

ENGLISH

**DDL-8000C Series
INSTRUCTION MANUAL**

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1. Specifications

1-1. Head

DDL-8000CS-△

S :	Light- to medium-weight materials
C :	Heavy-weight materials (Middle-weight-material gauge)
H :	Heavy-weight materials

	DDL-8000CSM	DDL-8000CSC	DDL-8000CSH
Application	Light- to medium-weight materials	Heavy-weight materials (Middle-weight-material gauge)	Heavy-weight materials
Max. sewing speed	5,000sti/min	4,000sti/min	4,000sti/min
Factory-set sewing speed at the time of shipment	4,000sti/min	4,000sti/min	4,000sti/min
Stitch length	5mm (*)	5mm (*)	5mm (*)
Needle bar stroke	30.7±0.5mm	36.0±0.5mm	36.0±0.5mm
Thread take-up lever stroke	Link thread take-up lever 106 to 112mm	Link thread take-up lever 110 to 120mm	Link thread take-up lever 110 to 120mm
Needle *1	DB×1(#14) #11 to 18 134(Nm75) Nm75 to Nm110	DB×5(#16) #11 to 18 134(Nm100) Nm75 to Nm110	DP×5(#21) #16 to 21 134(Nm130) Nm100 to Nm130
Corresponding thread count	#60 ~ #8 (200 ~ 600dtex)	#60 ~ #8 (200 ~ 600dtex)	#30 ~ #8 (600 ~ 1200dtex)
Amount of lift of the presser foot	Manual: 6 mm, By knee-lifter: 13 mm	Manual: 6 mm, By knee-lifter: 13 mm	Manual: 6 mm, By knee-lifter: 13 mm
Lubricating oil	JUKI MACHINE Oil(40263283)		
Noise	Equivalent continuous emission sound pressure level (L _{pA}) at the workstation: A-weighted value of 81.0 dBA ; (Includes K _{pA} = 2.5 dBA) ; according to ISO 10821- C.6.2 -ISO 11204 GR2 at 4,000 sti/min.	Equivalent continuous emission sound pressure level (L _{pA}) at the workstation: A-weighted value of 83.0 dBA ; (Includes K _{pA} = 2.5 dBA) ; according to ISO 10821- C.6.2 -ISO 11204 GR2 at 4,000 sti/min.	Equivalent continuous emission sound pressure level (L _{pA}) at the workstation: A-weighted value of 83.0 dBA ; (Includes K _{pA} = 2.5 dBA) ; according to ISO 10821- C.6.2 -ISO 11204 GR2 at 4,000 sti/min.

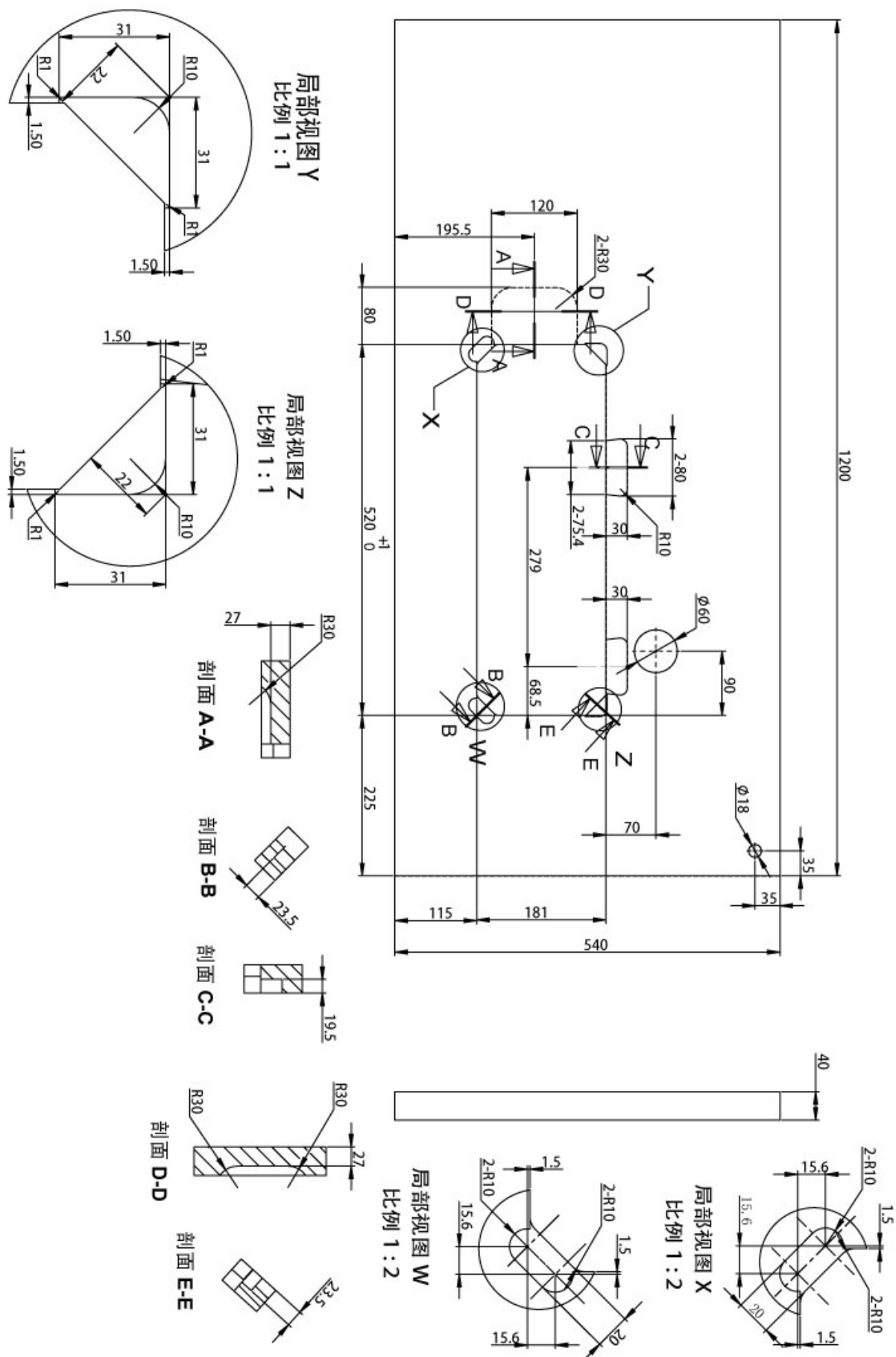
(Caution) Sewing speed differs according to the sewing conditions.

* If the optional long-pitch kit is set, the maximum stitch length will be 7 mm at the maximum.

1-2. Control box

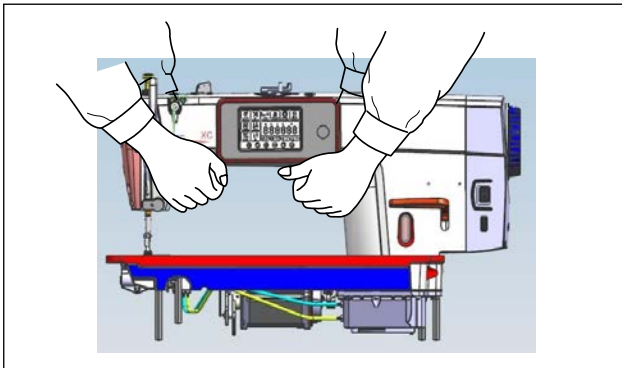
Supply voltage	Single phase 220V to 240V	Single phase 220V to 240V CE	3-phase 200V to 240V Single phase 100V to 120V
Frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
Operating environment	Temperature: 5°C to 35°C, Humidity: 35 to 85%	Temperature: 5°C to 35°C, Humidity: 35 to 85%	Temperature: 5°C to 35°C, Humidity: 35 to 85%
Input	450VA	450VA	450VA
Motor in use	Ac servomotor 550 W	Ac servomotor 550 W	Ac servomotor 550 W

1-3. Drawing of table

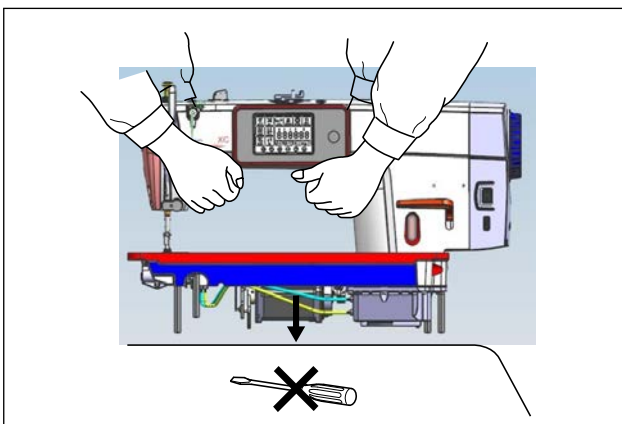


2. Set-up

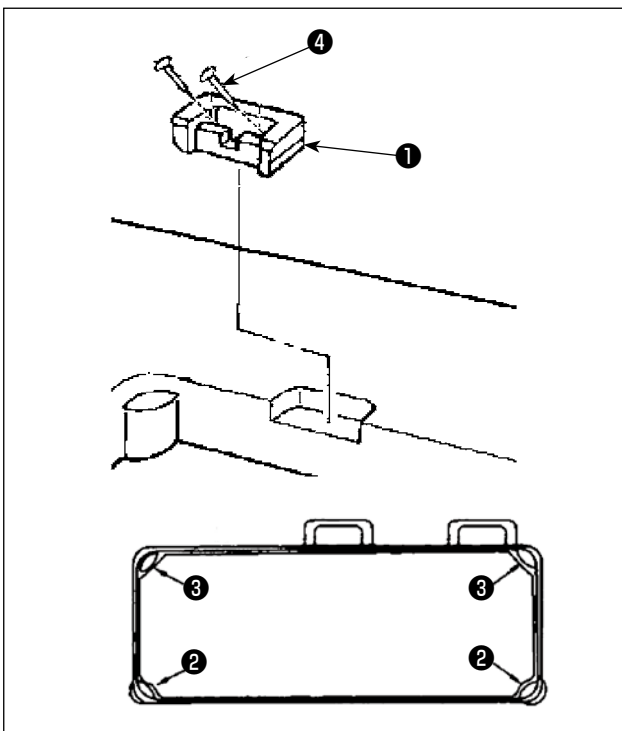
2-1. Installation of the sewing machine



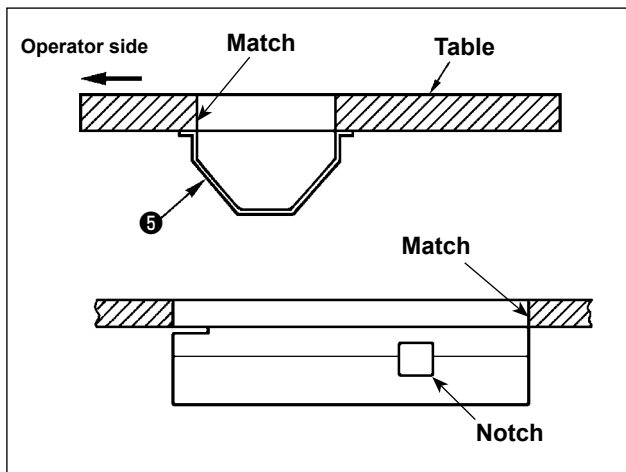
- 1) To prevent possible accidents caused by the full of the sewing machine, perform the work by two persons or more when the machine is moved.



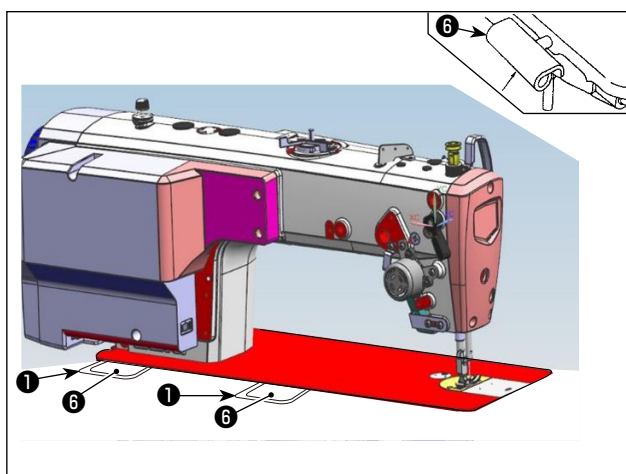
- 2) Place the sewing machine on a horizontal and plane place when placing it and do not place any protruding thing such as a screwdriver or the like.



- 3) Place rubber cushions ② and ③ at four corners of the table groove. Secure each of them with nail ④ (one piece).
(Two types of rubber cushions are provided)
- 4) Secure rubber hinge ① to the table with nails ④ (two pieces) as shown in the figure.

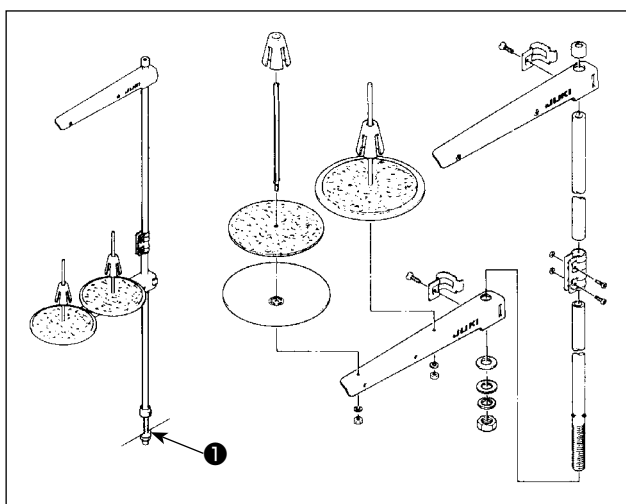


- 5) Attach supplied under-cover **5** to the underside of the table with six wood screws.
(The notch should face the worker.)



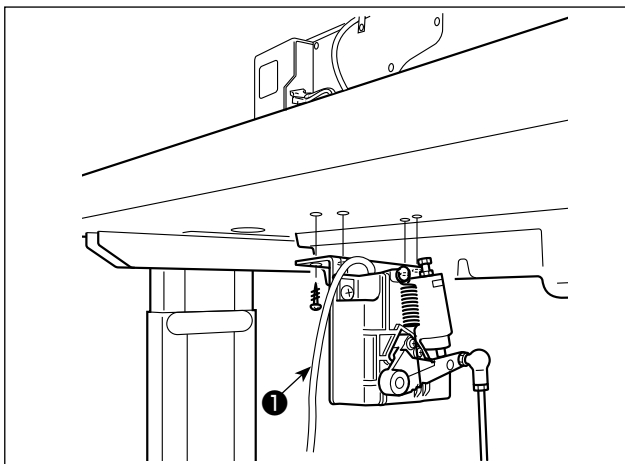
- 6) Put hinge **6** into the hole in the bed and engage it with rubber hinge **1** of the table. Then, place the machine head on rubber cushions **2** and **3** at four corners of the table.

2-2. Installing the thread stand



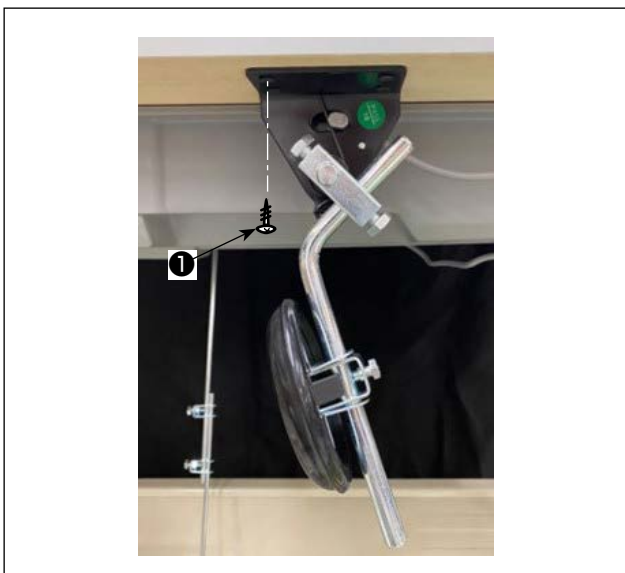
- 1) Assemble the thread stand unit, and insert it in the hole in the machine table.
- 2) Tighten nut **1**.

2-3. Installing the pedal sensor



- 1) Install the pedal sensor on the underside of the table with four supplied mounting screws ❶. It is necessary to install the pedal sensor at such a position that the connecting rod is perpendicular to the table.
- 2) After the completion of installation of the pedal sensor on the table, place the sewing machine head on the table.

2-4. Installing the knee-lifter



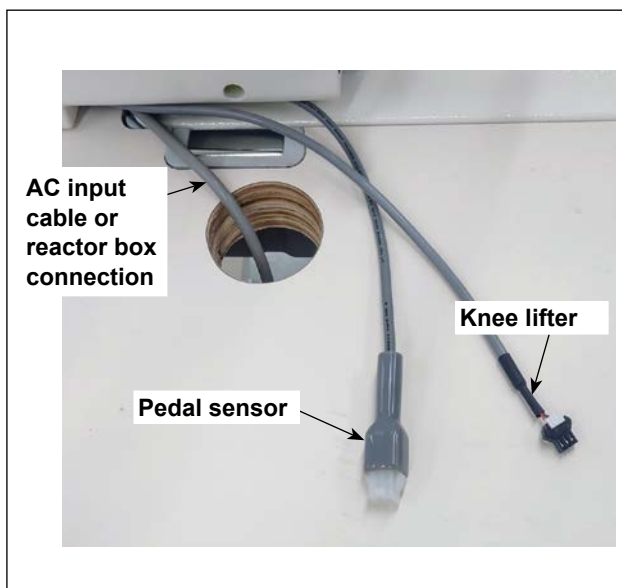
- 1) Install the knee lifter (asm.) on the underside of the table near the notch on the under-cover with four supplied mounting screws ❶.

2-5. Connecting the connector

WARNING :



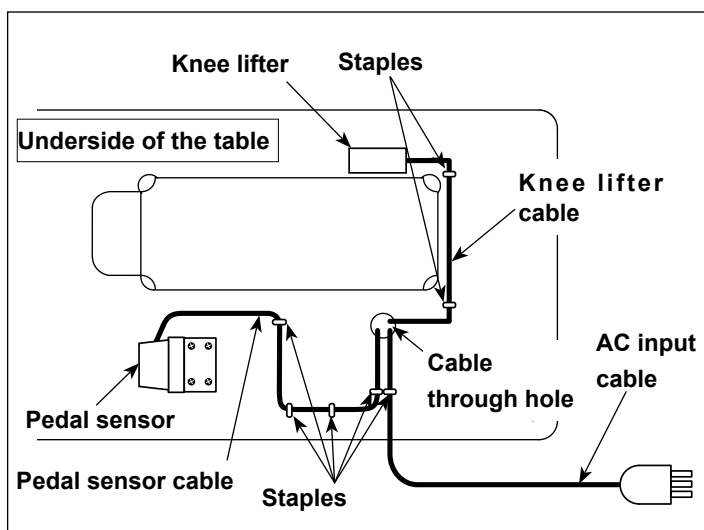
- To protect against personal injury resulting from abrupt start of the sewing machine, be sure to turn the power OFF, unplug the machine and wait for five minutes or more before installing the pedal sensor.
- To prevent damage of device caused by maloperation and wrong specifications, be sure to connect all the corresponding connectors to the specified places. (If any of the connectors is inserted into a wrong connector, not only the device corresponding to the connector can break but also it can start abruptly, inviting the risk of personal injury.)
- To prevent personal injury caused by maloperation, be sure to lock the connector with lock.
- Do not connect the power plug until the connection of cords is completed.
- Fix the cords while taking care not to forcibly bend them or excessively clamp them with staples.
- As for the details of handling respective devices, read carefully the Instruction Manuals supplied with the devices before handling the devices.



Caution Do not insert the power plug into the wall outlet.
Check to be sure that the power switch is turned OFF.

- 1) Connect three cables after passing them through the hole in the table.

