ENGLISH

AE-200AN
INSTRUCTION MANUAL

CONTENTS

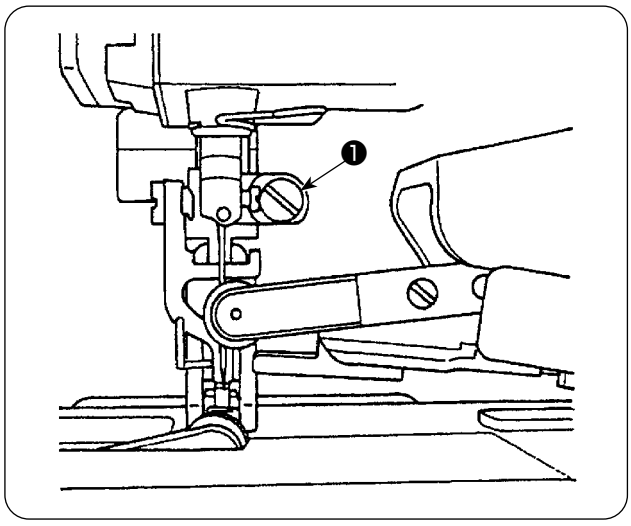
I. CAUTIONS BEFORE OPERATION

Following items have to be checked every working day before the operation of the machine and before the start of work hours.

1. Ascertain that the oil pan is filled with the predetermined amount of oil.
2. Never operate the machine unless the oil pan has been filled up with oil.
3. Ascertain that the pressure gauge indicates the designated air pressure of 0.5 MPa.
   * (This is necessary particularly when the compressor is stopped for a lunch break or the like.)
   If the compressed air pressure is equal to or less than the designated value, troubles such as interference between the parts can occur. It is therefore necessary to carefully check the compressed air pressure.
4. Check whether the needle thread/bobbin thread need to be replenished.
5. To perform sewing immediately after turning ON the power switch, perform trial stitching first, then proceed with sewing of actual products after the test sewing.
6. In order to prevent the sensor from showing a detecting failure, be sure to clean thread waste around the sensor using an air gun once or more times a day.

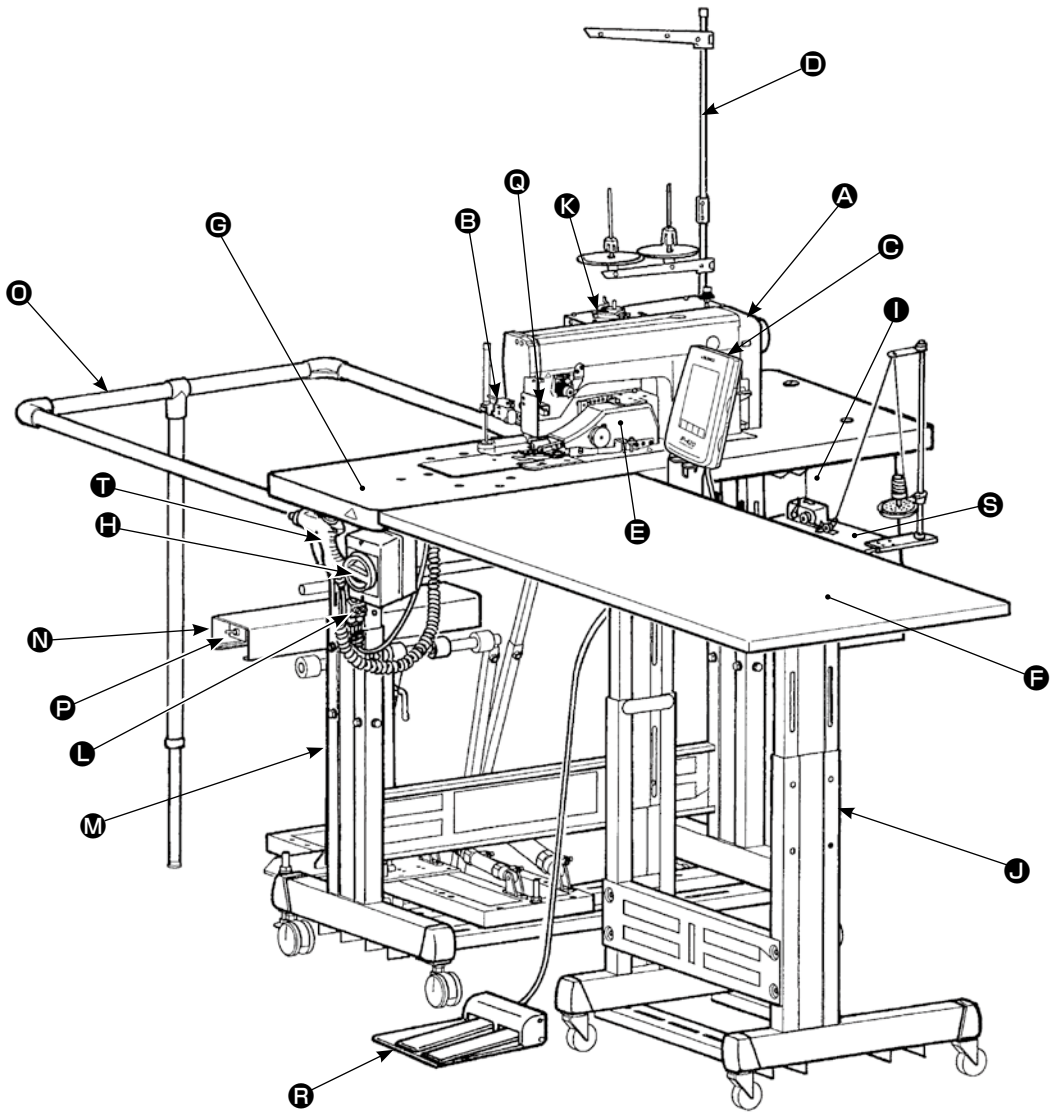
1. Precautions for use

1. For a wider material, fold the material toward you and sew it while putting your hand on it. If you don't guide the fabric by hand during sewing, the material may warp at the end of sewing.
2. When sewing some patterns, it is also necessary to put your hand on the material at the end of sewing.
3. Setscrew for the presser bar base



1) Never loosen setscrew ❶ in the presser bar base. If it is loosened, the walking foot movement timing will change from the correct one.
2) When it is really necessary to loosen setscrew ❶ , it should be loosened when the walking foot comes down to contact the throat plate surface.

II. CONFIGURATION OF THE MACHINE



Ⓐ Machine head (DLU-5498N-7)
Ⓑ Start switch
Ⓒ Operation panel
Ⓓ Thread stand
Ⓔ Upper manipulator
Ⓕ Auxiliary table
Ⓖ Sewing machine table
Ⓗ Power switch
(also used as the emergency stop switch)
Ⓘ Control box
Ⓙ T stand
Ⓚ Bobbin winder
Ⓛ Air blow SC (Speed controller)
Ⓜ T stand
Ⓝ SS52 Stacker device (optional)
Ⓞ Safety bar (optional)
Ⓟ Air valve switch
Ⓠ Material end sensor
Ⓡ 2-pedal unit (optional)
Ⓢ Bobbin winder (optional)
Ⓣ Air gun

III. OVERVIEW

This automatic machine consists of a bottom & variable top-feed, lockstitch machine with an automatic thread trimmer, auto-lifter, upper and lower manipulators which control the material end with accuracy, control box which controls the whole system, operation panel and auxiliary table.
(The sewing machine head is DLU-5498N-7 specifically developed for AE-200A, AE-200AN.)
Stacker device (SS52), 2-pedal unit, bobbin winder and bobbin thread remaining amount detecting device are provided as options.

1. Features

1) Easy operation requiring no skill (Even an inexperienced operator is able to carry out work equivalent to that by a skilled operator.)
2) Increased efficiency is promised. (Re-arrangement of two pieces of fabric is required during manual work. This machine eliminates such a re-arrangement, thereby shortening the time required for sewing.)
3) High-quality is ensured to improve reliability. (The sewing machine sews the materials with a consistent seam allowance, thereby producing uniform products.)
4) The sewing machine permits the operator to operate it from its side face automatically or manually by means of the pedal either standing or sitting.
5) The 2-pedal unit ensures accurate placement of the material on the sewing machine.
6) Seam allowance can be set in the range of 1 and 30 mm.
7) Uneven material feed can be adjusted with ease.

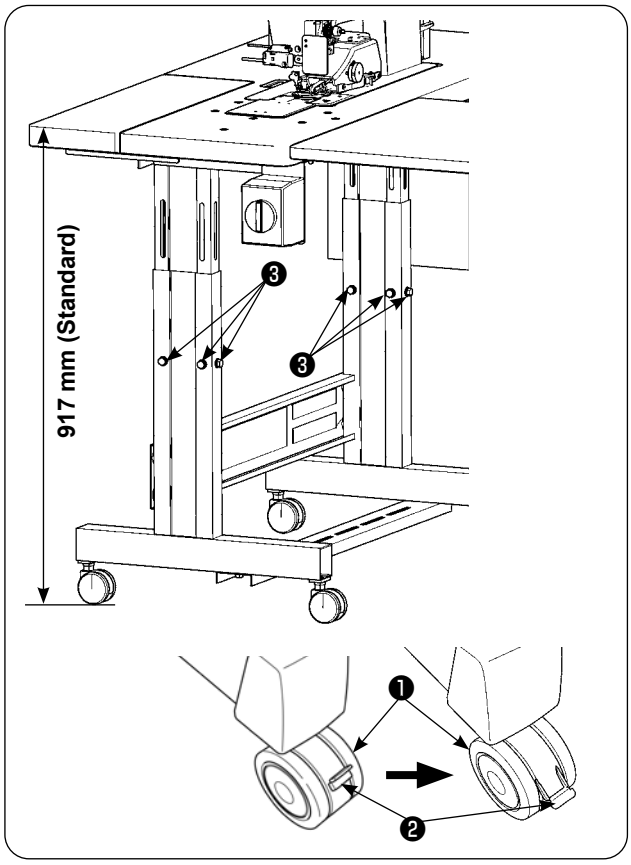
2. Specifications

1	Speed of stitch	200 to 3,500 sti/min
2	Stitch length	0 to 4 mm
3	Top feed amount	8 mm (Max.)
4	Presser foot lift (max.)	10 mm (Air-driven)
5	Seam allowance	1 to 30 mm
6	Needle to be used	DBx1 #9 to #18 (Standard: #11)
7	Sewing condition A) Curve sewing B) Material size C) Number of plies of materials	 100 mm R or more 1,500 (length) x 500 (width) or less 2 or 1
8	Power consumption	280VA
9	Power source	3-phase 200 to 240 V Single-phase 200 to 240 V
10	Table height	Adjustable between 820 to 1,020 mm (Standard: 917 mm)
11	Sewing machine dimensions	2,375 (length) x 1,200 (width) x 1,150 (height) (mm)
	Auxiliary table	Standard: 1,200 (length) x 550 (width) mm
12	Stacker	SS52 Workpiece constant-retaining type
13	2-pedal unit	Provided with the presser foot up/down switch and 2-step start switch; high/low speed changeover
14	Weight	135 kg (when all options are installed)
15	Noise	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation : A-weighted value of 80 dB; (Includes K_{pA} = 2.5 dB); according to ISO 10821-C.6.3 -ISO 11204 GR2, at sewing cycle: 4 s ON and 7 s OFF.

IV. INSTALLATION

1. Table height

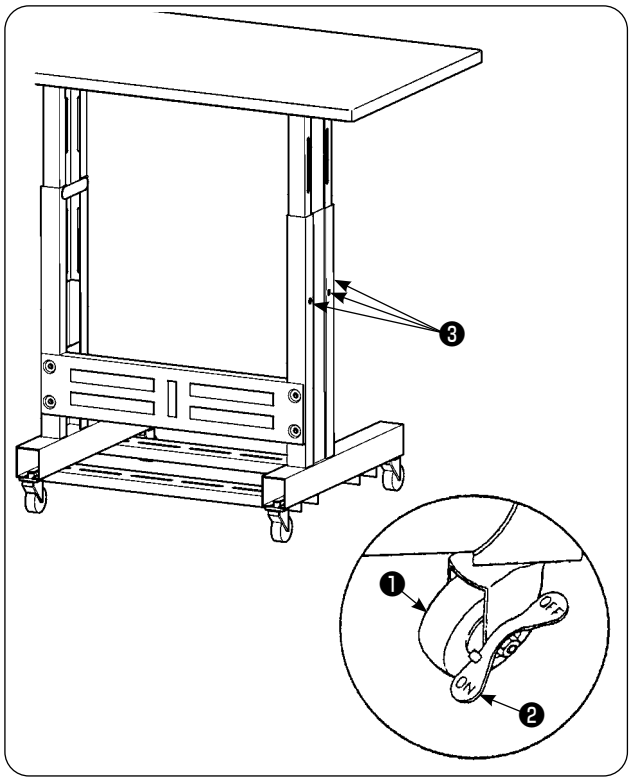
CAUTION :
Be sure not to lift the table by one worker but to lift it with four or more workers for supporting each of the four corners of the table when adjusting the table height.



The table height can be adjusted in the range of 820 and 1,020 mm. The standard height is 917 mm.

1) Install the table stand on a flat place.
2) Casters ❶ are secured by lowering levers ❷ .
3) Loosen six bolts ❸ mounted on the right and left legs of the table stand to adjust the table height.

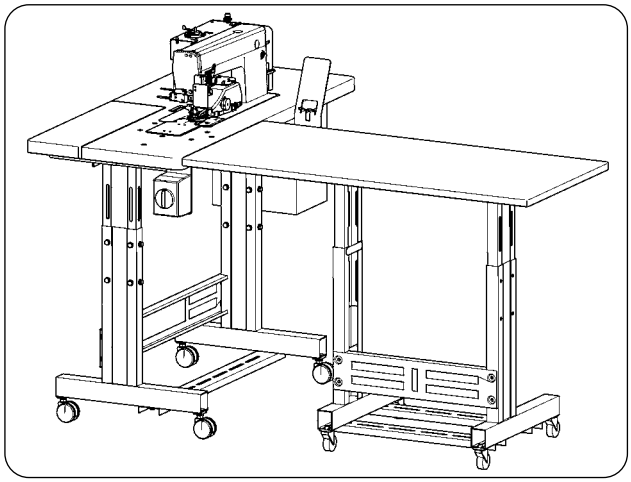
[Table height of the auxiliary table]



1) Install the table stand on a flat place.
2) Casters ❶ are secured by lowering the ON side of levers ❷ .
3) Loosen six bolts ❸ mounted on the right and left legs of the table stand to adjust the table height.

2. Auxiliary table

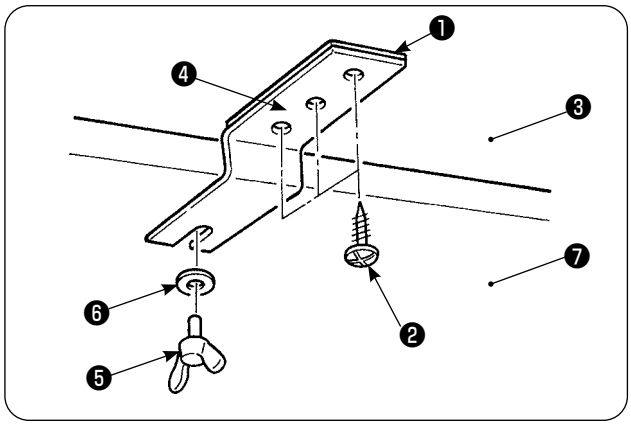
CAUTION :
When installing the auxiliary table, the related parts may drop off or the table may fall causing personal injury. To prevent this, be sure to carry out the installation of the auxiliary table with two workers. One of them has to support the table. When installing the auxiliary table to the sewing machine table, take care not to allow your hands, fingers, etc. to be caught between them.



Adjust the auxiliary table height to the sewing machine table height.

3. Assembling the sewing machine table and auxiliary table

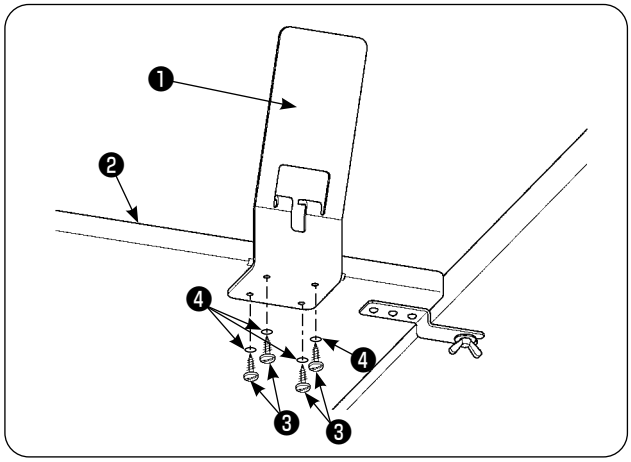
CAUTION :
When using tools, take care to prevent parts from dropping resulting in personal injury. Take also care not to get injured with the tool.



Fix spacer ❶ and auxiliary table joint bracket ❹ with three wood screws ❷ on auxiliary table ❸ . Then, mount the joint bracket onto table ❼ with thumb screw ❺ and washer ❻ .

4. Installing the operation panel mounting plate

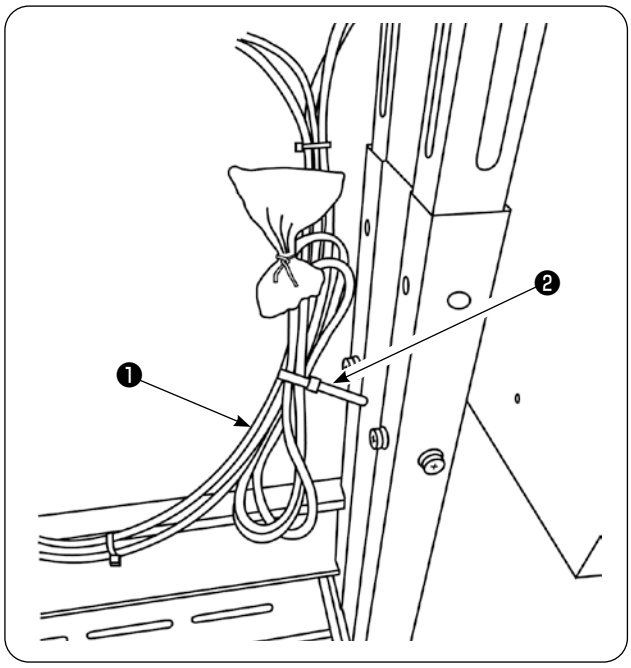
CAUTION :
When using tools, take care to prevent parts from dropping resulting in personal injury. Take also care not to get injured with the tool.



Install panel mounting plate ❶ on auxiliary table ❷ with four wood screws ❸ and four washers ❹ .

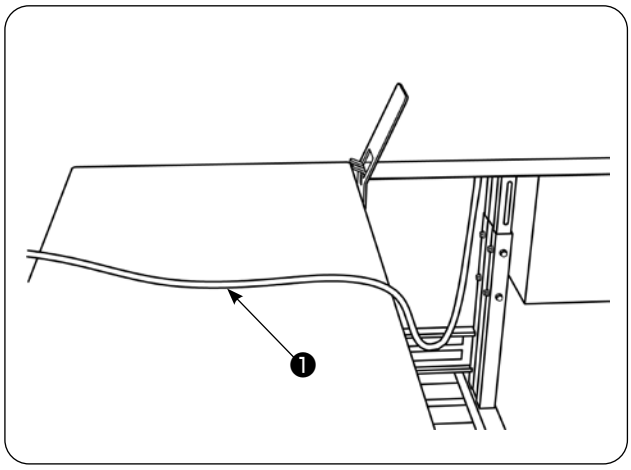
5. Connecting the operation panel

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

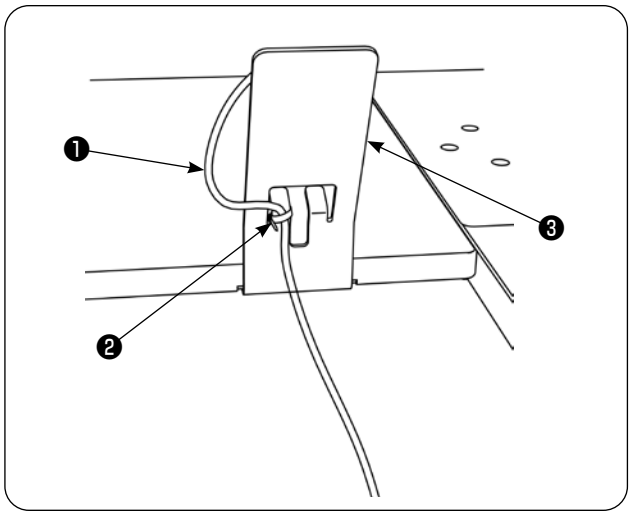


1) Remove cable clip band ❷ of operation panel cable ❶ bound to the air hose.

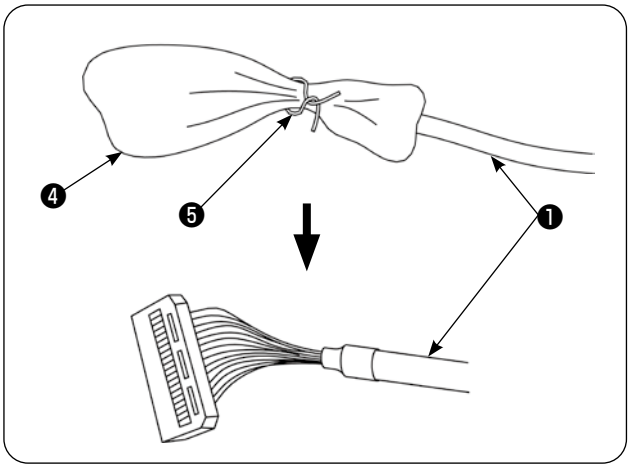
* The cable clip band you have removed will be used in the later procedure.



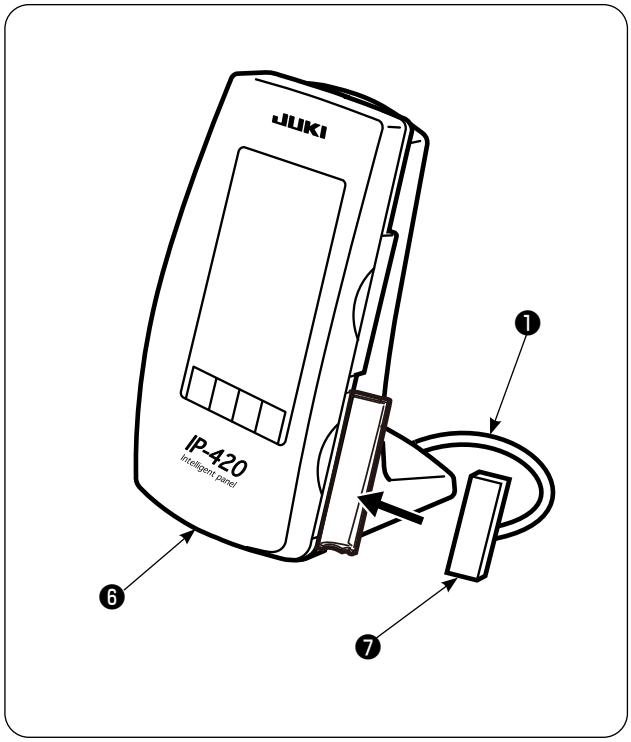
2) Draw out operation panel cable ❶ up to the operator side.



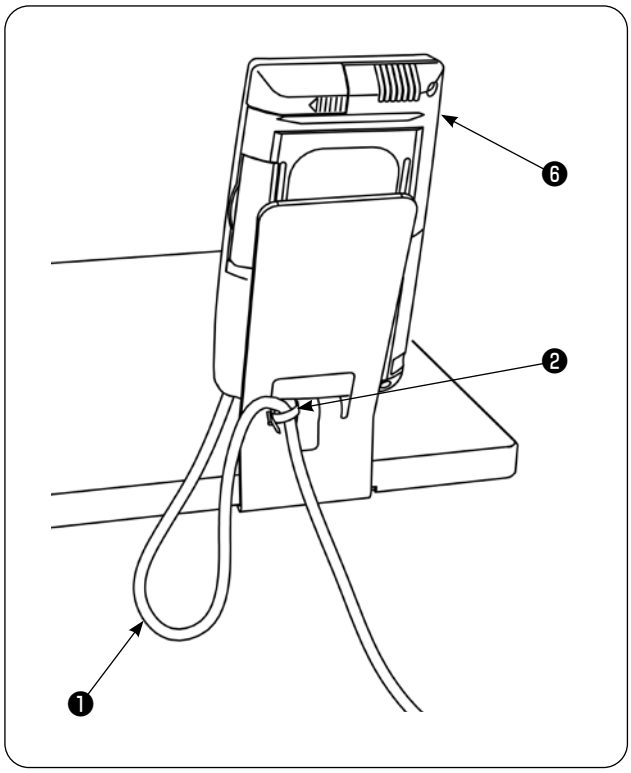
3) In the aforementioned state, secure operation panel cable ❶ you have removed in step 1) to operation panel mounting plate ❸ with cable clip band ❷ as shown in the figure.



4) Remove bag ❹ and plastic band ❺ that cover the connector of operation panel cable ❶ .



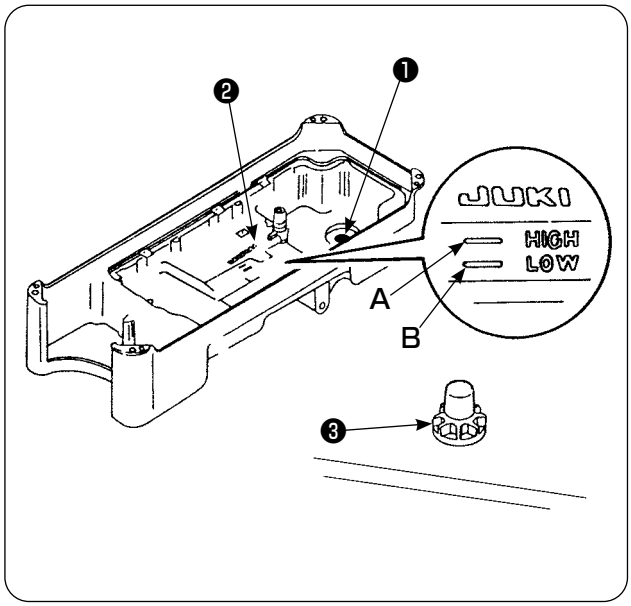
5) Connect connector ❼ of operation panel cable ❶ to operation panel ❻ .



6) Bring operation panel cable ❶ extending between operation panel ❻ and cable clip band ❷ under the table.

6. Lubrication

CAUTION :
When tilting or re-raising the sewing machine, take care not to allow your fingers or any other part of your body to be caught.



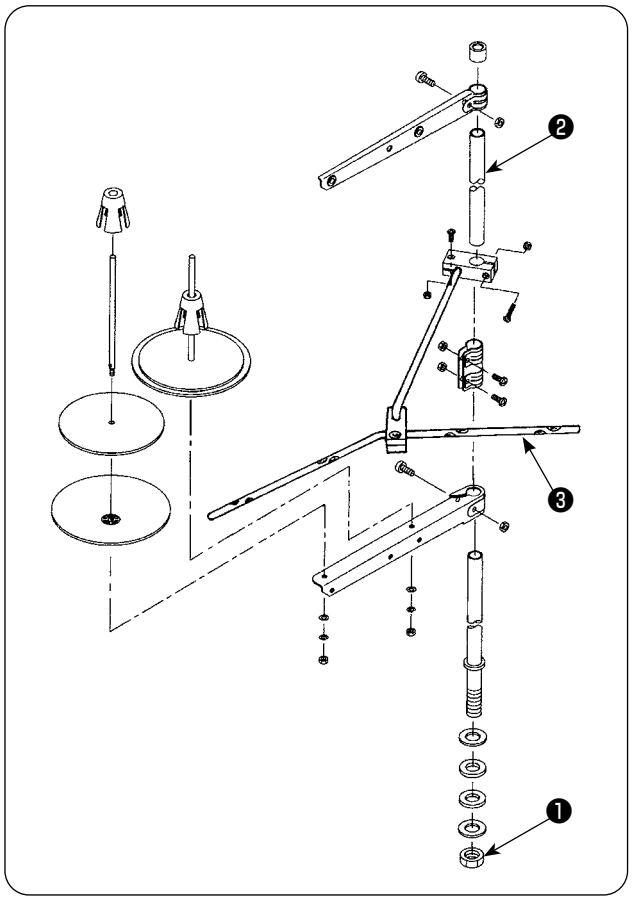
Before operating the sewing machine

1) Put magnet ❶ supplied with the unit in the waste oil screw section.
2) Fill oil pan ❷ with JUKI New Defrix Oil No. 1 until HIGH mark (**A**) is reached.
3) When the oil level lowers below LOW mark (**B**), re-fill the oil pan with the specified oil.
4) When you operate the sewing machine after lubrication, you will see splashing of oil through oil sight window ❸ if the lubrication is normal.
5) Note that the amount of the splashing oil does not represent the amount of oil in the oil pan.

Caution

1. When operating a newly installed sewing machine or a machine which has not been used a long period, be sure to run the sewing machine for approximately 10 minutes for the purpose of break-in using the bobbin winding key mounted on the operation panel.
2. Be sure to use JUKI's genuine oil. If any other oil is used, a trouble may be caused.

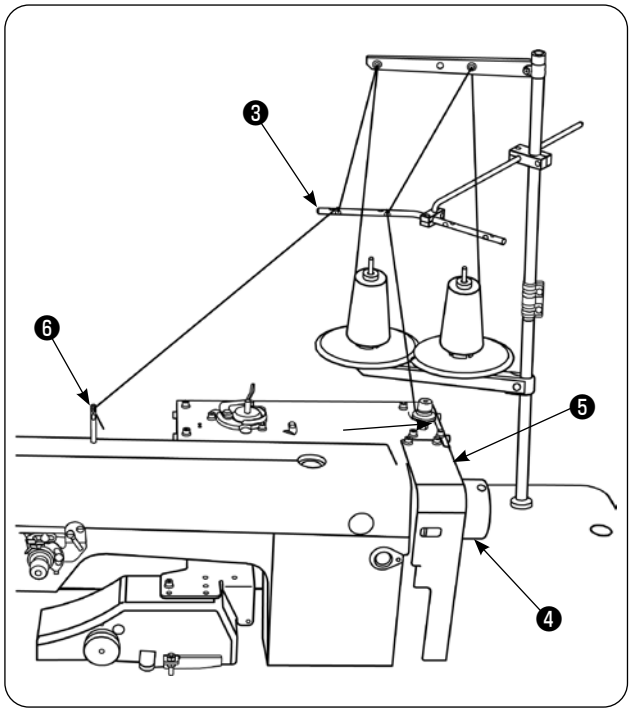
7. Installing the thread stand



1) Assemble the thread stand unit. Then, insert the assembled thread stand into the hole in the table.
2) Tighten locknut ❶ to fix the thread stand.
3) When ceiling wiring is possible, pass the power cord through spool rest rod ❷ .

Caution

Be sure to install intermediate thread guide ❸ to the thread stand without exceptions.



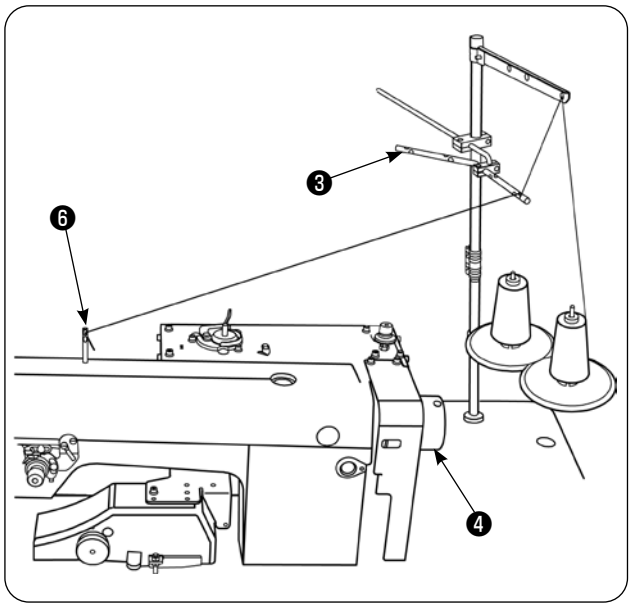
4) Place the thread stand so that its spool holder disks are brought to the rear side of the sewing machine in order to prevent the thread from getting in and caught between handwheel ❹ and belt cover ❺ of the sewing machine. In addition, use intermediate thread guide ❸ of the thread stand to minimize the length of thread extending from that guide to thread guide ❻ of the sewing machine.

Check the following items to make sure that the thread will neither get into nor be entangled in handwheel ❹ of the sewing machine.

1. Be sure to use intermediate thread guide ❸ and pass the thread through it when threading the machine head in order to prevent the thread from getting into handwheel ❹ .

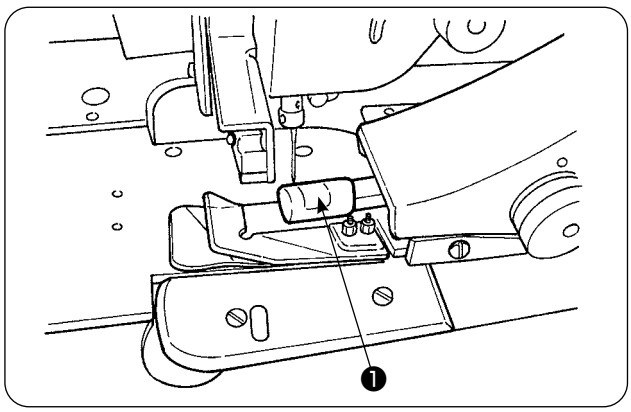
2. The thread drawn from the thread stand may slack and get caught in the handwheel due to the effects of wind (direction). Check the direction, etc. of wind.

3. Be aware that, in the case you have tilted the sewing machine for maintenance, the thread drawn from the thread stand may slack and get entangled in handwheel ❹ when you raise the sewing machine after the completion of maintenance.

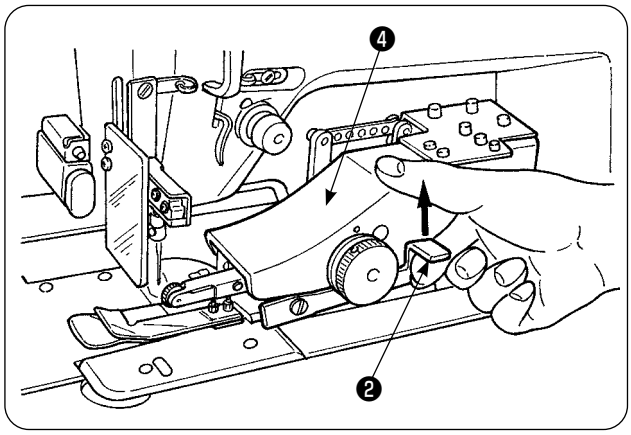


5) As an example of poor installation of the thread stand, if the thread stand is installed so that its spool holder disks are brought to handwheel ❹ side, the thread extending from intermediate thread guide ❸ of the thread stand to thread guide ❻ of the sewing machine passes above handwheel ❹ during sewing. In this case, the thread is likely to slack and may be entangled in handwheel ❹ .

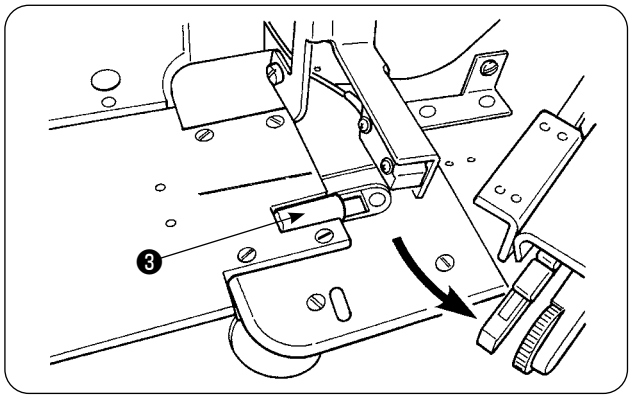
8. Removing the covers



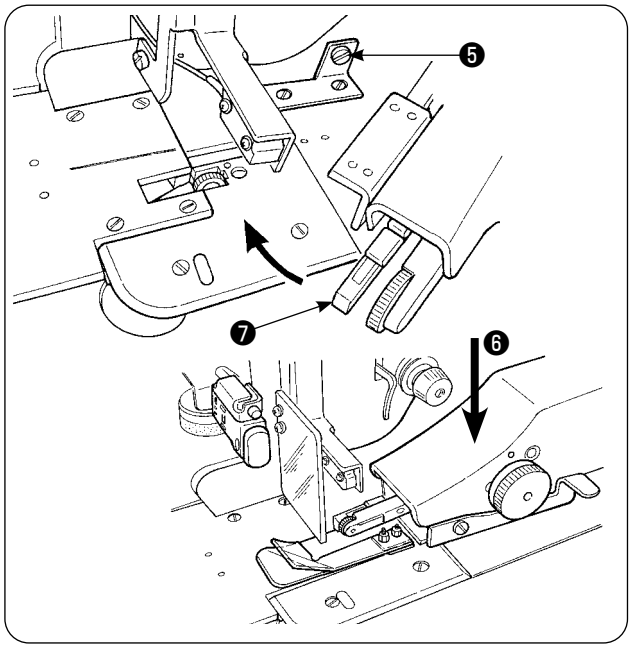
1) Remove upper manipulator roller cover ❶ .



2) Putting your finger on lever ❷ , lift the lever to release the upper manipulator ❹ .



3) Rotate the upper manipulator to remove lower manipulator roller cover ❸ .
After the removal of the upper and lower manipulator roller covers, replace the upper manipulator ❹ back to its position.

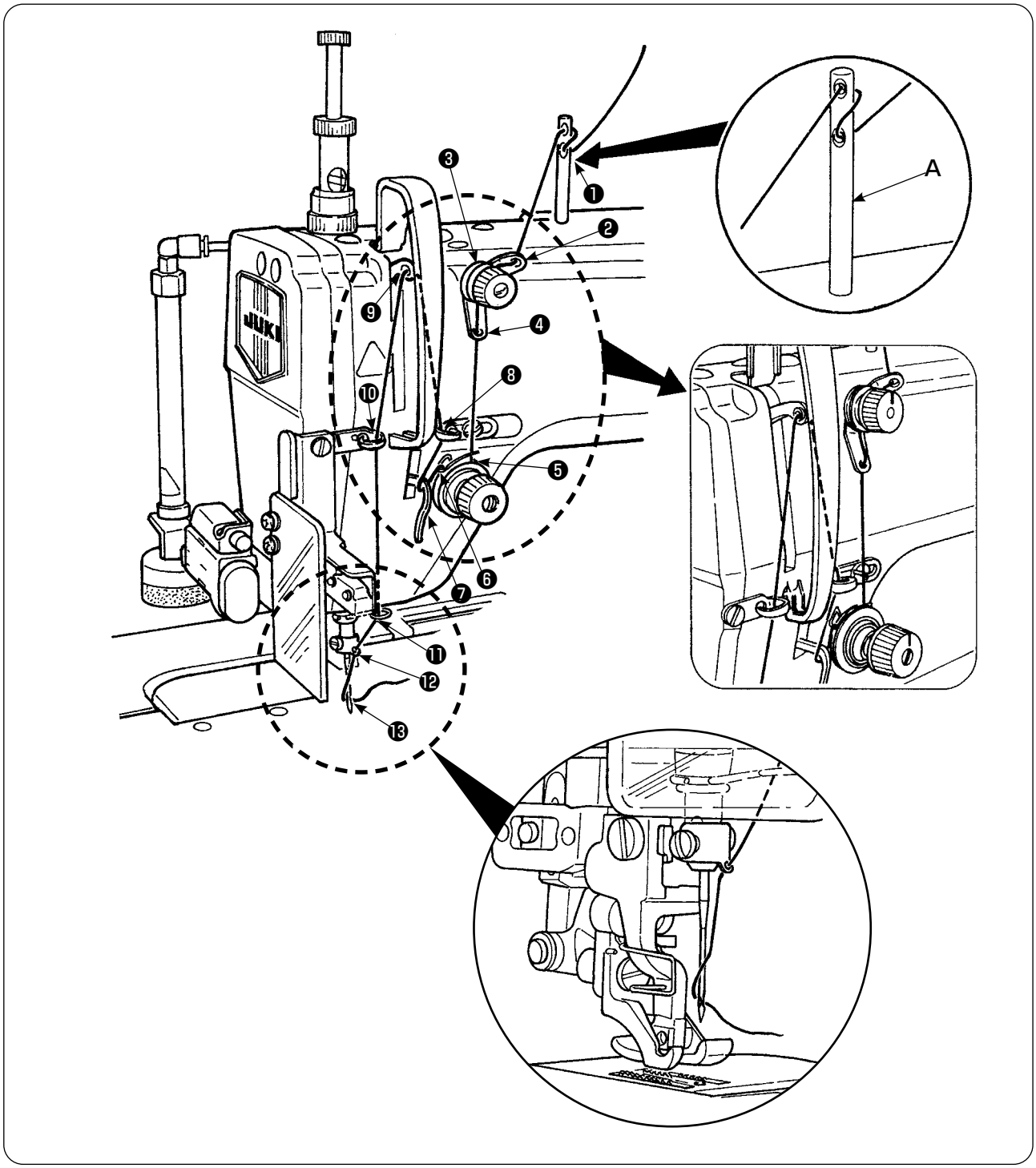


4) To rotate upper manipulator ❹ back to its home position, rotate upper manipulator ❹ until it comes in contact with stopper screw ❺ , then press upper manipulator ❹ downward ❻ .

If you press the upper manipulator downward ❻ while rotating it, the underside of sensor ❼ can come in contact with the machine table and the top plate of the bed, resulting a failure.

9. Threading the machine head

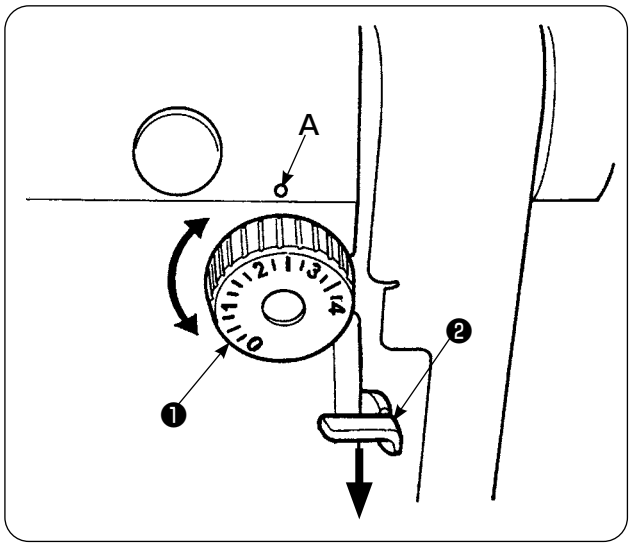
CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.



Thread the machine head in the order as illustrated in the figure.

Drive thread guide pin **A** in the hole on the top surface of the machine arm before threading it.

10. Adjusting the stitch length



Bottom feed length

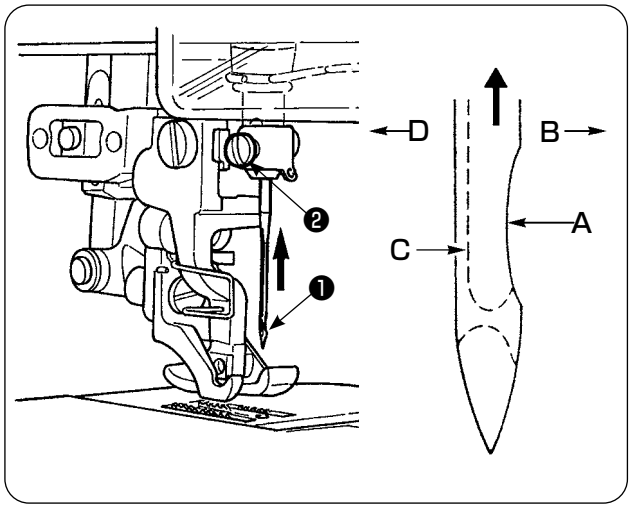
1) Turn stitch dial ❶ in the direction of the arrow until a desired numeral is aligned with marker dot (**A**) on the machine arm.
2) The numerals are given in millimeters (mm).
3) To change the feed length from a larger value to a smaller value, turn stitch dial ❶ while pressing feed lever ❷ in the direction of the arrow.

Top feed length

Refer to **"VI-24-3. Correcting the bottom feed amount readout potentiometer" p.98** for how to adjust the top feed length.

11. Fitting a needle

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

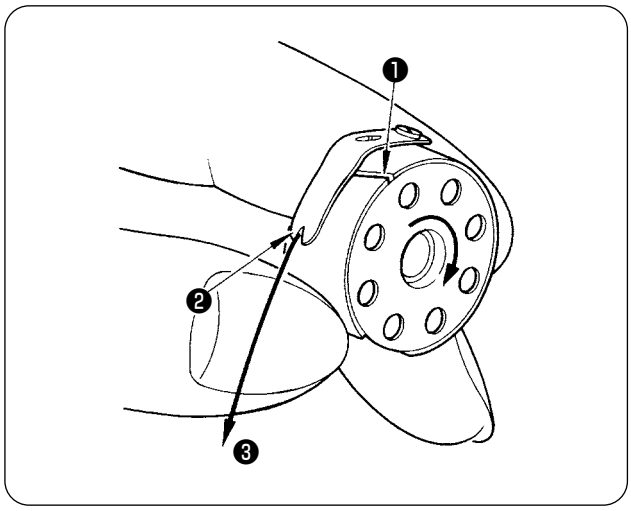


Turn off the power to the motor.

Use DBx1 (DPx1 for the DP type sewing machine) needle.

1) Turn the handwheel to move the needle bar up to its highest position.
2) Loosen needle clamping screw ❷ . Hold needle ❶ so that its scarf (**A**) faces exactly to the right (**B**).
3) Insert the needle fully into the hole in the needle bar in the direction of the arrow until it goes no further.
4) Securely tighten needle clamping screw ❷ .
5) Check to be sure that slot (**C**) in the needle faces just left (**D**) direction.

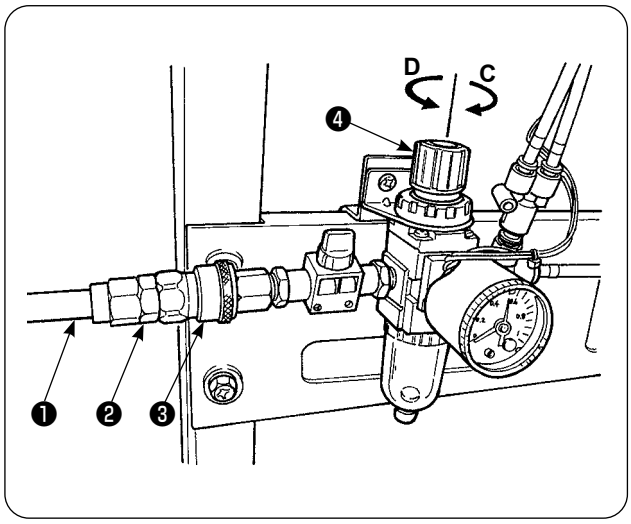
12. Loading the bobbin



1) Holding the bobbin so that thread inside the bobbin spins clockwise, put it in the bobbin case.
2) Pass the thread through slot ❶ in the bobbin case. Draw the thread in toward thread opening ❷ , and it will appear from thread opening ❷ through under the tension spring.
3) Check to be sure that the bobbin rotates in the direction of the arrow when drawing bobbin thread ❸ .

13. Connecting and adjusting the air source

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.

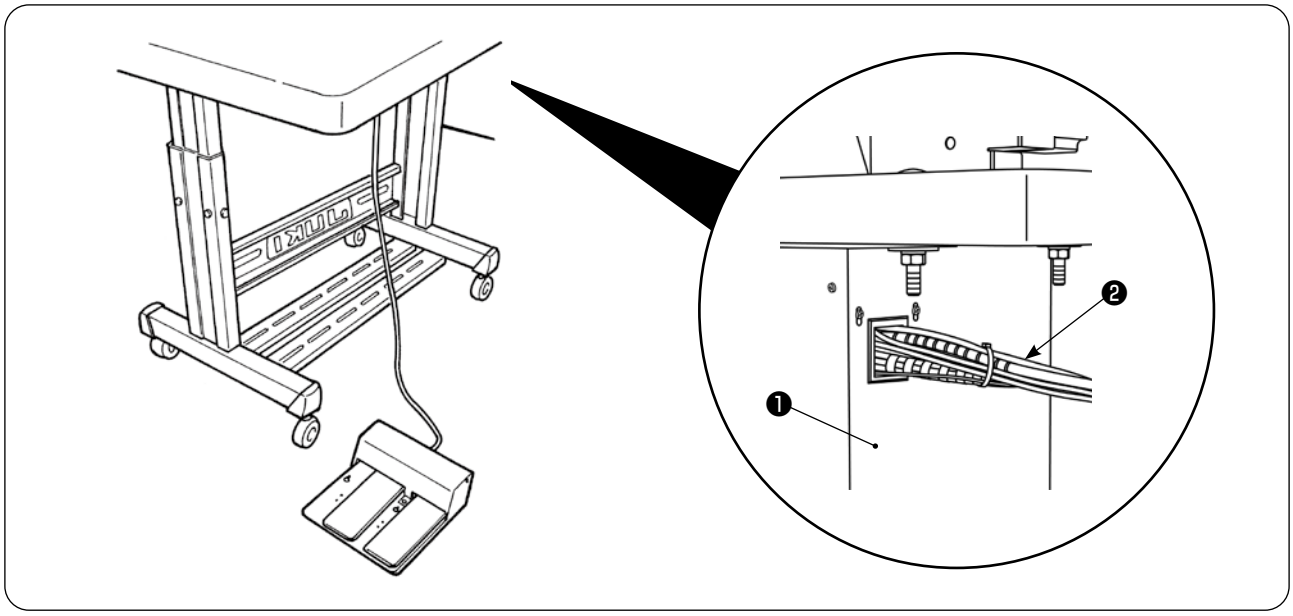


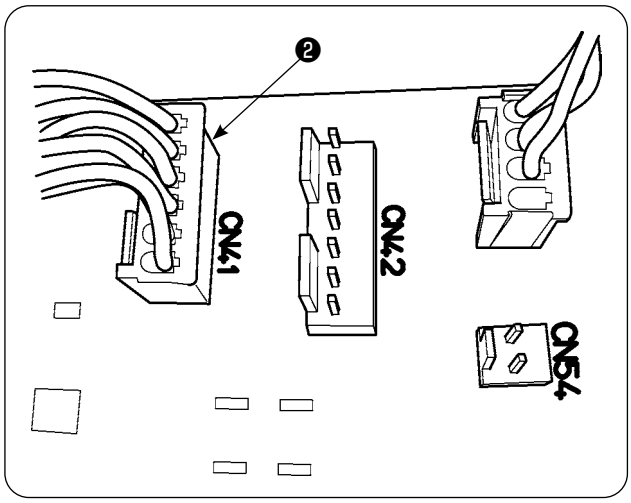
1) Insert air hose ❶ into one-touch utility joint ❷ supplied with the unit.
2) Insert one-touch utility joint ❷ into joint ❸ until it clicks.
3) Adjust the air pressure to 0.5 MPa (5 kgf/cm^2).
   If the pressure is inadequate, lift knob ❹ and turn it clockwise (in direction **C**).
   If the pressure is too high, turn the knob counterclockwise (in direction **D**).
   When the air presser is set at 0.5 MPa (5 kgf/cm^2), lower knob ❹ and fix it.

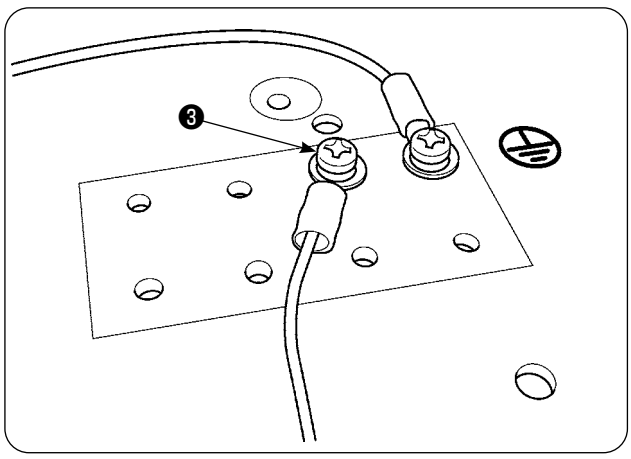
V. INSTALLING THE OPTIONAL DEVICES

1. Installing the 2-pedal unit

CAUTION :
Be sure to turn off the power to the sewing machine before installation of the 2-pedal unit in order to protect the electric parts from being damaged.

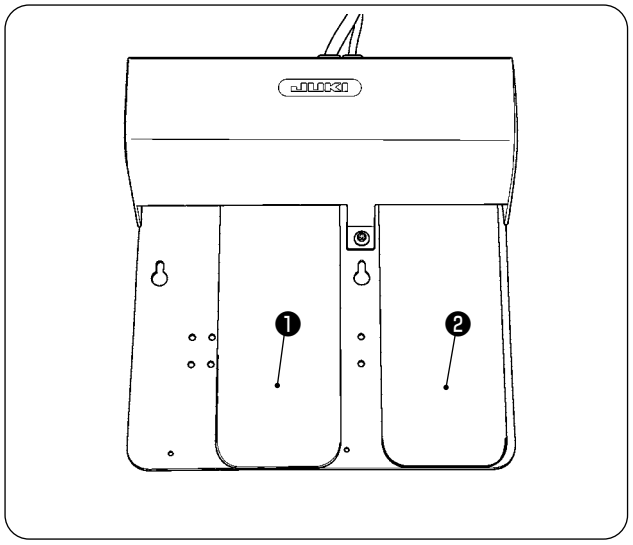






1) Pass 2-pedal unit cord ❷ through the cord through-hole in control box ❶ .

2) Connect the 2-pedal unit cord ❷ to the CN41 on the main PCB in the electrical control box ❶ . In addition, connect the ground wire to ground wire setscrew ❸ located on the undersurface of the electrical control box ❶ .



❶ Left pedal, 2-step pedal (manual start, pause)

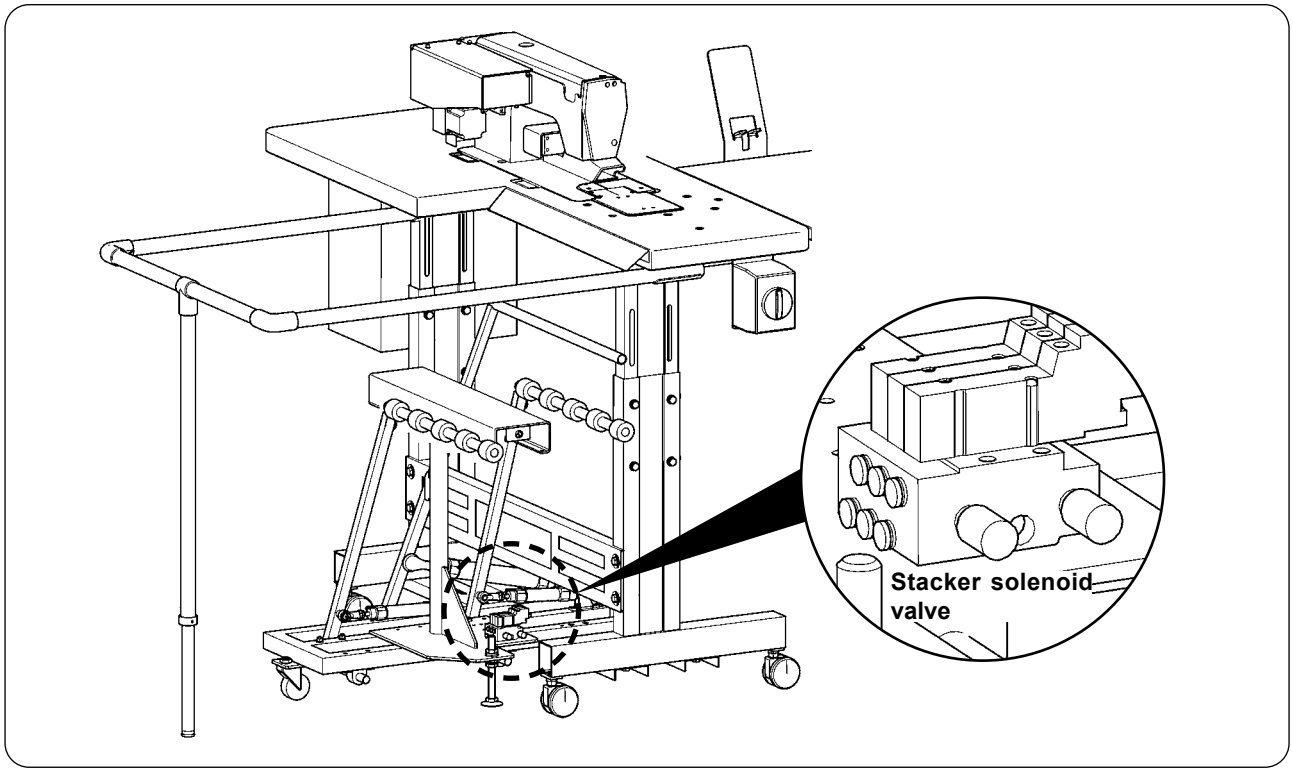
1) Place the material on the machine under the manual start mode. The LED at the hand switch section flashes on and off. When you depress the pedal to the first step, the presser foot of the sewing machine comes down. When you depress the pedal to the second step with the presser foot of the sewing machine remained in the lowest position, the sewing machine starts running.
   When you depress the pedal to the fist step and release it with the presser foot of the sewing machine remained in the lowest position, the presser foot of the sewing machine goes up.
2) When you depress the pedal during sewing, the sewing machine pauses. When you depress the pedal again, the machine re-starts sewing.

