





ENGLISH

INSTRUCTION MANUAL



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1. PREFACE

For setup or handling of DLU-5494N-7 (1-needle, bottom and variable top feed lockstitch machine with automatic thread trimmer), refer to the Instruction Manual for DLU-5494N-7.

In addition, for the details of handling of SC-910 (sewing machine controller) and IP-110, similarly, refer to the respective Instruction Manuals.

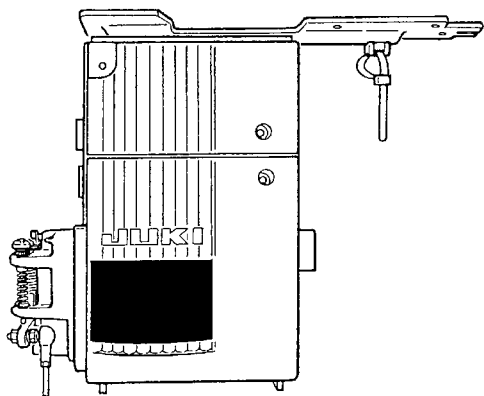
2. SET-UP

SC-910 control box can be used for DD (direct-drive) system machine head and the belt-drive system machine head by connecting the separately-available small-sized motor unit (M-91).

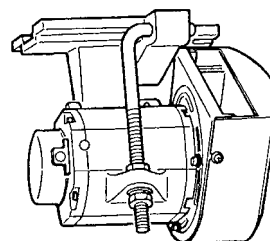
When using the small-sized motor unit, it is necessary to install the motor unit to the control box before installing the control box to the table.

Install the motor unit to the control box following the instructions below.

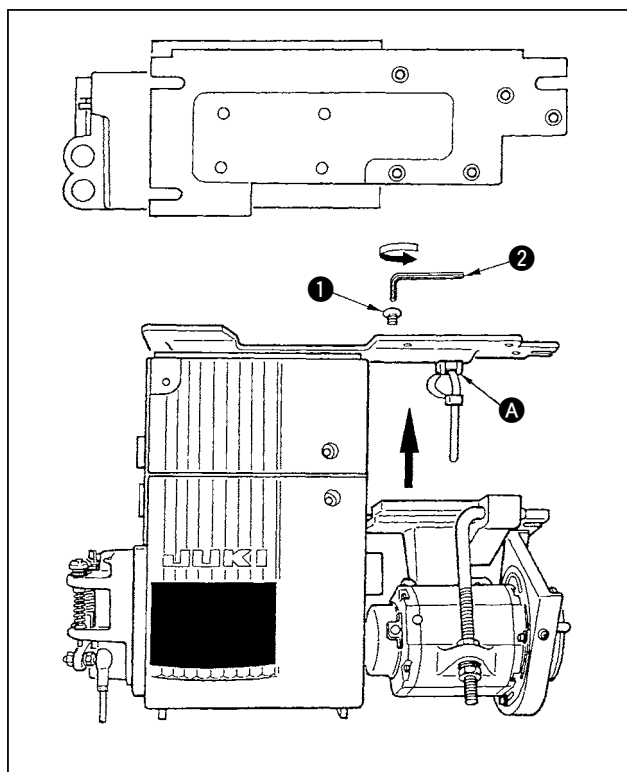
SC-910 control box



M-91 small-sized motor unit
(separately-available article)



(1) Installing M-91 small sized motor unit

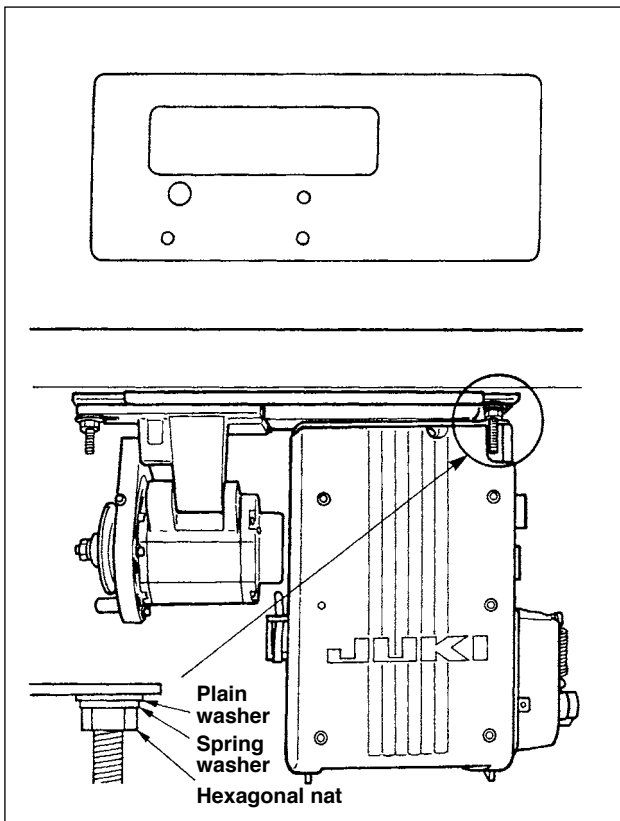


- 1) Lay down the control box while the rear cover is placed under the control box.
- 2) Remove tie-mount **A**.
- 3) Adjust the hole section of the installing base of M-91 to the hole section of the installing plate.
- 4) Temporarily tighten five places with counter-sunk screws **1** supplied with the unit as accessories.
- 5) Securely tighten them with hexagonal wrench key **2** supplied with the unit as accessories.



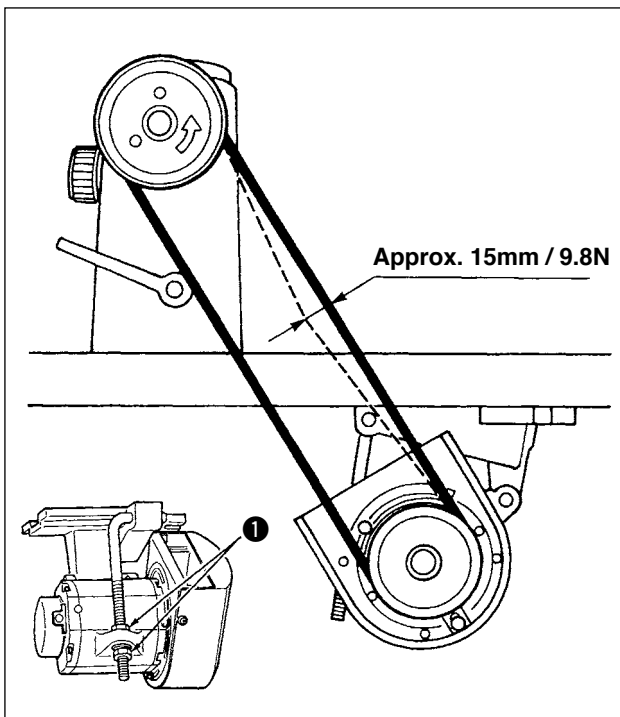
1. When tightening the screw, securely insert the hexagonal wrench key into the screw hole section to tighten.
2. Hexagonal wrench key is attached to M-91.
3. Be careful that the motor shaft does not hit against anything. (If a strong shock is given to the motor shaft, there is the possibility that the motor is damaged.)

(2) Installing to the table



- 1) Install the control box to the table with the fitting bolt (asm.) supplied with the unit as accessories. At this time, insert the nut and washer supplied with the unit as accessories as shown in the figure so that the control box is securely fixed.
- 2) Set the machine head to the table after installing the control box (or with small-sized motor) to the table. (Refer to Instruction Manual for the sewing machine.)

(3) Adjusting the belt (when M-91 is used)

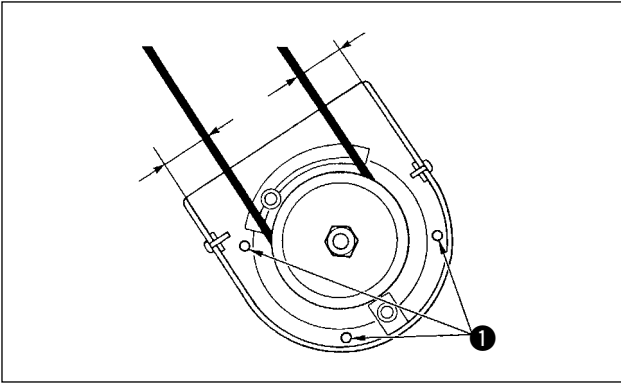


- 1) Adjust the belt tension by turning upper and lower nuts ❶ of the adjustment bolt and adjust the height of the center of the motor so that the belt sags 15 mm (9.8N) when the center of the belt is pressed by hand.



When the belt tension is excessively low, medium or low speed rotation becomes uneven, or stop accuracy is deteriorated. When the tension is excessively high, deterioration of the motor is advanced. So, be careful.

(4) Adjusting the belt cover (when M-91 is used)

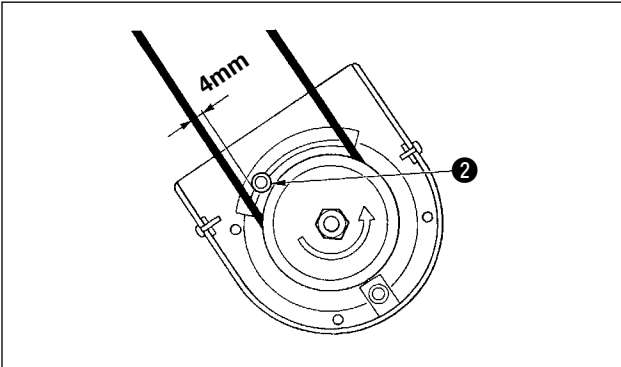


1) Adjusting the clearance of the cover

Loosen cover setscrew ① and adjust so that the left and right clearances between the belt cover and the belt are equal to each other.



Perform the adjustment of the cover with the hexagonal wrench key supplied with the unit as accessories. At this time, be careful that the screw is not excessively loosened.

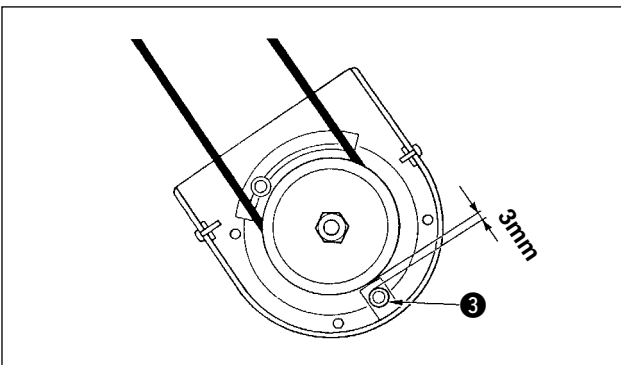


2) Adjusting the roll-in prevention pin

Adjust the roll-in prevention pin with the hexagonal wrench key supplied with the unit as accessories so that the clearance between the belt and roll-in prevention pin ② is approximately 4 mm.



1. Be careful of the direction of rotation of the motor and determine the position of the pin. (Position shown in the figure is the installing position when the motor rotates in the direction of the arrow mark.)
2. Perform the adjustment of the cover with the hexagonal wrench key supplied with the unit as accessories. At this time, be careful that the screw is not excessively loosened.

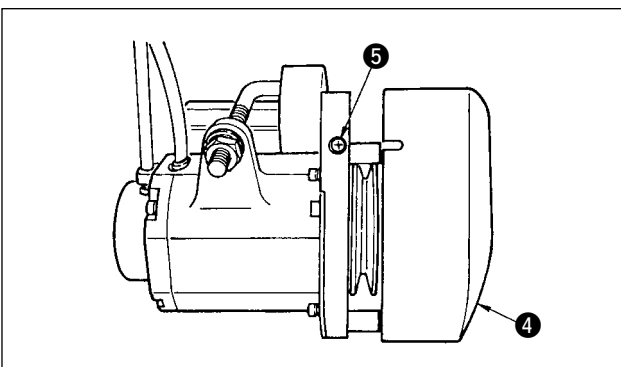


3) Adjusting the off-belt prevention pin

Adjust the off-belt prevention pin with the hexagonal wrench key supplied with the unit as accessories so that the clearance between the belt and off-belt prevention pin ③ is approximately 3 mm.



Perform the adjustment of the cover with the hexagonal wrench key supplied with the unit as accessories. At this time, be careful that the screw is not excessively loosened.



4) Installing the belt cover

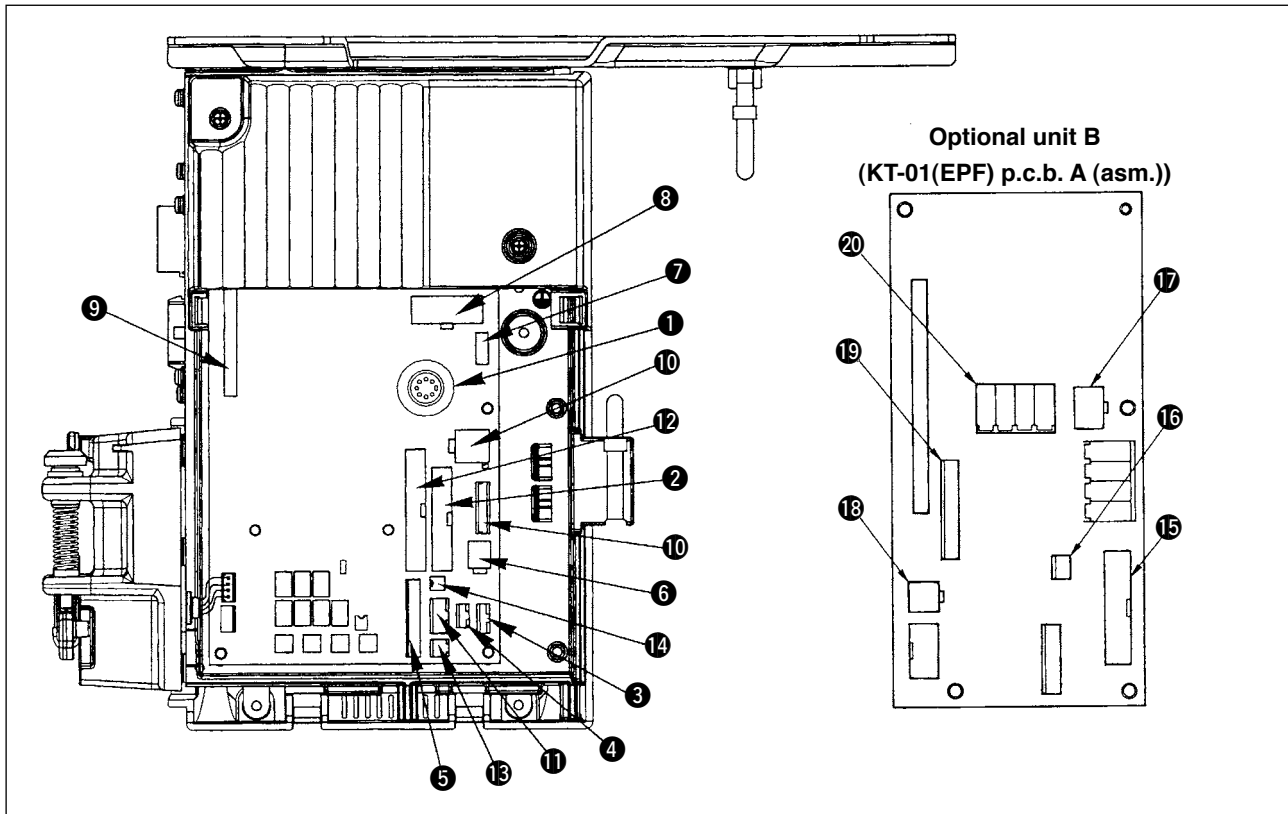
1. Adjust the notch section of the pulley outer cover ④ to the gap of screw ⑤ of the pulley inner cover and insert the outer cover to the inner cover.
2. Tighten screw ⑤ to complete the adjustment of the cover.

(5) Connecting the cords



WARNING :

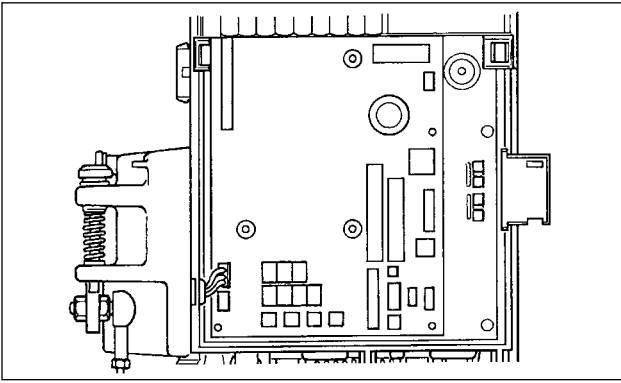
- To prevent personal injury caused by abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more.
- To prevent damage of device caused by maloperation and wrong specifications, be sure to connect all the corresponding connectors to the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



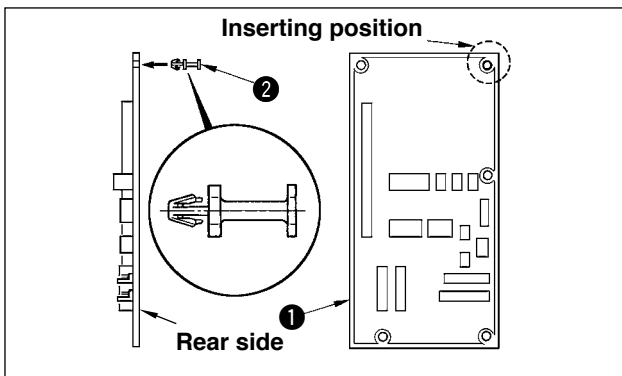
Following connectors are prepared on the front face of SC-910. Connect the connectors coming from the machine head to the corresponding places so as to fit the devices mounted on the machine head.

