ENGLISH

PS-810-13085
INSTRUCTION MANUAL

CONTENTS

1. SPECIFICATIONS

1	Sewing area (X,Y)(mm)	1300 × 850 (Cutting area Rotary knife type：1199 × 793 Laser type：1146 × 826)
2	Feed motion of feeding frame	Intermittent feed (2-shaft drive by stepping motor)
3	Needle bar stroke	40mm
4	Max. sewing speed	[S type] 3,000sti/min (When stitching pitch is 2.2 mm or less) [H type] 1,800sti/min (When stitching pitch is 3.5 mm or less) For other stitch pitches and numbers of revolutions, refer to Table 1.
5	Settable stitch length	0.05 to 12.7mm
6	Needle	[S type] DB×1 #8(#7 to #14)、DP×5 #8(#7 to #14) [H type] DP17 #21 To be chosen according to the model.
7	Hook	Double-capacity full-rotary hook
8	Intermediate presser stroke	4 mm (Standard)
9	Lift of intermediate presser	20 mm
10	Lift of disc presser	15 mm
11	Memory of pattern data	Max. 999 patterns
12	Number of patterns that can be identified	Max. 999 patterns
13	Program input method	USB
14	Data format	SCD、SCO、DXF、PLT
15	Main shaft servomotor power	750W
16	Power consumption	300VA（Standard type）
17	Input voltage	200 to 240V±10%
18	Mass (gross mass)	[Standard] 511 kg、[Rotary knife] 519 kg、[Laser] 568 kg
19	Dimensions	2193mm(L)×2160mm(W)×1238mm(H)
20	Operating temperature range	5 to 35 ˚C [Laser type] 1 to 35 ˚C
21	Operating humidity range	35 to 85 % (No dew condensation) [Laser type] 5 to 70 %
22	Storage temperature range	-5 to 60 ˚C [Laser type] -10 to 100 ˚C
23	Storage humidity range	20 to 85 % (No dew condensation, 85 % applies to the case where the temperature is 40 ˚C or lower) [Laser type] 20 to 85 % (No dew condensation)
24	Air pressure used	0.5 to 0.6 MPa
25	Needle highest position stop facility	After the completion of sewing, the needle can be brought up to its highest position.
26	Noise	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation : A-weighted value of 78.0 dB ; (Includes K_{pA} = 2.5 dB) ; according to ISO 10821-C.6.2 -ISO 11204 GR2 at 2,800 sti/min.
27	Lubricating oil	#10 (Equivalent to JUKI NEW DEFRIX OIL No. 1) #32 (Equivalent to JUKI NEW DEFRIX OIL No. 2), Lithium based grease No. 2 Grease information JUKI Grease A XHP222MP

Table 1

S type

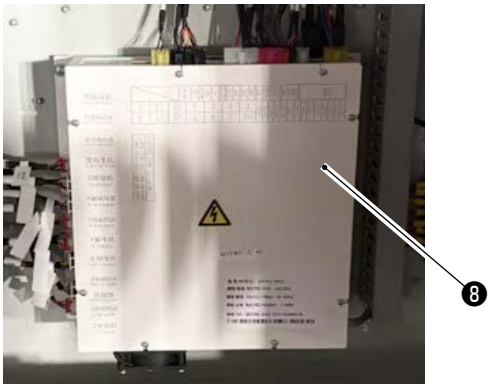
Stitch pitch(mm)	Sewing speed(sti/min)
to 2.2	3,000
2.3 to 2.8	2,800
2.9 to 3	2,500
3.1 to 4	2,200
4.1 to 5	1,800
5.1 to 12.7	800

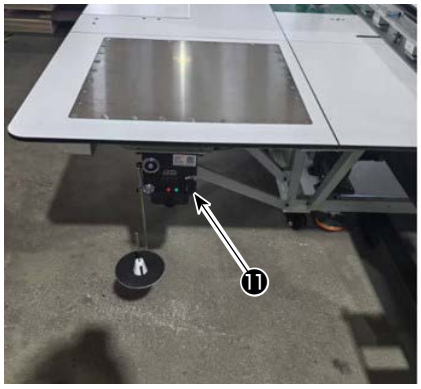
H type

Stitch pitch(mm)	Sewing speed(sti/min)
to 3.5	1,800
3.6 to 4	1,600
4.1 to 4.5	1,400
4.6 to 5	1,200
5.1 to 12.7	800

Note: The sewing machine must not run at the maximum number of revolutions continuously for more than 15 minutes.
The number of revolutions may vary even if the pitch is consistent due to the change in the needle and material.

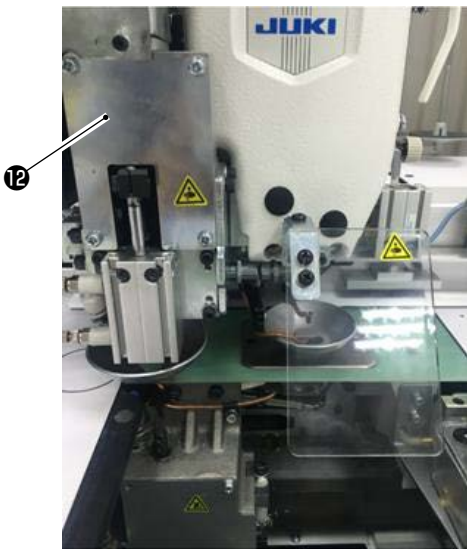
2. CONFIGURATION





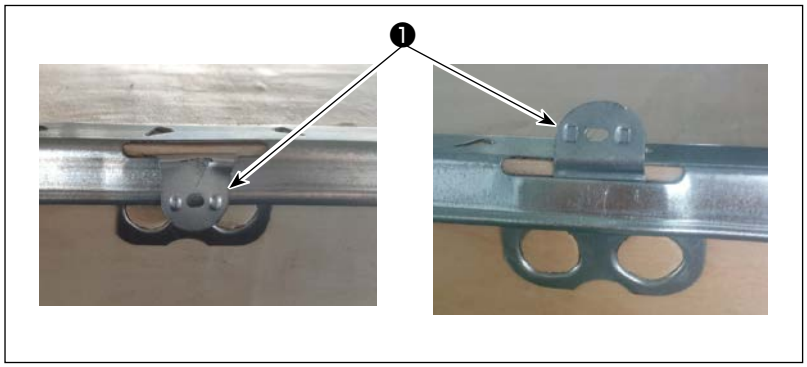
❶ Machine head
❷ Table
❸ X-axis feed mechanism
❹ Y-axis feed mechanism
❺ Cassette clamp device
❻ Operation panel
❼ Air control box
❽ Electrical control box
❾ Power switch (also used as the emergency stop switch)
❿ Thread stand
⓫ Bobbin winder device
⓬ Rotary knife device (subclass)
⓭ Laser Device (subclass)

Rotary knife



3. INSTALLATION

3-1. Setting up the sewing machine



3-1-1. Unpacking

1) Lift clamp ❶ as shown in the picture.

If the clamp is not lifted up sufficiently, unpacking will not be smoothly carried out.

2) Detach top cover ❷ first. Then, detach the remaining covers from the four surfaces.

3) Remove clamping plates of front and rear caster seats ❸ from the sewing machine.

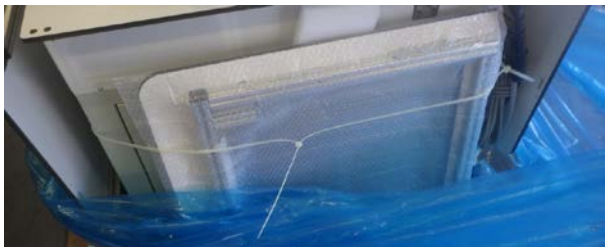
* Tools are packed in the accessory box for the sewing machine.

4) Remove the plastic cover.

5) Removing parts such as support bars, table etc.

[Standard type and rotary knife type]

Remove the support bars, tables, and other parts from under the table legs, and then remove the packaging materials.



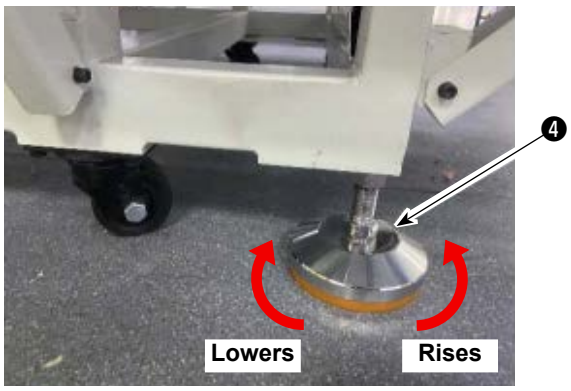
[Laser type]

Remove the support bars and other parts from under the table legs on the rear side of the sewing machine, and then remove the packaging materials.

6) Remove the accessories, panel, and thread stand from the electrical equipment shelf.
   * For the laser type, the panel and thread stand are attached to the sewing machine.

Insert the forks of the forklift into this portion.

7) Lift the sewing machine with a forklift to bring it to the specified location. (Weight of the sewing machine: 511 kg)

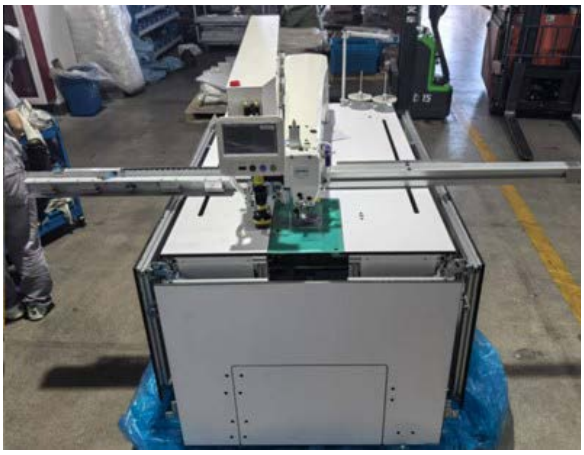


8) Turn adjuster ❹ to level the sewing machine.

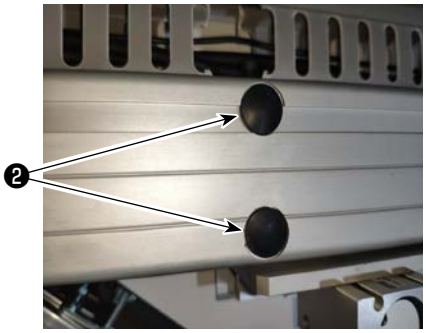
3-1-2. Setting up the X-feed mechanism

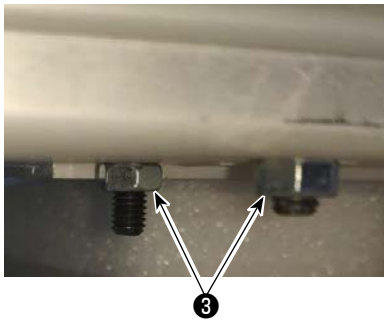
1) Detach clamping plates ❶ . Put the screws and nuts you have removed in the accessory box.

2) Unpack the X-feed mechanism.



3) Lay the X-feed mechanism aside the main body of the sewing machine.
Move the clamp to the center of the X-feed mechanism.





4) Detach rubber plug ❷ . Remove four nuts ❸ on the opposite side with a wrench key. Take care no to allow the screws to slip off the mounting holes after you have removed the nuts.
Put the nuts you have removed in the accessory box.

5) Aligning the screws with the taps of the X-feed support block, tighten the screws.

3-1-3. Setting up the table

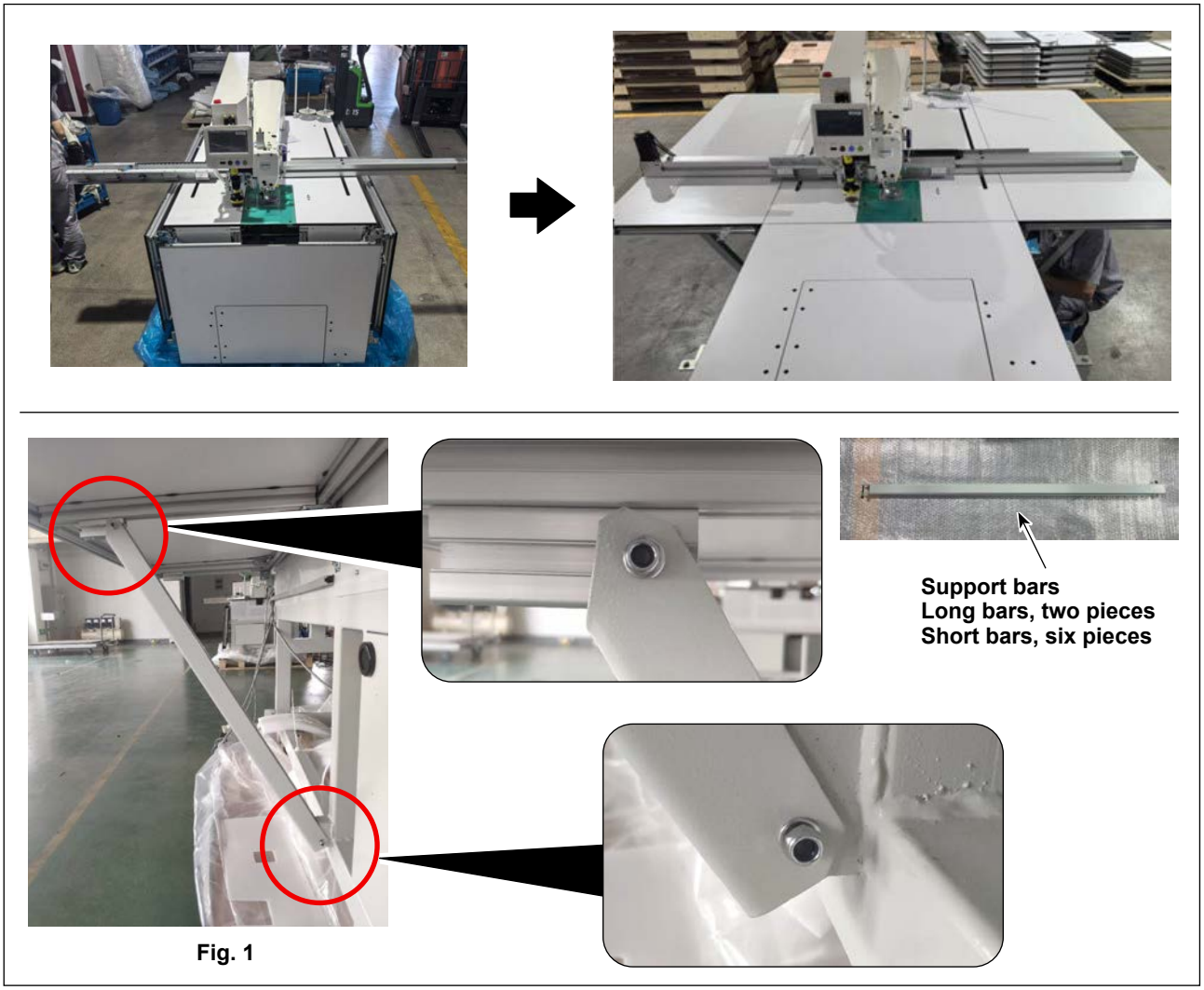
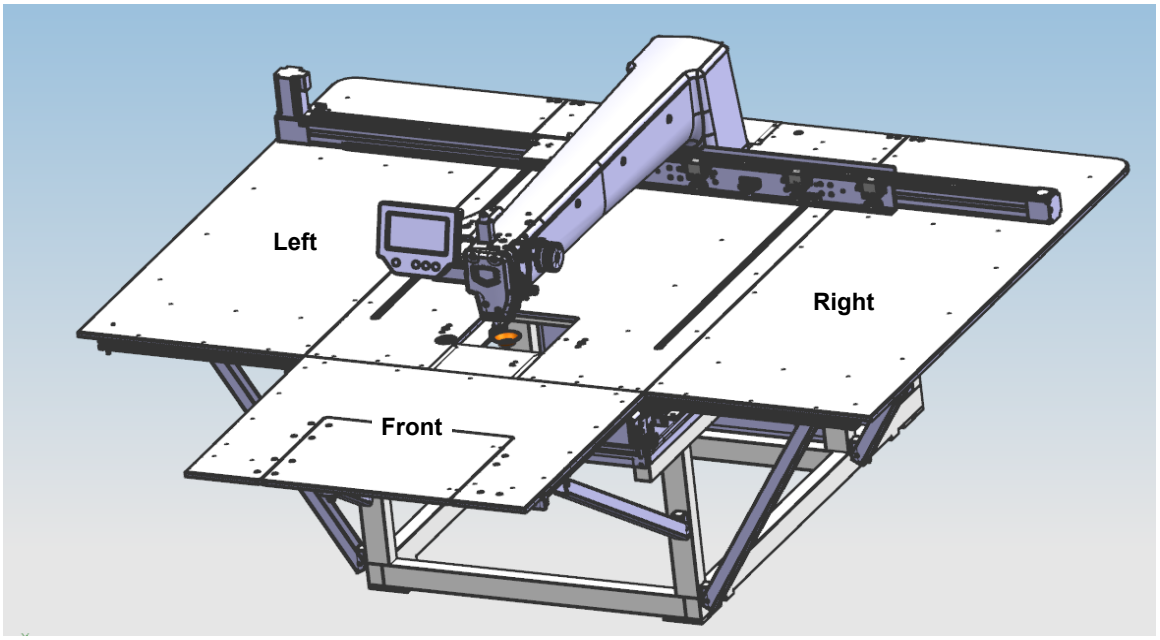


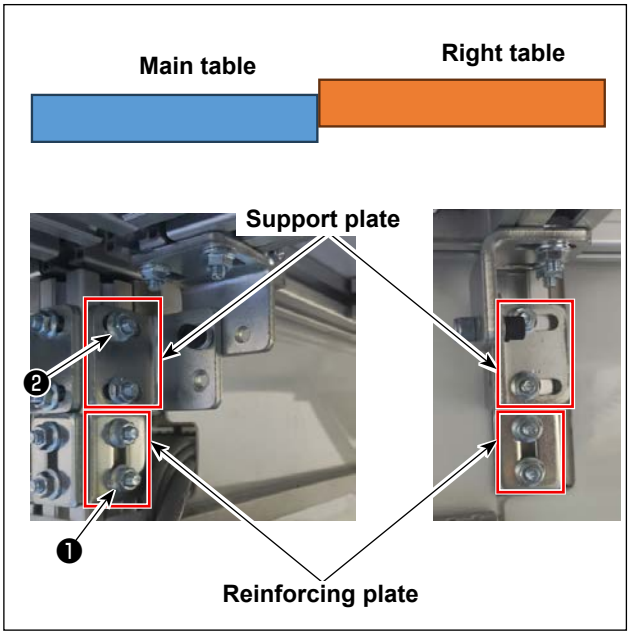
Fig. 1

2) Set up the right and left tables and the front table (middle) with short bars (two each for the right, left and front tables).
Tighten the screws as illustrated in Fig. 1.

2) Make fine adjustments so that each table is level with the main table.



[Example]



If there is a height difference between any table and the main table, adjust it using the following procedure.

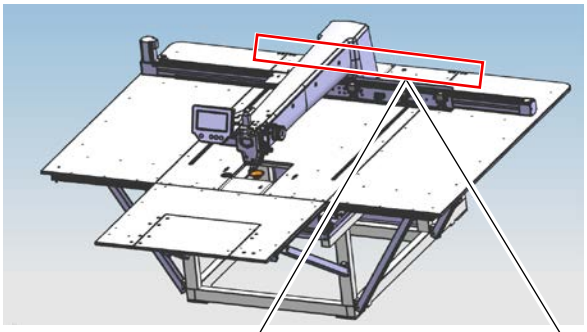
① Loosen setscrews ❶ on the reinforcing plate that supports the unit from below, and remove the reinforcing plate.

② Loosen setscrews ❷ on the support plate, adjust the level difference between the table and the main table, and then tighten setscrews ❷ .

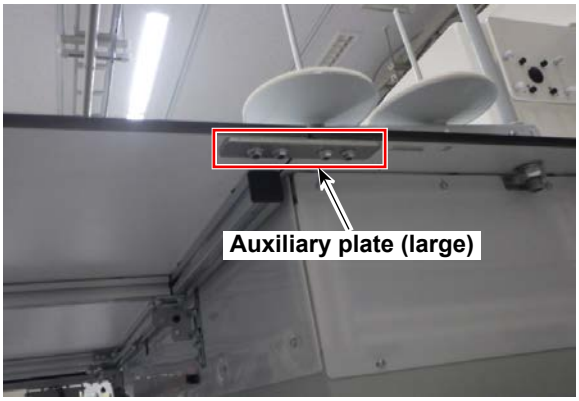
③ Place the reinforcing plate against the support plate and tighten setscrews ❶ .

3) Checking the gap between the X-feed and the table
Make sure that the X-feed does not come into contact with the left or right table.

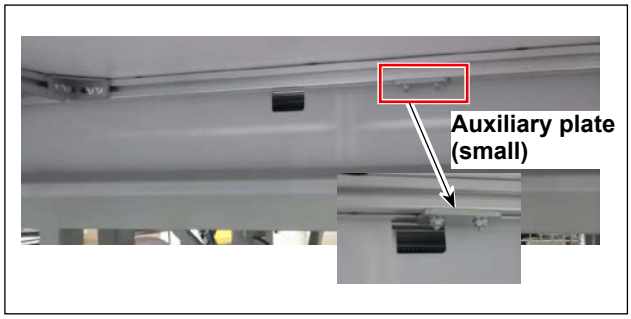
In case of contact
Loosen the two setscrews under the aluminum frame attached to the support bar and adjust the position of the aluminum frame.



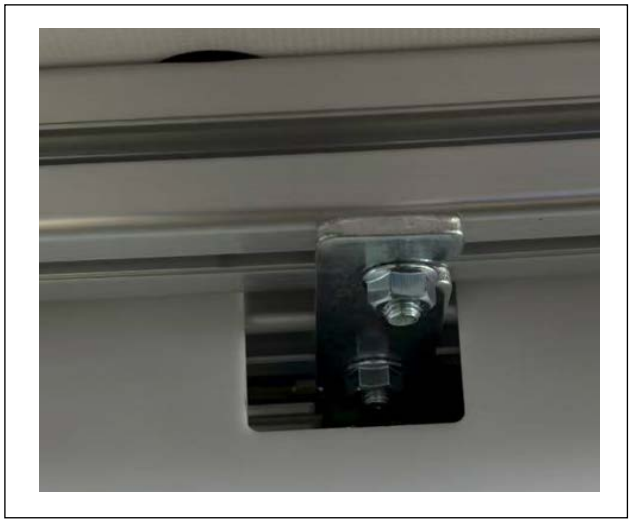
4) Installing the left and right table auxiliary plates (large)
Loosen the two screws on the auxiliary table and the two screws on the main table on the rear side of the sewing machine, and remove the plate, screws, and nuts. (One set each for left and right)



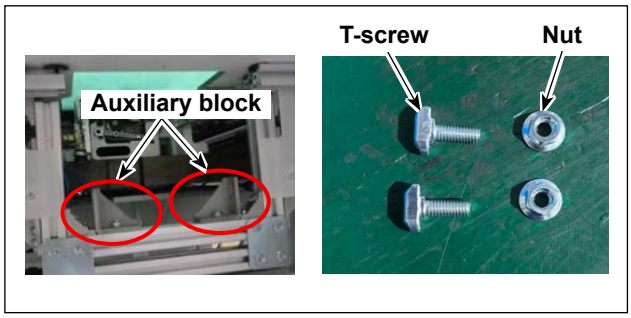
Assemble the auxiliary plate (large) as shown in the left figure.



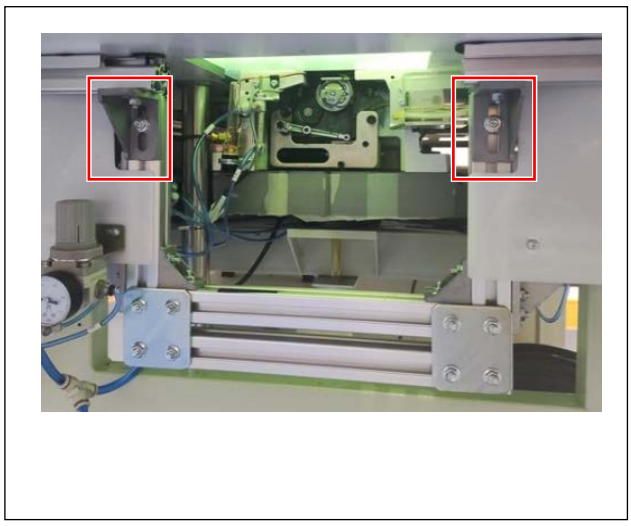
5) Installing the left and right table auxiliary plates (small)
Remove the auxiliary plates attached to the aluminum frame (one on each side of the table).



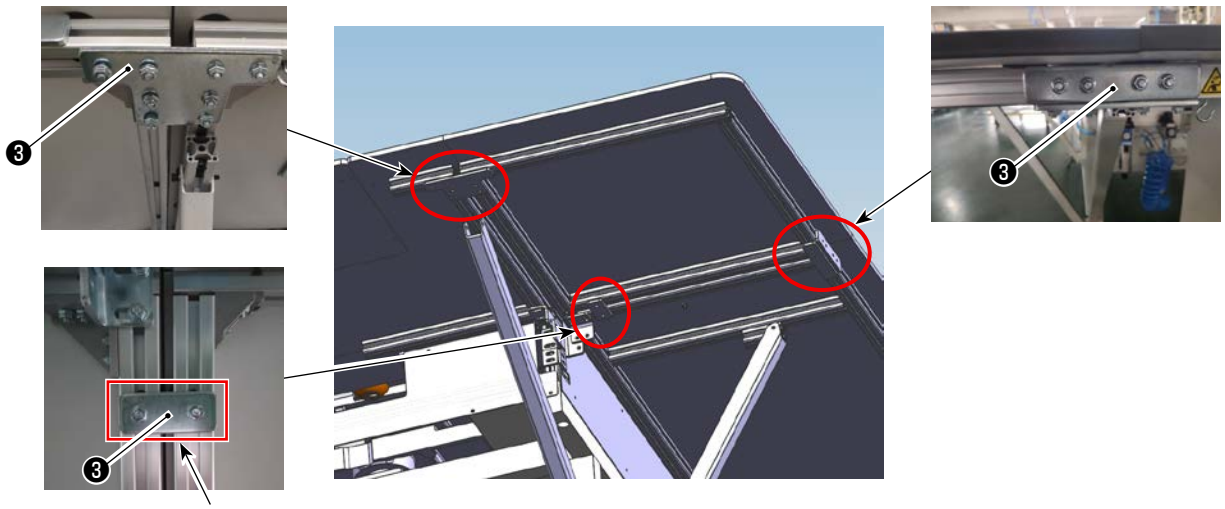
As shown in the left figure, insert it through the opening in the resin cover to connect the two aluminum frames.



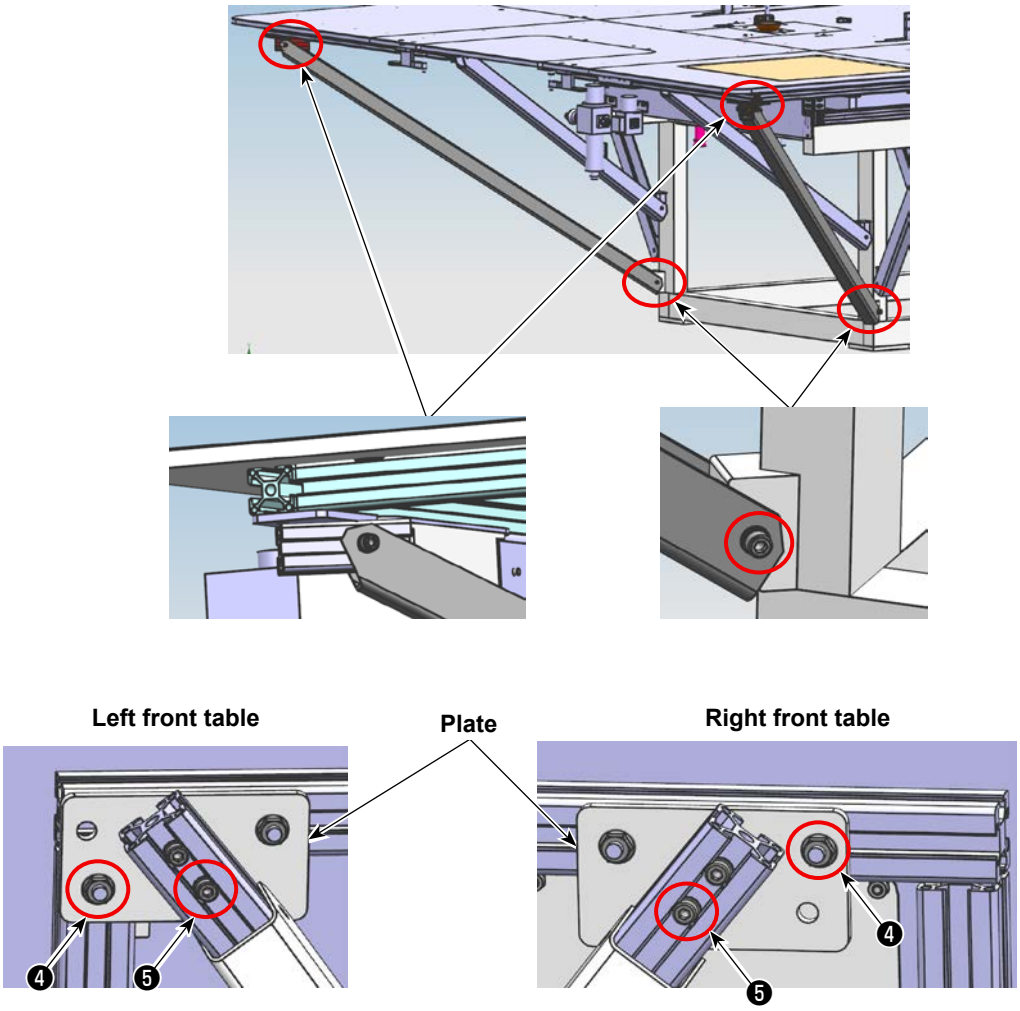
6) Installing the front table auxiliary block
Remove the two auxiliary blocks attached to the aluminum frame.
Take the T-screws and nuts (two of each) from the accessory box and attach them to the auxiliary block.



As shown in the left figure, fit the T-screw of the auxiliary block into the groove of the aluminum frame, then move the block toward the aluminum frame and tighten the nut.

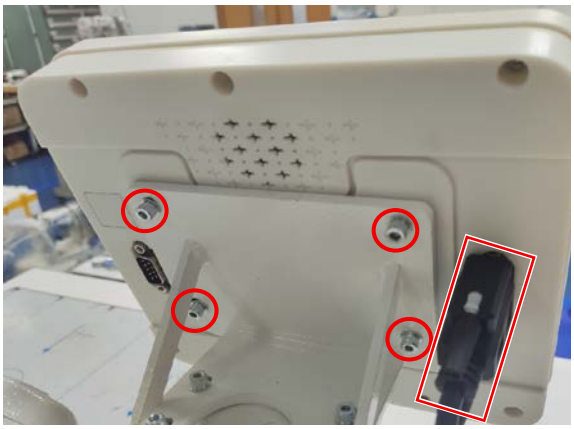


7) Set up the front tables (left) and (right).
Secure the aforementioned parts with dedicated link plates ❶ and the nuts.



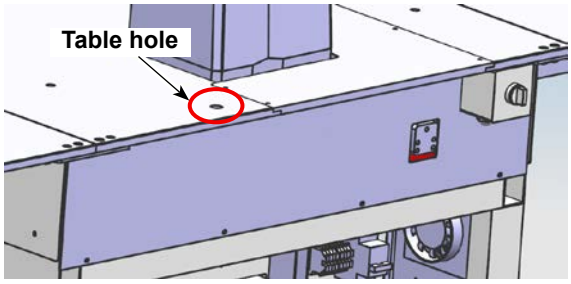
8) Attach one end of the long bar to the table legs on the front left and right sides.
Loosen the fixing screws ❺ (two on each side) of the aluminum frame on the other end, and attach the plate to the aluminum frame of the table with T-screw and nut assemblies ❹ (two on each side), then adjust the position of the plate and fix it in place.

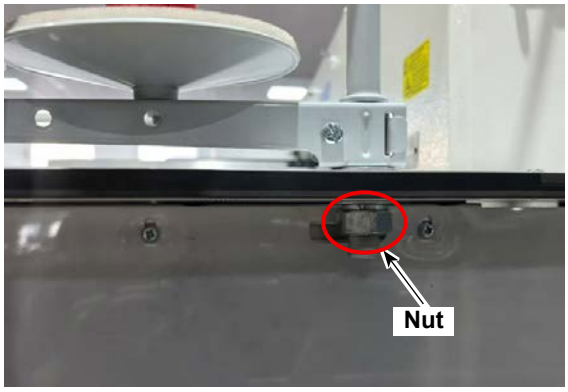
3-1-4. Installing the panel



Secure the panel to the mounting plate with four screws.
Connect the cable to the panel and tighten the cable plug screw.
* Applied to both standard type and rotary knife type.

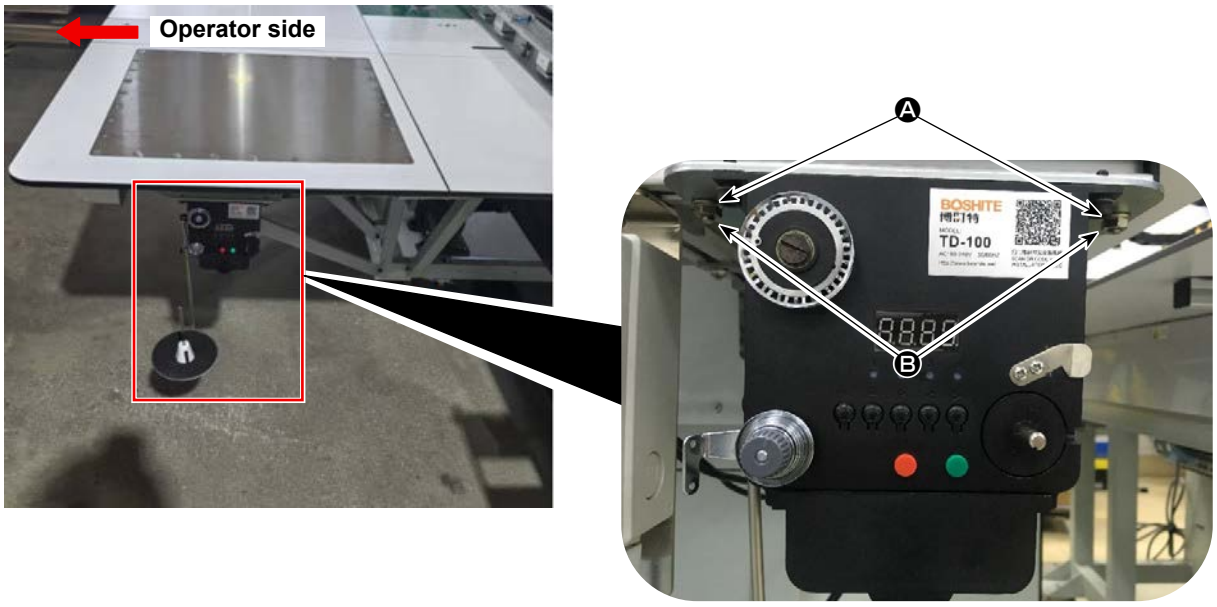
3-1-5. Installing the thread stand





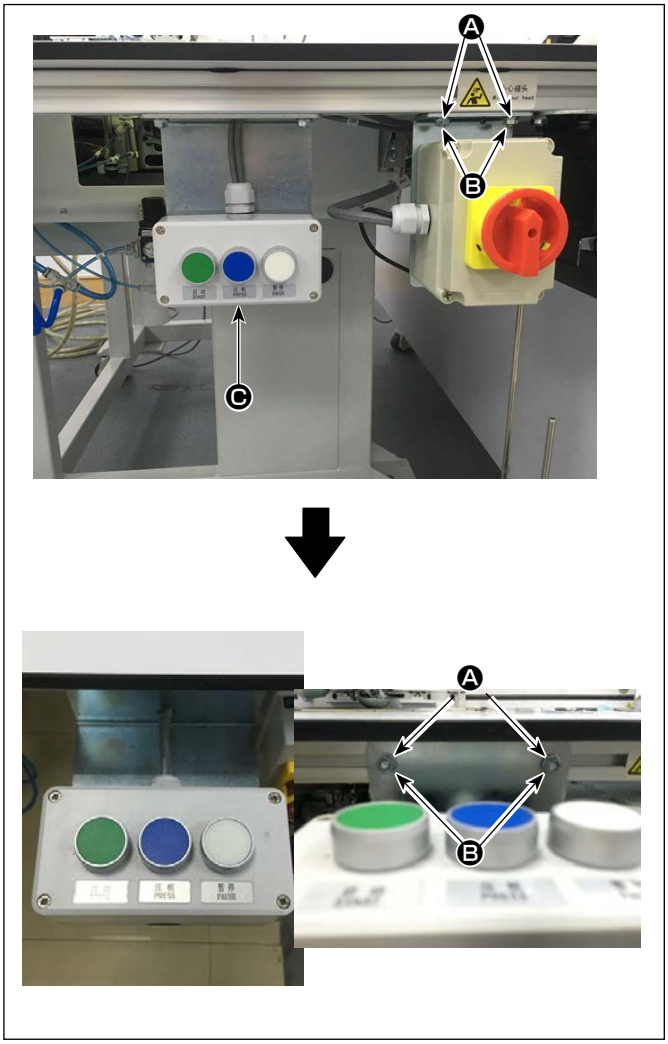
Insert the thread stand into the hole in the table and secure it with the nut.
* Applied to both standard type and rotary knife type.

3-1-6. Setting up the switches, bobbin thread winder and switch button (asm.)



* Tools are packed in the accessory box for the sewing machine.

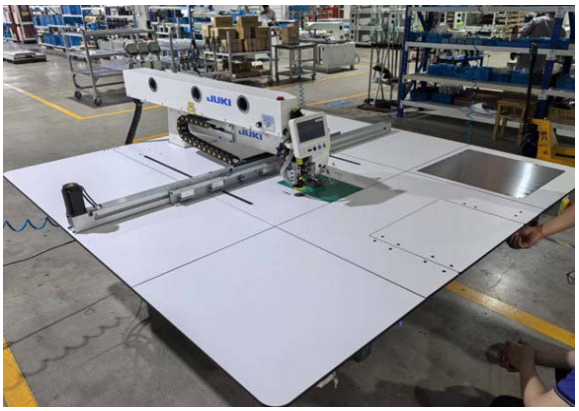
1) The bobbin winding device is fixed to the aluminum frame on the right side of the front table (right) with T-screw Ⓐ and nut Ⓑ.



2) Secure the power switch plate to the aluminum plate of the front table (right) with T-head screw Ⓐ and nut Ⓑ.

