

ENGLISH

**LU-2810ES-7, LU-2818ES-7
INSTRUCTION MANUAL**

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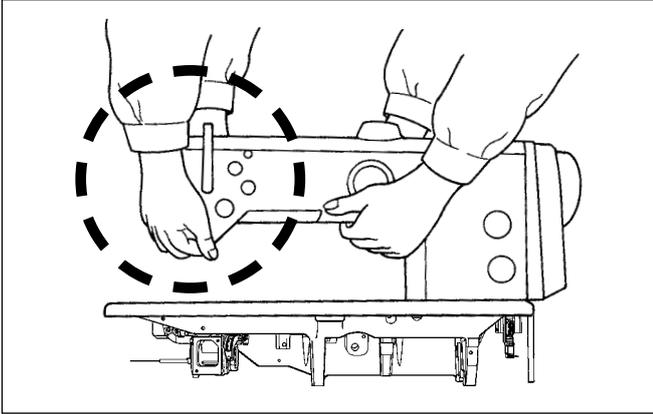
1. SPECIFICATIONS

No.	Item	Application	
		LU-2810ES-7	LU-2818ES-7
1	Model	LU-2810ES-7	LU-2818ES-7
2	Model name	1-needle, unison-feed, lockstitch machine with automatic thread trimmer (with 2.0-fold vertical axis hook/long pitch type)	1-needle, unison-feed, lockstitch machine with automatic thread trimmer (with 2.7-fold vertical axis hook/long pitch type)
3	Application	Medium- to heavy-weight materials, car seat, furniture	
4	Sewing speed	Max. 3,800 sti/min (See "6. SEWING SPEED TABLE" p.37.) *1	Max. 3,500 sti/min (See "6. SEWING SPEED TABLE" p.37.) *1
5	Needle	GROZ-BECKERT 135×17 (Nm 125 to Nm 200) (Standard : Nm 160)	
6	Applicable thread size for sewing	#30 to #0	
7	Applicable thread size to be cut	#30 to #0	
8	Stitch length	Max. 12 mm (forward/reverse feed)	
9	Stitch length dial	2-pitch dial	
10	Presser foot lift	Hand lifter : 10 mm Automatic presser foot lifter : 20 mm	
11	Stitch length adjusting mechanism	By dial	
12	Reverse stitch adjusting method	Air cylinder type (with touch-back switch)	
13	Thread take-up	Link thread take-up	
14	Needle bar stroke	40 mm	
15	Amount of the alternate vertical movement	1 mm to 9 mm (Alternate vertical dial adjustment type)	
16	Hook	Full-rotary vertical-axis 2.0-fold hook (Latch type)	Full-rotary vertical-axis 2.7-fold hook (Latch type)
17	Feed mechanism	Box feed	
18	Top and bottom feed actuation mechanism	Timing belt	
19	Thread trimming method	Cam-driven scissors type	
20	Lubrication	Automatic lubrication by oil tank (with oil gauge)	
21	Lubricating oil	JUKI NEW DEFRIX OIL No.1 (equivalent to ISO standard VG7) or JUKI MACHINE OIL #7	
22	Bed size	643 mm × 178 mm	
23	Space under the arm	347 mm × 127 mm	
24	Hand wheel size	Outer diameter : ø123 mm	
25	Motor/Control box	SC-923	
26	Machine head weight	65.5 kg	
27	Rated power consumption	600 VA	
28	Noise	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation: A-weighted value of 84.0 dB; (Includes $K_{pA} = 2.5$ dB); according to ISO 10821-C.6.2 - ISO 11204 GR2 at 3,000 sti/min. - Sound power level (L_{WA}); A-weighted value of 94.0 dB; (Includes $K_{WA} = 2.5$ dB); according to ISO 10821-C.6.2 - ISO 3744 GR2 at 3,800 sti/min.	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation: A-weighted value of 84.0 dB; (Includes $K_{pA} = 2.5$ dB); according to ISO 10821-C.6.2 - ISO 11204 GR2 at 3,000 sti/min. - Sound power level (L_{WA}); A-weighted value of 94.0 dB; (Includes $K_{WA} = 2.5$ dB); according to ISO 10821-C.6.2 - ISO 3744 GR2 at 3,500 sti/min.

*1 The speed setting according to the amount of the alternating vertical movement of the walking foot and presser foot is automatically carried out.

2. INSTALLATION

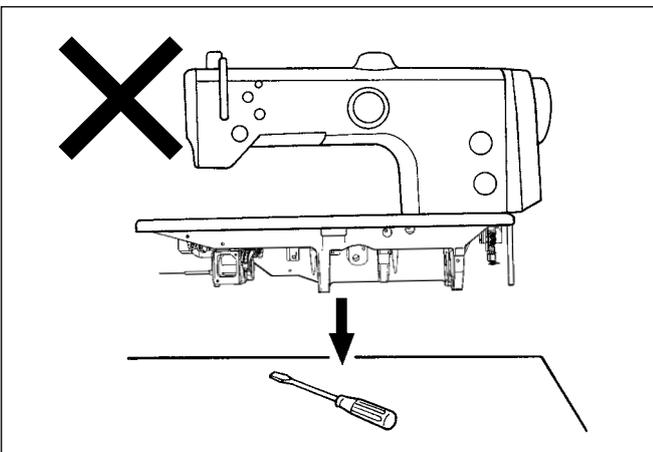
2-1. Installation of the sewing machine



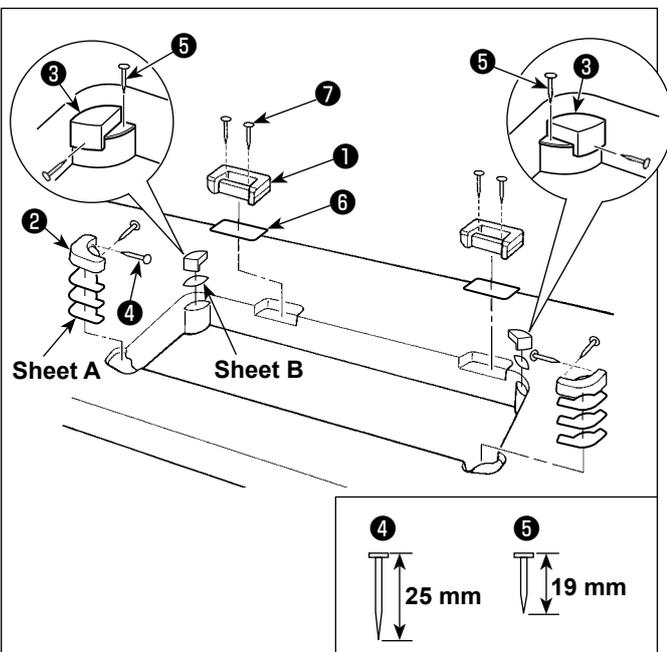
- 1) To prevent possible accidents caused by the full of the sewing machine, perform the work by two persons or more when the machine is moved.



Do not hold the pulley and the reverse feed lever.



- 2) Do not put protruding articles such as the screwdriver and the like at the location where the sewing machine is placed.



- 3) Attaching the hinge seats and the support rubbers of the machine head
Fix accessory hinge seat **1** supplied with the unit on the table with wood screw **7** while putting seat plate **6** under the hinge seat as shown in the figure on the left.

Fix machine head support rubbers **2** and **3** on the table with nails while putting sheets A (standard: 3 pieces) and sheet B (standard: 1 piece) under the machine head support rubbers. Use nail **5** for sheet B and nail **4** for sheets A. There are two different machine head support rubbers **3**; i.e., the rubber for the right and that for the left. Be sure to check the types of the support rubbers before fixing them.

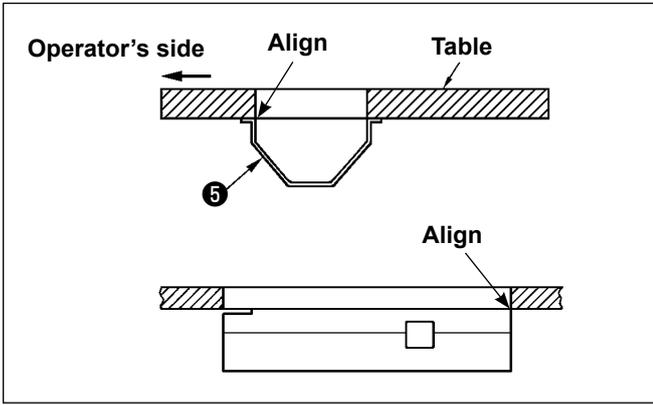
Sheet A (eight pieces) and sheet B (four pieces) are supplied with the machine as accessories.

For the sheet A, three sheets are to be used as standard for each mounting position. For the sheet B, one sheet is to be used as standard. (The state shown in the left figure)

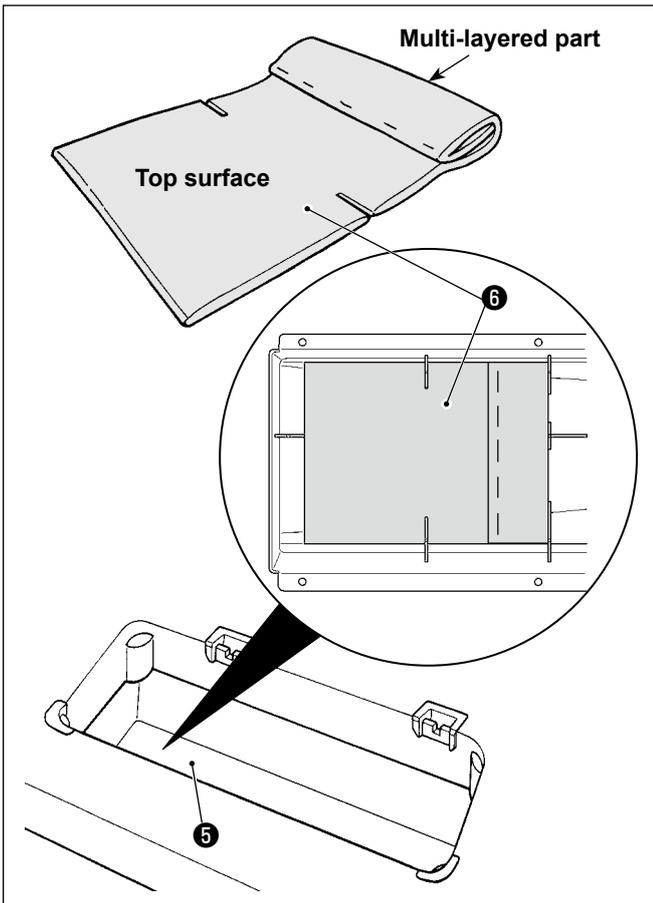
The sheets A and B are used for adjusting the height of the top surface of the bed. Use one more sheet to increase the height, or use only one sheet to decrease it.



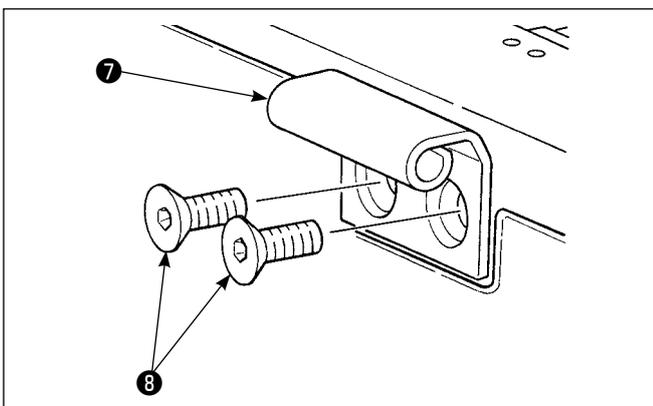
Be sure to use a short nail **5 for sheet B. If long nail **4** is used, the nail tip can penetrate the table giving rise to a risk of injury.**



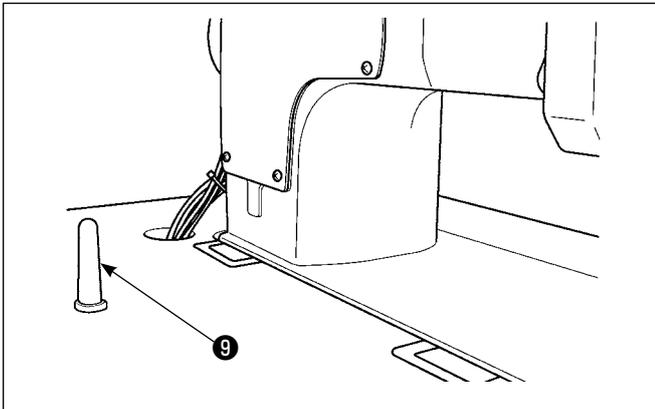
- 4) Attaching the oil pan
Fix the oil pan 5 supplied with the machine on the table by tightening ten wood screws.



- 5) Attach a filter 6 to the oil pan 5 as shown in the figure.
Install filter 6 so that its multi-layered part is brought to the right side as observed from you.



- 6) Install hinge 7 on the bed with screw 8. Engage the hinge with the rubber hinge of the table. Then, place the machine head on the machine head support rubber.

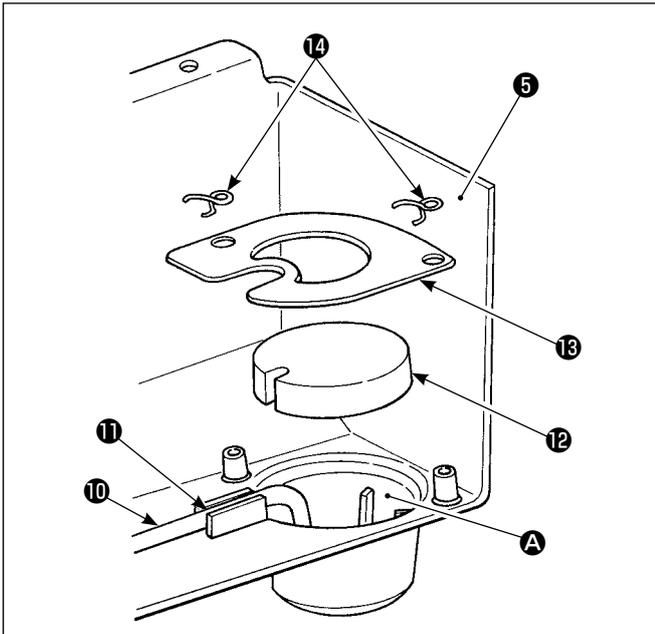


- 7) Securely attach head support rod **9** until its rib is closely pressed against the table.

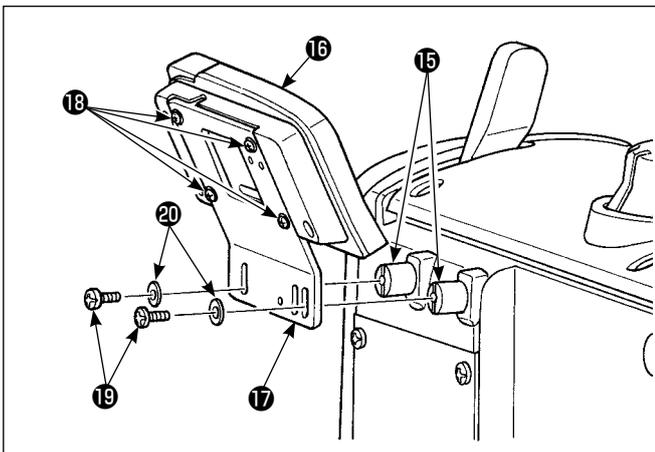


When it is really necessary to conduct work with the machine head supporting rod removed for the purpose of maintenance and repair, it is necessary to carry out the work with two or more persons.

In the case the machine head is tilted more than necessary, oil can leak from the oil inlet of the oil tank. It is, therefore, necessary to remove oil from the oil tank before tilting the machine head.



- 8) Put reflux pipe **10** in the oil reservoir **A** of oil pan **5**. Secure the pipe in groove **11**.
- 9) Fix filter **12** and filter clamp **13** with fitting **14**.



- 10) Mount spacers **15** supplied with the machine head on the frame.
- 11) Install bracket **17** on CP panel **16** with screws **18** supplied with the panel.
- 12) Install bracket **17** on spacer **15** with screws **19** supplied with the machine head and washers **20** supplied with the panel.



