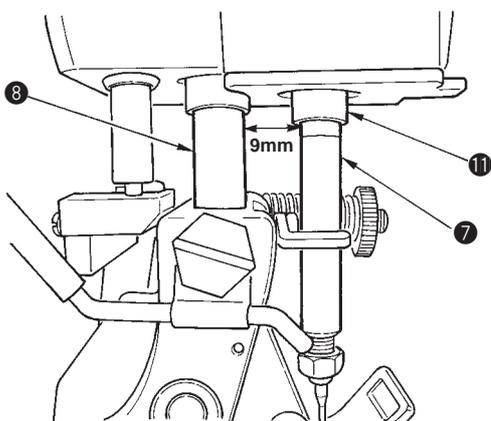
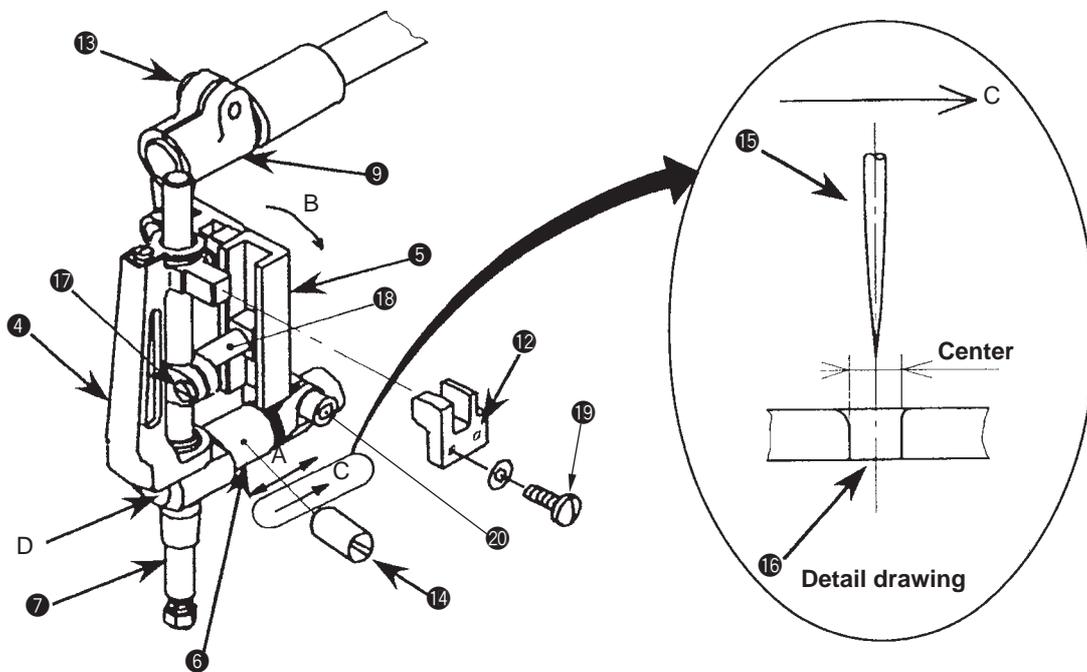
Standard Adjustment



Chamfering aligns with end plane.



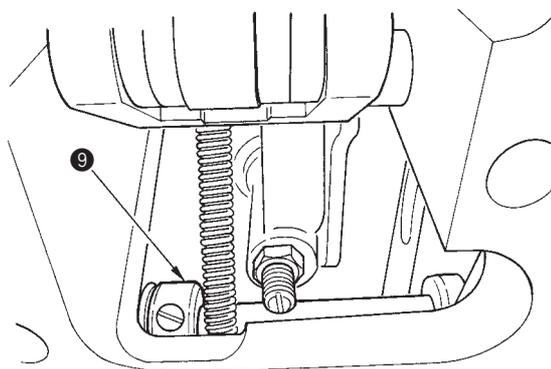
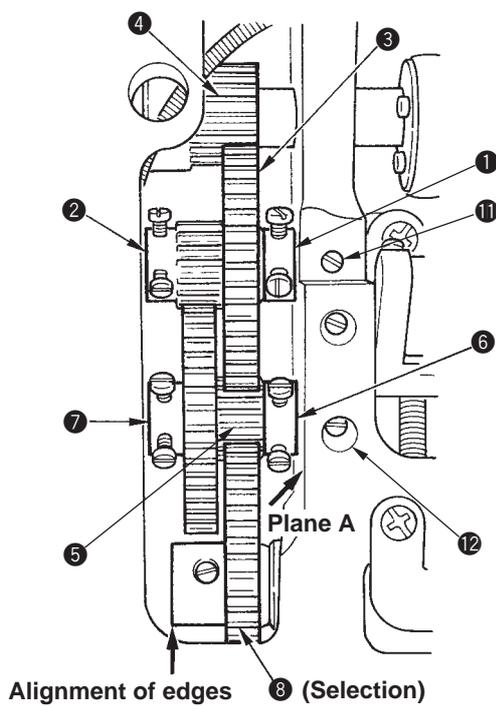
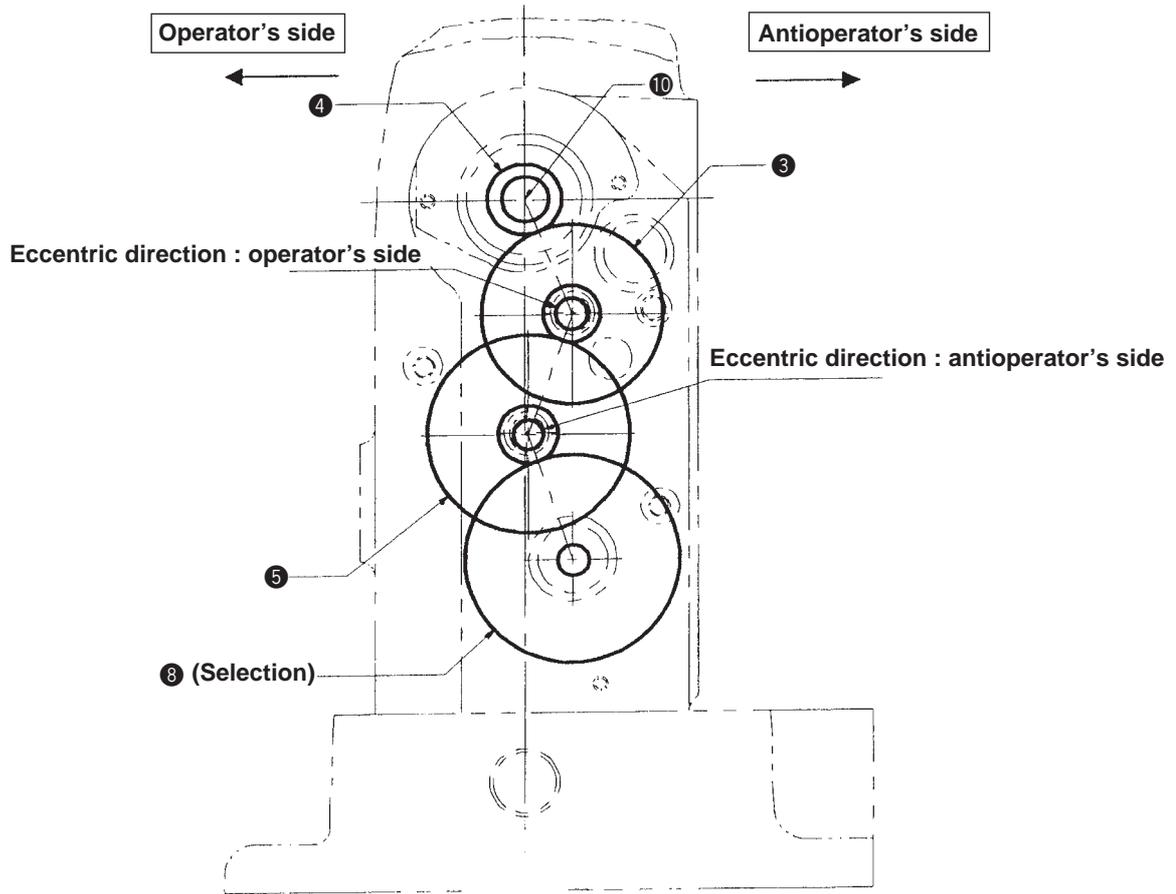
No screw on window plate side