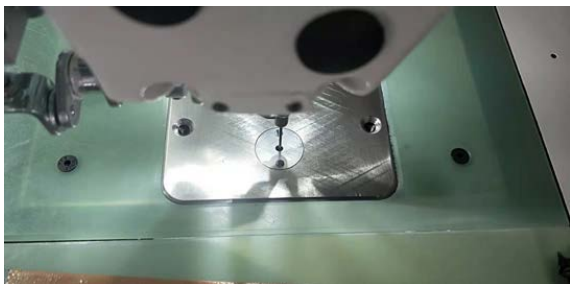
3) For switch button (asm.) Ⓒ, change round the direction of assembly.
Then, secure it to the aluminum plate of the front table (right) with T-head screw Ⓐ and nut Ⓑ.
Secure the switch button (asm.) so that its three switch buttons are faced upward.

3-1-7. Points to be checked and precautions to be taken before turning the power ON



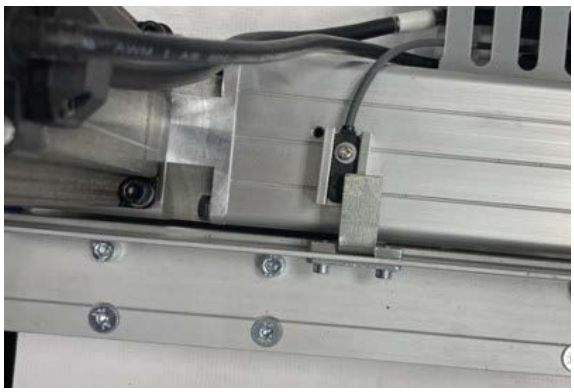
1) Ensure that the sewing machine is level.

2) Check the assembly of the sewing machine's electrical and air components.



3) Check that the needle entry point is aligned with the center of the needle hole in the throat plate.

4) Remove the throat plate and check the hook alignment.

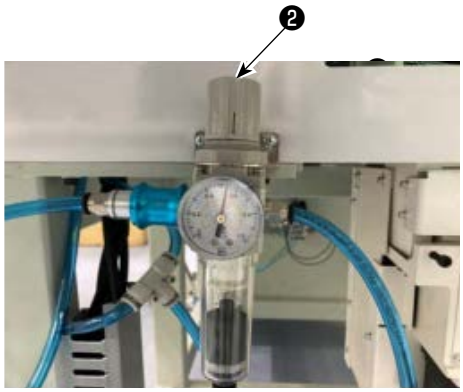


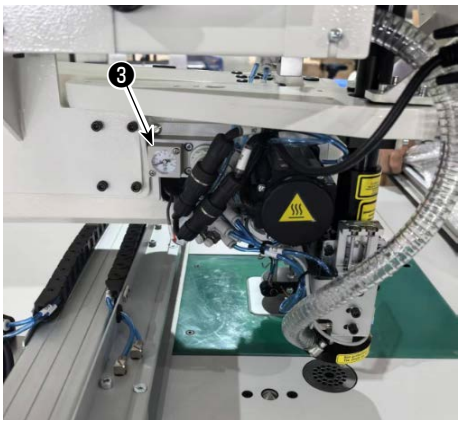
5) Check the clearance between the X-feed origin detection sensor and the detection plate.

6) Check whether the X-feed mechanism operates smoothly.

3-2. Installing the air hose

WARNING :
Check to be sure that the air hose is fully inserted into the air cock before supplying the air to the machine so as to prevent the air from being blown directly to the human body. Then, carefully open the air cock.





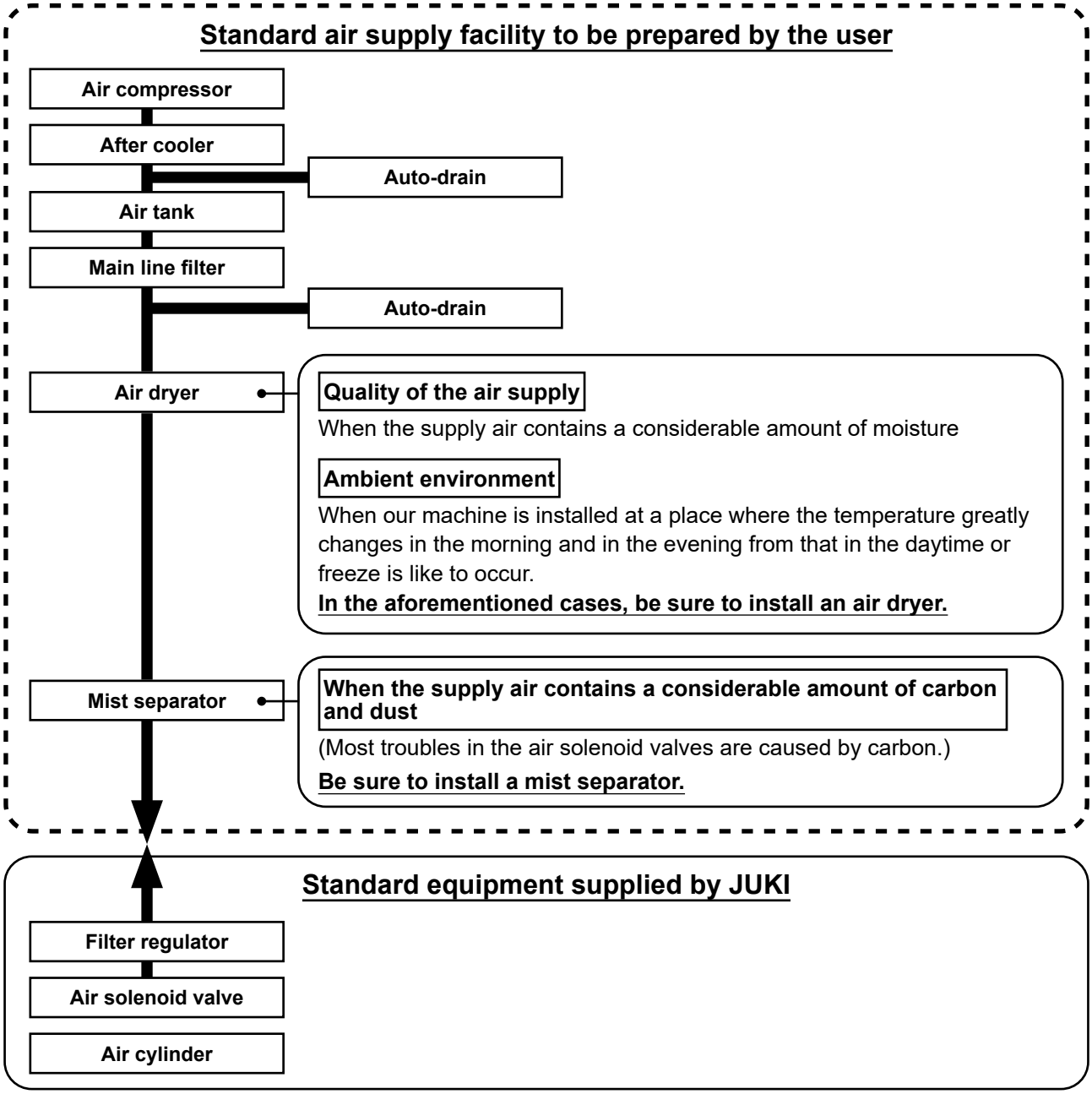
1) Connecting the air hose
   Connect the air hose to ❶ .

2) Adjustment of air pressure
   Pull up air regulating knob ❷ . Then, turn it to adjust the air pressure to 0.5 - 0.55 MPa.
   Then, push down air regulator knob ❷ .
   Pull up air regulating knob ❸ . Then, turn it to adjust the air pressure to 0.15 MPa.
   Then, push down air regulator knob ❸ .

   ❷ : Adjustment of the air pressure of the entire sewing machine
   ❸ : Adjustment of the air pressure of the disk presser

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

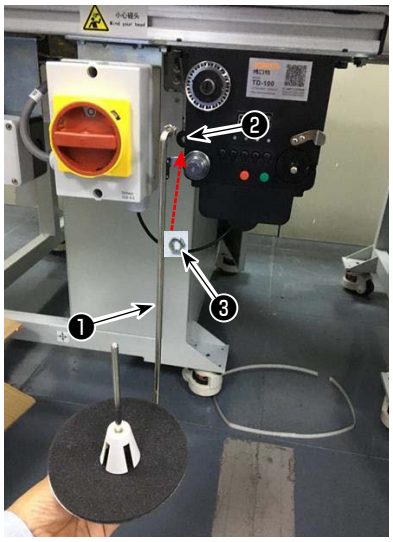
As large as 90 % of failures in pneumatic equipment (air cylinders, air solenoid valves) are caused by "contaminated air."
Compressed air contains lots of impurities such as moisture, dust, deteriorated oil and carbon particles. If such "contaminated air" is used without taking any measures, it can a cause of troubles, inviting reduction in productivity due to mechanical failures and reduced availability.
Be sure to install the standard air supply facility shown below whenever the machine provided with pneumatic equipment is used.



Cautions for main piping

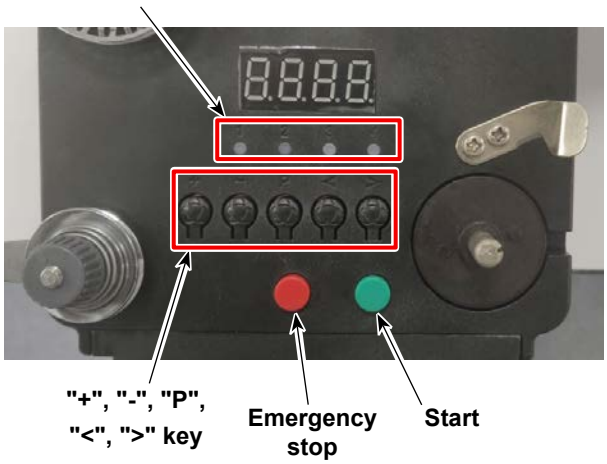
- **Be sure to slope main piping by a falling gradient of 1 cm per 1 m in the direction of air flow.**
- **If the main piping is branched off, the outlet port of the compressed air should be provided at the top part of the piping using a tee in order to prevent drain settling inside the piping from flowing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

3-4. Installing the bobbin winder device

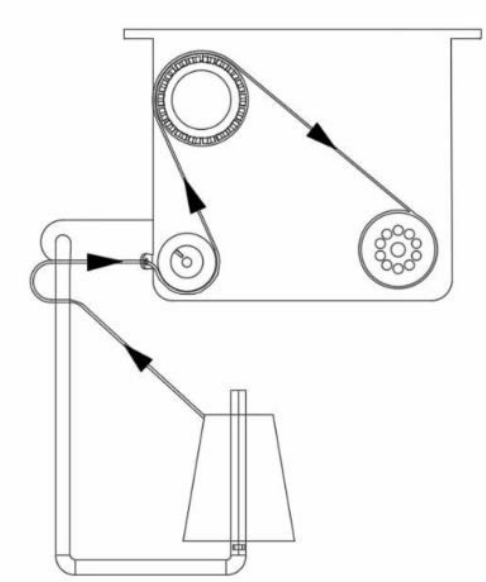


1) Insert bobbin winder disk mounting bar ❶ into hole ❷ in the bobbin winder and secure with nut ❸ .

3-5. How to use the bobbin winding device



4. Threading Diagram



1. Button description

1) Red button: emergency stop, press this button for 2 seconds will be reset.
2) Green button: Start
3) "P" key: function key, Hold down "P" key for 2 seconds to enter parameter setting, after setting is finished, press this key again for 2 seconds to keep parameter.
4) "+" key: numbers from 0 to 9
5) "-" key: numbers from 9 to 0
6) "<" key: turn left
7) ">" key: turn right

2. Indicator light

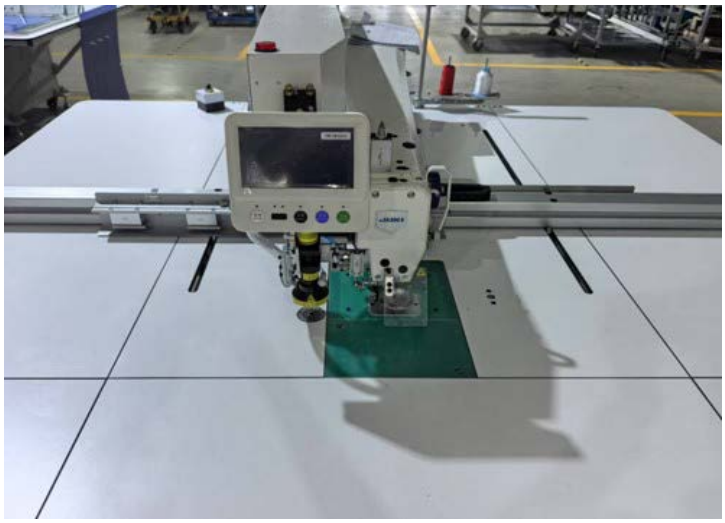
1) Parameter indicator light
2) Production failure indicator light
3) Stop indicator light
4) Work indicator light

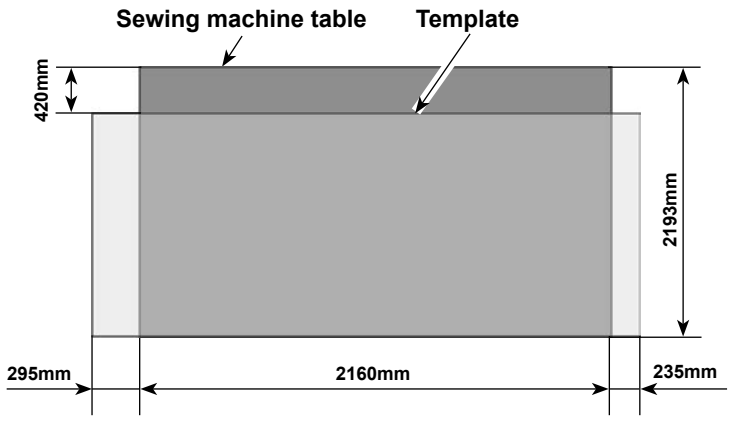
3. Parameter setting

Hold down "P" key for 2 seconds to enter the parameter setting inter face.

A: The thread length setting is 0 to 99.9 meters
B: Compensate for 0 to 9.9 meters
C: The bobbin calculate to thread length 0 to 99.9 meters
D: Motor speed: F1 (fast), F2 (medium), F3 (slow)
E: LED lamp brightness: H0 (OFF), H1 (darkest), H2, H3, H4, H5 (brightest)

3-6. Precautions for installation of the machine





1. **Depending on the size of template, the sewing machine may extend beyond the sewing machine table in X direction. Take care not to allow the machine to hit against someone standing near the table to cause injury.**
2. **Be sure to secure a space as wide as 500 mm or more around the sewing machine table (i.e., both in lateral and longitudinal directions).**

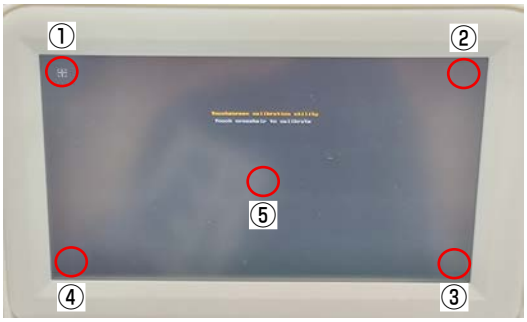
4. PREPARATION OF THE SEWING MACHINE

4-1. Panel calibration

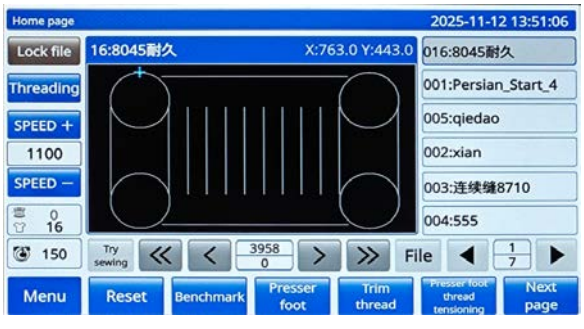
Start the sewing machine, touch the panel, and if the response point on the panel does not match the touch point, calibrate the panel.

1) With the sewing machine turned off, press the LCD panel with your hand and turn it on.

2) Release your hand from the panel only when the calibration screen appears.



3) A “+” mark is displayed on the calibration screen. Click the “+” marks in the order of ① to ⑤ .



4) Once the calibration is complete, the panel will enter the main operation screen.

4-2. Panel language setting

4-2-1. Language setting

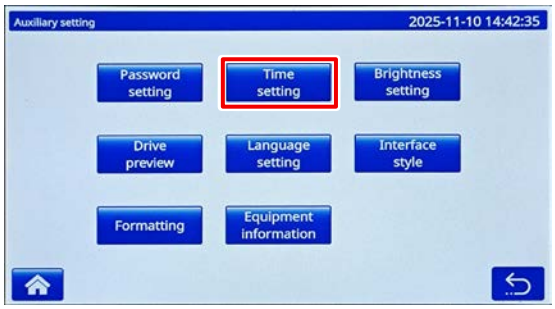
1) Click “Menu”.
   * The panel language is set to Chinese at the time of shipment.

2) Click “Assist Setting”.

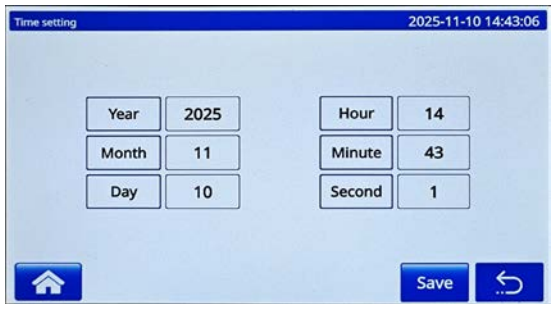
3) Click “Language Setting”.

4) There are 13 languages available.
   Select the language of your preference.

4-2-2. Time settings



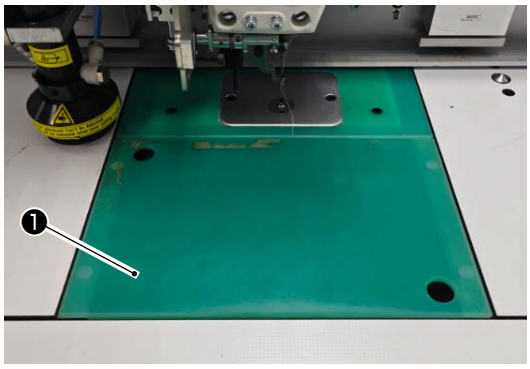
1) Click “Time Settings”.



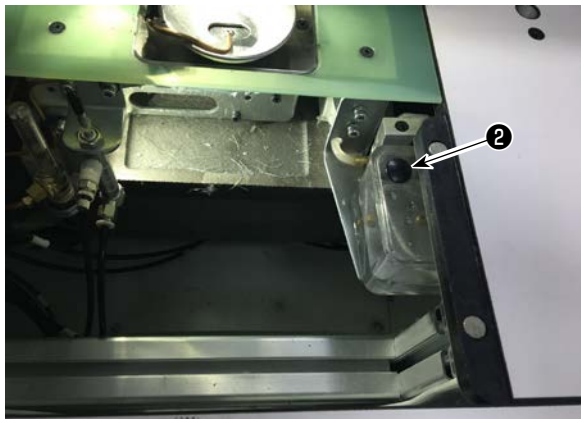
2) You can set the year, month, day, hours, minutes, and seconds.

4-3. Lubricating method and check of the oil quantity

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

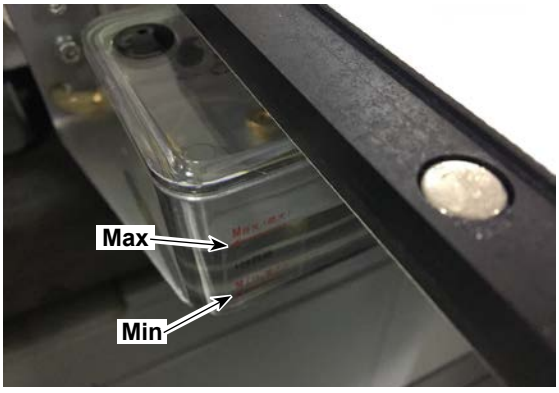


1) Detach cylinder lifting plate ❶ .



2) Remove rubber plug ❷ from the oil tank.

3) Fill the oil tank with the accessory oil (or the specified oil).

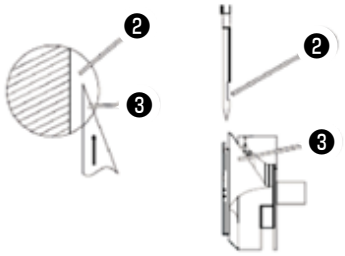


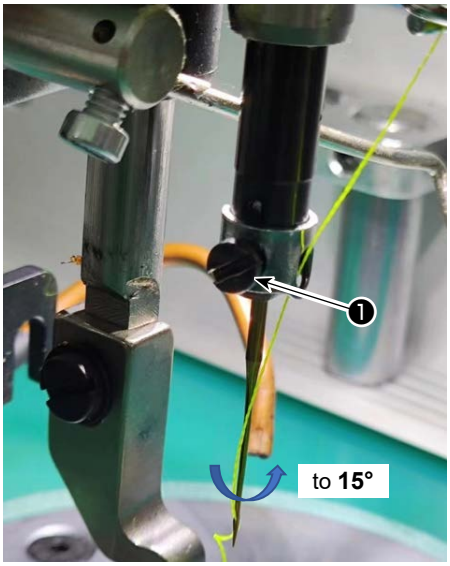
4) The adequate oil amount is obtained when the oil surface stays between the oil tank indications "Min" and "Max".

1. Do not use any oil other than the specified oil. After the completion of lubrication, securely attach the rubber plug and cylinder lifting plate to their original positions.
2. When you put the sewing machine into use for the first time after delivery or after having disused it for a long time, replenish the hook with a small amount of oil in advance.

4-4. Attaching the needle

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





1) Loosen screw ❶ to remove the needle.

Be sure to hold the needle so that its groove ❷ faces toward blade point ❸ of the rotary hook.
If polyester filament thread is used, it may be sometimes difficult for the wiper to spread the thread. In such a case, turn the needle counterclockwise to tilt it slightly (15° or less).
After you have turned the needle, re-check the hook timing (clearance between the needle and the hook).

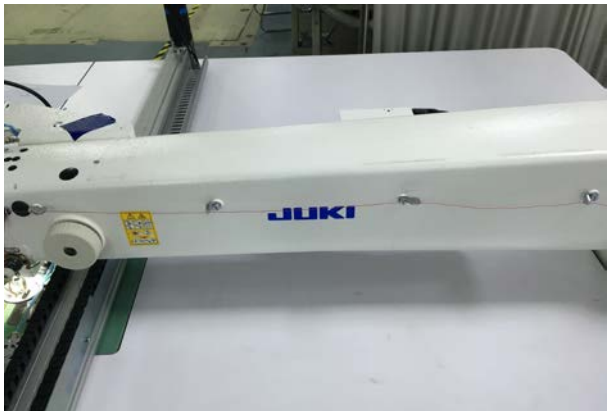
2) Tighten screw ❶ .

In the case of replacing the needle with a needle which differs in specifications, be sure to re-adjust the distance from the rotary hook to the needle. If you neglect this re-adjustment, the problems listed below can occur.
1. Stitch skipping
2. Thread fray
3. Breakage of blade point of hook
4. Breakage of needle

4-5. Threading the machine head

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

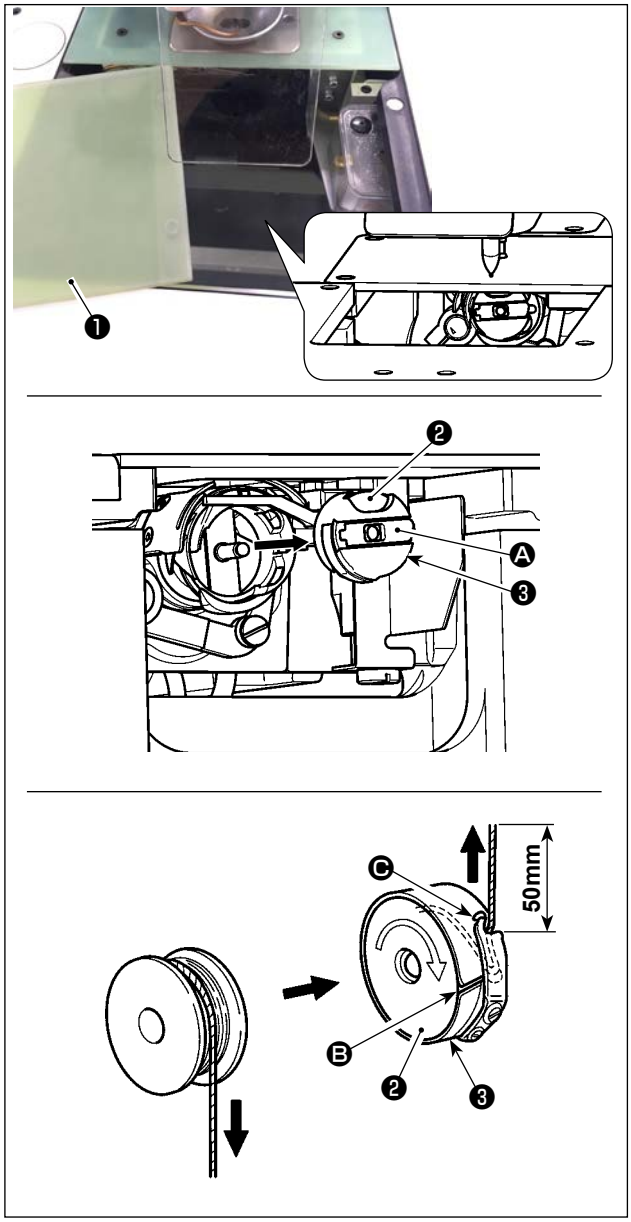
1) Put sewing machine thread ❶ on thread stand ❷.



2) Pass the thread as illustrated in the figure.
Lastly, draw out thread end through needle eyelet by 50 to 60 mm.

4-6. Bobbin replacement procedure

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



(1) Removing the bobbin case

1) Open cover ❶ . Then, the bobbin can be changed.
2) Raise latch Ⓐ of bobbin case ❸ , and remove the bobbin case ❸ and the bobbin ❷ .

Check the position of your hands and the locations of goods before opening / closing cover ❶ so as to prevent the goods from being caught under the cover and to prevent bodily injury.
In addition, do not push cover ❶ with your hands placed on it.

(2) Installing the bobbin

1) Set the bobbin ❷ into bobbin case ❸ in the direction shown in the figure.
2) Pass the thread through thread slit Ⓑ of bobbin case ❸ , and pull the thread as it is. By so doing, the thread will pass under the tension spring and be pulled out from thread hole Ⓒ.
3) Pull out the thread by 50 mm from thread opening Ⓒ.

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

(3) Installing the bobbin case

1) Place the bobbin case in the hook with its knob Ⓐ tilted and fully push it into the hook until you hear it click.
2) Close cover ❶ .

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

4-7. Adjusting the thread tension

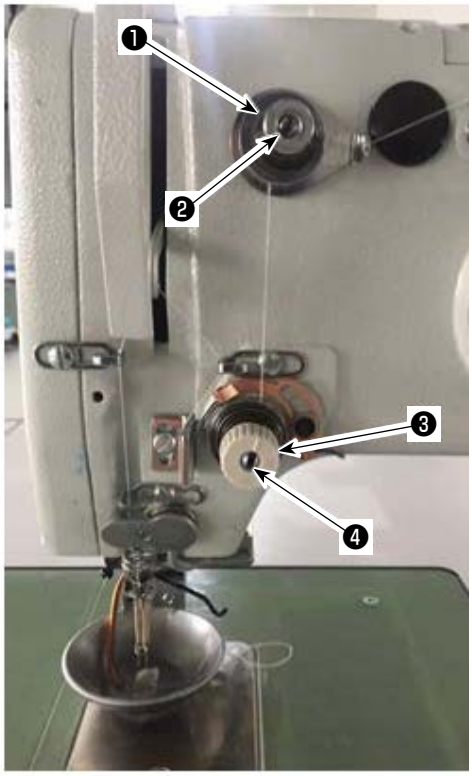


Fig. A

Fig. B

Fig. C

(1) Adjusting the needle thread tension

Thread tension controller No. 1 ❶

When the tension disk of thread tension controller No. 2 ❸ is loosened, such a small tension as to control the thread trimmer has to remain. The remaining tension is produced by tension controller ❶ . It is possible to determine the length of thread trailing from the needle after automatic thread trimming by adjusting nut ❷ of the thread tension controller. The length of thread trailing from the needle is reduced by turning nut ❷ clockwise (+). It is increased by turning nut ❷ counterclockwise (-).

Thread tension controller No. 2 ❸

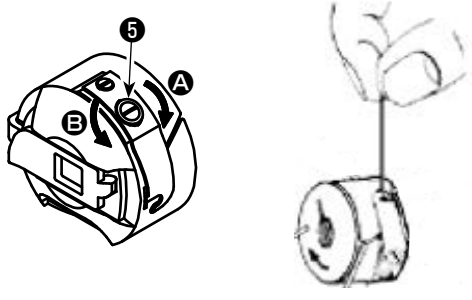
The tension (applied to the thread coming from the needle) controlled with thread tension controller No. 2 ❸ should be set as low as possible so that the needle thread and bobbin thread are interlaced together at the center of material thickness (Fig. A). If the thread tension is excessively high when sewing a light-weight material, the material may become wrinkled or thread may break. The tension applied to the thread coming from the needle is increased by turning nut ❹ clockwise (+).

It is decreased by turning nut ❹ counterclockwise (-).

Fig. A: Threads are interlaced together accurately at the center of material thickness.

Fig. B: Needle thread tension is too low or bobbin thread tension is too high.

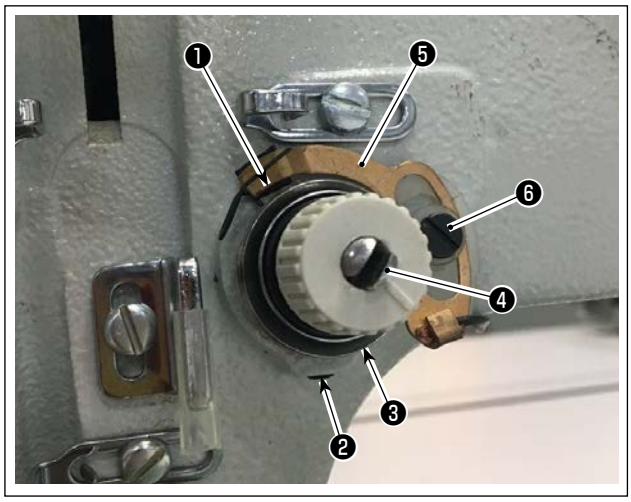
Fig. C: Needle thread tension is too high or bobbin thread tension is too low.



(2) Adjusting the bobbin thread tension

1) Turn tension adjusting screw ❺ clockwise (in direction Ⓐ) to increase or counterclockwise (in direction Ⓑ) to reduce the bobbin thread tension.
Recommended value: Approximately 25 g
The bobbin case will come down slowly by its dead weight by holding it as illustrated in the figure.

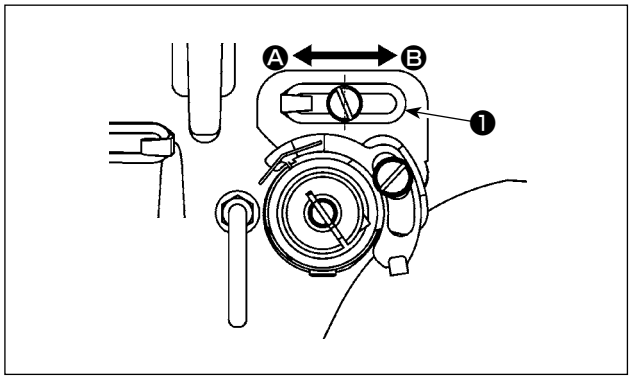
4-8. Adjusting the thread take-up spring and the thread breakage detector plate



1) Adjusting the stroke
   Loosen setscrew ❷ . Turn thread tension controller ❸ . Turning it clockwise will increase the stroke of the thread take-up spring ❶ and the thread drawing amount will increase.
2) Adjusting the pressure
   To change the pressure of the thread take-up spring ❶ , insert a thin screwdriver into the slot of thread tension post ❹ while screw ❷ is tightened, and turn it. Turning it clockwise will increase the pressure of the thread take-up spring ❶ . Turning it counterclockwise will decrease the pressure.
3) Adjusting the thread breakage detector plate
   Loosen setscrew ❻ . Adjust the position of thread breakage detection plate ❺ so that the contact depth between thread breakage detection plate ❺ and thread take-up spring ❶ becomes 0 to 0.2 mm.

Adjust so that thread breakage detector plate ❺ does not touch any adjacent metallic parts other than thread take-up spring ❶ . If the thread breakage detection plate comes in contact with any other metal part, a maloperation can occur.

4-9. Adjusting the thread take-up stroke

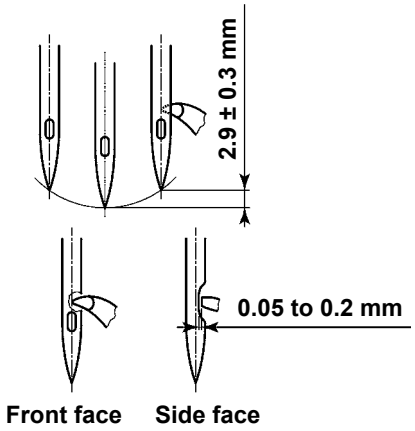


1) When sewing heavy-weight materials, move thread guide ❶ to the left (in direction Ⓐ) to increase the length of thread pulled out by the thread take-up.
2) When sewing light-weight materials, move thread guide ❶ to the right (in direction Ⓑ) to decrease the length of thread pulled out by the thread take-up.
3) Normally, thread guide ❶ is positioned in a way that the center of elongated hole is aligned with the center of the screw.

4-10. Needle-to-hook relationship

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

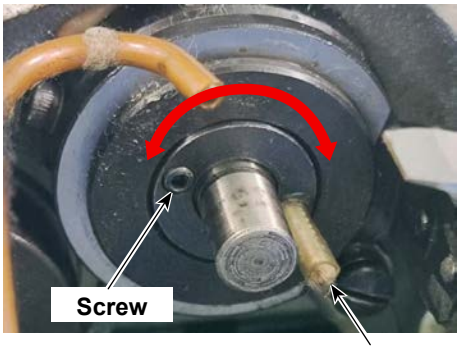
(1) Needle and hook, and angle setting



1) Lift the needle bar from its lower dead point by 2.9 ± 0.3 mm. In this state, adjust the needle bar height and the hook position.
2) When observing from the front face of the sewing machine, the blade point of hook seems to overlap with the center of needle.
3) When observing from the side face of the sewing machine, the clearance provided between the blade point of hook and the scarf of needle is 0.05 to 0.2 mm.

If thread breakage occurs, the thread can be tangled in the hook. In such a case, remove the thread being tangled in the hook carefully. Then, re-start sewing.

4) As shown in the figure, refer to the QEP values below for the angle setting of the electrical shaft.
At needle bar bottom dead point: 1190-1210
At hook timing alignment: 1360-1380

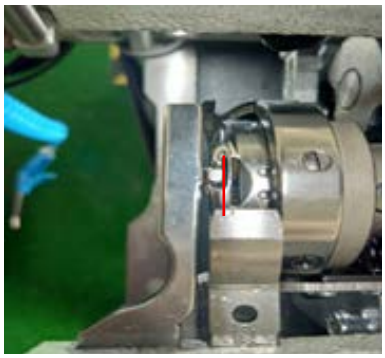


5) As shown in the figure, the lubrication pipe is inserted into the oil supply hole on the hook. When the hook alignment is adjusted significantly, the lubrication pipe must be adjusted relative to the position of the oil supply hole on the hook.
How to adjust :
① Loosen the screw.
② Insert the lubrication pipe into the hook and attach the hook.
③ After adjusting the hook alignment, remove the hook.

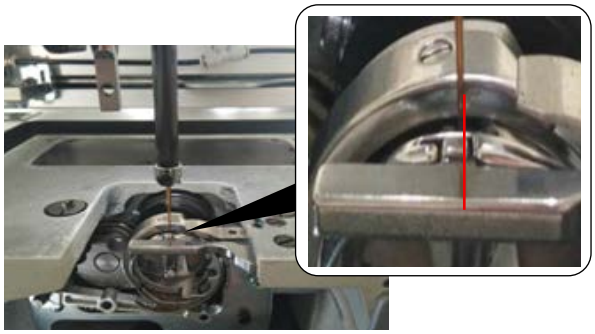
When removing the hook, do not turn it left or right to avoid misalignment of the lubrication pipe.

④ While pressing the lubrication pipe assembly, tighten the screw. After that, attach the hook and perform the hook alignment.

(2) Position of the needle and the inner hook holder



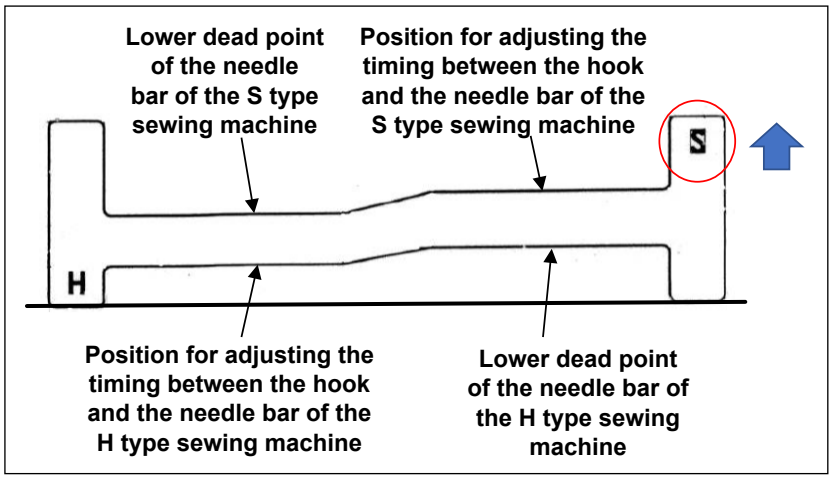
Longitudinal position of the inner hook holder and needle: The front end of needle is aligned with the inner hook.



Lateral position of the inner hook holder and needle: The rightmost end of projection of inner hook holder is aligned with the right side of needle.

(3) Adjusting the hook timing

The timing gauge is supplied for the machine as an accessory.



Adjust the hook timing according to the sewing type (S type / H type) of the sewing machine.

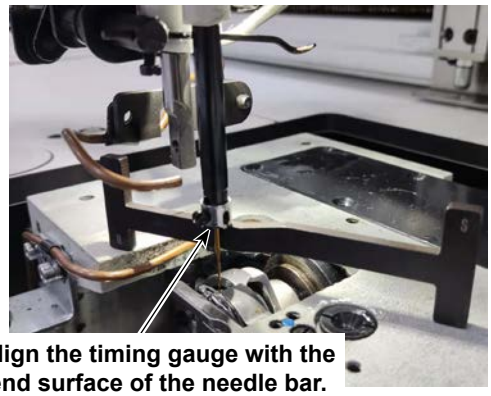
Turn the timing gauge upside down according to the sewing machine type as shown in the figure on the left.

