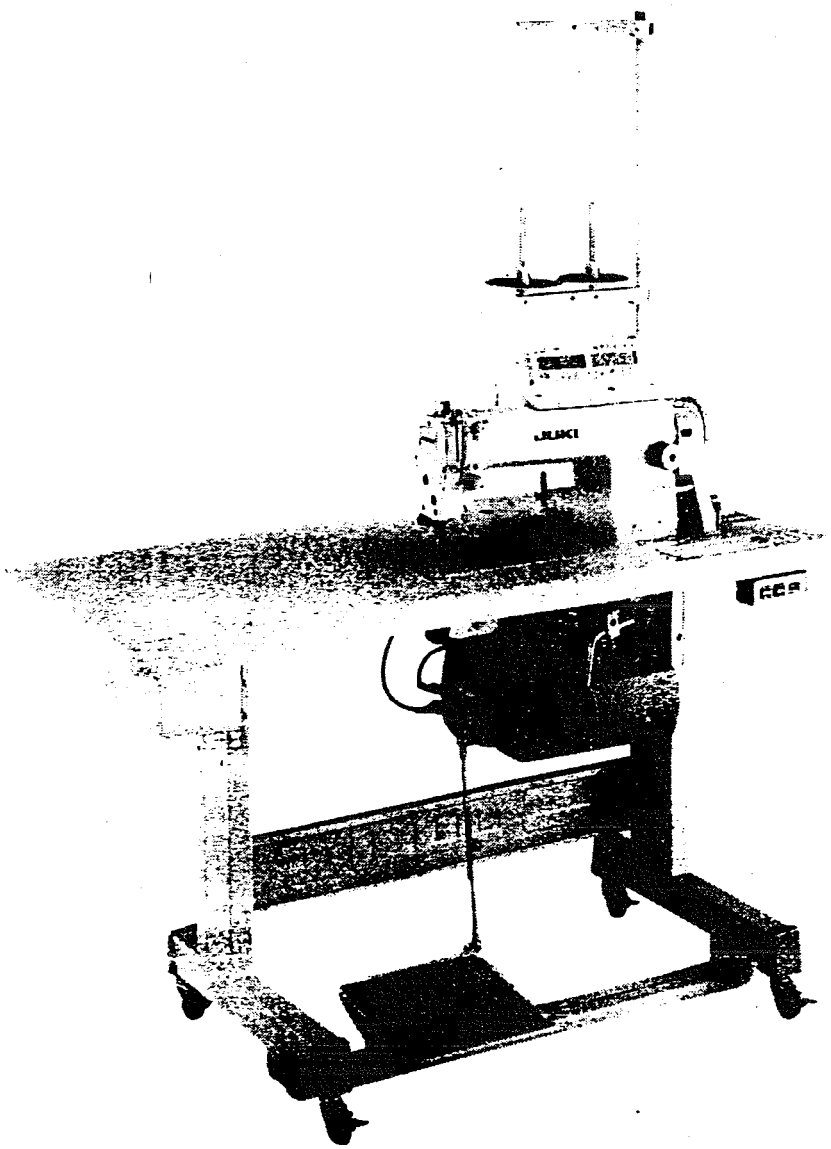
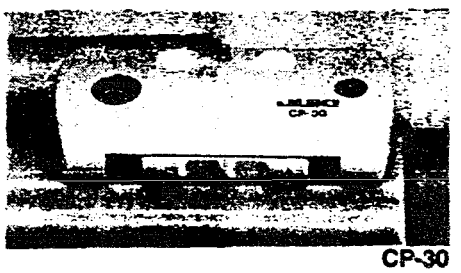
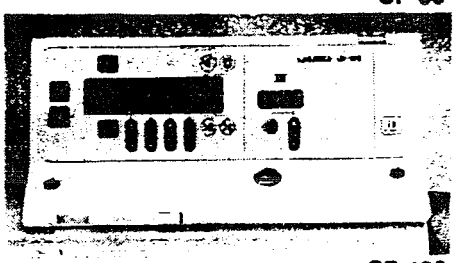
JUKI

SC-1
SC-2
CP-30 •CP-130
CP-230•CP-330
ENGINEER'S MANUAL

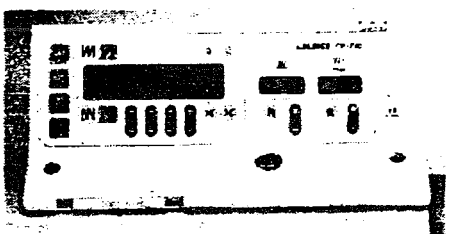




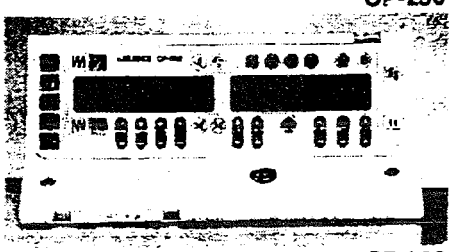
CP-30



CP-130



CP-230



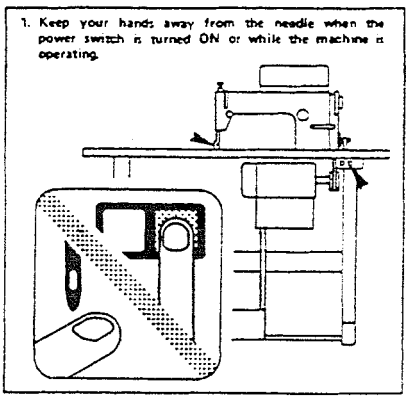
CP-330

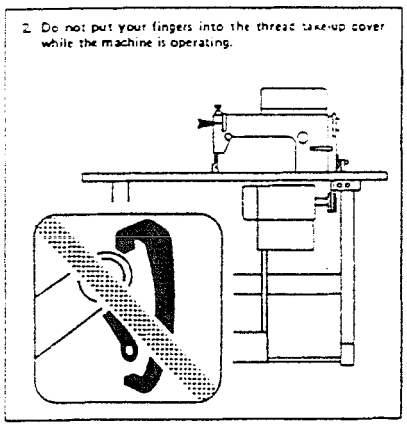
No. I-47
1993. 12

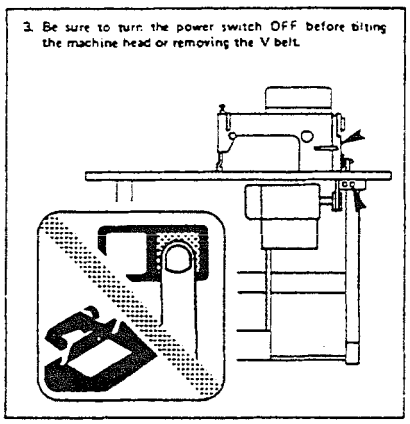
PREFACE

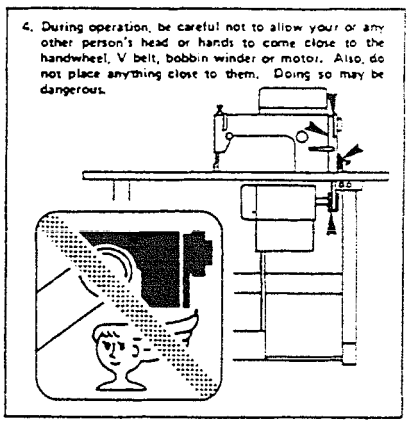
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines. The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. It is advisable to use the relevant Instruction Manual and Parts list together with this Engineer's Manual when carrying out the maintenance of these machines.

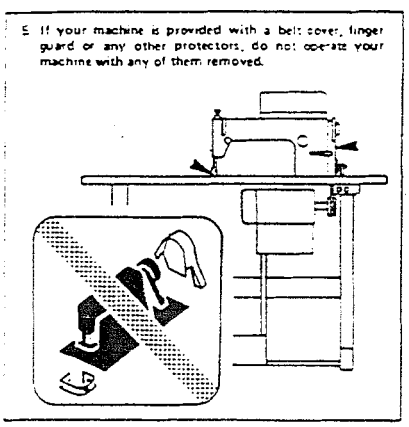
CAUTION

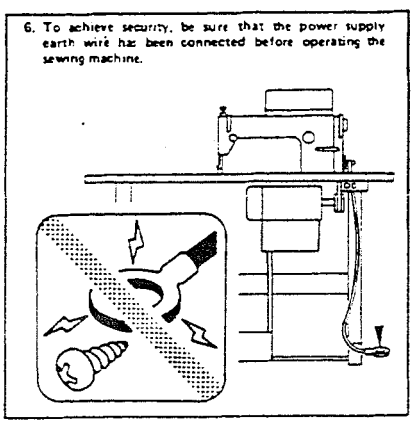


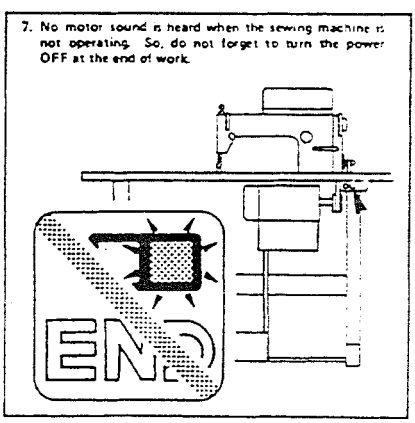












8. **When you move the unit from a cold place directly to warm place, dew condensation may result. Turn ON the power to the unit after you have confirmed there is no fear of dew condensation.**
9. **In case of thunder, be sure to stop the unit and remove the power plug from the receptacle for extra safety.**
10. **Whenever you connect/remove the power connector or the like, be sure to turn OFF the power switch beforehand.**

BEFORE OPERATION

1. Never operate the machine unless its oil pan has been filled with oil.
2. Confirm that the voltage and phase (single- or 3-phase) are correct by checking them against the ratings shown on the PSC box nameplate located under the motor.
3. Be sure to connect the power supply earth wire to assure safety either for a single-phase or 3-phase version.
4. After setting up the machine, check the direction of motor rotation. To check it, turn the handwheel by hand to bring the needle down, and turn the power switch ON while observing the handwheel.
   (The handwheel should turn counterclockwise as observed from the handwheel side.)

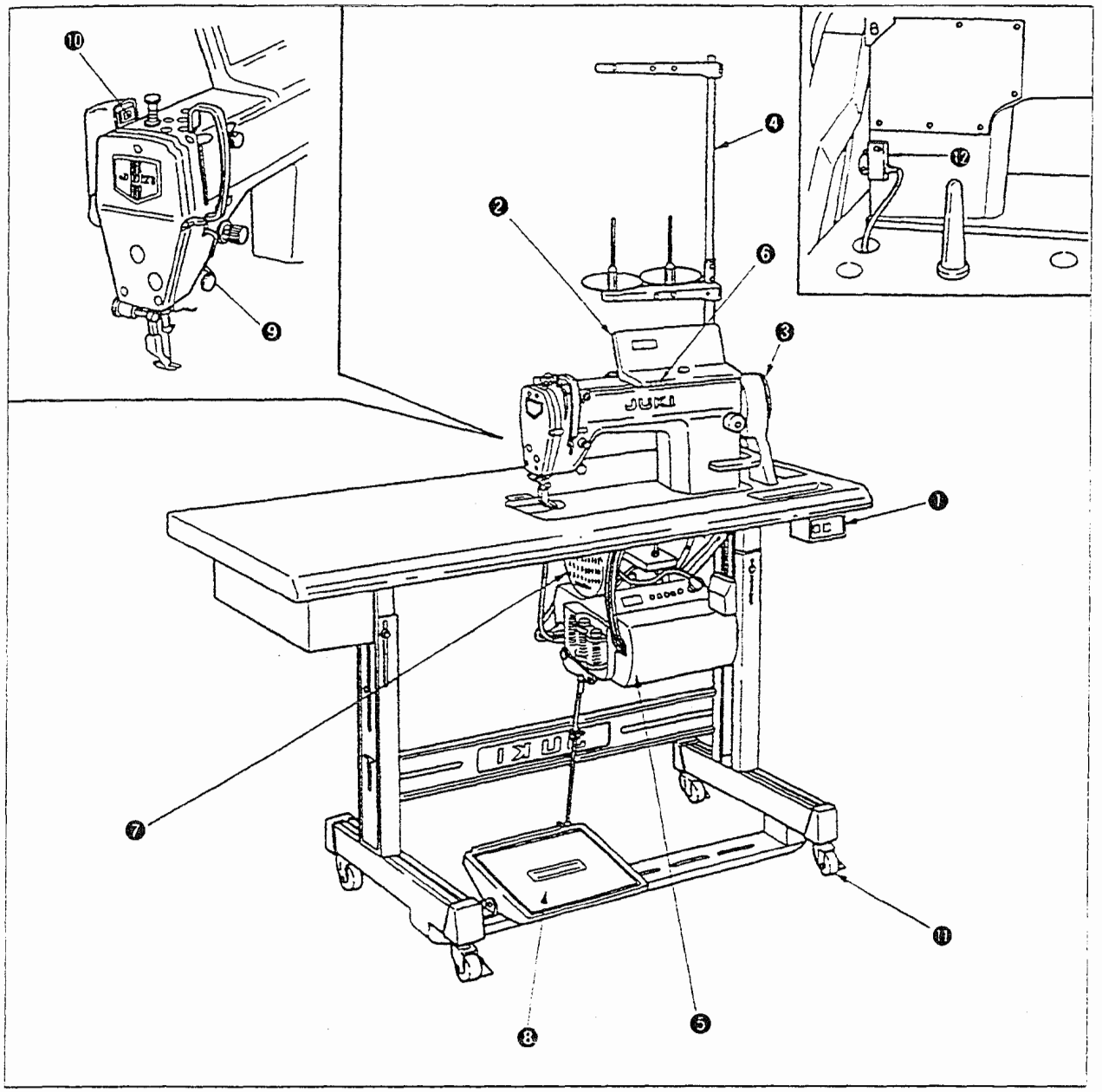
CONTENTS

1. GENERAL

(1) Features

1) The max. sewing speed control variable resistor is mounted on the control panel, thereby facilitating operation.
2) The liquid crystal display panel is introduced as the indicator of the control panel. As a result, numerical characters are shown on the LCD panel in larger size, thereby allowing the operator to read them at a glance.
3) The foot pedal can be operated applying a light pressure on it when depressing the front part or the back part. This helps achieve easier operation.
4) Material edge sensor (ED), bobbin thread remaining amount detecting device (AE) and foot pedal for standing work are optionally available.
5) The motor is no longer equipped with a mechanical brake.
6) Contactless pedal sensor is introduced, thereby eliminating a contact point.
7) The sewing machine controller quickly stops the sewing machine with its needle down.

2. CONFIGURATION



❶ Power switch
❷ Control panel
❸ Synchronizer
❹ L-shaped thread stand
❺ PSC box
❻ Max. sewing speed control variable resistor
❼ Motor
❽ Operation pedal
❾ One-touch type reverse feed switch
❿ Wiper
⓫ Stand leveling screw or caster
⓬ Resistor pack (It is not equipped with the JE type machine.)

❶ Power switch
Power switch for the motor, PSC and control panel.

❷ Control panel
Used to specify the automatic reverse feed stitching function, pattern sewing function, etc.

❸ Synchronizer
Incorporated in the sewing machine pulley, the synchronizer detects the needle position (up or down) and the sewing speed, then sends an input signal to the main circuit board in the PSC box.

❹ L-shaped thread stand

❺ PSC box
Comprises a circuitry to control the sewing machine and motor, an output circuitry to operate the elements (thread trimming solenoid, reverse feed solenoid, etc.), a pedal sensor to detect pedal position, and a power circuitry to actuate the respective functions.

❻ Max. sewing speed control variable resistor
Allows analog adjustment of the maximum sewing speed without changing the motor pulley.

❼ Motor
Operates the sewing machine at high speed, medium speed or low speed responding to a signal output from the PSC box.

❽ Operation pedal
The front and back parts of the foot pedal are depressed to control the sewing speed and to actuate the thread trimmer, presser foot lifter (only for the sewing machine equipped with AK-85).

❾ One-touch type reverse feed switch
Manually operated to make the sewing machine perform reverse feed stitching.

❿ Wiper
Wipes the needle thread off the material after thread trimming responding to a wiper signal output from the PSC box.

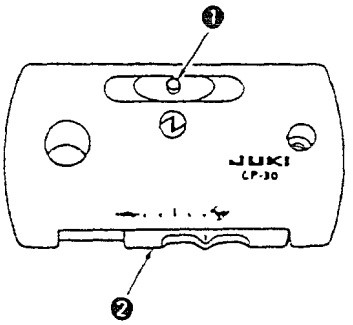
⓫ Stand leveling screw or caster
Used to perform adjustment so that the stand rests with securely leveled on the floor to minimize vibration during operation.

⓬ Resistor pack (It is not equipped with the JE type machine.)
Automatically identifies the type of machine head.

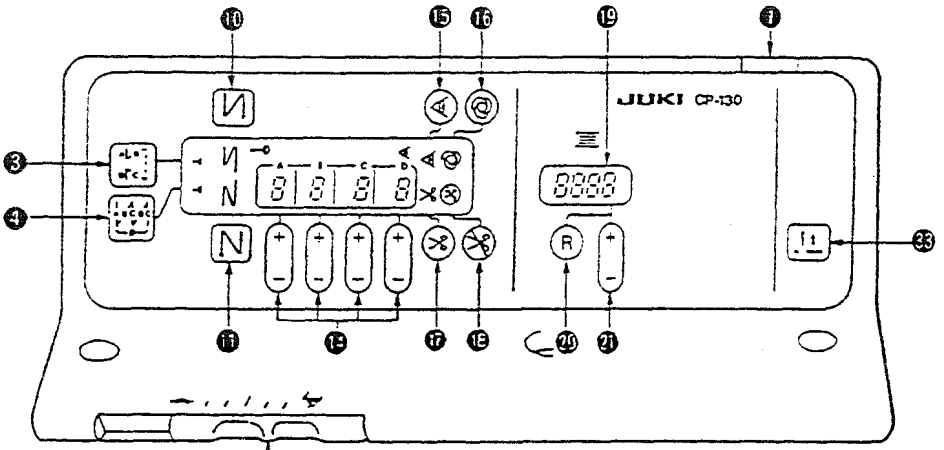
3. EXPLANATION OF THE CONTROL PANEL

(1) Control panels of CP-30, -130, -230 and -330
(All the indications on the control panel are illustrated in their ON state for the explanation's sake.)

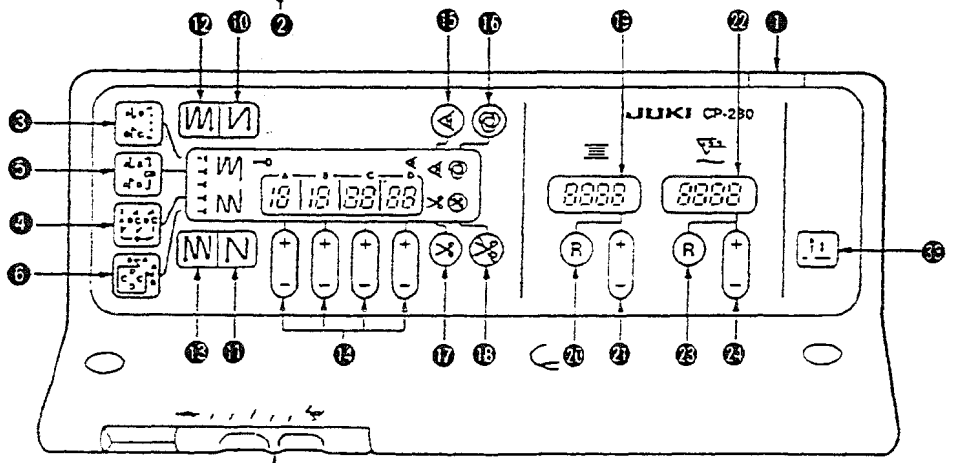
CP-30



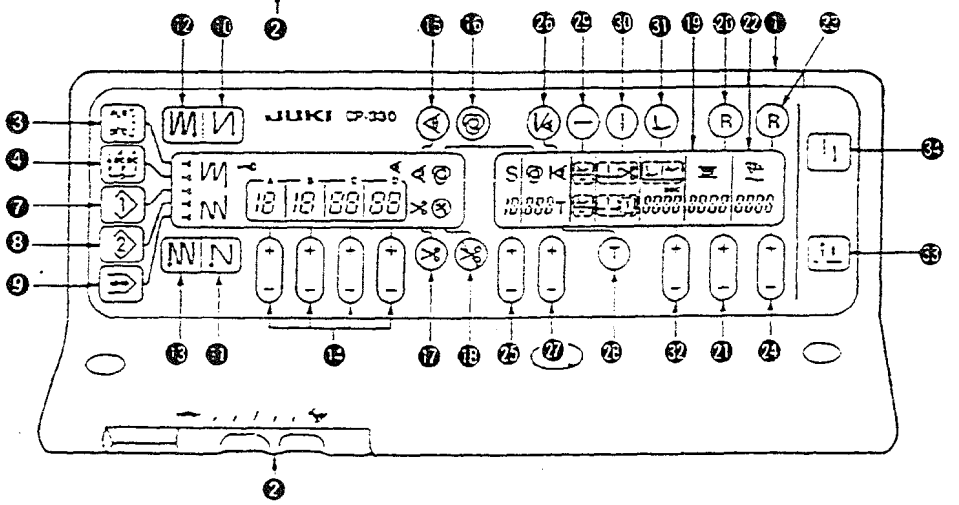
CP-130



CP-230



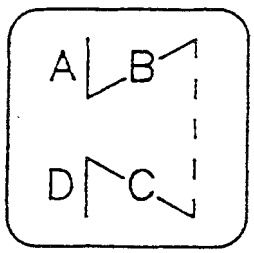
CP-330



No.	Explanation of the components	CP-30	CP-130	CP-230	CP-330
❶	**Power indicator lamp (LED)** • Lights up when the power switch is turned ON.	○	○	○	○
❷	**Max. sewing speed control variable resistor** • Move the variable resistor to the left (←), and the max. sewing speed will be limited.	○	○	○	○
❸	**Reverse stitching pattern selector switch** • Used to select a reverse stitching pattern.		○	○	○
❹	**Overlapped stitching pattern selector switch** • Used to select an overlapped stitching pattern.		○	○	○
❺	**Constant-dimension stitching pattern selector switch** • Used to select a constant-dimension sewing pattern.			○	
❻	**Rectangular stitching pattern selector switch** • Used to select a rectangle stitching pattern.			○	
❼	**Programmed stitching pattern 1 switch** • Used to specify the programmed stitching pattern 1.				○
❽	**Programmed stitching pattern 2 switch** • Used to specify the programmed stitching pattern 2.				○
❾	**Combined stitching pattern switch** • Used for sewing stitching patterns ❸, ❹, ❼ and ❽ with combined.				○
❿	**Automatic reverse stitching (for start) switch** • Used to turn ON/OFF the automatic reverse feed stitching at the start of sewing.		○	○	○
⓫	**Asutomatic reverse stitching (for end) switch** • Used to turn ON/OFF the automatic reverse feed stitching at the end of sewing.		○	○	○
⓬	**Double reverse stitching (for start) switch** • Used for turning ON/OFF the double reverse stitching at the start of sewing.			○	○
⓭	**Double reverse stitching (for end) switch** • Used for turning ON/OFF the double reverse stitching at the end of sewing.			○	○
⓮	**Switches for setting the number of stitches** • Used for setting the number of stitches to be sewn in processes A through D.		○	○	○
⓯	**Material edge sensor ON/OFF switch** • Rendered effective when the material edge sensor is installed on the machine. Used for setting whether or not the material edge sensor is used during sewing.		○	○	○
⓰	**One-shot automatic stitching switch** • When you start the sewing machine with this switch, the sewing machine will run automatically until the material edge is detected or the specified number of stitches are finished.		○	○	○
⓱	**Automatic thread trimming switch** • When the material edge is detected, the machine will start the thread trimming process even when the front part of the foot pedal is held depressed.		○	○	○
⓲	**Thread trimming prohibition switch** • Used for prohibiting thread trimming at any time.		○	○	○
⓳	**Bobbin thread counter** • Counts down the amount of bobbin thread in subtracting method. When the bobbin thread remaining amount detecting device is installed on the machine, the counter indicates the number of times of detections.		○	○	○
⓴	**Bobbin counter reset switch** • Used for returning the value shown on the bobbin thread counter to the initial set value.		○	○	○
㉑	**Bobbin thread amount setting switch** • Used for setting the amount of bobbin thread.		○	○	○
㉒	**No. of pcs. counter** • Counts up the number of finished pieces of garments every time the machine performs thread trimming.			○	○
㉓	**No. of pcs. counter reset switch** • Used for resetting the value on the No. of pcs. counter to zero (0).			○	○
㉔	**No. of pcs. counter value correction switch** • Used for correcting the value on the No. of pcs. counter.			○	○
㉕	**Step setting switch** • Used for changing over the operation steps of a programmed stitching pattern.				○
㉖	**Number of stitches/sensor change over switch** • Used for selecting whether the sewing machine finishes sewing when the specified number of stitches is reached or it finishes sewing when the material edge sensor actuates.				○
㉗	**Number of stitches input switch** • Used for inputting the number of stitches for a programmed stitching pattern.				○
㉘	**Teaching switch** • Used for setting the number of stitches to a value which has been actually sewn.				○
㉙	**Feeding direction change-over switch** • Used for specifying the direction in which the material is to be fed either normal direction or reverse direction.				○
㉚	**Stop-state selector switch** • Used for specifying the stop-state of the sewing machine at the time of completion of operation steps.				○
㉛	**Presser foot selector switch** • Used for specifying the state of the presser foot.				○
㉜	**Lifting time setting switch** • Used for setting the length of time during which the presser foot is raised.				○
㉝	**Needle up/down compensating switch** • Used when performing needle up/down compensating stitching.		○	○	○
㉞	**Re-sewing switch** • If the bobbin thread runs out before the completion of the operation steps of a programmed stitching pattern, this switch is used for re-starting stitching after replacing the bobbin from the operation step where the stitching has been interrupted.				○

(2) Explanation of the control panel

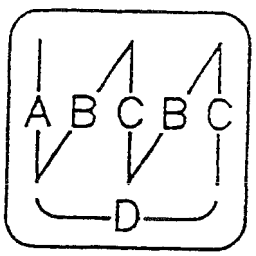
1) Reverse stitching pattern (CP-130/-230/-330)



In the free stitching mode, the machine performs reverse feed stitching at the start and end of sewing.
The reverse feed stitching can be set to ON/OFF state. Furthermore, either single reverse stitching or double reverse stitching (CP-230/-330) can be specified. The number of reverse feed stitches and other data on the reverse stitching can be set by operating the switches on the control panel.

A=B=C=D= 0 to 19 stitches CP-230/-330
0 to 9 stitches CP-130

2) Overlapped stitching pattern (CP-130/-230/-330)

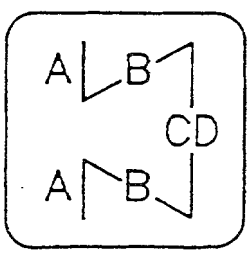


The machine performs normal feed stitching and reverse feed stitching by the predetermined number of times, performs straight line tacking, automatically performs thread trimming and finishes the sewing.
The number of stitches and the number of times by which the sewing is repeated can be changed by operating the switches on the control panel.

A=B=C= 0 to 9 stitches
D= 0 to 9 times — CP-130

A=B=C= 0 to 19 stitches — CP-230
D= 0 to 9 times — CP-330

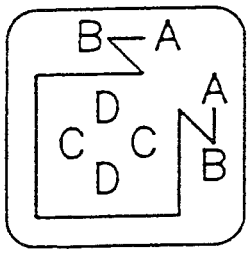
3) Constant-dimension sewing pattern (CP-230)



The free stitching process in a reverse feed stitching pattern is used as the set value of the number of stitches. When the specified number of stitches for process CD is completed, the sewing machine automatically stops (if the automatic thread trimming is specified, the machine will automatically perform thread trimming).
If the automatic thread trimming is not specified, the sewing machine will automatically stop. Now, if you operate the One-touch type reverse stitching switch, the sewing machine will run at low speed (perform compensating stitching).
If you return the foot pedal to its neutral position, then depress the front part of the foot pedal, the machine will continue sewing regardless of the specified number of stitches.
The number of stitches and automatic thread trimming are specified by operating the switches on the control panel.

A=B= 0 to 19 stitches, CD= 0 to 500 stitches

4) Rectangular stitching pattern (CP-230)



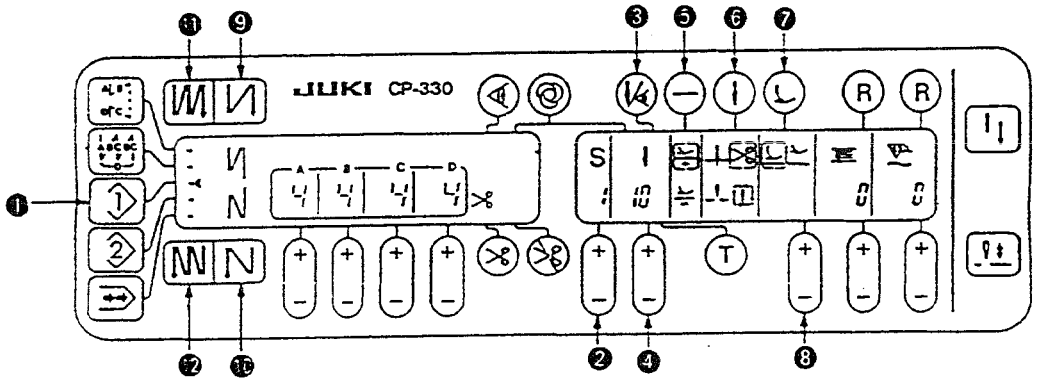
The constant-dimension sewing process has four operation steps. The machine automatically stops running upon completion of the sewing of the number of stitches specified for each step of operation. If you operate the One-touch type reverse stitching switch after the sewing machine has stopped, the machine will run at low speed (performs compensating stitching). For the last operation step, you can make the sewing machine continue sewing regardless of the specified number of stitches by returning the foot pedal to its neutral position then depressing the front part of the pedal. Note that the machine will automatically perform thread trimming if the automatic thread trimmer is specified.
The number of stitches and automatic thread trimming are specified by operating the switches on the control panel.

A=B= 0 to 19 stitches, C=D= 0 to 99 stitches

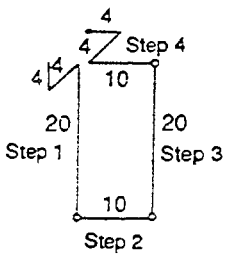
5) Programmed stitching pattern (CP-330)

The constant-dimension sewing process can be programmed as many as 15 operation steps. The sewing conditions including the number of stitches (Max. 500), needle up/down stop mode, automatic thread trimming, continuous operation steps, lifting/lowering of presser foot and normal/reverse feed stitching can be separately specified for the respective operation steps. If the lifting of presser foot is specified (for KFL or PFL type), the time during which the presser foot is raised can also be specified.

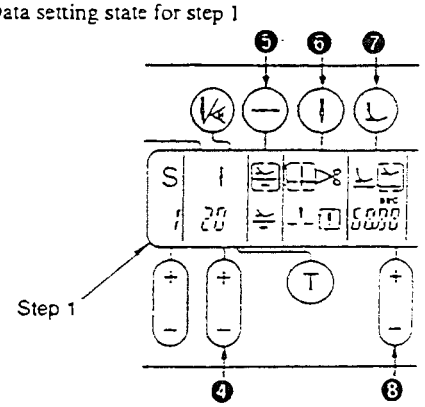
< How to set data on a program >



Example of a pattern



Data setting state for step 1



Data programming procedure is described below while taking the pattern illustrated on the left as an example.

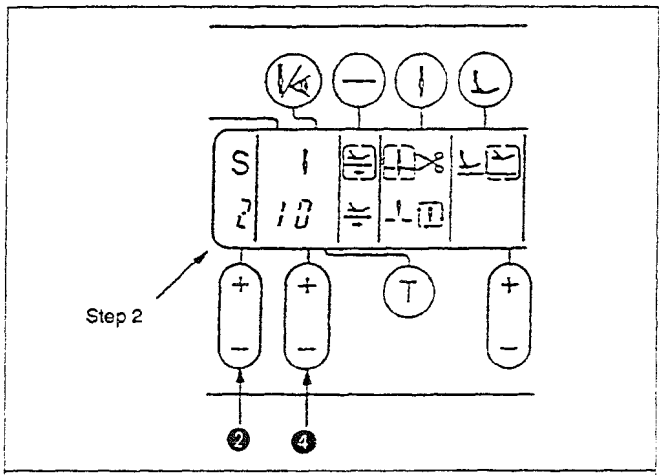
(Step 1)

1. Press Programmed stitching pattern 1 switch ❶ to select programmed stitching pattern 1.
2. Programmed stitching pattern 1 is specified and the predetermined number of stitches and data on step 1 are shown on the LCD.
3. Confirm that data on step 1 are shown on the LCD. Then set the number of stitches to 20 using Number of stitches input switch ❹ .
4. Set the feeding direction to the normal direction using Feeding direction change-over switch ❺ .
5. Set the stop-state of the sewing machine to the needle-down stop using Stop-state selector switch ❻ .

(Caution) If the stop-state of the sewing machine is set to the automatic thread trimming , data setting procedure is not allowed to go forward to the next step.

