ENGLISH

SC-510
INSTRUCTION MANUAL

⮌

CONTENTS

Ⅰ. SPECIFICATIONS

Supply voltage	Single phase 100 to 120V / 3-phase 200 to 240V	Single phase 200 to 240V
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating environment	Temperature : 0 to 40°C Humidity : 90% or less	Temperature : 0 to 40°C Humidity : 90% or less
Power consumption	425VA	425VA

(Caution) 1. **Indication of the power consumption is the mean power consumption when LU-1520N-7 is mounted in accordance with the operating conditions JUKI specifies. The power consumption changes in accordance with the operating conditions and the mounted machine head. So, be careful.**

2. **Instantaneous maximum power consumption may become 1.5 times or more than the mean power consumption.**

Ⅱ. SET-UP

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

1. Installing the motor unit
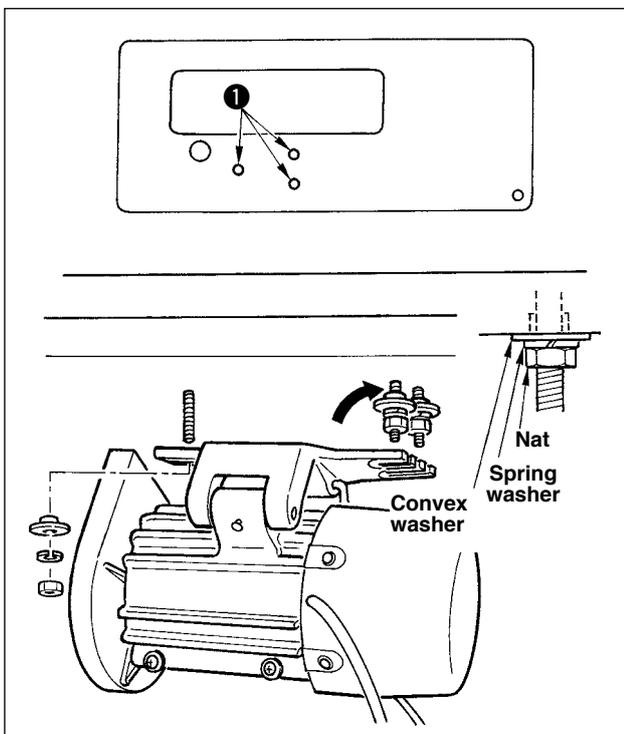
Install the motor unit on the table with the fitting bolt asm. supplied with the unit as accessories.

At this time, insert the nuts and washers supplied with the unit as accessories as shown in the figure so that the motor unit can be securely fixed on the table.

1) Press three bolts ❶ supplied with the unit as accessories into the motor hanging bolt hole in the table and fix them.

2) Temporarily tighten convex washer, spring washer and nut on the side where two bolts are attached.

3) Hang the motor unit to the washer which has been temporarily tightened, and attach convex washer, spring washer and nut to the other bolt on the opposite side.

4) After adjusting the installing position of the motor, securely tighten the respective nuts.

2. Installing the control box
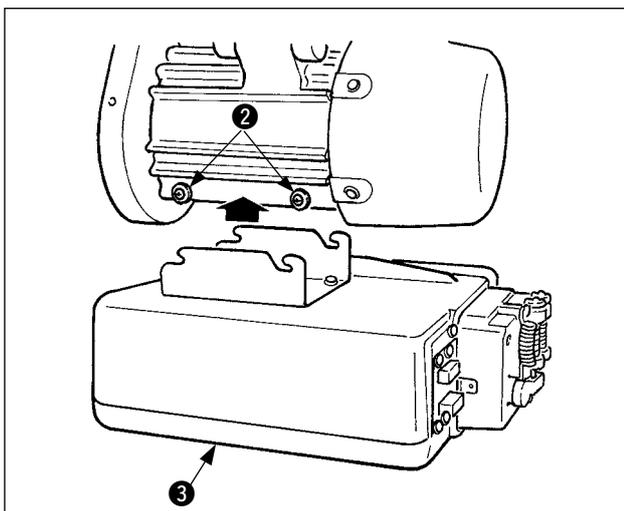
1) Loosen four screws ❷ supplied with the motor unit as accessories, tighten screws ❷ after hanging control box unit ❸ to the screws, and fix control box unit ❸.

3. Installing the belt

15mm (9.8N)

Tension adjust nuts
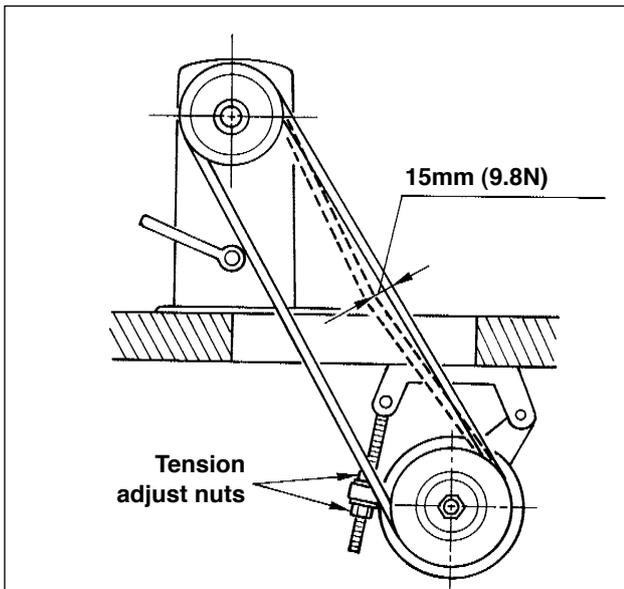
1) The belt distance, between sewing machine pulley and motor pulley, must be parallel.
2) The belt tension should be adjusted by turning the tension adjust nuts to change height of the motor, so that the belt sinks down by about 15 mm (9.8N) when it is depressed by band at the center of the belt span.

   If the belt tension is not tight, speed is unstable at low-speed or medium-speed operation, and the needle will not stop exactly in position.

4. Adjusting the pulley cover

❶
❷
Belt
ⓐ
ⓑ
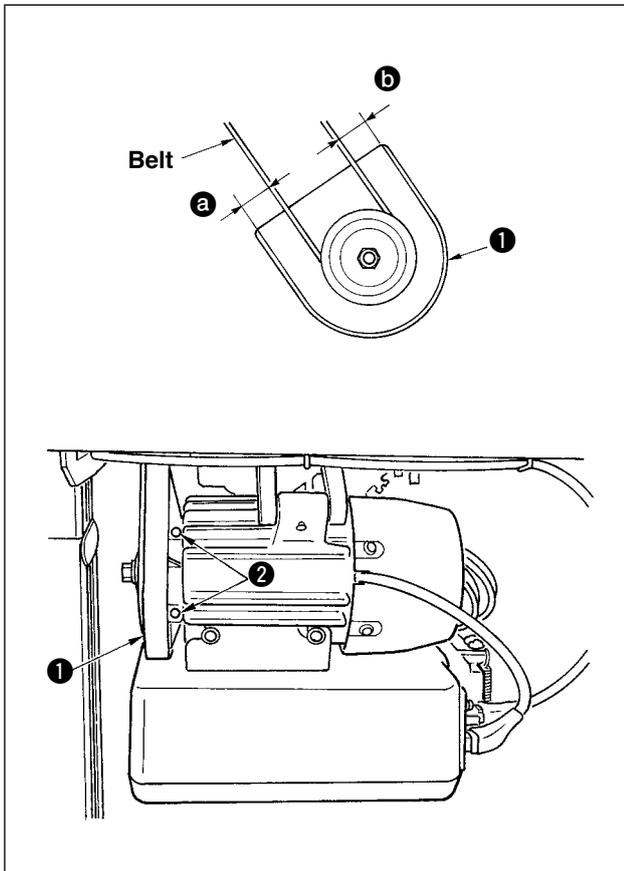
1) After adjusting the belt tension, adjust the pulley cover ❶ so that the clearances between the belt and the pulley cover ❶, ⓐ and ⓑ should be the same.
2) After the completion of adjustment, tighten screws ❷ located on the side of pulley cover ❶ and securely fix the pulley cover ❶ so that it does not slip out of position.

5. Installation and adjustment for the protecting pin and the belt slip-off preventing bracket

Belt

Attaching hole Ⓐ

Attaching hole Ⓑ

A　　**B**

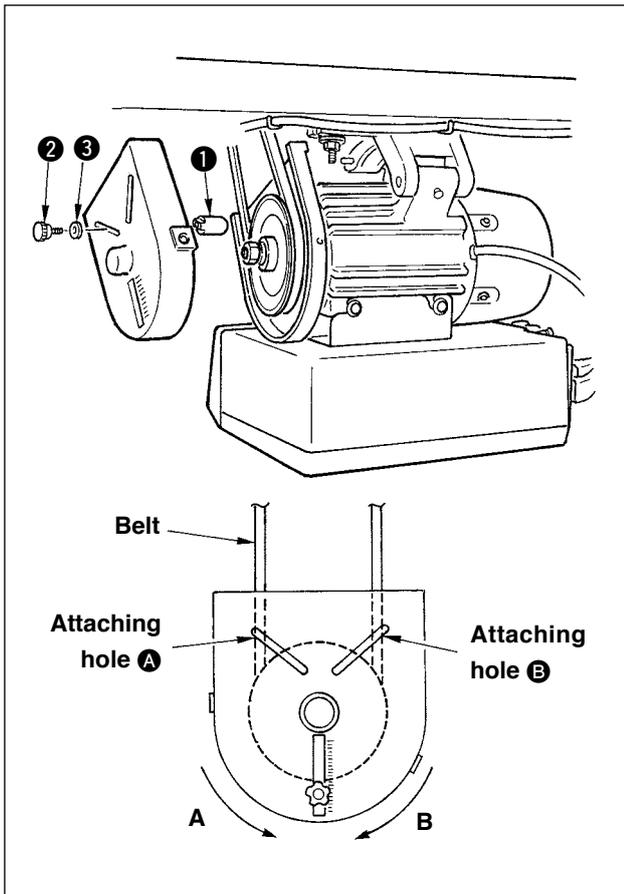**Belt**　**4 mm or less**

❶

4 mm or less

Adjusting position for protecting pin

Pulley cover

Motor pulley

Belt

3 mm or less

❺　　❹

Adjusting position for belt slip-off preventing braket

1) Attaching hole for the protecting pin
   To attach protecting pin ❶, select either attaching hole Ⓐ or attaching hole Ⓑ in the motor pulley cover in accordance with the direction of rotation of the sewing machine and attach the pin in the selected hole using screw ❷ and washer ❸ supplied with the unit.
   a) If the motor shaft rotates in direction A in the figure on the above:
      → Attach protecting pin ❶ in attaching hole Ⓐ .
   b) If the motor shaft rotates in direction B in the figure on the above:
      → Attach protecting pin ❶ in attaching hole Ⓑ .

2) Adjustment for the protecting pin and the belt slip-off preventing bracket
   Adjust the position of protecting pin ❶ and belt slip-off preventing bracket ❹ in accordance with the figure on the left.
   a) Adjusting the protecting pin
      Loosen screw ❷ and adjust so that protecting pin ❶ is positioned at the location indicated in the figure on the left.
   b) Adjusting belt slip-off preventing bracket
      Loosen screw ❺ and adjust so that belt slip-off preventing bracket ❹ is positioned at the location indicated in the figure on the left.
      If protecting pin ❶ is not properly adjusted, it is possible that your fingers may be caught in the clearance provided between the pulley and the belt resulting in injury. If belt slip-off preventing bracket ❹ is not properly adjusted, it is possible to allow the belt to slip off causing safety hazard.
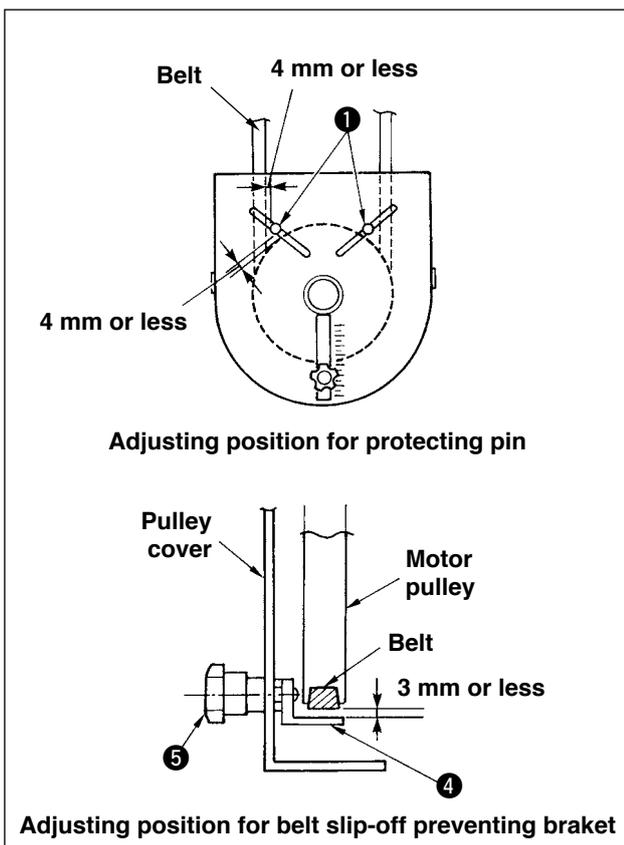
3) After the adjustment, tighten screws ❷ and ❺ so as to secure protecting pin ❶ and belt slip-off preventing bracket ❹ to prevent these components to fluctuate because of vibration.

4) Before starting the operation of the sewing machine, ascertain that protecting pin ❶ and belt slip-off preventing bracket ❹ do not come in contact with the pulley and the belt.

6. 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 when loosening the front cover fixing screws **Ⓐ** of SC-510 and opening the cover. Connect the machine head connectors to the positions corresponding to each other so as to fit the devices mounted on the machine head.
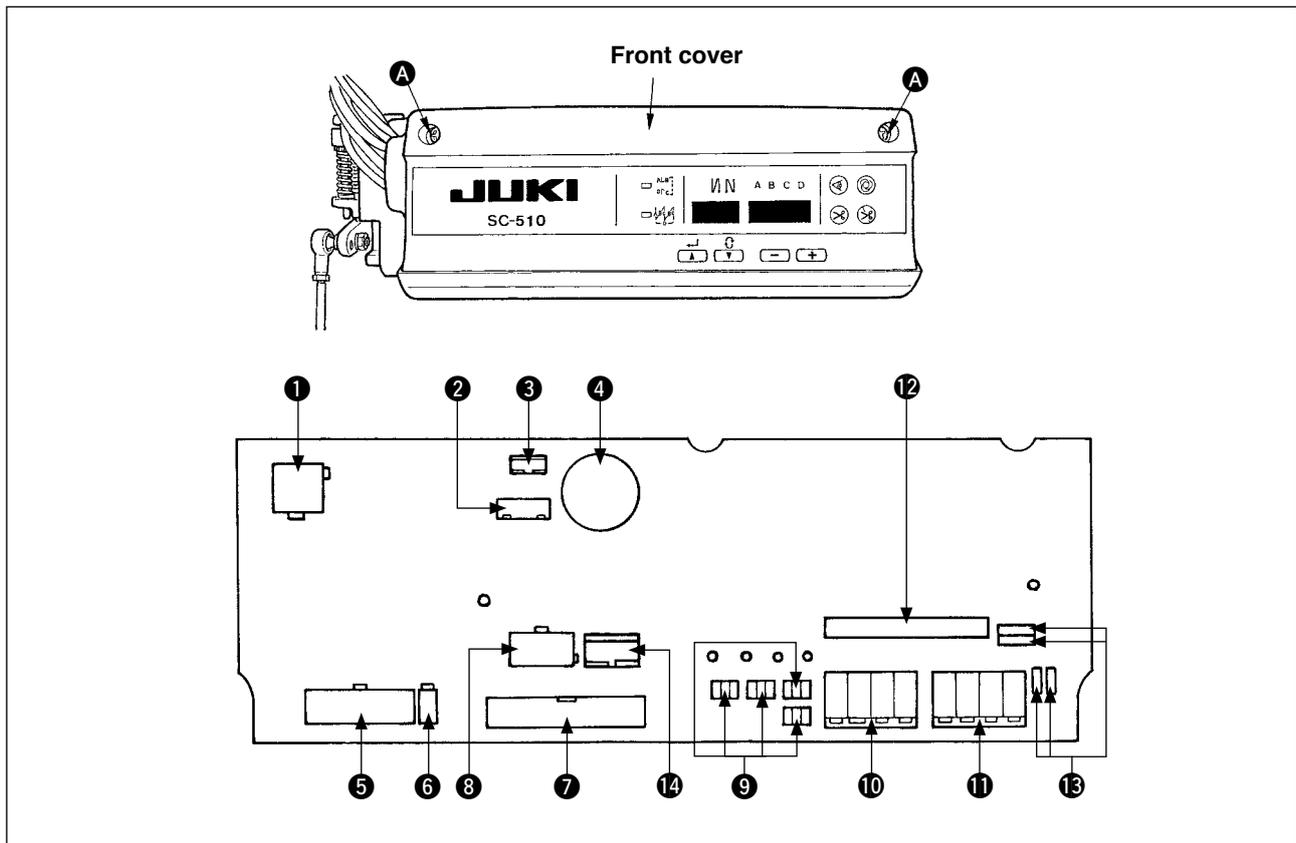
❶	CN30	Motor signal connector
❷	CN43	Needle bar position detector connector (+12V type)
❸	CN32	Machine head connector
❹	CN33	Needle bar position detector connector (+5V type)
❺	CN36	Machine head solenoid connector
❻	CN37	Presser foot lifter solenoid connector
❼	CN38	CP-160 panel connector
❽	CN40	Signal for extension output connector (For the details, refer to Engineer's Manual.)
❾	W1, W2, W3, W4	Optional jumper pins for changeover of input/output of power source (For the details, refer to Engineer's Manual.)
❿	CN50	Optional output connector (For the details, refer to Engineer's Manual.)
⓫	CN51	Optional input connector (For the details, refer to Engineer's Manual.)
⓬	CN41	Connector for extension p.c.b. (For the details, refer to Engineer's Manual.)
⓭	W5 to W8	Jumpers for optional input changeover (For the details, refer to Engineer's Manual.)
⓮	CN39	Pedal for standing work connector (PK-70 and the like can be used.)
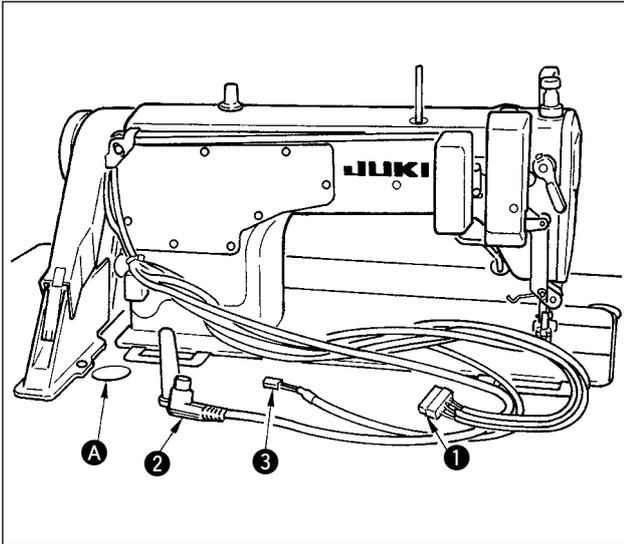
1) Pass the cords ❶ of the thread trimming sole-
noid, reverse-stitching solenoid, etc., and the
cords of the synchronizer ❷, machine head 4P
connector ❸ through hole Ⓐ in the table to route
them down under the machine table.
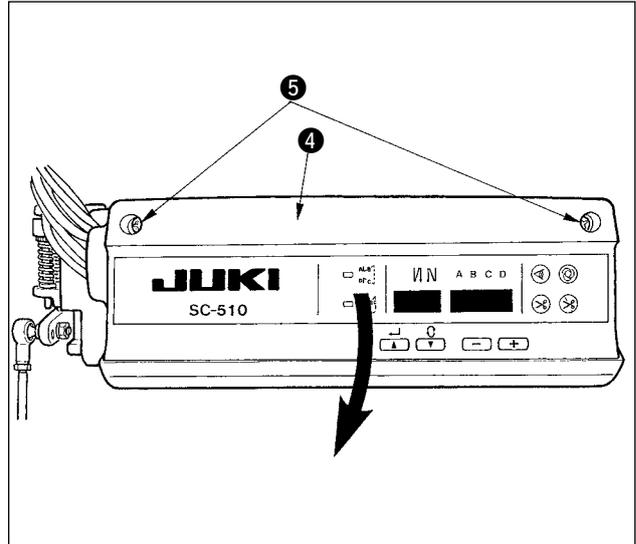
2) Loosen setscrew ❺ in front cover ❹.