Do not use the screws supplied the panel instead of screws **19 supplied with the machine head.**

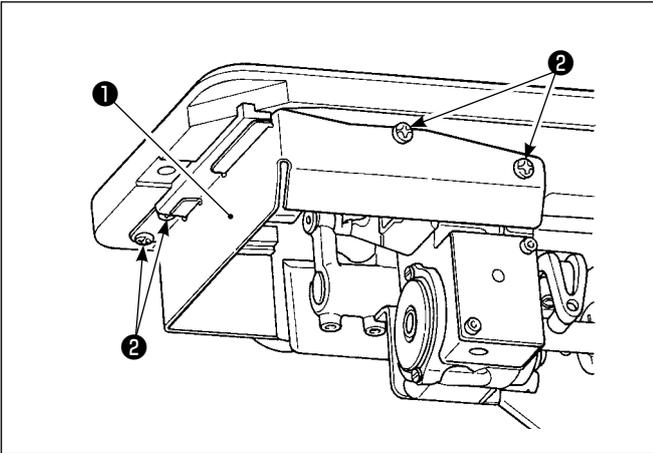
- * Accessory screw **19** supplied with the machine head: Thread diameter M5; Length: 8 mm

2-2. Installing the oil shield



WARNING :

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



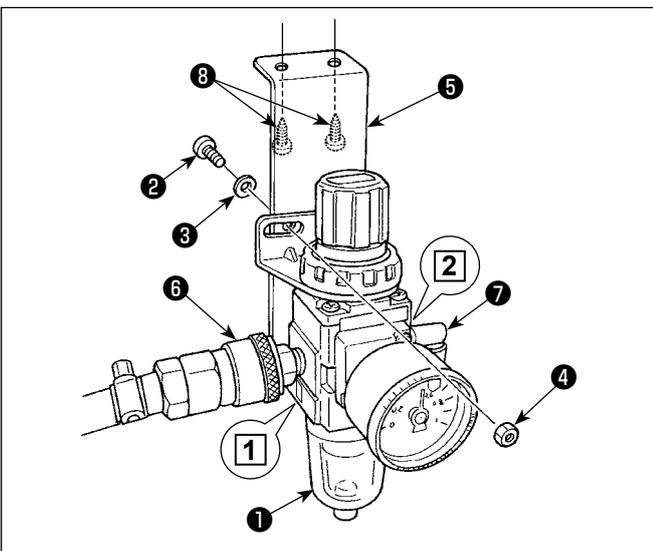
Install oil shield **1** , supplied with the unit, on the frame with screws **2** .

2-3. Pneumatic components



WARNING :

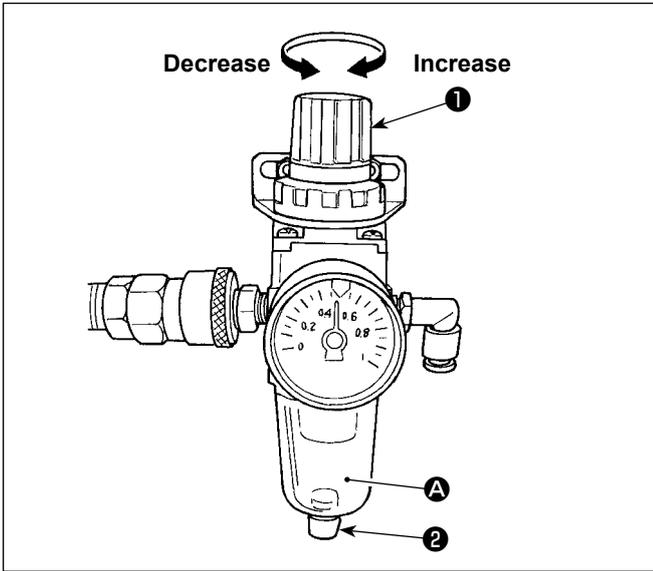
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



(1) Installing the regulator

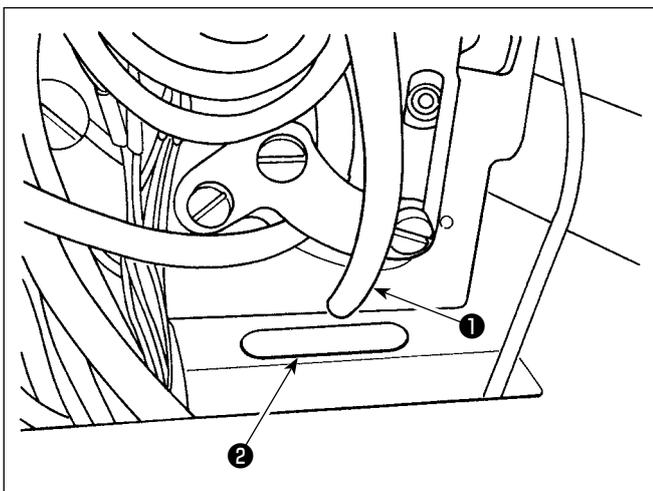
- 1) Install regulator (asm.) **1** on mounting plate **5** with screw **2** , spring washer **3** and nut **4** which are supplied with the unit.
- 2) Attach joint **6** to inlet **1** . Attach joint **7** to outlet **2** .
- 3) Attach mounting plate **5** on the undersurface of the table with accessory screws **8** supplied with the plate.
- 4) Connect $\varnothing 6$ air tube coming from the sewing machine to coupling **7** .

* Screw **2** which is supplied with the unit:
Thread diameter M5; Length: 12 mm
(SM6051202TP)



(2) Adjusting the air pressure

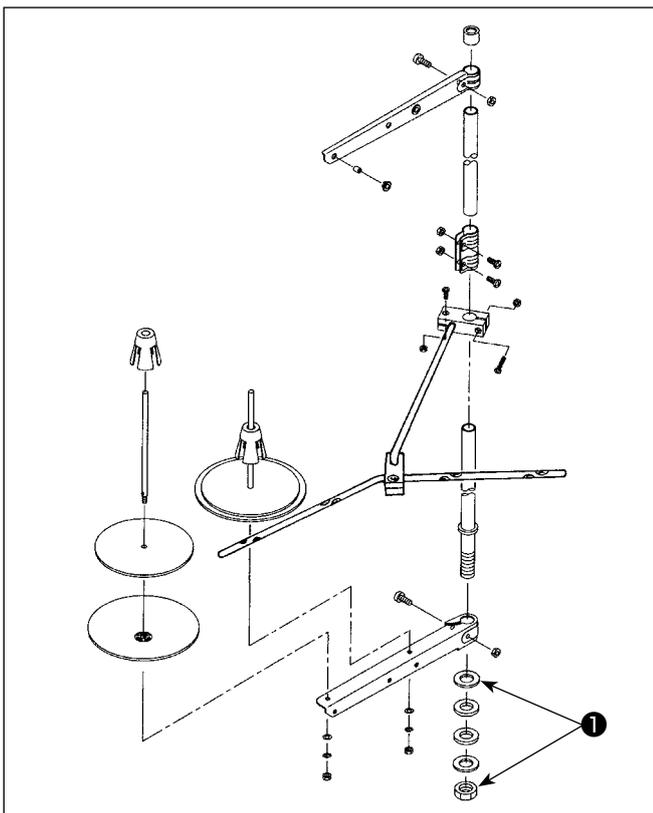
- 1) The operating air pressure is 0.5 to 0.55 MPa. Adjust the air pressure using air pressure regulating knob ❶ of the filter regulator.
- 2) In the case fluid accumulation is observed in ❷ section of the filter regulator, turn drain cock ❸ to drain the fluid.



(3) Exhaust tube

Pass $\varnothing 8$ exhaust tube ❶ coming from the sewing machine through hole ❷ in the table. In the case of high humidity, water may flow out from the exhaust tube.

2-4. Installing the thread stand



Assemble the thread stand, set it up on the machine table using the installation hole in the table and tighten nut ❶ gently.

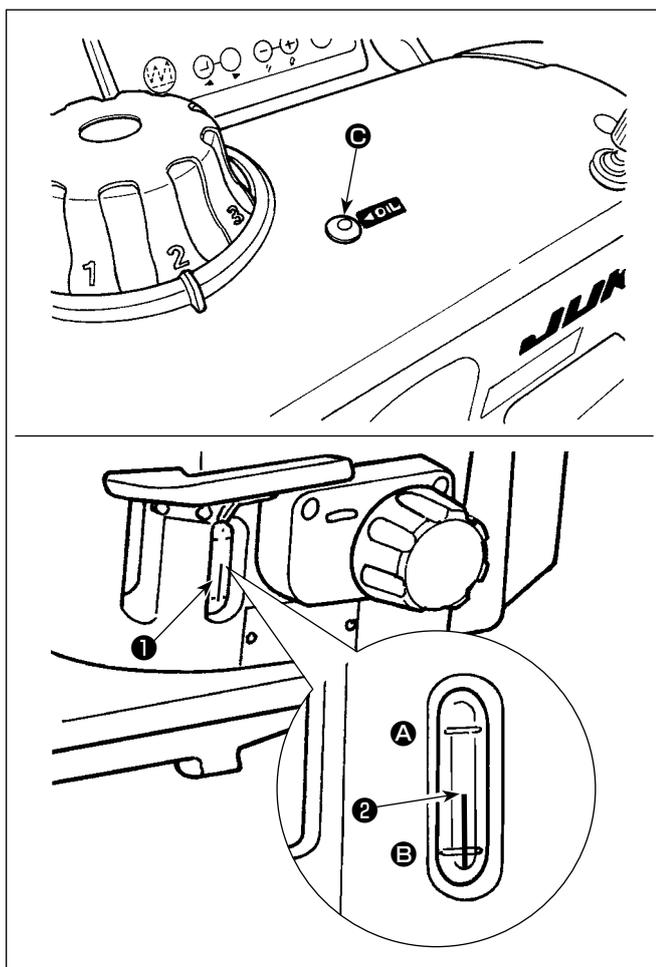
3. PREPARATION OF THE SEWING MACHINE

3-1. Lubrication

WARNING :



1. Do not connect the power plug until the lubrication has been completed so as to prevent accidents due to abrupt start of the sewing machine.
2. To prevent the occurrence of an inflammation or rash, immediately wash the related portions if oil adheres to your eyes or other parts of your body.
3. If oil is mistakenly swallowed, diarrhea or vomiting may occur. Put oil in a place where children cannot reach.



■ Lubrication procedure

Fill the oil tank with oil before operating the sewing machine.

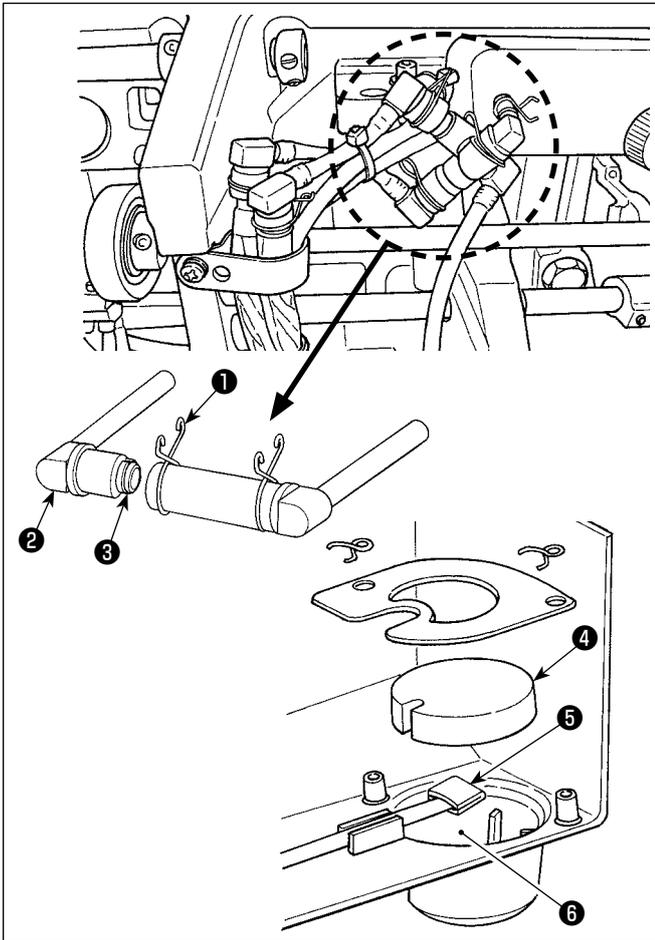
- 1) Fill the oil tank with JUKI NEW DEFRIX OIL No.1 (Part No. : MDFRX1600C0) or JUKI MACHINE OIL #7 (Part No. : MML007600CA) using the oiler supplied with the machine from section **C**.
- 2) Fill the oil tank with the oil until the top end of oil amount indicating rod **2** comes between the upper engraved marker line **A** and the lower engraved marker line **B** of oil amount indicating window **1**.
If the oil is filled excessively, it will leak from the air vent hole in the oil tank or proper lubrication will be not performed. In addition, when the oil is vigorously filled, it may overflow from the oil hole. So, be careful.
- 3) When you operate the sewing machine, refill oil if the top end of oil amount indicating rod **2** comes down to the lower engraved marker line **B** of oil amount indicating window **1**.

1. When using a new sewing machine for the first time or using the sewing machine which has not been used for a long time, run in the sewing machine at a sewing speed of 1,000 sti/min or less and check the oil quantity in the hook before use.



If the quantity of oil in the hook is insufficient, adjust the quantity of oil by turning the oil quantity adjusting screw counterclockwise to ensure that the oil quantity in the hook is adequate. After that, adjust the quantity of oil to the adequate one. (Refer to " **■ Adjusting the oil quantity in the hook**" p.8.)

2. For the oil for hook lubrication, purchase JUKI NEW DEFRIX OIL No. 1 (Part No. : MDFRX1600C0) or JUKI MACHINE OIL #7 (Part No. : MML007600CA).
3. Be sure to lubricate clean oil.



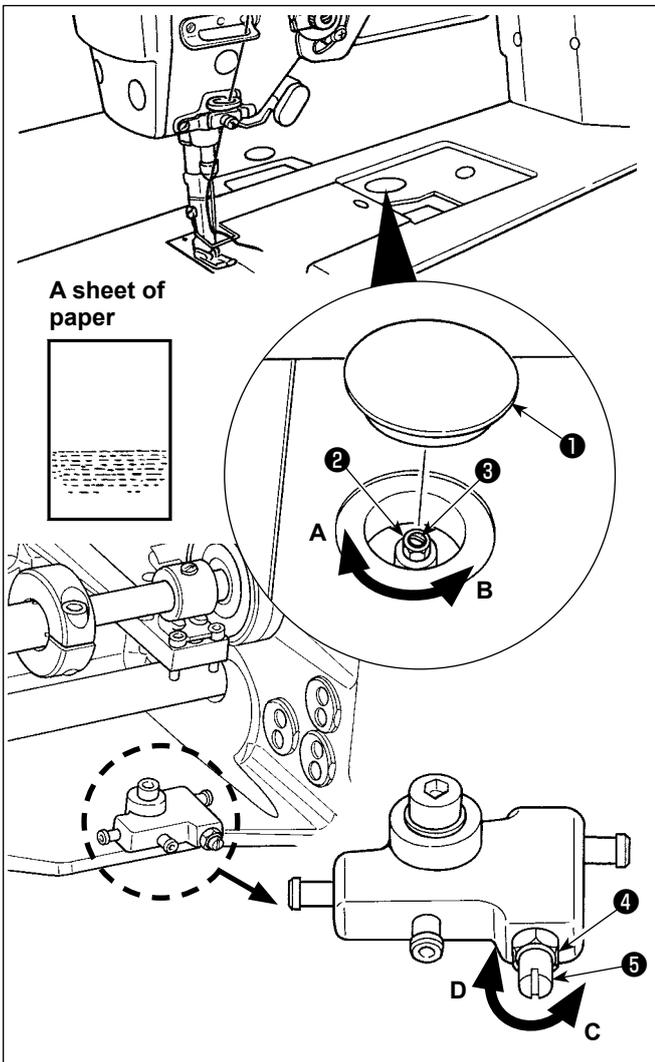
■ Cleaning the oil filter

- 1) Loosen fastening plate ① on the back-flow side. Remove oil filter joint (asm.) ② on the back-flow side.
- 2) Clean up filters ③, ④ and ⑤ and oil reservoir ⑥ of the oil pan.



Be sure to clean up the oil reservoir of the oil pan and the filter case approximately once a month.

If the filter is clogged with soil, lubrication fails resulting in trouble.



■ Adjusting the oil quantity in the hook

- 1) Remove rubber cap ①.
- 2) Loosen nut ② and turn oil amount adjustment screw ③ to adjust the amount of oil in the hook. Turning the screw clockwise **A** will decrease the amount of oil in the hook or counterclockwise **B** will increase it.
- 3) The appropriate amount of oil, when a sheet of paper is placed near the periphery of the hook, is to such an extent that splashes of oil from the hook appear in approximately five seconds as shown in the figure on the left.



In the case the oil quantity in the hook cannot be adjusted to the proper quantity, it should be adjusted by loosening nut ④ and turning oil quantity adjusting screw ⑤. The oil quantity in the hook is increased by turning the oil quantity adjusting screw counterclockwise **C**, or is decreased by turning it clockwise **D**.