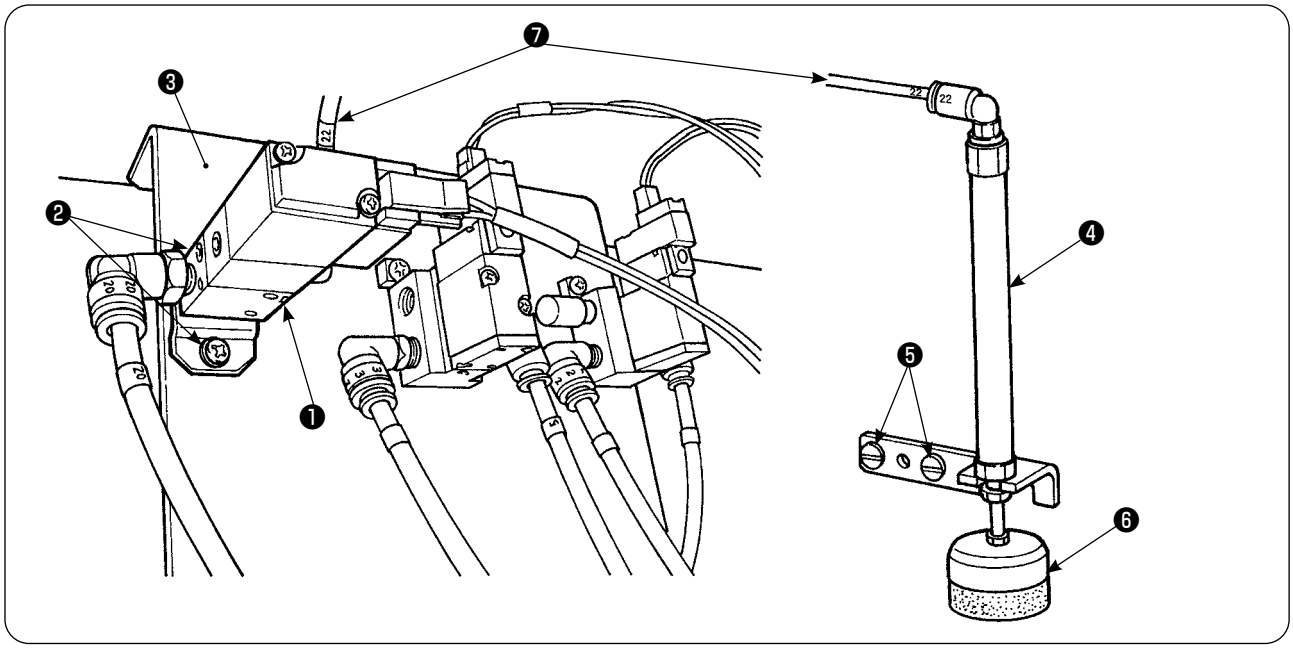
❷ Right pedal (changeover of speed between high and low)

1) When you depress the pedal during sewing, the speed of stitch changes over from high speed to low speed.
2) When you depress the pedal during pause, the thread trimmer actuates to trim the thread and the sewing machine stops.

2. Installing the stacker

CAUTION :
Be sure to turn off the power to the sewing machine before installation of the 2-pedal unit in order to protect the electric parts from being damaged.

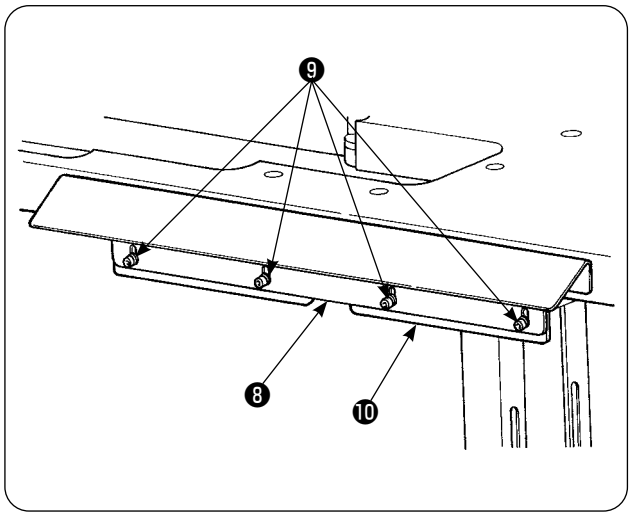




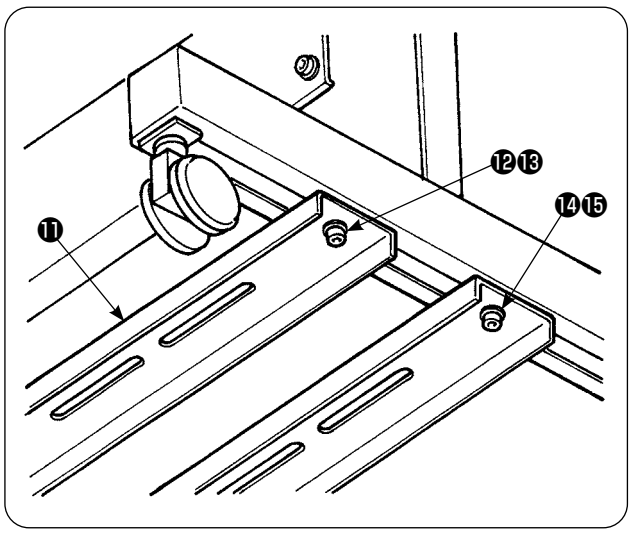
1) Install solenoid valve asm. ❶ on solenoid valve mounting plate ❸ with setscrews ❷ .

2) Place material presser cylinder asm. ❹ on the side of the machine head with setscrews ❺ . At this time, extend top end ❻ of the cylinder to make sure that the cylinder lightly holds the material.

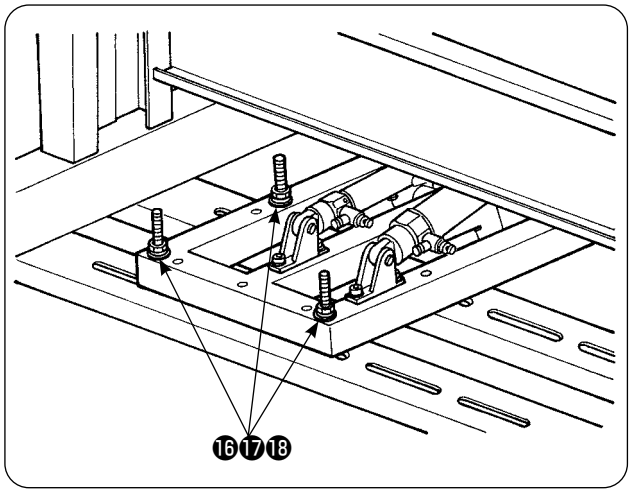
3) Pass Φ4 air pipe ❼ of solenoid valve asm. through the hole in the table and connect to cylinder ❹ .



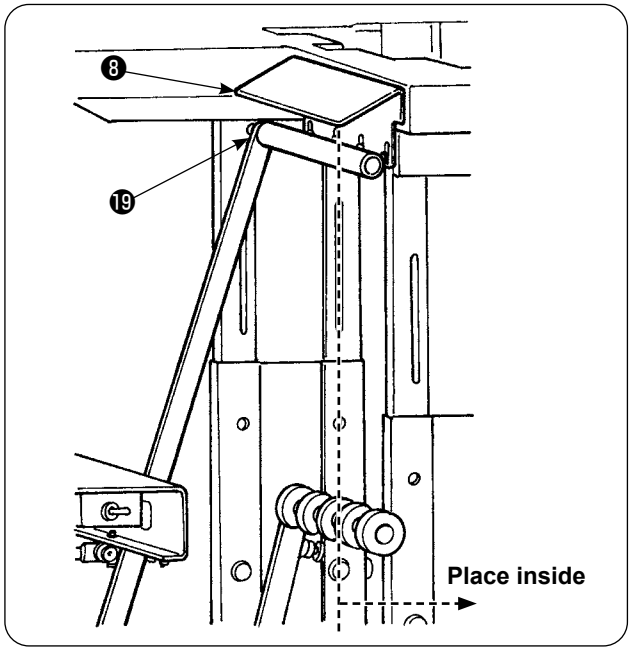
4) Place table bracket ❿ on support plate ❽ with screws ❾ .



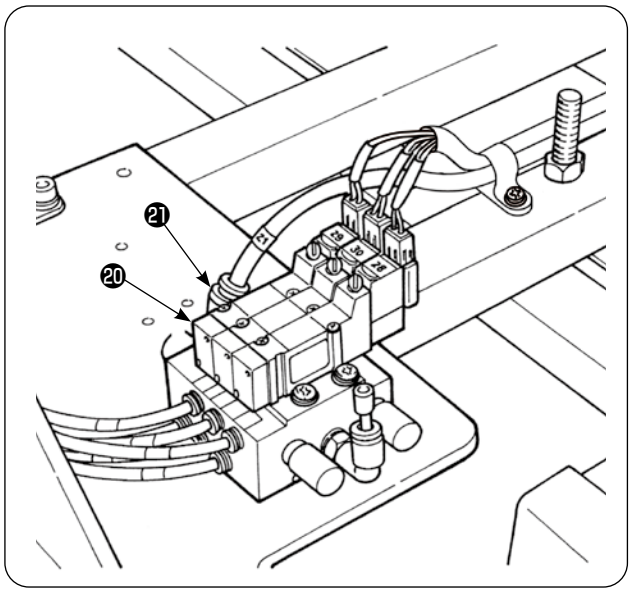
5) Temporarily place lower support strut ⓫ on the table stand with screw nuts ⓬ and ⓭ . Then, loosen screw nuts ⓮ and ⓯ .



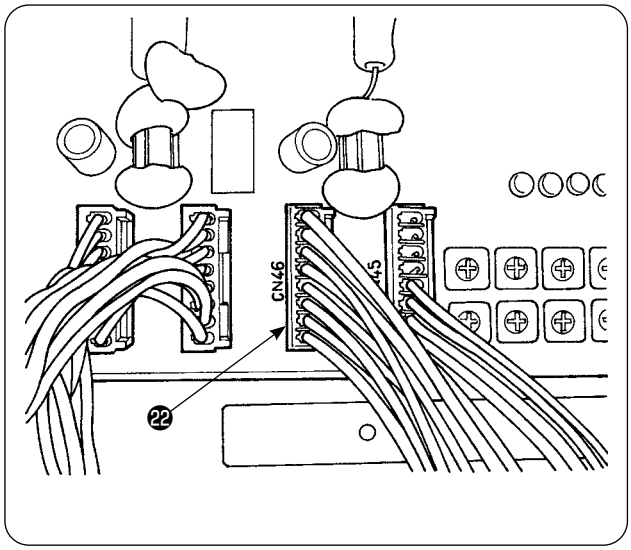
6) Secure the main body of the stacker on lower support strut ⓫ with screw washer nuts ⓰ , ⓱ and ⓲ .



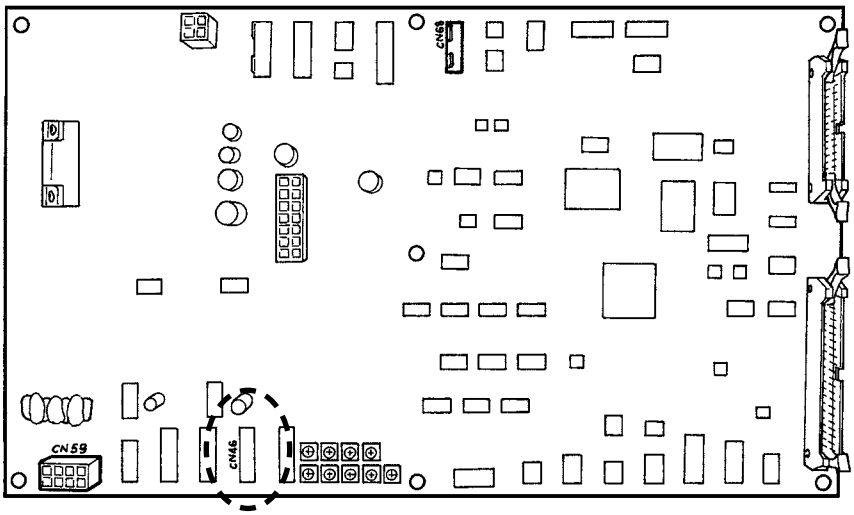
7) Move the main body of the stacker so that garment body wiper ⓳ is placed inside support plate ❽ . Then, securely tighten ⓬ to ⓯ which have been temporarily tightened in step 5).



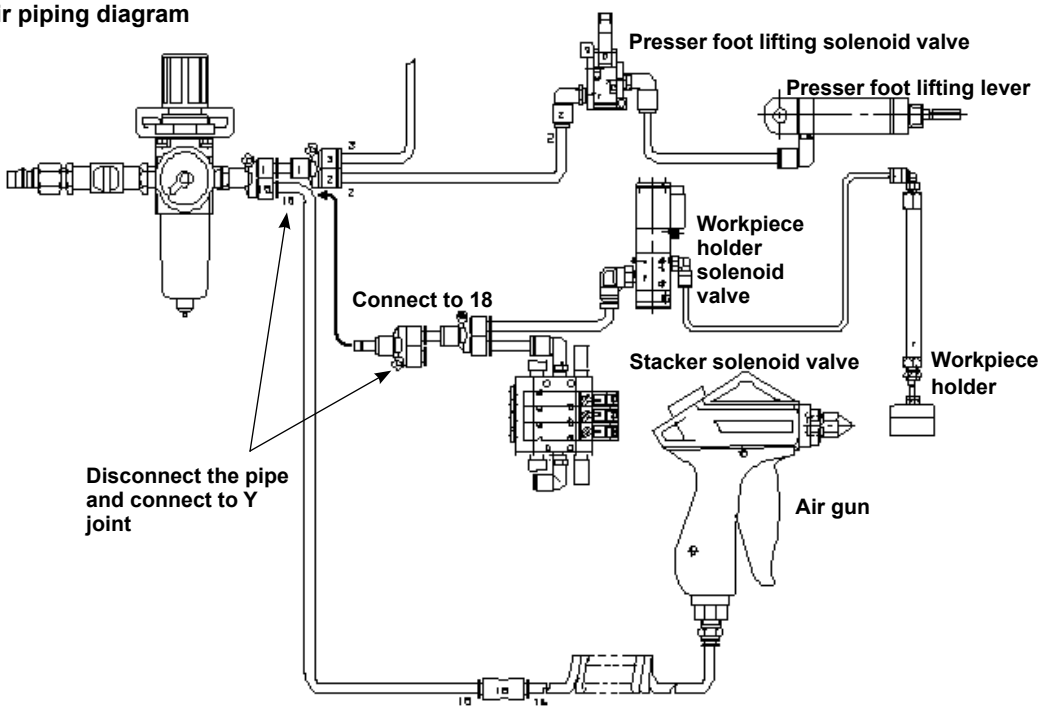
8) Branch the air pipe of the air gun. Connect the air pipe to Φ6 air coupling ㉑ coming from stacker solenoid valve ⓴ . (See the air piping diagram.)



9) Connect the cable of stacker solenoid valve ㉒ to CN46 mounted inside the control box.

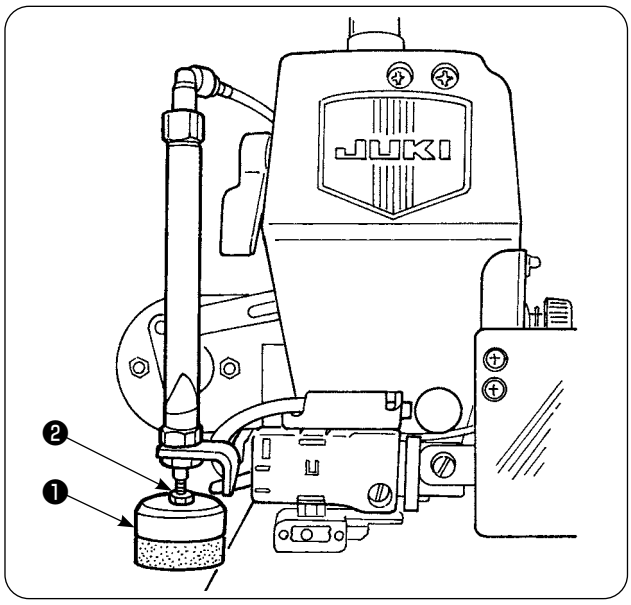


Air piping diagram

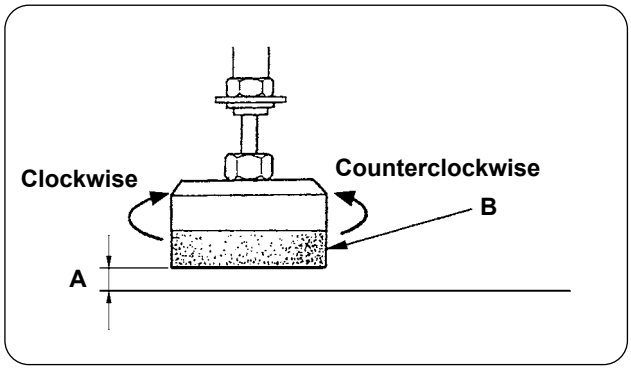


・Adjusting the workpiece holder

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal. In addition, take care not to allow your fingers to be caught under the stacker workpiece holder since it comes down.



1) Adjust the pressure of workpiece holder ❶ to the standard value so that the workpiece holder lightly holds two plies of material and allows them to smoothly come off when the stacker cloth wiper bar actuates. (Clearance (**A**))
2) To adjust the pressure, loosen workpiece holder locknut ❷ and turn the workpiece holder counterclockwise to decrease the pressure or clockwise to increase it.

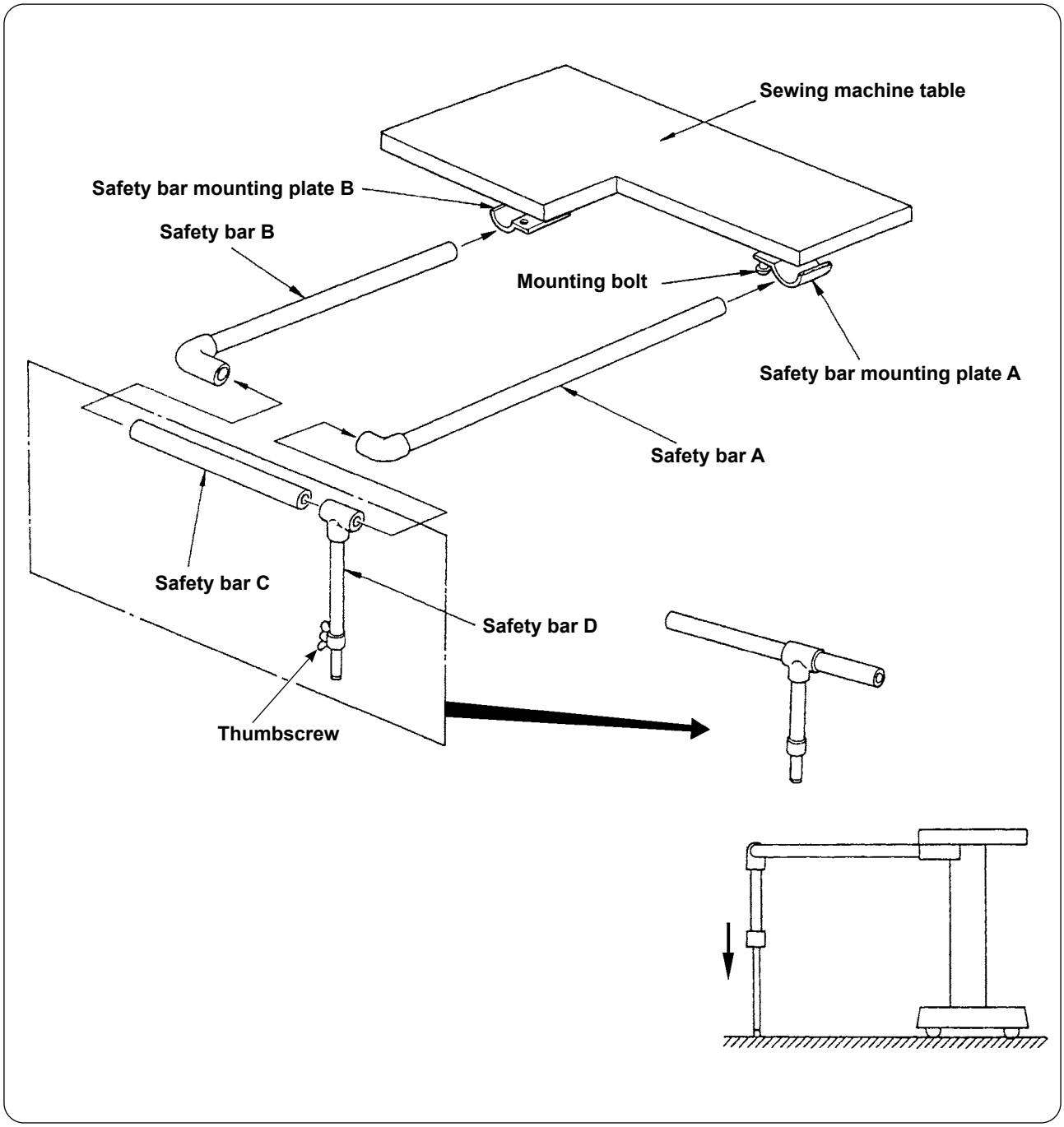


3) Sponge (**B**) is a consumable part. When it has worn out, replace it with a new one. (Part number: 18072603)

・Installing the stacker safety bar

CAUTION :
Be sure to securely mount parts and firmly tighten screws and bolts since parts may come off resulting in personal injury.

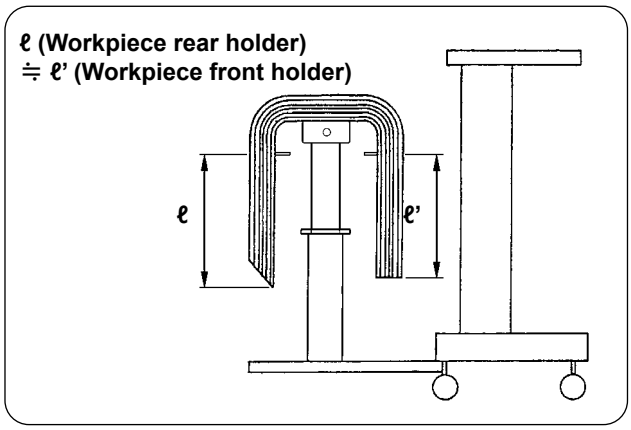
Install the safety bar on the sewing machine table.



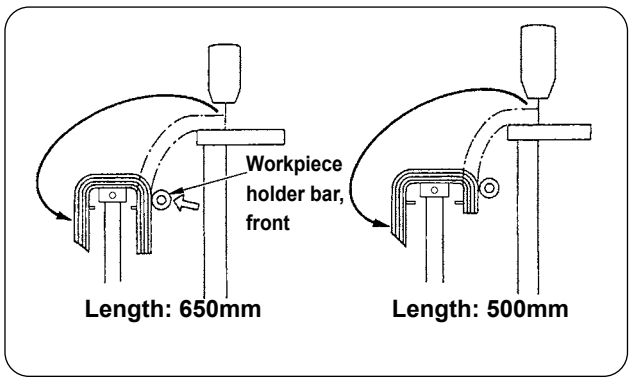
1) Loosen safety bar mounting plates **A** and **B** to such an extent that safety bars **A** and **B** can be inserted.
2) Combine the respective safety bars and insert them respectively into mounting plates **A** and **B**, then, secure with mounting bolts.
3) Bring safety bar **D** down to reach the floor surface and secure with the thumbscrew.

・Adjusting the stacker timing

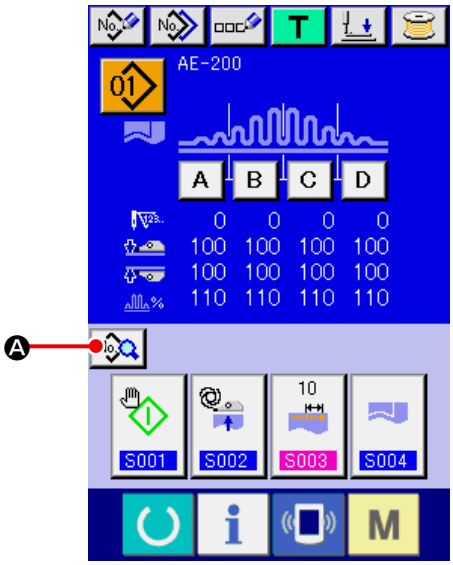
CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.



1) Adjust the stacker timing so that the workpieces are stacked symmetrically on the cloth receiving table with respect to the longitudinal direction of the workpiece so that the workpieces are stacked with stability.



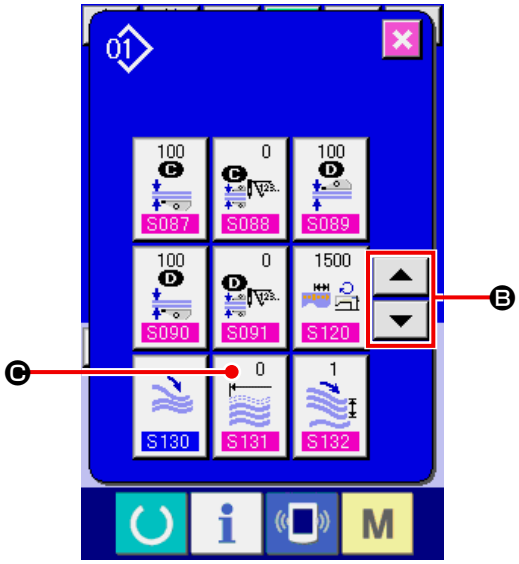
For shorter workpieces length of which is 650 mm or less, adjust the number of stitches on the operation panel so that the workpiece holder bar front actuates simultaneously with the sewing machine finishes sewing.



Operation panel setting procedure

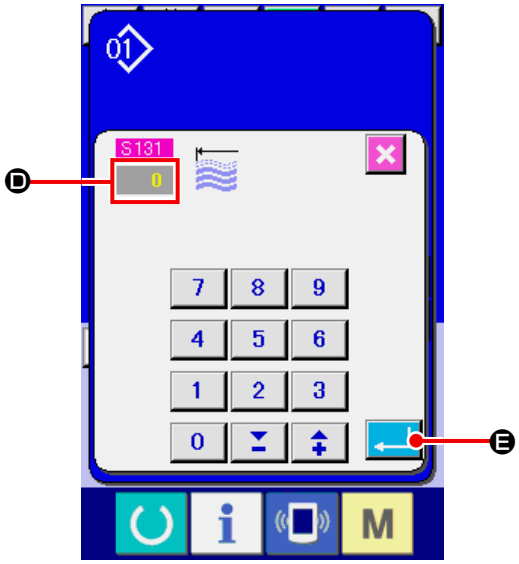
① **Displaying the data input screen.**
Only on the data input screen (blue), the sewing data can be changed. In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

② **Calling up the sewing data screen.**
When you press SEWING DATA button (Ⓐ), the sewing data screen is displayed.



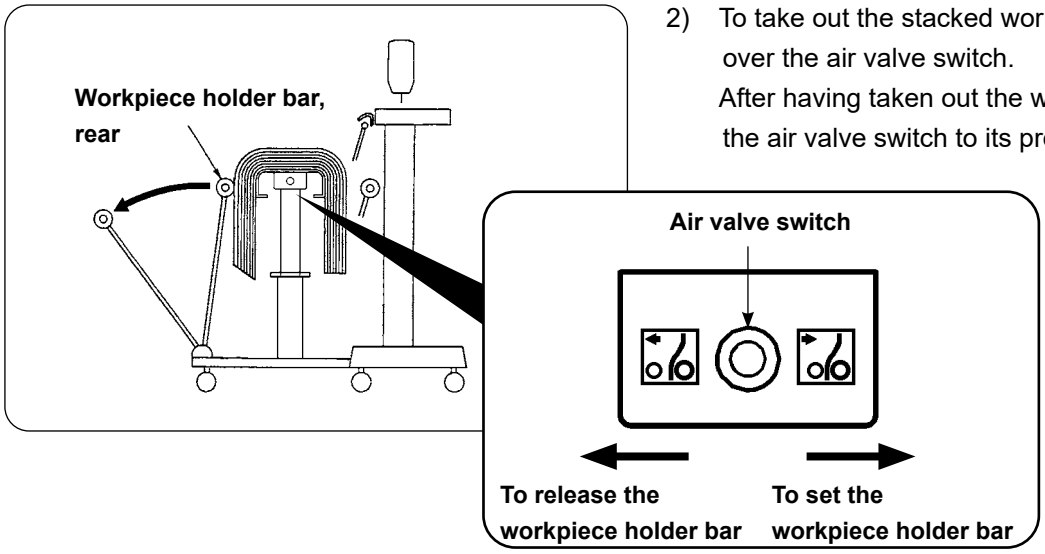
③ **Selecting the operating position of the stacker.**

When you select S131 STACKER OPERATING POSITION button (Ⓒ) by pressing UP/DOWN SCROLL button (Ⓑ), S131 change screen is displayed.

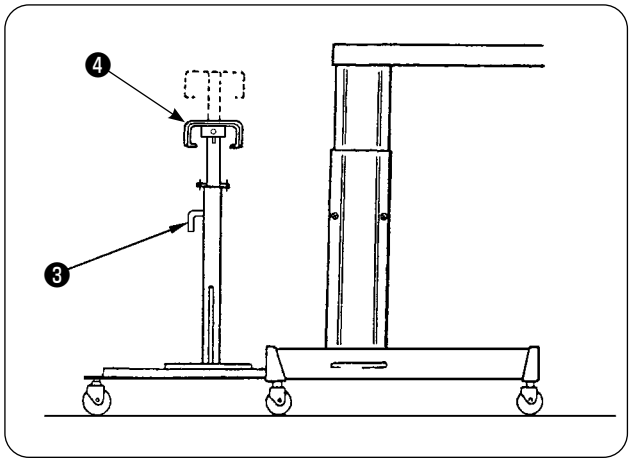


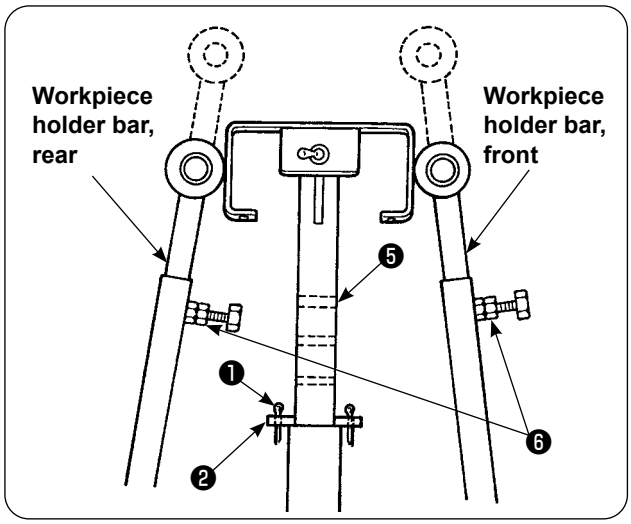
Enter the number of stitches (Ⓓ) to be sewn before the workpiece holder bar, front operates in accordance with the length of material.

After you have entered the number of stitches, press ENTER button (Ⓔ) to save the setting.



2) To take out the stacked workpieces, change over the air valve switch.
After having taken out the workpieces, return the air valve switch to its previous position.





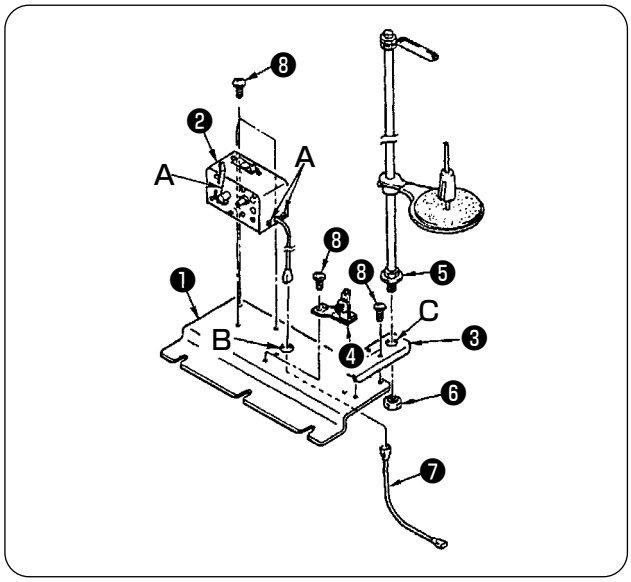
3) To increase the number of workpieces to be stacked on the cloth receiving table, change the position of the table.

① Remove split cotter pin ❶ , pull out table check pin ❷ , loosen handle ❸ and lower cloth receiving table ❹ .
② Lower cloth receiving table ❹ to a desired height. Insert table check pin into hole ❺ in the cloth receiving table pipe, insert split cotter pin ❶ into table lock pin ❷ , and secure with handle ❸ .
③ Loosen bolts ❻ in the workpiece folder bars, front and rear, and align the bar rubber sections of those bars with the center of cloth receiving table ❹ , and secure the workpiece holder bars by tightening bolts ❻ .

3. Installing and adjusting the bobbin winder

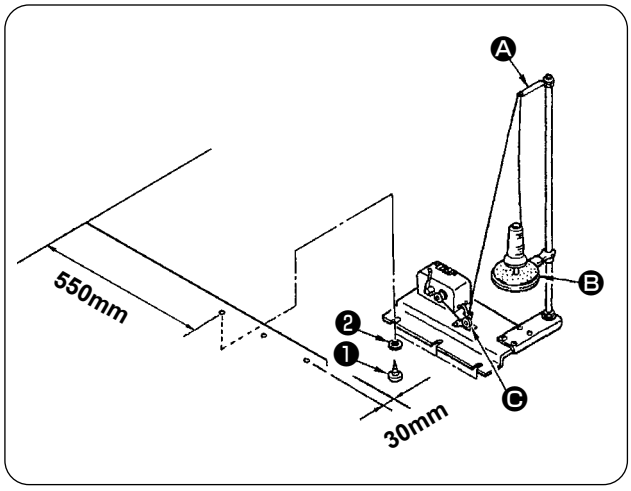
CAUTION :
Securely fix parts by firmly tightening screws with a larger screwdriver and spanner since the parts may come off resulting in personal injury.

3-1. Assembling the bobbin winder



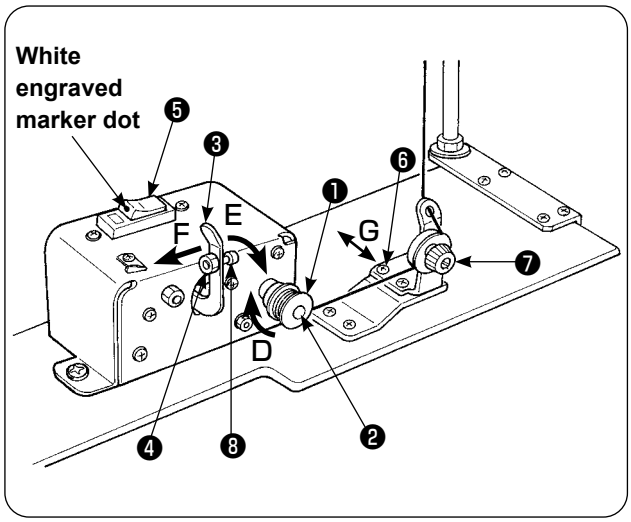
1) Fix bobbin winder ❷ on bobbin winder mounting plate ❶ with two setscrews ❽. In addition, pass the bundle wires of bobbin winder ❷ through hole (**B**) in bobbin winder mounting plate ❶ and connect them to bobbin winder junction bundle wires ❼ . Insert the other end of ❼ into CN61 on the main PCB.
2) Place thread stand mounting plate ❸ on bobbin winder mounting plate ❶ with four setscrews ❽. Mount thread stand asm. ❺ in hole (**C**) in ❸ and secure with nut ❻ .
3) Install tension regulator ❹ on bobbin winder mounting plate ❶ with two setscrews ❽ .

3-2. Installing and threading the bobbin winder



1) Install the bobbin winder on the auxiliary table with setscrews ❶ and ❷ so that the dimensions shown in the sketch at left are obtained.
2) Place thread on spool holder (Ⓑ) and pass it through take-up thread guide arm (Ⓐ), then through tension regulator (Ⓒ) and wind on the bobbin.
3) Secure take-up thread guide arm (Ⓐ) and spool holder (Ⓑ) so that spool holder (Ⓑ) does not interfere with thread path when routing the thread from guide asm. (Ⓐ) to tension regulator (Ⓒ).

3-3. Winding and adjusting the bobbin

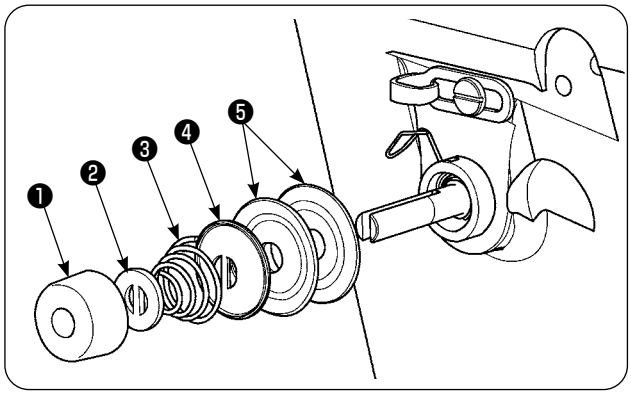


1) Fit bobbin ❶ over bobbin winder spindle ❷ .
2) Wind thread on the bobbin by four or five turns in the direction of arrow (**D**).
3) Bobbin winding starts by pressing bobbin winder stop latch ❸ against the bobbin (in the direction of arrow (**E**)) (breaker ❺ is in the ON state (where the white engraved marker dot is visible)) and automatically stops when the bobbin has been wound with a predetermined amount of thread (80 to 90 % of the outside diameter of the bobbin).
4) Loosen locknut ❹ of the bobbin winder stop latch boss and adjust the amount of thread to be wound on the bobbin by changing the position of bobbin winder stop latch boss ❽ . (When the boss is moved in direction (**F**), the amount of thread to be wound on the bobbin increases.) (The amount of thread to be wound on the bobbin increases by moving the latch in the direction of arrow (**F**).)
5) Adjust the thread tension applied by the tension regulator, when winding the bobbin, to 0.4 N to 0.5 N by means of knob ❼ .
6) Loosen screw ❻ and adjust the position of the tension regulator by moving it in direction (**G**) (to the right or left) so that thread is wound round the center of bobbin.

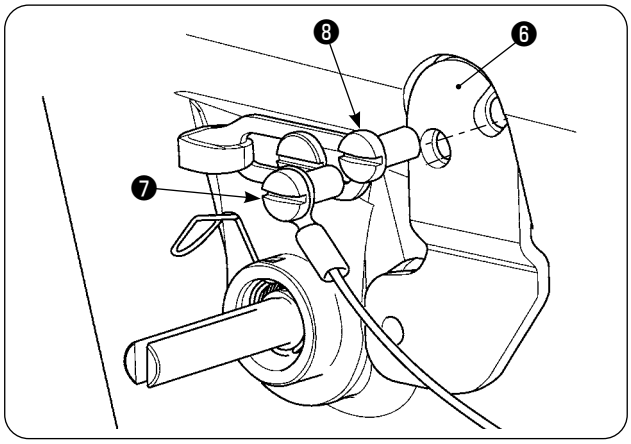
1. Even when breaker ❺ is in the ON state (where the white engraved marker dot is visible), the bobbin winder may fail to operate. In this case, the breaker ❺ is internally in the OFF state. The bobbin winder should be used after turning OFF and ON the breaker ❺ in order to avoid such a trouble.
2. Be sure to use JUKI's genuine bobbin and bobbin case.

4. Assembling the thread breakage detecting device and setting of the operation panel

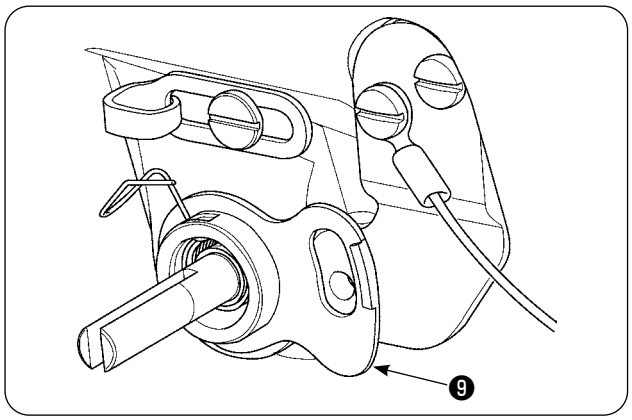
CAUTION :
Securely fix parts by firmly tightening screws with a larger screwdriver and spanner since the parts may come off resulting in personal injury.



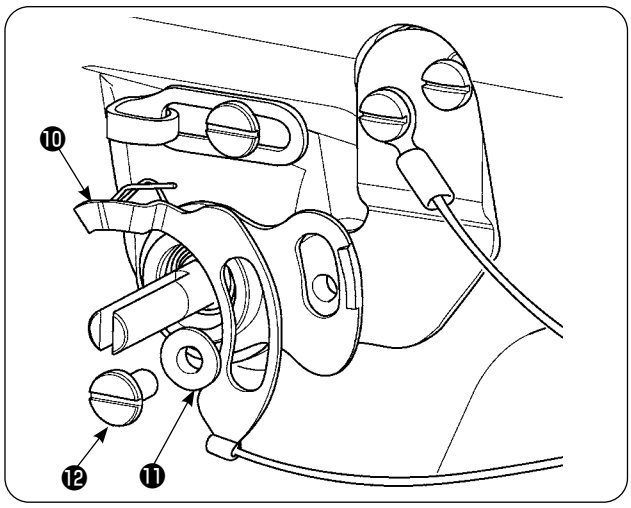
1) Loosen tension regulating nut ❶ of tension regulator asm. No. 2. Remove parts ❶ to ❺ .



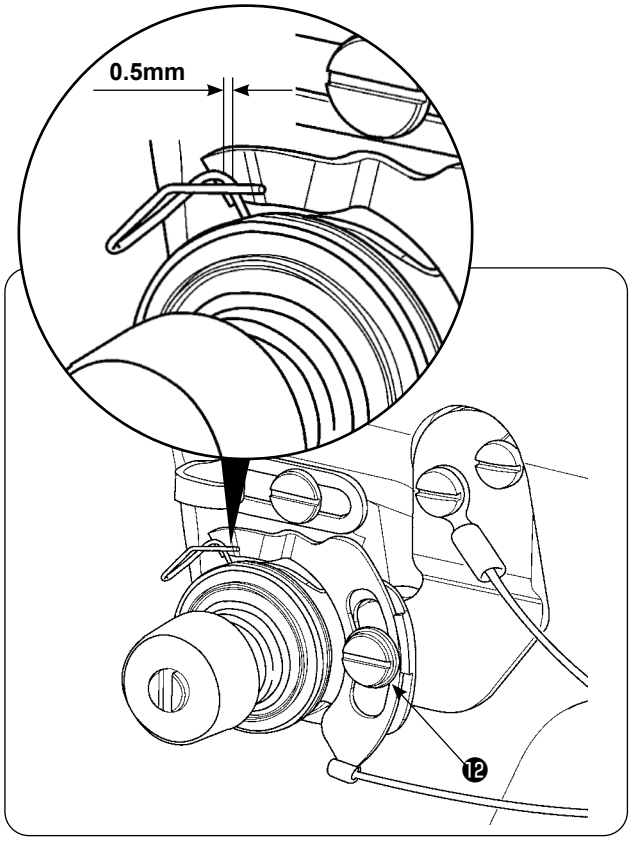
2) Place sensor plate mounting plate ❻ with screws ❼ and ❽ .
Secure the ring crimp contact of the thread breakage detecting plate cable asm. also with screw ❼ .



3) Put thread breakage detecting guide ❾ over thread tension spring to position as illustrated in the sketch at left.

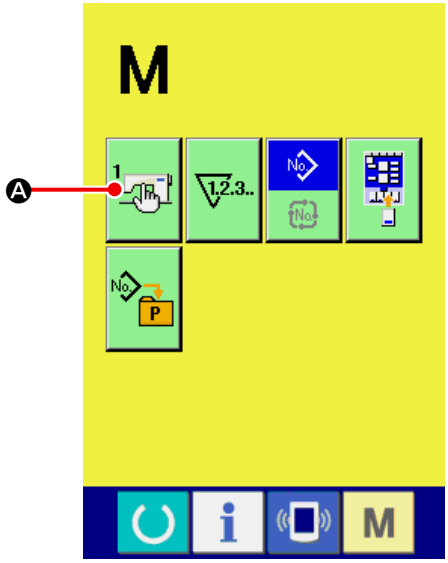


4) Temporarily secure thread breakage detecting plate cable asm. ❿ and thread breakage detecting plate guide bushing ⓫ with thread breakage detecting plate setscrew ⓬ .



5) Re-assemble parts ❶ to ❺ which have been removed in step 1).

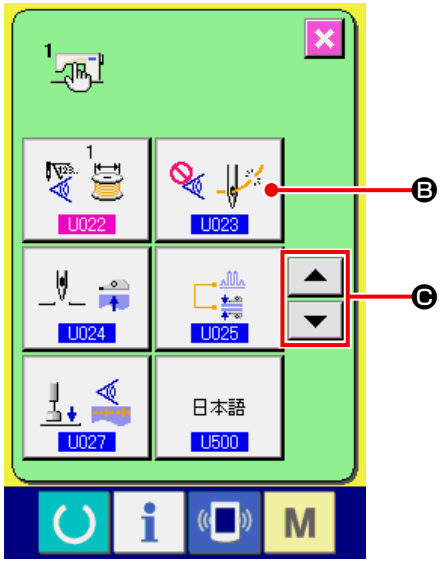
6) Turn the thread breakage detecting plate to the position where the pressing amount of the detecting plate against the thread take-up spring is 0.5 mm or less. Then, tighten screw ⓬ .



Operation panel setting procedure

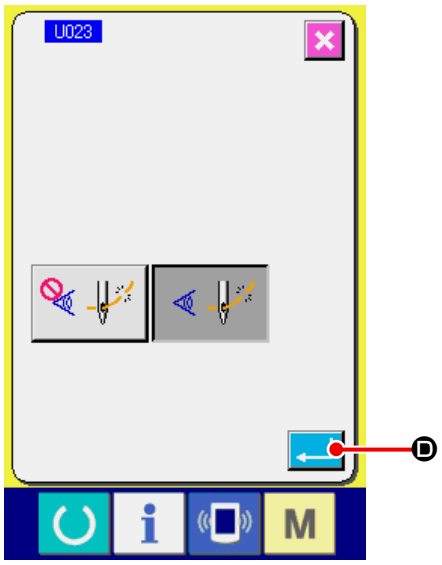
① **Displaying the MEMORY switch list screen.**

When you press M key, the current screen is changed over to the mode changeover screen on which the MEMORY switch button (Ⓐ) is displayed. When you press this button, the MEMORY switch data list screen is displayed.



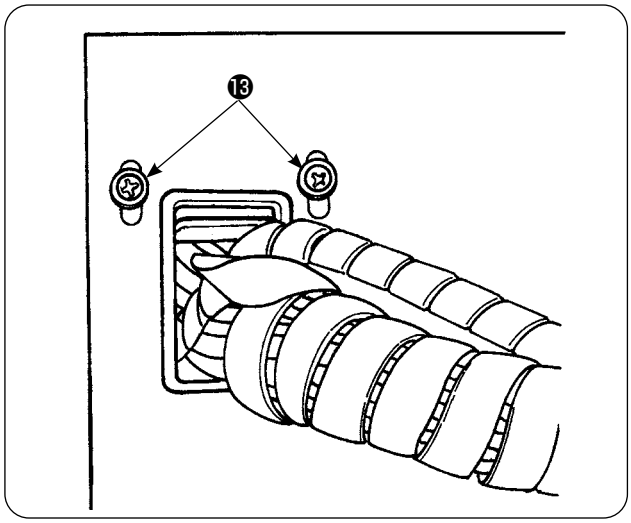
② **Selecting the thread breakage detection operation selection.**

When you select U023 THREAD BREAKAGE DETECTION OPERATION SELECT button  (Ⓑ) by pressing UP/DOWN SCROLL button  (Ⓒ) and press the former, the thread breakage detection operation selection screen is displayed.

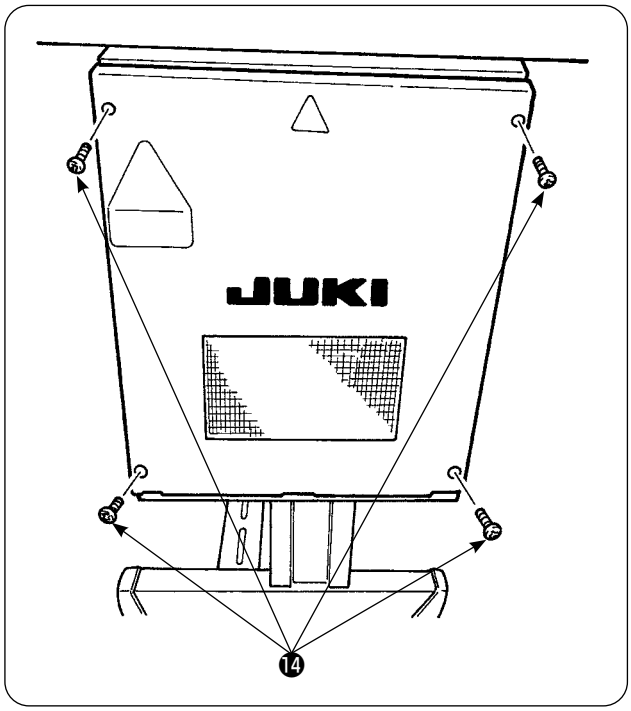


Select the "ENABLE"  of the thread breakage detection.

After you have set the status of the thread breakage detection, press ENTER  (Ⓓ) button to save the setting.



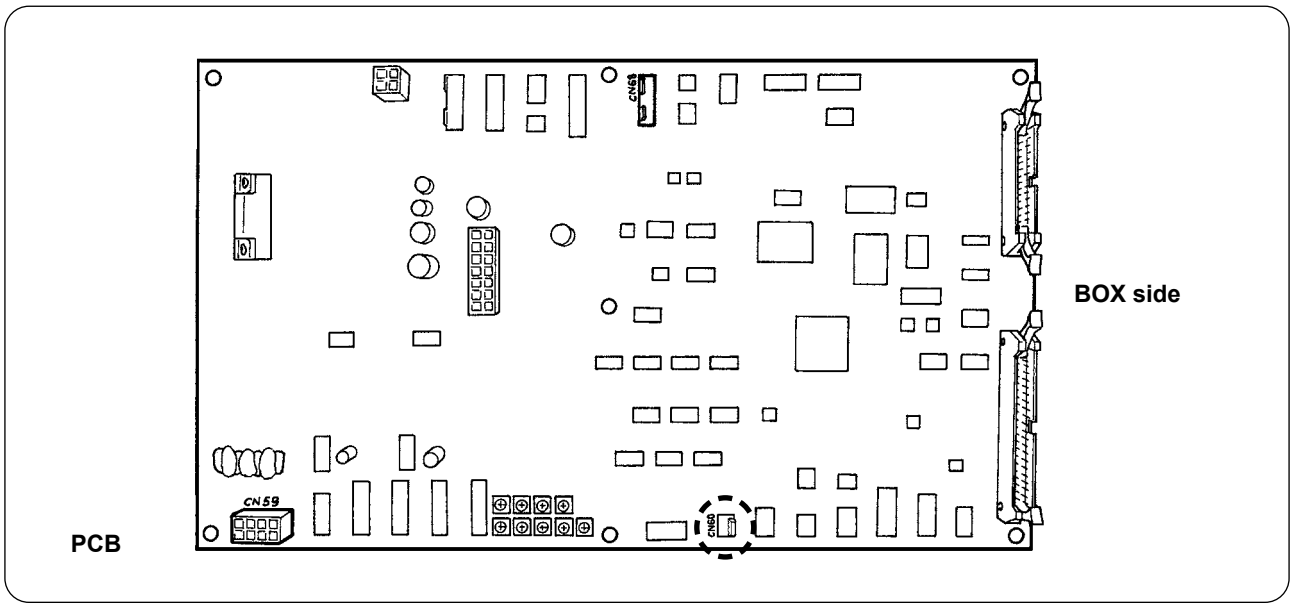
7) Loosen setscrews ⓭ of the cord keep plate located on the side face of the electrical control box. Lift the cord keep plate and pass the cord of thread breakage detecting plate cable asm. ⓾ through the hole.



Remove four screws ⓮ which are used to secure the electrical box cover. Open the cover.

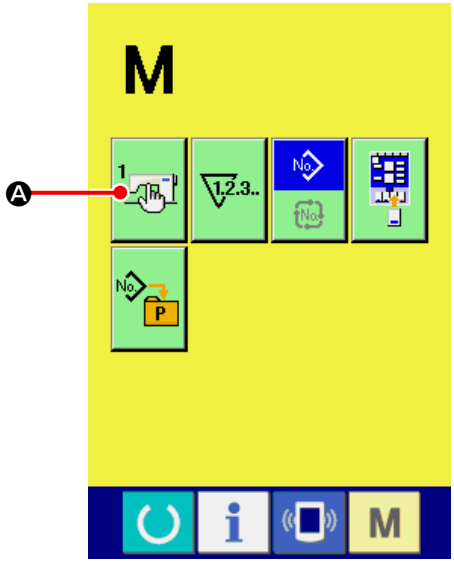
8) Insert the connector of thread breakage detecting plate cable asm. ⓾ into CN60 (3P, yellow) on the main PCB inside the control box.

9) Secure the electrical box cover, lower the cord keep plate and secure the cover with the screws.



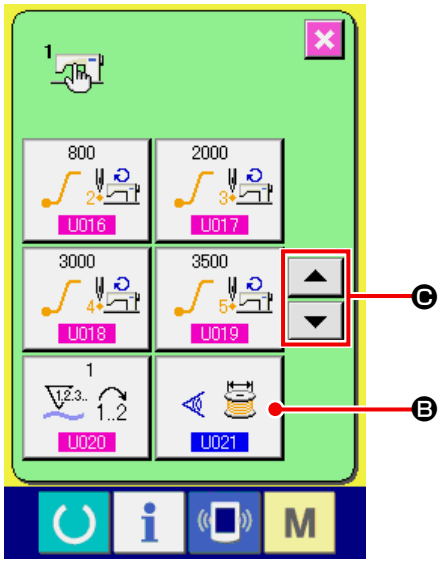
5. Installing the bobbin thread remaining amount detecting device

5-1. Setting the bobbin thread remaining amount detection



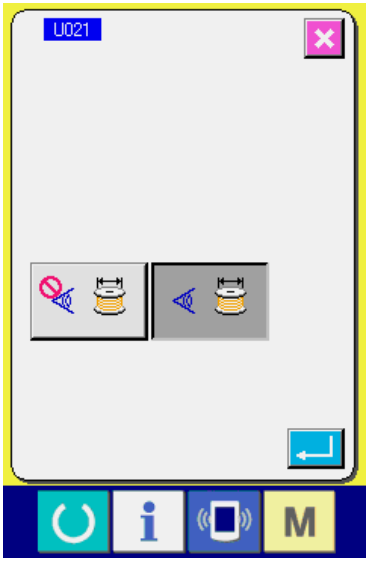
① **Displaying the MEMORY switch list screen.**

When you press M key, the current screen is changed over to the mode changeover screen on which the MEMORY switch button (Ⓐ) is displayed. When you press this button, the MEMORY switch data list screen is displayed.

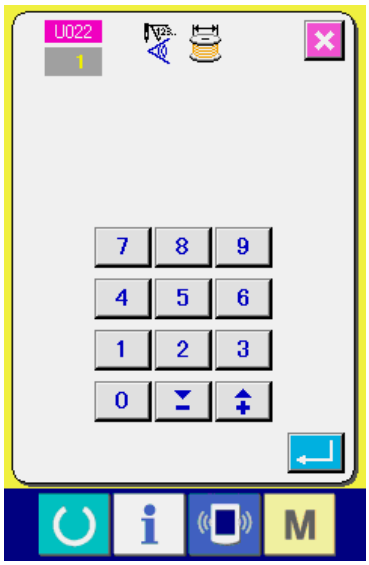


② **Setting with/without the bobbin thread remaining amount detection.**

Select U021 WITH/WITHOUT OF BOBBIN THREAD REMAINING AMOUNT DETECTION button (Ⓑ) by pressing UP/DOWN SCROLL button (Ⓒ), U021 change screen is displayed.



On the U021 with/without bobbin thread remaining amount detection selection screen, set the bobbin thread remaining amount detection to "WITH" .



③ **Setting the number of times of detection of the remaining amount of bobbin thread.**

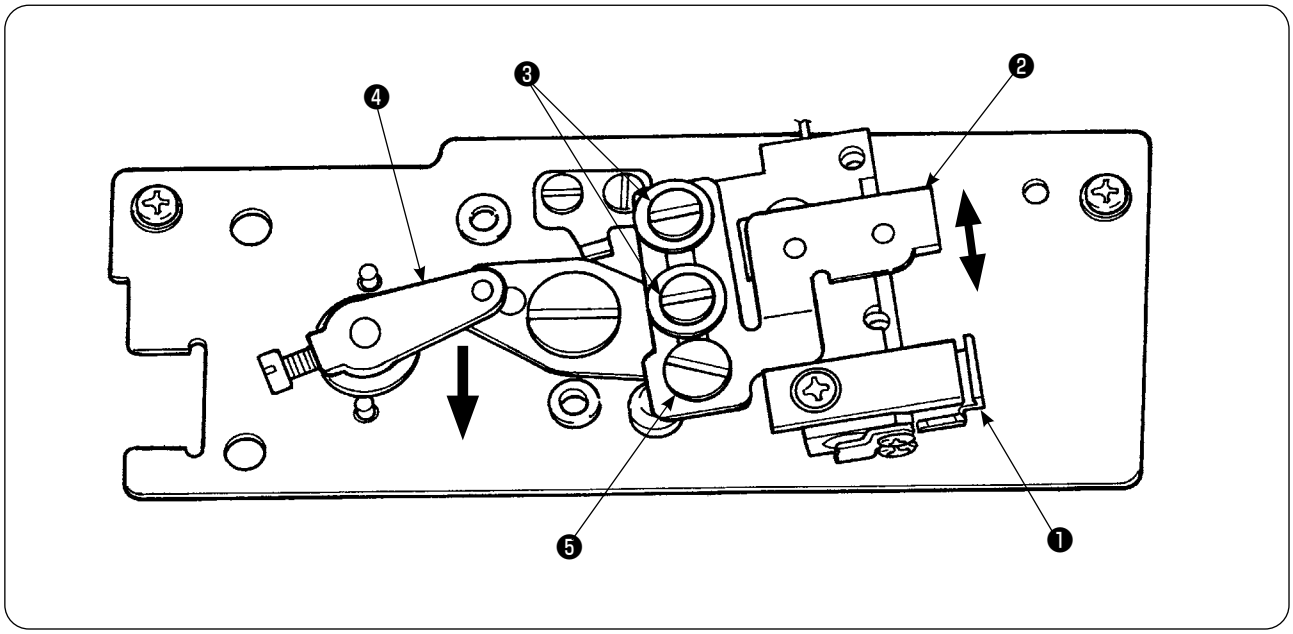
When you select U022 NUMBER OF TIMES OF BOBBIN THREAD REMAINING AMOUNT DETECTION button by pressing UP/DOWN SCROLL button (Ⓒ) on the MEMORY switch data list screen, U022 number of times of bobbin thread remaining amount detection setting screen is displayed.