- | | | | |
|--------|---|--|---|
| ① CN30 | Synchronizer : it detects the needle bar position. | ⑩ CN38, CN39 | Motor signal connector |
| ② CN35 | CP-160 panel : Various kinds of programmed sewing can be executed. (Refer to the Instruction Manual for each panel for the details of functions.) | ⑪ CN32 | Standing machine pedal : JUKI standard PK-70, etc. Sewing machine can be controlled with the external signal. |
| ③ CN33 | Not used | ⑫ CN34 | IP-110 panel (LCD panel) : Various kinds of programmed sewing can be executed. |
| ④ CN31 | Machine head connector 4P | ⑬ CN45 | Material end detection sensor ED-4, etc. |
| ⑤ CN42 | External input/output connector : input/output of up/down detection signal, rotation prohibition signal, etc. is prepared. | ⑭ CN43 | FAN |
| ⑥ CN48 | Safety switch (standard) : When tilting the sewing machine without turning the power OFF, the operation of the sewing machine is prohibited so as to protect against danger. Optional switch : by changing over the internal functions, 6 kinds of functions can be selected. | * By adding this unit (optional unit B), the machine can be used as 1-needle, bottom and variable top feed lockstitch machine with automatic thread trimmer. | |
| ⑦ CN40 | Presser foot lifter solenoid. (For automatic presser foot lifter type only) | ⑮ CN132 | Shirring LED, bottom feed amount |
| ⑧ CN46 | Machine head solenoid : Thread trimming, reverse-stitching solenoid, touch-back switch, etc. | ⑯ CN133 | External shirring input |
| ⑨ CN47 | Optional circuit board connection connector : Required when using JUKI standard bobbin thread remaining amount detection sensor, etc. | ⑰ CN134 | Top feed amount |
| | | ⑱ CN139 | Stepping motor control |
| | | ⑲ CN141 | Up/down detection, thread trimming, reverse feed stitching |
| | | ⑳ CN138 | Shirring release input (extreme left) |

(6) Attaching the circuit board



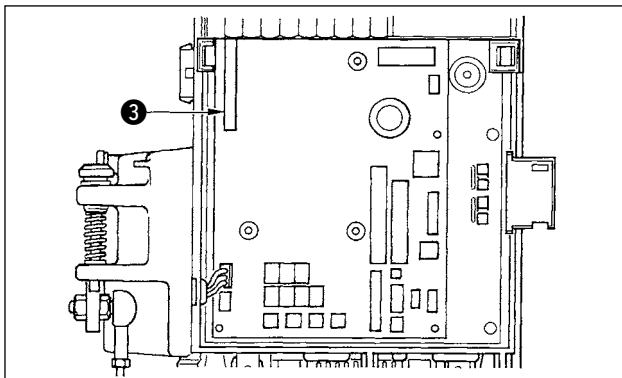
- 1) Open the front cover according to the instructions given in the Instruction Manual for the control box main unit.



- 2) Insert stud ② supplied with the unit as accessories to KT-01(EPF) p.c.b. A (asm.) ①.



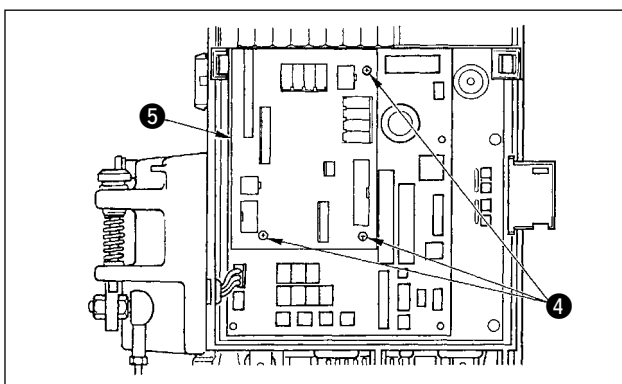
Be careful of the inserting direction.



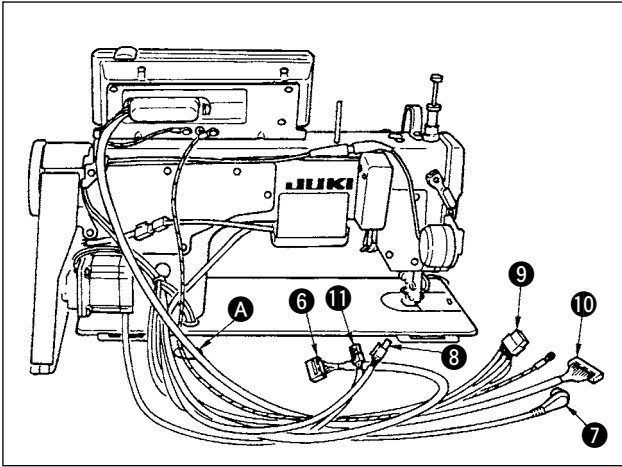
- 3) Insert KT-01(EPF) p.c.b. A (asm.) ① to connector CN47 ③ of the main unit as illustrated.



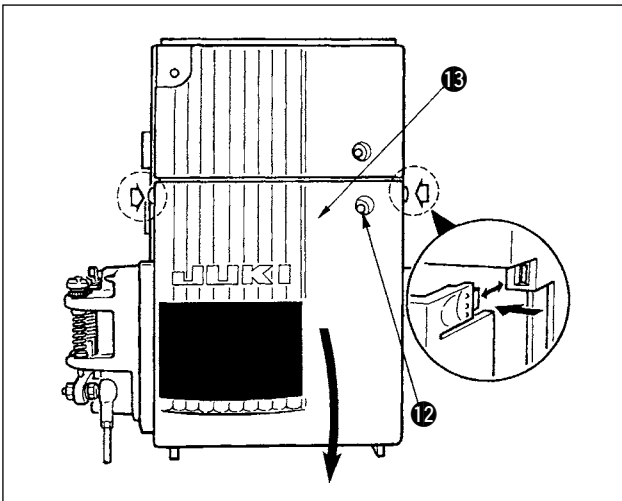
1. Insert KT-01(EPF) p.c.b. A (asm.) from the oblique lower section, check the inserting position and insert it until “click” sounds since connector CN47 ③ is hidden by the cover located in the upper section of the control box main unit.
2. Do not forcibly press the circuit board.




- 4) Securely fix KT-01(EPF) p.c.b. A (asm.) ④ to the control box main unit using three screws ⑤ supplied with the unit as accessories.

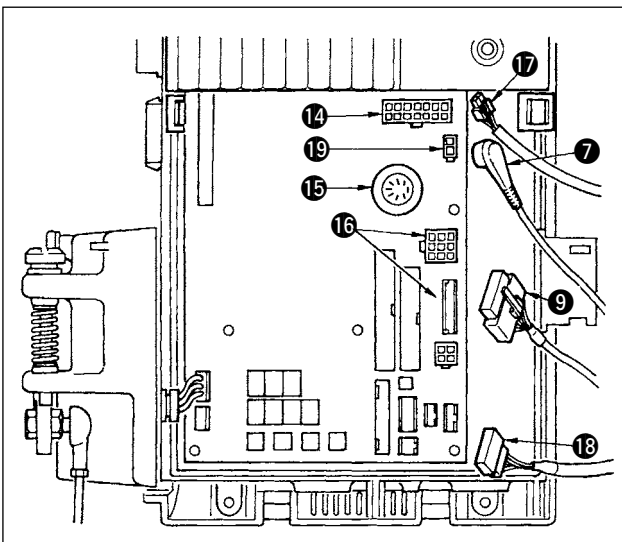


- 5) Pass through table hole **A** under the table cords **9** of thread trimmer solenoid, reverse feed stitching solenoid, etc., synchronizer cord **7**, IP panel cord **10**, operation display panel cord **6**, top feed detection cord **8** and motor control cord **11**.

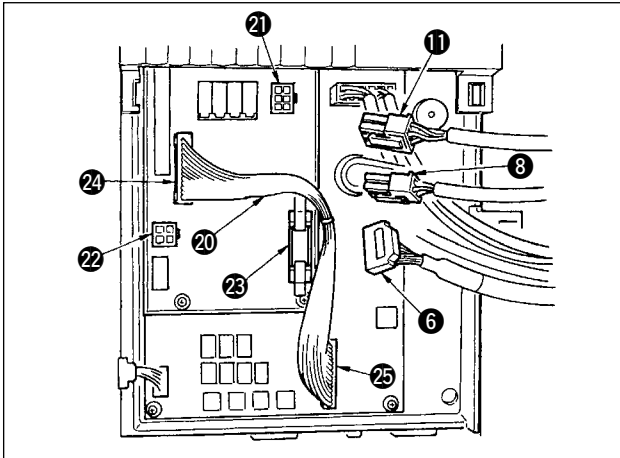


- 6) Loosen setscrew **12** in front cover **13**.
- 7) Pressing the side of front cover **13** in the direction of the arrow, open the front cover toward you.


Caution Be sure to open / close the front cover with your hands.



- 8) Connect 14P cord **9** coming from the machine head to connector **14** (CN46).
- 9) Connect 7P connector **7** coming from the machine head to connector **15** (CN30).
- 10) Connect connector **18** coming from the machine head to connector **16** (CN38, CN39). (Connect 8P connector to CN38 and in case of 9P connector, connect to CN39.)
- 11) When the optional AK118 device is attached, connect 2P connector **17** coming from the AK device to connector **19** (CN40).



- 12) Connect 6P connector ① coming from the machine head to connector ②① (CN139).
- 13) Connect 4P connector ③ coming from the machine head to connector ②② (CN134).
- 14) Connect 14P connector ⑥ coming from the operation display panel to connector ②③ (CN132).
- 15) Insert KT-01(EPF) relay connector ④① to connector ②④ (CN141) and connector ②⑤ (CN42).



When the connectors are not properly connected, the p.c.b. does not work normally.

1. When using the AK device, set whether to use the AK device after confirming how to select the auto-lifter function.

(Refer to "Instruction Manual for SC-910".)



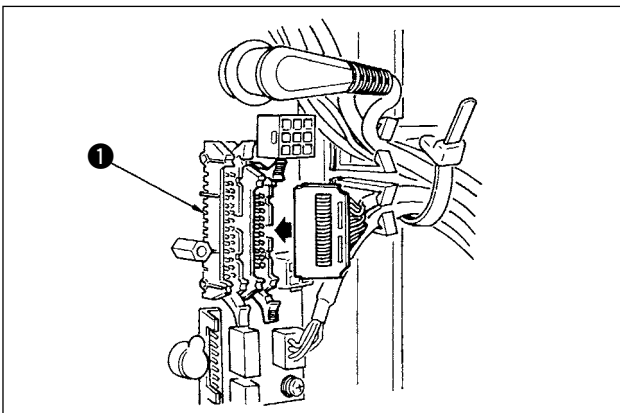
2. Be sure to securely insert the respective connectors after checking the inserting directions since all connectors have the inserting directions.

(When using a type with lock, insert the connectors until they go to the lock.)

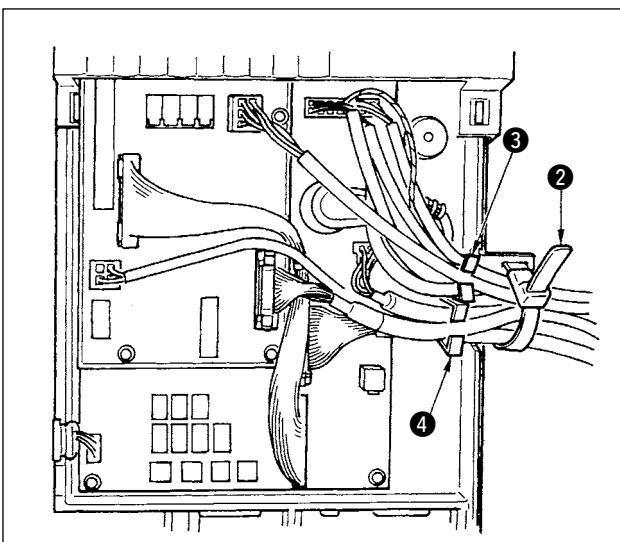
The sewing machine is not actuated unless the connectors are inserted properly.

In addition, not only the problem of error warning or the like occurs, but also the sewing machine and the control box are damaged.

(7) Connecting for IP-110 panel

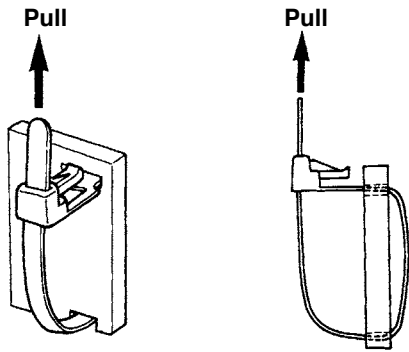


- 1) The connector for connecting IP-110 is prepared. When connecting, insert the connector until it is locked to ① (CN34).

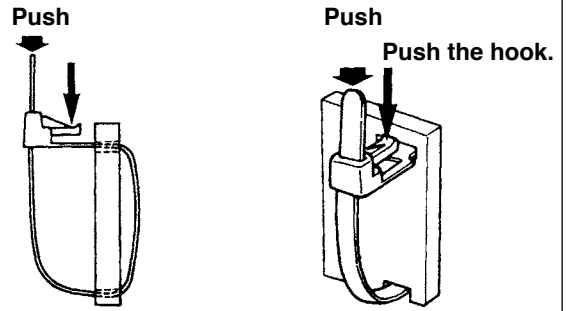


- 2) After inserting the connector, put all cords together with cable clip band ② located on the side of the box. At this time, bundle the connectors which are arranged above the wire saddle to wire saddle ③ and those which are arranged below the wire saddle to wire saddle ④.

How to fix cable clip band ②



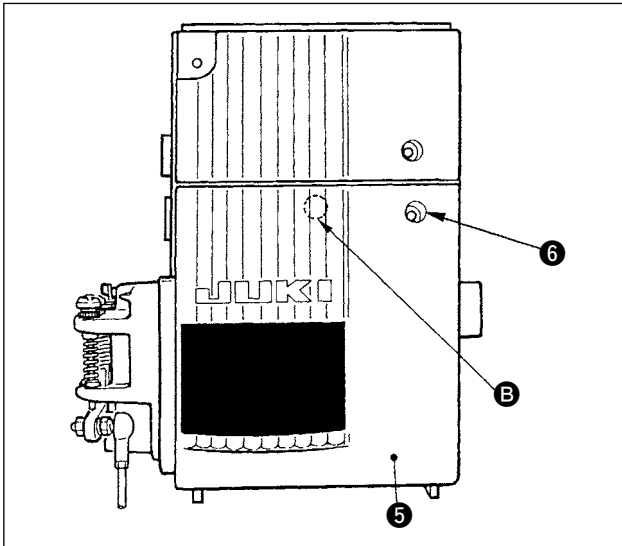
How to remove cable clip band ②



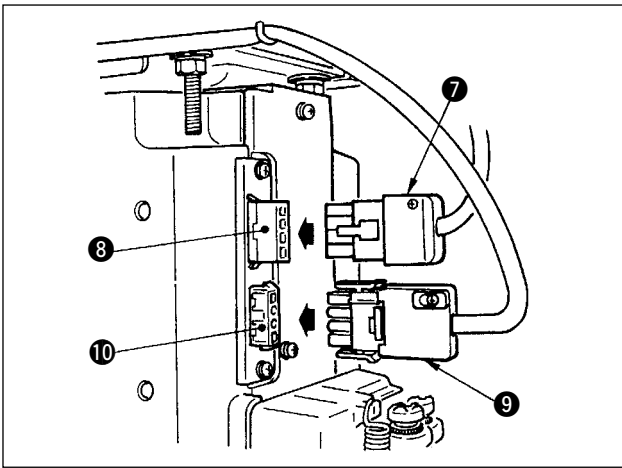
Pushing the hook portion, push the band to remove it.



1. Fix the cable clip band following the attaching procedure as shown in the figure.
2. When removing the cord, remove the wire saddle first and the cable clip band next.
3. To remove the cable clip band, as show in the illustration of how to remove the cable clip band, pressing the hook of cable clip band, push the band to remove the cable clip band.



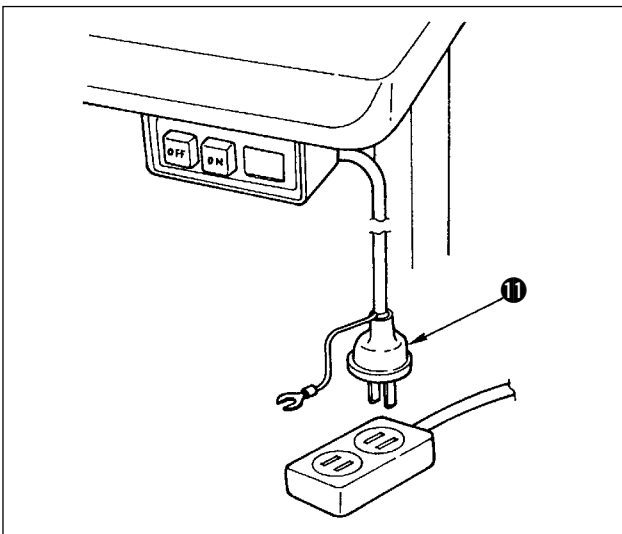
- 3) Close front cover ⑤ while paying attention to pinching of the wire.
Lightly press portion ② and insert front cover ⑤ with “click”.
- 4) After that, fix it with the screw ⑥.



- 5) Connect motor output cord ⑦ to connector ⑧ located on the side of the box.
- 6) Connect connector 4P ⑨ of the power switch to connector ⑩.



Route the motor output cord from the front face of the box.

