

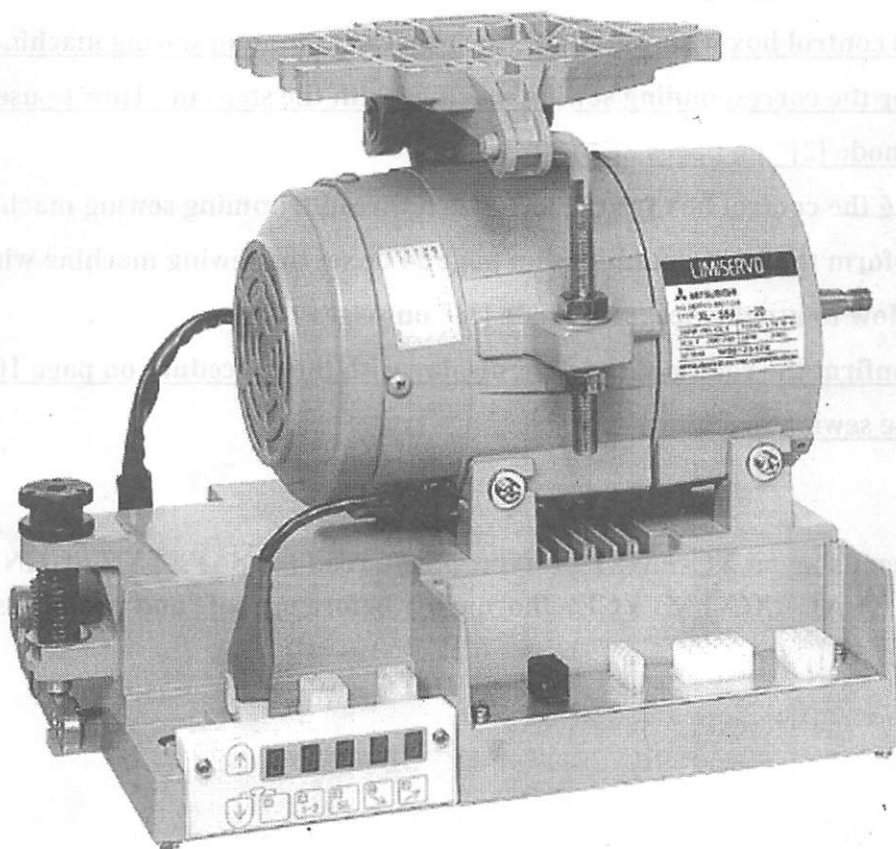
MITSUBISHI

Mitsubishi Limiservo X F Series

TECHNICAL INSTRUCTION MANUAL

Motor XL-554-10(Y), XL-554-20(Y)
Control box XC-FMFY

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)1400004-A(200110)



Before use " FMFY " 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 21 to 22.

When using the control box for the lock stitch thread trimming sewing machine again, always perform the reset operations on page 34 or set the sewing machine with the steps in "How to use the program mode [1]" on pages 16.

(Always confirm the rotation direction display with the procedure on page 10 before running the sewing machine.)

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

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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 $\pm 10\%$ of the rated voltage.
 - Place where frequency fluctuation exceeds $\pm 1\%$ 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

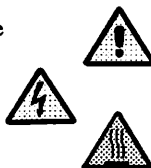
- Follow the technical manuals for maintenance and inspection of this control unit.
- Repairs and maintenance must be done and approved by specially trained personnel.
- Do not run this control with the ventilation openings of the motor's dust-proof filter blocked or clogged with dust, loose cloth, etc.
- Always turn the main 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.
- During power-on or for some time after power-off, do not touch the control box.
The temperature of the control box surface may be high and you may get burnt.
- 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.
- When system have to be stop in case of emergency, remove the power supply plug from the power supply line.

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.
- (3) This symbol indicates thermal risks and warnings.

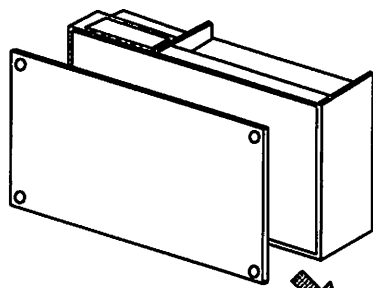




Caution

1. Please remove your foot from the pedal when turning the power ON.
2. Always turn the power OFF when leaving the machine.
3. Do not inspect the control circuit with a tester.
4. Do not use branched wiring when using the single-phase motor.
5. The brakes may not function when the power is turned OFF or when there is a power failure during sewing machine operation.
6. Match the connector shape and direction, and insert securely.
7. 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.
8. 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.
9. 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.

