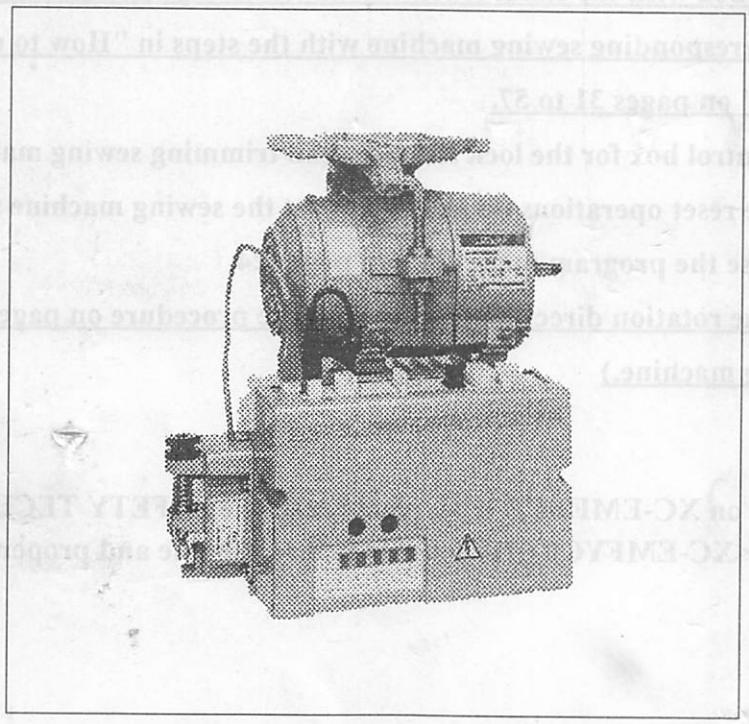
フランス・アメリカ向け

MITSUBISHI

Mitsubishi Limiservo X E Series
TECHNICAL INSTRUCTION MANUAL

Motor	XL-554-10, XL-554-20
	XL-754-20
Control box	XC-EN, XC-EMFY

Induction type AC servo motor and control box with automatic needle positioner



Thank you for purchasing the Mitsubishi Limiservo X.

Please read this manual thoroughly before use to ensure safe and proper use.

Please read the instruction manual for the machine head together with this manual.

Save this manual for future reference.

IB(NA)67331-C(9709)

C

Before use "EMFY" control box !

This control box can be used with either the lock stitch thread trimming sewing machine or chain stitch thread trimming sewing machine. The factory setting is for the lock stitch thread trimming sewing machine.

To use this control box with the chain stitch thread trimming sewing machine, set the function for the corresponding sewing machine with the steps in "How to use the Program mode [2]" on pages 31 to 57.

When using the control box for the lock stitch thread trimming sewing machine again, always perform the reset operations on page 90 or set the sewing machine with the steps in "How to use the program mode [1]" on pages 24.

(Always confirm the rotation direction display with the procedure on page 22 before running the sewing machine.)

Note : When using on XC-EMFYCE type, please read the SAFETY TECHNICAL MANUAL <XC-EMFYCE> thoroughly before use safe and proper use.

1 Contents

2 Safety Instructions

1. To ensure safe use
- Always observe the following items to ensure safe use of the industrial sewing machine drive unit (motor and control box).

1.1 Before starting
- Read all instruction manual thoroughly before starting use of this drive unit, and follow the technical manuals. 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 50/60Hz.
- 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 1,000m 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 technical manuals.

2.2 Accessories
- Always disconnect this control unit from the main power supply when installing any accessories listed in the technical 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 25mm.

(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 safety low voltage.

2.6 Removal

(1) Turn the main switch OFF and remove the plug from the outlet (power supply line) before 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 outlet (power supply line) before opening the control box panel.

3. Maintenance, inspection and repairs

- Follow the technical manuals for maintenance and inspection of 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 (power supply line) before 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 parts (especially near sewing machine needle, V-belt, etc.).
- 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.

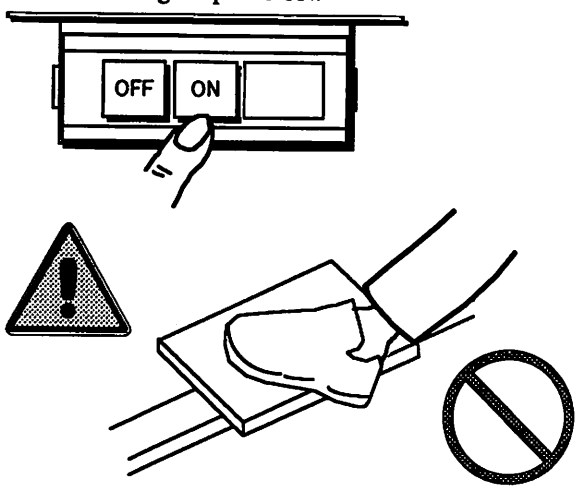
5. Hazard display, warning display

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

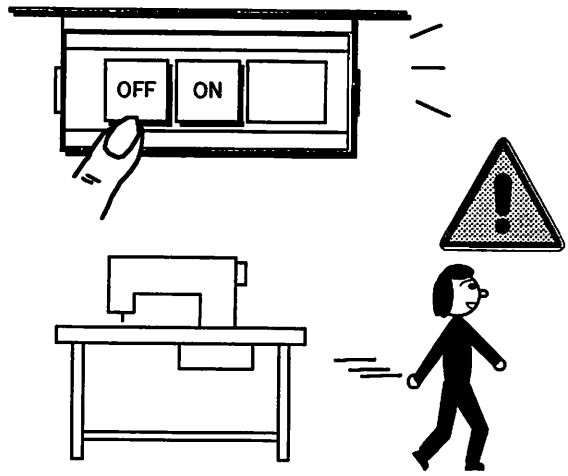
(2) This symbol indicates electrical risks and warnings.

Save these technical manuals for future reference.

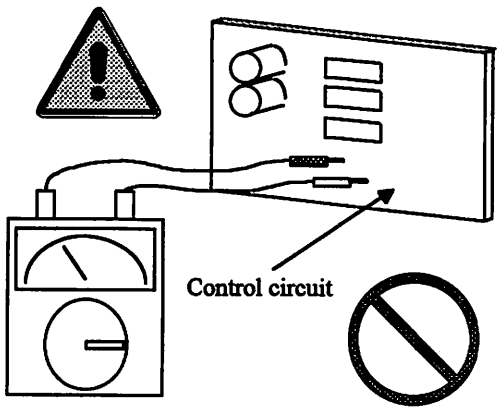
1. Please remove your foot from the pedal when turning the power ON.



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

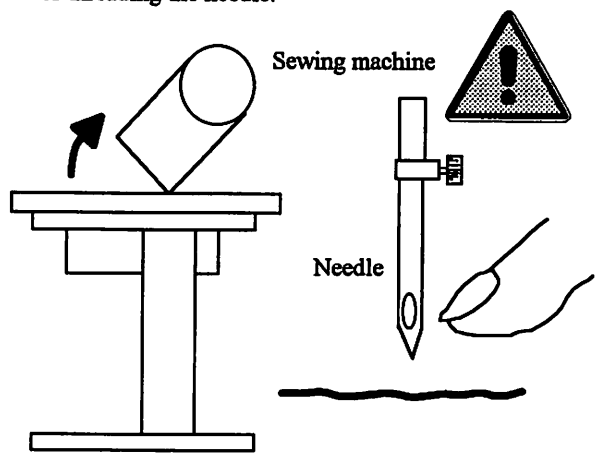


3. Do not inspect the control circuit with a tester.

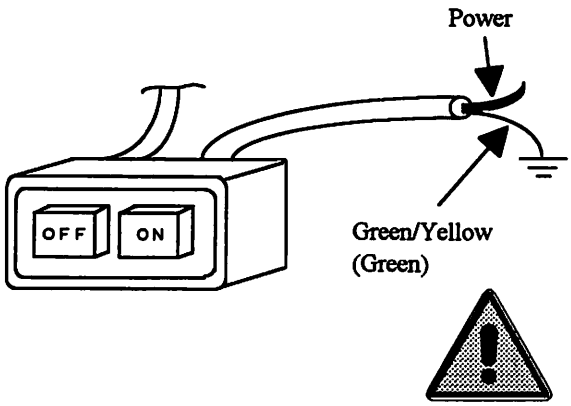


The semiconductor parts may be damaged when the tester's voltage is applied.

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

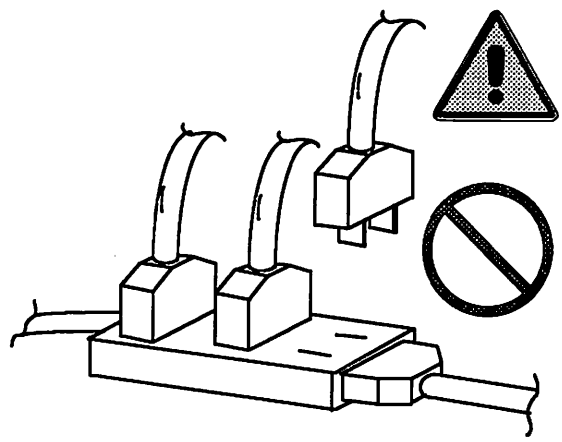


5. Always ground the machine.

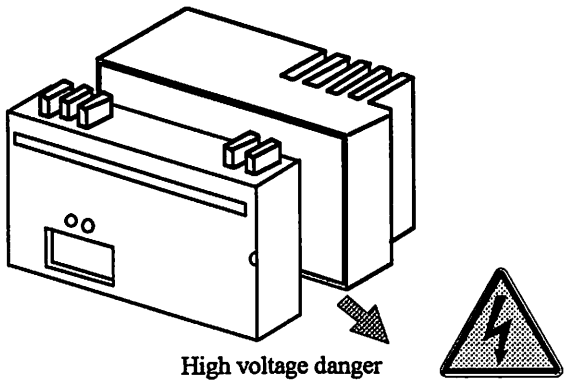


The 3-phase motor has a grounding wire (green) (green/yellow). Always ground this.

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

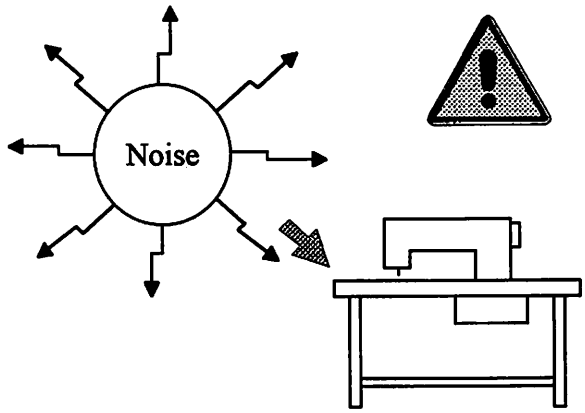


7. A high voltage is applied inside the machine, so wait 10 minutes after turning the power switch OFF before opening the cover.



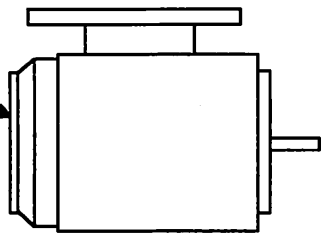
High voltage danger

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



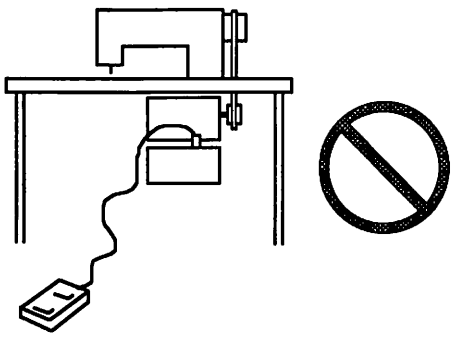
9. The brakes may not function when the power is turned OFF or when there is a power failure during sewing machine operation.
10. Match the connector shape and direction, and insert securely.
11. An optical method is used for the detector's detection element so take care not to let dust or oils get on 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 or the belt has come off or when the sewing machine is completely locked, the motor will be automatically 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.

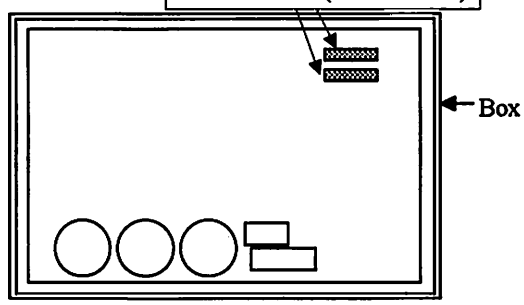
14. When connecting the external switch to the option connector, etc., keep the signal wire as short as possible. If it is long, malfunctions may occur.



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

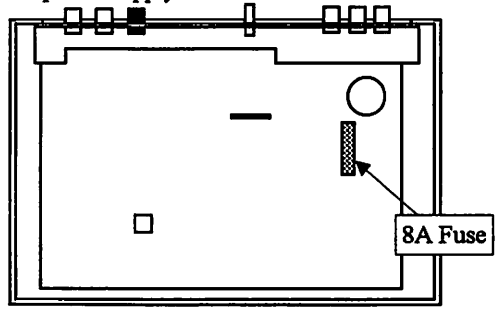
15. If the fuse blows, remove the cause, and replace the blown fuse with one having the same capacity.

200V Two fuses
100V One fuses
Two 20A Fuses (XC-EN, EMFY)
Two 15A Fuses (XC-EMFYCE)



(Front view with cover removed.)

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

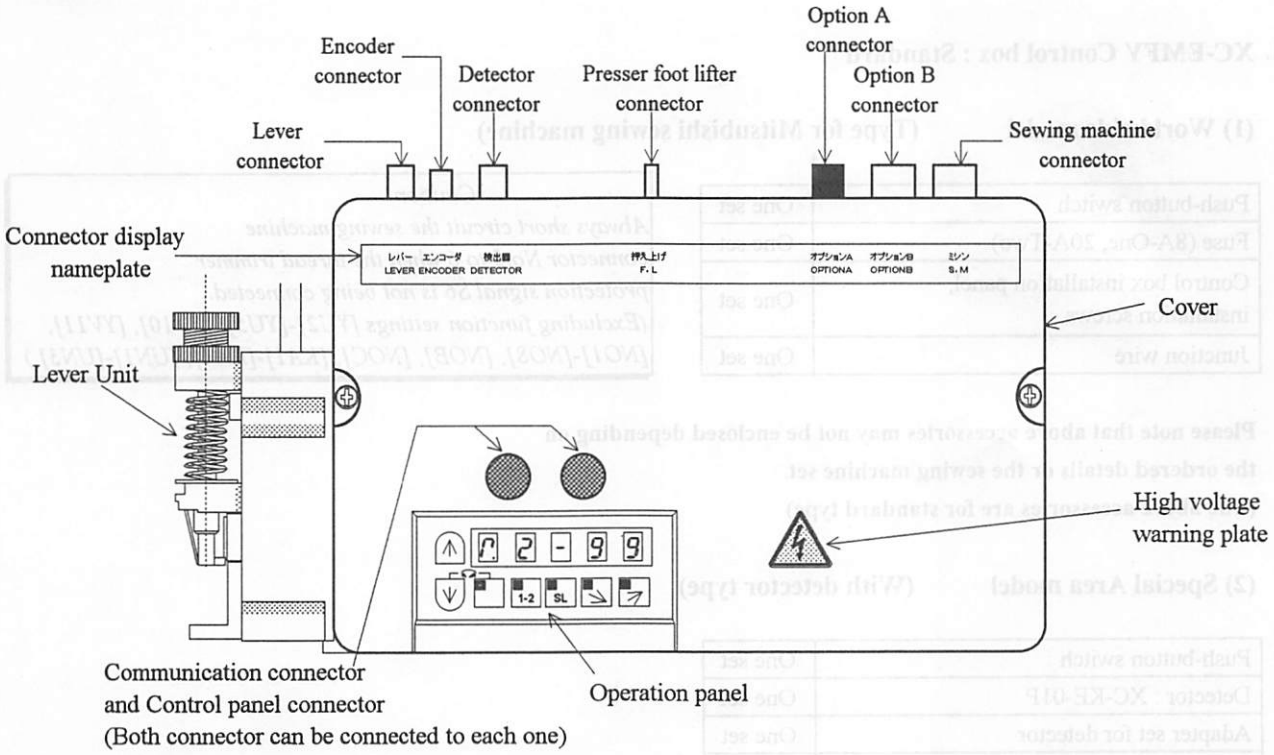


(View from back of cover.)

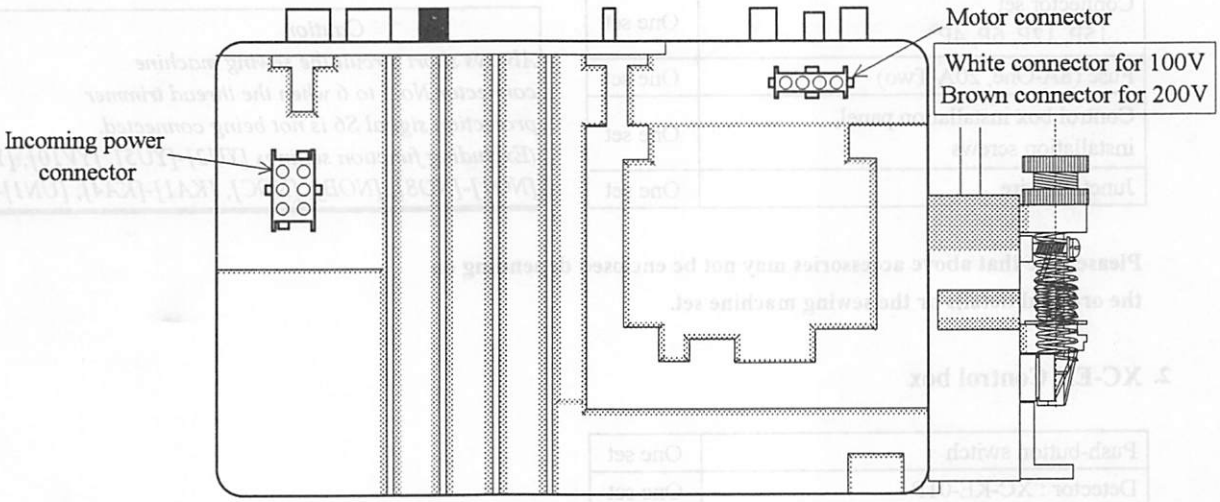
※ The above 8A fuse is for protection of the solenoid output power supply (24V) section.

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

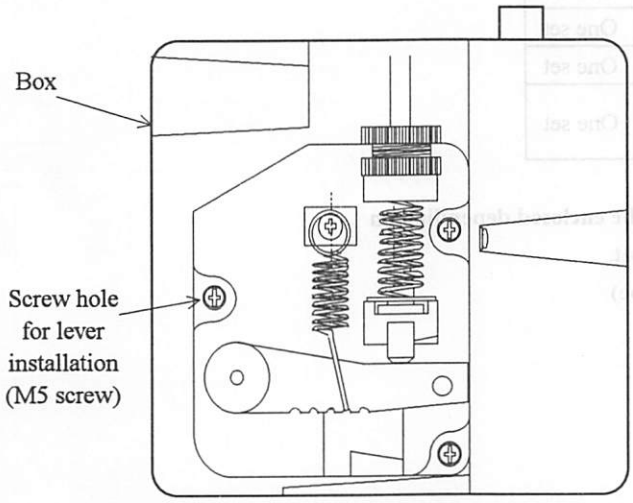
1. Front



2. Rear



3. Left



Note : There isn't a sewing machine connector and option B connector on XC-EN control box.

1. XC-EMFY Control box : Standard

(1) Worldwide model (Type for Mitsubishi sewing machine)

Push-button switch	One set
Fuse (8A-One, 20A-Two)	One set
Control box installation panel, installation screws	One set
Junction wire	One set

Caution
Always short circuit the sewing machine connector No.5 to 6 when the thread trimmer protection signal S6 is not being connected.
(Excluding function settings [YU2]-[YU5], [YV10], [YV11], [NO1]-[NO8], [NOB], [NOC], [KA1]-[KA4], [UN1]-[UN3].)

Please note that above accessories may not be enclosed depending on the ordered details or the sewing machine set.
(The above accessories are for standard type)

(2) Special Area model (With detector type)

Push-button switch	One set
Detector : XC-KE-01P	One set
Adapter set for detector	One set
Stopper set for detector	One set
Connector set 15P, 12P, 6P, 4P	One set
Fuse (8A-One, 20A-Two)	One set
Control box installation panel, installation screws	One set
Junction wire	One set

Caution
Always short circuit the sewing machine connector No.5 to 6 when the thread trimmer protection signal S6 is not being connected.
(Excluding function settings [YU2]-[YU5], [YV10], [YV11], [NO1]-[NO8], [NOB], [NOC], [KA1]-[KA4], [UN1]-[UN3].)

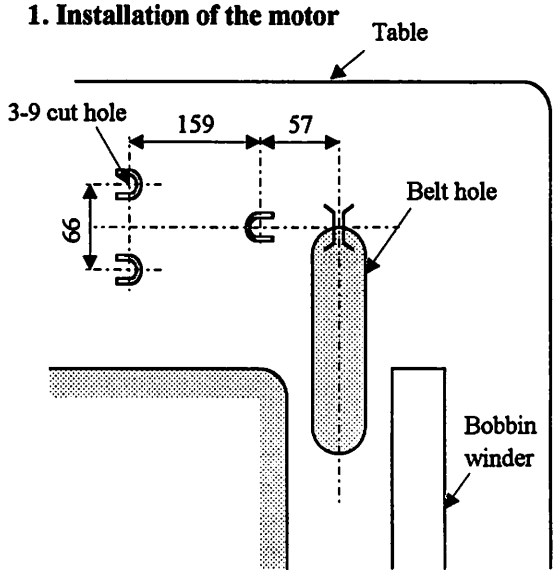
Please note that above accessories may not be enclosed depending on the ordered details or the sewing machine set.

2. XC-EN Control box

Push-button switch	One set
Detector : XC-KE-01P	One set
Adapter set for detector	One set
Stopper set for detector	One set
Connector set 6P	One set
Fuse (8A-One, 20A-Two)	One set
Control box installation panel, installation screws	One set

Please note that above accessories may not be enclosed depending on the ordered details or the sewing machine set.
(The above accessories are for standard type)

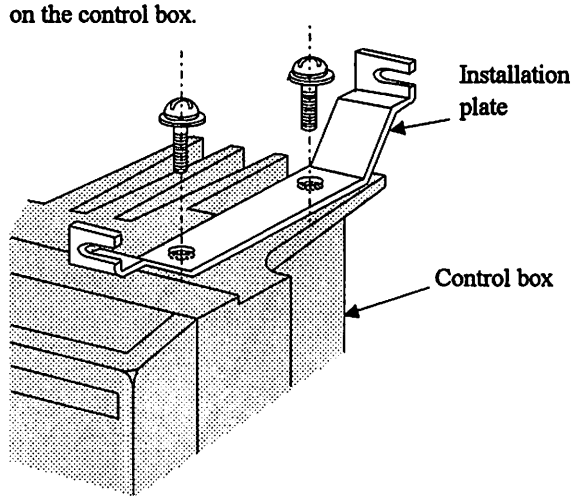
1. Installation of the motor



Using the hole opening pattern, open three 9mm 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.

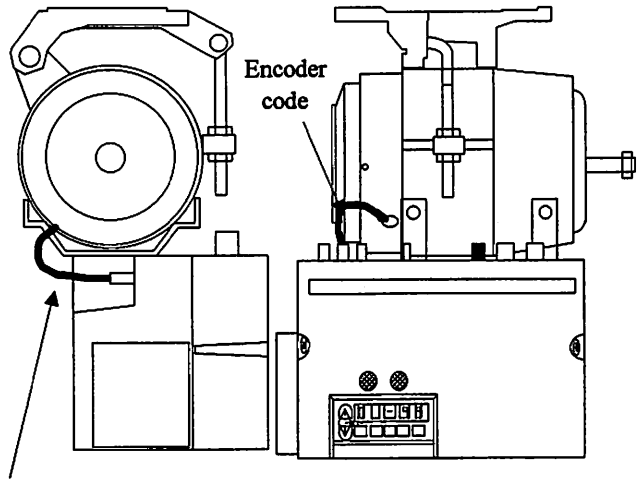
2. Installation of the control box

(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.

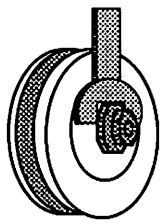


3. Installation of the pulley

Securely tighten the pulley.

Caution

Incomplete tightening may cause malfunctions.



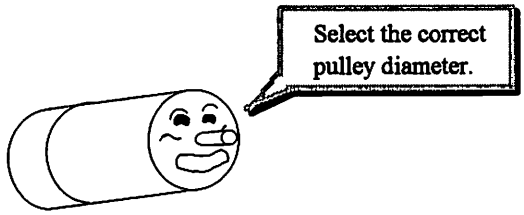
Select the correct pulley diameter to ensure complete use of the motor performance.

Selection of the motor pulley:

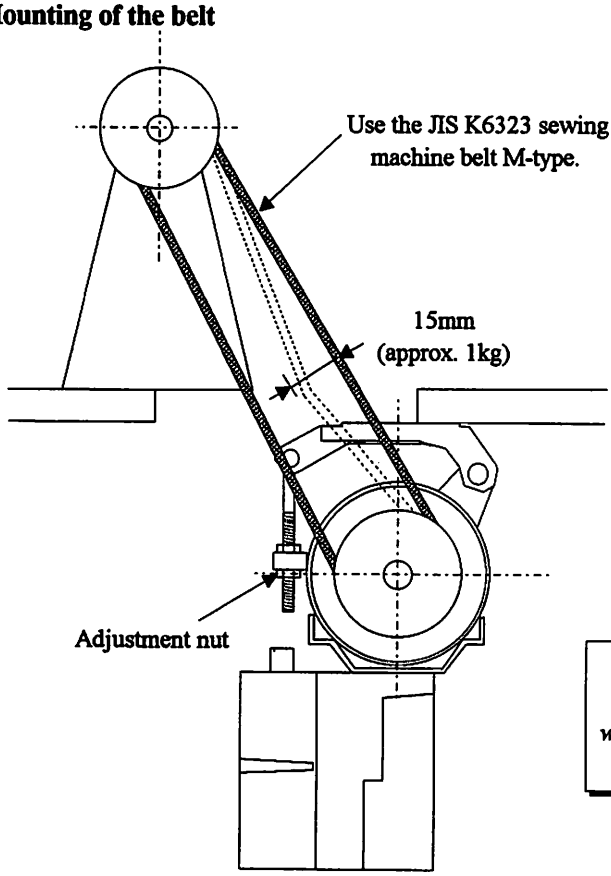
$$\text{Motor pulley outer diameter (mm)} = \frac{\text{Normal sewing machine speed}}{\text{※ Motor speed}} \times \text{Motor pulley diameter (effective diameter)} + 5\text{ mm}$$

※ The motor speed should be set at 3,600r/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 25 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 15mm.

Caution
For safety always turn the power switch off, before adjusting the belt.

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.

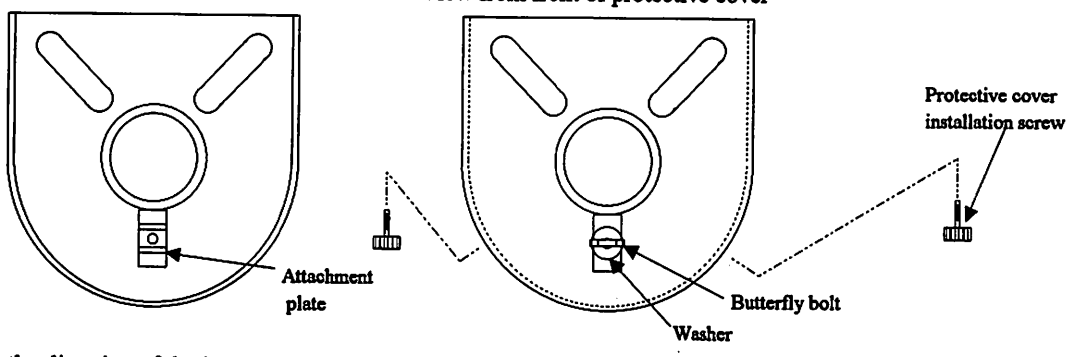
5. Installation of the protective cover

(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

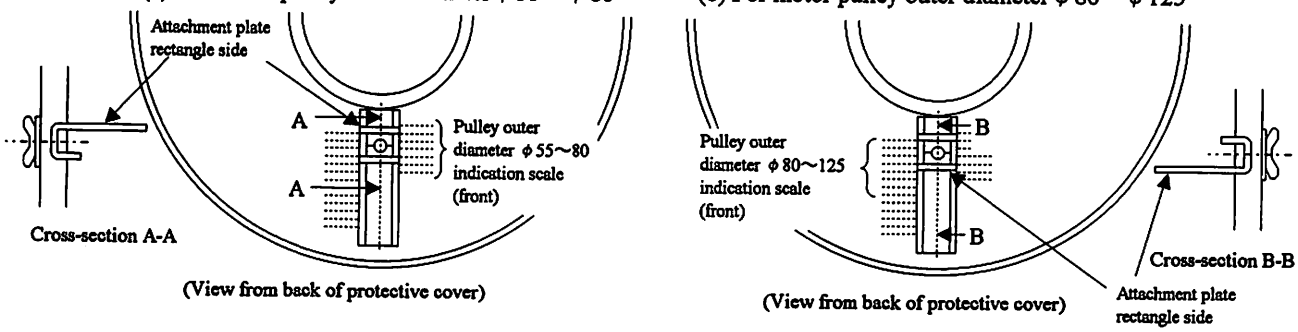
View from front of protective cover



・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 ϕ 55～ ϕ 80

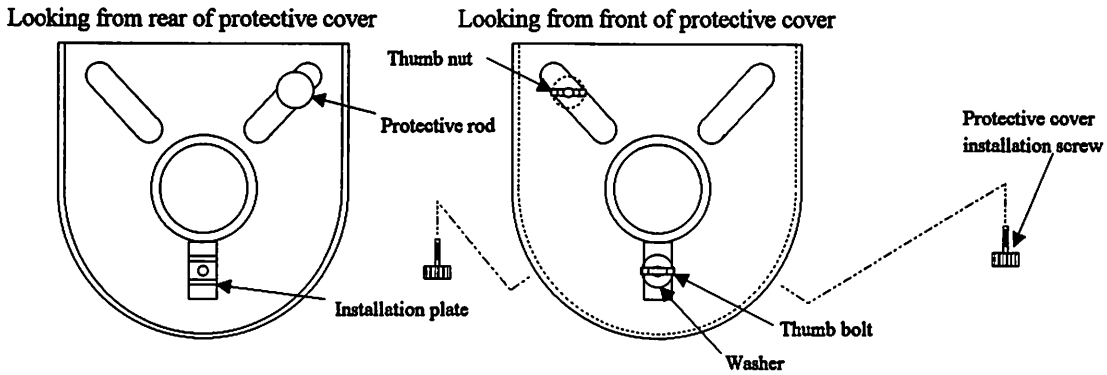
(b) For motor pulley outer diameter ϕ 80～ ϕ 125



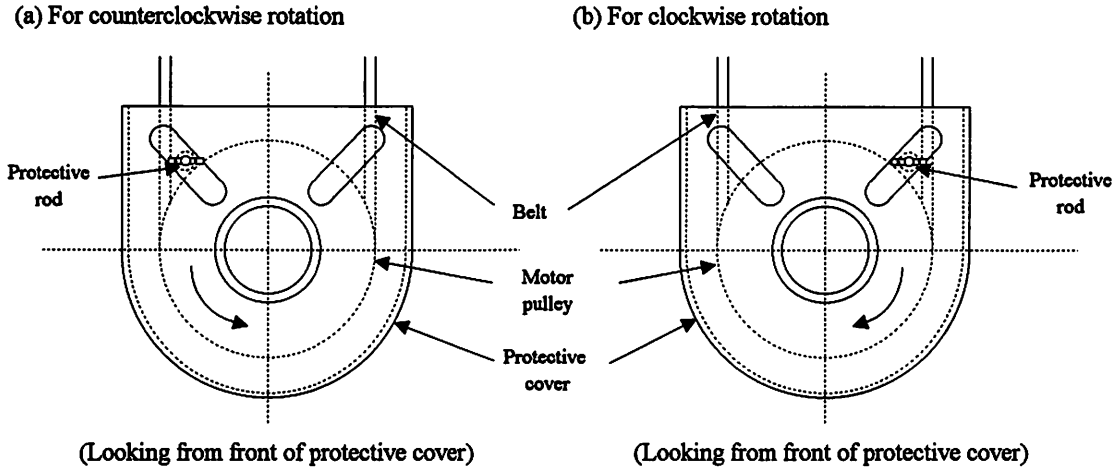
・Set the center of the washer to the pulley diameter indication scale and tighten the butterfly bolt.
・Confirm that the belt does not contact the attachment plate.

(2) Installation of the protective rod

The protective rod is enclosed as a motor accessory.

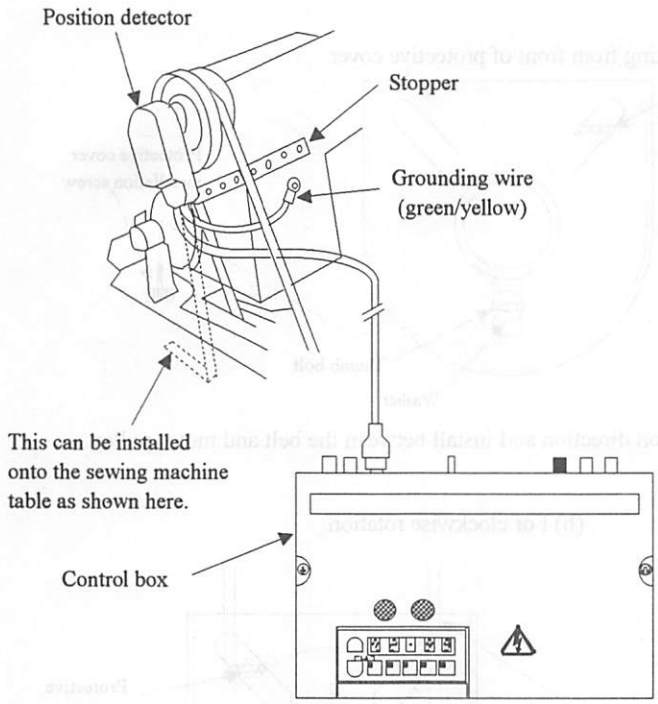


- Set the protective rod to the motor pulley rotation direction and install between the belt and motor pulley.



- 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 dealer for details. The diagram on the left shows an example of the position detector installation.

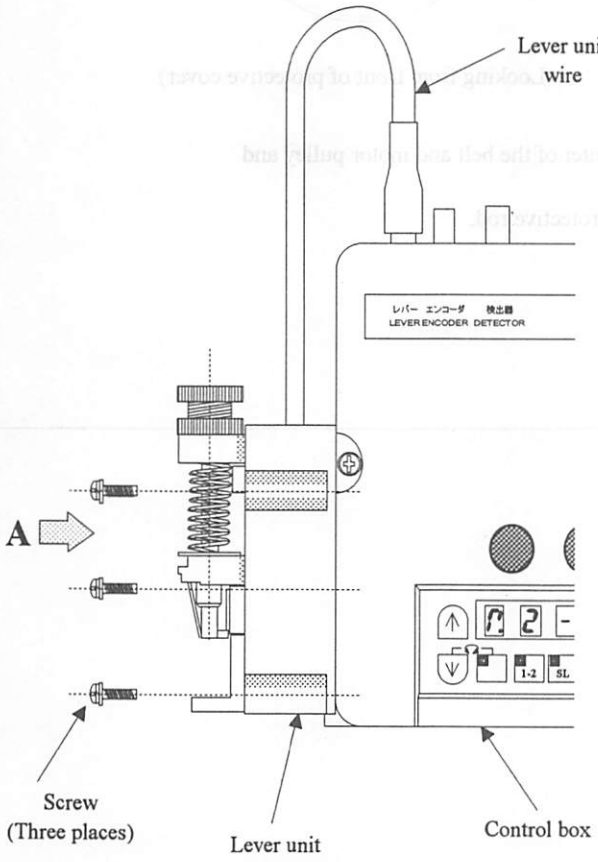
(2) Insert the connector from the position detector into the control box position connector.

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

Caution

This position detector has a grounding wire so it is exclusive for XC-E and B series. This can not used with the conventional XC-A, LF-A, ZK Series.

7. Connection of the lever unit connector

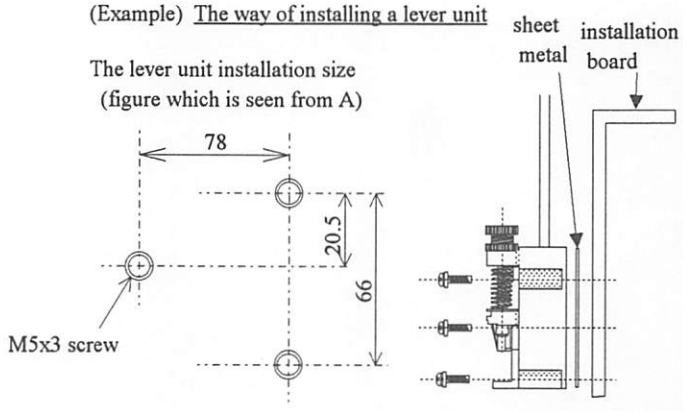


(1) Insert connector from the lever unit into the lever connector of the control box.

(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

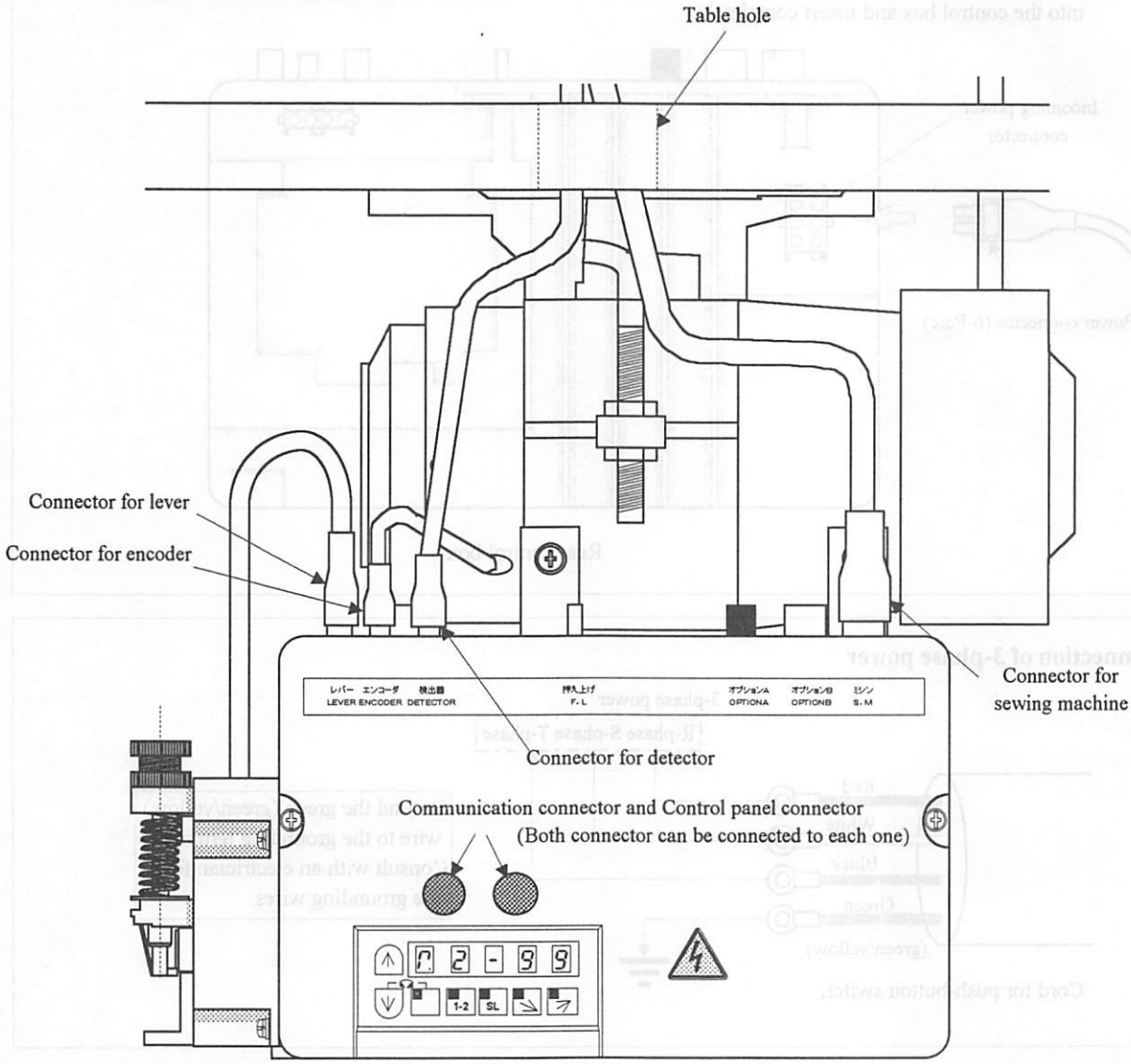
The lever unit installation size
(figure which is seen from A)



Note) This is sample how to setup the lever unit independently. This installation board is not accessory, not option.

8. Connection of the Mitsubishi sewing machine and control box. (XC-EMFY)

Wire the units as shown below.

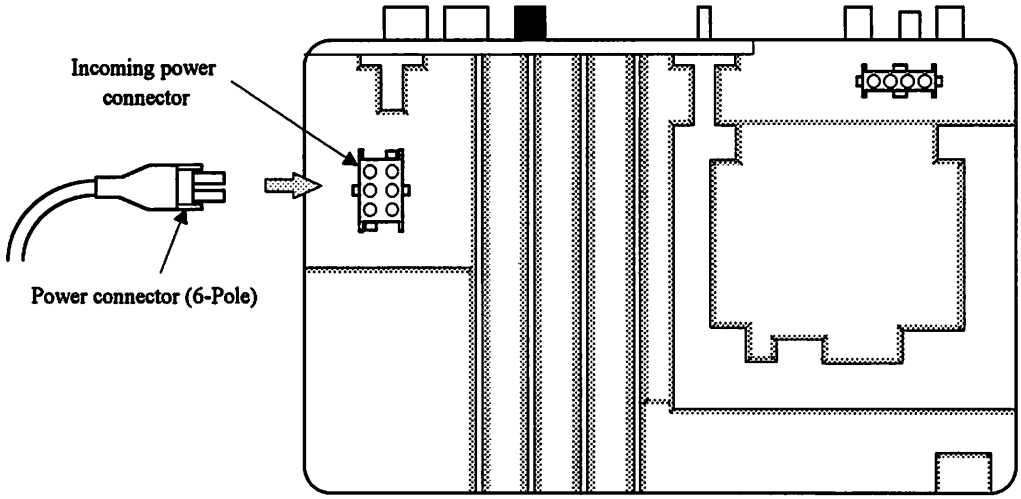


Caution

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.

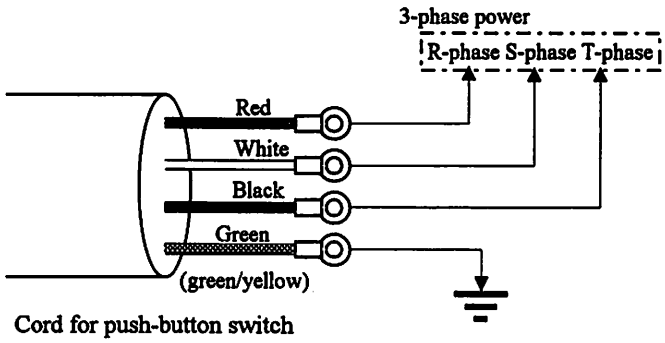
1. Insertion of the power connector

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.

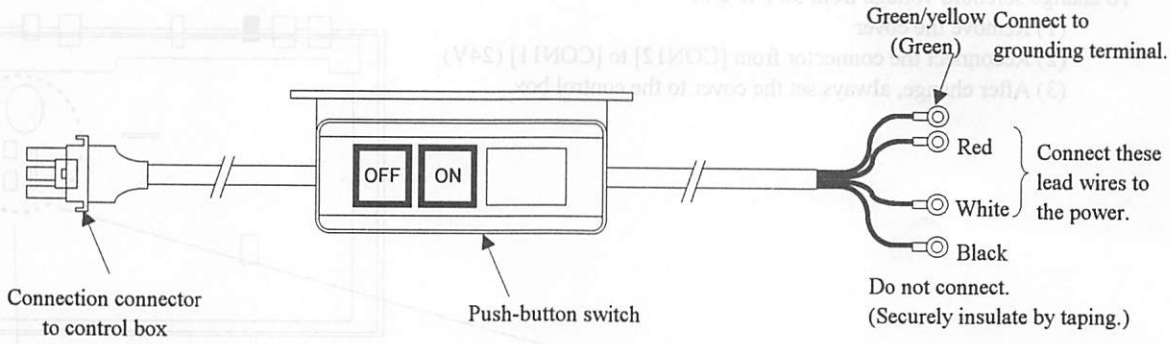
3. Current capacity

Use a fuse or complete breaker for the power.

Power	Recommended current capacity
Single phase 100-120V 550W 200-240V 550W 200-240V 750W	15A
3-phase 200-240V 550W 200-240V 750W	10A

4. When using the 3-phase 200V class Limiservo X with single phase 200～220V class

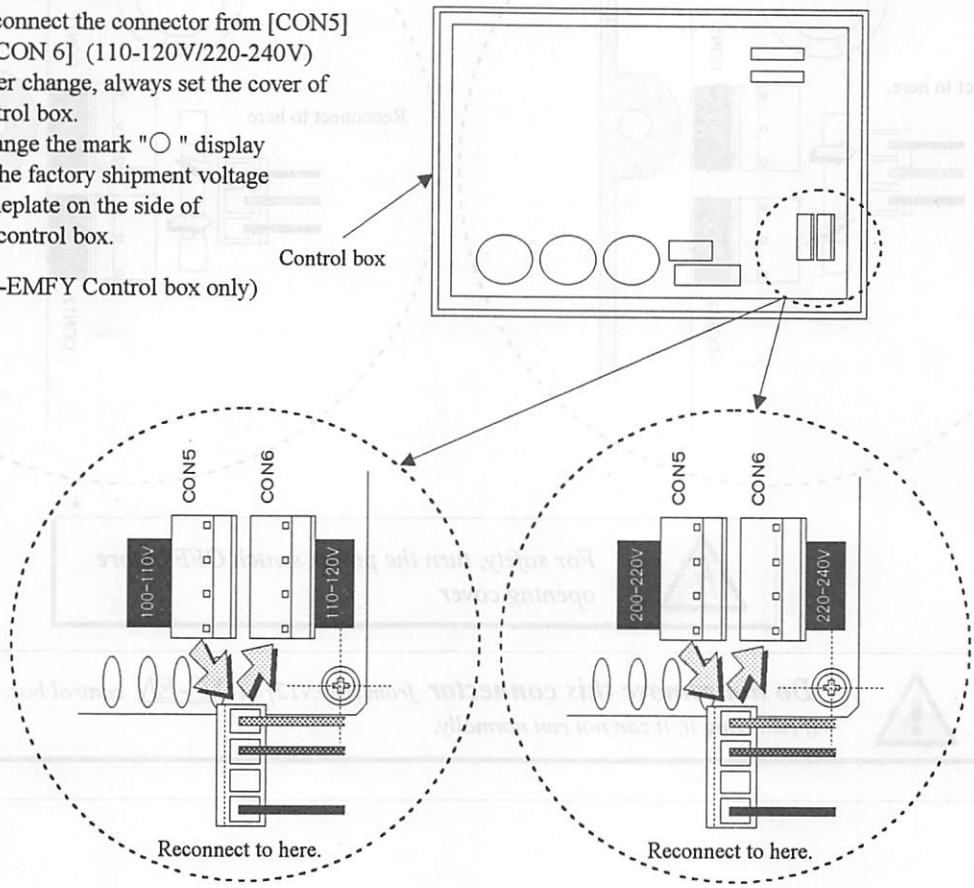
- Connect the "red" and "white" lead wires from the push-button switch to the power.
  The black wire is not used.
  Tape it with insulation tape, etc., to insulate securely.
  Always ground the green/yellow (green) grounding wire.