The value you set in this step determines the number of times of bobbin thread remaining amount detection at which the bobbin thread runout warning message is displayed on the sewing machine (to prevent the sewing machine from proceeding to the next sewing). If the amount of bobbin thread remaining on the bobbin is still sufficient for continuing sewing when the bobbin thread runout warning message is displayed on the sewing machine, adjust by increasing the number of times of bobbin thread remaining amount detection. The setting range is 0 (zero) to 19.

If the number of times of bobbin thread remaining amount detection is set to 0 (zero), the bobbin thread remaining amount detection will be temporarily placed in the OFF state. If the bobbin thread remaining amount detecting function does not work, firstly check the set value of this data item.

5-2. Adjusting procedure of the sensor position

Two sensors are used in the bobbin thread remaining amount detecting device. The device does not work properly unless those sensors are correctly positioned.



1. Home position sensor ❶

The one of the two sensors, which is located at the lower side of the device is the home position sensor ❶ . Check to be sure that the light of the sensor goes out when the detecting rod hides in the hook and lights up when it comes back.

2. Detecting sensor ❷

Detecting sensor ❷ , which is located at the upper side of the device, detects the remaining amount of bobbin thread. The remaining length of thread is changed by moving up or down the mounting position of the sensor. Be sure to adjust the position of the sensor according to the type of bobbin thread to be used and sewing length specified for the process.

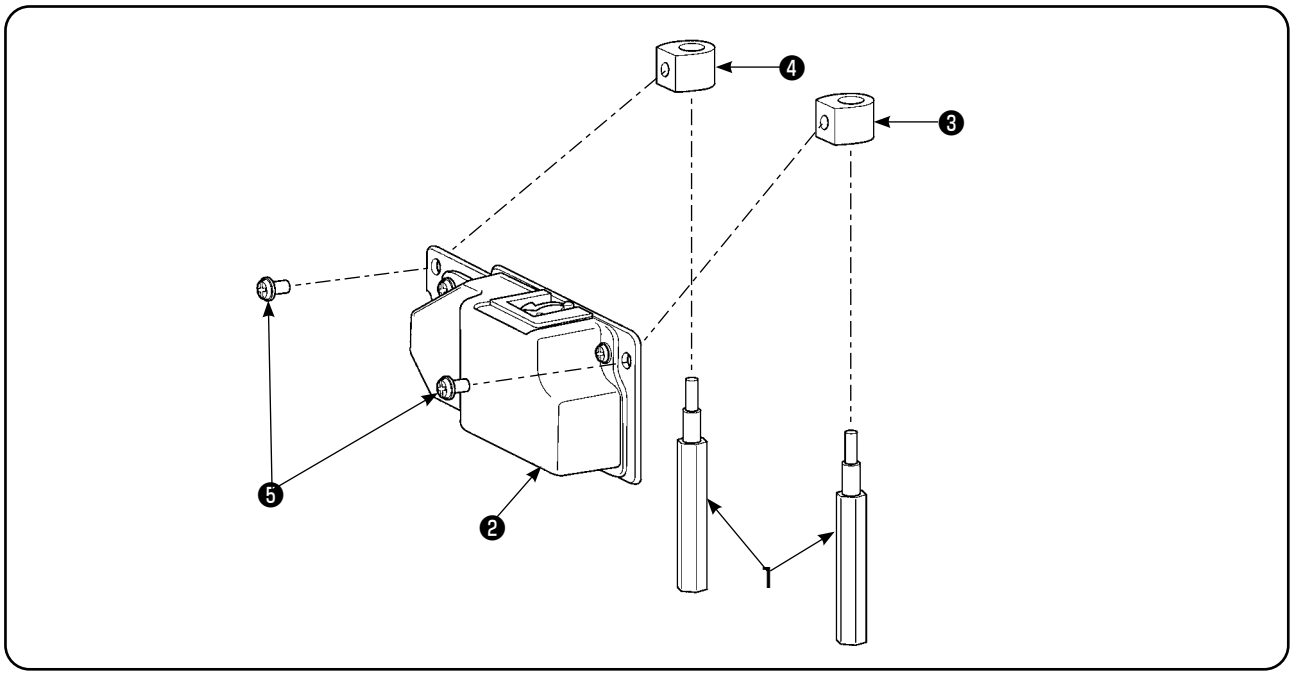
1) Uniformly wind the bobbin thread to be actually used for sewing on the bobbin.
The winding length of the thread is roughly as described below.
Example) When the sewing length is 0.5 m:

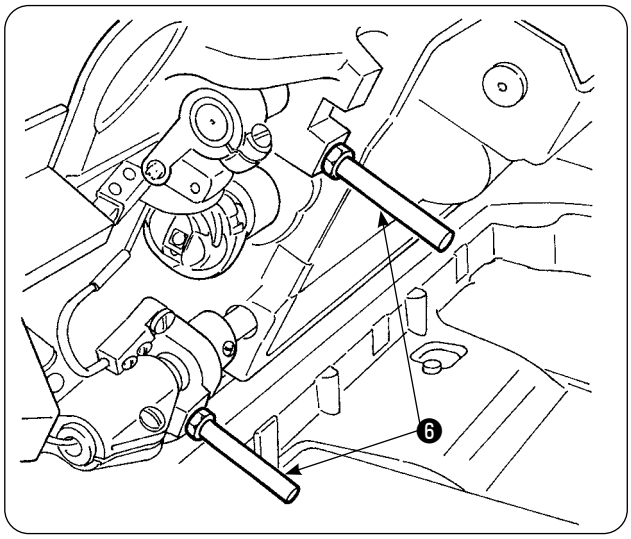
0.5 m	×	5	+	1.5 m	=	4m
(Length of thread for each detection)		(Number of times of detection)		(Bobbin thread remaining length at the time of detection)		

2) Fit the bobbin in the bobbin case (exclusive). Put the bobbin case in the hook.
3) Slightly loosen two detecting sensor fixing screws ❸ .
4) Turn eccentric pin ❺ to lower detecting sensor ❷ little by little from its highest position, while pressing down solenoid arm ❹ with one hand.
5) Lower detecting sensor ❷ until its monitor lamp lights up.
6) Carefully moving the solenoid arm up and down, check to be sure that the monitor lamp of detecting sensor ❷ flashes on and off.
7) The position at which the monitor lamp lights up and the position at which it goes out are not the same. It is therefore necessary to check the above at the former position.
8) Once the correct position of the sensor is found, securely tighten detecting sensor fixing screw ❸ . At this time, carefully tighten the screw while preventing the sensor from being displaced.

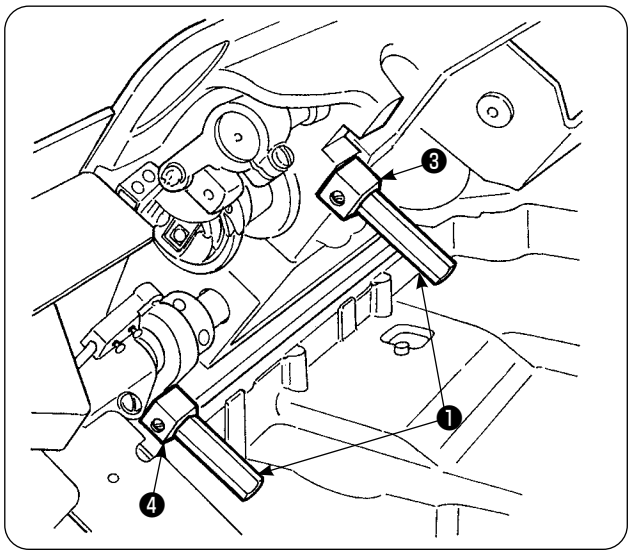
5-3. Installing the bobbin thread remaining amount detecting devices

Be sure to install the driving device which has already been adjusted. If not, the sewing machine can fail.



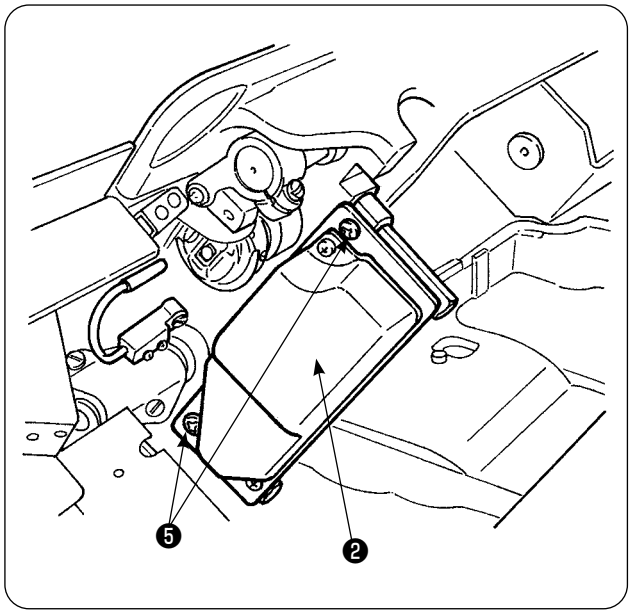


1) Remove two front bed struts ❻ from the sewing machine to which the bobbin thread remaining amount detecting device is to be installed.

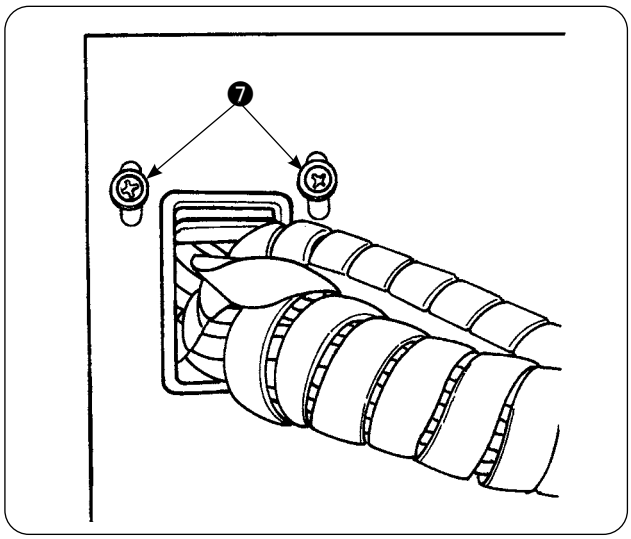


2) Install base plate stator ❸ , ❹ to the bed with placed between bed struts ❶ supplied with the unit.
There are two types of base plate stators ❸ and ❹ , one for the left side and the other for the right side. Be sure to install them correctly.

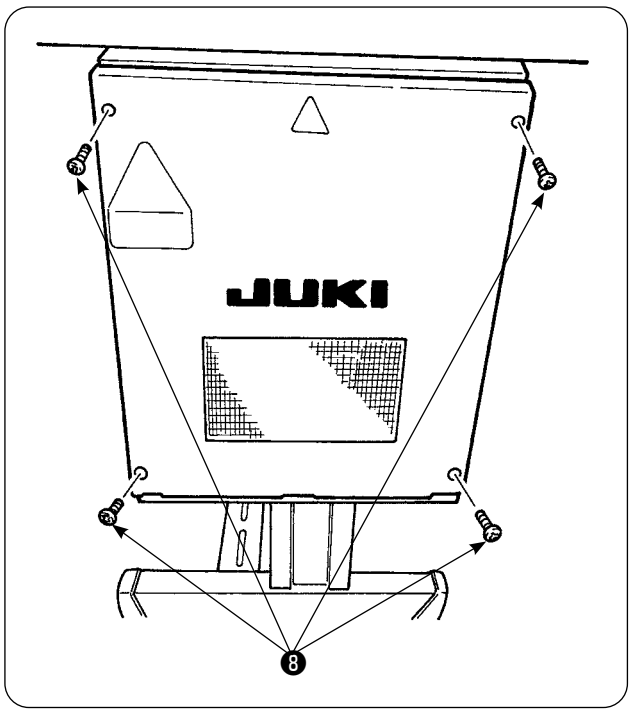
Base plate stator for the left side (far side)	Area of flat section Small	
Base plate stator for the right side (Operator side)	Area of flat section Large	



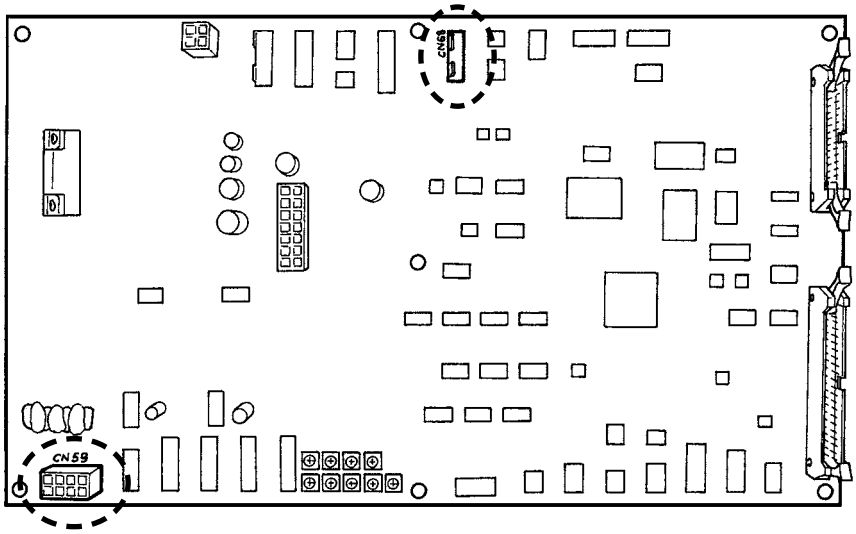
3) Secure driving device ❷ on right and left base plate stators ❸ and ❹ with screws ❺ supplied with the unit. At this time, carefully secure driving device ❷ so that the detecting rod correctly faces the center of inside of the hook.

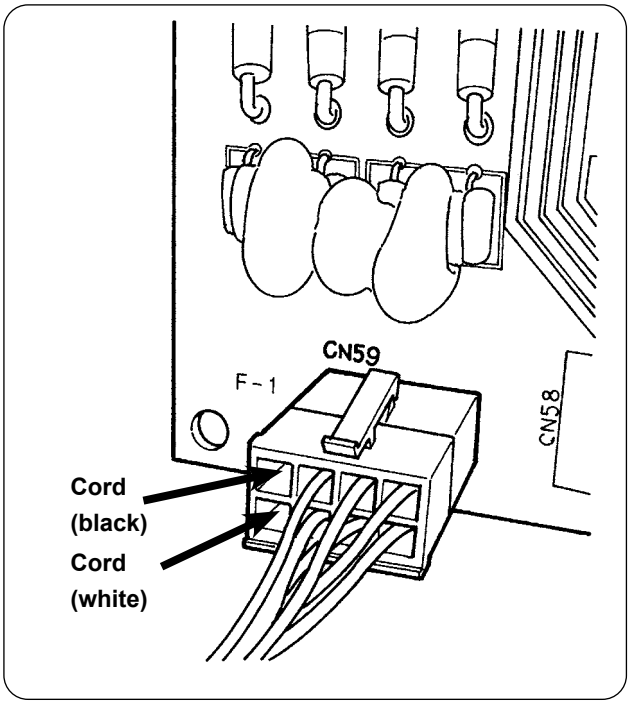


4) Loosen setscrews ❼ of the cord keep plate located on the side face of the electrical control box. Lift the cord keep plate and pass the solenoid cord and sensor cord through the hole.



Remove four screws ❽ which are used to secure the electrical box cover. Open the cover.

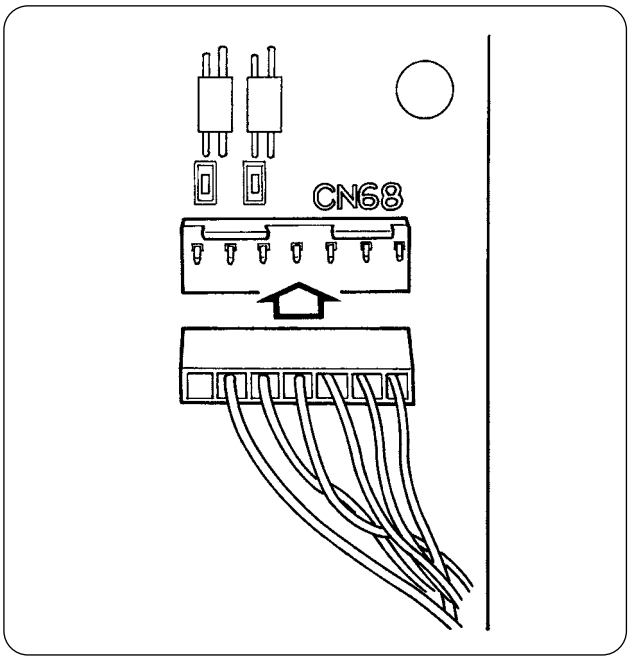




5) Insert the pins coming out from the solenoid into vacant receptacles of CN59 on the board. Insert the black pin into No. 8 and the white pin into No. 4.
Insert the sensor connector into CN68.

6) Close the electrical box cover. Clamp the cords coming out from the electrical box with the cord keep plate. Now, the installation of the bobbin thread remaining amount detecting sensor. Do not forget to tighten the screws in the cover.

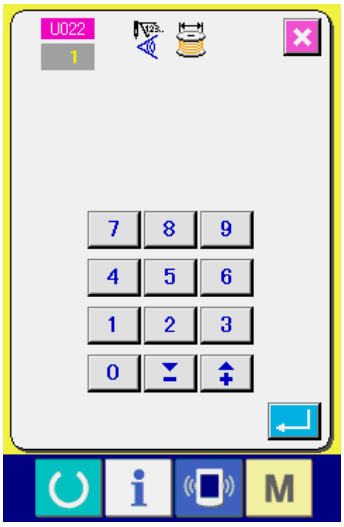
7) Turn ON the power to the sewing machine. Set the bobbin thread remaining amount detection. (Refer to **"V-5-5-1. Setting the bobbin thread remaining amount detection" p.30** for the setting procedure.)



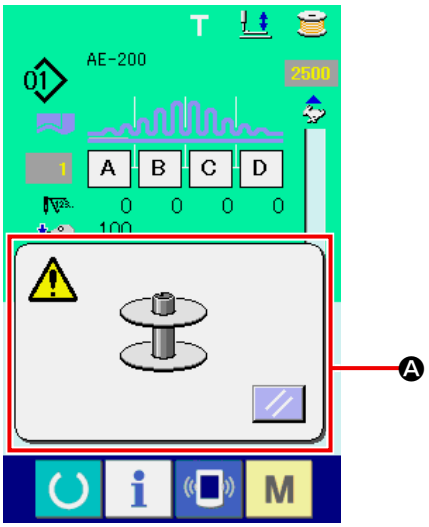
About errors

1. If the error display [E998] appears on the operation panel, turn OFF the power to the sewing machine once and check that the connectors are fully inserted into the board.
2. Remove the cover from the driving device for cleaning. In particular, the sensor and driving section should be carefully cleaned.

5-4. Sewing



① U022 Set the number of times of detection of the remaining amount of bobbin thread to "1". Refer to **"V-5-5-1- ③ Setting the number of times of detection of the remaining amount of bobbin thread." p.31** for the method for setting the number of times of detection of the remaining amount of bobbin thread.



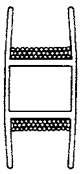
② Start the normal sewing. (For test sewing, specify the sewing length which is same as that for actual process.)

③ If you continue sewing and carry out thread trimming in repetition, the error popup screen (Ⓐ) will be displayed and the buzzer will sound when the remaining amount of bobbin thread is detected.

④ At this time, observe the actual length of bobbin thread remaining on the bobbin and adjust the counter value appropriately.

⑤ The remaining length of bobbin thread when its runout has been detected by the sensor varies more or less even under the most favorable conditions. This variation is caused by the type of thread or sewing length. As a guide, the remaining length of bobbin thread varies by approximately three turns of thread around the bobbin.
At this time, the length of thread is as shown in the following example.
Adjust the counter so that bobbin thread remains by "a half of variation in length + 0.5 m."

[Example of thread length equivalent to three-turns of thread on the bobbin.]

	Spun thread #60, #80	Approximately 2.5 m for three turns around the bobbin
	Tetoron thread #60, #80	Approximately 3 m for three turns around the bobbin
	Spun thread, Tetoron thread #30	Approximately 2 m for three turns around the bobbin

⑥ If the counter value is increased by one, the remaining length of bobbin thread will be shortened by one sewing length.

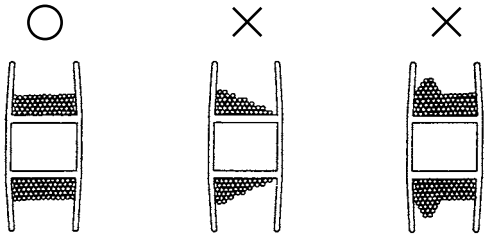
⑦ Due to the aforementioned variation in the remaining length of bobbin thread, the bobbin thread may completely run out during sewing depending on the adjustment of the counter value. Adjust the counter to the set value which ensures that the bobbin thread will never run out during sewing in accordance with sewing conditions for each sewing process.

⑧ If the bobbin thread runs out during sewing even when the bobbin thread remaining amount adjustment counter at "1," or, to the contrary, if the remaining length of bobbin thread is still too long even when it is set at "19," the position of the detecting sensor has to be adjusted. (Refer to **"V-5-5-2. Adjusting procedure of the sensor position" p.32** for the adjusting procedure.)
In the case the bobbin thread runs out → Lower the position of the detecting sensor.
In the case the remaining length of bobbin thread is too long → Raise the position of the detecting sensor.

5-5. For proper operation of the bobbin thread remaining amount detecting device

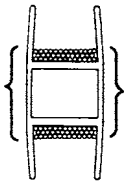
This device mechanically detects the remaining amount of bobbin thread. Since the device performs detection after thread trimming, the remaining amount of bobbin thread varies by a certain degree. The variation in the remaining amount of bobbin thread can be minimized by paying attention to the following.

1. How the bobbin is wound with thread
   The bobbin thread remaining amount detecting device detects the thread amount by directly touching the thread wound on the bobbin with its detecting rod. It is therefore important that the bobbin is uniformly wound with thread. In particular, carefully check how the thread is wound on the bobbin at the beginning of winding.



2. Sewing length
   Since the device performs detection after thread trimming, the degree of variation in the remaining amount of bobbin thread differs according to the sewing length of one sewing operation.
   In general, the shorter the sewing length of one sewing operation is set, the smaller the variation in the remaining amount of bobbin thread becomes small. In the case multiple processes are combined for sewing where the sewing length differs by process, the variation can become larger.

   <Guide of variation>



ength of thread when wound on the bobbin by three turns

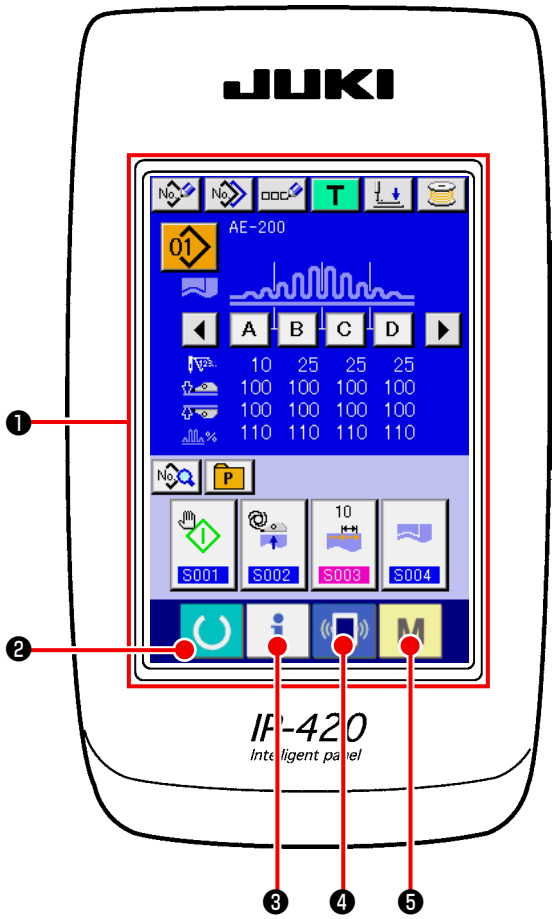
Spun thread #60, #80	Approx. 2 to 2.5 m
Tetoron thread #60, #80	Approx. 3 m
Spun thread, Tetoron thread #30	Approx. 2 m

VI. OPERATION SECTION (WITH REGARD TO THE PANEL)

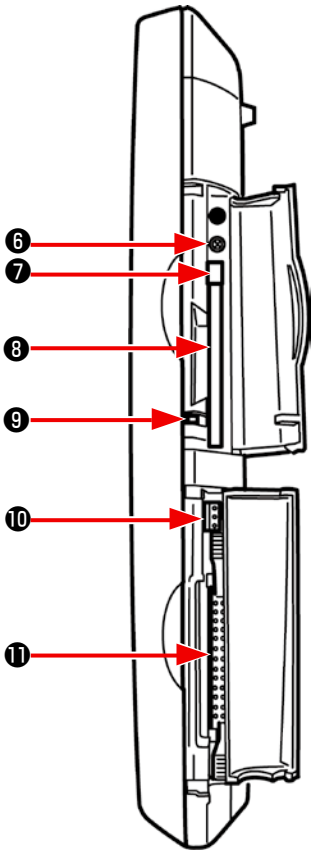
1. Explanation about switches on the operation panel

1-1.Name of each section of IP-420

(Front)



(Right side)



❶ Touch panel·LCD display section

❷ READY key → Changeover of the data input screen and the sewing screen can be performed.

❸ INFORMATION key → Changeover of the data input screen and the information screen can be performed.

❹ COMMUNICATION key → Changeover of the data input screen and the communication screen can be performed.

❺ MODE key → Changeover of the data input screen and the mode changeover screen which performs various detail settings can be performed.

❻ Brightness control

❼ CompactFlash (TM) eject button

❽ CompactFlash (TM) slot

❾ Cover detection switch

❿ Connector for external switch

⓫ Connector for control-box connection

1-2. Buttons to be used in common

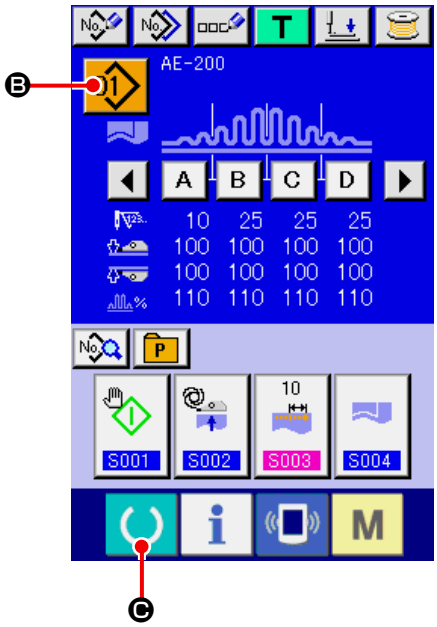
The buttons which perform common operations in each screen of IP-420 are as follows :

 CANCEL button	→	This button closes the pop-up screen. In case of the data change screen, the data being changed can be cancelled.
 ENTER button	→	This button determines the changed data.
 UP SCROLL button	→	This button scrolls the button or the display in the upward direction.
 DOWN SCROLL button	→	This button scrolls the button or the display in the downward direction.
 RESET button	→	This button performs the release of error.
 NUMERAL INPUT button	→	This button displays ten keys and input of numerals can be performed.
 SEWING DATA DISPLAY button	→	To be used to display the sewing data list corresponding to the currently-selected sewing pattern No.
 CHARACTER INPUT button	→	This button displays the character input screen.
 PRESSER FOOT LOWERING button	→	Presser is lowered, and the presser lowering screen is displayed. To lift presser, press presser lift button displayed in the presser lowering screen.
 BOBBIN WINDING button	→	Bobbin thread winding is performed.

① **Turn ON the power switch.**

When you turn ON the power to the sewing machine for the first time after purchase, the language selection screen is displayed. Set the language to the one you want to use. (The language setting can be changed with the MEMORY switch "U500".)

* If you exit from the language selection screen with CANCEL button or ENTER button without selecting the language, the language selection screen will be displayed every time you turn ON the power to the sewing machine until you select the language you want to use.

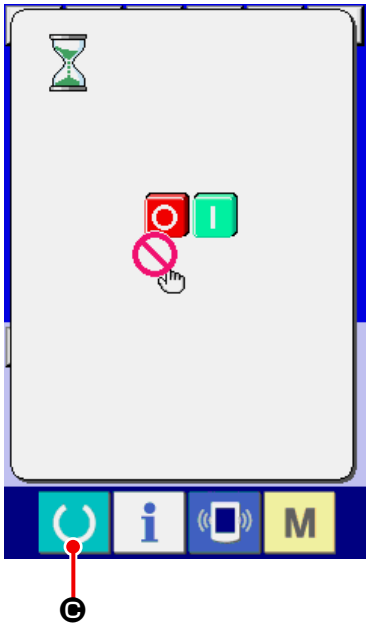


② **Select the pattern No. you want to sew.**

When you turn ON the power to the sewing machine, the data input screen is displayed. Currently-selected PATTERN No. button (Ⓑ) is displayed on the upper part of the screen. You can select a pattern No. by pressing that button. Refer to **"VI-4. Selecting a pattern" p.46** for the method for selecting a pattern No.

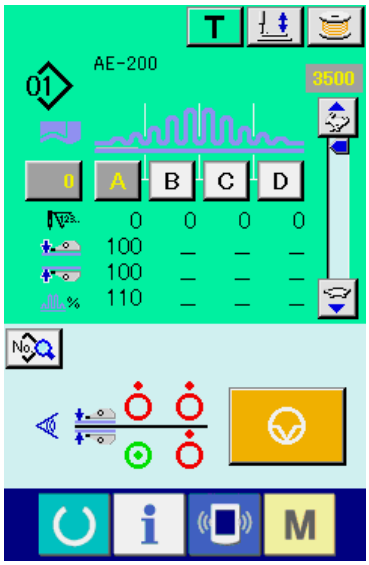
In the purchased state, pattern Nos. 1 to 3 as described in **"VI-10. Changing sewing data" p.57** have been factory-registered. Select one from those three pattern numbers. (The number to which no pattern has been registered will not be displayed.)

* Refer to **"VI-3-1.Data input screen" p.42** for detailed explanation of this screen.



③ **Bring the sewing machine into the sewing ready state.**

When you press READY key (Ⓒ), the power OFF prohibition screen is displayed. The sewing machine prepares for sewing while this screen is displayed. Once the sewing machine is ready for sewing, the background color of the LCD changes to green and the presser foot of the sewing machine goes up.

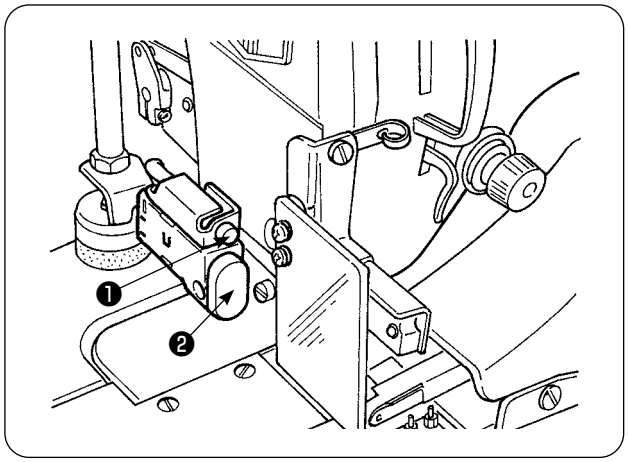


④ **Start sewing.**

When you set a sewn product under the presser foot, LED ❶ blinks. When you press START button ❷ , the sewing machine starts sewing.

* The pedal switch can be optionally selected for starting sewing instead of the START button.

* Refer to **"VI-3-2.Sewing screen" p.44** for detailed explanation of this screen.



Caution

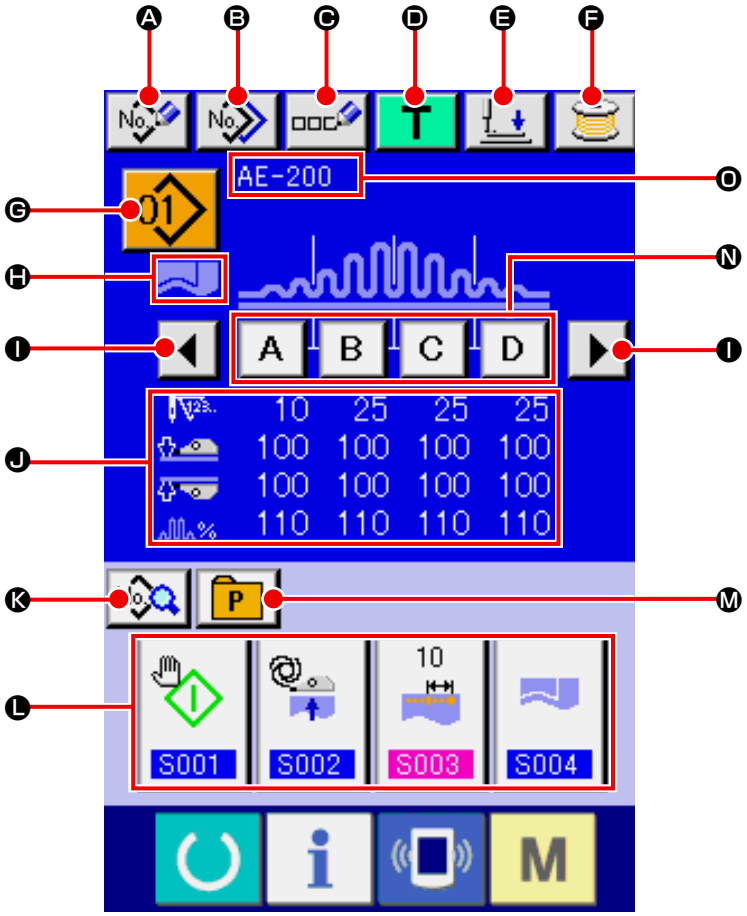
Because of the characteristics of the manipulator sensor, the sensor's detection status will be unstable if you turn ON the power to the sewing machine with a material placed on the sewing machine. To prevent the sensor from becoming unstable, carry out placement of the material as described below.

1. Be sure to press the READY key for the first time after turning ON the power to the sewing machine with no material placed on the sensor.

2. If LED ❶ blinks at a high speed or irregularly, remove the material from the sensor once. Then, re-place the material on the sensor to use the sewing machine.

3. LCD display section at the time of independent sewing

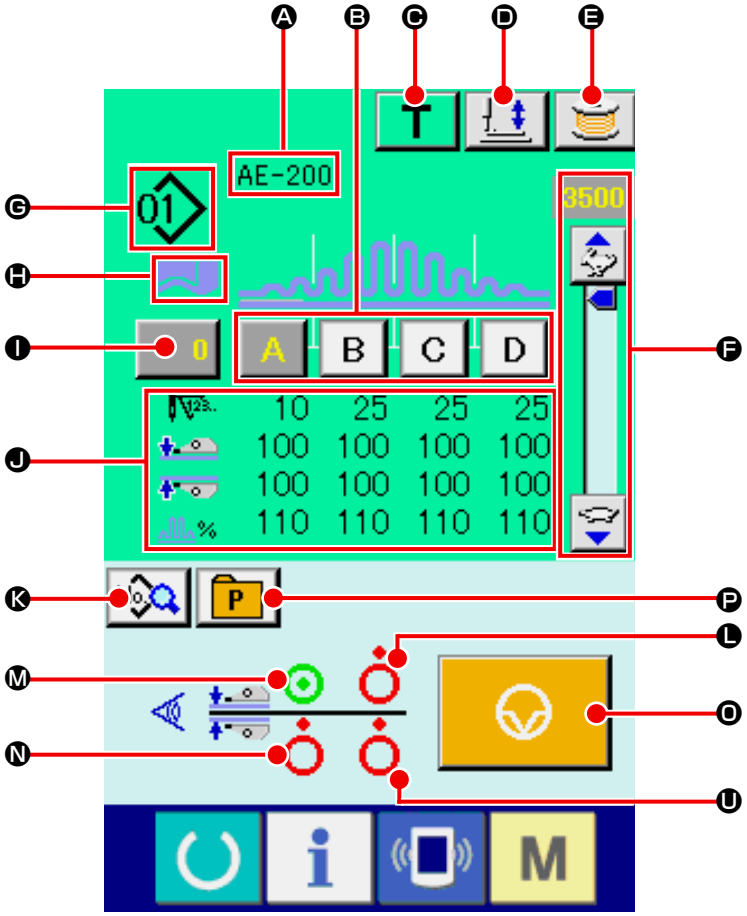
3-1.Data input screen



	Button and display	Description
Ⓐ	NEW PATTERN REGISTRATION button	To be used to display the new pattern No. registration screen. → Refer to **"VI-11. Registering a new sewing pattern" p.59**.
Ⓑ	PATTERN COPY button	To be used to display the pattern copy (copy source selection) screen. → Refer to **"VI-13. Copying sewing pattern" p.69**.
Ⓒ	PATTERN NAME SETTING button	To be used to display the sewing pattern name input screen. → Refer to **"VI-5. Naming the pattern" p.48**.
Ⓓ	TEACHING button	To be use to display the teaching screen. → Refer to **"VI-23. Using the teaching" p.93**.
Ⓔ	PRESSER FOOT LOWERING button	To be used to display the presser foot lowering screen. If you want to lift the presser foot, press the PRESSER FOOT LIFTING button displayed on the presser foot lowering screen.
Ⓕ	BOBBIN WINDING button	To be used to display the bobbin winding screen. Thread can be wound on a bobbin. → Refer to **"VI-7. Winding a bobbin" p.51**.
Ⓖ	PATTERN SELECT button	To be used to display the currently-selected pattern No. on the button. If you press this button, the pattern No. change screen will be displayed. → Refer to **"VI-4. Selecting a pattern" p.46**.

	Button and display	Description
ⓗ	"S04" "Number of plies of material to be sewn" mode display	To be used to display the currently-set "number of plies of material to be sewn" mode
ⓘ	RIGHT/LEFT SCROLL buttons	When these buttons are pressed, the section display is changed over in sequence.
ⓙ	Sewing data display	To be used to display the content of the currently-selected pattern data. The displays from top to bottom are: • Number of stitches for section • Upper manipulator pressure • Lower manipulator pressure • Upper shirring amount
ⓚ	SEWING DATA EDIT button	To be used to display the sewing data list screen. → Refer to **"VI-10. Changing sewing data" p.57**.
ⓛ	CUSTOMIZE buttons	It is possible to assign the sewing data you use frequently to these four buttons. When you press one of these four buttons, the sewing data change screen for the sewing data assigned to that button is displayed. → Refer to **"VI-15. Registering the sewing data with the CUSTOMIZATION button" p.73**.
ⓜ	PATTERN DIRECT button	To be used to display the pattern No. list screen that shows the pattern No. that are registered with the PATTERN DIRECT button. → Refer to **"VI-14. Registering the direct pattern" p.71**.
ⓝ	SEWING DATA SECTION EDIT button	To be used to display the sewing data section editing screen. → Refer to **"VI-6. Sewing data editing function" p.49**.
ⓞ	Patten name display	The name entered in the currently-selected sewing pattern is displayed in this field.

3-2.Sewing screen



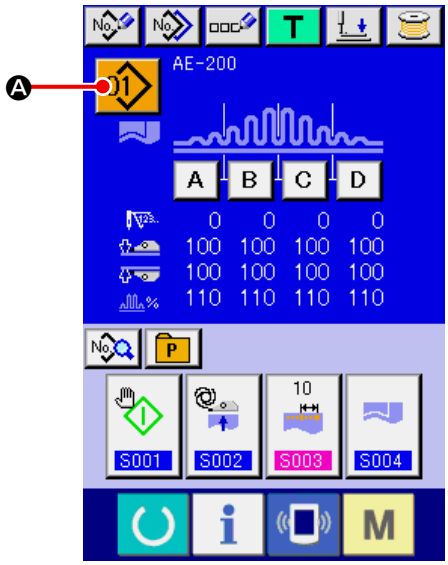
	The state where the sensor detects a material
	The state where the sensor does not detect a material
A	Currently-sewn section status

	Button and display	Description
Ⓐ	Patten name display	The name entered in the currently-selected sewing pattern is displayed in this field.
Ⓑ	SEWING DATA SECTION EDIT button	To be used to display the sewing data section editing screen.
Ⓒ	TEACHING button	To be use to display the teaching screen.
Ⓓ	PRESSER FOOT LOWERING button	To be used to display the presser foot lowering screen. If you want to lift the presser foot, press the PRESSER FOOT LIFTING button displayed on the presser foot lowering screen. * Sewing is completed by pressing this button while the sewing machine is at rest during sewing.
Ⓔ	BOBBIN WINDING button	To be used to display the bobbin winding screen. Thread can be wound on a bobbin.
Ⓕ	SPEED VARIABLE RESISTOR	The number of revolutions of the sewing machine can be changed with this variable resistor.
Ⓖ	PATTERN No. display	To be used to display the currently-sewn pattern No..
Ⓗ	"S04" "Number of plies of material to be sewn" mode display	To be used to display the currently-set "number of plies of material to be sewn" mode

	Button and display	Description
❶	COUNTER VALUE CHANGE button	The current counter value is displayed on this button. When you press this button, the counter value change screen is displayed.
❷	Sewing data display	The currently-sewn pattern data is displayed in this field. • Number of stitches for section • Pressure values of the upper and lower manipulators • Upper shirring amount
❸	SEWING DATA EDIT button	To be used to display the sewing data list screen.
❹	Presence/absence of material detection status of the upper manipulator outer sensor	State of the sensor is displayed.
❺	Presence/absence of material detection status of the lower manipulator outer sensor	State of the sensor is displayed.
❻	Presence/absence of material detection status of the upper manipulator inner sensor	State of the sensor is displayed.
❼	TEMPORARY STOP button	To be used to display the temporary stop screen.
❽	PATTERN DIRECT button	To be used to display the pattern No. list screen that shows the pattern No.s that are registered with the PATTERN DIRECT button.
❾	Presence/absence of material detection status of the lower manipulator inner sensor	State of the sensor is displayed.

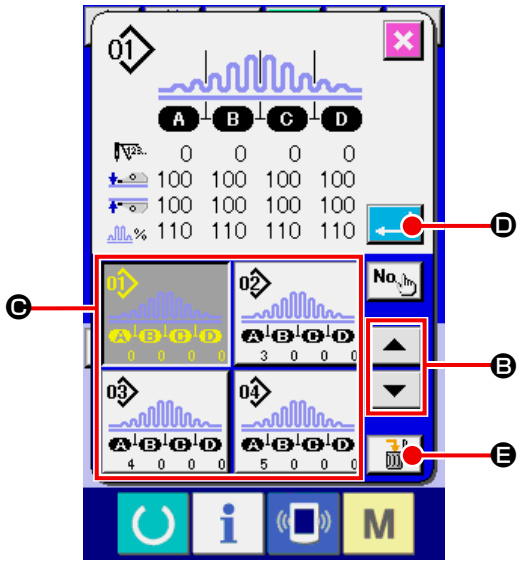
4. Selecting a pattern

4-1. Selection on the data input screen



① **Display the data input screen.**
The pattern No. can be selected only on the data input screen (blue). In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

② **Calling up the pattern No. selection screen.**
When you press PATTERN No. SELECT button (Ⓐ), the pattern No. selection screen is displayed. Currently-selected pattern No. and its content are displayed on the upper part of the screen. The list of the registered PATTERN No. buttons is displayed on the lower part of the screen.



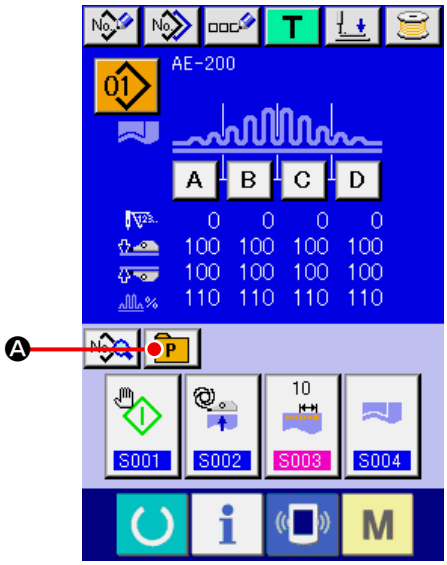
③ **Select a pattern.**
When you press UP or DOWN SCROLL button (Ⓑ), the registered PATTERN No. button (Ⓒ) is changed over in sequence. Content of the sewing data entered to the pattern No. is displayed on the button. In this state, press the PATTERN No. button (Ⓒ) you want to select.

④ **Determine the pattern No.**
When you press ENTER button (Ⓓ), the pattern No. selection screen is closed to terminate the pattern No. selection procedure.

* If you want to delete a registered pattern, press DELETE button (Ⓔ). It should be noted, however, the patterns that are registered with continuous sewing or cycle sewing cannot be deleted.

4-2. Selection by means of the PATTERN DIRECT button

It is possible to register a desired pattern No. with the DIRECT button.
Once you have registered the pattern with the DIRECT button, you can select the pattern with ease only by pressing the DIRECT button.
→ Refer to **"VI-14. Registering the direct pattern" p.71** .

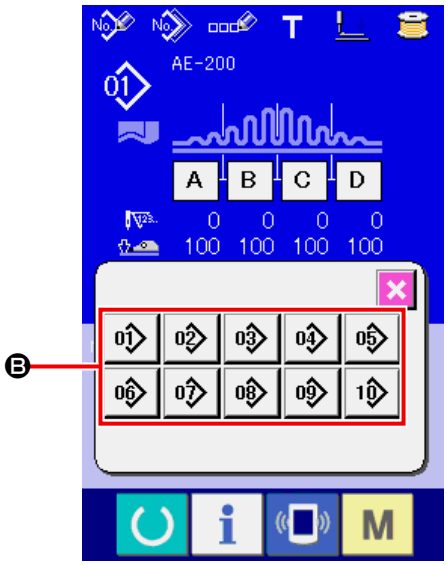


① **Displaying the DIRECT button selection screen.**

Press PATTERN DIRECT button (Ⓐ) on the data input screen (blue) to display the PATTERN DIRECT button selection screen.

* If you have selected "Display" of the DIRECT button with the MEMORY switch (level 2) "Display/non-display of the DIRECT button", you can use the DIRECT button even on the sewing screen.

→ Refer to **"VI-14. Registering the direct pattern" p.71** .

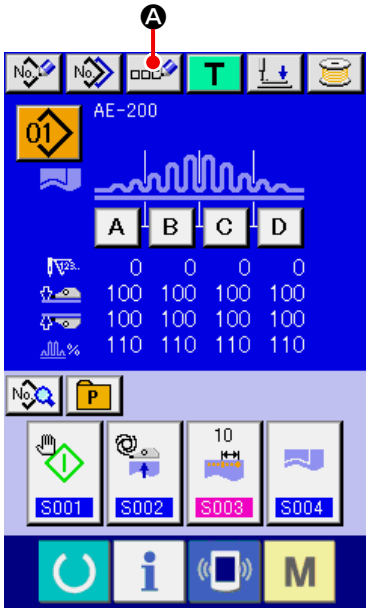


② **Select the pattern No.**

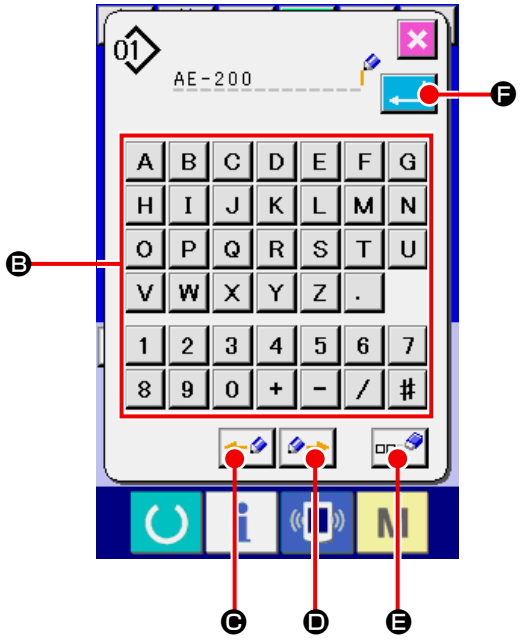
It is possible to select the pattern No. registered with the DIRECT button. When you press the PATTERN No. button (Ⓑ) you want to select, the DIRECT button selection screen is closed and the pattern No. you have selected is displayed.

5. Naming the pattern

As many as 14 characters can be entered to each pattern.



① **Display the data input screen.**
The pattern No. can be selected only on the data input screen (blue). In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

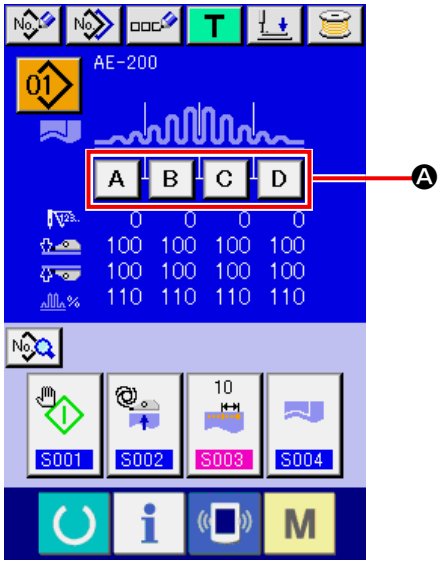


② **Calling up the character input screen.**
When you press CHARACTER INPUT button (Ⓐ), the character input screen is displayed.

1) **Input the character.**
Characters can be entered by pressing the CHARACTER button (Ⓑ) corresponding to the character you want to input. Characters (A to Z, 0 to 9) and symbols (+, -, /, #, etc.) can be input. As many as 14 characters can be input. The cursor can be moved with CURSOR LEFT MOVE button (Ⓒ) or CURSOR RIGHT MOVE button (Ⓓ). If you want to delete the character you have entered, bring the cursor to the target character and press DELETE button (Ⓔ).

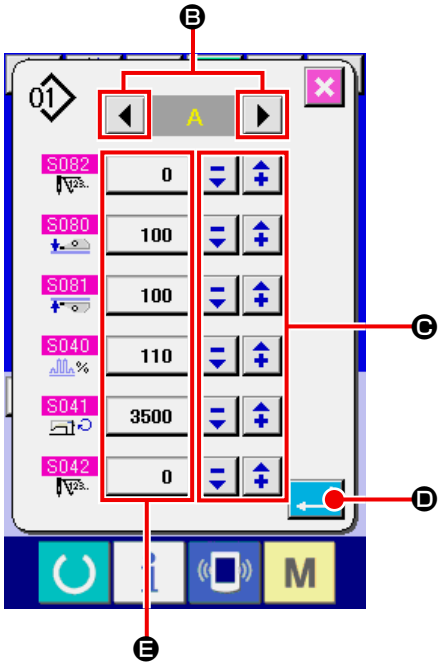
2) **Finish inputting the character.**
When you press ENTER button (Ⓕ), the character input procedure is terminated. After you have exited from the character input screen, the characters you have input are displayed on the upper part of the data input screen.

6. Sewing data editing function



① **Displaying the sewing data section editing screen.**

When you press the SEWING DATA SECTION EDIT button (Ⓐ) on the individual sewing editing screen (blue), the sewing data section editing screen is displayed.

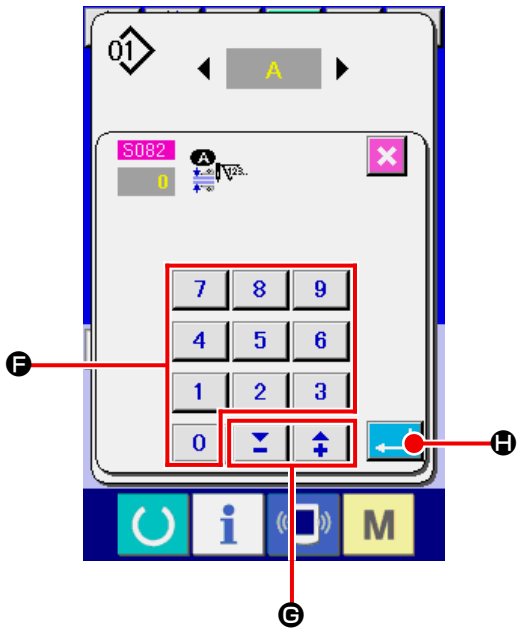


② **Using the sewing data section editing screen.**

The target editing section can be changed by pressing RIGHT or LEFT SCROLL button (Ⓑ).

It is possible to change the sewing data value for each editing unit using -/+ button (Ⓒ). When you press ENTER button (Ⓓ), the setting you have made is confirmed and the screen returns to the individual sewing editing screen.

When you press the SEWING DATA EDIT button (Ⓔ), the sewing data input screen is displayed.



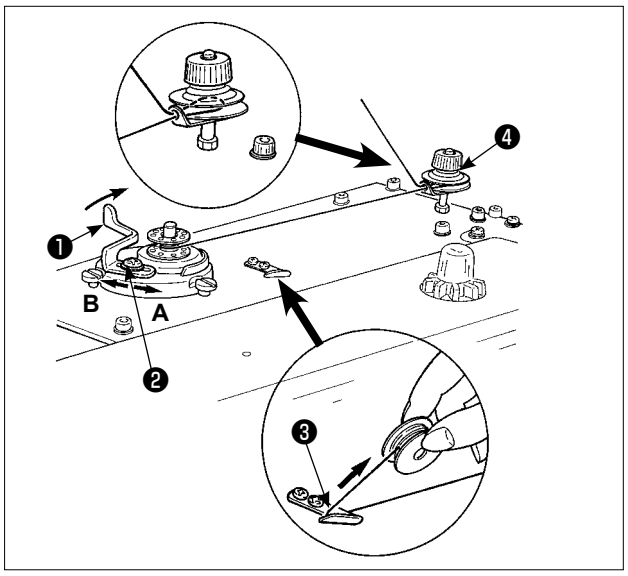
③ **Using the sewing data input screen.**

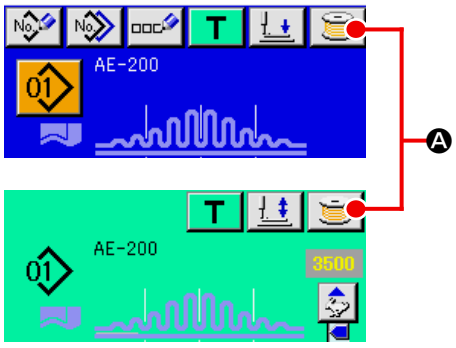
If you want to change the value you have input, change it with the numeric keypad (Ⓕ) or -/+ button (Ⓖ).

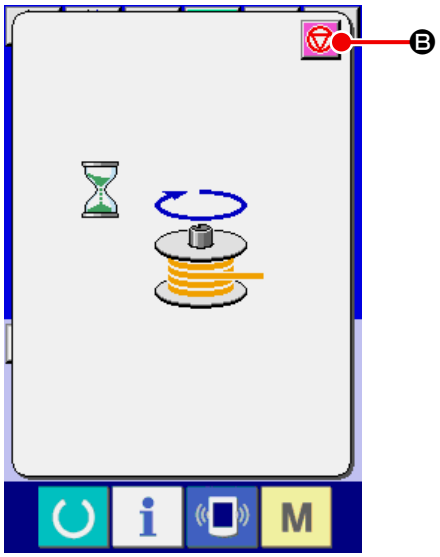
When you press ENTER button (Ⓗ), the sewing data is confirmed and the screen returns to the sewing data section editing screen.

7. Winding a bobbin

7-1. Bobbin winding procedure







① **Set a bobbin.**

Fit a bobbin over the bobbin winder spindle until it will go no further. Route thread as illustrated and wind thread on the bobbin. Then, press bobbin winding lever ❶ in the direction of the arrow.

1. When winding the bobbin thread, start the winding in the state that the thread between the bobbin and thread tension disk ❹ 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.

Caution

3. If you want to wind a bobbin without carrying out sewing, lift the presser foot with the hand lifter and wind the bobbin.
Refer to "VIII-4. Presser foot lifting lever" p.160

4. 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.

② **Displaying the bobbin winding screen.**

When you press BOBBIN WINDING button  (Ⓐ) on the data input screen (blue) or on the sewing screen (green), the bobbin winding screen is displayed.

③ **Start winding the bobbin.**

When you press the start switch, the sewing machine runs to start winding the bobbin.

④ **Stop the sewing machine.**

Once the bobbin is wound with a predetermined amount of thread, bobbin winding lever ❶ will be released. Then, press STOP button  (Ⓑ) or the START switch to stop the sewing machine. After the sewing machine has stopped, remove the bobbin from the bobbin winder spindle and trim the thread by means of thread trimmer retaining plate ❸ .

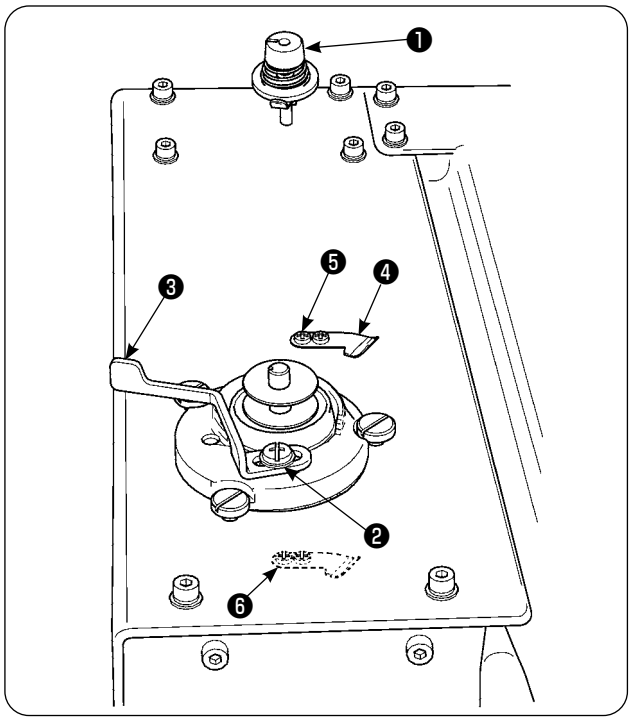
- When you press STOP button  (Ⓑ), the sewing machine stops and returns to the normal mode.
- When you press the start switch, the sewing machine stops in the bobbin winding mode. It is recommended to use the start switch when you wind two or more bobbins continuously.

7-2. Adjusting the bobbin thread amount

To adjust the amount of thread to be wound round a bobbin, loosen screw ❷ , move bobbin winding lever ❶ in direction **A** or **B** for adjustment, and tighten setscrew ❷ .

Direction **A**: The amount of bobbin thread is decreased.
Direction **B**: The amount of bobbin thread is increased.