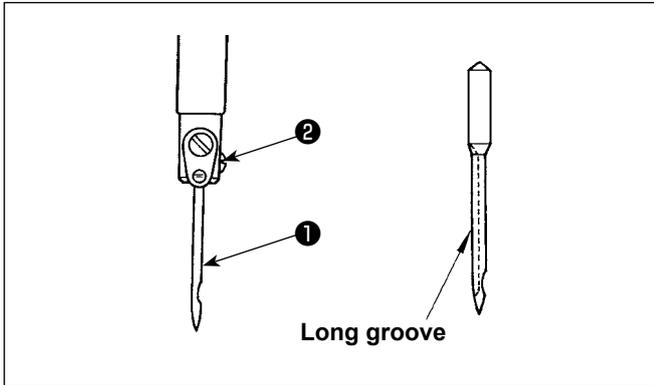
Also check to be sure that the oil is fed to the hook at the sewing speed of 1,000 sti/min.

3-2. Attaching the needle



WARNING :

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



Switch "OFF" the motor.

Use 135×17 needles.

- 1) Turn the handwheel to bring the needle bar to the highest position of its stroke.
- 2) Loosen needle clamp screw ② . Hold the needle so that the long groove on needle ① faces directly to the right.
- 3) Push needle ① deep into the needle clamp hole until it will go no further.
- 4) Tighten needle clamp screw ② firmly.



When replacing the needle, check the clearance provided between the needle and the blade point of hook. (Refer to "4-5. Needle-to-hook relation" p.21 and "4-6. Adjusting the hook needle guard" p.22.)

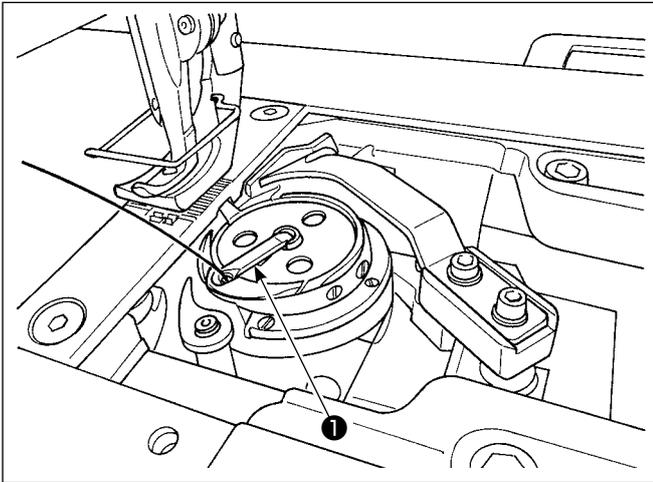
If there is no clearance, the needle and the hook will be damaged.

3-3. Attaching and removing the bobbin



WARNING :

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



- 1) Lift latch ❶ of hook, and take out the bobbin.
- 2) Put the bobbin into the shaft in the hook correctly and release the latch.



1. Do not make the machine run idle with the bobbin (bobbin thread). The bobbin thread is caught in the hook. As a result, the hook may be damaged.

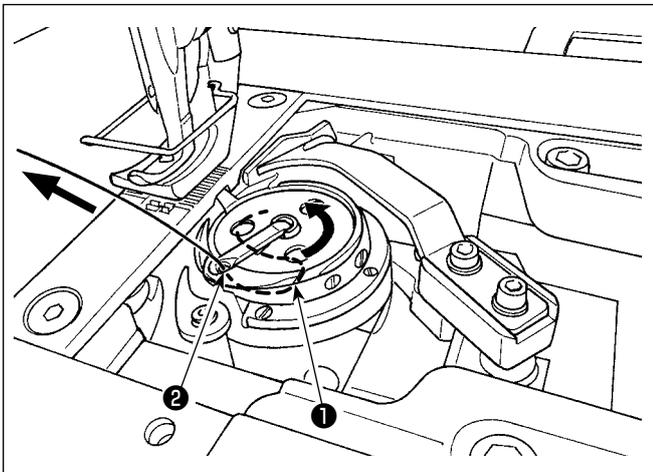
2. Be careful so as not to get hurt with the top end of the counter knife.

3-4. Threading the hook



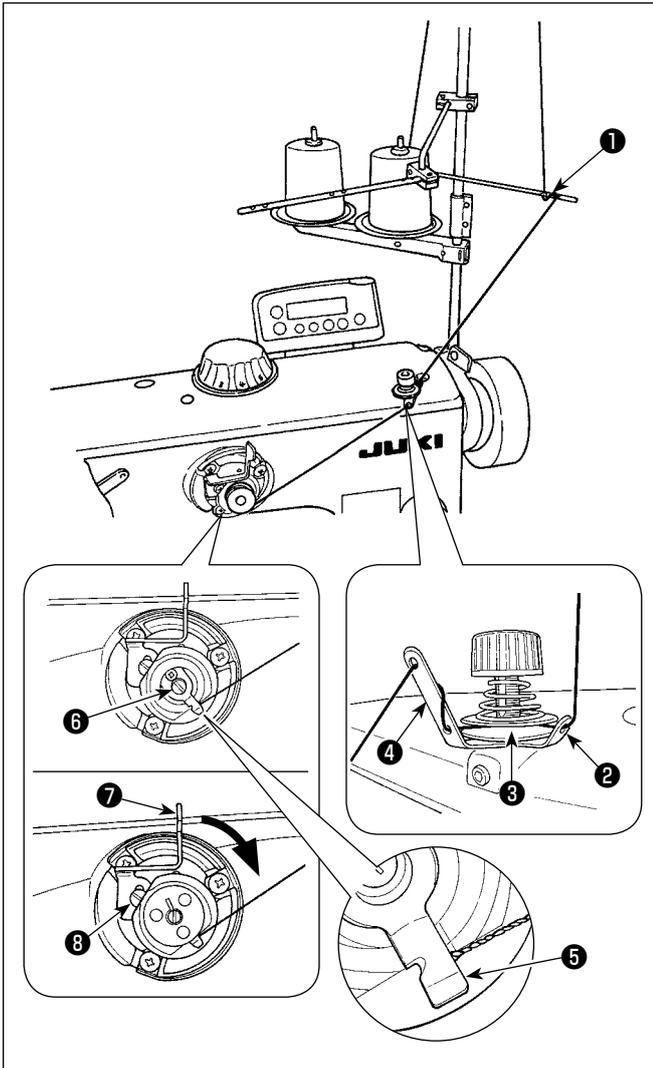
WARNING :

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



- 1) Pass the thread through thread path ❶ in the inner hook and thread hole ❷ in the lever, and slowly draw the thread. Now, the thread passes under the tension spring.
- 2) Make sure that the bobbin revolves in the direction of the arrow when you draw the thread.

3-5. Winding a bobbin



- 1) Pass the thread through sections ❶ to ❷ in the numerical order.
- 2) Put the thread until the root of bobbin thread clamp ❸ is reached. Then, trim the thread. (The thread end is retained under the looper thread clamp.)
- 3) Load a bobbin on bobbin winder shaft ❹.
- 4) Press bobbin winder lever ❺ in the direction of the arrow.
- 5) When you start the sewing machine, the bobbin rotates to automatically wind the thread on itself.
- 6) When the bobbin is filled up, the bobbin winder lever ❺ automatically releases the bobbin and the bobbin winder stops running.



1. The bobbin thread winding amount is adjusted by loosening setscrew ❸. The bobbin thread winding amount is increased by moving bobbin winder lever ❺ upward.
2. If the thread comes off the thread tension controller, wind the thread on the intermediate thread guide by one turn.



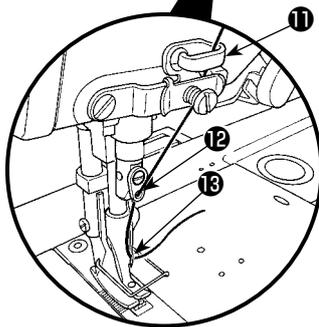
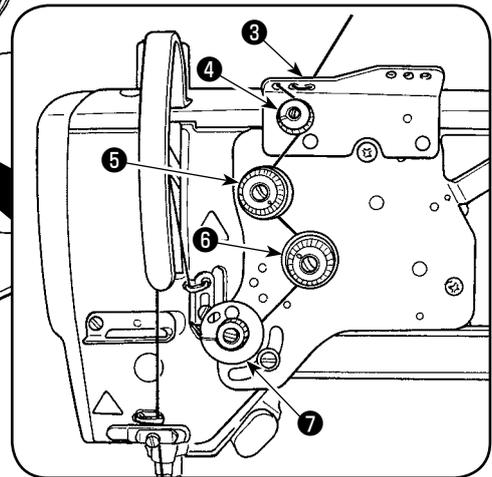
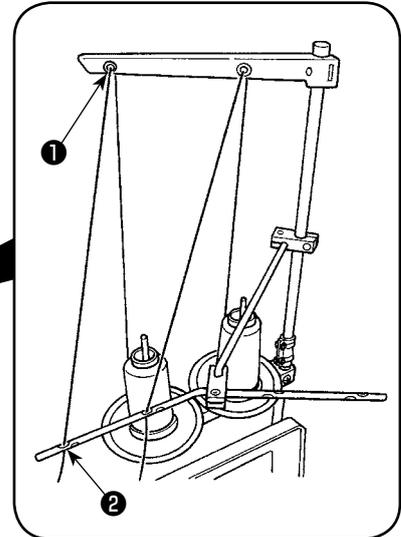
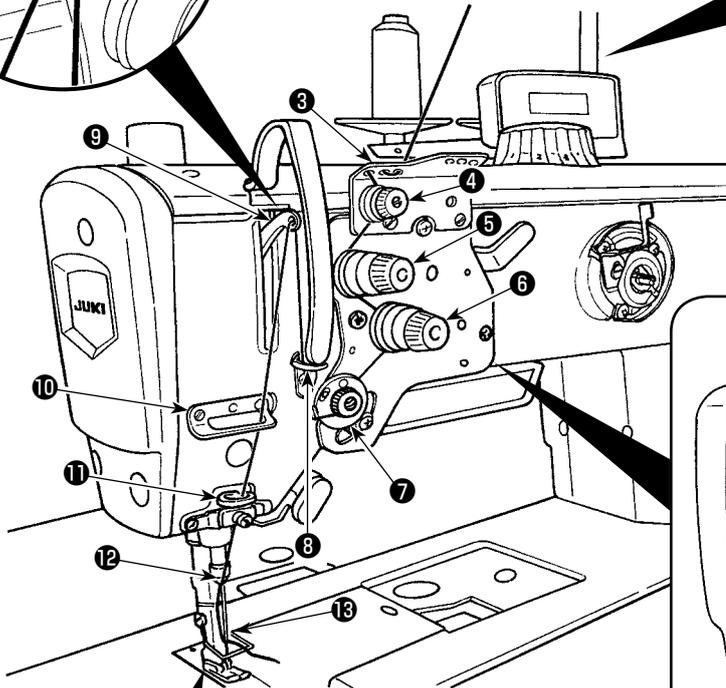
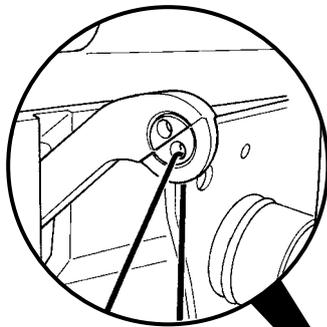
1. This is the one-touch type bobbin winder. When the bobbin is fully wound with thread, bobbin thread clamp ❸ automatically returns to the initial position.
2. To terminate bobbin winding before the bobbin is fully wound with thread, turn the handwheel, while slightly lifting bobbin winder lever ❺, to bring bobbin thread clamp ❸ back to its initial position.
3. If the thread is not brought to the root of the bobbin thread clamp, the thread slips off the bobbin at the beginning of bobbin winding.

3-6. Threading the machine head



WARNING :

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



Thread the machine head following the order as illustrated in the figure.

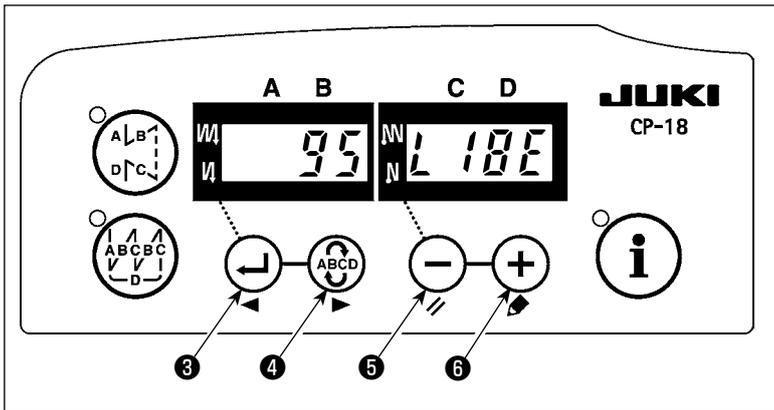
1. Thread guide ⑪ is necessary to prevent the thread from slipping off the needle eyelet when performing thread trimming at a position which is outside the material.
2. If thread tangling failure occurs when starting sewing from the material edge, the thread should be removed from the location where it is clamped with the spring of thread guide ⑪, or thread guide ⑪ should be changed with another one. The thread guide which replaces thread guide is an accessory part supplied with the unit.



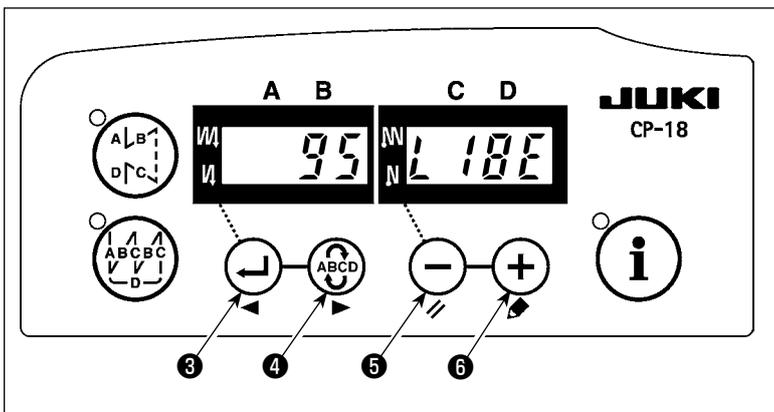
Part number of replacement thread guide: 40169642

3-7. How to set the model of the machine head

• CP-18

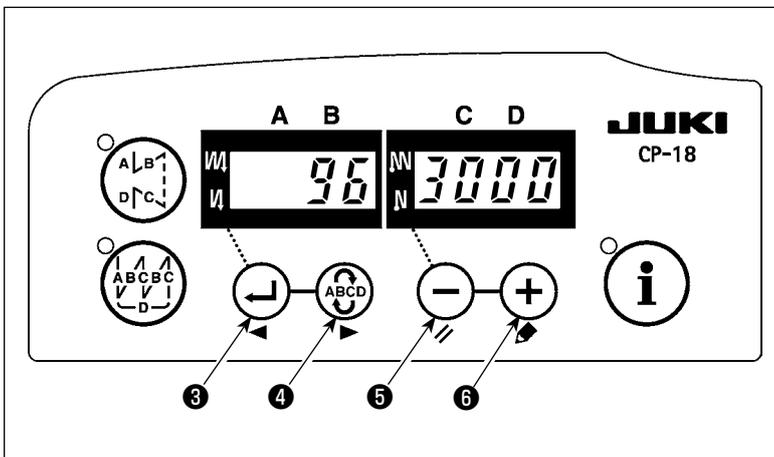


- 1) Call Function Setting No. 95 in reference to "III-6. Function Setting of SC-923" in the Instruction Manual for the SC-923.



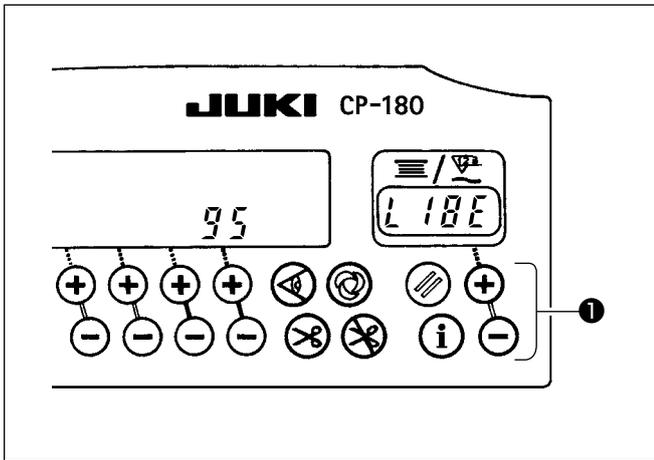
- 2) The type of machine head can be selected by pressing \ominus switch ⑤ (\oplus switch ⑥).
Select the model of the machine head according to the table shown below.