For the S type :

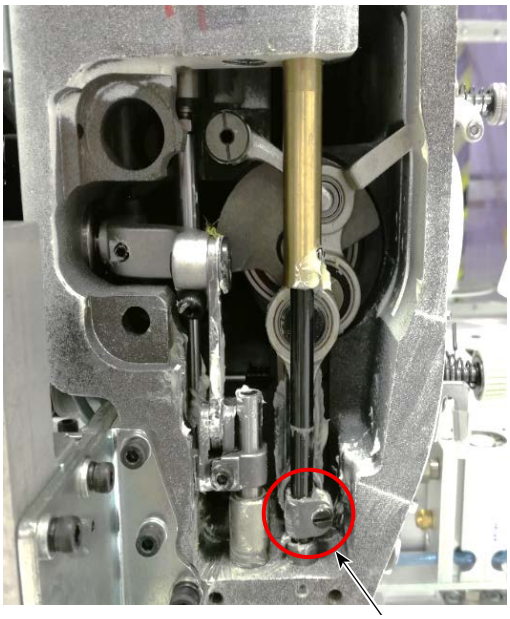
Position the timing gauge with its S inscription turned up

For the H type :

Position the timing gauge with its H inscription turned up



Align the timing gauge with the end surface of the needle bar.

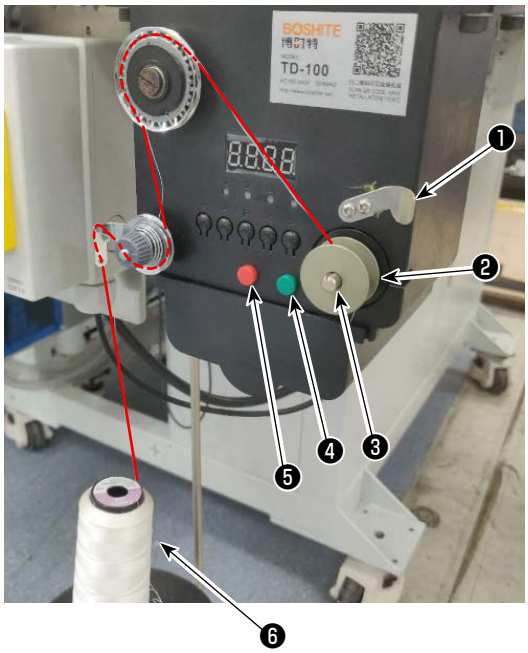


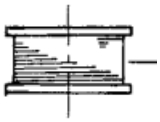
Needle bar connection setscrew

1) Put the timing gauge on the hook spindle base. Then, adjust the lower dead point of the needle bar first.
   Loosen needle bar connection setscrew. Adjust the height of the needle bar.
2) Then, turn the timing gauge by 180 degrees of an angle longitudinally. Adjust the hook timing position.

When adjusting the hook timing, it is necessary to put the jig on the left side of the needle to prevent the jig from coming in contact with the needle bar thread guide.

4-11. How to wind a bobbin



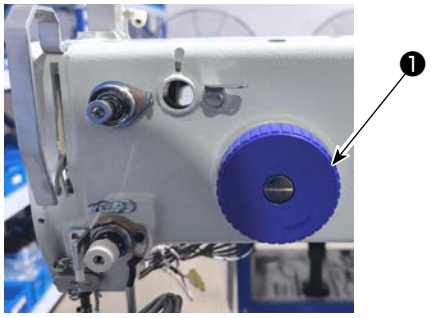


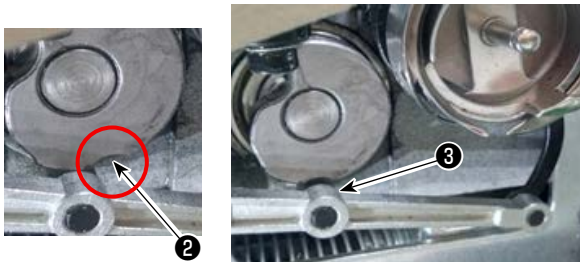
Amount of thread wound on a bobbin: 80 %
(recommended)

1) Put bobbin ❷ on bobbin winder shaft ❸ .
2) Pass sewing thread ❻ through spool rest rod.
3) Pass the thread as illustrated in the figure.
4) Manually wind thread on bobbin ❷ by several turns clockwise.
5) Press button ❹ to start winding thread on the bobbin.
6) When the bobbin thread amount wound on the bobbin reaches the set amount (80 %), the bobbin winder automatically stops turning. Or, press button ❺ to stop the bobbin winder.
7) Trim the thread with thread trimmer ❶ . Detach bobbin ❷ .

4-12. Adjusting the position of the thread trimmer

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

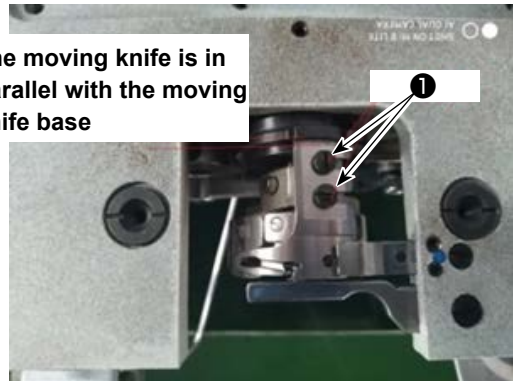




(1) Adjusting the position of the thread trimming cam

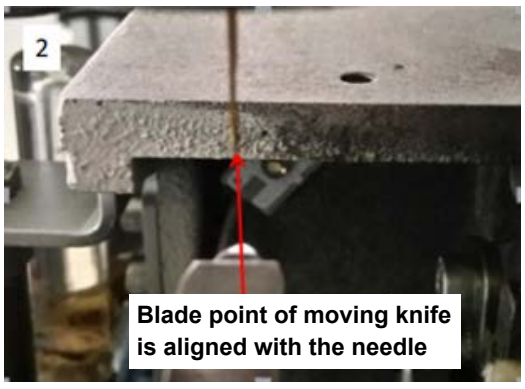
1) Turn pulley ❶ to engage needle bearing ❸ of the thread trimmer connecting rod with groove ❷ in the thread trimming cam.

The specified QEP value of the electrical shaft angle setting parameter has been factory-adjusted to 700±10 at the time of shipment. Finely adjust the parameter according to the difference in material.

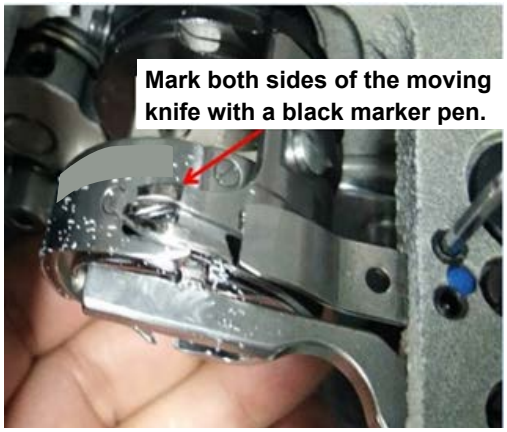


(2) Adjusting the position of the moving knife and counter knife

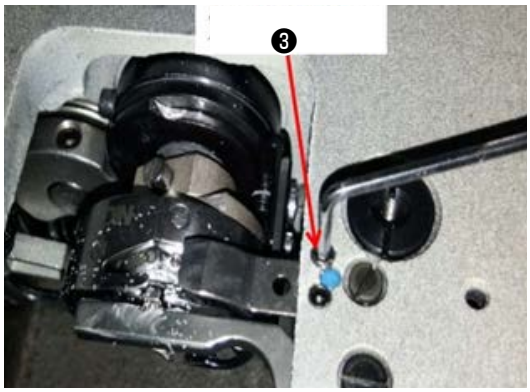
1) Attach the moving knife to the moving knife base. Push the moving knife to the right to make the tail of the moving knife in parallel with the moving knife base. At this time, the blade point of moving knife is aligned with the needle. Tighten moving knife clamping screw ❶ .

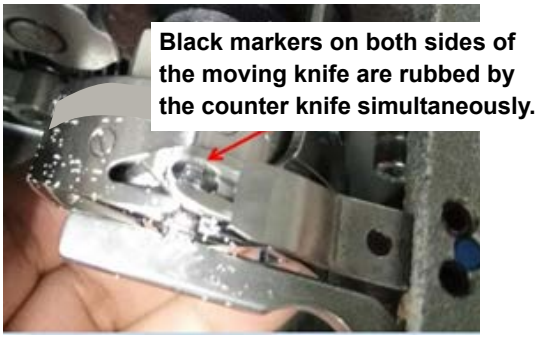


2) Attaching the counter knife
The tail portion of the counter knife has a hole. Inserting 2.5 hexagonal wrench key ❷ into that hole, tighten the fixation screw of the counter knife while aligning the tail portion of the counter knife with the hexagonal wrench key.

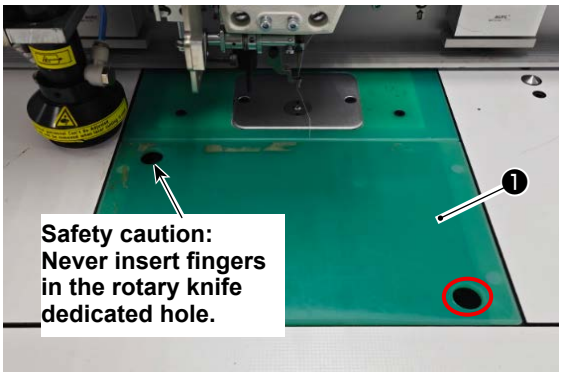


3) Mark the 5-mm position of the moving knife blade with a black marker pen. Adjust the counter knife pressure with counter knife pressure adjustment screw ❸ .
After the completion of the aforementioned adjustment, face down the moving knife and re-adjust the moving knife pressure repeatedly until both sides of the black marker on the moving knife blade are rubbed by the counter knife at the same time. In addition, try to adjust so that; the less the friction force between the moving knife and the counter knife is decreased, the better thread trimming result can be obtained.





4-13. How to remove and install the lifting plate



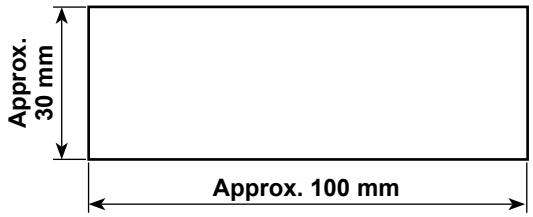
1) With the sewing machine turned off and in a safe state, insert your finger into the round hole in the lifting plate ❶ and remove it.
2) When installing the lifting plate ❶ , fit it into the table opening and secure it with an embedded magnet so that it does not protrude from the table top.

4-14. How to confirm the amount of oil (oil splashes) in the hook

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.

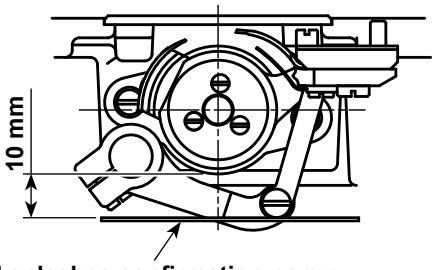
(1) How to confirm the amount of oil (oil splashes)

❶ **Amount of oil (oil splashes) confirmation paper**



*** Use any paper available regardless of the material.**

❷ **Position to confirm the amount of oil (oil splashes)**

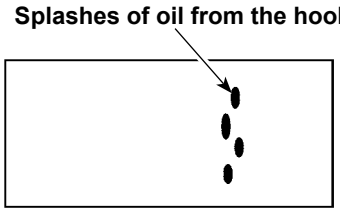


When carrying out the procedure described below, confirm the state that the needle thread from the thread take-up lever to the needle and the bobbin thread are removed, the presser foot is lifted and the slide plate is removed. At this time, take extreme caution not to allow your fingers to come in contact with the hook.

1) Check to make sure that the oil quantity is adequate referring to **"4-3. Lubricating method and check of the oil quantity" p.24**.
2) If the machine has not been sufficiently warmed up for operation, make the machine run idle for approximately fifteen minutes.
3) Place the amount of oil (oil splashes) confirmation paper under the hook while the sewing machine is in operation.
4) Confirmation of the amount of oil (oil splashes) should be completed in ten seconds.

(2) Sample showing the appropriate amount of oil (oil splashes)

Appropriate amount of oil (State of oil spots)

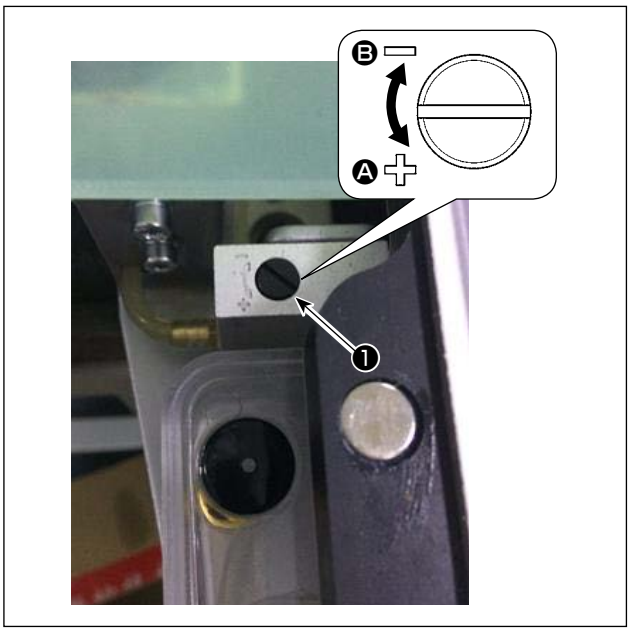


1) The state given in the figure above shows the appropriate amount of oil (oil splashes).
2) Check the oil amount (oil splashes) three times (on the three sheets of paper), and adjust so that it should not change.

Do not 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.

4-15. Adjusting the amount of oil in the hook

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

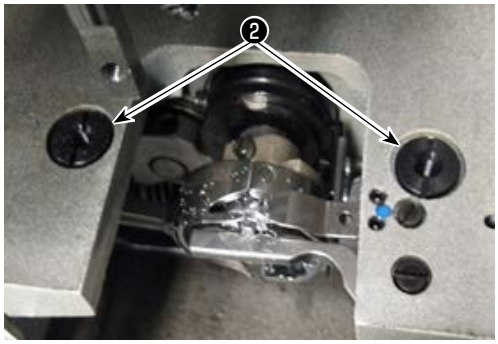


1) Remove the cylinder lifting plate.
2) The oil amount is increased by turning screw ❶ in the direction of arrow Ⓐ, or decreased by turning it in the direction of arrow Ⓑ.
3) After the completion of adjustment, attach the cylinder lifting plate.

1. **After the adjustment, check the oil quantity by running the sewing machine idle for approximately 30 seconds, as well as by checking it in comparison with the sample showing the adequate oil quantity. (Refer to "4-14. How to confirm the amount of oil (oil splashes) in the hook" p.37.)**
2. **In the case of adjusting the hook oil quantity, firstly adjust the oil quantity by turning oil quantity adjustment screw in the direction of arrow Ⓐ to increase it. Then, adjust the hook oil quantity by turning the adjustment screw in the direction of arrow Ⓑ to decrease it.**
3. **The hook oil quantity has been factory-adjusted at the time of shipment, based on the maximum sewing speed of sewing machine. When the customer always operate the sewing machine at a low speed, the hook oil quantity may run short causing a sewing machine failure. To prevent such a failure, adjustment of the hook oil quantity is required when the customer runs the sewing machine at a low speed at all times.**

4-16. Adjusting the needle hole in the throat plate and the needle

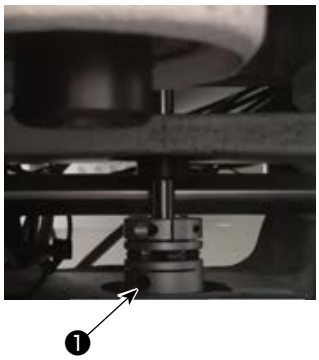
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

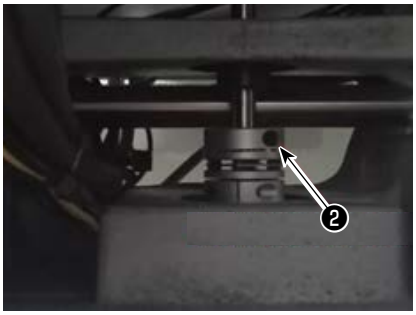


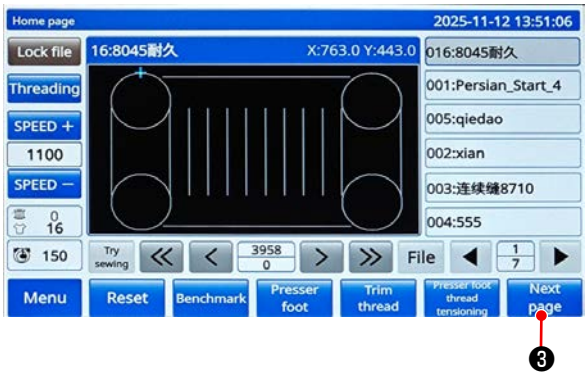
In the case the needle does not come down to the center of needle hole in The throat plate, the position of the throat plate can be adjusted with screw ❶ .

1) Attach the throat plate.
2) Loosen two needle hole adjustment eccentric screws ❷ of the throat plate. Adjust the position of the throat plate so that the needle is aligned with the center of needle hole in the throat plate by moving the throat plate.
3) Tighten needle hole adjustment eccentric screws ❷ of the throat plate.

4-17. Setting the mechanical origin

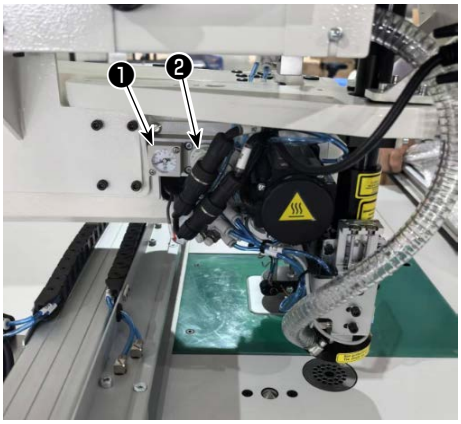




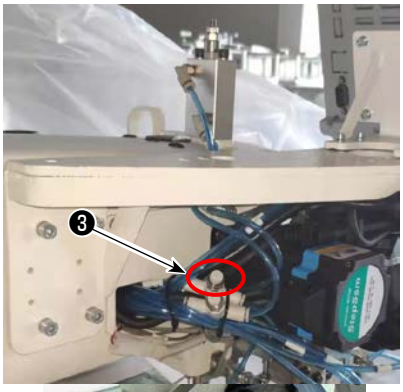


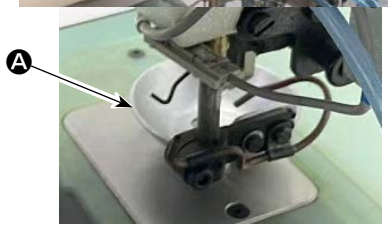
1) Slightly tighten screw ❷ on the lower shaft side. Then, turn the pulley to position screw ❶ on the main shaft motor so that it is levelled and faces upward.
2) Holding the pulley, press Next page ❸ on the main screen of the electrical box.
3) Set the QEP value to 588 (reference value), tighten screw ❶ on the main shaft motor side, loosen screw ❷ on the lower shaft side, and then turn the pulley to raise the needle bar to its upper dead point.
4) Hold down the pulley (do not move the needle bar), click on the QEP value, adjust it to 0 ±10, and then tighten screw ❷ on the lower shaft side.
5) This completes the origin adjustment. Turn the pulley again, and if the QEP value at the upper dead point of the needle bar becomes 0, then the origin adjustment is correct.

4-18. Adjusting the disk presser pressure

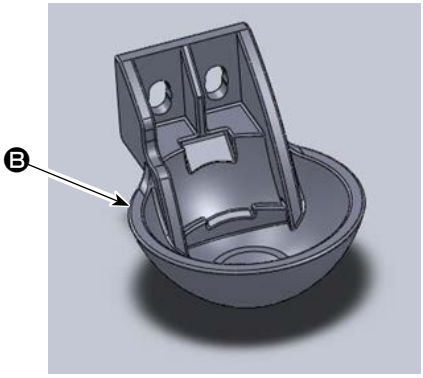


1) Adjust the disk presser air cylinder pressure regulation valve ❶ . Pull up nut ❷ . Then, turn the nut clockwise to increase the disk presser pressure or turn it counterclockwise to decrease it. The air pressure has been factory-set to 0.15 MPa at the time of shipment. Adjust it appropriately while checking the actual sewing state.

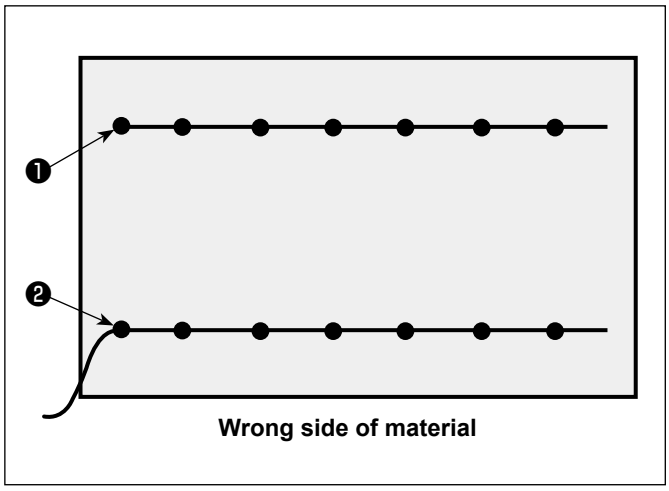




2) To slow down the sewing speed when the disk presser is placed at its upper position, adjust speed controller ❸ .
3) Changing the disk presser
Check the actual sewing operation. Use the disk presser or the plastic disk presser according to the condition of actual sewing operation.
Ⓐ Disk presser (factory-attached at the time of shipment)
Ⓑ Plastic disk presser
When changing the disk presser with the plastic disk presser or vice versa, try to position the disk presser so that its bottom surface is in parallel with the hook cover. Adjust the height of the disk presser according to the actual material thickness (i.e., height) while taking care not to allow the disk pressers to come in contact with the intermediate presser.



4-19. Adjusting the thread end position at the beginning of sewing

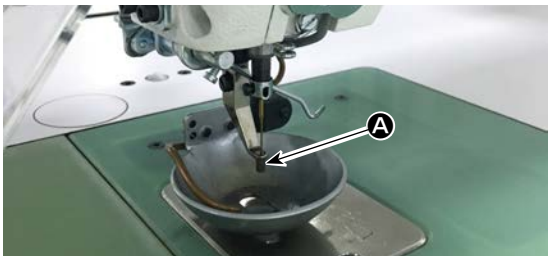


It is possible to set the needle thread end position at the beginning of sewing to top side ❶ or underside ❷ of material.
Change over the setting of the wiper function between ON and OFF in accordance with these two conditions of the needle thread end position.

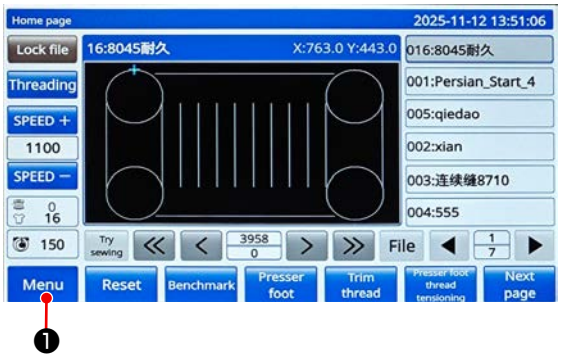
❶ To put the needle thread end on the top of material
Place the wiper function in OFF.

❷ To put the needle thread end on the underside of material
Place the wiper function in ON.

4-20. Adjusting the electronic intermediate presser stroke

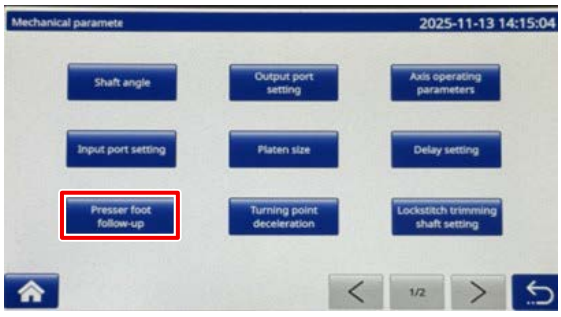


It is necessary to adjust the intermediate presser stroke (Ⓐ) appropriately since there would be the need for preventing stitch skipping depending on thickness or type of the material.

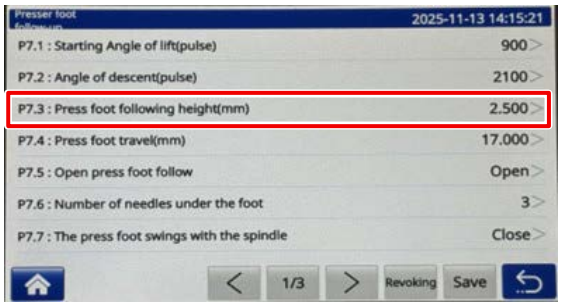


1) Press Menu ❶ on the main screen of electrical box.

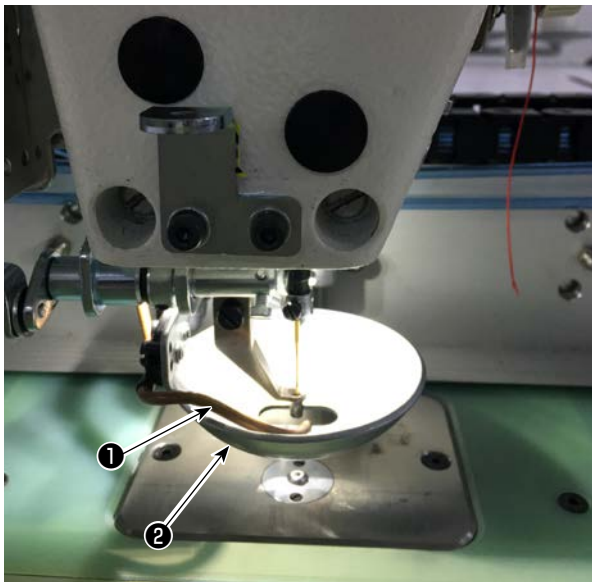
2) Press “Machine Parameter”.



3) Press “Presser Foot Height Setting” to set the presser foot height.
(The presser foot height 2 to 3 mm at the time of shipment.)

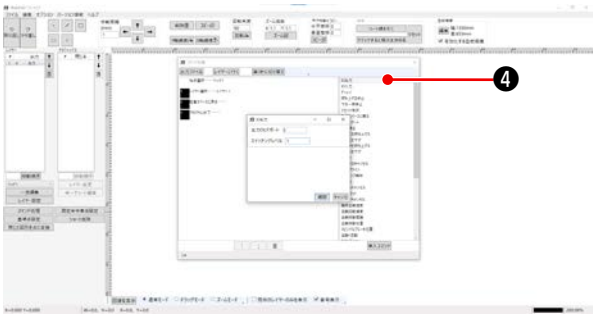


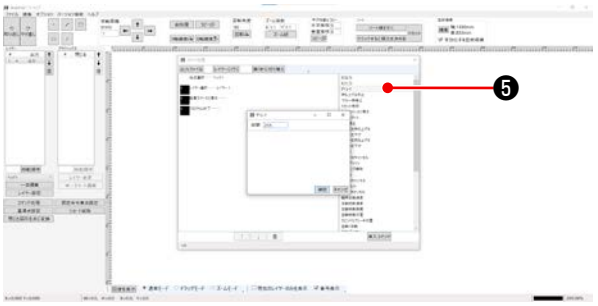
4-21. Adjusting the air blow for the needle thread and bobbin thread



Blow-up pipe ❶ blows air to blow up the thread end trailing from the needle to bring it under disk presser ❷ at the beginning of sewing by controlling the solenoid valve of the electrical system.
Thread end is pushed by air between the disk presser and the pattern at the beginning of sewing. In the case the thread end cannot be pushed due to the location and direction of slits on the pattern, adjust the blowing direction of the air to allow the thread end to be pushed by air.

Launch the pattern creation software to operate and process the pattern to be sewn.
On the screen that is displayed by clicking "Operation processing" ❸ , click ❹ ("Enter I/O") and change the "I/O" to 5.
Change the "Level" to "high" ("low" refers to "turning OFF"). Click ❺ ("Delay"). Change the "Delay (msec)" to 225.





The needle thread air blower and the wiper cannot be used simultaneously.

Caution

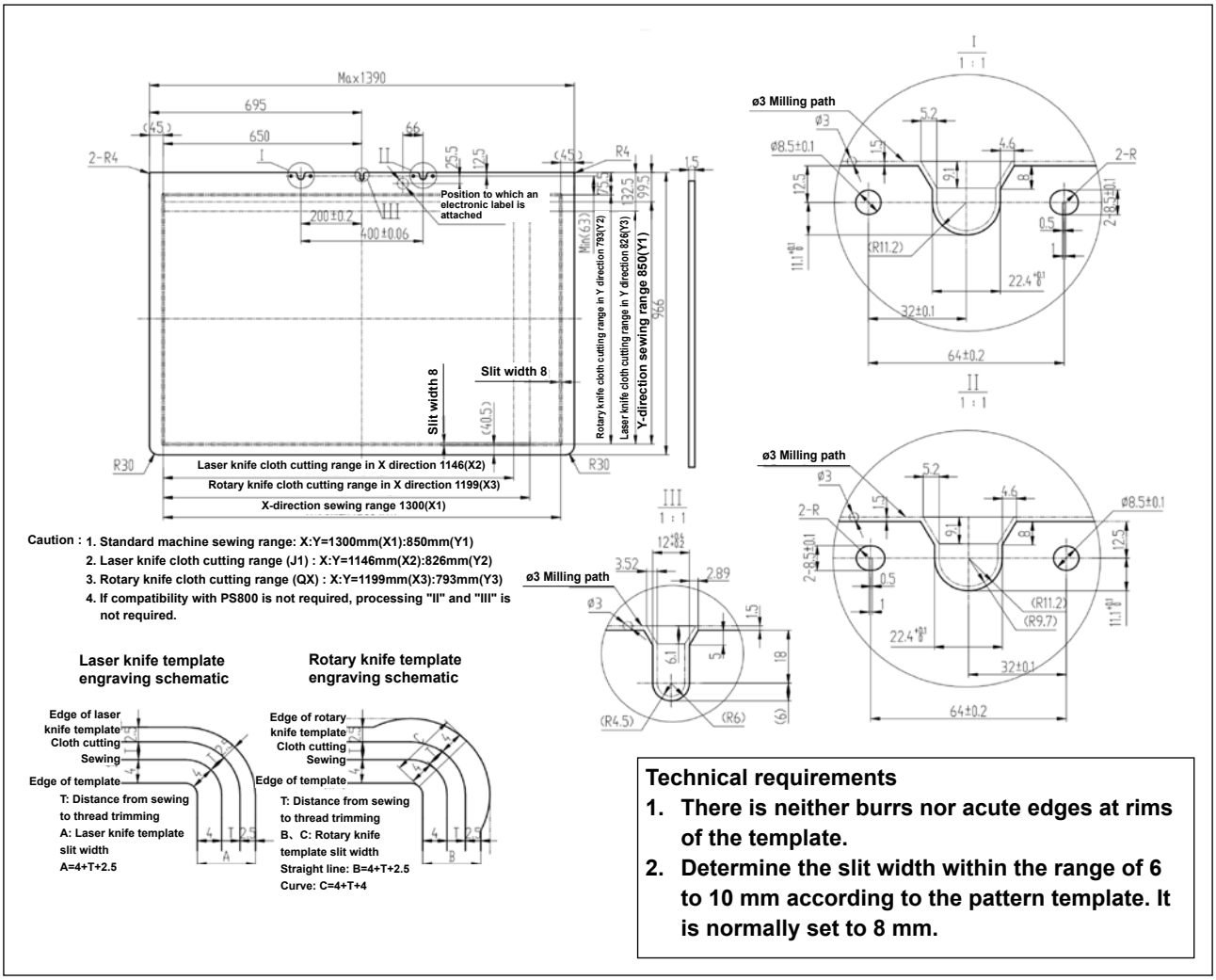
1. **The wiper provides the function for bringing the needle thread above the presser foot.**
2. **The needle thread air blower provides the function for bringing the needle thread under the disk presser.**

4-22. Making a template

(1) Machining a template

13085 type template of dimensions of the maximum sewing range

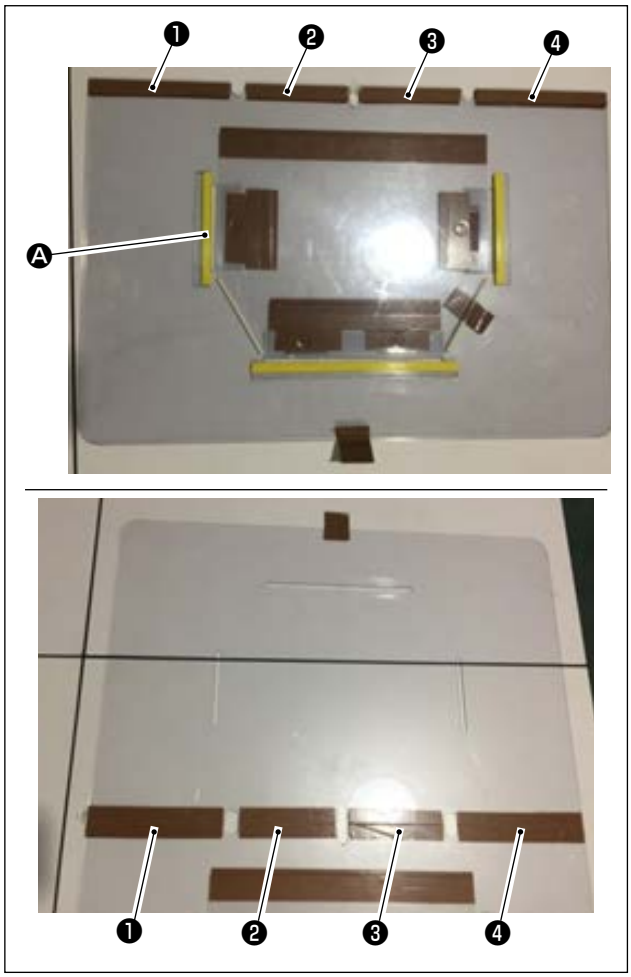
- Material of template: PVC plate
- Template thickness: 1.5 mm thick PVC plate
- Adjust the template size according to the cloths and/or pattern to be sewn.
  The size must not exceed the maximum dimensions of the relevant specifications.
- Check complexity of the pattern to be sewn. Then, select the sewing slits from the range of 6 mm to 8 mm according to the complexity of the pattern.
- Locus of sewing slits on the template should be designed according to the pattern to be sewn or intended machining.
- Select the suitable pattern carving machine. The template must be machined by the qualified engineers who have successfully finished the on-the-job training.
- After the completion of machining upper and lower templates, deburr the templates and the top surface of the template mounting plate.



Technical requirements

1. **There is neither burrs nor acute edges at rims of the template.**
2. **Determine the slit width within the range of 6 to 10 mm according to the pattern template. It is normally set to 8 mm.**

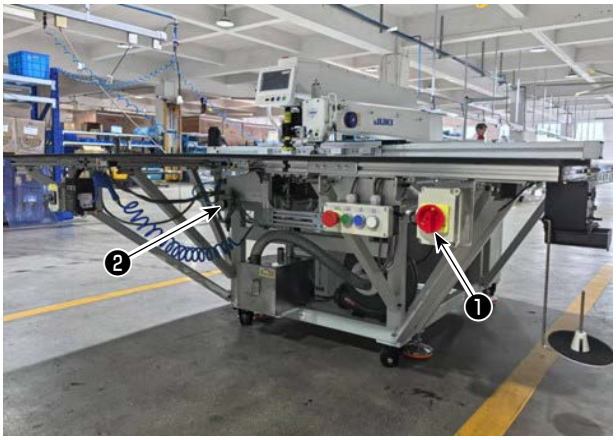
(2) Attaching the templates



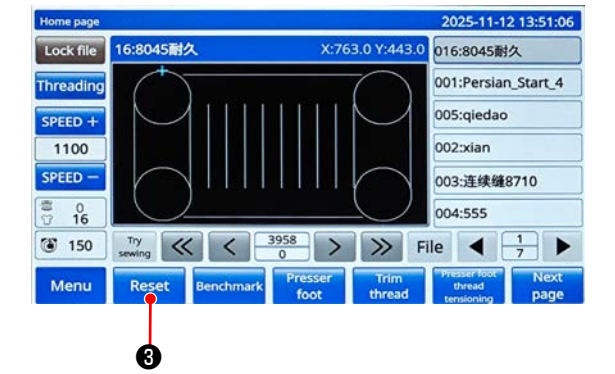
Machine the upper and lower templates based on the design.

1) Put the upper template on the lower template, as shown in the figure, and adjust so that sewing slits Ⓐ on the upper and lower templates are aligned. Affix exclusive template tape (36 mm wide) to portions ❶ , ❷ , ❸ and ❹ as illustrated in the figure.
2) To produce more beautiful seams, it is recommended to firmly secure the material at the correct position by affixing sand tape, double-sided adhesive tape, etc. on the slits of the upper and lower templates or put positioning pins at appropriate locations in order to prevent the material slippage.

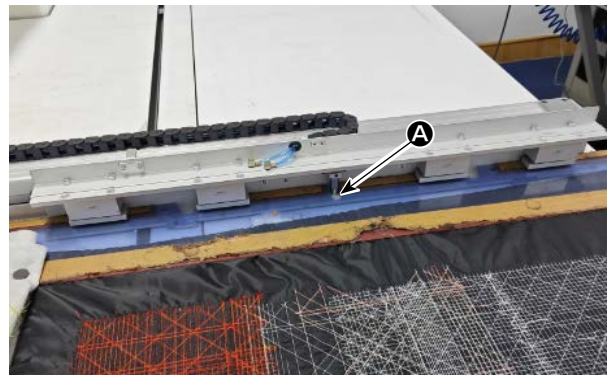
4-23. Preparation for sewing



1) Turning ON the main power switch.
   Press switch ❶ to turn ON the main power supply.
2) Turning ON the main air source switch
   Move main air valve ❷ to the right to open the main air source.



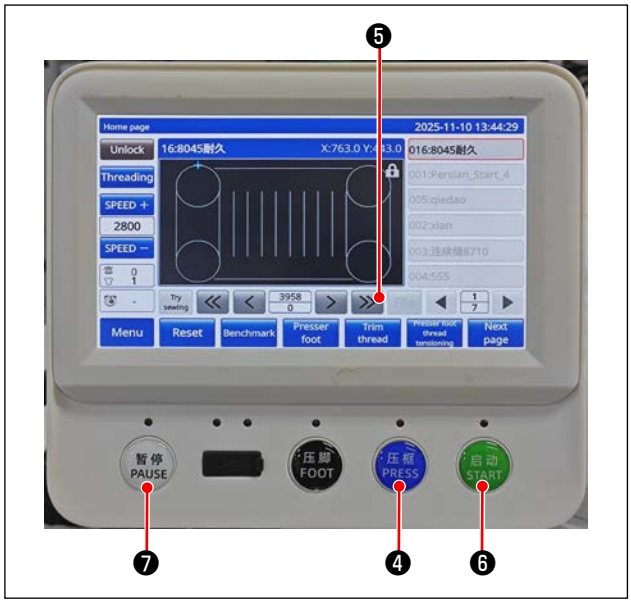
3) Resetting the equipment
   When the equipment is reset by pressing Reset ❸ , the needle stops at its upper stop position, and the disk presser and intermediate presser go up.
4) Read the pattern data to be sewn, or directly edit the pattern data on the operation panel.
   Refer to the Instruction Manual for the computer-control system for details.