Adjustment Procedures	Results of Improper Adjustment
<p>1) Assembling the needle feed shaft</p> <ol style="list-style-type: none"> ① Position the lateral position of needle feed shaft ① with thrust collars ③ so that the end plane of needle feed shaft arm (rear) ② aligns with the chamfering of needle feed shaft ①. ② Assemble needle feed shaft ① with two thrust collars ③ so that the shaft smoothly moves without thrust play. ③ When tightening needle feed shaft arm (rear) ②, tighten it at the position where the setscrews in thrust collars ③ of needle feed shaft ① are not located on the window plate side. <p>2) Adjusting the lateral position of the needle bar</p> <ol style="list-style-type: none"> ① Adjust the lateral position of needle bar ⑦ by moving needle bar rocking base bushing ⑥ in the direction C as shown in the figure. ② Check that setscrew ⑭ in the needle bar rocking base bushing and clamp screw ⑬ in the needle feed arm, front are loosened, lightly hit section D of needle bar rocking base ④ with the plastic hammer or brass bar, and move bushing ⑥ until needle ⑮ comes to the center of needle hole ⑯. ③ Perform this adjustment before 4) Assembling the needle bar rocking base guide below. <p>3) Assembling the needle bar rocking base and the roller guide base</p> <ol style="list-style-type: none"> ① Put needle bar rocking base shaft bushing ⑥ between needle bar rocking base ④ and roller guide base ⑤, and temporarily tighten roller guide base ⑤ so that needle bar rocking base ④ smoothly moves without play in the direction A as shown in the figure. <p>* Securely perform the thrust removing since if there is a thrust play at needle bar rocking base ④, stitch skipping may occur.</p> <ol style="list-style-type: none"> ② The roller guide base ⑤ is assembled not directly by normal tightening with a screw but by gripping at first around with a base holder not to let it make rotary move in the direction B as indicated in the figure. Otherwise, direct tightening with a screw makes it unable to fix right positioning of the needle. Thereafter, the accurate needle bar ⑦ positioning is acquired by fastening a screw ⑳ for roller guide base ⑤ with keeping pushing the needle bar frame ④ by hand in the direction B shown in the figure. In tightening the screw ⑳ be sure to check no ratting nor shaking exists with the needle bar ⑦ by moving it up and down. <p>(Caution) When the center of needle bar ⑦ is not obtained, seizure of the needle bar may occur. Securely perform the centering of needle bar ⑦. Especially, be careful that jar is apt to occur near the highest position of the needle bar.</p> <p>4) Assembling the needle bar rocking base guide</p> <ol style="list-style-type: none"> ① Assemble needle bar rocking base guide ⑫ with setscrew ⑰ at the position where there is no torque in the direction of rotation of needle bar rocking base ④. <p>* When the position of needle bar rocking base guide ⑫ is not obtained, the horn section of needle bar rocking base ④ is worn up and the lateral play at the needle bar may occur. Be sure to check the torque of needle bar rocking base ④ after securely tightening setscrew ⑰ of needle bar rocking base guide ⑫.</p> <p>5) Adjusting the initial position of the needle bar</p> <ol style="list-style-type: none"> ① For the initial position of the needle bar, tighten needle feed shaft arm (front) ⑨ at the position where the interval between needle bar ⑦ and presser bar ⑧ is 9 mm when the scale of needle feed dial is "0" and the needle bar is in its lower dead point. <p>* For the interval between needle bar ⑦ and presser bar ⑧, there is a section of 9 mm on gauge ⑩ supplied as accessories. Use it at the time of adjustment.</p> <p>* Adjust the interval between needle bar ⑦ and presser bar ⑧ at the bottom end section of needle bar lower bushing ⑪.</p>	<ul style="list-style-type: none"> ○ Torque turns heavy if needle bar ⑦ is operated without fighting the needle clamp screw ⑰.

(15) Assembling the reduction gear

Standard Adjustment



Adjustment Procedures

Results of Improper Adjustment

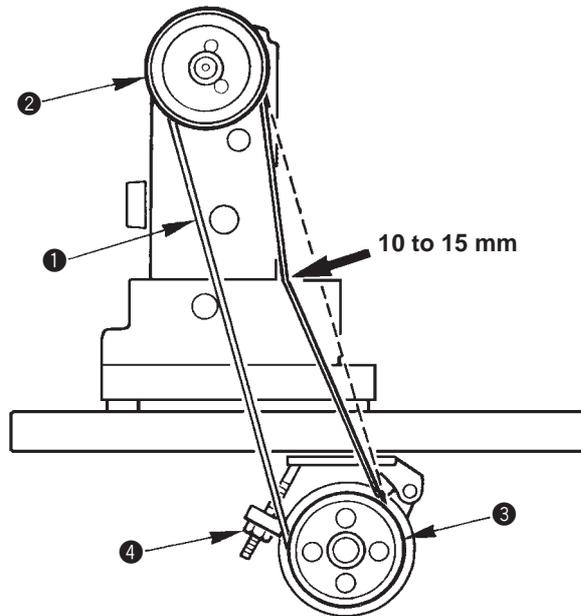
- 1) The reduction gears inside the machine arm are composed of four gears (A, B, C and D).
 - Reduction gear A : Gear attached to main shaft ⑩ (Screw No. 1 is set to the flat section.)
 - Reduction gear B : The center of shaft is eccentric and the backlash in terms of reduction gear A ④ is adjusted according to the eccentric direction of the shaft.
 - * Adjust so that the eccentric direction of reduction gear B shaft is on the operator's side. When the eccentric direction is on the antioperator's side, the adjustment of backlash at reduction gear D ⑧ may not completely performed.
 - Reduction gear C : The center of shaft is eccentric and the backlash in terms of reduction gear B ③ is adjusted according to the eccentric direction of the shaft.
 - * Adjust so that the eccentric direction of reduction gear C shaft is on the antioperator's side which is the reverse direction of reduction gear B ③. When the eccentric direction is on the operator's side, the adjustment of backlash at reduction gear D ⑧ may not completely performed.
 - Reduction gear D : Backlash in terms of reduction gear C ⑤ is adjusted by selection of gear (A through G). (Screw No. 1 is set to the flat section.)
- 2) Assembling procedure of the reduction gear
 - ① Make thrust collar ① on the right side of reduction gear B shaft come in contact with plane A of machine arm and fix it in the state of making the step section of reduction gear B shaft come in contact with the plane of machine arm (plane A as shown in the figure).
 - ② Perform the thrust removing with thrust collar ② on the left side so that reduction gear B ③ smoothly turns without play. At this time, align the angle of the setscrews in left and right thrust collars ① and ②.
 - ③ Fix reduction gear A ④ at the position where the end plane on the right side of reduction gear A ④ of main shaft ⑩ aligns with the end plane on the right side of reduction gear B ③. (Screw No. 1 is set to the flat section.)
 - ④ Set the eccentric direction of reduction gear B shaft to the operator's side as described in 1), perform the adjustment of backlash between reduction gears A and B, and tighten setscrew ⑪ in the reduction gear B shaft.
 - ⑤ Make thrust collar ⑥ on the right side come in contact with plane A of machine arm and fix it in the state of making the step section of reduction gear C shaft come in contact with plane A of machine arm (plane A as shown in the figure).
 - ⑥ Perform the thrust removing with thrust collar ⑦ on the left side so that reduction gear C ⑤ smoothly turns without play . At this time, align the angle of the setscrews in left and right thrust collars.
 - ⑦ Set the eccentric direction of reduction gear C shaft to the operator's side as described in 1), perform the adjustment of backlash between reduction gears B and C, and tighten setscrew ⑫ in the reduction gear C shaft.
 - ⑧ Insert reduction gear D ⑧ into the reduction gear D shaft and adjust the backlash between reduction gears C and D by selecting reduction gears D ⑧.
 - * Reduction gears D ⑧ are composed of 7 steps from DA to DG. The nearer the gear comes to DA, the more the backlash between reduction gears C and D is increased. On the contrary, the nearer the gear comes to DG, the more the backlash is decreased.
 - ⑨ When reduction gear D ⑧ is determined, perform the thrust removing with reduction gear D ⑧ and thrust collar ⑨ so that reduction gear D shaft smoothly turns without play. (Screw No. 1 in reduction gear D ⑧ is set to the flat section.)
At this time, assemble so that the end plane on the left side of reduction gear D shaft aligns with the end plane on the left side of reduction gear D ⑧.
* For the adjustment of the backlash of respective gears, adjust so that the backlash is minimized within the range where the backlash is secured over the full periphery of the gears.

