

***ENGLISH***

**NA-P3020  
INSTRUCTION MANUAL**

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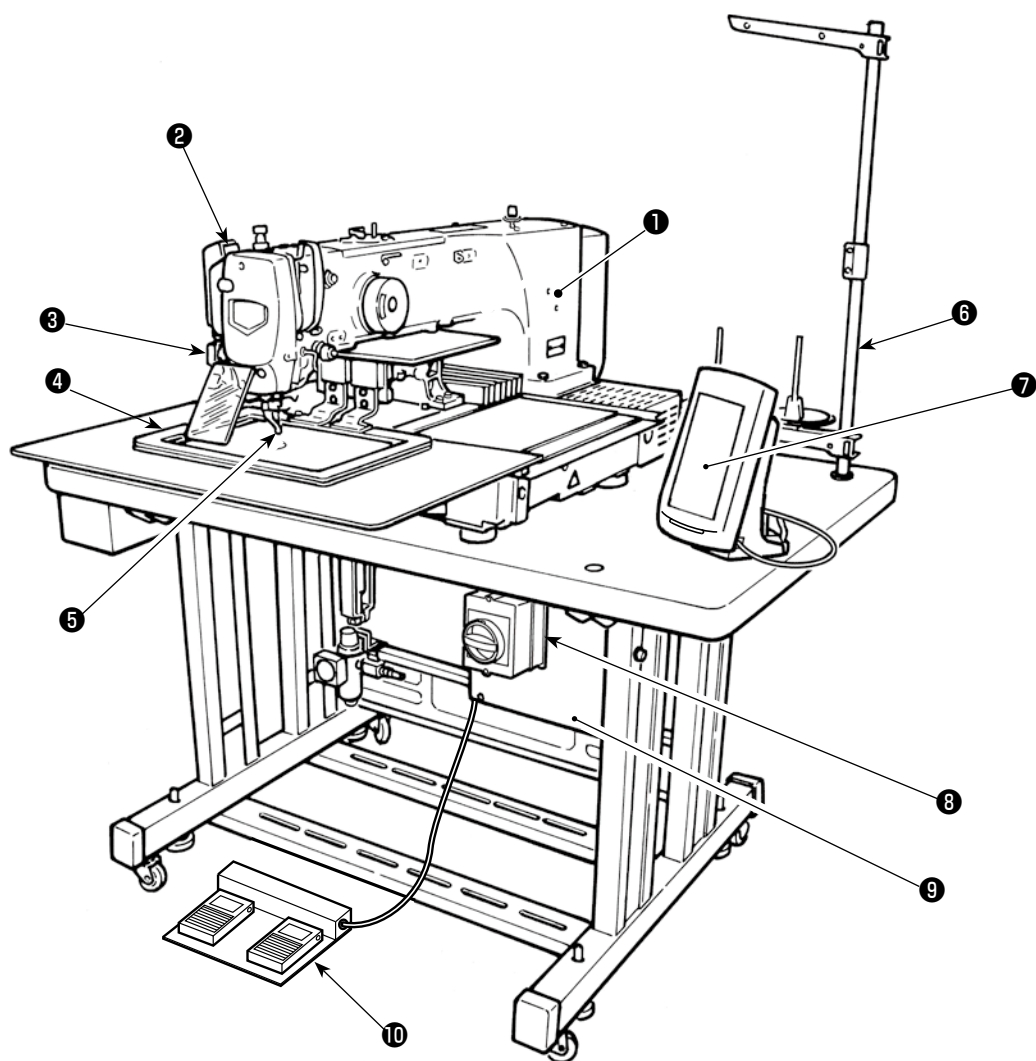
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# I. MECHANICAL SECTION (WITH REGARD TO THE SEWING MACHINE)

## 1. SPECIFICATIONS

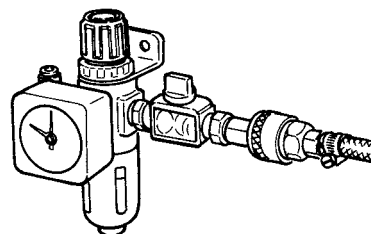
1	Sewing area	X (lateral) direction AMS-221EN-3020 : 300 mm	Y (longitudinal) direction × 200 mm
2	Max. sewing speed	2,800 sti/min (When sewing pitch is 3 mm or less)	
3	Stitch length	0.1 to 12.7 mm (Min. resolution : 0.01 mm)	
4	Feed motion of feeding frame	Intermittent feed (2-shaft drive by stepping motor)	
5	Needle bar stroke	41.2 mm	
6	Needle	GROZ-BECKERT 134, 135x17, ORGAN needle DPx5, DPx17	
7	Lift of feeding frame	Max. 30mm	
8	Intermediate presser stroke	4 mm (Standard) (0 to 10 mm)	
9	Lift of intermediate presser	20 mm	
10	Intermediate presser DOWN position variable	Standard 0 to 3.5 mm (Max. 0 to 7.0 mm)	
11	Shuttle	Double-capacity semi-rotary hook	
12	Lubricating oil	New Defrix Oil No. 2 (Supplied by oiler)	
13	Memory of pattern data	Main body, Media • Main body : Max. 999 patterns (Max. 8,000 stitches/pattern) • Media : Max. 999 patterns (Max. 8,000 stitches/pattern)	
14	Temporary stop facility	Used to stop machine operation during a stitching cycle.	
15	Enlarging / Reducing facility	Allows a pattern to be enlarged or reduced on the X axis and Y axis independently when sewing a pattern. Scale : 1% to 400% times (0.1% steps)	
16	Enlarging / Reducing method	Pattern enlargement / reduction can be done by increasing / decreasing either stitch length or the number of stitches. (Increasing/decreasing stitch length only can be performed when pattern button is selected.)	
17	Max. sewing speed limitation	200 to 2,800 sti/min (Scale : 100 sti/min steps)	
18	Pattern selection facility	Pattern No. and Pattern Name selection method (Main body : 1 to 999, Media : 1 to 999)	
19	Sewing counter	UP/DOWN method (0 to 9,999)	
20	Memory back-up	In case of a power interruption, the pattern being used will automatically be stored in memory.	
21	2nd origin setting facility	Using jog keys, a 2nd origin (needle position after a sewing cycle) can be set in the desired position within the sewing area. The set 2nd origin is also stored in memory.	
22	Sewing machine motor	Servo-motor	
23	Dimensions	AMS-221EN-3020 : 1,200mm (W) x 1,070mm (L) x 1,200mm (H) (Excluding thread stand)	
24	Mass (gross mass)	AMS-221EN-3020 : 210 kg	
25	Power consumption	700 VA	
26	Operating temperature range	5°C to 35°C	
27	Operating humidity range	35 % to 85 % (No dew condensation)	
28	Line voltage	Rated voltage ±10% 50 / 60 Hz	
29	Air pressure used	AMS-221EN-3020 : 0.35 to 0.4 MPa (Max. 0.55 MPa)	
30	Air consumption	1.8 dm <sup>3</sup> / min (ANR)	
31	Needle highest position stop facility	After the completion of sewing, the needle can be brought up to its highest position.	
32	Noise	- Equivalent continuous emission sound pressure level (L <sub>pA</sub> ) at the workstation: A-weighted value of 85 dB; (Includes K <sub>pA</sub> = 2.5 dB); according to ISO 10821-C.6.3 -ISO 11204 GR2 at 2,800 sti/min. - Sound power level (L <sub>WA</sub> ): A-weighted value of 94 dB; (Includes K <sub>WA</sub> = 2.5 dB); according to ISO 10821-C.6.3 -ISO 3744 GR2 at 2,800 sti/min Time required for sewing: 2.2 sec, using Pattern No. 102	

## 2. CONFIGURATION



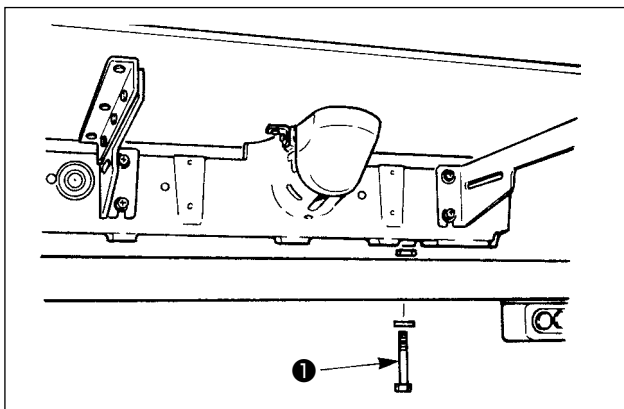
- ❶ Machine head
- ❷ Wiper switch
- ❸ Temporary stop switch
- ❹ Feeding frame
- ❺ Intermediate presser
- ❻ Thread stand
- ❼ Operation panel
- ❽ Power switch  
(also used as the emergency stop switch)
- ❾ Control box
- ❿ Foot pedal

Air regulator



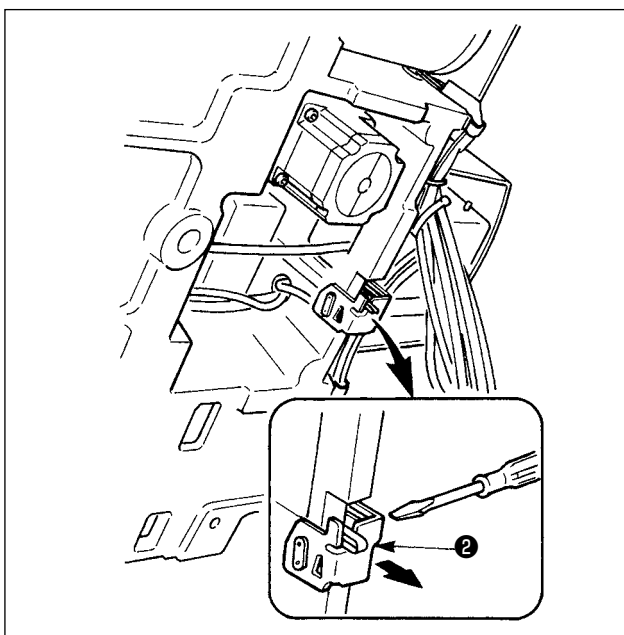
## 3. INSTALLATION

### 3-1. Removing the bed fixing bolt



Remove bed fixing bolt ❶. This bolt is necessary to transport the sewing machine.

### 3-2. Adjusting the safety switch



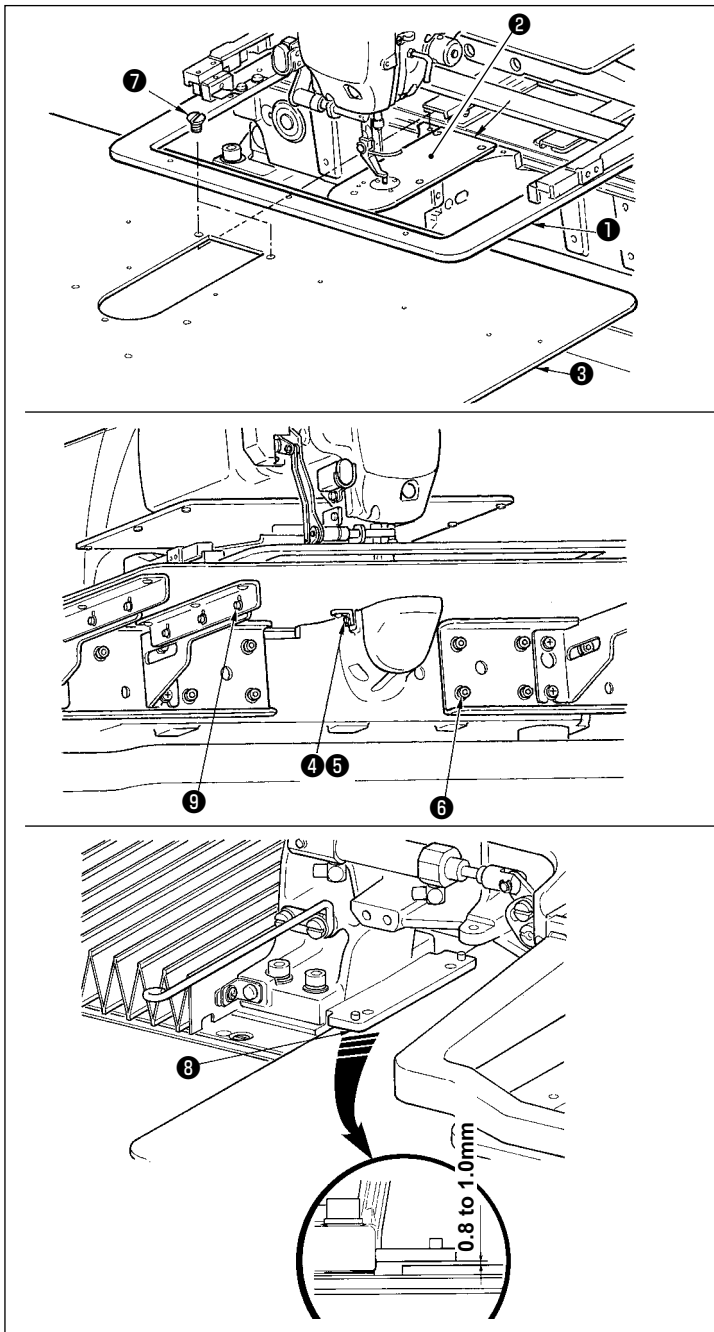
In case error E003 occurs when the sewing machine works after setup, loosen the safety switch fitting screw with a screwdriver, and lower the switch ❷ to the downside of the sewing machine.

### 3-3. Installing the throat plate auxiliary cover

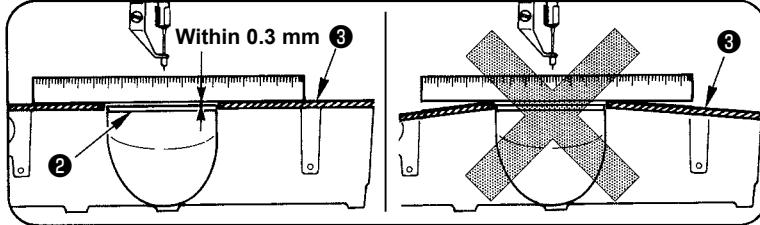
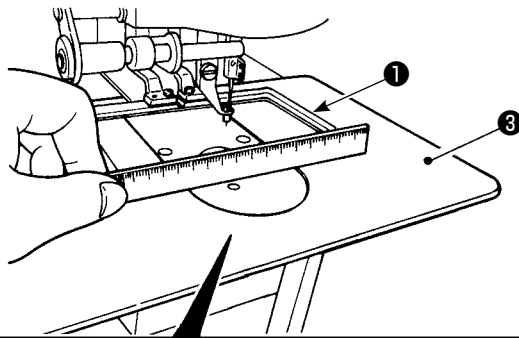


1. The stay and the like are set to the throat plate auxiliary cover and the fitting screws and washers to the bed are packed together with the accessories at the time of delivery.
2. When using the cover sheet supplied as accessories, paste it to the throat plate auxiliary cover before installing.

