JUKI®

Sewing machine controller

SC-380

ENGINEER'S MANUAL

29320900
No.01

PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine.

The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered in the Instruction Manual.

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.

This manual gives the "Standard Adjustment" on the former page under which the most basic adjustment value is described and on the latter page the "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures and "How To Adjust" are described.

CONTENTS

1. DRIVE UNIT SAFETY INSTRUCTIONS

1. To ensure safe use

– Always observe the following items to ensure safe use of the industrial sewing machine drive unit SC-380.

1.1 Before starting

– Read all instruction manual thoroughly before starting use of this drive unit,and follow the Engineer's Manual. Also read the instruction manuals for the installed sewing machine.

1.2 Application and purpose

– This drive unit is designed to drive a sewing machine and must not be used for other applications or purposes. Do not use this drive unit until it can be confirmed that safety measures for the installed sewing machine have been taken.

1.3 Work environment

– Use this drive unit in dry and well-kept clean locations,e.g. in the clothing industry, and which process dry sewing material.
– Avoid using this control unit in the following types of environments.

(1) Power voltage
– Place where voltage fluctuation exceeds ±10 % of the rated voltage.
– Place where frequency fluctuation exceeds ± 1 % of 50/60 Hz.
– Place where the specified power capacity cannot be secured.

(2) Electromagnetic noise
– Place where strong electric or magnetic fields are generated such as near a large-output high frequency oscillator or high frequency welding machine.

(3) Temperature and humidity
– Place where atmospheric temperature is 40 ˚C or higher and 5 ˚C or lower.
– Place subject to direct sunlight or outdoors.
– Near a heat source such as a heater.
– Place where relative humidity is 30 % or less and 95 % or more, or where dew condensation occurs.

(4) Atmosphere
– Atmosphere with dust or corrosive gases.
– Atmosphere with combustible gases or explosive atmosphere.

(5) Altitude
– Place where at altitudes exceeds 1,000 m above mean sea level.

(6) Storage
– Place where storage temperature is 55 ˚C or higher and –25 ˚C or lower.

(7) Vibration
– If excessive vibration occurs when the control box is installed on the sewing machine, install it separately.

2. Installation

2.1 Motor and control box

– Correctly install according to the attached Engineer's Manual.

2.2 Accessories

– Always disconnect this control unit from the main power supply when installing any accessories listed in the Engineer's Manual. (Turn the main switch OFF, and remove the plug from the outlet (power supply line).)

2.3 Cable

(1) Arrange the connection cable so that excessive force is not applied during use, and do not excessively bend the cable.
(2) Cables near moving parts (e.g., pulley or V-belt) must be wired at a minimum distance of 25 mm.

(3) Confirm that the power voltage of the power cable for supplying to the control box meets the specifications on the motor and control box rating nameplates before connecting it to the power line. Connect it to the designated places to supply the power. Perform this step with the power ON/OFF switch turned OFF.

2.4 Grounding

(1) Correctly connect the control box grounding to the power supply grounding.

2.5 Accompanying appliances and accessories

(1) Electric accompanying appliances and accessories must only be connected to safely low voltage.

2.6 Removal

(1) Turn the main switch OFF and remove the plug from the outlet Åipower supply lineÅjbefore removing the motor or control box.
(2) Do not pull on the cord when removing the plug. Always hold the plug itself.
(3) There is a high voltage applied inside the control box, so always wait at least 10 minutes after running the power switch OFF and remove the plug from the outletÅipower supply lineÅjbefore opening the control box panel.

3. Maintenance, inspection and repairs

– Follow the Engineer's Manual for maintenance and inspection of the this control unit.
– Repairs and maintenance must be done and approved by specially trained personnel.
– Do not run this control with the ventilation openings of the motor's dust-proof filter blocked or clogged with dust, loose cloth, etc.
– Always turn the power switch OFF and remove the plug from the outlet Åipower supply lineÅjbefore replacing the sewing machine needle or bobbin, etc.
– Always use original replacement parts for repairs or maintenance.

4. Other safety measures

– Keep fingers away from all moving partsÅiespecially near sewing machine needle, V-belt, etc.Åj.
– Do not drop this control unit or insert any object into any opening.
– Do not operate without required protective devices.
– If any damage is observed on this control unit, if the drive does not run properly or if operator is uncertain about operation, do not operate the drive unit. Operate the drive only after adjustments, repairs and approvals have been made by qualified personnel.
– The user must avoid making modifications or changes based on user's judgment.
Observe all safety guidelines if modifications or changes must be made.

5. Hazard display, warning display

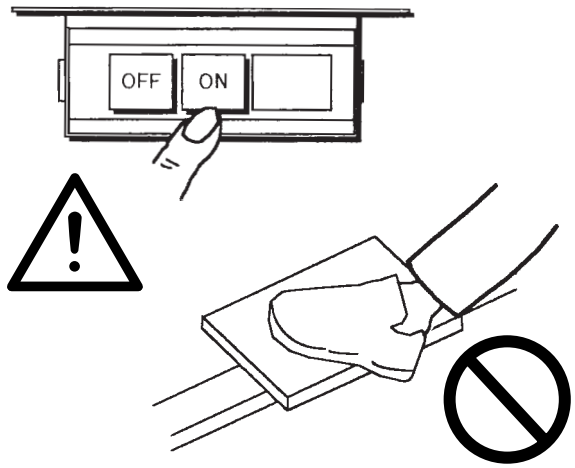
(1) Risks that may cause personal injury or risk to the machine ate marked with this symbol in the instruction manual.

(2) This symbol indicates electrical risks and warnings.

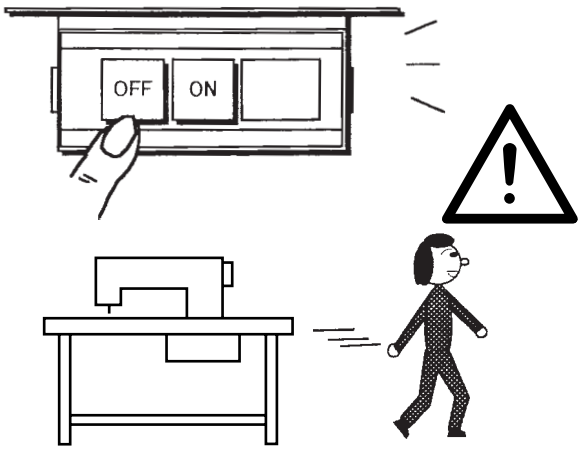
Save these Engineer's Manual for future reference.

2. POINTS OF CAUTION

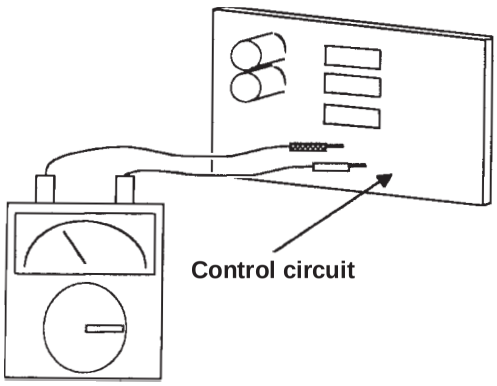
1. Please remove your foot from the pedal when turning the power ON.



2. Always turn the power OFF when leaving the machine.

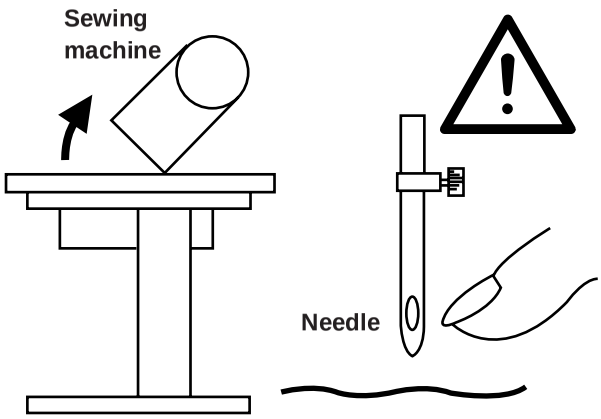


3. Do not inspect the control circuit with a tester.

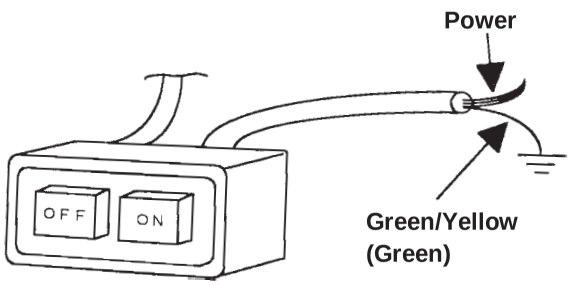


The semiconductor parts may be damaged when the tester's voltage is applied.

4. Always turn the power switch OFF before tilting the sewing machine head, replacing the needle, or threading the needle.

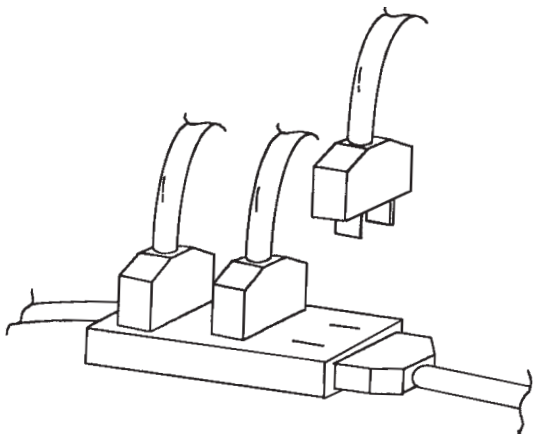


5. Always ground the machine.

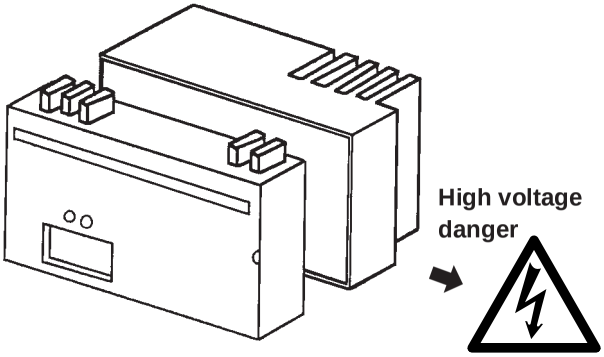


The 3-phase motor has a grounding wire (green) (green/yellow). Always ground this.

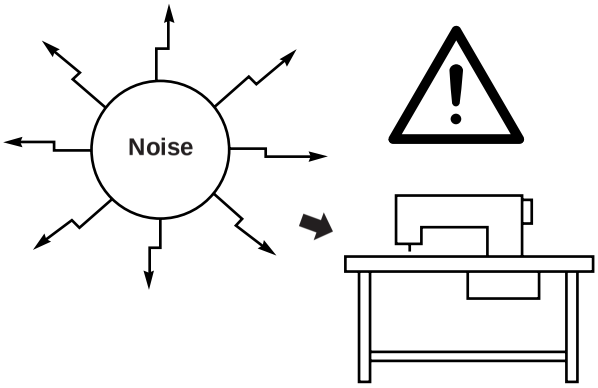
6. Do not use branched wiring when using the single-phase motor.



7. A high voltage is applied inside the machine, so wait 10 minutes after turning the power switch OFF before opening the cover.

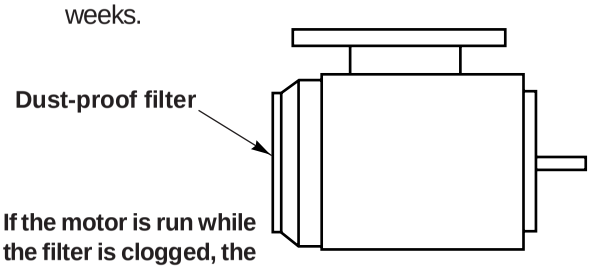


8. Use the machine away from sources of strong noise such as a high frequency welder.



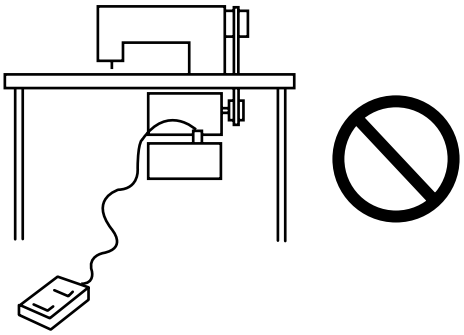
9. The brakes may not function when the power is turned OFF or when there is a power failure during sewing machine operation.
10. Match the connector shape and direction, and insert securely.
11. An optical method is used for the detector's detection element so take care not to let dust or oils get on the detection plate when removing the cover for adjustment, etc. If these do get on the plate, wipe off with a soft cloth and do not scratch the plate. Take care not to let oils enter between the detector discs.
12. When the position detector connector turned OFF after a set time to prevent damage to the motor. (The motor may not turn OFF if the locking is not complete.) After the problem has been resolved, turn the power OFF and ON and normal operation will be possible. The same operation should be taken when the detector or wires are broken.

13. Remove the dust that has adhered on the motor's dust-proof filter once every two to three weeks.



If the motor is run while the filter is clogged, the motor may overheat and affect the motor life.

14. When connecting the external switch to the option connector, etc., keep the signal wire as short as possidle. If it is long, malfunctions may occur.

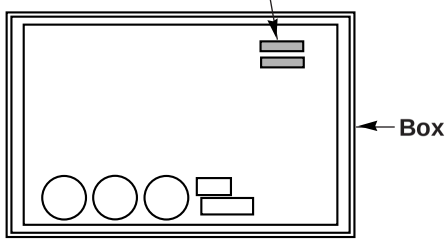


- Use a shield cable for the signal wire when possible.

15. If the fuse, remove the cause, and replace the blown fuse with one having the same capacity.

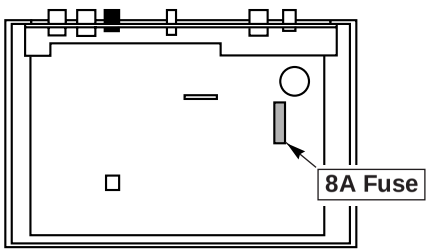
200 V Two fuses
100 V One fuse

Two 20 A Fuses (XC-EJK)
Two 15 A Fuses (XC-EJKCE)



(Front view with cover removed.)

* The above fuses is for protection of the control box power supply section.



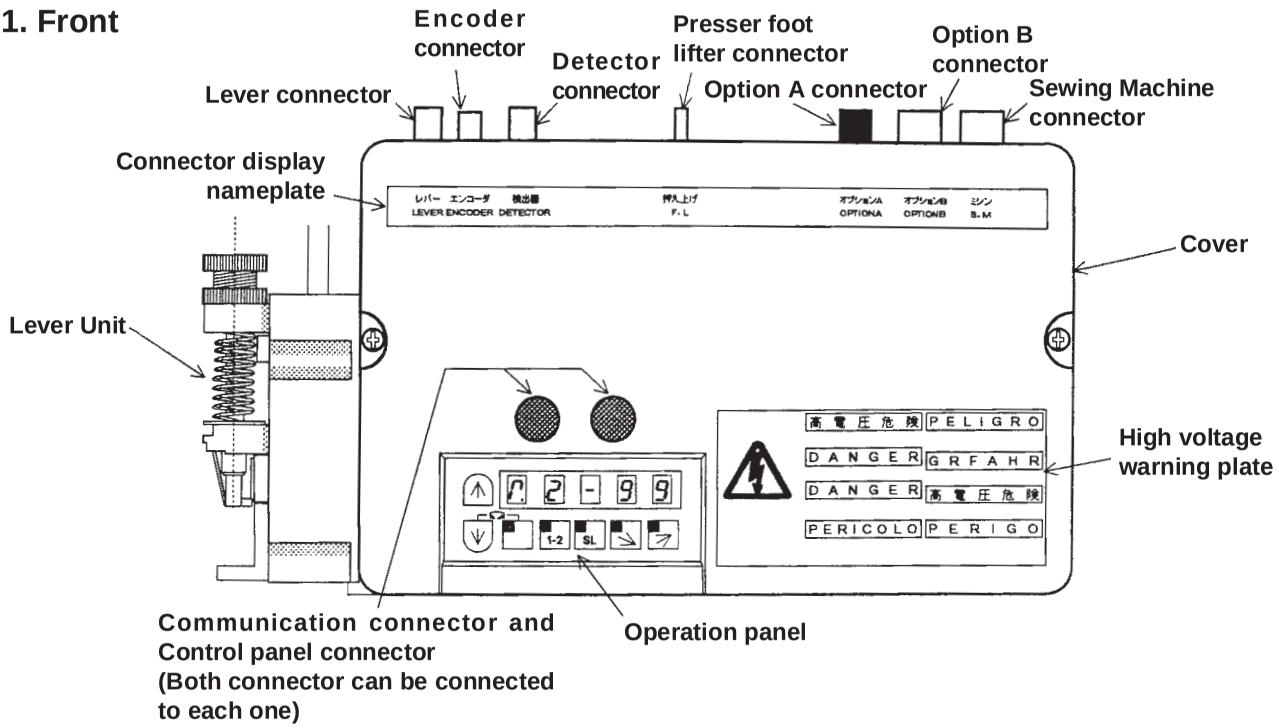
(View from back of cover)

* The above 8 A fuse is for protection of the solenoid output power supply (30 V/24 V) section.

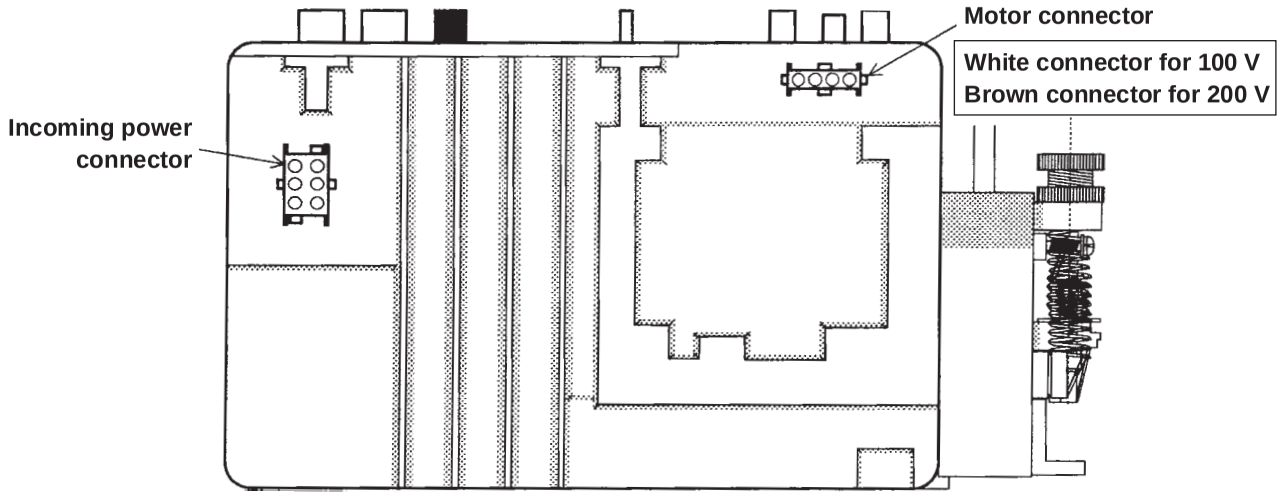
Wait 10 minutes after turning the power switch OFF before opening the cover

3. NAMES OF EACH PARTS

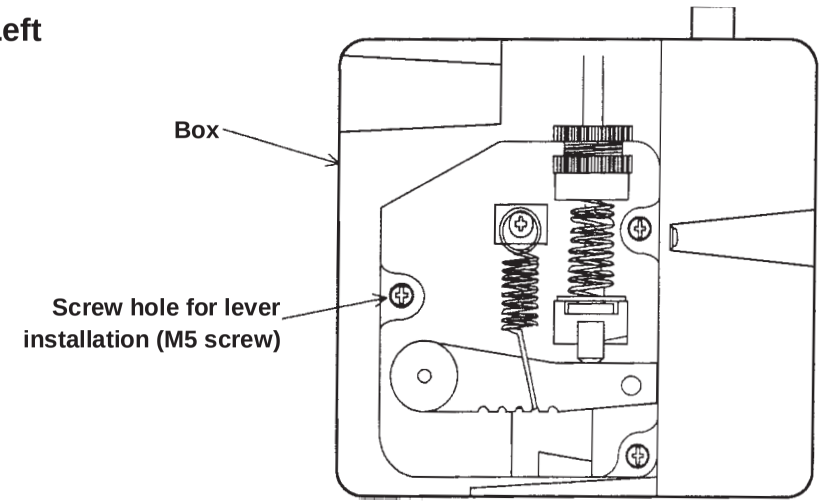
1. Front



2. Rear

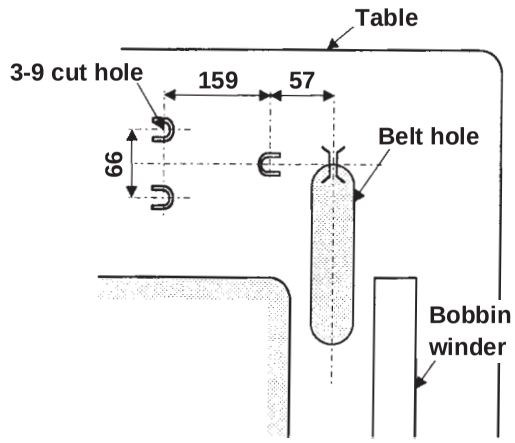


3. Left



4. INSTALLATION

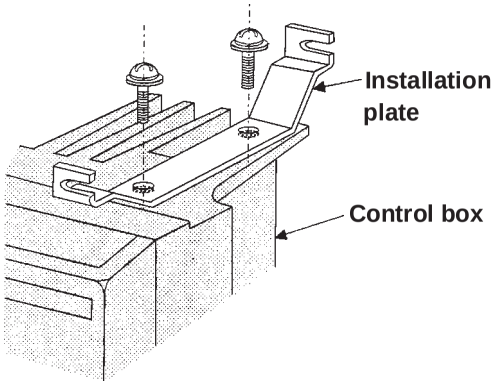
1. Installation of the motor



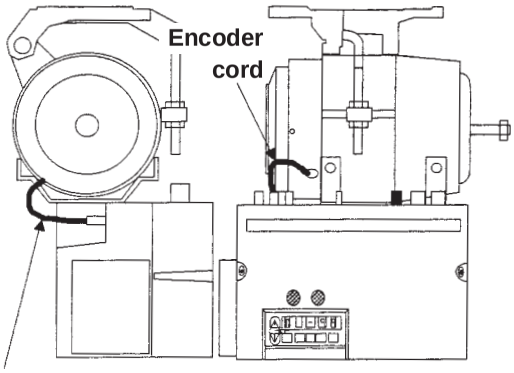
Using the hole opening pattern, open three 9 mm holes on the table. Install the motor securely using the installation bolts, washers, spring washers and nuts.
The pattern and installation bolts, etc., are included with the motor as accessories.

2. Installation of the control box.

(1) Install the two enclosed installation plates on the control box.



(2) Next, tighten the control box onto the motor.
(3) Insert the power cord from the motor into the connector on the back of the control box. Insert the encoder cord from the motor into the encoder connector on the front of the control box.

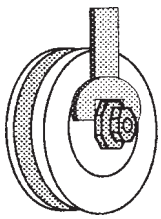


Power cord from motor
100 V : White connector
200 V : Brown connector

3. Installation of the pulley

Securely tighten the pulley.

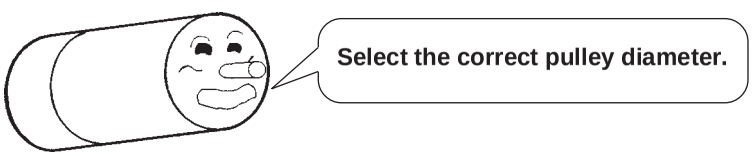
(Caution)
Incomplete tightening may cause malfunctions.



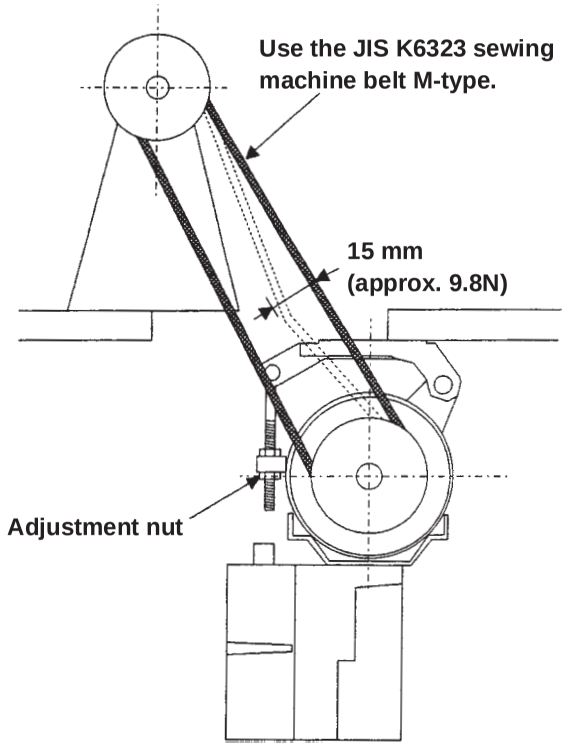
Select the correct pulley diameter to ensure complete use of the motor performance.
Selection of the motor pulley :

$$\text{Motor pulley outer diameter (mm)} = \frac{\text{Normal sewing machine speed}}{\text{※ Motor speed}} \times \text{Motor pulley diameter (effective diameter)} + 5\text{ mm}$$

※ The motor speed should be set at 3,600 r/min. When the motor pulley diameter is selected with the above method and the pulley diameter is too small, select the minimum pulley in the range that the belt will not slip.
※ Refer to page 28 for the pulley diameter to be used when using the Mitsubishi thread trimming sewing machine.



4. Mounting of the belt.



To adjust the belt tension, press down on the center of the belt with your hand, and turn the upper and lower nuts of the adjustment nut to increase or decrease the center height of the motor so that the belt dips approximately 15 mm.

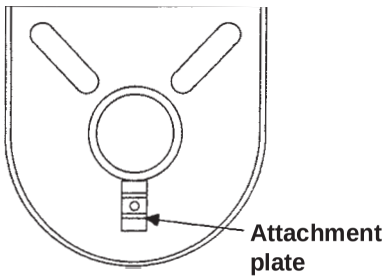
(Caution) If the belt tension is too low, the medium and low speeds will be inconsistent, and the stopping precision will be poor. When too tight, the motor bearings will deteriorate.

5. Installation of the protective cover

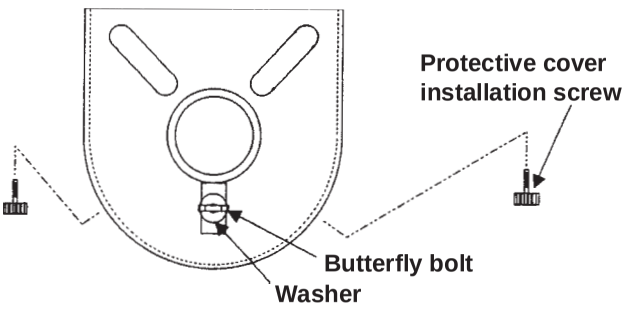
(1) Installation of the protective cover (with belt slip off prevention part)

The protective cover is enclosed with the motor as an accessory.

View from back of protective cover

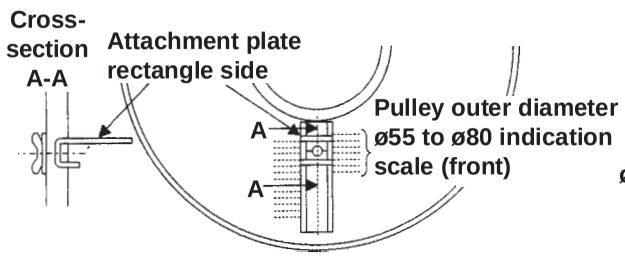


View from front of protective cover



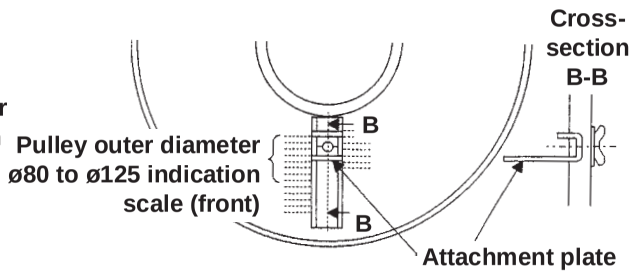
- Change the direction of the long and short side of the attachment plate according to the motor pulley outer diameter.

(a) For motor pulley outer diameter ø55 to ø80



(View from back of protective cover)

(b) For motor pulley outer diameter ø80 to ø125



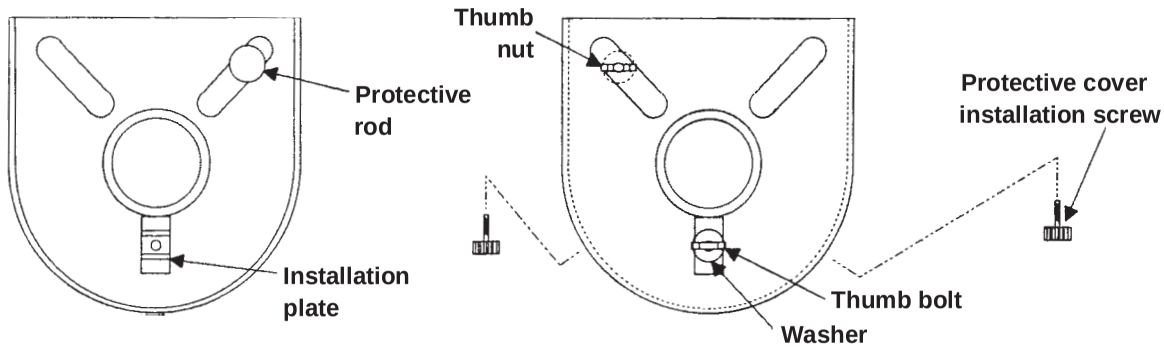
(View from back of protective cover)

- Set the center of the washer to the pulley diameter indication scale and tighten the butterfly bolt.
- Confirm that the belt does not contact the attachment plate.

(2) Installation of the protective rod.

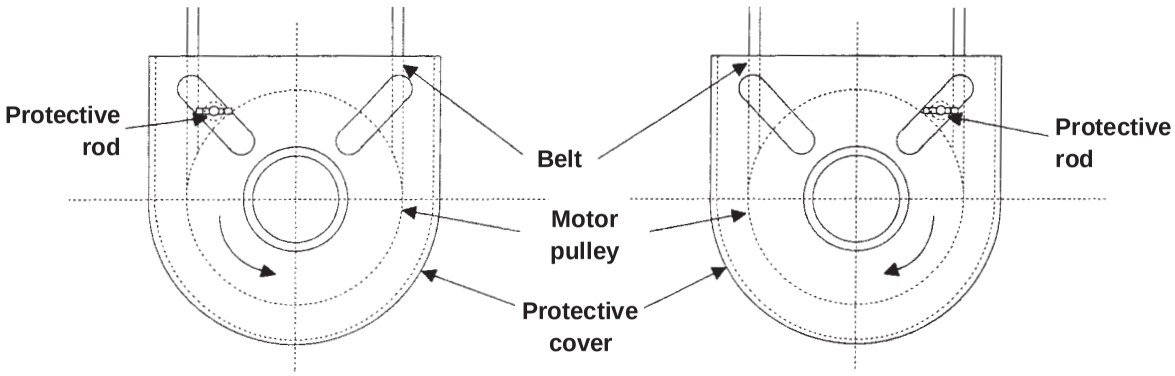
The protective rod is enclosed as a motor accessory.

Looking from rear of protective cover **Looking from front of protective cover**



- Set the protective rod to the motor pulley rotation direction and install between the belt and motor pulley.

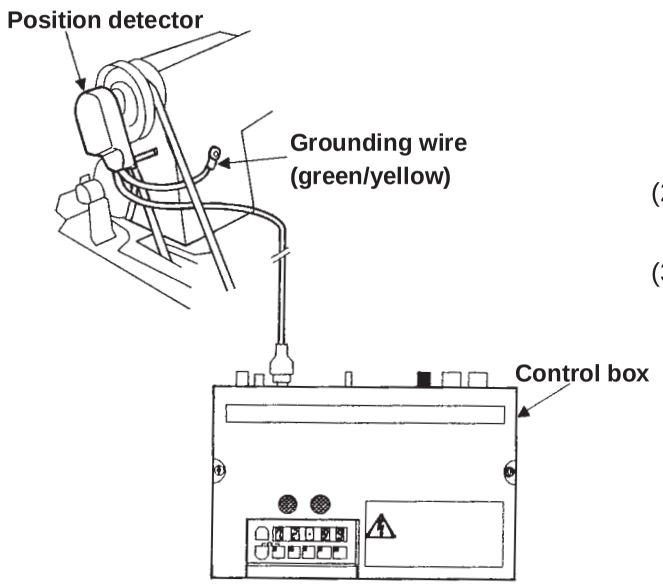
(a) For counterclockwise rotation **(b) For clockwise rotation**



(Looking from front of protective cove) **(Looking from front of protective cover)**

- Set the center of the protective rod to the position at the center of the belt and motor pulley and tighten the thumb nut.
- Confirm that the belt and motor pulley do not contact the protective rod.

6. Installation of the position detector

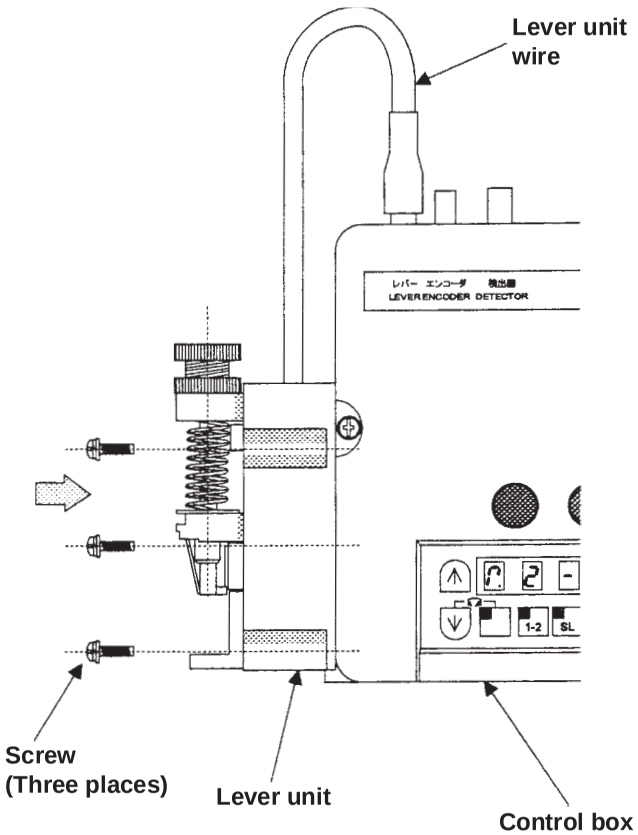


(1) The installation of the position detector will differ according to the sewing machine model, so please consult with your sewing machine model dealer for details.
The diagram on the left shows an example of the position detector installation.

(2) Insert the connector from the position detector into the control box position installation.

(3) To prevent malfunctions caused by static electricity, connect the grounding wires (green/yellow) from the position detector onto the sewing machine head.

7. Connection of the lever unit

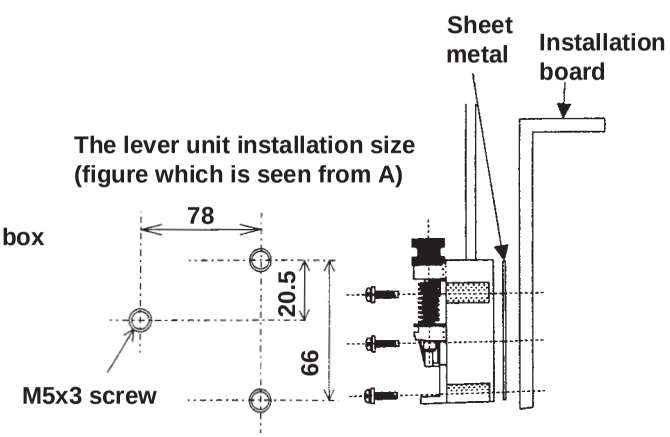


(1) Insert connector from the lever unit into the lever connector of the control box.

(2) When removing a lever unit from the control box and then setting it independently.

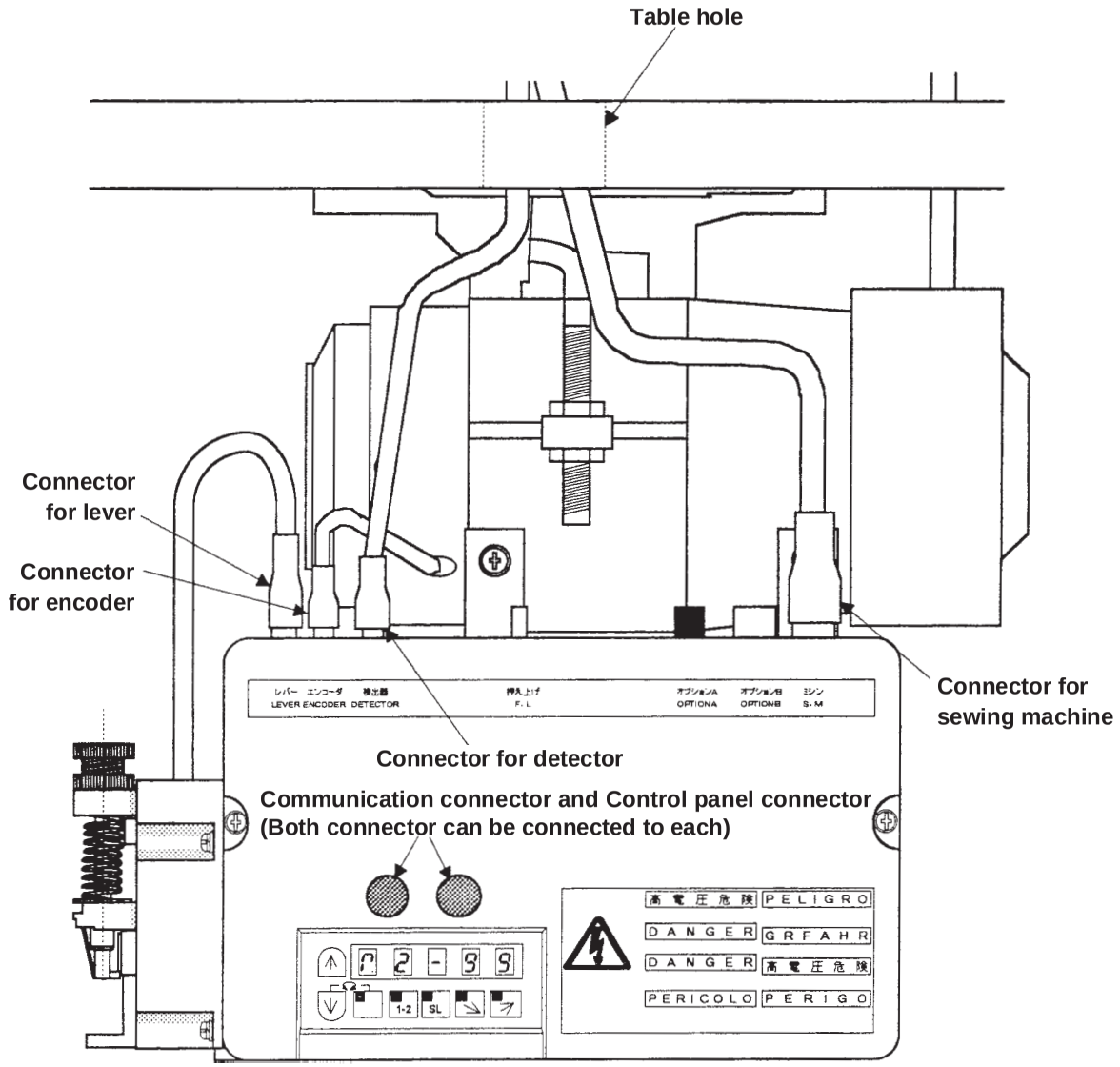
1. As for the installation size, refer to the lever unit installation size of the following figure.
2. Refer to the way of the following figure of installing a lever unit and install a way of installing.
In installation, always keep the sheet metal between lever unit and the installation board.

(Example) The way of installing a lever unit



8. Connection of the sewing machine and control box.

Wire the units as shown below.

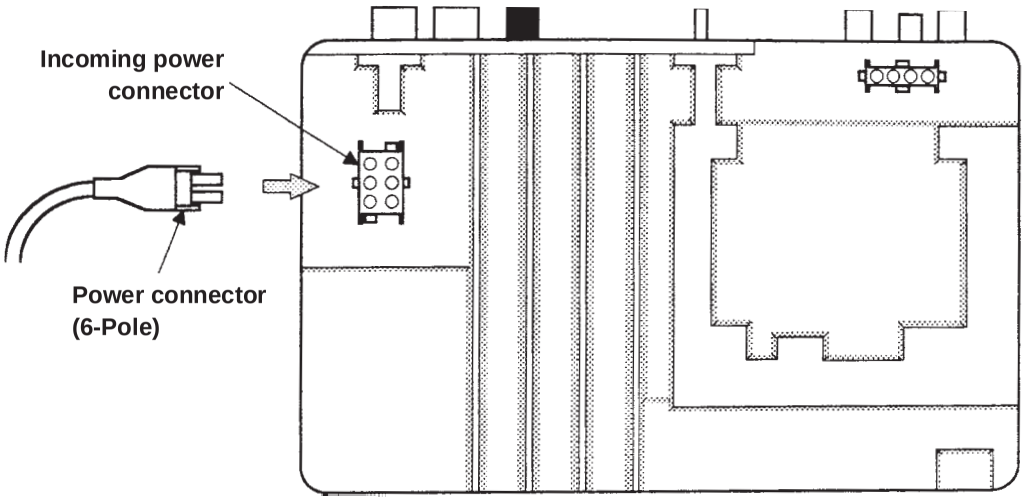


(Caution) For safety, always turn the power switch OFF and wait for the panel display [PWR.OF] (displayed for approx. 10 seconds) before connecting or disconnecting the plugs. This [PWR.OF] display is not an error.

5. WIRE AND GROUNDING

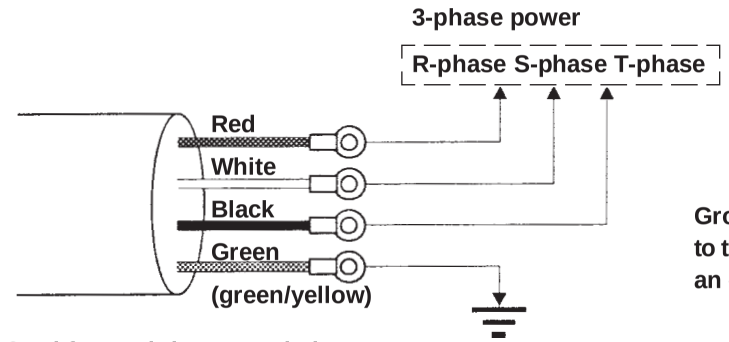
1. Insertion of the power connector

Confirm the connector from and insertion direction when inserting the power connector into the control box and insert completely.



Rear control box

2. Connection of 3-phase power



Cord for push-button switch

Ground the green (green/yellow) wire to the grounding terminal. Consult with an electrician for the grounding wires.

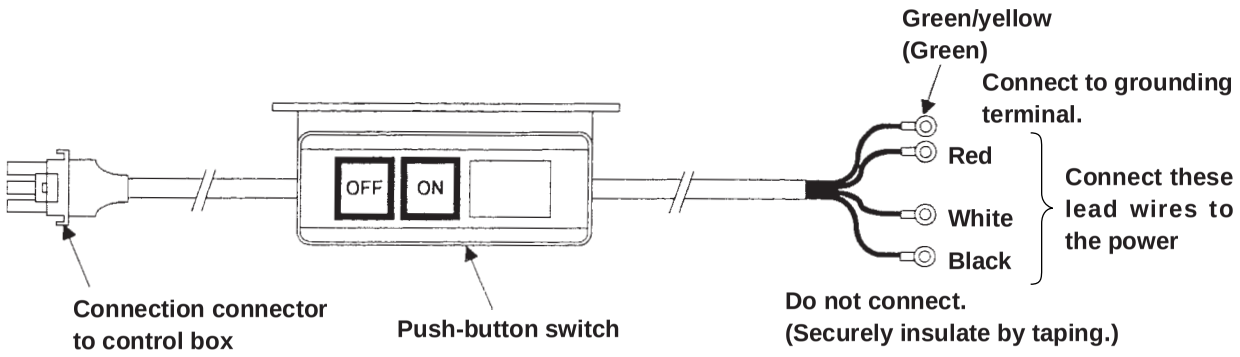
3. Power capacity

Use a fuse or complete breaker for the power

Power	Recommended power capacity
Single phase 100-120 V 550 W 200-240 V 550 W	15 A
3-phase 200-240 V 550 W	10 A

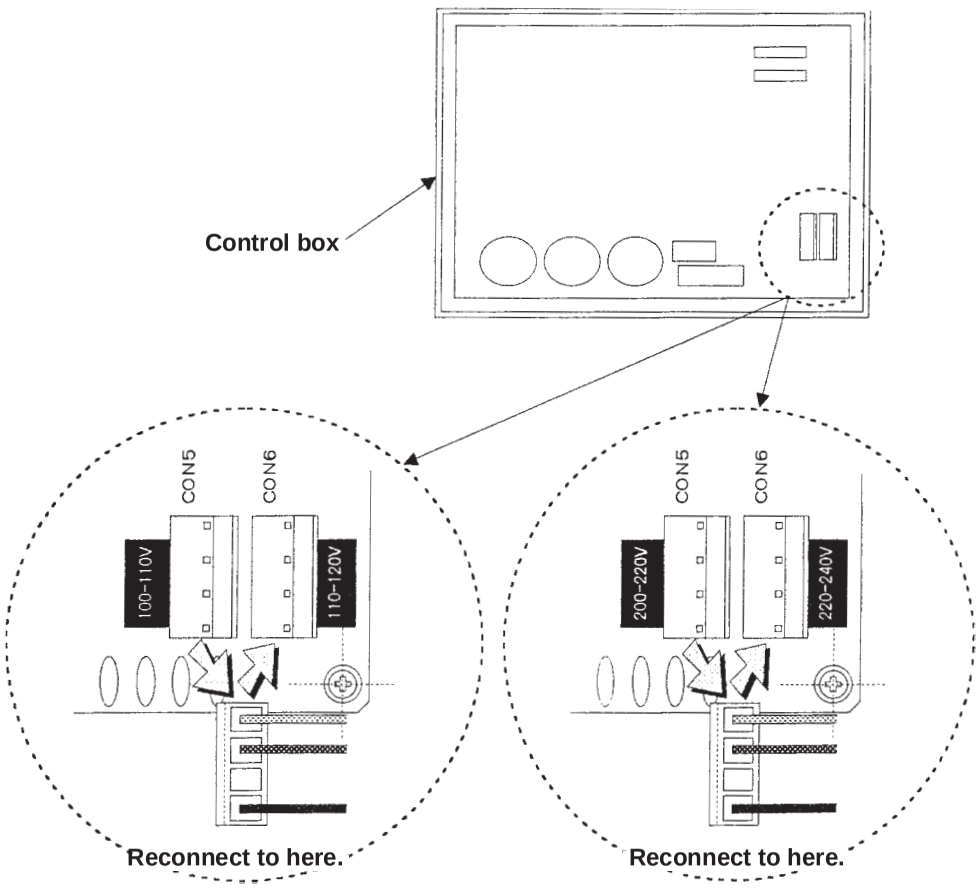
4. When using the 3-phase 200 V class SC-380 with Single- phase 200 to 220 V class

- Connect the “red”and”white”lead wires from the push-button switch to the power.
  The black wire is not used.
  Tape it with insulation tape, etc., to insulate securely.
  Always ground the green/yellow (green) grounding wire.



5. When using the single phase 100 V SC-380 with single phase 110 V to 120 V or 3-phase 200 to 220 V SC-380 with 3-phase 220 V to 240 V

(1) Remove the cover.
(2) Reconnect the connector from [CON5] to [CON6] (110-120 V/220-240 V)
(3) After change, always set the cover of control box.
(4) Change the mark “◯” display on the factory shipment voltage nameplate on the side of the control box.



6. To change solenoid voltage

To change solenoid voltage from 24 V to 30 V

(1) Remove the cover.

(2) Reconnect the connector from [CON11] to [CON12] (30 V)

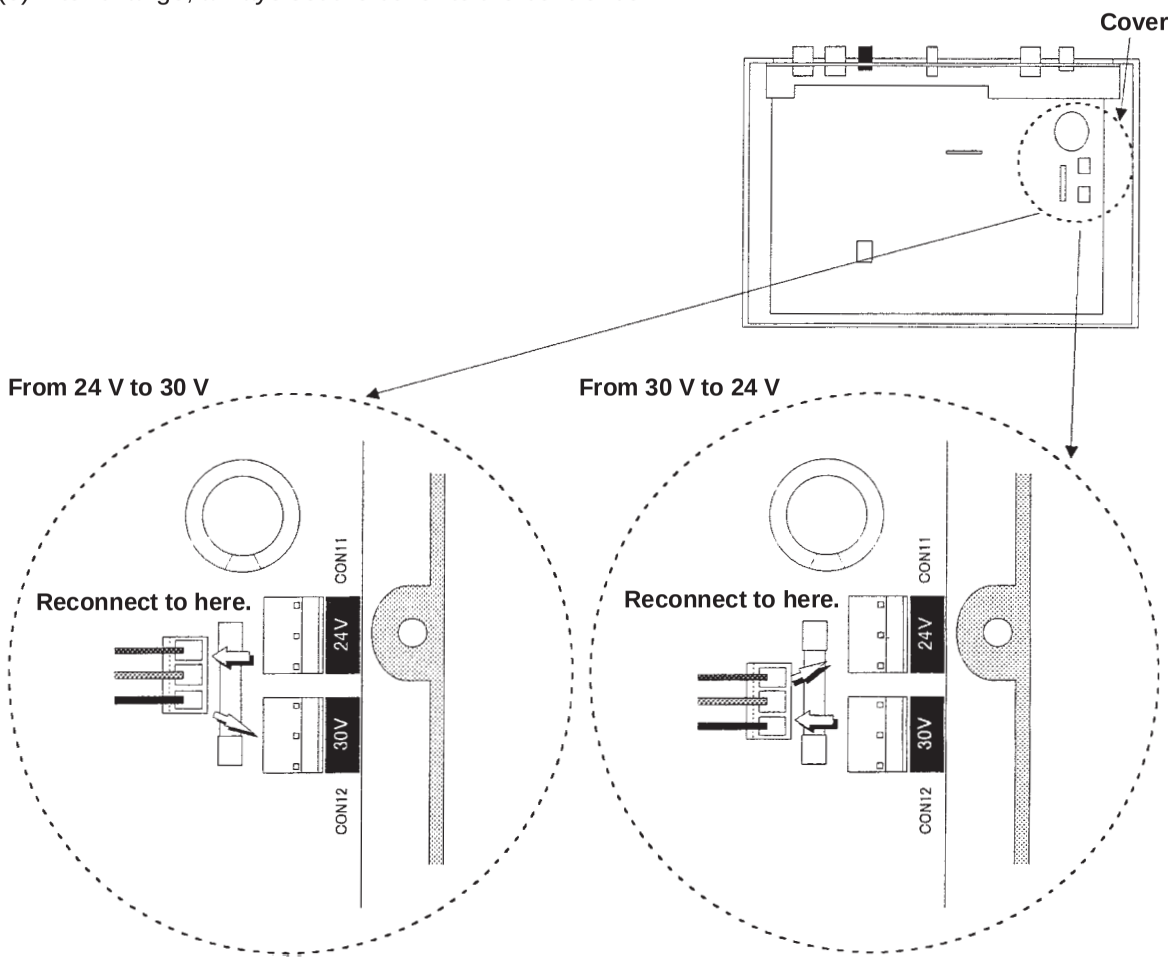
(3) After change, always set the cover to the control box.