Spec. Table for reduction gear D

No.	Name of part	Part No.
1	Reduction gear DA	40003861
2	Reduction gear DB	40003862
3	Reduction gear DC	40003863
4	Reduction gear DD	40003864
5	Reduction gear DE	40003865
6	Reduction gear DF	40003866
7	Reduction gear DG	40003867

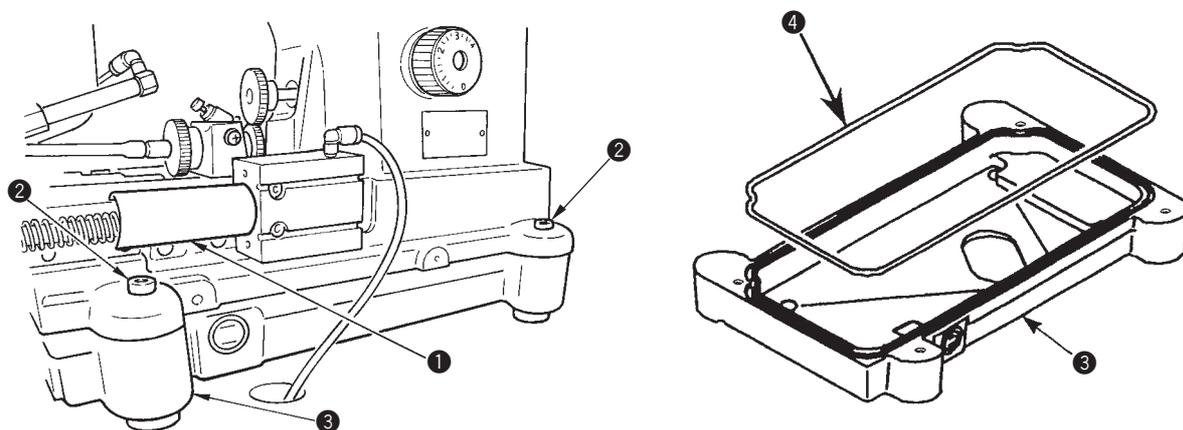
(16) Adjusting the belt tension

Standard Adjustment



(17) Removing/installing the oil reservoir

Standard Adjustment

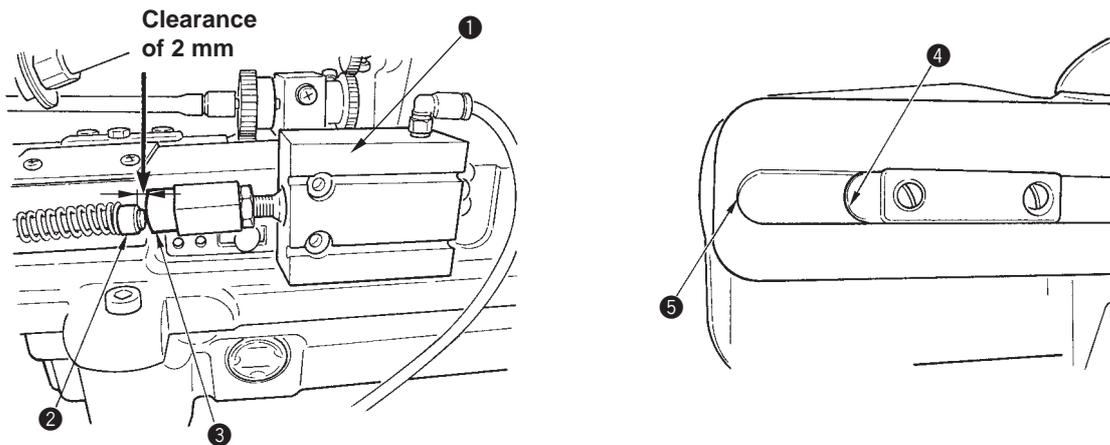


Adjustment Procedures	Results of Improper Adjustment
<p>1) Put belt ❶ on handwheel ❷ of the sewing machine.</p> <p>2) Turning handwheel ❷ of the sewing machine, put one side of the belt ❶ on motor pulley ❸.</p> <p>3) Stretch the belt ❶ so that the belt sags 10 to 15 mm when the center of the belt ❶ is applied with a load of approximate 10N (1.02kgf)</p> <p>4) When the belt ❶ is stretched, securely fix it with lock nut ❹.</p> <p>(Caution) In case the vibration of belt ❶ is excessive when operating the sewing machine, re-adjust the tension of belt ❶.</p>	<ul style="list-style-type: none"> ○ When the belt tension is excessively high <ul style="list-style-type: none"> 1. Seizure of main shaft rear bushing 2. Damage of bearing in the motor ○ When the belt tension is excessively low <ul style="list-style-type: none"> 1. Belt ❶ is quickly worn out. 2. Thread trimming is not completed. 3. Uneven stop position after thread trimming

Adjustment Procedures	Results of Improper Adjustment
<p>1) When removing the oil reservoir</p> <ul style="list-style-type: none"> ❶ Remove hemming binder cylinder cover ❶. ❷ Remove four setscrews ❷ in the oil reservoir on the four corners and remove oil reservoir ❸. <p>(Caution) When removing setscrews ❷ in the oil reservoir and lifting the machine head, there is a case where oil reservoir ❸ sticks to the machine bed and is lifted together with the machine head. So, be careful.</p> <p>2) When installing the oil reservoir</p> <ul style="list-style-type: none"> ❶ Cleanly wipe off with the waste the oil adhered to the machine bed and the installing plane of oil reservoir ❸ to prevent oil from leaking. ❷ Put O ring ❹ into the groove of oil reservoir ❸ so that the O ring does not protrude. ❸ Adjust the installing holes and quietly set the machine head from the upside. <p>(Caution) When the machine head and oil reservoir ❸ are not fitted, be careful of pinching of O ring ❹.</p> <ul style="list-style-type: none"> ❹ Securely tighten four setscrews ❷ in the oil reservoir. ❺ Attach hemming binder cylinder cover ❶. 	

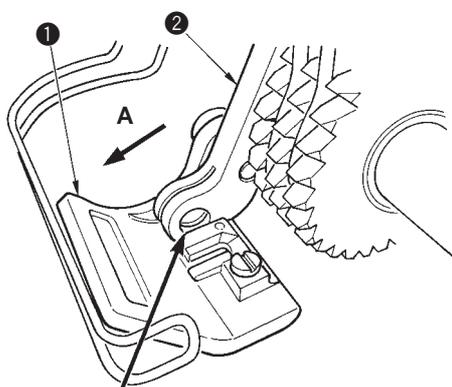
(18) Adjusting the position of the hemming binder cylinder

Standard Adjustment

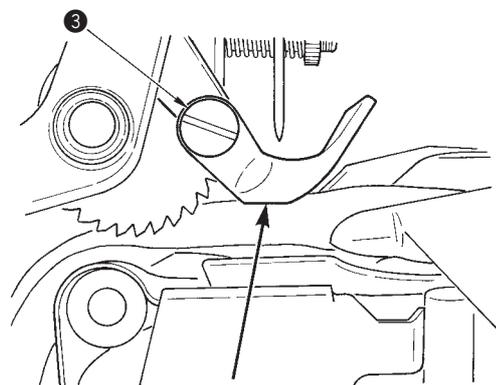


(19) Installing the presser

Standard Adjustment



To make top end of presser foot come in contact with presser



Bottom surface becomes almost flush at overlapped section and cloth is pressed by the whole bottom surface in the normal state.

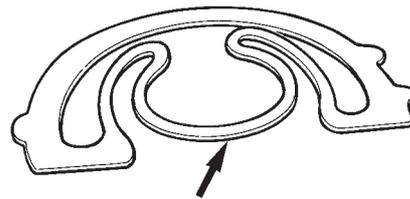
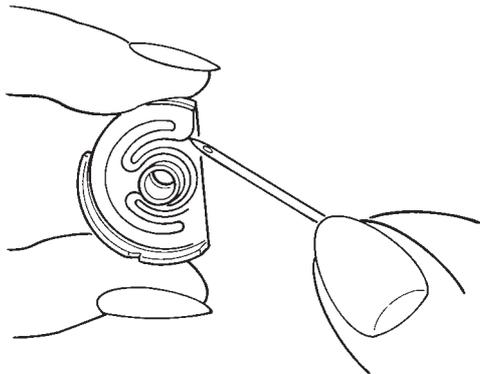
Adjustment Procedures	Results of Improper Adjustment
<p>1) Assemble hemming binder cylinder ❶ so that the clearance provided between the end plane of shaft ❷ of the hemming binder and cylinder cap ❸ is 2 mm.</p> <p>* The aim of open amount of the binder is 13 mm.</p> <p>(Caution) If the clearance is excessively small, top end ❹ of the guide section in the rear face of the binder comes in contact with groove ❺ in the base plate, and the binder may be damaged when the binder is fully opened. Do not make the clearance excessively small.</p>	

Adjustment Procedures	Results of Improper Adjustment
<p>1) Draw up the looseness of the screw hole in the direction of the arrow mark A and fix presser ❶ with setscrew ❸ at the position where the top end of presser foot ❷ comes in contact with presser ❶.</p> <p>In this state, the bottom surface of presser ❶ is almost flush and cloth can be pressed by the whole bottom surface when presser ❶ runs on the overlapped section of thick materials.</p>	

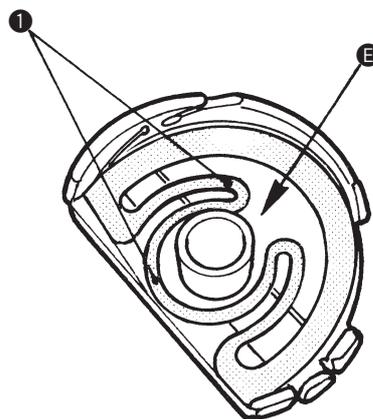
(20) Bobbin case

Standard Adjustment

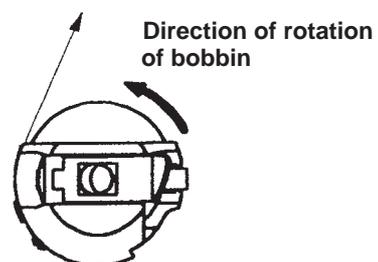
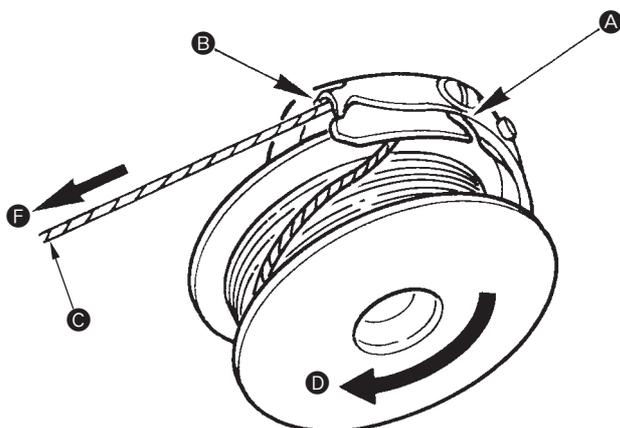
1) Adjusting pressure of idle-protection spring



Change height of this section.



