ENGLISH

DX-01
INSTRUCTION MANUAL

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1. SPECIFICATIONS

1-1. Specifications of the sewing machine head

DX-01△ △

Oiling and sewing material specification classification

DS	Fully dry, medium-weight material

	DX-01
Max. sewing speed (standard locus)	Stitch length 0 to 5.00mm : 4,000sti/min Stitch length 5.01 to 6.50mm : 3,000sti/min Stitch length 6.51 to 9.00mm : 2,000sti/min
Stitch length	9 mm
Presser foot pressure control	Electronic control
Needle *1	1738 Nm 65 to 90 (DB×1 #9 to 14) 134 Nm 65 to 90 (DP×5 #9 to 14)
Lubricating oil	-
Motor	AC servo motor
Feed control	Electronic control
Noise	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation: A-weighted value of 78.0 dBA ; (Includes K_{pA} = 2.5 dBA) ; according to ISO 10821- C.6.2 -ISO 11204 GR2 at 4,000 sti/min.

• The sewing speed will vary depending on the sewing conditions. The sewing speed preset at the time of shipping is 4,000 sti/min.

***1 : Needle used depends on the destination.**

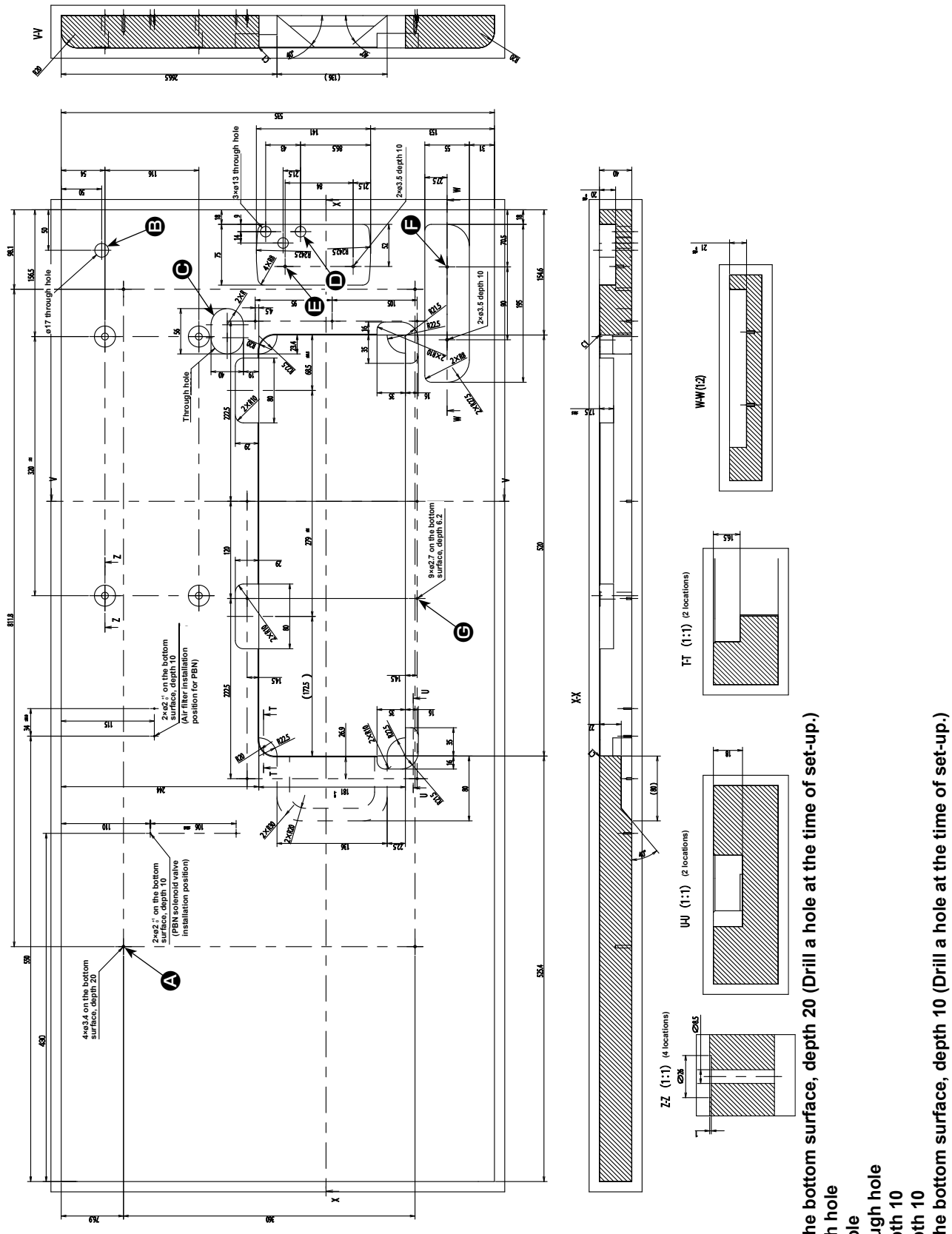
1-2. Specifications of the control box

Supply voltage	Single phase 100 to 120V / 3-phase 200 to 240V *1	Single phase 220 to 240V	Single phase 220 to 240V CE
Frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
Operating environment	Temperature : 0 to 35˚C Humidity : 90% or less	Temperature : 0 to 35˚C Humidity : 90% or less	Temperature : 0 to 35˚C Humidity : 90% or less
Input	600VA	600VA	600VA

***1 : The factory default setting is 3-phase 200–240 V.**
For information on how to switch between the 200–240 V and 100–120 V power supply voltage specifications, contact your dealer.

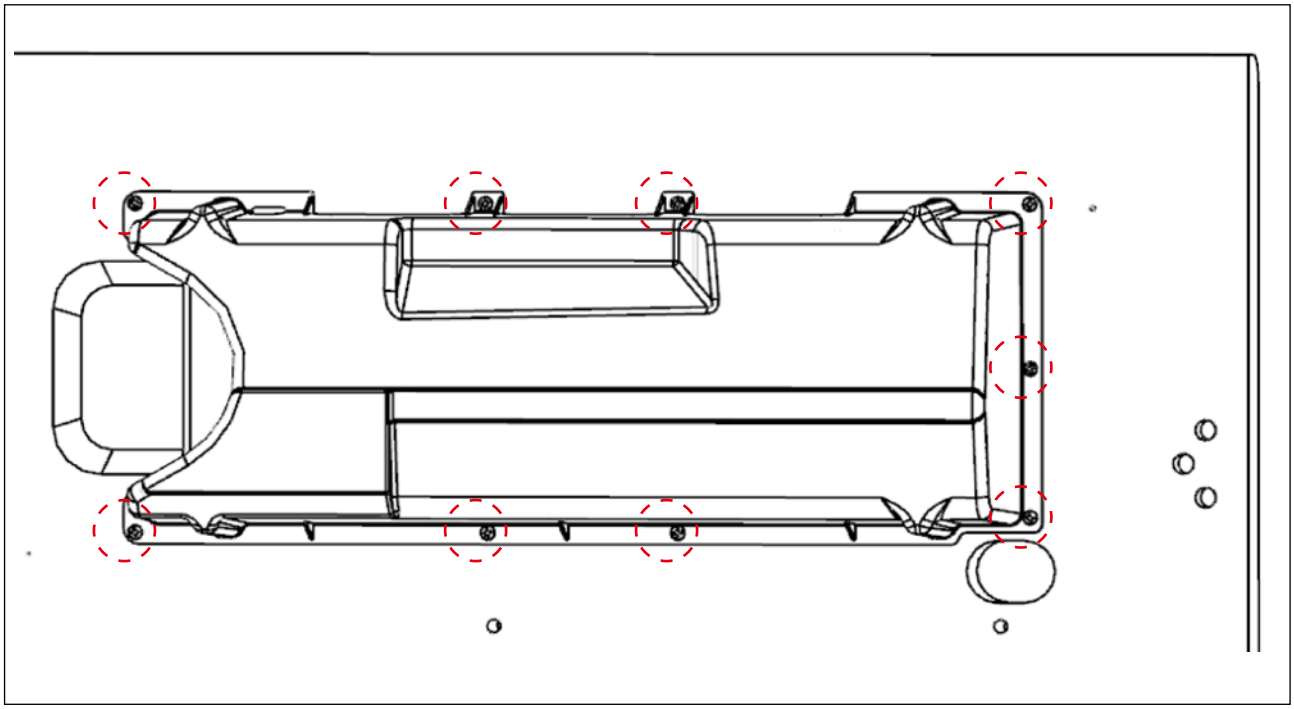
2. SET UP

2-1. Drawing of table



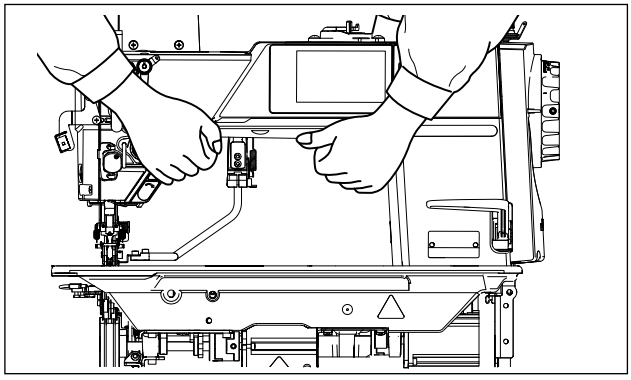
2-2. Installing the under cover

Align the 9×ø2.7 hole (shown as Ⓖ in "2-1. Drawing of table") with a depth of 6.2 on the back side with the under cover hole, and attach the under cover using the nine included wood screws.



2-3. Cautions when setting up the sewing machine

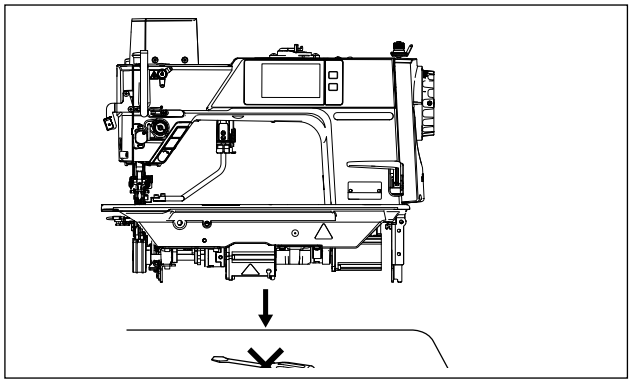
Thank you very much for the purchase of JUKI Industrial Sewing Machine this time. Make sure of items 2-1 to 2-16 before operating to use this sewing machine with ease.



2-3-1. How to carry the sewing machine

Carry the sewing machine while holding the machine arm with two persons as shown in the figure.

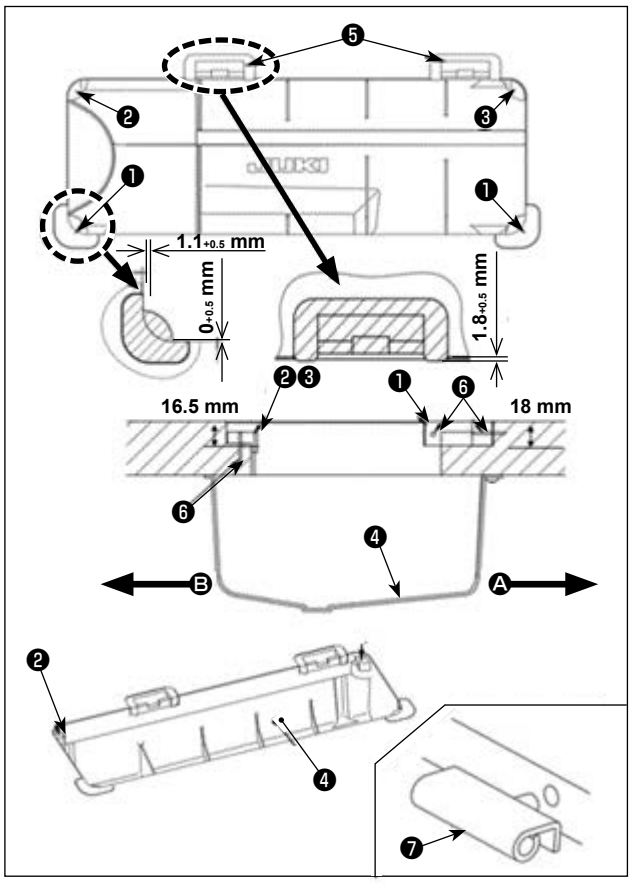
1. Never hold the handwheel since it rotates.
2. Be sure to handle the sewing machine with two persons or more since the sewing machine weighs 49.5 kg or more.



2-3-2. Caution when placing the sewing machine

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

2-4. Installation



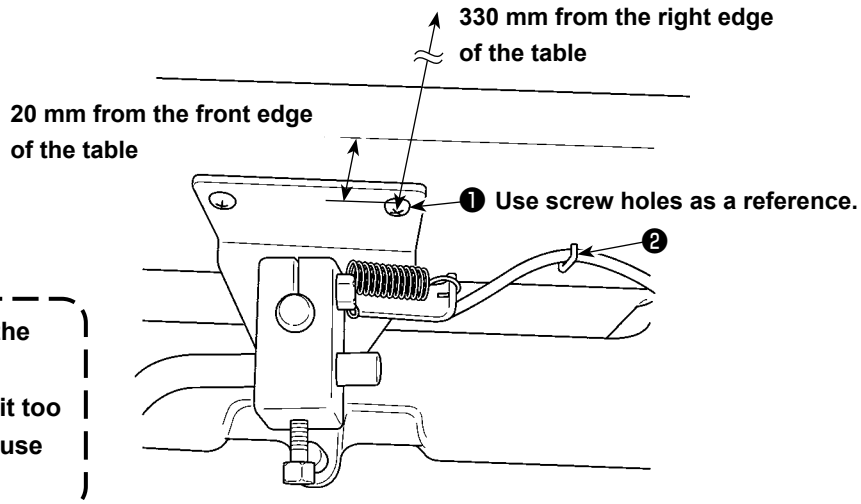
1) Be sure that the machine head rests on the four corners of the table groove. Mount the rubber hinge seat ❺ on the table and fix it on the table with a nail.
2) On the front side Ⓐ, secure the two head support rubber seats ❶ to the table wall using nails ❻. On the hinged side Ⓑ, fix the two head cushion seats ❷ and ❸ with a rubber-based adhesive, then secure them to the table using nails ❻.
3) Fit hinge ❼ into the opening in the machine bed, and fit the machine head to the table rubber hinge ❺ before placing the machine head on cushions ❷ and ❸ on the four corners.

Do not hold the handwheel.

2-5. Installing the automatic knee-lifting device

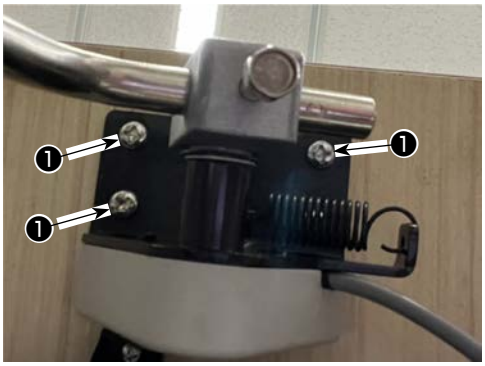
Fix the automatic knee-lifting device using the three included wood screws (SK3512001SE) ❶.

* The installation position dimensions are for reference only; fix the device in a position that is easy for each individual to operate.



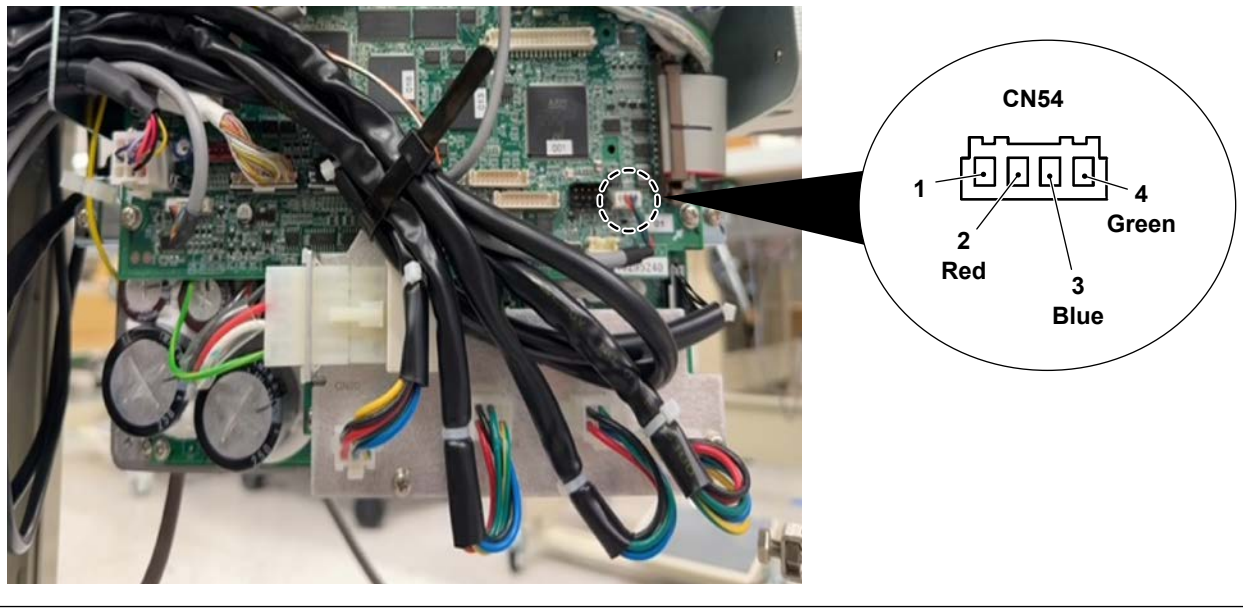
Caution

Fix the cable using the cord stopper ❷. Be careful not to strike it too hard, as this may cause the cord to break.

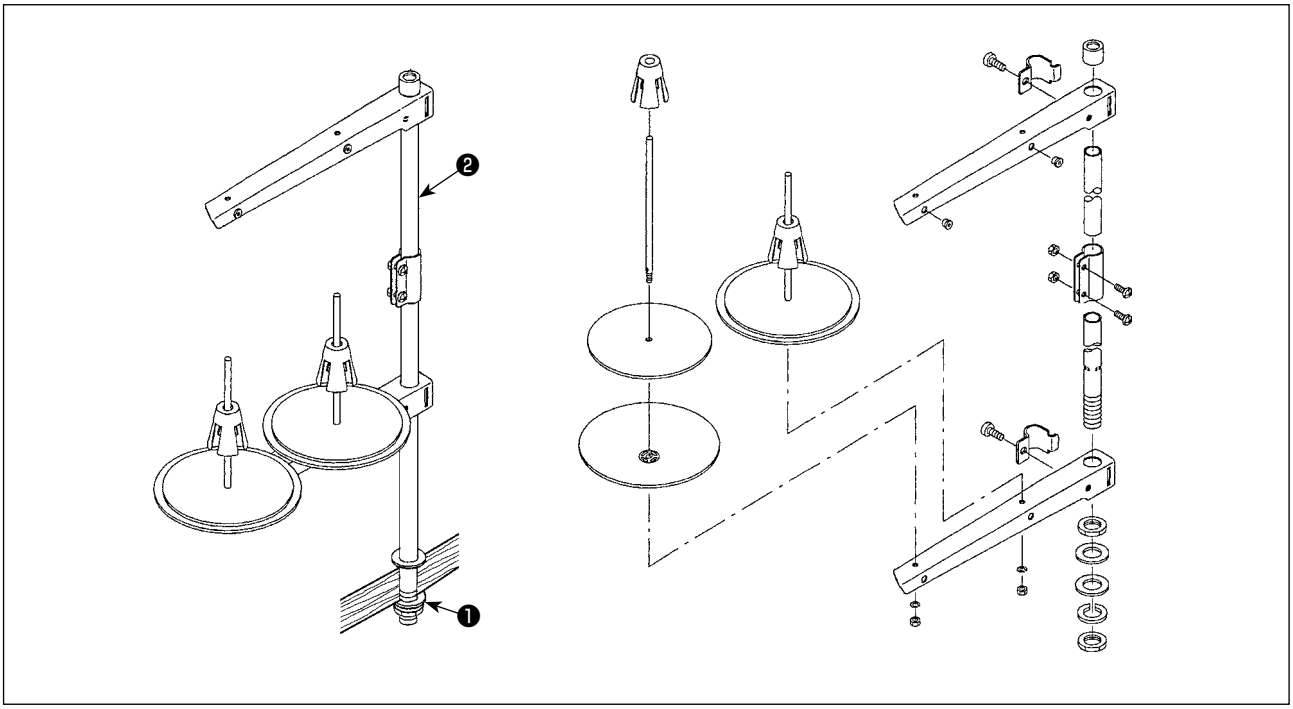




2-6. Inserting the automatic knee-lifting device connector

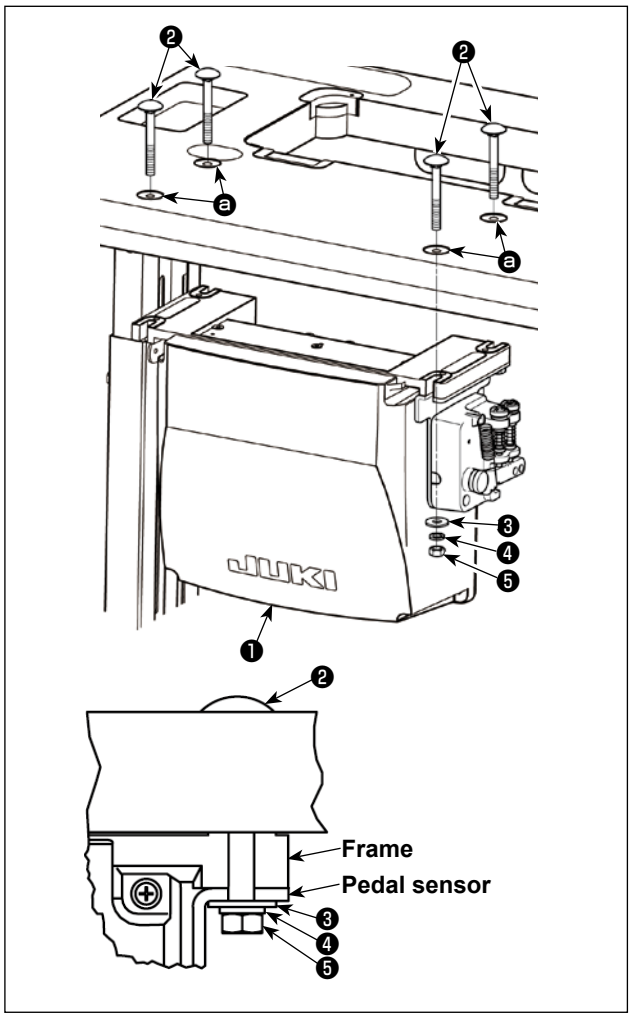


2-7. Installing the thread stand



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

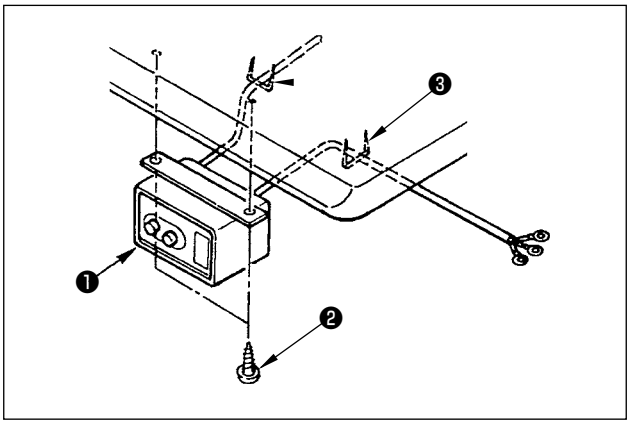
2-8. Installing the electrical box



Install control box ❶ on the table using four holes ⓐ in the table. Secure the control box with four bolts ❷, four plain washers ❸, four spring washers ❹ and four hexagonal nuts ❺ supplied with the control box.

At this time, insert the nut and washer supplied with the unit as accessories as shown in the figure so that the control box is securely fixed.

2-9. Connecting the power switch cable

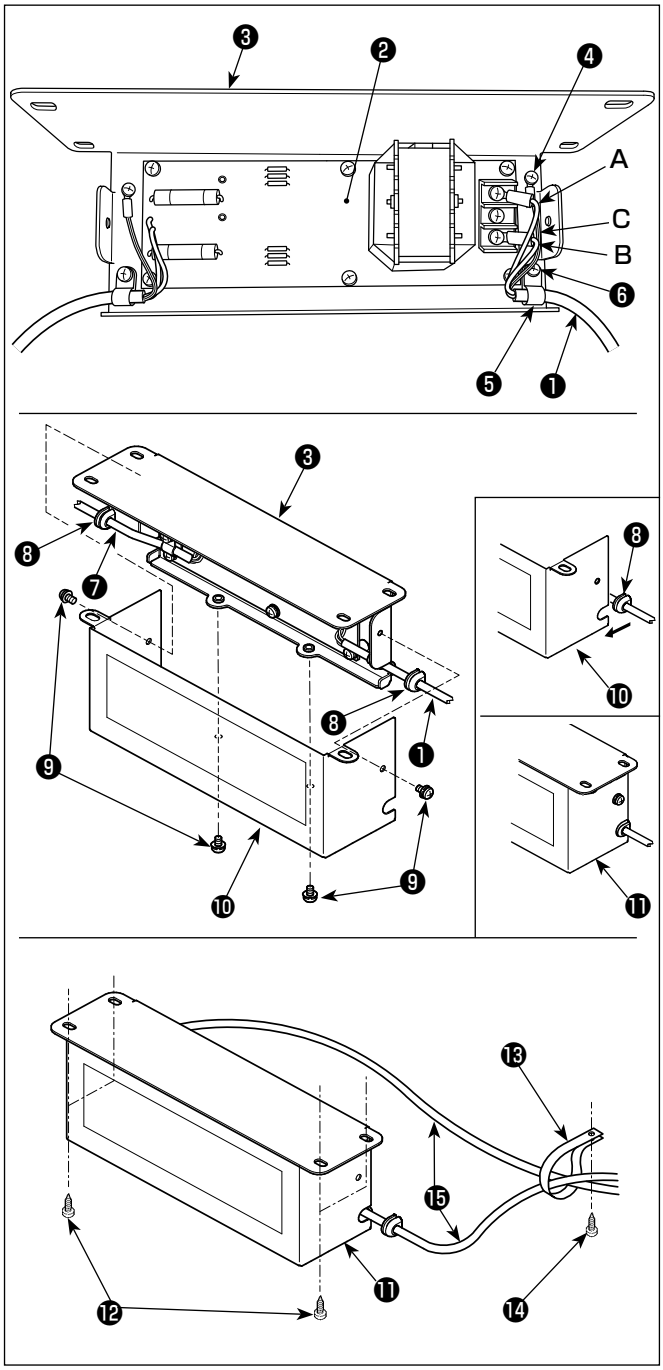


2-9-1. Installing the power switch

Fix power switch ❶ under the machine table with wood screws ❷.

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

2-10. Installing the reactor box (Only for the EU type models)

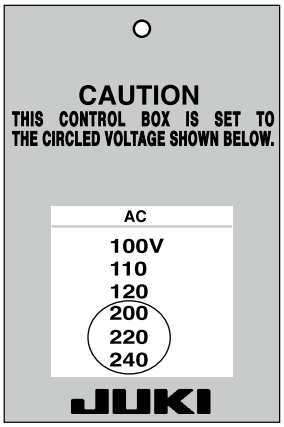


1) Attach the terminals of power cord ❶ coming from the electrical box to reactor box PCB asm. ❷ and reactor box mounting plate ❸ .
   Connect brown wire **A** to the first connector and blue wire **B** to the third connector respectively from the top of terminal block on the reactor box PCB asm. using screws. Connect green/yellow wire **C** to reactor box mounting plate ❸ with earth setscrew ❹ .
2) Attach cable clip ❺ to the power cord coming from the electrical box. Then, attach the power cord together with the cable clip to reactor box mounting plate ❸ with cable clip setscrew ❻ .
3) Attach cord bushes ❽ to input/output cables ❶ and ❼ of the reactor box. Attach both bushes in the same manner.
4) Attach reactor box cover ❿ to reactor box mounting plate ❸ with four reactor-box cover setscrews ❾ .
   At this time, fix cord bushes ❽ attached to input/output cables ❶ and ❼ in the concave section on reactor box cover ❿ to eliminate a gap between reactor box ⓫ and cover ❿ .
5) Secure reactor box ⓫ to the undersurface of table with four accessory wood screws ⓬.
6) Secure two cables ⓯ coming from reactor box ⓫ to the table with accessory cable clip ⓭ and wood screw ⓮ .

2-11. Connecting the power source cord

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

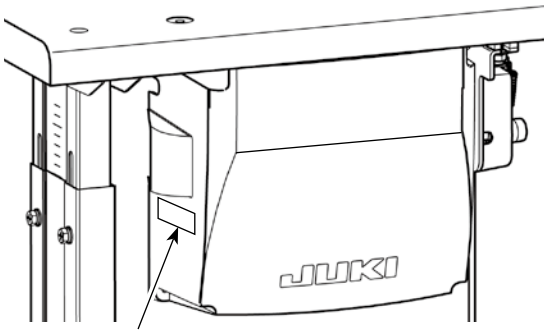
Power indication tag



(For example : In the case of 200V)

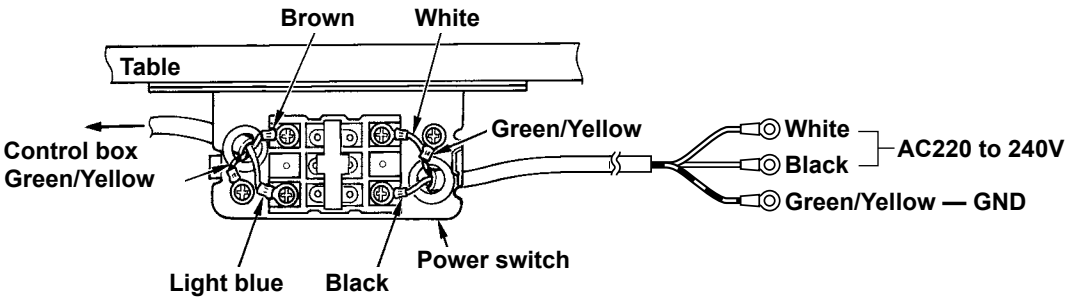
Caution

Never use under the wrong voltage and phase.

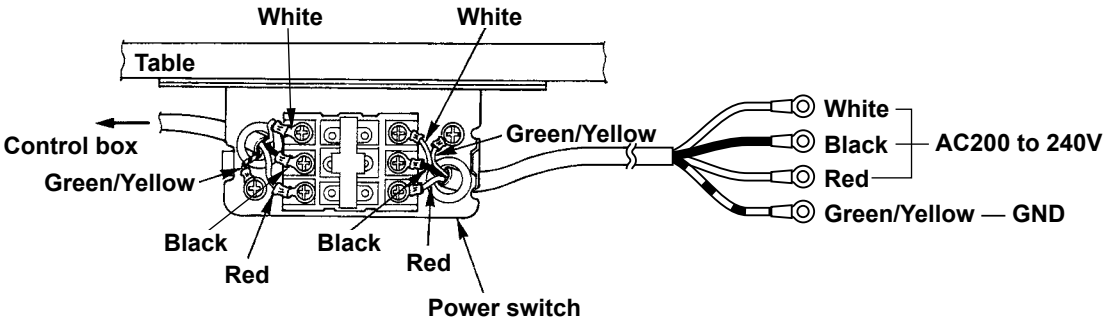


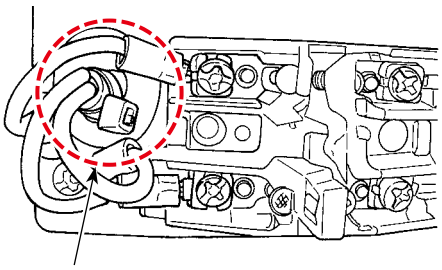
Rating plate

• Connecting single phase 220 to 240V



• Connecting 3-phase 200 to 240V

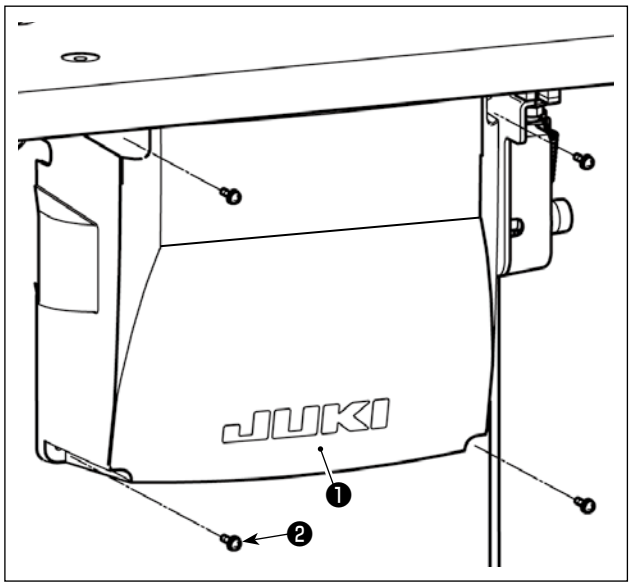




After screwing the cable to the power switch, bind the cable sheath portion with an accessory clip band inside the power switch.

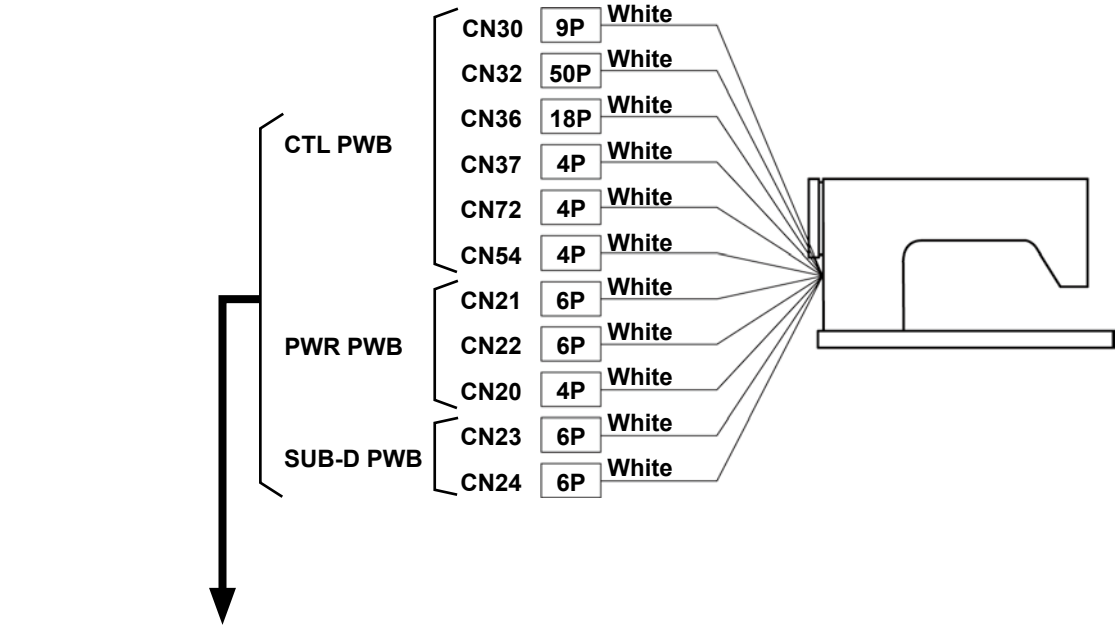
2-12. Connecting the cords

DANGER :
1. To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more.
2. To prevent accidents caused by unaccustomed work or electric shock, request the electric expert or engineer of our dealers when adjusting the electrical components.



1) Loosen four setscrews ❷ of control box cover ❶ . Remove control box cover ❶ .
2) Connect the respective cords to the corresponding connectors of CTL PCB, PWR PCB and SUB-D PCB. (Fig. 1)

Caution **Take care not to incorrectly connect the connectors CN21, CN22, CN23 and CN24.**



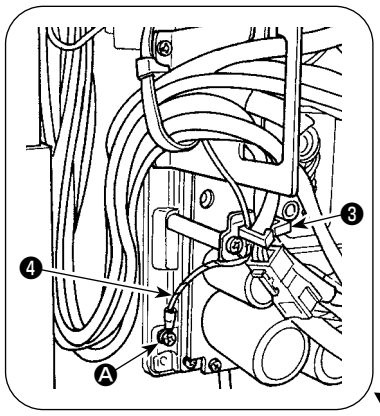


Fig. 2

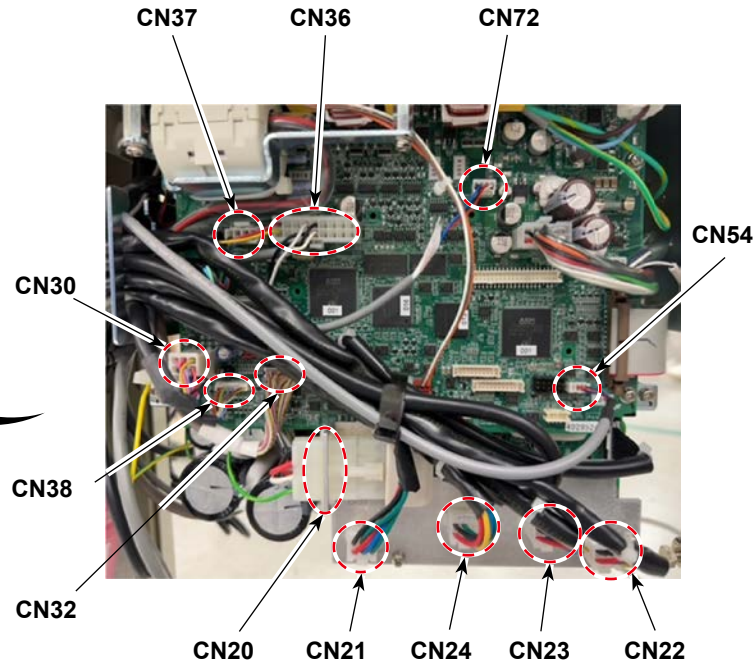
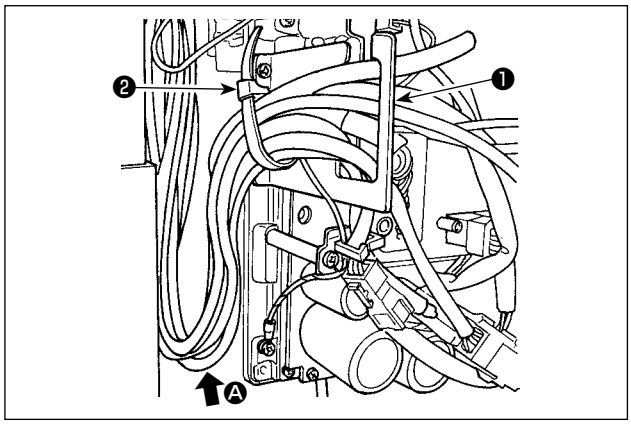


Fig. 1

3) Fix the ground wire ❹ on position Ⓐ of the control box with a screw. (Fig. 2)

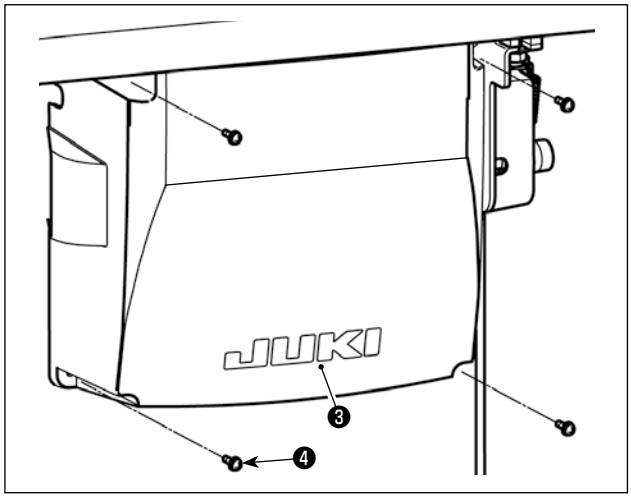
2-13. Handling the cords

DANGER :
1. To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more.
2. To prevent accidents caused by unaccustomed work or electric shock, request the electric expert or engineer of our dealers when adjusting the electrical components.



1) Bring the cords under the table into the control box.
2) Put the cord brought into the control box through cord exit plate ❶ and fix cable clip band ❷.

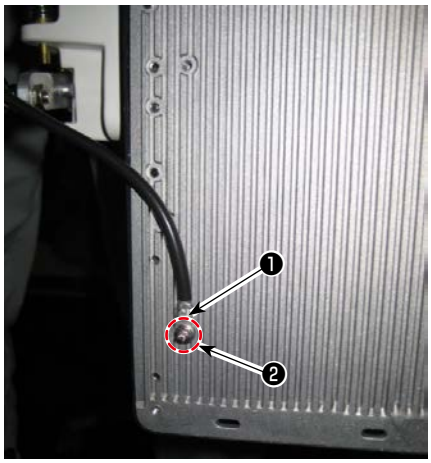
Arrange the cord so that it is not tensed or hitched even when the machine head is tilted. (See Ⓐ section.)



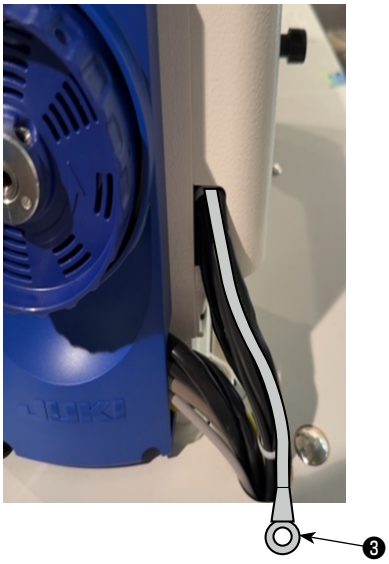
3) Install control box cover ❸ with four setscrews ❹.

For the purpose of preventing the cord breakage, take care not to allow the cords to be caught between the control box and control box cover ❸ when attaching the latter.

■ FG cord connection (CE type only)

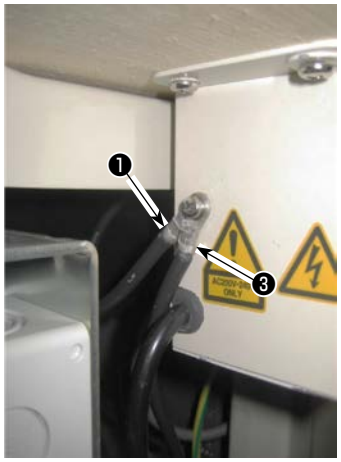


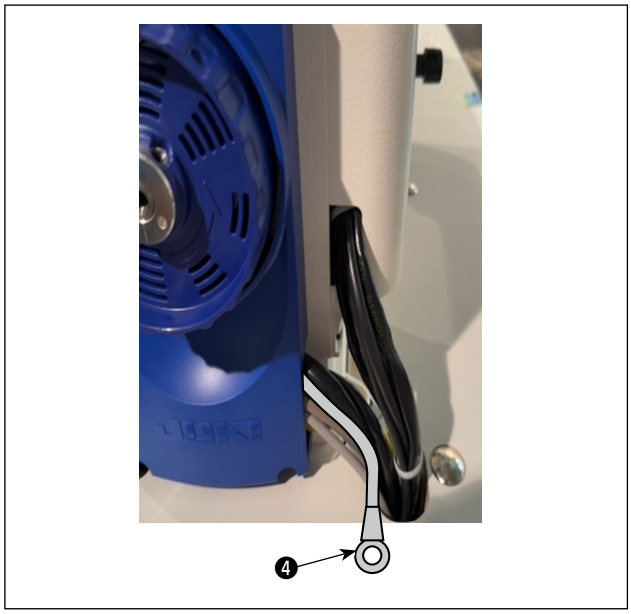
1) Fix one end of the included FG cord ❶ (gray) to the rear of the electrical control box using the included screw (M4) ❷.



2) Screw the FG cord ❸ (gray), which is pulled out from the machine head, and the FG cord ❶ (gray), which was screwed to the back of the electrical control box in step 1), to the front of the reactor box.

Front of the reactor box



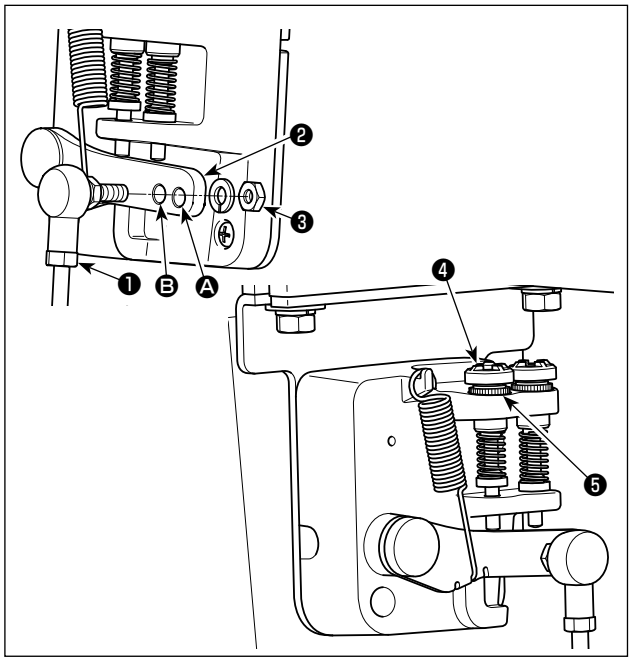


3) Screw the FG cord ❹ (gray), which is pulled out from the pulley cover, to the back of the reactor box.



2-14. Attaching the connecting rod

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and a lapse of 5 minutes or more.



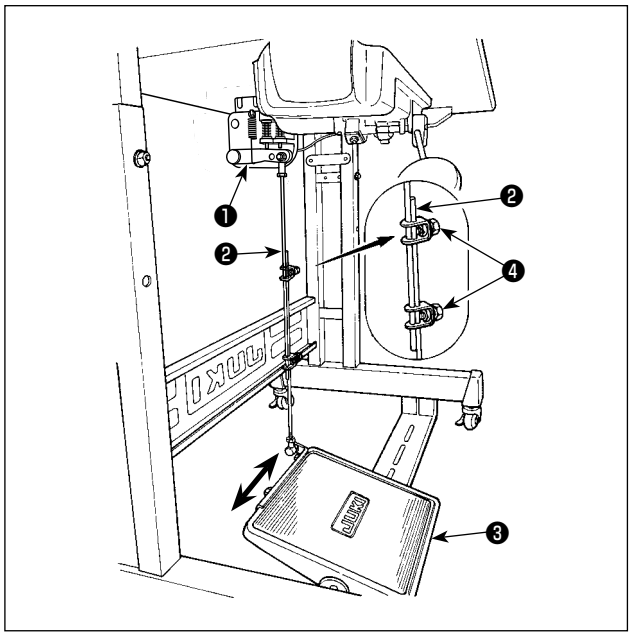
1) Fix connecting rod ❶ to installing hole Ⓑ of pedal lever ❷ with nut ❸.
2) Installing connecting rod ❶ to installing hole Ⓐ will lengthen the pedal depressing stroke, and the pedal operation at a medium speed will be easier.
3) The pressure increases as you turn reverse depressing regulator screw ❹ in, and decreases as you turn the screw out.

Caution

1. If the screw is excessively loosened, the spring will come off. Loosen the screw to such an extent that the top of the screw can be observed from the case.
2. Whenever you have adjusted the screw, be sure to secure the screw by tightening metal nut ❺ to prevent the screw from loosening.

2-15. Adjustment of the pedal

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



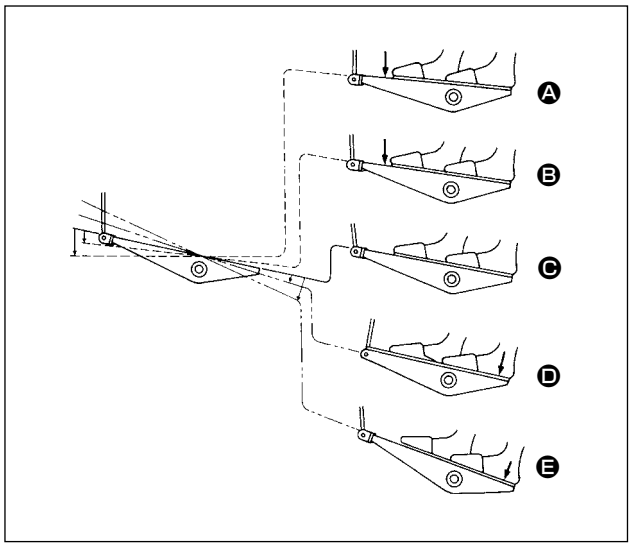
2-15-1. Installing the connecting rod

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

2-15-2. Adjusting the pedal angle

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

2-16. Pedal operation



The pedal is operated in the following four steps :

1) The machine runs at low sewing speed when you lightly depress the front part of the pedal. Ⓑ
2) The machine runs at high sewing speed when you further depress the front part of the pedal. Ⓐ (If the automatic reverse feed stitching has been preset, the machine runs at high speed after it completes reverse feed stitching.)
3) The machine stops (with its needle up or down) when you reset the pedal to its original position. Ⓒ
4) The machine trims threads when you fully depress the back part of the pedal. Ⓔ

* When the auto-lifer (AK device) is used, one more operating switch is provided between the sewing machine stop switch and thread trimming switch.
The presser foot goes up when you lightly depress the back part of the pedal Ⓓ, and if you further depress the back part, the thread trimmer is actuated.
When starting sewing from the state that the presser foot has been lifted with the Auto-lifter and you depress the back part of the pedal, the presser foot only comes down.

- If you reset the pedal to its neutral position during the automatic reverse feed stitching at seam start, the machine stops after it completes the reverse feed stitching.
- The machine will perform normal thread trimming even if you depress the back part of the pedal immediately following high or low speed sewing.
- The machine will completely perform thread trimming even if you reset the pedal to its neutral position immediately after the machine started thread trimming action.

2-17. How to use the operation panel (Basic explanation)

2-17-1. Selection of the language (operation to be done at first)

Select the language to be displayed on the operation panel when you turn ON the power to your sewing machine for the first time after the purchase.
Note that, if you turn the power OFF without selecting the language, the language selection screen will be displayed every time you turn the sewing machine ON.

Currently supported languages: Japanese, English, Chinese (Simplified), one additional language (English if no additional language is added).

① Turning ON the power switch

Be aware that the needle bar may move automatically, according to the settings of the sewing machine, when the power is turned ON. The needle bar can also be set so that it does not move automatically. Refer to "4-9. List of memory switch data" p. 82 for details.



<Welcome screen>

Firstly, the welcome screen is displayed on the panel. Then, the language selection screen is displayed.

* If you turn the sewing machine ON again immediately after having turned it OFF, the sewing machine may sometimes fail to start.
It is therefore recommended to wait for a while after you have turned the sewing machine OFF before turning it back ON.

② Selecting the language



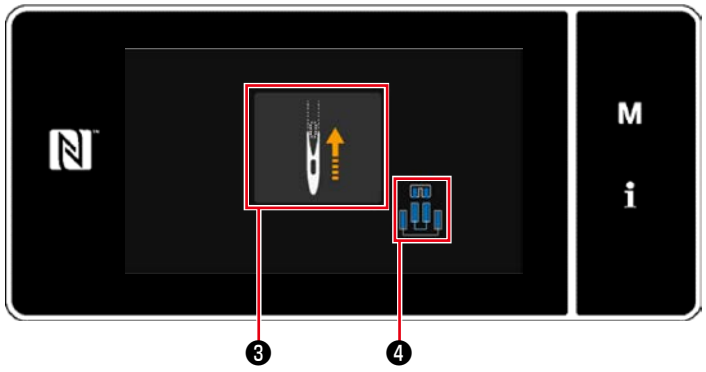
<Language selection screen>

Select the language you want to use and press corresponding language button ❶ . Then, press ↵ ❷ .

This determines the language to be displayed on the panel.

The language to be displayed on the operation panel can be changed using the memory switch U406.
Refer to **"4-9. List of memory switch data" p. 82** for details.

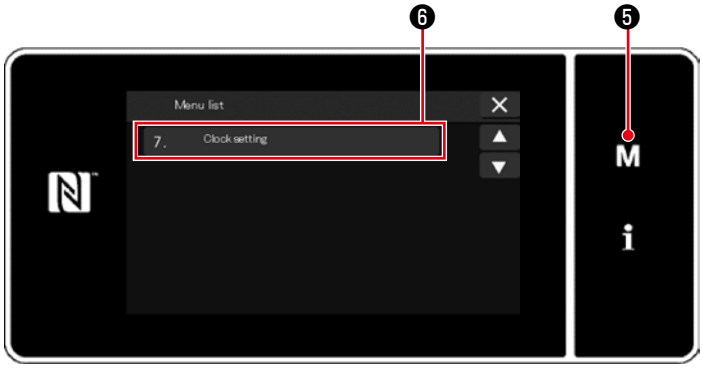
③ Retrieval of the origin



<Origin retrieval screen>

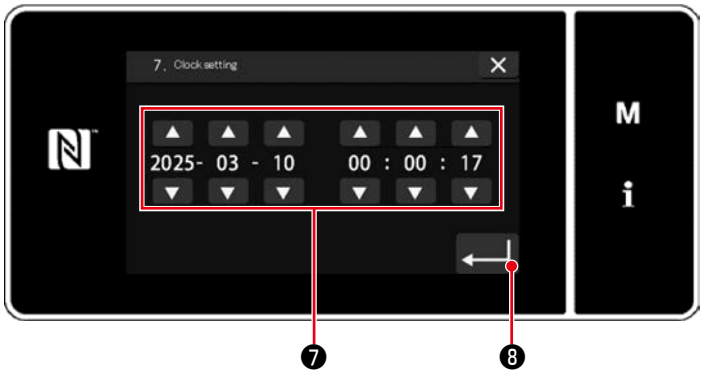
* In the case memory switch "U090 Initial operation upper position stop function" is set to "1", the screen shown on the left is not displayed, but the needle bar automatically rises to its upper position.
The status of the top feed and bottom feed settings (K499, K347) is displayed on ❹ .
* When memory switch "K499" is set to "0", the bottom feed of the sewing machine will be displayed for left-right differential feed, and when set to "1", the bottom feed will be displayed for front-back differential feed.

④ Setting the clock



<Mode screen>

1. Press M ❺.
   The "mode screen" is displayed.
2. Select the "7. Clock setting".
   The "clock setting screen" is displayed.



<Clock setting screen>

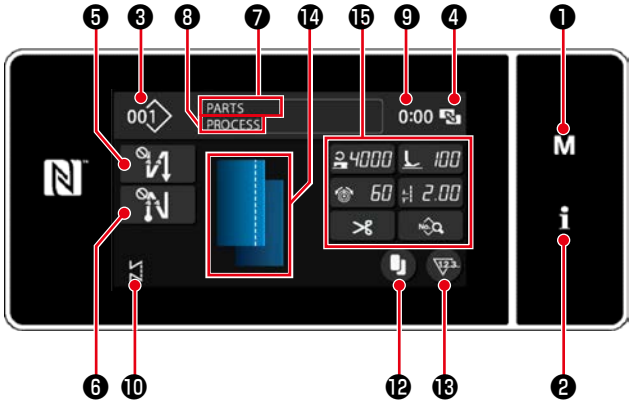
3. Enter year/month/day/hour/minute/second with ▲▼ ❼.
   The time entered is displayed in 24-hour notation.
4. Press ↵ ❽ to confirm the clock setting. Then, the current screen returns to the previous screen.

2-18. Names and functions of the panel keys

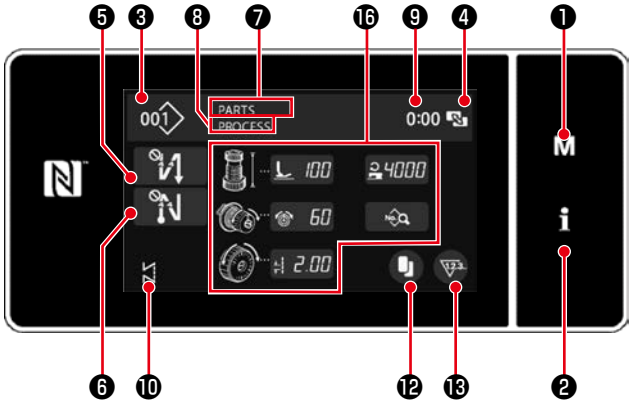
2-18-1. First sewing screen

The first sewing screen will switch to the following four screens depending on the pattern settings.

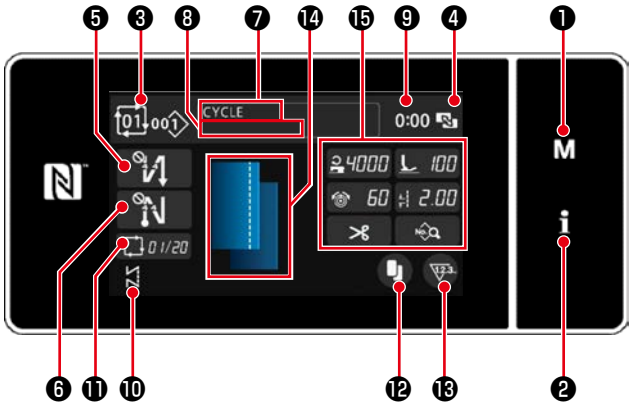
<First sewing screen (standard image)>



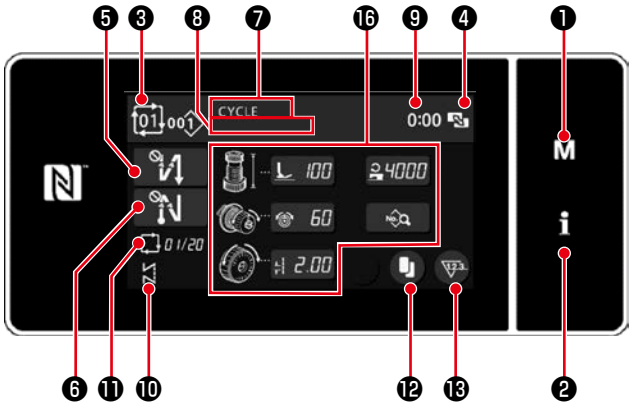
<First sewing screen (sewing machine image)>



<First sewing screen (cycle sewing)>



<First sewing screen (cycle sewing and sewing machine image)>



No.	Switch/display	Description
❶	Mode key	This switch is used for displaying the menu screen.
❷	Information key	This switch is used for displaying the information screen.
❸	Sewing pattern No. button	This switch is used for displaying the number of the sewing pattern.
❹	Mode changeover button/ Simple screen lock display	When the simple lock is released, the mode changeover button is displayed. When the simple lock is applied with M ❶ and i ❷, a lock icon is displayed. The mode changeover button is displayed only on the first sewing screen when the simple lock is released. Touching the mode changeover button switches the display mode. Locked : Unlocked :
❺	Sewing-start reverse-feed stitch button	This switch is used for changing the ON/OFF status of the reverse feed stitching at the beginning of sewing. When reverse feed stitching at the start of sewing is OFF, the "prohibited mark" is displayed on the icon. When it is turned ON, the button is displayed in blue.
❻	Sewing-end reverse-feed stitch button	This switch is used for changing the ON/OFF status of reverse feed stitching at the end of sewing. When reverse feed stitching at the end of sewing is OFF, a "prohibited mark" is displayed on the icon. When it is turned ON, the button is displayed in blue.

No.	Switch/display	Description
❼	Part number	In the case the part number/process display is selected with U404, the part number is displayed. In the case the comment display is selected, the comment is displayed.
❽	Process/comment	In the case the part number/process display is selected with U404, the process is displayed. In the case the comment display is selected, the comment is displayed.
❾	Clock display	The time is displayed in 24-hour system.
❿	Sewing pattern display/Polygonal-shape stitching step edit	Displays the shape of the selected sewing pattern. For polygonal-shape stitching, the step edit button is displayed.
⓫	Cycle sewing step edit	If the selected sewing pattern is a cycle sewing pattern, the button is displayed. If it is not a cycle sewing pattern, the button is not displayed. Touching the button allows you to edit the cycle sewing steps.
⓬	Button to switch to the second sewing screen	The screen switches to the second sewing screen (differential feed amount setting). For details on screen operations, refer to **"2-18-2. Second sewing screen" p. 21**.
⓭	Button to change to the counter screen	The screen switches to the counter screen. For details on screen operations, refer to **"4-7. Counter function" p. 75**.
⓮	Shape display	Displays the finished shape of the selected pattern. Press the button to switch to the second sewing screen (differential feed amount setting).
⓯	Customization buttons 1 to 6	You can assign and register functions to these buttons.
⓰	Sewing machine image screen parameters 1 to 5	Set the patterns.
	Simple lock	Press M ❶ and i ❷ simultaneously to enable or disable the on-screen button operations. When panel operation is disabled, the display of ❹ changes to .

*** Confirmation of data**

To change the pattern number, first select the pattern you want to use. Then, press to confirm your selection.

For the setting items of the Memory switch or sewing pattern, change the target data and press to confirm the change.

After the setting data on the number of stitches of reverse-feed stitching or the number of stitches of multi-layer stitching has been changed, the changed setting data is confirmed by pressing .