To change solenoid voltage from 30 V to 24 V

(1) Remove the cover.

(2) Reconnect the connector from [CON12] to [CON11] (24 V)

(3) After change, always set the cover to the control box.

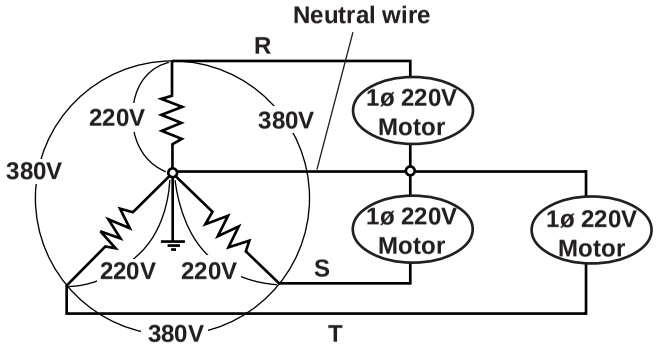


7. When using the single-phase 220V servomotor in the 380V area

Note) For the single phase 220V, refer to "[5] 4. When using the three phase 200V SC-380 with single phase 200 to 220V class".

(1) Connecting the power

① When there is a neutral wire :



Connect the ground wire of motor to the neutral wire.

② When there is no neutral wire :

Singlephase 220V is generally used for the residence in the 380V area.
Connect the wire from the single phase 220V power.

(2) Caution

① Connect equal number of motors to the respective phases, R, S, and T as shown in the above illustration so that the load of 3-phase power is not unbalanced.

② Change the voltage in the control box to 220 to 240V.

Refer to "[5] Wire and Grounding 5. When using the single phase 100V SC-380 with single phase 110V to 120V or 3-phase 200 to 220V SC-380 with 3-phase 220 to 240V".

③ For the overseas market, use the motor after checking whether the voltage is in the range of 220$$240V since there is a case where voltage regulation is high.

④ Connect the servomotor after checking whether or not the wiring in the factory is mistaken (especially connecting mistake of the neutral wire).

(3) Others

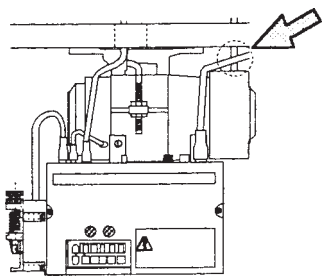
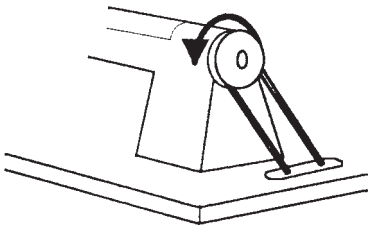
Even the 3-phase 200V motor (for domestic market) can be used in the single phase 200 to 220V area by changing wiring of the push button section. In addition, it can be used in the 220 to 240V area by changing the connecting position of the connector as shown in the illustration of the previous item.

Refer to "[5] Wire and Grounding 4. When using the 3-phase 200V class SC-380 with Single-phase 200 to 220V class".

6. CONFIRMATION

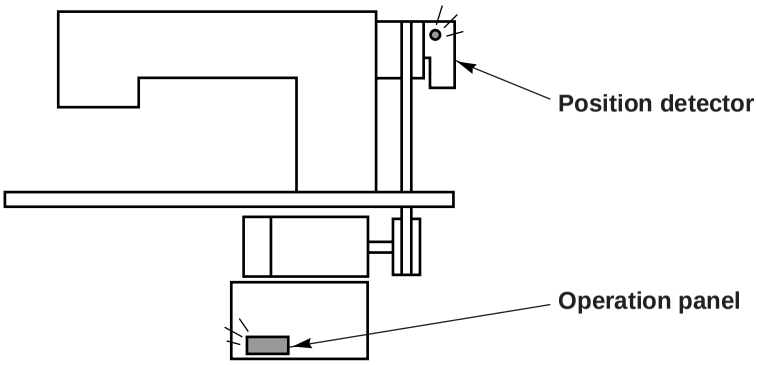
1. Before turning switches on…..

<table>
<tr><th>Place to confirm</th><th>Reference</th></tr>
<tr><td>(1) Is the power and capacity suitable?</td><td>Current capacity on page 11.</td></tr>
<tr><td>(2) Is the power voltage the same as the ○ mark on the factory preset voltage nameplate on the side of the control box? (XC-EMFY Control Box)</td><td>XC-EJK-20-05 (JE : XC-EJKCE20-05) (200 V type)
<table><tr><th colspan="3">POWER UNIT L20E</th></tr><tr><td></td><td>200-220 V</td><td rowspan="2">OUTPUT
550 W</td></tr><tr><td>○</td><td>220-240 V</td></tr></table>
XC-EJK-10-05 (100 V type)
<table><tr><th colspan="3">POWER UNIT L10E</th></tr><tr><td></td><td>100-110 V</td><td rowspan="2">OUTPUT
550 W</td></tr><tr><td>○</td><td>110-120 V</td></tr></table></td></tr>
<tr><td>(3) Are the connectors inserted correctly ?
• Power connector from push-button switch
• Motor connector
• Motor encoder connector
• Lever connector
• Position detection connector
• Other connectors (options, presser foot lifter control switch panel, etc.)</td><td>Installation of control box on page 6.

Installation of lever unit on page 9.
Installation of position detector on page 9.</td></tr>
<tr><td>(4) Is the lead wire contacting the V belt ?
  </td><td>—</td></tr>
<tr><td>(5) Is the belt tension okay ?</td><td>Mounting of the belt on page 7.</td></tr>
<tr><td>(6) Are the pulley nuts securely tightened ?</td><td>Installation of the pulley on page 6.</td></tr>
<tr><td>(7) Can the sewing machine be rotated lightly by hand ?
  </td><td>—</td></tr>
</table>

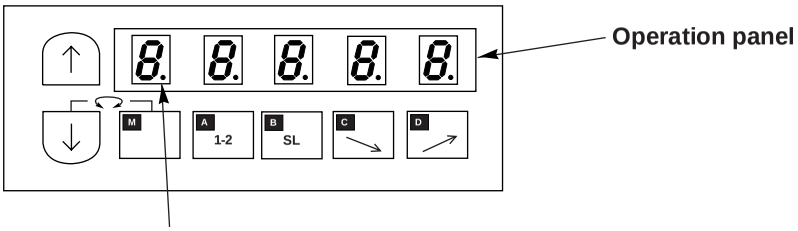
2. Thrn on the power ……

(1) Does the position detector lamp light?



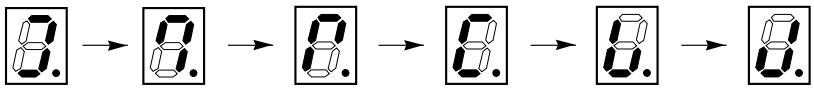
(2) Does the LED on the control box operation panel light ?

(3) Is the sewing machine rotation direction correct ?

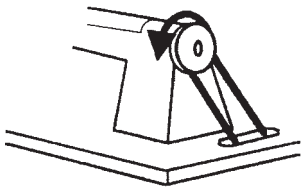


The sewing machine rotation direction is determined with the rotation direction of this LED.

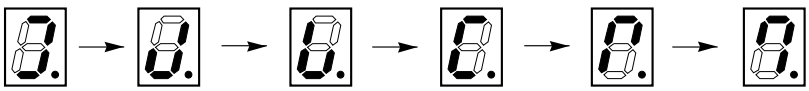
•For left rotation (CCW)



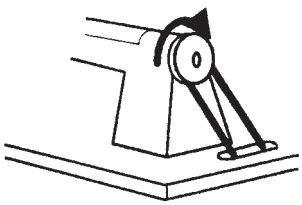
The sewing machine rotates to the left looking from the pulley side.
<u>The factory setting is left rotation.</u>



•For right rotation (CW)

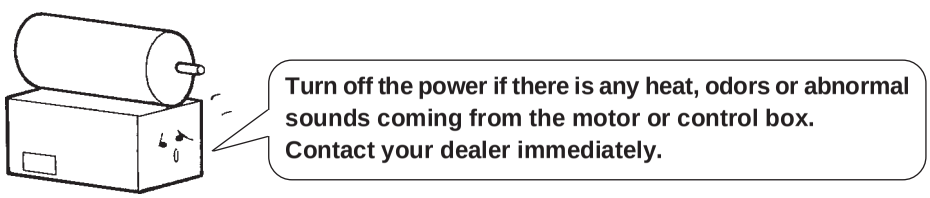


The sewing machine rotates to the right looking from the pulley side.



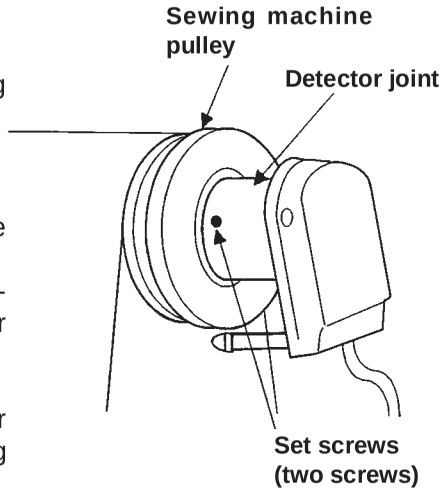
Refer to page 26 for the procedure fir changing the rotaition.

(4) Is there any heat, odors or abnormal sounds coming from the motor of control box ?



7. ADJUSTMENTS

1. Adjustment of stopping position

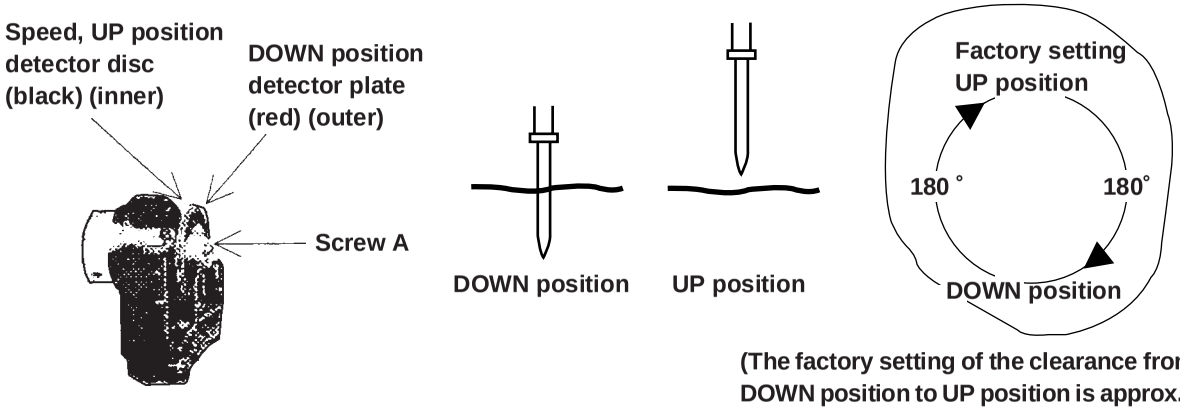


Adjust this position with the detector installed onto the sewing machine and while stopping at the UP and DOWN positions.
For safety, disconnect the connector for the sewing machine.

(1) Adjustment of UP position
- Loosen the two set screws on the detector joint, and set the stop position by rotating by hand.
- If adjustment is not possible by turning the joint, loosen the cross-recessed screw A shown in the figure below, and turn all detector plates simultaneously to adjust to the designated stop position.

(2) Adjustment of DOWN position
- The relation of the DOWN position and UP position will differ according to the model, so adjust this according to the sewing machine.
- When changing the DOWN position , remove the detector cover, and turn only the red detector plate to adjust to the designated stop position.
  (The cross-recessed screw A does not need to be loosened at this time.)
- Always replace the cover after adjustment.

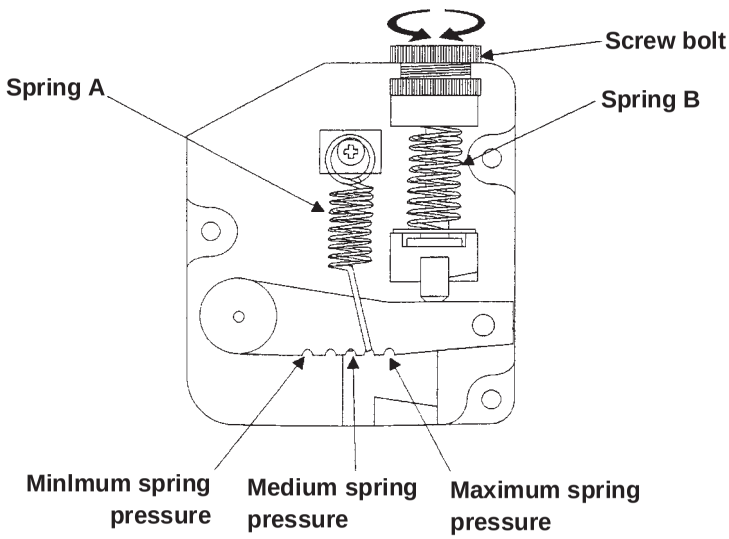
(Caution) Refer to the sewing machine instruction manual when adjusting for use with the.



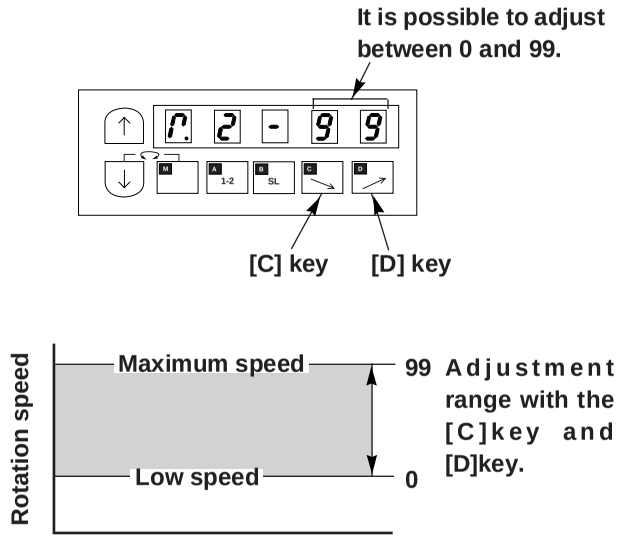
(The factory setting of the clearance from the DOWN position to UP position is approx. 180)

2. Adjustment of pedal toe down pressure, and heeling pressure

The pedal toe down force can be adjusted by changing the hooking position of spring A to the lever. (five level is available)
Turn the screw bolt to adjust the spring B pressure.



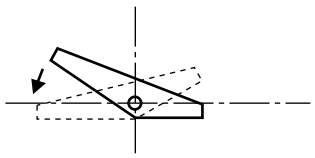
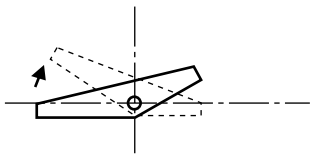
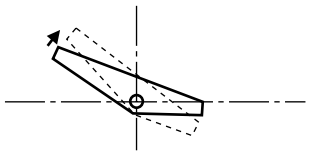
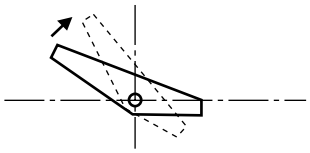
3. Adjustment of operation speed

Adjustment of each speed		Reference
Maxim speed	H	Refer to program mode [P].
Low speed	L	Refer to program mode [P].
Thread trimming speed	T	Refer to program mode [P].
Start tack speed	N	Refer to program mode [P].
End tack speed	V	Refer to program mode [P].
Slow start speed	S	Refer to program mode [P].
Operation speed		The speed can be adjusted from low to maximum the [C] key and [D] key on the operation panel. 

Note ＊: There is not output of the solenoid, but it is possible to set speed.

(Caution) No matter how large the motor pulley diameter is, the speed will not rise higher than the maximum speed H and the speed set with the [C]key and [D] key.

8. PEDAL OPERATION

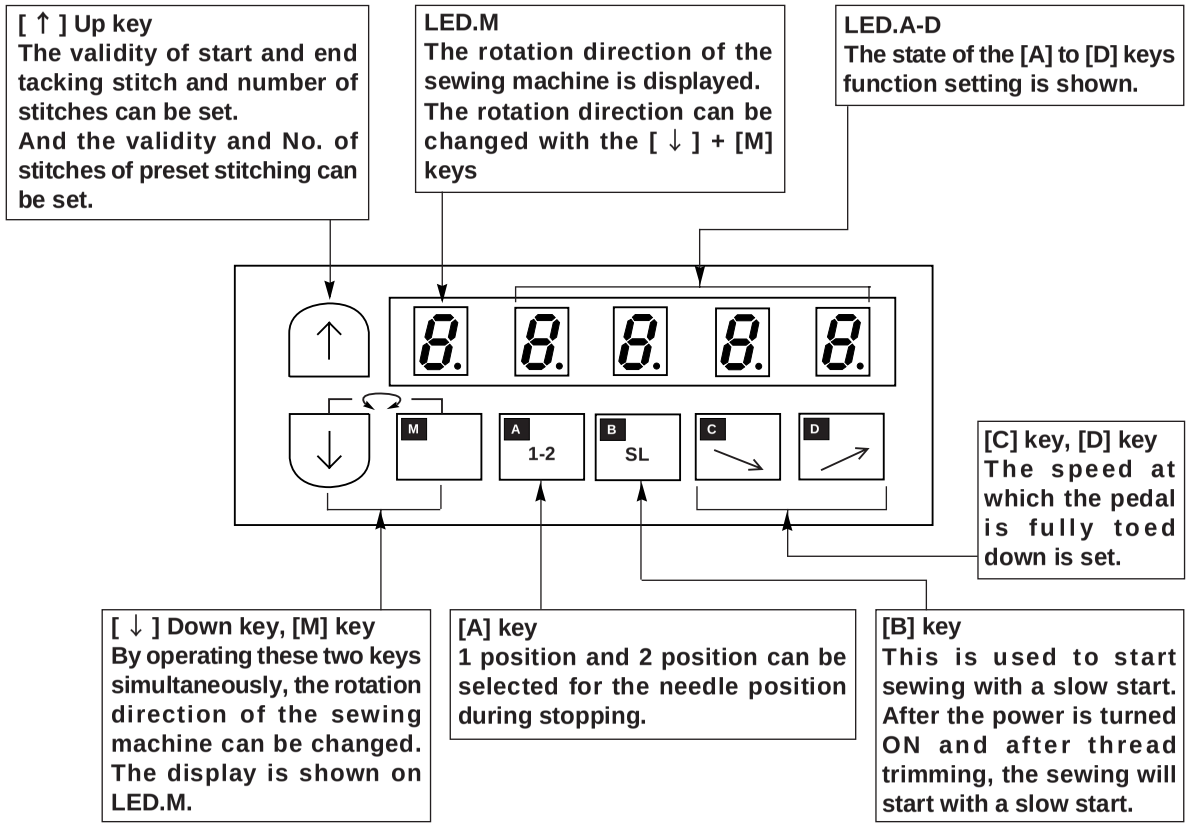
Pedal operation	Operation
 Neutral—Toe down	The sewing machine will rotate at a speed that is relevant to the toe down amunt.
 Toe down—Neutral	1 position setting Needle UP position stop 2 position setting Needle DOWN position stop
 Neutral—Light heeling	Presser foot lifter operation
 Neutral—Full heeling	1 position setting Operation of needle UP position stop. 2 position setting Needle UP position with half-rotation.

(Caution) Refer to the explanation of [A] key " How to use normal mode" page 27 for details on setting the 1 position and 2 position.

9. OPERATION OF THE OPERATION PANEL KEYS

1) Displays during normal mode and functions of each key

When the power supply switch is turned ON, the rotation direction will display on the LED.M shown below.
When the rotation direction isn't displayed on LED.M, press the [↓] key anytime.
This state is called the normal mode, and the following keys can be operated.



Note) This above keys can be operated only when the rotary display is shown on the LED.M.

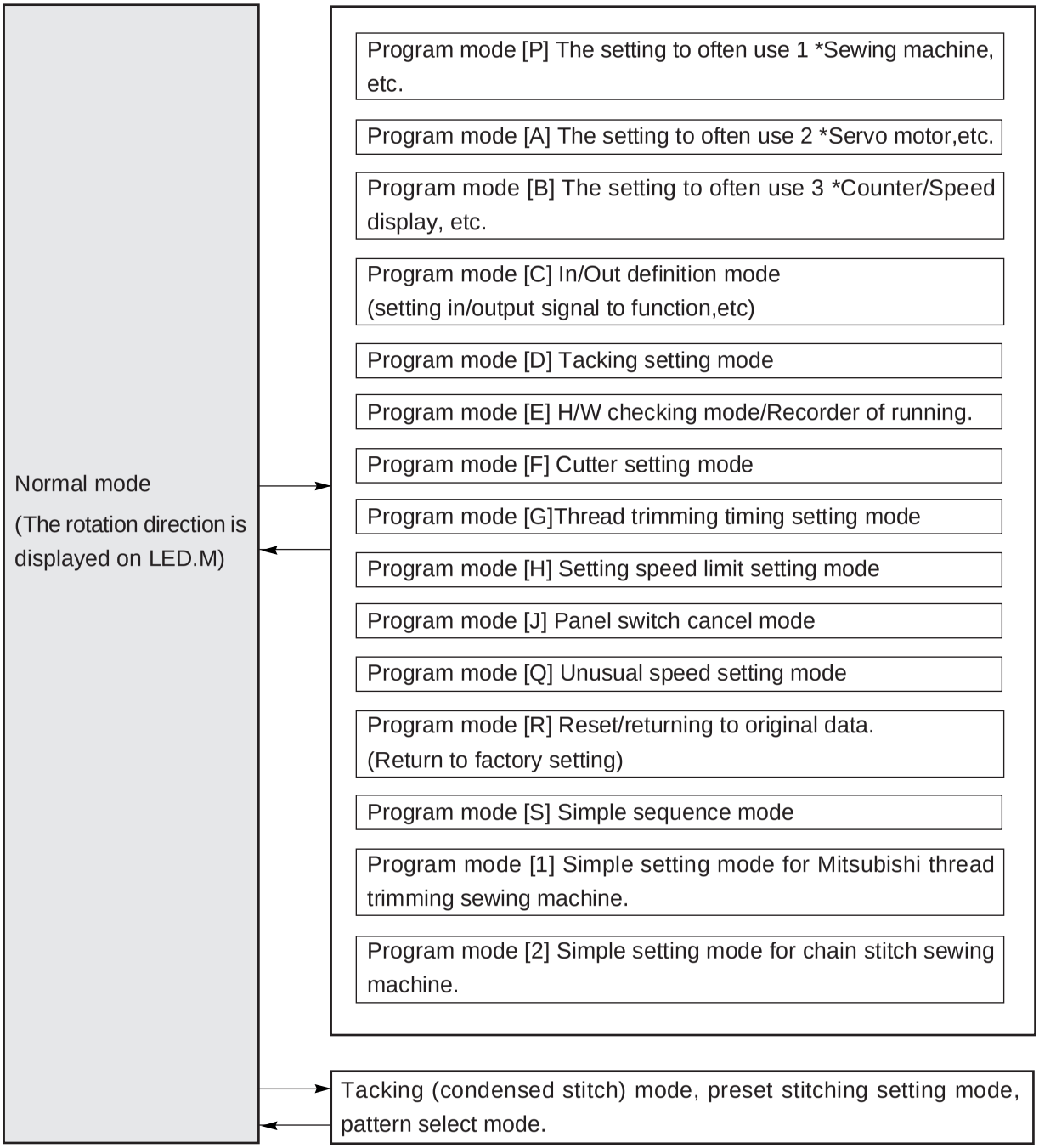
2) Selection of each mode

The modes can be changed from the normal mode to various program modes and various basic functions and application functions set with this operation panel.
(For each mode function, refer to a table of program mode function.)

(1) Program mode and model

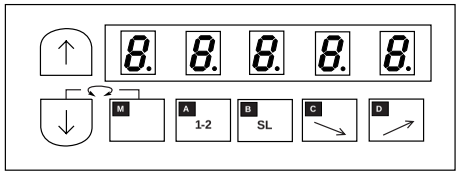
Model / Model name	SC-380	Model / Model name	SC-380
Normal mode	○	Program mode [F]	○
Tacking setting mode	○	Program mode [G]	○
No.of tacking stitches setting mode	○	Program mode [H]	○
Preset stitching setting mode	○	Program mode [J]	○
Pattern No. selection mode	○	Program mode [Q]	○
Program mode [P]	○	Program mode [R]	○
Program mode [A]	○	Program mode [S]	○
Program mode [B]	○	Program mode [1]	○
Program mode [C]	○	Program mode [2]	○
Program mode [D]	○		
Program mode [E]	○		

(3) Types of program mode

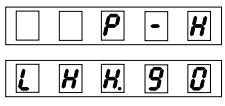
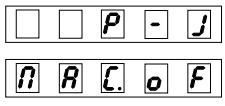
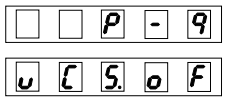
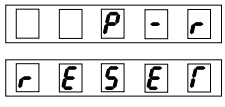
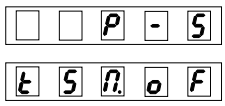
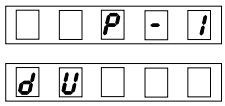
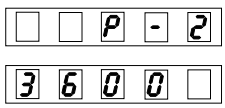


(Caution) A different program mode cannot be entered from the program mode. To change the program mode, always return to the normal mode first.

(3) Selection of each program mode from the normal mode.



Mode mane	Key operation	Digital display	Return to the normal mode
Tacking type setting mode	Press the ↑ key one time from the normal mode.	b. - 2 - 2 * The tacking setting mode will be entered. Note) Skipping about this menu at the time of pattern No. = 4.	Press ↓ key any time.
No. of tacking stitch setting mode	Press the ↑ key two times form the normal mode.	n. 4 4 4 4 * The tacking stitches setting mode will be entered.	Press ↓ key any time.
Preset stitching setting mode	Press the ↑ key three times form the normal mode.	- □ □ 4 4 * The tacking stitches setting mode will be entered. Note) Skipping about this menu at the time of pattern A to H.	Press ↓ key any time.
Pattern No. selection mode	Press the ↑ key four times form the normal mode.	P. S r r. 1. * The pattern No. selection mode will be entered.	Press ↓ key any time.
Program mode [P]	While holding down the ↓ key, press the ↑ key for 2 seconds or more from normal mode.	□ □ P - P * The display will flicker. H. 4 0 0 0 * The program mode [P] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [A]	While holding down the ↓ key, press the A 1-2 key for 2 seconds or more from normal mode.	□ □ P - A * The display will flicker. C A . □ L * The program mode [A] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [B]	While holding down the ↓ key, press the B SL key for 2 seconds or more from normal mode.	□ □ P - b * The display will flicker. S. □ □ □ 0 * The program mode [B] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [C]	While holding down the ↓ key, press the C key for 2 seconds or more from normal mode.	□ □ P - C * The display will flicker. 1 A. P S U * The program mode [C] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [D]	While holding down the ↓ key, press the D key for 2 seconds or more from normal mode.	□ □ P - d * The display will flicker. d 1. □ □ n * The program mode [D] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [E]	While holding down the ↓ key, press the A 1-2 key and the ↑ key for 2 seconds or more from normal mode.	□ □ P - E * The display will flicker. 1. □ E - - * The program mode [E] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [F]	While holding down the ↓ key, press the A SL key and the ↑ key for 2 seconds or more from normal mode.	□ □ P - F * The display will flicker. C o. A. □ 0 * The program mode [F] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [G]	While holding down the ↓ key, press the C key and the ↑ key for 2 seconds or more from normal mode.	□ □ P - G * The display will flicker. r r. □ n 1 * The program mode [G] will be entered.	While holding down ↓ key, press ↑ key.

Mode mane	Key operation	Digital display	Return to the normal mode
Program mode [H]	While holding down the ↓ key, press the D key and the ↑ key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [H] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [J]	While holding down the ↓ key, press the ↑ key and the A 1-2 key and the B SL key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [J] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [Q]	While holding down the ↓ key, press the A 1-2 key and the C key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [Q] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [R]	While holding down the ↓ key, press the B SL key and the C key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [R] will be entered.	Press D key for 2 seconds or more.
Program mode [S]	While holding down the ↓ key, press the B SL key and the D key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [S] will be entered.	While holding down ↓ key, press ↑ key.
Program mode [1]	While holding down the ↓ key, press the A 1-2 key and the B SL key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [1] will be entered.	Press D key for 2 seconds or more. (*1)
Program mode [2]	While holding down the ↓ key, press the C key and the D key for 2 seconds or more from normal mode.	 * The display will flicker. * The program mode [2] will be entered.	Press D key for 2 seconds or more. (*1)

Note (*1) : It is set by pressing [D] key for over two seconds.
It is possible to return to normal mode by holding down [↑], [↓] key, but in this case it is not set to new setting.

3) HOW TO USE PROGRAM MODES [1] AND [2]

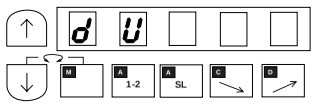
(1) PROGRAM MODE [1]

(SEWING MACHINE HEAD FOR LEATHER AND HEAVY-WEIGHT MATERIALS)

To set the functions for the sewing machine with thread trimmer for leather and heavy-weight materials.
(ex.To set for the DNU-241H) ..... Function setting [DNU4]

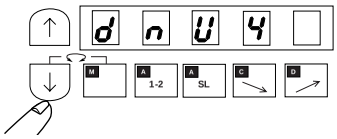
① Enter program mode [1] ([↓] + [A] + [B])

②



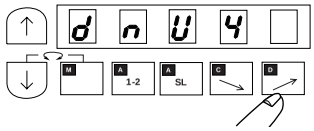
* Program mode [1] will be entered.

③



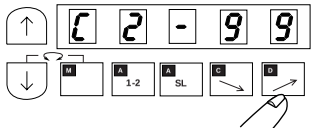
* Set function to [DNU4].

④



* [DNU4] will flicker when [D] key is pressed.

⑤



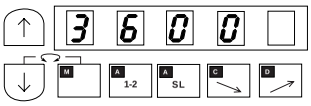
* Press [D] key (2 seconds or mode) to return to the normal mode.

(2) THE PROGRAM MODE [2] (CHAINSTITCH SEWING MACHINE HEAD)

To set the functions for the chainstitch sewing machine head

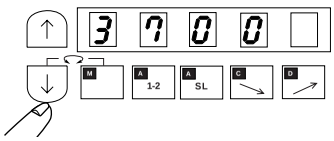
① Enter program mode [2] ([↓] + [C] + [D])

②



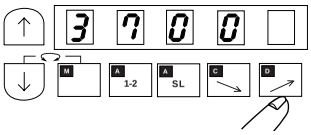
* Program mode [2] will be entered.

③



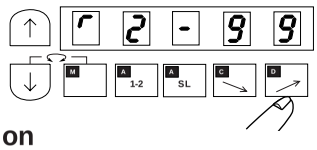
* Set function to [3700]

④



* [3700] will flicker when [D] key is pressed.

⑤



* Press [D] key (2 seconds or more) to return to the normal mode.

Description

A. Select the function name that corresponds to the sewing machine model from "Table of simplified setting value for JUKI sewing machine with thread trimmer" described in the next page. Press [D] key for 2 seconds or more, and the number of revolution of the function name and connector function setting can be automatically set.
B. To return to the normal mode from the [dU] display, press the [↓] key while holding down [↑] key. In the case, [dU] will not be set, and the last settings will be used.
C. Each time the [↓] key is pressed in step ③, the function will change in order from [dU] [dnU4] [LZH] [dSU] …[U639]. (The factory setting is [LU2v].)

(Note) In case of SC-380, when this setting function is performed, all contents which have been set so far are cleared and the number of revolution and function which correspond to the selected sewing machine model can be set automatically.

Table of simplified setting value for JUKI sewing machine with thread trimmer

Program mode [1] (Machine head for leather and heavy-weight materials)

Note1.

Function name	7 segment display	Sewing machine model	High speed (H)	Low speed (L)	Thread trimming speed (T)	Start tacking speed (N)	End tacking speed (V)	Slow start speed (S)	Slow start number of stitches (SLN)	Rotating direction	Connector function setting
dU	dU	DU-141H	2000	200	200	600	600	200	1	CCW	A
dnU4	dnU4	DHU-241H	2400	200	170	820	820	200	0	CCW	A
LZH	LZH	LZH-1290	2000	185	185	490	490	190	1	CCW	A
dSU	dSU	DSU-14 ＊	2000	170	170	1270	1270	170	1	CCW	A
dSC	dSC	DSC-24 ＊	2200	185	185	570	570	190	1	CCW	A
PLW4	PLW4	PLW-124 ＊	2500	180	180	570	570	180	1	CCW	A
PLW6	PLW6	PLW-126 ＊	2500	180	180	570	570	180	1	CCW	A
PLC	PLC	PLC-1660 PLC-1610	2000	170	170	1200	1200	170	1	CCW	A
LU2v	LU2U	LU-22 ＊ 0 (VR type)	3500	170	170	1200	1200	170	0	CCW	B
LU2s	LU25	LU-22 ＊ 0 (SW type)	3500	170	170	1200	1200	170	0	CCW	C
LU2L	LU2L	LU-2216	3000	170	170	1200	1200	170	0	CCW	B
LU51	LU51	LU-1510	3000	170	170	600	600	170	1	CCW	D
LU56	LU56	LU-1560	2500	170	170	600	600	170	1	CCW	D
LU11	LU11	LU-1114	2500	170	170	600	600	170	1	CCW	A
LS34	LS34	LS-341N	2000	170	170	1200	1200	170	1	CCW	A
U639	U639	63900	4000	250	180	–	–	250	3	CCW	N

Note2.

Note) 1. Each time the [↓] key is pressed, a function name is displayed in order to the direction of ↓ .
2. Each time the [↑] key is pressed, a function name is displayed in order to the direction of ↑ .

(Caution) Be sure to select the function name corresponding to the machine head used. If the selection is mistaken, damage to the machine head, control box or motor may result. (However, the actual number of rotations is limited by the machine head used.)

Program mode [2] (Chainstitch machine head)

Note1.

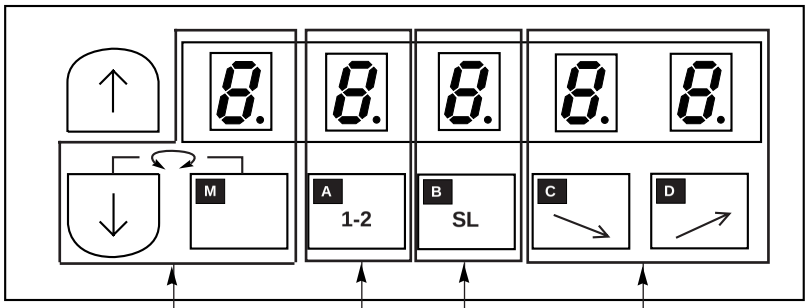
Function name	7 segment display	Sewing machine model	High speed (H)	Low speed (L)	Thread trimming speed (T)	Start tacking speed (N)	End tacking speed (V)	Slow start speed (S)	Slow start number of stitches (SLN)	Rotating direction	Connector function setting
3600	3600	MO-3600/Z18 △	6000	250	250	-	-	250	0	CW	E
3700	3700	MO-3700/Z18 △	7000	250	250	-	-	250	0	CW	E
3914	3914	MO-3914/Z18 △	8000	250	250	-	-	250	0	CW	E
3904	3904	MO-3904/Z18 △	8500	250	250	-	-	250	0	CW	E
3900	3900	MOR-3900/Z18 △	7000	250	250	-	-	250	0	CW	E
MO65	n065	SY-34	6500	250	250	-	-	250	0	CW	F
MO70	n070	SY-33	7000	250	250	-	-	250	0	CW	F
MO75	n075	SY-32	7500	250	250	-	-	250	0	CW	F
MO80	n080	SY-31	8000	250	250	-	-	250	0	CW	F
MO85	n085	SY-30	8500	250	250	-	-	250	0	CW	F
AH1	AH1	MFC-7000/AH1	5000	250	250	-	-	250	0	CW	G
MF	nF	MF-7000	5000	250	250	-	-	250	0	CCW	H
AXM1	AIIn1	MH-481, 482	5500	200	200	-	-	200	0	CCW	I
AXM2	AIIn2	MH-486, 488	4500	200	200	-	-	200	0	CCW	I
U345	U345	34500	4000	200	200	-	-	1000	5	CW	M
U347	U347	34700	4000	200	200	-	-	1000	5	CW	K
U348	U348	34800	5500	200	200	-	-	1000	5	CW	L
U160	U160	160	1000	250	200	-	-	250	2	CW	I
U16	U16	16	800	250	200	-	-	250	2	CW	O

Note2.

Note) 1. Each time the [↓] key is pressed, a function name is displayed in order to the direction of ↓ .
2. Each time the [↑] key is pressed, a function name is displayed in order to the direction of ↑ .

(Caution) Be sure to select the function name corresponding to the machine head used. If the selection is mistaken, damage to the machine head, control box or motor may result. (However, the actual number of rotations is limited by the machine head used.)

4) How to use the normal mode



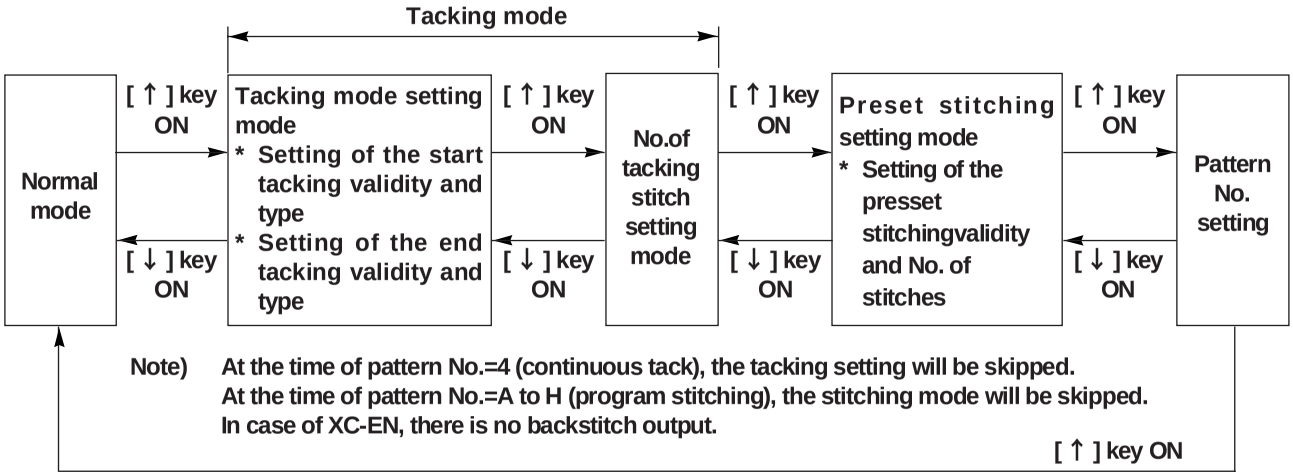
Change motor rotation direction
By operating these two keys ([↓] + [M]) simultaneously,the rotation direction of the sewing machine can be changed.
As for the rotation direction, the direction which was seen from the motor axis is displayed in LED.M.
(CCW : Counterclockwise rotation
CW : Clockwise rotation)

Speed adjustment
By operating this [C] key, the speed which is become late.
By operating this [D] key, the speed when the pedal is fully toed down is risen.
The rate with speed is 2 digits of LED.C, LED.D, and is displayed and can be set in 0-99.

Change 1 position / 2 position
By operating this [A] key, 1 position / 2 position can be selected for the needle position during stopping.
1 position or 2 position is displayed on LED.A.
At the time of 1 position, the needle is stopped at Up position.
At the time of 2 position, the needle is stopped at Down position.
After thread trimming, the needle is stopped at up position.
[1] is Up position
[2] is Down position

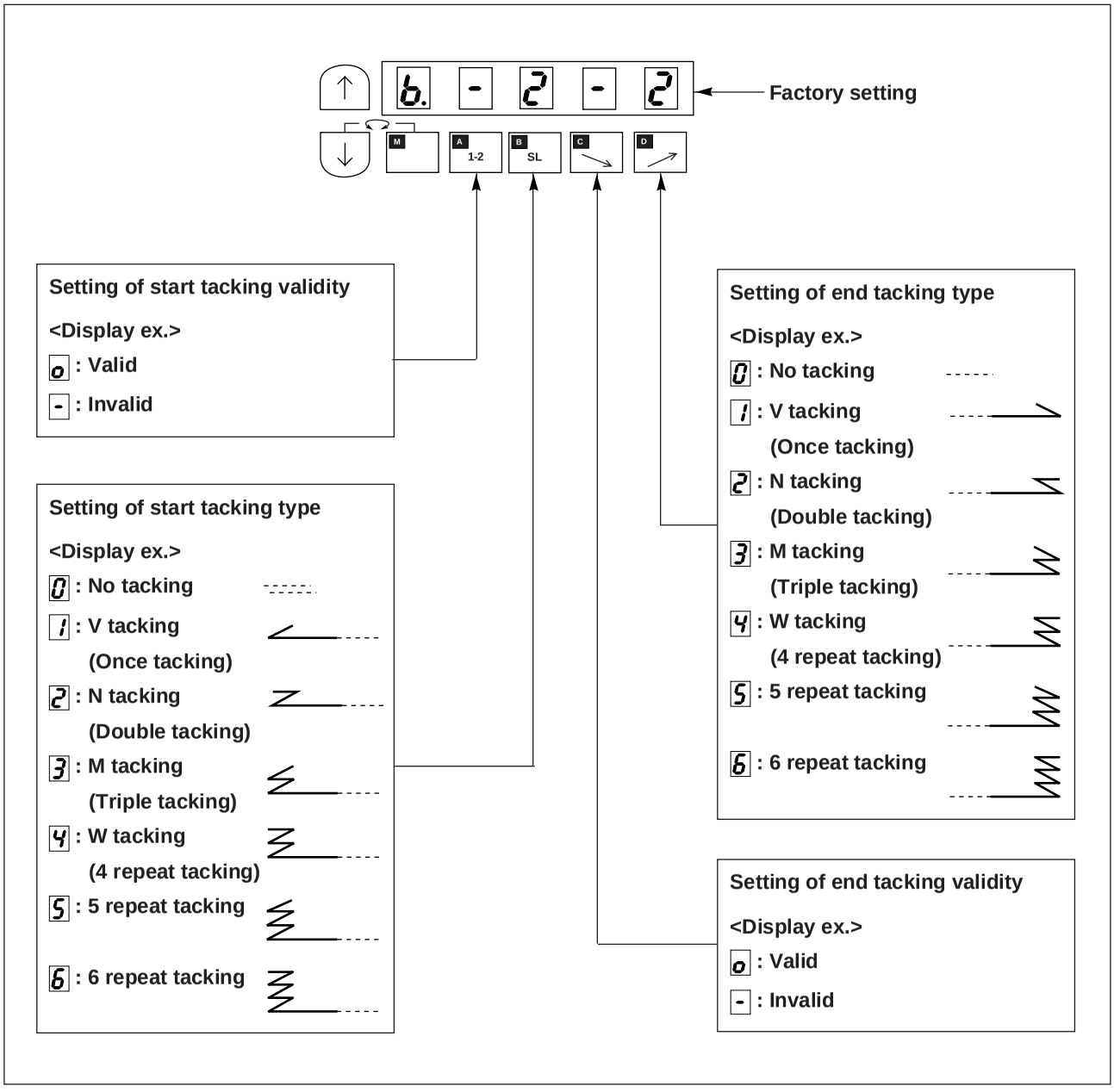
Slow start ON/OFF
By operating this [B] key, slow start ON/OFF can be selected.
Turned ON when wanting to sew the beginning of the sewing in slow start.
After the power is turned ON or after thread trimming, the sewing will start with a slow start.
Slow start ON/OFF is displayed on LED.B.
[-] is OFF
[o] is ON

5) Display and function of each key in the tacking mode and pattern mode. (for lock stitch machine)



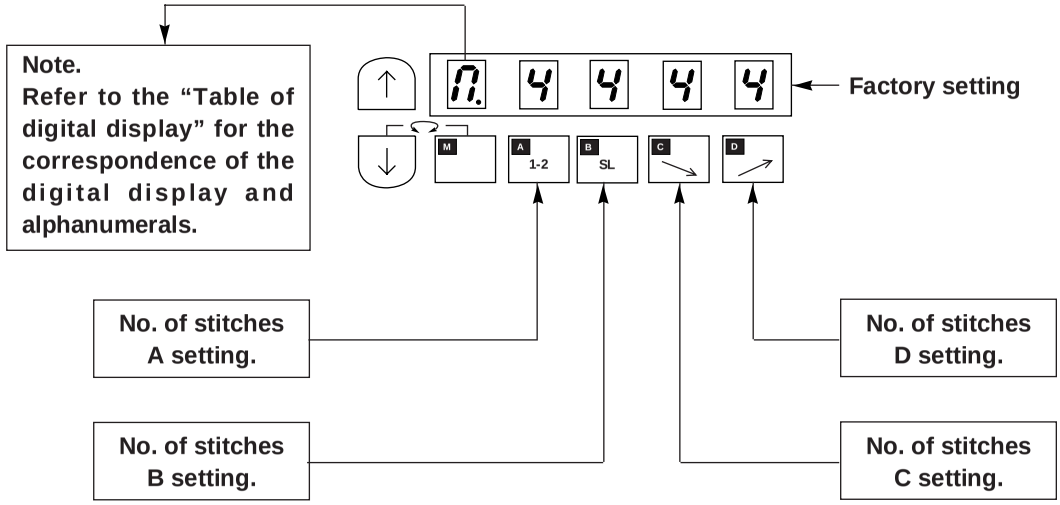
(1) Tacking setting mode (At the time of patter No.=4, this mode will be skipped.)

When the [↑] key is turned ON, b. will display above the [M] key, and the tacking setting mode will be entered. The validity and type of start and tacking can be set here.



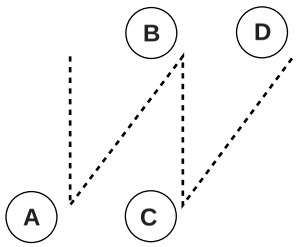
(2) No. of tacking stitches setting mode.

When the [↑] key is turned ON again, n. will display above the [M] key indicator, and the No. of stitches can be set.