[Area 3020]

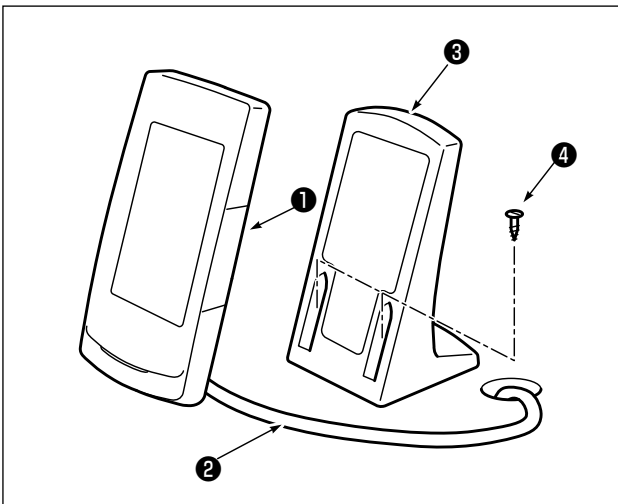


- 1) Move the cloth feed base to the rear, and place throat plate auxiliary cover (asm.) ③ from between lower plate ① and throat plate ②. At this time, be careful not to bend or damage lower plate ①.
- 2) Temporarily fix throat plate auxiliary cover (asm.) ③ with throat plate auxiliary cover setscrew ⑤ and washer ④.
- 3) Temporarily fix throat plate auxiliary cover (asm.) ③ to the machine bed with throat plate auxiliary cover support setscrews ⑥ (10 pcs.).
- 4) Fix throat plate auxiliary cover (asm.) ③ to the machine bed with two counter-sunk screws ⑦.
- 5) Move the cloth feed base to the left front, move up and down throat plate auxiliary cover (asm.) ③ so that a distance of 0.8 to 1.0 mm is provided between the bottom surface of lower plate installing base ⑧ and the top surface of throat plate auxiliary cover (asm.) ③, and fix setscrews ⑥.
- 6) Perform the similar work by moving the cloth feed base to the right front.
- 7) Fix throat plate auxiliary cover setscrew ⑤.
- 8) Referring to the caution below, perform positioning of the throat plate auxiliary cover. When the positioning is not performed enough, perform the positioning after loosening once throat plate auxiliary cover setscrew ⑤ and throat plate auxiliary cover base setscrews ⑨.



1. Fix the throat plate auxiliary cover ③ so that is higher than the throat plate ② (within 0.3 mm). When it is lower than the throat plate ②, needle breakage or the like due to the defective feed will be caused.
2. Confirm by putting a ruler or the like that the throat plate auxiliary cover ③ is horizontally installed. If not, throat plate auxiliary cover ③ and lower plate ① come in contact partially with each other, and abnormal worn-out will be caused.

### 3-4. Installing the panel

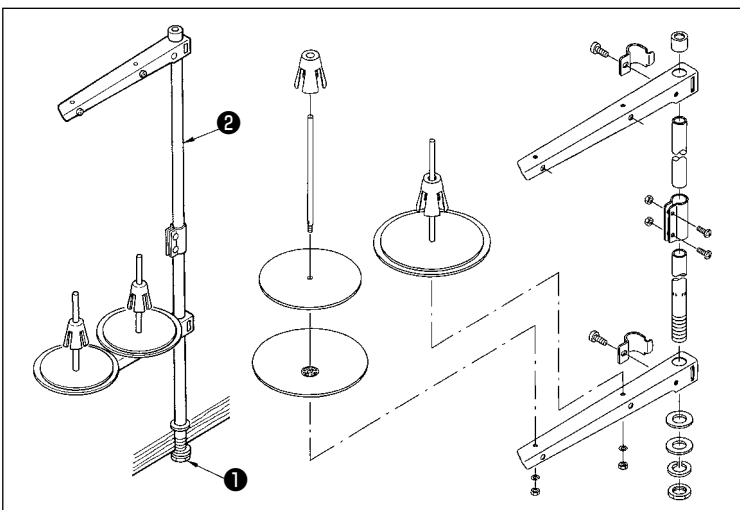


- 1) Open cover ① and remove cable ② once. Then connect it again to the panel on the top surface of the table after passing it through the hole in the table.
- 2) Fix operation panel installing plate ③ to an optional place on the table with two wood screws ④.



Install the panel at the position where X-move cover or head grip does not interfere with it since breakage of the panel will be caused.

### 3-5. Installing the thread stand



- 1) Assemble the thread stand, and put it in the hole in the top left corner of the machine table.
- 2) Tighten locknut ① to fix the thread stand.
- 3) When ceiling wiring is possible, pass the power cord through spool rest rod ②.



### 3-6. Raising the machine head



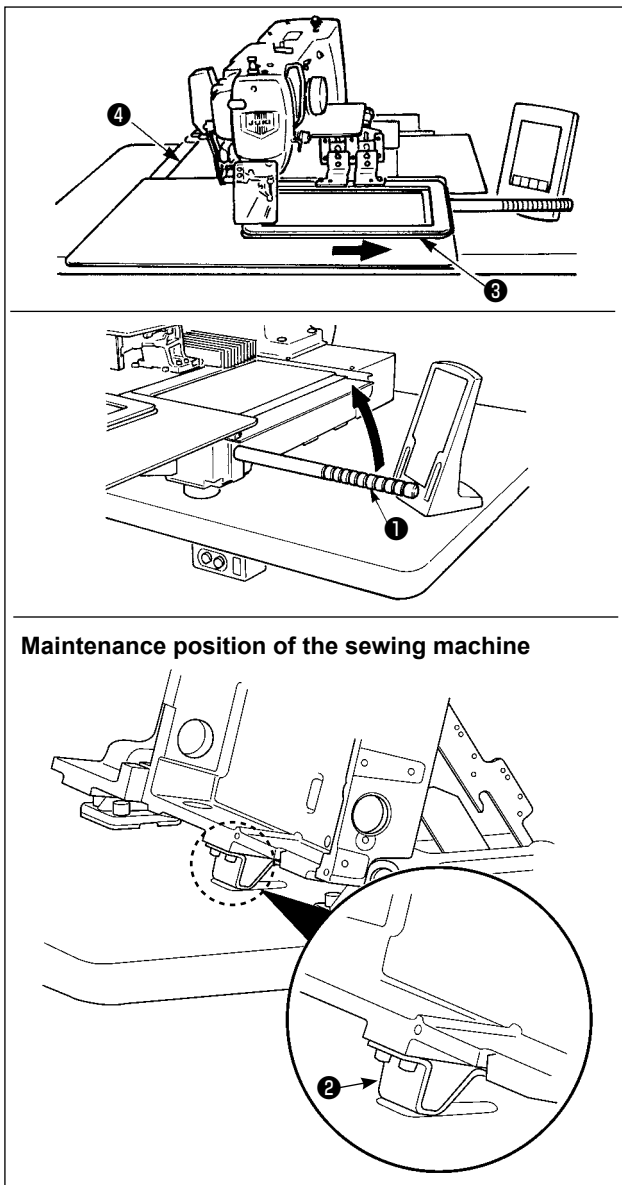
**WARNING :**

Tilt/raise the sewing machine head with both hands taking care not to allow your fingers to be caught in the head.

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

The sewing machine of area 3020 cannot be raised unless the throat plate auxiliary cover (asm.) is removed. Raise the sewing machine after removing the throat plate auxiliary cover (asm.) referring to **“I-3-3. Installing the throat plate auxiliary cover” p.4.**

When using the sewing machine, install the throat plate auxiliary cover (asm.) referring to **“I-3-3. Installing the throat plate auxiliary cover” p.4.**



To carry out work with the sewing machine raised, follow the steps of procedure described below.

1. Move feeding frame **3** to the rightmost position and fix it there. Then mount machine head grip **1** supplied with the unit by fully screwing it into position.
2. Holding machine head grip **1**, lift the sewing machine in the direction of the arrow until the maintenance position (where machine head support **2** comes in contact with the table) is reached.

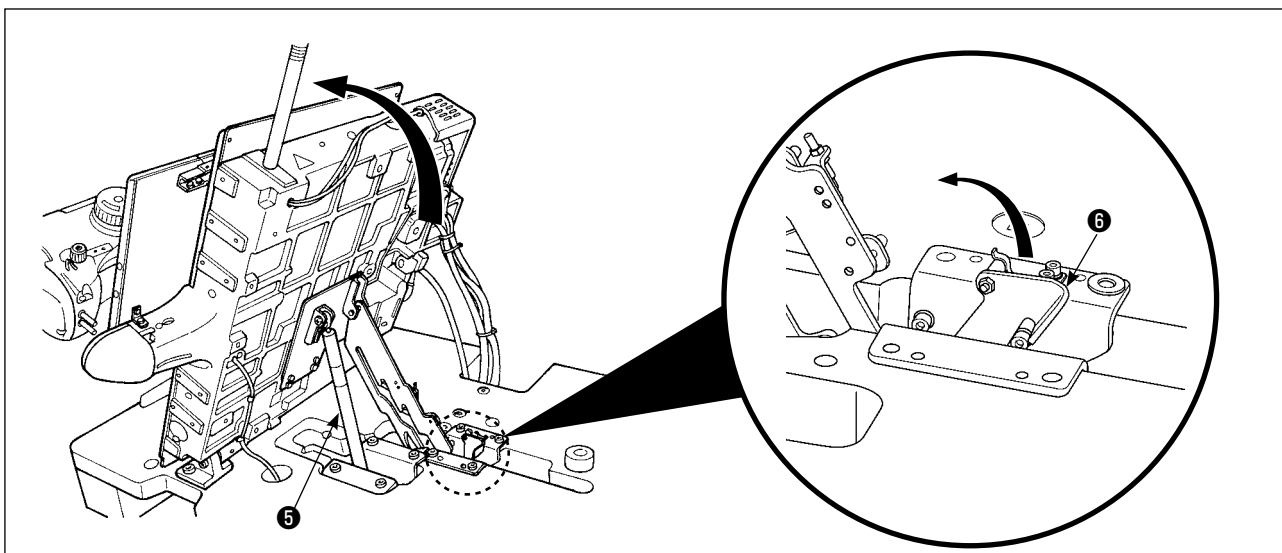
- If a 20 kg or more load is necessary to be applied to the position of machine head grip **1** in order to lift the machine head, gas spring **5** has outgassed. Be sure to replace the gas spring with a new one.
- While raising the sewing machine, gas spring **5** works to move the sewing machine in the direction of the arrow when the sewing machine is inclined by approximately 45 degrees of an angle with respect to the table. It is therefore necessary to lift the sewing machine until the maintenance position is reached while supporting the sewing machine with both hands.

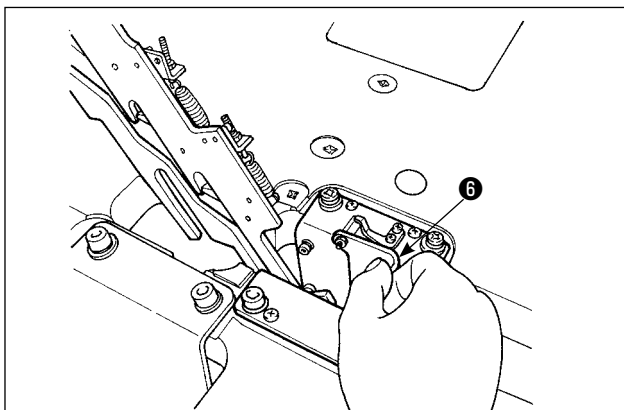


3. Turn stopper release lever **6** in the direction of the arrow to secure the sewing machine.

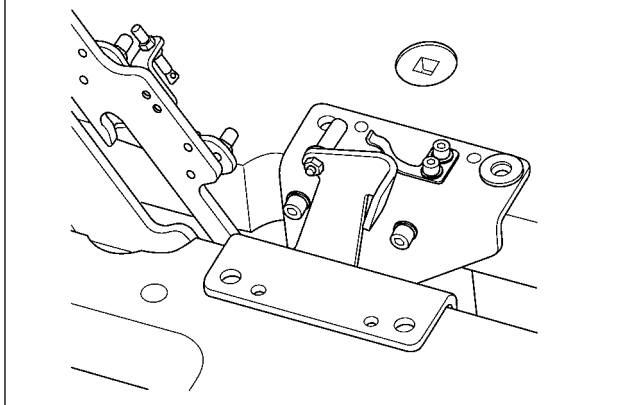


**Never operate stopper release lever **6** at any position other than the maintenance position so as not to allow your hand or other part of body to be caught between the sewing machine and the table.**





Machine head in the fixed state



To return the sewing machine to its initial position, follow the steps of procedure described below.

1. Return stopper release lever **6** to its initial position. (Return the lever until it is fixed.)
2. Carefully return machine head grip **1** to its initial position with both hands.



- While returning the sewing machine to its initial position, gas spring **5** works when the sewing machine is inclined by approximately 70 degrees of an angle to hold the machine at that position before the machine reaches its initial position. Then, further apply force in the returning direction to return the sewing machine to its initial position.
- If you return the sewing machine to its initial position swiftly, the sewing machine open/close lock mechanism will work. In this case, slightly lift the sewing machine from the position where it is locked to reset the lock mechanism. Then, carefully return the sewing machine to its initial position again.

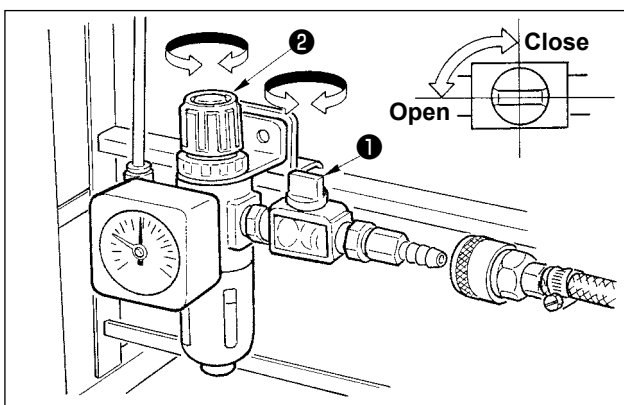


1. To prevent the sewing machine from falling, be sure to raise the machine head after fixing table/stand (casters) at the leveled place so as to prevent it from moving.
2. Be sure to raise the machine after shifting feeding frame **3** to the rightmost position since X-feed cover **4** interferes with the machine table causing breakage.
3. When the machine is raised, clean portion **A** of the bottom face of the machine to prevent the surface of the machine table from being stained with oil.