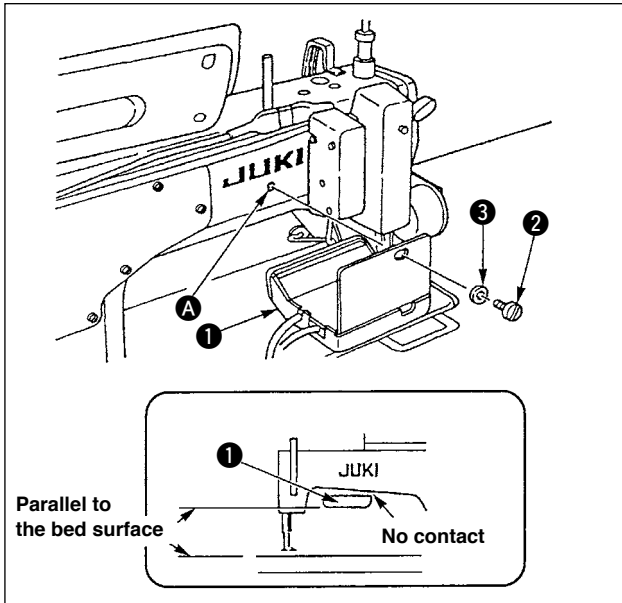


- 7) Make sure that the power switch is turned OFF and insert power supply cord ⑪ coming from the power switch into the power plug socket.



1. Check again the supply voltage and the voltage designated on the control box before connecting the power supply cord.
2. Prepare the power switch conformed to the safety standard.
3. Be sure to connect the ground wire (green / yellow).

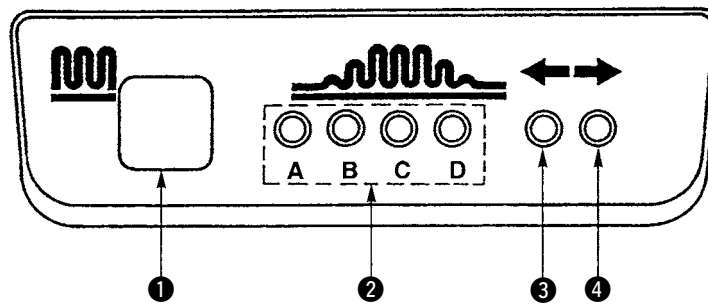
(8) Installing the operation display panel



- 1) Fix operation display panel ① in tapped hole ① in the rear section of the machine arm using screw ② and washer ③.
- 2) Attach operation display panel ① to the aforementioned place so that it is in parallel to the bed surface and does not come in contact with the lower section of the machine arm.

(9) How to use the operation display panel

• Operation indication panel



- ① Partial shirring switch
 - This is the switch used to change over the partial shirring process.
- ② Indicator lamp (LED) of the partial shirring process step
 - Indicates the current state of partial shirring process step.

Partial shirring process step	Indicator lamp (LED)			
	A	B	C	D
1	○	●	●	●
2	○	○	●	●
3	○	○	○	●
4	○	○	○	○
5	●	○	○	○
6	●	●	○	○
7	●	●	●	○
8	●	●	●	●

(Note)

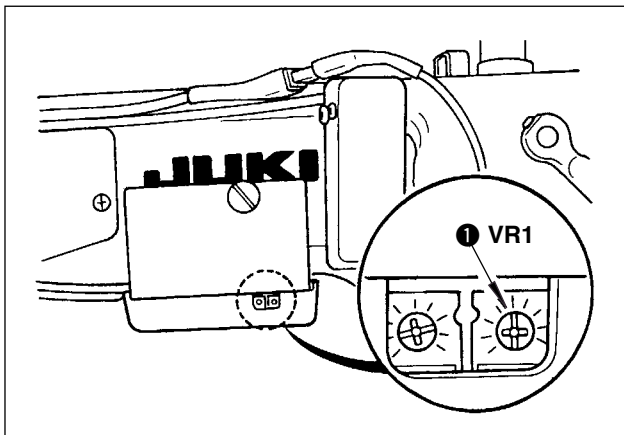
- ……Lights up
- ……Goes out

③, ④ Partial shirring pattern indicator lamps (LEDs) under the alternate stitching mode

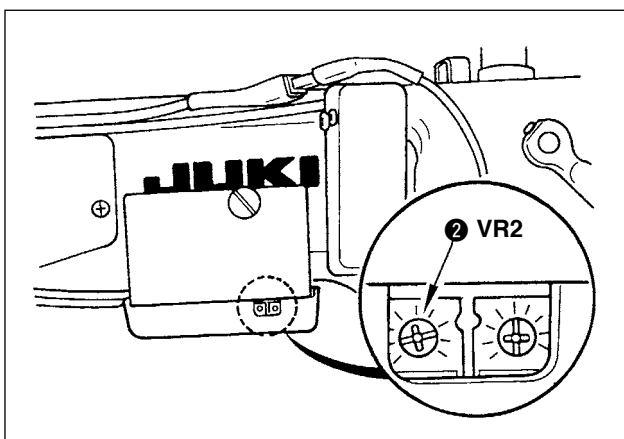
- If partial shirring pattern ① or ③ is selected under the alternate stitching mode, LED ③ will light up. If partial shirring pattern ② or ④ is selected under the aforementioned mode, LED ④ will light up.
- If the machine is not operated under the alternate stitching mode, both LEDs ③ and ④ will go out.

(10) Adjusting the bottom feed pitch display

When the display of the bottom feed pitch does not correspond with the scale of the pitch dial, perform the setting below.



1. Adjust the scale of the bottom feed pitch dial to "0".
2. Turn the variable resistor VR1 ❶ located on the right side of the rear of the operation display panel, and adjust so that the bottom feed display is set to the minimum display.



3. Adjust the scale of the bottom feed pitch dial to "5".
4. Turn the variable resistor VR2 ❷ located on the right side of the rear of the operation display panel, and adjust so that the bottom feed display is set to 5.0.

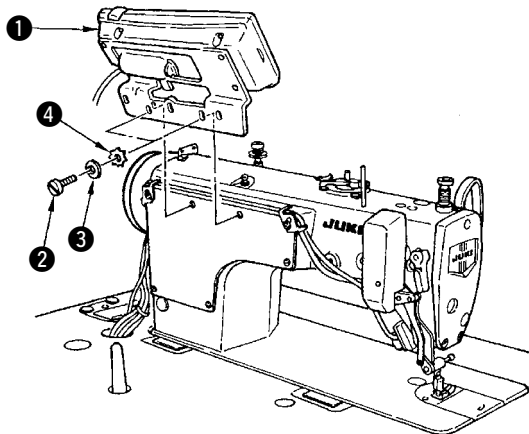
3. INSTALLING THE OPERATION PANEL



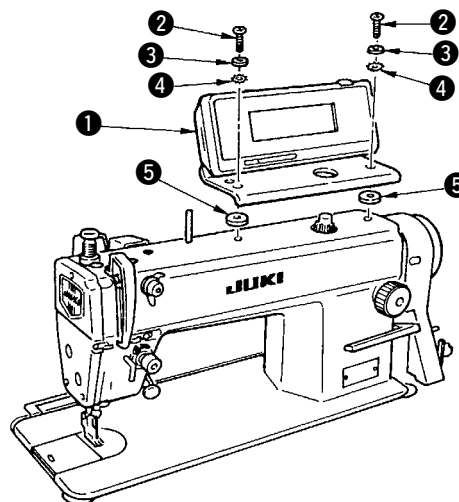
WARNING :

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

Type B (Type name plate TYPE B0 *)

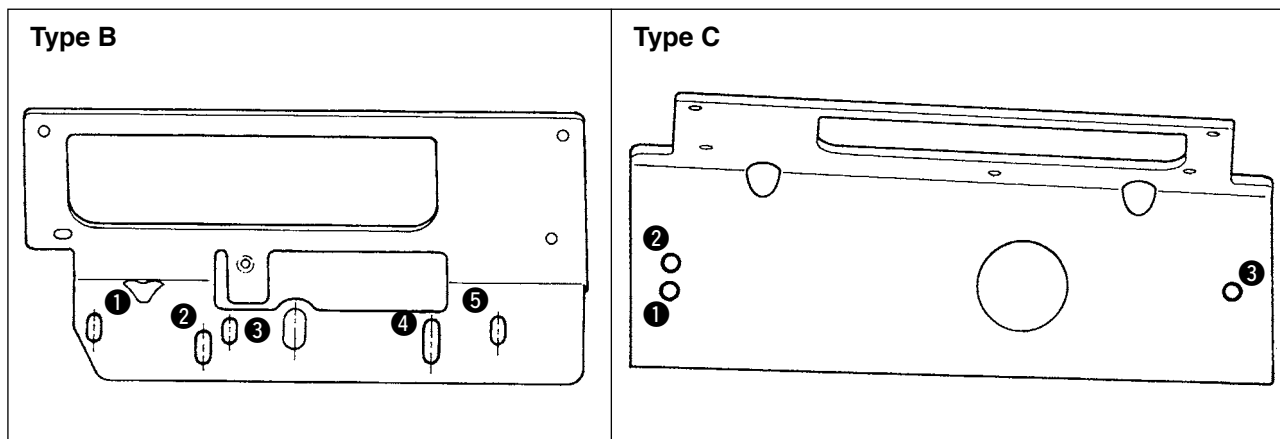


Type C (Type name plate TYPE C0 *)



- 1) Attach operation panel ① to the machine head using screw ②, plain washer ③, toothed lock washer ④ and spacer ⑤ (for type C) supplied with the operation panel.
- 2) The positions of the holes in the bracket for installing the operation panel are different from each other according to the respective models. Refer to the table below.

IP-110 / bracket type classified by model correspondence table

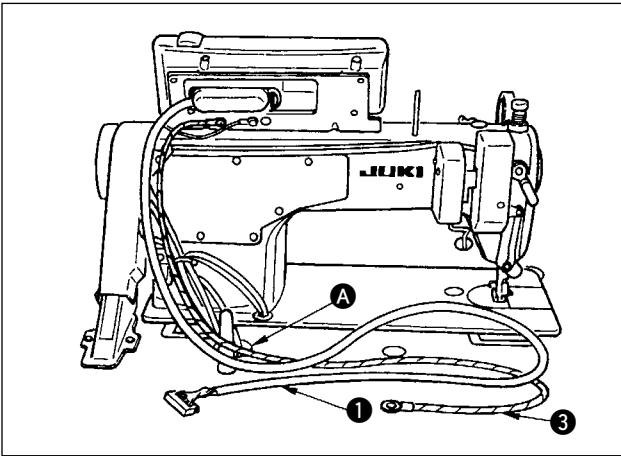


No.	Mounted machine head	Bracket type	Installing hole used	Part No. of screw	Remarks
1	DDL-9000	Type B	② - ④	SS4121415SP(3/16-28)	
2	DLN-9010	Type B	② - ④	SS4121415SP(3/16-28)	
3	LH-31 * *	Type B	① - ⑤	SS6111210SP(11/64-40)	
4	LZ-228 * N	Type B	③ - ④	SS4121415SP(3/16-28)	To be fixed on the exclusive bracket for installing standard panel
5	DDL-5550N	Type C	① - ③	SS7121410SN(3/16-24)	Use ② - ③ in case of optional unit (V0 and the like).
6	DDL-8700	Type C	① - ③	SS7121410SN(3/16-24)	
7	DLN-5410N	Type C	① - ③	SS7121410SN(3/16-24)	
8	DLU-5494N	Type C	① - ③	SS7121410SN(3/16-24)	

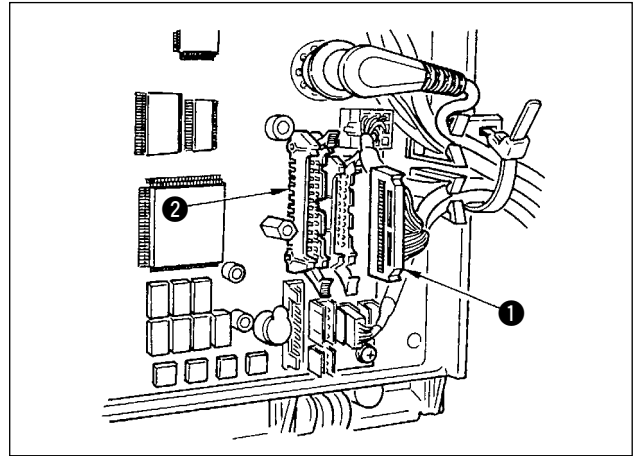
4. CONNECTING THE CORD



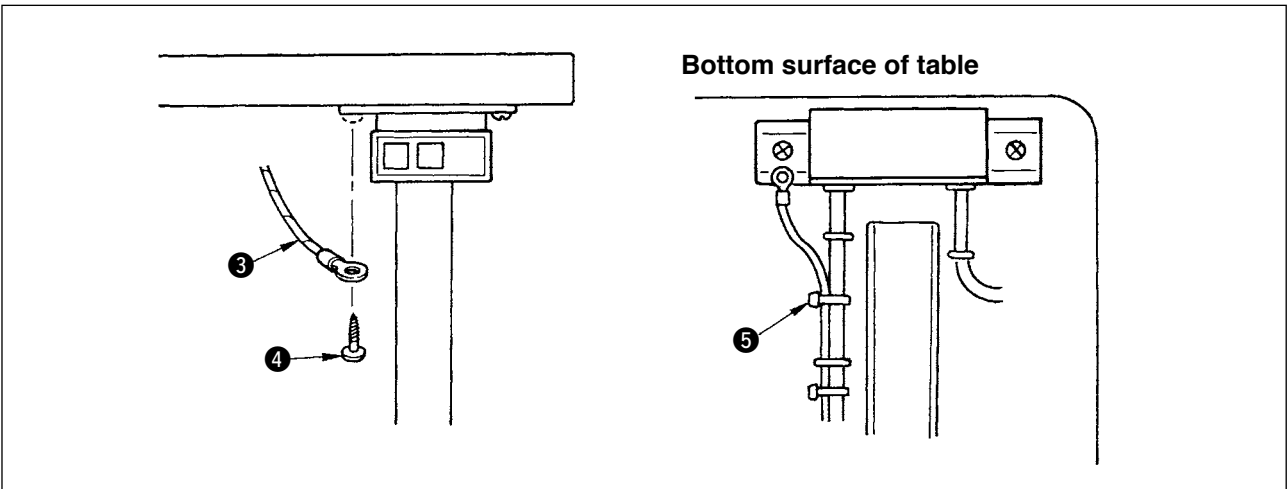
WARNING :
Turn OFF the power and start the work after 5 minutes or more have passed so as to prevent accidents caused by abrupt start of the sewing machine.



1) Pass cord ① and FG cord ③ (for type C) of the operation panel through hole A in the machine table to route it to the underside of the table.



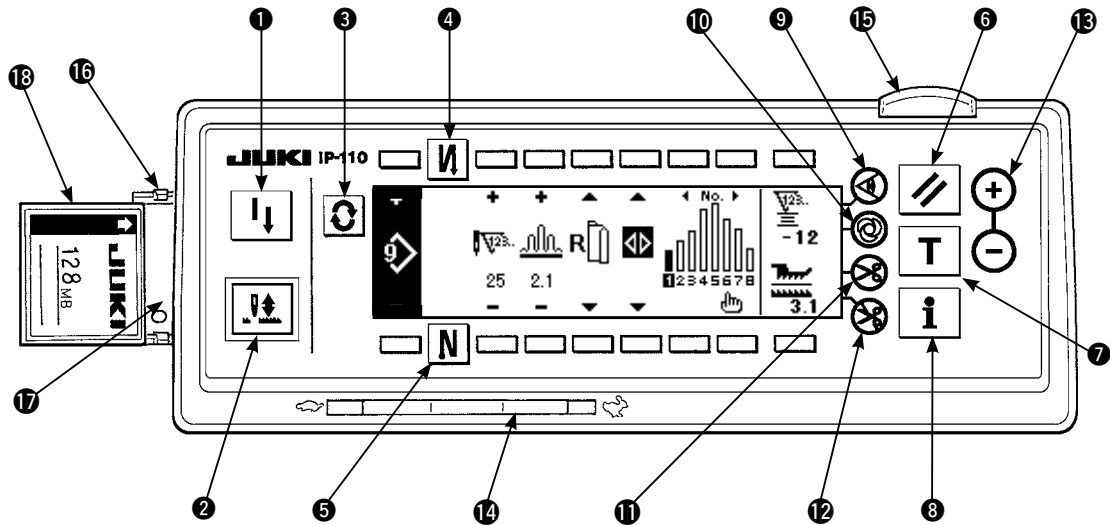
2) Connect the connector of cord ① to connector CN34 ② in the control box.









3) For type C, fix FG cord ③ to the power switch with wood screw ④ supplied with the panel as accessories. Wire FG cord ③ after bundling it with the power cable and the like with cable clip band ⑤ supplied with the panel as accessories.