1) The time except pattern No.4

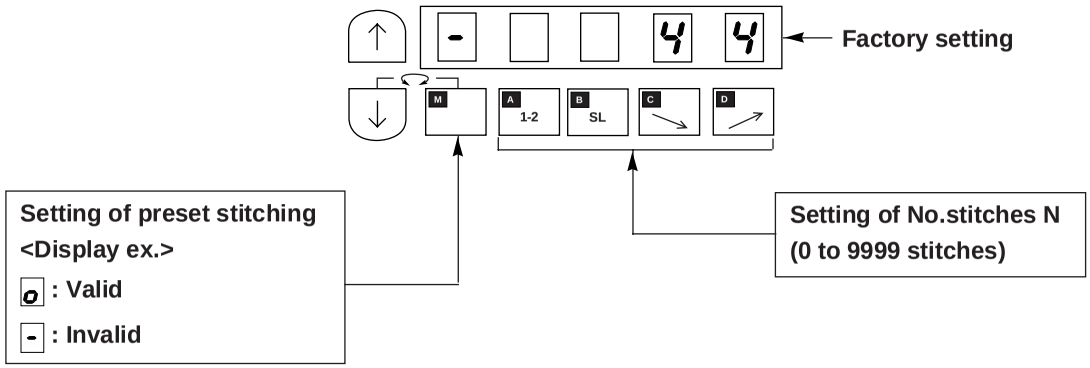
2) When the pattern No.4

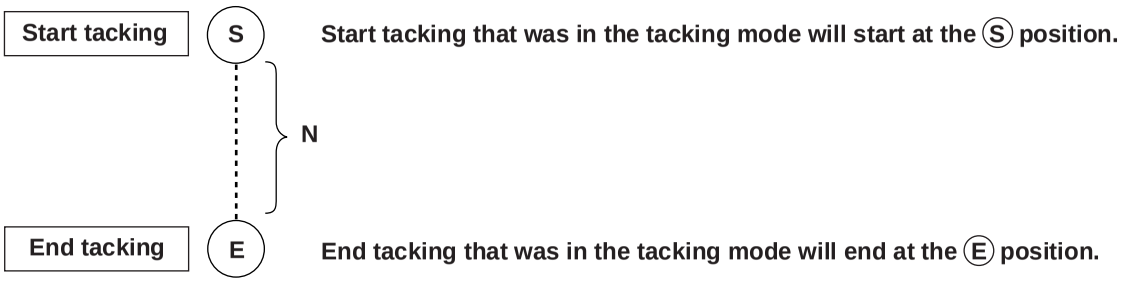


Each setting value can be changed from 0 to 9 stitches,A,B,C,D,E,F stitches
A is 10 stitches
B is 11 stitches
C is 12 stitches
D is 13 stitches
E is 14 stitches
F is 15 stitches

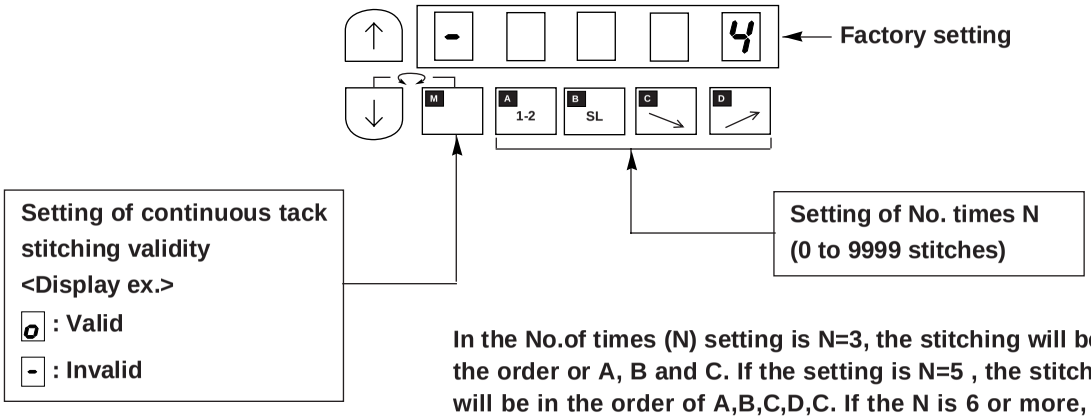
(3) Preset stitching setting mode

1) When the pattern is the time except pattern No.4

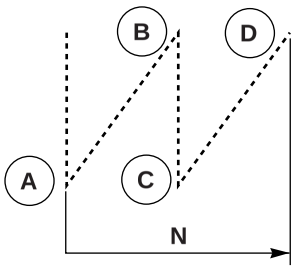




2) When the pattern is No.4



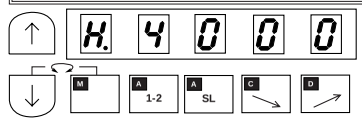
In the No.of times (N) setting is N=3, the stitching will be in the order or A, B and C. If the setting is N=5 , the stitching will be in the order of A,B,C,D,C. If the N is 6 or more, the order will be A,B,C,D,C,D…… (If N=0, tacking will continue in the order ABCDCD…… while the pedal is pressed down.)



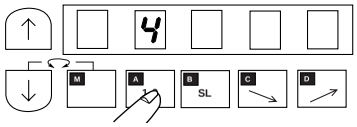
10. HOW TO USE THE PROGRAM MODE (EXAMPLE OF MOST FREQUENTLY USING)

No.1 To change the maximum speed (EX. To change to 4500 rotations)……Function setting [H.4500]

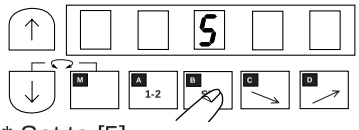
(1) Enter program mode [P] ([↓] + [↑])

(2) 

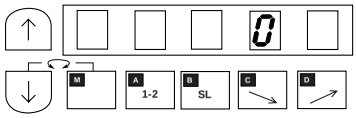
* Program mode [P] will be entered.

(3) 

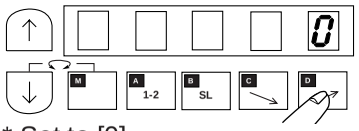
* Set to [4]

(4) 

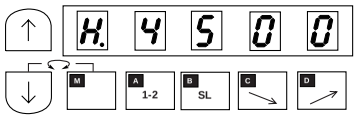
* Set to [5]

(5) 

* Set to [0]

(6) 

* Set to [0]

(7) 

* Complete the [H] function setting

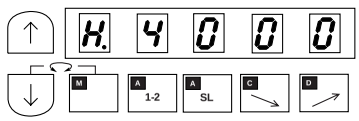
(8) Return to the normal mode ([↓] + [↑])

Description

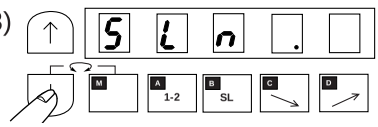
A. The setting range of the maximum speed is 0 to 8999 rotations.
B. By pressing each of the [A],[B],[C] and [D] keys, the setting value will change between 0 to 9. (However, the [A] key is only between 0 to 8.)
C. The factory setting is [200 rotations].
D. Low speed,thread trimming speed, start tacking speed, end tacking speed, medium speed and slow start speed can be set in the same manner.

No.2 To change the number of stitches in slow start (EX. to change three …… Function setting [SLN.3])

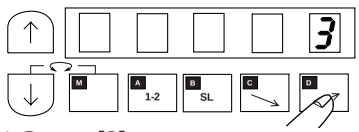
(1) Enter program mode [P] ([↓] + [↑])

(2) 

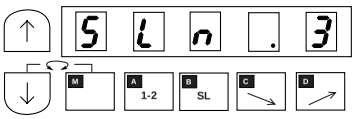
* Program mode [P] will be entered.

(3) 

* Set function to [SLN]

(4) 

* Set to [3]

(5) 

* Complete the [SLN] function setting

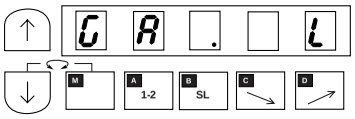
(6) Return to the normal mode ([↓] + [↑])

Description

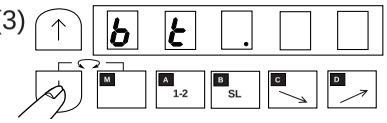
A. This is valid when the [B] key in the normal mode is turned ON.
B. The setting range of the number of stitches is 1 to 5 stitches.
C. By pressing [D] key, the setting value will change between 1 to 5 stitches.
D. The factory setting is [2 stitches].

No.3 To apply a weak break during stopping ……function setting[BK.ON]

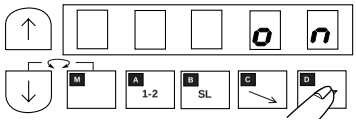
(1) Enter program mode [A] ([↓] + [A])

(2) 

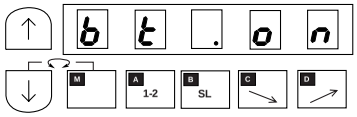
* Program mode [A] will be entered.

(3) 

* Set function to [BK]

(4) 

* Set to [ON]

(5) 

* Complete the [BK] function setting

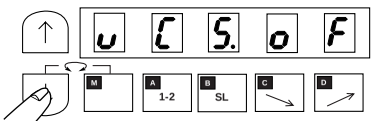
(6) Return to the normal mode ([↓] + [↑])

Description

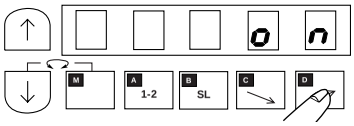
A. Use this when the sewing machine needle is completely down when stopped.
   To set ON, motor is applied a weak brake during stopping.
B. The setting value will alternate between [OF] and [ON] with each press of [D] key in step (4).

No.4 To set the standing work type……function setting[VCS.ON]

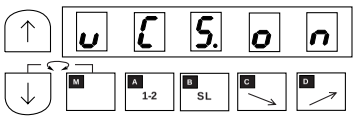
(1) Enter program mode [Q] ([↓]+ [A] + [C])

(2) 

* Program mode [Q] will be entered.

(3) 

* Set to [ON]

(4) 

* Complete the [VCS.ON] function setting

(5) Return to the normal mode ([↓] + [↑])

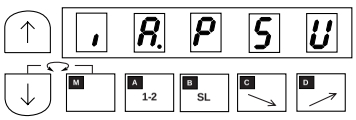
Description

A. This is used for high speed operation during standing operations.
   To turned ON, it operates at the speed with the rate which was set with the [C] and the [D] key in normal mode regardless of the pedal stepping quantity.
B. This setting is first priority to the key switch [AUTO] of operation panel.
C. The setting value will alternate between [OF] and [ON] with each press of the [D] key in step (3).
   (factory setting is [OF])

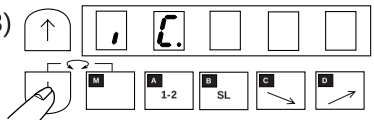
No.5 To change input/output port function.

(1) To operate one stitch operation with a external switch……function setting[IC.S01]

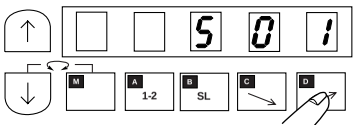
(1) Enter program mode [C] ([↓] + [C])

(2) 

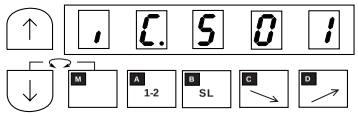
* Program mode [C] will be entered.

(3) 

* Set function to [IC]

(4) 

* Set to [S01]

(5) 

* Complete the [IC] function setting

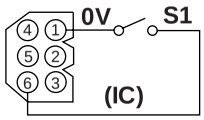
(6) Return to the normal mode ([↓] + [↑])

Description

A. Using the external switch connected No.6 pin in the option A connector, one stitch operation will be operated.
B. The setting value will be changed with each press of the [D] key in step (4). (factory setting is [S0])

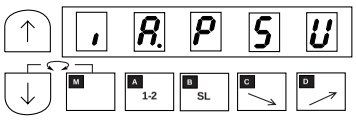
Note) When using this function, always return to the normal mode before starting operations.

OptionA

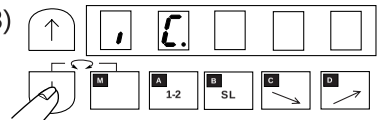


(2) To confirm the position where the needle passed through the fabricated to raise the penetration strength of the first stitch with the external switch. ……function setting[IC.BCR]

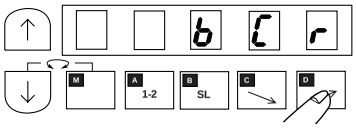
(1) Enter program mode [C] ([↓] + [C])

(2) 

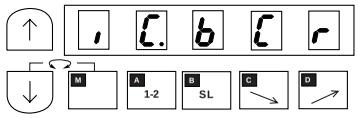
* Program mode [C] will be entered.

(3) 

* Set function to [IC]

(4) 

* Set to [BCR]

(5) 

* Complete the [IC] function setting

(6) Return to the normal mode ([↓] + [↑])

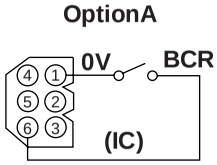
Description

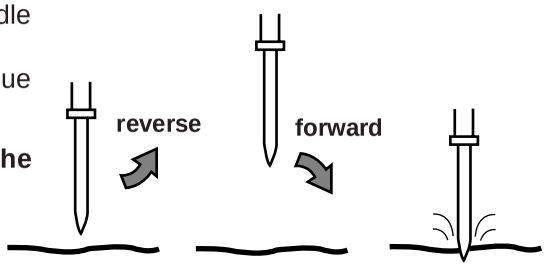
A. This is used to increase the penetration strength of the first stitch when the fabric is thick.
Each time the switch [BCR] connected to the No.6 pin in the option A connector is turned ON, the (forward) - (reverse) operation will be repeated, and the needle will stop right with forward operation, above the fabric. However, when the operation signal is turned ON and the needle is stopped the sewing machine will operate forward after reversing once.
When stopped with reverse operation, forward operation will start from that position.
* The needle position stop angle is set with the needle position stop angle [C8] in the program mode[P]

B. Each time the [D] key is pressed in step (4), the set value will be changed. (factory setting is [S0])

Note) When using this function, always return to the normal mode before starting operations.

OptionA

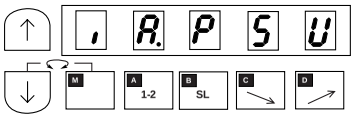




(3) To emergency stop during sewing machine operation …… function setting[IA.ES]

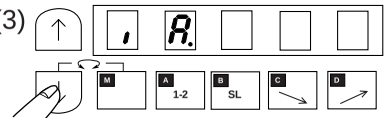
(1) Enter program mode [C] ([↓] + [C])

(2)



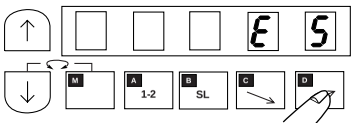
* Program mode [C] will be entered.

(3)



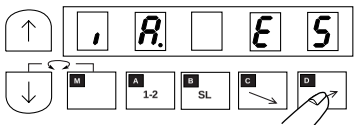
* Set function to [IA]

(4)



* Set to [ES]

(5)



* Complete the [IA] function setting

(6) Return to the normal mode ([↓] + [↑])

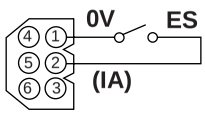
Description

A. The switch connected No.2 pin in the option A connector is emergency stop signal.

B. The setting value will be changed with each press of the [D] key in step (4).
(factory setting is [PSU])

C. Setting function [ID.ES], It becomes the function of emergency stop signal too.
(Connect the external switch No.5-No.6 pin in the sewing machine connector.)

Option A

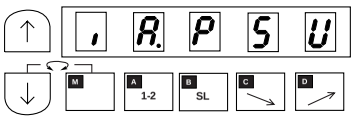


Note) When using this function, always return to the normal mode before starting operations.

(4) To operate backstitching signal during sewing machine is stopped. ……function setting [IE.BSL]

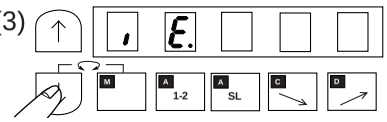
(1) Enter program mode [C] ([↓] + [C])

(2)



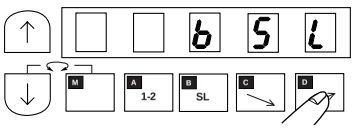
* Program mode [C] will be entered.

(3)



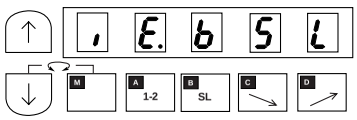
* Set function to [IE]

(4)



* Set to [BSL]

(5)



* Complete the [IE] function setting

(6) Return to the normal mode ([↓] + [↑])

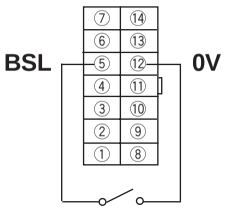
Description

A. Turning ON the external switch connected No.5 pin in sewing machine connector, backtacking output will be operate when sewing machine is stopped.
When beginning to sew by backstitching,the operation becomes smooth.

B. The setting value will be changed with each press of [D] key in step (4).
(factory setting is [S7])

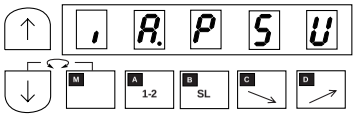
Note) When using this function, always return to the normal mode before starting operations.

Sewing machine

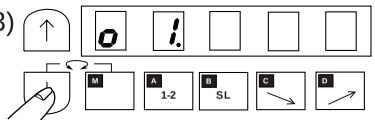


(5) To output a needle cooler output to spare output SOL1 ……function setting [O1.NCL]

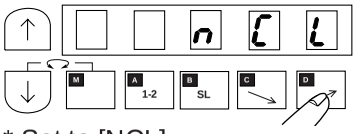
(1) Enter program mode [C] ([↓] + [C])

(2) 

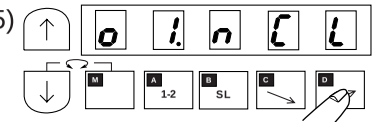
* Program mode [C] will be entered.

(3) 

* Set function to [OI]

(4) 

* Set to [NCL]

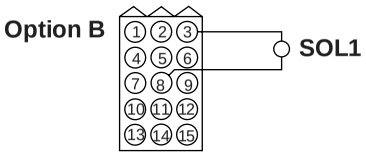
(5) 

* Complete the [OI] function setting

(6) Return to the normal mode ([↓] + [↑])

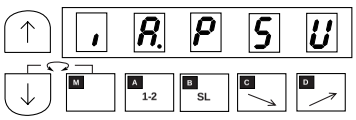
Description

A. Select the needle cooler output [NCL] from the setting table on page 130. Select the setting to connect [OI] and [NCL].
B. Spare output [SOL1] will be turned ON while the sewing machine is running (including needle lifting).

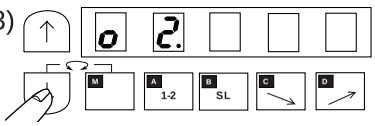


(6) To output a puller output to spare output SOL2 ……function setting[O2.PUL] + [O2C.ON] (To set 50 % duty)

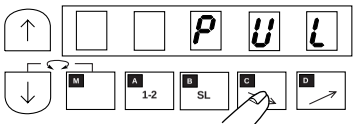
(1) Enter program mode [C] ([↓] + [C])

(2) 

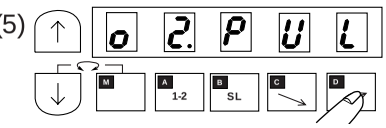
* Program mode [C] will be entered.

(3) 

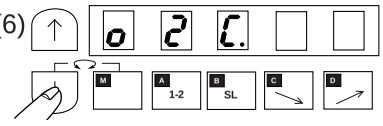
* Set function to [O2]

(4) 

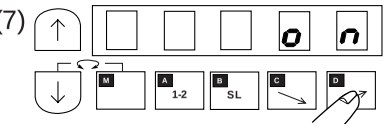
* Set to [PUL]

(5) 

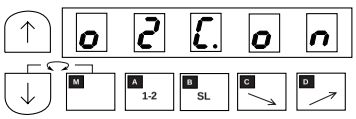
* Complete the [O2] function setting

(6) 

* Set function to [O2C]

(7) 

*Set to [ON]

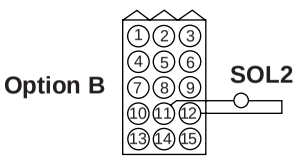
(8) 

*Complete the [O2] founction setting

(9) Return to the normal mode ([↓] + [↑])

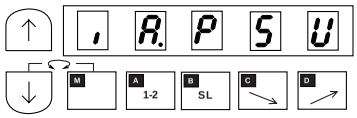
Description

A. Select the puller output [PUL] from the setting table on page 131.
B. Spare output solenoid [SOL2] will be turned on, while presser foot lifter is operated.

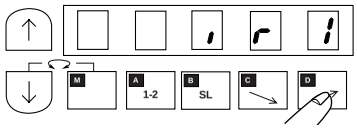


(7) To operate spare output SOL2 only during sewing machine operation using the spare input switch IN1.
.....function setting [I1.IR1] + [O2. OT1]

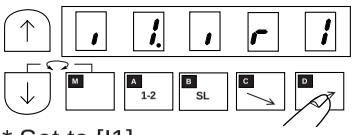
(1) Enter program mode [C] ([↓] + [C])

(2) 

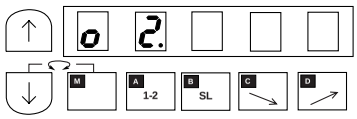
* Program mode [C] will be entered.

(3) 

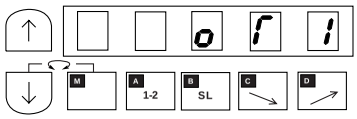
* Set function to [IR1]

(4) 

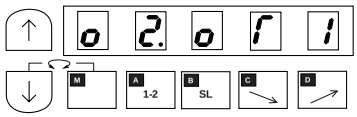
* Set to [I1]

(5) 

* Complete the [O2] function setting

(6) 

* Set to [OT1]

(7) 

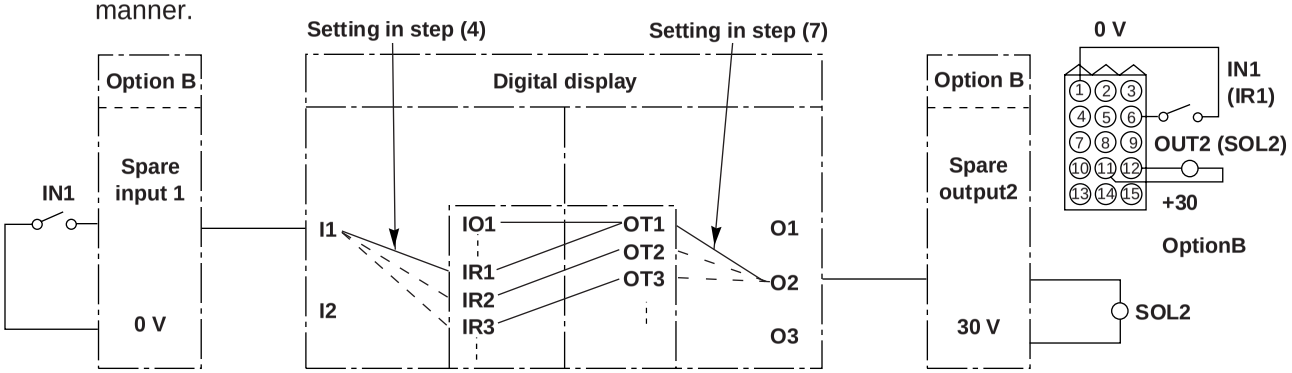
* Complete the [O2] function setting

(8) Return to the normal mode ([↓] + [↑])

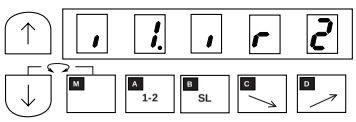
Description

A. Select the set value[IR1],[IR2] or [IR3] from the setting table on page 128
When [IR1] is selected,[I1] and [IR1] are connected, and [O2] and [OT1] are connected.
When [IR2] is selected,[I1] and [IR2] are connected, and [O2] and [OT2] are connected.
When [IR3] is selected,[I1] and [IR3] are connected, and [O2] and [OT3] are connected.
The example is when [IR1] is selected.

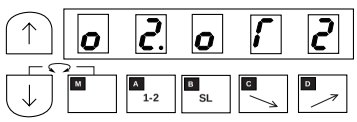
B. The option B connector spare input switch IN1 and spare output SOL2 are connected in the following manner.



C. The following setting will appear when [IR2] is selected.

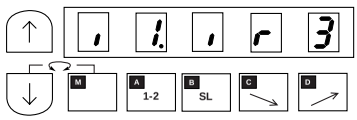
(4)' 

*Connect [I1] to [IR2]

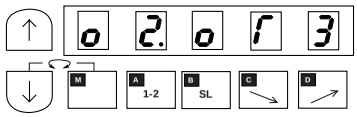
(7)' 

* Connect [O2] to [OT2]

D. The following setting will appear when [IR3] is selected.

(4)" 

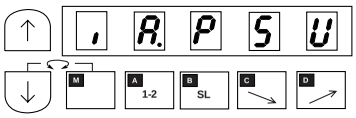
* Connect[I1] to [IR3]

(7)" 

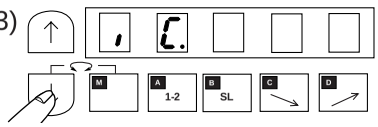
* Connect [O2] to [OT3]

No.6 To set external one shot signal ……function setting C mode [IC.SH] + P mode [SHM.SH]

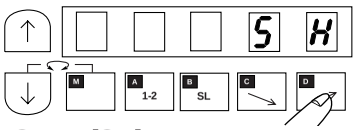
(1) Enter program mode[C] ([↓] + [C])

(2) 

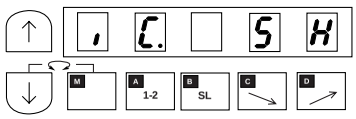
* Program mode [C] will be entered.

(3) 

* Set function to [IC]

(4) 

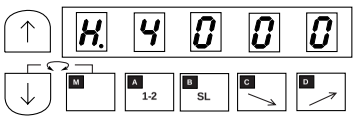
*Set to [SH]

(5) 

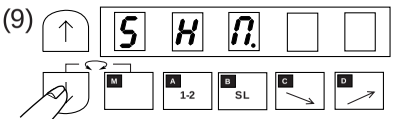
* Complete the [IC] function setting

(6) Return to the normal mode ([↓] + [↑])

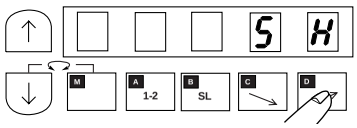
(7) Enter program mode [P] ([↓] + [↑])

(8) 

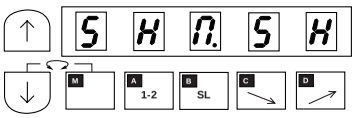
* Program mode [P] will be entered.

(9) 

* Set function to [SHM]

(10) 

* Set to [SH]

(11) 

* Complete the [SHM] function setting

(12) Return the normal mode ([↓] + [↑])

Description

A. Set both C mode [IC] and P mode [SHM] function.

B. When external one shot signal [SH] (connected No.6 pin in option connector A) is turned ON.automatic sewing is operated. And when [SH] signal is turned OFF, manual sewing can be operated.

   * When one shot signal ON and then either of external operation signals (S0,S1,S4) is turned ON, the sewing machine will be operate at each order speed. And external operation signal is turned OFF, sewing machine will be operate at the speed set by [C],[D] key.
   (When [P] mode [AT]=ON or control panel key is ON,operation can be stopped by PSU,PSD or ES signals.)

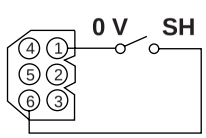
C. Each time the [D] key is pressed in step (4), the set value will be changed.

D. Each time the [D] key is pressed in step (10), the set value will be changed. (factory setting is [SH])

   * Set[SS] setting,the operation will be become same as No.13.

Note) When using this function, always return to the normal mode before starting operations.

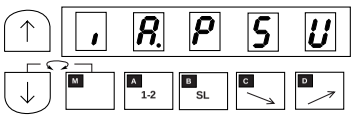
Option A



No.7 To set number of stitches to the needle UP position stop after detecting the fabric end with an optical sensor, etc. (Ex. to set to 10 stitches)……function setting C mode [IA.PSU] + P mode [PSU.10]

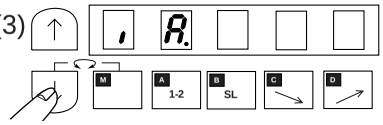
(1) Enter program mode[C] ([↓] + [C])

(2)



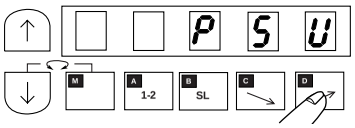
* Program mode [C] will be entered.

(3)



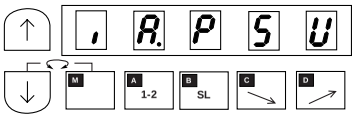
* Set function to [IA]

(4)



* Set to [PSU]

(5)

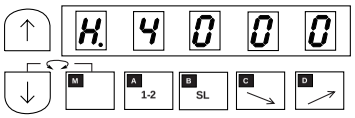


* Complete the [IA] function setting

(6) Return to the normal mode ([↓] + [↑])

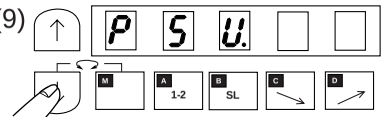
(7) Enter program mode [P] ([↓] + [↑])

(8)



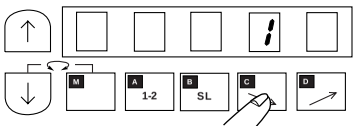
* Program mode [P] will be entered.

(9)



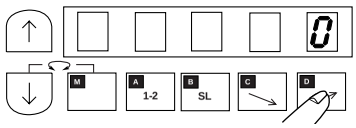
* Set function to [PSU]

(10)



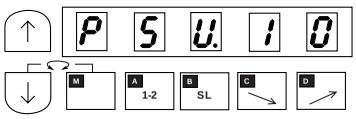
* Set to [1]

(11)



* Set to [0]

(12)



* Complete the [PSU] function setting

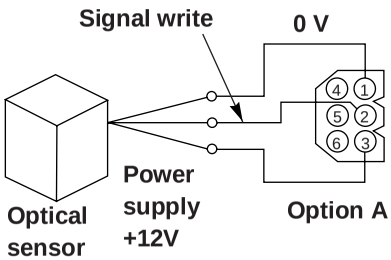
(13) Return the normal mode ([↓] + [↑])

Description

A. Set both C mode [IA] and P mode [PSU] function.

B. Connect photoelectric sensor to No.2 pin in option A connector, and photoelectric sensor is turned ON, the needle will stop at the UP position after 10 stitches and then the thread will be trimmed.

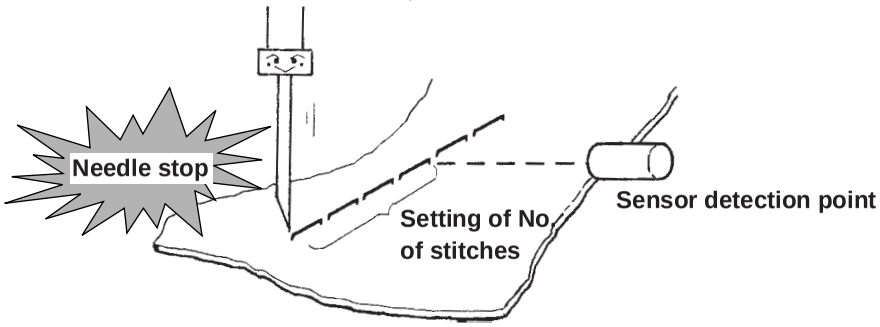
C. Each time the [D] key is pressed in step (4), the set value will be changed.(factory setting is [PSU])



D. The setting range of the number of stitches in 0 to 99 stitches.

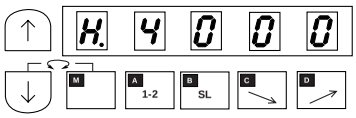
E. Each time the [C] key in step (10) or [D] key in step (11) is pressed, the set value will change between 0 to 9.

F. Set function [IB.PSU] + [PSU.10], it is possible to set number of stitches after detecting the fabric end with an optical sensor. (Connect optical sensor output to No.4 pin in option connector A.)
(* for example, use the optical sensor in OMRON E3V3-D62)

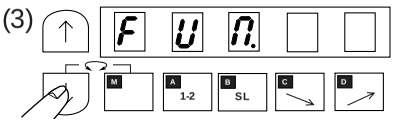


No.8 To continue presser foot lifting after the thread trimming, and to bring down the presser foot after the time set on the timer has passed. …… function setting [FUM.ON] + [FU.C]

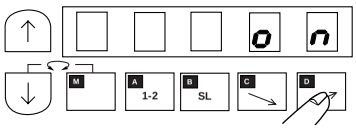
(1) Enter program mode [P] ([↓] + [↑])

(2) 

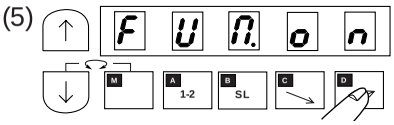
* Program mode [P] will be entered.

(3) 

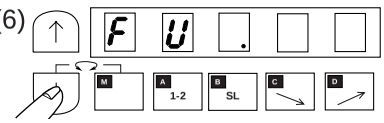
* Set function to [FUM]

(4) 

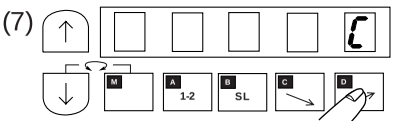
* Set to [ON]

(5) 

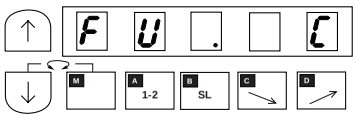
* Complete the [FUM] function setting

(6) 

* Press [↓] key and set function [FU]

(7) 

* Set to [C]

(8) 

* Complete the [FU] function setting

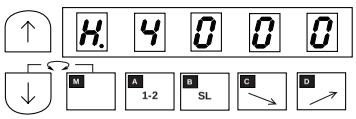
(9) Return to the normal mode ([↓] +[↑])

Description

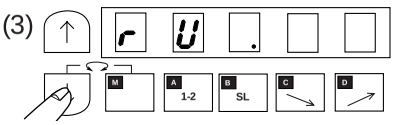
A. Set both [FUM] and [FU] functions.
B. Each time of the [D] key is pressed in step (4), the se value will alternate between [OF] and [ON]. (factory setting is [OF])
C. Each time the [D] key is pressed in step (7), the set value will change in order of [M][C][A][T]. (factory setting is [M])
D. The timer time can be adjusted with the FUM timer setting[FCT] in the [C] mode. (factory setting is 12 sec)

No.9 To set needle position higher than usual after thread trimming …… function setting [RU.ON]

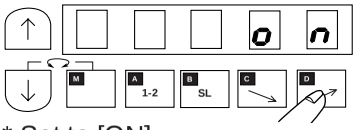
(1) Enter program mode [P] (↓] + [↑])

(2) 

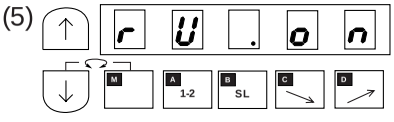
* Program mode [P] will be entered.

(3) 

* Set function to [RU]

(4) 

* Set to [ON]

(5) 

* Complete the [RU] function setting

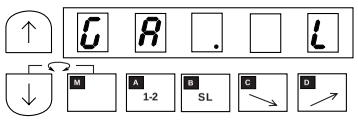
(6) Return to the normal mode ([↓] + [↑])

Description

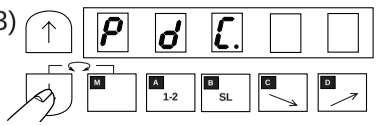
A. The motor is reverse run after thread trimming, and the needle will stop near the needle bar top dead point.
The reverse run angle can be set in [R8] and the setting range is 0 to 360, and it is 2-degree interval.
B. The setting value will alternate between [OF] and [ON] with each press of [D] key in (4). (factory setting is [OF])

No.10 To adjust the correlation between toe down angle speed. (EX. to set value 55 to sew quickly at a high speed)……function setting [PDC.55]

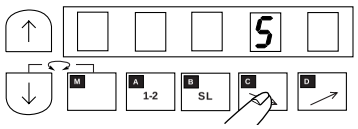
(1) Enter program mode [A] ([↓] + [A])

(2) 

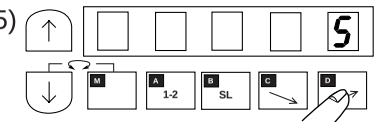
* Program mode [A] will be entered.

(3) 

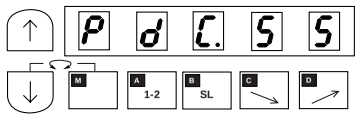
* Set function to [PDC]

(4) 

* Set to [5]

(5) 

* Set to [5]

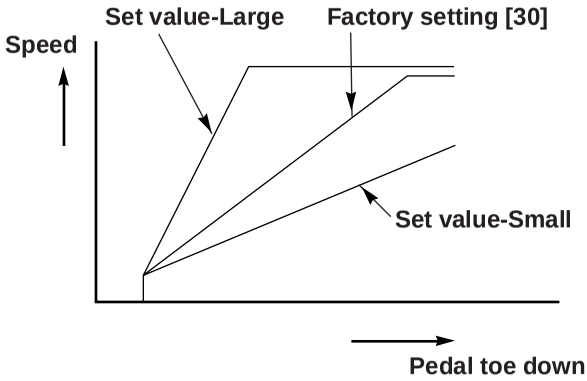
(6) 

* Complete the [PDC] function setting

(7) Return to the normal mode ([↓] + [↑])

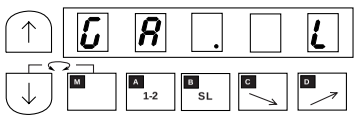
Description

A. The curve amount of the speed change for the amount that.
The curve amount of the speed change for the size of the set value can be set. The pedal is pressed can be set. To sew quickly at a high speed, increase the set value. To finely adjust the medium speed region, decrease the setting.
B. The setting range is 10 to 99. (factory setting is [30])
C. Each time the [C] key in step (4) or [D] key in step (5) is pressed, the set value will change between 0 to 9. (However, the [C] key is between 1 to 9)

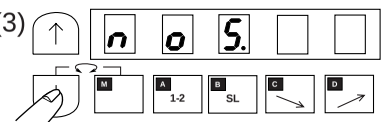


No.11 To run without the detector (when the detector is broken). ……function setting[NOS.ON]

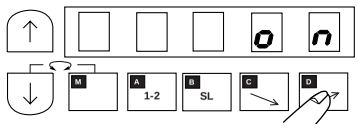
(1) Enter program mode [A] ([↓] + [A])

(2) 

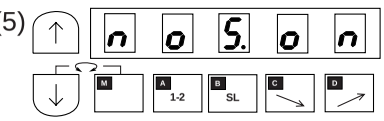
* Program mode [A] will be entered.

(3) 

* Set function to [NOS]

(4) 

* Set to [ON]

(5) 

* Complete the [NOS] function setting

(6) Return to the normal mode ([↓] + [↑])

Description

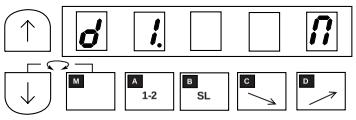
A. Only variable-speed operation will be possible. Set position stopping and thread trimming will not be possible.
B. Each time the [D] key is pressed, the setting will alternate between [OF] and [ON]

No.12 To adjust tacking accurately

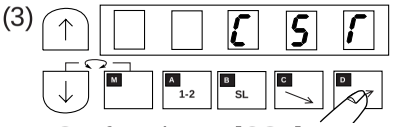
(1) To adjust tacking surely ……[D1.CST] + [CT.10]

(To set the stop time at each tacking corner to 100 milliseconds)

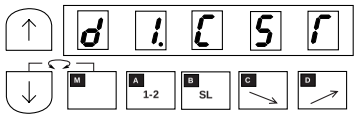
(1) Enter program mode [D] ([↓] + [D])

(2) 

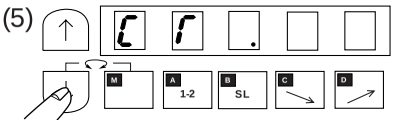
* Program mode [D] will be entered.

(3) 

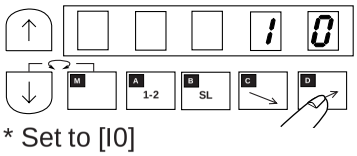
* Set function to [CST]

(4) 

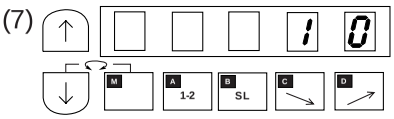
* Complete the [D1] function setting

(5) 

* Set function to [CT]

(6) 

* Set to [I0]

(7) 

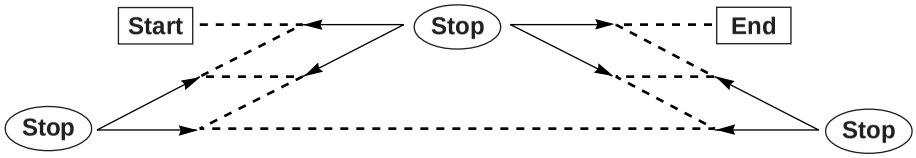
* Complete the [CT] function setting

(8) Return to the normal mode ([↓] + [↑])

Description

A. Set the type of start/end tacking and the no.of stitches before making the above setting.

B. For example, to carry out W tacking, the unit will stop at each corner for 100 milliseconds.



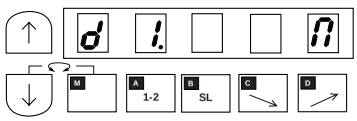
C. Each time the [D] key is pressed in step (3), the setting will change in the order of [M], [D], [CST], [CSU] and [CSD]. (factory setting is [M])

D. The setting range of the stop time is 0 to 990 milliseconds in 10-millisecond intervals.

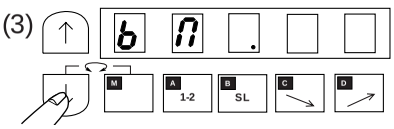
E. Each time the [C] key is pressed in the step (6), the set value will change from 0 to 9, and each time the [D] key is pressed, will change from 0 to 9.

(2) To align tacking when start/end tacking speed is less than 1000 rpm. ……function setting [BM.ON]

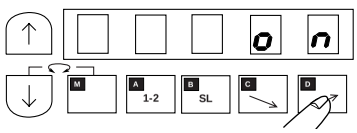
(1) Enter program mode [D] ([↓] + [D])

(2) 

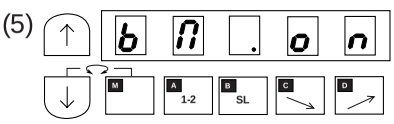
* Program mode [D] will entered.

(3) 

* Set function to [BM]

(4) 

* Set to [ON]

(5) 

* Complete the [BM] function setting

(6) Return to the normal mode ([↓] + [↑])

Description

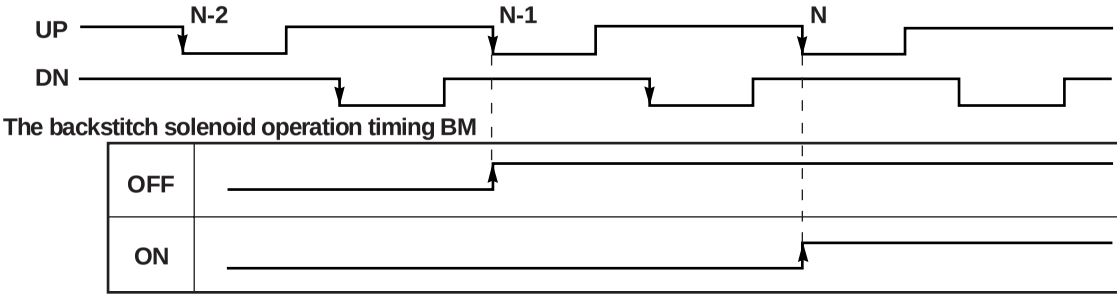
A. Set function [BM] to [ON] when start/end tacking speed is less than 1000 rpm

B. Set function [BM] to [OF] when start/end tacking speed is 1000 rpm or higher.
This BM function can be used for a rough tacking alignment of the start and end tacking.

C. Each time the [D] key is pressed, the setting will alternate between [OF] and [ON]. (The factory setting is [OF].)

Note) This function can be used when a stop is not made at each corner when tacking.
When the function setting [D1.CST] is set, this function setting [BM.ON] will be invalidated.

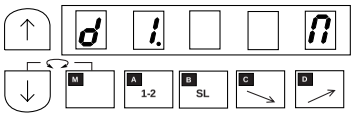
D. Set to the tack alignment
When “BM” is OFF, the timing of backstitch solenoid turning ON is one stitch before the setting number stitches. (as shown below.)
When “BM” is ON, the timing of backstitch solenoid turning ON is the setting number stitches.



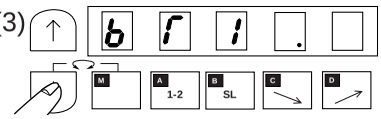
(3) To set the no. of stitch compensation for start tacking alignment BT1
(To correct the no. of advance stitches during start tacking) …… Function setting [BT1.4]

(Note) This no.of stitch correction can be used when a stop is not made at each corner when tacking.

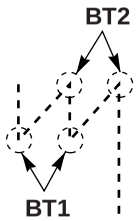
(1) Enter program mode [D] ([↓] + [D])

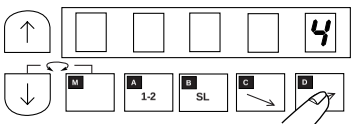
(2) 

* Program mode [D] will be entered.

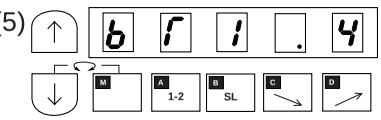
(3) 

* Set function to [BT1]

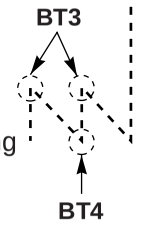


(4) 

* Set to [4]

(5) 

* Complete the [BT1] function setting



(6) Return to the normal mode ([↓] + [↑])

Description

A. In the above example, the four stitches art used for the start tack advance. This is one stitch more than the no. of stitches set in the start tack setting, so reset it so that it is shorter. Set the no. of correction stitches to –1. The relation of the no. of correction stitches and setting value is shown below. Set the setting value to [4].
B. With this setting, the advance section will be one stitch sorter, and the retract section will be increased by one stitch to three stitches. The no.of stitches will be as set.
C. Each time the [D] key is pressed, the setting will change in order from 0 to 9,A,B,C,D,E,and F.
D. The relation of the no. of correction stitches and setting value is as shown below.

Setting value	9	8	7	6	5	4	3	2	1	0	A	B	C	D	E	F
No.of correction stitches	$-2\frac{1}{4}$	-2	$-1\frac{3}{4}$	$-1\frac{2}{4}$	$-1\frac{1}{4}$	-1	$-\frac{3}{4}$	$-\frac{2}{4}$	$-\frac{1}{4}$	0	$+\frac{1}{4}$	$+\frac{2}{4}$	$+\frac{3}{4}$	1	$+1\frac{1}{4}$	$+1\frac{2}{4}$

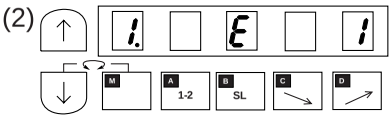
E. The no.of correction stitches set in BT1 is common for the start tack, V tack, M tack, and W tack.
F. The no.of stitches can be corrected easily by using this function and the start tack speed change.

Note : 1. When the function setting[D1.CST] is to adjust taking surely, this fumction setting [BT1.*] will be invalidated.
2. The setting of “BT2” “BT3” and “BT4” is as same as “BT1”.

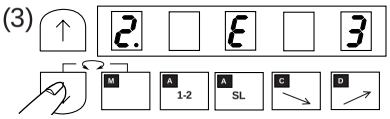
No.13 To check the error code history and input/output signal

(1) How to view the error code history … ……function setting [1.E--], [2.E--], [3.E--], [4.E--]

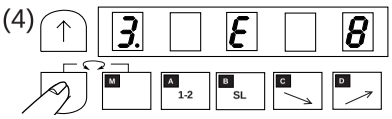
(1) Enter program mode [E] ([↓] + [↑] +[A])

(2) 

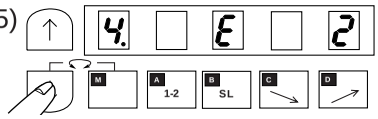
* The last error code is displayed.
(Ex. error code E1 is displayed.)

(3) 

* The second to last error code is displayed.
(Ex. error code E3 is displayed.)

(4) 

* The third to last error code is displayed.
(Ex. error code E8 is displayed.)

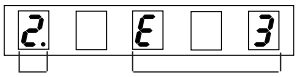
(5) 

* The fourth to last error code is displayed.
(Ex. error code E2 is displayed.)

(6) Return to the normal mode ([↓] + [↑])

Description

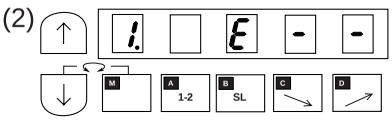
A. The last to fourth to last errors can be viewed.
B. Refer to page 140 for the error code.
C. The display is as in the right figure.



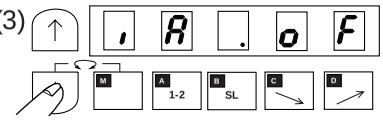
The record number of times **Error code number**

(2) To check input signals ……function setting [IA] – [IP], [I1] – [I7], [UP], [DN], [ECA], [ECB]

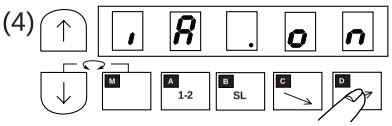
(1) Enter program mode [E] ([↓] + [↑] + [A])

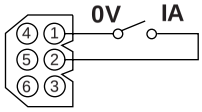
(2) 

* Program mode [E] will be entered.

(3) 

* Select input function to see

(4) 

Option 

* If the display changes from [OF] to [ON] when the input signal is turned ON, the operation is normal.
(This example is checking input signal [IA])
When to check the signals of [UP], [DN], rotate sewing machine shaft and to check the signal of [ECA], [ECB], rotate motor shaft.

(Caution) Be careful to sewing machine operation when turned ON the signal which the sewing machine operation has relation.

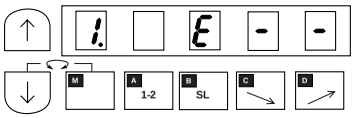
(5) Return to the normal mode ([↓] + [↑])

Description

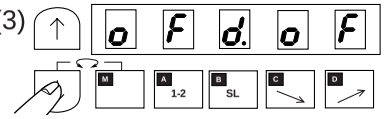
A. It is possible to check whether or not input signal is wired right.
When the display doesn't [ON] even if it turned ON a signal, check wiring to a control box from the signal.
B. The input terminal refer to the explanation of the input/output signal and input function name refer to a C mode input signal setting table.

(3) To check output signal (check in operation)……function setting [OAD]-[OFD], [O1D]-[O7D]

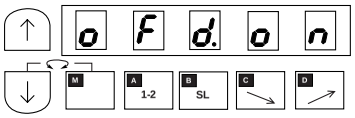
(1) Enter program mode [E] ([↓] + [↑] + [A])

(2) 

* Program mode [E] will be entered.

(3) 

* Select output function to see

(4) 

* Operate that the output terminal turned ON and check display is turned [ON]

(5) Return to the normal mode ([↓] + [↑])

(Caution) Be careful to sewing machine operation when turned ON the signal which the sewing machine operation has relation.

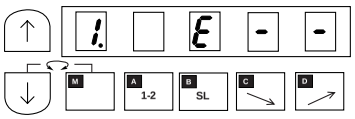
Description

A. It is useful function for check a operation before wiring solenoid.

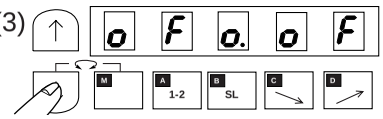
B. The input terminal refer to the explanation of the input/output signal and input function name refer to a C mode input signal setting table.

(4) To check an output terminal
(It is turned ON an output terminal without sewing machine operation ……function setting [OAO]-[OFO], [O1O]-[O7O])

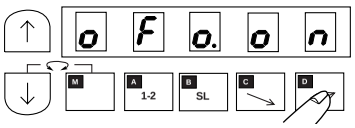
(1) Enter program mode [E] ([↓] + [↑] + [A])

(2) 

* Program mode [E] will be entered.

(3) 

* Select output function to see

(4) 

Output signal is turned ON while pressing the [D] key.

(5) Return to the normal mode ([↓] + [↑])

Note) While displaying this function, sewing machine can not operate.