Model	Indication
LU-2810ES-7	L10E
LU-2818ES-7	L18E



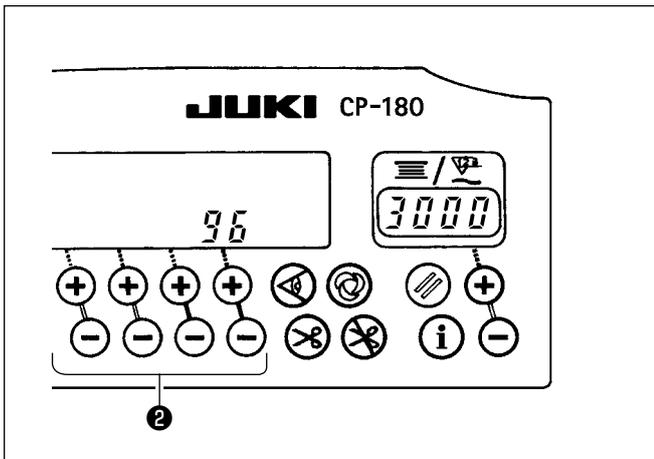
- 3) After selecting the type of machine head, by pressing \curvearrowright switch ③ (\curvearrowleft switch ④), the step proceeds to 94 or 96, and the display automatically changes to the contents of the setting corresponding with the type of machine head.
- 4) Turn the power OFF.

• CP-180



- 1) Refer to "18. FUNCTION SETTING SWITCH" in the Instruction Manual for the CP-180, and call the function setting No. 95.
- 2) The type of machine head can be selected by pressing switch ① .
Select the model of the machine head according to the table shown below.

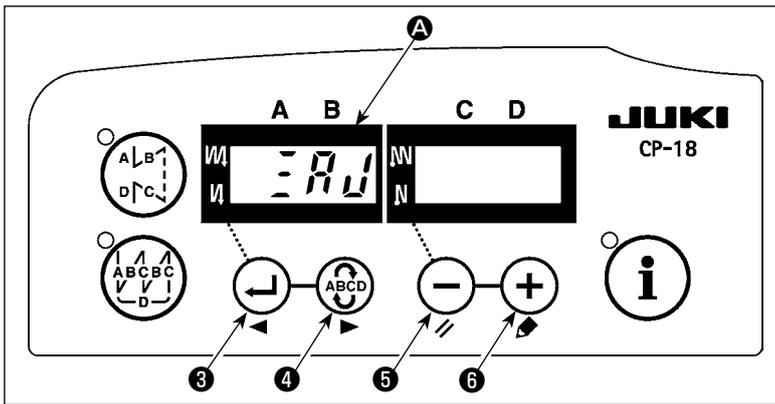
Model	Indication
LU-2810ES-7	L10E
LU-2818ES-7	L18E



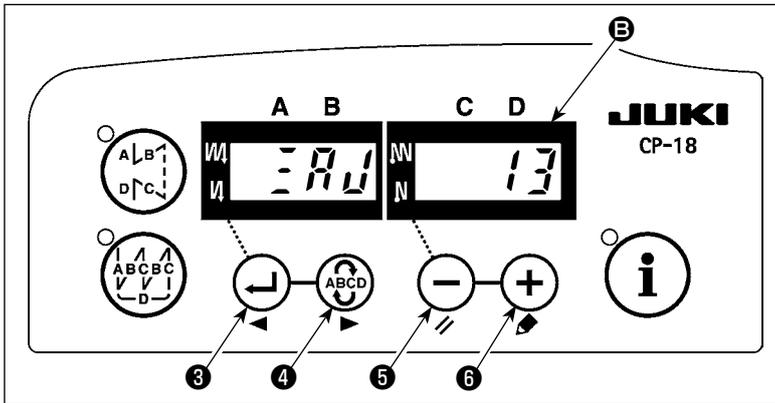
- 3) After selecting the type of machine head, by pressing switch ② , the step proceeds to 96 or 94, and the display automatically initializes to the contents of the setting corresponding with the type of machine head.
- 4) Turn the power OFF.

3-8. Adjusting the machine head

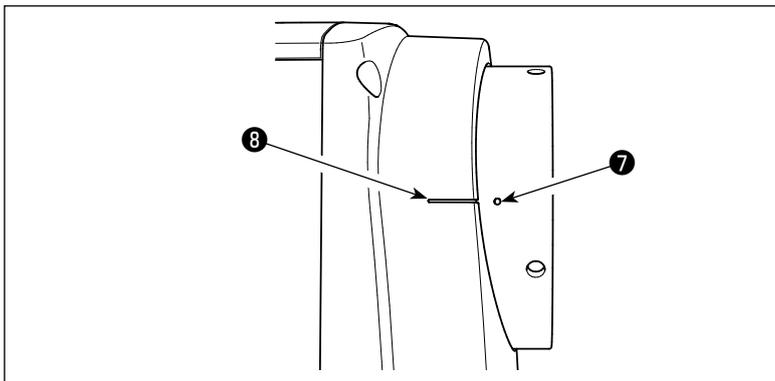
• CP-18



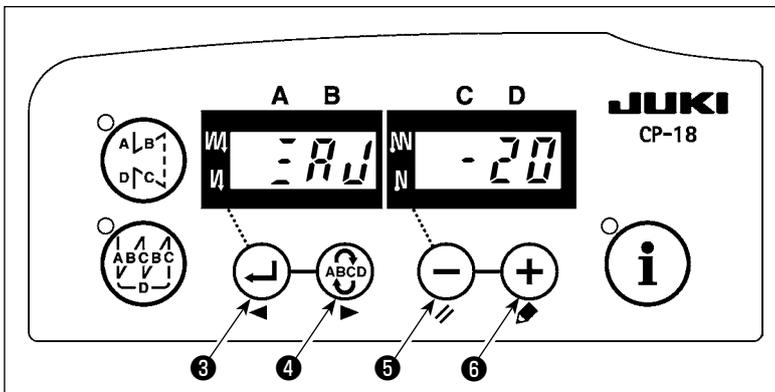
- 1) Simultaneously pressing switch **4** and switch **5**, turn ON the power switch.
- 2) **3RU** is displayed in the indicator **A** and the mode is changed over to the adjustment mode.



- 3) Turn the pulley of the machine head by hand until the main-shaft reference signal is detected. At this time, the degree of an angle from the main-shaft reference signal is displayed on the indicator **B**.
(The value is the reference value.)



- 4) In this state, align one of the marker dots **7** on the pulley with marker line **8** on the pulley cover as shown in the figure.

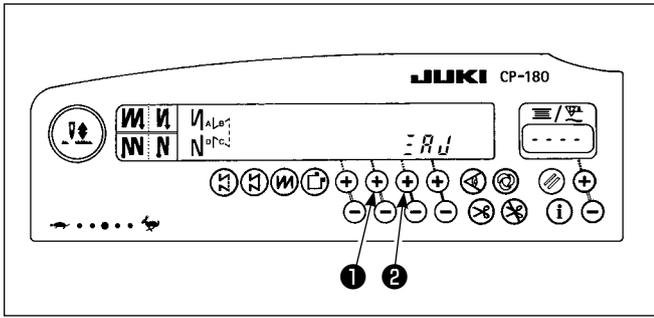


- 5) Press switch **6** to finish the adjustment work. (The value is the reference value.)
- 6) Turn the power OFF.

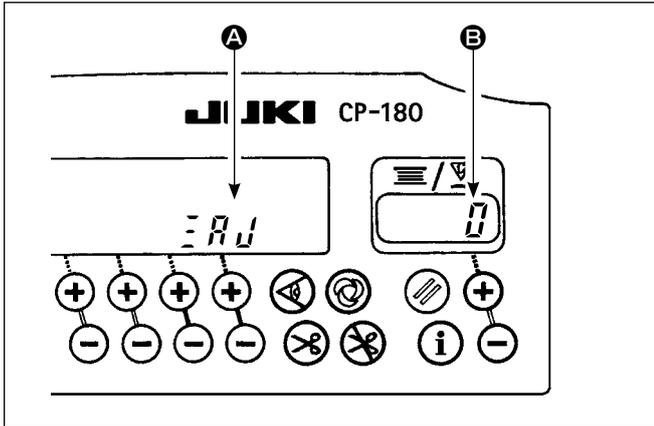


When checking the adjustment result, set "Function setting No. 90; Initial sewing machine movement function" at "1: Initial operation - Sewing machine stops with its needle up". Then, check whether or not marker dot **7** is aligned with marker line **8**. If they are not aligned, carry out the adjustment again.
After checking the adjustment result, return the setting of No. 90 to the previous setting. (Initial value is "2. Initial operation: Sewing machine turns in the reverse direction and stop with its needle up".)
For the function setting procedure, refer to "III-6. How to set the functions of the SC-923" in the Instruction Manual for the SC-923.

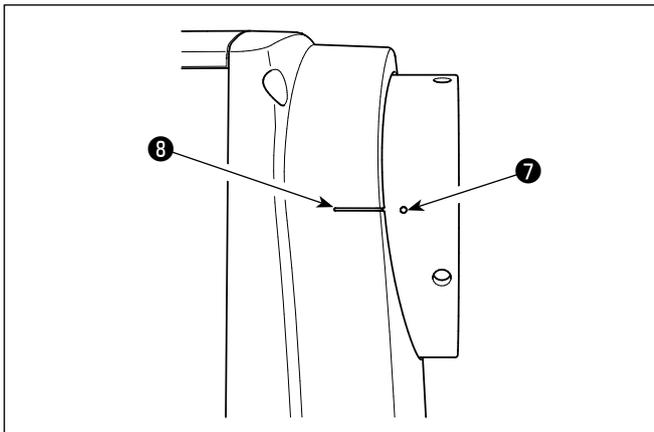
• CP-180



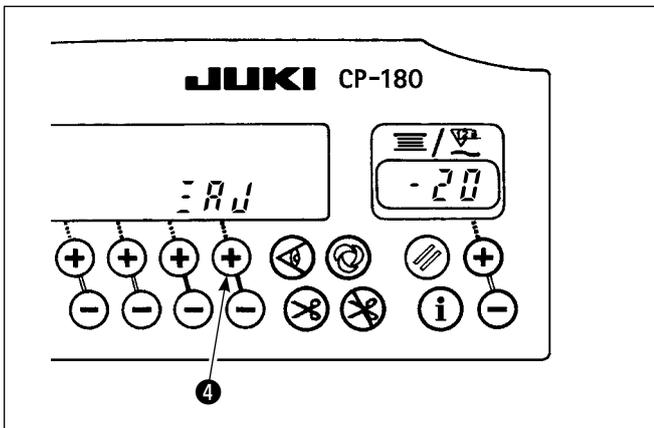
- 1) Simultaneously pressing switch ① and switch ②, turn ON the power switch.



- 2) $\bar{R}U$ is displayed in the indicator A and the mode is changed over to the adjustment mode.
- 3) Turn the pulley of the machine head by hand until the main-shaft reference signal is detected. At this time, the degree of an angle from the main-shaft reference signal is displayed on the indicator B.
(The value is the reference value.)



- 4) In this state, align one of the marker dots ⑦ on the pulley with marker line ⑧ on the pulley cover as shown in the figure.



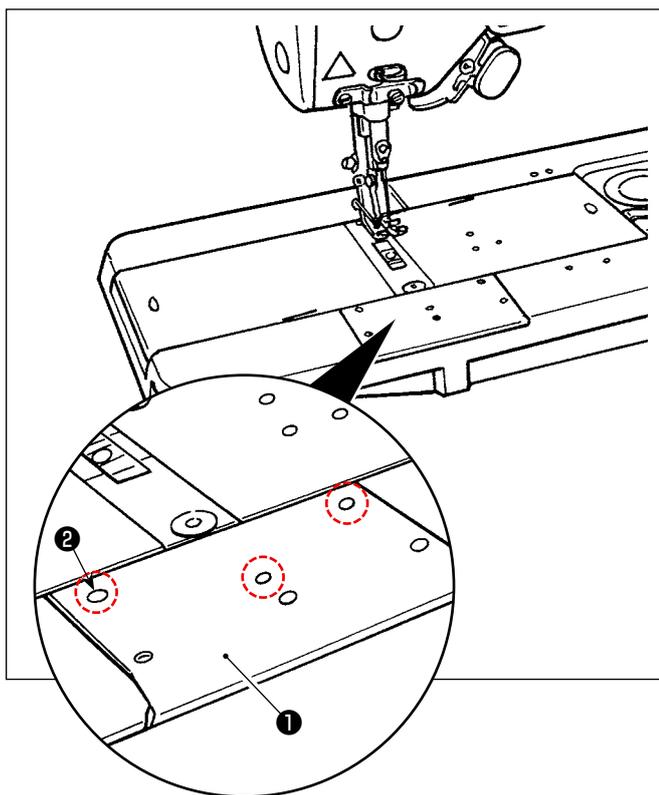
- 5) Press switch ④ to finish the adjustment work.
(The value is the reference value.)
- 6) Turn the power OFF.

Caution

When checking the adjustment result, set "Function setting No. 90; Initial sewing machine movement function" at "1: Initial operation - Sewing machine stops with its needle up". Then, check whether or not marker dot ⑦ is aligned with marker line ⑧. If they are not aligned, carry out the adjustment again. After checking the adjustment result, return the setting of No. 90 to the previous setting. (Initial value is "2. Initial operation: Sewing machine turns in the reverse direction and stop with its needle up".)

For the function setting procedure, refer to "18. How to set the functions" in the Instruction Manual for the CP-180.

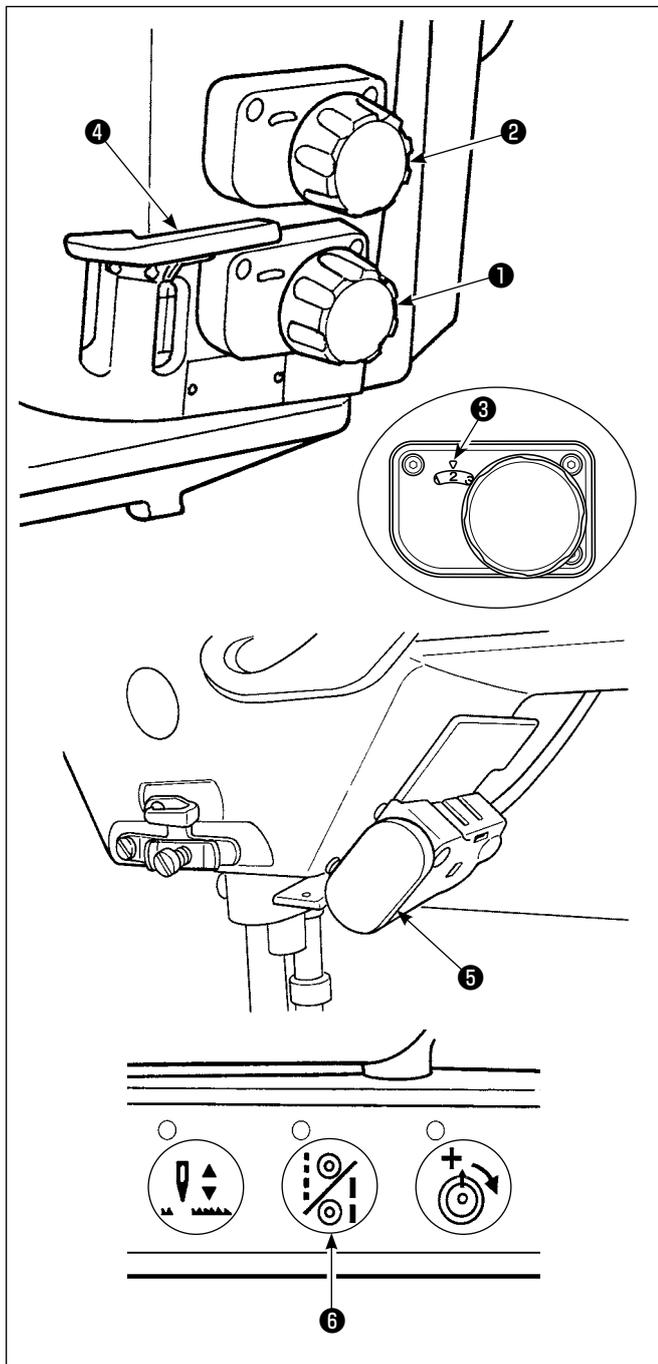
3-9. Installing the attachment



Remove screws ② (three pieces) from front bed slide ① . Install the attachment with those screws.

4. ADJUSTING THE SEWING MACHINE

4-1. Adjusting the stitch length



Turn standard feed adjusting dial ❶ and 2P feed adjusting dial ❷ to align the desired number with marker dot ❸ on the machine dial.

(1) Reverse feed stitching

- 1) Press down reverse feed control lever ❹ .
- 2) Reverse feed stitches are made as long as you keep pressing the lever down.
- 3) Release the lever, and the machine will run in the normal feed direction.

(2) Manual one-touch reverse feed stitching

- 1) Press touch-back switch ❺ .
- 2) Reverse feed stitches are made as long as you keep pressing the lever down.
- 3) Release the switch, and the machine will run in the normal feed direction.