2) Setting bobbin into the bobbin case



Adjustment Procedures	Results of Improper Adjustment
<p>For DLN-6390 Series, bobbin case with idle-protection spring is used. Perform the points below to adjust the pressure of the idle prevention spring.</p> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px;">When bobbin runs idle.</div> <div style="font-size: 24px; margin: 0 10px;">➔</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Increase the pressure of idle-protection spring.</div> </div> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px;">When stitches are not well tightened.</div> <div style="font-size: 24px; margin: 0 10px;">➔</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Decrease the pressure of idle-protection spring.</div> </div> <p>1) Adjusting the pressure of idle-protection spring</p> <ol style="list-style-type: none"> ① When the idling amount of the bobbin is excessive at the time of thread trimming, raise idle-protection spring ❶ in the bobbin case and adjust the idling amount within the range where the sewing is not affected. ② Insert an old sewing machine needle or the like into the bobbin case and remove the spring so as to raise it as shown in the figure. ③ Adjust the pressure of the spring by changing the height of the spring. (Be careful that the height of the spring is as parallel as possible.) ④ When setting the spring, first, put one of ears and put the other ear in the state that the center section of the spring is raised. (Be careful that the spring is not deformed.) <p>* Part No. of bobbin case spring : G181687500E</p> <p>2) Setting the bobbin into the bobbin case</p> <ol style="list-style-type: none"> ① Pass the thread through thread slit ❶, and pull the thread in the direction of arrow mark ❷. By so doing, the thread will pass under the tension spring and come out from notch ❸. ② Check that the bobbin rotates in the direction of arrow mark ❹ when bobbin thread ❺ is pulled. ③ Securely insert the bobbin case into the hook until the end of the hook is reached in the state that bobbin thread is pulled out approximately 20 mm from the bobbin case. <p>(Caution) 1. When waste thread or cloth dust infiltrates in section ❹ (between bobbin case and bobbin), and disturbs the rotation of bobbin, unexpected sewing trouble will be caused. Remove waste thread or cloth dust gathered inside the bobbin periodically when replacing the bobbin or the like.</p> <p>2. When sewing is performed in the state that the bobbin case is not securely inserted into the hook, unexpected troubles may be caused. When setting the bobbin case to the hook at the time of replacement of bobbin or the like, securely insert the bobbin case into the hook until the end of the hook is reached.</p>	

(21) Adjusting sewing

1) Return amount of the hook (hook timing)

The aim of the return amount of the hook of the machine is 1.8 mm.

Use the gauge supplied as accessories and adjust the return amount of the hook according to 4. - (2) Hook timing.

- * When using the gauge, use it in the normal direction of rotation of the sewing machine (needle bar lifting direction) according to 4. - (2) Hook timing.
- * When the return amount is larger than 1.8 mm, the contact of belly section of needle with the blade point becomes strong and the clearance provided between the needle and the hook cannot be obtained as aimed when the blade point of the hook aligns with the center of the needle. So, be careful.
- * When the problem such as stitch skipping or thread breakage occurs, adjust the return amount somewhat to small one, delay the timing when the belly section of needle comes in contact with the blade point of the hook, and keep even the clearance provided between the needle and the hook up to the last. Then sewing performance becomes stable.

2) Height of the needle bar

Use the gauge supplied as accessories and adjust the height of the needle bar as described in 4. - (1) Adjusting the height of the needle bar.

- * When the height of the needle bar is excessively low, needle thread is caught between the needle guard section of the hook and the needle hole at the lower dead point of the needle bar. As a result, it is locked or becomes resistance, and sewing performance is not stable. When the height of the needle bar is changed, check whether needle thread is locked at the lower dead point.
- * In case of thick thread (Cotton thread #8), the aforementioned phenomenon is apt to occur. (Abnormal rough motion of thread or thread breakage occurs.) If the aforementioned phenomenon occurs even when using the gauge supplied as accessories and adjusting the height of the needle bar, raise the height of the needle bar by 0.1 as the standard.
- * When the problem such as stitch skipping or thread breakage occurs, lower the position of the needle bar within the range where there is neither lock of needle thread nor resistance at the aforementioned lower dead point of the needle bar and sewing performance becomes stable since the contact of the belly section of the needle with the blade point of the hook described in 1) can be minimized.

3) Clearance provided between the needle and the hook

The aim of the clearance provided between the needle and the hook is 0 to 0.06 mm (when the center of needle aligns with the blade point of hook).

- * When stitch skipping occurs with thick materials such as denim or the like, make as near as "0" the clearance provided between the needle and the hook.

4) Kind of the needle

The needle recommended for the machine is SCHMETZ UY180GVS (Nm75 to 150).

- * Sewing performance greatly varies by the kind of needle. Use the needle recommended for the machine to the utmost.
- * When using the needle other than that recommended for the machine, there is a case where the performance related to the sewing cannot be shown with the return amount of the hook or the height of the needle bar described in the aforementioned 1). Adjust the needle within the range where the thread trimming performance is not affected.

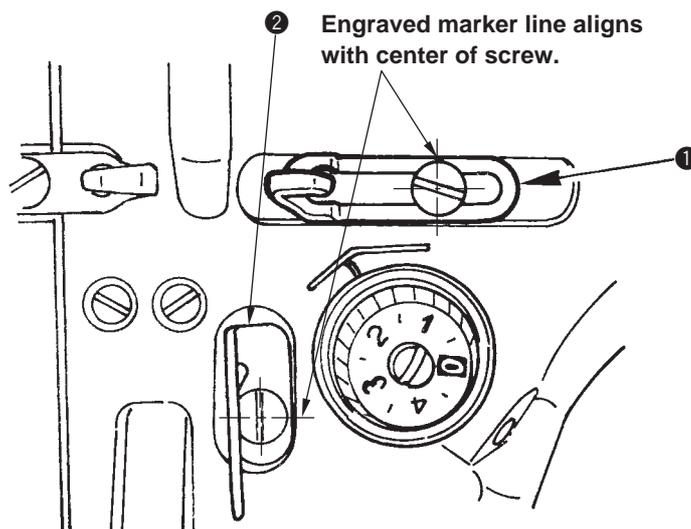
5) Kind of the hook

The machine is equipped with the exclusive 1.7 fold hook with needle guard.

- * The range of use of the needle is up to max. Nm150 since the hook is with needle guard.

6) Installing position of the arm thread guides A and C

For arm thread guides A ① and C ②, the aim is the position where the engraved marker line aligns with the center of setscrew.



7) Adjustment value for reference in combination of main materials and threads

The reference values related to the thread tension of main materials and threads are as follows. Adjust the sewing to the materials and threads making the reference values as standard.

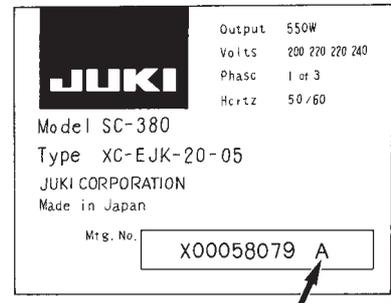
Cloth	Count of thread	Needle size	Bobbin thread tension (N) [Top surface of throat plate]	Thread take-up spring stroke (mm)	Thread take-up spring tension (N)	Remarks
Denim 14oz	#8	Nm150	0.45 to 0.55	6 to 8	0.15 to 0.25	
↑	#20	Nm140	↑	↑	↑	
↑	#30	↑	0.35 to 0.45	↑	↑	
Corduroy	↑	Nm110	↑	↑	↑	
Chinos	↑	↑	↑	↑	↑	

- * Bobbin thread tension is the tension when bobbin thread is pulled out from the top surface of the throat plate in the direction of front side at 45°.
- * Thread take-up spring stroke is the drawing amount of thread from the start-up of the motion to the end of the motion of the thread take-up spring.
- * Thread take-up spring tension is the tension when the start-up section of the thread take-up spring moves by 1 mm.

5. SETTING OF SC-380

It is necessary to set the following settings after set-up of SC-380 to use SC-380 with DLN-6390-7.

Contents of setting varies according to the version of SC-380. Perform setting after checking the English letter indicated at the end of serial No. of the control box.