5) Attaching a pattern
   Moving an empty pattern (with no material), fit positioning hole Ⓐ on the pattern positioning plate on the positioning pin.

6) Reading the sewing pattern data
   1. In the case an IC tag is attached to the pattern, the electrical system will automatically identify the sewing pattern program that matches the pattern from among those stored on the IC tag.
   2. In the case no IC tag is attached to the pattern, manually select the sewing pattern data that matches the relevant pattern on the operation screen.

*** Refer to "4-25. Configuration of the operation panel" p.51 for how to use the IC tag.**



7) Selecting the reference

In order to align the locus of sewing pattern with the sewing slits of the pattern, it is necessary to set a reference. Specifically, set the reference referring to the Instruction Manual for the electrical system scanner.

After the completion of establishment of a reference, display the operation screen. When you keep button ❺ held pressed, the pattern locus simulation sewing starts.

Operate the sewing machine once to check whether or not the sewing pattern locus is aligned with the pattern slits. If they are not aligned, re-adjust the reference.

To stop the operation while the simulation operation is being carried out, press button ❼ to stop it.

8) Placing the material to be sewn

1. Detaching the pattern

When you move the pattern to the reset position and press clamp button ❹ on the operation panel, two air cylinders on the X-direction linear module release the pattern. Take out the pattern.

2. Placing the material

Place the material to be sewn on the pattern. Then, check that the material is neatly arranged horizontally. In addition, secure the material with the holding method that matches the pattern to prevent the material from moving out of position. If the material has an infill of feather or cotton, squeeze the material to push out air as far as possible.

9) Setting the reset, pattern on which the material is placed, and the reference

* Carry out resetting following the step of procedure 3).

* Handling of the pattern on which the material is placed is described in the step of procedure 5).

* Reference setting is carried out following the step of procedure 7).

10) Starting

Press the start button ❻ on the operation panel to start sewing. Then, the sewing machine enters the automatic sewing mode.

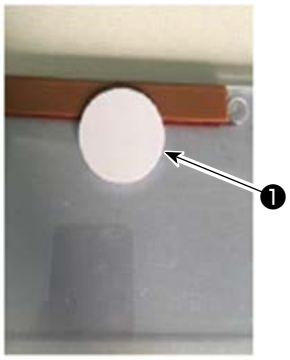
11) Temporary stop

If any accident occurs during sewing, press the temporary stop button ❼ on the operation panel. Then, the sewing machine immediately stops operation.

12) Re-starting

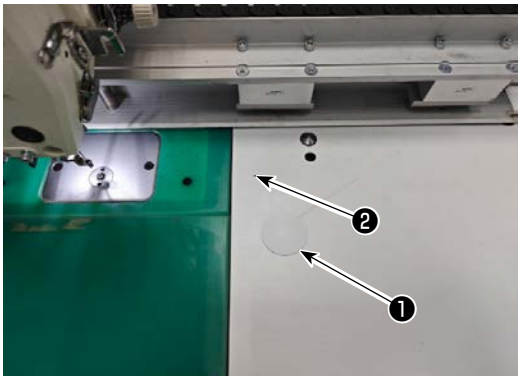
Once the aforementioned accident is eliminated, turn temporary stop button ❼ . Then, the button pops up and the emergency stop mode is reset. Then, press start button ❻ to re-start automatic sewing.

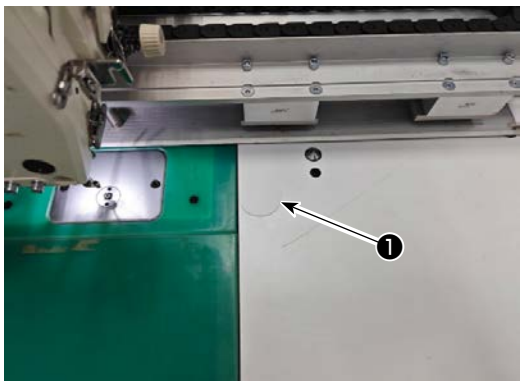
4-24. RFID (How to use the IC tag)



1. Attaching the IC tag

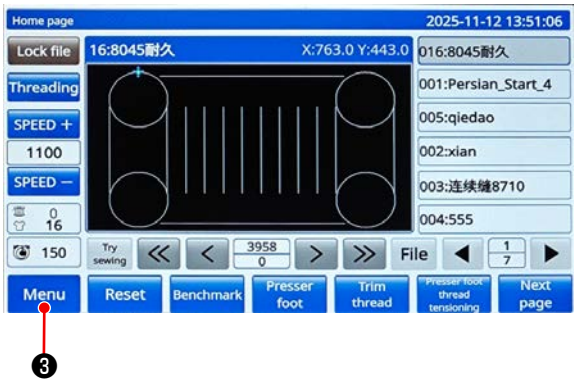
Attach IC tag ❶ onto the pattern with double-sided adhesive tape or the like.



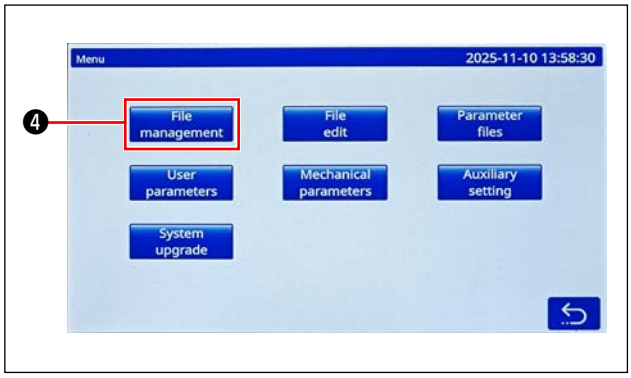


2. Writing sewing pattern data

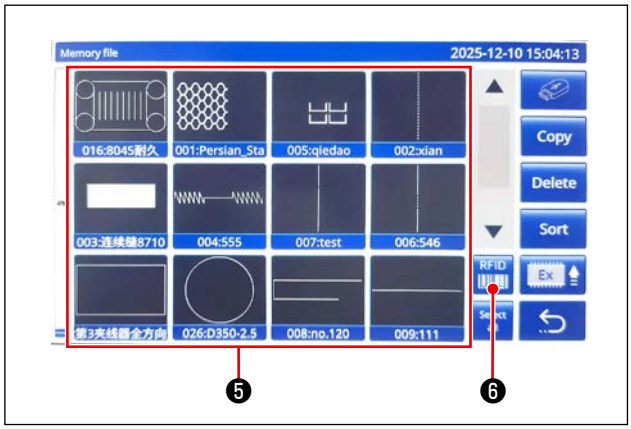
1) Place IC tag ❶ on black dot ❷ on the sewing machine table.



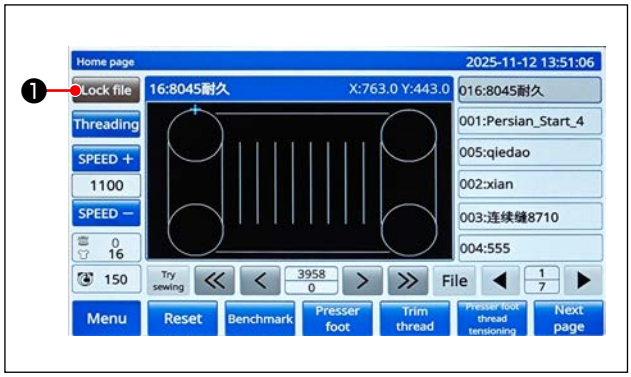
2) Press Menu ❸ on the initial screen.



3) Press the File management ❹ on the menu screen.



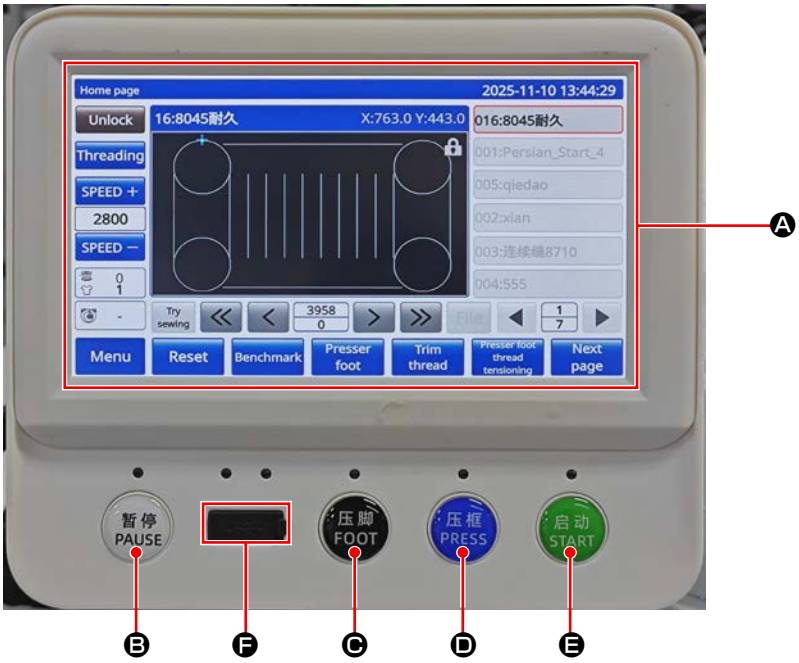
4) Select sewing pattern data ❺ you want to write on the IC tag on the memory file screen.
After you have made a selection, press RFID ❻ to write the sewing pattern data on the IC tag.



3. Loading sewing pattern data

1) On the initial screen, press the Lock file ❶ button.
2) Place the IC tag with the sewing pattern data written on it on the black dot on the table.
3) The sewing pattern data written in the IC tag is read.

4-25. Configuration of the operation panel

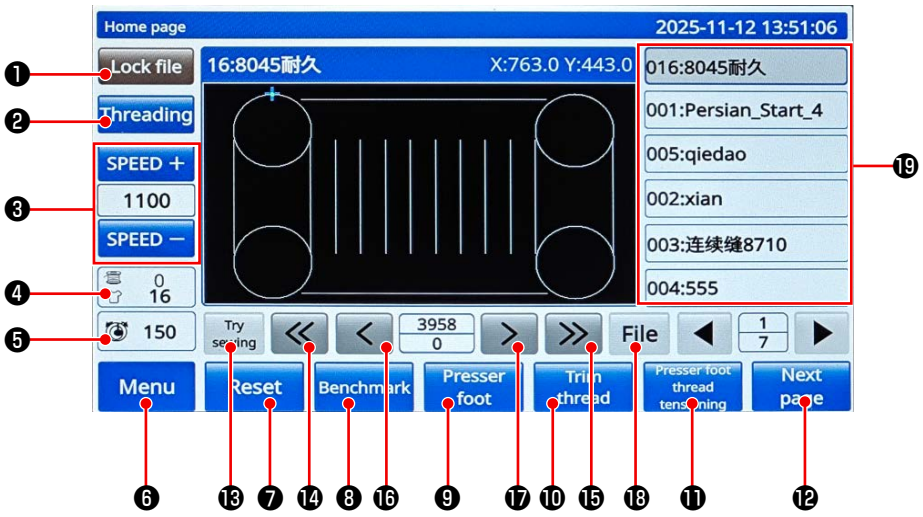


Ⓐ	LCD portion of the touch panel	
Ⓑ	PAUSE key	Used to temporarily stop sewing
Ⓒ	FOOT key	Move the presser foot up and down
Ⓓ	PRESS key	Move the clamp up and down
Ⓔ	START key	Used to start sewing
Ⓕ	USB port	

Ⓖ	COM port	RS232C

*** This product is not provided with the Wi-Fi function.**

Explanation of the operation panel screen

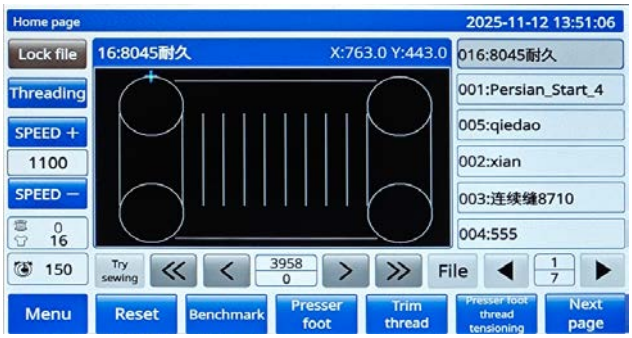


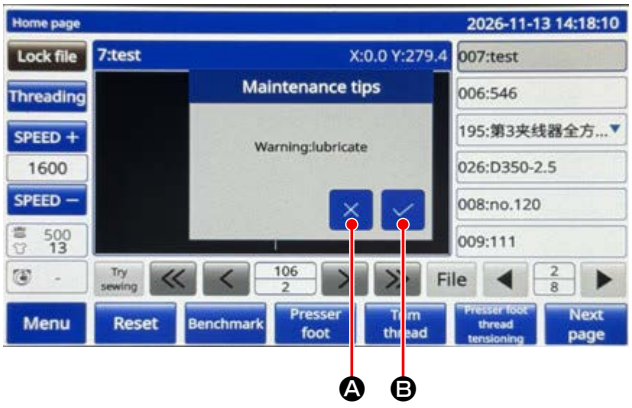
	Buttons / display	Description
❶	Lock key	Used to lock the sewing pattern
❷	Threading key	Used to thread the machine head
❸	Main shaft speed change key	Used to change the sewing machine main shaft speed
❹	Bobbin thread usage key	Used to display the amount of use of the bobbin thread and to move the screen to the setting screen ***1**
❺	Sewing count key	Used to display the sewing count and to move the screen to the setting screen ***1**
❻	Menu	Used to move the screen to the menu screen ***1**
❼	Ready key	Used to return the sewing machine to its origin
❽	Reference setting key	Used to move the screen to the reference setting screen ***1**
❾	Presser Foot button	Operates the presser foot.
❿	Thread Trimmer button	Cuts the thread.
⓫	Presser Clamp button	Shifts to the setting screen for the presser clamp.
⓬	Page move key	Used to move the screen to the test mode screen ***1**
⓭	Test key	Used to operate the sewing pattern by jumping
⓮	Line segment return key	Used to return the sewing machine to the starting position of the previous continuous sewing by jumping
⓯	Line segment feed key	Used to feed the sewing machine to the starting position of the next continuous sewing by jumping
⓰	Single stitch return key	Used to return the sewing machine to the previous stitch. If this key is held pressed, fast-backward mode starts
⓱	Single stitch feed key	Used to feed the sewing machine to the next stitch. If this key is held pressed, fast-forward mode starts
⓲	File key	Used to move the screen to the sewing pattern selection screen
⓳	Sewing pattern selection	Select the sewing pattern to be used by touching it

***1. Refer to the Instruction Manual for the operation panel for details.**

4-26. Maintenance mode

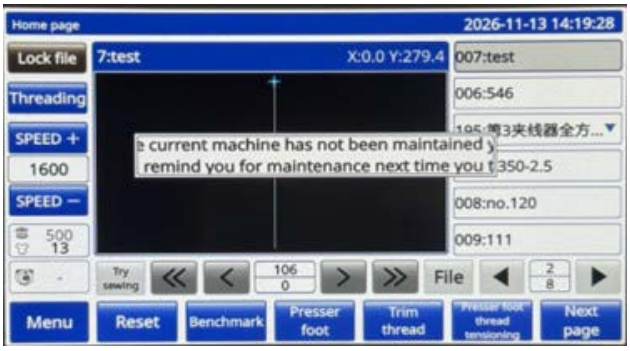
The maintenance mode is the mode under which the notice telling that the duration of use of the sewing machine has reached the time requiring maintenance is provided in order to extend the product life of the sewing machine. Under this mode, the maintenance screen is displayed on the operation panel. When the maintenance staff enters the user password, the maintenance screen is erased.





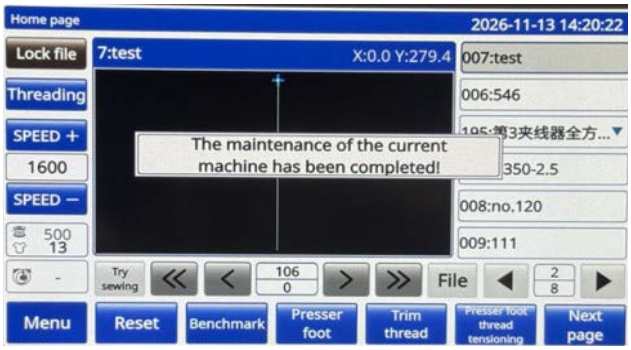
1) The maintenance screen is displayed when the time at which the sewing machine requires maintenance has come. (90 days)

   Pressing the Cancel button Ⓐ returns to the sewing screen, but the next time you start the sewing machine, the maintenance screen will be displayed.



2) When you press the Confirm button Ⓑ, if a machine password has been set in advance, the machine password entry screen will be displayed.
3) Add grease referring to **"5. MAINTENANCE OF SAWING MACHINE" p.69**.

4) After entering the machine password, the screen returns to the sewing screen.



4-27. List of parameters

Parameter group name	Parameter number	Parameter description	Parameter range	Default value
Automatic machining	P21.1	Presser plate lifting after automatic machining is completed	1:ON, 0:OFF	1
	P21.2	Thread trimming after automatic machining is completed	1:ON, 0:OFF	1
	P21.3	Return position after automatic machining is completed	0: Return to origin 1: Completion position 2: Return to stop position	2
	P21.4	AT device operates	1:ON, 0:OFF	0
	P21.5	The reference presser is set so that it does not change	1:ON, 0:OFF	0
	P21.6	Automatic frame clamp is enabled	1:ON, 0:OFF	0
	P21.7	The frame is clamped before the shaft is manually moved	1:ON, 0:OFF	1
	P21.8	Number of needle repeats at the start of sewing	0:OFF, 1 to 3	0
	P21.9	Number of stitches at the start of sewing with the thread tension release disabled	0 to 255	0
	P21.11	Presser follow-up reset after work completion	1:ON, 0:OFF	0
	P21.12	Reference axis movement is enabled	1:ON, 0:OFF	1
	P21.13	Setting for reporting a reference clamp not set error	1:ON, 0:OFF	0
	P21.14	Automatically outputs IOi1 after work is completed	0: No 1:15 (IO1 to IO15)	0
	P21.15	Automatically outputs IOi2 after work is completed	0: No 1:15 (IO1 to IO15)	0
	P21.16	Reference and sewing jump feed method	0: X and Y simultaneously, 1: X preference, 2: Y preference	0
	P21.17	Automatically returns to the reference point after shifting to the reference screen	1:ON, 0:OFF	1
	P21.18	Method for returning to the stop position	0: X and Y simultaneously, 1: X preference, 2: Y preference	0
Sewing start speed	P22.1	First stitch startup speed (sti/min)	100 to 3000	500
	P22.2	Second stitch startup speed (sti/min)	100 to 3000	800
	P22.3	Third stitch startup speed (sti/min)	100 to 3000	1200
	P22.4	Fourth stitch startup speed (sti/min)	100 to 3000	1600
	P22.5	Fifth stitch startup speed (sti/min)	100 to 3000	2000
	P22.6	Reverse feed rotation speed (sti/min)	100 to 3000	1000
	P22.7	Slow startup is enabled	1:ON, 0:OFF	1
Speed parameter	P23.1	Main shaft maximum rotation speed (sti/min)	100 to 3000	3000
	P23.2	Jump feed speed (mm/s)	78 to 624	200
	P23.3	Test sewing speed (sti/min)	100 to 3000	2300
	P23.4	Head 2 speed (mm/s)	8 to 234	78
	P23.5	Reverse rotation speed (sti/min)	10 to 3000	10
	P23.6	Intermediate presser foot lifting speed (mm/s)	8 to 234	78

Parameter group name	Parameter number	Parameter description	Parameter range	Default value
Speed parameter	P23.7	Number of stitches at the end of sewing for which the speed setting is effective	0 to 5	5
	P23.8	First stitch speed at the end of sewing (sti/min)	100 to 3000	300
	P23.9	Second stitch speed at the end of sewing (sti/min)	100 to 3000	800
	P23.10	Third stitch speed at the end of sewing (sti/min)	100 to 3000	1200
	P23.11	Third stitch speed at the end of sewing (sti/min)	100 to 3000	1600
	P23.12	Fifth stitch speed at the end of sewing (sti/min)	100 to 3000	2000
	P23.13	Main shaft setting speed (sti/min)	100 to 3000	1600
	P23.14	Frame shift button position 1 offset distance (0.01 mm)	5 to 50	5
	P23.15	Frame shift button position 2 offset distance (0.01 mm)	50 to 100	50
	P23.16	Frame shift button position 3 offset distance (0.01 mm)	100 to 300	100
	P23.17	Resonance speed range lower limit (sti/min)	100 to 3000	100
	P23.18	Resonance speed range upper limit (sti/min)	100 to 3000	100
	P23.19	Clamp inching speed (mm/s)	8 to 234	39
	P23.21	Head 3 speed (mm/s)	8 to 351	78
	P23.22	Head 4 speed (mm/s)	8 to 351	78
	P23.23	Shaft 6 key gear 1 offset angle (0.1°)	1 to 10	1
	P23.24	Shaft 6 key gear 2 offset angle (0.1°)	10 to 50	10
	P23.25	Shaft 6 key gear 3 offset angle (0.1°)	50 to 1800	50
Presser plate setting	P24.1	Sewing is prohibited while the presser plate is lifted	1:ON, 0:OFF	1
	P24.2	The frame is always clamped during movement	1:ON, 0:OFF	0
	P24.4	Clamp lifting delay (ms)	0 to 10000	500
	P24.5	Clamp lowering delay (ms)	0 to 10000	500
	P24.6	The auxiliary presser foot is not lowered at startup	1:ON, 0:OFF	0
Bobbin winder setting	P25.1	Bobbin winder condition	1: Permitted 0: Prohibited	1
	P25.2	Bobbin winder setting speed (r/min)	100 to 3000	2500
	P25.3	Bobbin winder timer (s)	1 to 1800	270
Reset settings	P27.1	The presser plate is lowered during reset	1:ON, 0:OFF	1
	P27.2	The presser plate is raised after manual reset	1:ON, 0:OFF	1
	P27.3	Method for returning to the origin	0: X and Y simultaneously, 1: X preference, 2: Y preference (0 to 2)	0
	P27.4	X-axis origin return speed (mm/s)	8 to 234	117
	P27.5	Y-axis origin return speed (mm/s)	8 to 234	78
	P27.6	Errors are cleared when reset is pressed	1:ON, 0:OFF	1
	P27.7	Reset output IOi1 enabled	0:No 1:15 (IO1 to IO15)	0
	P27.8	Reset output IOi2 enabled	0:No 1:15 (IO1 to IO15)	0

Parameter group name	Parameter number	Parameter description	Parameter range	Default value
Reset settings	P27.9	Reset output IOi3 enabled	0:No 1:15 (IO1 to IO15)	0
	P27.10	Reset output IOi4 enabled	0:No 1:15 (IO1 to IO15)	0
	P27.11	Reset output IOi5 enabled	0:No 1:15 (IO1 to IO15)	0
	P27.12	Reset output IOi6 enabled	0:No 1:15 (IO1 to IO15)	0
	P27.13	The presser foot is lowered before resetting	1:ON, 0:OFF	0
Temporary stop settings	P28.1	Automatic thread trimming during temporary stop	1:ON, 0:OFF	0
	P28.2	Needle position during temporary stop	0: Upper position 1: Not set	0
	P28.3	The presser plate is raised during temporary stop	1:ON, 0:OFF	0
	P28.4	Temporary stop switch type	1: Normal 0: Self-locking	0
	P28.5	The presser plate is not raised during temporary stop	1:ON, 0:OFF	0
	P28.6	The last working position of the pattern is restored	1:ON, 0:OFF	0
Statistics settings	P29.1	The bobbin thread is reset on power-on	1:ON, 0:OFF	1
	P29.2	Operation is stopped as soon as the bobbin thread runs out	1:ON, 0:OFF	0
	P29.3	Bobbin thread detection is enabled	1:ON, 0:OFF	0
	P29.4	Production is reset on power-on	1:ON, 0:OFF	0
	P29.5	Operation is continued after production is achieved	1:ON, 0:OFF	0
	P29.6	Production counting setting is enabled	1:ON, 0:OFF	1
	P29.7	Operation time timer	1:ON, 0:OFF	1
	P29.8	Bobbin thread counting mode	0: Bobbin thread learning mode 1: Bobbin thread sensor mode 2: Bobbin thread setting mode	1
	P29.9	Remaining bobbin thread warning threshold (mm)	0 to 600000	200
	P29.10	Additional bobbin thread count length (mm)	-1000000 to +1000000	0
	P29.13	Production threshold	1 to 65000	10000
	P29.14	Length of bobbin thread drawn by thread trimmer (mm)	10 to 60000	50
	P29.15	Bobbin thread length (mm) corrected according to thread breakage	10 to 60000	50
	P29.16	Bobbin thread sensor detection of remaining length (mm)	0 to 600000	500
Thread clamp settings	P30.1	Third thread tension automatic action is enabled	1:ON, 0:OFF	0

Parameter group name	Parameter number	Parameter description	Parameter range	Default value
Thread breakage detection	P31.1	Thread breakage automatic detection	1:ON, 0:OFF	1
	P31.2	Automatic thread cutting when thread breaks	1:ON, 0:OFF	0
	P31.3	The number of stitches during sewing is ignored	1 to 255	3
	P31.4	Number of effective stitches is detected when thread breaks	1 to 255	5
	P31.5	Time delay is processed when thread breakage is detected	1 to 60000	100
	P31.6	QEP2 opening/closing is used for bobbin thread detection	1:ON, 0:OFF	1
	P31.7	Number of rollback stitches due to thread breakage	0 to 10	0
Thread trimming settings	P32.1	Thread trimming main shaft rotation speed (sti/min)	10 to 500	170
	P32.2	Thread trimming operation time (ms)	1 to 990	200
	P32.5	Main shaft reverse rotation/needle-up after thread trimming	1:ON, 0:OFF	1
	P32.6	Main shaft reverse rotation/needle-up angle adjustment (pulse) after thread trimming	0 to 10000	127
	P32.7	Thread trimming method selection	0: By electromagnet 1: By air pressure 2: By stepping motor	0
	P32.15	Whether thread trimming is required during automatic jump feeding after sewing	1:ON, 0:OFF	0
	P32.16	Wiper is enabled	1:ON, 0:OFF	1
	P32.17	Presser foot lifting time delay (ms) during wiper usage	1 to 990	170
	P32.21	Thread clamp is enabled during thread trimming	1:ON, 0:OFF	1
	P32.23	Thread slackening start delay (ms)	1 to 990	50
	P32.28	Thread clamp function is enabled at the start of sewing	1:ON, 0:OFF	1
Power-on settings	P33.1	Automatic reset when power is applied	1:ON, 0:OFF	0
	P33.2	Clamp is raised when power is applied	1:ON, 0:OFF	1
	P33.3	Presser foot is raised when power is applied	1:ON, 0:OFF	0
Other settings	P34.1	Air pressure detection function is enabled	1:ON, 0:OFF	1
	P34.2	Cyclic work mode is enabled	1:ON, 0:OFF	0
	P34.3	Cycle machining interval (s)	0 to 100	1
	P34.4	Oil level detection function is enabled	1:ON, 0:OFF	0
	P34.5	Audio guidance method	0: Audio broadcast, 1: Buzzer	0
	P34.6	Sound volume	0:OFF, 1, 2, 3, 4, 5	3
	P34.7	Power failure memory retention function is enabled	1:ON, 0:OFF	0
	P34.8	File remains enabled even when separated from the electronic tag	1:ON, 0:OFF	1
	P34.9	Function where imported patterns are not centered is enabled	1:ON, 0:OFF	0
	P34.10	Display of drawing number settings	1:ON, 0:OFF	0

Parameter group name	Parameter number	Parameter description	Parameter range	Default value
Other settings	P34.11	OUTPORT for automatic conversion laser	1:ON, 0:OFF	1
	P34.12	Laser brush pattern type selection This parameter is enabled when PS800 pattern data (.SLW extension) is used.	0: Head 2 brush, Head 3 laser 1: Head 2 laser, Head 3 brush	1
	P34.13	OUTPORT for automatic conversion pen stick	1:ON, 0:OFF	1
	P34.14	Universal extension board is enabled	1:ON, 0:OFF	0
	P34.15	OUTPORT for automatic conversion rotary knife	1:ON, 0:OFF	1
	P34.16	RFID/barcode reader software function is enabled	0:OFF, 1:RFID 2:Barcode reader	1
	P34.17	External start button is enabled	1:ON, 0:OFF	1
Air blow settings	P35.1	Automatic air blow at the start of sewing	1:ON, 0:OFF	0
	P35.2	Automatic air blow at the end of sewing	1:ON, 0:OFF	1
	P35.3	Continuous air blow time (ms)	0 to 10000	150
JaNets settings	P36.1	JaNets function	1:ON, 0:OFF	0
	P36.2	JaNets announcement	1:ON, 0:OFF	1

* For P34.2, when the cyclic work mode is used, it is automatically disabled (OFF) when the power is turned off. Therefore, set this parameter each time cycle machining is performed.

4-28. List of error codes

Error code	Error item	Problem cause	Solution
E100	X-axis motor lock	1. The graphic data exceeded the X-axis range of motion, causing the X-axis motor to collide with the module. 2. An incorrect setting of the X-axis “motor direction” parameter caused the X-axis motor to collide with the module. 3. The X-axis motor was blocked by a mechanical obstruction. 4. Deterioration of lubrication in the X-axis module caused excessive friction. 5. An abnormal encoder signal caused the motor to run away.	1/2. F4.P1: Check that the X-axis stroke parameter setting is correct. 3. Check that no object is jammed in the machine module. 4. Protect the guide rails by applying lubricating oil. 5. Check that the encoder is securely connected.
E101	Y-axis motor lock	1. The geometry data exceeded the Y-axis operating range, causing the Y-axis motor to collide with the module. 2. An incorrect setting of the Y-axis “motor direction” parameter caused the Y-axis motor to collide with the module. 3. The Y-axis motor was caught by a mechanical obstruction. 4. Deterioration of lubrication in the Y-axis module caused excessive friction. 5. A faulty encoder connection caused the motor to lock.	1/2. F4.P2: Check that the Y-axis stroke parameter setting is correct. 3. Check that no object is jammed in the machine module. 4. Protect the guide rails by applying lubricating oil. 5. Check that the encoder is securely connected.
E102	Z-axis motor lock	1. The presser foot stroke exceeded the actual operating height, causing the Z-axis motor to collide with the throat plate. 2. An incorrect setting of the Z-axis “motor direction” parameter caused the motor to lock. 3. The intermediate presser foot motor was caught by an object. 4. Check that the encoder is securely connected.	1/2. F7.P4: Check that the pressure foot stroke parameter is set correctly. 3. Check that no object is jammed in the machine module. 4. Check that the encoder is securely connected.
E107	X-axis motor encoder Z-phase failure	1. There is a poor connection in the encoder wire of the X-axis motor. 2. The X-axis encoder is faulty. 3. The electronic control board is faulty.	1. Turn the power off, investigate the cause, and then turn the it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E108	Y-axis motor encoder Z-phase failure	1. There is a poor connection in the encoder wire of the Y-axis motor. 2. The Y-axis encoder is faulty. 3. The electronic control board is faulty.	1. Turn the power off, investigate the cause, and then turn the it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E109	Z-axis motor encoder Z-phase failure	1. There is a poor connection in the encoder wire of the Z-axis motor. 2. The Z-axis encoder is faulty. 3. The electronic control board is faulty.	1. Turn the power off, investigate the cause, and then turn the it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.

Error code	Error item	Problem cause	Solution
E114	Abnormal AB count of the X-axis motor encoder	1. There is a poor connection in the encoder wire of the X-axis motor. 2. The X-axis encoder is faulty. 3. The electronic control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E115	Abnormal AB count of the Y-axis motor encoder	1. There is a poor connection in the encoder wire of the Y-axis motor. 2. The Y-axis encoder is damaged. 3. The electronic control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E116	Abnormal AB count of the Z-axis motor encoder	1. There is a poor connection in the encoder wire of the Z-axis motor. 2. The Z-axis encoder is damaged. 3. The electronic control board is faulty.	1. Turn the power off, identify the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E121	X-axis motor overcurrent	1. Poor contact of the X-axis motor connector 2. X-axis stepping motor failure or motor wiring short-circuit 3. Electronic control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E122	Y-axis motor overcurrent	1. Poor contact of the Y-axis motor connector 2. Y-axis stepping motor failure or motor wiring short-circuit 3. Electronic control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E123	Z-axis motor overcurrent	1. Poor contact of the Z-axis motor connector 2. Z-axis stepping motor failure or motor wiring short-circuit 3. Electronic control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or electronic control board with a new one.
E128	Main shaft motor lock	1. The intermediate presser foot is not lowering properly. 2. The electronic control board is faulty. 3. The main shaft motor is faulty.	1. Turn the power off, turn it back on, and then check that the F20.P2/P27 main shaft motor parameters are set correctly. 2/3. Contact after-sales service to replace the electronic control board or motor with a new one.
E129	Abnormal signal from main shaft encoder	1. There is a poor connection in the encoder wire of the main shaft motor. 2. The main shaft encoder is faulty. 3. The electronic control board is faulty.	1. Turn the power off, turn it back on, and then check that the P20.P3/P5/P6 main shaft motor parameters are set correctly. 2/3. Contact after-sales service to replace the electronic control board or motor with a new one.
E130	Main shaft motor overcurrent	1. Poor contact of the main shaft motor connector 2. Main shaft motor failure or motor wiring short-circuit 3. Electronic control board failure	1. Turn the power off, turn it back on, and then check that the F20.P2/P27 settings are correct. 2/3. Contact after-sales service to replace the electronic control board or motor with a new one.
E200	X-axis motor startup malfunction	1. There is a poor connection in the base wiring of the X-axis motor. 2. The X-axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the motor with a new one.
E201	Y-axis motor startup malfunction	1. There is a poor connection in the base wiring of the Y-axis motor. 2. The Y-axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the motor with a new one.

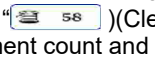
Error code	Error item	Problem cause	Solution
E202	Z-motor startup malfunction	1. There is a poor connection in the base wiring of the Z-axis motor. 2. The Z-axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the motor with a new one.
E218	X-axis motor overload	1. There is a poor connection in the base wiring of the X-axis motor. 2. X-axis stepping motor failure or motor wiring short-circuit 3. Control board failure 4. The X-axis current exceeds the set upper limit.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor with a new one. 4. Check that the X-axis operates smoothly and is not stuck.
E219	Y-axis motor overload	1. There is a poor connection in the base wiring of the Y-axis motor. 2. Y-axis stepping motor failure or motor wiring short-circuit 3. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor with a new one.
E220	Z-axis motor overload	1. There is a poor connection in the base wiring of the Z-axis motor. 2. Z-axis stepping motor failure or motor wiring short-circuit 3. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor with a new one.
E300	Overvoltage	1. The power supply does not meet the specified requirements. 2. The control board is faulty.	1. Check that the operating voltage of the power supply equipment is within the normal range. 2. Contact after-sales service to replace the control board with a new one.
E301	Insufficient voltage	1. The power supply does not meet the specified requirements. 2. The control board is faulty.	1. Inspect the power supply equipment according to the requirements specified in Chapter 3. 2. Contact after-sales service to replace the control board with a new one.
E303	Electronic control system power loss	1. The power cable is not inserted properly or is poorly connected. 2. The control board is faulty.	1. Turn the power off, check the wiring condition, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one. Note: This error code is also displayed on the panel when power is actively shut off, but this is a normal behavior.
E304	The main shaft motor electrical angle is not found.	1. The electrical angle calibration of the main shaft motor was not performed during installation. 2. The motor is faulty.	1. Go to Main Menu → Next Page → Output Test, click on the “Main Shaft Electrical Angle Calibration” button, and set the electrical angle automatic writing parameters. 2. Contact after-sales service to replace the motor with a new one.
E305	Head electromagnet overcurrent	1. The electromagnet duty cycle is too high. 2. The electromagnet is shorted. 3. The control board is faulty. 4. The AT device is faulty.	1. Turn the power off, turn it back on, then reduce the duty ratio of this function (Machine Parameters → Output Settings). 2/3/4. Contact after-sales service to replace the electromagnet or control board with a new one.
E306	Communication error between the main control chip and the X-axis	1. The upgrade file is invalid or the upgrade failed. 2. The control board is faulty.	1. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one.
E307	Communication error between the main control chip and the Y-axis	1. The upgrade file is invalid or the upgrade failed. 2. The control board is faulty.	1. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one.

Error code	Error item	Problem cause	Solution
E308	Communication error between the main control chip and the Z-axis	1. Firmware file error or upgrade failure 2. Control board failure	1. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one.
E317	Communication error between the main control chip and the IO chip	1. Upgrade file error or upgrade failure 2. Control board failure	1. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one.
E318	EEPROM read/write identification error	1. The EEPROM chip is malfunctioning and causing reboot due to a power outage. 2. The control board is faulty.	Turn the power off, and if the problem is not resolved after turning it back on, contact after-sales service to replace the control board with a new one.
E322	Communication error between the main control and the panel	1. Control board malfunction	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E323	High temperature alarm	1. The temperature sensor on the control board is faulty. 2. The temperature inside the control box is too high.	1. Contact after-sales service to replace the temperature sensor with a new one. 2. Turn the power off, allow the temperature inside the control box to drop, and then resume operation after turning the power back on.
E324	Machine head solenoid valve overcurrent	1. The solenoid valve is shorted. 2. The control board is faulty.	1/2. Contact after-sales service to replace the solenoid valve or control board with a new one.
E325	Expansion board communication failure	1. Firmware file error or upgrade failure 2. Control board failure 3. Communication cable failure	1. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one. 3. Contact after-sales service to replace the cable with a new one.
E326	IO board duty cycle error	1. Upgrade file error or upgrade failure (causing a communication failure) 2. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E329	IO board watchdog timer failure	1. Upgrade file error or upgrade failure (causing a communication failure) 2. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E600	Expansion board overvoltage	1. The power supply does not meet the specified requirements. 2. The control board is faulty.	1. Inspect the power supply equipment according to the requirements specified in Chapter 3. 2. Contact after-sales service to replace the control board with a new one.
E601	Expansion board insufficient voltage	1. The power supply does not meet the specified requirements. 2. The control board is faulty.	1. Inspect the power supply equipment according to the requirements specified in Chapter 3. 2. Contact after-sales service to replace the control board with a new one.
E602	Expansion board active reset	1. Software upgrade error 2. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E603	Expansion board insufficient voltage reset	1. The power supply does not meet the specified requirements. 2. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.