7-3. Adjusting the bobbin winder



① Adjust the take-up thread guide tension to 0.5 N to 0.8 N (maximum) by means of tension regulating knob ❶ .

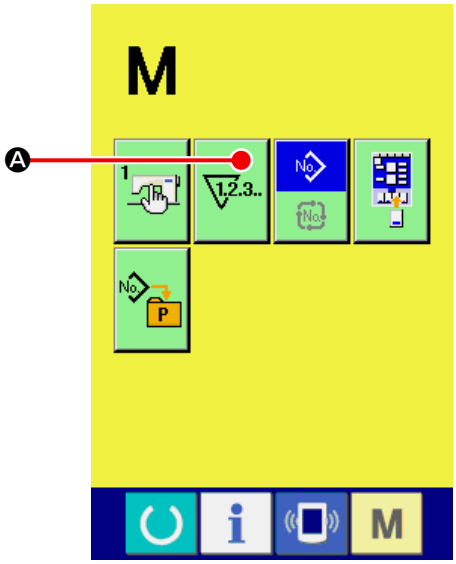
② Loosen bobbin winder stop latch lever setscrew ❷ and adjust so that thread is wound uniformly round a bobbin by 80 to 90 % of its diameter and bobbin winding operation stops by moving bobbin winder stop latch lever ❸ to the right or left.

③ The bobbin winder can be used with the position of bobbin thread presser ❹ changed. To re-position the bobbin thread presser, remove bobbin thread presser setscrew ❺ and re-position it to the location of tap ❻ .

If an excessive amount of thread wound round a bobbin, thread may wind on the bobbin winder spindle, causing a failure.

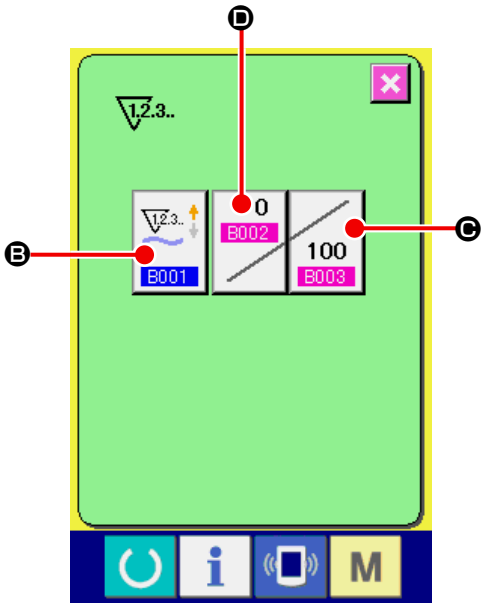
8. Using counter

8-1. Setting procedure of the counter



① **Display the counter setting screen.**

When you press M key, COUNTER SETTING button (Ⓐ) is displayed. When you press this button, the counter setting screen is displayed.



② **Selection of the kinds of counters.**

When you press COUNTER TYPE button (Ⓑ), the counter type selection screen is displayed. Select the type of counter you want to use from among the counter types described below.

※ Counter types

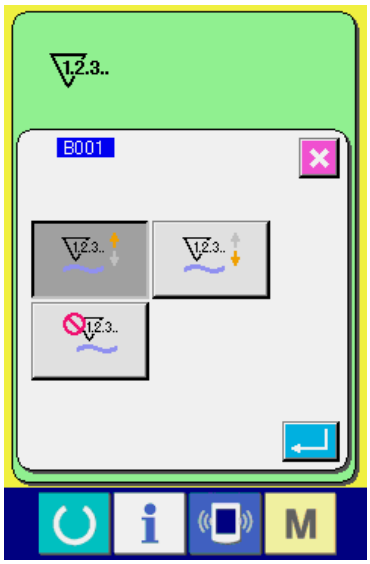
No. of pcs. UP counter :

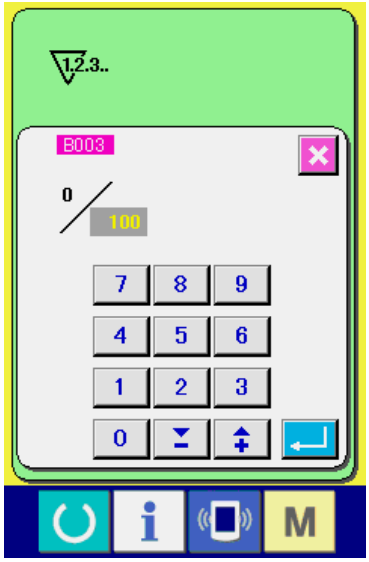
Every time one cycle or one continuous sewing is carried out, the current value on the counter increases. When the current value reaches the set value, the count-up screen is displayed.

No. of pcs. DOWN counter :

Every time one cycle or one continuous sewing is carried out, the current value on the counter decreases. When the current value reaches 0 (zero), the count-up screen is displayed.

Counter unused :



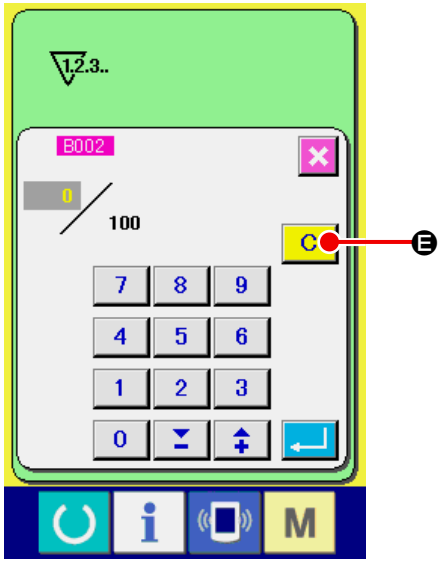


③ **Change of counter set value.**

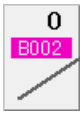
When you press COUNTER SETTING button 

(Ⓒ), the counter set value input screen is displayed.

Input a set value on this screen. If you set the set value to 0 (zero), the count-complete screen will not be displayed.



④ **Change of counter existing value.**

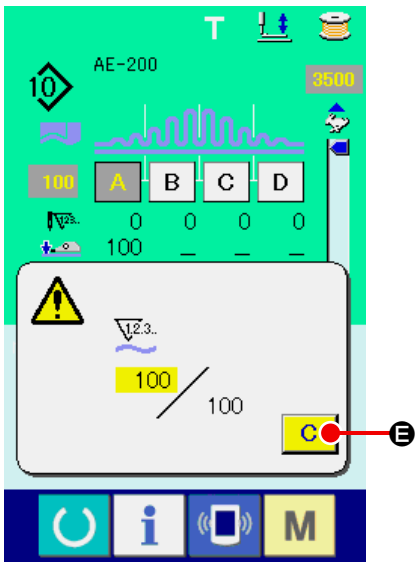
When you press COUNTER SETTING button 

(Ⓓ), the current value input screen is displayed.

On this screen, input the current value.

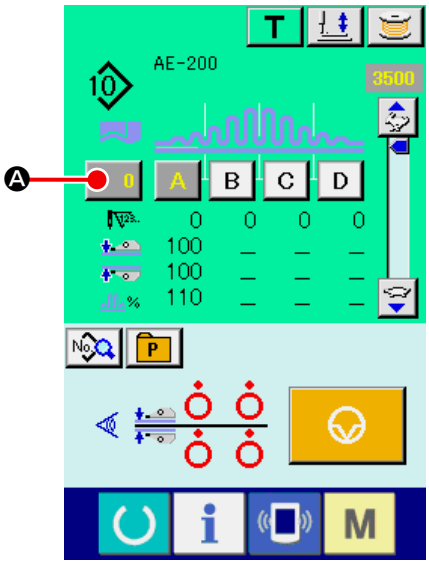
If you want to clear the counter value, press CLEAR button C (Ⓔ).

8-2. Count-up releasing procedure



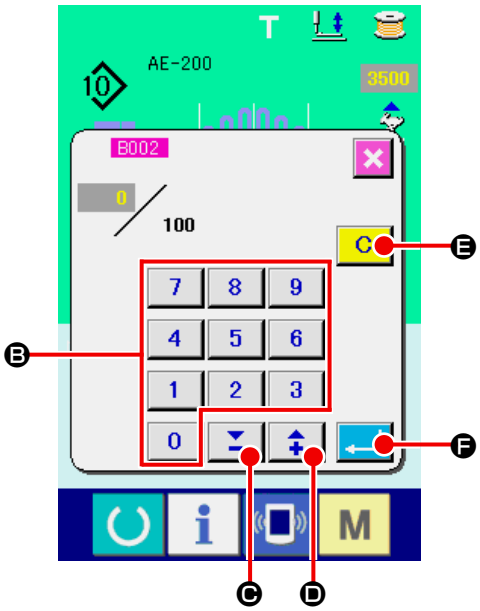
If the count-complete condition is reached during sewing work, the count-complete screen is displayed and the buzzer sounds. When you press CLEAR button C (Ⓔ), the counter is reset and the screen returns to the sewing screen. On the sewing screen, the counter starts counting again.

8-3. Method for changing the value of the counter during sewing



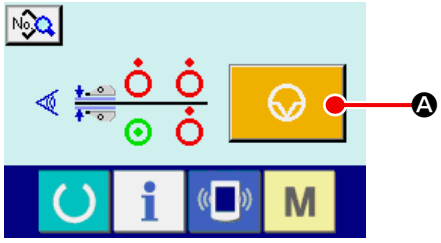
① **Displaying the counter value change screen.**
If you want to correct the counter value due to a stitching failure or the like during sewing work, press COUNTER VALUE CHANGE button 0 (Ⓐ) on the sewing screen. Then, the counter value change screen is displayed.

② **Changing the value on the counter.**
Input a desired value with numeric keypad (Ⓑ) and -/+ buttons (Ⓒ, Ⓓ).

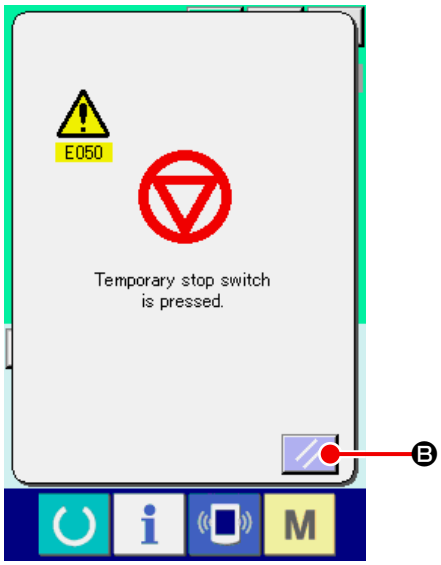


③ **Confirming the value on the counter.**
When you press ENTER button (Ⓕ), the data you have input is confirmed. If you want to clear the counter value, press CLEAR button C (Ⓔ).

9. Using the TEMPORARY STOP button

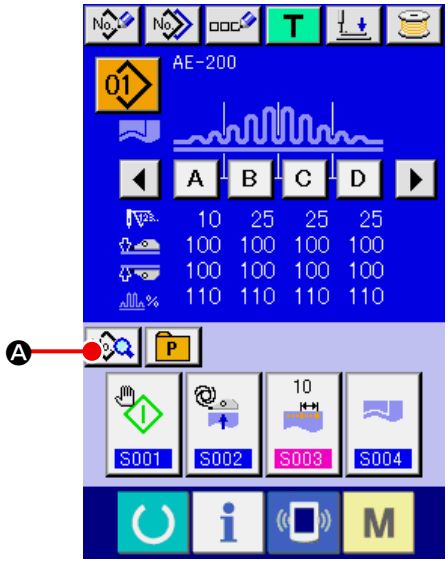


When you press TEMPORARY STOP button  (Ⓐ) on the teaching screen, individual sewing screen or cycle sewing screen, the sewing machine stops and the temporary stop screen "E050" is displayed.



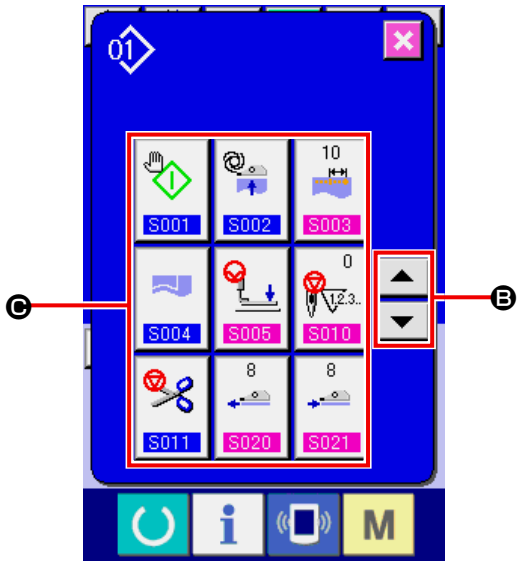
When you press RESET button  (Ⓑ) on the temporary stop screen, the sewing machine performs thread trimming and the screen returns to the individual sewing editing screen (or the cycle sewing editing screen in the case of cycle sewing).

10. Changing sewing data

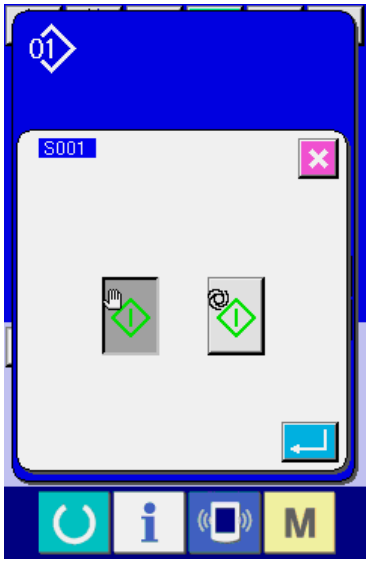


① **Display the data input screen.**
Only on the data input screen (blue), the sewing data can be changed. In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

② **Call the sewing data screen.**
When you press SEWING DATA button (Ⓐ), the sewing data screen is displayed.



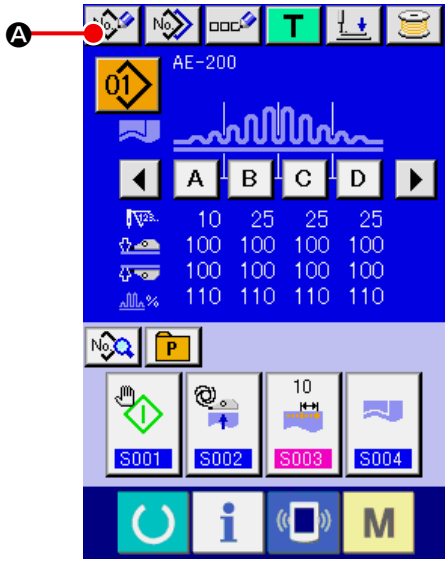
③ **Select the sewing data to be changed.**
Select the SEWING DATA ITEM button (Ⓒ) you want to change by pressing UP or DOWN SCROLL button (Ⓑ). Be aware that the data items that are not used because of the sewing pattern shape and that are set to "No function" are not displayed.



④ **Display the data input screen.**

There are two types of sewing data such as the data item the value of which is to be changed and the data item a pictograph for which is to be selected. For the data item the value of which is to be changed is attached with the number, highlighted in pink, as S003 . Its set value can be changed with the +/- buttons displayed on the change screen. For the data item a pictograph for which is to be selected is attached with the number, highlighted in blue, as S001 . For this type of data item, you can select one from the pictographs displayed on the change screen.

11. Registering a new sewing pattern

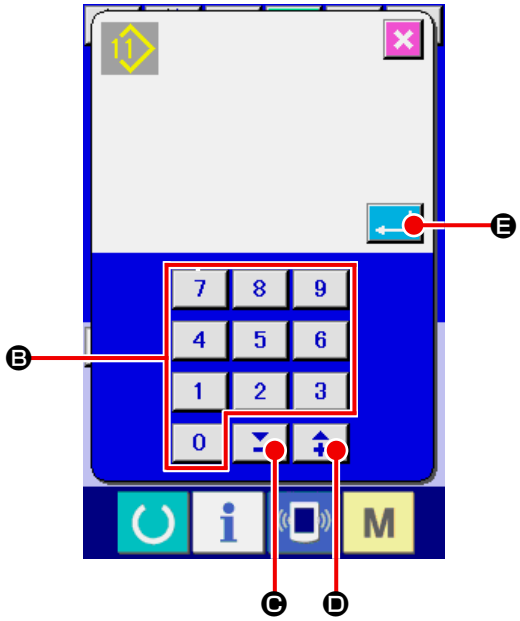


① **Display the data input screen.**

Only on the data input screen (blue), the sewing data can be changed. In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

② **Calling up the new pattern registration screen.**

When you press NEW PATTERN REGISTRATION button (Ⓐ), the new sewing pattern registration screen is displayed.



③ **Input the pattern No.**

Input a pattern No. you want to newly register with the numeric keypad (Ⓑ). If you input the pattern No. that has already been registered, the information on that pattern No. will be displayed on the upper part of the screen. Select a pattern No. that is not yet registered and no pattern information is displayed on the screen. It is prohibited to newly register sewing data with the already-registered pattern No.. It is also possible to retrieve an unregistered pattern No. with -/+ buttons (Ⓒ, Ⓓ).

④ **Determine pattern No.**

When you press ENTER button (Ⓔ), the pattern No. you have specified is registered and the screen returns to the individual sewing editing screen. If you have entered the already-registered pattern No. and press the ENTER button, the error screen will be displayed.

12. Sewing data list

No.	Item	Setting ange	Unit	Initial value
S001	**Start mode**	—	—	Manual start
	Manual start 	Selection		
	Auto start (Once the material is placed on the sewing machine, the machine starts sewing after a preset period of time.) 			
S002	**Automatic material alignment**	—	—	With automatic material alignment
	Without automatic material alignment 	Selection		
	With automatic material alignment 			
S003	**Sewing end distance** 	0 to 15	mm	10
S004	**Changeover of No. of plies**	—	—	Upper and lower materials 2 plies sewing
	Upper and lower materials 2 plies sewing 	Selection		
	1 piece sewing 			
S005	**Changeover of upper/lower position of presser foot at stop during sewing**	—	—	Presser foot stops at lower position at stop during sewing
	Presser foot stops at lower position at stop during sewing 	Selection		
	Presser foot stops at upper position at stop during sewing 			
S006	**Changeover of sewing end**	—	—	Sewing ends when all materials move away from the manipulator
	Sewing ends when all materials move away from the manipulator 	Selection		
	Sewing ends when 1 pc. of material moves away from the manipulator 			
S010	**Stop after total number of stitches** 	0 to 9999	Number of stitches	0
S011	**Stop state after total number of stitches**	—	—	Stop after thread trimming
	Stop after thread trimming 	Selection		
	Stop with the needle down 			
	Stop with the needle down and one stitch is additionally sewn 			
S020	**Upper scrape-out speed of manipulator** 	0 to 9	No unit	8

No.	Item	Setting ange	Unit	Initial value
S021	**Upper draw-in speed of manipulator** 	0 to 9	No unit	8
S022	**Lower scrape-out speed of manipulator** 	0 to 9	No unit	8
S023	**Lower draw-in speed of manipulator** 	0 to 9	No unit	8
S024	**Cloth fluff detection level** 	0 to 10	No unit	0: Cloth fluff detection is not performed.
S025	**Setting of manipulator-pressure intermittent-adjustment section**	—	—	No setting of manipulator-pressure intermittent-adjustment section
	No setting of manipulator-pressure intermittent-adjustment section 			
	A section setting 			
	B section setting 			
	C section setting 			
	D section setting 			
	E section setting 			
	F section setting 			
	G section setting 			
	H section setting 			
	I section setting 			
	J section setting 			
S026	**Number of stitches for intermittent interval of upper manipulator pressure** 	0 to 10	Number of stitches	5 The initial value is not displayed when [S25] manipulator presser intermittent adjustment section setting is set to "No setting."
S027	**Number of stitches for intermittent interval of lower manipulator pressure** 	0 to 10	Number of stitches	5 The initial value is not displayed when [S25] manipulator presser intermittent adjustment section setting is set to "No setting."
S028	**A speed of machine (rabbit)** 	200 to 3500	sti/min	3500

No.	Item	Setting ange	Unit	Initial value
S029	**B speed of machine (turtle)** 	200 to 3500	sti/min	1500
S030	**Sewing start - Selection of back tack**	—	—	Without reverse feed stitching
	Without reverse feed stitching 			
	With reverse feed stitching 			
S031	**Sewing start - Number of back tack stitches - A** 	0 to 8	Number of stitches	4 The initial value is not displayed when [S30] reverse feed stitching at the start of sewing is set to "Without reverse feed stitching."
S032	**Sewing start - Number of back tack stitches - B** 	0 to 8	Number of stitches	4 The initial value is not displayed when [S30] reverse feed stitching at the start of sewing is set to "Without reverse feed stitching."
S033	**Sewing start - State of back tack manipulator**	—	—	Without manipulator
	Without manipulator 			
	With manipulator 			
S034	**Sewing end - Selection of back tack**	—	—	Without reverse feed stitching
	Without reverse feed stitching 			
	With reverse feed stitching 			
S035	**Sewing end - Number of back tack stitches - C** 	0 to 8	Number of stitches	4 The initial value is not displayed when [S34] reverse feed stitching at the end of sewing is set to "Without reverse feed stitching."
S036	**Sewing end - Number of back tack stitches - D** 	0 to 8	Number of stitches	4 The initial value is not displayed when [S34] reverse feed stitching at the end of sewing is set to "Without reverse feed stitching."
S037	**Sewing end - State of back tack manipulator**	—	—	Without manipulator
	Without manipulator 			
	With manipulator 			

No.	Item	Setting ange	Unit	Initial value
S040	**Section A - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section A - Shirring ratio 	0 to 200	Percent	110 Displayed when "absolute value display" is selected in [U06] Shirring display.
S041	**Machine head section speed A** 	200 to 3500	sti/min	3500
S042	**Shirring changeover position A (number of stitches)** 	0 to 9999	Number of stitches	0
S043	**Section B - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section B - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S044	**Machine head section speed B** 	200 to 3500	sti/min	3500
S045	**Shirring changeover position B (number of stitches)** 	0 to 9999	Number of stitches	0
S046	**Section C - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section C - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S047	**Machine head section speed C** 	200 to 3500	sti/min	3500
S048	**Shirring changeover position C (number of stitches)** 	0 to 9999	Number of stitches	0
S049	**Section D - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section D - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S050	**Machine head section speed D** 	200 to 3500	sti/min	3500

No.	Item	Setting ange	Unit	Initial value
S051	**Shirring changeover position D (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S52] to [S69] are not displayed.
S052	**Section E - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section E - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S053	**Machine head section speed E** 	200 to 3500	sti/min	
S054	**Shirring changeover position E (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S55] to [S69] are not displayed.
S055	**Section F - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section F - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S056	**Machine head section speed F** 	200 to 3500	sti/min	
S057	**Shirring changeover position F (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S58] to [S69] are not displayed.
S058	**Section G - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section G - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S059	**Machine head section speed G** 	200 to 3500	sti/min	

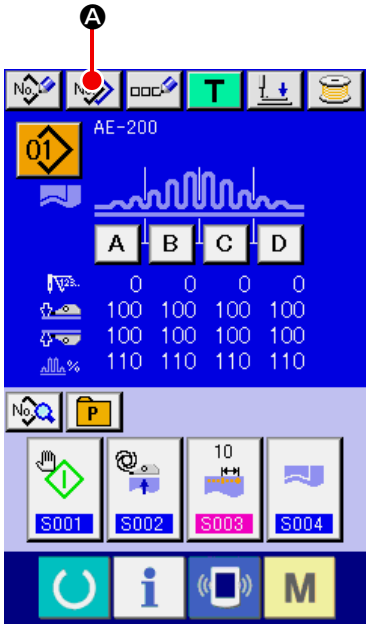
No.	Item	Setting ange	Unit	Initial value
S060	**Shirring changeover position G (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S61] to [S69] are not displayed.
S061	**Section H - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section H - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S062	**Machine head section speed H** 	200 to 3500	sti/min	
S063	**Shirring changeover position H (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S64] to [S69] are not displayed.
S064	**Section I - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section I - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S065	**Machine head section speed I** 	200 to 3500	sti/min	
S066	**Shirring changeover position I (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S67] to [S69] are not displayed.
S067	**Section J - Shirring amount** 	0 to 8.0	mm	2.5 Displayed when "absolute value display" is selected in [U06] Shirring display.
	Section J - Shirring ratio 	0 to 200	Percent	110 Displayed when "percentage display" is selected in [U06] Shirring display.
S068	**Machine head section speed J** 	200 to 3500	sti/min	
S069	**Shirring changeover position J (number of stitches)** 	0 to 9999	Number of stitches	0

No.	Item	Setting ange	Unit	Initial value
S080	**Section A - Upper manipulator pressure** 	0 to 200	No unit	100
S081	**Section A - Lower manipulator pressure** 	0 to 200	No unit	100
S082	**Upper/lower manipulator pressure change-over position A (number of stitches)** 	0 to 9999	Number of stitches	0
S083	**Section B - Upper manipulator pressure** 	0 to 200	No unit	100
S084	**Section B - Lower manipulator pressure** 	0 to 200	No unit	100
S085	**Upper/lower manipulator pressure change-over position B (number of stitches)** 	0 to 9999	Number of stitches	0
S086	**Section C - Upper manipulator pressure** 	0 to 200	No unit	100
S087	**Section C - Lower manipulator pressure** 	0 to 200	No unit	100
S088	**Upper/lower manipulator pressure change-over position C (number of stitches)** 	0 to 9999	Number of stitches	0
S089	**Section D - Upper manipulator pressure** 	0 to 200	No unit	100
S090	**Section D - Lower manipulator pressure** 	0 to 200	No unit	100
S091	**Upper/lower manipulator pressure change-over position D (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S92] to [S109] are not displayed.
S092	**Section E - Upper manipulator pressure** 	0 to 200	No unit	100
S093	**Section E - Lower manipulator pressure** 	0 to 200	No unit	100
S094	**Upper/lower manipulator pressure change-over position E (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S95] to [S109] are not displayed.
S095	**Section F - Upper manipulator pressure** 	0 to 200	No unit	100
S096	**Section F - Lower manipulator pressure** 	0 to 200	No unit	100
S097	**Upper/lower manipulator pressure change-over position F (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S98] to [S109] are not displayed.
S098	**Section G - Upper manipulator pressure** 	0 to 200	No unit	100

No.	Item	Setting ange	Unit	Initial value
S099	**Section G - Lower manipulator pressure** 	0 to 200	No unit	100
S100	**Upper/lower manipulator pressure change-over position G (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S101] to [S109] are not displayed.
S101	**Section H - Upper manipulator pressure** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S101] to [S109] are not displayed.
S102	**Section H - Lower manipulator pressure** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S101] to [S109] are not displayed.
S103	**Upper/lower manipulator pressure change-over position H (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S104] to [S109] are not displayed.
S104	**Section I - Upper manipulator pressure** 	0 to 200	No unit	100
S105	**Section I - Lower manipulator pressure** 	0 to 200	No unit	100
S106	**Upper/lower manipulator pressure change-over position I (number of stitches)** 	0 to 9999	Number of stitches	0 When the number of stitches is set at 0 (zero), data items [S107] to [S109] are not displayed.
S107	**Section J - Upper manipulator pressure** 	0 to 200	No unit	100
S108	**Section J - Lower manipulator pressure** 	0 to 200	No unit	100
S109	**Upper/lower manipulator pressure changeover position J (number of stitches)** 	0 to 9999	Number of stitches	0
S120	**Speed of stitch of the machine head after the detection of material end** 	200 to 3500	sti/min	1500
S130	**Selection of stacker operation**	—	—	Stop This item is not displayed when MEMORY switch [U10] is set to "Without stacker."
	Stop 			
	Operate 			

No.	Item	Setting ange	Unit	Initial value
S131	**Stacker operating position** 	0 to 999	No unit	0 This item is not displayed when MEMORY switch [U10] is set to "Without stacker."
S132	**Selection of the number of times of stacker operation** 	1 to 10	No unit	1 This item is not displayed when MEMORY switch [U10] is set to "Without stacker."

13. Copying sewing pattern



It is possible to copy the sewing data of the already-registered pattern No. to an unregistered pattern No. Copy of the sewing pattern by overwriting is prohibited. If you want to overwrite the existing pattern data, erase that pattern first. Then, carry out overwriting.

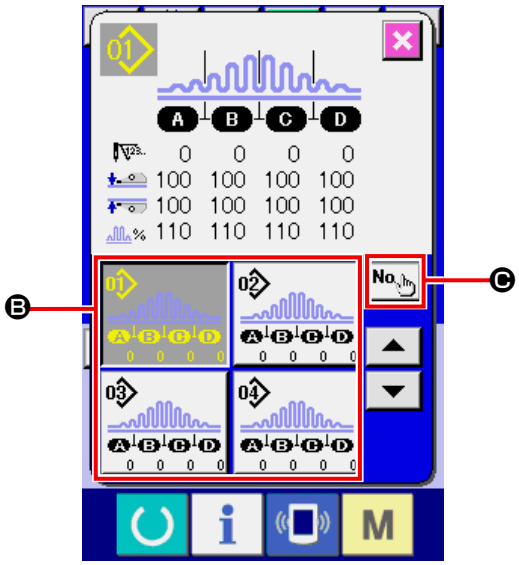
→ Refer to **"VI-4. Selecting a pattern" p.46**.

① **Display the data input screen.**

Only on the data input screen (blue), the sewing data can be changed. In the case the sewing screen (green) is displayed, press READY key to display the data input screen (blue).

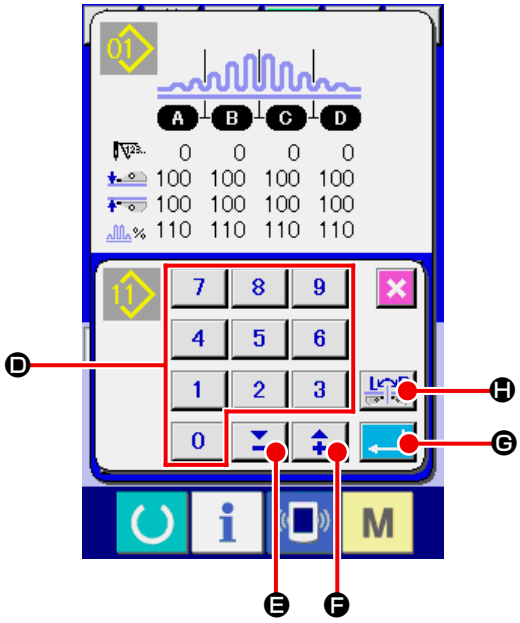
② **Calling up the pattern copy screen.**

When you press PATTERN COPY button (Ⓐ), the pattern copy (copy source selection) screen is displayed.



③ **Select the source pattern No. for copying.**

Select a source pattern No. from PATTERN LIST buttons (Ⓑ). Then, press COPY DESTINATION INPUT button (Ⓒ) to display the copy destination input screen.



④ **Input the pattern No. of copy destination.**

Input a copy destination pattern No. with the numeric keypad (Ⓓ). It is possible to retrieve an unused pattern No. with -/+ buttons (Ⓔ, Ⓕ). It is possible to select whether or not the data is copied with its right and left portions changed over with RIGHT/LEFT CHANGE-OVER key (Ⓗ).

⑤ **Start copying.**

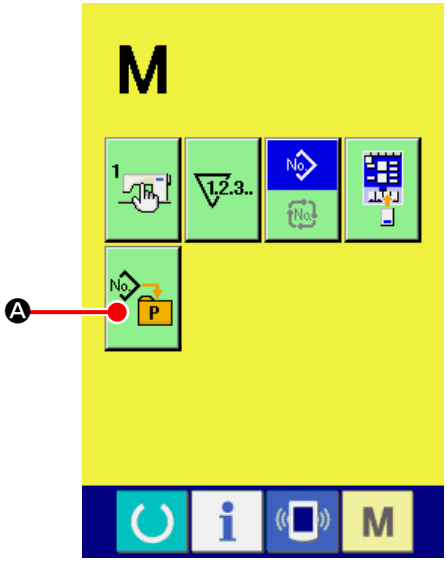
When you press ENTER button (Ⓖ), copying is started. Approximately two seconds later, the screen returns to the pattern copy (copy source selection) screen while displaying the copied pattern No. in the selected state.

If you have input the existing pattern No. and press the ENTER button, the error screen will be displayed.

14. Registering the direct pattern

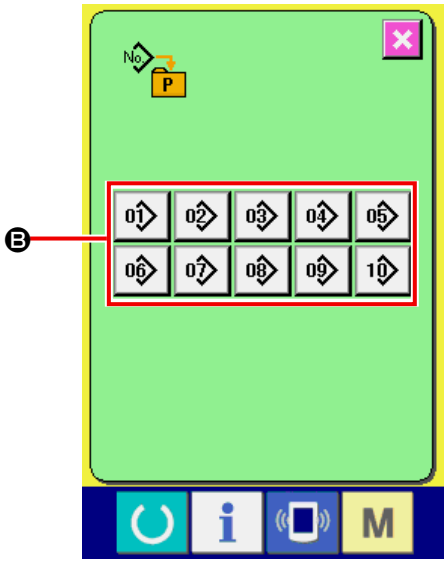
It is recommended to register the pattern No. you use frequently with the PATTERN DIRECT button.
Once you have registered a pattern No. with the PATTERN DIRECT button, you can select the pattern No. with ease only by pressing that button.

14-1. Registration procedure



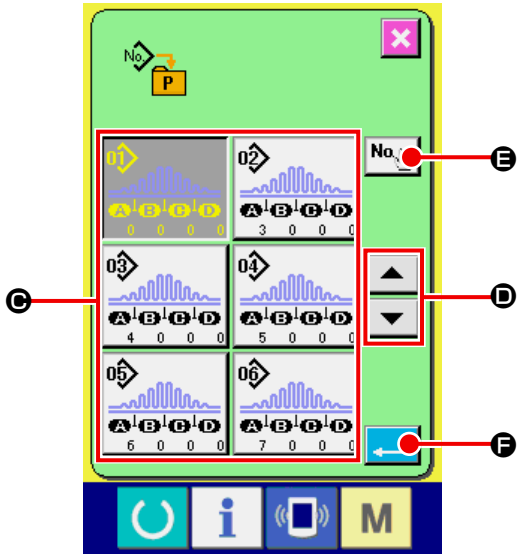
① **Displaying the direct pattern registration screen.**

When you press M key, DIRECT PATTERN REGISTRATION button (Ⓐ) is displayed on the screen. The direct pattern registration screen is displayed by pressing this button.



② **Selecting the button to be used for registration.**

As many as 10 direct patterns can be registered. Ten direct patterns (Ⓑ) are displayed on the screen. When you press the button displayed at a desired location on the screen, the pattern No. list screen is displayed.

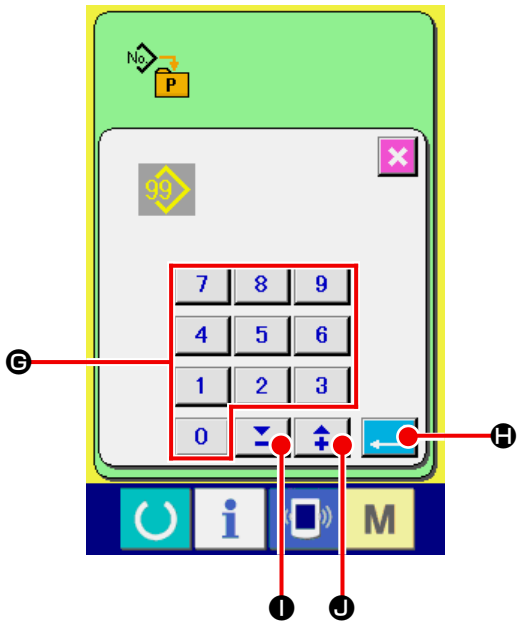


③ **Selecting the pattern No. to be registered.**

Select the pattern No. you want to register from among the PATTERN No. buttons (Ⓒ). If you press the PATTERN No. button you have selected again, your selection will be canceled. The PATTERN No. button (Ⓒ) will be changed over in sequence by pressing the UP/DOWN SCROLL buttons (Ⓓ).

When you press PATTERN No. INPUT button No. (Ⓔ), the pattern No. input screen is displayed.

Select the pattern you want to register. Then, press ENTER button ↵ (Ⓕ)to register the pattern you have selected.



④ **Input the pattern No.**

When you press PATTERN No. INPUT button (Ⓔ), the pattern No. input screen is displayed. On this screen, you can directly input the number you want to select with the numeric keypad.

Input the pattern No. with numeric keypad (Ⓖ).

It is also possible to retrieve an existing pattern No. with -/+ buttons (Ⓘ, Ⓙ).

When you press ENTER button ↵ (Ⓗ), the pattern No. you have specified is selected.

If you have input unregistered pattern No. and press the ENTER button, the error screen will be displayed.

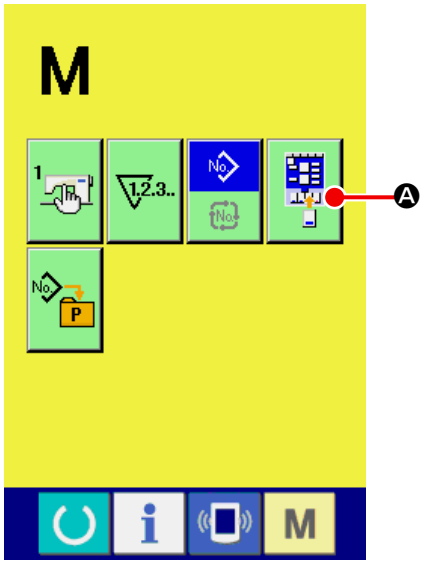
14-2. State of registration at the time of purchase

Pattern Nos. 1 to 3 have been factory-registered at the time of purchase.

15. Registering the sewing data with the CUSTOMIZATION button

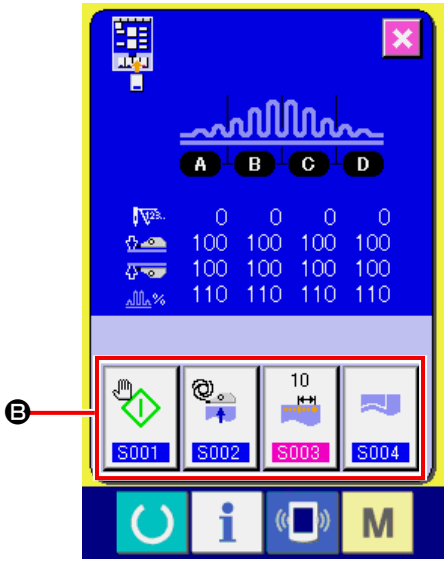
It is recommended to register the parameter you use frequently with the CUSTOMIZATION button.
Once you have registered a parameter with the CUSTOMIZATION button, you can call up the change screen for the registered parameter only by pressing that button on the data input screen.

15-1. Registration procedure



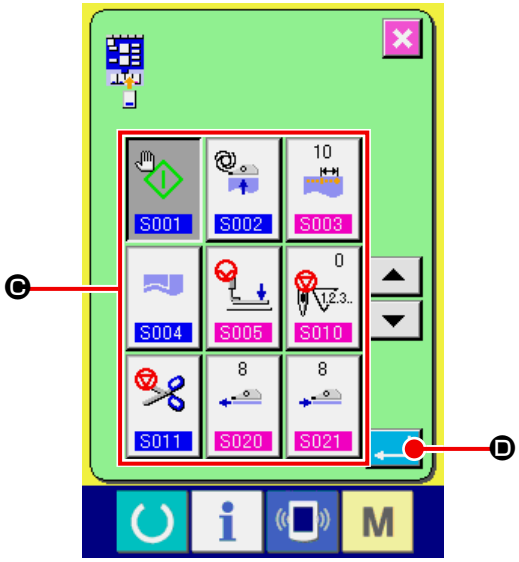
① **Displaying the customization pattern registration screen.**

When you press M key, the CUSTOMIZATION PATTERN REGISTRATION button is displayed on the screen. The customization pattern registration screen is displayed by pressing this button.



② **Selecting the button to be used for registration.**

As many as four CUSTOMIZATION buttons can be registered. Four CUSTOMIZATION REGISTRATION buttons (Ⓑ) are displayed on the screen. When you press the button displayed at a desired location on the screen, the sewing data list screen is displayed.



③ **Selecting the sewing data to be registered.**
Select the sewing data you want to register by means of the SEWING DATA button (Ⓒ). If you press the button you have selected again, you selection will be cancelled.

④ **Registering the sewing data with the CUSTOMIZATION button.**
When you press ENTER button (Ⓓ), registration of the sewing data is completed and the CUSTOMIZATION button registration screen is displayed. The sewing data you have registered is displayed on the CUSTOMIZATION button.

15-2. State of registration at the time of purchase

At the time of purchase, the following four parameters have been factory-registered in the order from left to right.

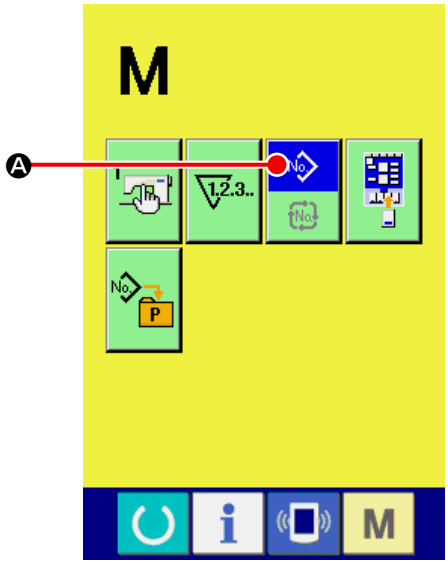
S001 Start mode

S002 Automatic material alignment

S003 Sewing end distance

S004 Changeover of the number of plies of material

16. Changing sewing mode



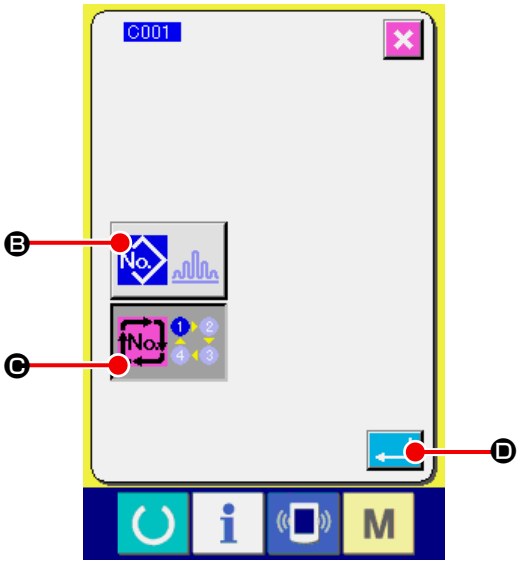
① **Displaying the sewing mode selection screen.**

When you press M key, SEWING MODE SELECT button (Ⓐ) is displayed on the upper part of the screen. The sewing mode selection screen is displayed by pressing this button.

The appearance of the SEWING MODE SELECT button differs with the currently-selected sewing mode.

Independent sewing button :

In the case cycle sewing is selected :



② **Select the sewing mode.**

Select the sewing mode you want to use for sewing.

Independent sewing button (Ⓑ) :

In the case cycle sewing is selected (Ⓒ) :

③ **Determine the sewing mode.**

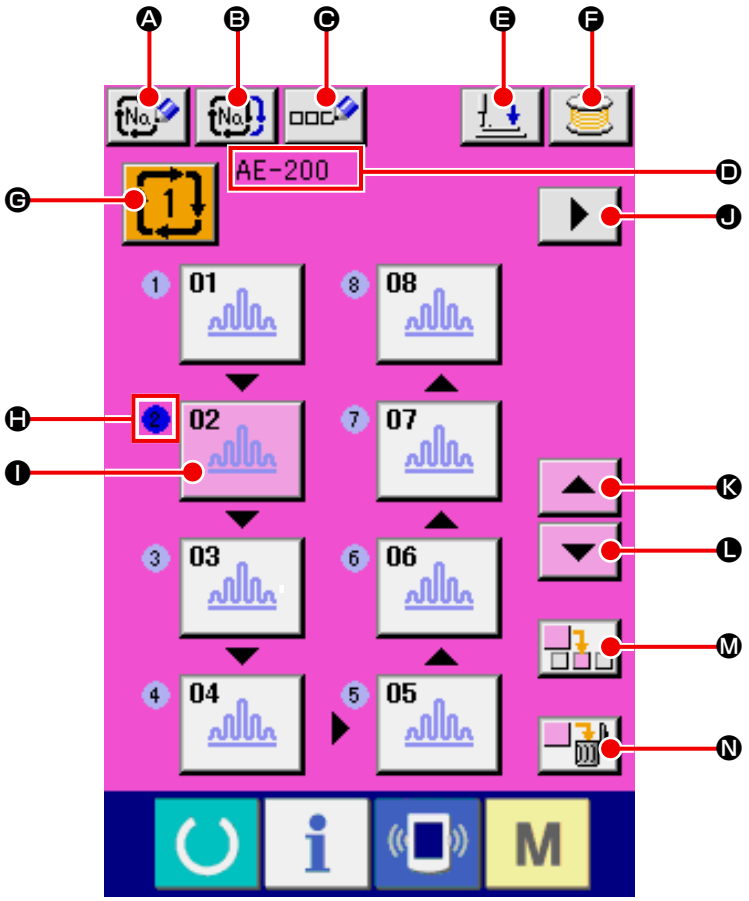
When you press ENTER button (Ⓓ), the sewing mode changing procedure is terminated. When you press M key, the data input screen is displayed under the sewing mode you have selected.

17. On the LCD display for cycle sewing

This sewing machine is able to carry out two or more pieces of sewing pattern data cyclically in sequence. As many as 30 patterns can be input. Use the cycle sewing when you sew several patterns that differ in shape on a sewing product. In addition, as many as 20 cycles can be registered. Register a new sewing pattern or copy an existing sewing pattern as appropriate.

→ Refer to **"VI-11. Registering a new sewing pattern" p.59** and **"VI-13. Copying sewing pattern" p.69** .

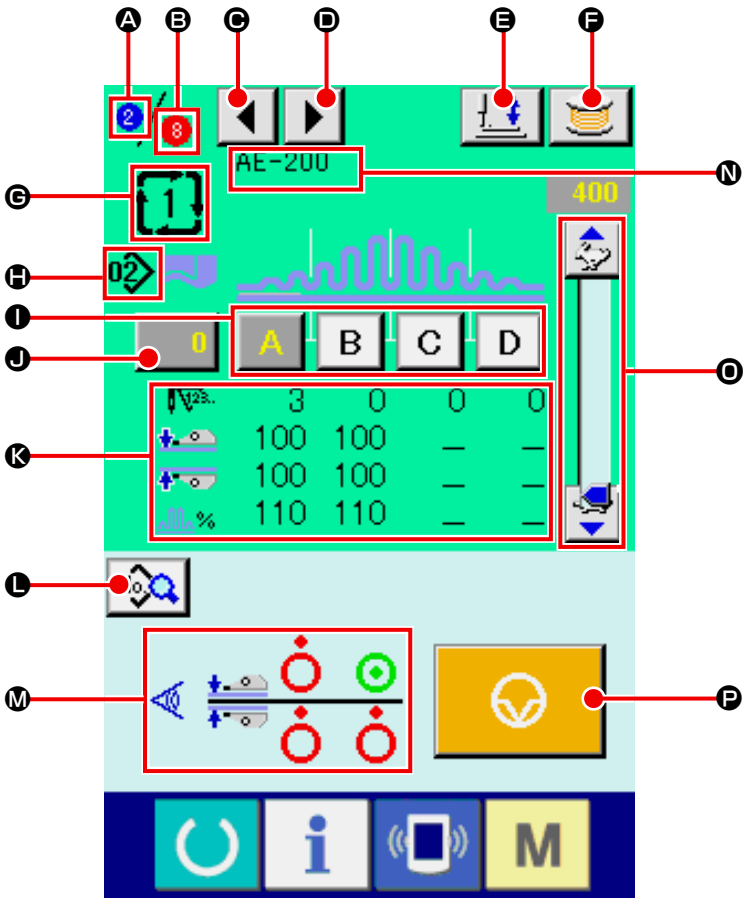
17-1. Data input screen



	Button and display	Description
Ⓐ	NEW CYCLE DATA REGISTRATION button	To be used to display the new cycle data No. registration screen.
Ⓑ	CYCLE DATA COPY button	To be used to display the cycle data No. copy screen.
Ⓒ	CYCLE DATA NAME INPUT button	To be used to display the cycle data name input screen. → Refer to **"VI-5. Naming the pattern" p.48** .
Ⓓ	Cycle data name display	The name entered to the currently-selected cycle data is displayed in this field.
Ⓔ	PRESSER DOWN button	To be used to display the presser foot lowering screen. The needle is moved to the right. To raise the presser, press the presser up button displayd in the presser down screen. * When performing threading in this state, turn OFF the power before performing.
Ⓕ	BOBBIN WINDING button	Bobbin thread can be wound. → Refer to **"VI-7. Winding a bobbin" p.51** .

	Button and display	Description
Ⓖ	CYCLE DATA No. SELECT button	To be used to display the currently-selected cycle data number on the button. When this button is pressed, the cycle data No. change screen is displayed.
Ⓗ	Sewing order display	The sewing order of the pattern data you have input is displayed. The pattern to be sewn firstly after the screen is changed over to the sewing screen is displayed in blue. * The button and display H and I are displayed by the number of patterns you have input.
Ⓘ	PATTERN SELECT button	The pattern No. and type of pattern you have registered are displayed on the button according to the "H: Sewing order display". When this button is pressed, the pattern selection screen is displayed. * The button and display H and I are displayed by the number of patterns you have input.
Ⓙ	NEXT PAGE DISPLAY button	This button is displayed in the case the number of patterns registered with the cycle data is eight or more.
Ⓚ	UP SCROLL button	To be used to select the one previous pattern No.
Ⓛ	DOWN SCROLL button	To be used to select the next pattern No.
Ⓜ	STEP INSERT button	To be used to insert a step just before the currently-selected pattern No.
Ⓝ	STEP DELETE button	To be used to delete the currently-selected step.

17-2. Sewing screen



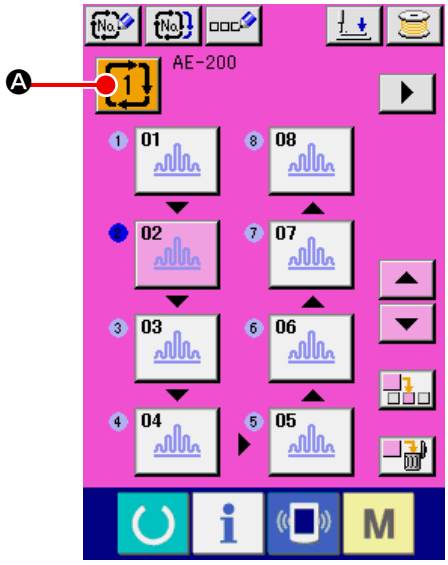
	Button and display	Description
Ⓐ	Sewing order display	The sewing order of the currently-sewn pattern is displayed in this field.

	Button and display	Description
Ⓑ	Total number of registered pattens display	The total number of patterns registered with the currently-sewn cycle number is displayed.
Ⓒ	SEWING ORDER RETURN button	To be used to display the cycle data name input screen. → Refer to **"VI-5. Naming the pattern" p.48** .
Ⓓ	SEWING ORDER PROCEED button	To be used to proceed the pattern to be sewn
Ⓔ	PRESSER DOWN button	Presser down screen is displayed and the needle moves to the right side. To raise the presser, press the presser up button displayd in the presser down screen. * When performing threading in this state, turn OFF the power before performing.
Ⓕ	BOBBIN WINDING button	Bobbin thread can be wound. → Refer to **"VI-7. Winding a bobbin" p.51** .
Ⓖ	Cycle data No. display	The cycle data number that is currently sewn is displayed in this field.
Ⓗ	Pattern No. display	The pattern No. that is currently sewn is displayed in this field.
Ⓘ	PATTERN SECTION button	The pattern data that is currently sewn. → Refer to **"VI-6. Sewing data editing function" p.49** .
Ⓙ	COUNTER VALUE CHANGE button	To be used to display the current counter value on the button. The counter value change screen is displayed by pressing this button. → Refer to **"VI-8. Using counter" p.53 .**
Ⓚ	Sewing data display	The currently-sewn pattern data is displayed in this field. • Number of stitches for section • Pressure values of the upper and lower manipulators • Upper shirring amount
Ⓛ	SEWING DATA CHANGE button	To be used to display the sewing data change screen for the pattern data that is input at the cursor position.
Ⓜ	Manipulator sensor status	The manipulator sensor status during sewing is displayed.
Ⓝ	Cycle data name display	The name input in the currently-sewn cycle data is displayed in this field.
Ⓞ	SPEED VARIABLE RESISTOR	The number of revolutions of the sewing machine can be changed with this variable resistor.
Ⓟ	TEMPORARY STOP button	To be pressed to stop the sewing machine.

18. Performing the cycle sewing

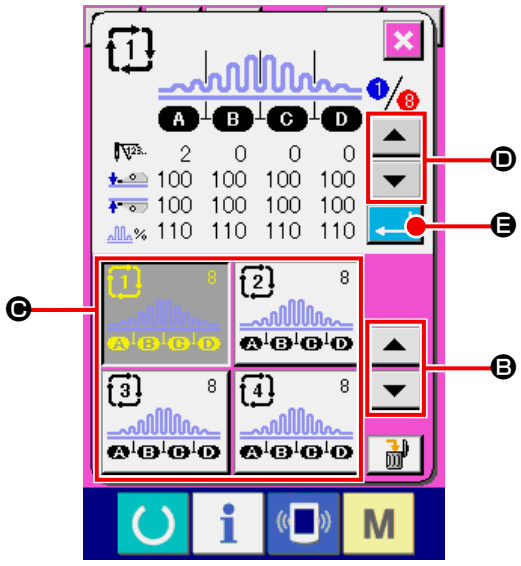
Firstly, change the sewing mode to the cycle sewing mode before starting setting of the cycle sewing data.
→ Refer to **"VI-16. Changing sewing mode" p.75** .

18-1. Selection of cycle data



① **Display the data input screen.**
The cycle data number can be selected only on the data input screen (pink). In the case the sewing screen (green) is displayed, press READY key to display the data input screen (pink).

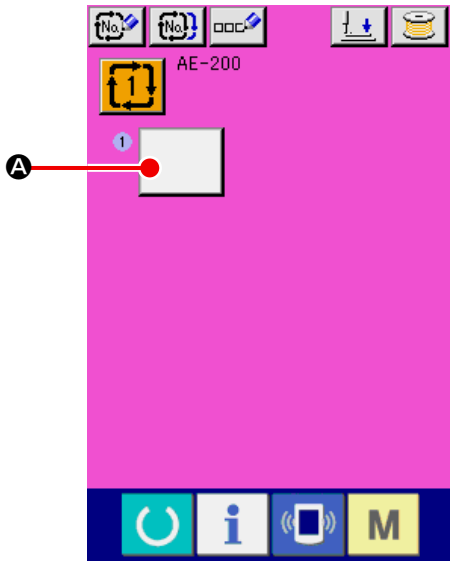
② **Calling up the cycle No. selection screen.**
When you press CYCLE DATA No. button (Ⓐ), the cycle data No. selection screen is displayed. The currently-selected cycle data number and its content are displayed on the upper part of the screen. Other CYCLE DATA No. buttons that you have registered are displayed on the lower part of the screen.



③ **Selecting the cycle data number.**
When you press UP/DOWN SCROLL buttons (Ⓑ), the registered CYCLE DATA No. button (Ⓒ) is changed over in sequence.
In this state, press CYCLE DATA No. button (Ⓒ) you want to select.
When you press STEP CHECK button (Ⓓ), the stitch shape or other data on the sewing pattern you have registered with cycle data is changed over and displayed in sequence.

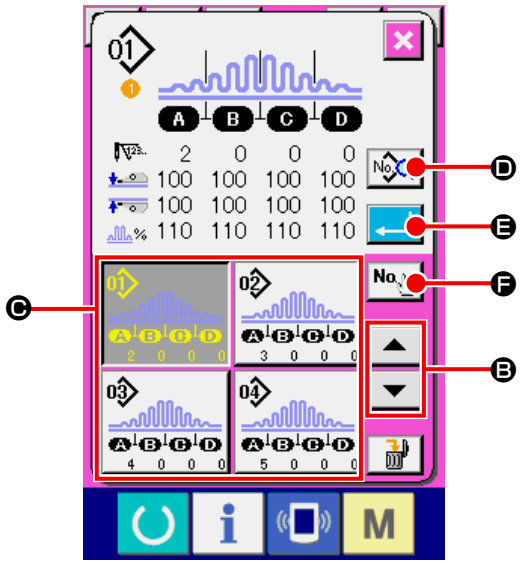
④ **Confirming the cycle data number.**
When you press ENTER button (Ⓔ), the cycle data No. selection screen is closed to terminate the cycle data number selection procedure.

18-2. Editing procedure of the cycle sewing



① **Display the data input screen.**
Cycle data can be input only on the data input screen (pink). In the case the sewing screen (green) is displayed, press READY key to display the data input screen (pink).
In the initial state of the sewing machine, no pattern No. has been registered. Therefore, the first PATTERN SELECT button is displayed in blank.

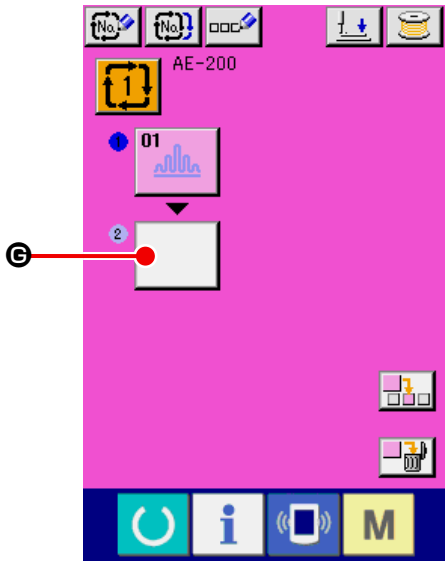
② **Calling up the cycle No. selection screen.**
When you press PATTERN SELECT button (Ⓐ), the pattern No. selection screen is displayed.



③ **Selecting the cycle data number.**
When you press UP/DOWN SCROLL buttons (Ⓑ), the registered PATTERN No. button (Ⓒ) is changed over in sequence.
It is also possible to display the pattern No. input screen with NUMERIC INPUT button (Ⓕ) and directly enter a pattern No.. The content of the pattern data is displayed o the button. In this state, press the PATTERN No. button you want to select.

④ **Editing sewing data of the pattern.**
When you press SEWING DATA EDIT button (Ⓓ), the sewing data screen is displayed to allow you to edit sewing data of the currently-selected pattern.