* To switch between "standard display" and "sewing machine image display" modes on the first sewing screen, press the "mode changeover button " on the screen.

Switching the sewing screen



<Second sewing screen - differential feed amount setting>

1) When you press the "button to switch to the second sewing screen" on "2-17-1. First sewing screen", the <Second sewing screen - differential feed amount setting> is displayed.
When you press the "return button " on the <Second sewing screen - differential feed amount setting>, the screen returns to the <First sewing screen>.
The return destination will be either "standard image display" or "sewing machine image display" depending on the mode switching status.

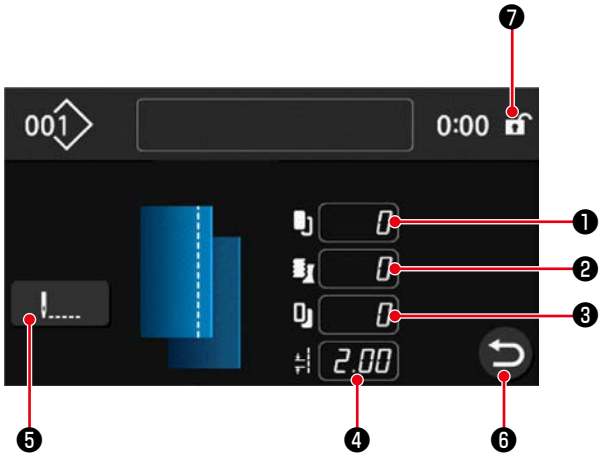


<Counter screen>

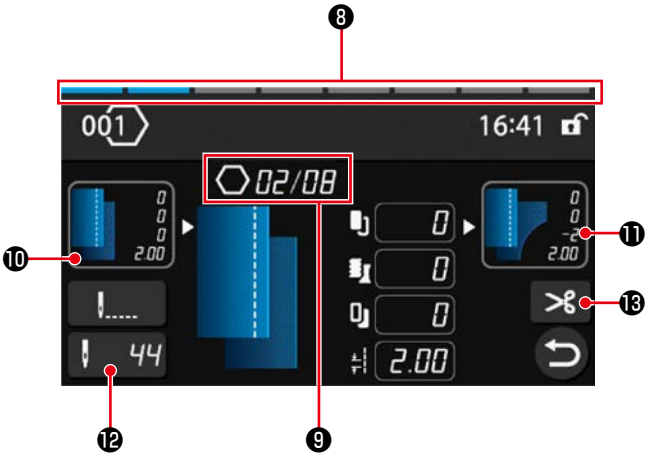
2) When you press the on "2-17-1. First sewing screen", the <Counter screen> is displayed.
When you press the on <Counter screen>, the screen returns to the <First sewing screen>.
The return destination will be either "standard image display" or "sewing machine image display" depending on the mode switching status.

2-18-2. Second sewing screen

On the second sewing screen, you can set the stitch length and the left-right or top-bottom/front-back differential feed amounts.
The four belt feed amounts are automatically calculated and set based on the settings on the second sewing screen.

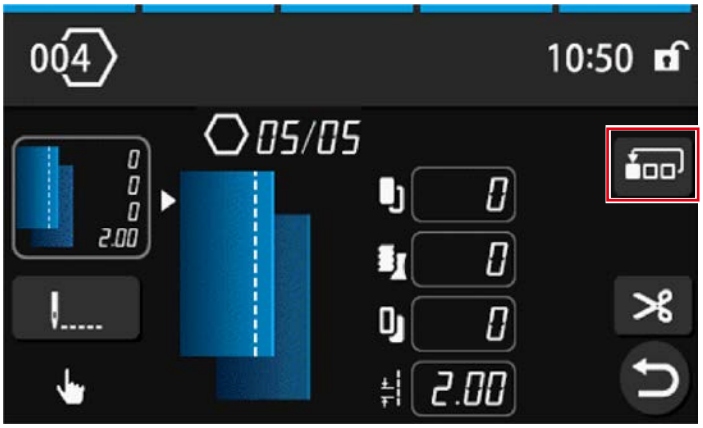


<Standard pattern>



<Polygonal-shape stitching>

No.	Switch/display	Description
❶	Top feed differential adjustment button	Displays the magnitude of the top feed differential (%). When the right feed amount is larger, a positive value is displayed; when the left feed amount is larger, a negative value is displayed. For example, when the setting value is 50%, the left-right feed ratio is 1.0:1.5.
❷	Vertical feed differential adjustment button	Displays the magnitude of the vertical feed differential (%). When the top feed amount is larger, a positive value is displayed; when the bottom feed amount is larger, a negative value is displayed. For example, when the setting value is 50%, the top-bottom feed ratio is 1.5:1.0.
❸	Bottom feed differential adjustment button	Displays the magnitude of the bottom feed differential (%). When the right feed amount is larger, a positive value is displayed; when the left feed amount is larger, a negative value is displayed. For example, when the setting value is 50%, the left-right feed ratio is 1.0:1.5.
❹	Entire feed amount button	Displays the stitch length (mm).
❺	Threadless preview button	Press the button to perform only the feed operation, without moving the needle.
❻	First sewing screen button	Press the button to display the first sewing screen.
❼	Simple lock	Press M and i simultaneously to enable or disable the on-screen button operations. When panel operation is disabled, the display of ❼ changes to 🔒.
❽	Step display (image)	The total number of steps and the current step position are displayed using the number and color of the bars.
❾	Step display	The current step position and the total number of steps are displayed as numbers.
❿	Previous step button	Displays the differential feed amount of the previous step. Press the button to change the current step to the previous step.

No.	Switch/display	Description
⓫	Next step button	Displays the differential feed amount of the next step. Press the button to change the current step to the next step. If the next step is the final step, a button to return to the first step will be displayed. 
⓬	Step changeover display	Displays the setting for "S202 Step changeover". If the setting is "Number of stitches", pressing the button switches the screen to one for changing "S206 Number of stitches".
⓭	Thread trimming button (no step switch)	Press the button to perform thread trimming. If you perform thread trimming using this button, the process will not proceed to the next step. Use this when adjusting the amount of step operation.

Press any button from ❶ to ❹ to switch the screen to one for changing the differential feed amount.

For details on how to operate, refer to **"3-7-1. Second sewing screen (differential feed amount setting)" p. 37**.

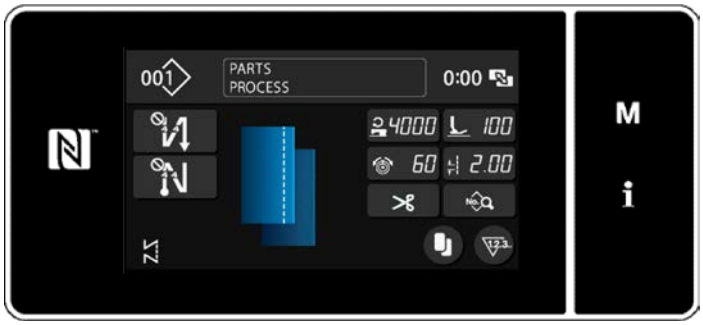
2-18-3. Basic operation

① Turning ON the power switch

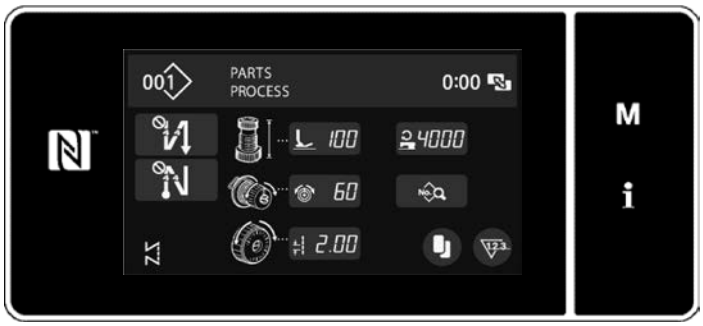


When you turn ON the power, the welcome screen is displayed.

② Selecting a sewing pattern



<First sewing screen (standard image display)>

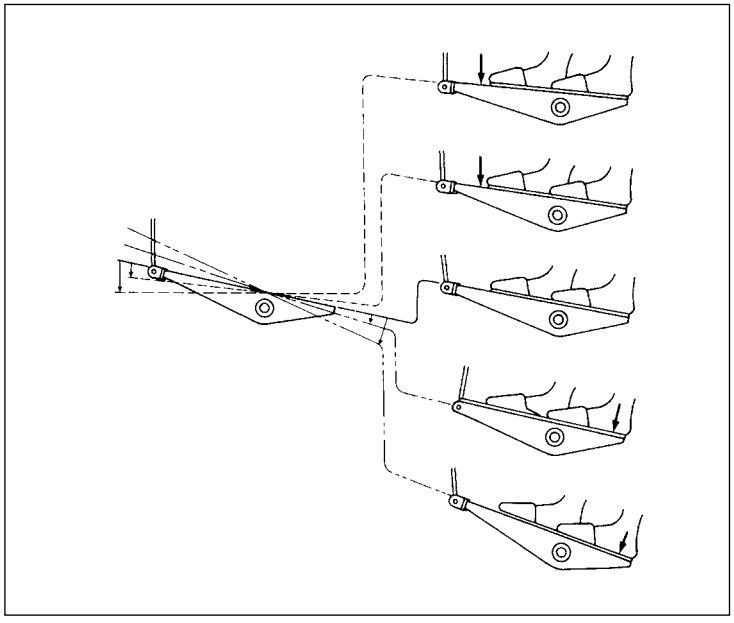


<First sewing screen (sewing machine image display)>

The first sewing screen will be displayed.

- Select a sewing pattern.
  Refer to **"4-4. Sewing patterns" p. 48** for details.
- Set up functions for the selected sewing pattern.
  (* Standard display mode only)
  Refer to **"4-4-6. List of pattern functions" p. 62** for details.

③ Starting sewing

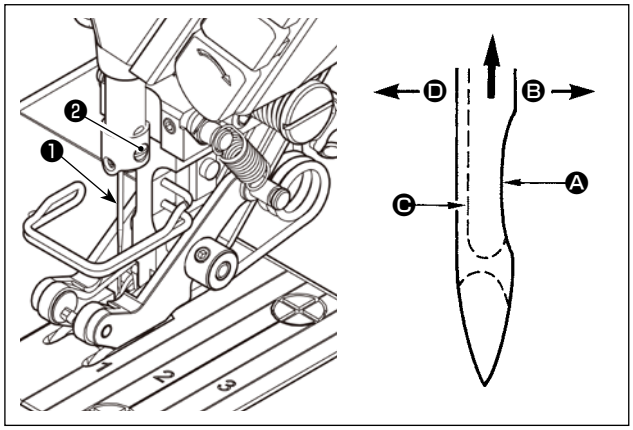


When you depress the pedal, the sewing machine starts sewing.
Refer to **"2-16. Pedal operation" p. 15**.

3. PREPARATION BEFORE SEWING

3-1. 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.



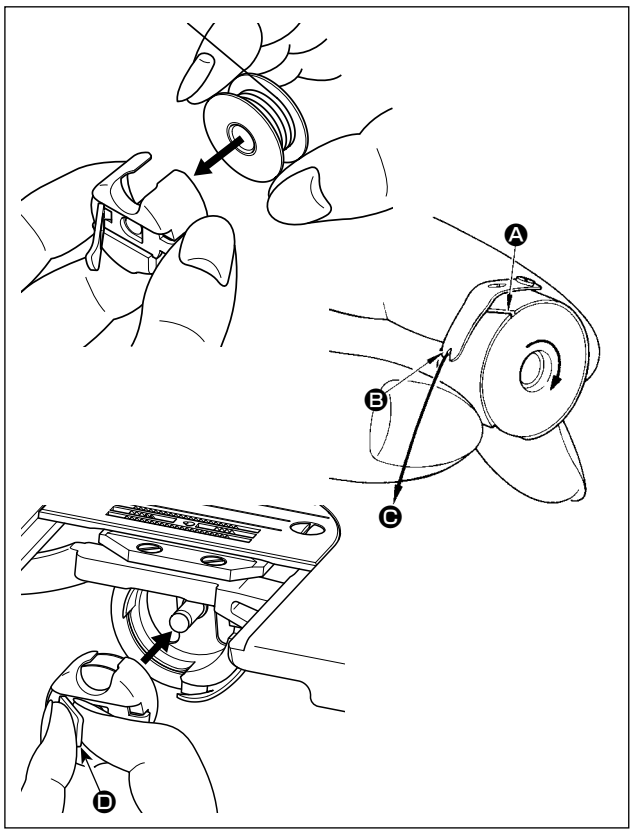
Use the specified needle for the machine. Use the proper needle in accordance with the thickness of thread used and the kinds of the materials.

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

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

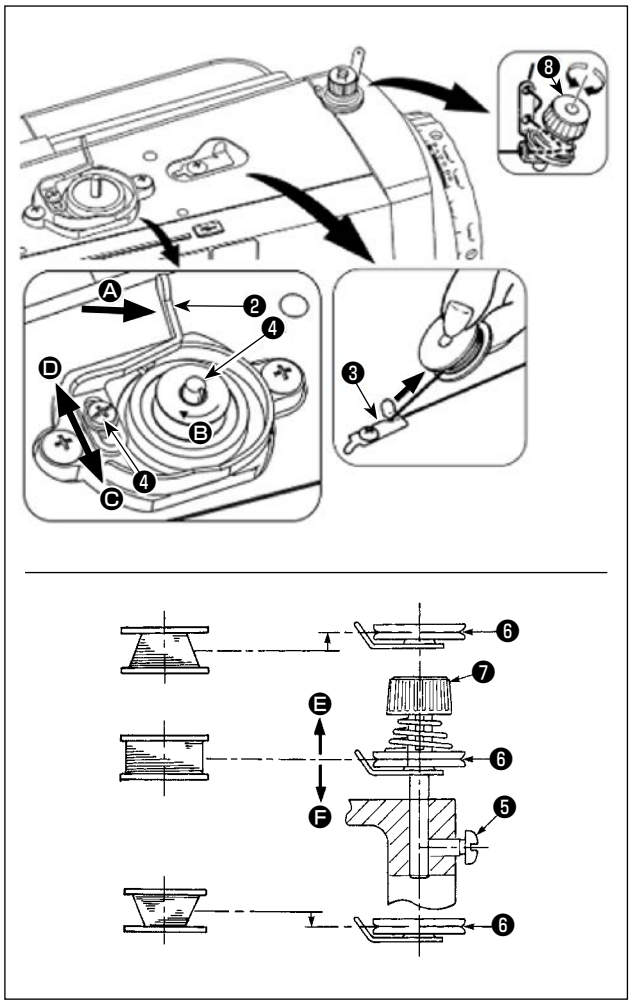
3-2. Removing/fitting the bobbin case

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



1) Turn the handwheel to lift the needle above the throat plate.
2) Install the bobbin in the bobbin case so that the thread wound direction is clockwise.
3) Pass the thread through thread slit Ⓐ of the bobbin case, and pull the thread in direction Ⓒ. By so doing, the thread will pass under the tension spring and come out from notch Ⓑ.
4) Check that the bobbin rotates in the direction of the arrow when thread is pulled.
5) Pinching latch Ⓓ of the bobbin case with fingers, fit the bobbin case in the hook.

3-3. Winding the bobbin thread



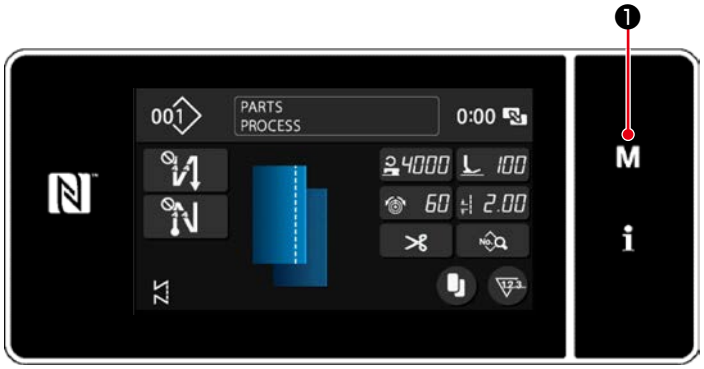
1) Insert the bobbin deep into the bobbin winder spindle ❶ until it will go no further.
2) Pass the bobbin thread pulled out from the spool rested on the right side of the thread stand following the order as shown in the figure on the left. Then, wind clockwise the end of the bobbin thread on the bobbin several times. (In case of the aluminum bobbin, after winding clockwise the end of the bobbin thread, wind counterclockwise the thread coming from the bobbin thread tension several times to wind the bobbin thread with ease.)
3) Press the bobbin winding lever ❷ in the direction of Ⓐ and start the sewing machine. The bobbin rotates in the direction of Ⓑ and the bobbin thread is wound up. The bobbin winder spindle ❶ automatically as soon as the winding is finished.
4) Remove the bobbin and cut the bobbin thread with the thread cut retainer ❸.
5) When adjusting the winding amount of the bobbin thread, loosen setscrew ❹ and move bobbin winding lever ❷ to the direction of Ⓒ or Ⓓ. Then tighten setscrew ❹.
   To the direction of Ⓒ : Decrease
   To the direction of Ⓓ : Increase
6) In case that the bobbin thread is not wound evenly on the bobbin, remove the handwheel, loosen screw ❺ and adjust the height of bobbin thread tension ❽.
   • It is the standard that the center of the bobbin is as high as the center of thread tension disk ❻.
   • Adjust the position of thread tension disk ❻ to the direction of Ⓔ when the winding amount of the bobbin thread on the lower part of the bobbin is excessive and to the direction Ⓕ when the winding amount of the bobbin thread on the upper part of the bobbin is excessive.
   After the adjustment, tighten screw ❺.
7) To adjust the tension of the bobbin winder, turn the thread tension nut ❼.

Caution

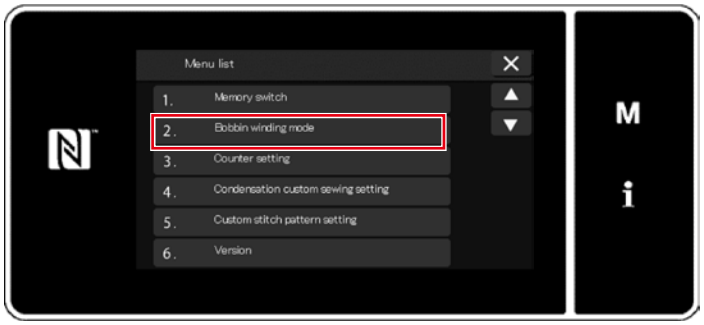
1. **When winding the bobbin thread, start the winding in the state that the thread between the bobbin and thread tension disk ❻ is tense.**
2. **When winding the bobbin thread in the state that sewing is not performed, remove the needle thread from the thread path of thread take-up and remove the bobbin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

[Bobbin winding mode]

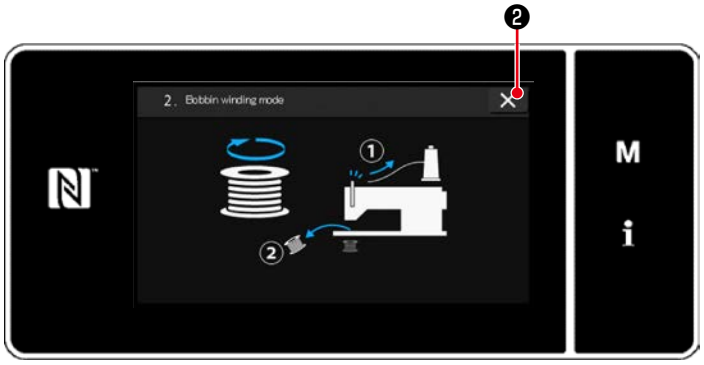
To wind a bobbin only or to check the oil quantity in the hook, the bobbin winding mode should be used. Depress the pedal to start winding a bobbin.



1) Display the mode screen by pressing M ❶.



2) Select the "2. Bobbin winding mode".

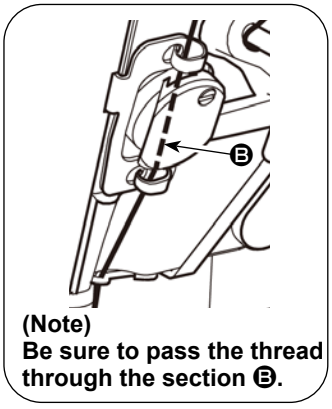


3) The sewing machine mode is changed over to the "Bobbin winding mode".
The sewing machine runs with its presser foot up when the pedal is depressed. In this state, a bobbin can be wound. The sewing machine runs only as long as the pedal is depressed.
When ✕ ❷is pressed, the sewing machine exits from the "Bobbin winding mode".

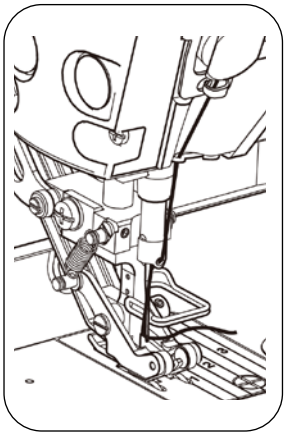
1. When winding the bobbin thread, start the winding in the state that the thread between the bobbin and thread tension disk ❻ is tense.
2. Remove the needle thread from the thread path of thread take-up and remove the bobbin from the hook.
3. There is the possibility that the thread pulled out from the thread stand is loosened due to the influence (direction) of the wind and may be entangled in the handwheel. Be careful of the direction of the wind.
4. The speed of the sewing machine under the bobbin winding mode is equal to the one which has been set for the machine head.

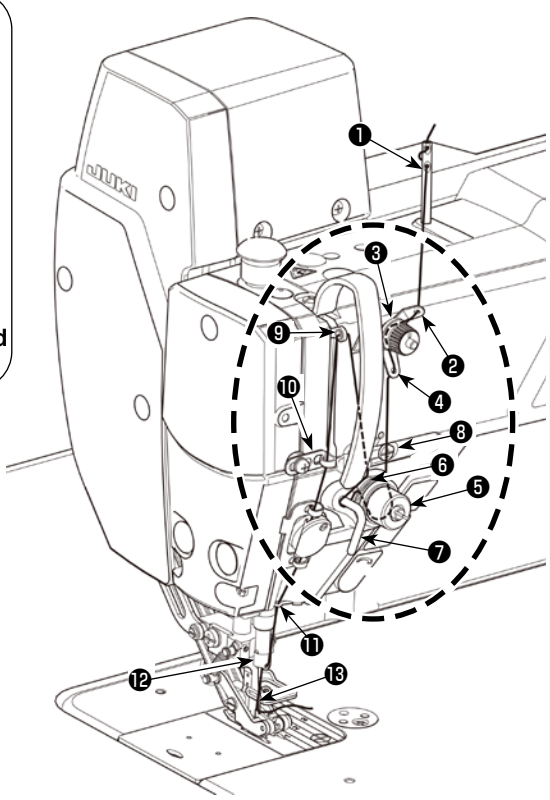
3-4. Threading the machine head

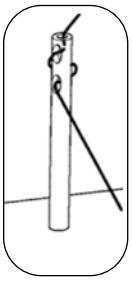
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



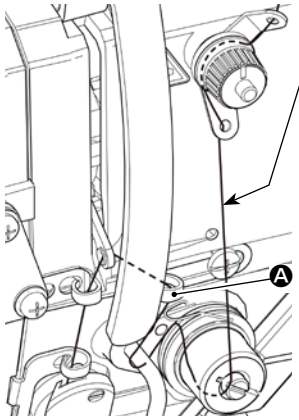
(Note)
Be sure to pass the thread through the section Ⓑ.





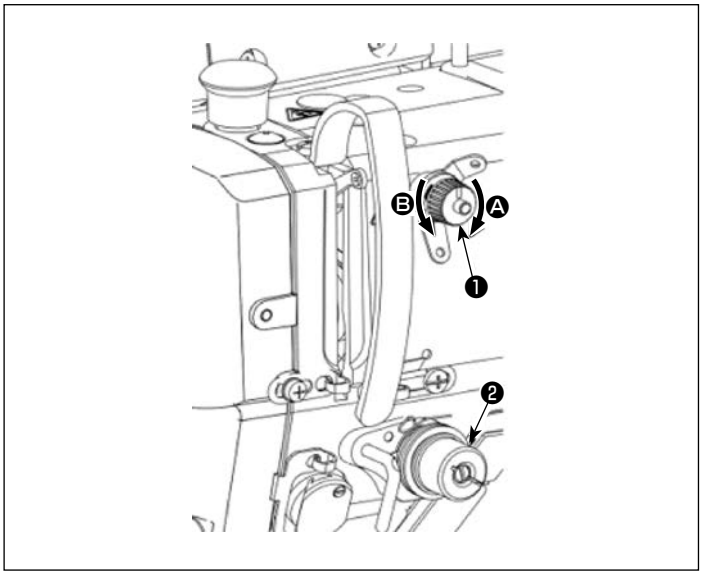


(Note)
Do not pass this thread through section Ⓐ.



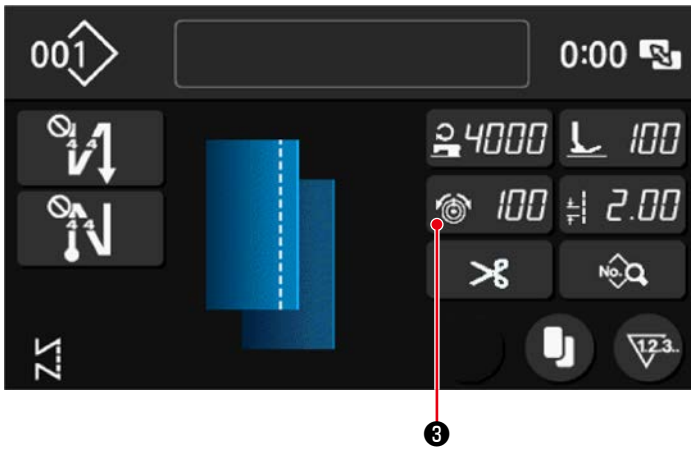
3-5. Thread tension

3-5-1. Adjusting the thread tension No. 1 tension

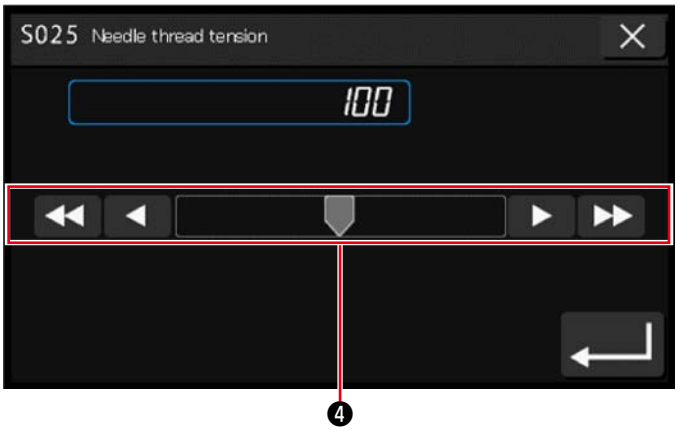


1) Turn thread tension No. 1 nut ❶ clockwise (in direction Ⓐ), to shorten the thread length remaining on the needle after thread trimming or counterclockwise (in direction Ⓑ), to lengthen the thread length.

3-5-2. Adjusting the needle thread tension (Active tension)



1) Active tension ❷ allows for the adjustment of the needle thread tension on the operation panel according to each sewing condition. In addition, the data can be saved to memory. Press  ❸ to display the needle thread tension input screen. (The numeric value displayed on the screen represents the current needle thread tension setting.)

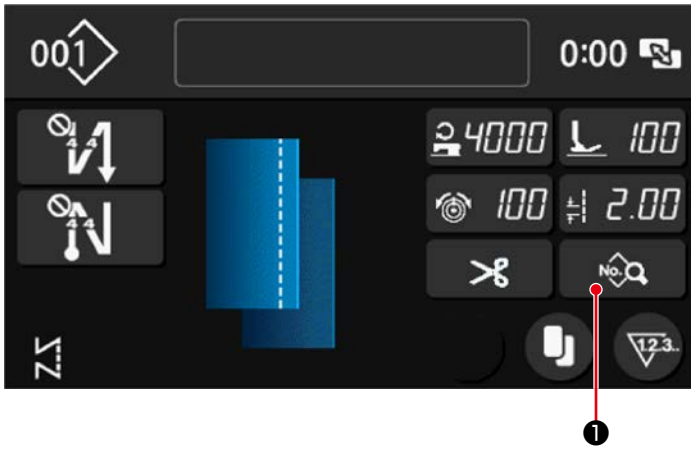


2) Press ❹ to change the needle thread tension setting.
The setting range is from 0 to 200.
As the setting increases, the needle thread tension becomes stronger.

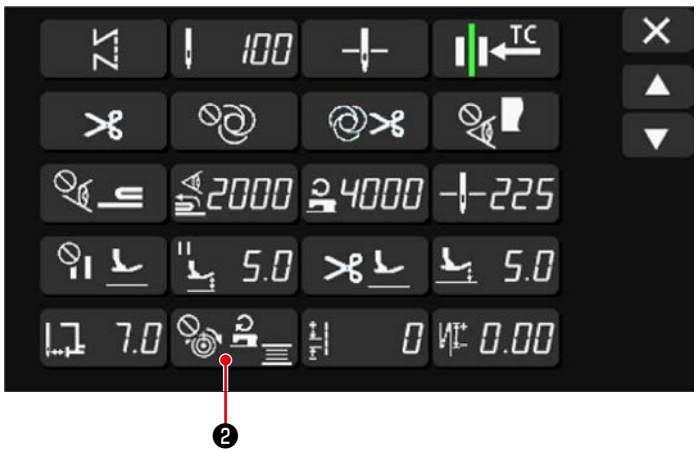
3-5-3. Tension correction (sewing speed)

The needle thread tension can be corrected according to the sewing speed.

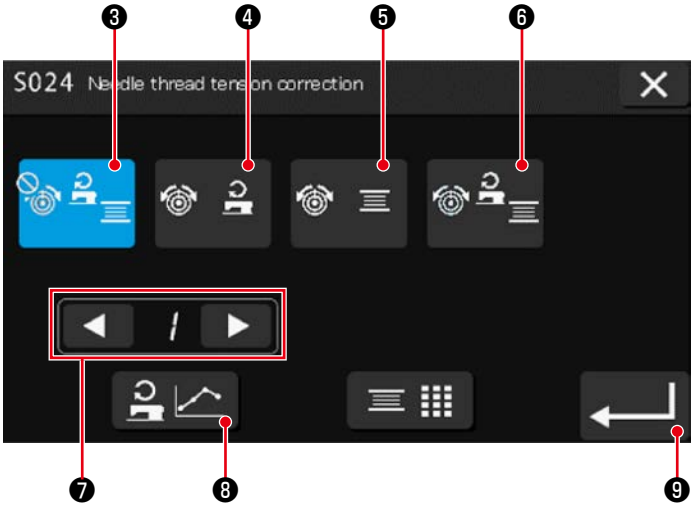
The needle thread tension can also be set on the operation panel. The needle thread tension data is stored in memory.



1) Press  ❶ on the first sewing screen.
The "sewing data edit screen" will be displayed.



2) Press  ❷.
The "S024 Needle thread tension correction screen" will be displayed.



<S024 Needle thread tension correction screen>

3) Select from the following four options for needle thread tension correction:

❸ Not used 

❹ Sewing speed (initial setting) 

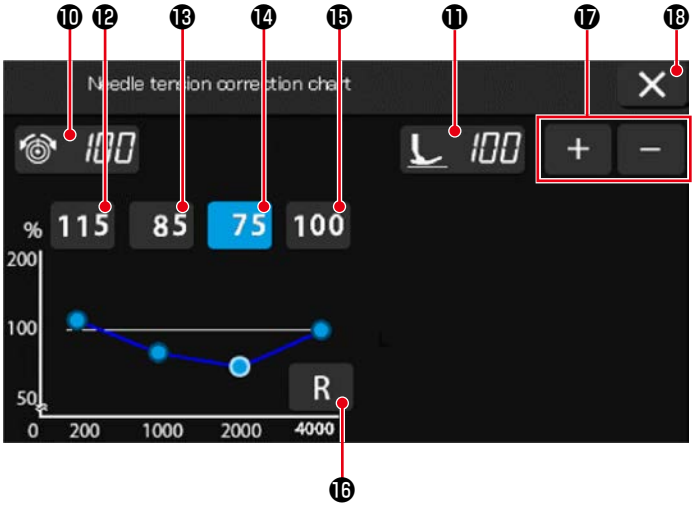
❺ Bobbin thread remaining amount 

❻ Both (sewing speed and bobbin thread remaining amount) 

For details on the bobbin thread remaining amount, refer to **"3-5-4. Tension correction (bobbin thread remaining amount)" p. 32**.

4) When you want to edit the thread tension correction data (sewing speed), select the chart number (from 1 to 4) you want to save to memory using  ❼, then press  ❽.

* Press  ❾ to confirm the entered content and return to the "sewing data edit screen".



5) The set values for needle thread tension 100 ❿ and presser foot pressure 100 ⓫ can be increased or decreased using + − ⓱.

* The needle thread tension and presser foot pressure settings changed here will be applied to the currently selected sewing pattern data.

6) Press 115 ⓬ to select the item and set the correction value [%] for the sewing speed 200 sti/min. Press + − ⓱ to increase or decrease the value. When 115 ⓬ is selected, pressing the pedal will operate the sewing machine at maximum speed 200 sti/min, allowing you to check the correction value you have set.

7) Similarly, ⓭ and ⓮ correspond to correction values and operations for 1,000 and 2,000 sti/min.
The correction value 100 ⓯ for 4,000 sti/min is fixed at 100%.

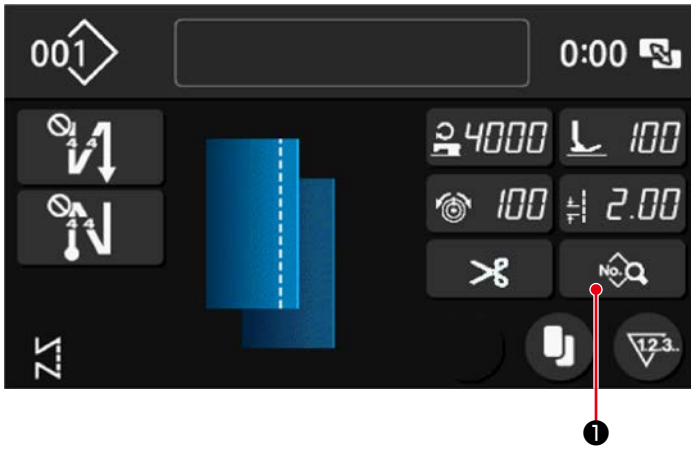
8) Press R ⓰ to reset all correction values from ⓬ to ⓮ to 100%.

9) × ⓲ is disabled during sewing.
After the thread trimming, pressing it will return the screen to the "S024 Needle thread tension correction screen".

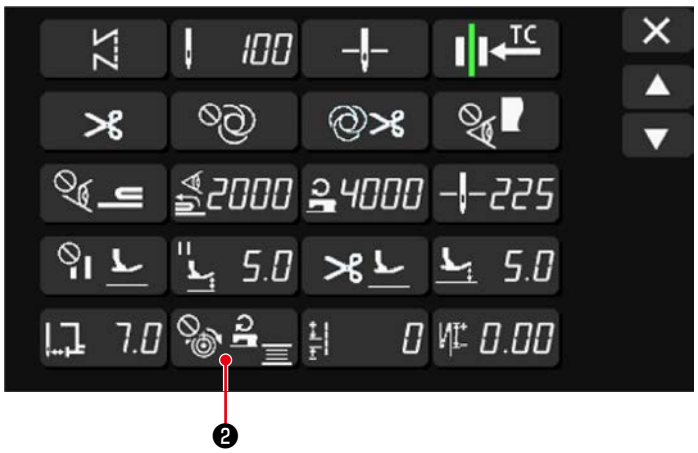
3-5-4. Tension correction (bobbin thread remaining amount)

The needle thread tension can be corrected according to the sewing speed.

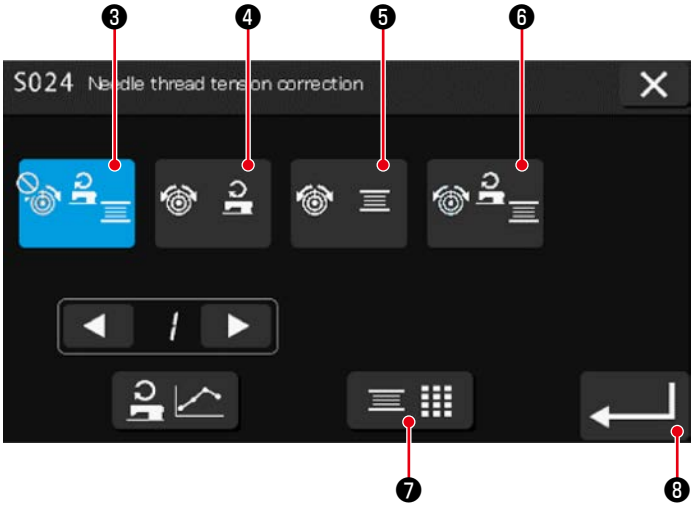
The needle thread tension can also be set on the operation panel. The needle thread tension data is stored in memory.



1) Press  ❶ on the first sewing screen.
The "sewing data edit screen" will be displayed.



2) Press  ❷.
The "S024 Needle thread tension correction screen" will be displayed.

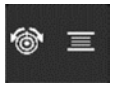


<S024 Needle thread tension correction screen>

3) Select from the following four options for needle thread tension correction:

❸ Not used 

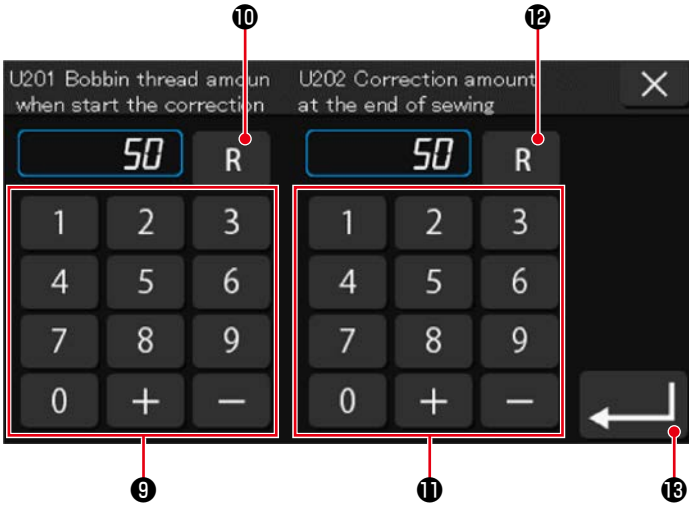
❹ Sewing speed (initial setting) 

❺ Bobbin thread remaining amount 

❻ Both (sewing speed and bobbin thread remaining amount) 

For details on the correction according to the sewing speed, refer to **"3-5-3. Tension correction (sewing speed)" p. 29**.

4) Press  ❼ when you want to change the tension correction data (bobbin thread remaining amount).

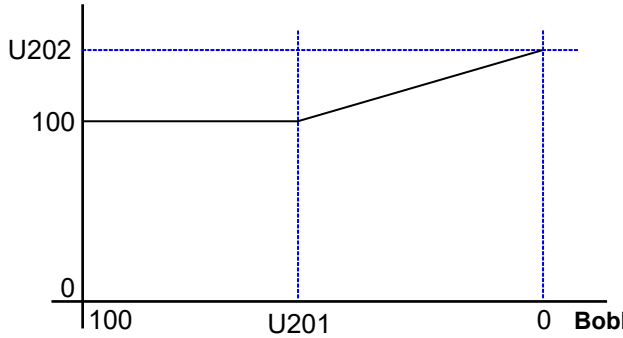


5) Use the numeric keypad ❾ to set "U201 Bobbin thread remaining amount for starting correction".
Using the aforementioned set value, determine the remaining amount of bobbin thread displayed on the bobbin thread counter at which the needle thread tension correction starts.
For details on how to set the bobbin thread counter, refer to **"4-7. Counter function" p. 75**.
Press R ❿ to reset the set value to the initial value.

6) Use the numeric keypad ⓫ to set "U202 Final correction amount".
Using the aforementioned set value, determine the correction ratio of the needle thread tension.
Press R ⓬ to return the value to what it was before changing the setting using the numeric keypad.

7) Press  ⓭ to confirm the entered value and return to the "S024 Needle thread tension correction screen".

Tension correction amount [%]



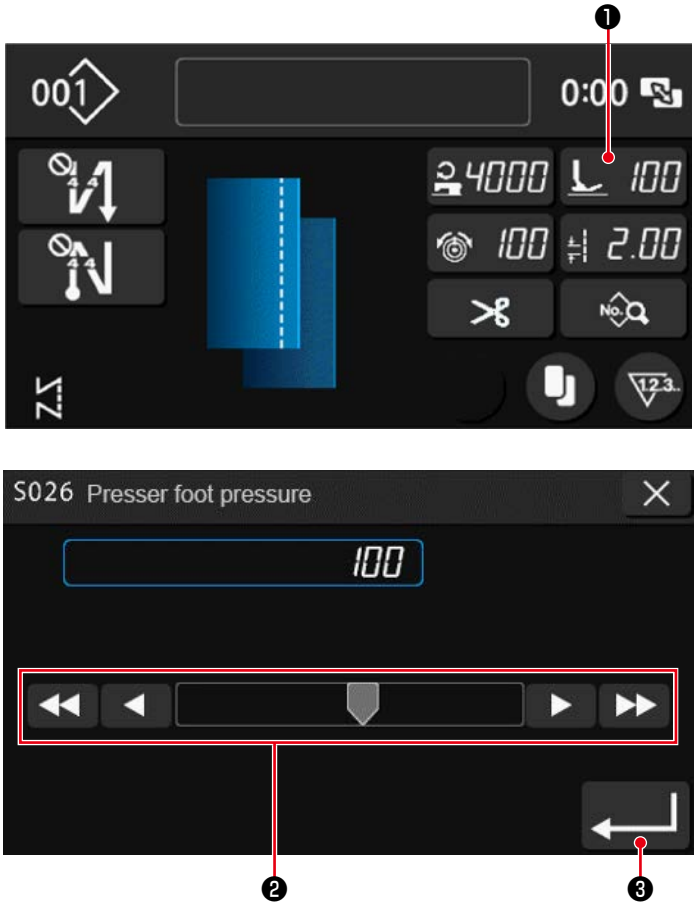
Bobbin thread remaining amount [%]

* Refer to the figure on the left for the relationship between "U201 Bobbin thread remaining amount for starting correction" and "U202 Final correction amount".

3-6. Presser foot

WARNING :
Do not place anything under the presser foot when turning the power ON.
If the power is turned ON with something under the presser foot, E910 will be displayed.

If the power is turned ON with material or something under the presser foot, the presser motor will generate a specific sound during home position retrieval. It should be noted that this phenomenon is not a fault.



3-6-1. Adjusting the presser foot pressure

The presser foot pressure setting is displayed on 1.

[How to change]

1) Press 100 ❶ to display the presser foot pressure input screen.
2) Press ❷ to change the presser foot pressure setting. (The setting range is from -20 to 200.)
   A negative setting will raise the presser foot.
3) Confirm your entry by pressing ↵ ❸
   Then, the sewing screen is displayed.

1. **To avoid personal injury, never put your fingers under the presser foot.**
2. **Be aware that the presser foot pressure varies when the presser foot or the throat plate is changed.**
3. **When the setting is negative, the presser foot remains in a floating state, which prevents sufficient feed power from being obtained.**
   In this case, lower the sewing speed or help feed the material by hand.

3-6-2. Micro-lifter function

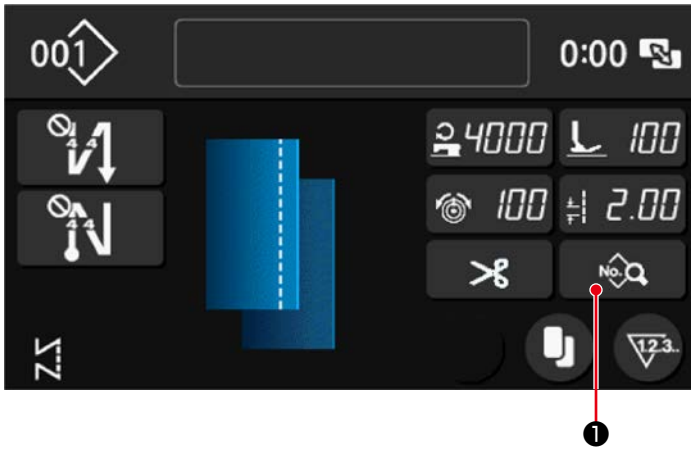
Sewing while lifting the presser foot by very small amount is enabled by inputting a negative value on the panel. The micro-lifter function helps reduce slippage and damage of the material in the case of sewing raised fabric such as velvet.

***1 The presser foot height 0 mm means the state the sole of presser foot comes in contact with the top surface of throat plate.**
***2 The presser foot pressure becomes constant by inputting a negative value on the panel.**
***3 The presser foot pressure varies when the presser foot or the throat plate is changed.**

1. **Be sure to input a positive value on the operation panel in the case the micro-lifter function is not used. If not, the presser foot is slightly raised and the feed dog is unable to provide a sufficient efficiency of feed.**
2. **In the case of using the micro-lifter function, the efficiency of feed is likely to be insufficient. To achieve the sufficient efficiency of feed, reduce the sewing speed or help feed the material by hand.**

3-6-3. Correction of the presser foot pressure

Presser foot pressure can be set according to the sewing speed.
(This adjustment is effective in preventing the presser foot from jumping.)

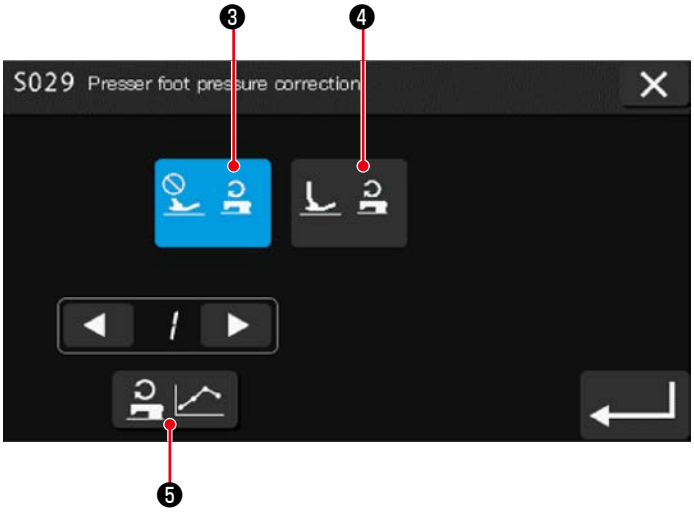


[How to change]

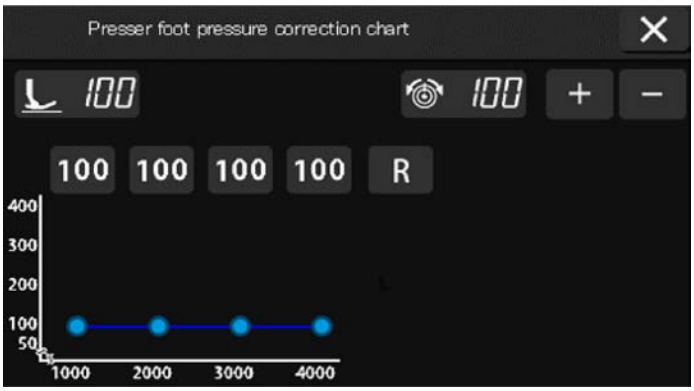
1) Press  ❶ on the first sewing screen.
The "sewing data edit screen" will be displayed.



2) Press  ❷ to display the presser foot presser correction function selection screen.



3) Press  ❹ to select and enable the presser foot pressure correction function.
Press  ❸ do disable the function.
Press  ❺ to display the presser foot pressure correction screen and set the correction amount.

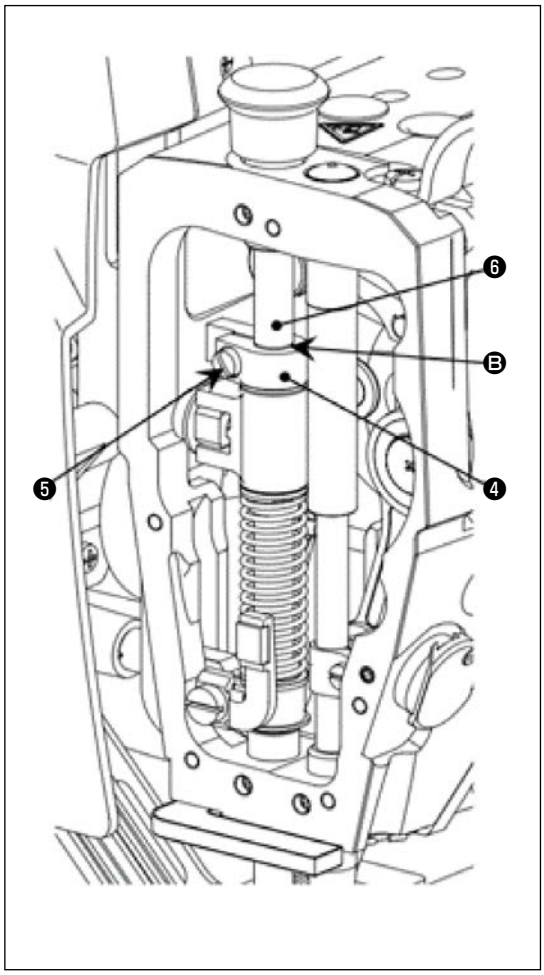


The presser foot pressure can be adjusted based on a reference speed of 1,000 sti/min (100%), allowing changes for 2,000 sti/min, 3,000 sti/min, and 4,000 sti/min.

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

3-6-4. Changing the initial value of presser foot pressure

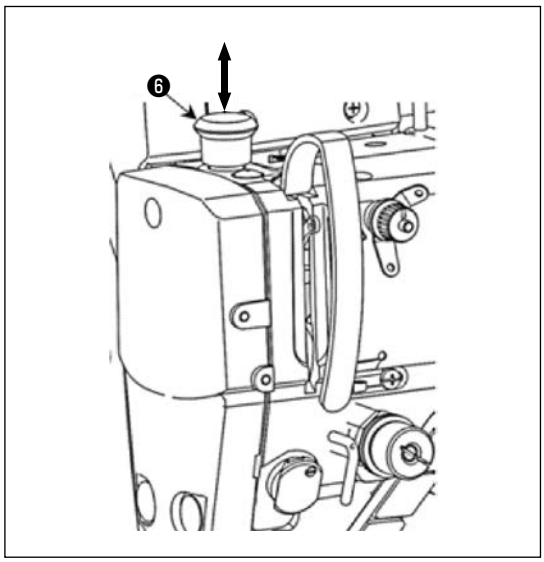
If you want to change the initial value of presser foot pressure, it is possible to change the initial presser foot pressure by changing the mounting position of presser bar position bracket (upper) ❹.
Carry out adjustment according to the sewing process as needed basis.



[How to adjust]

1) Turn OFF the power to the sewing machine.
2) Remove the face plate.
3) Loosen presser bar position bracket (upper) clamping screw ❺. Adjust the vertical position of presser bar position bracket (upper) ❹ using marker line Ⓑ on presser bar ❻ as reference.
   * Adjust the orientation of presser bar position bracket (upper) ❹ so that it is in parallel with the face plate.
4) After the completion of adjustment, tighten presser bar position bracket (upper) clamping screw ❺ and attach the face plate.

Position of presser bar position bracket (upper) ❹ with respect to marker line Ⓑ on presser bar ❻	Presser foot pressure (Reference)
4 mm above	
1 mm above	Approx. 0 N (0 kg)
0 (just beneath the marker line) (Factory-setting at the time of shipment)	Approx. 10 N (1 kg)
1 mm below	Approx. 20 N (2 kg)



3-6-5. Manual lifter

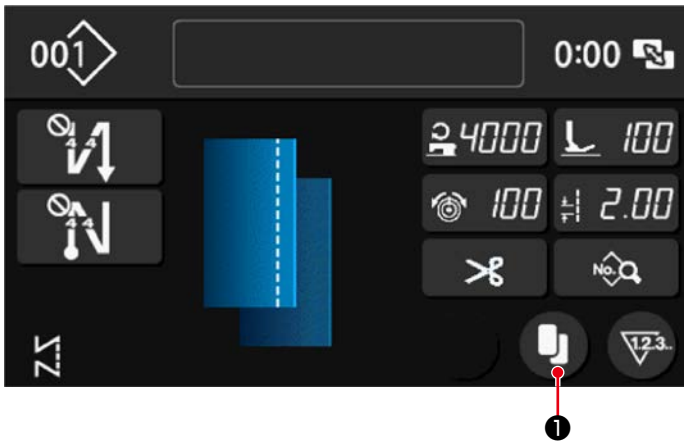
The presser foot can be manually lifted/lowered by moving presser bar cap ❻ up and down while the power to the sewing machine is in the OFF state.
Use this manual lifting feature when replacing the gauge or adjusting the needle entry area.

3-7. Adjusting the stitch length

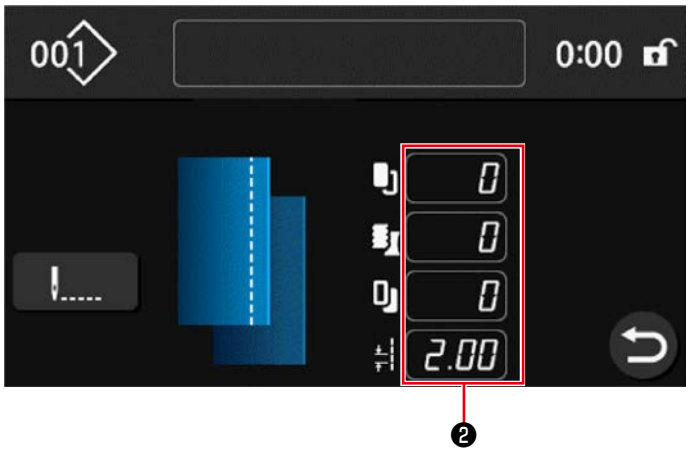
In cases where the machine is used in conditions other than the standard shipping state or with different materials, the feed amount on the operation panel and the actual sewing stitch length may differ. Adjust the stitch length to match the sewing product.

The stitch length and the differential feed amount can be changed on the "second sewing screen (differential feed amount)" .

3-7-1. Second sewing screen (differential feed amount setting)



1) Press ❶.
The "second sewing screen (differential feed amount setting)" will be displayed.



2) Second sewing screen (differential feed amount setting)

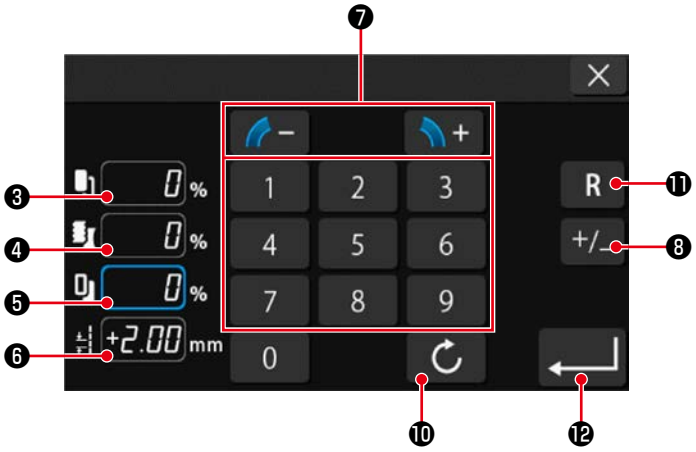
: Displays the magnitude of the top feed differential (%). When the right differential feed is larger, a positive value is displayed; when the left differential feed is larger, a negative value is displayed.
For example, when the setting value is 50%, the left-right feed ratio is 1.0:1.5.

: Displays the magnitude of the vertical feed differential (%). When the top differential feed is larger, a positive value is displayed; when the bottom differential feed is larger, a negative value is displayed.
For example, when the setting value is 50%, the top-bottom feed ratio is 1.5:1.0.

: Displays the magnitude of the bottom feed differential (%). When the right differential feed is larger, a positive value is displayed; when the left differential feed is larger, a negative value is displayed.
For example, when the setting value is 50%, the left-right feed ratio is 1.0:1.5.

: Displays the stitch length (mm).

Press ❷ to display the "differential feed amount change screen".



3) Differential feed amount change screen
On this screen, you can operate the pedal and check the feed amount and differential feed amount you have set.
Based on this setting, the four belt feed amounts are automatically calculated and set.

The display and functions of each button are as follows: Set the differential feed and feed amounts using buttons ❸ to ❻, then depress the pedal to check the operation.

No.	Switch/display	Description
❸	Top feed differential adjustment button	Displays the magnitude of the top feed differential (%). Press the button to select the item (blue frame).
❹	Vertical feed differential adjustment button	Displays the magnitude of the vertical feed differential (%). Press the button to select the item (blue frame).
❺	Bottom feed differential adjustment button	Displays the magnitude of the bottom feed differential (%). Press the button to select the item (blue frame).
❻	Entire feed amount button	Displays the stitch length (mm). Press the button to select the item (blue frame).
❼	+ button, - button	Use these buttons to increase or decrease the value of the selected item by 1.
❽	+/- button	Use this button to invert the sign of the selected item.
❾	Numeric keypad	Use this to change the value of the selected item.
❿	Provisional confirm button	Press the button to perform the feed based on the value changed with the numeric keypad.
⓫	Reset button	Use this button to cancel changes to the selected item
⓬	Enter button	Use this button to confirm the differential feed amount and feed amount settings.

4) Press ↵ ⓬ to confirm the setting.

If the feed amount is automatically calculated from the differential feed amount setting and the belt feed amount exceeds 9.00 mm, a warning screen like the one below will appear.

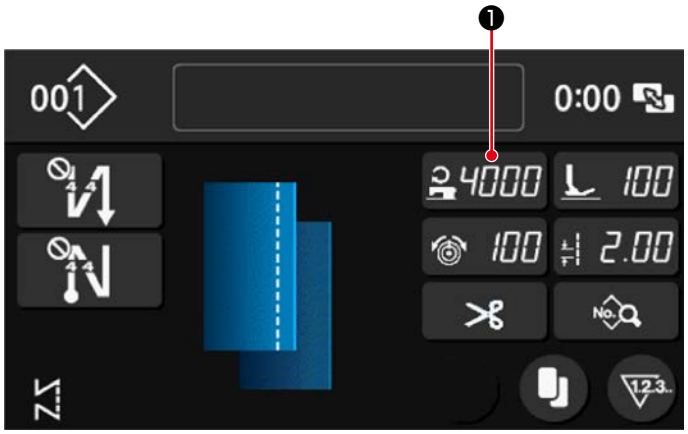


2. 25 : Displays the setting value that keeps the belt feed amount within 9.00 mm. Press the button to confirm the setting with the displayed value.

↵ : Press to confirm the entered value.
*** The feed amount for each belt is limited to a maximum of 9.00 mm.**

// : Press to return to the setting screen.

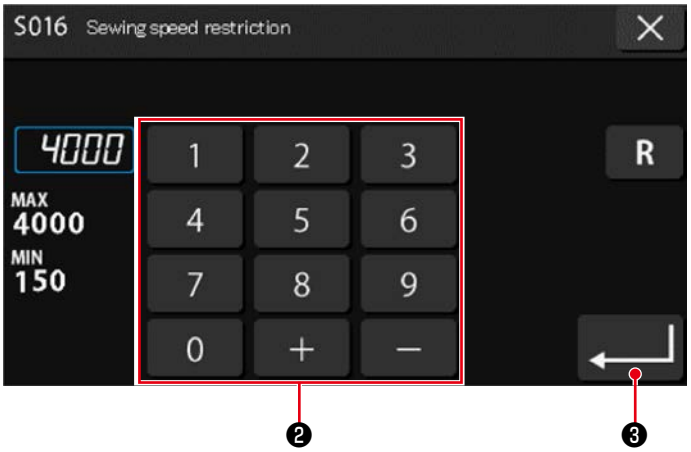
3-8. Changing the sewing speed



The sewing speed setting (sti/min) is displayed on ❶.

[How to change]

1) Press 4000 ❶ to display the sewing speed input screen.

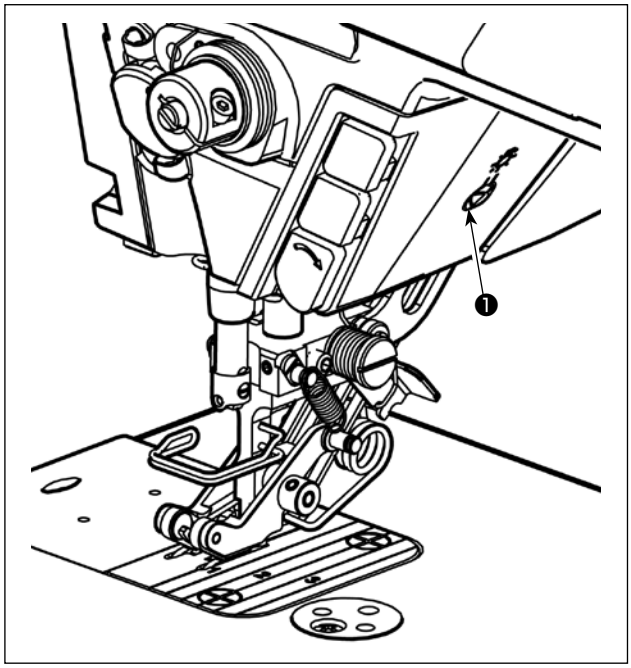


2) Change the sewing speed using the numeric keypad ❷.