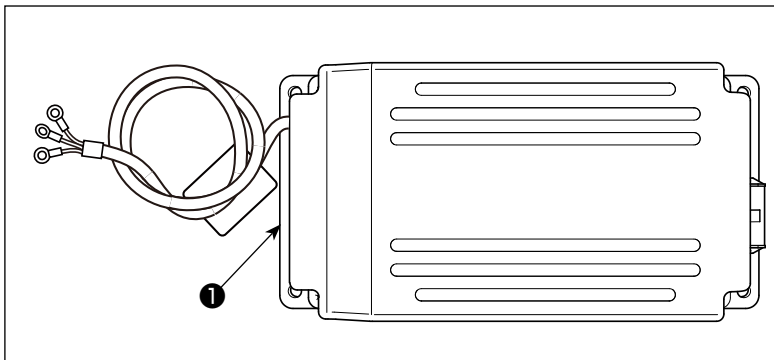
Caution Be sure to fully insert the connectors into the corresponding ports until they are locked.



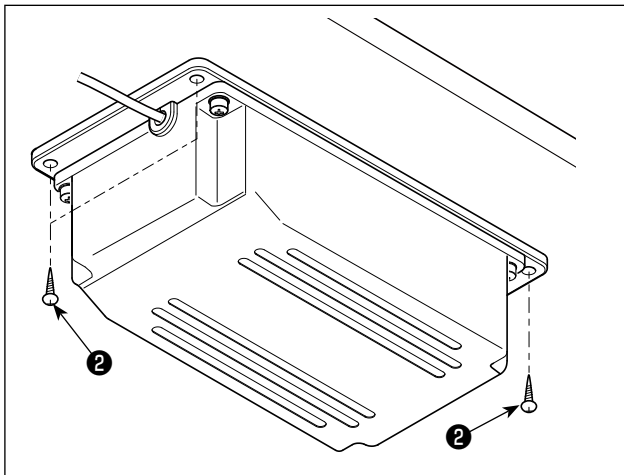
- 2) Secure the pedal cable, AC input cable and knee lifter cable with staples.

2-6. Installing the reactor box [Only for the EU type models]

* For the EU-type models, install the reactor box that is supplied with the sewing machine.

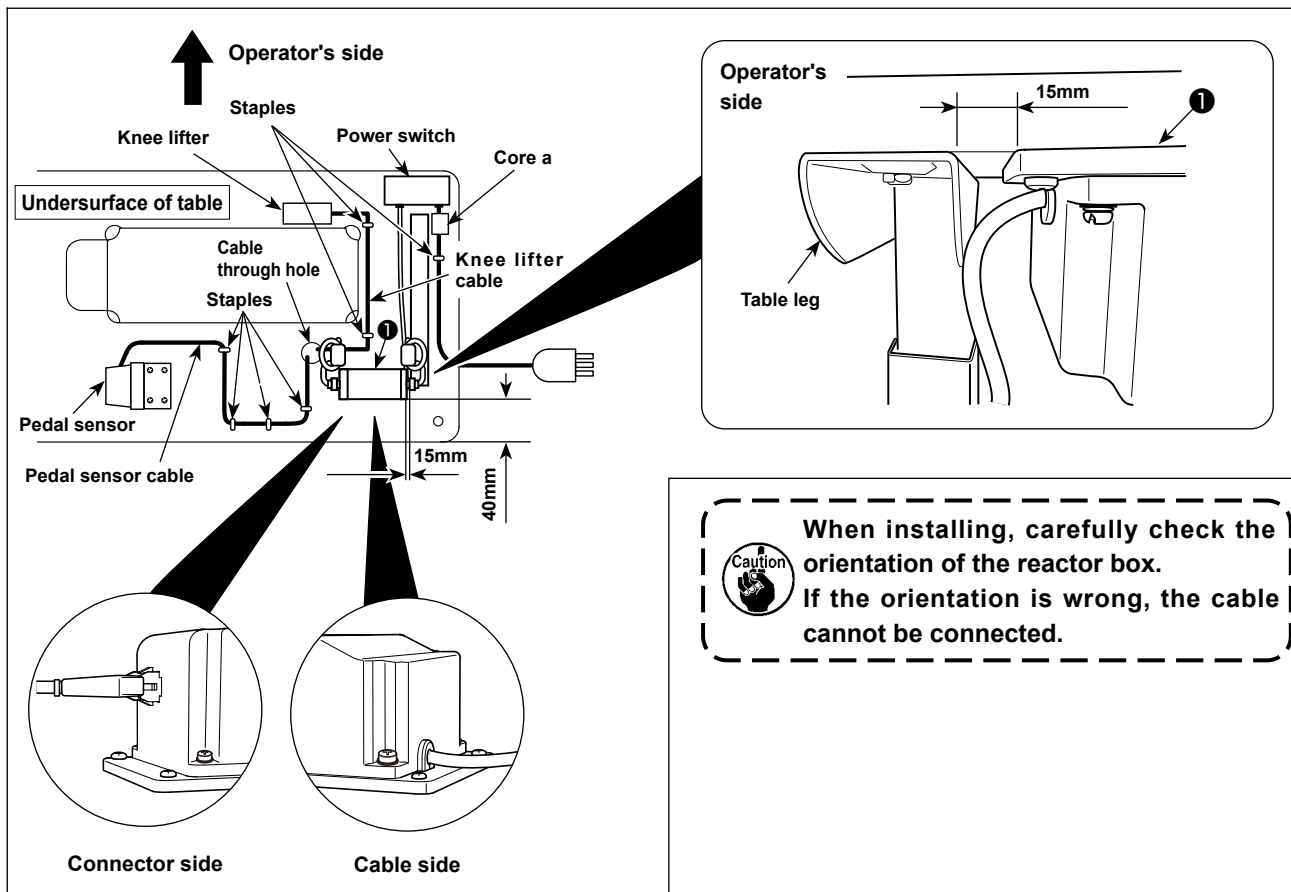


- 1) Remove the reactor box ❶ from the accessory box.



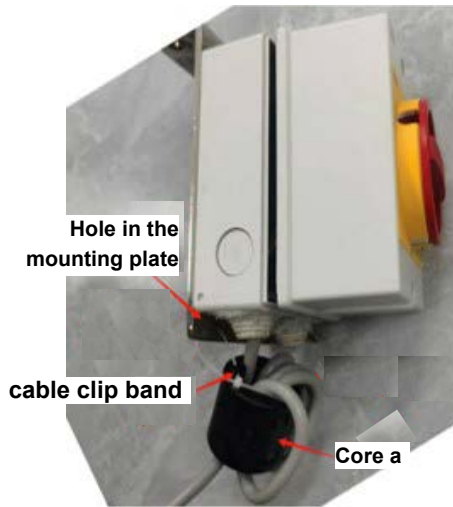
- 2) Remove the wood screws ❷ from the accessory bag and install the reactor box under the table. (4 screw tightening locations)

- 3) Refer to the figure to install the reactor box ❶.

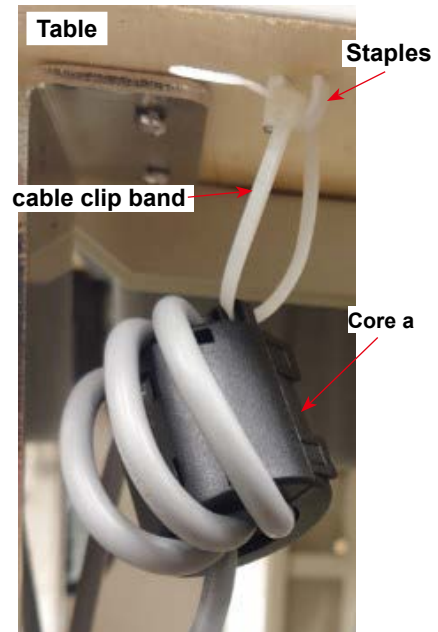


Secure the core a to the mounting plate of the power switch or the table, etc. with the supplied cable clip band or staple.

Example showing the core a secured to the power switch



Example showing the core a secured to the table



2-7. Installing the power switch

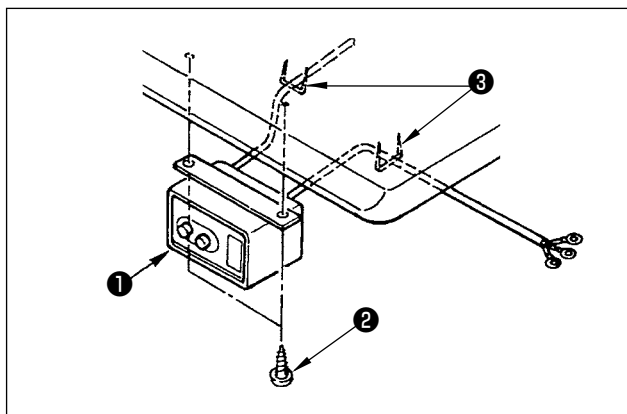


WARNING :

1. Be sure to attach the ground wire (green/yellow) to the specified location (on the ground side).
2. Take care not to allow terminals to come in contact with each other.
3. When closing the power switch cover, take care not to allow the cord to be caught under it.

2-7-1. 3-phase 200 to 240V, Single phase 100 to 120V

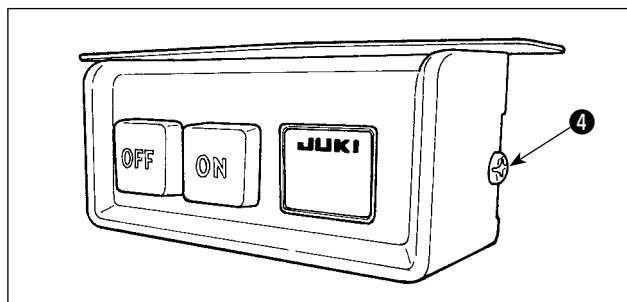
Voltage specifications at the time of delivery from the factory are indicated on the voltage indication seal. Connect the cord in accordance with the specifications.



1) Installing the power switch

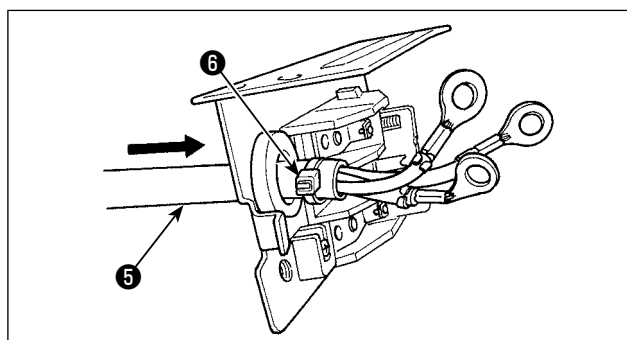
Fix power switch ① under the machine table with wood screws ② .

Fix the cable with staples ③ supplied with the machine as accessories in accordance with the forms of use.



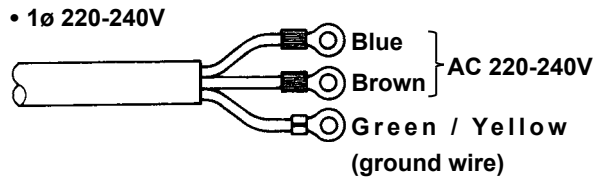
Caution Do not insert the power plug into the plug receptacle.

2) Remove screw ④ on the side face of the power switch cover to open the power switch cover.



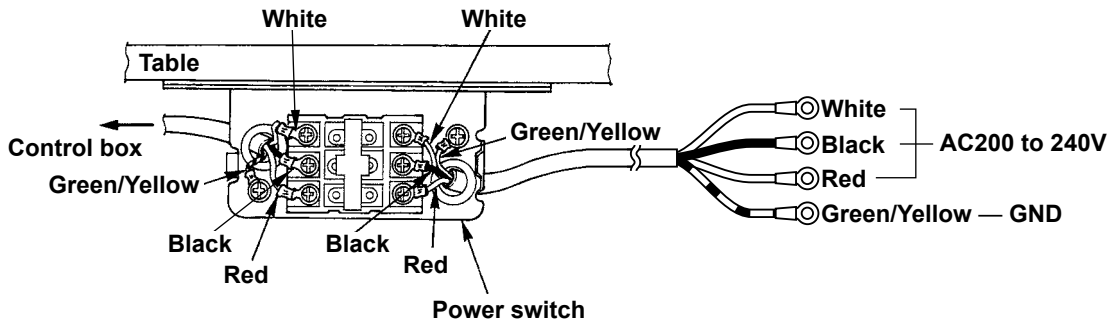
3) Pass AC input cord ⑤ ,through the rear face of the power switch. Bundle the cord with cable clip band ⑥ to secure it.

4) Tighten the screws at the specified positions to firmly secure the AC input cables to the power plug.

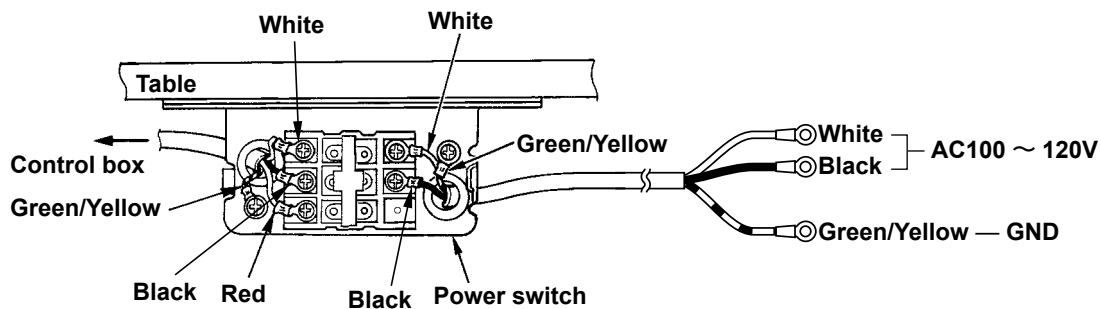


1. Be sure to prepare the power plug which conforms to the safety standard.
2. Be sure to connect the ground lead (green/yellow) to the grounding side.

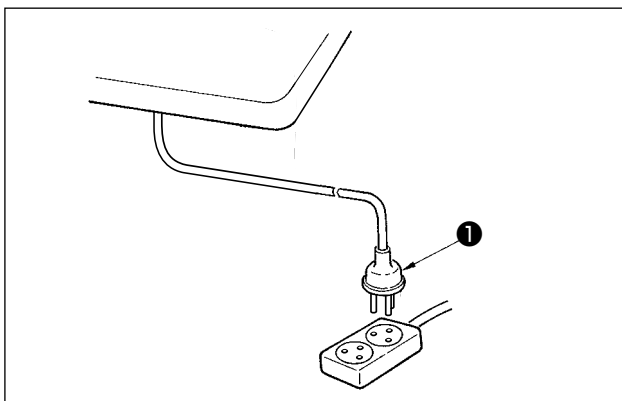
• Connecting 3-phase 200 to 240V



• Connecting single phase 100 to 120V



5) Close the power switch cover. Tighten screw ④ on the side face of the power switch cover.



6) Check that the power switch is in the OFF state. Then, insert the power plug ① coming from the power switch into the plug receptacle.



In prior to the connection of the power plug ①, re-check the supply voltage specification indicated on the control box.

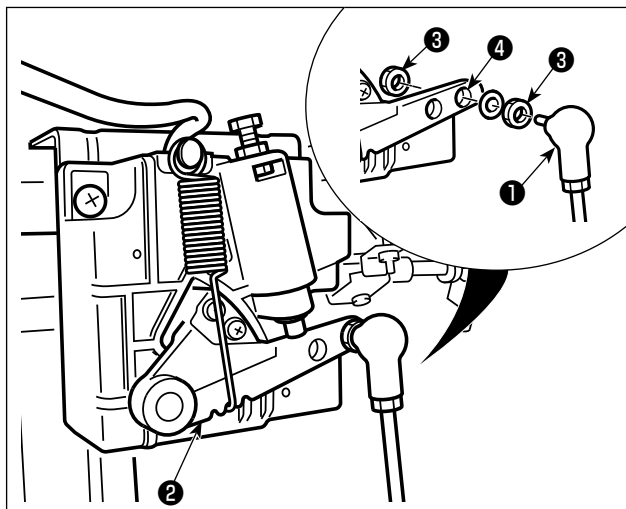
* The power plug ① is different in shape according to the destination of the sewing machine.

2-8. Attaching the connecting rod



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 a lapse of 5 minutes or more.



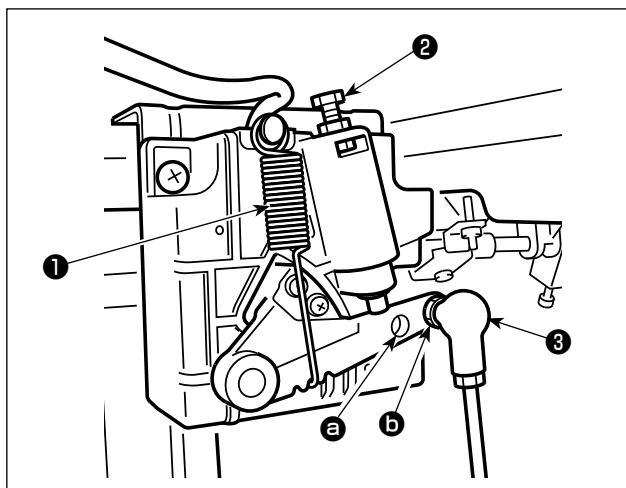
Fix connecting rod ① to installing hole ④ of pedal lever ② with nut ③ .

2-9. Pedal pressure and pedal stroke



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



(1) Adjusting the pressure required to depress the front part of the pedal

- 1) This pressure can be changed by changing the mounting position of pedaling pressure adjust spring ① .
- 2) The pressure decreases when you hook the spring on the left side.
- 3) The pressure increases when you hook the spring on the right side.

(2) Adjusting the pressure required to depress the back part of the pedal

- 1) This pressure can be adjusted using regulator screw ② .
- 2) The pressure increases as you turn the regulator screw in.
- 3) The pressure decreases as you turn the screw out.

(3) Adjusting the pedal stroke

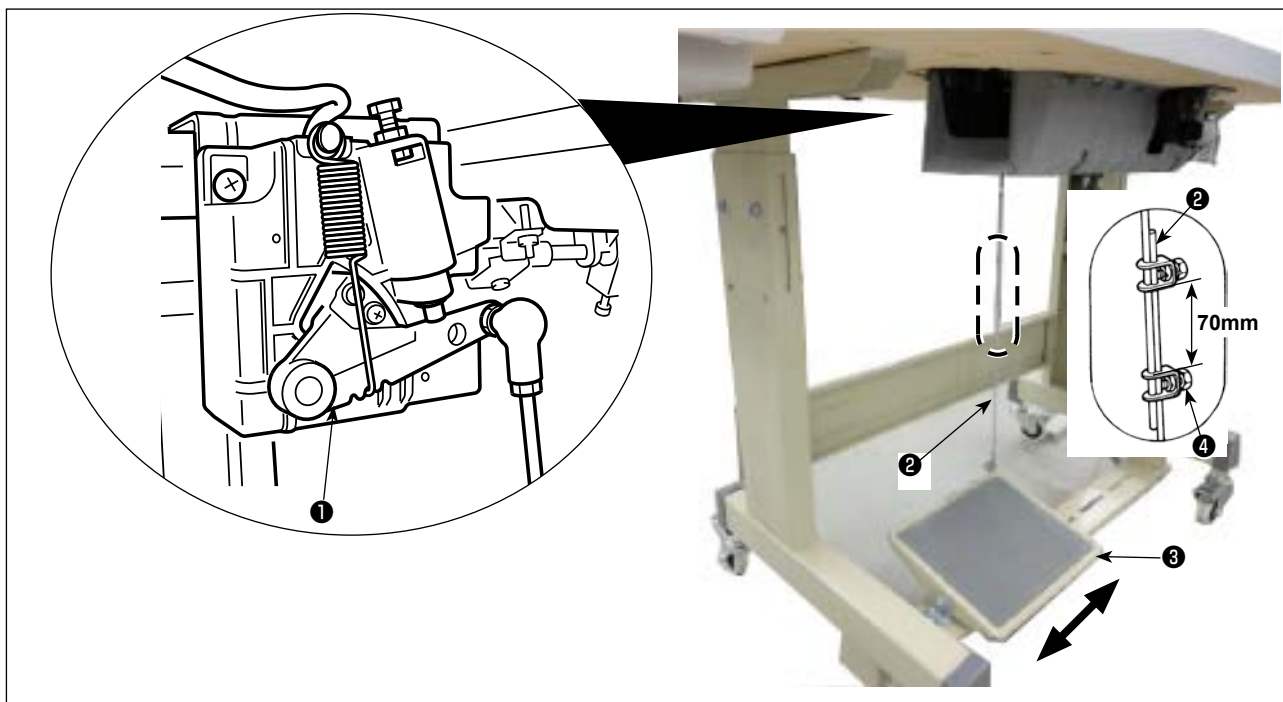
- 1) If you replace connecting rod ③ with ③a, the stroke will become smaller.