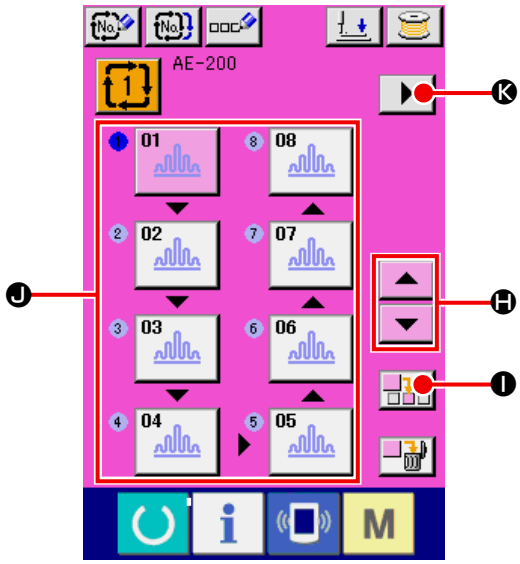
⑤ **Editing sewing data of the pattern.**
When you press ENTER button (Ⓔ), the pattern No. selection screen is closed to terminate the pattern No. selection procedure.



⑥ **Repeating steps ② to ④ by the number of cycle patterns you want to register.**

Upon completion of registration of the first cycle pattern, second PATTERN SELECT button  (Ⓖ) is displayed.

Repeat steps ② to ④ by the number of cycle patterns you want to register.



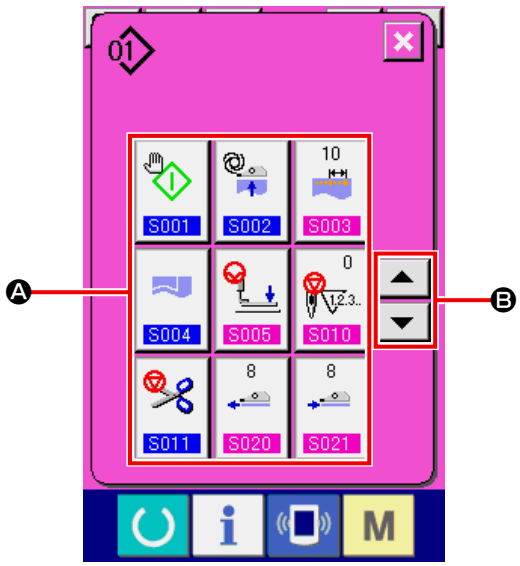
⑦ **Selecting the cycle data number.**

You can select the PATTERN No. button by pressing UP/DOWN SCROLL buttons (Ⓗ). The PATTERN No. button you have selected is displayed in pink as  .

When you press PATTERN No. INSERT button  (Ⓘ), a step is inserted before the currently-selected pattern No. (displayed in pink).
If you press the currently-displayed PATTERN No. button (Ⓙ) to select another pattern No., the pattern No. will be changed over.

In the case the cycle data you have created extends to multiple screens, the next screen can be displayed with SCREEN SCROLL button  (Ⓚ).

18-3. Editing the currently-selected sewing data in cycle data



① **Calling up the cycle data No. selection screen.**

Carry out steps ① to ④ as described in **"VI-18-2. Editing procedure of the cycle sewing" p.80** to display the screen for editing the pattern sewing data.

② **Selecting the sewing data to be changed.**

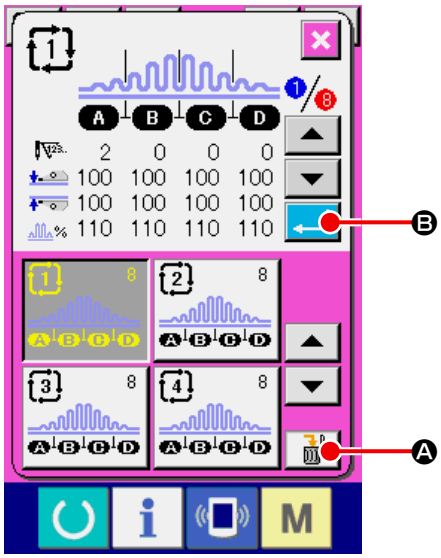
Press UP/DOWN SCROLL buttons ▲ ▼ (Ⓑ) to select DATA ITEM button (Ⓐ) you want to change. Be aware that the data item that is not used because of the sewing pattern shape and that is set to "No function" are not displayed.

③ **Changing the data.**

There are two types of sewing data such as the data item the value of which is to be changed and the data item a pictograph for which is to be selected. For the data item the value of which is to be changed is attached with the number, highlighted in pink, as S003 . Its set value can be changed with the +/- button displayed on the change screen. For the data item a pictograph for which is to be selected is attached with the number, highlighted in blue, as S002 . For this type of data item, you can select one from the pictographs displayed on the change screen.

→ Refer to **"VI-12. Sewing data list" p.60** for details of the sewing data.

18-4. Method for deleting the cycle data



① **Calling up the cycle data No. selection screen.**

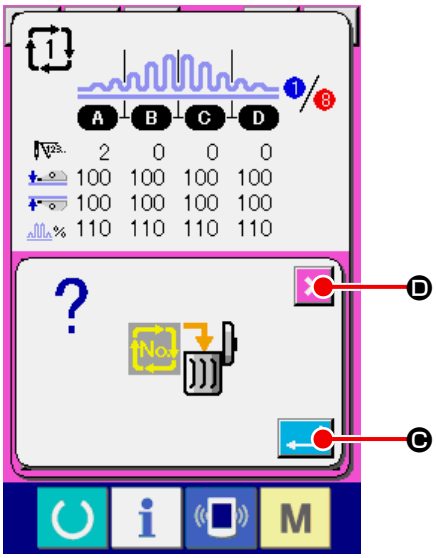
Carry out steps ① to ③ as described in **"VI-18-1. Selection of cycle data" p.79** to display the screen for editing the pattern sewing data.

② **Deleting the cycle data.**

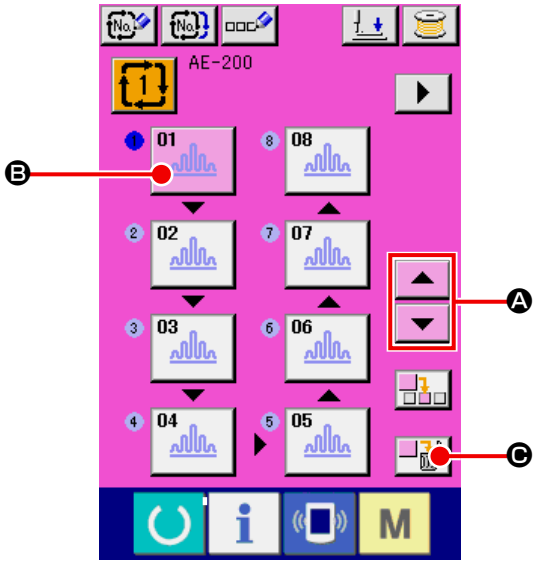
When you press DATA DELETE button  (Ⓐ), the cycle data deletion confirmation popup appears on the screen.

When you press ENTER button  (Ⓒ) in this state, the cycle data step you have selected is deleted.

If you press CANCEL button  (Ⓓ), the screen will return to the cycle data selection screen without deleting the cycle data you have selected.



18-5. Method for deleting a step of the cycle data

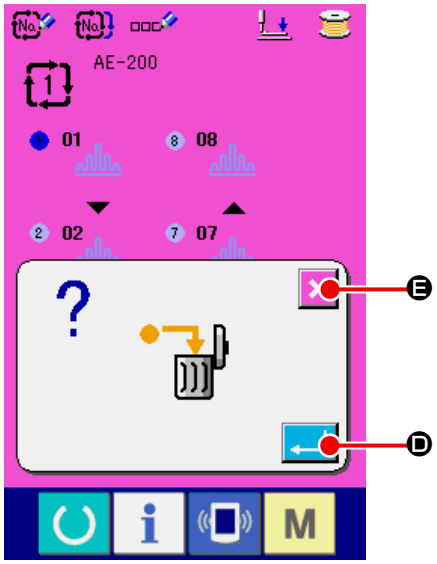


① **Selecting the cycle data No. selection screen.**

Carry out steps ① to ② as described in **"VI-18-1. Selection of cycle data" p.79** to place the cycle data that contains the step you want to delete in the selected state.

② **Displaying the pattern No. selection screen.**

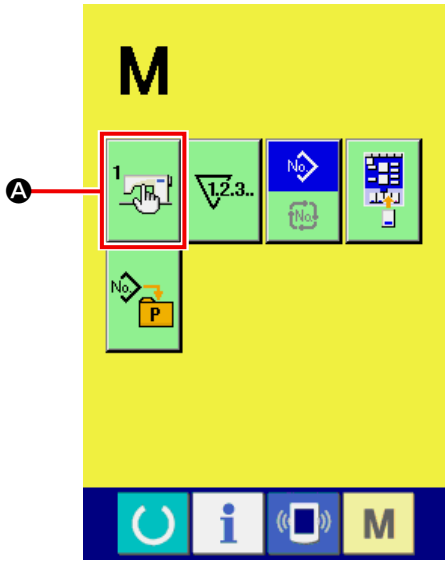
Press UP/DOWN SCROLL buttons (Ⓐ) to place the PATTERN SELECT button for the step you want to delete in selected state 01 (Ⓑ). In this state, the data step deletion popup is displayed by pressing STEP DELETE button (Ⓒ).



③ **Deleting the step in the selected cycle data.**

When you press ENTER button (Ⓓ), the cycle data step you have selected is deleted. If you press CANCEL button (Ⓔ), the screen will return to the cycle data selection screen without deleting the cycle data you have selected.

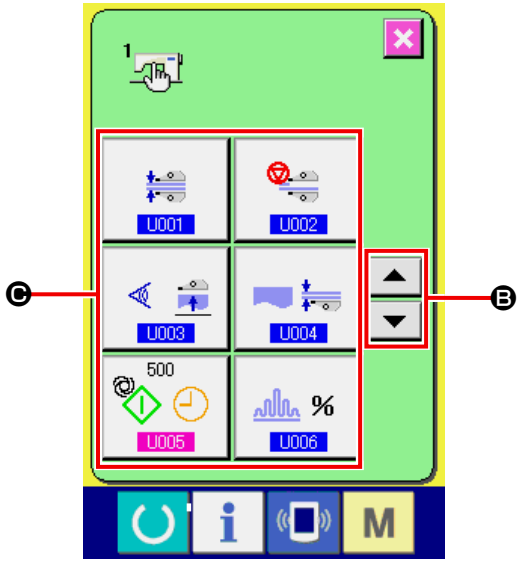
19. Changing the memory switch data



① **Display the data input screen.**

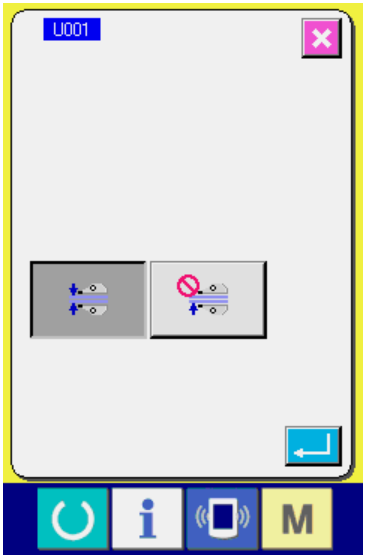
When you press M key, MEMORY switch button (Ⓐ) is displayed on the screen.

When you press this button, the memory switch data list screen is displayed.



② **Selecting the MEMORY switch button you want to change.**

Press UP/DOWN SCROLL button (Ⓑ) to select the DATA ITEM button (Ⓒ) you want to change.



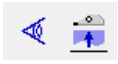
③ Changing the MEMORY switch data.
There are two types of MEMORY switch data such as the data item the value of which is to be changed and the data item a pictograph for which is to be selected. For the data item the value of which is to be changed is attached with the number, highlighted in pink, as S005 . Its set value can be changed with the +/- button displayed on the change screen. For the data item a pictograph for which is to be selected is attached with the number, highlighted in blue, as U001 . For this type of data item, you can select one from the pictographs displayed on the change screen.

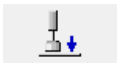
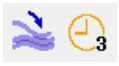
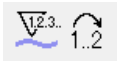
→ Refer to **"VI-20. List of memory switch data" p.87** for details of the MEMORY switch data.

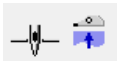
20. List of memory switch data

20-1. Level 1

Memory switch data (Level 1) are the operation data shared by sewing machines. They are common to all sewing patterns.

No.	Item	Setting range	Unit	Initial value
U001	**Selection of the manipulator operation**	—	—	Manipulator is operative
	Manipulator is operative 			
	Manipulator is inoperative 			
U002	**Selection of the operation at sewing end**	—	—	Standard operation
	Standard operation Sewing machine finishes sewing regardless of the material end sensor 			
	When no lower cloth remains on the sewing machine though the material end sensor is detecting the material, the sewing machine stops after thread trimming without sewing back tack stitches. 			
U003	**Selection of the material placement condition**	—	—	The sensor assumes that the material is placed on the sewing machine only when the material is inserted under the sensor until it will go no further.
	The sensor assumes that the material is placed on the sewing machine only when the material is inserted under the sensor until it will go no further. 			
	The sensor assumes that the material is placed on the sewing machine when the material is placed just before the sensor. 			
U004	**Selection of one piece sewing mode**	—	—	Lower manipulator
	Lower manipulator (normal) 			
	One piece of material is sewing using the upper manipulator. 			
U005	**Automatic starting time** 	100 to 500	msec	500
U006	**Changeover of shirring display**	—	—	Displayed in percent figures
	Absolute value display Shirring amount (mm) is displayed using sewing data items [S40, S43, S46, S49, S52, S55, S58, S61, S64 and S67]. The shirring amount does not change even if the bottom feed amount is changed by means of the dial. 			
	Percentage display (with respect to the bottom feed amount) Shirring ratio (%) is displayed using sewing data items [S40, S43, S46, S49, S52, S55, S58, S61, S64 and S67]. If the bottom feed amount is changed by means of the dial, the shirring amount will be automatically changed to the value corresponding to the preset ratio (%). 			

No.	Item	Setting range	Unit	Initial value
U007	**Selection of the material presser operation**	—	—	The material presser operates.
	The material presser operates when the stacker operates. 			
	The material presser operation is prohibited when the stacker operates. 			
U010	**Implementation/type of the stacker**	—	—	Without stacker When "Without stacker" is selected, the sewing data items [S130], [S131] and [S132] are not displayed.
	Without stacker 			
	Air stacker is implemented 			
	Standard bar stacker is implemented 			
U011	**Stacker timer 1** 	0.0 to 9.9	0.1 sec	0.5 This item is not displayed when the stacker is set to "Without stacker."
U012	**Stacker timer 2** 	0.0 to 9.9	0.1 sec	0.5 This item is not displayed when the stacker is set to "Without stacker."
U013	**Stacker timer 3** 	0.0 to 9.9	0.1 sec	1.5 This item is not displayed when the stacker is set to "Without stacker."
U015	**Soft start speed setting for the 1st stitch** 	200 to 3500	sti/min	800
U016	**Soft start speed setting for the 2nd stitch** 	200 to 3500	sti/min	800
U017	**Soft start speed setting for the 3rd stitch** 	200 to 3500	sti/min	2000
U018	**Soft start speed setting for the 4th stitch** 	200 to 3500	sti/min	3000
U019	**Soft start speed setting for the 5th stitch** 	200 to 3500	sti/min	3500
U020	**Counter updating unit** 	1 to 30	No unit	1
U021	**Selection of with/without the bobbin thread remaining amount detection**	—	—	Without the bobbin thread remaining amount detecting device
	Without the bobbin thread remaining amount detecting device 			
	The bobbin thread remaining amount detecting device is implemented. 			

No.	Item		Setting range	Unit	Initial value
U022	**Number of times of bobbin thread remaining amount detection** 		0 to 19	Number of times	1 In the case the bobbin thread remaining amount detecting function is disabled, the error popup screen will not be displayed.
U023	**Selection of thread breakage detecting operation**		—	—	Without the bobbin thread remaining amount detecting device
	Without the bobbin thread remaining amount detecting device 				
	The bobbin thread remaining amount detecting device is implemented. 				
U024	**Lowering of needle at the material placement**		—	—	Material placement with the needle lifted
	Material placement with the needle lifted 				
	Material placement with the needle lowered (*1) If you press the START button before placement of the material on the sewing machine, the needle bar will come down. 				
U025	**Selection of section**		—	—	Shirring amount section and manipulator pressure section are identical.
	Shirring amount section and manipulator pressure section are identical. 				
	Shirring amount section and manipulator pressure section are separate. 				
U027	**Selection of the material presser timing**				The material presser operates after the sewing machine has sewn the predetermined number of stitches or after the sewing machine stops and carries out thread trimming.
	The material presser operates after the sewing machine has sewn the predetermined number of stitches or after the sewing machine stops and carries out thread trimming. 				
	The material presser operates when the material has moved out of the material sensor. 				
U500	**Language selection**	日本語	Japanese		Not selected (displayed in English)
		English	English		
		中文简体字	Simplified Chinese		
		Español	Spanish		
		Tiếng Việt	Vietnamese		

(*1) It is possible to place the material on the sewing machine using the needle bar as reference with the needle bar lowered. Since the needle bar stops when it has passed its lowest point, adjust the upper position of the presser foot. (Refer to **"VIII-1. Adjusting the presser foot lifting lever" p.159**.) When you press the START button after having place the material on the sewing machine, the sewing machine starts sewing.

20-2. Level 2

Memory switch data (level 2) can be edited when pressing MODE switch for as long as 6 seconds.

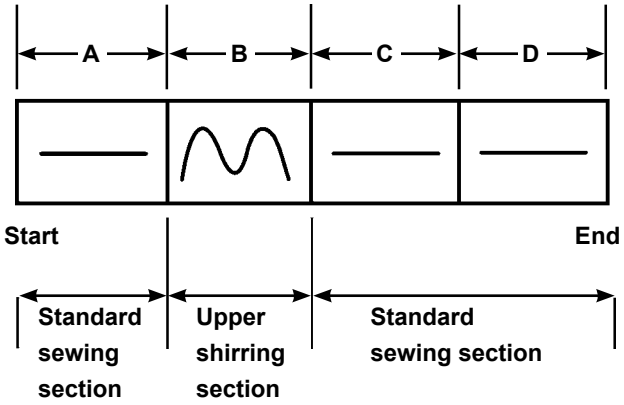
No.	Item	Setting range	Unit	Initial value
K002	**Setting of max. limited speed** 	200 to 3500	sti/min	3500
K004	**Waiting time for coming-down of the presser foot** 	0 to 100	msec	50
K005	**Manipulator pressure upper correction value** 	–30 to 30	—	0
K006	**Manipulator pressure lower correction value** 	–30 to 30	—	0
K007	**Setting of manipulator sensor type** 	0 to 3	—	0
K008	**Start of sewing - Machine head rotating speed for back tacking** 	200 to 1900	sti/min	800
K009	**End of sewing - Machine head rotating speed for back tacking** 	200 to 1900	sti/min	800
K010	**Number of correction stitches A for reverse-feed stitching at the start of sewing** 	0 to 5	Number of times	0
K011	**Number of correction stitches B for reverse-feed stitching at the start of sewing** 	0 to 5	Number of times	0
K012	**Number of correction stitches C for reverse-feed stitching at the end of sewing** 	0 to 5	Number of times	0
K013	**Number of correction stitches D for reverse-feed stitching at the end of sewing** 	0 to 5	Number of times	0
K014	**Correction angle A for back-tack solenoid output at the start of sewing** 	–36 to 36	×10 degrees	0
K015	**Correction angle B for back-tack solenoid output at the start of sewing** 	–36 to 36	×10 degrees	0
K016	**Correction angle D for back-tack solenoid output at the start of sewing** 	–36 to 36	×10 degrees	0
K017	**Set value for the needle bar stopping position** 	–50 to 50	Degrees	0

21. Setting the upper shirring

The upper shirring amount can be selected with MEMORY switch "U06" between two different methods; i.e., "Specify the top feed amount" (indicated in mm) and "Specify the percentage with respect to the bottom feed amount" (indicated in %).

It is possible to divide the upper shirring section into as many as 10 sections and specify the shirring amount for the respective sections separately.
At the same time, the machine head speed can be set separately for those sections.

Example: In the case only one section of a seam is shirred shirring



For the shirring amount, the "absolute value display" is to be selected in the data item "U06" and four sections A to D are to be used.

Number	Setting item	Set value	Remarks
S40	Section A - Shirring amount	2.5	Top feed amount should be set at 2.5 mm.
S41	Machine head section speed A	2500	The machine head speed should be set at 2,500 sti/min.
S42	Upper shirring changeover position A (the number of stitches)	40	40-stitches section
S43	Section B - Shirring amount	3.7	Top feed amount should be set at 3.7 mm.
S44	Machine head section speed B	2500	The machine head speed should be set at 2,500 sti/min.
S45	Upper shirring changeover position B (the number of stitches)	40	40-stitches section
S46	Section C - Shirring amount	2.5	Top feed amount should be set at 2.5 mm.
S47	Machine head section speed C	2500	The machine head speed should be set at 2,500 sti/min.
S48	Upper shirring changeover position C (the number of stitches)	20	20-stitches section
S49	Section D - Shirring amount	2.5	Top feed amount should be set at 2.5 mm.
S50	Machine head section speed D	3500	The machine head speed should be set at 3,500 sti/min.
S51	Upper shirring changeover position D (the number of stitches)	0	To the end

When the upper shirring changeover position (the number of stitches) is set at "0" the upper shirring section continues to the end. The sewing machine does not move to the next section.

22. Setting the manipulator pressure

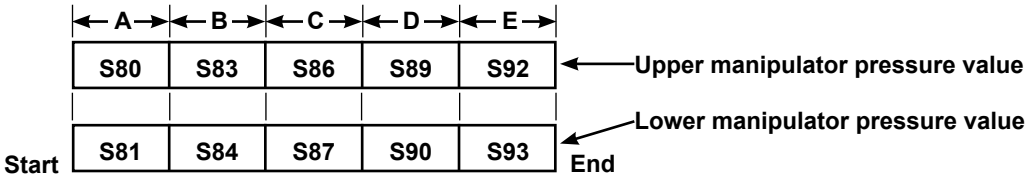
One seam can be divided into 10 upper/lower manipulator pressure section subsections at the maximum. The pressure value can be separately set for the respective sections.

Example: In the case one seam is sewn with the one same pressure

Number	Setting item	Set value	Remarks
S80	Section A - Upper manipulator pressure	85	The material is clamped with the pressure value 85.
S81	Section A - Lower manipulator pressure	98	The material is clamped with the pressure value 98.
S82	Manipulator pressure changeover position A (the number of stitches)	0	The section up to the end of sewing
S83	Section B - Upper manipulator pressure	xxx	Any value will do
S84	Section B - Lower manipulator pressure	xxx	Any value will do
S85	Manipulator pressure changeover position B (the number of stitches)	xxx	Any value will do
S86	Section C - Upper manipulator pressure	xxx	Any value will do
S87	Section C - Lower manipulator pressure	xxx	Any value will do
S88	Manipulator pressure changeover position C (the number of stitches)	xxx	Any value will do
S89	Section D - Upper manipulator pressure	xxx	Any value will do
S90	Section D - Lower manipulator pressure	xxx	Any value will do
S91	Manipulator pressure changeover position D (the number of stitches)	xxx	Any value will do

When the manipulator changeover position (the number of stitches) at "0," the manipulator pressure section continues to the end. The sewing machine does not move to the next section.

Example: In the case one seam is divided into five sections and those section are respectively sewn with different pressure values.

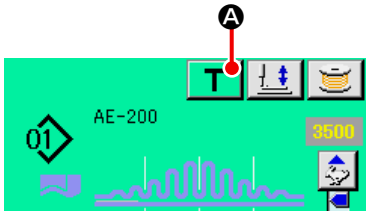


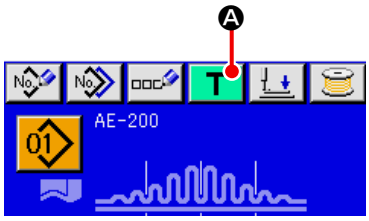
Number	Setting item	Set value	Remarks
S80	Section A - Upper manipulator pressure	85	The material is clamped with the pressure value 85.
S81	Section A - Lower manipulator pressure	98	The material is clamped with the pressure value 98.
S82	Manipulator pressure changeover position A (the number of stitches)	10	10-stitches section
S83	Section B - Upper manipulator pressure	80	
S84	Section B - Lower manipulator pressure	90	
S85	Manipulator pressure changeover position B (the number of stitches)	10	10-stitches section
S86	Section C - Upper manipulator pressure	0	Manipulator is raised.
S87	Section C - Lower manipulator pressure	0	Manipulator is raised.
S88	Manipulator pressure changeover position C (the number of stitches)	5	5-stitches section
S89	Section D - Upper manipulator pressure	80	
S90	Section D - Lower manipulator pressure	90	
S91	Manipulator pressure changeover position D (the number of stitches)	30	30-stitches section
S92	Section E - Upper manipulator pressure	85	
S93	Section E - Lower manipulator pressure	98	
S94	Manipulator pressure changeover position E (the number of stitches)	0	Section up to the end of sewing

When the manipulator changeover position D (the number of stitches) [S91] is set to some number of stitches (one or more), sections E [S92] to [S94] are displayed. When the manipulator changeover position (the number of stitches) at "0" the manipulator pressure section continues to the end. The sewing machine does not move to the next section.

23. Using the teaching

The teaching function is the function that enables checking of sewing by actually operating the sewing machine while changing the upper shirring amount and the upper/lower manipulator pressure.
The upper shirring amount and the upper/lower manipulator pressure according to which the sewing machine operated can be recorded on a section-by-section of the number of stitches basis.





① **Select the target pattern number for teaching.**
Select the pattern No. to be used for teaching on the pattern selection screen.

② **Displaying the teaching screen.**
When you press TEACHING button T (Ⓐ) on the individual sewing editing screen (blue) or individual sewing screen (green), the teaching screen is displayed.

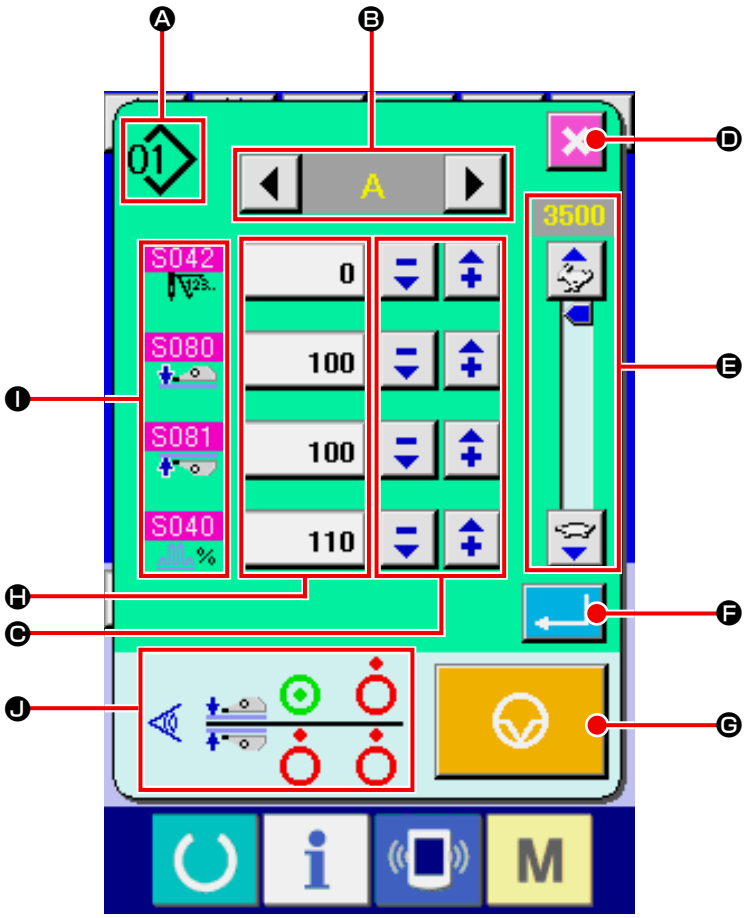
Because of the characteristics of the manipulator sensor, the sensor's detection status will be unstable if you turn ON the power to the sewing machine with a material placed on the sewing machine. To prevent the sensor from becoming unstable, carry out placement of the material as described below.

1. Be sure to press the TEACHING button(A) for the first time after turning ON the power to the sewing machine with no material placed on the sensor.

2. If LED blinks at a high speed or irregularly, remove the material from the sensor once. Then, re-place the material on the sensor to use the sewing machine.

23-1. Start teaching.

The teaching screen shown below is displayed. The backlight of the LCD display is green.
The number of stitches for all sections is 0 (zero).
Data on the upper/lower manipulator pressure value and the upper shirring amount which have already been recorded for the pattern selected for teaching are displayed.
The absolute value display and the percentage display can be changed over by selecting the shirring amount display U006 .When you press the START button after having placed the material on the sewing machine, the sewing machine head starts rotating and the number of stitches sewn in the relevant section is added. After the sensor detects the material end to allow the sewing machine to finish sewing, the number of stitches in the relevant section is cleared to "0" (zero).

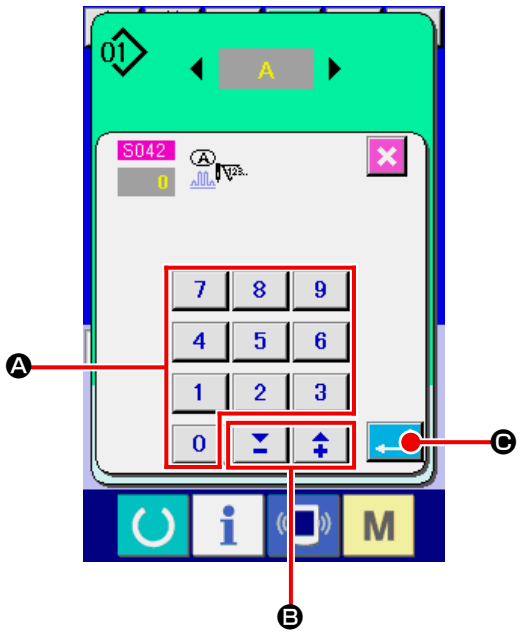


	Button and display	Description
Ⓐ	pattern No. display	To be used to display the target pattern No. for teaching.
Ⓑ	Section name display RIGHT/LEFT SCROLL buttons	To be used to display the target section for editing. The target section for editing can be selected by pressing these buttons.
Ⓒ	PLUS button MINUS button	The sewing data value can be changed by pressing these buttons.
Ⓓ	CANCEL button	When you press this button, the teaching screen is closed and the screen returns to the individual sewing screen.
Ⓔ	SPEED VARIABLE RESISTOR	The number of revolutions of the sewing machine can be changed with this variable resistor.
Ⓕ	ENTER button	When you press this button, the changed value in the sewing data list can be saved. Then, the teaching screen is closed and the screen returns to the individual sewing screen.
Ⓖ	TEMPORARY STOP button	The sewing machine can be stopped by pressing this button.
Ⓗ	SEWING DATA EDIT button	To be used to display the sewing data value. When you press this button, the sewing data input screen is displayed.
Ⓘ	Sewing data number display	To be used to display the sewing data number and pictographs.
Ⓙ	Sensor status display	To be used to display the sensor status.

23-2. Finish teaching

When you press ENTER button (Ⓕ), thread trimming is carried out, the respective data are confirmed and the teaching is terminated. If the teaching is terminated though the material end sensor does not detect that the material has moved out of the sensor (teaching is terminated by stopping the sewing machine during sewing), the total number of stitches for sections [A] to [J] will be set for sewing parameter S010 (Stop after total number of stitches).

When you press CANCEL button (Ⓓ), the sewing machine terminates the teaching after performing thread trimming and discarding the setting you have made.



[Using the sewing data screen]

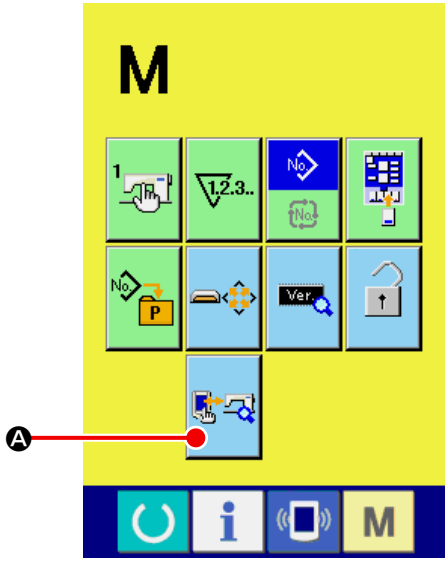
When you want to change the teaching sewing data value, input a desired value with the numeric keypad (Ⓐ).

It is possible to change the input value for each editing unit using -/+ button (Ⓑ).

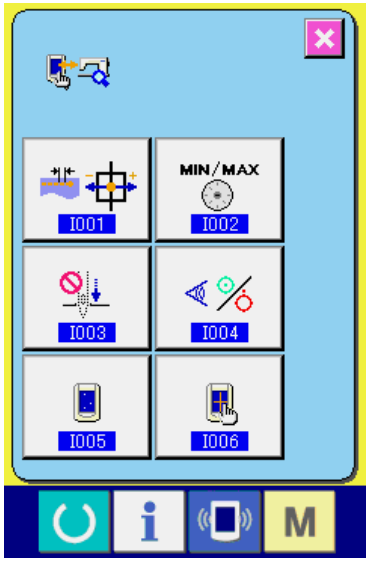
When you press ENTER button (Ⓒ), the teaching input data value is confirmed and the screen returns to the teaching screen.

24. Using check program

24-1. Displaying the check program screen



Press M key for three seconds, and CHECK PROGRAM button (Ⓐ) is displayed on the screen.
When this button is pressed down, the check program screen is displayed.



There are six check program items as described below.

Adjustment of the feed pitch
→ Refer to **"VI-24-2. Adjusting the feed pitch" p.97** .

Correction of the potentiometer for reading the bottom feed amount
→ Refer to **"VI-24-3. Correcting the bottom feed amount readout potentiometer" p.98** .

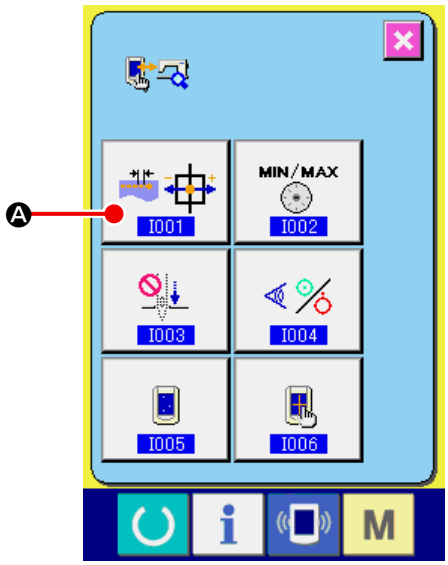
Main shaft motor belt replacement
→ Refer to **"VI-24-4. Replacing the main shaft motor belt" p.99** .

Sensor check
→ Refer to **"VI-24-5. Performing sensor check" p.100** .

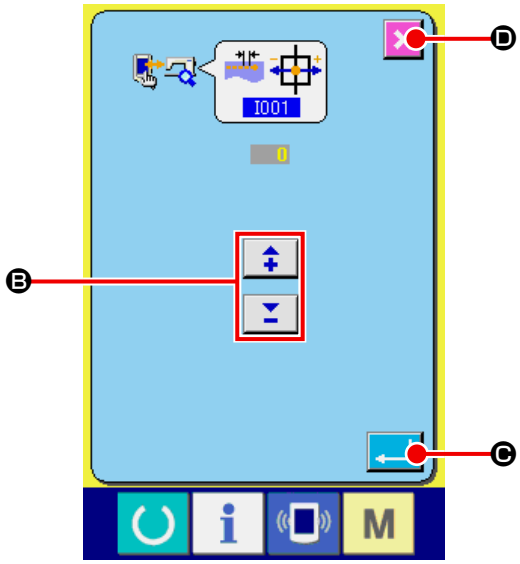
LCD check
→ Refer to **"VI-24-6.Performing LCD check" p.102** .

Touch panel compensation
→ Refer to **"VI-24-7. Performing touch panel compensation" p.103** .

24-2. Adjusting the feed pitch



① **Displaying the feed pitch adjustment screen.**
When you press TOP FEED PITCH ADJUSTMENT button  (Ⓐ) on the check program screen, the feed pitch adjustment screen is displayed.

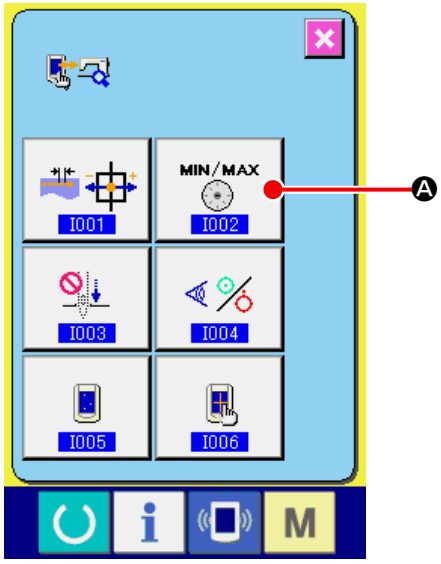


② **Adjusting the feed pitch.**
Feed pitch adjustment range : -10 to 10
Initial value of the feed pitch adjustment : 0

It is possible to change the input value for each editing unit with -/+ button  (Ⓑ). If you press CANCEL button (Ⓓ), the adjustment value you have entered is discarded and the screen returns to the check program screen.
When you press ENTER button  (Ⓒ), the feed pitch adjustment value is confirmed and the screen returns to the check program screen.

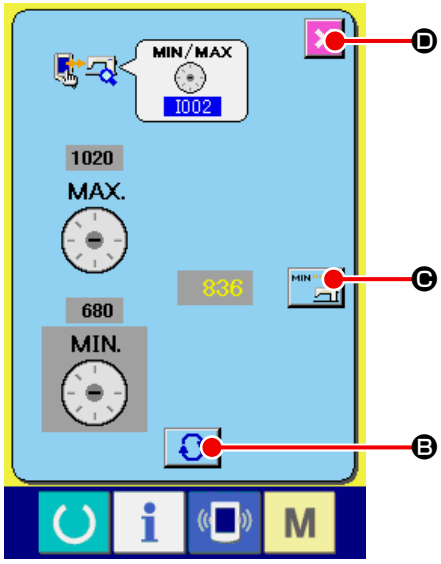
24-3. Correcting the bottom feed amount readout potentiometer

A potentiometer is used to read the bottom feed amount of the machine head. This potentiometer requires correction so as to compare its readout value with the actual feed amount.



① **Displaying the bottom feed amount reading potentiometer correction screen.**

When you press CORRECTION button  (Ⓐ) for the bottom feed amount reading potentiometer on the check program screen, the correction screen for the top and bottom feed amount reading potentiometer is displayed.



② **Correcting the bottom feed amount reading potentiometer.**

Select [MIN] or [MAX] by pressing CHANGE-OVER button  (Ⓑ).

* When "MIN" is selected：

Pictograph of the COMMUNICATION button (Ⓒ) : 

Set the feed amount to [0] (zero) by turning the BOTTOM FEED dial. Then, press COMMUNICATION button  (Ⓒ) to record the bottom feed amount.

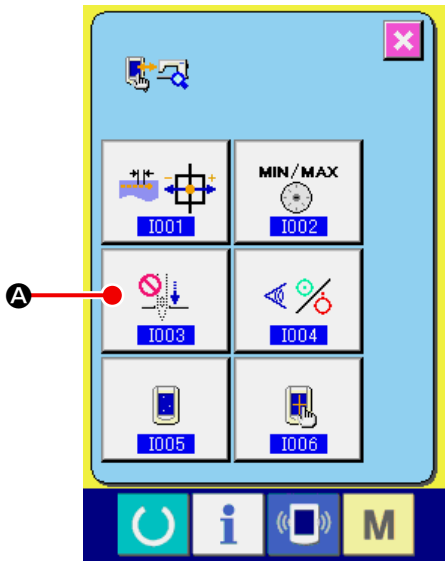
* When "MAX" is selected：

Pictograph of the COMMUNICATION button (Ⓒ) : 

Set the feed amount to [4] by turning the BOTTOM FEED dial. Then, press COMMUNICATION button  (Ⓒ) to record the bottom feed amount.

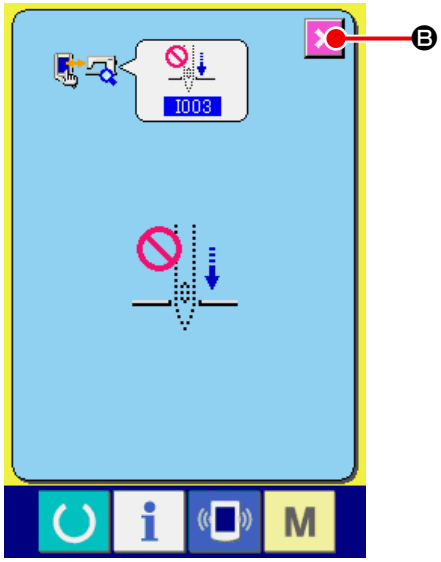
It is possible to exit from the setting screen by pressing CANCEL button  (Ⓓ).

24-4. Replacing the main shaft motor belt



① **Displaying the main shaft motor belt replacement screen.**

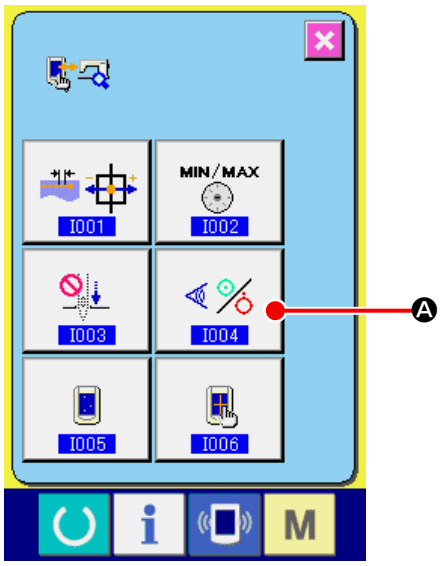
When you press MAIN SHAFT MOTOR BELT REPLACEMENT button  (Ⓐ) on the check program screen, the main shaft motor belt replacement screen is displayed.



② **Replacing the main shaft motor belt.**

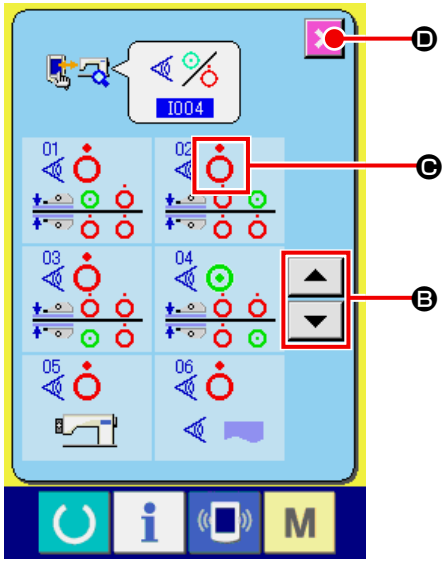
When you press CANCEL button  (Ⓑ), the screen returns to the check program screen.

24-5. Performing sensor check



① **Display the sensor check screen.**

When SENSOR CHECK button (Ⓐ) on the check program screen is pressed, the sensor check screen is displayed.



② **Perform the sensor check screen.**

Input status of the various sensors can be checked on the sensor check screen.

Input status of each sensor is displayed as (Ⓒ).

The display of ON status/OFF status is displayed as below.

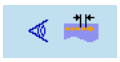
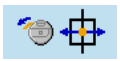
: ON status

: OFF status

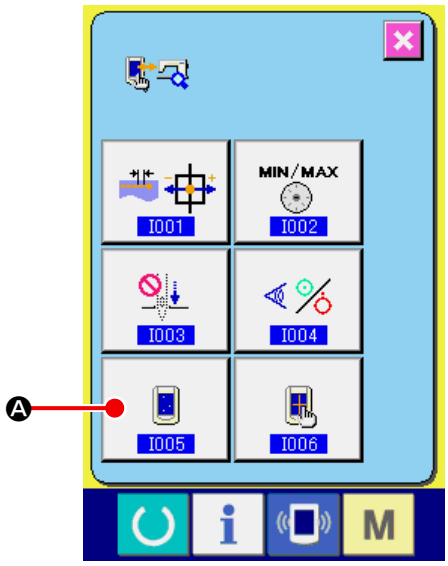
Press UP or DOWN button (Ⓑ) and display the sensor which has been checked.

When you press CANCEL button (Ⓓ), the screen returns to the check program screen.

14 kinds of sensors below are displayed.

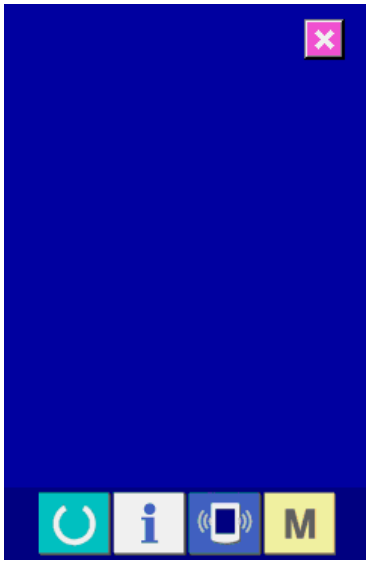
No.	Pictograph	Description of sensor
01		Upper cloth inner (material end) sensor
02		Upper cloth outer sensor
03		Lower cloth inner (material end) sensor
04		Lower cloth outer sensor
05		Start switch
06		Material detection sensor
07		Top feed pitch origin sensor
08		Machine head tilting switch
09		SDET sensor
10		Starting pedal sensor 1 (Start)
11		Starting pedal sensor 2 (Presser foot)
12		Starting pedal sensor 3 (Machine head speed changeover)
13		Bobbin thread remaining amount detection, origin
14		Bobbin thread remaining amount detection, no thread

24-6.Performing LCD check



① **Display the LCD check screen.**

When LCD CHECK button  (Ⓐ) on the check program screen is pressed, the LCD check screen is displayed.



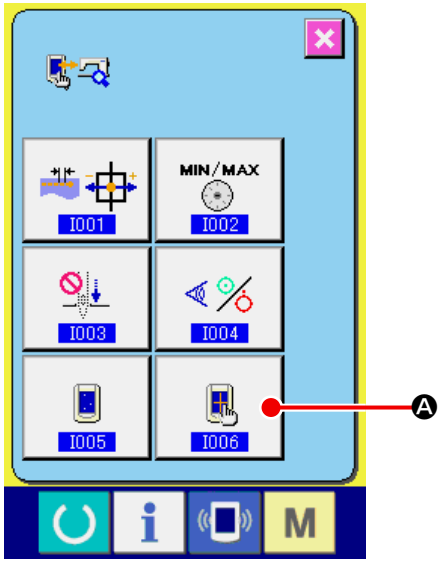
② **Performing LCD check**.

The screen of LCD check screen is displayed by one color only. Check in this state whether any dot is omitted or not.

After checking, press a proper place on the screen.

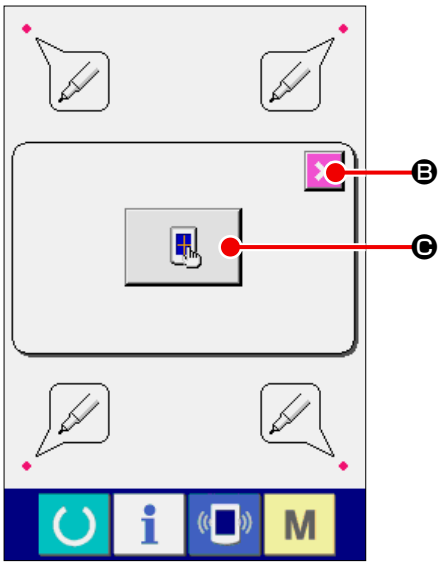
The LCD check screen is closed and the check program screen is displayed

24-7. Performing touch panel compensation



① **Display the touch panel compensation screen.**

When TOUCH PANEL COMPENSATION button  (Ⓐ) on the check program screen is pressed, the touch panel compensation screen is displayed.



② **Pressing the TOUCH PANEL CORRECTION button.**

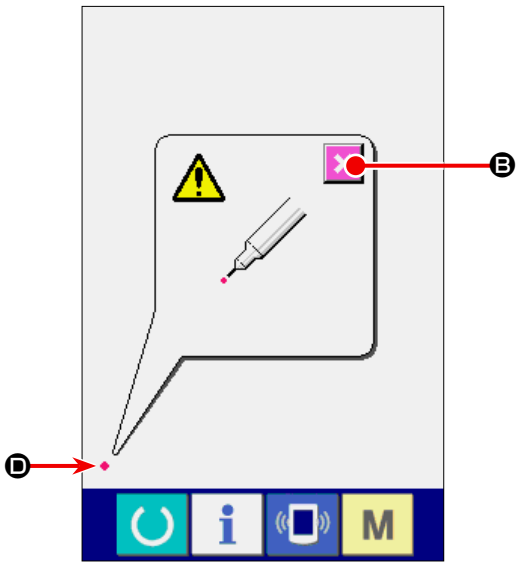
If you want to start the correction of the touch panel, press TOUCH PANEL button  (Ⓒ).

On that screen, the touch position can be checked. Press red dot  on the screen. ON state/OFF state is displayed as shown below.

 : OK state

 : NG state

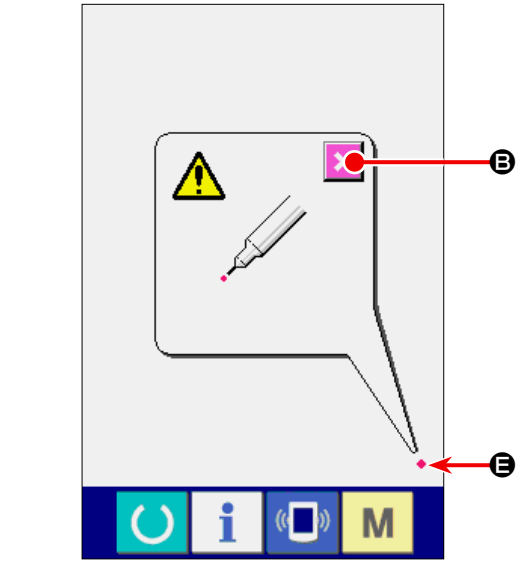
When you press CANCEL button  (Ⓑ), the screen returns to the previous screen.



③ **Press the lower left position.**

Press red circle (Ⓓ) located at the lower left position on the screen.

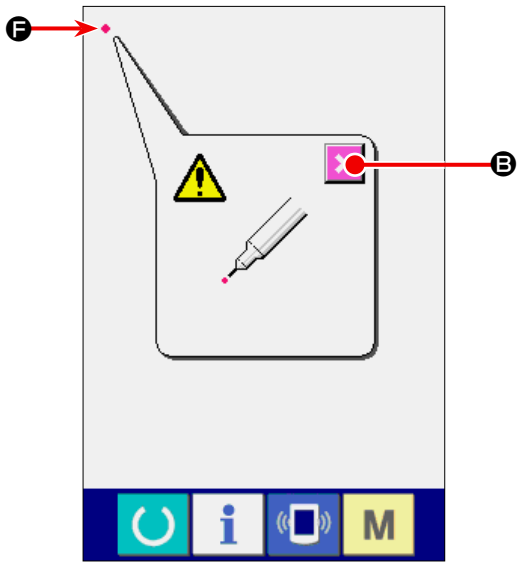
When finishing the compensation, press CANCEL button (Ⓑ).



④ **Press the lower right position.**

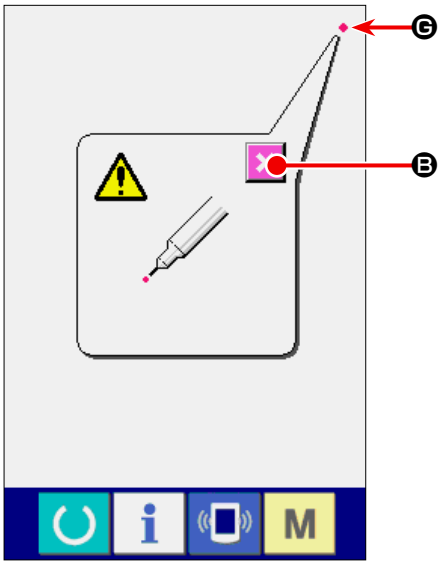
Press red circle (Ⓔ) located at the lower right position on the screen.

When finishing the compensation, press CANCEL button (Ⓑ).



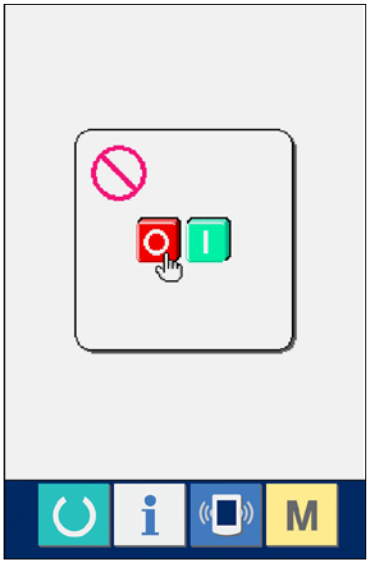
⑤ **Press the upper left position.**

Press red circle (Ⓕ) located at the upper left position on the screen.
When finishing the compensation, press CANCEL button (Ⓑ).



⑥ **Press the upper right position.**

Press red circle (Ⓖ) located at the upper right position on the screen.
When finishing the compensation, press CANCEL button (Ⓑ).



⑦ **Store the data.**

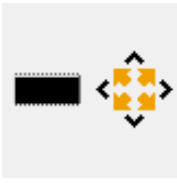
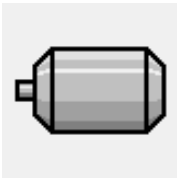
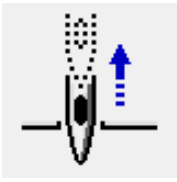
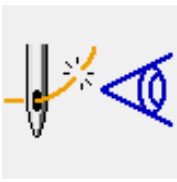
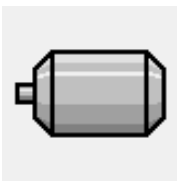
When 4 points have been pressed, the screen showing power-OFF prohibition is displayed since the compensation data are to be stored.

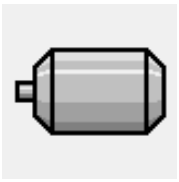
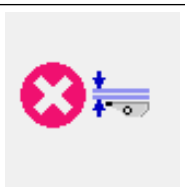
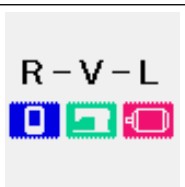
Do not turn OFF the power while this screen is being displayed.

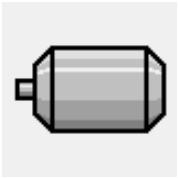
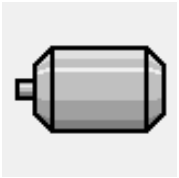
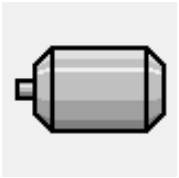
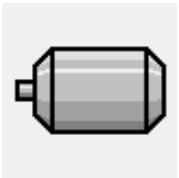
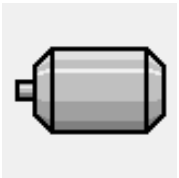
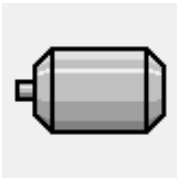
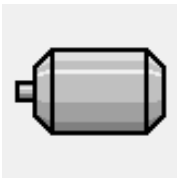
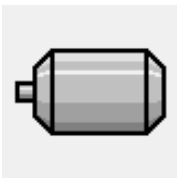
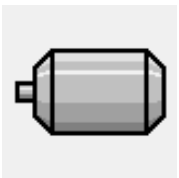
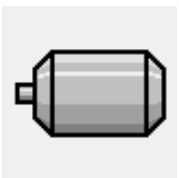
When the power is turned OFF, the compensated data are not stored.

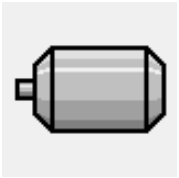
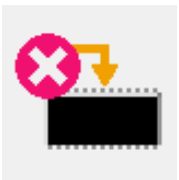
When storing is finished, the check program screen is automatically displayed.

25. Error code list

Error code		Description of error	How to recover	Place of recovery
E001		**Notification of initialization of EEP-ROM on main control PCB** Notifies that the EEP-ROM has been automatically initialized since no data was written on the EEP-ROM or the data written on it was broken	Turn OFF the power.	
E007		**Main shaft motor lock** When the material which gives a high resistance to needle has been sewn	Turn OFF the power.	
E030		**Displacement of needle bar from upper position** When the needle fails to stop at its upper position even if you have tried to stop the sewing machine with its needle up at the startup of the sewing machine	Possible to re-enter after reset	Standard screen
E031		**Air pressure drop**	Possible to re-enter after reset	
E050		**Stop switch** When the stop switch has been pressed at the time of startup of the sewing machine	Possible to re-enter after reset	Standard screen
E052		**Thread breakage detection** When the needle thread has broken	Possible to re-enter after reset	
E061		**Memory switch data error** When the memory switch data is broken or revision update is necessary	Turn OFF the power.	
E062		**Sewing data error** When the sewing data is broken or revision update is necessary	Turn OFF the power.	
E072		**Motor lock error (during thread trimming)**	Turn OFF the power.	

Error code		Description of error	How to recover	Place of recovery
E302		**Machine head tilt confirmation** When the machine head tilt sensor in the OFF state	Possible to re-enter after reset	Standard screen
E303		**Main shaft Z-phase sensor error** Abnormal Z-phase sensor for the encoder of the sewing machine motor	Turn OFF the power.	
E401		**When you have input the pattern No. that has already been registered**	Possible to re-enter after reset	Copy destination pattern No. input screen
E402		**When you have tried to delete the pattern registered with cycle sewing**	Possible to re-enter after reset	Pattern deletion screen
E403		**When you have input the pattern No. that has already been registered**	Possible to re-enter after reset	New pattern No. registration screen
E404		**When you have tried to select an unregistered pattern**	Possible to re-enter after reset	Pattern No. selection screen
E435		**When the set value exceeds the setting range**	Possible to re-enter after reset	Data item input screen
E499		**Faulty setting of lower manipulator pressure** When the bottom feed pitch is 2.5 mm or more, an error occurs if the lower manipulator pressure is set at 65 or less.	Possible to re-enter after reset	Standard screen
E703		**Operation panel connection to unexpected sewing machine (model error)** When the model codes of the systems do not match during initial communication	Turn OFF the power.	
E704		**System version disagreement** When the software versions of the systems software do not match during initial communication	Turn OFF the power.	