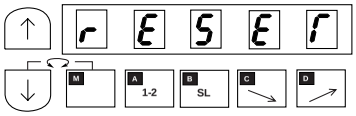
Description

A. It is useful function for check a wiring.

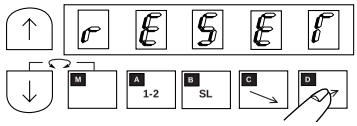
B. The input terminal refer to the explanation of the input/output signal and input function name refer to a C mode input signal setting table.

No.14 To return all setting to the factory settings ……function setting [RESET]

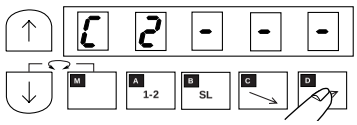
(1) Enter program mode [R] ([↓] + [B] + [C])

(2) 

* Program mode [R] will be entered.

(3) 

* [RESET] will flicker when the [D] key is pressed.

(4) 

* When the [D] key is held down (for two seconds), all settings will be returned to the factory settings.

Description

A. When the normal mode will be entered pressing the [D] key when displayed [RESET], all settings will be returned to the factory settings.

B. To return the normal mode from the [RESET], press the [↓] key while holding down the [↑] key.

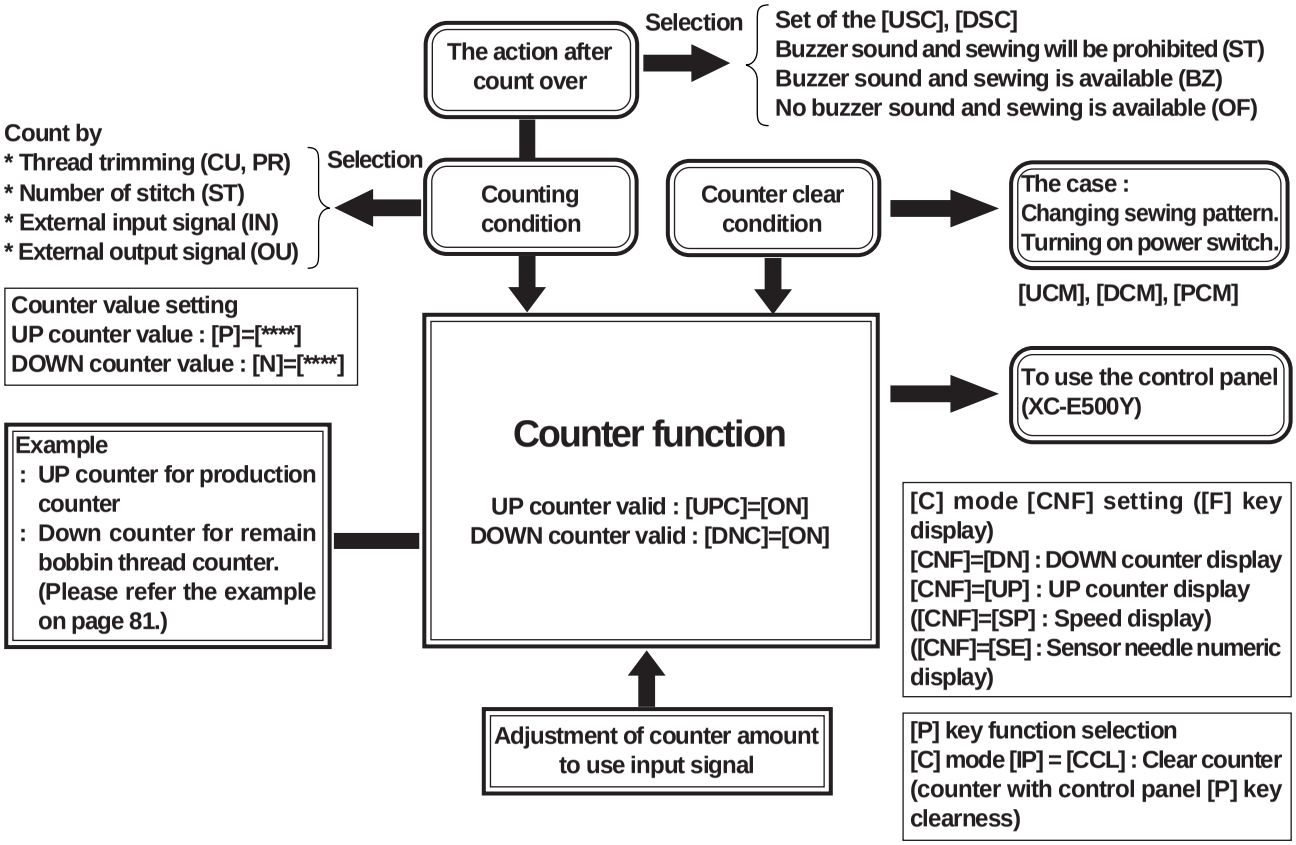
(Caution) When this function is set, the contents of all settings to this point will be cleared, and will return to the factory settings. Please take care when using this function.

11. HOW TO SET COUNTER FUNCTION

1. To use the counter function

(1) The outline of the counter function

By setting a counter function which is shown in the following figure, it is possible to do the operation to want.



(2) Example for counter function

* The counting product amount and bobbin thread are enabled with up and down counter.

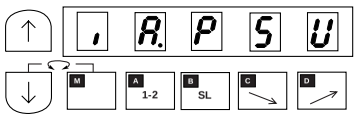
1 UP counter for product amount (one hundred times)

(1) Up counter “U” is add at each thread trimming.

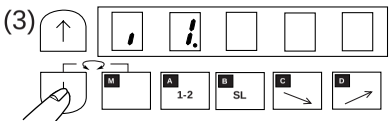
(2) When up counter amount “U” become the setting amount “P”, sewing will be prohibited.

(3) When the input signal “I1” is turned on, Up counter amount become zero and sewing become possible.

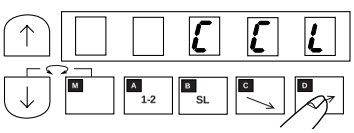
(1) Enter program mode “C” ([↓] + [C])

(2) 

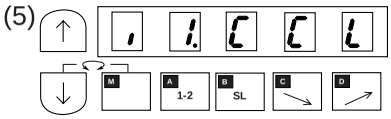
* Program mode [C] will entered.

(3) 

* Set function to [I1]

(4) 

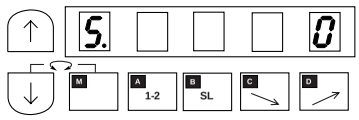
* Set to [CCL]

(5) 

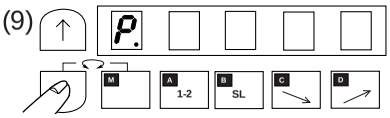
* Complete the [I1] function setting

(6) Return to the normal mode ([↓] + [↑])

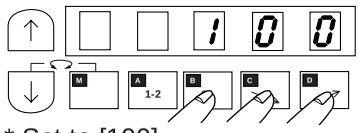
(7) Enter program mode “B” ([↓] + [B])

(8) 

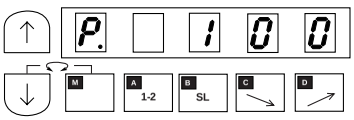
* Program mode [B] will be entered.

(9) 

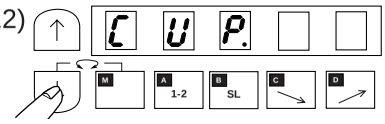
* Set function to [P]

(10) 

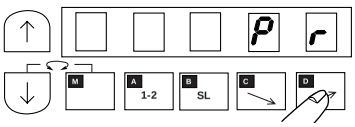
* Set to [100]

(11) 

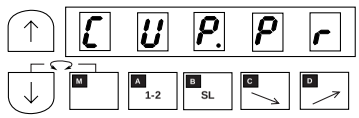
* Complete the [P] function setting

(12) 

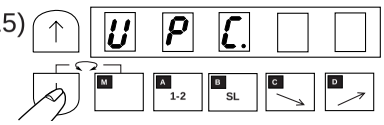
* Set function to [CUP]

(13) 

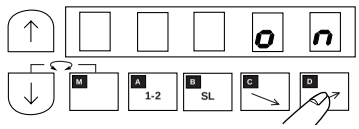
* Set to [PR]

(14) 

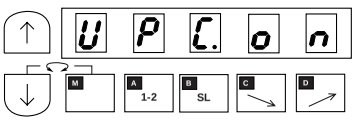
* Complete the [CUP] function setting

(15) 

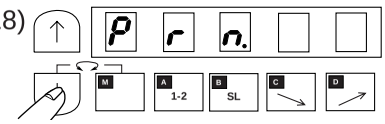
* Set function to [UPC]

(16) 

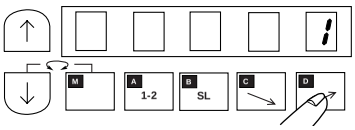
* Set to [ON]

(17) 

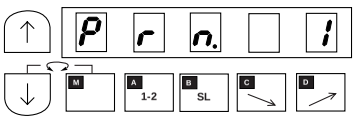
* Complete the [UPC] function setting

(18) 

* Set function to [PRN]

(19) 

* Set to [1]

(20) 

* Complete the [PRN] function setting

(21) Return to the normal mode ([↓] + [↑])

Description

Selection the function on program mode “C”.

[I1,CCL] : Input signal “I1” is set to counter clear function.

Selection the function on program mode “B”.

[P.100] Set the setting amount of up counter “P”. This amount become the target amount for up counter.

* [U.0] Current up counter amount “0”

[CUP.PR] : ”PRN” function is that up counter is added at each trimming time.

(”PRN” is set “1”, up counter is added each trimming time in this example)

* [USC.ST] : When the amount of current up counter “U” become setting amount “P”, sewing will be prohibited

Input signal “I1” is set to the following function. When it is turned on, sewing become possible.

[UPC.ON] Set “UPC” to “ON” to use up counter.

[PRN.1] one trimming time add one count amount.

Mark “ * ” is factory setting.

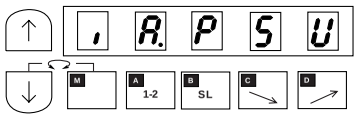
2. Down counter for bobbin remain thread count (10,000 stitches is count over)

[1] Down counter “D” is subtracted at each ten stitches.

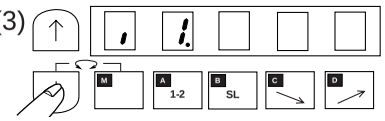
[2] When down counter amount “D” become zero, sewing will be prohibited.

[3] When the input signal “I1” is turned on, Down counter amount become “N” stitch and sewing become possible.

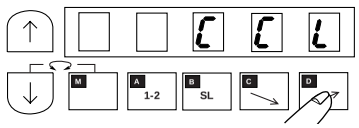
(1) Enter program mode “C” ([↓] + [C])

(2) 

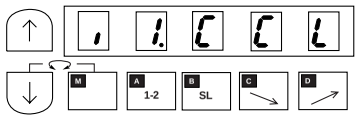
* Program mode “C” will be entered.

(3) 

* Set to “I1”ÅiInput signalÅj

(4) 

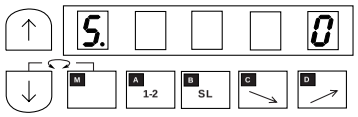
* Set to “CCL” (Input function)

(5) 

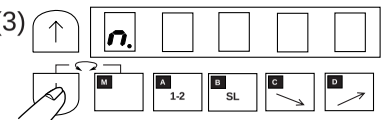
* Complete the “I1” function setting.

(6) Return to the normal mode ([↓] + [↑])

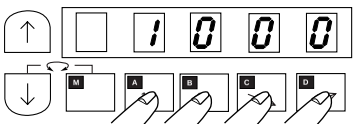
(1) Enter to program mode “B” ([↓] + [B])

(2) 

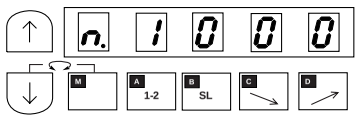
* Program mode “B” will be entered.

(3) 

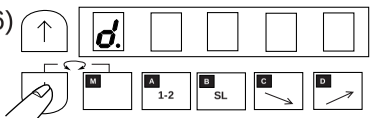
* Set to “N”

(4) 

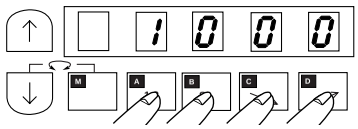
* Set to “1000”

(5) 

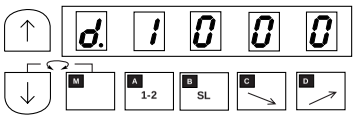
* Complete the “N” function setting.

(6) 

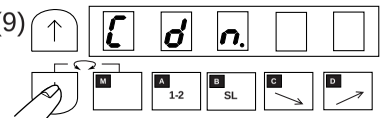
* Set to “D”

(7) 

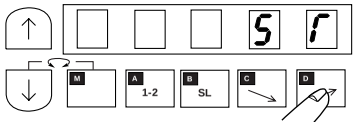
* Set to “1000”

(8) 

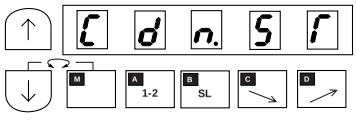
* Complete the “N” function setting

(9) 

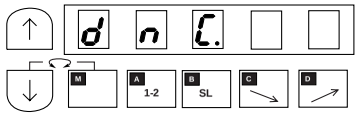
* Set to “CDN”

(10) 

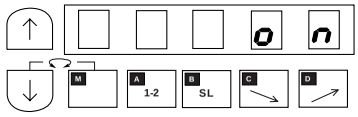
* Set to “ST”

(11) 

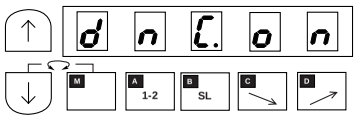
* Complete the “CDN” function setting

(12) 

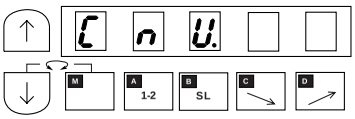
* Set to “DNC”

(13) 

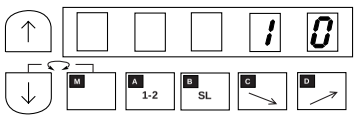
* Set to “ON”

(14) 

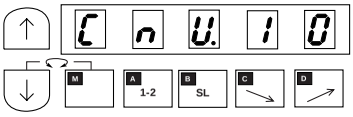
* Complete the “DNC” function setting

(15) 

* Set to “CNU”

(16) 

* Set to “10”

(17) 

* Complete the “CNU” function setting

(18) Return to the normal mode ([↓] + [↑])

Description

Selection the function on program mode “C”.

[I1,CCL] : Input signal “I1” is set to counter clear function.

Selection the function on program mode “B”.

[N.1000] Set the setting amount of up counter “N”. This amount is start amount of down count.

[CDN.ST] : When stitch amount become the amount set by “CNU”, down counter “D” is subtracted one. (”CNU” is set “10”, so down counter is subtracted at each ten stitches in this example)

* [DSC.ST] : When the amount of current down counter become zero, sewing will be prohibited Input signal “I1” is set to the following function. When it is turned on, sewing become possible.

[DNC.ON] Set “DNC” to “ON” to use down counter.

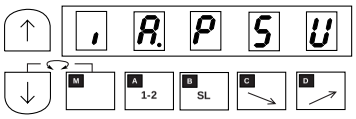
[CNU.10] Ten stitches subtract one count amount.

Mark “ * ” is factory setting.

3. How to Adjust current count amount to use input signal.

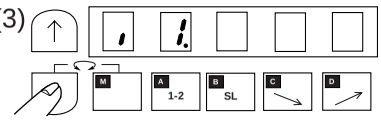
(1) Enter program mode “C” ([↓] + [C])

(2)



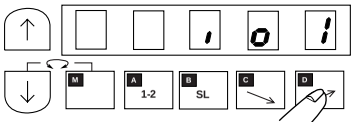
* Program mode “C” will be entered.

(3)



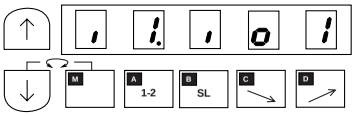
* Set to “I1” (Input signal)

(4)



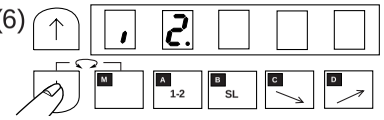
* Set to “IO1”

(5)



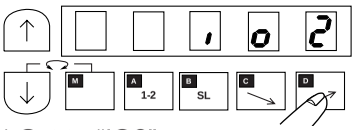
* Complete the “I1” function setting

(6)



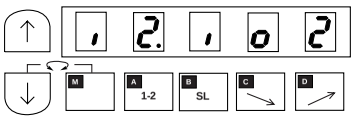
* Set to “I2” (Input signal)

(7)



* Set to “IO2”

(8)

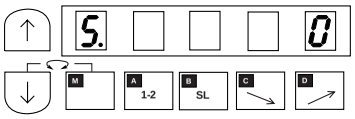


* Complete the “I2” function setting

(9) Return to the normal mode ([↓] + [↑])

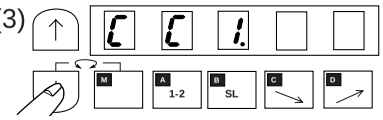
(1) Enter program mode “B” ([↓] + [B])

(2)



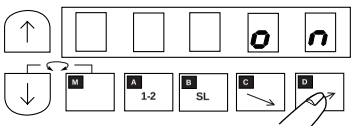
* Program mode “B” will be entered.

(3)



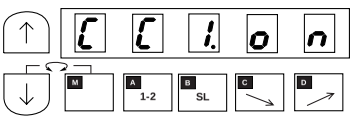
* Set to “CCI”

(4)



* Set to “ON”

(5)



* Complete the “CCI” function setting.

(6) Return to the normal mode ([↓] + [↑])

Description

Selection the function on program mode “C”.

[I1.IO1] Input signal “I1” is set to “IO1” function.

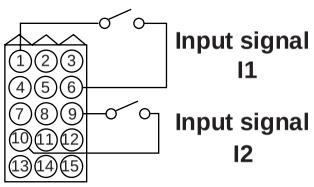
[I2.IO2] Input signal “I2” is set to “IO2” function.

Selection the function on program mode “B”.

[CCL.ON] When input signal “I1” is turned on both counter will be added one amount.

[CCL.ON] When input signal “I2” is turned on both counter will be subtracted one amount.

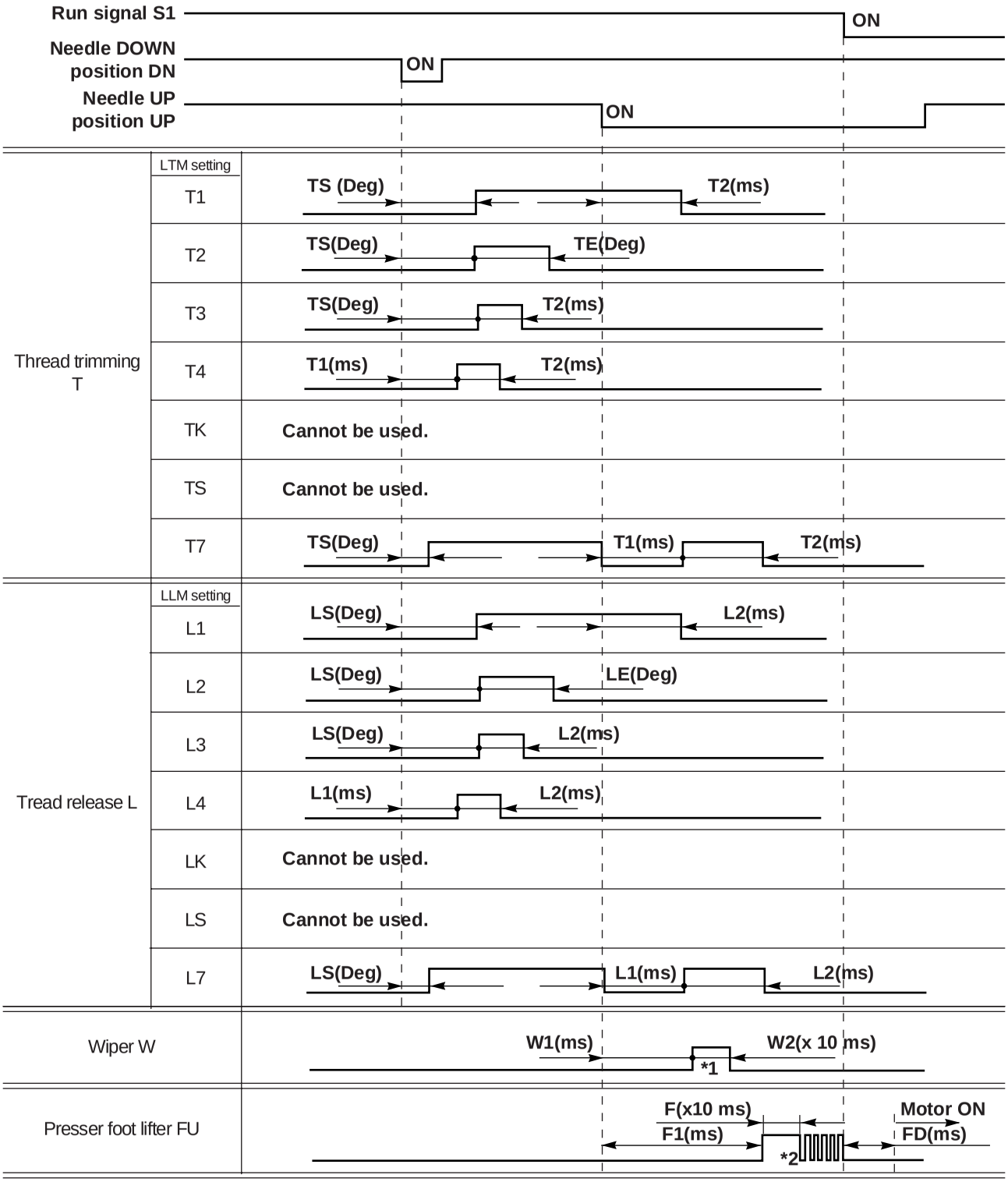
Option B counter



12. SETTING IN THE THREAD TRIMMING MODE TR

1) Thread trimming timing when thread trimming mode TR setting is PRG

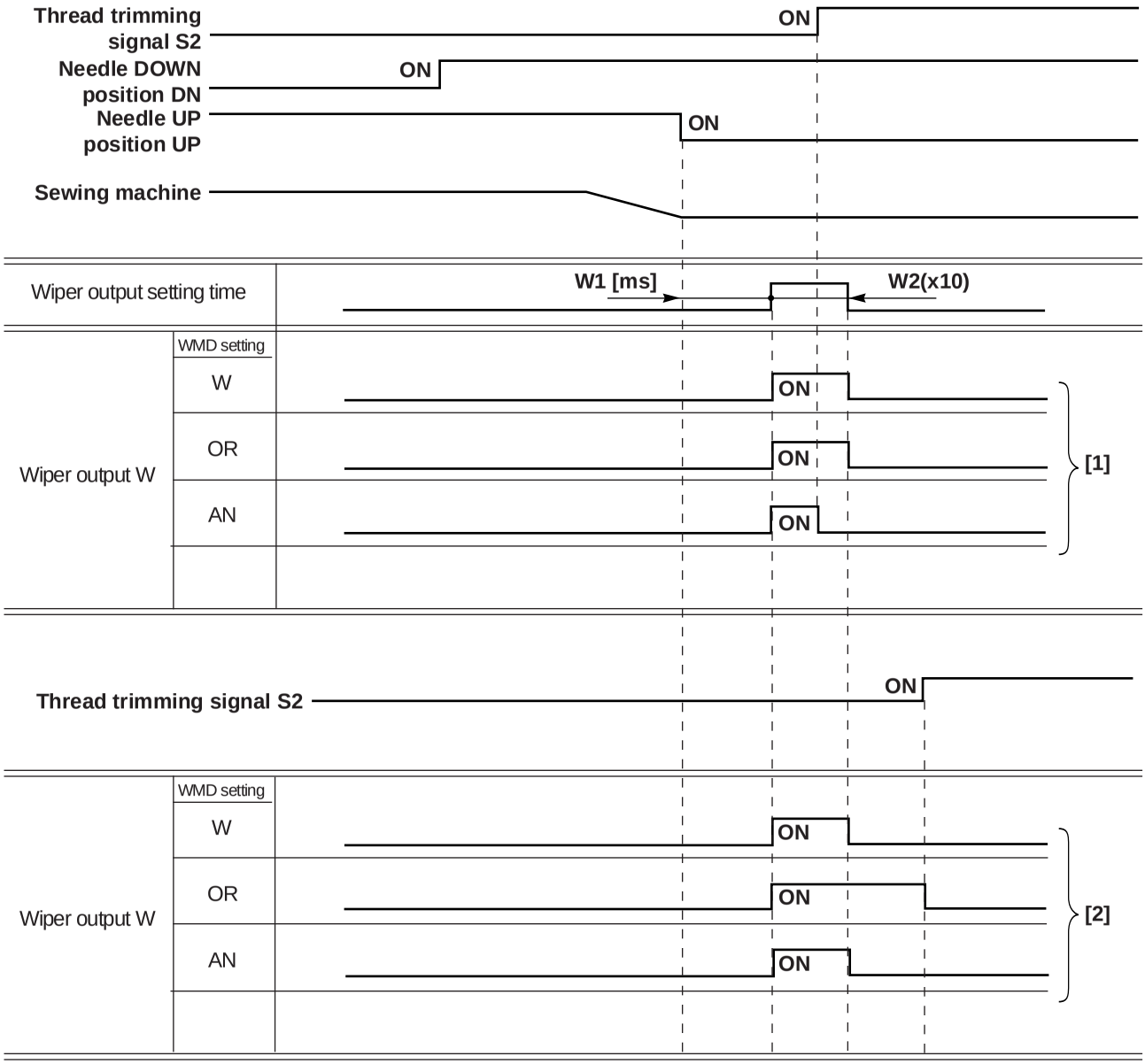
(1) Output timing of thread trimming output



Notes : *1. The wiper output [W] operation will be special according to the G mode WMD setting.
***2. The presser foot lifter [FU] chopping duty can be set with FUD in the P and C mode.**

(2) Wiper output timing

Wiper output OFF timing with (S2) signal WMD (in program mode G) [1]



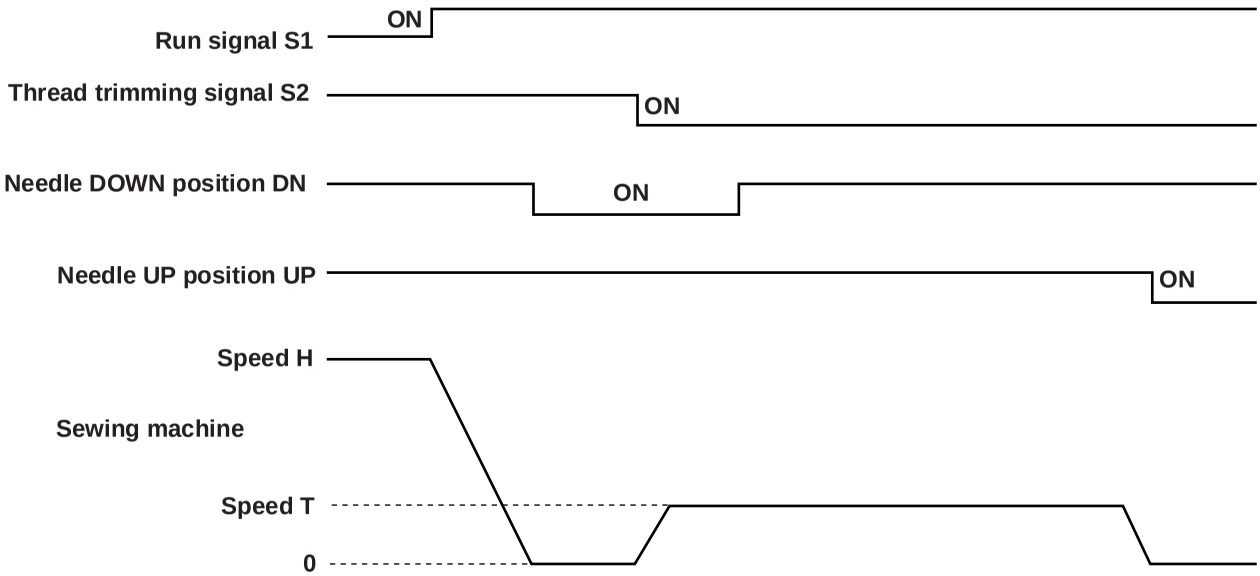
*** Wiper output OFF timing is changed by S2 signal OFF timing like above chart [1] and [2].**

2) Sewing machine motion pattern

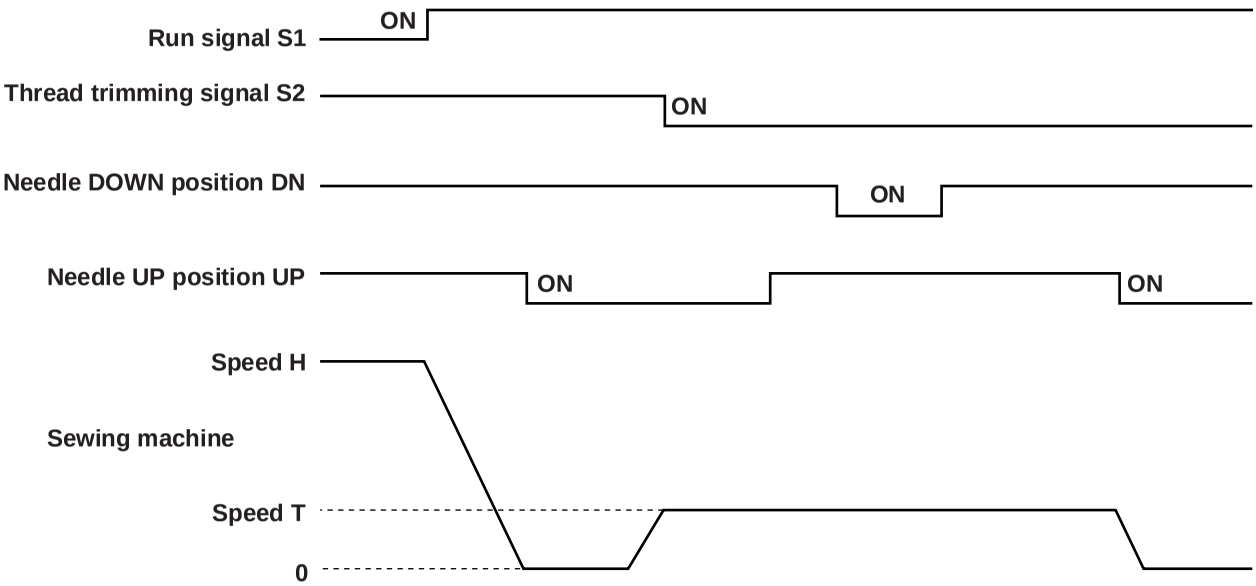
Thread trimming mode [TR] in program mode P or G ……Function setting [TR[PRG]]

(1) Function setting [TRM [LK]] in program mode G

[1] Full-heeling after 2 position stop

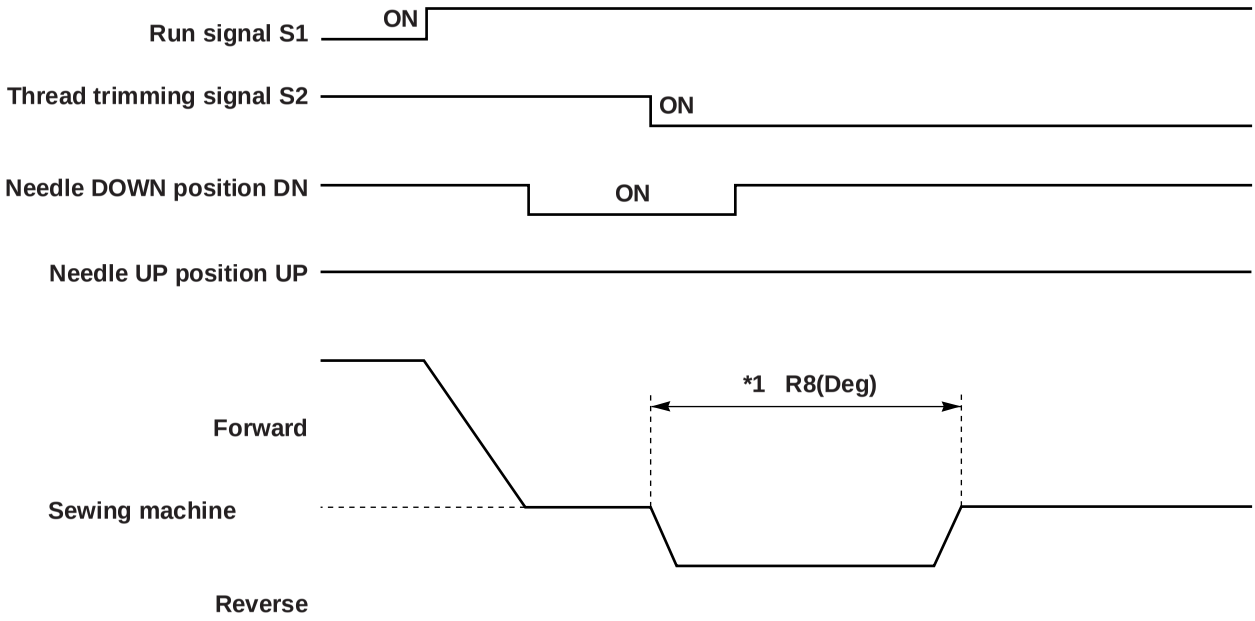


[2]Full-heeling after 1 position stop

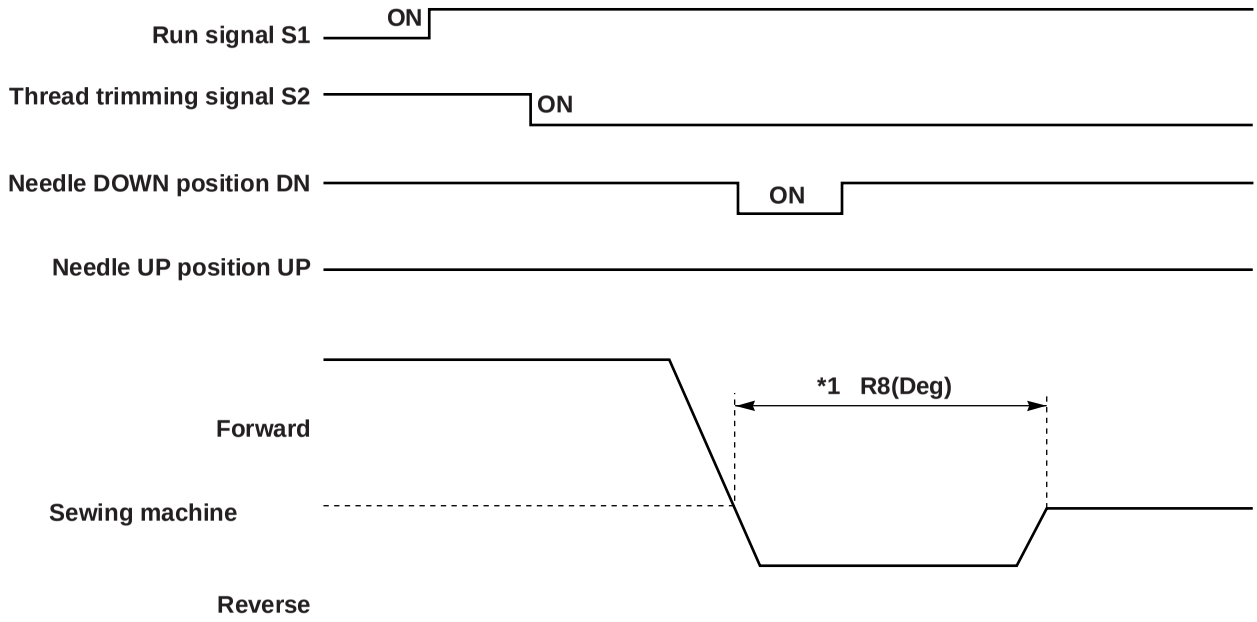


(2) Function setting [TRM [RK]] in program mode G (Function setting [S2R [OF]])

[1] Full-heeling after 2 position stop (Tacking is invalid.)



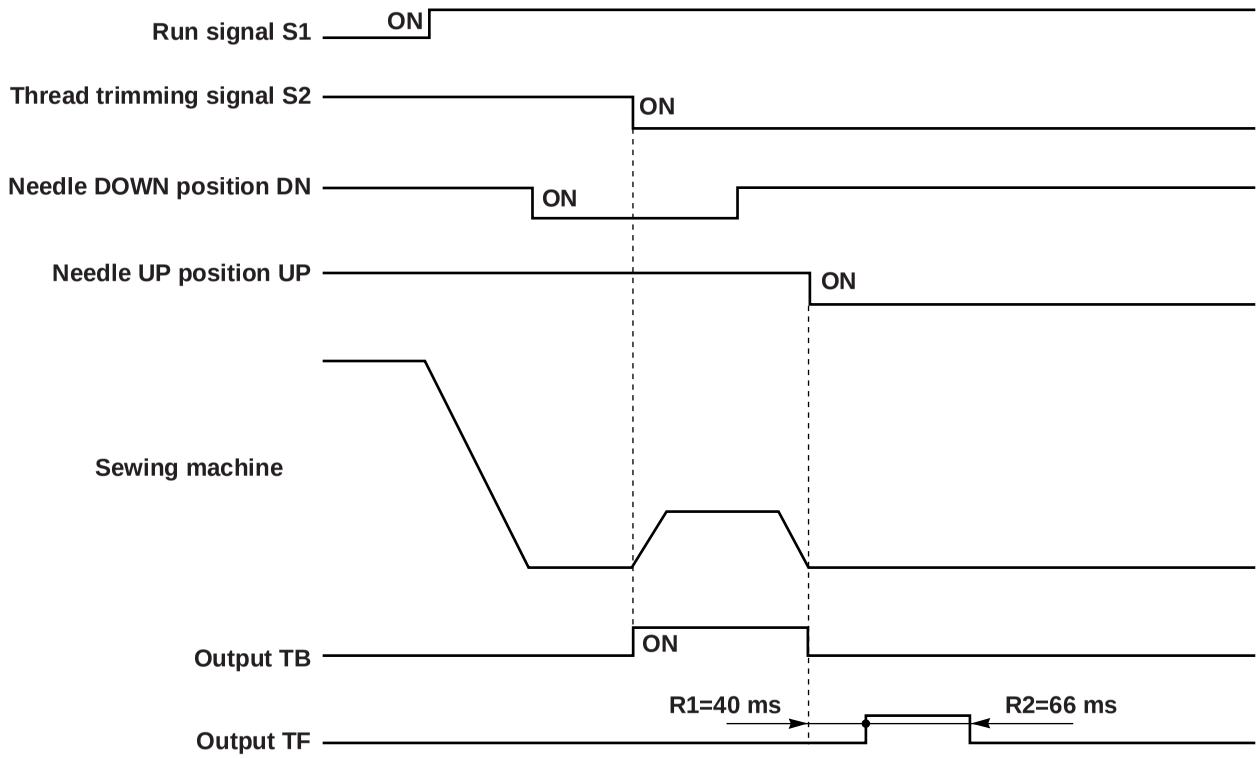
[2] Full-heeling (2 position) (Tacking is invalid)



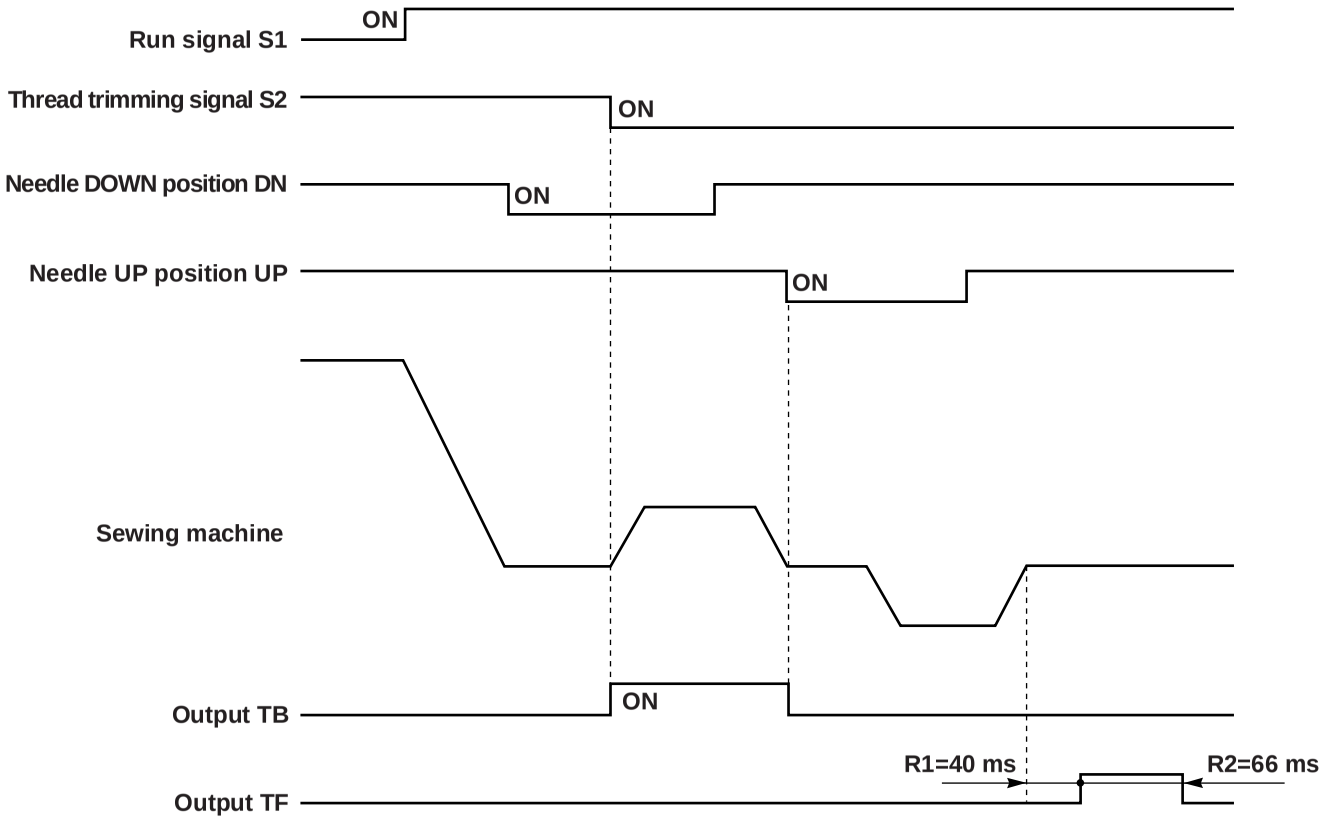
Notes : 1. The same operation as G mode TRM=LK will occur when set to 1 position.
2. The reverse angle can be set with R8 in the P mode. (*1)

13. OUTPUT TF, TB TIMINGS

1) Output normal timing

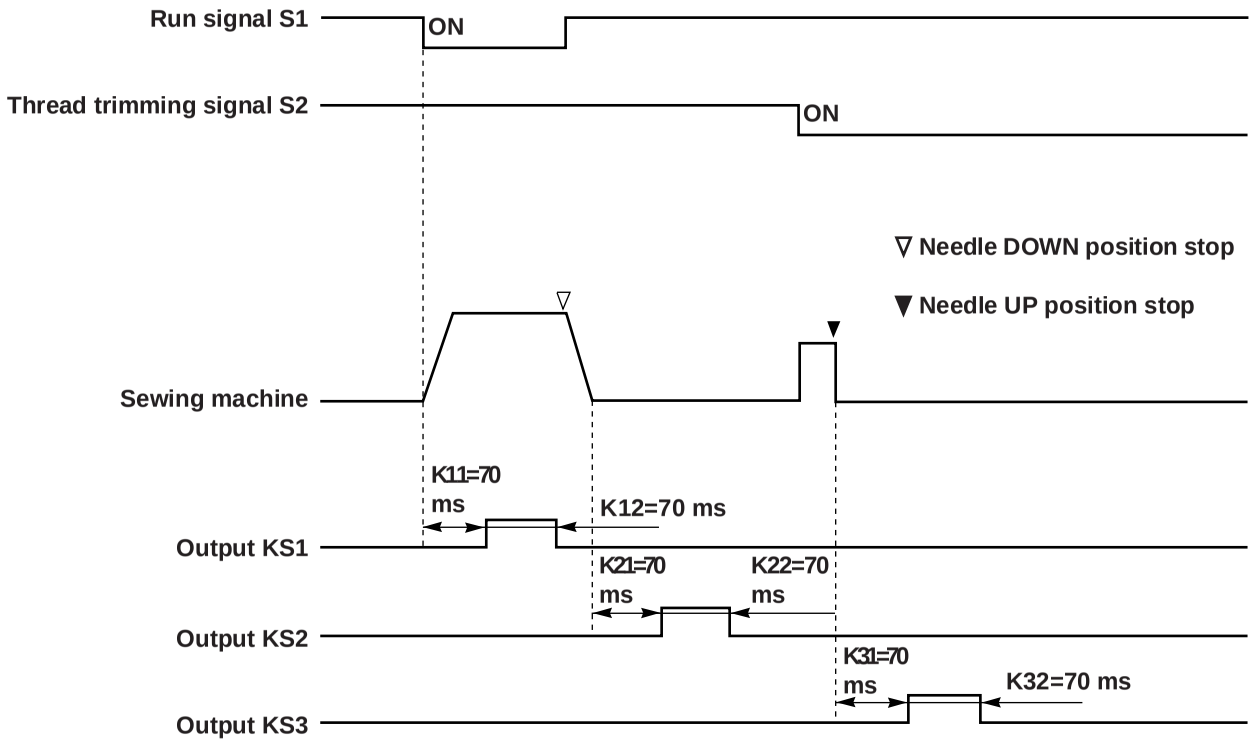


2) Function setting [RU [ON]] in program mode P



Note) 1. The TF output start time can be set with R1 in the G mode.
The TF output time can be set with R2 in the G mode.
2. The above-mentioned timing is function setting [TRM[LK]] in program mode G.

14. OUTPUT KS1,KS2,KS3 TIMINGS



Note) The KS1 to KS3 output start time and output time can be set with K11 to K32 in the S mode.

(Caution) This timing chart (sequence) is only available when [SQS] is set to [NO].
When [SQS] is not set to [NO], please refer to “[15] Simple sequence”.

15. SIMPLE SEQUENCE

The function outputs [KS1], [KS2] and [KS3] can be set as simple sequence outputs.
To set the simple sequence output, the starting conditions [IN] [T] [R] [S] [TR] [SB] [GO] are set in the simple sequence starting condition
Setting function [SQS] of the [S] mode. With this, function outputs [KS1],[KS2] and [KS3] will be simple sequence outputs. (The default setting is the [NO] setting.)

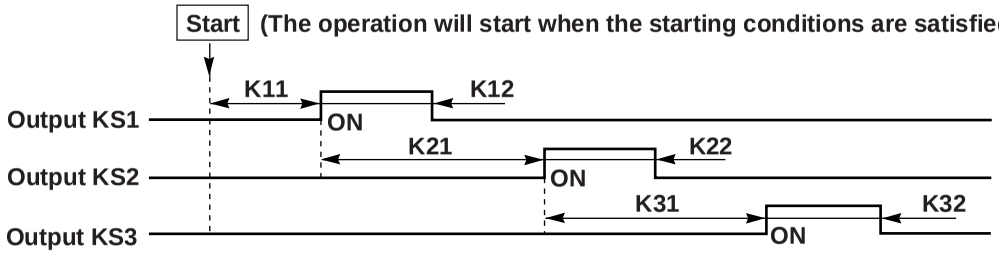
1. Simple sequence starting conditions

The function outputs [KS1],[KS2] and [KS3] can be set as simple sequence outputs.

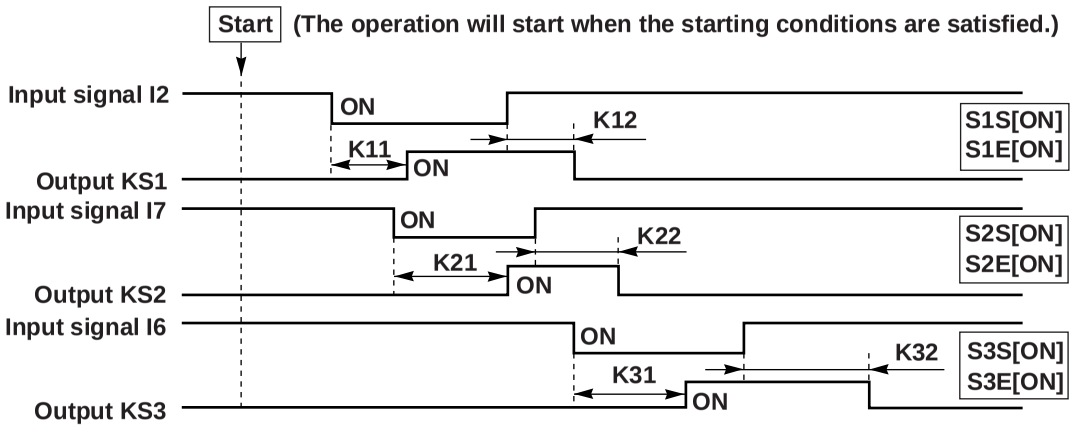
[NO] : The simple sequence is not started. (The default setting is the [NO] setting.)
(Refer to "[18] Output KS1,KS2,KS3 timings".)
[IN] : When input signal I4 (IN4) is turned ON.
[T] : When thread trimming is completed.
[R] : When operation is starting.
[S] : When motor is stopped. (This also includes when single-stitch operation is stopped.)
[TR] : When starting stitching after thread trimming.
[SB] : When start tacking is completed. (This will not start if the start tacking setting is "NO".)
[GO] : Always start.

2. Simple sequence output timing chart

2-1.



2-2.