3) Pressing the side of front cover ❹ in the direction
of the arrow, open the front cover toward you.

Note :
Be sure to open / close the front cover with your hands.
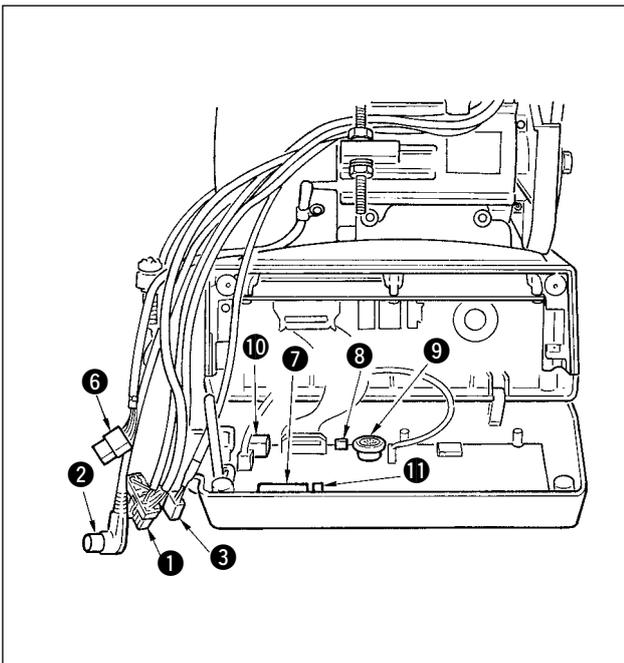
4) Connect 14P code ❶ coming from the machine
head to connector ❼ (CN36).

5) Connect 4P connector coming from the machine
head ❸ to connector ❽ (CN32).

6) Connect 7P connector ❷ coming from the ma-
chine head to connector ❾ (CN33).

7) When the optional AK device is attached, con-
nect 2P connector coming from the AK device to
connector ⓫(CN37) .

8) Connect the connector ❻ coming from the motor
to connector ❿ (CN30) on the circuit board.

**(Caution) 1. When using the AK device, set whether
to use the AK device after confirming
how to select the auto-lifter function.
(Refer to page 37.)**
     **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 un-
less the connectors are inserted prop-
erly.**
**In addition, not only the problem of error
warning or the like occurs, but also the
sewing machine and the control box are
damaged.**
     **3. Perform the insertion of the connector by
lending your hands to the front cover.**
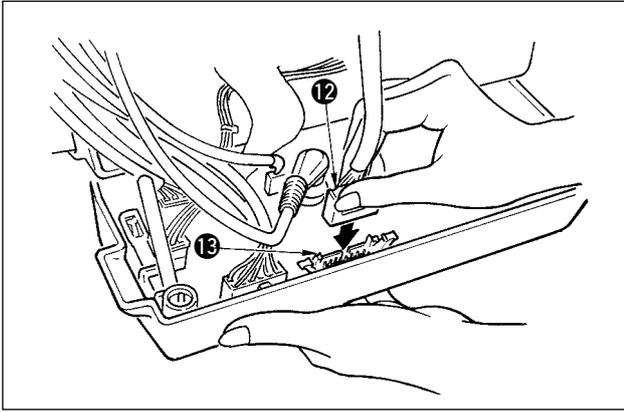
[Connection of the connector for CP panel]

Exclusive connectors are prepared for connection of the connector for CP-160.

Paying attention to the orientation of the connector ❷, connect it to connector ❸ located on the circuit board. After connecting, securely lock the connector.
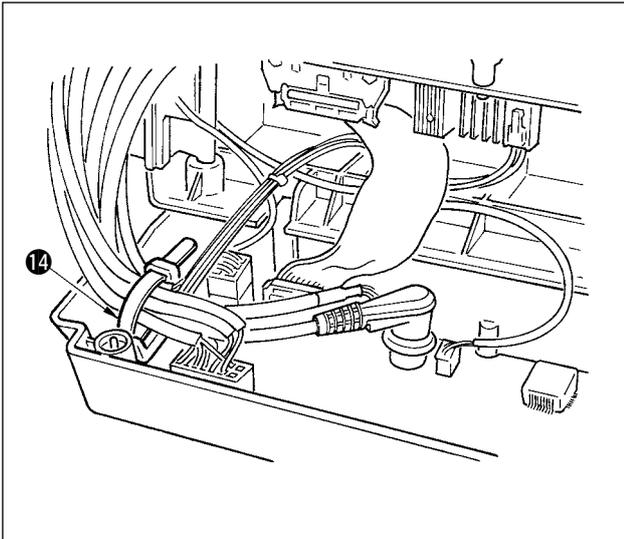
9) After inserting the connector, put all cords together with cable clip band ❹ located on the side of the box.

(Caution) 1. **Fix the cord clamp and the cable clip band following the attaching procedure.**
2. **When removing the cable clip band, remove it while pressing the hook of the cable clip band.**

How to fix cable clip band ❹

Pull   Pull

How to remove cable clip band ❹

Push   Push   Push   Push the hook.

Pushing the hook portion, push the band to remove it.
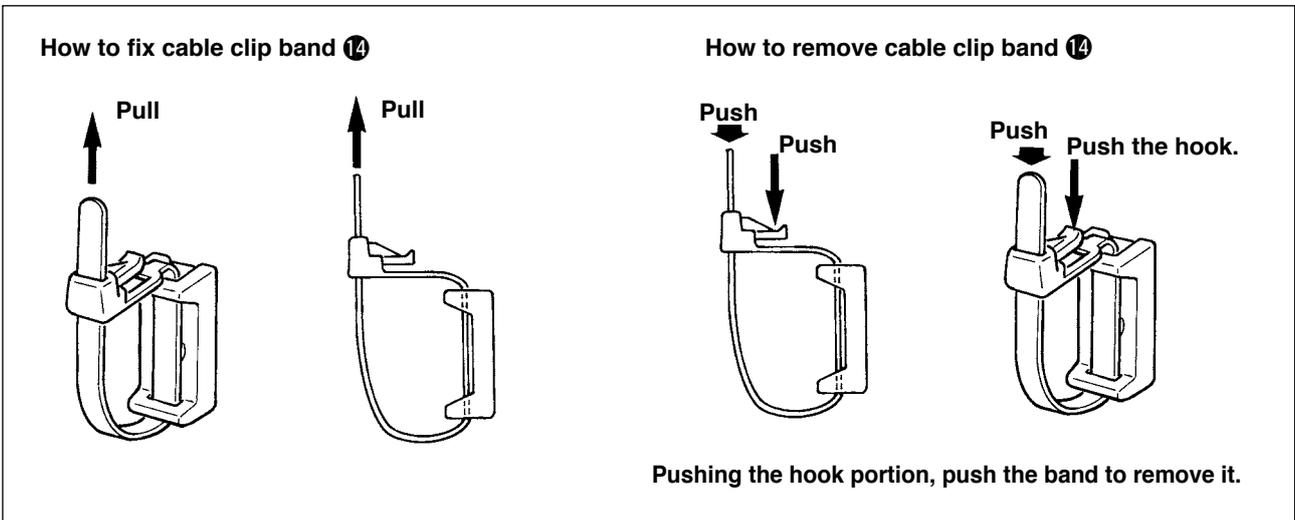
(Caution) 1. **Fix the cable clip band following the attaching procedure as shown in the figure.**
2. **To remove the cable clip band, push the cable clip band until it comes off while pressing the hook of the band following the removing procedure as shown in the figure.**
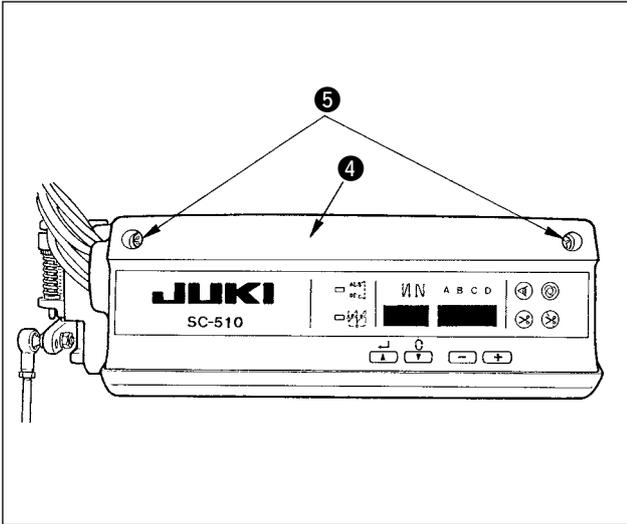
10) Close front cover ❹ while paying attention to pinching of the wire.

11) After that, fix it with the screw ❺.
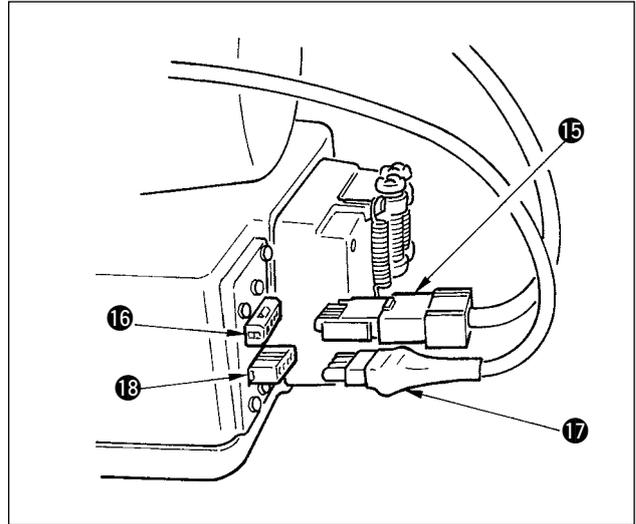
12) Connect connector 4P ⓕ to connector ⓖ located on the side of the box.

13) Connect motor output cord ⓗ of the power switch to connector ⓘ.
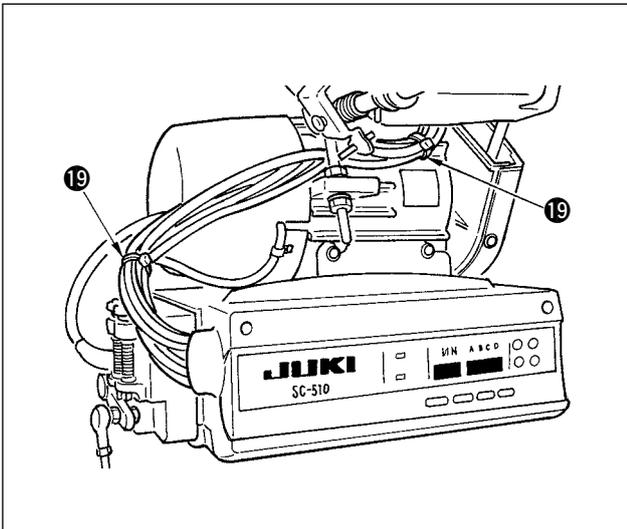
14) Binding of the cords coming from machine head
Bind the cable attached to the machine head at two places with the cable clip band ⓙ supplied with the unit as accessories as shown in the figure.
(Do not bind the motor signal cable together.)
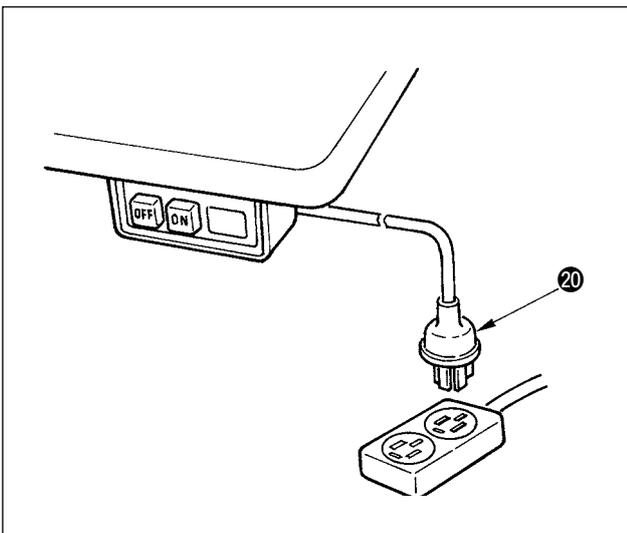
15) Make sure that the power switch is turned OFF and insert power supply cord ⓴ coming from the power switch into the power plug socket.

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

[For CE specifications only]
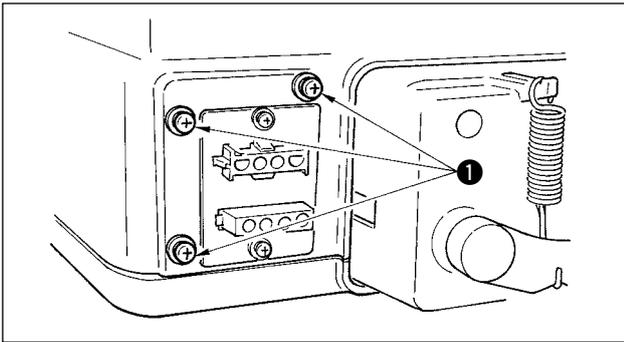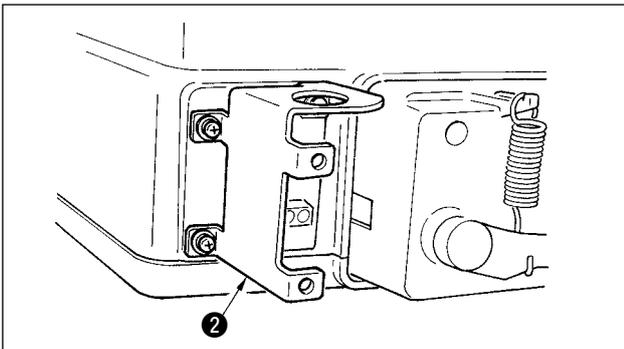
1) Remove three screws ❶ located on the side of the control box.

2) Set power source cover installing plate ❷ supplied with the unit as accessories to the control box main unit with the three screws which have been removed.
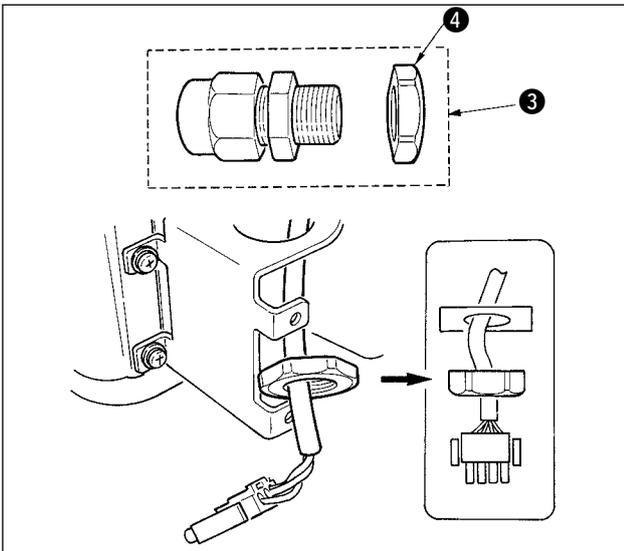
3) Remove nut section ❹ from cord bush ❸ supplied with the unit as accessories.

4) After checking the direction of the nut, pass the nut through the power source cord supplied with the unit as accessories.

(Caution)   Note that the flat face of the nut should face the power source cover installing plate side.

5) Pass the terminal of the power source cord through the hole from the inside of the power source cover installing plate.
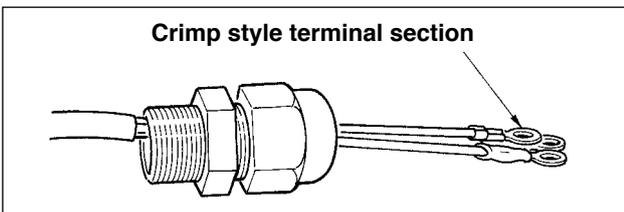
Crimp style terminal section

6) Pass the cord bush, while paying attention to the direction, through the power source cord from the power source cord terminal side.
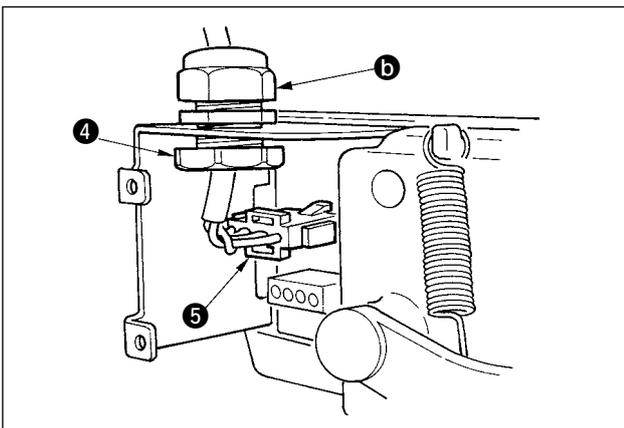
7) Insert connector ❺ of the power source cord to the connector (top) of the control box.

(Caution)   Securely insert the connector while paying attention to the direction.

8) Tighten nut ❹ and securely fix the cord bush to the installing plate.

9) Clamp section ⓑ of the cord bush and securely fix it to the cord.
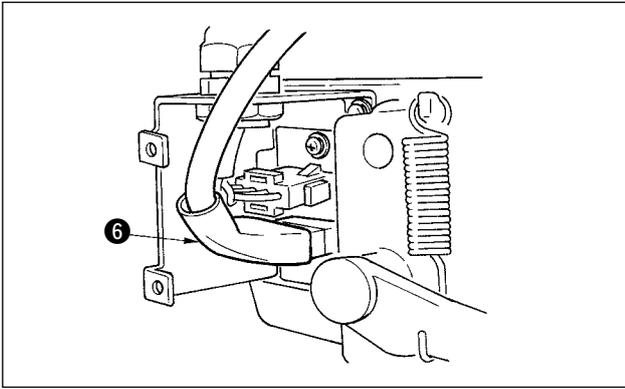
10) Insert connector ❻ coming from the motor to the connector of the control box from the inside.
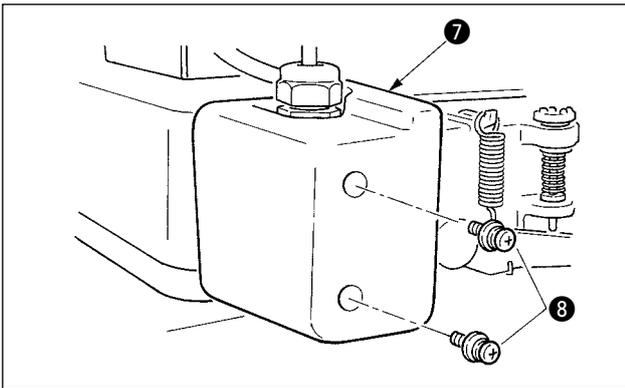
11) Securely fix power source cover ❼ supplied with the unit as accessories to power source cover installing plate ❷ with two screws ❽ supplied with the unit as accessories while being careful that the cord is not caught by the cover.

* For handling the cable, refer to 14) and 15) of "6. Connecting the cords".