Error code	Error item	Problem cause	Solution
E604	Expansion board watchdog timer failure	1. Software upgrade error 2. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E605	Extension motor 1 startup malfunction	1. There is a poor connection in the base wiring of the extended axis motor. 2. The extended axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the motor with a new one.
E606	Extension motor 1 encoder AB phase failure	1. There is a poor connection in the encoder wire of the extended axis motor. 2. The extended axis encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E607	Extension motor 1 encoder Z phase failure	1. There is a poor connection in the encoder wire of the extended axis motor. 2. The extended axis encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E608	Extension motor 1 overcurrent	1. There is a poor connection in the extension motor base wiring. 2. The extended axis stepping motor is faulty or the motor wiring is shorted. 3. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E609	Extension motor 1 lock	1. The motor travel stroke exceeds the actual stroke range. 2. The extended axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E610	Extension motor 1 correction error	1. There is a poor connection in the encoder wiring of extension motor 1. 2. The extension motor 1 encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E612	Extension motor 2 start malfunction	1. There is a poor connection in the base wiring of the extended axis motor. 2. The extended axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the control board with a new one.
E613	Extension motor 2 encoder AB phase failure	1. There is a poor connection in the base wiring of the extended axis motor. 2. The extended axis encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E614	Extension motor 2 encoder Z phase failure	1. There is a poor connection in the encoder wiring of the extended axis motor. 2. The extended axis encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E615	Extension motor 2 overcurrent	1. There is a poor connection in the encoder wiring of the extended axis motor. 2. The extended axis stepping motor is faulty or the motor wiring is shorted. 3. Control board failure	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E616	Extension motor 2 lock	1. The motor travel stroke exceeds the actual stroke range. 2. The extended axis motor is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2. Contact after-sales service to replace the motor or control board with a new one.

Error code	Error item	Problem cause	Solution
E617	Extension motor 2 correction error	1. There is a poor connection in the encoder wiring of extension motor 2. 2. The extended axis encoder is faulty. 3. The control board is faulty.	1. Turn the power off, investigate the cause, and then turn it back on. 2/3. Contact after-sales service to replace the motor or control board with a new one.
E619	Watchdog timer time-out	1. Software upgrade error 2. Control board failure	1. Turn the power off and then on again to complete the reset. 2. Contact after-sales service to replace the control board with a new one.
E620	Reset during operation	1. Software upgrade error 2. Control board failure	1. Turn the power off and then on again to complete the reset. 2. Contact after-sales service to replace the control board with a new one.
E621	Insufficient voltage reset	1. Software upgrade error 2. Control board failure	1. Turn the power off and then on again to complete the reset. 2. Contact after-sales service to replace the control board with a new one.
E401	X-axis position deviation too large	1. The pattern reference exceeds the plate size. 2. The X-axis lock current is too small. 3. An AB code correction error has occurred.	1/2. Turn the power off, and if the problem is not resolved after turning it back on, contact after-sales service to confirm that you have the latest version of the software and the correct model settings. 3. Contact after-sales service to replace the affected motor.
E402	Y-axis position deviation too large	1. The pattern reference exceeds the presser plate size. 2. The Y-axis lock current is too small. 3. An AB code correction error has occurred.	1/2. Turn the power off, and if the problem is not resolved after turning it back on, contact after-sales service to confirm that you have the latest version of the software and the correct model settings. 3. Contact after-sales service to replace the affected motor.
E403	Z-axis position deviation too large	1. The Z-axis lock current is too small. 2. An AB code correction error has occurred.	1. Turn the power off, and if the problem is not resolved after turning it back on, contact after-sales service to confirm that you have the latest version of the software and the correct model settings. 2. Contact after-sales service to replace the affected motor.
E409	X-axis motor has not reached the target position.	1. Poor connection of X-axis limit switch 2. Incorrect X-axis motor wiring 3. Incorrect presser plate size parameter setting 4. Program version incompatibility	1. Check the connection condition and normal operation of the X-axis limit switch. 2. Ensure that the X-axis motor wiring is properly connected. 3. Check that the presser plate size is within the operating range of the applicable model. 4. Contact after-sales service to upgrade the program.
E410	Y-axis motor has not reached the target position.	1. Poor connection of Y-axis limit switch 2. Incorrect Y-axis motor wiring 3. Incorrect presser plate size parameter setting 4. Program version incompatibility	1. Check the connection condition and normal operation of the Y-axis limit switch. 2. Ensure that the Y-axis motor wiring is properly connected. 3. Check that the presser plate size is within the operating range of the applicable model. 4. Contact after-sales service to upgrade the program.

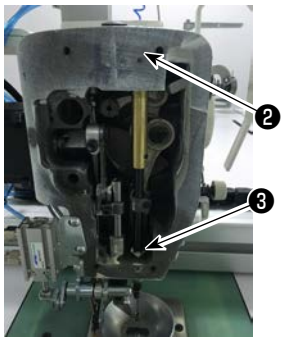
Error code	Error item	Problem cause	Solution
E411	Z-axis motor has not reached the target position.	1. Incorrect Z-axis motor wiring 2. Incorrect presser plate size parameter setting 3. Program version incompatibility	1. Check the connection condition and normal operation of the Z-axis limit switch. Ensure that the Z-axis motor wiring is properly connected. 2. Check that the presser foot follow-up operation is within the operating range of the applicable model. 3. The program version is not the latest. Contact after-sales service to upgrade the program.
E412	G code length error	A system startup error has occurred.	Turn the power off and then on again to complete the reset.
E414	Extension motor 1 has not reached the target position.	1. Incorrect bobbin motor wiring 2. Incorrect bobbin motor parameter setting 3. Incorrect program version 4. Poor contact of the motor cable	1. Check that the wiring is correct. 2. Re-import the default parameter file. 3. Rewrite (refresh) the program. 4. Check for looseness of the connector.
E415	Extension motor 2 has not reached the target position.	1. Incorrect bobbin change motor wiring 2. Incorrect bobbin change motor parameter setting 3. Incorrect program version 4. Poor contact of the motor cable	1. Check that the wiring is correct. 2. Re-import the default parameter file. 3. Rewrite (refresh) the program. 4. Check for looseness of the connector.
E416	G18 code length error	A system startup error has occurred.	Turn the power off and then on again to complete the reset.
E427	Electronic control cache code execution has ended.	Electronic control cache code execution has ended.	The control chip cache has reached its limit.
E428	Send data overflow	An error has occurred in the sewing count data.	Turn the power off and then on again to complete the reset.
E429	Sewing count overflow	An error has occurred in the sewing count data.	Turn the power off and then on again to complete the reset.

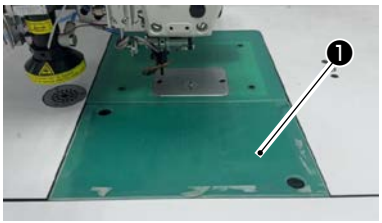
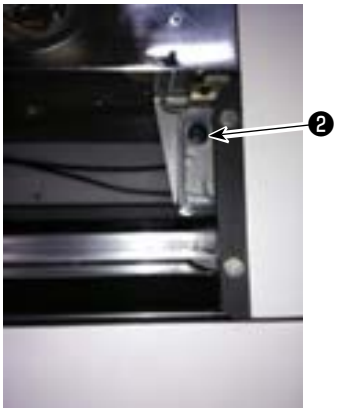
Error code	Error item	Problem cause	Solution
W500	Thread breakage warning	1. Thread breakage has occurred during sewing.	1. After canceling the warning on the warning pop-up screen or pressing the “Emergency Stop” button, promptly rethread the machine to continue operation. 2. You can disable the detection module in the “Thread Break Detection” setting under the user parameters.
W501	Insufficient air pressure	1. The air pressure detection wire is shorted. 2. The air pressure has dropped.	1. Check the wiring condition on the terminal block. 2. Check that the air pressure is within the normal range.
W503	Insufficient bobbin thread! Replace the bobbin.	1. The alarm has been activated because the bobbin thread counter has reached the threshold.	1. Press “√” on the warning pop-up screen to reset all “Used Bobbin Thread” values at once and continue machine operation. 2. You can disable the bobbin thread counting function in the “Statistics Settings” under the user parameters. 3. The alarm will be cleared upon receiving the warning clear command (only valid when the automatic bobbin change function is disabled).
W504	RFID module not detected	1. The RFID module is not connected correctly. 2. The RFID module function is not enabled. 3. The RFID module is faulty.	1. After checking the wiring of the RFID module, close the warning pop-up screen. 2. Enable the RFID module function in the parameter settings. 3. Contact after-sales service to replace the RFID module.
W505	Clamp not pressed warning	1. The clamp function interface is not connected correctly. 2. The automatic clamp operation function is not enabled. 3. The clamp is not operating properly due to insufficient air pressure.	1. After resetting, check that the clamp is operating normally. 2. Check that the “User Parameters → Auto Clamp Start” function is enabled. 3. Check that there is sufficient air pressure for the clamp to operate properly.
W506	RFID writing error	1. The RFID module is not connected correctly. 2. The RFID module function is not enabled. 3. The RFID module is faulty. 4. It is not possible to write when multiple graphics are selected. 5. The IC card is faulty.	1. After checking the wiring of the RFID module, close the warning pop-up screen. 2. Enable the RFID module function in the parameter settings. 3. Replace the RFID module. 4. When selecting design files, make sure that multiple files are not selected. 5. If the card write error persists, contact after-sales service to replace the RFID module or IC card.
W507	The number of workpieces has reached the set value.	1. The sewing count has reached the set threshold.	Cancel the warning on the warning pop-up screen and click “ )(Clear)” to reset the measurement count and resume normal operation. Bobbin changer error
W509	Bobbin changer error	1. All bobbins on the bobbin holder have been used. Add bobbins. 2. An error occurred during the bobbin change process.	1. Check the automatic bobbin changer.
W510	BK change in progress	1. The automatic bobbin changer is changing the bobbin.	—

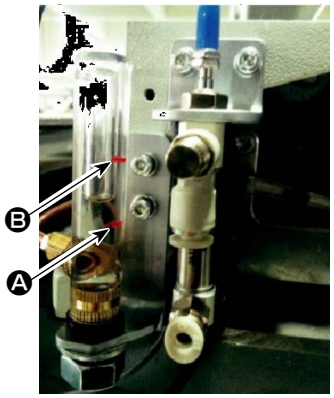
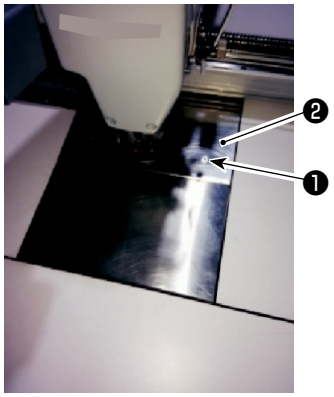
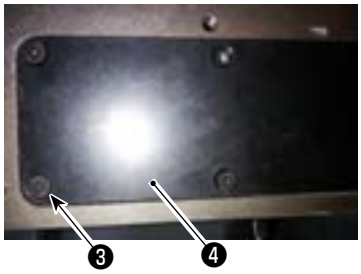
Error code	Error item	Problem cause	Solution
W511	Communication error between the main control and the expansion electrical equipment	1. Firmware file error or upgrade failure 2. Control board failure	1. Turn the power off and then on again. Contact after-sales service to re-upgrade the software version. 2. Contact after-sales service to replace the control board with a new one.
W512	Contact after-sales service to re-upgrade the software version. The bobbin is worn out.	There is no bobbin case in the bobbin holder.	Place a bobbin case in the bobbin holder.
W513	The bobbin disk is full.	There is no empty bobbin position in the bobbin holder.	Ensure there is at least one empty bobbin position.
W514	Wait until the bobbin change is complete.	The automatic bobbin change process has stopped and the change has not been completed. Press the Start button to resume.	Press the Reset/Bobbin Change button to complete the change process and then press the Start button.
W515	Bobbin change is not being performed at the initial position.	Before starting the bobbin change, the bobbin changer is not in the initial position.	Press the “Reset Changer” button on the Reset/Bobbin Change screen.

5. MAINTENANCE OF SAWING MACHINE

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

No.	Region	Explanation	Operating time
1	The area under the throat plate, area surrounding the hook, bobbin case and its inner portion, thread trimming area, needle bar area, areas inside and outside of the presser foot, openings of the electronic control box such as air inlet and outlet, and the regions in which thread waste, thread end and other stains are likely to remain. 	Clean up the surface of equipment with a tool such as an air gun. In particular, clean up the regions in which the aforementioned thread waste, thread end and other stains are likely to remain.	Eight hours
2	Apply grease to the upper and lower bushing of the needle bar.     **Fig 1** **Fig 2**	1. Loosen screw ❶ of the face plate. Remove the face plate. 2. Loosen and remove screw ❷ of the needle bar upper bushing and screw ❸ of the needle bar lower bushing. 3. Aligning the grease hole of grease gun with the tapped hole in the needle bar upper and lower bushings, add grease. (See Figs. 1 and 2.) 4. The grease amount to be added must exceed 0.5 cm^3. 5. After the completion of oiling, tighten the screws of the needle bar upper and lower bushings and return the face plate in position. Tighten the screw of the face plate. 6. Use JUKI Grease A as the lubricating grease, and do not mix it with other lubricating greases.	Operation for 720 hours

No.	Region	Explanation	Operating time
3	Lubricate the hook oil tank.   	1. Detach cover ❶ . 2. Remove rubber plug ❷ of the oil tank. 3. Pour accessory (or specified) oil to the oil tank through the rubber plug hole. 4. When the oil amount in the oil tank reaches the upper scale mark, stop pouring oil. 5. Return the rubber plug to and return the cover to their original positions.	If the oil level in the oil tank drops below the lower scale marker, replenish the oil tank with the accessory (or specified) oil.

No.	Region	Explanation	Operating time
4	Adding the lubricating oil to the gear box.    	1. Remove four screws ❶ . Detach hook cover ❷ . Remove six screw ❸ . Detach gear box cover ❹ and gasket. 2. Pour No. 32 white oil to the gear box little by little. 3. When the oil amount reaches the upper scale mark Ⓑ of the oil level gauge, stop pouring oil. 4. Return the cover and gasket of the gear box, and hook cover to their original positions. Tighten the screw.	Replenish the gear box with No. 32 white oil if the oil surface shown on the level gauge falls below the lower scale mark Ⓐ.

5-1. Troubles and corrective measures (Sewing conditions)

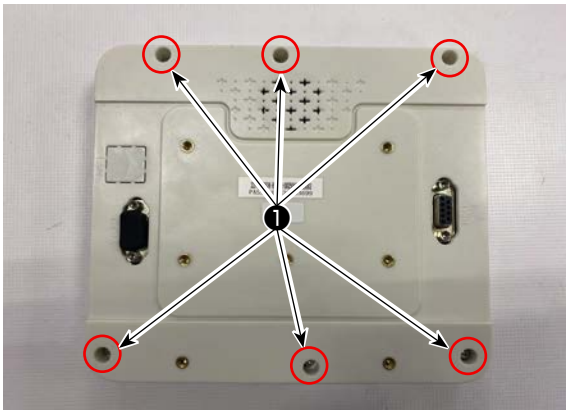
Trouble	Cause	Corrective measures
1. The needle thread slips off at the start of bar-tacking.	① Stitches are slipped at the start.	○ Adjust the clearance provided between the needle and the hook. ○ Set soft-start sewing at the beginning of sewing.
	② The needle thread remaining on the needle after thread trimming is too short.	○ Decrease the tension of the thread tension controller No. 1. ○ Increase the tension of the thread take-up spring.
	③ The bobbin thread is too short.	○ Decrease the bobbin thread tension. ○ Increase the clearance between the needle and the counter knife.
	④ Needle thread tension at 1st stitch is too high.	○ Decrease the needle thread tension at 1st stitch, and extend the duration of the AT operation at the beginning of sewing.
	⑤ Stitching pitch at 1st stitch is too small.	○ Make the stitching pitch at 1st stitch longer. ○ Decrease the needle thread tension at 1st stitch.
2. Thread often breaks or synthetic fiber thread splits finely.	① The hook or the inner hook holder has scratches.	○ Remove the hook and grind hook or the inner hook holder with a fine grind stone or buff them.
	② The needle hole guide has scratches.	○ Buff the needle hole guide or replace it with a new one.
	③ Thread enters the groove in the hook.	○ Detach the hook to remove the thread.
	④ The needle thread tension is too high.	○ Decrease the needle thread tension.
	⑤ The tension of the thread take-up spring is too high.	○ Decrease the tension of the thread take-up spring.
	⑥ The synthetic fiber thread melts due to heat generated on the needle.	○ Use the optional needle cooler.
	⑦ When taking up the thread, the needle tip penetrates the thread.	○ Check the rough state of needle tip. ○ Use the ball-pointed needle.
3. The needle often breaks.	① The needle is bent.	○ Replace the bent needle.
	② The needle comes in contact with the intermediate presser.	○ Adjust the position of the intermediate presser.
	③ The needle is too thin for the material.	○ Replace it with a thicker needle according to the material.
	④ Clearance between the needle and the hook is too small.	○ Adjust the clearance between the needle and the hook.
4. Threads are not trimmed. (Bobbin thread only)	① The counter knife is dull.	○ Replace the counter knife.
	② Knife pressure of the counter knife is low.	○ Adjust the knife pressure of the counter knife.
	③ The counter knife has been improperly positioned.	○ Correct the position of the counter knife.
	④ The last stitch is skipped.	○ Correct the timing between the needle and the hook.
	⑤ Bobbin thread tension is too low.	○ Increase the bobbin thread tension.
	⑥ Flopping of cloth	○ Lower the intermediate presser height.
5. Stitch skipping often occurs.	① Clearance provided between the needle and the hook is not correct.	○ Adjust the clearance between the needle and the hook.
	② Position of the inner hook holder against the needle is not correct.	○ Adjust the position of the inner hook holder against the needle.
	③ The needle is bent.	○ Replace the bent needle.
	④ The needle thread after thread trimming is too long.	○ Decrease the tension of the thread take-up spring. ○ Increase the tension of the thread tension controller No. 1.
6. The needle thread comes out on the wrong side of the material.	① The needle thread tension is not high enough.	○ Increase the needle thread tension.
	② The needle thread after thread trimming is too long.	○ Increase the tension of the thread tension controller No. 1.
7. Threads break at time of thread trimming.	① The knife has been improperly position.	○ Correct the position of the knife.

Trouble	Cause	Corrective measures
8. Thread end of the 1st stitch comes out on the right side of the material.	① Stitch skipping at the 1st stitch. ② Needle used and thread used are thick in terms of the inner diameter of the intermediate presser. ③ Intermediate presser is not properly positioned in terms of the needle. ④ The direction of air blower is incorrect. As a result, needle thread at the tip of needle cannot be clamped with the disc presser.	○ Increase the length of needle thread remaining at the needle after thread trimming. ○ Change the current intermediate presser with another one which has a larger inner diameter. ○ Adjust the eccentricity between intermediate presser and needle so that needle enters in the center of intermediate presser. ○ Adjust the air-blowing direction of the air blower according to the direction of sewing so that the needle thread at the tip of needle can be clamped with the disc presser.
9. The needle thread is entangled in the inner hook holder.	① The clearance provided between the inner hook holder and the inner hook is too small.	○ Adjust the clearance provided between the inner hook holder and the inner hook appropriately according to the thickness of needle thread to be used.
10. The knotting section of bobbin thread at 2nd stitch at the sewing start appears on the right side.	① The bobbin runs idle excessively. ② Bobbin thread tension is too low. ③ The needle thread tension at 1st stitch is too high.	○ Adjust the height of idling prevention spring of the bobbin case appropriately. ○ Increase the bobbin thread tension. ○ Decrease the needle thread tension at 1st stitch.

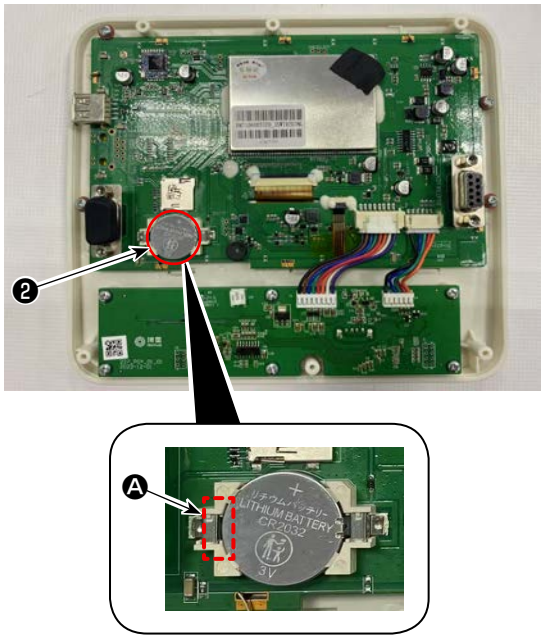
5-2. Disposal of batteries

The operation panel has a built-in battery in order to operate the clock even when the power is turned OFF. Be sure to dispose of the battery following the local laws and regulations.

■ How to remove the battery (There is a battery inside the panel.)



1) Remove the six screws ❶ on the back of the panel.



2) Use a flat-head screwdriver on the recessed part of battery ❷ (Ⓐ in the red frame) to gently pry out battery ❷ .

6. SUBCLASS MODEL

6-1. Laser knife type

6-1-1. Safety Precautions

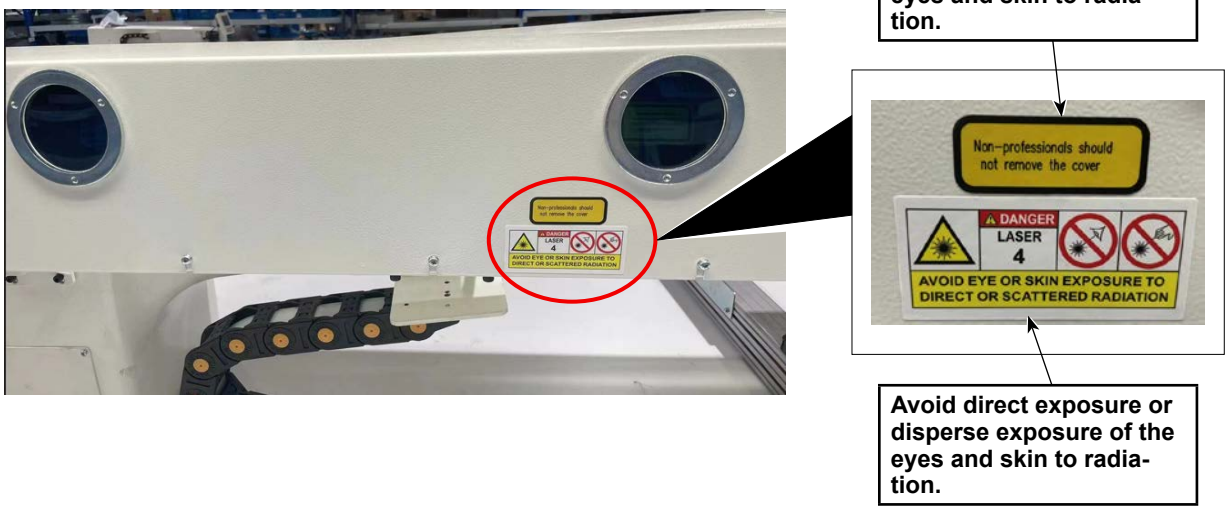
1. **This product cuts the material using the Level 4 no observation light continuous wave laser. Wave length is 10.6 µm, maximum output is 100 W and the angle is 3.1 mrad. Only the persons who have received professional training are allowed to use and handle this product. Be sure to contact our After-Sale Service staff if you want to carry out maintenance and / or repair of this product. Professional staff who has received professional training in JUKI to gain experience of the relevant work will carry out maintenance / repair of your product.**

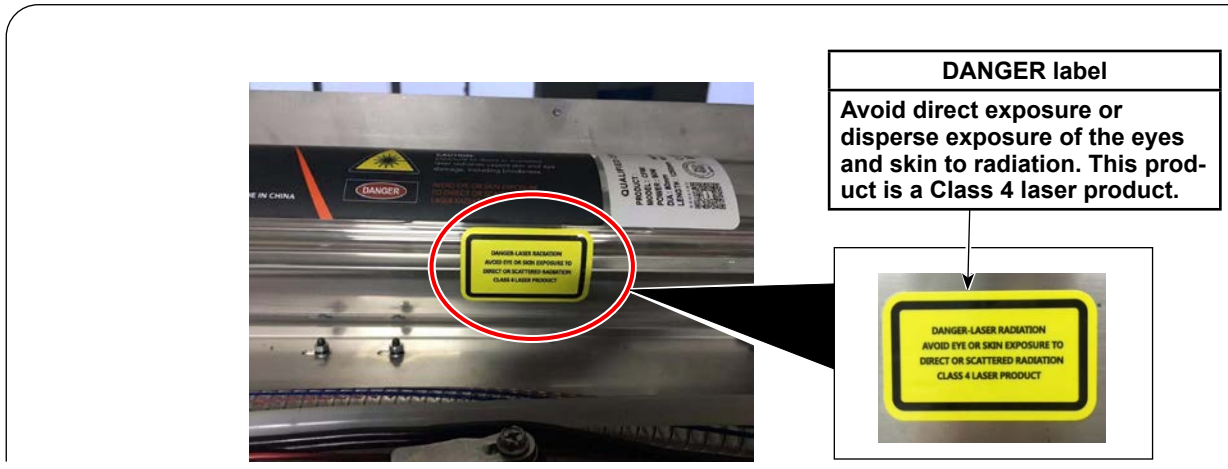
2. **Whenever you use of this product or carry out maintenance / repair of it, be sure to wear safety goggles. Use the safety goggles that satisfy the following criteria or that are provided by the manufacturer.**

   Safety goggles selection criteria :

   1. CE Marking is obtained
   2. Visible light transmittance VLT>60%
   3. Applicable wave length :10.6µm
   4. Protective characteristics : Light absorption type CO2 laser safety goggles or light reflection type CO2 laser safety goggles
   5. Protection level : OD5+

3. Safety-mark attachment positions and meaning of icons and expressions





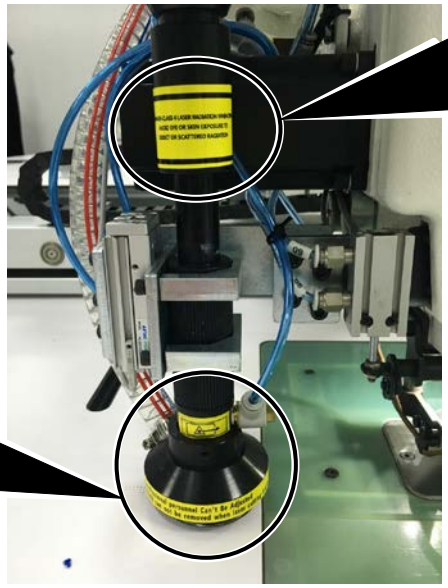
Warning label against pinching

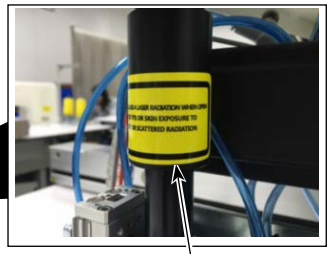
This label indicates that there is a risk of pinching hands between the sewing machine and the laser device mechanism.

CAUTION label

This is the laser exit port.

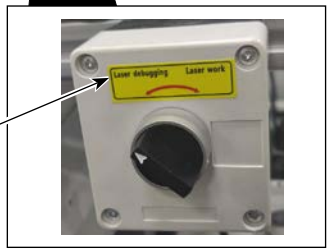
Any person other than the professional engineer is allowed to carry out adjustment. Do not remove the cover while the laser is in operation.



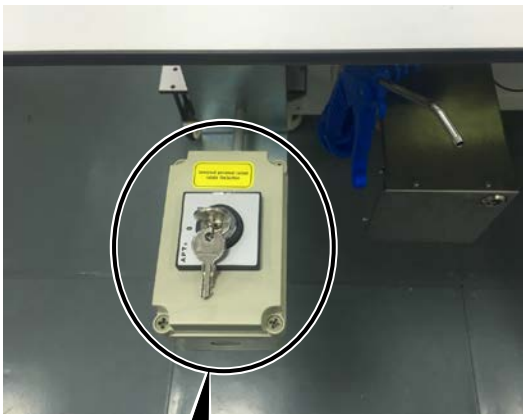


DANGER label

This product causes Class 4 laser beam exposure. When you have detached the cover, be sure to avoid direct exposure or disperse exposure of the eyes and skin to radiation.



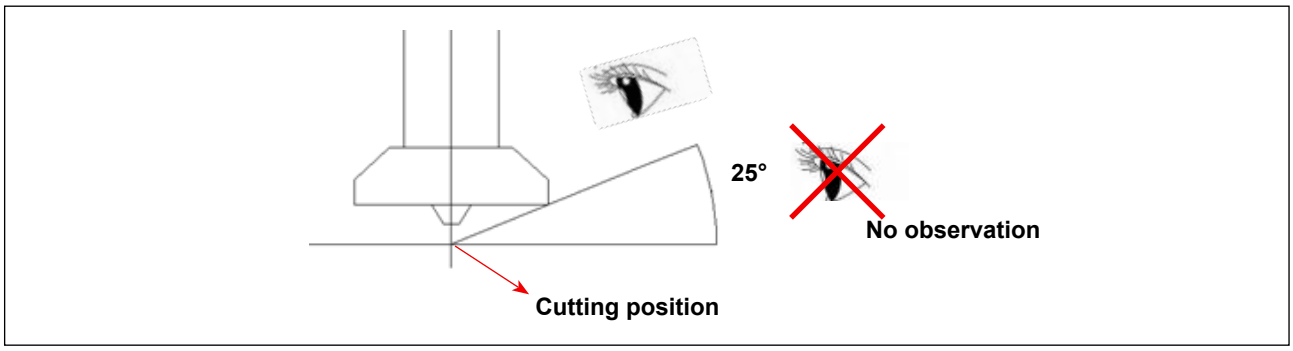
Twist counterclockwise:
Laser maintenance mode
Twist clockwise:
Laser operation mode



Any person who has not received professional training is not allowed to touch the keys.

6-1-1-1. Precautions to be taken when installing or adjusting the laser

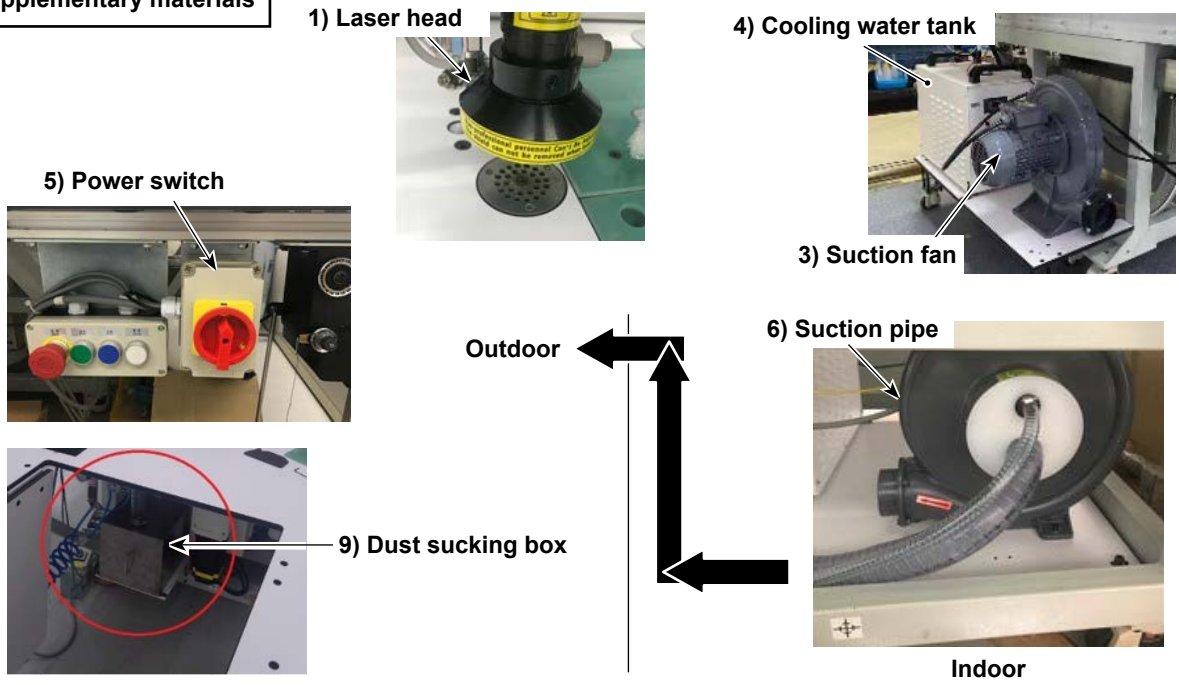
1) If the laser intensity is excessively high, take care not to directly look into the laser in order to protect your eyes. Be sure to wear safety goggles during work.
2) Take care not to irradiate the mirror surface with laser light in order to prevent reflection.
3) Laser current during the adjustment: Adjustment of the laser current during adjustment is prohibited. The factory-set value at the time of shipment must be used as the standard value.
4) Be sure to use the adjustment mode when you adjust this product. (Refer to **"6-1-5-3. Adjusting the laser" p.92**.)
5) Visible angle during work or adjustment (See the figure given below)



6-1-1-2. Precautions to be taken when using the laser

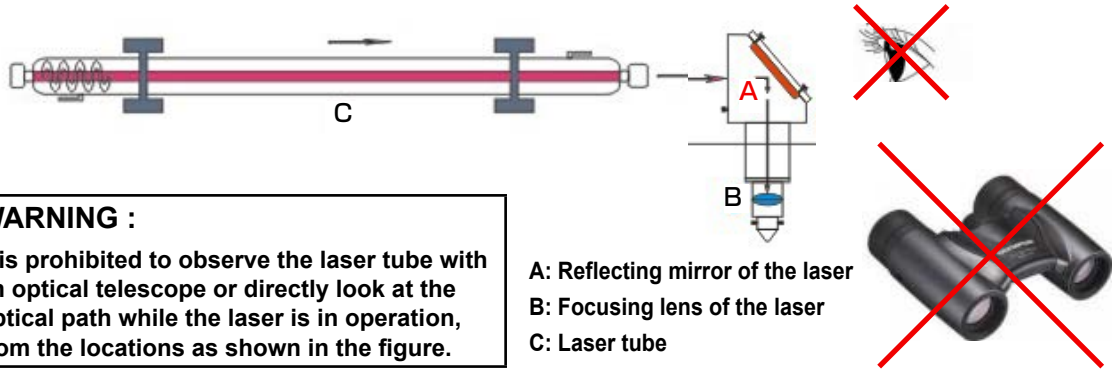
1) Be sure to check the head section of the laser to clean it up to remove the accumulated combustion impurity every working day before commencing the work.
2) Check atmospheric pressure and adjust it to 0.5 - 0.55 MPa every working day before commending the work.
3) Be sure to check whether the cooling water tank and suction fan of the equipment normally operate and also check the suction fan for abnormal noise and the cooling water tank for errors every working day before starting the work.
4) Be sure to check the cooling water tank of the laser contains an adequate amount of commercially available pure water.
5) Turn OFF the power switch every working day at the end of the work.
6) Be sure to place the exhaust pipe of the suction fan in an outdoor location and attach a combustion deodorizing filter to its outer connector.
7) This product is a Level-4 no observation light laser product. Anybody who has not received the professional training must remain away from this product to protect against injury.
8) Whenever you want to carry out maintenance / repair of the laser equipment of this product, be sure to contact our After-Sale Service Department. The professional staff who has received professional training in JUKI to gain experience of the relevant work will carry out maintenance / repair of your product.
9) Before start working, remove any dust from the dust collection box and add water to a depth of 10-20 mm to prevent fire.

Supplementary materials



WARNING :

9) There is a risk of fire if 9) is not properly handled.



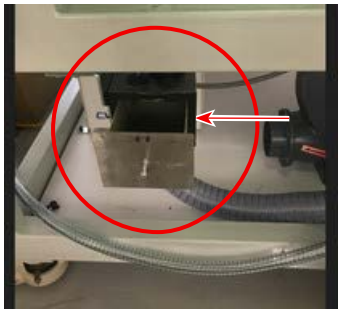
WARNING :

It is prohibited to observe the laser tube with an optical telescope or directly look at the optical path while the laser is in operation, from the locations as shown in the figure.

A: Reflecting mirror of the laser
B: Focusing lens of the laser
C: Laser tube

6-1-2. Maintenance

1) Observe the cooling water tank of the laser to check whether the water normally circulates in the tank to ensure that the laser tube is not clogged inside.
2) Wipe the reflecting mirror surface with alcohol once every half month to keep it clean and to improve its reflecting effect. Wipe the focusing lens inside the irradiation cylinder with alcohol from time to time to keep it clean.(Refer to **"6-1-2-1. Care for the lens" p.81** for details.)
3) Replace the laser tube based on the frequency of use. If the laser tube fails to satisfy the requirements for cutting the material, change the laser tube with an appropriate one.
4) Periodically change approximately five to six liters of pure water in the cooling water tank of the laser tube once every three months.
5) The water in the cooling water tank of the laser tube should be changed every time the laser tube is changed together. The tank uses approximately five to six liters of commercially available pure water.
6) Check the hose of the tank and laser tube periodically once every three months and change it with a new one if necessary in order to prevent a broken tube from negatively affecting smoking and cooling.
7) Adjust / calibrate the laser path once every six months to ensure that the laser beam is focused without distortion.
8) After 4 hours of operation, loosen the screw indicated by the arrow in the photo, pull out the dust collection box drawer to clean it (remove dust), and add water to a depth of 10–20 mm to prevent fire.

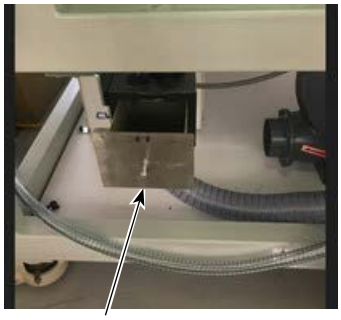


9) Thoroughly inspect and carry out cleaning of the following parts every time you have used the laser for eight hours to prevent accumulation of dust and deterioration of the tube, thereby preventing a fire from occurring. In some cases, blow the relevant parts with an air blower or disconnect the hose to remove dust.
   ① Clean up litter in the upper smoking tube.
   ② Clean up litter in the lower smoking tube (Loosen the screw in the cover on the table. Clean up litter at the tube opening and in the tube with a tool or small wooden stick).
   ③ Clean up litter accumulated in the dust suction opening, outlet and exhaust pipe of the suction fan.

10) Immediately carry out inspection and maintenance according to the instructions displayed on the operation panel.

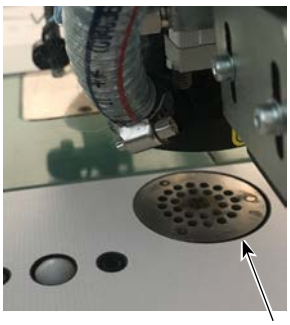
Service life of the laser tube: Approximately six months. Service life of the focusing lens and reflecting mirror: Approximately one year. Periodical cleaning is required to prevent foreign matters from attaching them.