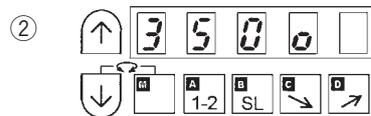


This English letter

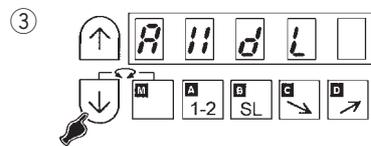
[In case of SC-380 that "A or B" is indicated at the end of serial No.]

* Select "AXDL" with the simplified model setting.

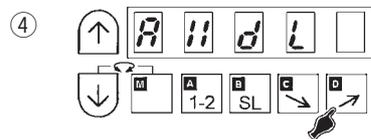
① Set the program mode [3]. (↓ + [A] + [D])



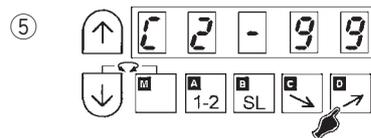
* Mode is changed to program mode [3].



* Press ↓ until [AXDL] is displayed.



* Press → when [AXDL] is displayed.

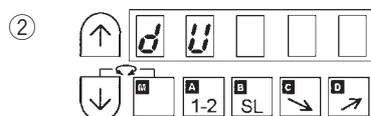


* Further, continue pressing → (more than two seconds) and the mode returns to the normal mode after the display has been changed over to [AXDL].

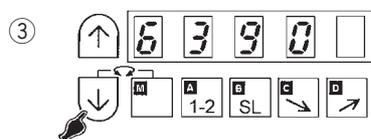
[In case of SC-380 that "C" is indicated at the end of serial No.]

* Select "6390" with the model setting.

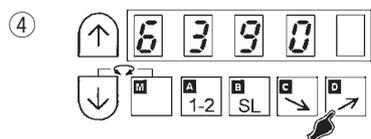
① Set the program mode [1]. (↓ + [A] + [B])



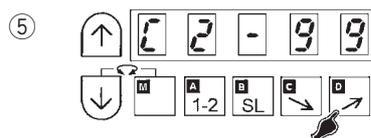
* Mode is changed to program mode [1].



* Press ↓ until [6390] is displayed.



* Press → when [6390] is displayed.



* Further, continue pressing → (more than two seconds) and the mode returns to the normal mode after the display has been changed over to [6390].

After executing the setting, perform the change of setting of each mode below.

Mode	Description	Symbol	End of serial No.	
			"A or B"	"C"
P mode	Max. speed	H	4200 → 4500	
	Slow-start speed	S	250 → 500	600 → 500
	Number of stitches of slow-start	SLN	2 → 1	
	Thread trimming mode	TR	J1 → PRG	J1 → PRG
	Delay time at the time of S3 signal input before thread trimming	S3D	10 → 60	
	Needle DOWN stop position angle	D8	28 → 10	28 → 10
	Needle UP stop position angle	U8	14 → 10	
A mode	GAIN high/low changeover	GA	L → H	
C mode	Alternate motion of IC input signal	IF	F → I02	
	Selection of output signal function	0C	B → L	
	Selection of output signal function	0D	L → PUL	
	Full-wave output time of presser lift output FU	F0	50 → 25	50 → 25
G mode	Output mode of L output	LLM	L1 → L2	
	Output start angle of L output	LS	0 → 116	0 → 116
	Output time of T output	T2	90 → 20	90 → 20
	Output start time of W output	W1	10 → 20	10 → 20
	Output time of W output	W2	8 → 5	8 → 5
H mode	Setting of upper limit value of max. speed H	LHH	90 → 51	

* Changeover procedure of the mode

Each mode can be changed over by simultaneously continuing pressing the buttons below.

○ P mode :  + 

○ A mode :  + [A]

○ C mode :  + [C]

○ G mode :  +  + [C]

○ H mode :  +  + [D]

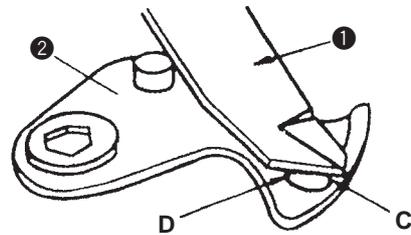
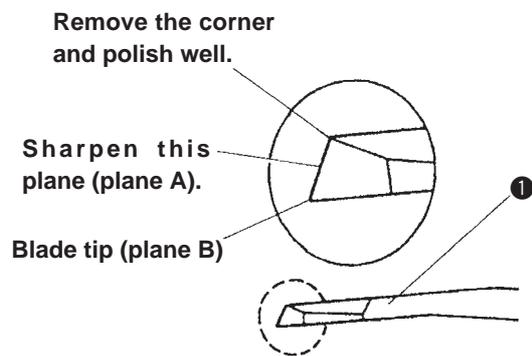
When returning to the normal mode

: Simultaneously press  + .

6. MAINTENANCE

(1) How to sharpen the knife

1. The shape of the blade tip of counter knife ❶ affects most the sharpness of the knife. In many cases, the sharpness becomes good only by sharpening of counter knife ❶.
2. Sharpness becomes good only by sharpening plane A in the figure.
 - 1) When the top end of plane B is dull and becomes round, sharpness becomes bad. Sharpen plane B while taking care that the angle of the blade tip is not changed.
 - 2) When the sharpness is bad although the blade plane is sharp enough, it is because the blade planes of moving knife ❷ and counter knife ❶ do not simultaneously come in contact with each other on the left and right sides (sections C and D in the figure). At this time, adjust the inclination of counter knife ❶.



Sections C and D of moving knife ❷ has to simultaneously come in contact with counter knife ❶.

7. TROUBLES AND CORRECTIVE MEASURES

(1) With regard to mechanical components

Troubles	Cause (1)	Cause (2)	Corrective measures
1. Stitch skipping of 1 to several stitches occurs at the start of sewing.	1-1) Needle thread remaining on the needle tip after thread trimming is too short.	1)-A Needle thread path is abnormal and needle thread resistance at the time of thread trimming is strong.	Check the inside of needle thread paths such as thread tangling or orientation of thread guide bar, position (height) and orientation (twist) of thread stand, mistake of threading at each section, etc.
		1)-B Tension of thread tension No. 1 is too high.	Decrease tension of thread tension No. 1 within the range where rough motion of thread does not occur between thread tensions No. 1 and No. 2.
		1)-C Rising amount of tension disk No. 2 at the time of thread trimming is small.	Correct the rising amount of the disk according to 4-(9). In addition, when the disk is obliquely rising, turn 180° the thread tension No. 2 spring or correct the inclination of the spring.
		1)-D Thread trimming timing is too early.	Correct the thread trimmer cam timing according to 4-(6).
		1)-E receding amount of moving knife is insufficient and needle thread is not caught in the thread-draw of knife unit.	Correct the receding amount of moving knife according to 4-(4).
		1)-F Counter knife is excessively near to needle. Blade tip is too sharp.	Check and adjust the position, shape, etc. of counter knife according to 4-(7).
		1)-G There are scratches on knife thread guide, moving knife, hook, and thread-draw.	Check the hook (especially, blade point and blade), edge of knife thread guide, moving knife (especially, thread catching section), and scratch of thread draw-out. If there is a scratch, polish it with buff. When the scratch is large, replace the part.
		1)-H Stroke or tension of thread take-up spring is too large or too high.	Adjust the stroke or the tension to a proper one. Aim of the machine is as follows. Stroke : 8 mm Tension : 0.2N
	1-2) Needle used is improper.	2)-A Thread is not held and apt to slip off since needle hole of material does not recover.	Use a needle which is as thin as possible to adjust it to cloth or thread count.
	1-3) Needle thread is not caught at the blade point of hook. (Stitch skipping)	3)-A Timing between hook and needle is improper.	Correct the hook timing (aim of return amount : 1.8 mm) according to the 4-(2). (Use the gauge supplied as accessories.)
		3)-B Clearance between hook and needle when needle thread is caught is too large.	Correct the clearance to 0 to 0.06 mm.
		3)-C Stroke or tension of thread take-up spring is too large or too high.	Adjust the stroke to a proper one (8 mm) or the tension to a proper one (0.2N).
		3)-D Worn-out of blade point of hook.	Correct the blade point or replace the hook.
		3)-E Installation of needle is improper.	Adjust the inclination of needle. (Replace the needle when it is bent.)
		3)-F Position where needle thread is caught is improper.	Adjust the height of the needle. (Refer to 4.- (1).) Check whether the needle is fully inserted.
		3)-G Pressure of presser foot is too low and cloth flops.	Adjust the pressure of the presser foot according to the Instruction Manual.