[For LA specifications only]
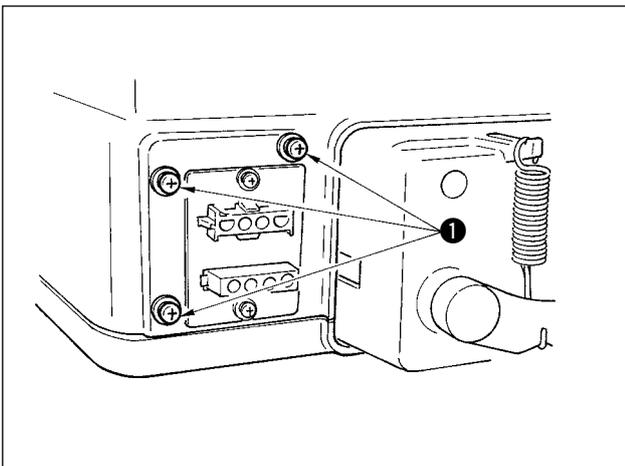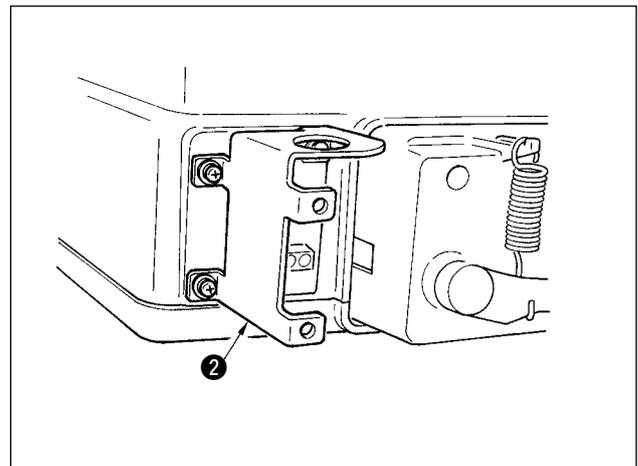
1) Remove three screws ❶ located on the side of the control box.

2) Set power source cover installing plate ❷ supplied with the unit as accessories to the control box main unit with the three screws which have been removed.
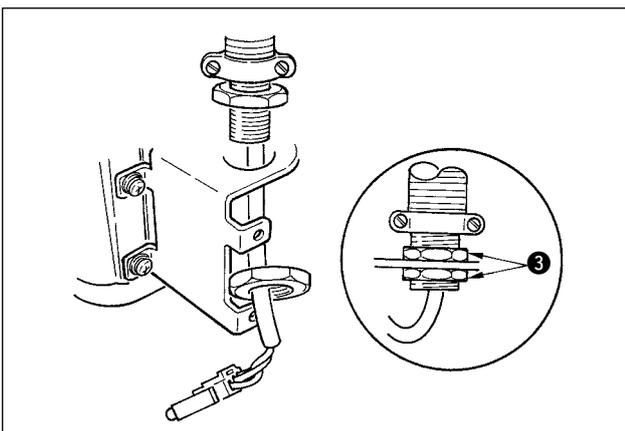
3) Pass the terminal of the power source cord through the hole from the inside of the power source cover installing plate.

4) After checking the direction of the nut ❸, pass the nut through the power source cord supplied with the unit as accessories and insert it into the conduit.

(Caution) **Note that the flat face of the nut should face the power source cover installing plate side.**

5) Securely fix it to the installing fittings with nut ❸ from both sides.
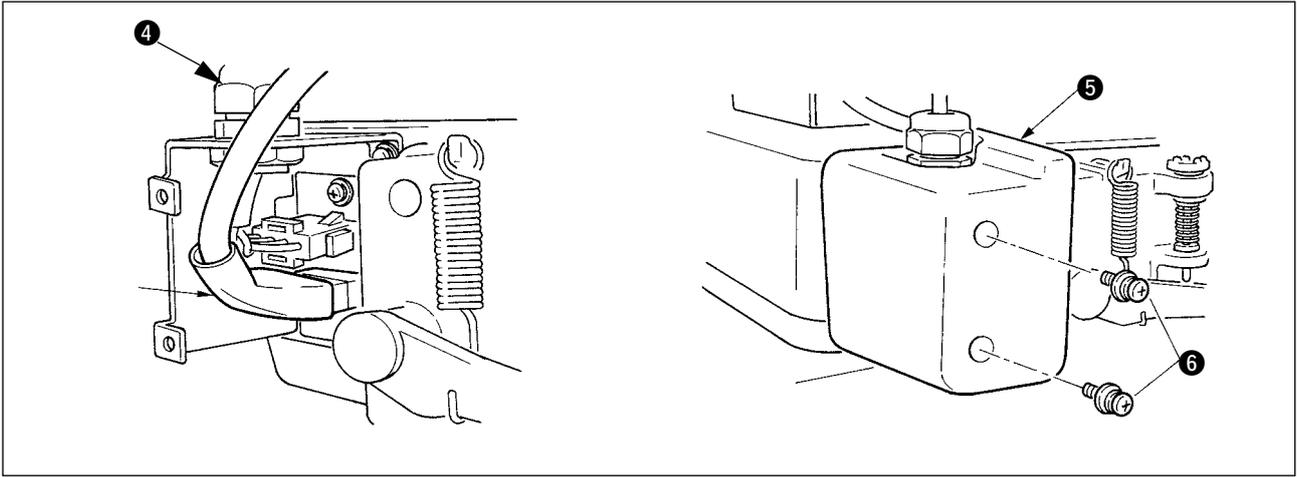
6) Insert connector ❹ of the power source cord to the connector (top) of the control box.

(Caution) Securely insert the connector while paying attention to the direction.

7) Securely fix power source cover ❺ supplied with the unit as accessories to power source cover installing plate ❷ with two screws ❻ supplied with the unit as accessories while being careful that the cord is not caught by the cover.

   * For handling the cable, refer to 14) and 15) of "6. Connecting the cords".

7. Attaching the connecting rod

⚠️ **WARNING :**
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and a lapse of 5 minutes or more.
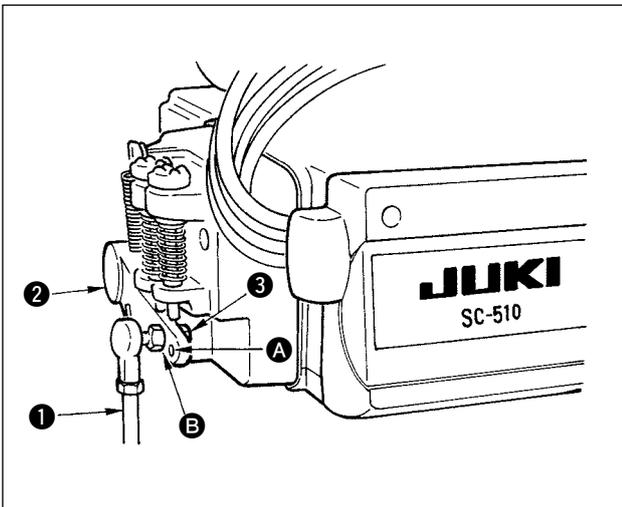
1) Fix connecting rod ❶ to installing hole Ⓑ of pedal lever ❷ with nut ❸.
2) Installing connecting rod ❶ to installing hole Ⓐ will lengthen the pedal depressing stroke, and the pedal operation at a medium speed will be easier.

Ⅲ. FOR THE OPERATOR

1. Operation of SC-510
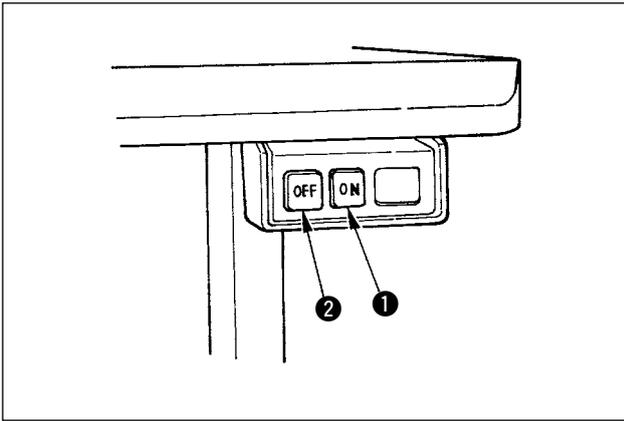
1) Press ON button ❶ of the power switch to turn ON the power.

(Caution)   **When the buzzer is kept beeping imme-diately after turning ON the power, press OFF button ❷ on the sewing machine to turn OFF the power since connection of the cord or power voltage may be wrong.**

Display of power ON

[When operation panel is not connected]
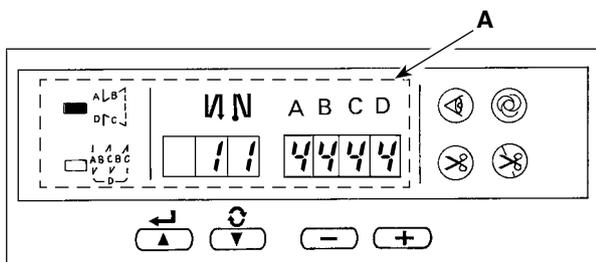
When operation panel (CP-160, and IP-110) is not used

LED of the display of reverse stitching or over-lapped stitching at the front cover of control box lights up. (**A**)

* The power display LED that is built in the machine head lights up according to the machine head.

[When operation panel is connected]
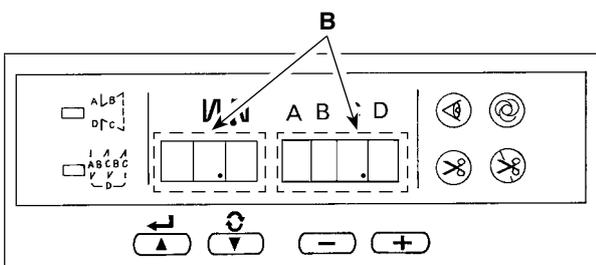
When operation panel (CP-160, and IP-110) is used

Power lamp of CP-160 or IP-110 lights up.

Two dots **B** of the number indicating window at the front cover of control box light up.

(Caution)   **When the buzzer continues sounding im-mediately after turning ON the power, the cord may not be properly connected or power voltage may be not proper. Press OFF button ❷ of the power switch to turn OFF the power.**

2) When the needle bar is not in its UP position, it automatically rotates to reach the UP position.
   (The motion differs by the selection of the machine head.)

(Caution)   1. **When turning ON the power for the first time, it will be slightly delayed since initialization is per-formed.**
   2. **When turning ON the power, do not place your hands under the needle.**
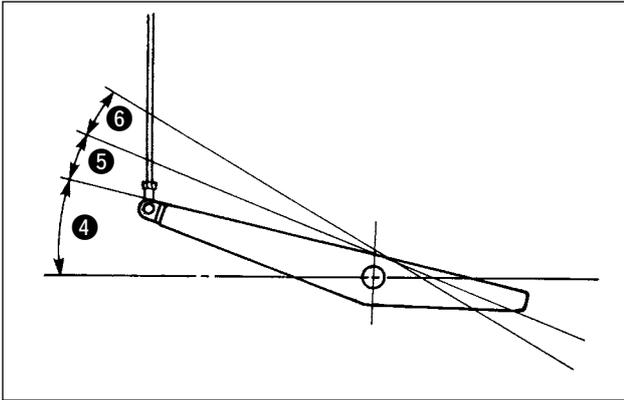
3) When depressing front part ❹ of the pedal, the sewing machine rotates at the number of revolutions in accordance with the depressing amount. When the pedal is returned to the neutral position, the sewing machine stops.

4) When lightly depressing back part ❺ of the pedal, the presser goes up. (PFL type only)

5) When strongly dpressing back part ❻ of the pedal, thread trimming is performed.
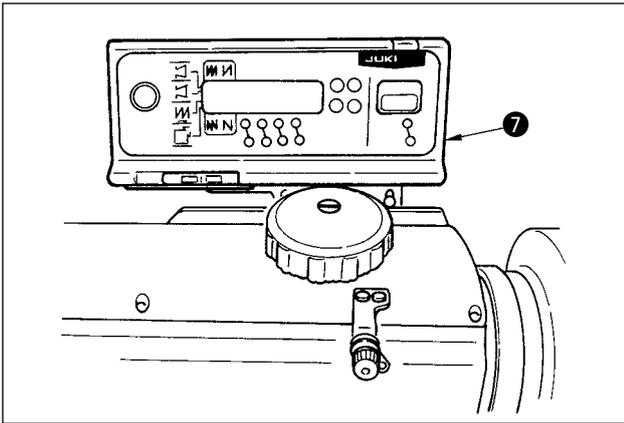
6) When operation panel ❼ is connected, various sewing patterns such as reverse feed stitching at sewing start, reverse feed stitching at sewing end, etc. can be set.
Refer to the Instruction Manual for the operation panel for the details.
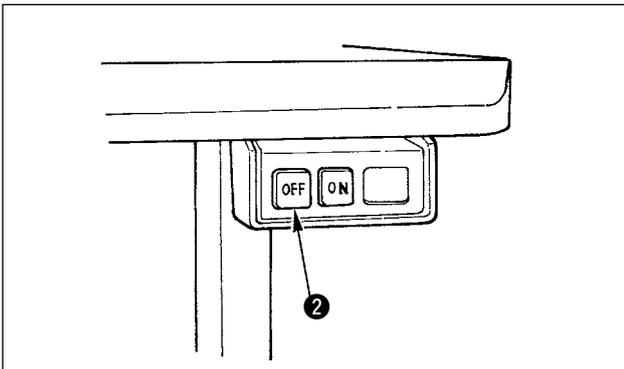
7) When sewing is completed, make sure that the sewing machine has stopped.
Then, press the OFF button ❷ of the power switch to turn OFF the power.
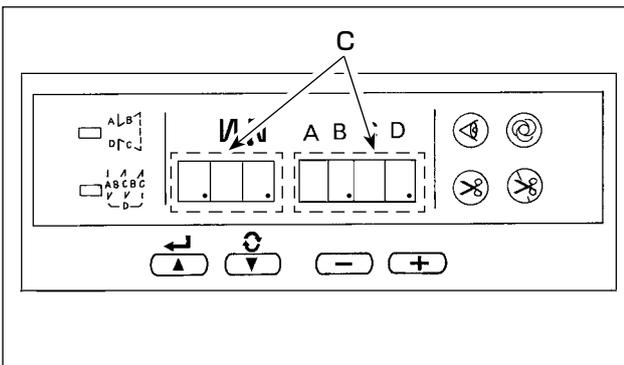
Four dots (**C**) in the numeral indicating window momentarily light up as shown in the figure, showing that the state has moved to the power OFF state.

2. Explanation of the operation panel
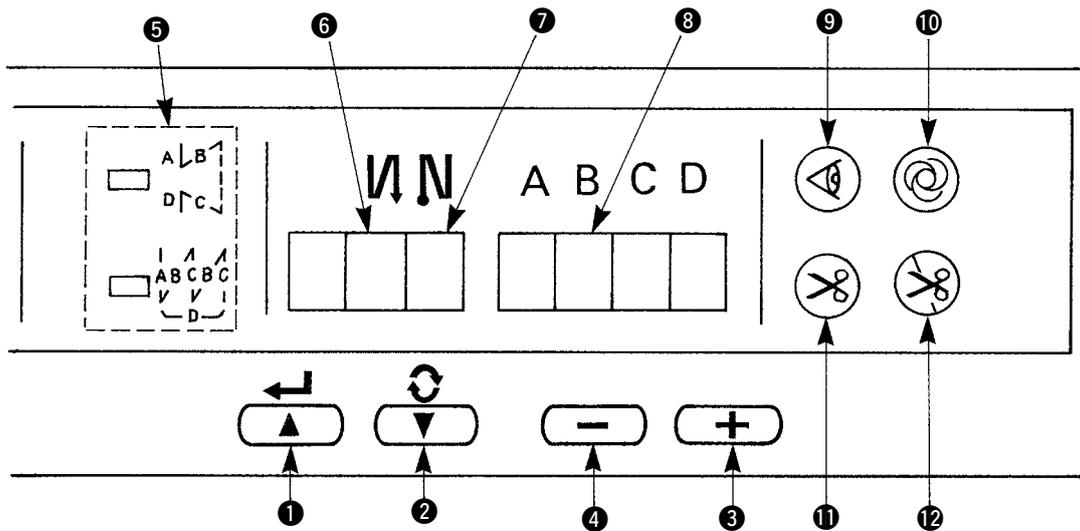
❶ ↵ / (▲) switch : Used for determining the contents of setting.
When this switch is pressed, flashing stops and the contents of setting are determined.

❷ ↻ / (▼) switch : Used for changing the contents of setting.
When this switch is pressed, changeable positions flash on and off.
By pressing the switch, flashing position shifts in the right direction.
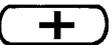
❸ (+) switch : Used for changing the contents of the selected display (flashing section).
When this switch is pressed, the contents of the display increase.
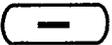
❹ (—) switch : Used for changing the contents of the selected display (flashing section).
When this switch is pressed, the contents of the display decrease.

❺ PATTERN SELECTION display : The selected pattern is displayed.

❻ REVERSE STITCHING AT START display : Rendered effective when reverse stitching pattern is selected.
" - " Without reverse stitching display / " | " Reverse stitching display /
" || " Double reverse stitching display

❼ REVERSE STITCHING AT END display : Rendered effective when reverse stitching pattern is selected.
" - " Without reverse stitching display / " | " Reverse stitching display /
" || " Double reverse stitching display

❽ NUMBER OF STITCHES display : Number of stitches of reverse stitching or overlapped stitching is displayed.

❾ MATERIAL EDGE SENSOR display : Lights up when the material edge sensor setting is selected.
Function setting No. 2

❿ ONE-SHOT AUTOMATIC STITCHING display : Lights up when the one-shot automatic stitching is selected.
Function setting No. 76

⓫ AUTOMATIC THREAD TRIMMING display : Lights up when the automatic thread trimming by depressing the front part of the pedal is selected.
Function setting No. 3

⓬ THREAD TRIMMING PROHIBITION display : Lights up when the thread trimming prohibition is selected.
Function setting No. 9

– 13 –

Operating procedure of the sewing pattern

(1) Reverse stitching pattern

Reverse stitching patterns below can be set by using the operation panel.

Reverse stitching patterns that can be set

Reverse stitching at start display	-	$\textit{l}$	-	$\textit{l}$	$\textit{ll}$	-	$\textit{ll}$	$\textit{l}$	$\textit{ll}$
Sewing pattern									
Reverse stitching at end display	-	-	$\textit{l}$	$\textit{l}$	-	$\textit{ll}$	$\textit{ll}$	$\textit{ll}$	$\textit{l}$
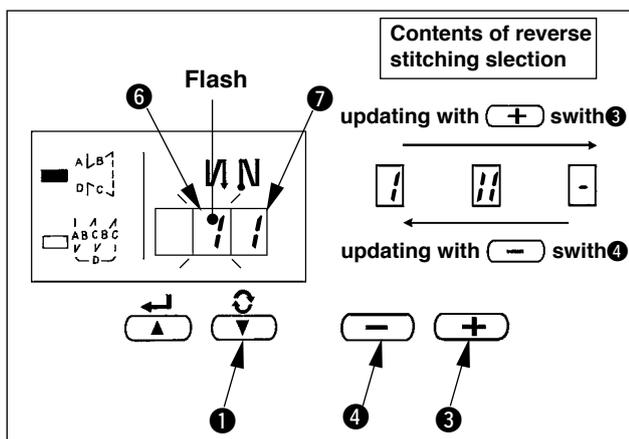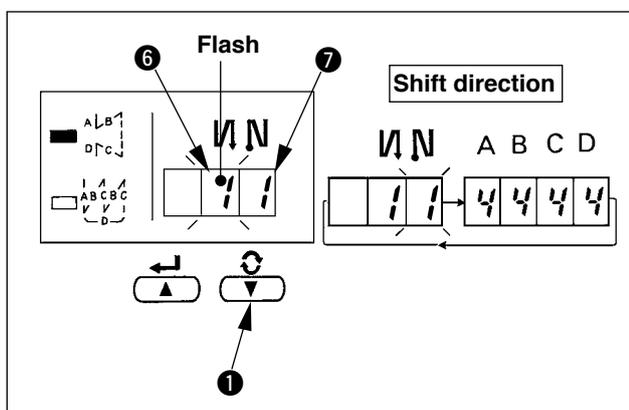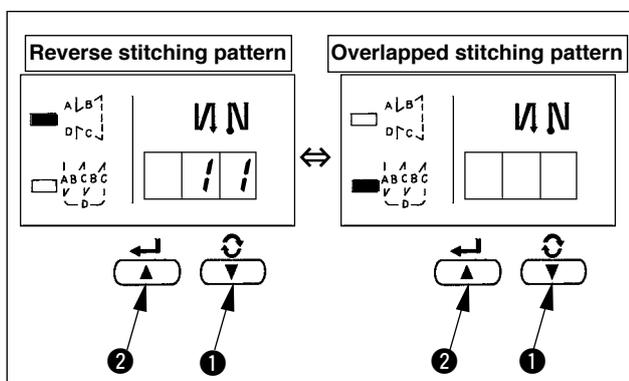
[Setting procedure of the reverse stitching]

1) Hold pressing ⟳ / (▼) switch ❶, and press ◄┘ / (▲) switch ❷ to select the reverse stitching pattern.