3) Press ↵ ❸ to confirm the entered value and return to the sewing screen.

3-9. LED hand light

WARNING :
In order to protect against personal injury due to unexpected start of the sewing machine, never bring hands near the needle entry area or place foot on the pedal during the adjustment of intensity of the LED.



*** This LED is intended to improve operability of the sewing machine and is not intended for maintenance.**

The light intensity can be adjusted and turned off in six steps by pressing switch ❶.

[Change of intensity]

1 ⇒ . . . 5 ⇒ 6 ⇒ 1
Bright ⇒ . . . Dim ⇒ Off ⇒ Bright

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

After pressing and holding switch ❶ for 2 seconds or more, you can switch to color adjustment mode by releasing switch ❶ once and then pressing it again within 2 seconds.
Pressing switch ❶ cycles through 11 levels.

[Color change]

1 ⇒ . . . 10 ⇒ 11 ⇒ 1
Incandescent color 100% ⇒ . . . Incandescent color 10%, White 90% ⇒ White 100% ⇒ Incandescent color 100%

Then, pressing switch ❶ will repeat the cycle.
If switch ❶ is not pressed for 2 seconds, the mode will return to brightness adjustment mode.

3-10. Reverse feed stitching

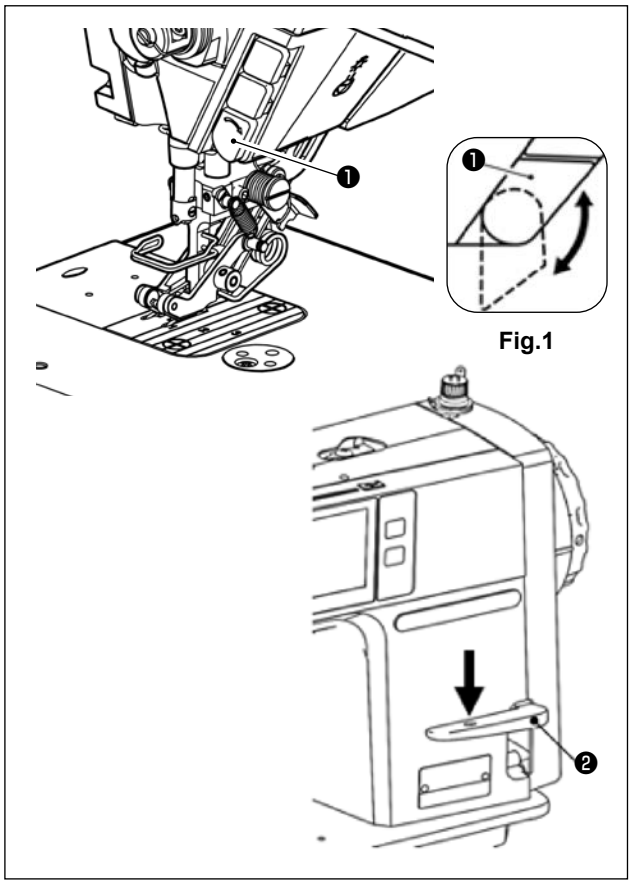


Fig.1

[One-touch type reverse feed stitching mechanism]

The one-touch type reverse feed switch ❶ is pressed, the machine performs reverse feed stitching.
The machine resumes normal feed stitching the moment the switch lever is released.

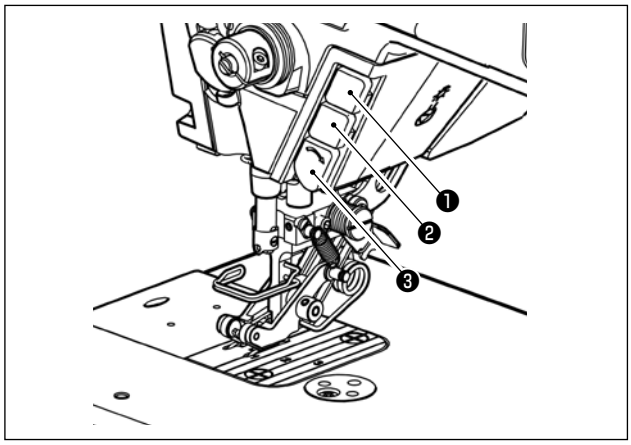
[Reverse feed stitching by means of the reverse feed lever]

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

[Adjusting the position of one-touch type reverse feed switch]

One-touch type reverse feed switch ❶ can be used at two different positions by turning it. (Fig. 1)

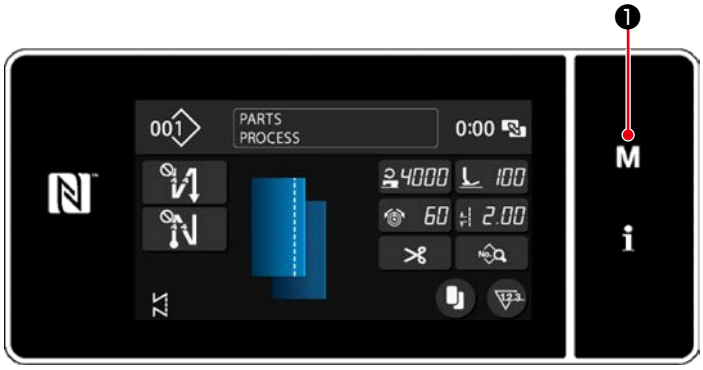
3-11. Custom switch



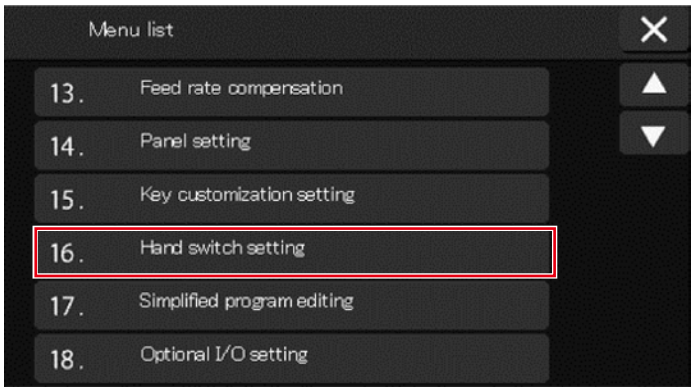
Various functions can be assigned to machine head switches ❶ and ❷, and to hand switch ❸.

The initial values are as follows.

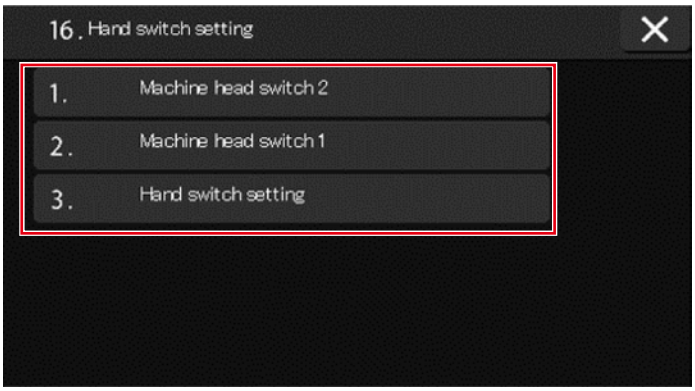
- ❶ Machine head switch 2: One stitch correction switch
- ❷ Machine head switch 1: One-touch change-over switch
- ❸ Hand switch: Reverse feed stitching switch



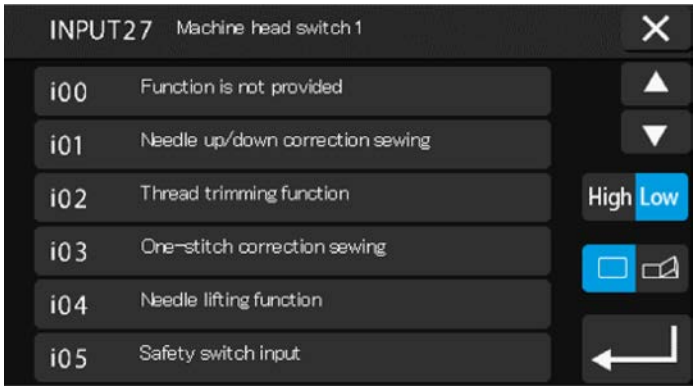
1) Press and hold **M** ❶ for three seconds.



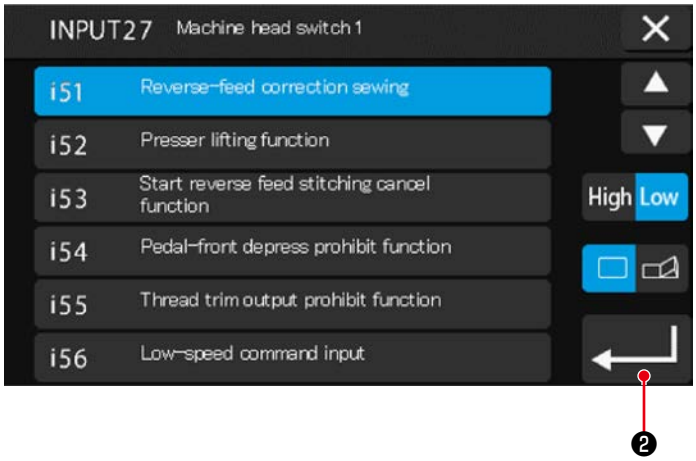
2) Select "16. Hand switch setting".



3) Select the switch to be set.



4) Select the function item to be assigned to the switch, and then select the input signal status (High / Low).



If a function item from i51 or beyond is selected, the operation to be carried out when the button is pressed will be set.

: Function is enabled while the button is held pressed.

: Press the button to enable or disable the function.

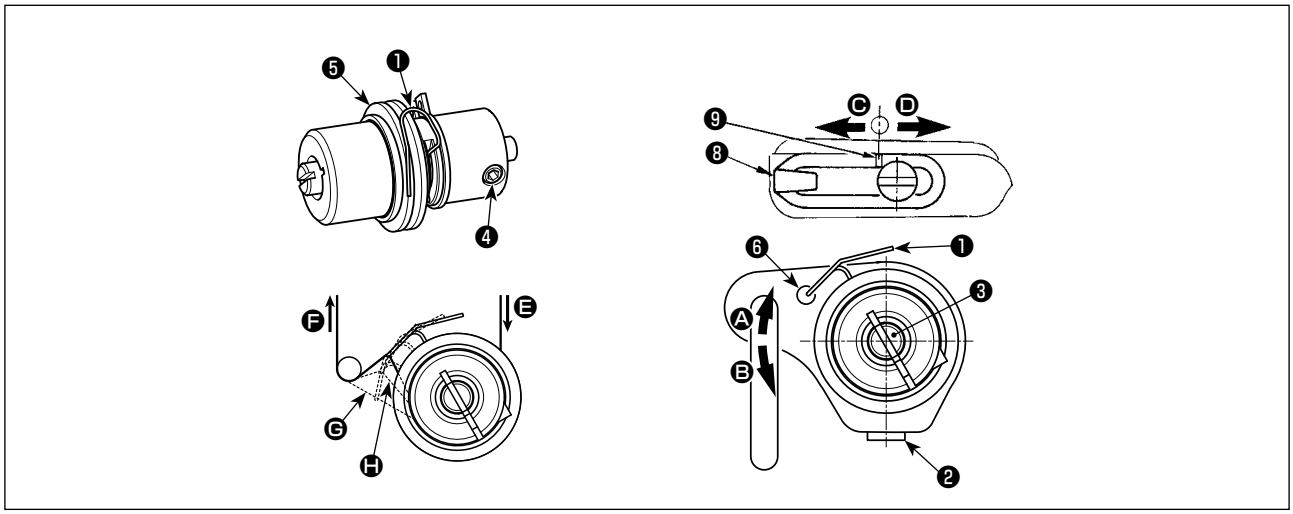
5) Press ❷ to confirm the setting.

[List of custom switch functions]

	Function item
i00	No function set
i01	Needle up/down correction stitching
i02	Thread trimming function
i03	One-stitch correction stitching
i04	Needle lifting function
i05	Safety switch input
i06	Function to cancel one-time reverse feed stitching at the end of sewing
i07	Cancellation/addition of automatic reverse feed stitching
i08	Sewing counter input
i09	One-touch changeover switch
i10	Material edge sensor input
i11	Standby mode

	Function item
i51	Back correction stitch
i52	Presser foot lifting function
i53	Function to cancel reverse feed stitching at both start and end of sewing
i54	Function to prohibit depressing the front part of the pedal
i55	Function to prohibit output of thread trimming
i56	Low-speed command input
i57	High-speed command input
i58	Reverse feed stitching switch input
i59	Soft start sewing speed limit
i60	One-shot sewing speed command
i61	Back one-shot sewing command

3-12. Adjusting the thread take-up spring and the thread take-up stroke



(1) Adjusting the stroke of thread take-up spring ❶

1) Loosen setscrew ❷.
2) Turn tension post ❸ clockwise (in direction Ⓐ), the stroke of the thread take-up spring will be increased, and turn the post ❸ counterclockwise (in direction Ⓑ), the stroke will be decreased.

(2) Adjusting the pressure of thread take-up spring ❶

1) Loosen setscrew ❷, and remove thread tension (asm.) ❺.
2) Loosen tension post setscrew ❹.
3) Turn tension post ❸ clockwise (in direction Ⓐ), the pressure will be increased, and turn the post ❸ counterclockwise (in direction Ⓑ), the pressure will be decreased.

*** Standard state of the thread take-up spring ❶**

The engraved marker line ❻ on the machine arm is almost aligned with the top of thread take-up spring. (It is necessary to adjust in accordance with materials and processes.)



To check how the thread take-up spring works, draw out the needle thread in direction Ⓕ after having adjusted the thread take-up spring pressure to check whether the thread take-up spring exerts force to the thread up to the last moment (state Ⓖ) just before the thread comes out from Ⓔ. If the spring fails to exert force to the spring until the last moment (state Ⓗ), decrease the thread take-up spring pressure. In addition, the stroke of the thread take-up spring is excessively small, the spring does not work properly. For the general fabrics, a stroke of 10 to 13 mm is proper.

(3) Adjusting the thread take-up stroke

1) When sewing heavy-weight materials, move thread guide ❽ 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 ❽ to the right (in direction Ⓓ) to decrease the length of thread pulled out by the thread take-up.

*** Standard state of the thread guide**

Marker line ❾ on the thread guide aligns with the center of the marker line on the machine arm.

4. HOW TO USE THE OPERATION PANEL

4-1. Explanation of the sewing screen (when selecting a sewing pattern)

On the sewing screen, the shape and set values of the currently-sewn sewing pattern are displayed.
The display and button operation differ according to the selected sewing pattern.
The display includes the first sewing screen for the standard display, the second for adjusting the differential feed amount, and the counter screen for displaying the counter.

- For details on the counter display, refer to **"4-7. Counter function" p. 75**.
- For detail on the second sewing screen display, refer to **"2-18-2. Second sewing screen" p. 21**.

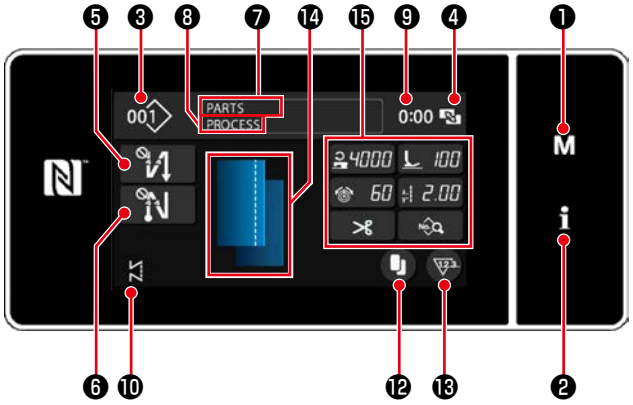
The first sewing screen has two display modes: <Standard image display> and <Sewing machine image display>. You can switch between these modes using the "mode changeover button" on the first sewing screen. The screen display mode can also be changed via the memory switch "U400 Panel operation mode". For details, refer to **"4-9. List of memory switch data" p. 82**.

For the simple lock function, press **M** ❶ and **i** ❷ simultaneously to enable or disable the panel operation.

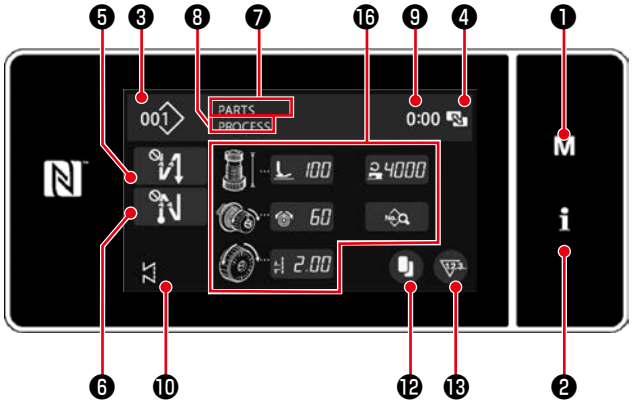
(1) Sewing screen (when selecting a sewing pattern)

A sewing pattern can be selected with ❸ . Four different stitch shapes are available as shown below.

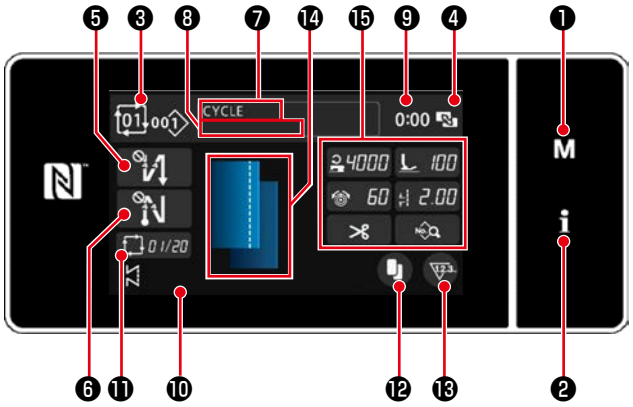
<First sewing screen (standard image display)>



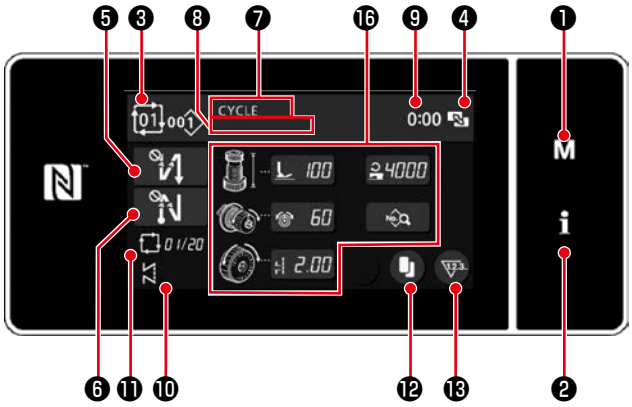
<First sewing screen (sewing machine image display)>



<First sewing screen (cycle sewing display)>

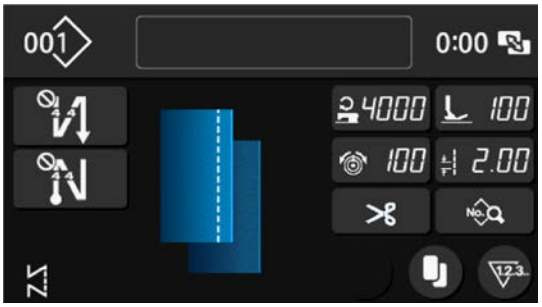


<First sewing screen
(cycle sewing and sewing machine image display)>

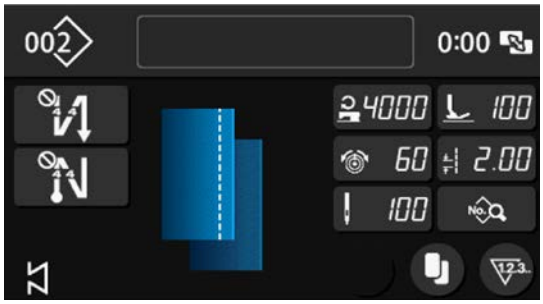


4-2. First sewing screen by pattern shape (standard image display)

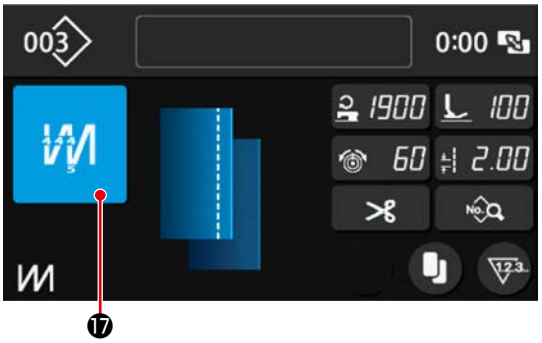
Free stitching pattern
(standard image display)



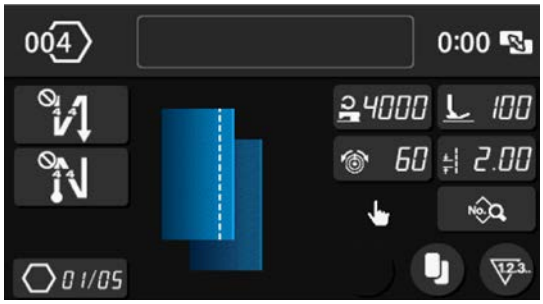
Constant-dimension sewing pattern
(standard image display)



Multi-layer stitching pattern
(standard image display)



Polygonal-shape stitching pattern
(standard image display)



4-3. First sewing screen by pattern shape (sewing machine image display)

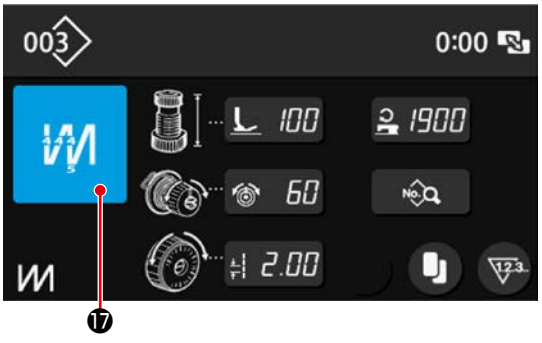
Free stitching pattern
(sewing machine image display)



Constant-dimension sewing pattern
(sewing machine image display)



Multi-layer stitching pattern
(sewing machine image display)



Polygonal-shape stitching pattern
(sewing machine image display)



No.	Switch/display	Description
❶	Mode key	This switch is used for displaying the menu screen. Press simultaneously with the Information key to enable or disable on-screen button operations.
❷	Information key	This switch is used for displaying the information screen. Press simultaneously with the Mode key to enable or disable on-screen button operations.
❸	Sewing pattern No. button	Sewing pattern list screen is displayed. The currently-selected sewing pattern number is displayed on this button.
❹	Mode changeover button	Press to switch the first sewing screen between <Standard image display> and <Sewing machine image display>. When the simple lock is enabled, the lock icon is displayed; when it is disabled, the mode switch icon is displayed. Locked:  Unlocked:  * When the simple lock is activated, panel operation is disabled. * The mode changeover function is only available on the first sewing screen. The other sewing screens will only display the lock status.
❺	Sewing-start reverse-feed stitch button	Enables or disables reverse feed stitching at the start of sewing for the sewing pattern displayed. When enabled, the button turns blue. When reverse feed stitching at the start of sewing is OFF, a "prohibited mark " is displayed in the upper left of the icon. The reverse feed stitching (at start) edit screen is displayed by keeping this key held pressed for one second. →This button is displayed for free stitching, constant-dimension sewing or polygonal-shape stitching.
❻	Sewing-end reverse-feed stitch button	Enables or disables reverse feed stitching at the end of sewing for the sewing pattern displayed. When enabled, the button turns blue. When reverse feed stitching at the end of sewing is OFF, a "prohibited mark " is displayed in the upper left of the icon. The reverse feed stitching (at end) edit screen is displayed by keeping this key held pressed for one second. →This button is displayed for free stitching, constant-dimension sewing or polygonal-shape stitching.
❼	Part number	The part number is displayed in this field. The number of characters that can be entered for a part number is 24. Up to 19 characters can be displayed on the upper portion of the operation panel.
❽	Process/comment	Depending on the setting of memory switch U404, the process or comment is displayed in this field. The number of characters that can be entered for a process is 24. Up to 19 characters can be displayed on the upper portion of the operation panel. The number of characters that can be entered for a comment is 50. Up to 37 characters can be displayed on the upper portion of the operation panel. * For the cycle sewing, only comments can be entered.

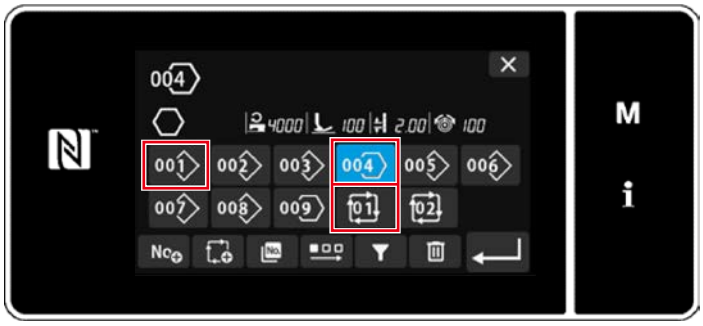
No.	Switch/display	Description
❾	Clock display	The time set on the sewing machine is displayed in this field in 24-hour system.
❿ *1	Polygonal-shape stitching step edit/Sewing shape button	Displays the selected sewing shape. For polygonal-shape stitching, the step edit screen for polygonal-shape stitching is displayed. For polygonal-shape stitching, the "current step number/total number of steps" (1 to 30 for polygonal-shape stitching) is displayed, and when you press the button, the step edit screen appears. Four types of sewing patterns are available: free sewing pattern, constant-dimension sewing pattern, multi-layer stitching pattern, and polygonal-shape stitching pattern.
⓫ *2	Cycle sewing step edit button	The button is displayed when the selected sewing pattern is a cycle sewing pattern. If it is not a cycle sewing pattern, the button and image are not displayed. The "current step number/total number of steps" for cycle sewing (1 to 20 for cycle sewing) is displayed. When the button is pressed, the step edit screen for the cycle sewing pattern is displayed.
⓬	Button to switch to the second sewing screen	Press the button to switch to the second sewing screen (differential feed amount setting). For details on screen operations, refer to **"3-7-1. Second sewing screen (differential feed amount setting)" p. 37**.
⓭	Button to change to the counter screen	Press the button to switch to the counter screen. For details on screen operations, refer to **"4-7. Counter function" p. 75**.
⓮	Shape display	Displays the finished sewing shape of the selected pattern. Press the button to switch to the second sewing screen (differential feed amount setting).
⓯	Customization button	This button allows you to assign and register functions. Refer to **"4-4-6. List of pattern functions" p. 62**.
⓰	Sewing machine image screen parameters 1 to 5	Displays fixed parameters according to the image.
⓱	Multi-layer stitching button	Press the button to display the multi-layer stitching setting screen. Refer to **"4-4-5. Editing sewing patterns" p. 57**. → This button is displayed when multi-layer stitching is selected.

***1 Only during polygonal-shape stitching**

***2 Only during cycle sewing**

4-4. Sewing patterns

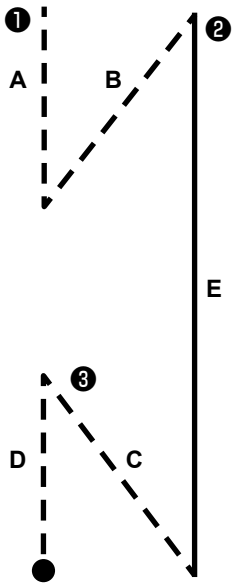
Sewing settings that are frequently used can be registered as sewing patterns.
Once the patterns are registered as sewing patterns, the desired sewing pattern can be called up only by selecting its sewing pattern number.
As many as 99 different patterns can be registered as sewing patterns.
The registered patterns are displayed on the "sewing pattern number list screen".
The <sewing pattern number list screen> is displayed as follows, depending on the sewing shape of the registered pattern.



Sewing shape	Display
Free stitching Constant-dimension sewing Multi-layer stitching	
Polygonal-shape stitching	
Cycle sewing	

4-4-1. Sewing pattern configuration

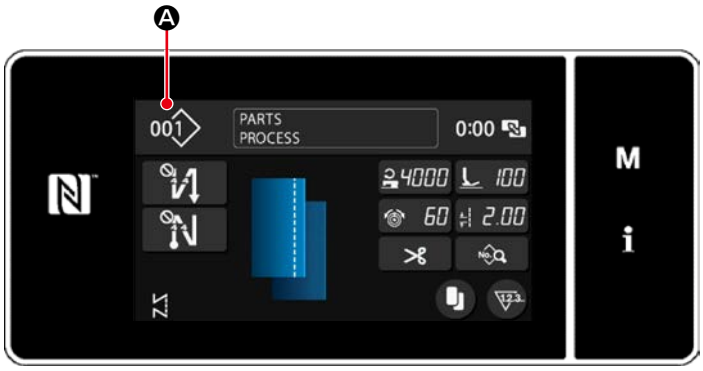
One sewing pattern consists of four elements, i.e., reverse feed stitching (at start), main stitching, reverse feed stitching (at end) and pattern function.



No.	Pattern No. 1 - No. 99
❶	Reverse feed stitching (at start) section Refer to **"4-4-3. Sewing-start reverse feed stitching pattern" p. 51**.
❷	Main stitching section · Free stitching · Constant-dimension sewing · Multi-layer stitching · Polygonal-shape stitching Refer to **"4-4-5. Editing sewing patterns" p. 57** and **"8. SETTING UP THE POLYGONAL-SHAPE STITCHING" p. 126**.
❸	Reverse feed stitching (at end) section Refer to **"4-4-4. Sewing-end reverse feed stitching pattern" p. 56**.
❹	Pattern function Refer to **"4-4-5. Editing sewing patterns" p. 57**.

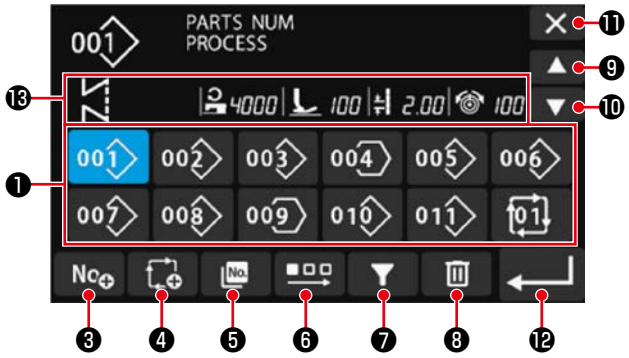
4-4-2. List of sewing patterns

The list of stored sewing patterns are displayed on the screen.You can perform operations such as creating new, copying, deleting, sorting, and filtering patterns.

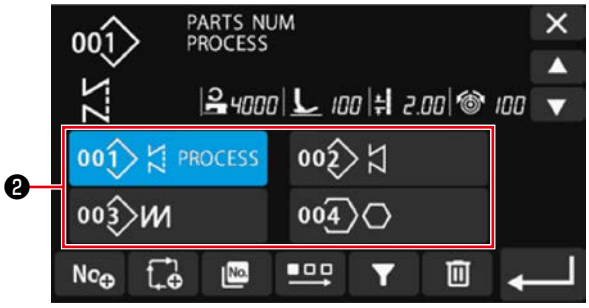


Press 001 Ⓐ on each sewing screen.

The "sewing pattern number list screen" will be displayed.



<Standard display>



<Sorting display>

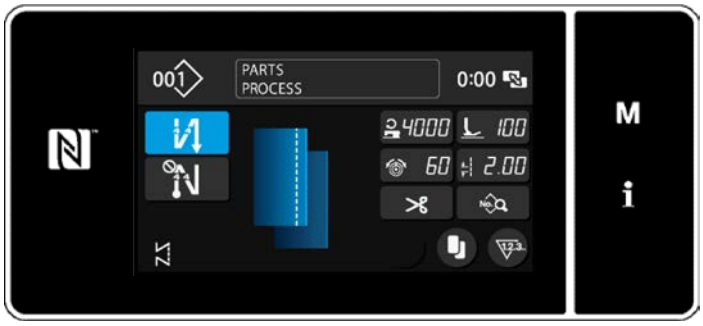
No.	Switch/display	Description
❶	Pattern No. button	This button is used for displaying numbers of the registered sewing patterns and cycle patterns. (Sewing pattern or cycle pattern numbers that are not registered are not displayed.) When this button is pressed, the sewing pattern is put into the selected state. Display range: Sewing pattern numbers 1 to 99 and cycle patterns 1 to 20.
❷	Pattern No. button (Sorting display)	Sewing pattern is displayed and the pattern is put into the selected state by pressing this button.
❸	Sewing pattern New creation button	Creates a new sewing pattern. Refer to **"7-1. Creating a new sewing pattern" p. 115** for details.
❹	Cycle pattern New creation button	Creates a new cycle pattern. Refer to **"9. CYCLE PATTERN" p. 131** for details.
❺	Pattern copy button	This button copies a sewing pattern or cycle pattern and registers the copied pattern with a new number. Refer to **"7-2. Copying a sewing pattern" p. 123** for details.

No.	Switch/display	Description
❻	Sorting button	This button sorts the registered patterns by sewing pattern number, process, part number, or comment. Pattern number display range: Sewing patterns 1 to 99 and cycle patterns 1 to 20 Character registration display range: Sewing patterns 1 to 99
❼	Filter button	Displays the filter condition setting screen.
❽	Pattern delete button	Displays a confirmation message for pattern deletion. If only one pattern is registered, it cannot be deleted. * The first sewing screen is displayed only in the standard image display.
❾	Scroll (up) button	This button is used for displaying the previous page.
❿	Scroll (down) button	This button is used for displaying the next page.
⓫	Close button	This button is used for cancelling the selected pattern and displaying the sewing screen.
⓬	Enter button	This button is used for confirming the selected pattern and displaying the sewing screen.
⓭	Display of pattern data being selected	This button is used for displaying data on the pattern that is being selected.

4-4-3. Sewing-start reverse feed stitching pattern

The sewing-start reverse feed stitching pattern is set as described below.

(1) Enabling the reverse feed stitching (at start) pattern

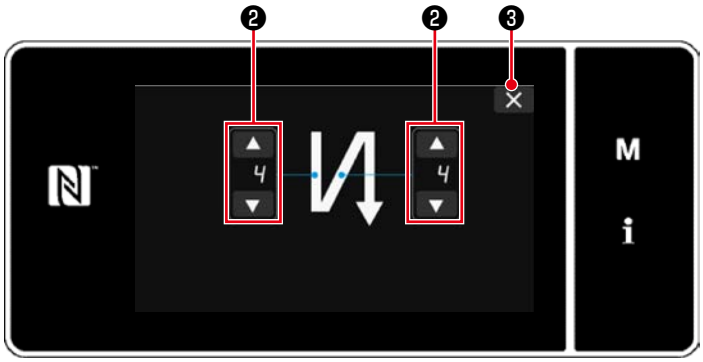


The sewing-start reverse feed stitching pattern can be operated when the sewing-start reverse feed stitching function is placed in the ON state (the button is blue).
If this function is placed in the OFF state, press the sewing start reverse feed stitch button to switch off mark display to enable the sewing-start reverse feed stitching function.

(2) Changing the number of stitches and stitch length of a sewing-start reverse feed stitching pattern



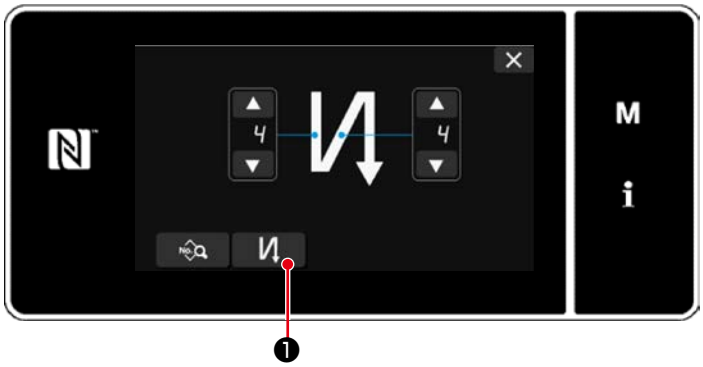
❶ held pressed for one second.
The "sewing-start reverse feed stitching edit screen" is displayed.



Change the number of reverse feed stitches using ❷. Press ❸ to confirm the entered value and return to the "sewing screen".

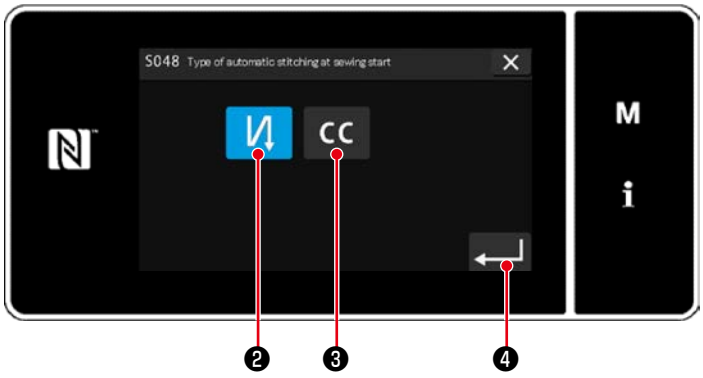
<Sewing-start reverse feed stitching edit screen (sewing machine image display)>

① **Selecting the type of reverse feed stitching at the start of sewing (Displayed only when the first sewing screen is in the standard image display)**



<Sewing-start reverse feed stitching edit screen (standard image display)>

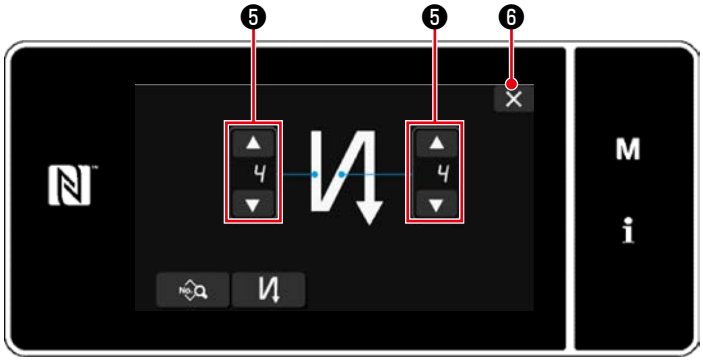
1) On the first sewing screen (standard image display), press and hold for 1 second.
2) Press ❶ to display the "type of reverse feed stitching input screen".



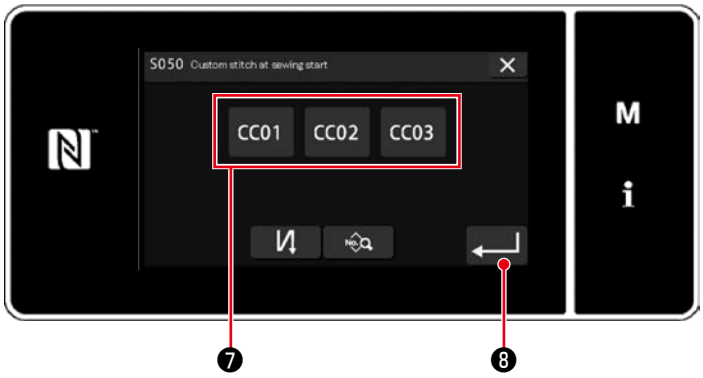
<Type of reverse feed stitching input screen>

3) Set the reverse feed stitching at the start of sewing.
Choose from two types of sewing-start reverse-stitching patterns:
· Standard reverse feed stitching ❷
· Condensation custom ❸
Press ❹ to confirm the operation and return to the "sewing-start reverse feed stitching edit screen".

② **Setting the sewing-start reverse feed stitching pattern**



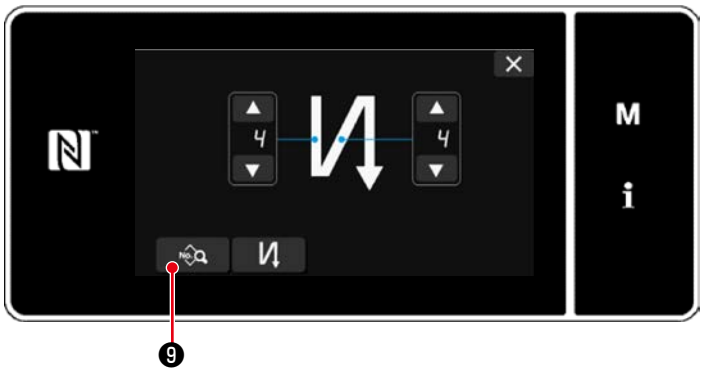
· If standard reverse feed stitching ❷ is selected, change the number of reverse feed stitches using ❺. Press ❻ to confirm the entered value and return to the "sewing screen".



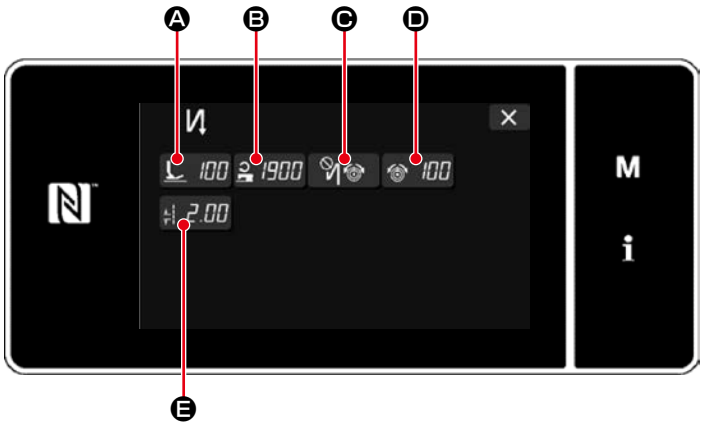
· If condensation custom ❸ is selected:
Press the ❼ to select the condensation custom pattern.
Press ❽ to confirm the operation and return to the "sewing-start reverse feed stitching screen".

* For details on condensation custom pattern, refer to **"9-6. Condensation custom pattern" p.141**.

③ Editing the data for reverse feed stitching at the start of sewing



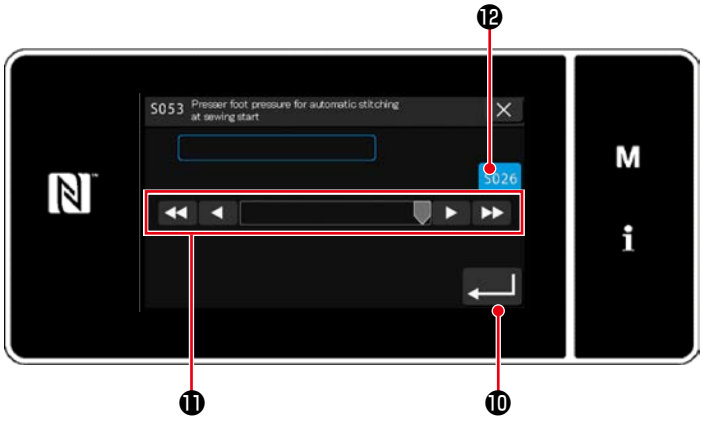
1) When [NO.Q] ❾ is pressed on the sewing-start reverse feed stitching screen, the "sewing-start reverse feed stitching edit screen" is displayed.



<Sewing-start reverse feed stitching data edit screen>

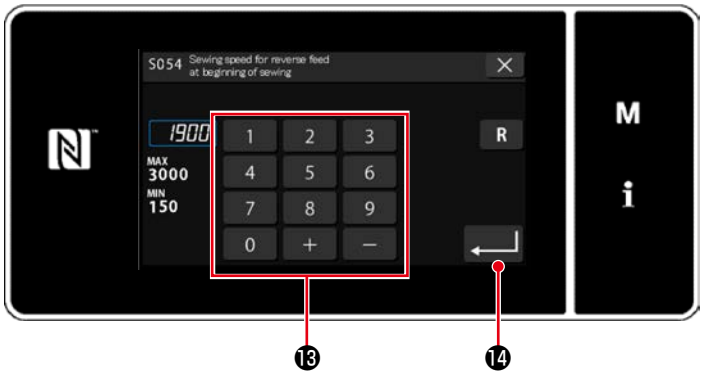
The parameters that can be set for reverse feed stitching at the start of sewing are:

- Sewing-start presser foot pressure setting(❹)
- Sewing-start reverse feed stitching speed input (❸)
- Sewing-start common needle thread tension setting(❷)
- Sewing-start needle thread tension setting(❶)
- Sewing-start feed amount input(❺)



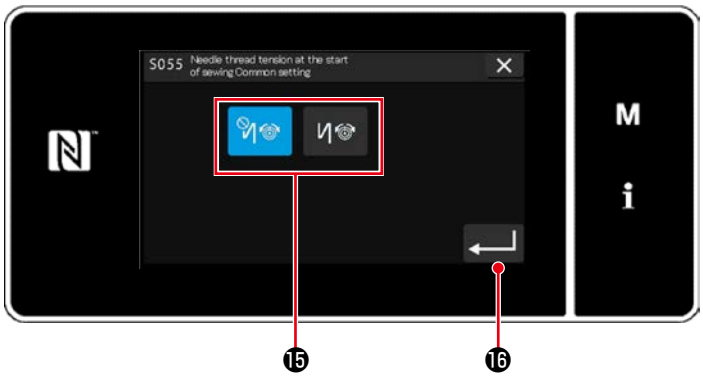
- **Sewing-start presser foot pressure setting (❹)** [100]

1) Press ❹ to display the "sewing-start presser foot pressure input screen".
2) Enter the presser foot pressure using button ⓫ .
   Input range: -20 to 200
3) When button ⓬ is selected, no value is displayed because a common presser foot pressure is used.
4) Press [↵] ⓫ to confirm the entered value and return to the "sewing-start reverse feed stitching data edit screen".



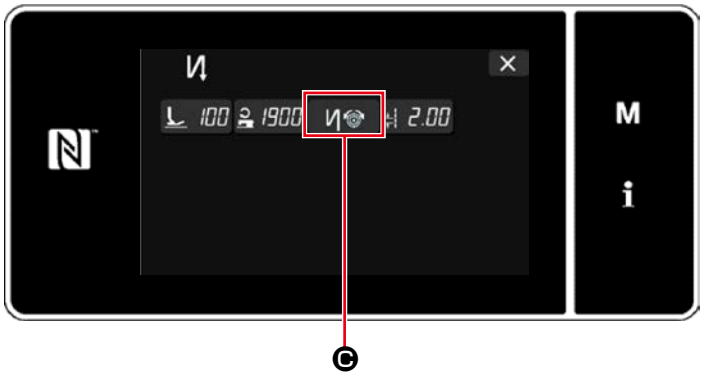
・Sewing-start reverse feed stitching speed input (Ⓑ) 1900

1) Press Ⓑ to display the "sewing-start reverse feed stitching speed input screen".
2) Enter the sewing speed using the numeric keypad ⓭ . Input range: 150 to 3000
3) Press ↵ ⓮ to confirm the entered value and return to the "sewing-start reverse feed stitching data edit screen".



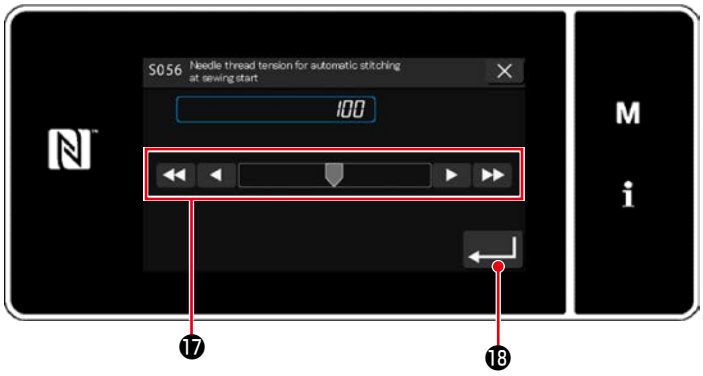
・Sewing-start common needle thread tension setting(Ⓒ)

1) Press Ⓒ to display the "sewing-start common needle thread tension setting screen".
2) Use button ⓯ to select the status (enabled/disabled) of the needle thread tension common setting function.
3) Press ↵ ⓰ to confirm the entered value and return to the "sewing-start reverse feed stitching data edit screen".



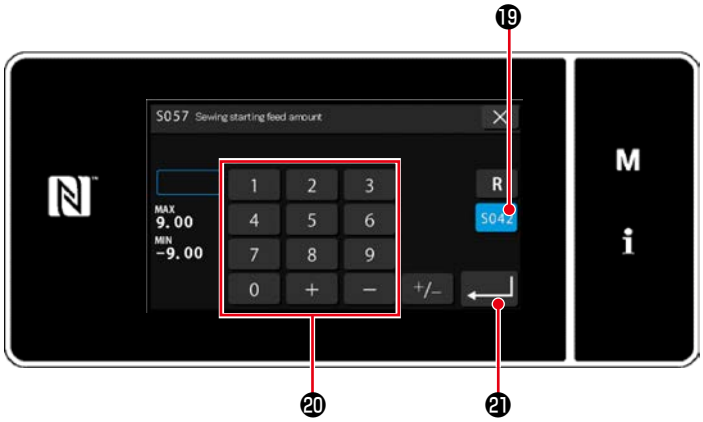
* If the function is enabled in step 2), the "sewing-start needle thread tension setting" button Ⓓ will not be displayed on the "sewing-start reverse feed stitching data edit screen".

* If the function is disabled in step 2), the "sewing-start needle thread tension setting" button will be displayed on the "sewing-start reverse feed stitching data edit screen".



・Sewing-start needle thread tension setting (Ⓓ) 100

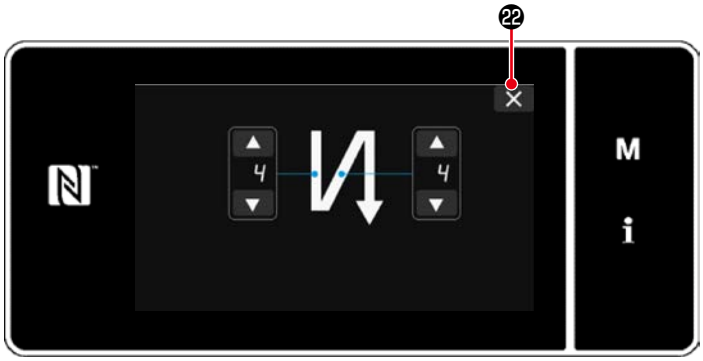
1) Press Ⓓ to display the "sewing-start needle thread tension input screen".
2) Enter the sewing-start needle thread tension using button ⓱ . Input range: 0 to 200
3) Press ↵ ⓲ to confirm the entered value and return to the "sewing-start reverse feed stitching data edit screen".



・Sewing-start feed amount input (Ⓔ) 100

1) Press Ⓔ to display the "sewing-start feed amount input screen".
2) Press button ⓳ to enable the sewing-start feed amount input.
3) Enter the sewing-start feed amount using the numeric keypad ⓴ . Input range: -9.00 to 9.00
   When button ⓳ is selected, the stitch length will be set to the one used for the main sewing section.
4) Press ↵ ㉑ to confirm the entered value and return to the "sewing-start reverse feed stitching data edit screen".

④ Applying the changed items



<Sewing-start reverse feed stitching edit screen (standard display mode)>

Press ✕ ㉒ to confirm the entered value and return to the "sewing screen".

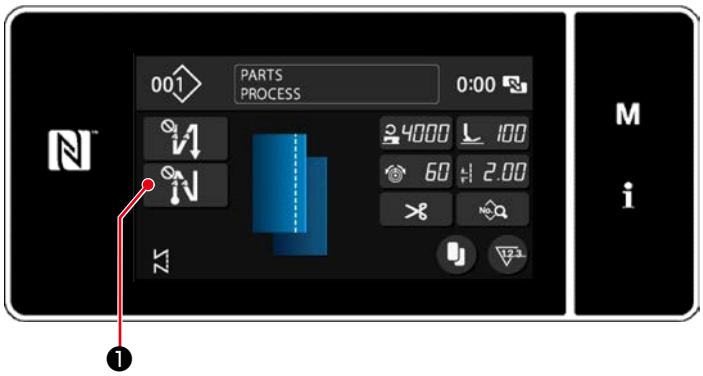
4-4-4. Sewing-end reverse feed stitching pattern

A sewing-end reverse feed stitching pattern is set as described below.

(1) Enabling the sewing-end reverse feed stitching pattern

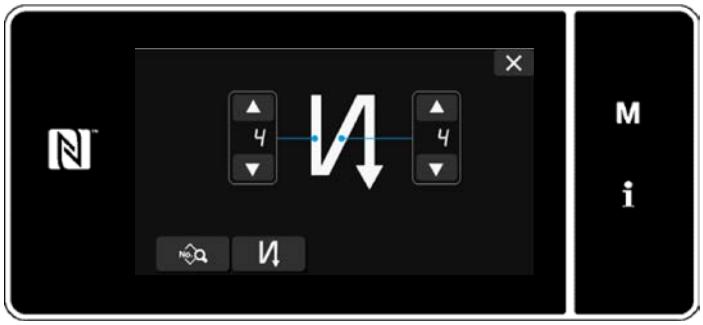
Refer to **"4-4-3. Sewing-start reverse feed stitching pattern" p. 51**.

(2) Changing the number of stitches and stitch length of a sewing-start reverse feed stitching pattern



❶ held pressed for one second.

The "sewing-end reverse feed stitching edit screen" will be displayed.



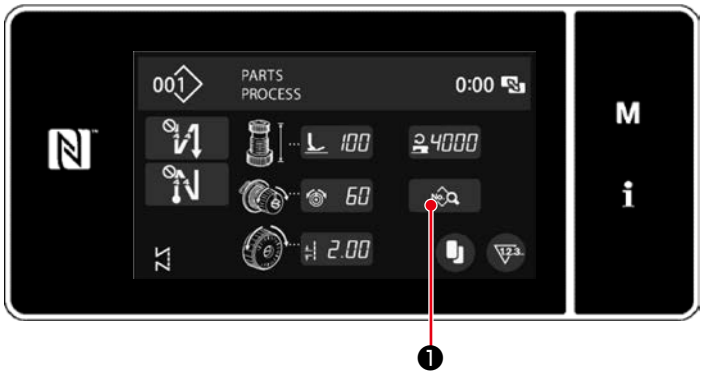
<Sewing-end reverse feed stitching edit screen>

* From the next item number and beyond, set the function items in the same manner as the functions for sewing-start reverse feed stitching. (Refer to **"4-4-3. Sewing-start reverse feed stitching pattern" p. 51**.)

4-4-5. Editing sewing patterns

(1) Edit method (when free stitching, constant-dimension sewing, or multi-layer stitching is selected)

* When polygonal-shape stitching is selected, refer to **"8. SETTING UP THE POLYGONAL-SHAPE STITCHING" p. 126** for details on how to edit it.

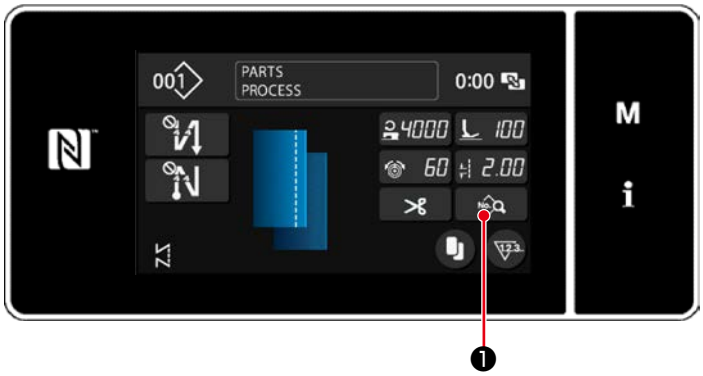


<First sewing screen (sewing machine image display)>

① Displaying the sewing data edit screen

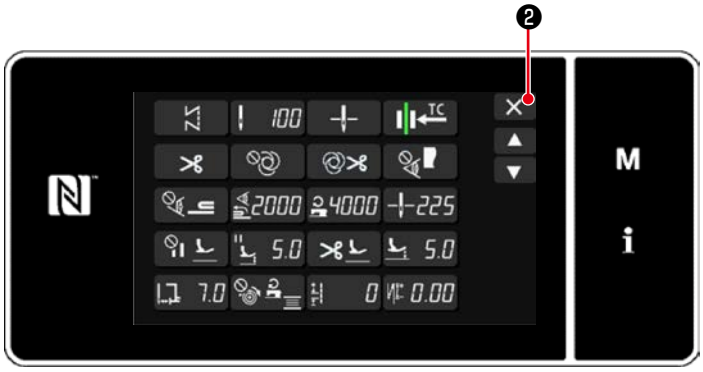
On the first sewing screen (sewing machine image display, standard image display), press [No.] ❶.

The "sewing data edit screen" will be displayed.



<First sewing screen (standard image display)>

* From the next item number and beyond, set the function items in the same manner as the functions for sewing-start reverse feed stitching. (Refer to **"4-4-3. Sewing-start reverse feed stitching pattern" p. 51**.)



<Sewing data edit screen>

② Editing a sewing pattern

On this screen, the pattern functions can be edited individually.

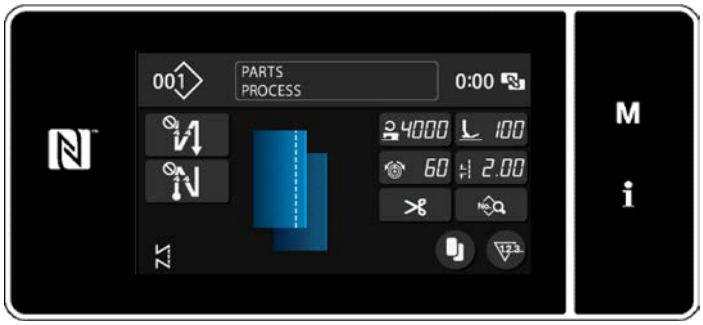
For details on the function items that can be edited, refer to **"4-4-6. List of pattern functions" p. 62**.

Change each desired item and press [↵] to confirm the changes.

Press [×] ❷ to display the "sewing screen".



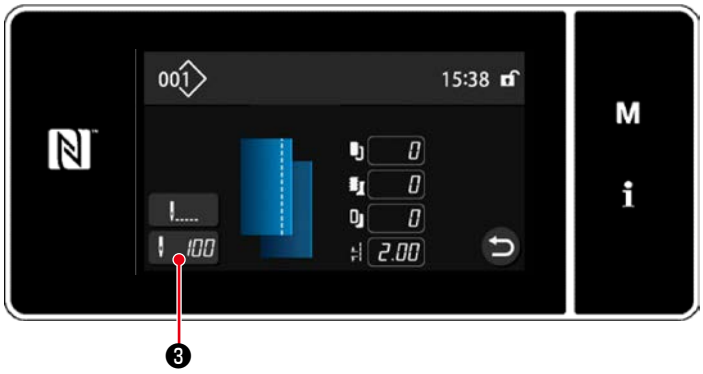
<Sewing data edit screen>



<First sewing screen(standard display mode)>

③ **Editing the data for reverse feed stitching at the start of sewing**

The changes you made are displayed on the screen.

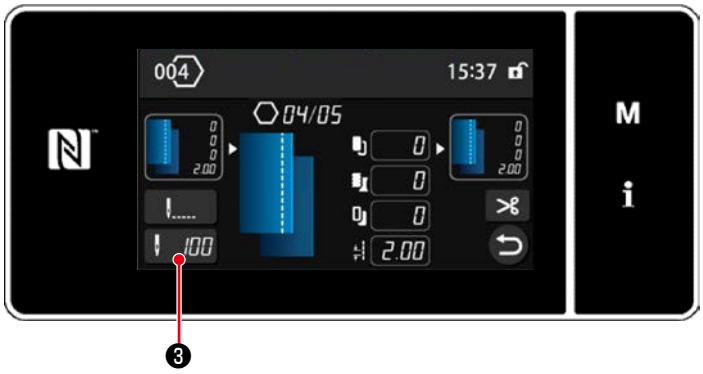


<Second sewing screen (differential feed amount setting) Constant-dimension sewing>

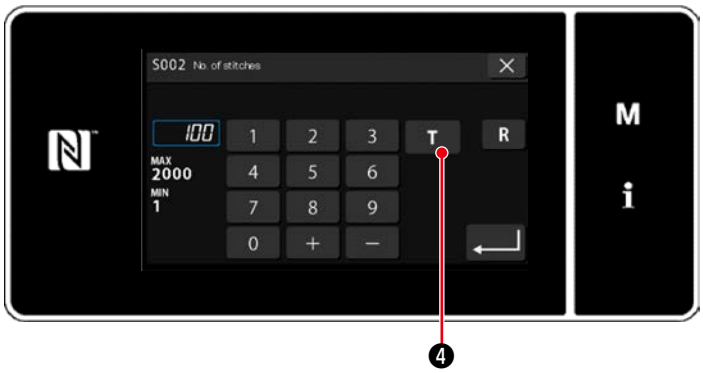
* **When the number of stitches is set (constant-dimension sewing, polygonal-shape stitching)**

The number of stitches can be set for constant-dimension sewing and polygonal-shape stitching.

When setting the operation switch by the number of stitches, pressing  ❸ will display the "number of stitches input screen".