2-10. Adjustment of the pedal



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



(1) 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.

(2) Adjusting the pedal angle

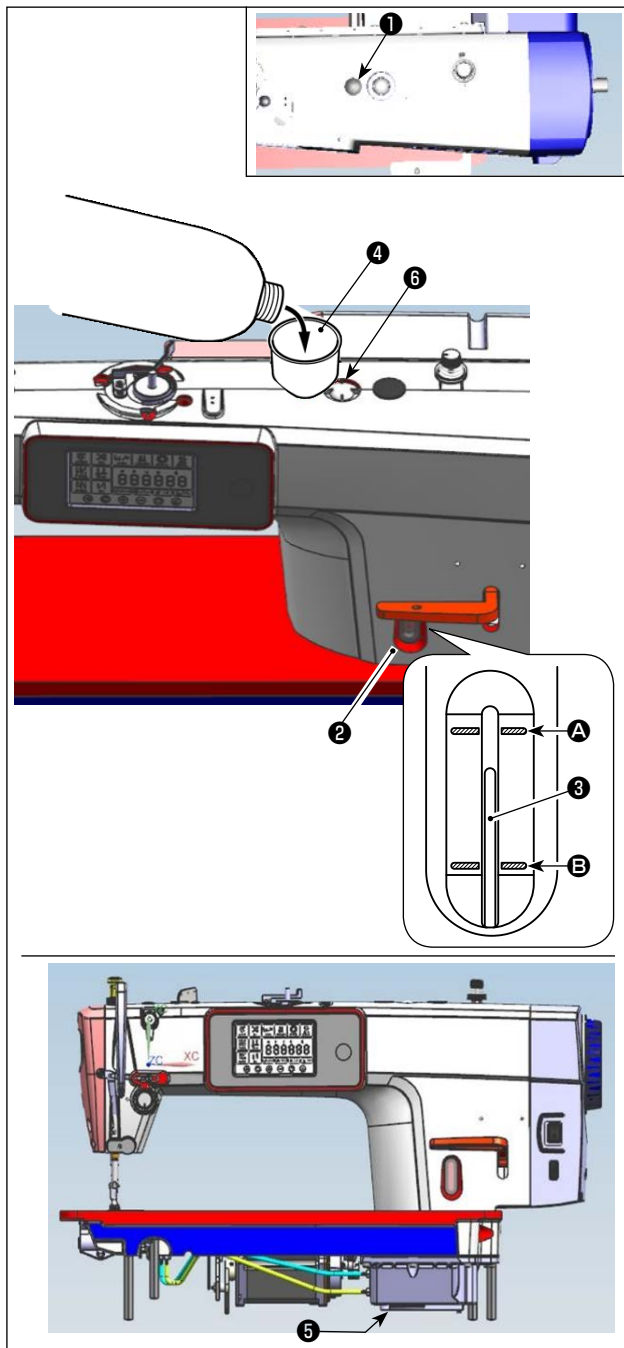
- 1) The pedal tilt can be freely adjusted by changing the length of the connecting rod ② .
- 2) Loosen adjust screw ④ , and adjust the length of connecting rod ② .

2-11. Lubrication



WARNING :

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



- 1) Before running the sewing machine, remove rubber plug ① from the top of the machine arm, and add oil through the oil inlet using accessory funnel ④ supplied with the sewing machine.
- 2) Fill the oil tank with the oil until the top end of oil amount indicating rod ③ comes between the upper engraved marker line A and the lower engraved marker line B of oil amount indicating window ②.

If the oil is filled excessively, it will lead from the junction between the oil shield and bed, or from the junction between the rubber plug and bed, or proper lubrication will not be performed. So, be careful. In addition, when the oil is vigorously filled, it may overflow from the oil hole. So, be careful.

- * When oil is added until MAX. line A is reached, the oil quantity becomes 500 cc.
 - * Check the oil quantity while the sewing machine is at rest.
 - * Check the quantity of oil in the oil tank by viewing the oil surface from the side of oil amount indicating window ②.
- 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 B of oil amount indicating window ②.
 - 4) When you operate the machine after lubrication, you will see splashing oil through oil sight window ⑥ if the lubrication is adequate.
- * Note that the amount of the splashing oil is unrelated to the amount of the lubricating oil.



1. When you use a new sewing machine or a sewing machine after an extended period of disuse, use the sewing machine after performing break-in at 2,000 sti/min or less.
2. Purchase JUKI MACHINE Oil (part number: 40263283) as the oil for the sewing machine.
3. Be sure to lubricate clean oil.
4. Be aware that if you add oil to such an extent as to exceed MAX line A, oil may leak from the oil shield mounting plane, bearing, etc., and the frame circulation mechanism may fail to function to cause reverse oil flow, which causes oil leakage from the frame.
5. Transporting the sewing machine with the sewing machine filled with oil can give rise to the risk of oil leakage. Be sure to discharge oil from the sewing machine through drain cock ⑤.

2-12. Connecting the power plug



WARNING :

Be sure to connect the ground wire in order to prevent accidents due to electrical leakage.

- 1) Attach the power plug to the cord. Connect the power plug to the power outlet. Turn OFF the power switch and disconnect the power plug from the power outlet when the sewing machine is not used or when lightening occurs.
- 2) The power plug differs in shape depending on the region and country. When you use this sewing machine in Europe, use the plug that conforms with the relevant applicable standards and regulations in Europe. An expert with electrical knowledge should attach the power plug following the instructions given in the instruction manual for the power plug to be used.
- 3) The picture below shows an example of wiring in the power plug used in Europe and other parts of worlds.

Route the power wires (blue wire) (brown wire) and ground wire (yellow-green wire) in the power plug following the instructions given in the instruction manual for the power plug.



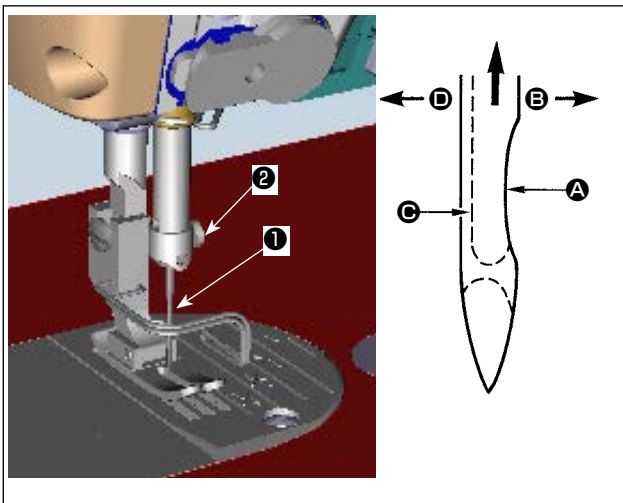
3. Preparation before sewing

3-1. Attaching the needle



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



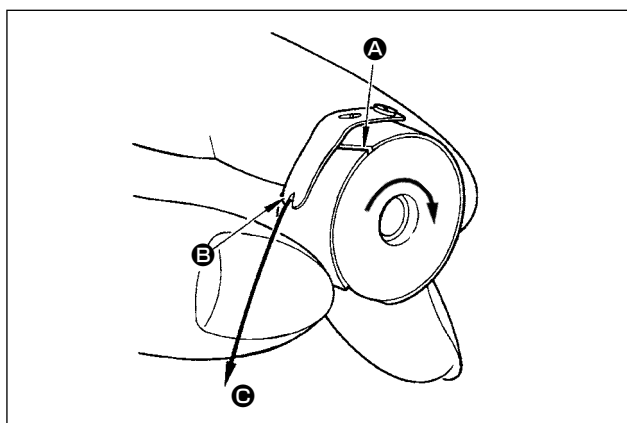
Use the specified needle for the machine. Use the proper needle in accordance with the thickness of thread used and the kinds of the materials.

- 1) Turn the handwheel until the needle bar reaches the highest point of its stroke.
- 2) Loosen screw ②, and hold needle ① with its indented part ① facing exactly to the right in direction ②.
- 3) Insert the needle fully into the hole in the needle bar in the direction of the arrow until the end of hole is reached.
- 4) Securely tighten screw ②.
- 5) Check that long groove ③ of the needle is facing exactly to the left in direction ④.

When polyester filament thread is used, if the indented part of the needle is tilted toward operator's side, the loop of thread becomes unstable. As a result, hangnail of thread or thread breakage may occur. For the thread that such phenomenon is likely to occur, it is effective to attach the needle with its indented part slightly slanting on the rear side.

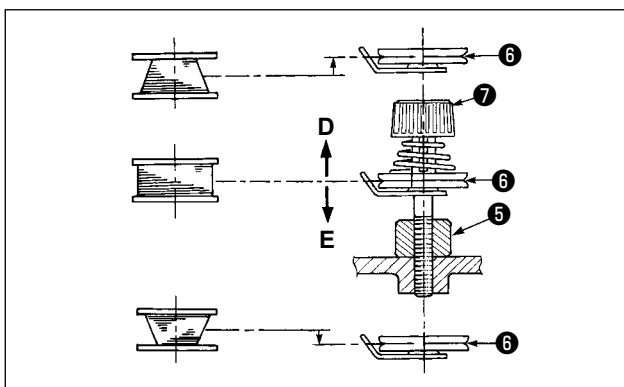
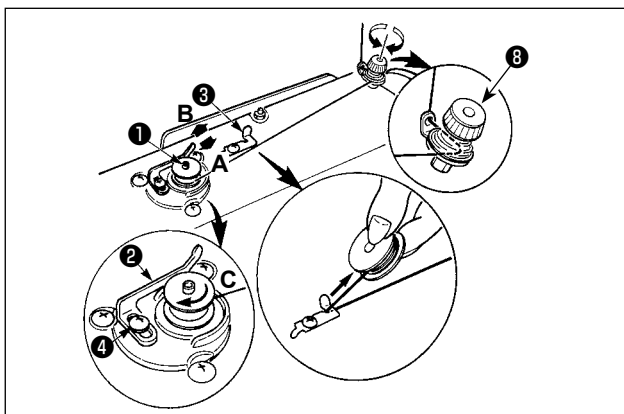


3-2. Setting the bobbin into the bobbin case



- 1) Pass the thread through thread slit ①, and pull the thread in direction ③. By so doing, the thread will pass under the tension spring and come out from notch ②.
- 2) Check that the bobbin rotates in the direction of the arrow when thread is pulled.

3-3. Winding the bobbin thread



- 1) Insert the bobbin deep into the bobbin winder spindle ❶ 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 as shown in the figure on the left. Then, wind clockwise the end of the bobbin thread on the bobbin several times.
(In case of the aluminum bobbin, after winding clockwise the end of the bobbin thread, wind counterclockwise the thread coming from the bobbin thread tension several times to wind the bobbin thread with ease.)
- 3) Press the bobbin winder trip latch ❷ 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 ❶ automatically as soon as the winding is finished.
- 4) Remove the bobbin and cut the bobbin thread with the thread cut retainer ❸ .

- 5) When adjusting the winding amount of the bobbin thread, loosen setscrew ❹ and move bobbin winding lever ❷ to the direction of **A** or **B**. Then tighten setscrew ❹ .
To the direction of **A** : Decrease
To the direction of **B** : Increase
- 6) In case that the bobbin thread is not wound evenly on the bobbin, loosen screw ❺ and adjust the height of bobbin thread tension ❽ .
• It is the standard that the center of the bobbin is as high as the center of thread tension disk ❻ .
• Adjust the position of thread tension disk ❻ to the direction of **D** when the winding amount of the bobbin thread on the lower part of the bobbin is excessive and to the direction **E** when the winding amount of the bobbin thread on the upper part of the bobbin is excessive.
After the adjustment, tighten screw ❺ .
- 7) To adjust the tension of the bobbin winder, turn the thread tension nut ❿ .



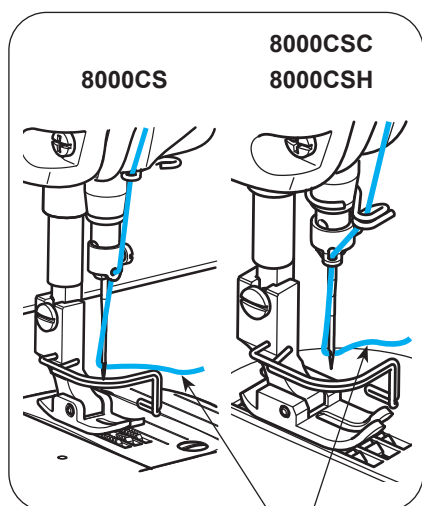
1. When winding the bobbin thread, start the winding in the state that the thread between the bobbin and thread tension disk ❻ is tense.
2. When winding the bobbin thread in the state that sewing is not performed, remove the needle thread from the thread path of thread take-up and remove the bobbin from the hook.
3. There is the possibility that the thread pulled out from the thread stand is loosened due to the influence (direction) of the wind and may be entangled in the handwheel. Be careful of the direction of the wind.

3-4. Threading the machine head

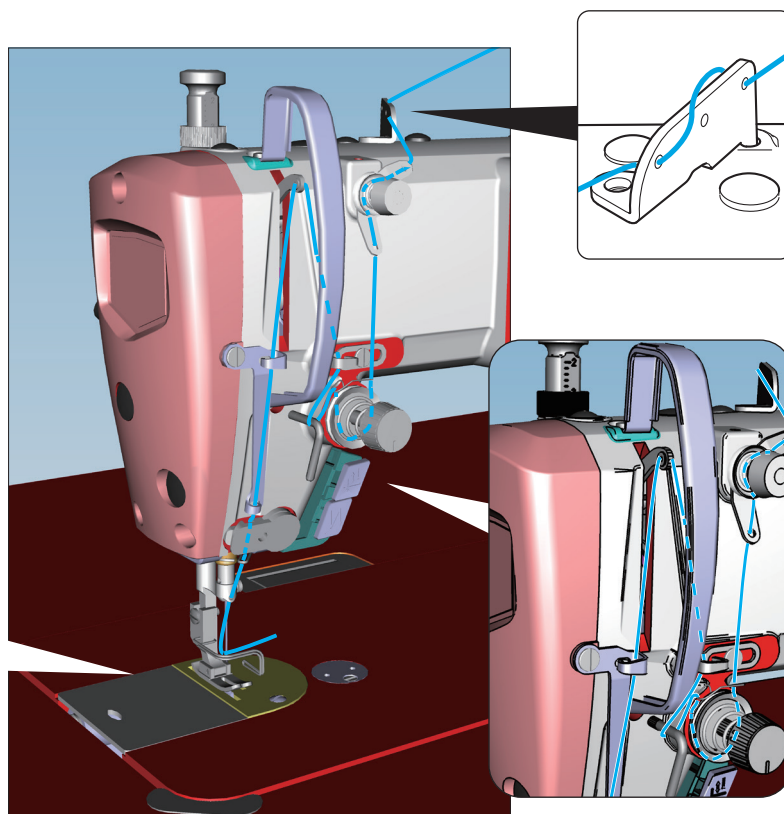


WARNING :

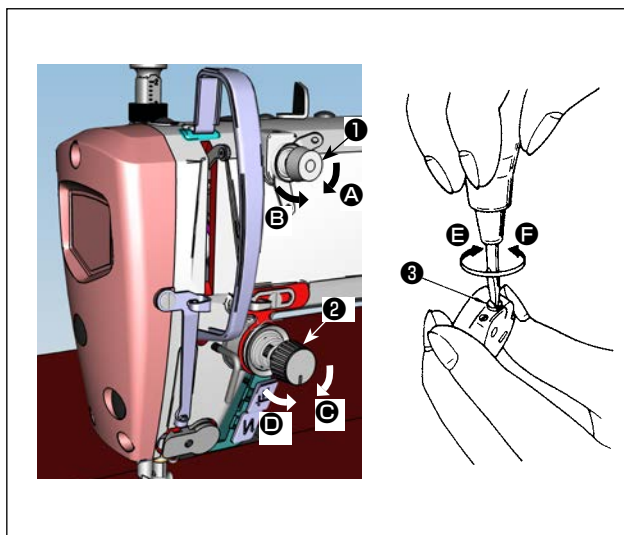
Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



30 to 50mm



3-5. Thread tension



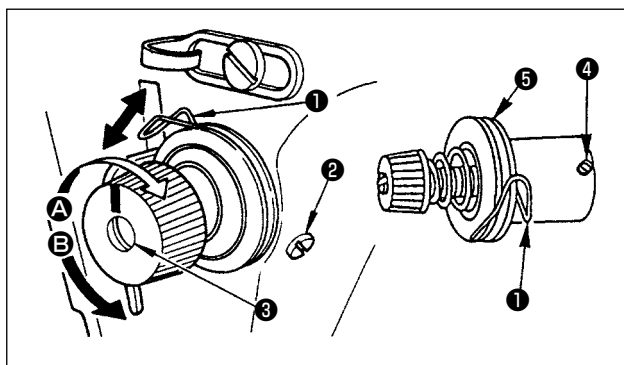
(1) Adjusting the needle thread tension

- 1) The length of thread remaining at the needle tip after thread trimming is shortened by turning tension regulating nut No. 1 **1** clockwise in direction **A**.
- 2) It is lengthened by turning the nut counterclockwise in direction **B**.
- 3) The needle thread tension is increased by turning tension regulating nut No. 2 **2** clockwise in direction **C**.
- 4) It is decreased by turning the nut counterclockwise in direction **D**.

(2) Adjusting the bobbin thread tension

- 1) The bobbin thread tension is increased by turning tension regulating screw **3** clockwise in direction **E**.
- 2) It is decreased by turning the screw counterclockwise in direction **F**.

3-6. Thread take-up spring



(1) Changing the stroke of thread take-up spring

- 1) Loosen setscrew **2**.
- 2) As you turn tension post **3** clockwise (in direction **A**), the stroke of the thread take-up spring will be increased.
- 3) As you turn tension post **3** counterclockwise (in direction **B**), the stroke will be decreased.

(2) Changing the pressure of thread take-up spring

- 1) Loosen setscrew **2**, and remove thread tension asm. **5**.
- 2) Loosen setscrew **4**.
- 3) As you turn tension post **3** clockwise (in direction **A**), the pressure will be increased.
- 4) As you turn the tension post **3** counterclockwise (in direction **B**), the pressure will be decreased.