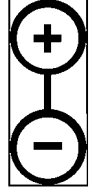
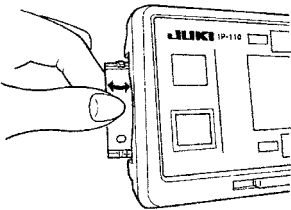
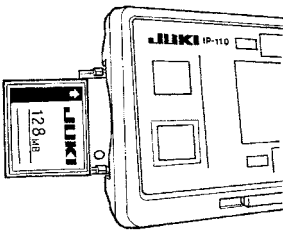
5. HOW TO USE THE OPERATION PANEL

(1) Names and functions of each components

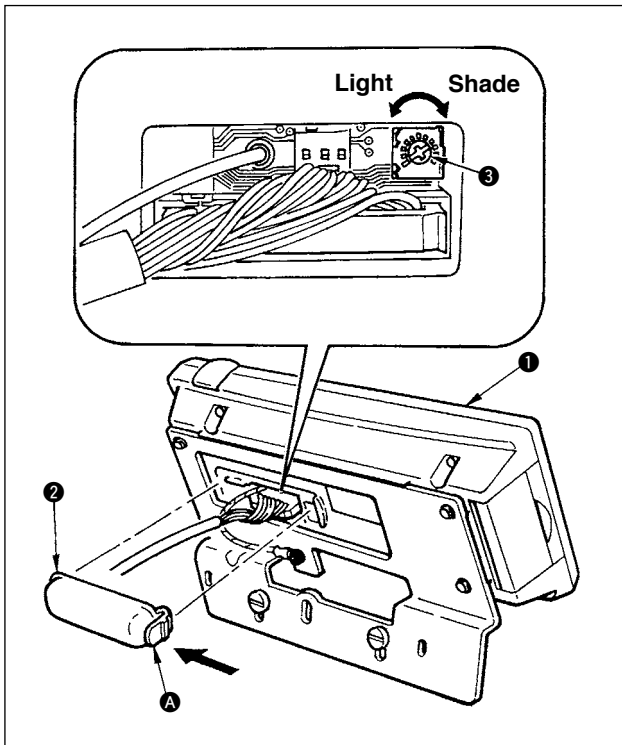


- | | | |
|---|--|--|
| ① Re-sewing switch | ⑧ Information switch | ⑮ Power display lamp |
| ② Needle up/down compensating switch | ⑨ Material edge sensor switch | ⑯ Media cover |
| ③ Screen changeover switch | ⑩ One-shot stitching switch | ⑰ Media slot
(Media inserting opening) |
| ④ With/without reverse feed stitch at sewing start switch | ⑪ With/without automatic thread trimmer switch | ⑱ CompactFlash (TM)
(Optional :
Part No.40000100) |
| ⑤ With/without reverse feed stitch at sewing end switch | ⑫ Thread trimming prohibiting switch | |
| ⑥ Reset switch | ⑬ Counter value setting switch | |
| ⑦ Teaching switch | ⑭ Max.speed limitation variable resistor | |

<p>① Re-sewing switch</p> 	<p>This switch is used to continue sewing from the step on the way after replacing bobbin thread when bobbin thread has run out during program stitching step.</p>
<p>② Needle up/down compensating switch</p> 	<p>This is the switch to perform needle up/down compensating stitching. (Needle up/down compensating stitching and one stitch compensating stitching can be changed over with function setting No. 22.)</p>
<p>③ Screen changeover switch</p> 	<p>This is the switch to change over the screen.</p>
<p>④ With/without reverse feed stitch at sewing start switch</p> 	<p>This is the switch to turn ON/OFF automatic reverse feed stitch at sewing start. * This switch cannot be used with the sewing machine which is not provided with automatic reverse feed stitching device.</p>
<p>⑤ With/without reverse feed stitch at sewing end switch</p> 	<p>This is the switch to turn ON/OFF automatic reverse feed stitch at sewing end. * This switch cannot be used with the sewing machine which is not provided with automatic reverse feed stitching device.</p>
<p>⑥ Reset switch</p> 	<p>This is the switch to make the value of bobbin thread counter or sewing counter the set value.</p>

<p>7 Teaching switch</p> 	<p>This is the switch to set the setting of the number of stitches with the value of number of stitches which has been actually sewn.</p>
<p>8 Information switch</p> 	<p>This is the switch to perform various function settings.</p>
<p>9 Material edge sensor switch</p> 	<p>Rendered effective when the material edge sensor is installed on the machine. Used for selecting whether or not the material edge sensor is used during sewing.</p>
<p>10 One-shot stitching switch</p> 	<p>When this switch is set to effective at the time of program stitching, the sewing machine automatically operates up to the specified number of stitches.</p>
<p>11 With/without automatic thread trimmer switch</p> 	<p>When this switch is set to effective at the time of program stitching, the sewing machine automatically performs thread trimming when the specified number of stitches has been completed.</p>
<p>12 Thread trimming prohibiting switch</p> 	<p>This switch prohibits all thread trimmings. * This switch cannot be used with the sewing machine which is not provided with the automatic thread trimming device.</p>
<p>13 Counter value setting switch</p> 	<p>This is the switch to set the value of bobbin thread counter or No. of pcs. counter.</p>
<p>14 Max. speed limitation variable resistor</p>	<p>When moving the resistor in the left direction, max. speed is limited.</p>
<p>15 Power display lamp</p>	<p>This lamp lights up when the power switch is turned ON.</p>
<p>16 Media slot cover</p> 	<p>This is the cover for media inserting opening. To open the cover, place your finger on the notch located on the side of the cover as shown in the figure and push the cover in the direction of left slanting rear. * There are some functions that are not able to be operated with the cover opened. Do not close the cover unless the CompactFlash(TM) is completely inserted.</p>
<p>17 Media slot (Media inserting opening)</p> 	<p>To set CompactFlash(TM), place the label face of the CompactFlash(TM) to the front and insert the part that has a small hole (place the notch of the edge to the rear) to the panel. To remove the CompactFlash(TM), hold it between your fingers and draw it out. * When the inserting direction of the CompactFlash(TM) is wrong, the panel and the CompactFlash(TM) may be damaged. Do not insert anything other than the CompactFlash(TM).</p>

(2) Adjusting the contrast of the operation panel display

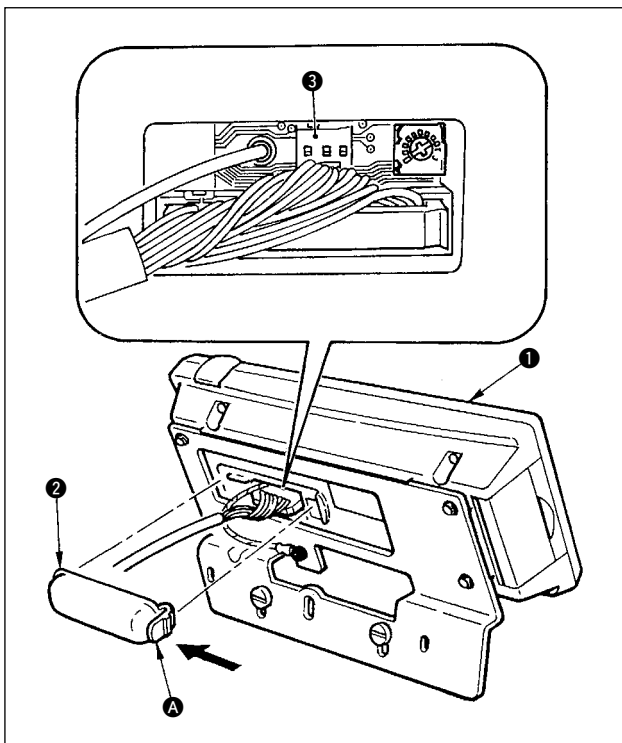


- 1) Press in the direction of arrow mark the click of section **A** of cord outlet cover **2** assembled in the rear of operation panel **1** and remove the cover.
- 2) Turn LCD screen display brightness adjustment variable resistor **3** to adjust the brightness (contrast) of LCD screen.



1. To prevent the operation panel from breakage, do not touch the circuit board pattern and the connector terminal.
2. Do not disassemble the operation panel to prevent it from breakage.

(3) Production control switch connecting connector

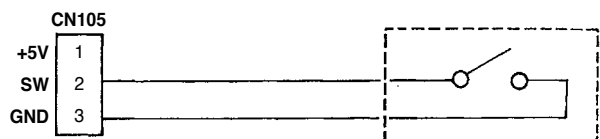
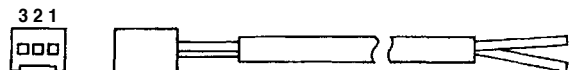


- 1) Press in the direction of arrow mark the click of section **A** of cord outlet cover **2** assembled in the rear of operation panel **1** and remove the cover.
- 2) Connect the optional relay cable connector to CN105 **3** of the production control switch connecting connector.



- Prepare the switch main unit by the customers or ask JUKI business office about it.

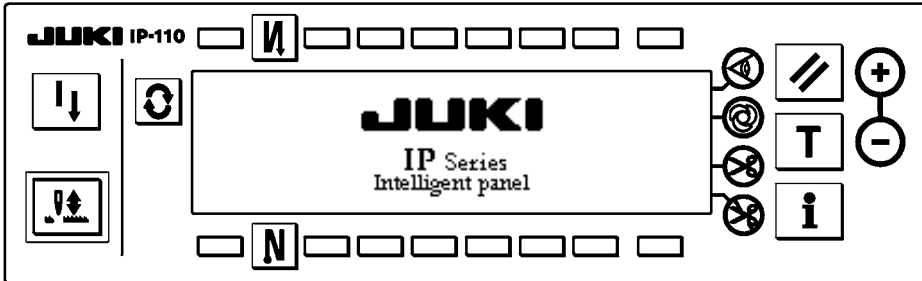
Optional relay cable A (asm.)
JUKI Part No. 40008168




6. SCREEN LIST

(1) Fundamental screen list

WELCOME screen is displayed immediately after turning ON the power.

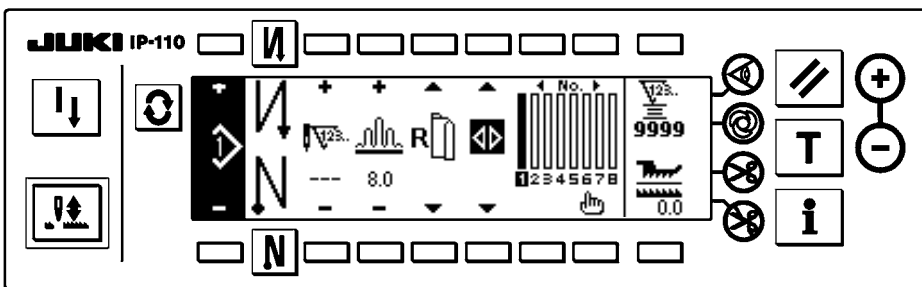


The screen immediately after WELCOME screen becomes the pattern edit screen.

Every time  switch is pressed, the screen changes.

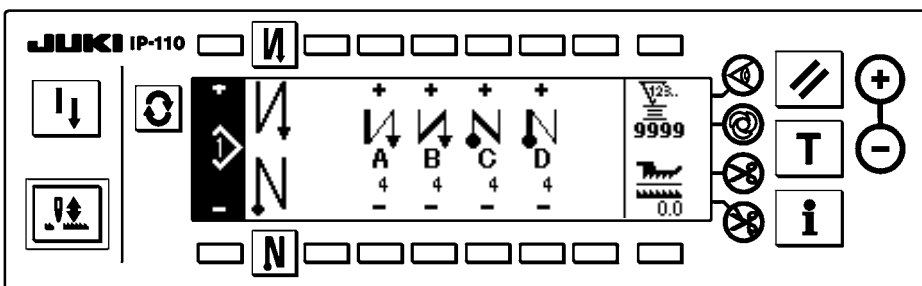
■ Pattern edit screen

Step editing of the pattern is performed.



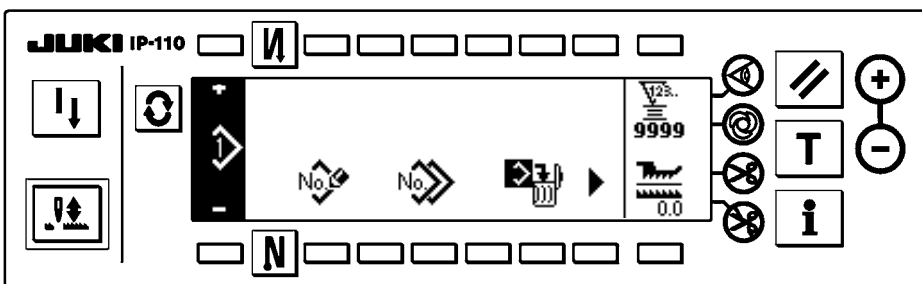
■ Number of stitches of back tuck stitching setting screen

Setting of number of stitches of reverse stitching is performed.



■ Pattern operation screen

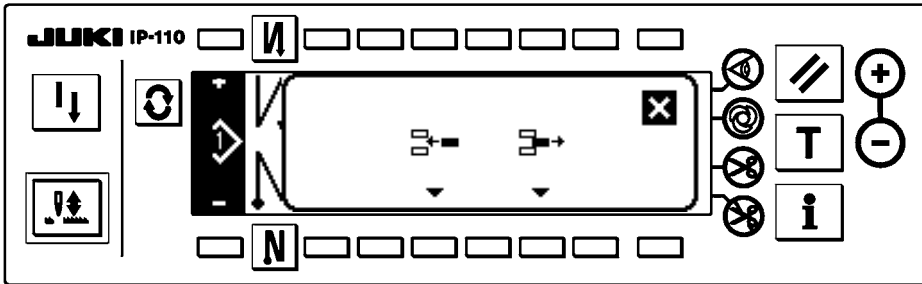
Register, copy or deletion of the pattern is performed.



(2) Pop-up list

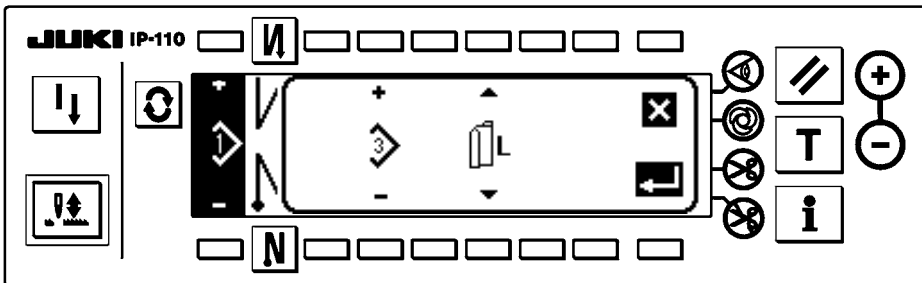
■ Pattern step insertion/deletion pop-up

Insertion/deletion of the step is performed.



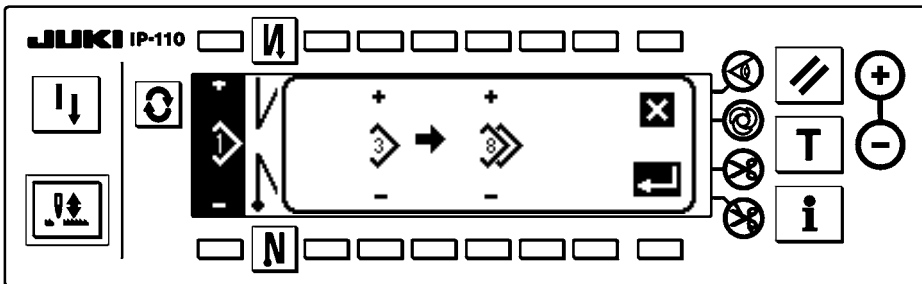
■ Pattern register pop-up

Selection of the pattern to be registered is performed.



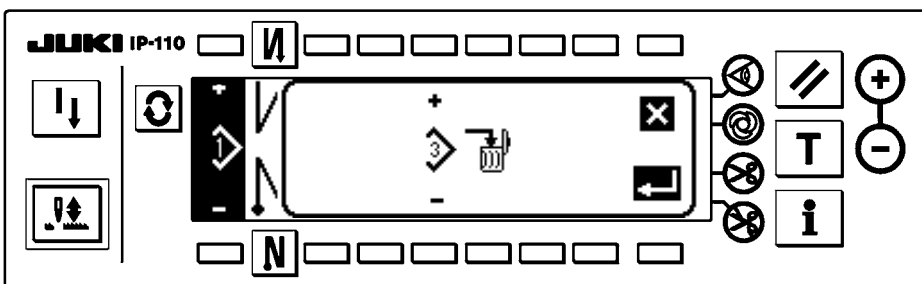
■ Pattern copy pop-up

Pattern of copy source or pattern of copy destination is selected.




■ Pattern deletion pop-up

Pattern to be deleted is selected.

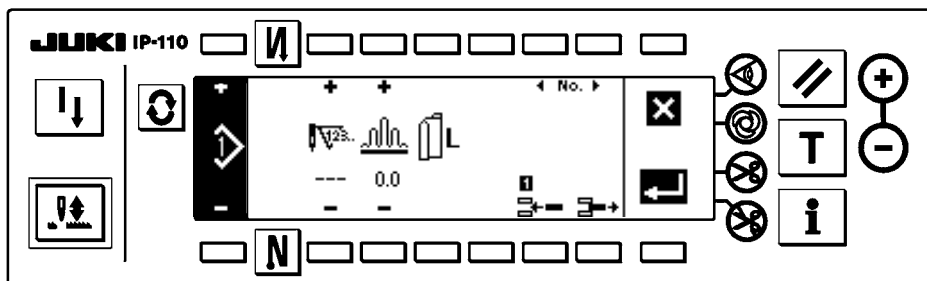


(3) Other screens


■ Pattern register screen

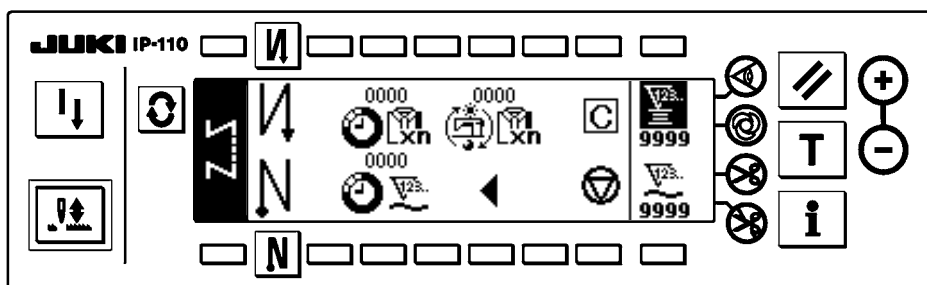
When DETERMINE  key is pressed at the "pattern register pop-up" of (2) Pop-up list, this screen is displayed.

Register and edit of the pattern is performed in this screen.



■ Output display screen

When  key is pressed at the "pattern operation screen" of (1) Fundamental screen list, this screen is displayed.