5. When using the single phase 100V Limiservo X with single phase 110V～120V or 3-phase 200～220V Limiservo X with 3-phase 220V～240V (XC-EMFY Control box only)

(1) Remove the cover.
(2) Reconnect the connector from [CON5] to [CON 6] (110-120V/220-240V)
(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.

(XC-EMFY Control box only)



For safety, turn the power switch OFF before opening cover.

Note : It is not necessary to change this connector position for XC-EN control box, because of no solenoid output.

6. To change solenoid voltage

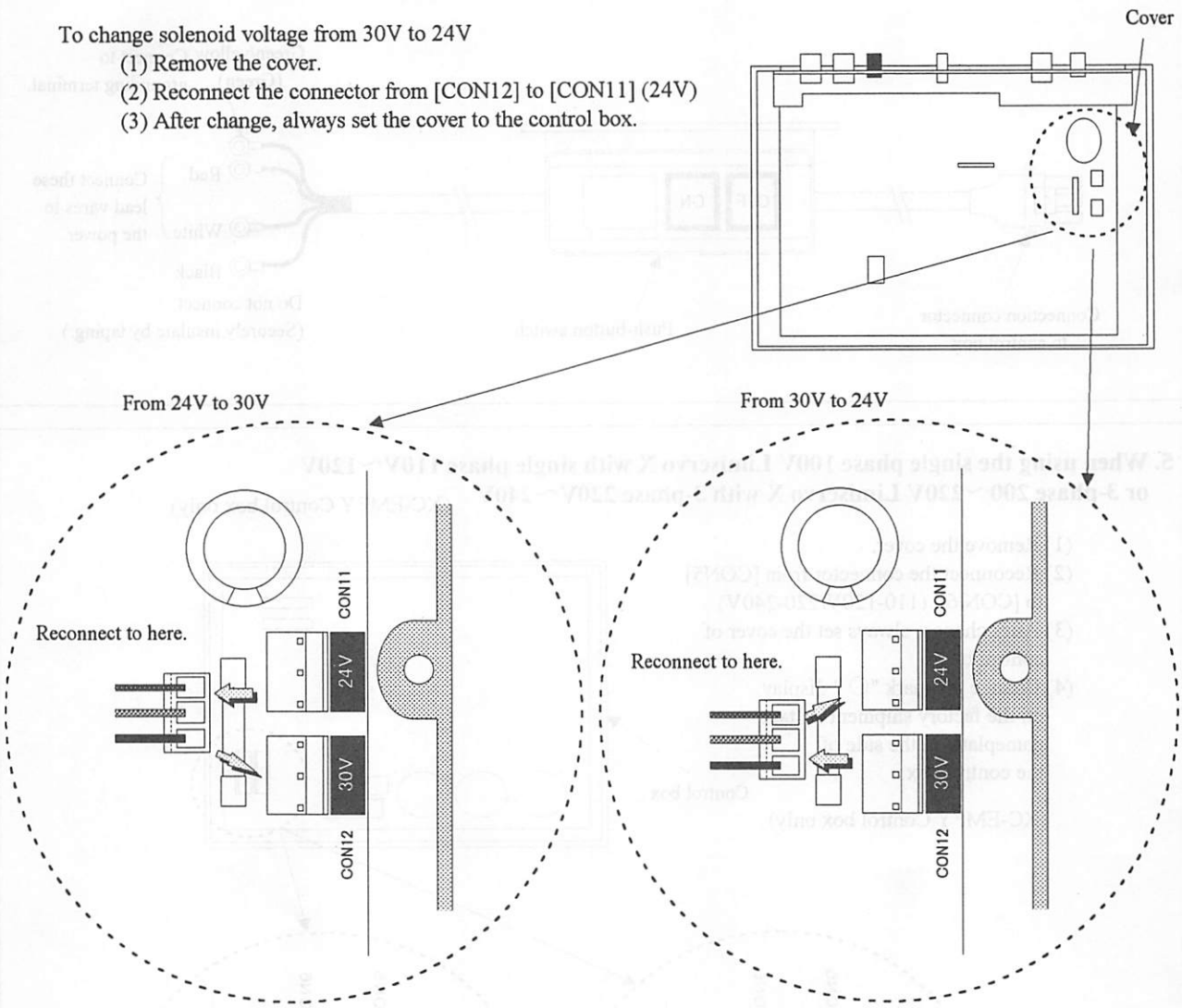
(XC-EMFY Control Box only)

To change solenoid voltage from 24V to 30V

(1) Remove the cover.
(2) Reconnect the connector from [CON11] to [CON12] (30V)
(3) After change, always set the cover to the control box.

To change solenoid voltage from 30V to 24V

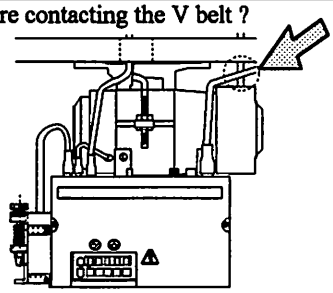
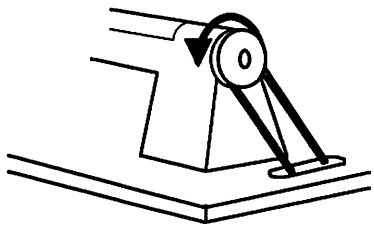
(1) Remove the cover.
(2) Reconnect the connector from [CON12] to [CON11] (24V)
(3) After change, always set the cover to the control box.



For safety, turn the power switch OFF before opening cover.

Do not remove this connector *from [CON12] in XC-EN control box.*
If removing it, it can not run normally.

1. Before turning switches on.....

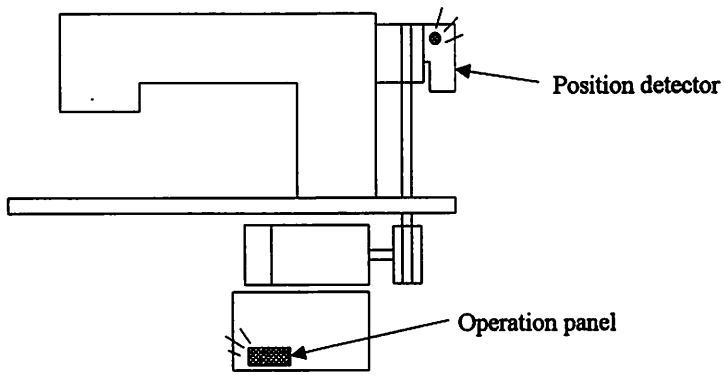
Places to confirm	Reference
(1) Is the power and capacity suitable ?	Current capacity on page 14.
(2) Is the power voltage the same as the○ mark on the factory preset voltage nameplate on the side of the control box ? (XC-EMFY Control Box) (Note : No preset voltage for XC-EN Control Box because of no solenoid output.)	**XC-EMFY Control Box** XC-EMFY-20-05 POWER UNIT L20E ○ 200-220V OUTPUT 550W 220-240V XC-EMFY-10-05 POWER UNIT L10E ○ 100-110V OUTPUT 550W 110-120V **Note : XC-EN Control Box** XC-EN-20-05 POWER UNIT N20E 200-240V OUTPUT 550W XC-EN-10-05 POWER UNIT N10E 100-120V OUTPUT 550W
(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.)	Installation of control box on page 9. Installation of lever unit on page 12. Installation of position detector on page 12.
(4) Is the lead wire contacting the V belt ? 	———
(5) Is the belt tension okay ?	Mounting of the belt on page 10.
(6) Are the pulley nuts securely tightened ?	Installation of the pulley on page 9.
(7) Can the sewing machine be rotated lightly by hand ? 	———
(8) Is the sewing machine a chain stitch sewing machine ? The factory setting is [Lock stitch thread trimming sewing machine].	How to use the program mode [2] on pages 31 to 57.
(9) Is the sewing machine solenoid voltage 24V or 30V ? The factory setting is 24V.	Change solenoid voltage from 24V to 30V on page 16.

Before use "EMFY" control box !

This control box can be used with either the lock stitch thread trimming sewing machine or chain stitch thread trimming sewing machine. The factory setting is for the lock stitch thread trimming sewing machine. To use this control box with the chain stitch thread trimming sewing machine, set the function for the corresponding sewing machine with the steps in "How to use the Program mode [2] " on pages 31 to 57. When using the control box for the lock stitch thread trimming sewing machine again, always perform the reset operations on page 90 or set the sewing machine with the steps in "How to use the program mode [1] " on page 24. (Always confirm the rotation direction display with the procedure on page 22 before running the sewing machine.)

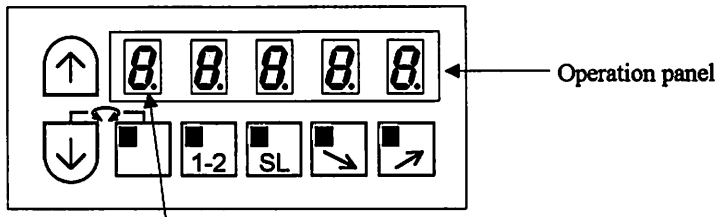
2. Turn on the power.....

(1) Does the position detector lamp light ?



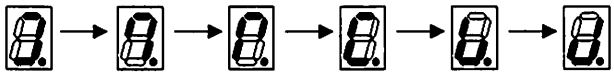
(2) Does the LED on the control box operation panel light ?

(3) Is the sewing machine rotation direction correct ?

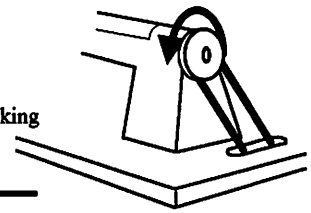


The sewing machine rotation direction is determined with the rotation direction of this LED.

- For left rotation

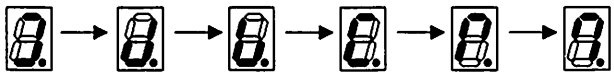


The sewing machine rotates to the left looking from the pulley side.

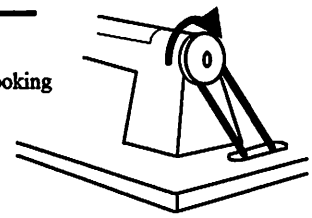


The factory setting is left rotation.

- For right rotation



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

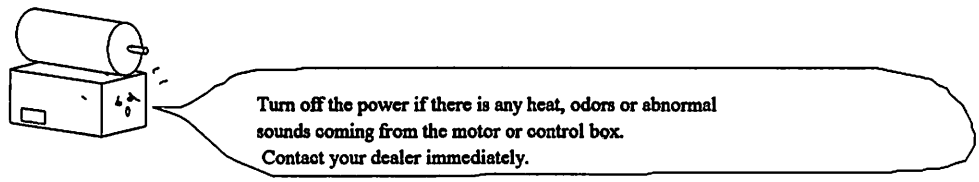


Refer to page 26 for the procedure fir changing the rotation.

Before use "EMFY" control box !

This control box can be used with either the lock stitch thread trimming sewing machine or chain stitch thread trimming sewing machine. The factory setting is for the lock stitch thread trimming sewing machine. To use this control box with the chain stitch thread trimming sewing machine, set the function for the corresponding sewing machine with the steps in "How to use the Program mode [2] " on pages 31 to 57. When using the control box for the lock stitch thread trimming sewing machine again, always perform the reset operations on page 90 or set the sewing machine with the steps in "How to use the program mode [1] " on page 24.
(Always confirm the rotation direction display with the procedure on page 22 before running the sewing machine.)

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

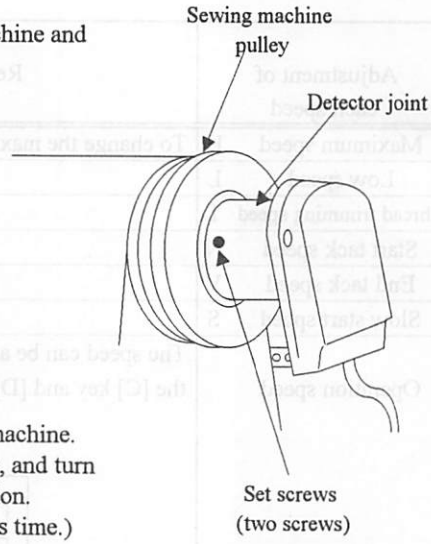


1. Adjustment of stopping position

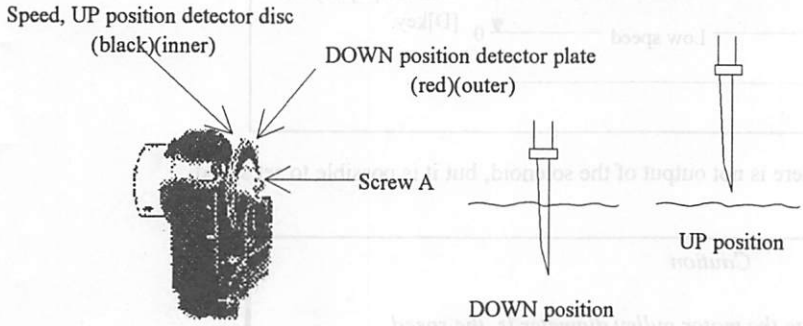
Adjust this position with the detector installed onto the sewing machine and while stopping at the UP and DOWN positions.
For safety, disconnect the connector for the sewing machine.

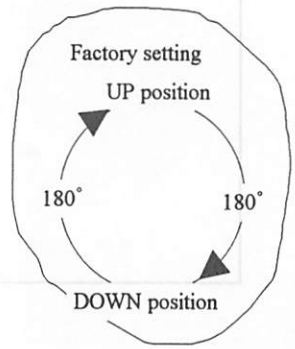
(1) Adjustment of UP position
-Loosen the two set screws on the detector joint, and set the stop position by rotating by hand.
-If adjustment is not possible by turning the joint, loosen the cross-recessed screw A shown of the following figure, and turn all detector plates simultaneously to adjust to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

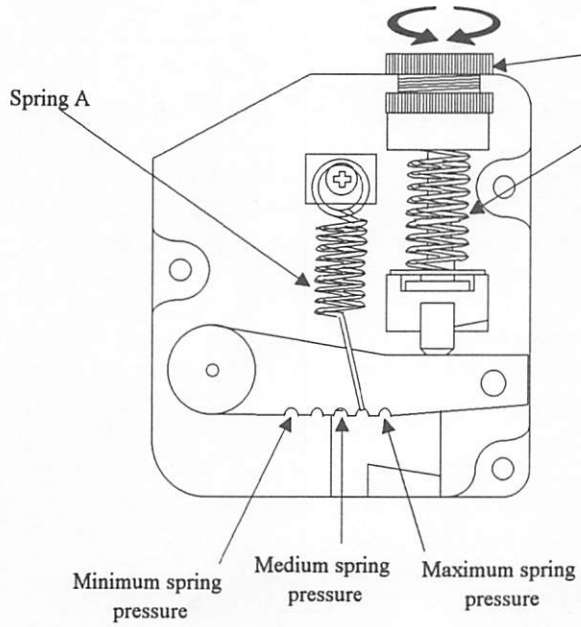




(The factory setting of the clearance from the DOWN position to UP position is approx. 180)

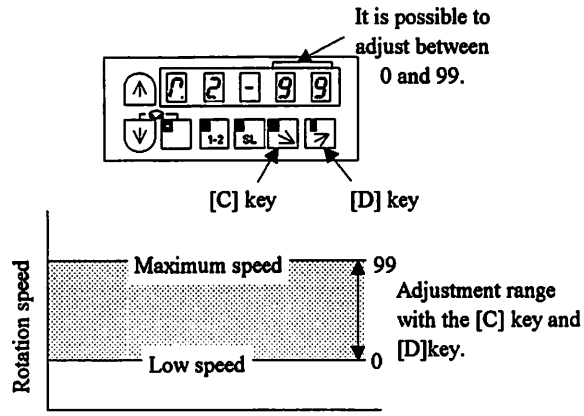
2. Adjustment of pedal toe down pressure, and heeling pressure

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.



Control box	Lever unit	Toe down
XC-EMFY	XC-CL-2	paragraph 2
XC-EN	XC-CL-1	paragraph 1

3. Adjustment of operation speed

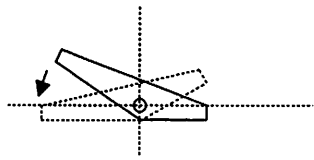
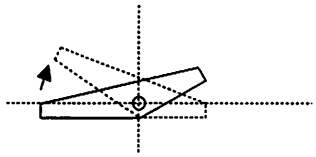
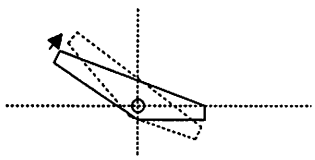
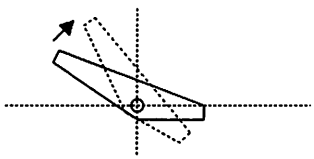
Adjustment of each speed		Reference	Factory setting (speed)	
			EN	EMFY
Maximum speed	H	To change the maximum speed	5000	4000
Low speed	L	----	250	250
Thread trimming speed	T	----	*200	200
Start tack speed	N	----	*1700	1700
End tack speed	V	----	*1700	1700
Slow start speed	S	----	250	250
Operation speed		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.

10 Pedal Operation

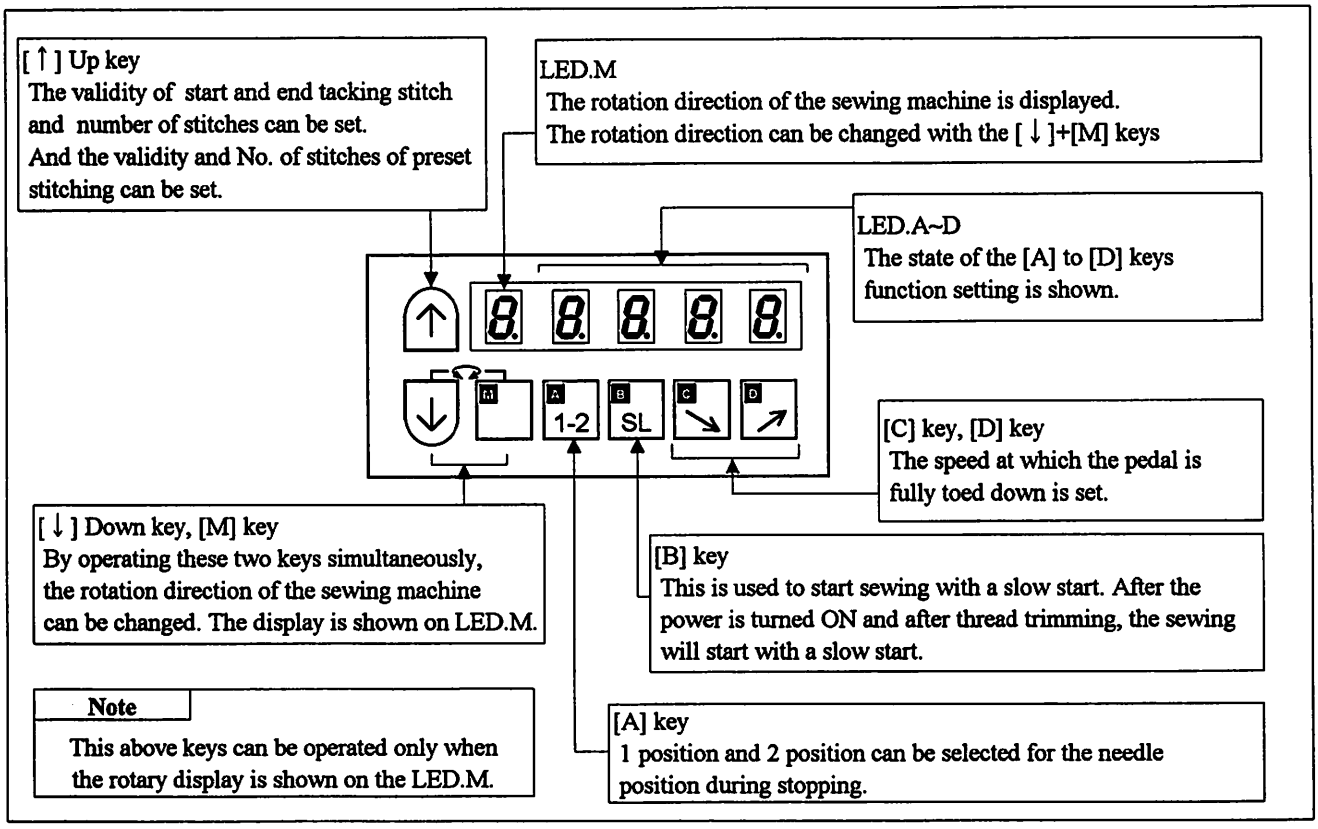
<table>
<tr><th>Pedal operation</th><th>Operation</th></tr>
<tr><td> 
Neutral – Toe down</td><td>The sewing machine will rotate at a speed that is relevant to the toe down amount.</td></tr>
<tr><td rowspan="2"> 
Toe down – Neutral</td><td>1 position setting
Needle UP position stop</td></tr>
<tr><td>2 position setting
Needle DOWN position stop</td></tr>
<tr><td> 
Neutral – Light heeling</td><td>Presser foot lifter operation
(The XC-EN uses a one-step heeling specification.
Light heeling cannot be used.)</td></tr>
<tr><td> 
Neutral – Full heeling</td><td>1 position setting
EMFY: The motor rotates once, trims the thread, and then the presser foot rises.
EN: Operation of needle UP position stop.
2 position setting
EMFY: The motor half-rotates from the DOWN position, trims the thread, and then the presser foot rises.
EN: Needle UP position with half-rotation.</td></tr>
</table>

Caution

Refer to the explanation of [A] key "How to use normal mode" page 26 for details on setting the 1 position and 2 position.

1. Displays during normal mode and functions of each key

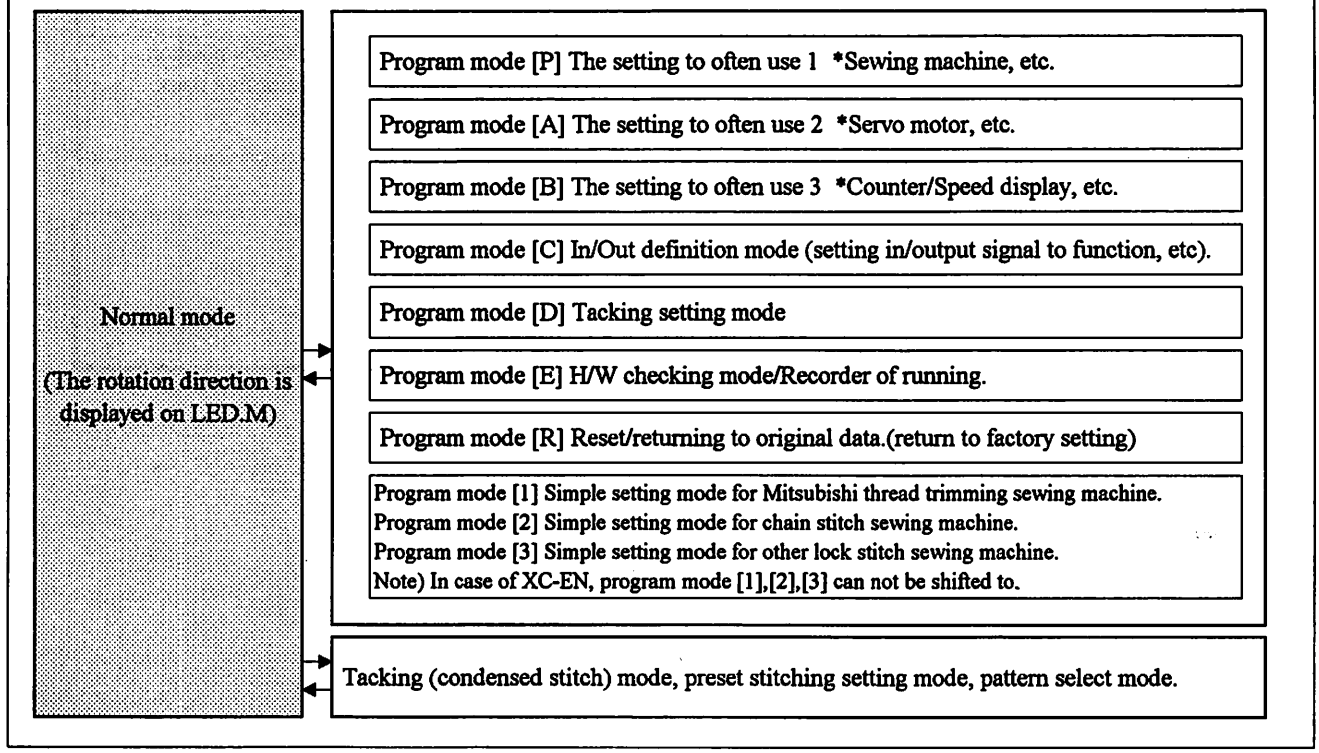
When the power supply switch is turned ON, the rotation direction will display on the LED.M shown below.
When the rotation direction isn't displayed on LED.M, press the [↓] key any time.
This state is called the normal mode, and the following keys can be operated.



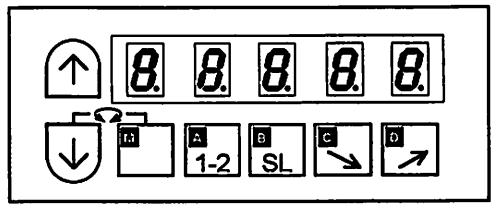
2. Selection of each mode

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) Types of program mode



(2) 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.	*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 from the normal mode.	*The tacking stitches setting mode will be entered.	Press [↓] key any time.
Preset stitching setting mode	Press the [↑] key three times from the normal mode.	*The preset stitching 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 from the normal mode.	*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.	*The display will flicker. *The program mode [P] will be entered.	While holding down [↓] key, press [↑] key.
Program mode [A]	While holding down the [↓] key , press the [A] key for 2 seconds or more from normal mode.	*The display will flicker. *The program mode [A] will be entered.	While holding down [↓] key, press [↑] key.
Program mode [B]	While holding down the [↓] key , press the [B] key for 2 seconds or more from normal mode.	*The display will flicker. *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.	*The display will flicker. *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.	*The display will flicker. *The program mode [D] will be entered.	While holding down [↓] key, press [↑] key.
Program mode [E]	While holding down the [↓] key , press the [A] key and the [↑] key for 2 seconds or more from normal mode.	*The display will flicker. *The program mode [E] will be entered.	While holding down [↓] key, press [↑] key.
Program mode [R]	While holding down the [↓] key , press the [B] key and the [↑] 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 [1] Note) In case of XC-EN, program mode [1] can not be entered.	While holding down the [↓] key , press the [A] key and the [B] 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.
Program mode [2] Note) In case of XC-EN, program mode [2] can not be entered.	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.
Program mode [3] Note) In case of XC-EN, program mode [3] can not be entered.	While holding down the [↓] key , press the [A] key and the [D] key for 2 seconds or more from normal mode.	*The display will flicker. *The program mode [3] will be entered.	Press [D] key for 2 seconds or more.

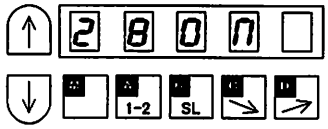
3. How to use the program mode [1]

EMFY

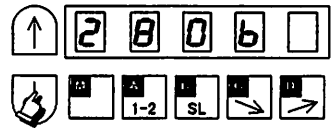
Note) In case of XC-EN, program mode [1] can not be entered.

To set the functions for Mitsubishi thread trimming sewing machine in simple setting.
(ex. To set for the LS2-1280-B1T).....Function setting [280B]

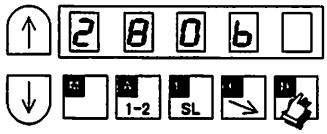
1) Enter program mode [1] ([↓]+[A]+[B])

2) 

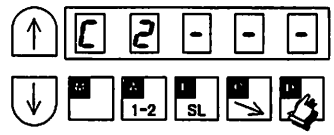
* Program mode [1] will be entered.

3) 

* Set function to [280B].

4) 

* [280B] 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 that corresponds the sewing machine model from "Simple setting table for Mitsubishi thread trimming sewing machine".
And to press [D] key 2 seconds or more, function will be carried out automatically for that model.

B) To return to the normal mode from the [280B] display, press the [↓] key while holding down [↑] key.
In this case, [280B] will not be set, and the last settings will be used.

C) Each time the [↓] key is pressed in step 2, the function will change in order from [280M][280L][280H] [280B].....[630][280E][EFL][EN]. (The factory setting is [280M].)

Note

All contents which were set so far are cleared and the setting speed and the function setting which corresponds to the chosen sewing machine type are automatically done.

Simple setting table for Mitsubishi thread trimming sewing machine and motor pulley outside diameter.

	Simple setting table for Mitsubishi thread trimming sewing machine												
	Function name	Digital display	Sewing machine type	Speed setting					Function setting			Motor pulley outside diameter (mm)	
				High speed (H)	Low speed (L)	Thread trimming speed (T)	Start tacking speed (N)	End tacking speed (V)	D mode Tack alignment (BM)	A mode weak brake (BK)	A mode gain selection (GA)		
	280M	280n	LS2-1280-M1T(W)	4000	250	200	1700	1700	OFF	OFF	L		*1
*4	280H	280H	LS2-1280-H1TW	3000	250	200	1200	1200	OFF	OFF	L	85	
	280B	280b	LS2-1280-B1T	3000	250	200	1200	1200	OFF	OFF	L		
	210M	2 10n	LS2-2210-M1T(W)	4000	250	200	1700	1700	OFF	OFF	L		
	230M	230n	LT2-2230-M1TW	3700	250	175	1200	1200	OFF	OFF	H		
	230L	230L	LT2-2230-L1T	3700	250	175	1200	1200	OFF	OFF	H		
	230B	230b	LT2-2230-B1T	3000	250	175	1200	1200	OFF	OFF	H	85	
	250M	250n	LT2-2250-M1TW	3000	250	175	1200	1200	OFF	OFF	H		
	250A	250A	LT2-2250-A1T	3000	250	175	1200	1200	OFF	OFF	H		
	250B	250b	LT2-2250-B1T	3000	250	175	1200	1200	OFF	OFF	H		
	3370	3370	LG2-3370-M1T	4000	250	200	1700	1700	OFF	OFF	L	85	*2
	359	359	DY-359-22BZ	2000	250	200	700	700	ON	OFF	L		
	3310	33 10	LY2-3310-B1T	2000	250	225	700	700	ON	OFF	H		
	3750	3750	LY2-3750-B1T	2000	250	200	700	700	ON	OFF	L	65	
	410B	4 10b	LU2-4410-B1T	2000	250	175	700	700	ON	OFF	H		
	430B	430b	LU2-4430-B1T	2000	250	175	700	700	ON	OFF	H		
	4710	47 10	LU2-4710-B1T	3000	250	175	700	700	ON	OFF	H		
	4730	4730	LU2-4730-B1T	2500	250	175	700	700	ON	OFF	H		
	630	630	LX2-630-M1	800	280	160	500	500	ON	ON	L		
*5	280E	280E	LS2-1280-M1T(W)	5000	250	200	1700	1700	OFF	OFF	H	110	*3
	EFL	EFL	*6	5000	250	200	1700	1700	OFF	OFF	L	*	
	EN	En	*7	5000	250	200	1700	1700	OFF	OFF	L		

*1 Factory setting is [280M].

*2 The effective diameter of the sewing machine pulley is 70 mm. (80 mm only for LY2-3750).

*3 [280E] shows setting for the exportation.

*4 A function name is displayed in order to the direction of ↓ every time it presses a [↓] key.

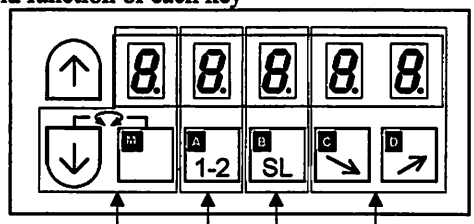
*5 A function name is displayed in order to the direction of ↑ every time it presses a [↑] key.

*6 For sewing machine with foot lifter, without thread trimmer.

*7 For needle positioner.

4. How to use the normal mode

(1) Display during normal mode and function of each key



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.

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.

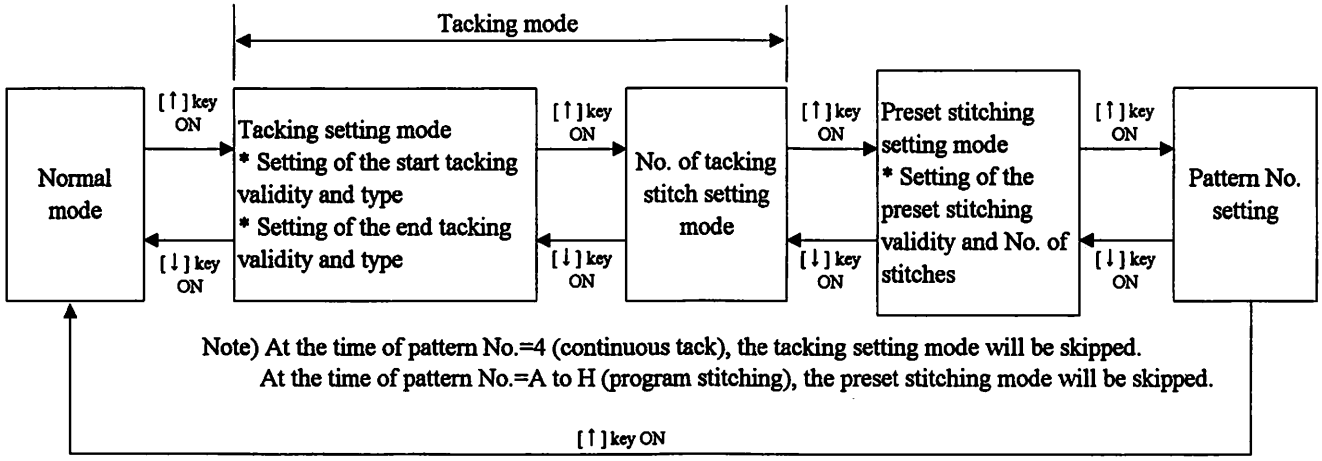
Slow start ON/OFF
By operating this [B] key, slow start ON/OFF can be selected.
Turned ON when wanting to sew the beginning of the sewing in slow start.
After the power is turned ON or after thread trimming, the sewing will start with a slow start.
Slow start ON/OFF is displayed on LED.B.

- is OFF o is ON

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.

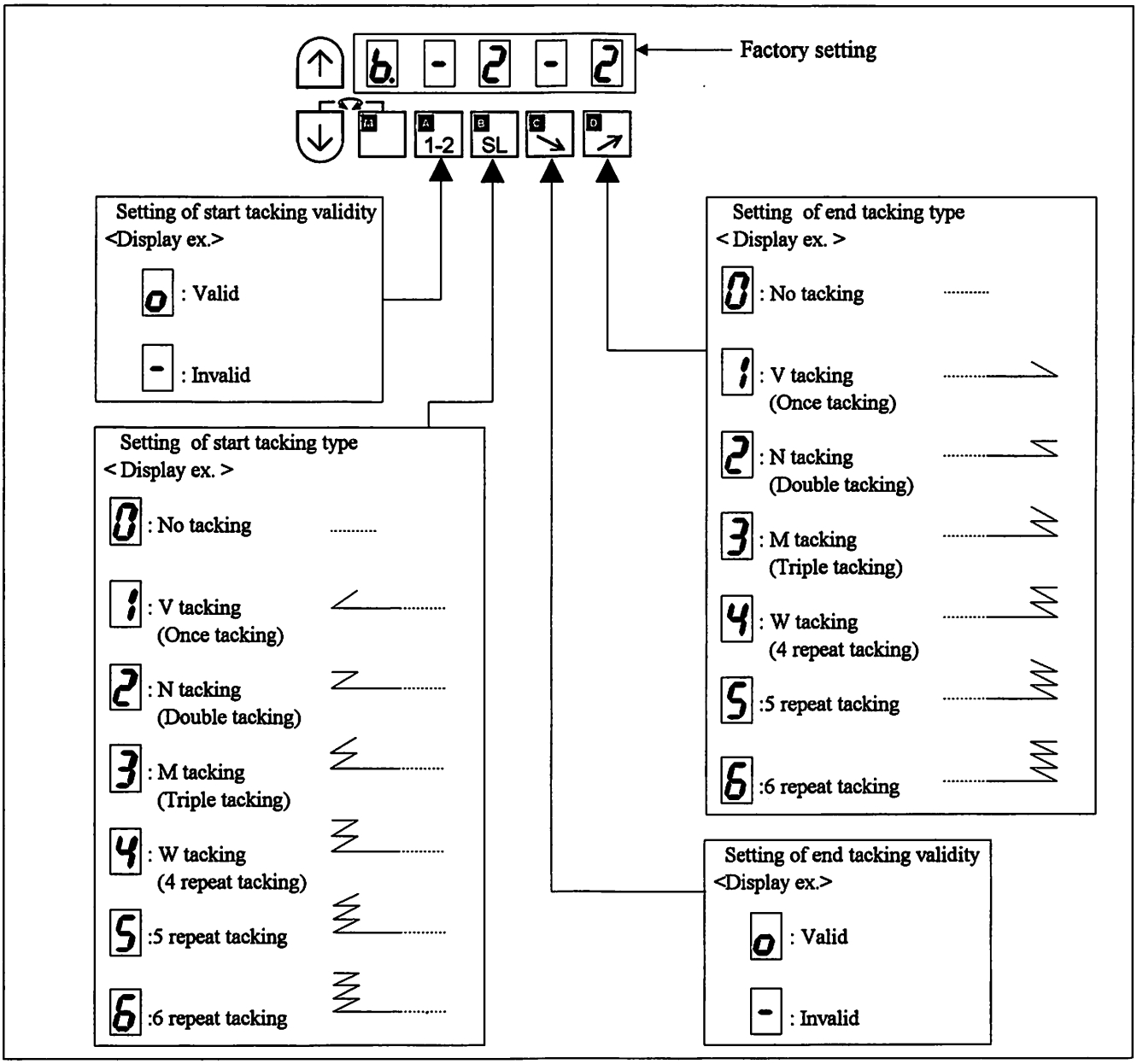
1 is Up position 2 is Down position

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



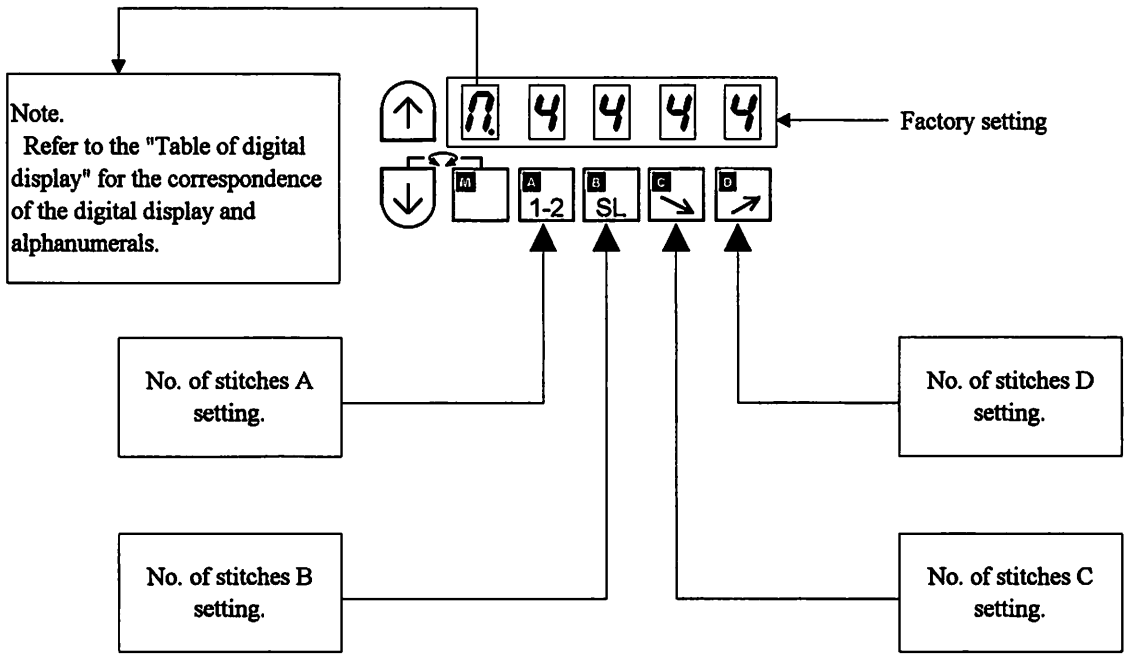
(1) Tacking setting mode (At the time of pattern No.=4, this mode will be skipped.)

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.

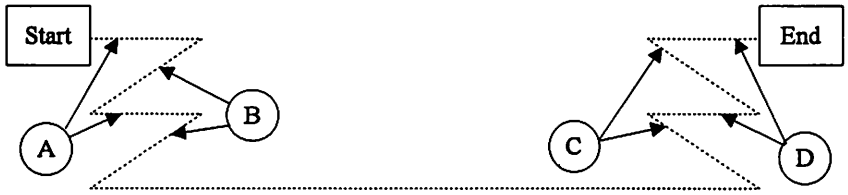


(2) No. of tacking stitches setting mode

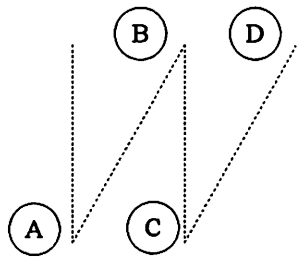
When the [↑] key is turned ON again, n will display above the [M] key indicator, and the No. of stitches can be set.



1) The time except pattern No.4



2) When the pattern No.4

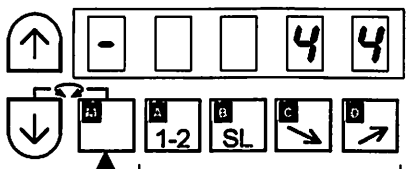


Each setting value can be changed from 0 to 9 stitches, A,B,C,D,E,F stitches
A is 10 stitches
B is 11 stitches
C is 12 stitches
D is 13 stitches
E is 14 stitches
F is 15 stitches

Note) In case of XC-EN, there is no backstitch output.

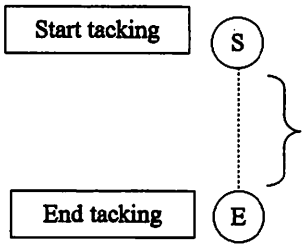
(3) Preset stitching setting mode

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



Setting of preset stitching
<Display ex.>
0 : Valid
- : Invalid

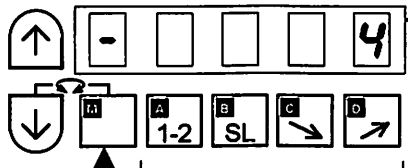
Setting of No. stitches N
(0 to 9999 stitches)



Start tacking that was in the tacking mode will start at the Ⓢ position.

End tacking that was in the tacking mode will start at the Ⓔ position.

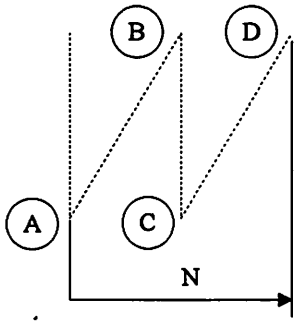
2) When the pattern is No.4



Setting of continuous
tack stitching validity
<Display ex.>
0 : Valid
- : Invalid

Setting of No. times N
(0 to 9999 stitches)

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.)

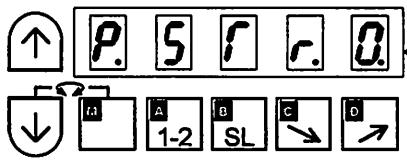


Note) In case of XC-EN, there is no backstitch output.

(4) Pattern No. selection mode

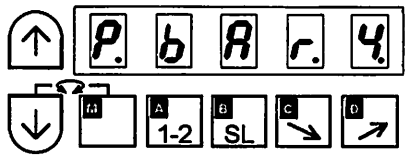
When the [↑] key is turned ON again, and the pattern No. selection mode will be entered.
Selecting of preset stitching setting, continuous tack stitching, program stitching (pattern No. A to H).

1) Display of preset stitching (Pattern 0 to 3)

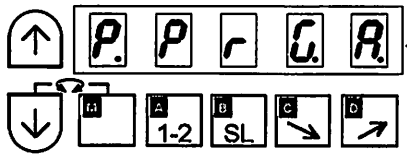


Display of pattern 0.
When pattern 1,2,3, display show 1,2,3.
When control panel is connected,
the pattern 0 disappears.

2) Display of continuous tack stitching (Pattern 4)



3) Display of program stitching (Pattern A to H)



Display of pattern A
When pattern B, C, D, E, F, G, H display
show B, C, D, E, F, G, H

a. Pattern A through H can be set on control panel "XC-E500Y".
So when programming will be changed, use control panel "XC-E500Y".
(Refer to technical manual of control panel in detail)

Caution

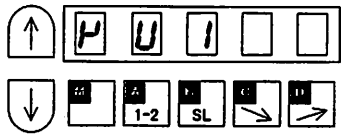
For safety purposes, always turn off the power switch when connecting or disconnecting the control panel.

12 How to use Simple setting of Program Mode [2] (for chain stitch trimming machine)

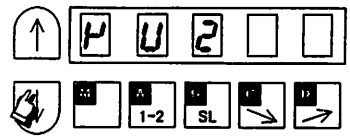
1. How to use the program mode [2]

No.1 To set the functions for chain stitch sewing machine in simple setting
(Ex. to set for the VC2600 class, "YAMATO").....Function setting [YU2]

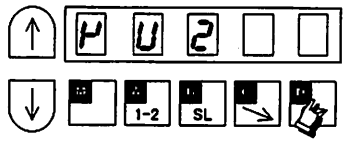
1) Enter program mode [2] ([↓] + [C] + [D]) (Indicates key operation. Refer to Page 23.)

2) 

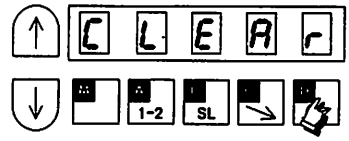
Program mode [2] will be entered.

3) 

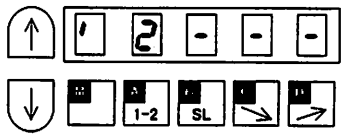
Set function to [YU2].

4) 

[YU2] will flicker when [D] is pressed.

5) 

[CLEAR] will be displayed when the [D] key is pressed for approx. two seconds.

6) 

Press [D] to return to the normal mode.

Description

A) Select the function that corresponds to the sewing machine model for "Simple setting table for chain stitch sewing machine" on the page 32. Display [CLEAR] with the [D] key, and functions will be carried out automatically for that model.(Refer to the simple setting table for "YAMATO" on page 32.)
B) To return to the normal mode from the [YU2] display, press the [↑] key while holding down [↓]. In this case, [YU2] will not be set, and the last settings will be used.
C) Each time the [↓]key is pressed in step 2, the function will change in order from [YU2], [YU3], [YU4].....[JMH].
D) Refer to Fig.1 (page 34) for the connector input/output signals.
E) Refer to Fig.50 (page 50) for the junction wiring.
F) Set the solenoid voltage to 30V. Refer to page 16. (The factory setting is 24V.)
G) Set the option A connector 5/12V setting to 12V. Refer to page 71. (The factory setting is 12V.)
H) The thread trimming protection signal S6 will stop the sewing machine when the switch is turned OFF.