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Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
	1-4) Length of bobbin thread at the start of sewing is too short.	4)-A Bobbin runs idle and end of bobbin thread is drawn in bobbin case. 4)-B There is a scratch on hook and bobbin thread is cut on the way. 4)-C Counter knife excessively protrudes. (Near to needle)	Increase the spring pressure of idle-protection spring. Increase bobbin thread tension. Correct the scratch on the hook or replace the hook. Correct the position of counter knife according to 4-(7).
	1-5) Knotting of needle and bobbin threads at the start of sewing is difficult.	5)-A Speed at the start of sewing is too fast, and needle and bobbin threads are difficult to be interlaced.	Decrease of the number of revolutions of soft-start. Increase the number of stitches of soft-start. * Normally one stitch per 500 rpm is set.
	1-6) Bobbin thread position is unstable.	6)-A There is no groove for guiding bobbin thread in the inner hook.	Check whether there is the groove for guiding bobbin thread in the hook. If not, replace the hook with one for thread trimming.
	1-7) Initial position of the needle bar is improper.	7)-A Needle rocking position is on the operator's side and pressing stitches with presser is too late.	Adjust the initial position of the needle bar according to 4-(14).
	1-8) Position of the needle hole is improper.	8)-A Position of throat plate is improper and the needle hole in terms of needle rocking position is located on the antioperator's side. As a result, presser is slow to press stitches.	Correctly fix the position of throat plate according to 4-(4).
2. End of needle thread comes out on the cloth at the start of sewing	2-1) Needle thread remaining on the needle tip after thread trimming is too long.	1)-A Tension of thread tension No. 1 is too low. 1)-B Thread trimming timing is too late.	Increase the tension of thread tension No. 1. Correct the thread trimmer timing according to 4-(6).
3. Wrong side of cloth at the start of sewing is dirty. (Long needle thread remains under the cloth.)		1)-C Counter knife is excessively receded.	Correct the position of counter knife according to 4-(7).
4. Thread slips off from needle at the start of sewing. Needle thread slips off from needle immediately after thread trimming.	4-1) Length of needle thread remaining on the needle tip after thread trimming is uneven. 4-2) Same causes and corrective measures as those of Trouble of "1. Stitch skipping of 1 to several stitches occurs at the start of sewing"	1)-A Tension of thread tension No. 1 is made too high and thread is cut before moving knife and counter knife engage with each other since thread trimming timing is too late. (Trimming on the way) 1)-B Receding amount of moving knife is insufficient and there is a case where needle thread is not caught by thread draw-out of the knife unit. 1)-C Blade of counter knife is too sharp and trimming on the way occurs.	Perform thread trimming by hand with the procedure described in 4-(6) and stop at UP stop position. At this time, when the length of needle thread remaining on the needle tip is shorter than 10 mm as compared with the length when performing thread trimming by pedal operation, it is thread trimming on the way. Properly adjust the thread trimming timing according to 4-(6) and decrease the tension of thread tension No. 1. Correct the receding amount of moving knife according to 4-(4). Resharp the counter knife according to 6-(1) or replace the counter knife.
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Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
		1)-D There is a scratch on knife thread guide, moving knife, hook, or thread draw-out, and trimming on the way occurs.	Correct the scratch with buff or replace the part.
		1)-E Tension releasing timing is too late and trimming on the way occurs.	Check the set value of LS (Output start angle of L output of G mode) according to 5. Reference.
		1)-F Lateral position of knife unit is improper and thread draw-out with moving knife cannot be performed. (3 pcs. trimming)	When waste thread of approximately 40 mm is fallen under throat plate, it is 3 pcs. trimming. Correct the position of knife unit according to (5). * When adjusting the lateral position of knife unit, the receding amount of moving knife varies and re-adjustment is necessary.
		1)-G Hook timing is too early and thread draw-out with moving knife cannot be performed.	(Refer to 4. - (2) Hook timing.) Correct the hook timing (aim of return amount : 1.8 mm). (Use the gauge supplied as accessories.)
		1)-H Tension release timing is too early and thread draw-out with moving knife cannot be performed.	Refer to 5. SETTING OF SC-380. Check the set value of LS (Output start angle of L output of G mode).
		1)-I Thread trimming timing is too late and thread draw-out cannot be performed.	Correct the thread trimmer cam timing according to 4-(6).
5. Needle thread is not cut. (Bobbin thread is cut.)	5-1) Stitch skipping at the last sti	1)-A Installation of needle is wrong.	Correctly install the needle according to the Instruction Manual. In addition, check the bend of needle.
		1)-B Stroke of thread take-up spring is too large.	Decrease the stroke of thread take-up spring.
		1)-C Hook adjustment is wrong.	Check stitch skipping with sewing at low speed and try again the hook adjusting. (Make the hook timing somewhat earlier.)
	5-2) Slackness of needle thread during thread trimming motion is large and needle thread cannot be caught when moving knife returns.	2)-A Tension release timing is too early.	Check the set value of LS (Output start angle of L output of G mode) according to 5.
		2)-B Hook timing is too late.	Correct the hook timing (aim of return amount : 1.8 mm) according to the 4-(2). (Use the gauge supplied as accessories.)
		2)-C Thread trimming timing is too early.	Correct the thread trimmer cam timing according to 4-(6).
	5-3) When moving knife draws out thread during thread trimming motion, two pieces of needle thread are simultaneously caught at the concave section of top end of moving knife.	3)-A Lateral position of knife unit is improper.	Adjust the lateral position of knife unit according to 4-(5). * When adjusting the lateral position of knife unit, the receding amount of moving knife varies and re-adjustment is necessary.
	5-4) A part of cutting blade section of knife is dull.	4)-A Cutting blade sections of moving knife and counter knife are not completely fit at the time of thread trimming. (Installing angle, position and inclination of blade plane of counter knife are not fit for the blade section of moving knife.)	Remove the throat plate, and move the moving knife by hand. It is good that 3 pcs. of cotton thread #50 are evenly cut when 3 pcs. of the thread are cut. If not, adjust the position and sharpening procedure of counter knife according to 4-(7) and 6-(1).

Troubles	Cause (1)	Cause (2)	Corrective measures
6. Bobbin thread is not cut. (Needle thread is cut.)	6-1) Receding amount of moving knife is insufficient.	1)-A Needle thread only is caught when moving knife returns.	Correct the receding amount of moving knife according to 4-(4).
	6-2) Position of bobbin thread is unstable.	2)-A There is no groove for guiding bobbin thread.	Check whether there is the groove for guiding bobbin thread in the hook. If not, replace the hook with one for thread trimming.
	6-3) A part of cutting blade section of knife is dull.	3)-A Cutting blade sections of moving knife and counter knife are not completely fit at the time of thread trimming. (Installing angle, position and inclination of blade plane of counter knife is not fit for the blade section of moving knife.)	Remove the throat plate, and move the moving knife by hand. It is good that 3 pcs. of cotton thread #50 are evenly cut when 3 pcs. of the thread are cut. If not, adjust the position and sharpening procedure of counter knife according to 4-(7) and 6-(1).
7. Thread trimming is not completed. (Noise occurs from the motor at the time of thread trimming.)	7-1) Amount of needle thread at the time of thread trimming is insufficient.	1)-A Tension release timing is too late.	Check the set value of LS (Output start angle of L output of G mode) according to 5.
		1)-B Rising amount of disk at the time of tension release is small or the disk is not rising.	Adjust the rising amount of disk according to 4-(9).
	7-2) There is no allowance of angle from thread trimming to UP stop.	2)-A Thread trimming timing is too late.	Correct the thread trimmer cam timing according to 4-(6).
		2)-B Angle of UP stop is too early.	Correct UP stop timing according to 4-(3).
	7-3) Force of motor is not transmitted well.	3)-A Diameter of motor pulley is too large.	Use the pulley (mark : 105) supplied as accessories.
		3)-B Belt tension is low.	Correct the belt tension according to 4-(16).
		3)-C Inferior belt is used.	Use the belt supplied as accessories.
		3)-D GAIN setting of control box is improper.	Check the set value of GA (changeover of high/low GAIN of A mode) according to 5.
	7-4) Number of revolutions of thread trimming is low.	4)-A Setting of number of revolutions of thread trimming of control box is improper.	Check the set value of T (setting of number of revolutions of thread trimming of P mode) according to the Instruction Manual. Normally 200 rpm is set. However, increase the number of revolutions of thread trimming within the tolerance of idling of bobbin at the time of thread trimming.
	7-5) Thread tension No. 1 is excessively tightened to prevent rough motion of needle thread.	5)-A Oil amount in the hook is small.	After adjusting oil amount in the hook according to the Instruction Manual, decrease the tension of thread tension No. 1 within the range where thread does not move roughly between thread tensions No. 1 and No. 2.
5)-B Height of needle bar is improper and when it is in the lower dead point, needle thread is locked and becomes resistance since needle thread is pinched with needle hole and needle guard.		After adjusting the height of needle bar according to 4-(21), decrease the tension of thread tension No. 1 within the range where thread does not move roughly between thread tensions No. 1 and No. 2.	