Error code		Description of error	How to recover	Place of recovery
E730		**Malfunction or open-phase of main shaft motor encoder** When the encoder of the sewing machine motor is abnormal	Turn OFF the power.	
E731		**Faulty main shaft motor hole sensor or position sensor** When the hole sensor or the position sensor for the sewing machine motor is defective	Turn OFF the power.	
E733		**Main shaft motor reverse rotation** When the sewing machine motor has rotated in the reverse direction	Turn OFF the power.	
E801		**Open-phase of power source** When the input power source has an open phase	Turn OFF the power.	
E802		**Instantaneous power interruption detection** When the input power source has been interrupted instantaneously	Turn OFF the power.	
E811		**Over-voltage** When the input power source voltage has increased to 280 V or more	Turn OFF the power.	
E813		**Low voltage** When the input power source voltage has decreased to 150 V or less	Turn OFF the power.	
E901		**Abnormal main motor IPM** When the IPM of servo-control PCB is abnormal	Turn OFF the power.	
E902		**Main shaft motor over-current** When an excessive current has flown in the sewing machine motor	Turn OFF the power.	
E903		**Abnormal stepping-motor power source** When the power source of the stepping motor for servo control PCB fluctuates by ±15 % or more	Turn OFF the power.	

Error code		Description of error	How to recover	Place of recovery
E904		**Abnormal solenoid power source** When the power source of the solenoid for servo control PCB fluctuates by ±15 % or more	Turn OFF the power.	
E915		**Abnormal communication between operation panel and main CPU** When difficulties in data communication have occurred	Turn OFF the power.	
E916		**Abnormal communication between main CPU and main shaft CPU** When difficulties in data communication have occurred	Turn OFF the power.	
E943		**Faulty EEP-ROM on main control PCB** When data cannot be written on the EEP-ROM	Turn OFF the power.	
E946		**Faulty writing on serial EEP-ROM** When data cannot be written on the serial EEP-ROM	Possible to re-enter after reset	
E998		**Bobbin thread remaining amount detecting device origin error**	Turn OFF the power.	
E999		**Upper shirring origin error**	Possible to re-enter after reset	

26. Using communication function

The communication function is able to download the sewing data created with other sewing machines to you sewing machine. In addition, it is possible to upload the aforementioned data onto a memory medium or personal computer.
To enable communication, memory media and USB port are available.
* It should be noted that SU-1 (data server utility) is required to download/upload the data from/onto the personal computer.

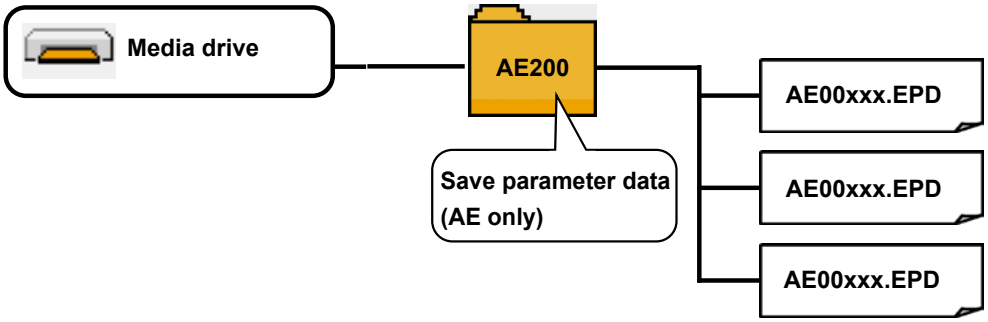
26-1. Handling possible data

Handling possible sewing data are two kinds below. The respective data formats are as described below.

Data name		Extension	Description of data
Parameter data		AE00×××. EPD	Dedicated sewing data for the AE model created by the sewing machine

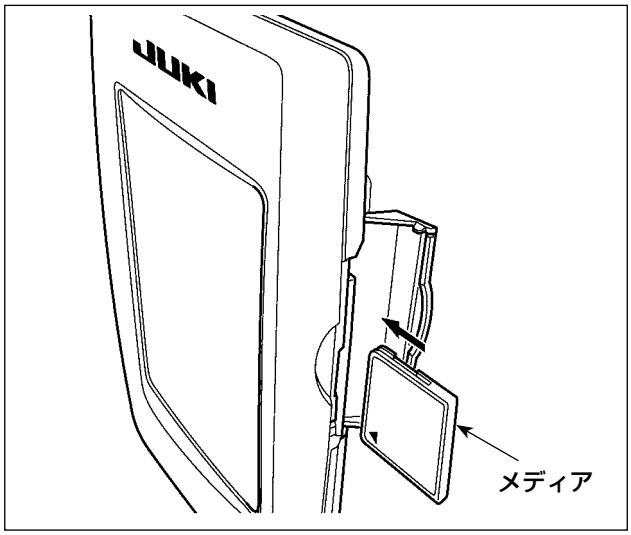
××× : file NO.

If you want to save data to a memory medium, use the below-stated directory structure for saving.
If the data file is not saved in the correct folder, the file cannot be read.



26-2. Performing communication by using the media

■ Memory medium insertion direction



① Turn the label side of the CompactFlash(TM) to this side (place the notch of the edge to the rear.) and insert the part that has a small hole into the panel.

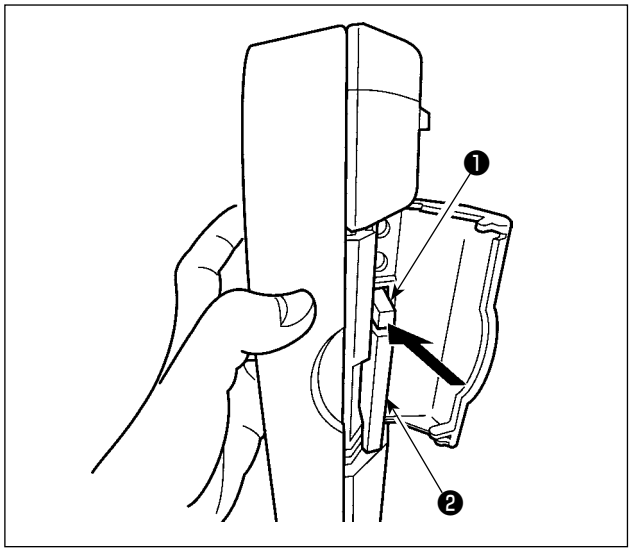
② After completion of setting of the media, close the cover. By closing the cover, it is possible to access. If the media and the cover come in contact with each other and the cover is not closed, check the following matters.

- Check that the media is securely pressed until it goes no further.
- Check that the inserting direction of the media is proper.

Caution

1. **When the inserting direction is wrong, panel or media may be damaged.**
2. **Do not insert any item other than the CompactFlash (TM).**
3. **The media slot in the IP-420 accommodates to the CompactFlash (TM) of 2 GB or less.**
4. **The media slot in the IP-420 supports the FAT16 which is the format of the CompactFlash (TM). FAT32 is not supported.**
5. **Be sure to use the CompactFlash (TM) which is formatted with IP-420. For the formatting procedure of the CompactFlash (TM), see "VI-26-4. Performing formatting of the media" p.115.**

■ Method for removing a memory medium



① Hold the panel by hand, open the cover, and press the media ❷ removing lever ❶ . The media is eject.

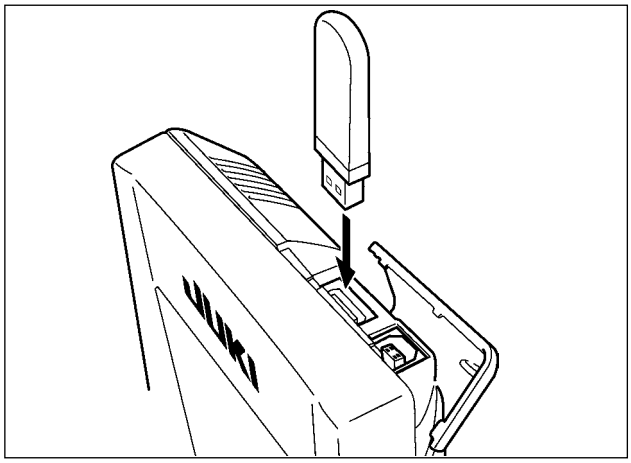
Caution

When the lever ❶ is strongly pressed, the media ❷ may be broken by protruding and falling.

② When the media ❷ is drawn out as it is, removing is completed.

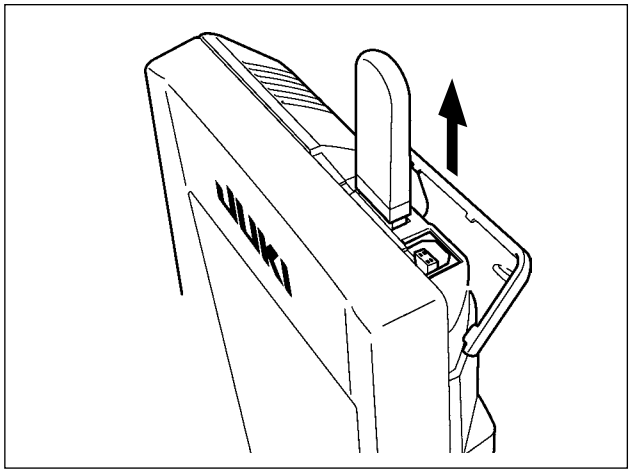
26-3. Carrying out communication with a USB thumb drive

■ Inserting a device into the USB port



Slide the top cover and insert the USB device into the USB port. Then, copy data to be used from the USB device onto the main body.
After completion of copying the data, remove the USB device.

■ Disconnecting a device from the USB port



Remove the USB device. Put the cover back in place.

Precautions for the use of CompactFlash (TM) :
• Do not wet or touch it with wet hands. Fire or electric shock will be caused.
• Do not bend, or apply strong force or shock to it.
• Never perform disassembling or remodeling of it.
• Do not put the metal to the contact part of it. Data may be disappeared.
• Avoid storing or using it in the places below.
Place of high temperature or humidity / Place of dew condensation /
Place with much dust / Place where static electricity or electrical noise is likely to occur

① Precautions to be taken when handling USB devices

- 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/writing 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.
- Some type of the USB device may not be properly recognized by this sewing machine.
- JUKI does not compensate for loss of data stored on the USB device caused by using it with this sewing machine.
- When the panel displays the communication screen or pattern data list, the USB drive is not recognized even if you insert a medium into the slot.
- For USB devices and media such as CF cards, only one device/medium should be basically connected/inserted to/into the sewing machine. When two or more devices/media are connected/inserted, the machine will only recognize one of them. Refer to the USB specifications.
- Insert the USB connector into the USB terminal on the IP panel until it will go no further.
- Do not turn the power OFF while the data on the USB flash drive is being accessed.

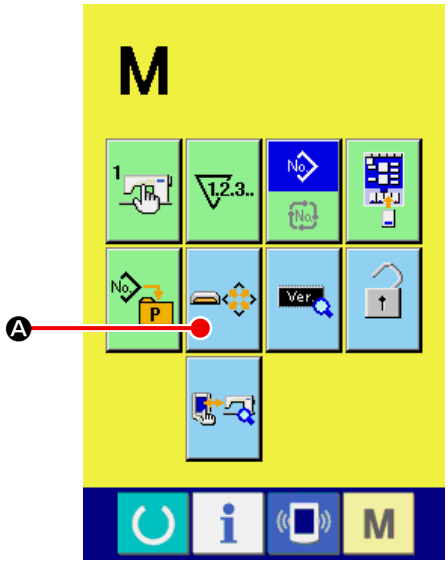
② USB specifications

- Conform to USB 1.1 standard
- Applicable devices *1 ___ Storage devices such as USB memory, USB hub, FDD and card reader
- Not-applicable devices __ CD drive, DVD drive, MO drive, tape drive, etc.
- Format supported _____ FD (floppy disk) FAT 12
  Others (USB memory, etc.), FAT 12, FAT 16, FAT 32
- Applicable medium size _ FD (floppy disk) 1.44MB, 720kB
  Others (USB memory, etc.), 4.1MB ~ (2TB)
- Recognition of drives __ For external devices such as a USB device, the device which is recognized first is accessed. However, when a medium is connected to the built-in media slot, the access to that medium will be given the highest priority. (Example: If a medium is inserted into the media slot even when the USB memory has already been connected to the USB port, the medium will be accessed.)
- Restriction on connection _ Max. 10 devices (When the number of storage devices connected to the sewing machine has exceeded the maximum number, the 11th storage device and beyond will not be recognized unless they are once disconnected and re-connected.)
- 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.

26-4. Performing formatting of the media

To re-format a medium, the IP-420 has to be used. The IP-420 is not able to read any medium which is formatted on a personal computer.



① **Display the media format screen.**

When M key is held pressed for three seconds, MEDIA FORMAT button (Ⓐ) is displayed on the screen. When this button is pressed, the media format screen is displayed.

② **Start formatting of the media.**

Set the media you desire to format to the media slot, close the cover, press ENTER button (Ⓑ) and formatting starts. Save necessary data in the media to the other media before formatting. When formatting is performed, the inside data are deleted.

When two or more media are connected to the sewing machine, the medium to be formatted is determined by the predetermined priority order.

High ← Low

CF(TM) slot ← USB device 1 ← USB device 2 ← ....

When a CompactFlash (TM) is inserted in the CF(TM) slot, the CompactFlash (TM) will be formatted according to the priority order as shown above.

Refer to the USB specifications for the priority order of access.

[Prohibitions concerning handling of the electronic medium]

① The memory medium is a precision electronic device. Do not bend or give an impact to the memory medium.

② It is recommended to periodically store the data you have saved to a memory medium on other memory medium as security against accidents.

③ If you want to initialize the data, firstly make sure that the memory card does not contain any necessary data. If the memory card is initialized, the data stored on the memory card will be totally erased.

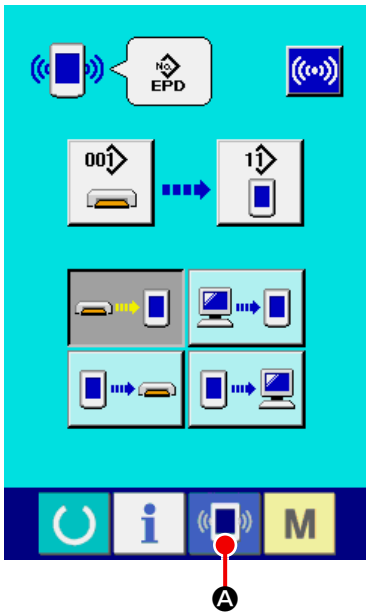
④ Avoid the use and storage of memory media in a hot and humid place.

⑤ Avoid the use of memory media near heat generating and/or combustible materials.

⑥ If contact parts of a memory medium are stained, contact failures will be caused. To avoid contact failures, do not touch them with hands. In addition, keep the contact parts clean by protecting them against dirt, dust, oil and other foreign matters. Carefully handle memory media also to protect against static electricity, etc. since static electricity can destroy internal elements.

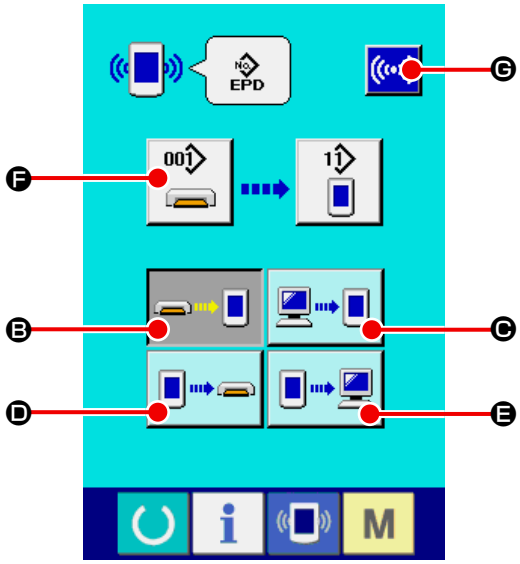
⑦ Memory media have a limited life. After a long time of use, writing or deletion failures will occur. If such a phenomenon occurs, replace the memory medium with a new one.

26-5. Take-in of the data



① **Display the communication screen.**

When communication key (Ⓐ) of switch seat part is pressed in the data input screen, the communication screen is displayed.



② **Select the communication procedure.**

There are four communication procedures as described below.

(Ⓑ) Writing data from media to panel

(Ⓒ) Writing data from personal computer (server) to panel

(Ⓓ) Writing data from panel to media

(Ⓔ) Writing data from panel to personal computer (server)

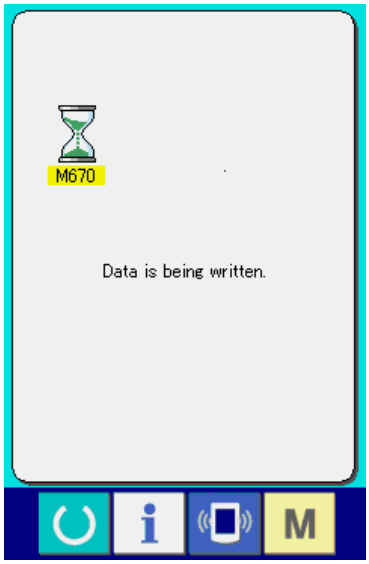
Select the button of communication procedure you desire.

③ **Select the data No.**

When you press 001 (Ⓕ), the writing file selection screen is displayed.
Input the file number of the data you want to write. Input the numerical digits corresponding to the "xxx" portion of the file name "AE00***.EPD".
It is also possible to specify the pattern No. to be written in the destination medium. If you want to write data on the operation panel, an unregistered pattern No. will be displayed.

④ **Determine the data No.**

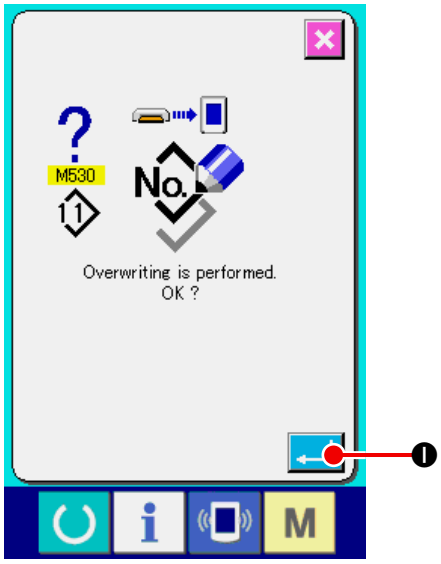
When ENTER button (Ⓗ) is pressed, the data No. selection screen is closed and the selection of the data No. has been completed.



⑤ **Start communication.**

When COMMUNICATION START button (Ⓖ) is pressed, the data communication starts.

Caution **Do not open the cover during reading the data. Data may not be read in.**



* If you want to write data on the existing pattern No., the overwrite confirmation screen will be displayed before executing writing. If you want to overwrite the existing pattern No., press ENTER button (❶).

27. Information function

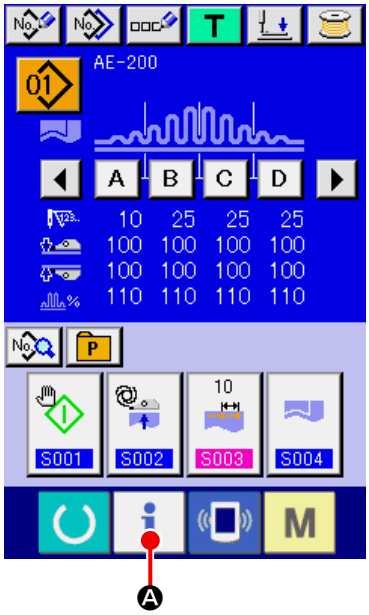
There are three functions below in the information function.

1. Oil replacement time, needle replacement time, cleaning time, etc. are designated and the warning notice is performed when the designated time has passed.
   → Refer to and **"VI-27-1.Observing the maintenance and inspection information" p.121**. and **"VI-27-2. Inputting the inspection time" p.124.**

2. Speed can be checked at a glance and the target achieving consciousness as a line or group is increased as well by the function to display the target output and the actual output.
   → Refer to and **"VI-27-4. Observing the production control information" p.126**. and **"VI-27-5. Performing setting of the production control information" p.129**.

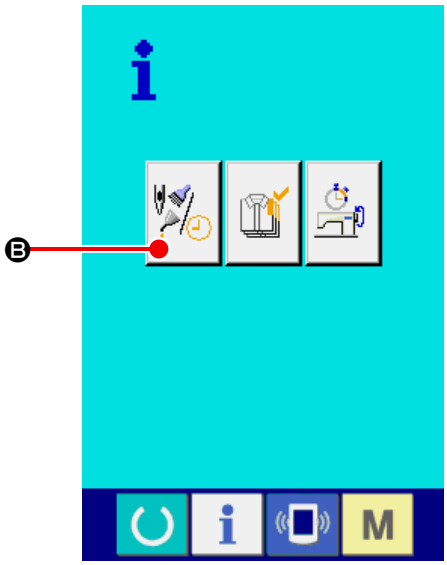
3. Information on machine working ratio, pitch time, machine time and machine speed can be displayed from the working state of the sewing machine.
   → Refer to and **"VI-27-6. Observing the working measurement information" p.132**.

27-1.Observing the maintenance and inspection information



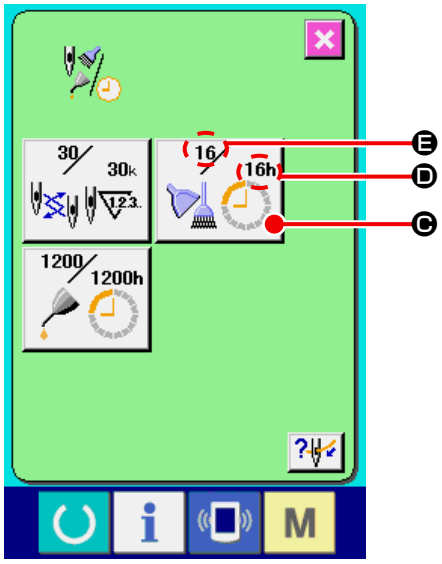
① Display the information screen.

When you press INFORMATION key  (Ⓐ) displayed on the switch seat part of the data input screen, the information screen is displayed.



② **Display the maintenance and inspection information screen.**

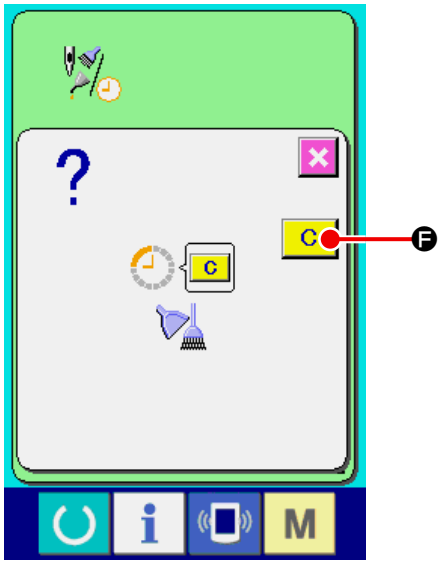
Press maintenance and inspection information screen display button  (Ⓑ) in the information screen.



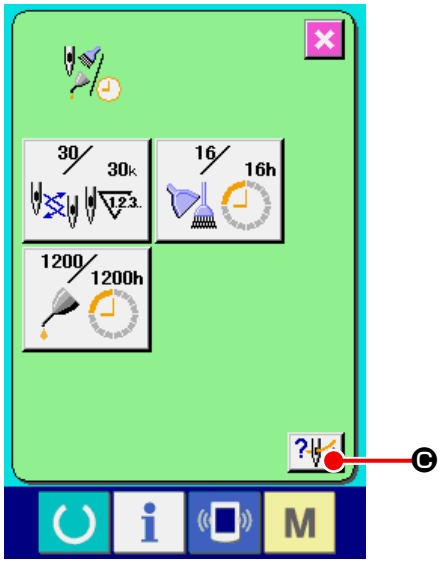
Information on the following three items is displayed in the maintenance and inspection information screen.

- Needle replacement : 
  (1,000 stitches)
- Cleaning time (hour) : 
- Oil replacement time (hour) : 

The interval to inform of the inspection for each item in button (Ⓒ) is displayed at (Ⓓ), and remaining time up to the replacement is displayed at (Ⓔ) In addition, remaining time up to the replacement can be cleared.

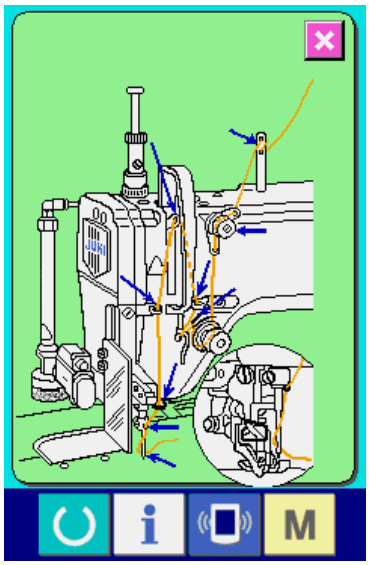


③ **Perform clearing remaining time up to the replacement.**
When you press the ITEM button (Ⓒ) you want to clear, the replacement clear screen is displayed. When you press CLEAR button C (Ⓕ), the remaining time before replacement is cleared.

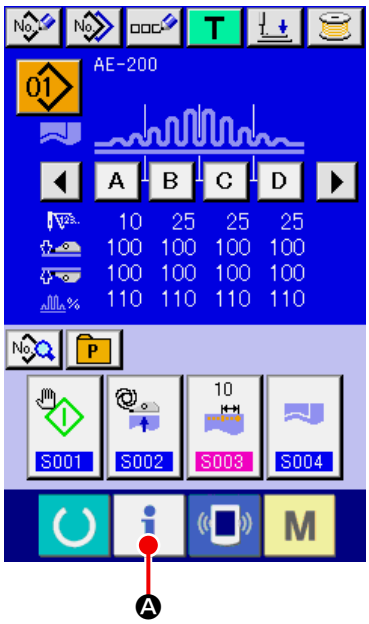


④ **Display the threading diagram.**

When threading button (Ⓒ) displayed in the maintenance and inspection screen is pressed, the needle thread threading diagram is displayed. Observe it when performing threading.

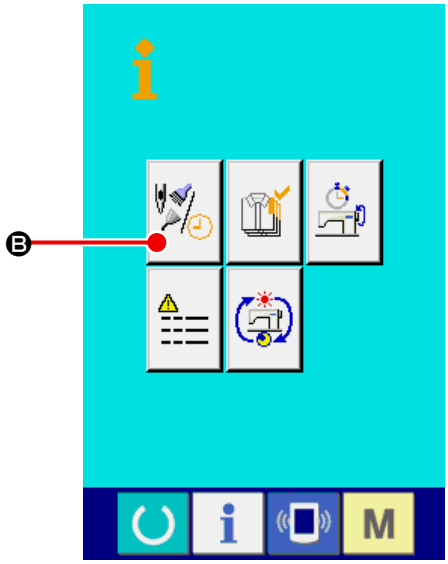


27-2. Inputting the inspection time



① **Display the information screen (maintenance personnel level).**

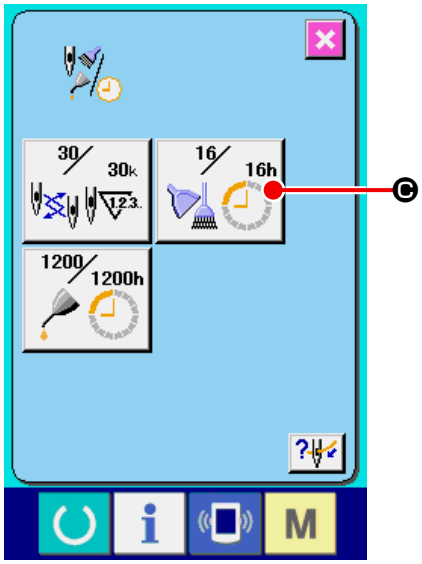
When you keep INFORMATION key (Ⓐ) displayed on the switch seat part of the data input screen held pressed for approximately three seconds, the information screen (maintenance personnel level) is displayed. In the maintenance personnel level, the color of the pictograph displayed at the upper left on the screen changes from blue to orange. In addition, five buttons are displayed.



② **Display the maintenance and inspection information screen.**

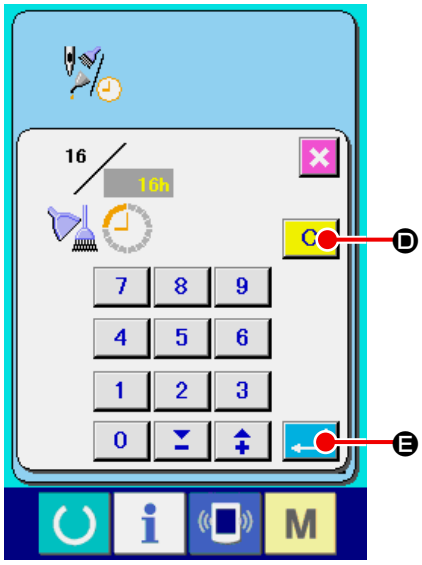
Press maintenance and inspection information screen display button (Ⓑ) in the information screen.

* Refer to **"VI-31. Information screen of the maintenance personnel level" p.142** for the two buttons displayed on the lower column of the screen.



The same information as that in the normal maintenance and inspection information screen is displayed in the maintenance and inspection information screen.

When button  (Ⓒ) of the item you desire to change the inspection time is pressed, the inspection time input screen is displayed.



③ **Input the inspection time.**

Input an inspection time.

When the inspection time is set to "0", the warning function stops.

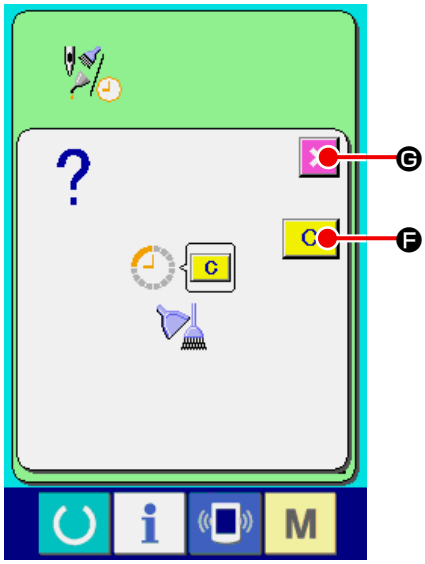
When clear button C (Ⓓ) is pressed, the value returns to the initial value.

The initial values of the inspection time of respective items are as follows.

- Needle replacement : 0 (1,000 stitches)
- Cleaning time : 0 (hour)
- Oil replacement time : 200 (hour)

When ENTER button ↵ (Ⓔ) is pressed, the inputted value is determined.

27-3. Releasing procedure of the warning



When the designated inspection time is reached, the warning screen is displayed.

In case of clearing the inspection time, press CLEAR button C (Ⓕ). The inspection time is cleared and the pop-up is closed. In case of not clearing the inspection time, press CANCEL button ✕ (Ⓖ) and close the pop-up. Every time one sewing is completed, the warning screen is displayed until the inspection time is cleared.

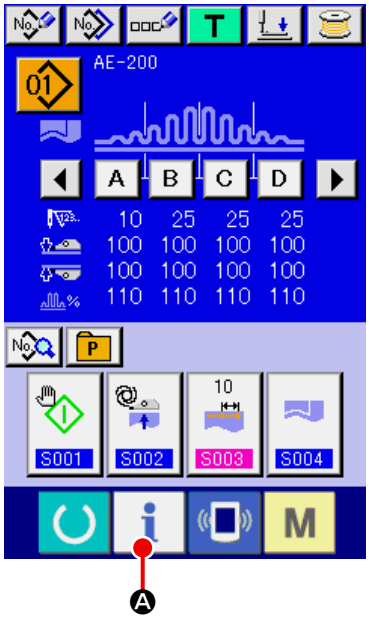
Warning Nos. of the respective items are as follows.

- Needle replacement : A201
- Cleaning time : A202
- Oil replacement time : A203

27-4. Observing the production control information

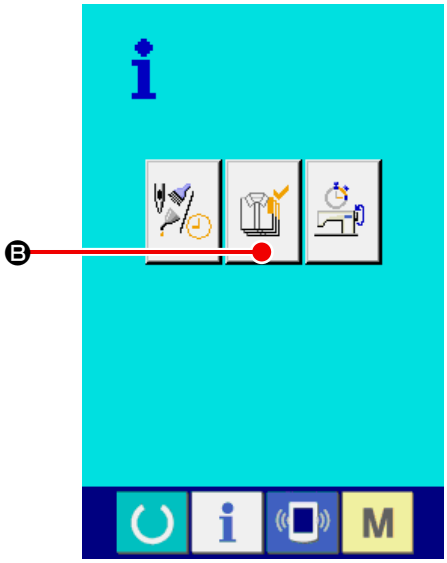
It is possible to designate the start, display the number of pieces of production from the start to the existing time, display the number of pieces of production target, etc. in the production control screen.
There are two kinds of display ways for the production control screen.

27-4-1. When displaying from the information screen



① **Display the information screen.**

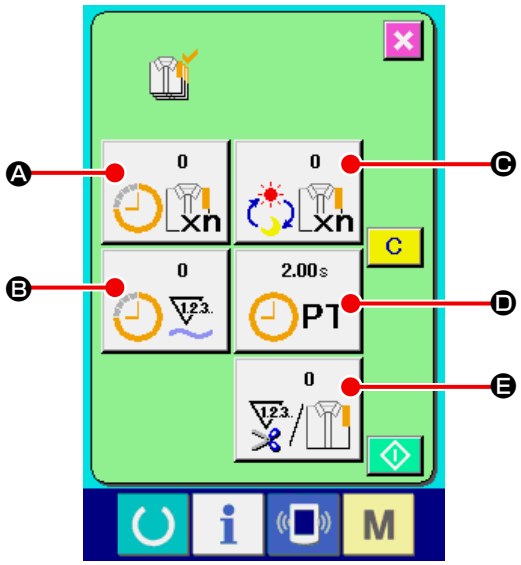
When you press INFORMATION key (Ⓐ) displayed on the switch seat part of the data input screen, the information screen is displayed.



② **Display the production control screen.**

Press production control screen display button (Ⓑ) in the information screen. The production control screen is displayed.

Information on the following 5 items is displayed in the production control screen.



Ⓐ : **Existing target value**

Number of pieces of the target of products at the present time is automatically displayed.

Ⓑ : **Actual results value**

Number of pieces of the sewn products is automatically displayed.

Ⓒ : **Final target value**

Number of pieces of the final target of products is displayed.

Input the number of pieces referring to **"VI-27-5. Performing setting of the production control information" p.129**.

Ⓓ : **Pitch time**

Time (second) required for one process is displayed.

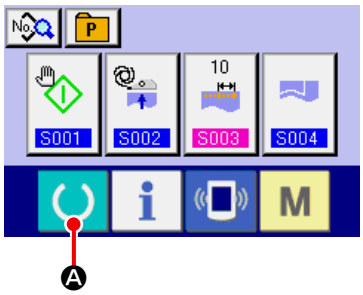
Input the time (unit : second) referring to **"VI-27-5. Performing setting of the production control information" p.129**.

Ⓔ : **Number of times of thread trimming**

Number of times of thread trimming per process is displayed.

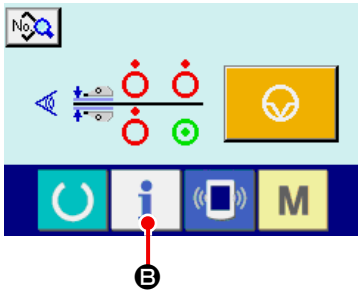
Input the number of times referring to **"VI-27-5. Performing setting of the production control information" p.129**.

27-4-2. When displaying from the sewing screen



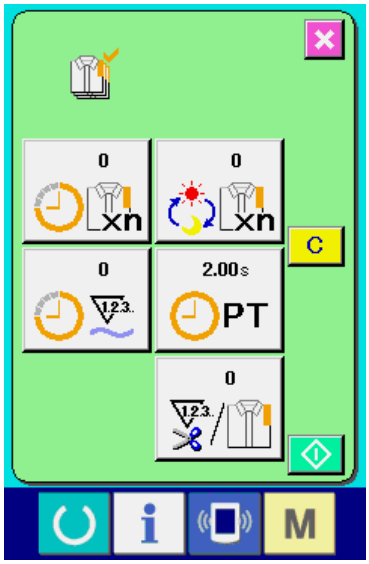
① **Displaying the sewing screen.**

When press READY key (Ⓐ) on the switch seat part of the data input screen, the sewing screen is displayed.



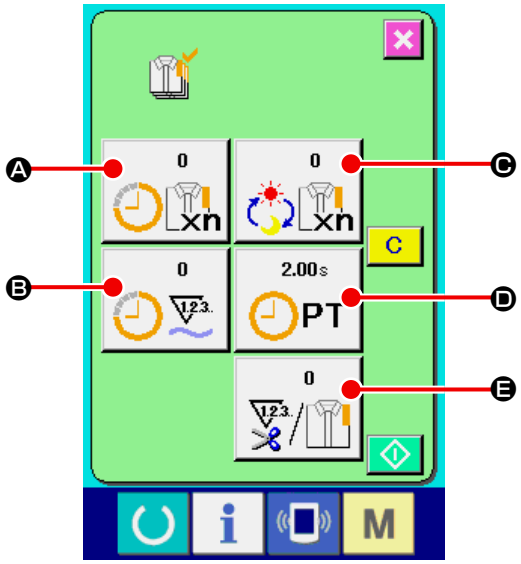
② isplay the production control screen.

When you press INFORMATION key (Ⓑ) on the switch seat part of the sewing screen, the product management screen is displayed.

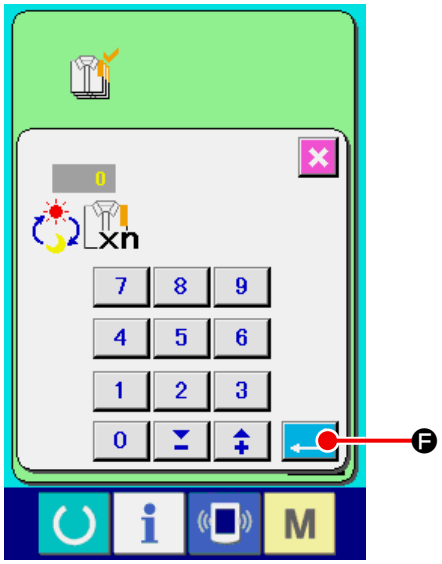


The contents of display and the functions are common to **"VI-27-4-1. When displaying from the information screen" p.126**.

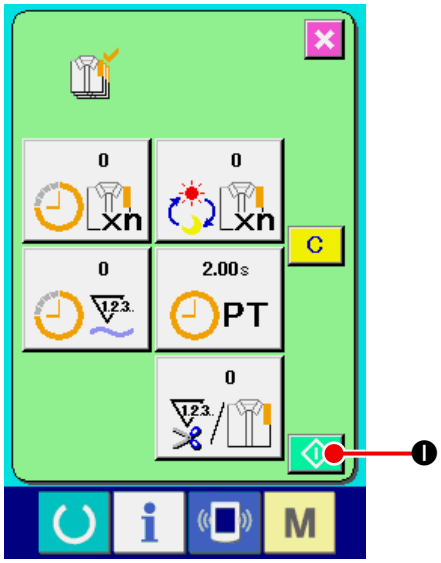
27-5. Performing setting of the production control information



① **Display the production control screen.**
Display the production control screen referring to **"VI-27-4. Observing the production control information" p.126**.

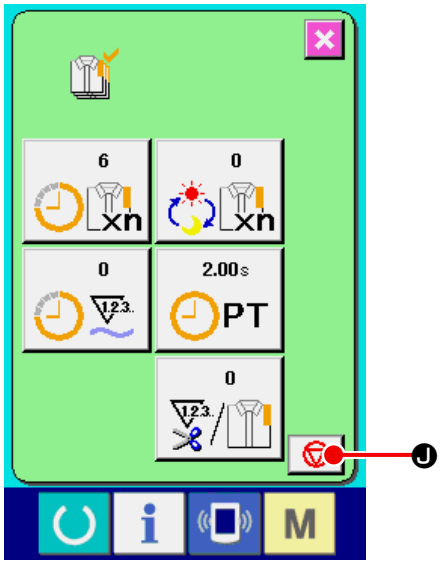


② **Input the final target value.**
Firstly, input the production target number of pieces for the process you want to carry out sewing. When you press FINAL TARGET VALUE button (Ⓒ), the final target value input screen is displayed. Input a desired value with the numeric keypad or the UP/DOWN buttons. After you have completed input of the target value, press ENTER button (Ⓕ).



③ **Start the count of number of pieces of production.**

When START button (❶) is pressed, the count of number of pieces of production is started.

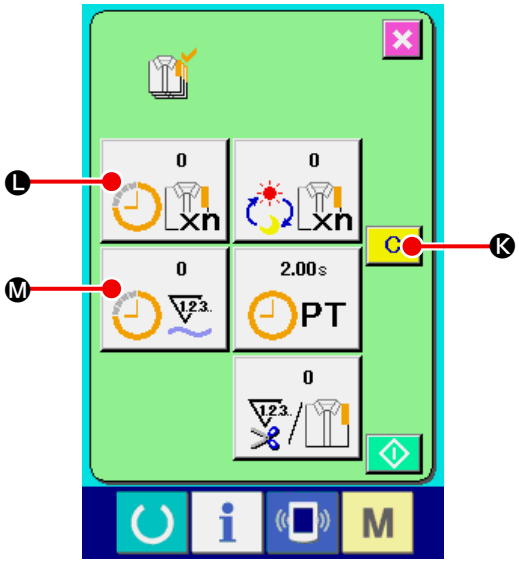


④ **Stop the count.**

Display the production control screen referring to **"VI-27-4. Observing the production control information" p.126**.

When the count is being performed, STOP button (❹) is displayed. When STOP button (❹) is pressed, the count is stopped.

After the stop, START button is displayed at the position of STOP button. When continuing the count, press START button again. The counted value is not cleared until CLEAR button is pressed.



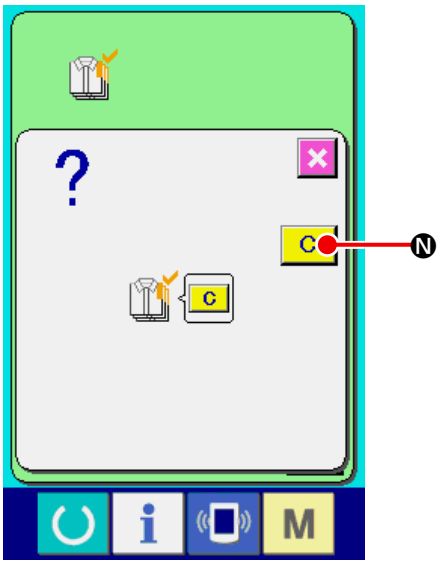
⑤ **Clear the counted value.**

When clearing the counted value, set the count to the stop state and press CLEAR button C (Ⓚ).

The value to be cleared is the present target value (Ⓛ) and actual results value (Ⓜ) only.

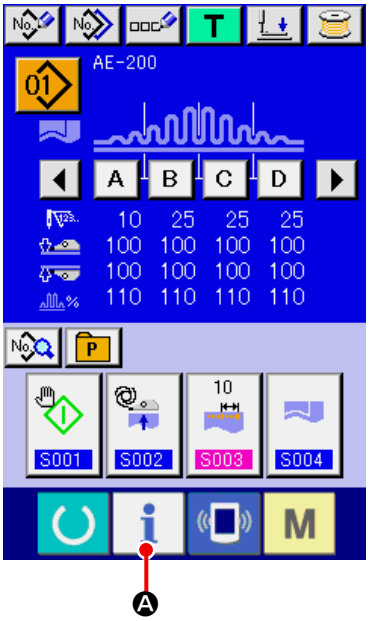
(Note : CLEAR button is displayed only in case of stop state.)

When CLEAR button C (Ⓚ) is pressed, the clear confirmation screen is displayed.



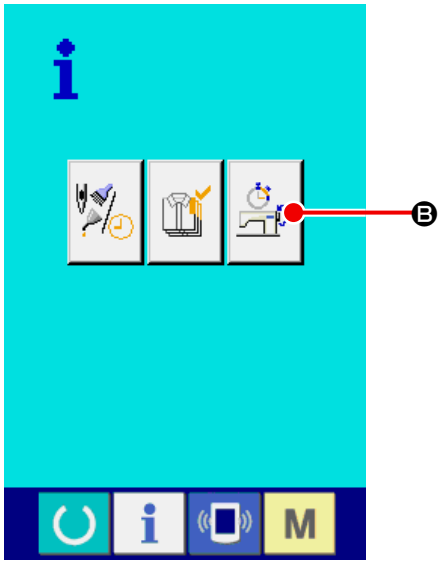
When CLEAR button C (Ⓝ) is pressed in the clear confirmation screen, the counted value is cleared.

27-6. Observing the working measurement information



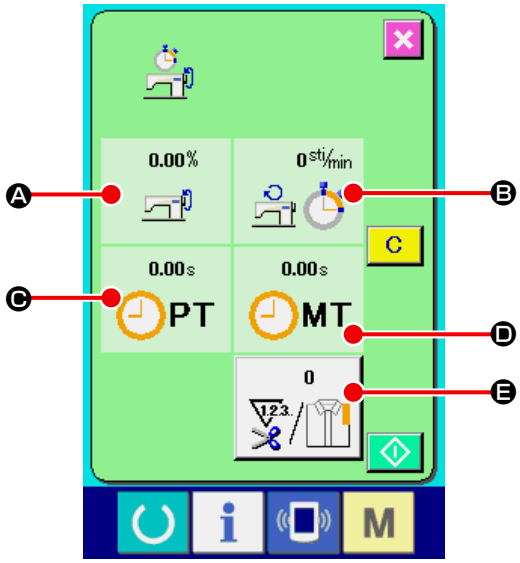
① **Display the information screen.**

When you press INFORMATION key  (Ⓐ) displayed on the switch seat part of the data input screen, the information screen is displayed.



② **Display the working measurement screen.**

Press working measurement screen display button  (Ⓑ) in the information screen. The working measurement screen is displayed.



Information on the following 5 items are displayed in the working measurement screen.

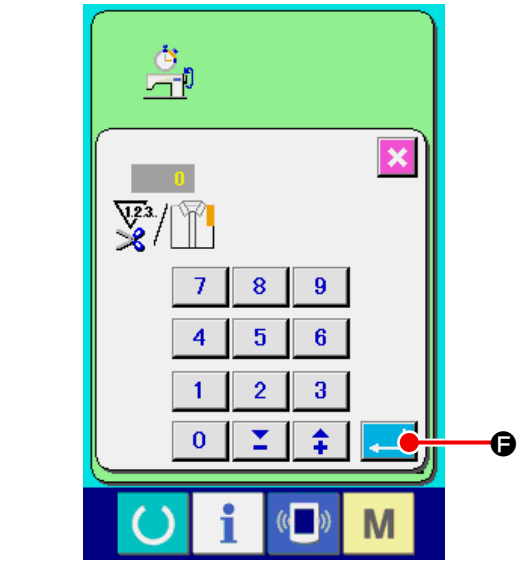
Ⓐ : The information is automatically displayed from the time of start of measuring the working ratio.

Ⓑ : The information is automatically displayed from the time of start of measuring the machine speed.

Ⓒ : The information is automatically displayed from the time of start of measuring the pitch time.

Ⓓ : The information is automatically displayed from the time of start of measuring the machine time.

Ⓔ : Number of times of thread trimming is displayed. Input the number of times referring to the next ③



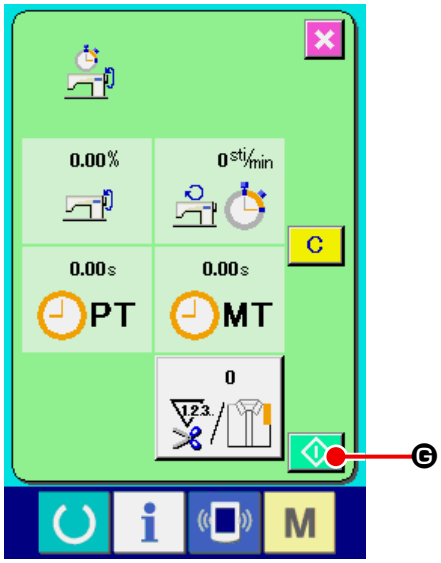
③ **Input the number of times of thread trimming.**

In the next step, input the number of times of thread trimming for one process.

When you press NUMBER OF TIMES OF THREAD TRIMMING button  (Ⓔ) displayed on the previous page, the number of times of thread trimming input screen is displayed.

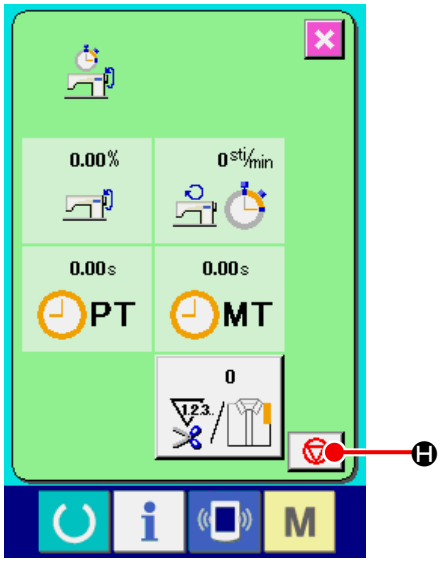
Input a desired value with the numeric keypad or the UP/DOWN buttons. After you have completed input of the desired value, press ENTER button  (Ⓕ).

* When the input value is 0, count of the number of times of thread trimming is not performed. Use this function by connecting the external switch.



④ **Start the measurement.**

When START button (Ⓖ) is pressed, measurement of each data is started.

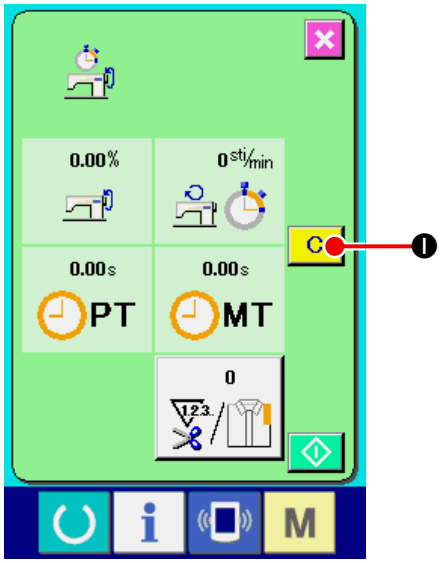


⑤ **Stop the count.**

Display the working measurement screen referring to ① and ② of **"VI-27-6. Observing the working measurement information" p.132**.

STOP button (Ⓗ) is displayed when the measurement is being performed. When STOP button (Ⓗ) is pressed, the measurement is stopped.

After the stop, START button is displayed at the position of STOP button. To continue measuring, press START button again. The measured value is not cleared until CLEAR button is pressed.

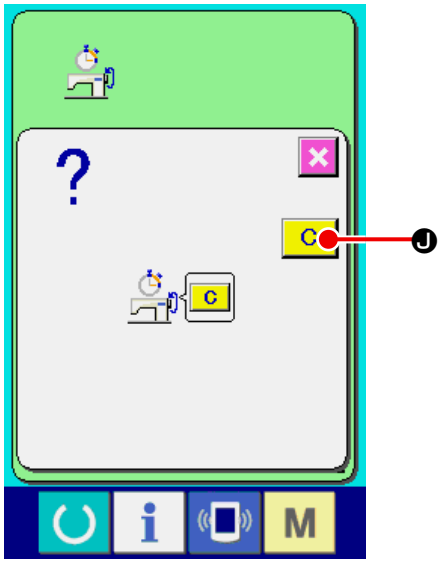


⑥ **Clear the counted value.**

When clearing the counted value, set the count to the stop state and press CLEAR button C (❶).

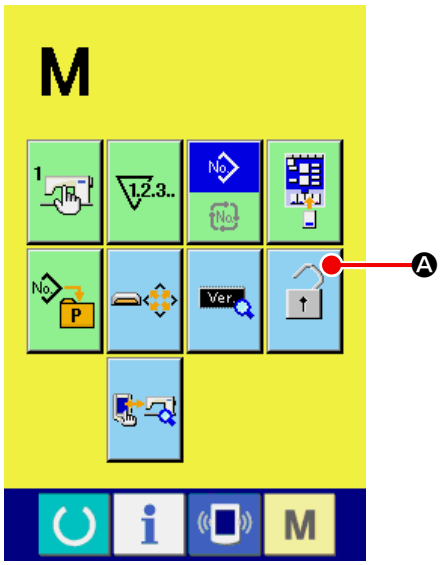
(Note : CLEAR button is displayed in case of the stop state only.)

When CLEAR button C (❶) is pressed, the clear confirmation screen is displayed.



When CLEAR button C (❷) is pressed in the clear confirmation screen, the counted value is cleared.

28. Performing keylock

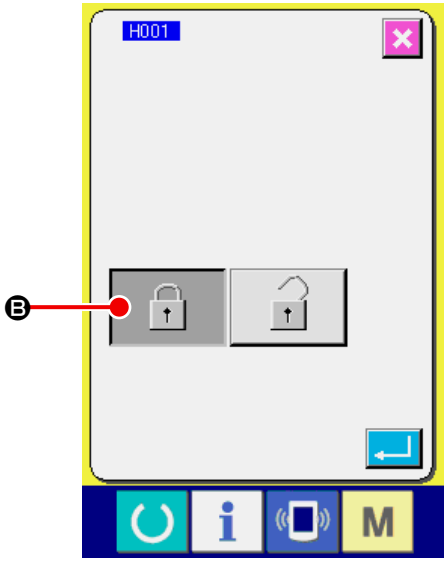


① **Display the key lock screen.**

When you keep M key held pressed for three seconds, KEYLOCK button (Ⓐ) is displayed on the screen.
When you press this button, the keylock screen is displayed. The current keylock setting state is displayed on the button.

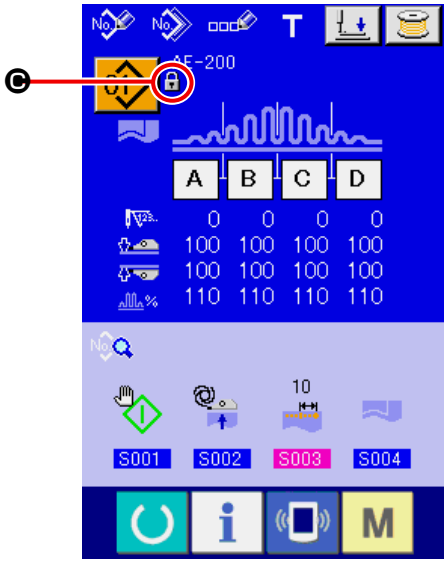
: The state where keylock is not set

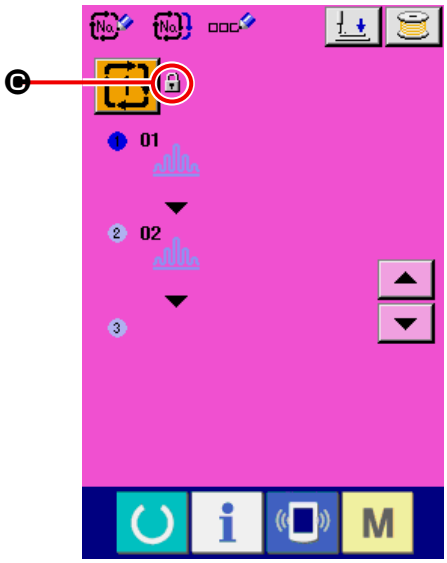
: The state where keylock is set



② **Select and determine the key lock state.**

Select the key lock state button (Ⓑ) in the key lock setting screen, and press . Then the key lock setting screen is closed and the key lock state is set.

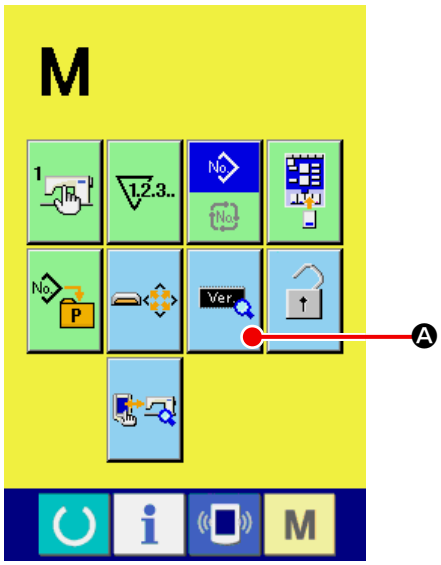




③ **Closing the mode screen to display the data input screen.**

When you close the mode screen to display the data input screen, the pictograph (Ⓒ) that indicates the keylock status is displayed on the right side of the pattern No. display. In addition, the buttons that can be used even under the keylock state are displayed.

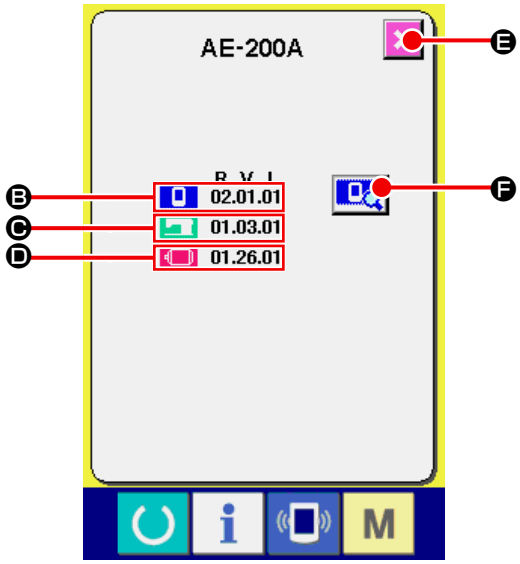
29. Displaying version information



① **Displaying the version information display screen.**

When you keep M key held pressed for three seconds, VERSION INFORMATION DISPLAY button (Ⓐ) is displayed on the screen. When you press this button, the version information screen is displayed.

On the version information screen, the version information on your sewing machine is displayed to allow you to confirm it.

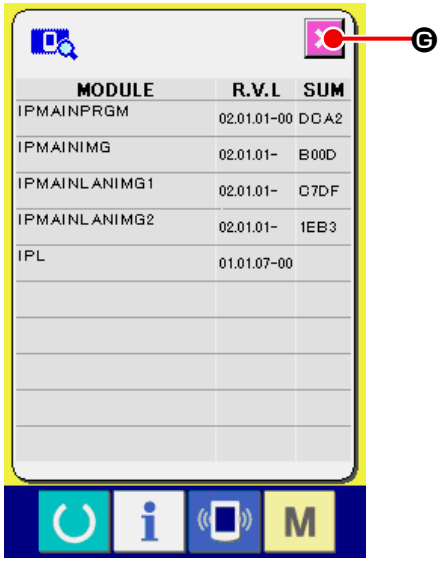


Ⓑ : Version information on panel program

Ⓒ : Version information on main program

Ⓓ : Version information on servo program

When CANCEL button (Ⓔ) is pressed, the version information screen is closed and the mode screen is displayed.