### 3-7. Installing the air hose



This sewing machine is not provided with the air pressure detection function. If the air pressure is not properly set or the sewing machine is used under the environment where the specified air pressure cannot be achieved, the sewing object will not be secured correctly, and it will not be sewn as preliminarily set. It is therefore necessary to check the air pressure.



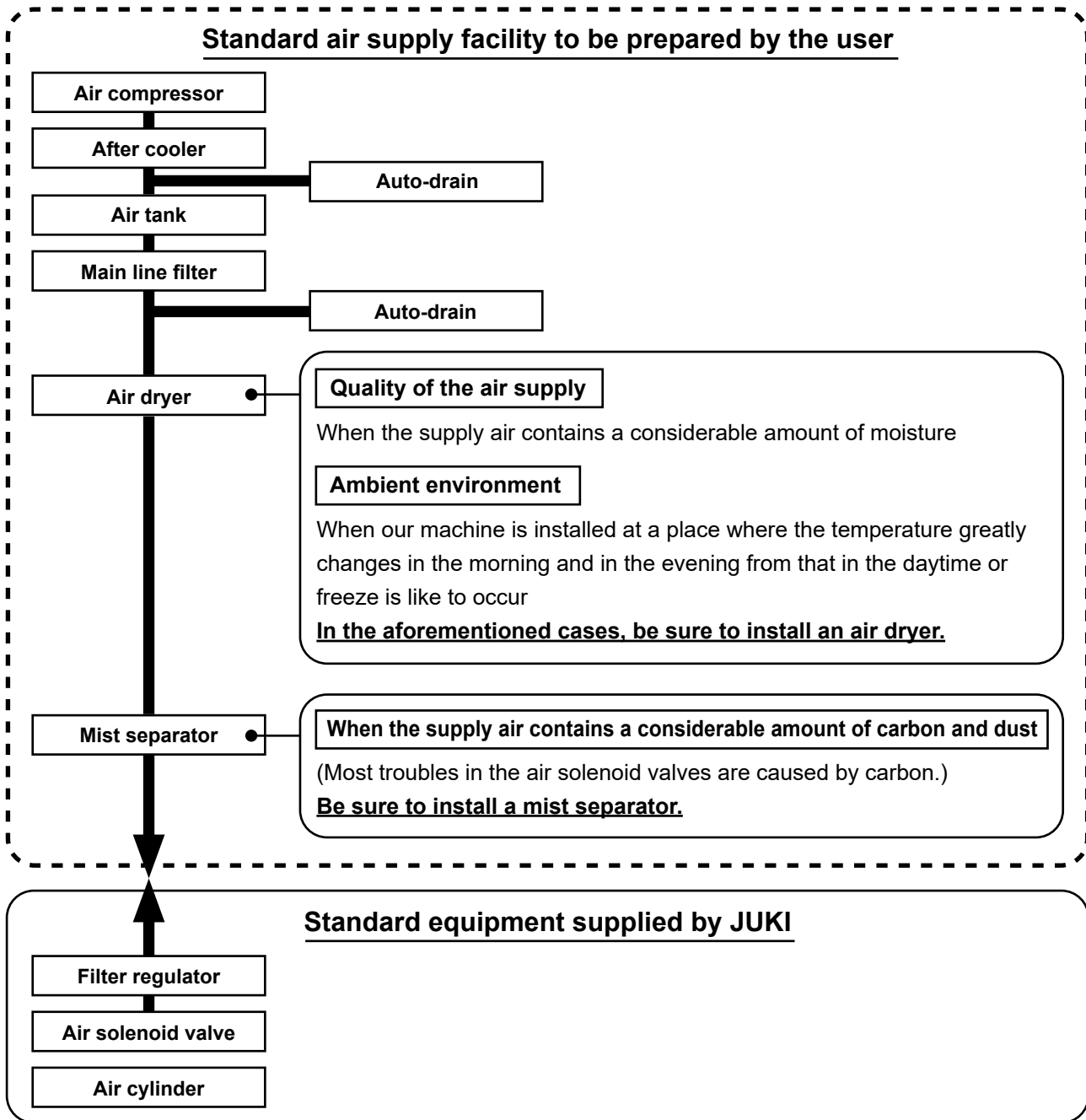
- 1) Connecting the air hose  
Connect the air hose to the regulator .
  - 2) Adjustment of air pressure  
Open air cock **1**, pull up and turn air adjustment knob **2** and adjust so that air pressure indicates 0.5 to 0.55 MPa (Max. 0.55 MPa). Then lower the knob and fix it.
- \* Close air cock **1** to expel air.

### 3-8. Cautions for the compressed air supply (source of supply air) facility

As large as 90 % of failures in pneumatic equipment (air cylinders, air solenoid valves) are caused by "contaminated air."

Compressed air contains lots of impurities such as moisture, dust, deteriorated oil and carbon particles. If such "contaminated air" is used without taking any measures, it can a cause of troubles, inviting reduction in productivity due to mechanical failures and reduced availability.

Be sure to install the standard air supply facility shown below whenever the machine provided with pneumatic equipment is used.



#### Cautions for main piping

- Be sure to slope main piping by a falling gradient of 1 cm per 1 m in the direction of air flow.
- If the main piping is branched off, the outlet port of the compressed air should be provided at the top part of the piping using a tee in order to prevent drain settling inside the piping from flowing out.
- Auto drains should be provided at all lower points or dead ends in order to prevent the drain from settling in those parts.

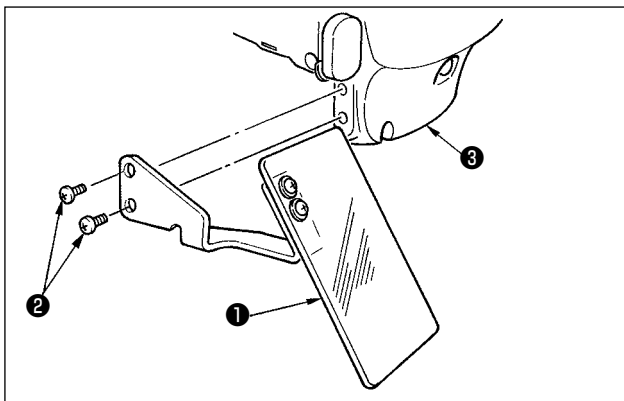


### 3-9. Installing the eye protection cover



#### WARNING :

Be sure to attach this cover to protect the eyes from the disperse of needle breakage.



Use eye protection cover ❶ after securely attaching it on face plate cover ❸ with screw ❷.

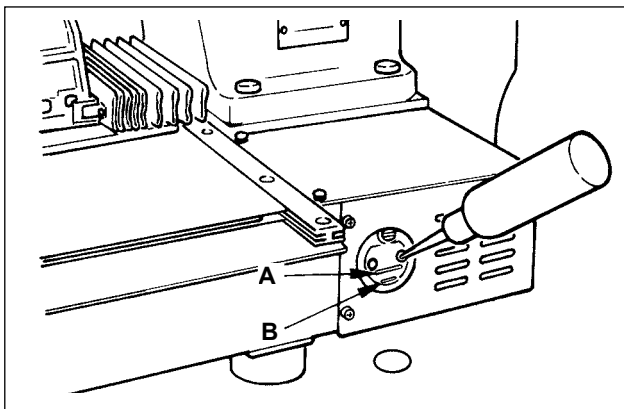
## 4. PREPARATION OF THE SEWING MACHINE

### 4-1. Lubrication

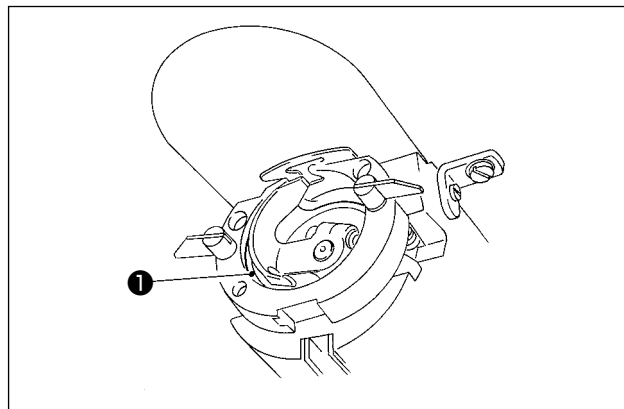


#### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) Check that the place between lower line **B** and upper line **A** is filled with oil. Fill there with oil using the oiler supplied with the machine as accessories when oil is short.



2) Apply one drop of oil to the hook race ❶ part to spread on it.



The oil tank which is filled with oil is only for lubricating to the hook portion. It is possible to reduce the oil amount when the number of rotation used is low and the oil amount in the hook portion is excessive. (Refer to “[I-1-10. Amount of oil supplied to the hook](#)” p.27 .)



1. Do not lubricate to the places other than the oil tank and the hook of Caution 2 below. Trouble of components will be caused.

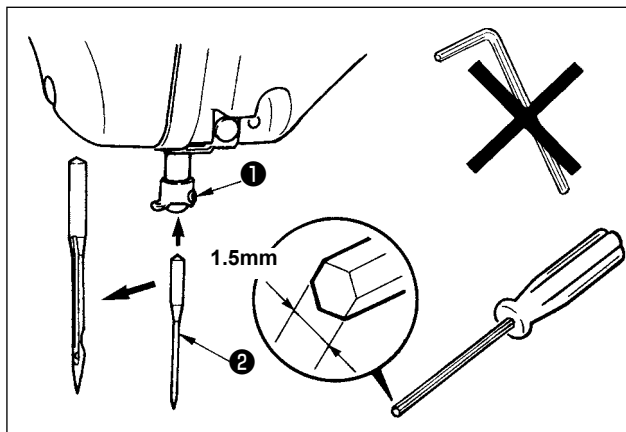
2. When using the sewing machine for the first time or after an extended period of disuse, use the machine after lubricating a small amount of oil to the hook portion. (For removing the shuttle, see “[II-1-2. Adjusting the needle-to-shuttle relation](#)” p.16.)

## 4-2. Attaching the needle



### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



Loosen setscrew ① and hold needle ② with the long groove facing toward you. Then fully insert it into the hole in the needle bar, and tighten setscrew ①.

When tightening setscrew ①, be sure to use the screwdriver (Part No. : 40032763) supplied as accessories.



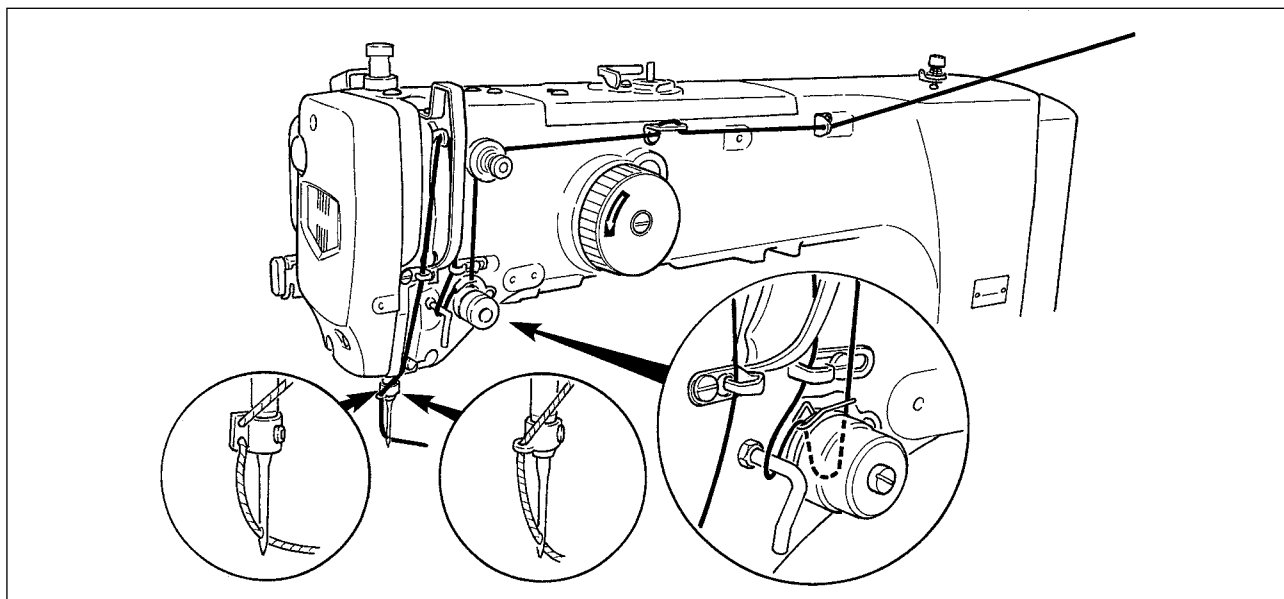
Do not use L-shaped hexagon wrench key. There is a danger of breaking setscrew ①.

## 4-3. Threading the machine head



### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

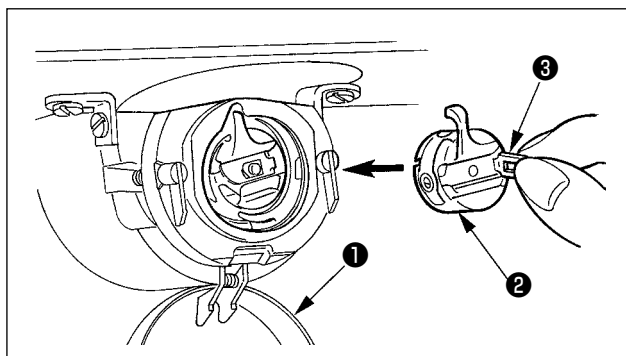


## 4-4. Installing and removing the bobbin case



### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



- 1) Open hook cover ①.
- 2) Raise latch ③ of bobbin case ②, and remove the bobbin case.
- 3) When entering bobbin case, insert it with the latch tilted until "click" sounds.



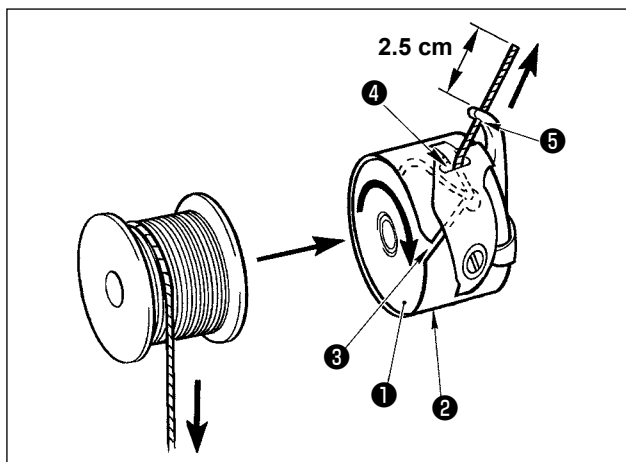
If it is not fully inserted, bobbin case ② may slip off during sewing.

