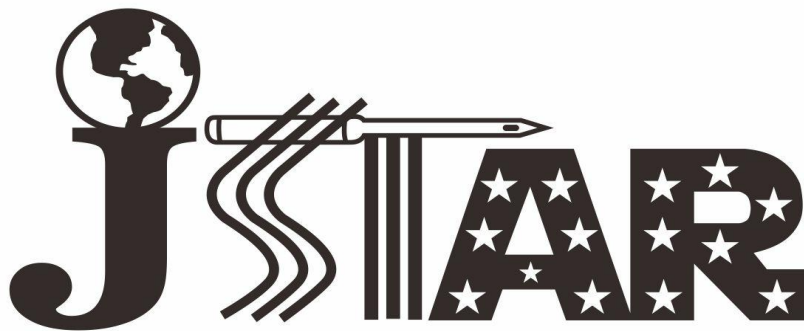




JS-2290D-SR-7P

产品使用说明书&产品零件图册

Manual book & parts book

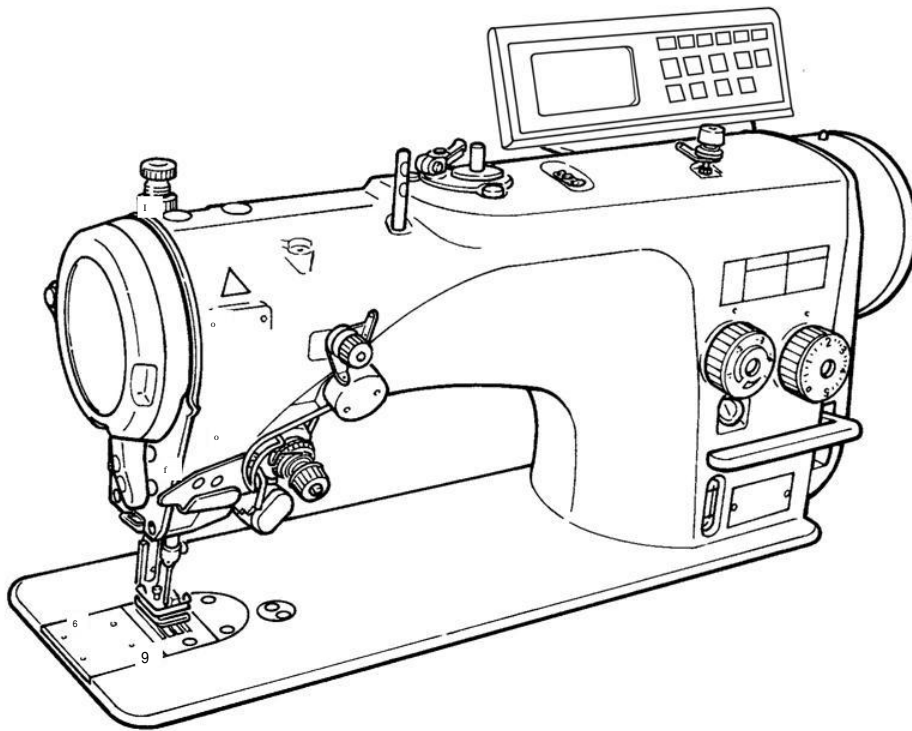


JSTAR SEWING MACHINE

Computer-controlled, Direct-drive,
High-speed, 1-needle, Lockstitch,
Zigzag Stitching Machine

2290 SERIES

INSTRUCTION MANUAL



NOTE: Read safety instructions carefully and understand them before using.
Retain this Instruction Manual for future reference.

IMPORTANT SAFETY INSTRUCTIONS

Putting sewing systems into operation is prohibited until it has been ascertained that the sewing systems in which these sewing machines will be built into, have conformed with the safety regulations in your country. Technical service for those sewing systems is also prohibited.

1. Observe the basic safety measures, including, but not limited to the following ones, whenever you use the machine.
2. Read all the instructions, including, but not limited to this Instruction Manual before you use the machine. In addition, keep this Instruction Manual so that you may read it at anytime when necessary.
3. Use the machine after it has been ascertained that it conforms with safety rules/standards valid in your country.
4. All safety devices must be in position when the machine is ready for work or in operation. The operation without the specified safety devices is not allowed.
5. This machine shall be operated by appropriately-trained operators.
6. For your personal protection, we recommend that you wear safety glasses.
7. For the following, turn off the power switch or disconnect the power plug of the machine from the receptacle.
 - 7-1 For threading needle(s), looper, spreader etc. and replacing bobbin.
 - 7-2 For replacing part(s) of needle, presser foot, throat plate, looper, spreader, feed dog, needle guard, folder, cloth guide etc.
 - 7-3 For repair work.
 - 7-4 When leaving the working place or when the working place is unattended.
 - 7-5 When using clutch motors without applying brake, it has to be waited until the motor stopped totally.
8. If you should allow oil, grease, etc. used with the machine and devices to come in contact with your eyes or skin or swallow any of such liquid by mistake, immediately wash the contacted areas and consult a medical doctor.

9. Tampering with the live parts and devices, regardless of whether the machine is powered, is prohibited.
10. Repair, remodeling and adjustment works must only be done by appropriately trained technicians or specially skilled personnel. Only spare parts designated by JUKI can be used for repairs.
11. General maintenance and inspection works have to be done by appropriately trained personnel.
12. Repair and maintenance works of electrical components shall be conducted by qualified electric technicians or under the audit and guidance of specially skilled personnel. Whenever you find a failure of any of electrical components, immediately stop the machine.
13. Before making repair and maintenance works on the machine equipped with pneumatic parts such as an air cylinder, the air compressor has to be detached from the machine and the compressed air supply has to be cut off. Existing residual air pressure after disconnecting the air compressor from the machine has to be expelled. Exceptions to this are only adjustments and performance checks done by appropriately trained technicians or specially skilled personnel.
14. Periodically clean the machine throughout the period of use.

15. Grounding the machine is always necessary for the normal operation of the machine. The machine has to be operated in an environment that is free from strong noise sources such as high-frequency welder.
16. An appropriate power plug has to be attached to the machine by electric technicians. Power plug has to be connected to a grounded receptacle.

17. The machine is only allowed to be used for the purpose intended. Other used are not allowed.
18. Remodel or modify the machine in accordance with the safety rules/standards while taking all the effective safety measures. We assumes no responsibility for damage caused by remodeling or modification of the machine.

19. Warning hints are marked with the two shown symbols.



Danger of injury to operator or service staff



Items requiring special attention

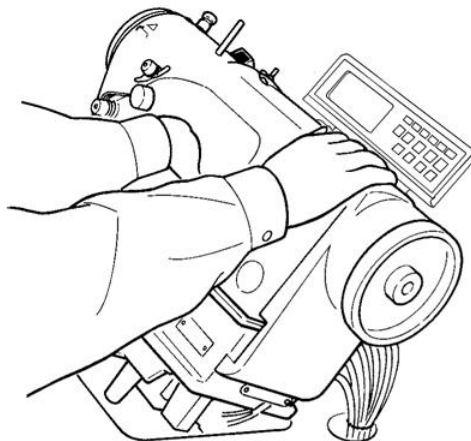
FOR SAFE OPERATION



1. To avoid electrical shock hazards, neither open the cover of the electrical box nor touch the components mounted inside the electrical box.



1. To avoid personal injury, never operate the machine with any of the finger guard or safety devices removed.
2. To prevent possible personal injuries caused by being caught in the machine, keep your fingers, head and clothes away from the handwheel while the machine is in operation. In addition, place nothing around it.
3. To avoid personal injury, never put your hand under the needle when you turn "ON" the power switch or operate the machine.
4. To avoid personal injury, never put your fingers into the thread take-up cover while the machine is in operation.
5. The hook rotates at a high speed while the machine is in operation. To prevent possible injury to hands, be sure to keep your hands away from the vicinity of the hook during operation. In addition, be sure to turn OFF the power to the machine when replacing the bobbin.
6. To avoid possible personal injuries, be careful not to allow your fingers in the machine when tilting/raising the machine head.
7. To avoid possible accidents because of abrupt start of the machine, turn OFF the power to the machine when tilting the machine head or performing replacement of parts, adjustment of the machine, etc.
8. The motor does not produce noise while the machine is at rest. To avoid possible accidents due to abrupt start of the machine, be sure to turn OFF the power to the machine.
9. To avoid electrical shock hazards, never operate the sewing machine with the ground wire for the power supply removed.
10. To prevent possible accidents because of electric shock or damaged electrical component(s), turn OFF the power switch in prior to the connection/disconnection of the power plug.
11. To prevent fires, periodically draw out the power plug from the plug socket and clean the root of the pins and the space between pins.
12. Do not turn OFF the power switch while the machine is in operation.
13. Hold the upper side of the machine head with both hands and perform the work quietly so as not to allow your fingers or the like to be caught in the machine when tilting the machine head or returning it to the home position.
14. Be careful that any load is not applied to the operation panel section.



CAUTION BEFORE OPERATION

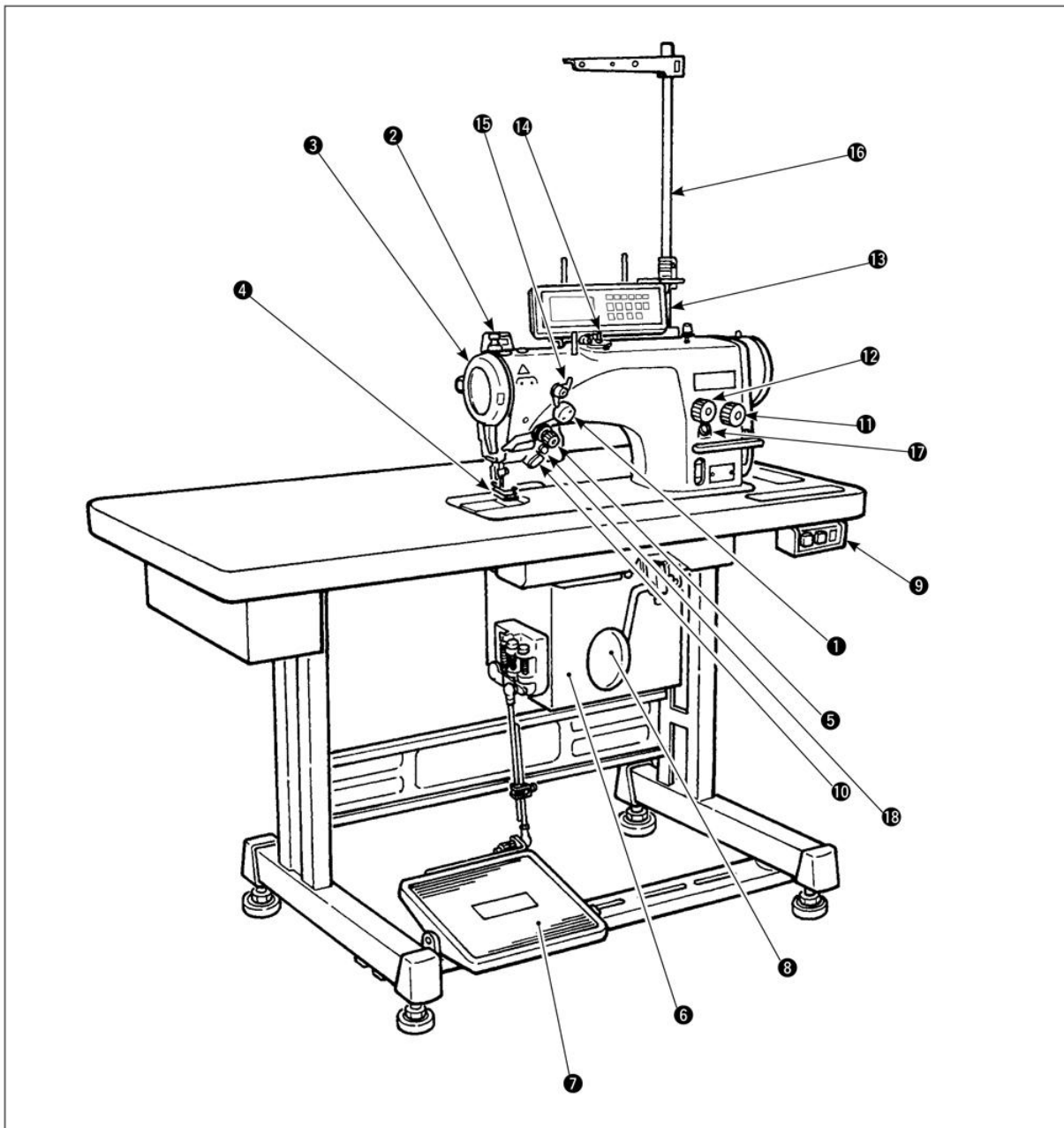


WARNING :

To avoid malfunction and damage of the machine, confirm the following.

- Remove the air-vent cap (red color) attached to the sewing machine bed.
- Be sure to fill the oil tank with oil before use.
- Remove the needle bar stopper.
- Clean the sewing machine thoroughly before using it for the first time.
- Remove all dust collected on the sewing machine during the transportation.
- Confirm that the voltage and phase are correct.
- Confirm that the power plug is properly connected.
- Never use the sewing machine in the state where the voltage type is different from the designated one.
- The direction of rotation of the sewing machine is counterclockwise as observed from the handwheel side. Be careful not to rotate it in reverse direction.
- Do not tilt the machine head toward this side since oil leakage or parts breakage occurs.
- A safety switch is installed so that the sewing machine cannot be operated with the machine head tilted. When operating the sewing machine, turn ON the power switch after properly setting the head on the table.
- Before starting a test run, remove the bobbin case and the needle thread from the machine.
- For the first month after set-up, use the machine at a reduced sewing speed of 3,000 rpm or less.
- Operate the handwheel after the sewing machine has totally stopped.