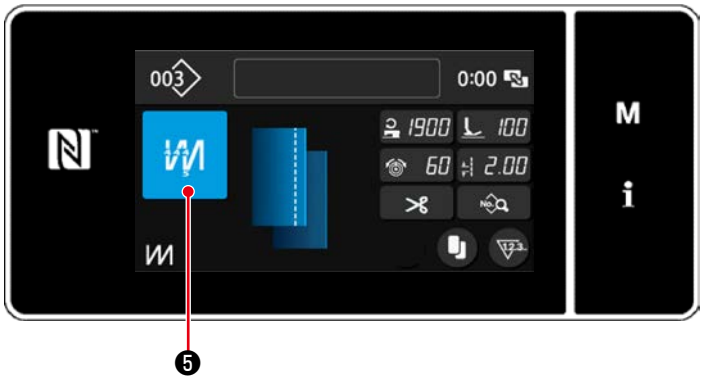


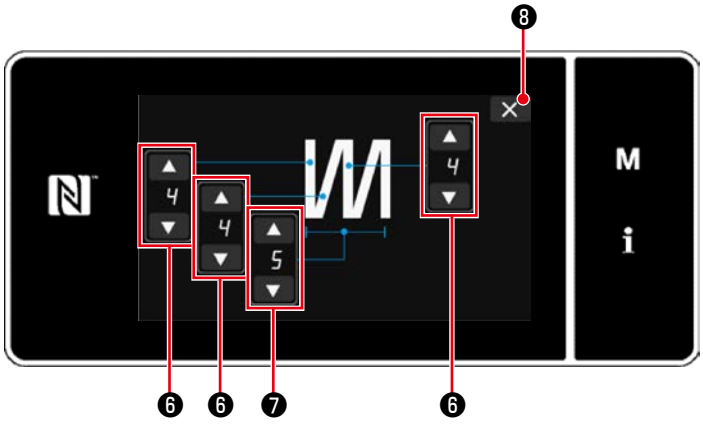
<Second sewing screen (differential feed amount setting) Polygonal-shape stitching>



Press button ❹ to turn the teaching function ON.

For details on the teaching function, refer to **"4-5. Teaching function" p. 69**.





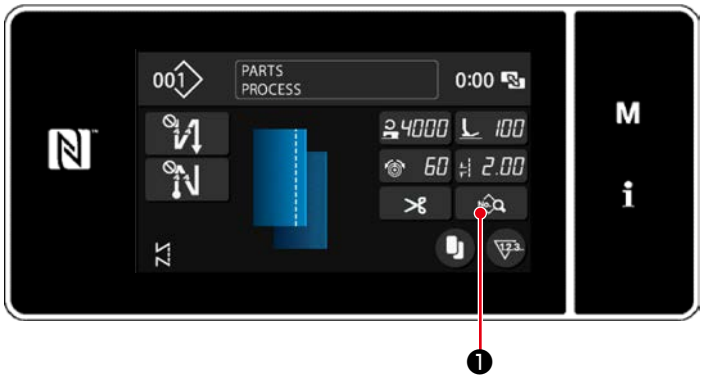
* When ❺ is pressed with a multi-layer stitching pattern selected, the "multi-layer stitching edit screen" will be displayed.

1) Set the number of stitches using ▲▼ ❻.
2) Set the number of times for the multi-layer stitching using ▲▼ ❼.
3) Press ✕ ❽ to confirm the set value and return to the "sewing screen".

(2) Adjusting the lower stop position

* When polygonal-shape stitching is selected, refer to **"8. SETTING UP THE POLYGONAL-SHAPE STITCHING" p. 126** for details on how to edit it.

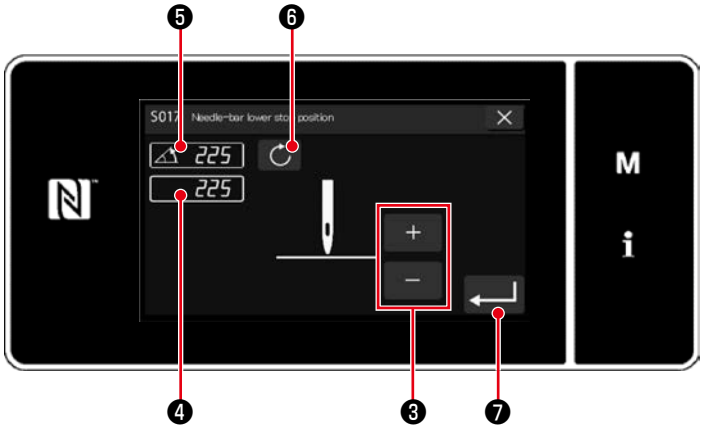
WARNING :
The needle bar moves during the adjustment of this item. Be careful not to place your fingers under the needle.



1) Press ⚙ ❶ on the sewing screen in maintenance personnel mode.



2) Press -225 ❷.
The "needle bar lower stop position setting screen" will be displayed.



3) Adjust the lower stop position of the needle bar following the two different adjustment methods described below.

[Adjustment with the +/- key]

Set the lower stop position of the needle bar using + / − ❸. (The value displayed on ❹ will change accordingly.)

[Adjustment with the main shaft angle]

Adjust the position of the needle bar by turning the pulley.

(The value displayed on ❺ will change accordingly.)

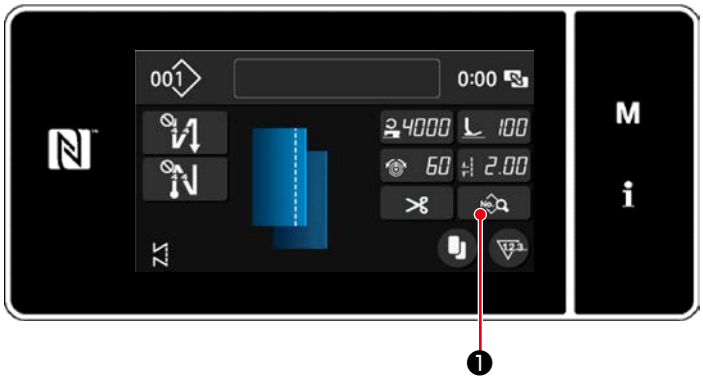
Press ↻ ❻ to apply the adjustment value to ❹.

Press ↵ ❼ to confirm the operation and return to the "sewing data edit screen".

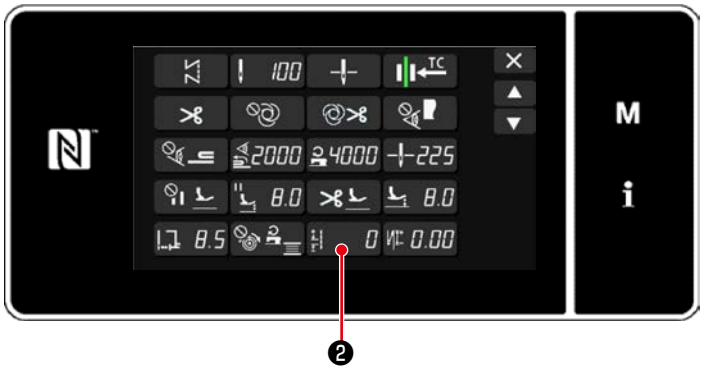
(3) Feed amount correction

You can correct the deviation between the set feed amount and the actual stitch length.

WARNING :
Be aware that the machine will automatically perform free stitching when the pedal is operated to allow for adjustment confirmation.
The operation speed will follow the sewing speed set in the pattern.

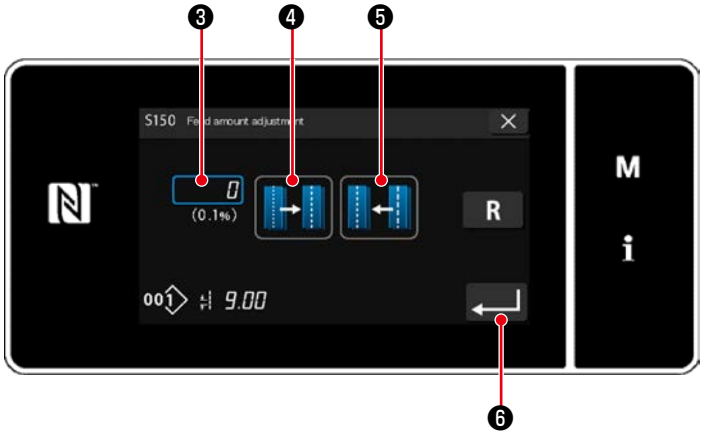


1) Press ❶ on the sewing screen.



2) Press 0 ❷.

The "feed amount correction screen" will be displayed.



* Depressing the pedal causes the belt to move. Adjust so that the actual stitch length matches the set feed amount.

3) Press 0 ❸ to switch to the numeric keypad screen and enter the correction value.
4) If the actual stitch length is shorter than the set feed amount, press ❹ to increase correction value ❸ .
5) If the actual stitch length is longer than the set feed amount, press ❺ to decrease correction value ❸ .
6) Press ❻ to save the correction value to memory switch "K351 Feed amount adjustment" and return to the menu screen.

4-4-6. List of pattern functions

Data No.	Item name	Unit of change	Input range					Display icon
			Common	Free	Constant dimension	Multi-layered	Polygonal shape	
S001	Shape selection	-	0: No registration 1:Free 2:Constant dimension 3:Multi-layered 4:Polygonal shape					
S002	Number of stitches (Stitch length: mm)	1sti	0 to 2000	○	○	1 to 15 times	×	
S003	Number of stitches	-	0:Stop with the needle up 1:Stop with the needle down	○	○	×	×	0:Stop with the needle up  1:Stop with the needle down 
S004	Thread presser	-	1:on / 0:off	○	○	○	○	0:off  1:on 
S005	Thread trimmer on/off	-	1:on / 0:off	○	○	○	○	0:off  1:on 
S006	One shot	-	1:on / 0:off	○	○	×	×	0:off  1:on 
S007	Automatic thread trimmer on/off	-	1:on / 0:off	○	○	○	×	0:off  1:on 
S010	Material edge sensor	-	1:on / 0:off	○	○	×	×	0:off  1:on 
S011	Multi-layered section sensor	-	1:on / 0:off	○	○	×	×	0:off  1:on 
S013	Multi-layered section detection sensor value	-	1000 to 3000	○	○	×	×	

Data No.	Item name	Unit of change	Input range					Display icon
			Common	Free	Constant dimension	Multi-layered	Polygonal shape	
S016	Sewing speed limit	10sti/min	150 to U096 (150 to 4000)	○	○	×	×	
S017	Needle bar Lower stop position	1deg	100 to 300	○	○	○	×	
S019	Presser foot lifting during intermediate stop	-	1:on / 0:off	○	○	×	×	0:off  1:on 
S020	Presser foot lifting height during intermediate stop	0.1mm	0.0 to 10.0	○	○	×	×	
S021	Presser foot lifting after thread trimming	-	1:on / 0:off	○	○	×	○	0:off  1:on 
S022	Presser foot lifting height after thread trimming	0.1mm	0.0 to 10.0	○	○	×	○	
S023	Suspended ruler position	0.1mm	K301 to 62.0 * Values smaller than K301 will not work.	○	○	○	○	
S024	Needle thread tension correction	-	0:off 1:Sewing speed 2:Bobbin thread remaining amount 3:Both	○	○	×	○	0:off  1:Sewing speed  2:Bobbin thread remaining amount  3:Both 
S150	Feed amount correction	(0.1%)	-999 to 999	○	○	○	○	
S151	Normal/reverse feed adjustment	0.01mm	-2.00 to 2.00mm	○	○	○	○	
S025	Needle thread tension	-	0 to 200	○	○	○	×	
S026	Presser foot pressure	-	-20 to 200	○	○	○	×	

Data No.		Item name	Unit of change	Input range					Display icon
				Common	Free	Constant dimension	Multi-layered	Polygonal shape	
	S029	Automatic presser foot pressure correction setting	-	0: Disabled 1: Enabled	○	○	○	○	0: Disabled  1: Enabled 
	S036	Feed timing	1deg	-40 to 120°	○	○	×	○	
	S037	Feed ratio	-	0: Small, 1: Normal	○	○	○	○	0: Small  1: Normal 
Differential feed	S042	Overall feed amount	0.01mm	-9.00 to 9.00	○	○	○	×	
	S043	Top feed left-right difference	1%	-300 to 300	○	○	○	×	
	S044	Bottom feed difference	1%	-300 to 300	○	○	○	×	
	S045	Vertical feed difference	1%	-300 to 300	○	○	○	×	
Sewing start	S048	Sewing start stitch	-	0: Reverse/ 1:Condensation custom	○	○	×	○	0: Reverse  1: Condensation custom 
	S050	Custom stitching at the beginning of sewing	-	Condensation custom No.1 to 9	○	○	×	○	
	S051	Number of stitches A	1sti	0 to 99	○	○	○	○	
	S052	Number of stitches B	1sti	0 to 99	○	○	○	○	
	S053	Sewing-start presser foot pressure	-	-20 to 200 (Common setting S026)	○	○	×	○	
	S054	Sewing-start reverse feed stitching speed	10sti/min	150 to 3000	○	○	×	○	
	S055	Common needle thread tension setting on/off	-	1:on / 0:off	○	○	×	○	0: Reverse  1:Condensation custom 
	S056	Needle thread tension	-	0 to 200	○	○	×	○	
	S057	Sewing-start feed amount	0.01mm	-9.00 to 9.00	○	○	×	○	

Data No.		Item name	Unit of change	Input range					Display icon
				Common	Free	Constant dimension	Multi-layered	Polygonal shape	
Sewing end	S059	Reverse feed stitching at the end of sewing	-	0: Reverse/ 1:Condensation custom	○	○	×	○	0: Reverse  1: Condensation custom 
	S061	Custom stitching at the end of sewing	-	Condensation custom No.1 to 9	○	○	×	○	
	S062	Number of stitches C	1sti	0 to 99	○	○	○	○	
	S063	Number of stitches D	1sti	0 to 99	○	○	×	○	
	S064	Sewing-end presser foot pressure	-	-20 to 200 (Common setting S026)	○	○	×	○	
	S065	Sewing-end reverse feed stitching speed	10sti/min	150 to 3000	○	○	×	○	
	S066	Common needle thread tension setting on/off	-	1:on / 0:off	○	○	×	○	0:off  1:on 
	S067	Needle thread tension	-	0 to 200	○	○	×	○	
	S068	Sewing-end feed amount	0.01mm	-9.00 to 9.00	○	○	×	○	
One-touch changeover	—	One-touch changeover							
	S100	Sewing speed limit for one-touch changeover	10sti/min	150 to U096 (150 to 4000), (Common setting S016)	○	○	×	×	
	S101	Needle thread tension for one-touch changeover	-	0 to 200, (Common setting S025)	○	○	×	×	
	S102	Presser foot pressure for one-touch changeover	-	-20 to 200 (Common setting S026)	○	○	×	×	
	S103	Number of stitches to disable the changeover function when the one-touch changeover function is enabled.	-	0: Changeover is disabled after a certain number of stitches (0 to 200)	○	○	×	×	

Data No.		Item name	Unit of change	Input range					Display icon
				Common	Free	Constant dimension	Multi-layered	Polygonal shape	
One-touch changeover	S108	Overall feed amount for one-touch changeover	0.01mm	-9.00 to 9.00mm (Common setting S042) S104 to 111 Even a single common setting can be used for all.	○	○	×	×	
	S109	Top feed left-right difference for one-touch changeover	1%	-300 to 300 (Common setting S043)	×	×	×	×	
	S110	Bottom feed difference for one-touch changeover	1%	-300 to 300 (Common setting S044)	×	×	×	×	
	S111	Vertical feed difference for one-touch changeover	1%	-300 to 300 (Common setting S045)	×	×	×	×	
Multi-layered portion changeover	-	Multi-layered portion changeover	-	-	-	-	-	-	
	S130	Multi-layered portion changeover, sewing speed limit	10sti/min	150 to U096 (150 to 4000), (Common setting S016)	○	○	×	×	
	S131	Multi-layered portion changeover, needle thread tension	-	0 to 200 (Common setting S025)	○	○	×	×	
	S132	Presser foot pressure for multi-layered sections	-	-20 to 200 (Common setting S026)	○	○	×	×	
	S133	Multi-layered portion changeover, number of stitches to be sewn before turning OFF the changeover function	-	0: Changeover is disabled after a certain number of stitches	○	○	×	×	
	S138	Overall feed amount for multi-layered sections	0.01mm	-9.00 to 9.00mm (Common setting S042) S134 to 141 Even a single common setting can be used for all.	○	○	×	×	
	S139	Top feed left-right difference for multi-layered sections	1%	-300 to 300 (Common setting S043)	×	×	×	×	
	S140	Bottom feed difference for multi-layered sections	1%	-300 to 300 (Common setting S044)	×	×	×	×	
	S141	Vertical feed difference for multi-layered sections	1%	-300 to 300 (Common setting S045)	×	×	×	×	

Data No.		Item name	Unit of change	Input range					Display icon
				Common	Free	Constant dimension	Multi-layered	Polygonal shape	
Polygonal-shape stitching step information	S202	Step changeover	-	0:Number of stitches 1:One-touch switch 2:Multi-layered part 3:Cloth edge	×	×	×	○	0:Number of stitches  1:One-touch switch  2:Multi-layered part  3:Cloth edge 
	S203	One shot	-	1:on / 0:off	×	×	×	○	0:off  1:on 
	S205	Sensor value to change over the step	-	1000 to 3000 (S202 = Displayed only when 2nd stage)	×	×	×	○	
	S206	Number of stitches	1sti	1 to 2000 (Displayed only when S202 = 0 stitch count)	×	×	×	○	
	S207	Needle thread tension	-	0 to 200	×	×	×	○	
	S208	Presser foot pressure	-	-20 to 200	×	×	×	○	
	S209	Needle bar stop position at the time of pause	-	0:Stop with the needle up 1:Stop with the needle down	×	×	×	○	0:Stop with the needle up  1:Stop with the needle down 
	S210	Needle entry alignment position of the needle bar	-	1:on / 0:off	×	×	×	○	0:off  1:on 
	S211	Presser foot lifting during intermediate stop	0.1mm	0.0 to 10.0	×	×	×	○	

Data No.		Item name	Unit of change	Input range					Display icon
				Common	Free	Constant dimension	Multi-layered	Polygonal shape	
Polygonal-shape stitching step information	S212	Needle bar stop position at the time of stop	-	0: Top 1: Bottom 2:Thread trimming 3:Continuity When S202 is set to 1 or 2, 3: Continuity is applied to 0: Top and 1: Bottom.	×	×	×	○	0: Top  1: Bottom  2:Thread trimming  3:Continuity 
	S213	Presser foot lifting during intermediate stop	-	1:on / 0:off	×	×	×	○	0:off  1:on 
	S214	Needle bar stop position at the time of stop	0.1mm	0.0 to 10.0	×	×	×	○	
	S217	Sewing speed limit	10sti/min	150 to U096 U096（150 to 4000）	×	×	×	○	
	S223	Top feed left-right difference	1%	-300 to 300	×	×	×	○	
	S224	Bottom feed difference	1%	-300 to 300	×	×	×	○	
	S225	Vertical feed difference	1%	-300 to 300	×	×	×	○	

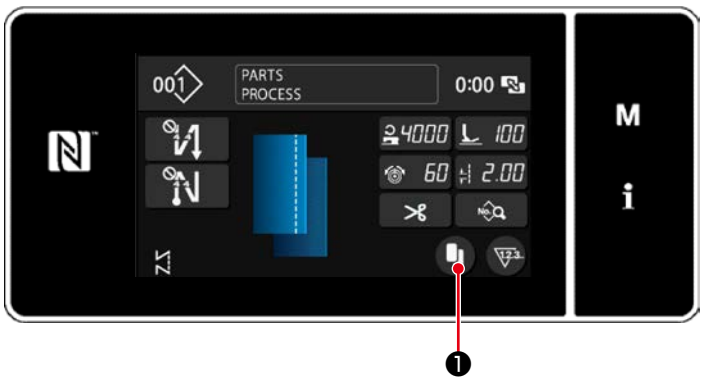
4-5. Teaching function

This is the function that enables entry of the number of stitches of a sewing pattern using the actual number of stitches sewn.

This function screen can be displayed from the sewing data edit screen.

* The teaching function can be used in the case the "constant-dimension sewing" or "polygonal-shape stitching" is selected.

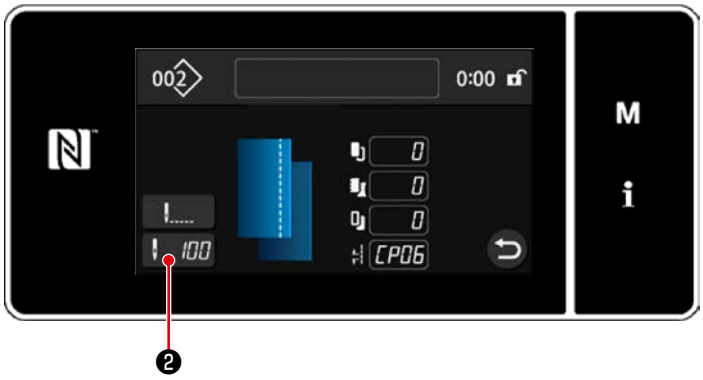
4-5-1. How to set (Constant-dimension sewing)



<First sewing screen>

① **Displaying the sewing screen with the teaching function**

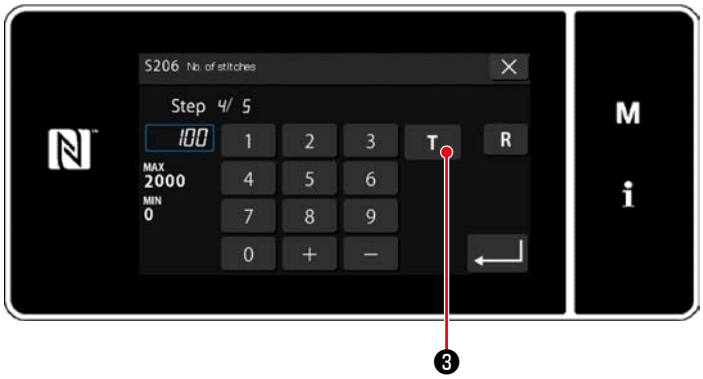
Pressing ❶ on the first sewing screen displays the "second sewing screen (differential feed amount setting)".



<Second sewing screen (differential feed amount setting)>

② **Displaying the "number of stitches input screen"**

On the "second sewing screen (differential feed amount setting)", press the number of stitches input button ❷ to display the "number of stitches input screen"



<Number of stitches input screen>

③ **Turning the teaching function ON**

Press teaching button T ❸ to turn the teaching function ON.



<Number of stitches input screen>

④ **Starting the teaching process**

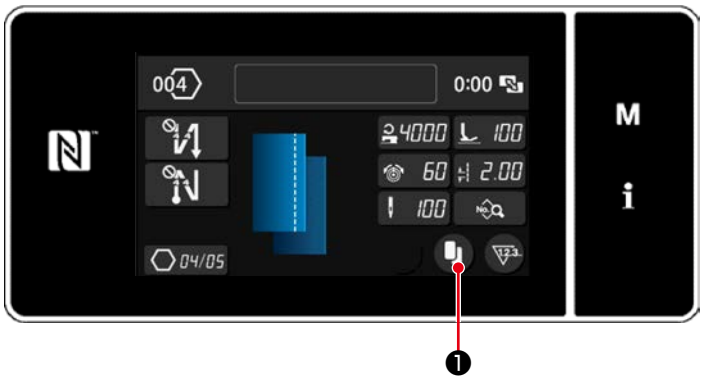
The input value is set to 0 (zero). Depress the pedal and sew to the desired position, then count the number of stitches sewn.

⑤ **Confirming the teaching content.**

Confirm the teaching content by performing thread trimming. The screen returns to either the "third sewing screen (individual feed amount setting)" or the "second sewing screen (differential feed amount setting)", whichever was displayed before entering the number of stitches input screen.

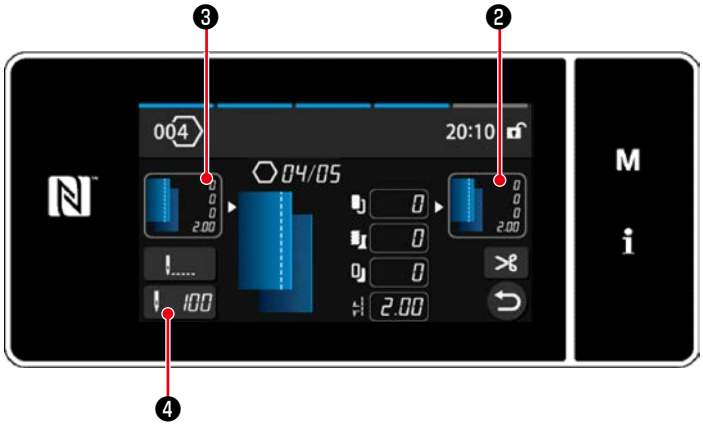
4-5-2. How to set (polygonal-shape stitching)

(1) Teaching function for the number of stitches in polygonal-shape stitching steps



① **Displaying the second sewing screen (differential feed amount setting)**

Pressing ❶ on the first sewing screen displays the "second sewing screen (differential feed amount setting)".



② **Proceeding to the next step or the previous step of a polygonal-shape stitching**

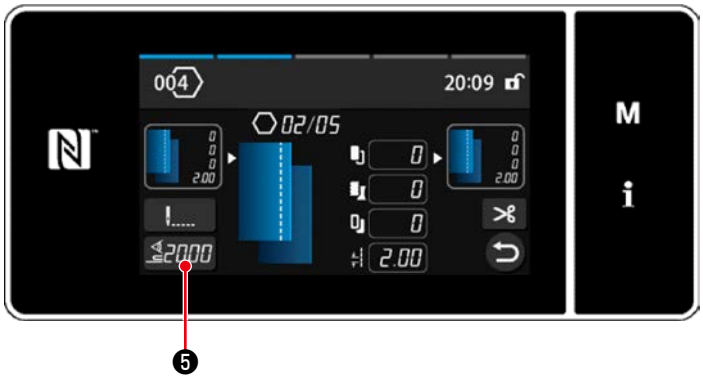
You can change the step by pressing the step specification button ❷ to move to the next step or the step specification button ❸ to move to the previous step.

In the case of polygonal-shape stitching, if the sewing parameter "S202 Step changeover" is set to "0: Number of stitches", the teaching function for the number of stitches will be enabled.

Press the number of stitches input button ❹ to display the "number of stitches input screen".

* For details on how to use the teaching function, refer to steps ② to ⑤ of **"4-5-1. How to set (Constant-dimension sewing)" p. 69**.

(2) Teaching function for the multi-layered section detection sensor in polygonal-shape stitching steps

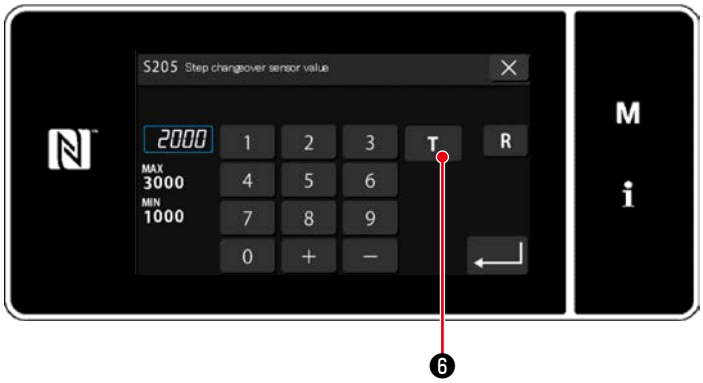


① **Displaying the sewing screen with the teaching function**

In the case of polygonal-shape stitching, if the sewing parameter "S202 Step changeover" is set to "2: Multi-layered section", the teaching function for "Multi-layered section detection sensor value" is displayed.

When "Multi-layered section detection sensor value" 2000 ❺ is pressed, the "S205 Step changeover center value" screen is displayed.

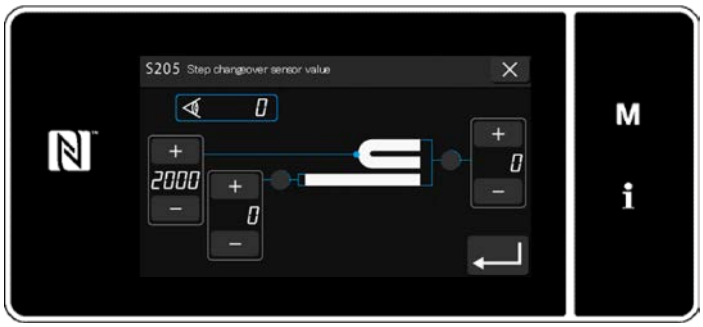
* For details on the multi-layered section detection function and how to use the teaching function, refer to **"6-4. Multi-layered section detection function" p. 111**.



<Step changeover sensor value input screen>

② **Turning ON the teaching function**

Press teaching button T ❻ to turn the teaching function ON.



<Step changeover sensor value teaching screen>

③ **Performing teaching**

* For details on the multi-layered section detection function and how to use the teaching function, refer to **"6-4. Multi-layered section detection function" p. 111**.

If the setting of "S202 Step changeover" above is set to anything other than "Number of stitches" or "Multi-layered section", only the icon will be displayed, as the teaching function is not available.



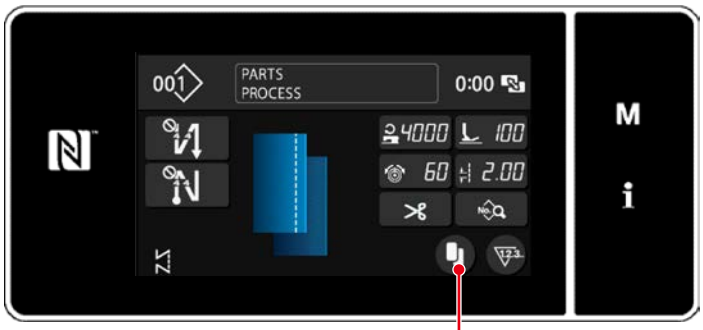
4-6. One-touch changeover

If the one-touch changeover function is assigned to a custom switch, pressing the custom switch will allow you to change the stitch length, sewing speed, and other parameters.
* At the time of factory shipment, the one-touch changeover function is assigned to machine head switch 1.

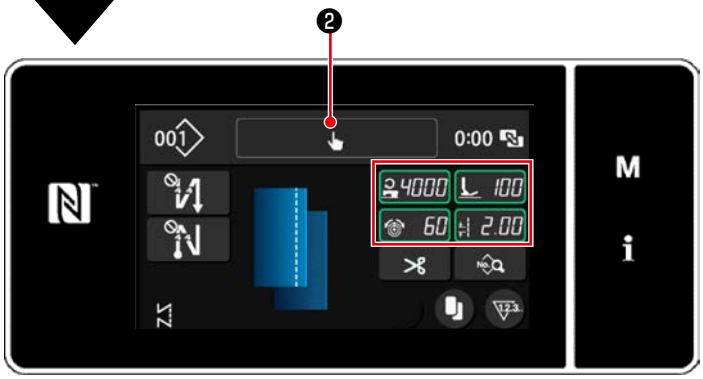
Data that is changed over with the one-touch changeover
- Sewing speed limit
- Needle thread tension
- Presser foot pressure
- Entire feed amount
- Top feed left-right difference
- Bottom feed difference
- Vertical feed difference

Refer to **"3-11. Custom switch" p. 41**.
* One-touch changeover is only effective during free stitching and constant-dimension sewing.

4-6-1. One-touch utility changeover function



<First sewing screen(standard display mode)>



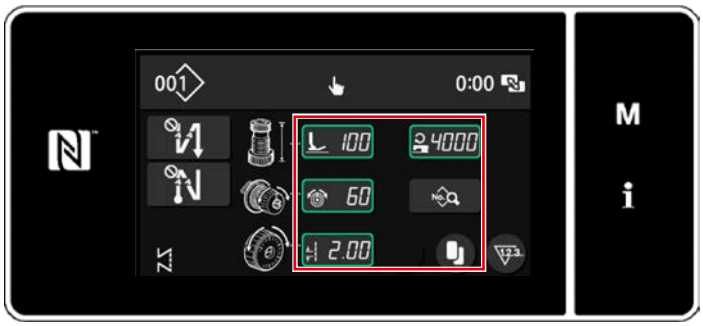
<First sewing screen(standard display mode)>
During one-touch type changeover

① **First sewing screen**
During one-touch changeover, the target data is displayed within a green frame, and the one-touch changeover icon appears on ❷ . Similarly, the target data is displayed in a green frame on the second sewing screen.
Pressing ❶ on the first sewing screen displays the "second sewing screen (differential feed amount setting)".

During one-touch type changeover



<First sewing screen
(sewing machine image display mode)>



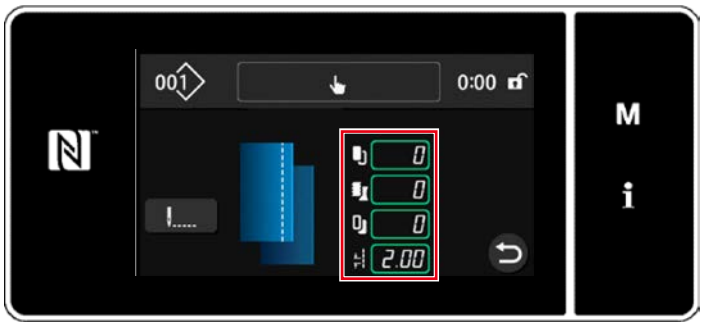
During one-touch type changeover

<First sewing screen (sewing machine image display mode)>
During one-touch type changeover



② **Second sewing screen (differential feed amount setting)**

<Second sewing screen
(differential feed amount setting)>

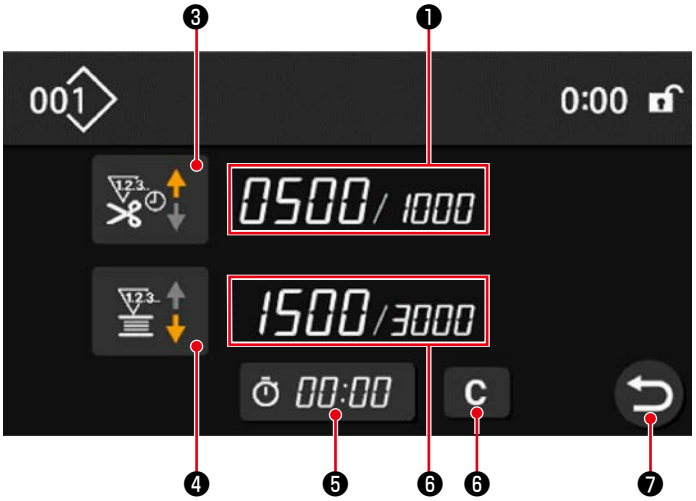


During one-touch type changeover

<Second sewing screen (differential feed amount setting)>
During one-touch type changeover

4-7. Counter function

This function counts sewing in the predetermined unit and gives a visible alarm on the screen when the pre-set value is reached.



<Counter screen>

No.	Switch/display	Description
❶	Sewing counter display	Displays the current value/setting value of the sewing counter.
❷	Bobbin thread counter display	Displays the current value/setting value of the bobbin thread counter.
❸	Sewing counter current value button	Displays the screen for changing the current value of the sewing counter.
❹	Bobbin thread current value button	Displays the screen for changing the current value of the bobbin thread counter.
❺	Stopwatch button	Displays the current value (in seconds) of the stopwatch. Press the button to start or stop the measurement operation.
❻	Stopwatch clear button	Press the button to reset the stopwatch to 0 (zero).
❼	First sewing screen button	Press the button to display the first sewing screen.

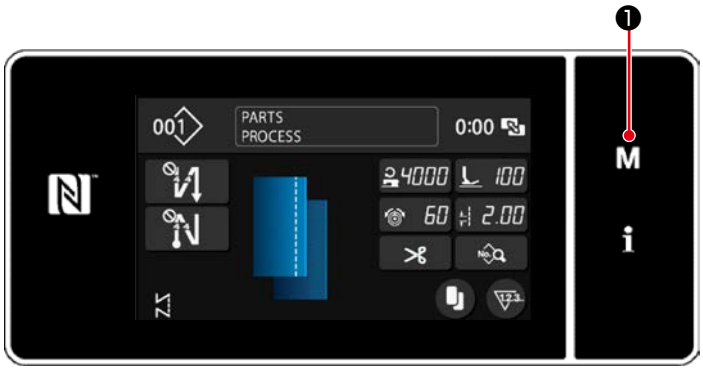
4-7-1. Types of the counter

There are three types of counters available: the bobbin thread counter, the sewing counter, and the pitch time counter.

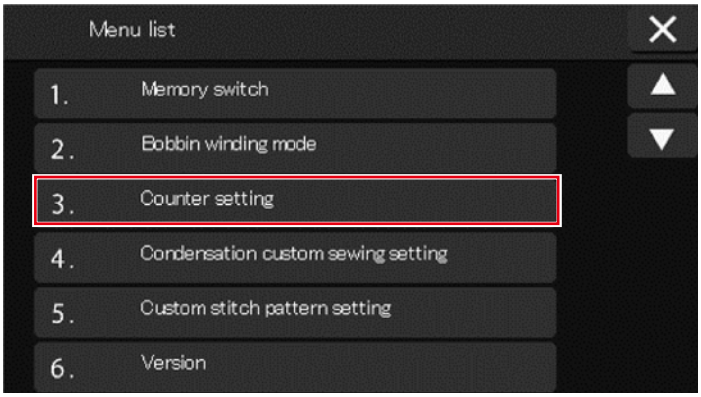
	**Sewing counter** The sewing counter adds one to its current value every time one stitch shape is sewn. When the preset value is reached, the count-completion screen is displayed. * Refer to **"4-7-3. How to reset the count-completion state" p. 80**.
	**Sewing counter (Pitch time counter)** The sewing counter adds one to its current value every time one stitch shape is sewn. When the pitch time counter is enabled,  appears on the counter setting screen (refer to **"4-7-2. How to set the counter" p. 76**). Once the time set with  has elapsed, the counter automatically increments the target value by 1 (unit: seconds).
	**Bobbin thread counter** The bobbin thread counter adds one to its current value every time the sewing machine sews 10 stitches. When the preset value is reached, the count-completion screen is displayed. * Refer to **"4-7-3. How to reset the count-completion state" p. 80**.

4-7-2. How to set the counter

① Selecting the counter setting



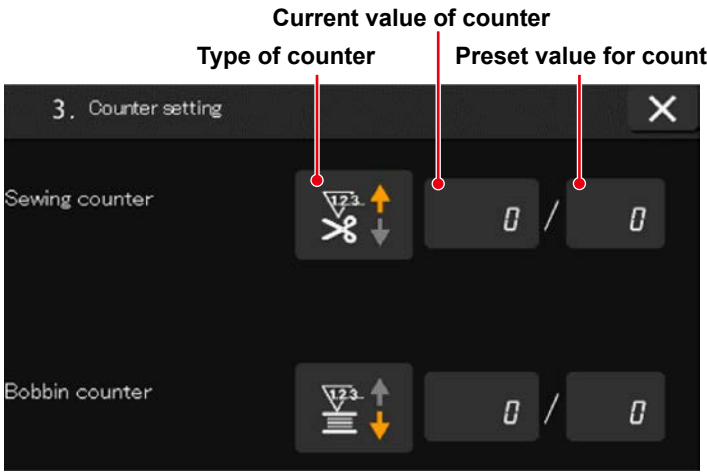
1) Display the mode screen by pressing **M** ❶.



2) Select the "3. Counter setting".

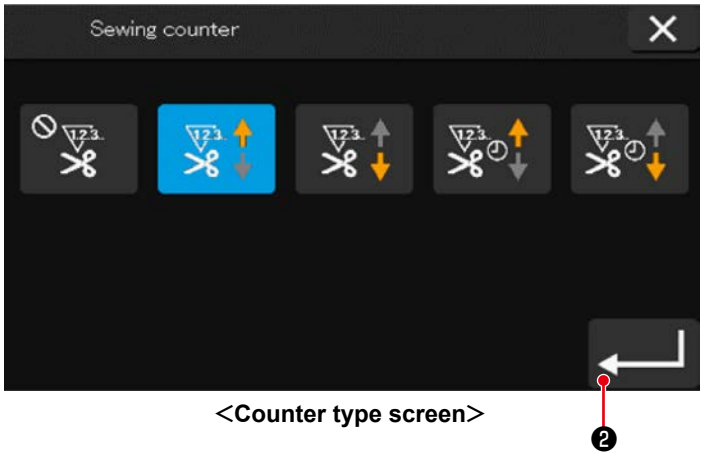
② Setting the type of counter, current value of counter and preset value for counter

The sewing counter and the bobbin counter should be set following the same procedure.



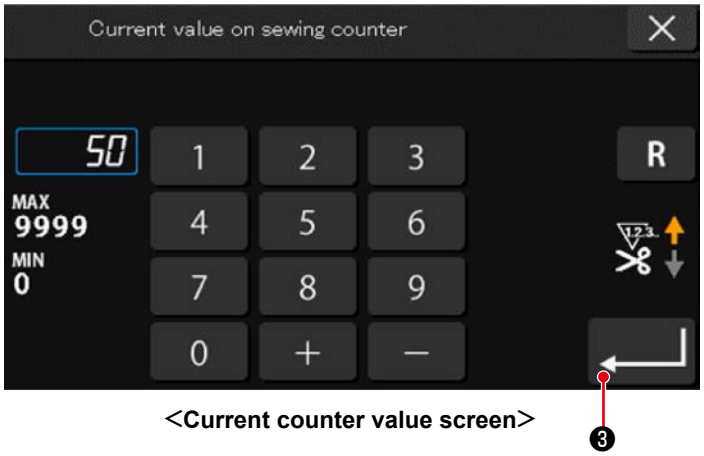
<Counter setting screen>

1) The counter setting screen is displayed to enable setting.
2) Press the button for the desired item to display its corresponding change screen.



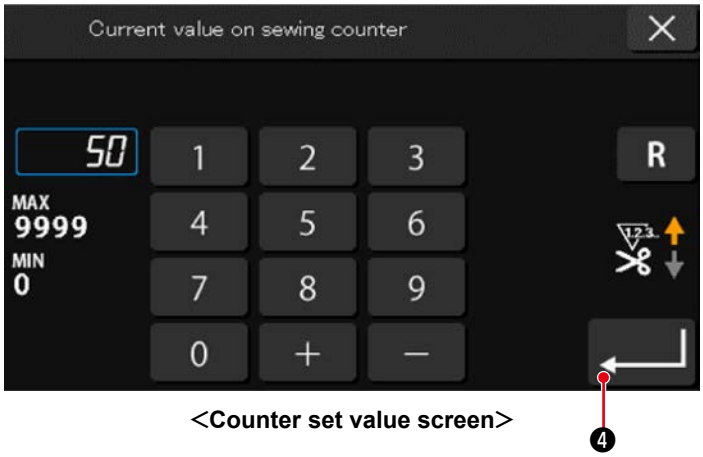
<Counter type screen>

3) Select the desired type of counter.
4) Press ↵ ❷ to confirm the type of counter you have selected.



<Current counter value screen>

5) Select the current counter value.
6) Enter with the numeric keypad.
7) Press ↵ ❸ to confirm the type of counter you have selected.



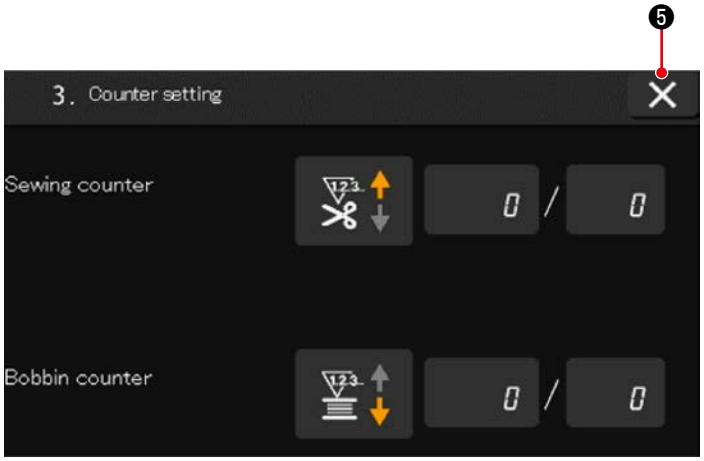
<Counter set value screen>

8) Select the counter set value.
9) Enter with the numeric keypad.
10) Press ↵ ❹ to confirm the type of counter you have selected.

Sewing counter	
	UP counter : The counter adds one to its current value every time the sewing machine sews one stitch shape. When the current value reaches the preset value, the count-completion screen is displayed.
	DOWN counter : The counter subtracts one from its current value every time the sewing machine sews one stitch shape. When the current value becomes 0 (zero), the count-completion screen is displayed.
	UP counter (Pitch time counter) : The counter adds one to its current value every time the sewing machine sews one stitch shape.
	DOWN counter (Pitch time counter) : The counter subtracts one from its current value every time the sewing machine sews one stitch shape.
	Disuse of counter : The sewing counter counts nothing even when the sewing machine performs sewing. The count-completion screen is, therefore, not displayed.

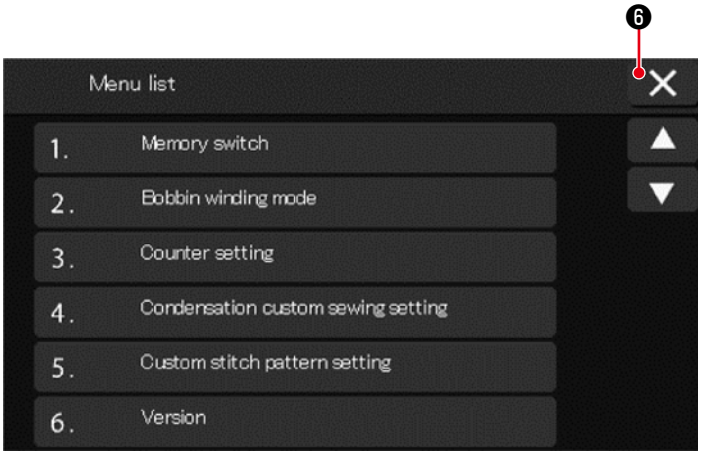
Bobbin thread counter	
	UP counter : The bobbin thread counter adds one to its current value every time the sewing machine sews 10 stitches. When the current value reaches the preset value, the count-completion screen is displayed.
	DOWN counter : The bobbin thread counter subtracts one from its current value every time the sewing machine sews 10 stitches. When the current value becomes 0 (zero), the count-completion screen is displayed.
	Disuse of counter: The bobbin thread counter counts nothing even when the sewing machine performs sewing. The count-completion screen is, therefore, not displayed.

③ Confirming the data entered



<Counter setting screen>

Confirm the data on counter setting items you have entered. Then, press ✕ ❺ to return the screen to the mode screen.



<Mode screen>

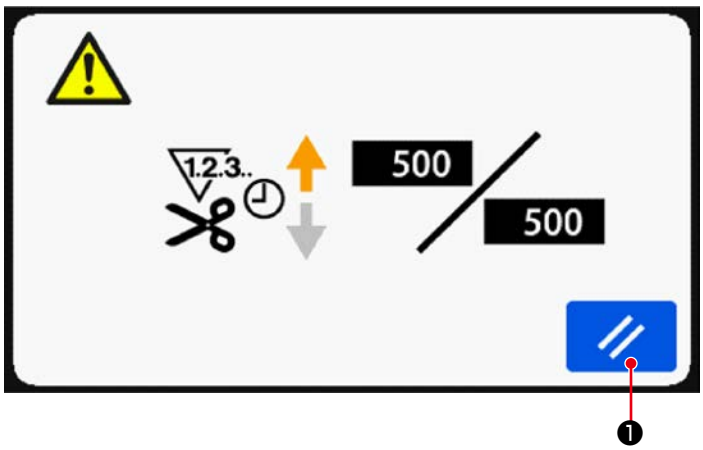
Press ✕ ❻ to return to either the sewing screen or the counter screen.



<Counter screen>

The data on the counter function entered is displayed.

4-7-3. How to reset the count-completion state

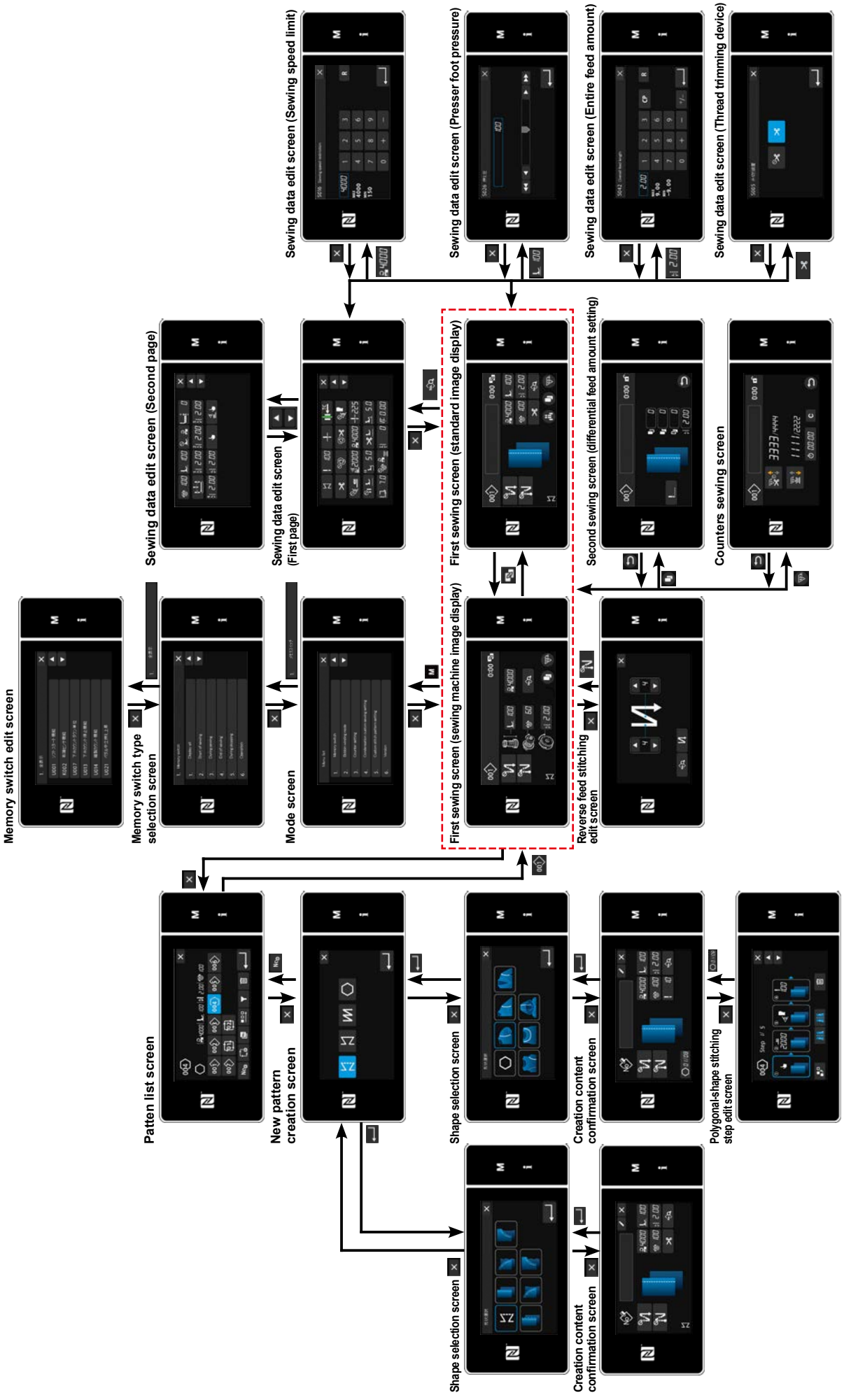


When the predetermined conditions are satisfied during sewing, the count-completion screen is displayed.

The counter is reset by pressing ❶.

Then, the mode is returned to the sewing mode. In this mode, the counter starts counting again.

4-8. Simplified chart of panel displays



4-9. List of memory switch data

1) Level 1

Settings are available when the operator level mode screen is displayed.

No.	Item	Setting range	Unit	Initial value
U001	**Soft-start function *)** 0: Not set 1 to 9: Number of stitches to perform soft start	0 to 9	stitch	2
U007	**Bobbin thread count-down unit** Setting for the number of stitches per count 0: 10 stitches / 1: 15 stitches / 2: 20 stitches	0 to 2	stitch	0
U013	**Bobbin thread count stop function** Setting to prohibit sewing machine operation when count is completed (-1 or less) 0: The sewing machine can operate even after count is completed (negative value) (not set). 1: After the count is completed, sewing machine operation is prohibited after thread trimming. 2: When the count is completed, the sewing machine stops, and operation is prohibited following thread trimming. * The initial counter value is set to 0 (zero). 0 (zero) disables the stop function. The prohibition function is disabled.	0 to 2	-	0
U014	**Sewing count function *)** Setting for counting completed sewing processes 1: Automatic sewing count / 2: Counter input via switch input	1 to 2	-	1
U021	**Presser foot lift when the pedal is in its neutral position *)** Setting for presser foot position at pedal's neutral position 0: No automatic presser foot lifting function at pedal's neutral position. 1: Automatic presser foot lifting function enabled at pedal's neutral position. 2: Automatic presser foot lifting function enabled at pedal's neutral position, but only if the presser foot was previously lowered. 3: Automatic presser foot lifting function enabled at pedal's neutral position + Alternating operation by depressing the back part of the pedal.	0 to 3	-	0
U025	**Operation after manual turning (thread trimming) *)** Setting for thread trimming operation after manually turning the pulley and moving out of the up/down position 0: Permitted / 1: Prohibited	0 to 1	-	0
U030	**Middle-of-sewing reverse feed stitching function *)** Setting to toggle the middle-of-sewing reverse feed stitching function ON/OFF 0: Without the midpoint-of-sewing reverse feed stitching function 1: With the midpoint-of-sewing reverse feed stitching function	0 to 1	-	0
U031	**Number of stitches of middle-of-sewing reverse feed stitching *)** Setting for the number of stitches in middle-of-sewing reverse feed stitching	1 to 19	-	4
U032	**Condition of enabling middle-of-sewing reverse feed stitching while sewing machine is at rest *)** 0: Disabled when the swing machine is at rest 1: Enabled when the sewing machine is at rest	0 to 1	-	0

No.	Item	Setting range	Unit	Initial value
U033	**Thread trimming activated by middle-of-sewing reverse feed stitching *)** Setting to toggle the thread trimming function ON/OFF after completing middle-of-sewing reverse feed stitching 0: Without automatic thread trimming function 1: With automatic thread trimming function	0 to 1	-	0
U035	**Minimum pedal sewing speed** The minimum pedal speed is set.	150 to 420	sti/min	200
U036	**Thread trimming speed** The speed for thread trimming is set.	100 to 420	sti/min	300
U037	**Speed during soft start** If the sewing start speed (soft start) is slower than the minimum pedal speed (U035), this setting will take priority.	100 to 4000	sti/min	800
U038	**One-shot stitching speed *)** The one-shot stitching speed is set.	100 to 4000	sti/min	2500
U039	**Start position of rotation *)** Setting for the sewing machine operation start position from the neutral pedal position (pedal stroke)	10 to 1000	-	600
U040	**Start position of acceleration *)** Setting for the sewing machine acceleration start position from the neutral pedal position (pedal stroke)	10 to 1000	-	900
U041	**Start position of lifting of presser foot *)** Setting for the presser foot lifting start position from the neutral pedal position (pedal stroke)	-500 to -10	-	-100
U042	**Start position of lowering of presser foot *)** Setting for the presser foot lowering start position from the neutral pedal position (pedal stroke)	10 to 500	-	300
U043	**Start position of thread trimming *)** Setting for the thread trimming start position from the neutral pedal position (pedal stroke)	-1000 to -100	-	-840
U044	**Position that maximum sewing speed is reached *)** Setting for the sewing machine maximum sewing speed reaching position from the neutral pedal position (pedal stroke)	10 to 15000	-	4000
U045	**Pedal neutral-position correction value Note 1)** Setting for the neutral position of pedal sensor	-150 to 150	-	0
U047	**Presser-foot lift finishing position** Setting for the position where the presser foot rises when the back part of the pedal is depressed to its first step (First step spring position)	-1000 to -100	-	-600
U048	**Pedal lift function** Setting to toggle the presser foot lifting operation ON/OFF by depressing the back part of the pedal 0: OFF ／ 1: ON	0 to 1	-	**Note 3**
U049	**Presser foot lowering time *)** Setting the time it takes for the presser foot to come down after the pedal is depressed	0 to 500	ms	140
U054	**Time delay before the presser foot starts rising** Setting for the time elapsed from when the pedal is depressed to the first step until the presser foot starts rising	0 to 200	ms	70
U056	**Reverse-rotation needle-up after thread trimming *)** Setting to toggle the reverse-rotation needle-up function ON/OFF after thread trimming 0: OFF ／ 1: ON	0 to 1	-	0
U059	**Selection of revere feed stitching operation *)** 0: Variable speed controlled by pedal operation 1: Constant speed at the set reverse stitching speed (S019)	0 to 1	-	1

No.	Item	Setting range	Unit	Initial value
U060	**Stop after reverse feed stitching *)** Setting for the function that temporarily stops the sewing machine, regardless of the pedal's status 0: No stop/1: Stop is activated	0 to 1	-	0
U064	**Sewing speed at the start of reverse feed stitching** Setting for the initial speed when EBT or condensation starts	150 to 1000	sti/min	500
U068	**Presser foot lifting operation changeover *)** Setting for the presser foot lifting operation specification when the back part of the pedal is depressed 0: 2-step operation 1: Manual operation depending on the pedal stroke when the back part of pedal is depressed	0 to 1	-	0
U070	**Presser-foot 2nd step lifting height** Setting for the maximum height of the second presser foot when the back part of the pedal is depressed (the height the presser foot rises to when the pedal is depressed to the thread trimming position after thread trimming)	2.0 to 13.5	0.1mm	10.0
U087	**Pedal acceleration characteristic *)** 0: Standard -1 to -10: Low-frequency low acceleration 1 to 10: Low-frequency high acceleration	-10 to 10	-	0
U090	**Initial-start upper-position stopping function *)** Setting to toggle automatic stop ON/OFF immediately after power is turned on 0: The sewing machine stops with its needle up after checking the panel. 1: The machine automatically stops with its needle up.	0 to 1	-	0
U092	**Speed reducing function for reverse feed stitching at beginning of sewing *)** Setting for the function to decelerate after the completion of sewing-start reverse feed stitching 0: Speed is not reduced. / 1: Speed is reduced	0 to 1	-	0
U093	**Half needle, 1 needle SW additional function *)** Setting for needle up/down correction switch operation after the power-on or after thread trimming 0: Normal / 1:One-stitch correction after thread trimming	0 to 1	-	0
U094	**One-stitch correction stitching feed amount** Feed amount is set when the one-stitch correction switch is pressed.	10 to 100	%	100
U096	**Maximum sewing speed *)** The initial value differs with the machine head.	150 to 4000	sti/min	4000
U120	**Main shaft reference angle correction *) Note 2)** Main shaft reference signal angle (home position) correction	-60 to 60	deg	0
U121	**Upper stop position angle correction *)** The position at which the sewing machine stops with its needle up is corrected.	-15 to 15	deg	0
U122	**Lower stop position angle correction *)** The position at which the sewing machine stops with its needle down is corrected.	-15 to 15	deg	0
U150	**Automatic knee-lifter function** 0: No / 1: Yes (enabled)	0 to 1	-	1
U151	**Adjustment of position to start automatic knee-lifter operation** Correction of the knee-lifter position at which the presser foot operates	-2000 to 1000	-	0
U152	**Adjustment of the maximum lift position by the automatic knee-lifter** Correction of the knee-lifter position at which the presser foot lifting height is maximized	-2000 to 1000	-	0

No.	Item	Setting range	Unit	Initial value
U164	**Pedal input high-speed switch function** 0: Normal pedal/1: Used as the high-speed switch	0 to 1	-	0
U182	**Sewing counter stopping function** 0: The sewing machine can be operated even after the sewing count is completed. 1: When the sewing count is completed, sewing machine operation is prohibited after thread trimming. * The initial counter value is set to 0 (zero). 0 (zero) disables the stop function.	0 to 1	-	0
U183	**Number of times of thread trimming for sewing counter** Setting for the number of thread trimming instances counted by the sewing counter	1 to 20	-	1
U194	**Setting for changing thread tension when lifting the presser foot *)** 0: OFF / 1: Always ON / 2: Only after thread trimming / 3: Only during stop	0 to 3	-	0
U195	**Thread tension when lifting the presser foot** The thread tension when lifting the presser foot is set.	0 to 200	-	50
U199	**Pedal priority for standing work *)** Setting for the switch which is given priority when the pedal is used for standing work 0: Start switch is given priority. / 1: Start switch is not given priority.	0 to 1	-	1
U201	**Thread tension correction (bobbin thread remaining amount) Remaining amount of bobbin thread to start correction *)** This memory switch is used to set the remaining amount of bobbin thread to start correction of the needle thread tension.	0 to 100	%	50
U202	**Thread tension correction (bobbin thread remaining amount) Final correction amount *)** The thread tension is set when the bobbin thread reaches its minimum level.	50 to 200	%	120
U273	**Setting to enable or disable operation start when lifting the presser foot** Setting to enable or disable the input for starting the sewing machine after the presser foot has been lowered from its raised position 0: Disabled / 1: Enabled	0 to 1	-	0
U318	**Correction of the position where the reverse feed lever operation starts** The position at which the reverse feed lever operation is enabled is adjusted.	-40 to 40	-	0
U319	**Correction of the position where the reverse feed lever's maximum operating amount is reached** The position at which the reverse feed lever reaches its maximum movement is adjusted.	-40 to 40	-	0
U400	**Panel operation mode** Setting for the sewing screen mode displayed at startup 0: Maintenance personnel mode / 1: Operator mode	0 to 1	-	1
U401	**Stitch length input unit** 0: Stitch length (mm) 1: Number of stitches per inch / 2: Number of stitches per 3 cm	0 to 2	-	0
U402	**Automatic lock time** Time until the panel is automatically locked if no operation is performed for a certain period of time 0: Not set / 1 to 300: Time until locking	0 to 300	sec	0
U403	**Auto-OFF of back light** Time until the backlight of the panel is automatically turned off if no operation is performed for a certain period 0: Not set / 1 to 20: Time until the backlight turns off.	0 to 20	min	0

No.	Item	Setting range	Unit	Initial value
U404	**Selection of part number and process / comment display** Setting for displaying either the part number/process or a comment on the sewing screen 0: Part number/process / 1: Comment	0 to 1	-	0
U406	**Language selection** 0: Language not selected / 1: Japanese / 2: English / 3: Simplified Chinese / 4: Additional language	0 to 4	-	
U407	**Operating sound of panel *)** 0: OFF / 1: ON	0 to 1	-	1

* Refer to **"2) Memory switch details" p. 87**.