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



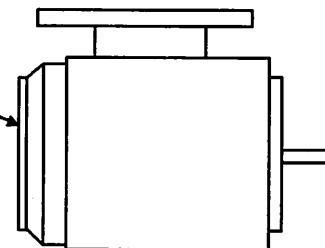
High voltage danger



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

Dust-proof filter

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



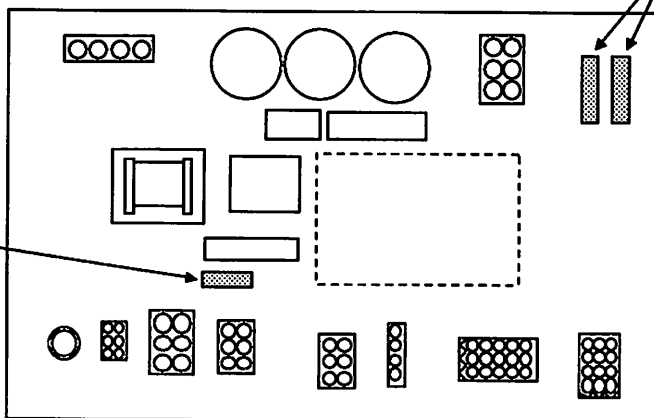
12. If the fuse blows, remove the cause, and replace the blown fuse with one having the same capacity.

Two 20A Fuses
or
One 20A Fuse

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

2.5A Fuse

※ The above 2.5A fuse is for protection of the 12V power supply section.

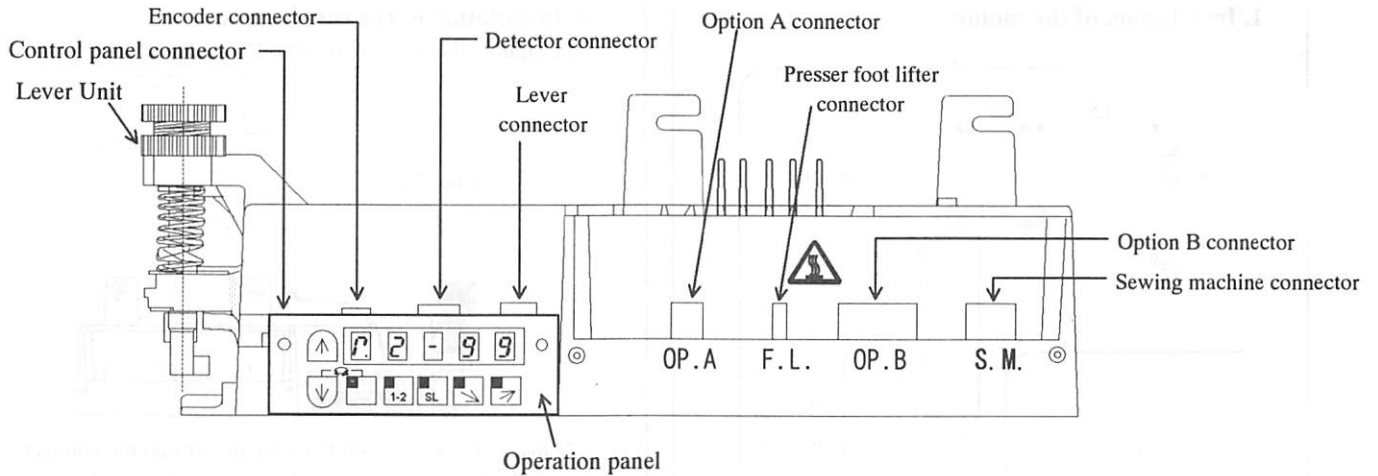


(View of the printed circuit board with cover removed.)