1. NAME OF EACH COMPONENT



- | | | |
|--|----------------------|---|
| ① Needle thread draw-out device (2290A-7) | ⑧ Knee lifter lever | ⑮ Tension controller No. 1 (Pre-tension) |
| ② Wiper switch (WB, CB type) | ⑨ Power switch | ⑯ Thread stand |
| ③ Thread take-up cover | ⑩ Hand switch | ⑰ Oil supply opening |
| ④ Finger guard | ⑪ Stitch length dial | ⑱ Mirror inversion switch |
| ⑤ Thread tension controller (Rotary tension) | ⑫ Condensation dial | |
| ⑥ Electrical box | ⑬ Control panel | |
| ⑦ Pedal | ⑭ Bobbin winder | |

2. SPECIFICATIONS

2-1. Specifications of the machine head

| | | | |
|---|--------------------|---|--|
| MACHINE MODEL | NO THREAD TRIMMING | 2290A-SR | 2290A-SS |
| | THREAD TRIMMING | 2290A-SR-7 | 2290A-SS-7 |
| SPECIFICATION | | STANDARD | |
| MAXIMUM SEWING SPED | | 5,000rpm (2 POINTS ZIGZAG SEWING BELOW 2mm) ※1 | |
| MAXIMUM ZIGZAG RANGE | | 10mm (0.1mm UNIT) (MAXIMUM STANDARD 8mm) | |
| SWING NEEDLE SETUP | | ELECTRIC CONTROL | |
| MAXIMUM FEED PITCH | | ± 2.5mm | 2.5mm |
| PRESSER RISING MEASURE | | MANUAL 5.5mm/KNEE 10mm | |
| HOOK | | DP HOOK (INNER TITANIUM DISPOSE) | |
| NEEDLE (FACTORY MODEL) | | (GROZ-BEICK) DP×5 (#11) | |
| STANDARD PATTERN NUMBER/MAXIMUM NEEDLE NUMBER | | 8-14 KINDS OF BASIC PATTERNS, MORE THAN 200 ROM PATTERNS, 500 NEEDLES/EACH PATTERN. | 8-14 KINDS OF BASIC PATTERNS, MORE THAN 50 ROM PATTERNS, 500 NEEDLES/EACH PATTERN. |
| SELF-COMMAND PATTERN FUNCTION/MEMORY | | THROUGH PC MACHINE EDIT PATTERNS (OPTION) /999 PATTERNS | EXPAND MEMORY; 999 PATTERNS |
| HOST COMPUTER INPUT FUNCTION | | STANDARD DEPLOYMENT (OPERATION DEPLOYMENT) | |
| THE MANNER OF SUPPLYING OIL | | TOWARDS NEEDLE BAR*HOOK MINIMUM LUBRICATION (NO OIL PAN) | |
| MACHINE HEAD | | 300mm/517mm×178mm | |
| ※1、THE MAXIMUM SEWING SPEED IS CONFINED BY EVERY NEEDLE'S SWING NUMBER. | | | |
| SWING RANGE mm | | SPEED rpm | |
| 2 BELOW | | 5000 | |
| 2~3 | | 4500 | |
| 3~4 | | 4000 | |
| 4~6 | | 3500 | |
| 6~8 | | 3000 | |
| 8~9 | | 2500 | |
| 9~10 | | 2000 | |

2-2. Specifications of the electrical box

■ For general export

| | | |
|-----------------------|--|----------------------------|
| Supply voltage | Single phase 200V / 220V / 240V | 3-phase 200V / 220V / 240V |
| Frequency | 50 Hz / 60 Hz | |
| Rated currency | 4.6A / 4.3A / 4.0A | 3.0A / 2.7A / 2.3A |
| Operating environment | Temperature : 0 to 40°C Humidity : 90% or less | |

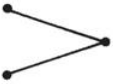












■ For CE

| | | |
|-----------------------|--|--|
| Supply voltage | Single phase 220V / 230V / 240V | |
| Frequency | 50 Hz/60 Hz | |
| Rated currency | 4.3A / 4.2A / 4.0A | |
| Operating environment | Temperature : 0 to 40°C Humidity : 90% or less | |

■ For JUS

| | | |
|-----------------------|--|----------------------------|
| Supply voltage | Single phase 100V / 110V / 120V | 3-phase 200V / 220V / 240V |
| Frequency | 50 Hz / 60 Hz | |
| Rated currency | 8.0A / 7.5A / 7.0A | 3.0A / 2.7A / 2.3A |
| Operating environment | Temperature : 0 to 40°C Humidity : 90% or less | |

3. STITCH PATTERN TABLE

| Name of pattern | | Stitch pattern | Number of stitches for pattern | Max.zigzag width | Remarks |
|------------------------|---------------------|---|--------------------------------|------------------|---------|
| Straight stitch | | - | 1 | - | |
| Standard zigzag stitch | |  | 2 | 10 | |
| 2-step zigzag stitch | |  | 4 | 10 | |
| 3-step zigzag stitch | |  | 6 | 10 | |
| Scallop (right) | Standard scallop |  | 24 | 10 | |
| | Crescent scallop |  | | | |
| | Equal-width scallop |  | | | |
| | Equal-width scallop |  | 12 | | |
| Scallop (left) | Standard scallop |  | 24 | 10 | |
| | Crescent scallop |  | | | |
| | Equal-width scallop |  | | | |
| | Equal-width scallop |  | 12 | | |
| Blind stitch (right) | |  | 2+a | 10 | |
| Blind stitch (left) | |  | | | |
| Custom pattern | | - | 500 | 10 | |

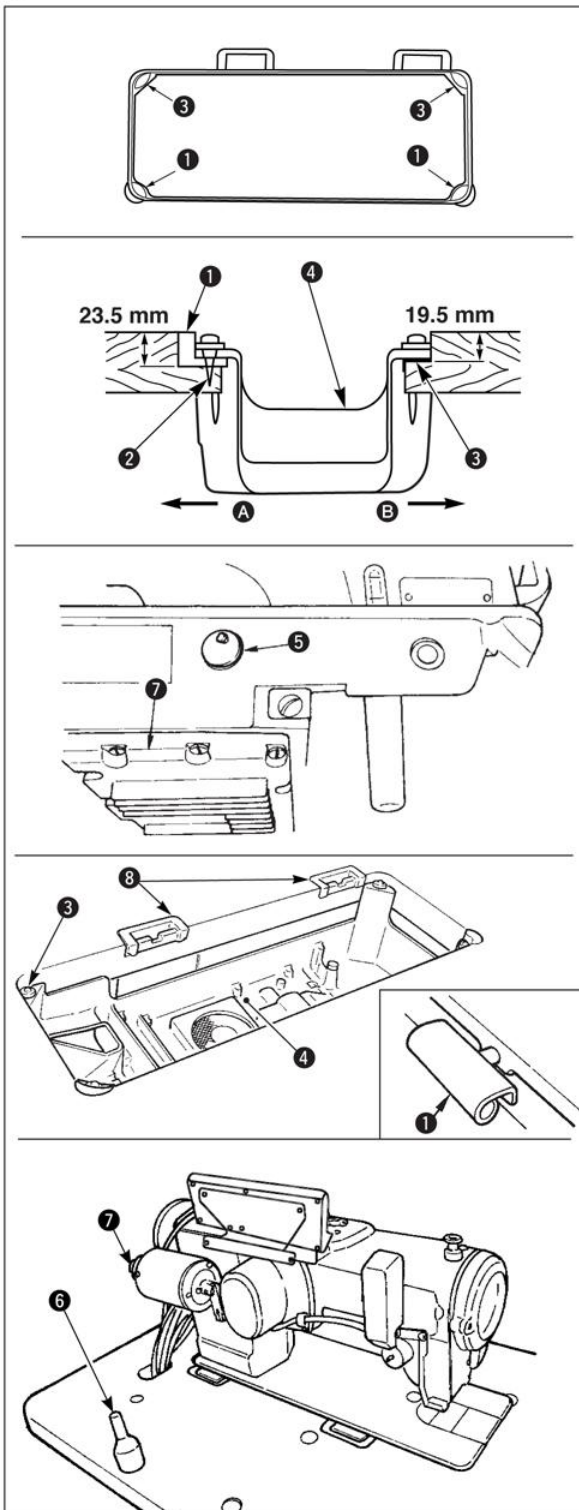
4. INSTALLATION

WARNING :



- Perform the installation of the sewing machine by the technical personnel who have been trained.
- To prevent personal injury, ask our dealer or the electrician for electric wiring.
- Be sure to perform the work with two persons or more when transporting the sewing machine and use a lorry when moving it.
- To prevent personal injury caused by abrupt start of the sewing machine, do not connect the power plug until the set-up of the sewing machine is completed.
- Be sure to earth the ground wire to prevent personal injury caused by leak.
- Be sure to attach safety protection cover, finger guard, etc.

4-1. Installation of the sewing machine head



■ Installing the under cover

1) The under cover should rest on the four corners of the machine table groove.

2) Fix two rubber seats ① on side ④ (operator's side) using nails ② as illustrated above. Fix two cushion seats ③ on side ⑤ (hinged side) using a rubber-based adhesive. Then place under cover ④ on the fixed seats.

3) Remove air vent cap ⑤ attached to the machine bed. (Be sure to attach cap ⑤ when transporting the machine head in the state that the machine head is removed from the machine table.)

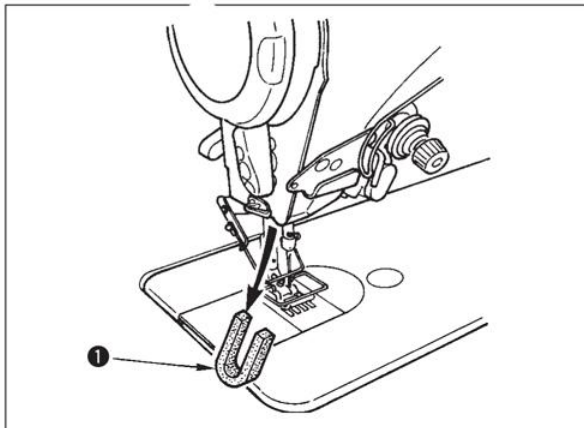


Caution If the sewing machine is operated without removing air vent cap ⑤, oil leakage from gear box portion ⑦ may occur.

4) Fit hinge ① into the opening in the machine bed, and fit the machine head to table rubber hinge ⑧ before placing the machine head on cushions ③ on the four corners.

5) Attach head support rod ⑥ to the machine table. (However, this step is not necessary for the machine with AK device.)

4-2. Removing the needle bar stopper

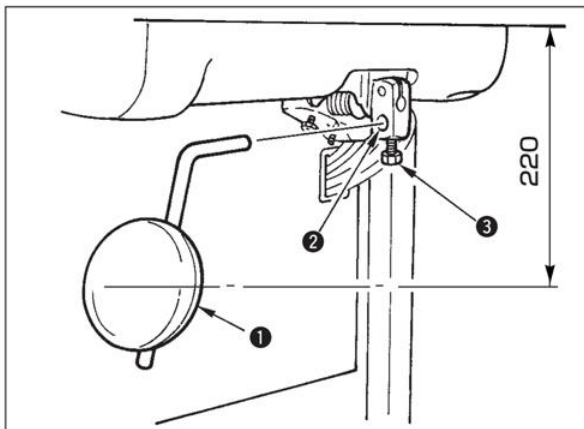


Remove needle bar stopper ❶ for transportation.



Keep the needle bar stopper which has been removed, and install this needle bar stopper when transporting the sewing machine. The needle bar stopper may be cut when it is strongly drawn out. Slightly move the needle bar to the right or left and slowly draw out the needle bar stopper.

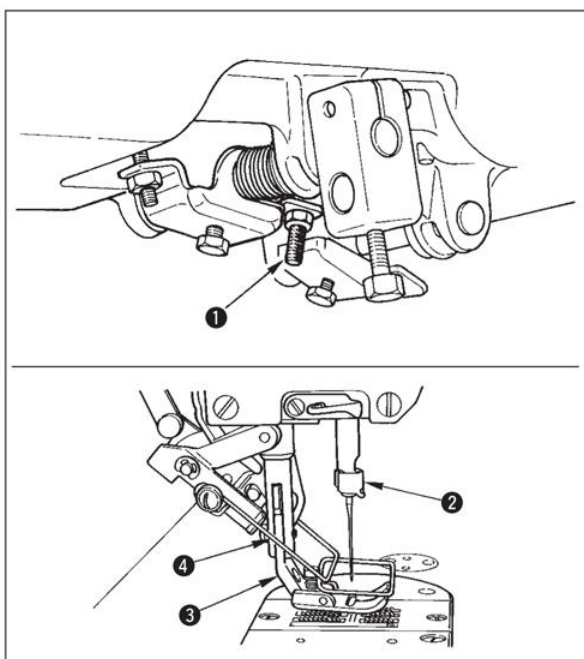
4-3. Attaching the knee-lifter



Insert knee-lifter into attaching hole ❷ and tighten it with bolt ❸.

* Adjust the position of knee lifter pad ❶ to a convenient place. For the reference dimension, the position is 180 mm from the bottom face of table.

4-4. Adjusting the height of the knee lifter



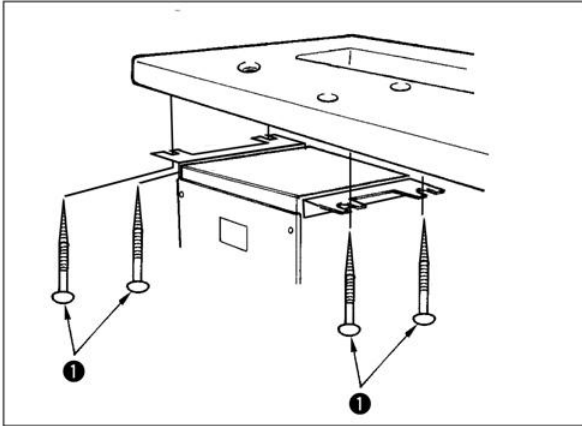
1) The standard height of the presser foot lifted using the knee lifter is 10 mm.

2) You can adjust the presser foot lift using knee lifter adjust screw ❶.