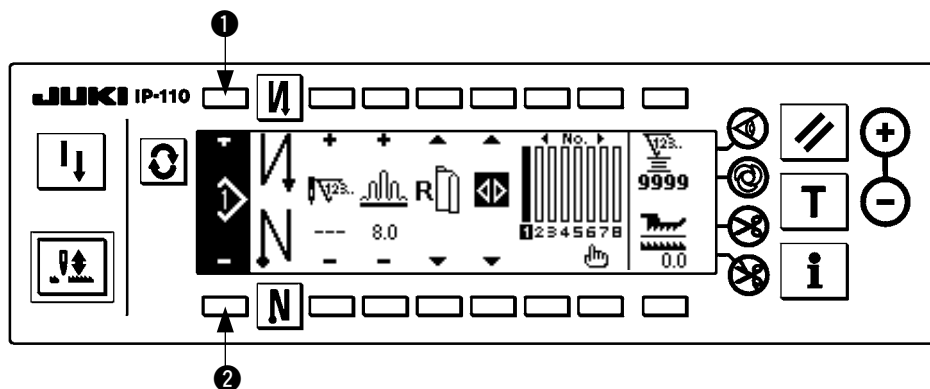


* For the details of the function, refer to the Instruction Manual for IP-110.

7. OPERATING PROCEDURE OF THE SEWING PATTERN

(1) Selecting procedure of the sewing pattern

As many as 16 patterns can be held as the sewing patterns.

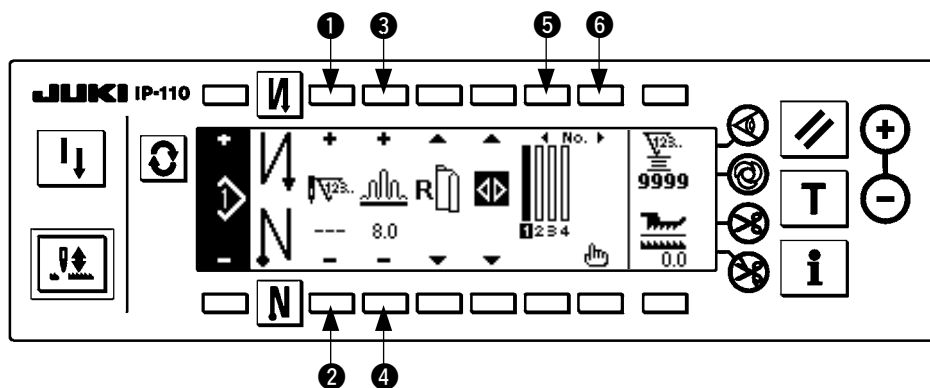


When changing the pattern, change it with pattern change switches ① and ②.

Change of the pattern can be performed not only in the step edit screen but also in the number of stitches of back tuck stitching screen or the pattern operation screen.

(2) Editing procedure of the sewing pattern

Press  switch to display the pattern edit screen.



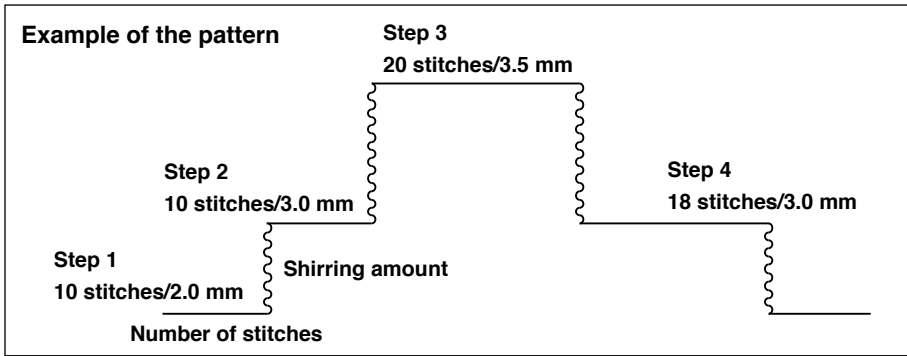
① and ② Number of stitches of the selected step is set.
(Setting range : 0 to 500 stitches)



When 0 stitch is registered to the number of stitches, automatic update of the step by the number of stitches is not performed. The step is manually changed over with the shirring step changeover switch located at the jaw section of the machine head.

③ and ④ Shirring amount of the selected step is set.
(Setting range : 0.0 to 8.0 mm)

⑤ and ⑥ Selected step can be moved.

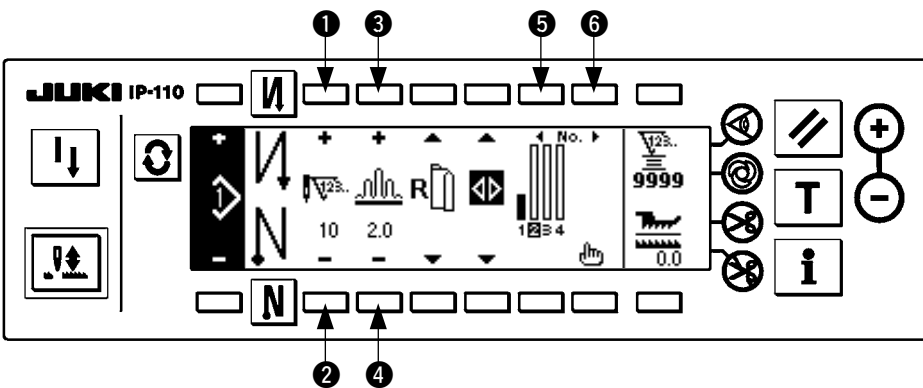


Editing procedure is shown as an example in the pattern on the left-hand side.

[Step 1]

- 1) Confirm that step 1 is selected, and set the number of stitches to 10 using switches ① and ②.
- 2) Set the shirring amount to 2.0 using switches ③ and ④.
- 3) Select the next edit step using switches ⑤ and ⑥.

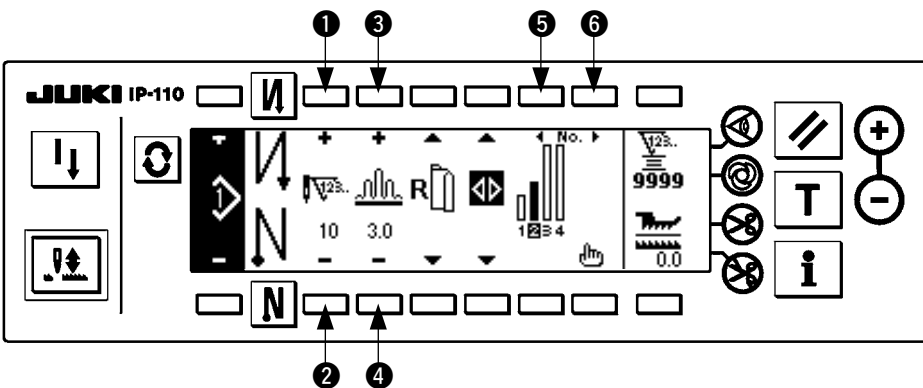
■ After editing step 1



[Step 2]

- 4) Confirm that step 2 is selected, and set the number of stitches to 10 using switches ① and ②.
- 5) Set the shirring amount to 3.0 using switches ③ and ④.
- 6) Select the next edit step using switches ⑤ and ⑥.

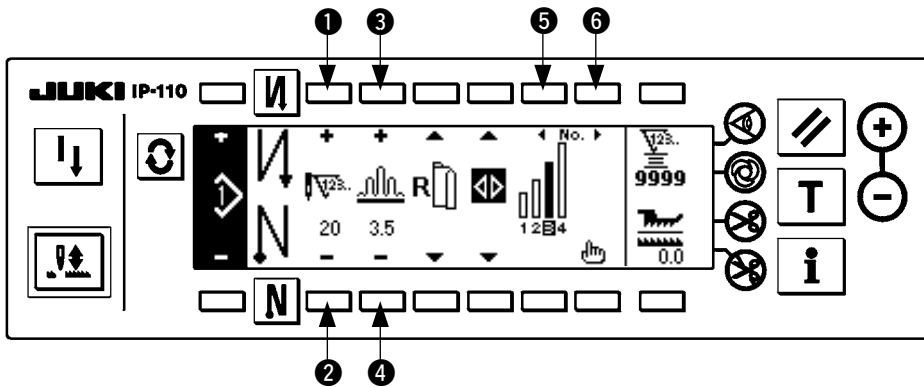
■ After editing step 2



[Step 3]

- 7) Confirm that step 3 is selected, and set the number of stitches to 20 using switches ① and ②.
- 8) Set the shirring amount to 3.5 using switches ③ and ④.
- 9) Select the next edit step using switches ⑤ and ⑥.

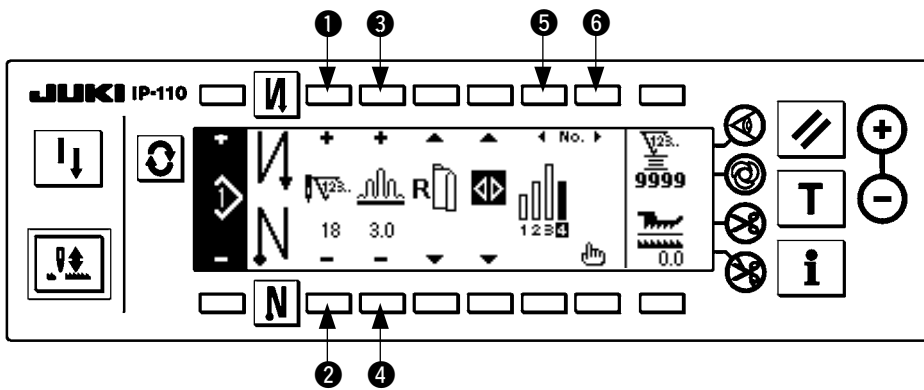
■ After editing step 3



[Step 4]

- 10) Confirm that step 4 is selected, and set the number of stitches to 18 using switches ① and ②.
- 11) Set the shirring amount to 3.0 using switches ③ and ④.

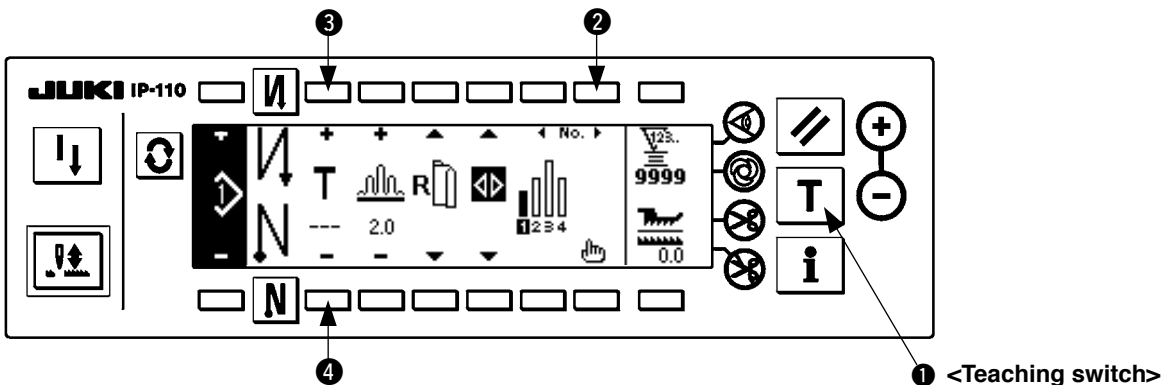
■ After editing step 4



(3) Teaching mode

By using the teaching mode, it is possible to input the number of stitches of the step in a program with the number of stitches that has been actually sewn.

Press  switch to display the pattern edit screen.

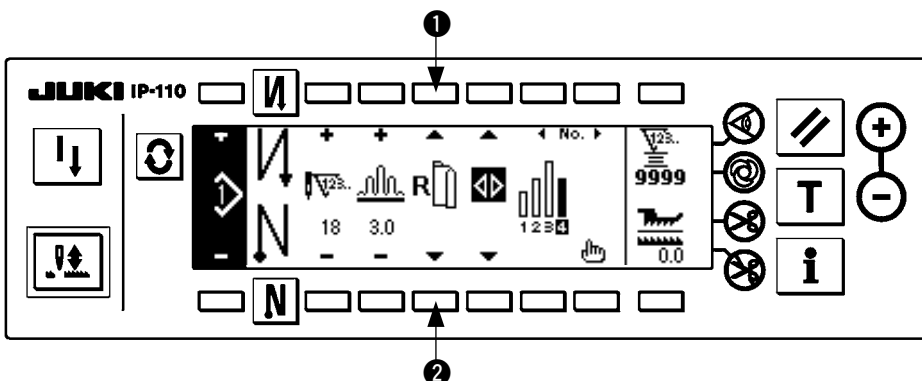


- 1) In the pattern edit screen, press teaching switch ① to select the teaching mode.
- 2) The indication shown on the number of stitches input section changes to **T**. This shows that the sewing machine has entered the teaching mode.
- 3) Depress the front part of the pedal to make the sewing machine perform sewing until the last stitch of the step. (Caution : the number of stitches is not inputted by manual turning or needle up/down compensating switch.)
- 4) Return the pedal to its neutral position to make the sewing machine stop running, and the number of stitches which has been sewn is displayed.
- 5) Number of stitches can be corrected by pressing switches ③ and ④ in the state that the sewing machine has stopped.
- 6) Proceed to the next step using switch ② or make the sewing machine perform thread trimming. This completes the input of the number of stitches of step 1.


(4) Selecting the sleeve to be sewn


One sewing pattern has the data on left sleeve and right sleeve.

Press  switch to display the pattern edit screen.



In the pattern edit screen, changeover of data on left sleeve and those on right sleeve can be performed with sleeve selection switches ① and ②.

 **L** is displayed while left sleeve is being selected.

 **R** is displayed while right sleeve is being selected.

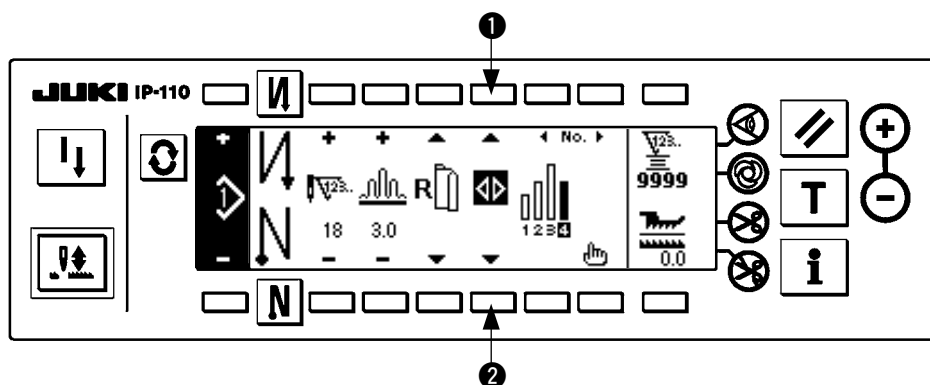


When "Without reference" is selected in the data creation reference of the pattern register, the sleeve selection pictograph is not displayed.


(5) Selection of the alternate sewing

There is the alternate sewing function that when performing thread trimming after completion of sewing of one sleeve, the sewing automatically changes to the sewing of the other one.

Press  switch to display the pattern edit screen.



Changeover of alternate sewing function ON/OFF can be performed with alternate sewing selection switches **1** and **2**.

When the alternate sewing function is ON,  is displayed.

When the alternate sewing function is OFF,  is displayed.

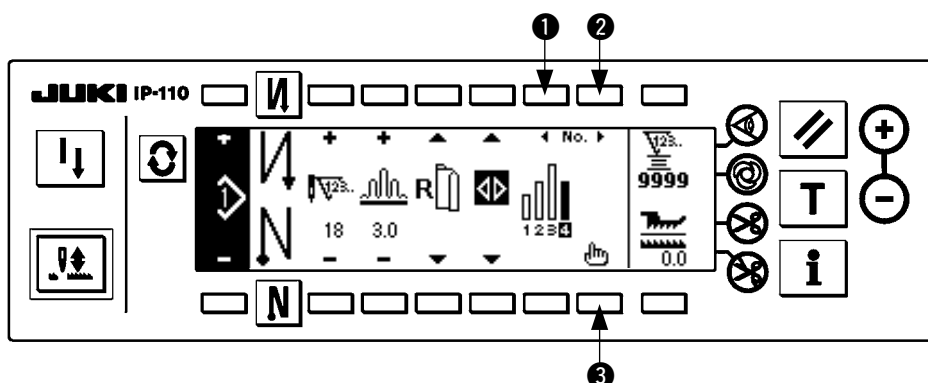


When "Without reference" is selected in the data creation reference of the pattern register, the sleeve selection pictograph is not displayed.

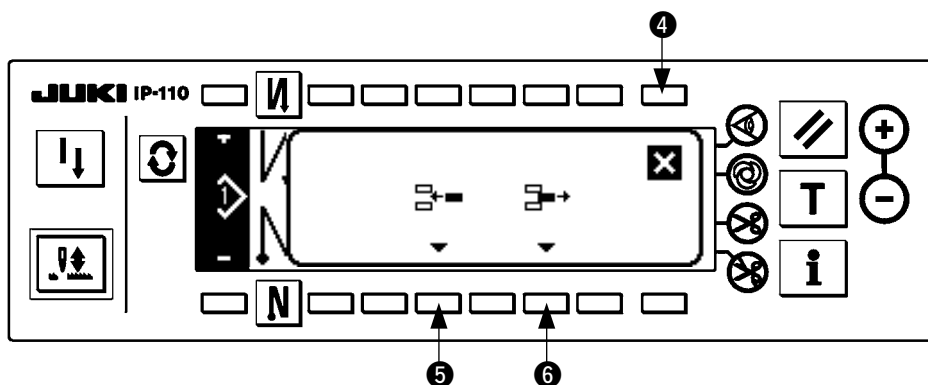
(6) Insertion and deletion of the step

When any insufficient step or any unnecessary step occurs at the time of editing the pattern, insertion or deletion of the step can be performed.