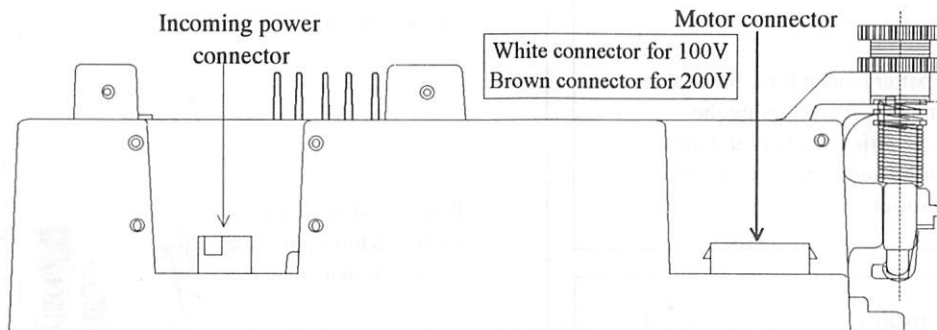


Wait 10 minutes after turning the power switch OFF before opening the cover

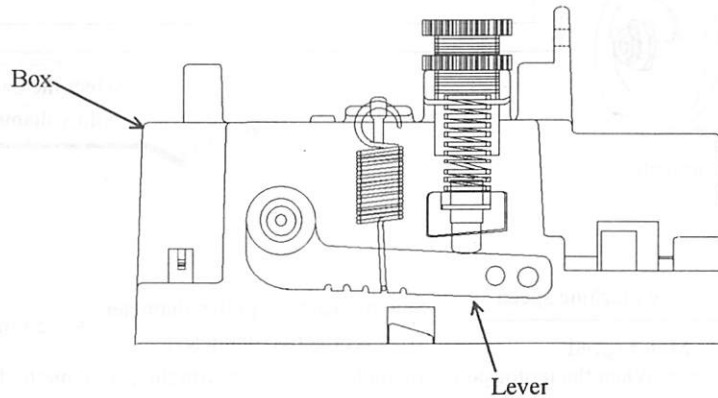
1. Front



2. Rear



3. Left



1. XC-FMFY Control box : Standard

(1) Worldwide model

(Type for Mitsubishi sewing machine)

Push-button switch	One set
Fuse (2.5A-One, 20A-One)	One set
Control box installation plate x 2 Installation screws x 6	One set
Junction rod for the Pedal	One set

(The above accessories are for standard type)

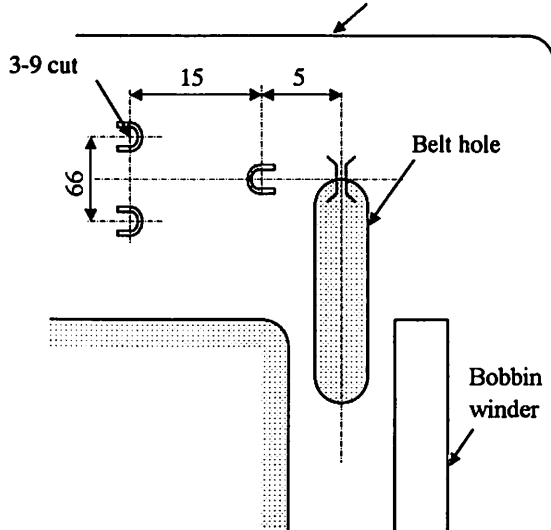
(2) Special Area model

(With detector type)

Push-button switch	One set
Fuse (2.5A-One, 20A-One)	One set
Control box installation plate x 2 Installation screws x 6	One set
Junction rod for the Pedal	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 and Terminal	One set

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

1. Installation of the motor

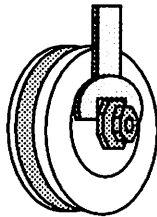


Using the hole opening pattern, open three 9mm holes on the table. Install the motor securely using the installation bolts, washers, spring washers and nuts. The pattern and installation bolts, etc., are included with the motor as accessories.

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:

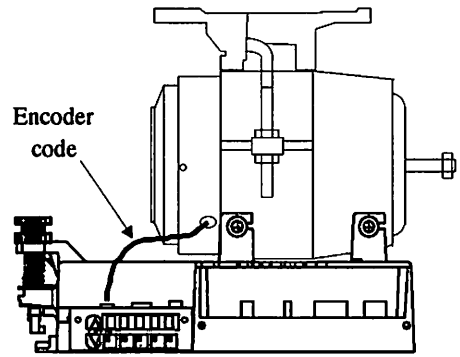
$$\text{Motor pulley outer diameter (mm)} = \frac{\text{Normal sewing machine speed}}{\text{Motor speed}} \times \text{Sewing machine pulley diameter (effective diameter)} + 5 \text{ mm}$$

※ The motor speed should be set at 3,600 rpm. 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.

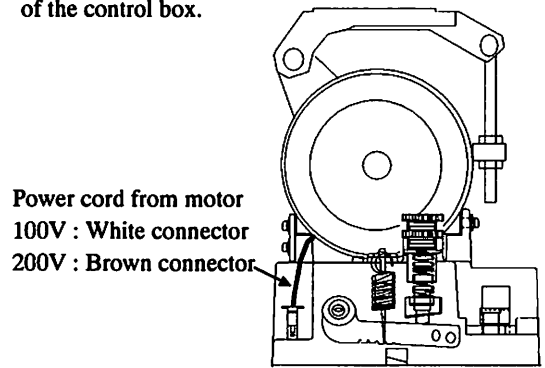
※※ Refer to page 17 for the pulley diameter to be used when using the Mitsubishi thread trimming sewing machine.

2. Installation of the control box

(1) Tighten the control box onto the motor.

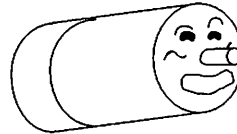


(2) Insert the power cord from the motor into the connector on the back of the control box. Insert the encoder cord from the motor into the encoder connector on the front of the control box.