(3) Changing over the stitching pitch

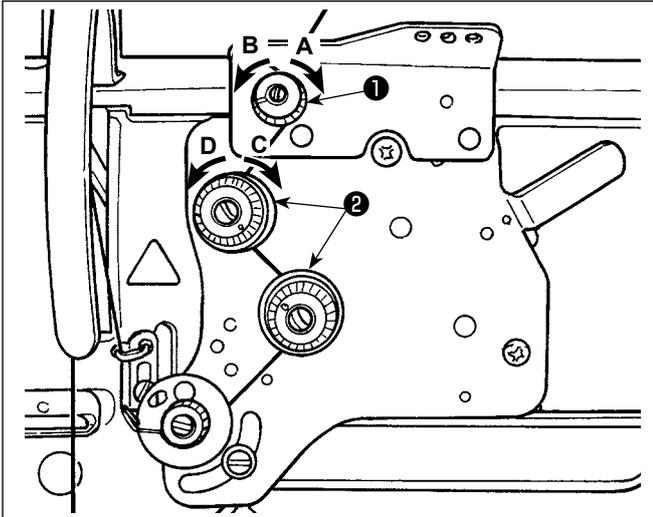
- 1) Press stitching pitch changeover switch ❻ to change over the stitch length to the one corresponding to the scale mark on the 2P feed adjusting dial. (The LED on the switch lights up.)

1. Set 2P feed adjusting dial ❷ at a value smaller than the value set by standard feed adjusting dial ❶ .
2. Adjust the 2P feed adjusting dial when the stitching pitch changeover switch is placed in OFF.
3. In the case standard stitch dial ❶ is set at a small pitch value, move feed control lever ❹ up and down several times before starting sewing.



Refer to "5-7. Operation switches" p.31 for the details of the 2P device.

4-2. Thread tension



(1) Adjusting the needle thread tension

- 1) Turn thread tension nut No. 1 ❶ clockwise **A** to shorten the length of thread remaining on the top of needle after thread trimming. Turn the nut counterclockwise **B** to lengthen it.
- 2) Turn thread tension nut No. 2 ❷ clockwise **C** to increase the needle thread tension, or counterclockwise **D** to decrease it.



Apply the same tension to both of the thread tension nut No. 2.

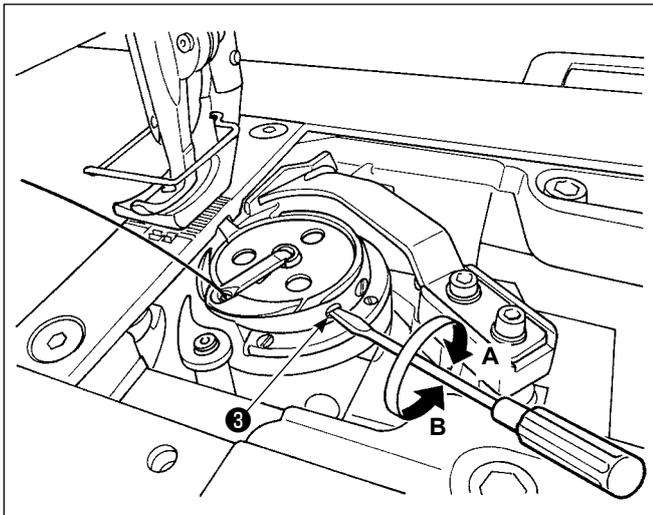


In the case, the length of thread remaining at the needle tip cannot be increased, replace the spring of tension controller No. 1 with 22945505 which is separately available.



WARNING :

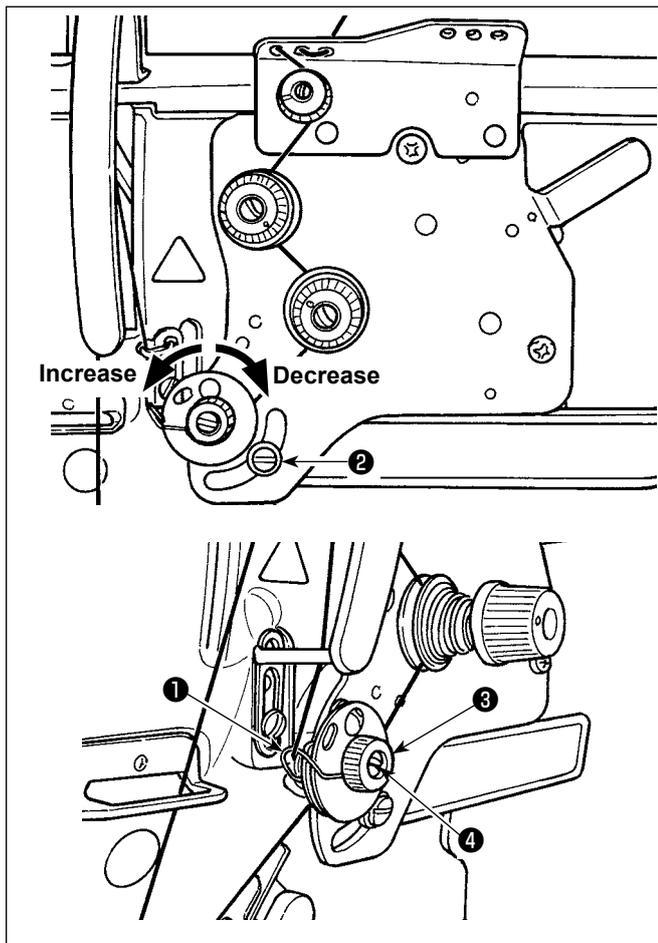
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



(2) Adjusting the bobbin thread tension

Turn tension adjustment screw ❸ clockwise **A** to increase the bobbin thread tension, or counterclockwise **B** to decrease it.

4-3. Thread take-up spring



(1) When you want to change the stroke of the thread take-up spring

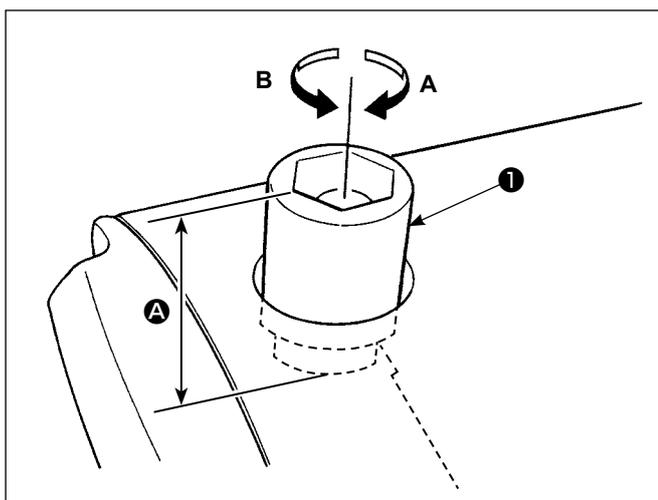
Loosen screw **2**. Adjust thread take-up spring **1** by moving it in the slot.

(2) When you want to change the tension of the thread take-up spring

To adjust the tension of thread take-up spring **1**, loosen nut **3** first. Turn spring shaft **4** counter-clockwise to increase the tension or clockwise to decrease it.

After the adjustment, fix the stud by tightening nut **3**.

4-4. Adjusting the pressure of the presser foot



Turn presser spring regulating dial **1** clockwise **A** to increase the pressure of the presser foot, or counter-clockwise **B** to decrease it.

Caution Be sure to operate the sewing machine with the pressure of the presser foot minimized as long as the presser foot securely holds the material.

The adjustable range extends from 38 to 60 mm which represents the distance from the upper surface **A** of the arm to presser spring regulating dial **1**.

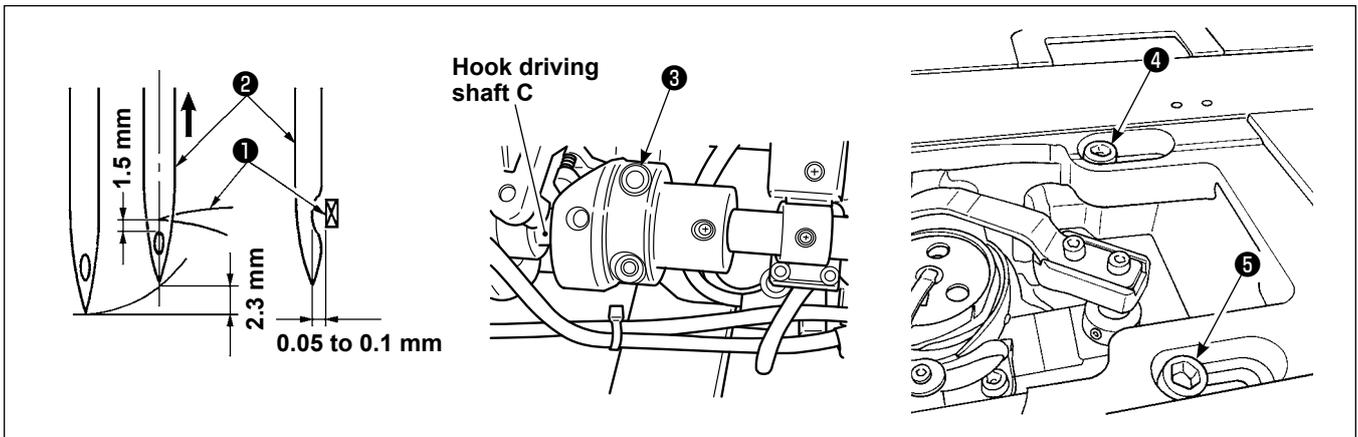
The standard value at the time of shipment is 53 mm.

4-5. Needle-to-hook relation



WARNING :

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



- 1) Adjust the standard feed adjusting dial to "0". (**Caution 1**)
- 2) Loosen connecting shaft clamping screw **3**. Turn the handwheel counterclockwise to lift the needle bar by 2.3 mm from its lower end.
- 3) In the state described in 2), align hook blade point **1** with the center of needle **2**, and tighten connecting shaft clamping screw **3**. At this time, a clearance of 1.5 mm is provided between the blade point of the hook and the top end of the needle eyelet.
- 4) Loosen setscrews **4** and **5** of the hook driving shaft saddle on the top face of the bed. Adjust the clearance between the blade point of the hook and the needle to 0.05 to 0.1 mm by moving the hook driving shaft saddle to the right or left to change its position. Then, tighten setscrews **4** and **5**.
- 5) Align the largest scale mark of the standard feed adjusting dial with the marker dot on the machine arm. Check to be sure that the blade point of the hook does not come in contact with the needle.



1. If stitch skipping and thread breakage occur when using elastic thread such as vinylon, adjust the hook timing with the pitch used for sewing.
2. The operation panel could come in contact with the thread stand when tilting the machine head. To protect the relevant parts from contact, shift the thread stand to a position at which the thread stand does not interfere with the control panel.



To check the needle bar position as described in the aforementioned 2) [i.e., "...the needle bar ascend by 2.3 mm from the lowest position of its stroke"], you may use the display of the main shaft rotation angle under the "machine head adjustment mode" of the SC-923.

Increase the numerical value displayed when the needle bar is in its lowest position of its stroke under the "machine head adjustment mode" by 25 degrees of an angle, the needle bar goes up by 2.3 mm. (When the needle bar ascends by 2.3 mm from its lowest position of its stroke, the main shaft rotation angle is 25 degrees of an angle.)

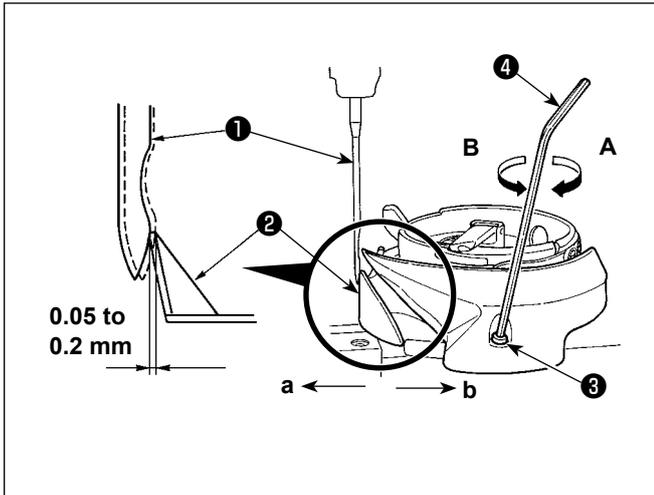
* In the case of adjusting the needle-to-hook relation under the "machine head adjustment mode", do not press **+** switch. Refer to "II-10. Adjustment of the machine head" in the Instruction Manual for the SC-923 for the machine head adjustment mode.

4-6. Adjusting the hook needle guard



WARNING :

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



When a hook has been replaced, be sure to check the position of the hook needle guard.

As the standard position of the hook needle guard, hook needle guard ② must push the side face of needle ① to lean the needle by 0.05 to 0.2 mm away from its straight position.

If the state of the hook is not as shown above, fit hexagon wrench ④ into needle guard adjusting screw ③ and adjust as follows:

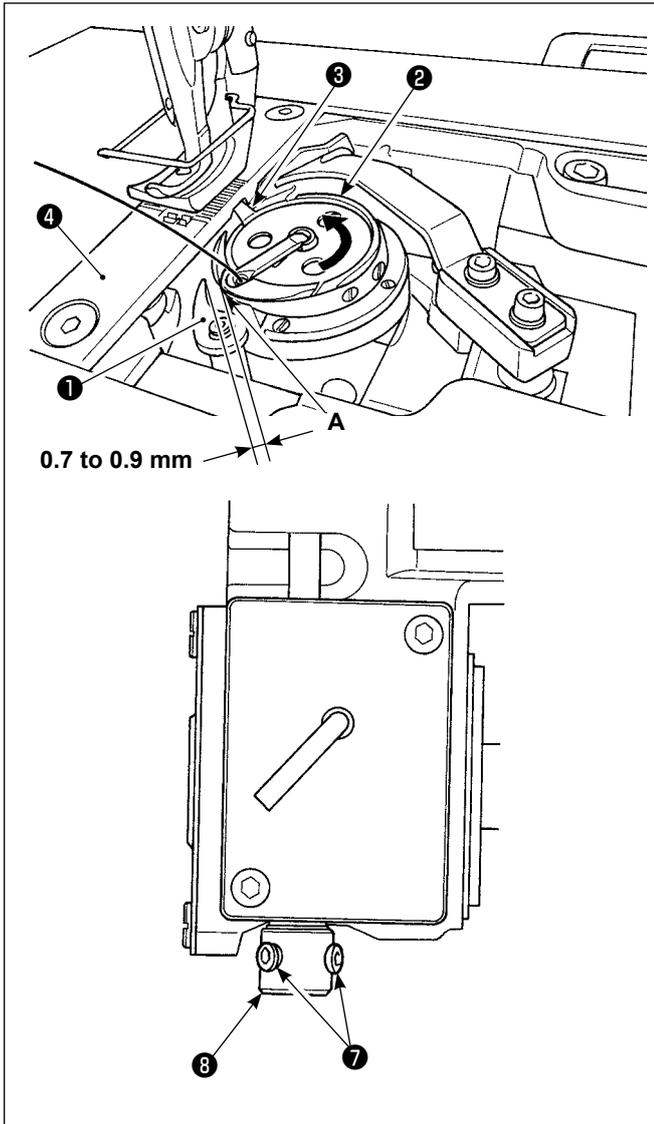
- 1) To bend the hook needle guard in direction **a**, turn the needle guard adjusting screw in direction **A**.
- 2) To bend the hook needle guard in direction **b**, turn the needle guard adjusting screw in direction **B**.
- 3) At the final step of procedure, appropriately adjust the clearance provided between the needle and the hook.

4-7. Adjusting the bobbin case opening lever



WARNING :

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



- 1) Turn the handwheel in the normal direction of rotation to bring bobbin case opening lever ① to the closest position to inner hook ② .
- 2) Turn inner hook ② in the direction of the arrow until stopper ③ is pressed against the slits in throat plate ④ .
- 3) Loosen setscrews ⑦ of the bobbin case opening lever sleeve. Adjust the clearance provided between the bobbin case opening lever and protruding portion A of the inner hook to 0.7 to 0.9 mm.