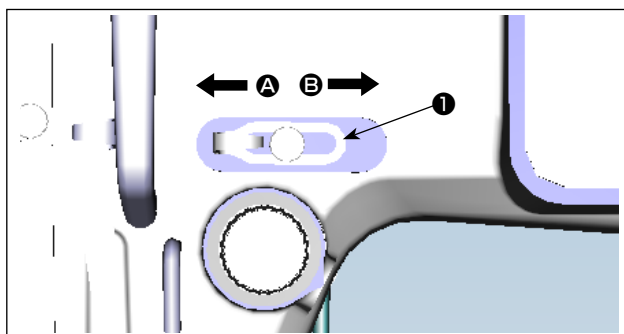
When you have removed thread tension controller (asm.) **5 to change the pressure, re-install it to such a position that the tension disk does not float.**

3-7. Adjusting the thread take-up stroke



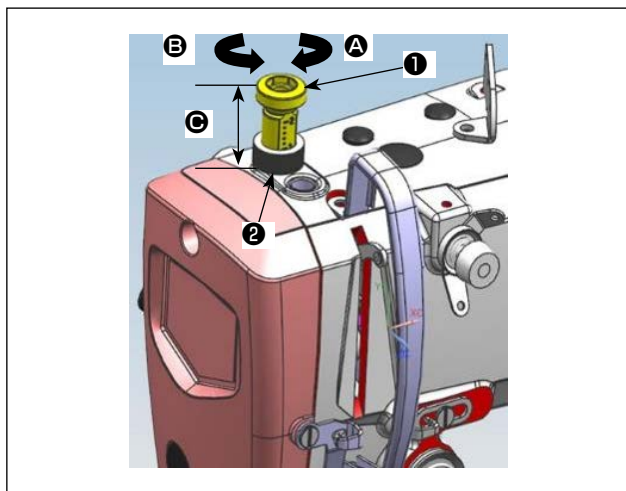
WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



- 1) When sewing heavy-weight materials, move thread guide **1** to the left (in direction **A**) to increase the length of thread pulled out by the thread take-up.
- 2) When sewing light-weight materials, move thread guide **1** to the right (in direction **B**) to decrease the length of thread pulled out by the thread take-up.

3-8. Presser foot pressure

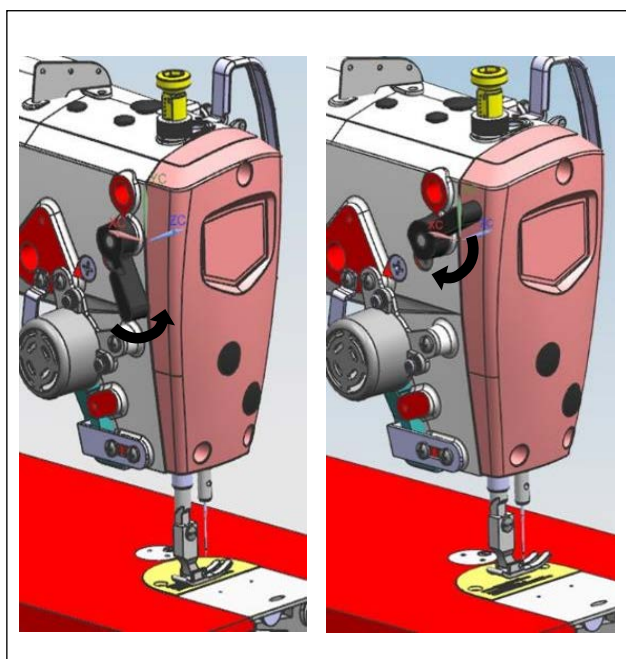


- 1) Loosen nut ②. As you turn presser spring regulator ① clockwise (in direction A), the presser foot pressure will be increased.
- 2) As you turn the presser spring regulator ① counter-clockwise (in direction B), the pressure will be decreased.
- 3) After adjustment, tighten nut ②.

③ dimension (mm) Standard value

8000CSM	32 to 38
8000CSC	
8000CSH	26 to 32

3-9. Hand lifter



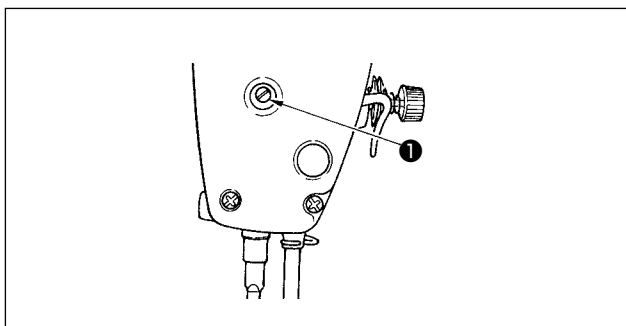
- 1) The presser foot is lifted by moving the lever upward.
- 2) The presser foot is lowered by moving the lever downward.

3-10. Adjusting the height of the presser bar



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



- 1) Loosen setscrew ①, and adjust the presser bar height or the angle of the presser foot.
- 2) After adjustment, securely tighten the setscrew ①.

3-11. Adjusting the amount of oil (oil splashes)

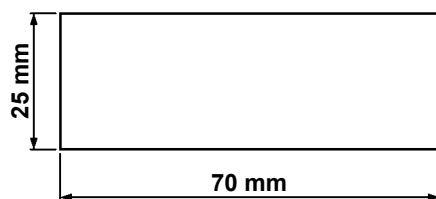


WARNING :

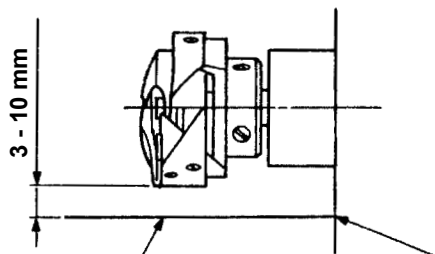
Be extremely careful about the operation of the machine since the amount of oil has to be checked by turning the hook at a high speed.

(1) Confirmation of the amount of oil in the hook

① Amount of oil (oil splashes) confirmation paper



② Position to confirm the amount of oil (oil splashes)



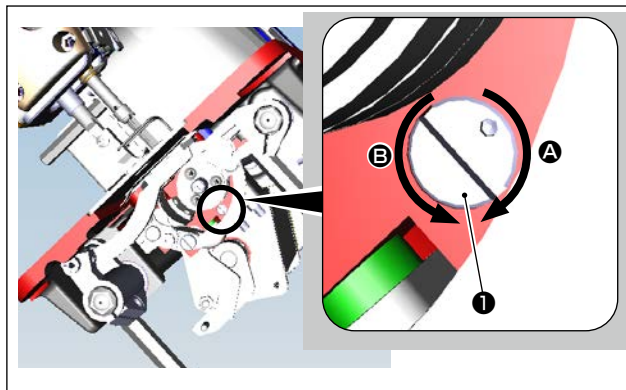
Oil splashes confirmation paper

Closely fit the paper against the wall surface of the bed.

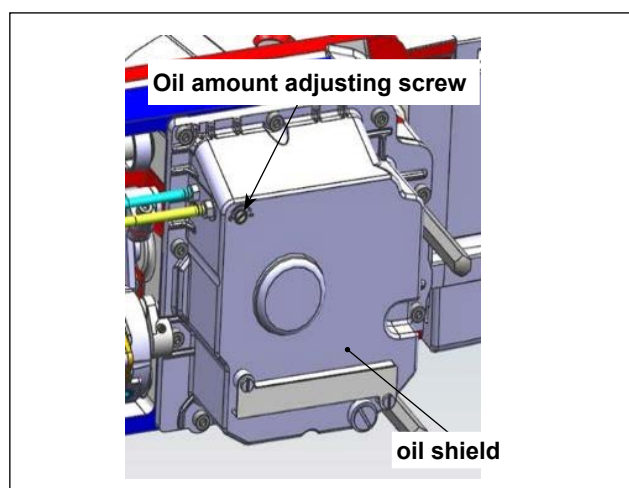
* When carrying out the procedure described below in 2), remove the slide plate and take extreme caution not to allow your fingers to come in contact with the hook.

- 1) If the machine has not been sufficiently warmed up for operation, make the machine run idle for approximately three minutes. (Moderate intermittent operation)
- 2) Place the amount of oil (oil spots) confirmation paper under the hook immediately after the machine stops running.
- 3) Check to be sure that the oil surface in the oil shield rests in the range between the "MAX. line" and the "MIN. line".
- 4) Confirmation of the amount of oil should be completed in five seconds. (Check the period of time with a watch.)

(2) Adjusting the amount of oil (oil spots) in the hook

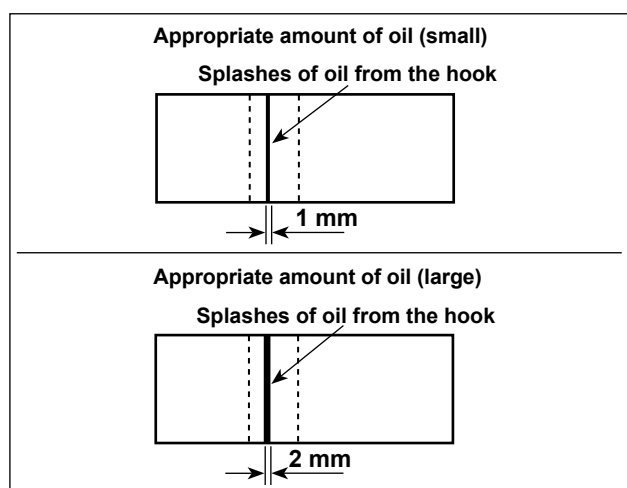


- 1) Tilt the sewing machine head. Turn oil amount adjustment screw ① mounted on hook driving shaft front bushing section in the "+" direction (direction A) to increase the amount of oil (oil splashes) or in the "-" direction (direction B) to decrease it.
- 2) After the amount of oil in the hook has been properly adjusted with the oil amount adjustment screw ①, make the sewing machine run idle for approximately 30 seconds to check the amount of oil in the hook.



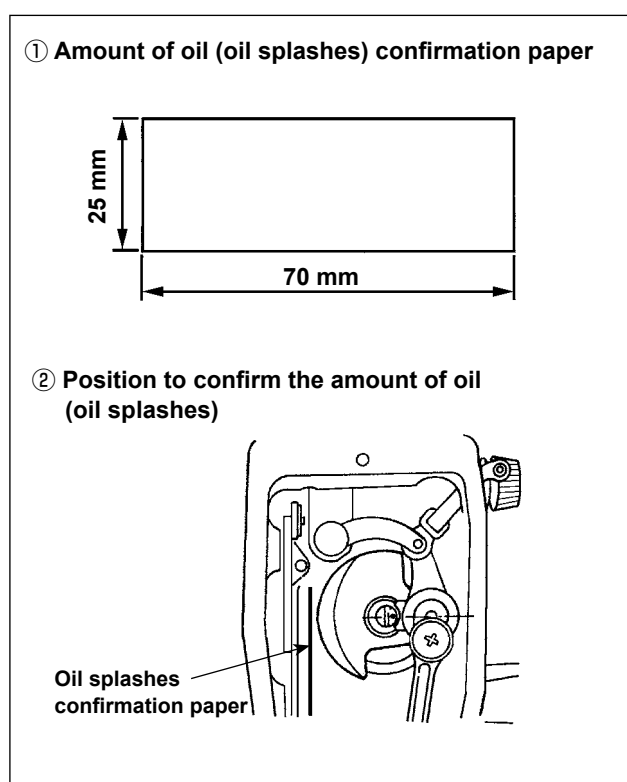
Do not adjust the oil amount adjusting screw (painted with paint marking) of the oil shield. If you adjust it, the oil amount to the lower shaft may change to cause seizure of the lower shaft.

(3) Sample showing the appropriate amount of oil in the hook



- 1) The amount of oil shown in the samples on the left should be finely adjusted in accordance with sewing processes. Be careful not to excessively increase/decrease the amount of oil in the hook. (If the amount of oil is too small, the hook will be seized (the hook will be hot). If the amount of oil is too much, the sewing product may be stained with oil.)
- 2) Check the oil amount (oil splashes) three times (with three sheets of paper).

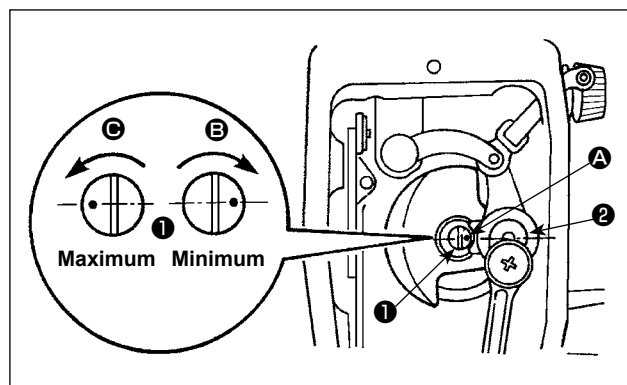
(4) Confirmation of the amount of oil supplied to the face plate parts



* When carrying out the work described below in 2), remove the face plate and take extreme caution not to allow your fingers to come in contact with the thread take-up lever.

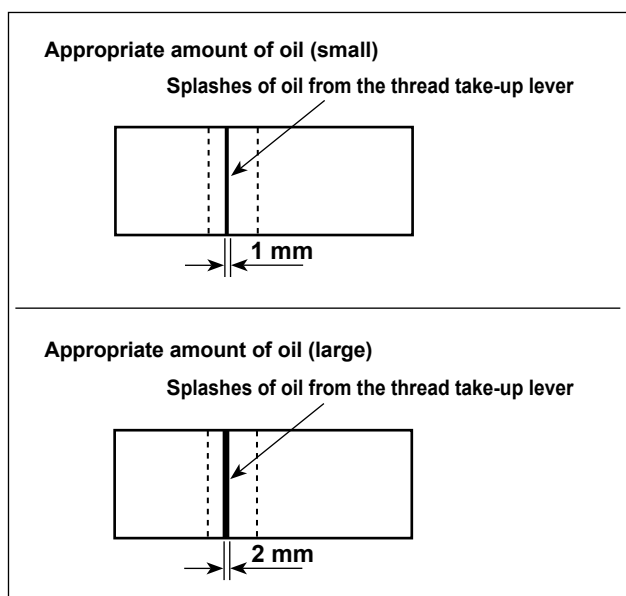
- 1) If the machine has not been sufficiently warmed up for operation, make the machine run idle for approximately three minutes. (Moderate intermittent operation)
- 2) Place the amount of oil (oil spots) confirmation paper under the hook immediately after the machine stops running.
- 3) Check to be sure that the oil surface in the oil shield rests in the range between the "MAX. line" and the "MIN. line".
- 4) The time required for the confirmation of the amount of oil (oil splashes) should be completed in ten seconds. (Measure the period of time with a watch.)

(5) Adjusting the amount of oil supplied to the face plate parts



- 1) Adjust the amount of oil supplied to the thread take-up and needle bar crank ② by turning adjust pin ①.
- 2) The minimum amount of oil is reached when marker dot ① is brought close to needle bar crank ② by turning the adjust pin in direction ③.
- 3) The maximum amount of oil is reached when marker dot ① is brought to the position just opposite from the needle bar crank by turning the adjust pin in direction ④.

(6) Sample showing the appropriate amount of oil supplied to the face plate parts



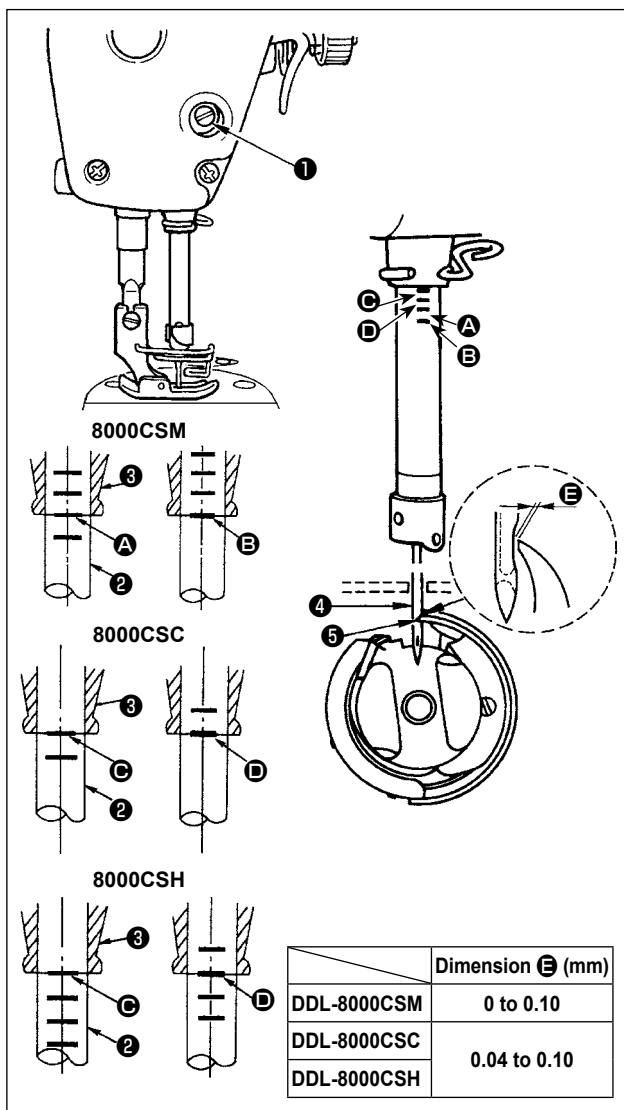
- 1) The state given in the figure shows the appropriate amount of oil (oil splashes). It is necessary to finely adjust the amount of oil in accordance with the sewing processes. However, do not excessively increase/decrease the amount of oil in the hook. (If the amount of oil is too small, the face plate parts will be hot or seize. If the amount of oil is too much, the sewing product may be stained with oil.)
- 2) Check the oil amount (oil splashes) three times (with three sheets of paper).

3-12. Needle-to-hook relationship



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



Adjust the timing between the needle and the hook as follows :

- 1) Turn the handwheel to bring the needle bar down to the lowest point of its stroke, and loosen setscrew ①.

Adjusting the needle bar height.

- 2) [For DDL-8000CSM]
Align marker line A on the needle bar ② with the bottom end of the needle bar lower bushing ③, then tighten clamping screw ① of the needle bar connection.
[For DDL-8000CSC, 8000CSH]
Align marker line C on the needle bar ② with the bottom end of the needle bar lower bushing ③, then tighten clamping screw ① of the needle bar connection.

Adjusting position of the hook ⑤.

- 3) [For DDL-8000CSM]
Loosen the three setscrews of the hook, turn the handwheel so as to raise the needle bar ② and align the marker line B with the lower end of the lower bushing of the needle bar ③.
[For DDL-8000CSC, 8000CSH]
Loosen the three setscrews of the hook, turn the handwheel so as to raise the needle bar ② and align the marker line D with the lower end of the lower bushing of the needle bar ③.
- 4) After making the adjustments mentioned in the above steps, align the blade point ⑤ of hook with the center of needle ④. Provide a clearance of dimension E (reference value) between the needle ④ and the hook ⑤, then securely tighten three setscrews of the hook.



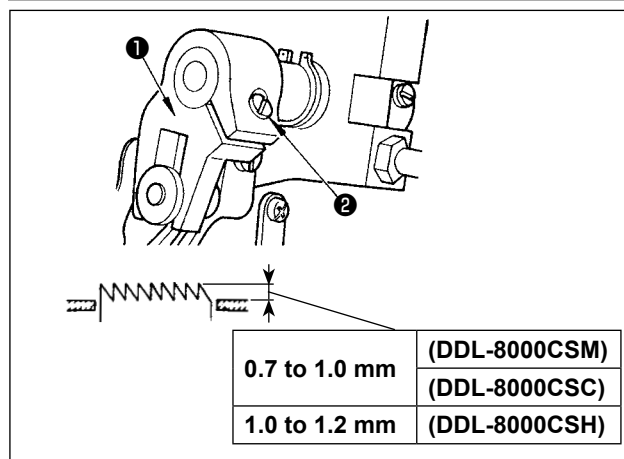
If the clearance between the blade point of hook and the needle is smaller than the specified value, the blade point of hook will be damaged. If the clearance is larger, stitch skipping will result.

3-13. Height of the feed dog



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



To adjust the height of the feed dog :

- 1) Loosen screw ② of crank ①.
- 2) Move the feed bar up or down to make adjustment.
- 3) Securely tighten screw ②.



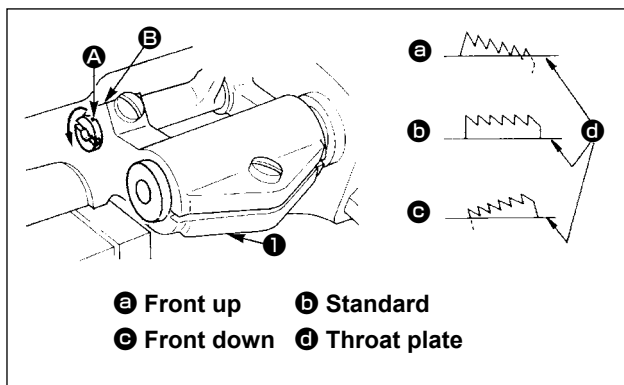
If the clamping pressure is insufficient, the motion of the forked portion becomes heavy.