Supplementary materials



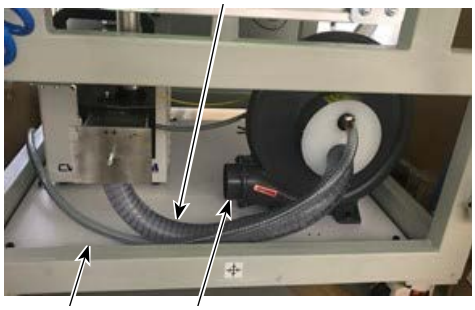
8) Dust sucking box

9) Upper suction tube



9) Lower suction (cover)

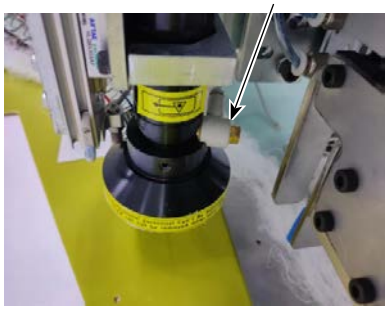
9) Lower suction tube



Upper suction tube

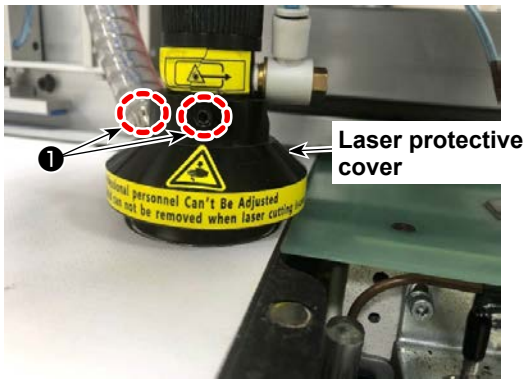
Outlet

Air outlet

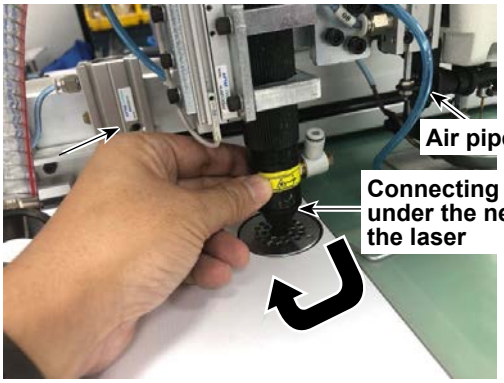


6-1-2-1. Care for the lens

WARNING :
Be sure to always turn OFF the power to the sewing machine and laser before disassembly and assembly.

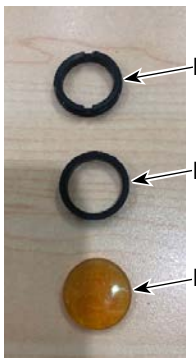


1) Loosen two setscrews ❶ of the laser protective cover to remove the cover.




Disassembled state

2) Turn OFF the air and disconnect the air pipe. Then, turn the connecting tube under the neck of the laser to remove it.

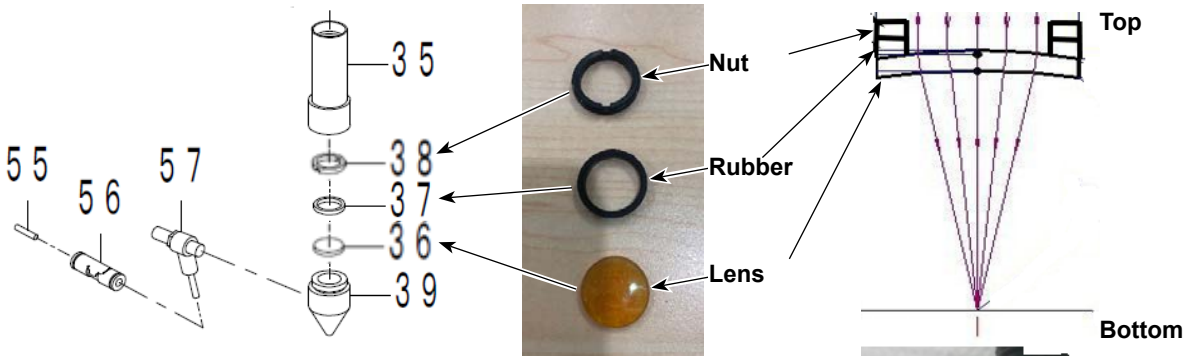



Disassembled state

3) Loosen the nut to remove the lens.

Be sure to loosen the nut with a jig that is suitable for the nut slot shape.
Never use a coin to disassemble or assemble the lens components since the coin will damage the lens.

4) Wipe the lens you have removed with alcohol using a piece of clean waste cloth.
Check to make sure that there is no abnormality such as dirt or flaws on the surface of the lens.



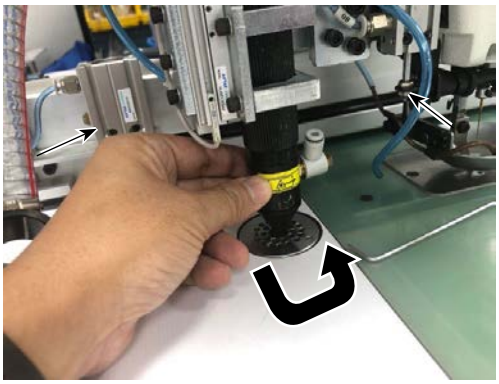
5) Reassemble the lens components.

Caution

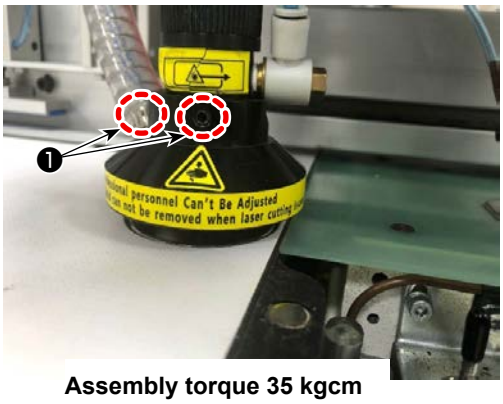
Reassemble the lens components paying attention to the mounting order and orientation of the lens components.

*** Convex surface of the lens should be on the top.**

Nut tightening torque 5 to 10 kgcm



6) Turn the connecting tube under the neck of the laser to install it.
Then, perform air piping.



Assembly torque 35 kgcm

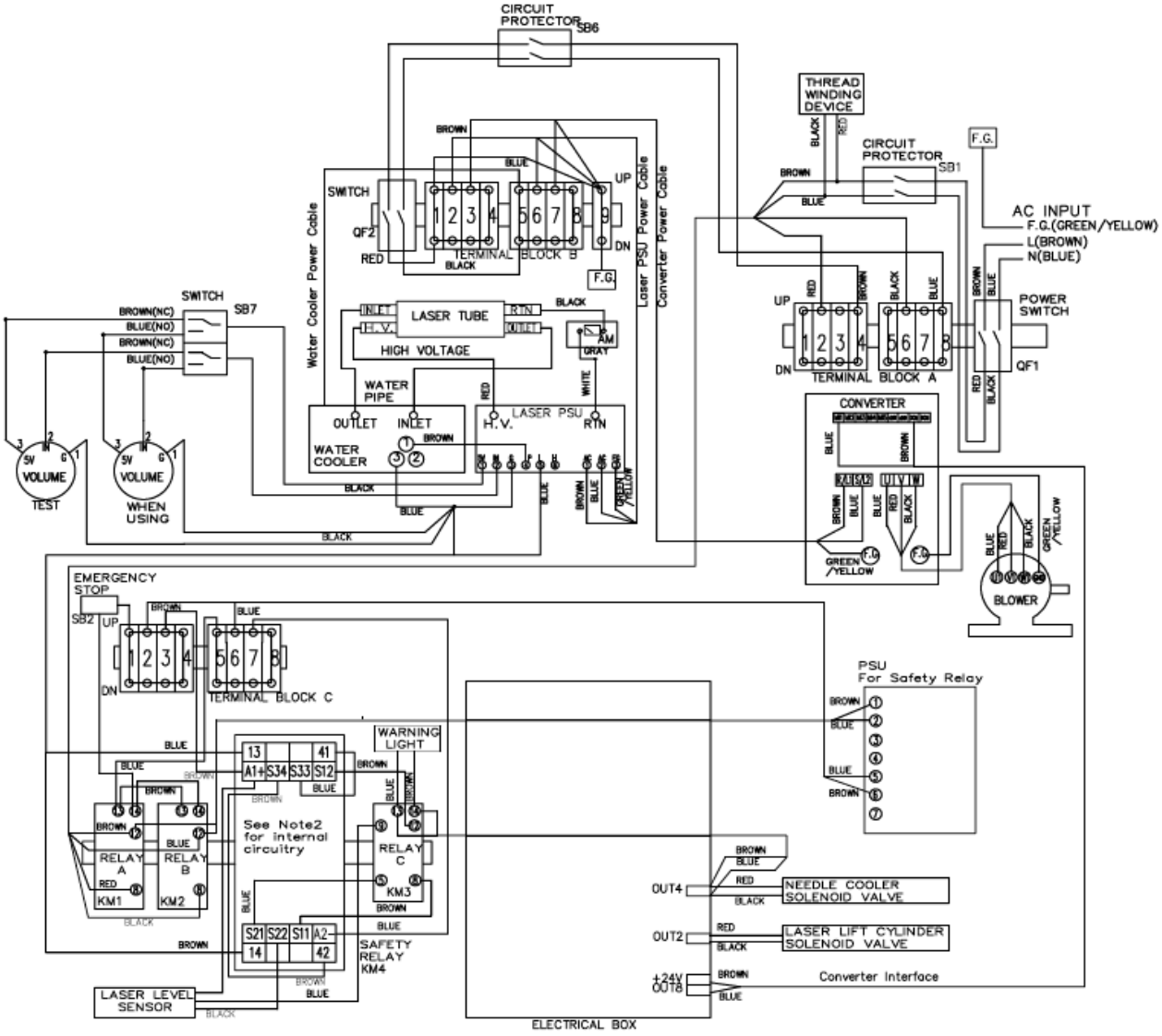
Clearance between the cover and the top surface of the table 5 to 8 mm

7) Attach two setscrews ❶ to the laser protective cover to secure the cover.

8) Lastly, carry out cutting test on the laser and adjust the laser if necessary.

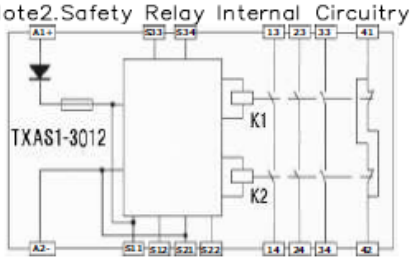
6-1-3. Electrical Safety

6-1-3-1. Circuit diagrams



Note1.: ┼ No signal line connection
┼ Signal line connection

Note2.Safety Relay Internal Circuitry



6-1-4. Installation

6-1-4-1. Installing the laser power supply

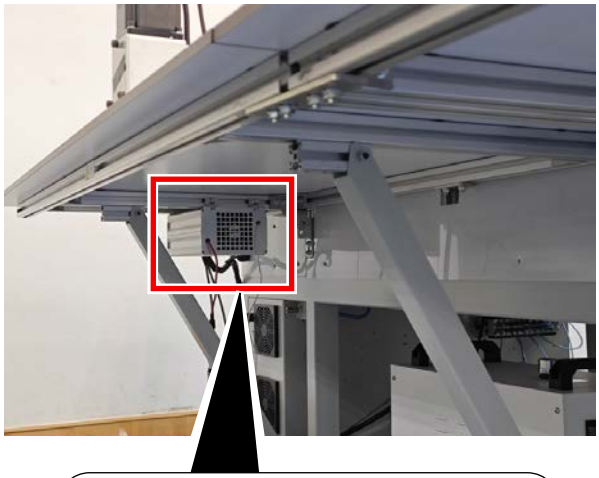
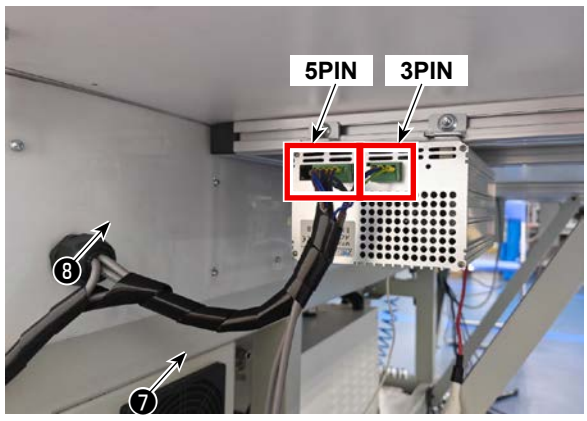
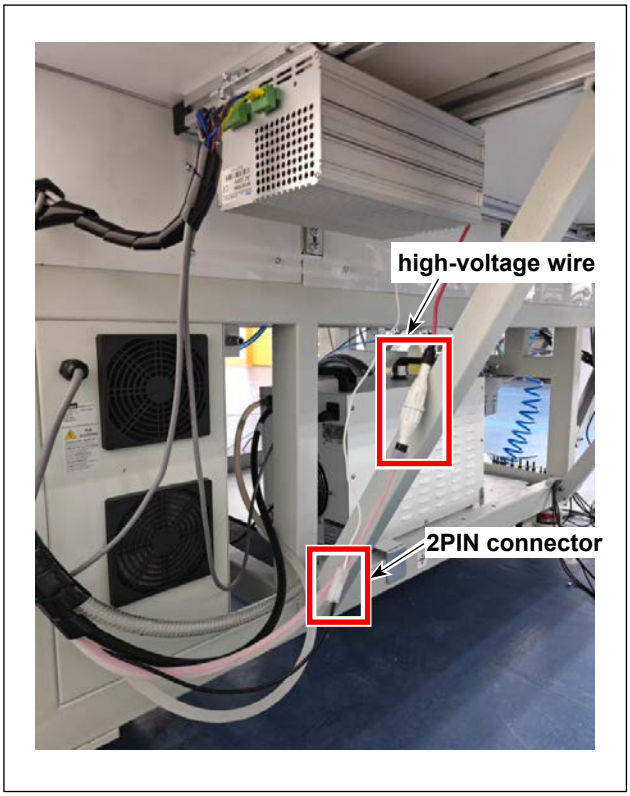


Fig. 1

1) Loosen the four screws Ⓐ from plate Ⓑ in Figure 1, turn on the laser power, and tighten screws Ⓐ.

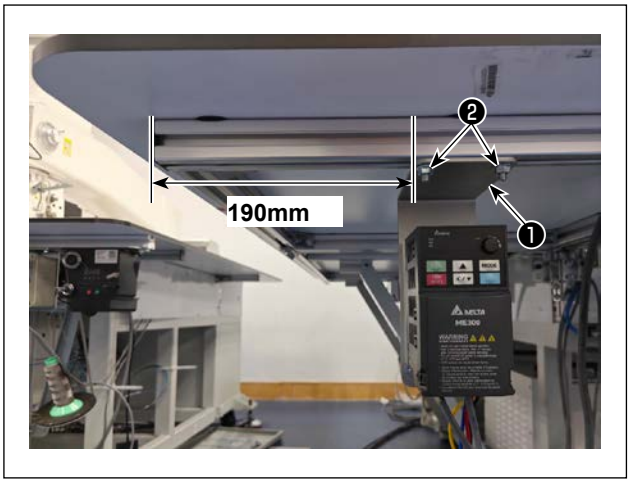


2) The two green connectors on the power cable correspond to the laser power supply. Connect the left connector to 5PIN and the right connector to 3PIN.



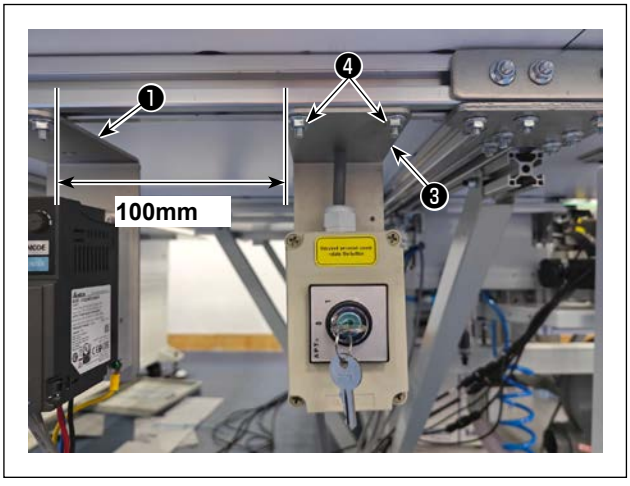
3) Connect the 2P connector of the power cable to the 2PIN connector of the laser power supply, and connect the high-voltage wire (red) connector to the high-voltage wire (red) connector of the laser power supply.

6-1-4-2. Installing the converter



Insert the T-screw of the converter into the aluminum frame, position the converter mounting plate ❶ 190 mm from the left end of the sewing machine aluminum frame, and tighten nut ❷ to secure it.

6-1-4-3. Installing the laser power switch



Insert the T-screw of the power switch box into the aluminum frame, position the power switch mounting plate ❸ at a distance of 100 mm to the right of the converter mounting plate ❶ , and tighten nut ❹ to secure it.

6-1-4-4. Verifying the converter settings

In this paragraph, setting of the parameter setting No. "0.20" is described. Set the parameters in Table 1 in the same way as described above.

Setting No.	Value
0.17	14
0.20	7
0.21	1
1.12	4

Setting No.	Value
1.13	5
1.35	60
1.52	60

When you turn ON the power to the sewing machine, the power to the converter is turned ON.
While the power to the converter is in the ON state, press the "ENTER" button.

Press the "▲" button to adjust the numeric value on the LED to "00.20".

Press the "ENTER" button.

Press the "▲" button to adjust the numeric value on the LED to "7".

Press the "ENTER" button.

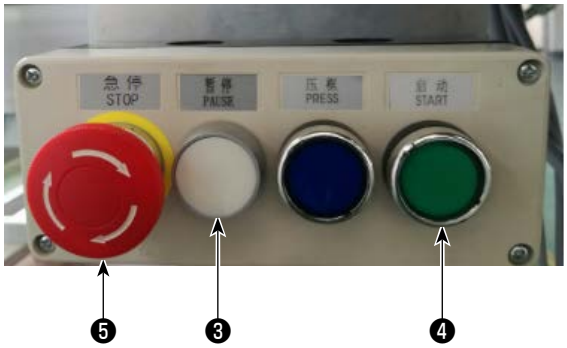
Press the "MODE" button twice.
Then, the LED display is changed over as illustrated in the figure on the left. Now, setting of the converter is completed.

6-1-5. Operation

6-1-5-1. Temporary measures

Fig. 1

Fig. 2



1. Emergency stop

In the case an accident occurs, press the white pause button on the operation panel (Fig. 1 and Fig. 2) to stop the current operation state (the laser operation is stopped, but the power to the laser is not turned OFF). Or, all of the power supply to the equipment excluding the bobbin winder and the control panel cabinet fan can be turned OFF by pressing the red emergency stop button on the five-button control panel (Fig. 2).

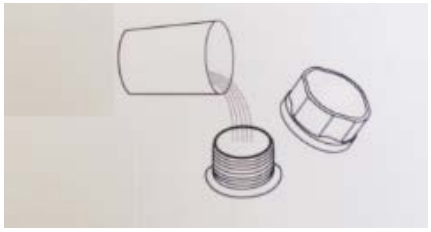
2. Re-start

Method ① : While the sewing machine is in the temporary stop state, the background LED lamp of "PAUSE" button ❶ (Fig. 1) located at the lower portion of the screen lights up in red.
When the accident is eliminated, press "PAUSE" button ❶ (Fig. 1). Then, the background LED lamp of the pause button changes its color to blue to indicate that the laser is released from the temporary stop state. Then, when you press "START" button ❷ (Fig. 1) located at the lower portion of the screen, the sewing machine re-starts automatic sewing.

Method ② : Press white "PAUSE" button ❸ (Fig. 2) on the five-button control panel to release the laser from the temporary stop state. When you press "START" button ❹ (Fig. 2) on the five-button control panel, the sewing machine continues automatic sewing.

Method ③ : When the laser is placed in the temporary stop state with emergency stop button ❺ (Fig. 2) pressed, turn the emergency stop button ❺ (Fig. 2) clockwise to release the laser from the emergency stop state, before re-starting the sewing machine. After the aforementioned re-setting, press "START" button ❹ (Fig. 1) located at the lower portion of the screen or green "START" button ❹ (Fig. 1) on the five-button control panel to continue / re-start sewing.

6-1-5-2. Use of the cooling system



Open the water inlet of the cooling system of the equipment. Put cooling water in the cooling system (take care not to allow water to overflow).

Fig. 1

1. Using the cooling system

1) Check to make sure that the drain pipe and water supplying pipe are securely connected to the equipment.
2) At least 5 to 6L water should be put in the cooling system. If the water in the cooling system runs short, an alarm will sound from the cooling system. (Be sure to use pure water or distilled water. Avoid the use of tap water or mineral water.)
3) After starting the cooling system for the first time after the purchase, immediately check the tubes for leakage of water.
4) Plug in the power cord and turn ON the power switch. (Starting the cooling system without supplying water is strictly prohibited.)

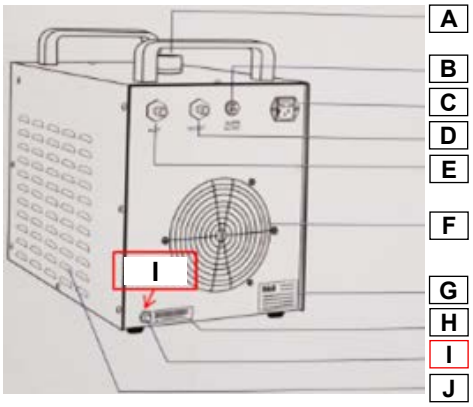


Fig. 2

2. How to feed water to the cooling system, and water changing cycle

1) How to feed water : See Fig. 1. Be sure to wait until the water temperature becomes equal to the room temperature before putting it in the cooling system.
2) Water changing cycle : It is recommended to change the water once every three months. When you want to change the water in the cooling system, turn the power OFF, turn the drain outlet (Fig. 2) to open it to allow the water to be discharged from inside of the system for cleaning. Then, tighten the drain output and put new water according to the instructions.

A	Water inlet	**F**	Radiating fan
B	Alarm signal output port	**G**	Equipment parameter
C	Power supply connector (provided with a fuse tube)	**H**	Serial number of the machine
D	Water outlet	**I**	Discharge outlet
E	Condensate inlet	**J**	Air inlet

3.Cooling system error display

If there is a problem with the cooling device, an error code will be displayed on the display of the cooling device body.

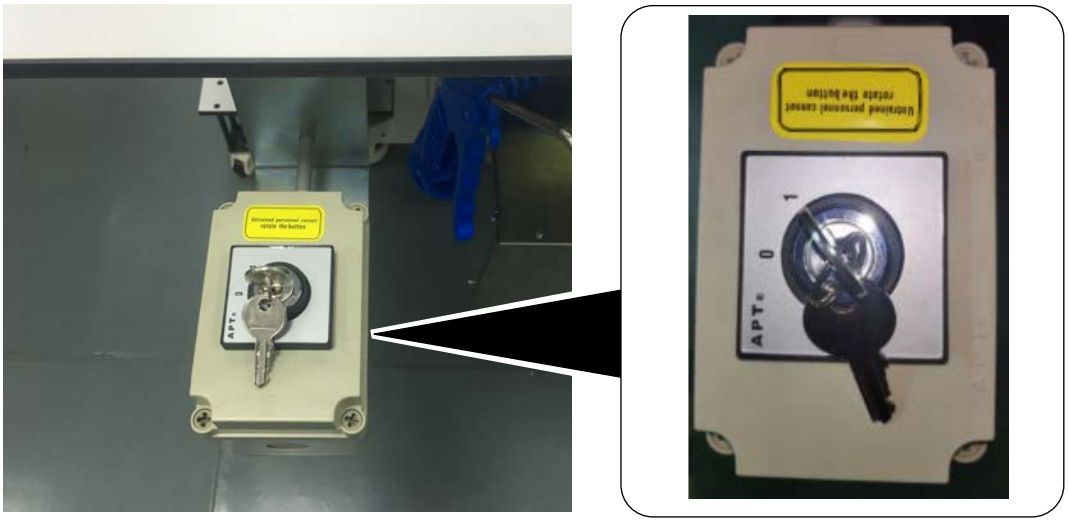
Error code	Error description
E0	Water flow alarm
E1	Excessive water temperature
HH	Water temperature sensor error (short circuit)
LL	Water temperature sensor malfunction (open)

4. Cause and action in case of cooling system failure

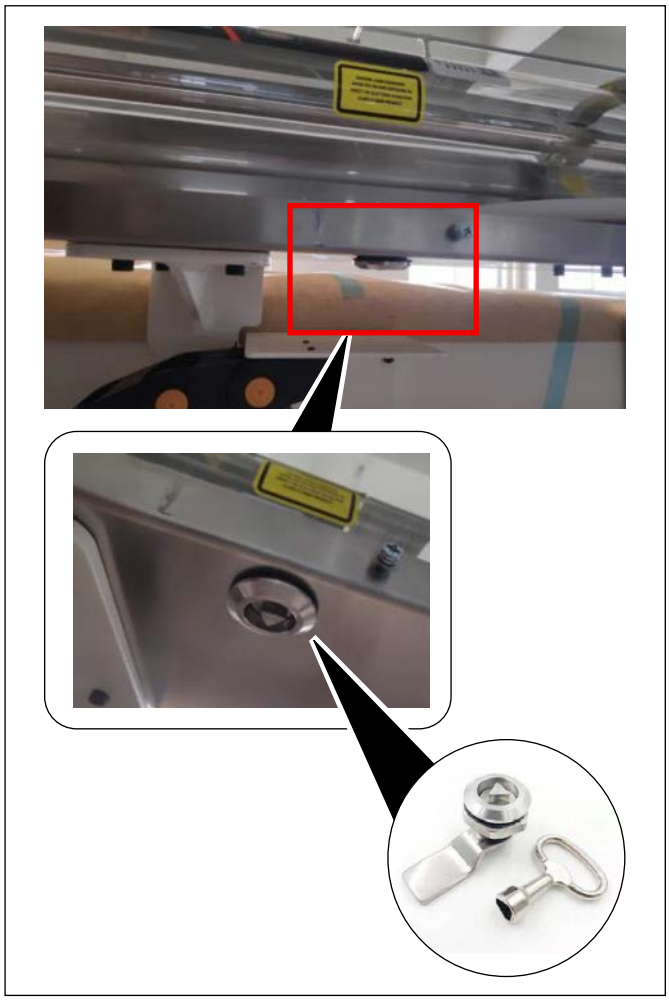
Symptom	Cause	Action
Power cannot be turned ON.	Power line is not connected.	Check the power line connection. If the problem cannot be solved, there may be a problem with cooling system.
Water flow error occurred and water is not flowing to the water outlet and condensate inlet.	Water level in tank is too low.	Add cooling water. Check for water leakage from the water distribution pipe.
Water flow error occurs when connecting the cooling system to the equipment. (No error in the cooling system alone)	Clogged water distribution pipe	Check for sudden bending or pinching of the water distribution pipe.
High water temperature	Poor ventilation of the cooling system	Ensure good ventilation around the cooling system.
	Excessive heat load	If there are heat sources around the cooling system, remove them.
Fan does not operate when cooling system is turned on.	Water temperature is lower than 20°C.	It is normal if the water temperature is below 20°C.
Error after adding and replacing cooling water.	Water splashed on the electrical circuit.	Let it dry naturally.
	Pump motor failure	There may be a problem with cooling system.

6-1-5-3. Adjusting the laser

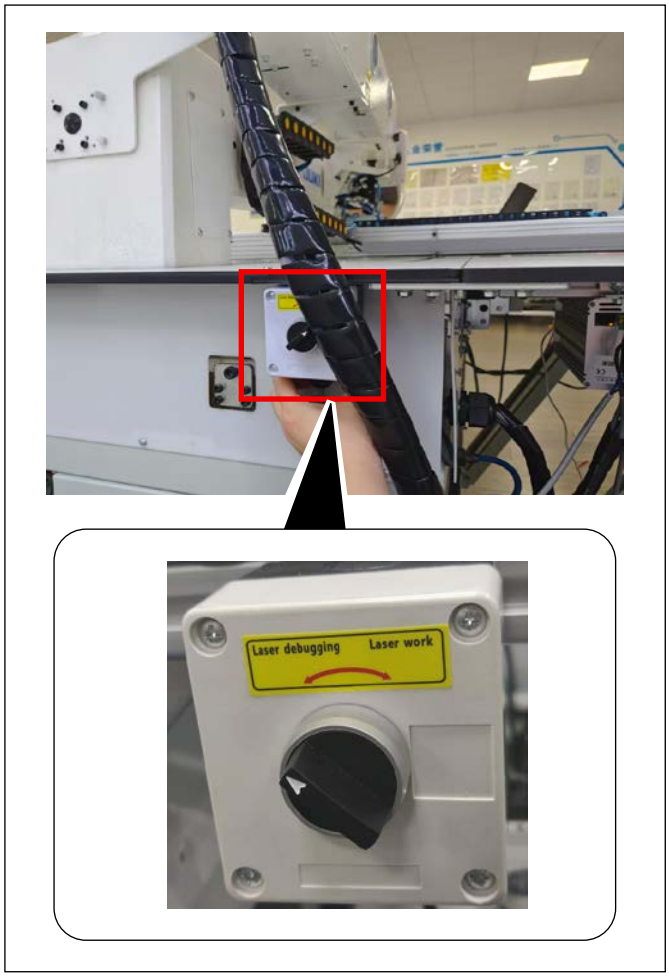
If it is necessary to adjust the light path, be sure to contact our After-Sale Service staff before carrying out the adjustment. The professional staff who has received professional training in JUKI to gain experience of the relevant adjustment work will carry out the adjustment.



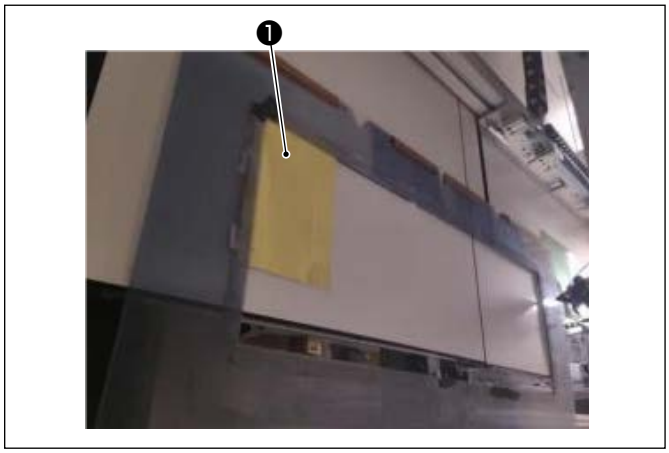
1) Laser switch key
   Do not pull out the laser switch key.
   When the switch is set to "1", the laser is energized and can be operated.
   When the switch is set to "0", the power to the laser is disconnected and the laser cannot be operated. However, even in this case, the sewing machine is able to perform sewing.



2) Laser tube cover key



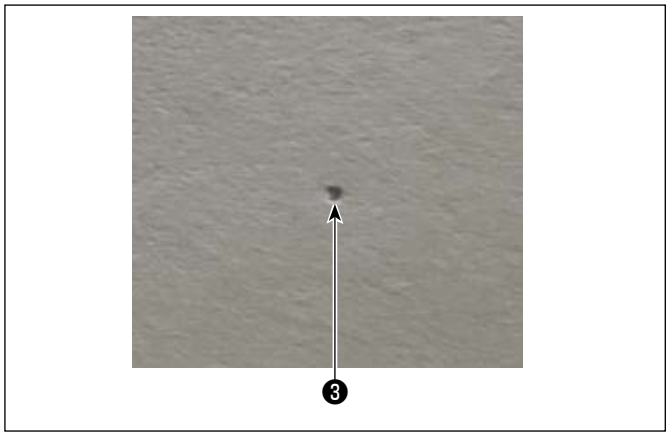
3) Opening the laser adjustment mode
Turn the laser operation mode knob located on the right side of the thyristor type electronic voltage regulator counterclockwise to proceed to the adjustment mode. (When the laser operation mode knob is turned counterclockwise, the laser enters the laser adjustment mode. When the knob is turned clockwise, the laser enters the laser operation mode.)



1. Adjusting the laser reference

1) Place paper ❶ on the upper left corner of the template.

2) Set the template, insert it in the X direction, and then click “Clamp” ❷ below the display.



3) Turn the pulley by hand to allow the needle to penetrate into the paper at one point ❸ .

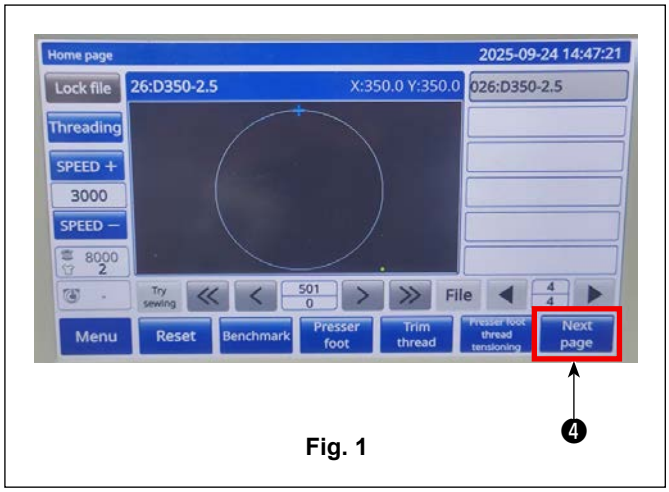


Fig. 1

4) Click “Menu” Next page ❹ on the main screen.

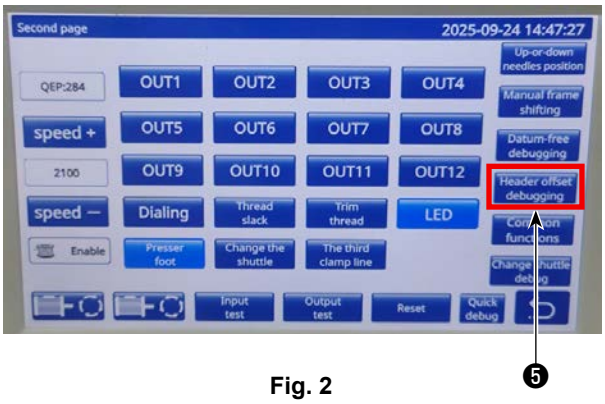


Fig. 2

5) Click Header offset debugging ❺ .

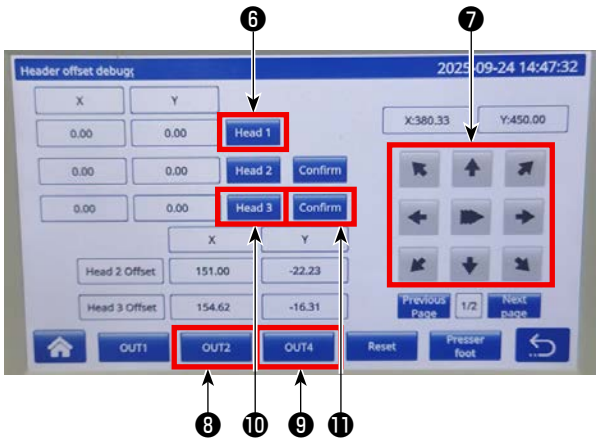
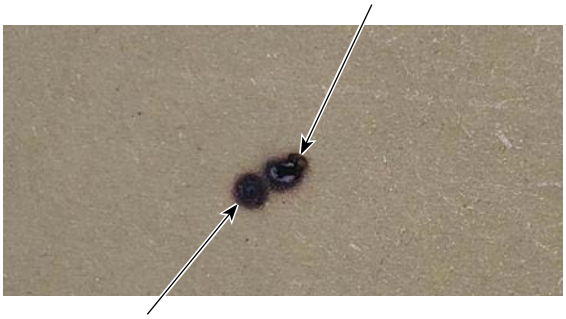


Fig. 3

Second time: Laser irradiation point is aligned with the needle-penetrated point of the paper



First time: Laser irradiation point is not aligned with the needle-penetrated point of the paper

Fig. 4

6) Clicking Head 1 ❻ on the screen shown in Figure 3 will change the X and Y coordinate values Head 1.
7) Use button ❼ to move up, down, left, and right to align the laser emitter with the needle entry point on the pattern paper. Press button OUT2 ❽ to lower the laser emitter, then press button OUT4 ❾ to emit the laser.

   Press button OUT4 ❾ again to stop laser emission, and then press button OUT2 ❽ to raise the laser emitter.
8) Check the distance between the needle point and the laser emission point on the paper, and repeat step 7) until the two points align. (Refer to Fig. 4.)
9) Once the two points are aligned, press Head 3 ❿ and then press Confirm ⓫ .

6-1-5-4. Using the laser

1. Electric control port for the laser for the regular use

1. Electric control port for the laser irradiation : OUT4
2. Electric control port for downward-direction operation of the laser head : OUT2
3. Laser blower electronic control port : OUT8

2. Reduction in the laser cutting range in comparison with the sewing range of the standard model of sewing machine

Reduction in the laser cutting range in the X direction : 153.5mm
Reduction in the laser cutting range in the Y direction : 3.5mm

3. Weight of the finished laser product

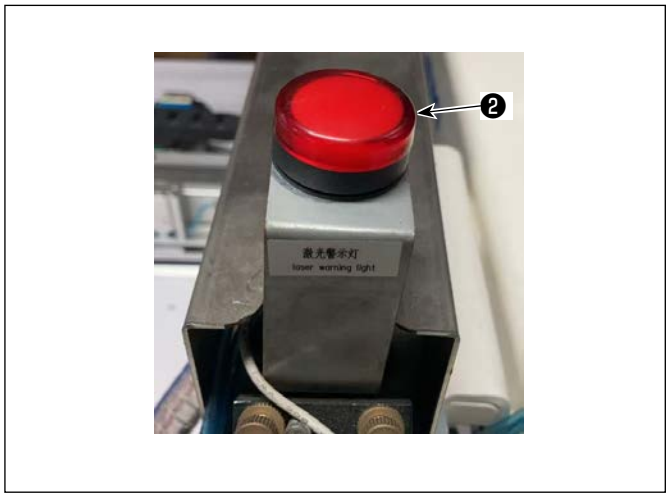
Weight of the finished laser product : 568kg

4. Power consumption of the laser

1130VA

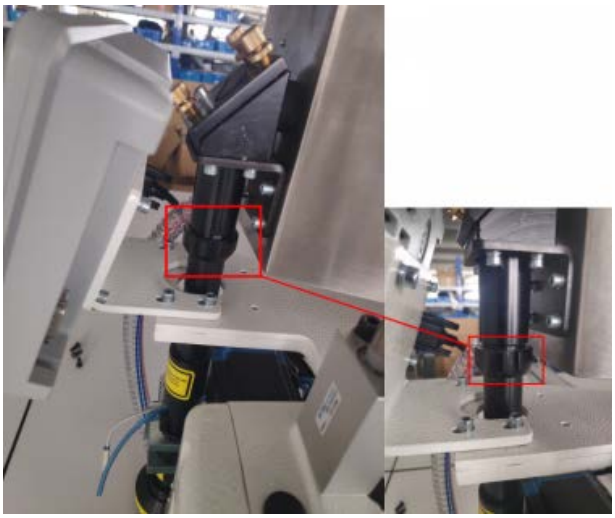
5. Operation pilot lamp

1) The laser irradiation is enabled only when sensor lamp ❶ lights up. When the sensor lamp goes out, the laser irradiation is disabled.