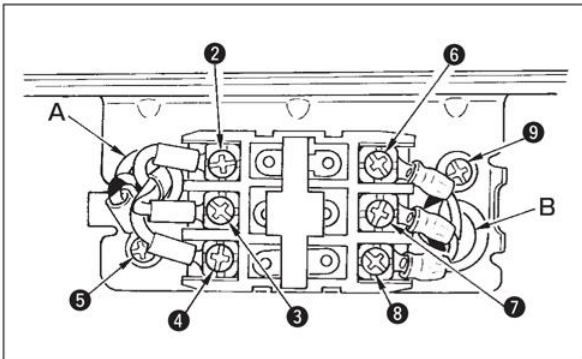
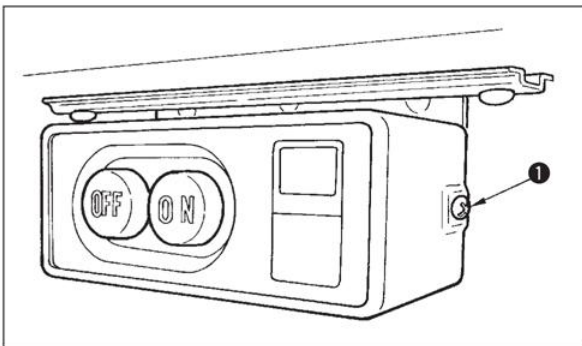
Do not operate the sewing machine in the state that presser foot ❸ is lifted by 10 mm or more since needle bar ❷ and presser foot ❸, or wiper ❹ and presser foot ❸ come in contact with each other.

4-5. Installing the electrical box



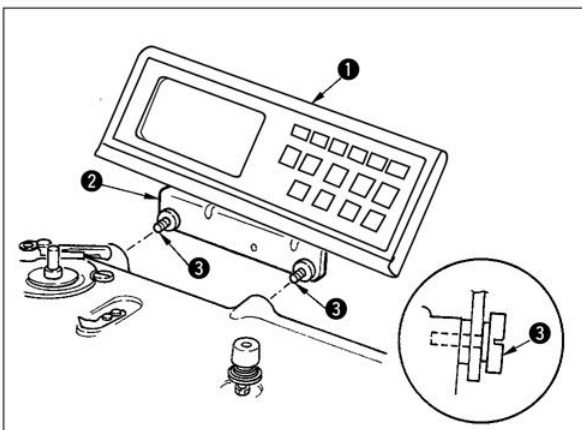
Install the electrical box on the underside of the table at the location illustrated using round-head bolt ①, plain washer.

4-6. Connecting the power switch cord



- 1) Loosen screw ① located on the side of the power switch supplied as accessories and remove the power switch cover.
- 2) Connecting the input power cord of electrical box
 - **When the input power cord of electrical box is 4P**
Put 4P cord from hole A of the power switch and securely fix green/yellow cord to ⑤, white cord to ②, black cord to ③ and red cord to ④ with screws.
 - **When the input power cord of electrical box is 3P**
Put 3P cord from hole A of the power switch and securely fix green/yellow cord to ⑤, brown cord to ② and sky blue cord to ③ with screws.
- 3) Connecting the power cable supplied as accessories
 - **In case of 3-phase power cable**
Put power cable from hole B of the power switch, and securely fix green/yellow cord to ⑨, white cord to ⑥, black cord to ⑦ and red cord to ⑧ with screws.
 - **In case of single phase power cable**
Put power cable from hole B of the power switch, and securely fix green/yellow cord to ⑨ and other cords to ⑥ and ⑦ with screws. ⑧ is not used.
- 4) Installing the power switch cover
Securely tighten screw ① located on the side of the power switch.

4-7. Installing the operation panel (IP-100)



- 1) Install operation panel ① on the machine head using screws ③ which have been assembled to panel installing bracket ②.

Caution Do not disassemble the operation panel to prevent it from breakage.

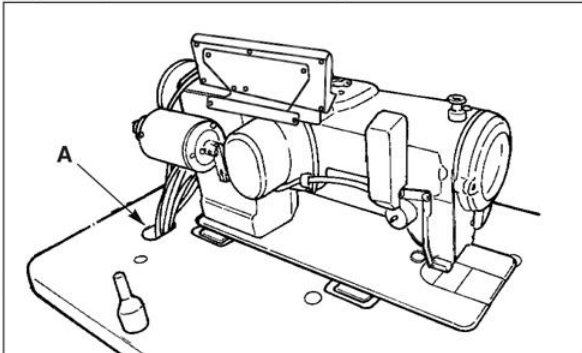
4-8. Connecting the cords



WARNING :

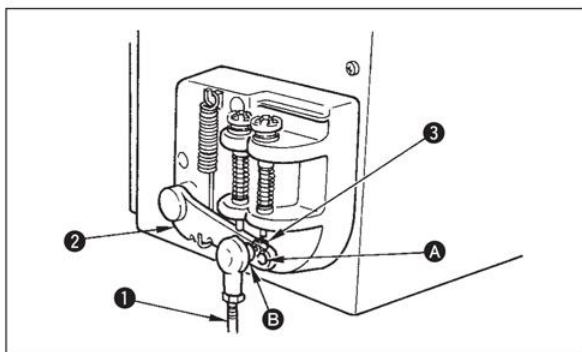
- To prevent personal injury caused by abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more.
- To prevent damage of device caused by maloperation and wrong specifications, be sure to connect all the corresponding connectors to the specified places.
- To prevent personal injury caused by maloperation, be sure to lock the connector with lock.
- As for the details of handling respective devices, read carefully the Instruction Manuals supplied with the devices before handling the devices.

(1) Preparation of wiring



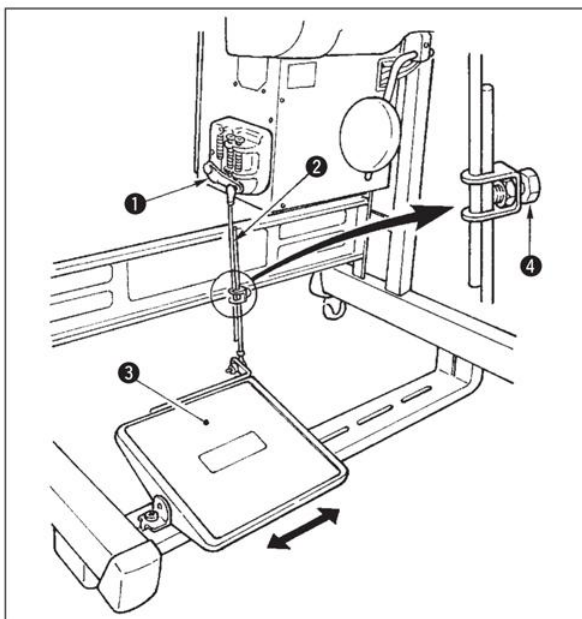
- 1) Pass the cords coming from the machine head to the underside of the table through hole A in the table.

4-9. Attaching the connecting rod



- 1) Fix connecting rod ① to installing hole ② of pedal lever ② with nut ③.
- 2) Installing connecting rod ① to installing hole ① will lengthen the pedal depressing stroke, and the pedal operation at a medium speed will be easier.

4-10. Adjustment of the pedal



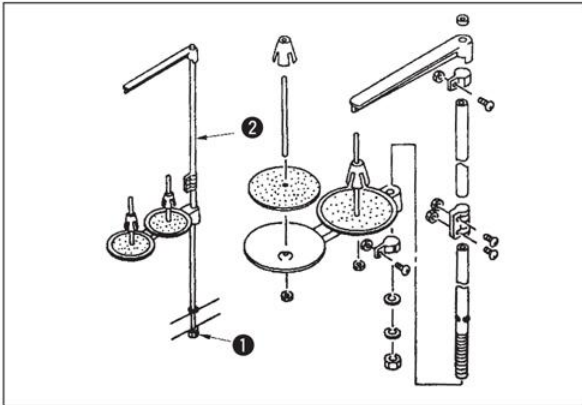
■ Installing the connecting rod

- 1) Move pedal ③ to the right or left as illustrated by the arrows so that motor control lever ① and connecting rod ② are straightened.

■ Adjusting the pedal angle

- 1) The pedal tilt can be freely adjusted by changing the length of the connecting rod.
- 2) Loosen adjust screw ④, and adjust the length of connecting rod ②.

4-11. Installing the thread stand



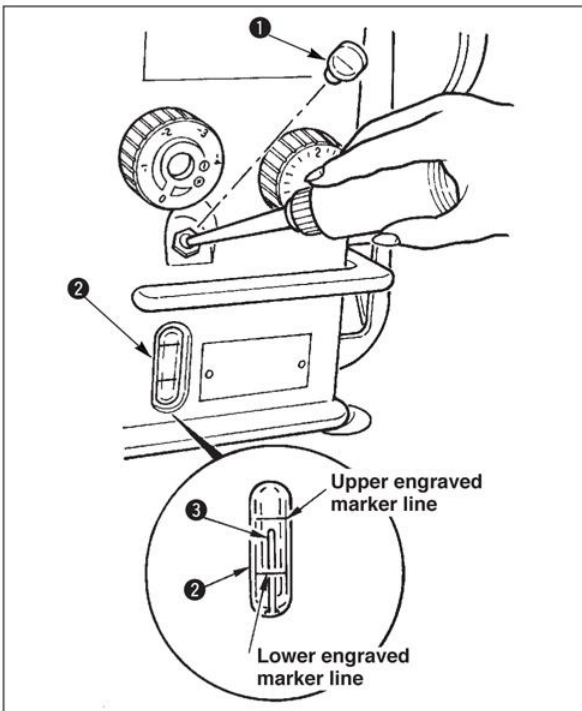
- 1) Assemble the thread stand unit, and insert it in the hole in the machine table.
- 2) Tighten locknut ① to fix the thread stand.
- 3) For ceiling wiring, pass the power cord through spool rest rod ②.

4-12. Lubrication (2290A-SS/SR)



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.



Fill the oil tank with oil for hook lubrication before operating the sewing machine.

- 1) Remove oil hole cap ① and fill the oil tank with JUKI New Defrix Oil No. 1 using the oiler supplied with the machine.
- 2) The amount of oil should reach up to the engraved marker line of oil tank ②.
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. So, be careful.
- 3) When you operate the sewing machine, refill oil if the top end of oil amount indicating rod ③ comes down to the lower engraved marker line of oil amount indicating window ④.



- When you use a new sewing machine or a sewing machine after an extended period of disuse, run your machine at 3,000 to 3,500 rpm for the purpose of break-in.
- For the oil for hook lubrication, purchase New Defrix Oil No.1 (Part No. : MDFRX1600C0).

4-13. Test run

(1) Turn ON the power



WARNING :

- Check again the power voltage before connecting the power cord.
- Check that the power switch is turned OFF and connect the power cord to the power receptacle.
- Be sure to connect the earth wire.
- In case where the buzzer keeps beeping immediately after turning ON the power, there is a possibility of the wrong connection of cord or wrong power voltage. Turn OFF the power.

1) When the needle bar is in its UP position, zigzag origin detection is performed.

2) When the needle bar is in the position other than UP position :

Display as shown in the figure below appears. Turn the handwheel to bring the needle bar to needle UP position and the display changes to the next screen. Then the needle moves left and right, and zigzag origin detection is performed.

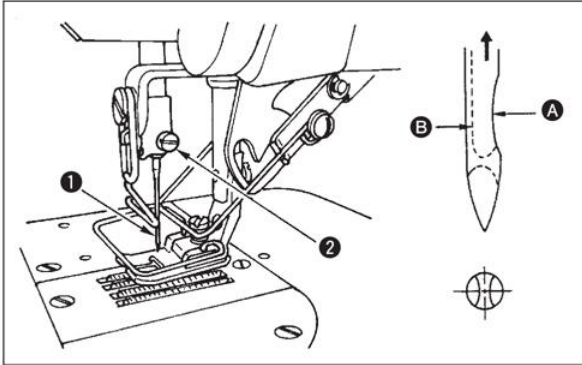
5. PREPARATION BEFORE SEWING

5-1. Inserting 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.



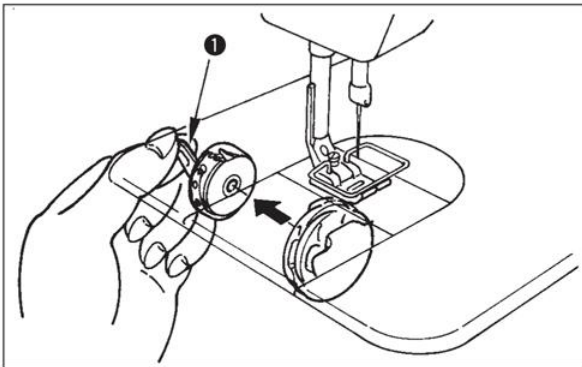
- 1) Turn the handwheel by hand to raise the needle to its highest position.
- 2) Loosen the needle clamp screw ②. Hold the needle ① so that the long groove B on the needle is facing exactly toward you.
- 3) Insert the needle deep into the hole of the needle bar in the direction of the arrow until it will go no further.
- 4) Securely tighten the screw ②.
- 5) Confirm that the long groove B on the needle faces toward you.

5-2. Removing the bobbin case



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.



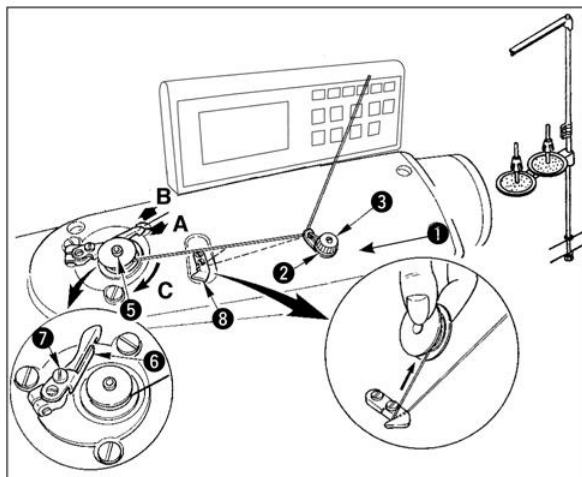
- 1) Turn the handwheel by hand to raise the needle to its highest position.
- 2) Raise bobbin case latch ① and remove the bobbin case.