Explanation of setting function

(a) Sequence output [KS1][KS2][KS3] output start time/No. of stitch setting changeover [NS1][NS2][NS3]
[OF] setting : Time setting ([K11][K21][K31] : 10 msec unit)
[ON] setting : No. of stitch setting ([K11][K21][K31])

(b) Sequence output [KS1][KS2][KS3] output start time/No. of stitch setting changeover [NS1][NS2][NS3]
[OF] setting : Time setting ([K12][K22][K32] : 10 msec unit)
[ON] setting : No. of stitch setting ([K12][K22][K32])

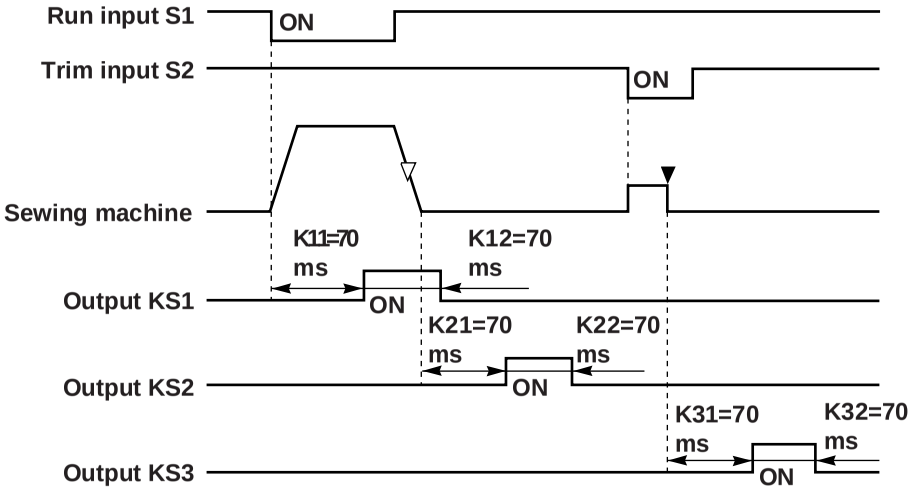
(c) Sequence output [KS1][KS2][KS3] output reference setting [S1S][S2S][S3S]
[OF] setting : The output start reference will be as shown in the timing chart[2-1]above.
[ON] setting : The output start reference will be the input signal ON reference as shown in the timing chart[2-2] above

(d) Sequence output [KS1][KS2][KS3] output reference setting [S1E][S2E][S3E]
[OF] setting : The output end reference will be as shown in the timing chart [2-1] above.
[ON] setting : The output end reference will be the input signal ON reference as shown in the timing chart [2-2] above

Note) 1. When using the simple sequence make each simple sequence related setting shown above, and assign the function output [KS1][KS2][KS3] to the output setting of the output pin being used by setting the C mode output function.
2. If the starting conditions are not set in the simple sequence setting starting condition setting [SQS] above (when [NO] is set), the function output [KS1][KS2][KS3] will have the output timing shown on the next page.

3. When starting condition setting [SQS] is [NO] (default setting)

Output timing of output [KS1] [KS2] [KS3]

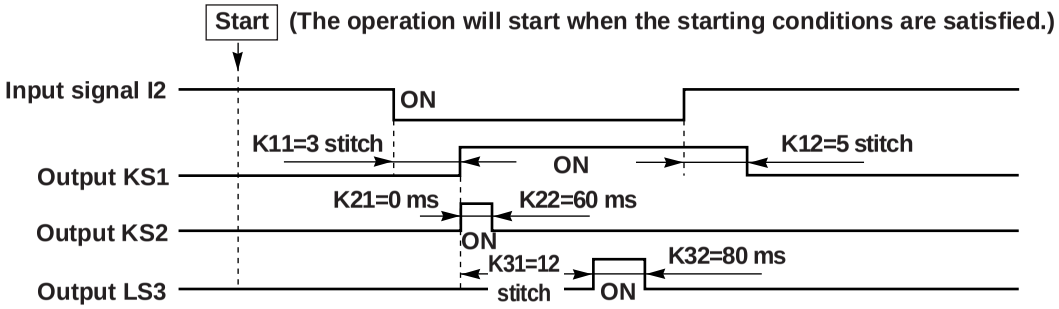


[KS1] : Output for [K12] after the [K11] time after the motor starts rotating.
[KS2] : Output for [K22] after the [K21] time after the motor stops.
[KS3] : Output for [K32] after the [K31] after thread trimming (or needle lift) stop by pedal heeling.

Note) 1. The output [KS1] [KS2] [KS3] output start time and output time can be adjusted with [K11] [K32] in the [S] mode.

4. Example of simple sequence setting

When the following timing output is to be output to the option B connector's No.3 pin,No.12 pin and No.15 pin. [OUT1][OUT2][OUT3]



Setting

1. Function setting of [C] mode

(1) Output function setting	O1 KS1	O2 KS2	O3 KS3
(2) Input function setting	I2 IO1		

2. Function setting of [S] mode

(1) Simple sequence starting condition setting	SQS T	
(2) KS1 output's output start time/No. of stitch setting changeover	NS1 ON	
(3) KS1 output's output time/No. of stitch setting changeover	NE1 ON	
(4) KS1 output's output start reference setting	S1S ON	
(5) KS1 output's output end reference setting	S1E ON	
(6) KS2 output's output start time/No. of stitch setting changeover	NS2 OF	
(7) KS2 output's output time/No. of stitch setting changeover	NE2 OF	
(8) KS2 output's output start reference setting	S2S OF	
(9) KS2 output's output end reference setting	S2E OF	
(10) KS3 output's output start time/No. of stitch setting changeover	NS3 ON	
(11) KS3 output's output time/No. of stitch setting changeover	NE3 OF	
(12) KS3 output's output start reference setting	S3S OF	
(13) KS3 output's output end reference setting	S3E OF	
(14) KS1 output's output start No. of stitches * output No. of stitches setting	K11 3	K12 3
(15) KS2 output's output start time * output time	K21 0	K22 6
(16) KS3 output's output start No. of stitches * output time	K31 12	K32 8

16. COMMUNICATION FUNCTION

Specification	
Connector	Mini-DIN connector 6-pin
Signal level	Doing based of RS-232C
Baud rate	9600 bps
Operation mode	Asyncrouns
Start bit	1 bit
Data length	8 bit
Parity	none
Stop bit	1 bit
Record format	Original
Function	The reading with various multiple time and various counter-value

1. About the communication

When communication among the equipment, it becomes the method which returns the reply by receiving a direction by this product.

Equipment (being computers such as the personal computer in this communication function) on the side which issues this direction is called a parent machine and equipment

(being SC-380 form control board in this communication function)

The child machine sends an answer only to the inquiry from the parent machine.

For example, when wanting to take out data continuously, it makes require repeat data on the side of the parent machine. The form of the data, the electric characteristic, the communication protocol and so on must be each other adjusted, to communicate difference machine.

1-1. The electric characteristic

It defines the definition of the voltage level and High/Low of the signal, the airlines of the communication and so on. This communication function is based on RS-232C which are an international standard, the parent machine which has to do RS-232C or of RS-232C display and based a can be connected with.

1-2. The communication procedure (protocol)

The protocol to be using for this communication function is the original method of the SC-380. Because this protocol can not be changed, make a program to agree with this protocol on the side of the parent machine.

2. Wiring

2-1. The pin arrangement by the connector

Connector H

Pin number	Signal name	I/O	The use
1	RXD	I	Receive data
2	–		No use
3	TXD	O	Send data
4	COM		Control common
5	+12 V		Power supply
6	–		No use
Peripheral plate	FG		Grounding for the shield

2-2. The manufacturing of the data

It makes the wiring figure of the following figure reference and manufacture machine.

a cable and connect a child machine and a parent

Parent side		Child side
Signal name	Contents	Signal name
FG	Ground	RXD
—	—	—
—	—	TXD
TXD	Send data	COM
RXD	Receive data	+12 V
COM	Common for the signal	—
—	—	FG

Note : Please be careful because the pin number to the signal and so on depend on the computer.

2-3. The attention item in case of wiring

(1) Please use a numerous wick cable with the shield and the shield connect with FG surely.

(2) The wiring distance depend on the environment around but use at the distance which is as short as possible.

3. The basic procedure

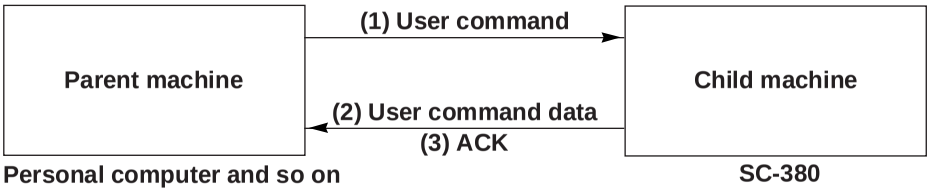
3-1. Commands

Transmitting a user command to the child machine from the parent machine.

It is answered that it does ACK to these all transmissions of it. (Note 1)

Note) 1. As for the partial command, the data which it was answered that it does and input condition itself become ACK. And all data transfer is used by ASCII code.

3-2. The sending and receiving of the various command.



3-2-1. User command (Parent machine → Child machine)

It manufactures optional data and it answers when receiving data.

(1) 9-byte fixation

?	Command	Check sum	CR	LF
1	4	2	1	1

?	Start code	
Command	Command	
	“SYSV”	Answer the version of the system.
	“DATV”	Answer the version of the EEPROM data.
	“TYPE”	Answer the type.
	“ **** ”	Command (Refer to the command list)
Check sum	Add ASCII code of user command and invert all bit (refer note 1)	
CR + LF	End code	

Answer of the data (Child machine → Parent machine)

(2) 13-byte fixation

#	Command	Data	Check sum	CR	LF
1	4	4	2	1	1

#	Start code
Command	Received command (echo)
Data	Data which corresponded to the command
Check sum	Add ASCII code of user command and Data and invert all bit (refer note)
CR + LF	End code

At the time of the reception error, following ACK is returned.
Answer of ACK (Child machine → Parent machine)

(3) 13-byte fixation

#	E**	No used	Check sum	CR	LF
1	4	4	2	1	1

#	Start code	
E***	E000	Normal end
	E001	Recode type error
	E002	Check sum error
No used	Unsettled	
Check sum	Add ASCII code of user command and invert all bit (refer note 1)	
CR + LF	End code	

Note) 1. For example to make check sum of (13-byte fixation command "type") *refer 4-1. The user command 1.

1) "type" ASCII code is 54,59,50.45.
2) Add ASCII code. (54+59+50+45=142)
3) It uses 2 digits below for the computation. (use 42 of 142)
   It uses 42 out of 142.
4) Invert all bit of 42. (Again, it hangs reduction 1 and it adds up 1.)
   The result which inverted all bit of 42 is BD.
5) The check sum is BD The check sum is BD.

4. The communication command list

4-1. The user command 1 (Permitted to data clear)

Command	Contents	Form of the answer data
PPWH	Integrating power supply time1 (upper 1 word)	Numerical value
PPWL	Integrating power supply time2 (lower 1 word)	Numerical value
PMTH	Integrating motor ON time1 (upper 1 word)	Numerical value
PMTL	Integrating motor ON time2 (lower 1 word)	Numerical value
PSTH	Integrating needle stitches1 (upper 1 word)	Numerical value
PSTL	Integrating needle stitches2 (lower 1 word)	Numerical value
PFUH	Full speed time1 (upper 1 word)	Numerical value
PFUL	Full speed time2 (lower 1 word)	Numerical value
PTRM	Thread trimming the number of times	Numerical value
TPWH	Integrating power supply time 1 (upper 1 word)	Numerical value
TPWL	Integrating power supply time 2 (lower 1 word)	Numerical value
TMTH	Integrating motor ON time 1 (upper 1 word)	Numerical value
TMTL	Integrating motor ON time 2 (lower 1 word)	Numerical value
TSTH	Integrating needle stitches 1 (upper 1 word)	Numerical value
TSTL	Integrating needle stitches 2 (lower 1 word)	Numerical value
FULH	Full speed time 1 (upper 1 word)	Numerical value
FULL	FULL Full speed time 2 (lower 1 word)	Numerical value
TTRM	Thread trimming the number of times	Numerical value
TCYC	Number of the integrating cycles (UP CONTER)	Numerical value

Command	Contents	Form of the answer data
EROR	Error code	Numerical value (Only subordinate position 15 bit is used). 9 : Solenoid overcurrent 8 : Detector error 6 : Noise error 5 : EEPROM error 4 : Motor connector omission 3 : Encoder error. Motor, sewing machine lock error 2 : Over voltage 1 : Transistor module error
ERR1	Error code Once ahead	
ERR2	Error code Twice ahead	
ERR3	Error code Three times ahead	
ERR4	Error code Four times ahead	
ERNW	In the error	FFFF (YES) 0000 (NO)
PAT.	Pattern number	Numerical value
USET	UP counter setting value	Numerical value
UCNT	UP counter value	Numerical value
DSET	DOWN counter setting value	Numerical value
DCNT	DOWN counter value	Numerical value
UPCT	UP counter ON/OFF	FFFF (YES) 0000 (NO)
DPCT	DOWN counter ON/OFF	FFFF (YES) 0000 (NO)
SPDD	Setting speed	Numerical value
OSAE	Condition of the presser foot lift	FFFF (Presser foot OFF) 0000 (Presser foot ON)
THRE	Thread break detector ON/OFF	FFFF (YES) 0000 (NO)
BOX_	Control panel (Connected/none)	FFFF (Connected) 0000 (none)
MOVE	In sewing	FFFF (YES) 0000 (NO)
SRV_	The principal axis number of rotations	Numerical value
UTYP	Present count UP way	Only subordinate position 4 bit is used. ***0 The number of trimming times become “1” ***1 The number of sewing stitch become “N” (Function setting [CUN.] in program mode B) ***2 The number of trimming times become “N” (Function setting [PRN.] in program mode B) ***3 When input function “IO1” become ON. ***4 When output function “O1” become ON. Note : *** is irregular.
DTYP	Present count DOWN way	Only subordinate position 4 bit is used. ***0 The number of trimming times become “1” ***1 The number of sewing stitch become “N” (Function setting [CUN.] in program mode B) ***2 The number of trimming times become “N” (Function setting [PRN.] in program mode B) ***3 When input function “IO1” become ON. ***4 When output function “O1” become ON. Note : *** is irregular.
WT_	Watt	
VOLT	Voltage	
TYPE	Swing machine type	
SYSV	Version of the system	Numerical value
DATV	Version of the data	Numerical value (Only subordinate position 12 bit is used.)

4-2. User data command 2 (Data clear command)

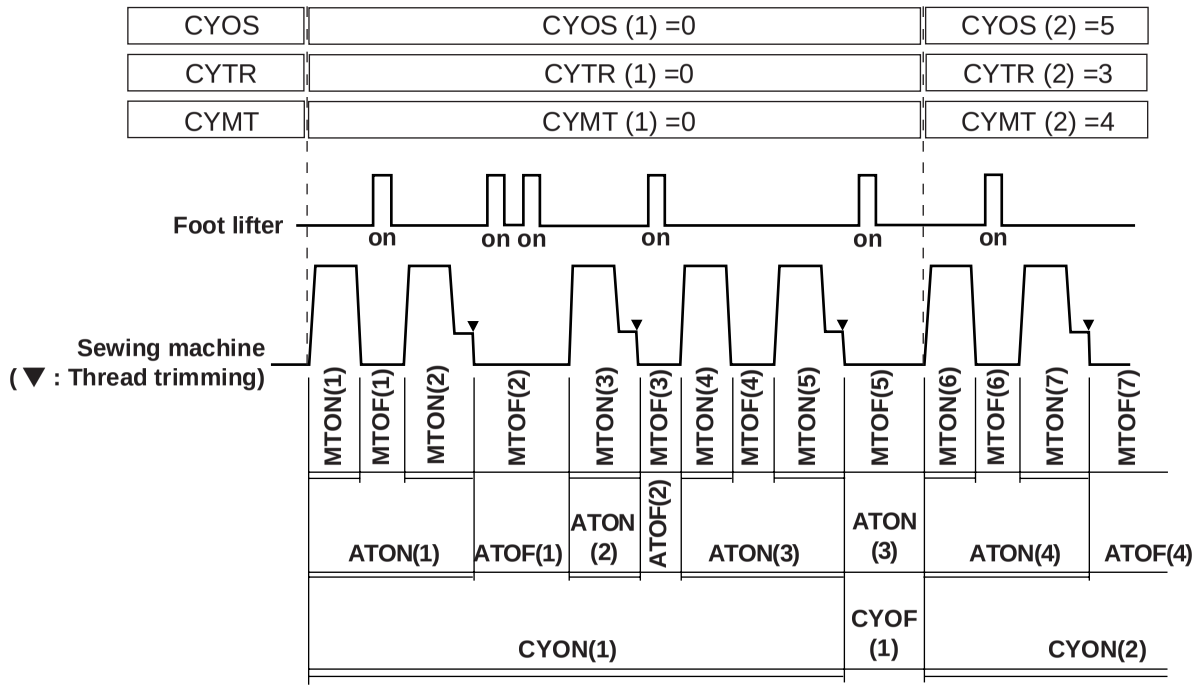
Command	Contents	Form of the answer data
PPCL	Integrating power supply time clear	Data which can be cleared becomes 0.
PMCL	Integrating motor ON time clear	Data which can be cleared becomes 0.
PSCL	Integrating needle stitches clear	Data which can be cleared becomes 0.
PFCL	Full speed time clear	Data which can be cleared becomes 0.
PTCL	Integrating needle stitches clear	Data which can be cleared becomes 0.
PCCL	Number of the integrating cycles clear	Data which can be cleared becomes 0.

4-3. User command 3

Command	Contents	Form of the answer data
MTON	Motor ON time	Numerical value
MTOF	Motor OFF time	Numerical value
ATON	Idle time after the thread trimming	Numerical value
ATOF	The integrating time to the thread trimming	Numerical value
CYON	Idle time after the one cycle	Numerical value
CYOF	One cycle time	Numerical value
CYOS	One-cycle foot lifting frequency (multiplication)	Numerical value
CYTR	One-cycle thread trimming frequency (multiplication)	Numerical value
CYMT	One-cycle motor stop frequency (multiplication)	Numerical value

(Caution) 3 BIT of the place is the order.
13 BIT of the subordinate position is time (unit of 0.1 s) or frequency.

(Reference chart 1)



17. HOW TO CHANGE VOLTAGE OF PANEL CONNECTOR AND SOLENOID RETURN SPEED

1. To change Solenoid voltage 24 V/30 V. (Refer to page 13.)

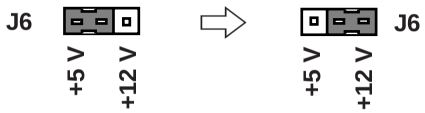
2. How to change the output voltage DC5 V/12 V

(1) Remove the cover.

(2) The DC5 V/12 V can be changed with the J2, J6,J7,J10 and J11 connector on the printed circuit board on the cover side as shown next page.

(3) This is set to 12 V when shipped from the factory. To change from 5 V to 12 V, pull out the connector and reinsert it into the 5 V side.

This is set to 5 V when shipped from the factory. To change from 12 V to 5 V, pull out the connector and reinsert it into the 12 V side.



(4) The power supply (+12 V) voltage will change form 12 V to 5 V by changing the J10 connector from 12 V to 5 V.

Position detector

0 V	1
—	2
Ground	3
UP	4
DOWN	5
+12 V/ (+5 V)	6

…12 V = = > 5 V

(5) The power supply (+12 V) voltage will change form 12 V to 5 V by changing the J11 connector from 12 V to 5 V. (When wanting to make change gears of the sewing machine possibly at variable speed command of 5 V, set the setting value of pedal curve function setting <PDC> by the A mode.)

Lever (white connector)

0 V	1
S1 : Run (Variable speed)	2
S2 : Tread trimming	3
S3 : Presser foot lifte	4
VC : Variable speed command	5
+12 V	6

…12 V = = > 5 V

(6) The power supply (+12 V) voltage will change form 12 V to 5 V by changing the J7 connector from 12 V to 5 V.

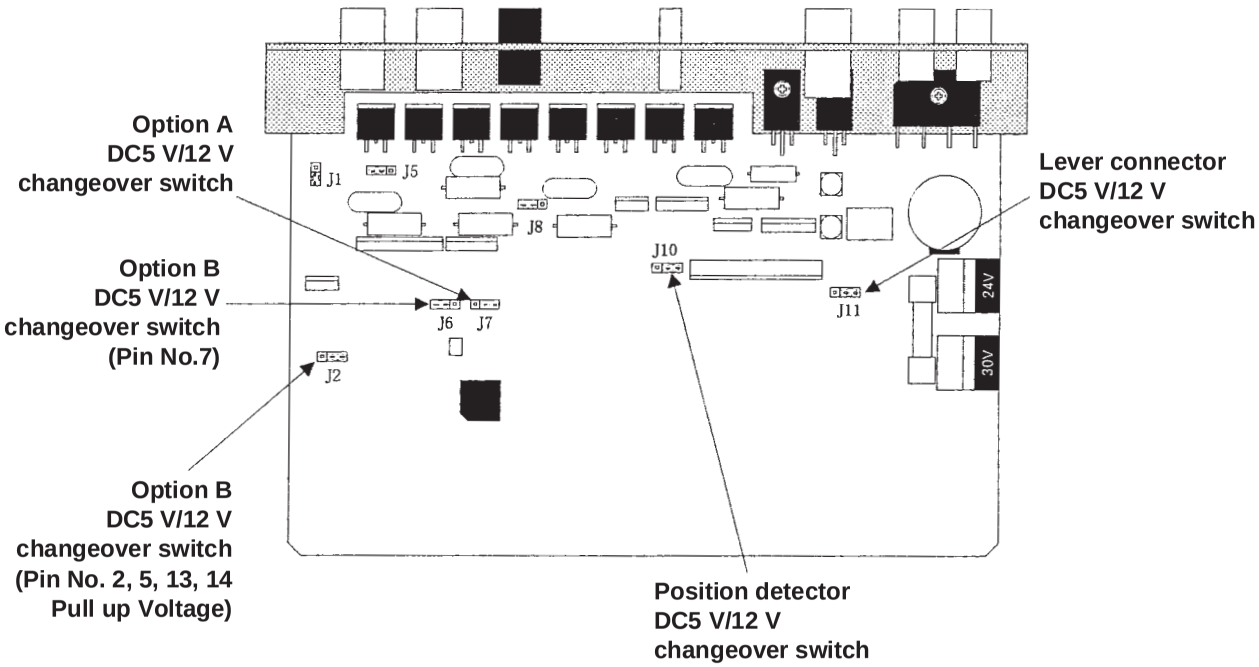
Option A

0 V	1	
PSU : Up position stop input	2	
+12 V	3	…12 V = = > 5 V
PSD : Down position stop input	4	
CKU : Up position output	5	…12 V = = > 5 V
S0 : Low speed input	6	

(7) The output of pin number 2, 5,13,14 will change from 12 V to 5 V by changing the J2 connector from 12 V to 5 V, also the power supply (+5 V : Pin number 7) voltage will change form 5 V to 12 V by changing the J6 connector from 5 V to 12 V.

Option B

0 V	1	
No setting	2	...12 V = = > 5 V
OT1 : Virtual output	3	
VC2 : Variable speed command	4	
No setting	5	...12 V = = > 5 V
IO1 : Virtual input	6	
+5 V	7	...5 V = = > 12 V
+30 V	8	
U : Needle lift signal	9	
0 V	10	
+30 V	11	
NCL : Needle cooler output	12	
No setting	13	...12 V = = > 5 V
No setting	14	...12 V = = > 5 V
TF : "TF" output	15	



3. How to set the switch for increasing the solenoid return speed.

(1) Remove the cover.

(2) The solenoid return speed can be increased with the setting of the J1, J5, J8 connector on the printed circuit board on the cover side as shown on the last page.

(3) Connector factory settings and solenoid return

Connector	Connector factory setting	Output during simple setting	Solenoid return	Output
J1	FAST	Sewing machine connector I1-I2 pin output.	Normal	OC
J5	SLOW	Sewing machine connector 3-4 pin output.	Normal	OA
J8	SLOW	Sewing machine connector 7-8 pin output.	Normal	OD

(4) Set the connector setting from SLOW to FAST increase the solenoid return speed.

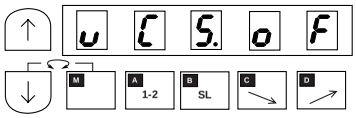
(Caution) The solenoid return cannot be increased if solenoid output chopping duty OAC, ODC, and O3C is return ON in the program mode [C].
The resistance on the printed circuit board will be burnt out if the solenoid return speed is increased.
If "UNION SPECIAL" [UN1], [UN2] and [UN3] are set in program mode [2], always use J1 and J8 set at SLOW (solenoid return is normal), J5 set at FAST (solenoid return is fast).

18. HOW TO SET THREAD BREAK DETECTOR

1. Setting Thread break detector function

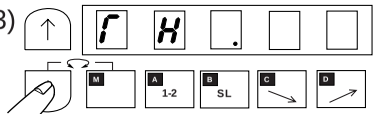
(1) Set to program mode “Q” ([↓] + [A] + [C])

(2)



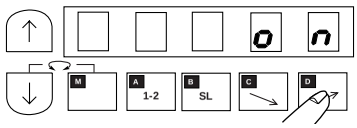
* Program mode “Q” will be entered.

(3)



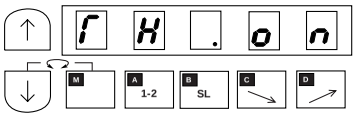
* Set to “TH”

(4)



* Set to “ON”

(5)

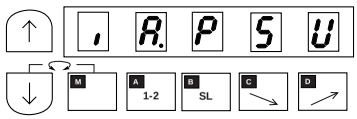


* Complete the “TH” function setting.

(6) Return to normal mode ([↓] + [↑])

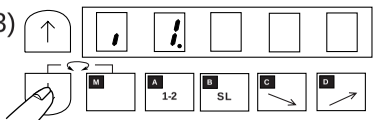
(1) Set to program mode “C” ([↓] + [C])

(2)



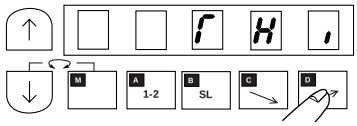
* Program mode “C” will be entered.

(3)



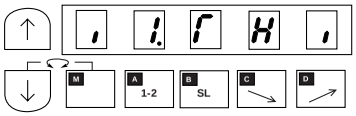
* Set to “I1”

(4)



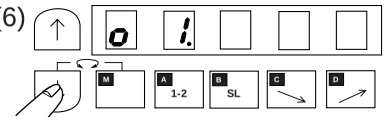
* Set to “THI”

(5)



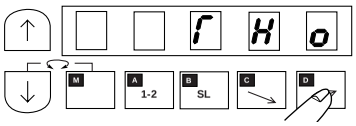
* Complete the “I1” function setting.

(6)



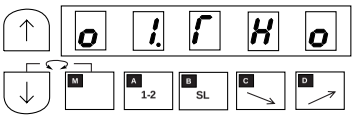
* Set to “O1”

(7)



* Set to “THO”

(8)



* Complete the “O1” function setting.

(9) Return to normal mode ([↓] + [↑])

Description

Selection the function on program mode “Q”.

[TH.ON] To use upper thread break detector function, set to “ON”

[TH.OFF] Upper thread break detector function is invalid.

[TST]	Setting the action, after thread was broken.
[NO.]	“THO” output function become on and continue to sew.
[TR.]	“THO” output function become on and trimming thread.
[ST.]	“THO” output function become on and sewing machine will be stooped. * When the sewing machine run,”THO” output will be clear.
[B.]	To set the speed neglect thread break function. When sewing machine rotation speed become under this speed, it neglect thread break function.
[THS.]	[B.] Setting the neglecting stitch amount from first stitch.
[THF]	Setting the judgment stitch amount of thread break.

Selection the function on program mode “C”.

[I1.THI]	No.6 pin of option connector B will be set to thread break input function.
[O1.THO]	No.3 pin of option connector B will be set to thread break output function.

2. Timing chart of thread break input and output.

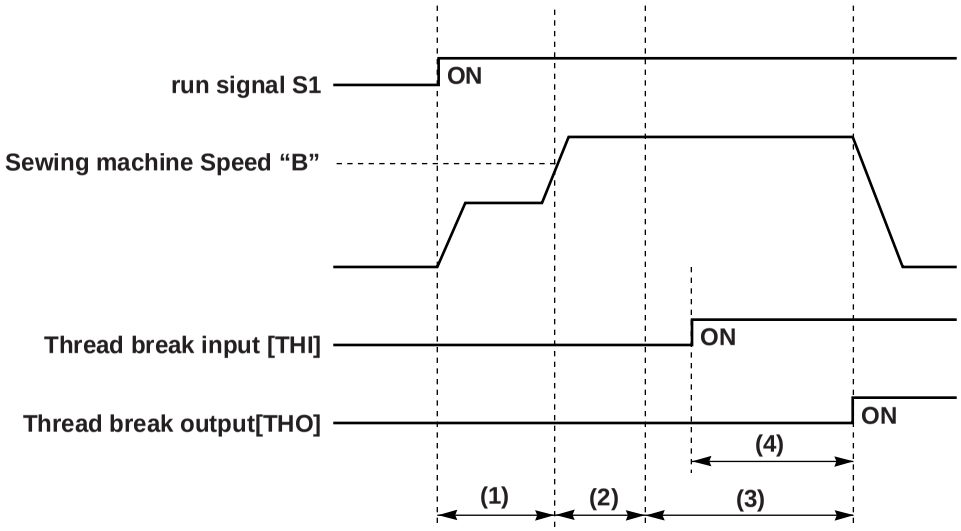


Fig 1 Timing chart

Term (1) : Sewing machine speed is under “B” speed, so it neglect thread break function.

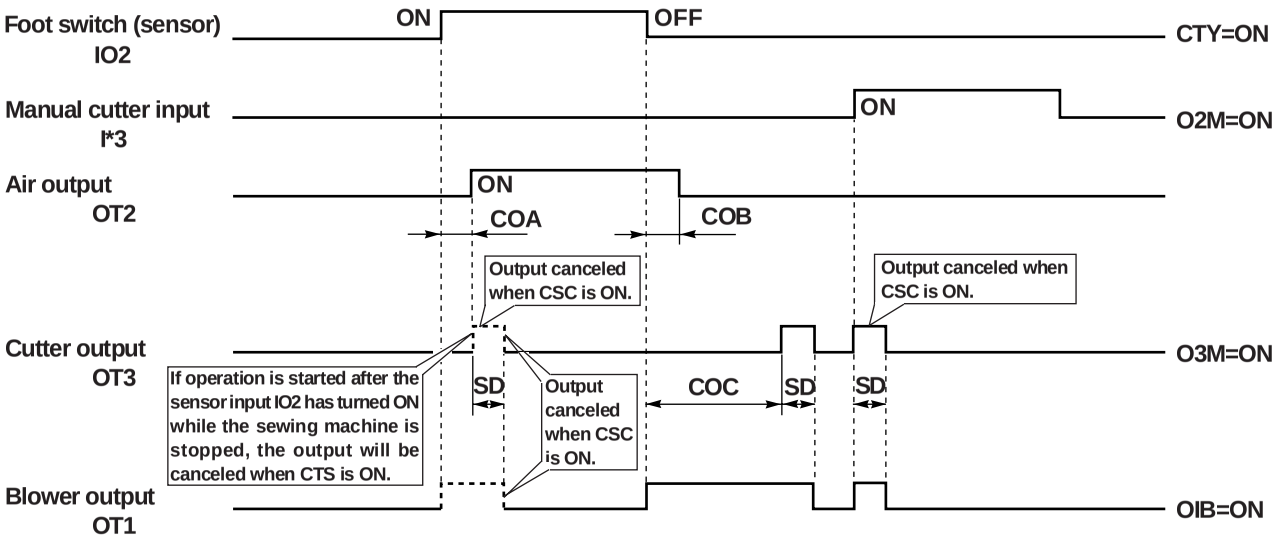
Term (2) : After sewing machine speed become over “B” speed,still under “THS” stitch amount, so it neglect thread break function.

Term (3) : Thread break function is valid.

Term (4) : The judgment stitch amount “THF” of thread break, after this stitch amount, thread break function move to “TST” function.

19. CUTTER OUTPUT

1) Cutter



Note) Use of the I*1 input is prohibited when using the blower output.

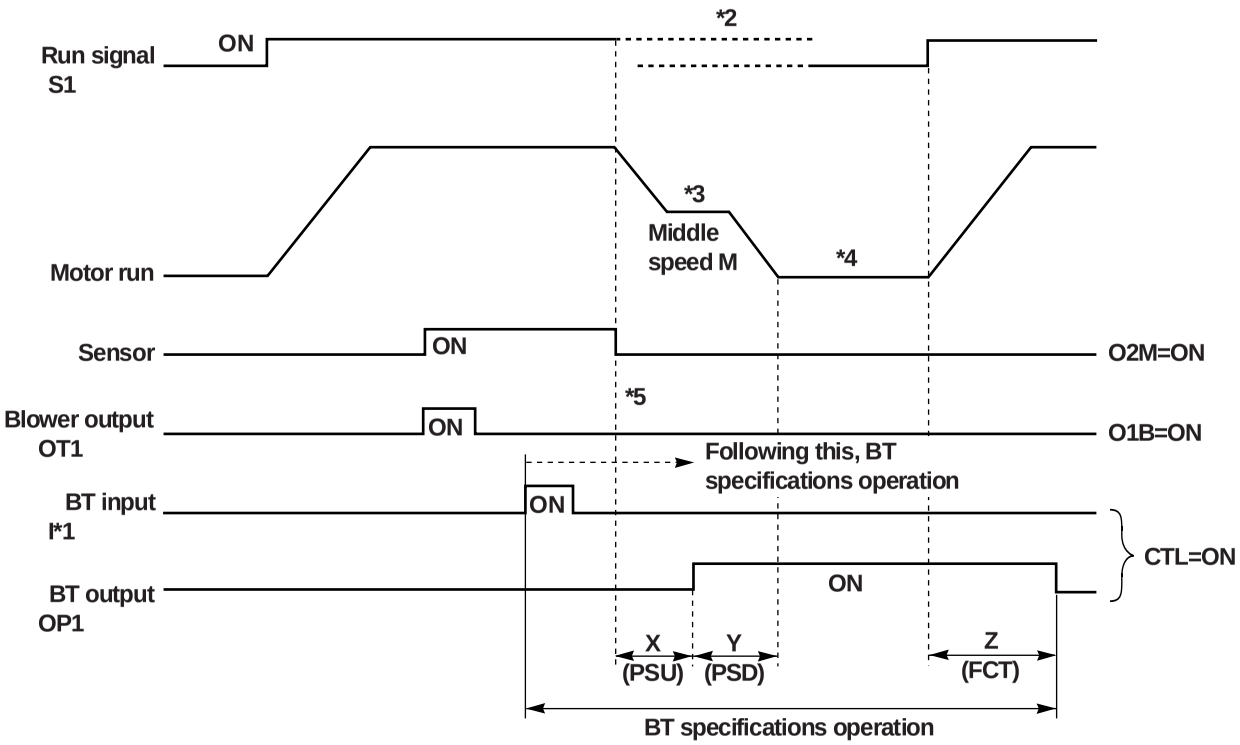
F mode setting

Function name	Specification
O1B	Set OT1 output to blower output.
O2M	Set OT2 output to air output.
O3M	Set OT3 output to cutter output.
I2M	Add mesh judgment control to IO2 input. (If output stays ON or OFF for longer than the mesh judgment time set with ED, the IO2 input will not be fixed.)
CTY	Set I*3 input to manual cutter input.
CTM	Set OT3 cutter output to both OFF → ON and ON → OFF of IO2 photo switch.
CTR	When IO3 is ON, turn OT3 output ON/OFF per set No. of stitches.
COA	No. of stitches A
COB	No. of stitches B
COC	No. of stitches C
SD	Cutter ON time
ED	Mesh judgment time
CSC	The output of the automatic cutter output is prohibited while the sensor is ON.
CEC	The output of the automatic cutter output is prohibited while the sensor is OFF.
CTC	The output of the automatic cutter output is prohibited while the sensor input is ON while the sewing machine is stopped.

Note) 1. Always set O2M to ON even when not using the air output.

2. Customize the option connectors I1, I2 and O1 to O3 to the required functions using the program mode beforehand.

2) BT specifications (*1) operation chart and required settings



*1 : When CTL is set to ON, the BT specification operation will be applied after the I*1 input turns ON.
(If the BT output is turned OFF after I*1 turns OFF, the BT specifications will be canceled.)

*2 : S1 is invalidated after the photo sensor detection.
Operation will restart after stopping and then turning S1 OFF and ON.

*3 : Medium speed preset stitching when photo sensor turns OFF after BT input.

*4 : Up position stop after thread trimming.

*5 : Not output when photo sensor is OFF after BT input.

Note) 1. Always set O2M to ON even when not using the air output.

2. Customize the option connectors I1, I2 and O1 to O3 to the required functions using the program mode beforehand.

3. The No. of stitch settings PSU, PSD and FCT are common with the other settings. Thus, when using as the BT specifications, the PSU/PSD input and the function that automatically lowers the presser with a timer cannot be used.

20. TABLE OF PROGRAM MODE FUNCTIONS

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
P mode ↓ + ↑	Maximum speed H.	O	3500	r/min	0 to 8999	H.	****	****	The maximum speed can be set.	
	Low speed L.	O	170	r/min	0 to 499	L.	***	***	The low speed can be set.	–
	Thread trimming speed T.	O	170	r/min	0 to 499	T.	***	***	The thread trimming speed to reach the needle UP position stop from the needle DOWN position during full heeling of when thread trimmer signal (S2) is turned ON can be set.	–
	Start tacking speed N.	O	1200	r/min	0 to 2999	n.	****	****	The speed of start tacking can be set.	–
	End tacking speed V.	O	1200	r/min	0 to 2999	u.	****	****	The speed of end tacking can be set.	–
	Medium speed M.	O	2000	r/min	0 to 8999	M.	****	****	The medium speed can be set.	–
	Slow start speed S.	O	170	r/min	0 to 2999	S.	****	****	The slow start speed can be set.	–
	No. of slow start stitches SLN.	O	0	Stitches	1 to 5	SLn.	*	*	The No. of slow start stitches can be set. This is valid when the [B.SL] key is ON in the normal mode.	–
	Slow start operation mode SLM.	O	T	–	–	SLM.			The slow start operation mode is selected. This is valid when the [B.SL] key is ON in the normal mode.	–
							T	T	Slow start operation will begin when the power is turned ON or when the first toe down after thread trimming, or the first external run signal ÅiS0, S1Åjis turned ON.	–
							A	A	Slow start operation will begin when the pedal is toed down or when the external run signal (S0, S1) is turned ON.	–
	Slow start when power is turned ON SLP.	O	OF	–	–	SLP.	on	ON	Slow start operation will begin when the pedal is toed down for the first time after turning the power ON, or when the first external run signal (S0, S1) is turned ON even if the [B, SL] key is turned OFF in the normal mode.	–
							oF	OF		
	One shot SH.	O	OF	–	–	SH.	on	ON	The one shot function can be selected. One shot operation (automatic operation) will begin when the external run signals (S0, S1, S4) is turned ON.	–
							oF	OF		
	One shot operation mode SHM.	O	SH	–	–	SHM.			The one shot SH operation mode is selected. This is valid when one shot SH is [ON].	–
							SH	SH	When one of the external run signals (S0, S1, S4) is turned ON the sewing machine will rotate at the commanded speed while ON, and will continue operating even when the signal is turned OFF. However, the speed will be that commanded with the speed setting key ([C,<= =], [D, = =>] key) while OFF. (When the automatic operation function is turned ON in the normal mode.) Stops with PSD, PSU, ES or SEN signal.	–

Caution

Operation validity

O mark : The sewing machine can be operated in the function setting state.

X mark : The sewing machine cannot be operated in the function setting state.

Operate the sewing after returning to the normal mode.

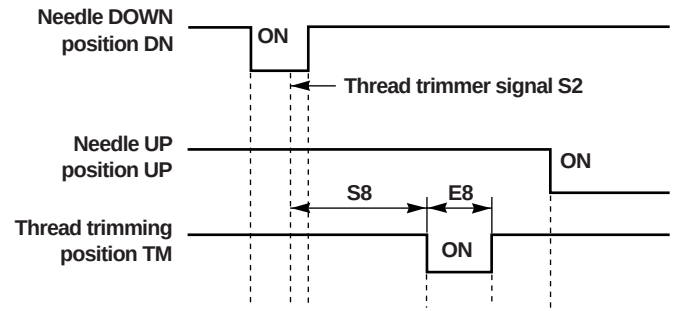
Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	One shot operation Mode SHM.	O	SH	–	–	SHM.	SS	SS	When one of the external run signals (S0,S1,S4) is turned ON, the sewing machine will rotate at the speed commanded with each signal even if the signal is turned OFF.	–
							SA	SA	The same operation as when [SS] is set is included. When one of the external run signals (S0,S1,S4) is turned (1) OFF=>ON=> (2) OFF=>ON, the sewing machine will stop (1) and will restart at (2) .(Alternate operation).	–
							RV	rU	If the automatic operation function is OFF and the one shot signal (SH) is turned ON, the sewing machine will run at the low speed. If the lever connector variable speed command [VC] is input in this state, the sewing machine speed will be approximately in proportion with the voltage. The sewing machine will continue to run at the speed proportional to the variable speed command [VC] even if the one shot signal (SH) is turned OFF in the normal mode. If the automatic operation function is ON and the one shot signal (SH) is turned on, the sewing machine will run at the speed set with the speed setting key ([C, <= =], [D,= =>] key). The sewing machine will continue to run at the set speed even if the on shot signal (SH) is turned OFF.	–
							RH	rH	The sewing machine will run at the maximum speed [H] when the one shot signal (SH) is turned ON. The sewing machine will continue to run at that speed even if the signal is turned OFF.	–
							RM	rM	The sewing machine will run at the medium speed[M] when the one shot signal (SH) is turned ON. The sewing machine will continue to run at that speed even if the signal is turned OFF.	–
							RL	rL	The sewing machine will run at the low speed [L] when the one shot signal (SH) is turned ON. The sewing machine will continue to run at that speed even if the signal is turned OFF.	–
							AV	AU	When the one shot signal (SH) is turned OFF => (1) ON => OFF=> (2) ON=> OFF=> (3) ON=>OFF, the same operation as the sewing machine speed is set to [RV] above is executed at (1). The sewing machine will stop at (2) and will run at the same conditions as [RV] at (3). (This operation is referred to as alternate operation hereafter.)	–
							AH	AH	The alternate operation of [RH] is executed.	–
							AM	AM	The alternate operation of [RM] is executed.	–
							AL	AL	The alternate operation of [RL] is executed.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	No. of stitches after PSU input PSU.	O	0	Stitches	0 to 99	PSU.	**	**	The no. of stitches until stopping after the UP position priority stop signal PSU is input is set.	–
	No. of stitches after PSD input PSD.	O	0	Stitches	0 to 99	PSd.	**	**	The no. of stitches until stopping after the DOWN position priority stop signal PSD is input is set.	–
	Restart after PSD, PSU input PSN	O	OF	–	–	PSn.	on oF	ON OF	After detecting the end of the fabric by a sensor with the PSU,PSD and SEN signals and stopping, restarting is possible with the pedal toe down or external run signalÅiS0,S1Åjeven if the sensor does not detect the fabric. (even if PSU,PSD signals are ON).	–
	Input sensor function valid/invalid SEN.	O	OF	–	–	SEn.	on oF	ON OF	Sensor input function “SEN” is valid. [SEN] have to be set on C mode. (as same as the sensor key on control panel)	–
	Setting stitch amount to stop by “SEN” SE.	O	0	Stitches	0 to 99	SE.	**	**	The number of stitch to stop, after the input function “SEN” ON. (”SEN” have to be set “ON”)	–
	Presser foot lift momentary FUM.	O	ON	–	–	FUn.	on oF	ON OF	This is the momentary function of the presser foot lifting.	–
	FUM operation mode FU.	O	M	–	–	FU.			The operation mode of the presser foot lift momentary mode is selected. This is valid when the presser foot lift momentary FUM is set to [ON].	–
							n	M	After thread trimming with full heeling or the external thread trimmer signal S2, the presser foot lifting operation is continued.	–
							C	C	After thread trimming with full heeling or the external thread trimmer signal S2, the presser foot lifting operation is continued while the timer is on,and then the presser foot will lower. The timer time is set with the timer setting FCT.	–
							A	A	The presser foot lifting operation is activated with full heeling, light heeling, or the external control signal (S2,F) ON. Then, when the full heeling, light heeling or external control signal (S2,F) is turned ON, the presser foot will bring down, and when turned ON again, the presser foot will lift. (Alternate operation.)	–
							T	T	The timer operates in the manner as the [C] setting. However, after the presser foot bring down, the same alternate operation as the [A] setting will occur.	–
	Time setting for FUM operation mode (FU is set to [C],[T]) FCT.	O	I2	sec	1 to 99	FCT.	**	**	The timer time for the presser foot output to turn ON and then turn OFF when the mode P FUM operation mode FU is set to [C], [T] can be set.	–
	Time to motor drive after presser foot lifter bring down FD.	O	I76	msec	0 to 998	Fd.	***	***	The time for the motor to start driving after the presser foot output FU is turned OFF when pedal toe down or external run signal (S0,S1) ON during presser foot lifting can be set in 2 millisecond units.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	Full wave time of presser foot lifter output FO.	O	50	X10 msec	–	F o.			The full wave time of the presser foot lifter output during [FU] operation can be set.	–
							20	20	[20] : Full wave time 200 mS	–
							25	25	[25] : Full wave time 250 mS	–
							30	30	[30] : Full wave time 300 mS	–
							40	40	[40] : Full wave time 400 mS	–
							50	50	[50] : Full wave time 500 mS	–
							60	60	[60] : Full wave time 600 mS	–
							80	80	[80] : Full wave time 800 mS	–
							100	100	[100] : Full wave time 1 sec.	–
	Delay time of presser foot signal S3 input S3D.	O	I0	X10 msec	1 to 99	S 3 d.	**	**	The delay time for the presser foot output FU to turn ON when the light heeling (lever signal presser foot lifting signal S3) is input before thread trimming can be set.	–
	Presser foot lifting output chopping duty FUD.	O	MF	–	–	F U d.			The chopping output duty during holding after the presser foot lifting output FU presser foot lifting operation can be set.	–
							MS	MS	Set to [MS] : 4 msON/OFF, 50 %duty	–
							MF	MF	Set to [MF] : 2 msON/OFF, 50 %duty	–
							HI	HI	Set to [HI] : 4 msON,2 msOFF, 50 %duty	–
							FL	FL	Set to [FL] : 100 % (full wave)	–
							LO	LO	Set to [LO] : 2 msON, 4 msOFF, 33 % duty	–
	Presser foot lifting output when power is turned ON PFU.	O	OF	–	–	P F U.	o n	ON	The presser foot lifting operation begins when power is turned ON.	–
							o F	OF	This is valid when the FUM function is set to [ON]. When FU is set to [C] or [T], the presser foot will lift only while the timer is ON.	
	Cancel the presser foot lifting with full heeling FL.	O	OF	–	–	F L.	o n	ON	The presser foot lifting operation after thread trimming with full heeling or the external thread trimmer signal S2 is prohibited.	–
							o F	OF	However, the presser foot lifting is carried out with the presser foot lifting signal F or light heeling.	
	Cancel presser foot lifting with light heeling S3L.	O	OF	–	–	S 3 L.	o n	ON	The presser foot lifting operation with light heeling is prohibited.	–
							o F	OF	The presser foot operation is carried out with full heeling or the presser foot lifting signal F.	
	Cancel of thread trimming operation S2L.	O	OF	–	–	S 2 L.	o n	ON	The thread trimming operation and subsequent presser foot lifting operation with full heeling or external thread trimmer signal S2 is prohibited.	–
							o F	OF		
	Thread trimming protection signal (S6) logical changeover S6L.	X	LO	–	–	S 6 L.			The operation can be changed when the thread trimming protection signal (S6) is turned Short/ Open.	–
							H I	HI	The sewing machine will stop when the input signal (S6) is Open.	–
							L o	LO	The sewing machine will stop when the input signal (S6)is Short.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	Automatic operation AT.	O	OF	–	–	AT.	on oF	ON OF	Automatic operation (standing operation) can be set.	–
	Thread trimmer cancel TL.	O	OF	–	–	tL.	on oF	ON OF	The thread trimming operation with full heeling of the pedal or with the thread trimming signal S2 is not performed, and instead needle UP position stop will occur.	–
	Auto-stop of preset stitch sewing before trim TLS.	O	OF	–	–	tLS.	on oF	ON OF	Auto-stop of preset stitch sewing before thread trimming. And then it is free sewing till thread trimming.	–
	Reverse run needle lifting after thread trimming RU.	O	ON	–	–	rU.	on oF	ON OF	The motor is reverse run after thread trimming, and the needle will stop near the needle bar top dead point.	–
	RU reverse run angle R8.	O	60	Degree	0 to 360	r8.	***	***	The reverse run angle from the UP position after thread trimming can be set for when the reverse run needle lifting after thread trimming RU is set to ON. The setting angle is in two degree intervals.	–
	Thread trimming with reverse feed TB.	O	OF	–	–	tb.	on oF	ON OF	The thread is trimmed with reverse feed by driving the backstitch solenoid simultaneously with the thread trimmer solenoid.	–
	Cancel of TB function at the time of end N or W tacking TBJ	O	ON	–	–	tbJ.	on oF	ON OF	Thread trimming is canceled with reverse feed of end N or W tacking when TB function is set to ON.	–
	Full heeling, S2 signal operation mode S2R.	O	ON	–	–	S2r.			The operation mode of full heeling or external thread trimmer signal S2 is selected. This is valid when cancel of thread trimming operation S2L is set to [OF].	–
							on	ON	With full heeling or the external thread trimmer signal S2 after the needle UP postion stop, the motor will rotate once to trim the thread. Then the presser foot will lift. When stopped at the needle DOWN position, the motor will make a half-rotation and then the presser foot will lift.	–
							oF	OF	The needle will remain at the UP position even when full heeling or external thread trimmer signal S2 is turned ON after stopping at the UP position. Only the presser foot lifting operation will operate after this. When full heeling or external thread trimming signal S2 is input after the needle DOWN position stop,motor will make a half-rotation and trim the thread. Only the foot lifting operation will operate after this.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	Cancel of interlock after full pedal heeling IL.	O	OF	–	–	IL.			This releases the restart operation prohibit command during thread trimming.	–
							on	ON	Restart is possible for a designated time after the pedal toe down or external operation signal (S0, S1) is turned ON immediately after full pedal heeling. This is used with a sewing machine that does not have thread trimming.	–
							oF	OF	Restart is not possible. Restart is possible if the pedal toe down or external run signal (S0,S1) is turned ON again after a set time is passed.	–
	Thread trimming mode TR.	O	J1	–	–	TR.			The thread trimming timing for each manufacturer's thread trimming sewing machine can be set.	–
							n1	M1	Not used.	–
							PrG	PRG	For free setting of the thread trimming.	–
							no	NO	Not thread trimming sewing machine.	–
							tA1	KA1	Not used.	–
							tA2	KA2	Not used.	–
							tA3	KA3	Not used.	–
							tA4	KA4	Not used.	–
							tA5	KA5	Not used.	–
							tA6	KA6	Not used.	–
							tA7	KA7	Not used.	–
							tA8	KA8	Not used.	–
							tb1	KB1	Not used.	–
							tb2	KB2	Not used.	–
							tb3	KB3	Not used.	–
							tb4	KB4	Not used.	–
							b1	B1	Not used.	–
							d1	D1	Not used.	–
							J1	J1	Standard	–
							J2	J2	–	–
							n1	N1	Not used	–
							P1	P1	Not used.	–
							P2	P2	Not used.	–
							P3	P3	Not used.	–
							P4	P4	Not used.	–
							T1	T1	Not used.	–
							T2	T2	Not used.	–
							t	K	Not used.	–
							rt	RK	The thread is trimmed by reverse running the motor at the set angle from the DOWN position with full heeling or the thread trimmer signal S2. The set angle can be adjusted with the reverse run angle K8 from the DOWN position to the UP position. This can be used for blind stitch sewing machine.	–

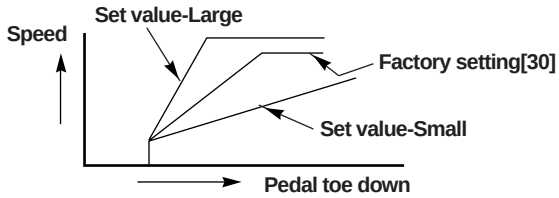


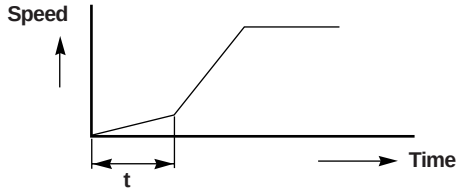
Adjust the thread trimming position TM signal's ON starting angle S8, and ON angle E8. (The factory setting is 50 for S8, and 90 for E8.)