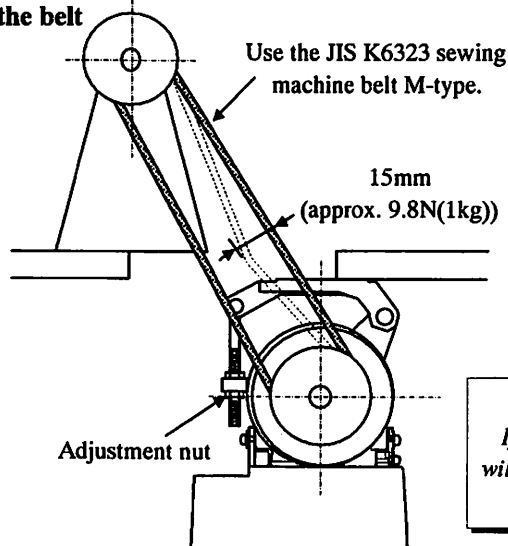


Power cord from motor
100V : White connector
200V : Brown connector

Select the correct pulley diameter.



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.

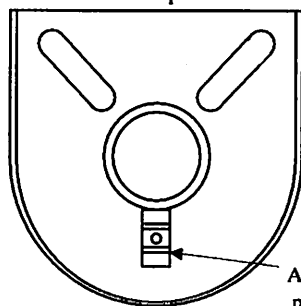
6. Installation

5. Installation of the protective cover

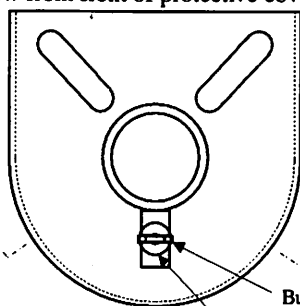
(1) Installation of the protective cover (with belt slip off prevention part)

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

View from back of protective cover



View from front of protective cover



Attachment plate

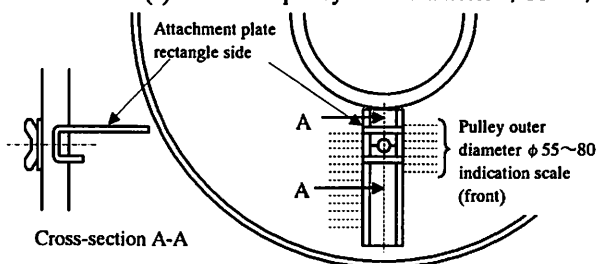
Butterfly bolt

Washer

Protective cover installation screw

- 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 $\phi 55 \sim \phi 80$

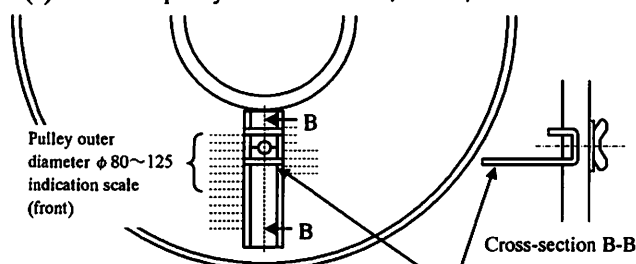


Cross-section A-A

Pulley outer diameter $\phi 55 \sim 80$ indication scale (front)

(View from back of protective cover)

(b) For motor pulley outer diameter $\phi 80 \sim \phi 125$



Pulley outer diameter $\phi 80 \sim 125$ indication scale (front)

Cross-section B-B

Attachment plate rectangle side

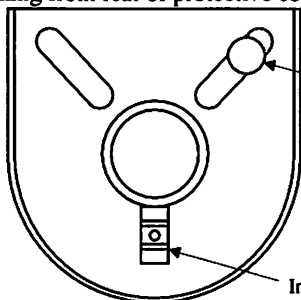
(View from back of protective cover)

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

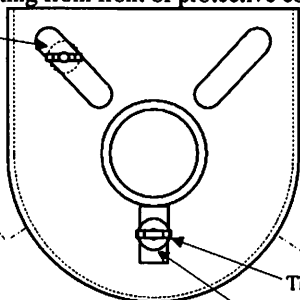
(2) Installation of the protective rod

The protective rod is enclosed as a motor accessory.