5-3. Winding the bobbin thread



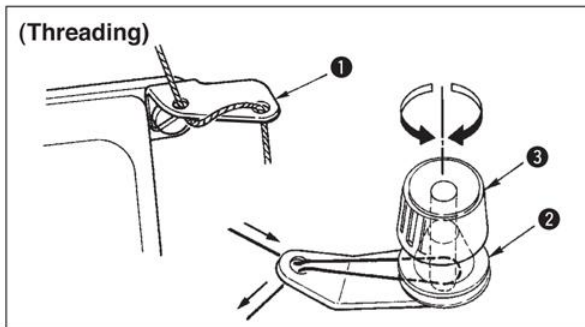
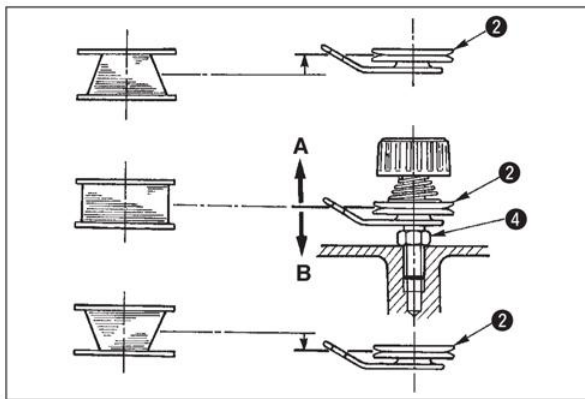
WARNING :

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) Insert the bobbin deep into the bobbin winder spindle ⑤ until it will go no further.
- 2) Pass the bobbin thread pulled out from the spool rested on the right side of the thread stand following the order from ① as shown in the figure on the left. Then, wind the end of the bobbin thread on the bobbin several times.
- 3) Press the bobbin winder adjusting plate ⑥ in the direction of A and start the sewing machine. The bobbin rotates in the direction of C and the bobbin thread is wound up. The bobbin winder spindle ⑤ will automatically stop as soon as the winding is finished.
- 4) Remove the bobbin and cut the bobbin thread with the thread cut retainer ⑧.
- 5) To adjust the winding amount of the bobbin thread, loosen setscrew ⑦ and move bobbin winder adjusting plate ⑥ to the direction of A or B. Then, tighten setscrew ⑦.

To the direction A : The amount is decreased.
To the direction B : The amount is increased.



6) In case that the bobbin thread is not wound evenly on the bobbin, loosen the nut ④ and turn the bobbin thread tension to adjust the height of the thread tension disk ②.

- It is the standard that the center of the bobbin is as high as the center of the thread tension disk.
- Move the position of the thread tension disk ② to the direction A as shown in the figure on the left when the winding amount of the bobbin thread on the lower part of the bobbin is excessive and to the direction B as shown in the figure on the left when the winding amount of the bobbin thread on the upper part of the bobbin is excessive.

After the adjustment, tighten the nut ④.

7) Turn the thread tension nut ③ to adjust the tension of the bobbin thread winder.

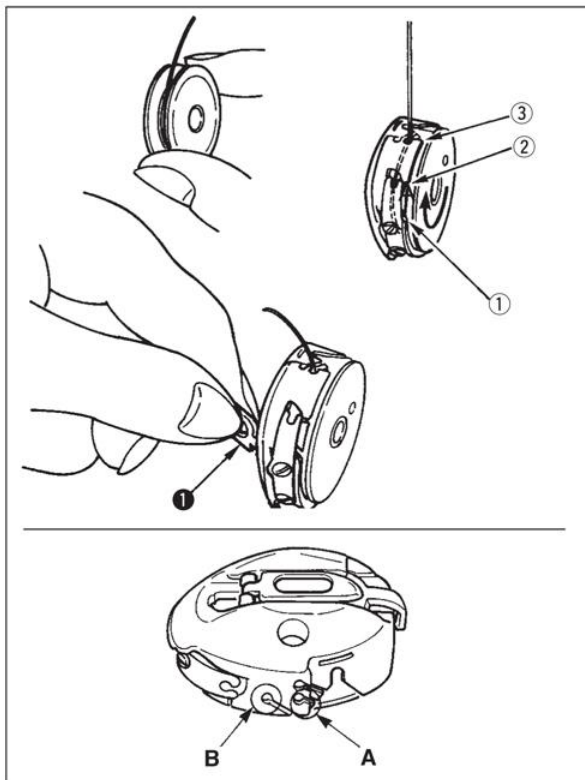
Note 1. When winding bobbin thread, start winding in the state that the thread between bobbin and thread tension disk ② is tense.
2. When winding bobbin thread in the state that the sewing is not performed, remove needle thread from the thread path of the thread take-up and remove bobbin from the hook.

5-4. Placing the bobbin case and 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) Turn the handwheel by hand to raise the needle to its highest position.
- 2) Take a bobbin by your right hand with the thread drawn out about 5 cm from the thread end of the bobbin and place it into the bobbin case as illustrated.
- 3) Thread the bobbin case in the order of the numbers and pull it out through the thread path as illustrated. The bobbin rotates in the bobbin case in the direction shown by arrow when bobbin thread is drawn.
- 4) Raise bobbin case latch ① and hold it between your two fingers as shown in the figure on the left.
- 5) Insert the bobbin case into the sewing hook shaft as far as it will go by putting your hand from the under cover of the inner hook. (Click sounds.)
- 6) Release the bobbin case latch to let it steadily rest in the closing position.

■ How to use the bobbin case thread hole

- 1) Use hole A mainly for zigzag stitches other than standard zigzag stitch and scallop zigzag stitch.
- 2) Use hole B mainly for standard zigzag stitch and scallop zigzag stitch.



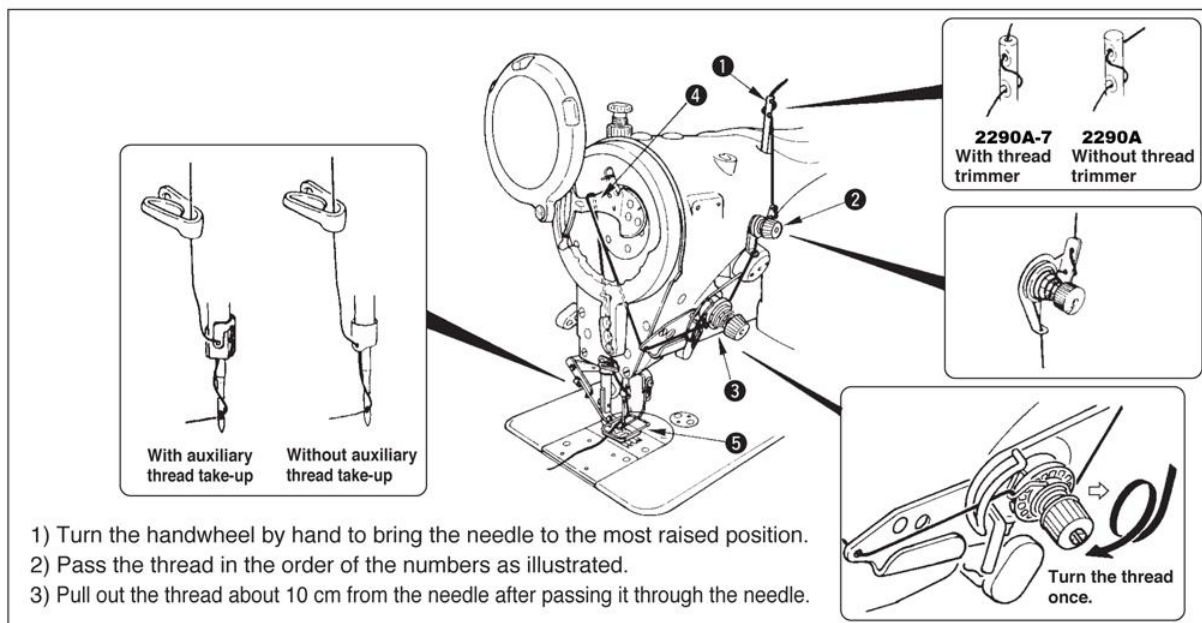
There may be a case where several stitches at the start of sewing are difficult to be knotted when thread trimmer is used with thin filament thread such as (#50, #60 or #80) using hole B. At this time, use the other hole or perform the sewing starting from the right.

5-5. Threading the machine head



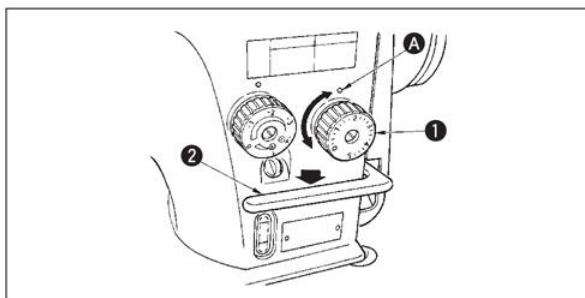
WARNING :

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.



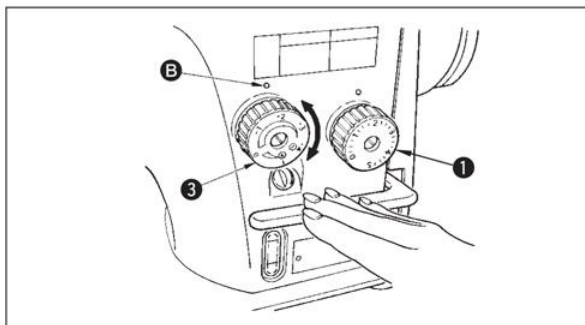
- 1) Turn the handwheel by hand to bring the needle to the most raised position.
- 2) Pass the thread in the order of the numbers as illustrated.
- 3) Pull out the thread about 10 cm from the needle after passing it through the needle.

5-6. Adjusting the stitch length



- 1) Turn the stitch length dial **1** in the direction of the arrow so that the number corresponding to the desired stitch length meets the marker dot **A** engraved on the machine arm.
- 2) Numbers on the stitch length dial are calibrated in mm.
- 3) To perform reverse feed stitching, press down the feed lever **2**. The sewing machine performs reverse feed stitching as long as you keep the feed lever held pressed. The feed lever will return to its home position and the sewing machine will run in the normal stitching direction when you release the feed lever.

5-7. Adjusting the condensation stitching



Stitch length can be reduced at the start or end of sewing. This feature is used for fastening stitch.

- 1) Turn condensation stitching adjusting dial **3** in the direction of the arrow mark, and adjust the desired number to engraved dot **B** on the machine arm.
 - 2) The number of the graduation is shown in the unit of mm.
 - 3) Turn condensation stitching adjusting dial **3** in the direction of + to reduce the reverse feed stitch length.
- Example : When stitch length dial **1** is used with the graduation of +2, the maximum adjustment value of condensation stitching adjusting dial **3** becomes -2. (It is possible to adjust within the range of -2 to +2.)



Maximum feed amount is regulated to ± 2 according to the gauge delivered (feed dog : 22581508). Adjustment can be performed up to the range of maximum +5 to -4 by replacing the gauge (feed dog : 22540009).

- 4) Note that the graduations on the dial are mere reference. Adjust the condensation stitching while actually observing the finished seam.

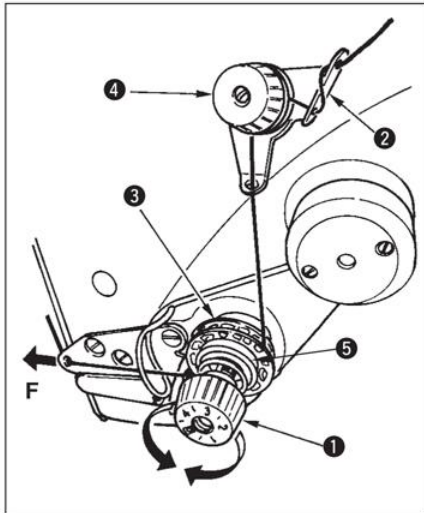
6. SEWING

6-1. Adjusting the thread tension



WARNING :

In case of thread-breakage. It may occur that the thread tangles on the thread take-up lever. In this case, remove the thread tangling around the thread take-up lever by raising the thread take-up cover. At this time, be careful not to cut your fingers with the knife.

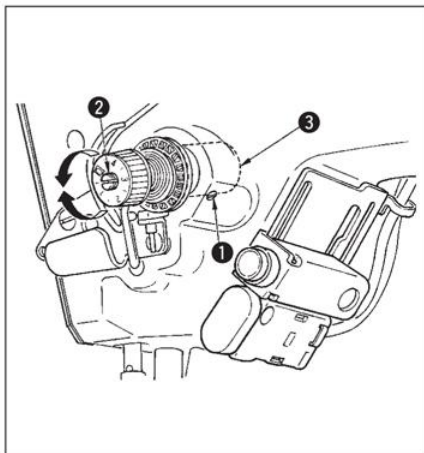


(1) Adjusting the needle thread tension

- 1) Adjust the needle thread tension using the tension nut ① .
Turning the tension nut clockwise increases the needle thread tension, or counterclockwise decreases it.



1. If the thread tension of pre-tension ② is too low, the thread may slip out of rotary disc ③. Adjust the thread tension of the pre-tension, using pre-tension adjusting nut ④ taking care of tension balance between the pre-tension and the rotary disc.
2. When setting the needle thread tension, draw the thread in the direction F to check that rotary disc ③ smoothly rotates with no slippage.
When the rotary disc slips, tighten pre-tension adjusting nut ④.
3. Thread tension disc felt ⑤ is a consumable part.
When rotary disc ③ slips, there is a possibility that the thread tension disc felt has been consumed. Replace the felt with new one (Part No. : 22528509 x 4 pcs.).