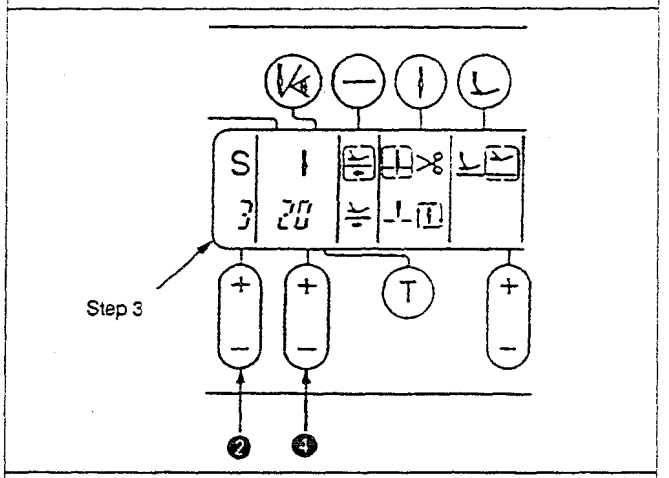
6. Set the position of the presser foot when the sewing machine stops to the upper position using Presser foot selector switch ❼ .

If you want to specify the length of time during which the presser foot is in the highest position in particular, set it to a desired value using Lifting time setting switch ❽ . If the length of time during which the presser foot is in the highest position is not particularly specified, it will be set to 60 sec.
Data setting range: 0.10 sec. to 99.95 sec.



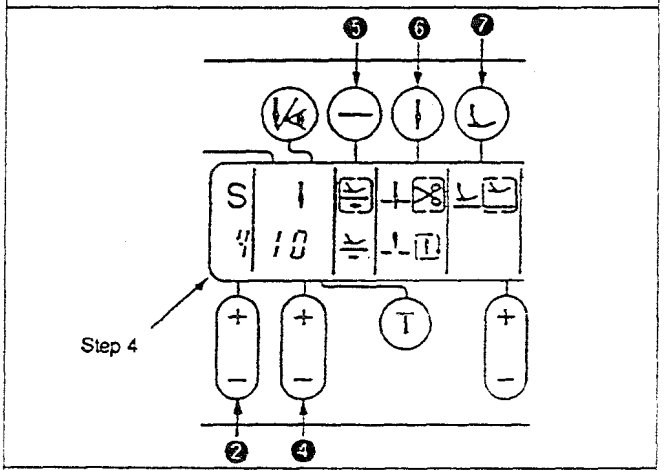
(Step 2)

7. Make the LCD indicate step 2 by pressing the + switch of Step setting switch ❷ once.
8. Set the number of stitches to 10 using Number of stitches input switch ❹ .
9. As in the data setting procedure for step 1, set the feeding direction to the normal direction, the stop-state to the needle-down stop state and the presser foot position to the upper position.



(Step 3)

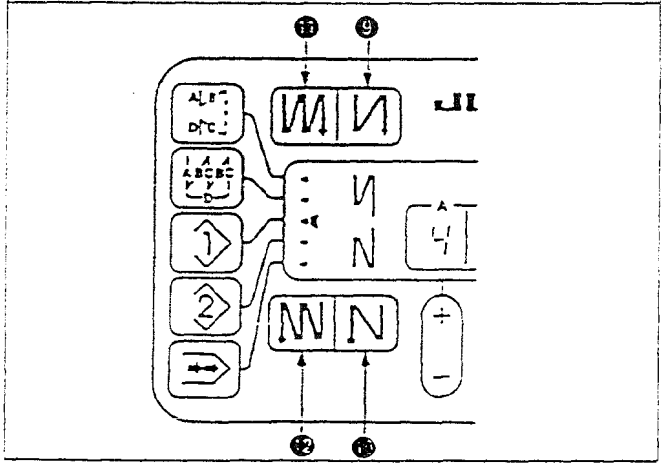
10. Make the LCD indicate step 3 by pressing the + switch of Step setting switch ❷ once.
11. Set the number of stitches to 20 using Number of stitches input switch ❹ .
12. As in the data setting procedure for step 1 and step 2, set the feeding direction to the normal direction, the stop-state to the needle-down stop state and the presser foot position to the upper position.



(Step 4)

13. Make the LCD indicate step 4 by pressing the + switch of Step setting switch ❷ once.
14. Set the number of stitches to 10 using Number of stitches input switch ❹ .
15. Set the feeding direction to the normal direction using Feeding direction change-over switch ❺ .
16. Set the stop-state of the sewing machine to the automatic thread trimming using Stop-state selector switch ❻ .
17. Set the position of the presser foot when the sewing machine stops to the upper position using Presser foot selector switch ❼ .
18. Specify the reverse stitching feature using Reverse stitching (for start) switch ❾ and Automatic reverse stitching (for end) switch ❿ . This completes the data setting procedure.
19. Furthermore, it is possible to specify the double reverse stitching feature using Double reverse stitching (for start) switch ⓫ and Double reverse stitching (for end) switch ⓬ .

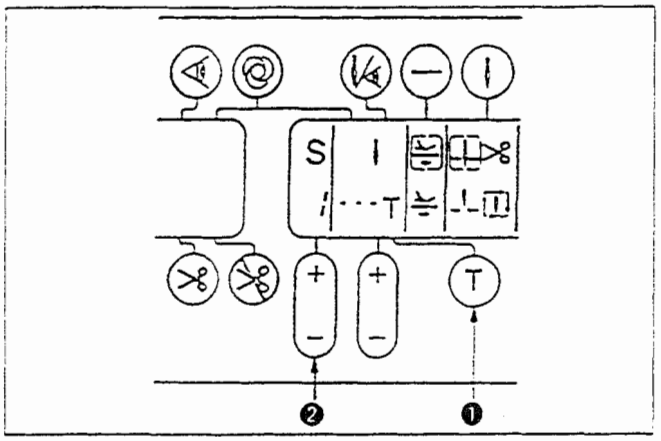
(Caution) If you operate the One-touch type reverse stitching switch at the completion of every operation step, the sewing machine will run at low speed (perform compensating stitching).



Data on another sewing process can be programmed, taking the aforementioned procedure, for programmed stitching pattern 2.

< Teaching mode >

In the teaching mode, it is possible to set the number of stitches in a programmed stitching pattern to the number of stitches that has been actually sewn.



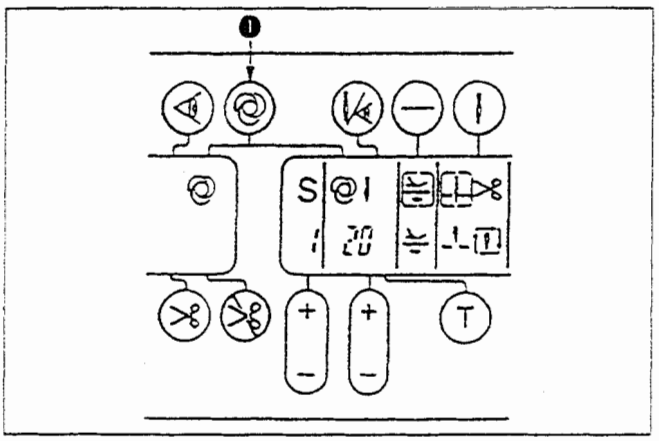
1. In a programmed stitching pattern, press Teaching switch ❶ to specify the teaching mode.
2. The indication shown on the number of stitches indicator changes to "----T." This shows that the sewing machine has entered the teaching mode.
3. Depress the front part of the pedal to make the sewing machine perform sewing until the last stitch of the current operation step is reached.

(Caution) The number of stitches will not be input when the sewing machine is manually operated or using the Compensating stitching switch.

4. Return the foot pedal to its neutral position to make the sewing machine stop running. Now, the number of stitches which has been sewn is shown on the control panel.
5. Proceed to the subsequent step using Step setting switch ❷ or make the sewing machine perform thread trimming. This completes the input of the number of stitches for operation step 1.

< One-shot automatic stitching >

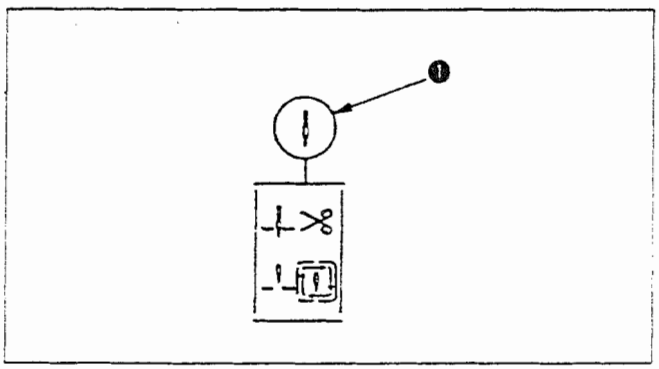
The one-shot automatic stitching function can be separately set by steps.



1. In the programmed stitching pattern process, press One-shot automatic stitching switch ❶ to specify the one-shot automatic stitching function.
2. ◎ is shown on the control panel, which shows the one-shot automatic stitching function has been specified.
3. In the step where the one-shot automatic stitching function has been specified, the sewing machine will automatically continue sewing, once the sewing machine starts running, until the end of the step is reached.

< Continuous stitching mode >

In this mode, it is possible to make the sewing machine execute the subsequent step after the completion of the current step.



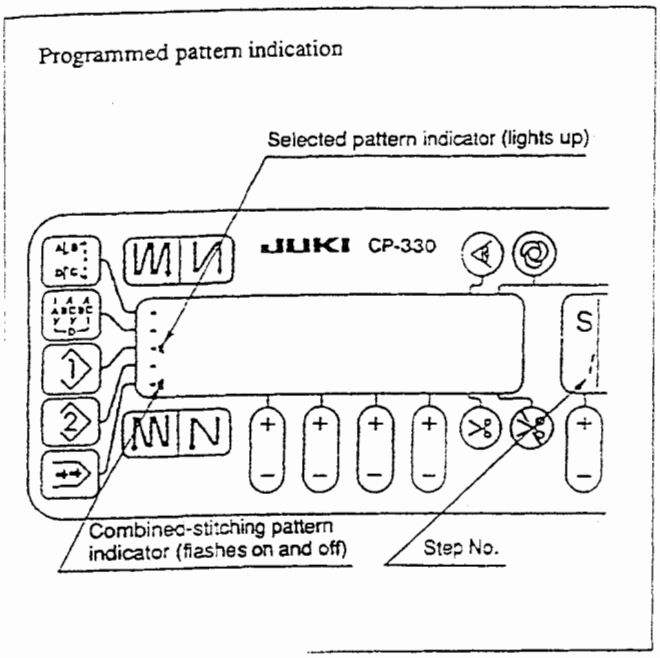
1. In the programmed stitching pattern process, press Stop-state selector switch ❶ to specify the continuous stitching mode.
2. As long as the continuous stitching mode is specified, you can make the sewing machine execute the subsequent step after the completion of the current step by depressing the front part of the foot pedal.

< To operate the control panel in combination with the material edge sensor >

- When the control panel is used in combination with the material edge sensor, the sewing process can be completed not by the predetermined number of stitches but by an input signal of the material edge sensor.
- Carefully read the Instruction Manual for the material edge sensor before using the material edge sensor.

6) Combined stitching pattern

Reverse stitching pattern, overlapped stitching pattern, programmed stitching pattern ① and programmed stitching pattern ② can be sewn with combined as desired. (As many as eight different patterns can be combined.)

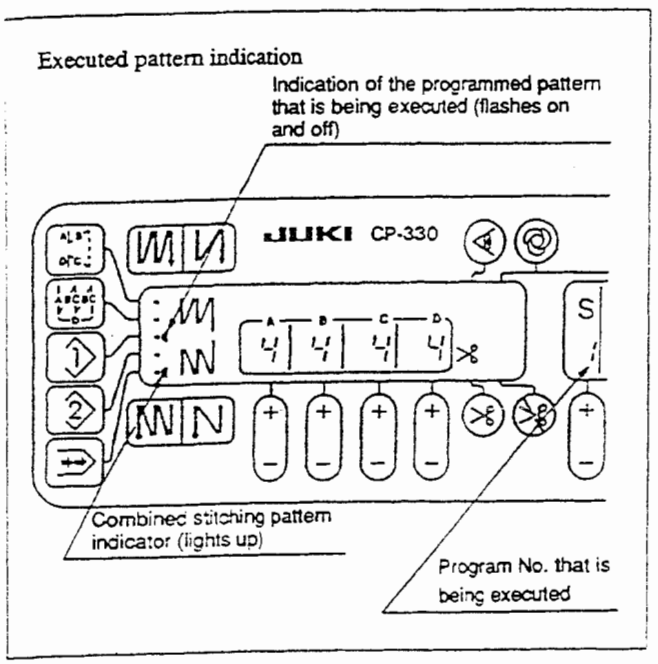


1 Programming mode

a. Press the ⇶ key twice to select the programming mode for the combined stitching pattern program. [Indications shown on the LCD panel go out excluding a part of them (only the step No. indication and the selected pattern indication stays ON.)]

b. Now, press the keys corresponding to the patterns to be combined in the order of sewing. (Every time a pattern is selected, the pattern indicator " ◂ " located on the side of the pattern, which corresponds to the selected pattern lights up and, at the same time, the step No. increases as 1, 2, 3 and so on.)

c. If you want to execute the same pattern twice continuously, press the pattern switch twice.



2 Execution mode

a. Upon completion of the programming procedure, press the ⇶ key again, and the machine will enter the combined program executing mode.

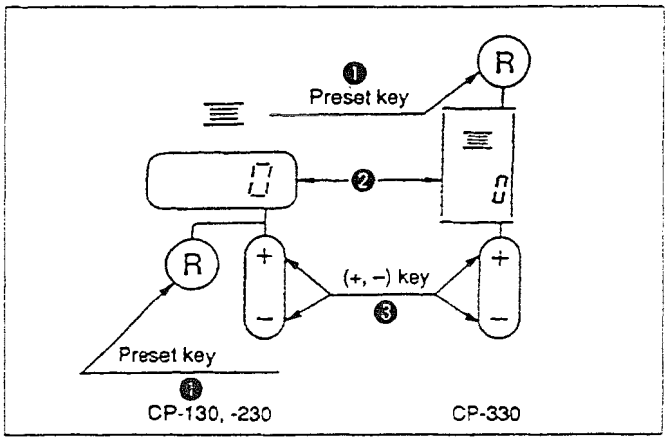
b. Every time the thread trimmer actuates, the machine proceeds to the subsequent pattern which has been selected. (The selected pattern indicator " ◂ " flashes on and off to indicate the pattern that is being executed.)

c. To finish the combined pattern stitching program, press another pattern selecting key after thread trimming.

(Caution) If the thread trimmer actuates before completion of a pattern, the machine will proceed to the subsequent program.

7) How to use the bobbin thread counter (CP-130/-230/-330)

The machine detects the number of stitches finished. The preset value on the bobbin thread counter is subtracted in accordance with the number of stitches finished. (Every time the detector detects that the sewing machine has finished 10 stitches, 1 is subtracted from the preset value on the bobbin thread counter.) When the value on the counter becomes a minus value as ". . . . ➡ 1 ➡ 0 ➡ –1," the buzzer peeps three times to warn the operator that the time to change the bobbin thread has come.

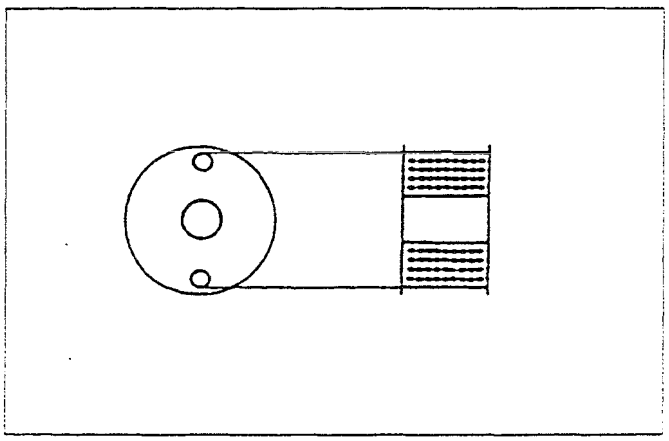


1. Press bobbin thread counter reset switch ❶ to return the value indicated on bobbin thread counter ❷ to the initial value (it has been factory-set to "0" at the time of delivery).

(Caution) **The bobbin thread counter cannot be rest during sewing. In this case, make the thread trimmer actuate once.**

2. Specify an initial value desired using bobbin thread amount setting switch ❸ .
(The initial value can be set to 9999 at the maximum.)

<Initial value on the bobbin thread counter for reference>



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

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

Thread tension rate 100%

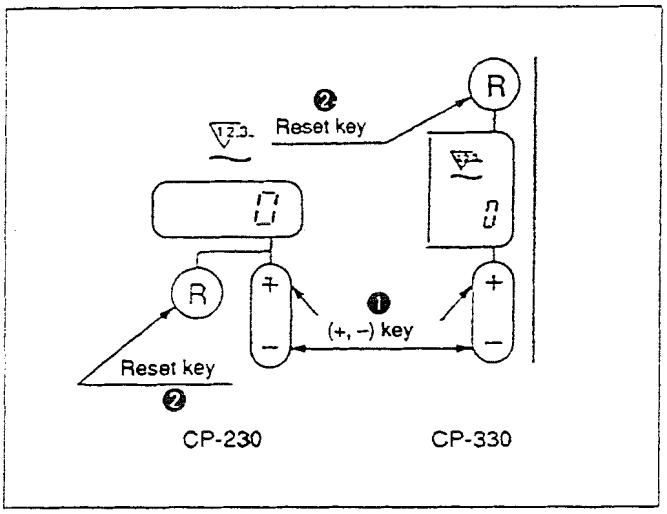
* Actually, the bobbin thread counter is affected by the material thickness and the sewing speed. So, adjust the initial value of the bobbin thread counter in accordance with the operating conditions.

3. Once the initial value is specified properly, start the sewing machine.
4. When a minus value is shown on the counter and the buzzer peeps three times, replace the bobbin thread.
5. After the bobbin thread has been properly replaced, press bobbin thread counter reset switch ❶ to return the value on the bobbin thread counter to the initial value. Now, re-start the sewing machine.
6. If the remaining amount of bobbin thread is excessive or the bobbin thread runs out before the bobbin thread counter indicates a minus value, adjust the initial value appropriately using the "+" or "–" switch of bobbin thread amount adjusting switch ❸ .

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

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

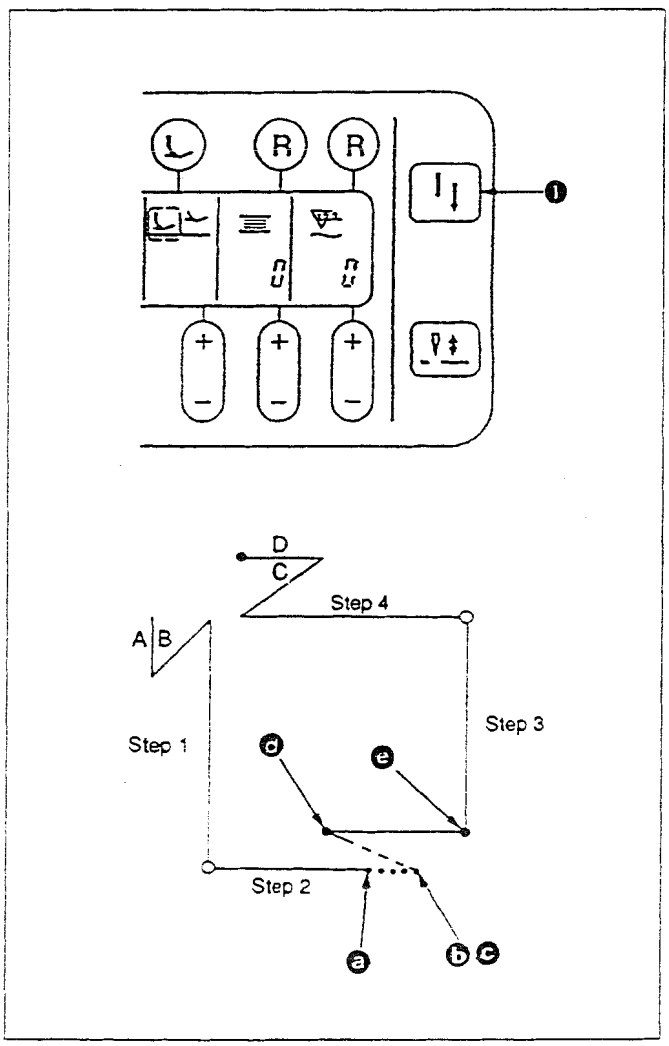
8) No. of pcs. counter (CP-230/-330)



The No. of pcs. counter counts up the number of finished products every time the machine performs thread trimming. (0 → 1 → 2 . . . . . → 9999)
The value on the No. of pcs. counter can be modified using No. of pcs. counter value correction switch ❶ mounted on the control panel. The value on the No. of pcs. counter is reset to "0" by pressing No. of pcs. counter reset switch ❷.

9) Re-sewing switch (CP-330)

The re-sewing switch is used when the bobbin thread runs out during the programmed stitch pattern sewing steps.

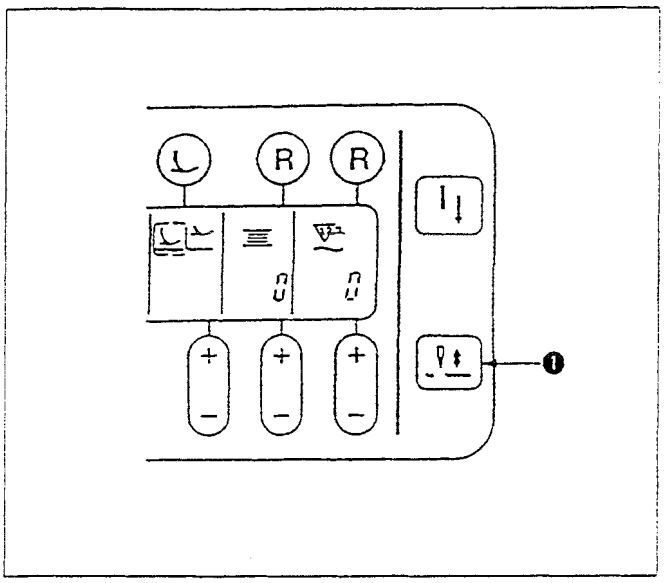


1. The bobbin thread runs out during the operation steps for sewing. ⓔ
2. Bring the foot pedal to its neutral position to make the sewing machine stop. Now, depress the back part of the foot pedal to make the thread trimmer actuate. ⓑ
3. Turn ON re-sewing switch ❶ . ⓒ
4. Replace the bobbin with a new one, thread the machine head and slightly feed the material on the machine in the reverse direction to return the material to the position where the sewing was interrupted to allow the sewing machine to sew over the finished seam. ⓓ
5. Depress the front part of the foot pedal until stop position ⓔ of step 2 is reached.
6. Turn ON re-sewing switch ❶ at stop position ⓔ . Then, the next step is indicated on the control panel. The sewing machine continues the sewing of the programmed stitching pattern.

* If the needle thread breaks while the sewing machine is running in the free sewing mode (ⓓ → ⓔ) after pressing re-sewing switch ❶ , bring the foot pedal to its neutral position. Then, depress the back part of the foot pedal to actuate the thread trimmer. Re-thread the machine head and slightly feed the material in the reverse direction, and press re-sewing switch ❶ . This enables the sewing machine to continue sewing under the free sewing mode. Then, operate the control panel as described in the aforementioned steps 5) and 6).

(Caution) **To return to the first operation step of the programmed stitching pattern without using re-sewing switch ❶ , depress the back part of the foot pedal to actuate the thread trimmer. This makes the control panel give the step indication 1. Now, you can start sewing from the first step of the programmed stitching pattern.**

10) Needle up/down compensation switch (CP-130/-230/-330)



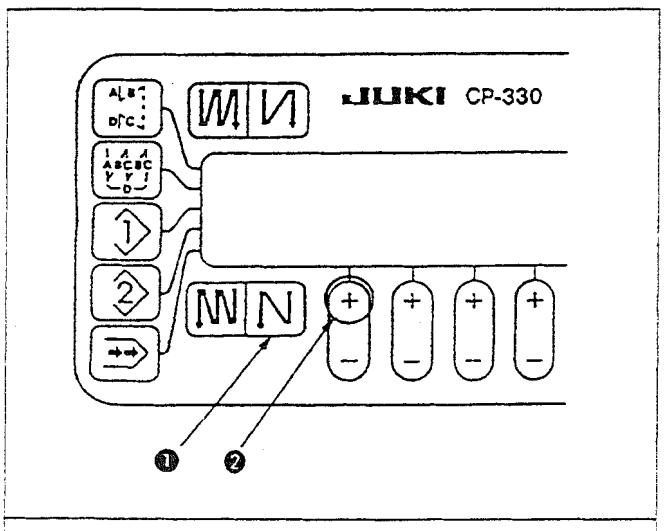
Every time needle up/down compensation switch ❶ is pressed, the needle goes up when it is in its lowest position or comes down when it is in its highest position. This compensates the stitch by a half of the predetermined stitch length. However, note that the machine does not run continuously at low speed even if you keep the switch held pressed.

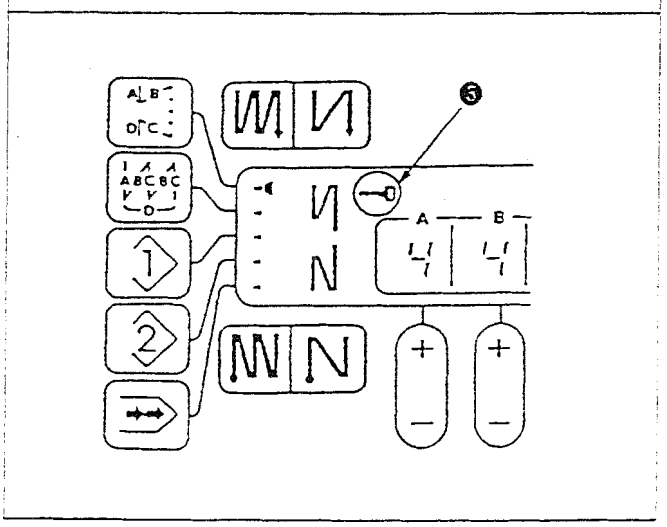
Also, note that the needle up/down compensation switch is rendered ineffective after you have turn the handwheel by hand.

The thread trimmer is operative only in the case of needle up/down compensation after the front part of the foot pedal has been once depressed.

11) Key lock function (CP-130/-230/-330)

In order to prevent the specified data on the number of stitches or the stitching processes (A, B, C and D) from being changed by mistake, the setting switch can be locked. (Even with the setting switches are in the key-lock state, the pattern to be sewn and the value on the bobbin thread counter can be changed.)





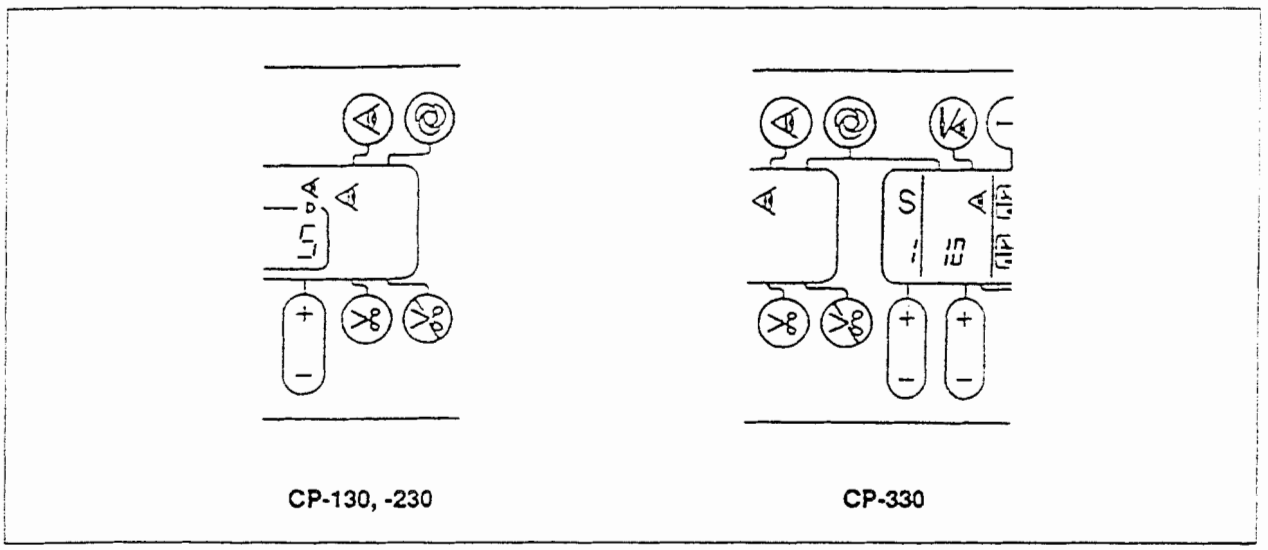
1. After the completion of the setting of data on the number of stitches, etc., turn OFF the power to the machine once.
2. Turn ON the power to the machine while simultaneously pressing automatic reverse stitching (for end) switch ❶ and the "+" switch of number of stitches setting switch ❷ for process A with fingers.
3. Key mark ❸ is shown on the control panel. This completes the key-locking of the switches.
   (If the key mark is not shown on the control panel, carry out the aforementioned steps 1 through 3 again.)

* To release the switches from the key-locked state, perform the aforementioned steps 1 and 2 .
(The key mark will go out and the switches will be released from the key-locked state.)

12) ON/OFF switch ⓐ of the material edge sensor

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

(Caution) **If the material edge sensor is used in combination with the control panel, carefully read the Instruction Manual for the material edge sensor beforehand.**



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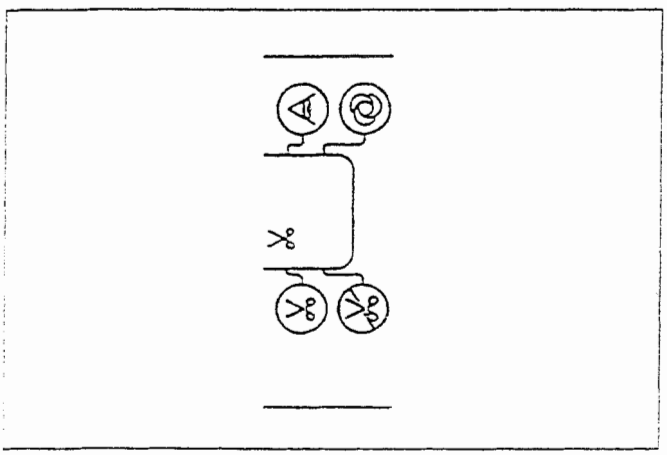
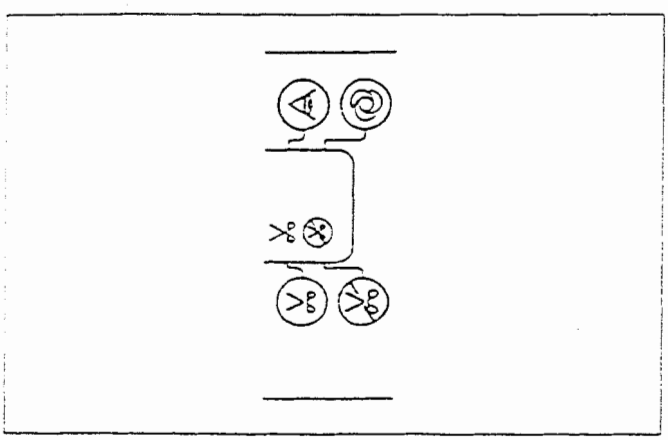
13) Automatic thread trimming switch ⓒ



- This switch is used to automatically actuate the thread trimmer in a process where the sewing machine automatically stops or when the material edge sensor is used. (If the automatic reverse stitching (for end) is specified, the thread trimmer will actuate after the sewing machine completes the automatic reverse stitching (for end).)

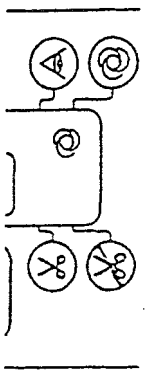
14) Thread trimming prohibition switch ⓓ



- This switch is used to temporarily make the thread trimming function inoperative.
  The other performance of the sewing machine is not affected by this switch.
- If the automatic thread trimming switch ⓒ and the thread trimming prohibition switch ⓓ are both specified, the machine will not perform thread trimming but stop with its needle up.

15) One-shot automatic stitching switch

- This switch is used, in the constant-dimension stitching mode or in the process where the material edge sensor is specified, to make the sewing machine automatically perform sewing at the specified speed until the end of the process is reached only by driving the sewing machine once.



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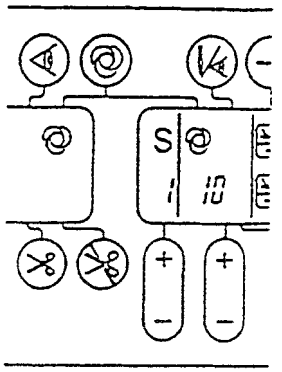
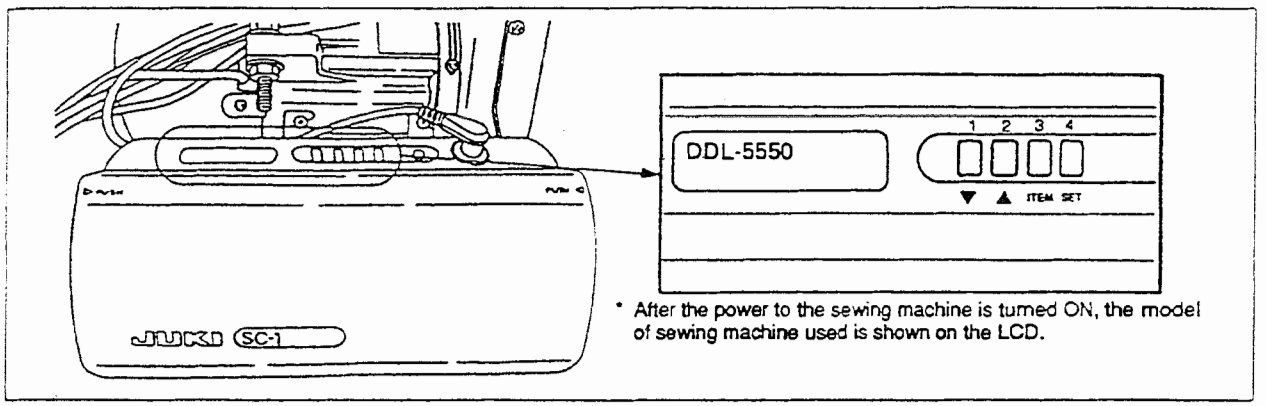


CP-330

4. EXPLANATION OF THE PSC BOX

(1) How to set for functions

Various functions can be selected and specified using the four setting switches and liquid crystal display mounted on the front face of the PSC box.