3-14. Tilt of the feed dog



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.



- 1) The standard tilt (horizontal) of the feed dog is obtained when marker dot **A** on the feed bar shaft is aligned with marker dot **B** on feed rocker **1**.
- 2) To tilt the feed dog with its front up in order to prevent puckering, loosen the setscrew, and turn the feed bar shaft 90° in the direction of the arrow, using a screwdriver.
- 3) To tilt the feed dog with its front down in order to prevent uneven material feed, turn the feed bar shaft 90° in the opposite direction from the arrow.



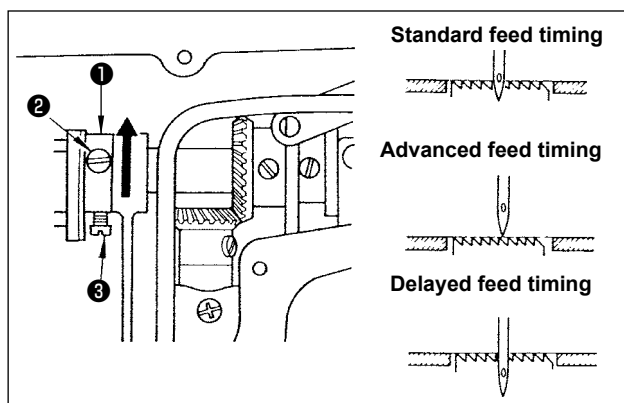
Whenever the feed dog tilt is adjusted, the feed dog height will be changed. So, it is necessary to check the height after tilt adjustment.

3-15. Adjusting the feed timing



WARNING :

Be sure to turn the power OFF before the following work in order to prevent personal injury due to unintentional starting of the sewing machine.

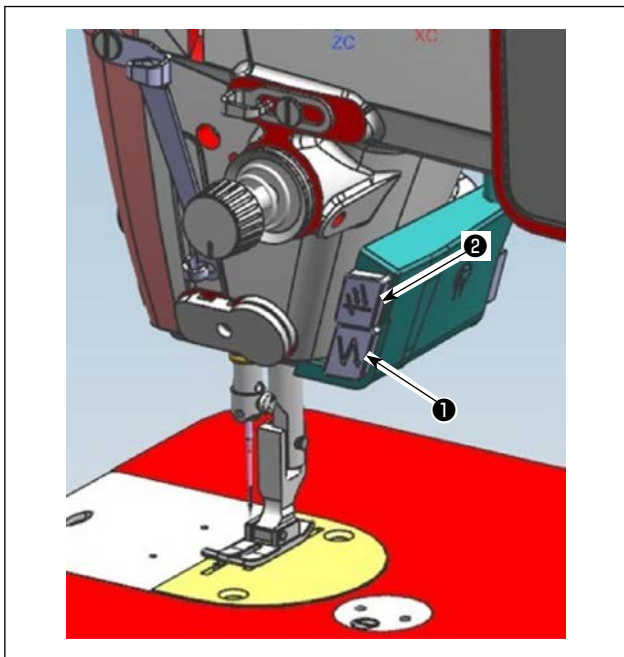


- 1) Loosen screws **2** and **3** in feed eccentric cam **1**, move the feed eccentric cam in the direction of the arrow or opposite direction of the arrow, and firmly tighten the screws.
- 2) If you want to use the standard feed timing, adjust the feed eccentric cam to such a position as to allow the top surface of the feed dog and the lower end of the needle eyelet to align with the top surface of the throat plate when the feed dog comes down below the throat plate.
- 3) To advance the feed timing to prevent uneven material feed (material slippage) and improve efficiency of feed, move the feed eccentric cam in the direction of the arrow.
- 4) To delay the feed timing in order to increase stitch tightness, move the feed eccentric cam in the opposite direction from the arrow.



Be careful not to move the feed eccentric cam too far, or else needle breakage may result.

3-16. Reverse feed stitching

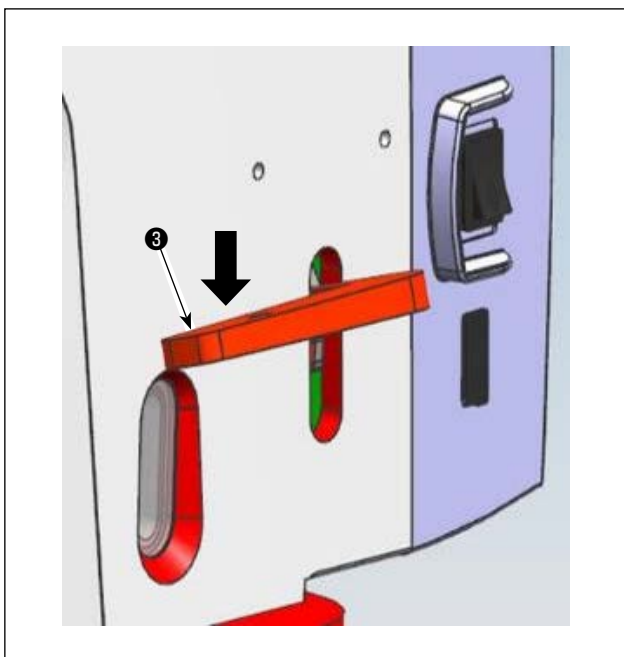


- 1) Press hand switch A ❶ to carry out reverse feed stitching.

Function of the hand switch A can be changed with U015 "Hand switch A function setting" (in the initial state, "back tack operation" is selected).

Press hand switch B ❷ to carry out continuous needle up/down stitching.

Function of hand switch B can be changed with U174 "Hand switch B function setting" (in the initial state, "continuous needle up/down stitching" is selected).



- 2) [Reverse feed stitching by means of the reverse feed lever]

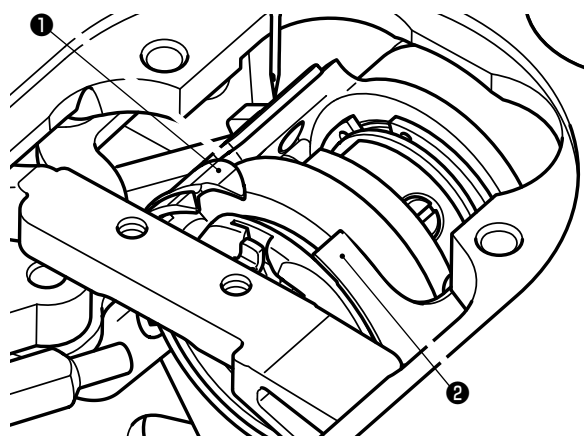
Length of the seam sewn by feeding the material in the normal or reverse direction of feed can be controlled by operating reverse feed lever ❸ .

3-17. Checking the knife unit

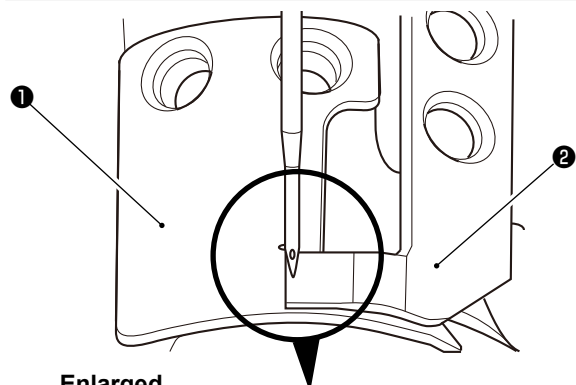
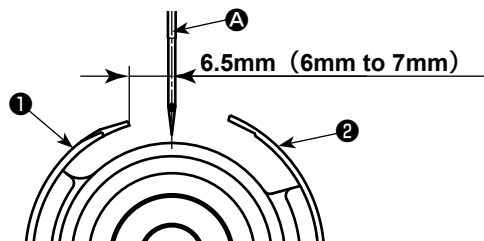


WARNING :

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



Standby state of the knife



Enlarged detailed view

Marker dot

1

-0.15 to 0.15mm

2

1

1 to 2mm

- 1) Check to make sure that the power switch is in the OFF state. Remove the gauge (presser foot, throat plate and feed dog) from around the needle.
- 2) In the standby state of loop spreading knife ①, the distance from the center of needle A to the tip of loop spreading knife ① is 6.5 mm (6 mm to 7 mm).



Be aware that, if the distance between loop spreading knife ① and center of needle A is reduced, thread loop is likely to interfere with loop spreading knife ①.

- 3) With respect to the alignment position of loop spreading knife ① and thread trimming knife ②, the distance from the needle and the tip of thread trimming knife ② is -0.15 to 0.15mm when the marker dot on loop spreading knife is aligned with the tip of thread trimming knife ②.



Be aware that, if the aligning position of the loop spreading knife and the thread trimming knife does not align with center of needle A, the length of thread remaining on the material after thread trimming will be longer.

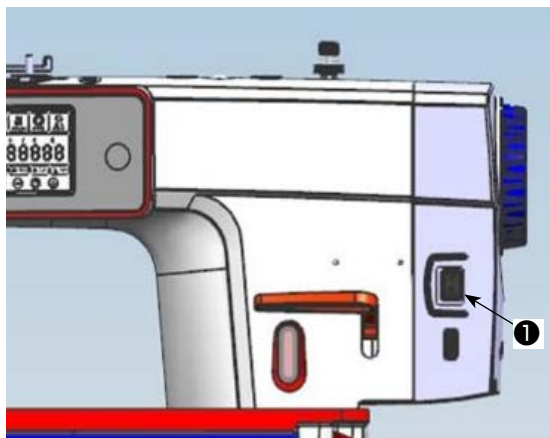
- 4) The amount of engagement between loop spreading knife ① and thread trimming knife ② is 1 to 2 mm as measured from center of needle A.



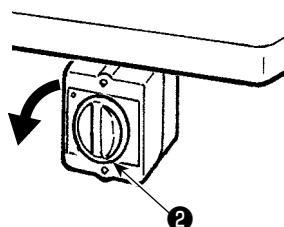
Be aware that, if the amount of engagement between them is insufficient, faulty thread trimming can occur.

4. For the operator

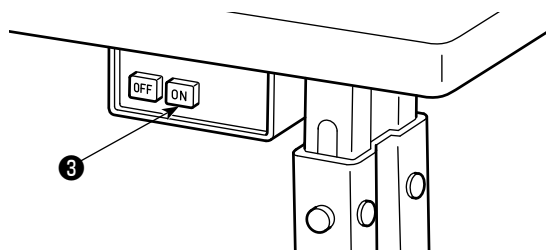
4-1. Operating procedure of the sewing machine



EU-Type model
1Φ 220V to 240V Type



3Φ 200-240VType
1Φ 100-120VType



- 1) Turning the power ON with the power switch
The power to the sewing machine is placed in the ON state when the "I" mark side of power switch ❶ (1Φ 220 - 240V type) is pressed; or in the OFF state when the "o" mark side is pressed.
- 2) The power to the sewing machine is placed in the ON state when the knob of power switch ❷ (EU type, 1Φ 220 - 240V type) is turned by 90 degrees counterclockwise; or in the OFF state when it is turned clockwise to return to its home position.
- 3) For power switches ❸ (3Φ 200 - 240 V type, 1Φ 100 - 120 V type), the power is in the ON state when the "ON" button is pressed, or in the OFF state when the "OFF" button is pressed.

1. Do not strongly tap the power switch by hand.

2. If the power indicator LED on the panel does not light up after having turned ON the power switch, immediately turn OFF the power switch and check the supply voltage.



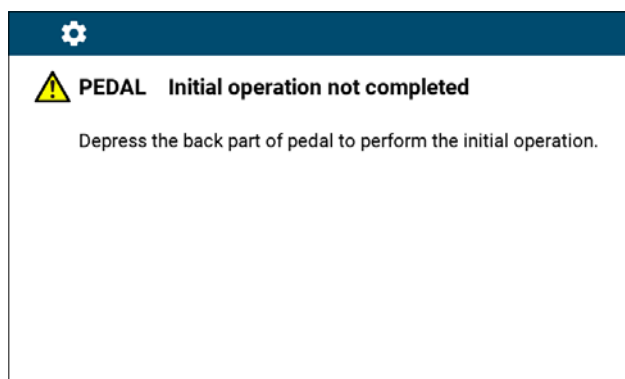
When you want to re-turn ON power switch after carrying out the aforementioned steps, it is necessary to wait for five minutes or more after you have turned OFF power switch.

3. Do not place your hand or anything under the needle since the needle bar may automatically move according to the memory switch setting when you turn ON the power to the sewing machine.

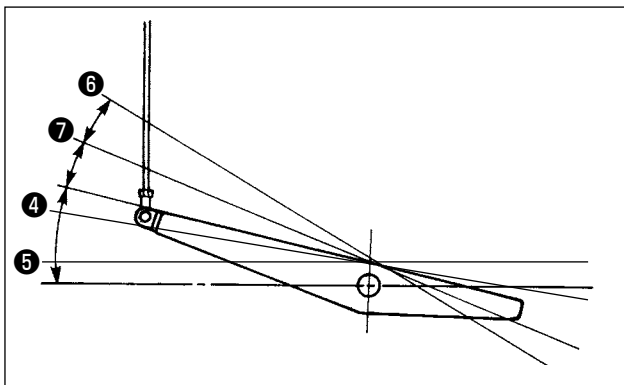
- 4) When you depress the back part of pedal, the needle bar and the presser lifting motor carry out their initial operation to allow the sewing machine to start sewing.



If you attempt to start sewing without depressing the back part of pedal, the warning message screen will be displayed. To prevent this, be sure to start sewing after depressing the back part of pedal.

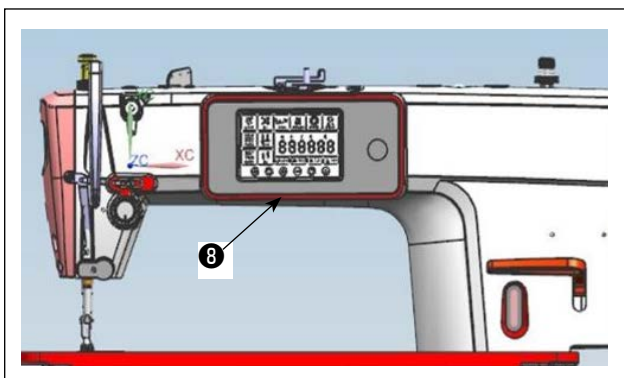


< Origin retrieval screen >



d. The machine trims threads when you fully depress the back part of the pedal **6**.

* When the auto-lifter (AK device) is used, one more operating switch is provided between the sewing machine stop switch and thread trimming switch. The presser foot goes up when you lightly depress the back part of the pedal **7**, and if you further depress the back part **6**, the thread trimmer is actuated.



- 5) The pedal is operated in the following four steps.
 - a. The machine runs at low sewing speed when you lightly depress the front part of the pedal **4**.
 - b. The machine runs at high sewing speed when you further depress the front part of the pedal **5**. (If the automatic reverse feed stitching has been preset, the machine runs at high speed after it completes reverse feed stitching.)
 - c. The machine stops (with its needle up or down) when you reset the pedal to its original position.

6) Reverse feed stitching at the beginning of sewing, reverse feed stitching at the end of sewing and various sewing patterns can be set on built-in panel **8** of the machine head.

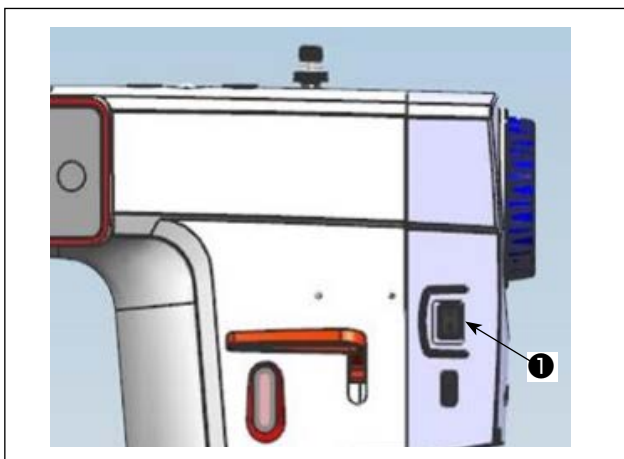


7) Degrees of brightness and OFF-state of the light can be changed over in four stages by pressing switch **9** on the side face of the sewing machine.

[Change of intensity]

1 ⇒ 2 ⇒ 3 ⇒ 4 ⇒ 5
Off ⇒ Bright ⇒ Medium ⇒ Dim ⇒ Off

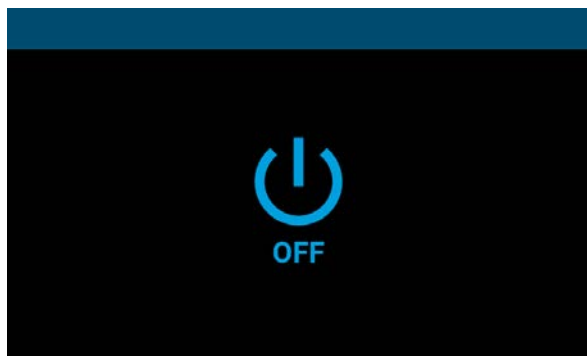
In this way, every time the switch is pressed, the hand lamp status is changed in repetition.



8) After the completion of sewing, check to make sure that the sewing machine has stopped. Then, press power switch **1** to turn it OFF.



In the case the machine is not used for a long time, remove the power plug from the plug receptacle.

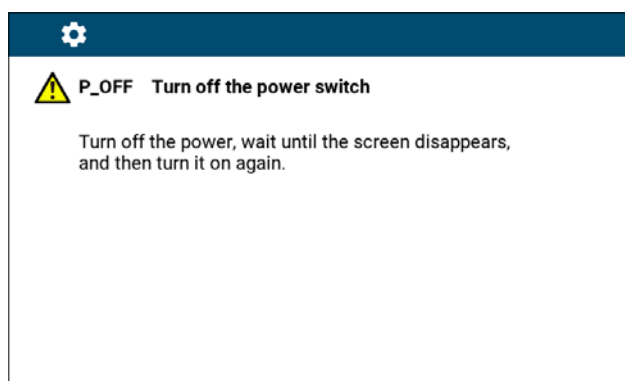


<Power OFF processing screen>

- 9) When you turn OFF the power switch, the "Power OFF processing screen" is displayed. When the power is turned OFF completely, the screen display disappears.



While the "Power OFF processing screen" is displayed, do not turn ON the power switch. If you turn ON the power switch during power OFF processing, the caution screen will be displayed as shown below. When you have turned OFF the power switch, re-turn it ON after confirming that the screen display disappears.