Note 1）：The value obtained in the "pedal sensor neutral position" check program is saved. You can also edit directly in "U045".

Note 2）：The value obtained by the "Z-phase adjustment" in the check program is saved. You can also edit directly in "U120".

Note 3）：It depends on the shipping specifications.

2) Memory switch details

① Selecting the soft start function (U001)

This function improves stitching stability by limiting the sewing machine speed at the beginning of sewing when the needle and bobbin threads do not tangle. It is particularly useful when the stitch pitch is small or the needle is thick.

0：Function not selected

1 to 9: Number of stitches for soft start

You can also adjust the speed limit for the soft start. (U037)

Possible setting range

100 to 4,000 sti/min

② Sewing count function (U014)

This function counts up each time a thread is trimmed and keeps track of the number of completed sewing processes.

1: ON - Sewing count function enabled (counts per thread trimming)

2: ON - External switch input for sewing counter

③ Presser foot lift when the pedal is in neutral position (U021)

This function automatically raises the presser foot when the pedal is in its neutral position.

The automatic lifting duration depends on the automatic presser foot lifting hold time. If the pedal is automatically lowered, it will rise again once the pedal moves out of the neutral position.

(Caution) When the setting value of U093 Needle up/down correction switch additional function is "2", the setting is disabled.

0: No automatic presser foot lifting function at pedal's neutral position.

1: Automatic presser foot lifting function enabled at pedal's neutral position.

2: Automatic presser foot lifting function enabled at pedal's neutral position, but only if the presser foot was previously lowered.

3: Automatic presser foot lifting function enabled at pedal's neutral position + Alternating operation by depressing the back part of the pedal.

④ Middle-of-sewing reverse feed stitching function (U030 to U033)

The touch back switch on the machine head can be used to set stitch limits and issue a thread trimming command.

Function setting U030: Enables the middle-of-sewing reverse feed stitching function.

0: OFF - Normal touch back function (Reverse stitching occurs when the switch is pressed).

1: ON - Middle-of-sewing reverse feed stitching function enabled.

Function setting U031: Sets the number of middle-of-sewing reverse feed stitches.

Setting Range: 0 to 19 <stitches>

Function setting U032: Specifies the condition to enable the middle-of-sewing reverse feed stitching function.

0: OFF - Disabled when the sewing machine is stopped (Reverse stitching operates only while the sewing machine is running).

1: ON - Enabled when the sewing machine is stopped (The middle-of-sewing reverse stitching functions both while the sewing machine is running and when it is stopped).

(Caution) Always enabled while the sewing machine is running, regardless of the condition.

Function setting U033: Thread trimming after middle-of-sewing reverse feed stitching is completed.

0: OFF - No thread trimming

1: ON - Thread trimming

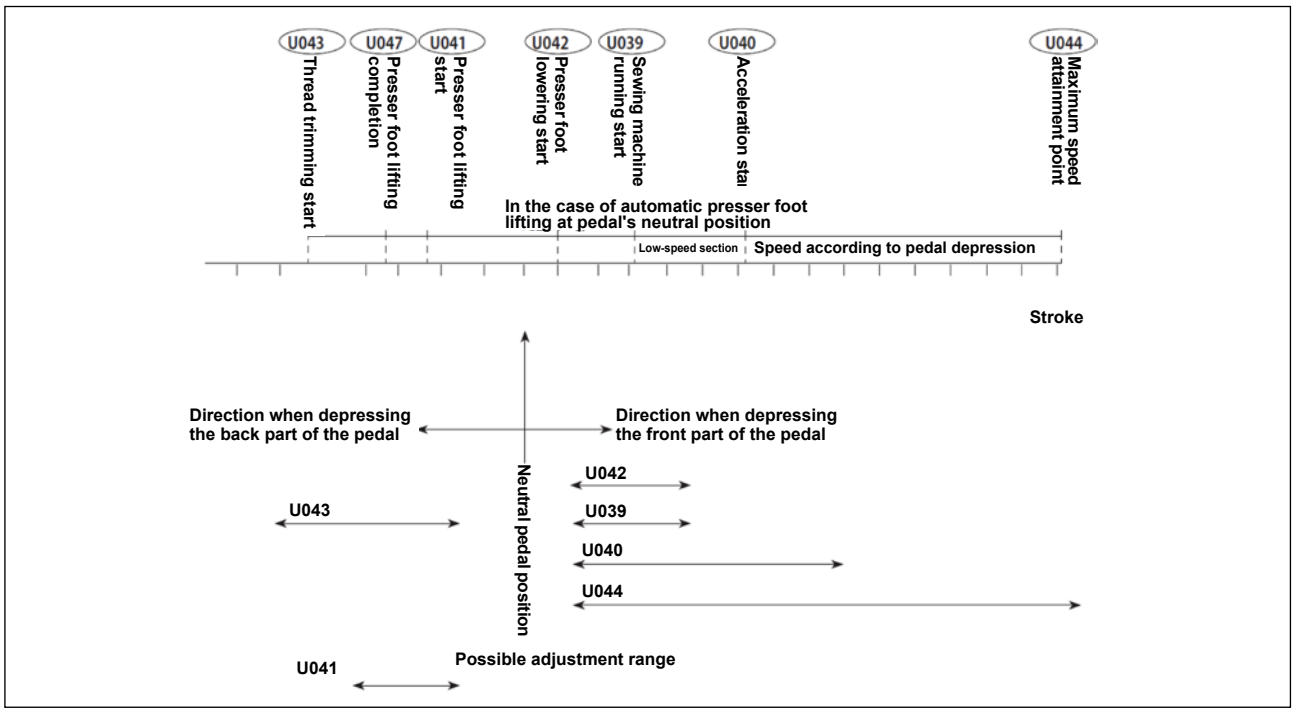
Application	Function setting			Output function
	U030	U032	U033	
❶	1	0 or 1	0 or 1	The switch functions as a normal touch back switch.
❷	1	0	0	When the touch back switch is operated when the front part of the pedal is depressed, the machine performs reverse feed stitching for the number of stitches set by function setting U031.
❸	1	1	0	When the touch back switch is operated, whether the sewing machine is stopped or the front part of the pedal is depressed, the machine performs reverse feed stitching for the number of stitches set by function setting U031.
❹	1	0	1	When the touch back switch is operated when the front part of the pedal is depressed, the machine performs reverse feed stitching for the number of stitches set by function setting U031, followed by automatic thread trimming.
❺	1	1	1	When the touch back switch is operated, whether the sewing machine is stopped or the front part of the pedal is depressed, the machine performs reverse feed stitching for the number of stitches set by function setting U031, followed by automatic thread trimming.

Operation according to each setting

❶ Used as a normal reverse-feed touch back switch.
❷ Used as a reinforcing stitch (presser stitch) for pleats. (Operates only while the sewing machine is running.)
❸ Used as a reinforcing stitch (presser stitch) for pleats. (Operates even when the sewing machine is stopped.)
❹ Used as a start switch for reverse feed at the end of sewing. (Used as a substitute for thread trimming by depressing the pedal. Operates only while the sewing machine is running. Particularly effective for standing work.)
❺ Used as a start switch for reverse feed at the end of sewing. (Used as a substitute for thread trimming by depressing the pedal. Operates whether the sewing machine is stopped or running. Particularly effective for standing work.)

⑤ **One-shot stitching speed (U038)**
Sets the sewing speed for one-shot stitching, which continuous stitching until the specified number of stitches is detected with a single pedal operation.
Setting range: 150 to 4,000 sti/min

⑥ Pedal stroke adjustment (U039 to U044)



1. Running start position (U039)
   You can adjust the stroke from the neutral pedal position to the point where the sewing machine starts running.
   Setting range: 10 to 1000

2. Acceleration start position (U040)
   You can adjust the pedal stroke in the low-speed section (the section before acceleration begins).
   Setting range: 10 to 1000

3. Start position for lifting the presser foot by pedal (U041)
   You can adjust the stroke from the neutral pedal position to the point where the presser foot starts to rise.
   (For models with presser foot lifting function activated by depressing the pedal.)
   Setting range: -500 to -10

4. Start position for lowering the presser foot (U042)
   You can adjust the stroke from the neutral pedal position to the point where the presser foot starts to lower.
   (For models with the automatic presser foot lift function at the pedal's neutral position.)
   Setting range: 10 to 500

5. Thread trimming start position (U043)
   You can adjust the stroke from the neutral pedal position to the point where the thread trimming starts.
   (For models with presser foot lifting function activated by depressing the pedal.)
   Setting range: -1000 to -100

6. Pedal position for reaching the maximum sewing speed (U044)
   You can adjust the stroke from the neutral pedal position to the point where maximum sewing speed is reached.
   (For models with presser foot lifting function activated by depressing the pedal.)
   Setting range: 10 to 15000

⑦ **Presser foot lowering time (U049)**

This function gently lowers the presser foot.

This is useful when you need to reduce the noise of the presser foot hitting the material, prevent damage to the material, or prevent material slippage when lowering the presser foot.

(Caution) If you are lowering the presser foot by depressing the pedal, a longer time setting is required to achieve the full effect.

0 to 500 ms

⑧ **Reverse-rotation needle-up function after thread trimming (U056)**

After the thread is trimmed, make the sewing machine run in the reverse direction to lift the needle bar to near the top dead center.

The needle protrudes from the bottom of the presser foot and can be used to hook the material being sewn.

0: OFF - Reverse-rotation needle-up function after thread trimming is disabled

1: ON - Reverse-rotation needle-up function after thread trimming is enabled

(Caution) Since the needle bar rotates in the reverse direction until it is close to its top dead point, the thread may come loose more easily. Adjust the amount of remaining thread after thread trimming.

⑨ **Changeover function of automatic/pedal selection of reverse feed stitching speed at the beginning of sewing (U059)**

This function allows you to choose whether the reverse feed stitching speed at the start of sewing is controlled by the speed set by memory switch S019, to be carried out all at once, or by the pedal operation speed.

0: Manual - Controlled by pedal operation

1: Auto - Automatic sewing at the set speed

(Caution) 1. The maximum reverse feed stitching speed at the start of sewing is limited to the speed set by memory switch S019, regardless of the pedal.

2. If you select "0", the reverse feed stitching may not align with the normal feed stitching.

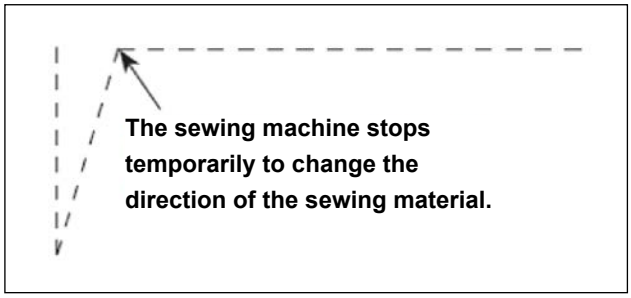
⑩ **Function of stop immediately after reverse feed stitching at the start of sewing (U060)**

This function temporarily stops the sewing machine, even if the front part of the pedal is still depressed, after completing the reverse feed stitching at the start of sewing.

It is used when sewing a short length with reverse feed stitching at the start of sewing.

0: Temporary stop function immediately after reverse feed stitching at the start of sewing is disabled.

1: Temporary stop function immediately after reverse feed stitching at the start of sewing is enabled.



⑪ **Manual presser foot lifting operation (U068)**

You can adjust the presser foot lifting height according to the pedal stroke when depressing the back part of the pedal.

0: 2-step operation

Depressing the back part of the pedal will raise the presser foot to the set height (S023).

1: Manual operation depending on the amount the pedal is depressed.

The presser foot moves up to the presser foot lift height (S023) depending on the amount the back part of the pedal is depressed.

⑫ **Second presser foot lifting height (U070)**

Setting for the maximum value of the second presser foot height when depressing the back part of the pedal.

(The height the presser foot rises to when the back part of the pedal is depressed to the thread trimming position after thread trimming.)

8.5 to 10.0 mm

⑬ **Pedal curve selection function (U087)**

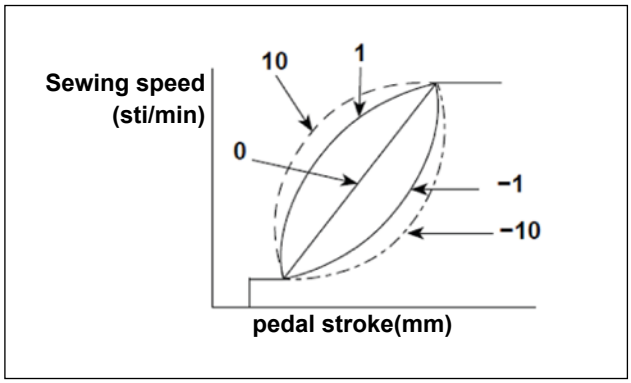
You can select the curve for the sewing speed based on the amount of pedal depression.

Change this setting if inching operation is difficult, pedal response is slow, or other such issues are experienced.

-10 to -1: Low acceleration when the pedal stroke is small.

0: Sewing speed increases linearly with the amount of pedal depression.

1 to 10: High acceleration when the pedal stroke is large.



⑭ **Initial sewing machine movement function (U090)**

The sewing machine will automatically return to the specified position immediately after the power is turned on.

0: The sewing machine returns to the upper stop position after checking the panel

1: The sewing machine automatically returns to the upper stop position.

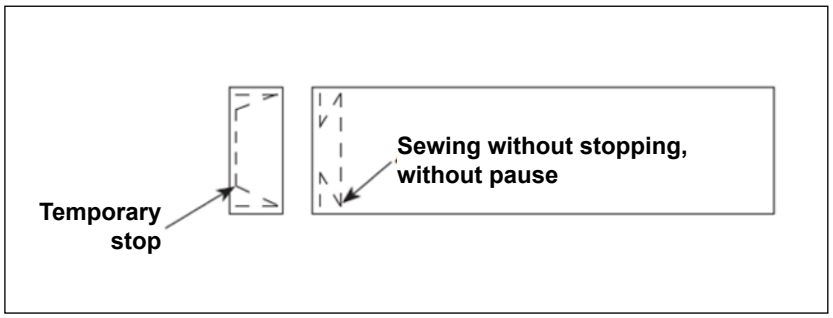
⑮ **Speed reduction function for reverse feed stitching at the start of sewing (U092)**

This function slows down the sewing machine after completing reverse feed stitching at the start of sewing. It is used in normal operation depending on the pedal condition.

(The speed accelerates to the maximum without pause.) - This function is useful when temporary stop is used effectively. (Cuff and cuff attachment)

0: Speed is not reduced.

1: Speed is reduced.



⑯ **Needle up/down correction additional function (U093)**

The one-stitch operation is performed only when the needle up/down switch is pressed while the machine is at the upper stop position, either immediately after the power is turned on or right after thread trimming.

0: Normal (only needle up/down correction)

1: Needle down function is enabled after thread trimming.

⑰ **Maximum machine head RPM setting (U096)**

This function allows you to set the maximum RPM for the machine head.

The upper limit of the setting value varies depending on the connected machine head.

This setting is reflected in the maximum RPMs of S062, S080, and S090.

Setting range: 150 to 4,000 sti/min

⑱ **Main shaft reference angle correction (U120)**

Corrects the main shaft reference angle.

Setting range: -60 to 60°

The value obtained by the "Z-phase adjustment" in the check program is saved.

⑲ **Upper position start angle correction (U121)**

Corrects the angle at which the upper position start is detected.

Setting range: -15 to 15°

⑳ **Lower position start angle correction (U122)**

Corrects the angle at which the start of the lower position is detected.

Setting range: -15 to 15°

㉑ Thread tension changeover when lifting the presser foot (U194)

0: All OFF (Presser foot intermediate lifting after thread trimming)

1: All ON

2: ON only after thread trimming

3: ON only during presser foot intermediate lifting

	During stop	Presser foot lifting	After thread cutting
0：OFF	○	×	×
1：Always ON	○	○	○
2：Only after thread trimming	○	×	○
3：Only during stop	○	○	×

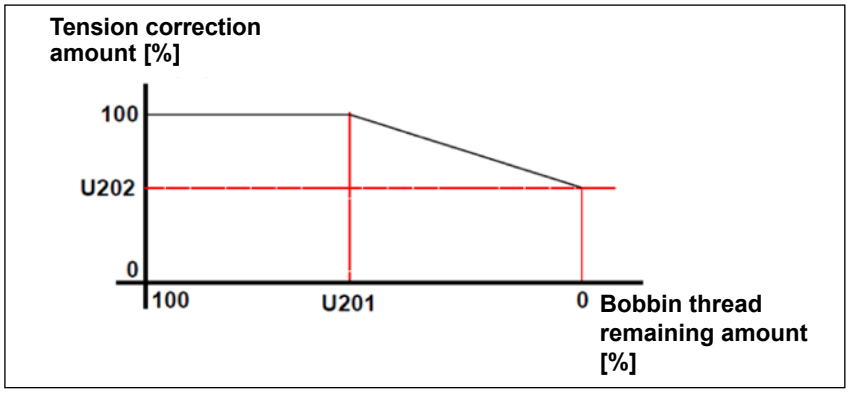
㉒ Tension correction (Short bobbin thread remaining) (U201, U202)

The setting "U201 Bobbin thread remaining amount for starting correction" determines the bobbin thread remaining amount displayed on the bobbin thread counter, at which the needle thread tension correction begins. However, this memory switch will not function unless the bobbin thread counter is enabled.

The setting "U202 Final correction amount" determines the correction ratio of the needle thread tension.

* Refer to the figure below for the relationship between "U201 Bobbin thread remaining amount for starting correction" and "U202 Final correction amount".

When the bobbin thread remaining amount decreases, the bobbin thread tension will also decrease, so you should reduce the needle thread tension.



㉓ Panel operation sound (U407)

You can enable or disable the panel operation sound.

0: OFF - Operation sound is disabled.

1: ON - Operation sound is enabled.

4-10. List of errors

Error code	Description of detected error	Description of detected error	Item to be checked
E000	Execution of data initialization (This is not an error.)	· The existing control box has been removed and a new one is mounted. · In the case the initialization operation is executed.	· This is not a failure.
E007	Motor overload	· In the case the machine head is locked. · The needle does not penetrate the sewing material. · The motor fails to rotate. · Main shaft motor or driver failure	· Check if the pulley is entangled with thread or other materials. · Check for looseness or disconnection of the main shaft motor output connector. · Check if the pulley can be turned smoothly by hand.
E011	Media is not inserted	· No media is inserted.	· Check if the media is inserted correctly.
E012	Read error	· Media data cannot be read.	· Check the data on the media.
E013	Write error	· Data cannot be written to the media.	· Ensure that the media is writable.
E014	Write protect	· The media is in the write-prohibition state.	· Ensure that the media is writable.
E015	Format error	· Formatting is not possible.	· Check the media format.
E016	External media over-capacity	· Insufficient media capacity	· Check the available space on the media.
E019	File size over	· In the case of attempting to read the custom pitch data or condensation custom data which exceeds the maximum permissible data size into the memory of sewing machine from the USB thumb drive.	· Check if the data is correct.
E022	File undetected	· In the case of attempting to read a file which is not stored in the USB thumb drive into the operation panel.	· Check if the data and save destination are correct.
E024	Pattern data size error	· This occurs when the number of stitches in the data is too large when attempting to read the condensation custom or condensation custom pattern data from the USB flash drive.	· Check if the data is correct.
E032	File compatibility error	· The file is not compatible.	· Check the file format.
E045	Pattern data error		
E071	Motor output connector disconnection	· The main shaft motor connector is disconnected. · The motor current detection circuit is damaged. · Main shaft current is not detected.	· Check for looseness or disconnection of the main shaft motor output connector.
E072	Motor overload when the thread trimmer operates	· Machine head locked during thread trimming. · The main shaft motor or driver is damaged.	· Ensure that the pulley is not entangled with thread or other materials. · Check for looseness or disconnection of the main shaft motor output connector. · Ensure that the thread trimming is performed smoothly.
E079	Overload operation error	· Main shaft motor continuously operated with overload.	· Turn off the power, wait a while, and then turn it on again.

Error code	Description of detected error	Description of detected error	Item to be checked
E082	Bottom feed motor A lock	· Bottom feed motor A lock	· Check if the bottom feed motor A operates smoothly.
E083	Bottom feed motor B lock	· Bottom feed motor B lock	· Check if the bottom feed motor B operates smoothly.
E084	Top feed motor A lock	· Top feed motor A lock	· Check if the top feed motor A operates smoothly.
E085	Top feed motor B lock	· Top feed motor B lock	· Check if the top feed motor B operates smoothly.
E204	USB insertion	· The sewing machine was started up with the USB flash drive inserted.	· Remove the USB thumb drive.
E220	Warning against shortage of grease	· When the predetermined number of stitches is reached.	· Add grease to the specified points of sewing machine and reset the error.
E221	Grease-shortage error	· In the case the sewing machine cannot continue sewing since the predetermined number of stitches is reached.	· Add grease to the specified points of sewing machine and reset the error.
E302	Head-tilt detection error	· The sewing machine was tilted while turned on. · Machine head tilt detection sensor error	· Turn off the power, raise the machine head, and then turn the power on again. · Ensure that there is no abnormality in the INT PCB.
E303	Meniscus sensor error	· The main shaft motor encoder (Z-phase) cannot be detected.	· Ensure that the cable is not broken. · Check for looseness or disconnection of the main shaft motor encoder connector.
E402	Deletion disabled error	· In the case of attempting to delete the pattern which is used in a cycle pattern. · In the case of attempting to delete the custom pitch or condensation custom which is used in a pattern.	· Change the settings to prevent it from being used in the cycle pattern or pattern you are using before deleting it.
E407	Wrong password	· In the case the password entered is wrong.	· Enter the correct password.
E408	Shortage of number of password characters	· In the case the number of password characters entered is not enough.	· Enter the correct password.
E412	Custom pitch unregistered error	· Custom pitch data is abnormal or missing.	· Ensure that the custom pitch data is registered.
E413	Condensation custom unregistered error	· Condensation custom data is abnormal or missing.	· Ensure that the condensation custom data is registered.
E421	The differential feed amount calculation result is outside the recommended range.	· This occurs when the belt feed amount exceeds 9.00 mm as a result of changing the differential feed amount. · This occurs when the differential feed amount exceeds four times its original value as a result of changing the belt feed amount individually.	· Correct the settings so that the range is not exceeded.
E491	Cycle sewing pattern error	· This occurs when the pattern used for cycle sewing causes an error.	· Re-enter the data after performing a reset. · Re-enter the data for the pattern that caused the error.
E499	Simplified program fault		

Error code	Description of detected error	Description of detected error	Item to be checked
E703	Model error	· The panel, sewing machine, and electrical control box types do not match.	· Connect the panel to the correct sewing machine and electrical control box. · Update the panel and electrical control box software to a compatible version.
E704	Data failure (system-version mismatch)	· The panel and electrical control box software combination is not appropriate.	· Update the panel and electrical control box software to the appropriate version.
E707	Panel NAND memory access error	· Panel PCB failure	
E708	Panel NAND memory is not formatted.	· Panel PCB failure	
E731	Motor hole sensor fault	· In the case the motor signal is not input properly.	· Check whether the motor signal connector has loosened or slipped off. · Check whether the motor signal cord has broken by being caught under the machine head. · Check whether the insertion direction of the motor encoder connector is correct.
E733	Reverse rotation of motor	· The main shaft motor encoder (U, V, W-phase) cannot be detected.	· Check if the main shaft motor encoder wiring is correct. · Check if the main shaft motor power wiring is correct.
E750	Sewing machine stops	· In the case the optional-input safety switch is pressed.	· Turn off the power.
E761	The top feed motor A encoder is not connected.	· The top feed motor A encoder signal is not input.	· Check the encoder cable connection for top feed motor A.
E762	The top feed motor B encoder is not connected.	· The top feed motor B encoder signal is not input.	· Check the encoder cable connection for top feed motor B.
E763	The bottom feed motor A encoder is not connected.	· The bottom feed motor A encoder signal is not input.	· Check the encoder cable connection for bottom feed motor A.
E764	The bottom feed motor B encoder is not connected.	· The bottom feed motor B encoder signal is not input.	· Check the encoder cable connection for bottom feed motor B.
E811	Over-voltage	· When a voltage higher than the guaranteed voltage is applied. · When 200 V is applied despite the voltage is set to 100 V. · When 220 V is applied to a 120 V box. · When 400 V is applied to a CE:230 V box.	· Check whether the supply voltage of "rated supply voltage ±10 % or more" is applied. · Check whether the 100 V/200 V changeover connector is set correctly. · In the above-described cases, the power PCB has broken.
E813	Low voltage	· When a voltage lower than the guaranteed voltage is applied. · The internal circuit was damaged due to low voltage input.	· Ensure that the applied voltage does not drop below 10% of the rated value. · Ensure that there is no abnormality in the PWR PCB. · Ensure that the 100V/200V changeover connector is set correctly.
E815	Regenerative resistor is not connected	· The regenerative resistor is not connected.	· Ensure that the regenerative resistor is connected correctly.
E900	Main shaft motor IPM overcurrent protection	· Maloperation of the main shaft motor.	· Check for looseness or disconnection of the main shaft motor output connector.

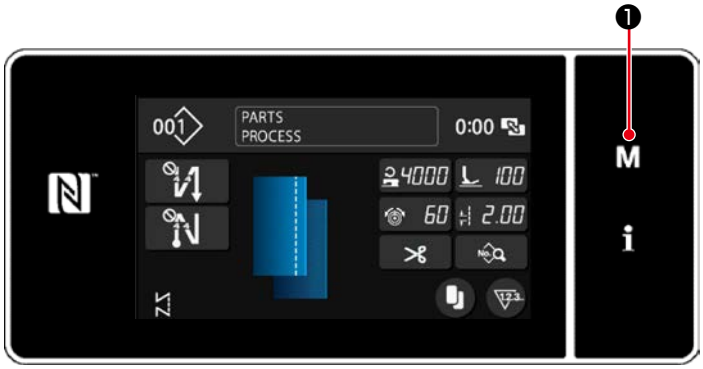
Error code	Description of detected error	Description of detected error	Item to be checked
E901	Main shaft motor IPM overload	· The load applied to the main shaft is excessively large.	· Check for looseness or disconnection of the main shaft motor output connector.
E903	85-V power supply fault	· The 85 V voltage is not output correctly.	· Ensure there is no abnormality in any of the motors. · Ensure that there is no abnormality in the CTL PCB. · Ensure that the ground wire is properly grounded.
E904	24-V power supply fault	· The 24 V output voltage is incorrect.	· Ensure there is no abnormality in any of the motors. · Ensure that there is no abnormality in the CTL PCB. · Ensure that the ground wire is properly grounded.
E910	The presser motor origin retrieval error	· This occurs when the presser motor fails to return to its home position.	· Ensure that the presser is properly installed. · Ensure that the presser's home position is correctly adjusted.
E912	Main shaft motor speed detection error	· Main shaft motor rotated faster than expected.	· Check that the wiring for the main shaft motor encoder connector is correct. · Check that the wiring for the main shaft motor output connector is correct.
E915	Operation panel communication error	· The operation panel cannot communicate with the CTL PCB.	· Ensure that the cable is not broken. · Check for looseness or disconnection of the CTL PCB and operation panel connectors.
E916	MAIN-SUB communication error	· Communication between MAIN-SUB is not possible.	· Ensure there is no abnormality in the CTL PCB.
E922	Main shaft control failure	· The main shaft motor cannot be controlled.	· Ensure there is no abnormality in the main shaft motor. · Ensure there is no abnormality in the PWR PCB.
E924	Motor driver fault	· The motor driver circuit is damaged.	· Ensure there is no abnormality in the main shaft motor. · Ensure there is no abnormality in the PWR PCB.
E946	Machine-head EEPROM write error	· Unable to write data to the INT PCB	· Check for looseness or disconnection of the communication connectors between the CTL and INT PCBs. · Ensure there is no abnormality in the INT PCB.
E955	Electric current sensor malfunction	· Main motor shaft failure. · Electric current sensor failure.	· Ensure there is no abnormality in the main shaft motor. · Ensure there is no abnormality in the PWR PCB.
E962	Presser motor deviation error	· The presser foot fails to operate due to excessive load.	· Check whether the presser motor runs smoothly.
E963	IPM temperature error	· An abnormal temperature in the CTL PCB was detected. · An abnormal temperature of the PWR PCB was detected.	· Check that each motor operates smoothly.
E964	Motor driver failure (SUB)	· The motor driver circuit (SUB) is damaged.	· Ensure there is no abnormality in the top feed motor. · Ensure there is no abnormality in the SUB PCB.

Error code	Description of detected error	Description of detected error	Item to be checked
E971	Bottom feed motor A IPM overcurrent protection	· Bottom feed motor A malfunction	· Check if the bottom feed motor A operates smoothly.
E972	Bottom feed motor A overload	· The load applied to the bottom feed motor A is excessively large.	· Check if the bottom feed motor A operates smoothly.
E973	Bottom feed motor B IPM overcurrent protection	· Bottom feed motor B malfunction	· Check if the bottom feed motor B operates smoothly.
E974	Bottom feed motor B overload	· The load applied to the bottom feed motor A is excessively large.	· Check if the bottom feed motor B operates smoothly.
E975	Presser motor IPM over-current protection	· Presser motor maloperation.	· Check if the presser motor motor operates smoothly.
E976	Presser motor overload	· In the case the presser motor is applied with an excessive load.	· Check whether the presser motor runs smoothly.
E977	CPU fault	· In the case of a program operation fault	· Ensure there is no abnormality in the CTL PCB.
E986	Bottom feed motor home position retrieval error	· This occurs when the bottom feed motor fails to return to its home position.	· Check if the bottom feed motor AB operates smoothly.
E987	Suspended ruler motor home position retrieval error	· This occurs when the suspended ruler motor fails to return to its home position.	· Check if the suspended ruler motor AB operates smoothly.
E988	Top feed motor home position retrieval error	· This occurs when the top feed motor fails to return to its home position.	· Check if the top feed motor AB operates smoothly.
E991	Top feed motor A IPM overcurrent protection	· Top feed motor A malfunction	· Check if the top feed motor A operates smoothly.
E992	Top feed motor A Overload	· The load applied to the top feed motor A is excessively large.	· Check if the top feed motor A operates smoothly.
E993	Top feed motor B IPM overcurrent protection	· Top feed motor B malfunction	· Check if the top feed motor B operates smoothly.
E994	Top feed motor B Overload	· The load applied to the top feed motor B is excessively large.	· Check if the top feed motor B operates smoothly.
E999	Main software rewriting	· When rewriting the software	· This is not an error.

4-11. Memory switch data

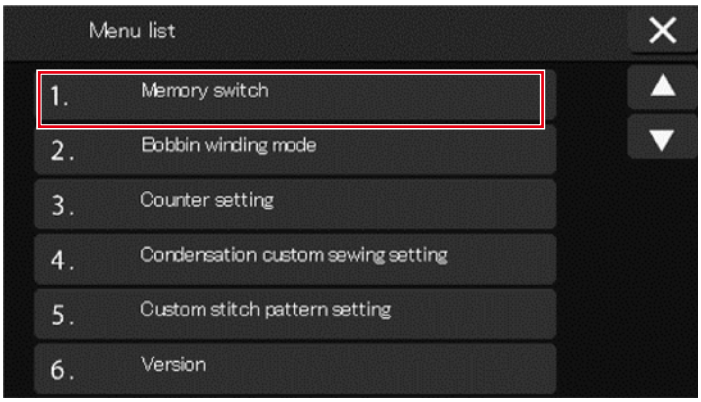
The memory switch data is the sewing machine operation data which commonly affects all sewing patterns and cycle patterns.

① Selecting the category of the memory switch data



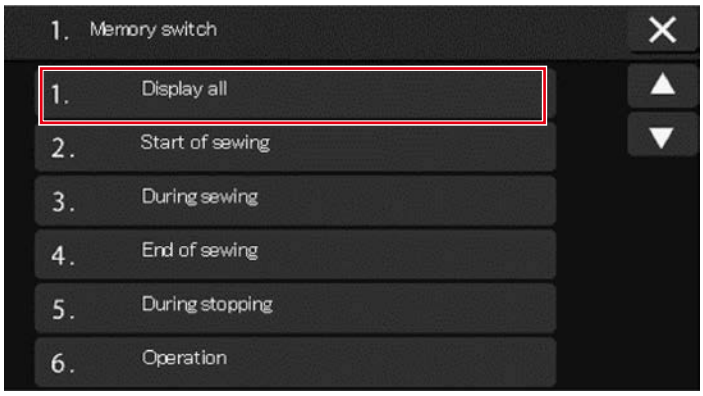
<Sewing screen>

1) Press **M** ❶ on the sewing screen to display the "mode screen".



<Mode screen>

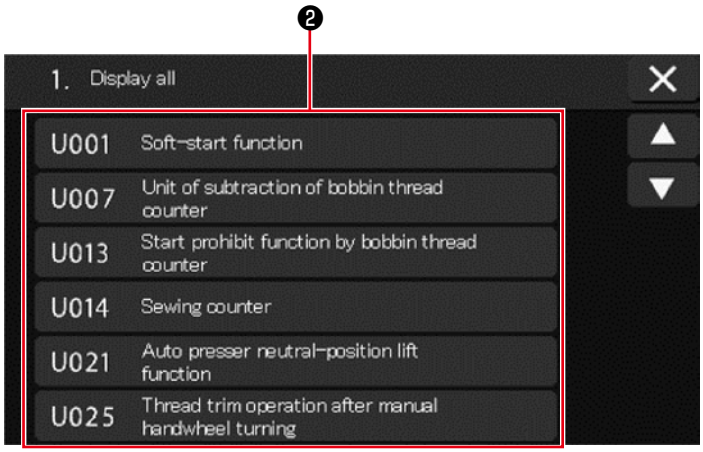
2) Select the "1. Memory switch".
The "memory switch type selection screen" is displayed.



<Memory switch type selection screen>

3) Select the "1. Display all".
The "memory switch edit screen" is displayed.
* In the case any item other than "1. Display all" is selected, only the memory switch which corresponds to the selected item is displayed on the memory switch edit screen.

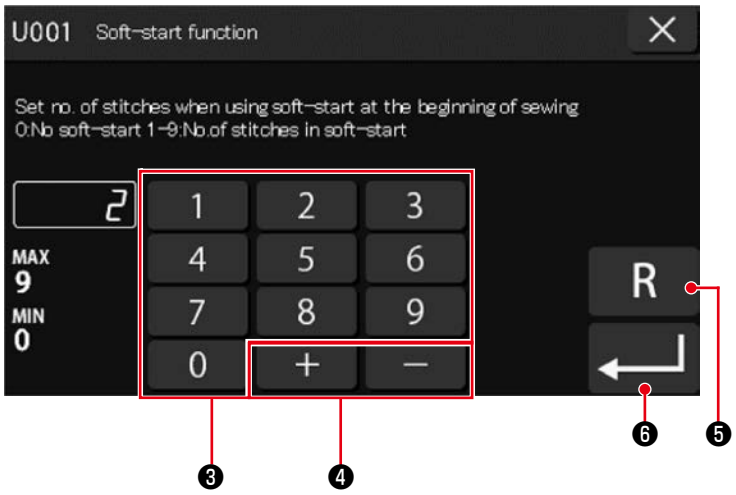
② Setting the memory switch



<Memory switch edit screen>

Select an item to edit from the memory switch list. Press button ❷ .

③ Confirming the data entered



<Input screen>

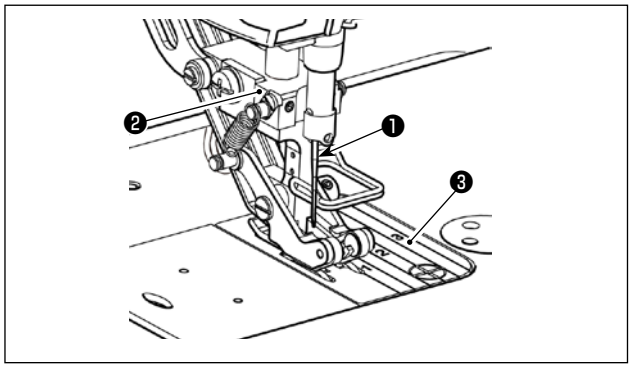
1) Enter a set value with numeric keypad ❸ and + − ❹ .
2) Keep R ❺ held pressed for one second to return the set value to the initial value.
3) Press ↵ ❻ to confirm the setting.
   The "memory switch edit screen" is displayed.

5. CARE

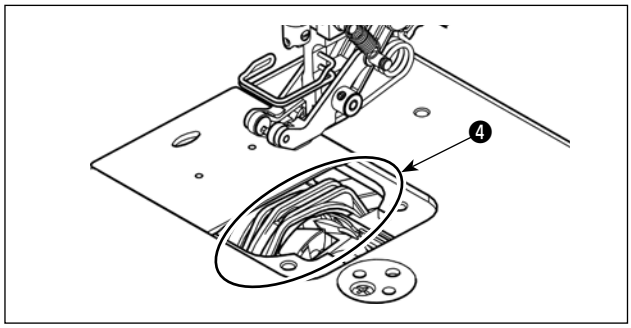
Perform the maintenance below every day for longer use of your machine.

5-1. Cleaning the area around the hook

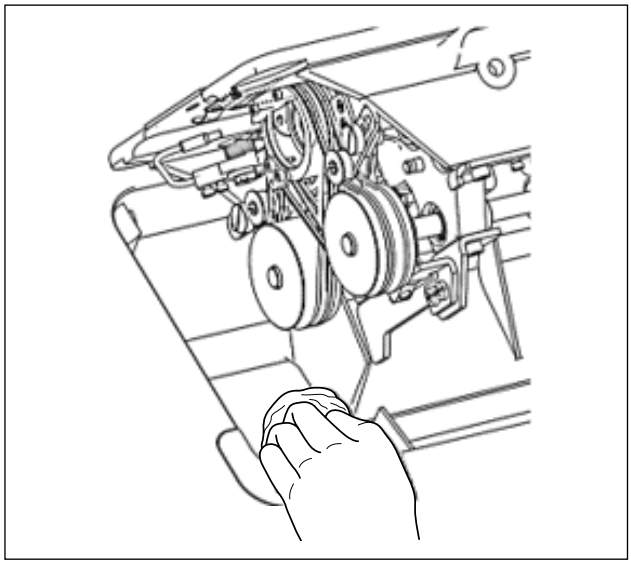
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) Remove needle ❶ and throat plate ❷, then lift the presser foot ❸.



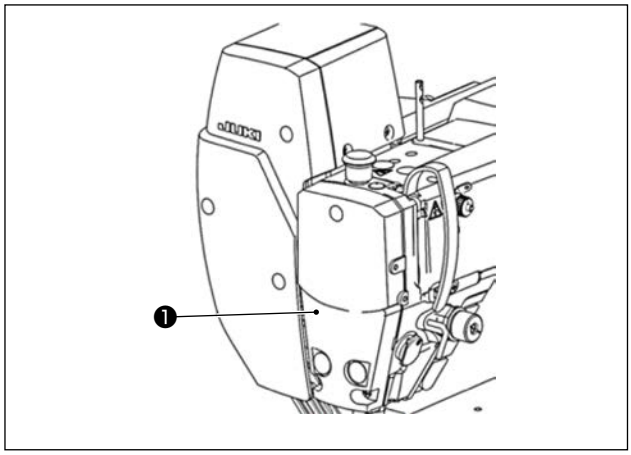
2) Remove any dust adhered to the thread trimmer unit ❹ using a soft brush or cloth.



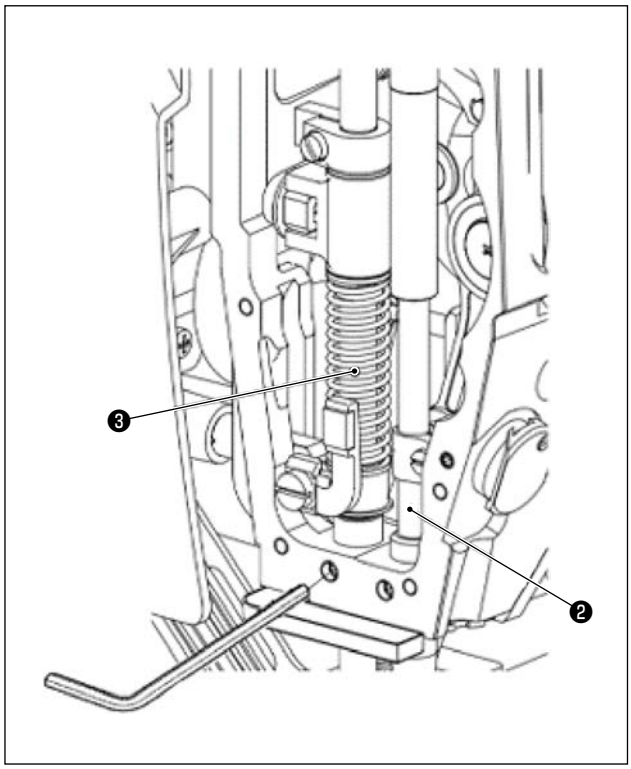
3) Tilt the machine head and wipe out the dirt of bobbin case and the like with soft cloth, and confirm that there is no scratch. Wipe out with the cloth dust and hook oil drained in the under cover near the hook.

5-2. Cleaning the interior of the frame

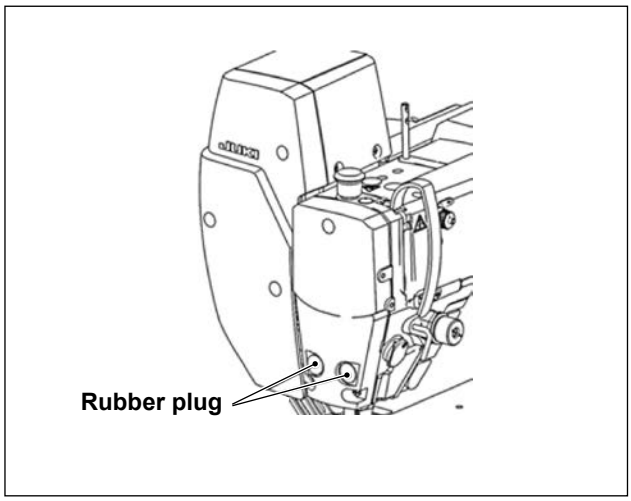
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) Remove face plate ❶.



2) Remove dust stuck the parts inside the frame such as needle bar ❷ and presser bar ❸ with a soft brush or a piece of soft cloth.
3) After the completion of cleaning, add grease to the needle bar and the presser bar. Then, attach face plate ❶.

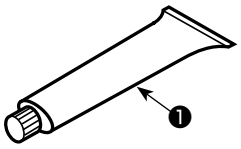


Be sure to attach the rubber plug back in place if you have removed it before cleaning.

5-3. Applying grease

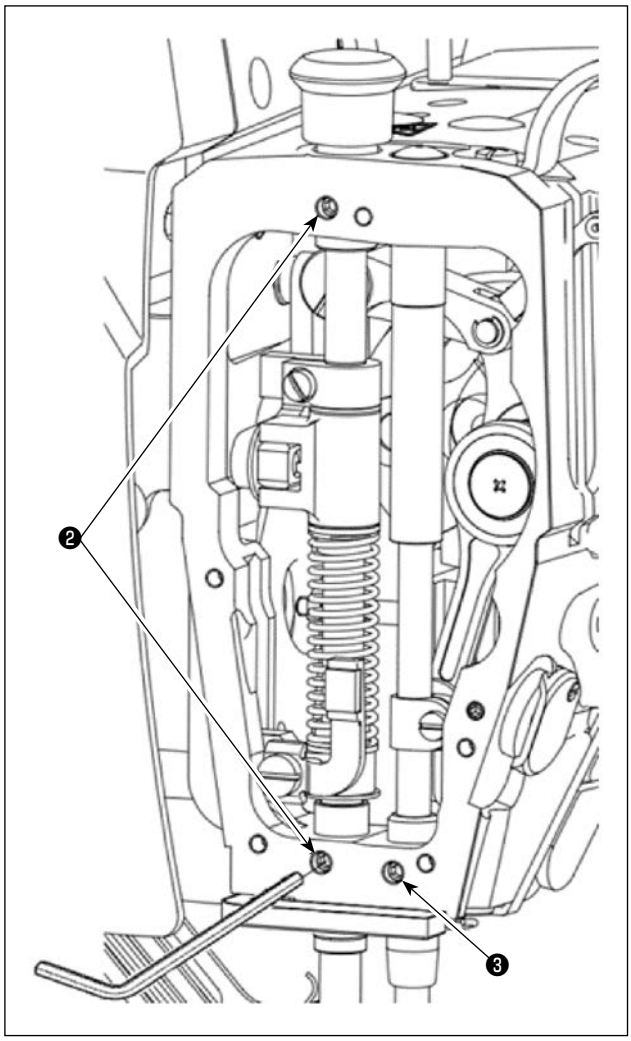
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

1. **When the machine needs replenishment of grease, an alarm sounds. Once the alarm sounds, replenish grease. In the case the machine is used under harsh environment, it is recommended to replenish grease once a year for ensuring effective greasing.**
2. **Do not apply oil to the sections which are lubricated with grease.**
3. **Be aware that grease can leak from the thread take-up cover and needle bar if the amount of grease is excessive.**
4. **Be sure to use JUKI GREASE A TUBE ❶ (part number : 40006323).**



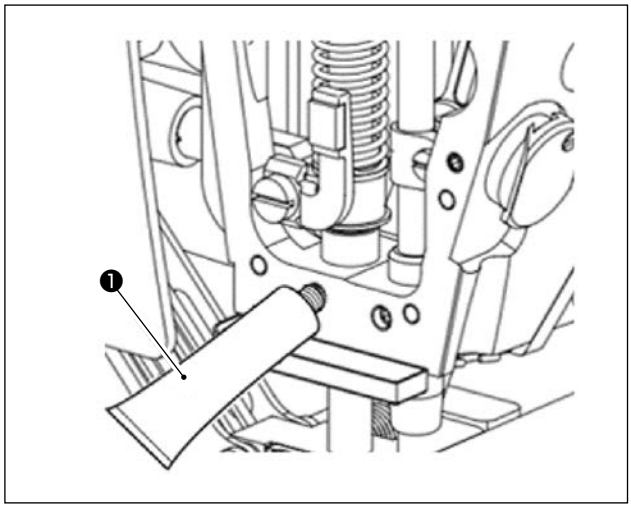
5-4. Applying grease to the needle bar lower bushing and the presser bar bushing

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



Carry out greasing with the needle bar installed.

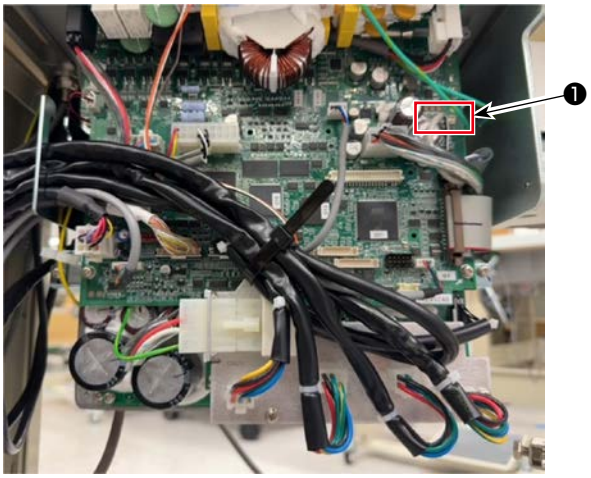
1) Remove the face plate.
2) Remove the presser bar bushing greasing screw ❷ and the needle bar bushing greasing screw ❸ using a hexagon wrench.



3) Remove the cap of exclusive grease tube ❶. Insert its tip into the oil hole and replenish grease from exclusive grease tube ❶.
   At this time, add grease until it overflows the oil hole.
4) Push overflowing exclusive grease with the oil filling screw into the oil hole.
5) Wipe the excess of grease off the area around the oil hole.

5-5. Replacing the fuse

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

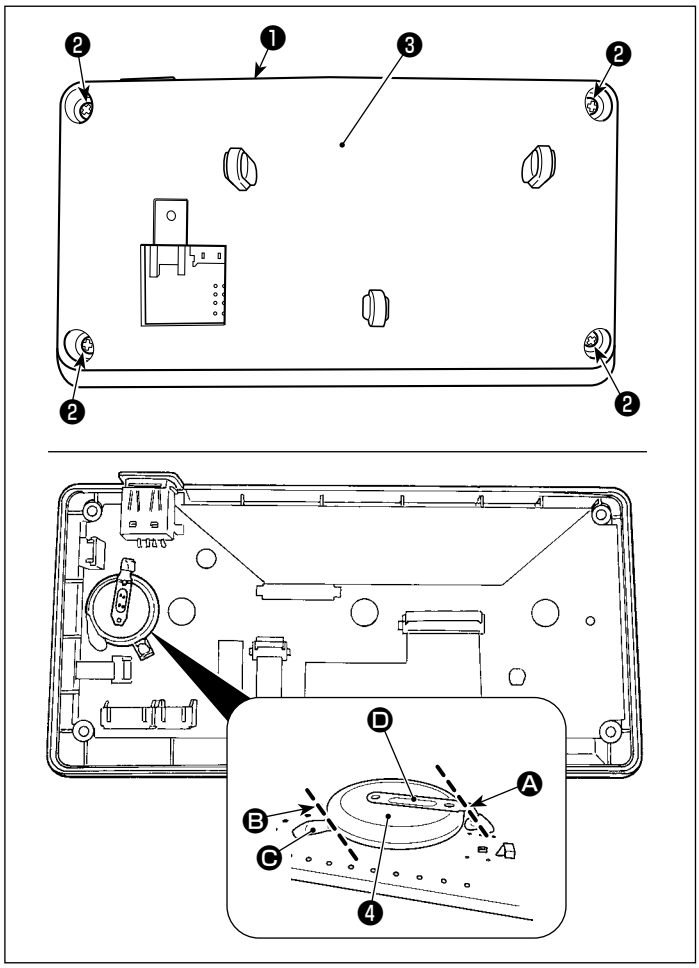


The machine uses the following one fuse :
MAIN PWB
❶ For 85V power supply protection
5A (time-lag fuse)

5-6. 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**]



1) Remove panel ❶ from the main body of sewing machine.
2) Loosen screw ❷ from the rear surface of the operation panel. Detach case ❸.

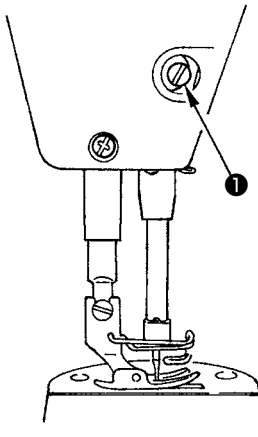
3) ❹ is the battery for clock.
   Type number: ML2020/F1AK
4) Cut metal plate Ⓓ that secures battery ❹ with nippers or the like at position Ⓐ.
5) Cut metal plate Ⓒ that secures battery ❹ with nippers or the like at position Ⓑ. Then, remove battery ❹.

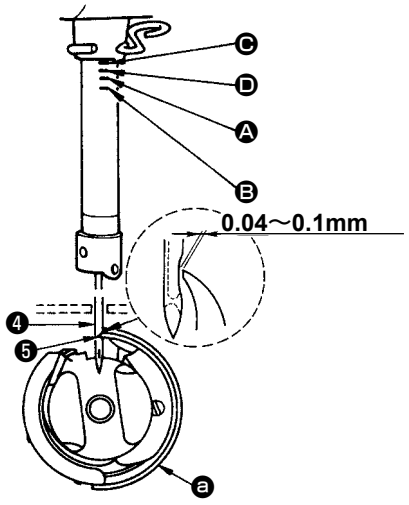
Carefully protect your fingers from being cut with the cut edge of the metal plate.

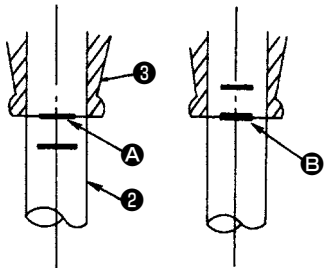
6. ADJUSTMENT OF THE MACHINE HEAD (APPLICATION)

6-1. 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.







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

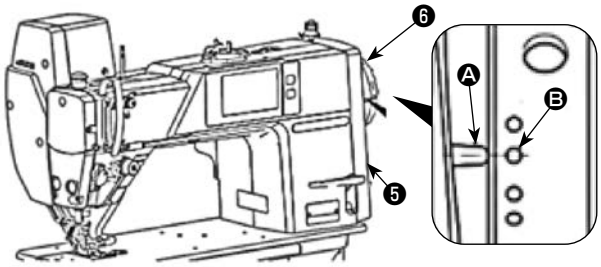
1) Adjusting the needle bar height. Turn the hand-wheel to bright the needle bar down to the lowest point of its stroke, and loosen setscrew ❶.
2) Adjusting the needle bar height. Align marker line (For a DB needle : marker line Ⓐ, For a DA needle : marker line Ⓒ) on needle bar ❷ with the bottom end of needle bar lower bushing ❸, then tighten setscrew ❶.
3) Position the needle and the hook ⓐ.
   Loosen the three hook setscrews, turn the hand-wheel in normal rotation and align marker line (For a DB needle : marker line Ⓑ, For a DA needle : marker line Ⓓ) on ascending needle bar ❷ with the bottom end of needle bar lower bushing ❸.
4) In this state, align hook blade point ❺ with the center of needle ❹. Provide a clearance of 0.04 to 0.1 mm (reference value) between the needle and the hook, then securely tighten the three hook setscrews.

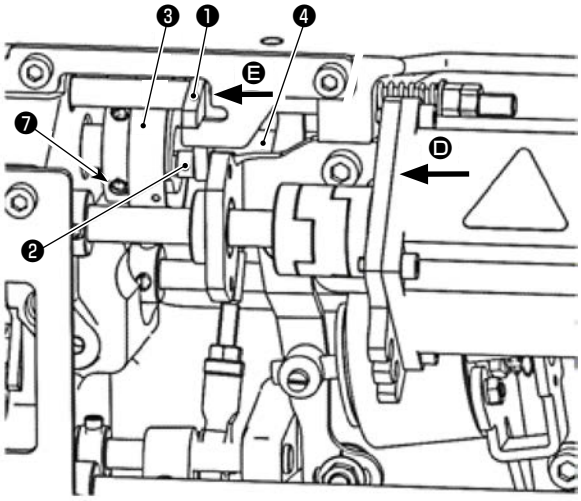
Caution

1. If the clearance between the blade point of hook and the needle is smaller than the specified value, the blade point of hook will be damaged. If the clearance is larger, stitch skipping will result.
2. If the marker line is difficult to see, use a light or other device to brighten the area and check.

6-2. Adjusting 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.





Turn thread trimming cam ❸ in the direction of arrow until the outer periphery of thread trimming cam groove Ⓒ comes in contact with roller ❷ and stops. At this position, fix thread trimming cam setscrew ❼.

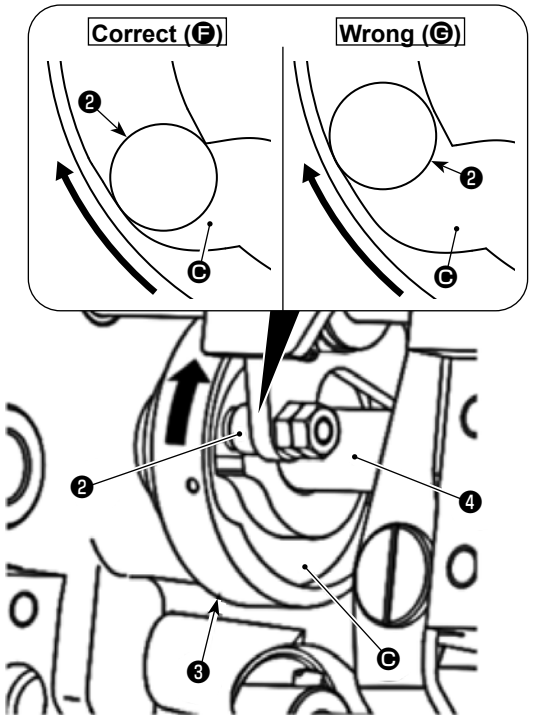


Illustration as observed from Ⓓ (right side face)

6-2-1. For checking of the thread trimming cam timing

The purpose of the thread trimmer cam timing is to align the marker line Ⓐ on the pulley cover ❺ with the green marker dot Ⓑ on the handwheel ❻.

1) Tilt the sewing machine head.
2) Turn handwheel ❻ by hand in the normal direction of rotation until the thread take-up lever goes up slightly below the upper dead point. Press cam follower ❶ with fingers to the left (in direction of arrow Ⓔ) to fit roller ❷ to in groove Ⓒ in thread trimming cam ❸.
3) In this state, turn handwheel ❻ in the direction which is opposite to the normal direction of rotation until handwheel ❻ will go no further. (If the handwheel is turned further, it reaches the position at which cam follower ❶ starts moving.)
   At this time, marker line Ⓐ on pulley cover ❺ aligns with green marker dot Ⓑ on handwheel ❻.

6-2-2. Adjustment of the thread trimming cam timing

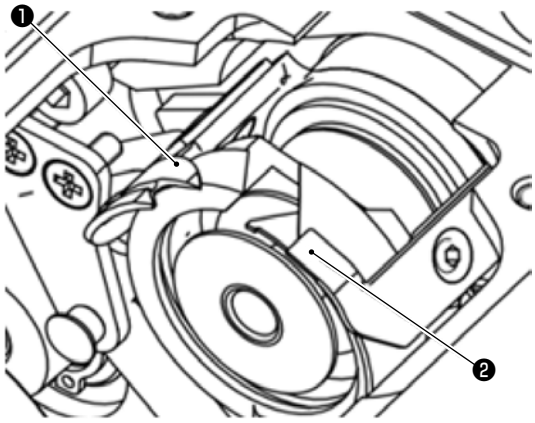
1) Tilt the sewing machine head.
2) Loosen the screws No. 2 and No. 1 of thread trimming cam setscrew ❼ in the written order.
3) Align marker line Ⓐ on pulley cover ❺ with green marker dot Ⓑ (H type : White marker dot Ⓑ´) on handwheel ❻.
4) Pressing cam follower ❶ to the left (in the direction of arrow Ⓔ), engage thread trimming cam ❸ with roller ❷. Then, turn only thread trimming cam ❸ with fingers in the direction which is opposite to the normal direction of rotation of feed driving shaft ❹ until it will go no further without turning feed driving shaft ❹. At this position, tighten the screws No. 1 and No. 2 of thread trimming cam setscrew ❼ in the written order while pressing thread trimming cam ❸ against roller ❷.