① **Displaying the operation panel program version details screen.**

When you press OPERATION PANEL VERSION DETAILS button (Ⓕ), the operation panel version details screen is displayed.
On the operation panel version details screen, details of the operation panel program version are displayed to allow you to confirm them.

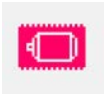
When you press CANCEL button (Ⓖ), the operation panel version details screen is closed and the screen returns to the version information screen.

30. Communication screen of maintenance personnel level

For the communication screen, the level which is normally used and the one which is used by the maintenance personnel are different in the kinds of data to be handled.

30-1. Data which are possible to be handled

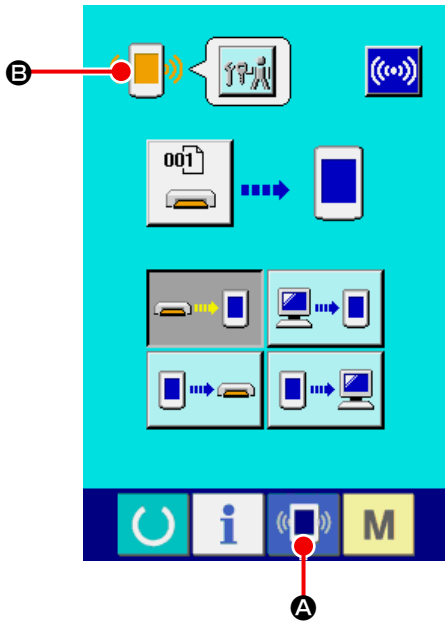
In case of the maintenance personnel level, it is possible to use 5 different kinds of data in addition to the normal two kinds.

Data name		Extension	Description of data
Adjustment data		Model name+00×××.MSW Example) AE00001.MSW	Data of memory switches 1 and 2
All sewing machine data		Model name+00×××.MSP Example) AE00001.MSP	All data which are held by sewing machine
Panel program data(*)		Folder BP+RVL (6 digits) (5 files)	Program data and display data of panel
Main program data(*)		MA+RVL(6 digits).PRG	Program data of main
Servo program data(*)		MT+RVL(6 digits).PRG	Program data of servo

×××: File No.

* Refer to the Setup Manual for the IP-420 for the operation panel program data, main program data and servo program data.

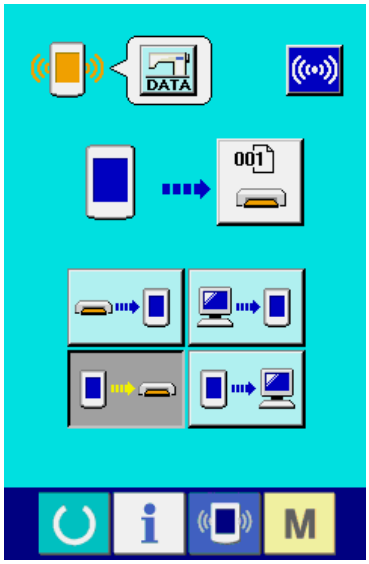
30-2. Displaying maintenance personnel level



① **Display the communication screen of the maintenance personnel level.**

When key  (Ⓐ) is pressed as long as three seconds, the image located at the upper left position is changed to orange color (Ⓑ) and the communication screen of the maintenance personnel level is displayed.

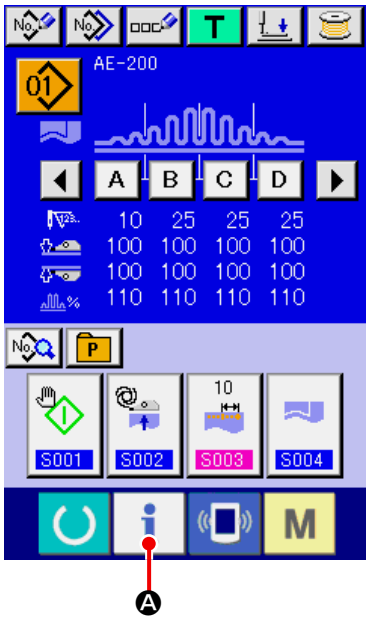
For the operating procedure, refer to **"VI-26-5. Take-in of the data" p.117**.



* If you have selected the adjustment data or all sewing machine data, the display on the screen will be as shown in the figure on the left. In this case, it is not necessary to specify the number on the operation panel side.

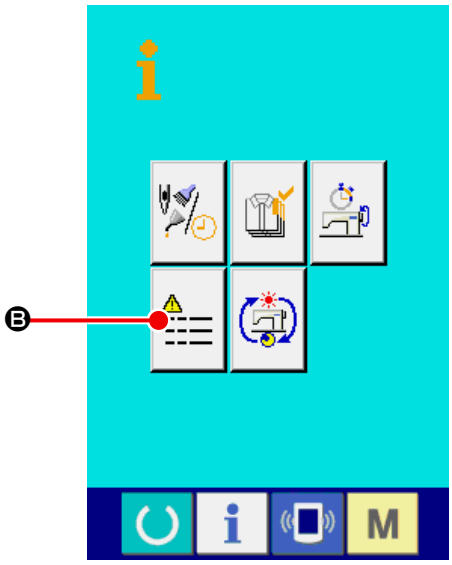
31. Information screen of the maintenance personnel level

31-1. Display of error record



① **Display the information screen of the maintenance personnel level.**

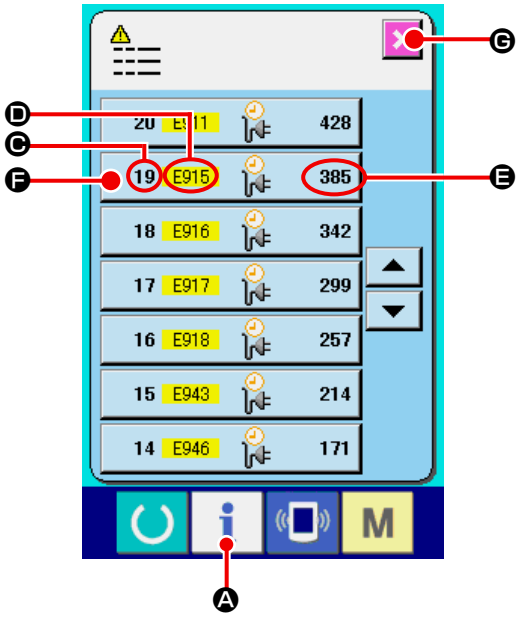
When INFORMATION key  (Ⓐ) of switch seat part is pressed for approximately three seconds in the data input screen, the information screen of the maintenance personnel level is displayed. In case of the maintenance personnel level, the pictograph located at the upper left position changes from blue color to orange color, and 5 buttons are displayed.



② **Displaying the error history screen.**

Press ERROR HISTORY SCREEN DISPLAY button  (Ⓑ) on the information screen.

Then, the error history screen is displayed.



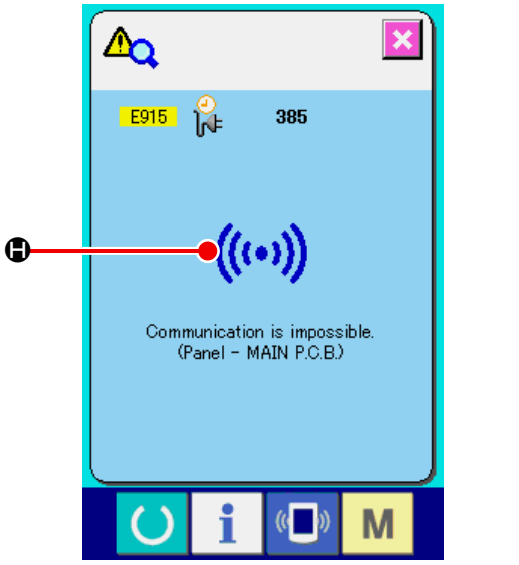
Error record of the sewing machine you use is displayed in the error record screen, and you can check the error.

Ⓒ : Order that error has occurred

Ⓓ : Error code

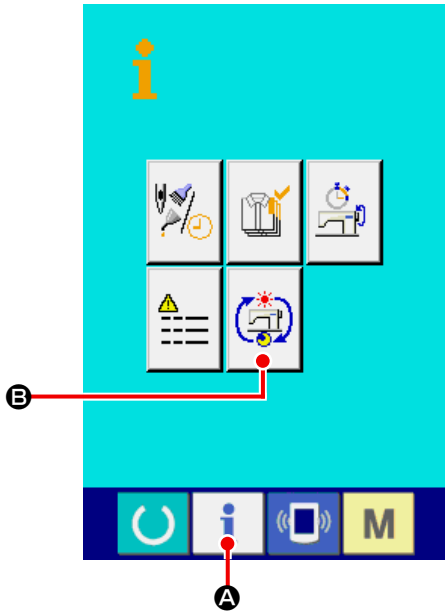
Ⓔ : Cumulative current-carrying time (hour) at the time of occurrence of error

When CANCEL button (Ⓖ) is pressed, the error record screen is closed and the information screen is displayed.



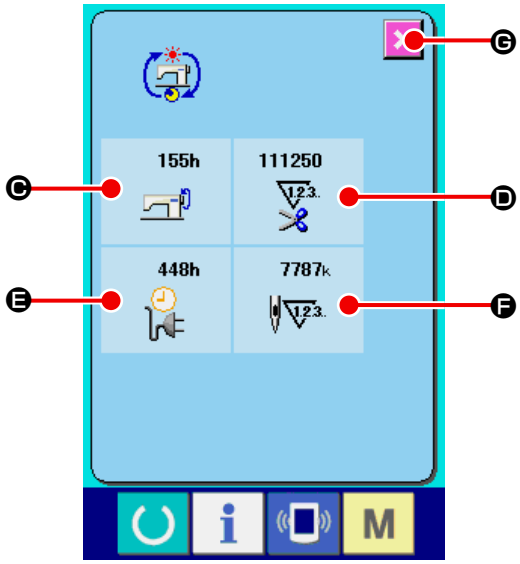
③ **Display the error record screen.**
When you desire to know the details of error, press ERROR button (Ⓕ) you desire to know. The error detail screen is displayed.
Pictograph (Ⓗ) corresponding to the error code is displayed in the error detail screen.
→ Refer to **"VI-25. Error code list" p.107**.

31-2. Display of the cumulative working information



① **Display the information screen of the maintenance personnel level.**

When INFORMATION key (Ⓐ) of switch seat part is pressed for approximately three seconds in the data input screen, the information screen of the maintenance personnel level is displayed. In case of the maintenance personnel level, the pictograph located at the upper left position changes from blue color to orange color, and 5 buttons are displayed.



② **Display the cumulative working information screen.**

Press CUMULATIVE WORKING INFORMATION SCREEN DISPLAY button (Ⓑ) of the information screen. The cumulative working information screen is displayed.
Information on the following 4 items are displayed in the cumulative working information screen.

Ⓒ : Cumulative working time (hour) of the sewing machine is displayed.

Ⓓ : Number of cumulative times of thread trimming is displayed.

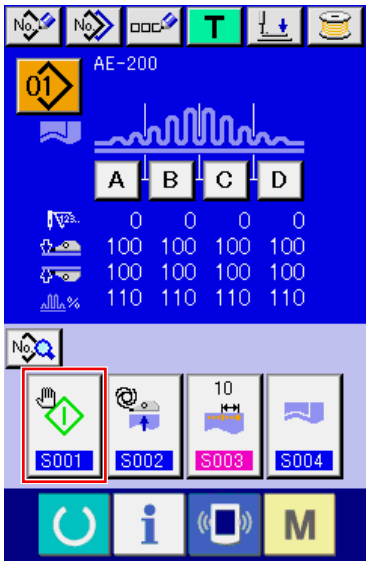
Ⓔ : Cumulative current-carrying time (hour) of the sewing machine is displayed.

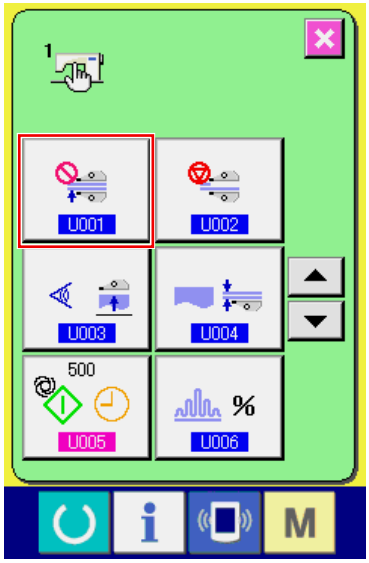
Ⓕ : Number of cumulative stitches is displayed. (Unit : X1,000 stitches)

When CANCEL button (Ⓖ) is pressed, the cumulative working information screen is closed and the information screen is displayed.

VII. HANDLING AND ADJUSTING THE PARTS

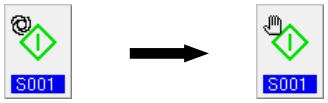
1. Adjusting the material slippage and manipulator pressure





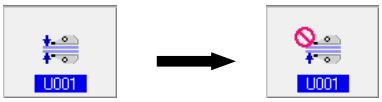
① **Displaying the data input screen.**
The set contents can be changed only on the data input screen (blue). In the case the sewing screen (green) is displayed, press READY key to display the data input screen.

② **Setting the start mode to the manual mode.**

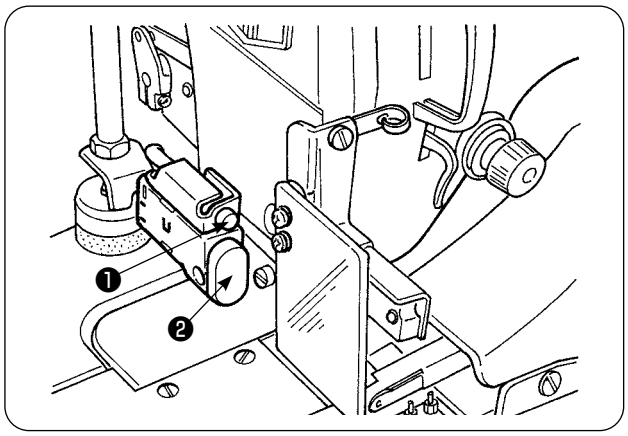


(Set the start mode referring to **"VI-10. Changing sewing data" p.57**.)

③ **Stopping the manipulator operation.**

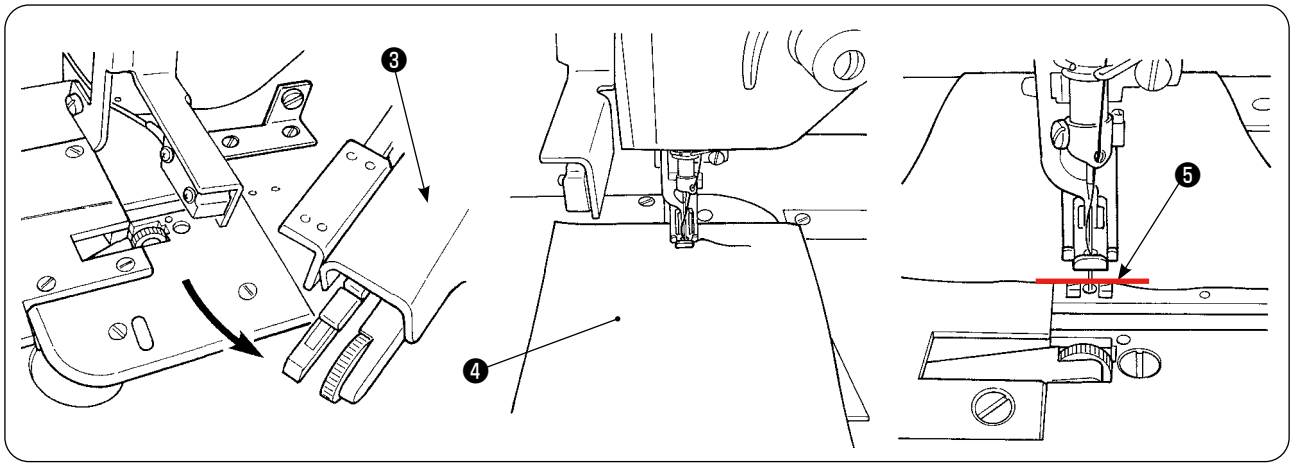


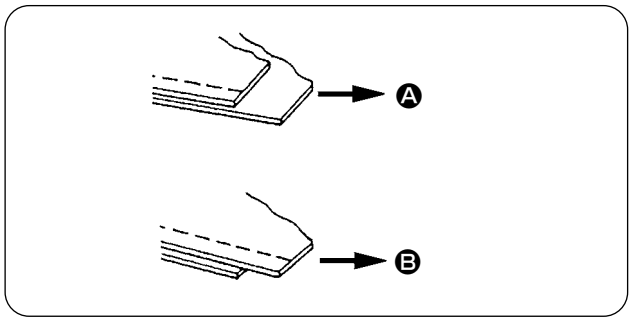
(Set the manipulators referring to **"VI-19. Changing the memory switch data" p.85**.)



④ **Displaying the sewing screen.**
When you press the READY key on the data input screen, the sewing screen is displayed, the presser foot of the sewing machine goes up and LED ❶ flashes on and off.

⑤ Rotate upper manipulator ❸ to enable adjustment without the manipulator.
After having adjusting the bottom feed length (refer to **"IV-10. Adjusting the stitch length" p.12** for the adjusting procedure), place two plies of material ❹ for trial stitching which have been cut into same dimensions under the presser foot of the sewing machine. Press START switch ❷ to start the sewing machine. Continue sewing until material end ❺ is reached. Then, re-press START switch ❷ to stop the sewing machine.

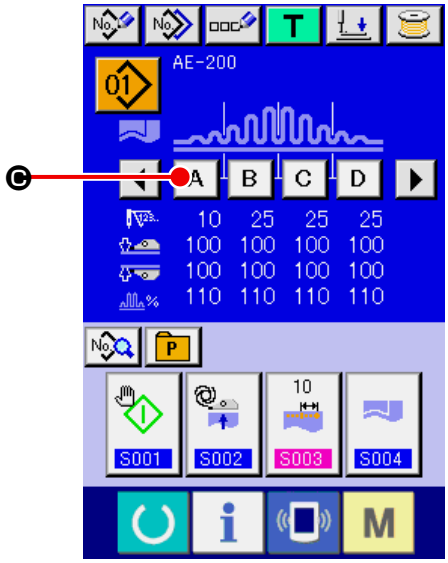




⑥ **Adjust the shirring amount in accordance with the slippage between the two plies of material after trial stitching.**

In the case of (Ⓐ), select the sewing parameter [S40] "section A-shirring amount." Decrease the shirring amount.

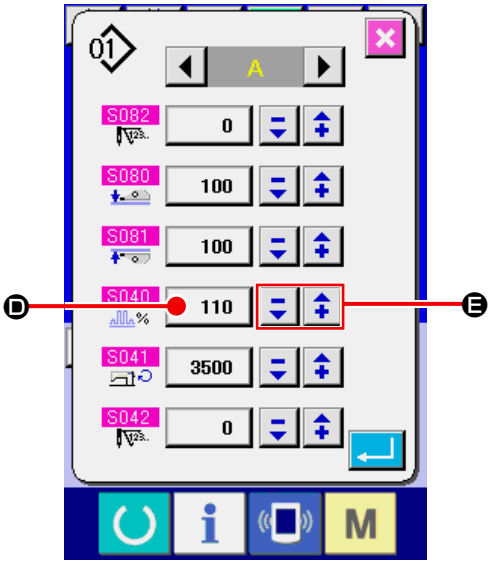
In the case of (Ⓑ), select the sewing parameter [S40] "section A-shirring amount." Increase the shirring amount.



⑦ **Operation for changing the shirring amount**

When you press SECTION A button A (Ⓒ) on the data input screen, the sewing data change screen is displayed.

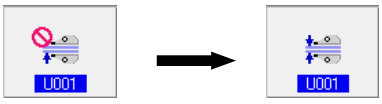
Change the percentage value (Ⓓ) in shirring section A data S040 field with -/+ button (Ⓔ). Then, carry out trial stitching again by pressing READY key to adjust the slippage between two plies of material. Repeat trial stitching and adjustment until the ends of the two plies of material are aligned.



⑧ **Adjusting the upper/lower manipulator pressure**

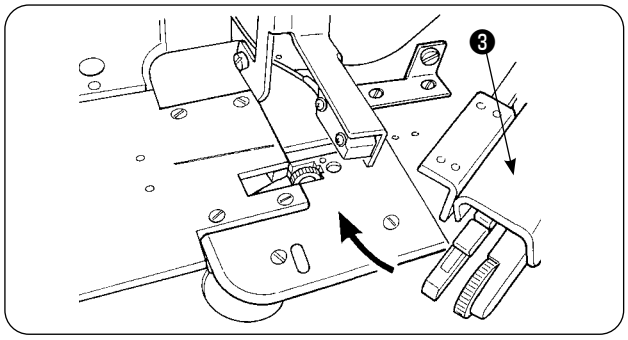
After you have adjusted the slippage between two plies of material, adjust the pressure of the upper and lower manipulators.

Select the MEMORY switch screen. Enable [U01] manipulator operation.

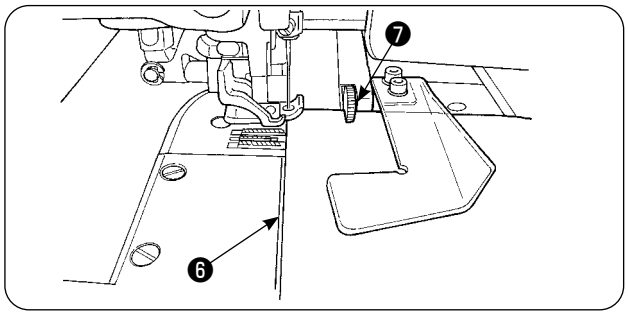


(Set the manipulators referring to **"VI-19. Changing the memory switch data" p.85**.)

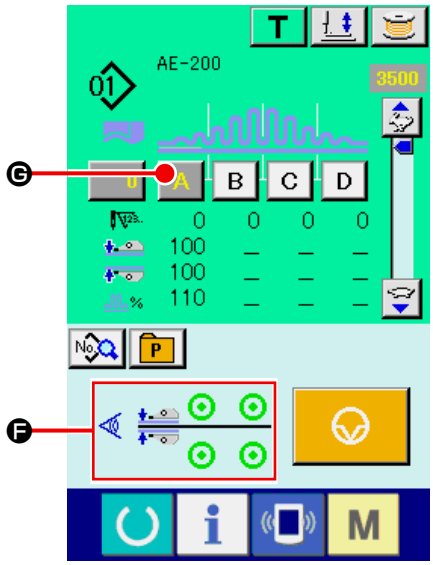
When you press the READY key , the sewing screen (green) is displayed, the presser foot of the sewing machine goes up and LED ❶ flashes on and off to inform you that the sewing machine is brought to the set-ready state for sewing.



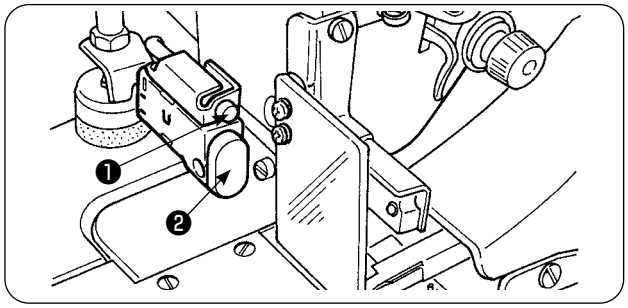
Rotate upper manipulator ❸ back to its home position.

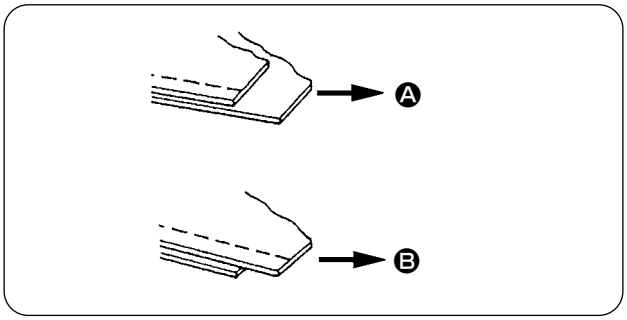


Place the materials on the cloth guide with the material ends aligned with material alignment line ❻ .



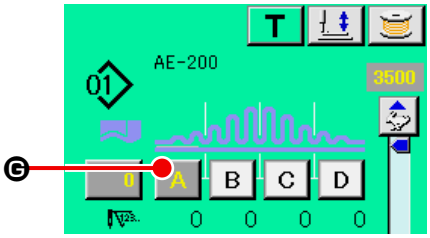
Once you have placed the material on the sewing machine, the sensor display on the sewing screen changes its status to ON state (Ⓕ) and LED ❶ flashes on and off. When you press the START switch ❷ , the sewing machine starts running while manipulators ❼ work to align the material ends. At the end of sewing, the sewing machine automatically performs thread trimming and stops.

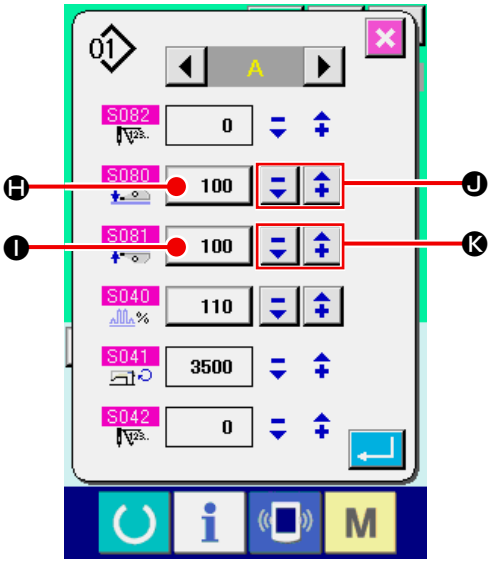


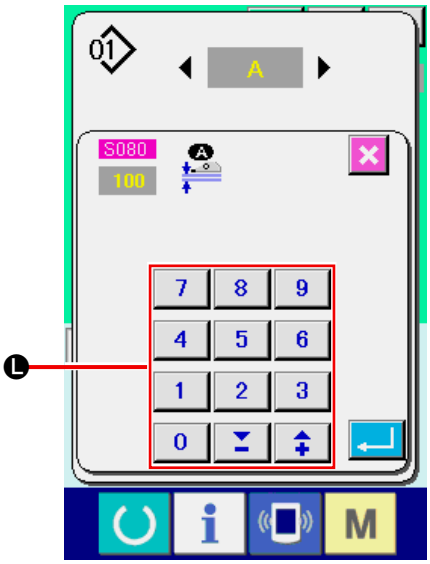


⑨ If the material ends are not aligned with each other at the end of sewing, change the upper/lower manipulator pressure to align the material ends at the end of sewing.
In the case of (Ⓐ), select sewing parameter [S80] section A - upper manipulator presser and decrease the upper manipulator pressure value.
In the case of (Ⓑ), select sewing parameter [S81] section B - lower manipulator presser and decrease the lower manipulator pressure.

If the manipulator pressure is excessively decreased, width of seam allowances will not be consistent.







⑩ **Operation for changing the upper manipulator pressure**

When you press SECTION A button A (Ⓖ), the sewing data change screen is displayed.

Changing the upper manipulator pressure data

Change the pressure value (Ⓗ) of the upper manipulator in upper manipulator pressure S080 field with -/+ buttons (Ⓙ).

In this state, place the material on the sewing machine. Then, start the sewing machine to carry out sewing.

At the time when the sewing machine performs thread trimming at the end of sewing, the upper manipulator pressure value (Ⓗ) you have changed is determined.

⑪ **Operation for changing the lower manipulator pressure**

When you press SECTION A button A (Ⓖ), the sewing data change screen is displayed.

Changing the lower manipulator pressure data

Change value (Ⓘ) of the lower manipulator pressure to lower manipulator pressure S081 using -/+ button (Ⓚ) or numeric keypad (L).

At the time when the sewing machine performs thread trimming at the end of sewing, the upper manipulator pressure value (Ⓘ) you have changed is determined.

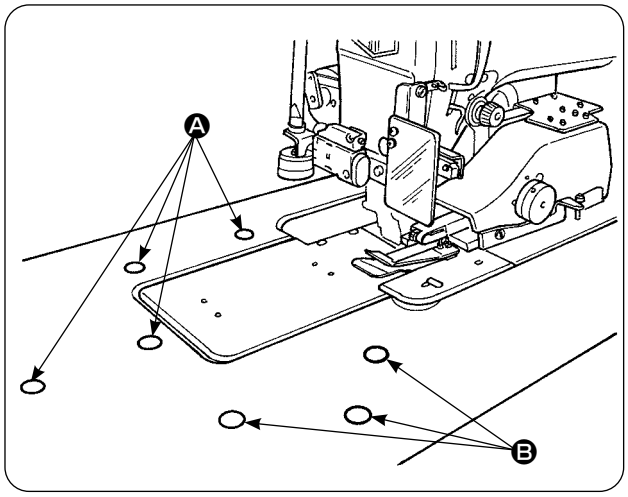
Recommended manipulator pressure (for linear patterns)

	Light-weight materials	Medium-weight materials	Heavy-weight materials
Upper manipulator pressure	65 to 85	90 to 110	120 to 130
Lower manipulator pressure	70 to 90	100 to 120	140 to 160

If the lower manipulator pressure is set to 65 when the bottom feed pitch is set at 2.5 mm or more, error [E499] will displayed to disable sewing.

2. Material auxiliary feed air blow

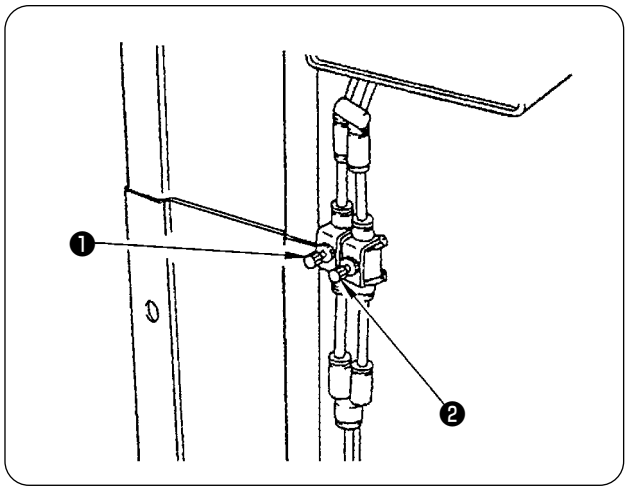
2-1. Material blowing air nozzles



1) Air nozzles are provided at seven location on the table.
Air nozzles (Ⓐ) are provided at four locations in front of the needle center and those (Ⓑ) are provided at three locations behind the needle center.
2) Adjust the speed controllers for (Ⓐ) and (Ⓑ) in accordance with the type of material, shape and size of the workpiece. (Refer to **"2-2. Adjusting the air blow-off pressure" p.149**.) Adjust the speed controllers to increase the air blow-off pressure for large and heavy workpieces or to decrease it for small and light ones.

Do not move your face near the blow-off air outlet.

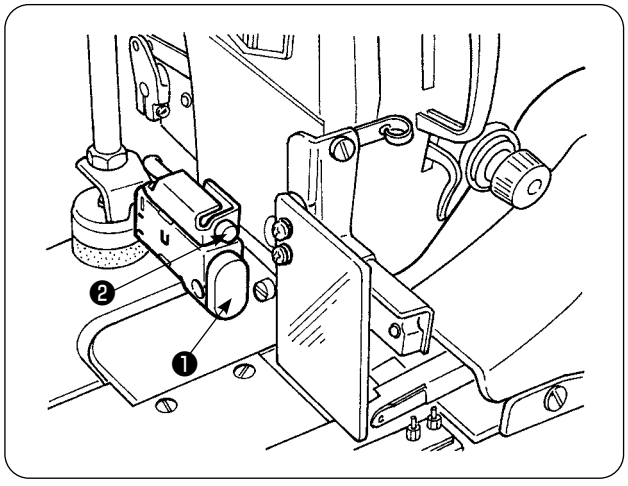
2-2. Adjusting the air blow-off pressure



1) Adjust the air blow-off pressure by means of speed controllers ❶ and ❷ .
2) Speed controller ❶ is used for adjusting the blow-off pressure of (Ⓐ), and speed controller ❷ is used for adjusting the blow-off pressure of (Ⓑ).

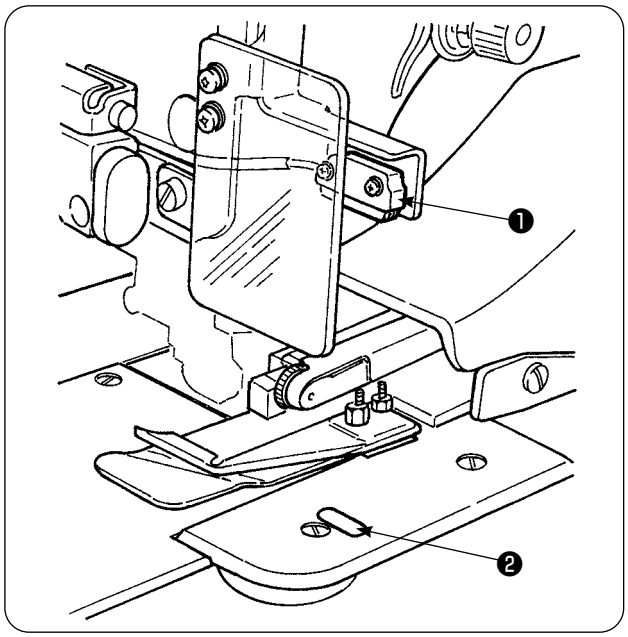
3. Hand switch

CAUTION :
When you press the start switch, the presser foot of the sewing machine comes down. Be careful not to allow your fingers to be caught under the presser foot.



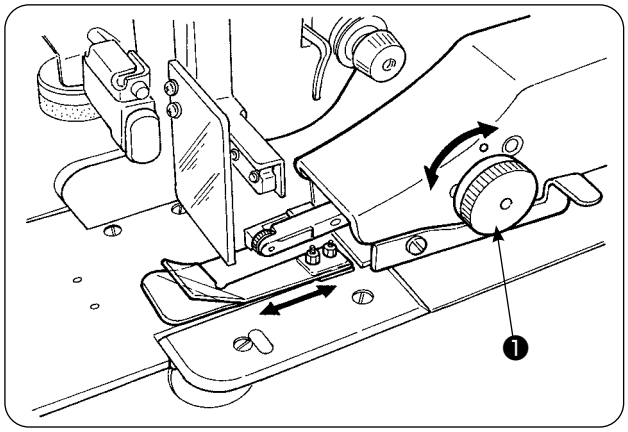
1) When the material is placed on the sewing machine under the manual start mode, LED ❷ flashes on and off.
When you press the start switch in this state, the sewing machine starts running.
2) When you press the switch while the sewing machine is in operation, the sewing machine pauses. Another press on the switch re-starts the sewing machine.

4. Material end sensor

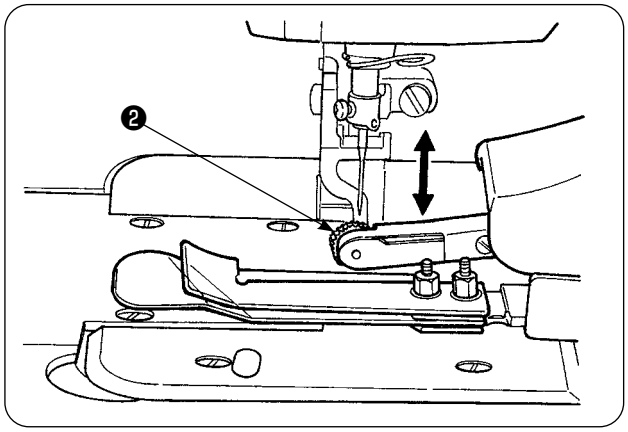


1) When material end sensor ❶ detects the end of material, the speed of stitch drops to 1,500 sti/min if the machine runs at 1,500 sti/min or more. (The factory-set value is 1,500 sti/min.)
2) When reflecting strip ❷ does not reflect light sufficiently, a malfunction can be caused. If any malfunction has occurred, replace the reflecting strip with a new one. (Part number: 40088020)
3) The initial value of the speed of stitch of the machine head after detection of the material end has been factory-set to 1,500 sti/min. However, it can be changed to 200 to 3,500 sti/min in accordance with process on the operation panel.

5. Adjusting the seam allowance

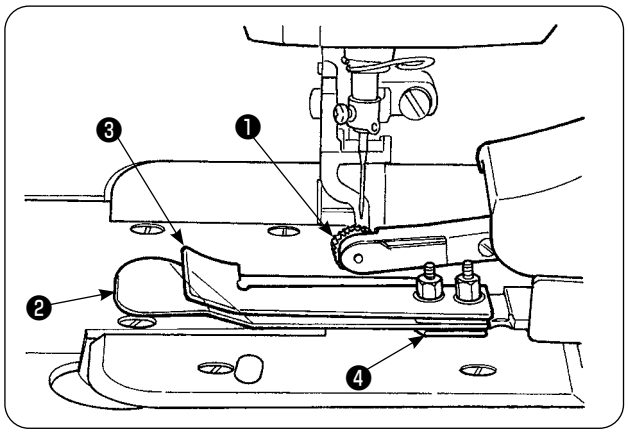


1) Seam allowance is changed by turning seam allowance adjusting knob ❶ . It is adjustable from 1 mm to 30 mm.

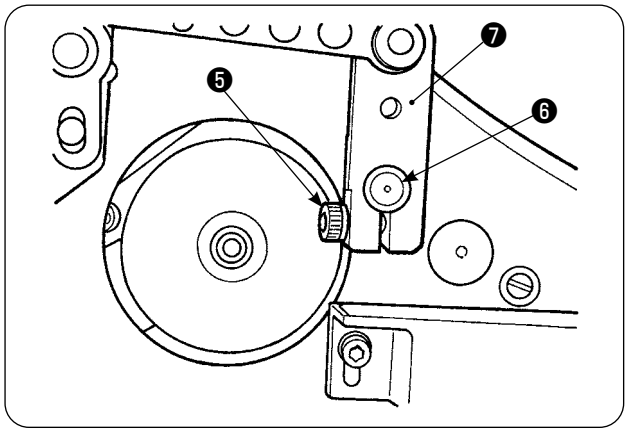


2) Check to be sure that swing arm ❷ smoothly moves up and down by pressing it with fingers.

6. Adjusting height of the upper manipulator roller



1) When you have replaced the sensor and cloth guide asm. ❹ (refer to pages 153 and 154 for how to replace them), it is necessary to adjust the clearance between roller ❶ and separation plate ❷ .

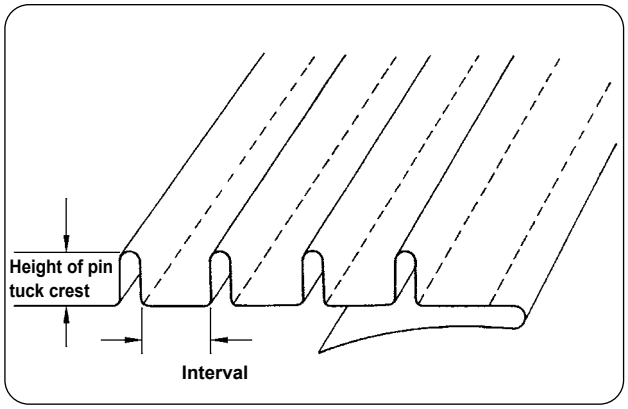


2) Loosen setscrew ❺ and move roller ❶ up and down to adjust so that the roller height matches cloth guide asm. ❹ . It is necessary to adjust the height of roller ❶ so that its underside (out periphery) does not project from the bottom face of cloth guide ❸ . Then, secure the roller with setscrew ❺ .
Secure the roller with the end face of upper manipulator shaft ❻ aligned with the end face of manipulator driving arm ❼ .

7. Pin tuck device S200 for AE-200A,AE-200AN

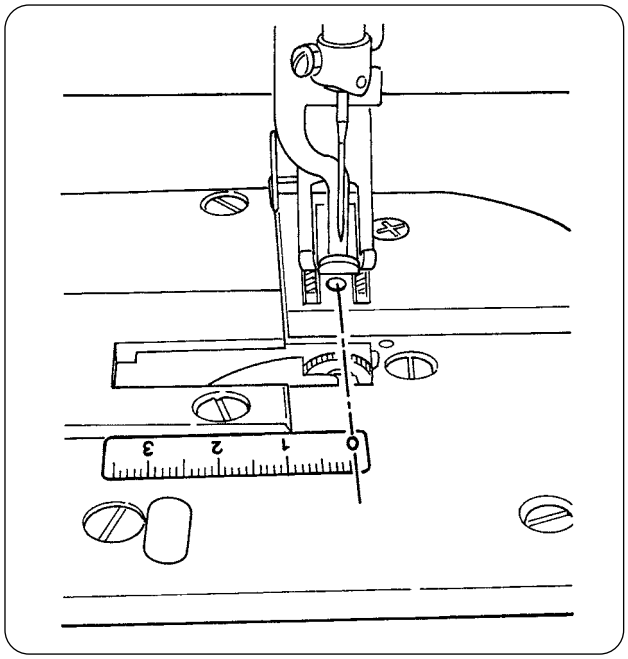
CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.

7-1. Specifications



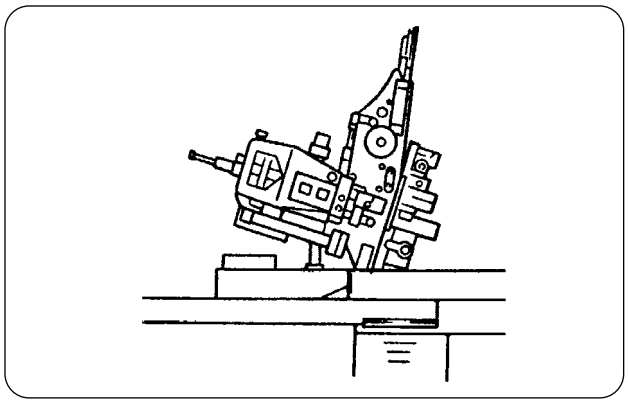
1. Pin tuck size
   Height of pin tuck crest: 1 to 30 mm
   Interval: 4 to 25 mm
   * The possible combination of specifications is "Height of crest + Interval = 50 mm" or less.
2. Speed of stitch: The best suited speed of stitch is 2,000 to 2,500 sti/min.

7-2. Adhering a scale



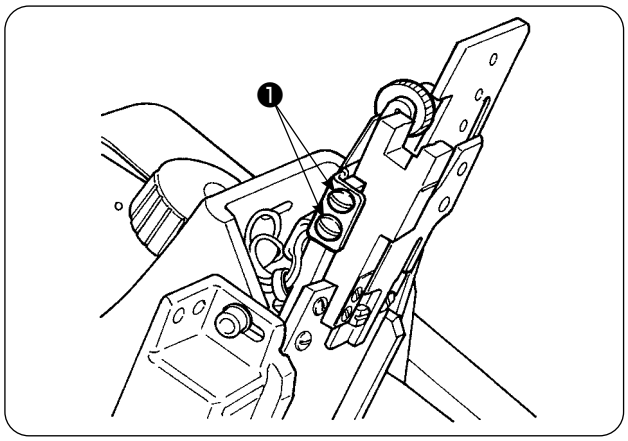
When the pink tuck device is retrofitted to the sewing machine, the scale label supplied with the unit should be adhered on the sewing machine.
Adhere the scale label on the sewing machine with its 0 (zero) position aligned with the needle entry line as illustrated in the sketch at left.

7-3. Replacing the upper manipulator sensor and cloth guide

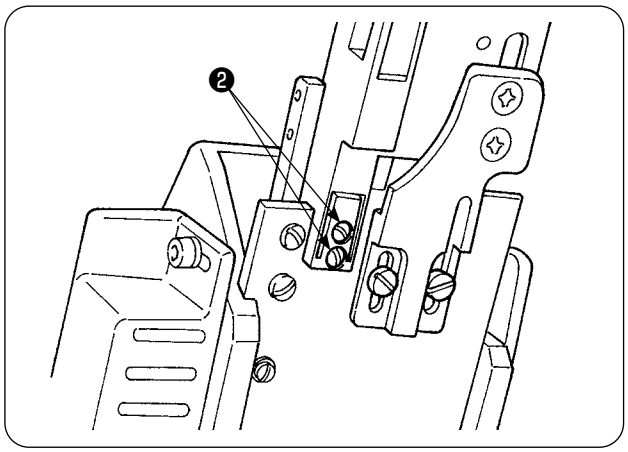


1) To replace the sensor, tilt the sewing machine and swing the upper manipulator.

Be careful not to allow the upper manipulator to fall when you swing the upper manipulator.

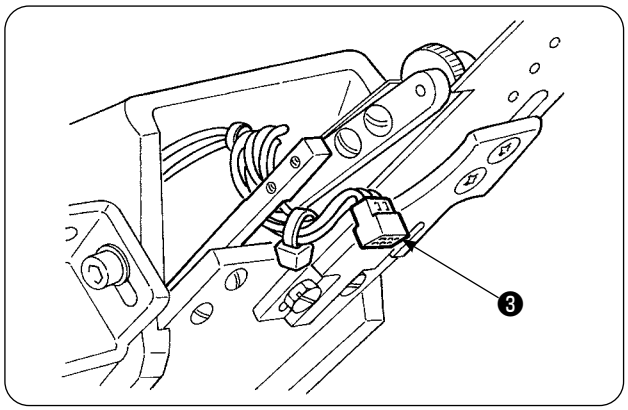


2) Remove two sensor holder setscrews ❶ . Remove the sensor holder.



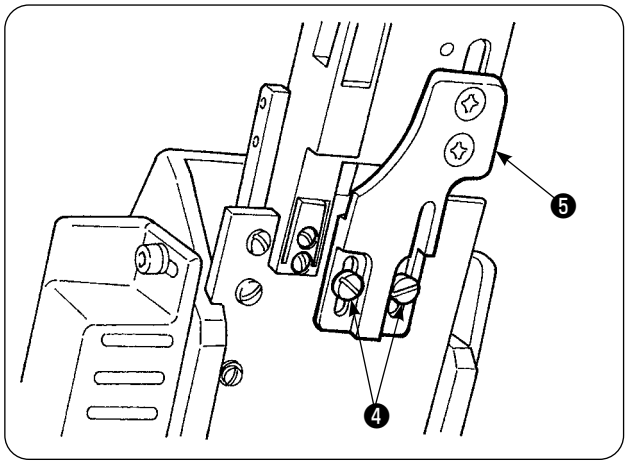
3) Remove two sensor setscrews ❷ . Remove the sensor. Change the standard sensor with the exclusive pin tuck sensor (part number: 40084103).

When securing the manipulator, adjust so that the sensor does not come in contact with the slots in the throat plate by means of two sensors ❷ .

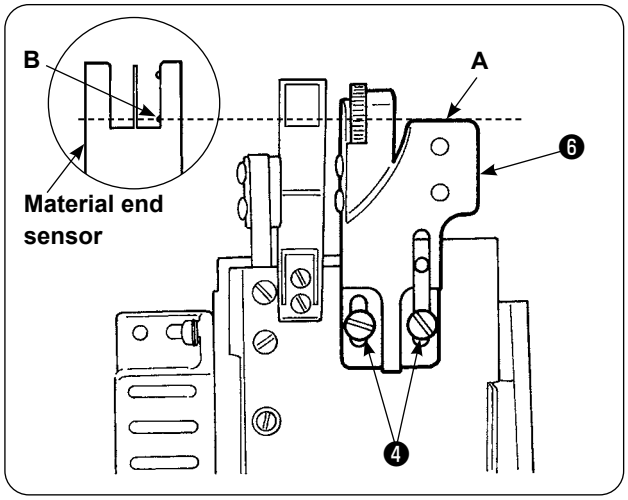


4) Remove sensor connector ❸ from the sensor. At this time, be sure to handle the connector section since it is very thin.

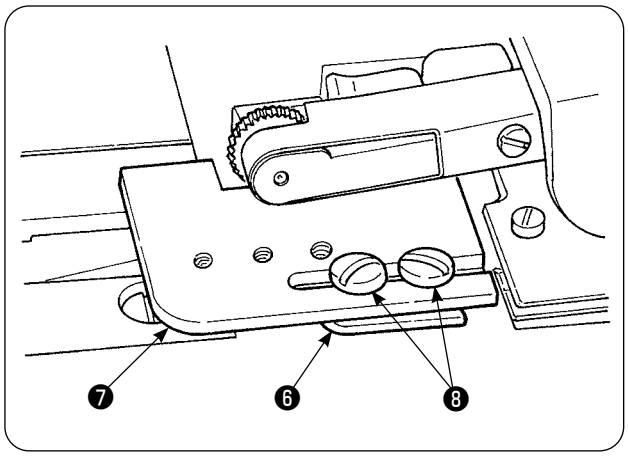
When installing the sensor connector, carefully check the orientation of the connector. (Align with the connector mark.)



5) Remove two cloth guide setscrews ❹ . Remove cloth guide ❺ .



6) Install tucking ruler base plate ❻ with two cloth guide setscrews ❹ .
Adjust tucking ruler base plate ❻ so that face (**A**) of tucking base plate ❻ is flush with section (**B**) of material end sensor (**B**).

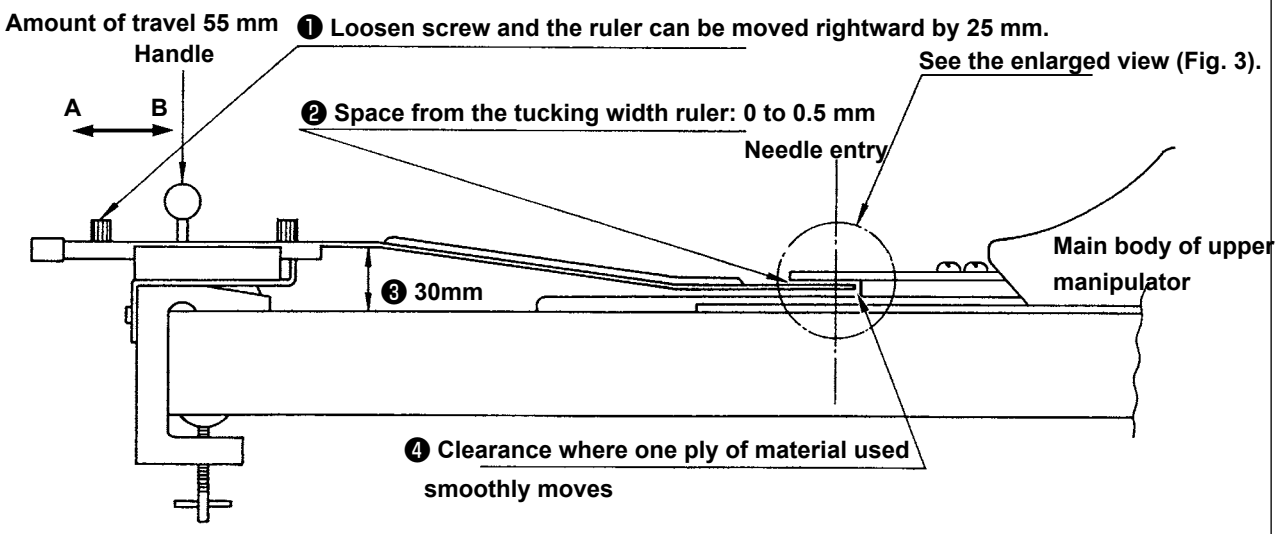


7) Mount tucking ruler ❼ on tucking ruler base plate ❻ with tucking ruler setscrews ❽ .

7-4. Installing the ruler

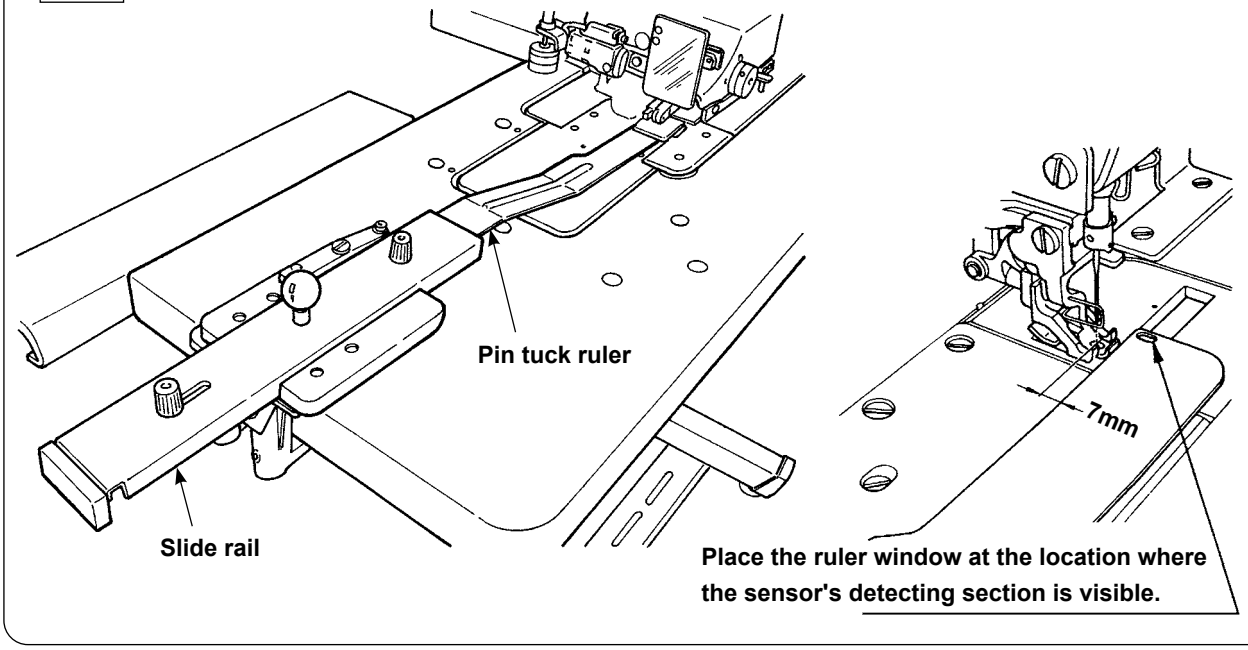
For the location of main-body ruler related parts, place the mounting base at the location shown in Fig. 1 and Fig. 2.

Fig. 1 **Mounting location of the ruler with respect to widthwise direction**



Install the mounting base on the leftmost table, and set the pin tuck ruler at the location which satisfies conditions ❷ and ❹ .

Fig. 2 **Mounting location of the ruler with respect to lengthwise direction**



With respect to the face plate, install the mounting base on the machine table so that the front end of pin tuck ruler is spaced 7 mm from the needle entry (in parallel to the red line). At this time, place the ruler at the location where two sensor detecting sections under the base are visible.

Fig. 3 Sewing position

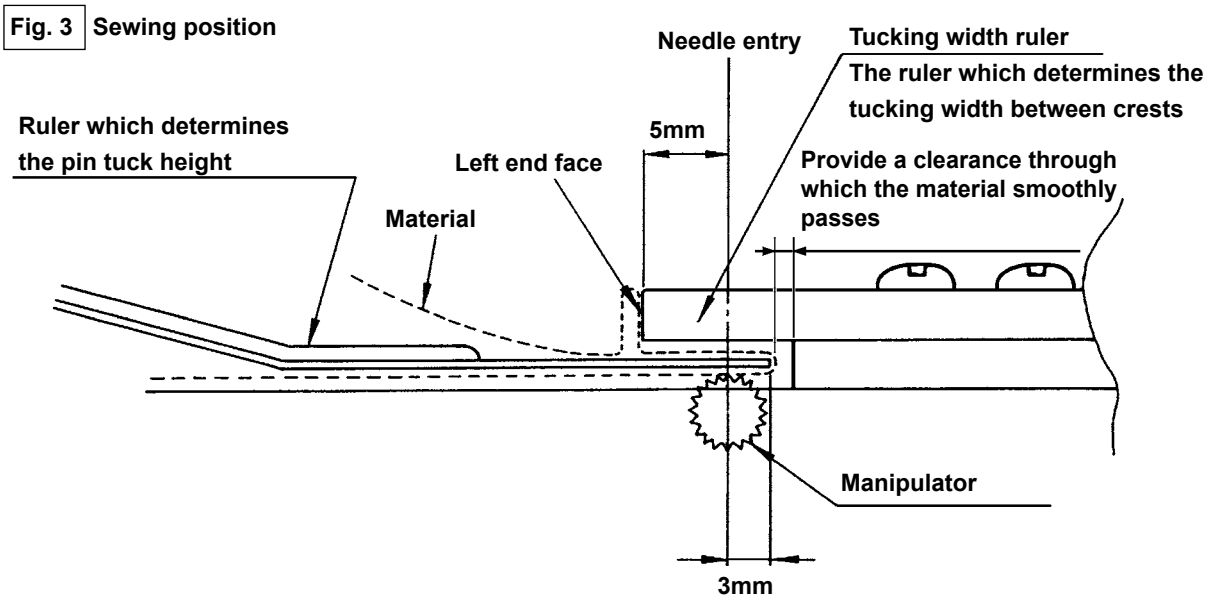
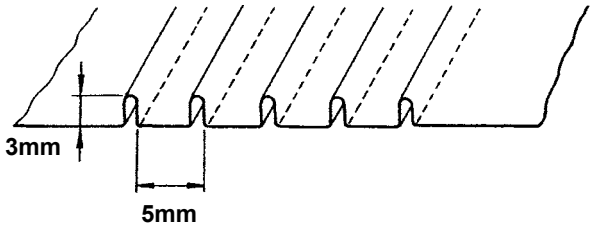
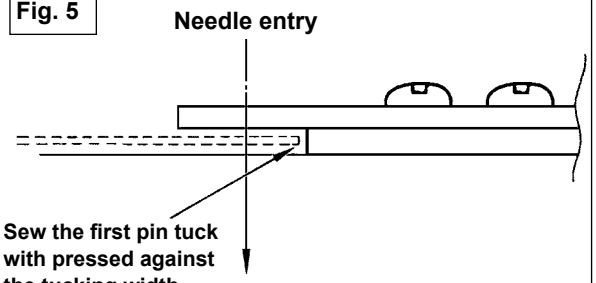


Fig. 4 Example of use



For sewing pin tucks of 5 mm in tucking width and 3 mm in height, the mounting location of the ruler is as illustrated in Fig. 3. The finished pin tucks are as illustrated in Fig. 4.

