ENGLISH

SC-910N
INSTRUCTION MANUAL

CONTENTS

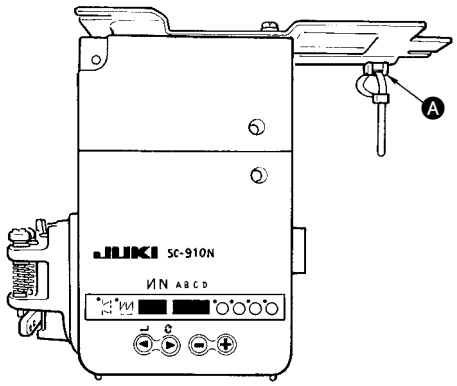
Ⅰ. SPECIFICATIONS

Supply voltage	Single phase 100 to 120V	3-phase 200 to 240V	Single phase 200 to 240V
Frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
Operating environment	Temperature : 0 to 40˚C Humidity : 90% or less	Temperature : 0 to 40˚C Humidity : 90% or less	Temperature : 0 to 40˚C Humidity : 90% or less
Input	350VA	350VA	350VA

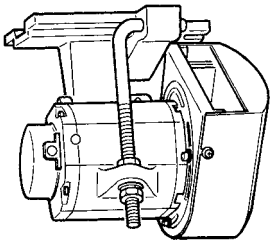
Ⅱ. SET-UP

SC-910N control box can be used for DD (direct-drive) system machine head and the belt-drive system machine head by connecting the separately-available small-sized motor unit (M91).
When using the small-sized motor unit, it is necessary to install the motor unit to the control box before installing the control box to the table.
Install the motor unit to the control box following the instructions below.

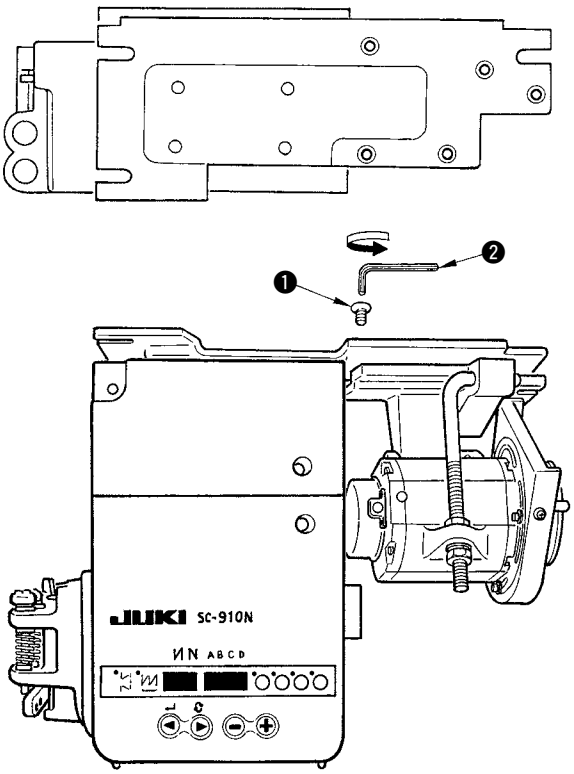
SC-910N control box



M91 small-sized motor unit (separately-available article)



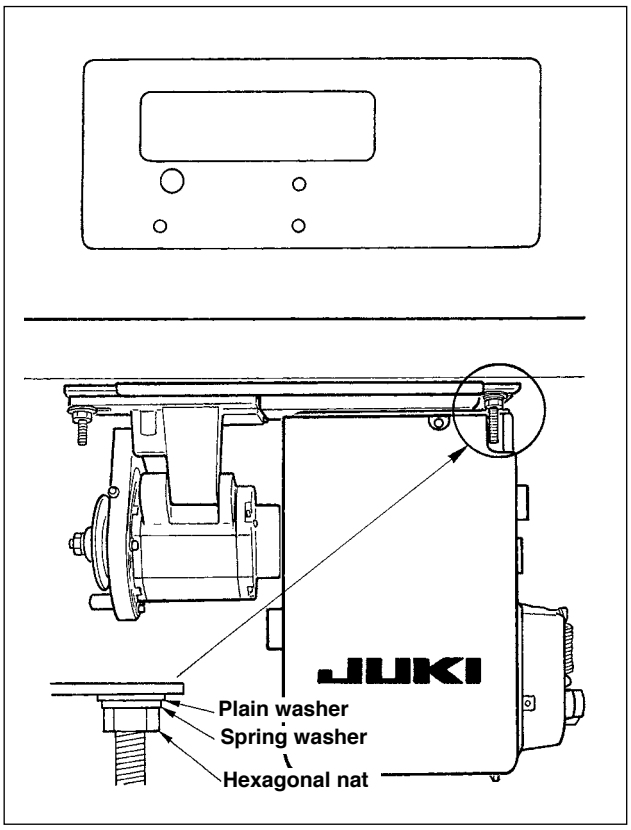
1. Installing M91 small sized motor unit



1) Lay down the control box while the rear cover is placed under the control box.
2) Remove tie-mount ❹.
3) Adjust the hole section of the installing base of M91 to the hole section of the installing plate.
4) Temporarily tighten five places with counter-sunk screws ❶ supplied with the unit as accessories.
5) Securely tighten them with hexagonal wrench key ❷ supplied with the unit as accessories.

(Caution) 1. When tightening the screw, securely insert the hexagonal wrench key into the screw hole section to tighten.
2. Hexagonal wrench key is attached to M91.
3. Be careful that the motor shaft does not hit against anything. (If a strong shock is given to the motor shaft, there is the possibility that the motor is damaged.)

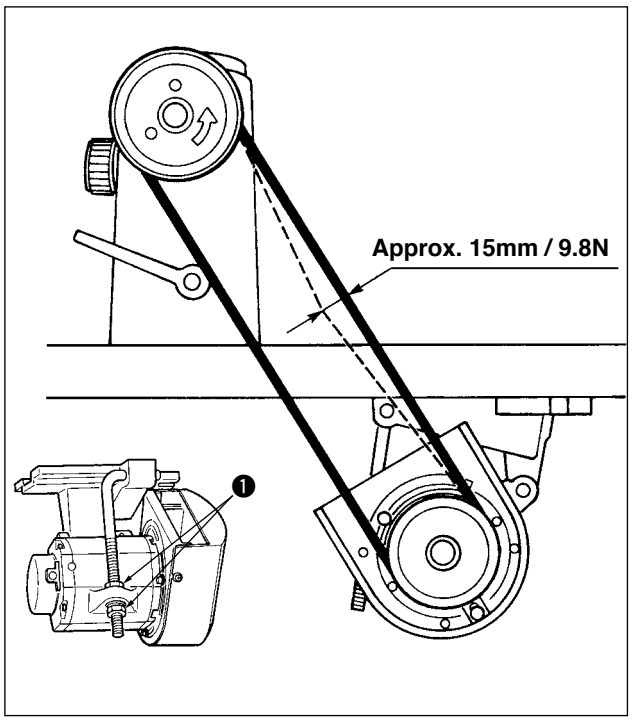
2. Installing to the table



1) Install the control box to the table with the fitting bolt (asm.) supplied with the unit as accessories. At this time, insert the nut and washer supplied with the unit as accessories as shown in the figure so that the control box is securely fixed.

2) Set the machine head to the table after installing the control box (or with small-sized motor) to the table. (Refer to Instruction Manual for the sewing machine.)

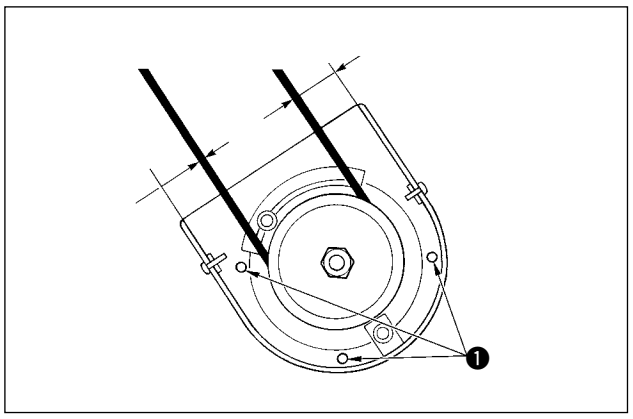
3. Adjusting the belt (when M91 is used)



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

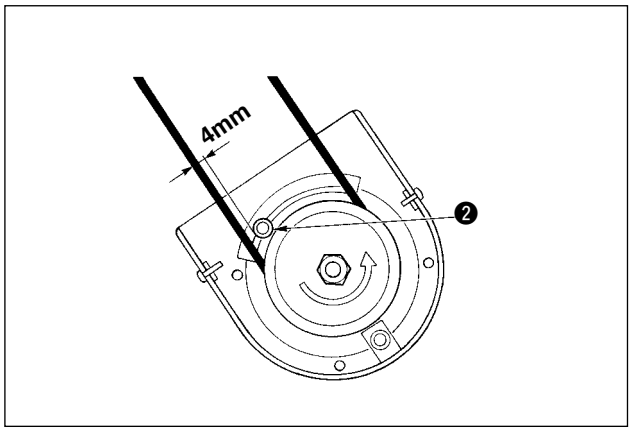
(Caution) 1. When the belt tension is excessively low, medium or low speed rotation becomes uneven, or stop accuracy is deteriorated. When the tension is excessively high, deterioration of the motor is advanced. So, be careful.

4. Adjusting the belt cover (when M91 is used)



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

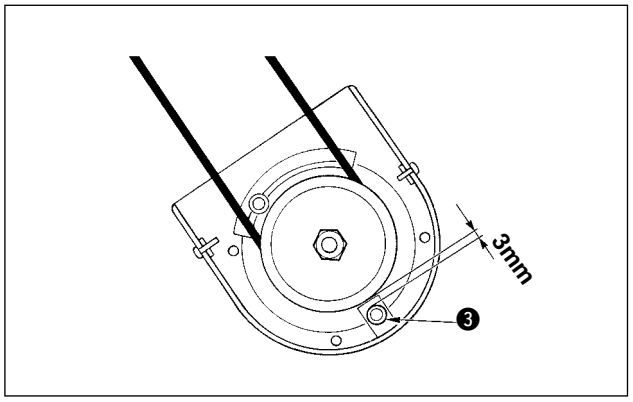
(Caution) 1. Perform the adjustment of the cover with the hexagonal wrench key supplied with the unit as accessories. At this time, be careful that the screw is not excessively loosened.



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

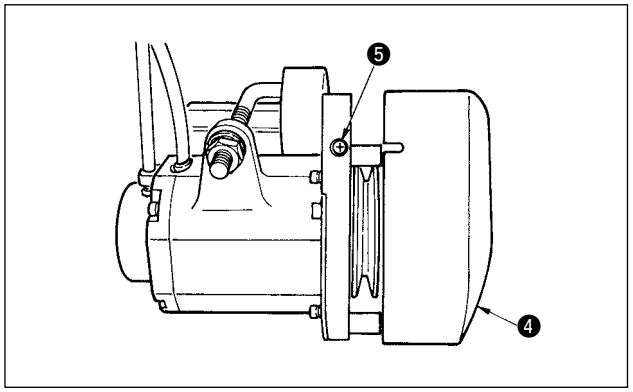
(Caution) 1. Be careful of the direction of rotation of the motor and determine the position of the pin. (Position shown in the figure is the installing position when the motor rotates in the direction of the arrow mark.)

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



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

(Caution) 1. Perform the adjustment of the cover with the hexagonal wrench key supplied with the unit as accessories. At this time, be careful that the screw is not excessively loosened.

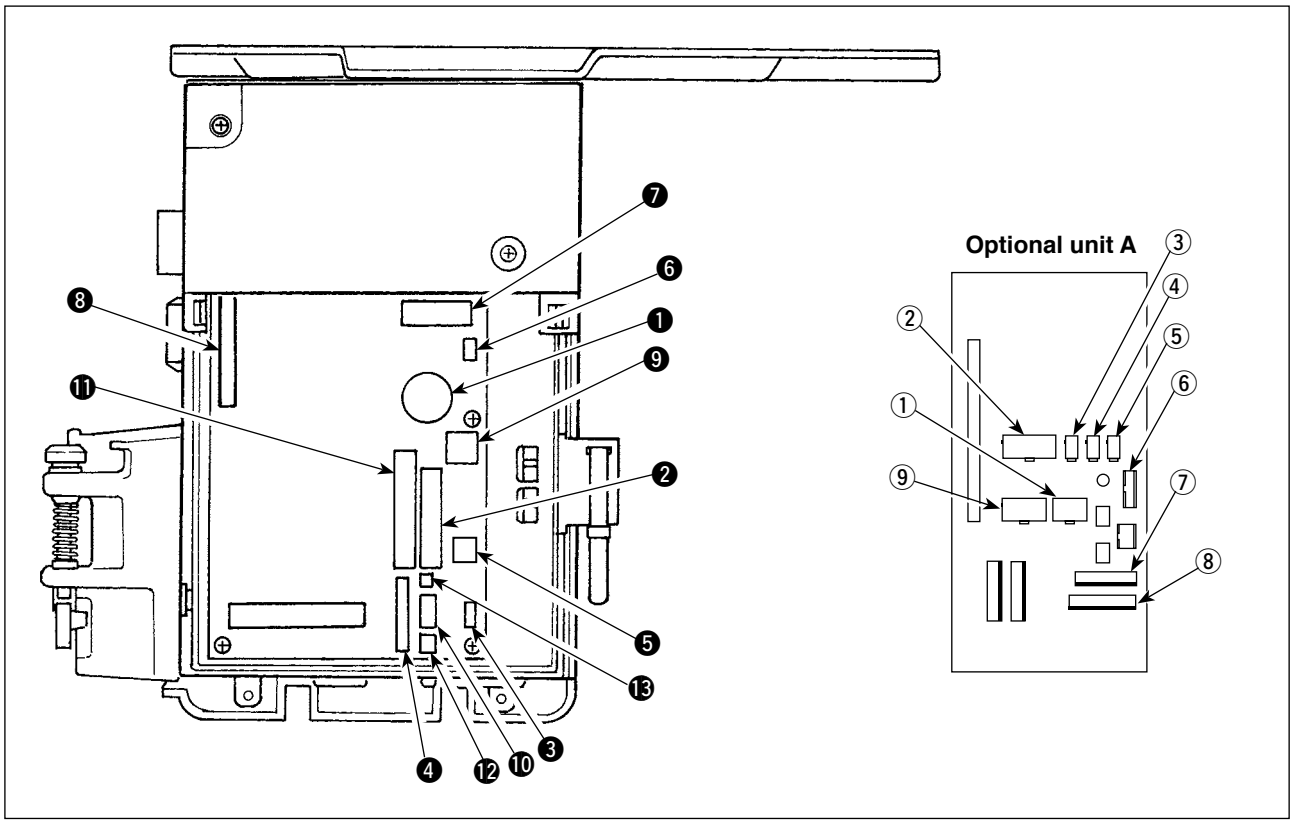


4) Installing the belt cover
Adjust the notch section of the pulley outer cover ❹ to the gap of screw ❺ of the pulley inner cover and insert the outer cover to the inner cover.

5) Tighten screw ❺ to complete the adjustment of the cover.

5. Connecting the cords

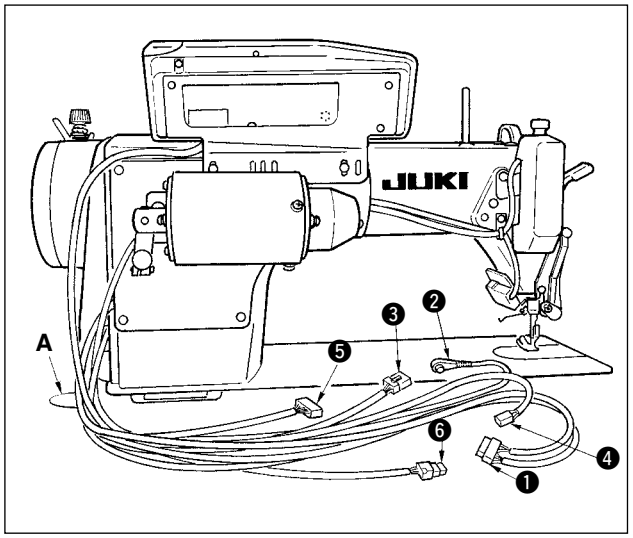
WARNING :
- **To prevent personal injury caused by abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more.**
- **To prevent damage of device caused by maloperation and wrong specifications, be sure to connect all the corresponding connectors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



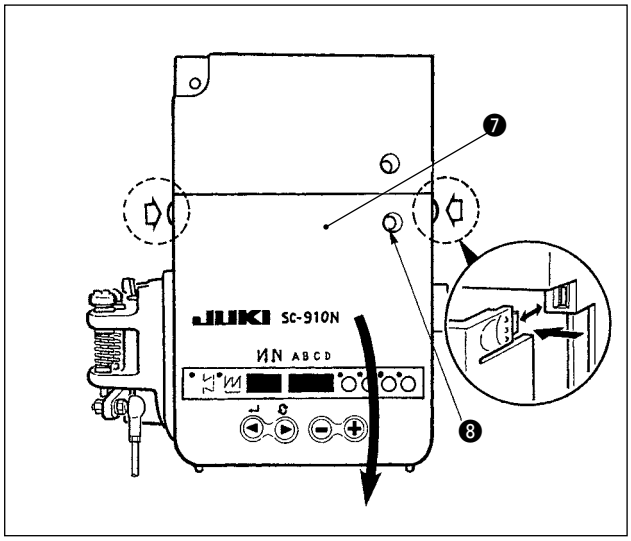
Following connectors are prepared on the front face of SC-910N. Connect the connectors coming from the machine head to the corresponding places so as to fit the devices mounted on the machine head.