2. Simple setting table for chain stitch sewing machine

Function	Sewing machine maker	Model name of sewing machine and device	I/O signals of connectors	Junction wiring	Note 1 solenoid voltage	Note 2 DC5V or 12V setting In option A connector	Note 3 Logic of thread trimming protection signal S6	Note 4 Setting of switch to increase solenoid return speed	1/2 pos	High speed H	Low speed L	Trimming speed T	*Start condensed speed N	End condensed speed V
YU2	YAMATO	VC2600, VC2700 class Solenoid-operated under thread trimmer	Fig.1	Fig.50	30V	12V	Sewing machine stops when switch:open	*Note 6	2	6000	200	200	1400	1400
YU3	YAMATO	VC2600, VC2700 class Air-operated under thread trimmer with air wiper	Fig.1	Fig.50	30V	12V			2	6000	200	200	1400	1400
YU4	YAMATO	VC3845P,2845P,2840P class Air-operated under thread trimmer with air wiper	Fig.1	Fig.50	30V	12V			2	6000	200	200	1400	1400
YU5	YAMATO	Solenoid-operated under thread trimmer with solenoid wiper	Fig.1	Fig.50	30V	12V			2	6000	200	200	1400	1400
YC1	YAMATO	CM357, CM400 class for manual feed roller device condensed stitch invalid	Fig.2	Fig.51	30V	5V	Sewing machine stops when switch:short		1	2000	200	200	200	200
YC2	YAMATO	CM400 class for automatic feed roller device condensed stitch invalid	Fig.2	Fig.51	30V	5V			1	2000	200	200	200	200
YC3	YAMATO	CM357, CM400 class for manual feed roller device condensed stitch valid	Fig.2	Fig.51	30V	5V			1	2000	200	200	200	200
YC4	YAMATO	CM400 class for automatic feed roller device condensed stitch valid	Fig.2	Fig.51	30V	5V			1	2000	200	200	200	200
YV10	YAMATO	VX series The sewing machine with the UT-A device	Fig.3	----	30V	5V	Sewing machine stops when switch:open		1	4200	200	200	1400	1400
YV11	YAMATO	VX series The sewing machine with the UT-A/ST-A device	Fig.3	----	30V	5V			1	4200	200	200	1400	1400
NO1	PEGASUS	W500, 600, 700 / UT207, UT434 Solenoid-operated under thread trimmer with solenoid wiper without top cover thread trimmer	Fig.4	Fig.52	24V	5V			2	6000	200	200	1400	1400
NO2	PEGASUS	W500, 600, 700 / UT207, UT434 Solenoid-operated under thread trimmer with solenoid wiper and top cover thread trimmer	Fig.4	Fig.52	24V	5V			2	6000	200	200	1400	1400
NO3	PEGASUS	W500, 600, 700 / UT103, 104, 109, 111 Solenoid-operated under thread trimmer with solenoid wiper without top cover thread trimmer	Fig.4	Fig.52	24V	5V			2	4500	200	200	1400	1400
NO4	PEGASUS	UT335 Super tack solenoid-operated under thread trimmer with air wiper	Fig.4	Fig.53	24V	5V			2	4000	200	200	1400	1400
NO5	PEGASUS	—	Fig.5	----	24V	5V			2	6000	200	200	1400	1400
NO6	PEGASUS	W562-82UT Angled stitch	Fig.5	Fig.52	24V	5V			2	6000	200	200	1400	1400
NO7	PEGASUS	W600 / UT / MS Solenoid-operated under thread trimmer with solenoid wiper and condensed stitch, without top cover thread trimmer	Fig.6	Fig.52	24V	5V			2	6000	200	200	1400	1400
NO8	PEGASUS	W600 / UT / MS Solenoid-operated under thread trimmer with solenoid wiper and condensed stitch and top cover thread trimmer	Fig.6	----	24V	5V			2	6000	200	200	1400	1400

Function	Sewing machine maker	Model name of sewing machine and device	I/O signals of connectors	Junction wiring	Note 1 solenoid voltage	Note 2 DC5V or 12V setting In option A connector	Note 3 Logic of thread trimming protection signal S6	Note 4 Setting of switch to increase solenoid return speed	1/2 pos	High speed H	Low speed L	Trimming speed T	*Start condensed speed N	End condensed speed V
NOB	PEGASUS	—	Fig.7	—	24V	5V	Sewing machine stops when switch:open	*Note 6	2	8000	200	200	1400	1400
NOC	PEGASUS	—	Fig.8	—	24V	5V			2	4000	200	200	1400	1400
KA1	KANSAI	M, RX series Automatic thread trimmer with solenoid wiper	Fig.9	Fig.54	24V	12V			2	6000	250	250	1400	1400
KA2	KANSAI	D series Automatic thread trimmer with air wiper	Fig.9	Fig.54	24V	12V			2	6000	250	250	1400	1400
KA3	KANSAI	F series Air-operated under thread trimmer with air wiper	Fig.10	Fig.54	24V	12V			2	6000	250	250	1400	1400
KA4	KANSAI	DX series Air-operated under thread trimmer with air wiper	Fig.9	Fig.54	24V	12V			2	6000	250	250	1400	1400
UN1	UNION SPECIAL	33700, 34500 class Solenoid-operated under thread trimmer	Fig.11	Fig.55	30V	12V		Always set J1 : SLOW J5 : FAST J8 : SLOW	2	4000	200	200	1400	2999
UN2	UNION SPECIAL	34800xkcc class Solenoid-operated under thread trimmer	Fig.12	Fig.55	30V	12V			2	5500	200	200	1400	2999
UN3	UNION SPECIAL	34700 class Push and Pull air-operated under thread trimmer with air wiper	Fig.12	Fig.56	30V	12V			2	4000	200	200	1400	2999
U345	***Do not use !!***													
U346	***Do not use !!***													
U348	***Do not use !!***													
U347	***Do not use !!***													
BR1	BROTHER	FD3, FD4 series	Fig.13	—	24V	5V	Sewing machine stops when switch:short	*Note 6	2	6000	200	200	1400	1400
RM1	RIMOLDI	—	Fig.14	—	24V	5V			1	6000	200	200	1400	1400
SRB1	SIRUBA	—	Fig.15	—	24V	5V			2	6000	200	200	1700	1700
JMH	JUKI	MH-481-4-4, MH-484-4-4 class	Fig.16	—	30V	5V			2	5500	200	200	1700	1900

Note : The function name will display in the order of [YU2], [YU3], [YU4].....[YC1].....[NO1].....[KA1].....[UN1].....[JMH], [YU2] with each press of the [C] key.
The function name will display in the order of [YU2], [JMH].....[UN1].....[KA1].....[NO1].....[YC1].....[YU2] with each press of the [D] key.

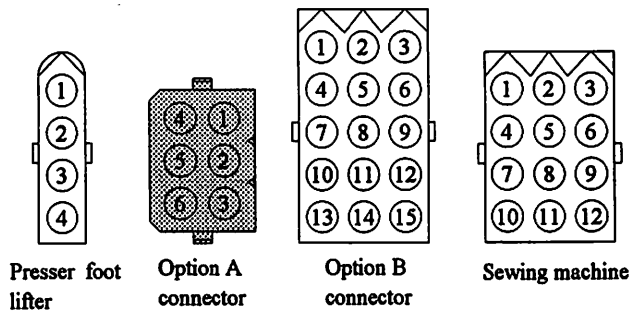
Note : XC-EMFY

1. Refer to page 16 for how to change the solenoid voltage. The factory setting is 24V.
2. Refer to page 71 for how to change the option A connector DC5V/12V. The factory setting is 12V.
3. Refer to page 91 for how to change the logic of the thread trimming protection signal S6.
   The factory setting is sewing machine stop at switch : short.
   (The operation of the thread trimming protection device and thread trimming protection sensor switch ON and OFF will not always match. Consult with your dealer on any unclear points.)
4. Refer to page 73 for how to set the switch to increase the solenoid return speed. Always set J1 and J8 SLOW, J5 FAST when [UN1], [UN2] and [UN3] are set.
   The factory settings are J1 : FAST, J5 : SLOW, J8 : SLOW.
5. The chain stitch sewing machine specifications may be changes in part by the sewing machine maker. Consult with your dealer before selecting the functions from the above table.
6. If the electromagnetic solenoid is connected to the trimming output, the S3 switch is recommended to set for "FAST".

3. I/O signals of connectors

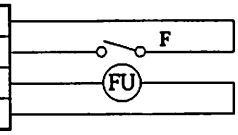
Fig.1 "YAMATO"

Function setting [YU2],[YU3],[YU4] and [YU5]



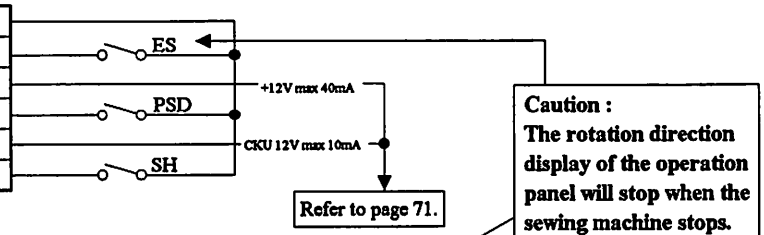
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



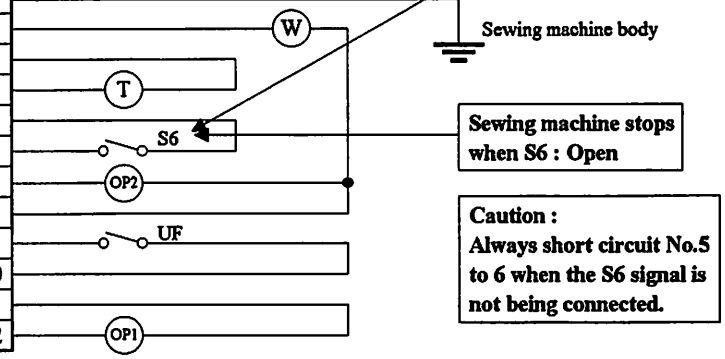
Option A (Black connector)

	0V	1
IA	Emergency stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One shot signal	6



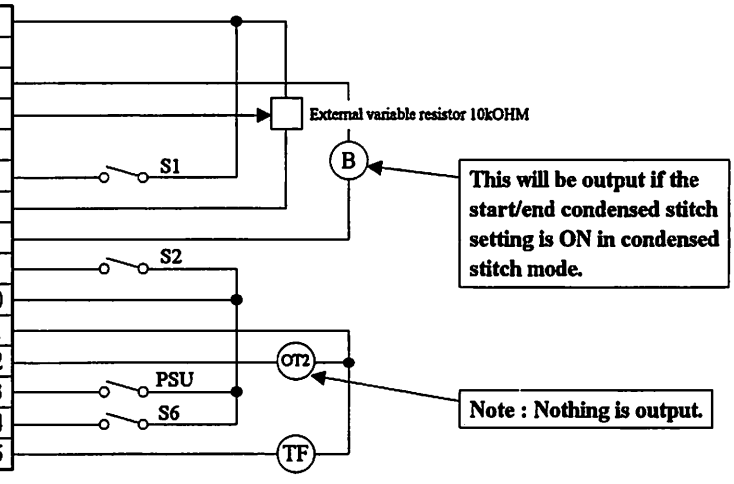
Sewing machine

	Ground	1
OB	Wiper output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Operation/thread trimming output	7
	+30V	8
IE	Needle lifting/presser foot lifting signal	9
	0V	10
	+30V	11
OC	Operation output	12



Option B

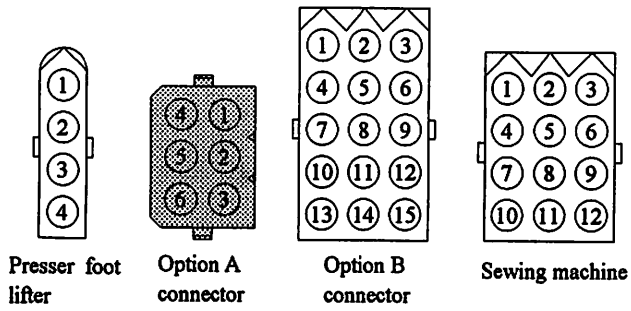
	0V	1
I4/O4	——	2
O1	Condensed stitch output	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Operation signal	6
	+5V	7
	+30V	8
I2	Thread trimming signal	9
	0V	10
	+30V	11
O2	Solenoid output No.2	12
I7/O7	Needle UP position priority stop signal	13
I6/O6	S6	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [YU2] to [YU5] simple settings, so select the setting value according to the sewing machine being used.

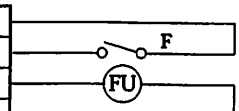
Fig.2 "YAMATO"

Function setting [YC1],[YC2],[YC3] and [YC4]



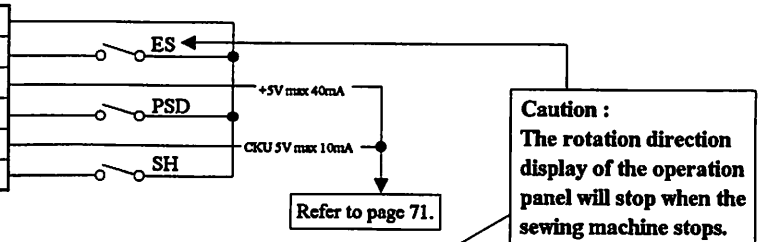
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



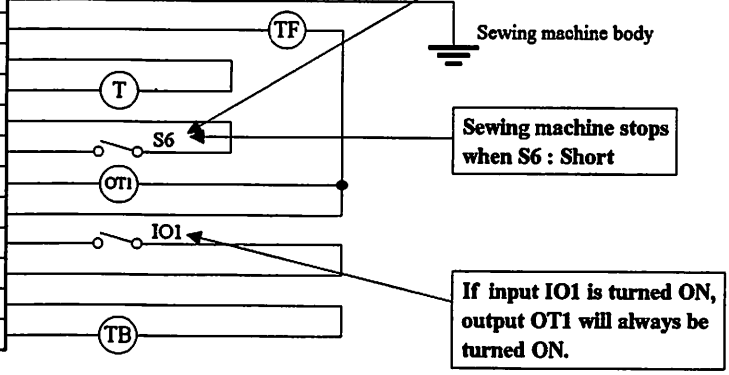
Option A (Black connector)

	0V	1
IA	Emergency stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	CKU Needle UP output	5
IC	One shot signal	6



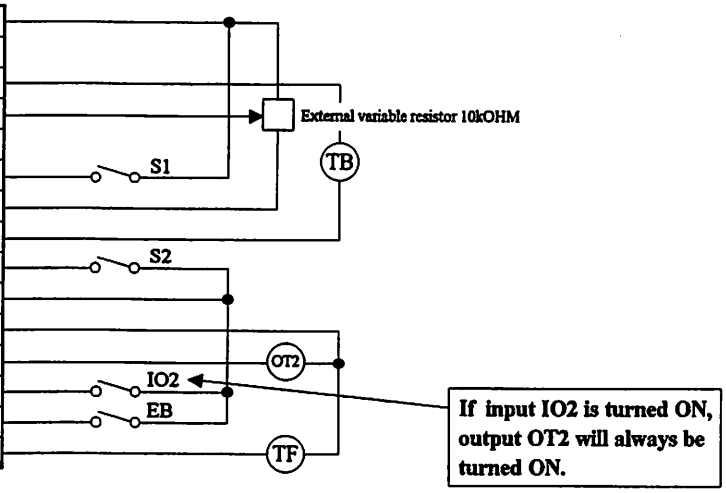
Sewing machine

	Ground	1
OB	Thread tension output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Solenoid output No.1	7
	+30V	8
IE	Solenoid input No.1	9
	0V	10
	+30V	11
OC	Condensed stitch sewing output	12



Option B

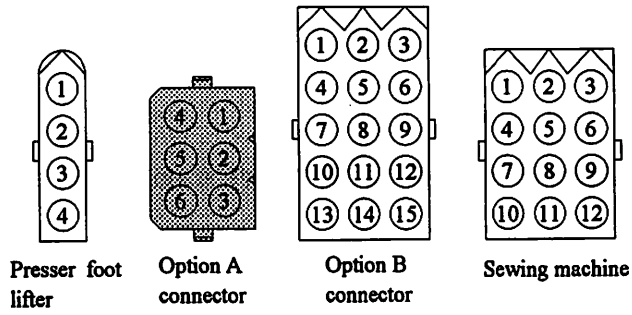
	0V	1
I4/O4	——	2
O1	TB output	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Operation signal	6
	+12V (Change J6 connector)	7
	+30V	8
I2	Thread trimming signal	9
	0V	10
	+30V	11
O2	Solenoid output No.2	12
I7/O7	Solenoid output to virtual output 2	13
I6/O6	End tacking cancel signal	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [YC1] to [YC4] simple settings, so select the setting value according to the sewing machine being used.

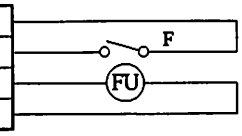
Fig.3 "YAMATO"

Function setting [YV10], [YV11]



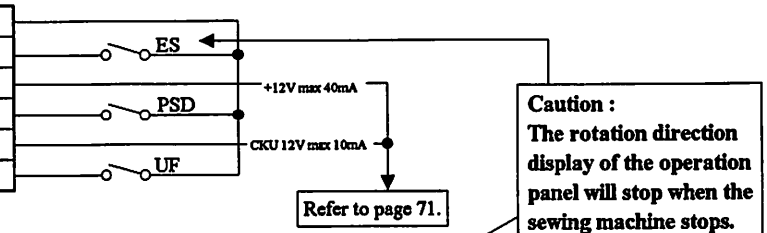
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



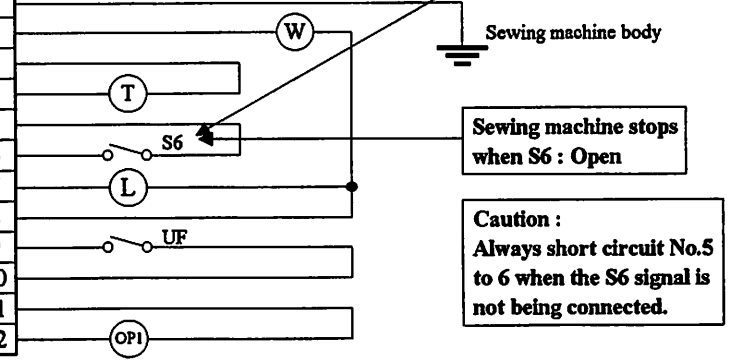
Option A (Black connector)

	0V	1
IA	Emergency stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Needle lifting/presser foot lifting signal	6



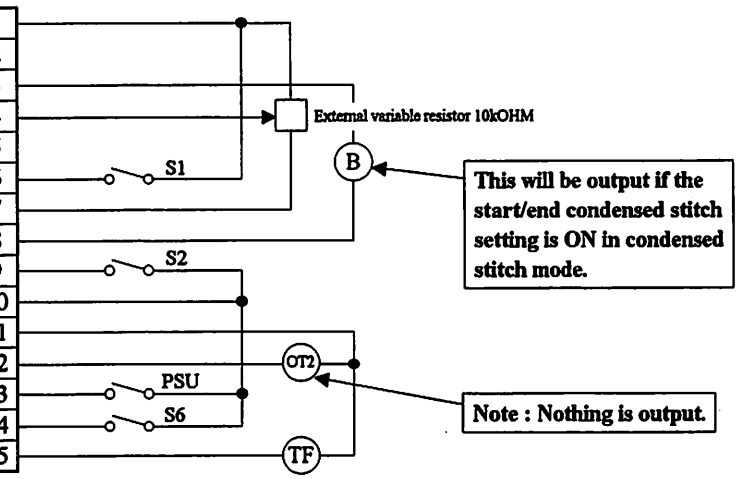
Sewing machine

	Ground	1
OB	Wiper output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+30V	8
IE	Needle lifting/presser foot lifting signal	9
	0V	10
	+30V	11
OC	Operation output	12



Option B

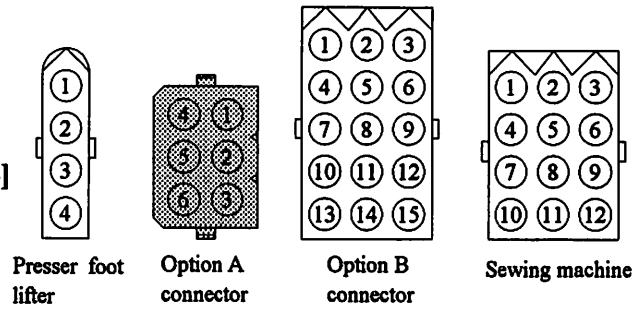
	0V	1
I4/O4	——	2
O1	Condensed stitch output	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Operation signal	6
	+5V	7
	+30V	8
I2	Thread trimming signal	9
	0V	10
	+30V	11
O2	Solenoid output No.2	12
I7/O7	Needle UP position priority stop signal	13
I6/O6	S6	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [YV10], [YV11] simple settings, so select the setting value according to the sewing machine being used.

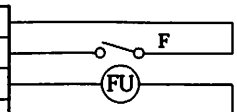
Fig.4 "PEGASUS"

Function setting [NO1], [NO2], [NO3] and [NO4]



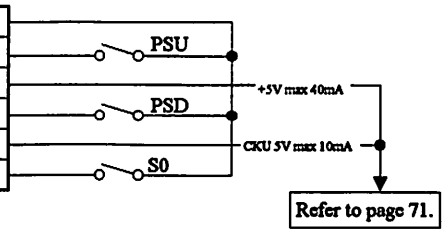
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



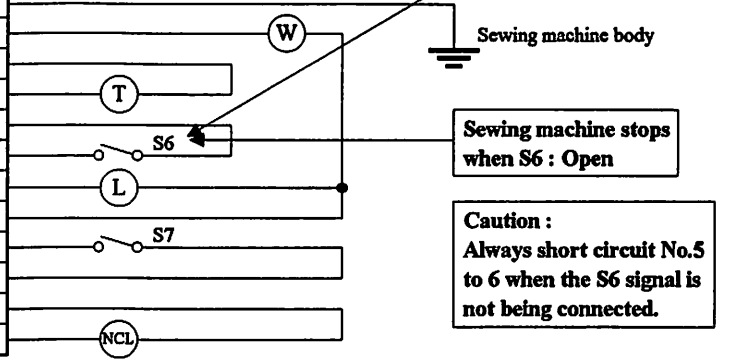
Option A (Black connector)

	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Run signal (Low speed)	6



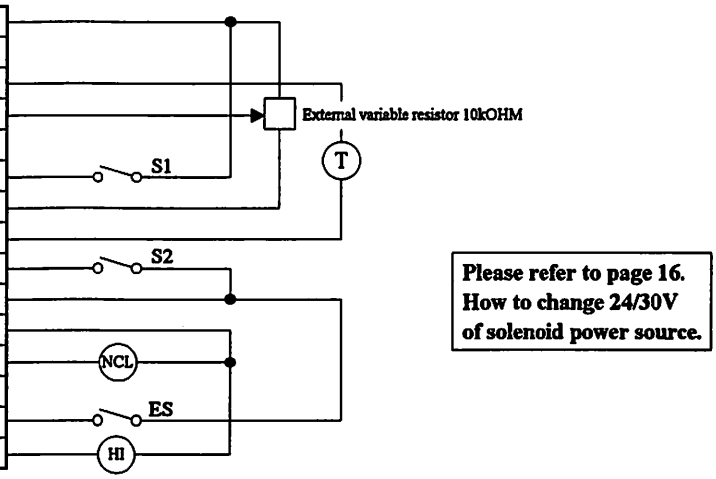
Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Needle cooler output	12



Option B

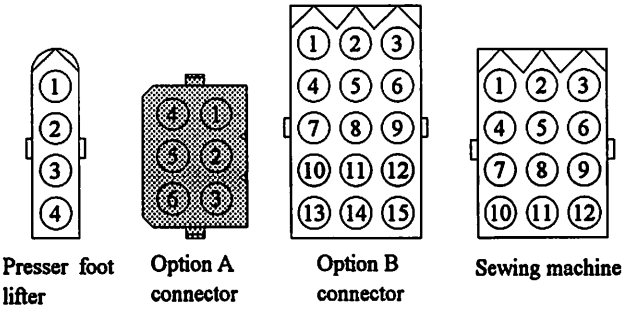
	0V	1
I4/O4	-----	2
O1	Thread trimming output	3
VC2	Variable speed command	4
I5/O5	-----	5
I1	Operation signal	6
	+12V (Change J6 connector)	7
	+24V	8
I2	Thread trimming signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	-----	13
I6/O6	Emergency stop signal	14
O3	Always ON output	15



Note) The thread trimming (operation) will differ with the [NO1] to [NO4] simple settings, so select the setting value according to the sewing machine being used.

Fig.5 "PEGASUS"

Function setting [NO5], [NO6]



Presser foot lifter

	0V	1
IF	Needle lift, presser foot signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

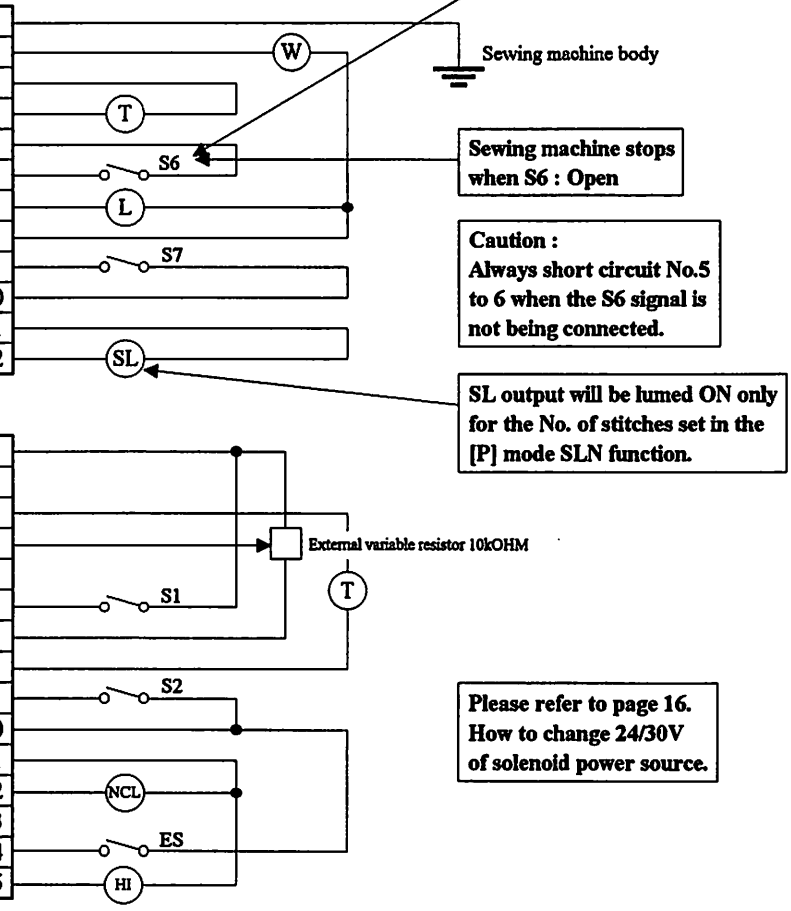
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Run signal (Low speed)	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Output for slow start	12

Option B

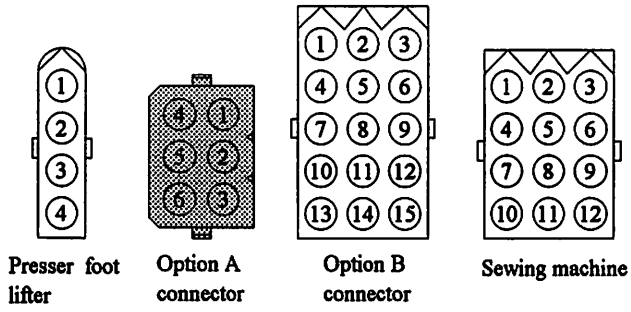
	0V	1
I4/O4	——	2
O1	Thread trimming output	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Operation signal	6
	+12V (Change J6 connector)	7
	+24V	8
I2	Thread trimming signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	——	13
I6/O6	Emergency stop signal	14
O3	Always ON output	15



Note) The thread trimming (operation) will differ with the [NO5], [NO6] simple settings, so select the setting value according to the sewing machine being used.

Fig.6 "PEGASUS"

Function setting [NO7], [NO8]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

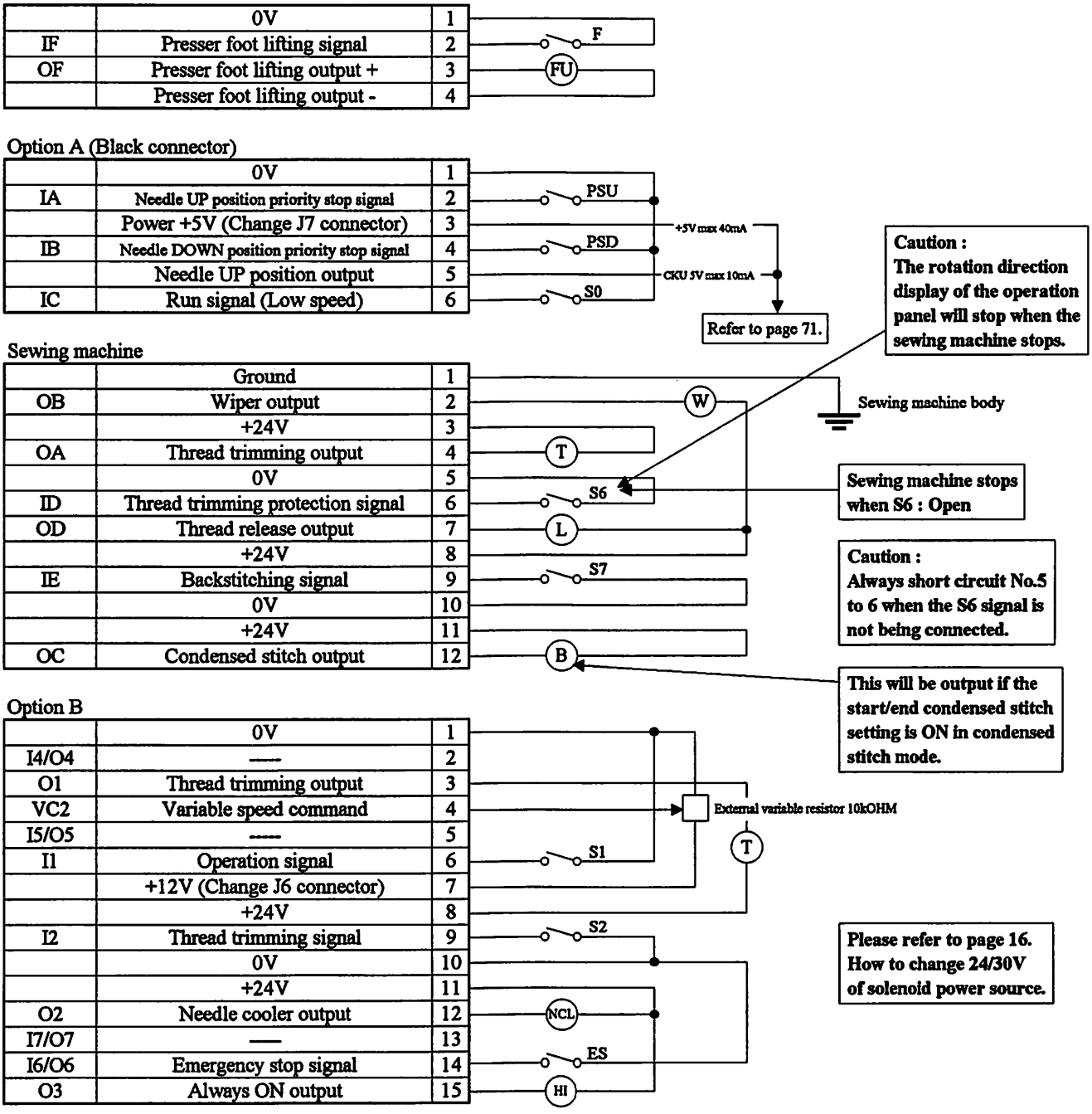
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Run signal (Low speed)	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Condensed stitch output	12

Option B

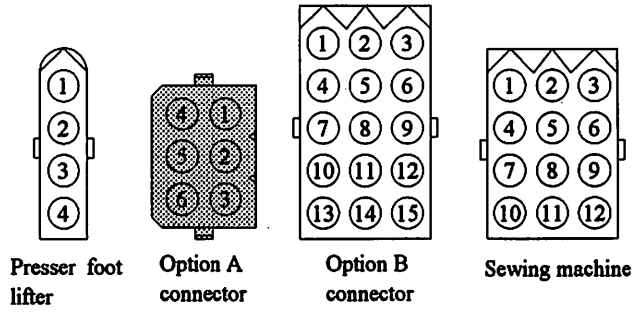
	0V	1
I4/O4	----	2
O1	Thread trimming output	3
VC2	Variable speed command	4
I5/O5	----	5
I1	Operation signal	6
	+12V (Change J6 connector)	7
	+24V	8
I2	Thread trimming signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	----	13
I6/O6	Emergency stop signal	14
O3	Always ON output	15



Note) The thread trimming (operation) will differ with the [NO7] , [NO8] simple settings, so select the setting value according to the sewing machine being used.

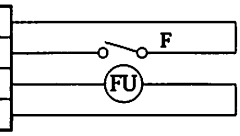
Fig.7 "PEGASUS"

Function setting [NOB]



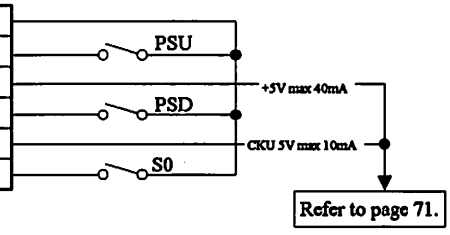
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



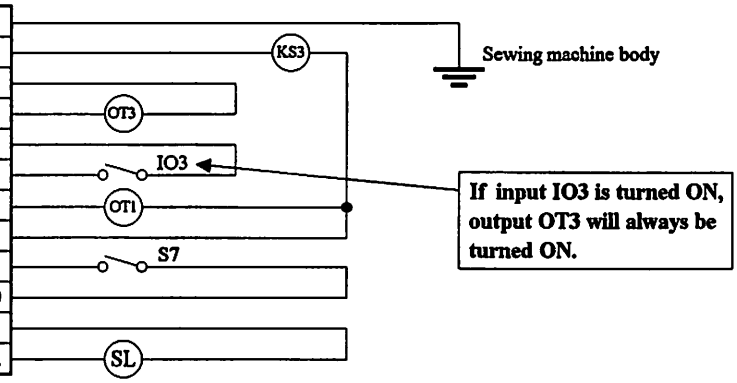
Option A (Black connector)

	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Run signal (Low speed)	6



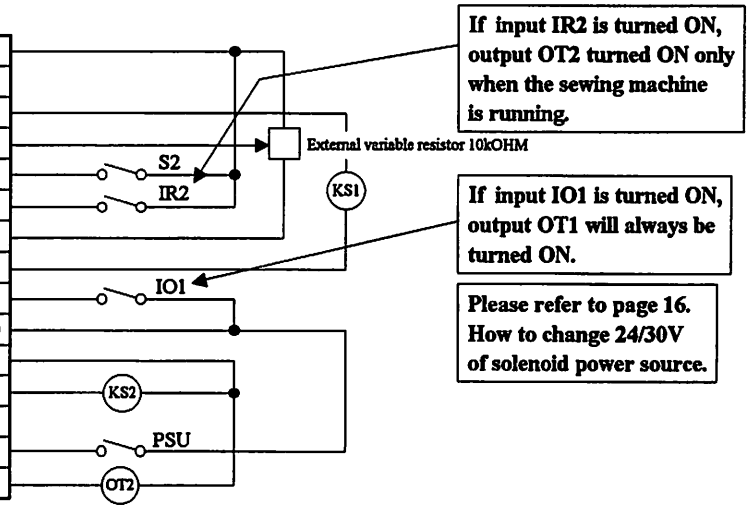
Sewing machine

	Ground	1
OB	[KS3] output	2
	+24V	3
OA	Virtual output 3	4
	0V	5
ID	Signal output to virtual output 3	6
OD	Virtual output 1	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	SL	12



Option B

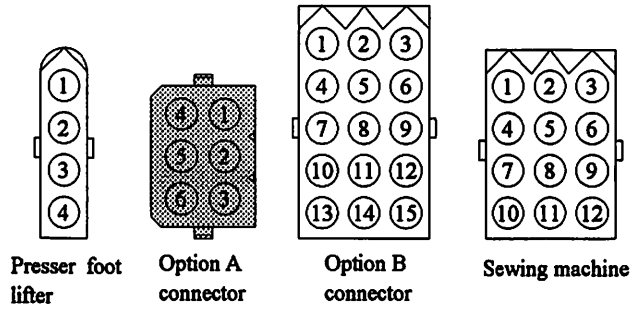
	0V	1
I4/O4	——	2
O1	[KS1] output	3
VC2	Variable speed command	4
I5/O5	Thread trimming signal	5
I1	Signal output to virtual output 3 during operation	6
	+12V (Change J6 connector)	7
	+24V	8
I2	Signal output to virtual output 1	9
	0V	10
	+24V	11
O2	[KS2] output	12
I7/O7	——	13
I6/O6	Needle UP position priority stop signal	14
O3	Virtual output 2	15



Note) The thread trimming (operation) will differ with the [NOB] simple setting, so select the setting value according to the sewing machine being used.

Fig.8 "PEGASUS"

Function setting [NOC]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

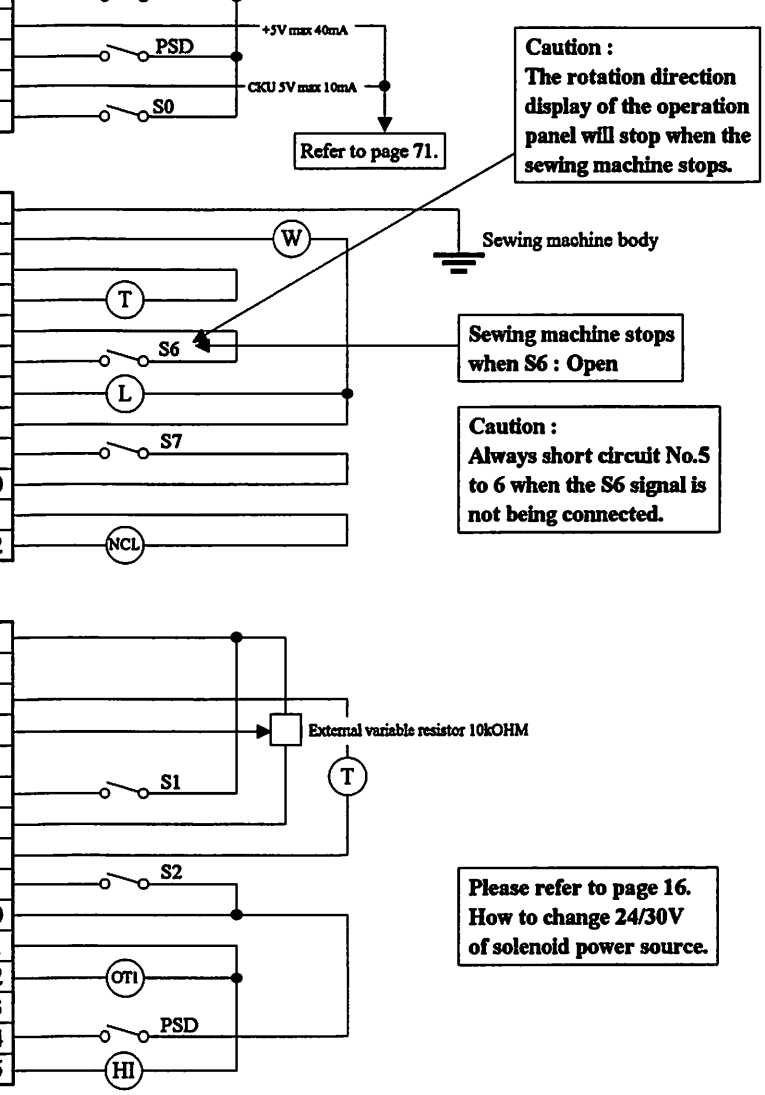
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Run signal (Low speed)	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Output for needle cooler	12

Option B

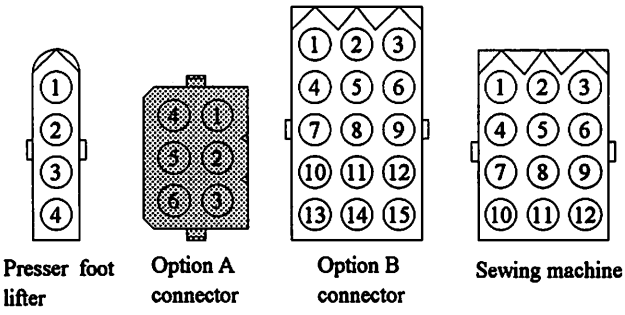
	0V	1
I4/O4	-----	2
O1	Thread trimming output	3
VC2	Variable speed command	4
I5/O5	-----	5
I1	Operation signal	6
	+12V (Change J6 connector)	7
	+24V	8
I2	Thread trimming signal	9
	0V	10
	+24V	11
O2	Virtual output 1	12
I7/O7	-----	13
I6/O6	Needle DOWN position priority stop signal	14
O3	Always ON output	15



Note) The thread trimming (operation) will differ with the [NOC] simple setting, so select the setting value according to the sewing machine being used.

Fig.9 "KANSAI"

Function setting [KA1], [KA2] and [KA4]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Puller output +	3
	Puller output -	4

Option A (Black connector)

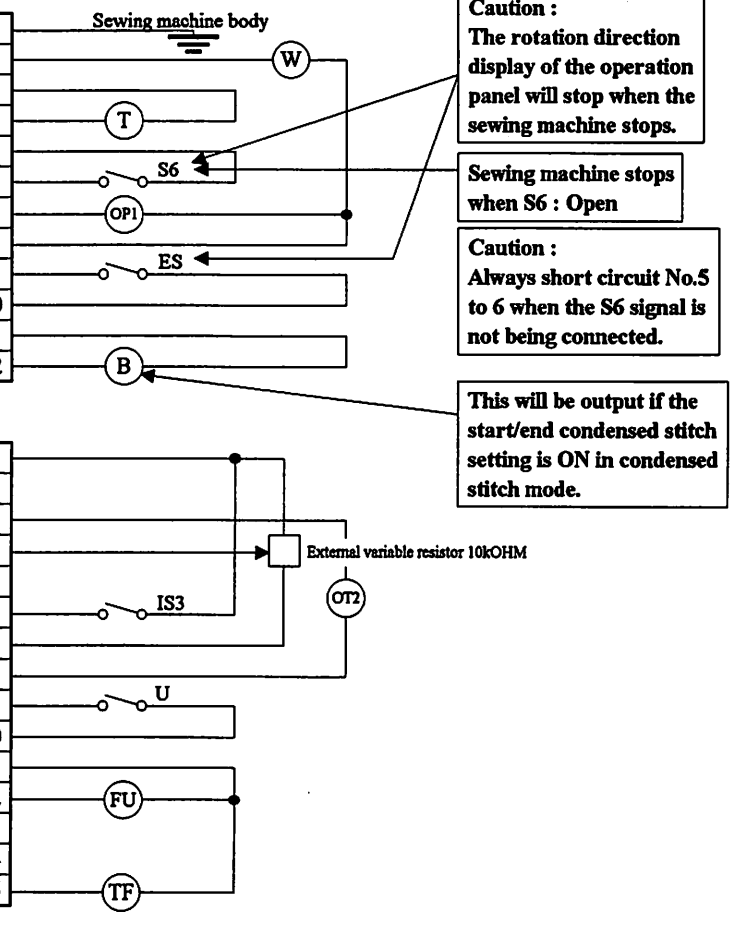
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One shot signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Operation output	7
	+24V	8
IE	Emergency stop signal	9
	0V	10
	+24V	11
OC	Condensed stitch output	12

Option B

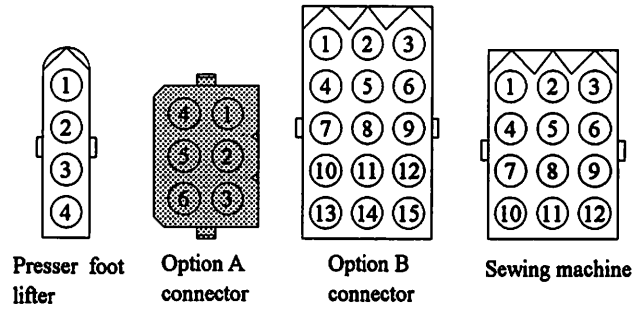
	0V	1
I4/O4	-----	2
O1	Virtual output 2	3
VC2	Variable speed command	4
I5/O5	-----	5
I1	Signal output to virtual output 3 when stopped	6
	+5V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Presser foot lifting output	12
I7/O7	-----	13
I6/O6	-----	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [KA1], [KA2] and [KA4] simple settings, so select the setting value according to the sewing machine being used.

Fig.10 "KANSAI"

Function setting [KA3]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Puller output +	3
	Puller output -	4

Option A (Black connector)

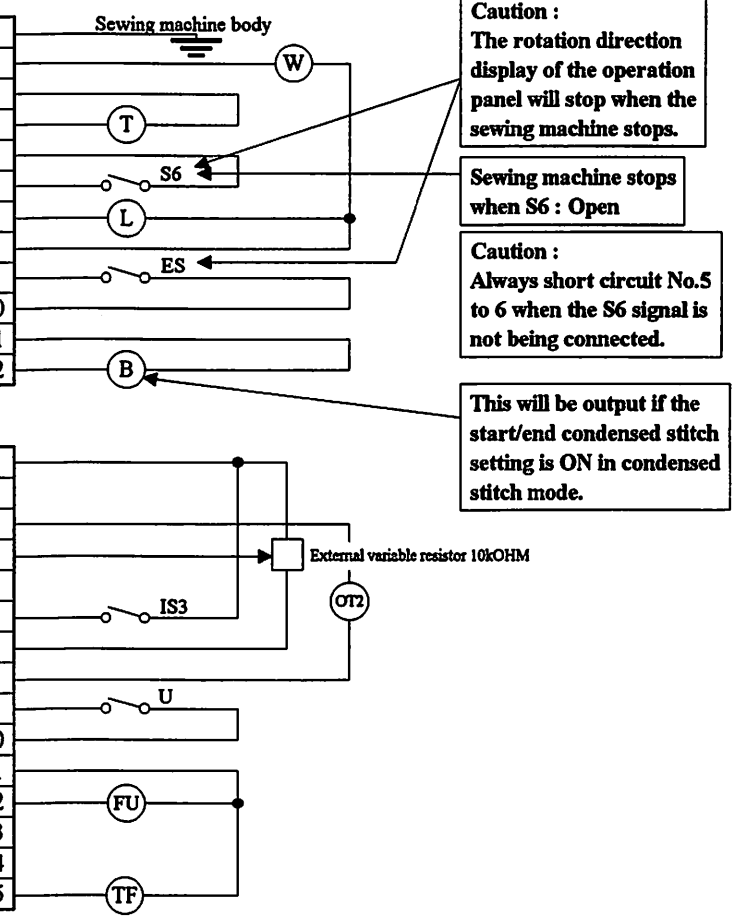
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One shot signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Emergency stop signal	9
	0V	10
	+24V	11
OC	Condensed stitch output	12

Option B

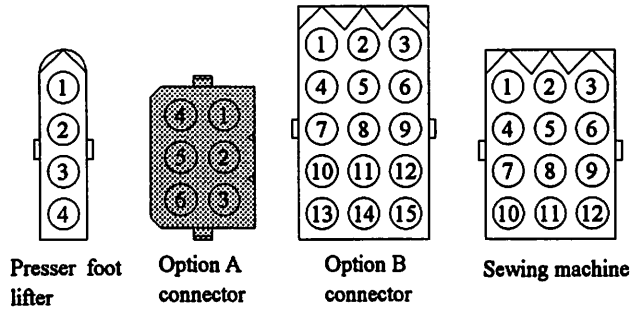
	0V	1
I4/O4	——	2
O1	Virtual output 2	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Signal output to virtual output 3 when stopped	6
	+5V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Presser foot lifting output	12
I7/O7	——	13
I6/O6	——	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [KA3] simple settings, so select the setting value according to the sewing machine being used.