Caution

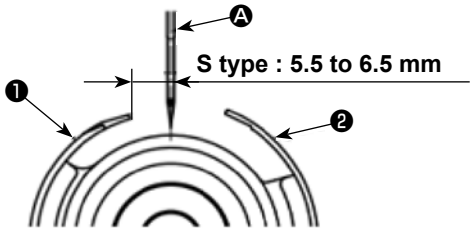
1. **In the case of using a high-count filament thread, thread loop formation may be unstable. If faulty loop spreading occurs in this state, correct the thread trimming cam timing by aligning the marker line on the pulley cover with the red marker dot, instead of the green marker dot, on the handwheel.**
2. **The alignment point between thread trimming cam ❸ and roller ❷ is position (Ⓕ) from which cam follower ❶ starts moving. Position (Ⓖ) at which you feel that thread trimming cam ❸ comes in contact with roller ❷ for the first time during adjustment is not the correct alignment position.**
   * **Be sure to correct the thread trimming cam timing carefully since it largely affects the loop spreading timing.**

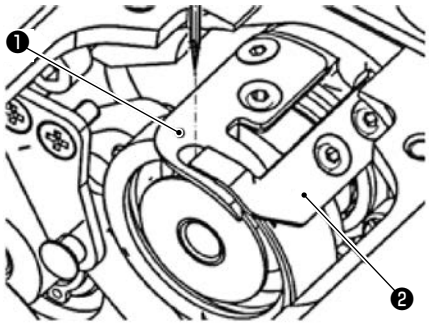
6-2-3. Checking of the knife unit

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



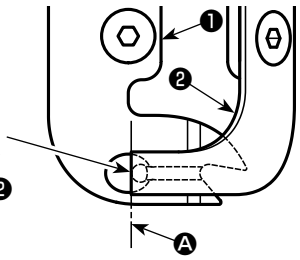
Standby state of the knife

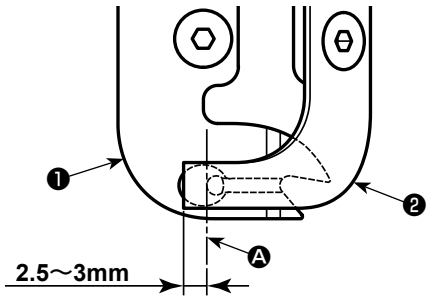




Aligning state of salient portion of loop spreading knife and thread trimming knife

Far end of the hole in loop spreading knife ❶ aligns with the tip of thread trimming knife ❷





State of engagement of knife

1) Check to make sure that the power switch is in the OFF state. Remove the gauge (Presser foot, throat plate, hook base assembly) from around the needle.
2) In the standby state of loop spreading knife ❶, the distance from center of needle Ⓐ to the tip of loop spreading knife ❶ is 5.5 to 6.5 mm.

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

* Refer to **"6-2-4. Adjustment of the knife unit" p. 109** for how to adjust it.

3) The purpose of adjustment of the aligning position of loop spreading knife ❶ and thread trimming knife ❷ (far end of the hole in loop spreading knife ❶ and the tip of thread trimming knife ❷) is to align the aforementioned aligning position with center of needle Ⓐ.

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

4) The amount of engagement between loop spreading knife ❶ and thread trimming knife ❷ is 2.5 to 3 mm as measured from center of needle Ⓐ.

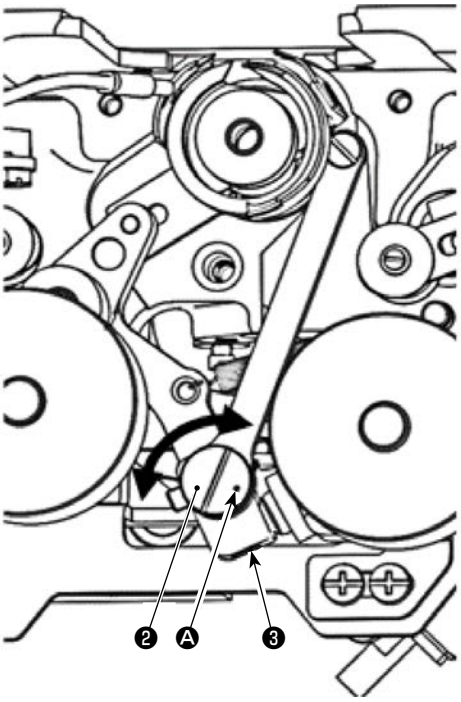
Caution
Be aware that, if the amount of engagement between them is insufficient, faulty thread trimming can occur.

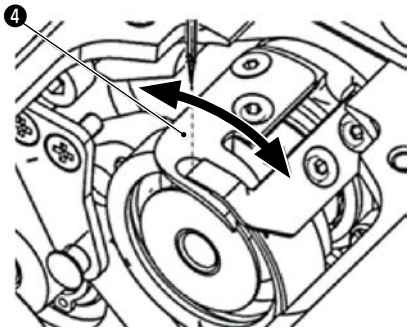
* Refer to **"6-2-4. Adjustment of the knife unit" p. 109** for how to adjust it.

Caution
The needle thread may be trimmed excessively short in the case thread such as filament thread which is likely to cause unstable thread loop formation is used or thread trimming is carried out at a position where there is no material. If the aforementioned phenomenon occurs, it should be corrected by carrying out the below-stated procedure.
- **Make the thread take-up spring stroke larger than the standard value.**
- **Make the pitch for thread trimming during condensation stitch larger than the standard pitch.**
- **Turn OFF the condensation stitch operation when carrying out thread trimming at a position where there is no material.**

6-2-4. Adjustment of the knife unit

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



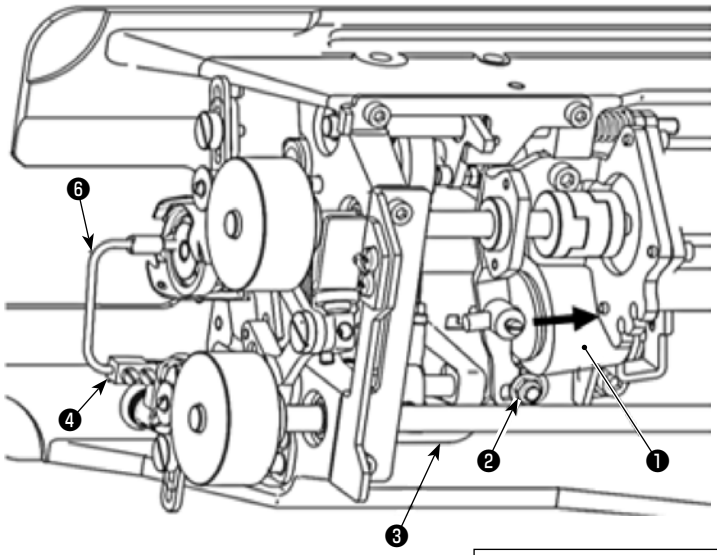


1) Check to make sure that the power switch is in the OFF state. Remove the gauge (Presser foot, throat plate, hook base assembly) from around the needle.
2) Tilt the sewing machine head.
3) Loosen loop spreading knife eccentric pin set-screws ❸ (two pieces). Turn loop spreading knife eccentric pin ❷ with a flat-blade screwdriver to finely adjust the rotational-direction position of loop spreading knife ❹.
4) After the adjustment, tighten loop spreading knife eccentric pin setscrews ❸ (two pieces).

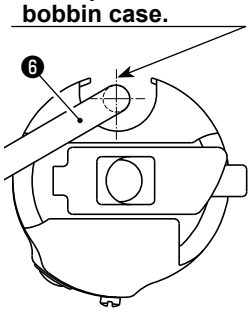
Caution
Position of marker dot Ⓐ on loop spreading knife eccentric pin ❷ should be adjusted only from the operator's side.

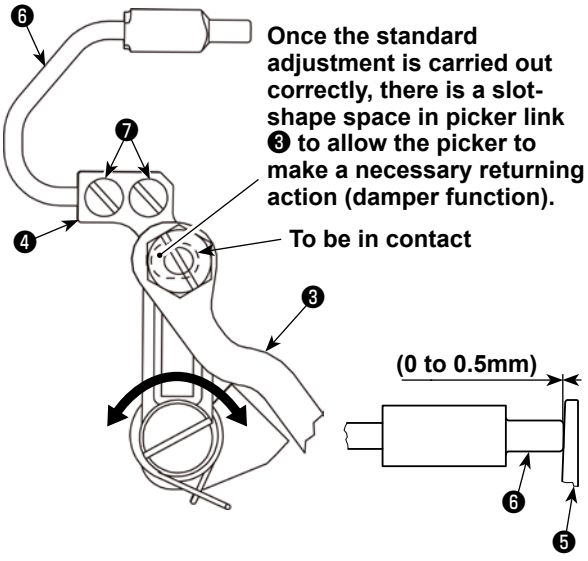
6-3. Adjustment of the picker

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



In the standard adjustment state of the picker, the center of picker ❻ is almost aligned with the center of U-shape section of bobbin case.





Once the standard adjustment is carried out correctly, there is a slot-shape space in picker link ❸ to allow the picker to make a necessary returning action (damper function).

To be in contact

The picker device is used in order to stabilize idling of the bobbin at the time of thread trimming.

When it is necessary to check how the picker is adjusted, install the bobbin case and bobbin in the hook first, then check the picker.

6-3-1. Checking the standard adjustment

1) Check to make sure that the power switch is in the "OFF" state. Tilt the sewing machine.
2) Bring thread trimming solenoid ❶ in the pull-in state by hand.
3) In this state, the standard adjustment value of the clearance between picker link ❸ and picker arm ❹ is 0.5 mm. At this time, a clearance of 0 to 0.5 mm is provided between bobbin ❺ and picker ❻.

6-3-2. Standard adjustment

1) Loosen picker link pin nut ❷ (9 mm). Carry out adjustment by moving picker link ❸ to the right and left.
2) After the adjustment, tighten picker link pin nut ❷.

6-3-3. Standard adjustment (Adjustment at the tip position)

1) Loosen picker setscrews ❼ (two pieces). Adjust the position of picker.
2) After the adjustment, tighten picker setscrews ❼ (two pieces).

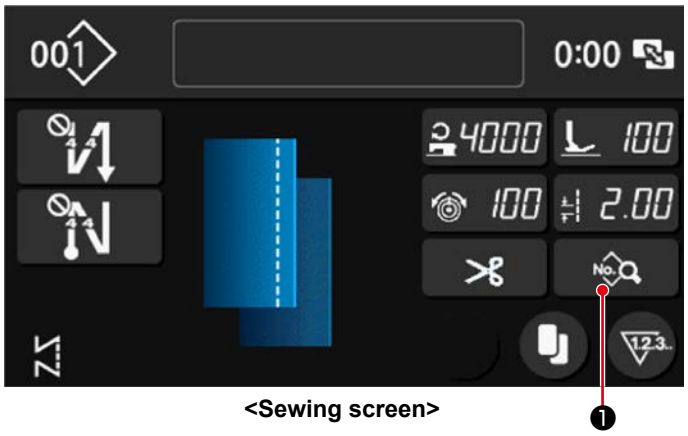
1. If there is no clearance between bobbin ❺ and the tip of picker ❻, picker ❻ strongly press bobbin ❺. As a result, the bobbin fails to supply a required length of bobbin thread at the time of thread trimming. In this case, the bobbin thread is likely to be trimmed short and thread slip-off at the beginning of sewing is likely to occur.
2. If there is an excessively large clearance between bobbin ❺ and the tip of picker ❻, thread required for thread trimming may slip off the tip of picker and the length of needle thread remaining at the needle tip after thread trimming will be short. In addition, bobbin ❺ is likely to idle frequently at the time of thread trimming causing problems at the beginning of sewing.

6-4. Multi-layered section detection function

6-4-1. Multi-layered section detection function

This function allows detection of a multi-layered section of material. When a multi-layered section of material is detected, the sewing parameter is automatically changed to the one-touch changeover parameter (**"4-6-1. One-touch utility changeover function" p. 73**) to allow the sewing machine to continue sewing. The multi-layered section detection setting can be stored in memory on a pattern-by-pattern basis.
Detectable material thickness : Max. 8 mm
Detection resolution : 0.1 mm

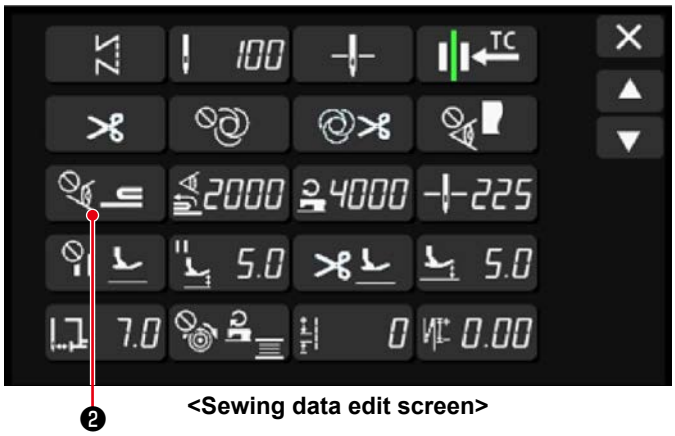
* It is not possible to detect two or more multi-layered sections with different heights. In such cases, use the one-touch changeover function or the polygonal-shape stitching function with the hand switch.
* After a layer is detected and the parameter is switched, the changed state will remain even after passing the layer. To restore the switched parameter, set "S133 Number of stitches to be sewn before turning changeover OFF when a multi-layered section is detected".



<Sewing screen>

① Select enable/disable of the multi-layered section detection function.

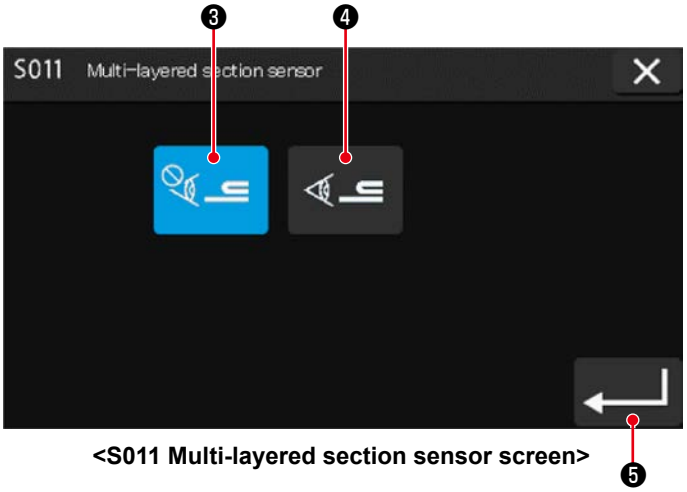
1) Press  ❶.
The "sewing data edit screen" is displayed.



<Sewing data edit screen>

2) Press  ❷.

"S011 Multi-layered section sensor" is displayed.



<S011 Multi-layered section sensor screen>

3) Press  ❸ (OFF) or  ❹ (ON) to disable or enable the multi-layered section detection.
Press  ❺ to confirm the setting and display the sewing data edit screen.



<Sewing data edit screen>

②Set a "threshold" for the multi-layered section detection.

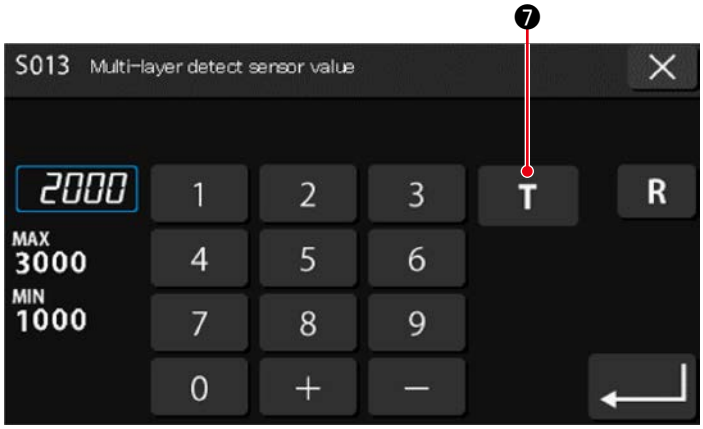
The word "threshold" means the value at which the multi-layered section sensor reacts.

MAX : 3000

MIN : 1000

1) Press 2000 ❻.

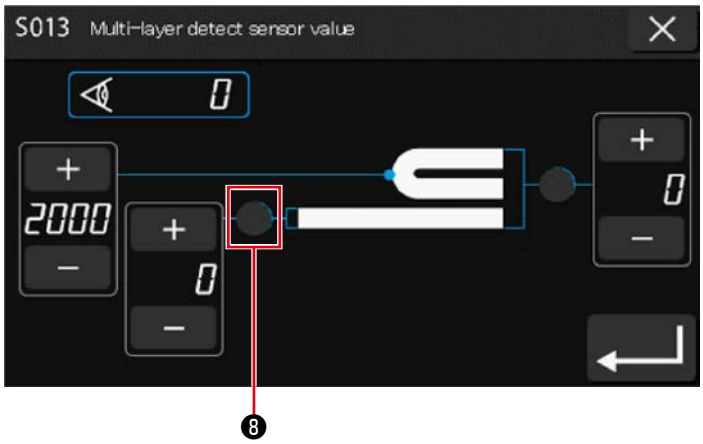
"S013 Multi-layered section sensor value screen" will be displayed.



<S013 Multi-layered section detection sensor value screen>

2) Press T ❼.

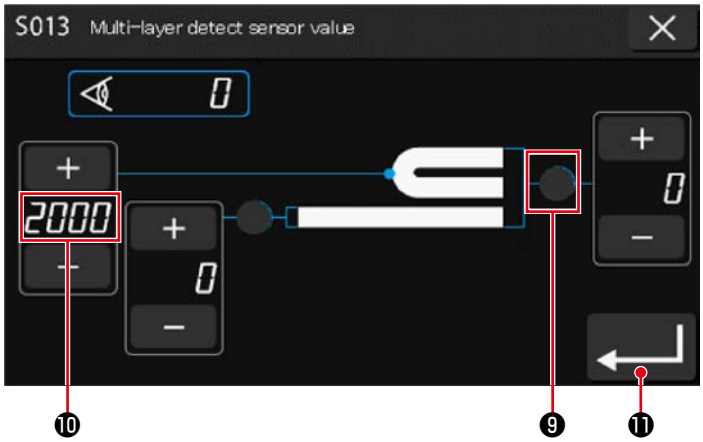
"S013 Multi-layered section detection sensor value screen" will be displayed.



<S013 Multi-layered section detection sensor value teaching screen>

3) Place the normal section of material under the presser foot, and press ❽.

Lift the presser foot by depressing the back part of the pedal.

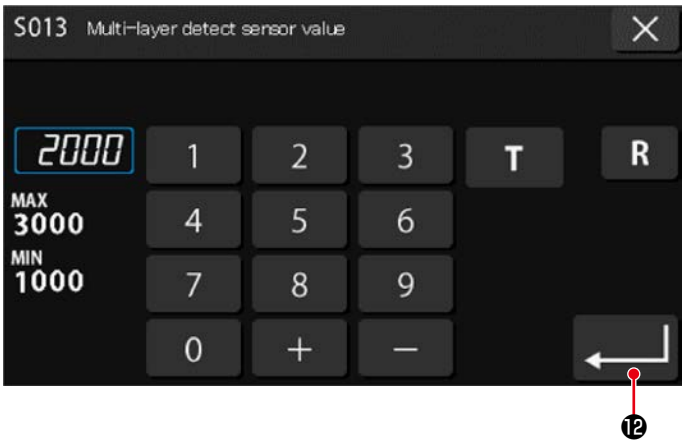


<S013 Multi-layered section detection sensor value teaching screen>

4) Place the multi-layered section of material under the presser foot, and press❾.
The value of ❿ is automatically calculated, and that value becomes the "threshold" for the multi-layered section detection. The value is adjustable with + − according to the sewing item.

If the "threshold" is decreased, the multi-layered section will be detected earlier. Be aware that an excessively decreased threshold can cause a faulty detection.

Press ⏎ ⓫ to display "S013 Multi-layered section detection sensor value".



<S013 Multi-layered section detection sensor value screen>

5) Ensure that the threshold you set has been entered, then press ⏎ ⓬ to confirm the setting.

* Note that the "threshold" can be directly entered or corrected on this screen.

The initial value of "threshold" for the multi-layered section detection is a reference indication. The threshold should be finely adjusted according to the actual sewing conditions such as the item to be sewn.

6-5. Disabling the multi-layered section changeover by the number of stitches

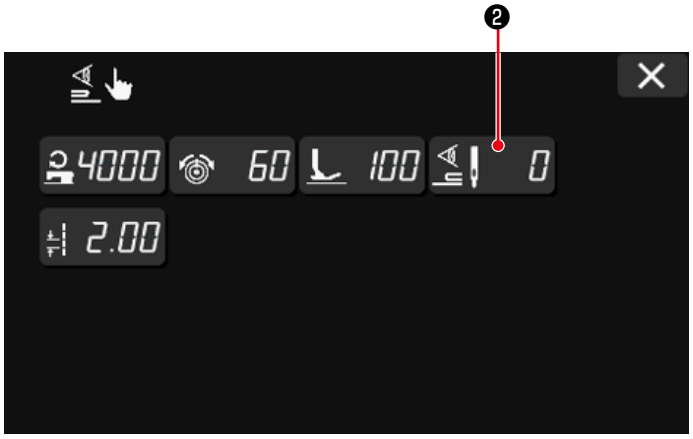
When the multi-layered section detection function is activated, the changeover can be disabled after the specified number of stitches.
Once the number of stitches for disabling the multi-layered section changeover function is set, the setting reverts to its previous value (before the changeover was activated) after the specified number of stitches is completed from the detected multi-layered section, even if detection occurs within the multi-layered section of the material.





<sewing data edit screen>

1) Press ❶ on the "sewing data edit screen".
The "multi-layered section changeover edit screen" will be displayed.



<Multi-layered section changeover edit screen>

2) Press ❷.
The "S133 Number of stitches to be sewn before turning changeover OFF when a multi-layered section is detected" screen will be displayed.



<S133 Number of stitches to be sewn before turning changeover OFF when a multi-layered section is detected>

3) Enter the number of stitches using the numeric keypad.
Press ❸ to confirm the entered value.

Factory default value: 0 (Number of stitches not set)
Setting Range : 0 to 200

* If this value is set to 0 (zero), the changeover OFF function by the number of stitches will be disabled.

7. SEWING PATTERN

You can register up to 99 sewing patterns.
You can register a new sewing pattern based on the individual feed amount setting (shape selection) registered in advance.
You can also register a new sewing pattern based on conventional settings or similar ones (custom), for which the individual feed amount has not been set.

7-1. Creating a new sewing pattern

You can create a new pattern by selecting an individual feed amount setting (shape selection) that is registered in advance, according to the sewing shape as shown in the table below.
You can also select "custom" for all stitch shapes.

Sewing shape	Custom	Shape selection
Free stitching	○	○
constant-dimension stitching	○	○
multi-layer stitching	○	×
polygonal-shape stitching	○	○ *1

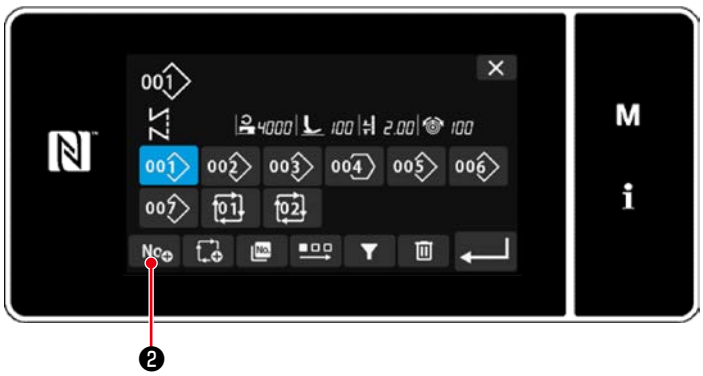
***1 Shape selection is created in multiple steps based on the image of the sewing object.**

7-1-1. New registration

① Selecting the new pattern creation function

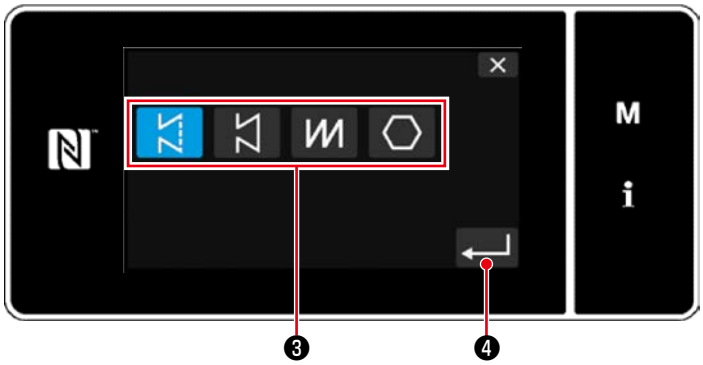


1) Press 001 ❶ to display the "sewing pattern management screen".



2) Press Nc ❷ .

② **Selecting the sewing shape**

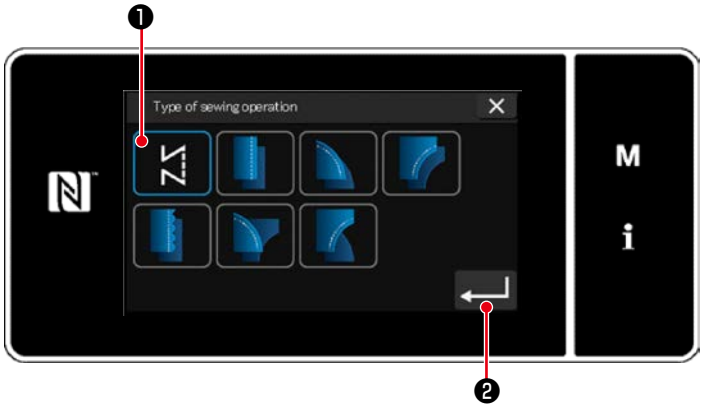


1) Select the shape selection button ❸ .
2) Press ↵ ❹ .

* The "shape selection" screen is displayed for free stitching, constant-dimension sewing, and polygonal-shape stitching.
* The multi-layer stitching is displayed on the "creation content confirmation" screen.

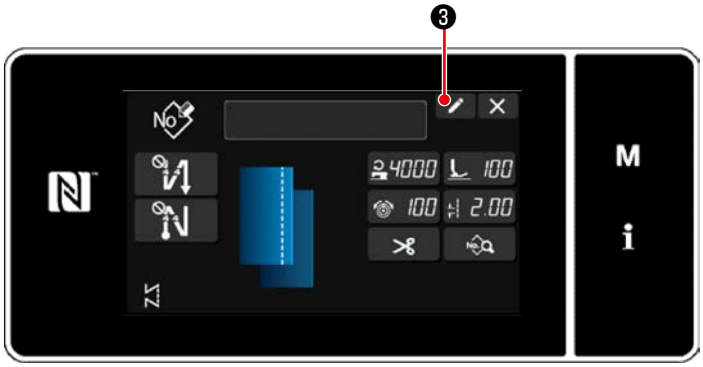
7-1-2. Creating a new pattern (free stitching, constant-dimension sewing)

① **Select shape**



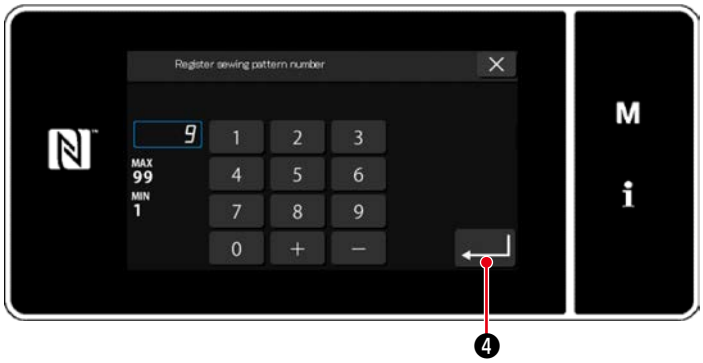
1) Select the shape selection button ❶ .
2) Press ↵ ❷ to display the "creation content confirmation" screen.

② **Checking the creation content**

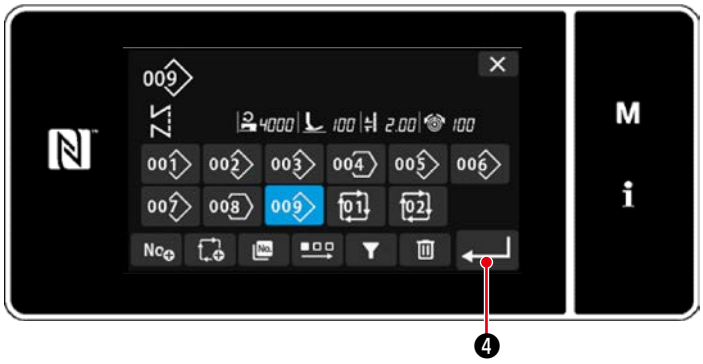


Check the creation content and press ✎ ❸ to display the sewing pattern number registration.

③ Enter registration number



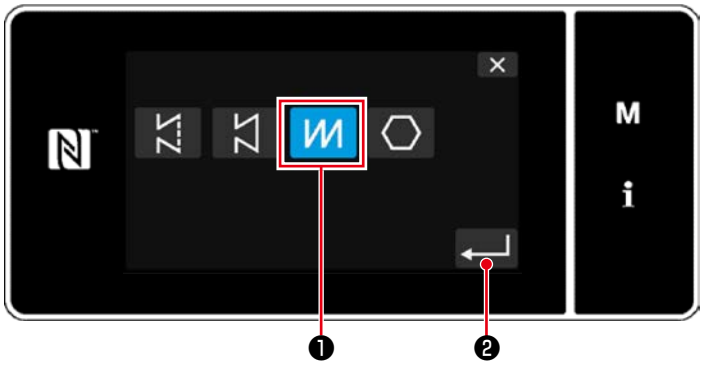
1) Enter the pattern number to be registered using the numeric keypad.
2) Press [↵] ❹ to confirm the pattern number and display the "sewing pattern management screen".



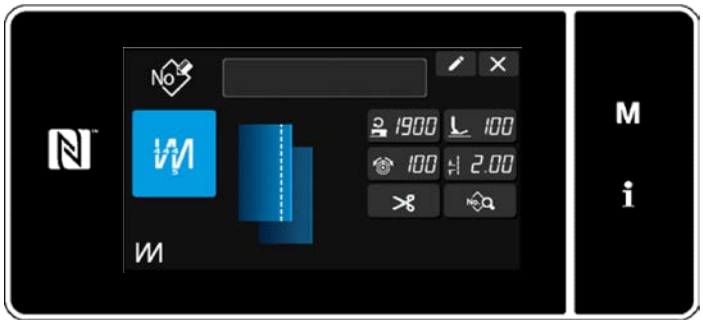
3) The registered sewing pattern data will be displayed.
- Free stitching, constant-dimension stitching, and multi-layer stitching are displayed with 001.
- Polygonal-shape stitching is displayed with 004.
- Cycle sewing pattern is displayed with 01.

7-1-3. Creating a new pattern (multi-layer stitching)

① Selecting a custom shape



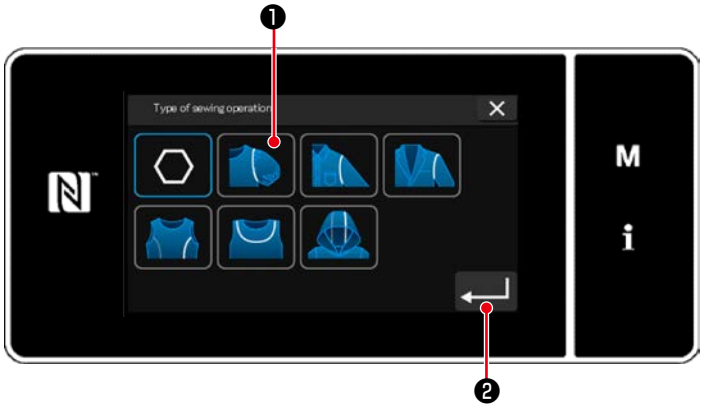
1) Select the shape selection button ❶ .
2) Press [↵] ❷ to display the "creation content confirmation" screen.



3) For the subsequent operations, refer to steps ② to ③ in **"7-1-2. Creating a new pattern (free stitching, constant-dimension sewing)" p. 116**

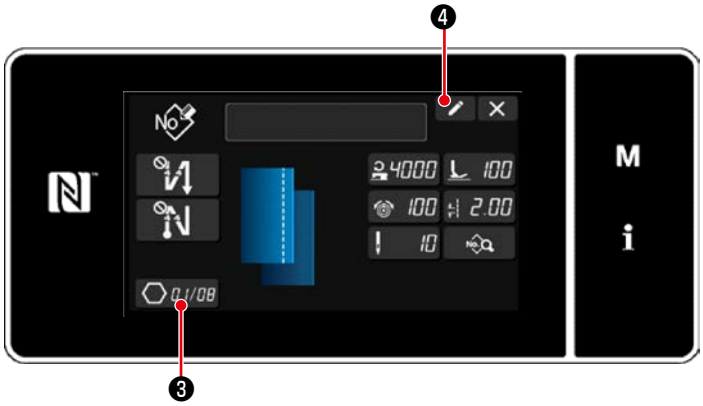
7-1-4. Creating a new pattern (polygonal-shape stitching)

① Select shape



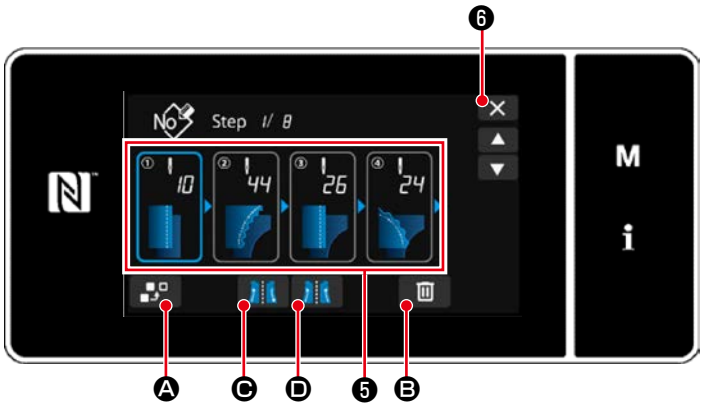
1) Select the shape selection button ❶ .
2) Press  ❷ to display the "creation content confirmation" screen.

② Check your creation



1) Press  ❸ to display the "polygonal-shape stitching step edit screen".
2) After checking the creation content, press  ❹ to display the sewing pattern number registration.

③ Editing the polygonal-shape stitching steps



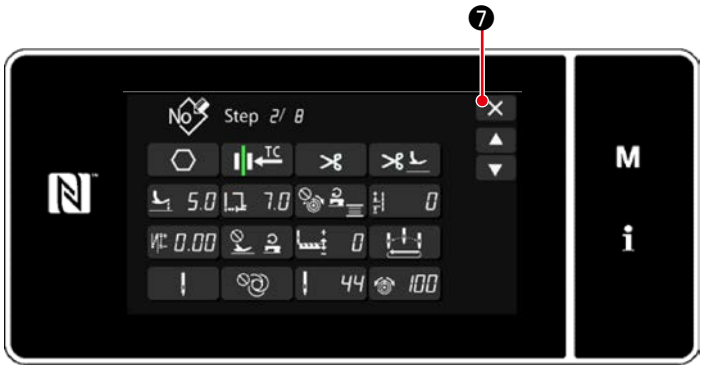
The step number, switching method, and image for each step are displayed on the polygonal-shape stitching step edit screen.

1) Press the step selection button ❺ once briefly to specify the step to edit.
2) Press the step selection button ❺ twice briefly to display the "polygonal-shape stitching step parameter list screen".

3) While step ❺ is selected, press  Ⓐ to insert a step with the same settings as the current step.
4) While step ❺ is selected, press  Ⓑ to delete the currently selected step.
5) While step ❺ is selected, press  Ⓒ to reverse the order of the current sewing pattern steps.
   Example of use: When sewing the right and left sides of a garment without reversing the top and bottom materials.
* As the sewing direction will change, you must readjust the differential feed amount.
6) While step ❺ is selected, press  Ⓓ *1 to swap the top and bottom feed amounts.
   Example of use: When sewing the right and left sides of a garment by reversing the top and bottom materials.
* As the top and bottom materials will change, you must readjust the differential feed amount.
7) After editing the steps, press  ❻ to return to the "creation content confirmation" screen.

***1  will not be displayed if memory switch K499 "Bottom feed method" is set to "1: Front-back feed."**

④ Editing parameters for each polygonal-shape stitching step

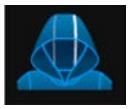


You can set pattern functions individually on the "polygonal-shape stitching step parameter list screen". For details on the function items that can be edited, refer to **"4-4-6. List of pattern functions" p. 62**.

Change each desired item and press  to confirm the changes.

Press  ❼ to display the "polygonal-shape stitching step edit screen".

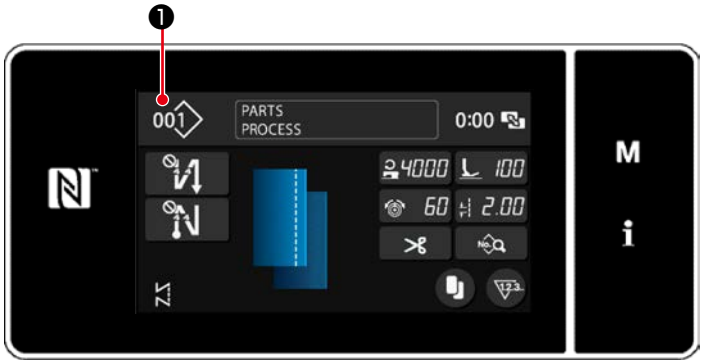
7-1-5. List of initial values for preset patterns

		No.	1	2	3	4	5	6
		Icon						
		Sewing item name	Puff sleeve attachment	Shirt sleeve attachment	Jacket sleeve attachment	Panel line changeover	Round changeover	Hood changeover
		Step No.	8	8	9	3	11	5
Step No.	No.	Setting parameter						
Step 1	S202	Step changeover	0	0	0	0	0	0
	S206	Number of stitches	10	10	5	48	15	80
	S222	Overall feed amount	200	200	200	200	200	200
	-	Top feed left-right difference	0	0	0	6	0	9
	-	Bottom feed difference	0	0	0	-4	0	0
	-	Vertical feed difference	0	0	0	2	0	9
Step 2	S202	Step changeover	0	0	0	0	0	0
	S206	Number of stitches	44	44	44	34	47	47
	S222	Overall feed amount	200	200	200	200	200	200
	-	Top feed left-right difference	-2	-2	-2	7	3	5
	-	Bottom feed difference	-4	-4	-4	-4	-2	0
	-	Vertical feed difference	2	2	2	5	3	3
Step 3	S202	Step changeover	0	0	0	1	0	0
	S206	Number of stitches	26	26	26	0	40	38
	S222	Overall feed amount	200	200	200	200	200	200
	-	Top feed left-right difference	0	0	-2	0	7	9
	-	Bottom feed difference	-2	-2	-2	0	-3	0
	-	Vertical feed difference	0	0	2	0	3	14
Step 4	S202	Step changeover	0	0	0	-	0	0
	S206	Number of stitches	24	24	24	-	20	47
	S222	Overall feed amount	200	200	200	-	200	200
	-	Top feed left-right difference	4	3	3	-	10	6
	-	Bottom feed difference	-3	-3	-3	-	-3	1
	-	Vertical feed difference	14	3	5	-	6	3
Step 5	S202	Step changeover	0	0	0	-	0	1
	S206	Number of stitches	48	48	30	-	15	0
	S222	Overall feed amount	200	200	200	-	195	200
	-	Top feed left-right difference	7	7	1	-	5	9
	-	Bottom feed difference	-7	-7	-6	-	-4	0
	-	Vertical feed difference	61	7	6	-	4	9

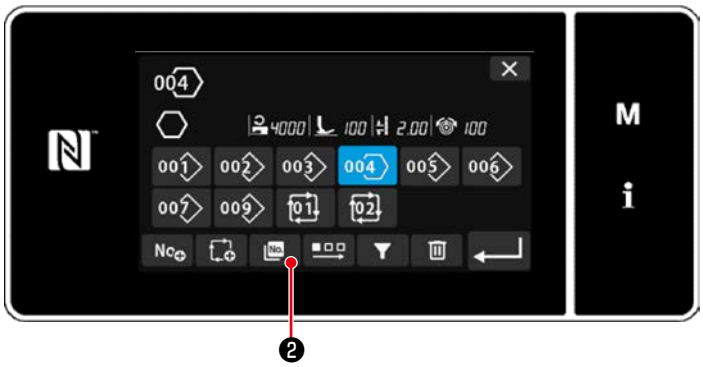
		No.	1	2	3	4	5	6
		Icon						
		Sewing item name	Puff sleeve attachment	Shirt sleeve attachment	Jacket sleeve attachment	Panel line changeover	Round changeover	Hood changeover
		Step No.	8	8	9	3	11	5
Step No.	No.	Setting parameter						
Step 6	S202	Step changeover	0	0	0	-	0	-
	S206	Number of stitches	40	40	27	-	18	-
	S222	Overall feed amount	200	200	200	-	198	-
	-	Top feed left-right difference	8	8	0	-	0	-
	-	Bottom feed difference	-8	-8	-4	-	0	-
	-	Vertical feed difference	63	8	6	-	1	-
Step 7	S202	Step changeover	0	0	0	-	0	-
	S206	Number of stitches	50	50	33	-	15	-
	S222	Overall feed amount	200	200	200	-	195	-
	-	Top feed left-right difference	-2	-2	1	-	5	-
	-	Bottom feed difference	-2	-2	-7	-	-4	-
	-	Vertical feed difference	2	2	7	-	4	-
Step 8	S202	Step changeover	1	1	0	-	0	-
	S206	Number of stitches	0	0	50	-	20	-
	S222	Overall feed amount	200	200	200	-	200	-
	-	Top feed left-right difference	0	0	-2	-	10	-
	-	Bottom feed difference	0	0	-2	-	-3	-
	-	Vertical feed difference	0	0	2	-	6	-
Step 9	S202	Step changeover	-	-	1	-	0	-
	S206	Number of stitches	-	-	0	-	40	-
	S222	Overall feed amount	-	-	200	-	200	-
	-	Top feed left-right difference	-	-	0	-	7	-
	-	Bottom feed difference	-	-	0	-	-3	-
	-	Vertical feed difference	-	-	0	-	3	-
Step 10	S202	Step changeover	-	-	-	-	0	-
	S206	Number of stitches	-	-	-	-	47	-
	S222	Overall feed amount	-	-	-	-	200	-
	-	Top feed left-right difference	-	-	-	-	3	-
	-	Bottom feed difference	-	-	-	-	-2	-
	-	Vertical feed difference	-	-	-	-	3	-

		No.	1	2	3	4	5	6
		Icon						
		Sewing item name	Puff sleeve attachment	Shirt sleeve attachment	Jacket sleeve attachment	Panel line changeover	Round changeover	Hood changeover
		Step No.	8	8	9	3	11	5
Step No.	No.	Setting parameter						
Step 11	S202	Step changeover	-	-	-	-	1	-
	S206	Number of stitches	-	-	-	-	0	-
	S222	Overall feed amount	-	-	-	-	200	-
	-	Top feed left-right difference	-	-	-	-	0	-
	-	Bottom feed difference	-	-	-	-	0	-
	-	Vertical feed difference	-	-	-	-	0	-

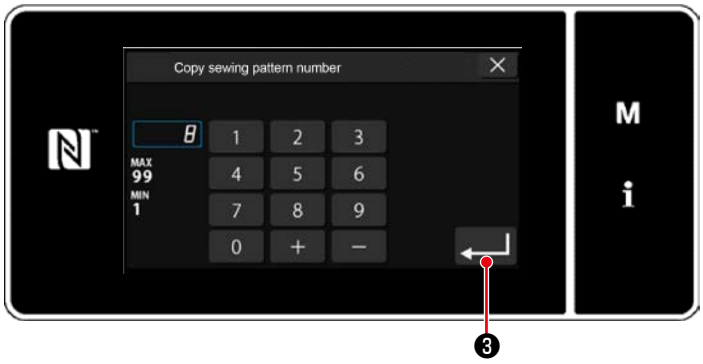
7-2. Copying a sewing pattern



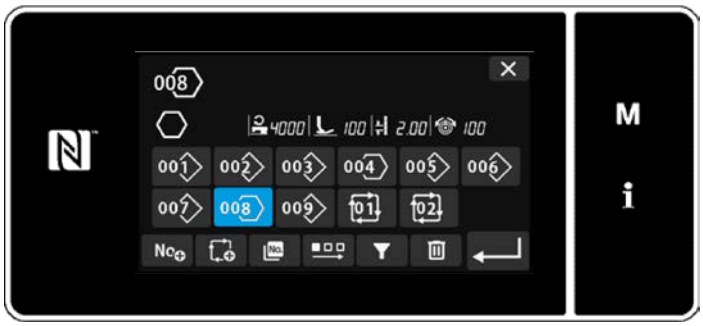
1) Press 001 ❶ to display the "sewing pattern management screen".



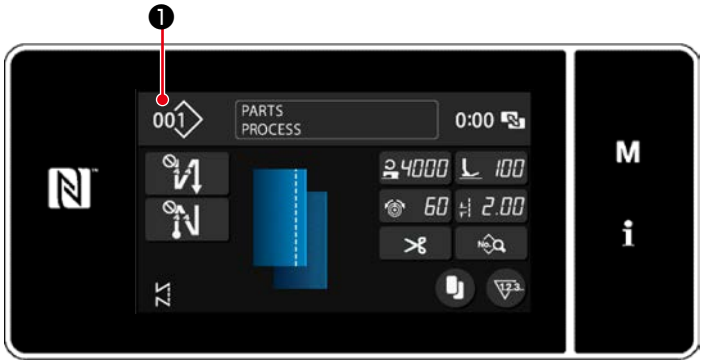
2) Select the copy destination and press ❷ .
3) Enter the pattern number for the copy destination using the numeric keypad.



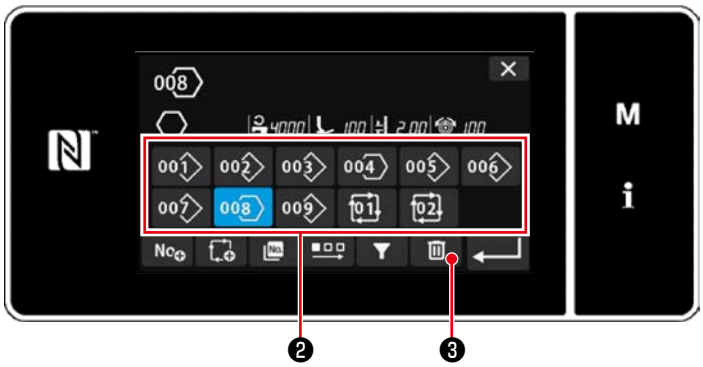
4) Press ❸ to confirm the pattern number and display the "sewing pattern management screen".



7-3. Deleting a sewing pattern

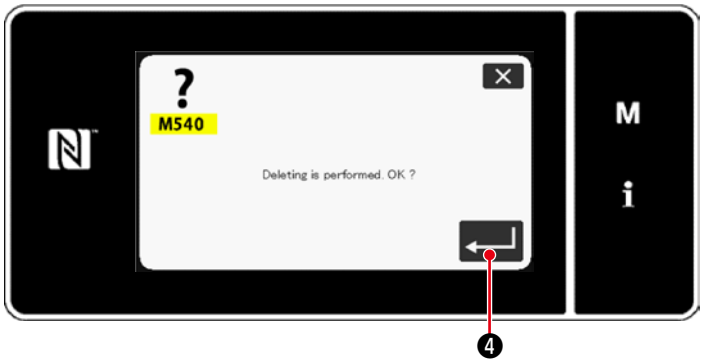


1) Press 001 ❶ to display the "sewing pattern management screen".



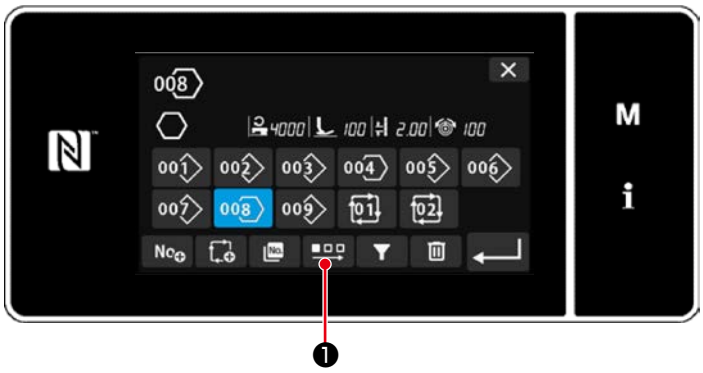
2) Select the pattern number ❷ you want to delete.

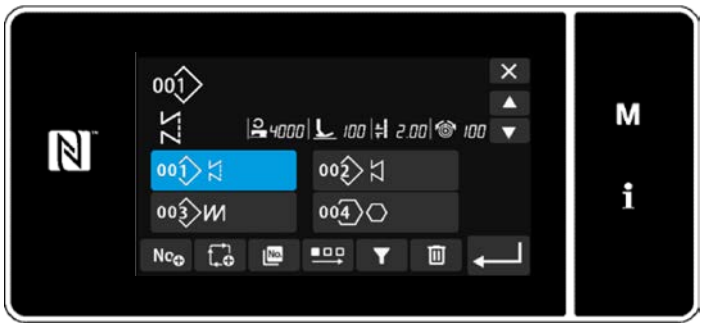
3) Press ❸ .
The "deletion confirmation screen" is displayed.



4) The pattern is deleted by pressing ❹ .
The "sewing pattern management screen" will be displayed.

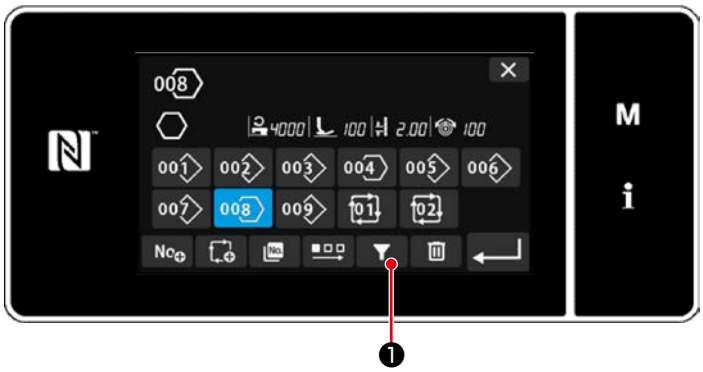
7-4. Sorting the sewing patterns

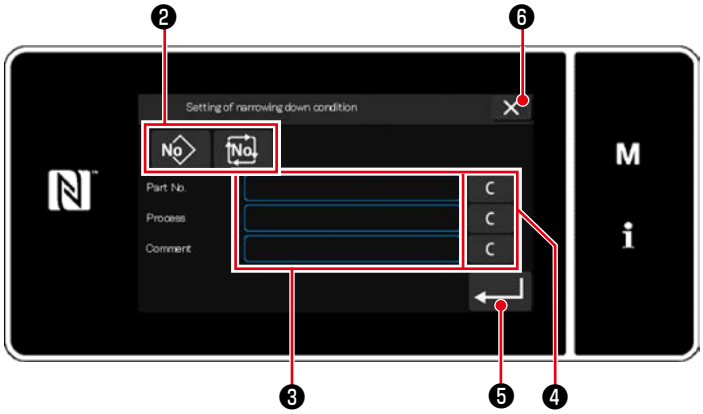




1) When you press ❶ on the "sewing pattern management screen", the registered patterns will be sorted and displayed in the following order:
No sorting → Sewing pattern number → Process → Part number → Comment → No sorting.

7-5. Filtering the sewing patterns





<Filter condition setting screen>

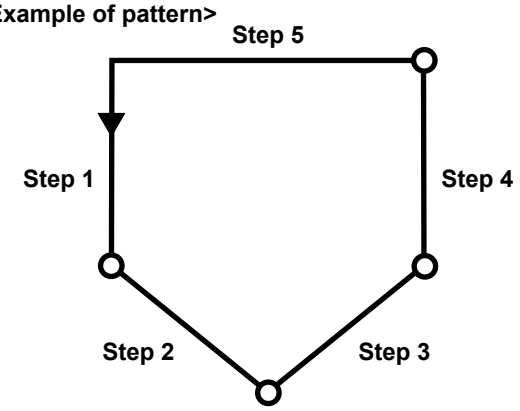
1) Press ❶ on the "sewing pattern management screen" to display the "filter condition setting screen".

2) Use the target selection button ❷ to select the target patterns to be filtered.
3) Press input button ❸ to display the character input screen. You can enter the characters you want to use for the filtering operation using the character string button.
4) Press clear button ❹ to delete the entered characters.
5) Press ❺ to display the "sewing pattern management screen", showing only the patterns that include the entered characters.
6) Press ❻ to display the "sewing pattern management screen" without applying the filtering.

* If characters are entered for two or more items on the filter condition setting screen, only patterns that satisfy all the entered conditions will be displayed. For cycle sewing patterns, filtering will only be based on the comments.

8. SETTING UP THE POLYGONAL-SHAPE STITCHING

<Example of pattern>

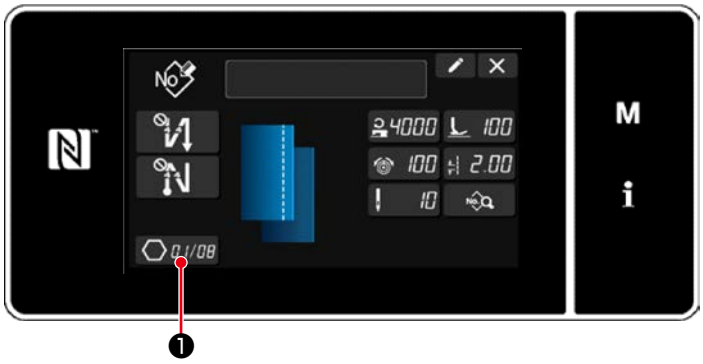


A polygonal-shape stitching pattern can consist of up to 30 steps, and individual sewing conditions can be set for each step.

8-1. Editing a polygonal-shape stitching pattern

This section describes how to change the number of steps and step-by-step conditions of a polygonal-shape stitching pattern.

① Displaying the polygonal-shape stitching pattern screen (standard image display)

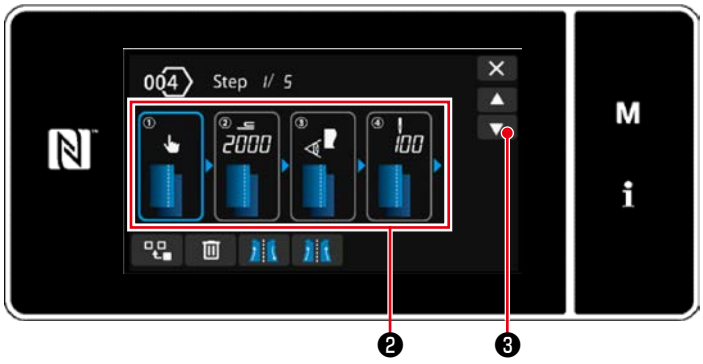


<First sewing screen (standard display mode)>

Select "polygonal-shape stitching" and press 01/08 ❶ at the bottom left of the <first sewing screen (standard image display)>.
The "polygonal-shape stitching step edit screen" will be displayed.

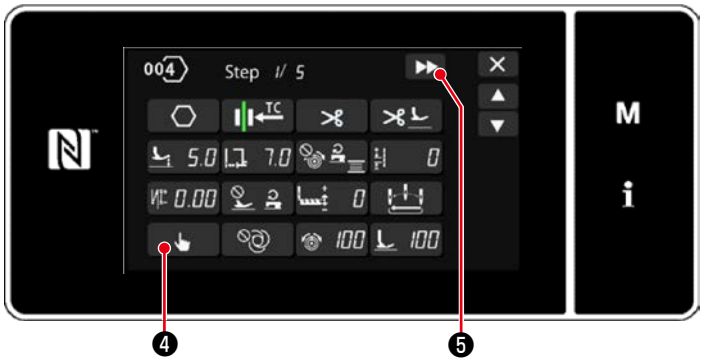
- The pattern shape icon and the "current step/total number of steps" are displayed above 01/08 ❶ .

② Editing the number of polygonal-shape stitching steps and the step changeover condition for a new step



<Polygonal-shape stitching step edit screen>

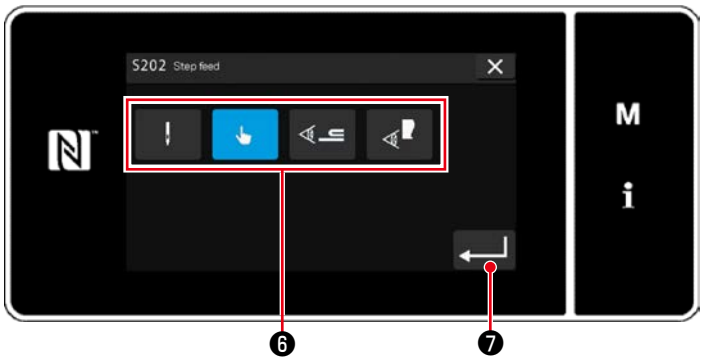
1) The step changeover conditions, step number, and finished image icon are displayed on the step specification button ❷ .
   - Press the step specification button ❷ to select the step.
   - A list of next and previous steps will be displayed with ▲▼ ❸ .



<Sewing data edit screen>

2) Pressing the selected condition step again will display the "sewing data edit screen".

- Press ❹ to display the "step changeover reference selection screen".
- Press ❺ to display the "sewing data edit screen" for the next step.



<Step changeover reference selection screen>

3) Select the condition button ❻ for S202 "Step changeover".

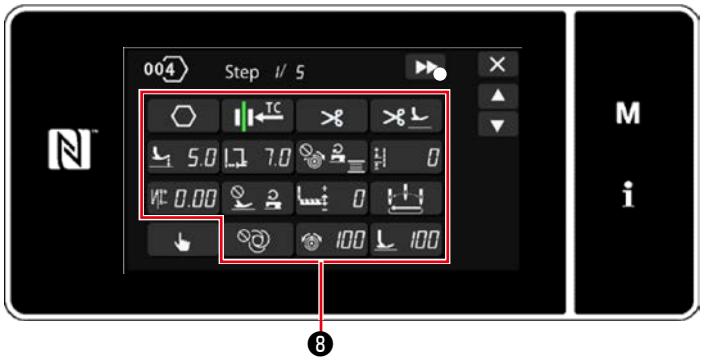
: Number of stitches

: One-touch changeover

: Multi-layered section detection

: Material edge detection

4) Press ❼ to confirm the operation and return to the "sewing data edit screen".



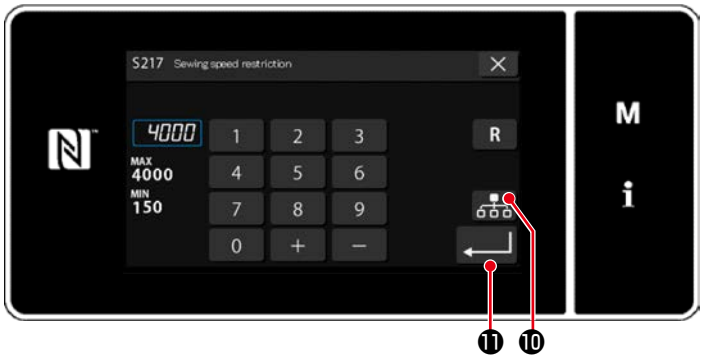


<Sewing data edit screen>

5) Set the other sewing data ❽ and ❾ . The type of sewing data displayed on the sewing data edit screen will change depending on the step changeover condition selected in item 3). (Refer to **"7-1-5. List of initial values for preset patterns" p. 120**.)

Caution

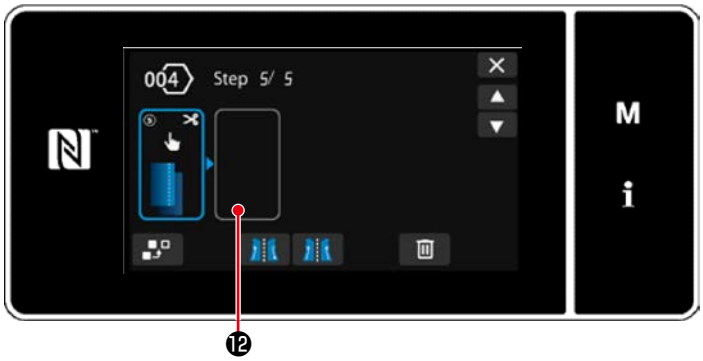
The presser foot lifting during thread trimming will operate according to the settings of the final step.



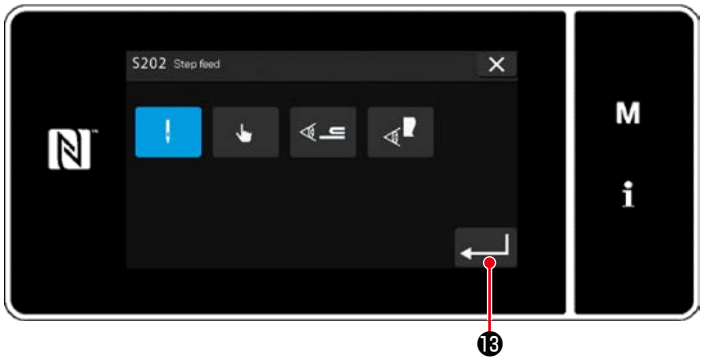
The following polygonal-shape sewing parameters can be applied to all steps by pressing ⓾ and then ⓫ :

- S207 Needle thread tension
- S208 Presser foot pressure
- S212 Stop Needle bar position
- S217 Sewing speed limit

				Step changeover condition			
Polygonal-shape stitching step information	S202		Step changeover	Number of stitches	One-touch switch	Multi-layered part	Material edge detection
	S203		One shot	○	○	○	○
	S204		Custom pitch	○	○	○	○
	S205		Sensor value to change over the step	×	×	○	×
	S206		Number of stitches	○	×	×	○
	S207		Needle thread tension	○	○	○	○
	S208		Presser foot pressure	○	○	○	○
	S209		Needle bar stop position at the time of pause	○	○	○	○
	S210		Needle entry alignment position of the needle bar	○	○	○	○
	S211		Presser foot lifting during intermediate stop	S210=on/off ○/×	S210=on/off ○/×	S210=on/off ○/×	S210=on/off ○/×
	S212		Needle bar stop position at the time of stop	○	○	○	○
	S213		Stop and presser foot lifting	○	○	○	○
	S214		Lifting height of presser foot when the sewing machine stops	S213=on/off ○/×	S213=on/off ○/×	S213=on/off ○/×	S213=on/off ○/×
	S217		Sewing speed limit	○	○	○	○
	S218		Stitch length 1	○	○	○	○
	S219		Stitch length 2	○	○	○	○
	S220		Stitch length 3	○	○	○	○
	S221		Stitch length 4	○	○	○	○
	S222		Overall feed amount	○	○	○	○



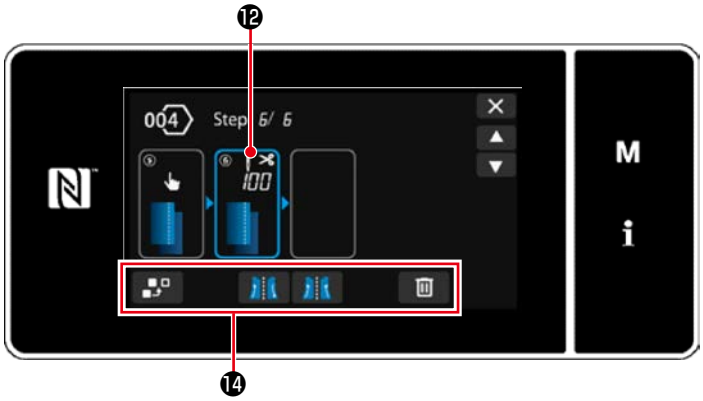
6) If it is possible to add steps to a pattern, an unused step ⓬ will be displayed at the end.