❶ CN30 Synchronizer : it detects the needle bar position.
❷ CN35 CP-170 panel : Various kinds of programmed sewing can be executed. (Refer to the Instruction Manual for each panel for the details of functions.)
❸ CN31 Machine head connector 4P
❹ CN42 External input/output connector : input/ output of up/down detection signal, rotation prohibition signal, etc. is prepared.
❺ CN48 Safety switch (standard) : When tilting the sewing machine without turning the power OFF, the operation of the sewing machine is prohibited so as to protect against danger. Optional switch : by changing over the internal functions, 6 kinds of functions can be selected.
❻ CN40 Presser foot lifter solenoid. (For automatic presser foot lifter type only)
❼ CN46 Machine head solenid : Thread trimming, reverse-stitching solenoid, touch-back switch, etc.
❽ CN47 Optional circuit board connection connector : Required when using JUKI standard bobbin thread remaining amount detection sensor, etc.
❾ CN39 Motor signal connector
❿ CN32 Standing machine pedal : JUKI standard PK-70, etc. Sewing machine can be controlled with the external signal.
⓫ CN34 IP-110 panel (LCD panel) : Various kinds of programmed sewing can be executed.
⓬ CN45 Material end detection sensor ED-5, etc.
⓭ CN43 Fan

* By adding the optional unit A, the following optional devices of JUKI standard can be connected.
① CN128 Left/right needle detection
② CN127 Thread holding, thread suction, thread drawing
③ CN122 Needle cooler (bottom fan)
④ CN121 Bobbin thread remaining amount detection
⑤ CN120 +24V external power source
⑥ CN123 Needle/bobbin thread remaining amount detection sensor
⑦ CN125 External interface I/F D/A Input
⑧ CN126 Left/right lock SW, LED
⑨ CN129 Thread holding, thread suction, thread drawing, bobbin thread remaining amount detection.

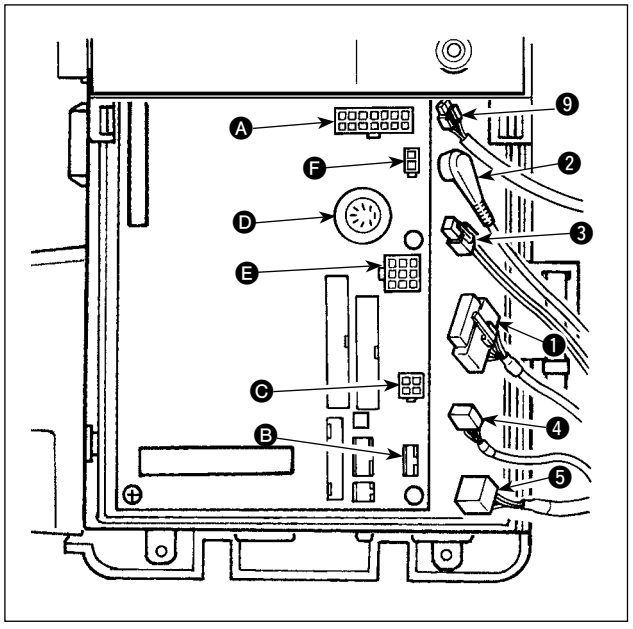


1) Pass the cords ❶ of the thread trimming solenoid, reverse-stitching solenoid, etc., and the cords of the synchronizer ❷, safety switch ❸, machine head 4P connector ❹, motor signal ❺, motor output ❻ through hole **A** in the table to route them down under the machine table.



2) Loosen setscrew ❽ in front cover ❼.
3) Pressing the side of front cover ❼ in the direction of the arrow, open the front cover toward you.

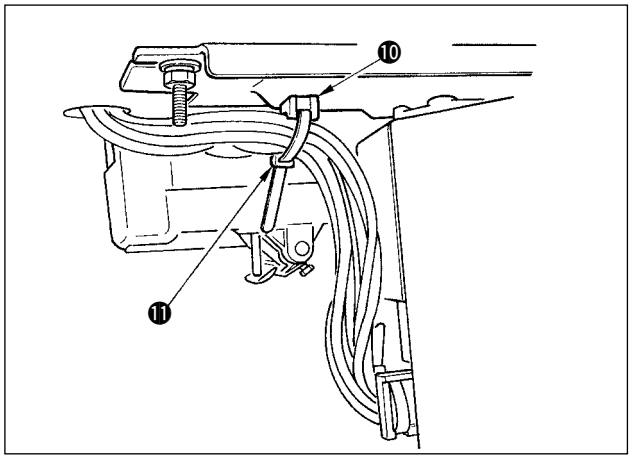
Note : Be sure to open / close the front cover with your hands.



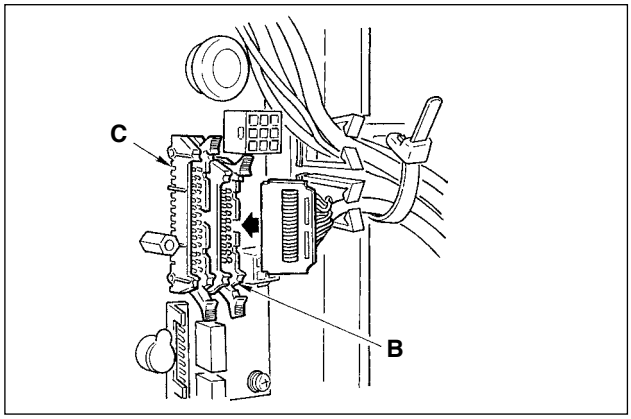
4) Connect 14P code ❶ coming from the machine head to connector Ⓐ (CN46).
5) Connect 4P connector coming from the machine head ❹ to connector Ⓑ (CN31). (It is not necessary in case of DDL-9000A.)
6) Connect 4P connector ❸ (safty switch connector) coming from the machine head to connector Ⓒ (CN48).
7) Connect 7P connector ❷ coming from the machine head to connector Ⓓ (CN30).(It is not necessary in case of DDL-9000A.)
8) Connect connector ❺ coming from the machine head (motor) to connector Ⓔ (CN39).
9) When the optional AK138 device is attached, connect 2P connector ❾ coming from the AK device to connector Ⓕ (CN40).

(Caution) 1. When using the AK device, set whether to use the AK device after confirming how to select the auto-lifter function. (Refter to "Ⅲ-9. Setting of the auto lifter function" p. 41.)

2. Be sure to securely insert the respective connectors after checking the inserting directions since all connectors have the inserting directions. (When using a type with lock, insert the connectors until they go to the lock.) The sewing machine is not actuated unless the connectors are inserted properly. In addition, not only the problem of error warning or the like occurs, but also the sewing machine and the control box are damaged.



10) Fix all cables coming from the machine head with cable clip band ⓾ attached to tie-mount ⓫.



[Connection of the connector for CP panel]

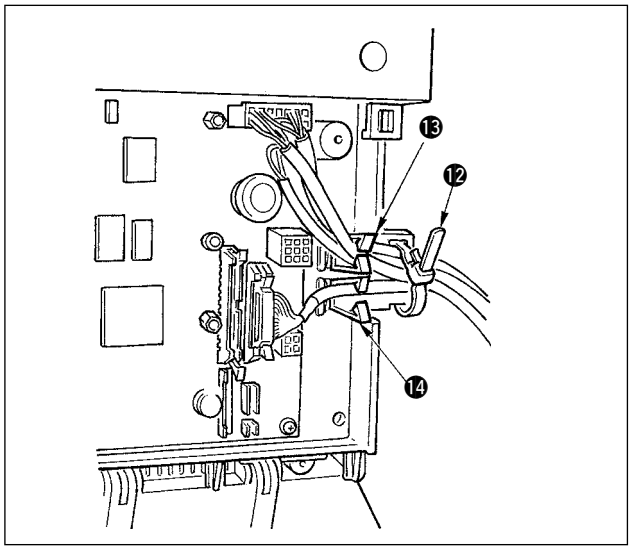
Exclusive connectors are prepared for connection of the connector for CP-170.

Paying attention to the orientation of the connector, connect it to connector **B** located on the circuit board. After connecting, securely lock the connector.

[Connecting for IP panel]

The connector for connecting IP-110 is prepared.

When connecting, insert the connector until it is locked to **C**.

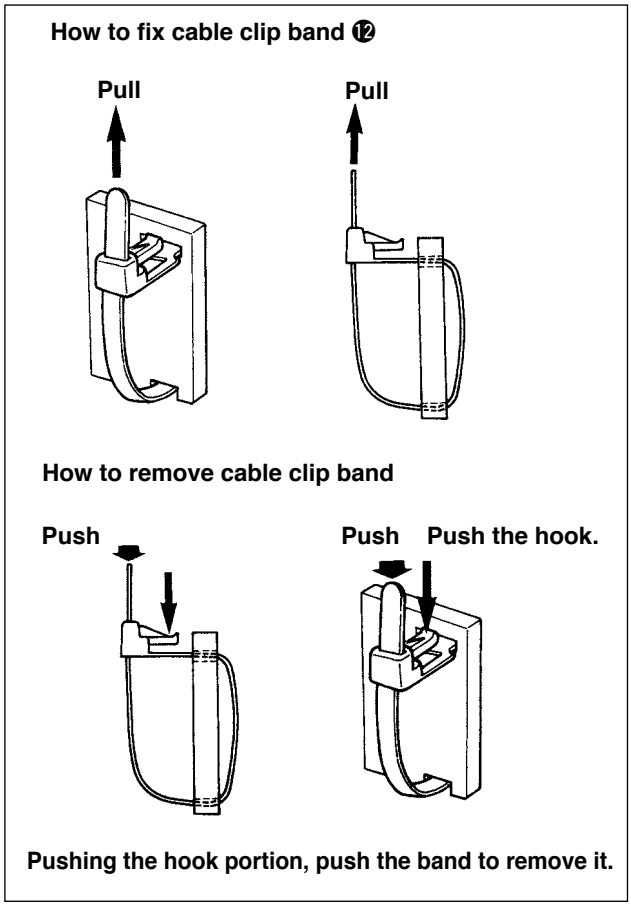


11) After inserting the connector, put all cords together with cable clip band ⓬ located on the side of the box.

At this time, bundle the connectors which are arranged above the wire saddle to wire saddle ⓭ and those which are arranged below the wire saddle to wire saddle ⓮.

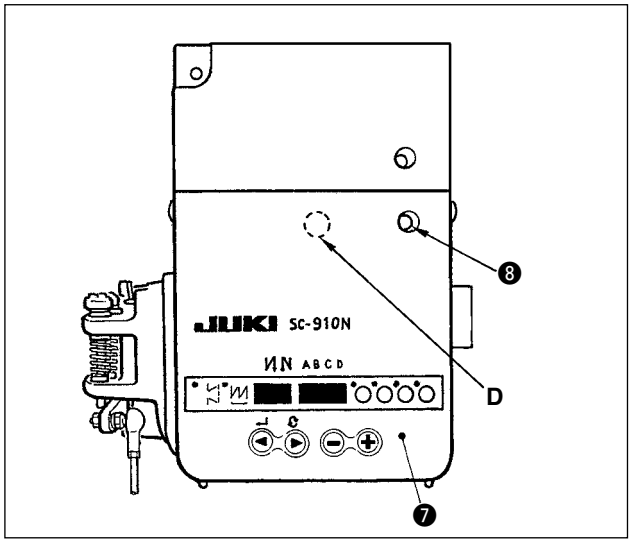
(Caution) 1. Fix the cord clamp and the cable clip band following the attaching procedure.

2. When removing the connector, remove it from the wire saddle and remove it while pressing the hook of the cable clip band.



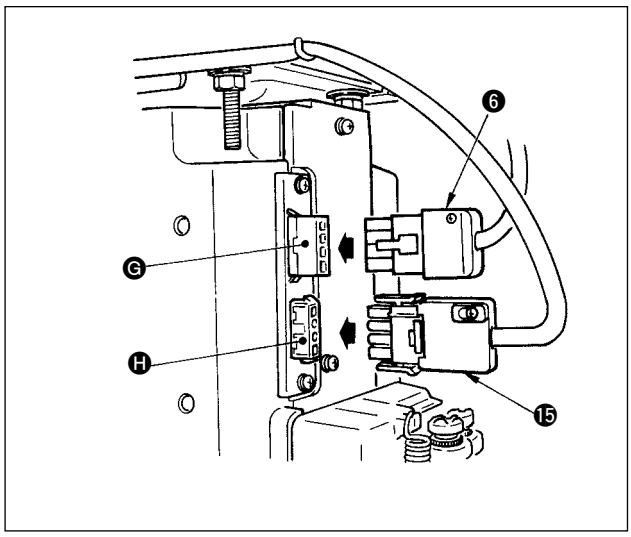
(Caution) 1. Fix the cable clip band following the attaching procedure as shown in the figure.

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.



12) Close front cover ❼ while paying attention to pinching of the wire.
Lightly press portion **D** and insert front cover ❼ with “click”.

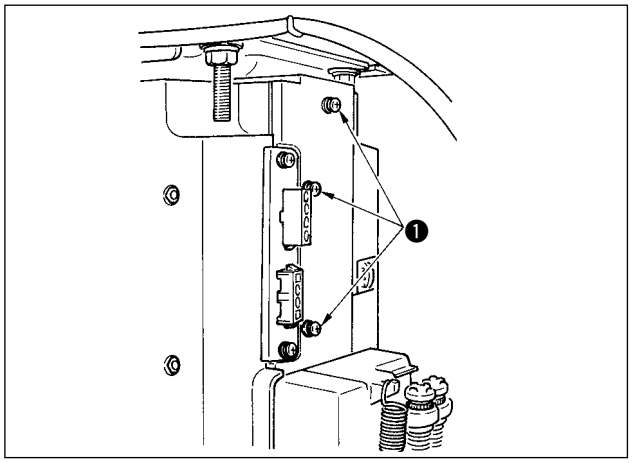
13) After that, fix it with the screw ❽.



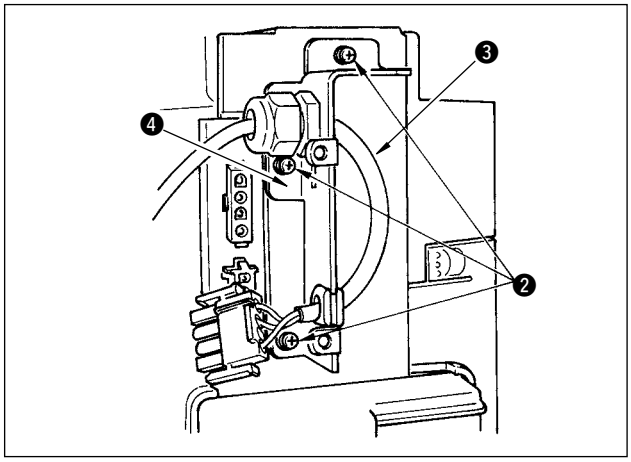
14) Connect motor output cord ❻ to connector Ⓖ located on the side of the box. Connect connector 4P ⓯ of the power switch to connector Ⓗ.

(Caution) Route the motor output cord from the front face of the box.

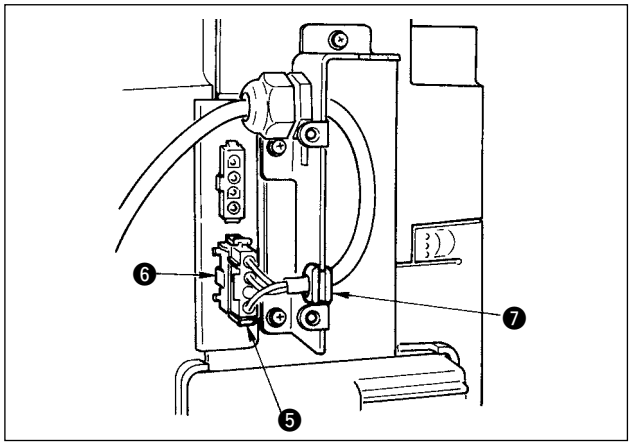
[For CE specifications only]



15) Remove three screws ❶ located on the side of the control box.

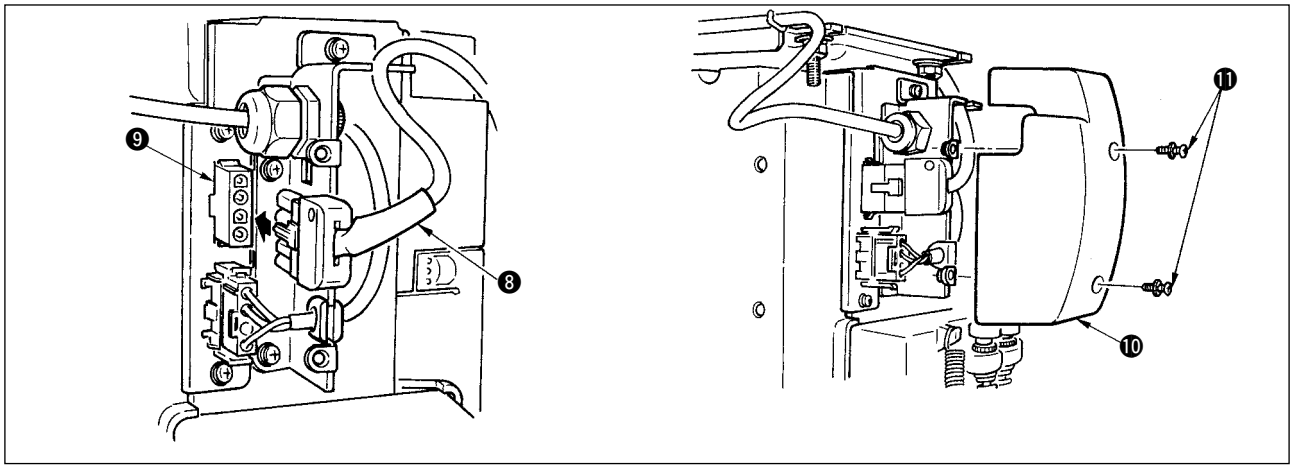


16) Set power source cord set ❸ and installing plate ❹ supplied with the unit as accessories as shown in the figure, and fix them to the control box main unit with three setscrews ❷ which have been removed.



17) Connect connector ❺ coming from the power source cord to lower connector ❻ after checking the direction.

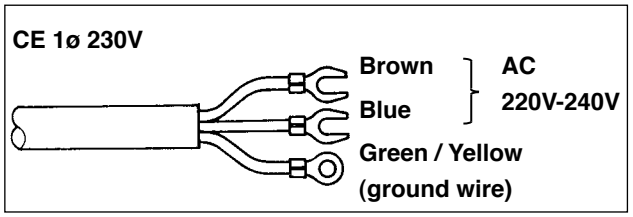
(Caution) When rubber bush ❼ is off the installing plate, adjust it to the groove of the installing plate and insert it.



18) Connect motor output cord ❽ to connector ❾ located on the side of the box.

19) Fix power source cover ❿ supplied with the unit using two screws ⓫ supplied with the unit.

(Caution) At this time, be careful so that the motor output cord is not caught by the power source cover and so that the cord enters the recess of the power source cover.



20) Installing power switch

Connect power supply cord to the power switch.