* After the power to the sewing machine is turned ON, the model of sewing machine used is shown on the LCD.

(Caution) Never operate the switches in any way other than the procedure described below.

1) Setting for functions

Functions can be set in two different levels, i.e., user level and service level. In the service level, the number of function items that can be specified is larger than that in the user level. Set for functions in either level according to sewing conditions.

User level (ITEM No. 001 to 006, 008 to 010, 012, 018 to 020, 030 to 033, 037, 038, 050, 055 to 057, 059, 061 and 108)

Service level (ITEM No. 007, 011, 013 to 015, 035, 036, 039 to 049, 051 to 054, 058, 060, 062, 064 to 066, 075, 100 to 103, 105 and 107 in addition to the items accepted under the user level)

1. Turn OFF the power to the machine once.

2. Call the user level or service level for the setting of functions.

   < How to call the user level >

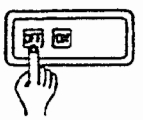
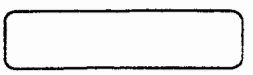
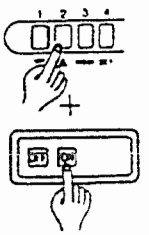
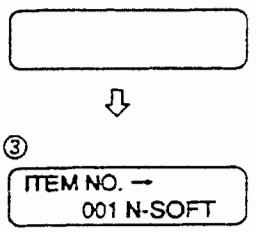
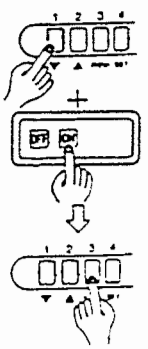
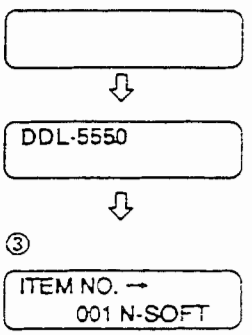
   Pressing the 2 [▲] switch, turn ON the power to the machine.

   < How to call the service level >

   Pressing the 1 [▼] switch, turn ON the power to the machine.

   Then, press the 3 [ITEM] switch.

3. Indication shown in the illustration on the right will be given on the LCD. (If the indication does not appear on the LCD, re-perform the procedure from step 1 .)

	Switch operation	Indication on the LCD
1		
2	Calling the user level 	
	Calling the service level 	

4. Then, select the item No. corresponding to the function you want to specify by pressing the 1 [▼] switch or 2 [▲] switch.
(Refer to the function setting table for the description of items.)

5. Once the item No. corresponding to the function desired has been selected, press the 4 [SET] switch.

Example)
Function for changing the number of stitches for the soft-start function (0 to 5)

* For example, the number of stitches for the soft-start function is changed to five.

6. The indication shown on the LCD will change as illustrated in the figure on the right. Now, the set value can be changed.

7. Press the 2 [▲] switch five times to change the number of stitches for the start to to five.
(To decrease the number of stitches, press the 1 [▼] switch.)

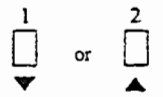
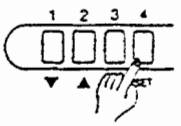
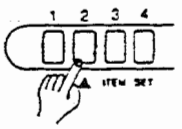
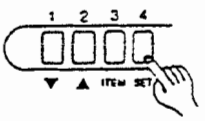
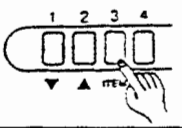
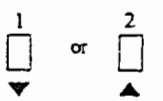
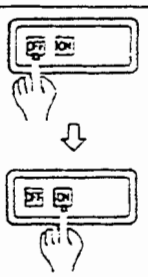
8. After the completion of data changing procedure, press the 4 [SET] switch to enter the modified value.

(Caution) If you omit this procedure, the modified value will not be entered.

9. The indication given on the LCD will change to show that data on the subsequent function item No. can be modified.

10. To put forward or put back the item No., press first the 3 [ITEM] switch to return the indication on the LCD to the function setting, and call the item No. desired by pressing the 1 [▼] switch or 2 [▲] switch.

11. After the completion of operation described in step 8 , turn OFF the power to the machine, then turn it ON. This will return the machine to the normal operation mode.

	Switch operation	Indication on the LCD
4		Selected item No. is indicated.
5	Example) Changing the number of stitches for the soft-start function 	ITEM NO. → 001 N-SOFT ⇩ ⑥ 001 N-SOFT → 0 (N)
7		001 N-SOFT → 5 (N)
8		001 N-SOFT → 5 (N) ⇩ ⑨ 002 ED → 0: off 1:on
10		ITEM NO. → 002 ED
		Selected item No. is indicated.
11		⇩ DDL-5550

(2) PSC function setting table (Refer to the pages for reference for details.)

- → shows the set value.

Number of stitches for the soft-start function (See 1) on page 20.)

△	001	N-SOFT	→	0 [N]

Material edge sensor function (See 2) on page 20.)

△	002	ED	→	0 : off 1 : on

Thread trimming function in accordance with the material edge sensor (See 2) on page 20.)

△	003	EDTRM	→	0 : off 1 : on

Number of stitches for the material edge sensor (See 2) on page 20.)

△	004	ED (N)	→	5 [N]

Flicker reducing function (See 3) on page 21.)

△	005	T-Acc	→	0 1

Bobbin thread counting function (See 4) on page 21.)

△	006	SCBob	→	1 : on 0 : off

Unit used for count-down of the bobbin thread (See 4) on page 21.)

	007	Ratio	→	1 / 10 1 / 15

Number of revolutions for reverse stitching (See 5) on page 21.)

△	008	S-BT	→	1900 [spm]

Thread trimming prohibiting function (See 6) on page 21.)

△	009	TRMINH	→	0 : off 1 : on

Specification of the needle bar position when the sewing machine stops (See 7) on page 21.)

△	010	NPS	→	Down Up

Click (See 8) on page 22.)

	011	Sound	→	1 : on 0 : off

SW2 on the simplified panel (See 9) on page 22.)

△	012	SW2	→	NF FFeed

Sewing machine stop in accordance with the bobbin thread counter (See 4) on page 21.)

	013	AsCnt	→	0 : off 1 : on

No. of pcs. counter (See 10) on page 22.)

	014	NTO	→	1 : on 0 : off

Number of times of detections of run-out of bobbin thread (See 11) on page 22.)

	015	BTDS	→	1 [N]

Prevention of tangle-up thread at the sewing start (See 12) on page 23.)

※ △	018	BNC	→	1 : on 0 : off

Needle thread releasing (for start) function (See 12) on page 23.)

※ △	019	THold	→	0 : off 1 : on

Number of condensation stitches (See 12) on page 23.)

※ △	020	N-CS	→	1 [N]

Number of intermediate reverse feed function (See 13) on page 24.)

△	030	OBT	→	0 : off 1 : on

Number of intermediate reverse feed stitches (See 13) on page 24.)

△	031	N-OBT	→	4 [N]

Conditions required to make the intermediate reverse stitching function effective while the sewing machine is in the stop state (See 13) on page 24.)

△	032	OBTS	→	0 : off 1 : on

Thread trimming function in accordance with the intermediate reverse stitching (See 13) on page 24.)

△	033	OBTT	→	0 : off 1 : on

Number of revolutions at low speed (See 14) on page 25.)

	035	S-Pos	→	200 [spm]

Number of revolutions for thread trimming (See 15) on page 25.)

	036	S-TRM	→	210 [spm]

Number of revolutions for soft start function (See 1) on page 20.)

△	037	S-SOFT	→	800 [spm]

One-shot automatic stitching speed (See 16) on page 25.)

△	038	S-ASS	→	2500 [spm]

Pedal stroke for starting the machine (See 17) on page 25.)

	039	P-SSP	→	3.0 [mm]

Low-speed operation section of the pedal (See 17) on page 25.)

	040	P-LSA	→	6.0 [mm]

Presser foot lift starting position of the pedal (See 17) page 25.)

	041	P-FLW	→	−2.1 [mm]

Presser foot descending starting position of the pedal (See 17) on page 25.)

	042	P-FLD	→	1.0 [mm]

Pedal stroke 2 for making the thread trimmer start (See 17) on page 25.)

043	P-TRM2	→	−5.1 [mm]

Pedal stroke for making the machine reach the largest number of revolutions (See 17) on page 25.)

044	P-MAX	→	15.0 [mm]

Compensation of the neutral point of the pedal (See 18) on page 27.)

045	P-ANP	→	0

Selection of auto-lifter (See 19) on page 27.)

046	FLSel	→	0 : sol 1 : air

Length of time during which the presser foot is held raised (See 19) on page 27.)

047	T-FL	→	60 [sec]

Pedal stroke 1 for making the thread trimmer start (See 17) on page 25.)

048	P-TRM1	→	−3.5 [mm]

Length of time during which the rotation of the machine is prohibited while the presser foot is descending (See 19) on page 27.)

049	T-FLWT	→	140 [msec]

Presser foot lifting function of the pedal (See 20) on page 28.)

△	050	PFL	→	0 : off 1 : on

Compensation of the timing for turning ON the solenoid for reverse stitching (for start) (See 21) on page 28.)

051	T-SON	→	3

Compensation of the timing for turning OFF the solenoid for reverse stitching (for start) (See 21) on page 28.)

052	T-SOFF	→	12

Compensation of the timing for turning OFF the solenoid for reverse stitching (for end) (See 21) on page 28.)

053	T-EOFF	→	18

Effective diameter of motor pulley (See 23) on page 32.)

054	PCDMP	→	105.0 [mm]

Presser foot lifting function after thread trimming (See 24) on page 32.)

△	055	FLAT	→	0 : off 1 : on

Reverse rotation function for raising the needle after thread trimming (See 25) on page 32.)

△	056	RATRM	→	0 : off 1 : on

Bobbin thread remaining amount detecting function (See 11) on page 22.)

△	057	BTDF	→	0 : off 1 : on

Predetermined upper/lower position of the needle bar (See 26) on page 32.)

058	HPos	→	0 : off 1 : on

Auto/manual change-over function for reverse stitching (for start) (See 27) on page 32.)

△	059	SBTO	→	Auto Manu

Sewing machine stop function immediately after reverse stitching (for start) (See 27) on page 32.)

060	SBTQ	→	0 : off 1 : on

Sewing machine stop function using the bobbin thread remaining amount detecting device (See 11) on page 22.)

△	061	ASBob	→	1 : on 0 : off

Auto/manual change-over function for overlapped stitching speed (See 28) on page 33.)

062	BTOp	→	Auto Manu

EBT change-over speed (See 22) on page 31.)

064	S-Wait	→	180 [spm]

Condensation stitching solenoid ON timing when the number of condensation stitches is set to 1 (See 12) on page 25.)

※	065	T-CS1	→	−15

Condensation stitching solenoid ON timing when the number of condensation stitches is set to 2 (See 12) on page 25.)

※	066	T-CS2	→	−15

Direction of rotation of the motor (See 29) on page 33.)

075	DM	→	CCW CW

Accumulated length of time during which the sewing machine is energized (See 30) on page 33.)

100	STO	→	0 [min]

E2PROM reset (See 31) on page 33.)

ITEM	NO.	→	■
	101	ResEEP	

Monitor of the state of input signal for ITEM No. 102 (See 32) on page 33.)

[PO*]	7 − − − − − − 0
→	1 1 1 1 1 1 1 1

Registered troubles of ITEM No. 103 (See 33) on page 33.)

→	EO	0
	EXIT	

Receiving mode of E2PROM (See 34) on page 33.)

ITEM	NO.	→	■
	105	RxCopy	

Transmission mode of E2PROM (See 34) on page 33.)

ITEM	NO.	→	■
	107	TxData	

Version management No. of ITEM No. 108 (See 35) on page 33.)

Version
* * − * * − * * − * *

△) User level

*) The function is rendered effective when the SC-2 is used in combination with the sewing machine which is equipped with a bird's nest prevention device.

(Caution) The function setting table is prepared for the DDL-5550 model of sewing machine.

(3) Explanation of the functions

1) Specifying the soft-start function (Function setting No. 001, 037)

1. Number of stitches for the soft-start function (Function setting No. 001)
The needle thread may fail to interlace with the bobbin thread at the start of sewing when a smaller stitch length or a thicker needle is used. To solve such problem, this function is used to limit the sewing speed at the sewing start, thereby ensuring successful formation of the starting stitches.

001 N-SOFT→ 0 [N]

0 : The soft-start function is not specified.
1 to 9 : The number of stitches to which the soft-function works.

2. The number of revolutions for the soft-start (Function setting No. 037)
The limit of sewing speed while the soft-start function works is also changed.

037 S-SOFT →800 [spm]

Data setting range
130 to 2000 [spm] <10/s.p.m.>

2) Material edge sensor (ED: Optional) function (Function setting No. 002 to 004)

This function is rendered effective when the material edge sensor (ED) is attached to the machine. Refer to the Instruction Manual for the material edge sensor for details.

(Caution) The specified data will be ineffective when the sewing machine is not equipped with the material edge sensor and when the sewing machine is equipped with the control panel of CP-130 or higher class.

1. ON/OFF of the material edge sensor (Function setting No. 002)
Selects either the material edge sensor is made operative or inoperative. (When the CP-130/-230/-330 control panel is used, the material edge sensor ON/OFF switch (④) mounted on the control panel is given priority.)

002 ED→ 0 : off 1 : on

off : Material edge sensor is inoperative. (Nos. 003 and 004 are ineffective.)
on : Material edge sensor is effective.

After the material edge sensor detects the edge of material, the sewing machine will sew a predetermined number of stitches (No. 004) and stop. If "1: on" is selected for No. 003, the sewing machine will automatically perform thread trimming.

2. Thread trimming function in accordance with the material edge sensor (Function setting No. 003)
Selects either the thread trimming function using the material edge sensor made effective or ineffective. (When the CP-130/-230/-330 control panel is used, the automatic thread trimming switch (⑤) mounted on the control panel is given priority.)

003 EDTRM→0 : off 1 : on

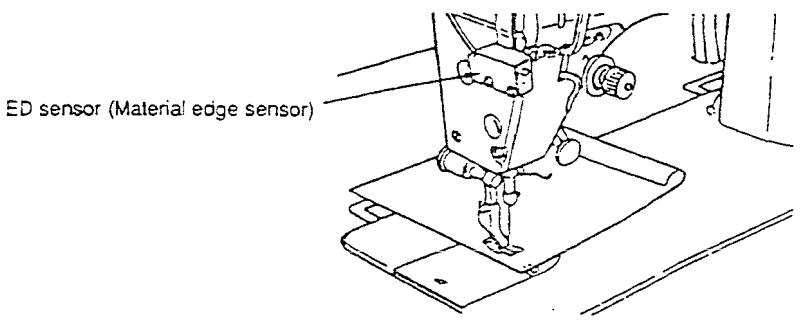
off : Automatic thread trimming function after the material edge has been detected is ineffective.
on : The machine sews a predetermined number of stitches (No. 004) then automatically performs thread trimming after the material edge has been detected.

3. Number of stitches for the material edge sensor (Function setting No. 004)
Specifies the number of stitches to be sewn until the machine stops after the material edge sensor has detected the edge of material.

004 ED [N] →5 [N]

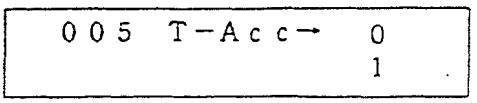
0 to 19 stitches <1/stitch>

(Caution) If the sewing speed is high, there is a minimum number of stitches required to be sewn until the sewing machine stops. For example, when the sewing machine perform sewing at a speed of 4,000 s.p.m., at least five stitches are required to be sewn until the sewing machine stops. This means that the sewing machine will not stop according to the number of stitches specified if it has been set to 1 or 2. In this case, specify the number of stitches that is sufficient to make the machine stop without fail in consideration of the sewing speed or lower the sewing speed.



3) Flicker reducing function (Function setting No. 005)

This function is used to prevent the hand lamp from flickering at the start-up of the sewing machine. The larger the value is set, the more effective the function will work.

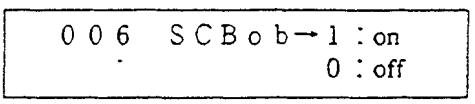


Data setting range
0 to 8
0 : Flicker reducing function does not work.
8 : Flicker reducing function works most effectively.

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

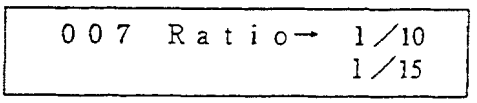
4) Bobbin thread counting function (Function setting Nos. 006, 007, 013)

1. This function is used, when the control panel (CP-130 or higher class) is used with the machine, to indicate the remaining amount of the bobbin thread while subtracting one from a predetermined set value every time the sewing machine finishes a predetermined number of stitches. Refer to the explanation of the control panel (on page 11).



(Caution) If the bobbin thread counting function is set to the OFF state, the indication on the LCD of the control panel will go out and the bobbin thread counting function is inoperative.

2. Unit used for count-down of the bobbin thread (Function setting No. 007)
The unit used for the count-down (subtraction) of the bobbin thread counter can be changed.



1/10 : 1 count-down for every 10 stitches
1/15 : 1 count-down for every 15 stitches
1/20 : 1 count-down for every 20 stitches

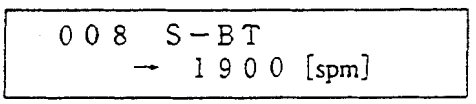
3. Sewing machine stop function in accordance with the bobbin thread counter (Function setting No. 013)
This function is used to stop the sewing machine when the value shown on the bobbin thread counter becomes "-1" or less.

0 : off Sewing machine stop function is inoperative even when the bobbin thread counter indicates "–1" or a smaller value.
1 : on Sewing machine stops when the bobbin thread counter indicates "–1" or a smaller value.

(Caution) If the bobbin thread counter indicate "–1" or a smaller value during a sewing process, the sewing machine will stop after the completion of the process (after thread trimming).

5) Number of revolutions for reverse stitching (Function setting No. 008)

Specifies the number of revolutions (sewing speed) of the sewing machine for reverse stitching (for start). reverse stitching (for end) and overlapped stitching.



Data setting range
180 to 3000 [spm] <10/s.p.m.>

(Caution) If any value other than the standard set value, the finished seam may not overlap the previously sewn one with accuracy. In this case, adjust so that the finished seam neatly overlap the previously sewn seam by changing the number of stitches for processes A through D. Refer to item Nos. 051, 052 and 053 for how to compensate the seam.

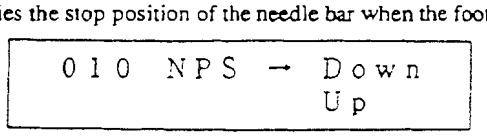
6) Thread trimming prohibiting function (Function setting No. 009)

This function is used to temporarily prohibit thread trimming in case of joining seams, etc.
When the CP-130/-230/-330 control panel is used, the thread trimming prohibiting switch ⊗ mounted on the control panel is given priority.

0 : off Thread trimming is effective.
1 : on Thread trimming is prohibited.
(The machine will not perform thread trimming but stops with its needle up when depressing the back part of the foot pedal.)

7) Specification of the needle bar position when the sewing machine stops (Function setting No. 010)

Specifies the stop position of the needle bar when the foot pedal rest in the neutral position.



Down : The needle bar stops in its lowest position.
Up : The needle bar stops in its highest position.

(Caution) If the upper stop position is specified, the thread trimmer actuates after the needle bar has descended to the lowest position.

8) Click of the key switches on the PSC (Function setting No. 011)

Specifies whether the four key switches mounted on the PSC box click.

011 Sound→ 1 : on 0 : off	1 : on Switches click. 0 : off Switches do not click.

9) Function setting No. 012

Not used at present. (Data specified are ineffective.)

012 SW2 → NF FFeed

10) No. of pcs. counter (Function setting No. 014)

The No. of pcs. counter counts the number of completed sewing processes every time the thread trimmer actuates.
This function is made operative when the machine is used in combination with the CP-230 or CP-330 control panel. Refer to the explanation of the control panel.

014 NTO → 1 : on 0 : off	1 : on No. of pcs. counting function is effective. 2 : off No. of pcs. counting function is inoperative. (Indication on the CP-230 or CP-330 will go out.)

11) Bobbin thread remaining amount detecting function (Function setting Nos. 057, 061 and 015)

The bobbin thread remaining amount detecting device detects the amount of bobbin thread after thread trimming to allow the operator to know the time to change the bobbin. The bobbin thread remaining amount detecting function is effective when the bobbin thread remaining amount detecting device (AE: Optional) is installed on the sewing machine.
Refer to the Instruction Manual for the bobbin thread remaining amount detecting device for details.

(Caution) If the bobbin thread remaining amount detecting device is not attached to the machine, be sure to make this function ineffective (Function setting No. 057 0: off).

1. Bobbin thread remaining amount detecting function (Function setting No. 057)
Specifies whether the bobbin thread remaining amount detecting function is made operative or inoperative.

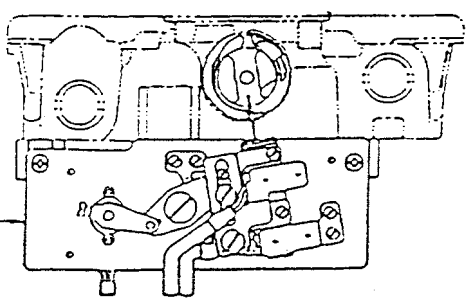
057 BTDF → 0 : off 1 : on	0 : off Bobbin thread remaining amount detecting function is ineffective. 1 : on Bobbin thread remaining amount detecting function is effective.

2. Sewing machine stop function using the bobbin thread remaining amount detecting device (Function setting No. 061)
This function stops the sewing machine when the value on the bobbin thread remaining amount detector becomes "–1" or less.

061 ASBob→ 1 : on 0 : off	1 : on Sewing machine stops when the bobbin thread remaining amount counter indicates "–1" or a smaller value. 0 : off Sewing machine stop function is inoperative even when the bobbin thread remaining amount counter indicates "–1" or a smaller value.

3. Number of times of detections of run-out of bobbin thread (Function setting No. 015)
Specifies the number of times of detections of run-out of bobbin thread required to make the buzzer sound after the bobbin thread remaining amount detecting device has detected run-out of bobbin thread. (When the CP-130, -230, -330 control panel is used, the bobbin thread counter mounted on the control panel is given priority.)

015 BTDS → 1 [N]	0 : Bobbin thread remaining amount detecting function is temporarily made ineffective. 1 to 19 : The number of times of detections of remaining amount of bobbin thread after the bobbin thread remaining amount detecting device has detected run-out of bobbin thread until the buzzer sounds.



Bobbin thread remaining amount detecting device

12) Prevention of tangle-up thread at the sewing start (Function setting Nos. 018 to 020, 065, 066)

This function is effective when the SC-2 is used in combination with the machine head provided with a bird's nest prevention device and the CP-130, -230 or -330 control panel.

(Caution) For the SC-1, this function is inoperative regardless of the set value of the function.

1. The prevention of tangle-up thread function (Function setting No. 018)

018 BNC → 1 : on 0 : off

1 : on Prevention of tangle-up thread is effective.
0 : off Prevention of tangle-up thread is ineffective.
Set values for function setting Nos. 019 to 020, 065 and 066 are ineffective.

2. Needle thread releasing (for start) function (Function setting No. 019)

019 THold→0 : off 1 : on

Normally the machine is operated with this function set to inoperative (0: off).

3. Number of condensation stitches (Function setting No. 020)
Specifies the number of stitches during which the condensation stitching is performed at the end of sewing.

020 N−CS →1 [N]

Data setting range
0 to 9 stitches <1/stitch>

4. Condensation stitching solenoid ON timing (when the number of condensation stitches is set to 1) (Function setting No. 065)
The solenoid actuating timing in terms of the angle when the number of condensation stitches is set to 1 can be compensated.

065 T−CS1 → −15

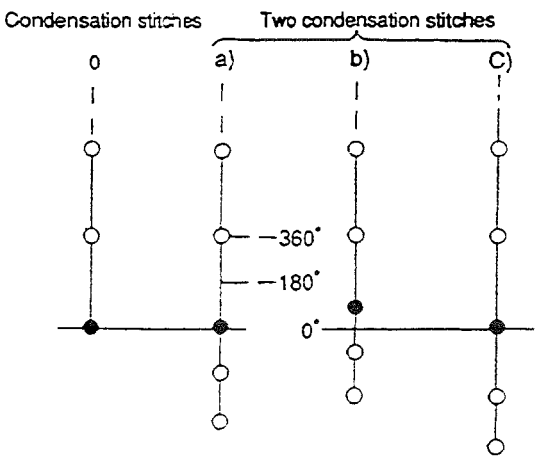
Adjustable range
−36 to 0 <1/10°>

5. Condensation stitching solenoid ON timing (when the number of condensation stitches is set to 2) (Function setting No. 066)
The solenoid actuating timing in terms of the angle when the number of condensation stitches is set to 2 or more can be compensated.

066 T−CS2 → −15

Adjustable range
−36 to 0 <1/10°>

Example) When the number of condensation stitches is set to 2



a) Normal condensation stitching pitch

b) Stitch length of the stitch just before starting condensation stitching is decreased.

c) The first condensation stitch length is larger than the normal condensation stitch length.

- If the stitch length of the stitch just before starting condensation stitching is decreased, specify a value to retard the solenoid ON timing (toward 0°).
- If the condensation stitch length is larger than the normal one, specify a value to advance the solenoid ON timing (toward 360°).

13) Intermediate reverse stitching function (Function setting Nos. 030 to 033)

The stitch number limit and thread trimming command functions can be added to the one-touch type reverse stitching switch mounted on the machine head.

1. Intermediate reverse stitching function (Function setting No. 030)

```
030  OBT  →  0 : off
             1 : on
```

0 : off Normal back tacking function
1 : on Intermediate reverse stitching function is effective.

2. Number of intermediate reverse stitches (Function setting No. 031)
Specifies the number of intermediate reverse stitches.

```
031  N−OBT→  4
               [N]
```

Data setting range
0 to 19 stitches <1/stitch>

3. Conditions required to make the intermediate reverse stitching function effective (Function setting No. 032)
Selects whether the intermediate reverse stitching function is effective or ineffective while the sewing machine is in the stop state.

```
032  OBTS  →0 : off
             1 : on
```

0 : off The intermediate reverse stitching function is ineffective when the sewing machine is in the stop state.
1 : on The intermediate reverse stitching function is effective even when the sewing machine is in the stop state.

(Caution) The intermediate reverse stitching function is effective while the sewing machine is rotating regardless of the setting of No. 032.

4. Thread trimming function in accordance with the intermediate reverse stitching (Function setting No. 033)
Enables automatic thread trimming after the completion of intermediate reverse stitching.

```
033  OBTT  →0 : off
             1 : on
```

0 : off Thread trimming is not performed.
1 : on Thread trimming function is effective.

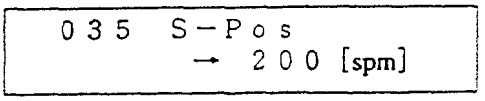
Application
1. Used for sewing reinforcement stitches (retaining stitches) on pleats if the thread trimming function is not specified.
2. Used as a thread trimming switch for the sewing machine for standing work when the thread trimming function is specified.

Appli-cation	Function setting			Output function
	No. 030 (OBT)	No. 032 (OBTS)	No. 033 (OBTT)	
❶	OFF	ON or OFF	ON or OFF	The manual count-down function will not operate.
❷	ON	OFF	OFF	If the one-touch type reverse stitching switch is operated with the front part of the foot pedal depressed, the machine will sew reverse feed stitches of the number specified for function setting No. 031.
❸	ON	ON	OFF	If the one-touch type reverse stitching switch is operated while the machine is at rest or the front part of the foot pedal depressed, the machine will sew reverse feed stitches of the number specified for function setting No. 031.
❹	ON	OFF	ON	If the one-touch type reverse stitching switch is operated with the front part of the foot pedal depressed, the machine will sew reverse feed stitches of the number specified for function setting No. 031, then perform the trimming.
❺	ON	ON	ON	If the one-touch type reverse stitching switch is operated while the machine is at rest or the front part of the foot pedal is depressed, the machine will sew reverse feed stitches of the number specified for function setting No. 031, then perform thread trimming.

❶ .....Used as the one-touch type reverse stitching switch for normal reverse stitching.
❷ .....Used for sewing reinforcement stitches (retaining stitches) for pleats. (Operates only as long as the machine is rotating.)
❸ .....Used for sewing reinforcement stitches (retaining stitches) for pleats. (Operates whether the machine is operating or not.)
❹ .....Used as the start switch for reverse stitching (for end). (Used to actuate the thread trimmer which is normally operated by depressing the back part of the foot pedal. Effective only when the sewing machine is in operation. Especially useful when the machine is used for standing work.)
❺ .....Used as the start switch for reverse stitching (for end). (Used to actuate the thread trimmer which is normally operated by depressing the back part of the foot pedal. Effective whether the sewing machine is operating or not. Especially useful when the machine is used for standing work.)

14) Number of revolutions at low speed (Function setting No. 035)

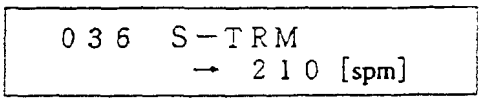
The lowest sewing speed of the sewing machine controlled by depressing the front part of the pedal can be adjusted.



Adjustable range
130 to 400 [spm] <5/s.p.m.>

15) Number of revolutions for thread trimming (Function setting No. 036)

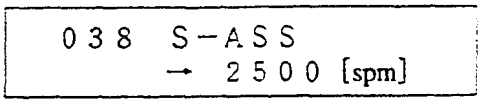
This function is used to regulate the sewing speed at the time of thread trimming which should be lowered regardless of the sewing speed controlled by the pedal.



Adjustable range
130 to 250 [spm] <5/s.p.m.>

16) One-shot automatic stitching speed (Function setting No. 038)

The sewing speed for one-shot automatic stitching mode, under which the machine continues sewing until a predetermined number of stitches is reached or the material edge is detected only by operating the foot pedal once, can be adjusted.

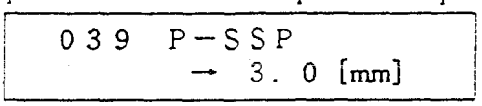


Adjustable range
200 to 10000 [spm] <50/s.p.m.>

(Cautions) **1. One-shot automatic stitching function is specified on the control panel of CP-130 or higher class.**
2. The max. sewing speed for the one-shot automatic stitching is limited by the machine head. (Note that the max. sewing speed can be set to 10,000 s.p.m. in terms of the indication on the control panel.)

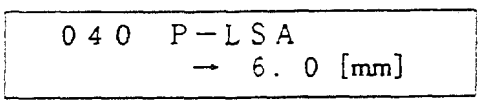
17) Adjustment of pedal stroke (Function setting Nos. 039 to 044, 048)

1. Pedal stroke for starting the sewing machine (Function setting No. 039)
The pedal stroke from the neutral position to the position at which the sewing machine starts running can be adjusted.



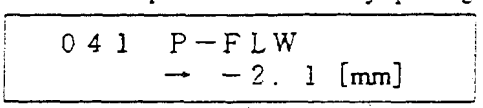
Adjustable range
1.0 to 5.0 [mm] <0.1/mm>

2. Low-speed operation section of the pedal (Function setting No. 040)
The pedal stroke to make the sewing machine run at low speed by operating the foot pedal can be adjusted.



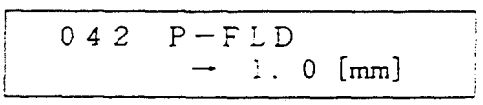
Adjustable range
1.0 to 10.0 [mm] <0.1/mm>

3. Presser foot lift starting position of the pedal (Function setting No. 041)
The pedal stroke from the neutral position to the position at which the presser foot starts going up can be adjusted. (For the machine of which presser foot is raised by operating the pedal.)



Adjustable range
-6.0 to 5.0 [mm] <0.1/mm>

4. Presser foot descending starting position of the pedal (Function setting No. 042)
The pedal stroke from the neutral position to the position at which the presser foot starts coming down can be adjusted. (When the function to automatically lift the presser foot from the neutral position is used.)



Adjustable range
0.8 to 5.0 [mm] <0.1/mm>

5. Pedal stroke 2 for making the thread trimmer start (Function setting No. 043)
The pedal stroke from the neutral position to the position at which the thread trimmer starts trimming the thread can be adjusted. (For the machine of which presser foot is raised by operating the pedal.)