#### 4-5. Installing the bobbin



##### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

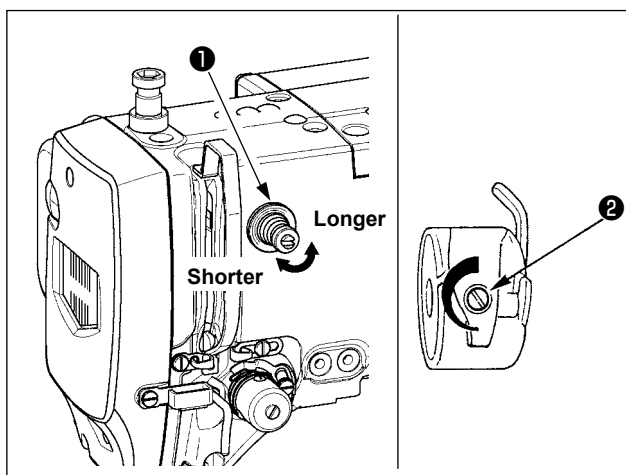


- 1) Set the bobbin ① into bobbin case ② in the direction shown in the figure.
- 2) Pass the thread through thread slit ③ of bobbin case ②, and pull the thread as it is. By so doing, the thread will pass under the tension spring and be pulled out from thread hole ④.
- 3) Pass the thread through thread hole ⑤ of the horn section, and pull out the thread by 2.5 cm from the thread hole.



If the bobbin is installed in the bobbin case orienting the reverse direction, the bobbin thread pulling out will result in an inconsistent state.

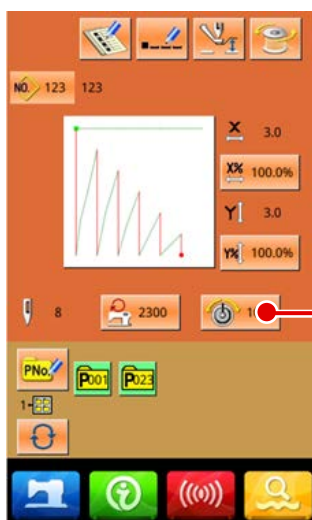
#### 4-6. Adjusting the thread tension




If thread tension controller No. 1 ① is turned clockwise, the length of remaining thread on the needle after thread trimming will be shorter. If it is turned counterclockwise, the length will be longer. Shorten the length to an extent that the thread is not slipped off.

Adjust needle thread tension from the operation panel and bobbin thread tension with ②.

#### Adjusting the needle thread tension



- 1) Select THREAD TENSION button  A in the sewing screen.

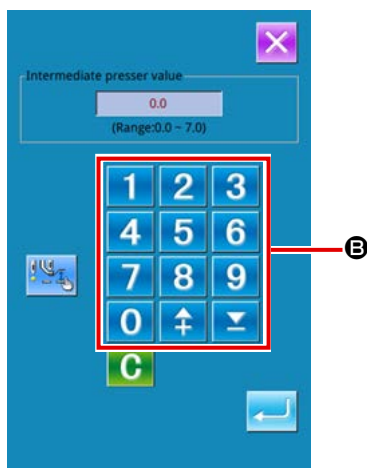
- 2) Set a needle thread tension using B. There is a setting range of 0 to 200. When the set value is increased, the tension becomes higher.

\* When the set value is 50 at the time of standard delivery, the thread tension is adjusted so that H type is 2.35N and S type is 1.47N (spun thread #50). (When thread tension No. 1 is released)

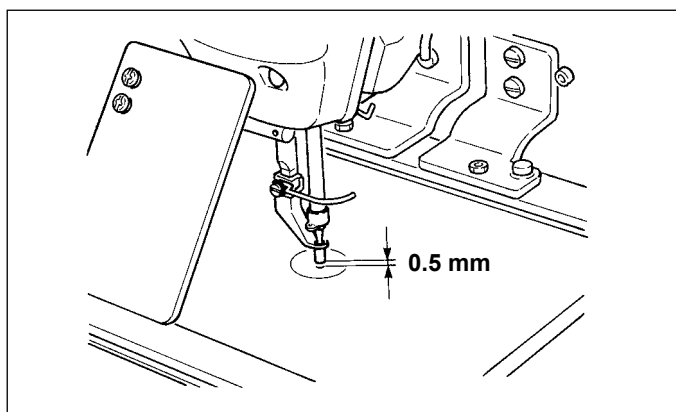
## 4-7. Intermediate presser height



1. When raising the intermediate presser height, turn the pulley by hand to lower the needle bar, and confirm that the needle bar does not interfere with the intermediate presser. (When using DP X 5 needle, use the sewing machine with the height of 3.5 mm or less.)
2. Take care not to get your hands and fingers caught in the feeding frame or intermediate presser.

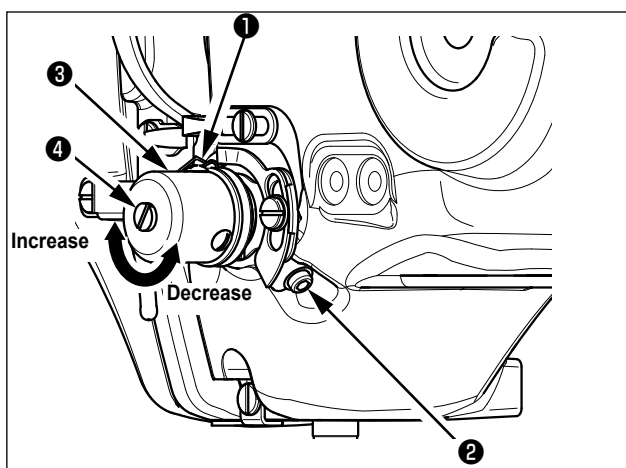


Press INTERMEDIATE PRESSER SETTING button **A** and adjust with TEN keys **B** so that the clearance between the bottom end of intermediate presser and the cloth is 0.5 mm (thickness of thread used).



1. Setting range of the intermediate presser is up to the standard of 3.5 mm. However, when using DP X 17 needle for H type or the like, the setting range can be changed up to max. 7 mm with memory switch U012 .
2. When increasing the height of intermediate presser or making the needle size thicker, confirm the clearance between the wiper and the components. Wiper cannot be used unless the clearance is secured. Turn OFF the wiper switch. Besides, note that the wiper is set so as to sweep at the position where the intermediate presser is in the lowest position in spite of the setting of intermediate presser height at the time of delivery. (Memory switch U105)

## 4-8. Adjusting the thread take-up spring



- 1) Adjusting the stroke  
Loosen setscrew **2**, and turn thread tension asm. **3**.  
Turning it clockwise will increase the moving amount and the thread drawing amount will increase.
- 2) Adjusting the pressure  
To change the pressure of the thread take-up spring **1**, insert a thin screwdriver into the slot of thread tension post **4** while screw **2** is tightened, and turn it. Turning it clockwise will increase the pressure of the thread take-up spring. Turning it counterclockwise will decrease the pressure.

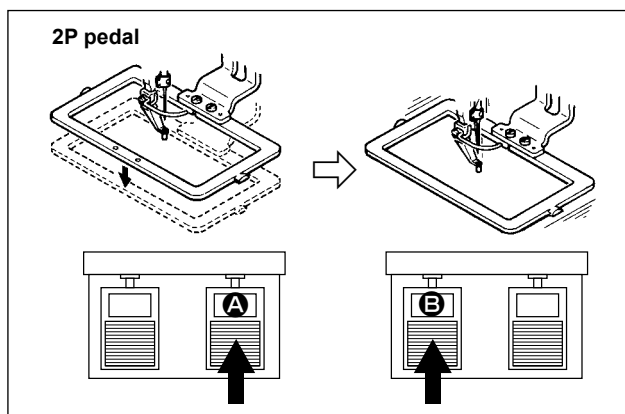


## 5. OPERATION OF THE SEWING MACHINE

### 5-1. Sewing




This sewing machine is not provided with the air pressure detection function. If the air pressure is not properly set or the sewing machine is used under the environment where the specified air pressure cannot be achieved, the sewing object will not be secured correctly, and it will not be sewn as preliminarily set. It is therefore necessary to check the air pressure.



#### [In case of 2P pedal]

- 1) Set a workpiece on the sewing machine.
- 2) Depress the pedal switch **A**, and the feeding frame will come down. Depress it again, and the feeding frame will go up.
- 3) Depress the pedal switch **B** after the feeding frame has come down and the sewing machine will start sewing.
- 4) After the sewing machine completes sewing, the needle point will return to the start point and the feeding frame will go up.

### 5-2. Needle thread clamp device

By actuating the needle thread clamp device, trouble of sewing at the high-speed start (needle thread slip-off, stitch skipping or needle thread stain) is prevented, and can reduce gathering (bird's nest) of needle thread on the wrong side of cloth while keeping stable sewing. When mounting the IP-420, changeover of motion ON/OFF is performed with  key.

When the needle thread clamp device is OFF, the machine automatically operates at slow-start.



When memory switch No. 35 is "1" (prohibited), the thread clamp does not work. In addition,  key is ineffective.

#### \* Matters that demand special attention when using the needle thread clamp device

For the thread clamp unit, there are S type and H type in accordance with the sewing types. Refer the respective types and the contents of the memory switches that can be set to the list below.

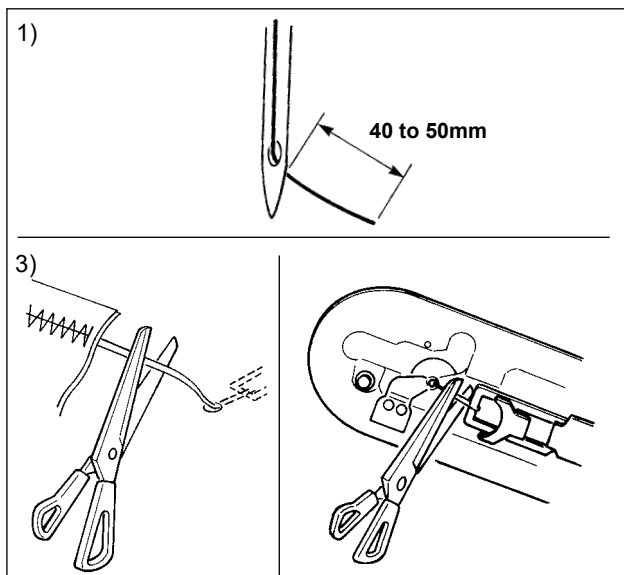
Sewing machine type	Thread clamp unit type	Memory switch	
		U069	U070
H type	H type	1 : H type thin thread (standard)(#50 to #8) 2 : H type intermediate (#20 to #5) 3 : H type thick thread (#5 to #2)	0 : Front 1 : Rear (standard)

#### [Regarding H type thread clamp unit]

Change the set value of memory switch U069 in accordance with the thickness of needle thread. The set value has been set to 1 : H type thin thread at the time of delivery. Commendable value is Set value : 1 for thread count #50 to #8, Set value : 2 for thread count #20 to #5, and Set value : 3 for thread count #5 to #2. (The value will change in accordance with the kind and thickness of the actual thread and the kinds of materials to be sewn.) Set the value by adjusting to the state of needle thread on the wrong side of materials.

In addition, it is possible to select the thread clamp position by means of memory switch U070. When using thick thread of thread count #5 to #2, and rolling-in or tucking at the start of sewing occurs, set the set value to 1 : Rear and use the machine.

- (1) When with thread clamp (motion), use the sewing machine after adjusting the needle thread length at the start of sewing to 40 to 50 mm. When the needle thread length is too long, the needle thread end held with the needle thread clamp may be rolled in the seams.



(2) When the thread clamp is used, and bobbin thread at the sewing start appears on the right side of material, reduce thread tension at the sewing start (2 to 3 stitches) and bobbin thread becomes less conspicuous.

[Example of setting]

Tension of 1 to 2 stitches at the sewing start is "20" when sewing tension setting is "35".

\* For setting of tension at the start of sewing, see of **"CHAPTER II Operation section 2.3. Normal Pattern Operation" p134.**

- 1) In case of with the needle thread clamp, the standard of the length of needle thread is 40 to 50 mm.
  - To prevent the thread from slipping off from the needle eyelet at the beginning of sewing or to prevent stitch skipping from the first stitch  
→ Adjust the length of needle thread longer within the range.
  - To prevent stitch skipping within the second to tenth stitches from the beginning of sewing  
→ Adjust the length of needle thread shorter within the range.



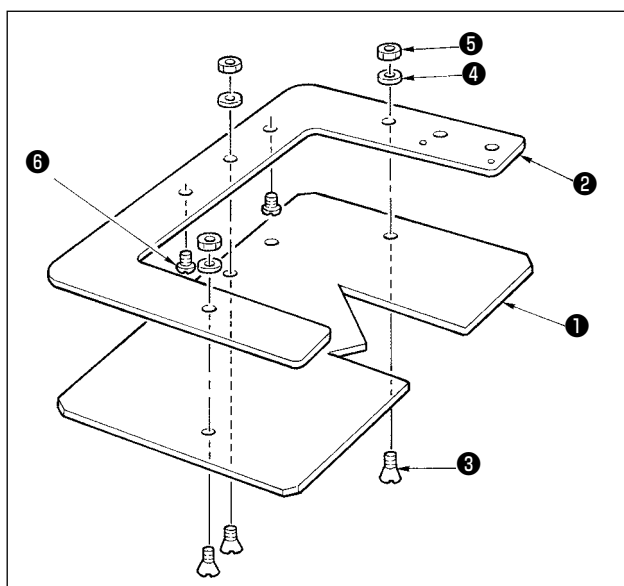
**When needle thread is excessively long at the time of using the thick thread, the end of needle thread held with the needle thread clamp is rolled in the seams, and slip of position of material may occur or needle breakage may be caused.**



1. Thread at the start of sewing may be rolled in case of some patterns. When thread is rolled in even after performing adjustment of (1) or (2), use the sewing machine with thread clamp OFF.
2. Thread clamp failure may occur in the state that thread waste is jammed in the thread clamp device. Remove the thread waste referring to **"II-1-6. Needle thread clamp device" p.20.**

### 5-3. How to use the plastic blank (option)

(For the separately-feeding frame with a double-stepped stroke function)



- 1) Machine the plastic blank supplied with the machine according to the stitching shape.
- 2) Attach the plastic blank to the feeding frame as illustrated in the figure shown above.



1. The plastic blank is commonly used with the frames (right) and (left) of the feeding frame. Attach the plastic blank to the frame (right).
2. Use a sponge sheet or rubber sheet supplied with the machine in combination with the plastic blank, if necessary.