[CE specifications]

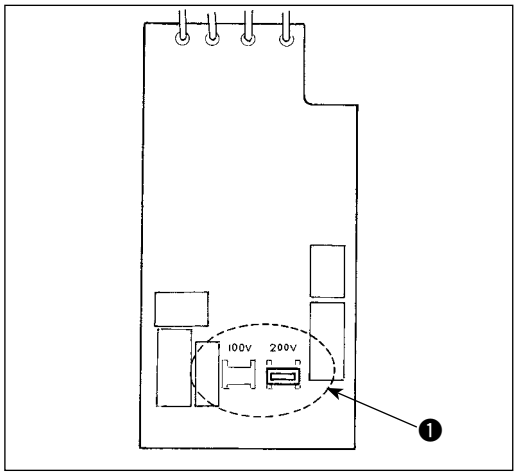
Single phase 230V : Power supply cords : Brown, Blue, and green/yellow (ground wire)

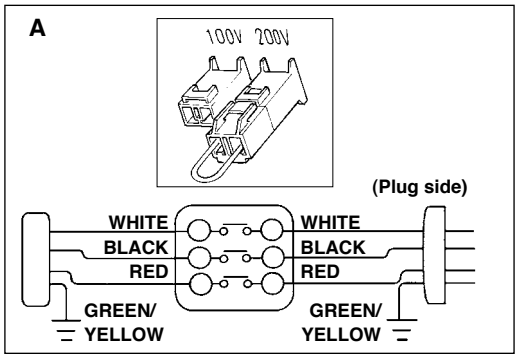
[Power voltage changeover procedure (power voltage setting procedure)]

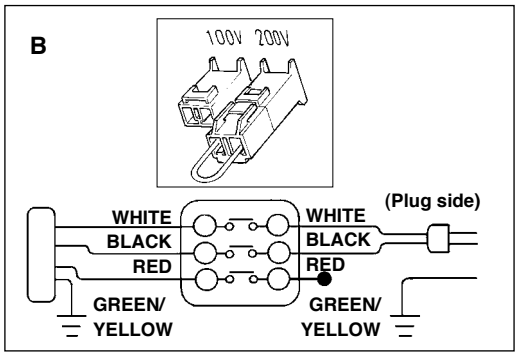
WARNING :
To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, carry out the work after turning OFF the power switch and a lapse of 5 minutes or more. To prevent accidents caused by unaccustomed work or electric shock, request the electric expert or engineer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

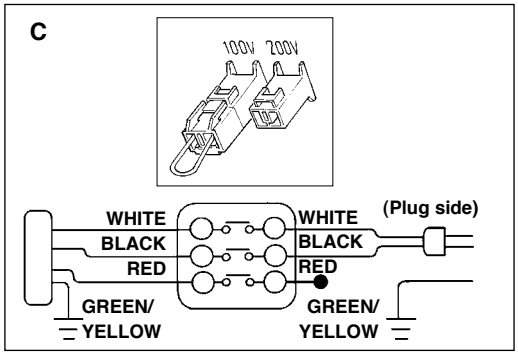
It is adaptable to the voltage of single phase 100V to 120V/3-phase 200V to 240V by changing the voltage changeover connector mounted on FLT p.c.b.

(Caution) When the changing procedure is wring, the control box will be broken. So, be very careful.









Changing procedure of the changeover connector

1. Turn OFF the power source with the power switch after confirming that the sewing machine has stopped.
2. Draw out the power cord from the power plug socket after confirming that the power switch is turned OFF. Then wait for five minutes or more.
3. Remove the front cover.
4. Remove three screws fixing the rear cover of the control box and slowly open the rear cover.

A. In case of using with 3-phase 200V to 240V¥

- Changing the changeover connector
  Connect to 200V the 100/200V changeover connector of FLT p.c.b. ❶.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.

B. In case of using with single phase 100V to 120V

- Changing the changeover connector
  Connect to 100V the 100/200V changeover connector of FLT p.c.b. ❶.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.

(Caution) Securely perform the insulation treatment to the red terminal which is not used with insulation tape or the like. (When the insulation is insufficient, there is a danger of electric shock or leakage current.)

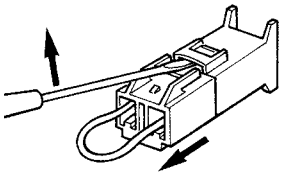
C. In case of using with single phase 200V to 240V

- Changing the changeover connector
  Connect to 200V the 100/200V changeover connector of FLT p.c.b. ❶.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.

(Caution) Securely perform the insulation treatment to the red terminal which is not used with insulation tape or the like. (When the insulation is insufficient, there is a danger of electric shock or leakage current.)

5. Check that the change has been performed without fail before closing the rear cover.
6. Be careful that the cord is not pinched between the rear cover and the control box main unit. Close the rear cover while pressing the lower side of rear cover, and tighten three screws.

[Point when inserting/drawing out the connector]



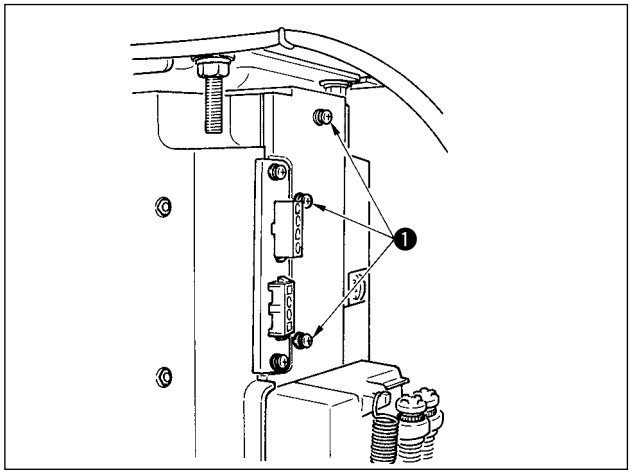
When it is difficult to remove the changeover connector, insert a small-sized screwdriver and press in the direction of the arrow as shown in the figure, and the connector can be removed with ease.

[In case of using the power switch for LA]

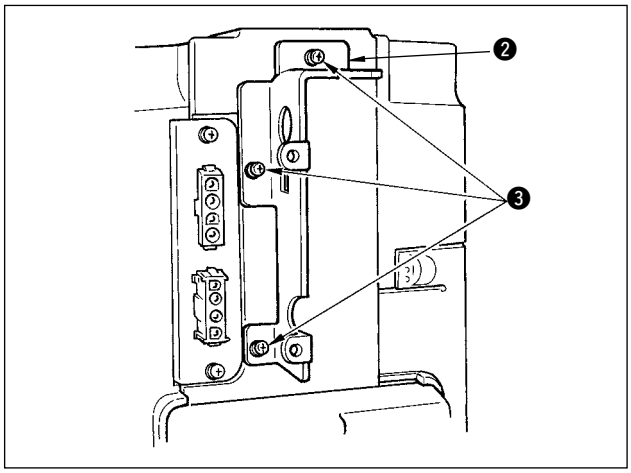
It is necessary to separately purchase the parts below.

JUKI Part No.	Description	Q'ty	Remarks
40012006	Set A for LA	1	For 3-phase 200 to 240V
40012007	Set B for LA	1	For single phase 100 to 120V

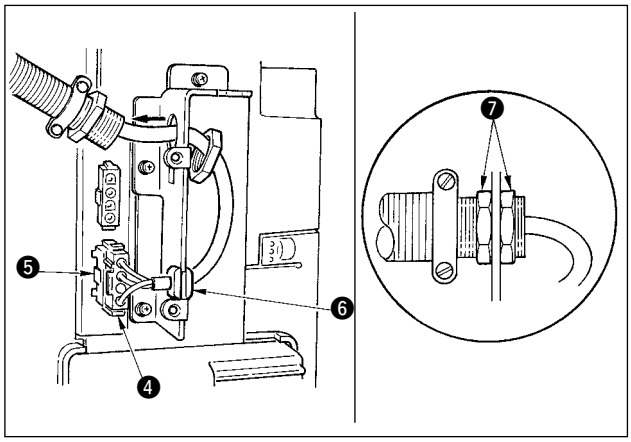
In addition, separately prepare the power switch for LA.



15) Remove three screws ❶ located on the side of the control box.



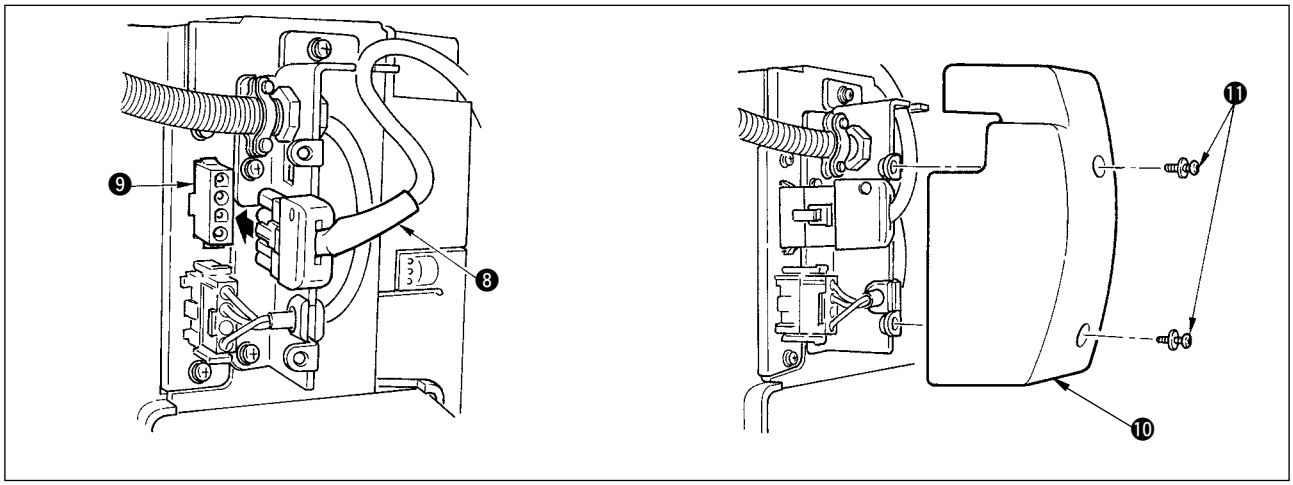
16) Tighten cover installing fittings ❷ to the control box main unit with three screws ❸ which have been removed in step 15).



17) Connect connector ❹ coming from the power source cord to lower connector ❺ after checking the direction.

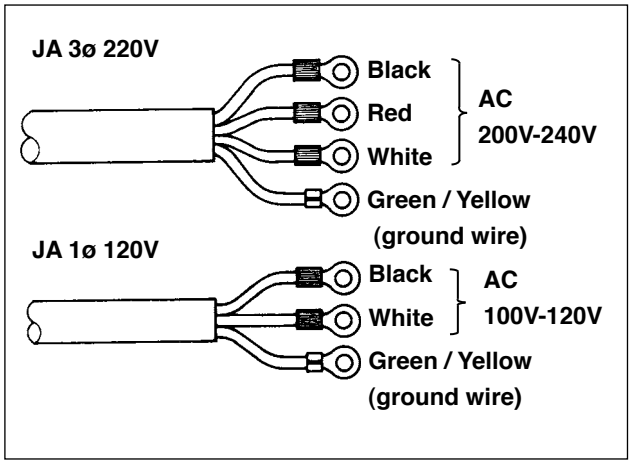
(Caution) Adjust rubber bush ❻ to the groove of installing plate and insert it.

18) Pass nut ❼ supplied with the power switch for LA through the power cord and insert the cord into the conduit (arrow mark).
Securely fix it to the installing fittings with nut ❼ from both sides.



19) Connect motor output cord ❽ to connector ❾ located on the side of the box.
Fix power source cover ❿ supplied with the unit using two screws ⓫ supplied with the unit.

(Caution) At this time, be careful so that the motor output cord is not caught by the power source cover and so that the cord enters the recess of the power source cover.



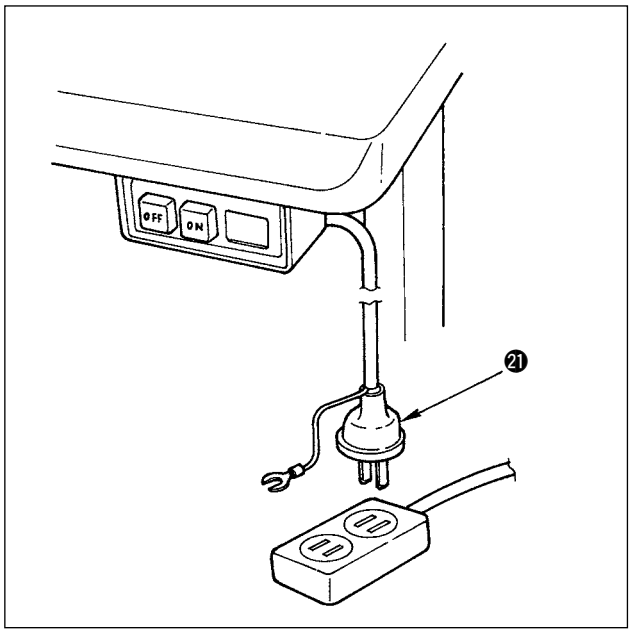
20) Installing power switch

Connect power supply cord to the power switch.

[JA specifications]

3-phase 220 V : Power supply cords : black, white, red and green/yellow (ground wire)

Single phase 120V : Power supply cords : black, white, and green/yellow (ground wire)



21) Make sure that the power switch is turned OFF and insert power supply cord ㉑ coming from the power switch into the power plug socket. (Illustration is for the japanese specification 100V type.)

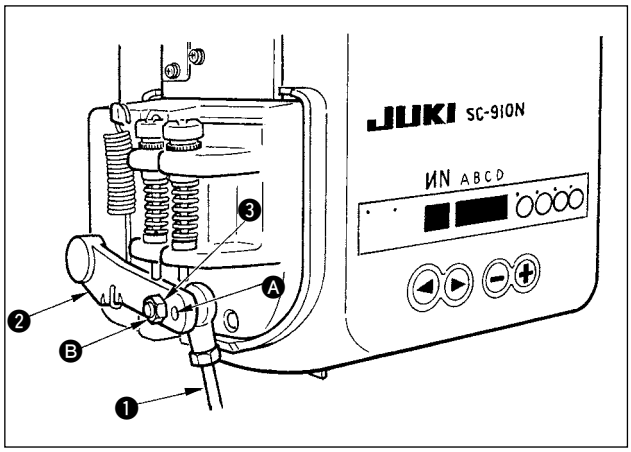
(Caution) 1. Top end of power supply cord ㉑ varies in accordance with destination or supply voltage. Check again the supply voltage and the voltage designated on the control box when installing the switch.

2. Prepare the power switch conformed to the safety standard.

3. Be sure to connect the ground wire (green / yellow).

6. 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.

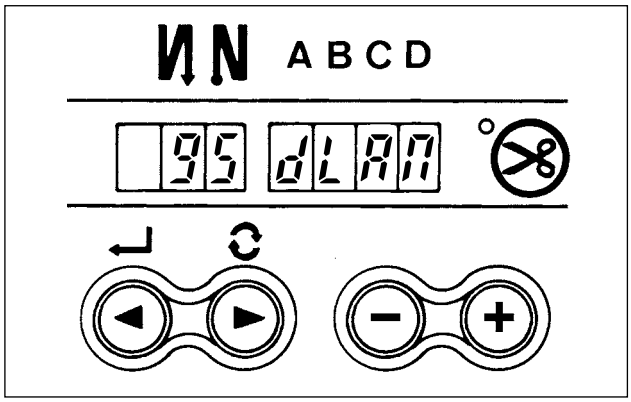


1) Fix connecting rod ❶ to installing hole Ⓑ of pedal lever ❷ with nut ❸.

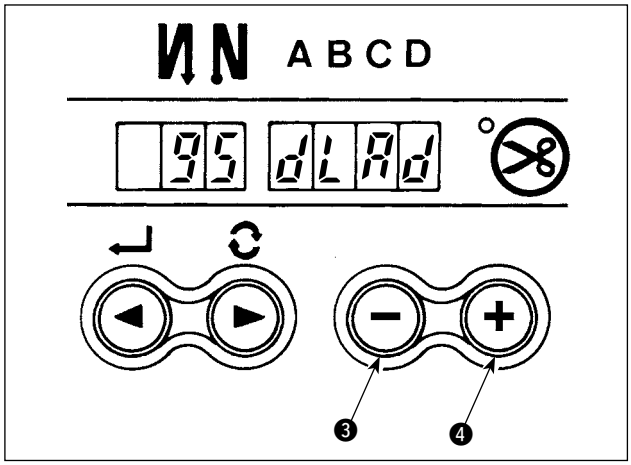
2) Installing connecting rod ❶ to installing hole Ⓐ will lengthen the pedal depressing stroke, and the pedal operation at a medium speed will be easier.

7. Setting procedure of the machine head

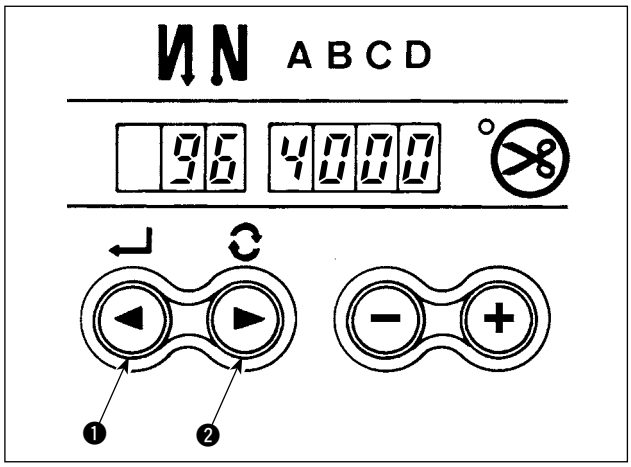
WARNING :
When the machine head other than DDL-9000A is used, the work of items 7, 8 and 9 is not necessary. The machine head is automatically selected by inserting the machine head connector.



1) Refer to **"Ⅲ-4. Setting for functions of SC-910N" p.22**, and call the function setting No. 95.



2) The type of machine head can be selected by pressing (−) switch ❸ ((+) switch ❹).

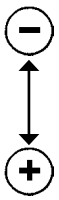


3) After selecting the type of machine head, by pressing (◄) switch ❶ ((►) switch ❷), the step proceeds to 96 or 94, and the display automatically changes to the contents of the setting corresponding with the type of machine head.

(Caution) When the type of machine head is changed, the contents which have been changed before return to the standard set values.