2) While laser operation pilot lamp ❷ located above the head is in the ON state, the laser receives the irradiation command. When it is in the OFF state, the laser does not receive the command. When the pilot lamp lights up, the laser equipment is in the operation state or in the stand-by state for irradiation.

The distance between the cover and the table becomes 8 mm or less when the pattern is pushed down while the laser is in operation.



6. Operation pilot lamp

1) When the laser tube is lifted to its upper position, there is a distance of 18 mm between the lowermost point of the laser head and the table surface. When the laser tube is pushed down to its lower position, the aforementioned distance is reduced to 5 to 8 mm. The highest position of the suction cover must be positioned 8 mm or lower than the pattern while the laser is in operation.

2) Loosen the connection at the upper part of the laser tube, and adjust the height of the laser tube according to the material thickness.

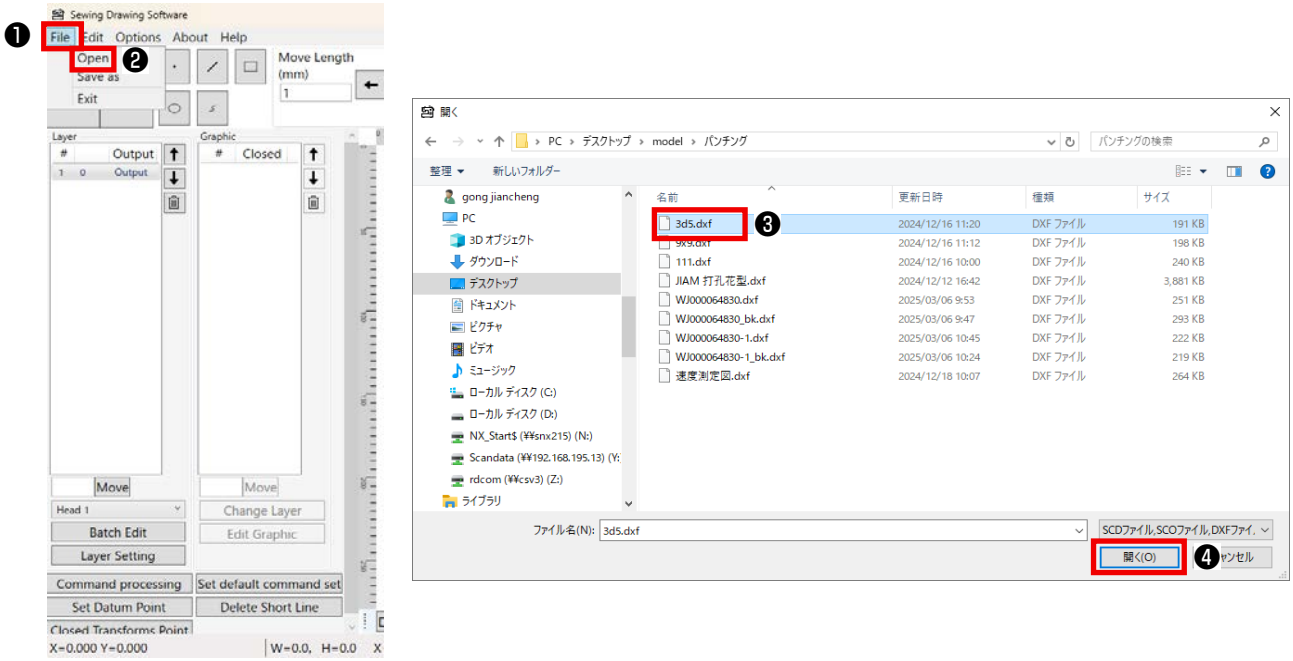
7. How to adjust the electric current according to the material thickness

The electric current is increased by turning the laser current adjustment knob, located on the left side of the laser tube, clockwise. The electric current is decreased by turning the aforementioned knob counterclockwise. The pointer of the current indication meter located on the right side of the knob vibrates to the right and left according to the increase / decrease of the electric current. In the case of normal cutting operation, the electric current is 100 mA ± 1 mA, while the maximum current value is 20 mA.

6-1-5-5. Adjusting the air volume of the fan

Turn the knob on the converter to adjust the fan airflow. Turn OUT8 ON to operate the dust collection device, and adjust the airflow until the fabric is no longer sucked in.

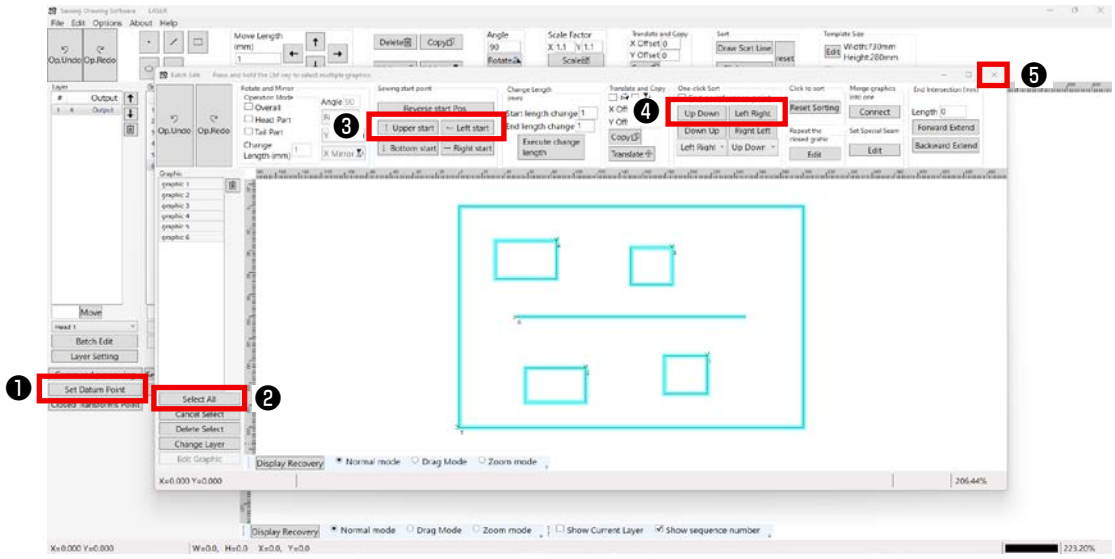
6-1-5-6. Using the pattern editing software



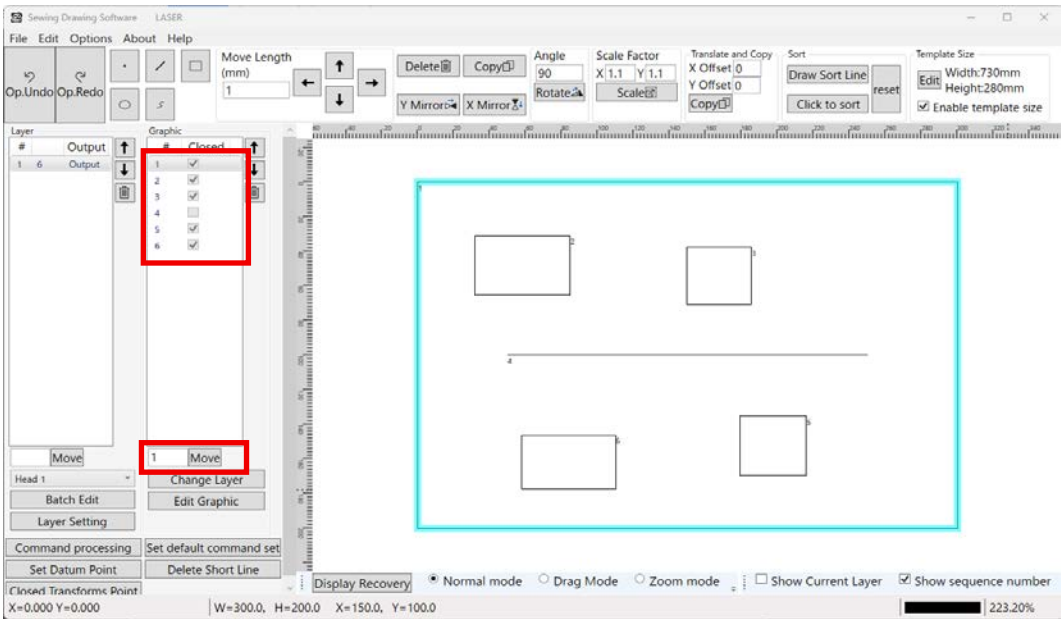
Start the NC software → Click the top left of the screen → ❶ File → ❷ Open → ❸ Select the file to be edited → ❹ Open

1. Sewing settings

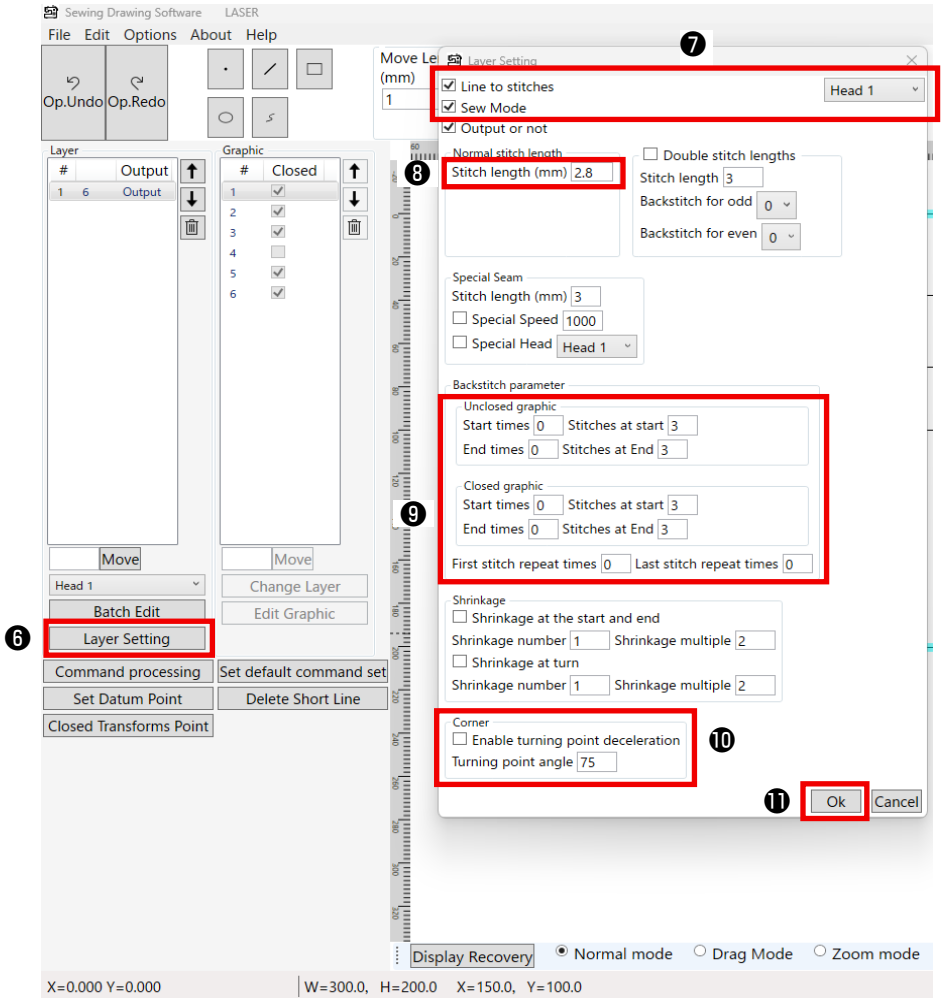
1) ❶ Bulk Edit → ❷ Select All → ❸ Top Start Point or Left Start Point → ❹ Align Top and Bottom or Align Left and Right → ❺ Close to complete.



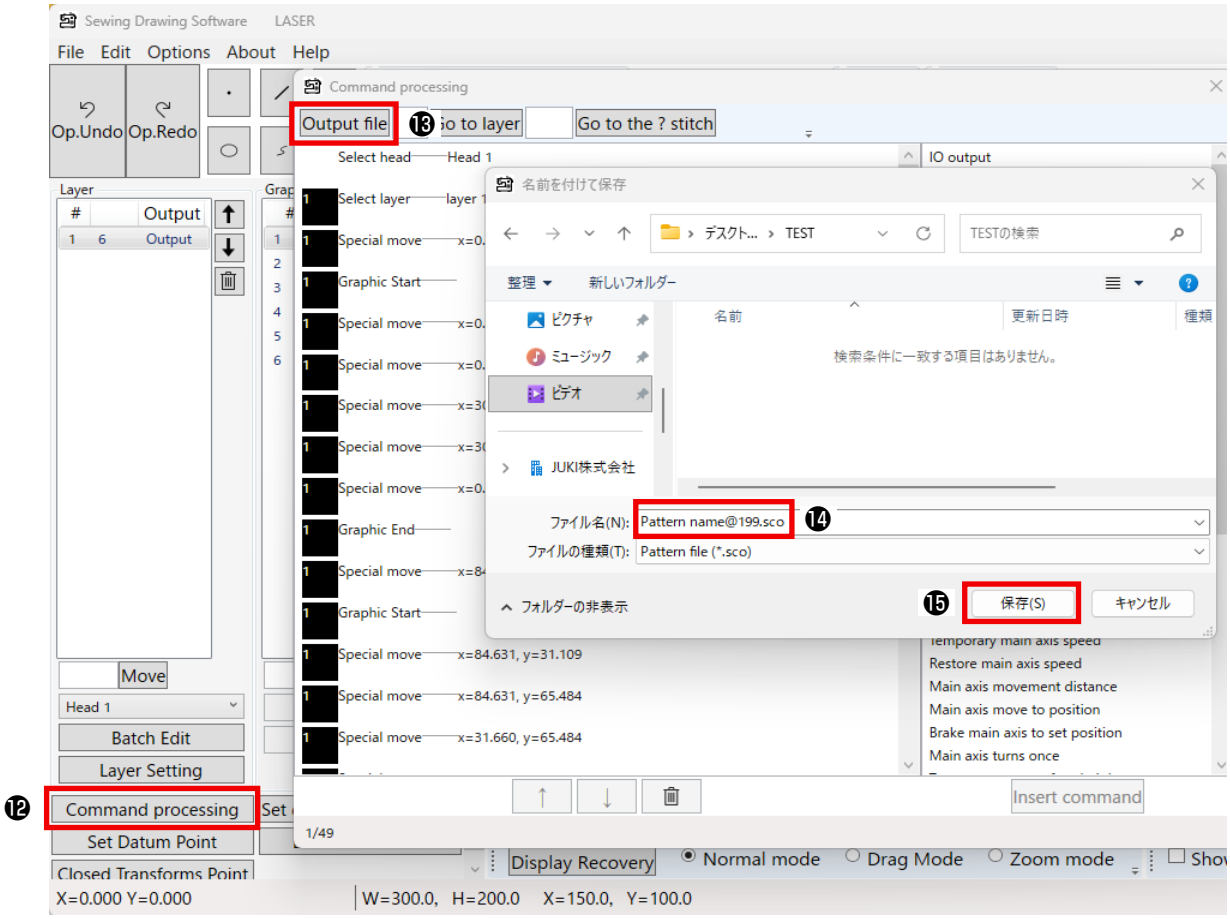
2) After completing the settings, check the sequence number of each shape.
If the order does not match the requirements, select the shape to be corrected, enter the number, and click “Move Order”.



3) After completing the editing: ❻ Click “Layer Settings” → ❼ Select “Graph Turning Point” and “Sewing Mode” and set to “Head 1” → ❽ Set the pitch (enter 3 cm ÷ number of stitches or 1 inch ÷ number of stitches in the “3.000” input field) → ❾ Set the number of stitches and repetitions for reverse feed stitching → ❿ If deceleration at corners is required, select “Inflection Point Deceleration Activation” and change the angle as required → ⓫ Click "Confirm" to complete.

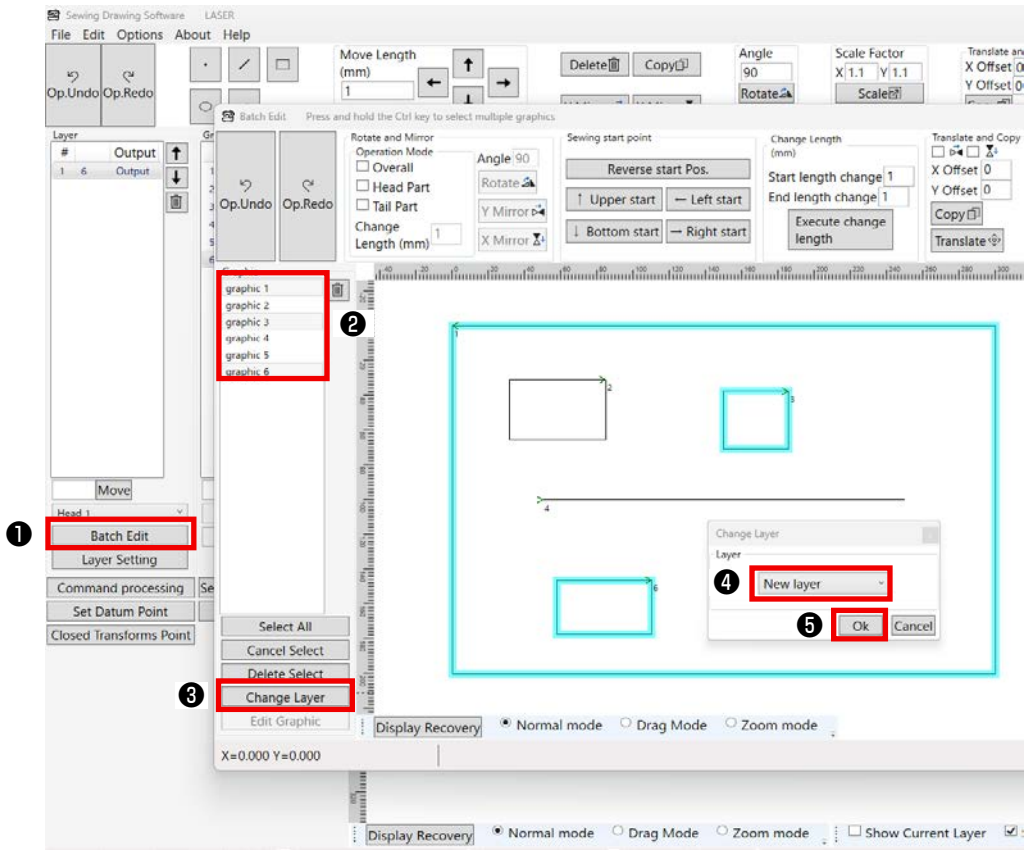


4) Once the procedure is complete, ⓬ Click “Command Processing” at the bottom left, ⓭ Click “Output File” to select the directory to save to, ⓮ Enter the file name, ⓯ Click “Save”.
File name rule: Name + @ + Sequence number

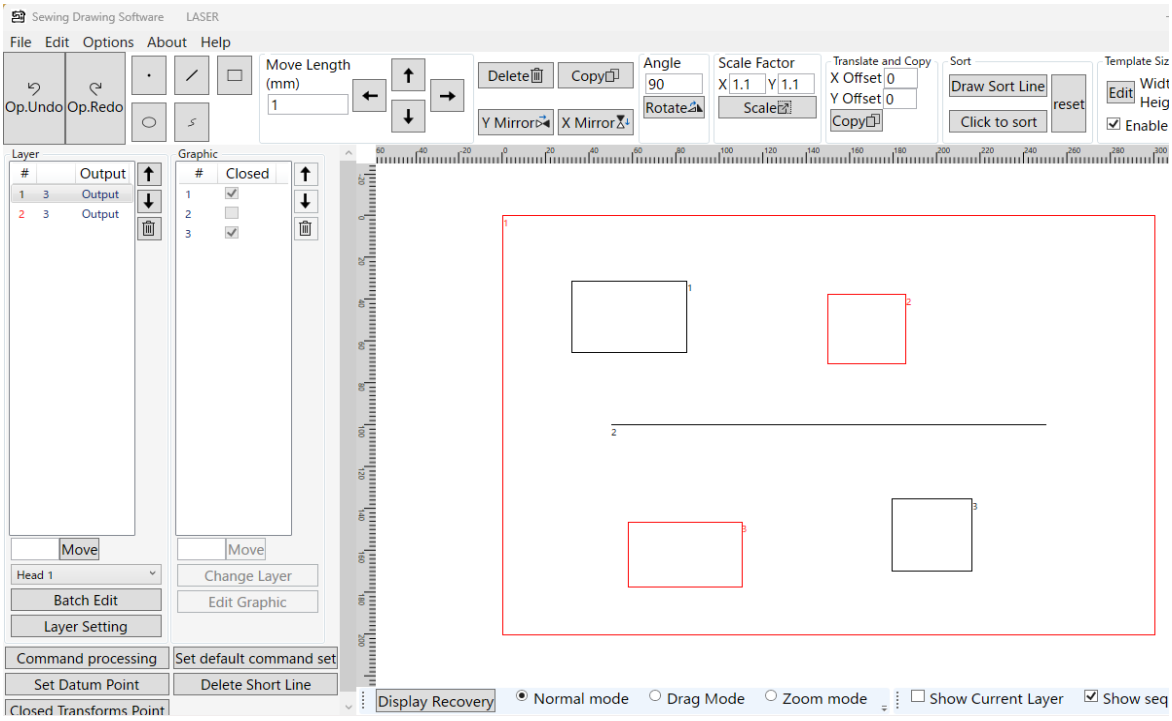


2. Layer settings

1) Open the file in the software → ❶ Click “Bulk Edit” → ❷ Select the shape for which you want to change the layer (you can select multiple shapes by holding down the Ctrl key at the bottom right of the keyboard) → ❸ Click “Change Layer” → ❹ Select the layer (create a new layer or select an existing layer) → ❺ Click “Confirm”.



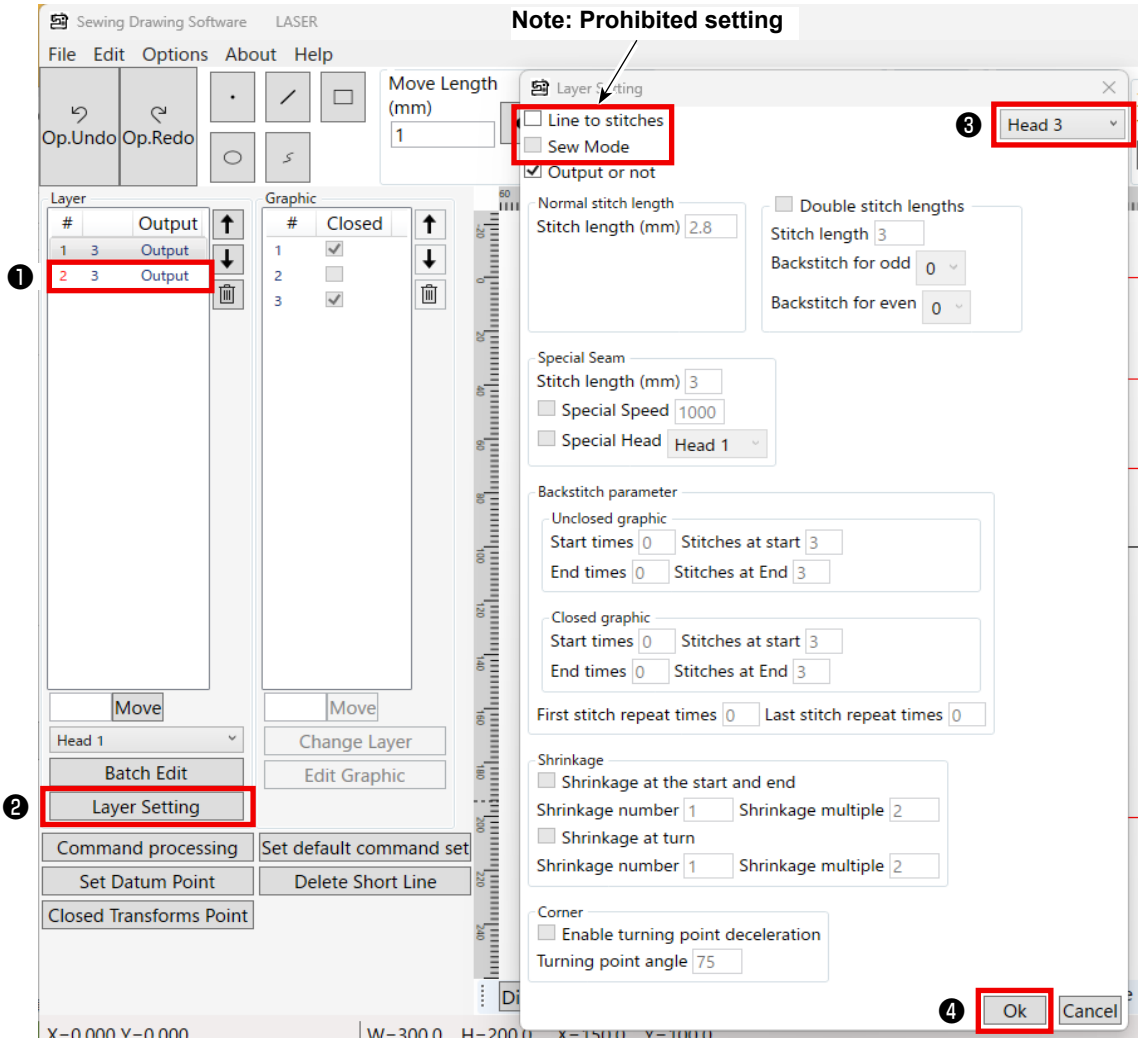
2) If you create a new layer, the number of layers will change.
In addition, the display color of the shapes differs for each layer.



3. Laser cutting settings

1) Select the laser cutting layer ❶ and click “Layer Settings” ❷ .
   Correct the head number to “Head 3” ❸ and click “Confirm” ❹ .

Do not check “Graph Turning Point” and “Sewing Mode” .



6-1-6. Precautions To Be Taken When Using The Equipment In Winter Or At A Cold Region

If the temperature drops suddenly, cold protection and heat retention for the equipment will be necessary. If no heating system is provided inside the plant, it will be necessary to maintain the circulation operation and immediately add antifreeze solution to the equipment without turning OFF the cooling system before stopping the equipment. (Industrial antifreeze solution, Anti-frozen N made by Clariant). If you do not start the equipment for a long time, expel water from the laser and the respective water tubes to keep them clean and to prevent suffering an unnecessary economic loss due to freezing. Composition ratio of the antifreeze is 3:7 (3: Antifreeze; 7: Water). It should be remembered, however, the antifreeze and water must be combined not only according to the aforementioned ratio but also taking the actual conditions of the site such as the temperature in consideration. From the results of inspection and measurement, we have reached the following conclusion. Refer the conclusion when you purchase the laser equipment.

6:4(6: Antifreeze solution; 4: Water) -45 degrees below zero
5:5(5: Antifreeze solution; 5: Water) -35 degrees below zero
4:6(4: Antifreeze solution; 6: Water) -25 degrees below zero
3:7(3: Antifreeze solution; 7: Water) -15 degrees below zero
2:8(2: Antifreeze solution; 8: Water) -5 degrees below zero

The laser equipment employs the latest laser technologies. The laser equipment has strict requirements for the working environment. When you use the laser equipment, take care of the installation environment of the laser equipment.
The CO2 laser cutter employs the water-cooled system for its cooling. This means that the liquid coagulates to form a solid substance if the liquid temperature drops below zero. In such a case, the connections of the tubes and seal portions of the cooling system will be likely to break, thereby inviting an extremely high risk of breaking the laser equipment, QBH output head and cooling system. During a cold winter, in particular, when the room temperature excessively drops, take additional care to take appropriate anti-freezing and maintenance measures for the laser equipment.

1 When you want to stop the laser equipment for a short time, do not turn OFF the cooling system but continuously run it to keep the equipment at a constant temperature. While the equipment is in use, carry out inspection at the fixed time to prevent the equipment from stopping unexpectedly.
2 When you want to stop the laser equipment for a long time, expel water from the cooling system. (If you do not have a preservative, the water may be stored in a clean tank.) In addition, blow out water from inside the tube, pump, filter and heat exchanger with nitrogen gas. It is also necessary, when the laser equipment made by ROFIN is used, to discharge deionized water from the laser tube.

6-1-7. Identification And Handling Of Failures In General

6-1-7-1. High-tension ignition and electric discharge

1) Check the area surrounding the high-pressure head of the laser equipment for dirt and moisture.
2) Check whether the high-pressure head is positioned too close to the metallic part of the equipment.
3) Check inside the high-pressure connecting device for breaking of wire or breakage.
4) In the case dew condensation (sweating) of condensed water is formed on the tube walls and water-cooled sleeves due to excessively low temperature of the water:
   Recommended measure : ① Wind insulating material on the high-pressure head of the laser equipment to separate it from the metallic part.
   ② Increase the cooling water temperature to 15 - 25 (°C).

6-1-7-2. Breakage / rupture of the laser tube

1) Water in the laser equipment freezes due to excessively low temperature
2) Water fails to pass inside the laser equipment
3) Water pressure is excessively low
4) Water flows according to the principle of flow of water for the laser equipment such as "water is put from a lower position and discharged from a higher position". However, the water cooling tube of the laser equipment is locally heated due to shortage of water.
   Recommended measure : ① Use the cooling system.
   ② See the figure for how to install the cooling system.

6-1-7-3. Cause of occurrence of high-pressure discharge and breakdown phenomenon

1) If the power supply of the laser equipment and the mains electricity differ in voltage or the power supply which has different specifications (such as in the case of energizing a low-output tube with a high-output power supply) is used, the rated voltage that the laser tube is able to withstand can be exceeded, resulting in breakage of the laser tube.
2) In the case the entire cooling tube is not filled with water due to poor water cooling conditions, air bubbles are formed. In such a case, the laser tube temperature will be increased excessively in the part that has no cooling system. As a result, the glass portion of the laser tube can be broken in part due to a change in glass property.

   Recommended measure : ① Use the power supply provided by the manufacturer.
   ② When you use the power supply provided by the manufacturer, check that the laser equipment is connected to the waterproofing function. Firstly, turn ON the cooling water system to circulate the water in the laser tube according to the requirement "water is put from a lower position and discharged from a higher position". Adjust the position of the drain pipe so as to ensure that the cooling water tube is filled with the cooling water with no air bubbles. Then, turn the power ON.

   Requirement : Use soft water (distilled water or pure water) as the cooling water. Keep the water temperature at 15 - 25 (°C) while carefully checking the temperature of the cooling water continuously to prevent the excessive increase / decrease in temperature.
   If the temperature excessively rises during the summer, in particular, immediately change the cooling water with an appropriate one or stop the laser equipment to put it at rest for a certain period of time. In a cold region, take care not to allow the cooling water to freeze. It is important, in particular, to thoroughly discharge the cooling water from the laser tube in order to prevent rupture of the laser tube due to freezing of the cooling water after the laser equipment is stopped.

   Special precaution : The user who uses the alternating current must ground the cooling water tank without exceptions.
   Limit the flow rate of the cooling water to 8 - 13 (L / min). If not, the cooling effect will be reduced to cause mode hopping. As a result, the spot will be deformed to reduce the laser tube output. The condensate outlet (water outlet) must be always immersed in water. If not, the cooling water tank water level will be dropped below the full water lever every time the laser equipment is turned ON and OFF.

6-1-7-4. Attenuation of output

1) Extremely high water temperature
2) If the water quality is poor, mucous membrane will adhere to the water cooling tube wall after the equipment has been used for an extended period of time to cause a reduction in the cooling effect.
3) If the laser equipment has been operated for a long time under the condition that the maximum operating current value of the laser tube is exceeded, the laser tube will be bleached.
4) Stains on the output lens
   Recommended measure : ① Refer to **"6-1-1-2. Precautions to be taken when using the laser" p.78** and **"6-1-2. Maintenance" p.79**.

6-1-7-5. Power fault inspection while the laser is in use

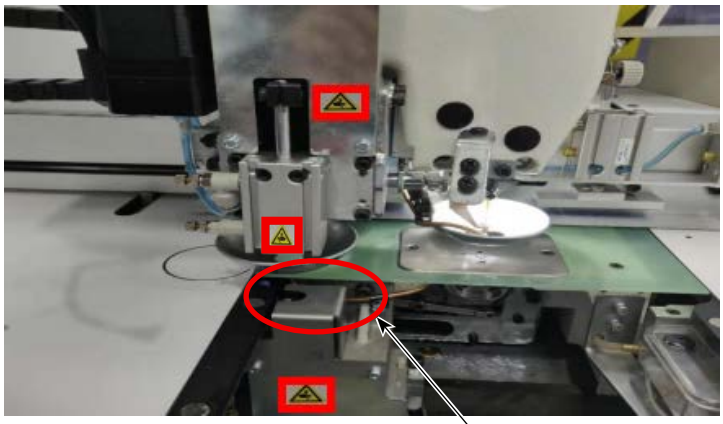
Carry out the following inspection procedure after you have confirmed that the laser tube has no defect in appearance.

1) In the case the laser power supply is provided with the testing function, the lamp will light up and the laser tube will irradiate laser beam when the test switch is pressed when the laser power supply is in the standby state. If the lamp fails to light up, the laser power supply is damaged. If the laser fails to irradiate the laser beam even if the lamp lights up, the laser equipment is damaged.
2) In the case the laser power supply is not provided with the testing function, connect two lead wires of the laser power supply signal ports 5V and IN. Connect three ports L, P and G and turn ON the power to the laser equipment. If the laser equipment fails to output energy or the energy output is inadequate, the laser equipment has been damaged. If the current is 10 mA or less, the laser power supply has been damaged.

If any of the following troubles has occurred, contact our After-Sale Service department for appropriate handling.

6-2. Rotary knife

6-2-1. Safety precautions

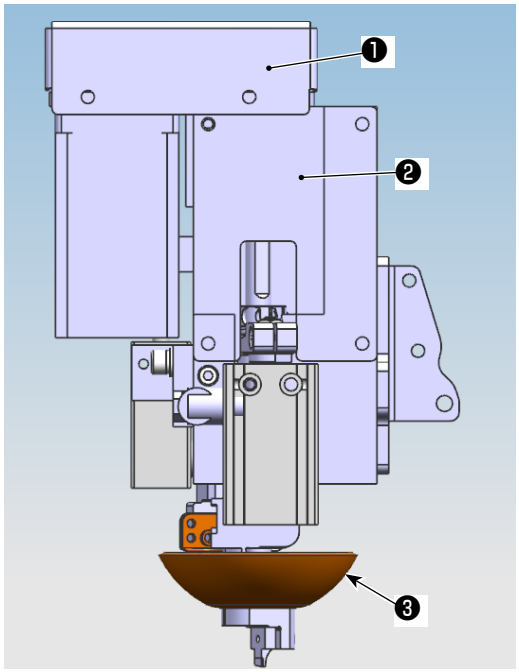


Putting a hand here is prohibited in order to protect against cuts and laceration.

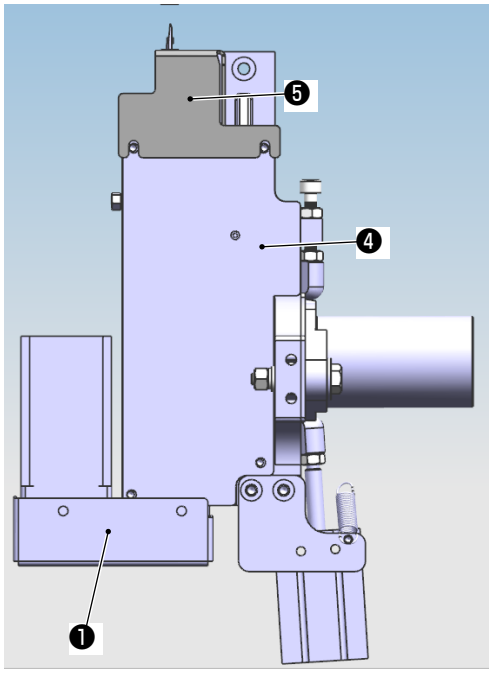
1. Anyone other than the workers (persons concerned) is prohibited from touching the machine during installation and adjustment procedures.
2. Keep your hands away from the moving parts in order to protect against cuts while the knife is in operation.
3. Direct contact with the blade point of the counter knife and moving knife is prohibited in order to protect against scrapes and scratches.

6-2-2. How to carry out coaxial adjustment

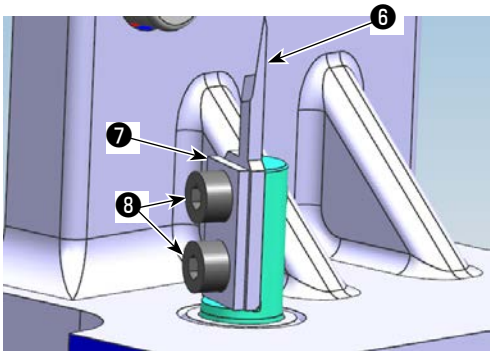
Counter knife device



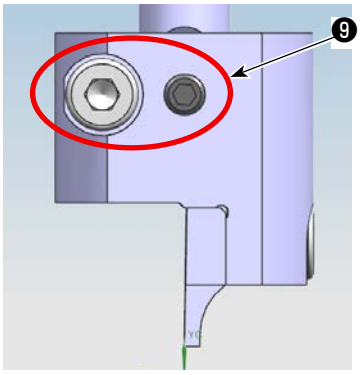
Moving knife device



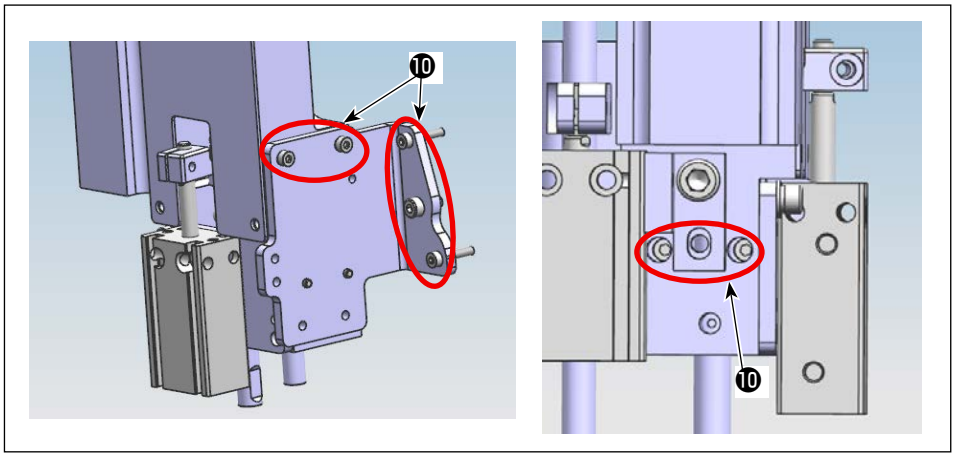
1) Turn OFF the power and air.
2) Detach upper fixing plate ❷ , lower fixing plate ❹ , timing belt cover ❶ , moving knife cover ❺ and knife clamp ❸ .