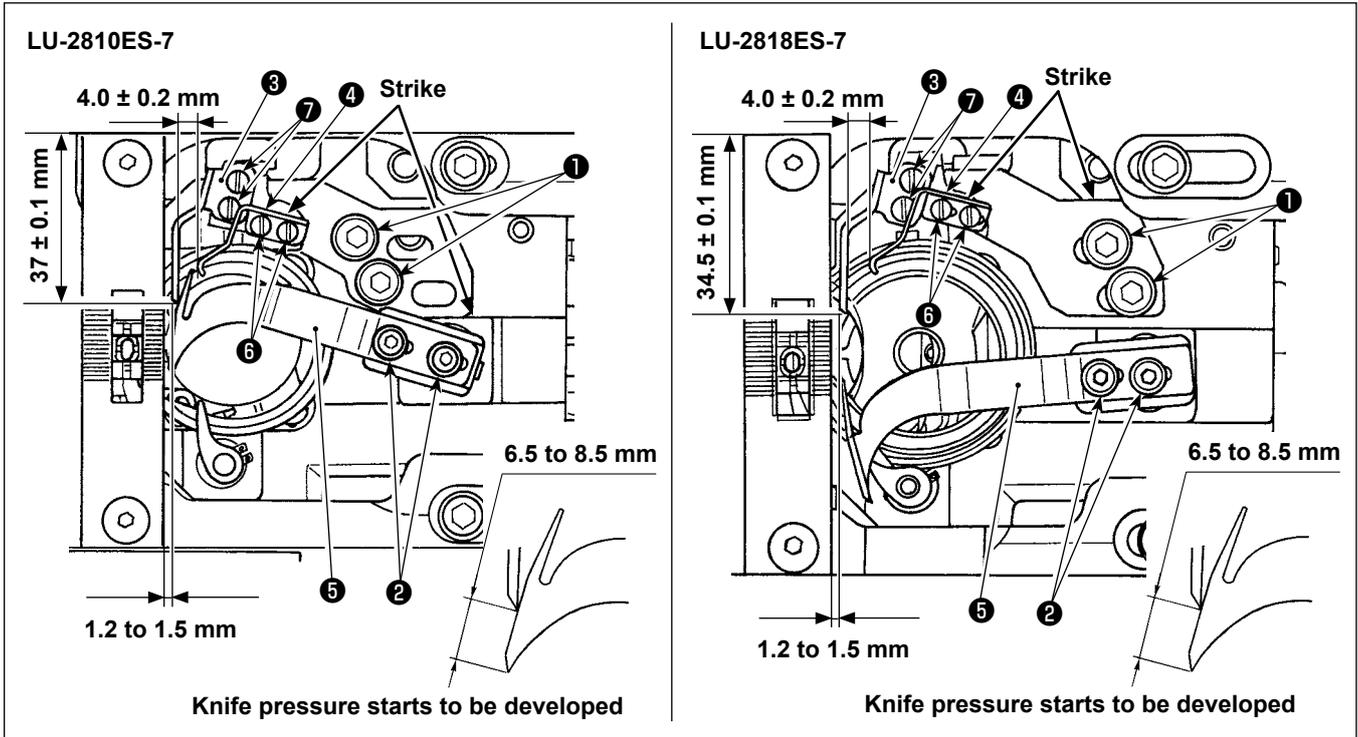
Tighten setscrews ⑦ while pressing bobbin case opening lever ① downward and pressing the bobbin case holding lever sleeve ⑧ upward.

4-8. Adjusting the position of counter knife, knife pressure and clamp pressure



WARNING :

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



1) Move the moving knife ⑤ by hand to its forward travel end.

• Adjusting the counter knife

2) Loosen counter knife base setscrews ① . Adjust the position of the counter knife so that top end of the counter knife ③ so that it is spaced 1.2 to 1.5 mm from the end face of the throat plate in terms of the lateral direction, and so that it is pressed against the stepped section of hook driving shaft saddle in terms of the longitudinal direction. Then, tighten setscrews ① .

Loosen counter knife setscrews ⑦ . Adjust the distance between the bed slide mounting plane and the counter knife tip to 37 ± 0.1 mm for the LU-2810ES-7, or 34.5 ± 0.1 mm for the LU-2818ES-7. Then, tighten setscrews ⑦ .

• Adjusting the knife pressure

3) Loosen setscrews ② in the moving knife.

Turn the handwheel to move the moving knife and adjust the knife pressure.

As the standard adjustment, the knife pressure should be applied from the time when the distance from the top end of the moving knife to the top end of the counter knife is 6.5 to 8.5 mm for the LU-2810ES-7 and LU-2818ES-7.



1. Adjust the knife pressure in the state that the clamp spring ④ does not come in contact with the moving knife ⑤ (the clamp pressure is not developed).

2. Be sure to carefully prevent from getting injured by the moving knife ⑤ , counter knife ③ , blade point of the hook, etc.

• Adjusting the clamp pressure

4) To adjust the clamp pressure, firstly loosen clamp spring setscrew ⑥ . Adjust the lateral position of clamp spring so that a clearance of 4.0 ± 0.2 mm is provided between clamp spring ④ and counter knife ③ . Then, adjust the longitudinal position of the clamp spring by tightening setscrew ⑥ with the clamp spring pressed against the stepped portion of the counter knife base.



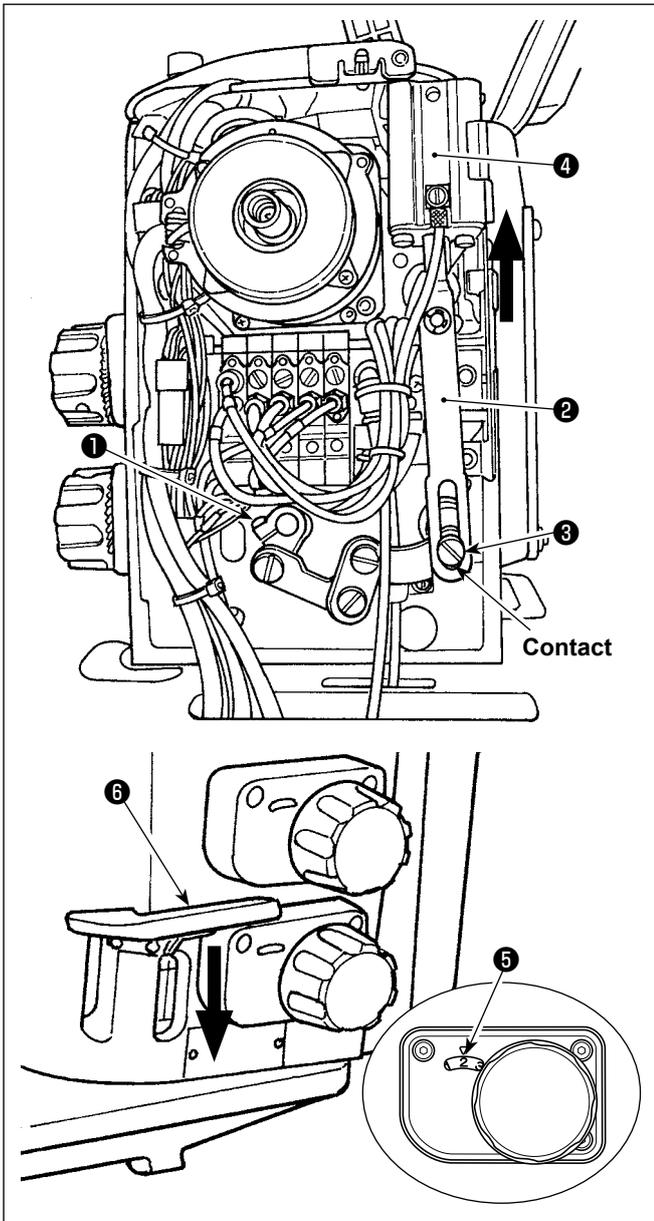
Check to make sure that the clamp pressure is applied when moving knife ⑤ moves to its back end.

4-9. Adjusting the condensation stitch



WARNING :

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

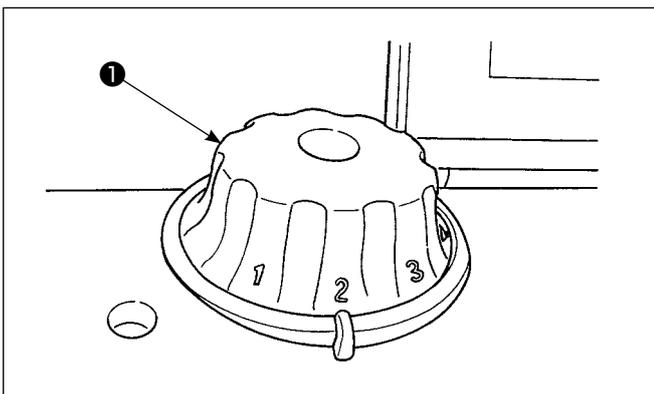


- 1) Place stitch dial plate ⑤ at the desired condensation amount.
(Pitch 2 in the case of condensation amount of 2 mm)
Loosen condensation stitch arm bracket screw ① .
- 2) Push up condensation cylinder ④ in the direction of the arrow. At this time, push down reverse feed control lever ⑥ by hand to put the sewing machine in the reverse feed stitching state. In this state, tighten condensation crank clamping screw ① at the position where the top end of slot in link ② comes in contact with hinge screw ③ .



If the condensation amount is excessively small, the material can be torn depending on the type of seam to cause stitch skipping. This can cause a thread trimming failure.

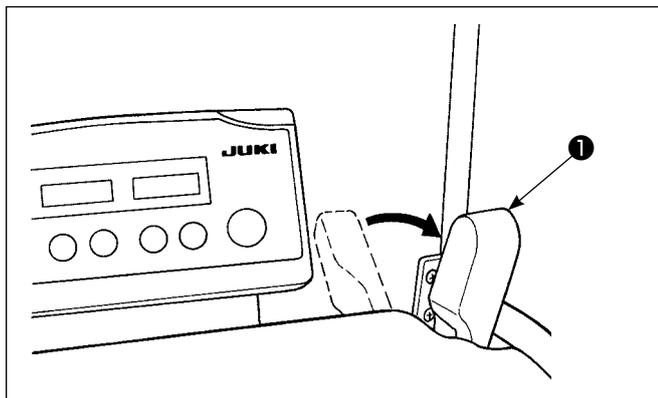
4-10. Adjusting the amount of the alternating vertical movement of the walking foot and the presser foot



Adjust the amount of the alternating vertical movement of the walking foot and the presser foot using dial ① . Turn the dial clockwise to increase the amount of the alternating vertical movement of the walking foot and the presser foot, or counterclockwise to decrease it.

5. OPERATION OF THE SEWING MACHINE

5-1. Hand lifter



To lift the presser foot manually, pull hand lifter ❶ in the direction of the arrow.

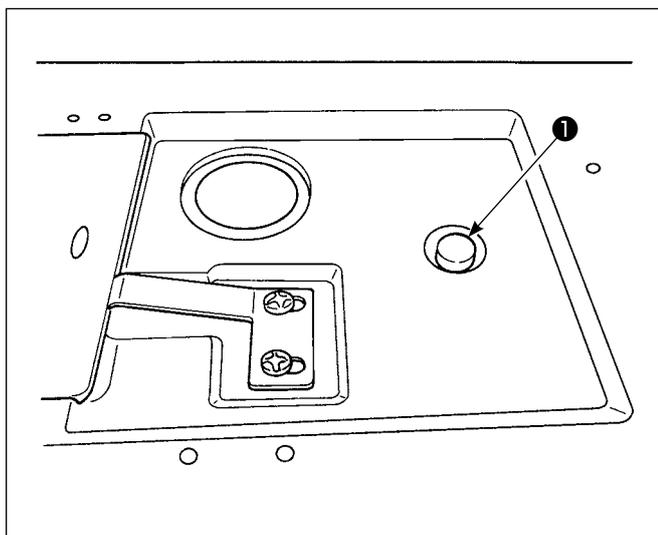
This makes the presser foot rise 10 mm and stay at that position.

5-2. Resetting the safety clutch



WARNING :

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



The safety clutch functions when an excessive load is applied to the hook or the other components during sewing. At this time, the hook will never rotate even if turning the handwheel. When the safety clutch has functioned, remove the cause and reset the safety clutch as given in the following procedure.

- 1) Pressing push button ❶ located on the top surface of the machine bed, strongly turn the handwheel in the reverse direction of rotation.
- 2) The resetting procedure completes when the handwheel clicks.



Turn the handwheel by hand, and confirm that push button ❶ has returned.

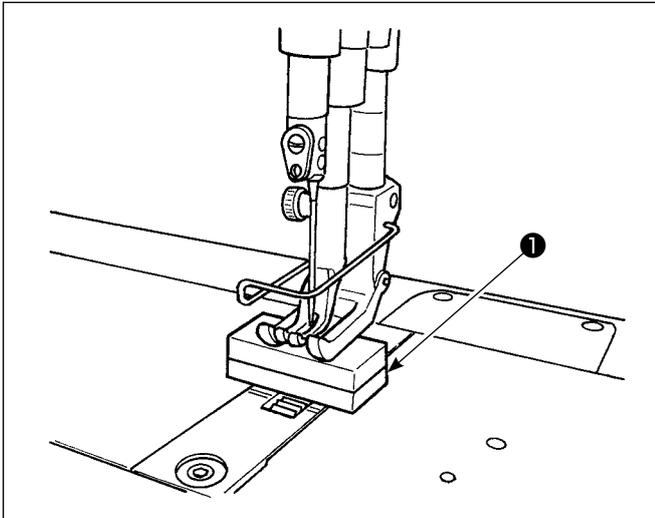
- 3) At the final step of procedure, check the needle-to-hook relation. (Refer to "[4-5. Needle-to-hook relation](#)" p.21)

5-3. Adjusting the automatic presser foot lifter

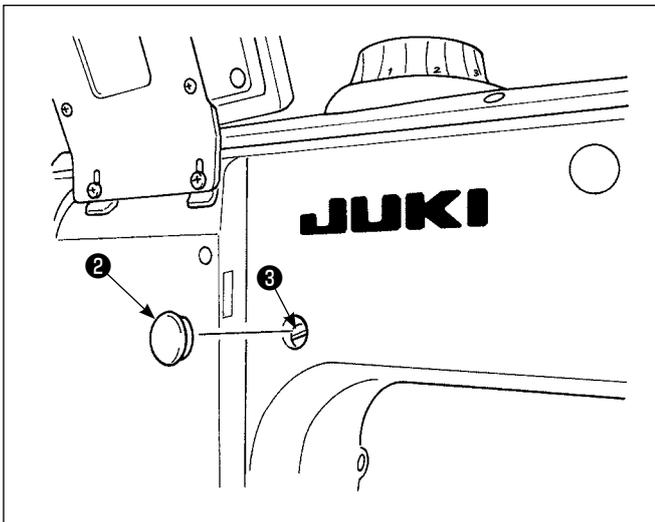


WARNING :

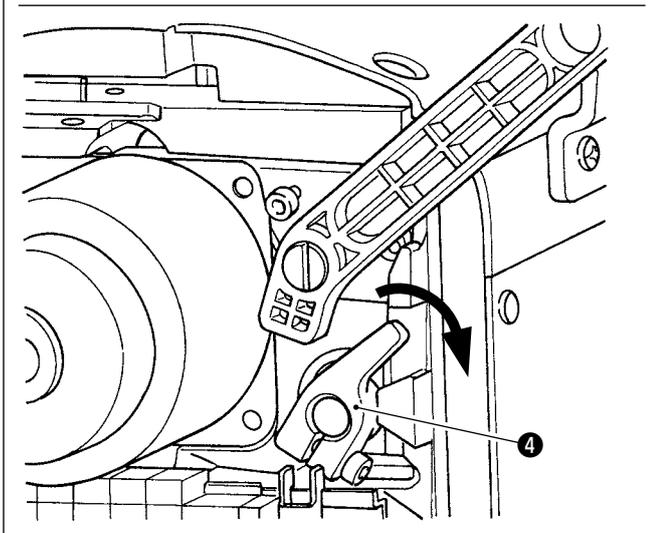
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



- 1) Turn the power ON. Carry out thread trimming once. Turn ON the automatic presser lifter.
- 2) Place a 20 mm spacer ① under the presser foot.
- 3) Turn the power OFF.



- 4) Remove rubber cap ② from the rear face of the machine arm. Loosen setscrew ③ .
- 5) Turn presser bar lifting arm ④ in the direction of the arrow until it will go no further. Then, tighten setscrew ③ .