8. Machine head list

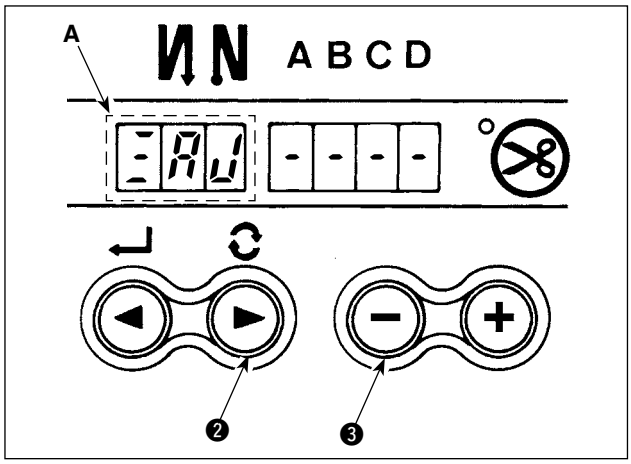
No.	Machine head	Contents of display	Number of revolutions at the time of delivery (rpm)	Max. number of revolutions (rpm)
1	DLM-5400	LM54	4000	4500
2	DLN-5410	Ln54	4000	5000
3	DLN-5410H	Ln5H	3500	4000
4	DMN-5420	Mn54	4000	5000
5	DLD-5430	Ld54	4000	4500
6	DLU-5490	LU90	4000	4500
7	DDL-5600B	dL6b	3700	4000
8	DDL-5550, DDL-8700	dL50	4000	5000
9	DDL-5550H	dL5H	3500	4000
10	DDL-5556	dL56	4000	4000
11	DLU-5494	LU94	3500	4000
12	DDL-5581	dL81	4000	5000
13	DDL-5571H	dL7H	3500	4000
14	DDL-5600J	dL6J	4000	4000
15	DDL-5600L, U, R	dL6L	3000	3000
16	DDL-5581S	dL85	2000	3500
17	DDL-5581M	dL8M	4000	4000
18	DDL-5550A	dL5A	4000	4000
19	DDL-5581A, K	dL8A	4000	4000
20	DDL-5571U	dL7U	3500	3500
21	DDL-5700	dL70	4000	4000
22	DDL-9000S	dL95	4000	5000
23	DDL-9000D	dL9d	4000	4000
24	DDL-9000H	dL9H	4000	4500
25	DLN-9010S	Ln95	4000	5000
26	DLN-9010H	Ln9H	3500	4000
27	DLN-9010J	Ln9J	3500	4000
* 28	DDL-9000A SS/MA/MS	dLAM	4000	5000
29	DDL-9000A DS	dLAd	4000	4000
30	DDL-9000A SH	dLAH	4000	4500
31	LH-3168	H368	3000	3000
32	LH-3178	H378	3000	3000
33	LH-3188	H388	3000	3000
34	LH-3128	H328	3000	3000
35	LH-2178	H278	4000	4000
36	LH-3162	H362	3000	3000
37	LH-3182	H382	3000	3000
38	LH-4128S	H425	3600	4000
39	LH-4128D	H42d	3000	3000
40	LH-4168	H465	3200	3200
41	LH-4168D	H46d	3000	3000
42	LH-4188	H488	3200	3200
43	LZ-2280	:280	4000	5000
44	LZ-2286	:286	4000	5000



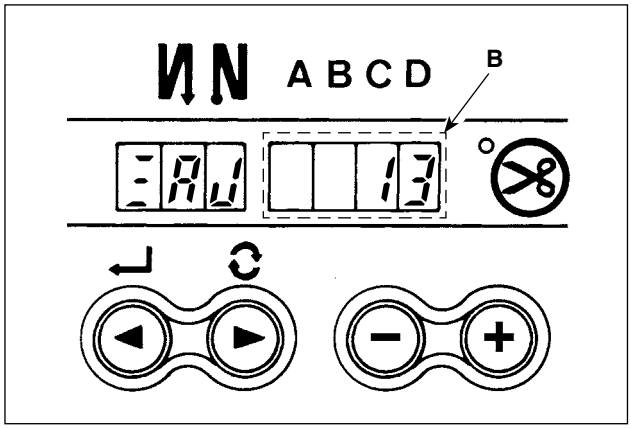
∗ **Machine head set at the time of delivery**

9. Adjusting the machine head (DDL-9000A only)

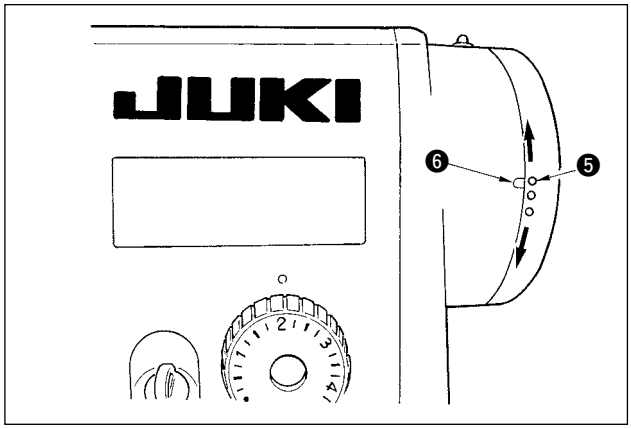
WARNING :
When the slip between the white marker dot on the handwheel and the concave of the cover is excessive after thread trimming, adjust the angle of the machine head by the operation below.



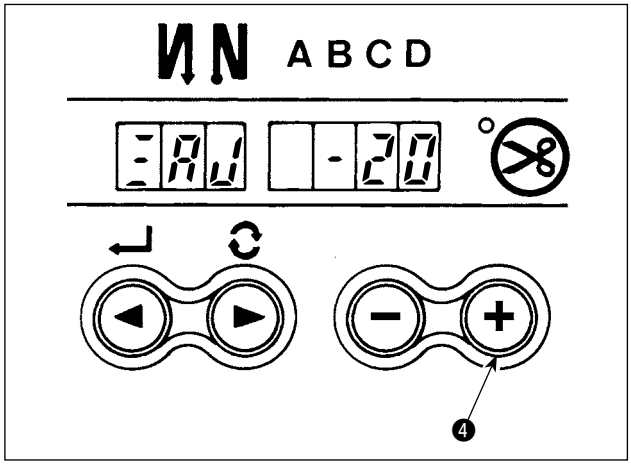
1) Simultaneously pressing ▶ switch ❷ and − switch ❸, turn ON the power switch.
2) -AU is displayed (**A**) in the indicator and the mode is changed over to the adjustment mode.



3) Turn the handwheel by hand and angle **B** is displayed in the indicator when the reference signal has been detected.
(The value is the reference value.)



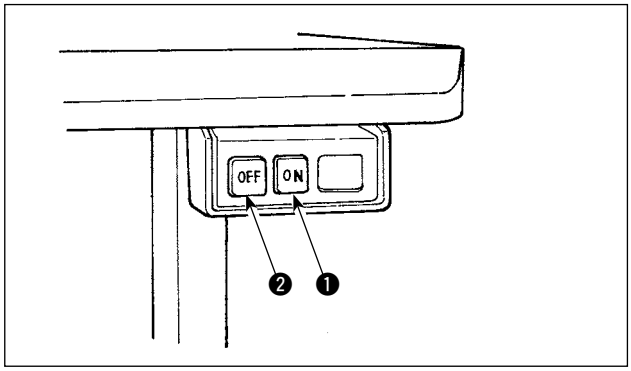
4) In this state, align the white dot ❺ of the handwheel with the concave ❻ of the pulley cover as shown in the figure.



5) Press + switch ❹ to finish the adjustment work.
(The value is the reference value.)

Ⅲ. FOR THE OPERATOR

1. Operating procedure of SC-910N

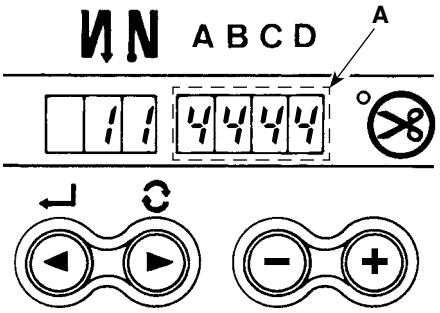


1) Press ON button ❶ of the power switch to turn ON the power.

(Caution) In case the power indication LED does not lights up even when turning ON the power switch,immediately turn OFF the power and check the voltage.
In addition, in such a case as this, return ON the power switch when 2 to 3 minutes or more have passed after turning OFF the power switch.
(When overvoltage is inputted, the protecting circuit works and re-turning in the state that the power is not completely turned OFF is not received.)

Display of power ON

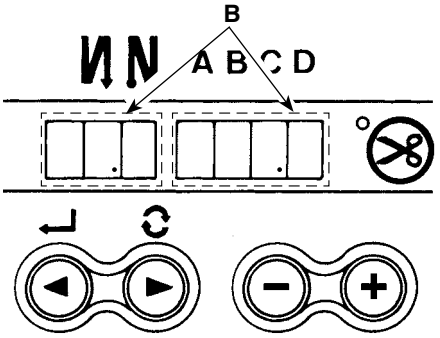
[When operation panel is not connected]



When operation panel (CP-170, and IP-110) is not used
LED of the display of reverse stitching or overlapped 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]

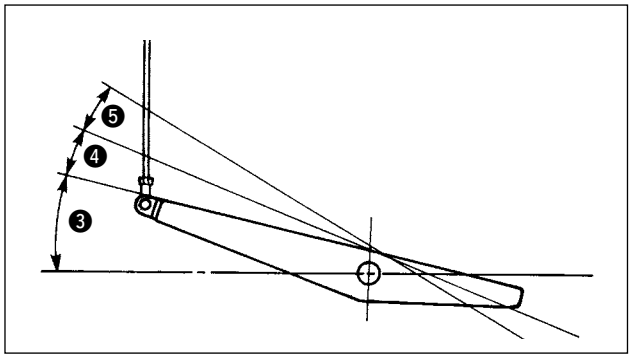


When operation panel (CP-170, and IP-110) is used
Power lamp of CP-170 or IP-110 lights up.
Two dots **B** of the number indicating window at the front cover of control box light up.

(Caution) When the buzzer continues sounding immediately 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.

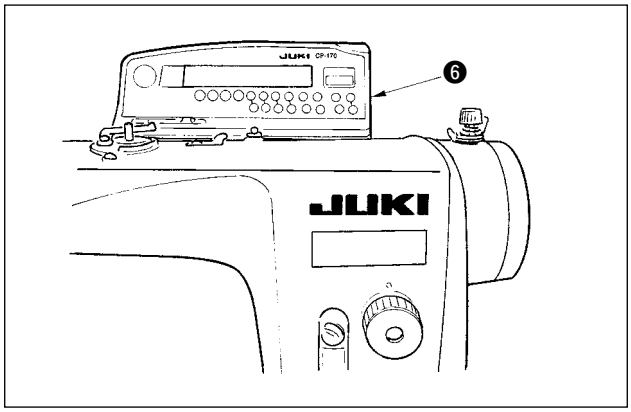
2) When the needle bar is not in UP position, it automatically turns to the UP position.

(Caution) When turning ON the power for the first time, there is the case where the timing is slightly retarded to perform the initialization work. When turning ON the power, the needle bar moves. Do not put your hands or things under the needle.

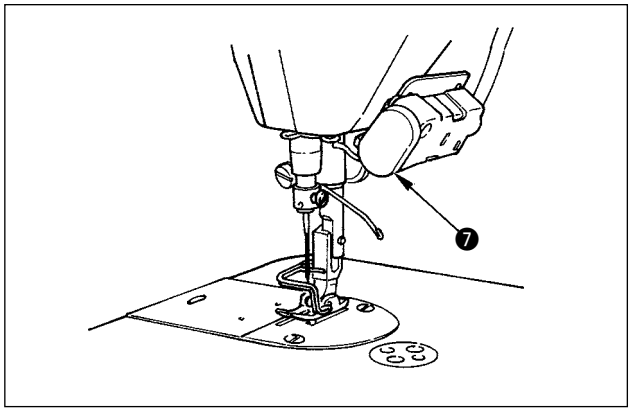


3) When depressing front part ❸ of the pedal, the sewing machine rotates at the number of revolutions in accordance with the depressing amount. When the pedal is returned to the neutral position, the sewing machine stops.
4) When lightly depressing back part ❹ of the pedal, the presser goes up. (PFL type only)
5) When strongly depressing back part ❺ of the pedal, thread trimming is performed.

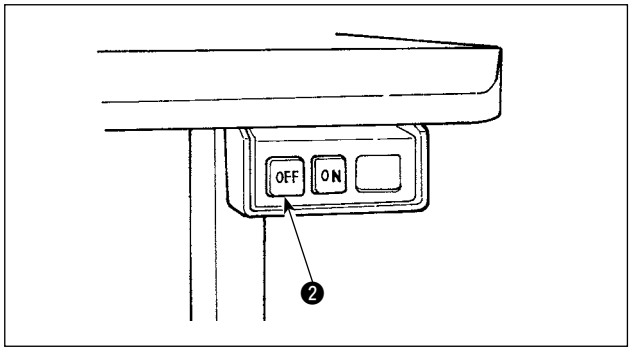
(Caution) For KFL and PFL types, thread trimming entering point is different from each other.



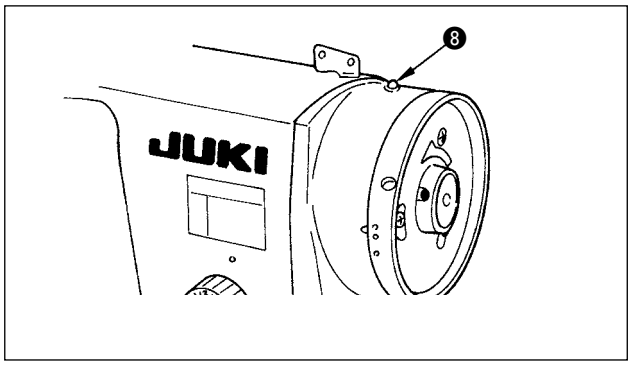
6) When operation panel ❻ is connected, various sewing patterns such as reverse feed stitching at sewing start, reverse feed stitching at sewing end, etc. can be set.
Refer to the Instruction Manual for the operation panel for the details.



7) When pressing touch-back switch ❼, reverse feed can be performed.

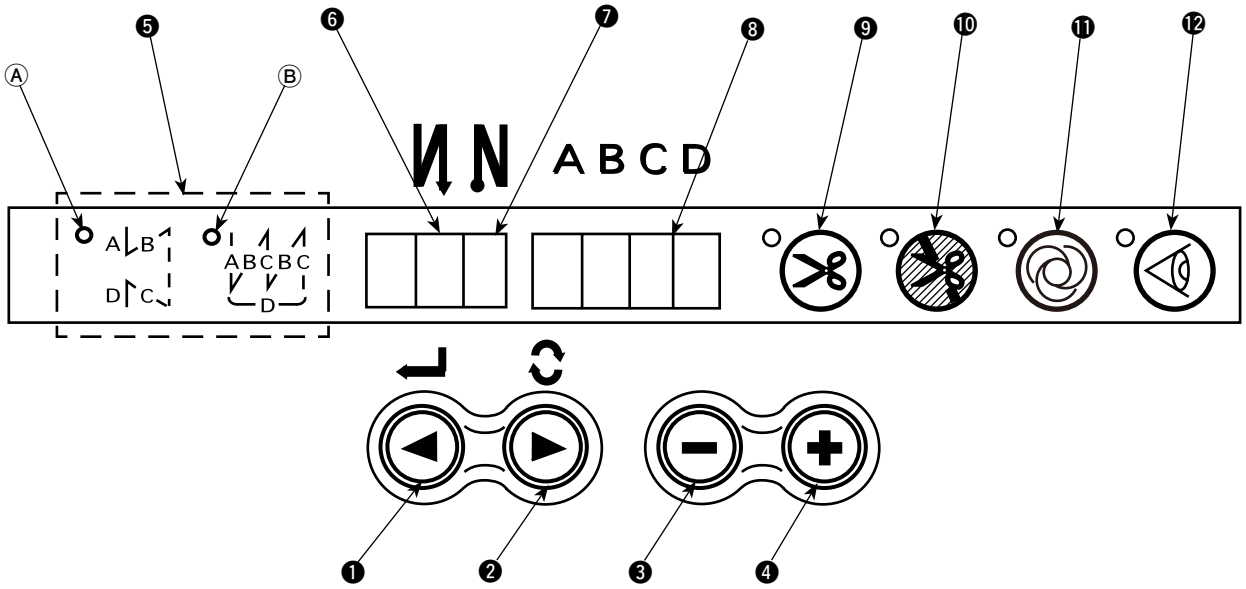


8) When sewing is completed, press OFF button ❷ of the power switch to turn OFF the power switch after confirming that the sewing machine has stopped.



(Power indication LED ❽ built in the machine head goes out in case of some machine heads.)

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 decrease.

❹ + switch : Used for changing the contents of the selected display (flashing section). When this switch is pressed, the contents of the display increase.

❺ PATTERN SELECTION display : The selected LED lamp lights up in case of Ⓐ reverse stitching LED and Ⓑ overlapped stitching.

❻ REVERSE STITCHING AT START display : Rendered effective when reverse stitching pattern is selected.
" - " Without reverse stitching display / " 1 " Reverse stitching display / " 11 " Double reverse stitching display

❼ REVERSE STITCHING AT END display : Rendered effective when reverse stitching pattern is selected.
" - " Without reverse stitching display / " 1 " Reverse stitching display / " 11 " Double reverse stitching display

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

❾ AUTOMATIC THREAD TRIMMING display : Lights up when the automatic thread trimming by depressing the front part of the pedal is selected.
(Lights up when the overlapped stitching is selected.)

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

⓫ ONE-SHOT AUTOMATIC STITCHING display : Lights up when the one-shot automatic stitching is selected.
(Lights up when the overlapped stitching is selected.)