Press  switch to display the pattern edit screen.



■ Step insertion/deletion pop-up



[Common operation]

- 1) Move the step to the position where you desire to insert or delete with step selection switches **1** and **2**.
- 2) Press step edit switch **3** to display the step insertion/deletion pop-up.
- 3) When the step insertion/deletion pop-up is displayed by mistake or the insertion/deletion position is selected by mistake, press cancel switch **4**.

[In case of insertion]







- 4) When step insertion switch **5** is pressed, insertion of the step is executed.

[In case of deletion]


- 5) When step deletion switch **6** is pressed, deletion of the step is executed.

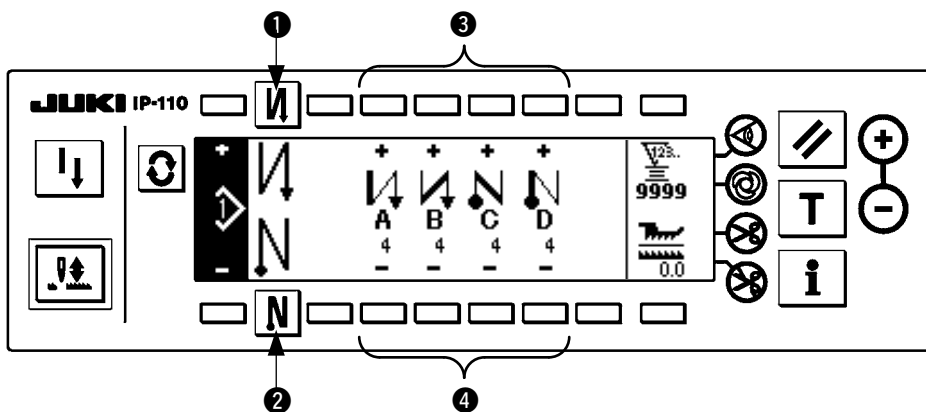
(7) Operating procedure of the number of stitches of the reverse stitching

[Sewing pattern diagram]

 ①	OFF	ON	OFF	ON
Sewing pattern				
 ②	OFF	OFF	ON	ON

[Operating procedure]

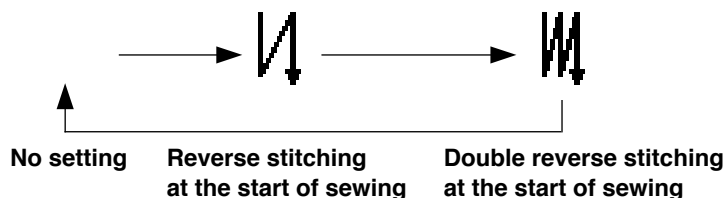
Press  switch to display the number of stitches of reverse stitching setting screen.



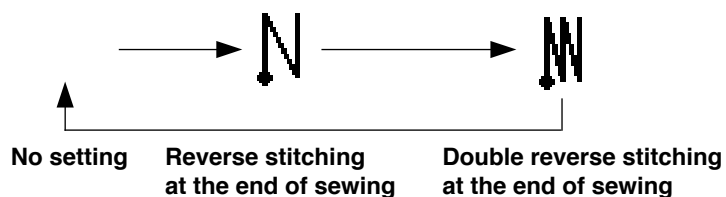
1. When changing the number of stitches, change it with switches ③ and ④ for setting the number of stitches A through D.

(The range of the number of stitches that can be changed : 0 to 99 stitches)

2. Press switch ① to set the reverse stitching at the start of sewing.



3. Press switch ② to set the reverse stitching at the end of sewing.

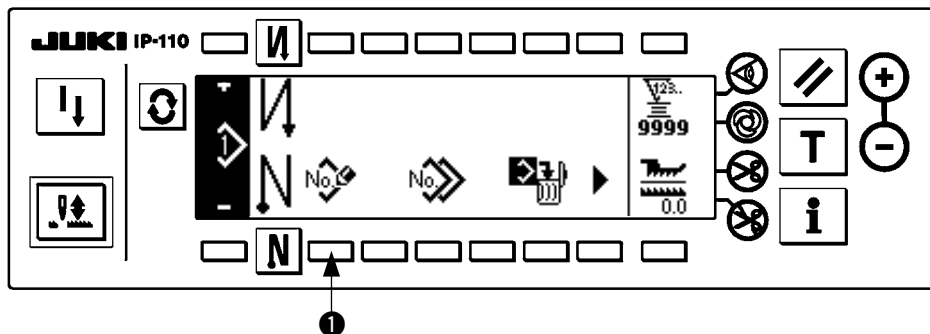


8. PATTERN OPERATION

Creation of the new sewing pattern, copy of the sewing pattern or deletion of the sewing pattern can be performed in the pattern operation screen.

(1) Sewing pattern register

Press  switch to display the pattern edit screen.

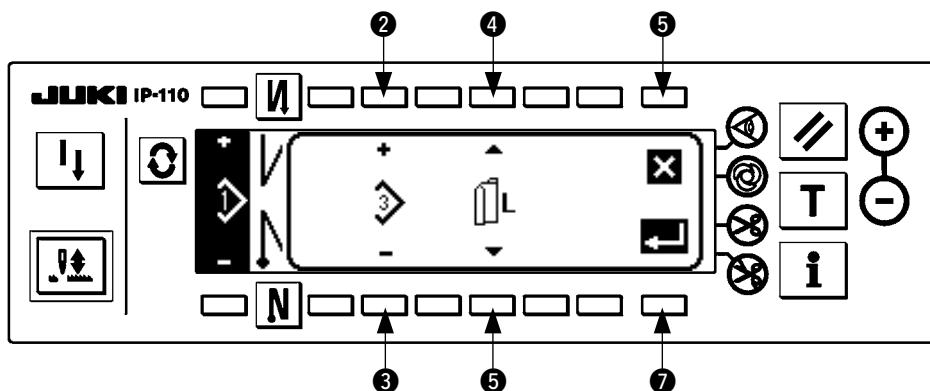


Press sewing pattern register switch ❶ in the sewing pattern operation screen.



When the information is registered to all patterns, the pattern register pop-up is not displayed.




■ Pattern register pop-up



❷ and ❸ Pattern to be registered is set.

❹ and ❺ Data creation reference at the time of creating the pattern is set.

References below can be selected.

Left reference  L , Right reference  R , Without reference 

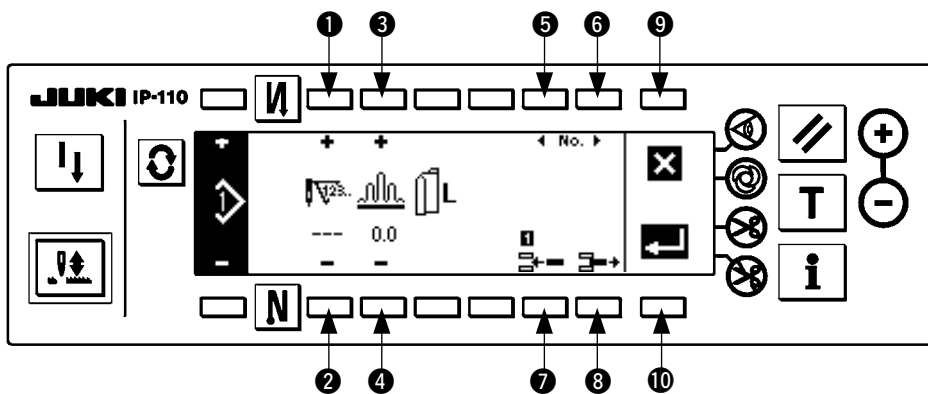
❻ This is the cancel switch. Screen returns to the pattern operation screen.

❼ This is the determination switch. Screen moves to the pattern register screen.



The pattern which has been already registered cannot be selected.

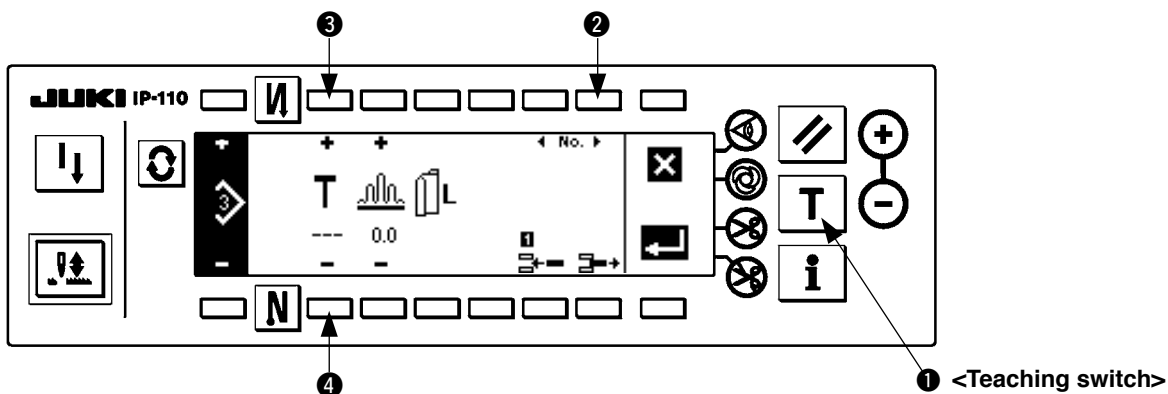
■ Pattern register screen



- ① and ② Number of stitches of the step is set.
- ③ and ④ Shirring amount of the step is set.
- ⑤ and ⑥ Move of the step is performed.
- ⑦ Step is inserted to the selected step.
- ⑧ Selected step is deleted.
- ⑨ Register is cancelled and the screen returns to the pattern operation screen.
- ⑩ Determination of register of the set data is performed. At this time, the data which is inverted to the left or right is automatically registered to the sleeve on the opposite side.

[Teaching mode]

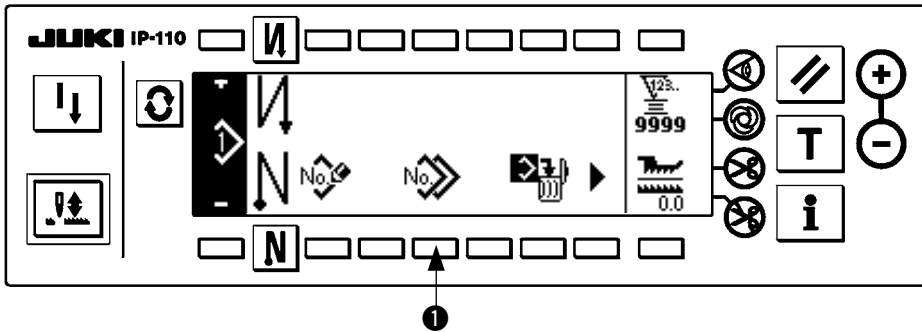
Teaching mode can be used in the pattern register screen.



1. Press teaching switch ① in the pattern register screen, and select the teaching mode.
2. The indication shown on the number of stitches input section changes to **T**. This shows that the sewing machine entered the teaching mode.
3. Depress the front part of the pedal to make the sewing machine perform sewing until the last stitch of the step. (Caution : the number of stitches is not inputted by manual turning or needle up/down compensating switch.)
4. Return the pedal to its neutral position to make the sewing machine stop running, and the number of stitches which has been sewn is displayed.
5. Number of stitches can be corrected by pressing switches ③ and ④ in the state that the sewing machine has stopped.
6. Proceed to the next step using switch ② or make the sewing machine perform thread trimming. This completes the input of the number of stitches for step 1.

(2) Copy of the sewing pattern

Press  switch to display the pattern edit screen.

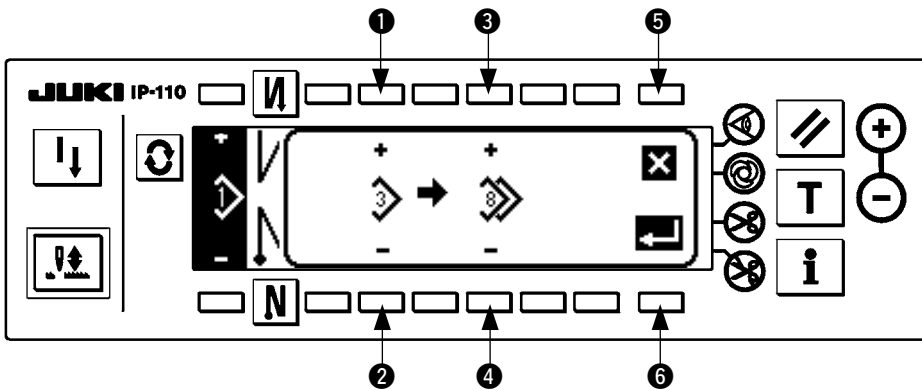


Press sewing pattern copy switch **1** in the sewing pattern operation screen.



When the information is registered to all patterns, the pattern copy pop-up is not displayed.

■ Pattern copy pop-up



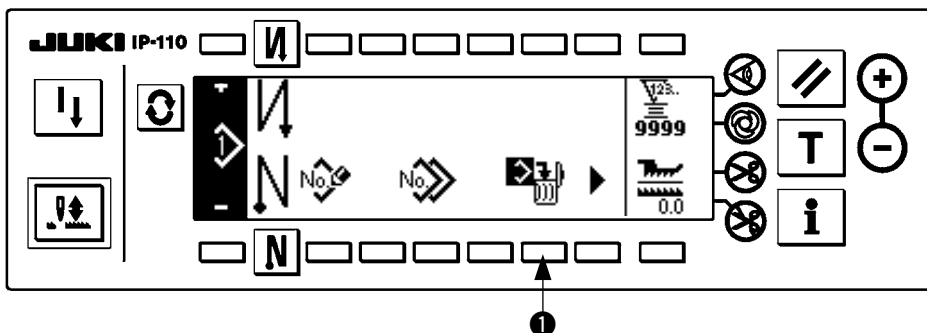
- 1** and **2** Pattern to be the pattern source is set.
- 3** and **4** Pattern to be the pattern destination is set.
- 5** Copy is cancelled.
- 6** Copy is executed.



The pattern which has been already registered cannot be selected to the copy destination.

(3) Deletion of the sewing pattern

Press  switch to display the pattern edit screen.

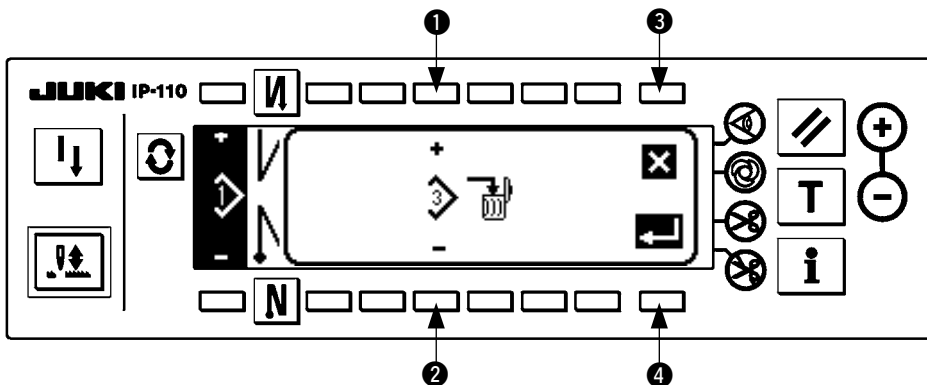


Press sewing pattern deletion switch **1** in the sewing pattern operation screen.



When the pattern which has been registered is one, the deletion pop-up is not displayed.

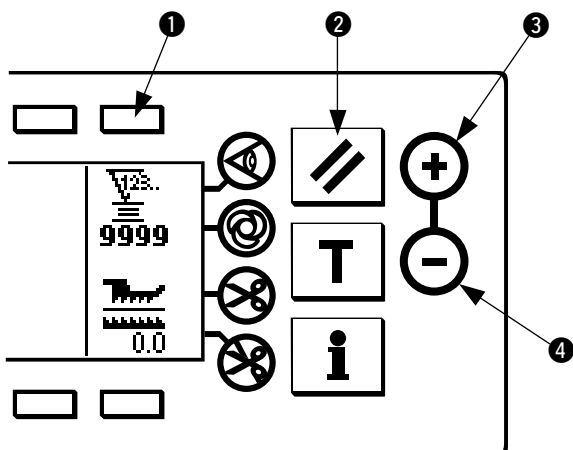
■ Pattern deletion pop-up



- 1** and **2** Pattern to be deleted is set.
- 3** Deletion is cancelled.
- 4** Deletion is executed.

9. HOW TO USE THE BOBBIN THREAD COUNTER

The machine detects the number of stitches. The preset value on the bobbin thread counter is subtracted in accordance with the number of stitches detected. (Every time the detector detects 10 stitches, 1 is subtracted from the preset value on the bobbin thread counter.) When the value on the counter becomes a minus value as (..... → 1 → 0 → -1), the buzzer (peeps three times) and the pop-up display inform that the time to change the bobbin thread has come.

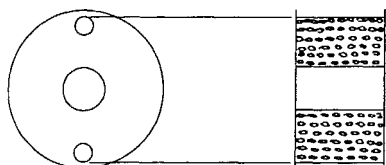


- 1) Press switch **1** to select the bobbin thread counter. Then press counter reset switch **2** to return the value indicated on the bobbin thread counter to the initial value (it has been factory-set to "0" at the time of delivery).

Caution The bobbin thread counter cannot be reset during sewing. In this case, make the thread trimmer actuate once.

- 2) Set an initial value using counter value setting switches **3** and **4**.

Initial value on the bobbin thread counter for reference



The table below gives the initial setting values for reference when the bobbin is wound with thread to the extent that the pinhole in the outside of the bobbin case is reached as shown in the figure on the left side.