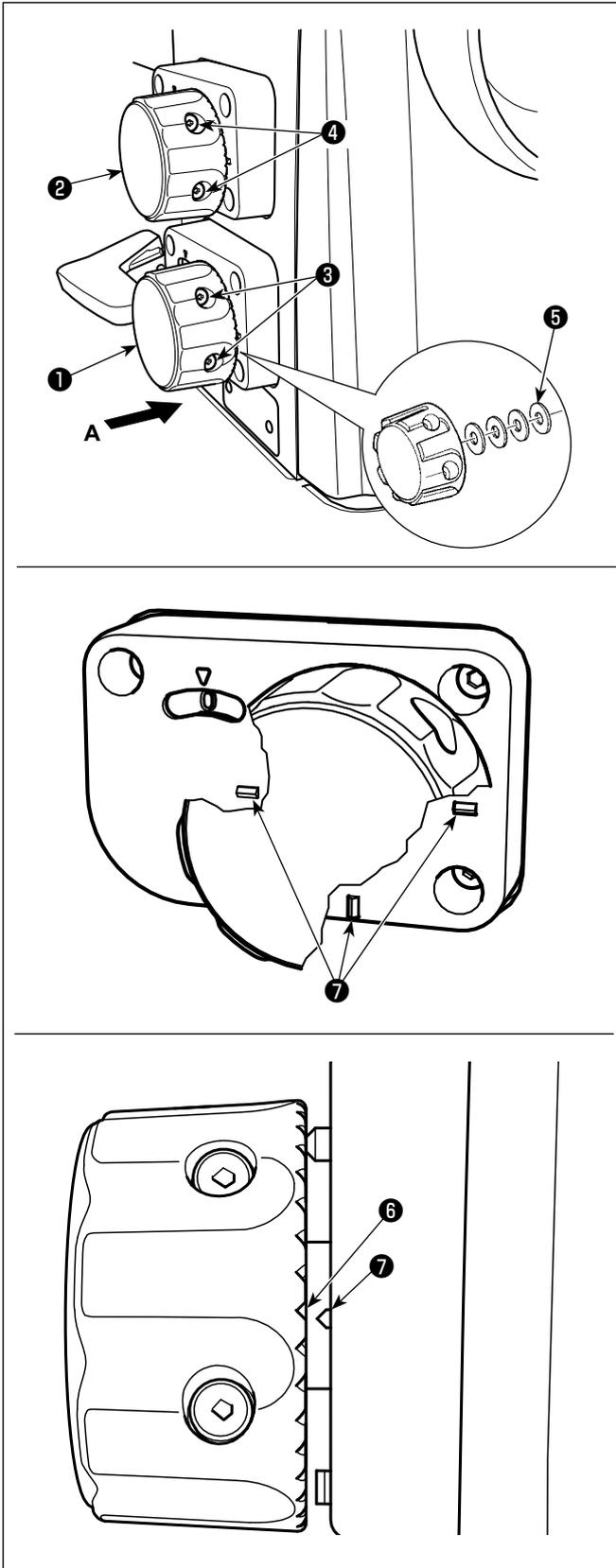


For the standard gauge type machine, the top end of the walking foot interferes with the needle bar frame when the auto-lifter is used in the case the amount of the alternating vertical movement of the walking foot and the presser foot is set at 2 mm or smaller and in the case it is set at 7 mm or more and the reverse-rotation needle-up is carried out.



To use the machine with the amount of the alternating vertical movement of the walking foot and the presser foot set at 2 mm or less, set the lifting amount of the presser foot by means of the auto-lifter at 17 mm or less.

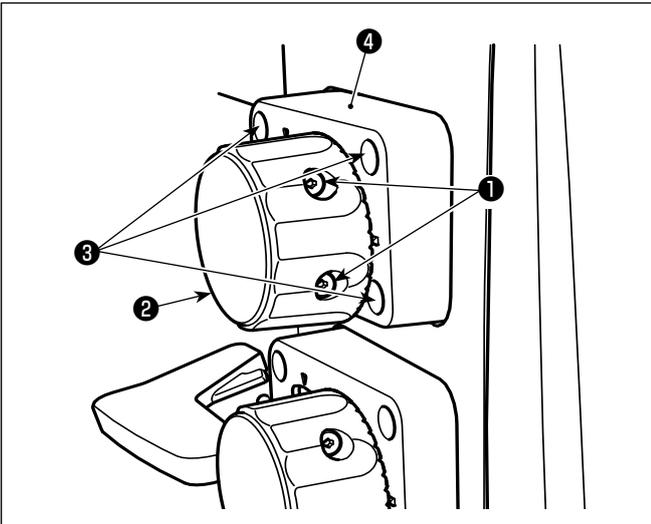
5-4. Fixing the feed adjusting dial



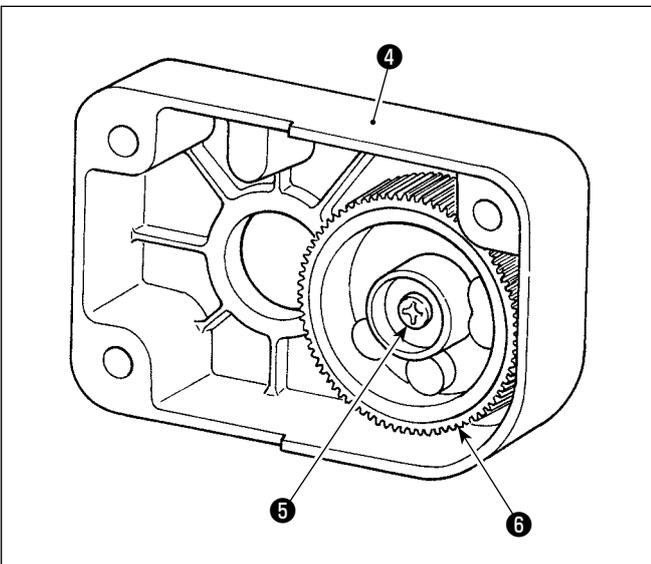
To prohibit the adjustment of the feed adjusting dial:

- 1) Loosen stitch dial setscrew **3** (or **4**). Remove stitch dial **1** (or **2**) and four washers **5**.
- 2) Insert stitch dial **1** (or **2**) back to its original position and push it in direction **A**. Notch **6** of the dial fits on projecting sections **7** of the cover to fix the dial so that it will not turn any further.
- 3) In the state as described in 2), tighten feed regulating dial setscrews **3** (or **4**) alternately to fix dial **1** (or **2**).

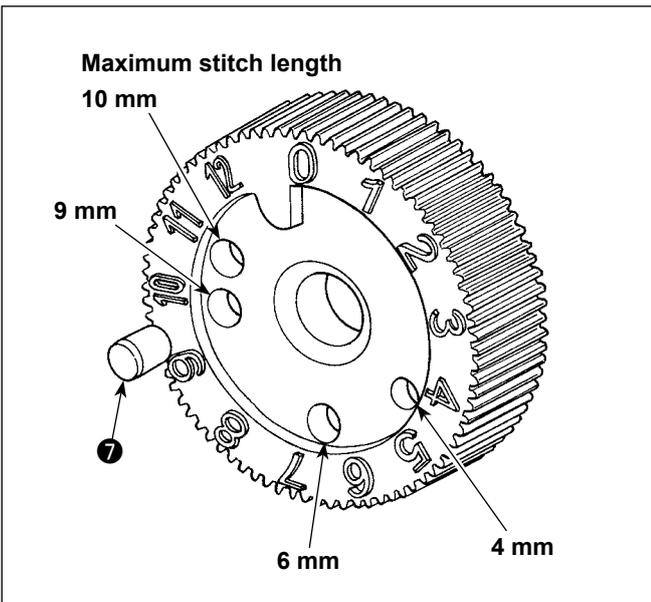
5-5. How to change the maximum stitch length



- 1) Loosen stitch dial setscrew **1** . Remove stitch dial **2** .
- 2) Loosen dial cover setscrew **3** . Remove dial cover **4** .



- 3) Loosen dial plate setscrew **5** . Remove dial plate **6** .



- 4) Insert stopper pin **7** into one of the dial plate holes which corresponds to the desired maximum stitch length until the pin will go no further. Re-attach stitch dial **2** , dial cover **4** and dial plate **6** respectively with setscrews **1** , **3** and **5** .

1. If inserted stopper pin **7** and tightened setscrew **5** get loose, apply epoxy adhesive to them.

 2. Adjust the tightening depth of dial plate setscrew **5** to allow dial plate **6** to move smoothly with no backlash.

 Stopper pin **7** is separately available.
Part number of stopper pin : PH0400062C0

5-6. Normal-/reverse-feed stitch needle entry points alignment at the time of automatic reverse feed stitching

When the sewing speed or stitch pitch is changed, the normal- and reverse-feed stitch needle entry points may not be aligned at the time of automatic reverse feed stitching.

In such a case, correct the alignment of needle entry points by changing the ON/OFF timing of the automatic reverse feed cylinder.

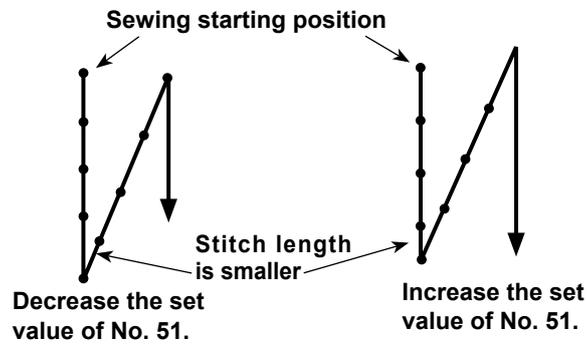
In the case the stitch pitch is large and correction of the timing is difficult, it is recommended to decrease the reverse feed sewing speed or use the temporary stop function at each corner section of the sewing pattern.

Refer to "III-8. Detailed explanation of selection of functions ⑭ Compensation of timing of the solenoid for reverse feed stitching" in the Instruction Manual for the SC-923 for detail.

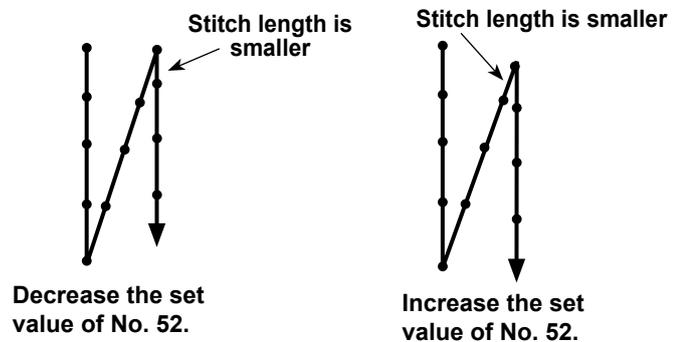
Normal- and reverse-feed stitches may need to be adjusted according to the stitch pitch to be used. Refer to the Engineer's Manual for how to adjust the stitches.

- 1) How to align needle entry points of the reverse feed stitching with those of the normal feed stitching
 Carry out "correction of the timing of the reverse feed stitching" according to the difference between the needle entry points of the reverse feed stitching and those of the normal feed stitching.
 Refer to "III-6. Setting the SC-923 functions" in the Instruction Manual for the SC-923 for how to carry out the "correction of the timing of the reverse feed stitching".

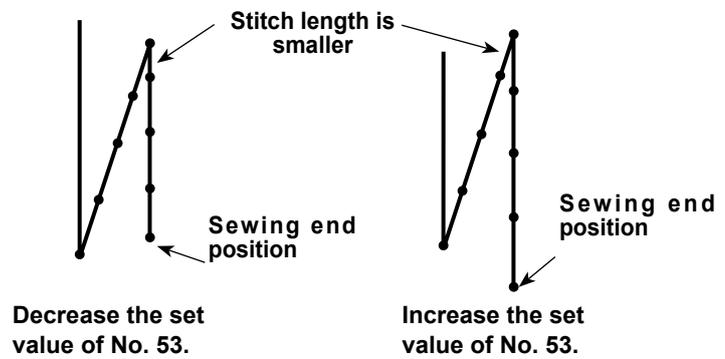
- ① ON-timing of the reverse feed stitching at the beginning of sewing (Function setting No. 51)



- ② Correction of the OFF-timing of the reverse feed stitching at the beginning of sewing (Function setting No. 52)



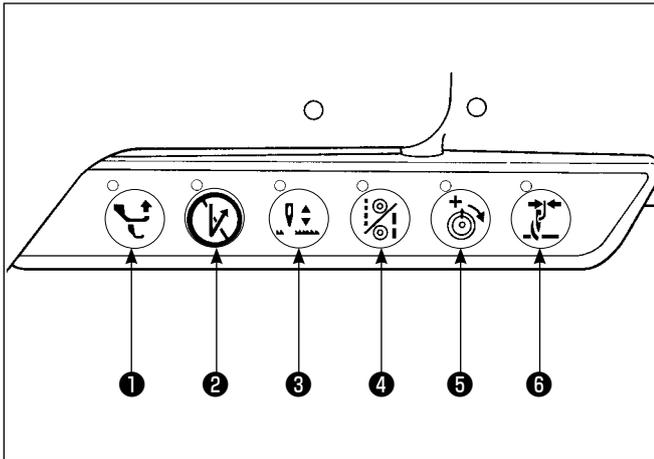
- ③ Correction of the OFF-timing of the reverse feed stitching at the end of sewing (Function setting No. 53)



- 2) Stitch-by-stitch reverse feed stitching speed (Function setting No. 8) and the temporary stop function at each corner section of the sewing pattern (Function No. 151)

	Default value	Recommended value	Recommended value	Recommended value
Stitch pitch (mm)	3 to 6	7 to 8	9	10 to 12
Reverse feed stitching speed (sti/min)	600	500	400	400
Temporary stop function at each corner section of the sewing pattern	0 (OFF)	0 (OFF)	0 (OFF)	1 (ON)

5-7. Operation switches



① Alternating vertical movement amount change-over switch

If this switch is pressed the amount of the alternating vertical movement of the walking foot and the presser foot will be maximized. (Lamp above the switch lights up)

Use this switch when a multilayered portion of the sewing product is not smoothly fed.

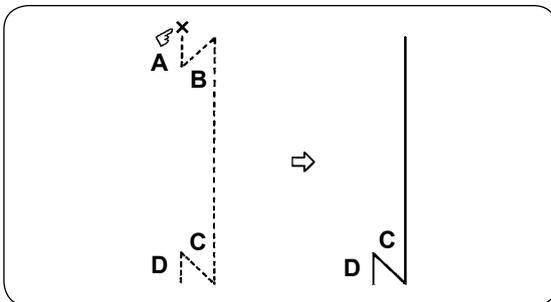
To change over the amount of the alternating vertical movement of the walking foot and the presser foot by means of the knee switch, join the knee switch and the mounting plate, supplied with the unit, together and fix them on the table with wood screw.

For the wiring, refer to "[5-8. Knee switch](#)" p.33.

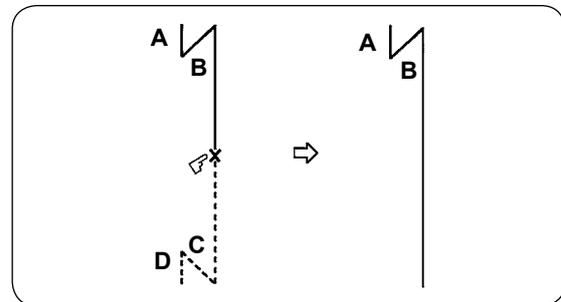
② Automatic reverse feed stitching cancellation/addition switch

- If this switch is pressed when the following automatic reverse feed stitching has been specified, the reverse stitching will not take place (for once immediately after it is pressed). (Example 1)
- If this switch is pressed when no automatic reverse feed stitching has been specified, the reverse feed stitching will take place (once immediately after it is pressed). (Example 2)

(Example 1) In the case where both automatic reverse feed stitching for start and that for end have been specified :

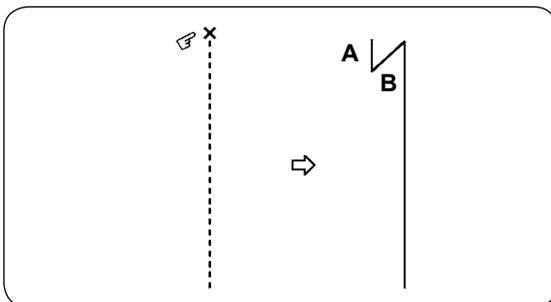


If the  switch is pressed before starting sewing, the automatic reverse feed stitching for start (between **A** and **B**) will not be carried out.

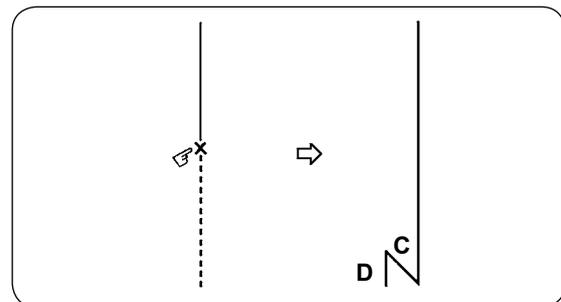


If the  switch is pressed during sewing, the automatic reverse feed stitching for end (between **C** and **D**) will not be carried out.

(Example 2) In the case where neither automatic reverse feed stitching for start nor that for end have been specified :



If the  switch is pressed before starting sewing, the automatic reverse feed stitching for start (between **A** and **B**) will be carried out.



If the  switch is pressed during sewing, the automatic reverse feed stitching for end (between **C** and **D**) will be carried out.

3 Needle lifting switch

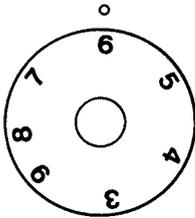
When the switch is pressed, the needle moves from its lower-end stop position to its upper-end stop position.



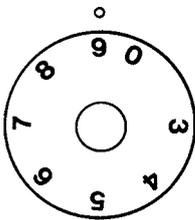
When raising the machine head which has been tilted, do not hold the operation switch to raise it.

Example

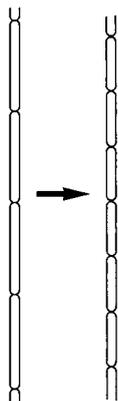
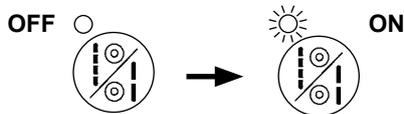
· 2P feed adjusting dial scale : 6



· Standard feed adjusting dial scale : 9



· When this switch is pressed, the stitch length is changed over from 9 to 6 and the lamp lights up.