(2) Adjusting the thread take-up spring

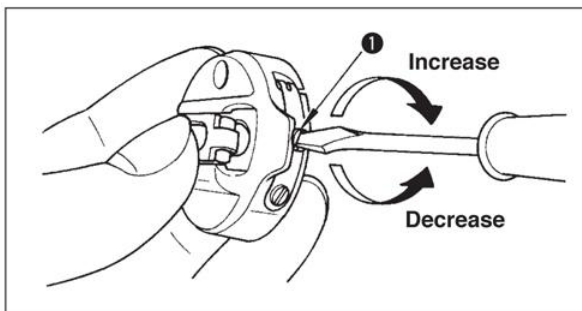
- 1) To change the tension of the thread take-up spring, firmly tighten the screw ① which fastens the tension post socket to the machine arm and insert the blade of a screwdriver into the slot in the tension post ② to adjust the tension of the thread take-up spring.

Turn it clockwise to increase.

Turn it counterclockwise to decrease.

- 2) To change the amount of thread taken by the thread take-up spring, loosen the clamping screw ① of the tension post socket and turn the tension post socket ③ .

Adjustable range of the amount of thread taken by the thread take-up spring : 6 to 10 mm



(3) Adjusting the bobbin thread tension

- 1) The tension of the bobbin thread is adjusted by turning the tension adjusting screw ① .

Turn it clockwise to increase.

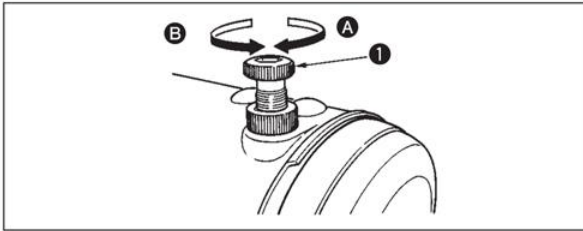
Turn it counterclockwise to decrease.

6-2. Adjusting the pressure of the presser foot



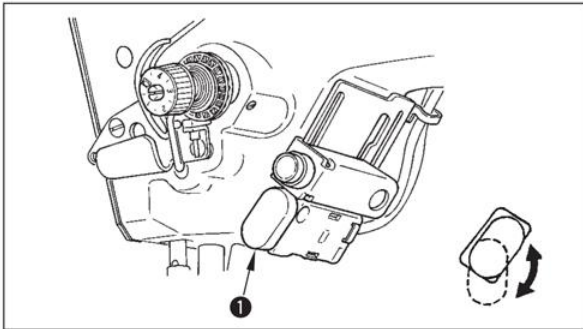
WARNING :

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



- 1) Turn the presser spring regulator ① clockwise **A** to increase the pressure given by the presser foot.
- 2) Turn the presser spring regulator counterclockwise **B** to decrease it.

6-3. One-touch type reverse feed stitching mechanism



(1) How to use the reverse feed switch lever

- 1) Press reverse feed switch ①, and the sewing machine will immediately run in the reverse direction to perform the reverse feed stitching.
- 2) Reverse stitching is performed as long as you keep the lever held pressed down.
- 3) Release the switch lever, and the machine will immediately run in the normal direction.
- 4) Reverse feed switch ① can be used in two positions by turning it.



Caution For the types other than WB, CB and 0B, touch-back kit (separately sold, Part No. 40010795) is necessary.

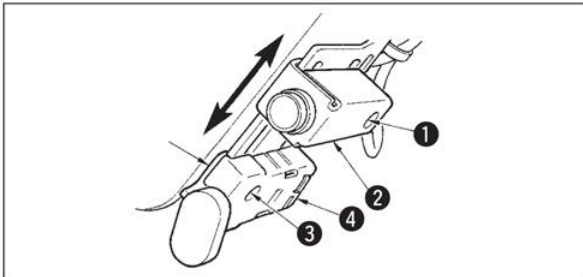
(2) Height of the switch



WARNING :

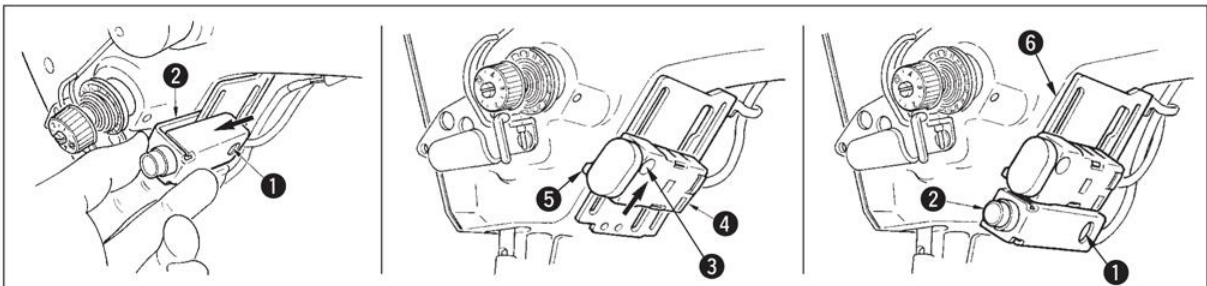
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

A. In case of the machine with the auxiliary thread take-up lever



- 1) Loosen setscrew ① and adjust up or down mirror switch ②.
- 2) Loosen setscrew ③ and move up or down reverse feed switch ④ to adjust the height.

* The position of reverse feed switch ④ and mirror switch ② can be reversed.

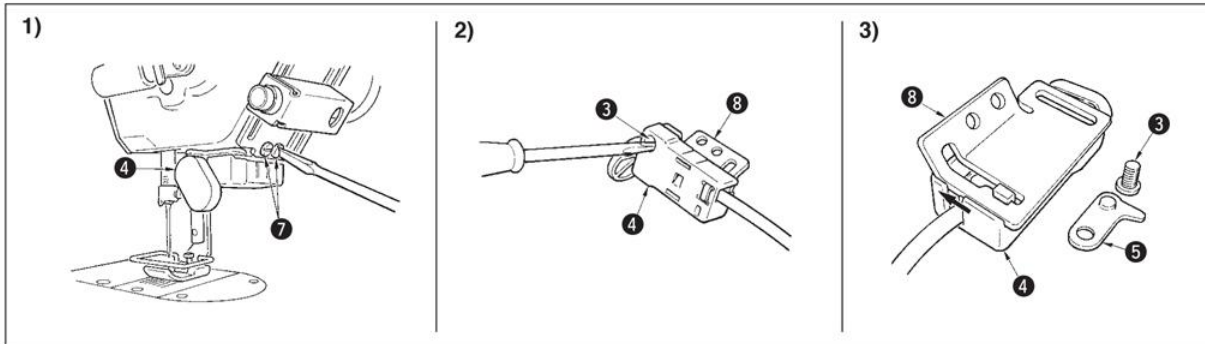


- 3) Loosen setscrew ① and remove mirror SW ②.
- 4) Slightly loosen setscrew ③, move upward reverse feed switch ④ and guide ⑤, and fix the switch with guide ⑤ and setscrew ③.

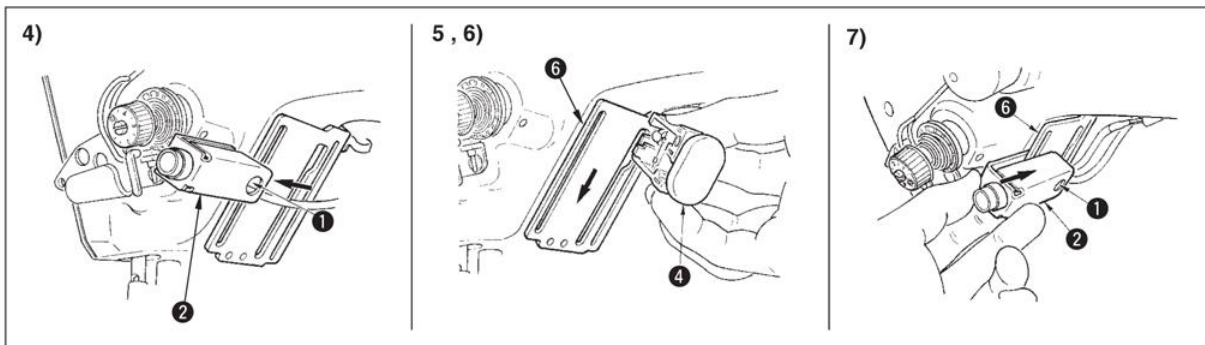
- 5) Put mirror SW ② in installing base ⑥ and fix it with setscrew ①.
 (Put mirror SW ② in installing base ⑥ so that the installing base ⑧ is inserted in the mirror SW ②.)
 (Note) Freely adjust the height of the respective switches.

B. In case of the machine with the auxiliary thread take-up lever

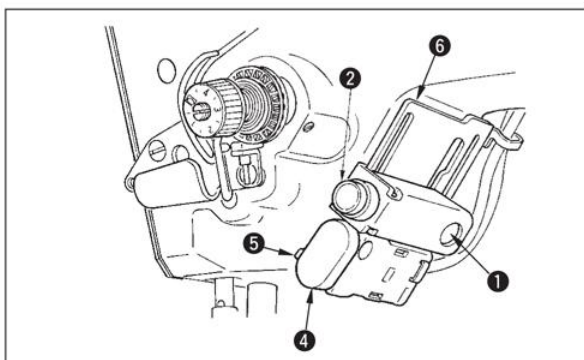
When reverse feed switch ④ is low according to the process, adjust the height.



- 1) Loosen two setscrews ⑦ and remove reverse feed switch ④.
- 2) Loosen setscrew ③ and remove reverse feed switch ④ from installing base ⑧.
- 3) Slide reverse feed switch ④ from installing base ⑧ to remove it.
 (Move the click of the reverse feed switch from the groove of the installing base. Guide ⑤ is used when installing the switch.)

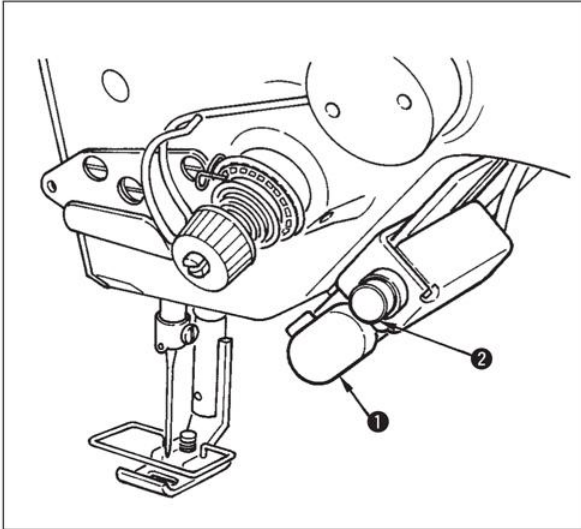


- 4) Slightly loosen setscrew ③, move upward reverse feed switch ④ and guide ⑤, and fix the switch with guide ⑤ and setscrew ③.
- 5) Put the click of reverse feed switch ④ in the groove of installing base ⑥.
- 6) Fix reverse feed switch ④ with guide ⑤ and setscrew ③.
- 7) Put mirror SW ② in installing base ⑥ and fix it with setscrew ①.
 (Put mirror SW ② in installing base ⑥ so that the installing base ⑧ is inserted in the mirror SW ②.)



* The position of reverse feed switch ④ and mirror switch ② can be reversed.
 When changing the position of the switch in case of "A. In case of the machine with the auxiliary thread take-up lever", refer to the items 3) through 5).
 (Note) Freely adjust the height of the respective switches.

6-4. Hand switch



1) Reverse feed switch ①

Press reverse feed switch ① and reverse feed is performed.

When it is released, normal feed is performed.

* Reverse feed switch is not installed on the types other than WB, CB, and 0B types.

(Touch-back device (separately sold), Part No. 40010795 is necessary.)

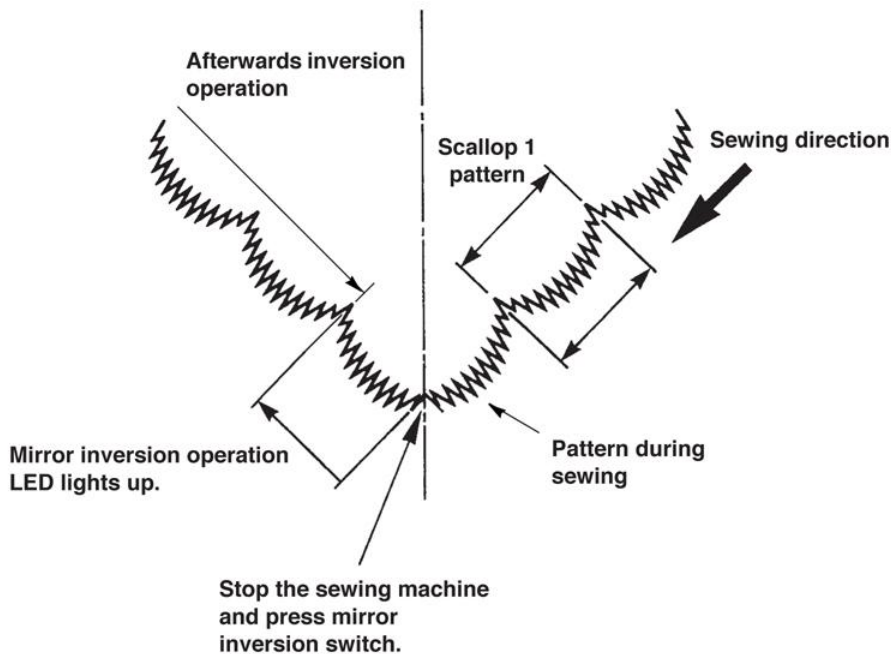
2) Mirror switch ②

When scallop, custom pattern or continuous stitching is selected, the switch becomes a mirror switch.

Mirror inversion means the function that the reverse pattern sewing is performed after pressing the mirror inversion switch during temporary stop of sewing.

■ Sewing procedure (Scallop)

- 1) Stop the sewing machine at the position you desire to perform mirror inversion during sewing.
- 2) Press the mirror inversion switch. When the mirror inversion switch is received, LED lights up. (The switch can receive only when the sewing machine stops and dose not receive when the sewing machine is running.)
- 3) Perform mirror inversion sewing with the sewing machine.
- 4) Perform thread trimming or press again the mirror inversion switch to complete the inversion sewing.