Caution

The thread trimming timing for each thread trimming sewing machine can be set in the thread trimming mode TR, but the speed, etc., cannot be set. These must be set separately. When set to [D1], set the lifting output chopping duty FUD in the B mode to [LO] 33 % duty.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	Thread trimming validity at neutral pedal POS.	O	OF	–	–	P o S.	o n	ON	The needle will stop in the UP position after thread trimming, during neutral after pedal toe down or when external run signal (S0,S1) is turned OFF.	–
							o F	OF		
	Operation when power is turned ON during 1 position setting P1P.	O	OF	–	–	P 1 P.	o n	ON	When 1 position is set with the [A,1-2] key in the normal mode, the needle will lift to the UP position if not in the UP position when the power is turned ON.	–
							o F	OF		
	Operation when power is turned ON during 2 position setting P2P.	O	OF	–	–	P 2 P.	o n	ON	When 2 position is set with the [A,1-2] key in the normal mode, the needle will lift to the UP position if not in the UP position when the power is turned ON.	–
							o F	OF		
	Needle stop position before fabric C8.	O	60	Degree	0 to 360	C 8.	***	***	The needle stop position angle can be set just above the fabric looking from the UP position when the input signal is set the [BC] or [BCR]. (The setting angle is in 2 degree intervals.)	–
	Needle DOWN position stop angle D8.	O	32	Degree	10 to 180	d 8.	**	**	The coasting angle at the needle DOWN position stop can be set. (The setting angle is in 2 degree intervals.)	–
	Needle UP position stop angle U8.	O	10	Degree	10 to 180	U 8.	**	**	The coasting angle at the needle UP position stop can be set. (The setting angle is in 2 degree intervals.)	–
	Reverse run angle from DOWN position to UP position K8.	O	180	Degree	0 to 360	t 8.	***	***	The reverse run angle from the DOWN position to the UP position can be set when the S0 operation mode [USR] or reverse thread trimming mode operation mode TR [RK] is set in mode P.	–
	ON angle of virtual TM E8.	O	90	Degree	0 to 360	E 8.	***	***	The width of virtual signal “TM”.: When [TR] = [B1] or [T2], it is possible to use this function.	–
	ON start angle of virtual TM S8.	O	50	Degree	0 to 360	S 8.	***	***	The start angle of virtual signal “TM”.: When [TR]= [B1] or [T2], it is possible to use this function.	–
	Setting sensor “SEN” input function SNM.	O	ON	–	–	S n n.	o n	ON	Input “SEN” is always valid.	–
							o F	OF	Input “SEN” is only valid, when setting pattern is free sewing.	
	Virtual down Setting KD.	O	OF	–	–	t d.	o n	ON	Sewing machine run without down signal. The angle between up and down position is set to “K8”.	–
							o F	OF	The width is set at 60 degree automatically.	
	Virtual width of up and down signal KDU.	O	OF	–	–	t d U.	o n	ON	It set the up and down signal width to 60 degree automatically.	–
							o F	OF		

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
A mode ↓ + A 1-2	Gain high/low selection GA.	O	H	–	–	GA.			The high/low gain can be set. Set with the following according to the sewing machine being used.	–
							H	H	Sewing machine with large inertia.	–
							L	L	Sewing machine with small inertia.	–
							LL	LL	This is used when there is a slight vibration when stopping even when the gain is set to [L].	–
	Pedal curve PDC.	O	30	–	10 to 99	PdC.	**	**	The size of the curve of the speed changes for the pedal toe down amount can be set. The speed change curve will change from small to large according to the small => large of the set value. 	–
	Acceleration time simple setting AC.	O	M	–	–	AC.			The time for the sewing machine to reach the high speed after the pedal toe down or external run signal (S1) is input can be set easily.	–
							H	H	[H] : 100 mS	–
							M	M	[M] : 140 mS	–
							L	L	[L] : 240 mS	–
							•	–	[–] : The time set in the next acceleration time ACT is used.	–
	Acceleration time ACT.	O	14	x10 msec	6 to 99	ACT.	**	**	The acceleration time for the sewing machine to reach the high speed after pedal toe down or external run signal (S1) ON can be set. This is valid when the acceleration time simple setting AC is set to [–].	–
	Deceleration time simple setting DC.	O	M	–	–	dC.			The deceleration time for the sewing machine to stop after returning to neutral from pedal toe down or when the external run signalÅiS1Åjis turned OFF can be set easily.	–
							H	H	[H] : 90 mS	–
							M	M	[M] : 160 mS	–
							L	L	[L] : 230 mS	–
							•	–	[–] : The time set in the next deceleration time DCT is used.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
A mode ↓ + 1-2	Deceleration time DCT. **Caution** **The factory setting [I6] refers to [I6x10 milliseconds=160 milliseconds].**	O	I6	x10 msec	6 to 99	dCT.	**	**	The deceleration time for the sewing machine to stop after returning to neutral from pedal toe down or when the external run signal (S1) is turned OFF can be set. This is valid when the deceleration time simple setting DC is set to [–]. Normally use this at 350 milliseconds or less.	–
	S-character cushion SC.	O	OF	–	–	SC.	on oF	ON OF	The speed change curve is accelerated slowly for the t time after pedal toe down or the external run signal (S1) is turned ON, and then the sewing machine accelerates rapidly and enters the high speed operation. This is effective when carrying out one stitch sewing with the external run signal (S1) when automatic operation function is set in the P mode. 	–
	S-character cushion time setting SCT.	O	7	x10 msec	0 to 99	SCT.	**	**	The "t" time can set when S-character cushion is set to [ON].	–
	Full heeling S2 signal operation mode when power is turned on or after thread trimming S2M.	O	FU	–	–	S2M.			The operation mode of the full heeling or S2 signal when the power is turned on or after thread trimming is determined.	–
							FU	FU	The presser foot lifting operation is entered.	–
							U	U	The needle lifting operation is entered.	–
							no	NO	No operation.	–
							UF	UF	The presser foot lifting operation after needle lifting is entered.	–
	Sewing machine shaft/ motor shaft speed setting selection PL.	O	OF	–	–	PL.	on oF	ON OF	The speed setting is set so that the normal sewing machine shaft speed is constant, but by the [ON] setting, it is possible to operate at the value which was set by the [MR], [SR] function. This is effective when the motor pulley diameter is small, the V belt slips and the sewing machine speed is unstable.	–
	Setting motor pulley diameter MR.	O	70	mm	20 to 349	MR.	***	***	Set the diameter of motor pulley When "PL" is "ON", this function is valid.	–
	Setting sewing machine pulley diameter SR.	O	70	mm	20 to 349	SR.	***	***	Set the diameter of sewing machine pulley When "PL" is "ON", this function is valid.	–

Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
A mode ↓ + 1-2	No detector mode	NOS.	O	OF	–	–	no S.	on oF	ON OF	Variable operation is possible when the detector has broken by setting to [ON] to invalidate the detector. The positioning stop and thread trimming operations will not be possible.	–
	Motor maximum speed	MSP.	O	36	x100 r/min	–	nSP.			The motor's maximum speed can be set.	–
								36	36	Set to [36]:3600 r/min	–
								40	40	Not used	–
	First priority stop => speed contro	STM.	O	OF	–	–	Snr.		ON OF	When machine will be stop,first priority become speed control (Usually first priority to stop is stop angle.)	–
	Brake time	BKT.	O	14	x10 msec	0 to 99	bkt.	**	**	The brake time for stopping the sewing machine can be set.	–
	Weak brake angle	B8.	O	14	x0.1 Degree	4 to 500	b8.	***	***	Setting the angle to clear weak break. Minimum setting angle is 0.2 degree.	–
	Reduction of weak brake sound	BNR.	O	ON	–	–	bnr.	on oF	ON OF	Reducing the sound (noise) of weak brake.	–
	Weak brake force	BKS.	O	99	%	0 to 99	bkS.	**	**	The weak brake force can be set.	–
	Weak brake mode	BKM.	O	E	–	–	bkn.			The weak brake force can be set for when stopping the sewing machine when the weak brake [BK] is set to [ON].	–
								E	E	Set to [E] : Brake that allows manual rotation.	–
								H	H	Set to [H] : Strong brake	–
	Weak brake	BK.	O	OF	–	–	bk.	on oF	ON OF	The weak brake validity can be set.	–

Caution
The factory setting [I4] refers to[I4x0.1 degree=1.4 degree].

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
B mode ↓ + SL	Display sewing speed S.	O	–	r/min	–	S.	****	****	Display the round per minute of running sewing machine.	–
	Down counter setting count amount N.	O	99	–	0 to 9999	n.	****	****	Setting the number of down counter.	–
	Down counter display count amount D.	O	99	–	0 to 9999	d.	****	****	Display the number of current down counter.	–
	Up counter setting count amount P.	O	99	–	0 to 9999	P.	****	****	Setting the number of up counter.	–
	Up counter display count amount U.	O	0	–	0 to 9999	U.	****	****	Display the number of current up counter.	–
	Up counter the selection of setting mode CUP.	O	CU	–	–	CUP.			Selection of count up condition.	–
							CU	CU	After thread trimming is finished.	–
							ST	ST	The number of sewing stitch become “N” (”N” have to be set at “CNU”)	–
							PR	PR	The number of trimming times become “N” (”N” have to be set at “PRN”)	–
							IN	IN	When output signal “O1” become ON. (”IO1” have to be set to input signal on the program mode C.)	–
							OU	OU	When output signal “O1” become ON. (”O1” have to be set to output function on “O1” of the program mode C.)	–
	Up counter the selection of counter operation USC.	O	ST	–	–	USC.			Selection of operation count over.(Up counter)	–
							ST	ST	Control panel buzzes and running is prohibited after trimming with buzzer sound. And then when counter clear key “CCL” is pressed, sewing become possible. (Buzzer will stop after a while.) (Factory is possible to continue without buzzer sound.)	–
							OF	OF	Sewing is possible to continue without buzzer sound.	–
							BZ	BZ	Sewing is possible to continue with buzzer sound. (Buzzer will stop after a while.)	–
	Up counter changing sewing pattern UCM.	O	OF	–	–	UCM.	on	ON	When sewing pattern is changed, it clear “up counter”. (UCM=ON)	–
							oF	OF		
	Up counter valid/invalid UPC.	O	OF	–	–	UPC.	on	ON	The up counter is valid. (UPC=ON)	–
							oF	OF		

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
B mode ↓ + SL	Up counter operation after counting over NXU.	O	OF	–	–	n 11 U.			The UP counter operation, after counting over. (it is valid, when [USC] is set to “OF,”BZ”.)	–
							o n	ON	The display shows the setting number and the counting is stopped.	–
							o F	OF	The display shows setting number and the counting is continued.	–
	Down counter the selection of setting mode CDN.	O	CU	–	–	C d n.			Selection of count condition.	–
							C U	CU	After thread trimming is finished.	–
							S t	ST	The number of sewing stitch become “N” (”N” have to be set at “CNU”)	–
							P r	PR	The number of trimming times become “N” (”N” have to be set at “PRN”)	–
							I n	IN	When input signal “O1” become ON. (”IO1” have to be set to input signal on the program mode C.)	–
							o U	OU	When output signal “O1” become ON. (”O1” have to be set to output function on “O1” of the program mode C.)	–
	Down counter the selection of counter operation DSC.	O	ST	–	–	d S C.			Selection of operation at count over. (Down counter)	–
							S t	ST	Control panel buzzes and running is prohibited after thread trimming with buzzer sound. And then when counter clear key “CCL” is pressed, buzzer and sewing become possible. (Buzzer will stop after a while.) (Factory is setting of counter clear key is “P” key on control panel.)	–
							o F	OF	Sewing is possible to continue without buzzer sound.	–
							b Z	BZ	Sewing is possible to continue with buzzer sound. (Buzzer will stop after a while.)	–
	Down counter changing sewing pattern DCM.	O	OF	–	–	d C M.	o n	ON	When sewing pattern is changed, it clear “down counter”. (DCM=ON)	–
							o F	OF		
	Down counter valid/invalid DNC.	O	OF	–	–	d n C.	o n	ON	The down counter is valid. (DNC=ON)	–
							o F	OF		
	Down counter operation after counting over NXD.	O	OF	–	–	n 11 d.			The down counter action, after counting over. (It is valid, when [DSC] is set to “OF”, ”BZ”.)	–
							o n	ON	The display shows “0” and the counting is stopped.	–
							o F	OF	The display shows “–“ and the counting is continued.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
B mode ↓ + SL	Counter condition turning on power switch PCM.	O	OF	–	–	P C n.			When power switch is turned on,	–
							o n	ON	Up counter is clear (zero) and down counter is set the setting number.	–
							o F	OF	Both counter keep previous amount.	–
	Setting Thread trimming times “N” PRN.	O	0	times	0 to 99	P r n	**	**	When “CUP” and “CDN” are PR, trimming times “N” is set.	–
	Setting Number of stitches “N” CNU.	O	1	stitches	1 to 99	C n U.	**	**	When “CUP” and “CDN” are ST, number of stitch “N” is set.	–
	Count modification (to use IO1,IO2) CCI.	O	OF	–	–	C C i.			Modification of count amount.	–
							o n	ON	When input function “IO1” is turn on, it become count up. When input function “IO2” is turn on, it become count down. (Input function can set input signal on program mode “C”.)	–
							o F	OF	Modification is prohibited.	–
	Display condition turning on power switch PMD.	O	OF	–	–	P n d.			Selection display mode, when power switch is turned on.	–
							o n	ON	When power switch turn on, display shows previous condition. (Keep previous condition)	–
							o F	OF	When power switch turn on, display shows normal mode.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
C mode +	Selection of input signal function I1. to I7. IA. to IP.	X	–	–	–	I1. I2. I4. IA. IB. IP.	***	***	The input functions of each signal I1 to I4 and IA to IP can be selected from 60 types of functions. 1. Refer to the C mode input signal setting table of the pages 126 to 131. 2. Refer to the Conception figure of input and output customization of the page 132 to 134. **Caution** **Input signal I3 is not available.** **Set CPK to ON when using the input signal I6.** **Set CKK to ON when using the input signal IC.**	– – – –

Caution

Table of each input signal and connector pin connection and factory setting correspondence

Input signal[IP] is [CCL] hey on control panel.

Input signal	IA	IB	IC	ID	IE
Factory setting	PSU	PSD	S0	TL	S7

Input signal	IF	IG	IH	II
Factory setting	F	S1	S2	S3

Input signal	I1	I2	I4	I5	I6	I7
Factory setting	IO1	IO1	NO	NO	F	BTL

Caution

Input signals [14, 15, 16, 17] are dual port of input and output.

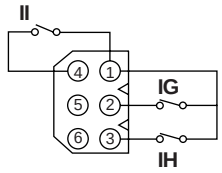
So when these input signals will be used, output functions of O4, O5, O6 and O7 have to be set to "NO".

(Lever connector)

IG : S1 (Variable speed run signal)

IH : S2 (Thread trimmer signal)

II : S3 (Presser foot lifter signal)

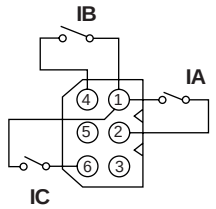


(Option A connector)

IA : PSU (Needle UP position priority stop signal)

IB : PSD (Needle DOWN position priority stop signal)

IC : S0 (Low speed run signal)



(Option B connector)

I1 : 1O1 (Signal output to virtual output 1)

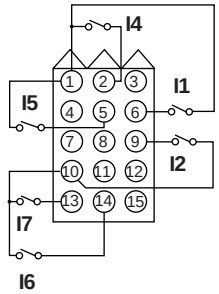
I2 : 1O1 (Signal output to virtual output 1)

I4 : NO (No setting)

I5 : NO (No setting)

I6 : F (Presser foot lifter signal)

I7 : BTL (Start/end tacking cancel signal)

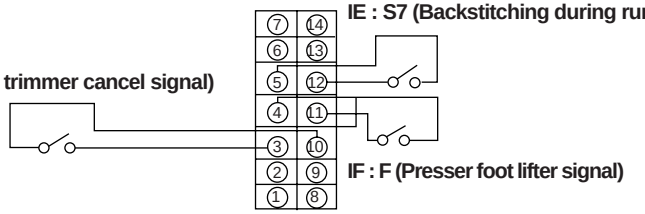


(Sewing machine connector)

ID : TL (Thread trimmer cancel signal)

IE : S7 (Backstitching during run signal)

IF : F (Presser foot lifter signal)



Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode +	Input signal logical changeover function I1L. to I7L. IAL. to IPL.	X	OF	–	–	1L. 7L. AL. PL.	on oF	ON OF	The input logic of each Input signal I1 to I7 and IA to IP is reversed. **Caution** **The function I3L is not available.** **Set CPK to ON when using the function I6L.**	–
	Input signal alternating operation I4A. to I7A. IAA. to IPA.	X	OF	–	–	4A. 7A. AA. PA.	on oF	ON OF	If each input signal I4 to I7 and IA to IP performs OFF =>(1) ON=>OFF=>(2) ON=>OFF=>(3) ON=>OFF the signal will stay ON at (1),stop (turn OFF) at (2), and will turn ON again at (3). (iThis is hereafter referred to alternate operation.) **Caution** **Set CPK to ON when using the function I6A.**	–
	Setting the function for I1 and I2 I1M. to I2M.	X	AL	–	–	1M. 2M.	no AL rS	NO AL RS	The operation mode of each input signal I1 and I2 can be selected. Normal operation Alternating operation. RS F/F (Flip-Flop) operation.	– – – –
	Special setting for input signal “I1” (Neglecting of signal) I1O.	O	OF	–	–	1o.	on oF	ON OF	When sewing machine is running, input signal[I1] is not accepted This function is valid, only [I1M] set [AL] or [RS].	–
	Special setting for input signal “I1” is ON I1F.	X	OF	–	–	1F.	on oF	ON OF	When [I1M] set [AL] on program mode “C”, the alternate operation of input [I1] sets virtual output [OT3] to alternative output.	–
	RS F/F clear setting I1C. to I2C.	X	OF	–	–	1C. 2C.	on oF	ON OF	F/F (Flip Flop) operation of input signal [I1] and [I2] is cleared by thread trimming operation.	–
	RS F/F delay time setting 1CT. to 2CT.	O	0	x100 msec	0 to 99	1CT. 2CT.	**	**	When above setting (I1C,I2C) is valid, these delay timer is set.	–
	Input signal I1 virtual F/F circuit operation 1 F1P.	X	OF	–	–	F1P.	on oF	ON OF	The input signal I1 virtual F/F (flip-flop) operation is tuned ON when power is turned ON. It is only valid, when [I1M] function is set to “AL” or “RS”.	–
	Input signal I1 virtual F/F circuit operation 2 F1C.	X	OF	–	–	F1C.	on oF	ON OF	The input signal I1 virtual F/F (flip-flop) operation is turned OFF when the sewing start No. of stitches RLN setting is completed.	–
	Input signal I1 virtual F/F circuit operation 3 F1S.	X	OF	–	–	F1S.	on oF	ON OF	The input signal I1 virtual F/F (flip-flop) operation is turned ON when the tacking starts or after thread trimming.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode +	Set condition of RS F/F for I1 and I2 R1S. to R2S.	X	IN	–	–	r1S. r2S.			Set condition RS F/F of I1 and I2 When [I1M] and [I2M] is set to [RS], it is valid.	–
							in	IN	RS F/F of I1 is set by I1, RS F/F of I2 is set by I2.	–
							rT	T	After thread trimming operation (stop to up position.)	–
							rR	R	When motor start, RS F/F will be set.	–
							rS	S	When motor stop, RS F/F will be set.	–
							rTr	TR	When sewing start, after thread trimming.	–
							Sb	SB	When start tacking or condensed stitch was finished. (When condensed stitch is not set, it is invalid)	–
	Reset condition of RS F/F for I1 and I2 R1R. to R2R.	X	IN	–	–	r1r. r2r.			Reset condition RS F/F of I1 and I2 When [I1M] and [I2M] is set to [RS], it is valid.	–
							in	IN	RS F/F of I1 is reset by I6, RS F/F of I2 is reset by 17.	–
							rT	T	When thread trimming is done (stop to up position.)	–
							rR	R	When motor start, RS F/F will be reset.	–
							rS	S	When motor stop, RS F/F will be reset.	–
							rTr	TR	When sewing start, after trimming.	–
							Sb	SB	When start condensed stitch was finished. (When condensed stitch is not set, it is invalid.)	–
							nC	NC	When sewing machine sew the setting stitch after set RS F/F, it will be reset. (R1N, R2N)	–
	RS F/F reset stitch amount for I1 and I2 R1N. to R2N.	O	3	Stitches	0 to 99	r1n. r2n.	**	**	When [R1R] or [R2] set [NC], the number of stitch is set by this counter.	–
	Selection of output signal function OA. to OD. OF. O1. to O7. OJ. to OK.	X	*	–	–	oA. od. oF. o1. on. oJ. ot.	***	***	The output functions of each output signal OA to OD,OF,OJ to OK and O1 to O7 can be selected from 37 types of functions. 1. Refer to the C mode input signal setting table of the pages I68 to I71. 2. Refer to the Conception figure of input and output customization of the page I74 to I76. **Caution** **Output signal OE is not available.** **Set CPK to ON when using the function O6.**	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
C mode + G	Selection of output signal function OO. to OP.	X	*	–	–	o o. / o P.	***	***	The output functions of each output signal OO to OP can be selected from 37 types of functions. 1. Refer to the C mode input signal setting table of the pages 126 to 131. 2. Refer to the Conception figure of input and output customization of the page 132 to 134.	–
	Output signal logical changeover function OAL. to ODL. OFL. O1L. to O7L.	X	OF	–	–	o AL. / o dL. / o FL. / o 1L. / o 7L.	o n o F	ON OF	The output logic of each output signal OA to OD, OF and O1 to O7 is reversed.	–

Caution

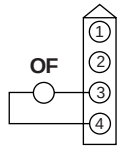
Table of each output signal and connector pin connection and factory setting correspondence.

Output signal	OA	OB	OC	OD	OF
Factory setting	T	W	B	L	FU

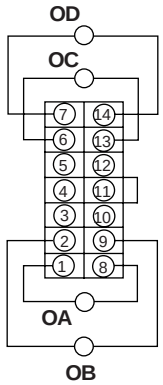
Output signal	O1	O2	O3	O4
Factory setting	OT1	NCL	TF	NO

Output signal	O5	O6	O7
Factory setting	NO	NO	NO

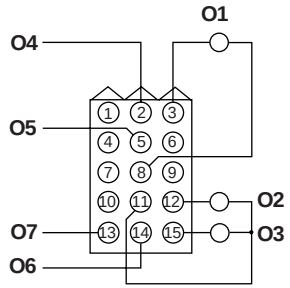
Caution
Output[O4,O5,O6,O7] are not solenoid output signal.
Also these signal are dual port of input and output.
So when these output signal will be used, input signal have to be set to "OF".



(Presser foot lifter connector)
OF : FU (Presser foot lifter output)



(Sewing machine connector)
OA : T (Thread trimmer output)
OB : W (Wiper output)
OC : B (Backstitch output)
OD : L (Thread release output)



(Option B connector)
O1 : OT1 (Virtual output)
O2 : NCL (Needle cooler output)
O3 : TF (TF output)
O4 : NO (No setting)
O5 : NO (No setting)
O6 : NO (No setting)
O7 : NO (No setting)

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode ↓ +	Output signal logical changeover function OJL. to OKL. OOL. to OPL.	X	OF	–	–	oJ1L. oK1L. oO1L. oP1L.	on oF	ON OF	The output logic of each output signal OJ to OK, and OO to OP is reversed.	–
	Output chopping function OAC. to ODC. O1C. to O3C.	X	OF	–	–	oA1C. od1C. o11C. o31C.	on oF	ON OF	Each output is output with full wave immediately after output starts, and then is reduced to half-wave output for each output signal OA to OD and O1 to O3. (Chopping control) The full wave output time can be set with the full wave time [PO] function for each output. **Caution** **Output signal [O4, O5, O6, O7] are chopping function is not available.**	–
	Output signal forced OFF function OAT. to ODT. O1T. to O7T. OJT. to OKT. OOT. to OPT.	X	OF	–	–	oA1T. od1T. o11T. o71T. oJ1T. oK1T. oO1T. oP1T.	on oF	ON OF	In each output signal OA to OD, OJ to OK, OO to OP and O1 to O7, each output is forcibly turned OFF after the time set in the OFF timer is passed. The OFF timer set time can be set with each output's forced OFF timer [OTT] function.	–
	Output signal delay time setting function DA. to DD. DF.	X	0	x20 msec	0 to 08	dA1. dd. dF.	***	***	In each output signal OA to OD and OF the delay time to when each output is started can be set. Each delay time can be set in 20ms intervals.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode +	Output signal delay time setting function D1. to D7. DJ. to DK. DO. to DP.	X	D1=10	msec	0 to 510	d1. d2. dJ. dt. do. dP.	***	***	In each output signal OJ to OK, OO to OP and O1 to O7, the delay time to when each output is started can be set. Each delay time can be set in 2 ms intervals.	–
	Presser foot lifter output chopping duty FUD.	X	MF	–	–	FUd.			The chopping output duty during holding after the presser foot lifter output FU lifting operation can be set.	–
							nS	MS	Set to [MS] : 4 ms ON/OFF 50 %duty	–
							nF	MF	Set to [MF] : 2 ms ON/OFF 50 %duty	–
							HI	HI	Set to [HI] : 4 ms ON, 2 ms OFF, 66 %duty	–
							FL	FL	Set to [FL] : 100 % (full wave)	–
							Lo	LO	Set to [LO] : 2 ms ON,4 ms OFF 33 %duty	–
	Presser foot lifter FU full wave output time FO.	X	50	x10 msec	–	Fo.			The full wave output time of the presser foot lifter output FU can be set.	–
							20	20	Set to [20] : 200 ms	–
							25	25	Set to [25] : 250 ms	–
							30	30	Set to [30] : 300 ms	–
							40	40	Set to [40] : 400 ms	–
							50	50	Set to [50] : 500 ms	–
							60	60	Set to [60] : 600 ms	–
							80	80	Set to [80] : 800 ms	–
							100	100	Set to [100] : 1000 ms	–
	Presser foot lifter FU momentary mode FU.	X	M	–	–	FU.			The operation mode of presser foot lifter momentary FUM is set. This is valid when presser foot lifter momentary FUM is set to [ON] in the P mode.	–
							n	M	The presser foot lifter operation is continued after full heeling or after thread trimmer with external thread trimmer signal S2.	–
							C	C	The presser foot lifter operation is continued during the timer time after full heeling or after thread trimming with external thread trimmer signal S2. Then the presser foot lifter is lowered. The timer can be adjusted with timer setting FCT in the P mode.	–

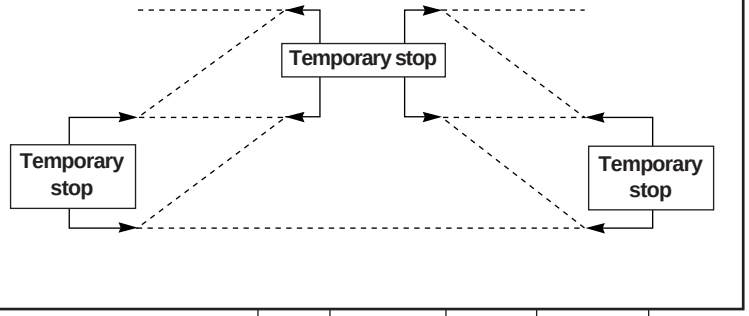
Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode ↓ + C	Presser foot lifter momentary mode FU.	X	M	–	–	F U.	A	A	The presser foot lifter operates with full heeling or when the external signal (S2, F) turns ON, and then the presser foot lifter. Lower when full heeling, light heeling or external signal (S2,F) turns on. The presser foot lifter will rise if these signal is turned ON again. (Alternate operation)	–
							T	T	The timer operates in the same manner as [C] setting. However, after the presser foot lifter lowers, the operation will be alternate as with the [A] setting.	–
	Full wave output time for each output PO.	O	50	x10 msec	–	P o.			The full wave output time of each output signal OA to OD and O1 to O7 can be set.	–
							20	20	Set to [20] : 200 ms	–
							25	25	Set to [25] : 250 ms	–
							30	30	Set to [30] : 300 ms	–
							40	40	Set to [40] : 400 ms	–
							50	50	Set to [50] : 500 ms	–
							60	60	Set to [60] : 600 ms	–
							80	80	Set to [80] : 800 ms	–
							100	100	Set to [100] : 1000 ms	–
	Output chopping duty except of FU output POD.	O	MF	–	–	P o d.			Setting output chopping duty, except FU output.	–
							MS	MS	Set to [MS] : 4ms ON/OFF 50%.	–
							MF	MF	Set to [MF] : 2ms ON/OFF 50%.	–
							HI	HI	Set to [HI] : 4ms ON, 2ms OFF, 66% duty.	–
							LO	LO	Set to [LO] : 2ms ON, 4ms OFF, 33% duty.	–
	Forced OFF timer setting function for each output OTT.	O	12	sec	1 to 24	o f f.	**	**	The timer that forcibly turns off output signals OA to OD and O1 to O7 can be set.	–
	FUM operation mode timer setting function FCT.	O	12	sec	1 to 99	F C f.	**	**	The timer from the time when the presser foot lifter output is turned ON to the time when it is turned OFF. (when FUM operation mode FU [C] or[T] is set can be set.)	–
	Logic [AND] input/selecting input function AN.	X	NO	–	–	A n.	***	***	Select input function to the logic input [AND]. Input function is select on “Input/output function for signal on C mode setting” (pages 126 to 131) Refer to “ The composition figure of input and output customization” about [AND] setting. (Pages 132 to 134)	–
	Logic[AND] input setting Hi / Low logic ANL.	X	OF	–	–	A n L.	o n	ON	[AND] input logic is set to opposite Refer to “The composition figure of input and output customization” about [AND] setting. (Pages 132 to 134)	–
							o F	OF		
	Logic[AND] input Alternate ANA.	X	OF	–	–	A n A.	o n	ON	[AND] input is set to alternative. Refer to “The composition figure of input and output customization” about [AND] setting. (Pages 132 to 134)	–
							o F	OF		

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode +	Logic [AND 1/2/3] output selecting output function N1. to N3.	X	HI	–	–	n1. / n3.	***	***	Select output function of [AND 1/2/3] Refer to “The composition figure of input and output customization” about [AND] setting. (Pages 132 to 134)	–
	Logic [AND 1/2/3] output setting of Hi/Low logic N1L. to N3L.	X	OF	–	–	n1L. / n3L.	on oF	ON OF	[AND 1/2/3] output logic is set to opposite Refer to “The composition figure of input and output customization” about [AND] setting. (Pages 132 to 134)	–
	Logic[OR] input selecting input function OR.	X	NO	–	–	or.	***	***	Select input function to logic input [OR] Input function is select on “Input/output function for signal on C mode setting” (pages 126 to 131) Refer to “The composition figure of input and output customization” about [OR] setting. (Pages 132 to 134)	–
	Logic [OR] input setting of Hi/Low logic ORL.	X	OF	–	–	orL.	on oF	ON OF	[OR] input logic is set to opposite. Refer to “The composition figure of input and output customization” about [OR] setting. (Pages 132 to 134)	–
	Logic[OR] input Alternate ORA.	X	OF	–	–	orA.	on oF	ON OF	[OR] input logic is set to Alternate. Refer to “The composition figure of input and output customization” about [OR] setting. (Pages 132 to 134)	–
	Logic [OR 1/2/3] output selecting output function R1. to R3.	X	NO	–	–	r1. / r3.		***	Select output function of [OR 1/2/3] Refer to “The composition figure of input and output customization” about [OR] setting. (Pages 132 to 134)	–
	Logic[OR 1/2/3] output setting of Hi/Low logic R1L. to R3L.	X	OF	–	–	r1L. / r3L.	on oF	ON OF	[OR 1/2/3] output logic is set to opposite. Refer to “The composition figure of input and output customization” about [OR] setting. (Pages 132 to 134)	–
	Variable speed command for digital input CSP.	X	OF	–	–	CSP.	on oF	ON OF	Set variable speed command for digital input. (I1, I2, I6, I7) High speed is set to [H] on program mode “P”. (CSP=ON.CSG=OFF)	–
	Variable speed command for digital input (Gray code) CSG.	X	OF	–	–	CSG.	on oF	ON OF	Set variable speed command for digital input. (I1, I2, I6, I7) High speed is set to [H] on program mode “P”. To use gray code. (3, 2, 1, 0)= (I6, I7, I2, I1). (CSP=ON, CSG=ON)	–
	Thread release + backstitch output LB.	O	OF	–	–	Lb.	on oF	ON OF	Thread release output L will turn ON even while backstitch output B is ON.	–
	Virtual output (OT1 to OT3) forced OFF function T1C. to T3C.	O	OF	–	–	F1C. / F3C.	on oF	ON OF	Virtual outputs OT1 to OT3 will be turned OFF forcibly after the OFF timer set time has passed. The OFF timer set time can be set with the virtual output OFF timer setting function [T1T to T3T].	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode ↓ +	Forced OFF timer setting function for virtual outputs (OT1 to OT3) T1T. to T3T.	O	99	x10 msec	0 to 99	r1T. / r2T. / r3T.	**	**	The timer time for forcibly turning OFF virtual outputs OT1 to OT3 can be set.	–
	Feed pulse output (CP) cancel function CPK.	O	ON	–	–	CPK.	on oF	ON OF	Feed pulse [CP] is invalid. When feed pulse will be used, set this function to “CF” This signal output is from the same pin of “I6” and “O6”.	–
	Setting CP pulse amount CP.	O	32	–	1 to 99	CP.	**	**	Setting the number of pulse [CP]. After changing this number, turn on power switch again.	–
	Prohibited angle of output CP pulse CPC.	O	OF	–	–	CPC.	on oF	ON OF	The prohibited angle section of pulse generated can be set from UP position. The prohibited angle of pulse generated is 60 degree from the setting position (angle).	–
	Panel switch operation prohibit PSW.	O	OF	–	–		on oF	ON OF	Panel switch operation ([M], [A,1-2], [B,SL], [C,<= =]. [D,= =>] key operations) during the normal mode, tacking mode and pattern mode will not be possible. However, changeover into each mode will be possible.	–
	CKD output cancel during backtack trem CKB.	O	OF	–	–	CKB.	on oF	ON OF	Output signal “CKD” is prohibited during backtack term.	–
	CP output cancel during backtack term CPB.	O	OF	–	–	CPB.	on oF	ON OF	Output signal “CP” is prohibited during backtack term.	–
	CKD output cancel CKK.	O	ON	–	–	CKK.	on oF	ON OF	Output signal “CKD” is prohibited.	–
	F key function on control panel CNF.	O	SE	–	–	CnF.			Selection F key function.	–
							UP	UP	Display Up counter amount	–
							dn	DN	Display Down counter amount	–
							SE	SE	Display stitch amount of sensor	–
							SP	SP	Display routine speed of sewing machine.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ +	Operation mode during tacking D1.	O	M	–	–	d 1.			The operation mode during tacking is determined.	–
							n	M	During start tacking, even if the pedal is returned to neutral or the external run signal (S1) is turned OFF, the stitching will continue to the last tack process, and then will stop. Stitching will continue in the same manner for end tacking, and the needle will be lifted after thread trimming.	–
							d	D	The tacking speed will change according to the pedal toe down amount only during start tacking. (the maximum speed is the start tacking speed N.) The sewing machine will stop if the pedal is returned to neutral or external signal turned OFF during start tacking.	–
							C S T	C S T	The sewing machine will stop for a set time at each tack corner even with pedal toe down or if the external run signal (S1) is ON. The stop time can be adjusted with [CT]. This is used to accurately tack.	–
							C S U	C S U	The sewing machine will stop for a set time at each tack corner even with pedal toe down or if the external run signal (S1) is ON. The sewing machine stops at the UP position irrespective of the position. The stop time can be adjusted with [CT]. This is used to accurately tack.	–
							C S d	CSD	The sewing machine will stop for a set time at each tack corner even with pedal toe down or if the external run signal (S1) is ON. The sewing machine stops at the DOWN position irrespective of the position. The stop time can be adjusted with [CT]. This is used to accurately tack.	–

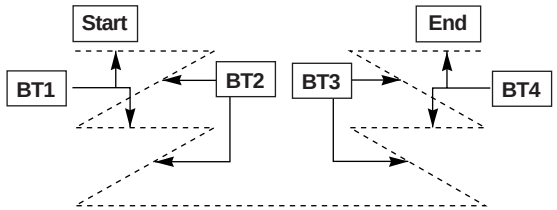
Caution
Set the start and end tack type, and number of stitches in the tacking mode before setting the functions in the D mode.



Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ +	Operation mode during start tack completion D2.	O	CON	–	–	d 2.			The operation mode during the completion of start tack is determined.	–
							Con	CON	If the pedal is toed down or the external run signals (S0, S1) are ON when start tacking is completed, the next straight line stitching will begin.	–
							StP	STP	Even if the pedal is toed down or the external run signals (S1) turned ON when start tacking is completed, the sewing machine will stop. The next straight line stitching will start when the pedal is toed down for neutral again, or when the external run signals (S1) is turned OFF to ON.	–
							trn	TRM	The thread is trimmed when start tacking is completed. This is used for continuous tack stitch.	–
	Stop time at each corner during start and backtacking CT.	O	5	x10 msec	0 to 99	CT.	**	**	The stop time at each corner during tacking can be set when [CST] in operation mode D1 is set.[CSU], [CSD]	–
	Tack alignment BM.	O	OF	–	–	bn.			The backstitch solenoid operation timing can be set to align the tacking.	–
							on	ON	Set to [ON] : Tacking speed less than 1000 rotations.	–
							oF	OF	Set to [OFF] : Tacking speed 1000 rotations or more.	–
	No. of stitch compensation for start tacking alignment BT1.	O	C	–	0 to F	bt 1.	*	*	By finely adjusting the backstitch solenoid operation timing of start tacking from forward to reverse, the no. of stitches can be compensated. The relation of the setting value and no. of stitch compensation is as shown below.	–
	No. of stitch compensation for start tacking alignment BT2.	O	2	–	0 to F	bt 2.	*	*	By finely adjusting the backstitch solenoid operation timing of start tacking from forward to reverse, the no. of stitches can be compensated. The relation of the setting value and no. of stitch compensation is as shown below.	–
	No. of stitch compensation for start tacking alignment BT3.	O	5	–	0 to F	bt 3.	*	*	By finely adjusting the backstitch solenoid operation timing of start tacking from reverse to forward, the no. of stitches can be compensated. The relation of the setting value and no. of stitch compensation is as shown below.	–

Caution
If the operation mode during tacking D1 is set ti [CST], [CSU] and [CSD], the tacking alignment functions BM, BT1, BT2, BT3 and BT4 will be invalid.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ + D	No. of stitch compensation for end tacking alignment BT4.	O	0	–	0 to F	b r 4.		*	By finely adjusting the backstitch solenoid operation timing of end tacking from forward to reverse, the no. of stitches can be compensated. The relation of the setting value and no. of stitch compensation is as shown below.	–
	No. of tacking stitches (+) 15 stitches function BTP.	O	OF	–	–	b r P.	o n o F	ON OF	15 stitches are added to the set No. of start and end tacking stitches. For example, if the set No. of start tacking stitches is 4 stitches, the actual No. of start tacking stitches will be 19 stitches (4+15).	–
	No. of tacking stitches addition stitches function BTO.	O	0	–	0 to 99	b r o.		**	[BTO] setting stitches are added to the set No. of start and end tacking stitches. For example, if the set No. of start tacking stitches is 4 stitches and [BTO] setting value is 20 stitches, the actual No. of start tacking stitches will be 24 stitches (4+20).	–
	Full heeling function immediately after start tacking stop BTT.	O	ON	–	–	b r r.	o n o F	ON OF	If full heeling is performed immediately after start tacking stops, end tacking will not be performed, and the sewing machine will stop after thread trimming.	–
	Temporary stop immediately before end tacking stitch CSJ.	O	OF	–	–	C S J.	o n o F	ON OF	ON The sewing machine temporarily stops immediately before end tacking stitch (Regardless of the position, the sewing machine stops at DOWN popsition.). Stop time can be adjusted with the function of stop time CT.	–



Relation of no. of compensated stitches and setting value

Setting value	9	8	7	6	5	4	3	2
No. of compensated	–2,1/4	–2	–1,3/4	–1,2/4	–1,1/4	–1	–3/4	–2/4
Setting value	1	0	A	B	C	D	E	F
No. of compensated	–1/4	0	+1/4	+2/4	+3/4	+1	+1,1/4	+1,2/4

Caution
If the operation mode during tacking D1 is set to [CST], [CSU] and [CSD], the tacking alignment functions BM, BT1, BT2, BT3 and BT4 will be invalid.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ +	The speed operation mode when both the medium speed signal and S5 V signal is ON. SPN.	O	OF	–	–	SPn.			When both the medium speed signal (medium speed run signal S5, medium speed command signal SPM) and the end tacking speed run signal S5 V is ON, the speed operation mode can be set.	–
							on	ON	If both the medium speed signal (S5, SPM) and the end tacking speed run signal (S5 V) is ON, the speed will be the end tacking speed N.	–
							oF	OF	If both the medium speed signal (S5, SPM) and the end tacking speed run signal (S5 V) is ON, the speed will be the end tacking speed V.	–
	Settable types of tacking BTM.	O	6	–	1 to 7	bTn.			Determine the type of tacking that can be set with the front and end tacking type ([B], [D] keys) in the tacking setting mode with setting values 1 to 7.	–
							1	1	Once tacking (V tacking)	–
							2	2	Double tacking (N tacking)	–
							3	3	Triple tacking (M tacking)	–
							4	4	4 repeat tacking (W tacking)	–
							5	5	5 repeat tacking	–
							6	6	6 repeat tacking	–
							7	7	7 repeat tacking	–
	Input signal S7 operation mode during preset stitching S7M.	O	OF	–	–	S7n.	on	ON	If the backstitch related inputs are turned ON during preset stitching, the backstitch solenoid will turn ON.	–
							oF	OF		
	Manual backstitch ON timing 1 S7U.	O	OF	–	–	S7U.	on	ON	The backstitch solenoid drive timing by the backstitch signal S7 is synchronized with the UP position. (When this function setting is [OF] setting, it will be synchronized with the random position.)	–
							oF	OF		
	Manual backstitch ON timing 2 S7D.	O	OF	–	–	S7d.	on	ON	The backstitch solenoid drive timing by the backstitch signal S7 is synchronized with the DOWN position. (When this function setting is [OF] setting, it will be synchronized with the random position.)	–
							oF	OF		

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ +	The OFF timing setting of output B when the backstitching signal (S7) is OFF setting. 7BD.	O	OF	–	–	7bd.	on oF	ON OF	When the manual backstitching signal (S7) is OFF setting, the OFF timing of the backstitching output B will be synchronized with the UP position. (When this function setting is [OF] setting, it will be synchronized with the DOWN position.)	–
	The maximum tacking stitches (maximum stitches is 99 stitches) BTN.	O	OF	–	–	btn.			The maximum tacking stitches can be set.	–
							on	ON	The No. of maximum tacking stitches will be 99 stitches. The No. of start and end tacking stitches will be the same stitches, the No. of start and end tacking stitches A and D can be set by the 2 figures of [A] and [B] of the operation panel, and the No. of start and end tacking stitches B and C can be set by the 2 figures of [C] and [D] of the operation panel.	–
							oF	OF	The No. of maximum tacking stitches is 15 stitches.	–
	No. of end tacking stitches during direct heeling BCC.	O	OF	–	–	bCC.	on oF	ON OF	The No. of end tacking stitches with direct heeling will be the No. of stitches C + 1 stitch when operation mode D1 is set to [D] [M] during tacking.	–
	Operation mode during thread trimmer cancel signal [TL] setting TLS.	O	OF	–	–	tLS.	on oF	ON OF	The operation mode for when the thread trimmer cancel signal (TL) is input will be set.	–
	Input signal BTL quick pressing operation BTS.	O	ON	–	–	btS.			The tacking cancel signal [BLT] operation is set.	–
							on	ON	Tacking is prohibited while the tacking cancel signal [BTL] is ON.	–
							oF	OF	The tacking operation is prohibited once after quick pressing (OFF-ON-OFF) of the tacking cancel signal [BTL].	–
	Input signal SB and EB quick pressing operation BS.	O	OF	–	–	bS.			The start and end tacking cancel signals SE and EB operations are set.	–
							on	OF	The start tacking operation is prohibited while the start tacking cancel signal SE is ON. (Same for end tacking cancel signal EB.)	–
							oF	ON	The start tacking operation is prohibited once after quick pressing (OFF-ON-OFF) of the start tacking signal SE. (Same for end tacking cancel signal EB.)	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode ↓ + P	Operation when input signal BTL is ON BTD.	O	ON	–	–	bTd.	on oF	ON OF	When the tacking is set to OFF, if tacking cancel signal (BTL) turns ON, the tacking will be permitted. (When this function is set to OFF, the tacking will be prohibited.)	–
	Operation when input signal SB and EB tacking OFF are set BD.	O	OF	–	–	bd.	on oF	ON OF	If the start tacking validity ([A] key) is set to OFF (–) in the tacking setting mode, start tacking can be validated by turning the start tacking cancel signal SE ON. (Same for end tacking cancel signal EB.)	–
	End tacking cancel mode with input signal PSU PNE.	O	OF	–	–	Pnd.	on oF	ON OF	When end tacking is set, if the needle UP position priority stop signal PSU turns ON during operation, the end tacking will not be executed after stopping at the needle UP position. After thread trimming, the presser foot will lift.	–
	The buzzer of control panel validity BZ.	O	ON	–	–	b-.	on oF	ON OF	The buzzer of control panel will be validate.	–

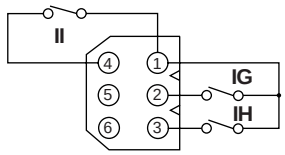
Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting (Digital display)		Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Error code didplay (Once ahead) to (Four times ahead)	1. to 4.	O	E- -	–	–	1. 1 4.	E - -	E- -	Error codes of once ahead to four times ahead are displayed. For details of error code, refer to [24. Error Display]. Data can be cleared by simultaneously pressing ([A, 1-2] + [D,==>]) keys.	–
	Total integration time of power on	P.	O	0	x10 hours	0 to 9999	P.	****	****	Total integration time of power on is displayed. Data can be cleared by simultaneously pressing ([A, 1-2] + [D,==>]) keys.	–
	Total integration time of motor run	M.	O	0	x10 hours	0 to 9999	M.	****	****	Total integration time of motor run is displayed. Data can be cleared by simultaneously pressing ([A, 1-2] + [D,==>]) keys.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Input display IA. to IP. I1. to I7.	O	–	–	–	A. / 1 / P. / 1. / 1 / 2.	o n ON o F OF	The input status (ON/OFF) of the input signal IA to IP and I1 to I7.	–

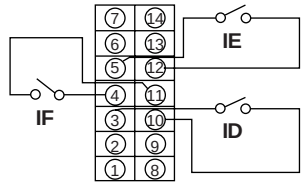
Caution

Correspondence of the display and input signal

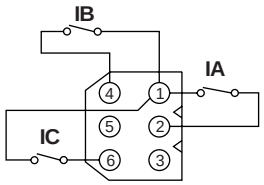
Input signal (Factory setting)		Display
Pedal toe down	(S1)	IG
Pedal full heeling	(S2)	IH
Pedal light heeling	(S3)	II
Presser foot lifter signal	(F)	IF
Input signal	(TL)	ID
Backstitching signal	(S7)	IE
Input signal	(PSU)	IA
Input signal	(PSD)	IB
Input signal	(S0)	IC
Reserved input signal	(IO1)	I1
Reserved input signal	(U)	I2
Reserved input signal	(NO)	I4
Reserved input signal	(NO)	I5
Presser foot lifter signal	(F)	I6
Reserved input signal	(NO)	I7



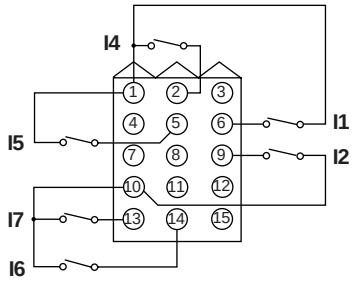
Lever connector



Sewing machine connector



Option A connector



Option B connector

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Encoder signal display (A phase) ECA.	O	–	–	–	ECA.	on oF	ON OF	The input status (ON/OFF) of the motor encoder A phase is displayed.	–
	Encoder signal display (B phase) ECB.	O	–	–	–	ECb.	on oF	ON OF	The input status (ON/OFF) of the motor encoder B phase is displayed.	–
	Detector signal display (UP signal) UP.	O	–	–	–	UP.	on oF	ON OF	The input status (ON/OFF) of the detector UP signal is displayed.	–
	Detector signal display (DOWN signal) DN.	O	–	–	–	dn.	on oF	ON OF	The input status (ON/OFF) of the detector DN signal is displayed.	–
	Display the angle from down position DR.	O	–	x2 Degree	0 to 180	dr.	on oF	ON OF	Display the angle of current position from down position.	–
	Display the voltage of VC1 PD.	O	–	–	0 to 3FF	Pd.	***	***	The numerical value that is equivalent to the variable speed voltage VC with the pedal toe down is displayed. Display range : 000 to 3FF	–
	Display the voltage of VC2 VC.	O	–	–	0 to 3FF	uC.	***	***	The numerical value that is equivalent to the variable speed voltage VC with the option B connector is displayed. Display range : 000 to 3FF	–

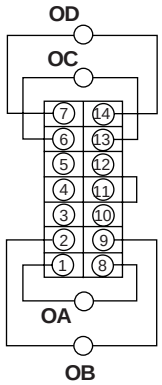
Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Output signal display	X	–	–	–	o Ad.	o n	The output status (ON/OFF) of the output signal OA to OD, OF, O1 to O7, OJ, OK, OO, OP.	–
	OAD. to ODD.					o Id.	o F		
	OFD.					o dd.	ON		
	O1D. to O7D.					o Fd.	OF		
	OJD.					o Id.			
	OKD.					o nd.			
	OOD.					o Jd.			
	OPD.					o td.			
						o od.			
						o Pd.			