⓬ MATERIAL END SENSOR display : Lights up when the material end sensor setting is selected.
Function setting No. 2

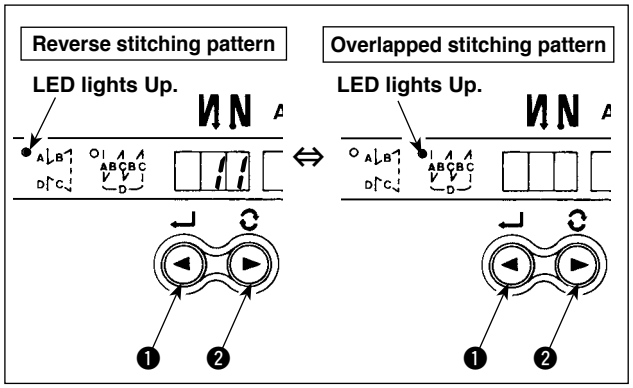
3. Operating procedure of the sewing pattern

(1) Reverse stitching pattern

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

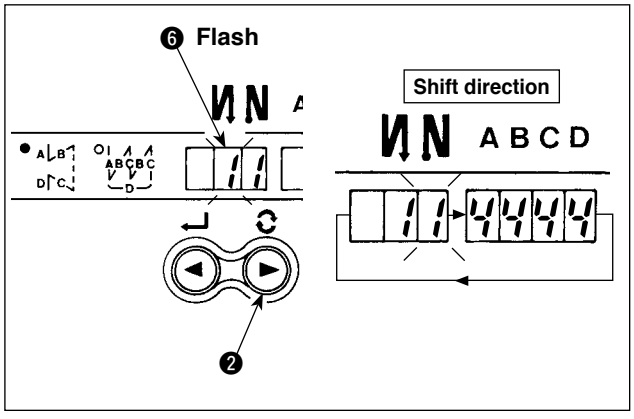
Reverse stitching patterns that can be set

Reverse stitching at start display	-	1	-	1	11	-	11	1	11
Sewing pattern									
Reverse stitching at end display	-	-	1	1	-	11	11	11	1



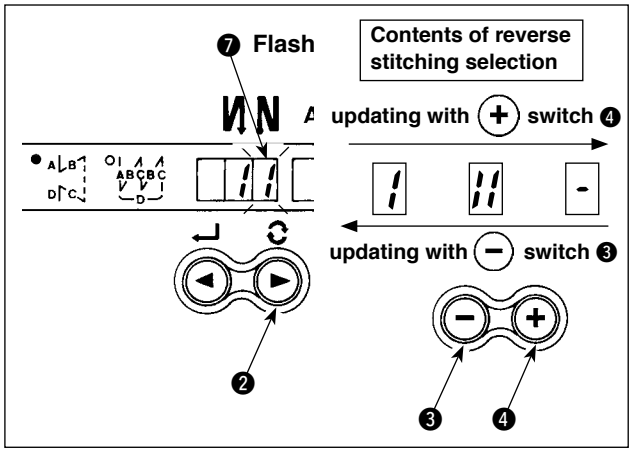
[Setting procedure of the reverse stitching]

1) Hold pressing ↻ / ► switch ❷, and press ↵ / ◄ switch ❶ to select the reverse stitching pattern.
(Every time ↵ / ◄ switch ❶ is pressed, reverse stitching pattern/overlapped stitching pattern change over alternately.)



2) Press ↻ / ► switch ❷ to make reverse stitching at start display ❻ flash on and off.
Every time ↻ / ◄ switch ❷ is pressed, the flashing position shifts in the right direction.

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



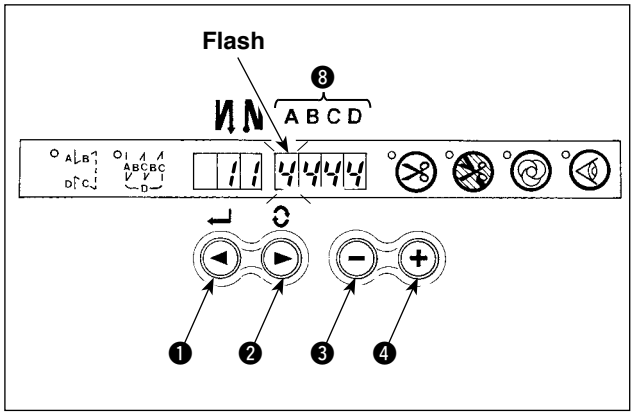
3) Press + switch ❹ or − switch ❸ and select the reverse stitching pattern. Reverse stitching patterns and displays are as follows.

1 : Reverse stitching

11 : Double reverse stitching

- : Without reverse stitching

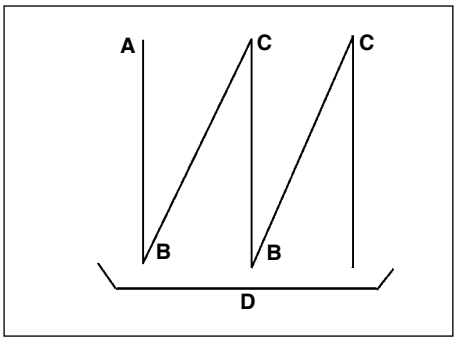
4) Press ↻ / ► switch ❷ to make reverse stitching at end display ❼ flash on and off, and set the pattern in the same way as step 3).



5) Press ↻ / ► switch ❷ 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 ❹ or − switch ❸ 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 ❶ to determine the contents of the setting. (Flashing stops.)

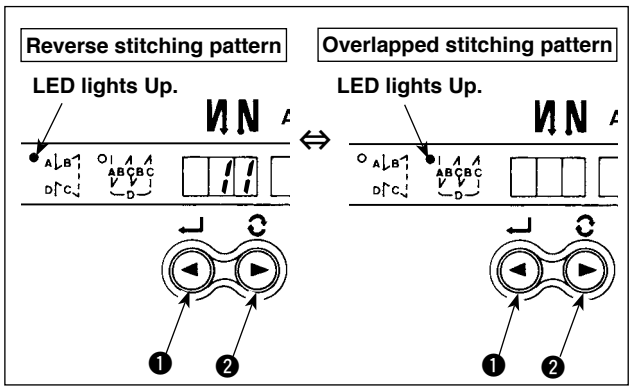
(2) Overlapped stitching pattern

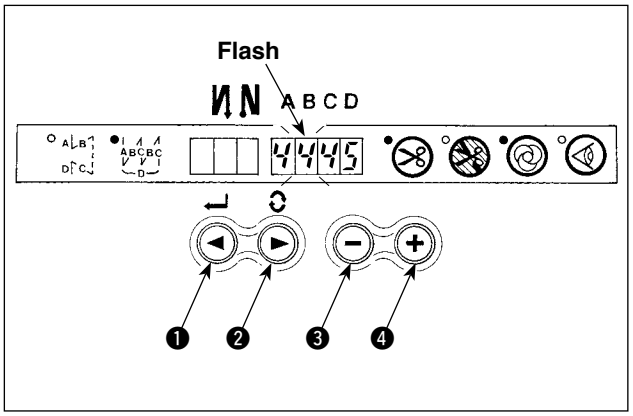
Overlapped stitching patterns below can be set by using the operation panel.



A : Number of stitches of normal stitching setting
0 to 15 (F) stitches
B : Number of stitches of reverse stitching setting
0 to 15 (F) stitches
C : Number of stitches of normal stitching setting
0 to 15 (F) 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.





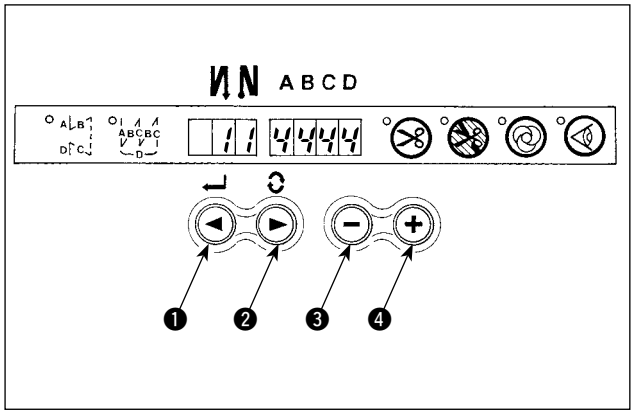
[Setting procedure of the overlapped stitching]

1) Hold pressing ↻ / ► switch ❷, and press ↵ / ◄ switch ❶ to select the overlapped stitching pattern.
   (Every time ↵ / ◄ switch ❶ 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 ❷ 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 ❹ or − switch ❸ to change the number of stitches.
5) When the setting of all processes has been completed, press ↵ / ◄ switch ❶ 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.

(3) Special setting

It is possible to change the set value in the front panel by directly moving to the function setting mode while the power is turned ON in addition to the normal function setting procedure.

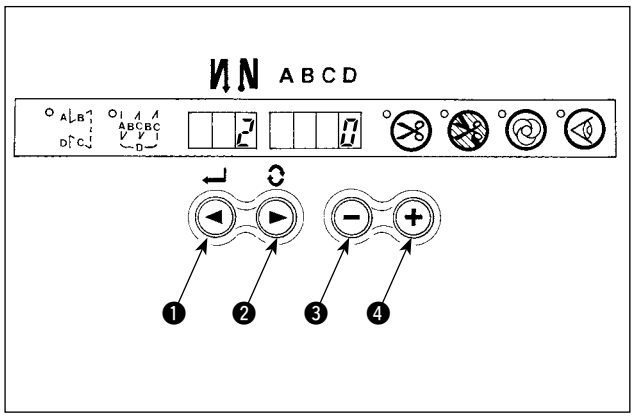


[Moving procedure to the function setting mode]

1) Hold pressing ↻ / ► switch ❷, and press + switch ❹ 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 ❶ and determine the contents of the setting.



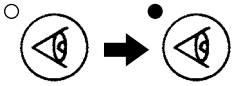
① Material end sensor function setting (Function setting No. 2)

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

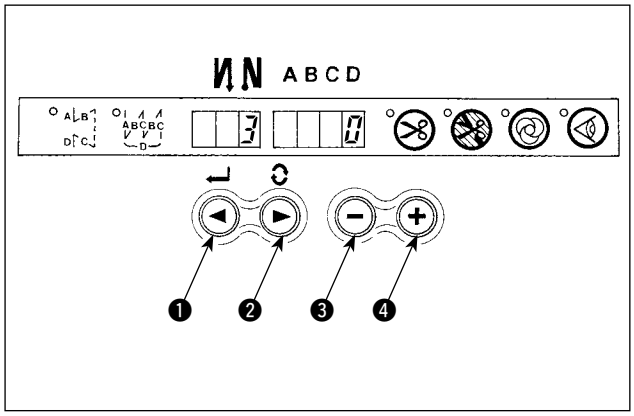
It is possible to change the set value with − switch ❸ or + switch ❹.

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.



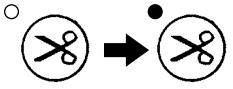
② Thread trimming operation after material end stop setting (Function setting No. 3)

Press ↻ / ► switch ❷ to advance to the function setting No. 3.

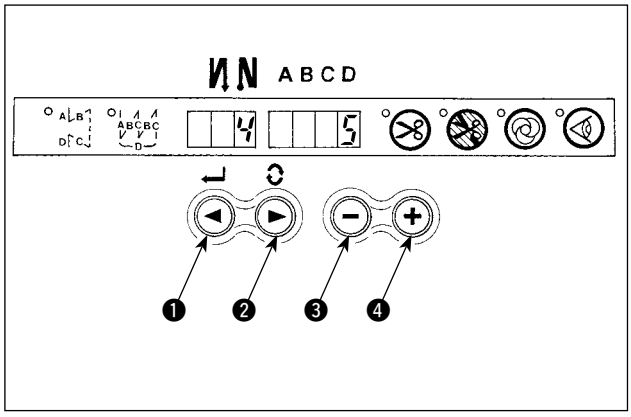
It is possible to change the set value with − switch ❸ or + switch ❹.

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.



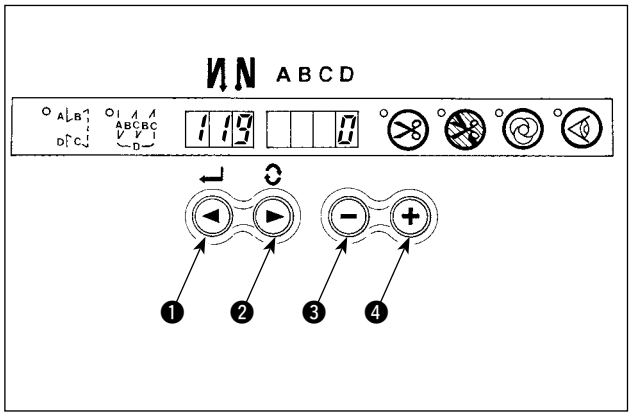
③ Number of stitches to stop the sewing machine after detection of material end setting (Function setting No. 4)

Press ↻ / ► switch ❷ 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. 119)

Press ↻ / ► switch ❷ to advance to the function setting No. 119.

It is possible to change the set value with ⊖ switch ❸ or ⊕ switch ❹.

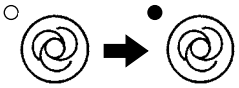
0 : Pedal designated speed is prior.

1 : Automatic operation

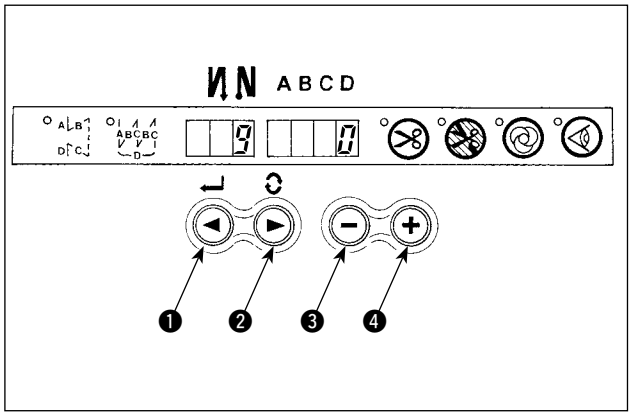
(Caution) It is rendered effective when the material end sensor function is set.

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.



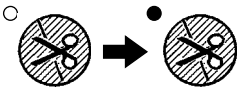
⑤ Thread trimming prohibition function setting (Function setting No. 9)

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

It is possible to change the set value with ⊖ switch ❸ or ⊕ switch ❹.

0 : Thread trimming is effective.

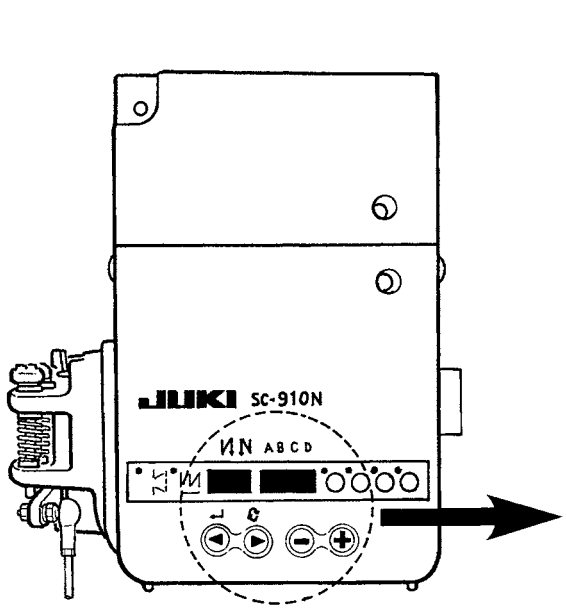
1 : Thread trimming is prohibited.

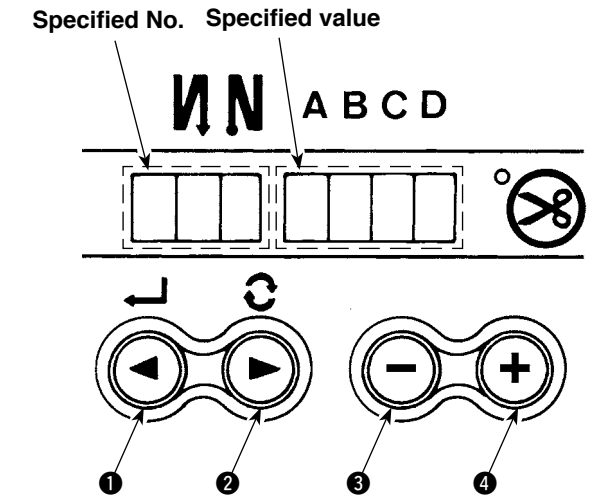


When "1" is selected, the thread trimming prohibition display lights up when the mode is returned to the normal one.

4. Setting for functions of SC-910N

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-910N.

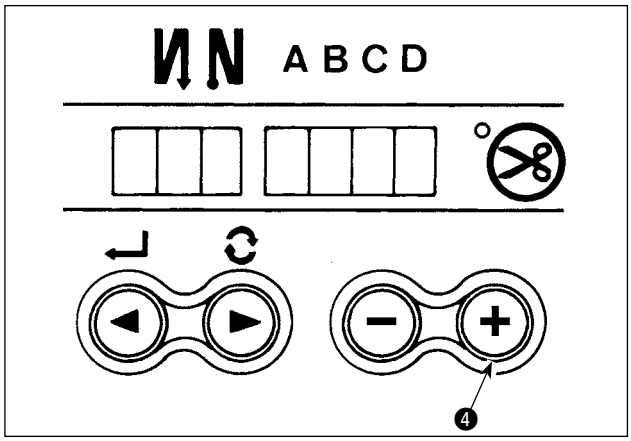




❶ Switch for entering specified value changed and updating setting No. in DOWN direction
❷ Switch for entering specified value changed and updating setting No. in UP direction
❸ Down switch (DOWN)
❹ Up switch (UP)

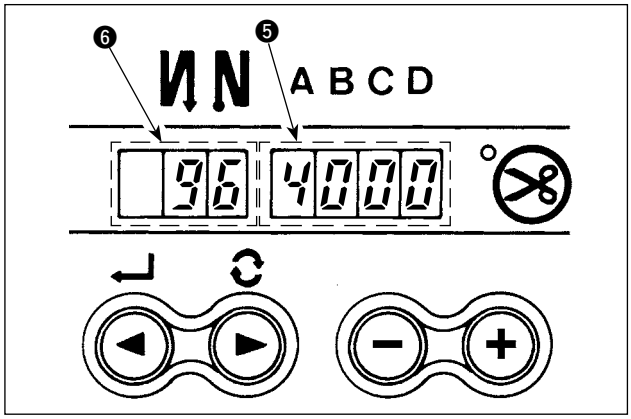
(Caution) • Do not perform switch operations other than those described in the following explanations.
• Be sure to re-turn the power switch ON after one second or more has passed. If the power is turned ON immediately after turning it OFF, the sewing machine may not work normally. In this case, turn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

WARNING :
To avoid possible personal injuries caused by movement other than that you desired, do not operate the switches in the procedure other than those required, as described below, to specify the functions.



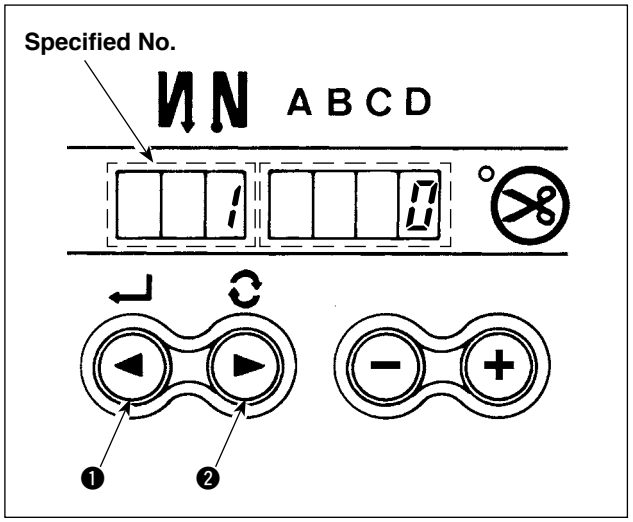
How to change over to the function setting mode

1) Turn OFF the power to the unit.
2) Pressing (+) switch ❹, turn ON the power to the unit.