   (Every time ◄┘ / (▲) switch ❷ is pressed, reverse stitching pattern/overlapped stitching pattern change over alternately.)

2) Press ⟳ / (▼) switch ❶ to make reverse stitching at start display ❻ flash on and off.

   Every time ⟳ / (▼) switch ❶ is pressed, the flashing position shifts in the right direction.

   (Caution) The sewing machine does not start in the flashing state.

3) Press (+) switch ❸ or (−) switch ❹ and select the reverse stitching pattern.

   Reverse stitching patterns and displays are as follows.

   $\textit{l}$: Reverse stitching

   $\textit{ll}$: Double reverse stitching

   - : Without reverse stitching

4) Press ⟳ / (▼) switch ❶ to make reverse stitching at end display ❼ flash on and off, and set the pattern in the same way as step 3).
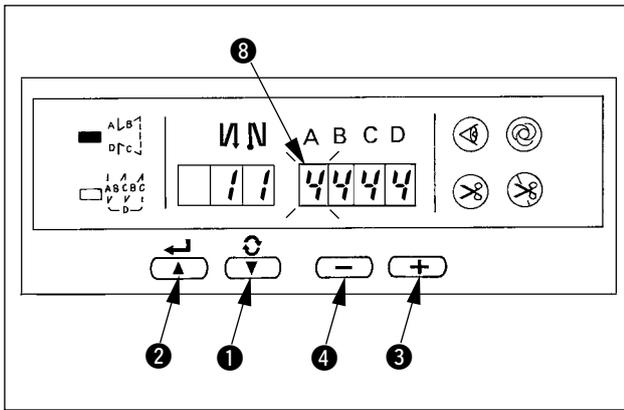
5) Press ⟳ / ▼ switch ❶ to make number of stitches display ❽ flash on and off, and set the number of stitches for the respective processes of the stitching.

6) Press ＋ switch ❸ or － switch ❹ to change the number of stitches.
The number of stitches can be changed up to as many as 15 stitches for the A, B, C, and D processes respectively.
However, displays are as follows.
10 stitches = A, 11 stitches = b, 12 stitches = c, 13 stitches = d, 14 stitches =E and 15 stitches = F

7) When the setting of all items has been completed, press ↵ / ▲ switch ❷ to determine the contents of the setting. (Flashing stops.)

(2) Overlapped stitching pattern

Overlapped stitching patterns below can be set by using the operation panel.
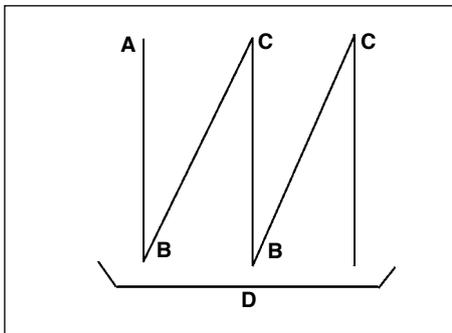
A : Number of stitches of normal stitching setting
0 to 15 stitches
B : Number of stitches of reverse stitching setting
0 to 15 stitches
C : Number of stitches of normal stitching setting
0 to 15 stitches
D : Number of times of repetition
0 to 9 times

(Caution) **When process D is set to 5 times, the sewing is repeated as A → B → C → B → C.**
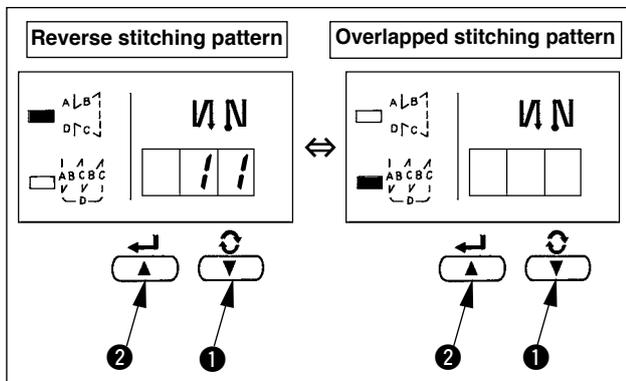
[Setting procedure of the overlapped stitching]

1) Hold pressing ⟳ / ▼ switch ❶, and press ↵ / ▲ switch ❷ to select the overlapped stitching pattern.
(Every time ↵ / ▲ switch ❷ is pressed, reverse stitching pattern/overlapped stitching pattern change over alternately.)
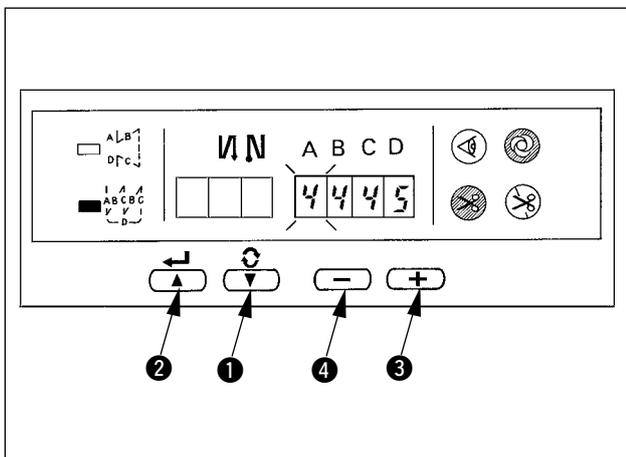
2) The number of stitches for process A becomes in flashing state.

3) Every time ⟳ / ▼ switch ❶ is pressed, the flashing position shifts in the right direction and the display of the process where setting can be changed flashes on and off.

4) Press ＋ switch ❸ or － switch ❹ to change the number of stitches.

5) When the setting of all processes has been completed, press ↵ / ▲ switch ❷ to determine the contents of the setting. (Flashing stops.)

(Caution) **When the overlapped stitching is selected, the automatic operation display flashes on and off. It is not possible to release the automatic operation.**

Reverse stitching pattern | Overlapped stitching pattern

– 15 –

(3) Special setting

For material end sensor function, automatic thread trimming function, one-shot automatic stitching function and thread trimming prohibition function which are displayed in the front panel, it is possible to change the set value by directly moving to the function setting mode while the power is turned ON in addition to the normal function setting procedure.
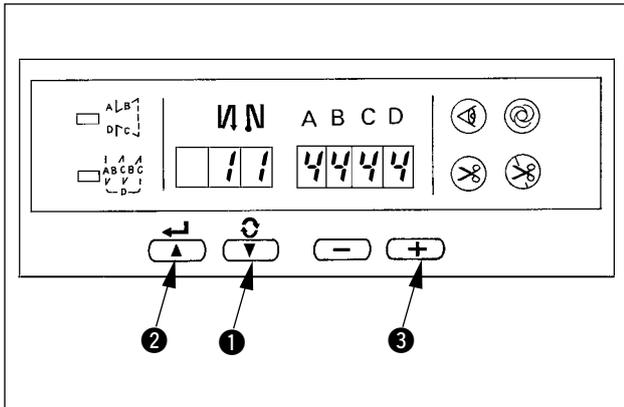
[Moving procedure to the function setting mode]

1) Hold pressing ⟳ / (▼) switch ❶, and press (＋) switch ❸ to move to the function setting mode.

(Caution) **Function setting No. 2 is displayed immediately after the changeover.**

2) When returning to the normal mode, press ⏎ / (▲) switch ❷ and determine the contents of the setting.
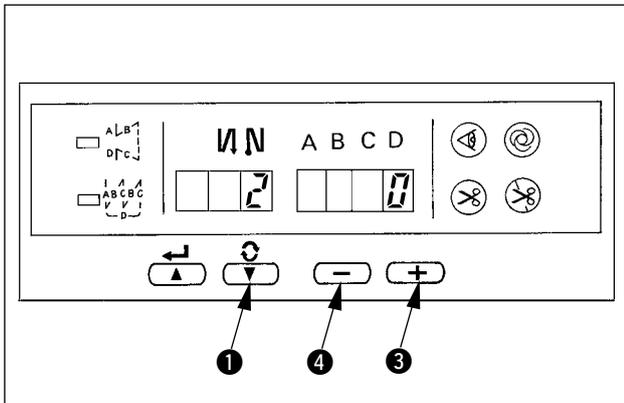
① Material end sensor function setting (Function setting No. 2)

It is rendered effective when connecting the optional material end sensor.

It is possible to change the set value with (＋) switch ❸ or (－) switch ❹.

0 : Material end sensor function is prohibited.

1 : Material end sensor function is effective.

When "1" is selected, material end sensor display lights up when the mode has returned to the normal one.
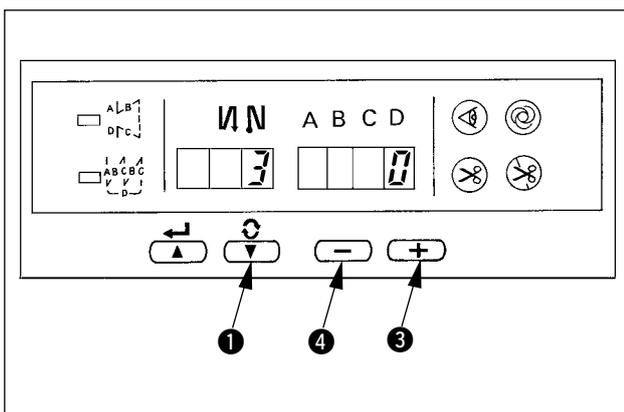
② Thread trimming operation after material end stop setting (Function setting No. 3)

Press ⟳ / (▼) switch ❶ to advance to the function setting No. 3.

It is possible to change the set value with (＋) switch ❸ or (－) switch ❹.

0 : Material end stop

1 : Automatic thread trimming after detection of material end

When "1" is selected, the automatic thread trimming display lights up when the mode is returned to the normal one.
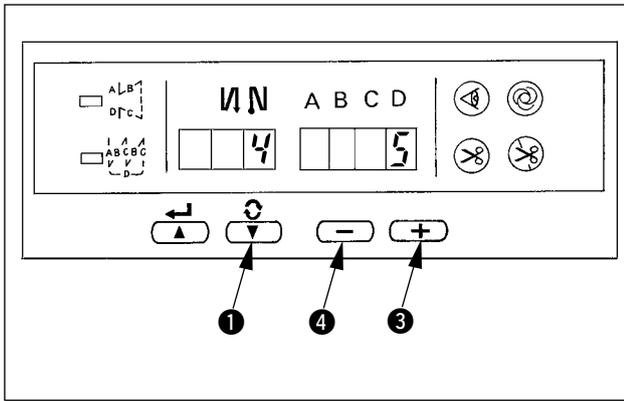
③ Number of stitches to stop the sewing machine after detection of material end setting (Function setting No. 4)

Press ⟳ / (▼) switch ❶ to advance to the function setting No. 4.

It is possible to change the set value with (+) switch ❸ or (−) switch ❹.

Specified number of stitches : 0 to 19 stitches

(Caution) **When the specified number of stitches is insufficient, there is a case where the sewing machine cannot stop within the specified number of stitches depending on the speed of rotation of the sewing machine.**
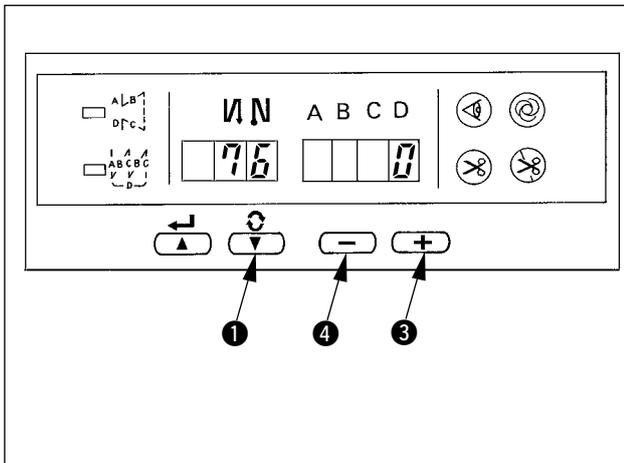
④ One-shot automatic stitching setting function (Function setting No. 76)

Press ⟳ / (▼) switch ❶ to advance to the function setting No. 76.

It is possible to change the set value with (+) switch ❸ or (−) switch ❹.

0 : Pedal designated speed is prior.

1 : Automatic operation

(Caution) **It is rendered effective when the material end sensor function is set.**
It is not possible to prohibit the one-shot operation at the time of the overlapped stitching operation.
Speed of rotation is the speed set at the function setting No. 38.
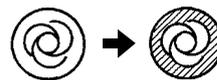
When "1" is selected, the one-shot automatic stitching display lights up when the mode is returned to the normal one.
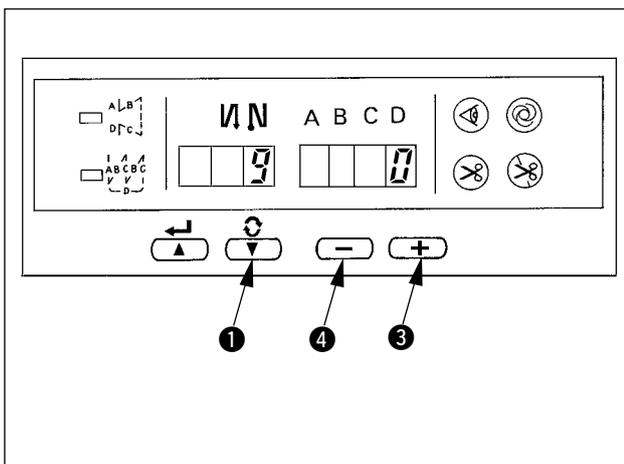
⑤ Thread trimming prohibition function setting (Function setting No. 9)

Thread trimming operation at normal stitching and overlapped stitching can be prohibited by selecting the thread trimming prohibition.

Press ⟳ / (▼) switch ❶ to advance to the function setting No. 9.

It is possible to change the set value with (+) switch ❸ or (−) switch ❹.

0 : Thread trimming is effective.

1 : Thread trimming is prohibited.
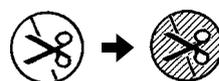
When "1" is selected, the thread trimming prohibition display lights up when the mode is returned to the normal one.

3. Setting for functions of SC-510

Functions can be selected and specified by means of the four setting switches and light emitting diode located inside the front cover of the SC-510.

Specified No.   Specified value

❶ Switch for entering specified value changed and updating setting No. in DOWN direction

❷ Switch for entering specified value changed and updating setting No. in UP direction

❸ Down switch (DOWN)

❹ Up switch (UP)
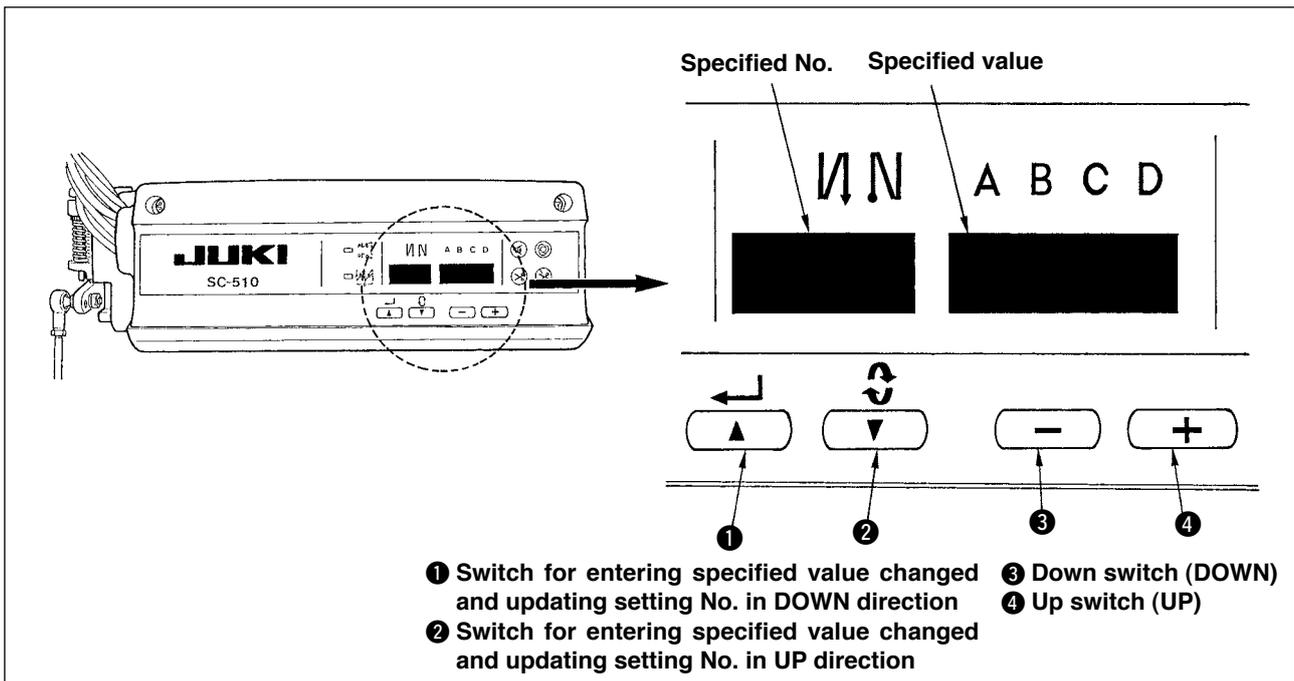
(Caution) ・ **Do not perform switch operations other than those described in the following explanations.**
・ **Be sure to re-turn the power switch ON after one second or more has passed. If the power is turned ON immediately after turning it OFF, the sewing machine may not work normally. In this case, turn ON the power again.**
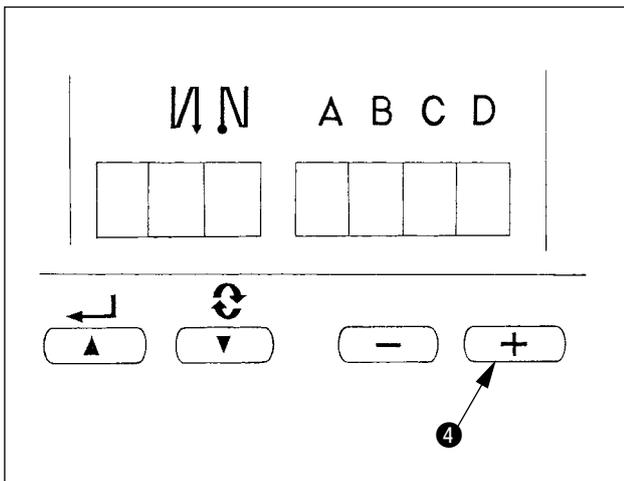
How to change over to the function setting modo

1) Turn OFF the power to the unit.
2) Pressing switch ❹, turn ON the power to the unit.
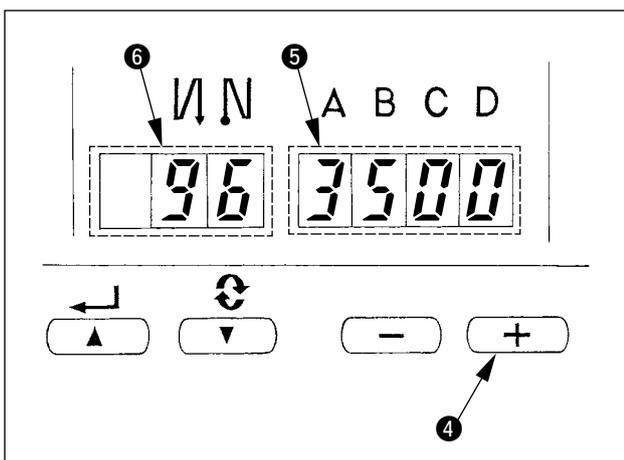
3) Indication ❺, ❻ will be shown on the display. (If the indication fails to change, re-perform the procedures 1) and 2).