043 P-TRM2 → -5.1 [mm]

Adjustable range
-6.0 to 1.0 [mm] <0.1/mm>

6. Pedal stroke for making the machine reach the largest number of revolutions (Function setting No. 044)
The pedal stroke from the neutral position to the position at which the max. sewing speed is reached can be adjusted.

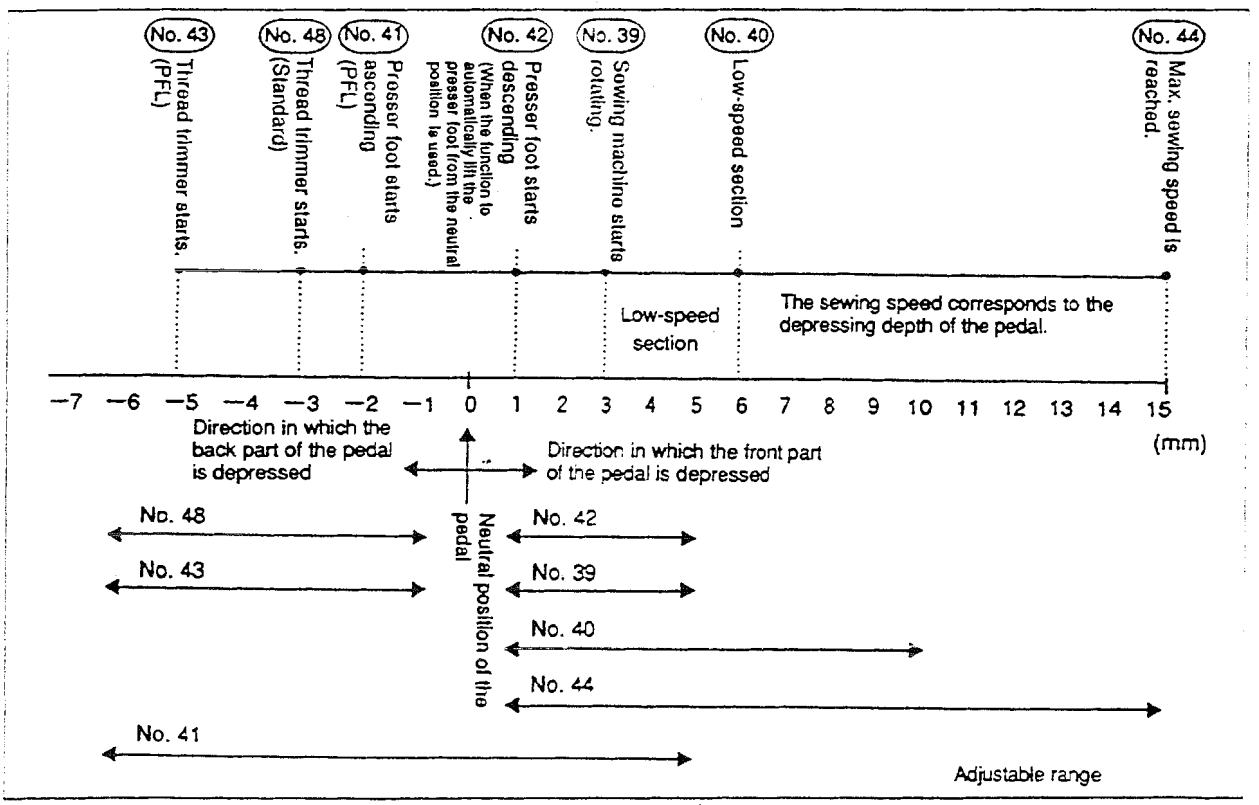
044 P-MAX → 15.0 [mm]

Adjustable range
1.0 to 15.0 [mm] <0.1/mm>

7. Pedal stroke 1 for making the thread trimmer start (Function setting No. 048)
The pedal stroke from the neutral position to the position at which the thread trimmer starts trimming the thread can be adjusted. (For the machine of which presser foot is raised by operating the standard hand-lifter or the knee switch.)

048 P-TRM1 → -3.5 [mm]

Adjustable range
-6.0 to 1.0 [mm] <0.1/mm>



(Caution) **The set positions shown above are intended for the DDL-5550.**

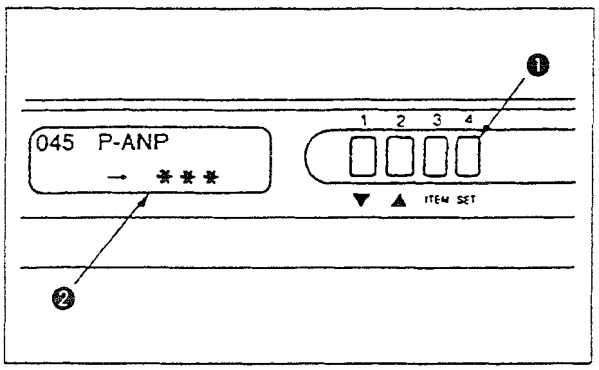
18) Compensation of the neutral point of the pedal (Function setting No. 045)

Indicates the compensating value of the neutral point of the pedal. Compensating value of the neutral point of the pedal is specified using the function to automatically compensate the neutral position of the pedal.

```
045  P-ANP
       → 0
```

Adjustable range
-15 to 15

Automatic compensation of the neutral position of the pedal



Pressing 4 [SET] switch ❶, turn ON the power switch. Then, a compensating value is indicated on the "***" section on LCD panel ❷ located on the left of the switch. Now, the value is additionally input as a compensating value.

(Caution) **If the pedal is held depressed when performing the aforementioned procedure, the machine will not operate properly. Be sure not to place anything on the pedal and not to rest your foot on it.**

19) Function of auto-lifter (Function setting Nos. 046, 047, 049)

1. Selection of the auto-lifter (Function setting No. 046)
   Selects either the solenoid-controlled auto-lifter or the pneumatic auto-lifter.

```
046  FLsel→ 0 : sol
             1 : air
```

0 : sol Solenoid type (provided with the function to control the length of time during which the presser foot is held raised)
Operating voltage: 31 Vdc (At the time of attraction) ⇨ 12 Vdc (At the time when the presser foot is held raised)

1 : air Pneumatic type (not provided with the function to control the length of time during which the presser foot is held raised)
Operating voltage: 24 Vdc

2. Length of time during which the presser foot is held raised (Function setting No. 047)
   For the solenoid type auto-lifter (No. 046 0: sol), the length of time during which the presser foot is held raised can be adjusted.
   For the pneumatic auto-lifter (No. 046 1: air), the presser foot is raised as long as desired regardless of the length of time specified.

```
047  T-FL
       → 60 [sec]
```

Adjustable range
60 to 600 sec [10/sec.]

3. Length of time during which the rotation of the machine is prohibited while the presser foot is descending (Function setting No. 049)
   The length of time during which the rotation of the sewing machine is prohibited after the presser foot has comes down until the sewing machine starts rotating can be adjusted.

```
049  T-FLWT
       → 140 [msec]
```

Adjustable range
0 to 200 [msec] <10/msec.>

(Caution) **If the specified length of time is insufficient, the sewing machine will start rotating before the presser foot is fully lowered. This will result in uneven material feed and slip-off of the thread.**

20) Selection of the presser foot lifting function of the pedal (PFL type) (Function setting No. 050)

The presser foot can be raised by depressing the back part of the pedal. This function is rendered effective when the sewing machine is used in combination with the AK device. (For the PFL type machine, specify "1: on.")

050 PFL → 0 : off 1 : on

0 : off Function of the pedal for lifting the presser foot is ineffective.
1 : on Function of the pedal for lifting the presser foot is effective.

21) Compensation of the timing for turning ON the solenoid for reverse stitching (Function setting Nos. 051 to 053)

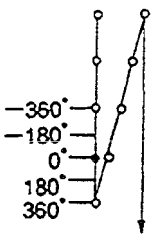
In the automatic reverse stitching procedure, if the normal feed and reverse feed stitches are not properly aligned, this function will correct the failure by changing the ON/OFF timing of the reverse stitching solenoid.
Use this function when the normal feed and reverse feed stitches are not properly aligned after changing the automatic reverse stitching speed or the machine head.

1. Compensation of the timing for turning ON the solenoid for reverse stitching (for start) (Function setting No. 051)
The ON timing of the reverse feed stitching solenoid can be corrected in terms of the angle.

051 T-SON → 3

Adjustable range
–36 to 36 <1/10°>

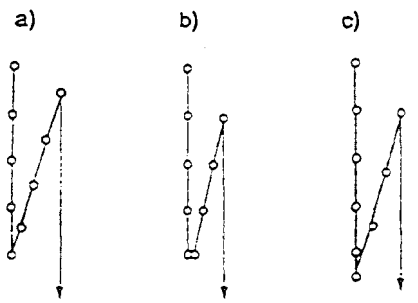
Set value	Angle of compensation	Compensating value
–36	–360°	–1
–18	–180°	–0.5
0	0°	0
18	180°	0.5
36	360°	1



* Assuming the point that is one stitch before the reverse feed stitches is 0°, the angle can be corrected by 360° (one stitch) back and forth.

(Note) The solenoid is attracted on stitch before the normal starting position in order to produce a time delay between the electric signal and the mechanical operation.

Example 1) Four reverse feed stitches (for start) — Stitches are not made properly in the reverse feed direction when the number of stitches is set at four.

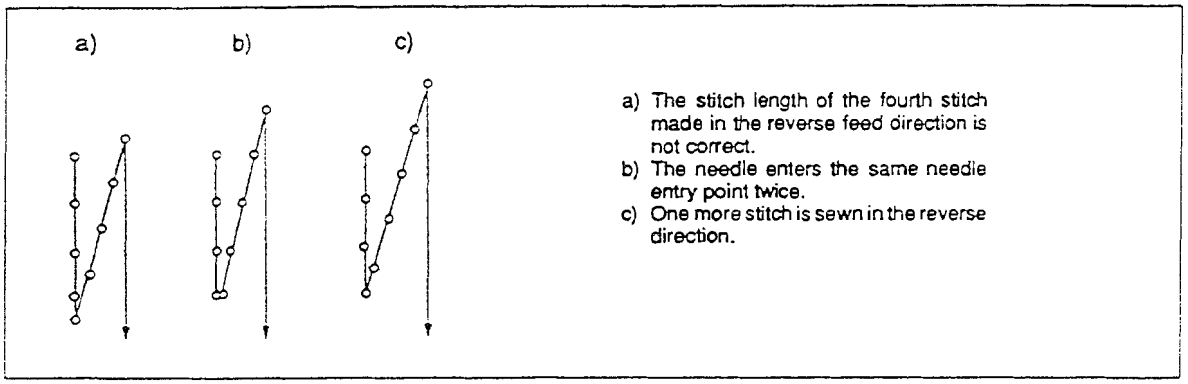


a) The stitch length of the first stitch made in the reverse feed direction is not correct.
b) The needle enters the same needle entry point twice.
c) One more stitch is sewn in the normal direction.

} These troubles occur when the reverse stitching speed is increased.

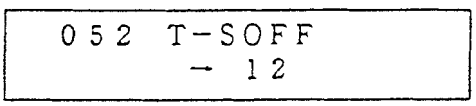
If any of the phenomena a), b) and c) is observed, decrease the set value (in the minus (–) direction) to allow the reverse stitching solenoid to be attracted earlier.

Example 2) Four reverse feed stitches (for start) — Stitches are not made properly in the normal feed direction when the number of stitches is set at four.



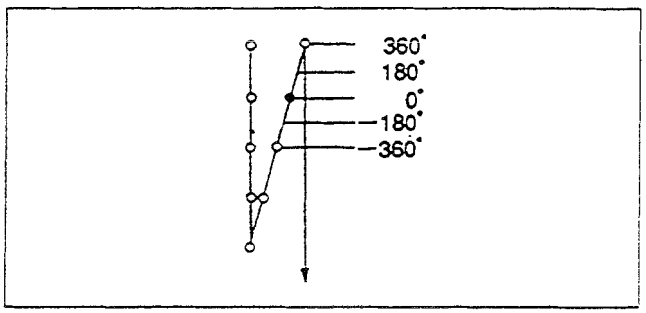
These troubles a), b) and c) occur when the reverse stitching speed is decreased. In this case, increase the set value (in the plus (+) direction) to allow the reverse stitching solenoid to be attracted later.

2. Compensation of the timing for turning OFF the solenoid for reverse stitching (for start) (Function setting No. 052)
The OFF timing of the reverse feed stitching solenoid can be corrected in terms of the angle.

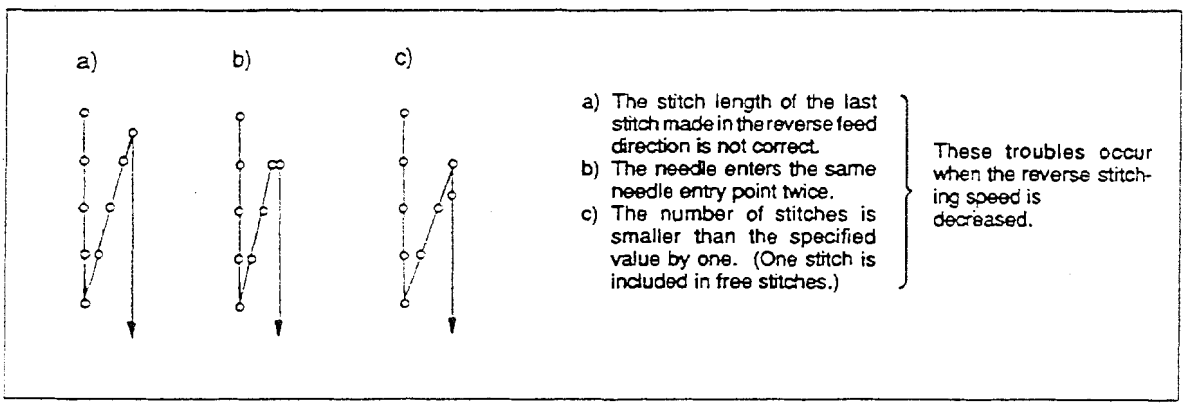


Adjustable range
–36 to 36 <1/10°>

Set value	Angle of compensation	Compensating value
–36	–360°	–1
–18	–180°	–0.5
0	0°	0
18	180°	0.5
36	360°	1

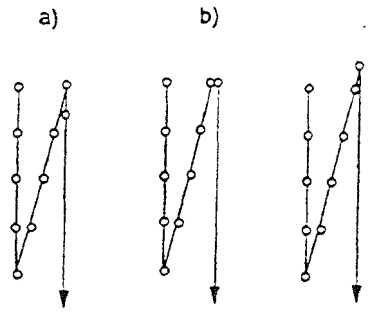


Example 1) Four reverse feed stitches (for start) — Stitches are not made properly in the reverse feed direction when the number of stitches is set at four.



If any of the phenomena a), b) and c) is observed, increase the set value (in the plus (+) direction) to allow the reverse stitching solenoid to be attracted later.

Example 2) Four reverse feed stitches (for start) — The number of stitches made in the normal feed direction is larger than the specified value by one when the number of reverse feed stitches is set at four.



a) The stitch length of the first of free stitching is not correct.
b) The needle enters the same needle entry point twice at the sewing end.
c) One stitch of free stitching is made in the reverse direction.

} These troubles occur when the reverse stitching speed is increased.

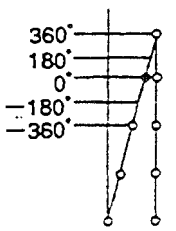
In this case, decrease the set value (in the minus (–) direction) to allow the reverse stitching solenoid to be attracted earlier.

3. Compensation of the timing for turning OFF the solenoid for reverse stitching (for end) (Function setting No. 053)
The OFF timing of the reverse feed stitching solenoid can be corrected in terms of the angle.

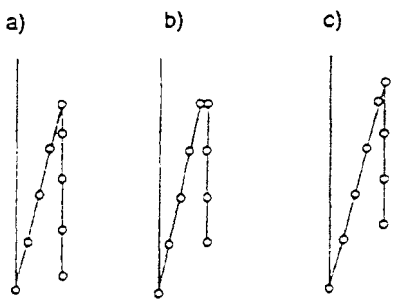
053 T–EOFF
→ 18

Adjustable range
–36 to 36 <1/10°>

Set value	Angle of compensation	Compensating value
–36	–360°	–1
–18	–180°	–0.5
0	0°	0
18	180°	0.5
36	360°	1



Example 1) Four reverse feed stitches (for end) — The number of stitches made in the normal feed direction is larger than the specified value when the number of stitches is set at four.

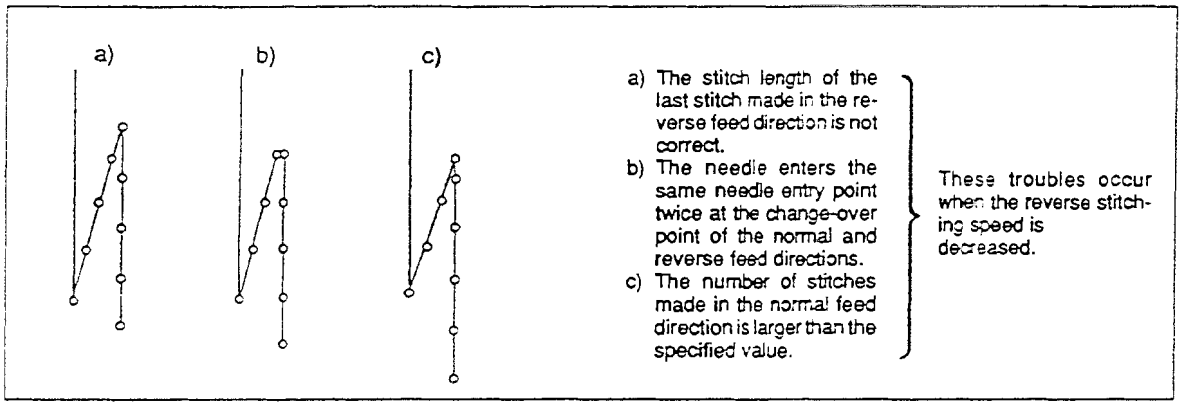


a) The stitch length of the first stitch made in the normal feed direction is not correct.
b) The needle enters the same needle entry point twice at the change-over point of the normal and reverse feed directions.
c) The number of stitches made in the reverse feed direction is larger than the specified value.

} These troubles occur when the reverse stitching speed is increased.

In this case, decrease the set value (in the minus (–) direction) to allow the reverse stitching solenoid to be attracted earlier.

Example 2) Four reverse feed stitches (for end) — The number of stitches made in the normal feed direction is smaller than the specified value when the number of stitches is set at four.



In this case, decrease the set value (in the plus (+) direction) to allow the reverse stitching solenoid to be attracted later.

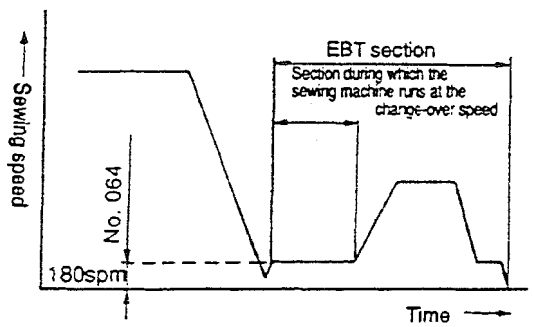
(Caution) The timing for turning ON the solenoid for reverse stitching (for end) is not compensated since the reverse stitching solenoid for reverse stitching (for end) is attracted when the sewing machine is running at low speed and the command is made from free sewing.

22) EBT change-over speed (Function setting No. 064)

The initial speed at the start of EBT can be adjusted.

064 S-Wait → 180 [spm]

0 to 250 [spm] <5/s.p.m.>



23) Effective diameter of motor pulley (Function setting No. 054)

Specifies the size of motor pulley (effective diameter) used.

```
054  PCDMP
       → 105.0 [mm]
```

Data setting range
40.0 to 200.0 [mm] <0.5/mm>

(Caution) **1. Be sure to specify the effective diameter of motor pulley whenever the motor pulley size is changed. If the motor pulley size is not properly specified, maloperation will result.**
2. The number engraved on the motor pulley indicates the outside diameter. So, be sure to specify the effective diameter of the motor pulley. (Effective diameter = Outside diameter – 5 mm)

24) Presser foot lifting function after thread trimming (for KFL or PFL type) (Function setting No. 055)

This function is used to automatically lift the presser foot after thread trimming. This function is rendered effective when the machine is used in combination with the AK device.
(For the KFL or PFL type machine, set this function to "1: on.")

```
055  FLAT  →0 : off
             1 : on
```

0 : off Automatic presser foot lifting function is ineffective.
1 : on Automatic presser foot lifting function is effective.

(Caution) **If this function is made effective when the sewing machine is not equipped with the AK device, the start of the sewing machine will be momentarily retarded when depressing the pedal after thread trimming. Be sure to specify "0: off" when the machine is not equipped with the AK device.**

25) Reverse rotation function for raising the needle after thread trimming (Function setting No. 056)

The sewing machine is rotated in the reverse direction to raise the needle bar near the highest dead point.
Use this function if the needle protrudes under the presser foot to catch the sewing product when sewing a heavy-weight material.

```
056  RATRM→0 : off
             1 : on
```

0 : off Reverse rotation function for raising the needle after thread trimming is ineffective.
1 : on Reverse rotation function for raising the needle after thread trimming is effective.

(Caution) **Since the needle bar is raised near the highest dead point, thread will be likely to slip off from the needle eyelet. So, properly adjust the length of thread remaining after thread trimming.**

26) Needle bar up/down position retaining function (Function setting No. 058)

When the needle bar is in the highest position or lowest position, the brake is slightly actuated to retain the needle at either position.

```
058  HPos  →0 : off
             1 : on
```

0 : off Needle bar up/down position retaining function is ineffective.
1 : on Needle bar up/down position retaining function is effective.

27) Reverse stitching (for start) function (Function setting Nos. 059, 060)

1. Auto/pedal-control change-over function for reverse stitching (for start) (Function setting No. 059)
Selects whether the reverse stitching is performed at a stretch at the sewing speed specified for the function setting No. 008 or it is performed at the sewing speed controlled by the depressing depth of the pedal.

```
059  SBTO  →  Auto
              Manu
```

Auto : Automatic sewing at the specified speed
Manu : Sewing speed changes according to the pedal operation.

(Caution) **1. The highest reverse stitching (for start) speed is limited to the sewing speed specified for the function setting No. 008 regardless of the depressing depth of the pedal.**
2. When the "Manu" is specified, the reverse feed stitches will not be compensated.

2. Sewing machine stop function immediately after reverse stitching (for start) (Function setting No. 060)
The machine can be temporarily stopped when the reverse stitching (for start) is finished.

```
060  SBTQ  →0 : off
             1 : on
```

0 : off Sewing machine temporary stop function immediately after reverse stitching (for start) is ineffective.
1 : on Sewing machine temporary stop function immediately after reverse stitching (for start) is effective.

28) Auto/manual change-over function for overlapping speed (Function setting No. 062)

Selects whether the overlapped stitching is performed at a stretch at the sewing speed specified for the function setting No. 008 or it is performed at the sewing speed controlled by the depressing depth of the pedal.

```
062  BTOp  →  Auto
               Manu
```

Auto : Automatic sewing at the specified speed
Manu : Sewing speed changes according to the pedal operation.

29) Direction of rotation of the motor (Function setting No. 075)

Specifies the direction of rotation of the motor.

```
075   DM   →  CCW
               CW
```

CCW : Counterclockwise
CW : Clockwise

30) Accumulated length of time during which the sewing machine is energized (Function setting No. 100)

Indicates the accumulated length of time during which the sewing machine is energized in the unit of minutes.

```
100   STO
      →  *** [min]
```

31) E²PROM reset (Function setting No. 101)

Returns the respective functions to the initial state. (The functions returns from the changed state to the initial state.)

```
ITEM No.  →
      101  ResEEP
```

When the item No. 101 is shown on the LCD panel, execute the function by simultaneously pressing the 3 [ITEM] switch and 4 [SET] switch. (While the function is being executed, the section on the right of the → blinks.)

(Caution) When this operation is performed, the neutral position of the pedal will return to "0." So, be sure to perform automatic compensation of the neutral position of the pedal.

32) Monitor of the state of input signal (Function setting No. 102)

Gives the real-time indication of the state of input signals (0/1).

33) Hysteresis of troubles (Function setting No. 103)

If a trouble occurs, the description of the trouble and the time (minute) when it occurs will be stored in the hysteresis of troubles.

```
→  E**      ***
   EXIT
```

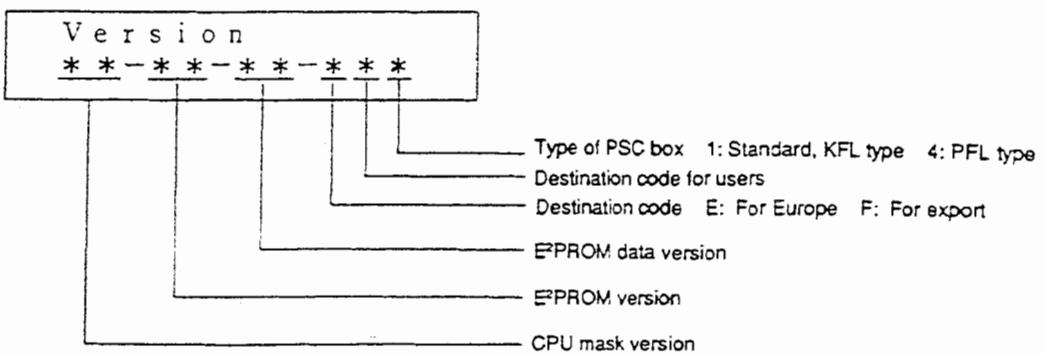
E** Description of trouble
*** Time of occurrence

34) Communication facility (Function setting Nos. 105, 107)

Receives/transmits data stored in the PSC box.

35) PSC box version management (Function setting No. 108)

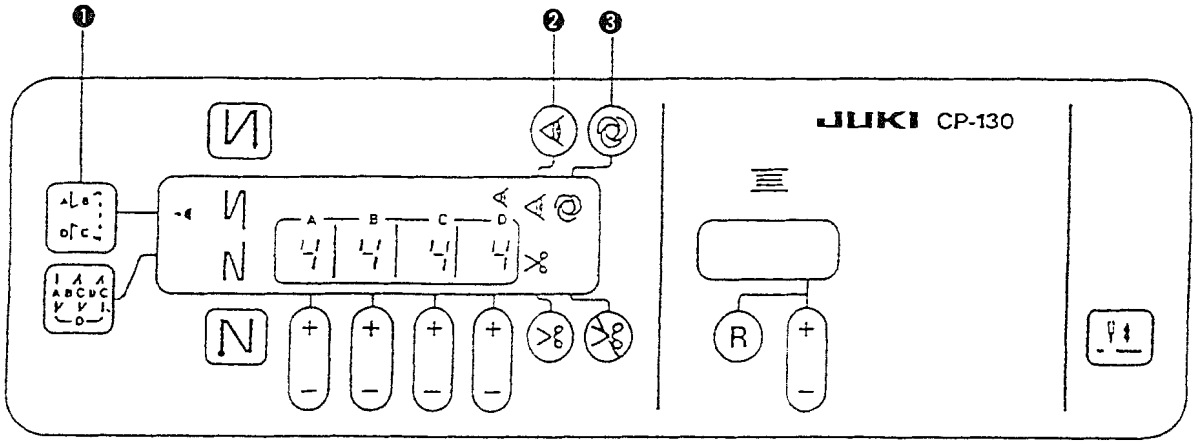
Be sure to contact our office after checking the version No. of your PSC box.

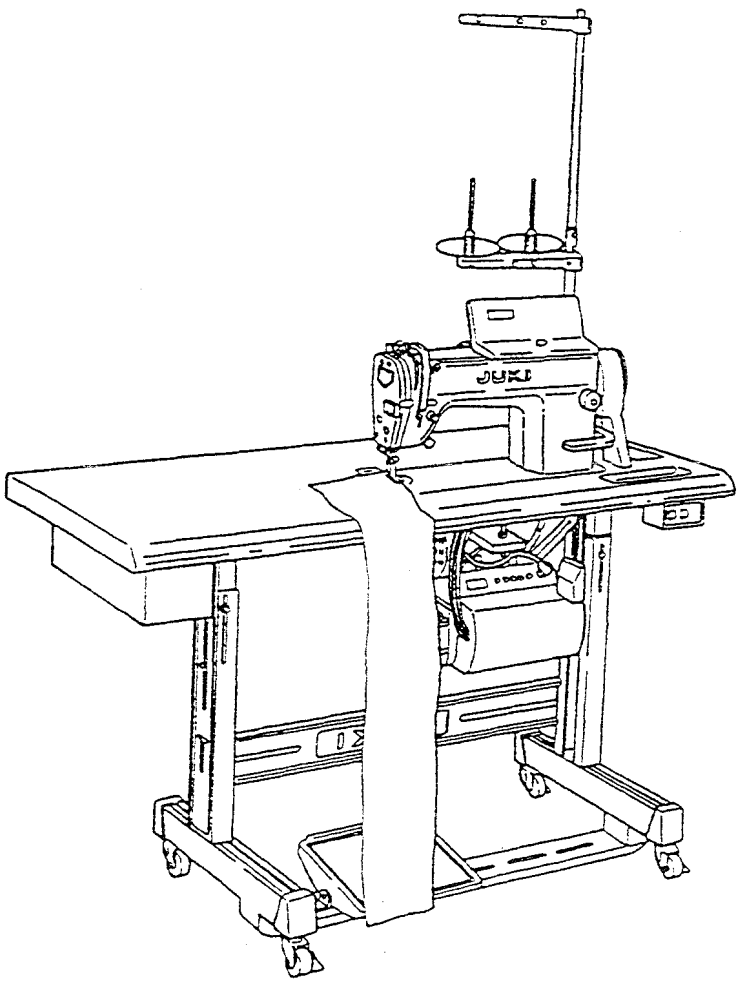


(4) Examples of applications

1) Used as an material edge control device by means of the CP-130 control panel and the material edge detecting function (ED: Optional).

Procedure) Set material edge detecting function (mark) ❷ to the ON state. Set one-shot automatic stitching function (mark) ❸ to the ON state.

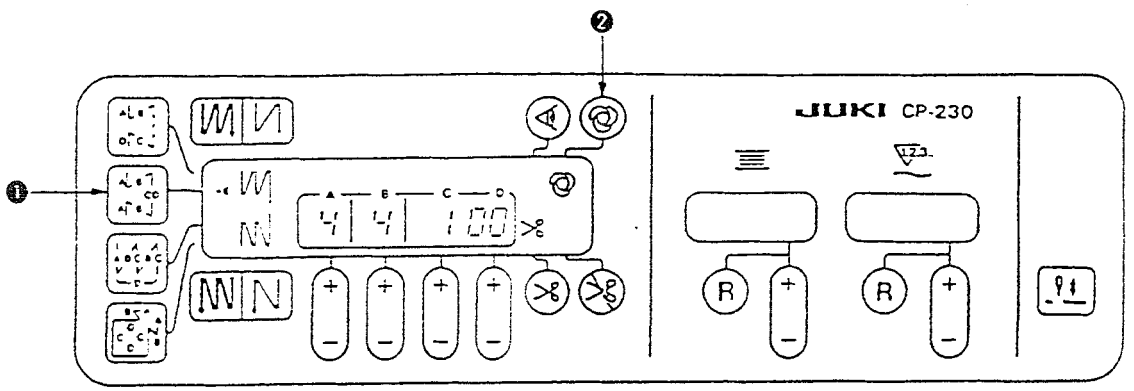




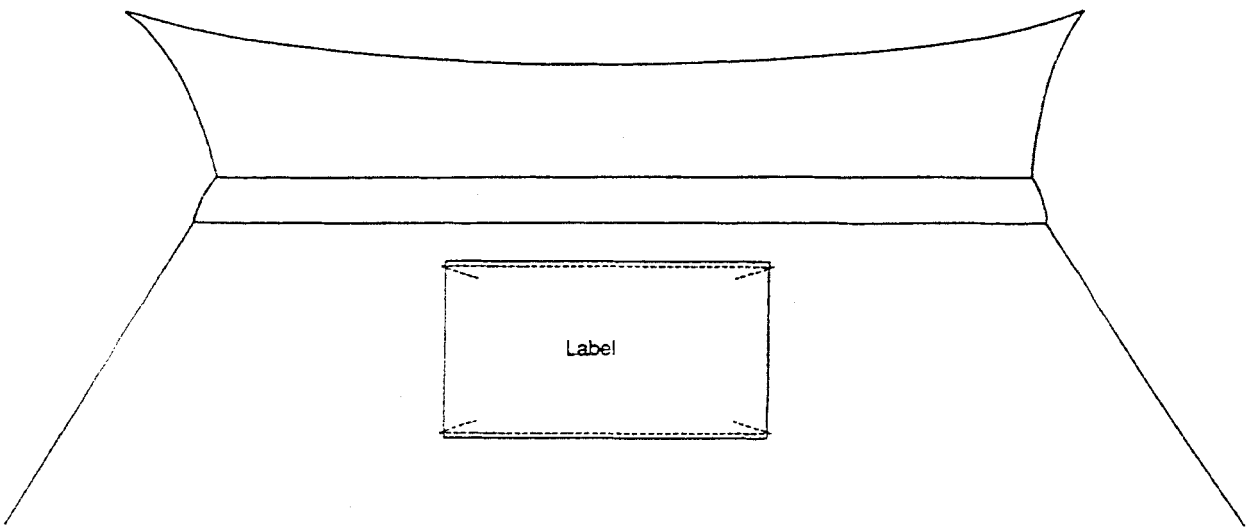
Caution) The one-shot automatic stitching speed can be changed using the function setting No. 038.