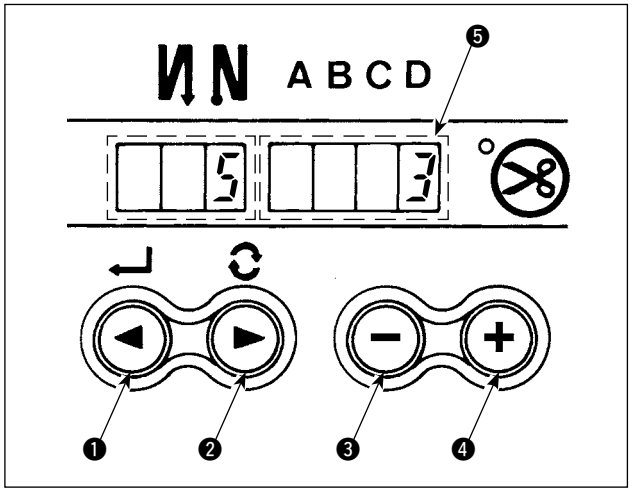
3) Indication ❺ and ❻ will be shown on the screen display.
(The indication item shows the item, the setting of which was changed the last time.)

* If the indication fails to change, re-perform the procedures 1) and 2).



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.

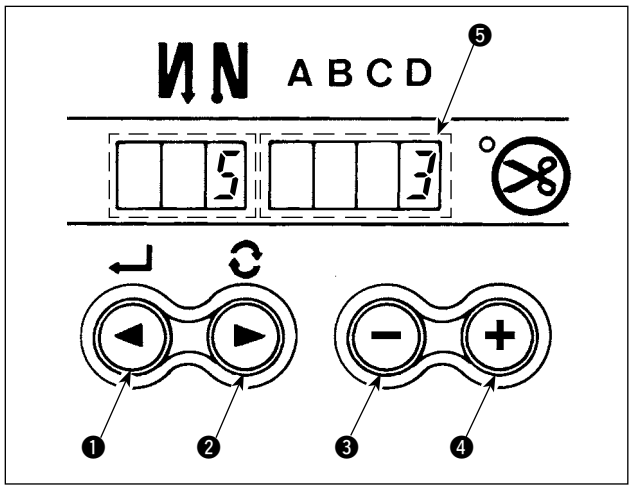
(Caution) When ↵/◄ switch ❶ (↻ / ► switch ❷) is held pressing, the setting No. will return (will advance) continuously. When the setting No. is advanced (returned), the contents which are before by one (after by one) will be determined. So, be careful when changing the contents (− + up/down switch is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



EXAMPLE) CHANGING THE FLICKER REDUCING FUNCTION (SETTING No. 5)

Press ↻ / ► switch ❷ several times to adjust set No. to "5". Press switch ❹ three times to change the set No. to "3" since the current set value is displayed on LED ❺. (Standard : "0")

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



5) When the change has been completed, press ↵ / ◄ switch ❶ or ↻ / ► switch 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.

* Simultaneously press − switch ❸ and + switch ❹, and the setting contents of set No. will return to the initial value.

5. 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**	31
	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**	
	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**	
	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**	
	5	Flicker reducing function	Flicker reducing function (If the hand lamp flickers). 0 : Flicker reducing function is not operative. 1 : Less effective → 8 : Highly effective	0 to 8	□□**5**□□□**0**	31
	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**	31
*	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****9****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**	31
	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**	31
	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**	31
	12	Optinal switch function selection	Switching of function of optional switch. 0 : No function 1 : Needle up/down compensating stitching 2 : Back compensating stitching 3 : Function of canceling once reverse feed stitching at the end of sewing 4 : Thread trimming function 5 : Presser foot lifting function 6 : One stitch compensating stitching 7 : Function of simultaneously canceling reverse feed stitching at the start and end of sewing 8 : Function of neutral presser foot lifting changeover	0 to 8	□**1****2**□□□**0**	32
*	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**	32
*	15	Number of times of detection of run-out of bobbin thread remaining amount	Number of times of detection of run-out of bobbin thread remaining amount 0 : Function of bobbin thread remaining amount is not operative. 1 to 19 : Number of times during which the signal is not made even if run-out of bobbin thread remaining amount is detected.	0 to 19	□**1****5**□□□**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 of DDL-9000A.) 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
*	18	Bird's nest prevention function	This function is effective in combination with the machine head with bird's nest prevention function (optional unit A is necessary). 0 : Bird's nest prevention function is not operative. 1 : Bird's nest prevention function is operative. 2 : Bird's nest prevention function is operative (with thread release).	0 to 2	18 0	32
*	19	Needle thread release function at the sewing start	This function is effective in combination with the machine head with bird's nest prevention function (optional unit A is necessary). 0 : Needle thread release function is not operative. 1 : Needle thread release function is operative.	0/1	19 0	32
	20	Number of condensation stitches	This function is effective in combination with the machine head with bird's nest prevention function (optional unit A is necessary). 0 : Condensation function is not operative. 1 to 9 : Number of condensation stitches	0 : Function OFF 1 to 9 stitches	20 0	32
	21	Function of neutral presser lifting	Function of lifting presser foot when the pedal is in neutral position. 0 : Function of neutral automatic presser lifting is not operative. 1 : Selection of function of neutral presser lifting.	0/1	21 0	33
	22	Function of changeover of compensating switch on the operation panel function	Function of needle up/down compensating switch on the operation panel can be changed. 0 : Needle up/down compensation 1 : One stitch compensation	0/1	22 0	33
*	24	Function of fine adjustment of number of rotation	Number of rotation can be compensated. Be sure to normally use this function with "0".	– 1.5% to 1.5% (0.1 %)	24 0	
	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	25 1	33
	26	Function of setting the holding force after stop	This function prevents the sewing machine from the reverse rotation after it has stopped. 0 : Initial value 1 : Less effective → 9 : Highly effective	0 to 9	26 0	33
	27	Function of setting the reaction force at the time of retry	This function sets the magnitude of return force of the needle bar before the retry motion. 1 : Less return force → 100 : High return force	1 to 100	27 50	33
*	28	Number of stitches of needle thread release	This function is effective in combination with the machine head with bird's nest prevention function (optional unit A is necessary). This function sets the number of stitches grasping thread at the sewing start. 0 to 30 stitches	0 to 30 (Stitches)	28 1	32
	29	Initial motion time of back-tack	This function sets the suction time of initial motion of back-tack solenoid. 50 ms to 300 ms	50 to 300 (ms)	29 250	34
	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	30 0	34
	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)	31 4	34
	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	32 0	34
	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	33 0	34
*	35	Number of rotation at a low speed	Lowest speed by pedal	20 to 400 (r.p.m.)	35 200	
*	36	Number of rotation of thread trimming	Thread trimming speed	20 to 250 (r.p.m.)	36 210	
	37	Number of rotation of soft-start	Sewing speed at the start of sewing (soft-start)	150 to 5500 (r.p.m.)	37 800	31

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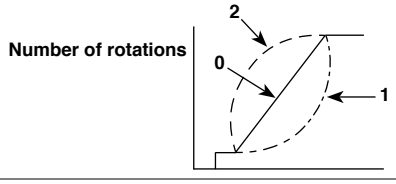
	No	Item	Description	Setting range	Indication of function setting	Ref. page
	38	One-shot speed	One-shot speed (The max. value depends on the number of rotation of the sewing machine head.)	200 to MAX (r.p.m.)	3 8 2 5 0 0	35
*	39	Pedal stroke at the start of rotation	Position where the sewing machine starts 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 machine 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	
*	46	Auto-lifter selecting function	Auto-lifter selection 0 : Solenoid drive system 1 : Pneumatic drive system	0/1	4 6 0	
*	47	Auto-lifter selecting function	Limitation time of waiting for lifting solenoid type auto-lifter device	10 to 600 (second)	4 7 6 0	35
*	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	Lowering time of presser foot	Lowering time of presser foot after the pedal has been depressed. (Start of rotation of the sewing machine is delayed during this time.)	0 to 250 (10 ms)	4 9 1 4 0	37
	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 – 1 8	35
	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 – 5	35
	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 – 5	35
	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	36
	56	Reverse revolution to lift the needle after thread trimming	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 0	36
	57	Bobbin thread remaining amount detection function	Function of detecting bobbin thread remaining amount at the time of (after thread trimming 0 : Not provided with the function of detecting bobbin thread remaining amount 1 : Provided with the function of detecting bobbin thread remaining amount	0/1	5 7 0	36
	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	0/1	5 8 0	36
	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	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 of DDL-9000A.) 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
	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	37
	61	Function of starting prohibition of the sewing machine by detection of bobbin thread remaining amount	Function of starting prohibition of the sewing machine by detection of bobbin thread remaining amount 0 : This function does not stop the sewing machine when counting is out (-1 or less). 1 : This function stops the sewing machine when counting is out (-1 or less).	0/1	6 1 1	36
*	64	Change-over speed of condensation stitch or EBT (end back tack)	Initial speed when starting condensation stitch or EBT	0 to 250 (r.p.m.)	6 4 1 8 0	
*	65	On-timing of solenoid for condensation stitch (when condensation stitch is performed by 1 stitch.)	Starting (compensation) timing of solenoid for compensation stitch : -1 Compensation value of starting the solenoid when condensation stitch is performed by 1 stitch.	– 36 to 0 (10°)	6 5 – 1 5	32
*	66	On-timing of solenoid for condensation stitch (when condensation stitch is performed by 2 stitches.)	Starting (compensation) timing of solenoid for condensation stitch : -2 Compensation value of starting the solenoid when condensation stitch is performed by 2 stitches.	– 36 to 0 (10°)	6 6 – 1 5	32
	67	Presser foot lifting solenoid output duty setting	Duty of presser foot lifting solenoid output	5 to 40	6 7 2 0	37
	68	Separately driven needle changeover speed-up function	Speed of separately driven needle changeover is set to high-speed. 0 : Standard 1 : High-speed	0/1	6 8 0	
○	70	Function of soft-down of presser foot	Presser foot is slowly lowered. 0 : Presser foot is rapidly lowered. 1 : Presser foot is slowly lowered.	0/1	7 0 0	37
	71	Function of limitation of re-acceleration from reduction of speed	Speed limitation is performed at the time of re-acceleration on the way of reducing speed of the sewing machine. It is effective when operating inching sewing.	0 to 5	7 1 0	37
	72	Function of limitation of acceleration at the start of rotation	Speed limitation is performed at the time of start-up of the sewing machine (excluding the start of sewing). It is effective when operating inching sewing.	0 to 5	7 2 0	37
	73	Retry function	This function is used when needle cannot pierce materials . 0 : Normal 1 : Retry function is provided.	0/1	7 3 1	38
*	75	Rotating direction of motor	Normal rotating direction of motor 0 : Clockwise 1 : Counterclockwise	0/1	7 5 0	
	76	Function to select the start-up speed of the sewing machine	Starting curve of the sewing machine is selected. 0 : Normal curve 1 : More sharp curve	0/1	7 6 0	38
	84	Initial motion suction time of presser foot lifting solenoid	Suction motion time of presser foot lifting solenoid	40 to 300 (ms)	8 4 1 0 0	38
	87	Function of pedal curve selection	Pedal curve is selected. (Improving pedal inching operation)  	0/1/2	8 7 0	38

* **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 of DDL-9000A.) However, contents of function setting are subject to change for improvement of function and performance without notice.**

Items with ○ mark are displayed when the machine heads of LH-4168, LH-4168D and LH-4188 are selected.

	No	Item	Description	Setting range	Indication of function setting	Ref. page
*	89	Tension release function	This function is effective in combination with the machine head with bird's nest prevention function (Optional unit A is necessary). 0 : Motion is prohibited. 1 : Motion of thread draw-out/return solenoid is prohibited.	0/1	8 9 0	32
	90	Initial motion up stop function	Automatic UP stop function is set immediately after turning ON the power. 0 : off 1 : on	0/1	9 0 1	38
*	91	Function of prohibiting compensation operation after turning handwheel by hand	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	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	38
	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)	0/1	9 3 0	38
	94	Continuous stitching + one-shot stitching non-stop function	In IP-110 program functions, a function that does not stop the sewing machine by combining continuous stitching with one-shot stitching when the step is changed. 0 : Normal (The sewing machine stops when a step is completed.) 1 : The sewing machine does not stop when a step is completed and proceeds to next step.	0/1	9 4 0	39
	95	Head selection function	Machine head to be used is selected. * When the machine head is changed, each setting item is changed to the initial value of the machine head.		9 5 d L A ∩	13
	96	Max. number of rotation setting	Max. number of rotation of the sewing machine head can be set.	50 to MAX (rpm)	9 6 4 0 0 0	39
*	100	Number of stitches of tension release motion at the sewing start	This function is effective in combination with the machine head with bird's nest prevention function. (Optional unit A is necessary). This function sets the number of stitches to make the tension release solenoid actuate at the sewing start. 0 : Tension release motion is prohibited. 1 to 2 stitches : Number of stitches of tension release motion	0 to 9	1 0 0 0	32
	101	Sewing counter input function	This function selects the input destination of the sewing counter. 0 : Every time thread trimming is performed, the counter automatically counts up. 1 : The counter counts up by inputting of the external sewing counter SW	0/1	1 0 1 0	39
○	105	Touch back switch needle up/down compensating stitching function	When connecting IP-110 and selecting the corner pattern, this function performs compensating stitching during sewing in-corner with the touch back switch. 0 : Touch back switch compensating stitching is invalid. 1 : Touch back switch compensating stitching is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 0 5 0	
○	106	Presser lifting switch one stitch compensating function	When connecting IP-110 and selecting the corner pattern, this function performs compensating stitching during sewing in-corner with the presser lifting switch. 0 : Presser lifting switch compensating stitching is invalid. 1 : Presser lifting switch compensating stitching is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head. * When using this function, set the presser lifting switch function selection (No. 117) to "0" (function invalid).	0/1	1 0 6 1	
○	107	In-corner sewing one-shot function	When connecting IP-110 and selecting the corner pattern, this function performs one-shot automatic sewing of in-corner sewing. 0 : One-shot automatic sewing of in-corner sewing is invalid. 1 : One-shot automatic sewing of in-corner sewing is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 0 7 0	
○	108	In-corner presser lifting function	When connecting IP-110 and selecting the corner pattern, this function performs automatic presser lifting after completion of the in-corner sewing. 0 : Automatic presser lifting after in-corner sewing is invalid. 1 : Automatic presser lifting after in-corner sewing is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head. * This function is valid only when the automatic presser lifting device (AK) is connected.	0/1	1 0 8 1	
○	109	Resewing function	When connecting IP-110, this function stops/uses resewing (resewing from a point on the way). 0 : Resewing function is invalid. 1 : Resewing function is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 0 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 of DDL-9000A.) However, contents of function setting are subject to change for improvement of function and performance without notice.**

Items with ○ mark are displayed when the machine heads of LH-4168, LH-4168D and LH-4188 are selected.

	No	Item	Description	Setting range	Indication of function setting	Ref. page
○	110	Separately driven needle changeover function (free stitching/ overlapped stitching)	When selecting reverse stitching pattern/overlapped stitching pattern, this function stops/uses the separately driven needle changeover function. When "0" (invalid) is selected, the separately driven needle changeover is not possible with reverse stitching pattern/overlapped stitching pattern. 0 : Separately driven needle changeover function (during free stitching) is invalid. 1 : Separately driven needle changeover function (during free stitching) is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 1 0 □ □ □ 1	
○	111	Separately driven needle changeover function (corner pattern)	When connecting IP-110 and selecting the corner pattern, this function stops/uses the separately driven needle changeover function. When "0" is selected, it is not possible to optionally perform the separately driven needle changeover with the corner pattern. 0 : Separately driven needle changeover (during corner pattern) is invalid. 1 : Separately driven needle changeover (during corner pattern) is valid. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 1 1 □ □ □ 1	
○	112	Teaching motion selection	Selection of the motion when pressing the teaching switch 0 : Normal : teaching motion with teaching + separately driven needle changeover) 1 : Teaching motion with separately driven needle changeover only (when starting teaching motion, it is not necessary to press the teaching switch.) 2 : Teaching motion in the state of separately driven needle is prohibited. (Set the state to two-needle state and press the teaching switch.) * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0 to 2	1 1 2 □ □ □ 0	
○	113	Number of stitches of teaching replay	This function selects the number of stitches of replay when performing corner teaching (measurement of number of stitches of separately driven needle sewing). 0 : Number of stitches of replay corresponds to that of measurement. 1 : Number of stitches of replay is that which is subtracted one stitch from number of stitches of measurement. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 1 3 □ □ □ 0	
○	114	Left bobbin thread counter function	When connecting IP-110, this function stops/uses left bobbin thread counter function. 0 : Left bobbin thread counter is stopped. 1 : Left bobbin thread counter is used. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 1 4 □ □ □ 1	
○	115	Right bobbin thread counter function	When connecting IP-110, this function stops/uses right bobbin thread counter function. 0 : Right bobbin thread counter is stopped. 1 : Right bobbin thread counter is used. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0/1	1 1 5 □ □ □ 1	
○	116	Corner teaching start switch selection	When connecting IP-110, this function selects the switch to start in-corner sewing in the corner pattern sewing. 0 : No function 1 : Left needle changeover switch 2 : Right needle changeover switch 3 : Teaching switch 4 : Optional switch 5 : Knee switch and presser lifting switch 6 : No function (Do not set.) * When selecting 1 : Left needle changeover switch, 2 : Right needle changeover switch or 3 : Teaching switch for in-corner changeover switch, be sure to set No. 111 Separately driven needle changeover function (corner pattern) to "0" (function invalid). * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head.	0 to 6	1 1 6 □ □ □ 5	

*** 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 of DDL-9000A.)
However, contents of function setting are subject to change for improvement of function and performance without notice.

Items with ○ mark are displayed when the machine heads of LH-4168, LH-4168D and LH-4188 are selected.