Specified No.

VN A B C D

```
|   |   | 1 |     |   |   | 0 |
```

↵ ↺
▲ ▼   − +

❶ ❷
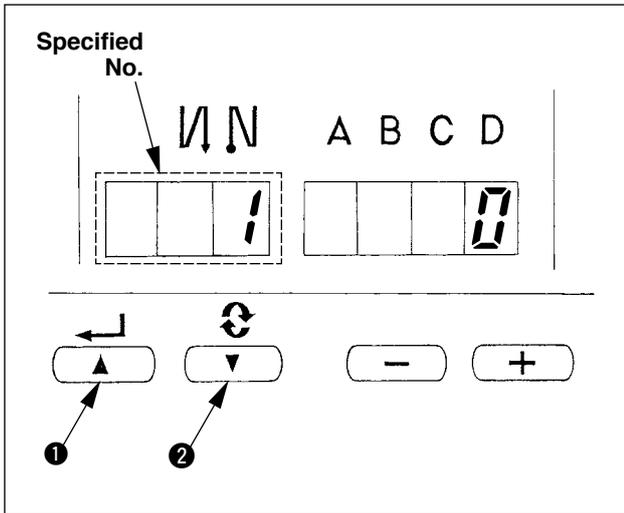
4) When you want to advance the setting No., press switch ❷ to advance the setting No.
When you want to return the setting No., press switch ❶ to return the setting No.

(Caution) When switch ❶ (switch ❷) is held pressing, the setting No. will return (will advance) continuously. When the setting No. is advanced (returned), the contents which are before by one (after by one) will be determined. So, be careful when changing the contents (up/down switch is touched).

VN A B C D   ❺

```
|   |   | 5 |     |   |   | 3 |
```

↵ ↺
▲ ▼   − +

❶ ❷   ❸ ❹
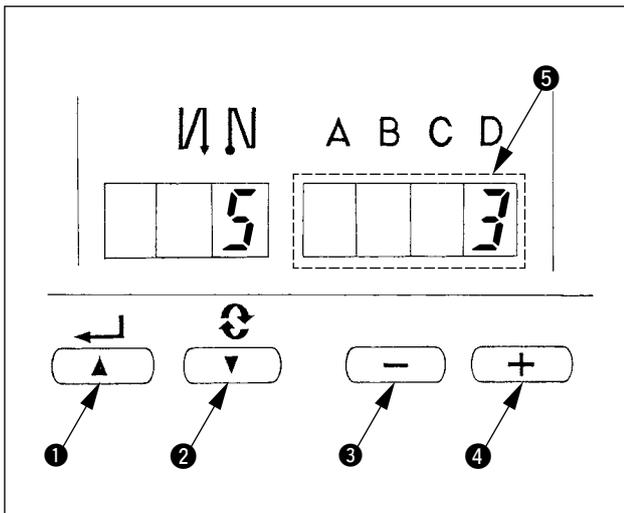
EXAMPLE) CHANGING THE FLICKER REDUCING FUNCTION (SETTING No. 5)

Press switch ❺ to set the setting No. to "5". Existing set value is displayed in LED ❺. (Standard is "0".)
Press switch ❹ three times to change to "3".

(Caution) Keep pressing switch ❹ or switch ❸, and the setting vaue can be changed continuously.

VN A B C D   ❺

```
|   |   | 5 |     |   |   | 3 |
```

↵ ↺
▲ ▼   − +

❶ ❷   ❸ ❹
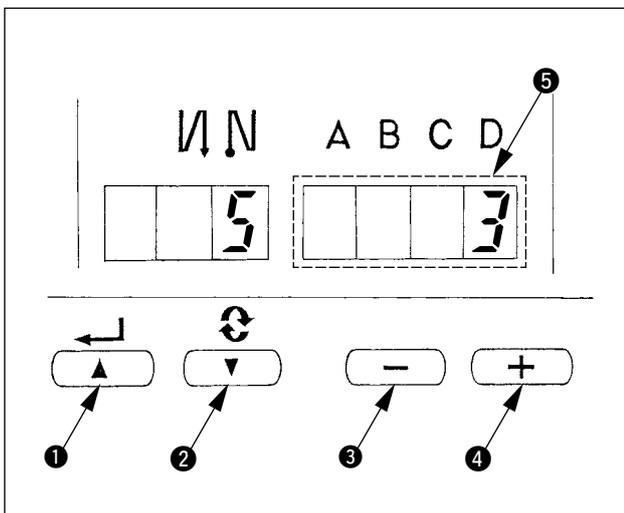
5) When the change has been completed, press switch ❶ or ❷ to specify the changed value.

(Caution) 1. When turning OFF the power before performing this work, the contents which have been changed are not updated.
2. Press switch ❶, and screen display will change to the contents of the setting No. which is before by one.
3. Press switch ❷, and screen display will change to the contents of next setting No. After completing the operation, turn OFF the power and turn ON the power again to return to the normal operation.

After completing the operation, turn OFF the power and turn ON the power again to return to the normal operation.

4. Function setting list

No	Item	Description	Setting range	Indication of function setting	Ref. page
1	Soft start function	The number of stitches to be sewn at a low speed when the soft-start function is used at the start of sewing. 0 : Soft-start function is not operative.	0 to 9 (Stitches)	[ ][ ][1][ ][ ][0]	24
2	Material end sensor function	Material end sensor function (used in case of without panel). 0 : Material end detection function is not operative. 1 : After detecting material end, the specified number of stitches (No. 4) will be sewn, and the sewing machine will stop.	0/1	[ ][ ][2][ ][ ][0]	24
3	Thread trimming function by material end sensor	Thread trimming function by material end sensor (used in case of without panel). 0 : Automatic thread trimming function after detection of material end is not operative. 1 : After detecting material end, the specified number of stitches (No. 4) will be sewn, and the sewing machine will stop and perform automatic thread trimming.	0/1	[ ][ ][3][ ][ ][0]	24
4	Number of stitches for material end sensor	Number of stitches for material end sensor (used in case of without panel). Number of stitches from detection of material end to stop of the sewing machine.	0 to 19 (Stitches)	[ ][ ][4][ ][ ][5]	24
5	Flicker reducing function	Flicker reducing function (If the hand lamp flickers). 0 : Flicker reducing function is not operative. 1 : Less effective → 3 : Highly effective	0 to 3	[ ][ ][5][ ][ ][0]	24
6	Bobbin thread counting function	Bobbin thread counting function 0 : Bobbin thread counting function is not operative. 1 : Bobbin thread counting function is operative.	0/1	[ ][ ][6][ ][ ][1]	24
7	Unit of bobbin thread counting down	Unit of bobbin thread counting down 0 : Count/10 stitches 1 : Count/15 stitches 2 : Count/20 stitches	0 to 2	[ ][ ][7][ ][ ][0]	
8	Number of rotation of reverse feed stitching	Sewing speed of reverse feed stitching	150 to 3,000 (r.p.m.)	[ ][ ][8][1][2][0][0]	
9	Thread trimming prohibiting function	Thread trimming prohibiting function (used in case of without panel). 0 : Thread trimming prohibiting function is not operative. 1 : Thread trimming is prohibited. (Output of solenoid is prohibited. : Thread trimmer and wiper)	0/1	[ ][ ][9][ ][ ][0]	24
10	Setting of needle bar stop position when the sewing machine stops.	Position of needle bar is specified when the sewing machine stops. 0 : Predetermined lowest position 1 : Predetermined highest position	0/1	[ ][1][0][ ][ ][0]	25
11	Click sound of key switch mounted on PSC	Click sound of key switch mounted on PSC is specified. 0 : Click is not operative. 1 : Click is operative.	0/1	[ ][1][1][ ][ ][1]	25
12	Optional input/output setting	Changeover of optional switch.		[ ][1][2][O][P][T][_]	26
13	Function of prohibiting start of the sewing machine by bobbin thread counter	Function of prohibiting start of the sewing machine by bobbin thread counting 0 : When counting is out (-1 or less) Function of prohibiting start of the sewing machine is not operative. 1 : When counting is out (-1 or less) Function of prohibiting start of the sewing machine after thread trimming is operative. 2 : When counting is out (-1 or less), the sewing machine stops once. Function of prohibiting start of the sewing machine after thread trimming is operative.	0 to 2	[ ][1][3][ ][ ][0]	
14	Sewing counter	Counting function of sewing (number of completion of process) 0 : Sewing counter function is not operative. 1 : Sewing counter function is operative.	0/1	[ ][1][4][ ][ ][1]	30
21	Function of neutral presser lifting	Function of needle up/down compensating switch on the operation panel can be changed. 0 : Needle up/down compensation 1 : One stitch compensation 2 : Neutral automatic presser lifting is valid and the alternate motion can be performed by depressing the pedal backward.	0/1/2	[ ][2][1][ ][ ][0]	30
22	Function of changeover of compensating switch on the operation panel function	This function sets the thread trimming motion after DOWN position has been off by turning handwheel by hand. 0 : Thread trimming after turning handwheel by hand is permitted. 1 : Thread trimming after turning handwheel by hand is prohibited.	0/1	[ ][2][2][ ][ ][0]	30
25	Thread trimming motion condition	This function sets the thread trimming motion after DOWN position has been off by turning handwheel by hand. 0 : Thread trimming after turning handwheel by hand is permitted. 1 : Thread trimming after turning handwheel by hand is prohibited.	0/1	[ ][2][5][ ][ ][1]	30

* Do not change the set values with asterisk (*) mark as they are functions for maintenance. If the standard set value set at the time of delivery is changed, it is in danger of causing the machine to be broken or the performance to be deteriorated.
If it is necessary to change the set value, please purchase the Engineer's Manual and follow the instructions.
(Descriptions of setting in this list are the standard values at the time of delivery.)
However, contents of function setting are subject to change for improvement of function and performance without notice.

No	Item	Description	Setting range	Indication of function setting	Ref. page
29	Suction time of the first start of the back solenoid	This function sets the suction motion time of the back-tack solenoid. 50 ms to 500 ms	50 to 500 (ms)	2 9 ☐ 2 5 0	30
30	Function of reverse feed stitching on the way	Function of reverse feed stitching on the way 0 : Function of reverse stitching on the way is not operative. 1 : Function of reverse feed stitching on the way is operative.	0/1	3 0 ☐ ☐ ☐ 0	31
31	Number of stitches of reverse feed stitching on the way	Number of stitches of reverse feed stitching on the way.	0 to 19 (Stitches)	3 1 ☐ ☐ ☐ 4	31
32	Effective condition of reverse feed stitching on the way when the sewing machine is stopping.	Effective condition of reverse feed stitching on the way 0 : Function is not operative when the sewing machine stops. 1 : Function is operative when the sewing machine stops.	0/1	3 2 ☐ ☐ ☐ 0	31
33	Thread trimming function by reverse feed stitching on the way	Thread trimming function by reverse feed stitching on the way 0 : Automatic thread trimming function after completion of reverse feed stitching on the way is not operative. 1 : Automatic thread trimming after completion of reverse feed stitching on the way is performed.	0/1	3 3 ☐ ☐ ☐ 0	31
* 35	Number of rotation at a low speed	Lowest speed by pedal	150 to 250 (r.p.m.)	3 5 ☐ ☐ 1 7 0	
37	Number of rotation of soft-start	Sewing speed at the start of sewing (soft-start)(The max. value depends on the number of rotation of the sewing machine head.)	100 to MAX (r.p.m.)	3 7 ☐ ☐ 1 7 0	24
38	One-shot speed	One-shot speed (The max. value depends on the number of rotation of the sewing machine head.)	150 to MAX (r.p.m.)	3 8 ☐ 1 5 0 0	32
* 39	Pedal stroke at the start of rotation	Position where the sewing machine starts rotating from pedal neutral position (Pedal stroke)	10 to 50 (0.1 mm)	3 9 ☐ ☐ ☐ 3 0	
* 40	Low speed section of pedal	Position where the sewing machine starts accelerating from pedal neutral position (Pedal stroke)	10 to 100 (0.1 mm)	4 0 ☐ ☐ ☐ 6 0	
* 41	Starting position of lifting presser foot by pedal	Position where the cloth presser starts lifting from pedal neutral position (Pedal stroke)	–60 to –10 (0.1mm)	4 1 ☐ ☐ – 2 1	
* 42	Starting position of lowering presser foot	Starting position of lowering presser foot Stroke from the neutral position	8 to 50 (0.1 mm)	4 2 ☐ ☐ ☐ 1 0	
* 43	Pedal stroke 2 for starting thread trimming	Position 2 where the thread trimming starts from pedal neutral position (When the function of lifting presser foot by pedal is provided.) (Pedal stroke)	–60 to –10 (0.1 mm)	4 3 ☐ ☐ – 5 1	
* 44	Pedal stroke for reaching the maximum number of rotation	Position where the sewing machin reaches its highest sewing speed from pedal neutral position (Pedal stroke)	10 to 150 (0.1 mm)	4 4 ☐ ☐ 1 5 0	
* 45	Compensation of neutral point of the pedal	Compensation value of the pedal sensor	–15 to 15	4 5 ☐ ☐ ☐ 0	
47	Holding time of lifting auto-lifter	Limitation time of waiting for lifting solenoid type auto-lifter device	10 to 600 (second)	4 7 ☐ ☐ ☐ 6 0	32
* 48	Pedal stroke 1 for starting thread trimming	Position where thread trimming starts from pedal neutral position (Standard pedal) (Pedal stroke)	–60 to –10 (0.1 mm)	4 8 ☐ ☐ – 3 5	
49	Presser lowering time	Presser lowering time from depressing the pedal 0 to 250 (ms)	0 to 250 (10ms)	4 9 ☐ ☐ 1 4 0	32
51	Compensation of solenoid-on timing of reverse feed stitching at the start of sewing	Compensation of starting the solenoid for reverse feed stitching when reverse feed stitching at the start of sewing is performed.	–36 to 36 (10˚)	5 1 ☐ ☐ ☐ 2 5	33
52	Compensation of solenoid-off timing of reverse feed stitching at the start of sewing	Compensation of releasing the solenoid for reverse feed stitching when reverse feed stitching at the start of sewing is performed.	–36 to 36 (10˚)	5 2 ☐ ☐ ☐ – 7	33

* **Do not change the set values with asterisk (*) mark as they are functions for maintenance. If the standard set value set at the time of delivery is changed, it is in danger of causing the machine to be broken or the performance to be deteriorated.**
If it is necessary to change the set value, please purchase the Engineer's Manual and follow the instructions.
(Descriptions of setting in this list are the standard values at the time of delivery.)
However, contents of function setting are subject to change for improvement of function and performance without notice.

No	Item	Description	Setting range	Indication of function setting	Ref. page
53	Compensation of solenoid-off timing of reverse feed stitching at the end of sewing	Compensation of releasing the solenoid for reverse feed stitching when reverse feed stitching at the end of sewing is performed.	−36 to 36 (10°)	5 3 − 1 2	33
55	Foot lift after thread trimming	Function of lifting presser foot at the time of (after) thread trimming 0 : Not provided with the function of lifting presser foot after thread trimming 1 : Provided with the function of lifting presser foot automatically after thread trimming	0/1	5 5 1	33
56	Bobbin thread remaining amount detection function	Function of reverse revolution to lift the needle at the time of (after) thread trimming 0 : Not provided with the function of reverse revolution to lift the needle after thread trimming 1 : Provided with the function of reverse revolution to lift the needle after thread trimming	0/1	5 6 1	34
58	Function of holding predetermined upper/lower position of the needle bar	Function of holding predetermined upper/lower position of the needle bar 0 : Not provided with the function of holding predetermined upper/lower position of the needle bar 1 : Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is weak.) 2 : Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is medium.) 3 : Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is strong.)	0 to 3	5 8 0	34
59	Function of Auto/Manual change-over of reverse feed stitching at the start of sewing	This function can specify the sewing speed of reverse feed stitching at the start of sewing. 0 : The speed will depend on the manual operation by pedal, etc. 1 : The speed will depend on the specified reverse feed stitching speed (No. 8).	0/1	5 9 1	34
60	Function of stop immediately after reverse feed stitching at the start of sewing	Function at the time of completion of reverse feed stitching at the start of sewing 0 : Not provided with the function of temporary stop of the sewing machine at the time of completion of reverse feed stitching at the start of sewing 1 : Provided with the function of temporary stop of the sewing machine at the time of completion of reverse feed stitching at the start of sewing.	0/1	6 0 0	34
64	Change-over speed of EBT (end back tack)	Initial speed when starting reverse feed stitching at the sewing end	0 to 250 (r.p.m.)	6 4 1 8 0	
71	Existence/non-existence of thread trimming condensation output	Existence/non-existence of condensation stitching output for remaining short thread trimming during thread trimming control can be set. (LU-2220 head with the function of condensation stitching for remaining short thread trimming) 0 : Invalid 1 : Valid	0/1	7 1 1	
73	Retry function	This function is used when needle cannot pierce materials . 0 : Normal 1 : Retry function is provided.	0/1	7 3 1	35
74	MF thread trimming device function setting	Existence/non-existence of mounting thread trimmer on MF is set. (Valid in case of MF head) 0 : Not mounted 1 : Mounted	0/1	7 4 1	35
* 75	Rotating direction of motor	Normal rotating direction of motor 0 : Clockwise 1 : Counterclockwise	0/1	7 5 1	
76	One-shot function up to end of material	One-shot automatic stitching up to end of material is performed. (Used in case of without panel) 0 : Without one-shot function 1 : With one-shot function	0/1	7 6 0	35
* 84	Presser lifter solenoid initial motion suction time	Suction motion time of presser lifter solenoid 50 to 500 ms	50 to 500 (ms)	8 4 2 5 0	
87	Function of pedal curve selection	Pedal curve is selected. (Improving pedal inching operation) **Number of rotations** with curves 0, 1, 2 plotted against **Pedal stroke**	0/1/2	8 7 0	35
* 89	Tension release function	It is effective in combination with the machine head provided with tension release function. 0 : Tension release function is ineffective. 1 : Tension release function is effective.	0/1	8 9 1	
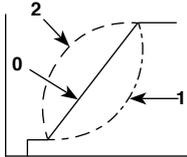
* Do not change the set values with asterisk (*) mark as they are functions for maintenance. If the standard set value set at the time of delivery is changed, it is in danger of causing the machine to be broken or the performance to be deteriorated. If it is necessary to change the set value, please purchase the Engineer's Manual and follow the instructions.
(Descriptions of setting in this list are the standard values at the time of delivery.)
However, contents of function setting are subject to change for improvement of function and performance without notice.