①	Plastic blank	40035093	④	Washer	WP0430801SC
②	Feeding frame (left) for separately-driven feeding frame	40032844	⑤	Nut	NM6040001SC
③	Setscrew	SM1041201SC	⑥	Positioning screw	SM4040455SP

## II. MAINTENANCE OF SAWING MACHINE

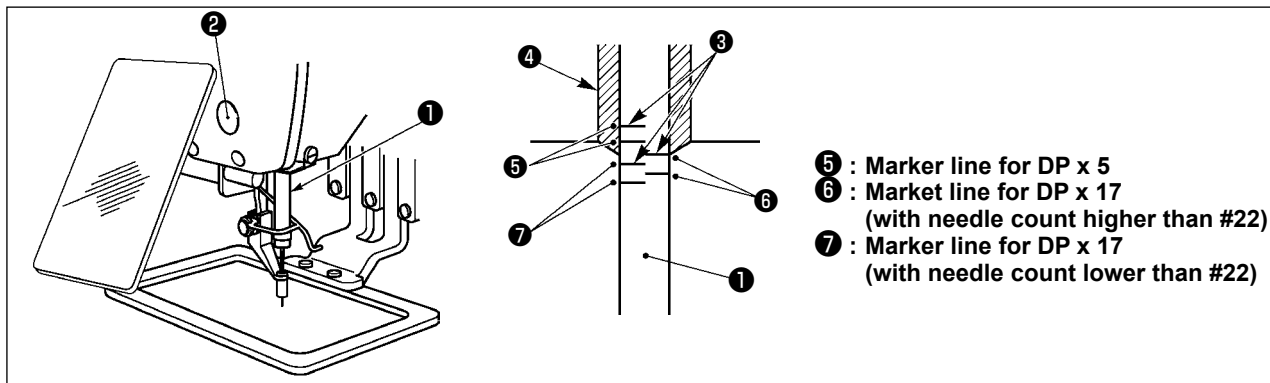
### 1. MAINTENANCE

#### 1-1. Adjusting the height of the needle bar (Changing the length of the needle)



#### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



\* Turn ON the power once, and turn OFF the power again after making the intermediate presser in the lowered state.

- 1) Bring needle bar ① down to the lowest position of its stroke. Loosen needle bar connection screw ② and adjust so that the upper marker line ③ engraved on the needle bar aligns with the bottom end of the needle bar bushing lower ④.
- 2) As illustrated in the above figure, change the adjusting position in accordance with the needle count.



After the adjustment, turn the pulley to check for an extra load.

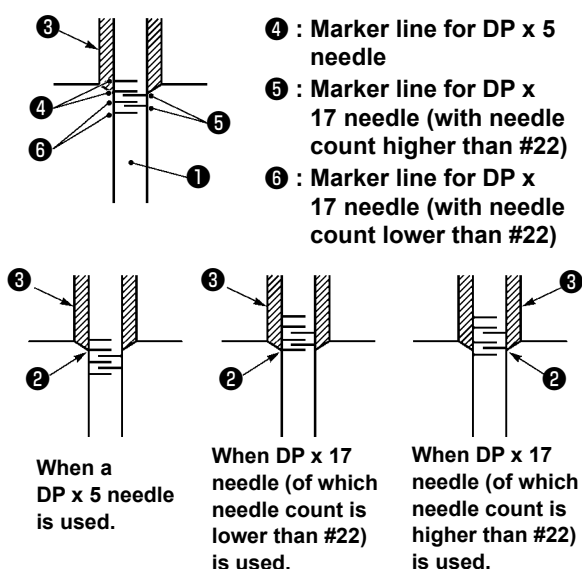
#### 1-2. Adjusting the needle-to-shuttle relation



#### WARNING :

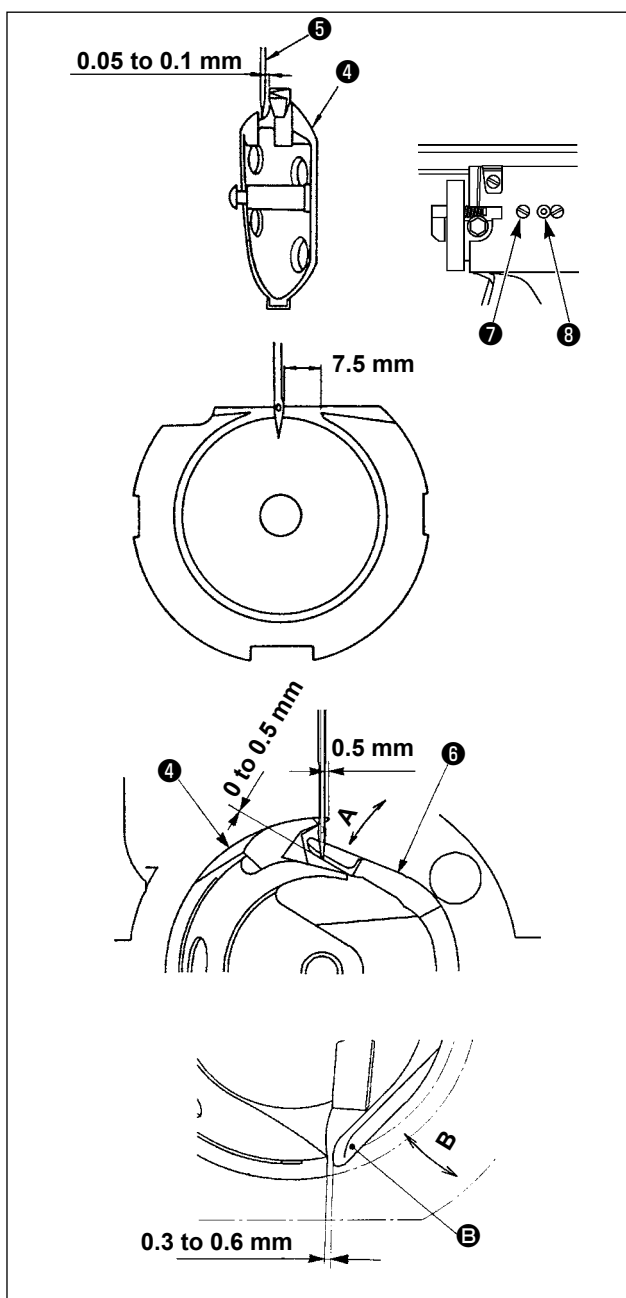
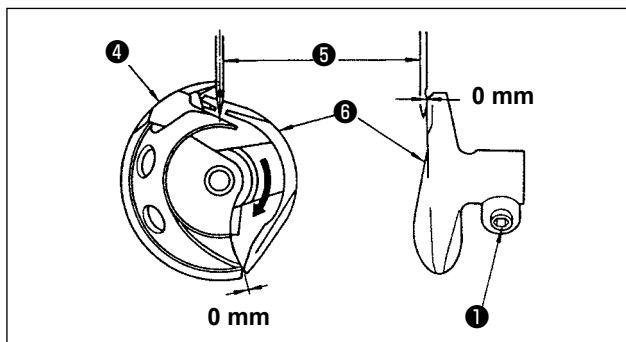
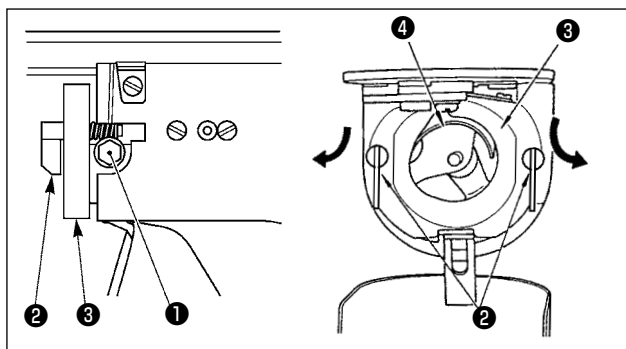
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Relation between the needle and the marker lines on the needle bar



\* Turn ON the power once, and turn OFF the power again after making the intermediate presser in the lowered state.

- 1) Turn handwheel by hand to ascend the needle bar ①.  
Adjust so that lower marker line ② on the ascending needle bar aligns with the bottom end of the needle bar bushing lower.



- 2) Loosen setscrew ① in the driver. Drawing bobbin case opening lever hook ② toward you, open it to the right and left until bobbin case opening lever ③ comes off.



**At this time, be careful not to let shuttle ④ come off and fall.**

- 3) Adjust so that the point of shuttle ④ meets the center of needle ⑤, and that a clearance of 0 mm is provided between the front end face of driver ⑥ and needle as the front end face of driver receives needle to prevent the needle from being bent. Then tighten setscrew ①.
- 4) Loosen shuttle race screw ⑦, and adjust the longitudinal position of the shuttle race. To do this adjustment, turn shuttle race adjusting shaft ⑧ clockwise or counterclockwise to provide a 0.05 to 0.1 mm clearance between needle ⑤ and the blade point of shuttle ④.
- 5) After adjusting the longitudinal position of shuttle race, further adjust to provide a 7.5 mm clearance between the needle and the shuttle race. Then, tighten screw ⑦ of shuttle race.
- 6) When changing the number of needle from the number at the time of standard delivery or using a new driver, perform the adjustment of the height of driver.

#### [Adjustment of height of driver]

- 1) Adjust so that the blade point of inner hook ④ meets the center of needle ⑤ and tighten setscrew ①.
- 2) Bend the needle guard section of driver ⑥ in the direction of arrow A so that the protruding amount from the bottom end of the needle guard section of driver ⑥ to the tip of needle ⑤ is 0 to 0.5 mm when the blade point of inner hook ④ is out by 0.5 mm from the right end of needle ⑤.
- 3) Bend rear end B of driver ⑥ in the direction B so that the clearance between rear end B of driver ⑥ and inner hook ④ is 0.3 to 0.6 mm.
- 4) Perform adjustment of steps 3) to 5) above.



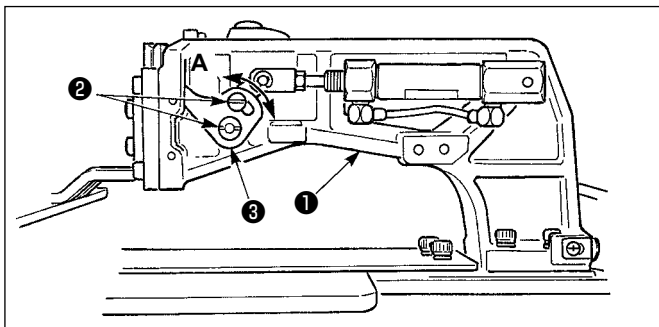
1. When making the needle size thicker, confirm the clearance between the needle tip or the intermediate presser and the wiper. Wiper cannot be used unless the clearance is secured. In this case, turn OFF the wiper switch, or change the set value of memory switch U105.
2. When the height of the needle guard of the driver is not proper, abrasion of the blade point of inner hook or stitch skipping will be caused.

### 1-3. Adjusting the height of the feeding frame



#### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

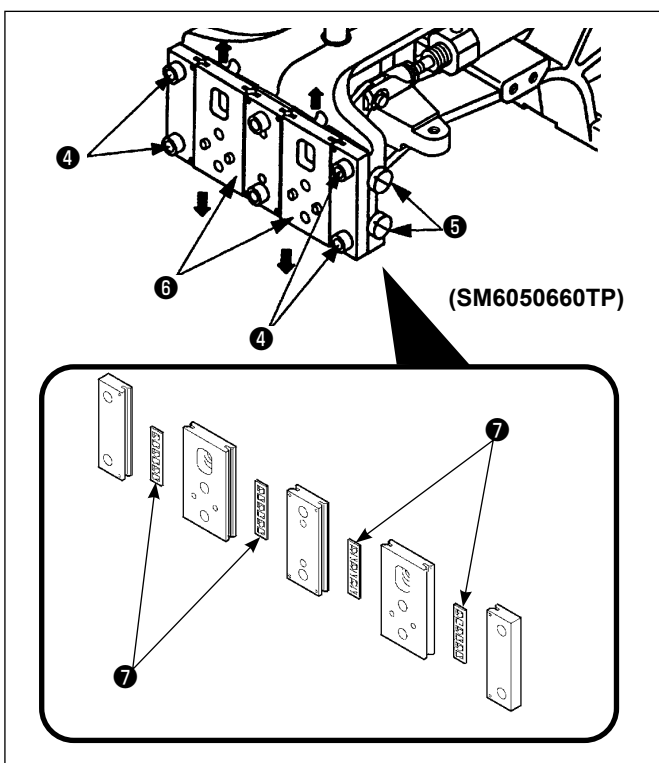


- 1) Loosen setscrews ② located on the right and left sides of feed bracket ①. Moving cloth presser link ③ to the direction A will decrease the height of the feeding frame.
- 2) After the adjustment of the height of the feeding frame, securely tighten the screws ②.

If the feeding frame still interferes with the face plate bearing and the feeding frame height does not change after the adjustment of the position of work clamp link, adjust the pressure applied to the face plate bearing to lower it as far as no lateral play of the feeding frame occur.

At the time of delivery, work clamp foot has been moved up and down to adjust the torque (sliding torque) of face plate bearing ⑦ to 0.98 to 7.84 N (100 to 800 g) applied when work clamp foot starts moving after face plate bearing ⑦ has come in contact with the spring pin.

1. Loosen the setscrew ④.
2. Lightly tighten the pressure adjusting screw ⑤ and give a pressure to the face plate bearing ⑦. At that time, move the presser foot face plate ⑥ vertically, making sure that uneven application of torque can be avoided.
3. Tighten the setscrew ④.



1. When the setscrew ④ is tightened, pressure kept applied to the face plate bearing ⑦ is changed.



Therefore, when the setscrew ④ is tightened, examine the amount of the slippage torque.

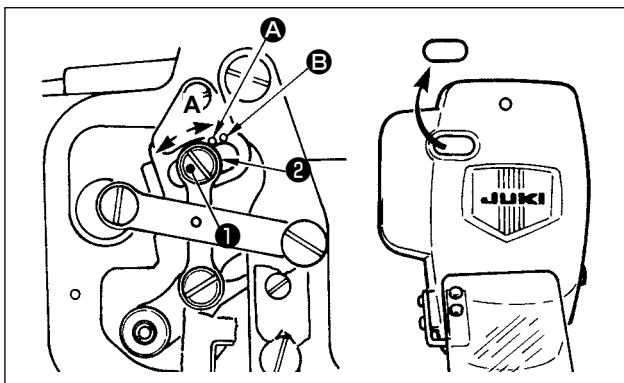
2. The pressure adjusting screw ⑤ is not attached to the sewing machine.

### 1-4. Adjusting the vertical stroke of the intermediate presser



#### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



By removing the rubber plug in the face plate cover, adjustment can be performed without removing the face plate cover.

\* Turn ON the power once, and turn OFF the power again after making the intermediate presser in the lowered state.