Fig. 5

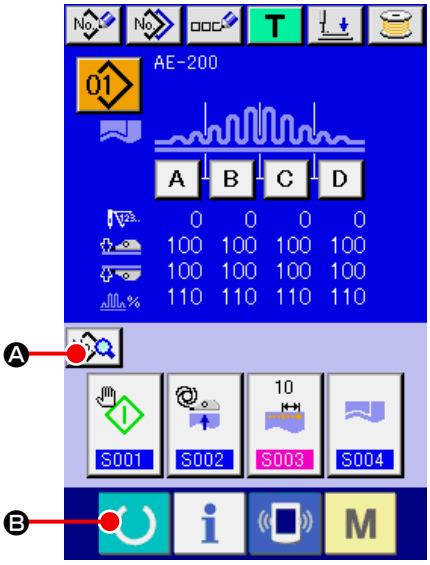


Sewing procedure

Select "without automatic material alignment" in [S02] "automatic material alignment" on the operation panel. Select "one piece sewing" in [S04] "changeover of No. of pieces to be sewn" [S04].

Sewing of the first pin tuck is most important since it is used as reference. Extremely careful when sewing the pin tuck. Note that the manipulator pressure should be set to a relatively lower value for sewing the first piece of material.

■ Method for setting the operation panel

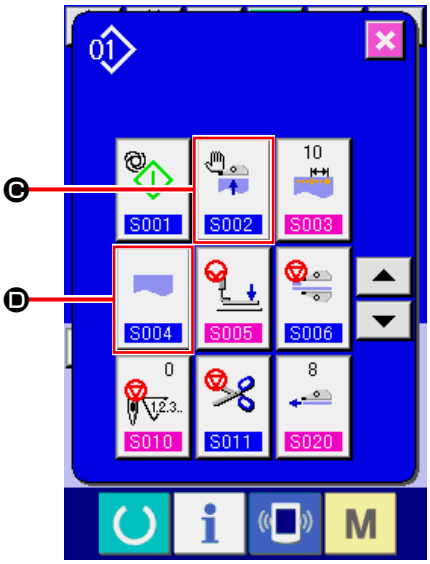


① **Displaying the data input screen.**

The set contents can be changed only on the data input screen (blue). In the case the sewing screen (green) is displayed, press READY key (Ⓑ) to display the data input screen.

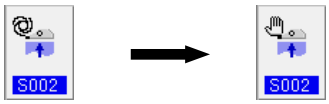
② **Displaying the sewing data editing screen.**

When press SEWING DATA EDIT button (Ⓐ) on the data input screen, the sewing data screen is displayed. On this screen, the sewing data of the currently-selected pattern can be edited.

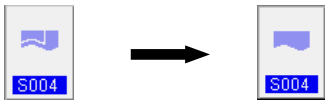


③ **Changing the sewing data.**

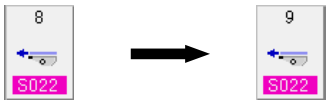
Select [S02] "Automatic material alignment "(Ⓒ). Select "Without automatic material alignment".



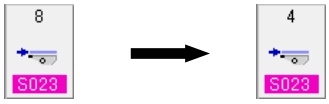
Select [S04] "Changeover of number of pieces to be sewn" (Ⓓ). Select "One piece sewing".



Select [S22] "Manipulator lower rake-out speed" (Ⓔ). Change the set value from 8 to 9.



Select [S23] "Manipulator lower pull-in speed" (Ⓕ). Change the set value from 8 to 4.



After you have completed the setting procedure, press the READY key (Ⓑ) to bring the sewing machine back to the set-ready state for sewing. Then, run the sewing machine.

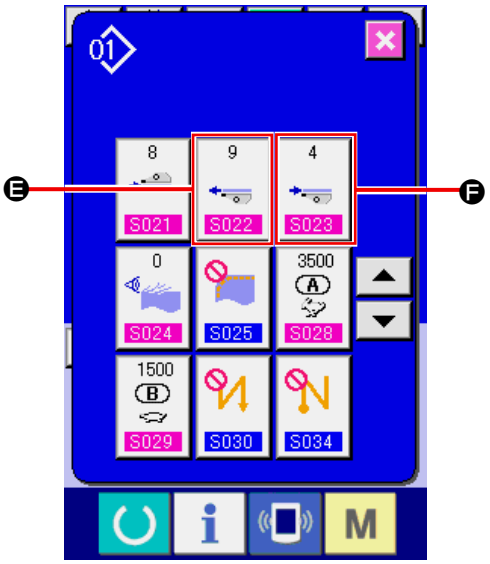
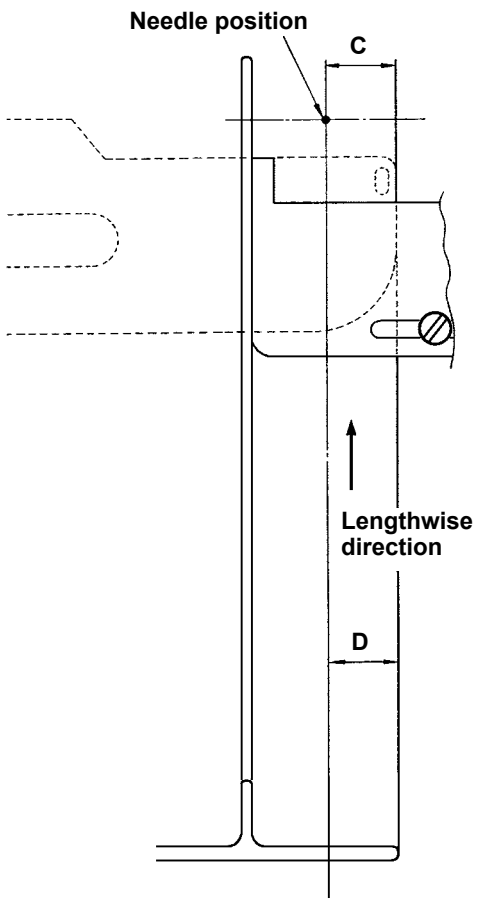


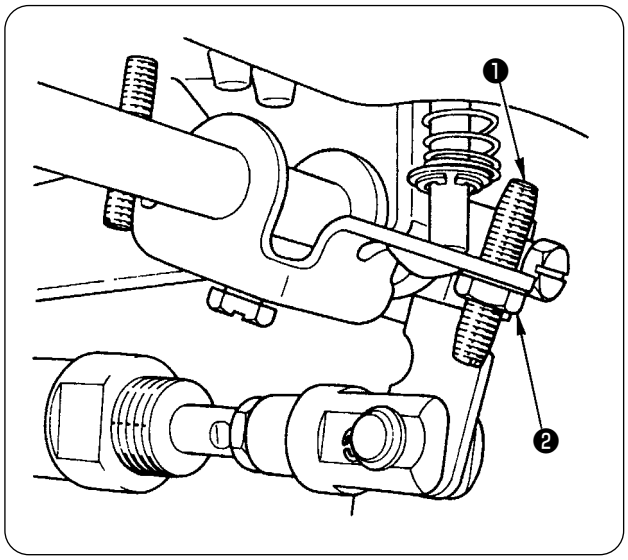
Fig. 6



1) Draw the handle of the pin tuck ruler in direction (**A**) as shown in Fig. 1. When you have brought the ruler away from the material, fold the material into two (at the dotted line) as shown in Fig. 5 and sew the material with pressed against the guide. For the first piece of material, it is recommended to fold the material into two with an iron or the like beforehand to make a reference line to be used to fold it on the sewing machine.
2) Put the first piece of material onto the left end face of the tucking width ruler (see Fig. 3), move the handle in direction (**B**) in such a way as to insert the pin tuck ruler under the material (see Fig. 1), and secure the slide rail with the magnet (see Fig. 2). Place the top end of the material with respect to the direction of sewing at the needle entry position, press the start switch or depress the pedal to start sewing. It is recommended to guide the material with your right or left hand during sewing to achieve neat finish.
3) Set the lower manipulator pressure at 90 to 120 first. Then, adjust it in accordance with the material to be used. The best-suited speed of stitch is 2,000 to 2,500 sti/min.
4) If the crests of pin tucks warp, adjust the top feed amount.
5) The tucking width ruler comes in four different types, S, A, B, and C. The S type ruler is for pin tucks with a lower crest. The C type ruler is for pin tucks with a higher crest. Change the ruler according to the pin tuck specifications.
6) As shown in Fig. 1, the clearance provided between the pin tuck ruler and the tucking width ruler greatly affects the finish quality of pin tucks. When you place the material on the machine, be sure to check that the material moves smoothly. If the material does not move smoothly, bend the pin tuck ruler by hand to correct it appropriately.
7) For sewing conditions where pin tucks crest height (**C**) of which is more than 15 mm as shown in Fig. 6, set (**D**) section of the material firstly to the same width as C in the figure, then start sewing.

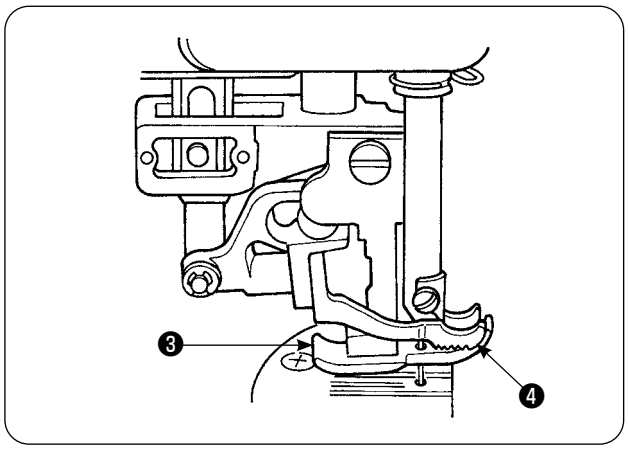
VIII. ADJUSTING THE SEWING MACHINE

1. Adjusting the presser foot lifting lever



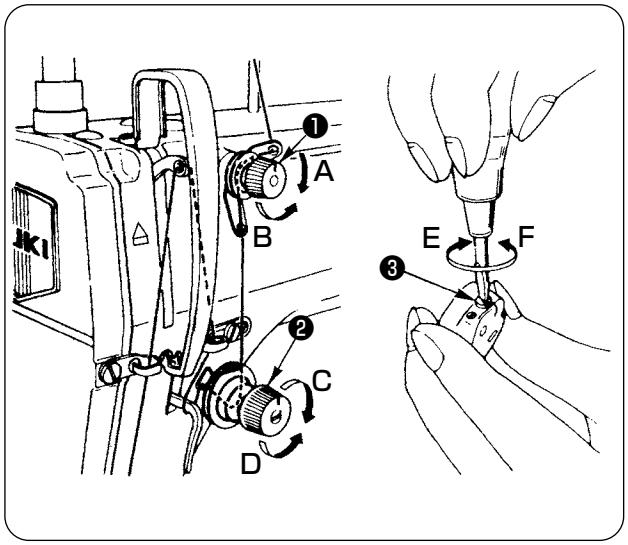
1) The maximum lift of the presser foot by means of the presser foot lifting lever is 10 mm.
2) The presser foot lift can be adjusted by means of presser foot lifting lever adjusting screw ❶ .
3) To increase the presser foot lift, re-adjust it by loosening nut ❷ and adjusting screw ❶ .

If you start the sewing machine with presser foot ❸ raised by presser foot lifting lever, the needle bar may hit against walking foot ❹ . So, be careful.



When you have changed the setting of [U25] to "Material placement with the needle lowered" as described in **"VI-20-[U24] Material placement with the needle lowered" p.89**, lower the presser foot height by the presser foot lifting lever.
If it is not adjusted, the needle bar will come in contact with the presser foot and the walking foot when the needle bar comes down by pressing the START button. It is therefore necessary to adjust the presser foot height.

2. Thread tension



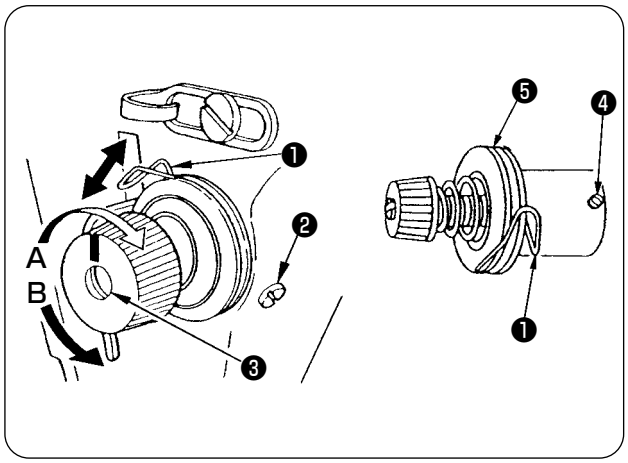
1. **Adjusting the needle thread tension**

1) The length of thread remaining at the needle after thread trimming is shortened by turning tension regulating nut No. 1 ❶ clockwise (**A**).
2) The aforementioned thread length is lengthened by turning the tension regulating nut No. 1 counterclockwise (**B**).
3) The needle thread tension is increased by turning tension regulating nut ❷ clockwise (**C**).
4) The tension is decreased by turning the tension regulating nut counterclockwise (**D**).

2. **Adjusting the bobbin thread tension**

1) The bobbin thread tension is increased by turning bobbin thread tension regulating spring ❸ clockwise (**E**).
2) The tension is decreased by turning the thread tension regulating spring counterclockwise (**F**).

3. Thread take-up spring



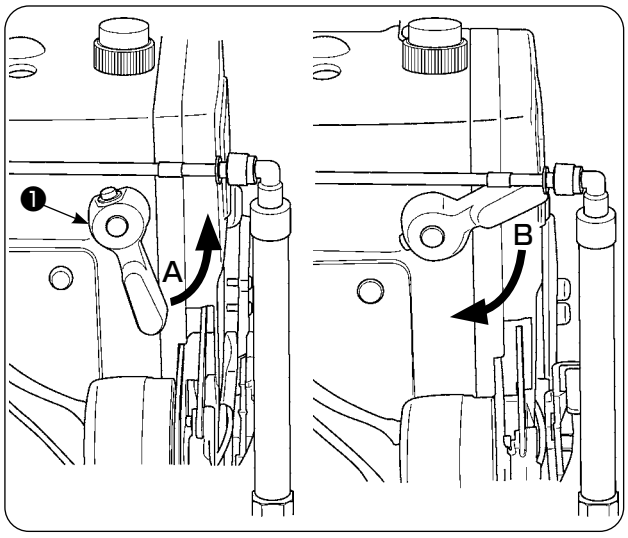
1. **To change the stroke of thread take-up spring ❶**

1) Loosen setscrew ❷ in the tension post socket.
2) The stroke is increased by turning tension post ❸ clockwise (**A**).
3) The stroke is decreased by turning the tension post counterclockwise (**B**).

2. **To change the pressure of thread take-up spring ❶**

1) Loosen setscrew ❷ , and remove thread tension regulator (asm.) ❺ .
2) Loosen setscrew ❹ in the tension post.
3) The pressure of the thread take-up spring is increased by turning tension post ❸ clockwise (**A**).
4) The tension is decreased by turning the thread tension regulating spring counterclockwise (**B**).

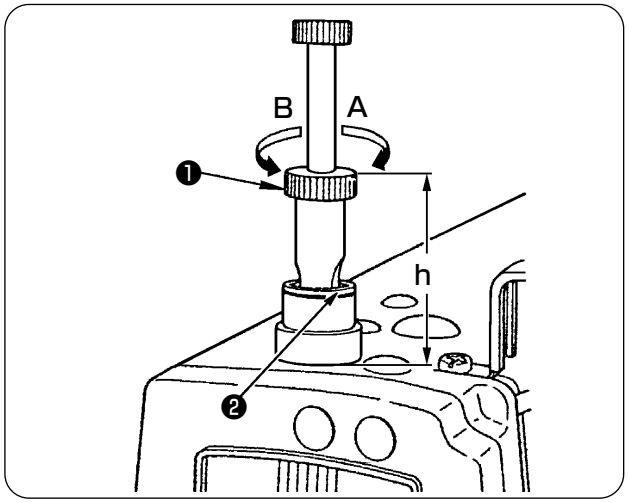
4. Presser foot lifting lever



1) To stop the presser foot at the raised position, turn presser foot lifting lever ❶ in direction (**A**).
2) The presser foot goes up by 5 mm and stops. The presser foot returns to its home position by turning presser foot lifting lever downward in direction (**B**).
3) The presser foot can be raised up to approximately 10 mm by means of the presser foot lifting lever.

5. Adjusting the presser foot pressure

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

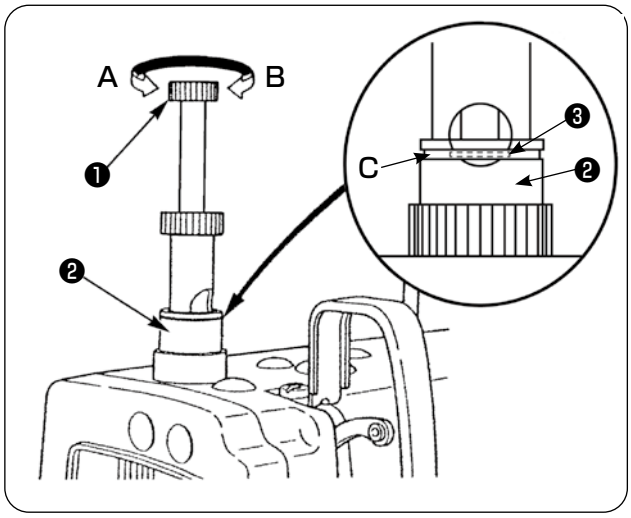


1) Loosen nut ❷ . The pressure foot pressure is increased by turning presser spring regulator ❶ clockwise (**A**).
2) The tension is decreased by turning the tension regulating nut counterclockwise (**B**).
3) After the adjustment, tighten nut ❷ .
4) For general fabric, standard height (**h**) of the presser spring regulator is approximately 45 mm.

If the presser foot pressure and walking foot pressure are excessively high, the presser foot may fail to go up to its highest position when the auto-lifter is used.

6. Adjusting the walking foot pressure

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

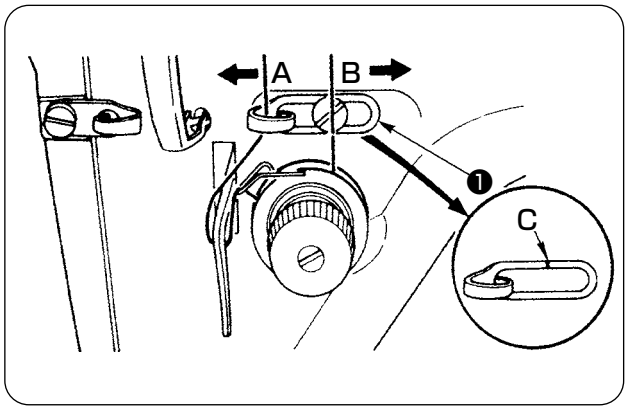


1) The walking foot pressure is increased by depressing walking foot pressure regulating knob ❶ and turning it clockwise (**A**), or decreased by turning it counterclockwise (**B**) .
(Be sure to turn the walking foot pressure regulating stud with securely depressed.)
2) The standard pressure of the working foot is obtained when snap ring ❸ (silver) located inside the circular hole in the pressure regulator spring is aligned with the white line (**C**) on pressure regulating nut ❷ when walking foot pressure regulating stud ❶ is depressed.
3) Adjust the walking foot pressure according to the type of material and process referring to the standard value obtained as described above.

If the walking foot pressure is excessive or the presser foot pressure is lower than the walking foot pressure, the presser foot may rise above the standard position. In this case, the presser foot may not provide adequate efficiency of feed or may damage the material. So be careful.

7. Adjusting the thread take-up amount by thread take-up lever

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

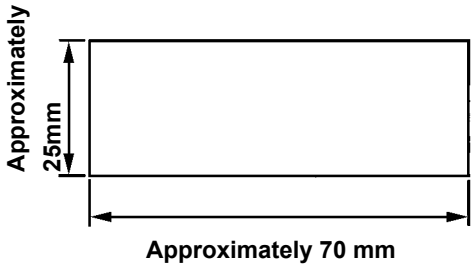


1) When sewing a heavy-weight material, increase the thread take-up amount by moving take-up thread guide ❶ leftward (**A**).
2) When sewing a light-weight material, decrease the thread take-up amount by moving take-up thread guide ❶ rightward (**B**).
3) The standard position of needle thread guide ❶ is obtained by aligning marker line (**C**) with the center of the screw.

8. How to adjust the amount of oil (oil splashes) in the hook

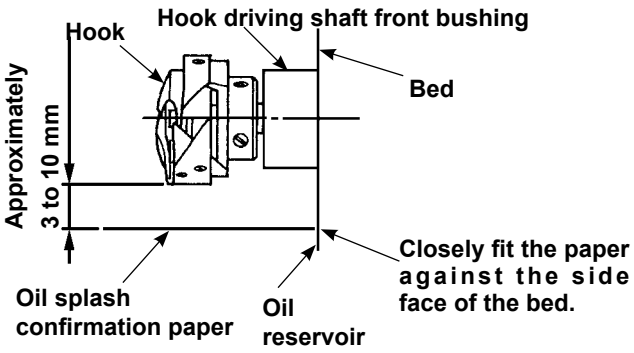
CAUTION :
The hook rotates at a high speed since the oil amount is to be checked while the machine is in operation. Be extremely careful when you adjust the oil amount in order to protect against personal injury.

① **Oil amount (oil splashes) confirmation paper**



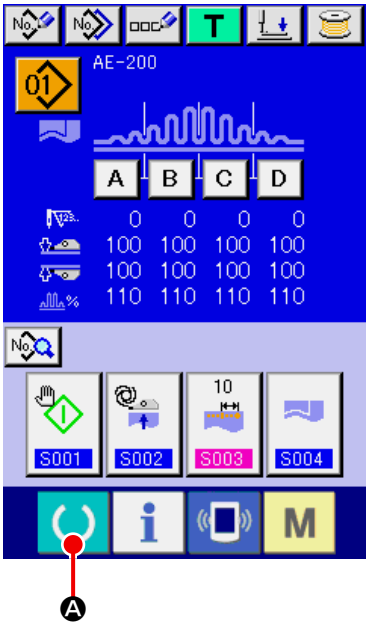
*Use any paper available regardless of the material.

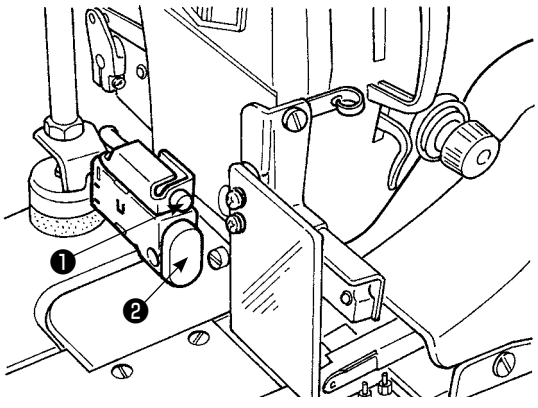
② **Position to confirm the oil amount (oil splashes)**



* Place the oil amount (oil splashes) confirmation paper under the hook.

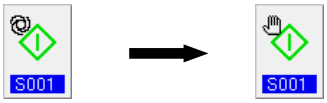
CAUTION :
When checking the amount of oil (oil splashes) in the hook, be extremely careful not to allow your fingers to come in contact with the hook.





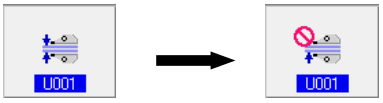
① **Turning ON the power to the sewing machine.**
When you turn ON the power to the sewing machine, the initial screen is displayed to allow you to change the set contents.

② **Setting the start mode to the manual mode.**



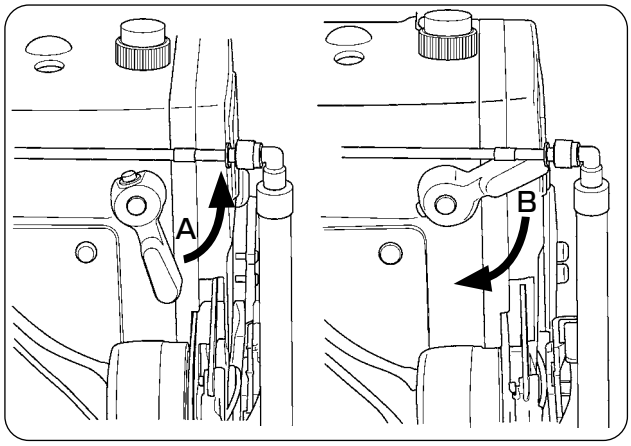
(Set the start mode referring to **"VI-10. Changing sewing data" p.57**.)

③ **Stopping operation of the manipulators.**



(Set the manipulators referring to **"VI-19. Changing the memory switch data" p.85**.)

④ When you press the READY key (Ⓐ), the sewing screen is displayed, presser foot of the sewing machine goes up and LED ❶ flashes on and off.



⑤ When you turn the presser foot lifting lever in direction (**A**) and press START switch ❷ , the presser foot of the sewing machine comes down and the sewing machine head starts rotating.

⑥ When you press START switch ❷ again after having checked the oil amount, the sewing machine head stops.

⑦ After completion of oil-amount checking, turn the presser foot lifting lever in direction (**B**) to lower the presser foot of the sewing machine.

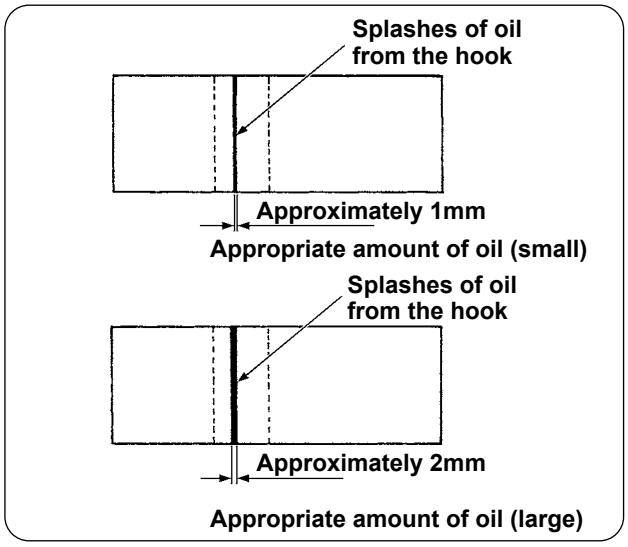
* If the machine head is not sufficiently warm, idle the machine for approximately three minutes. (Moderate intermittent operation)

* Place the oil amount (oil splashes) confirmation paper under the hook while the sewing machine is in operation.

* Check to be sure that the oil level in the oil reservoir is between HIGH and LOW.

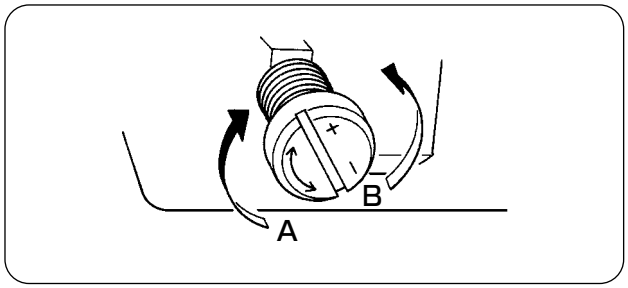
* The length of time required for checking the oil amount (oil splashes) is five seconds. (Check the length of time with a watch.)

• Sample showing the appropriate amount of oil



1) The appropriate amount of oil shown in the sample at left has to be finely adjusted to increase or decrease in accordance with the sewing process. Be extremely careful not to excessively increase or decrease the oil amount.
   • Excessively small amount of oil = The hook will be seized (the hook will be hot).
   • Excessively large amount of oil = The product will be stained with oil.
2) Check the oil amount (oil splashes) three times (with three sheets of paper). Adjust the oil amount so that it does not change among three times of checking.

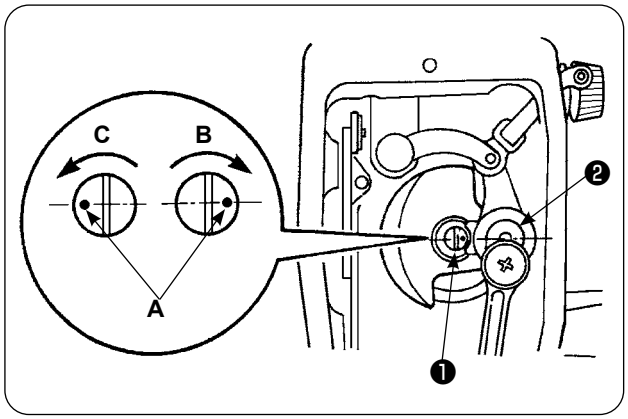
• Adjusting the amount of oil (oil splashes) in the hook



1) The oil amount (oil splashes) in the hook is increased by turning the oil amount adjustment screw mounted on the hook driving shaft front bushing in direction (**A**) (toward “+”), or decreased by turning it in direction (**B**) (toward “-”).
2) After the adjustment of the oil amount in the hook with the oil amount adjustment screw, idle the sewing machine for approximately 30 seconds. Then, check the oil amount (oil splashes).

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

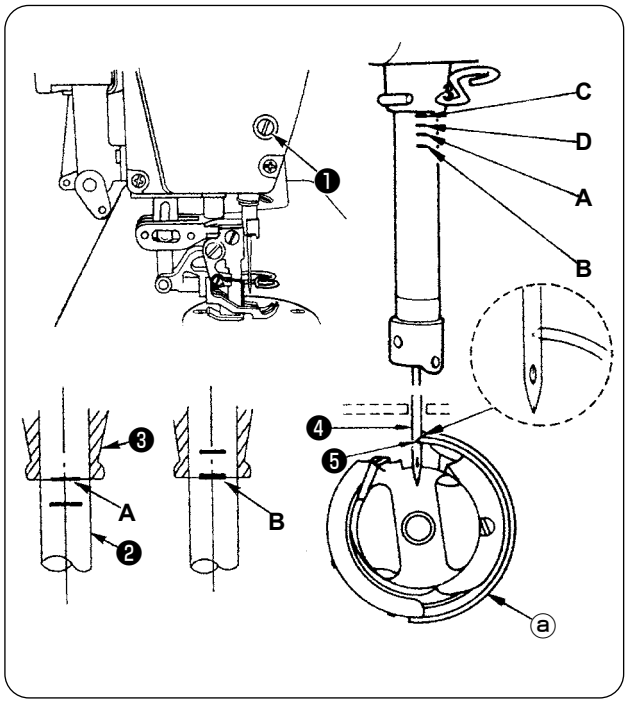
・Adjustment of the oil amount in the frame



1) Adjust the amount of oil supplied to the thread take-up lever and needle bar crank section ❷ by turning oil amount adjust pin ❶ .
2) The oil amount supplied is minimized when marker dot (**A**) on the adjust pin is brought near needle bar crank ❷ by turning the adjust pin in direction (**B**).
3) The oil amount supplied is maximized when marker dot A on the adjust pin is brought to the direct opposite position of needle bar crank ❷ by turning the adjust pin in direction (**C**).

9. Needle-to-hook relation

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.



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

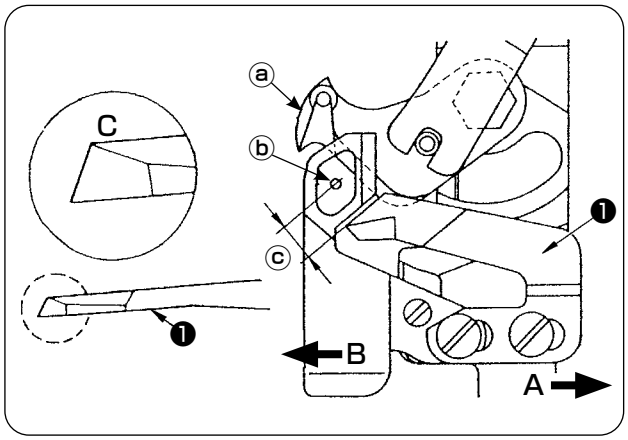
1) Turn the handwheel to bring the needle bar down to the lowest point of its stroke. Loosen needle bar connection setscrew ❶ .
2) Determine the needle bar height.
   [For DB needle]
   Align marker line (**A**) on needle bar ❷ with the bottom end of needle bar lower bushing ❸ , and tighten needle bar connection setscrew ❶ .
   [For DA needle]
   Align marker line (**C**) on needle bar ❷ with the bottom end of needle bar lower bushing ❸ , and tighten needle bar connection setscrew ❶ .
3) Determine the mounting position of hook ⓐ .
   [For DB needle]
   Loosen three setscrews in the hook. Turn the handwheel to align marker line (**B**) with the bottom end of needle bar lower bushing ❸ while needle bar ❷ is going up.
   [For DA needle]
   Loosen three setscrews in the hook. Turn the handwheel to align marker line (**D**) with the bottom end of needle bar lower bushing ❸ while needle bar ❷ is going up.
4) In the aforementioned state, align hook blade point ❺ with the center of needle ❹ . Adjust so that a clearance of 0.04 to 0.1 mm (reference value) is provided between the needle and hook, then securely tighten the hook setscrews.

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

* The part number of the hook used is 11038650. Replace the hook with a hook with the same part number when necessary.

10. Counter knife

CAUTION :
- **To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.**
- **To prevent personal injury or death, keep your hands and fingers away from the knife blade.**
- **To prevent accidents caused by the worker's unfamiliarity to the machine or by improper adjustment, the sewing machine shall be maintained by a maintenance technician who is familiar to the sewing machine and has been trained in maintenance.**

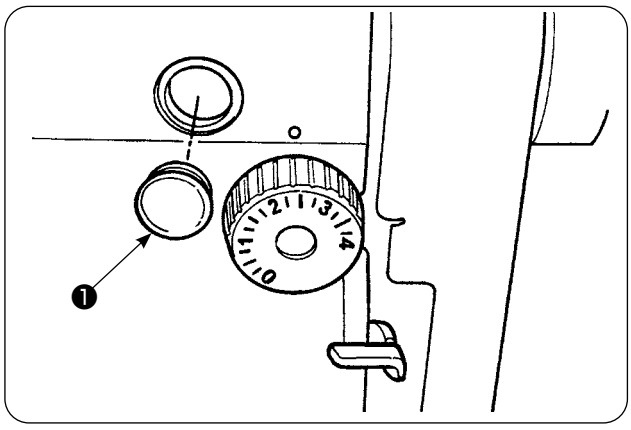


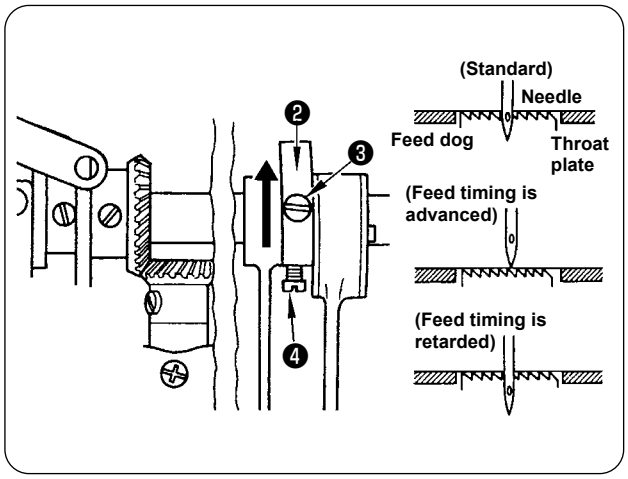
1) When the knife has become blunt, re-sharpen counter knife ❶ as illustrated in Fig. (**C**) and re-install it properly.
2) When the counter knife is moved rightward (**A**) from the standard mounting position, the length of thread remaining after thread trimming becomes longer than the standard length by the length of move of the knife.
3) When the counter knife is moved leftward (**B**), the length of thread becomes shorter than the standard length by the length of move of the knife.

ⓐ Moving knife
ⓑ Center of needle
ⓒ Standard: 4.0 mm

11. Adjusting the feed timing

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.





1) Remove rubber plug ❶ and carry out adjustment.

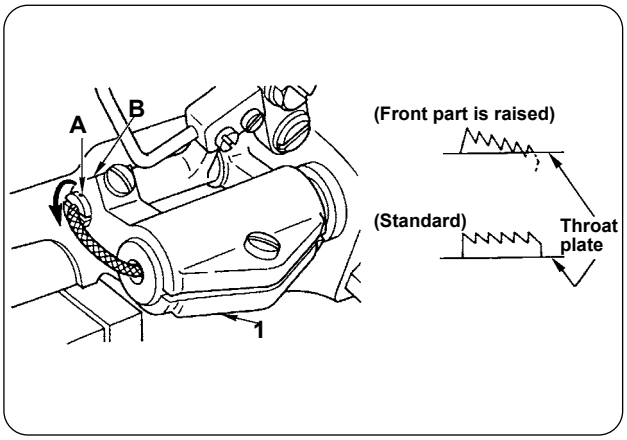
After completion of the adjustment, apply sealing agent to rubber plug 1 and mount it back to its position.

2) Loosen setscrews ❸ and ❹ in feed eccentric cam ❷ and move the feed eccentric cam in the direction of the arrow or the opposite direction of the arrow for adjustment. Then, securely tighten the setscrews.
3) To adjust to the standard timing, adjust so that the top face of the feed dog and top end of the needle eyelet are aligned with the top face of the throat plate when the feed dog comes down under the throat plate.
4) To advance the feed timing for the purpose of prevention of uneven material feed, move the feed eccentric cam in the direction of the arrow.
5) To retard the feed timing for the purpose of produce well-tensed seams, move the feed eccentric cam in the opposite direction of the arrow.

If the feed eccentric cam is excessively moved from the standard position, needle breakage will be caused.

12. Inclination of the feed dog

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.

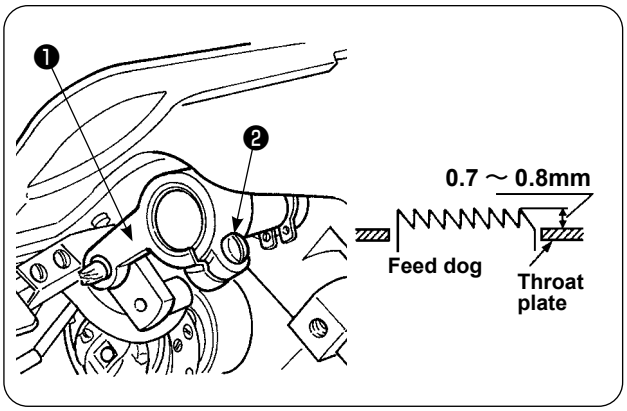


1) The standard inclination (horizontal) of the feed dog is obtained when marker dot (**A**) on the feed bar shaft is aligned with section (**B**) of feed bar base arm ❶ .
2) To adjust the inclination of the feed dog so that its front part is raised for the purpose of prevention of puckering, loosen the setscrew, insert a screwdriver into the feed bar shaft and turn the shaft in the direction of the arrow by 90 degrees of an angle.
3) To adjust the inclination of the feed dog so that its rear part is raised for the purpose of prevention of uneven material feed, turn the shaft in the opposite direction of the arrow by 90 degrees of an angle.

When you have adjusted the feed dog inclination, the feed dog height may change. So, be sure to re-check the feed dog height.

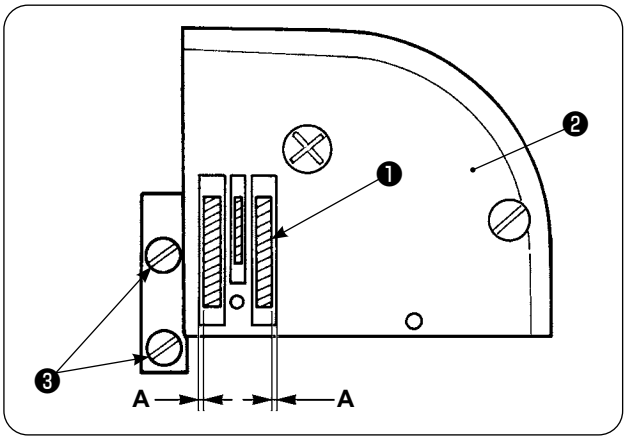
13. Height of the feed dog

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.



1) Jutting amount of the feed dog from the throat plate has been factory-adjusted to 0.7 to 0.8 mm at the time of delivery.
2) In the case of sewing a light-weight material, stitch gathering may result if the jutting amount of the feed dog is excessive.
3) To adjust the height of the feed dog
   ① Loosen clamping screw ❷ in feed driving arm ❶ .
   ② Adjust the feed dog height by moving the feed bar up or down.
   ③ Securely tighten clamping screw ❷ .

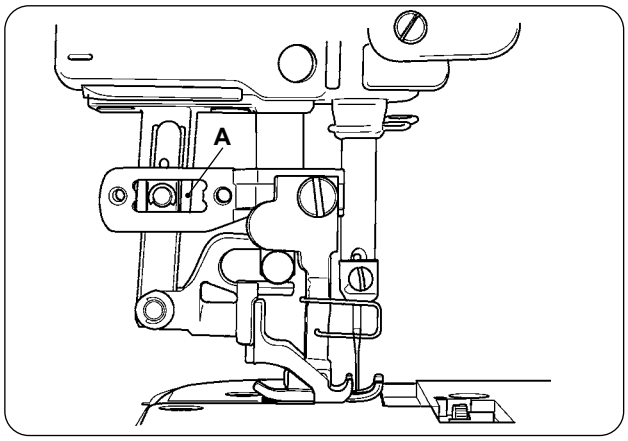
14. Lateral position of the feed dog



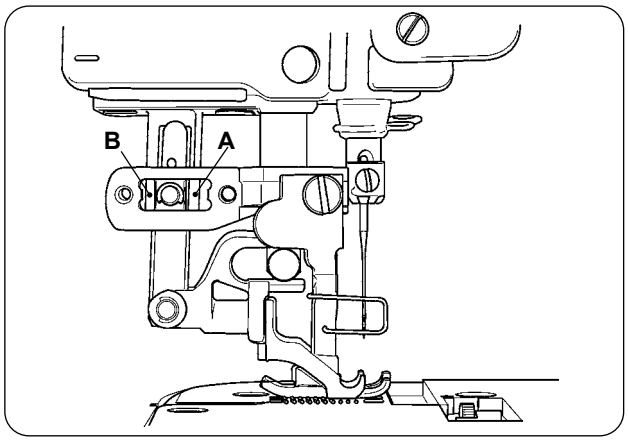
1) Adjust the lateral position of feed dog ❶ so that right and left clearances A between the feed dog ❶ and slots in throat plate ❷ are in parallel and equal by means of setscrews ❸ in the feed dog. After the adjustment, secure the feed dog by tightening the setscrews.

15. Precautions to be taken when correcting the longitudinal position of the walking foot

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine beforehand.



1) The standard lateral position of the walking foot is obtained when a clearance of 1 mm is provided in section (**A**) by maximizing the top feed amount and bringing the walking foot to the front end position of its stroke. Adjust the longitudinal position of the walking foot so as to avoid abnormal noise or extra load while the sewing machine is in operation.

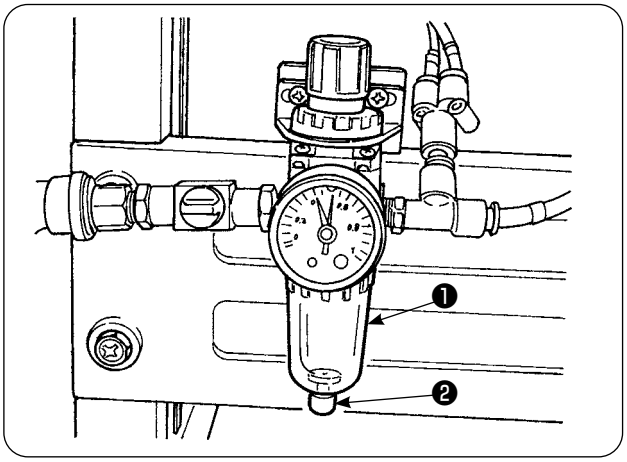


2) To operate the sewing machine with the longitudinal position of the walking foot slightly displaced, be sure to secure a clearance of 1 mm or more at sections (**A**) and (**B**) with the feed amount maximized.

IX. MAINTENANCE AND INSPECTION

1. Draining the filter regulator

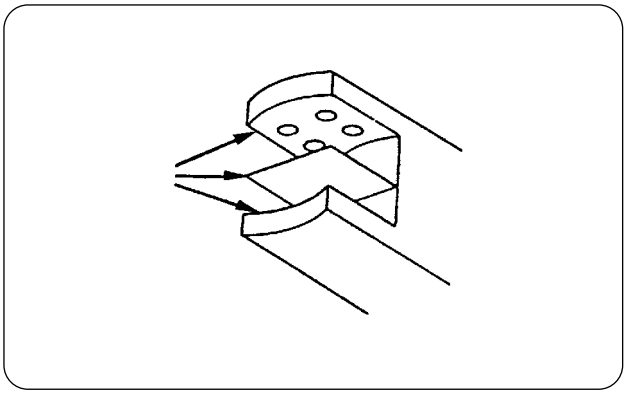
CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.



1) Drain regulator ❶ before using the sewing machine to expel water from the regulator. (Loosen knob ❷ to drain the regulator.)
2) Water content affects the pneumatically controlled components. So, be careful.
3) When the air pressure drops, the pressure gauge switch for regulator ❶ is activated to cause an error.

2. Cleaning the sensor

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.

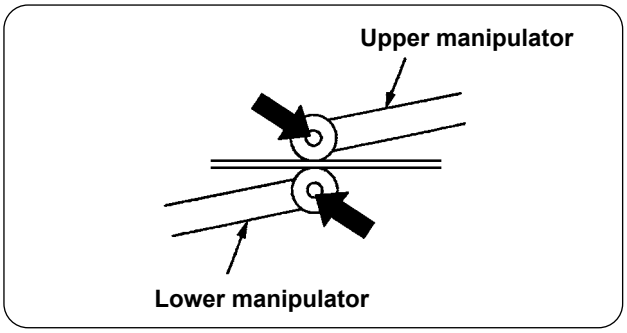


1) When sensor is stained with dust, malfunction will result. Blow away dust from the lens, slits, angular part at the back of the sensor, and reflecting plate with an air gun supplied with the unit.
2) When the sensor is stained with oil, dust will easily gather on the sensor. If the sensor is stained with oil by any possibility, remove it with benzine or the line immediately.

Carefully clean up the slit in the throat plate sensor in particular.

3. Lubricating the manipulator roller section

CAUTION :
To avoid possible accident due to abrupt start of the sewing machine, turn off the power to the machine and make sure that the machine does not run even when you depress the start pedal.



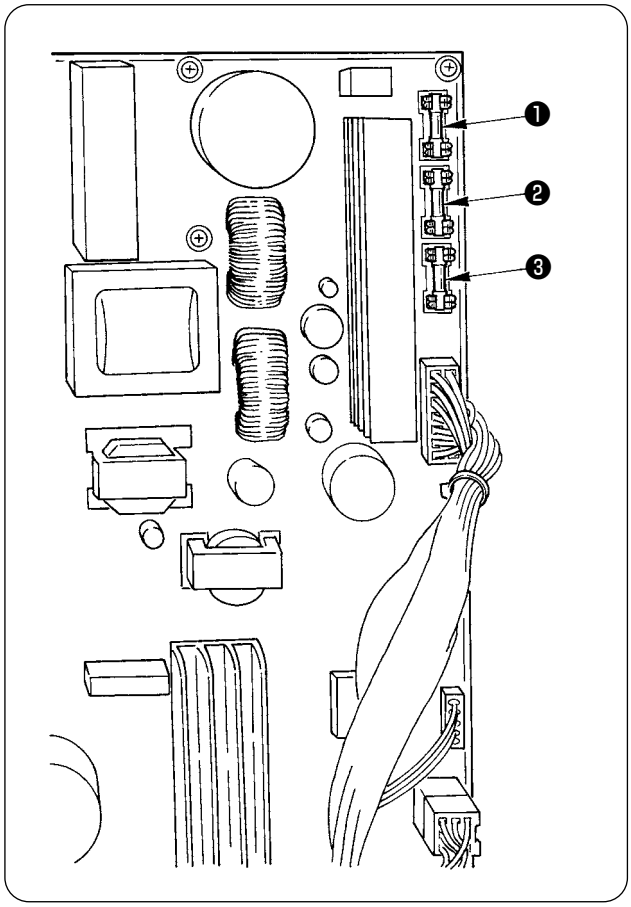
1) If the upper/lower manipulator shaft section generates abnormal noise, apply a little amount of grease on to the shaft section. (The sections shown with bold arrows in the illustration.)

4. Replacing the fuse

CAUTION :

1. In order to prevent accidents caused by electrical shock, be sure to turn OFF the power to the sewing machine and wait for five minutes before opening the cover.

2. Be sure to open the control box cover after having turned OFF the power switch, and replace the fuse with a new one of the designated capacity.



Use three fuses.

❶ For protection of the power to the stepping motor
5 A (Time lag fuse)

❷ For protection of the power to the solenoid and stepping motor
3.15 A (Time lag fuse)

❸ For protection of the power to the control box
2 A (Quick blowout type fuse)

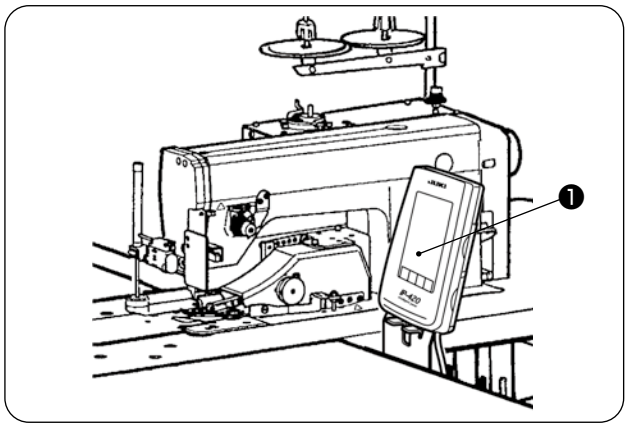
5. List of optional parts for AE-200AN

Part name	Part number
Pin tuck device	40088621
2-pedal unit	40084064
Bobbin thread remaining amount detecting device	40088623
Stacker device	40088624
Electric bobbin winding device	40088627
4/4 sensor for heavy-weight materials	40084101
4/4 cloth guide for heavy-weight materials	40088212
2/2 sensor for light-weight materials	40084102
2/2 cloth guide for light-weight materials	40088211
Thread breakage detecting device	40088632
Throat plate for light-weight materials	40098871
Feed dog for light-weight materials	22881700
Urethane upper feed dog	40088215
Cloth guide 4/4 for small curves	18076257
Cloth guide 4/2 for small curves	18076356
Cloth guide 2/2 for small curves	18076059
High-voltage transformer	40005422

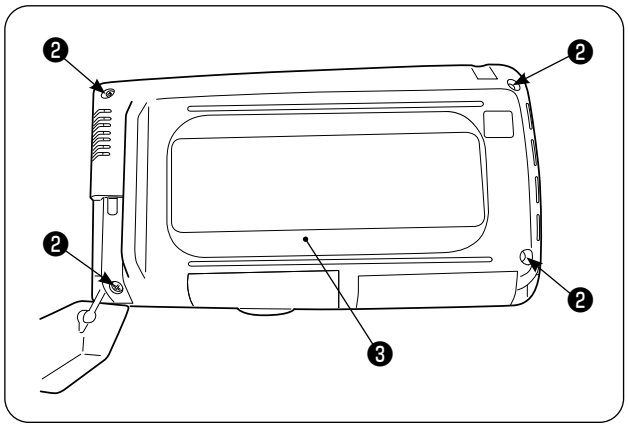
6. Disposal of batteries

The operation panel has a built-in battery to back up the memory even when the power to the operation panel is OFF.
Be sure to dispose of the battery following the local laws and regulations.

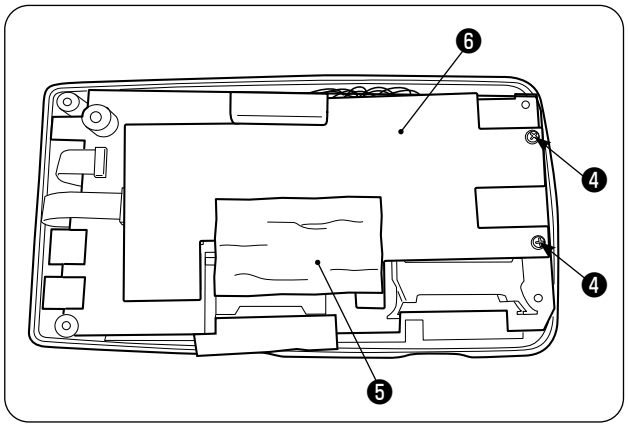
[How to remove the battery]



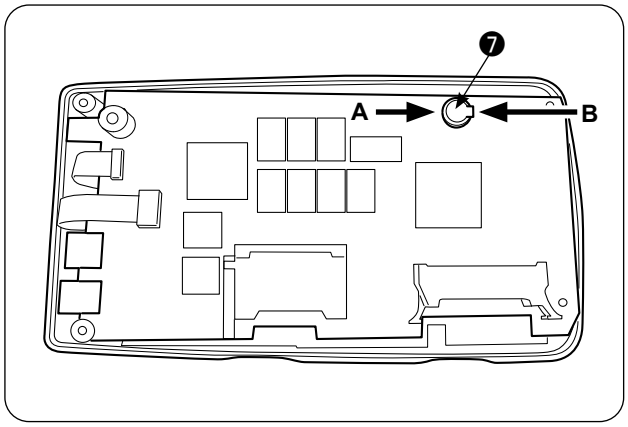
1) Remove panel ❶ from the main body of sewing machine.



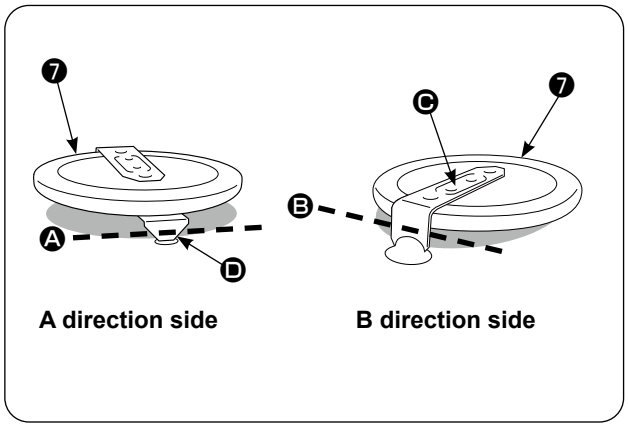
2) Loosen screw ❷ from the rear surface of the operation panel. Detach case ❸ .



3) Remove screws ❹ and remove copper foil tape ❺ . Detach shielding plate ❻ .



4) ❼ is the backup battery.
Model number: VL1220/HFR



5) Cut metal plate (Ⓓ) that secures battery ❼ with nippers or the like at position (Ⓐ).
6) Cut metal plate (Ⓒ) that secures battery ❼ with nippers or the like at position (Ⓑ). Then, remove battery ❼ .

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

7. Setting data recording paper for AE-200AN

		1	2	3	4	5	6	7	8	9	10
Name of sewing		Factory-delivered state	Factory-delivered state								
Pattern number		1	1	2	3						
Process (2-ply joining, pin tuck)		2-ply sewing	Pin tuck	2-ply sewing	2-ply sewing						
Product name											
Material type		Combed broadcloth	Combed broadcloth								
Needle thread; type and yarn count		Spun thread #60	Spun thread #60								
Bobbin thread; type and yarn count		Spun thread #60	Spun thread #60								
Needle; type and count		DB×1#11	DB×1#11								
Joining edge width (mm)		-	3×5mm								
Sewing machine stitch length		2.5mm	2.5mm								
Height of the presser spring regulating		45mm	45mm								
Walking foot regulating knob		53mm	53mm								
Function setting item											
Item	Description										
S20	Upper scrape-out speed of manipulator	8	8	8	8						
S21	Upper draw-in speed of manipulator	8	8	8	8						
S22	Lower scrape-out speed of manipulator	8	9	8	8						
S23	Lower draw-in speed of manipulator	8	4	8	8						
S24	Cloth fluff detection level	-	-	0	0						
S25	Setting of manipulator-pressure intermittent-adjustment section	No setting	No setting	No setting	No setting						
S26	Number of stitches for intermittent interval of upper manipulator pressure	-	-	-	-						
S27	Number of stitches for intermittent interval of lower manipulator pressure	-	-	-	-						
S28	A speed of machine (rabbit)	3500	2500	3500	3500						
S29	B speed of machine (turtle)	1500	1500	1500	1500						
S30	Sewing start - Selection of back tack	Without	Without	Without	Without						
S31	Sewing start - Number of back tack stitches - A	-	-	-	-						
S32	Sewing start - Number of back tack stitches - B	-	-	-	-						
S33	Sewing start - State of back tack manipulator	-	-	-	-						
S34	Sewing end - Selection of back tack	Without	Without	Without	Without						
S35	Sewing end - Number of back tack stitches - C	-	-	-	-						
S36	Sewing end - Number of back tack stitches - D	-	-	-	-						
S37	Sewing end - State of back tack manipulator	-	-	-	-						
S40	Section A - Shirring amount	-	-	-	-						
S40	Section A - Shirring ratio	110 to130	110	110	110						
S41	Machine head section speed A	3500	3500	3500	3500						
S42	Shirring changeover position A (number of stitches)	0	0	0	0						
S43	Section B - Shirring amount	-	-	-	-						
S43	Section B - Shirring ratio	-	-	-	-						
S44	Machine head section speed B	-	-	-	-						
S45	Shirring changeover position B (number of stitches)	-	-	-	-						
S46	Section C - Shirring amount	-	-	-	-						
S46	Section C - Shirring ratio	-	-	-	-						
S47	Machine head section speed C	-	-	-	-						
S48	Shirring changeover position C (number of stitches)	-	-	-	-						
S49	Section D - Shirring amount	-	-	-	-						
S49	Section D - Shirring ratio	-	-	-	-						
S50	Machine head section speed D	-	-	-	-						
S51	Shirring changeover position D (number of stitches)	-	-	-	-						
S80	Section A - Upper manipulator pressure	70 to 100	100	100	100						
S81	Section A - Lower manipulator pressure	100 to 130	100 to 130	100	100						
S82	Upper/lower manipulator pressure changeover position A (number of stitches)	0	0	0	0						
S83	Section B - Upper manipulator pressure	-	-	-	-						
S84	Section B - Lower manipulator pressure	-	-	-	-						
S85	Upper/lower manipulator pressure changeover position B (number of stitches)	-	-	-	-						
S86	Section C - Upper manipulator pressure	-	-	-	-						
S87	Section C - Lower manipulator pressure	-	-	-	-						
S88	Upper/lower manipulator pressure changeover position C (number of stitches)	-	-	-	-						
S89	Section D - Upper manipulator pressure	-	-	-	-						
S90	Section D - Lower manipulator pressure	-	-	-	-						
S91	Upper/lower manipulator pressure changeover position D (number of stitches)	-	-	-	-						
S130	Selection of stacker operation	Selections of specifications	Selections of specifications	-	-						
S131	Stacker operating position	-	-	-	-						
S132	Selection of the number of times of stacker operation	-	-	-	-						