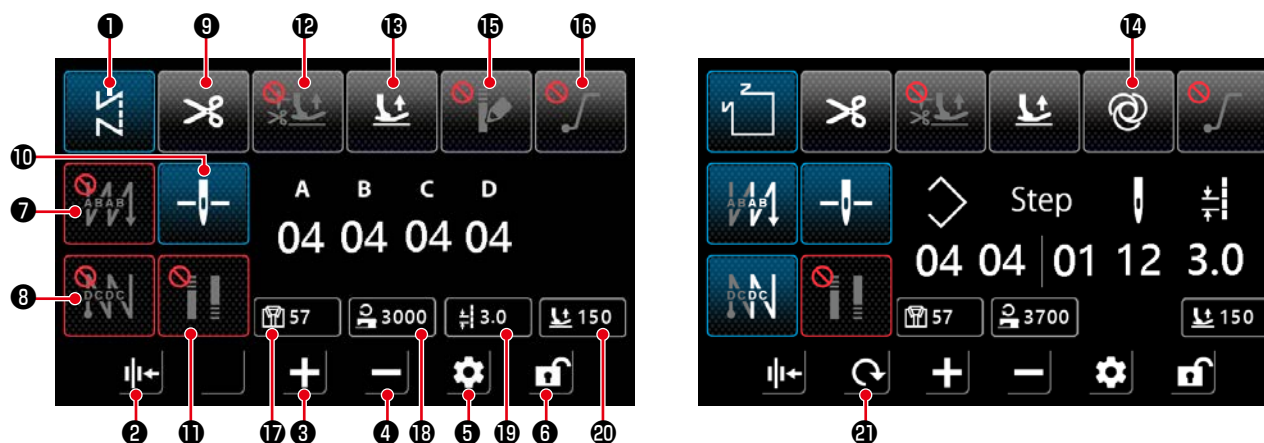


<Power OFF confirmation screen>

5. Explanation of the operation panel

5-1. Explanation of common buttons

(1) Sewing screen

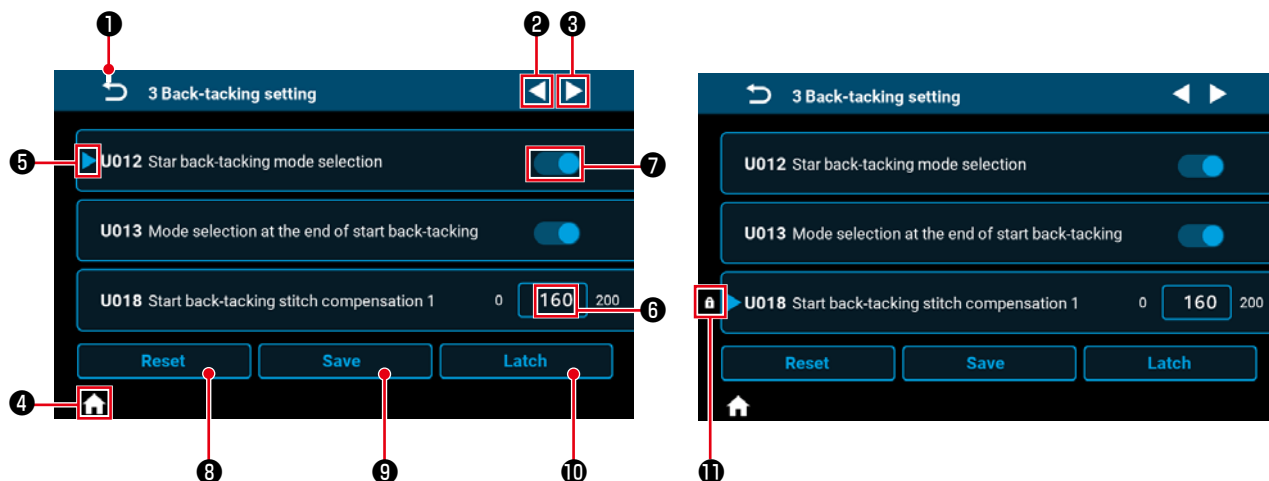


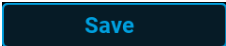
No.	Name	Display
①	Mode changeover key	This key is used to display the current sewing mode. Every time you press this key, the sewing mode is changed over in the order of free stitch, multi-layer stitch, polygonal-shape stitch and custom pitch stitch. : Free stitch : Multi-layer stitch : Polygonal-shape stitch : Custom pitch stitch
②	Thread presser setting	This key is used to change over the thread presser function between ON and OFF. : ON : OFF
③	Parameter increase key	The parameter can be increased by one by clicking this key. The parameter can be increased continuously by holding down this key.
④	Parameter decrease key	The parameter can be decreased by one by clicking this key. The parameter can be decreased continuously by holding down this key.
⑤	Setting key	This key is used to display the parameter setting screen.
⑥	Lock screen key	This key is used to change over the screen lock status. : Locked : Unlocked
⑦	Sewing-start reverse feed stitch setting	This button is used to change over the sewing-start reverse feed stitch pattern in sequence. : OFF : Process B : Process A → Process B : Process A → Process B → Process A → Process B The reverse feed stitch setting screen is displayed by holding down this button.

No.	Name	Display
⑧	Sewing-end reverse feed stitch setting	This button is used to change over the sewing-end reverse feed stitch pattern in sequence.  : OFF  : Process C  : Process C → Process D  : Process C → Process D → Process C → Process D The reverse feed stitch setting screen is displayed by holding down this button.
⑨	Thread trimming setting	 : ON  : OFF
⑩	Needle bar stop position	 : Lower stop  : Upper stop * This setting does not change the operation for a multi-layer stitching pattern.
⑪	Condensation stitch setting	This button is used to change over the condensation stitch setting in sequence.  : Condensation stitch OFF  : Sewing-start condensation stitch ON  : Sewing-end condensation stitch ON  : Sewing-start/sewing-end condensation stitch ON * Carry out setting of the condensation stitch in "2 Tight seam function setting" on the setting screen. The condensation stitch setting screen is displayed by holding down this button. * When the thread trimming is set to "OFF", the sewing-end condensation stitch is not carried out.
⑫	Automatic presser lifting function setting	This button is used to set the automatic presser lifting function after a stop in the middle of sewing and after thread trimming.  : Function is disabled  : Automatic presser lifting after stop in the middle is enabled.  : Automatic presser lifting after thread trimming is enabled  : Automatic presser lifting after a temporary stop and after thread trimming is enabled. * Auto-lifter does not operate after a stop in the middle of sewing for a multi-layer stitching pattern.
⑬	Presser lifting function by depressing the back part of the pedal	 : ON  : OFF
⑭	One shot function	 : ON  : OFF
⑮	Condensation custom pattern function	This button is used to change over the condensation custom pattern between ON and OFF. When the function is ON, the condensation custom setting screen is displayed.  : ON  : OFF

No.	Name	Display
16	Soft-start function setting	This button is used to change over the soft-start function between ON and OFF.  : ON  : OFF
17	Sewing count display	 The sewing count value is displayed. The count is cleared by double-clicking this button. This data is put into the selected state ( 0) by holding down the button to allow the data to be changed with the parameter increase/decrease key.
18	Sewing speed display	 The current sewing speed is displayed. The data is put into the selected state ( 4000) by clicking this button, and can be changed with the parameter increase/decrease key.
19	Stitch length display	 The stitch length under the current mode is displayed. The data is put into the selected state ( 3.0) by clicking this button, and can be changed with the parameter increase/decrease key.
20	Presser foot lifting height display	 The presser foot lifting height under the current mode is displayed. The data is put into the selected state ( 85) by clicking this button, and can be changed with the parameter increase/decrease key.
21	Screen change-over key	This key is used to change over the screen. 

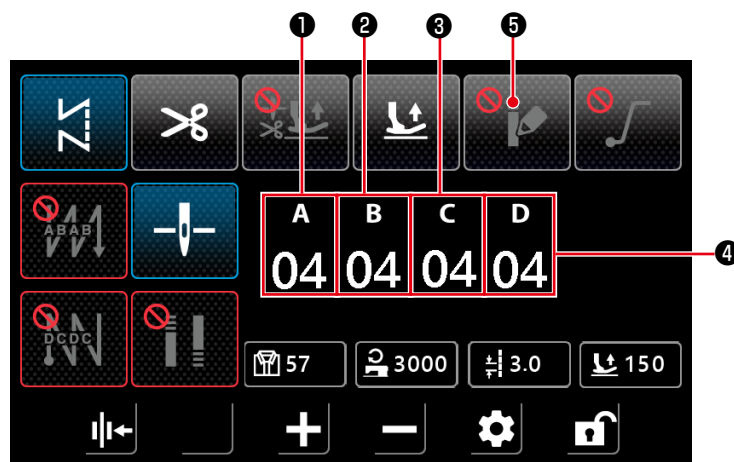
(2) Setting screen



No.	Item	Explanation
①		This item is used to return the screen to the previous screen.
②		This item is used to move the page forward.
③		This item is used to move the page backward.
④		This item is used to return the screen to the sewing screen.
⑤		This item is displayed for the parameter that is being selected. The parameter is put into the selected state by clicking within the parameter frame.
⑥		Set value of the parameter is displayed. The numeric keypad screen for inputting the parameter is displayed by clicking within the parameter frame.
⑦	  : OFF、  : ON	ON or OFF state of the function is displayed. The ON/OFF state of the function is changed over by clicking this item.
⑧		This item is used to return the setting of the parameter selected with ⑤ to the initial value.
⑨		This item is used to confirm the parameter setting you have changed. * If you exit the screen without confirming the setting, the content you have changed will not be saved.
⑩		When this button is held down, the setting of the parameter selected with ⑤ is fixed or released from fixed state.
⑪		This item is displayed for the parameter setting of which is fixed. If you reset the parameter setting of which is fixed, the parameter will be reset to the value when it was fixed.

5-2. Explanation of the screen

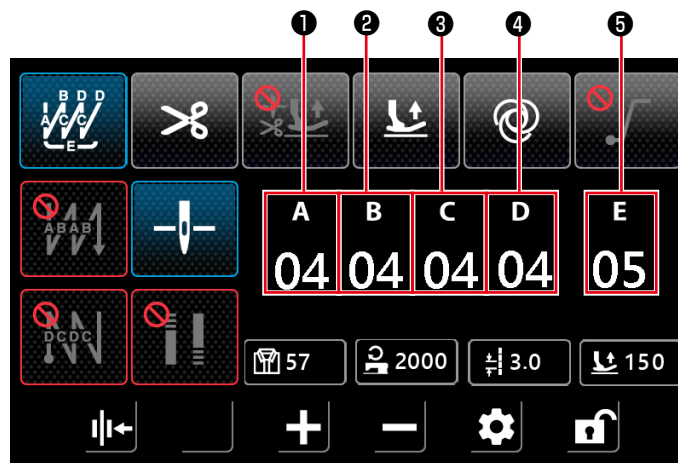
(1) Free stitch screen



No.	Item	Range	Initial value	Explanation
①		0-15	4	The number of stitches for the sewing-start reverse feed stitching process A is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
②		0-15	4	The number of stitches for the sewing-start reverse feed stitching process B is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
③		0-15	4	The number of stitches for the sewing-end reverse feed stitching process C is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
④		0-15	4	The number of stitches for the sewing-end reverse feed stitching process D is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
⑤				The condensation custom is placed in ON and the "(5) Condensation custom selection screen" p.38 is displayed by clicking this item.

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

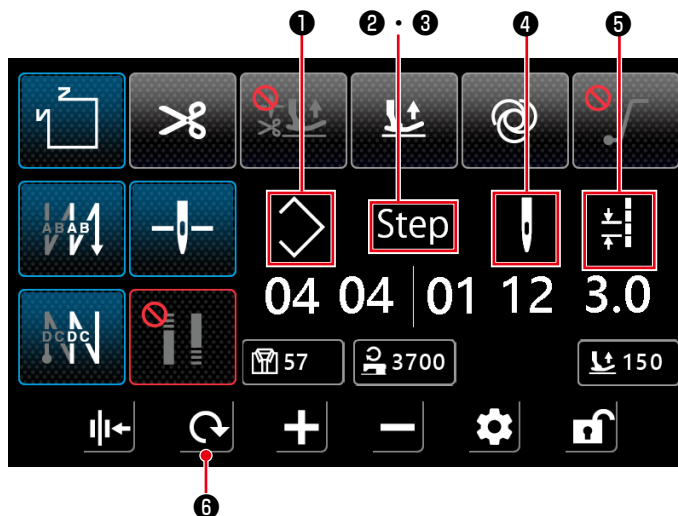
(2) Multi-layer stitch screen



No.	Item	Range	Initial value	Explanation
①	A 04	0-99	4	The number of stitches for process A is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
②	B 04	0-99	4	The number of stitches for process B is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
③	C 04	0-99	4	The number of stitches for process C is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
④	D 04	0-99	4	The number of stitches for process D is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
⑤	E 05	1-99	5	The number of repetitions is displayed. The screen for inputting the number of repetitions is displayed by clicking the numeric part.

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

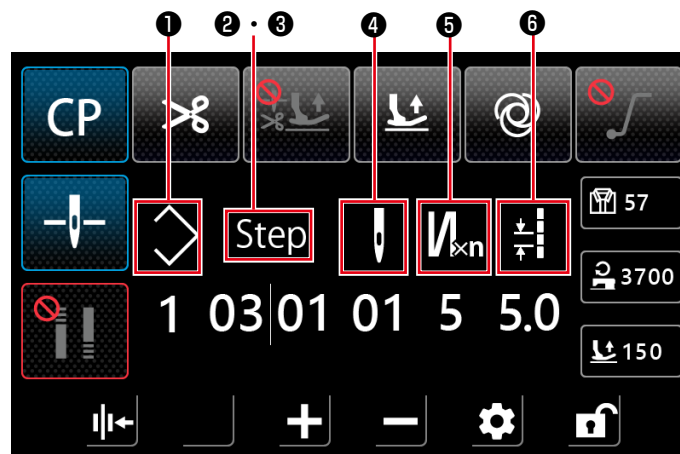
(3) Polygonal-shape stitch screen



No.	Item	Range	Explanation
①		1-10	Polygonal-shape stitching pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
②・③		1-15	Number ② on the left indicates the total number of steps of the pattern. The numeric keypad screen for inputting the total number of steps is displayed by clicking the numeric part. Number ③ on the right indicates the step number for editing. The numeric keypad screen for inputting the step number is displayed by clicking the numeric part.
④		0-99	The number of stitches of the step that is being edited is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part. If the number of stitches is 0 (zero), the sewing machine will finish sewing at the previous step. The number of stitches for step 1 cannot be set to 0 (zero).
⑤		0-5.0	Stitch length The stitch length for the step that is being edited is displayed. The numeric keypad screen for inputting the stitch length is displayed by clicking the numeric part.
⑥			In the case the condensation custom is placed in OFF, the "(7) Reverse feed stitch setting screen for the polygonal-shape stitch"p.40 is displayed. In the case the condensation custom is placed in ON, the "(8) Condensation custom selection screen for the polygonal-shape stitch"p.41 is displayed.

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

(4) Custom pitch stitch screen



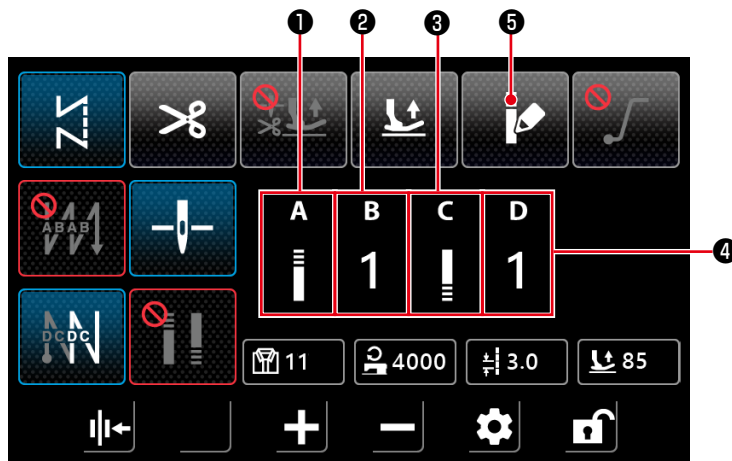
No.	Item	Range	Explanation
①		1-9	The custom pitch pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
②・③		1-10	Number ② on the left indicates the total number of steps of the pattern. The numeric keypad screen for inputting the total number of steps is displayed by clicking the numeric part. Number ③ on the right indicates the step number for editing. The numeric keypad screen for inputting the step number is displayed by clicking the numeric part.
④		1-99	The number of stitches of the step that is being edited is displayed. In the case the number of times of forward and reverse feed stitching for the multi-layer stitch is 1, the number represents the number of stitches for the step. In the case the number of times of forward and reverse feed stitching for the multi-layer stitch is larger than 1, the number represents the number of times to repeat multi-layer stitching. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
⑤		1-9	Number of times of forward and reverse feed stitching for the multi-layer stitch The number of times of forward and reverse stitching for the multi-layer stitch for the step that is being edited is displayed. In the case the value is 1, the sewing machine does not perform multi-layer stitching and the value represents the number of stitches for the step. The numeric keypad screen for inputting the number of times of multi-layer stitching is displayed by clicking the numeric part. (Only odd numbers can be input as the number of times.)
⑥		0-5.0	Stitch length The stitch length for the step that is being edited is displayed. The numeric keypad screen for inputting the stitch length is displayed by clicking the numeric part.

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

(5) Condensation custom selection screen

The condensation custom selection screen is displayed by pressing  button on the free stitch screen.

Condensation custom can be set separately from the condensation stitch and shorter thread remaining function.



No.	Item	Range	Explanation
①			The "(6) Condensation custom setting screen"p.39 is displayed by clicking the icon part.
②		1-9	The sewing-start condensation custom pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
③			The numeric keypad screen for setting the sewing-end "(6) Condensation custom setting screen"p.39 by clicking the icon part.
④		1-9	The sewing-end condensation custom pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
⑤			The condensation custom is placed in OFF by clicking this item. Then, the "(1) Free stitch screen"p.34 is displayed.

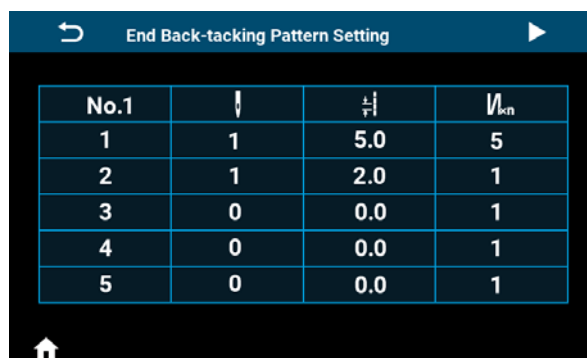
* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

(6) Condensation custom setting screen

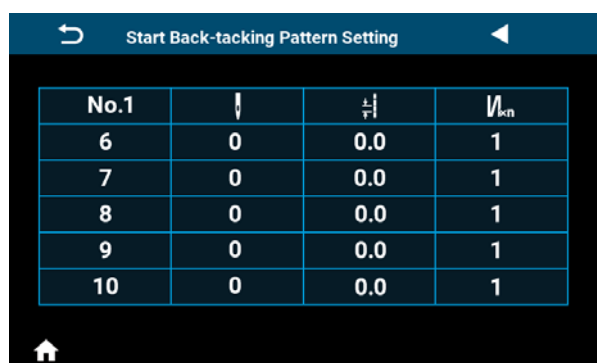
The condensation custom screen is displayed by pressing  button on the condensation custom selection screen or the condensation custom selection screen for the polygonal-shape stitch.



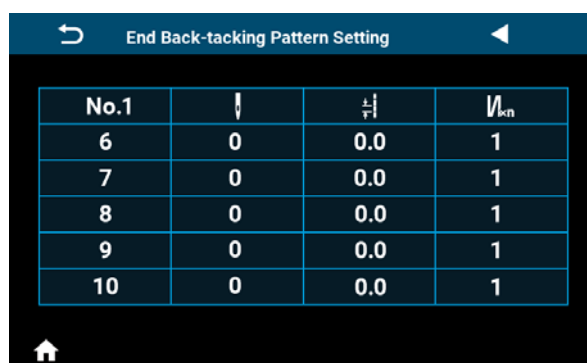
Sewing-start condensation custom setting screen



Sewing-end condensation custom setting screen

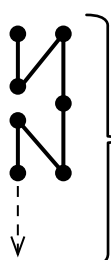


Sewing-start condensation custom setting screen (2)



Sewing-end condensation custom setting screen (2)

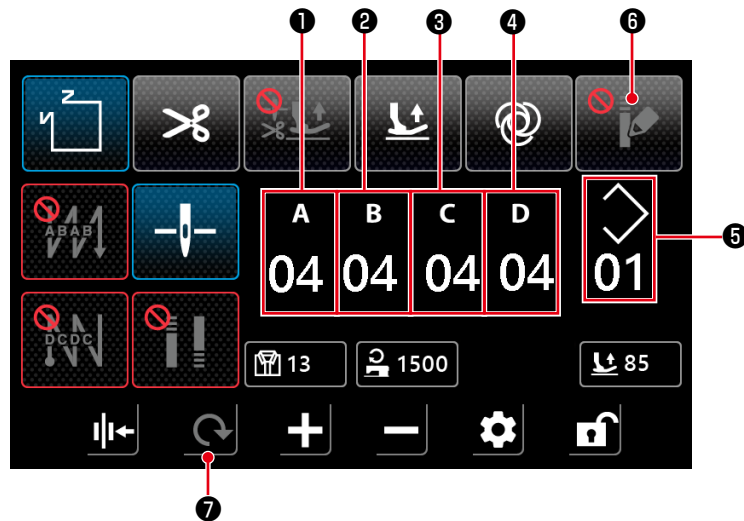
No.	Item	Setting	Explanation
①	No.1		The condensation custom pattern number is displayed.
②	1		The step number is displayed.
③		0-99	This item is used to set the number of stitches for the step. The numeric keypad screen for inputting the number of stitches is displayed by clicking this item. If the number of stitches is 0 (zero), the sewing machine will finish sewing at the previous step. The number of stitches for step 1 cannot be set to 0 (zero). If the number of stitches for the Step 1 is set to 0 (zero), the condensation custom stitch will be disabled.
④		0-5.0	This item is used to set the stitch length for the step. The numeric keypad screen for inputting the stitch length for the step is displayed by clicking this item.
⑤		1-9	This item is used to set the number of repetitions of the step. The numeric keypad screen for inputting the number of repetitions of the step is displayed by clicking this item. (Only odd numbers can be input as the number of times.)