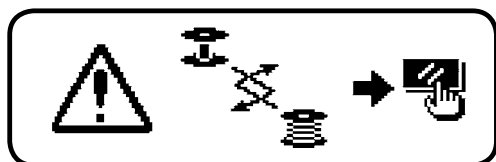
Thread used	Length of thread wound round the bobbin	Value on bobbin thread counter
Polyester spun thread #50	36 m	1200 (stitch length : 3 mm)
Cotton thread #50	31 m	1000 (stitch length : 3 mm)

Thread tension rate 100 %

* Actually, the bobbin thread counter is affected by the material thickness and the sewing speed. So, adjust the initial value of the bobbin thread counter in accordance with the operating conditions.

- 3) Once the initial value is specified, start the sewing machine.
- 4) When a minus value is shown on the counter, the buzzer peeps three times and the pop-up display appears, replace the bobbin thread.

Bobbin thread replacement warning pop-up



- 5) After the bobbin thread has been properly replaced, press counter reset switch **2** to turn out the pop-up. Then press again switch **2** to return the value to the initial value, and re-start the sewing machine.
- 6) If the remaining amount of bobbin thread is excessive or the bobbin thread runs out before the bobbin thread counter indicates a minus value, adjust the initial value appropriately using counter value setting switches **3** and **4**.

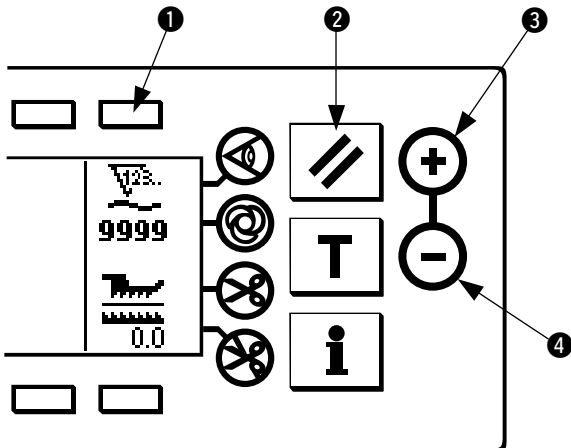
If the remaining amount of bobbin thread is excessive Increase the initial value using the "+" switch.
If the remaining amount of bobbin thread is insufficient Decrease the initial value using "-" switch.



Caution If the bobbin thread counter is used in combination with the bobbin thread remaining amount detecting device, the bobbin thread counter indicates the number of times of detection of the bobbin thread remaining amount detecting device. So, be sure to use the device after carefully reading the Instruction Manual for the bobbin thread remaining amount detecting device.

10. NO. OF PCS. COUNTER

The No. of pcs. counter counts up the number of finished products every time the machine performs thread trimming. (0 → 1 → 2 → 9999)

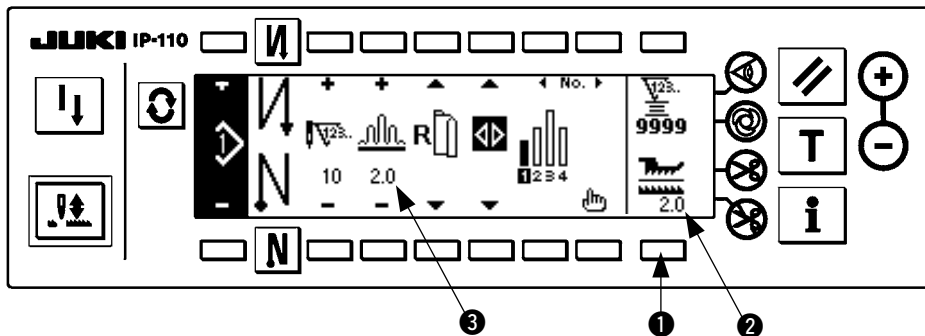


The value on the No. of pcs. counter can be modified using counter value setting switches ③ and ④. The value on the No. of pcs. counter is reset to "0" by pressing counter reset switch ②.

11. BOTTOM FEED AMOUNT DISPLAY

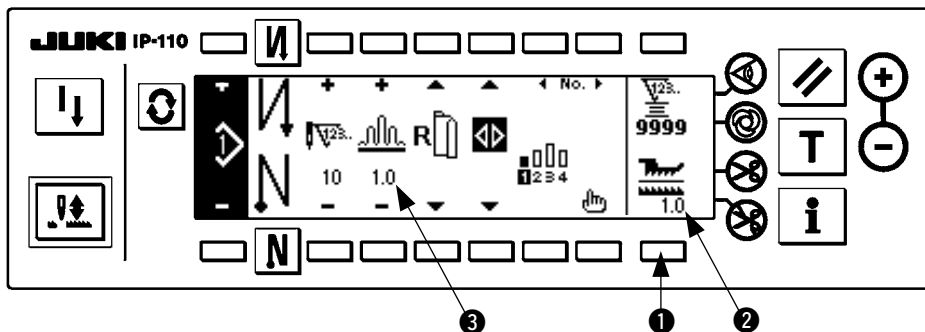
Observation of the bottom feed amount is performed and the value is displayed on the panel. There are the direct display and the ratio display for the way of display.

■ Direct display



For the direct display, the bottom feed amount is displayed at bottom feed amount display section ②, and the set value is displayed at top shirring amount display section ③. When switch ① is pressed, the display changes to the ratio display.

■ Ratio display



For the ratio display, 1.0 (fixed display) is displayed at bottom feed amount display section ②, and the value that the top shirring amount is divided by the bottom feed amount is displayed at top shirring amount display section ③. When switch ① is pressed, the display changes to the direct display.

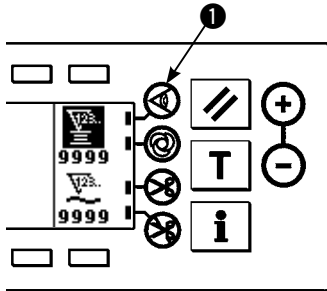
12. RE-SEWING SWITCH

For the details, refer to "Instruction Manual for IP-110"

13. NEEDLE UP/DOWN COMPENSATION SWITCH

For the details, refer to "Instruction Manual for IP-110"

14. ON/OFF SWITCH OF THE MATERIAL EDGE SENSOR

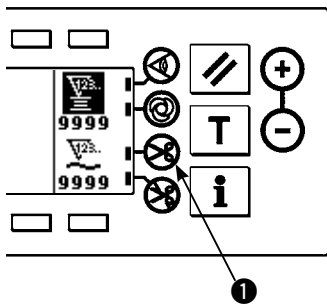


- When material edge sensor **1** is pressed, ON/OFF of the material edge sensor is changed over.
- When the material edge sensor, which is optionally available, is connected to the operation panel, the ON/OFF switch of the material edge sensor becomes effective.
- If the material edge sensor is specified, the sewing machine will automatically stop running or perform thread trimming when the sensor detects the material edge.



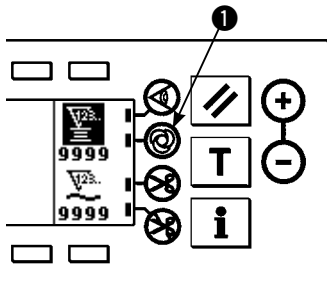
If the material edge sensor is used in combination with the operation panel, carefully read the Instruction Manual for the material edge sensor beforehand.

15. AUTOMATIC THREAD TRIMMING SWITCH



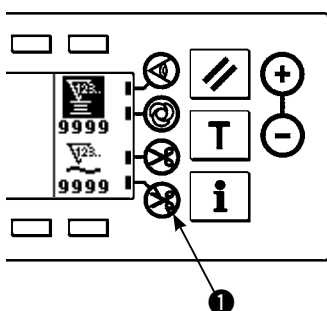
- When automatic thread trimming switch **1** is pressed, ON/OFF of the automatic thread trimming is changed over.
- This is the switch which makes the sewing machine automatically execute thread trimming when the material edge sensor is used. (When the reverse stitching at the end of sewing is specified, the thread trimming is performed after performing the reverse stitching at the end of sewing.)



16. ONE-SHOT AUTOMATIC STITCHING SWITCH



- When one-shot automatic stitching switch **1** is pressed, ON/OFF of the one-shot automatic stitching is changed over.
- This is the switch which makes the sewing machine automatically perform sewing at the specified speed until the material edge is detected when the material edge sensor is used.

17. THREAD TRIMMING PROHIBITION SWITCH



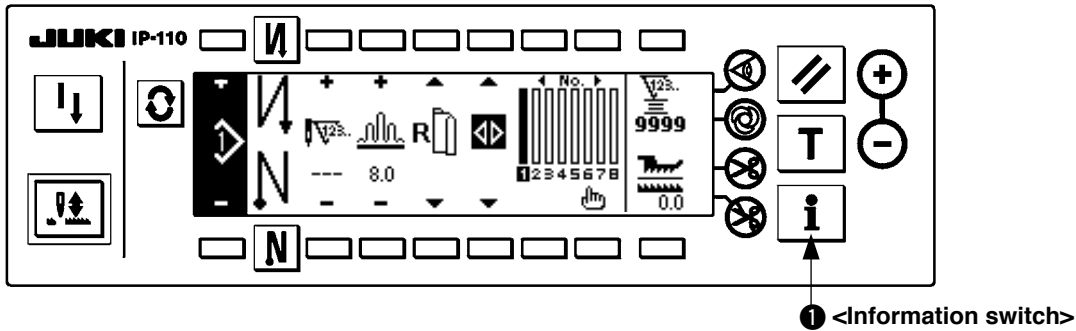
- When thread trimming prohibition switch **1** is pressed, ON/OFF of the thread trimming prohibition is changed over.
- This switch is used to temporarily make the thread trimming function inoperative. The other performance of sewing machine is not affected by this switch. (If the automatic reverse stitching (for end) is specified, the sewing machine will perform the automatic reverse stitching at the end of sewing.)
- If the automatic thread trimming switch  and the thread trimming prohibition switch  are both specified, the machine will not perform thread trimming but stop with its needle up.

18. INFORMATION

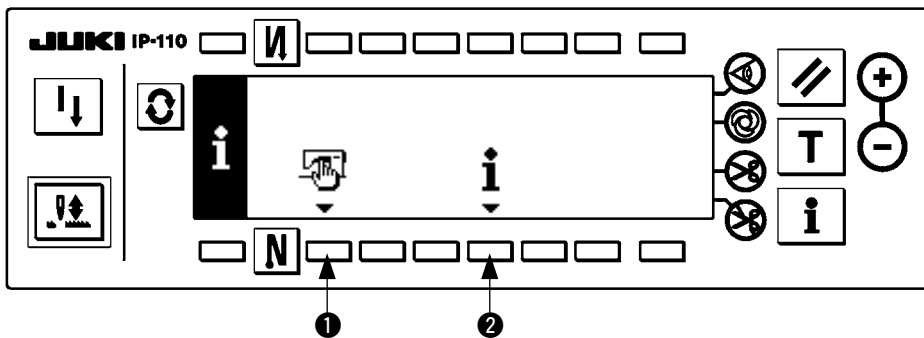
Setting and checking of various data can be performed with the information.

For the information, there are the operator level and the maintenance personnel level.

(1) Information operator level

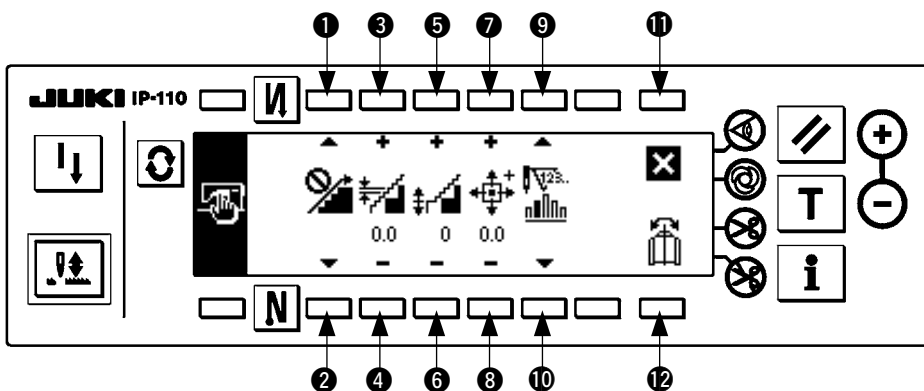


1. Turn ON the power.
2. Press switch ① to display the information screen.



- ① Sewing common data
- ② Sewing management information

1) Sewing common data




- ① and ② Shirring smoothing function setting is performed.
- ③ and ④ Smoothing shirring pitch setting is performed.
- ⑤ and ⑥ Smoothing shirring offset setting is performed.
- ⑦ and ⑧ Stepping motor origin position setting is performed.
- ⑨ and ⑩ Number of remaining stitches of the step setting is performed.
- ⑪ Setting is completed.
- ⑫ Pattern data mirroring function is performed.

[Explanation of the respective functions]

1. Shirring smoothing function setting

ON/OFF setting of smoothing (shirring between the steps is smoothly changed over) function is performed.

Smoothing function ON  is displayed.

Smoothing function OFF  is displayed.

2. Smoothing shirring pitch setting

Feed pitch per stitch is set when performing the smoothing. Setting range is 0.0 to 8.0 [mm].

3. Smoothing shirring offset setting


Offset of the 1st stitch is set when performing the smoothing. Setting range is 0 to 9.

Set value	1	2	3	4	5	6	7	8	9
Ratio to enter 1st stitch	10%	11%	12%	14%	17%	20%	25%	33%	50%

- * When offset is set to "0", the smoothing function does not work.
- * "Ratio to enter first stitch" is the ratio in terms of the difference of shirring amounts between the steps.

4. Stepping motor origin position setting


Origin compensation of the stepping motor which determines the shirring amount is performed. Setting range is -2.5 to 2.5 [mm].




The motor may fail to properly work. Any person other than the service engineer should not operate the motor.

5. Number of remaining stitches of the step display function

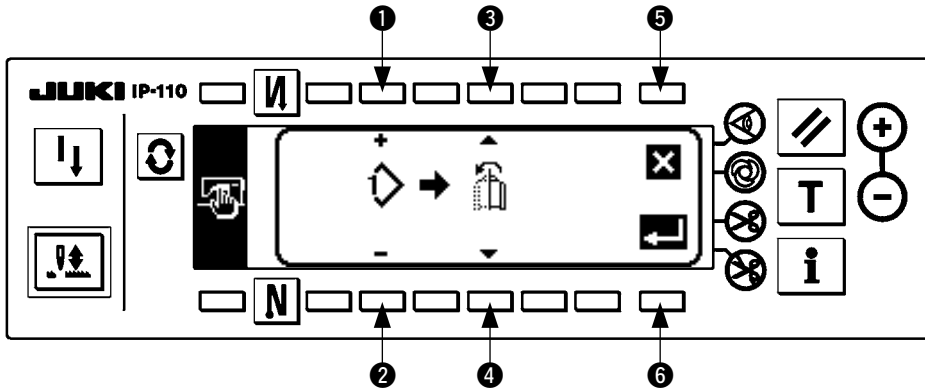
This is the function to display the number of remaining stitches of the number of stitches of the step which is currently being sewn as against the number of stitches which has been set. When this function is used, the display is updated every time the sewing machine stops (excluding during the teaching mode).

Number of remaining stitches display function ON  is displayed.

Number of remaining stitches display function OFF ...  is displayed.


6. Pattern data mirroring function


Mirroring (data inversion) processing of the pattern which has been already registered is performed.



① and ② Pattern to which mirroring is executed is set.

③ and ④ Sleeve to be the reference of mirroring is set.

Mirroring from left sleeve to right sleeve ...  is displayed.

Mirroring from right sleeve to left sleeve ...  is displayed.

⑤ Mirroring processing is cancelled.

⑥ Mirroring processing is executed.



The pattern to which mirroring has been performed here is selected as the current pattern.

7. Completion of setting

Setting of the common data is completed and the screen returns to the information screen.

2) Sewing management information

For the details, refer to "Instruction Manual for IP-110"

(2) Setting for functions

1) How to change over to the function setting mode

For the details, refer to "Instruction Manual for IP-110"

2) Function setting list

For the details, refer to "Instruction Manual for IP-110"

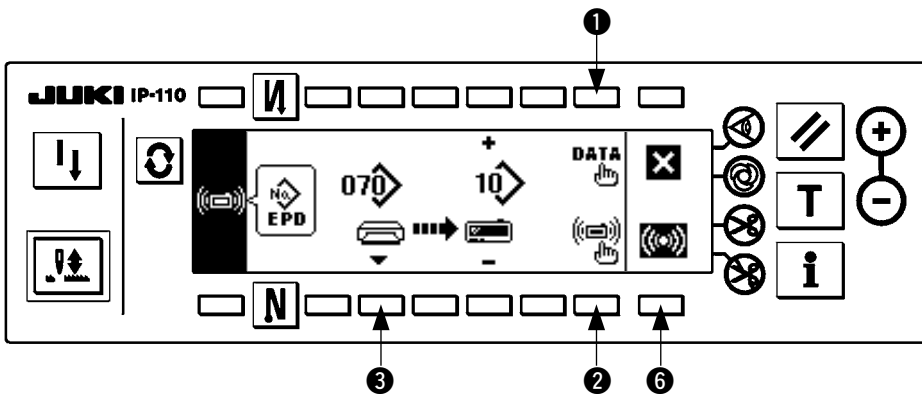
3) Communication mode

For the entering procedure to the communication mode, refer to the item of "Information maintenance personnel level" of Instruction Manual for IP-110.

The matters below can be performed in the communication mode.

1. Parameter data (EPD) from the media can be overwritten to the sewing pattern and registered.
2. Sewing pattern can be uploaded to SU-1 or the media.