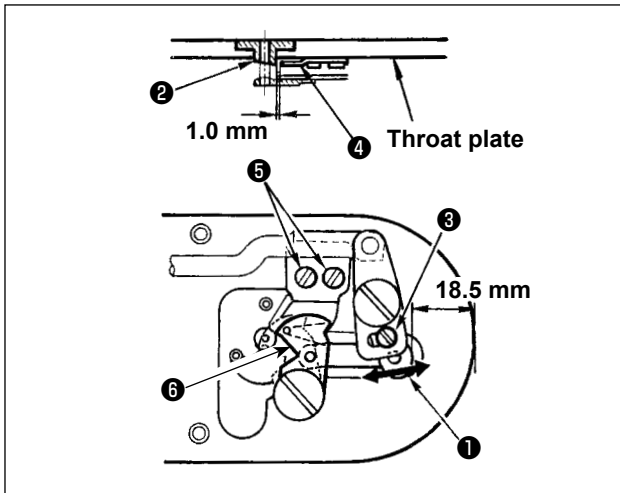
- 1) Remove face cover.
- 2) Turn handwheel to make the needle bar come down to its lowest point.
- 3) Loosen hinge screw ① and move it to the direction A to increase the stroke.
- 4) When marker dot A is aligned with the right side of the outer periphery of washer ②, the vertical stroke of the intermediate presser becomes 4 mm. And, when marker dot B is aligned with the right side of the outer periphery of the washer, it becomes 7 mm. (The vertical stroke of the intermediate presser is factory-set to 4 mm at the time of delivery.)

## 1-5. The moving knife and counter knife

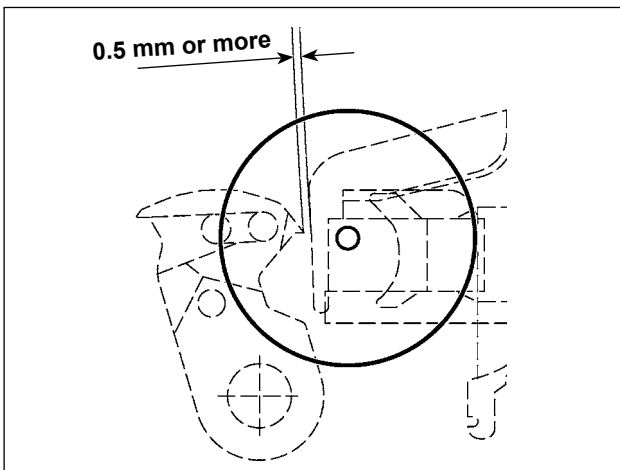


### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



- 1) Loosen adjusting screw ❶ so that a clearance of 18.5 mm is provided between the front end of the throat plate and the top end of thread trimmer lever, small ❸. To adjust, move the moving knife in the direction of arrow.
- 2) Loosen setscrew ❺ so that a clearance of 1.0 mm is provided between needle hole guide ❷ and counter knife ❹. To adjust, move the counter knife.



After the origin retrieval, press the SET READY key on the IP panel to verify that a clearance of 0.5 mm or more is provided between the top end of moving knife and the top end of needle thread clamp. If a clearance of 0.5 mm or more cannot be secured, adjust the position of moving knife within  $18.5 \pm 0.5$  mm to secure the specified clearance.

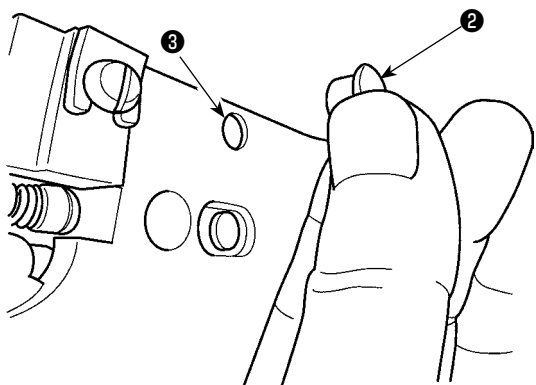
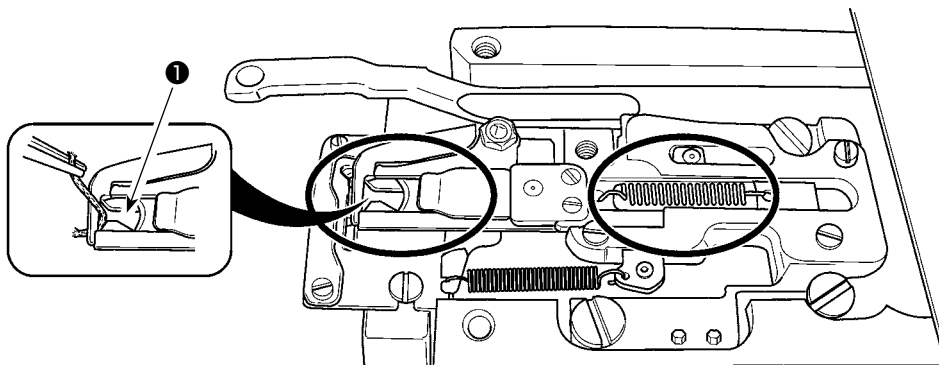


## 1-6. Needle thread clamp device



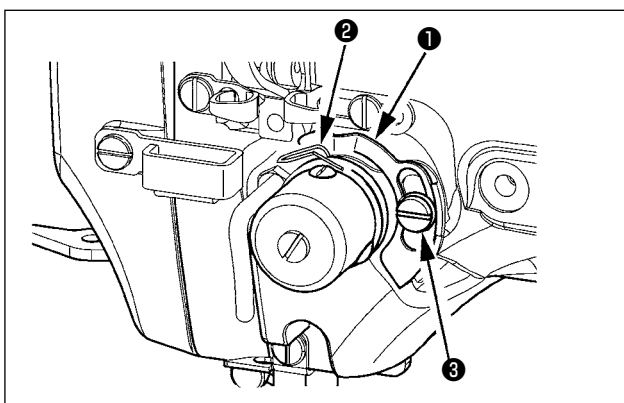
### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



When thread is caught at top end ❶ of the thread clamp, thread clamp becomes incomplete and sewing trouble at the sewing start will be caused. Thread waste and lint are likely to accumulate in the sections which are shown in the circles. The sections should therefore be periodically cleaned by removing the throat plate and by blowing air through hole ❸ by removing rubber plug ❷.

## 1-7. Thread breakage detector plate

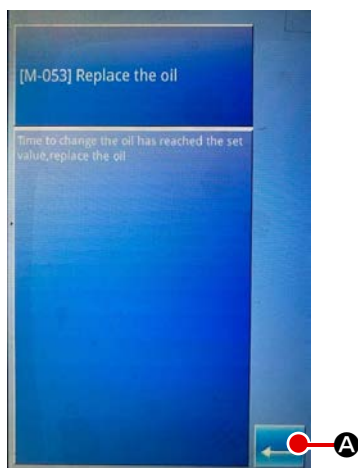


- 1) Adjust so that thread breakage detector plate ❶ is always in contact with thread take-up spring ❷ in the absence of needle thread. (Slack : approx. 0.5 mm)
- 2) Whenever the stroke of thread take-up spring ❷ has been changed, be sure to readjust thread breakage detector plate ❶. To make this adjustment, loosen screw ❸.




Adjust so that thread breakage detector plate ❶ does not touch any adjacent metallic parts other than thread take-up spring ❷.

## 1-8. Replenishing the designated places with grease



When the sewing machine has been used for one year, the pop-up error screen notifying the time to replenish grease for the specified greasing locations will be displayed.

Once this error screen is displayed, press ENTER button  **A** to cancel the display, turn the power OFF and replenish grease.

When the screen is restored to the information display screen after the completion of greasing, the time for replacement of the oil will return to the default setting.

### (1) Location where exclusive grease is provided

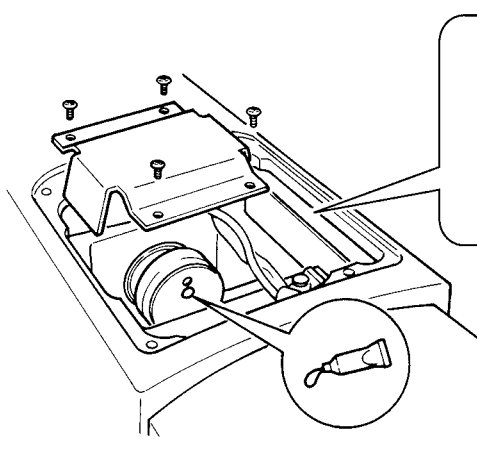
Two different types of JUKI Grease A **①** and B **②** and an exclusive coupling and setscrew for JUKI Grease B are provided at the location as shown in the illustration. In addition, exclusive grease for the LM guide is supplied with the unit as an accessory.

Add grease periodically (when the grease runout warning No. E220 is displayed on the panel or once a year) to points to be applied with grease.

If grease has decreased due to cleaning of the sewing machine or any other reasons, be sure to immediately add grease.



**Do not use Grease A and Grease B with mixed. Be sure to use the specified grease without fail. The grease filling coupling and setscrew should be used when applying JUKI Grease B. Do not use them for the JUKI Grease A and the exclusive grease for the LM guide.**



**JUKI Grease B ②**

**JUKI Grease A ①**

When the grease runs short, be sure to purchase new grease.

		Spare parts No.
JUKI Grease A	10g tube	40006323
	100g tube	23640204
JUKI Grease B	10g tube	40013640
Exclusive grease for the LM guide	70g tube	40097886



#### **WARNING :**

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start or the sewing machine. In addition, attach the covers which have been removed before operation back in place.

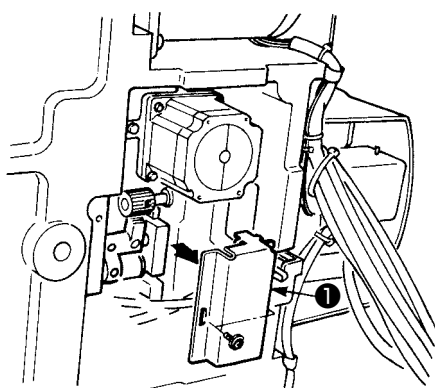


## (2) Points to be applied with JUKI Grease A



Use grease tube A (part number: 40006323) supplied with the unit for adding grease to any points other than the points specified below. If any grease other than the specified one is used, the related components can be damaged.

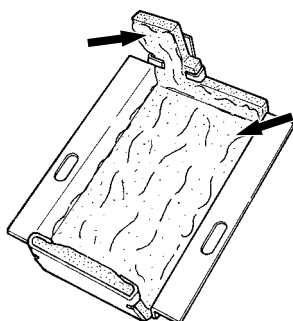
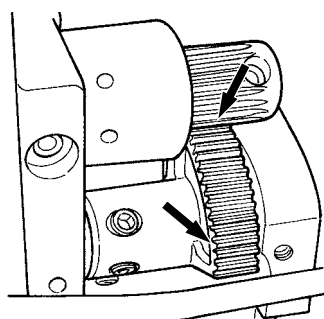
### ■ Adding grease to the oscillating rock shaft gear section



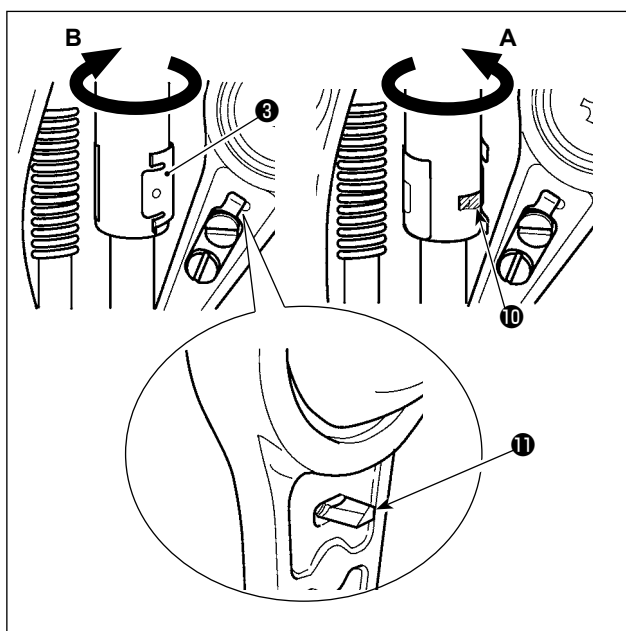
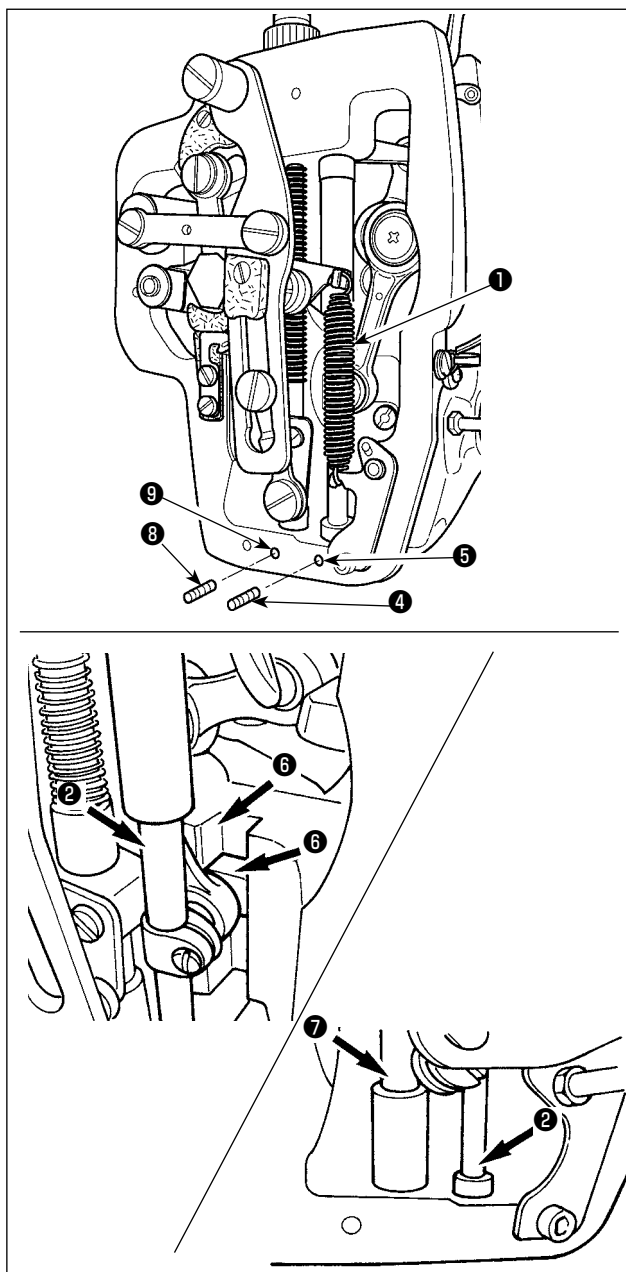
- 1) Tilt the sewing machine and remove grease cover ❶.
- 2) Apply JUKI Grease A onto the gear section of oscillating rock shaft and the periphery of the hook driving shaft.
- 3) Apply JUKI Grease A also onto the felt surface of grease cover ❶.