2) **Attaching labels using the one-shot automatic stitching function with the CP-230 control panel**

Procedure) Specify mark ❶ on the CP-230 control panel and set the one-shot automatic stitching function (mark) ❷ to its ON state.



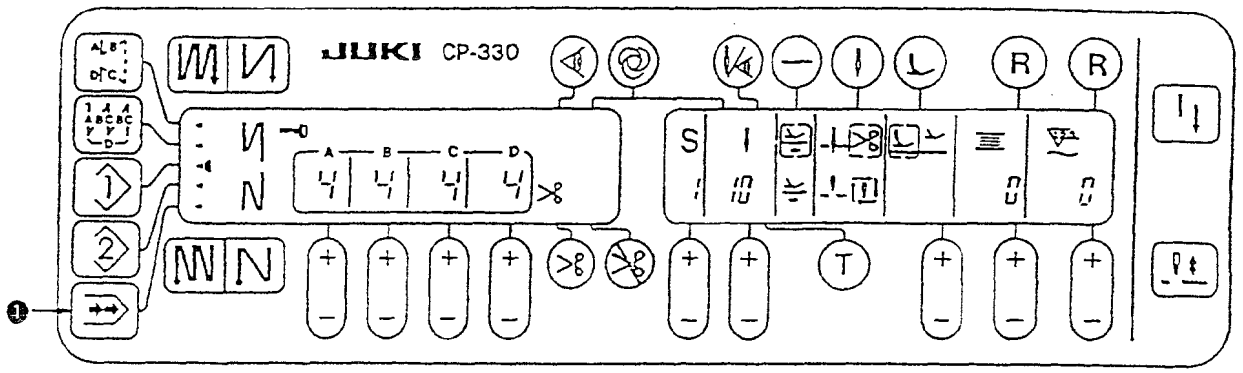
Description) The number of stitches for section CD can be set to 500 at the maximum. If the stitch length is set to 2 mm, the machine can sew as long as approximately 1,000 mm (1 m). In this case, the one-shot automatic stitching can be performed without using the material edge detecting device (ED: Optional). So, the machine is capable of finished the label attaching according to a specified pattern only by depressing the pedal even when the label is not attached on the edge of the material.



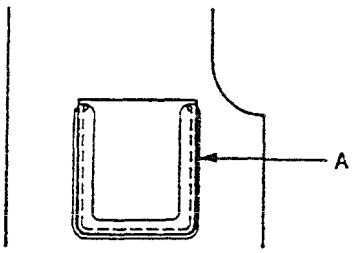
3) Sewing small parts effectively using the CP-330 control panel.

Procedure) Specify combined stitching mode ➡ ❶ on the CP-330 control panel.

Example) Attaching a pocket with a pen slit on a work uniform (Single unit of the sewing machine is used in four different processes.)

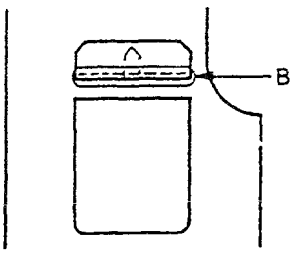


(1) Attaching a pocket



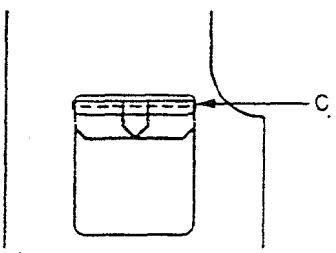
Input pattern A to 1.

(2) Attaching a flap



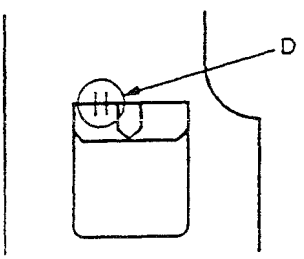
Input B to [ALB DFC] or 2.

(3) Welting the flap



Input C to [ALB DFC] or 2.

(4) Sewing reinforcement stitches for a pen slit



Input D to [1 A A ABCBC Y Y i D].

Process sequence)

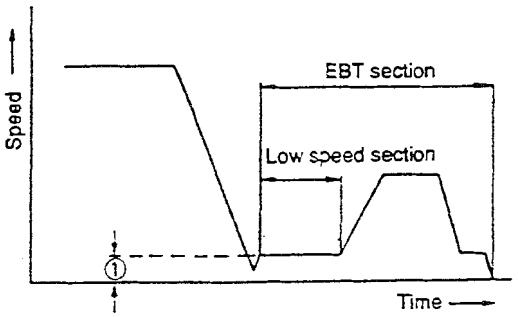
(1)–A ➡ (2)–B ➡ (3)–C ➡ (4)–D

Data input sequence)

1 ➡ [ALB DFC] ➡ [ALB DFC] ➡ [1 A A ABCBC Y Y i D] ➡ [1 A A ABCBC Y Y i D]

4) Aligning the reverse feed stitches made by the reverse stitching (for end) function to the normal feed stitches (For the sewing machine for heavy-weight materials)

When using the machine head for heavy-weight material, in particular, the reverse feed stitches may fail to be aligned with the normal feed stitches even when the timing of reverse stitching (for end) is compensated. To align the aforementioned stitches, specify the functions described below.

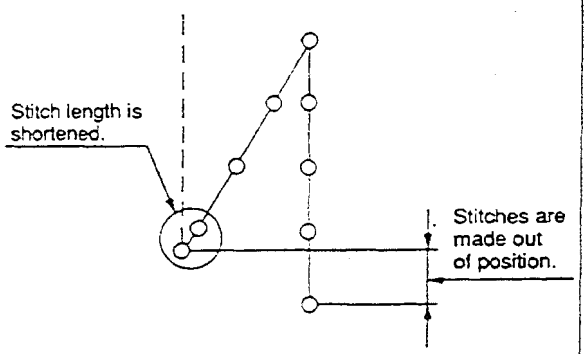


1. With respect to the timing for changing over the feeding direction from the normal direction to the reverse one, the sewing speed used in the low speed section can be changed. SC-1 function setting No. 064 (The sewing speed can be changed within the range of 0 to 250 s.p.m. though it has been conventionally fixed at 200 s.p.m.)

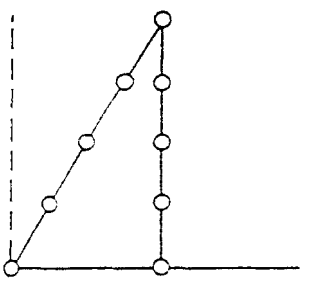
Example) Use this example for reference.

Standard

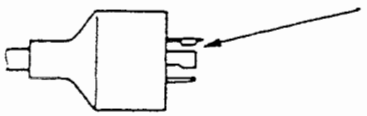
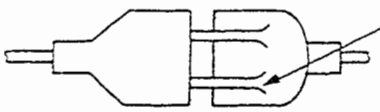
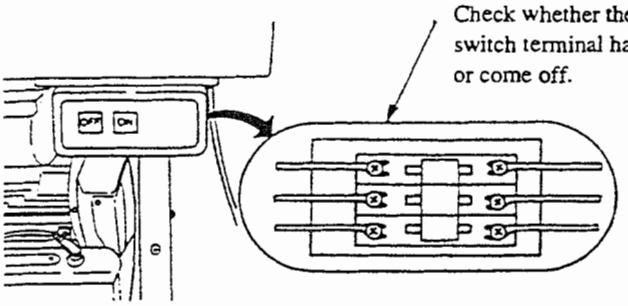
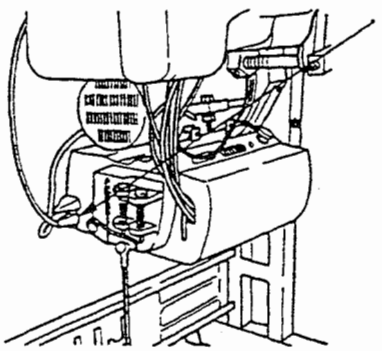
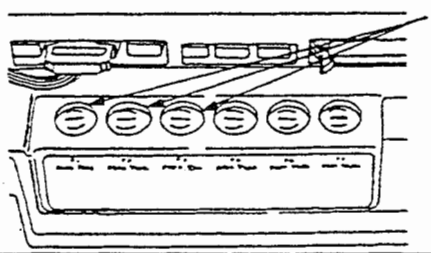
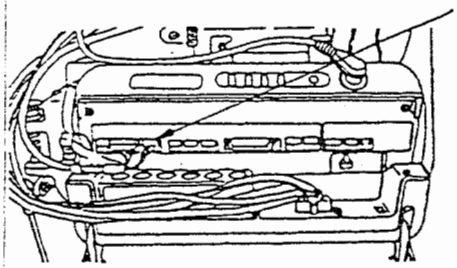
Conditions	Machine head DDL-5550H (for heavy-weight materials)	
	Stitch length	4 mm
	Number of stitches	4
	ITEM No. 064	170 s.p.m.

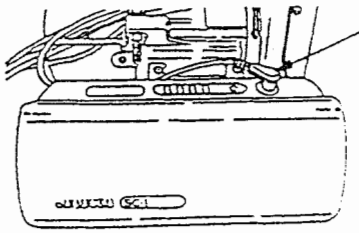
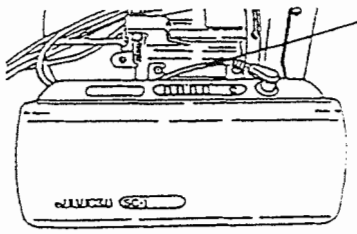
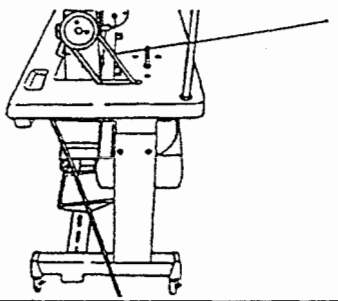
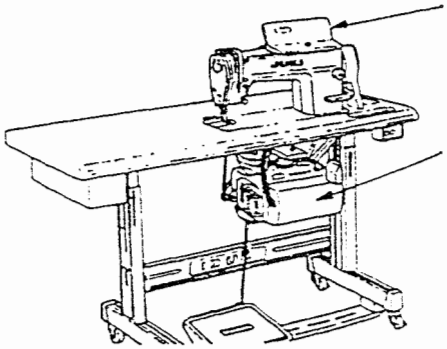


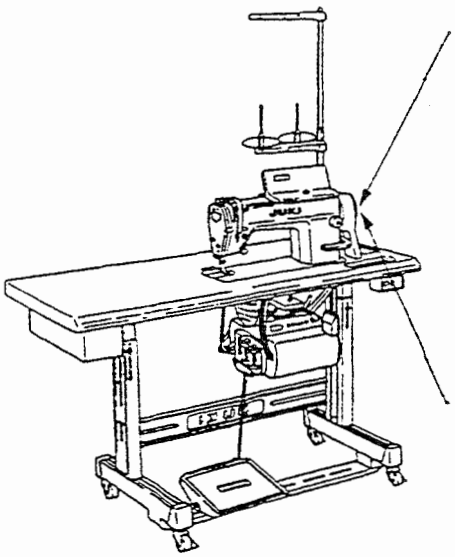
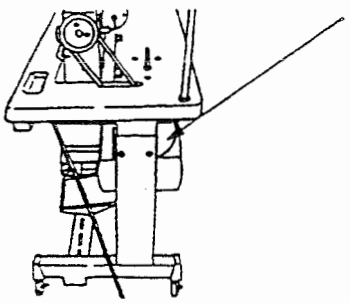
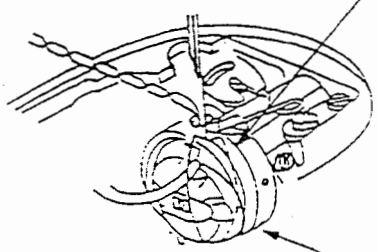
Conditions	Machine head DDL-5550H (for heavy-weight materials)	
	Stitch length	4 mm
	Number of stitches	4
	ITEM No. 064	0 s.p.m.

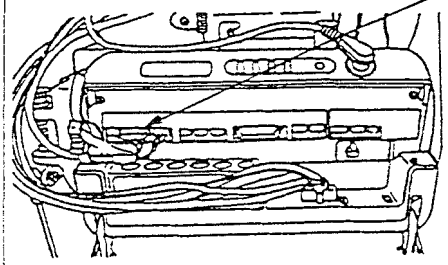
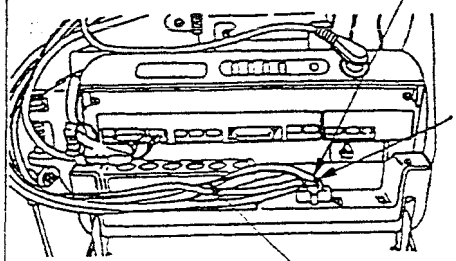
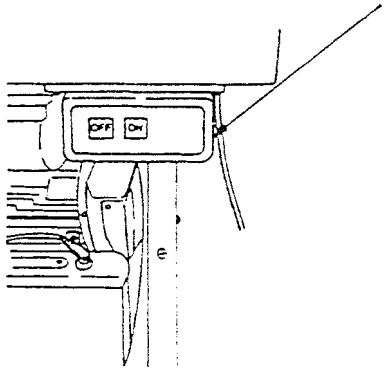


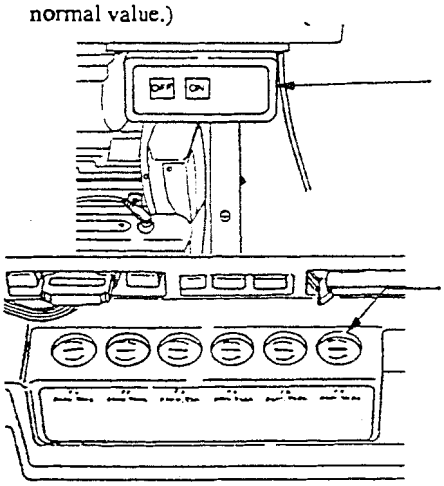
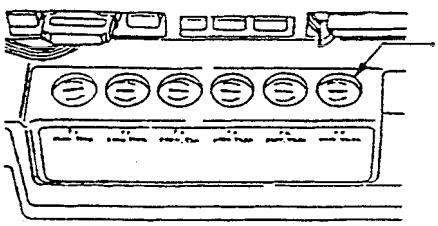
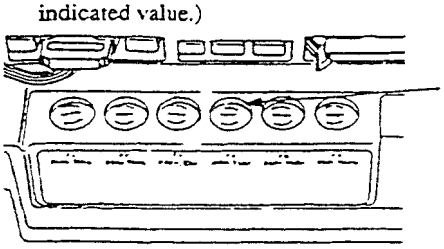
5. EXPLANATION OF ERRORS AND CORRECTIVE MEASURES

No.	Description and components to be checked	Corrective measures
E0	• Initialization of data on E^2PROM	
E1	• Failed input power supply (open phase of power supply)  Check whether the power plug and receptacle have loosened or come off.	• Tighten the screw mounted in the plug. • Re-connect the plug to the receptacle.
	 Check the power plug for failed contact.	• Correct the receptacle.
	 Check whether the power switch terminal has loosened or come off.	• Tighten the screw inside the power switch.
	 Check whether the power connector pin has loosened or come off.	• Re-connect the connector.
	 Check whether the power fuse has blown.	• Check the fuses F1, F2 and F3 for blow-out. Then, replace a blown out fuse, if any, with a new one. (Only for the machine of ø3 and220 V.)
E2	• Motor connector has come off. (The motor connection signal has not been input in the normal value.)  Check whether the motor signal connector pin has loosened or come off.	• Re-connect the connector. (Caution) **The error is not stored in memory of the hysteresis of troubles.**

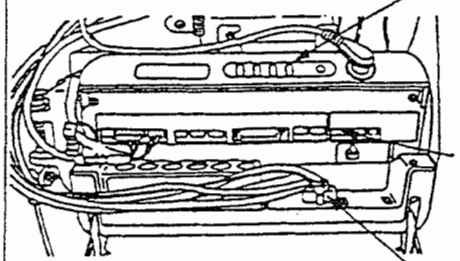
No.	Description and components to be checked	Corrective measures
E3	• V belt has slipped or come off. Synchronizer connector has come off. (The motor rotates, however, the upper/lower position detecting signal is not input.)  Check whether the synchronizer connector has loosened or come off.  Check the synchronizer for disconnection.  Check whether the V belt has come off, loosened or slipped. **(Caution) After the error has been detected, the motor will operate as a clutch motor without thread trimming function.**	• Re-connect the synchronizer. • Replace the synchronizer with a new one. • Check the V belt. (Belt tension: 15 mm/kg) **(Caution) The trouble is not stored in memory of the hysteresis of troubles.**
E4	• The V belt has slipped, come off or the lower position sensor has failed. (The motor rotates, however, the lower detection signal of the machine head is not input.) Refer to E3.	Refer to E3.
E5	• The V belt has slipped, come off or the upper position sensor has failed. (The motor rotates, however, the upper detection signal of the machine head is not input.) Refer to E3.	Refer to E3.
E6	• Failed communication with the control panel (The sewing machine controller has failed to communicate with the control panel.)  Check the control panel cord for disconnection. (Check whether the panel cord comes in contact with the V belt.) Check whether the control panel connector has loosened. (Check whether the control panel connector has been securely connected to the machine.)	• Check the control panel cord and replace it with a new one, if necessary. • Re-connect the connector.

No.	Description and components to be checked	Corrective measures
E7	• The motor has locked. (The motor fails to rotate with controlled even when the motor has been driven.)	
	 Check whether the sewing machine head has locked. (Is it possible to turn the pulley lightly by hand?)	• Correct the seizure of the machine head.
	Check whether the thread has been tangled in the pulley of the sewing machine.	• Remove the thread from the pulley.
	 Check whether the thread has been tangled in the motor pulley shaft.	• Remove the pulley and eliminate the thread from the pulley.
	Check whether the thread has been caught in the hook.	• Check the hook.
	 Check whether the proper amount of oil is supplied to the hook.	• Properly adjust the amount of oil supplied to the hook.

No.	Description and components to be checked	Corrective measures
E8	• The pedal connector has come off. (The pedal identification signal has changed after turning ON the power to the machine.)  Check whether the pedal sensor connector has come off.	• Re-connect the connector. (Caution) The trouble is not stored in memory of the hysteresis of troubles.
E9	• Failure of the pedal sensor (Connection signal of the pedal has failed.)	• Replace the pedal sensor with a new one.
E10	• The solenoid has short-circuited. (Short-circuit signal has been detected when actuating the solenoid.)  The machine head solenoid has short-circuited. The solenoid connector has been improperly wired. The transformer fuse has blown.	• Check the resistance of the solenoid. • Check the wiring. • Check the fuse F4.
E11	• Overvoltage of the power supply (The source voltage exceeds the normal value.)  Check whether the source voltage is correct.	• Measure the voltage.

No.	Description and components to be checked	Corrective measures
E12	• Overcurrent of the power supply (The source current exceeds the normal value.) • Overcurrent of the power supply (The source current exceeds the normal value.)	
E13	• Low voltage of the power supply (The source voltage is lower than the normal value.)  Check whether the source voltage is correct. Check whether the regenerative fuse has blown.	• Measure the voltage. • Check the fuse F6.
E14	• Power supply detecting circuit has failed. (Overvoltage and low voltage of the power supply are simultaneously input.)  Check whether the regeneration fuse has blown.	• Check the fuse F6.
E20	• Circuit board inside the PSC box has failed. (Failure has been found during the performance checking procedure taken after turning ON the power to the machine.)	
E22	• Failed control of the motor rotation (The number of revolutions of the motor is larger than that controlled by the motor control circuit board by a specified value or more.)	
E23	• Solenoid transistor is defective. (Short-circuit signal of the solenoid transistor has been detected when turning ON the power to the machine.)	
E24	• Motor DRv element has failed. (Error signal from the DRv element has been input.)	
E25	• Defective power supply of the solenoid (When the output voltage of the power supply of the solenoid has been changed at the time of turning ON the power to the machine to find that the voltage is defective against the indicated value.)  Check whether the transfer fuse has blown.	• Check the fuse F4.
E26	• Failed +24 V power supply (The +24 V power supply has short-circuited.) Refer to E25.	Refer to E25.

No.	Description and components to be checked	Corrective measures
E30	• Open phase of the motor encoder (Motor encoder provides pulses below the specified value.)	
E31	• Open phase of the motor pole sensor (A signal other than the acceptable input signals of the pole sensor has been input.)	
E33	• Failed reverse rotation of the motor (The motor has rotated in the direction other than the one controlled.)	
E41	• Micro-computer has failed. (The micro-computer has failed to control the peripheral components.)	
E42	• E^2PROM (Failed access to the memory)	
E43	• Failed home position of the bobbin thread remaining amount detecting device [AE-4 or -5]. (The bobbin thread remaining amount detecting solenoid has failed to return to its home position after the actuation.)	



The bobbin thread remaining amount detecting device has been removed from the sewing machine by setting the ITEM No 057 to the ON state.

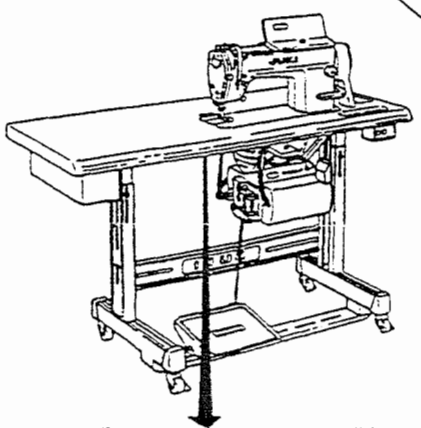
- Set the ITEM No. 057 to the OFF state.

Check whether the connector of the bobbin thread remaining amount detecting device has been securely connected.

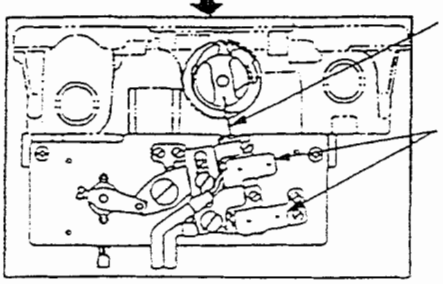
- Connect the connector.

Solenoid pin has come off.

- Check the solenoid pin for secure connection.



- Check whether there is oil or dust in the bobbin thread remaining amount detecting device.



Check whether the detecting bar has lowered.

- Check whether the detecting bar can be moved by hand.

Check whether the sensor emits light.

- Replace the bobbin thread remaining amount detecting unit.

6. HOW TO CHANGE OVER THE SEWING MACHINE FROM THE STANDARD TYPE TO THE MACHINE WITH AN AUTO-LIFTER CONTROLLED BY THE PEDAL (PFL TYPE)

(1) Parts required for the modification

Part No.	Name of part	Q'ty
M4009351000A	Spring shaft B	1
M4011351000	Spring B	2
M4012351000	Pressure adjusting screw	1
M2010110000	Pressure adjusting nut	1

(2) How to assemble the parts

1) Loosen pressure adjusting nut ⓑ in the pedal sensor A asm. (Fig. 1) and remove pressure adjusting screw ⓐ. Remove spring A ⓒ and replace it with spring B. Then, attach adjusting screw ⓐ and adjusting nut ⓑ in position.

2) Attach spring shaft B, spring B, adjusting screw and adjusting nut to side ❷ shown in Fig. 2 following the procedure same as step ❶).

(Caution) **Apply grease to shafts ❸ and ❹ when assembling.**

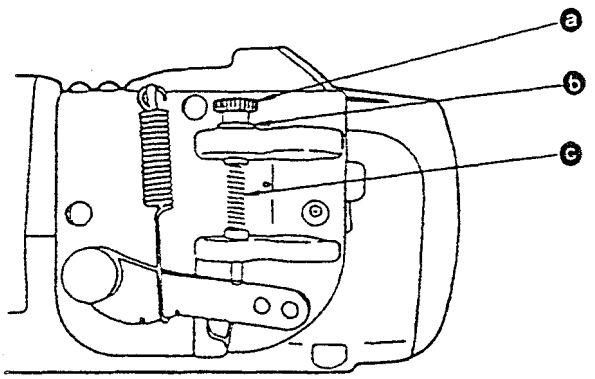


Fig. 1 Pedal sensor A asm.

(3) Adjusting the pressure required to depress the back part of the pedal

Adjust the height of spring which has been changed to adapt to the auto-lifter controlled by the pedal (PFL type). Adjust the length of the spring located on side ❶, in Fig. 2, to 27 mm and that of the spring located on side ❷ to 28 mm using presser adjusting screws ⓐ. After the adjustment, tighten pressure adjusting nuts ⓑ to prevent pressure adjusting screw ⓐ from loosening.

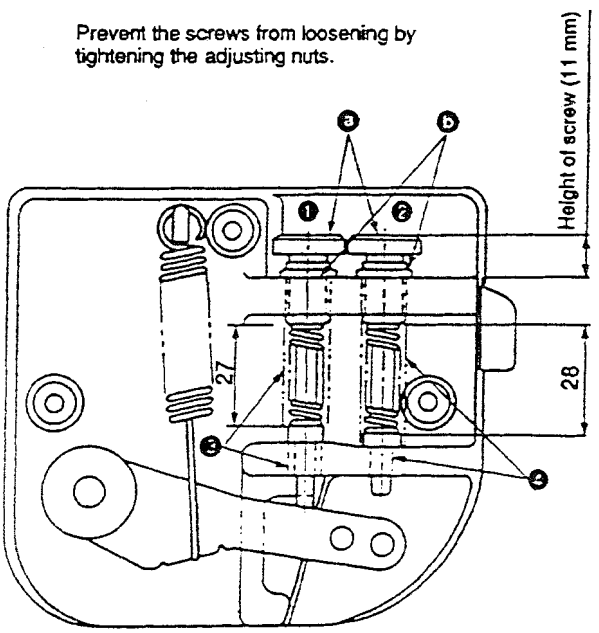


Fig. 2 Pedal sensor B asm.

(4) Setting for the functions of the PSC box

Now, change the standard setting of functions of the PSC box to adapt to the PFL type.
The setting of the following two functions for the PFL type machine are different from that for the standard type sewing machine.
So change the setting of the functions to adapt to the PFL type referring to the explanation of the functions.

1) Selection of the presser foot lifting function using the pedal (ITEM No. 050)

```
050 PFL → 0 : off
          1 : on
```

⬇

```
050 PFL → 1 : on
          0 : off
```

Set the function to "1: on."

2) Presser foot lifting function after thread trimming (ITEM No. 055)

```
055 FLAT→ 0 : off
          1 : on
```

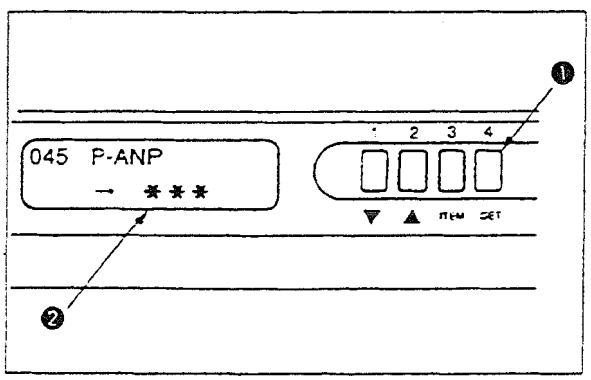
⬇

```
055 FLAT→ 1 : on
          0 : off
```

Set the function to "1: on."

(5) Automatic compensation of the neutral position of the pedal sensor

When the pedal is in the neutral position, error caused during assembly is corrected.



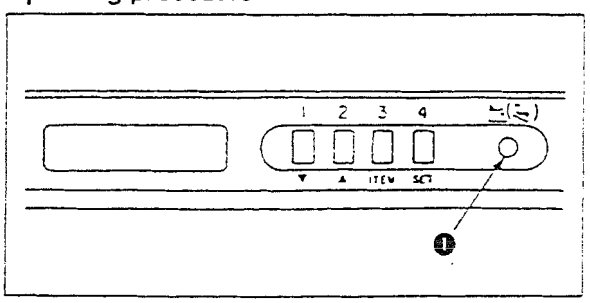
Pressing 4 [SET] switch ❶, turn ON the power switch. Then, a compensating value is indicated on the "***" section on LCD panel ❷ located on the left of the switch. Now, the value is additionally input as a compensating value.

(Caution) If the pedal is held depressed when performing the aforementioned procedure, the machine will not operate properly. Be sure not to place anything on the pedal and not to rest your foot on it.

7. AUTOMATIC PRESSER FOOT LIFTING FUNCTION FROM THE NEUTRAL POSITION (Only for the sewing machine equipped with the AK device)

This function is used to automatically lift the pedal when it is in the neutral position.
The length of time during which the presser foot automatically goes up depends on the length of time during which the presser foot automatically ascend after thread trimming. If the presser foot automatically comes down, it will go up from the neutral position after it has once moved away from the neutral position.

Operating procedure



1) Turn ON switch ❶ for lifting the presser foot from the neutral position, that is located next to the function switches on the PSC box. [Once the switch is turned ON, the monitor LED of the switch will light up.]
2) To release this function, press switch ❶ again. The switch will be released from the locked state and the monitor LED will go out.

8. HOW TO CHANGE THE SIZE OF MOTOR PULLEY

Be sure to change the setting of the motor pulley size on the PSC box (function setting NO. 054) whenever the motor pulley size is changed.
If the motor pulley size is not properly specified, the correct number of revolutions will not be obtained and maloperation will result.

Example) ø110 mm (outside diameter) ⇨ ø80 mm (outside diameter)

(1) Access to the service level referring to "4-1. Setting for functions."

(2) Specify ITEM No. 054 by pressing the 1 [▼] switch or 2 [▲] switch.

(3) Press the 4 [SET] switch so that the PSC box accepts a change of data.

(4) Specify 75.0 [mm] using the 1 [▼] switch.

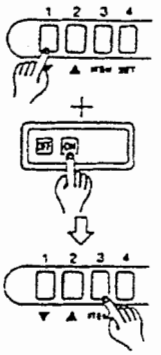
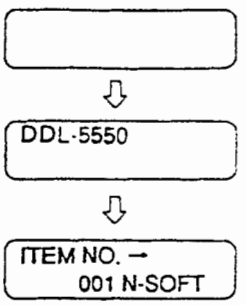
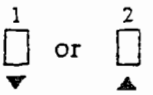
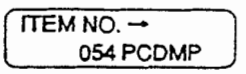
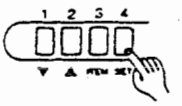
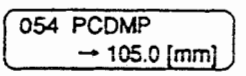
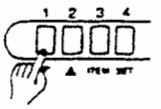
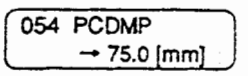
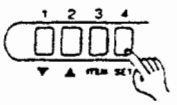
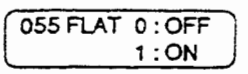
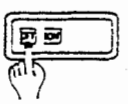
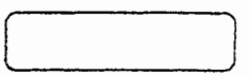
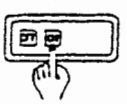
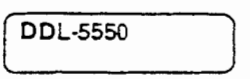
(Note) The number engraved on the motor pulley indicates the outside diameter. Effective diameter is obtained by subtracting 5 [mm] from the outside diameter. (80 – 5 = 75 mm)

(5) Press the 4 [SET] switch the enter the specified value.

(Caution) If you omit this procedure, the modified value will not replace the previous set value.

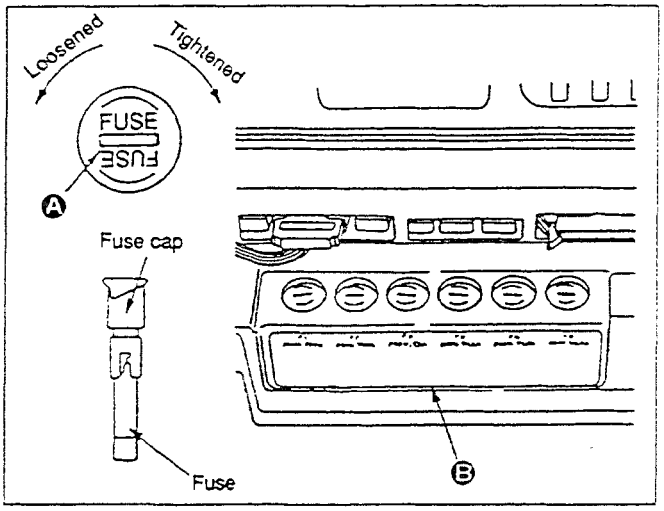
(6) Turn OFF the power to the machine. Now the change of the setting of the motor pulley size is completed.

(7) Re-turn ON the power to the machine. This will return the machine to the normal operation mode.

	Switch operation	Indication on the LCD panel
(1)		
(2)		
(3)		
(4)		
(5)		
(6)		
(7)		

9. EXPLANATION OF FUSES

(1) Replacing the fuses



Open the front cover. Fit a screwdriver onto slit Ⓐ on the fuse cap. Turn the cap in the direction of the arrow using the screwdriver while lightly pressing the screwdriver against the slit until the cap comes off.
Use a fuse with a capacity indicated on a label attached on section Ⓑ of the connector panel.

(Caution) Be sure to replace the fuse with the power to the machine turned OFF.