Fig.11 "UNION SPECIAL"

Function setting [UN1]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

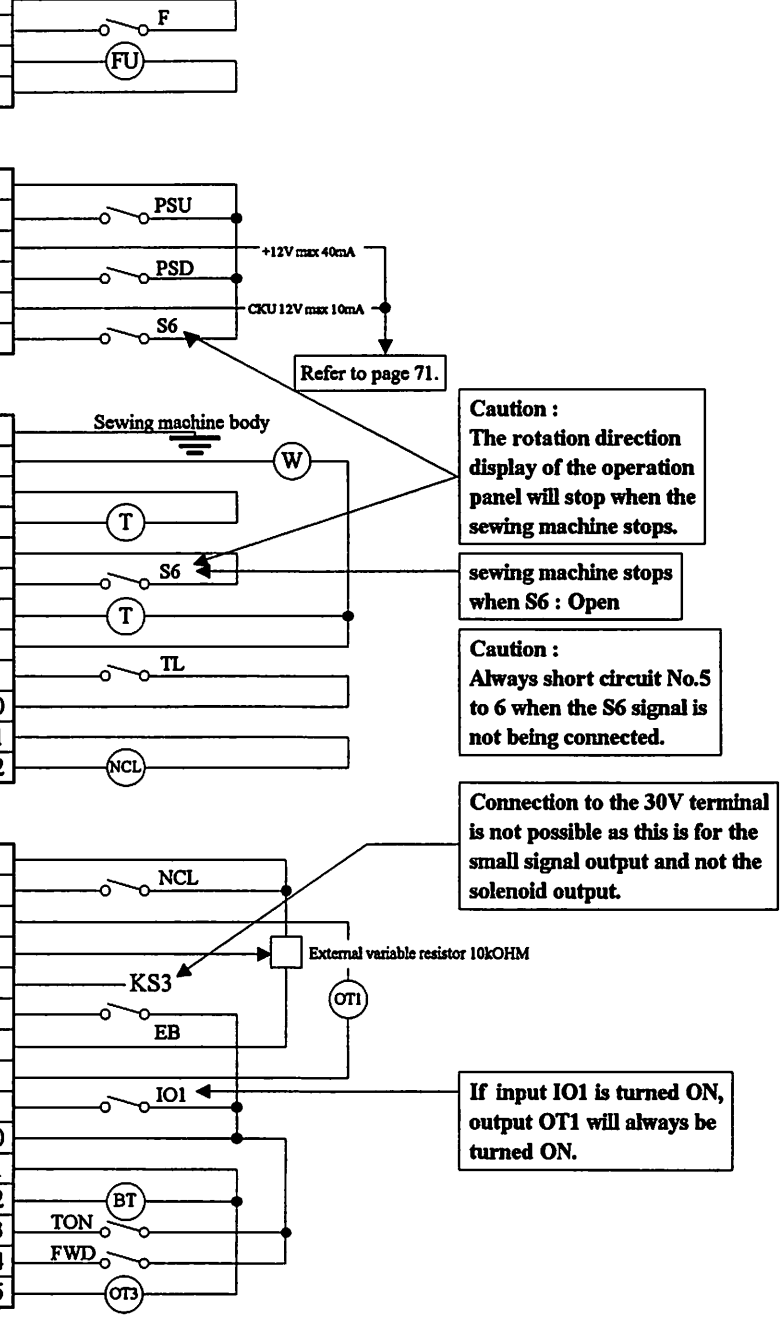
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Thread trimming protection signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread trimming output	7
	+30V	8
IE	Thread trimmer release signal	9
	0V	10
	+30V	11
OC	Needle cooler output	12

Option B

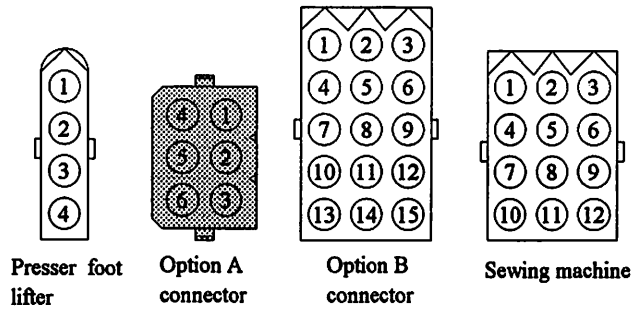
	0V	1
I4/O4	Needle cooler output during rotation forced [OFF] signal	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	Solenoid output synchronized with thread trimming	5
I1	End tacking cancel signal	6
	+12V (Change J6 connector)	7
	+30V	8
I2	Solenoid input signal No.1	9
	0V	10
	+30V	11
O2	Output for signal during tacking	12
I7/O7	Thread trimmer output confirmation signal	13
I6/O6	Non-stitching feed input	14
O3	Solenoid output No.3	15



Note) The thread trimming (operation) will differ with the [UN1] simple settings, so select the setting value according to the sewing machine being used.

Fig.12 "UNION SPECIAL"

Function setting [UN2], [UN3]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

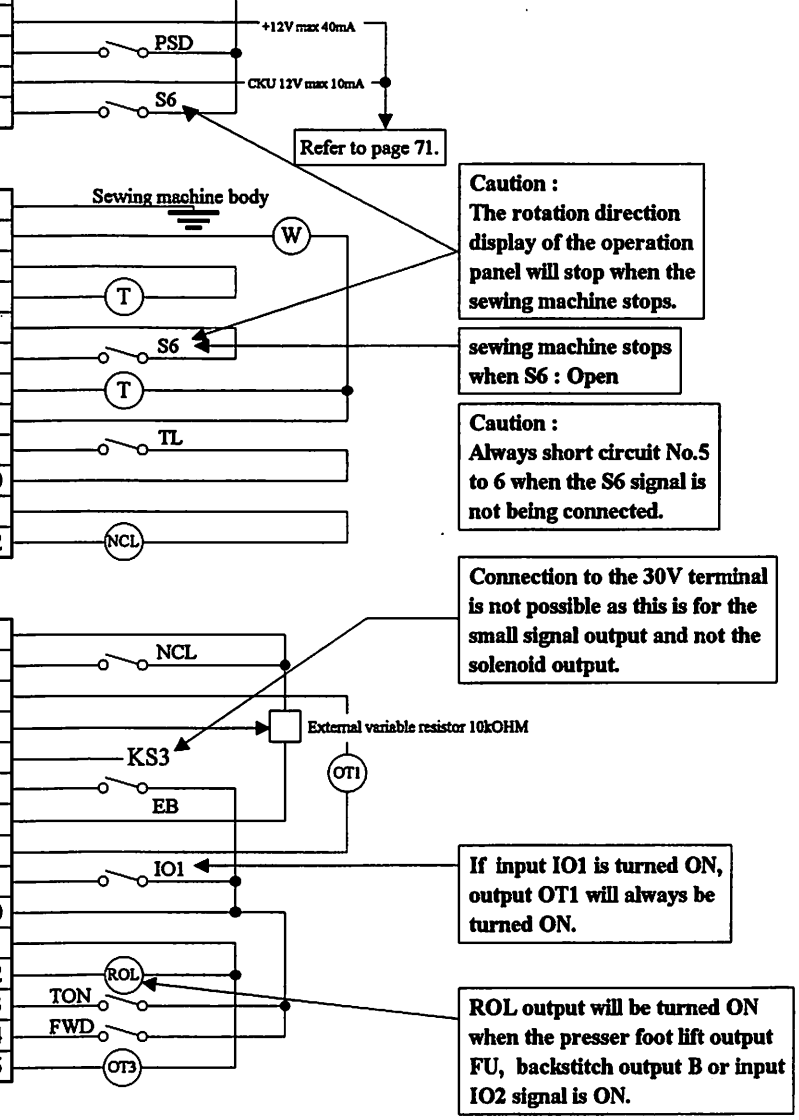
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Thread trimming protection signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread trimming output	7
	+30V	8
IE	Thread trimmer release signal	9
	0V	10
	+30V	11
OC	Needle cooler output	12

Option B

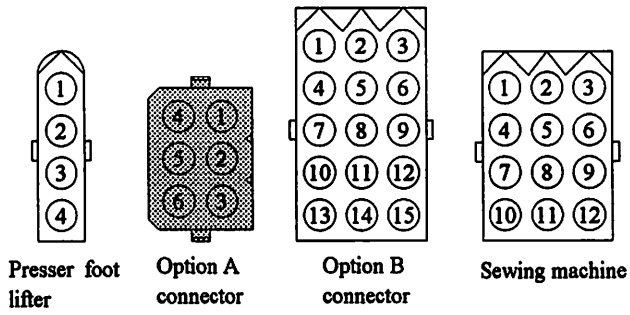
	0V	1
I4/O4	Needle cooler output during rotation forced [OFF] signal	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	Solenoid output synchronized with thread trimming	5
I1	End tacking cancel signal	6
	+12V (Change J6 connector)	7
	+30V	8
I2	Solenoid input signal No.1	9
	0V	10
	+30V	11
O2	Roller lifting output	12
I7/O7	Thread trimmer output confirmation signal	13
I6/O6	Non-stitching feed input	14
O3	Solenoid output No.3	15



Note) The thread trimming (operation) will differ with the [UN2], [UN3] simple settings, so select the setting value according to the sewing machine being used.

Fig.13 "BROTHER"

Function setting [BR1]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

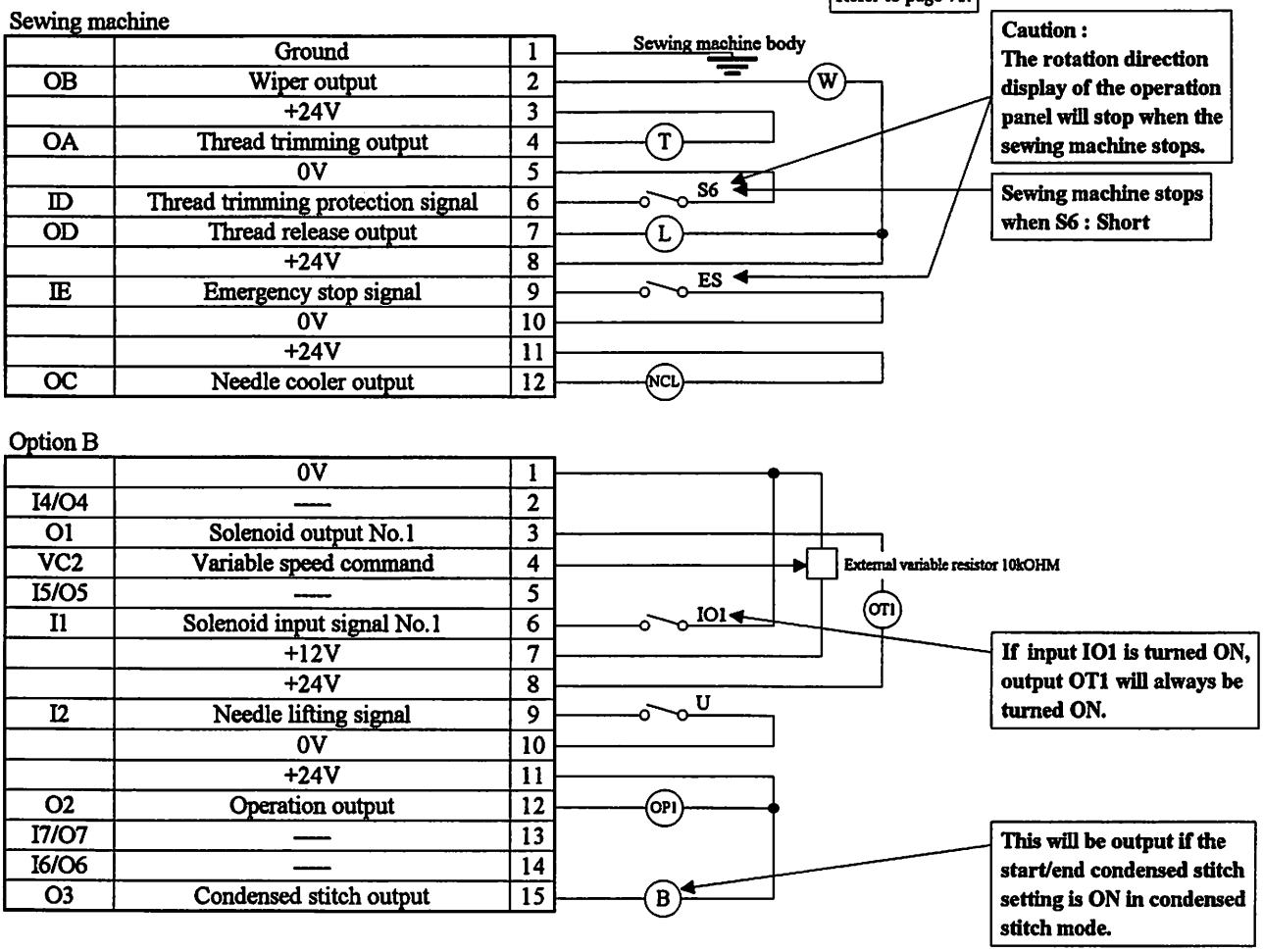
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One shot signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Emergency stop signal	9
	0V	10
	+24V	11
OC	Needle cooler output	12

Option B

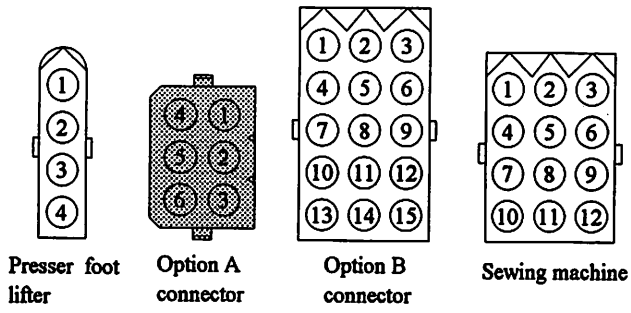
	0V	1
I4/O4	——	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Solenoid input signal No.1	6
	+12V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Operation output	12
I7/O7	——	13
I6/O6	——	14
O3	Condensed stitch output	15



Note) The thread trimming (operation) will differ with the [BR1] simple setting, so select the setting value according to the sewing machine being used.

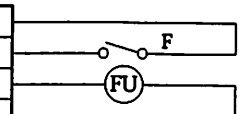
Fig.14 "RIMOLDI"

Function setting [RM1]



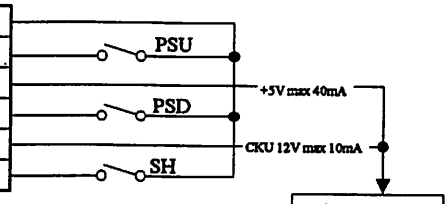
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



Option A (Black connector)

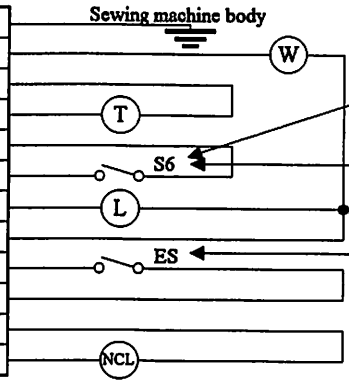
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One shot signal	6



Refer to page 71.

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimming protection signal	6
OD	Thread release output	7
	+24V	8
IE	Emergency stop signal	9
	0V	10
	+24V	11
OC	Needle cooler output	12

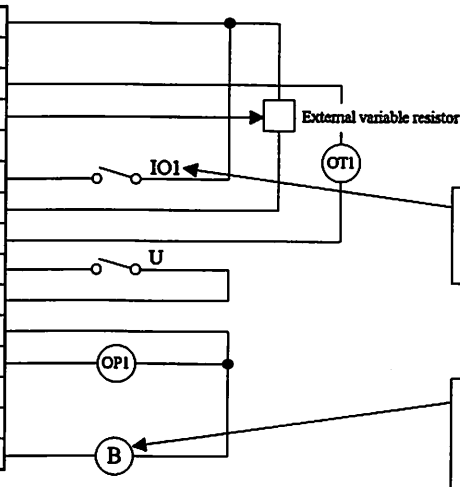


Caution :
The rotation direction display of the operation panel will stop when the sewing machine stops.

Sewing machine stops when S6 : Short

Option B

	0V	1
I4/O4	——	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	——	5
I1	Solenoid input signal No.1	6
	+12V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Operation output	12
I7/O7	——	13
I6/O6	——	14
O3	Condensed stitch output	15



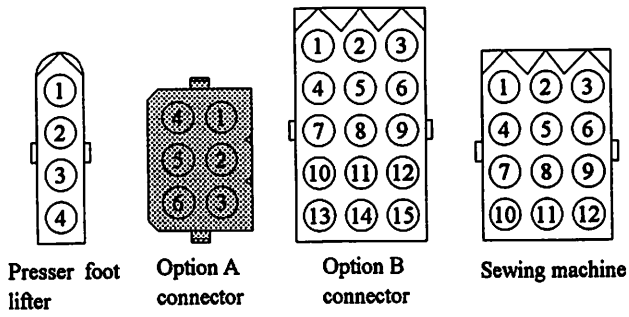
If input IO1 is turned ON, output OT1 will always be turned ON.

This will be output if the start/end condensed stitch setting is ON in condensed stitch mode.

Note) The thread trimming (operation) will differ with the [RM1] simple setting, so select the setting value according to the sewing machine being used.

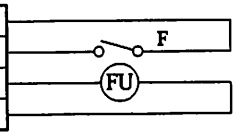
Fig.15 "SIRUBA"

Function setting [SRB1]



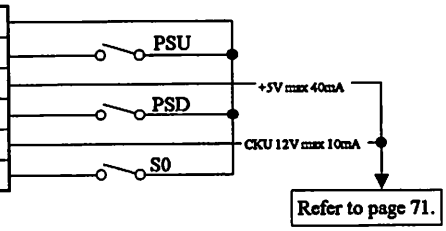
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



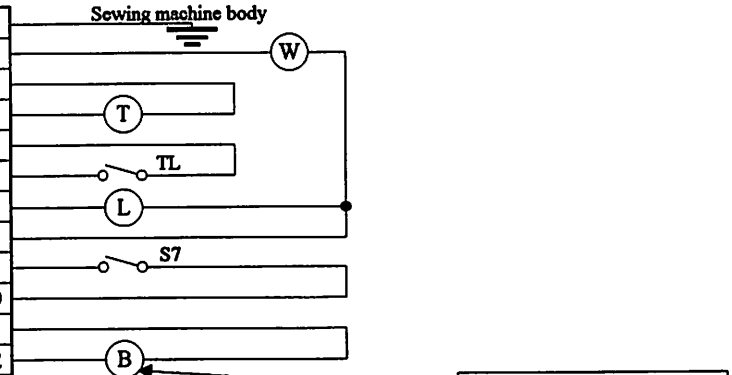
Option A (Black connector)

	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Low speed run signal	6



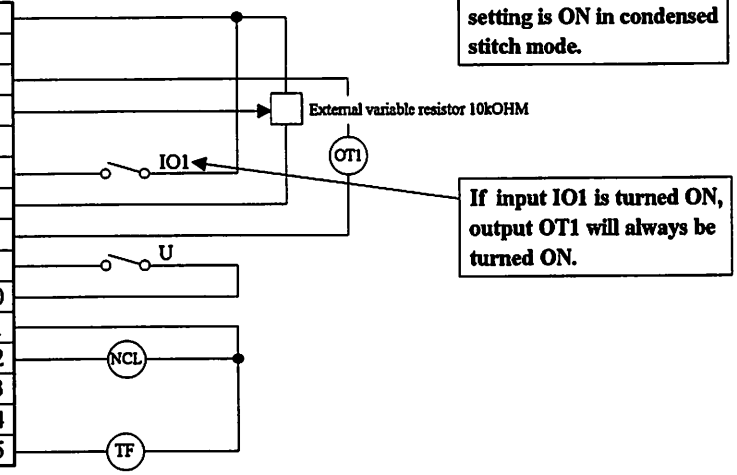
Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimmer cancel signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching during run signal	9
	0V	10
	+24V	11
OC	Condensed stitch output	12



Option B

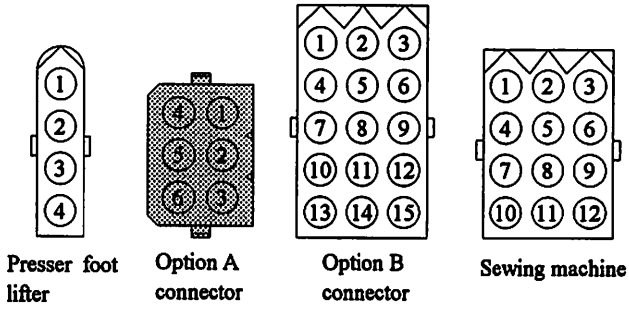
	0V	1
I4/O4	——	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	-----	5
I1	Solenoid input signal No.1	6
	+12V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	——	13
I6/O6	-----	14
O3	[TF] output	15



Note) The thread trimming (operation) will differ with the [SRB1] simple setting, so select the setting value according to the sewing machine being used.

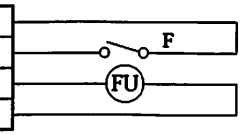
Fig.16 "JUKI"

Function setting [JMH]



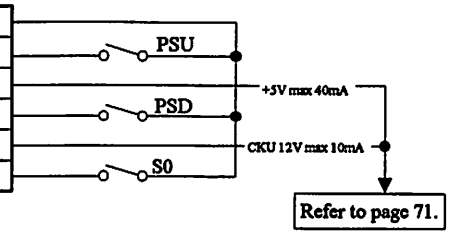
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



Option A (Black connector)

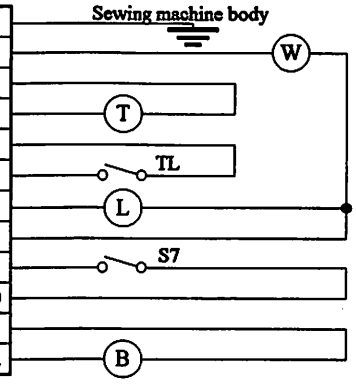
	0V	1
IA	Needle UP position priority stop signal	2
	Power +5V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Low speed run signal	6



Refer to page 71.

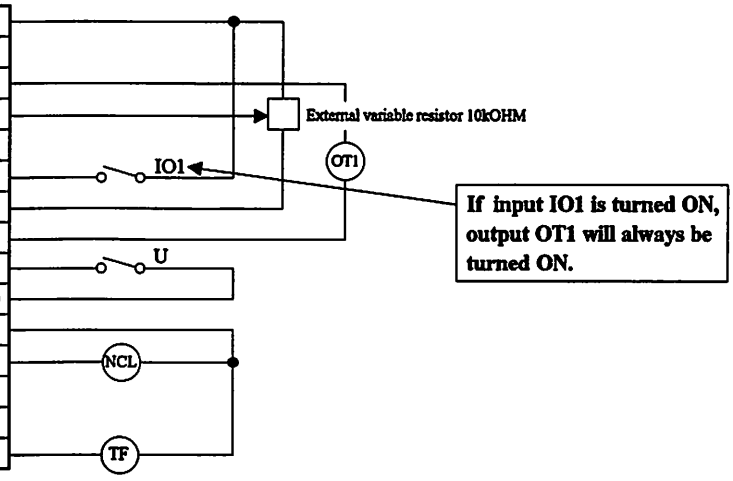
Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimmer cancel signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching during run signal	9
	0V	10
	+24V	11
OC	Condensed stitch output	12



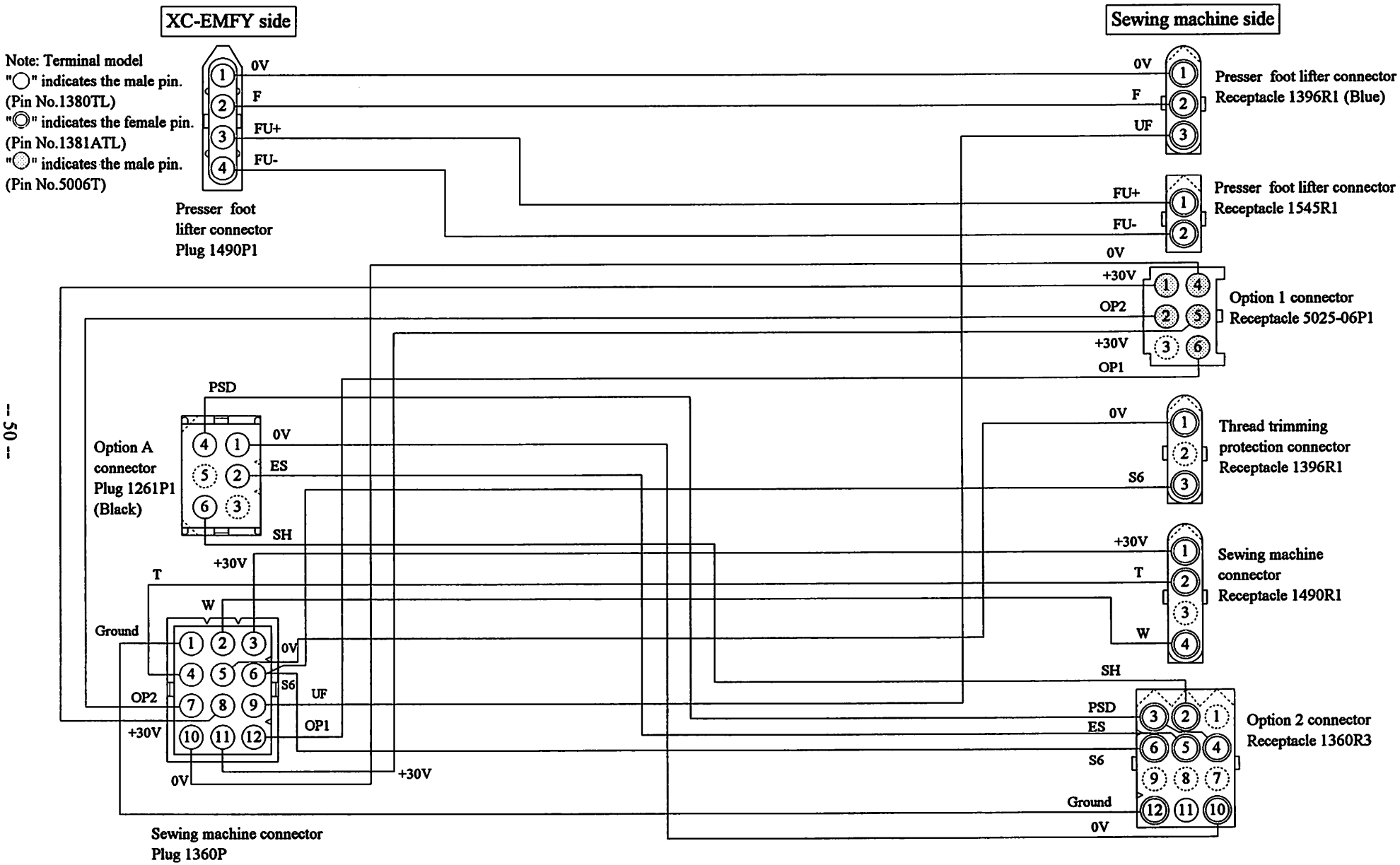
Option B

	0V	1
I4/O4	-----	2
O1	Solenoid output No.1	3
VC2	Variable speed command	4
I5/O5	-----	5
I1	Solenoid input signal No.1	6
	+12V	7
	+24V	8
I2	Needle lifting signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	-----	13
I6/O6	-----	14
O3	[TF] output	15



Note) The thread trimming (operation) will differ with the [JMH] simple setting, so select the setting value according to the sewing machine being used.

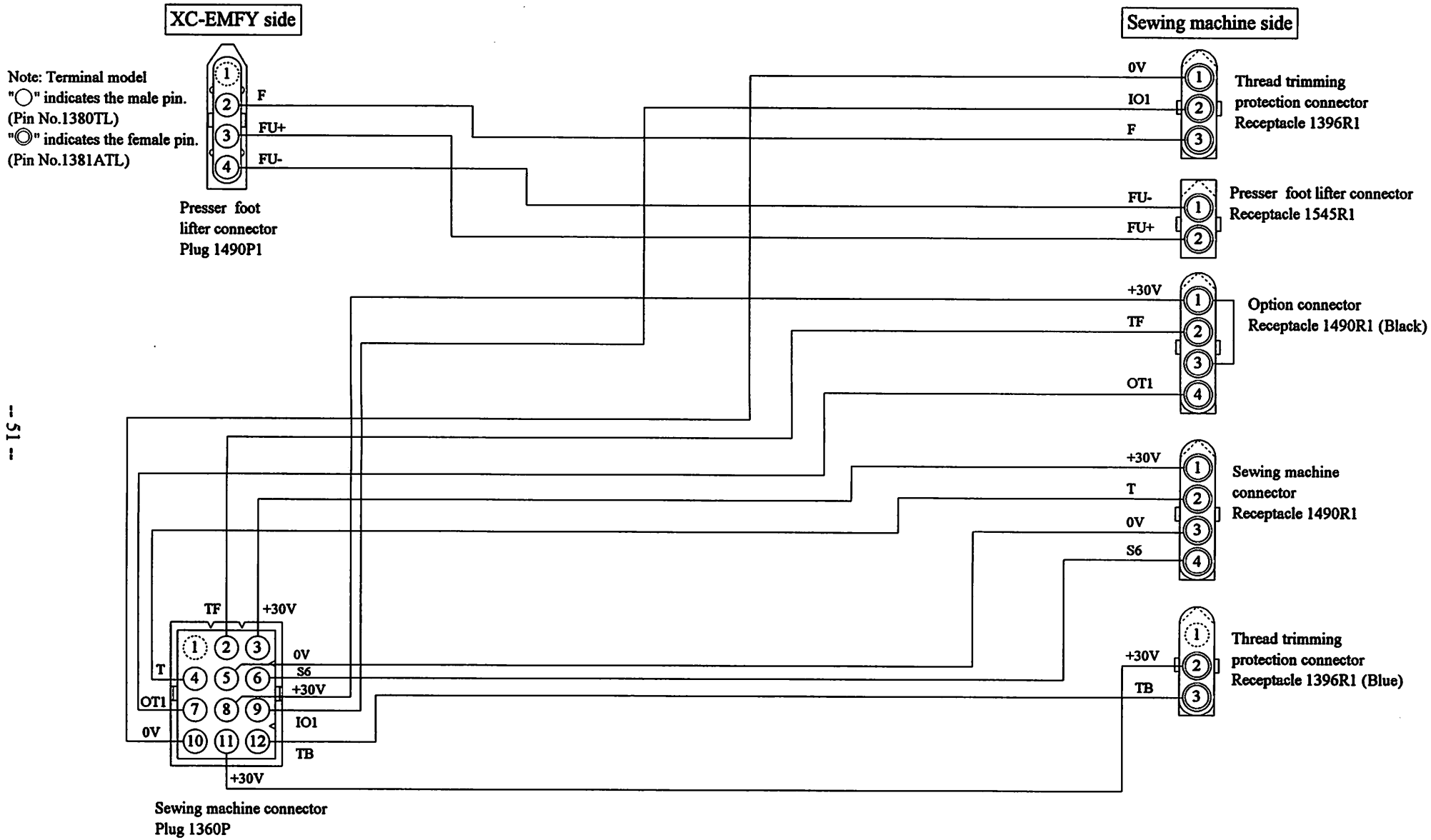
Fig.50 "YAMAYO", Function setting [YU2],[YU3],[YU4] and [YU5]



Part Name	XC-CBL-YU-1
Part No.	K11M71928530

Note: The connector diagram is looking from the pin insertion side.

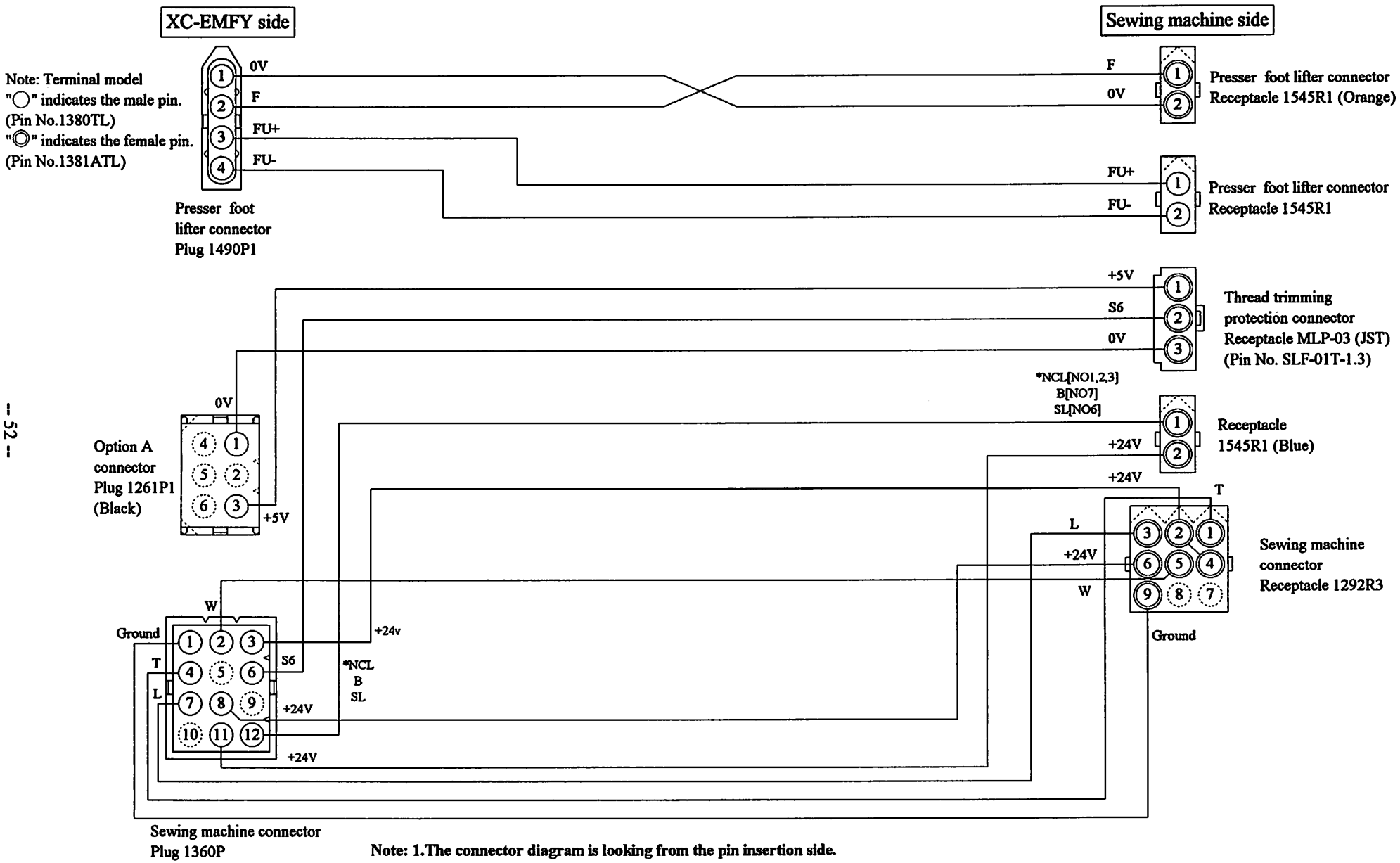
Fig.51 "YAMAYO", Function setting [YC1],[YC2],[YC3] and [YC4]



Part Name	XC-CBL-YU-2
Part No.	K11M71928630

Note: The connector diagram is looking from the pin insertion side.

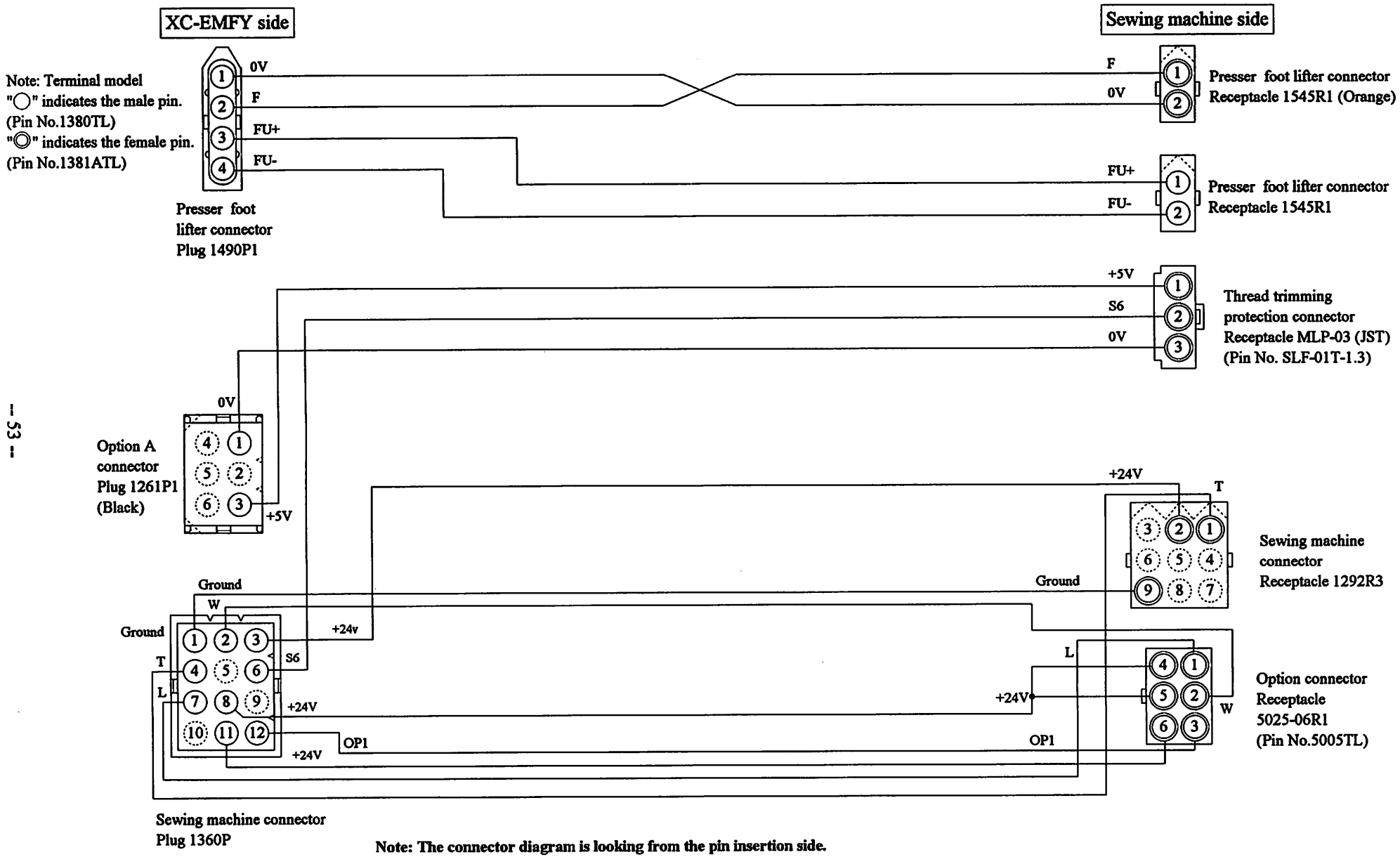
Fig.52 "PEGASUS", Function setting [NO1],[NO2],[NO3],[NO6] and [NO7]



Part Name	XC-CBL-PP-1
Part No.	K11M71928730

Note: 1.The connector diagram is looking from the pin insertion side.
2."*" OP1 output will be applied for function settings [NO1], [NO2] and [NO3].
The CH1 output will be applied for function settings [NO7].
The SL output will be applied for function settings [NO6].

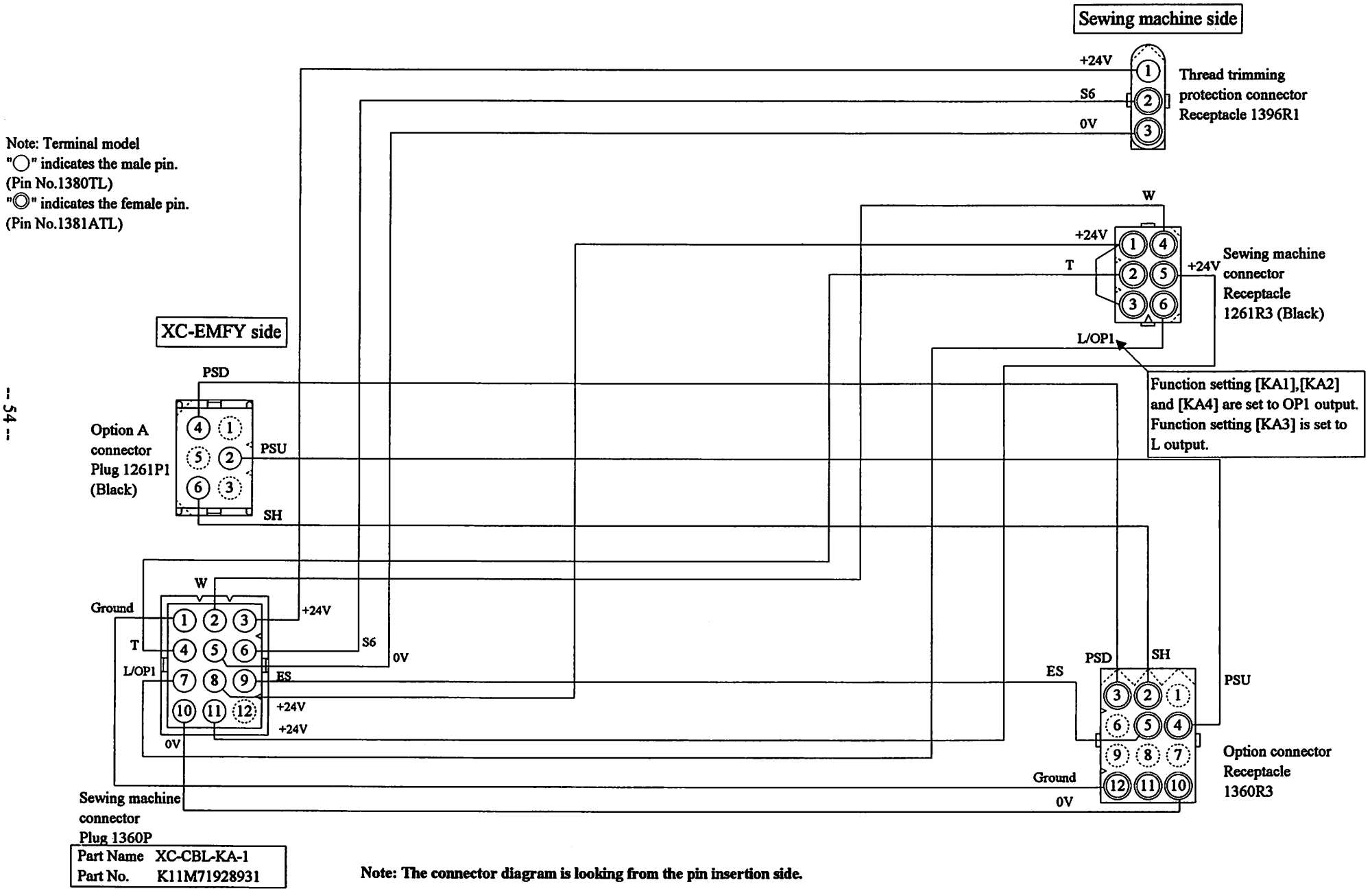
Fig.53 "PEGASUS", Function setting [NO4]



Note: The connector diagram is looking from the pin insertion side.

Part Name	XC-CBL-PP-2
Part No.	K11M71928830

Fig.54 "KANSAI", Function setting [KA1],[KA2],[KA3] and [KA4]

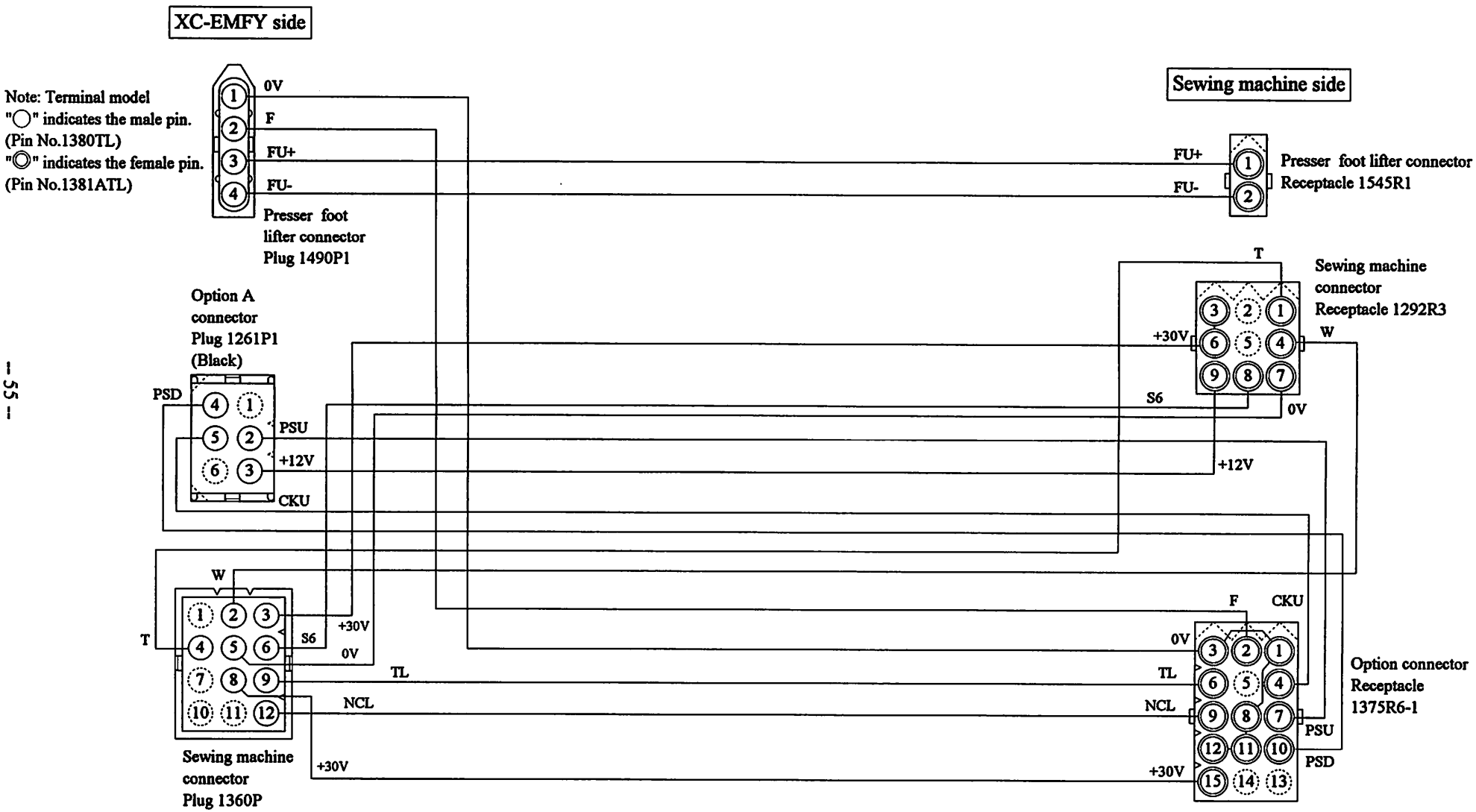


Part Name	XC-CBL-KA-1
Part No.	K11M71928931

Note: Terminal model
"◯" indicates the male pin.
(Pin No.1380TL)
"◎" indicates the female pin.
(Pin No.1381ATL)

Note: The connector diagram is looking from the pin insertion side.