If the grease has decreased due to cleaning, air blow or other reasons, apply grease again without exceptions.



■ Adding grease to the needle bar upper and lower bushings section, slide block section and intermediate presser bar lower bushing section



- 1) Open the frame cover to remove intermediate presser auxiliary spring B ①.
- 2) Apply JUKI Grease A onto periphery of needle bar ②. Turn the sewing machine by hand to apply grease onto the entire periphery of the needle bar.  
Turn needle bar upper bushing grease cover ③ in the direction of arrow A to add grease through the grease inlet. After completion of the procedure, turn the needle bar upper bushing grease cover in the direction of arrow B to return to its home position.  
Remove setscrew ④ from the needle bar lower bushing grease hole. Put JUKI Grease A through hole ⑤ and tighten setscrew ④ to fill inside the bushing with the grease.
- 3) Apply JUKI Grease A also onto groove section ⑥ of the slide block.
- 4) Apply JUKI Grease A onto periphery of intermediate presser bar ⑦.  
Remove setscrew ⑧ from the intermediate presser bar bushing grease hole. Put JUKI Grease A through inlet ⑨. Tighten screw ⑧ to fill inside the bushing with JUKI Grease A.

1. Do not wipe off the grease applied onto the periphery of needle bar inside the frame. If the grease has decreased due to cleaning, air blow or other reasons, apply grease again without exceptions.

2. When operating the sewing machine, turn the needle bar upper bushing grease cover in direction B to close grease inlet ⑩.

3. The rear face of the needle bar crank rod has projection ⑪ with a sharp edge. So, care should be taken to the projection. Never put your finger to the rear face of the needle bar crank rod during greasing procedure.

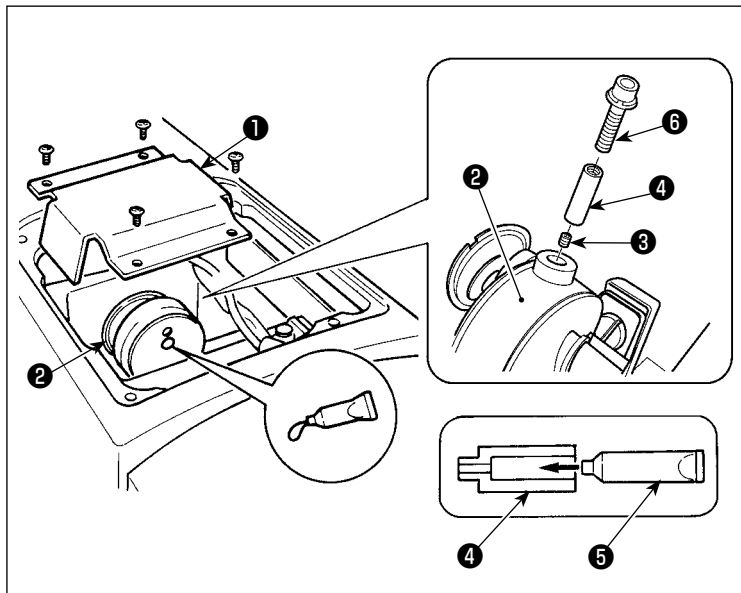


### (3) Points to be applied with JUKI Grease B



Use grease tube B (part number: 40013640) supplied with the unit for adding grease to any points other than the points specified below. If any grease other than the specified one is used, the related components can be damaged.

#### ■ Adding grease onto the eccentric cam section

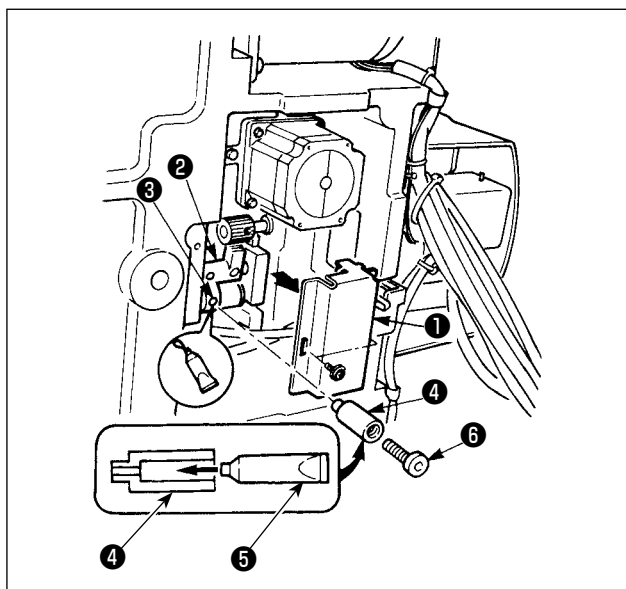


- 1) Open crank rod cover ①.
- 2) Remove setscrew ③ from the grease inlet cover located at periphery of crank rod ②.
- 3) Fill coupling ④ with grease through JUKI Grease B tube ⑤.
- 4) Sink screw ⑥ supplied with the unit into the coupling to add the grease.
- 5) After adding the grease, securely tighten setscrew ③ which has been removed.



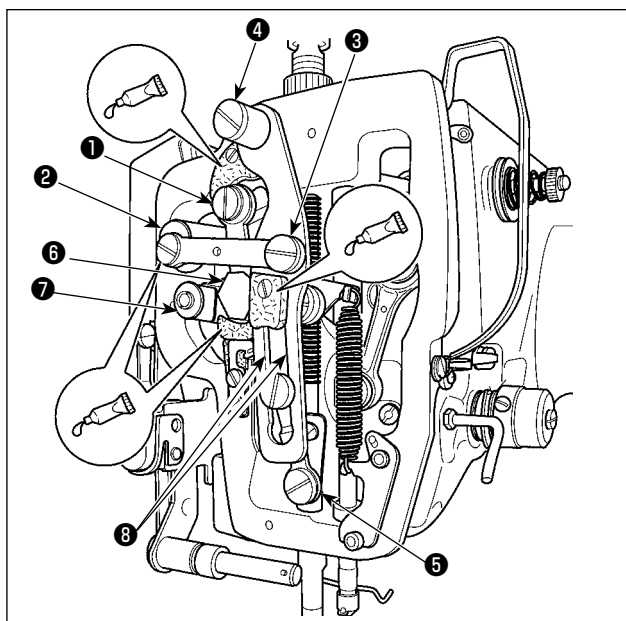
The eccentric cam section can be sufficiently filled with grease by adding the grease while turning the main shaft of sewing machine.

#### ■ Adding grease onto the oscillating rock shaft pin section



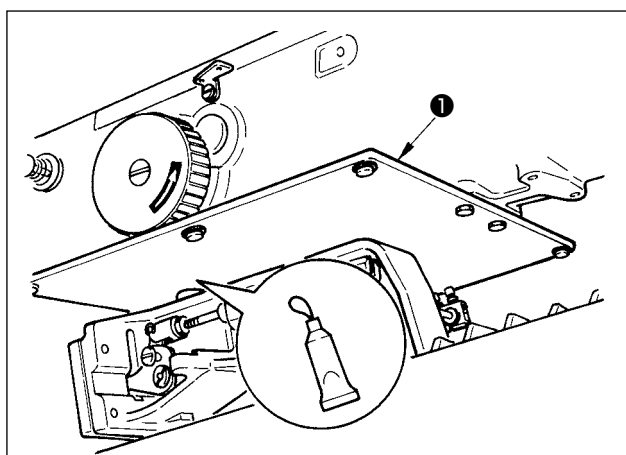
- 1) Tilt the machine head and remove the grease cover ①.
- 2) Fill coupling ④ supplied with the unit with grease through JUKI Grease B tube ⑤.
- 3) Remove setscrew ③ in oscillator gear ② and screw in joint ④ into the screw hole.
- 4) Sink screw ⑥ supplied with the unit into the coupling to add the JUKI Grease B.
- 5) Securely tighten setscrew ③ which has been removed after replenishing with the grease.

### ■ Grease supplement to the face plate section



- 1) Open the face plate cover.
- 2) Add the JUKI Grease B onto the felt sections (3 locations), peripheral shoulder screw, fulcrums ❶ to ❷ and guide groove section ❸.

### ■ Replenishing the presser plate with grease



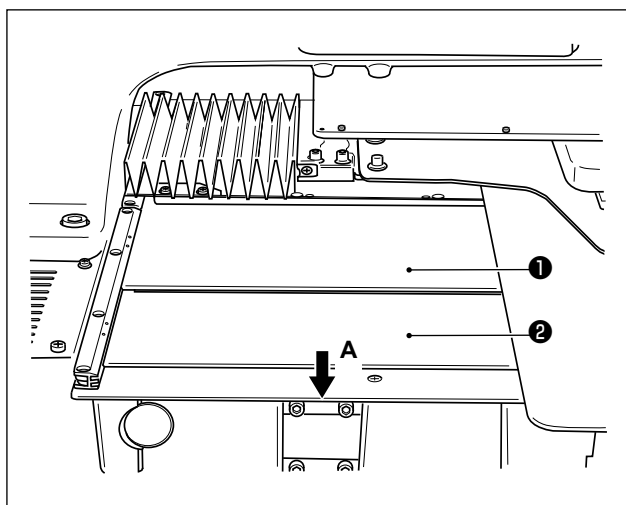
- 1) Apply grease to the rear of presser plate ❶.

#### (4) Points to be applied with the exclusive grease for the LM guide

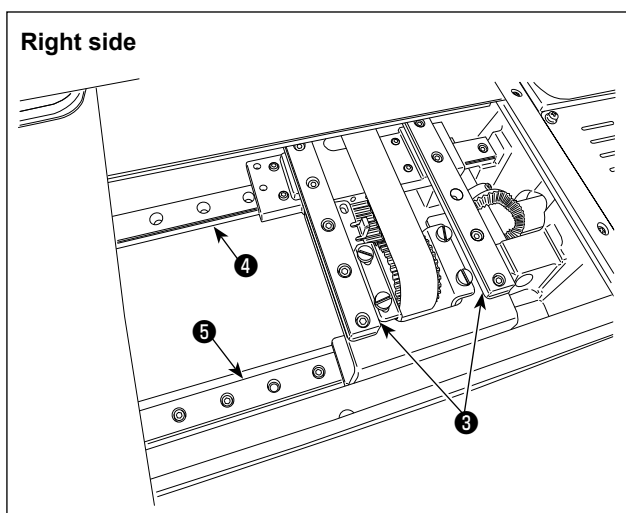
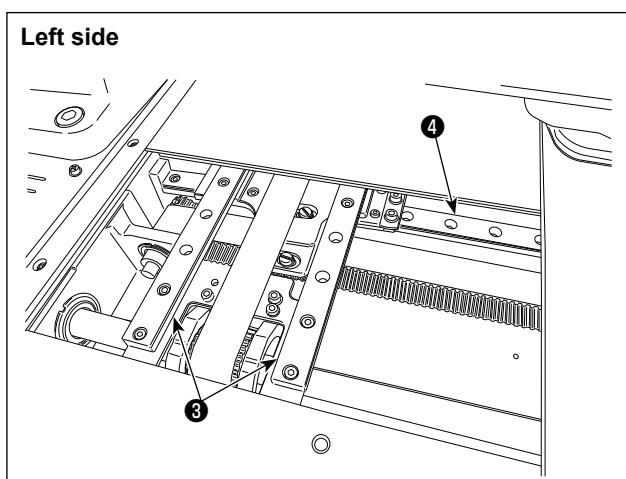


To add grease to the points specified below, use the accessory grease (part number: 40097886) supplied with the unit. If any grease other than the specified one is used, the related components can be damaged.

##### ■ Removing the X-travel bottom cover



- 1) Lightly pushing X-travel top cover ① upward, pull out X-travel bottom cover ② in the direction of arrow A.
- 2) Apply the accessory grease (part number: 40097886) supplied with the unit to the groove on the both of side faces of the rails on two X\_LM guides ③, two Y\_LM guides ④ and one Y auxiliary guide LM ⑤.  
Remove X-travel bottom cover ② and apply the grease from both sides.  
In addition, apply the grease while moving the feed bracket back and forth.
- 3) Manually move the feed bracket back and forth and to the right and left as far as it goes to allow the grease to spread over the entire LM guide.



1. If the grease has decreased due to cleaning, air blow or other reasons, apply grease again without exceptions.

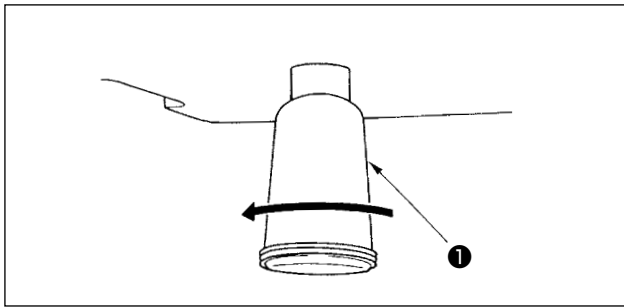
2. Do not apply the machine oil to the LM guide. The grease inside the LM guide will flow out to cause the LM guide abrasion.



3. When removing X-travel bottom cover ②, take care not to break the stopper rubber which is stuck on the cover.

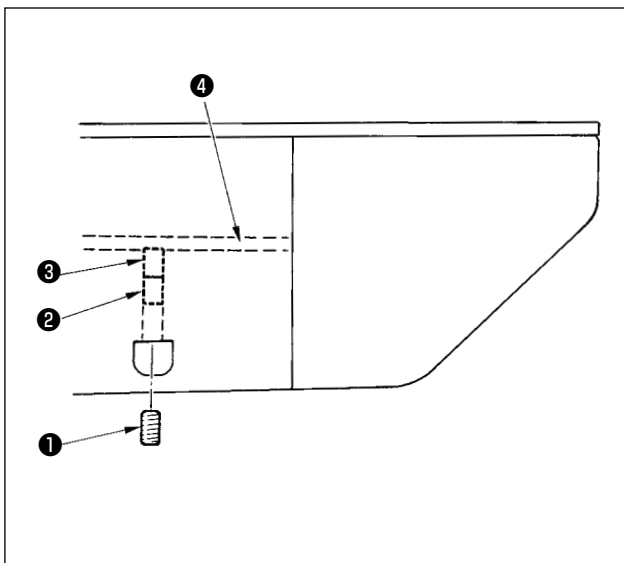
4. After having assembled X-travel bottom cover ②, move the feed bracket by hand to check to be sure that the X-travel cover smoothly moves without a large backlash and hitch.