The sewing machine sews two triple-step stitches with a pitch (stitch length) of 4.0 mm.

Example) In the case Item ③  the number of stitches for the Step is set to 2, Item ④  the stitch length for the Step is set to 4.0 and Item ⑤  the number of repetitions for the Step is 3.

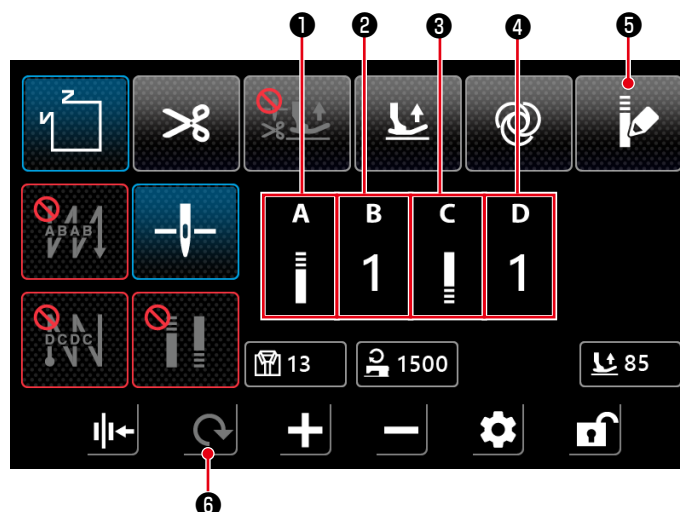
(7) Reverse feed stitch setting screen for the polygonal-shape stitch



No.	Item	Range	Initial value	Explanation
①		0-15	4	The number of stitches for the sewing-start reverse feed stitching process A is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
②		0-15	4	The number of stitches for the sewing-start reverse feed stitching process B is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
③		0-15	4	The number of stitches for the sewing-end reverse feed stitching process C is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
④		0-15	4	The number of stitches for the sewing-end reverse feed stitching process D is displayed. The numeric keypad screen for inputting the number of stitches is displayed by clicking the numeric part.
⑤		1-10		Polygonal-shape stitching pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
⑥				The condensation custom is placed in ON by clicking this item. Then, the "(8) Condensation custom selection screen for the polygonal-shape stitch"p.41 is displayed.
⑦				The screen returns to the "(3) Polygonal-shape stitch screen"p.36.

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

(8) Condensation custom selection screen for the polygonal-shape stitch

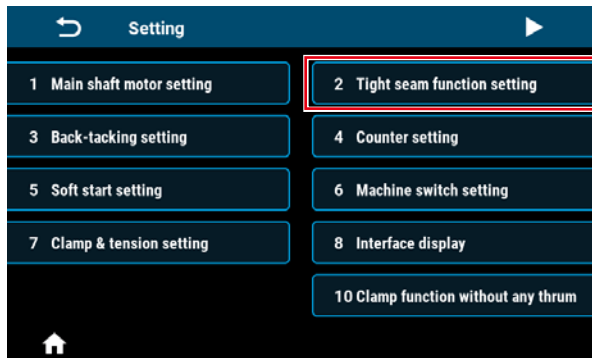


No.	Item	Range	Explanation
①			The sewing-start "(6) Condensation custom setting screen"p.39 is displayed by clicking the icon part.
②		1-9	The sewing-start condensation custom pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
③			The numeric keypad screen for setting the sewing-end "(6) Condensation custom setting screen"p.39 by clicking the icon part.
④		1-9	The sewing-end condensation custom pattern number is displayed. The numeric keypad screen for inputting the pattern number is displayed by clicking the numeric part.
⑤			The condensation custom is placed in OFF by clicking this item. Then, the "(7) Reverse feed stitch setting screen"p.40 .
⑥			The screen returns to the "(3) Polygonal-shape stitch screen"p.36 .

* Be aware that the sewing machine starts when you depress the pedal even when the numeric keypad is displayed on the screen.

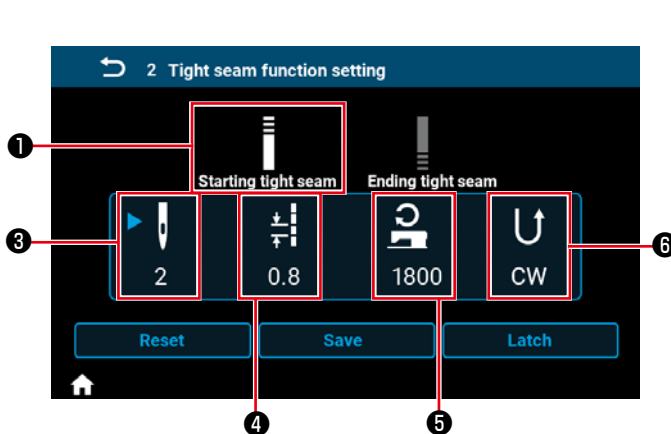
* The condensation custom pattern is common to the free stitch and polygonal-shape stitch.

(9) Condensation stitch setting screen

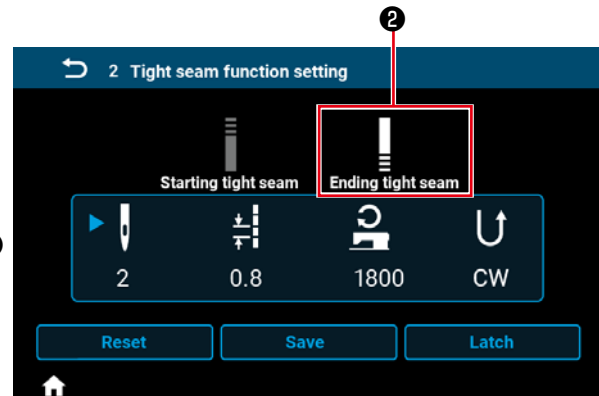


The condensation stitch setting screen is displayed by clicking "2 Tight seam function setting" on the setting screen.

Condensation stitch can be set separately from the condensation custom and/or shorter thread remaining function.



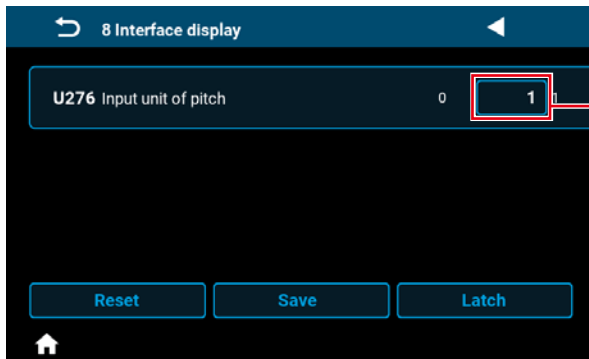
Sewing-start condensation stitch setting screen



Sewing-end condensation stitch setting screen

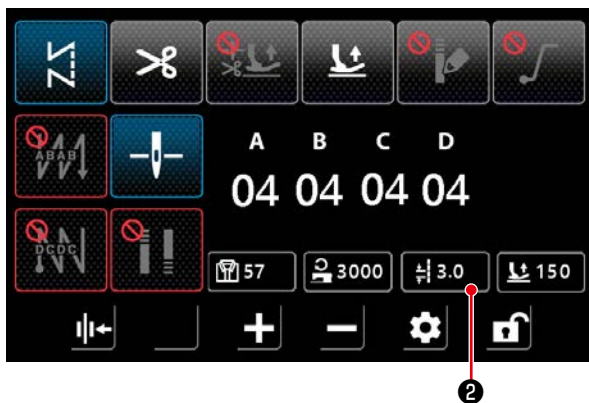
No.	Item	Range	Explanation
①			The sewing-start condensation stitch is placed in the set state by clicking this item.
②			The sewing-end condensation stitch is placed in the set state by clicking this item.
③		0-12	The number of condensation stitches is displayed. This item is placed in the set state by clicking the icon part. The numeric keypad screen for inputting the number of condensation stitches is displayed by clicking the numeric part.
④		0.0-5.0	The condensation stitch length is displayed. This item is placed in the set state by clicking the icon part. The numeric keypad screen for inputting the condensation stitch length is displayed by clicking the numeric part.
⑤		100-2000	Sewing speed of the condensation stitch is displayed. This item is placed in the set state by clicking the icon part. The numeric keypad screen for inputting the condensation stitching speed is displayed by clicking the numeric part.
⑥			The condensation stitching direction is displayed. This item is placed in the set state by clicking the icon part. The condensation stitching direction is alternately changed over between CW (clockwise direction) and CCW (counterclockwise direction).

(10) Screen for setting the number of stitches per inch

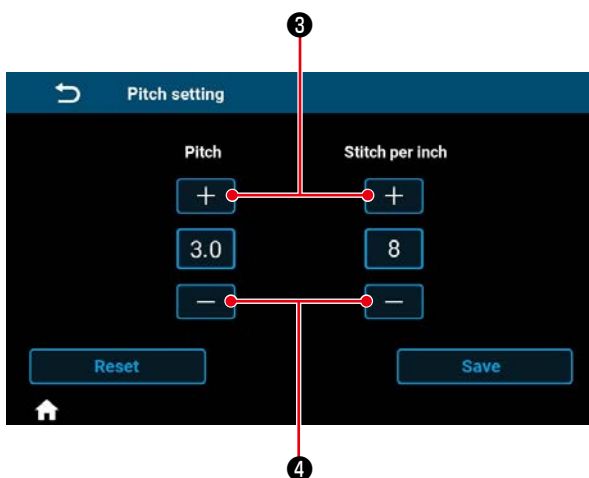


The stitch length can be set using the number of stitches per inch by setting "U276 Input unit of pitch" to ①.

* Refer to "[Table 1: Pitch correspondence table](#)" and "[Table 2: Stitch per inch correspondence table](#)"p.44 for settable values.



- 1) In the case the function of setting the number of stitches per inch is enabled, the screen for setting the number of stitches per inch is displayed by pressing the stitch length button ②.



- 2) The stitch length is set to the value that corresponds to the number of stitches per inch by inputting the number of stitches per inch with the + and - buttons.

Table 1: Pitch correspondence table

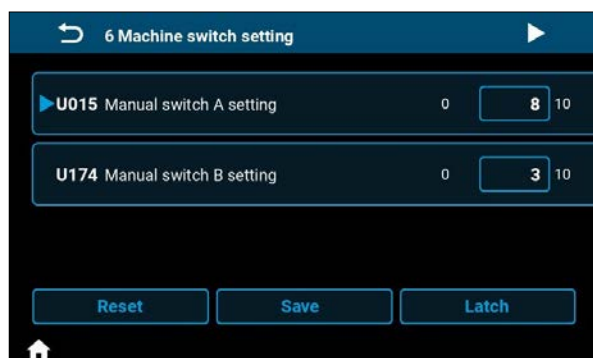
Pitch	Stitch per inch
0.0	100
0.1	100
0.2	100
0.3	85
0.4	64
0.5	51
0.6	42
0.7	36
0.8	32
0.9	28
1.0	25
1.1	23
1.2	21
1.3	20
1.4	18
1.5	17
1.6	16
1.7	15
1.8	14
1.9	13
2.0	13
2.1	12
2.2	12
2.3	11
2.4	11
2.5	10
2.6	10
2.7	9
2.8	9
2.9	9
3.0	8
3.1	8
3.2	8
3.3	8
3.4	7
3.5	7
3.6	7
3.7	7
3.8	7
3.9	7
4.0	6
4.1	6
4.2	6
4.3	6
4.4	6
4.5	6
4.6	6
4.7	5
4.8	5
4.9	5
5.0	5

Table 2: Stitch per inch correspondence table

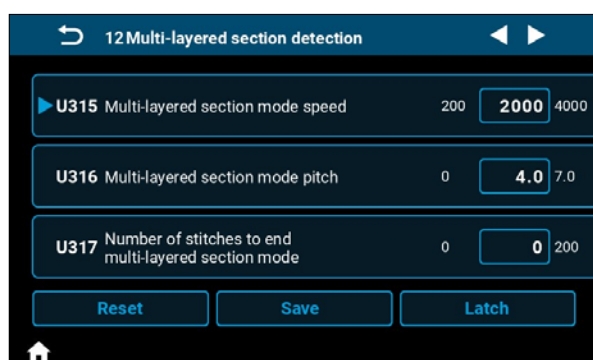
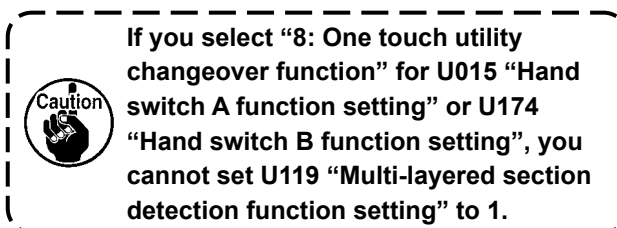
Stitch per inch	Pitch
0	0.0
1	5.0
2	5.0
3	5.0
4	5.0
5	5.0
6	4.2
7	3.6
8	3.2
9	2.8
10	2.5
11	2.3
12	2.1
13	2.0
14	1.8
15	1.7
16	1.6
17	1.5
18	1.4
19	1.3
20	1.3
21	1.2
22	1.2
23	1.1
24	1.1
25	1.0
26	1.0
27	0.9
28	0.9
29	0.9
30	0.8
31	0.8
32	0.8
33	0.8
34	0.7
35	0.7
36	0.7
37	0.7
38	0.7
39	0.7
40	0.6
41	0.6
42	0.6
43	0.6
44	0.6
45	0.6
46	0.6
47	0.5
48	0.5
49	0.5
50	0.5
51	0.5
52	0.5
53	0.5
54	0.5

Stitch per inch	Pitch
55	0.5
56	0.5
57	0.4
58	0.4
59	0.4
60	0.4
61	0.4
62	0.4
63	0.4
64	0.4
65	0.4
66	0.4
67	0.4
68	0.4
69	0.4
70	0.4
71	0.4
72	0.4
73	0.3
74	0.3
75	0.3
76	0.3
77	0.3
78	0.3
79	0.3
80	0.3
81	0.3
82	0.3
83	0.3
84	0.3
85	0.3
86	0.3
87	0.3
88	0.3
89	0.3
90	0.3
91	0.3
92	0.3
93	0.3
94	0.3
95	0.3
96	0.3
97	0.3
98	0.3
99	0.3
100	0.3

(12) One-touch changeover function



- 1) The one-touch changeover function can be assigned to the hand switch A or hand switch B by setting U015 "Hand switch A function setting" or U174 "Hand switch B function setting" to "8. One-touch changeover".



- 2) In the case the one-touch changeover function is assigned, the sewing speed and stitch length can be respectively changed over to the set value for the multi-layered section mode.

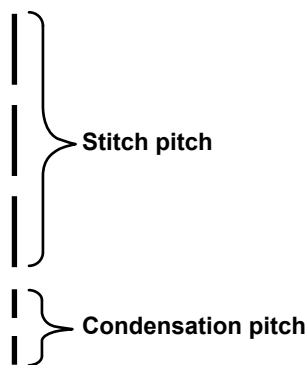
Normal sewing speed ⇔ U315 Sewing speed for the multi-layered section mode

Normal stitch length ⇔ U316 Pitch for the multi-layered section mode



- 3) While the one-touch changeover function is assigned,  mark is displayed at the lower left corner of the screen and the display of the sewing speed and that of the stitch length are changed over.

(13) Shorter thread remaining function

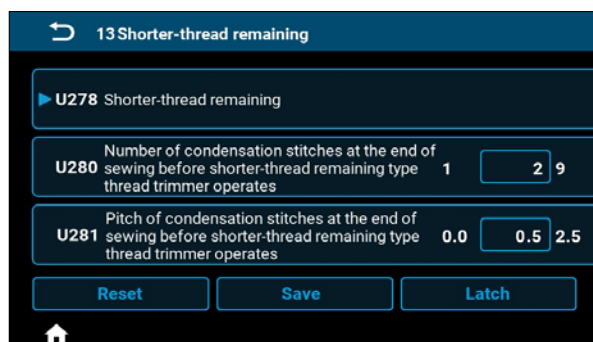


Condensation stitch for the shorter thread remaining thread trimming can be set.

It is possible to change the set value of the number of stitches and/or pitch from "13. Shorter thread remaining" on the setting screen.

Adjust the number of stitches and/or pitch in accordance with the sewing item.

This function can also be set separately from the condensation customer and condensation stitch.



- 1) Change over enable/disable of the shorter-thread remaining function with U278 "Shorter-thread remaining function setting".

Factory-set value: ON

- 2) The number of condensation stitches can be set with U280 "Number of end condensation stitches for shorter-thread remaining thread trimming".

Factory-set value: 2

- 3) The condensation pitch can be set with U281 "End condensation pitch for shorter-thread remaining thread trimming".

Factory-set value: 0.5 (M type)

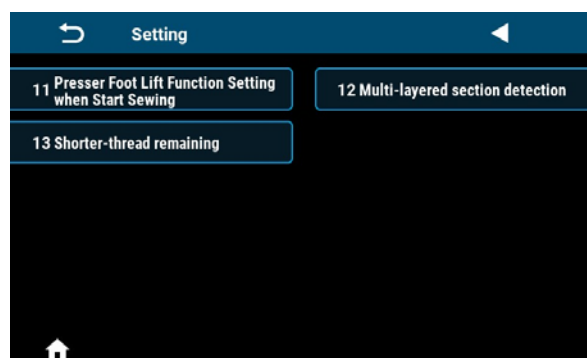
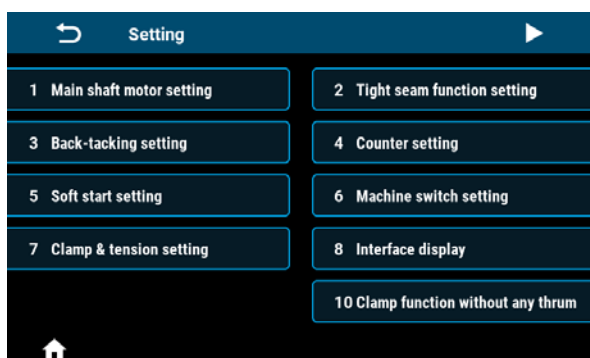
0.8 (C type, H type)



If the condensation pitch is decreased, the phenomenon where the needle enters the same needle entry point will be likely to occur, resulting in unstable formation of thread loop at the time of thread trimming. As a result, thread trimming fault is likely to occur. So be careful. (As the needle entry phenomenon differs according to the material to be sewn and the needle count, the pitch should be increased if thread trimming fault occurs.)