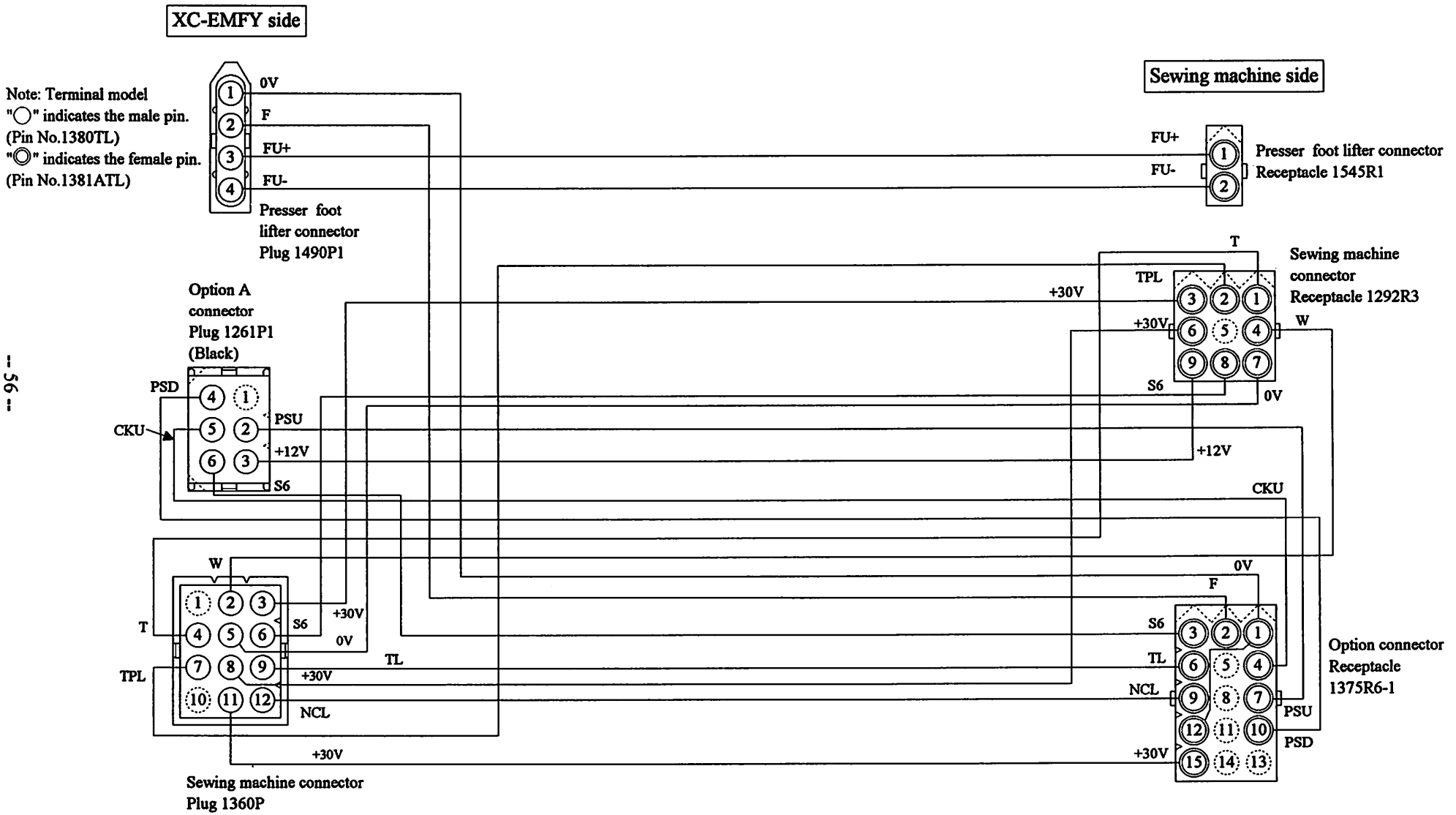
Fig.55 "UNION", Function setting [UN1] and [UN2]



Part Name	XC-CBL-UN-1
Part No.	K11M71925030

Note: The connector diagram is looking from the pin insertion side.

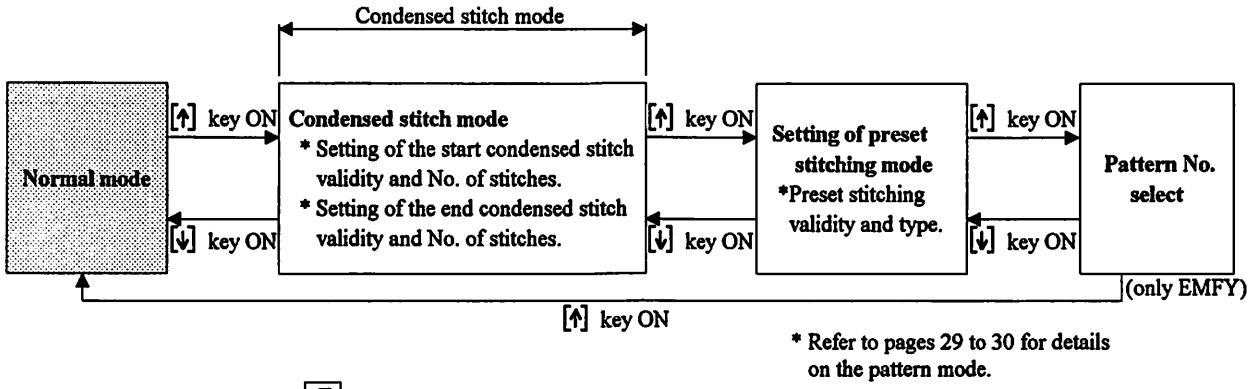
Fig.56 "UNION", Function setting [UN3]



Part Name	XC-CBL-UN-2
Part No.	K11M71925130

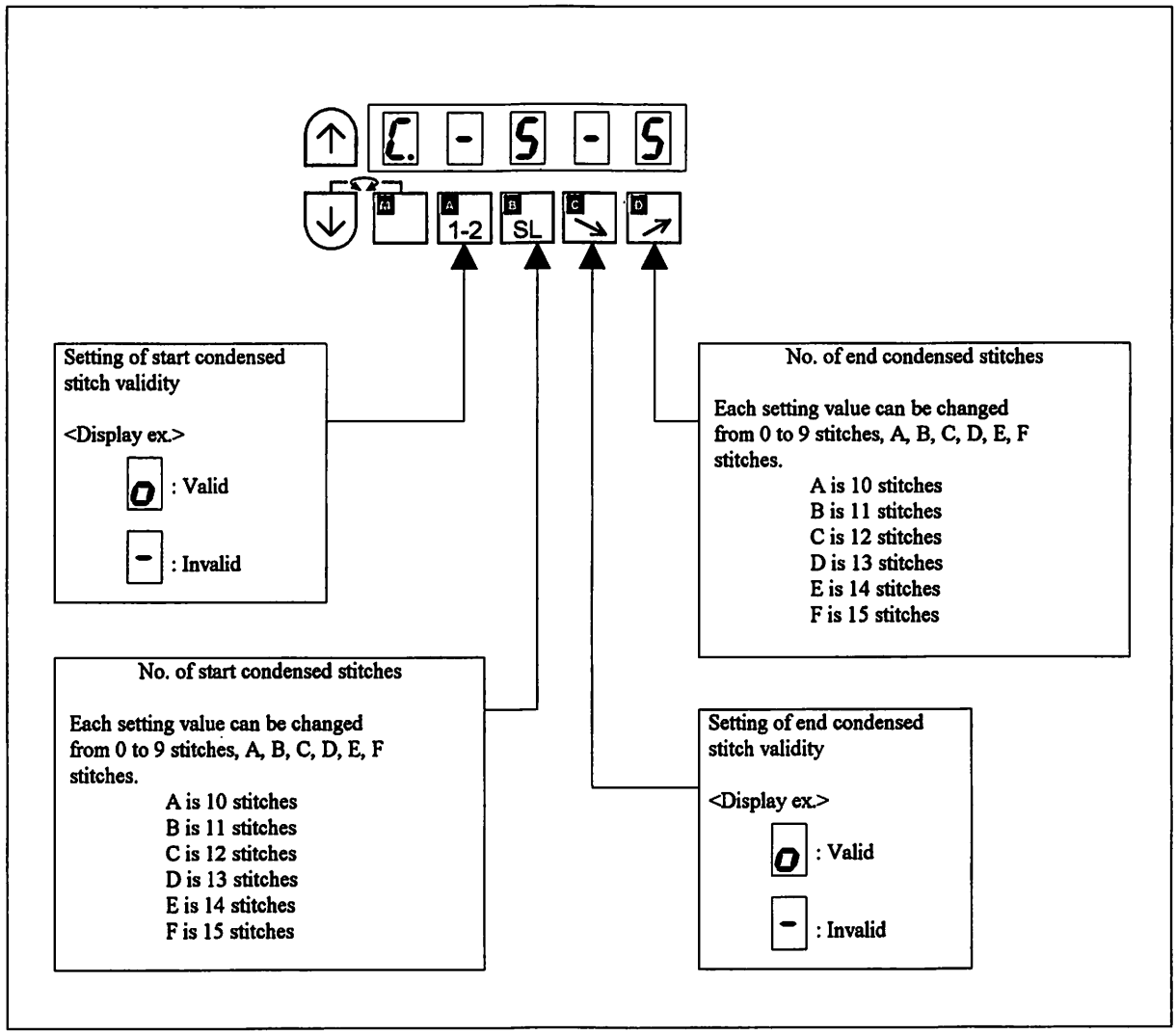
Note: The connector diagram is looking from the pin insertion side.

5. Displays and function of each key in the condensed stitch mode



* Refer to pages 29 to 30 for details on the pattern mode.

When the [↑] key is turned ON, C. will display above the [M] key, and the condensed stitch mode will be entered. The validity and No. of stitches of start and end condensed stitch can be set here.



13 How to use Simple setting of Program Mode [3] (for lock stitch trimming machine)

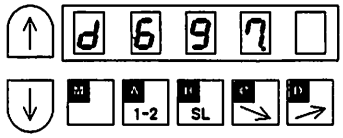
1.How to use Simple setting of Program Mode [3] (for lock stitch trimming machine)

No.1 To set the functions for the DÜRKOPP ADLER thread trimming sewing machine in one step (For example, to set for the 271 class, "DÜRKOPP ADLER").....Function setting [D271]

1)

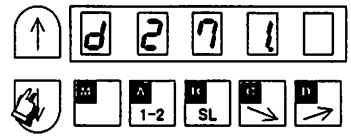
Enter program mode [3] ([↓] + [A] + [D]) (Indicates key operation. Refer to page 23.)

2)



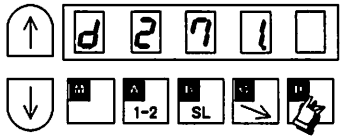
Program mode [3] will be entered.

3)



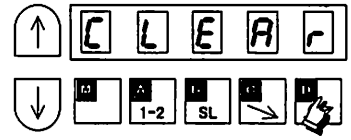
Set function to [D271].

4)



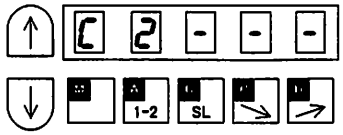
[D271] will flicker when [D] is pressed.

5)



[CLEAR] will be displayed when the [D] key is pressed for approx. two seconds.

6)



Press [D] to return to the normal mode.

Description

A) Select the model name that corresponds to the sewing machine model for the simple setting values for the DÜRKOPP ADLER thread trimming sewing machine on the "Technical manual". Display [CLEAR] with the [D] key, and the setting of the speed and functions will be carried out automatically for that model.

B) To return to the normal mode from the [D271] display, press the [↑] key while holding down [↓]. In this case, [D271] will not be set, and the last settings will be used.

C) Each time the [↓] key is pressed in step 2, the model name will change in order from [D697], [D271] .... [691B].

Caution

To use this mode, please ask your dealer or look at "Technical manual" about simple setting, I/O signal, Junction wiring in detail.

2. Simple setting table for lock stitch sewing machine

Function	Digital display	Sewing machine maker	Model name of sewing machine and device	I/O signals of connectors	Junction wiring	Note 1 solenoid voltage	Note 2 DC5V or 12V setting In option A connector	1/2 pos	High speed H	Low speed L	Trimming speed T	*Start condensed speed N	End condensed speed V
D697	d697	DÜRKOPP ADLER	697-15000 class	Fig.20	Fig.57	24V	12V	2	1500	250	150	700	700
D271	d271	DÜRKOPP ADLER	271-14000,272-14000 class	Fig.21	Fig.58	24V	12V	2	3000	170	250	1500	1500
D273	d273	DÜRKOPP ADLER	273-14000,274-14000 class	Fig.22	Fig.59	24V	12V	2	3000	170	250	1500	1500
B715	b715	BROTHER	DB2-B705,DB2-B707,DB2-B715 class	Refer to "HOW TO USE WITH OTHER MANUFACTURER'S MACHINE".	Refer to "HOW TO USE WITH OTHER MANUFACTURER'S MACHINE".	30V	5V	2	4300	215	215	1800	1800
B716	b716	BROTHER	DB2-B716-?,DB2-B716-1,DB2-B716-?,DB2-B716-5 class			30V	5V	2	3500	215	215	1800	1800
B737	b737	BROTHER	DB2-B737-1,DB2-B737-3,DB2-B737-5 class			30V	5V	2	4000	215	215	1800	1800
B740	b740	BROTHER	DB2-B746-5,DB2-B746-7,DB2-B746-8,DB2-B747-5,DB2-B748-5,DB2-B748-7 class			30V	5V	2	2000	215	215	1800	1800
B757	b757	BROTHER	DB2-B757 class			30V	5V	2	5000	215	215	1800	1800
B770	b770	BROTHER	DB2-B772,DB2-B774,DB2-B7740,DB2-B778 class			30V	5V	2	4500	215	215	1800	1800
B790	b790	BROTHER	DB2-B790,DB2-B791-3,DB2-B791-5,DB2-B7910-3,DB2-B7910-5,DB2-B792,DB2-B793-403,DB2-B795,DB2-B798 class			30V	5V	2	3500	215	215	1800	1800
B830	b830	BROTHER	DB2-B837,DB2-B838 class			30V	5V	2	3000	215	215	1800	1800
BLT	bLT	BROTHER	LT2-B841-1,LT2-B841-3,LT2-B841-5,LT2-B842-1,LT2-B842-3,LT2-B842-5,LT2-B845,LT2-B8450,LT2-B8480,LT2-B847,LT2-B848,LT2-B872,LT2-B875,LT2-B8750 class			30V	5V	2	3000	185	185	1000	1000
BLZ	bLZ	BROTHER	LZ2-B852,LZ2-B853,LZ2-B854,LZ2-B856,LZ2-B857 class			30V	5V	2	3000	185	185	1800	1800
J500	J500	JUKI	DDL-500,DMN-5420NFA-6-WB class			30V	5V	2	5000	200	200	1700	1900
J505	J505	JUKI	DDL-505,DDL-505A,DDL-506,DDL-506A,DDL-506E,DDL-560-5,DDL-5600,DLU-5494NBB-6-WB,PLW-1245-6,PLW-1246-6,PLW-1257-6,PLW-1264-6,PLW-1266-6 class			30V	5V	2	4000	200	200	1700	1900
J555	J555	JUKI	DDL-555-2-2B,DDL-555-2-4B,DDL-555ON,DDL-5570,DDL-5571,DDL-5580 class			30V	5V	2	4000	200	200	1700	1900
JDL	JdL	JUKI	DLD-432-5,DLD-436-5,DLM-5400N-6,DLM-5400-6,DLN-415-5,DLN-5410N-6,DLN-5410-6,DLU-450,DLU-490-5,DLU-491-5,DLU-5490BB-6-OB,DLU-5490BB-6-WB,DLU-5490N-6,DMN-530-5,DMN-531-5 class			30V	5V	2	4200	200	200	1700	1900
JDU	JdU	JUKI	DNU-241H-5,DNU-241H-6,DSC-244-6,DSC-244V-6,DSC-245-5,DSC-245-6,DSC-246-6,DSC-246V-6,DSU-142-6,DSU-144-6,DSU-145-5,DSU-145-6,DU-141H-4,DU-141H-5,DU-141H-6,DU-161H-6 class			30V	5V	2	2000	200	200	1700	1900

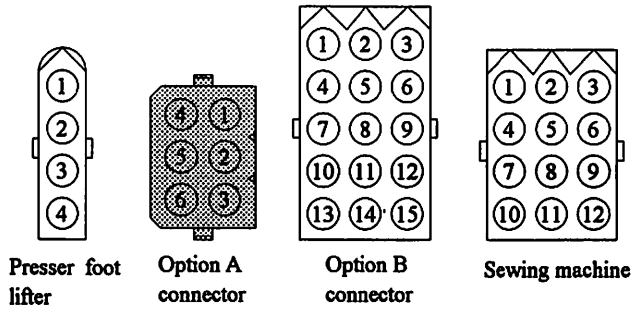
Function	Digital display	Sewing machine maker	Model name of sewing machine and device	I/O signals of connectors	Junction wiring	Note 1 solenoid voltage	Note 2 DC5V or 12V setting In option A connector	1/2 pos	High speed H	Low speed L	Trimming speed T	*Start condensed speed N	End condensed speed V
JLH	JLH	JUKI	LH-1172,LH-1180-5,LH-1182-5,LH-1150,LH-1152,LH-1160,LH-1162 class	Refer to "HOW TO USE WITH OTHER MANUFACTURER'S MACHINE".	Refer to "HOW TO USE WITH OTHER MANUFACTURER'S MACHINE".	30V	5V	1	2300	200	200	1700	1900
JLU1	JLU1	JUKI	DDL-5560NL-6,LU-1114-5,LU-1114-6,LZH-1290-6 class			30V	5V	2	2800	200	200	1700	1900
JLU2	JLU2	JUKI	LU-2210-6-0B class			30V	5V	2	3500	200	200	1700	1900
T100	T100	TOYOTA	AD1012,AD1012B,AD1012G,AD1013,AD1013A,AD1013G,AD1020,AD1102,AD1102B,AD1102G,AD1103,AD1103A,AD1202,AD1203,AD1204S,AD1205,AD1205S,AD1212G,AD1213,AD2200,AD5010S class			30V	12V	2	3500	200	200	1700	1700
T157	T157	TOYOTA	AD157,AD157G class			30V	12V	2	4000	200	200	1700	1700
T158	T158	TOYOTA	AD158,AD158-2,AD158-22,AD158A-3,AD158A-32,AD158B-2,AD158B-22,AD158G-2,AD158G-22,AD158-3,AD158-32 class			30V	12V	2	3500	200	200	1700	1700
T300	T300	TOYOTA	AD3110,AD3110P,AD320-2,AD320-22,AD320-202,AD331,AD3310,AD3310P,AD332,AD340-2,AD340-22,AD340-202,AD340B-2,AD340B-22,AD340B-202,AD341-2,AD341-22,AD341-202,AD345-2,AD345-22,AD345-202,AD352 class			30V	12V	2	1900	200	200	1700	1700
U639	U639	UNION SPECIAL	Class 63900 Solenoid-operated needle feed under trimmer	Fig.23	----	30V	12V	2	4000	250	180	1700	1700
SLH2	SLH2	SEIKO	SLH-2B	----	----	24V	12V	2	570	100	100	1700	1700
457G	457G	SINGER	457 Wiper	Fig.24	Fig.60	24V	12V	2	4000	250	160	1500	1500
457F	457F	SINGER	457 Thread pull	Fig.24	Fig.60	24V	12V	2	4000	250	160	1500	1500
591	591	SINGER	591, 1591	Fig.24	Fig.60	24V	12V	2	4000	250	200	1500	1500
211A	211A	SINGER	211A	Fig.24	Fig.60	24V	12V	2	2300	200	180	1000	1000
212A	212A	SINGER	212A	Fig.24	Fig.60	24V	12V	2	3500	200	180	1000	1000
411U	411U	SINGER	411U	Fig.24	Fig.60	24V	12V	2	4000	250	180	1500	1500
412U	412U	SINGER	412U	Fig.24	Fig.60	24V	12V	2	4500	250	180	1500	1500
591V	591U	SINGER	591V	Fig.24	Fig.60	24V	12V	2	4000	250	200	1500	1500
691A	691A	SINGER	1691D250	Fig.24	Fig.60	24V	12V	2	4000	250	200	1500	1500
691B	691b	SINGER	1691D210, 1691D200	Fig.24	Fig.60	24V	12V	2	4000	250	200	1500	1500

Note : 1. Refer to page 16 for how to change the solenoid voltage. The factory setting is 24V.
2. Refer to page 71 for how to change the option A connector DC5V/12V. The factory setting is 12V.

3. I/O signals of connectors

Fig.20 "DÜRKOPP ADLER"

Function setting [D697]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

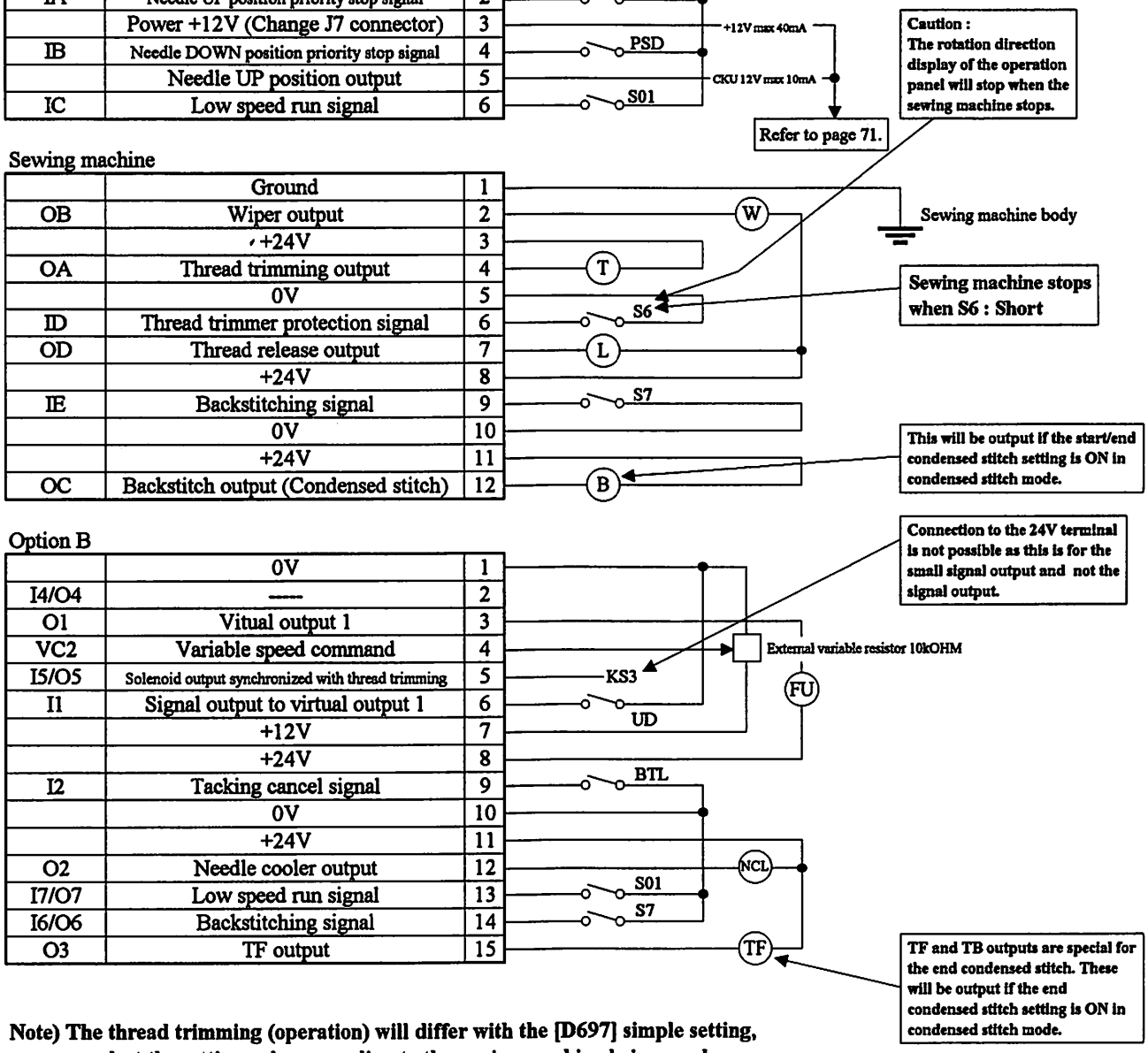
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Low speed run signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimmer protection signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Backstitch output (Condensed stitch)	12

Option B

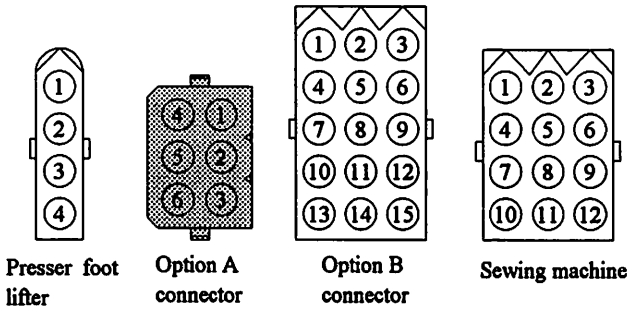
	0V	1
I4/O4	-----	2
O1	Vitual output 1	3
VC2	Variable speed command	4
I5/O5	Solenoid output synchronized with thread trimming	5
I1	Signal output to virtual output 1	6
	+12V	7
	+24V	8
I2	Tacking cancel signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	Low speed run signal	13
I6/O6	Backstitching signal	14
O3	TF output	15



Note) The thread trimming (operation) will differ with the [D697] simple setting, so select the setting value according to the sewing machine being used.

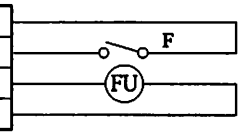
Fig.21 "DÜRKOPP ADLER"

Function setting [D271]



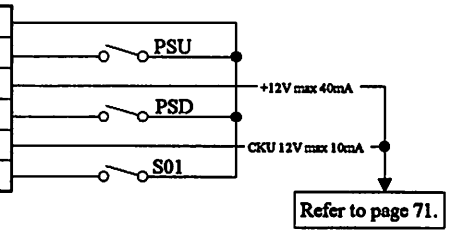
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



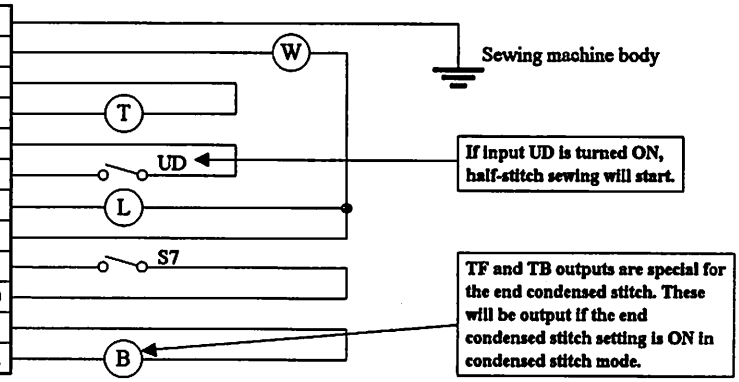
Option A (Black connector)

	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One stitch signal	6



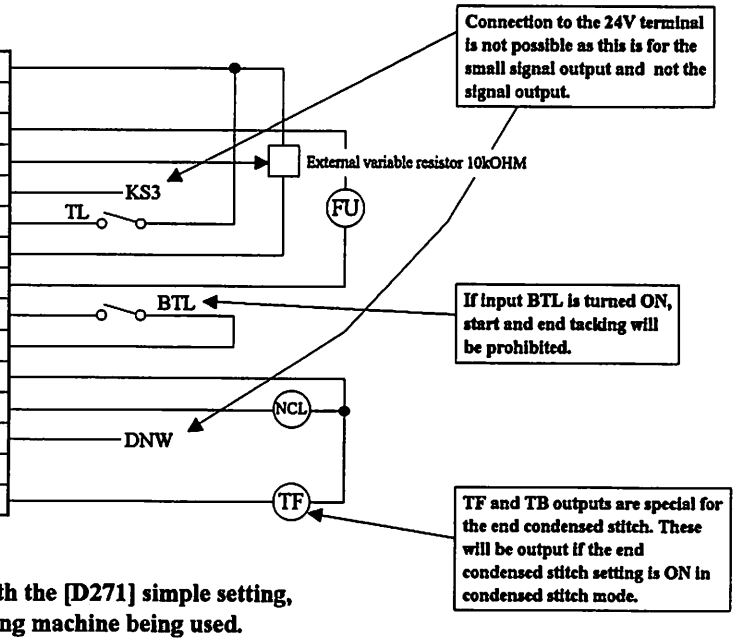
Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Half-stitch signal	6
OD	Thread release output	7
	+24V	8
IE	Backstitching signal	9
	0V	10
	+24V	11
OC	Backstitch output (Condensed stitch)	12



Option B

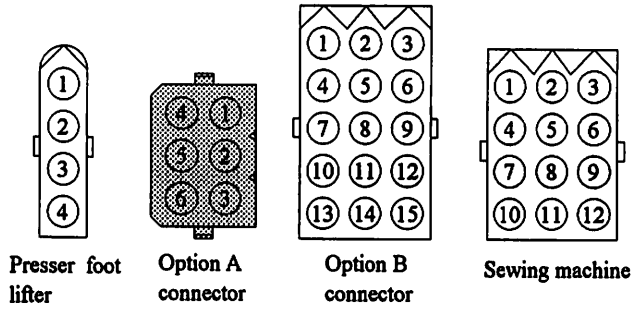
	0V	1
I4/O4	----	2
O1	Presser foot lifting output +	3
VC2	Variable speed command	4
I5/O5	Solenoid output synchronized with thread trimming	5
I1	Operation signal	6
	+12V	7
	+24V	8
I2	Condensed stitching prohibit signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	Needle DOWN position output	13
I6/O6	----	14
O3	TF output	15



Note) The thread trimming (operation) will differ with the [D271] simple setting, so select the setting value according to the sewing machine being used.

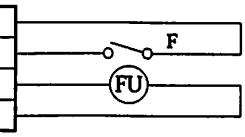
Fig.22 "DÜRKOPP ADLER"

Function setting [D273]



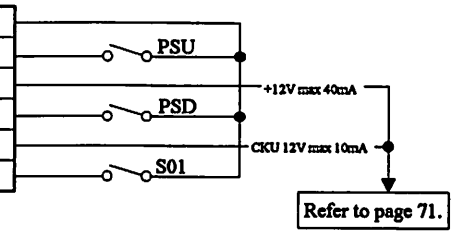
Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4



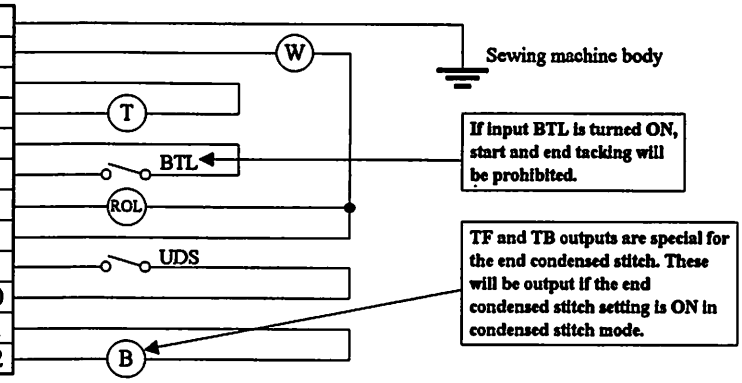
Option A (Black connector)

	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	One stitch signal	6



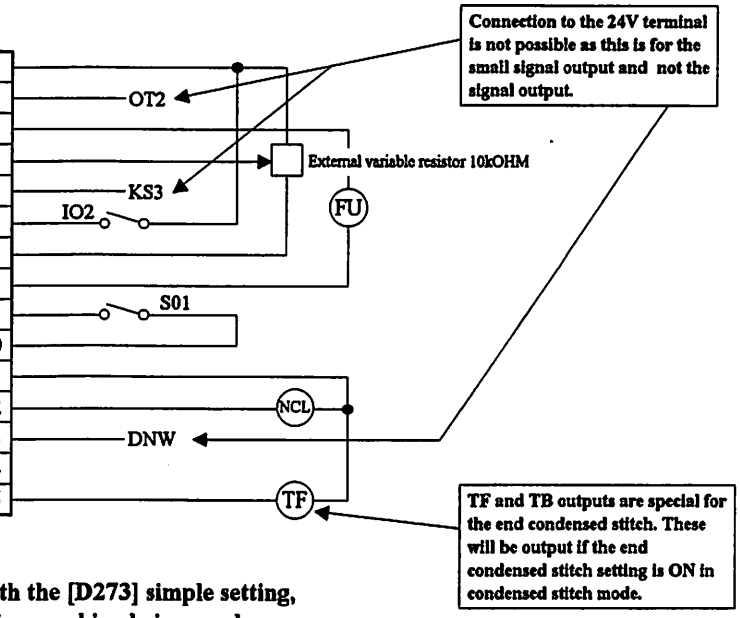
Sewing machine

	Ground	1
OB	Wiper output	2
	+24V	3
OA	Thread trimming output	4
	0V	5
ID	Condensed stitching prohibit signal	6
OD	Roller lifting output	7
	+24V	8
IE	Backstitching during run signal	9
	0V	10
	+24V	11
OC	Backstitch output (Condensed stitch)	12



Option B

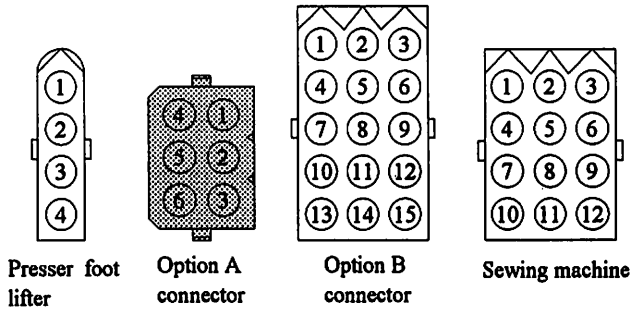
	0V	1
I4/O4	Virtual output 2	2
O1	Presser foot lifting output +	3
VC2	Variable speed command	4
I5/O5	Solenoid output synchronized with thread trimming	5
I1	Signal output to virtual output 2	6
	+12V	7
	+24V	8
I2	One stitch signal	9
	0V	10
	+24V	11
O2	Needle cooler output	12
I7/O7	Needle DOWN position output	13
I6/O6	----	14
O3	Thread tension output	15



Note) The thread trimming (operation) will differ with the [D273] simple setting, so select the setting value according to the sewing machine being used.

Fig.23 "UNION SPECIAL"

Function setting [U639]



Presser foot lifter

	0V	1
IF	Presser foot lifting signal	2
OF	Presser foot lifting output +	3
	Presser foot lifting output -	4

Option A (Black connector)

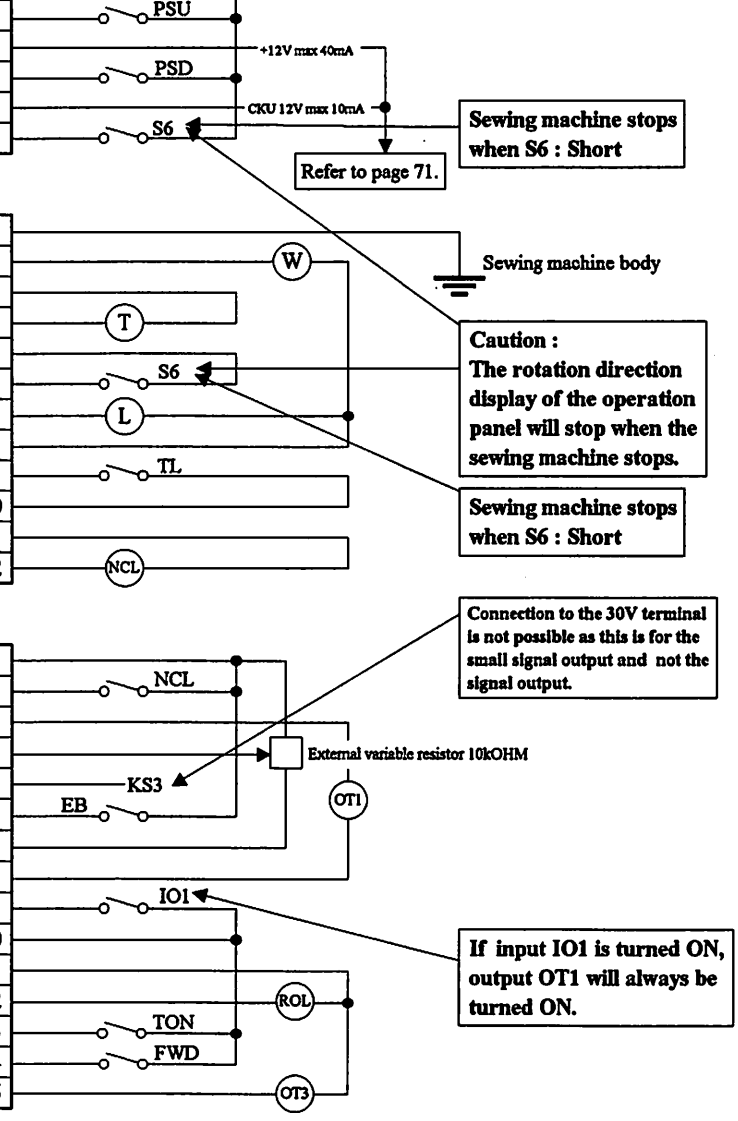
	0V	1
IA	Needle UP position priority stop signal	2
	Power +12V (Change J7 connector)	3
IB	Needle DOWN position priority stop signal	4
	Needle UP position output	5
IC	Thread trimmer protection signal	6

Sewing machine

	Ground	1
OB	Wiper output	2
	+30V	3
OA	Thread trimming output	4
	0V	5
ID	Thread trimmer protection signal	6
OD	Thread release output	7
	+30V	8
IE	Backstitching during run signal	9
	0V	10
	+30V	11
OC	Needle cooler output	12

Option B

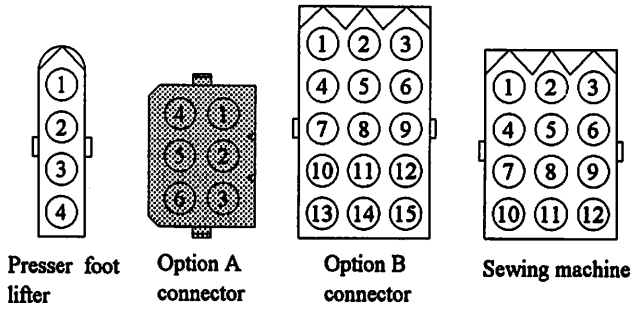
	0V	1
I4/O4	Needle cooler output during rotation forced [OFF] signal	2
O1	Vitual output 1	3
VC2	Variable speed command	4
I5/O5	[KS3] output	5
I1	End tacking cancel signal	6
	+12V	7
	+30V	8
I2	Signal output to virtual output 1	9
	0V	10
	+30V	11
O2	Roller lift output	12
I7/O7	Thread trimmer output confirmation signal	13
I6/O6	Non-stitching feed input	14
O3	Vitual output 3	15



Note) The thread trimming (operation) will differ with the [U639] simple setting, so select the setting value according to the sewing machine being used.

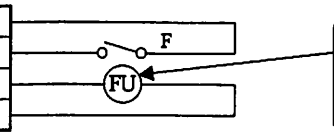
Fig.24 "SINGER"

Function setting [457G], [457F], [591], [211A], [212A], [411U], [412U], [591V], [691A] and [691B]



Presser foot lifter

	0V	—	1
IF	Presser foot lifting signal	—	2
OF	Presser foot lifting output +	—	3
	Presser foot lifting output -	—	4



Caution :
The chopping output duty of the presser foot lifting output FU is 100% duty (full wave).

Option A (Black connector)

	0V	—	1	0V
IA	Start tacking cancel signal	—	2	If this input is turned ON, start tacking will be inhibited while the signal is ON.
	Power +12V (Change J7 connector)	—	3	DC12V (max 40mA) is output.
IB	End tacking cancel signal	—	4	If this input is turned ON, end tacking will be inhibited while the signal is ON.
	Needle UP position output	—	5	The needle UP position signal is output. The output voltage is DC12V.
IC	Thread trimmer cancel signal	—	6	If pedal full heeling is turned ON while this input is ON, the thread will not trimmed. After the thread trimmer interlock time passes, the presser foot lifting operation will start.

Sewing machine

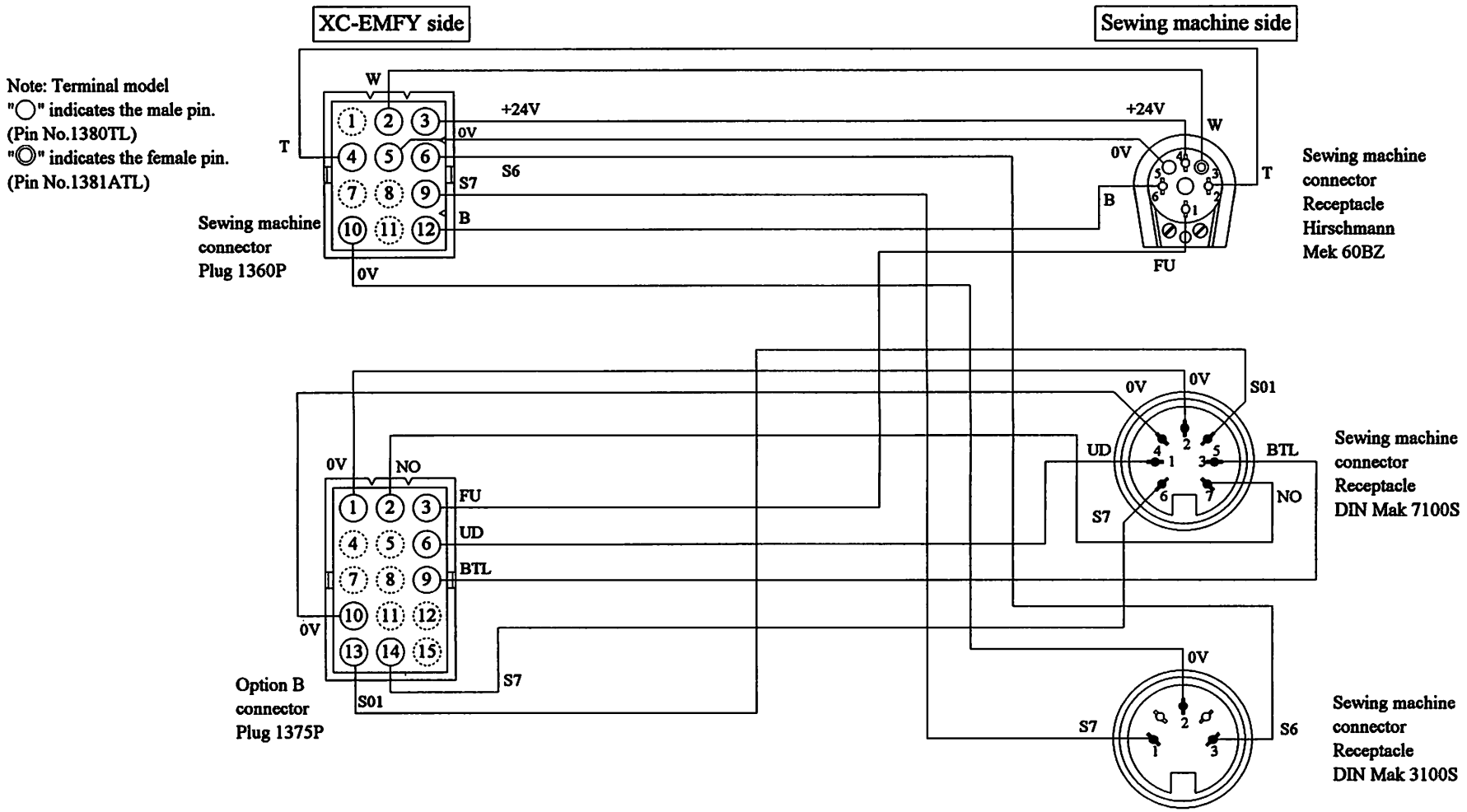
	Ground	—	1	Ground
OB	—	457G	2	Not output.
	Thread pull solenoid output	457F		It will be for thread pull solenoid output.
	Option solenoid output	411U, 412U, 591, 211A, 212A, 591V		This output is always turned ON when option solenoid input signal is ON.
	Thread release solenoid output	691A, 691B		It will be for thread release solenoid output.
	+24V	—	3	+24V
OA	Thread trimming output	—	4	It will be for thread trimming solenoid output.
	0V	—	5	0V
ID	Needle up input	—	6	If this input is turned ON, the needle up input will function.
OD	Thread release solenoid	457G,	7	It will be for thread release solenoid output.
	Wiper solenoid output	Except 457G, 457F		It will be for wiper solenoid output.
	+24V	—	8	+24V
IE	Manual backtacking signal	—	9	If this input is turned ON, the backtacking operation will start.
	0V	—	10	0V
	+24V	—	11	+24V
OC	Backstitch output	—	12	It will be for Backstitch solenoid output.

Option B

	0V	—	1	0V
I4/O4	—	—	2	—
O1	—	Except 691A,691B	3	Not output.
	ADD.BT solenoid output	691A,691B		It will be for ADD.BT solenoid output.
VC2	Variable speed command	—	4	This input is for external speed command. (If voltage is applied to this input, sewing machine will start.)
I5/O5	—	—	5	—
I1	Needle UP position priority stop signal	—	6	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.
	+12V	—	7	DC12V (max 40mA) is output.
	+24V	—	8	+24V
I2	Emergency stop signal	457G, 457F, 691A, 691B	9	If this input is turned ON while the sewing machine is running, all running states will be canceled, and the sewing machine will stop with the brakes.
	Option solenoid input signal	591, 211A, 212A, 591V, 411U, 412U		If this input is turned ON, the option solenoid output will start.
	0V	—	10	0V
	+24V	—	11	+24V
	—	Except 691A	12	Not output.
	Air blow output	691A		It will be for the air blow output.
I7/O7	—	—	13	—
I6/O6	—	—	14	—
O3	—	Except 691A	15	Not output.
	Thread pull output	691A		It will be for the thread pull output.

Note) The thread trimming (operation) will differ with the [457G], [457F], [591], [211A], [212A], [411U], [412U], [591V], [691A] and [691B] simple setting, so select the setting value according to the sewing machine being used.