No	Item	Description	Setting range	Indication of function setting	Ref. page
* 91	Function of prohibiting compensation operation after turning handwheel by hand	Function of compensating stitching when turning handwheel by hand at the time of completion of constant-dimension stitching 0 : Function of compensating stitching is effective. 1 : Function of compensating stitching is prohibited.	0/1	9 1 1	
92	Function of reducing speed of reverse feed stitching at the start of sewing	Function to reduce speed at the time of completion of reverse feed stitching at the start of sewing. 0 : Speed is not reduced. 1 : Speed is reduced.	0/1	9 2 0	34
93	Function added to needle up/down compensating switch	Operation of needle up/down compensating switch is changed after turning ON the power or thread trimming. 0 : Normal (needle up/down compensating stitching only) 1 : One stitch compensating stitching is performed only when aforementioned changeover is made. (Upper stop → upper stop) 2 : Needle-down function operates after thread trimming. 3 : Function of needle-down with operation of 2 plus presser lowering operation and needle-up with thread trimming operation is added.	0 to 3	9 3 0	35
95	Head selection	Head to be connected is selected. (In case of the head with resistor pack, the head is automatically selected when resistor pack is connected.)		9 5 L U. 2 v	
96	Max. number of rotation setting	Max. number of rotation of the sewing machine head can be set * Setting differs in accordance with the head (resistor pack) to be connected.	150 to MAX (rpm)	9 6 3 5 0 0	35
100	2-pitch output during reverse feed stitching at sewing start or end	Existence/non-existence of 2-pitch output during controlling reverse feed stitching at sewing start or end is set. 0 : Invalid 1 : Valid	0/1	1 0 0 0	35
101	Inversion of 2-pitch output during outputting alternate vertical amount	Existence/non-existence of inversion output of 2-pitch output synchronizing with alternate vertical output is set. 0 : Invalid 1 : Valid	0/1	1 0 1 0	36
102	2-pitch initial output selection	Whether 2-pitch output at the time of turning ON the power is to be "ON" or "OFF" can be set. 0 : Output ON 1 : Output OFF 2 : It is returned to the state immediately before turning OFF the power.	0/1/2	1 0 2 1	36
103	Number of stitches of automatic release of alternate vertical output setting	Release of alternate vertical output is automatically performed by number of stitches. 0 : Automatic release is invalid. 1 to 30 stitches	0 to 30 (Stitch)	1 0 3 0	36
104	Selection of up-position of automatic presser lifting at the time of reverse revolution to lift needle of thread trimming	Automatic presser lifting timing at the time of reverse revolution to lift needle of thread trimming is selected to up-position. 0 : Invalid 1 : Valid	0/1	1 0 4 0	36
105	Needle cooler output OFF delay time	Delay time from the stop to output OFF is set with the needle cooler output function.	0 to 2000 (100ms)	1 0 5 5 0 0	36
107	Selection of alternate vertical output after thread trimming	This function forcibly outputs ON/OFF of the alternate vertical output after thread trimming. 0 : Output state maintained 1 : OFF output 2 : ON output	0/1/2	1 0 7 0	36
109	Selection of needle thread clamp switch function	Valid/invalid of pattern sewing function is set. Selection of needle thread clamp switch function (LU-2220 head) 0 : Needle thread clamp motion is invalid. 1 : ON/OFF with the motion valid switch 2 : Forcibly valid	0/1/2	1 0 9 0	36
112	Setting of brake starting angle at the time of thread trimming up-position stop	This function sets the brake starting angle at the time of thread trimming up-position stop. (0 : Up-detection start)	0 to 10 (1°)	1 1 2 0	36

* **Do not change the set values with asterisk (*) mark as they are functions for maintenance. If the standard set value set at the time of delivery is changed, it is in danger of causing the machine to be broken or the performance to be deteriorated.**
If it is necessary to change the set value, please purchase the Engineer's Manual and follow the instructions.
(Descriptions of setting in this list are the standard values at the time of delivery.)
However, contents of function setting are subject to change for improvement of function and performance without notice.

5. Detailed explanation of selection of functions

① **Selection of the soft-start function (Function setting No. 1)**

The needle thread may fail to interlace with the bobbin thread at the start of sewing when the stitching pitch (stitch length) is small or a thick needle is used. To solve such problem, this function (called "soft-start") is used to limit the sewing speed, thereby assuring successful formation of the starting stitches.

| | | 1 | | | | 0 |

0 : The function is not selected.

1 to 9 : The number of stitches to be sewn under the soft-start mode.

The sewing speed limited by the soft-start function can be changed. **(Function setting No. 37)**

| | 3 | 7 | | 1 | 7 | 0 |

Data setting range

100 to MAX rpm <50 rpm>

② **Material end sensor (ED : optional) function (Function setting No. 2 to 4)**

This function is possible when the material end sensor (ED) is attached.

As for the details, refer to the instruction manual for the material end sensor.

(Caution)   Setting will be invalid when the material end sensor is not attached, or CP-160 is connected.

③ **Flicker reducing function (Function setting No. 5)**

The function reduces flickering of the hand lamp at the start of sewing. The higher the set value increases, the more effective the function will work.

| | | 5 | | | | 0 |

Setting range 0 to 3

0 : Flicker reducing function does not work.

to 3 : Flickering is effectively reduced.

(Caution)   The more effective the flicker reducing function works (the more the set value is made), the lower the start-up speed of the sewing machine will become.

④ **Bobbin thread counting function (Function setting No. 6)**

When the control panel (CP-160) is used, the function subtracts from the predetermined value and indicates the used amount of bobbin thread.

For the details, refer to the instruction manual for the control panel.

(Caution)   If "0" is set, the LCD indication on the control panel will go out and the bobbin thread counting function will be invalid. For the details, refer to (Caution) of "Sewing count function (Function setting No. 14)".

⑤ **Thread trimming prohibiting function (Function setting No. 9)**

This function turns OFF thread trimming solenoid output and wiper solenoid output when thread trimming is actuated. [If the control panel (CP-160) is used with the sewing machine, this function will work in accordance with the function setting on the control panel.]

By this function, separate sewing material can be spliced and sewn without trimming thread.

| | | 9 | | | | 0 |

0 : off Thread trimming is operative. (thread can be trimmed).

1 : on Thread trimming is inoperative. (thread can not be trimmed).

⑥ **Setting of the needle bar stop position when the sewing machine stops (Function setting No. 10)**
The position of the needle bar when the pedal is in its neutral position is specified.

| | 1 | 0 | | | | | 0 |

0 : Down   The needle bar stops in the lowest position of its stroke.
1 : Up   The needle bar stops in the highest position of its stroke.

When connecting CP-160, holding pressing needle up/down compensating switch ❶, turn ON the power and the stop position can be changed.

| | n | P | | L | o | | Down stop position

| | n | P | | U | P | | Up stop position

❶

(Caution) If the stop position of the needle bar is set to the highest position, the thread trimming action will be taken after the needle bar comes down once to the lowest position.

⑦ **Sound of click of the key switch mounted on the PSC box (Function setting No. 11)**
This function selects whether the sound is effective or ineffective when operating the four key switches mounted on the PSC box.

| | 1 | 1 | | | | | 1 |

0 : off The sound of click is ineffective.
1 : on The sound of click is effective.

⑧ **Selection of the optional input/output function (Function setting No. 12)**

Operation keys array　　↵　　🔄　　—　　＋
　　　　　　　　　　　　　▲　　　▼
　　　　　　　　　　　　❶　　❷　　❹　　❸
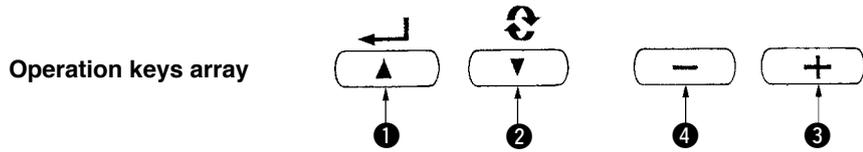
| | 1 | 2 | O | P | T | _ | Select function setting No. 12 with the operating procedure of function set-ting procedures 1) through 4). |

| 9 | 0 | 0 | _ | E | n | d | Select the items of "End", "in" and "ouT" with keys ❸ and ❹. |

| | | | i | n | _ | _ |

| | | | o | u | T | _ |

| 9 | 0 | 1 | | * | * | * |

↕
**Optional input
1 to 8 are**

| 9 | 0 | 8 | **displayed.** |

[When "in" is selected]
The port Nos. are displayed in the left 3 digits. Designate the input port with key ❶ or ❷. Designate the function of input port with key ❸ or ❹.
The function code and the abbreviation are alternately displayed in the 4-digit LED. (For the relation between signal input No. and connector pin array, refer to the separate list.)

| 9 | 1 | 1 | | * | * | * |

↕
**Optional output
1 to 8 are**

| 9 | 1 | 8 | **displayed.** |

[When "ouT" is selected]
The port Nos. are displayed in the left 3 digits. Designate the output port with key ❶ or ❷. Designate the function of output port with key ❸ or ❹.
The function code and the abbreviation are alternately displayed in the 4-digit LED. (For the relation between signal input No. and connector pin array, refer to the separate list.)

(Caution) **Note that the voltage used in output function should not exceed the voltage set with W1 and W2. (For the details, refer to Engineer's Manual.)**

* **Example) Setting the thread trimming function to the optional input port 1**

| | 1 | 2 | O | P | T | _ | 1. Select function setting No. 12 with the operating procedure of function setting procedures 1) through 4). |

| 9 | 0 | 0 | i | n | _ | _ | 2. Select the item of "in" with keys ❸ and ❹. |

| 9 | 0 | 1 | | n | o | P | 3. Select the port of 901 with key ❷. |

| 9 | 0 | 1 | | T | S | W | 4. Select the thread trimming function, "TSW" with keys ❸ and ❹. |

Lighting alternately ↕

| L | | | 4 |

5. Determine the thread trimming function, "TSW" with key ❷.

| 9 | 0 | 1 | L | | | 4 | 6. Set ACTIVE of the signal with keys ❸ and ❹.
Set the display to "L" when the signal is "Low" and performing thread trimming, and set the display to "H" when the signal is "High" and performing thread trimming. |

↕

| H | | | 4 |

| 9 | 0 | 2 | | n | o | P | 7. Determine the aforementioned function with key ❷. |

⋮

| 9 | 0 | 0 | | | i | n | 8. Finish the optional input with key ❷. |

| | E | n | d | 9. Select the item of "End" with keys ❸ and ❹ to return to the function setting mode. |

* **For the other optional function, it is possible to program simple input/output sequence control. (For the details, refer to Engineer's Manual.)**

Input function list

Function code	Abbrevia-tion	Function item	Remarks
0	noP	No function	(Standard setting)
1	HS	Needle up / down compensating stitching	Every time the switch is pressed, normal feed stitching by half stitch is performed. (Same operation as that of up / down compensating stitching switch on the panel.)
2	bHS	Back compensating stitching	Reverse feed stitching is performed at low speed while the switch is held pressing.
3	EbT	Function of canceling once reverse feed stitching at the end of sewing	By depressing the back part of the pedal after pressing the switch, operation of reverse feed stitching is canceled once.
4	TSW	Thread trimming function	This function is actuated as the thread trimming switch.
5	FL	Presser foot lifting function	This function is actuated as the foot lifter switch.
6	oHS	One stitch compensating stitching	Every time the switch is pressed, one stitch stitching operation is executed.
7	SEbT	Function of cancel of reverse feed stitching at start/end	By operating the optional switch, ineffective/effective can be alternately changed over.
8	PnFL	Presser lifting function when pedal is neutral	Every time the switch is pressed, the function whether automatically lifting the presser foot when the pedal is neutral or not can be selected.
9	Ed	Material edge sensor input	This function works as the input signal of material edge sensor.
10	LinH	Function of prohibiting depressing front part of pedal	Rotation by pedal is prohibited.
11	TinH	Function of prohibiting thread trimming output	Output of thread trimming is prohibited.
12	LSSW	Low speed command input	This function works as low speed switch for standing sewing machine.
13	HSSW	High speed command input	This function works as high speed switch for standing sewing machine.
14	USW	Needle lifting function	UP stop motion is performed when switch is pressed during DOWN stop.
15	rSW	Reverse revolution to lift needle function	Brake stop motion by reverse revolution is performed at specified angle when switch is pressed during DOWN stop.
16	SFSW	Safety switch input	Rotation is prohibited.
17	MES	Thread trimmer knife sensor input	This function works as input signal of thread trimmer knife sensor.
18	AUbT	Cancel of automatic reverse feed stitching/input of addition switch	Every time the switch is pressed, cancel or addition of reverse feed stitching at start or end is performed.
19	vErT	Alternate vertical amount change panel switch input	Every time the switch is pressed, alternate vertical amount change output is inversed.
20	vSW	Alternate vertical amount change knee switch input	Alternate vertical amount change output is performed as long as the switch is pressed.
21	2Pit	2-pitch alternate input	Every time the switch is pressed, alternate vertical amount change output is inversed.
22	2PSW	2-pitch momentary switch input	2-pitch is outputted as long as the switch is pressed.
23	oSSW	One-shot speed command switch input	This function works as one-shot speed command as long as the switch is pressed.
24	bbCG	Bobbin replacement switch input	Presser goes up with the first ON and the start-up of the sewing machine becomes invalid. (Replacing bobbin) Presser comes down with the second ON and the sewing machine returns to the normal motion.
25	CGUd	Center guide switch input	Every time the switch is pressed, center guide output is inversed.
26	bKoS	Back one-shot speed command switch input	This function works as one-shot speed command of reverse feed stitching as long as the switch is pressed.

Output function list

Function code	Abbrevia-tion	Function item	Remarks
0	noP	No function	(Standard setting) *
1	TrM	Thread trimming output	Output of thread trimming signal *
2	WP	Thread wiper output	Output of thread wiper signal *
3	TL	Thread release output	Output of thread release signal *
4	FL	Presser lifter output	Output of presser lifting signal *
5	bT	Reverse feed stitching output	Output of reverse feed stitching signal *
6	EbT	EBT cancel monitor output	State of one time cancel of reverse feed stitching at end function is output.
7	SEbT	Reverse feed stitching at start/end cancel monitor output	State of cancel of reverse feed stitching at start/end is output.
8	AUbT	Automatic reverse feed stitching cancel/addition monitor output	State of cancel or addition of automatic reverse feed stitching is output.
9	vErT	Alternate vertical amount change (monitor) output	Output of alternate vertical amount change signal.
10	SSTA	Sewing machine stop state output	Sewing machine stop state is output.
11	2PiT	2-pitch output	Output of 2-pitch signal
12	CGUd	Center guide output	Output of center guide signal
13	CooL	Needle cooler output	Output for needle cooler

* **Magnet output does not work when they are used as optional.**

 (Caution) **Note that the voltage used in output function should not exceed the voltage set with W1 and W2.**

     (For the details, refer to Engineer's Manual.)

Input connector

Connector No.	Pin No.	7-segment display No.	Function	Jumper for power voltage setting
CN51-1	1	Vcc4	Power voltage selected with W4	W4 Vcc4 selects +5V, +12V and +24V with the setting of W4.
	2	901	Optional input 1	
	3	902	Optional input 2	
	4	-	GND	
CN51-2	1	Vcc4	Power voltage selected with W4	
	2	903	Optional input 3	
	3	904	Optional input 4	
	4	-	GND	
CN51-3	1	Vcc3	Power voltage selected with W3	W3 Vcc4 selects +5V, +12V and +24V with the setting of W3.
	2	905	Optional input 5	
	3	906	Optional input 6	
	4	-	GND	
CN51-4	1	Vcc3	Power voltage selected with W3	
	2	907	Optional input 7	
	3	908	Optional input 8	
	4	-	GND	

Note) **Note that the input voltage should not exceed +5V. (For the details, refer to Engineer's Manual.)**

Output connector

Connector No.	Pin No.	7-segment display No.	Function	Jumper for power voltage setting
CN50-1	1	Vcc1	Power voltage selected with W1	W1 Vcc4 selects +5V, +12V and +24V with the setting of W1.
	2	911	Optional output 1	
	3	912	Optional output 2	
	4	-	GND	
CN50-2	1	Vcc1	Power voltage selected with W1	
	2	913	Optional output 3	
	3	914	Optional output 4	
	4	-	GND	
CN50-3	1	Vcc2	Power voltage selected with W2	W2 Vcc4 selects +5V, +12V and +24V with the setting of W2.
	2	915	Optional output 5	
	3	916	Optional output 6	
	4	-	GND	
CN50-4	1	Vcc2	Power voltage selected with W2	
	2	917	Optional output 7	
	3	918	Optional output 8	
	4	-	GND	

Note) **Note that the voltage used in output function should not exceed the voltage set with W1 and W2. (For the details, refer to Engineer's Manual.)**

⑨ **Sewing counting function (Function setting No. 14)**

The function counts up every time thread trimming is completed and counts the number of completion of the sewing process.

This can be realized together with the CP-160 control panel. Refer to the explanation of the control panel.

| | 1 | 4 | | | | 1 |

0 : off Sewing counting function is inoperative.
(Indication on the CP-160 contorl panel will go out as well.)
1 : on Sewing counting function is operative.

(Caution) Setting will be invalid when the material end sensor is not attached, or CP-160 control panel is connected.

In combination with function setting No 6 and No. 14, counter display of CP-160 is changed as shown below.

No.6	No.14	CP-160 counter display
1	1	Bobbin thread counter
1	0	Bobbin thread counter
0	1	Sewing counter
0	0	No display

⑩ **Neutral automatic presser lifting function (with AK device only) (Function setting No. 21)**

This function can automatically lift the presser foot when the pedal is in the neutral position.

Automatic lifting time of the pedal depends on the automatic lifting time after thread trimming and when the presser foot is automatically lowered, it is automatically lifted at the second neutral position after it has come off the neutral position once.

| | 2 | 1 | | | | 0 |

0 : off Function of neutral automatic presser lifting is not operative.
1 : on Selection of function of neutral automatic presser lifting
2 : on Neutral automatic presser lifting is valid, and lifting and lowering of the presser foot is performed by alternate motion by depressing the pedal backward (neutral position is off).

⑪ **Function of changeover of compensating switch on the operation panel function (Function setting No. 22)**

Function of compensation switch on the operation panel of CP-160 can be changed over to needle up / down compensating stitching or one stitch compensating stitching.

| | 2 | 2 | | | | 0 |

0 : Needle up / down compensating stitching
1 : One stitch compensating stitching

⑫ **Thread trimming motion condition (Function setting No. 25)**

This function makes the thread trimming motion ineffective when depressing the back part of the pedal after DOWN detection position has been off by turning handwheel by hand or the like.

| | 2 | 5 | | | | 1 |

0 : Thread trimming motion is effective.
1 : Thread trimming motion is prohibited.

⑬ **Setting of the suction time of the back-tack solenoid (Function setting No. 29)**

This function can change the suction time of the back-tack solenoid.

It is effective to decrease the value when the heat is high.

(Caution) When the value is excessively decreased, failure of motion or defective pitch will follow. Be careful when changing the value.

| | 2 | 9 | | 2 | 5 | 0 |

Setting range : 50 to 500 ms <10 / ms>

⑭ **Function of reverse feed stitching on the way (Function setting Nos. 30 to 33)**

Functions of the limit of number of stitches and thread trimming command can be added to the touch back switch on the sewing machine head.

Function setting No. 30   Function of reverse feed stitching on the way is selected.

| ☐ | 3 | 0 | ☐ | ☐ | ☐ | 0 |

    0 : off   Normal back-tack function
    1 : on   Function of reverse feed stitching on the way

Function setting No. 31   Number of stitches performing reverse feed stitching is set.

| ☐ | 3 | 1 | ☐ | ☐ | ☐ | 4 |

    Setting range
    0 to 19 stitches

Function setting No. 32   Effective condition of reverse feed stitching on the way

    0 : off   Inoperative when the sewing machine stops.
             (Reverse feed stitching on the way functions only when the sewing machine is running.)

| ☐ | 3 | 2 | ☐ | ☐ | ☐ | 0 |

    1 : on   Operative when the sewing machine stops.
             (Reverse feed stitching on the way functions both when the sewing machine is running and stops.)

(Caution)   Either condition is operative when the sewing machine is running.

Function setting No. 33   Thread trimming is performed when reverse feed stitching on the way is completed.

| ☐ | 3 | 3 | ☐ | ☐ | ☐ | 0 |

    0 : off   Without thread trimming
    1 : on   Thread trimming is executed.