<Step changeover reference selection screen>

7) Press the displayed step button ⓬ to display the "step changeover condition selection screen". Select the step changeover condition as described in item 3).

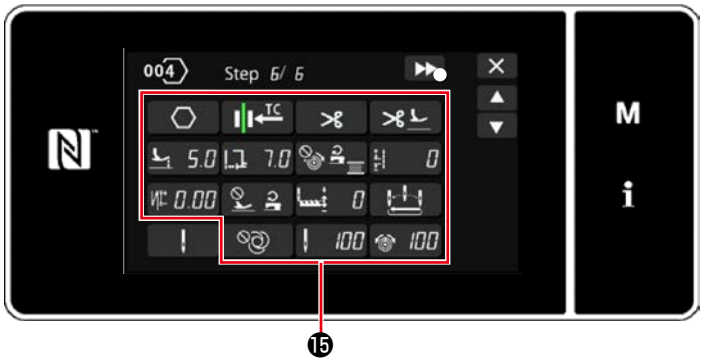
8) Press  ⓭ to confirm the operation and return to the "polygonal-shape stitching step edit screen".



<Polygonal-shape stitching step edit screen>

9) Pressing the step button ⓬ again will display the "sewing data edit screen".
Select the step changeover condition as described in item 3).

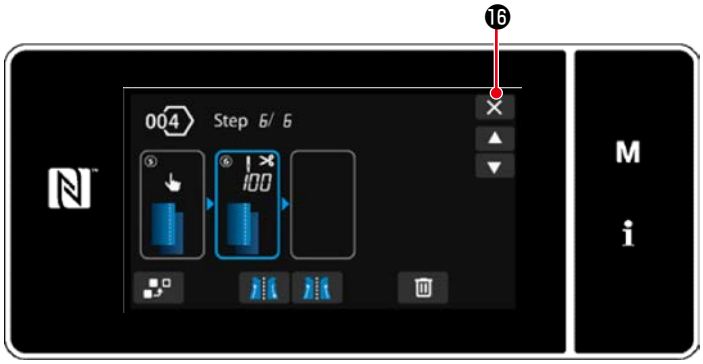
10) Functions such as "insert", "reverse sewing order", "reverse top and bottom feed", "delete", etc., which are part of the steps, can be performed using the button ⓮ .
For details on how to edit polygonal-shape stitching steps, refer to **"7-1-4. ③ Editing the polygonal-shape stitching steps" p. 119**.



<Sewing data edit screen>

11) Set the other sewing data ⓯ as described in item 5).

③ **Confirming the data on the created sewing pattern**



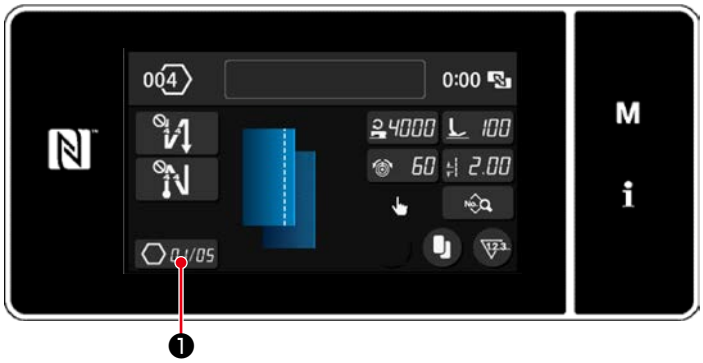
Press [×] ⓰ to complete the operation and return to the <first sewing screen (standard display mode)">.

8-2. Creating a new polygonal-shape stitching pattern

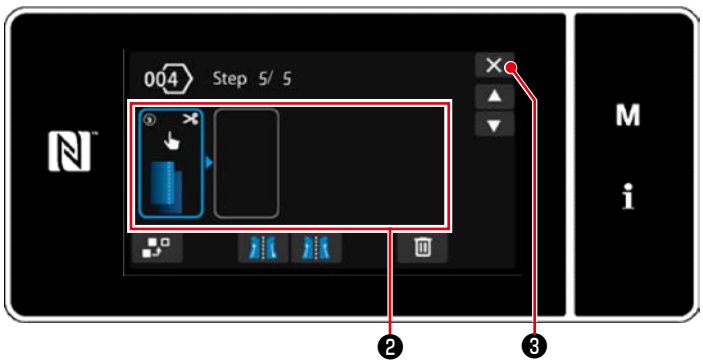
For details on how to create a new polygonal-shape stitching, refer to **"4. HOW TO USE THE OPERATION PANEL" p. 44**.

8-3. Setting the step from which polygonal-shape stitching is started

In the case it is necessary to re-sew a pattern from the middle of the pattern after the occurrence of troubles such as thread breakage, it is possible to re-start sewing from an arbitrary step of the pattern.

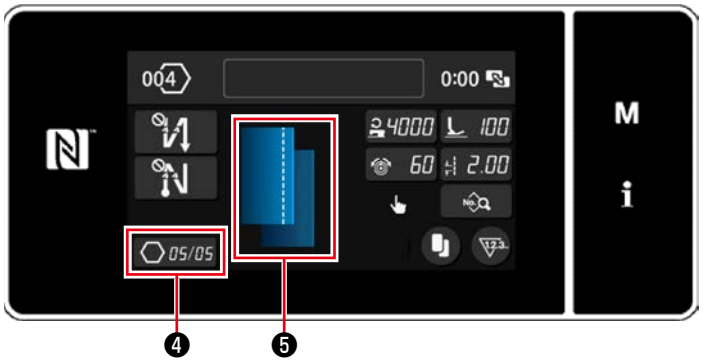


1) Displaying the polygonal-shape stitching step edit screen
Press [01/05] ❶ on the polygon displayed on the <first sewing screen (standard image display)>. The "polygonal-shape stitching step edit screen" will be displayed.



<Sewing screen (polygonal-shape stitching pattern)>

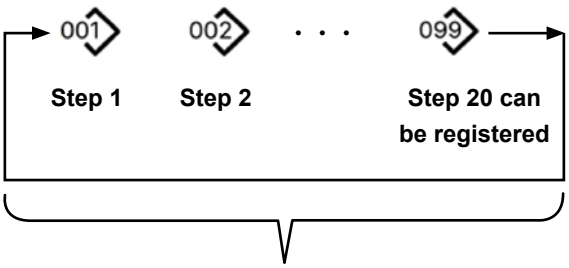
2) Specifying the current step
- On the "polygonal-shape stitching step edit screen", check all steps, then press any step button ❷ .
- Press [×] ❸ to return to the <first sewing screen (standard display mode)">. This will update the current step.



<First sewing screen (standard display mode)>

3) Checking the current step
- Ensure that ❹ and ❺ match the steps you specified.

9. CYCLE PATTERN



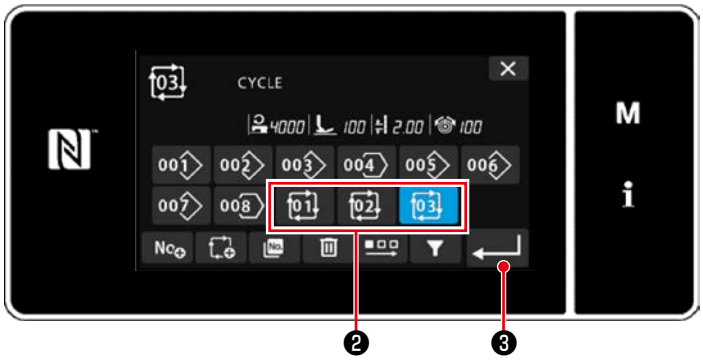
It is possible to combine several different sewing patterns as one cycle pattern for sewing.
You can enter up to 20 steps in a single cycle sewing pattern.
This function is helpful in the case several different patterns are regularly repeated in a product sewing process.
As many as 20 cycle patterns can be registered.

9-1. Selecting the cycle pattern



<First sewing screen (standard display mode)>

1) Press 004 ❶ on each sewing screen.



<Sewing pattern number list screen>

2) The "sewing pattern number management screen" will be displayed.
The cycle pattern appears after the registered sewing patterns.
Press the No. button ❷ to make your selection.
Press ↵ ❸ to confirm the setting.
The "cycle sewing screen" is displayed.

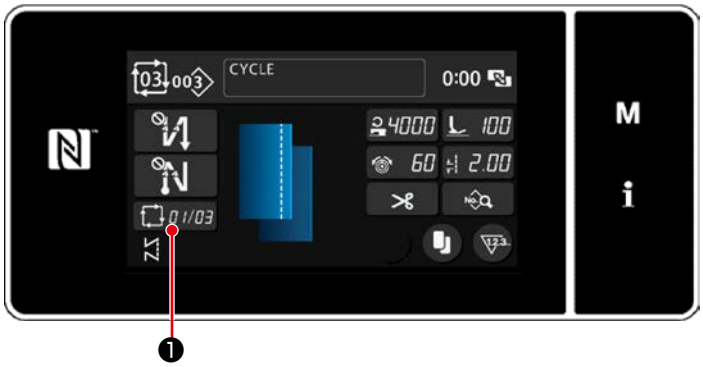


<Sewing screen (Cycle pattern)>

3) Sewing of the selected cycle pattern is enabled.

9-2. Editing cycle sewing data

① Displaying the sewing screen (cycle pattern) for cycle pattern

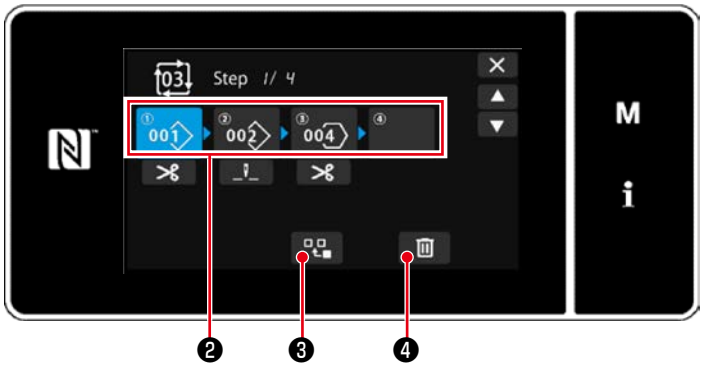


<Sewing screen (Cycle pattern)>

Press the cycle step edit button ❶ on the sewing screen (cycle pattern).
The "cycle sewing step edit screen" is displayed.

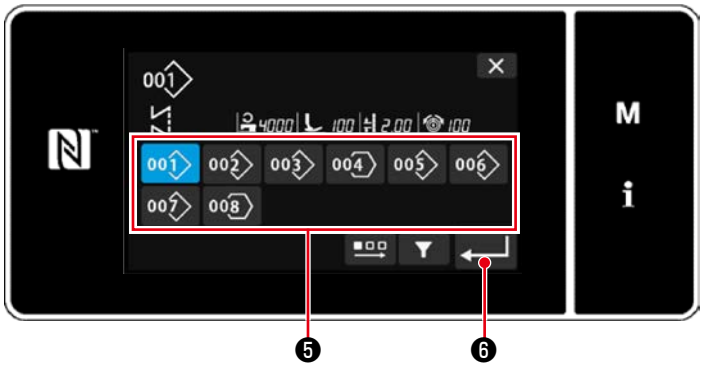
- The pattern icon and the "current cycle step/ total number of cycle steps" are displayed on the cycle step edit button.

② Setting a cycle sewing pattern



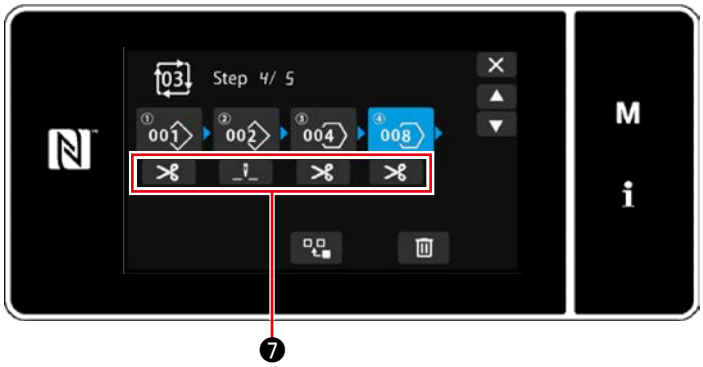
<Cycle sewing step edit screen>

1) The registered cycle pattern No. (up to 20) is displayed on ❷ .
   Press any step button ❷ to select a step.
2) If it is possible to add steps to a pattern, an unused step will be displayed at the end.
   Pressing the unconfigured step will display the "cycle register pattern selection screen".



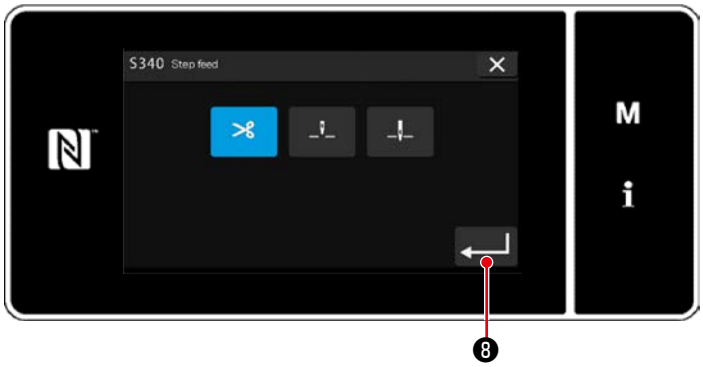
<Registered cycle pattern selection screen>

3) Select the pattern to be registered using sewing pattern number button ❺ .
   Press ❻ to confirm.
4) Press ❸ while selecting a step. Then, the "registered cycle pattern selection screen (In numerical order)" is displayed.
   Insert a pattern ahead of the selected step.
5) The pattern is deleted by pressing ❹ .



<Cycle sewing step edit screen>

6) Select the step changeover condition button ❼ for the cycle pattern.
The "step changeover" setting screen for each step of the cycle pattern will be displayed.



<S340 "Step changeover">

7) S340 "Step changeover" setting
The cycle pattern changeover operation allows you to specify the operation performed when switching to the next step.

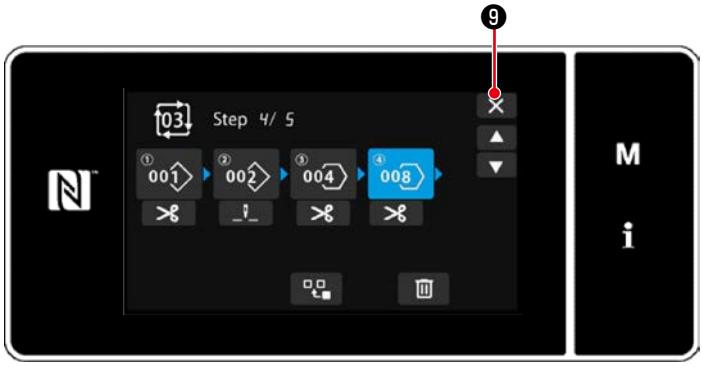
: Thread trimming

: upper stop

: lower stop

Press ❽ to confirm the changeover condition.

③ Confirming the data entered



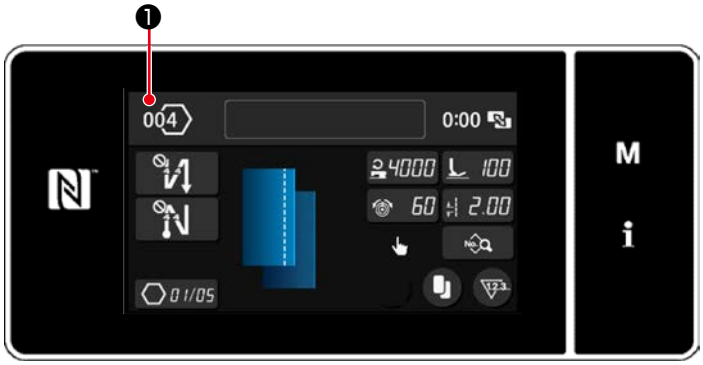
<Cycle sewing step edit screen>

Press ❾ to complete the operation.
Then, the current screen returns to the sewing screen for cycle sewing.

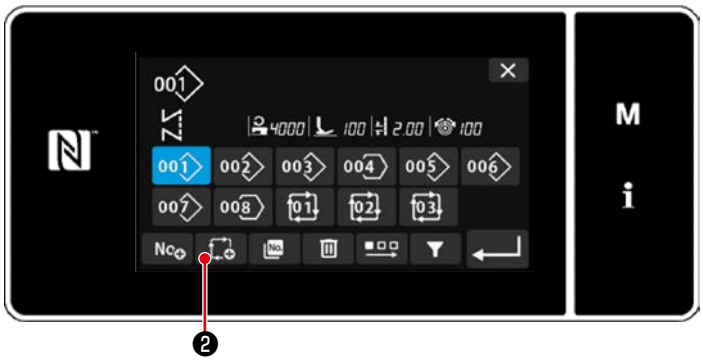
Caution
The step selected on the edit screen will be applied with the current settings and the sewing screen will be displayed.

9-3. Creating new cycle data

① Selecting the new cycle pattern creating function



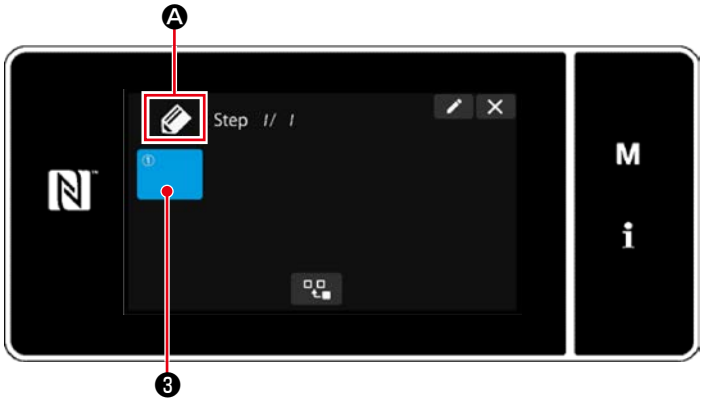
1) Press 004 ❶ on each sewing screen.
The "sewing pattern number management screen" will be displayed.



2) Press the new cycle pattern creation button ❷.
The "new cycle sewing pattern edit screen" is displayed.

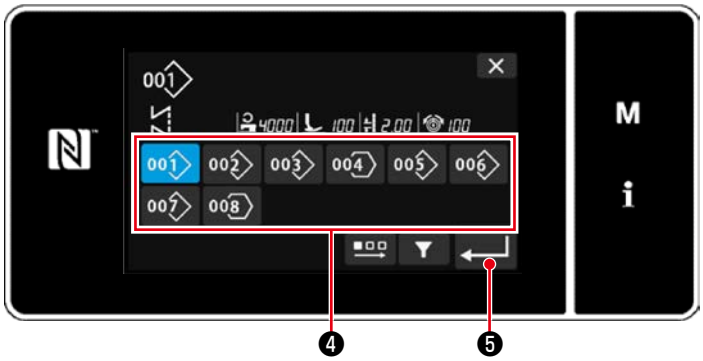
<Sewing pattern number management screen>

② Registering a pattern in new cycle sewing data



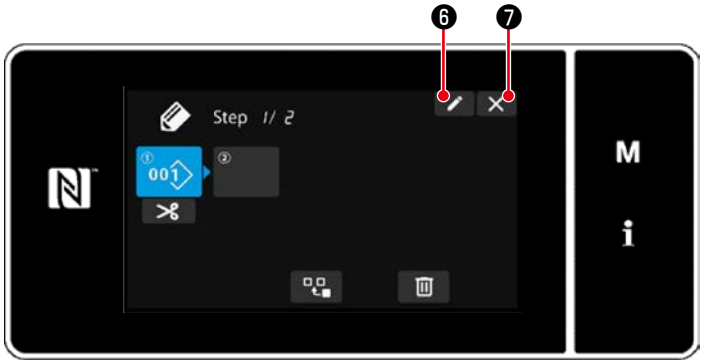
1) Ⓐ which indicates that a new pattern is being created is displayed on the screen.
2) Press ❸.
The "registered cycle pattern selection screen " is displayed.

<New cycle sewing pattern edit screen>



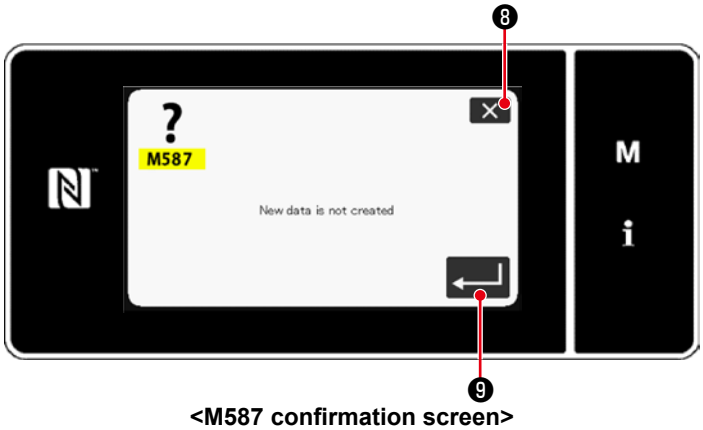
3) Press the desired pattern number ❹.
4) Press ❺ to confirm the operation and return to the "new cycle pattern edit screen".

<Sewing pattern number management screen>



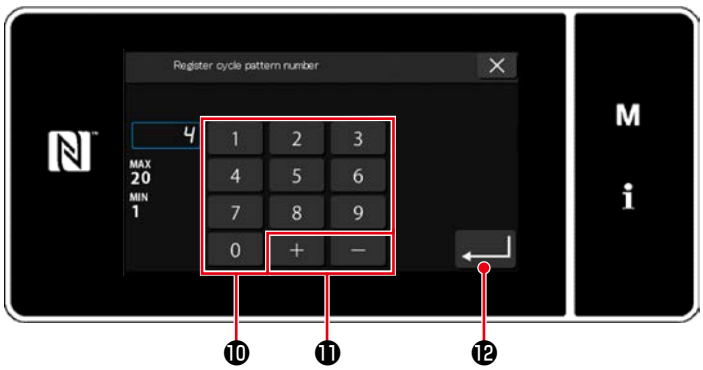
<Cycle sewing pattern edit screen>

5) The selected pattern is added to the cycle sewing data.
   Repeat steps 2) to 5) to create additional cycle sewing data.
6) Press [×] ❼ to display the confirmation screen for discarding the data.
   The M587 confirmation screen will be displayed.



<M587 confirmation screen>

7) Press [×] ❽ to return to the "cycle sewing pattern edit screen".
8) Press [↵] ❾ to discard the content and return to the "sewing pattern number management screen".



<Cycle sewing pattern number registration screen>

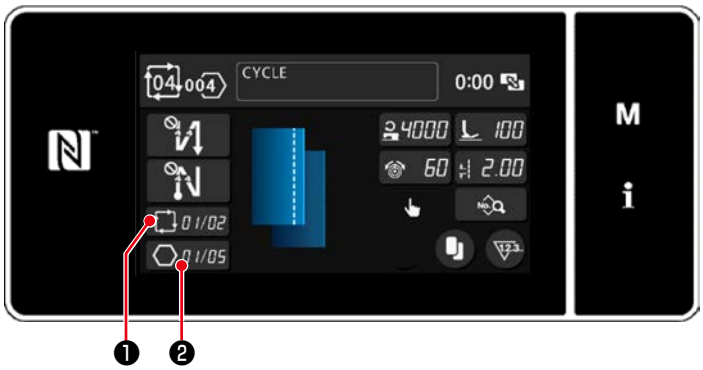
9) On the <cycle sewing pattern edit screen>, press [✎] ❻ to display the <cycle pattern number registration screen>.
10) Enter the pattern number to be registered using the numeric keypad ❿ .
    Press [+] [−] ⓫ to display the nearest available (unassigned) registration number in the positive or negative direction relative to the entered value.
11) Press [↵] ⓬ .
    The created pattern is registered, and the screen returns to the "sewing pattern number list screen".
    If the entered number is already registered, a confirmation message for overwriting will be displayed.



<Sewing pattern number management screen>

9-4. Setting the step from which cycle sewing pattern is started

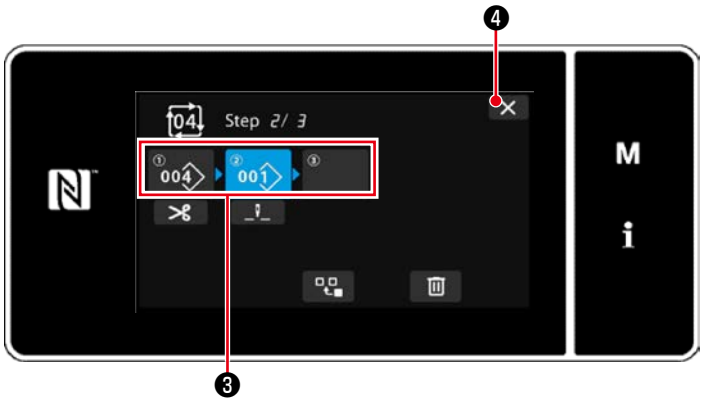
In the case it is necessary to re-sew a cycle sewing pattern from the middle of the cycle sewing pattern after the occurrence of troubles such as thread breakage, it is possible to re-start sewing from an arbitrary step of the cycle sewing pattern.



<Sewing screen (cycle pattern) (polygonal-shape stitching step)>

1) Press 01/02 ❶ to display the "cycle sewing step edit screen".

* If the cycle sewing step involves polygonal-shape stitching, you can also modify the polygonal-shape stitching step by pressing 01/05 ❷ .



<Cycle sewing step edit screen>

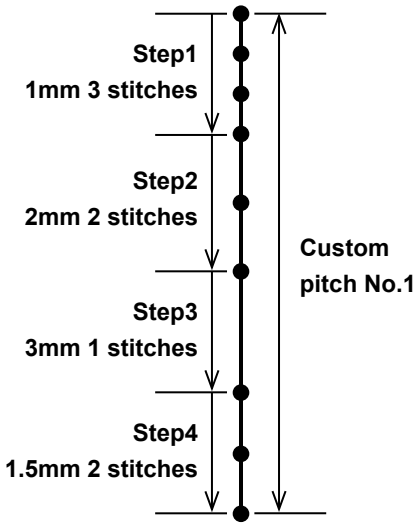
2) On the "cycle sewing pattern edit screen", press any step button ❸ to select a step.

3) Press ✕ ❹ to display the <sewing screen (cycle pattern)>.



<Sewing screen (cycle pattern) (step other than polygonal-shape stitching step)>

9-5. Custom pitch



<Fig. 1>

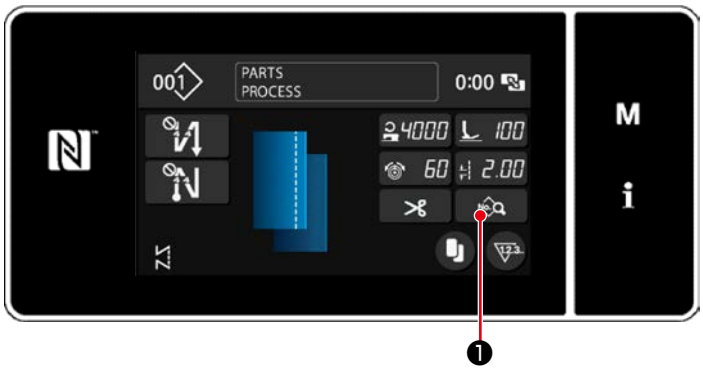
It is possible to register as many as 20 different sewing designs each of which consists of several different pitches (20 steps at the maximum).
As many as 100 stitches of the same pitch can be set in one step.

1. Desired stitches may not be formed depending on the sewing speed. If desired stitches are not produced, the sewing speed should be reduced.
2. The same needle entry cannot be used with a stitch length of 0.0 mm.

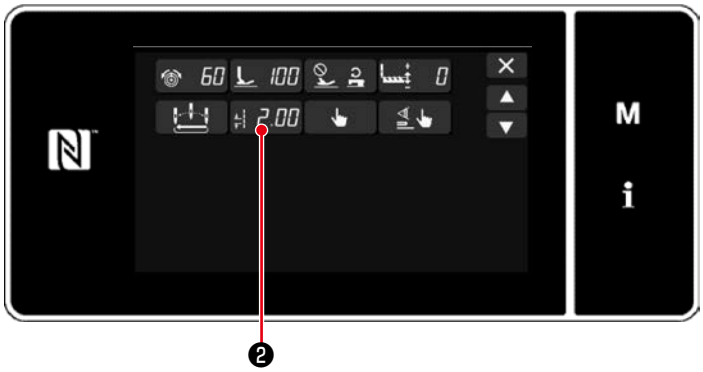
9-5-1. Selecting a custom pitch

Select an already-created custom pitch.

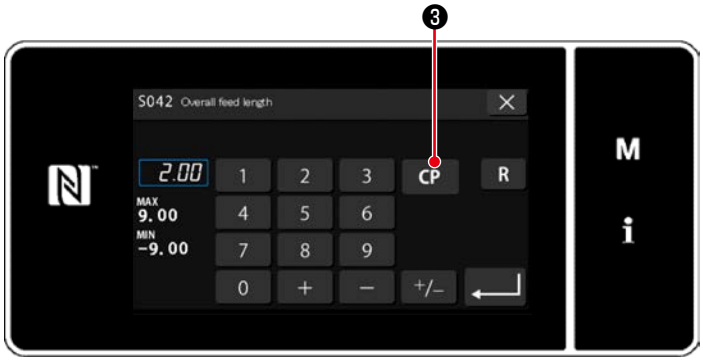
① Displaying the entire feed amount input screen



1) Press ❶ on the first sewing screen.
The "sewing data edit screen" is displayed.

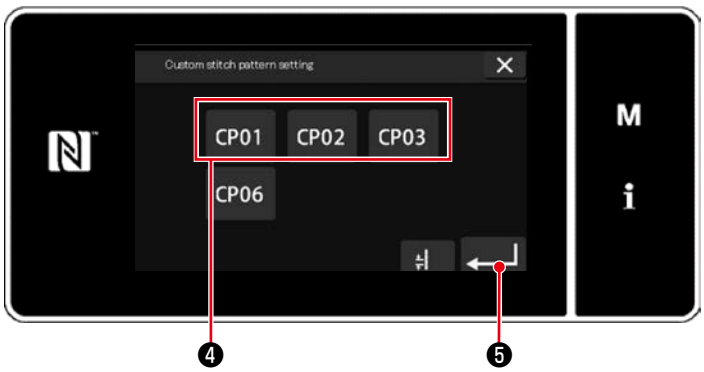


2) Press 2.00 ❶ .
The "entire feed amount input screen" will be displayed.



3) Press CP ❸ .
The "custom pitch setting screen" is displayed.

② **Selecting a custom pitch**



Registered custom pitch pattern(s) is displayed.

1) Press custom pitch ❹ .

2) Press ↵ ❺ to confirm the setting.

Return the current screen to the sewing screen (maintenance personnel mode).

9-5-2. Creating a new custom pitch

Create the new custom pitch No. 1 shown in <Fig. 1> as an example.

① **Selecting the custom pitch setting on the mode screen**



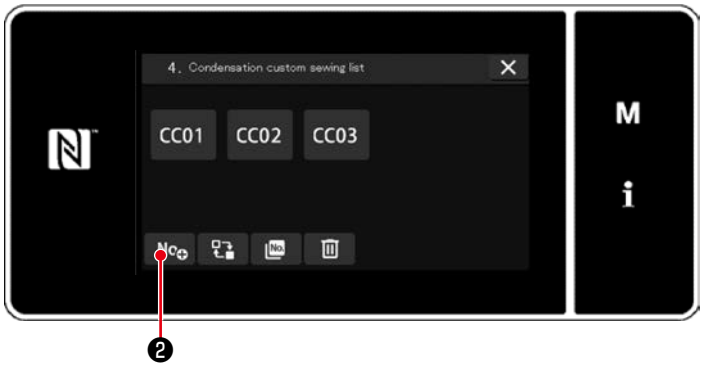
1) Press M ❶ on the sewing screen.

The "mode screen" is displayed.

2) Select the "5. Custom pitch setting".

The "custom pitch list screen" is displayed.

② **Selecting the new custom pitch creating function**

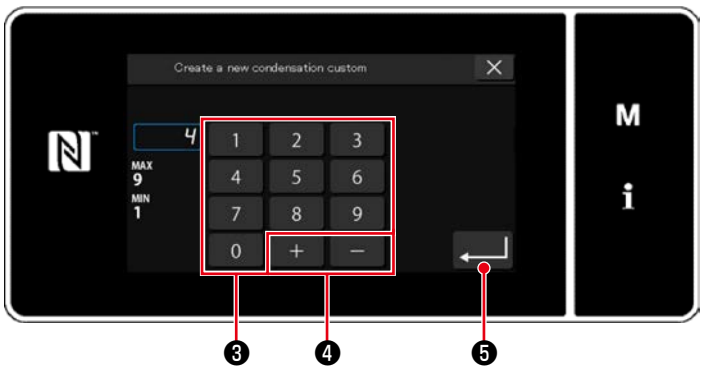


Registered custom pitch pattern(s) is displayed.

Press Nc ❷ .

The "new custom pitch creation screen" will be displayed.

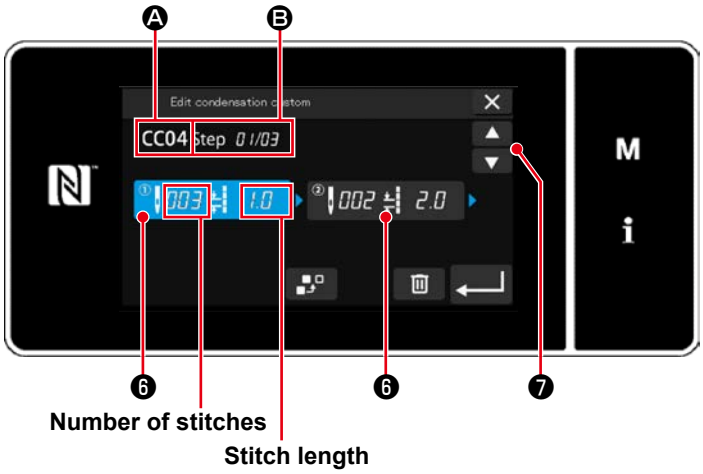
③ Inputting a custom pitch number



1) Enter the custom pitch number using the numeric keypad ❸ .
2) Press  ❺ .

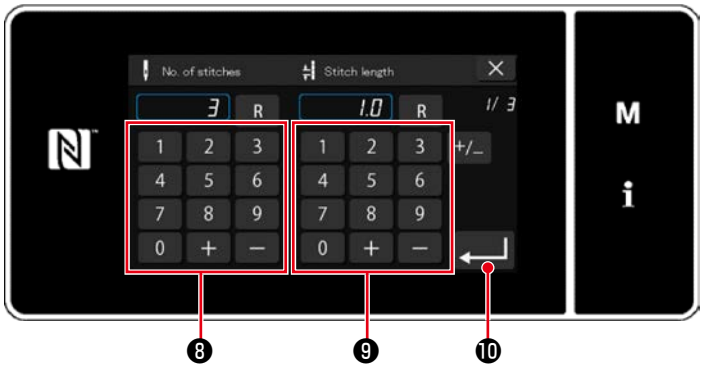
   The "custom pitch edit screen" is displayed. In the case the entered number has already been registered, the prompt message for overwrite confirmation is displayed.

④ Creating a custom pitch



The selected custom pitch number is displayed on Ⓐ, and the step number being edited and the total number of steps are displayed on Ⓑ. The "number of stitches" and "stitch length" for the step are displayed on ❻ .

1) Use  ❼ to display the screen with the previous or next number.
2) When you press ❻ , the step will be selected and displayed in blue.
3) When a step is selected and ❻ is pressed, the "custom pitch data input screen" will be displayed.



As an example, explanation is given about the input procedure of custom pitch number 1 shown in <Fig. 1>.

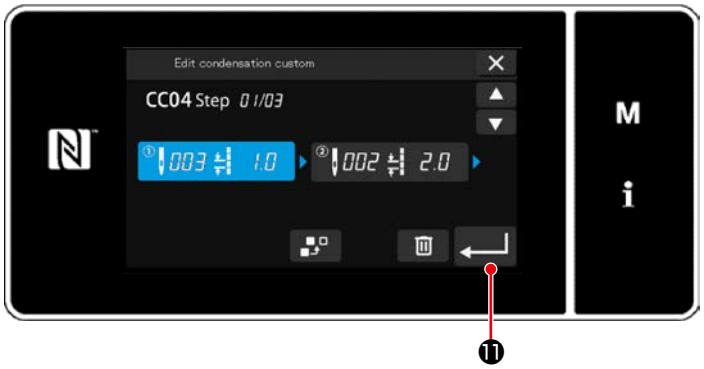
Input range

Number of stitches：1 to 100 stitches

Stitch length：-9.0 to 9.0 mm

1) Enter 3 stitches for the number of stitches of step 1 using the numeric keypad ❽ for the number of stitches.
2) Enter 1.0 mm for the stitch length of step 1 using the numeric keypad ❾ for the stitch length.
3) Press  ❿ to confirm the setting.
4) Carry out the following setting in the similar manner.
   For step 2, set 2 stitches for the number of stitches, and 2.0 mm for the stitch length
   For step 3, set 1 stitch for the number of stitches, and 3.0 mm for the stitch length
   For step 4, set 2 stitches for the number of stitches, and 1.5 mm for the stitch length

⑤ Confirming the numeric value



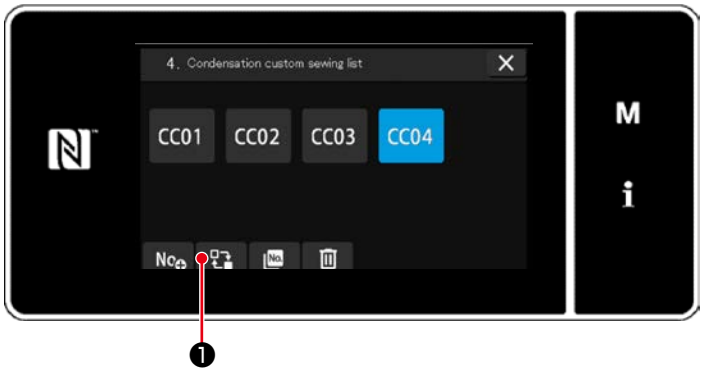
After the completion of editing, press  ⓫.



The custom pitch list screen is displayed with the custom pitch number you have created added.

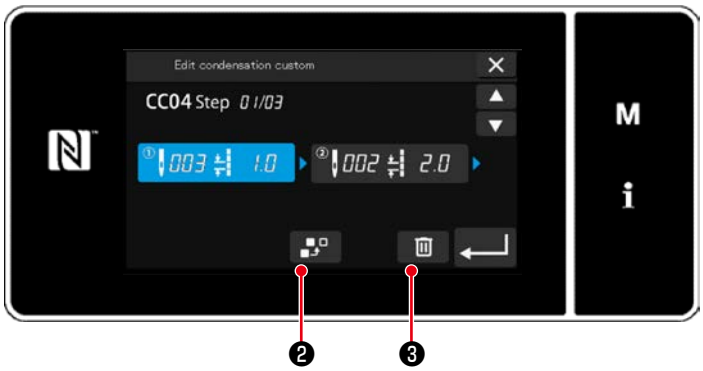
9-5-3. Custom pitch edit function

① Selecting the custom pitch edit function



1) Refer to **"9-5-2. Creating a new custom pitch" p. 138** to display the "custom pitch list screen".
2) Select the custom pitch number you want to edit and press ❶.
   The "custom pitch edit screen" will be displayed.

② Editing the custom pitch value

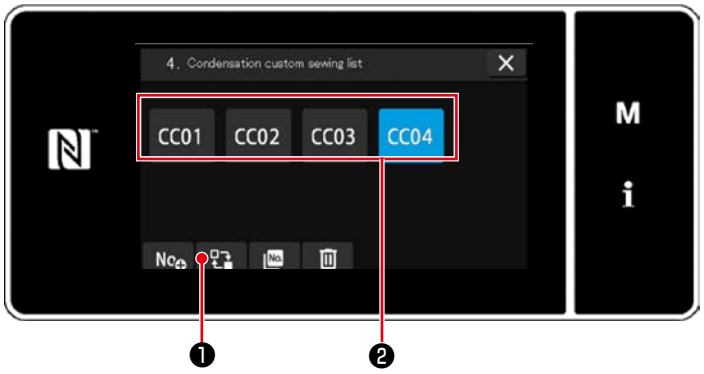


1) Press ❷ to display the "custom pitch data input screen".
   The data entered on the "custom pitch data input screen" will be inserted before the selected step.
2) Press ❸ to delete the selected step.
3) Refer to **"9-5-2. Creating a new custom pitch" p. 138** to edit the number of stitches and the stitch length for each step.

9-5-4. Copying/deleting a custom pitch

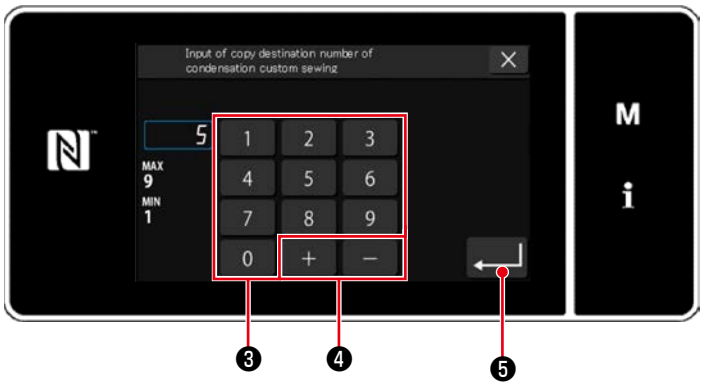
(1) Copying a custom pitch

① Displaying the custom pitch list screen



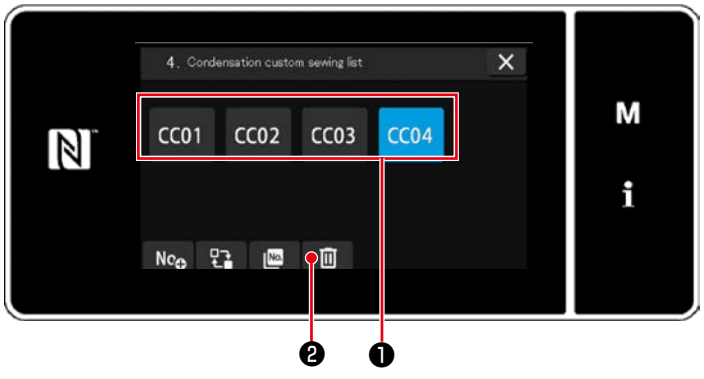
1) Display the "custom pitch list screen" referring to **"9-5-2. Creating a new custom pitch" p. 138**.
2) Press CP04 ❶ of the copy source to put it in the selected state.
3) Press ❷.
The "custom pitch copy destination number input screen" is displayed.

② Inputting the custom pitch number

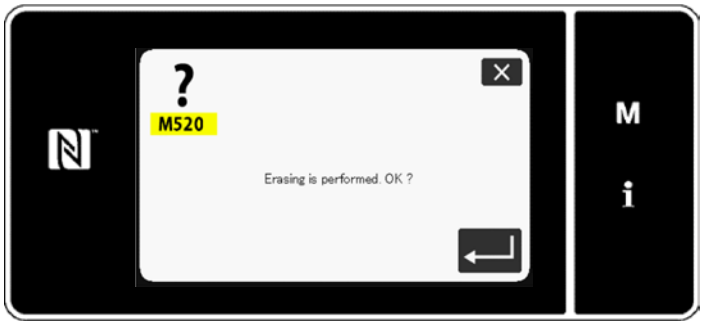


1) Enter the custom pitch number for the copy destination using the numeric keypad ❸.
2) Press + − ❹ to display the nearest available (unassigned) registration number in the positive or negative direction relative to the entered value.
3) Press ❺.
The created pattern is registered, and the current screen is returned to the custom pitch screen.
In the case the entered number has already been registered, the prompt message for overwrite confirmation is displayed.

(2) Deleting a custom pitch



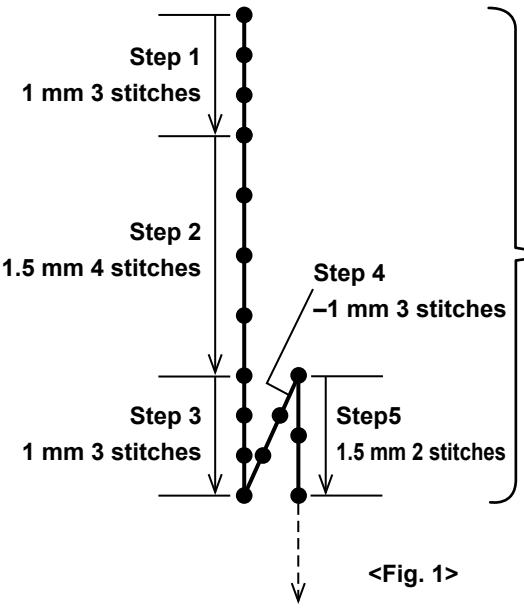
1) Display the "custom pitch list screen" referring to **"9-5-2. Creating a new custom pitch" p. 138**.
2) Press CP04 ❶ to put the custom pitch to be deleted in the selected state.
3) Press ❷.



4) The "deletion confirmation screen" is displayed.
Press to delete the custom pitch.

* You cannot delete custom pitch used in a pattern.

9-6. Condensation custom



<Fig. 1>

Condensation stitches can be sewn while specifying needle entry points as desired, by setting a condensation custom. As many as 20 steps can be created in one condensation custom pattern. For each step, as many as nine different patterns of start and end of sewing can be registered.

Condensation custom No. 1

Caution

1. **Desired stitches may not be formed depending on the sewing speed. If desired stitches are not produced, the sewing speed should be reduced.**
2. **The same needle entry cannot be used with a stitch length of 0.0 mm.**

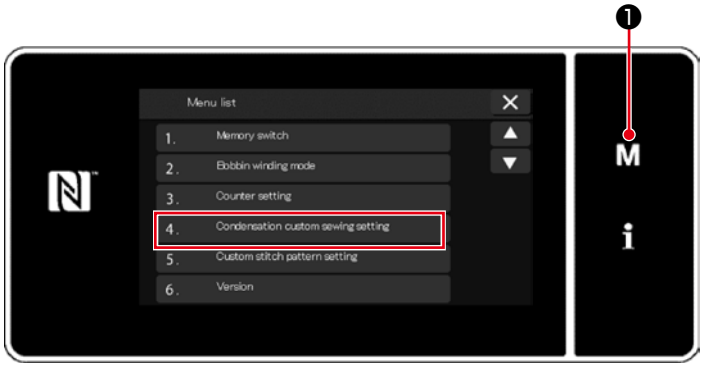
9-6-1. Selecting the condensation custom

Refer to **"4-4-3. Sewing-start reverse feed stitching pattern" p. 51**. and **"4-4-4. Sewing-end reverse feed stitching pattern" p. 56**, and select the condensation custom pattern.

9-6-2. Creating a new condensation custom

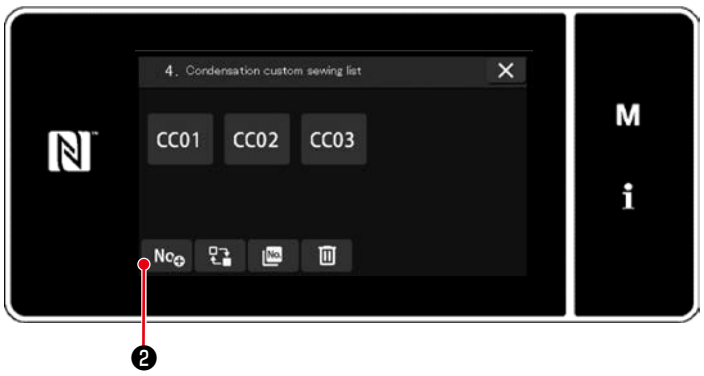
Create the new condensation custom No. 1 shown in <Fig. 1> as an example.

① Selecting the condensation custom pattern setting on the mode screen



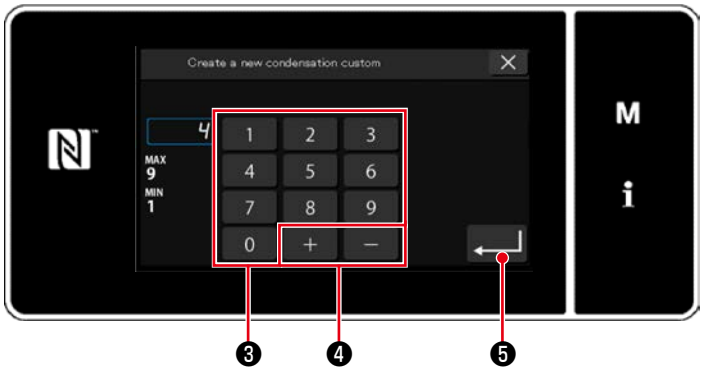
1) Press **M** ❶.
   The "mode screen" is displayed.
2) Select the "4. Condensation custom sewing setting".
   The "condensation custom pattern list screen" is displayed.

② Selecting the new condensation custom creating function



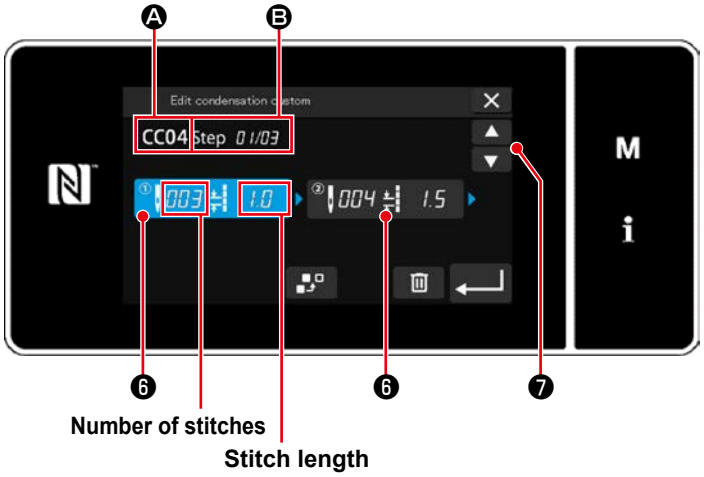
1) Registered condensation custom patterns are displayed on the screen.
   Press Nc ❷ .
   The "new condensation custom pattern creation pattern number input screen" is displayed.

③ Inputting the condensation custom number



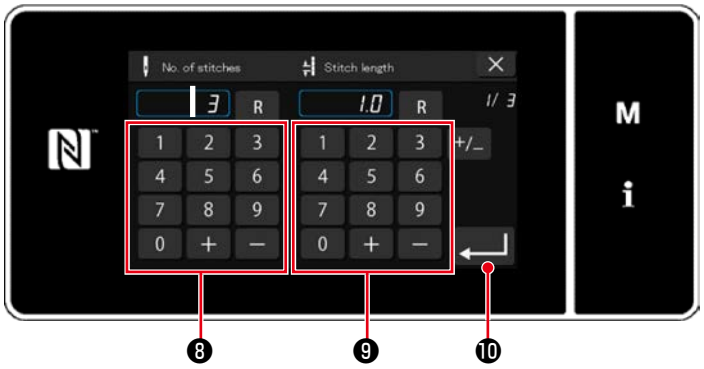
1) Enter the condensation custom number using numeric keypad ❸ .
   An unassigned registration number that is closest to the entered value in the plus/minus direction is displayed by pressing + − ❹ .
2) Press ↵ ❺ .
   The "condensation custom edit screen" is displayed.
   If the entered number is already registered, a confirmation message for overwriting will be displayed.

④ Creating a condensation custom



The selected condensation custom number is displayed on Ⓐ, and the step number being edited and the total number of steps are displayed on Ⓑ.
The "number of stitches" and "stitch length" of the step are displayed on ❻ .

1) Use ▲ ▼ ❼ to display the screen with the previous or next number.
2) When you press ❻ , the step will be selected and displayed in blue.
3) When a step is selected and ❻ is pressed, the "condensation custom data input screen" will be displayed.



As an example, explanation is given about the input procedure of condensation custom number 1 shown in <Fig. 1>.

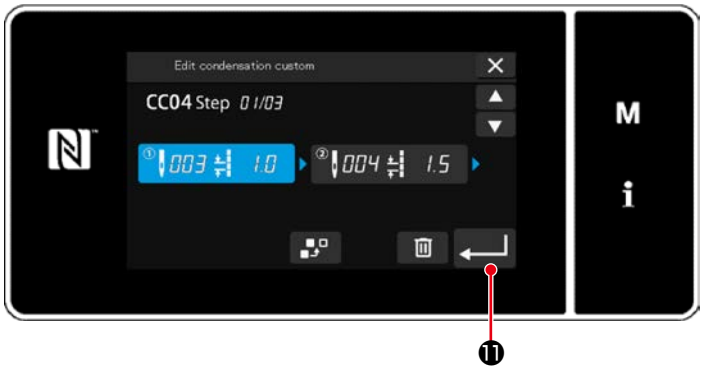
Input range

Number of stitches：1 to 100 stitches

Stitch length：-9.0 to 9.0 mm

1) Enter 3 stitches for the number of stitches of step 1 using the numeric keypad ❽ for the number of stitches.
2) Enter 1.0 mm for the stitch length of step 1 using the numeric keypad ❾ for the stitch length.
3) Press  ❿ to confirm the setting.
4) Carry out the following setting in the similar manner.
   For step 2, set 4 stitches for the number of stitches, and 1.5 mm for the stitch length
   For step 3, set 3 stitch for the number of stitches, and 1.0 mm for the stitch length
   For step 4, set 3 stitches for the number of stitches, and -1.0 mm for the stitch length
   For step 5, set 2 stitches for the number of stitches, and 1.5 mm for the stitch length

⑤ Confirming the numeric value



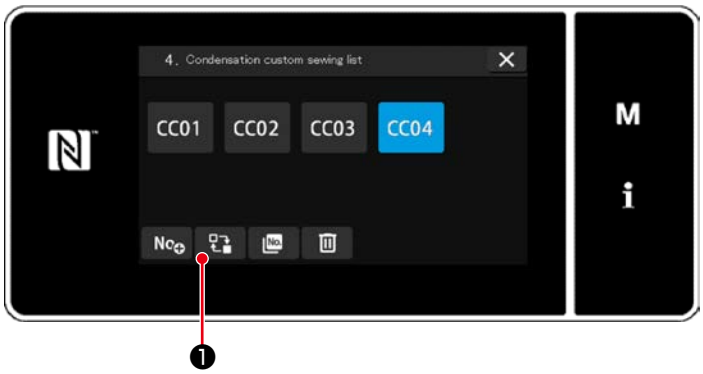
1) Press  ⓫ to confirm the setting.



2) The condensation custom list screen is displayed with the condensation custom number you have created added.

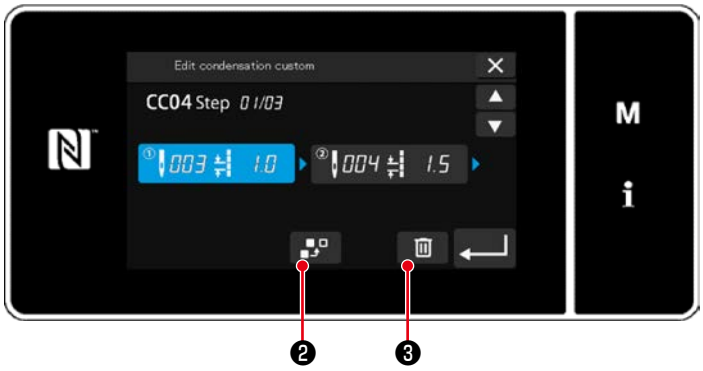
9-6-3. Condensation custom edit function

① Selecting the condensation custom edit function



1) Display the "condensation custom edit screen" referring to **"9-6-2. Creating a new condensation custom" p. 143**.
2) Select the condensation custom number you want to edit and press ❶.
The "condensation custom edit screen" will be displayed.

② Editing the condensation custom value

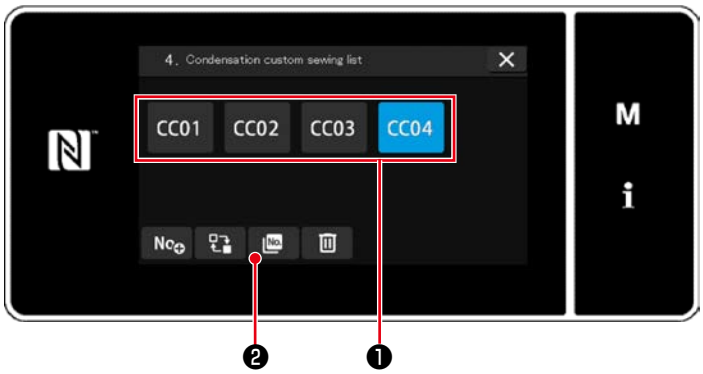


1) Press ❷ to display the "condensation custom data input screen".
The data entered on the "condensation custom data input screen" will be inserted before the selected step.
2) Press ❸ to delete the selected step.
3) Refer to **"9-6-2. Creating a new condensation custom" p. 143** to edit the number of stitches and the stitch length for each step.

9-6-4. Copying/deleting a condensation custom

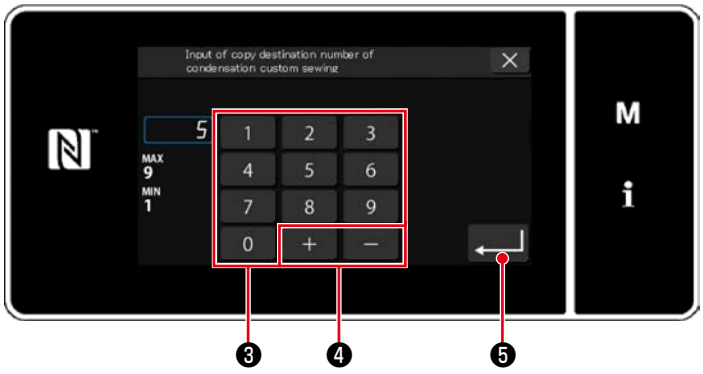
(1) Copying a condensation custom

① Displaying the condensation custom pattern list screen



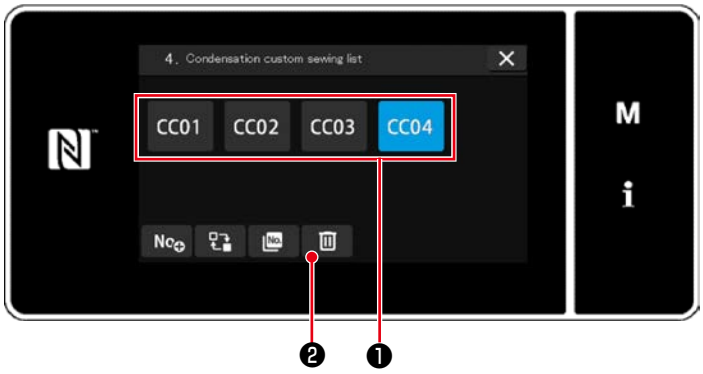
1) Display the "condensation custom pattern list screen" referring to **"9-6-2. Creating a new condensation custom" p. 143**.
2) Press CC04 ❶ of the copy source to put it in the selected state.
3) Press ❷.
The "condensation custom copy destination number input screen" is displayed.

② Inputting the condensation custom pattern number



1) Enter the condensation custom number for the copy destination using the numeric keypad ❸.
2) Press + − ❹ to display the nearest available (unassigned) registration number in the positive or negative direction relative to the entered value.
3) Press ❺.
The created condensation custom pattern is registered, and the screen returns to the "condensation custom pattern list screen".
If the entered number is already registered, a confirmation message for overwriting will be displayed.

(2) Deleting a condensation custom



1) Display the "condensation custom pattern list screen" referring to **"9-6-2. Creating a new condensation custom" p. 143**.
2) Press CC04 ❶ to put the custom pitch to be deleted in the selected state.
3) Press ❷.
The "deletion confirmation screen" is displayed.
Press to delete the condensation custom data.