(2) With regard to sewing

Troubles	Cause (1)	Cause (2)	Corrective measures
1. Stitch skipping	1-1) Needle components	1)-A Needle is bent.	Replace the needle.
		1)-B Installation of needle is wrong. (Orientation or insufficient insertion)	Install the needle again.
		1)-C Blunt of needle tip	Replace the needle.
		1)-D Needle is too thin for thread used or cloth.	Replace the needle with a proper needle (thick needle if possible).
		1)-E Kind of needle is improper.	Replace the needle with a proper one. SCHMETZ UY180GVS is recommended.
	1-2) Hook components	2)-A Blunt or worn-out of blade point of hook	Correct the blade point of hook or replace the hook.
		2)-B Defective hook timing	Adjust the timing according to 4-(2). Perform the adjustment described in the Instruction Manual as the aim and in accordance with the conditions of cloth and thread, perform fine adjustment according to 4-(21).
		2)-C Height of needle bar is improper.	Adjust the height of needle bar according to 4-(1). Making as the base the adjustment procedure described in the Instruction Manual, in accordance with the conditions of cloth and thread, perform fine adjustment according to 4-(21). <ul style="list-style-type: none"> • When setting the needle bar rather in a lower position, be careful of the needle thread lock between needle and inner hook needle guard at the lower dead point of the needle bar. • When setting the needle bar rather in a higher position, be careful of the contact between the blade point of hook and the belly section of needle.
		2)-D Clearance at blade point of hook is improper.	Make small the clearance between needle and the blade point (Make it near to "0".)
		2)-E No needle guard	Especially, in case of thick materials, use the designated hook with needle guard.
	1-3) Defective feed	3)-A Stitch skipping due to stitch gathering	Refer to the item "Stitch gathering at overlapped section".
	1-4) Thread tension components	4)-A Needle thread tension is too high. (excessively tightened)	Decrease the tension.
		4)-B Tension of thread take-up spring is too high.	Correct to the proper tension. (0.2N is recommended.)
		4)-C Stroke of thread take-up spring is too large	Correct to the proper stroke. (8 mm is recommended.)
		4)-D Stroke of thread take-up lever is small.	Correct to the proper stroke at the position of arm thread guide A. (Position of marker line is standard, and when moving counterclockwise, stroke of thread take-up lever is increased.)
		4)-E Tension of thread tension No. 1 is too low.	Adjust the tension to such an extent that thread does not move roughly between thread tensions No. 1 and No. 2. (However, when the tension of thread tension No. 1 is excessively high, thread trimming performance is affected. Do not excessively increase the tension.)

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Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
	1-5) Thread path components.	5-A Threading is wrong.	Check the threading according to the Instruction Manual.
	1-6) Flopping of cloth.	6-A Presser is rising.	Check the presser lifting base according to the Instruction Manual.
		6-B Angle of the presser is wrong.	Correct the angle of presser according to 4-(19).
		6-C Pressure of the presser is low.	Adjust the pressure of the presser foot according to the Instruction Manual.
		6-D Presser foot comes in contact with the hemming binder.	Correct the position of binder base on the Instruction Manual. When the presser foot comes in contact with the hemming binder, the presser foot rises or the motion is hindered.
	1-7) Needle position is improper.	7-A Lateral position of needle and the needle hole of throat plate is wrong.	Correct the lateral position of needle. Alignment of the center of needle hole in throat plate with the center of needle is the aim.
		7-B Lateral position of needle and the needle hole of presser foot is wrong.	Loosen the presser bar bracket and correct the lateral position of presser. It is the aim that the center of the needle hole in the presser foot is slightly located to the right side.
	1-8) Binder components.	8-A Edge of folding of hemming is sewn.	Correct the lateral position of hemming binder to the proper position.
		8-B Sewing is performed in the condition that hemming is rolled in more than three fold.	Adjust by handling so that correct hemming is performed. (When cloth becomes thicker than necessary due to inferior rolling, stitch skipping is apt to occur.)
		8-C Sewing quality of the previous process is inferior (especially lapping seam).	Check the rolled condition of the previous process. (When cloth becomes thicker than necessary due to inferior rolling of the previous process, stitch skipping is apt to occur.)
	1-9) Setting of needle cooler is improper.	9-A Air pressure of needle cooler is too high.	Set the air pressure to the proper one (lower is better if possible). When the air pressure is excessively high, needle thread becomes unstable and inferior products are apt to occur.)
2. Stitch gathering at overlapped section	2-1) Presser components.	1-A Pressure of the presser is too high.	Adjust the pressure of presser foot according to the Instruction Manual. When excessively tightening the pressure adjustment dial, the lifting angle of the presser is limited.
		1-B Position of cooling pipe is wrong and the pipe comes in contact with the presser foot.	Correct the position of needle cooler pipe according to the Instruction Manual. When the installing position of pipe is improper, pipe comes in contact with presser foot when the presser rides on the overlapped section and lift of the presser may be hindered.
	2-2) Binder components.	2-A Sewing is performed in the condition that hemming is rolled in more than three fold.	Adjust by handling so that correct hemming is performed. (When cloth becomes thicker than necessary due to inferior rolling, stitch gathering is apt to occur.), stitch gathering is apt to occur.)
		2-B Sewing quality of the previous process is inferior (especially lapping seam).	Check the rolled condition of the previous process (When cloth becomes thicker than necessary due to inferior rolling of the previous process, stitch gathering is apt to occur.)
3. Thread breakage	3-1) Hook components.	1-A Blunt or worn-out of the blade point of hook	Correct the blade point of hook or replace the hook.
		1-B Clearance at the blade point of hook is improper.	Make small the clearance between needle and the blade point (near to "0").
		1-C Hook timing is improper.	Adjust the timing according to 4-(2). Perform adjustment described in the Instruction Manual as the aim and in accordance with the conditions of cloth and thread, perform fine adjustment according to 4-(21).
		1-D No needle guard	Especially, in case of thick materials, use the designated hook with needle guard.

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Troubles	Cause (1)	Cause (2)	Corrective measures	
From the previous page				
	3-2) Thread tension components	2)-A Needle thread tension is too high (excessively tightened).	Decrease the tension.	
		2)-B Tension of thread tension No. 1 is too low.	Adjust the tension to such an extent that thread between thread tensions No. 1 and No. 2 does not move roughly. (However, when the tension of thread tension No. 1 is excessively high, thread trimming performance is affected. Do not excessively increase the tension.)	
	3-3) Influence of heat	3)-A Damage of thread due to heat	Increase oil amount in the hook. When sewing at 4,000 rpm or more, install the needle cooler.	
	3-4) Thread path components	4)-A Threading is wrong.	Check the threading according to the Instruction Manual.	
		4)-B Finish of thread path is improper.	Check the finish of each thread path and correct with buff when it is improper.	
	3-5) Position of needle is improper.	5)-A Height of the needle bar is improper.	Adjust the height of needle bar according to 4-(1). Making as the base the adjustment procedure described in the Instruction Manual, in accordance with the conditions of cloth and thread, perform fine adjustment according to 4-(21). • When setting the needle bar somewhat in the lower position, be careful of needle thread lock between needle and needle guard section of inner hook at the lower dead point of needle bar. • When setting the needle bar somewhat in the upper position, be careful of the contact of the blade point of hook with the belly section of needle.	
	3-6) Setting of needle cooler is improper.	6)-A Air pressure of needle cooler is too high.	Set the air pressure to the proper one (as low as possible) according to the Instruction Manual. When the air pressure is too high, needle thread becomes unstable and inferior product is apt to occur.	
		6)-B Direction of air blow is improper.	Adjust the direction of air blow according to the Instruction Manual.	
	3-7) Needle is improper	7)-A Installation of needle is improper. (Direction and insertion are improper.)	Install needle again	
	4. Needle breakage	4-1) Position of needle is improper.	1)-A Lateral position of needle and needle hole of throat plate is improper.	Adjust the lateral position of the needle.
			1)-B Lateral position of needle and needle hole of presser foot is improper.	Loosen the presser bar bracket and correct the lateral position of the presser. It is the aim that the center of needle in terms of the center of needle hole of the presser foot is slightly located to the right side.
		4-2) Hemming binder components	2)-A Edge of fold of hemming is sewn.	Properly correct the lateral position of the binder.
			2)-B Sewing is performed in the state that hemming is rolled in more than three folds.	Adjust by handling so that correct hemming is performed. (When cloth becomes thicker than necessary due to inferior rolling, needle breakage is apt to occur.)
2)-C Sewing quality of the previous process (especially, lapping seam) is inferior.			Check the rolled condition of the previous process. (When cloth becomes thicker than necessary due to inferior rolling of the previous process, needle breakage is apt to occur.)	
4-3) Thread tension components		3)-A Needle thread tension is too high.	Decrease the tension.	