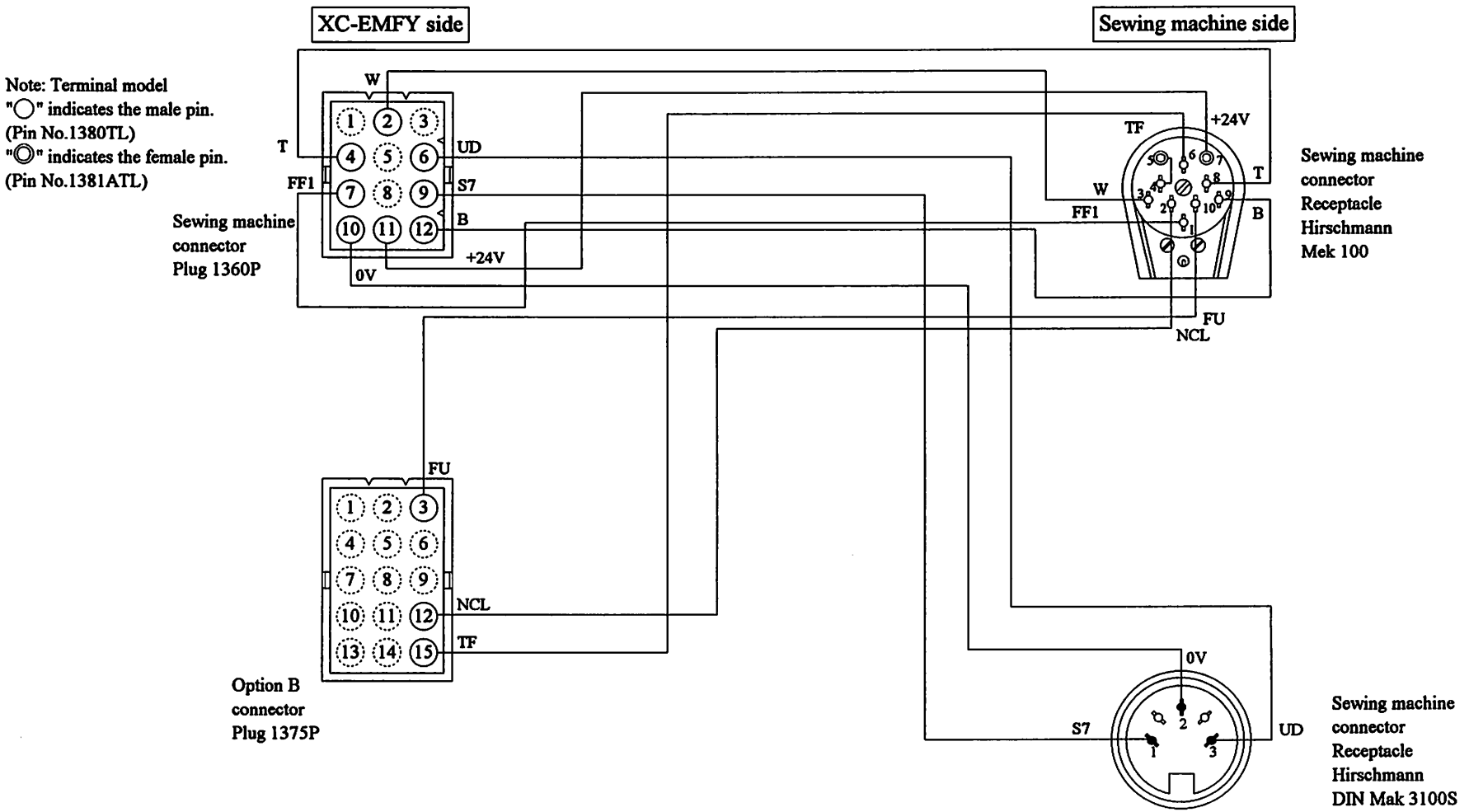
Fig.57 "DÜRKOPP ADLER", Function setting [D697]



Part Name	XC-CBL-DA-1
Part No.	K11M71924730

Note: The sewing machine connector and option B connector diagrams are looking from the pin insertion side.

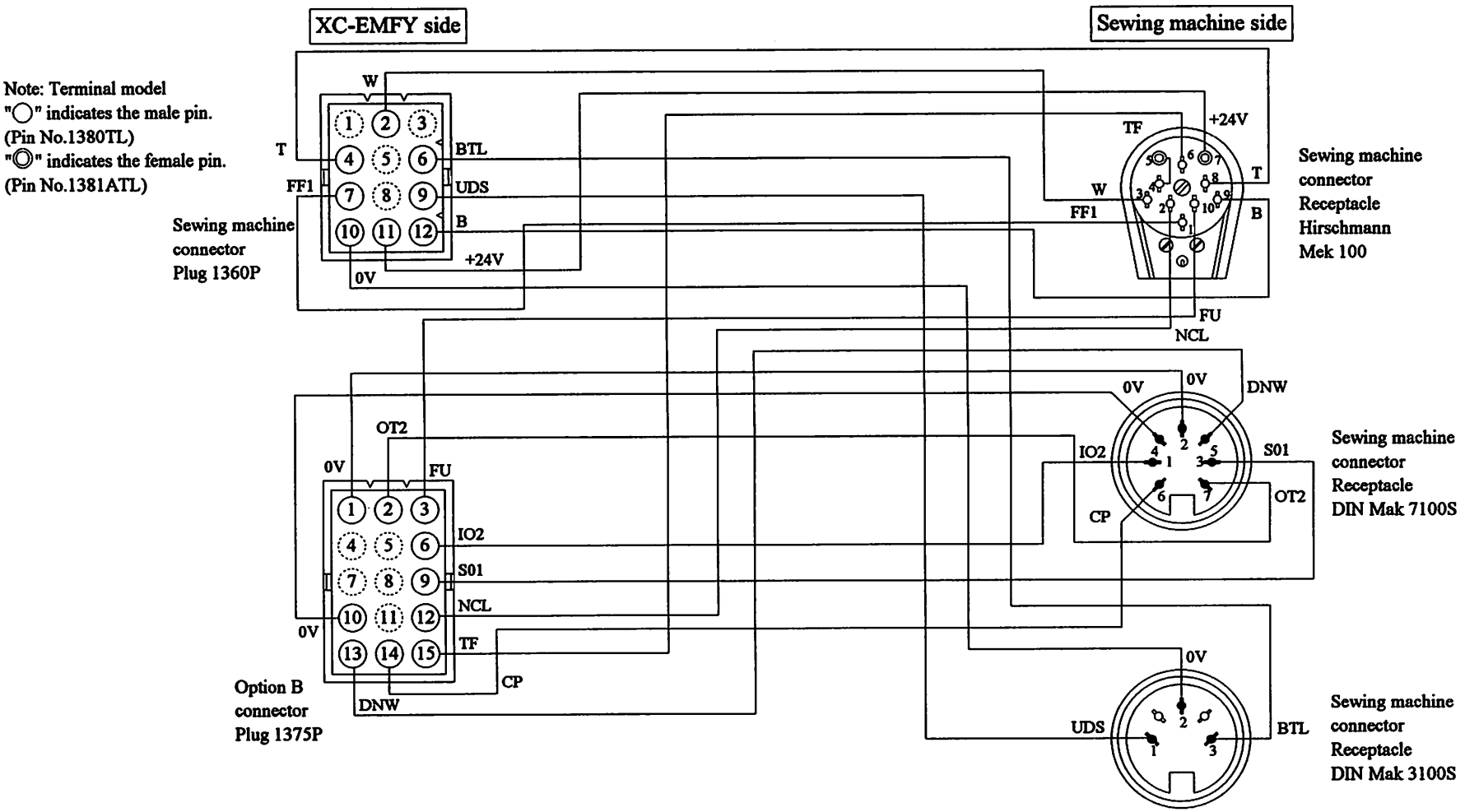
Fig.58 "DÜRKOPP ADLER", Function setting [D271]



Part Name	XC-CBL-DA-2
Part No.	K11M71924830

Note: The sewing machine connector and option B connector diagrams are looking from the pin insertion side.

Fig.59 "DÜRKOPP ADLER", Function setting [D273]

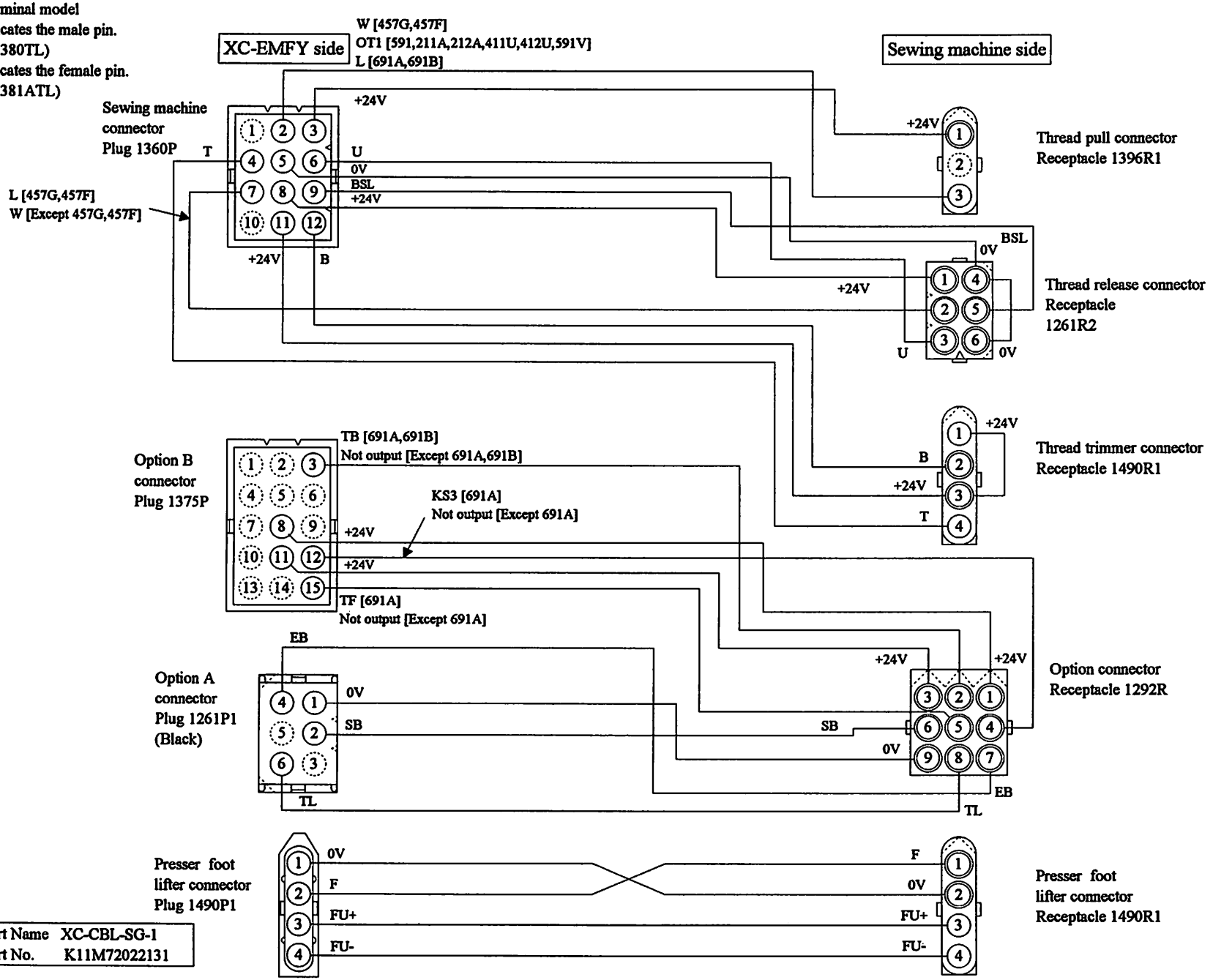


Part Name	XC-CBL-DA-3
Part No.	K11M71924930

Note: The sewing machine connector and option B connector diagrams are looking from the pin insertion side.

Fig.60 "SINGER", Function setting [457G],[457F],[591],[211A],[212A],[411U],[412U],[591V],[691A] and [691B]

Note: Terminal model
"◯" indicates the male pin.
(Pin No.1380TL)
"◎" indicates the female pin.
(Pin No.1381ATL)



Part Name	XC-CBL-SG-1
Part No.	K11M72022131

1. To change Solenoid voltage 24V/30V. **(Refer to page 16.)**

2. How to change the output voltage DC5V/12V

(1) Remove the cover. *Caution : Wait over 10 minutes after turning the power switch OFF before opening cover.*

(2) The DC5V/12V 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 12V when shipped from the factory. To change from 5V to 12V, pull out the connector and reinsert it into the 5V side.

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

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

Position detector

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

(5) The power supply (+12V) voltage will change form 12V to 5V by changing the J11 connector from 12V to 5V. (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)

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

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

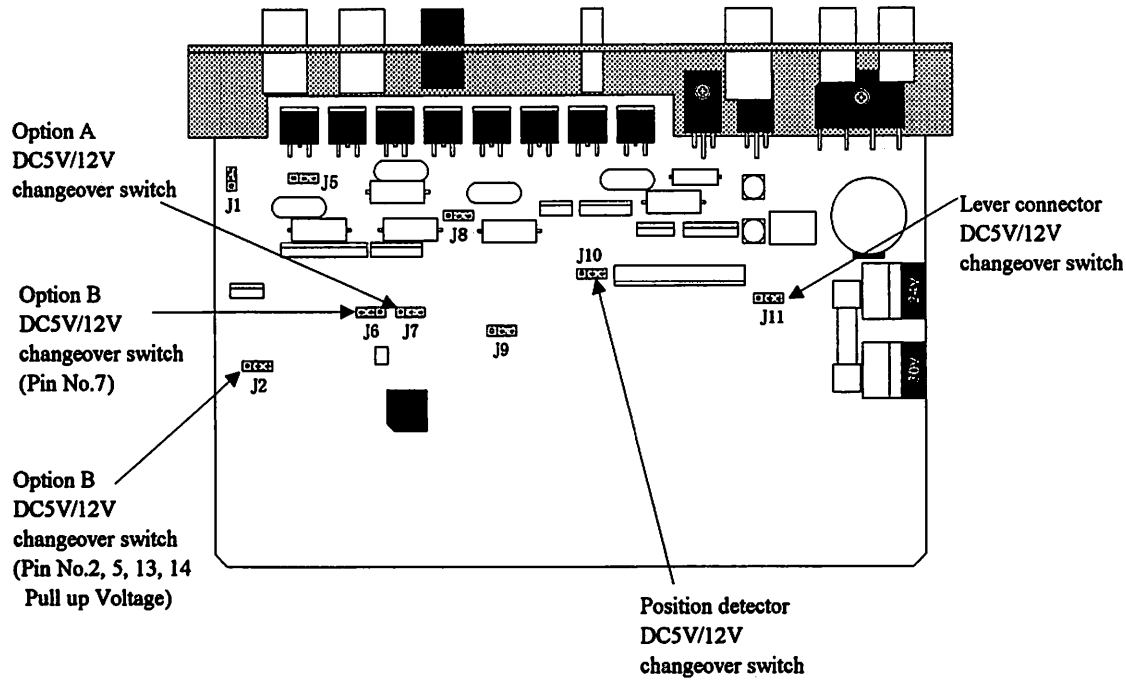
Option A

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

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

Option B

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



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

(1) Remove the cover.

Caution : Wait over 10 minutes after turning the power switch OFF before opening 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 11-12 pin output.	Fast	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.

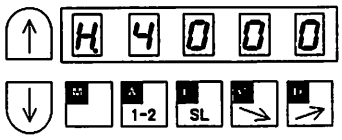
Caution

The solenoid return speed 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.
This connector must always be turned ON.
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).

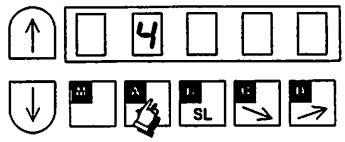
15 How to use the program mode (example of most frequently using)

1. To change the maximum speed (Ex. to change to 4500 rotations) ..... Function setting [H.4500]

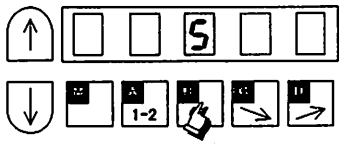
1) Enter program mode [P] ([↓] + [↑])

2) 

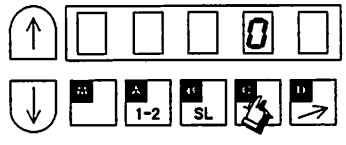
* Program mode [P] will be entered.

3) 

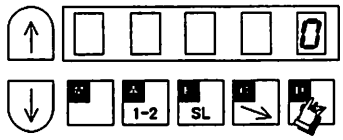
* Set to [4].

4) 

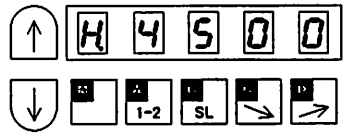
* Set to [5].

5) 

* Set to [0].

6) 

* Set to [0].

7) 

* Complete the [H] function setting.

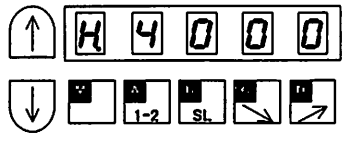
8) Return to the normal mode ([↓] + [↑])

Description

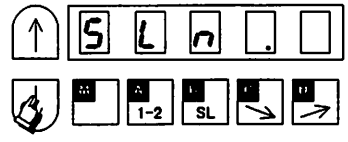
A. The setting range of the maximum speed is 0 to 8999 rotations.
B. By pressing each of the [A],[B],[C] and [D] keys, the setting value will change between 0 to 9.
(However, the [A] key is only between 1 to 8.)
C. The factory setting is [4000 rotations]. (The factory setting of XC-EN is [5000 rotations].)
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.

2. To change the number of stitches in slow start (Ex. to change three stitches) ..... Function setting [SLN.3]

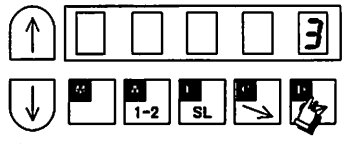
1) Enter program mode [P] ([↓] + [↑])

2) 

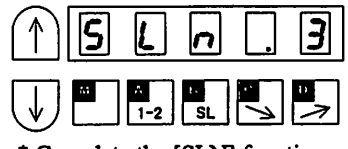
* Program mode [P] will be entered.

3) 

* Set function to [SLN].

4) 

* Set to [3].

5) 

* Complete the [SLN] function setting.

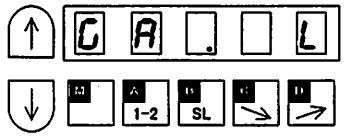
6) Return to the normal mode ([↓] + [↑])

Description

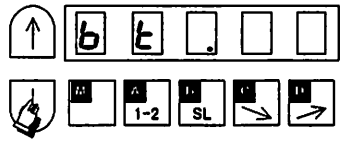
A. This is valid when the [B] key in the normal mode is turned ON.
B. The setting range of the number of stitches is 1 to 5 stitches.
C. By pressing [D] key, the setting value will change between 1 to 5 stitches.
D. The factory setting is [2 stitches].

3. To apply a weak brake during stopping ..... function setting [BK.ON]

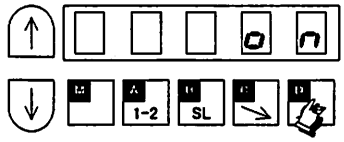
1) Enter program mode [A] ([↓] + [A])

2) 

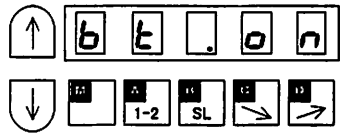
* Program mode [A] will be entered.

3) 

* Set function to [BK].

4) 

* Set to [ON].

5) 

* Complete the [BK] function setting.

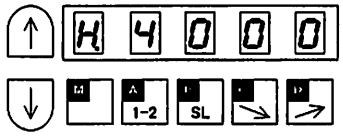
6) Return to the normal mode ([↓] + [↑])

Description

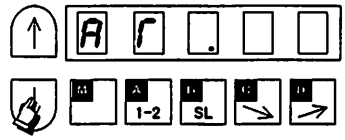
A. Use this when the sewing machine needle is completely down when stopped.
To set ON, motor is applied a weak brake during stopping.
B. The setting value will alternate between [OF] and [ON] with each press of [D] key in step 4).

4. To set the standing work type ..... function setting [AT.ON]

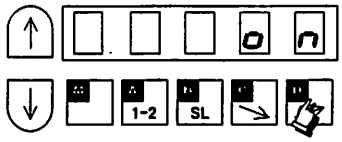
1) Enter program mode [P] ([↓] + [↑])

2) 

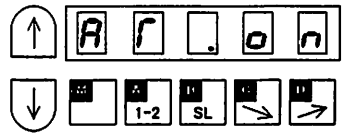
* Program mode [P] will be entered.

3) 

* Set function to [AT].

4) 

* Set to [ON].

5) 

* Complete the [AT] function setting.

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

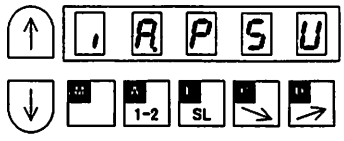
Description

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 5).
(factory setting is [OF])

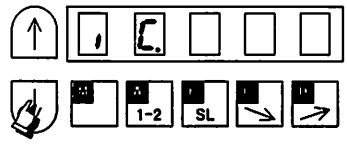
5. To change input/output port function.

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

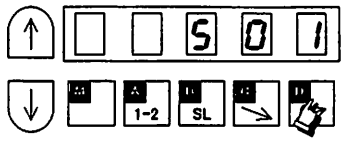
1) Enter program mode [C] ([↓] + [C])

2) 

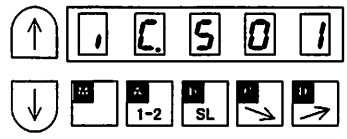
* Program mode [C] will be entered.

3) 

* Set function to [IC].

4) 

* Set to [S01].

5) 

* Complete the [IC] function setting.

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

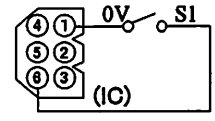
Description

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])

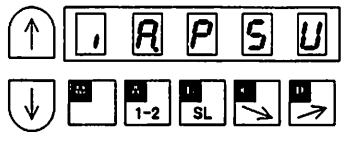
Note) When using this function, always return to the normal mode before starting operations.

Option A

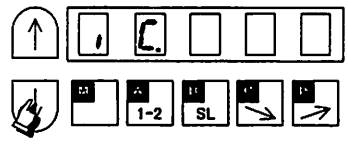


(2) To confirm the position where the needle passed through the fabricated to raise the penetration strength of the first stitch with the external switch. ..... function setting [IC.BCR]

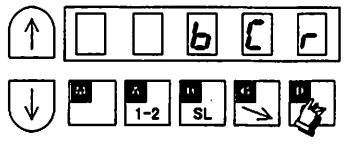
1) Enter program mode [C] ([↓] + [C])

2) 

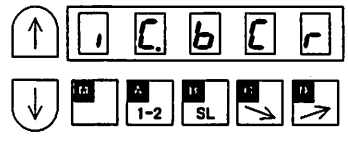
* Program mode [C] will be entered.

3) 

* Set function to [IC].

4) 

* Set to [BCR].

5) 

* Complete the [IC] function setting.

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

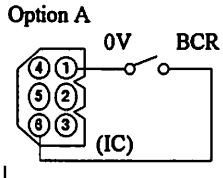
Description

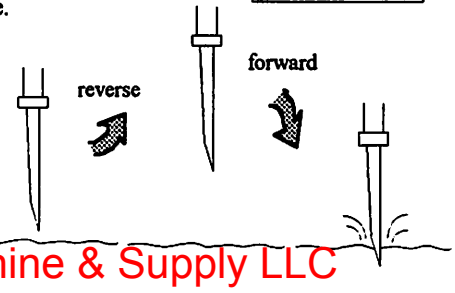
A. This is used to increase the penetration strength of the first stitch when the fabric is thick. Each time the switch [BCR] connected to the No.6 pin in the option A connector is turned ON, the (forward)-(reverse) operation will be repeated, and the needle will stop right with forward operation, above 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.

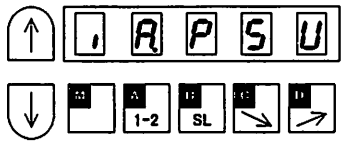
Option A



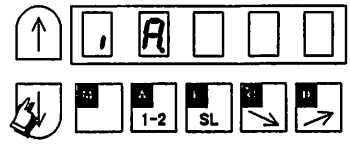


(3) To emergency stop during sewing machine operation. ..... function setting [IA.ES]

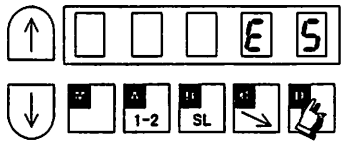
1) Enter program mode [C] ([↓] + [C])

2) 

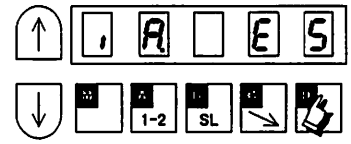
* Program mode [C] will be entered.

3) 

* Set function to [IA].

4) 

* Set to [ES].

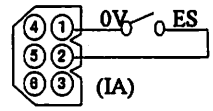
5) 

* Complete the [IA] function setting.

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

Description

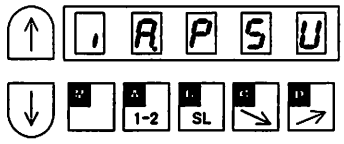
A. The switch connected No.2 pin in the option A connector is emergency stop signal.
B. The setting value will be changed with each press of the [D] key in step 4).
(factory setting is [PSU])
C. Setting function [ID. ES], It becomes the function of emergency stop signal too.
(Connect the external switch No.5-No.6 pin in the sewing machine connector.)
Note) When using this function, always return to the normal mode before starting operations.



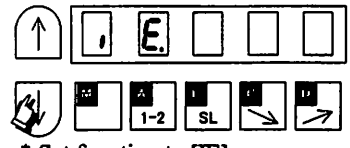
option A

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

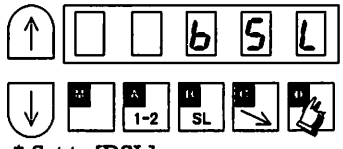
1) Enter program mode [C] ([↓] + [C])

2) 

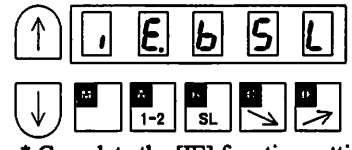
* Program mode [C] will be entered.

3) 

* Set function to [IE].

4) 

* Set to [BSL].

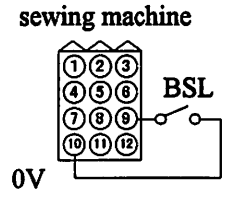
5) 

* Complete the [IE] function setting.

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

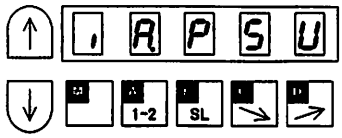
Description

A. Turning ON the external switch connected No.9 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])
C. XC-EN type has no sewing machine connector, do not use function setting [IE].
Note) When using this function, always return to the normal mode before starting operations.

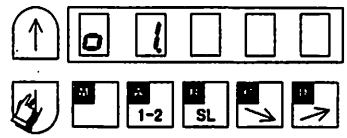


(5) To output a needle cooler output to spare output SOL1 ..... function setting [O1.NCL]

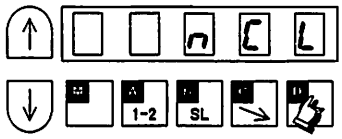
1) Enter program mode [C] ([↓] + [C])

2) 

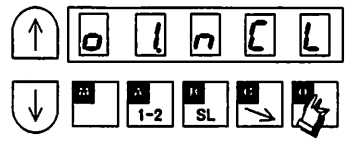
* Program mode [C] will be entered.

3) 

* Set function to [O1].

4) 

* Set to [NCL].

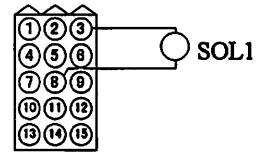
5) 

* Complete the [O1] function setting.

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

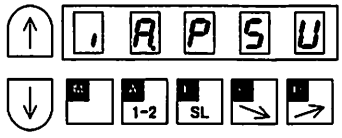
Description

A. Select the needle cooler output [NCL] from the setting table on page 131.
Select the setting to connect [O1] and [NCL].
B. Spare output [SOL1] will be turned ON while the sewing machine is running (including needle lifting).
C. XC-EN type has no output terminal.

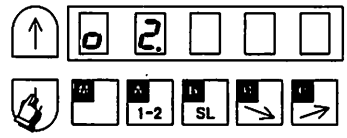
Option B 

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

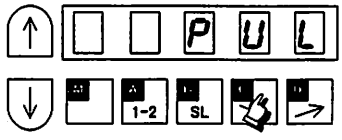
1) Enter program mode [C] ([↓] + [C])

2) 

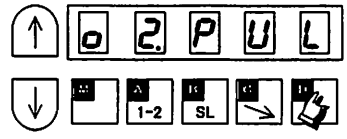
* Program mode [C] will be entered.

3) 

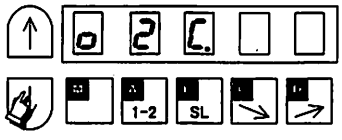
* Set function to [O2].

4) 

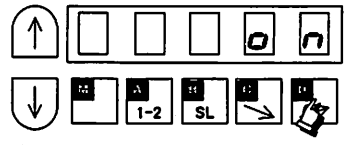
* Set to [PUL].

5) 

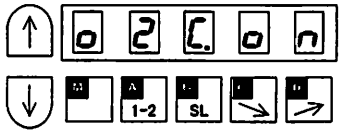
* Complete the [O2] function setting.

6) 

* Set function to [O2C].

7) 

* Set to [ON].

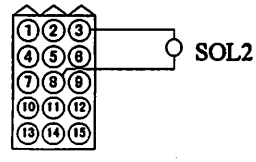
8) 

* Complete the [O2] function setting.

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

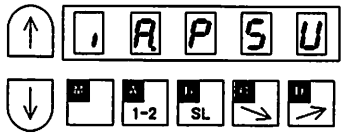
Description

A. Select the puller output [PUL] from the setting table on page 132.
Select the setting to connect [O2] and [PUL].
B. Spare output solenoid [SOL2] will be turned on, while presser foot lifter is operated.
C. XC-EN type has no output terminal.

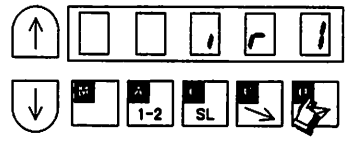
Option B 

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

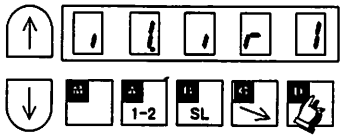
1) Enter program mode [C] ([↓] + [C])

2) 

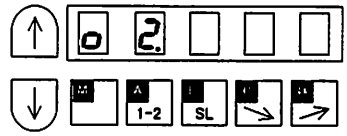
* Program mode [C] will be entered.

3) 

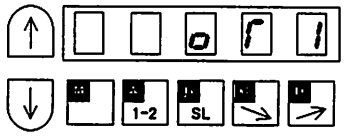
* Set to [IR1].

4) 

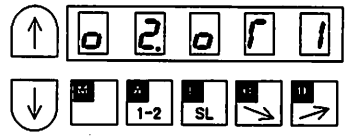
* Complete the [I1] function setting.

5) 

* Set function to [O2].

6) 

* Set to [OT1].

7) 

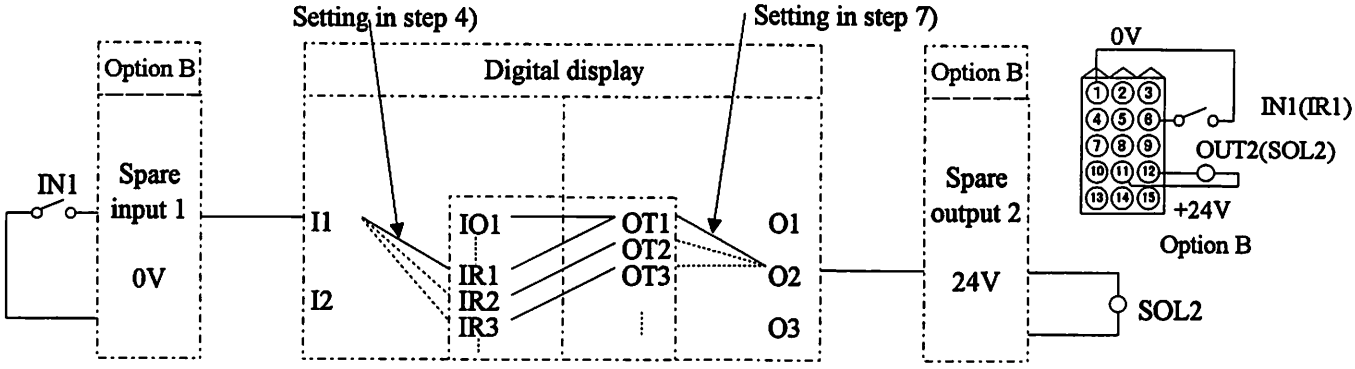
* Complete the [O2] function setting.

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

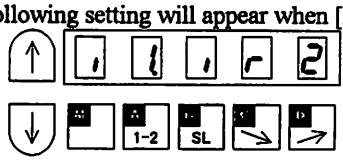
Description

A. Select the set value[IR1], [IR2] or [IR3] from the setting table on pages 129.
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.

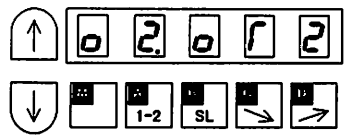
B. The option B connector spare input switch IN1 and spare output SOL2 are connected in the following manner.



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

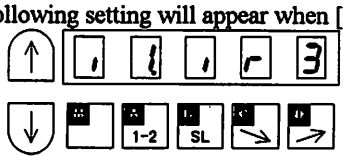
4)' 

* Connect [I1] to [IR2].

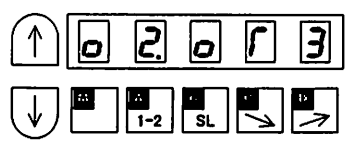
7)' 

* Connect [O2] to [OT2].

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

4)" 

* Connect [I1] to [IR3].

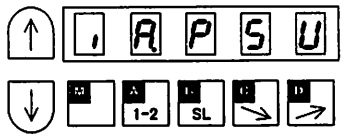
7)" 

* Connect [O2] to [OT3].

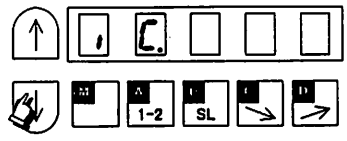
E. XC-EN type has no output terminal.

6. To set external one shot signal ..... function setting [C] mode [IC.SH] + [P] mode [SHM.SH]

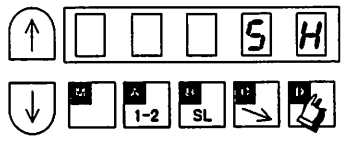
1) Enter program mode [C] ([↓] + [C])

2) 

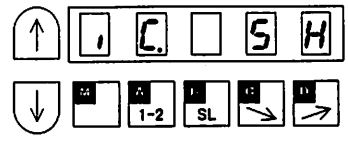
* Program mode [C] will be entered.

3) 

* Set function to [IC].

4) 

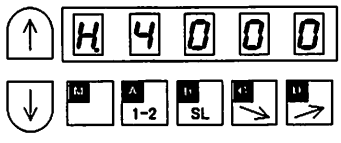
* Set to [SH].

5) 

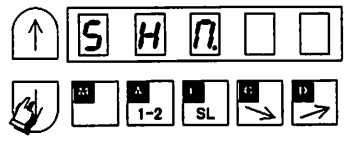
* Complete the [IC] function setting.

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

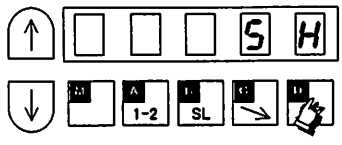
7) Enter program mode [P] ([↓] + [↑])

8) 

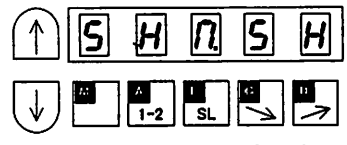
* Program mode [P] will be entered.

9) 

* Set function to [SHM].

10) 

* Set to [SH].

11) 

* Complete the [SHM] function setting.

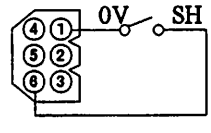
12) Return to the normal mode ([↓] + [↑])

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 [auto] 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.

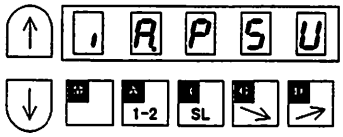
Note) When using this function, always return to the normal mode before starting operations.

Option A

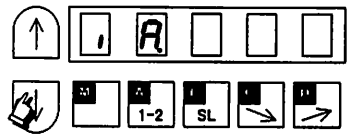


7. To set number of stitches to the needle UP position stop after detecting the fabric end with an optical sensor, etc.
(Ex. to set to 10 stitches) ..... function setting [C] mode [IA.PSU] + [P] mode [PSU.10]

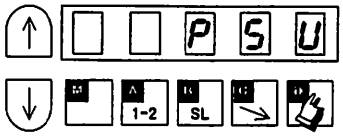
1) Enter program mode [C] ([↓] + [C])

2) 

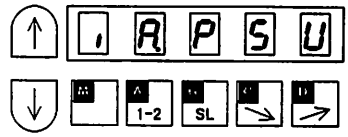
* Program mode [C] will be entered.

3) 

* Set function to [IA].

4) 

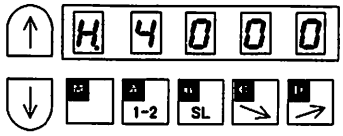
* Set to [PSU].

5) 

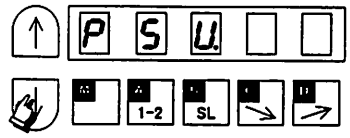
* Complete the [IA] function setting.

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

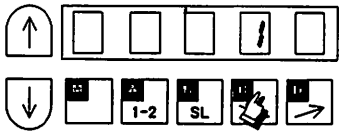
7) Enter program mode [P] ([↓] + [↑])

8) 

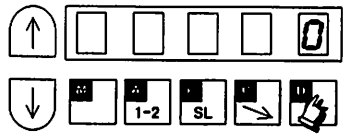
* Program mode [P] will be entered.

9) 

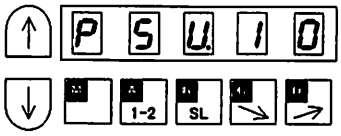
* Set function to [PSU].

10) 

* Set to [1].

11) 

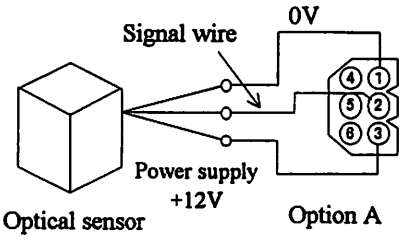
* Set to [0].

12) 

* Complete the [PSU] function setting.

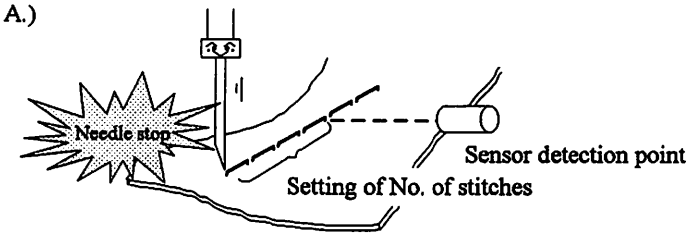
13) Return to the normal mode ([↓] + [↑])

Description



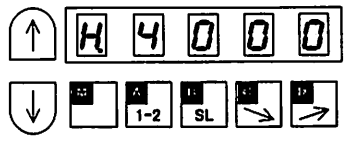
A. Set both [C] mode [IC] and [P] mode [SHM] function.
B. Connect photoelectric sensor to No.A pin in option A connector, and photoelectric sensor is turned ON, the needle will stop at the UP position after 10 stitches and then the thread will be trimmed.
XC-EN type has no thread trimming output, so it operate only needle lift operate.
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 made in OMRON E3V3-D62.)

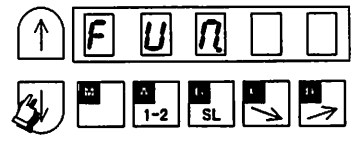


8. To continue presser foot lifting after the thread trimming, and to bring down the presser foot after the time set on the timer has passed ..... function setting [FUM.ON] + [FU.C]

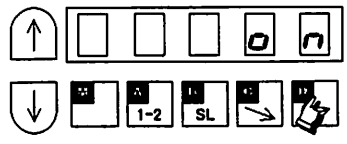
1) Enter program mode [P] ([↓] + [↑])

2) 

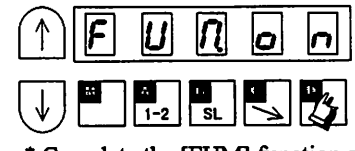
* Program mode [P] will be entered.

3) 

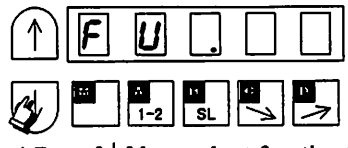
* Set function to [FUM].

4) 

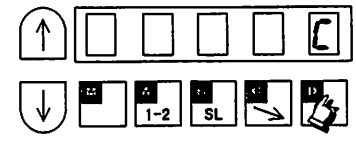
* Set to [ON].

5) 

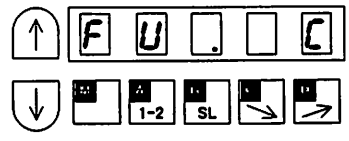
* Complete the [FUM] function setting.

6) 

* Press [↓] key and set function [FU].

7) 

* Set to [C].

8) 

* Complete the [FU] function setting.

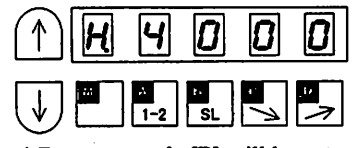
9) Return to the normal mode ([↓] + [↑])

Description

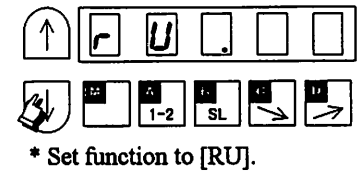
A. Set both [FUM] and [FU] functions.
B. Each time of the [D] key is pressed in step 4), the set value will alternate between [OF] and [ON]. (factory setting is [OF])
C. Each time the [D] key is pressed in step 7), the set value will change in order of [M][C][A][T]. (factory setting is [M])
D. the timer time can be adjusted with the FUM timer setting [FCT] in the [C] mode. (factory setting is 12 sec)
Note) XC-EN type has no presser foot lifter output.

9. To set needle position higher than usual after thread trimming ..... function setting [RU.ON]

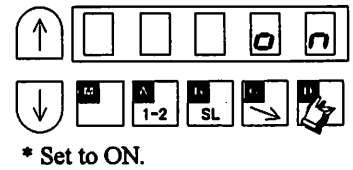
1) Enter program mode [P] ([↓] + [↑])

2) 

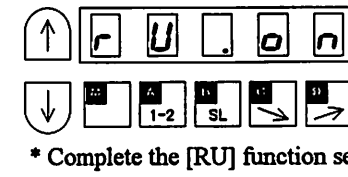
* Program mode [P] will be entered.

3) 

* Set function to [RU].

4) 

* Set to ON.

5) 

* Complete the [RU] function setting.

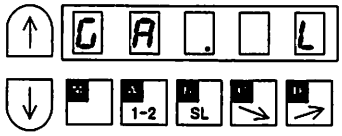
6) Return to the normal mode ([↓] + [↑])

Description

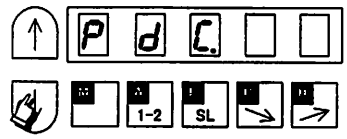
A. The motor is reverse run after thread trimming, and the needle will stop near the needle bar top dead point.
The reverse run angle can be set in [R8] and the setting range is 0 to 360, and it is 2-degree interval.
(factory setting is [30 degree]) [RU] can be set in [P] mode.
B. The setting value will alternate between [OF] and [ON] with each press of [D] key in 4). (factory setting is [OF])
Note) At time of XC-EN type, the motor is reverse run after needle lifting, and the needle will stop near the needle bar top dead point.

10. To adjust the correlation between toe down angle and speed ..... function setting [PDC.55]
(Ex. to set value 55 to sew quickly at a high speed)

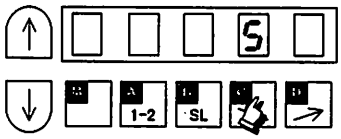
1) Enter program mode [A] ([↓] + [A])

2) 

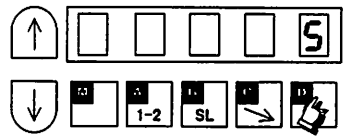
* Program mode [A] will be entered.

3) 

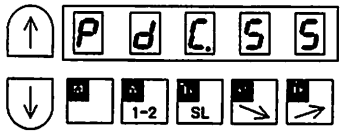
* Set function to [PDC].

4) 

* Set to [5].

5) 

* Set to [5].

6) 

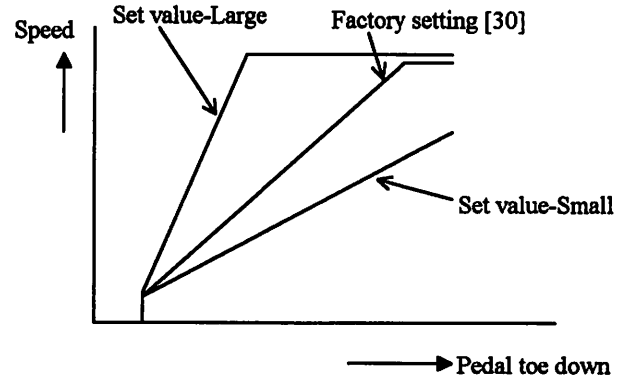
* Complete the [PDC] function setting.

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

Description

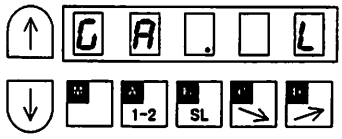
A. The curve amount of the speed change for the amount that
The curve amount of the speed change for the size of the set value can be set. The pedal is pressed can be set. To sew quickly at a high speed, increase the set value. To finely adjust the medium speed region, decrease the setting. The setting range is 10 to 99.
(factory setting is [30])

B. 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)

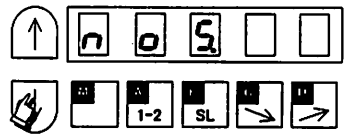


11. To run without the detector (when the detector is broken) ..... function setting [NOS.ON]

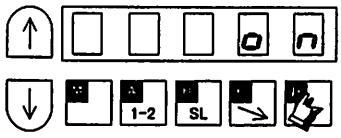
1) Enter program mode [A] ([↓] + [A])

2) 

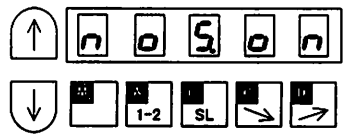
* Program mode [A] will be entered.

3) 

* Set function to [NOS].

4) 

* Set to [ON].

5) 

* Complete the [NOS] function setting.

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

Description

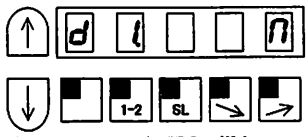
A. Only variable-speed operation will be possible. Set position stopping and thread trimming will not be possible

B. Each time the [D] key is pressed, the setting will alternate between [OF] and [ON]

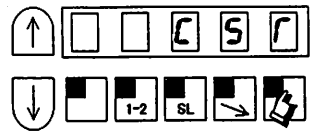
12. To adjust tacking accurately

(1) To adjust tacking surely ..... [D1. CST] + [CT. 10]
(To set the stop time at each tacking corner to 100 milliseconds)

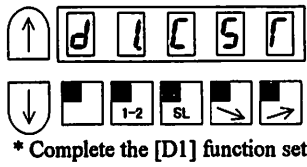
1) Enter program mode [D] ([↓] + [D])

2) 

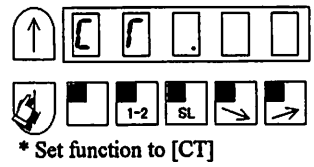
* Program mode [D] will be entered.

3) 

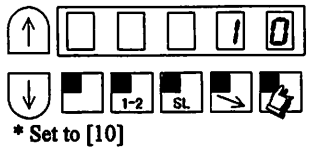
* Set to [CST]

4) 

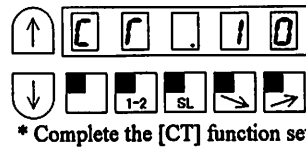
* Complete the [D1] function setting

5) 

* Set function to [CT]

6) 

* Set to [10]

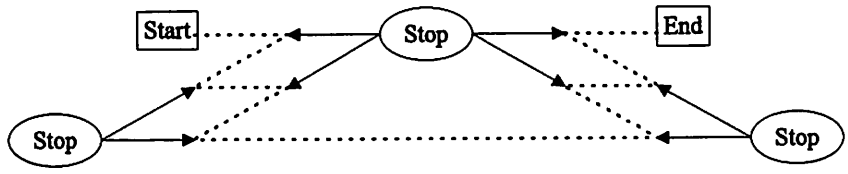
7) 

* Complete the [CT] function setting

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

Description

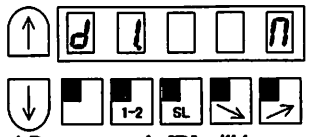
A. Set the type of start/end tacking and the no.of stitches before making the above setting.
B. For example, to carry out W tacking, the unit will stop at each corner for 100 milliseconds.