■ Communication setting screen

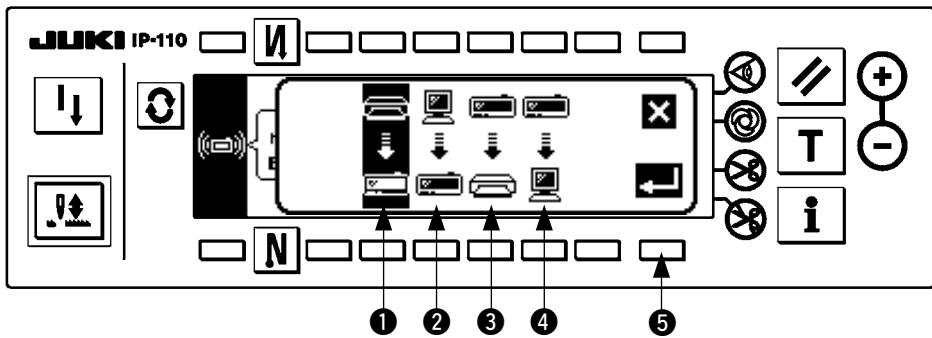


Example of download

Example) Parameter file No. 70 of the media is downloaded to the sewing pattern No. 10.

- ①. Open the media cover and insert CompactFlash (TM) (Optional Part No. ; 40000100) from the inserting opening.
* Panel function does not work with the cover opened.
- ②. Selection of data
EPD is selected from the beginning since the data of EPD form only is handled for DLU-5494.
- ③. Selection of communication method
Press ② in the communication setting screen to display the communication method setting screen.

■ Communication setting screen



Communication method which is selected at present is shown in reverse video.

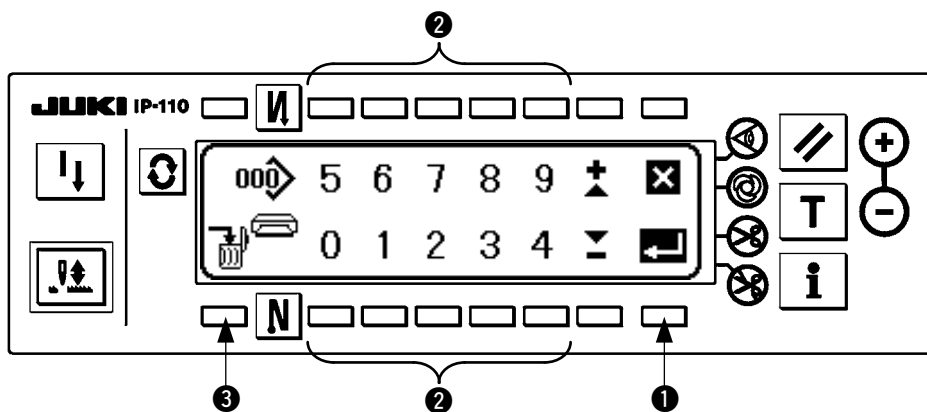
[Explanation of the pictograph]


- ① : Down load from the media
- ② : Download from SU-1
- ③ : Upload to the media
- ④ : Upload to SU-1

Press ① to select download from the media. Then press ⑤ to determine.

- ④. Selection of file No. of the media
Press ③ in the communication setting screen to display the file No. of media input screen.

■ File No. input screen

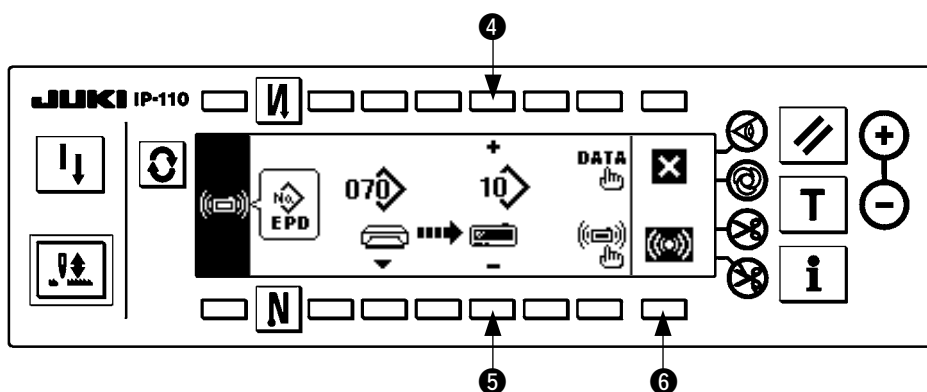


Input file No. of the media at ②. The file No. which has been inputted is displayed in . The No. is determined with ① after inputting the file No.

⑤. Custom pattern No. setting

Press ④ and ⑤ in the communication setting screen to set the custom pattern No.

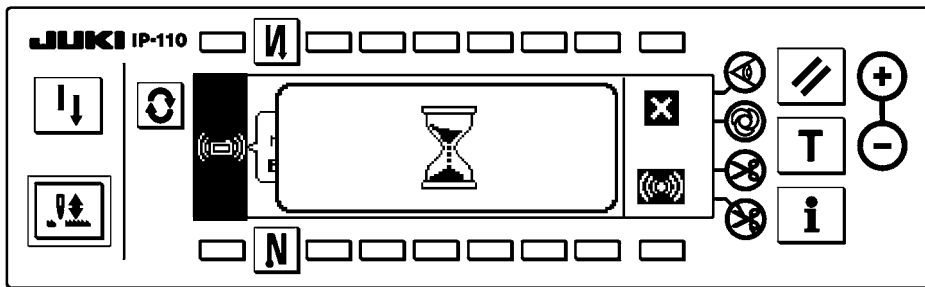
■ Communication setting screen



⑥. Start of download

When all setting procedures have been completed, press ⑥ in the communication setting screen to start downloading.

■ During communication screen



When the screen returns to the communication setting screen after display of the during communication screen, communication is completed.

Example of upload

Example) Sewing pattern No. 8 is uploaded as the parameter form file No. 15 of the media.

- ①. Open the media cover and insert CompactFlash (TM) (Optional Part No. : 40000100) from the inserting opening.
* Panel function does not work with the cover opened.
- ②. Selection of data
EPD is selected from the beginning since the data of EPD form only is handled for DLU-5494.
- ③. Selection of communication method
Press ② in the communication setting screen to display the communication method setting screen.

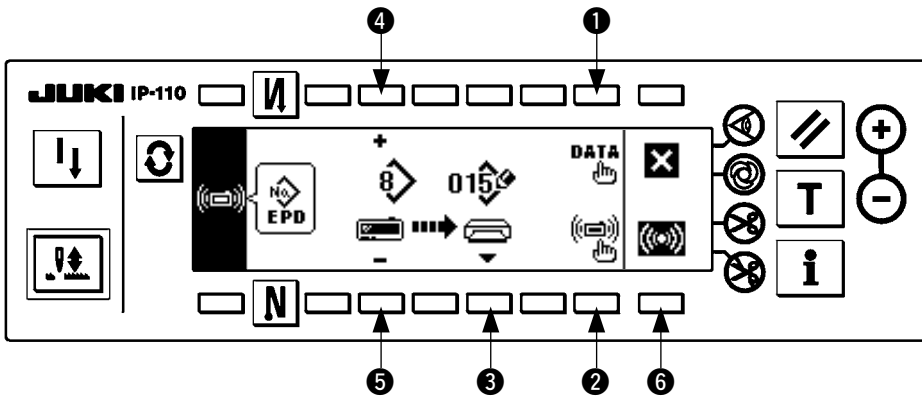
[Explanation of the pictograph]

- ① Download from the media
- ② Download from SU-1
- ③ Upload to the media
- ④ Upload to SU-1

Press ③ in the communication setting screen and press ⑤ to determine after selecting upload to the media.

- ④. Setting of the custom pattern No.
Press ④ and ⑤ in the communication setting screen to set the custom pattern No.
- ⑤. Selection of file No. of the media
Press ③ in the communication setting screen to display the file No. of media input screen.
Input the file No. of the media. The inputted file No. is displayed in . After inputting the file No., determine it with ①.
- ⑥. Start of the upload
When all setting procedures have been completed, press ⑥ in the communication setting screen to start uploading.
When the screen returns to the communication setting screen after display of the during communication screen, communication is completed.

■ Communication setting screen

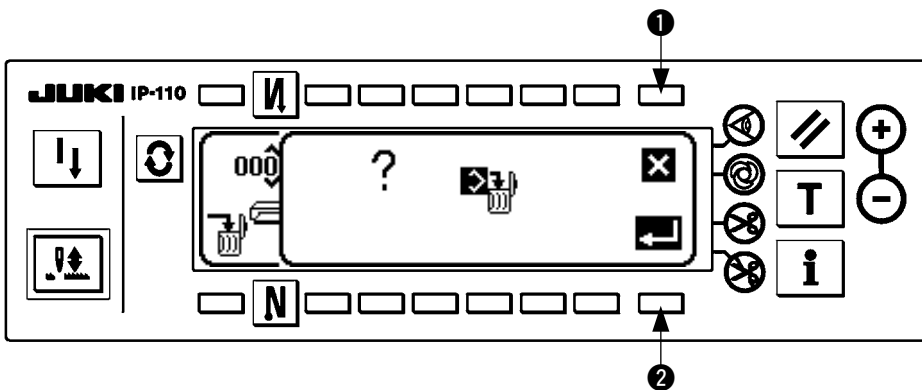


When the screen returns to the communication setting screen after display of the during communication screen, communication is completed.

[How to delete the file of media]

After selecting No. you desire to delete in the file No. of media input screen, press switch of ③. Then the screen moves to the deletion confirmation screen.

■ Deletion confirmation screen



Press ① and the deletion is discontinued. Then the screen returns to the file No. input screen. Press ② and the deletion is executed. Then the screen returns to the file No. input screen.



The deleted file is not restored. Be very careful when executing the deletion.

(3) External interface

External interface means the section to connect the operation panel and the system which is different from the operation panel.

For the use and details, refer to the Engineer's Manual.

1) Media slot

Media slot is installed in the face cover located on the left side of operation panel.

2) RS-232C port

RS-232C connector is installed in the rubber cap located on the back side of operation panel.

3) General input port (Production control switch connecting connector)

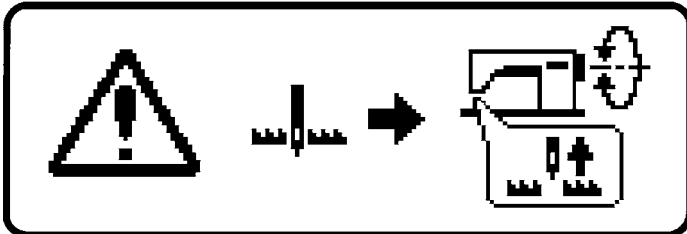
General input connector, CN105 is installed in the cord outlet cover located on the back side of operation panel.

19. ERROR DISPLAY

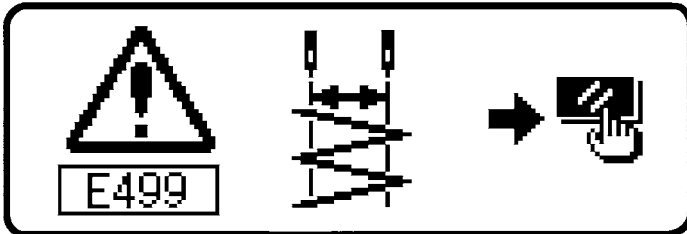


Error is informed by means of the panel display and control box buzzer.

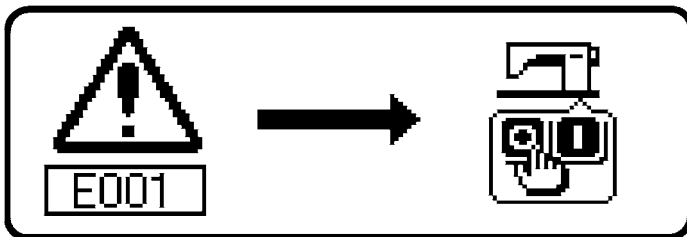
Three different kinds of screens of the panel display screen appear due to the difference of the procedures.



- 1) Error screen disappears when the operator removes the cause.



- 2) Press the reset switch, and remove the cause of error after erasing the error screen.



- 3) Remove the cause of error after turning OFF the power.

(1) Error code list (Error display in panel)

There are the following error codes in this device. These error codes interlock (or limit function) and inform the problem so that the problem is not enlarged when any problem is discovered. When you request our service, please confirm the error codes.

No.	Description of error detected	Cause	Item to be checked or corrective measure
—	Media cover open	<ul style="list-style-type: none"> Lid of media slot is open. 	<ul style="list-style-type: none"> Close the lid.
000	Execution of data initialization (Not error)	<ul style="list-style-type: none"> When machine head is replaced. When initializing operation is executed. 	
003	Disconnection of synchronizer connector	<ul style="list-style-type: none"> When position detection signal is not inputted from the sewing machine head synchronizer. When the synchronizer has broken. 	<ul style="list-style-type: none"> Check the synchronizer connector (CN30) for loose connection and disconnection. Check whether the synchronizer cord has broken since the cord is caught in the machine head or the like.
004	Synchronizer lower position sensor failure		
005	Synchronizer upper position sensor failure		
007	Overload of motor	<ul style="list-style-type: none"> When the machine head is locked. When sewing extra-heavy material beyond the guarantee of the machine head. When the motor does not run. Motor or driver is broken. 	<ul style="list-style-type: none"> Check whether the thread has been entangled in the motor pulley. Check the motor output connector (4P) for loose connection and disconnection. Check whether there is any draw when turning motor by hand.
008	Machine head connector failure (Resistance pack)	<ul style="list-style-type: none"> When the machine head connector is not properly read. 	<ul style="list-style-type: none"> Check the machine head connector (CN31) for loose connection and disconnection.
011	Media not inserted	<ul style="list-style-type: none"> Media is not inserted. 	<ul style="list-style-type: none"> Turn OFF the power.
012	Read error	<ul style="list-style-type: none"> Data read from media is not possible. 	<ul style="list-style-type: none"> Turn OFF the power.
013	Write error	<ul style="list-style-type: none"> Data write to media is not possible. 	<ul style="list-style-type: none"> Turn OFF the power.
014	Write protect	<ul style="list-style-type: none"> Media is in the state of writing prohibition. 	<ul style="list-style-type: none"> Turn OFF the power.
015	Format error	<ul style="list-style-type: none"> Formatting cannot be performed. 	<ul style="list-style-type: none"> Turn OFF the power.
016	External media capacity over	<ul style="list-style-type: none"> Capacity of media is short. 	<ul style="list-style-type: none"> Turn OFF the power.
019	File size over	<ul style="list-style-type: none"> File is too big. 	<ul style="list-style-type: none"> Turn OFF the power.
032	File compatibility error	<ul style="list-style-type: none"> There is no file compatibility. 	<ul style="list-style-type: none"> Turn OFF the power.
053	Execution of panel backup data initialization (Not error)	<ul style="list-style-type: none"> When model code of panel does not agree with that of control box. When executing initialization operation with the panel. 	<ul style="list-style-type: none"> Turn OFF the power.

No.	Description of error detected	Cause	Item to be checked or corrective measure
302	Fail detection switch failure (When safety switch works)	<ul style="list-style-type: none"> When fall detection switch is inputted in the state that the power is turned ON. 	<ul style="list-style-type: none"> Check whether the machine head is tilted without turning OFF the power switch (sewing machine operation is prohibited for safety sake). Check whether the fall detection switch cord is caught in the sewing machine or the like and has broken. Check whether the fall detection switch lever is caught in something.
343	Bobbin thread remaining amount sensor unit trouble	<ul style="list-style-type: none"> When the position of detection rod of AE device is out of the home position. 	<ul style="list-style-type: none"> Check whether the detection rod of AE device is returned to the proper position. Check whether function setting No. 57 is wrongly set. Check whether connectors (CN121 and CN123) of AE device are loosened or disconnected. Check whether cord of AE device is broken due to pinching of cord or the like by machine head.
810	Solenoid short-circuit	<ul style="list-style-type: none"> When the short-circuited solenoid is desired to be driven. 	<ul style="list-style-type: none"> Check whether the solenoid is short-circuited.
811	Overvoltage	<ul style="list-style-type: none"> When voltage upper than guaranteed one is inputted. When 200V is inputted for 100V setting. 	<ul style="list-style-type: none"> Check whether the applied power voltage is higher than the rated voltage + (plus) 10% or more. Check whether 100V/200V changeover connector is set by mistake. <p>Check whether fuse or regenerative resistance is broken. In the above cases, POWER circuit board has broken.</p>
813	Low voltage	<ul style="list-style-type: none"> When voltage lower than guaranteed one is inputted. When 100V is inputted for 200V setting. Internal circuit is broken due to applied overvoltage. 	<ul style="list-style-type: none"> Check whether the voltage is lower than the rated voltage – (minus) 10% or less. Check whether 100V/200V changeover connector is set by mistake. Check whether fuse or regenerative resistance is broken.
906	Operation panel transmission failure	<ul style="list-style-type: none"> Disconnection of operation panel cord Operation panel has broken. 	<ul style="list-style-type: none"> Check the operation panel connector (CN34,CN35) for loose connection and disconnection. Check whether the operation panel cord has broken since the cord is caught in the machine head or the like.
924	Motor driver failure	<ul style="list-style-type: none"> Motor driver has broken. 	
930	Encoder failure	<ul style="list-style-type: none"> When the motor signal is not properly inputted. 	<ul style="list-style-type: none"> Check the motor signal connector (CN38,CN39) for loose connection and disconnection.
931	Motor hole sensor failure		<ul style="list-style-type: none"> Check whether the motor signal cord has broken since the cord is caught in the machine head or the like.
939	Stepping motor origin retrieval error	<ul style="list-style-type: none"> When the origin position of the stepping motor is not detected at the time of turning ON the power. 	<ul style="list-style-type: none"> Check whether the detecting connector (CN139) is wrongly inserted. Check the detecting connector (CN139) for loose connection and disconnection.