Actions under each setting state

Application	Function setting			Output function
	No.30	No.32	No.33	
①	0	0 or 1	0 or 1	It works as normal touch-back switch.
②	1	0	0	When operating touch-back switch at the time of depressing front part of the pedal, reverse feed stitching as many as the number of stitches specified by the function setting No. 31 can be performed.
③	1	1	0	When operating touch-back switch at the time of either stop of the sewing machine or depressing front part of the pedal, reverse feed stitching as many as the number of stitches specified by the function setting No. 31 can be performed.
④	1	0	1	When operating touch-back switch at the time of depressing front part of the pedal, automatic thread trimming is performed after reverse feed stitching as many as the number of stitches specified by the function setting No. 31 has been performed.
⑤	1	1	1	When operating touch-back switch at the time of either stop of the sewing machine or depressing front part of the pedal, automatic thread trimming is performed after reverse feed stitching as many as the number of stitches specified by the function setting No. 31 has been performed.

① Used as the normal reverse feed stitching touch-back switch.

② Used for reinforcing seam (press sewing) of the pleats. (It works only when the sewing machine is running.)

③ Used for reinforcing seam (press sewing) of the pleats.
(It works either when the sewing machine stops or when the sewing machine is running.)

④ Used as starting switch for reverse feed stitching at the sewing end.
(Used as the substitute for thread trimming by depressing back part of the pedal. It works only when the sewing machine is running. It is especially effective when the sewing machine is used as the standing-work machine.)

⑤ Used as starting switch for reverse feed stitching at the sewing end.
(Used as the substitute for thread trimming by depressing back part of the pedal. It works either when the sewing machine stops or when the sewing machine is running. It is especially effective when the sewing machine is used as the standing-work machine.)

⑮ **Number of rotation of one-shot stitching (Function setting No. 38)**

This function can set, by the pedal operation of one time, the sewing speed of one-shot stitching when the sewing machine continues stitching until completing the number of stitches specified or detecting the material end.

| | 3 | 8 | 1 | 5 | 0 | 0 |

Setting range
150 to MAX. rpm. <50 / rpm>

(Caution) 1. Setting of one-shot stitching is made by the operation panel of the CP-160, or the function setting No. 76.

2. The max. number of rotation of one-shot stitching is limited by the model of the sewing machine head.

⑯ **Holding time of lifting presser foot (Function setting No. 47)**

Solenoid type presser foot lifter can adjust the holding time control of lifting presser foot.
This function automatically lowers the presser foot when the time set with the setting No. 47 has passed after lifting the presser foot.
When the pneumatic type presser foot lifter is selected, the holding time control of lifting presser foot is limitless regardless of the set value.

| | 4 | 7 | | | 6 | 0 |

Setting range
10 to 600 sec <10 / sec>

⑰ **Presser lowering time (Function setting No. 49)**

Delay time from presser output OFF to start-up of the sewing machine.

| | 4 | 9 | | 1 | 4 | 0 | 0 to 250ms (10ms)

⑱ **Compensation of timing of the solenoid for reverse feed stitching (Function setting No. 51 to 53)**
When the normal and reverse feed stitches are not uniform under the automatic reverse feed stitching action, this function can change the ON / OFF timing of the solenoid for back tack and compensate the timing.

① Compensation of on-timing of solenoid for reverse feed stitching at the start of sewing
(Function setting No. 51)
On-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

☐ 5 1 ☐ ☐ 2 5
Adjusting range
− 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of sitches of compensation
− 36	− 360 ˚	− 1
− 18	− 180 ˚	− 0.5
0	0 ˚	0
18	180 ˚	0.5
36	360 ˚	1
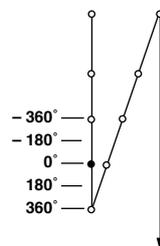
* **When the point before 1 stitch is regarded as 0˚, compensation is possible by 360˚ (1 stitch) in front and in the rear.**

② Compensation of off-timing of solenoid for reverse feed stitching at the start of sewing
(Function setting No. 52)
Off-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

☐ 5 2 ☐ ☐ − 7
Adjusting range
− 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of sitches of compensation
− 36	− 360 ˚	− 1
− 18	− 180 ˚	− 0.5
0	0 ˚	0
18	180 ˚	0.5
36	360 ˚	1
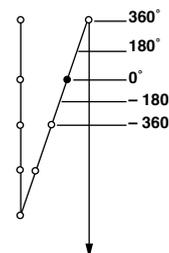
③ Compensation of off-timing of solenoid for reverse feed stitching at the end of sewing
(Function setting No. 53)
Off-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

☐ 5 3 ☐ ☐ − 1 2
Adjusting range
− 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of sitches of compensation
− 36	− 360 ˚	− 1
− 18	− 180 ˚	− 0.5
0	0 ˚	0
18	180 ˚	0.5
36	360 ˚	1
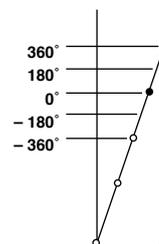
⑲ **Foot lift function after thread trimming (Function setting No. 55)**
This function can automatically lift the presser foot after thread trimming. This function is effective only when it is used in combination with the AK device.

☐ 5 5 ☐ ☐ ☐ 1

0 : off   Function of automatically lifting the presser foot is not provided.
(Presser foot does not automatically go up after thread trimming.)
1 : on   Function of automatically lifting the presser foot is provided.
(Presser foot automatically goes up after thread trimming.)

⑳ **Reverse revolution to lift the needle after thread trimming (Function setting No. 56)**
This function is used to make the sewing machine rotate in the reverse direction after thread trimming to lift the needle bar almost to highest position. Use this function when the needle appears under the presser foot and it is likely to make scratches on the sewing products of heavy-weight material or the like.

| | 5 | 6 | | | | | 1 |

0 : off   Function of making the sewing machine rotate in the reverse direction to lift the needle after thread trimming is not provided.
1 : on   Function of making the sewing machine rotate in the reverse direction to lift the needle after thread trimming is provided.

(Caution)   The needle bar is raised, by rotating the machine in the reverse direction, almost to the highest dead point. This may result in slip-off of the needle thread. It is therefore necessary to adjust the length of thread remaining after thread trimming properly.

㉑ **Function of holding predetermined upper / lower position of the needle bar (Function setting No. 58)**
When the needle bar is in the upper position or in the lower position, this function holds the needle bar by applying a brake slightly.

0 : off   Not provided with the function of holding predetermined upper/lower position of the needle bar
1 : on   Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is weak.)

| | 5 | 8 | | | | | 0 |

2 : on   Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is medium.)
3 : on   Provided with the function of holding predetermined upper/lower position of the needle bar (holding force is strong.)

㉒ **Change-over function of AUTO / Pedal for sewing speed of the reverse feed stitching at the start of sewing (Function setting No. 59)**
This function selects whether the reverse feed stitching at the start of sewing is performed without a break at the speed set by the function setting No. 8 or the stitching is performed at the speed by the pedal operation.

| | 5 | 9 | | | | | 1 |

0 : Manu   The speed is indicated by the pedal operation.
1 : Auto   Automatic stitching at the specified speed

(Caution)   1. The max. sewing speed of the reverse feed stitching at the start of sewing is limited to the speed set by the function setting No. 8 regardless of the pedal.
2. When "0" is selected, stitches of reverse feed stitching may not match those of normal feed stitching.

㉓ **Function of stop immediately after the reverse feed stitching at the start of sewing (Function setting No. 60)**
This function temporarily stops the sewing machine even when keeping depressing the front part of the pedal at the time of completion of process of reverse feed stitching at the start of sewing.
It is used when sewing a short length by reverse feed stitching at the start of sewing.

0 : Not provided with the function of temporary stop of the sewing machine immediately after the reverse feed stitching at the start of sewing

| | 6 | 0 | | | | | 0 |

1 : Provided with the function of temporary stop of the sewing machine immediately after the reverse feed stitching at the start of sewing

Stop the sewing machine temporarily to change direction of sewing products.

㉔ **Function of reducing speed of reverse feed stitching at the start of sewing (Function setting No. 92)**
Function to reduce speed at the time of completion of reverse feed stitching at the start of sewing : Normal use depending on the pedal condition (Speed is accelerated to the highest without a break.)
This function is used when temporary stop is used properly. (Cuff and cuff attaching)

| | 9 | 2 | | | | | 0 |

0 : Speed is not reduced.
1 : Speed is reduced.

Sew without stopping without a break.

Temporary stop

㉕ **Retry function (Function setting No. 73)**
When the retry function is used, if the sewing material is thick and not pierced with needle, this function makes the needle pierce in the material with ease.

☐ 7 3 ☐ ☐ ☐ 1

0 : Normal
1 : Retry function is provided.

㉖ **One-shot function up to material end (Function setting No. 76)**
This function can perform the one-shot automatic stitching up to the end of material in combination with the material end sensor when the operation panel is not connected.

☐ 7 6 ☐ ☐ ☐ 0

0 : Without one-shot function
1 : With one-shot function

㉗ **Function of pedal curve selection (Function setting No. 87)**
This function can perform the selection of the curve of number of rotation of the sewing machine against the depressing amount of the pedal.
Change to this function when you feel that inching operation is hard or that pedal response is slow.

☐ 8 7 ☐ ☐ ☐ 0

0 : Number of rotation of the sewing machine in terms of the depressing amount of the pedal increases linearly.
1 : Reaction to intermediate speed in terms of the depressing amount of the pedal is delayed.
2 : Reaction to intermediate speed in terms of the depressing amount of the pedal is advanced.

㉘ **Function added to the needle up / down compensating switch (Function setting No. 93)**
One stitch operation can be performed only when the needle up / down compensating switch is pressed at the time of upper stop immediately after turning ON the power switch or upper stop immediately after thread trimming.

☐ 9 3 ☐ ☐ ☐ 0

0 : Normal (Only needle up / down compensating stitching operation)
1 : One stitch compensating stitching operation (upper stop → upper stop) is performed only when aforementioned changeover is made.
2 : Needle-down function operates after thread trimming.
3 : Function of needle-down with operation of 2 plus presser lowering operation and needle-up with thread trimming operation is added.

㉙ **Setting of max. number of rotation of the sewing machine head (Function setting No. 96)**
This function can set the max. number of rotation of the sewing machine head you desire to use.
Upper limit of the set value varies in accordance with the sewing machine head to be connected.

☐ 9 6 3 5 0 0

150 to Max. [rpm] <50 / rpm>

㉚ **MF thread trimming device function setting (Function setting No. 74)**
Existence/non-existence of mounting of MF head thread trimming device is set.
Note : (Valid in case of MF head)

☐ 7 4 ☐ ☐ ☐ 1

0 : Not mounted
1 : Mounted

㉛ **2-pitch output during reverse feed stitching at sewing start or end (Function setting No. 100)**
2-pitch output is set to ON state during controlling reverse feed stitching at sewing start or end.

1 0 0 ☐ ☐ ☐ 0

0 : Function OFF
1 : Function ON

㉜ **Inversion of 2-pitch output during outputting alternate vertical amount (Function setting No. 101)**
State of 2-pitch output synchronizing with alternate vertical output is inversed and outputted.
When 2-pitch output is "ON" at the time of changeover of alternate vertical output, the output is changed over to "OFF" and in case of "OFF", to "ON".

| 1 | 0 | 1 | | | | 0 |

0 : Function OFF
1 : Function ON

㉝ **2-pitch initial output selection (Function setting No. 102)**
Whether 2-pitch output at the time of turning ON the power is to be "ON" or "OFF" can be set.

| 1 | 0 | 2 | | | | 1 |

0 : Output ON
1 : Output OFF
2 : It is returned to the state immediately before turning OFF the power.

㉞ **Number of stitches of automatic release of alternate vertical output setting**
(Function setting No. 103)
Release of alternate vertical output is automatically performed by number of stitches.
 (0 : Automatic release is invalid.)
Set the output to "OFF" after setting number of stitches of alternate vertical output.
When "0" is set, this function does not work. (Stitches become, however, more than the number of stitches that has been set.)

| 1 | 0 | 3 | | | | 0 |

0 : Automatic release is invalid
1 : 1 to 30 (1 stitch)

㉟ **Selection of up-position of automatic presser lifting at the time of reverse revolution to lift needle of thread trimming (Function setting No. 104)**
Selection of automatic presser lifting timing at up-position at the time of reverse revolution to lift needle of thread trimming
By making this setting "ON", the presser is lifted to up-position after thread trimming and the reverse revolution to lift needle motion is performed.
At the time of "OFF", the presser is lifted after the reverse revolution to lift needle.

| 1 | 0 | 4 | | | | 0 |

0 : Selection of up-position is not performed.
1 : Automatic presser lifting at up-position is performed.

㊱ **Needle cooler output OFF delay time (Function setting No. 105)**
Delay time from the stop of the sewing machine to output OFF is set with the needle cooler output function. Needle cooler output continues "ON" as long as this setting time from the stop of the sewing machine.
Note) This function is valid only when setting Function No. "13" Needle cooler output of the optional output function setting.

| 1 | 0 | 5 | | 5 | 0 | 0 |

0 to 2000ms (100ms)

㊲ **Selection of alternate vertical output after thread trimming (Function setting No. 107)**
Alternate vertical output is forcibly set to ON or OFF after thread trimming.
In case of the invalid setting, alternate vertical output maintains the state before thread trimming. In case of the set value is "1", alternate vertical output becomes the state of "OFF" and in case of "2", the output becomes "ON".

| 1 | 0 | 7 | | | | 0 |

0 : Invalid
1 : OFF
2 : ON

㊳ **Selection of needle thread clamp switch function (Function setting No. 109)**
Needle thread clamp switch function of LU-2220 machine head is selected. (When No.93 is "2" or "3", however, the motion become invalid.)

| 1 | 0 | 9 | | | | 0 |

0 : Needle thread clamp motion is invalid.
1 : On/Off with the motion valid switch
2 : Forcibly valid

㊴ **Setting of brake starting angle at the time of thread trimming up-position stop (Function setting No. 112)**
This function sets the brake starting angle at the time of thread trimming up-position stop.

| 1 | 1 | 2 | | | | 0 |

Setting range (0 : Up-detection start)
0 to 10°

6. Automatic compensation of neutral point of the pedal sensor

Whenever the pedal sensor, spring, etc. are replaced, be sure to perform following operation :
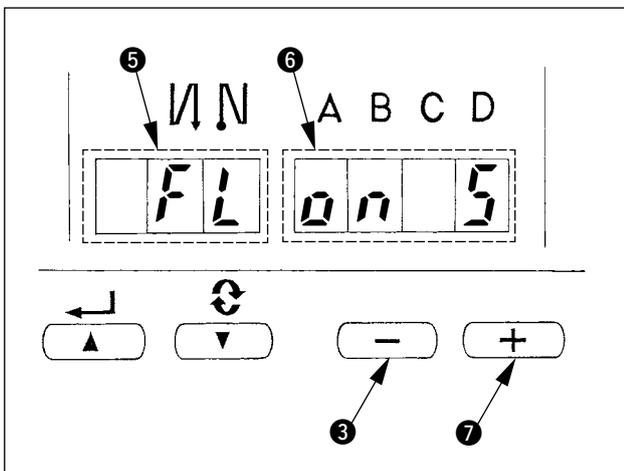
ИN A B C D

PA   0

❻

❷
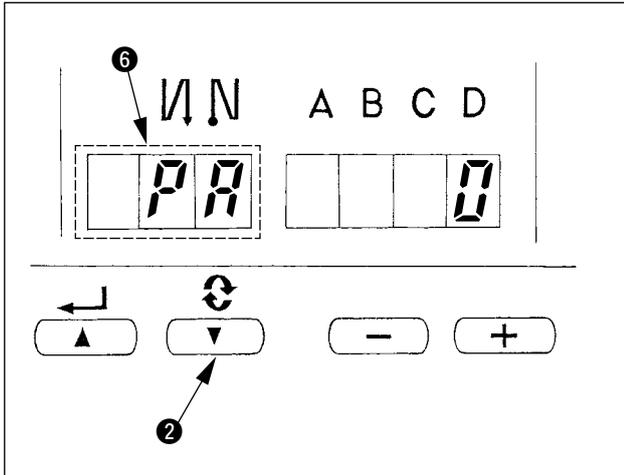
1) Pressing switch ❷, turn ON the power switch.
2) Indication on the screen will be as illustrated in ❻. At this time, the value indicated in the 7 segments of four figures is the compensation value.

(Caution) **At this time, the pedal sensor does not work properly if the pedal is depressed. Do not place the foot or any object on the pedal. Warning sound "peeps" and the compensation value is not displayed.**

3) Turn OFF the power switch, and turn ON the power switch again to return to the normal mode.

7. Setting of the auto lifter function

❺ ❻

ИN A B C D

FL on 5

❸ ❼

When the auto-lifter device (AK) is attached, this function makes the function of auto-lifter work.
1) Turn ON the power switch while pressing switch ❸ inside the control box.
2) LED display is turned to ❺, ❻ (FL ON) with "beep", and the function of auto-lifter becomes effective.
3) Turn OFF the power switch, and turn ON the power switch again to return to the normal mode.
4) Repeat the operation 1) to 3), and LED display is turned to (FL OFF). Then, the function of auto-lifter does not work.

FL ON :   Auto-lifter device becomes effective. Selection of the auto-lifter device of solenoid drive (+33V) or of air drive (+24V) can be performed with switch ❼. However, when the version is old, this operation becomes ineffective.. (Changeover is performed to drive power +33V or +24V of CN37.)

F L o n 5

Solenoid drive display (+33V)

F L o n A

Air drive display (+24V)

FL OFF :   Auto-lifter function does not work. (Similarly, the presser foot is not automatically lifted when programmed stitching is completed.)

⚠ **WARNING :**
When the solenoid is used with the air drive setting, the solenoid may be burned out. So, do not mistake the setting. For the initial display of ON setting, the default setting of the machine head is displayed.

(Caution) **1. To perform re-turning ON of the power, be sure to perform after the time of one second or more has passed.**
       (If ON / OFF operation of the power is performed quickly, setting may be not changed over well.)
    2. Auto-lifter is not actuated unless this function is properly selected.
    3. When "FL ON" is selected without installing the auto-lifter device, starting is momentarily delayed at the start of sewing. In addition, be sure to select "FL OFF" when the auto-lifter is not installed since the touch-back switch may not work.
    4. For the details, refer to the Engineer's Manual.

8. Initialization of the setting data
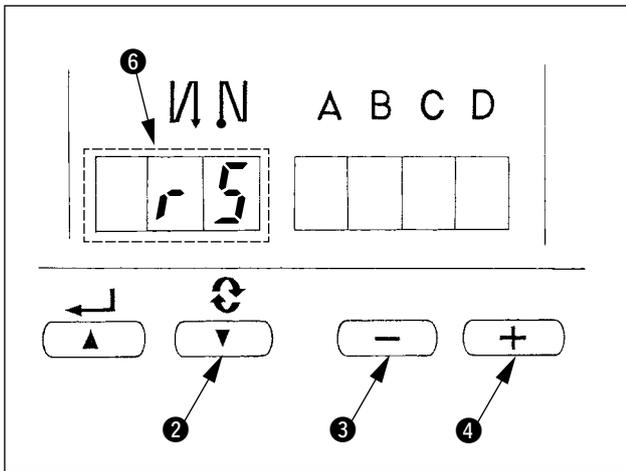
All contents of function setting of SC-510 can be returned to the standard set values.

1) Pressing all switches ❷, ❸ and ❹, turn ON the power switch.

2) LED displays indication ❻ with the sound "peep", and initialization starts.

3) The buzzer sounds after approximately one second (single sound three times, "peep", "peep", and "peep"), and the setting data returns to the standard setting value.

(Caution) Do not turn OFF the power on the way of initializing operation. Program of the main unit may be broken.

4) Turn OFF the power switch, and turn ON the power switch again to return to the normal mode.

(Caution) 1. When this operation is performed, the neutral compensation value of the pedal sensor becomes "0". Accordingly, be sure to execute the operation of automatic pedal sensor neutral compensation before using the sewing machine. (Refer to page 37.)