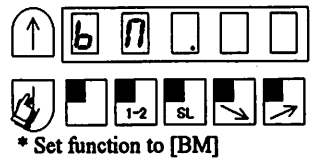
C. Each time the [D] key is pressed in step 3), the setting will change in the order of [M], [D], [CST], [CSU] and [CSD]. (factory setting is [M])
D. The setting range of the stop time is 0 to 990 milliseconds in 10-millisecond intervals.
The setting display 10 refers to 100 milliseconds, and 20 to 200 milliseconds. (factory setting is 50 milliseconds)
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]

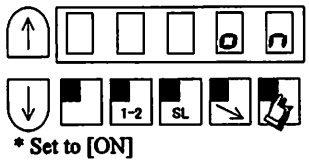
1) Enter program mode [D] ([↓] + [D])

2) 

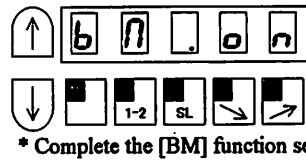
* Program mode [D] will be entered.

3) 

* Set function to [BM]

4) 

* Set to [ON]

5) 

* Complete the [BM] function setting

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

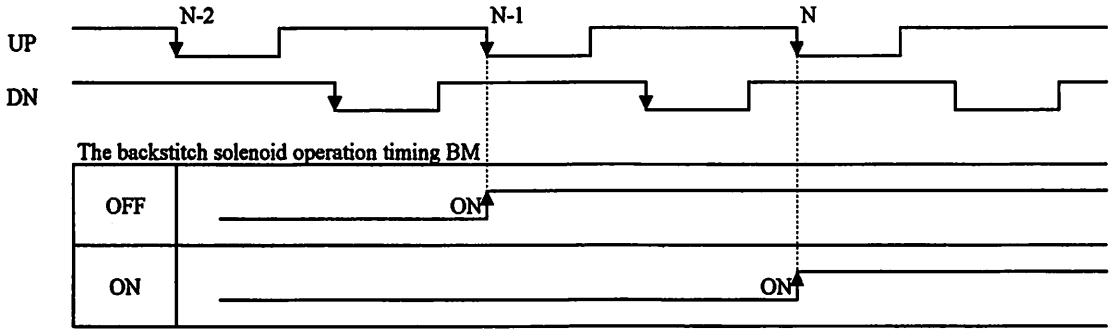
Description

A. Set function [BM] to [ON] when start/end tacking speed is less than 1000rpm
B. Set function [BM] to [OF] when start/end tacking speed is 1000rpm 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].)
D. XC-EN type has no tacking output.
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.

E. 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.)

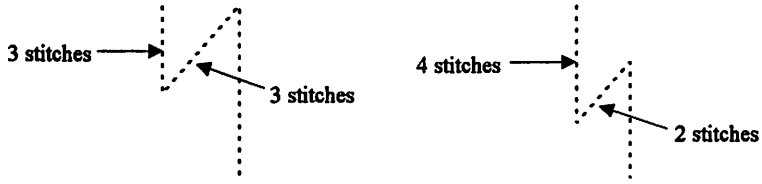
When "BM" is ON, the timing of backstitch solenoid turning ON is the setting number stitches.



(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]

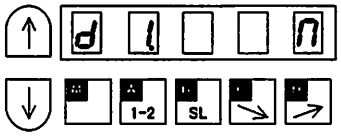
(Ex.) No. of start tacking set stitches　　Actual no. of stitches



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

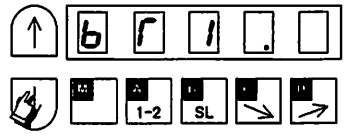
1) Enter program mode [D] ([↓] + [D])

2)

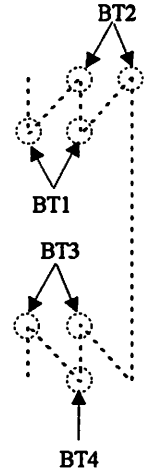


* Program mode [D] will be entered.

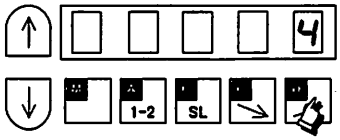
3)



* Set function to [BT1]

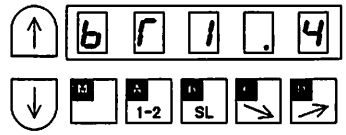


4)



* Set to [4]

5)



* Complete the [BT1] function setting

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

Description

A. In the above example, the four stitches are 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 shorter, 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 1/4	-2	-1 3/4	-1 2/4	-1 1/4	-1	- 3/4	- 2/4	- 1/4	0	+ 1/4	+ 2/4	+ 3/4	1	+1 1/4	+1 2/4

E. The no. of correction stitches set in BT1 is common for the start tack, V tack, N 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.

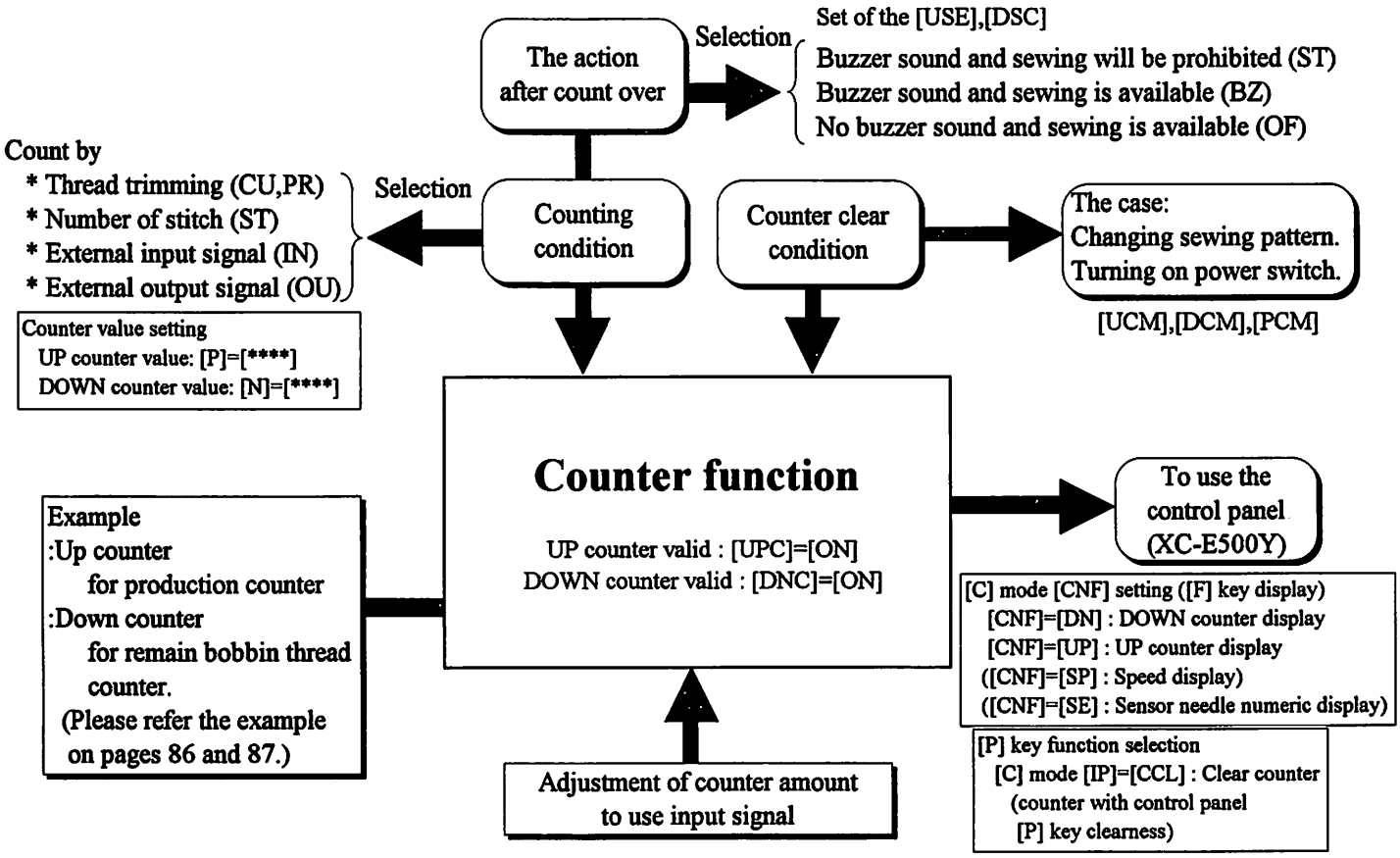
Note : 1.When the function setting [D1.CST] is to adjust tacking surely, this function setting [BT1.*] will be invalidated.

2.The setting of "BT2" "BT3" and "BT4" is as same as "BT1".

13. 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 amount "U" is add at each thread trimming.

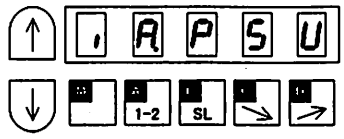
(2) When up counter amount "U" become the setting amount "P", sewing will be prohibited.

(3) When the input signal "I1" is turned on,

Up counter amount become zero and sewing become possible.

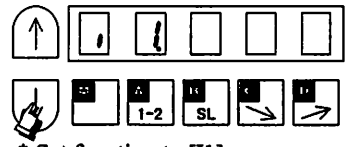
1) Enter program mode [C] ([↓]+[C])

2)



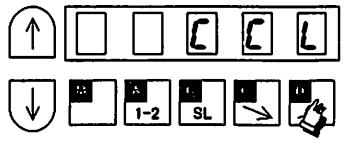
* Program mode [C] will be entered.

3)



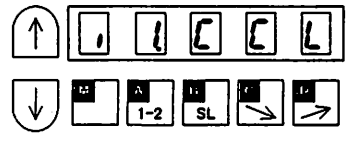
* Set function to [I1].

4)



* Set to [CCL].

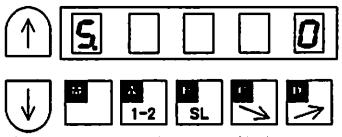
5)



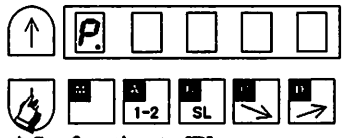
* Complete the [I1] function setting.

6) Return to the normal mode([↓]+[↑])

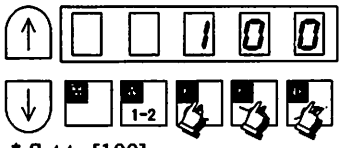
7) Enter program mode [B] ([↓]+[B])

8) 

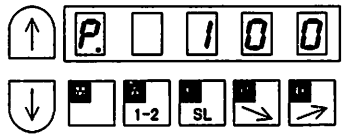
* Program mode [B] will be entered.

9) 

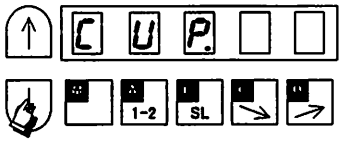
* Set function to [P].

10) 

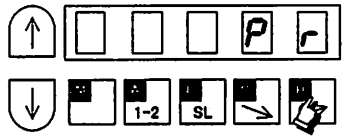
* Set to [100].

11) 

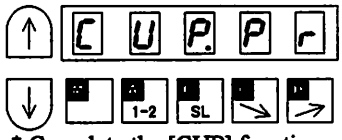
* Complete the [P] function setting.

12) 

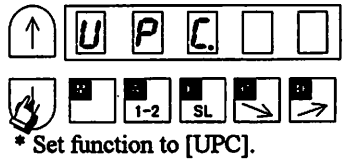
* Set function to [CUP].

13) 

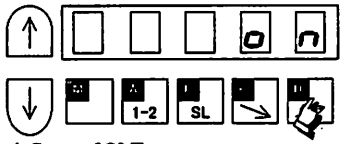
* Set to [PR].

14) 

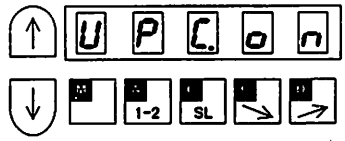
* Complete the [CUP] function setting.

15) 

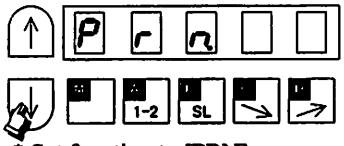
* Set function to [UPC].

16) 

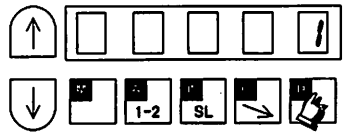
* Set to [ON].

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([↓]+[↑])

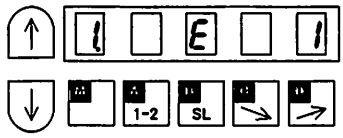
Description

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.

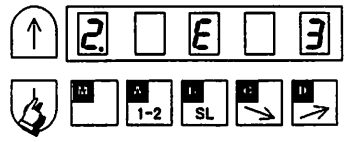
14. To check the error code history and input/output signal

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

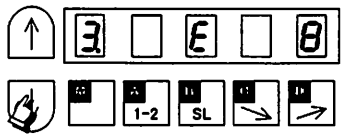
1) Enter program mode [E] ([↓] + [↑] + [A])

2) 

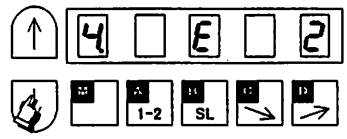
* The last error code is displayed.
(Ex. error code E1 is displayed.)

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.)

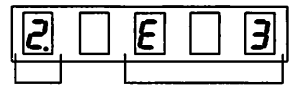
5) 

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

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

Description

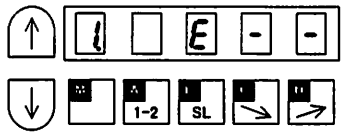
A. The last to fourth to last errors can be viewed.
B. Refer to page 140 for the error code.
C. The display is as in the right figure.



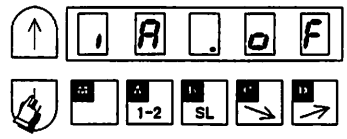
The record number of times Error code number

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

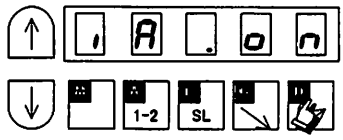
1) Enter program mode [E] ([↓] + [↑] + [A])

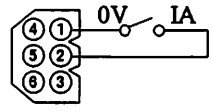
2) 

* Program mode [E] will be entered.

3) 

* Select input function to see

4) 

Option A 

* 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

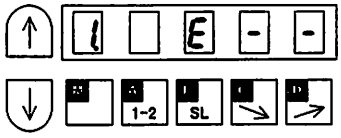
(5) Return to the normal mode ([↓] + [↑])

Description

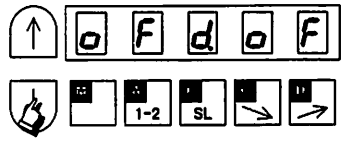
A. It is possible to check whether or not input signal is wired right.
When the display doesn't [ON] even if it turned ON a signal, check wiring to a control box from the signal.
B. The input terminal refer to the explanation of the input/output signal and input function name refer to a C mode input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

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

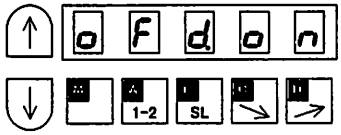
1) Enter program mode [E] ([↓] + [↑] + [A])

2) 

* Program mode [E] will be entered.

3) 

* Select output function to check.

4) 

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

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

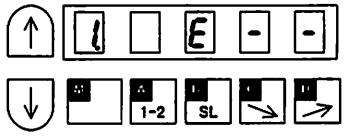
Caution
Be careful to sewing machine operation when turned ON
the signal which the sewing machine operation has relation

Description

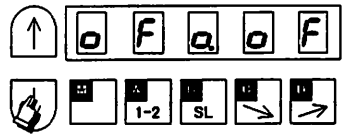
A. It is useful function for check a operation before wiring solenoid.
B. The input terminal refer to the explanation of the input/output signal and input function name refer to a [C] mode input signal setting table.
C. XC-EN has no output terminal.

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

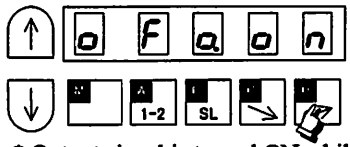
1) Enter program mode [E] ([↓] + [↑] + [A])

2) 

* Program mode [E] will be entered.

3) 

* Select output function to check.

4) 

* Output signal is turned ON while pressing the [D] key.
Note) While displaying this function, sewing machine can not operate.

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

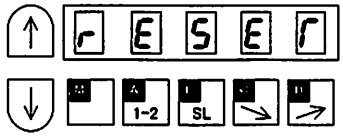
Description

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.
C. XC-EN type has no output terminal.

15. To return all settings to the factory settings ..... function setting [RESET]

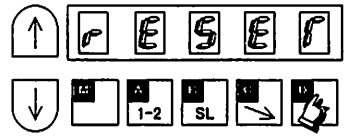
1) Enter program mode [R] ([↓] + [B] + [C])

2)



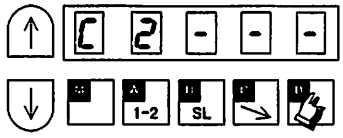
* Program mode [R] will be entered.

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. In this case, the settings will not be returned to the factory setting.

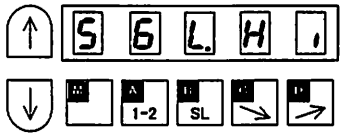
Caution

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.

16. To set the ON/OFF operation of the thread trimming protective signal (S6) ..... Function setting [S6L.LO]
(Ex. To stop the machine by short circuiting (ON) the thread trimming protective signal (S6).)

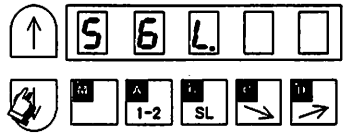
1) Enter program mode [P] ([↓] + [↑])

2)



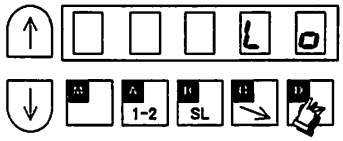
* Program mode [P] will be entered.

3)



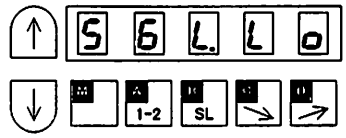
* Set function to [S6L].

4)



* Set to [LO].

5)

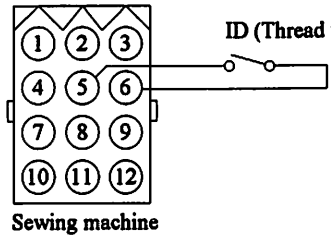


* The [S6L] function setting has been completed.

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

Description

A. The setting value will alternate between [HI] and [LO] with each press of the [D] key.
B. If the logic changeover [S6L] of the thread trimming protective signal [S6] is set to [HI], the sewing machine will stop when the signal (S6) opens (S6 turns off). This includes the constant open state. (The speed display on the operation panel will also stop when the sewing machine stops.)
C. If the logic changeover [S6L] of the thread trimming protective signal [S6] is set to [HI], the sewing machine will stop when the signal (S6) is short circuited (S6 turns on). This includes the constant short circuit state. (The speed display on the operation panel will also when the sewing machine stops.)
D. Connection example



Sewing machine

ID (Thread trimming protective signal S6)

[HI] setting.....Stops when S6 is open.
[LO] setting.....Stops when S6 is short circuited.

E. The simple setting value is [LO] during function settings [YC1] ~ [YC4], [BR1], [RM1], [SRB1] and [JMH].
During the other function setting [YU2] ~ [YU5], [YV10], [YV11], [NO1] ~ [NO8], [NOB], [NOC], [KA1] ~ [KA4], [UN1], [UN2], and [UN3] is [HI].

16 Table of Program Mode Functions

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name		Oper ability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
P mode ↓ + ↑	Maximum speed	H.	O	5000	4000	r/min	0~8999	H.	****	****	The maximum speed can be set.	74
	Low speed	L.	O	250	250	r/min	0~499	L.	***	***	The low speed can be set.	
	Thread trimming speed	T.	O	(200)	200	r/min	0~499	T.	***	***	The thread trimming speed to reach the needle UP position stop from the needle DOWN position during full heeling or when thread trimmer signal (S2) is turned ON can be set.	
	Start tacking speed	N.	O	(1700)	1700	r/min	0~2999	n.	****	****	The speed of start tacking can be set.	
	End tacking speed	V.	O	(1700)	1700	r/min	0~2999	u.	****	****	The speed of end tacking can be set.	
	Medium speed	M.	O	1700	1700	r/min	0~8999	M.	****	****	The medium speed can be set.	
	Slow start speed	S.	O	250	250	r/min	0~2999	S.	****	****	The slow start speed can be set.	
	No. of slow start stitches	SLN.	O	2	2	Stitches	1~5	SLn.	*	*	The No. of slow start stitches can be set. This is valid when the [B, SL] key is ON in the normal mode.	74
	Slow start operation mode	SLM.	O	T	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 (S0, S1) is 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	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	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	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.	80

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 machine after returning to the normal mode.

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
P mode ↓ + ↑	One shot operation mode SHM.	O	SH	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 at (1) and will restart at (2). (Alternate operation).	
								- L	RV	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 one shot signal (SH) is turned OFF.	
								- H	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.	
								- M	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.	
								- L	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.	
								A L	AV	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.)	
								A H	AH	The alternate operation of [RH] is executed.	
								A M	AM	The alternate operation of [RM] is executed.	
								A L	AL	The alternate operation of [RL] is executed.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification Note: It is not able to use for "XC-EN"	Ref. page
P mode ↓ + ↑	No. of stitches after PSU input	PSU.	O	0	0	Stitches	0~99	PSU.	**	**	The no. of stitches until stopping after the UP position priority stop signal PSU is input is set.	81
	No. of stitches after PSD input	PSD.	O	0	0	Stitches	0~99	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	PSN.	O	OF	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 signal (S0, S1) even if the sensor does not detect the fabric (even if PSU, PSD signals are ON).	
	Input sensor function valid / invalid	SEN.	O	OF	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	0	Stitches	0~99	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	OF Note1	OF	-	-	FUn.	on oF	ON OF	This is the momentary function of the presser foot lifting.	82
	FUM operation mode	FU.	O	M Note1	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.	82
									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 same 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	12 Note1	12	sec	1~99	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	176 Note1	176	msec	0~998	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.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting	Specification Note: It is not able to use for "XC-EN"	Ref. page
P mode ↓ + ↑	Full wave time of presser foot lifter output FO.	O	50 Note1	50	x10 msec	-	F 0.		The full wave time of the presser foot lifter output during [FU] operation can be set.	
								20 20	[20]: Full wave time 200mS	
								25 25	[25]: Full wave time 250mS	
								30 30	[30]: Full wave time 300mS	
								40 40	[40]: Full wave time 400mS	
								50 50	[50]: Full wave time 500mS	
								60 60	[60]: Full wave time 600mS	
								80 80	[80]: Full wave time 800mS	
								100 100	[100]: Full wave time 1 sec.	
	Delay time of presser foot signal S3 input S3D.	O	10 Note1	10	x10 msec	1~99	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 Note1	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]: 4ms ON/OFF, 50% duty	
								MF MF	Set to [MF]: 2ms ON/OFF, 50% duty	
								HI HI	Set to [HI]: 4ms ON,2ms OFF,66% duty	
								FL FL	Set to [FL] : 100% (full wave)	
								LO LO	Set to [LO]: 2ms ON, 4ms OFF, 33% duty	
	Presser foot lifting output when power is turned ON PFU.	O	ON Note1	ON	-	-	P F U.	o n ON o F OF	The presser foot lifting operation begins when power is turned ON. 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	ON Note1	OF	-	-	F L.	o n ON o F OF	The presser foot lifting operation after thread trimming with full heeling or the external thread trimmer signal S2 is prohibited. 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	ON Note1	OF	-	-	S 3 L.	o n ON o F OF	The presser foot lifting operation with light heeling is prohibited. 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	OF	-	-	S 2 L.	o n ON o F OF	The thread trimming operation and subsequent presser foot lifting operation with full heeling or external thread trimmer signal S2 is prohibited .	
	Thread trimming protection signal (S6) logical changeover S6L.	X	LO Note1	LO	-	-	S 6 L.		The operation can be changed when the thread trimming protection signal (S6) is turned Short/Open.	91
								HI HI	The sewing machine will stop when the input signal (S6) is Open.	
								LO LO	The sewing machine will stop when the input signal (S6) is Short.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

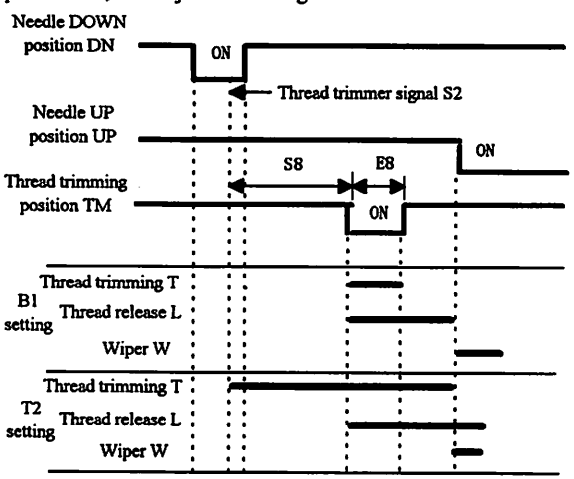
Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification **Note: It is not able to use for "XC-EN"** **Note2: It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation.**	Ref. page
P mode ↓ + ↑	Automatic operation	AT.	O	OF	OF	-	-	AT.	ON OF		Automatic operation (standing operation) can be set.	75
	Thread trimmer cancel	TL.	O	OF	OF	-	-	TL.	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 Note2	OF	-	-	TLS.	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	OF Note2	OF	-	-	RU.	ON OF		The motor is reverse run after thread trimming, and the needle will stop near the needle bar top dead point.	82
	RU reverse run angle	R8.	O	30 Note2	30	Degree	0~360	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 Note1	OF	-	-	TB.	ON OF		The thread is trimmed with reverse feed by driving the backstitch solenoid simultaneously with the thread trimmer solenoid.	
	Full heeling, S2 signal operation mode	S2R.	O	OF Note1	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		With full heeling or the external thread trimmer signal S2 after the needle UP position 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		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 presser foot lifting operation will operate after this.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting	Specification Note: It is not able to use for "XC-EN"	Ref. page
P mode ↓ + ↑	Cancel of interlock after full pedal heeling IL.	O	ON Note1	OF	-	-	IL.		This releases the restart operation prohibit command during thread trimming.	
								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	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	NO Note1	M1	-	-	TR.		The thread trimming timing for each manufacturer's thread trimming sewing machine can be set.	
								M1	Mitsubishi, Toyota, Seiko, Yakumo, Brother (excluding those noted below)	
								PRG	For free setting of the thread trimming.	
								NO	Not thread trimming sewing machine	
								KA1	Not used	
								KA2	Not used	
								KA3	Not used	
								KA4	Not used	
								KA5	Not used	
								KA6	Not used	
								KA7	Not used	
								KA8	Not used	
								KB1	Not used	
								KB2	Not used	
								KB3	Not used	
								KB4	Not used	
								B1	Brother, Models: 705, 715, 716	
								D1	(Durkopp Adler, Model 270)	
								J1	JUKI (Lock stitch type)	
								J2	JUK I(MH 471/474type) Note: Please check machine rotation direction!	
								N1	Not used	
								P1	Puff, Models: 463, 900	
								P2	Not used	
								P3	Not used	
								P4	Not used	
								T1	Toyota, Model: AD158	
								T2	Toyota, Model: AD3110	
								K	Chain stitch sewing machine Note: Please check machine rotation direction!	
								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.	

Caution

When setting for the B1 (Brother) or T2 (Toyota) machines, refer to the following thread trimming timing. Follow the sewing machine adjustment procedures, and adjust the setting.



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.)

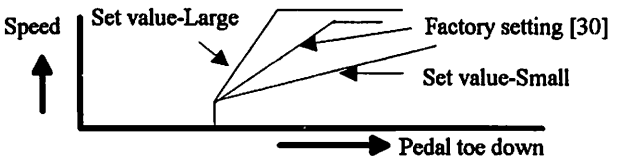
Caution

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.

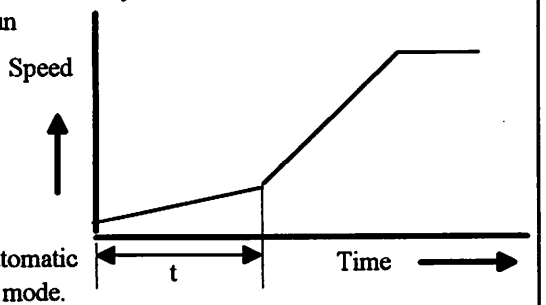
Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification **Note: It is not able to use for "XC-EN"**	Ref. page
P mode ↓ + ↑	Thread trimming validity at neutral pedal	POS.	O	OF Note1	OF	-	-	P o S.	o n o F	ON OF	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.	
	Operation when power is turned ON during 1 position setting	P1P.	O	OF	OF	-	-	P 1 P.	o n o F	ON OF	When 1 position is set with the [A, 1-2] key in the normal mode, the needle will left to the UP position if not in the UP position when the power is turned ON.	
	Operation when power is turned ON during 2 position setting	P2P.	O	OF	OF	-	-	P 2 P.	o n o F	ON OF	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.	
	Needle stop position before fabric	C8.	O	60	60	Degree	0~360	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	28	28	Degree	10~180	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	14	14	Degree	10~180	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	180	Degree	0~360	k 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 Note1	90	Degree	0~360	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 Note1	50	Degree	0~360	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	ON	-	-	S n M.	o n o F	ON OF	Input "SEN" is always valid Input "SEN" is only valid, when setting pattern is free sewing	
	Virtual down Setting	KD .	O	OF	OF	-	-	k d.	o n o F	ON OF	Sewing machine run without down signal. The angle between up and down position is set to "K8". The width is set at 60 degree automatically.	
	Virtual width of up and down signal	KDU.	O	OF	OF	-	-	k d U.	o n o F	ON OF	It set the up and down signal width to 60 degree automatically.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
A mode + 1-2	Gain high/low selection GA.	O	L	L	-	-	G. A.			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.	
								L L	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	30	-	10~99	P d C.	**	**	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. 	83
	Acceleration time simple setting AC.	O	M	M	-	-	A C.			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] : 100mS	
								M	M	[M] : 140mS	
								L	L	[L] : 240mS	
								-	-	[-] : The time set in the next acceleration time ACT is used.	
	Acceleration time ACT.	O	14	14	x10 msec	6~99	A C T.	**	**	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	M	-	-	d C.			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 easily.	
								H	H	[H] : 90mS	
								M	M	[M] : 160mS	
								L	L	[L] : 230mS	
								-	-	[-] : The time set in the next deceleration time DCT is used.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification **Note: It is not able to use for "XC-EN"**	Ref. page
A mode + 1-2	Deceleration time	DCT.	O	16	16	x10 msec	6~99	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	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	7	x10 msec	0~99	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 Note1	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	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	70	mm	20~349	Mr.	***	***	Set the diameter of motor pulley When "PL" is "ON", this function is valid.	
	Setting sewing machine pulley diameter	SR.	O	70	70	mm	20~349	Sr.	***	***	Set the diameter of sewing machine pulley When "PL" is "ON", this function is valid.	

Caution
The factory setting [16] refers to [16x10 milliseconds = 160 milliseconds].

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
A mode + 1-2	No detector mode	NOS.	O	OF	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.	83
	Motor maximum speed	MSP.	O	36	36	x100 r/min	-	MSP.			The motor's maximum speed can be set.	
									36	36	Set to [36]: 3600r/min	
									40	40	Not used	
	First priority stop => speed control	STM.	O	OF	OF	-	-	STM.	on oF	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	14	x10 msec	0~99	bkT.	**	**	The brake time for stopping the sewing machine can be set.	
	Weak brake angle	B8.	O	14	14	x0.1 Degree	4~500	b8.	***	***	Setting the angle to clear weak break. Minimum setting angle is 0.2 degree.	
	Reduction of weak brake sound	BNR.	O	ON	ON	-	-	bnr.	on oF	ON OF	Reducing the sound (noise) of weak brake.	
	Weak brake force	BKS.	O	99	99	%	0~99	bkS.	**	**	The weak brake force can be set.	
	Weak brake mode	BKM.	O	E	E	-	-	bkM.			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	OF	-	-	bk.	on oF	ON OF	The weak brake validity can be set.	75

Caution
The factory setting [14] refers to [14 x 0.1 degree = 1.4 degree].

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	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	99	-	0~9999	n.	****	****	Setting the number of down counter.	
	Down counter display count amount D.	O	99	99	-	0~9999	d.	****	****	Display the number of current down counter.	
	Up counter setting count amount P.	O	99	99	-	0~9999	P.	****	****	Setting the number of up counter.	
	Up counter display count amount U.	O	0	0	-	0~9999	U.	****	****	Display the number of current up counter.	
	Up counter the selection of setting mode CUP.	O	CU	CU	-	-	C U P.			Selection of count up 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 function "IO1" 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.)	
	Up counter the selection of counter operation USC.	O	ST	ST	-	-	U S C.			Selection of operation count over. (Up counter)	
								S T	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 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.)	
	Up counter changing sewing pattern UCM.	O	OF	OF	-	-	U C n.	o n	ON	When sewing pattern is changed, it clear "up counter". (UCM=ON)	
								o F	OF		
	Up counter valid / invalid UPC.	O	OF	OF	-	-	U P C.	o n	ON	The up counter is valid. (UPC= ON)	
								o F	OF		

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
B mode + SL	Up counter operation after counting over NXU.	O	OF	OF	-	-	n1U.			The Up counter operation, after counting over. (it is valid, when [USC] is set to "OF", "BZ".	
								on	ON	The display shows the setting number and the counting is stopped.	
								oF	OF	The display shows the setting number and the counting is continued.	
	Down counter the selection of setting mode CDN.	O	CU	CU	-	-	Cdn.			Selection of count down condition.	
								CU	CU	After thread trimming is finished	
								SF	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 input function "IO1" 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.)	
	Down counter the selection of counter operation DSC.	O	ST	ST	-	-	dSC.			Selection of operation at count over. (Down counter)	
								SF	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 setting of counter clear key is "P" key on control panel.)	
								oF	OF	Sewing is possible to continue without buzzer sound.	
								bE	BZ	Sewing is possible to continue with buzzer sound. (Buzzer will stop after a while.)	
	Down counter changing sewing pattern DCM.	O	OF	OF	-	-	dCn.	on	ON	When sewing pattern is changed, it clear "down counter". (DCM=ON)	
								oF	OF		
	Down counter valid / invalid DNC.	O	OF	OF	-	-	dnC.	on	ON	The down counter is valid. (DNC= ON)	
								oF	OF		
	Down counter operation after counting over NXD.	O	OF	OF	-	-	n1d.			The down counter action, after counting over. (it is valid, when [DSC] is set to "OF", "BZ".	
								on	ON	The display shows "0" and the counting is stopped.	
								oF	OF	The display shows "-" and the counting is continued.	

Note: For the EN, please read the "thread trimming" expression as "needle lifting".

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
B mode ↓ + SL	Counter condition turning on power switch PCM.	O	OF	OF	-	-	PCN.			When power switch is turned on,	
								on	ON	Up counter is clear (zero) and down counter is set the setting number.	
								oF	OF	Both counter keep previous amount.	
	Setting Thread trimming times "N" PRN.	O	0	0	times	0~99	PrN.	**	**	When "CUP" and "CDN" are PR, trimming times "N" is set.	
	Setting Number of stitches "N" CNU.	O	1	1	stitches	1~99	CnU.	**	**	When "CUP" and "CDN" are ST, number of stitch "N" is set.	
	Count modification (to use IO1, IO2) CCI.	O	OF	OF	-	-	CC.			Modification of count amount.	
								on	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".)	
								oF	OF	Modification is prohibited.	
	Display condition turning on power switch PMD.	O	OF	OF	-	-	PMd			Selection display mode, when power switch is turned on.	
								on	ON	When power switch turn on, display shows previous condition. (Keep previous condition)	
								oF	OF	When power switch turn on, display shows normal mode.	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
C mode	Selection of input signal function I1.~I7. IA.~IP.	X	*	*	-	-	I1. : I7. IA. : IP.	***	***	The input functions of each input signal I1 to I4 and IA to IO can be selected from 62 types of functions. 1.Refer to the C mode input signal setting table of the pages 127 to 130. 2.Refer to the Conception figure of input and output customization of the pages 133 to 135.	76 77 79 80 81

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

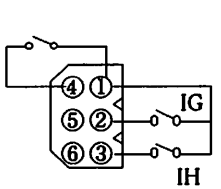
Table of each input signal and connector pin connection and factory setting correspondence
Input signal [IP] is [CCL] key on control panel.

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

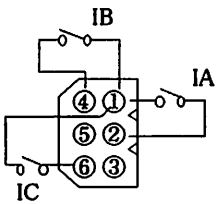
Input signal	IF	IG	IH	II
Factory setting	F	S1	S2	S3

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

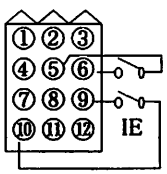
Caution
Input signal [I4,I5,I6,I7] are dual port of input and output.
So when these input signal will be used, output signal have to be set to "NO".



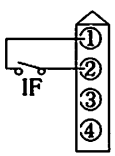
(Lever connector)
IG:S1(Variable speed run signal)
IH:S2(Thread trimmer signal)
II:S3(Presser foot lifter signal)



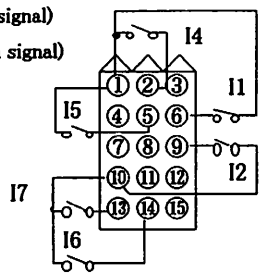
(Option A connector)
IA:PSU(Needle UP position priority stop signal)
IB:PSD(Needle DOWN position priority stop signal)
IC:S0(Low speed run signal)



(Sewing machine connector)
ID:TL(Thread trimmer cancel signal)
IE:S7(Backstitching during run signal)



(Presser foot lifter connector)
IF:F(Presser foot lifter signal)



(Option B connector)
I1:IO1(Signal output to virtual output 1)
I2:U(Needle lift signal)
I4:NO(No setting)
I5:NO(No setting)
I6:NO(No setting)
I7:NO(No setting)

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
C mode + G	Input signal logical changeover function I1L.~I7L. IAL.~IPL.	X	OF	OF	-	-	I1L. : I7L. IAL. : IPL.	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.~I7A. IAA.~IPA.	X	OF	OF	-	-	I4A. : I7A. IAA. : IPA.	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). (This is hereafter referred to alternate operation.) **Caution** Set CPK to ON when using the function I6A	
	Setting the function for I1 and I2 I1M.~I2M.	X	NO	NO	-	-	I1M. : I2M.	 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	OF	-	-	I1O.	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	OF	-	-	I1F.	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.~I2C.	X	OF	OF	-	-	I1C. : I2C.	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.~2CT.	O	0	0	100 msec	0~99	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	OF	-	-	F1P.	ON OF	The input signal I1 virtual F/F (flip-flop) operation is turned 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	OF	-	-	F1C.	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	OF	-	-	F1S.	ON OF	The input signal I1 virtual F/F (flip-flop) operation is turned ON when the tacking starts or after thread trimming.	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
C mode +	Set condition of RS F/F for I1 and I2 R1S.~R2S.	X	IN	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.	
								T	T	After thread trimming operation (stop to up position.)	
								R	R	When motor start, RS F/F will be set.	
								S	S	When motor stop, RS F/F will be set.	
								TR	TR	When sewing start, after 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.~R2R.	X	IN	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 I7.	
								T	T	When thread trimming is done (stop to up position.)	
								R	R	When motor start, RS F/F will be reset.	
								S	S	When motor stop, RS F/F will be reset.	
								TR	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.~R2N.	O	3	3	Stitches	0~99	r1n. : r2n.	**	**	When [R1R] or [R2] set [NC], the number of stitch is set by this counter.	
	Selection of output signal function OA.~OD. OF. O1.~O7. OJ.~OK.	X	*	*	-	-	oA. : od. oF. o1. : o7. oJ. : oK.	***	***	The output functions of each output signal OA to OD, OF, OJ to OK and O1 to O7 can be selected from 39 types of functions. 1.Refer to the C mode input signal setting table of the pages 131 to 132. 2.Refer to the Conception figure of input and output customization of the pages 133 to 135. **Caution** Output signal OE is not available. Set CPK to ON when using the function O6.	78 79

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
C mode +	Selection of output signal function OO.~OP.	X	*	*	-	-	oo : oP	***	***	The output functions of each output signal OO to OP can be selected from 39 types of functions. 1.Refer to the C mode input signal setting table of the pages 131 to 132. 2.Refer to the Conception figure of input and output customization of the pages 133 to 135.	
	Output signal logical changeover function OAL.~ODL. OFL. O1L.~O7L.	X	OF	OF	-	-	oAL : odL oFL o1L : o7L	on oF	ON OF	The output logic of each output signal OA to OD, OF and O1 to O7 is reversed.	

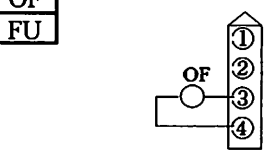
Caution

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

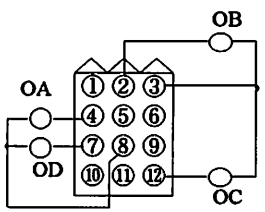
Output signal	OA	OB	OC	OD	OF
Factory setting	T	W	B	L	FU

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

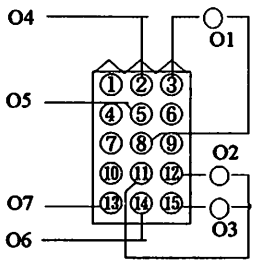
Output signal	O5	O6	O7
Factory setting	NO	NO	NO



(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)

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".

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
C mode +	Output signal logical changeover function OJL.~OKL. OOL.~OPL.	X	OF	OF	-	-	oJL. : oKL. oOL. : oPL.	on oF - -	ON OF	The output logic of each output signal OJ to OK, and OO to OP is reversed.	
	Output chopping function OAC.~ODC. O1C.~O3C.	X	OF	OF	-	-	oAC. : odC. o1C. : o3C.	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.	78
	Output signal forced OFF function OAT.~ODT. O1T.~O7T. OJT.~OKT. OOT.~OPT.	X	OF	OF	-	-	oAT. : odT. o1T. : o7T. oJT. : oKT. ooT. : oPT.	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.~DD. DF.	X	0	0	x20 msec	0~508	dA. : 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.	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
C mode +	Output signal delay time setting function D1.~D7. DJ.~DK. DO.~DP.	X	0	0	x20 msec	0~ 508	d 1. : d 7. d J. : d K. d O. : d P.	***	***	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 20ms intervals.	
	Presser foot lifter output chopping duty FUD.	X	MF	MF	-	-	F U d.			The chopping output duty during holding after the presser foot lifter output FU lifting operation can be set.	
								n S.	MS	Set to [MS]: 4ms ON/OFF 50% duty	
								n F	MF	Set to [MF]: 2ms ON/OFF 50% duty	
								H i	HI	Set to [HI] : 4ms ON, 2ms OFF, 66% duty	
								F L	FL	Set to [FL]: 100% (full wave)	
								L o	LO	Set to [LO]: 2ms ON, 4ms OFF 33% duty	
	Presser foot lifter FU full wave output time FO.	X	50	50	x10 msec	-	F O.			The full wave output time of the presser foot lifter output FU can be set.	
								2 0	20	Set to [20]: 200ms	
								2 5	25	Set to [25]: 250ms	
								3 0	30	Set to [30]: 300ms	
								4 0	40	Set to [40]: 400ms	
								5 0	50	Set to [50]: 500ms	
								6 0	60	Set to [60]: 600ms	
								8 0	80	Set to [80]: 800ms	
								1 0 0	100	Set to [100]: 1000ms	
	Presser foot lifter FU momentary mode FU.	X	M	M	-	-	F U.			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.	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name Digital display	Setting		Specification	Ref. page
C mode	Presser foot lifter FU momentary mode	FU.	X	M	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	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]: 200ms	
									25	25	Set to [25]: 250ms	
									30	30	Set to [30]: 300ms	
									40	40	Set to [40]: 400ms	
									50	50	Set to [50]: 500ms	
									60	60	Set to [6O]: 600ms	
									80	80	Set to [80]: 800ms	
									100	100	Set to [100]: 1000ms	
	Output chopping duty except of FU output	POD.	O	MF	MF	-	-	P o d.			Setting output chopping duty ,except FU output	
									MS	MS	Set to [MS]: 4ms ON/OFF 50% duty	
									MF	MF	Set to [MF]: 2ms ON/OFF 50% duty	
									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	12	sec	1~24	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	12	sec	1~99	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	NO	-	-	A n.	***	***	Select input function to the logic input [AND]. Input function is select on "output signal setting table" (pages 131 to 132) Refer to "The composition figure of input and output customization" about [AND] setting. (Pages 133 to 135)	
	Logic [AND] input setting of Hi /Low logic	ANL.	X	OF	OF	-	-	A n L.	o n	ON	[AND] input logic is set to opposite	
									o F	OF	Refer to "The composition figure of input and output customization" about [AND] setting. (Pages 133 to 135)	
	Logic [AND] input Alternate	ANA.	X	OF	OF	-	-	A n A.	o n	ON	[AND] input is set to alternative.	
									o F	OF	Refer to "The composition figure of input and output customization" about [AND] setting. (Pages 133 to 135)	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
C mode +	Logic [AND1/2/3] output selecting output function N1.~N3.	X	HI	HI	-	-	n1. : n3.	***	***	Select output function of [AND1/2/3] Refer to "The composition figure of input and output customization" about [AND] setting. (Pages 133 to 135)	
	Logic [AND1/2/3] output setting of Hi /Low logic N1L.~N3L.	X	OF	OF	-	-	n1L. : n3L.	on oF	ON OF	[AND1/2/3] output logic is set to opposite Refer to "The composition figure of input and output customization" about [AND] setting. (Pages 133 to 135)	
	Logic [OR] input selecting input function OR.	X	NO	NO	-	-	or.	***	***	Select input function to logic input [OR] Input function is select on "output signal setting table". (pages 131 to 132) Refer to "The composition figure of input and output customization" about [OR] setting. (Pages 133 to 135)	
	Logic [OR] input setting of Hi /Low logic ORL.	X	OF	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 133 to 135)	
	Logic [OR] input Alternate ORA.	X	OF	OF	-	-	orA.	on oF	ON OF	[OR] input is set to Alternate Refer to "The composition figure of input and output customization" about [OR] setting. (Pages 133 to 135)	
	Logic [OR1/2/3] output selecting output function R1.~R3.	X	NO	NO	-	-	r1. : r3.	***	***	Select output function of [OR1/2/3] Refer to "The composition figure of input and output customization" about [OR] setting. (Pages 133 to 135)	
	Logic [OR1/2/3] output setting of Hi /Low logic R1L.~R3L.	X	OF	OF	-	-	r1L. : r3L.	on oF	ON OF	[OR1/2/3] output logic is set to opposite Refer to "The composition figure of input and output customization" about [OR] setting. (Pages 133 to 135)	
	Variable speed command for digital input CSP.	X	OF	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	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	OF	-	-	Lb.	on oF	ON OF	Thread release output L will turn ON even while backstitch output B is ON.	
	Virtual output (OT1 ~ OT3) forced OFF function T1C.~T3C.	O	OF	OF	-	-	t1C. : t3C.	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].	