Looking from rear of protective cover



Looking from front of protective cover



Protective rod

Installation plate

Thumb nut

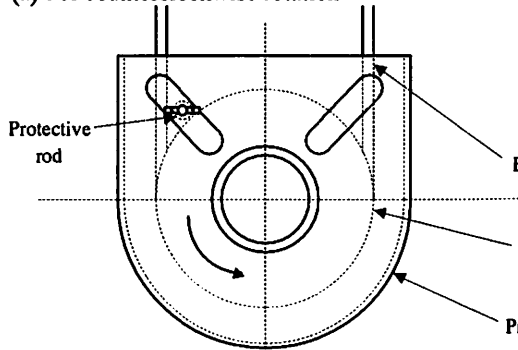
Thumb bolt

Washer

Protective cover installation screw

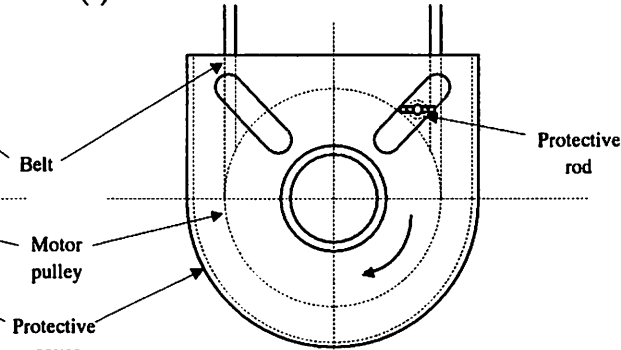
- Set the protective rod to the motor pulley rotation direction and install between the belt and motor pulley.

(a) For counterclockwise rotation



(Looking from front of protective cover)

(b) For clockwise rotation

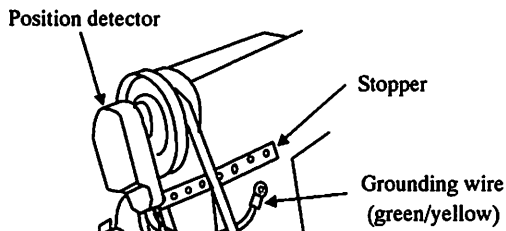


(Looking from front of protective cover)

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

6. Installation

6. Installation of the position detector

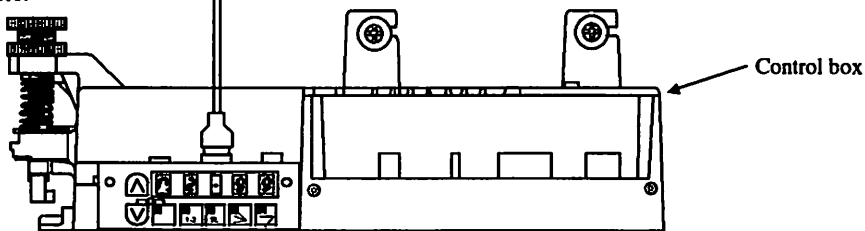


This can be installed onto the sewing machine table as shown here.

- (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.