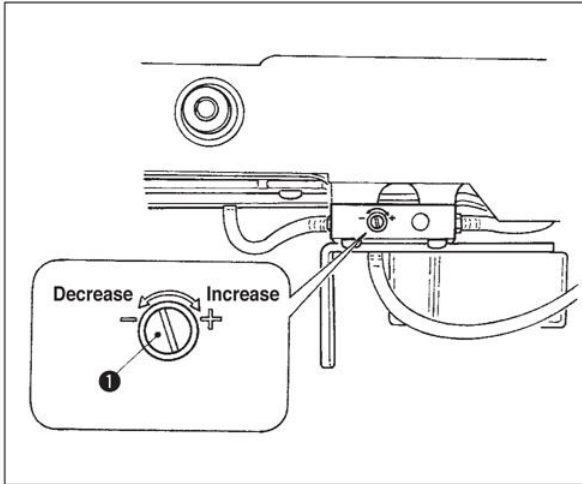
7. STANDARD ADJUSTMENT

7-1. Adjusting the amount of oil in the hook (2290A-SS/SR)



WARNING :

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



Adjustment of the amount of oil in the hook is performed with oil amount adjustment screw ①.

(1) Adjustment procedure

Tighten (turn clockwise) oil amount adjustment screw ① to increase the amount of oil in the hook, or loosen (turn counterclockwise) to decrease it.



1. When adjusting the amount of oil in the hook, perform the adjustment in a way of reducing the oil amount after somewhat increasing it.
2. The amount of oil in the hook has been adjusted at the max. number of revolution at the time of delivery. When you always use the sewing machine at low speed, there is a possibility that trouble occurs due to the lack of amount of oil in the hook. When the sewing machine is used always at low speed, perform the adjustment of the amount of oil in the hook.
3. There is a possibility of causing oil leakage from the hook shaft section since oil does not return to the oil tank when oil amount adjustment screw ① is used in fully-tightened state. Do not use the screw in fully-tightened state. In addition, when the amount of oil in the hook is not obtained unless oil amount adjustment screw ① is near in fully-tightened state, it is considered that hook shaft oil wick (Part No. 11015906) is clogged or the like. Replace the hook shaft oil wick. For the replacing procedure, refer to (10) Replacing the hook shaft oil wick of 9. MAINTENANCE.

7-2. Adjusting the amount of lubricating to face plate section (2290A-SS/SR)

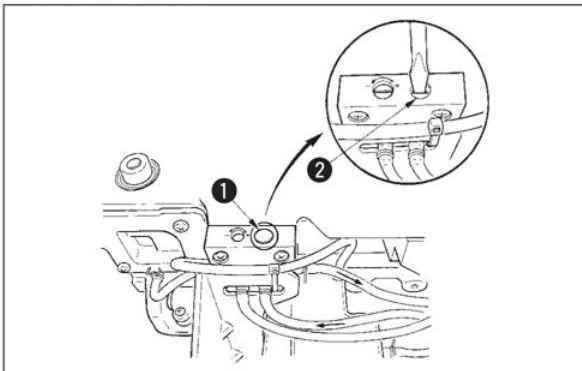


WARNING :

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

It is not necessary to adjust the amount of lubricating to face plate section since it has been factory-adjusted at the time of delivery. (Oil amount adjustment screw ② in the face plate section lubricating tank is hidden with stop plug ① since it is not necessary to be adjusted.)

When the adjustment is performed by mistake (mistaken as the adjustment of oil amount in the hook), re-adjust as shown below.



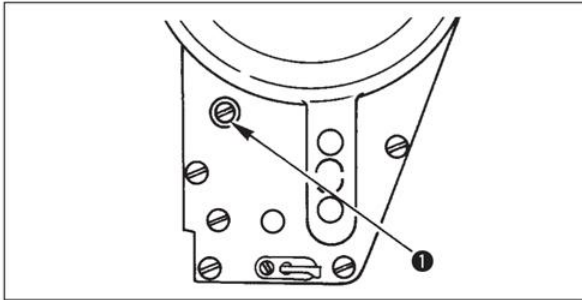
- 1) Remove stop plug ①, and when lightly tightening the adjustment screw ②, return the screw by approximately 0.6 turn from the stop position.



Lightly tighten the screw ②. Be careful that it is not excessively tightened.

- 2) In case of the normal state, the flow of oil can be confirmed (direction of the arrow in the illustration). In case the flow is stopped, be sure to adjust. (Worn-out of the mechanism of face plate section will be caused.)

7-3. Adjusting the height of the presser bar



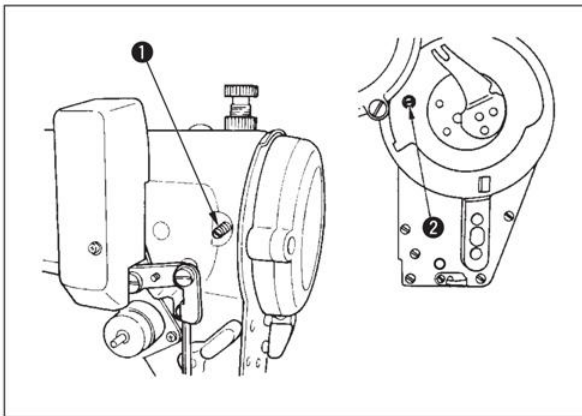
- 1) To change the height of the presser bar or the inclination of the presser foot, loosen the presser bar connection screw ❶ and perform the adjustment properly.
- 2) After the adjustment, securely tighten the screw.

7-4. Adjusting the micro-lifting mechanism of the presser foot



WARNING :

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



Some type of material needs to be sewn with the presser foot slightly lifted. In this case, perform this adjustment following the procedure described below.

- 1) Loosen the setscrew ❶ in the presser foot micro-lifter.
- 2) Turn the presser foot micro-lifting screw ❷ clockwise through the hole in the face plate until the presser foot is raised as desired. Then, tighten the screw ❶.



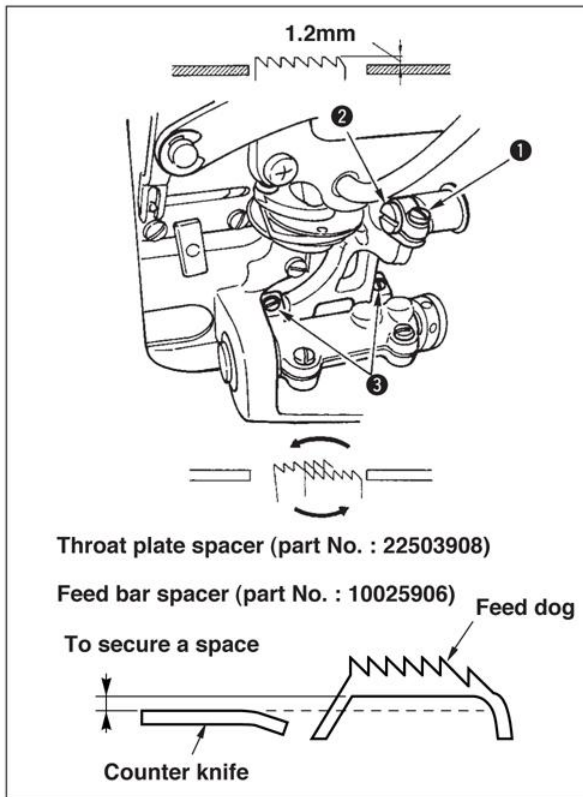
If you do not use the micro-lifting mechanism of the presser foot, fully return the presser foot micro-lifting screw ❷ to its home position. The standard of lifting amount of the presser foot is as thick as a sheet of paper.

7-5. Height and inclination of the feed dog



WARNING :

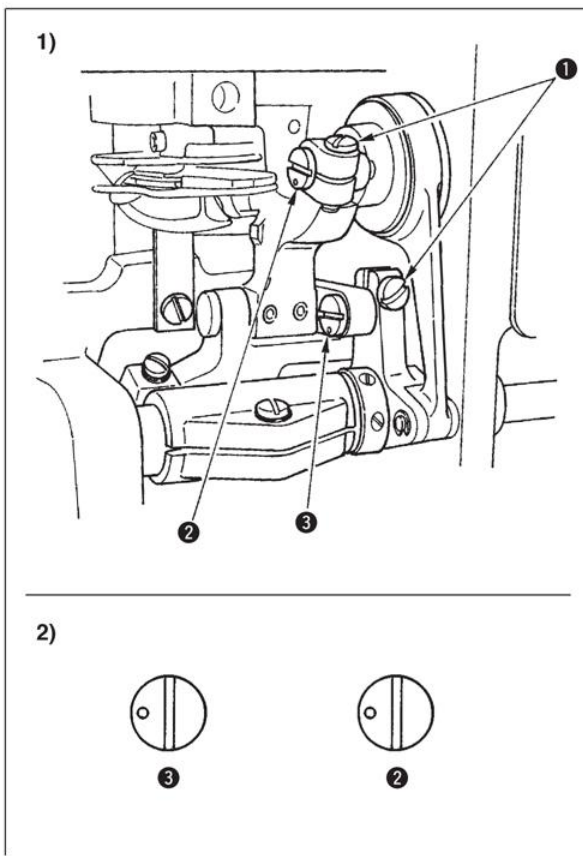
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



(1) 2290A*S

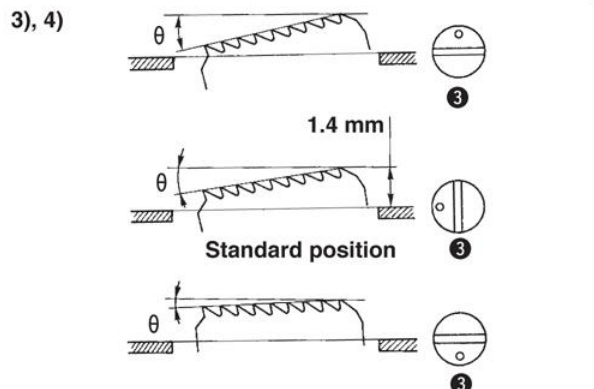
- 1) To adjust the height of the feed dog, loosen the screw ① and turn the feed driving link pin ② using a screwdriver.
- 2) The standard height of the feed dog is 1.2 mm.
- 3) To adjust the inclination of the feed dog, loosen the two screws ③ and turn the eccentric shaft inserting a screwdriver through the adjustment hole in the machine bed.
- 4) For the machine with a thread trimmer, there can be no space between the counter knife and the underside of the feed dog when adjusting the feed mechanism (change in height and timing) or using a commercially-available feed dog. In this case, place a feed bar spacer (part No. : 10025906) under the feed mechanism and a throat plate spacer (part No. : 22503908) under the throat plate so as to secure a space between the counter knife and the underside of the feed dog.

The standard inclination of the feed dog is obtained by adjusting the feed dog so that it becomes horizontal when it rises above the top surface of the throat plate.



(2) 2290A*U

- 1) To adjust the height and inclination of the feed dog, loosen the screws ① and turn the feed driving link pins ② and ③ using a screwdriver as shown in the figure.
- 2) The standard inclination of the feed dog is obtained by adjusting so that the engraved dot of feed driving link pin ② faces at 9 o'clock and the engraved dot of feed driving link pin ③ faces at 9 o'clock.
- 3) The standard height of the feed dog is 1.4 mm.
- 4) Mainly adjust feed driving link pin ③ to adjust the uneven material feeding. The uneven material feeding can be corrected by adjusting the inclining angle θ of the feed dog.
- 5) A spacer is inserted between the throat plate and the feed dog of the sewing machine with thread trimmer only.

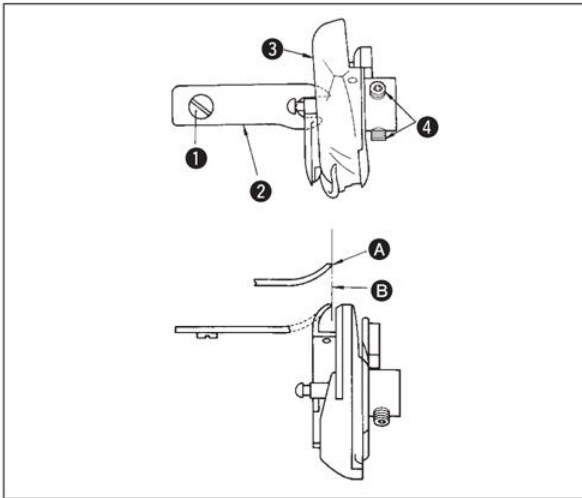


7-6. Attaching / removing the hook



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.



When you replace the sewing hook, remove it in the following procedures ;

- 1) Turn the handwheel until the needle reaches to its highest position.
- 2) Remove the needle, presser foot, throat plate, feed dog and bobbin case from the machine.
- 3) Remove the setscrew ① and take out the bobbin case positioning finger ②.
- 4) Loosen the two screws ④ and remove the sewing hook ③.

Reverse the above procedures when inserting the sewing hook. At this time, make sure that top end A of the bobbin case positioning finger is aligned with line B. as shown in the figure on the left. Never let A protrude from line B.



Part No. of hook ③ is 22525877.

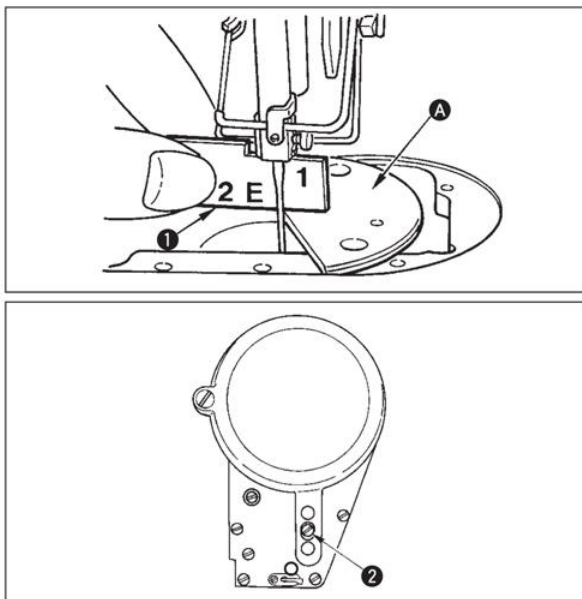
Do not use the hook other than that designated by we.