## 1-9. Draining waste oil



When polyethylene oiler ❶ becomes filled with oil, remove polyethylene oiler ❶ and drain the oil.

## 1-10. Amount of oil supplied to the hook



- 1) Loosen setscrew ❶ and remove setscrew ❶.
- 2) When screwing in adjustment screw ❷, the amount of oil of oil pipe, left ❹ can be reduced.
- 3) After the adjustment, screw in setscrew ❶ and fix it.

1. The state of standard delivery is the position where ❸ is lightly screwed in and returned by 4 turns.



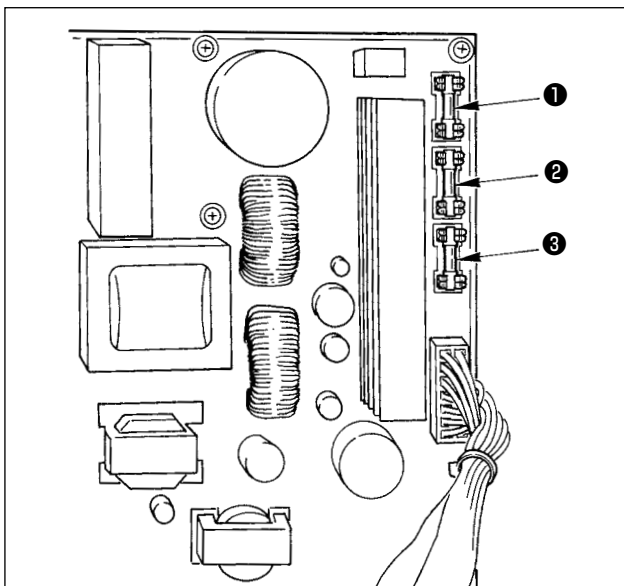
2. When reducing the amount of oil, do not screw in the screw at once. Observe the state for approximately half a day at the position where ❸ is screwed in and returned by 2 turns. If reducing is excessive, worn-out of the hook will result.

## 1-11. Replacing the fuse



### WARNING :

1. To avoid electrical shock hazards, turn OFF the power and open the control box cover after about five minutes have passed.
2. Open the control box cover after turning OFF the power without fail. Then, replace with a new fuse with the specified capacity.



The machine uses the following three fuses :

- ❶ For pulse motor power supply protection  
15A (time-lag fuse)
- ❷ For solenoid and pulse motor power supply protection  
3.15A (time-lag fuse)
- ❸ For control power supply protection  
2A (fast-blow type fuse)

## 1-12. Troubles and corrective measures (Sewing conditions)

Trouble	Cause	Corrective measures	Page
1. The needle thread slips off at the start of bartacking.	① Stitches are slipped at the start.	<ul style="list-style-type: none"> <li>Adjust the clearance between the needle and the shuttle to 0.05 to 0.1 mm.</li> <li>Set soft-start sewing at the start of bartacking.</li> </ul>	17
	② The needle thread remaining on the needle after thread trimming is too short.	<ul style="list-style-type: none"> <li>Correct the thread tension release timing of the thread tension controller No. 2.</li> <li>Increase the tension of the thread take-up spring, or decrease the tension of the thread tension controller No. 1.</li> </ul>	12, 13
	③ The bobbin thread is too short.	<ul style="list-style-type: none"> <li>Decrease the tension of the bobbin thread.</li> </ul>	12
	④ Needle thread tension at 1st stitch is too high.	<ul style="list-style-type: none"> <li>Increase the clearance between the needle hole guide and the counter knife.</li> <li>Decrease the tension at 1st stitch.</li> </ul>	19
	⑤ Thread clamp is unstable (material is apt to be expanded, thread is hard to slide, thread is thick, etc.).	<ul style="list-style-type: none"> <li>Decrease the number of rotation at 1st stitch at the sewing start. (Extent of 600 to 1,000 sti/min)</li> <li>Increase the number of stitches of thread clamp to 3 to 4 stitches.</li> </ul>	
	⑥ Pitch at 1st stitch is too small.	<ul style="list-style-type: none"> <li>Make the pitch at 1st stitch longer.</li> <li>Decrease the needle thread tension at 1st stitch.</li> </ul>	
2. Thread often breaks or synthetic fiber thread splits finely.	① The shuttle or the driver has scratches.	<ul style="list-style-type: none"> <li>Take it out and remove the scratches using a fine whetstone or buff.</li> </ul>	
	② The needle hole guide has scratches.	<ul style="list-style-type: none"> <li>Buff or replace it.</li> </ul>	
	③ The needle strikes the intermediate presser foot.	<ul style="list-style-type: none"> <li>Correct the position of the intermediate presser foot.</li> </ul>	13
	④ Fibrous dust is in the groove of the shuttle race.	<ul style="list-style-type: none"> <li>Take out the shuttle and remove the fibrous dust from the shuttle race.</li> </ul>	
	⑤ The needle thread tension is too high.	<ul style="list-style-type: none"> <li>Reduce the needle thread tension.</li> </ul>	12
	⑥ The tension of the thread take-up spring is too high.	<ul style="list-style-type: none"> <li>Reduce the tension.</li> </ul>	13
	⑦ The synthetic fiber thread melts due to heat generated on the needle.	<ul style="list-style-type: none"> <li>Use silicone oil.</li> </ul>	30
	⑧ When taking up thread, thread is pierced with needle tip.	<ul style="list-style-type: none"> <li>Lower the needle bar height from the engraved marker line by a half of the line to as much as the line.</li> <li>Check the rough state of needle tip.</li> <li>Use the ball-pointed needle.</li> </ul>	
3. The needle often breaks.	① The needle is bent.	<ul style="list-style-type: none"> <li>Replace the bent needle.</li> </ul>	11
	② The needle strikes the intermediate presser foot.	<ul style="list-style-type: none"> <li>Correct the position of the intermediate presser foot.</li> </ul>	13
	③ The needle is too thin for the material.	<ul style="list-style-type: none"> <li>Replace it with a thicker needle according to the material.</li> </ul>	
	④ The driver excessively bends the needle.	<ul style="list-style-type: none"> <li>Correctly position the needle and the shuttle.</li> </ul>	17
4. Threads are not trimmed.  (Bobbin thread only)	① The counter knife is dull.	<ul style="list-style-type: none"> <li>Replace the counter knife.</li> </ul>	
	② The difference in level between the needle hole guide and the counter knife is not enough.	<ul style="list-style-type: none"> <li>Increase the bend of the counter knife.</li> </ul>	
	③ The moving knife has been improperly positioned.	<ul style="list-style-type: none"> <li>Correct the position of the moving knife.</li> </ul>	19
	④ The last stitch is skipped.	<ul style="list-style-type: none"> <li>Correct the timing between the needle and the shuttle.</li> </ul>	17
	⑤ Bobbin thread tension is too low.	<ul style="list-style-type: none"> <li>Increase the bobbin thread tension.</li> </ul>	
	⑥ Flopping of cloth	<ul style="list-style-type: none"> <li>Lower the intermediate presser height of the last stitch.</li> </ul>	

Trouble	Cause	Corrective measures	Page
5. Stitch skipping often occurs.	① The motions of the needle and shuttle are not properly synchronized. ② The clearance between the needle and shuttle is too large. ③ The needle is bent. ④ The driver excessively bends the needle. ⑤ Length of needle thread remaining after thread trimming is too long. (In the case of stitch skipping within the 2nd to 10th stitch from the beginning of sewing)	<ul style="list-style-type: none"> <li>○ Correct the positions of the needle and shuttle.</li> <li>○ Correct the positions of the needle and shuttle.</li> <li>○ Replace the bent needle.</li> <li>○ Correctly position the driver.</li> <li>○ Reduce the thread take-up spring pressure or increase the thread tension applied by the thread tension controller No. 1.</li> </ul>	17          12,13
6. The needle thread comes out on the wrong side of the material.	① The needle thread tension is not high enough. ② The tension release mechanism fails to work properly. ③ The needle thread after thread trimming is too long. ④ Number of stitches is too few. ⑤ When sewing length is short (End of needle thread protrudes on the wrong side of sewing product.) ⑥ Number of stitches is too few.	<ul style="list-style-type: none"> <li>○ Increase the needle thread tension.</li> <li>○ Check whether or not the tension disc No. 2 is released during bar-tracking.</li> <li>○ Increase the tension of the thread tension controller No. 1.</li> <li>○ Turn OFF the thread clamp.</li> <li>○ Turn OFF the thread clamp.</li> <li>○ Use the lower plate, the hole of which is larger than the presser.</li> </ul>	12       12
7. Thread end of the 1st stitch comes out on the right side of the material.	① Stitch skipping at the 1st stitch ② Needle used and thread used are thick in terms of the inner diameter of the intermediate presser. ③ Intermediate presser is not properly positioned in terms of the needle.	<ul style="list-style-type: none"> <li>○ Adjust the hook timing faster by a 1/2 stitch.</li> <li>○ Increase the inner diameter of intermediate presser.</li> <li>○ Adjust the eccentricity between intermediate presser and needle so that needle enters in the center of intermediate presser.</li> </ul>	
8. Threads break at time of thread trimming.	① The moving knife has been improperly position.	○ Correct the position of the moving knife.	19
9. The thread clamp is entangled with needle thread.	① The needle thread at the sewing start is too long.	○ Tighten thread tension controller No. 1 and make the length of needle thread 40 to 50 mm.	16
10. Uneven length of the needle thread	① The tension of thread take-up spring is too low.	○ Increase the tension of the thread take-up spring.	13
11. The length of needle thread does not become short.	① The tension of thread tension controller No. 1 is too low. ② The tension of thread take-up spring is too high. ③ The tension of thread take-up spring is too low and motion is unstable.	<ul style="list-style-type: none"> <li>○ Increase the tension of thread tension controller No. 1.</li> <li>○ Decrease the tension of thread take-up spring.</li> <li>○ Increase the tension of thread take-up spring and lengthen the stroke as well.</li> </ul>	12  13
12. The knotting section of bobbin thread at 2nd stitch at the sewing start appears on the right side.	① Idling of bobbin is large. ② The bobbin thread tension is too low. ③ The needle thread tension at 1st stitch is too high.	<ul style="list-style-type: none"> <li>○ Adjust the position of the moving knife.</li> <li>○ Increase the bobbin thread tension.</li> <li>○ Decrease the needle thread tension at 1st stitch.</li> <li>○ Turn OFF the thread clamp.</li> </ul>	19 12
13. Wiper fails to work. (Return is defective.)	① Needle entry of the last needle is the same as that of the sewing start, and the resistance of thread and cloth is large.	○ Shift the needle entry point of the last needle.	

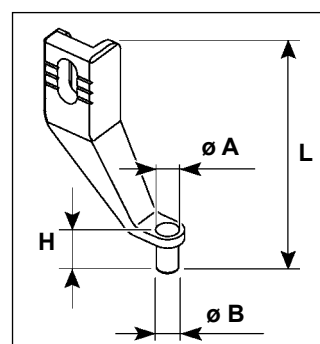


## 2. OPTIONAL

### 2-1. Table of Needle hole guide

Needle used	Needle hole guide		
Size	Part No.	Needle hole diameter	Application
#09 to #11	B242621000C	ø 1.6	For knits (OP)
#11 to #14 * <sub>1</sub>	B242621000A	ø 1.6	For light-weight to medium-weight materials (S type)
#14 to #18 * <sub>2</sub>	B242621000B	ø 2.0	For medium-weight to heavy-weight materials (H type)
#18 to #21	B242621000D	ø 2.4	For heavy-weight materials (OP)
	B242621000F	ø 3.0	For heavy-weight materials (G type)
#22 to #25 * <sub>3</sub>	B242621000G	ø 3.0 (with a counterbore)	For extra heavy-weight materials (OP) (Supplied with G type models)
#18 to #25	B242621000H	ø 3.0 (eccentric hole)	For heavy-weight materials to prevent skip-stitching (OP)

Needle used	Intermediate presser	
Size	Part No.	Size (øA × øB × H × L)
#09 to #11	B1601210D0E (OP)	ø 1.6 × ø 2.6 × 5.7 × 37.0
#11 to #14 * <sub>1</sub>	40023632 (Standard)	ø 2.2 × ø 3.6 × 5.7 × 38.5
#14 to #18 * <sub>2</sub>	B1601210D0FA (OP)	ø 2.2 × ø 3.6 × 8.7 × 41.5
#18 to #21	B1601210D0BA (G type)	ø 2.7 × ø 4.1 × 5.7 × 38.5
#22 to #25 * <sub>3</sub>	B1601210D0CA (OP)	ø 3.5 × ø 5.5 × 5.7 × 38.5
#18 to #25		



\*<sub>1</sub> : S type installed needle (DP X 5 #14)

\*<sub>2</sub> : H type installed needle (DP X 17 #18)

\*<sub>3</sub> : G type installed needle (DP X 17 #23)

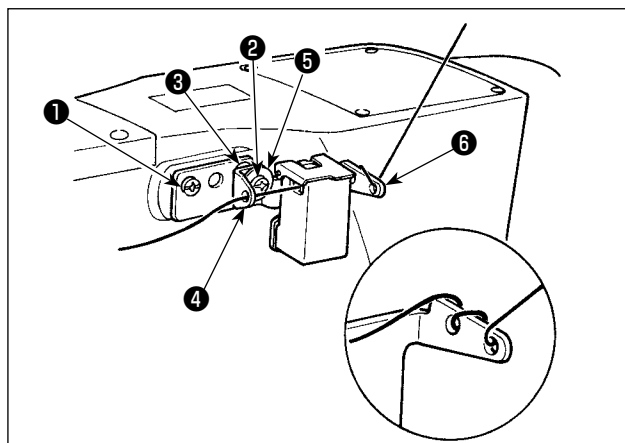
- S type : Applicable count of thread : #80 to #20
- H type : Applicable count of thread : #50 to #02
- G type : Applicable count of thread : #20 to #02
- (OP) means the optional.

### 2-2. Silicon oil tank



#### WARNING :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



If the thread twists hard on silicon oil tank base ⑥ (40096982), reverse the direction of winding the thread.

The G type model is provided with silicon oil tank asm. (40097301) as an accessory. (For the types of models other than G type, this device can also be retrofitted as an option.)

The silicon oil tank asm. should be fixed on the sewing machine by means of setscrews ① (SM-4041055SP) and ② (SM4042055SP) supplied with the unit. To tighten setscrew ②, tighten it together with thread guide collar ③ (11315108), silicon oil tank thread guide ④ (40010414) and thread guide setscrew washer ⑤ (WP0501046SC). Silicon oil tank thread guide ④ (40010414) should be placed so that it is in parallel with silicon oil tank base ⑥ (40096982).