	No	Item	Description	Setting range	Indication of function setting	Ref. page
○	117	Presser lifting switch function selection	When connecting knee switch, this function selects stop/use of automatic presser lifting function by knee switch. 0 : Automatic presser lifting by knee switch is stopped 1 : Automatic presser lifting by knee switch is used. * It is possible to set only when LH-4168 or LH-4188 is selected for the machine head. * When using this function, set the presser lifting switch one stitch compensating function (No. 106) to "0" (function invalid).	0/1	1 1 7 □ □ □ 0	
○	118	Grease-up error release	When grease-up error (E220 or E221) has occurred, the error is released by setting the value to 1. 0 : Normal state 1 : Grease-up error is released when turning ON the power next time. (This function is also released after releasing grease-up error.) * When releasing grease-up error, be sure to execute grease-up. * It is possible to set only to the machine heads that require grease-up (LH-4100 and some of LH-3500 series).	0/1	1 1 8 □ □ □ 0	
	120	Main shaft reference angle compensation	Main shaft reference angle is compensated.	–35 to 35	1 2 0 – □ 2 1	39
	121	Up position starting angle compensation	Angle to detect UP position starting is compensated.	–15 to 15	1 2 1 □ □ □ 2	39
	122	DOWN position starting angle compensation	Angle to detect DOWN position starting is compensated.	–15 to 15	1 2 2 □ □ □ 0	39

* **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 of DDL-9000A.) However, contents of function setting are subject to change for improvement of function and performance without notice.**

Items with ○ mark are displayed when the machine heads of LH-4168, LH-4168D and LH-4188 are selected.

6. 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**□**8****0****0**

Data setting range
150 to 5,500 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 control panel 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 8

0 : Flicker reducing function does not work.
to
8 : 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 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.

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 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.

(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 **Optional switch function selection (Function setting No. 12) : It is used only when it is combined with the machine head provided with the optional switch.**

Functions to be assigned to the optional switch can be selected from the following functions.

□ 1 2 □ □ □ 0

0 : No function (Standard setting)

1 : 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 : Back compensating stitching : Reverse feed stitching is performed at low speed while the switch is held pressing. (It is effective only when constant dimension sewing pattern is selected.)

3 : 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 : Thread trimming function : This function is actuated as the thread trimming switch.

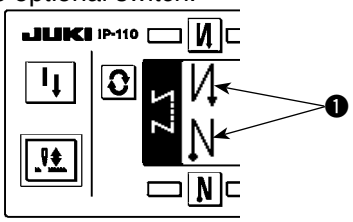
5 : Presser foot lifting function : This function is actuated as the foot lifter switch.

6 : One stitch compensating stitching : Every time the switch is pressed, one stitch stitching operation is executed.

7 : Function of simultaneously canceling reverse feed stitching at the start and end of sewing : By operating the optional switch, ineffective/effective can be alternately changed over.

8 : Function of neutral presser foot lifting changeover : ON/OFF can be changed over alternately by operating the optional switch.

(Note) Indication ❶ of reverse feed stitching at the start and end of sewing on the operation panel is the same even when the function is canceled. So, be careful.



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 IP-110 control panel. Refer to the explanation of the control panel.

□ 1 4 □ □ □ 1

1 : on Sewing counting function is operative.

0 : off Sewing counting function is inoperative.
(Indication on the IP-110 control panel will go out as well.)

⑩ **Bird's nest prevention function (Function setting No. 18 to 20, 28, 65, 66, 89, 100)**

This function prevents the thread from being entangled at the sewing start. This function is used only when it is combined with the sewing machine head with bird's nest prevention specifications.

(When using this function, the optional unit A is necessary.)

❶ Bird's nest prevention function (Function setting No. 18)

□ 1 8 □ □ □ 0

1 : Bird's nest prevention function is effective.

0 : Bird's nest prevention function is ineffective.

2 : Bird's nest prevention function is effective.
(Thread release is effective.)

Setting of function setting Nos. 19 to 20, 28, 65, 66, 89 and 100 becomes ineffective.

❷ Needle thread release function at the sewing start (Function setting No. 19)

□ 1 9 □ □ □ 0

0 : Not provided with needle thread release function at the sewing start (Normal)

1 : Provided with needle thread release function at the sewing start

❸ Number of condensation stitches at the sewing start (Function setting No. 20)

Number of condensation stitches at the sewing end can be set.

□ 2 0 □ □ □ 0

Setting range

1 to 9 stitches

0 : Condensation function is ineffective.

❹ On-timing of solenoid for condensation stitch (when condensation stitch is performed by 1 stitch.) (Function setting No. 65)

Starting timing of solenoid for condensation of 1 stitch can be corrected by angle at the unit of 10˚.

□ 6 5 – □ 1 5 Adjusting range
– 36 to 0 <1 / 10˚>

❺ On-timing of solenoid for condensation stitch (when condensation stitches are performed by 2 stitches or more.) (Function setting No. 66)

Starting time of solenoid for condensation of 2 stitches or more can be corrected by angle at the unit of 10˚.

□ 6 6 – □ 1 5 Adjusting range
– 36 to 0 <1 / 10˚>

❻ Needle thread release function (Function setting No. 28)

This function sets the number of stitches until the clamped needle thread is held after the start of sewing

□ 2 8 □ □ □ 1 Setting range : 0 to 30 stitches

❼ Thread draw-out/return solenoid (Function setting No. 89)

This function sets whether the motion of draw-out/return solenoid (LZ) is performed or prohibited.

□ 8 9 □ □ □ 0 0 : Motion is ineffective.
1 : Function is effective.

❽ Number of stitches of tension release motion at the sewing start (Function setting No. 100)

This function sets the number of stitches to make the tension release solenoid actuate at the sewing start.

1 0 0 □ □ □ 0 Setting range : 0 to 9 stitches

⑪ **Neutral automatic presser lifting function (with AK device only) (Functionsetting 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

⑫ **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-170 or IP-110 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

⑬ **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.

⑭ **Function of setting the holding force after stop (Function setting No. 26)**

Function to prevent the increased amount of reverse rotation after stop when the machine has been used for a long time and the machine head torque has become light. When the set value is increased, the prevention effect becomes large. However, when the set value is excessively increased, on the contrary, there is a danger that the machine normally rotates. Adjust the function while checking the motion of the needle bar.

□ 2 6 □ □ □ 0 Setting range : 0 to 9

⑮ **Function of setting the reaction force at the time of retry (Function setting No. 27)**

This function changes the magnitude of the reversing force before moving to the retry motion.

□ 2 7 □ □ 5 0 Setting range : 1 to 100
1 : Less reversing force to 100 : More reversing force

⑯ **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 300 ms <10 / ms>

⑰ **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

□ 3 2 □ □ □ 0

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

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	
❶	0	0 or 1	0 or 1	It works as normal touch-back switch.
❷	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.
❸	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.
❹	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.
❺	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.

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

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

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

❹ 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.)

❺ 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.)

⑱ **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 2 5 0 0

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

(Caution) 1. Setting of the one-shot stitching is made by the control panel of the CP170.
2. The max. number of rotation of one-shot stitching is limited by the model of the sewing machine head.

⑲ **Holding time of lifting presser foot (Function setting No. 47)**

Solenoid type presser foot lifter (No. 46 0) 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 (No. 46 1) 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>

⑳ **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.

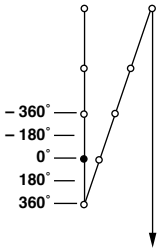
❶ Compensation of on-timing of solenoid for reverse feed stitching at the start of sewing (Function setting No. 51)

On-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

□ 5 1 – □ 1 8

Adjusting range
– 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of stitches 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.**

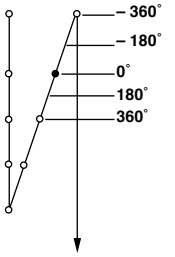
❷ Compensation of off-timing of solenoid for reverse feed stitching at the start of sewing (Function setting No. 52)

Off-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

□ 5 2 – □ □ 5

Adjusting range
– 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of stitches of compensation
− 36	− 360 ˚	− 1
− 18	− 180 ˚	− 0.5
0	0 ˚	0
18	180 ˚	0.5
36	360 ˚	1



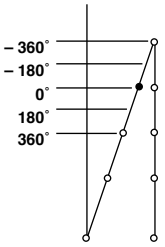
❸ Compensation of off-timing of solenoid for reverse feed stitching at the end of sewing (Function setting No. 53)

Off-timing of solenoid for reverse feed stitching at the start of sewing can be compensated by the unit of angle.

□ 5 3 – □ □ 5

Adjusting range
– 36 to 36 <1 / 10˚>

Set value	Compensation angle	Number of stitches of compensation
− 36	− 360 ˚	− 1
− 18	− 180 ˚	− 0.5
0	0 ˚	0
18	180 ˚	0.5
36	360 ˚	1



㉑ **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.)

㉒ **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 □ □ □ 0

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.

㉓ **Bobbin thread remaining amount detection function (Function setting No. 57, No. 61)**

This function detects the amount of the bobbin thread used and informs of the time of replacement of the bobbin.

This function is used when the bobbin thread remaining amount detection device (AE) is attached.

As for the details, refer to the instruction manual for the bobbin thread remaining amount detection device.

□ 5 7 □ □ □ 0

(Caution) Be sure to set the setting No. 57 to ineffective (“0”) when the AE device is not attached. (“E43” is displayed, and the sewing machine is not actuated.)

㉔ **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.

□ 5 8 □ □ □ 0

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

㉕ **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 □ □ □ 0

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.

㉖ **Function of stop immediately after the reverse feed stitching at the start of sewing (Function setting No. 60)**

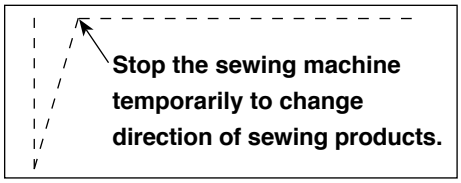
This function temporarily stops the sewing machine even when keeping depressing the front part of the pedal at the time of completion of process of reverse feed stitching at the start of sewing.

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

□ 6 0 □ □ □ 0

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

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



㉗ **Presser foot lifting solenoid output duty setting (Function setting No. 67)**

Output duty of presser foot lifting solenoid can be changed. When heating is great, it is effective to lessen the value.

(Caution) When the value is excessively small, malfunction will be caused. So, be careful when changing the value.

□ 6 7 □ □ 2 0 Setting range : 5 to 40% <5%>

㉘ **Function of soft-down of presser foot (with AK device only) (Function setting Nos. 70 and 49)**

This function can softly lower the presser foot.

This function can be used when it is necessary to decrease contact noise, cloth defect, or slippage of cloth at the time of lowering the presser foot.

Note : Change the time of function setting No. 49 together at the time of selecting the function of soft-down since the sufficient effect cannot be obtained unless the time of function setting No. 49 is set longer when lowering the presser foot by depressing the pedal.

□ 4 9 □ 1 4 0 0 to 250 ms
10 ms/Step

□ 7 0 □ □ □ 0 0 : Function of soft-down of presser foot is not operative. (Presser foot is rapidly lowered.)

1 : Selection of function of soft-down of presser foot

㉙ **Function of improving inching operation (Function setting Nos. 71 and 72)**

This function improves operability of one-stitch sewing by operating the high-speed switch for the pedal or sewing machine for standing work.

The more the set value becomes, the more the speed limitation at the start of rotation is remarkably added and operability of one-stitch sewing is improved.

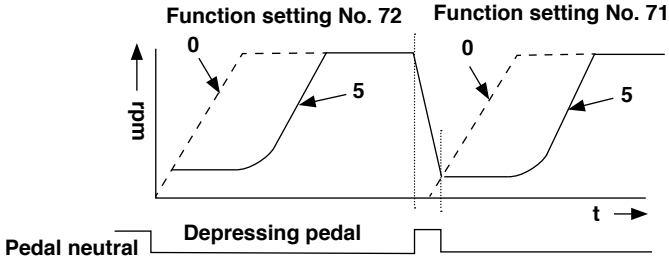
Function setting No. 71 limits the speed at the time of re-acceleration on the way of reducing speed.

Function setting No. 72 limits acceleration from the stop state.

Note : This function fails to work when turning ON the power or starting sewing immediately after thread trimming.

□ 7 1 □ □ □ 0 0 to 5

□ 7 2 □ □ □ 0 0 to 5



㉚ **Function of reducing speed of reverse feed stitching at the start of sewing (Function setting No. 92)**

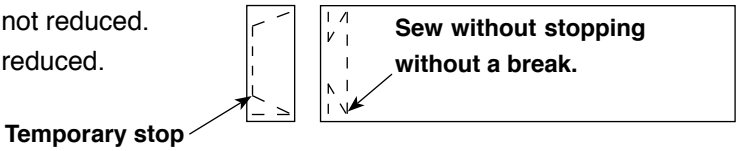
Function to reduce speed at the time of completion of reverse feed stitching at the start of sewing : Normal use depending on the pedal condition (Speed is accelerated to the highest without a break.)

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.



㉛ **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.

㉜ **Function to select the start-up speed of the sewing machine (Function setting No. 76)**

This function is selected in the case where the speed of the sewing machine is desired to be more at the time of start-up. (Time required to start is shortened by approximately 10%.)

□ 7 6 □ □ □ 0

0 : Normal curve

1 : More sharp curve

(Caution) If "1" is set, motor may move irregularly. In addition, noise may occur when the sewing machine is running or noise may increase when the sewing machine is running.

㉝ **Presser foot lifting solenoid suction time setting (Function setting No. 84)**

Suction time of presser foot lifting solenoid can be changed. When heating is great, it is effective to lessen the value.

(Caution) When the value is excessively small, malfunction will be caused. So, be careful when changing the value.

□ 8 4 □ 1 0 0 Setting range : 40 to 300ms <10/ms>

㉞ **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.

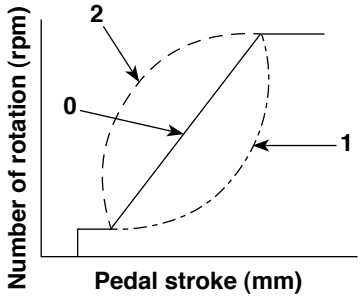
Change to this function when you feel that inching operation is hard or that pedal response is slow.

□ 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.



㉟ **Initial motion UP stop position move function (Function setting No. 90)**

Effective/ineffective of automatic return to UP stop position immediately after turning ON the power can be set.

□ 9 0 □ □ □ 1

0 : Ineffective

1 : Effective

㊱ **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.

㊲ **Continuous stitching + one shot stitching nonstop function (Function setting No. 94)**

In IP-110 program functions, this is a function that does not stop the sewing machine at the last of a step and proceeds to the next step when performing sewing by combining continuous stitching with one shot stitching.

Select this function when you desire to execute the overlapped stitching of 19 stitches or more.

□ 9 4 □ □ □ 0

0 : Normal (Stop when a step has completed.)

1 : The sewing machine proceeds to next step without stopping after a step has completed.

㊳ **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 4 0 0 0

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

㊴ **Sewing counter input function (Function setting No. 101)**

This function can change over the count of the sewing counter displayed on the panel, when connecting IP-100 panel, whether to the external sewing counter switch input or to the automatic updating by the internal thread trimming count.

1 0 1 □ □ □ 0

0 : Every time thread trimming is performed, the counter automatically counts up.

1 : Every time the sewing counter switch is inputted, the counter counts up.

㊵ **Main shaft reference angle compensation (Function setting No. 120)**

1 2 0 – □ 2 8

Main shaft reference angle is compensated

Setting range

– 35 to 35˚ <1 / ˚>

㊶ **UP position starting angle compensation (Function setting No. 121)**

1 2 1 □ □ □ 0

Angle to detect UP position starting is compensated.

Setting range

– 15 to 15˚ <1 / ˚>

㊷ **DOWN position starting angle compensation (Function setting No. 122)**

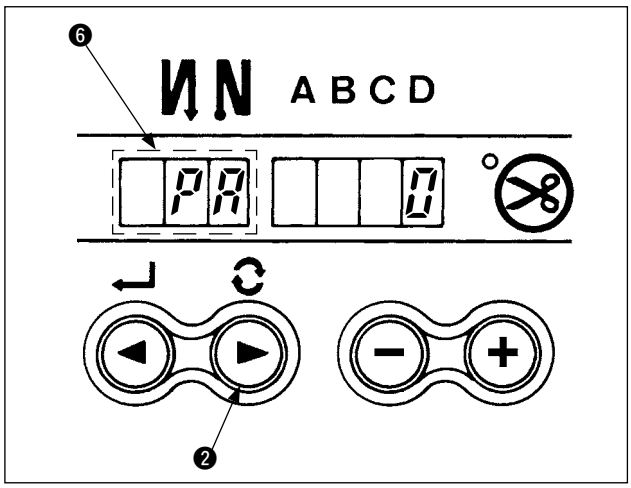
1 2 2 □ □ □ 0

Angle to detect DOWN position starting is compensated.

Setting range

– 15 to 15˚ <1 / ˚>

7. Automatic compensation of neutral point of the pedal sensor



Whenever the pedal sensor, spring, etc. are replaced, be sure to perform following operation :

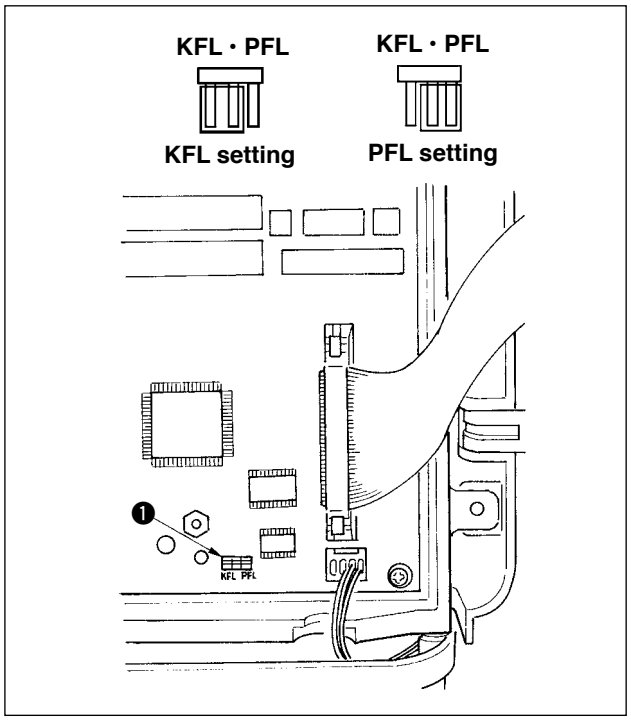
1) Pressing switch ❷, turn ON the power switch.
2) Indication on the screen will be as illustrated in ❻. At this time, the value indicated in the 7 segments of four figures is the compensation value.

(Caution) 1. 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.