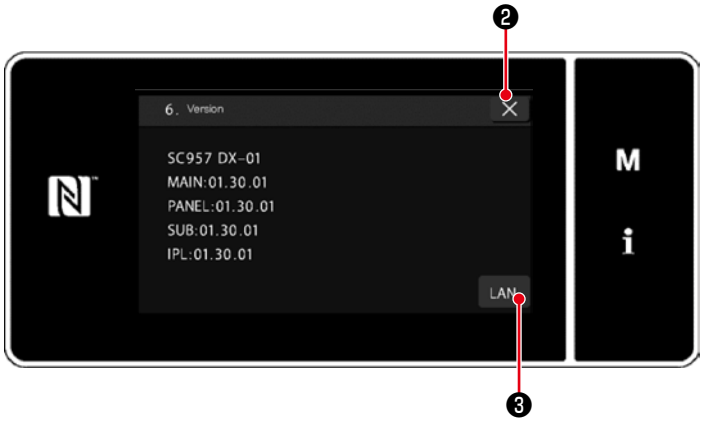
* You cannot delete condensation custom data used in a pattern.

9-7. Version information



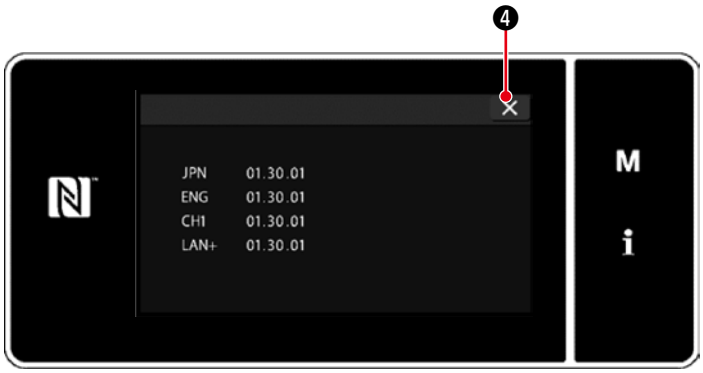
<Mode screen>

1) Press M ❶ .
The "mode screen" is displayed.
2) Select the "6. Version".
The "version information screen" is displayed.



<Version information screen>

3) The screen returns to the previous screen by pressing ✕ ❷ .
When LAN ❸ is pressed, the "communication version information screen" is displayed.



<Version information screen>

4) When ✕ ❹ is pressed on the "communication version information screen", the screen returns to the "version information screen".

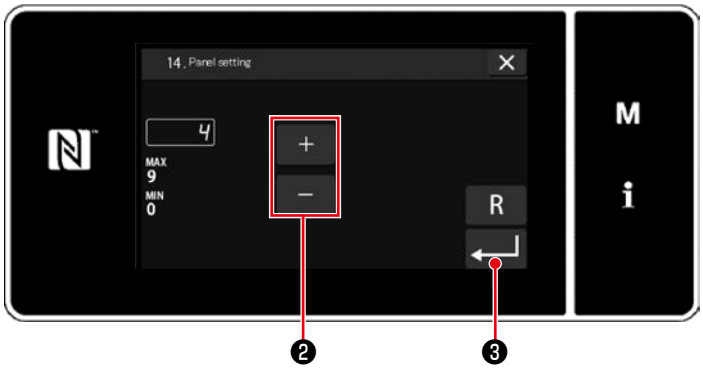
9-8. Adjustment of brightness of the LED panel

Screen brightness of the LED panel can be changed.



<Mode screen>

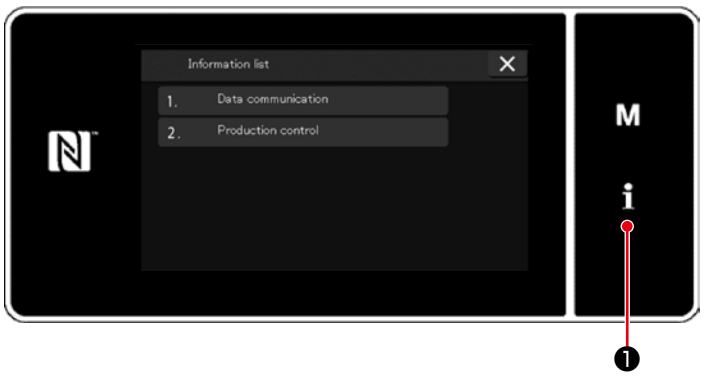
1) Keep M ❶ held pressed for three second.
   The "mode screen" is displayed.
2) Select the "14. Panel setting".
   The "operation panel setting screen" is displayed.



<Operation panel setting screen>

3) Brightness of the operation panel is adjustable with + − ❷ .
4) Press ↵ ❸ to confirm the setting.
   Return the "mode screen".

9-9. Information



<Information screen>

Press ❶.

The "information screen" is displayed.

Data communication and production management are carried out on the information screen.

9-9-1. Data communication

Data can be input/output by means of a USB thumb drive.

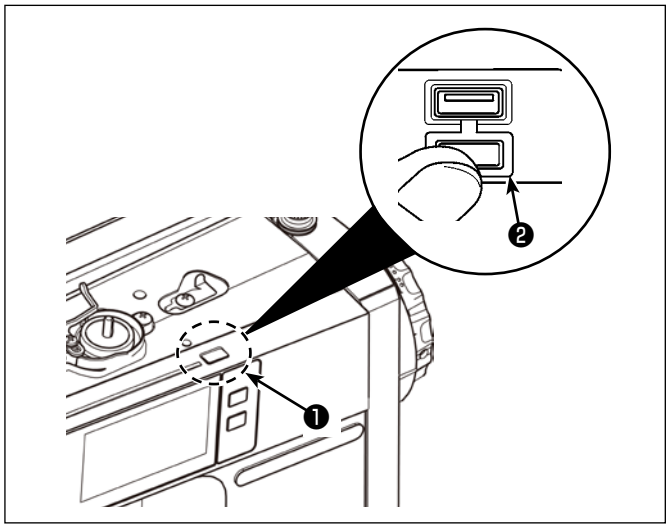
Data that can be handled on the information screen is as follows:

Data name	Extension	Description of data
Sewing data	SC00×××.EPD (×××:001 to 999)	Model-specific sewing data format of the sewing pattern shape, number of stitches, etc. created on the sewing machine.
Custom pattern data	VD00×××.VDT (×××:001 to 999)	The data format that can be operated in common between JUKI sewing machines.
Condensation custom data	VD00×××.VDT (×××:001 to 999)	The data format that can be operated in common between JUKI sewing machines.

9-9-2. USB

Sewing data, custom pitch data and condensation custom data can be copied on a commercially-available USB thumb drive.
Refer to **"9-9-1. Data communication" p. 150** for details of how to copy the sewing data on a USB thumb drive.

① Position of the USB connector



[USB thumb drive insertion position]
The USB connector is provided on top ❶ of the operation panel.
To use a USB thumb drive, remove connector cover ❷ and insert the USB thumb drive into the USB connector.

* In the case a USB thumb drive is not used, the USB connector should be protected with connector cover ❷ without exceptions.

If dust or the like enters the USB connector, a failure can be caused.

② Precautions to be taken when handling USB devices

- Do not connect to the USB connection terminal other than the USB memory.
  It may cause failure.
- Do not leave the USB device or USB cable connected to the USB port while the sewing machine is in operation. The machine vibration can damage the port section resulting in loss of data stored on the USB device or breakage of the USB device or sewing machine.
- Do not insert/remove a USB device during reading a program or sewing data.
  It may cause data breakage or malfunction.
- When the storage space of a USB device is partitioned, only one partition is accessible.
- Never forcefully insert a USB thumb drive into the USB connector while carefully checking the orientation of the USB thumb drive. Forceful insertion of the USB thumb drive can cause failure.
- JUKI does not compensate for loss of data stored on the USB device caused by using it with this sewing machine.
- In principle, connect only one USB thumb drive to the operation panel. When two or more devices/media are connected/inserted, the machine will only recognize one of them. Refer to the USB specifications.
- Do not turn the power OFF while the data on the USB flash drive is being accessed.

③ USB specifications

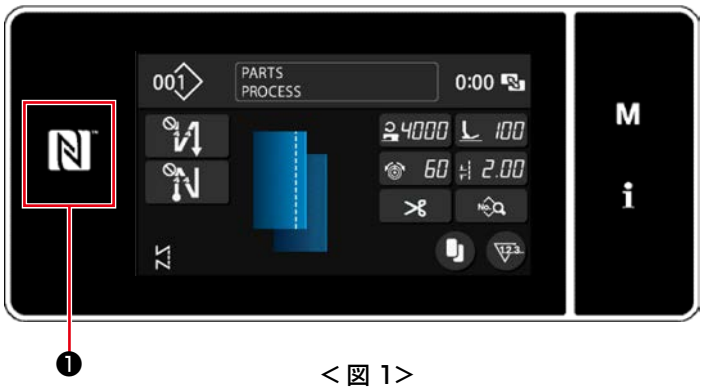
- Conform to USB 1.1 standard
- Applicable devices *1 ____ USB memory
- Format supported _____ FAT 12, FAT 16, FAT 32
- Applicable medium size __ 4.1MB ~ (2TB)
- Consumption current ____ The rated consumption current of the applicable USB devices is 500 mA at the maximum.

*1: JUKI does not guarantee operation of all applicable devices. Some device may not operate due to a compatibility problem.

9-9-3. NFC

The operation panel supports NFC (Near Field Communication).
Sewing data, maintenance information or the like can be viewed, edited, copied, etc., on an Android terminal (such as tablet and smartphone) on which JUKI application for Android "JUKI Smart App" has been installed, by means of the NFC communication function.
Refer to the Instruction Manual for JUKI Smart App for details of JUKI application for Android "JUKI Smart App".

① Position of the NFC antenna

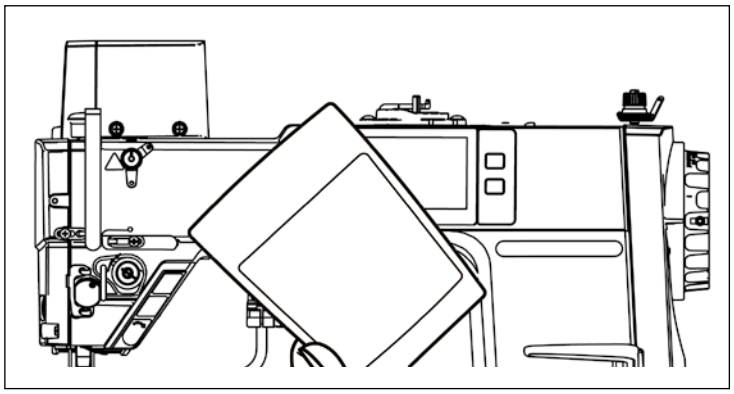


<図 1>

[Position of the NFC antenna]
In the case of carrying out the NFC communication between the sewing machine and a tablet or smartphone, bring the antenna of the tablet or smartphone near to NFC mark ❶ as shown in Fig. 2.

* If the NFC communication has failed, error message will be displayed on the tablet/smartphone screen.

When the error message is displayed on the screen, carry out the NFC communication again.



<図 2>

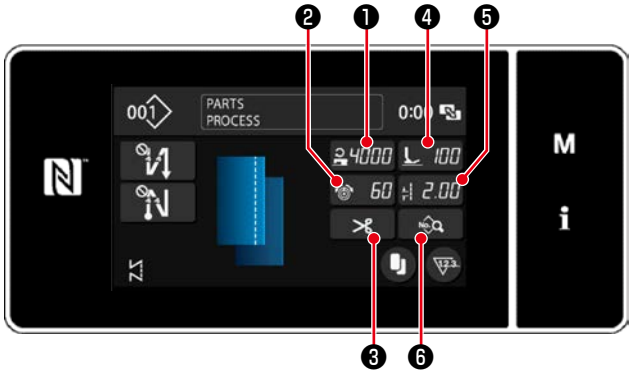
② Precautions to be taken when handling NFC

- The position of the NFC antenna varies according to the tablet/smartphone used.
  Be sure to read the instruction manual of your device before using the NFC communication function.
- To use the NFC communication function, place the NFC communication function setting in "Enable" while referring to the instruction manual for your tablet/smartphone.
- If you use the NFC while the main body of sewing machine is being started, a malfunction can occur.

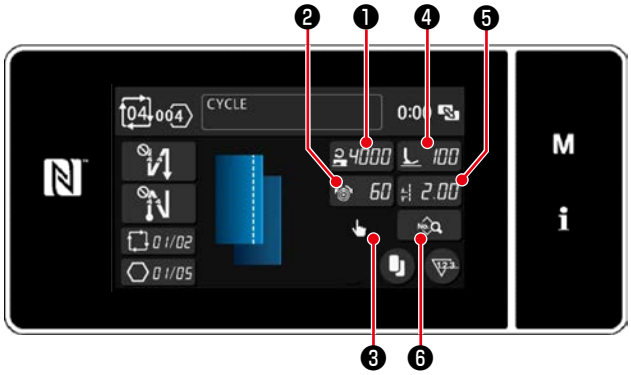
9-10. Key customization

9-10-1. Assignable data

You can assign any function to a key and customize the panel key layout.
Functions that can be assigned to panel keys are as described below.
The key to which no function is assigned is displayed in blank.



<First sewing screen (standard display mode)>



<Sewing screen (Cycle mode)>

No.	Initial value		Assignable data	
	Pattern sewing	Cycle sewing		
❶	Sewing speed	Sewing speed	Pattern data	Bobbin winding mode
❷	Needle thread tension	Needle thread tension	Pattern number	Function is not provided
❸	Thread trimming device	Thread trimming device	Cycle pattern number	Standby mode
❹	Presser foot pressure	Presser foot pressure	Memory switch	
❺	Entire feed amount	Entire feed amount	One-touch changeover	
❻	Sewing data list	Sewing data list	One-touch type changeover (multi-layered portion)	

9-10-2. How to assign a function to a key

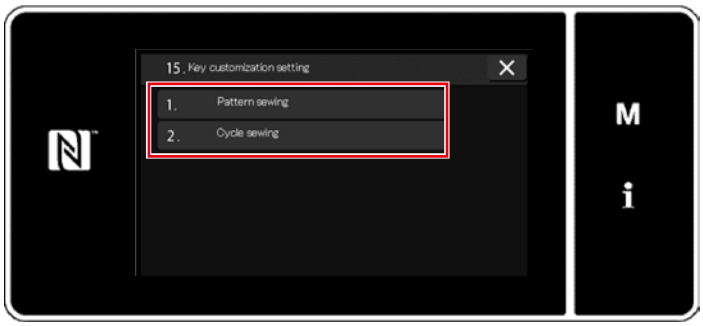
① Displaying the key customization mode list screen



<Mode screen>

1) Keep **M** ❶ held pressed for three second.
   The "mode screen" is displayed.
2) Select the "15. Key customization setting".
   The "key customization mode list screen" is displayed.

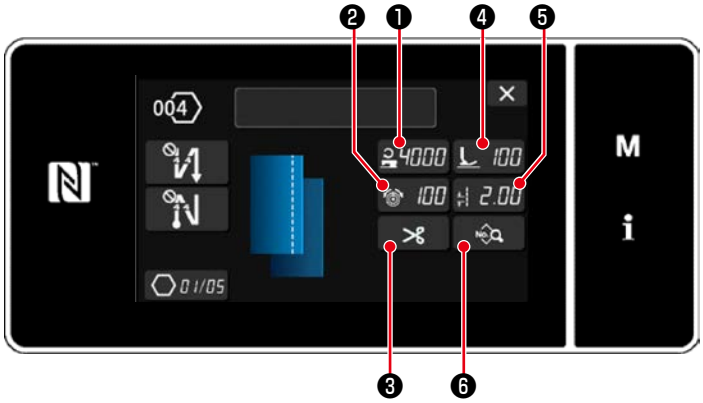
② Setting the key customization



<Key customization mode list screen>

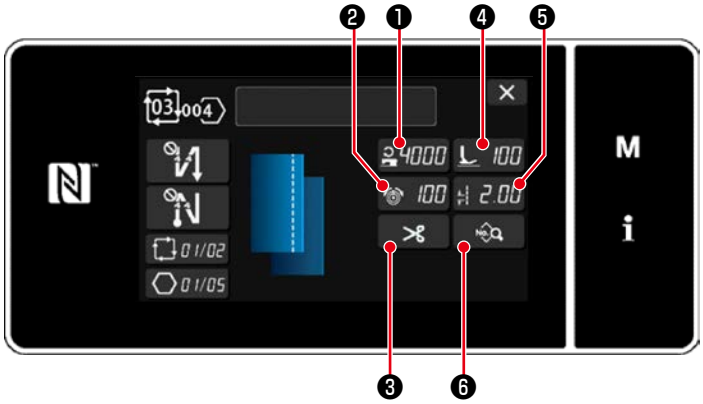
1) Press "1. Pattern sewing" to display the "key customization assignment screen (pattern sewing)".
2) Press "2. Cycle sewing" to display the "key customization assignment screen (cycle sewing)".

③ Selecting a function to be assigned

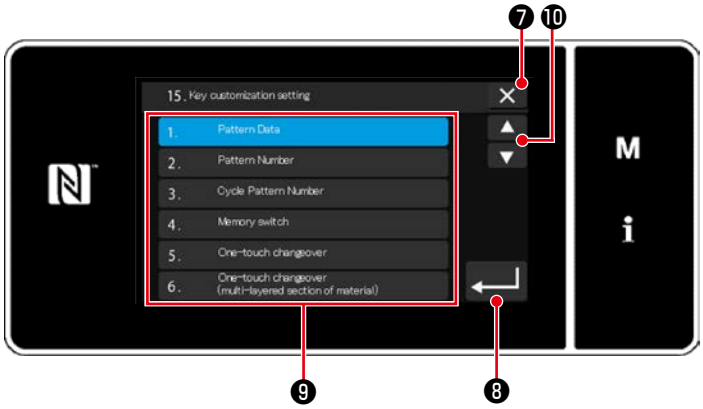


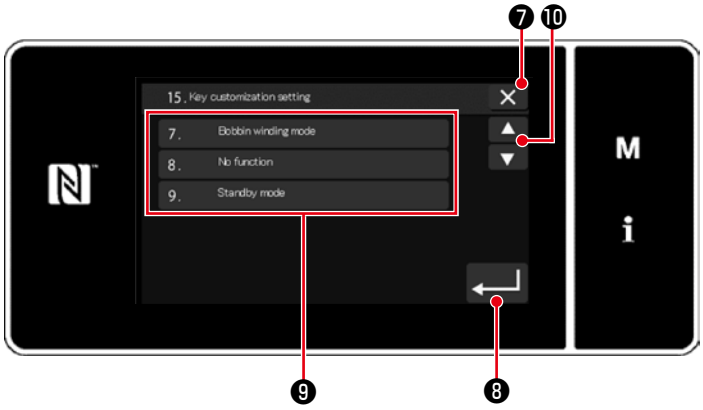
<Key customization assignment screen (pattern sewing)>

When you press any button in pattern sewing mode ❶ to ❻ or cycle sewing mode ❶ to ❻, the "key customization selection screen" will be displayed.



<Key customization assignment screen (cycle sewing)>





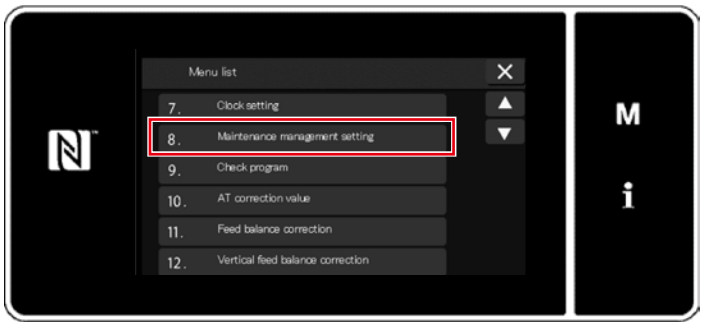
1) Use ▲▼ ❿ to scroll the list, and press a function button ❾ to assign functions to pattern sewing modes ❶ to ❻ and cycle sewing modes ❶ to ❻ .
2) The counter button is respectively displayed by pressing ❶
3) Press ↵ ❽ to confirm the setting.
   Cancel the operation with ✕ ❼ . The current screen returns to the previous screen.

9-11. Maintenance management function

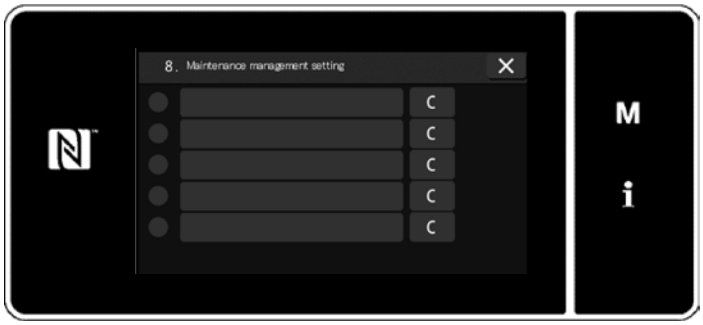
When the set value for the counter is reached, this function gives a warning on the screen. As many as five different set values can be registered for warning.



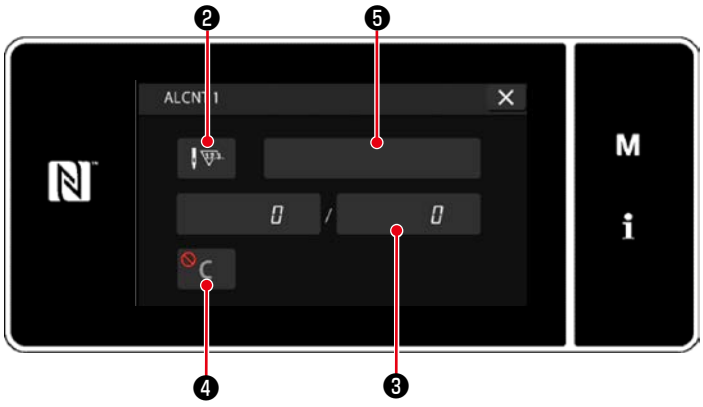
1) M ❶ held pressed for three second.
The "mode screen" is displayed.



2) Select "8. Maintenance management setting".

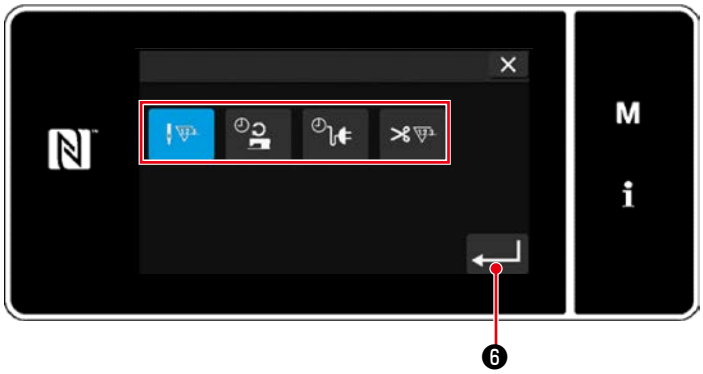


3) When the counter for which the set value for warning is selected, the "warning counter setting screen" is displayed.



<Warning counter setting screen>

4) When ❷ is pressed, the "warning counter type selection screen" is displayed.



<Warning counter type selection screen>

5) Select the setting condition of the warning counter.

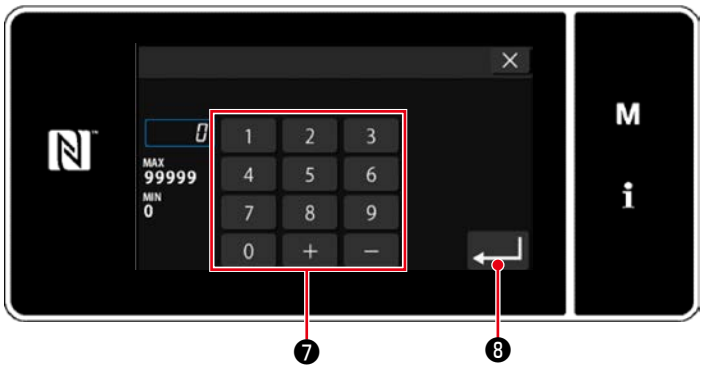
: Number of stitches (Unit: 1000 stitches)

: Operating time (Unit: Hours)

: Energizing time (Unit: Hours)

: Number of times of thread trimming (Unit: Number of times)

6) When ↵ ❻ is pressed, the operation is confirmed. Then, the screen returns to the "warning counter setting screen".

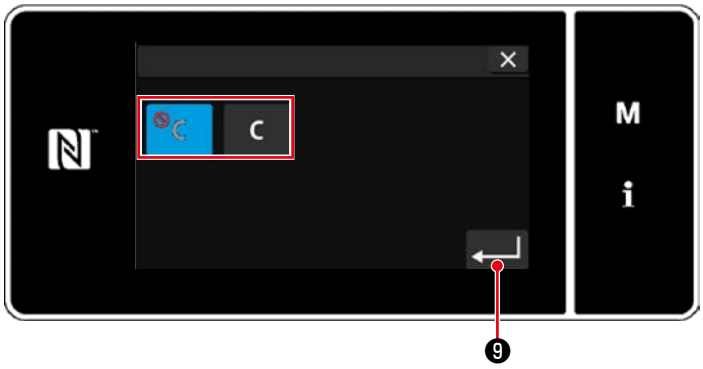


<Warning counter set value input screen>

7) When ❸ on the "warning counter setting screen" is pressed, the "warning counter set value input screen" is displayed.

8) Input the warning counter set value with numeric keypad ❼ .

9) When ↵ ❽ is pressed, the operation is confirmed. Then, the screen returns to the "warning counter setting screen".



<Warning counter clearing setting screen>

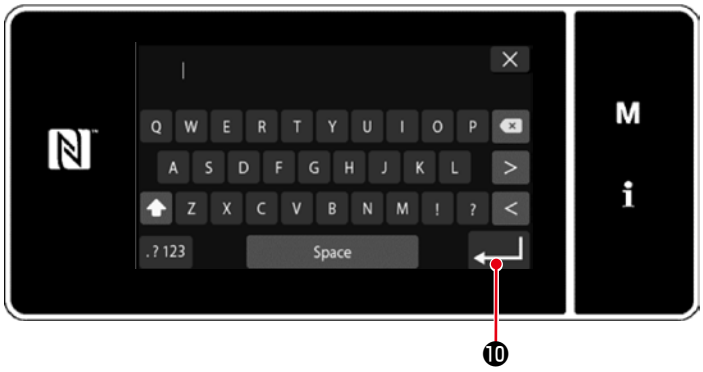
10) When ❹ on the "warning counter setting screen" is pressed, the "warning counter clearing setting screen" is displayed.

11) Select enable/disable of the warning counter clearing displayed on the warning screen.

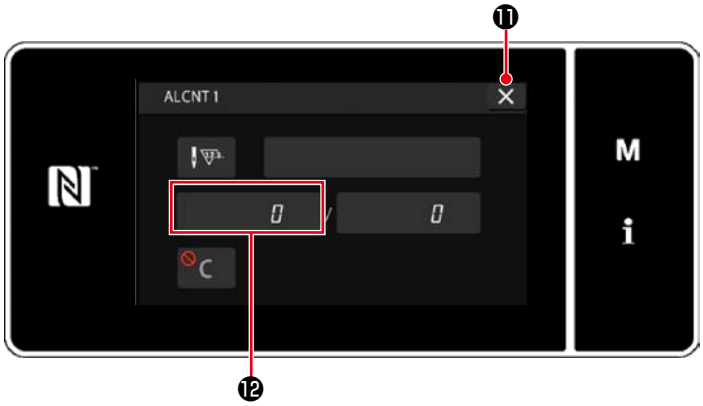
: Disable (Current-value clear key is not displayed on the warning screen)

C : Enable (Current-value clear key is displayed on the warning screen)

12) When ↵ ❾ is pressed, the operation is confirmed. Then, the screen returns to the "warning counter setting screen".

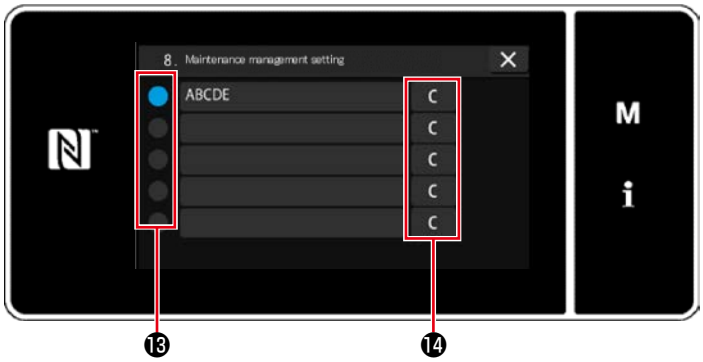


13) When ❺ on the "warning counter setting screen" is pressed, the "keyboard" is displayed.
14) Enter a name of the warning counter.
15) When ↵ ❿ is pressed, the operation is confirmed. Then, the screen returns to the "warning counter setting screen".

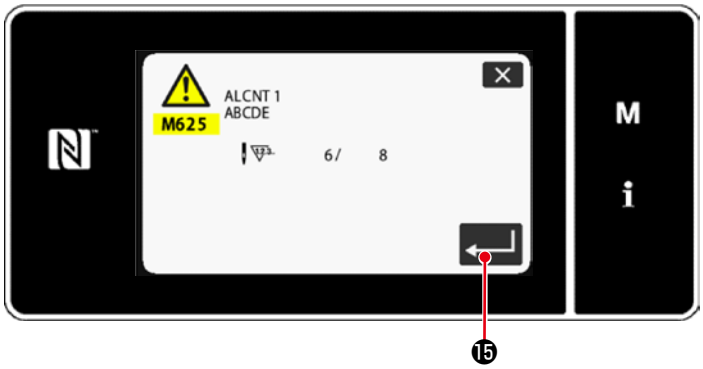


16) When ✕ ⓫ is pressed, the operation is confirmed. Then, the screen returns to the "maintenance management setting screen".

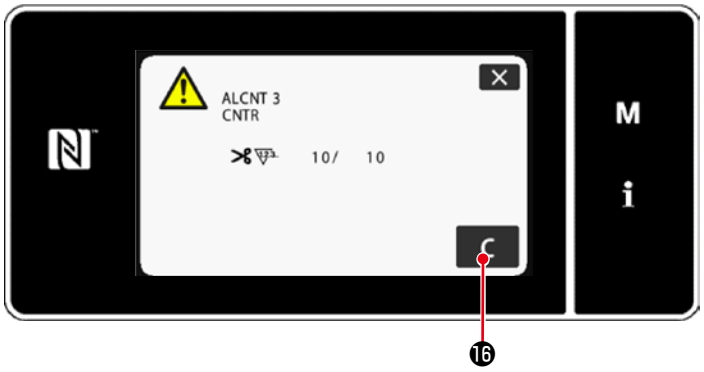
* When the sewing machine performs sewing after the warning counter has been set, number of counts is displayed in ⓬ .



17) The warning counter selected with a checkmark in ⓭ is enabled.
18) When the relevant "C" button in ⓮ is pressed, the number of counts displayed in the corresponding counter field can be cleared.



19) When ↵ ⓯ is pressed, the operation is confirmed. Then, the screen returns to the "maintenance management screen".



20) When the preset number of counts for the counter is reached, the warning screen is displayed.
21) Clear the number of counts by pressing C ⓰ .

* If (disable) is selected in item number 10), C ⓰ will not be displayed.

22) If the number of counts of the counter is not cleared, the warning screen will be displayed again at the time of next count.

10. LIMITING SEWING SPEED RELATIVE TO FEED AMOUNT

The maximum sewing speed varies depending on the stitch length, as shown in the table below.

Stitch length(mm)	Sewing speed(sti/min)
0.00 to 5.00mm	4000
5.01 to 6.50mm	3000
6.51 to 9.00mm	2000

11. MAINTENANCE

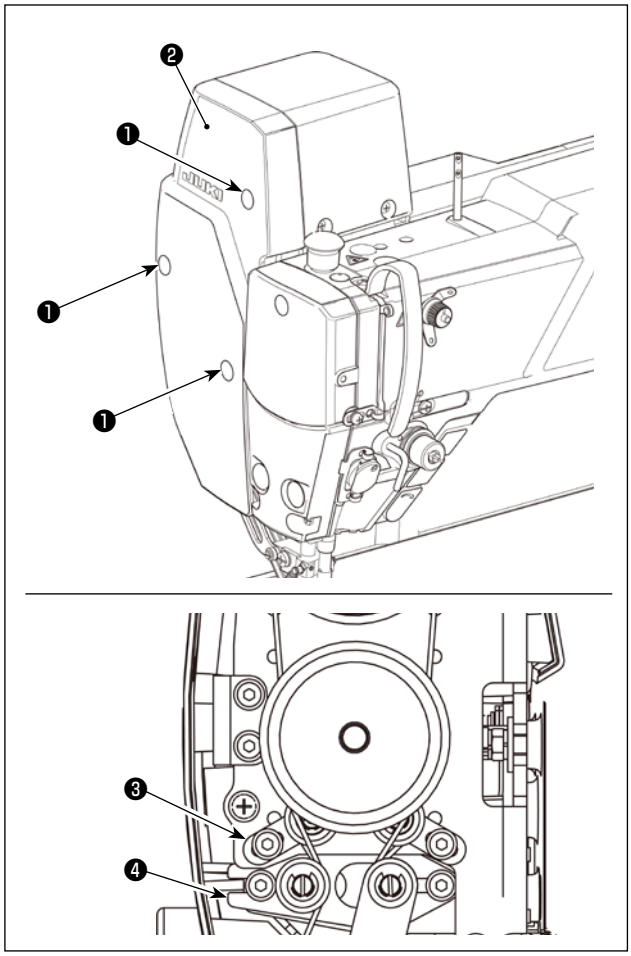
11-1. How to replace a feed belt

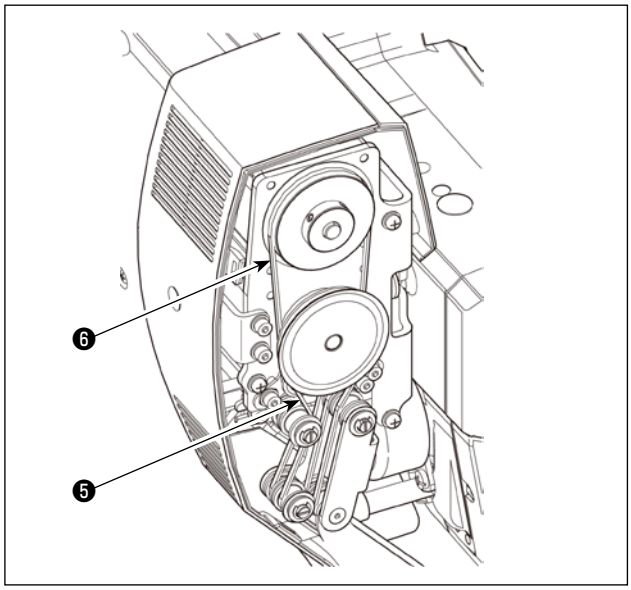
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Caution

1. **Although the recommended replacement period is once a year, this may vary depending on the usage frequency. If you notice a significant decrease in feed force, replace the belt.**
2. **Dust can accumulate inside the upper feed cover, causing the belt to become tangled, which may result in poor feeding and shorten the belt's lifespan. To prevent this, clean it regularly, about once a week.**

(1) Replacing the top feed belt

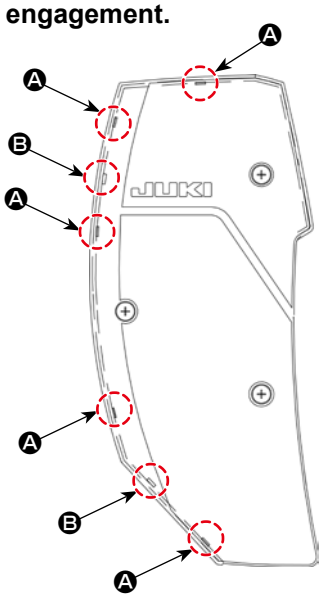




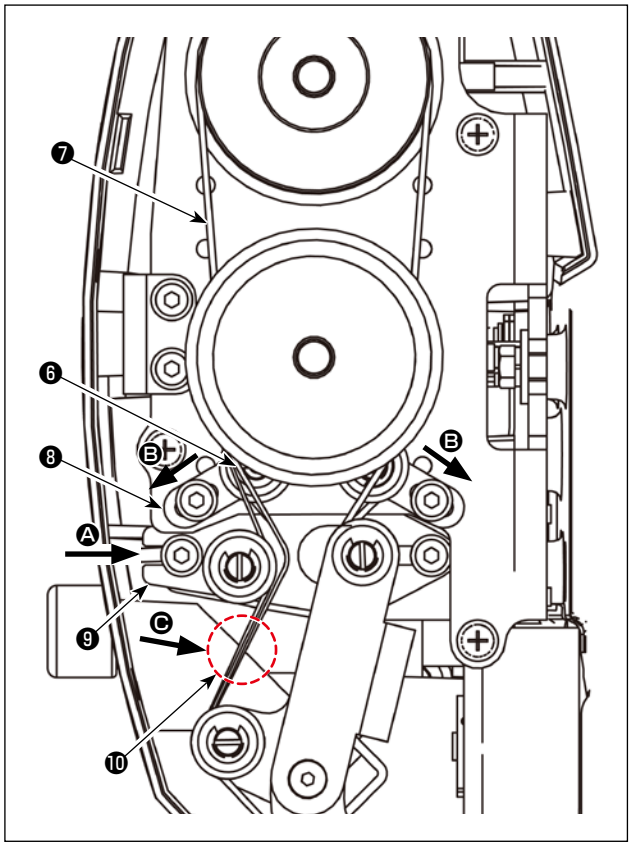
1) Remove the cover setscrew ❶ , then remove the cover ❷ .
2) Loosen the tension adjustment plate S ❸ , remove the tension adjustment plate L ❹ , upper belt (left) ❺ , and upper belt (right) ❻ , then replace them with new belts.
(See the instructions on how to thread the belt.)
3) After adjusting the tension, attach the cover ❷ .

1. The cover has a protrusion at Ⓐ to prevent positional displacement and a protrusion at Ⓑ to prevent detachment.
When attaching or removing the cover, lightly press it to adjust its engagement.

Caution



2. Tightening the screws that secure the cover too much may cause the cover to break.
Tighten the screw until the spring seat is fully deformed.



■ How to adjust belt tension

(1) Left belt

Adjust the tension by moving the tension adjustment plate L ❾ left and right.

· Moving it to the right (towards Ⓐ) increases tension, and moving it to the left decreases tension.

(2) Right belt

Adjust the tension by moving the tension adjustment plate S ❽ left and right.

· The tension increases when opened on both sides (towards Ⓑ) and decreases when closed.

(3) Adjusting the belt tension value

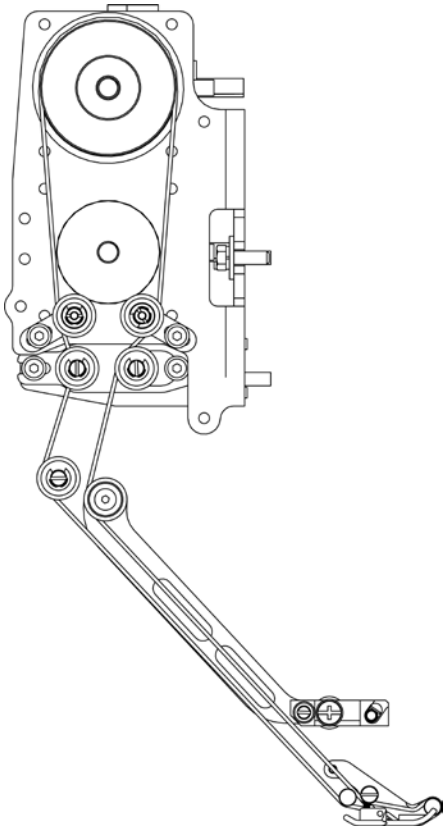
Adjust position ❿ so that it deflects 5 ±1 mm in the direction Ⓒ when pressed with a force of 300 g.



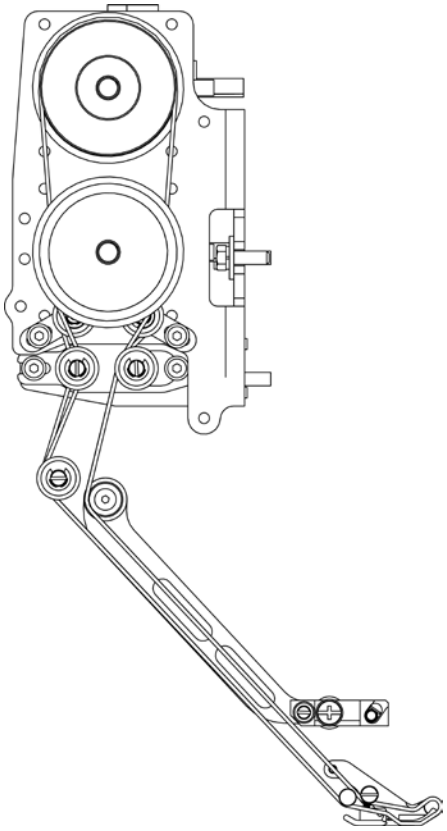
Incorrect tension can cause feed pitch errors.

How to thread a belt

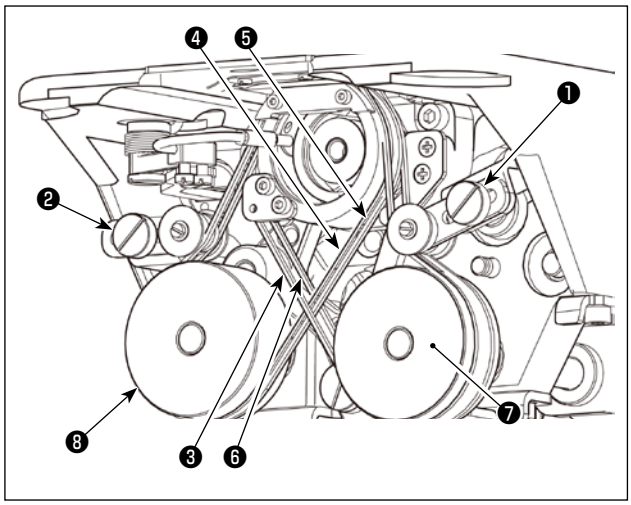
Right belt



Left belt

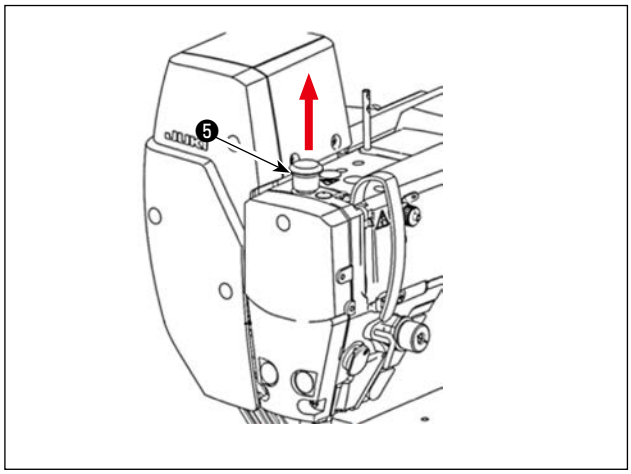


11-2. Replacing the bottom feed belt



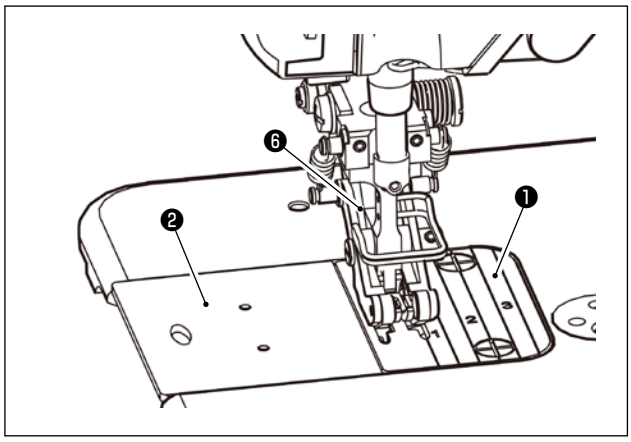
(1) Bottom feed belt: Replacing from left-right feed differential to front-back feed differential

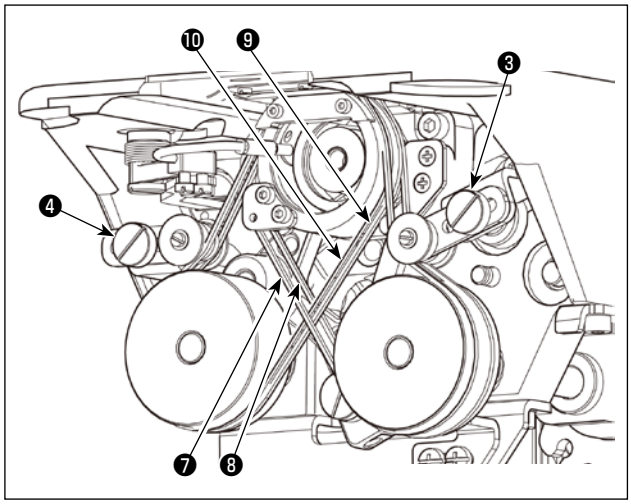
1) Loosen the idler fixing screw ❶ , then loosen the belt tension of the lower belts ❸ and ❹ .
2) Remove the lower belts ❸ and ❹ from the sprocket.
3) Loosen the idler fixing screw ❷ , then loosen the belt tension of the lower belts ❺ and ❻ .
4) Remove the lower belts ❺ and ❻ from the sprocket ❽ .
5) Thread the lower belt ❻ through the sprocket ❼ .
6) Thread the lower belts ❹ and ❺ through the sprocket ❽ .
7) Thread the lower belt ❸ through the sprocket ❼ .
8) After adjusting the lower belt tension, fix it with the idler fixing screws ❶ and ❷ .



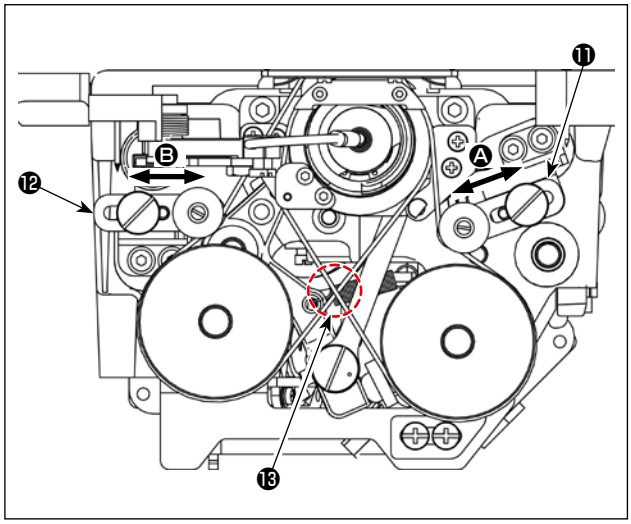
(2) Replacing the bottom feed belt

1) Lift the presser bar cap ❺ to raise the presser foot ❻ , then remove the throat plate ❶ and the slide plate ❷ .





2) Loosen the idler fixing screws ❸ and ❹ .
3) Replace the bottom feed belts ❼ , ❽ , ❾ and ❿ with new ones.



■ How to adjust belt tension

Adjust the tension by moving the bottom feed tension adjustment plates ⓫ and ⓬ left and right.

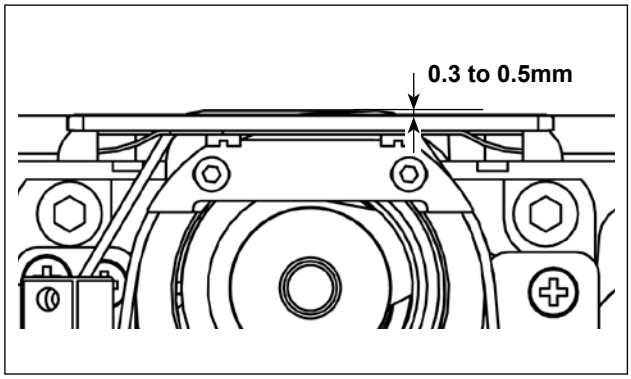
Belt tension value :

Adjust the deflection to 5 ±1 mm when the flat surface at position ⓭ is pressed with a force of 300 g toward the toothed surface.

Incorrect tension can cause feed pitch errors.

■ How to adjust belt tension

4) After adjusting the tension, attach the throat plate ❶ and the slide plate ❷ .



(3) Confirming the gap after replacing a belt

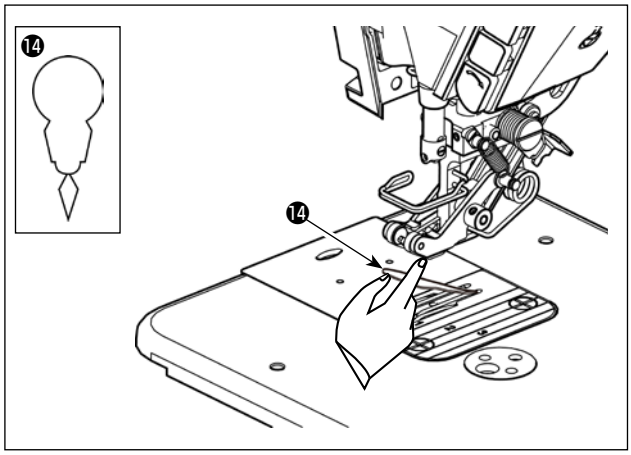
There are slight variations in the thickness of the belts.

When replacing a belt, check the "belt protrusion amount" and the "gap between the throat plate and the belt".

If the belt protrusion amount is out of range or if the belt is touching the throat plate, adjust the hook base.

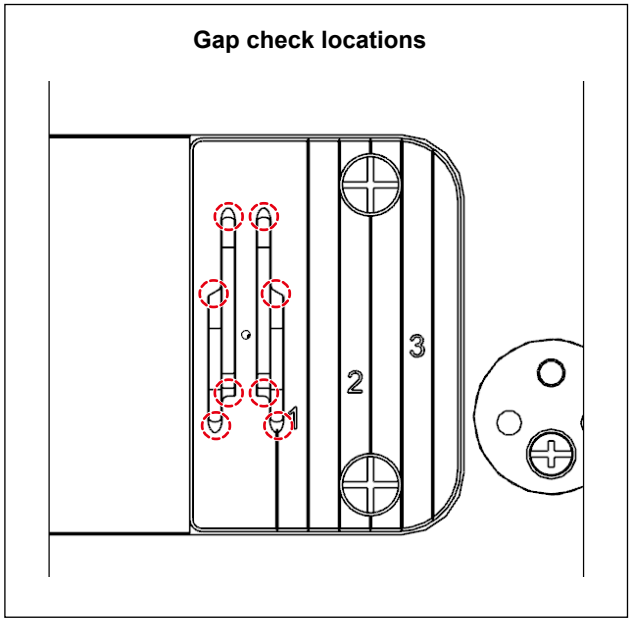
■ Confirming the belt protrusion amount

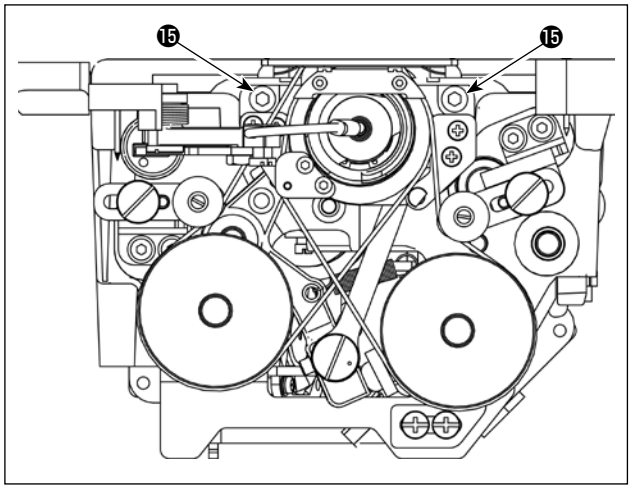
Ensure that the belt protrudes 0.3 to 0.5 mm from the throat plate.



■ Confirming the belt protrusion amount

Use the lower belt gap check tool ⓮ to ensure there is a gap between the belt and the throat plate. (8 locations)





■ How to adjust the hook base

1) Loosen the hook base mounting screws ⓯ .
2) Adjust the height of the belt to 0.3 to 0.5 mm from the throat plate and temporarily tighten the hook base mounting screws ⓯ .
3) Use the lower belt gap check tool ⓮ to confirm that the belt and throat plate are not in contact.
4) Once you have confirmed that there is a gap, tighten the hook base mounting screws ⓯ .

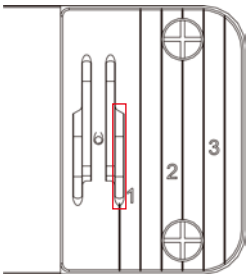
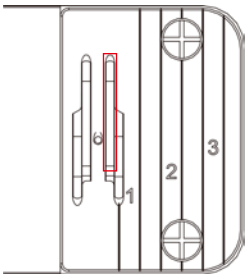
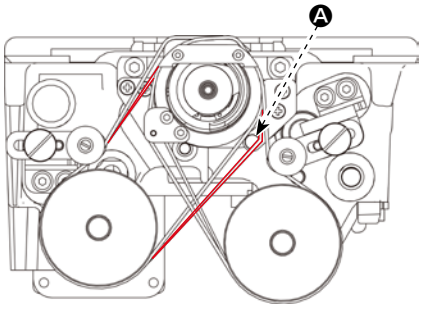
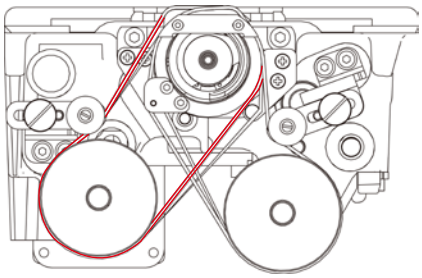
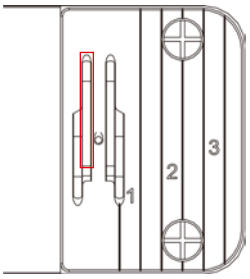
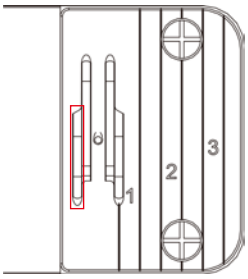
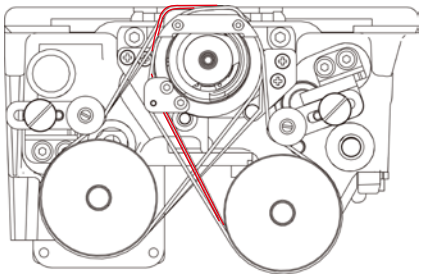
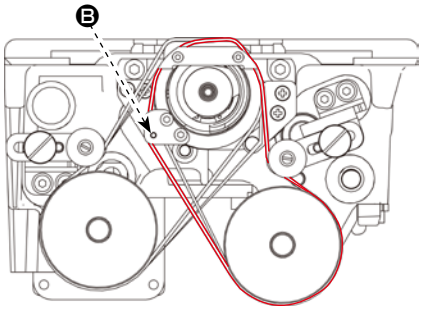
Caution

If the hook base is set too low, it may cause poor feed and insufficient thread trimming.
If the hook base is set too high, it may cause poor motor control and shorten the lifespan of the belt.
Use with proper adjustment.

11-3. How to thread the lower belt

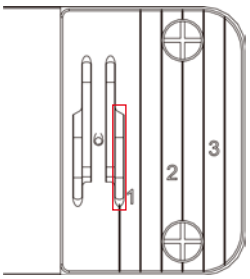
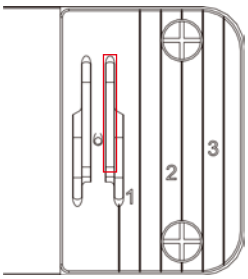
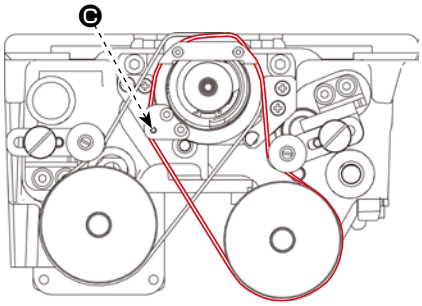
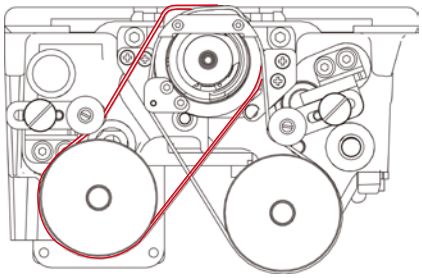
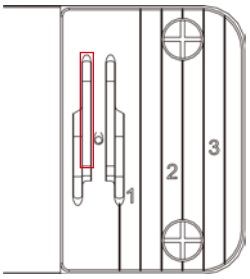
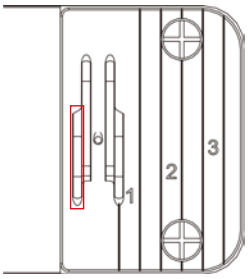
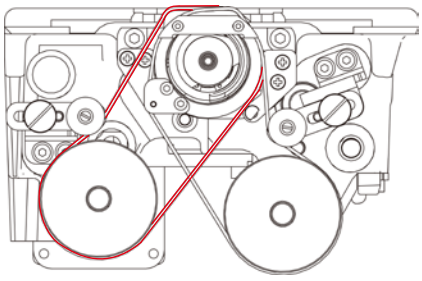
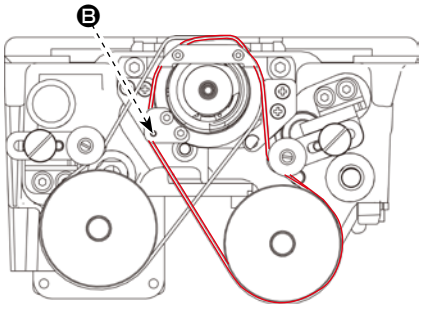
[Left-right feed differential]

Install the belt in the following order: ① , ② , ③ , ④ . If you forget to place the belt on rollers Ⓐ and Ⓑ along the belt path, the belt length will be incorrect and the belt will become loose.

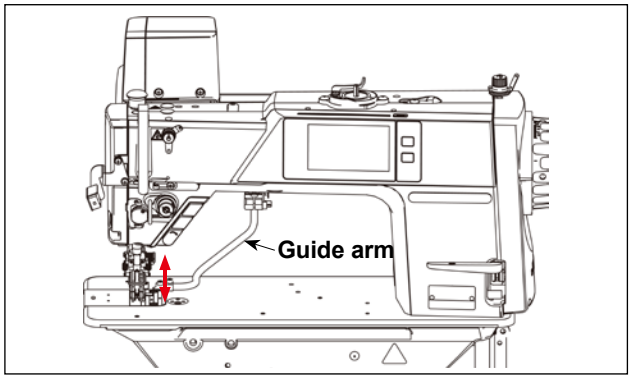
①	②
	
	
③	④
	
	

[Front-back feed differential]

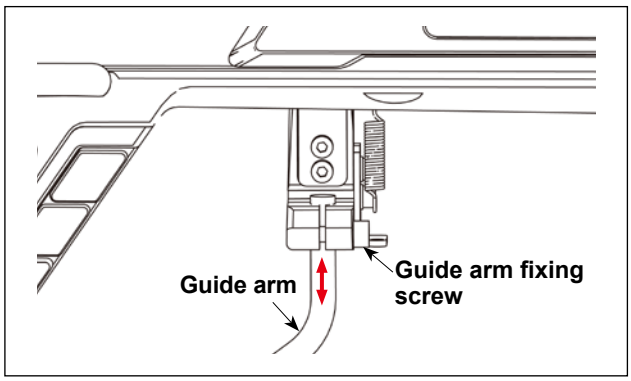
Install the belt in the following order: ① , ② , ③ , ④ . If you forget to place the belt on rollers Ⓑ and Ⓒ along the belt path, the belt length will be incorrect and the belt will become loose.

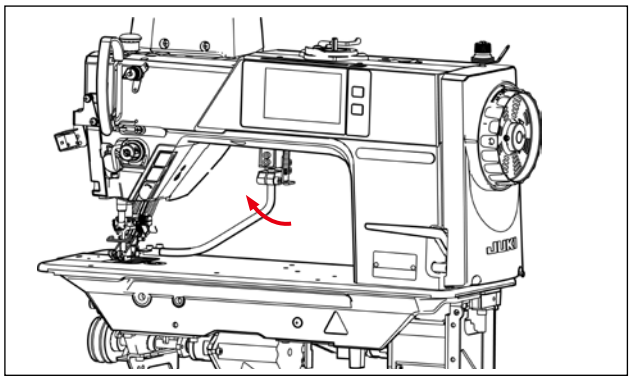
①	②
	
	
③	④
	
	

11-4. Adjusting the suspended ruler



1) To adjust the vertical direction of the cloth guide, loosen the guide arm fixing screw and move the guide arm up or down to adjust the cloth guide accordingly.





2) When not using the cloth guide, you can lift it up. In addition, by moving the cloth guide to the retracted position on the right side, the guide arm can be raised significantly.