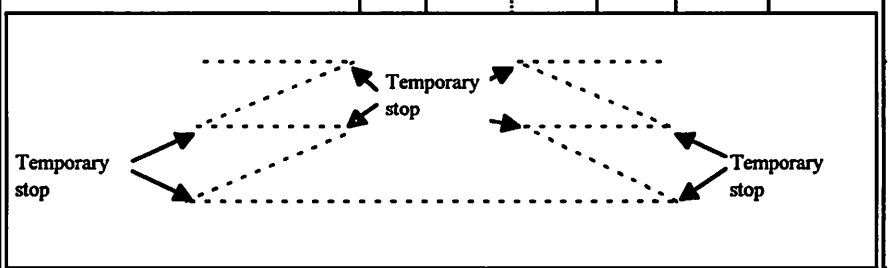
Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name		Operability	Factory setting EN	Factory setting EMF	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
C mode +	Forced OFF timer setting function for virtual outputs (OT1 ~ OT3)	T1T.~T3T.	O	99	99	x10 msec	0~99	T1T. : T3T.	**	**	The timer time for forcibly turning OFF virtual outputs OT1 to OT3 can be set.	
	Feed pulse output (CP) cancel function	CPK.	O	ON	ON	-	-	CPK.	on oF	ON OF	Feed pulse [CP] is invalid. When feed pulse will be used, set this function to "OF" This signal output is from the same pin of "I6" and "O6".	
	Setting CP pulse amount	CP.	O	32	32	-	1~ 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	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	OF	-	-	PSW.	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 term	CKB.	O	OF	OF	-	-	CKB.	on oF	ON OF	Output signal "CKD" is prohibited during backtack term.	
	CP output cancel during backtack term	CPB.	O	OF	OF	-	-	CPB.	on oF	ON OF	Output signal "CP" is prohibited during backtack term.	
	CKD output cancel	CKK.	O	OF	ON	-	-	CKK.	on oF	ON OF	Output signal "CKD" is prohibited	
	F key function on control panel	CNF.	O	SE	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	

Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name Digital display	Setting	Specification	Ref. page
D mode +	Operation mode during tacking D1.	O	M	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 CST	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.	84
								C S U CSU	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.



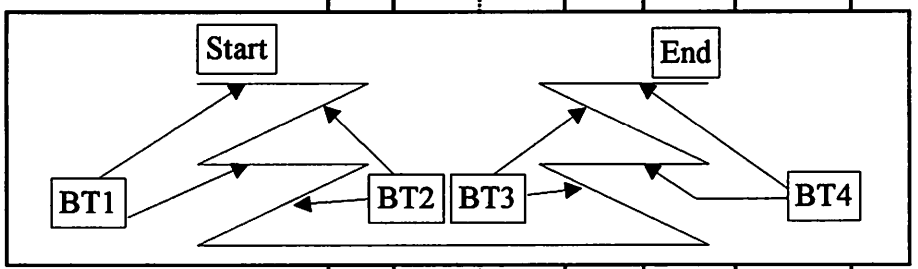
Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name		Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode +	Operation mode during start tack completion	D2.	O	CON	CON	-	-	d2.			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.	
									TRM	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	5	x10 msec	0~99	CT.	**	**	The stop time at each corner during tacking can be set when [CST] in operation mode D1 is set. [CSU],[CSD]	84
	Tack alignment	BM.	O	OF	OF	-	-	bM.			The backstitch solenoid operation timing can be set to align the tacking.	
									on	ON	Set to [ON] : Tacking speed less than 1000 rotations	84
									oF	OF	Set to [OFF]: Tacking speed 1000 rotations or more	
	No. of stitch compensation for start tacking alignment	BT1.	O	0	0	-	0~F	bT1.	*	*	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.	85
	No. of stitch compensation for start tacking alignment	BT2.	O	0	0	-	0~F	bT2.	*	*	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.	85
	No. of stitch compensation for end tacking alignment	BT3.	O	0	0	-	0~F	bT3.	*	*	By finely adjusting the backstitch solenoid operation timing of end 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.	85

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.

Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
D mode ↓ +	No. of stitch compensation for end tacking alignment BT4.	O	0	0	-	0~F	bT4.	*	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.	85
	No. of tacking stitches (+) 15 stitches function BTP.	O	OF	OF	-	-	bTP.	on oF	ON 15 stitches are added to the set No. of start and end tacking stitches. OF 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.		0	0	-	0~99	bTo.	**	** [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	ON	-	-	bTT.	on oF	ON If full heeling is performed immediately after start tacking stops, OF end tacking will not be performed, and the sewing machine will stop after thread trimming.	



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.

Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name		Opera bility	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting		Specification	Ref. page
D mode +	The speed operation mode when both the medium speed signal and S5V signal is ON	SPN.	O	OF	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 S5V is ON, the speed operation mode can be set.	
									0 n	ON	If both the medium speed signal (S5, SPM) and the end tacking speed run signal (S5V) is ON, the speed will be the start tacking speed N.	
									0 F	OF	If both the medium speed signal (S5, SPM) and the end tacking speed run signal (S5V) is ON, the speed will be the end tacking speed V.	
	Set table types of tacking	BTM.	O	6	6	-	1~7	bTM.			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	OF	-	-	S7M.	0 n	ON	If the backstitch related inputs are turned ON during preset stitching, the backstitch solenoid will turn ON.	
									0 F	OF		
	Manual backstitch ON timing 1	S7U.	O	OF	OF	-	-	S7U.	0 n	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.)	
									0 F	OF		
	Manual backstitch ON timing 2	S7D.	O	OF	OF	-	-	S7d.	0 n	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.)	
									0 F	OF		

Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	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	OF	-	-	7bd.	0n 0F	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	OF	-	-	btn.			The maximum tacking stitches can be set.	
								0n	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.	
								0F	OF	The No. of maximum tacking stitches is 15 stitches.	
	No. of end tacking stitches during direct heeling BCC.	O	OF	OF	-	-	bcc.	0n 0F	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	OF	-	-	tls.	0n 0F	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	ON	-	-	bts.			The tacking cancel signal [BTL] operation is set.	
								0F	OF	Tacking is prohibited while the tacking cancel signal [BTL] is ON.	
								0n	ON	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	OF	-	-	bs.			The start and end tacking cancel signals SE and EB operations are set.	
								0F	OF	The start tacking operation is prohibited while the start tacking cancel signal SE is ON. (Same for end tacking cancel signal EB.)	
								0n	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.)	

Note) It is possible to set for "XC-EN", but no output signal. So only use the function of sewing machine rotation

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
D mode +	Operation when input signal BTL is ON	BTD.	O	OF	OF	-	-	btF	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	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	OF	-	-	PnE	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	ON	-	-	bE	on oF	ON OF	The buzzer of control panel will be validate.	

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
E mode + + 1-2	Error code 1. (The last error code)	O	E--	E--	-	-	1.	E - - E--	The last error code is displayed. Refer to page 140 for the error codes.	88
	Error code 2. (The second to last code)	O	E--	E--	-	-	2.	E - - E--	The second to last code is displayed. Refer to page 140 for the error codes.	88
	Error code 3. (The third to last code)	O	E--	E--	-	-	3.	E - - E--	The third to last code is displayed. Refer to page 140 for the error codes.	88
	Error code 4. (The fourth to last code)	O	E--	E--	-	-	4.	E - - E--	The fourth to last code is displayed. Refer to page 140 for the error codes.	88
	Total integration time of power on P.	O	0	0	x10 hours	0~ 9999	P.	**** ****	Display total integration time of power on	
	Total integration time of motor run M.	O	0	0	x10 hours	0~ 9999	M.	**** ****	Display total integration time of motor run	

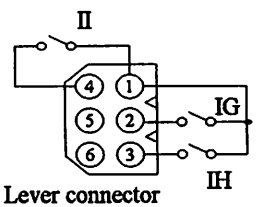
Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
E mode + + 1-2	Input display IA.~IP. I1.~I7.	O	-	-	-	-	PA. : PP. P1. : P7.	on ON / oF OF	The input status (ON/OFF) of the input signal IA ~ IP and I1 ~ I7.	88

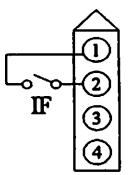
Correspondence of the display and input signal

Input signal (Factory setting)		Display
Variable speed run signal	(S1)	IG
Thread trimming	(S2)	IH
Presser foot lifter	(S3)	II
Presser foot lifter signal	(F)	IF
Thread trimmer cancel signal	(TL)	ID
Backstitching signal	(S7)	IE
Needle UP position priority stop signal	(PSU)	IA
Needle DOWN position priority stop signal	(PSD)	IB
Low speed run signal	(S0)	IC
Input signal	(IO1)	I1
Needle lift signal	(U)	I2
No setting	(NO)	I4
No setting	(NO)	I5
No setting	(NO)	I6
No setting	(NO)	I7

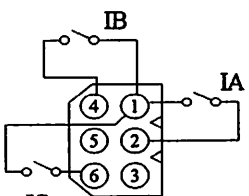
Caution



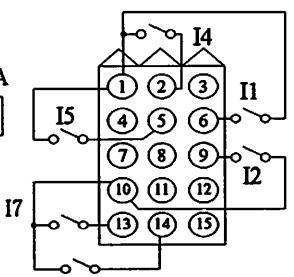
Lever connector



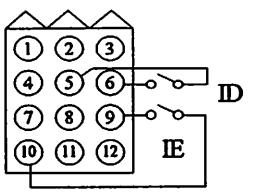
Presser foot lifter connector



Option A connector



Option B connector

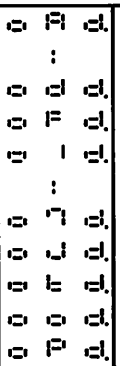


Sewing machine connector

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
E mode ↓ + ↑ + 1-2	Encoder signal display (A phase) ECA.	O	-	-	-	-	ECA.	on ON oF OF	The input status (ON/OFF) of the motor encoder A phase is displayed.	88
	Encoder signal display (B phase) ECB.	O	-	-	-	-	ECb.	on ON oF OF	The input status (ON/OFF) of the motor encoder B phase is displayed.	88
	Detector signal display (UP signal) UP.	O	-	-	-	-	UP.	on ON oF OF	The input status (ON/OFF) of the detector UP signal is displayed.	88
	Detector signal display (DOWN signal) DN.	O	-	-	-	-	dn.	on ON oF OF	The input status (ON/OFF) of the detector DN signal is displayed.	88
	Display the angle from down position DR.	O	-	-	x2 Degree	0~ 180	dr.	on ON oF OF	Display the angle of current position from down position.	
	Display the voltage of VC1 PD.	O	-	-	-	0~ 3FF	Pd.	*** ***	The numerical value that is equivalent to the variable speed voltage VC with the pedal toe down is displayed. Display range: 000 ~ 3FF	
	Display the voltage of VC2 VC.	O	-	-	-	0~ 3FF	uC.	*** ***	The numerical value that is equivalent to the variable speed voltage VC with the option B connector is displayed. Display range: 000 ~ 3FF	

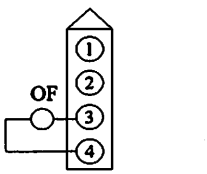
Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
E mode (↓ + ↑ + 1-2)	Output signal display OAD.~ODD. OFD. O1D.~O7D. OJD. OKD. OOD. OPD.	O	-	-	-	-		ON OF	The output status (ON/OFF) of the output signal OA ~ OD, OF, O1 ~ O7, OJ, OK, OO, OP. Note : When CPK is OFF on [C] mode, the O6D function is invalidated on [E] mode.	89

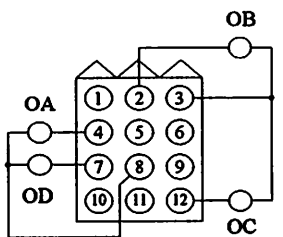
Caution

Correspondence of the display and output signal

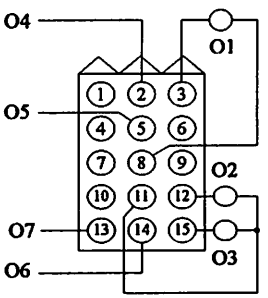
Output signal (Factory setting)		Display
Thread trimming output	(T)	OAD
Wiper output	(W)	OBD
Backstitch output	(B)	OCD
Thread release output	(L)	ODD
Presser foot lifter output	(FU)	OFD
Virtual output 1	(OT1)	O1D
Output for needle cooler	(NCL)	O2D
TF output	(TF)	O3D



Presser foot lifter connector



Sewing machine 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.

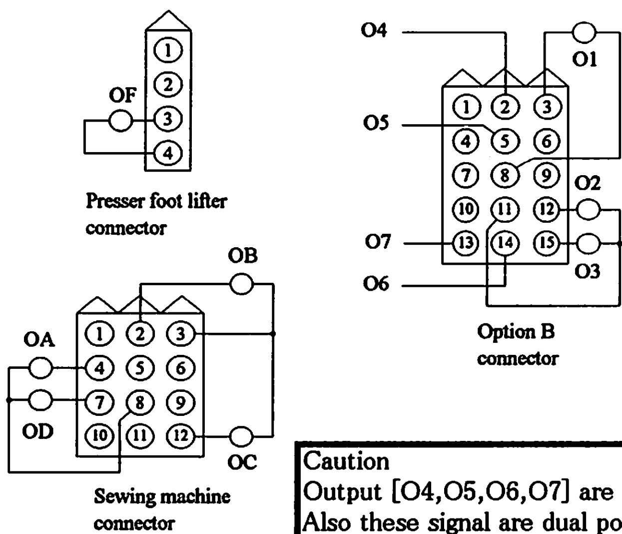
Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Digital display	Setting	Specification	Ref. page
E mode	Solenoid output OAO.~ODO. OFO. O1O.~O7O. OJO. OKO. OOO. OPO.	X	-	-	-	-	oAo. : odo. oFo. o1o. : o7o. oJo. oKo. ooo. oPo.	on ON oF 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.	89

Caution

Correspondence of the display and output signal

Output 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 output 1 (OT1)	O1O
Output for needle cooler (NCL)	O2O
TF output (TF)	O3O



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

Note) XC-EN: There are no "Foot lifter", "Option B"," Sewing machine" connector, so these input/output signals are not available to use.

Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name (Digital display)	Setting		Specification	Ref. page
E mode ↓ + ↑ + 1-2	Rated output display WT.	O	**	**	Watt	-	WT.			The motor's rated output value is displayed.	
								55	55	[05] refers to 550W.	
								75	75	[07] refers to 750W.	
	Voltage display VL.	O	***	***	Volt	-	VL.			The rated input voltage value in the control box is displayed.	
								100	100	[100] refers to 100V class.	
								200	200	[200] refers to 200V class.	
	Model display TP.	O	N	MF	-	-	TP.			The control box model name is displayed.	
								N	N	XC-EN	
								MFY	MFY	XC-EMFY	
	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.	

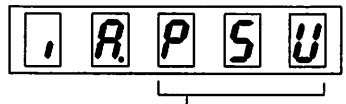
Mode name	Function name	Operability	Factory setting EN	Factory setting EMFY	Unit	Setting range	Function name / Setting: Digital display	Specification	Ref. page
R mode ↓ + SL + C	Reset RESET.	X	-	-	-	-	r E S E t.	The EEPROM data is returned to the EEPROM back up state. This is used return the function setting to the factory settings.	90
1 mode ↓ + 1-2 + SL	Simple setting for Mitsubishi thread trimming sewing machine	X	X	280M	-	-		Refer to the simple setting values for the Mitsubishi thread trimming sewing machine on the pages 24 to 25. **Caution** All function setting other than the simple setting values will be reset to the factory setting.	24
2 mode ↓ + C + D	Simple setting for chain stitch sewing machine	X	X	-	-	-		Refer to the simple setting table for chain stitch sewing machine on the pages 31 to 57. **Caution** All function setting other than the simple setting values will be reset to the factory setting.	31
3 mode ↓ + 1-2 + D	Simple setting for lock stitch sewing machine (DÜRKOPP ADLER, SINGER etc.)	X	X	-	-	-		Refer to the simple setting table for lock stitch sewing machine on the pages 58 to 70. **Caution** All function setting other than the simple setting values will be reset to the factory setting.	58

17 Table of input/output function for signal on C mode

EN EMFY

C mode input signal setting table

<Example> Input signal



No.	Setting name	Setting value		Specification
			Digital display	
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 0	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 S	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 run 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 performed 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 completed, 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 from that position. The needle position stop angle can be set with needle position stop angle C8 in the [B] 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 from 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.
15	Needle lift, presser foot lift signal	UF	U F	If input UF is turned ON, the presser foot will lift after needle lifting.

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.

17. Table of input/output function for signal on C mode

	No.	Setting name	Setting value	Digital display	Specification
	16	Presser foot lifter signal	S3	S 3	If input S3 is turned ON after trimming, the presser foot will lift. If input S3 is turned ON before trimming, the presser foot will lift, after delay time. The delay time is set by S3D the [P] mode of the 95 page.
Note 1	17	Presser foot lifter signal	F	F	If input F is turned ON, the presser foot lifter operation will start.
	18	Needle UP position priority stop signal	PSU	P S U	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 94 page.
	19	Needle DOWN position priority stop signal	PSD	P S d	If input PSD is turned ON while the sewing machine is running, the needle will stop at the DOWN position after swing PSD stitches. The no. of stitches after PSD input is set by PSU the [P] mode of 94 page.
	20	Emergency stop signal	ES	E S	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	S H	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	C U	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	S 6	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	T L	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.
Note 2	25	Low speed signal	SPL	S P L	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	S P M	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	S P b	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 V while the signal is ON.
	28	High speed signal	SPH	S P H	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	S P U	If input SPV is turned ON while the sewing machine is running, the sewing machine will run at a speed proportional to the variable speed voltage VC while the signal is ON.
	30	Tacking cancel signal	BTL	b T L	If 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.

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.

17. Table of input/output function for signal on C mode

No.	Setting name	Setting value	Digital display	Specification
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 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.
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. Needle lift 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 IO1 is turned ON, output OT1 will always be turned ON.
40	Signal output to virtual output 2	IO2	I o 2	If input IO2 is turned ON, output OT2 will always be turned ON.
41	Signal output to virtual output 3	IO3	I o 3	If input IO3 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.
44	Signal output to virtual output 3 during operation	IR3	I 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	I 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	I 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	I 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	T o n	The thread trimmer output T can be turned ON or OFF only when the sewing machine is stopped. (Thread trimmer solenoid confirmation signal)
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 be turned OFF.

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.

17. Table of input/output function for signal on C mode

No.	Setting name	Setting value	Digital display	Specification
50	1 position priority signal	P12	P 1 2	1 position will be set forcibly.
51	Weak brake [ON] signal	BK	b E	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	E 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	Counter clear signal	CCL	C C L	If input CCL is turned ON, it clears an up counter in [0] and it clears a down counter in [the setting value].
60	Thread break detector input signal	THI	r H i	It is possible to use as the input signal of thread break detector.
61	Signal output to virtual output 4	IO4	i o 4	If input IO4 is turned ON, output OT4 will always be turned ON.
62	Signal output to virtual output 5	IO5	i o S	If input IO5 is turned ON, output OT5 will always be turned ON.

Note 1 ↓

Note 2 ↑

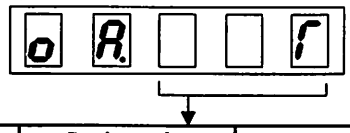
Note 1. The setting name will display in the descending order with each press of the [D] key.
2. The setting name will display in the ascending order with each press of the [C] key.

17. Table of input/output function for signal on C mode

C mode output signal setting table

EN EMFY

<Example> Output signal



No.	Setting name	Setting value	Digital display	Specification
1	Output for slow start	SL	SL	During the no. of the setting stitches, SL output is turned ON. The setting no. of stitches can select SLN on [P] mode or HOF on [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 down, the external operation signal (S0, S1, SH), full pedal heeling 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	UCM	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	bT	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	T	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. Refer to "Technical manual"
16	[TF] output	TF	TF	TF output for chain stitches. Refer to pages 132 for the output timing.
17	[KS1] output	KS1	KS1	Behind operation signal ON, KS1 output is turned ON after the setting delay time. Refer to "Technical manual" in detail.
18	[KS2] output	KS2	KS2	After the motor stopped, KS1 output is turned ON after the setting delay time. Refer to "Technical manual" in detail.
19	[KS3] output	KS3	KS3	After trimming and stopped up position, KS3 output is turned ON after setting delay time. Refer to page 132 for the output timing.
20	[TB] output	TB	TB	TB output for chain stitches. Refer to "Technical manual" in detail.
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.

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.

17. Table of input/output function for signal on C mode

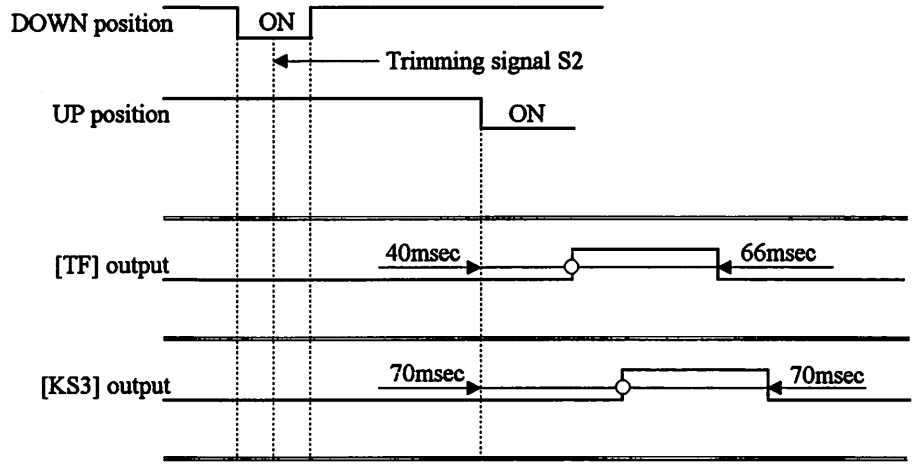
No.	Setting name	Setting value	Digital display	Specification
22	Output for UP position when stopped	UC	U C	UC output is turned ON if at the needle UP position when the sewing machine is stopped.
23	Needle UP position output	UPW	U P U	UPW output is turned ON if at the UP position when the, sewing machine is stopped, and while moving from the UP position to the DOWN position when the sewing machine is running.
24	Needle DOWN position output	DNW	d n U	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	o r 1	OT1 output is turned ON according to each input specifications while inputs IO1, IR1 and IS1 are ON.
26	Virtual output 2	OT2	o r 2	OT2 output is turned ON according to each input specifications while inputs IO2, IR2 and IS2 are ON.
27	Virtual output 3	OT3	o r 3	OT3 output is turned ON according to each input specifications while inputs IO3, IR3 and IS3 are ON.
28	Output for error occurrence confirmation	ERR	E r r	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	. P F	Not used.
30	[OT4]output	OT4	o r 4	OT4 output is turned ON according to each input specification while input IO4 is ON.
31	[OT5]output	OT5	o r 5	OT5 output is turned ON according to each input specification while input IO5 is ON.
32	Puller output	PUL	P U L	PUL output is turned ON during the presser foot lifter operation, during the IO2 output is ON.
33	Count up output	CUP	C U P	When +1 up counter does, the [CUP] output is turned on.
34	Thread break detector output	THO	r H o	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	F U U	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	n o	Nothing is output.
38	[CUE] output	CUE	C U E	This output becomes ON when Up-counter becomes end. This output becomes OFF when "CCL" input is turned on.
39	[CDE] output	CDE	C d E	This output becomes ON when Down-counter becomes end. This output becomes OFF when "CCL" input is turned on.

Note 1

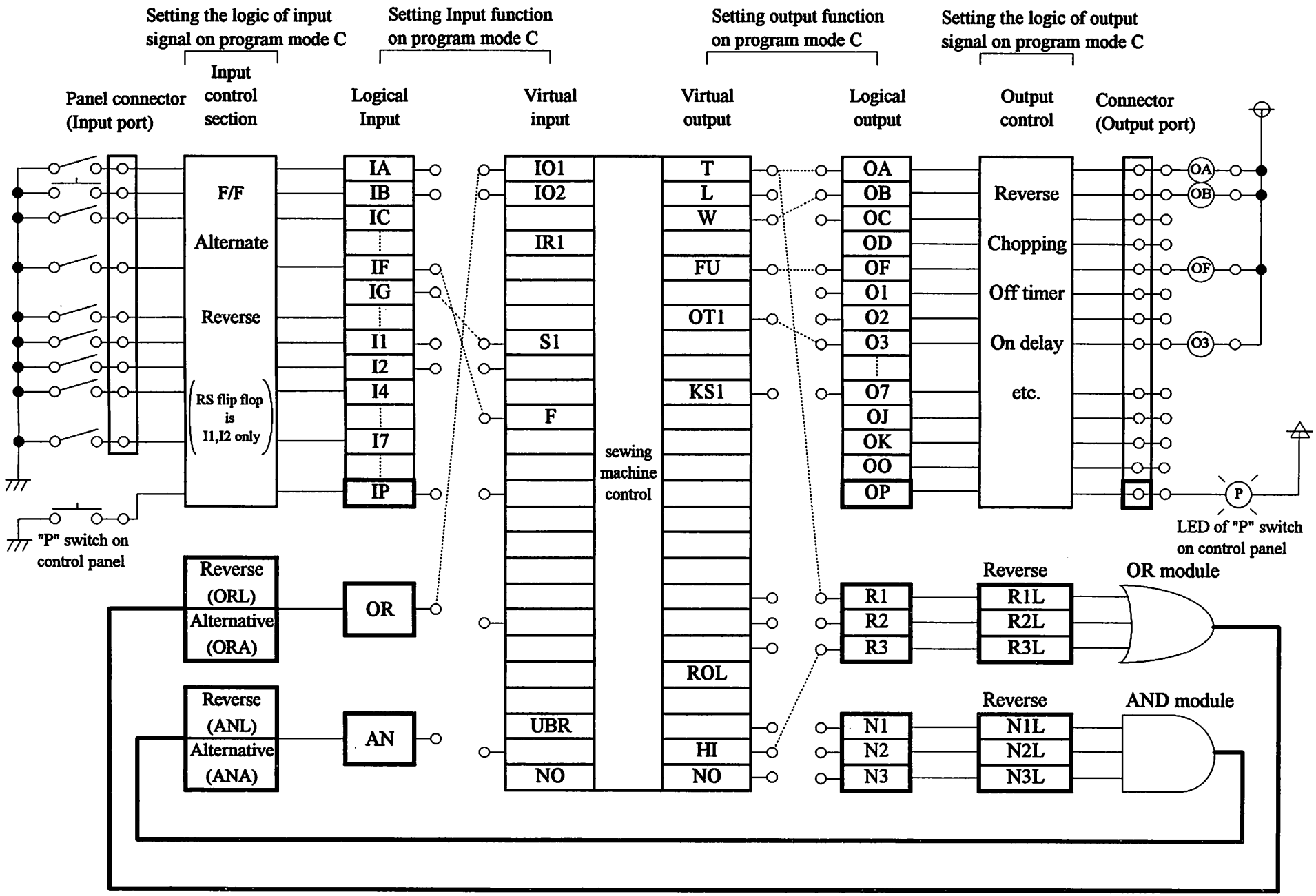
Note 2

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.

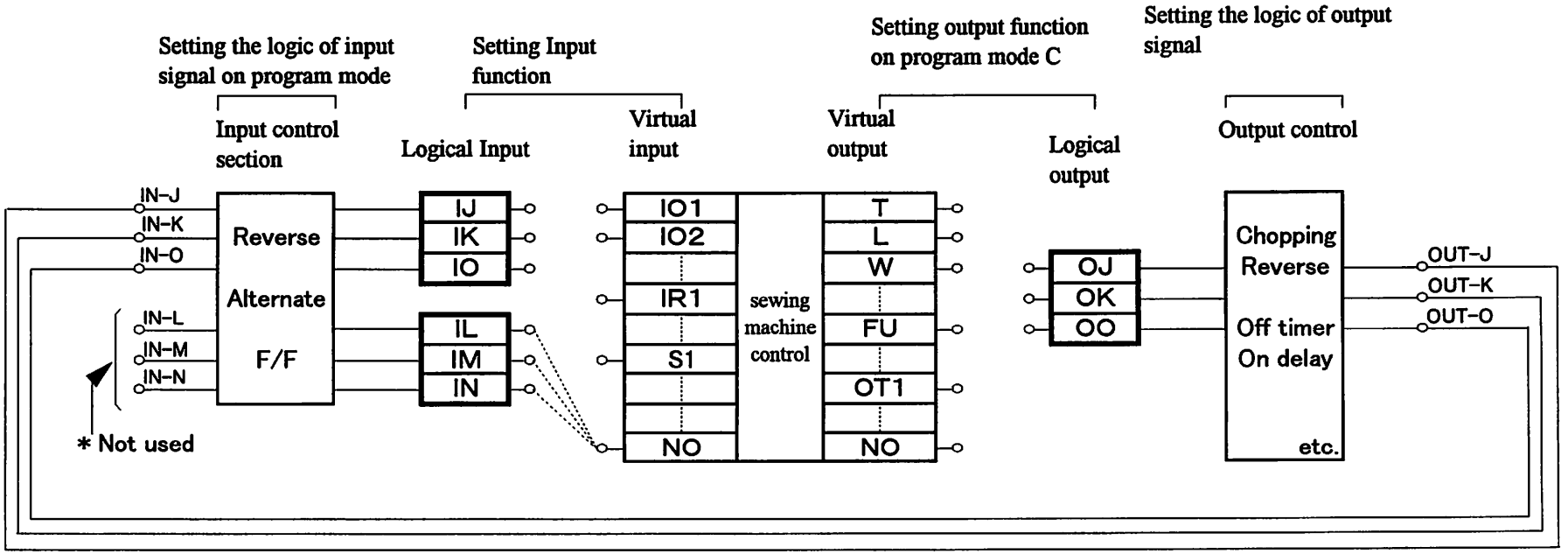
Notice The TF output and KS3 output timings are as shown below.



1. Input and output customization

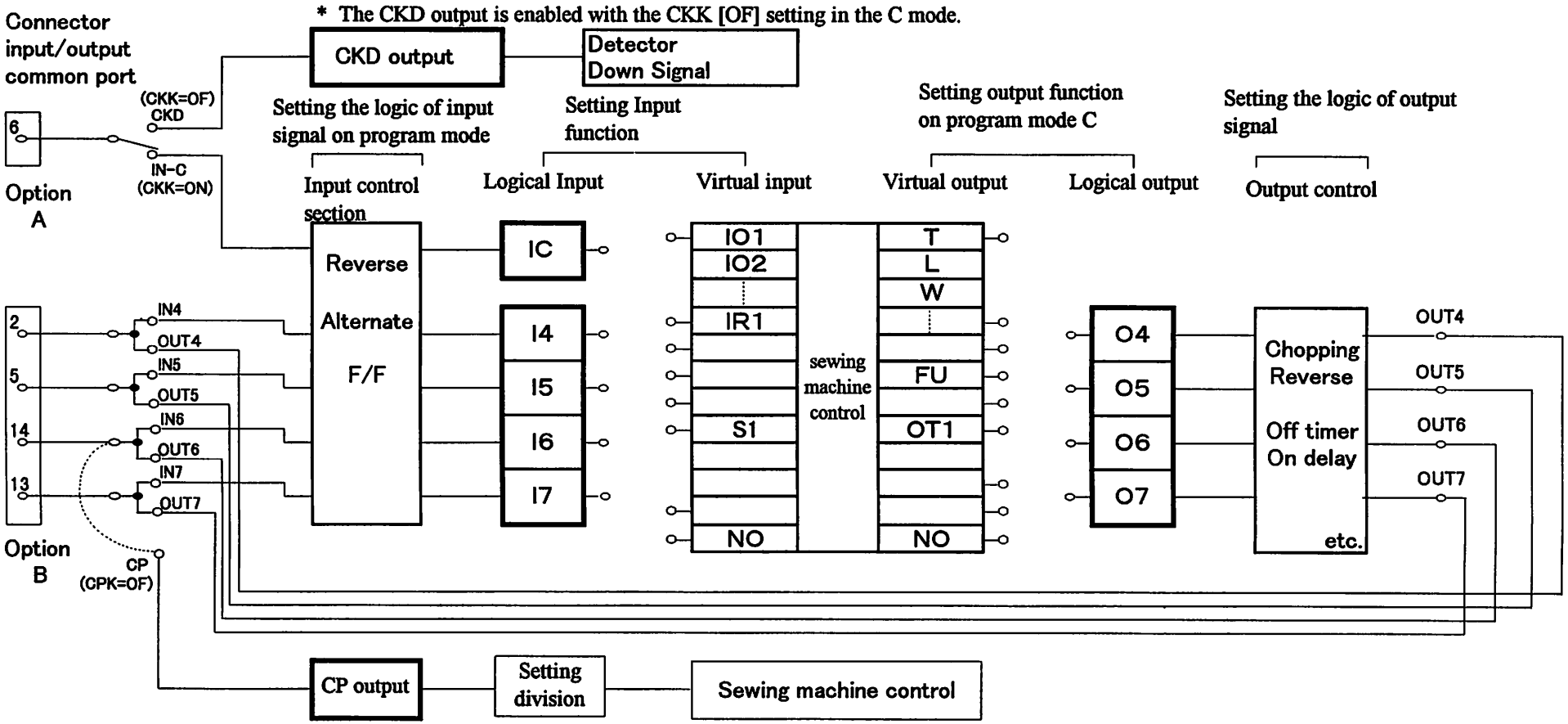


2. Coupling output signal with input inside control unit



* The factory settings of the input function settings [IJ], [IK], [IO] and [IL], [IM], [IN] are all [NO].
* The factory setting of the output function settings [OJ], [OK], [OO] 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



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.)

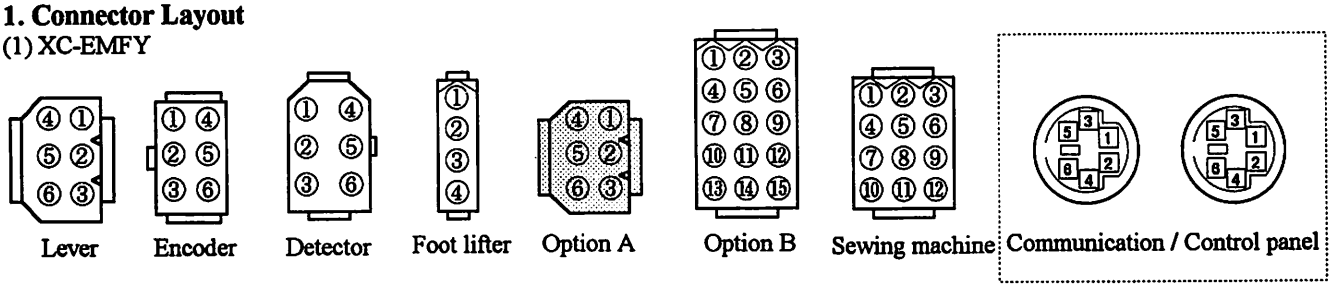
The above input/output common port is connected internally,
so if a function other than [NO] is set on both the input side and output side, the output side setting will affect the input side.

19 How to Use the Option Connector

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

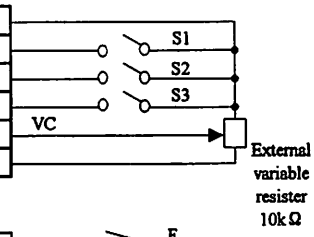
1. Connector Layout

(1) XC-EMFY



Lever (White)

Signal name	*Factory setting*	
0V	0V	1
IN-G	S1 : Run (Variable speed)	2
IN-H	S2 : Thread trimming	3
IN-I	S3 : Presser foot lifter	4
VC	VC : Variable speed command	5
+12V/(5V)	+12V	6

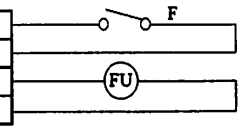


Communication / Control panel

RXD	1
—	2
TXD	3
COM	4
+12V	5
—	6

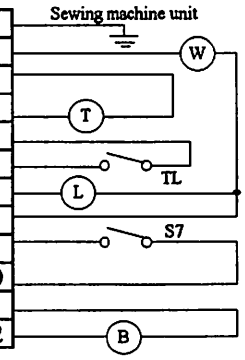
Presser foot lifter

—	0V	1
IN-F	F : presser foot input	2
OUT-F	FU+ : presser foot lifter output +	3
OUT-F	FU- : presser foot lifter output -	4



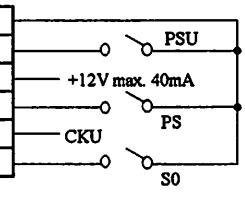
Sewing machine

Grand	Grand	1
OUT-B	W : Wiper output	2
+24V/+30V	+24V/+30V	3
OUT-A	T : Thread trimming output	4
0V	0V	5
IN-D	TL : Thread trimmer cancel input	6
OUT-D	L: Thread release output	7
+24V/+30V	+24V/+30V	8
IN-E	S7 : Backstitch input	9
0V	0V	10
+24V/+30V	+24V/+30V	11
OUT-C	B : Backstitch output	12



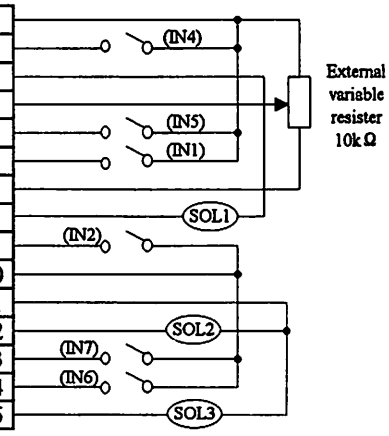
Option A (Black)

0V	0V	1
IN-A	PSU: Up position stop input	2
+12V/(+5V)	+12V	3
IN-B	PSD: Down position stop input	4
CKU	CKU : Up position output	5
IN-C/(CKD)	S0: Low speed input	6



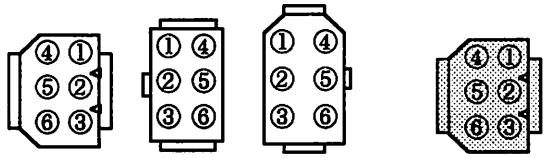
Option B

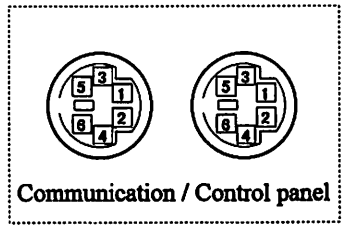
0V	0V	1
OUT-4/IN-4	No setting	2
OUT-1	OT1 : Virtual output	3
VC2	VC2 : Variable speed command	4
OUT-5/IN-5	No setting	5
IN-1	IO1:Virtual input	6
+5V(12V)	+5V	7
+24V/+30V	+24V/+30V	8
IN-2	U: Needle lift signal	9
0V	0V	10
+24V/+30V	+24V/+30V	11
OUT-2	NCL : Needle cooler output	12
OUT-7/IN-7	No setting	13
CP/OUT-6/IN-6	No setting	14
OUT-3	TF : "TF" output	15



Note: Pin number 3,12,15 are solenoid output.

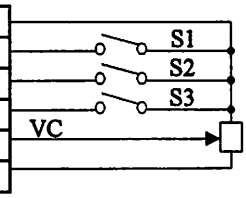
(2) XC-EN





Lever connector (white)

Signal name	*Factory setting*	
0V	0V	1
IN-G	S1: Run (Variable speed)	2
IN-H	S2: Thread trimming	3
IN-I	S3: Presser foot lift lifter	4
VC	VC: Variable speed command	5
+12V/(+5V)	+12V	6

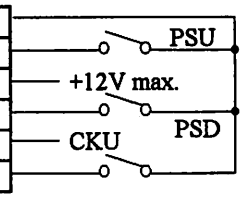


Communication / Control panel

RXD	1
---	2
TXD	3
COM	4
+12V	5
---	6

Option A connector (black)

0V	0V	1
IN-A	PSU: UP position stop input	2
+12V/(+5V)	+12V	3
IN-B	PSD: DOWN position stop input	4
CKU	CKU: Up position output	5
IN-C/(CKD)	S0: Low speed input	6



2. The explanation of the input/output signal

Note) There are no "Foot lifter ", "Option B", "Sewing machine " connector at the model [XC-EN].

Connector name	Pin number	The input/output signal name (Factory setting)	Physics input port name	Model name XC-EN	Model name XC-EMFY	The specification
Lever connector	2	Variable speed run signal S1	IG	○	○	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.
	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.
	4	Presser foot lifter signal S3	II	○	○	If input S3 is turned ON after trimming, the presser foot will lift. If input S3 is turned ON before trimming, the presser foot will lift after delay time. The delay time is set by S3D the [P] mode of the 95 page.
	5	Variable speed command voltage VC	VC	○	○	It is speed regulation input from outside. By giving variable speed command voltage (0-11V), the speed which is proportional to the voltage is gotten.
	6	Constant voltage power supply +12V		○	○	This is the power for the variable speed command. A DC12V (max.40mA) is out put.
Sewing machine connector	2	Wiper output W	OB	×	○	Wiper operation starts.
	4	Thread trimmer output T	OA	×	○	Thread trimming starts.
	6	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.
	9	Backstitching during 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.
	12	Backstitch output (Condensed stitch) B	OC	×	○	Backstitching (reverse feed) starts. (Condensed stitch)

Note) There are no "Foot lifter ", "Option B", "Sewing machine " connector at the model [XC-EN].

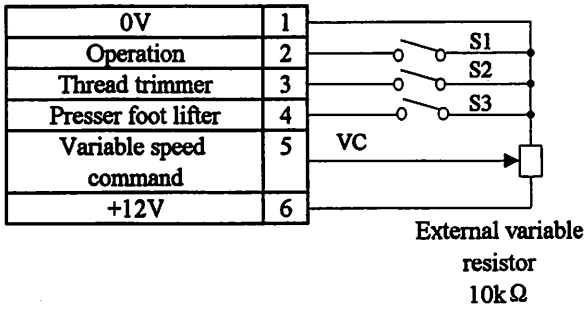
Comector name	Pin number	The input/output signal name (Factory setting)	Physics input port name	Model name XC-EN	Model name XC-EMFY	The specification
Presser foot lifter	2	Presser foot lifter signal F	IF	×	○	If input F is turned ON, the presser foot lifter operation will start.
	3 4	Presser foot lifter output FU+ FU-	OF	×	○	Presser foot lifter operation starts. The operation mode set in the [P] mode FUM function and FU function will be entered.
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 94 page.
	3	Constant voltage power supply +12V	—	○	○	The constant voltage power supply. DC +12V (max.40mA)
	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. The no. of stitches after PSD input is set by PSU the [P] mode of 94 page.
	5	Needle UP position output CKU		○	○	The UP position signal is output. This can be used as the signal for the stitch count, etc. The output voltage is DC 12V/5V (max. 10mA). The factory setting is 5V.
	6	Low speed run signal S0	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 113 page C mode by S0 and CKD.)
Option B connector	2	The signal which does nothing NO	I4/O4	×	○	It is an 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	Variable 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 power +5V		×	○	A DC 5V is output (max.50mA). 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 NO	I6/O6 /CP	×	○	It is an also input/output serving port. When using as the input, make O6 NO setting, and when using as the output, make I6 NO setting. When using as the CP output, make 113 page C mode CPK OFF setting. In this caseI6, O6, become invalid.
	15	[TF] output TF	O3	×	○	TF output for chain stitches. Refer to pages 131 and 132 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.

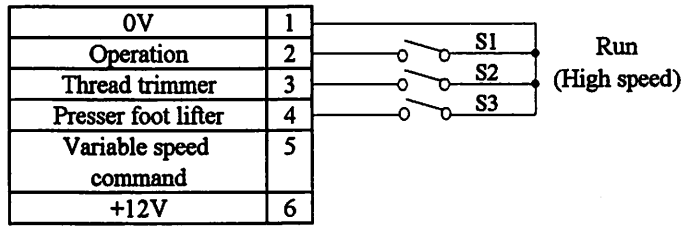
(1) When operating with an external variable resistor
(Control panel [auto] and AT in [P] mode is OFF)

Lever (white connector)



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

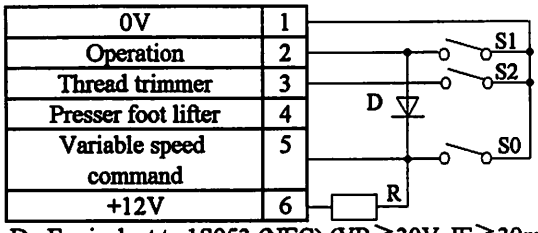
Lever (white connector)



(3) When operation with high speed and inching
(Control panel [auto] and AT in [P] mode is OFF)

(a) When using the lever connector

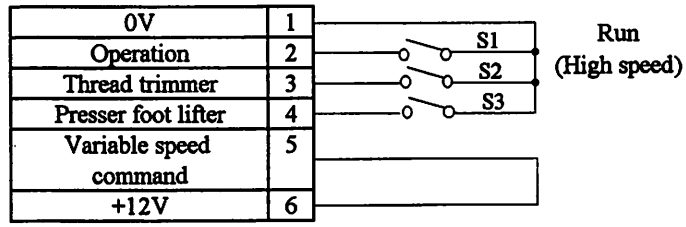
Lever (white connector)



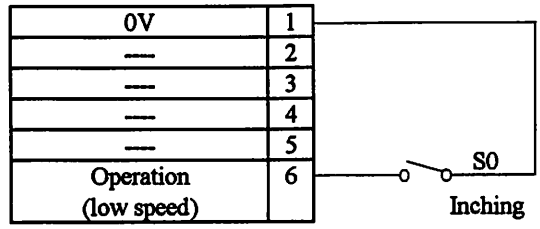
D : Equivalent to 1S953 (NEC) (VR≧30V. IF≧30mA)
R : 1kΩ 1/2W or higher

(b) When using the lever connector and option connector

Lever (white connector)



Option A (black connector)



Note) At the time of XC-EN, there is no thread trimmer output and presser foot lifter output.
"Thread trimming" means "Needle lifting".

20 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
PUr.oF	8A 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 to [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	Probable cause	Inspection
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.	It does not displayed 99 in normal mode. Is the variable speed voltage with the pedal toed down low? Is the motor pulley diameter too small?	Change 99 using control box [D] key. Check the variable speed voltage. (Refer to [E] mode.) Check the motor pulley diameter. (Refer item 9.3.)
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 the 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 the thread trimming signal (S2) from the lever unit broken? Is the presser foot lift signal (F) broken? Is the presser foot output (FU) broken?	Check signals S2 and S3. (Refer [E] mode.) Check signal F. (Refer [E] mode.) Check FU output. (Refer [E] mode.)

21 Specifications

Specifications \ Voltage and Frequency			110V single phase 50/60 Hz	230V single phase, 3-phase 50/60 Hz	
Motor	Model name		XL-554-10	XL-554-20	XL-754-20
	Voltage (V)		100 to 120V	200 to 240V	
	Rated output (W)		550W		750W
	Rated speed (r/min)		3,000r/min		3,600r/min
	Rated torque (N.m)		1.76N.m(0.18Kgm)		1.96N.m(0.2Kgm)
Control box	Model mane	Needle positioner	XC-EN-10-05	XC-EN-20-05	XC-EN-20-07
		General purpose automatic thread trimmer	XC-EMFY-10-05	XC-EMFY-20-05	XC-EMFY-20-07
	Voltage (V)		XC-EMFY:100-110/110-120V / XC-EN: 100-120V	XC-EMFY:200-220/220-240V / XC-EN: 200-240V	
	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 24V/30V		(XC-EN has no solenoid output)
	Range of rating Voltage		±10%		
	Ambient temperature		5℃ ~ 40℃		
	Ambient humidity		30% ~ 95%		
	Storage temperature		-25℃ ~ 55℃		
	Altitude		Under 1000m above mean sea level		
	Weight (kg)		Motor: 8.0 kg / Control Box: 5.5 kg (XC-EMFY, EMFYCE), 4.0 kg (XC-EN)		

Specifications \ Model	XC-EN	XC-EMFY
Lever unit	XC-CL-1	XC-CL-2

Position detector
XC-KE-01P
(XC-EMFY for Mitsubishi sewing machine is option)

(DC 24V Setting)

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

(DC 30V Setting)

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

Note 1) XC-EN type has no solenoid voltage. **Note 2) In the brackets, it is a factory setting.**
Note 3) The continuous time rating of "OF" output is 50 percentage of chopping duty.

22 Table of digital display and Dimensions

Table of digital display

Numeral	0	1	2	3	4	5	6	7	8	9
Digital display	0	1	2	3	4	5	6	7	8	9
Character	A	B	C	D	E	F	G	H	I	J
Digital display	A	b	C	d	E	F	G	H	I	J
Character	K	L	M	N	O	P	Q	R	S	T
Digital display	k	L	n	n	o	P	q	r	S	t
Character	U	V	W	X	Y	Z				
Digital display	U	v	W	H	Y	Z				

Dimensions

●MOTOR and CONTROL BOX