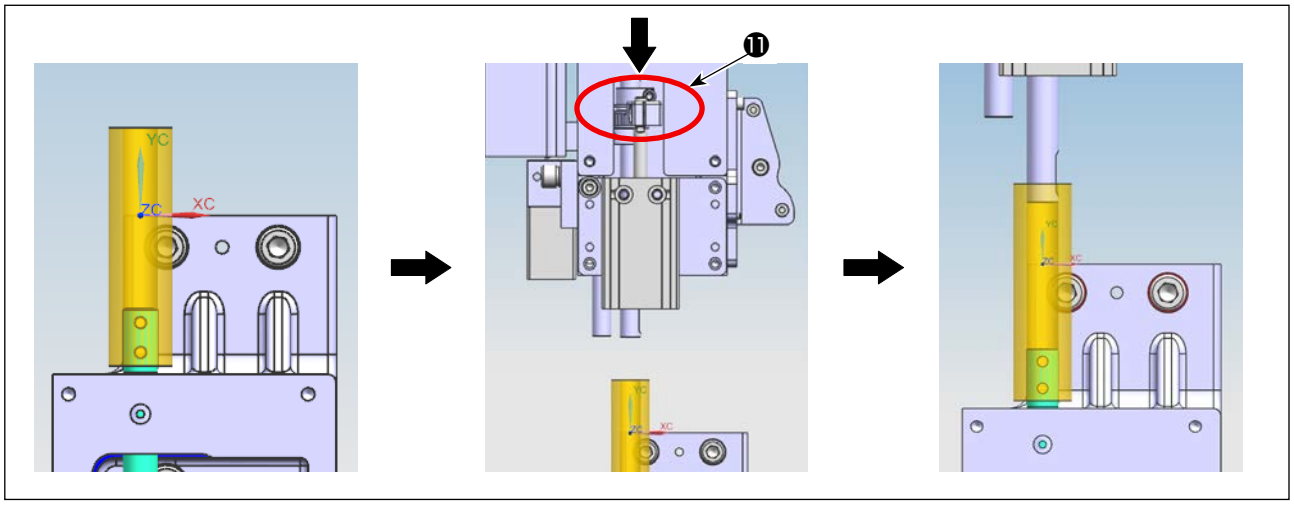
3) Detach the moving knife components (clamp plate ❼ (one piece), one moving knife ❻ (one piece) and setscrews ❽ (two pieces)).



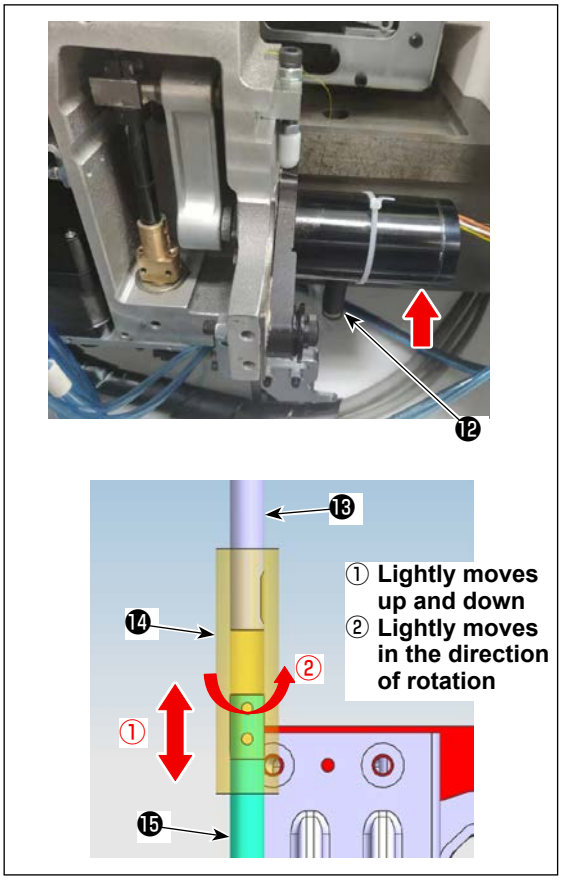
4) Loosen setscrews ❾ (two pieces). Detach the counter knife asm.



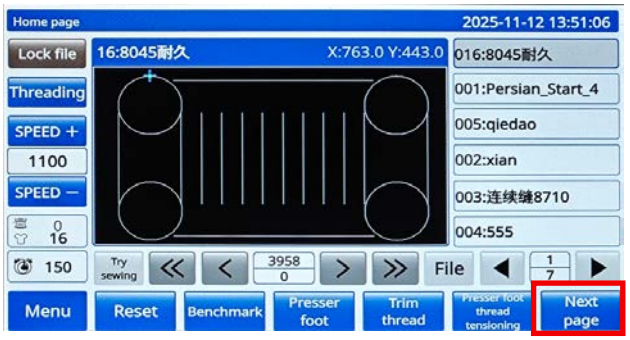
5) Loosen setscrews ⓾ (seven pieces) of the counter knife unit.



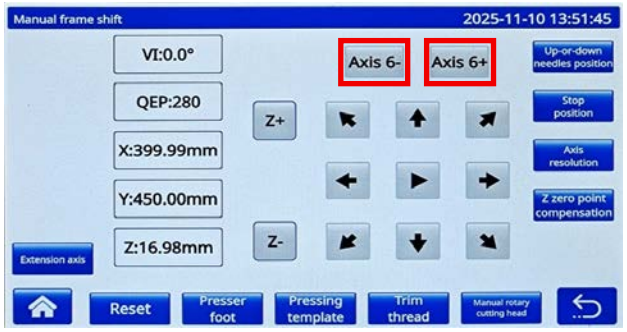
6) Fit the bushing jig into the moving knife shaft. Push down link ⓫ of the counter knife unit to put the counter knife shaft into the bushing jig.



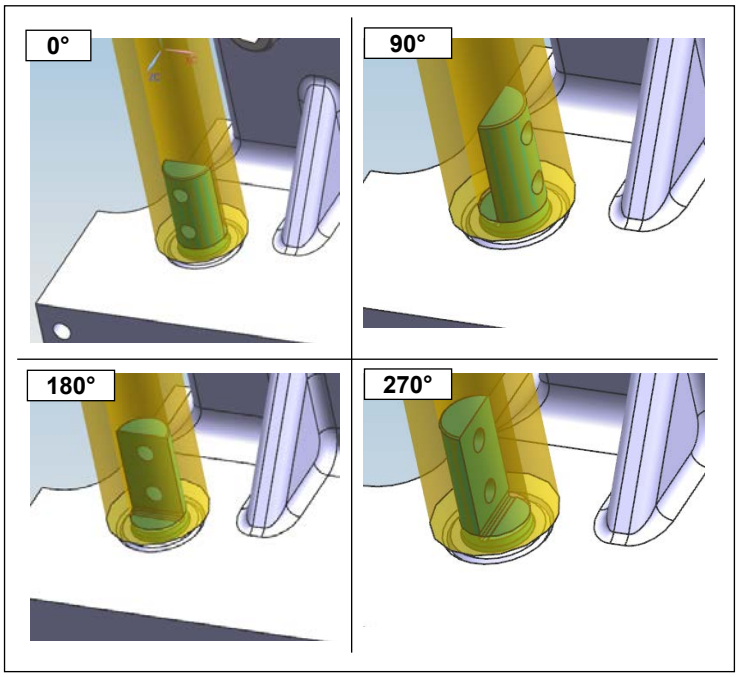
7) Remove reposition spring ⓬ of the moving knife. Lift up the drive motor.
8) Lifting bushing jig ⓮ while taking care to prevent it from interfering with the flat portion of moving knife shaft ⓯ / counter knife shaft ⓭ , adjust the position of the counter knife unit so that the bushing shaft lightly moves up and down and also lightly moves in the direction of rotation.
Temporarily tighten the setscrew No. 4 of the counter knife unit.
9) Put reposition spring ⓬ on the spring hook. Turn ON the power and air to the sewing machine. Reset the origin.



10) After resetting, proceed to the "next page" of the operation panel. ⇒Press the "OUT 9" to bring the tip of the counter knife shaft and that of the moving knife shaft closer to each other while fitting the bushing jig in position.



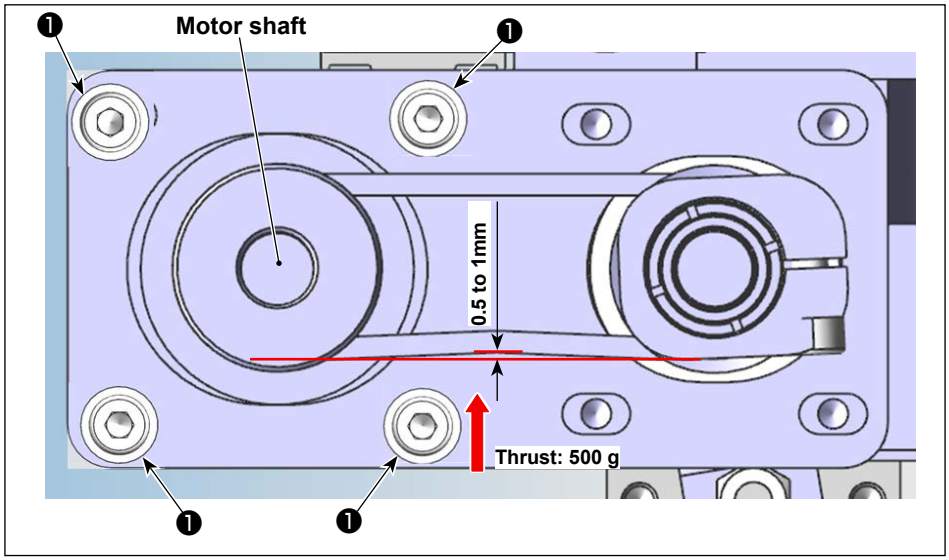
11) Press the "manual feed". ⇒ , press the "Axis 6 + / Axis 6 -" button to turn the rotary knife for lifting the bushing jig as No. 6. Now, check that the bushing jig freely drops in each of the four directions (0 °, 90 °, 180 °, 270 °) and that it rotates smoothly.
If any malfunction occurs, adjust the position of the counter knife unit.



12) Check the operation status of the bushing jig respectively in the aforementioned four directions. Then, securely tighten the setscrew No. 4.
The position of the bushing jig may slightly shift from the adjusted position by securely tightening the setscrew No. 4. It is therefore necessary to check that the bushing jig smoothly rotates in the aforementioned four directions respectively.

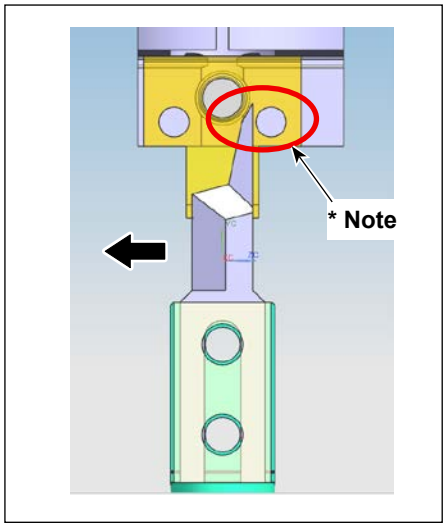
If you want to change the worn-out counter knife with a new one, it will be necessary to adjust the knife pressure. On the other hand, if you want to change the worn-out moving knife with a new one, the knife pressure adjustment will not be necessary. (Turning off of the power during adjusting is prohibited. Persons other than those who are in concern are prohibited from contacting the electrical control devices.)

6-2-3. How to adjust the timing belt tension



Measure the belt tension with a thrust meter and a pair of vernier calipers. If the belt tension falls out of the specification, loosen motor fixation screws ❶ (four pieces) and adjust the position of the motor appropriately.

6-2-4. How to adjust he knife pressure



6-2-4-1. Adjusting the mounting position of the moving knife

Install the moving knife vertically while shifting it toward the blade portion (in the direction of the arrow) so as to prevent the blade portion of the moving knife from coming in contact with the knife pressure adjustment screw of the counter knife.

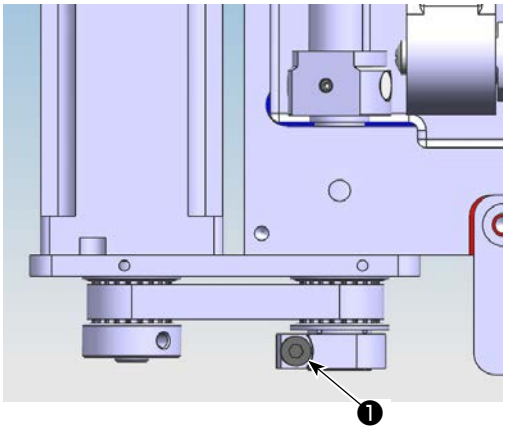
*Note: Do not allow the moving knife to interfere with the screw.

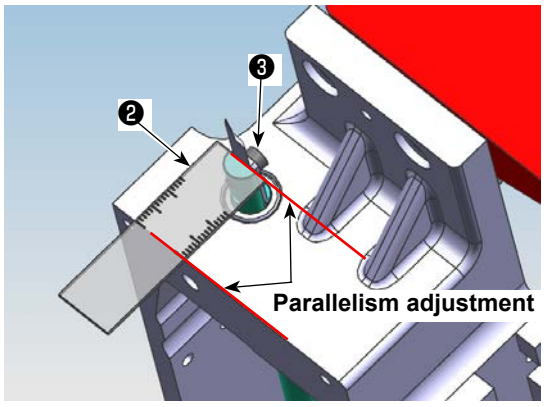
6-2-4-2. Adjusting the direction of installation of the moving knife

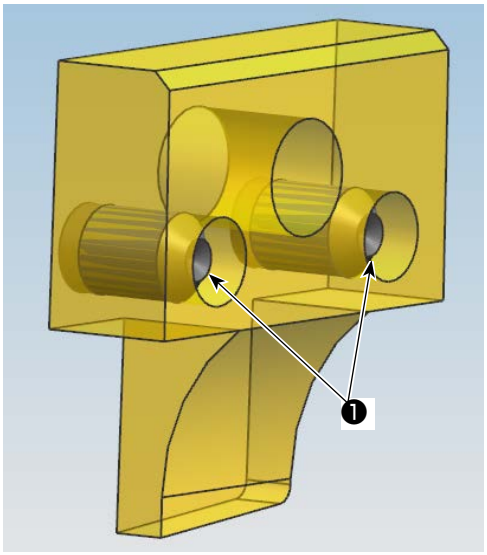
Turn ON the power and air to the sewing machine. Reset the origin.

Shift setscrew ❸ of the moving knife toward the far side of the sewing machine. Check to make sure that the moving knife is in parallel to the end face of the unit by observing the scale marks of scale ❷ .

If the moving knife is not in parallel with the end face of the unit, adjust the parallelism between them by loosening clamp screws ❶ .

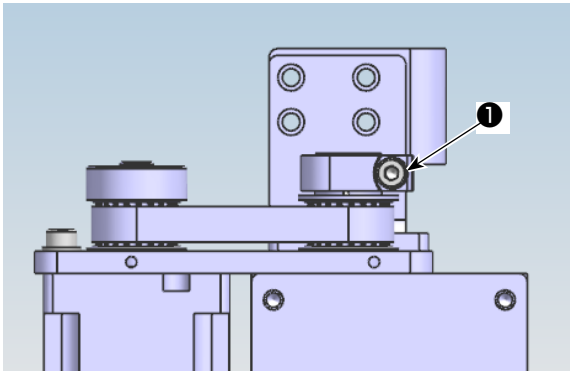


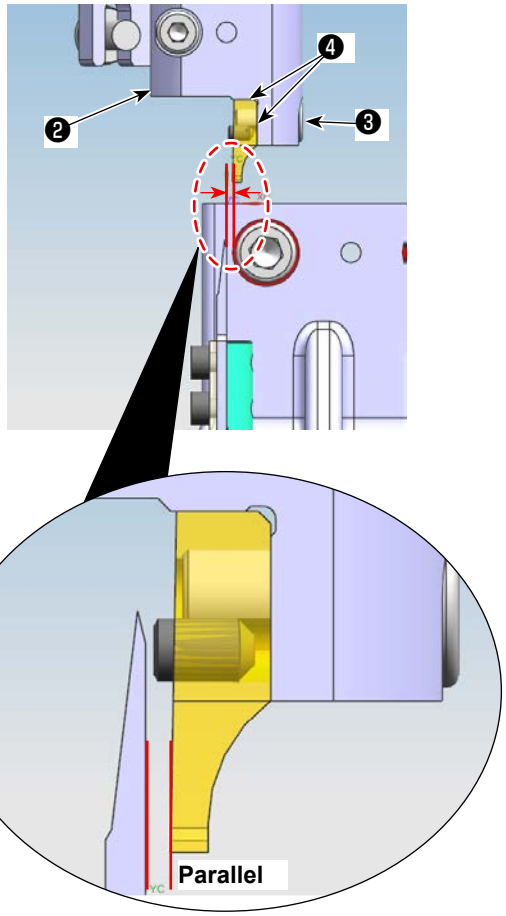




6-2-4-3. Position of the knife pressure adjustment screw of the counter knife

Adjust the position of the knife pressure adjustment screw so that it does not protrude the end face of the counter knife.



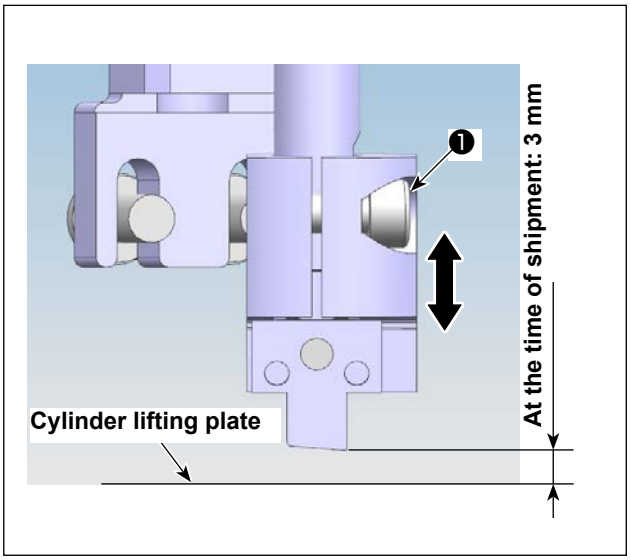


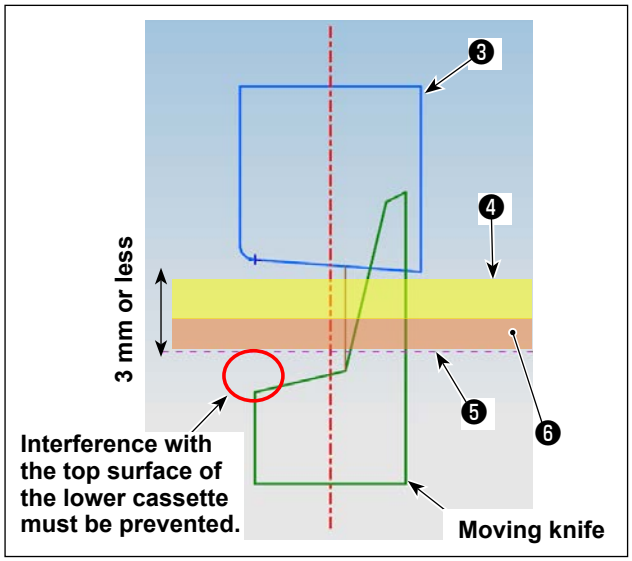
6-2-4-4. Position of the knife pressure adjustment screw of the counter knife

Temporarily tighten setscrew ❸ to allow the counter knife to be pressed against two portions ❹ of mounting base ❷ .
Loosen connection screw ❶ . Turn the counter knife shaft by hand to adjust so that the counter knife is almost in parallel with the moving knife.

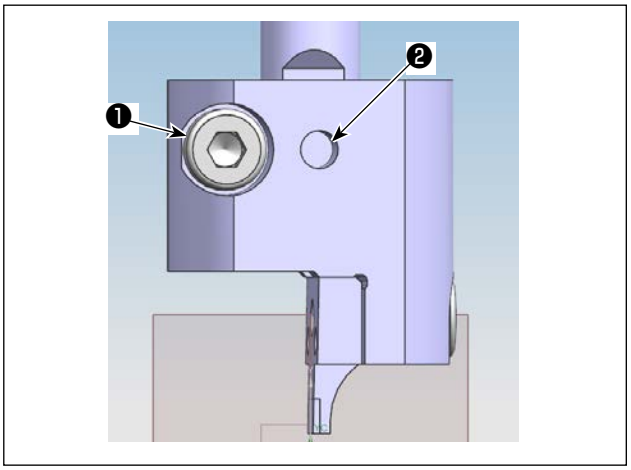
Under the operation panel manual mode, press the "OUT1 (before the port change) / OUT9 (after the port change)" button to place it in the ON state. Bring the moving knife closer to the counter knife. Adjust the parallelism between them.

6-2-4-5. Adjustment of the height of the counter knife and moving knife

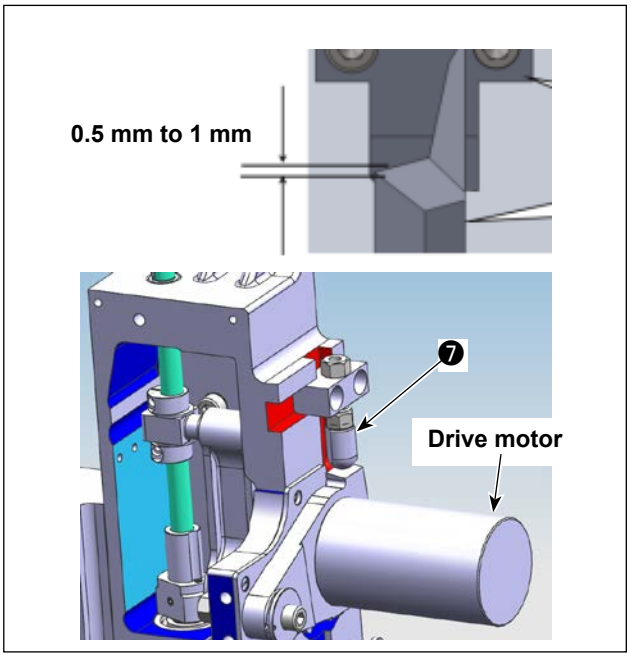




1) Loosen setscrews ❶ and ❷ of the counter knife base. Adjust the height of the counter knife.
2) In the normally shipped state, the sewing machine has been factory-adjusted so that the height of the blade point (lower end point) of the counter knife is 3 mm above the top surface of lifting plate ❺ .
   If the total thickness of material ❹ and lower cassette ❻ is 3 mm or less, adjustment of the height of counter knife ❸ will not be necessary.
   If this total thickness exceeds 3 mm, it will be necessary to adjust the height of counter knife ❸. (Up to 5.5 mm)



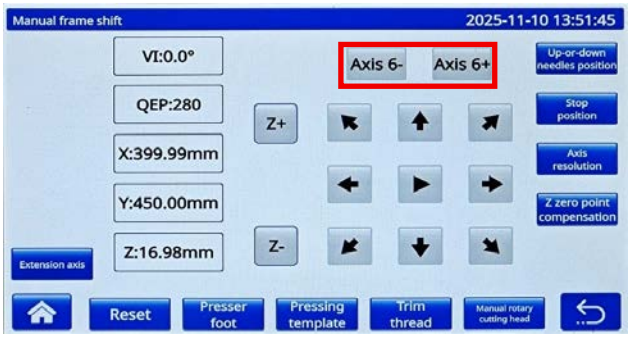
3) After you have adjusted the counter knife to an appropriate height, tighten first setscrew ❷ so that it is flush with the flat part of the counter knife shaft. Then, tighten setscrew ❶ .
   (Fix setscrew ❷ on the flat part of the counter knife shaft.)

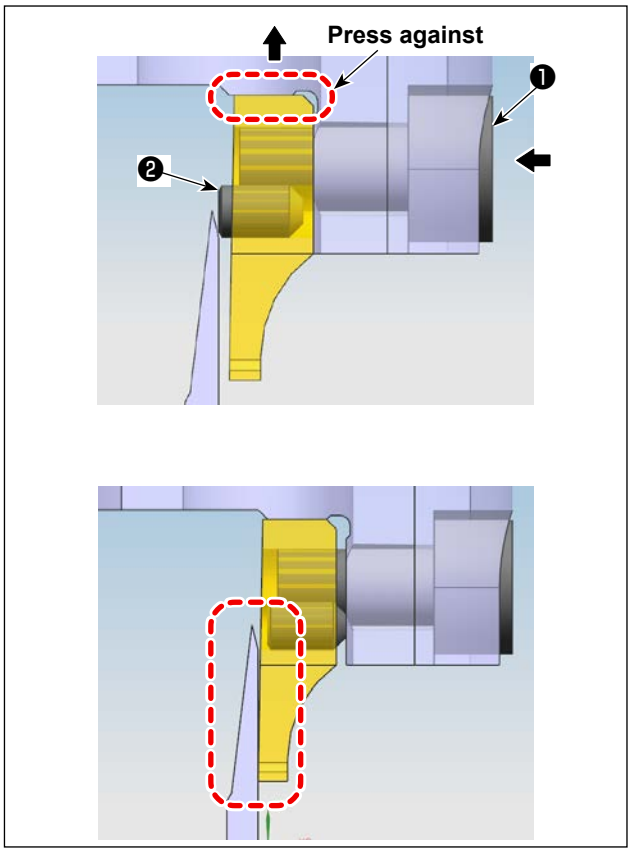


4) After you have adjusted the height of the counter knife, adjust the height of drive motor lifting stopper ❼ so that the engagement amount between the moving knife and the counter knife is 0.5 to 1 mm.

Caution

Lifting the drive motor by hand, check to make sure that the square portion of the moving knife blade does not interfere with the top surface of the lower cassette when the moving knife is at its lower dead point.





6-2-4-6. Adjusting the knife pressure

Under the manual mode, press the axis 6 button.
Turn the knife to change its direction so as to allow easy adjustment.
Push a hexagonal wrench key into the slot in the setscrew ❶ (in the direction of the left arrow) and loosen the setscrew ❶ until the counter knife is aligned with the moving knife while lifting the setscrew ❶ in the direction of the up arrow to allow the counter knife to be pressed against the mounting base.
After you have loosened the setscrew ❶ , push the adjustment screw keeping the setscrew ❷ held loosened.

Target knife pressure is 0 (zero). (So that the moving knife comes in slight contact with the counter knife)

After you have pushed the adjustment screw ❷ , tighten the setscrew ❶ .
Adjust the counter knife and the moving knife until they are aligned well with each other.

6-2-4-7. Cutting test

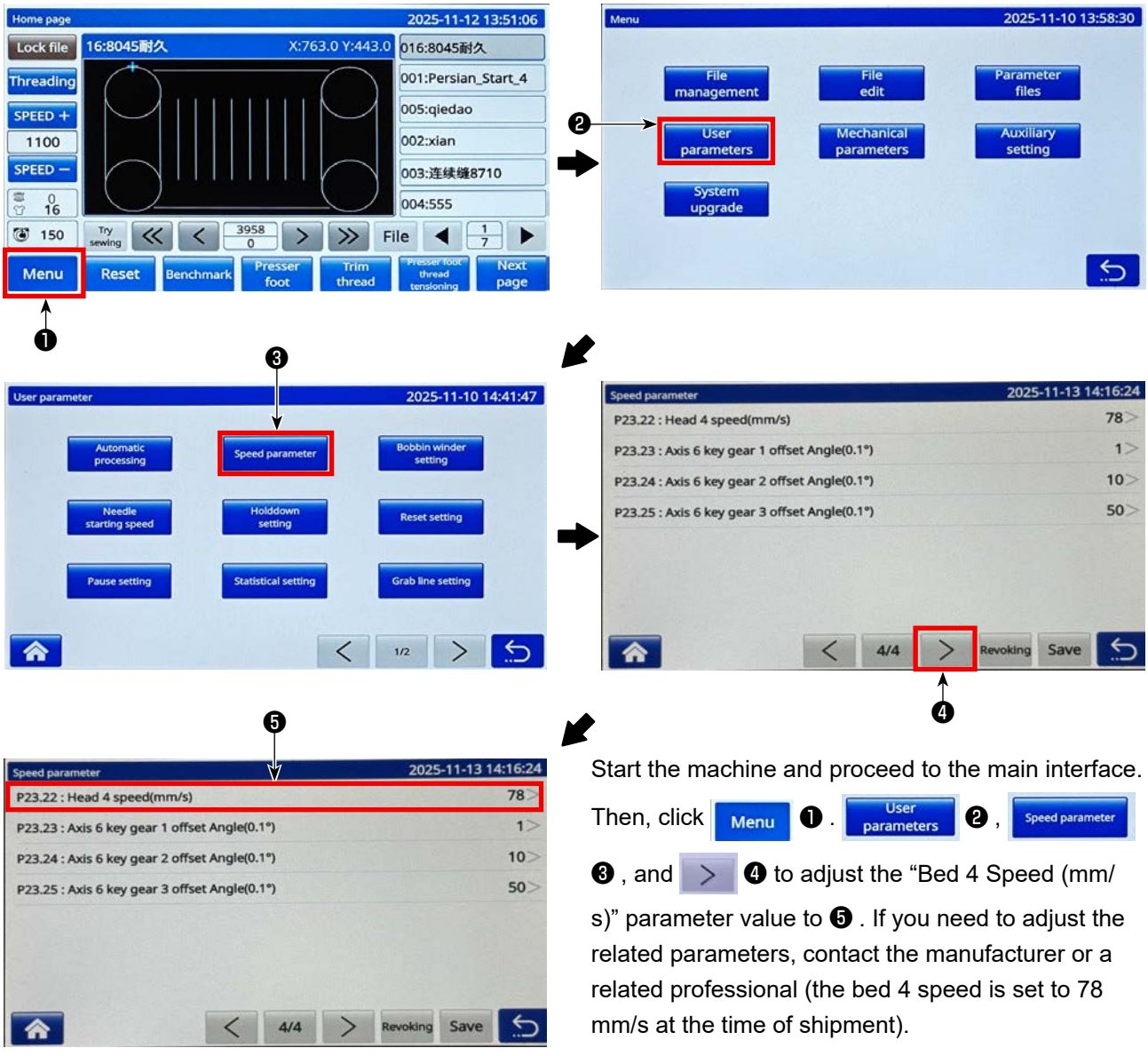
After you have adjusted the knife pressure, try to cut the material.
If the knife fails to cut the material, it will be necessary to re-adjust the knife pressure to a slightly higher value than the adjustment value given in**"6-2-4-6. Adjusting the knife pressure" p.115**.

In order to ensure the service life of the moving knife and counter knife, it is recommended that a profession engineer carries out adjustment of the knife pressure so as to adjust the knife pressure to the best-suited value.

6-2-5. Changing the moving knife

Loosen two screws (rotary moving knife parts catalog number 53) on the moving knife. Detach the moving knife and change it with a new one. Then, tighten the aforementioned two screws. When you attach a moving knife, take care to attach it so that its bottom portion comes in contact with the moving knife rod without fail.

6-2-6. Adjusting the operating speed of template when the knife operates



Start the machine and proceed to the main interface. Then, click Menu ❶ . User parameters ❷ , Speed parameter ❸ , and > ❹ to adjust the “Bed 4 Speed (mm/s)” parameter value to ❺ . If you need to adjust the related parameters, contact the manufacturer or a related professional (the bed 4 speed is set to 78 mm/s at the time of shipment).

6-2-7. Usage instructions

6-2-7-1. Creating patterns

When you want to create a knife pattern, take care to ensure that the shortest distance of 3 mm or more is provided from the knife locus line to the seam line. Sewing patterns are created using the Layer 1, and knife patterns are created using the Layer 2.

6-2-7-2. Installing the sewing software

Open the exclusive rotary knife sewing software. Select the file and click it to open. Select the file you want to edit. Set a graphic of the knife you want to use to the Layer 2 (as shown in Fig. 1). Double-click on Layer 2 to open the interface (as shown in Fig. 2). Change the Head 1 with the Head 4. Then, confirm with a click on the OK button to complete the procedure.

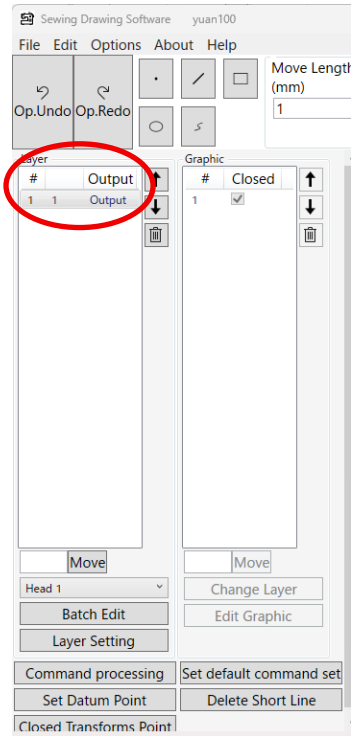


Fig. 1

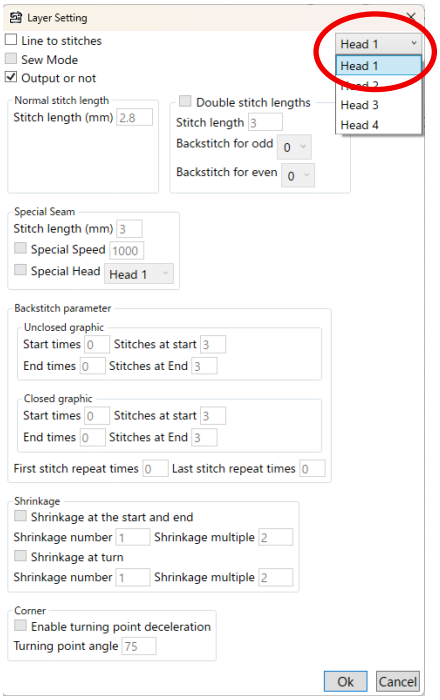
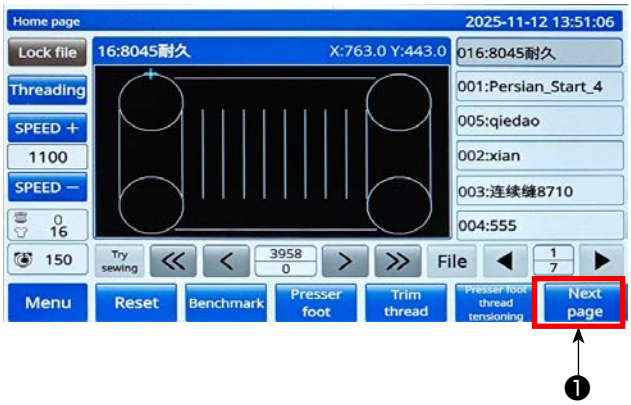
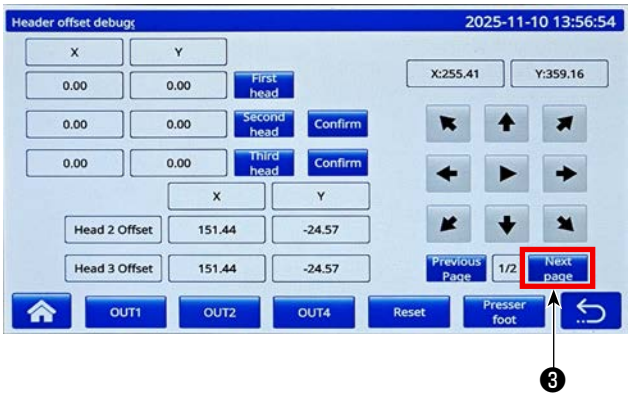
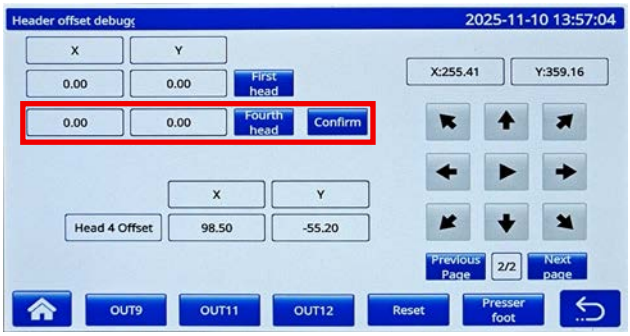


Fig. 2

6-2-7-3. Setting the references





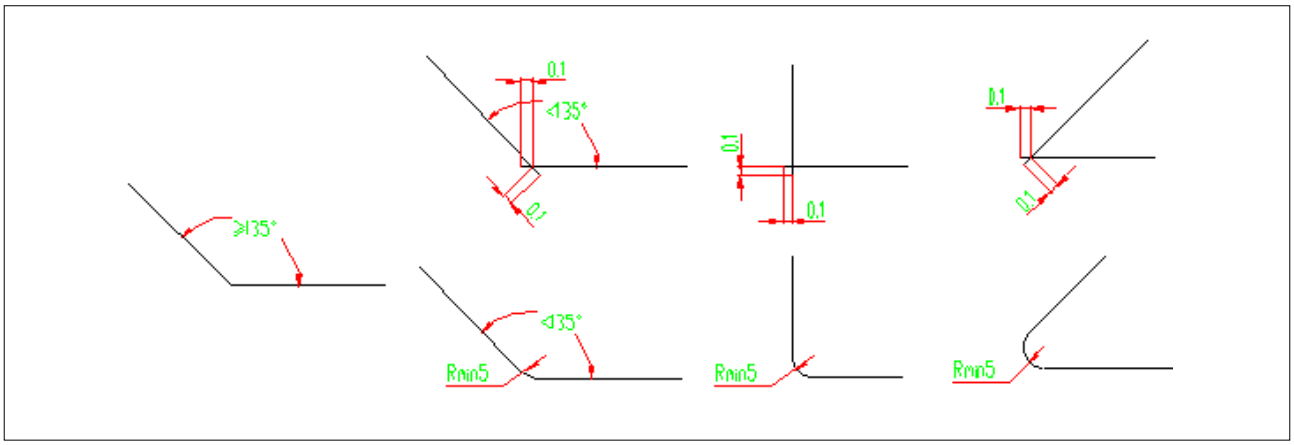


After starting the machine and entering the main interface, click Next page ❶. Click Header offset debugging ❷, Next page ❸, and Fourth head, and enter 98.5 in the X-axis direction and 54.5 in the Y-axis direction.
(The head 2 position should be adjusted according to the cutting position and the displacement of sewing position. The smaller the X-axis travel amount is entered, the more the knife position is moved to the left. The smaller the Y-axis travel amount is entered, the closer the sewing position that faces to the knife position is brought to the work position).

6-2-8. Definition of the electrical control buttons

OUT9 Lifting / lowering of the rotary counter knife / moving knife
OUT11 Starting the cutting operation of the rotary moving knife
OUT12 Lifting / lowering of the clamp foot of the rotary counter knife

6-2-9. Function-related precautions



1. Do not cut a graphic that has a corner R of which is less than 5 (radius is less than 5 mm)
2. When cutting a graphic that has no corner with an excessive R, it is possible to cut it without interrupting the cutting operation at connection points provided that the angle is 135 ° or more. If the angle is less than 135 °, the connection points intersect with each other at the position that is 0.1 mm ahead of them (as shown in the figure).
3. From the beginning to the end of cutting, cutting effect will be maximized by extending or shortening the cutting lines according to the specific effect of cutting. (Extend or shorten the length of cutting lines when cutting a graphic)