2. Even when this operation is performed, the sewing data set by the operation panel cannot be initialized.

Ⅳ. MAINTENANCE

1. Replacing the fuse

> **WARNING :**
> To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, remove the cover after turning OFF the power switch and a lapse of 5 minutes or more. To prevent personal injuries, when a fuse has blown out, be sure to replace it with a new one with the same capacity after turning OFF the power switch and removing the cause of the blown-out of the fuse.
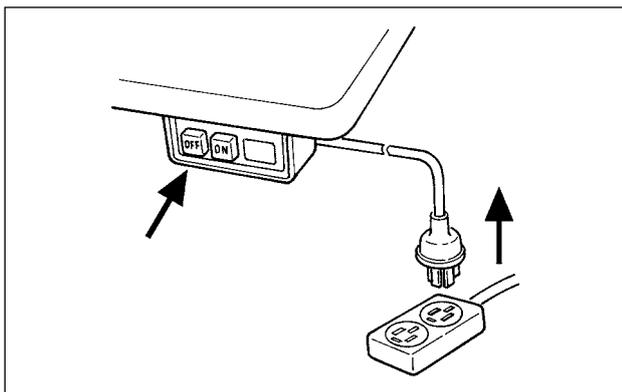

1) Press the OFF button of the power switch to turn OFF the power after confirming that the sewing machine has stopped.

2) Draw out the power cord coming from the power plug socket after confirming that the power switch is turned OFF. Perform the work of step 3) after confirming that the power has been cut and it has passed for 5 minutes or more.
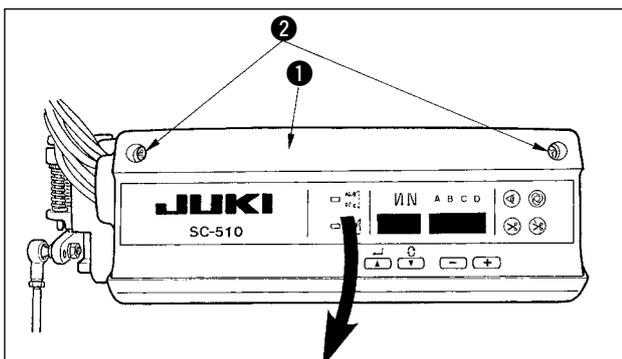
3) Loosen setscrew ❷ in front cover ❶.

4) Pressing the side of front cover ❶ in the direction of the arrow, open the front cover toward you.

Note : Be sure to open / close the front cover with your hands.
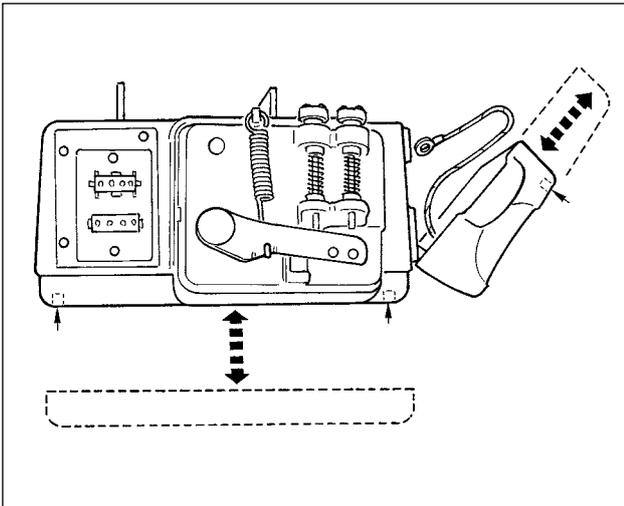
**[Replacing F1 fuse on CTL circuit board (solenoid protection fuse)]**
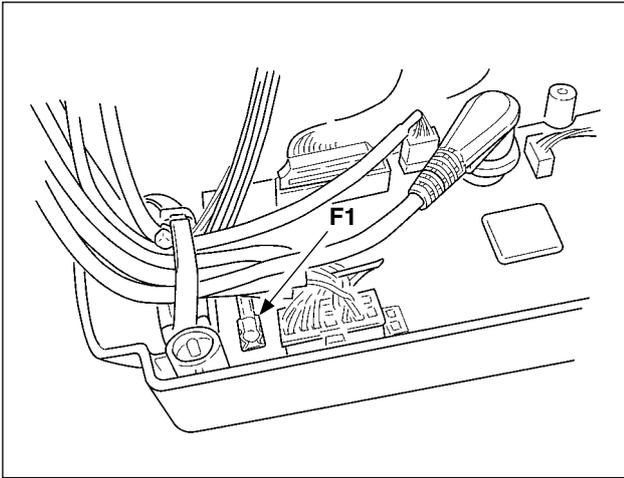
1) Loosen two setscrews in the front cover and open the cover after checking that the power has been turned OFF.
2) Replace 5A F1 fuse on CTL circuit board with a fuse of the same capacity supplied as accessories.
3) Close the front cover as before and fix it with the setscrews while paying attention to pinching of the cords.

[Replacing F1 fuse on PWR circuit board (power circuit protection fuse)]
[Replacing F2 fuse on PWR circuit board (regenerative resistance protection fuse)]

1) Loosen two setscrews in the front cover and open the cover after checking that the power has been turned OFF.
2) Remove connectors CN30, CN32, CN33, CN36, CN37 and CN38 and remove the setscrew attached to the ground wire of CTL circuit board. (Connector Nos. depend on the specifications.)
3) Draw up the front cover obliquely at the position where the front cover is obliquely tilted by approximately 45 degrees, and remove the cover. Remove the control box from the motor.
4) Remove four setscrews in the bottom cover and remove the bottom cover.
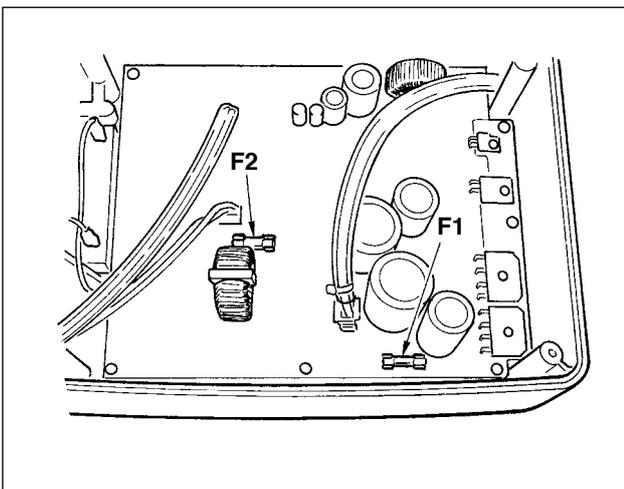
5) Replace 3.15A F1 fuse or 2A F2 fuse on PWR circuit board with a fuse of the same capacity supplied as accessories.
6) Fix the bottom cover as before with the setscrews, and press the front cover to the bottom cover from the position where the front cover is obliquely tilted by approximately 45 degrees for assembling.
7) Attach the connectors and the ground wire which have been removed.
8) Close the front cover as before and fix it with the setscrews while paying attention to pinching of the cords.

2. Changing procedure between 100V to 120V and 200V to 240V (Possible only for the voltage changeover type)
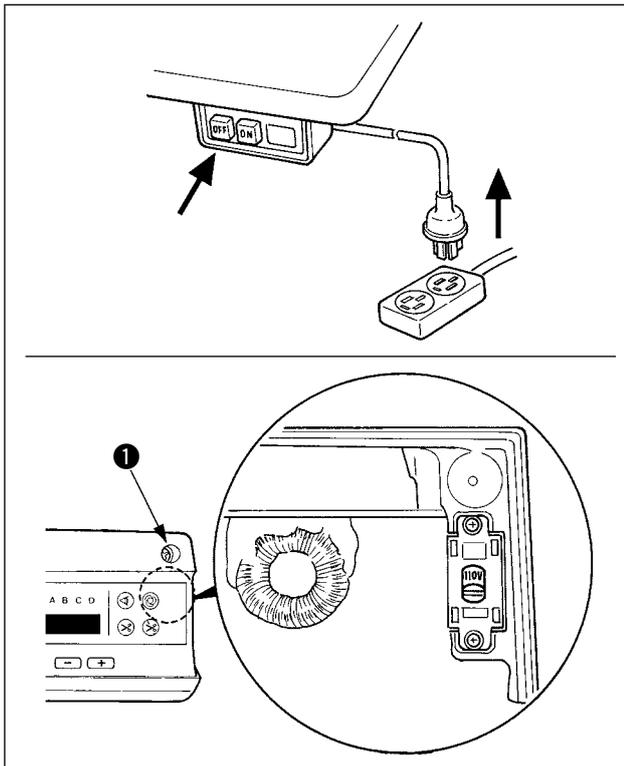
WARNING :
To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more. To prevent accidents caused by unaccustomed work or electric shock, request the electric expert or engineer of our dealers when adjusting the electrical components.

Voltage can be changed between single phase 100 to 120V and single phase/3-phase 200 to 240V by changing over the voltage changeover switch.

(Caution) The voltage changeover switch is on the inside of the control box. When changing the setting, be sure to open the front cover after turning OFF the power switch and a lapse of 5 minutes or more. In addition, if the changing procedure is mistaken, the control box is damaged. So, be very careful.

Voltage changeover switch — **AC input cord** — **Fig. A**
Plug side
WHITE / BLACK / RED / GREEN/YELLOW

Voltage changeover switch — **AC input cord** — **Fig. B**
Plug side
WHITE / BLACK / RED / GREEN/YELLOW

Voltage changeover switch — **AC input cord** — **Fig. C**
Plug side
WHITE / BLACK / RED / GREEN/YELLOW

1) Turn OFF the power with the power switch after checking that the sewing machine has stopped.
2) Draw out the power cord from the power receptacle after checking that the power switch has been turned OFF. Then wait for 5 minutes or more.
3) Remove two screws ❶ fixing the front cover and slowly open the front cover.

4) Changing procedure of the power voltage
(Caution) When the voltage of the power changeover switch and that of the AC input cord are wrong, the control box is damaged.
Be sure to check the indication of the changeover switch and the input power voltage for use.

4)-1 When using with 3-phase 200 to 240V
● Put a screwdriver or the like to the slit section Ⓐ of the changeover switch and push up the switch. (Indication of the voltage of switch is 220V.)
● Connect the crimp style terminal of AC input cord to the power plug as shown in the figure A.
4)-2 When using with single phase 200 to 240V
● Put a screwdriver or the like to the slit section Ⓐ of the changeover switch and push up the switch. (Indication of the voltage of switch is 220V.)
● Connect the crimp style terminal of AC input cord to the power plug as shown in the figure B.
4)-3 When using with single phase 100 to 120V
● Put a screwdriver or the like to the slit section Ⓐ of the changeover switch and push down the switch. (Indication of the voltage of switch is 110V.)
● Connect the crimp style terminal of AC input cord to the power plug as shown in the figure C.

(Caution) Be very careful that the components are not damaged by the top end of the screwdriver.

5) Check again that the change has been performed without fail before closing the front cover.
6) Close the front cover and tighten two screws while being very careful that the cord is not caught by the cover.
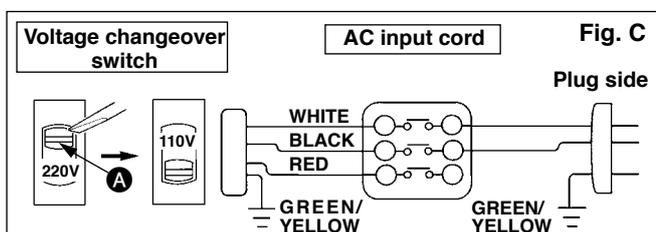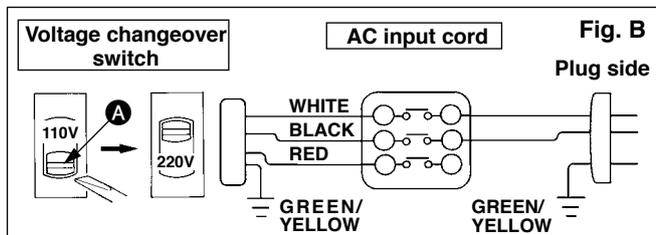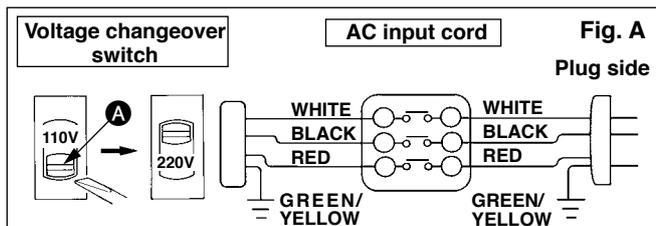
3. Error codes

In case of the following, check again before you judge the case as trouble.

Phenomenon	Cause	Corrective measure
When tilting the sewing machine, the buzzer beeps and the sewing machine cannot be operated.	When tilting the sewing machine without turning OFF the power switch, action given on the left side is taken for safety sake.	Tilt the sewing machine after turning OFF the power.
Solenoids for thread trimming, reverse feed, wiper, etc. fail to work. Hand lamp does not light up.	When the fuse for solenoid power protection has blown out	Check the fuse for solenoid power protection.
Even when depressing the pedal immediately after turning ON the power, the sewing machine does not run. When depressing the pedal after depressing the back part of pedal once, the sewing machine runs.	Neutral position of the pedal has varied. (Neutral position may be shifted when changing spring pressure of the pedal or the like.)	Execute the automatic neutral correction function of the pedal sensor.
The sewing machine does not stop even when the pedal is returned to its neutral position.		
Stop position of the sewing machine varies (irregular).	When tightening the screw in the handwheel is forgotten at the time of adjustment of needle stop position.	Securely tighten the screw in the handwheel.
Presser foot does not go up even when auto-lifter device is attached.	Auto-lifter function is OFF.	Select "FL ON" by auto-lifter function selection.
	Pedal system is set to KFL system.	Change the jumper to PFL setting to lift the presser foot by depressing the back part of the pedal.
	Cord of auto-lifter device is not connected to connector (CN37).	Connect the cord properly.
Touch-back switch fails to work.	Presser foot is going up by auto-liter device.	Operate the switch after the presser foot lowered.
	Auto-lifter device is not attached. However, auto-lifter function is ON.	Select "FL OFF" when auto-lifter device is not attached.
UP position move fails to work when all lamps on the panel light up.	The mode is in the function setting mode. The switch on the CTL p.c.b. is pressed by the bound cords and the aforementioned mode resulted.	Remove the front cover, and arrange the cords by the regular binding procedure described in the Instruction Manual.
Sewing machine fails to run.	Motor output cord (4P) is disconnected.	Connect the cord properly.
	Connector (CN30) of motor signal cord is disconnected.	Connect the cord properly.

In addition, 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.
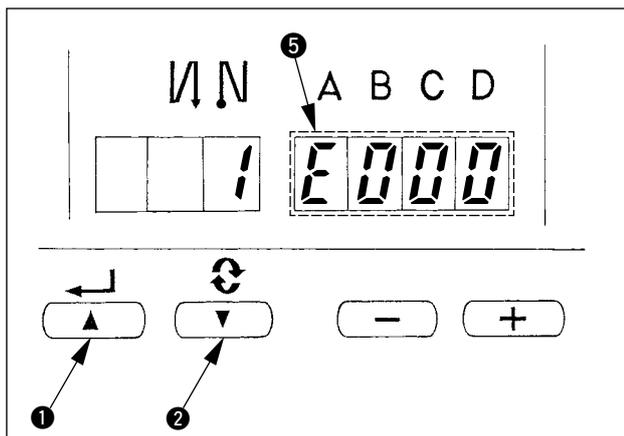
Checking procedure of the error code

1) Pressing switch ❶ in the control box, turn ON the power switch.
2) LED becomes display ❺ with the sound of "peep" and the latest error code is displayed.
3) Confirmation of the contents of previous error can be performed by operating switches ❶ or ❷.

(Caution) When operating switch ❶, one before the existing error code is displayed.
When operating switch ❷, one after the existing error code is displayed.

Error code list

No.	Description of error detected	Cause of occurrence expected	Items to be checked
E000	Execution of data initialization (This is not the error.)	• When the machine head is changed. • When the initialization operation is executed	
E003	Disconnection of synchronizer connector	• When position detection signal is not input from the sewing machine head synchronizer. • When the synchronizer has broken.	• Check the synchronizer connector (CN33, CN43) for loose connection and disconnection. • Check whether the belt is loose. • Check whether the synchronizer cord has broken since the cord is caught in the machine head.
E004	Synchronizer lower position sensor failure		
E005	Synchronizer upper position sensor failure	• Belt is loose. • Machine head is not proper. • Motor pulley is not proper.	• Check the belt tension. • Check the setting of the machine head. • Check the setting of the motor pulley.
E007	Overload of motor	• 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.	• 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 holdup when turning the motor by hand.
E008	Machine head connector failure (Resistance pack)	• When the machine head connector is not properly read.	• Check the machine head connector (CN32) for loose connection and disconnection.
E070	Slip of belt	• When the machine head is locked. • Belt is loose.	• Check whether there is any holdup when turning the motor by hand. • Check the belt tension.
E071	Disconnection of motor output connector	• Disconnection of motor connector	• Check the motor output connector for loose connection and disconnection.
E072	Overload of motor at the time of thread trimming motion	• Same as E007	• Same as E007
E220	Grease-up warning	• When the predetermined number of stitches has been reached.	• Replenish the specified places with grease and reset. (For the details, refer to the data of the machine head.)
E221	Grease-up error	• When the predetermined number of stitches has been reached and the sewing is not possible.	• Replenish the specified places with grease and reset. (For the details, refer to the data of the machine head.)
E302	Tilt detection (MF : Thread trimming knife sensor) (At the time of safety switch motion)	• When the tilt detection switch is inputted in the state that the power is turned ON. • Position of thread trimming knife is improper.	• Check whether the machine head is tilted without turning ON the power switch. (Sewing machine operation is prohibited for safety.) • Check whether the tilt detection switch cord is caught with the sewing machine or the like. • Check whether the tilt detection switch lever is caught. • Adjustment of the position of MF thread trimming sensor • When MF head is not mounted with the thread trimming device, set the function setting No. 74 to "0".
E331	Tape cutter device (TC03) Simultaneous ON of cutter sensor	• Cutter sensor failure	• Check whether the air pressure is proper.
E332	Tape cutter device (TC03) Simultaneous OFF of cutter sensor	• Assembly adjustment failure	• Check whether the air pressure is proper.
E499	Simplified program data abnormality	• Command parameter data exceeds the range.	• Input again the simplified program. • Set the simplified program to the invalid setting.
E704	Simplified program and sewing machine data type abnormality	• The program and the data read the different type.	• Turn OFF the power.
E730	Encoder failure	• When the motor signal is not properly inputted.	• Check the motor signal connector (CN30) for loose connection and disconnection. • Check whether the motor signal cord has broken since the cord is caught in the machine head.
E731	Motor hole sensor failure		
E733	Inverse rotation of motor	• This error occurs when the motor is running at 500 rpm or more in the opposite direction of that of rotation indication during motor is running.	• Connection of the encoder of main shaft motor is wrong. • Connection for the electric power of main shaft motor is wrong.

No.	Description of error detected	Cause of occurrence expected	Items to be checked
E799	Thread trimming sequence time over	• Thread trimming sequence control is not completed within the predetermined time (3 seconds).	• The machine head mounted is different from the selection of the machine head. • Motor pulley diameter is different from the setting of motor pulley diameter effective diameter). • Belt is loose.
E811	Overvoltage	• When voltage higher than guaranteed one is inputted. • 220V has been inputted to SC-510 of 110V specifications. • 400V is applied to the box of 220V (230V).	• Check whether the applied power voltage is higher than the rated voltage + (plus) 10% or more. • Check whether 110V/220V changeover switch is improperly set. In the aforementioned cases, POWER p.c.b is broken.
E813	Low voltage	• When voltage lower than guaranteed one is inputted. • 110V has been inputted to SC-510 of 220V specifications. • 110V is applied to the box of 220V. • Inner circuit is broken by the applied over-voltage	• Check whether the voltage is lower than the rated voltage – (minus) 10% or less. • Check whether 110V/220V changeover switch is improperly set. • Check whether fuse or regenerative resistance is broken.
E906	Operation panel transmission failure	• Disconnection of operation panel cord. • Operation panel has broken.	• Check the operation panel connector (CN38) for loose connection and disconnection. • Check whether the operation panel cord has broken since the cord is caught in the machine head.
E924	Motor driver failure	• Motor driver has broken.	

Contents