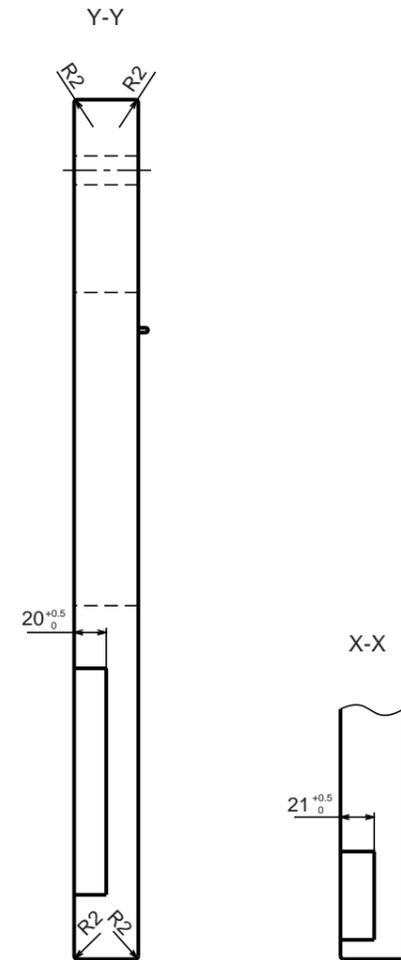
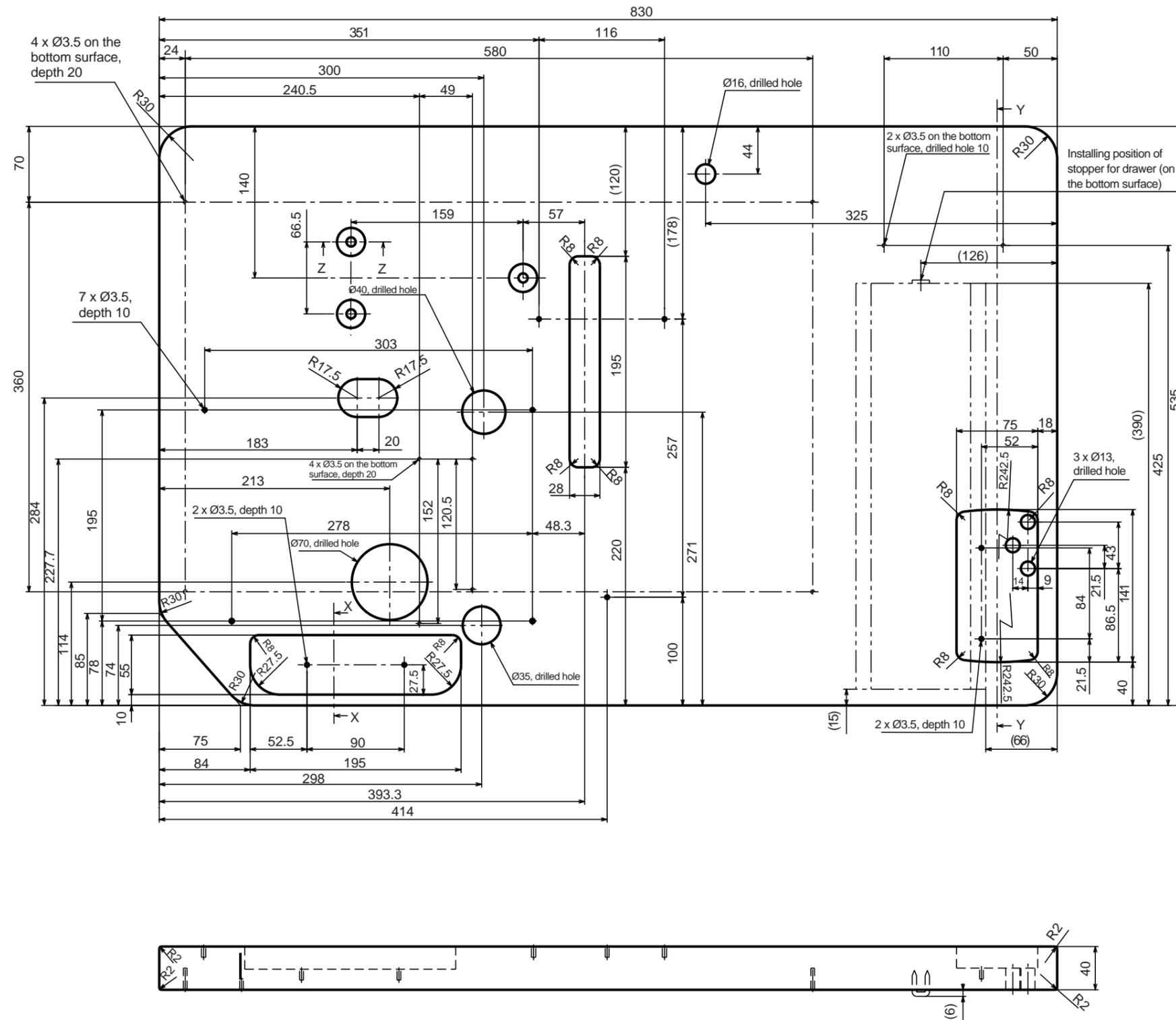
Troubles	Cause (1)	Cause (2)	Corrective measures
5. Balloon stitch Irregular stitches	5-1) Needle components	1)-A Kind of needle is improper.	Replace the needle with a proper one. SCHMETZ UY180GVS is recommended.
		1)-B Blunt of needle tip	Replace the needle.
		1)-C Needle is too thin for the thread used.	Use a thick needle.
	5-2) Position of needle is improper.	2)-A Lateral position of needle and needle hole in throat plate is improper.	Correct the lateral position of needle. Alignment of the center of needle hole of throat plate with the center of needle is the aim. However, especially when the needle is located to the left side, draw-up by thread take-up lever is hindered and balloon stitch is apt to occur.
		2)-B Position of needle and throat plate is improper.	Adjust the initial position of the needle bar in accordance with 4 - (14). Clearance between needle bar and presser bar is 9 mm. If the clearance between needle and needle hole is small when needle bar goes up, thread take-up by the thread take-up lever is hindered and especially, balloon stitch at the overlapped section is apt to occur.
		2)-C Lateral position of needle and needle hole in the presser foot is improper.	Loosen the presser bar bracket and correct the lateral position of presser. It is the aim that the center of needle in terms of the center of needle hole of presser foot is slightly located to the right side. However, especially when needle is located to the left side, draw-up by thread take-up lever is hindered and balloon stitch is apt to occur.
		2)-D Height of needle bar is too low.	Check again 4. - (1) Adjusting the height of the needle bar. In case of 1.7 fold hook, when the needle bar is excessively lowered, needle thread is locked between needle and the needle guard section of inner hook at the lower dead point of the needle bar, and balloon stitch is apt to occur.

To the next page

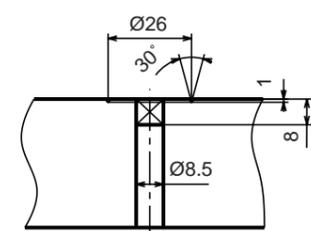
Troubles	Cause (1)	Cause (2)	Corrective measures
From the previous page			
5-3) Needle feed components	3)-A Scale of needle feed dial is not adjusted to the needle feed amount corresponding to cloth feed amount.		Adjust the scale of needle feed dial to the needle feed amount corresponding to the cloth feed amount of the selected gear.
	3)-B Assembling of needle feed adjustment mechanism is improper.		Re-check the assembling of the needle feed adjustment mechanism according to 3) and 4) of 4-13.
5-4) Setting of needle cooler is improper.	4)-A Air pressure of needle cooler is too high.		Set the air pressure to the proper one (as low as possible). When the air pressure is too high, needle thread becomes unstable and inferior product is apt to occur.
5-5) Thread tension components	5)-A Thread tension is improper.		Properly adjust the thread tension. When the thread tension is too low, needle thread is not fully drawn up and when it is too high, twist becomes tight and balloon stitch is apt to occur.
	5)-B Bobbin thread tension is too low.		Adjust to proper bobbin thread tension. 0.5N is recommended for spun thread #20. Even when thread tension is proper, if bobbin thread tension is too low, balloon stitch is apt to occur. Apply a proper load to bobbin thread tension.
	5)-C Tension of thread take-up spring is improper.		Correct to the proper tension. (0.2N is recommended.)
	5)-D Stroke of thread take-up spring is improper.		Correct to the proper stroke. (8 mm is recommended.)
	5)-E Tension of thread tension No. 1 is improper.		Adjust the tension to such an extent that thread between thread tensions No. 1 and No. 2 does not move roughly. (However, when tension of thread tension No. 1 is excessively high, thread trimming performance is affected. Do not make the tension excessively high.)
	5)-F Stroke of thread take-up lever is large.		Correct to the proper stroke at the position of arm thread guide A.
5-6) Hook components	6)-A Rotation is not smooth.		Replace the hook.
	6)-B Play of inner hook is large.		
	6)-C Hook timing is improper.		Correct to the proper timing.
	6)-D Clearance between hook and bobbin case stopper is small.		Correct the clearance according to 4. - (2) Hook timing. 0.8 mm is recommended.
5-7) Thread path components	7)-A Threading is wrong.		Check the threading according to the Instruction Manual.
	7)-B Finish of thread path is improper.		Check the finish of each thread path. When it is improper, correct it with buff.
5-8) Bobbin components	8)-A There is a scratch on the periphery of bobbin.		Replace the bobbin.
	8)-B Finish of inner diameter of bobbin is improper.		
	8)-C Idle-protection spring of bobbin case is weak.		Increase the spring tension.
5-9) Flopping of cloth	9)-A Presser is rising.		Correct the height of presser lifting base according to the Instruction Manual.
	9)-B Pressure of the presser is low.		Adjust the pressure of presser foot according to the Instruction Manual.
	9)-C Presser foot comes in contact with the hemming binder.		Correct the position of binder based on the Instruction Manual. When the presser foot comes in contact with the binder, the presser foot rises or the motion is hindered.

8. DRAWING OF TABLE

Part No. : 40004480



Z-Z (1 : 1) 3 places



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