5-3. Function setting list

(1) User level memory switch



No.	Setting items
1	Main shaft motor setting
2	Tight seam function setting
3	Back-tacking setting
4	Counter setting
5	Soft start setting
6	Machine switch setting
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12	Multi-layered section detection
13	Shorter-thread remaining

No.	Items	Range	Default			Description
			M type	C type	H type	
1. Main shaft motor setting						
1-U056	Needles goes up automatically as power turned on	OFF/ ON	ON	ON	ON	
1-U060	Origin retrieve when power is turned on	OFF/ ON	OFF	OFF	OFF	OFF : After turning on the power, you cannot sew unless you depress the pedal once. ON : After turning on the power, make it ready for sewing immediately. ⇒ When this item is set to ON, the sewing machine shifts to the origin retrieval after turning the power ON. Take care not to place your hands or the fabric around the presser foot and pulley.
1-U301	Main shaft motor maximum speed limit (Maximum value varies with the machine head)	0-MAX	4000	4000	4000	M type : MAX 5000 C,H type : MAX 4000
2. Tight seam function setting						
2-1. Starting tight seam						
		0-12	2	2	2	Condensation stitching
		0-5.0	0.5	0.8	0.8	Stitches length Unit: mm
		100-2000	1800	1800	1800	Sewing speed
		CW/ CCW	CW	CW	CW	Direction
2-2. Ending tight seam						
		0-12	2	2	2	Condensation stitching
		0-5.0	0.5	0.8	0.8	Stitches length Unit: mm
		100-2000	1800	1800	1800	Sewing speed
		CW/ CCW	CW	CW	CW	Direction

No.	Items	Range	Default			Description
			M type	C type	H type	
3. Back-tacking setting						
3-U004	Start back-tacking speed	200-3200	2000	2000	2000	
3-U005	End back-tacking speed	200-3200	2000	2000	2000	
3-U010	The constant-stitch whether can execute end back-tacking sewing function selection	OFF/ON	ON	ON	ON	
3-U012	Star back-tacking mode selection	OFF/ON	ON	ON	ON	
3-U013	Mode selection at the end of start back-tacking	OFF/ON	ON	ON	ON	
3-U018	Start back-tacking stitch compensation 1	0-200	160	160	160	
3-U019	Start back-tacking stitch compensation 2	0-200	160	160	160	
3-U025	End back-tacking stitch compensation 3	0-200	160	160	160	
3-U026	End back-tacking stitch compensation 4	0-200	160	160	160	
3-U032	Back-tacking stitch compensation 5	0-200	160	170	170	
3-U033	Back-tacking stitch compensation 6	0-200	160	170	170	
3-U237	Start back-tacking stitch compensation 11	0-200	160	160	160	
3-U238	Start back-tacking stitch compensation 12	0-200	160	160	160	
3-U239	End back-tacking stitch compensation 13	0-200	160	160	160	
3-U240	End back-tacking stitch compensation 14	0-200	160	160	160	
3-U241	Back-tacking stitch compensation 15	0-200	160	170	170	
3-U242	Back-tacking stitch compensation 16	0-200	160	170	170	
3-U235	Pattern sewing compensation 1	0-200	160	160	160	
3-U236	Pattern sewing compensation 2	0-200	160	160	160	
4. Counter setting						
4-U260	Counter selection	0-2	1	1	1	0: Counter does not count 1: Count up 2: Count-down
4-U261	Counter current value /setting value	0-9999	0/9999	0/9999	0/9999	
4-U262	Sewing counter trimming time	0-50	1	1	1	
5. Soft start setting						

No.	Items	Range	Default			Description
			M type	C type	H type	
5-U014	Soft start switch	ON/ OFF	OFF	OFF	OFF	
5-U008	Stitch numbers for soft start	1-15	2	2	2	
5-U090	Soft start first stitch speed	200- 1500	400	400	400	
5-U091	Soft start second stitch speed	200- 1500	1000	1000	1000	
5-U007	Soft start speed after second stitch	200- 1500	1500	1500	1500	
6. Machine switch setting						
6-U015	Manual switch A setting	0-10	5	5	5	0: OFF 1: Half stitch 2: One stitch 3: Continuous half stitch 4: Continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function 7: Count number of pieces sewn 8: One-touch changeover function 9: 1/2 pitch function 10: 1/4 pitch function
6-U174	Manual switch B setting	0-10	3	3	3	0: OFF 1: Half stitch 2: One stitch 3: Continuous half stitch 4: Continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function 7: Count number of pieces sewn 8: One-touch changeover function 9: 1/2 pitch function 10: 1/4 pitch function
6-U175	Setting of the needle up/down switch operation after thread trimming	0-2	0	0	0	Operation of the needle up/down switch is set in the case of "U015 = 1 to 4" or "U174 = 1 to 4". 0: Function OFF 1: Needle up/down operation 2: One-stitch operation
7. Clamping & tension setting						
7-U103	Tension strength setting	1-80	50	50	50	
7-U035	With or without tension while foot lifting action	ON/ OFF	OFF	OFF	OFF	

No.	Items	Range	Default			Description
			M type	C type	H type	
7-U037	Wiping / clamping strength setting	0-11	7	7	7	0-1 : OFF 2-11 : clamping strength * This parameter is not initialized with U272 Restore factory defaults.
7-U036	Tension function switch	ON/ OFF	ON	ON	ON	
7-U030	The foot lift height of thread tension release start action when knee-control foot lift	0-300	75	75	75	
7-U031	Thread tension release function switch when knee-control foot lift	ON/ OFF	OFF	OFF	OFF	
8. Interface display						
8-U270	Brightness	10-100	80	80	80	
8-U271	Main interface locked automatically	0-900	60	60	60	
8-U272	Restore factory defaults	-	-	-	-	
8-U273	Language	0-6	1	1	1	0: Chinese 1: English 2: Japanese 3: Korean 4: Turkish 5: Spanish 6: Portuguese * This parameter is not initialized with U272 Restore factory defaults. * Available languages vary depending on the destination.
8-U275	Data output to JaNets	0-3	0	0	0	This item is used to set data output to JaNets. 3: Data is output to JaNets
8-U276	Input unit of pitch	0-1	0	0	0	0 : mm 1 : inch
10. Clamp function without any thrum						
10-U111	Clamp function without any thrum switch	ON/ OFF	OFF	OFF	OFF	
10-U279	Cloth puller function selection	0-3	0	0	0	0: Pre-emption function OFF 1: Output from bird's nest prevention port1 2: Output from bird's nest prevention port2 3: Output from bird's nest prevention port3
11. Presser Foot Lift Function Setting when Start Sewing						
11-U201	Presser Foot Lift Function Setting Switch when Start Sewing	ON/ OFF	OFF	OFF	OFF	
11-U202	Presser Foot Lift Function Setting Start Output Angle when Start Sewing	1-359	1	1	1	

No.	Items	Range	Default			Description
			M type	C type	H type	
11-U203	Presser Foot Lift Function Setting End Output Angle when Start Sewing	1-359	80	80	80	
11-U204	Presser Foot Lift Output Signal when Start Sewing	0-100	30	30	30	
12. Multi-layered section detection						
12-U119	Multi-layered section detection function setting	0-1	0	0	0	0:OFF 1:ON
12-U310	Normal section presser foot height AD value display	-	-	-	-	
12-U311	Multi-layered section presser-foot height AD value display	-	-	-	-	
12-U312	Multi-layered section detection AD threshold	0-4095	530	530	530	
12-U313	Normal section presser-foot height AD value	0-4095	0	0	0	
12-U314	Multi-layered section presser-foot height AD value	0-4095	0	0	0	
12-U315	Sewing speed for multi-layered section mode	200-4000	2000	2000	2000	
12-U316	Pitch for multi-layered section mode	0-5.0	4.0	4.0	4.0	
12-U317	Number of stitches to end multi-layered section mode	0-200	0	0	0	
12-U318	Number of stitches waiting for changeover to multi-layered section mode	0-10	0	0	0	
13. Shorter-thread remaining						
13-U278	Shorter-thread remaining function setting	ON/OFF	ON	ON	ON	
13-U280	Number of end condensation stitches for shorter-thread remaining thread trimming	1-9	2	2	2	
13-U281	Pitch for end condensation stitch for shorter-thread remaining thread trimming	0.0-2.5	0.5	0.8	0.8	If the pitch is extremely decreased, thread trimming fault will be likely to occur. So be careful.

5-4. List of error codes

Error codes	Description	Measures
E01	High-voltage	1. The AC input voltage exceeds 300 VAC (130 VAC). Turn OFF the power switch and refrain from using the sewing machine until the power supply returns to an appropriate voltage.
		2. In the case of the private power generation, check the power of the generator and adjust it to an appropriate value.
		3. If no input voltage fault is found, change the control box with a new one and contact the After-sale Service.
E02	Low-voltage	1. The AC input voltage is lower than 150 VAC (80 VAC). Turn OFF the power switch and refrain from using the sewing machine until the power supply returns to an appropriate voltage.
		2. In the case of the private power generation, check the power of the generator and adjust it to an appropriate value.
		3. If no AC input voltage fault is found, change the control box with a new one and contact the After-sale Service.
E03	CPU communication fault	1. Turn OFF the power switch. Check whether or not the operation panel connector has loosened and the operation panel cord is broken. Turn the power switch back ON after the pedal signal is restored to the normal state.
		2. Turn OFF the power to the system. Remove the control box. Connect only the power cord to the system and turn ON the power. If E05 or E03 error occurs, change the control box with a new one and contact the After-sale Service.
E05	Pedal signal abnormal	1. Turn OFF the power switch. Check whether or not the pedal connector has loosened and the pedal cord is broken. Turn the power switch back ON after the pedal signal is restored to the normal state.
		2. If the pedal signal cannot be restored to the normal state, change the control box or the pedal sensor with a new one and contact the After-sale Service.
E07	Main shaft motor locked-rotor	1. Turn OFF the power switch. Check whether or not the sewing machine pulley can be turned smoothly (turn it by hand). If the sewing machine pulley cannot be smoothly turned, check for section(s) that is mechanically locked.
		2. Turn OFF the power switch. Check to make sure that the power connector of the motor has not loosened. If the power connector has loosened, insert the connector and turn the power switch back ON.
		3. Check whether the upper needle stop position is correct, if not, please adjust the upper positioning position.
		4. If the encoder signal cannot be restored to the normal state, change the control box or the main shaft motor with a new one and contact the After-sale Service.
E09 E11	The upper positioning signal of main shaft motor encoder is abnormal	1. Turn OFF the power switch. Check the main-shaft motor encoder connector. If it has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. Check to make sure that the motor origin correction setting is correct. Then, re-set the origin correction.
		3. Check whether or not oil is adhered to the encoder disk. If oil is adhered, clean the encoder disk.
		4. If the encoder signal cannot be restored to the normal state, change the control box or the main shaft motor with a new one and contact the After-sale Service.

Error codes	Description	Measures
E10	Electromagnet over-current	1. Turn OFF the power switch. Remove the solenoid connector. If error E10 occurs when you turn ON the power switch ON in this state, change the control box with a new one and contact the After-sale Service.
		2. If no error occurs when you turn ON the power switch with the solenoid connector removed, return the solenoid connector to the original state and carry out the following steps of procedure.
		1) If this error occurs when you depress the pedal to operate the thread presser, set the thread presser function in the OFF state and turn the power switch back ON. If no error occurs when you depress the pedal to run the sewing machine in the forward direction, replace the thread presser solenoid with a new one.
		2) If no error occurs when you depress the pedal to operate the thread presser, depress the back part of the pedal to conduct thread trimming operation. If the error occurs at this time, change the thread tension release solenoid with a new one.
E14	Main shaft motor encoder signal is abnormal	1. Turn OFF the power switch. Check the main-shaft motor encoder connector. If it has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. Check whether or not the encoder disk is correctly mounted (whether or not the encoder disk fixing screw has not loosened) and whether or not the encoder disk is located at the center of the encoder element.
		3. Check whether or not oil is adhered to the encoder disk. If oil is adhered, clean the encoder disk. After cleaning, return the encoder disk to the original state and turn the power switch back ON.
		4. If the encoder signal cannot be restored to the normal state, change the control box or the main shaft motor with a new one and contact the After-sale Service.
E15	Main shaft motor drive overcurrent	1. Please check whether the motor power cord has bad contact.
		2. Please check whether the motor power cord is crushed.
		3. If the main shaft motor start cannot be restored to the normal state, change the control box or the main shaft motor with a new one and contact the After-sale Service.
E17	Machine overturned	1. Turn OFF the power switch. Check whether or not the sewing machine head section is tilted.
		2. Check whether or not the machine-head tilting detection sensor is correctly adjusted.
		3. If the machine-head tilting detection function cannot be restored to the normal state, change the control box or the operation panel with a new one and contact the After-sale Service.
E20	Main shaft motor start failure	1. Turn OFF the power switch. Check the power cord connector and encoder connector of the main shaft motor. If the connector(s) has loosened or is disconnected, turn it to the original state and turn the power switch back ON.
		2. Check whether or not the main-shaft motor origin correction setting is correct. If you find any problem, reset the motor origin correction.
		3. If the main shaft motor start cannot be restored to the normal state, change the control box or the main shaft motor with a new one and contact the After-sale Service.
E32	File interchangeability error	The file is not interchangeable.

Error codes	Description	Measures
E46	Watchdog timer reset failure	1. Turn OFF the power switch. Check whether or not the timer reset is restored to the normal state after you switch the power back ON to the sewing machine.
		2. If the timer reset cannot be restored to the normal state, change the control box with a new one and contact the After-sale Service.
E60	The regeneration resistance is abnormal.	1. Turn OFF the power switch. Check the regeneration resistance for looseness or damage.
		2. Turn OFF the power switch. Change the regeneration resistance with a new one.
		3. If the regeneration resistance cannot be restored to the normal state, change the control box with a new one and contact the After-sale Service.
E70	System error	Please cut off the power, and then turn on the power again.
E71	CRC error	The stored data is broken. Select "U272 Restore factory defaults" to initialize the stored data.
E72	Open phase failure of 3-phase power supply	1. Check whether or not the AC input voltage is 3-phase 220 V.
		2. Check whether or not the connected power plug is loose. If the power plug connection is loose, detach the power plug once and re-insert it properly.
E80	Abnormal communication between main chip and drive chip	Please replace the control box and notify the after-sales service.
E82	Pitch motor overcurrent	1. Turn OFF the power switch. Check whether or not the pitch motor fails to run. If the motor fails to run, correct mechanically-locked section(s). If the pitch motor is normal, check the pitch-motor power cord connector and encoder connector. If the connector(s) has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. If the pitch motor cannot be restored to the normal state, change the control box or the pitch motor with a new one and contact the After-sale Service.
E84	Pitch-motor Z-phase fault	1. Turn OFF the power switch. Check whether or not the pitch motor fails to run. If the motor fails to run, correct mechanically-locked section(s). If the pitch motor runs normally, check the pitch-motor encoder connector. If it has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. Check whether or not the encoder disk is correctly mounted (whether or not the encoder disk fixing screw has not loosened) and whether or not the encoder disk is located at the center of the encoder element.
		3. Check whether or not oil is adhered to the encoder disk. If oil is adhered, clean the encoder disk. After cleaning, return the encoder disk to the original state and turn the power switch back ON.
		4. If the pitch-motor encoder signal cannot be restored to the normal state, change the control box or the pitch motor with a new one and contact the After-sale Service.

Error codes	Description	Measures
E85	Pitch motor encoder signal fault	1. Turn OFF the power switch. Check the pitch-motor encoder connector. If it has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. Check whether or not the encoder disk is correctly mounted (whether or not the encoder disk fixing screw has not loosened) and whether or not the encoder disk is located at the center of the encoder element.
		3. Check whether or not oil is adhered to the encoder disk. If oil is adhered, clean the encoder disk. After cleaning, return it to the original state and turn the power switch back ON.
		4. If the pitch-motor encoder signal cannot be restored to the normal state, change the control box or the pitch motor with a new one and contact the After-sale Service.
E86	Pitch motor malfunction	1. Turn OFF the power switch. Check the pitch-motor encoder connector. If it has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. Check whether or not the encoder disk is correctly mounted (whether or not the encoder disk fixing screw has not loosened) and whether or not the encoder disk is located at the center of the encoder element.
		3. Check whether or not oil is adhered to the encoder disk. If oil is adhered, clean the encoder disk. After cleaning, return the encoder disk to the original state and turn the power switch back ON.
		4. If the pitch motor operation cannot be restored to the normal state, change the control box or the pitch motor with a new one and contact the After-sale Service.
E87	Pitch motor lock	1. Turn OFF the power switch. Check whether or not the pitch motor fails to run. If the motor fails to run, correct mechanically-locked section(s). If the pitch motor is normal, check the pitch-motor power cord connector and encoder connector. If the connector(s) has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. If the pitch motor cannot be restored to the normal state, change the control box or the pitch motor with a new one and contact the After-sale Service.
E92	Thread trimmer/presser motor overcurrent	1. Turn OFF the power switch. Check whether or not the thread trimmer/presser motor fails to run. If the motor fails to run, correct mechanically-locked section(s). If the motor is normal, check the power cord connector and encoder connector of the thread trimmer/presser motor. If the connector(s) has loosened or is disconnected, return it to the original state and turn the power switch back ON.
		2. If the motor cannot be restored to the normal state, change the control box or the thread trimmer/presser motor with a new one and contact the After-sale Service.
E94	Thread trimmer/presser motor Z-phase fault	1. Turn OFF the power switch. Check whether or not the thread trimmer/presser motor can be moved by hand. If the motor cannot be moved by hand, correct mechanically-locked section(s). If the motor is normal, check the encoder connector of the thread trimmer/presser motor. If it has loosened or is disconnected, return it to the original state. Also check whether or not oil is adhered to the encoder disk. If oil is adhered to the disk, clean the disk, return it to the original state and turn ON the power switch.
		2. If the motor cannot be restored to the normal state, change the control box or the thread trimmer/presser motor with a new one and contact the After-sale Service.

Error codes	Description	Measures
E95	Thread trimmer/presser motor encoder-signal fault	1. Turn OFF the power switch. Check the encoder connector of the thread trimmer/presser motor. If it has loosened or is disconnected, return it to the original state and turn ON the power switch.
		2. If the motor cannot be restored to the normal state, change the control box or the thread trimmer/presser motor with a new one and contact the After-sale Service.
E96	Thread trimmer/presser motor start failure	1. Turn OFF the power switch. Check the power supply and encoder connectors of the thread trimmer/presser motor. If they have loosened or are disconnected, return them to the original state and turn on the power switch.
		2. If the motor cannot be restored to the normal state, change the control box or the thread trimmer/presser motor with a new one and contact the After-sale Service.
E97	Thread trimmer/presser motor lock	1. Turn OFF the power switch. Check whether or not the thread trimmer/presser motor fails to run. If the motor fails to run, correct mechanically-locked section(s). If the motor is normal, check the power cord connector and encoder connector of the thread trimmer/presser motor. If the connector(s) has loosened or is disconnected, return it to the original state and turn ON the power switch.
		2. If the motor cannot be restored to the normal state, change the control box or the thread trimmer/presser motor with a new one and contact the After-sale Service.
E100	Main shaft motor overload	1. Turn OFF the power switch. Check whether or not the mechanical load on the main shaft motor is excessively large. After checking, return the main shaft motor to the original state and turn ON the power switch.
		2. Check to make sure that the main shaft motor origin correction is correct. After checking, return the main shaft motor to the original state and turn ON the power switch.
		3. If the load on the main shaft motor cannot be restored to the normal state, change the control box and main shaft motor with new ones and contact the After-sale Service.
E110	Operation panel data reception fault while the power is ON	1. Turn OFF the power switch. Check the operation panel connector. If it has loosened or is disconnected, return it to the original state and turn ON the power switch.
		2. If the operation panel data reception cannot be restored to the normal state, change the operation panel and control box with new ones and contact the After-sale Service.
PEDAL	Initial operation has not yet been completed.	Depress the back part of the pedal to carry out the initial operation.
P_OFF	Power OFF display	Turn OFF the power switch. Wait until the screen disappears. Then, turn ON the power switch.