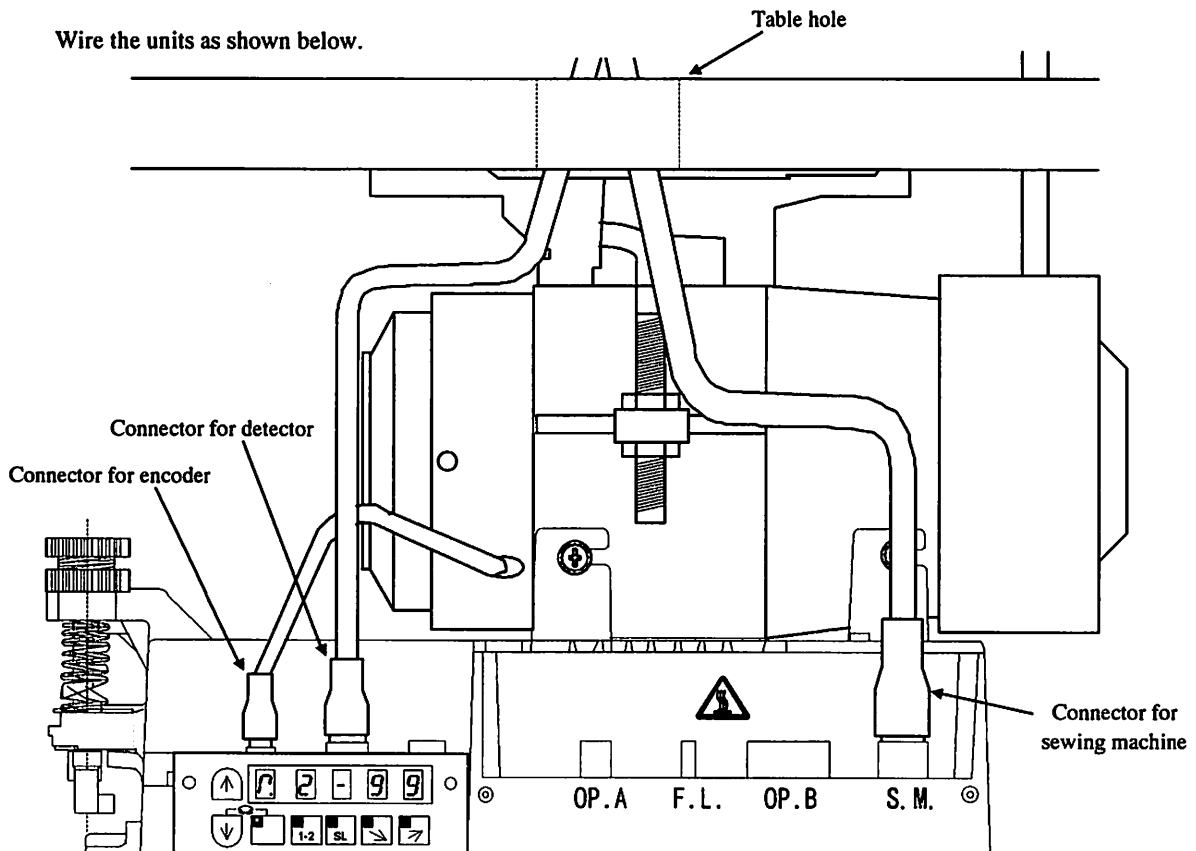
Caution

This position detector has a grounding wire so it is exclusive for XC-F series. This can not used with except XC-F, XC-E Series.



7. Connection of the Mitsubishi sewing machine and control box.

Wire the units as shown below.



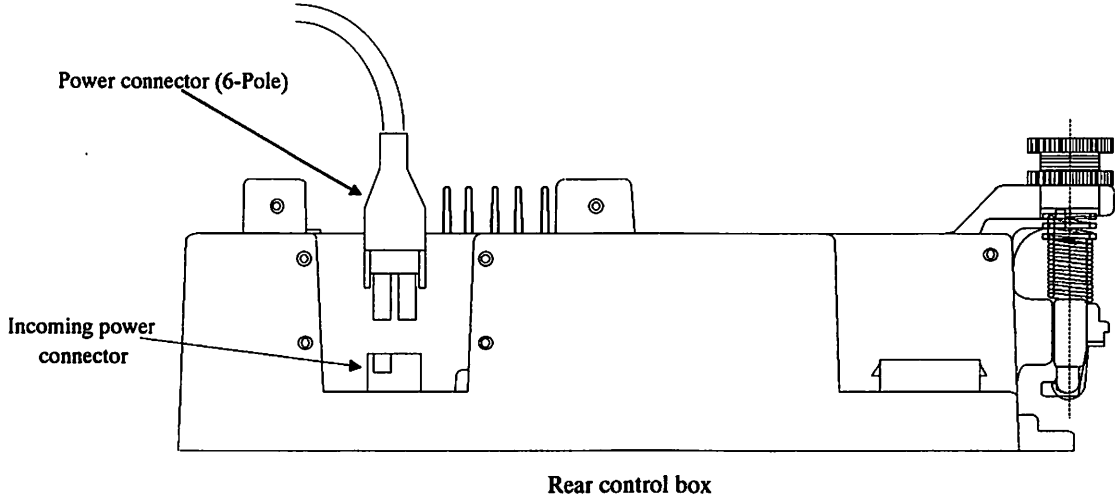
Caution



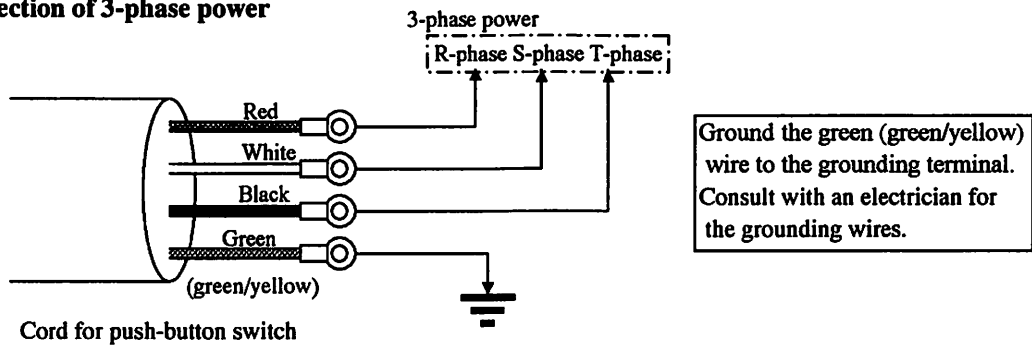
For safety, always turn the power switch OFF and wait for the panel display [PWR.OF] (displayed for approx. 10 seconds) before connecting or disconnecting the plugs. This [PWR.OF] display is not an error.

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.