· When this switch pressed again, the stitch length returns from 6 to 9 and the lamp goes out.

4 2P switch

If this switch is pressed, the stitch length is changed over to that of the scale on the 2P feed adjusting dial. (Lamp in the button is lit up.)



Be sure to make the number of 2P feed adjusting dial less than that of the standard feed adjusting dial.

5 Needle thread tension changeover switch

When the switch is pressed, the double tension function is selected to increase the needle thread tension. (The lamp above the switch is lit up.)

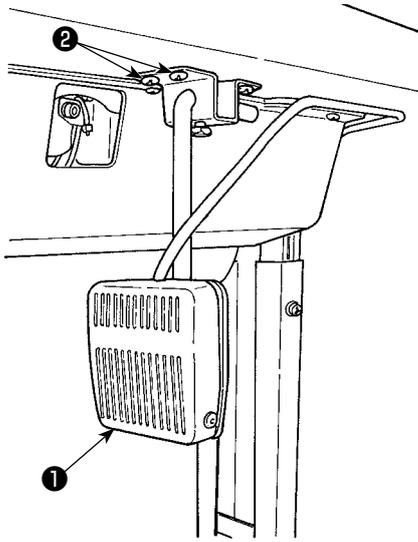
6 This is not used for the LU-2810ES-7 and LU-2818ES-7.

5-8. Knee switch



WARNING :

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



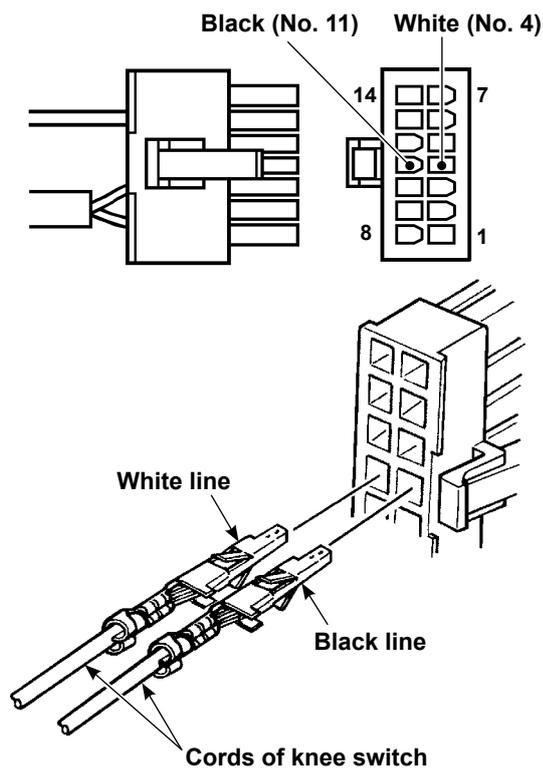
(1) Installation of the knee switch

- 1) Fix accessory knee switch ① supplied with the unit on a desired location of the undersurface of table with wood screws ② .
- 2) Connect the knee switch to No. 4 and No. 11 pins of the machine connector 14P which is connected to CN36 of the machine controller.

(2) Functions of the knee switch

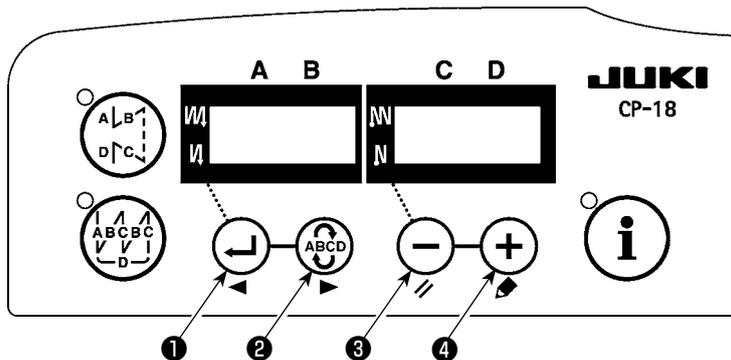
If knee switch ① is pressed, the amount of the alternating vertical movement of the walking foot and the presser foot will be maximized. (Same with the performance carried out by pressing the alternating vertical movement amount change-over switch “↕” on the machine head.)

The knee lifter switch can also be used as the presser bar lifting lever through the relevant function setting. (When the switch is used as the presser lifting switch, the function as the alternating vertical movement amount changeover switch is lost.)



(3) Function setting of the knee switch

• CP-18



1) Enter the function setting mode referring to "6. Setting of functions of SC-923, 1)" in the Instruction Manual for the SC-923.

□ □ 1 2 o P T _

2) Press switch ① or switch ② to call out function setting No.12 (option input/output function selection).

□ o P T i n _ _

3) Press switch ③ or switch ④ and select the item for "in".

□ i 3 1 v E r T

4) Press switch ② and select display No.i31.

The lamps will be on alternately.

L □ 2 4

5) Press switch ③ or switch ④ to select the knee switch function. Refer to list 1 for the details of the functions.

□ i 3 1 L □ 2 4

6) Press switch ② and fix the function.

□ o P T □ □ i n

7) Press switch ② and end the option input.

□ E n d

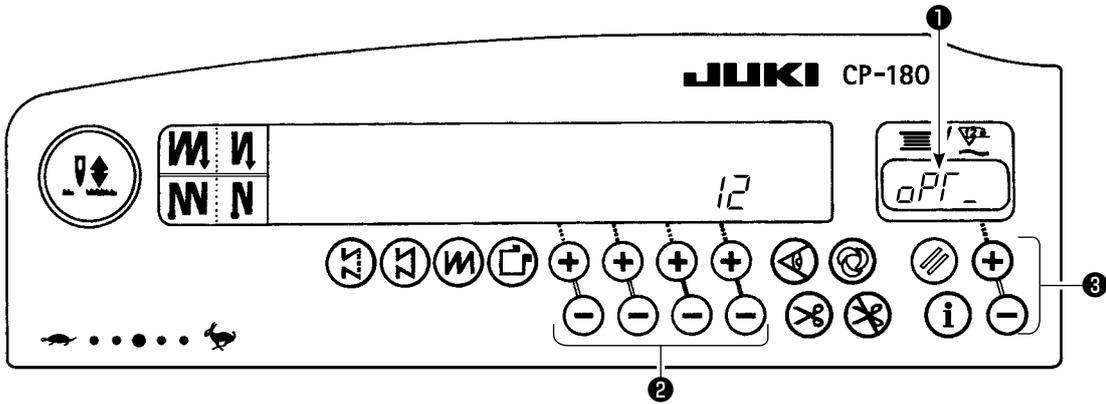
8) Select "End" item using switch ③ or switch ④ .

□ □ 1 2 o P T _

9) Press switch ① or switch ② and return to the function setting mode.

List 1

Function code	Abbreviation	Functional item	Remarks
5	FL	Presser lifter switch function	Presser output will be ON while the switch is being pressed.
31	ALFL	Presser lifter alternate switch function	Presser output will be ON or OFF each time the switch is pressed.
24	vErT	Alternate vertical movement amount conversion alternate switch function	Alternate vertical movement amount output will be ON or OFF each time the switch is pressed.
25	vSW	Alternate vertical movement amount conversion switch function	Alternate vertical movement amount output will be ON while the switch is being pressed.



1) Enter the function setting mode referring to "18. FUNCTION SETTING SWITCH, 1)" in the Instruction Manual for the CP-180.



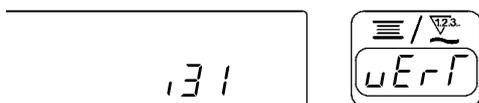
2) Select function number 12 according to the function setting method.



3) Select the item of "in" by switch 3.



4) Select the displayed number "131" by means of switch 2.



5) Select the knee switch function by switch 3. Refer to list 1 for the details of the functions.

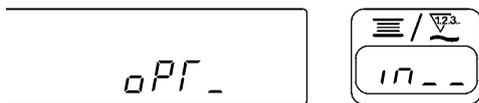
The lamps will be on alternately. ↑



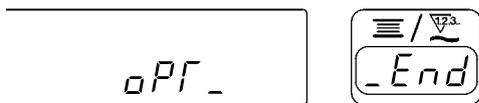
6) Fix the knee switch function by switch 2.



7) The above function is fixed by switch 2.



8) The option input is ended by switch 2.



9) Select the item of "End" by switch 3, and return to the function setting mode.

5-9. Function setting for the SC-923

This section describes how to set the functions of the SC-923 specific to long pitch type.
Refer to "6. Function setting for the SC-923" in the Instruction Manual for the SC-923.

Function setting list

No	Item	Description	Setting range	Indication of function setting
158	Condensation stitching function during thread trimming	The function is enabled when the SC-923 is used in combination with the machine head which is provided with condensation stitching function for thread trimming. This item is used for setting whether or not the output of condensation stitching function for thread trimming is produced while the thread trimmer is under control. 0 : The function is disabled 1 : The function is enabled	0/1	<input type="checkbox"/> <input checked="" type="checkbox"/> 1 5 8 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 1

Details of the function setting

● Condensation stitching function during thread trimming (function setting No. 158)

This function setting number is used for setting whether or not the output of condensation stitching function for thread trimming is produced while the thread trimmer is under control.

When this setting is set to "0" (condensation stitching function is disabled), the same thread trimming control as the LU-2810-7 is carried out.

1 5 8 1

0: Condensation stitching function is disabled

1: Condensation stitching function is enabled (initial value)



If thread trimming failure occurs, with a heavy-weight material, since the needle enters the same entry points repeatedly when carrying out condensation stitching during thread trimming, the condensation stitching function during thread trimming should be disabled, or adjust to increase the condensation stitch pitch.

6. SEWING SPEED TABLE

Operate the sewing machine at a speed equal to or lower than the maximum sewing speed selected from those shown in the table below according to the sewing conditions.

For the LU-2810ES-7 and LU-2818ES-7, the sewing speed is automatically set according to the amount of the alternating vertical movement of the walking foot and the presser foot.

In the case the stitch length exceeds 6 mm, change the maximum sewing speed referring to **"6. Function setting of SC-923"** in the Instruction Manual for the SC-923.

LU-2818ESAL-7

Amount of alternate vertical movement of the walking foot and presser foot	Pitch	Stitch length : 6 mm or less	Stitch length : More than 6 mm and 9 mm or less	Stitch length : More than 9 mm and 12 mm or less
	3 or less		3,500 sti/min	2,000 sti/min
3.25 to 3.5		3,400 sti/min	2,000 sti/min	1,800 sti/min
3.75 to 4		3,200 sti/min	2,000 sti/min	1,800 sti/min
4.25 to 4.5		2,900 sti/min	2,000 sti/min	1,800 sti/min
4.75 to 5		2,500 sti/min	2,000 sti/min	1,800 sti/min
5.25 to 9		1,800 sti/min	1,800 sti/min	1,800 sti/min

LU-2810ESAL-7

Amount of alternate vertical movement of the walking foot and presser foot	Pitch	Stitch length : 6 mm or less	Stitch length : More than 6 mm and 9 mm or less	Stitch length : More than 9 mm and 12 mm or less
	3 or less		3,800 sti/min	2,000 sti/min
3.25 to 3.5		3,400 sti/min	2,000 sti/min	1,800 sti/min
3.75 to 4		3,200 sti/min	2,000 sti/min	1,800 sti/min
4.25 to 4.5		2,900 sti/min	2,000 sti/min	1,800 sti/min
4.75 to 5		2,500 sti/min	2,000 sti/min	1,800 sti/min
5.25 to 9		1,800 sti/min	1,800 sti/min	1,800 sti/min

7. TROUBLES IN SEWING AND CORRECTIVE MEASURES

Troubles	Causes	Corrective measures
<p>1. Thread breakage (Thread frays or is worn out.)</p> <p>(Needle thread trails 2 to 3 cm from the wrong side of the fabric.)</p>	<ul style="list-style-type: none"> ① Thread path, needle point, hook blade point or bobbin case resting groove on the throat plate has sharp edges or burrs. ② Needle thread tension is too high. ③ Bobbin case opening lever provides an excessive clearance at the bobbin case. ④ Needle comes in contact with the blade point of hook. ⑤ Amount of oil in the hook is too small. ⑥ Needle thread tension is too low. ⑦ Thread take-up spring works excessively or the stroke of the spring is too small. ⑧ Timing between the needle and the hook is excessively advanced or retarded. 	<ul style="list-style-type: none"> ○ Remove the sharp edges or burrs on the blade point of hook using a fine emery paper. Buff up the bobbin case resting groove on the throat plate. ○ Decrease the needle thread tension. ○ Decrease the clearance provided between the bobbin case opening lever and the bobbin. Refer to "4-7. Adjusting the bobbin case opening lever" p.23. ○ Refer to "4-5. Needle-to-hook relation" p.21. ○ Adjust the amount of oil in the hook properly. Refer to "3-1. Lubrication" p.7. ○ Increase the needle thread tension. ○ Decrease the tension of the spring and increase the stroke of the spring. ○ Refer to "4-5. Needle-to-hook relation" p.21.
<p>2. Stitch skipping</p>	<ul style="list-style-type: none"> ① Timing between the needle and the hook is excessively advanced or retarded. ② Pressure of the presser foot is too low. ③ The clearance provided between the top end of the needle eyelet and the blade point of hook is not correct. ④ Hook needle guard is not functional. ⑤ Improper type of needle is used. 	<ul style="list-style-type: none"> ○ Refer to "4-5. Needle-to-hook relation" p.21. ○ Tighten the presser spring regulator. ○ Refer to "4-5. Needle-to-hook relation" p.21. ○ Refer to "4-6. Adjusting the hook needle guard" p.22. ○ Replace the needle with one which is thicker than the current needle by one count.
<p>3. Loose stitches</p>	<ul style="list-style-type: none"> ① Bobbin thread does not pass through the tension spring of the inner hook. ② The hook, feed dog or the thread path of thread guide, etc. has worn out or has flaws. ③ Bobbin fails to move smoothly. ④ Bobbin case opening lever provides too much clearance at the bobbin. ⑤ Bobbin thread tension is too low. ⑥ Bobbin has been wound too tightly. ⑦ The needle does not match the needle hole in the feed dog. 	<ul style="list-style-type: none"> ○ Thread the bobbin thread correctly. ○ Remove rough parts with a fine emery paper or buff it up. ○ Replace the bobbin or hook with a new one. ○ Refer to "4-7. Adjusting the bobbin case opening lever" p.23. ○ Increase the bobbin thread tension. ○ Decrease the tension applied to the bobbin winder. ○ Change the feed dog appropriately. (Refer to the Parts List.)
<p>4. Thread slips off the needle eyelet simultaneously with thread trimming.</p>	<ul style="list-style-type: none"> ① Thread tension given by the tension controller No. 1 is too high. 	<ul style="list-style-type: none"> ○ Decrease the thread tension given by the tension controller No. 1.

Troubles	Causes	Corrective measures
5. Thread slips off the needle eyelet at the start of sewing.	<ul style="list-style-type: none"> ① Thread tension given by the tension controller No. 1 is too high. ② The clamp spring has deformed. ③ Bobbin thread tension is too low. 	<ul style="list-style-type: none"> ○ Decrease the thread tension given by the tension controller No. 1. ○ Replace the clamp spring with a new one or correct the current one. ○ Increase the bobbin thread tension.
6. Thread is not cut sharply.	<ul style="list-style-type: none"> ① The blades of moving knife and counter knife have been improperly adjusted. ② The knives have blunt blades. ③ Bobbin thread tension is too low. 	<ul style="list-style-type: none"> ○ Refer to "4-8. Adjusting the position of counter knife, knife pressure and clamp pressure" p.24. ○ Replace the moving knife and counter knife with new ones, or correct the current ones. ○ Increase the bobbin thread tension.
7. Thread remains uncut after thread trimming. (Bobbin thread trimming failure when stitch length is comparatively short.)	<ul style="list-style-type: none"> ① Initial position of the moving knife has been improperly adjusted. ② Bobbin thread tension is too low. 	<ul style="list-style-type: none"> ○ Refer to the Engineer's Manual. ○ Increase the bobbin thread tension.
8. Thread breaks at the start of sewing after thread trimming.	<ul style="list-style-type: none"> ① The needle thread is caught in the hook. 	<ul style="list-style-type: none"> ○ Shorten the length of thread remaining on the needle after thread trimming. Refer to "4-2. Thread tension" p.19.
9. When a heave-weight material is sewn, the material warps.	<ul style="list-style-type: none"> ① The feed amount of the top feed is inadequate. 	<ul style="list-style-type: none"> ○ Decrease the feed dog height and reduce the feed amount of the bottom feed. (Refer to the Engineer's Manual for the adjustment procedure.)
10. Stitch skipping at the beginning of sewing (in the case of starting sewing from the material edge)	<ul style="list-style-type: none"> ① Needle thread and bobbin thread fail to intertwine with each other. 	<ul style="list-style-type: none"> ○ Refer to "3-6. Threading the machine head" p.12. ○ Retain the needle thread on the material.