7-7. Adjusting height of the needle bar



WARNING :

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



- 1) Set the zigzag width to "0". Bring the needle to the center of the zigzag stroke.
- 2) Remove the presser foot, throat plate, semicircle plate and feed dog.
- 3) Place a semicircle plate on the plane, to which the throat plate is to be attached, of the bed. Loosen setscrew ②, and adjust so that from the top surface of semicircle plate A to the bottom end of the needle bar is as high as "1" of timing gauge ①.



1. Thickness of the semicircle plate is different from that of the throat plate. Be sure to use the semicircle plate when adjusting the height of the needle bar. Be sure to perform the adjustment with zigzag width set to zero and with the needle positioned at the center of the zigzag stroke.

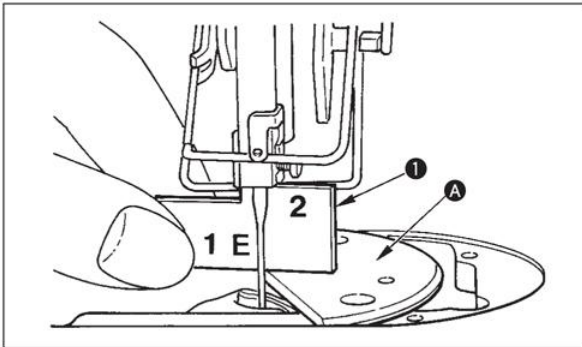
2. Use the timing gauge on which the indication "E" is engraved which has been supplied as accessories. (Part No. 22536502)

7-8. Adjusting the needle-to-hook timing and the 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.



(1) Positioning the hook

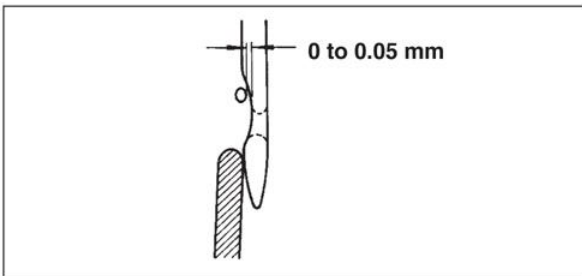
- 1) After the completion of the adjustment of the needle bar height, adjust so that the blade point of the hook comes to the center of the needle at the height of the "2" of timing gauge 1 which has been supplied as accessories.
- 2) At this time, the blade point of the hook should slightly come in contact with the needle when the needle guard does not touch the needle.

(2) Confirmation

Maximize the zigzag width (2290A : 5 mm). Bring the needle to the leftmost position of the zigzag stroke. Now, confirm that the top end of the needle eyelet is spaced 0.2 to 0.5 mm away from the blade point of the hook. If the zigzag width of 10 mm is used or the shape of indented part of the needle is different from that of indented part of the needle at the time of delivery, re-adjust the height of the needle bar.

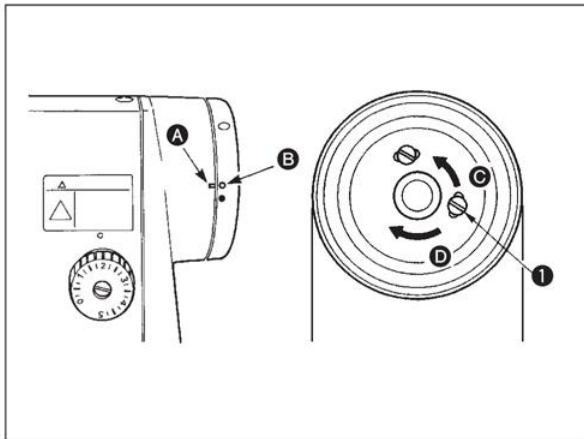
(3) Adjusting the needle guard

- 1) Maximize the zigzag width. Bend the needle guard to adjust so that the needle does not come in contact with the blade point of the both at the leftmost and rightmost positions of the zigzag stroke. At this time, adjust the clearance provided between the needle and the blade point of the hook to 0 to 0.05 mm.
- 2) The needle guard functions to keep the needle away from the blade point of the hook, thereby preventing damage to the blade point of the hook. Whenever you have replaced the hook with a new one, be sure to adjust the position of the needle guard.



Caution When thread breakage has occurred, there is a case where thread is caught in the hook. Be sure to perform sewing after removing the thread caught in the hook.

7-9. Adjusting the stop position of the needle

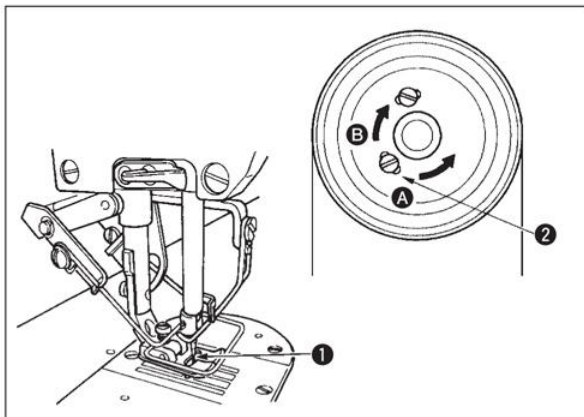


(1) Stop position of the needle after thread trimming

- 1) The needle stops at the standard stop position when marker dot **A** engraved on the handwheel cover is aligned with white marker dot **B** engraved on the handwheel.
- 2) Stop the needle at the highest position of its stroke, loosen screw **1**, and adjust the stop position of the needle by moving screw **1** within the slot.
 - ① Move the screw in the direction **C** to advance the timing to make the needle stop.
 - ② Move the screw in the direction **D** to retard the timing to make the needle stop.

Caution

Do not operate the sewing machine with screw **1** loosened. Loosen the screw only, and do not removed it.



(2) The lowest stop position of the needle

When you return the pedal to its neutral position after having depressed the front part of it, the needle stops at the lowest stop position. As in the case of the adjustment of the highest stop position of the needle, stop the needle **1** in the lowest position of its stroke, loosen the screw **2**, and adjust the lowest stop position of the needle by moving the screw **2** within the slot. Move the screw in the direction **A** to advance the timing to make the needle stop or in the direction **B** to retard it.

Caution

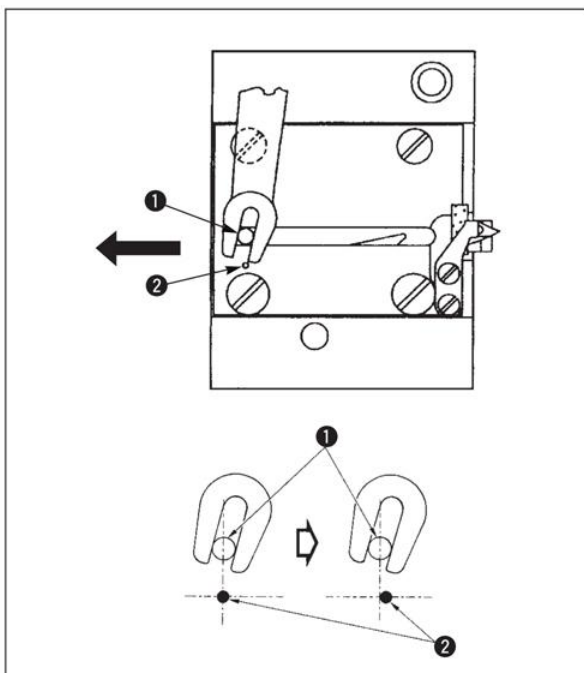
Do not adjust screw **2**. It has been factory-adjusted at the time of delivery and needle sway will be caused if it is adjusted.

7-10. Adjusting the thread trimmer



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.

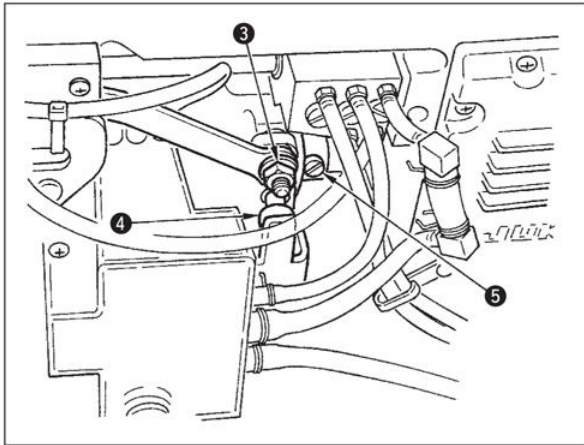


(1) Initial position of the moving knife

When the moving knife is in its initial position, the moving knife pin **1** should be aligned with the engraved marker dot **2** as shown in the figure on the left.

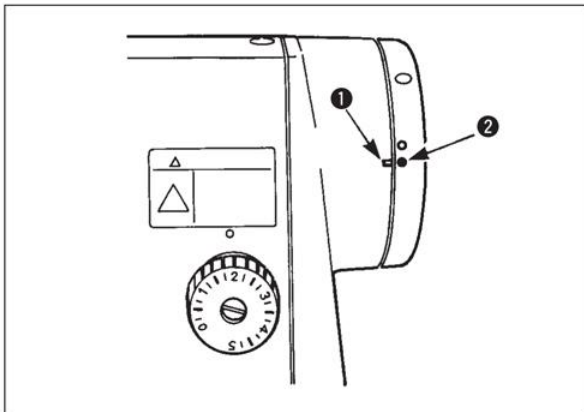
Caution

When the gauge size which is more than that delivered as standard or the gauge size of other manufactures is used, and the counter knife interferes with the feed dog, loosen nut **3**, move the initial position of moving knife pin **1** to the left from engraved maker dot **2** by approximately one half of engraved marker dot **2** and fix the pin.



If the initial position of the moving knife is not correct

Loosen the nut ③, and move the moving knife to the right or left until the pin ① meets the marker dot ②. Then, tighten the nut ③.



(2) Adjusting the thread trimming timing

Put roller ④ in the cam groove. Now, gradually turn the handwheel in the reverse direction. The handwheel will go no further when marker dot ① engraved on the handwheel cover is aligned with red marker dot ② engraved on the handwheel.

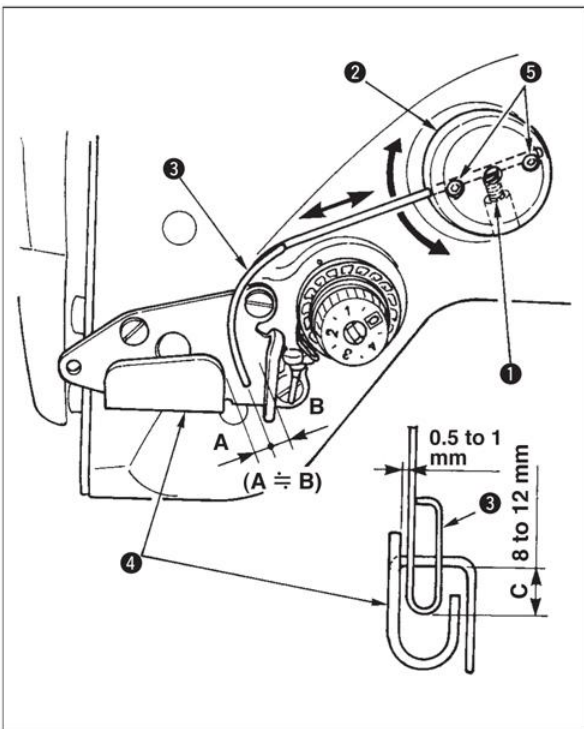
To adjust the thread trimmer cam, align the red marker dot on the handwheel cover with the red marker dot on the handwheel, put the roller in the groove of the thread trimming cam, and gradually turn the handwheel in the direction opposite to the direction of rotation of the hook driving shaft until it will go no further. Now, tighten two screws ⑤.

7-11. Adjusting the needle thread feeding device (Thread trimmer type only)



WARNING :

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



Standard position of the feeding wire

- 1) Loosen screw ①.
- 2) Turn the feeding wire together with feeding wire installing base ②, adjust the installing position of the feeding wire so that a distance of C (8 to 12 mm) is provided between the top end of feeding wire ③ and the guide portion of thread take-up thread guide A ④, and tighten screw ①.



At this time, leave a space of 0.5 to 1 mm between the feeding wire and the top surface of the thread take-up thread guide A.

- 3) Finely adjust with setscrews ⑤ so that the top end of the feeding wire is placed approximately in the center (A ≅ B) of the thread take-up thread guide A.

When turning OFF the feeding device :

It is possible to turn OFF with the function setting No. 89 described in the function setting list.

When needle thread feeding amount is desired to be increased :

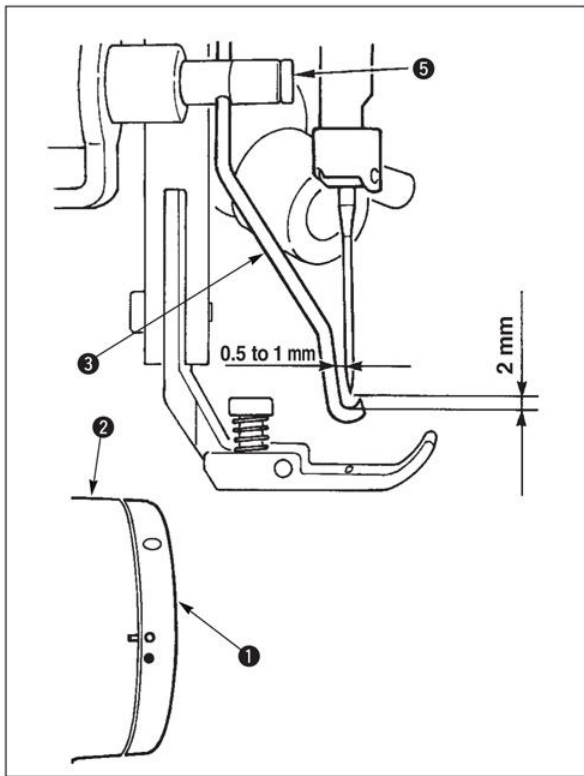
- Loosen setscrew ① and adjust the relation between A and B to $A > B$.
- Loosen setscrew ① and when the whole feeding wire installing base ② is adjusted to the upward direction (decrease the value, C), the feeding amount can be increased.