Note : When CPK is OFF on C mode, the O6D function is invalidated on E mode.

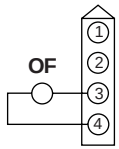
Caution

Correspondence of the display and output signal

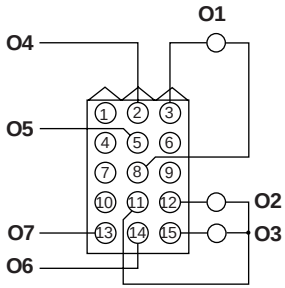
Input signal (Factory setting)		Display
Thread trimming output	(T)	OAD
Wiper output	(W)	OBD
Backstitch output	(B)	OCD
Thread release output	(L)	ODD
Presser foot lifter output	(FU)	OFD
Virtual output1	(OT1)	O1D
Output for needle cooler	(NCL)	O2D
TF output	(TF)	O3D



Sewing machine connector



Presser foot lifter connector



Option B connector

Caution

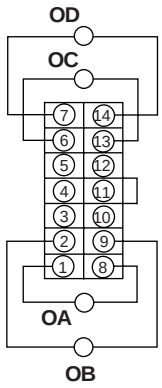
Output [O4, O5, O6, O7] are not solenoid output signal.
Also these signal are dual port of input and output.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Solenoid output OAO. to ODO. OFO. O1O. to O7O. OJO. OKO. OOO. OPO.	X	–	–	–	oA0. od0. of0. oI0. on0. oJ0. ot0. oo0. oP0.	ON OF	The output status (ON/OFF) of the solenoid output OA to OD, OF, O1 to O7, OJ, OK, OO, OP with the [D,= =>] key ON/OFF is changed. Do not turn the O4 to O7 outputs ON/OFF with the [D,= =>] key. **Note : When CPK is OFF on C mode, the O6O function is invalidated on E mode.**	–

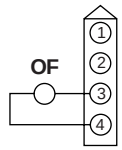
Caution

Correspondence of the display and output signal

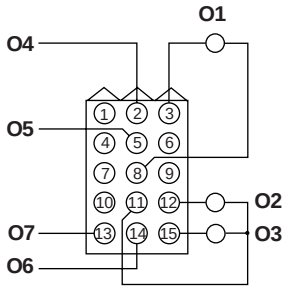
Input signal (Factory setting)		Display
Thread trimming output	(T)	OAO
Wiper output	(W)	OBO
Backstitch output	(B)	OCO
Thread release output	(L)	ODO
Presser foot lifter output	(FU)	OFO
Virtual output1	(OT1)	O1O
Output for needle cooler	(NCL)	O2O
TF output	(TF)	O3O



Sewing machine connector



Presser foot lifter connector



Option B connector

Caution

Output [O4, O5, O6, O7] are not solenoid output signal.
Also these signal are dual port of input and output.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
E mode ↓ + ↑ + A 1-2	Rated output display WT.	O	55	Watt	–	WT.			The motor's rated output value is displayed.	–
							55		[05] refers to 550 W.	–
							75		Not used.	–
	Voltage display VL.	O	100	Volt	–	VL.			The rated input voltage value in the control box is displayed.	–
							100		[100] refers to 100 V class.	–
							200		[200] refers to 200 V class.	–
	Model display TP.	O	MF	–	–	TP.			The control box model name is displayed.	–
							N		Not used.	–
							MF		SC-380	–
	Data version No. DV.	O	***	–	–	DV.	***	***	The data version No. (3-digit alpha-numeral) of the EEPROM is displayed.	–
	Software version No. RV.	O	***	–	–	RV.	***	***	The version No. (3-digit alpha-numeral) of the software is displayed.	–
	Display previous simple setting selected. T.	O	–	–	–	T.	****	****	Display previous simple setting selected.	–

Note) For the details of each function, refer to 19. CUTTER OUTPUT.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
F mode ↓ + ↑ + SL	Set No. of stitches A for cutter output (Setting the delay time during chain-off output ON) COA.	O	0	Stitches	0 to 99	CoA.		**	The No. of stitches A (delay during chain-off output ON) for chain-off output operation can be set. When CTR=ON, the No. of stitches for cutter output OFF can be set.	–
	Set No. of stitches B for cutter output (Setting the delay time during chain-off output OFF) COB.	O	0	Stitches	0 to 99	Cob.		**	The No. of stitches B (delay during chain-off output OFF) for chain-off output operation can be set. When CTR=ON, the No. of stitches for cutter output ON can be set.	–
	Set No. of stitches C for cutter output COC.	O	0	Stitches	0 to 99	CoC.		**	The No. of stitches C (delay during cutter output ON) during cutter output operation can be set.	–
	No. of stitches for BT output ON after sensor OFF setting X.	O	0	Stitches	0 to 99	X.		**	The No. of stitches to be stitched before the output BT for the in-tacking signal is turned ON after the sensor turns OFF can be set.	–
	No. of stitches for sewing machine stop after BT output ON setting Y.	O	0	Stitches	0 to 99	Y.		**	The No. of stitches to be stitched before the sewing machine stops after the output BT for the in-tacking signal turns ON can be set.	–
	No. of stitches for BT output OFF after start of stitching setting Z.	O	12	Stitches	0 to 99	Z.		**	The No. of stitches to be stitched before the output BT for in-tacking signal is turned OFF after stitching is started can be set.	–
	Delay time to when S output turns from OFF to ON SD.	O	0	msec	0 to 508	Sd.		***	The delay time for the output SL to turn from OFF to ON can be set in 2 msec intervals. The cutter output time setting is also possible.	–
	Delay time to when SL output turns from ON to OFF ED.	O	0	msec	0 to 508	Ed.		***	The delay time for the output SL to turn from ON to OFF can be set in 2 msec intervals. The chain-off output mesh judgment time setting is also possible.	–
	No. of set stitches during SL output ON selection mode SLH.	O	OF	–	–	SLH.			The No. of set stitches for the output SL can be selected from HOF set No. of stitches (during ON setting) or SLN set No. of stitches (during OFF setting).	–
							on	ON	Setting HOF function.	–
							oF	OF	Setting SLN function.	–
	SL output start position setting SLK.	O	OF	–	–	SLt.	on	ON	The output of SL for thread dislocation prevention starts when the needle lift operation (US, U, UF) is completed.	–
							oF	OF		

Note) For the details of each function, refer to 19. CUTTER OUTPUT.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
F mode ↓ + ↑ + SL	SL output start position during SLS function ON setting SLT.	O	OF	–	–	SLT.	on oF	ON OF	When the SL output operation mode SLS is ON while the motor is stopped, the output of SL for thread dislocation prevention will start after the thread is trimmed.	–
	Speed limit M except tacking and SL on SLL.	O	OF	–	–	SLL.	on oF	ON OF	If the output SL turns ON during an operation other than tacking, the speed is limited to that set in the medium speed M.	–
	SL output operation during motor stop SLS.	O	OF	–	–	SLS.	on oF	ON OF	The output SL is ON even when the motor is stopped.	–
	OT1 output blower output setting O1B.	O	OF	–	–	o1b.	on oF	ON OF	Virtual output OT1 will be set to blower output of cutter function.	–
	OT2 output chain-off output setting O2M.	O	OF	–	–	o2M.	on oF	ON OF	Virtual output OT2 can be used as the chain-off output.	–
	OT3 output cutter output setting O3M.	O	OF	–	–	o3M.	on oF	ON OF	Virtual output OT3 can be used as the cutter output.	–
	Mesh judgment control with IR2 input I2M.	O	OF	–	–	i2M.	on oF	ON OF	The mesh judgment control of cutter specification is added to chain-off output. Refer to the section [21. Input/output function for signal on C mode setting] for details on the IO2, IR2 and IS2 signal function.	–
	Setting I * 3 signal for manual cutter output CTY.	O	OF	–	–	CTY.	on oF	ON OF	When the IO3, IR3 and IS3 signals are ON, the output is set to the manual cutter output. Refer to the section [21. Input/output function for signal on C mode setting] for details on the IO3, IR3,and IS3 signal function.	–
	Status of cutter output photo switch (I*3) signal according to OT3 output CTM.	O	OF	–	–	CTM.			The change status of the IO3, IR3 and IS3 signal photo switch that outputs the cutter output by the virtual output OT3 can be selected. Refer to the section [21. Input/output function for signal on C mode setting] for details on the IO3 and IR3 and IS3 signal function.	–
							on	ON	The cutter output by the OT3 is output at both changes (OFF=>ON) (ON=>OFF) of the IO3, IR3 and IS3 and IS3 signal function.	–
							oF	OF	The cutter output by the OT3 is output at only the (OFF=>ON) change of the IO3, IR3 and IS3 signal photo switch.	–
	Turn OT3 output ON/OFF per set No. of stitches when I*3 signal is ON CTR.	O	OF	–	–	CTr.	on oF	ON OF	When the IO3, IR3 and IS3 signals are ON, the virtual output OT3 is turned ON/OFF per set No. of stitches.(When this is turned ON, the cutter specifications by the sensor will be invalidated.) The set No. of stitches can be set with the cutter specifications No. of stitches A (non-stitching chain ON delay) setting COA function, cutter specifications No. of stitches B (non-stitching chain ON delay) setting COB function and the cutter specifications No. of stitches C (non-stitching chain ON delay) setting COC function. Refer to the section [21. Input/output function for signal on C mode setting] for details on the IO3,IR3 and IS3 signal function.	–

Note) For the details of each function, refer to 19. CUTTER OUTPUT.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
F mode ↓ + ↑ + SL	Automatic cutter output prohibit during sensor ON CSC.	O	OF	–	–	CSC.	on oF	ON OF	The output of the automatic cutter output is prohibited while the sensor is ON.	–
	Automatic cutter output prohibit during sensor OFF CEC.	O	OF	–	–	CEC.	on oF	ON OF	The output of the automatic cutter output is prohibited while the sensor is OFF.	–
	Cutter output prohibit when sensor is ON while stopped CTS.	O	OF	–	–	CTS.	on oF	ON OF	The output of the automatic cutter output is prohibited when the sensor input is ON while the sewing machine is stopped.	–
	Automatic thread trim setting after cutter sensor is turned off CAT.	O	OF	–	–	CAT.	on oF	ON OF	Automatic stop and trim setting, after the cutter sensor is turned off and then the number of stitch “C” set by “COC” function is run.	–
	Set I*1 input, NOP output to cutter BT specifications input/output CTL.	O	OF	–	–	CTL.	on oF	ON OF	The IO1,IR1 and IS1 signals and the run output OP1 are set to the cutter BT specifications input/output signals. Refer to the section [21. Input/output function for signal on C mode setting] for details on the IO3, IR3 and IS3 signal function.	–
	Preset stitching operation after operation signal OFF NMD.	O	OF	–	–	nMd.	on oF	ON OF	Only the preset No. of stitches is stitched after the operation signal (S1) is turned OFF.	–
	ROL output mode RLM.	O	OF	–	–	rLM.	on oF	ON OF	The roller lift output ROL will turn ON when presser foot lifting output FU, backtacking output B, virtual output OT2 are ON, and during tacking and thread trimming.	–
	No. of stitches setting for auxiliary feeding rear roller RLN.	O	0	Stitches	0 to 99	rLn.	**	**	The roller lower No. of stitches is set for the auxiliary feeding rear roller.	–

Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting (Digital display)		Specification	Ref. page
G mode ↓ + ↑ +	Thread trimming mode	TR.	O	M1	–	–	tr.	M1	M1 to RK	The thread trimming timing for each manufacturer's thread trimming sewing machine can be set. Same function as the P mode thread trimming mode [TR]. When [PRG] is set, the sewing machine operation and thread trimming timing can be set when combined with the functions [TRM], [LTM] or [LLM].	–
	Motor operation mode during thread trimming	TRM.	O	LK	–	–	trM.			The motor operation mode during thread trimming can be set when thread trimming mode TR is set to [PRG].	–
								LK	LK	The motor will run for the lockstitch thread trimming sewing machine.	–
								rK	RK	The motor will run for reverse thread trimming.	–
								tA	KA	The motor will run (A mode) for the chain stitch thread trimming sewing machine.	–
								tb	KB	The motor will run (B mode) for the chain stitch thread trimming sewing machine.	–
								UP	UP	The motor will run with special functions for the lockstitch thread trimming sewing machine. The motor stop time TD before thread trimming will be the needle UP position reference.	–
								dn	DN	The motor will run with special functions for the lockstitch thread trimming sewing machine. The motor stop time TD before thread trimming will be the needle DOWN position reference.	–
	Thread trimming output (T) output mode	LTM.	O	T2	–	–	LTM.	T1	T1	Thread trimming mode TR becomes effective when [PRG] is set. The output timing mode of the thread trimming output (T) can be selected. For the details of the selection of the output timing of thread trimming output (T), refer to [12.1) Thread trimming timing when thread trimming mode TR setting is PRG].	–
								T2	T2		
								T3	T3		
								T4	T4		
								TK	TK		
								TS	TS		
								T7	T7		
	Thread release output (L) output mode	LLM.	O	L2	–	–	LLM.	L1	L1	Thread trimming mode TR becomes effective when [PRG] is set. The output timing mode of the thread release output (L) can be selected. For the details of the selection of the output timing of thread release output (L), refer to [12.1) Thread trimming timing when thread trimming mode TR setting is PRG].	–
								L2	L2		
								L3	L3		
								L4	L4		
								LK	LK		
								LS	LS		
								L7	L7		
	Thread trimming output start angle	TS.	O	24	Degree	0 to 360	TS.	***	***	When the thread trimming mode TR is set to [PRG], the output start angle of the thread trimming output (T) can be set. Set according to the thread trimming output (T) timing chart.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
G mode ↓ + ↑ + C	Thread trimming output angle TE.	O	30	Degree	0 to 360	rE.	***	***	When the thread trimming mode TR is set to [PRG], the output end angle of the thread trimming output (T) can be set. Set according to the thread trimming output (T) timing chart.	–
	Thread release output start angle LS.	O	188	Degree	0 to 360	LS.	***	***	When the thread trimming mode TR is set to [PRG], the output start angle of the thread release output (L) can be set. Set according to the thread release output (L) timing chart.	–
	Thread release output angle LE.	O	134	Degree	0 to 360	LE.	***	***	When the thread trimming mode TR is set to [PRG], the output end angle of the thread release output (L) can be set. Set according to the thread release output (L) timing chart.	–
	Thread trimming output start time T1.	O	20	msec	0 to 998	r1.	***	***	The output start time of the thread trimming output (T) for chain stitch sewing machine can be set. When the thread trimming mode TR is set to [PRG], the output start time of the thread trimming output (T) for lock stitch sewing machine can be set. Set according to the thread trimming output (T) timing chart.	–
	Thread trimming output time T2.	O	90	msec	0 to 998	r2.	***	***	The output time of the thread trimming output (T) for chain stitch sewing machine can be set. When the thread trimming mode TR is set to [PRG], the output time of the thread trimming output (T) for lock stitch sewing machine can be set. Set according to the thread trimming output (T) timing chart.	–
	Thread release output start time L1.	O	150	msec	0 to 998	L1.	***	***	The output start time of the thread release output (L) for chain stitch sewing machine can be set. The output start time of the thread release output (L) during chain stitching thread trimming timing A can be set. The chain stitching thread trimming timing B is invalid at this time. When the thread trimming mode TR is set to [PRG], the output start time of the thread release output (L) for lock stitch sewing machine can be set. Set according to the thread release output (L) timing chart.	–
	Thread release output time L2.	O	70	msec	0 to 998	L2.	***	***	The output time of the thread release output (L) for chain stitch sewing machine can be set. The output time of the thread release output (L) during chain stitching thread trimming timing A can be set. The chain stitching thread trimming timing B is invalid at this time. When the thread trimming mode TR is set to [PRG], the output time of the thread release output (L) for lock stitch sewing machine can be set. Set according to the thread release output (L) timing chart.	–
	Thread release outpu start time (Output TF start time) R1.	O	40	msec	0 to 508	r1.	***	***	The output start time of the thread release output (L) during chain stitching thread trimming timing B can be set. The chain stitching thread trimming timing A is invalid at this time. The output start time of the output (TF) can be set. Set according to teach output's timing chart.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
G mode ↓ + ↑ +	Thread release output time (TF output time) R2.	O	66	msec	0 to 508	r 2.	***	***	The output time of the thread release output (L) during chain stitching thread trimming timing B can be set. The chain stitching thread trimming timing A is invalid at this time. The output time of the output (TF) can be set. Set according to teach output's timing chart.	–
	Condensed stitching start time (Stop time before thread trimming) R3.	O	50	msec	0 to 508	r 3.	***	***	The time of when the sewing machine begins condensed stitching after the condensed stitching (CH) turn ON during start/end condensed stitching can be set. However, during the end condensed stitching in the chain stitching thread trimming timing B, this time [R3] will be the time for end condensed stitching after the thread release output (L) turns OFF. (If end condensed stitching is not set, the time will be that for the needle to rise from the DOWN to UP position after the thread release output (L) is turned OFF.)	–
	Wiper output start time W1.	O	10	msec	0 to 998	W 1.	***	***	When the thread trimming mode TR is set to [PRG], the output start time of the wiper output (W) can be set. Set according to the wiper output (W) timing chart.	–
	Wiper output time W2.	O	8	x10 msec	0 to 999	W 2.	***	***	When the thread trimming mode TR is set to [PRG], the output time of the wiper output (W) can be set. Set according to the wiper output (W) timing chart.	–
	Wiper output operation mode WMD.	O	W	–	–	W n d.			The output timing mode of the wiper outputÅiWÅjcan be set. The timing that the wiper output W is turned OFF can be set with the thread trimming signal S2. Refer to [12 . 1)]. Thread trimming timing when thread trimming mode TR setting is [PRG] for details on setting the OFF timing.	–
							W	W	If the S2 signal turns OFF within the wiper output W set time, the W output will turn OFF after the set time has passed. If the S2 signal turns OFF after the wiper output W set time has passed, the W output will turn OFF after the set time has passed.	–
							o r	OR	If the S2 signal turns OFF within the wiper output W set time, the W output will turn OFF after the set time has passed. If the S2 signal turns OFF after the wiper output W set time has passed, the W output will turn OFF when the S2 signal turns OFF.	–
							A n	AN	If the S2 signal turns OFF without the wiper output W set time, the W output will turn OFF when the S2 signal turns OFF. If the S2 signal turns OFF after the wiper output W set time passes, the W output will turn OFF after the set time has passed.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
G mode ↓ + ↑ +						r U	RU	This setting is valid when the reverse run needle setting after thread trimming RU is ON. When the reverse run needle lifting is completed after the thread is trimmed, the W output will turn ON. If the S2 signal turns OFF within the wiper output W set time, the W output will turn OFF after the set time has passed. If the S2 signal turns OFF after the wiper output W set time has passed, the W output will turn OFF after the set time has passed.	–
						C H	CH	This setting is valid when the thread trimming motor operation mode TRM is set to KB. The W output will start before the short stitch. If the S2 signal turns OFF within the wiper output W set time, the W output will turn OFF after the set time has passed. If the S2 signal turns OFF after the wiper output W set time has passed, the W output will turn OFF after the set time has passed.	–
						F U	FW	This setting is valid when the thread trimming motor operation mode TRM is set to KB. The W output will start before the sort stitch. The W output will turn OFF when the set time has passed after the thread trimming operation is completed.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
G mode ↓ + ↑ + C	Presser foot lifting output start time F1.	O	140	msec	0 to 998	F 1.	***	***	When the thread trimming mode TR is set to [PRG], the output start time for the presser foot lifting output (FU) is set. Set according to the presser foot lifting output (FU) timing chart.	–
	Time to motor drive after presser foot lifter bring down FD.	O	176	msec	0 to 998	F d.	***	***	The time for the motor to start driving after the presser foot output FU is turned OFF when pedal toe down or external run signal (S0,S1) ON during presser foot lifting can be set in 2 millisecond units.	–
	Interlock time during thread trimming IL.	O	140	msec	0 to 998	I L.	***	***	The interlock time that prohibits operation during thread trimming can be set. Manual calculation will be used during the [P] mode thread trimming (TR) timing [PRG] ,[KA3], [KA4], [KB3], [KB4], so the setting is valid. [KA1], [KA2], [KB1], [KB2] are for automatic calculation and cannot be set.	–
	Interlock time during no thread trimming IT.	O	0	msec	0 to 510	I T.	***	***	The interlock time during the no thread trimming timing can be set.This is valid when the [P] mode thread trimming timing [NO] or thread trimming release signal (TL) is turned ON.	–
	Motor rotation after motor stop before thread trimming TDS.	O	OF	–	–	T d S.	o n o F	ON OF	After the motor stops, it will start rotating after the thread trimming output T turns ON and the delay time has passed. The delay time can be set by the [TD] function.	–
	Motor stop time during lockstitch and R output time during chain stitch TD.	O	50	msec	0 to 508	T d.	***	***	The motor stop time before thread trimming during lock stitch can be set in 2 msec intervals. The output R output time during chain stitch can be set in 2 msec. When the chain stitch mode is set, it is possible to set to the delay time of the motor “R3”. Please refer to “12 .1) Thread trimming timing when thread trimming mode TR setting is PRG” about the delay time setting.	–
	Delay setting before reverse run during RU setting RUS.	O	OF	–	–	r U S.	o n o F	ON OF	Delay time before reverse run (RU operation) after thread trimming is completed can be set with RT when the thread trimming reverse needle lift RU is set to ON.	–
	Delay setting before reverse run during RU setting RT.	O	76	msec	0 to 508	r T.	o n o F	ON OF	When reverse needle lift after thread trimming RU is ON and RUS is ON, the delay time before the motor reverse run after thread trimming can be set in 2 msec intervals.	–
	Reverse run needle lifting [RU] after output T,L and W RUM.	O	OF	–	–	r U n.	o n	ON OF	Cannot be used.	–
	Wiper output OFF trimming with (S1) signal WS1.	O	OF	–	–	W S 1.	o n o F	ON OF	If the pedal is toed down or external output signal (S2) is turned ON during the wiper output time [W2] (after thread trimming interlock time),the wiper output time [W] will turn OFF. The presser foot lifting output (FU) will also turn OFF simultaneously, and the sewing machine will run after the [FD] time. Use this for the air type wiper. This is effective for standing operation (automatic machine operation).	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
G mode ↓ + ↑ +	Operation mode with thread trimming signal to shift the needle stop position and return to the original needle stop position before the thread trimming signal S2T.	O	OF	–	–	S2F.			If the sewing machine pulley is rotated by hand and set to 1 position while the sewing machine is stopped before thread trimming, if the needle UP position is 2 position, the needle DOWN position will shift. To return to the original stop position after that, fully heel the pedal, or set the operation mode by turning thread trimming signal (S2) ON.	–
							on	ON	The same operation as then next [S2P] setting value ([NO], [TR], [PS]) is executed.	–
							oF	OF	The thread trimming operation is executed according to the thread trimming mode TR setting value ([KA1], [KA2], etc.).	–
	Operation mode with thread trimming signal when shifting the needle stop position before the thread trimming signal S2P.	O	TR	–	–	S2P.			The thread mode started with the full pedal heeling or thread trimming signal (S2) ON when rotating the sewing machine pulley, etc., manually, and leaving the UP position when in 1 position, and leaving the DOWN position when in 2 position.	–
							rr	TR	When [KA1] to [KA4] of the thread trimming mode [TR] are set, the thread trimming operation will be performed according to the settings after the needle is lifted. When [KB1] to [KB4] are set, the thread trimming operation will be performed according to the settings after the needle is lowered.	–
							PS	PS	The presser foot lifting operation will be executed after the needle is lifted. The thread trimming operation will not be executed.	–
							no	NO	The sewing machine does not rotate or perform thread trimming, and only the presser foot lifting operation is executed.	–
	Solenoid output OT1 manual/automatic change MAN.	O	ON	–	–	MAn.			The sewing of the solenoid output [OT1] manual/automatic output is selected.	–
							on	ON	The solenoid output [OT1] will be set to manual. The solenoid input signal IO1 is validated.	–
							oF	OF	The solenoid output [OT1] will be set to manual. The solenoid input signal IO1 is validated.	–
	Setting of no. of stitches during MAN [OFF]setting HOF.	O	7	Stitches	0 to 99	HoF.	**	**	This is valid when the solenoid output [OT1] manual/automatic output change is set to automatic. If the pedal is toed down or the external run signal (S00, S1, SH) is turned ON while the solenoid output [OT1] is ON, the OT1 output will turn OFF after the set No. of stitches.	–
	Weak brake ON simultaneously with wiper output (W) WB.	O	OF	–	–	Wb.	on	ON	The weak brake will turn ON when the wiper output (W) turns ON.	–
							oF	OF		
	Motor rotation operation when LTM function is set to T1,T2 or T3 TDT.	O	OF	–	–	Fdt.	on	ON	When the thread trimming output T mode LTM for lockstitch is set to [T1], [T2] or [T3], after the motor stops, it will start again after the thread trimming output T turns ON and the delay time has passed. Set time can be set by the [TD] function.	–
							oF	OF		

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
H mode ↓ + ↑ +	Upper limit of maximum speed [H] LHH.	O	90	x100 r/min	0 to 99	LHH.	**	The upper limit value of the maximum speed [H] in P mode is set. A value that exceeds the value set in this limiter cannot be set for the maximum speed [H]. The factory setting [90] refers to [90x100=9000] r/min.	–
	Lower limit of maximum speed [H] LHL.	O	0	x100 r/min	0 to 99	LHL.	**	The lower limit value of the maximum speed [H] in P mode is set. A value that is lower than the value set in this limiter cannot be set for the maximum speed [H].	–
	Upper limit of low speed [L] LLH.	O	5	x100 r/min	0 to 99	LLH.	**	The upper limit value of the maximum speed [L] in P mode is set. A value that exceeds the value set in this limiter cannot be set for the low speed [L]. The factory setting [5] refers to [5x100=500] r/min.	–
	Lower limit of low speed [L] LLL.	O	0	x100 r/min	0 to 99	LLL.	**	The lower limit value of the low speed [L] in P mode is set. A value that is lower than the value set in this limiter cannot be set for the low speed [L].	–
	Upper limit of thread trimming speed [T] LTH.	O	5	x100 r/min	0 to 99	LrH.	**	The upper limit value of the thread trimming speed [T] in P mode is set. A value that exceeds the value set in this limiter cannot be set for the thread trimming speed [T]. The factory setting [5] refers to[5x100=500] r/min.	–
	Lower limit of thread trimming speed [T] LTL.	O	0	x100 r/min	0 to 99	LrL.	**	The lower limit value of the thread trimming speed [T] in P mode is set. A value that is lower than the value set this limiter cannot be set for the thread trimming speed [T].	–
	Upper limit of start/end tacking (condensed stitching) speed LNH.	O	30	x100 r/min	0 to 99	LnH.	**	The upper limit value of the start/end tacking (condensed stitching) speed in P mode is set. A value that exceeds the value set in this limiter cannot be set for the start/end tacking (condensed stitching) speed. The factory setting [30] refers to [30x100=3000] r/min.	–
	Lower limit of start/end tacking (condensed stitching) speed LNL.	O	0	x100 r/min	0 to 99	LnL.	**	The lower limit value of the start/end tacking (condensed stitching) speed in P mode is set. A value that is lower than the value set in this limiter cannot be set for the start/end tacking (condensed stitching) speed.	–
	Upper limit of medium speed [M] LMH.	O	90	x100 r/min	0 to 99	LMH.	**	The upper limit value of the medium speed [M] in P mode is set. A value that exceeds the value set in this limiter cannot be set for the medium speed [M]. The factory setting [90] refers to [90x100=9000] r/min.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
H mode ↓ + ↑ + P	Lower limit of medium speed [M] LML.	O	0	x100 r/min	0 to 99	L n L.	** **	The lower limit value of the medium speed [M] in P mode is set. A value that is lower than the value set in this limiter cannot be set for the medium speed [M].	–
	Upper limit of slow start speed [S] LSH.	O	30	x100 r/min	0 to 99	L S H.	** **	The upper limit value of the medium speed [M] in P mode is set. A value that exceedsthe value set in this limiter cannot be set for the medium speed [M]. The factory setting [30] refers to [30x100=3000] r/min.	–
	Lower limit of slow start speed [S] LSL.	O	0	x100 r/min	0 to 99	L S L.	** **	The lower limit value of the medium speed [S] in P mode is set. A value that is lower than the value set in this limiter cannot be set for the medium speed [S].	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
J mode ↓ + ↑ + A 1-2 + B SL	Simple setting mode for Mitsubishi thread trimming sewing machine prohibit MAC.	O	ON	–	–	nAC.	on oF	ON OF	The simple setting mode (program mode [1] for Mitsubishi thread trimming sewing machine) cannot be entered. ([↓]+[A]+[B] key operation will not be possible.)	–
	[P], [G] mode thread trimmer mode TR prohibit TRC.	O	OF	–	–	rrC.	on oF	ON OF	The [P] mode thread trimmer mode, TR cannot be entered.([↓]+[↑] key operation (program mode P) will be possible.) The thread trimmer mode [G] cannot be entered. ([↓]+[↑]+[C] key operation will not be possible.)	–
	Rotation direction changeover prohibit CWC.	O	ON	–	–	CWC.	on oF	ON OF	Rotation direction changeover ([↓]+[M] key operationÅjduring the normal mode will not be possible.	–
	1-2 position changeover prohibit 12C	O	OF	–	–	12C.	on oF	ON OF	1-2 position changeover ([A] key operation) during the normal mode will not be possible.	–
	Slow start changeover prohibit SLC.	O	OF	–	–	SLC.	on oF	ON OF	Slow start validity changeover ([B] key operation) during the normal mode will not be possible.	–
	Speed setting key changeover prohibit SPC.	O	OF	–	–	SPC.	on oF	ON OF	Speed setting operation of normal mode ([C] key and [D] key operation) jwill not be possible.	–
	JKC.	O	OF	–	–	JkC.	on oF	ON OF	Not used.	–
	Start tacking validity changeover prohibit SBC.	O	OF	–	–	SbC.	on oF	ON OF	Start tacking validity changeover ([A] key operation) during the tacking mode will not be possible.	–
	No. of start tacking stitches changeover prohibit SNC.	O	OF	–	–	SnC.	on oF	ON OF	The No. of start tacking stitches setting ([A], [B] key operations) during the tacking mode will not be possible.	–
	End tacking validity changeover prohibit EBC.	O	OF	–	–	EbC.	on oF	ON OF	End tacking validity changeover ([C] key operation) during the tacking mode will not be possible.	–
	No. of end tacking stitches changeover prohibit ENC.	O	OF	–	–	EnC.	on oF	ON OF	The No. of end tacking validity changeover ([C], [D] key operations) during the tacking mode will not be possible.	–
	Start tacking type changeover prohibit SKC.	O	OF	–	–	StC.	on oF	ON OF	Start tacking type setting ([B] key operation) during the tacking mode will not be possible.	–
	End tacking type changeover prohibit EKC.	O	OF	–	–	EtC.	on oF	ON OF	End tacking type setting ([D] key operation) during the tacking mode will not be possible.	–

Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
J mode ↓ + ↑ + 1-2 + SL	Pattern stitching validity changeover prohibit	TSC.	O	OF	–	–	rSC.	on oF	ON OF	Preset stitching validity and backtacking validity changeover operation ([M] key operation) in the pattern mode will not be possible.	–
	Pattern stitching No. of stitches and times changeover prohibit	TNC.	O	OF	–	–	rnC.	on oF	ON OF	No of preset stitching stitches and No. of backtacking times setting operation ([C], [D] key operations) in the pattern mode will not be possible.	–
	Pattern mode pattern changeover prohibit	MDC.	O	OF	–	–	ndC.	on oF	ON OF	Preset stitching, backtacking and control switch panel data play mode changeover ([D] key operation) in the pattern mode will not be possible.	–
	Panel switch operation prohibit	PSW.	O	OF	–	–	PSW.	on oF	ON OF	Panel switch operation ([M], [A], [B], [C], [D] key operations) during the normal mode, tacking mode and pattern mode will not be possible. However, changeover into each mode will be possible.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
Q mode ↓ + A 1-2 + C	Virtual S1 operation with VC1 levels VCS.	×	OF	–	–	uCS.	on	ON	The virtual operation signal S1 is turned ON when the variable speed voltage VC1 and VC2 exceeded the set voltage level.	–
							oF	OF		
	Setting of VC1 and VC2 where virtual S1 turns ON VCL.	×	24	–	1 to 99	uCL.	**	**	The voltage level of the variable speed voltage VC1 and VC2 where virtual run signal S1 turns ON.	–
	Input voltage hysteresis during virtual S1 signal ON/OFF by VC1 and VC2 level VCD.	×	4	–	0 to 99	ud.	**	**	The voltage level hysteresis width for judging the ON/OFF of the virtual S1 signal when VCS turns ON can be set.	–
	VC1 curve reversal mode V1R.	×	OF	–	–	u1r.	on	ON	The voltage curve of the variable speed voltage VC1 is reversed.	–
							oF	OF		
	VC1 input 5 V/12 V changeover mode V15.	×	OF	–	–	u15.			The VC1 input range is set to 0 to 5 V.	–
							on	ON	VC1 maximum input voltage is set to 5 V.	–
							oF	OF	VC1 maximum input voltage is set to 12 V.	–
	VC2 operation mode VC2.	×	LM	–	–	uC2.			The external analog input VC2 function is set.	–
							uC	VC	Speed command input	–
							uS	VS	The virtual S1 signal turns on with the input voltage, and the sewing machine runs. This also acts as the speed command input.	–
							ur	VR	The VC2 input acts as the variable resistor on the control box panel, and the variable resistor is invalidated.	–
							bC	BC	During operation with the BC and BCR input, the speed set with the program P mode C8 is invalidated, and the speed is controlled with the VC2 input.	–
							LM	LM	The speed control input for reciprocal stroke change.	–
							Md	MD	The value set in the program P mode M is invalidated, and the middle speed is controlled with the VC2 input voltage.	–
							1	1	Virtual input IO1 is selected.	–
	VC2 curve reversal mode V2R.	×	OF	–	–	u2r.	on	ON	The external analog input VC2 curve is reversed.	–
							oF	OF		
	VC2 input 5 V/12 V changeover mode V25.	×	OF	–	–	u25.			The VC2 input rang is set to 0 to 5 V.	–
							on	ON	VC2 maximum input voltage is set to 5 V.	–
							oF	OF	VC2 maximum input voltage is set to 12 V.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
Q mode ↓ + A 1-2 + C ↘	Speed limiter curve inflection point 1 percentage VL1.	O	56	%	1 to 99	uL1.	**	**	The inflection point is set when using the reciprocal stroke change specification speed limiter process (VC2=LM.)	–
	Speed limiter curve inflection point 1 point VP1.	O	39	–	1 to 99	uP1.	**	**	Setting inflection point 1	–
	Speed limiter curve inflection point 2 point VP2.	O	42	–	1 to 99	uP2.	**	**	Setting inflection point 2	–
	Operation speed limit specification mode 1 FLM.	O	OF	–	–	FLM.	on oF	ON OF	The speed limit is valid only if the presser foot is rising when the VC2 operation mode is set to LM or the medium speed limit function LIM. Is set to ON during OT1 output ON.	–
	Operation speed limit specification mode 2 2LM.	O	OF	–	–	2LM.	on oF	ON OF	The speed limit is valid only if the virtual output OT2 is ON when the VC2 operation mode is set to LM or the medium speed limit function LIM. Is set to ON during OT1 output ON.	–

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
Q mode ↓ + A 1-2 + C	Speed command value correctly by middle speed digital during speed limit process. LMD.	O	OF	–	–	LMd.	on oF	ON OF	The middle speed during the speed limit process is read into the speed command value (speed high speed signal SPH, speed end tacking signal SPB, speed medium speed signal SPM, high speed run signal S4, end tacking speed run signal S5 V, medium speed run signal S5) other than the low speed from an external source by the digit.	–
	Speed limit with digital speed setting on operation panel HMD.	O	OF	–	–	Hmd.	on oF	ON OF	The speed during stitching other than tacking is limited by the digital speed setting (LED C and D) on operation panel.	–
	Ignore detector error E8C.	O	OF	–	–	E8C.			The sewing machine detector error E8 will be ignored.	–
							on	ON	If a signal is not received from the sewing machine detector within a set time during operation, the detector error E8 will not be displayed.	–
							oF	OF	If a signal is not received from the sewing machine detector within a set time during operation, the detector error E8 will be displayed and the sewing machine will stop.	–
	Thread break sensor valid TH.	O	OF	–	–	rH.	on oF	ON OF	The thread break detector is validated.	–
	Operation after thread break sensor detection TST.	O	TR	–	–	rSr.			The operation after the thread break is detected (thread break sensor detection) is set.	–
							no	NO	The operation continues, and the thread break sensor output THO turns ON.	–
							rr	TR	The sewing machine stops after the thread trimming, and then the thread break sensor output THO turns ON.	–
							Sr	ST	The sewing machine stops normally, and then the thread break sensor output THO turns ON.	–
	Speed to ignore thread break sensor B.	O	600	r/min	0 to 8999	b.	****	****	The speed to ignore the thread break sensor can be set.	–
	No. of stitches to ignore thread break sensor after starting stitching THS.	O	7	Stitches	0 to F	rH5.	**	**	Setting the number of stitch that the sensor of thread break detector becomes valid from first stitch.	–
	Number of stitches for judgment of thread break. THF.	O	0	Stitches	0 to F	rHF.	**	**	The No. of stitches to judge the thread break detection when the thread break sensor input continues for a certain number of stitches can be set.	–

Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
Q mode ↓ + A 1-2 + C	Operation mode with F input during sewing machine operation	RFU.	O	OF	–	–	rFU.	on oF	ON OF	The presser foot lifting output will turn ON by turning ON the presser foot lifting signal F during sewing machine operation. Note that the presser foot lifting signal S3 is invalid during sewing machine operation.	–
	Output of backtacking output (B) during OT1 output ON inhibited	S7C.	O	OF	–	–	S7C.	on oF	ON OF	The output of the backstitching output (B) with input S7 is inhibited while the virtual output (OT1) is ON.	–
	Medium speed (M) limit mode during OT1 output ON	LIM.	O	ON	–	–	LIM.	on oF	ON OF	The speed will be limited to that set in medium speed M while virtual output (OT1) is ON.	–
	Simultaneously ON of OP1 output during OT1 output ON	O1P.	O	OF	–	–	o1P.	on oF	ON OF	OP1 output will turn ON simultaneously when virtual output (OT1) is ON.	–
	Disregard of S3 signal of Lever Unit	LVB.	O	ON	–	–	LUb.	on oF	ON OF	When the lever unit run signal S1 is ON, the presser foot lift signal S3 will be ignored even when received.	–

Mode name	Function name		Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting	Specification	Ref. page
R mode ↓ + B SL + C	Reset	RESET	x	–	–	–	rESEt.		EEPROM data is returned to EEPROM back-up state. This function can be used when returning the function setting to the factory setting. Every time [D,==>] key is pressed for two seconds or more, the mode returns to the normal mode after copying (factory setting data) to (existing data).	–

Note) For the details of each function, refer to 15. SIMPLE SEQUENCE.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
S mode ↓ + SL +	KS1,KS2 output run mode KSM.	O	OF	–	–	tSM.			This is the virtual output KS1 and KS2 run mode.	–
							on	ON	During the one needle stitching, half-stitching (one needle stitching signal S01, needle lift signal U, half-stitching signal UD, backstitching during run signal US, backstitching during run signal UDS,etc.),The outputs KS1 and KS2 will turn ON.	–
							oF	OF	The KS1 and KS2 output swill turn ON only during normal operation.	–
	Simple sequence start conditions SQS.	O	NO	–	–	SqS.			The simple sequence start conditions are set.	–
							no	NO	The simple sequence will not start.	–
							in	IN	When the input signal I4 (IN4) is ON.	–
							t	T	When the thread trimming is completed.	–
							r	R	When run starts.	–
							S	S	When the motor starts. (This includes while stopped during the one needle stitching run.)	–
							tr	TR	When stitching starts after thread trimming.	–
							Sb	SB	When start tacking is completed. (If the start tacking setting is OFF, the operation will be identical to [TR].)	–
							Go	GO	Normal starting.	–
	When the motor stops (This includes while stopped during the one needle stitching run.) Simple seuence end conditions SQE .	O	NO	–	–	SqE.			The simple sequence end conditions are set.	–
							no	NO	The simple sequence is not compulsorily ended.	–
							in	IN	When the input signal (15) is ON.	–
							t	T	When the thread trimming is completed.	–
							r	R	When run starts.	–
							S	S	When the motor stops. (This includes while stopped during the one needle stitching run.)	–
							tr	TR	When stitching starts after thread trimming.	–
							Sb	SB	When start tacking is completed. (When the start tacking setting is [OF], the operation will be identical to [TR] setting.	–
							Go	GO	The use is prohibited.	–
	This is the simple sequence output KS1 output start time/output start No. of stitches setting changeover function. NS1.	O	OF	–	–	nS1.			[Time] / [No. of Stitches] selection for start of KS1 output. The [Time] / No. of Stitches] can be set with the KS1 output start [Time] / [No. of Stitches] setting K11.	–
							on	ON	The KS1 output start time can be set with a No. of stitches.	–
							oF	OF	The KS1 output start time can be set as a time. (10 msec unit)	–
	[Time]/[No. of Stitches] selection for KS1 output NE1.	O	OF	–	–	nE1.			This is the simple sequence output KS1 output time/output No. of stitches setting changeover function. The [Time] / [No. of Stitches] can be set with the KS1 output [Time] / [No. of Stitches] setting K12.	–
							on	ON	The KS1 output time can be set with a No. of stitches.	–
							oF	OF	The KS1 output time can be set as a time. (10 msec unit)	–

Note) For the details of each function, refer to 15. SIMPLE SEQUENCE.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
S mode ↓ + SL +	KS1 output start reference setting. S1S.	O	OF	–	–	S1S.			The simple sequence output KS1 output start reference is set. The setting time can be set with the KS1 output start [Time]/[No. of stitches] setting K11.	–
							on	ON	Using the input signal 12 ON as a reference after the start conditions are established, the KS1 output will turn ON after the set time has passed.	–
							oF	OF	Using the start conditions establishment as a reference, the KS1 output will turn ON after the set time has passed.	–
	KS1 output end reference setting. S1E.	O	OF	–	–	S1E.			The simple sequence output KS1 output end reference is set. The setting time can be set with the KS1 output [Time]/[No. of Stitches] setting K12.	–
							on	ON	Using the input signal 12 OFF as a reference after the KS1 output turns ON, the KS1 output will turn OFF after the set time has passed.	–
							oF	OF	Using the KS1 output ON as a reference, the KS1 output will turn OFF after the set time has passed.	–
	KS2 : Selection of Stitch amount and time till ON NS2.	O	OF	–	–	nS2.			Selection stitch amount and time till ON for simple sequence output “KS2” (Amount have to be set at “K21”)	–
							on	ON	Stitch amount is counted till ON	–
							oF	OF	Time is counted till ON (10 mill-second per each)	–
	KS2 : Selection of Stitch amount and time till OFF NE2.	O	OF	–	–				Selection stitch amount and time till OFF for simple sequence output “KS2” (Amount have to be set at “K22”)	–
							on	ON	Stitch amount is counted till OFF.	–
							oF	OF	Time is counted till OFF (10 mill-second pre each)	
	KS2 : Setting of count condition till ON S2S.	O	OF	–	–	S2S.			Setting start condition of counting till ON for simple sequence output “KS2”.	–
							on	ON	When Input signal “I7” become ON after the count start condition was established, counting will start.	–
							oF	OF	When the count start condition is established, counting will start.	
	KS2 : Setting of count condition till OFF S2E.	O	OF	–	–	S2E.			Setting start condition of counting till ON for simple sequence output “KS2”.	–
							on	ON	When Input signal “I7” become OFF after the count start condition was established, counting will start.	–
							oF	OF	When the count start condition is established, counting will start.	–
	KS3 : Selection of Stitch amount and time till ON NS3.	O	OF	–	–	nS3.			Selection stitch amount and time till ON for simple sequence output “KS3” (Amount have to be set at “K21”)	–
							on	ON	Stitch amount is counted till ON.	–
							oF	OF	Time is counted till ON (10 mill-second per each)	–
							oF	OF	When the count start condition is established, counting will start.	–

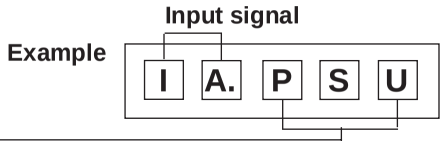
Note) For the details of each function, refer to 15. SIMPLE SEQUENCE.

Mode name	Function name	Oper ability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
S mode ↓ + SL + D	KS3 : Selection of Stitch amount and time till OFF NE3.	O	OF	–	–	nE3.			Selection stitch amount and time till OFF for simple sequence output "KS3" (Amount have to be set at "K22")	–
							on	ON	Stitch amount is counted till OFF	–
							oF	OF	Time is counted till OFF (10 mill-second per each)	–
	KS3 : Setting of count condition till ON S3S.	O	OF	–	–	S3S.			Setting start condition of counting till ON for simple sequence output "KS3".	–
							on	ON	When Input signal "I6" become ON after the count start condition was established, counting will start.	–
							oF	OF	When the count start condition is established, counting will start.	–
	KS3 : Setting of count condition till OFF S3E.	O	OF	–	–	S3E.			Setting start condition of counting till OFF for simple sequence output "K3".	–
							on	ON	When Input signal "I6" become OFF after the count start condition was established, counting will start.	–
							oF	OF	When the count start condition is established, counting will start.	–
	KS1 output start [Time]/[No. of stitches] setting K11.	O	7	x10 msec stitch	0 to 99	t11.	**	**	The output start time/output start No. of stitches for the simple sequence output KS1 can be set. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–
	KS1 output [Time]/[No. of stitches] setting K12.	O	7	x10 msec stitch	0 to 99	t12.	**	**	The output time/output start No. of stitches for the simple sequence output KS1 can be set. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–
	KS2 output start [Time]/[No. of stitches] setting K21.	O	7	x10 msec stitch	0 to 99	t21.	**	**	The output start time/output start No. of stitches for the simple sequence output KS2 can be set. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–
	KS2 output [Time]/[No. of stitches] setting K22.	O	7	x10 msec stitch	0 to 99	t22.	**	**	The output time/output start No. of stitches for the simple sequence output KS2 can be et. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–

Note) For the details of each function, refer to 15. SIMPLE SEQUENCE.