2. Connection of 3-phase power



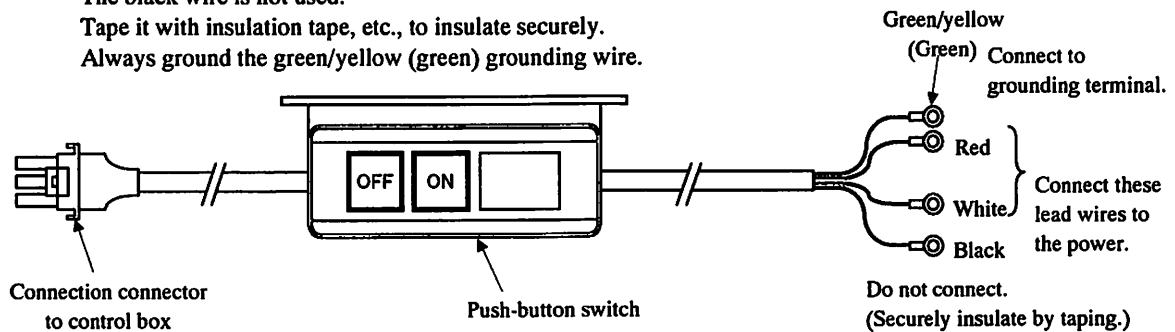
3. Current capacity

Use a fuse or complete breaker for the power.

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

4. When using the 3-phase 200 ~240V class Limiservo X with single phase 200 ~240V 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.



1. Before turning switches on.....

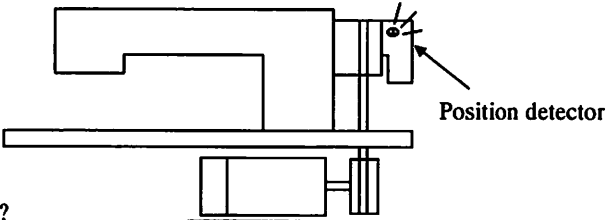
Places to confirm	Reference
(1) Is the power and capacity suitable ?	Current capacity on page 9.
(2) Is the power voltage the same as the factory preset voltage of the rated nameplate on the side of the control box ?	Rated Voltage [XC-FMFY-20-05 : 200-240V] [XC-FMFY-10-05 : 100-120V]
(3) Are the connectors inserted correctly ? -Power connector from push-button switch -Motor connector -Motor encoder connector -Position detection connector	Insertion of the power connector on page 9. } Installation of control box on page 6. Installation of position detector on page 8.
(4) Is the lead wire contacting the V belt ?	_____
(5) Is the belt tension okay ?	Mounting of the belt on page 6.
(6) Are the pulley nuts securely tightened ?	Installation of the pulley on page 6.
(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 21 to 22.
(9) Is the sewing machine solenoid voltage 24V or 30V ? The factory setting is 24V.	Change solenoid voltage from 24V to 30V on page 12.

Before use "FMFY" 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 21 to 22. When using the control box for the lock stitch thread trimming sewing machine again, always perform the reset operations on page 34 or set the sewing machine with the steps in "How to use the program mode [1] " on page 16. (Always confirm the rotation direction display with the procedure on page 10 before running the sewing machine.)

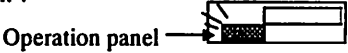
2. Turn on the power.....

(1) Does the position detector lamp light ?



Position detector

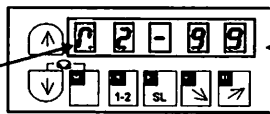
(2) Does the LED on the control box operation panel light ?



Operation panel

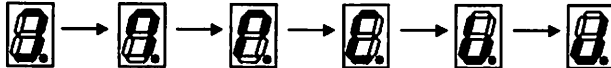
(3) Is the sewing machine rotation direction correct ?

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

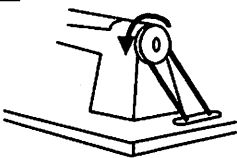


Operation panel

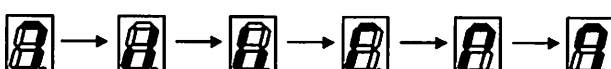
- For left rotation



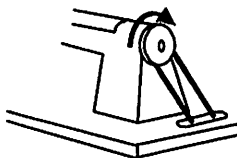
The sewing machine rotates to the left looking from the pulley side.
The factory setting is left rotation.



- For right rotation

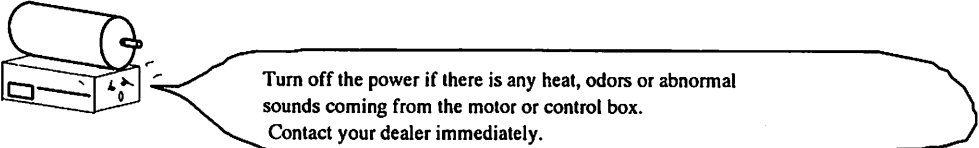


The sewing machine rotates to the right looking from the pulley side.



Refer to page 14 for the procedure for changing the rotation.