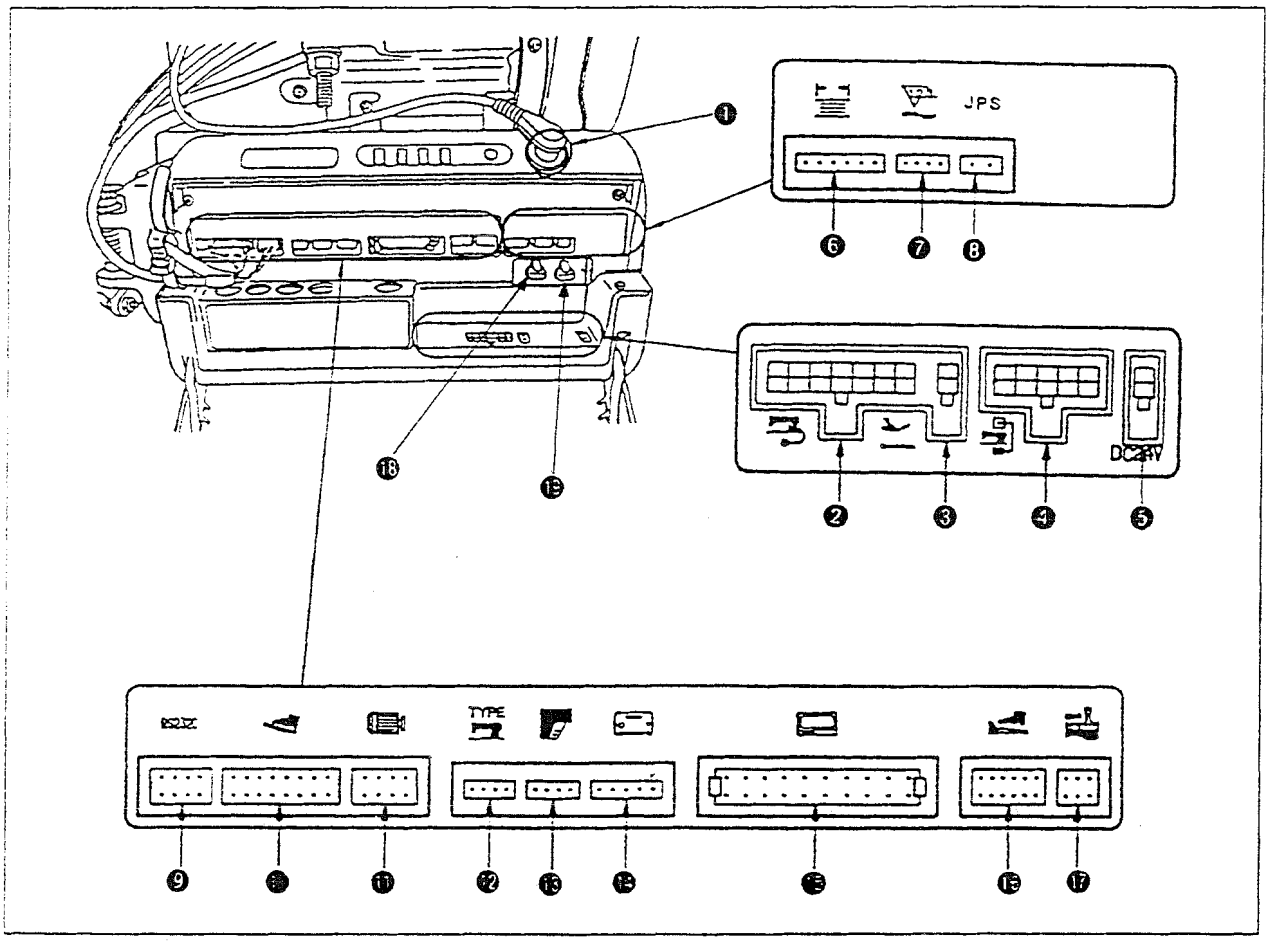
Enlarged view of section Ⓑ (The figure illustrates the fuse for the machine of ø3 and 220 V for general export.)

F1	F2	F3	F 4	F5	F6
250V. 12A	250V 12A	250V 12A	250V. T1.6A	250V. T1.6A	250V. T0.5A

* Fuse table

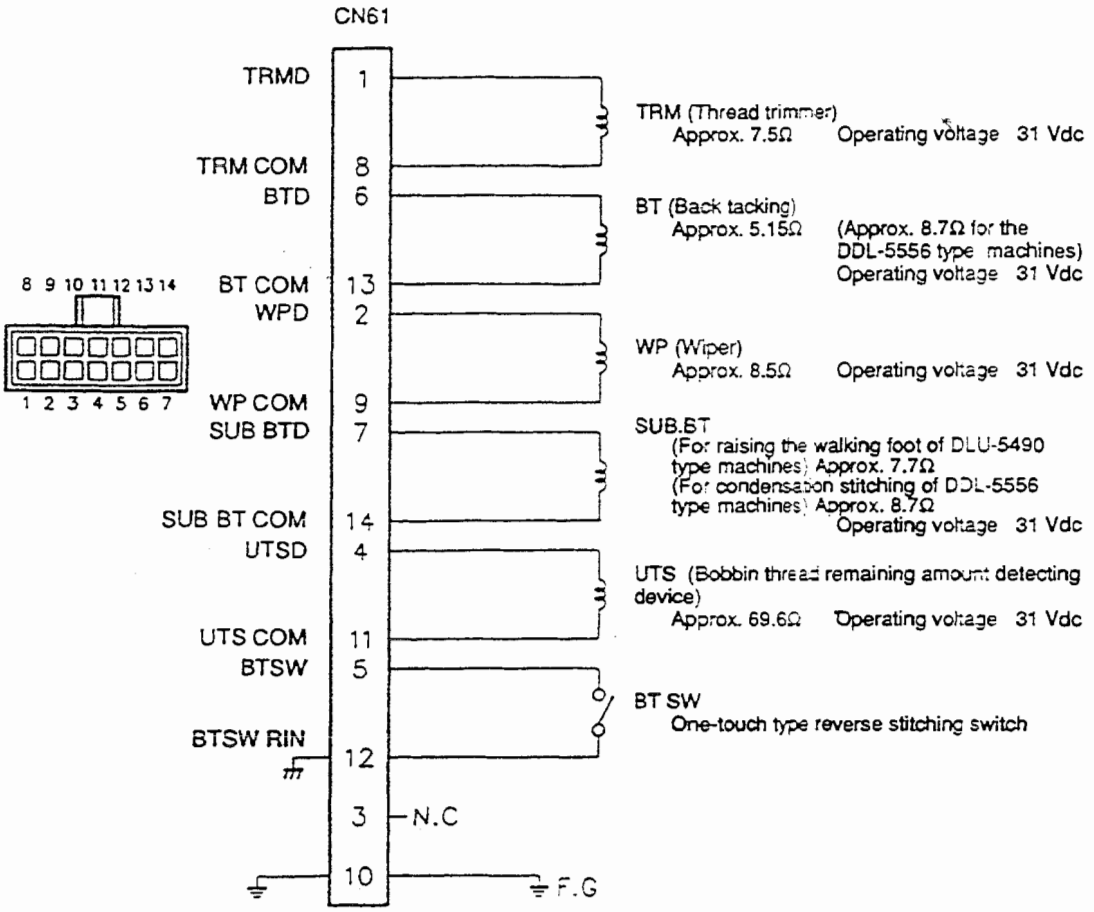
	3ø 220 V	Phenomenon caused by blown out fuse	1ø 220 V	1ø 120 V	Phenomenon caused by blown out fuse	JE type of ø1 and 220 V	Phenomenon caused by blown out fuse
F1	250 V 12 A Main	E1 is indicated on the display.	250 VT 20 A Main	250 VT 20 A Main	The machine cannot be energized.	— —	— —
F2	250 V 12 A Main	E1 is indicated on the display.	250 VT 20 A Main	250 VT 20 A Main	The machine cannot be energized.	— —	—
F3	250 V 12 A Main	E1 is indicated on the display.	— —	— —	— —	— —	— —
F4	250 VT 1.6 A Transformer	E25 is first indicated on the display, then E26 replaces it.	250 VT 1.6 A Transformer	250 VT 3.0 A Transformer	E25 is first indicated on the display, then E26 replaces it.	250 VT 1.6A Transformer	E25 is first indicated on the display, then E26 replaces it.
F5	250 VT 1.6 A Rush-current prevention	The machine cannot be energized.	250 VT 1.6 A Rush-current prevention	250 VT 1.6 A Rush-current prevention	The machine cannot be energized.	250 VT 1.6A Rush-current prevention	The machine cannot be energized.
F6	250 VT 0.5 A Regeneration absorption	E13 is indicated on the display.	250 VT 0.5A Regeneration absorption	250 VT 0.5A Regeneration absorption	E13 is indicated on the display.	250 VT 0.5A Regeneration absorption	E13 is indicated on the display.

10. CONNECTOR CONNECTION DIAGRAM

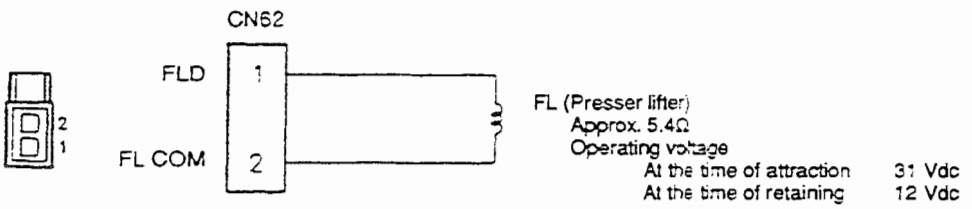


❶	CN32	7P	Synchronizer
❷	CN61	14P	Machine head solenoid
❸	CN62	2P	Presser foot lifting solenoid (Flyback resistor asm. is not required.)
❹	CN63	10P	Solenoid valve (for SC-2 only)
❺	CN64	2P	24 V external output
❻	CN10	6P	Bobbin thread remaining amount detecting device (AE: Optional)
❼	CN11	4P	External switch for No. of pcs. counter (optional)
❽	CN12	2P	JPS, production control system (optional)
❾	CN1	8P	RS232C
❿	CN3	16P	Pedal sensor
⓫	CN3	10P	Motor
⓬	CN4	4P	Resistor pack
⓭	CN5	4P	Sub-panel (not used at present)
⓮	CN6	5P	CP-30 control panel
⓯	CN7	20P	CP-130, -230, -330 control panel
⓰	CN8	12P	Pedal for sewing machine for standing work (optional)
⓱	CN9	6P	Material edge sensor (ED: Optional)
⓲	CN93	2P (red)	Lamp for 6 V (JE type is excluded.)
⓳	CN94	2P (black)	Lamp for 12 V (JE type is excluded.)

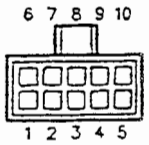
Machine head solenoid

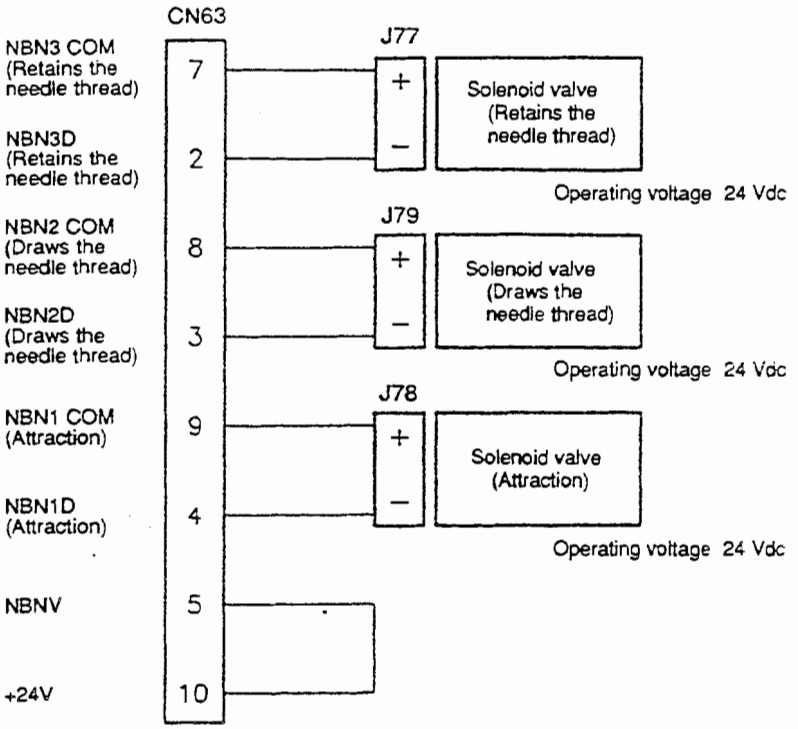


Presser foot lifting solenoid



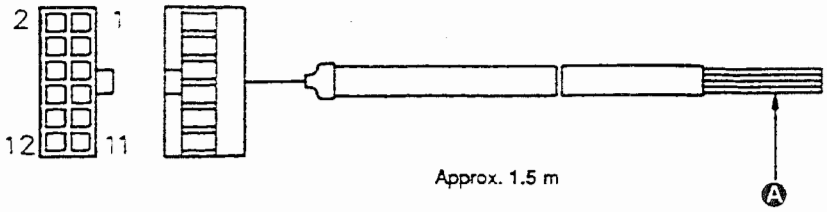
SC-2 solenoid valve



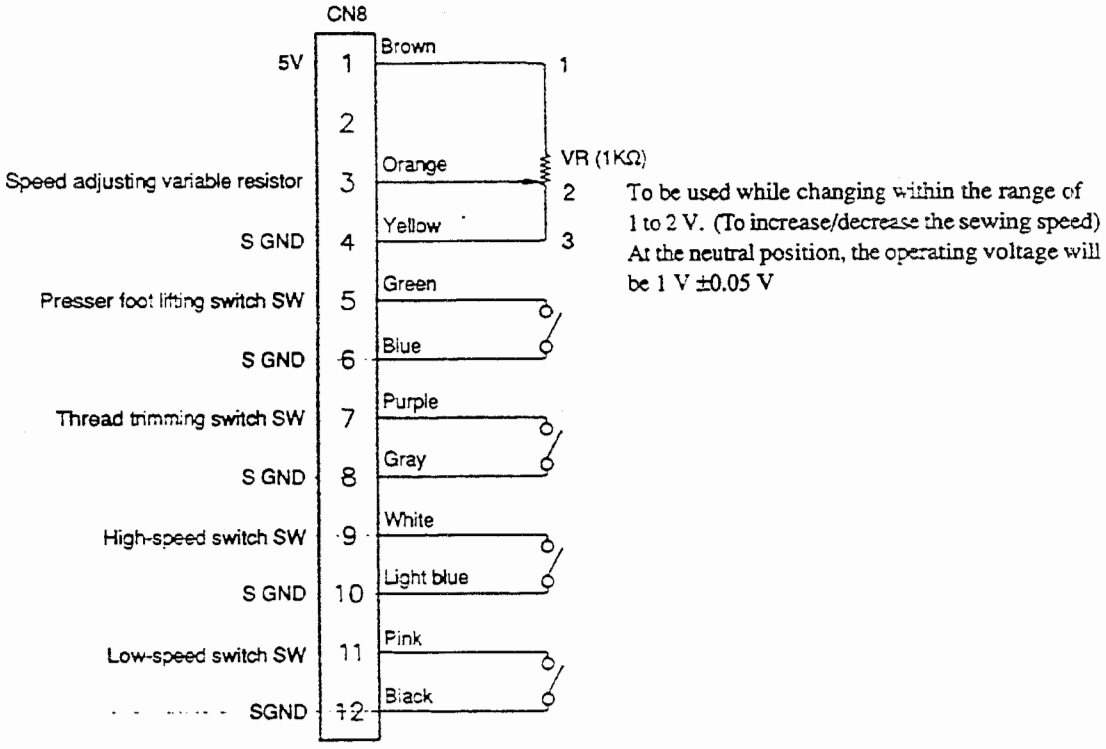


11. OPTIONAL CORDS

(1) Junction cord A asm. for sewing machine for standing work (Part No. M9701351AA0)



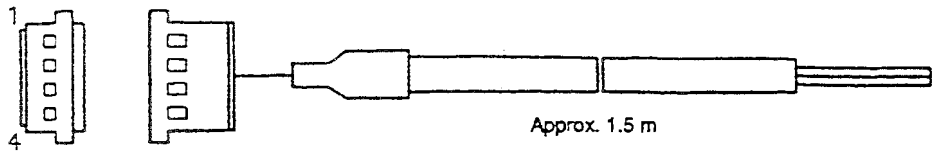
Wiring diagram



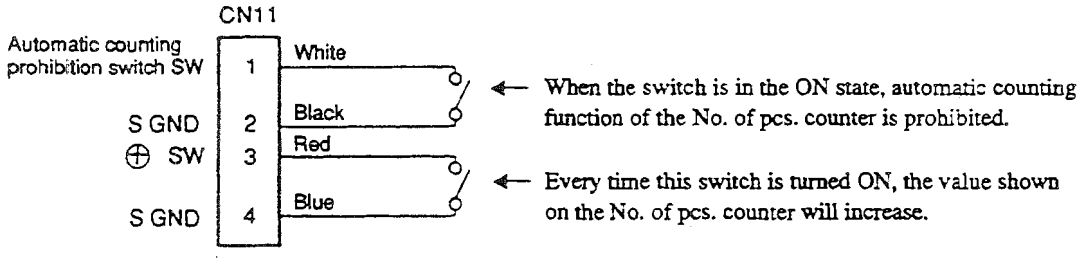
- Power source section Ⓐ that is colored with signals appears outside the junction cord A asm. for sewing machine for standing work. So, connect the switches and speed adjusting variable resistor in accordance with the wiring diagram.
- Use the cord with connected to the connector (Ⓑ CN8 12P on "10. Connector connection diagram") of the pedal for sewing machine for standing work on the PSC box.

(Caution) **When the high-speed switch is turned ON, the sewing machine will run at the max. sewing speed. The max. sewing speed cannot be regulated using the max. sewing speed control variable resistor mounted on the control panel.**

(2) Junction cord A asm. for the No. of pcs. counter (Part No. M9702351AA0)

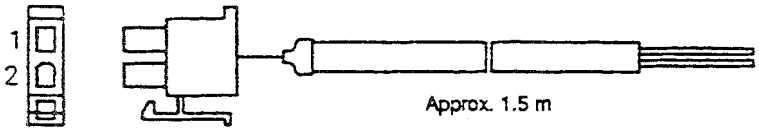


Wiring diagram

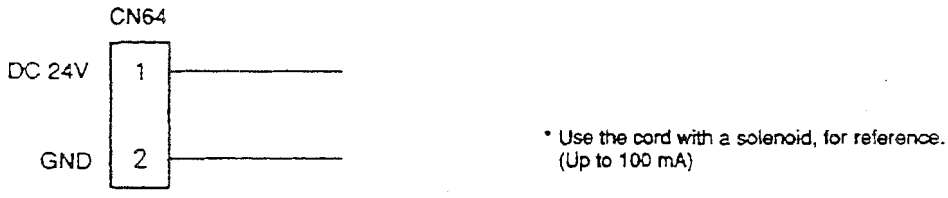


- Use the cord with connected to the connector (❼ CN11 4P on "10. Connector connection diagram") of the external switch of the No. of pcs. counter on the PSC box. (When the CP-230 or CP-330 is used with the machine)

(3) Junction cord A asm. for 24 Vdc (Part No. M9703351AA0)



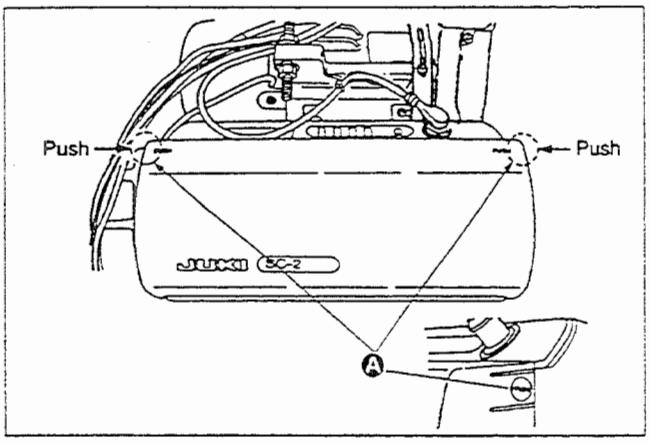
Wiring diagram



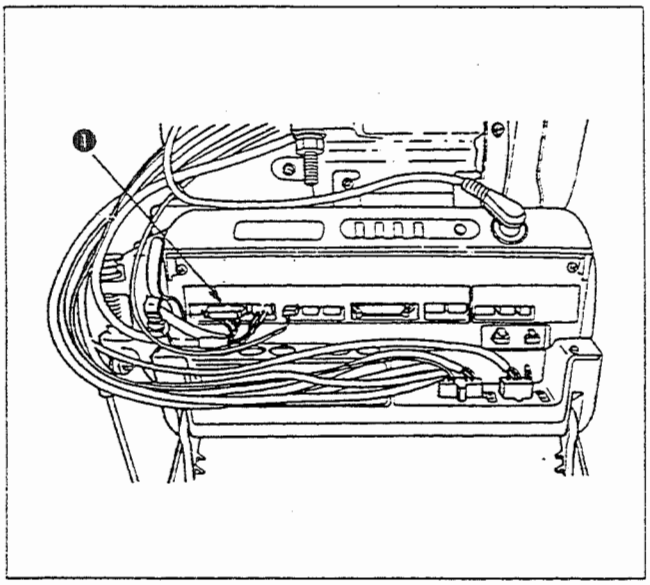
- Use the cord with connected to the yellow connector (❺ CN64 2P on "10. Connector connection diagram") of 24 Vdc on the PSC box.

12. HOW TO REPLACE THE CIRCUIT BOARDS

(1) PDL circuit board AA asm. [M8606351AAA]

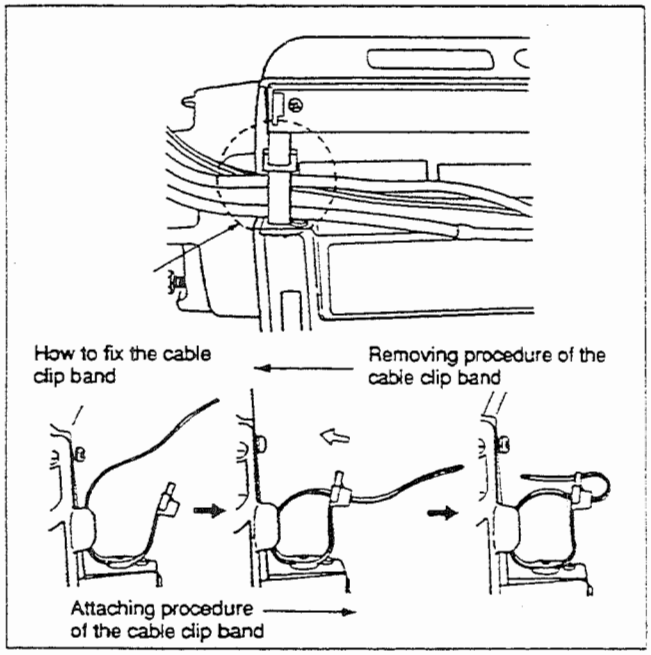


1. Push two points Ⓐ on both sides of the front cover to open the front cover.



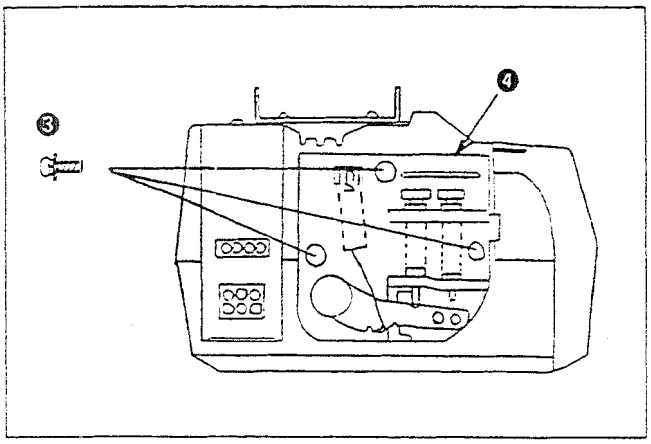
2. Remove pedal connector ❶ "  ".

(Caution) **Be sure to remove the pedal connector while holding the connector section. (Removing the connector while holding the cord will cause imperfect contact.)**

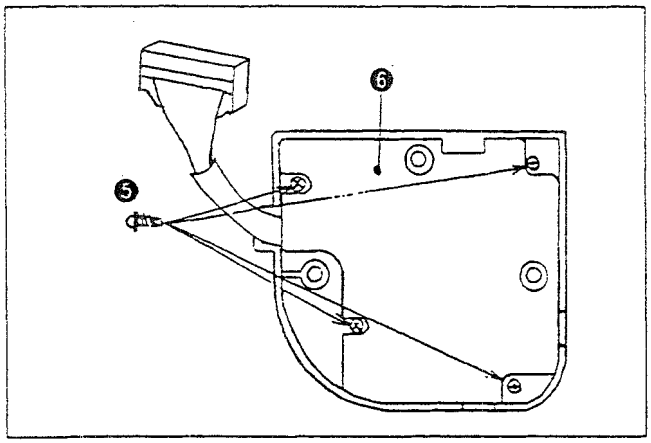


3. Remove cable clip band ❷ following the removing procedure shown in the figure on the left to release the pedal connector.

(Caution) **The cable clip band is used repeatedly. So, do not cut it off with a pair of nippers or the like.**

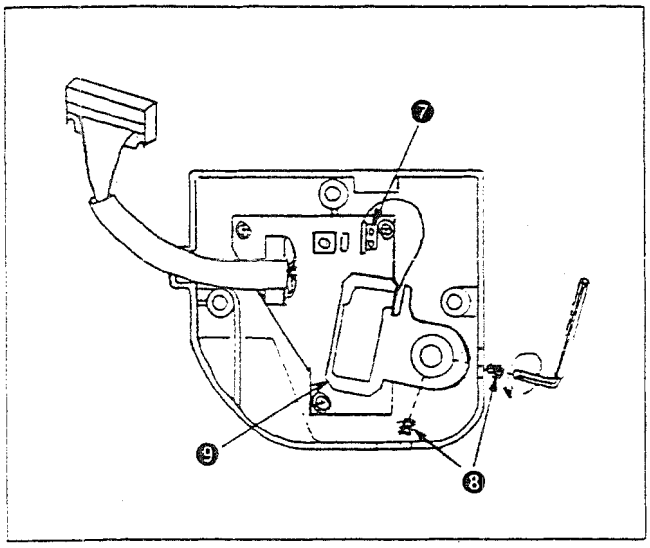


4. Remove three pedal sensor attaching screws [M4, L=10, sems] ❸ with a screwdriver. Then, detach pedal sensor unit ❹ from the main unit of SC-1.



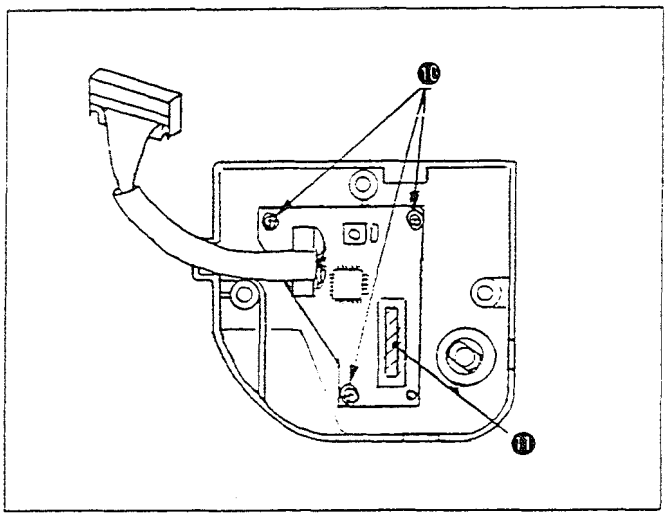
5. Turn over the pedal sensor unit that has been detached in the aforementioned step 4.
6. Remove four tapping screws [D3, L=10] ❺ with a screwdriver and open cover ❻ of the sensor unit.

(Caution) **When installing the sensor cover, take care not to allow the cover to catch the cord under it.**



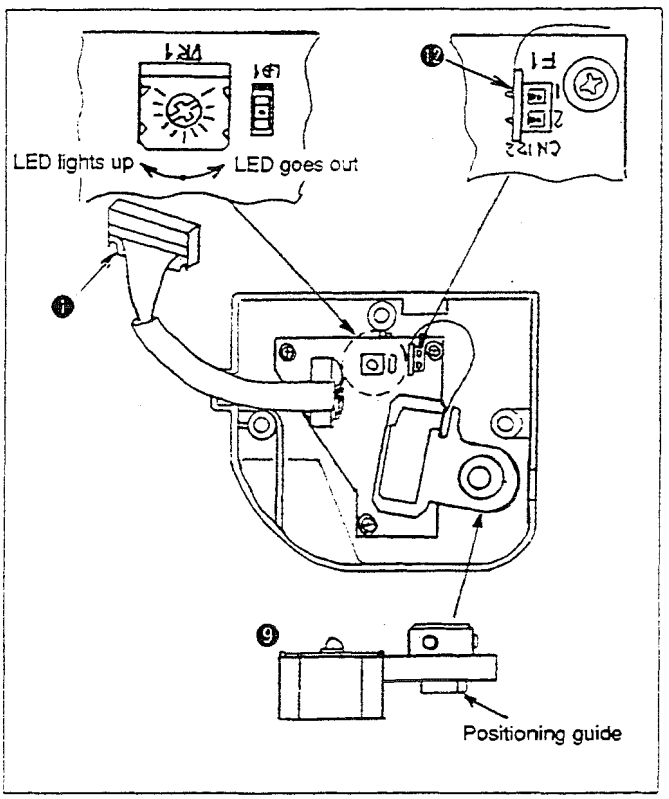
7. Remove CN122 connector (for LED power supply) ❼ while holding the connector section.
8. Loosen two square screws [M4, L=6] ❽ using a hexagon wrench key [2 mm or 5/64"] and remove LED mounting base ❾.

(Caution) **Do not remove the square screws from LED mounting base ❾.**
(The figure shown on the left illustrates the screws in the removed state only to clearly indicate them.)



9. Remove three tapping screws [D3, L=8] ⑩ with a screwdriver and remove the circuit board from the sensor base.
10. To replace the circuit board, attach a circuit board to be used.

(Caution) **When replacing the circuit board, take care not to leave fingerprints or dust on the glass plane of CCD ⑪. (Irregular rotation of the machine will result.)**



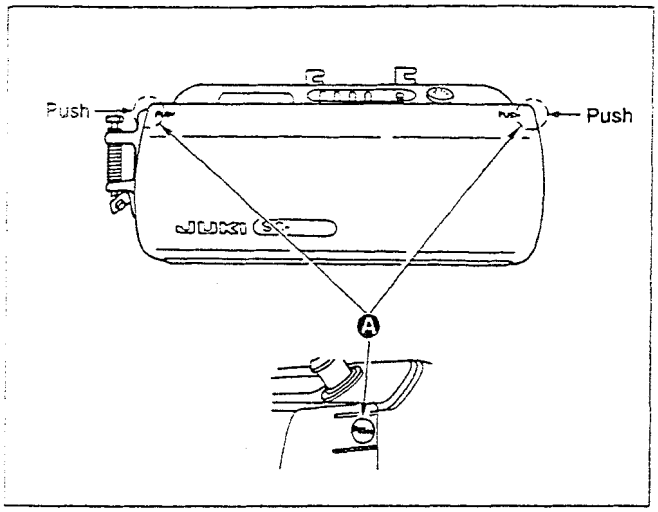
11. After the circuit board is properly attached in position, put LED mounting base ⑨ over the pedal lever shaft taking care of the orientation of the base (using for reference the positioning guide located on the lower section) and fix it using a hexagon wrench key.
12. Connect 2P connector ⑫ to the CN122 on the circuit board facing the connector to the correct direction.
13. Adjust the quantity of light of the LED following the procedure described below.
    (1) Turn the variable resistor 1 once in the direction in which the LED is to go out to go out the LD1. (If the LD1 has been in the OFF state, this step is not necessary.)
    (2) Then, turn the variable resistor in the direction in which the LED is to light up the LD1.
    (3) After the LD1 has lit up, further turn it in the direction by one division on the scale same as the aforementioned step 2. This completes the adjustment.

(Caution) **1. To adjust the quantity of light of the LED, temporarily turn ON the power to the machine by connecting pedal connector ⑬ to the connector " " on the SC-1.**
2. If the connector CN122 is connected in the opposite direction, the quantity of light of the LED cannot be adjusted.
3. If the aforementioned adjustment of the quantity of light of the LED is not performed, the sewing machine will not normally operate according to the operation command by the pedal.

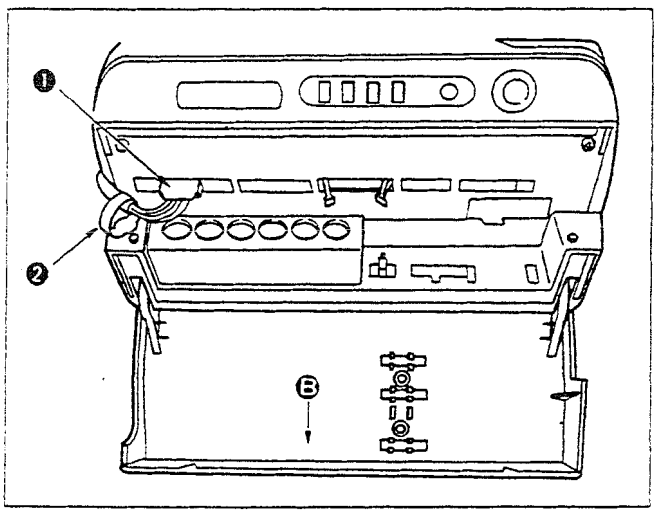
14. After the quantity of light of the LED has been adjusted, assemble the related components following the procedure for disassembling them in the reverse order.
15. Finally, correct the neutral position of the pedal as described in 4. 18) of the Engineer's Manual for the SC-1. This completes the replacement of the circuit board.