2. When any thing other than number is displayed in 7 segment of 4 digits, refer to the Engineer's Manual.

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

8. Selection of the pedal specifications

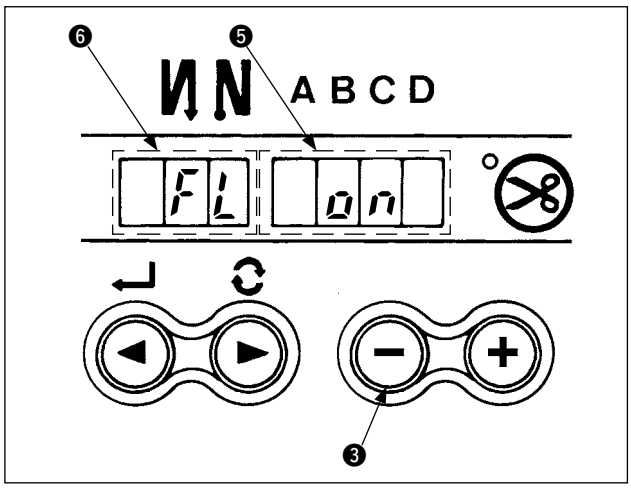


When the pedal sensor is changed (KFL → PFL or PFL → KFL), replace jumper ❶ to fit the pedal spcifications changed.

(Caution) 1. Pedal sensor with two springs located at the back part of the pedal type is PFL, and that with one spring type is KFL. Set the pedal sensor to PFL when lifting the presser foot by depressing the back part of the pedal.

2. When changing the jumper, be sure to do the work after turning OFF the power. If the jumper is changed while the power is ON, the setting does not change.
The main unit may be broken.

9. Setting of the auto lifter function



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 after closing the front cover. The machine returns to the normal motion.
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.

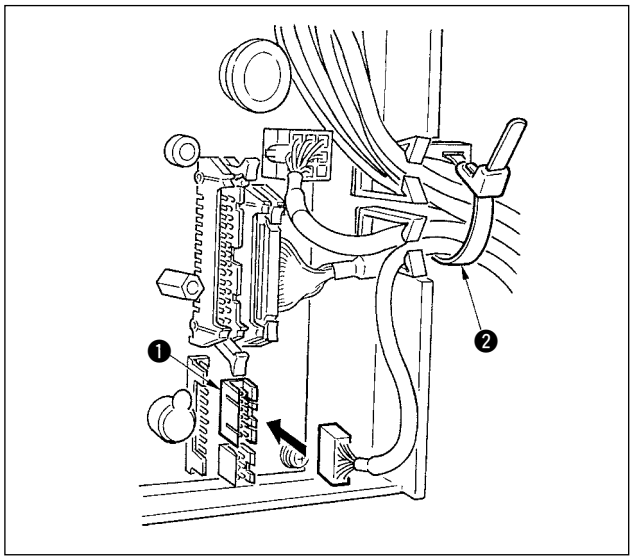
   FL OFF : Auto-lifter function does not work.

   (Standard at the time of delivery)

   Similarly, the presser foot is not automatically lifted when programmed stitching is completed.

(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.

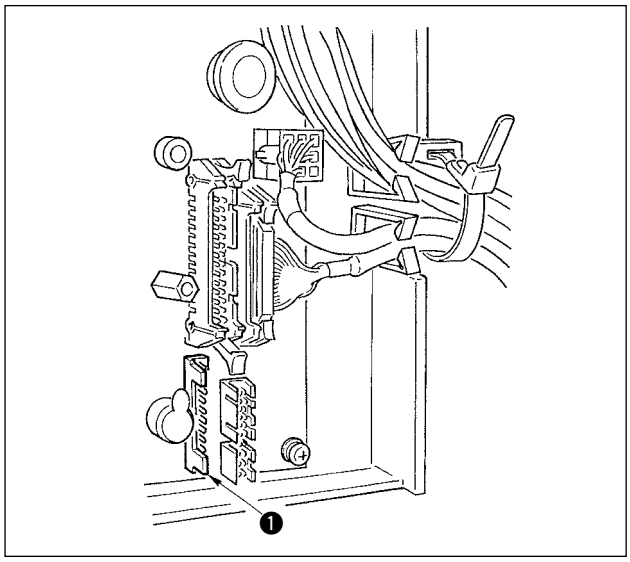
10. Connection of the pedal of standing-work machine



1) Connect the connector of PK70 to connector ❶ (CN32 : 12P) of SC-910N.
2) Tighten the cord of PK70 together with other cords with cable clip band ❷ attached to the side of the box after passing it through the cable clamp.

(Caution) Be sure to turn OFF the power before connecting the connector.

11. External input / output connector



External input/output connector ❶ which can take out the following signals that are convenient when installing counter or the like outside is prepared.

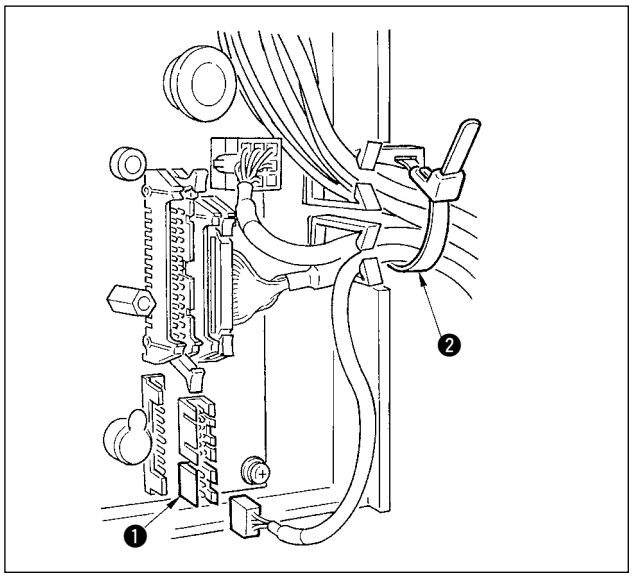
(Caution) When using the connector, note that the engineer who has the electrical knowledge has to work.

Table of assignment of connector and signal

CN42	Signal name	Input / output	Description	Electric spec.
1	+5V	-	Power source	
2	LS(N)	Output	Rotation signal 360 pulses/rotation	DC5V
3	N.C.	-	–	
4	UDET(N)	Output	"L" is output when needle bar is at LOW position.	DC5V
5	DDET(N)	Output	"L" is output when needle bar is at UP position.	DC5V
6	HS(N)	Output	Rotation signal 45 pulses/rotation	DC5V
7	BTD(N)	Output	"L" is output when the back-tack solenoid works.	DC5V
8	TRMD(N)	Output	"L" is output when the thread trimmer solenoid works.	DC5V
9	LSWO(P)	Output	Rotation request (pedal or the like) monitor signal	DC5V
10	S.STATE(N)	Output	"L" is output when the sewing machine is in the stop state.	DC5V
11	LSWINH(N)	Input	Rotation by pedal is prohibited while "L" signal is being inputted.	DC5V, –5mA
12	SOFT	Input	Rotation speed is limited to the soft-speed while "L" signal is being inputted.	DC5V, –5mA
13	SGND	-	0V	

JUKI genuine part No. Connector : Part No. HK016510130
Pin contact : Part No. HK016540000

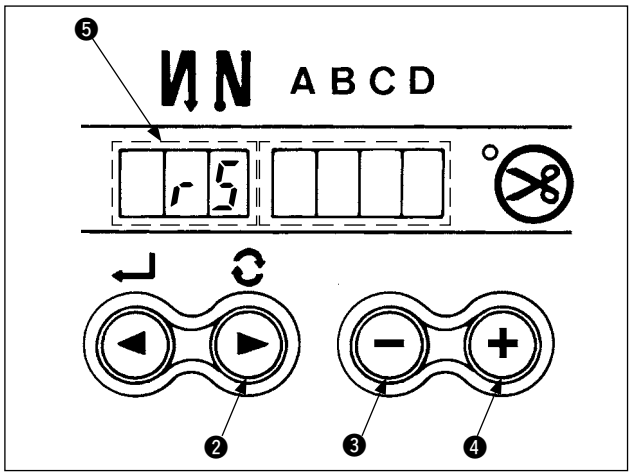
12. Connection of the material end sensor (ED)



1) Connect the connector of material end sensor (ED) to connector ❶ (CN45 : 6P) of SC-910N.
2) Tighten the cord of the material end sensor together with other cords with cable clip band ❷ attached to the side of the box after passing it through the cable clamp.

(Caution) 1. Be sure to turn OFF the power before connecting the connector.
2. For the use of the material end sensor, refer to the Instruction Manual attached to the material end sensor.

13. Initialization of the setting data



All contents of function setting of SC-910N can be returned to the standard set values.

1) Pressing all switches ❷, ❸ and ❹ inside the front cover, turn ON the power switch.
2) LED displays indication ❺ 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 after closing the front cover. The machine returns to the normal motion.

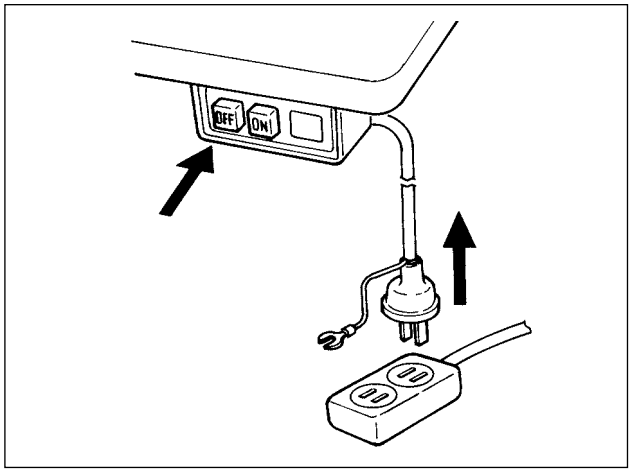
(Caution) 1. When this operation is performed, the neutral compensation value of the pedal sensor becomes “0”. Accordingly, be sure to execute the operation of automatic pedal sensor neutral compensation before using the sewing machine. (Refer “Ⅲ-7. Automatic compensation of neutral point of the pedal sensor” p. 40.)

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

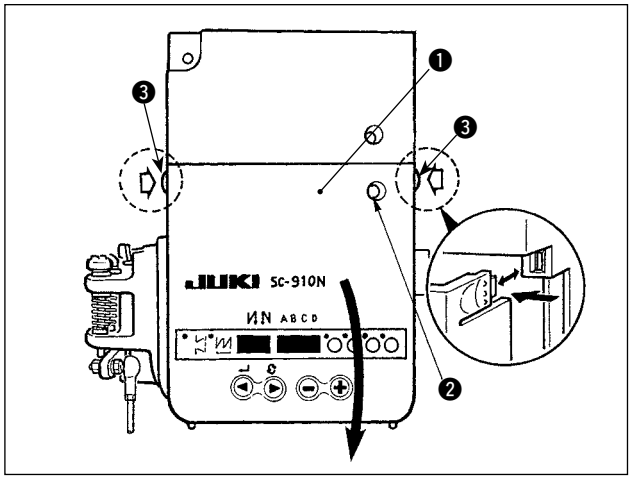
Ⅳ. MAINTENANCE

1. Removing the rear cover

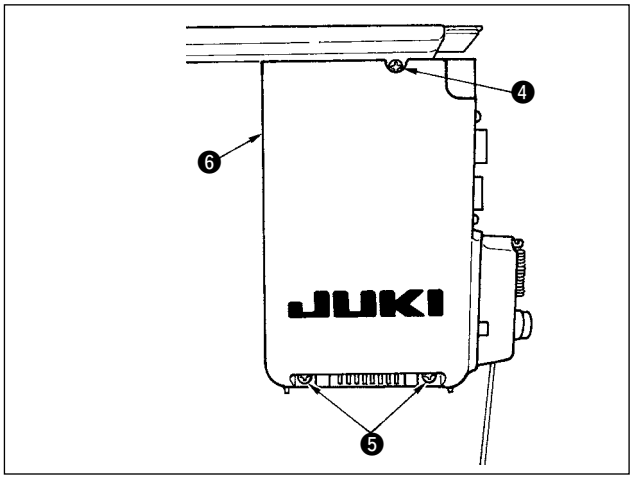
WARNING :
To prevent personal injuries caused by electric shock hazards or abrupt start of the sewing machine, remove the cover after turning OFF the power switch and a lapse of 5 minutes or more. To prevent personal injuries, when a fuse has blown out, be sure to replace it with a new one with the same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

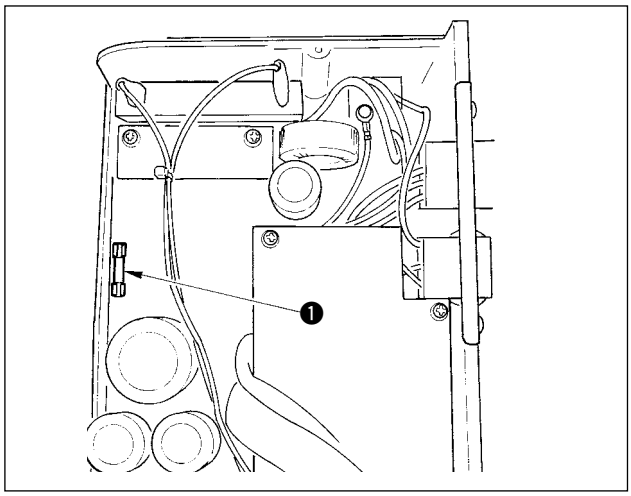


3) Loosen setscrews ❷ in front cover ❶.
4) Open front cover ❶ while pressing latch ❸ located on the side face.



5) Loosen two screws ❺ after loosening screw ❹, and remove rear cover ❻. When attaching rear cover ❻, tighten two secrews ❹ after lightly entering screw ❹, and tighten screw ❹ again.

2. Replacing the fuse



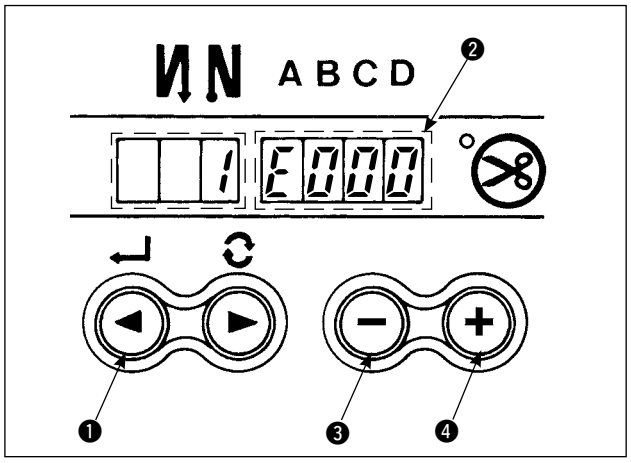
1) Hold the glass section of the fuse ❶ and remove it.
2) Use the fuse of which capacity is specified.
   ❶ : 3.15A/250V time-lag fuse
   (Power circuit protection fuse)
   Part No. KF000000080

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. Solenoids for thread trimming	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 (CN40).	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 (CN39) 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 ❷ 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 ❸ or ❹. (When the confirmation of the contents of previous error advanced to the last, the warning sound peeps in single tone two times.)

(Caution) When operating switch ❸, one before the existing error code is displayed.
When operating switch ❹, 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	
E302	Fall detection switch failure (When the safety switch works)	• When fall detection switch is input in the state that the power is turned ON.	• Check whether the machine head is tilted without turning OFF the power switch (sewing machine operation is prohibited for safety sake). • Check whether the fall detection switch cord is caught in the sewing machine or the like. • Check whether the fall detection switch lever is caught in something.
E221	Grease-up error	• Greasing warning of LH-41** (Greasing warning after passing the specified time)	• Perform greasing and execute the reset operation.
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 (CN30) for loose connection and disconnection. • 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		
E906	Operation panel transmission failure	• Disconnection of operation panel cord • Operation panel has broken.	• Check the operation panel connector (CN34, CN35) for loose connection and disconnection. • Check whether the operation panel cord has broken since the cord is caught in the machine head.
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 (CN31) for loose connection and disconnection.
E808	Solenoid short circuit	• Solenoid power does not become normal voltage.	• Check whether the machine head cord is caught in the pulley cover or the like.
E809	Holding motion failure	• Solenoid is not changed over to holding motion.	• Check whether the solenoid is abnormally heated. (CTL circuit board asm. Circuit is broken.
E810	Solenoid current abnormality	• Solenoid rare short-circuit.	• Solenoid resistance

No.	Description of error detected	Cause of occurrence expected	Items to be checked
E811	Overvoltage	• When voltage higher than guaranteed one is inputted. • 200V has been inputted to SC-910N of 100V specifications. • JA : 220V is applied to 120V box. • CE : 400V is applied to 230V box.	• Check whether the applied power voltage is higher than the rated voltage + (plus) 10% or more. • Check whether 100V/200V changeover connector is improperly set. In the aforementioned cases, POWER p.c.b is broken.
E813	Low voltage	• When voltage lower than guaranteed one is inputted. • 100V has been inputted to SC-910N of 200V specifications. • JA : 120V is applied to 220V box • Inner circuit is broken by the applied overvoltage	• Check whether the voltage is lower than the rated voltage - (minus) 10% or less. • Check whether 100V/200V changeover connector is improperly set. • Check whether fuse or regenerative resistance is broken.
E924	Encoder failure	• Motor driver has broken.	
E944	Right needle control impossible (When LH-4168, or 4188 is selected)	• Right needle has shifted from the origin during holding it. • Right needle has shifted from the origin during releasing left needle.	• Check whether the right needle origin sensor is broken. • Check whether needle bar has shifted from the holding position by the exterior force.
E945	Left needle control impossible (WhenLH-4168, or 4188 is selected)	• Right needle has shifted from the origin during holding it. • Right needle has shifted from the origin during releasing left needle.	• Check whether the left needle origin sensor is broken. • Check whether needle bar has shifted from the holding position by the exterior force
E046	Both-needle lock (When LH-4168, or 4188 is selected)	• Both needles are locked at the time of turning ON the power. (Needles are in the lifting position.)	• Check whether left-right needle position origin sensors are broken. • Check whether the sensor connectors are disconnected or loosely connected.
E730	Encoder failure	• When the motor signal is not properly inputted.	• Check the motor signal connector (CN39) 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		
E303	Woodruff plate sensor error	• Woodruff plate sensor signal cannot be detected.	• Check whether the machine head corresponds with the machine type setting. • Check whether the motor encoder connector is disconnected.
E343	Bobbin thread remaining amount sensor unit failure	• When the position of the detection bar of the AE device is shifted from the home position.	• Check whether the detection bar of the AE device has returned to the correct position. • Check whether the function setting No. 57 has been mistakenly set. • Check the AE device connectors (CN121, CN123) for loose connection and disconnection. • Check whether the AE device cord has broken since the cord is caught in the machine head.