7-12. Adjusting the bird's nest prevention (CB) type wiper



WARNING :

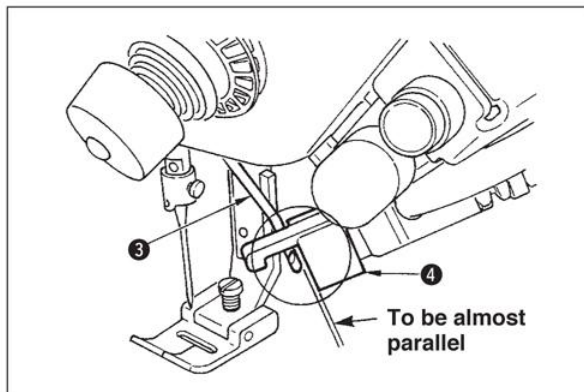
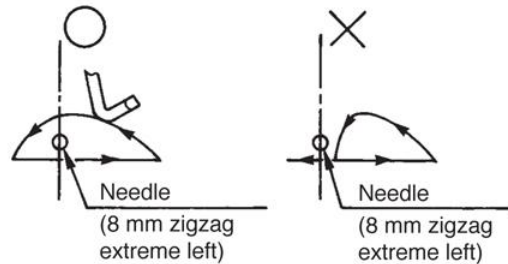
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



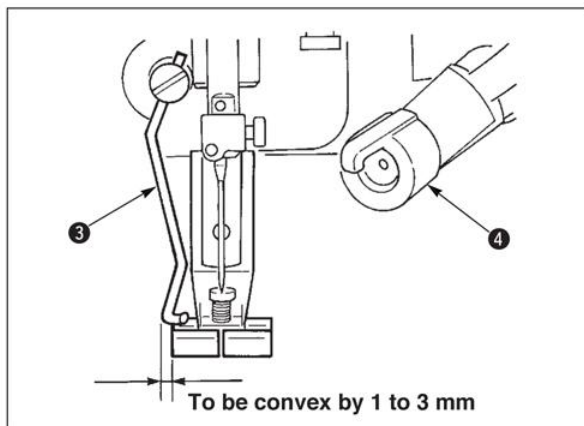
■ Position of the wiper

1) Adjust the white marker dot on the handwheel **1** to the position where it is aligned with the marker dot on the pulley cover **2**, quietly press wiper link A to move wiper **3**. The wiper recedes by the ratchet when going and the position where the wiper returns to its home position is in the center of needle or the position exceeding the center of needle.

Besides, adjust with wiper setscrew **5** so that when wiper **3** comes to the position of the center of needle when returning, the clearance between the wiper and the needle tip should be approximately 2 mm and that between the wiper and the side of needle should be approximately 1 mm.



2) The top end plane of wiper **3** should be positioned to be almost parallel to the end plane of clamp head **4**. Besides, set the clamp head so that the upper side is the protruding section.



3) Adjust the maximum stroke of the wiper to the position of 1 to 3 mm from the left end plane of the presser of standard delivery.

- Presser (asm.) of standard delivery (Part No. 40003542)
- Optional Presser (asm.) for narrow width (Part No. 40003549) (For zigzag width 4 mm or less)

7-13. Replacing procedure of the bird's nest prevention (CB) type presser knife



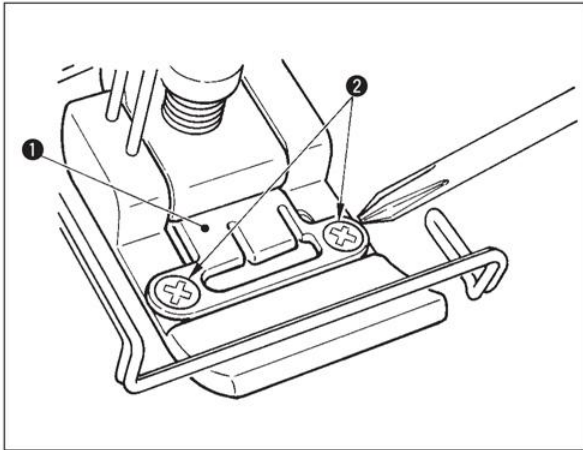
WARNING :

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

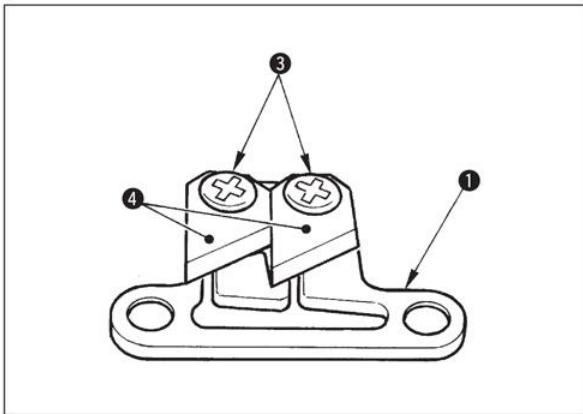
The needle thread cutting knife is mounted on the presser delivered as standard for the bird's nest prevention (CB) type.

The needle thread cutting knife is an article of consumption. When the knife becomes dull, replace it with a new one.

Name of part : Knife (ceramic) Part No. : 11434206



- 1) Remove two setscrews **2** in the knife fixing plate using a precision screwdriver and remove knife fixing plate **1**.



- 2) Remove two setscrews **3** in the knife using a precision screwdriver and remove knife (ceramic) **4** from fixing plate **1**. Then replace the knife.



- When replacing knife **4** (ceramic), be careful of the injury to the fingers.
- When replacing knife **4** (ceramic), be careful of its direction and position. (It should be almost parallel to knife fixing plate **1**.)

■ When using the bird's nest prevention type as the needle thread clamp type

When using as the needle thread clamp type, perform the setting below.

[Example of use] • When using as the interlacing failure prevention at the time of sewing from the cloth end.

• When using the normal presser. (presser without knife)

1. Set the value of function setting No.19 to 1. (Standard "0")
2. Input the setting of number of stitches of releasing needle thread with function setting No. 28. ("0" to 30 stitches)



**Needle thread clamp ratio when needle does not enter the cloth excessively drops in comparison with that when needle enters the cloth.
Be sure to operate the wiper on the cloth.**

■ When using the bird's nest prevention type as the wiper type

1. Set the value of function setting No. 18 to "0". (Standard 1)

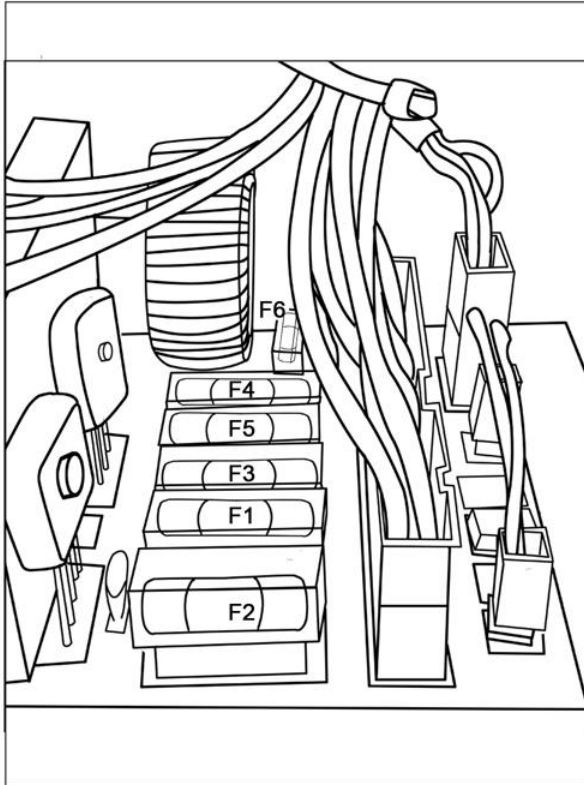
8. MAINTENANCE



WARNING :

To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, carry out the work after turning OFF the power switch and ascertaining that the motor has completely stopped. To prevent personal injuries, when a fuse has blown out, be sure to replace it with a new one with the same capacity after turning OFF the power switch and removing the cause of the blown-out of the fuse.

(1) Replacing the power fuse



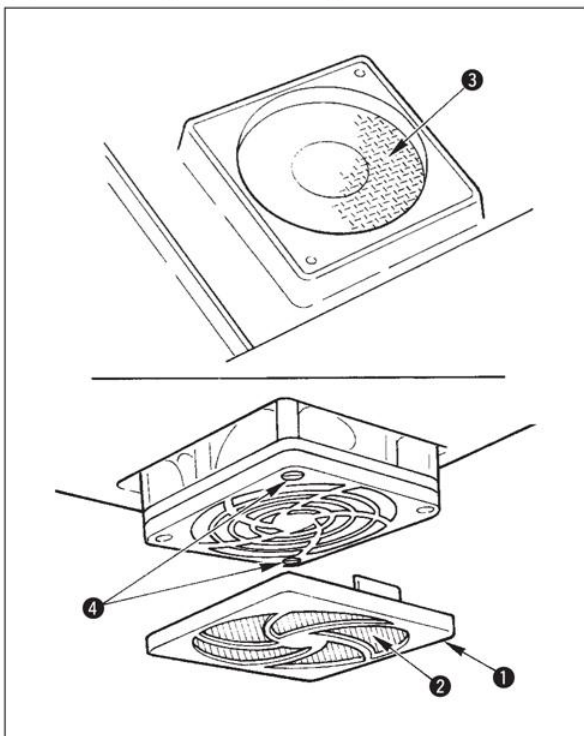
- 1) Confirm that the sewing machine has stopped, and turn OFF the power with the power switch.
- 2) Confirm that the power switch has been turned OFF, and draw out the power cord from the power receptacle. Then, wait for five minutes or more.
- 3) Remove four screws tightening the rear cover of the electrical box and slowly remove the rear cover.
- 4) Hold the glass portion of the fuse to be replaced and remove the fuse.
- 5) Use the fuse with the specified capacity.

F2、F3、F4---1A/250V

F6-----5A/250V

F1、F5-----10A/250V

(2) Cleaning the cooling fan installed on the under cover

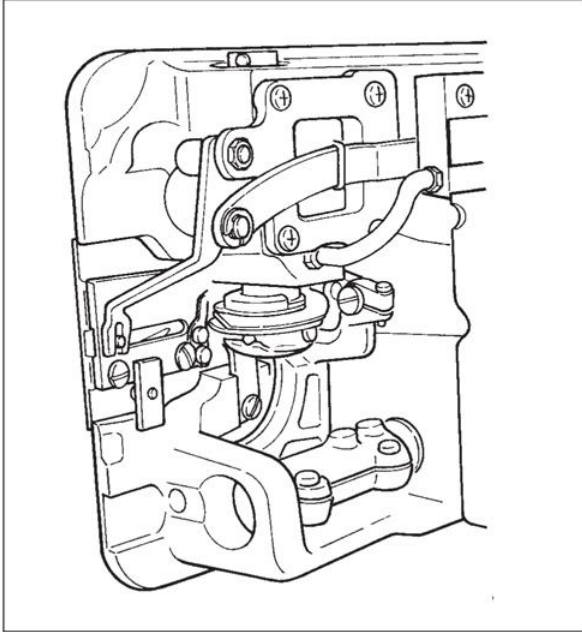


Cloth waste or the like gathers around the cooling fan filter section installed on the lower part of the under cover, and there is a case where cooling effect of the machine head is decreased.



Caution Be sure to install filters ② and ③ after they have been completely dried up.

(3) Cleaning the hook section



When cloth waste or the like gathers around or adheres to the hook section, trouble (defective sewing, seizure of hook, etc.) of sewing machine will be caused. Periodically clean the section.

(4) Cleaning the rear cover of the control box.

Clean the rear cover when dust or the like gathers on it.

(5) Cleaning the operation panel screen

Do not wipe the operation panel screen with thinner or strong force.

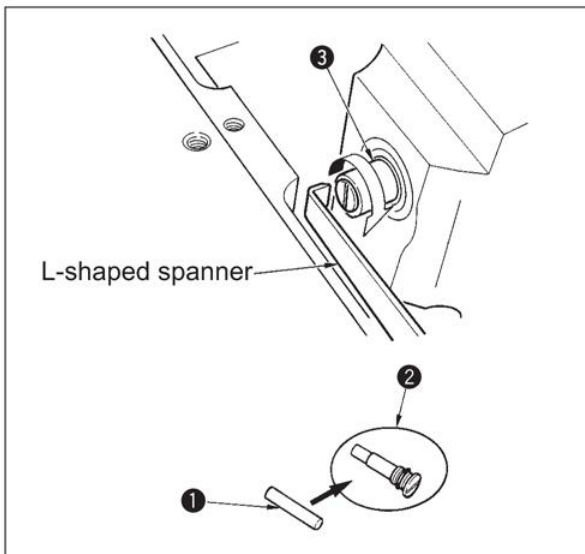
Lightly wipe the screen with a dry and soft cloth or an alcohol-soaked cloth to clean it.

(6) Replacing procedure of the hook shaft oil wick



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) Hook shaft oil wick ① is mounted on the top end of hook shaft ③. Remove the needle and the parts around the needle (presser foot, needle, throat plate, feed plate, hook and woodruff plate), put a spanner, top end of which is L-shaped to the groove section of hook shaft oil wick screw ②, turn the handwheel in the normal direction of rotation by hand, and draw out the screw.

2) Draw out hook shaft oil wick ① from hook shaft oil wick screw ② which has been drawn out and push a new hook shaft oil wick ① (Part No. : 11015906) to hook shaft oil wick screw ② (Part No. B1808552000). At this time, be sure to check that hook shaft oil wick ① has entered up to the end of hook shaft oil wick screw ②.

* When re-assembling, check that the hole at the top end of hook shaft oil wick screw ② is not broken.

3) Securely tighten hook shaft oil wick screw ② to the top end of hook shaft ③.