Mode name	Function name	Operability	Factory setting	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
S mode + SL + D	KS3 output start [Time]/[No. of Stitches] setting K31.	O	7	x10 msec stitch	0 to 99	t31.	**	**	The output start time/output start No. of stitches for the simple sequence output KS3 can be et. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–
	KS3 output [Time]/[No. of Stitches] setting K32.	O	7	x10 msec stitch	0 to 99	t32.	**	**	The output time/output start No. of stitches for the simple sequence output KS3 can be et. When using time, the setting value will be (7) x10=70 msec. When using No. of stitches, the setting value will be (7) x1=7 stitches.	–
	KS1 output run mode K1M.	X	ON	–	–	t1n.			This is the output KS1 run mode for when the simple sequence start conditions [SQS] are set to NO.	–
							on	ON	The KS1 output is output each time the start conditions are established.	–
							oF	OF	The KS1 output is output each time the start conditions are established after thread trimming.	–
	Run prohibit during KS1 output ON K1D.	O	OF	–	–	t1d.	on oF	ON OF	Running is prohibited while the output KS1 is ON. (This is valid only when the simple sequence start conditions [SQS] are set to NO.)	–
	K11,K12 time clear during KS1 output ON K1C.	O	OF	–	–	t1C.	on oF	ON OF	The K11 and K12 timers will be cleared and the KS1 output will be turned OFF when the sewing machine stop (motor turns OFF) even when the output KS1 timer is continuing. (This is valid only when the simple sequence start conditions [SQS] are set to NO.)	–
	K21,K22 time clear during KS1 output ON K2C.	O	OF	–	–	t2C.	on oF	ON OF	The K21 and K22 timers will be cleared and the KS1 output will be turned OFF when the sewing machine stop (motor turns OFF) even when the output KS2 timer is continuing. (This is valid only when the simple sequence start conditions [SQS] are set to NO.)	–
	K31,K32 time clear during KS1 output ON K3C.	O	OF	–	–	t3C.	on oF	ON OF	The K31 and K32 timers will be cleared and the KS1 output will be turned OFF when the sewing machine stop (motor turns OFF) even when the output KS3 timer is continuing. (This is valid only when the simple sequence start conditions [SQS] are set to NO.)	–
	Increase the number of K11 through K33 by ten KSL.	O	OF	–	–	t5L.	on oF	ON OF	Increase the number of K11 through K33 by ten. (ex. 10 mS=>100 mS, note: Stitch number is not changed.)	–

21. INPUT/OUTPUT FUNCTION FOR SIGNAL ON C MODE SETTING



1. C mode input signal setting table

No.	Setting name	Setting value	Digital display	Specification
1	Nothing signal	NO	n o	The sewing machine will do nothing even if input NO is turned ON.
2	Low speed run signal	S0	S o	If input S0 is turned ON, the sewing machine will run at the speed set in low speed L.
3	Variable speed run signal	S1	S 1	This signal is equivalent to full toe down when using the pedal. It is operated at the speed which was set with the [C, <= =][D, = =>] key of operation panel when the automatic operation AT is ON input S1 at the time of ON.
4	Medium speed run signal	S5	S 5	If input S5 is turned ON, the sewing machine will run at the speed set in medium speed M.
5	High speed run signal	S4	S 4	If input S4 is turned ON, the sewing machine will rum at the speed set in high speed H.
6	Stop position random run signal	RND	r n d	If input RND is turned ON, the sewing machine will run at the speed set in low speed L, and when stopping the sewing machine will stop at random regardless of the needle position.
7	Correction stitching signal	COR	C o r	If input COR is turned ON, correction stitching will be preformed at the speed set in low speed L.
8	Thread trimmer signal	S2	S 2	This signal is equivalent to full heeling when using the pedal. When S2 is ON and thread trimming or needle UP position stop has been competed, the wiper will operate. After that, the automatic presser foot lifting will function while the signal is ON.
9	1 stitch signal	S01	S 0 1	If input S01 is turned ON, 1 stitch operation will start.
10	Needle lift signal	U	U	If input U is turned ON, the needle lift operation will start.
11	Half-stitch signal	UD	U d	If input UD is turned ON, half-stitch operation will start.
12	Constant angle [reverse run/forward run] signal	BC	b C	The needle is stopped just above the fabric to confirm the fabric puncture position. Each time the signal turns ON, the operation will alternate between forward-reverse-forward run. If the pedal is toed down or the external run signal (S1) turns ON after that, forward run will start form that position. The needle position stop angle can be set with needle position stop angle C8 in the [P] mode.
13	Constant angle [reverse run/forward run] signal	BCR	b C r	The needle is stopped just above the fabric to confirm the fabric puncture position. Each time the signal is turned ON, the operation will alternate between forward-reverse-forward run. If the pedal is toed down or the external run signal (S1) turns ON after stopping at a forward run position, forward run will start after reverse run. If stopped at a reverse run position, the sewing machine will forward run form that position. The needle position stop angle can be set with needle position stop angle C8 in the [P] mode.
14	Constant angle reverse run signal	USR	U S r	Reverse run needle lift will be performed to the set angle. The set angle can be adjusted from the DOWN position to UP position with reverse run angle K8 in the [P] mode. This is effective for blind stitch sewing machine.

Note 1

Note 2

Note) **1. The setting name will display in the descending order with each press of the [D] key.**
2. The setting name will display in the ascending order with each press of the [C] key.

No.	Setting name	Setting value	Digital display	Specification
15	Needle lift, presser foot lift signal	UF	UF	If input UF is turned ON, the presser foot will lift after needle lifting.
16	Presser foot lifter signal	S3	S3	If input S3 is turned ON after trimming, the presser foot will lift. If input S3 is turned ON before triming, the presser foot will lift after delay time. The delay time is set by S3D the [P] mode of the 74 page.
17	Presser foot lifter signal	F	F	If input F is turned ON, the presser doot lifter operation will start.
18	Needle UP position priority stop signal	PSU	PSU	If input PSU is turned ON while the sewing machine is running, the needle will stop at the UP position after swing PSU stitches and thread trimming. The no. of stitches after PSU input is set by PSU the [P] mode of 73 page.
19	Needle DOWN position priority stop signal	PSD	PSd	If input PSD is turned ON while the sewing machine is running, the needle will stop at the DOWN position after swing PSD stitches and thread trimming. The no. of stitches after PSD input is set by PSU the [P] mode of 73 page.
20	Emergency stop signal	ES	ES	If input ES is turned ON while the sewing machine is running, all running states will be canceled, and the sewing machine will stop with the brakes.
21	One shot signal	SH	SH	If input SH is turned ON, one shot operation will start. The operation mode set in [P] mode SHM function will be entered.
22	Reverse run signal	CW	CW	If input CW is turned ON while running with pedal toe down or external run signal, reverse run will be enabled while the signal is ON.
23	Thread trimmer protection signal	S6	S6	If input S6 is turned ON while the sewing machine is running, the sewing machine will stop. If input S6 is turned ON during thread trimming, the operation will be completed, and operation will not be possible until input S6 is turned OFF.
24	Thread trimmer cancel signal	TL	TL	If pedal full heeling or thread trimmer signal S2 is turned ON while input TL is ON, the thread will not be trimmed. After the thread trimmer interlock time passes, the presser foot lifting operation will start. When TL of [D] mode signal is turned ON a little time and TLS setting is ON, next thread trimming is prohibited at once.
25	Low speed signal	SPL	SPL	If input SPL is turned ON while the sewing machine is running, the sewing machine will run at the speed set in low speed setting L while the signal is ON.
26	Medium speed signal	SPM	SPn	If input SPM is turned ON while the sewing machine is running, the sewing machine will run at the speed set in medium speed setting M while the signal is ON.
27	End tacking speed signal	SPB	SPb	If input SPB is turned ON while the sewing machine is running, the sewing machine will run at the speed set in end tacking speed setting V while the signal is ON.
28	High speed signal	SPH	SPH	If input SPH is turned ON while the sewing machine is running, the sewing machine will run at the speed set in high speed setting H while the signal is ON.
29	Variable speed signal	SPV	SPu	If input SPV is turned ON while the sewing machine is running, the sewing machine will run at the speed proportional to the variable speed voltage VC while the signal is ON.

Note 1

Note 2

Note) **1. The setting name will display in the descending order with each press of the [D] key.**
2. The setting name will display in the ascending order with each press of the [C] key.

No.	Setting name	Setting value	Digital display	Specification
30	Tacking cancel signal	BTL	b r L	IIf input BTL is turned ON, start and end tacking will be prohibited while the signal is ON. When BTS of [D] mode is ON, and BTL signal is turned ON a little time, next tacking is prohibited at once.
31	Start tacking cancel signal	SB	S b	If input SB is turned ON, start tacking will be prohibited while the signal is ON. When BS of [D] mode is ON, and SB signal is turned ON a little time, next start tacking is prohibited at once.
32	End tacking cancel signal	EB	E b	If input EB is turned ON, end tacking will be prohibited while the signal is ON. When BS of [D] mode is ON, and EB signal is turned ON a little time, next end tacking is prohibited at once.
33	Backstitching during run signal	S7	S 7	If input S70 is turned ON while the sewing machine is running, backstitching (reverse feed) will start. Nothing will happen if input S70 is turned ON while the sewing machine is stopped.
34	Backstitching during run signal	UDS	U d S	If input UDS is turned ON while the sewing machine is running, backstitching (reverse feed) will start. Half-stitch operation will start if input UDS is turned ON while the sewing machine is stopped.
35	Backstitching during run signal	US	U S	If input US is turned ON while the sewing machine is running, backstitching (reverse feed) will start. Half-stitch operation will start if input US is turned ON while the sewing machine is stopped.
36	Backstitching signal [when running when stopped.]	BSL	b S L	If input BSL is turned ON when the sewing machine is running or stopped, backstitching (reverse feed) will start.
37	Backstitching signal when running	UCR	U C r	If input UCR is turned ON while the sewing machine is running, backstitching (reverse feed) will start. 1 stitch operation will start if input UCR is turned ON while the sewing machine is stopped.
38	Backstitching signal when running	UBR	U b r	If input UBR is turned ON while the sewing machine is running, backstitching (reverse feed) will start. 1 stitch operation with backstitching (reverse feed) will start if input UBR is turned ON while the sewing machine is stopped.
39	Signal output to virtual output 1	IO1	I o 1	If input I01 is turned ON, output OT1 will always be turned ON.
40	Signal output to virtual output 2	IO2	I o 2	If input I02 is turned ON, output OT2 will always be turned ON.
41	Signal output to virtual output 3	IO3	I o 3	If input I03 is turned ON, output OT3 will always be turned ON.
42	Signal output to virtual output 1 during operation	IR1	I r 1	If input IR1 is turned ON, output OT1 turns ON only when the sewing machine is running.
43	Signal output to virtual output 2 during operation	IR2	I r 2	If input IR2 is turned ON, output OT2 turns ON only when the sewing machine is running.

Note 1

Note 2

Note) 1. The setting name will display in the descending order with each press of the [D] key.
2. The setting name will display in the ascending order with each press of the [C] key.

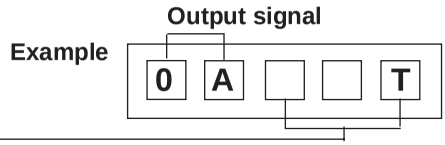
No.	Setting name	Setting value		Specification
			Digital display	
44	Signal output to virtual output 3 during operation	IR3	, r 3	If input IR3 is turned ON, output OT3 turns ON only when the sewing machine is running.
45	Signal output to virtual output 1 when stopped	IS1	, S 1	If input IR1 is turned ON, output OT1 turns ON only when the sewing machine is stopped.
46	Signal output to virtual output 2 when stopped	IS2	, S 2	If input IR2 is turned ON, output OT2 turns ON only when the sewing machine is stopped.
47	Signal output to virtual output 3 when stopped	IS3	, S 3	If input IR3 is turned ON, output OT3 turns ON only when the sewing machine is stopped.
48	Thread trimmer output confirmation signal	TON	r o n	The thread trimmer output T can be turned ON or OFF only when the sewing machine is stopped.ÅiThread trimmer solenoid confirmation signalÅj
49	Needle cooler output during rotation forced [OFF] signal	NCL	n C L	If input NCL is turned ON, the needle cooler output NCL during sewing machine rotation will forcibly by turned OFF.
50	1 position priority signal	P12	P 1 2	1 position will be set forcibly.
51	Weak brake [ON] signal	BK	b t	If input BK is turned ON, the weak brake will turn ON. Use this with the BK of the [D] mode set to [OF].
52	Sensor input signal	SEN	S E n	This is the cloth edge sensor input.
53	Wiper output cancel signal	WL	W L	If input WL is turned ON, the wiper output W will not be output.
54	Slow start signal	SL	S L	If the SL signal is ON, the slow start operation will be valid. Use this with the normal mode [B,SL] key set to [OF].
55	Preset stitching forced [ON] signal	N	n	If input N is turned ON,preset stitching will start forcibly from that point.
56	Continuous tack stitching forced [ON] signal	CBT	C b r	If input CBT is turned ON, continuous backstitching will start forcibly from that point.
57	Non-stitching feed input	FWD	F W d	If input FWD is turned ON, output OT3, output NCL and output FU will be turned ON forcibly. Output ROL and output PUL will be turned OFF forcibly.
58	End tacking speed run signal	S5V	S S. U	If input S5V is turned ON, the sewing machine will run at the speed set in end tacking speed V.
59	Count-UP clear signal	CCU	C C U	If input CCU is turned ON, it clears the UP counter only.
60	Count-DOWN clear signal	CCD	C C d	If input CCD is turned ON, it clears the DOWN counter only.
61	Needle thread break detector input signal	THI	r H ,	It can be used as the input signal of needle thread break detector.

Note 1

Note 2

Note) 1. The setting name will display in the descending order with each press of the [D] key.
2. The setting name will display in the ascending order with each press of the [C] key.

C mode output signal setting table



No.	Setting name	Setting value		Specification
			Digital display	
1	Output for slow start	SL	SL	During the no. of the setting needles, SL output is turned ON. The setting no. of needles can select SLN on [P] mode of H0Fon [G] mode by setting SLH on [F] mode
2	Run output 1	OP	oP	OP output is turned ON while the sewing machine is running. (not including needle lifting during thread trimming).
3	Run output 2	OP1	oP1	OP1 output is turned ON while the sewing machine is running. (not including needle lifting during thread trimming). OP1 output will turn ON during needle lifting when directly heeling.
4	Run output 3	OP2	oP2	OP1 output is turned ON while the pedal is toed dawn, the external operation signal (S0, S1, SH), full pedal heelimg or thread trimming signal (S2) is ON.
5	Output for run signal	S1	S1	S1 output is turned ON when the run signal is ON except during on 1 stitch sewing.
6	Output for blower	VAC	uAC	VAC output is turned ON during pedal full heeling or while thread trimmer signal S2 is ON.
7	Output for needle cooler	NCL	nCL	NCL output is turned ON while the sewing machine is running (including needle lifting).
8	Output for vacuum signal	VCM	uCn	VCM output is turned ON during pedal full heeling or while thread trimmer signal S2 is ON while the sewing machine is stopped.
9	Output for signal during tacking	BT	bF	BT output is turned ON during tacking.
10	Roller lift output	ROL	roL	ROL output is turned ON when presser foot lifter output FU is ON, backstitching output B is ON, or when input IO2 signal is ON. ROL output is turned ON while tacking and while thread trimming if RLM of [F] mode is ON.
11	Thread trimmer output	T	F	Thread trimming starts.
12	Thread release output	L	L	Thread release operation starts.
13	Wiper output	W	W	Wiper operation starts.
14	Backstitch output (Condensed stitch)	B	b	Backstitching (reverse feed) starts. (Condensed stitch)
15	[CH2] output	CH	CH	CH2 Output for chain stitches.
16	[TF] output	TF	rF	TF output for chain stirches. Refer to “Output TB,TF timings”.
17	[KS1] output	KS1	tS1	Behind operation signal ON, KS1 output is turned ON after the setting delay time. Refer to “Output KS1,KS2,KS3 timings”.
18	[KS2] output	KS2	tS2	After the motor stopped, KS1 output is turned ON after the setting delay time. Refer to “Output KS1, KS2, KS3 timings”.
19	[KS3] output	KS3	tS3	After trimming and stopped up position, KS3 output is turned ON after setting delay time. Refer to “Output KS1,KS2,KS3 timings”.
20	[TB] output	TB	rb	TB Output for chain stitches. Refer to “Output TB,TF timings”.

Note 1

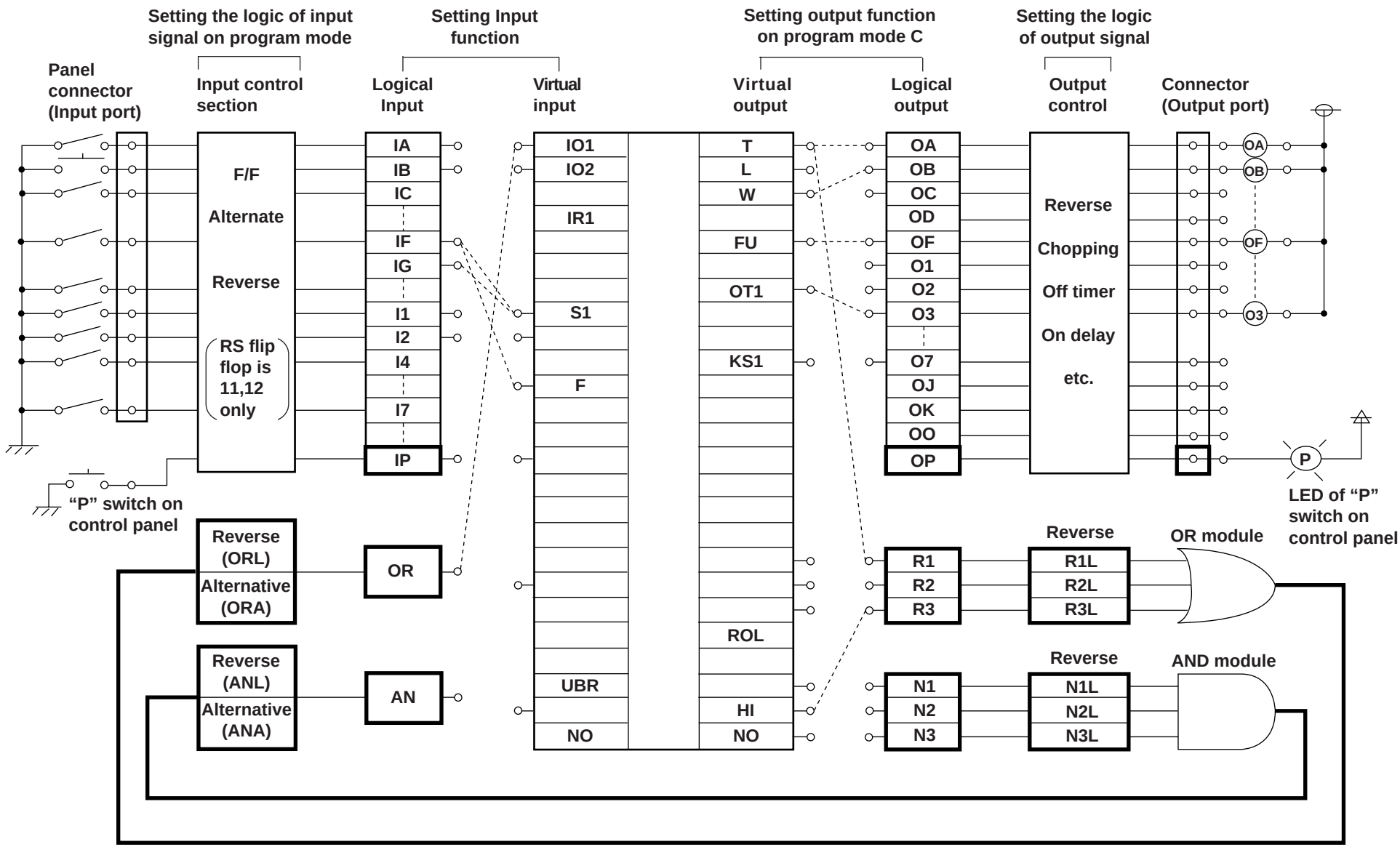
Note 2

Note) **1. The setting name will display in the descending order with each press of the [D] key.**
2. The setting name will display in the ascending order with each press of the [C] key.

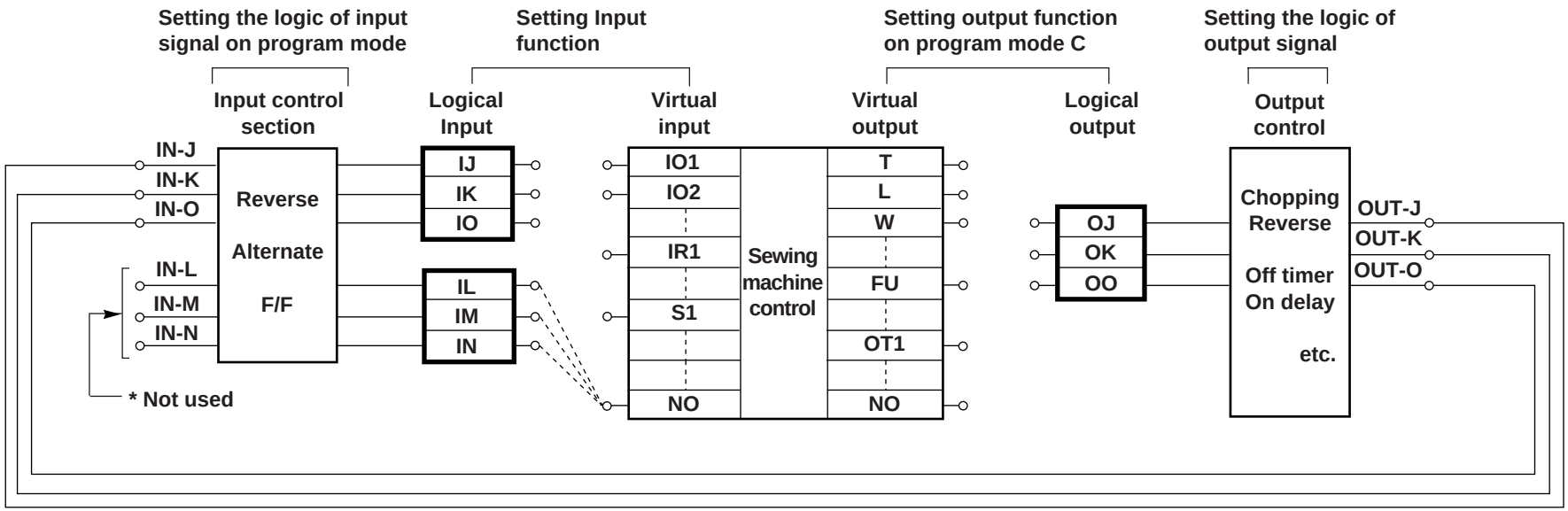
	No.	Setting name	Setting value		Specification
				Digital display	
	21	Presser foot lifter output	FU	FU	Presser foot lifter operation starts. The operation mode set in the [P] mode FUM function and FU function will be entered.
	22	Output for UP position when stopped	UC	UC	UC output is turned ON if at the needle UP position when the sewing machine is stopped.
	23	Needle UP position output	UPW	UPW	UPW output is turned ON if at the UP position when the, sewing machine is stopped, and while moving from the UP position to the DOWN position when the sewing, machine is running.
Note 1	24	Needle DOWN position output	DNW	dnW	DNW output is turned ON if at the DOWN position when the, sewing machine is stopped, and while moving from the DOWN position to the UP position when the sewing, machine is running.
	25	Virtual output 1	OT1	or1	OT1 output is turned ON according to each input specifications while inputs IO1,IR1 and IS1 are ON.
	26	Virtual output2	OT2	or2	OT2 output is turned ON according to each input specifications while inputs IO2,IR2 and IS1 are ON.
	27	Virtual output3	OT3	or3	OT3 output is turned ON according to each input specifications while inputs IO3,IR3 and IS1 are ON.
	28	Output for error occurrence confirmation	ERR	Err	This is output when an error occurs. (Note that this is not output when error code E9 occurs.)
	29	Output for power [OFF] confirmation	IPF	,PF	When power is turned OFF, IPF output is turned ON. (Not used)
	30	[A01] output	AO1	Ao1	Not used
	31	[A02] output	AO2	Ao2	Not used
	32	Puller output	PUL	PUL	PUL output is turned ON during the presser foot lifter operation, during the IO2 output is ON.
	33	Count up output	CUP	CUP	When +1 up counter does, the [CUP] output is turned on.
Note 2	34	Thread break detector output	THO	rHo	When detecting thread break detector, THO output is turned ON (When re-operation, the signal is turned off)
	35	Vacuum output for holding thread	FUW	FUW	FUW output is turned ON during the presser foot lifter operation or during wiper operation.
	36	Always ON output	HI	H,	In case of the power on, [HI] output is always ON.
	37	[NO] output	NO	no	Nothing is output.
	38	[CUE] output	CUE	CUE	This output becomes ON when Up-counter becomes end. This output becomes OFF when “CCL” input is turned on.
	39	[CDE] output	CDE	CdE	This output becomes ON when Down-counter becomes end. This output becomes OFF when “CCL” input is turned on.

Note) **1. The setting name will display in the descending order with each press of the [D] key.**
2. The setting name will display in the ascending order with each press of the [C] key.

1. Input and output customization

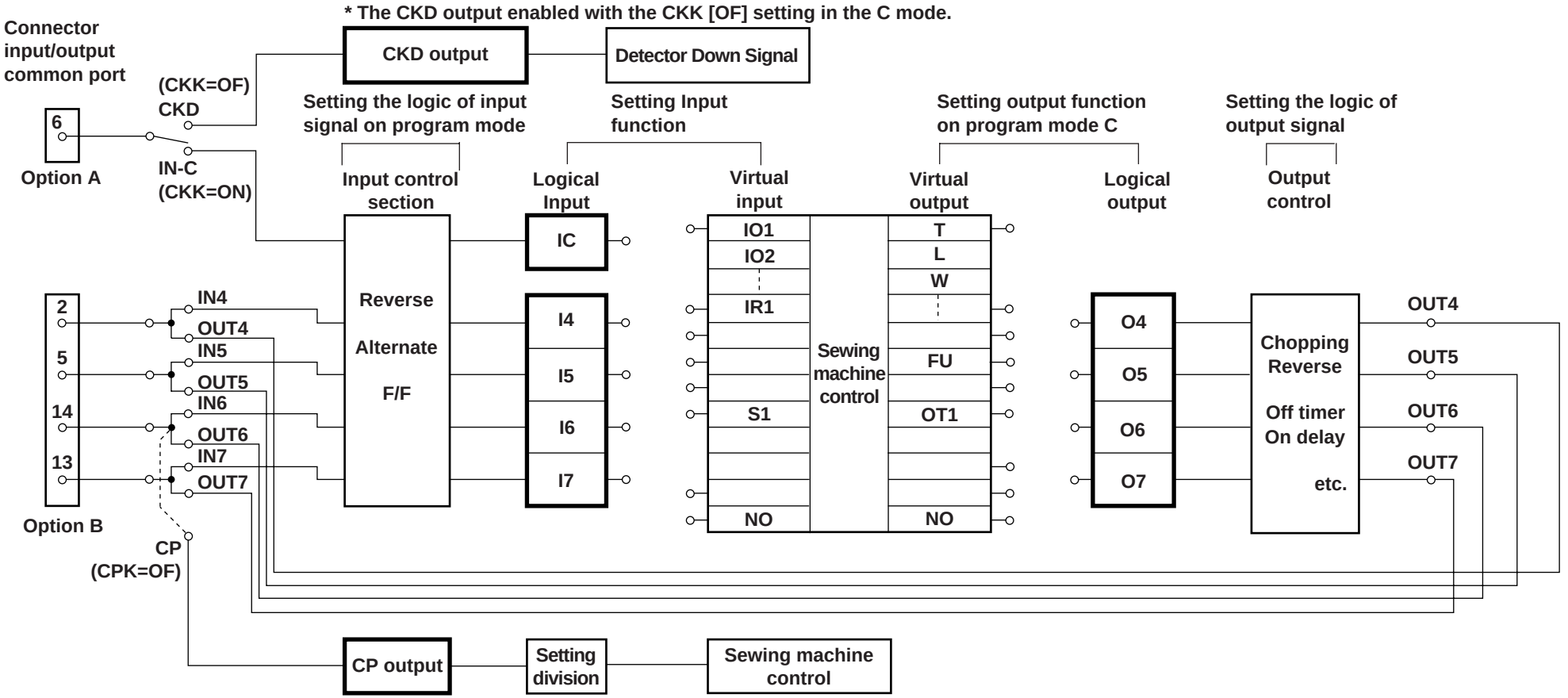


2. Input/output direct coupling port (inside connecting port)



* The factory settings of the input function settings [IJ], [IK], [IO] and [IL], [IM], [IN] are all [NO].
* The factory settings of the output function settings [OJ], [OK], [OIO] are all [NO].
* The input function settings [IL], [IM], [IN] must not be used with the default setting [NO].

3. Connector input/output common port



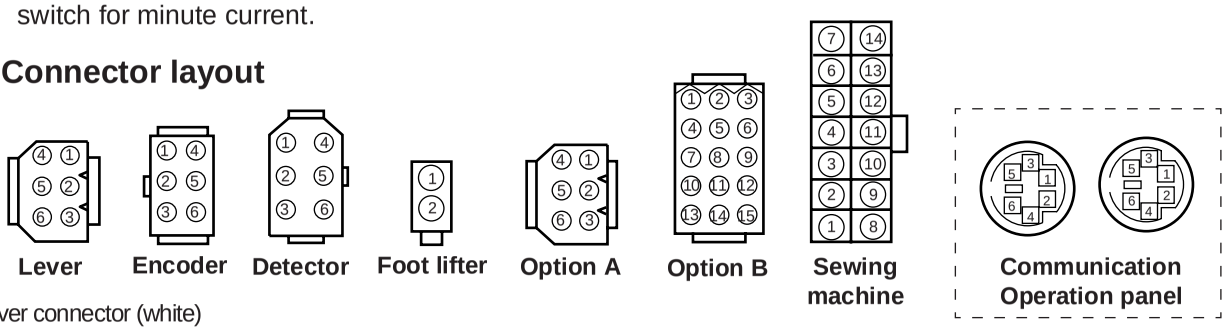
* The CP output is enabled with the CPK [OF] setting in the C mode.
* The division rate can be with the division rate setting [CP] in the [C] mode.
  (When the setting has been changed, turn the power OFF and ON once.)

Note) **Option B connector input/output common port**
When changing the input/output, set the output side to [NO] to use the port for inputs and set the input side to [NO] to use the port for outputs. The default settings are all [NO].
(For example, if the option B connector No.2 pin is to be set to input, set the OUT4, or [O4] function to [NO], and set the required input function in IN4, or [I4] function.)
The above input/output common port is connected internally, so if a function other than [NO] is set on both the input side and output side, the output side setting will affect the input side.

23. HOW TO USE THE OPTION CONNECTOR

Variable operation are possible by adding external signals to the option connector.
A current of approximately 1.5mA flows through the switches used for the input signal, so please use switch for minute current.

1) Connector layout



Lever connector (white)

No.	Physics input port name	Setting function		Remarks
1		0V		
2	IG	Run signal	S1	
3	IH	Thread trimming signal	S2	
4	II	Presser foot lifter signal	S3	
5	VC	Variable speed signal	VC	
6		+12V		

Operation panel/Communication

No.	Signal name	Remarks
1	RXD	
2	–	
3	TXD	
4	0V	
5	+12V	
6	–	

Encoder

No.	Physics input port name	Setting function		Remarks
1		0V		
2		Phase A signal	EA	
3		Phase B signal	EB	
4		+12V		
5		Ground		
6		–		

Detector

No.	Physics input port name	Setting function		Remarks
1		0V		
2		–		
3		Ground		
4		UP position detection	UP	
5		DOWN position detection	DN	
6		+12V		

Presser foot lifter

No.	Physics input port name	Setting function		Remarks
1	OF	Presser foot lifter output	FU-	
2	OF	Presser foot lifter output	FU+	

Sewing machine

No.	Physics input port name	Setting function (A, C, D, E, F, G, H, I, J, O)		Setting function (B)		Setting function (K, M)		Setting function (L)		Setting function (N)		Remarks
1	0A	Thread trimmer output	T	Thread trimmer output	T	Thread trimmer output	T	Thread trimmer output	T	Thread trimmer output	T	
2	0B	Wiper output	W	Wiper output	W	Wiper output	W	Wiper output	W	Wiper output	W	
3	ID	Thread trimmer cancel signal	TL	Thread trimmer cancel signal	U	Thread trimmer protection signal	S6	Thread trimmer protection signal	S6	Thread trimmer protection signal	S6	
4	IF	Presser foot lifter signal	F	Presser foot lifter signal	F	Presser foot lifter signal	F	Presser foot lifter signal	F	Presser foot lifter signal	F	
5	IE	Backstitching signal	S7	Backstitching signal	S7	Thread trimmer cancel signal	TL	Thread trimmer cancel signal	TL	Thread trimmer cancel signal	TL	
6	0C	Backstitching output	B	Backstitching output	B	Needle cooler output	NCL	Needle cooler output	NCL	Needle cooler output	NCL	
7	0D	Sub-back output	L	Sub-back output	L	Lower thread remove output	SL	Thread trimmer output	T	Thread release output	L	
8		+24V		+24V		+24V		+24V		+24V		
9		+24V		+24V		+24V		+24V		+24V		
10		Ground		Ground		Ground		Ground		Ground		
11		0V		0V		0V		0V		0V		
12		0V		0V		0V		0V		0V		
13		+24V		+24V		+24V		+24V		+24V		
14		+24V		+24V		+24V		+24V		+24V		

Functions set to the sewing machine connectors vary in accordance with the sewing machine heads selected.
(Make sure of the simple selecting table for the sewing machine heads, 9-3) Program modes [1] and [2], and the marks described under the setting functions.)

Connector E (Option A : Black)

No.	Physics input port name	Setting function (A, B, C, D, F, I, O)		Setting function (E)		Setting function (G, H)		Setting function (J)		Setting function (K, L, M, N)		Remarks
1		0V		0V		0V		0V		0V		
2	IA	Needle UP position priority stop signal	PSU	I05 input siganl	IO5	Thread trimmer safe signal	S6	Emergency stop signal	ES	Needle UP position priority stop signal	PSU	
3		+12V		+12V		+12V		+12V		+12V		
4	IB	Needle DOWN position priority stop signal	PSD	Needle DOWN position priority stop signal	PSD	Needle DOWN position priority stop signal	PSD	Needle DOWN position priority stop signal	PSD	Needle DOWN position priority stop position	PSD	
5		Needle UP position output	CKU	Needle UP position output	CKU	Needle UP position output	CKU	Needle UP position output	CKU	Needle UP position output	CKU	
6	IC	Low speed run signal	SO	Low speed run signal	SO	Low speed run signal	SO	Low speed run signal	SO	Thread trimmer protection signal	S6	

Connector G (Option B)

No.	Physics input port name	Setting function (A)		Setting function (B)		Setting function (C)		Setting function (D)		Setting function (E)		Remarks
1		0V		0V		0V		0V		0V		
2	O4/I4	–		–		Medium speed signal	SPM	Medium speed signal	SPM	OT1 output	OT1	
3	O1	OT1 output	OT1	OT1 output	OT1	OT1 output	OT1	OT1 output	OT1	OT5 output	OT5	
4	VC2	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	
5	O5/I5	–		–		End tacking speed signal	SPB	End tacking speed signal	SPB	Thread trimmer output	T	
6	I1	I01 input signal	IO1	I01 input signal	IO1	I01 input signal	IO1	I01 input signal	IO1	I01 input signal	IO1	
7		+12V		+12V		+12V		+12V		+12V		
8		+24V		+24V		+24V		+24V		+24V		
9	I2	Needle lift signal	U	Needle lift signal	U	I01 input signal	IO1	Needle lift signal	U	Needle lift signal	U	
10		0V		0V		0V		0V		0V		
11		+24V		+24V		+24V		+24V		+24V		
12	O2	Needle cooler output	NCL	Needle cooler output	NCL	Needle cooler output	NCL	Needle cooler output	NCL	OT4 output	OT4	
13	O7/I7	–		Start/end tacking cancel signal	BTL	Start/end tacking cancel signal	BTL	–		KS1 output	KS1	
14	CP/O6/I6	Presser foot lifter signal	F	Presser foot lifter signal	F	Presser foot lifter signal	F	Presser foot lifter signal	F	–		
15	O3	TF output	TF	TF output	TF	TF output	TF	TF output	TF	OT3 output	OT3	

No.	Physics input port name	Setting function (F, H, I, O)		Setting function (G)		Setting function (J)		Setting function (K, L, N)		Setting function (M)		Remarks
1		0V		0V		0V		0V		0V		
2	O4/I4	–		OT1 output	OT1	Constant angle signal	BC	Needle cooler prohibit signal	NCL	Needle cooler prohibit signal	NCL	
3	O1	OT1 output	OT1	OT1 output	OT1	KS1 output	KS1	OT1 output	OT1	OT1 output (Folder)	OT1	
4	VC2	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	Variable speed command	VC	
5	O5/I5	–		–		–		Reset signal	KS3	Reset signal	KS3	
6	I1	I01 input signal	IO1	I01 input signal	IO1	I01 input signal	IO1	Short stitch cancel signal	EB	Short stitch cancel signal	EB	
7		+12V		+12V		+12V		+12V		+12V		
8		+24V		+24V		+24V		+24V		+24V		
9	I2	Needle lift signal	U	Needle lift signal	U	Needle lift signal	U	Folder input signal	IO1	Folder input signal	IO1	
10		0V		0V		0V		0V		0V		
11		+24V		+24V		+24V		+24V		+24V		
12	O2	Needle cooler output	NCL	OT3 output	OT3	Needle cooler output	NCL	Roller lift output	ROL	Short stitch output	BT	
13	O7/I7	–		–		–		Thread trimmer knife out signal	TON	Thread trimmer knife out signal	TON	
14	CP/O6/I6	–		–		–		Non-stitching feed signal	FWD	Non-stitching feed signal	FWD	
15	O3	TF output	TF	OT2 output	OT2	TF output	TF	Non-stitching feed output	OT3	Non-stitching feed output	OT3	

Functions set to the sewing machine connectors vary in accordance with the sewing machine heads selected. (Make sure of the simple selecting table for the sewing machine heads, 9 - 3) Program modes [1] and [2], and the marks described under the setting functions.)

2)The explanation of the input/output signal

Connector	Pin number	The input/output signal name (Factory setting)	Physics input port name	Model name SC-380	The specification
Lever connector	2	Variable speed run signal S1	IG	○	This signal is equivalent to full the down when using the pedal. It is operated at the speed which was set with the [C][D]key of operation panel when the automatic operation AT is ON input S1 at the time of ON.
	3	Thread trimmer signal S2	IH	○	This signal is equivalent to full heeling when using the pedal. When S2 is ON and thread trimming or needle UP position stop has been completed, the wiper will operate. After that, the automatic presser foot lifting will function while the signal is ON. If input S3 is turned ON after trimming, the presser foot will lift.
	4	Presser foot lifter signal S3	II	○	If input S3 is turned ON before triming, the presser foot will lift after delay time. The delay time is set by S3D the [P] mode of the 74 page.
	5	Variable speed command voltage VC	VC	○	It is speed regulation input from outside. By giving variable speed command voltage (0-11 V), the speed which is proportional to the voltage is gotten.
	6	Constant voltage power supply +12 V		○	This is the power for the variable speed command. A DC12 V (max. 40 mA) is out put.
Sewing machine connector	2	Wiper output W	OB	○	Wiper operation starts.
	1	Thread trimmer output T	OA	○	Thread trimming starts.
	3	Thread trimmer cancel signal TL	ID	○	If pedal full heeling or thread trimmer signal S2 is turned ON while input TL is ON, the thread will not be trimmed. After the thread trimmer interlock time passes, the presser foot lifting operation will start. When TL of [D] mode signal is turned ON a little time and TLS setting is ON, next thread trimming is prohibited at once.
	7	Thread release output L	OD	○	Thread release operation starts.
	5	Backstitching durin run signal S7	IE	○	If input S7 is turned ON while the sewing machine is running, backstitching (reverse feed) will start. Nothing will happen if input S7 is turned ON while the sewing machine is stopped.
	6	Backstitching output (Condensed stitch) B	OC	○	Backstitching (reverse feed) starts. (Condensed stitch)
	4	Presser foot lifter signal F	IF	○	If input F is turned ON, the presser foot lifter operation will start.
Presser foot lifter	2	Presser foot lifter output FU+	OF	○	Presser foot lifter operation starts. The operation mode set in the [P] mode FUM function and FU function will be entered.
	1	FU-			

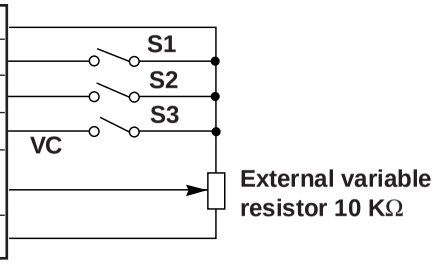
Connector	Pin number	The input/output signal name (Factory setting)	Physics input port name	Model name SC-380	The specification
Option A connector	2	Needle UP position priority stop signal PSU	IA	○	If input PSU is turned ON while the sewing machine is running, the needle will stop at the UP position after swing PSU stitches and thread trimming. The no. of stitches after PSU input is set by PSU the [P] mode of 73 page.
	3	Constant voltage power supply +12 V		○	The constant voltage power supply. DC +12 V (max. 40 mA)
	4	Needle DOWN position priority stop signal PSD	IB	○	If input PSD is turned ON while the sewing machine is running, the needle will stop at the DOWN position after swing PSD stitches and thread trimming. The no. of stitches after PSD input is set by PSU the [P] mode of 73 page.
	5	Needle UP position output CKU		○	The UP position is output. This can be used as the signal for the stitch count, etc. The output voltage is DC 12 V/5 V (max. 40 mA). The factory setting is 5 V.
	6	Low speed run signal SO	IC/CKD	○	If input S0 is turned ON, the sewing machine will run at the speed set in low speed L. (CKD is DOWN position signal output It changes by the CKK setting of 92 page C mode by S0 and CKD.)
Option B connector	2	The signal which does nothing NO	O4/I4	○	It is also input/output serving port. When using as the input, make O4 NO setting, and when using as the output, make I4 NO setting.
	3	Virtual output 1 OT1	O1	○	OT1 output is turned ON according to each input specifications while inputs IO1,IR1 and IS1 are ON.
	4	Virtual speed command VC2	VC2	○	This is the input for external speed command. By applying the variable speed command voltage, the speed that is relative to the voltage is obtained.
	5	The signal which does nothing NO	I5/O5	○	It is an also input/output serving port. When using as the input, make O5 NO setting, and when using as the output, make I5 NO setting.
	6	Signal output to virtual output 1 IO1	I1	○	If input IO1 is turned ON, output OT1 will always be turned ON.
	7	Rated voltage poser +12 V		○	A DC 12 V is output (max.50 mA).This can be used as the power source for the photoelectric switches in the amplifier.
	9	Needle lift signal U	I2	○	If input U is turned ON, the needle lift operation will start.
	12	Output for needle cooler NCL	O2	○	NCL output is turned ON while the sewing machine is running (including needle lifting).
	13	The signal which does nothing NO	I7/O7	○	It is an also input/output serving port. When using as the input, make O7 NO setting, and when using as the output, make I7 NO setting.
	14	The signal which does nothing F	I6/O6/CP	○	If input F is turned ON, the presser foot lifter operation will start. * Same function as that of No. 4 pin of sewing machine connector.
	15	[TF] output TF	O3	○	TF output for chain stitches. Refer to pages 55 and 109 for the output timing.

3) To use as a standing work type sewing machine.

The sewing machine can be used as a standing work type sewing machine with the four connections below using the lever connector. However, take special care to the intrusion of noise, and use the shortest wiring possible.
For the standing work, it is recommended to use JUKI PK75.

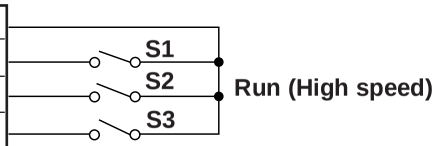
(1) When operating with an external variable resistor
(Control panel auto and AT in [P] mode is OFF)
Lever (white connector)

0 V	1
Operation	2
Thread trimmer	3
Presser foot lifter	4
Variable speed command	5
+12 V	6



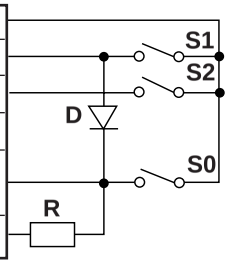
(2) For operating with a high speed
(Control panel auto and AT in [P] mode is ON)
Lever (white connector)

0 V	1
Operation	2
Thread trimmer	3
Presser foot lifter	4
Variable speed command	5
+12 V	6



(3) When operation with high speed and inching (Control panel auto and AT in [P] mode is OFF)
(a) When using the lever connector
Lever (white connector)

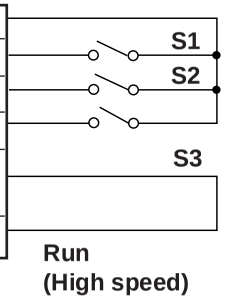
0 V	1
Operation	2
Thread trimmer	3
Presser foot lifter	4
Variable speed command	5
+12 V	6



D : Equivalent to 1S953 (NEC) (VR ≧ 30 V, IF ≧ 30 mA)
R : 1 kΩ 1/2W higher

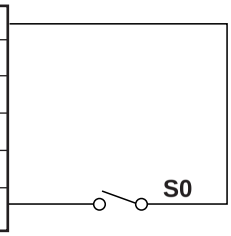
(b) When using the lever connector and option connector
Lever (white connector)

0 V	1
Operation	2
Thread trimmer	3
Presser foot lifter	4
Variable speed command	5
+12 V	6



Option A (black connector)

0V	1
	2
	3
	4
	5
Operation (low speed)	6



24. ERROR DISPLAY

When the control box detects an error, the error code is flickered on the operation panel display. Confirm the error code, and investigate with the following table.

Error code	Probable cause	Inspection
P U r. o F	8 A fuse in control box broken. Is the power voltage too low ? Is the power supply capacity too small ? **Note) It does this display when power supply is turned OFF, but this is not an error.**	Replace the 8A fuse. Check the power voltage. Check the power supply capacity.
E1	Is the wire to the motor short-circuited ? Is the sewing machine load torque too high ?	Check the motor wiring. Check the sewing machine.
E2	Is the power voltage too high ? Is the sewing machine inertia too high ?	Check the power voltage. Lengthen the deceleration time. (Refer to DC in [A] mode)
E3	Is the connector to the motor encoder securely inserted ? Are the signals from the motor encoder correct ? Is the sewing machine locked ? Is the motor locked ?	Check the connector insertion. Check the encoder signals. (Refer [E] mode) Check the sewing machine. Check the motor.
E4	Is the motor connector securely inserted ? Are the signals from the motor connector correct ?	Check the motor connector insertion. Check the motor connector.
E6	Is an extraordinary signal inputted ? (The signal as it repeats ON/OFF at the high frequency) Does the noise from outside enter an input signal.	Check the input signal. Removes a noise source.
E8	Is the position detector connector securely inserted ? Are the signals from the detector correct ? (UP/DOWN signal interruption)	Check the detector connector insertion. Check the detector UP/DOWN signals. (Refer to [E] mode.)
E9	Is the solenoid wiring short-circuited ? Solenoid defect (coil defect)	Check the solenoid wiring. Replace the solenoid.
M5	A error of the copy mode using the control panel. Is the control panel connector securely inserted ? The voltage or the type of control panel is difference.	 Check the connector insertion. Check the voltage and the type are right.
Others		
The sewing does not run when the pedal pressed.	Is the lever unit connector securely inserted ? Are the operation signals (S1) from the lever unit broken ?	Check the lever unit connector insertion. Check the lever unit signal. (Refer S1 signal, [E] mode)
The sewing machine does not run at the high speed.	Is does not displayed 99 in normal mode. Is the variable speed voltage with the pedal toe down low ? Is the motor pulley diameter too small ?	Change 99 using control box [D] key. Check the variable speed voltage. (Refer [E] mode) Check the motor pulley diameter. (Refer item 4.3)
The thread is not trimmed even with heeling.	Is the thread trimming signal (S2) from the lever unit broken ? Is the cancel thread trimmer operation S2L ON ?	Check signal S2, (Refer [E] mode) Set S2L to OFF. (Refer [P] mode)
The presser foot lifter output does not operate.	Is the light heeling signal (S3) or thread trimming signal (S2) from the lever unit broken ? Is the presser foot lift signal (F) broken ? Is the presser foot lift signal (FU) broken ?	Check signals S2 and S3. (Refer [E] mode) Check signal F (Refer [E] mode) Check FU output. (Refer [E] mode)

25. SPECIFICATIONS

Specifications \ Voltage and Frequency			110 V signal phase 50/60 Hz	230 V single phase, 3-phase 50/60 Hz
Motor	Model name		XL-554-10Y	XL-554-20Y, JE type (XL-554-20CE)
	Voltage (V)		100 to 120 V	200 to 240 V
	Rate output (W)		550 W	
	Rate speed (r/min)		3,000 r/min	
	Rate torque (N.m)		1.76 Nm (0.18 Kgm)	
SC-380	Model name	General purpose automatic thread trimmer (V)	XC-EJK-10-05	XC-EJK-20-05 JE type (XC-EJKCE-20-05)
	Voltage (V)		XC-EJK : 100-110/110-120 V	XC-EJK : 200-220/220-240 V
	Speed control range	With sewing machine shaft (S/min)	70 to 4,000 (MAX 8,999) S/min	
		With motor shaft (r/min)	50 to 3,600 r/min	
	Solenoid voltage		DC 24 V/30 V	
	Range of rating Voltage		±10 %	
	Ambient temperature		5 ˚C to 40 ˚C	
	Ambient humidity		30 % to 95 %	
	Storage temperature		-25 ˚C to 55 ˚C	
	Altitude		Under 1000 m above mean sea level	
	Weight (kg)		Motor 8.0 kg/Control Box : 5.5 kg	

Specification \ Model	XC-EJK
Lever unit	XC-CL-2

Position detector
XC-KE-01PJ

(DC 24 V Setting)

Specifications \ Solenoid	OF (Presser foot lifter output FU)	OA (Thread trimming output T)	OB (Wiper output W)	OD (Thread release L)
Impedance	8 or more (continuous time rating)	4 or more (short time rating)	4 or more (short time rating)	4 or more (short time rating)
Specifications \ Solenoid	OC (back stitch output B)	O1 (Virtual output1)	O2 (needle cooler output)	O3 (TF output TF)
Impedance	4 or more (short time rating)	4 or more (short time rating)	4 or more (short time rating)	4 or moer (short time rating)

(DC 30 V Setting)

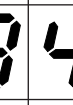
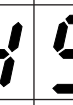
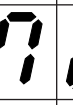
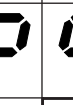
Specifications \ Solenoid	OF (Presser foot lifter output FU)	OA (Thread trimming output T)	OB (Wiper output W)	OD (Thread release L)
Impedance	10 or more (continuous time rating)	5 or more (short time rating)	5 or more (short time rating)	5 or more (short time rating)
Specifications \ Solenoid	OC (back stitch output B)	O1 (Virtual output1)	O2 (needle cooler output)	O3 (TF output TF)
Impedance	5 or more (short time rating)	5 or more (short time rating)	5 or more (short time rating)	5 or moer (short time rating)

Note) 1. In the brackets, it is a factory setting.

2. The continuous time rating of "OF" output is 50 percentage of chopping duty.

<REFERENCE> TABLE OF DIGITAL DISPLAY

Table of digital display

Numeral	0	1	2	3	4	5	6	7	8	9
Digital display										
Numeral	A	B	C	D	E	F	G	H	I	J
Digital display										
Numeral	K	L	M	N	O	P	Q	R	S	T
Digital display										
Numeral	U	V	W	X	Y	Z				
Digital display										

JUKI®

JUKI CORPORATION

INTERNATIONAL SALES H.Q.
8-2-1, KOKURYO-CHO,
CHOFU-SHI, TOKYO 182-8655, JAPAN
PHONE : (81)3-3430-4001 to 4005
FAX : (81)3-3430-4909 • 4914 • 4984
TELEX : J22967

Please do not hesitate to contact our distributors or agents in your area for further information when necessary.

∗ The description covered in this engineer's manual is subject to change for improvement of the commodity without notice.

01 · 03 Printed in Japan (E)