(Caution) **1. Whenever you have removed the pedal unit (also in case of replacement of the pedal unit or the circuit board), be sure to perform the automatic neutral position correction. (If the automatic neutral position correction is not carried out, the normal operation of the sewing machine cannot be ensured.)**

(2) Replacing the circuit boards of the SC-1

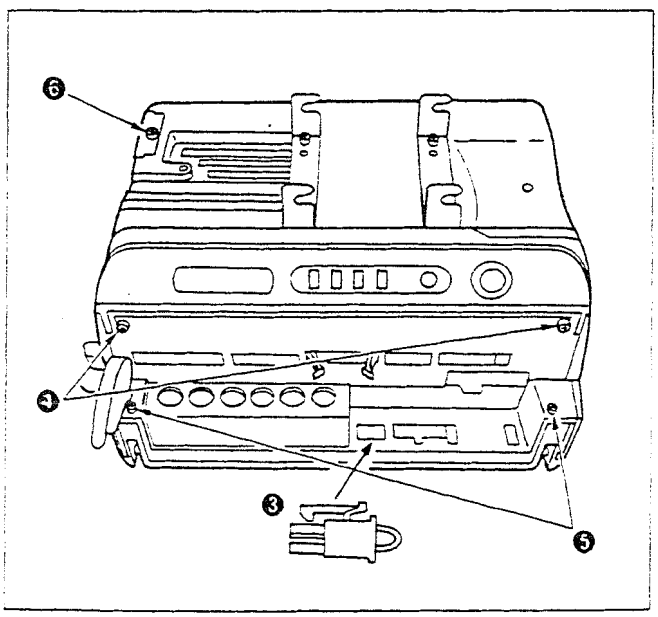


1. Push two points Ⓐ on both sides of the front cover to open the front cover.

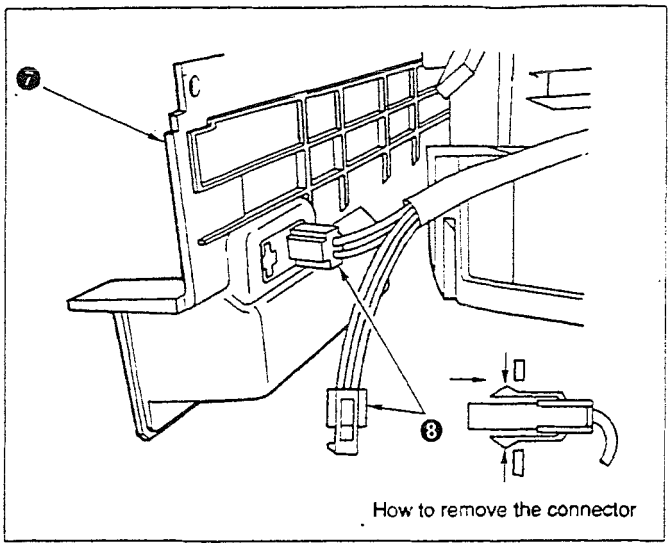


2. 1) Remove pedal connector ❼ " ".
   2) Unbind cable clip band ❷ .
   3) Depress the front cover in the direction Ⓑ and remove cover.

(Caution) Be sure to detach the pedal connector while holding the connector section.

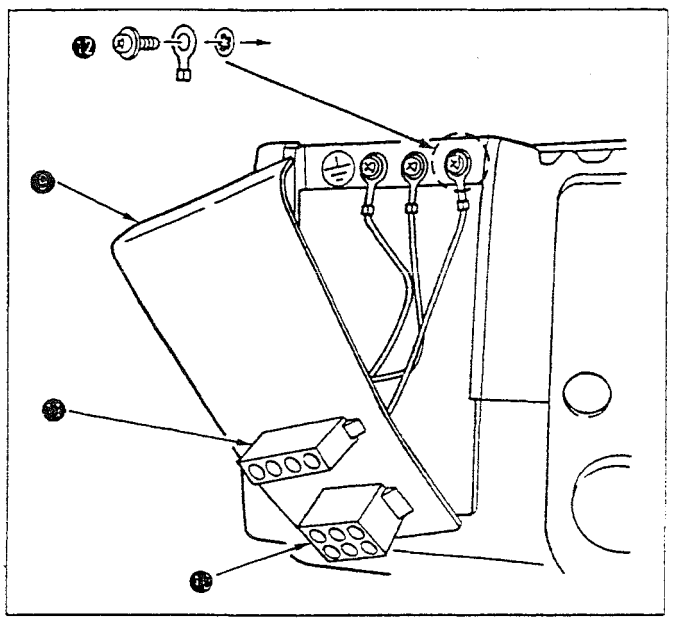


3. 1) Remove transformer input change-over cord A asm. ❸ while holding the lock tab.
   2) Remove connector panel attaching screws A ❹ and connector panel attaching screws B ❺ using a screwdriver.
   3) Remove screw ❻ from the connector installing plate using a screwdriver.



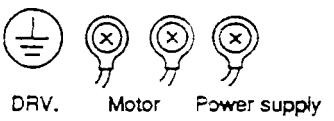
How to remove the connector

4. 1) Draw connector panel ⑦ toward you until it comes off. Press lamp power connectors ⑧, while pinching the lack tab with your fingers, away from you until it comes off. (Refer to figure.)

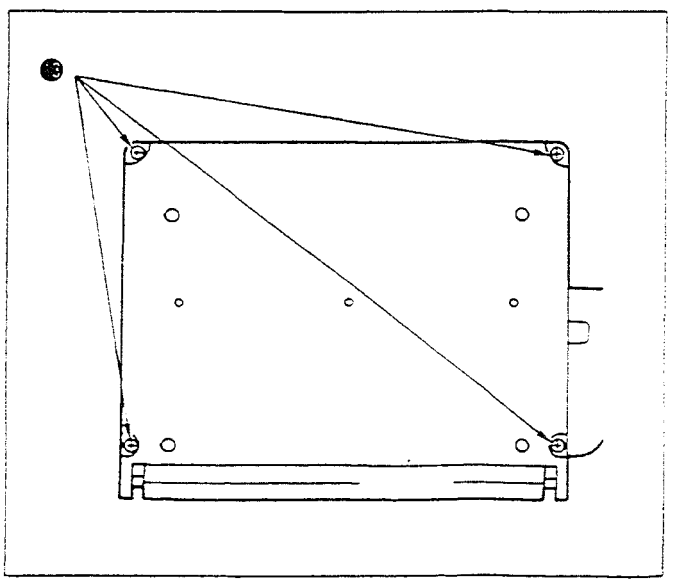


5. 1) Draw out AC input connector ⑩ (5P) and motor output connector ⑪ (4P) from connector installing plate ⑨.
   2) Loosen screw ⑫ which is used to retain the FG using a screwdriver and remove the FG.

(Caution) **1. The FGs have been factory-installed in the order as illustrated below at the time of delivery.**

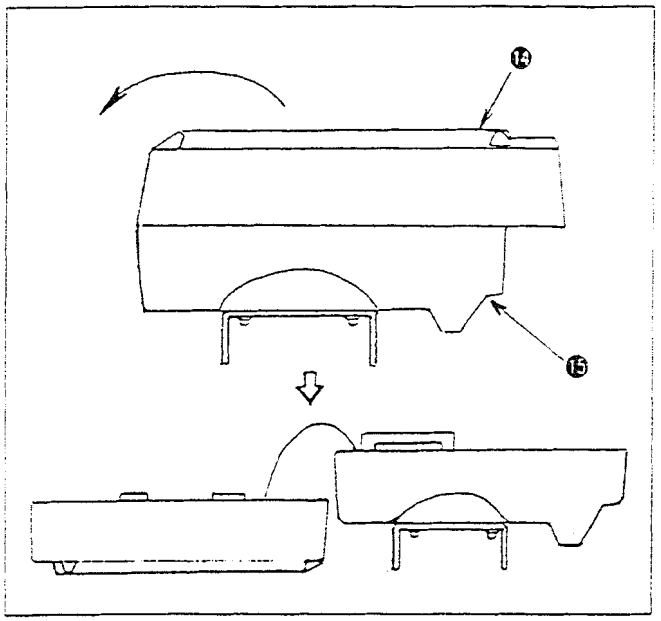


2. When removing the FG, take care not to drop the toothed washer.

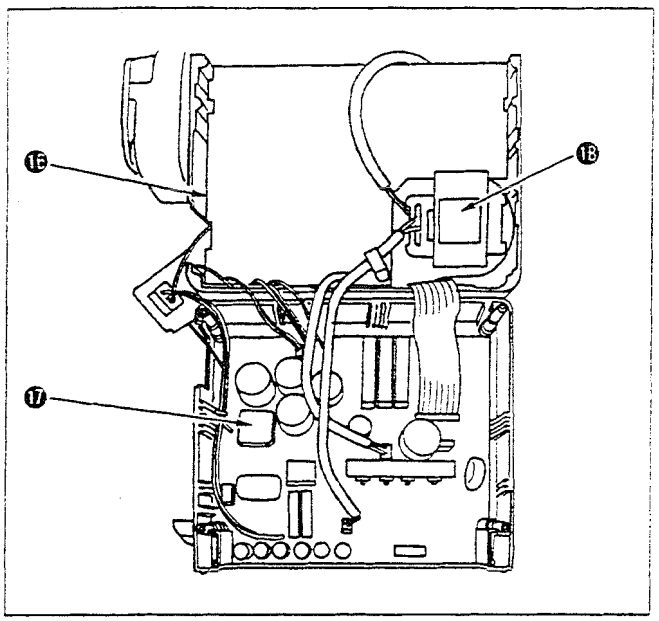


6. 1) Turn over the SC-1 and loosen four screws ⑬ in the bottom cover using a screwdriver.

(Caution) **1. The screws for the bottom cover have been designed so that they hardly come off.**

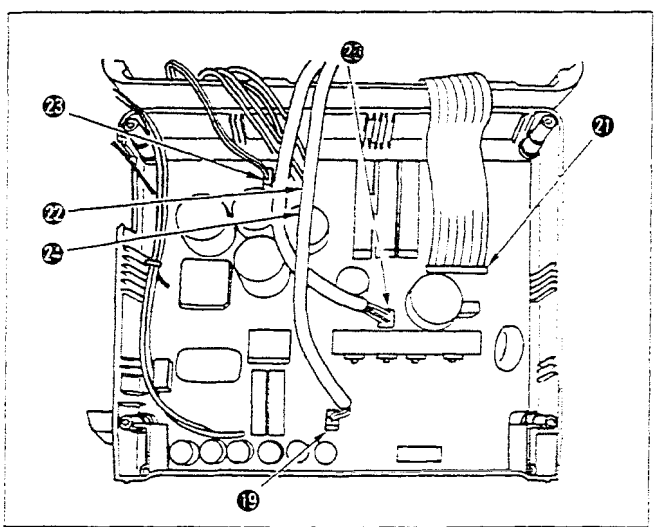


7. 1) Tilt bottom cover ⑮ in the direction of the arrow (⟵). Then detach bottom cover ⑮ from top cover ⑭.

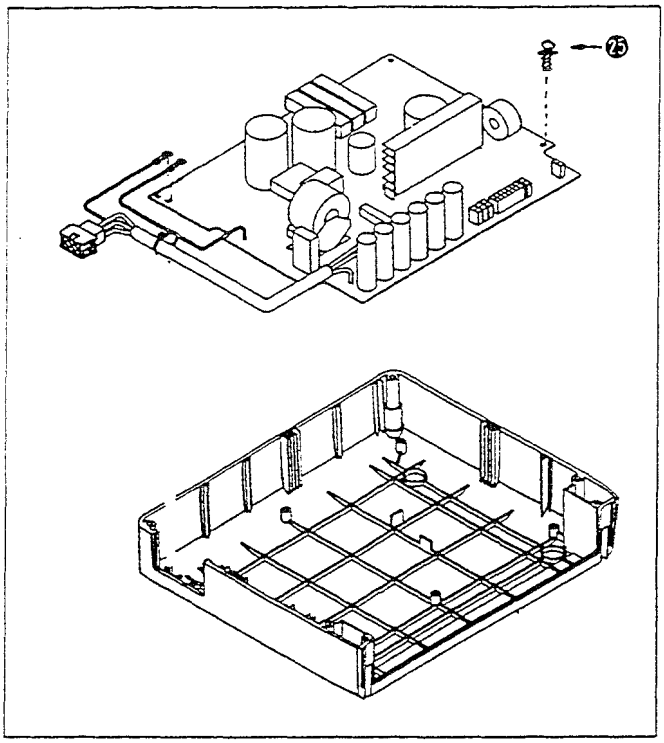


8. 1) When the the bottom cover and the top cover are separated from each other, you can observe CTL circuit board ** asm. ⑯, power circuit board ** asm. ⑰ and power transformer * asm. ⑱.

(Caution) The asterisk (*) mark of the assemblies indicate the type of circuit board and the destination.

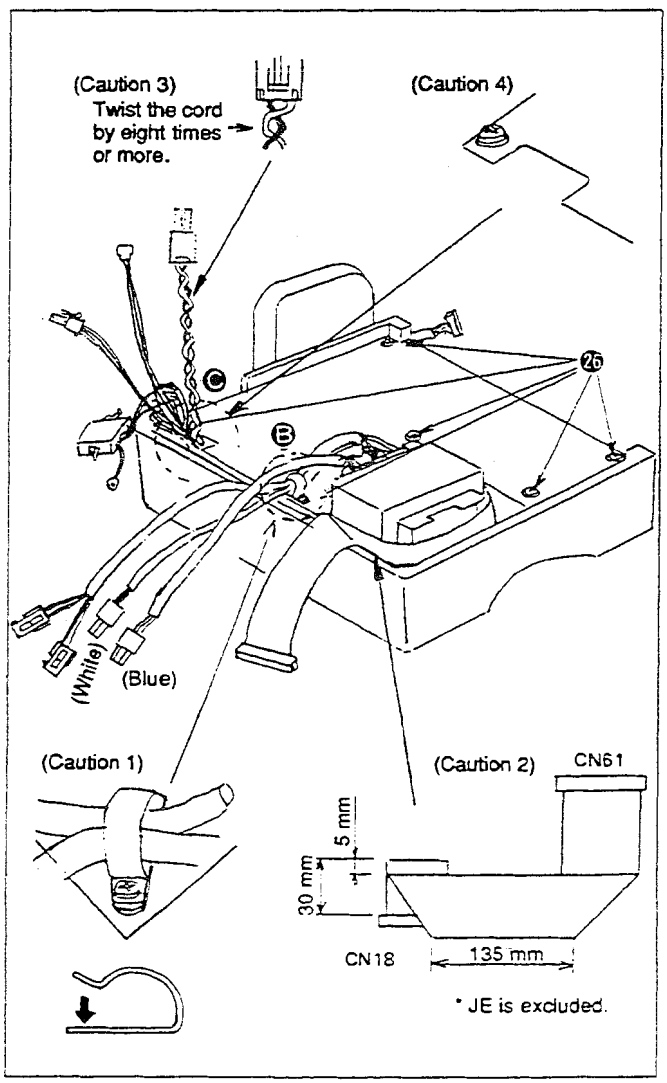


9. Power circuit board ** asm. [M860*351*A*]
   1) Remove transformer input connector (6P blue) ㉖ from CN57, and output connector (4P white) ㉔ from CN56.
   2) Remove I/F connector (34P) ㉑, which connects the power circuit board with the CTL circuit board, from the CN54, power connector (2P) ㉒ for RCC from the CN53, and power connector (2P) ㉕ for +15 V power supply supply from the CN51.
   3) Remove driver power connector (2P) ㉓ coming from the DRV circuit board from the CN52.



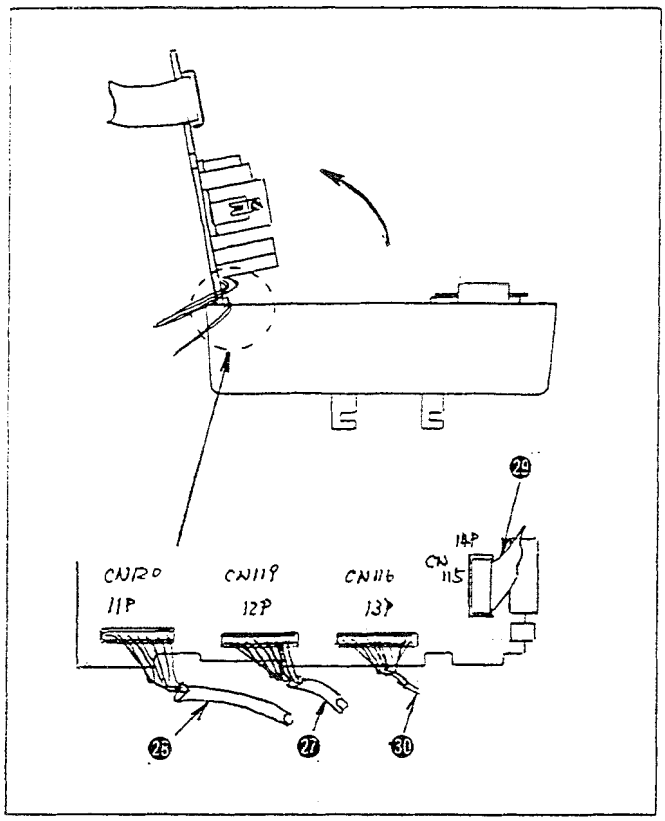
4) Remove six screws ㉕ from the power circuit board. Then, remove the power circuit board from the bottom cover.

(Caution) **1. Some connectors are equipped with a lock. Carefully connect/remove such a connector.**



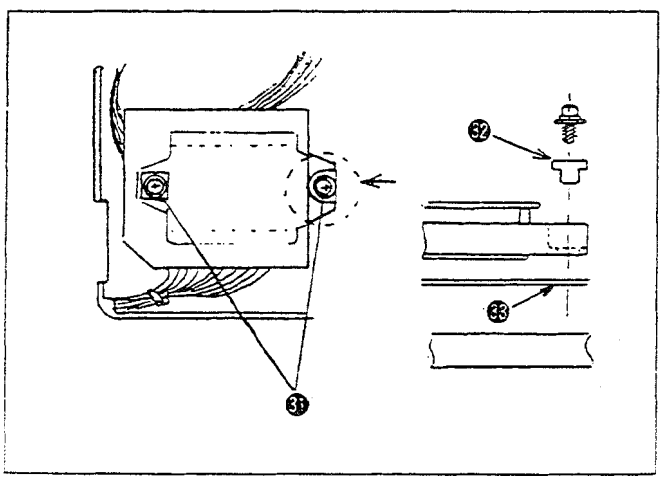
10. CTL circuit board ** asm. [M3601351*A*]
    1) Remove six screws ㉖ from the CTL circuit board. Then separate the CTL circuit board ** asm. from the top cover.

(Caution) **1. One of the six screws that is located in section Ⓑ is also used to fix the cable clamp. So, clamp the transfer cords, except the lamp output cord, with the cable clamp.**
2. Bend the I/T cable which connects the CTL circuit board to the PWR circuit board as illustrated in the figure to allow it to bypass the transformer.
3. Twist the driver power cord by eight times of more.
4. Draw out the cords coming from the CTL circuit board and DRV circuit board which are to be connected to the other circuit boards through section Ⓒ of the CTL circuit board.



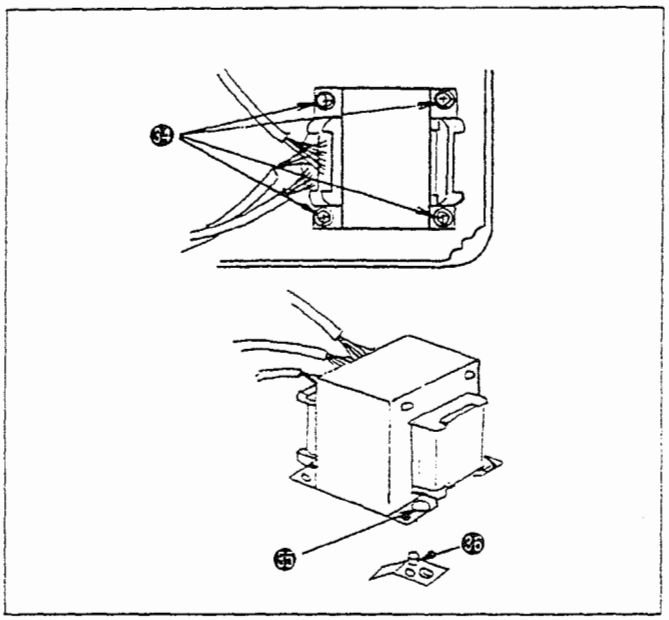
2) Raise the CTL circuit board as illustrated in the figure on the left. Remove DRV circuit board signal connector ㉗ from the CN119, and predriver power connector ㉘ from the CN120.
3) Remove junction connector ㉙ which is used to connect the CTL circuit board with the LCD circuit board from the CN115. Then remove junction connector ㉚ which is used to connect the CTL circuit board with the SW circuit board from the CN116.

(Caution) 1. Special attention must be attached not to erroneously connect the CN120, CN119 and CN116.



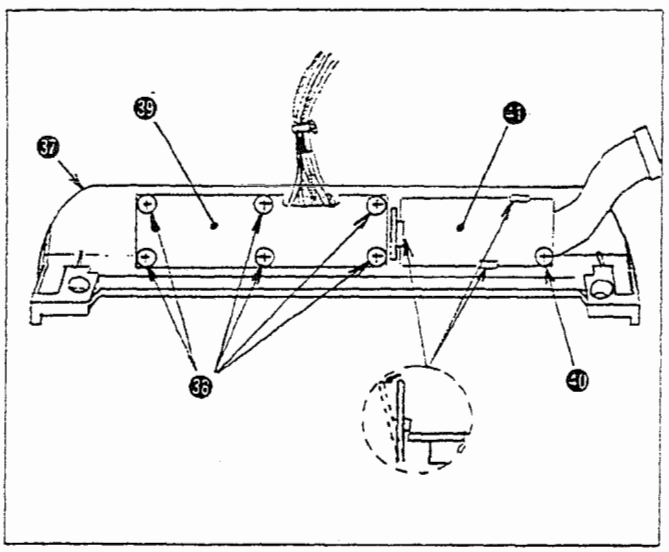
11. DRV circuit board ** asm. [M8602351AA*]
    1) Remove screws ㉛ from the DRV circuit board using a screwdriver.

(Caution) 1. When assembling, be careful to attach spacer ㉜ and sheet ㉝, together with the screw, to the circuit board.



12. Power transformer asm. [M8502351*A0]
    1) Remove screws 34 from the power transformer with a screwdriver.

    (Caution) 1. When assembling, be sure to align transformer positioning guide hole 35 with projection 36 on the top cover.



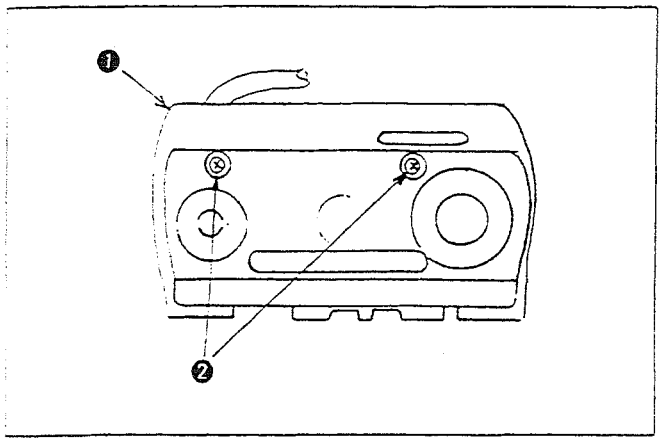
13. SW circuit board A* asm. [M8607351AA*]
    1) Remove screws 38 for the SW circuit board, using a screwdriver, from display setting device * asm. 37. Then, remove SW circuit board * asm. 39.

14. LCD unit A asm. [M8503351AA0]
    1) Remove screw 40 from the LCD unit with a screwdriver.
    2) Open the three circuit holders in the direction of the arrow (⬅), then remove LCD unit A asm. 51.

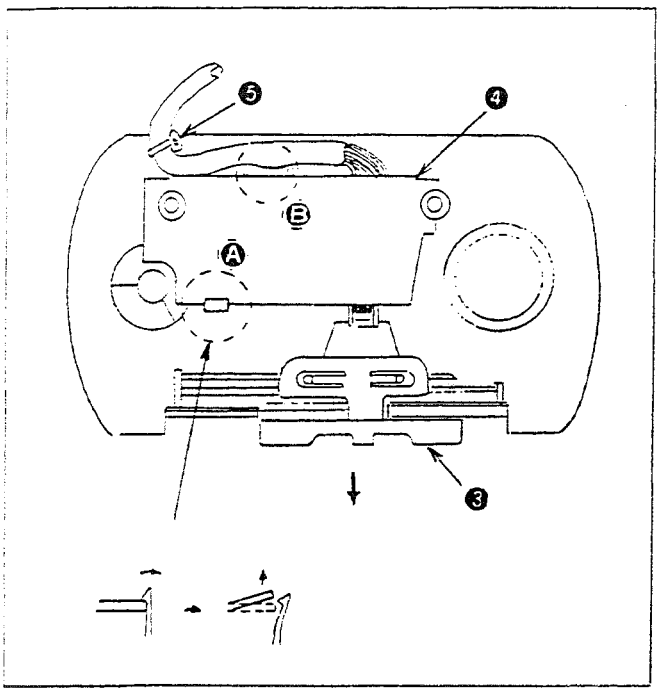
    (Caution) 1. Carefully opening the circuit board holder in the direction of the arrow (⬅), since they may break if you open them roughly.
    2. Be careful not to excessively tighten the screws for the SW circuit board and LCD unit, since they are tapping screws.

When assembling the circuit boards after the replacement, follow the procedure for disassembling them in the reverse order.

(3) CP-30 circuit board A asm. [M8601370AA0]



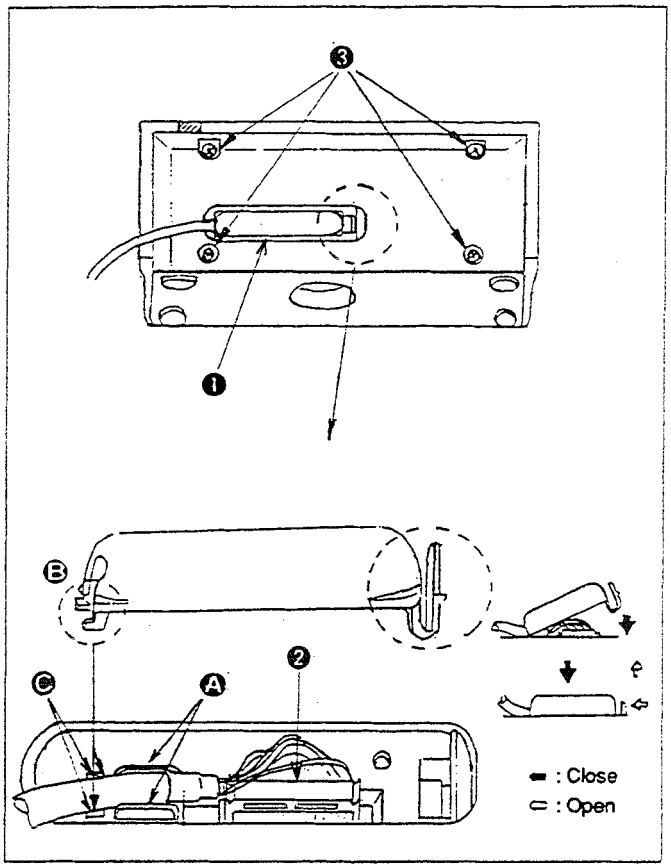
1. Turn over CP-30 (CP-33) ❶ , and remove screws ❷ with a screwdriver. Then, open the cover.



2. Move variable resistor knob ❸ in the direction of the arrow (⬇) until it comes off.
3. Remove portion Ⓐ of the circuit board holder from CP-30 circuit board A asm. ❸ referring to the removing procedure shown in the figure on the left.

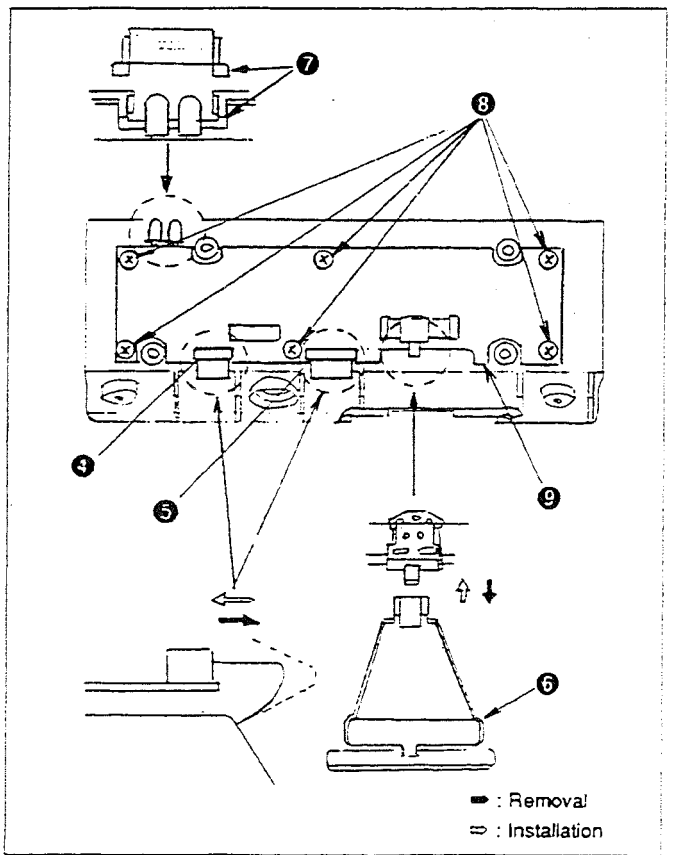
(Caution) 1. Bring cable clip band ❺ inside the panel. (It works as a stopper when an external load is applied to the cords.)
2. Place the cabtyre cord in clearance Ⓑ provided between the cables and the circuit board.

(4) CP-*30 circuit board * asm. [M860137**A0]



1. Draw out cord exit cover ❶ following the procedure shown in the figure on the left.
2. Remove signal cord connector (20P) ❷ while holding it with both hands.
3. Remove screws ❸ from the cover using a screwdriver. Then remove the cover.

(Caution) 1. When closing the cord exit cover, insert first the lock Ⓑ of the exit cover diagonally into holes Ⓒ in the panel while aligning the signal cord with cord guides Ⓐ, then push the cover down until it closes. (See the direction indicated by an arrow (⬇) in the figure on the left.)

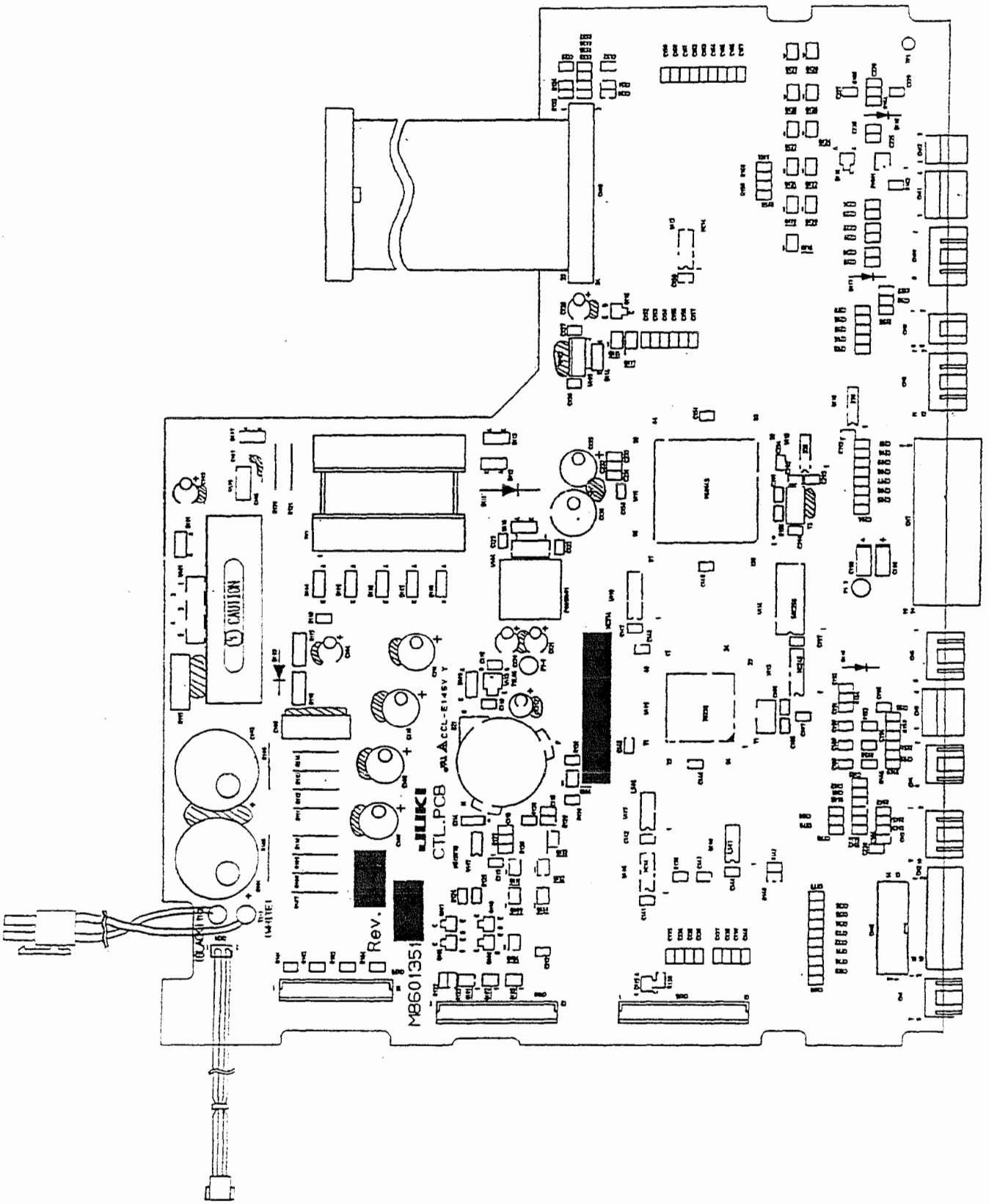


4. Remove the membrane switch cables from connectors ❹ and ❺.
5. Lower variable resistor knob ❻ and remove it.
6. Remove display window ❼ from the panel. (The panel is designed so that the hook of the display window is to be fitted in the stepped section of the panel.)
7. Remove screws ❽ from the circuit board with a screwdriver. Then, remove CP-*30 circuit board * asm. ❾ from the panel.

(Caution) 1. When the screws are removed from the circuit board, the membrane switch will be released. So, take care not to drop the switch.

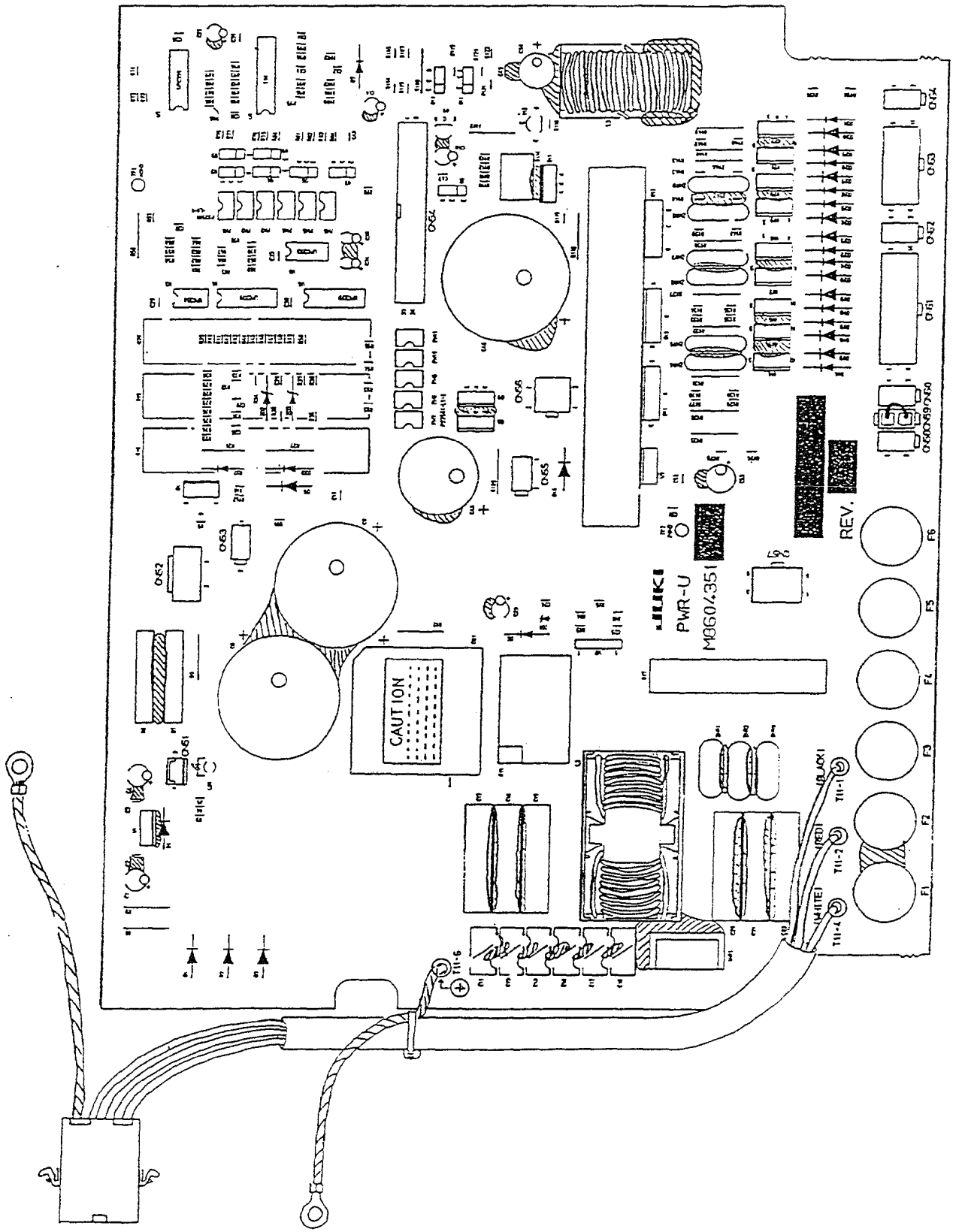
13. CIRCUIT BOARD MOUNTING DIAGRAM

1) **CTL circuit board AA asm. [M8601351AAA] : Excluding JE**
   CTL circuit board AB asm. [M8601351AAB] : JE

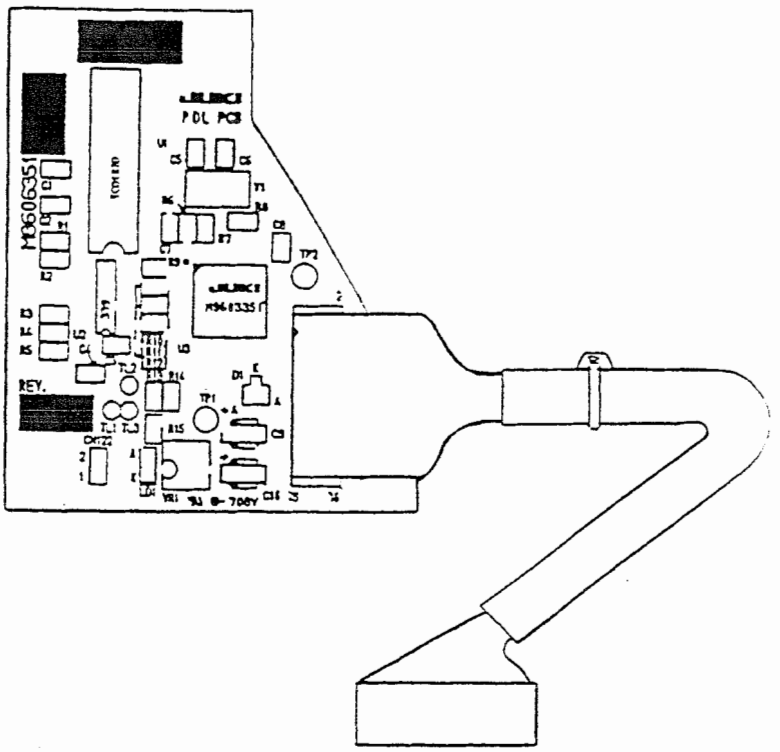


2) **Power circuit board B * asm. [M8604351BA*] : General export ø3 200 to 240 V**
Power circuit board C * asm. [M8605351CA*] : General export ø1 200 to 240 V
Power circuit board E * asm. [M8604351EA*] : JA ø3 200 to 240 V
Power circuit board F * asm. [M8605351FA*] : JA ø1 100 to 120 V
Power circuit board G * asm. [M8605351GA*] : JA ø1 200 to 240 V
Power circuit board H * asm. [M8605351HA*] : General export ø1 100 to 120 V

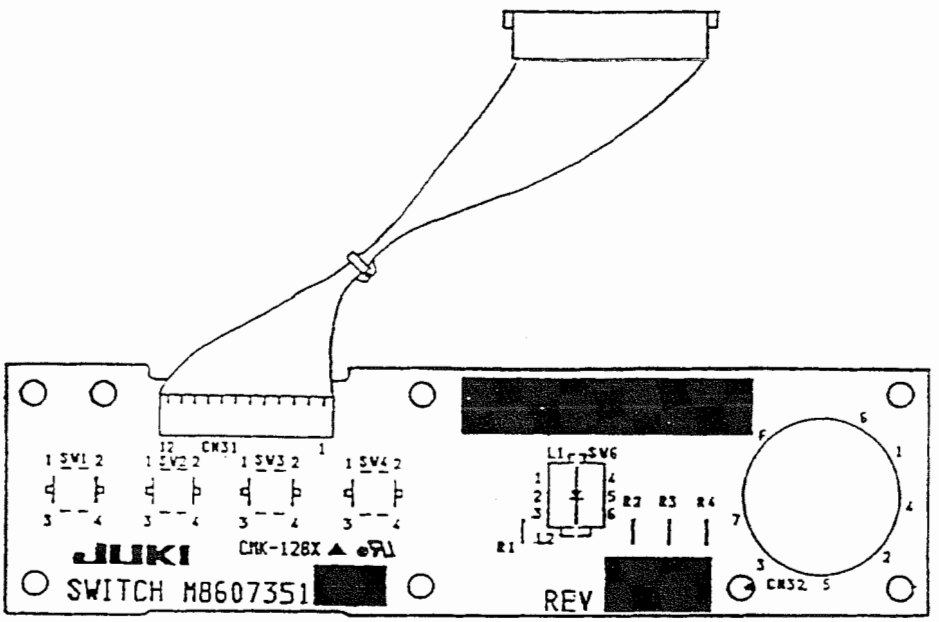
[Note] The asterisk (*) represents the type of sewing machine controller.
A : SC-1
B : SC-2



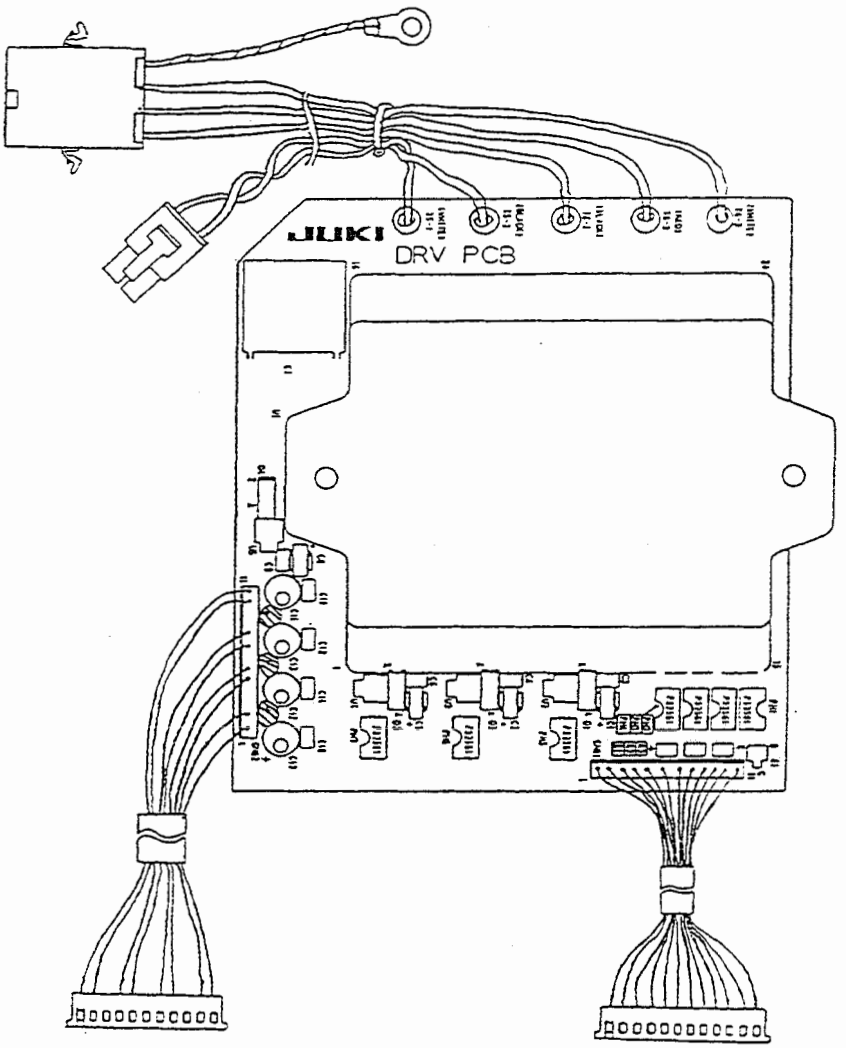
3) PDL circuit board AA asm. [M8606351AAA]



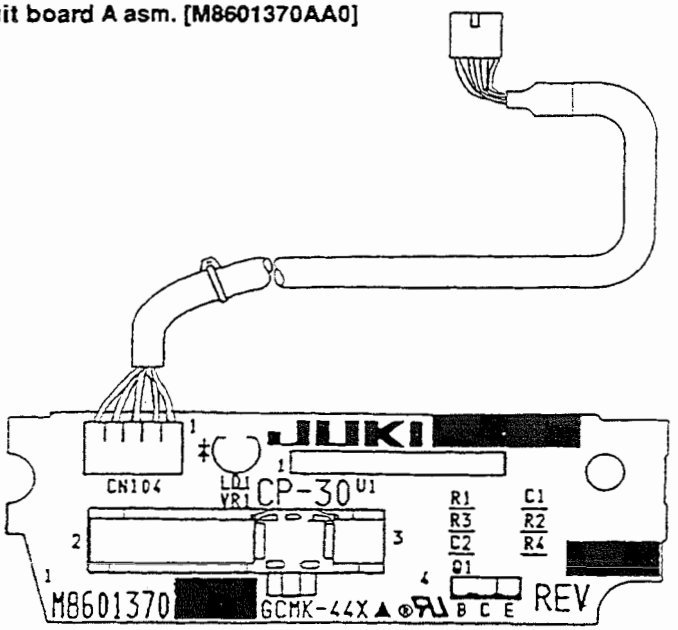
4) SW circuit board AA asm. [M8607351AAA] : Excluding JE
SW circuit board AB asm. [M8607351AAB] : JE



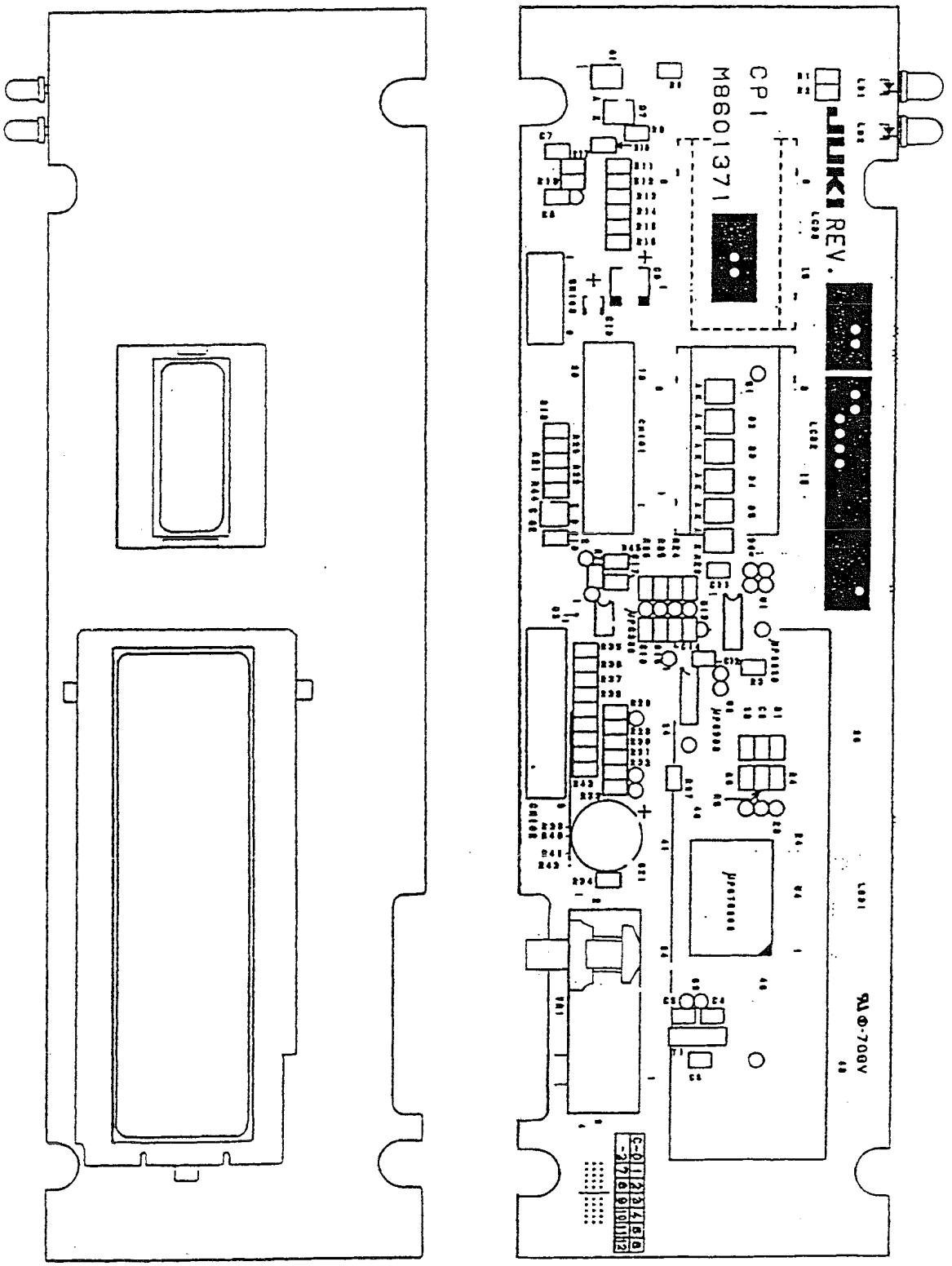
5) DRV circuit board AA asm. [M8602351AAA] : General export
DRV circuit board AB asm. [M8602351AAB] : JE
DRV circuit board AC asm. [M8602351AAC] : JA



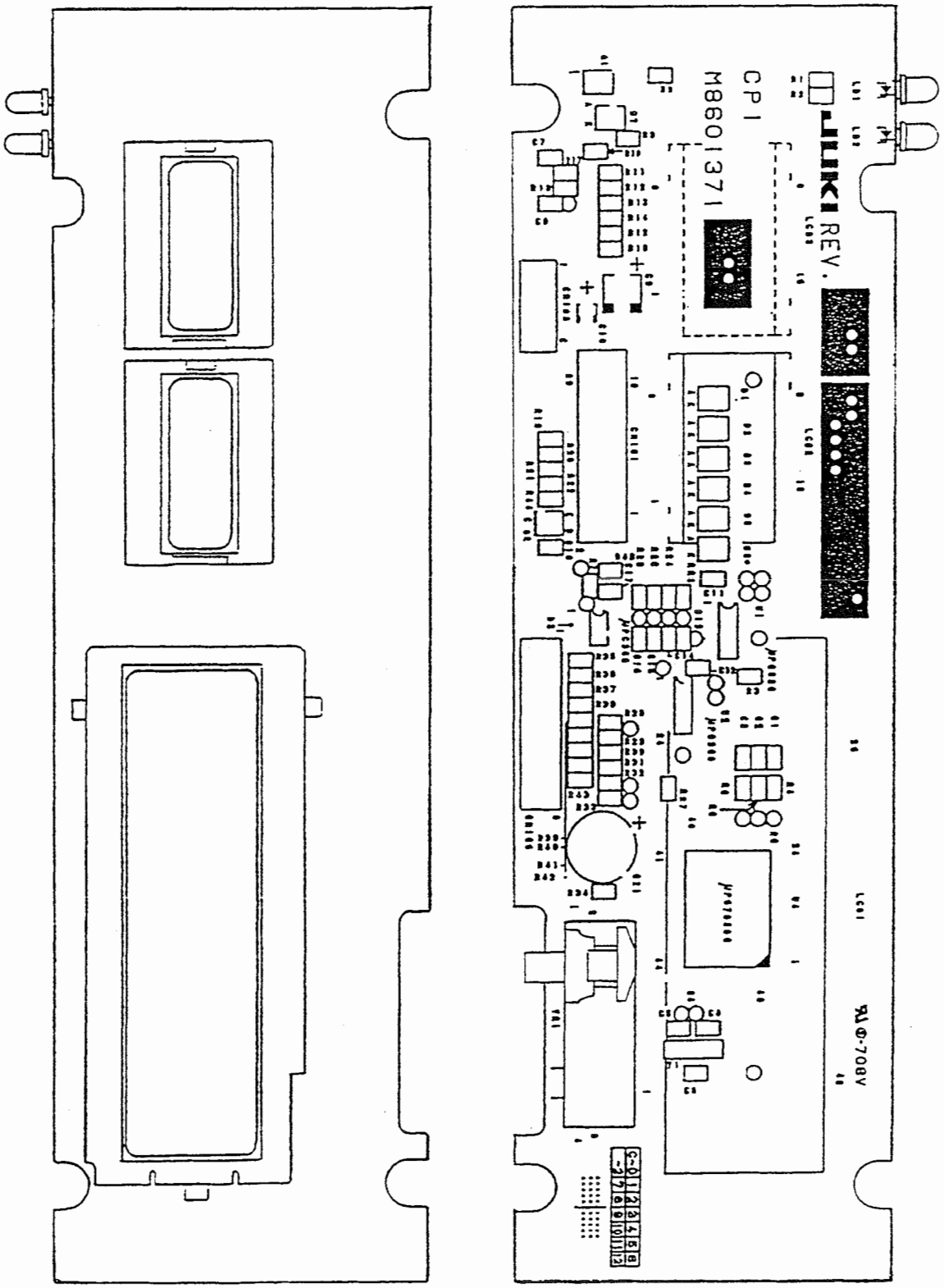
6) CP-30 circuit board A asm. [M8601370AA0]



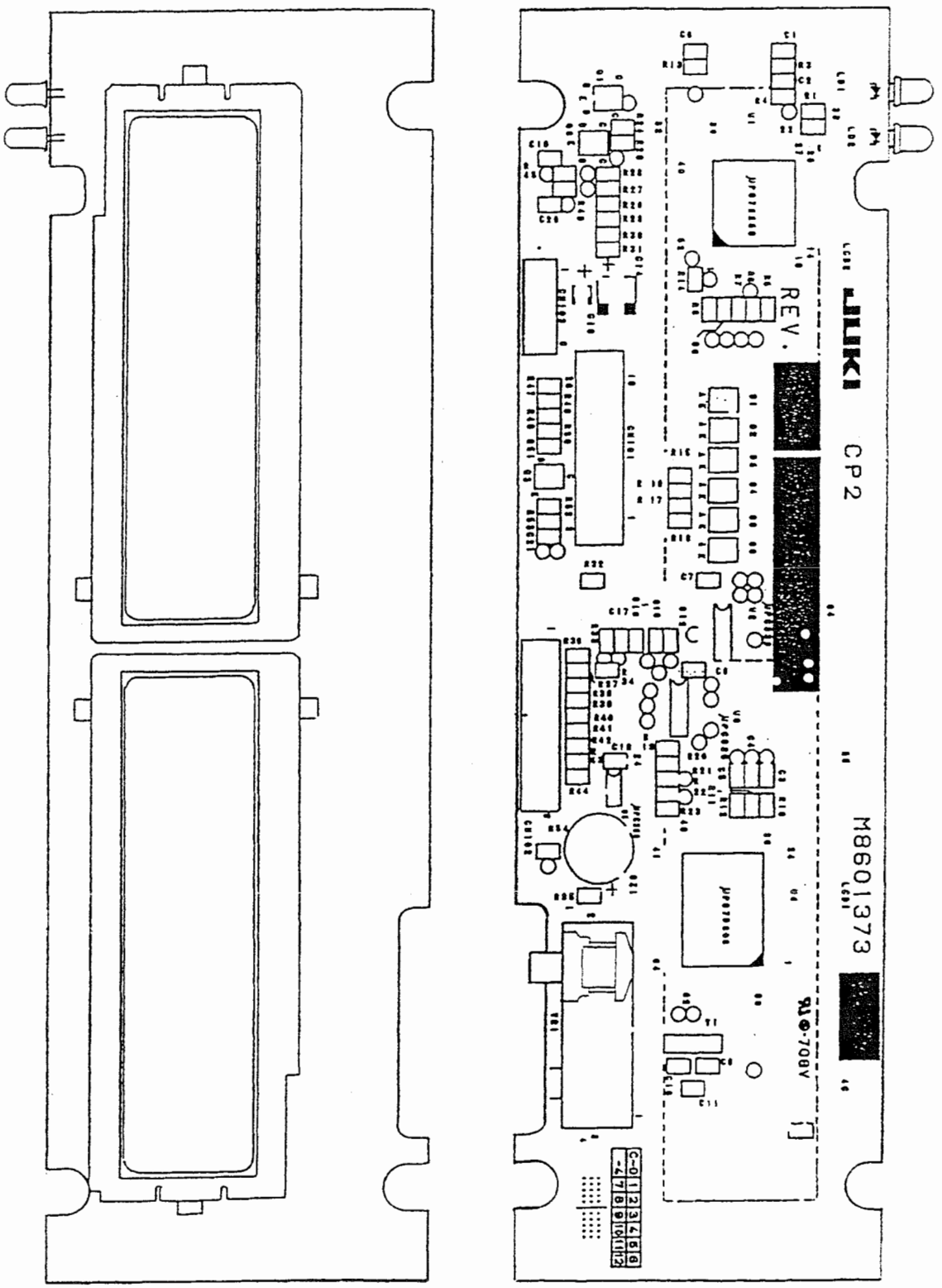
7) CP-130 circuit board asm. [M8601371AA0]



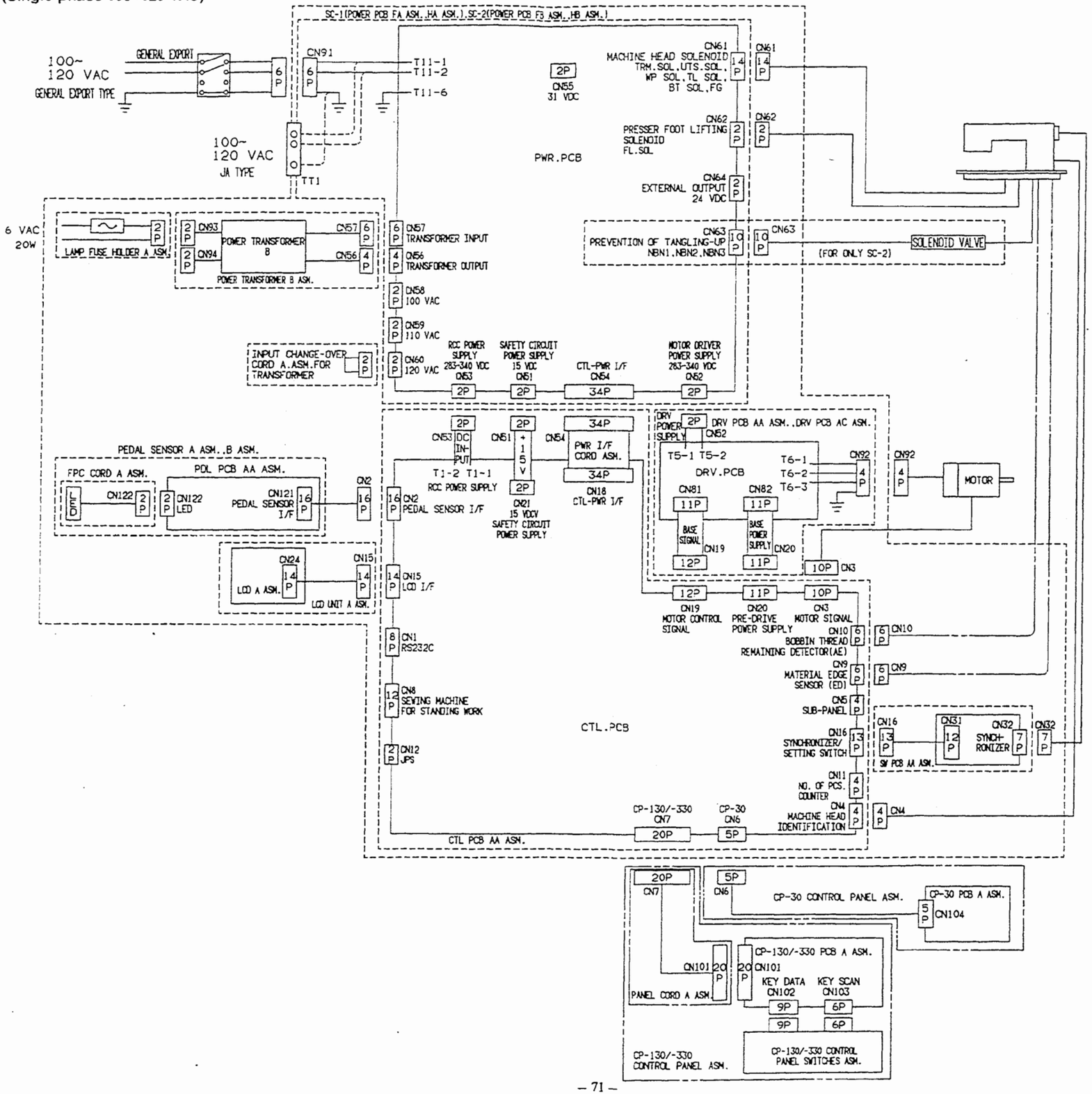
8) **CP-230 circuit board B asm. [M8601370BA0]**



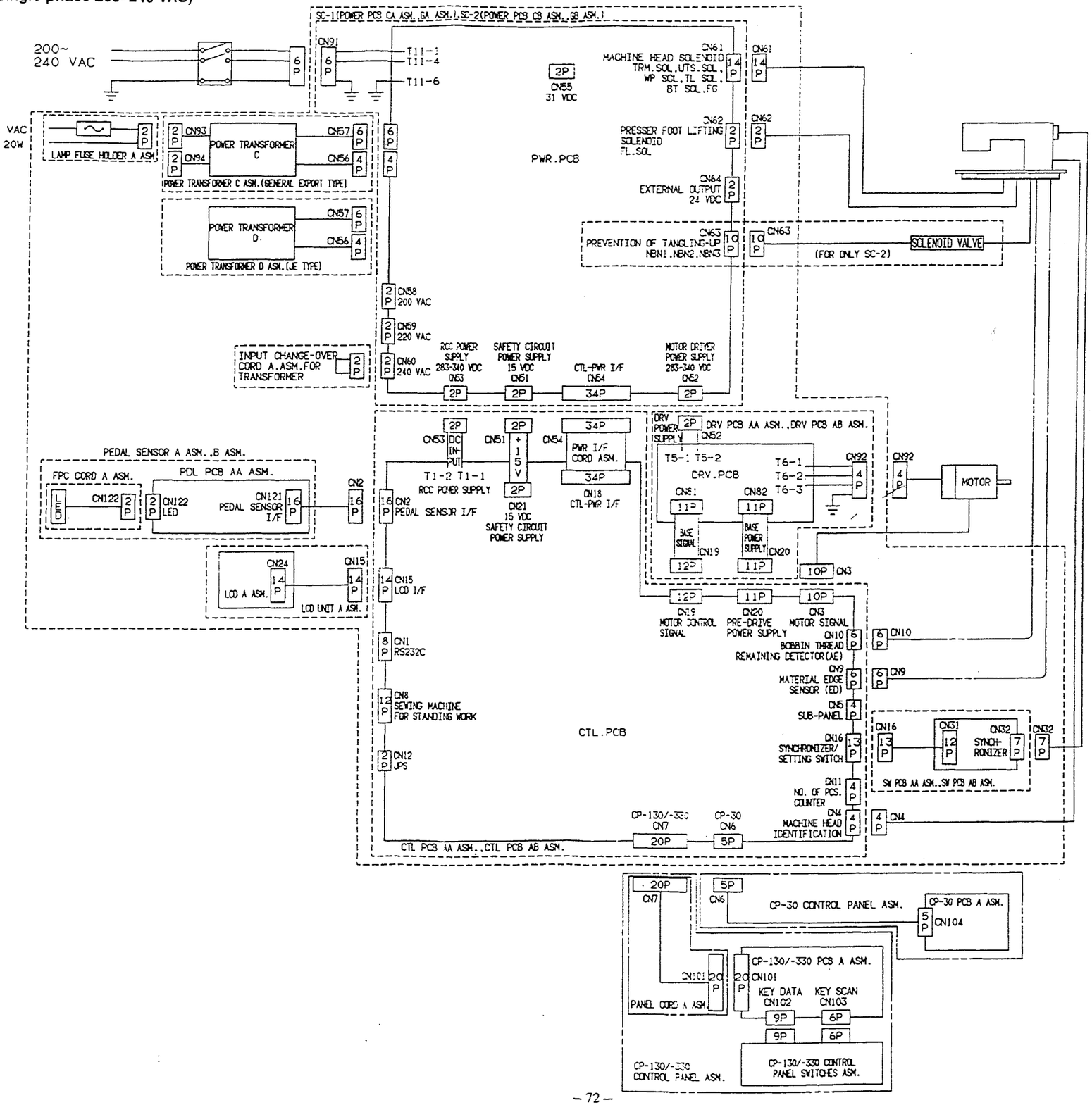
9) CP-330 circuit board A asm. [M8601373AA0]



14. BLOCK DIAGRAM (Single-phase 100~120 VAC)



15. BLOCK DIAGRAM (Single-phase 200~240 VAC)



3. BLOCK DIAGRAM (3-phase 200~240 VAC)