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



Turn off the power if there is any heat, odors or abnormal sounds coming from the motor or control box.
Contact your dealer immediately.

1. Adjustment of stopping position

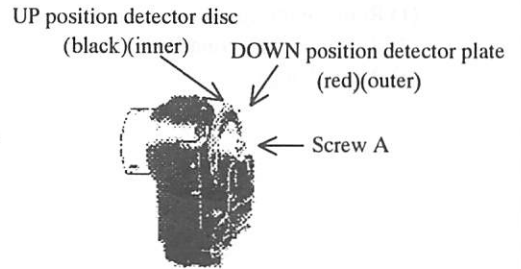
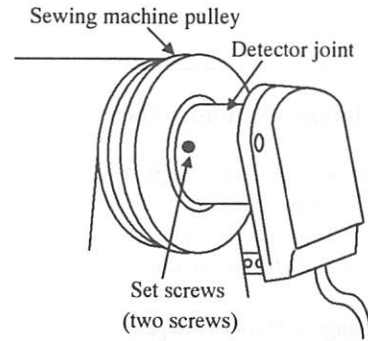
Adjust this position with the detector installed onto the sewing machine and while stopping at the UP and DOWN positions. For safety, disconnect the connector for the sewing machine.

(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.



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

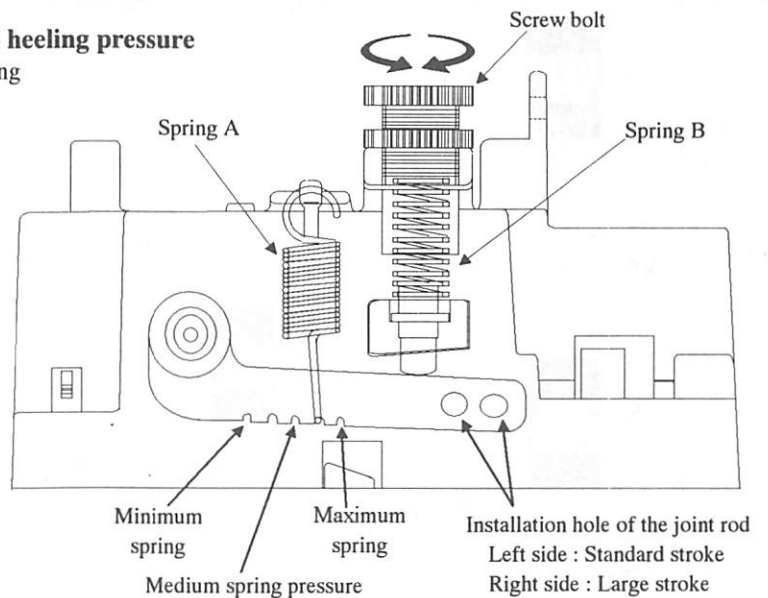
Caution

Refer to the sewing machine instruction manual when adjusting for use with the Mitsubishi sewing machine.

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

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

Turn the screw bolt to adjust the spring B pressure.



3. Adjustment of operation speed

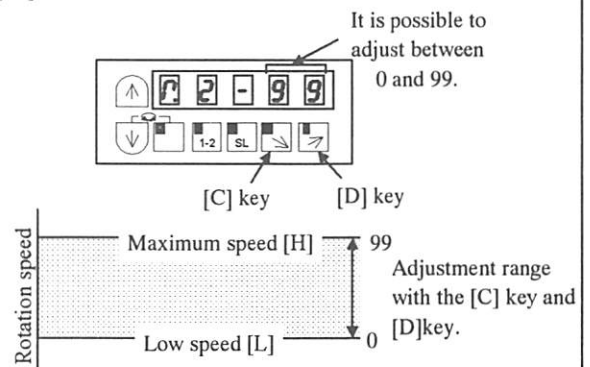
Adjustment of each speed	Reference	Factory setting
		(speed) FMFY
Maximum speed [H]	To change the maximum speed	4000
Low speed [L]	-----	250
Thread trimming speed [T]	-----	200
Start tack speed [N]	-----	1700
End tack speed [V]	-----	1700
Slow start speed [S]	-----	250

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.

Operation speed

The speed can be adjusted from low [L.] to maximum [H.]



10 How to change voltage of panel connector and solenoid return speed

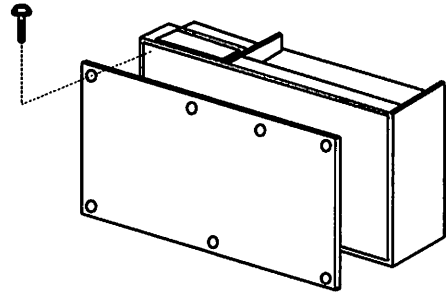
1. To change solenoid voltage


To change solenoid voltage from 24V to 30V

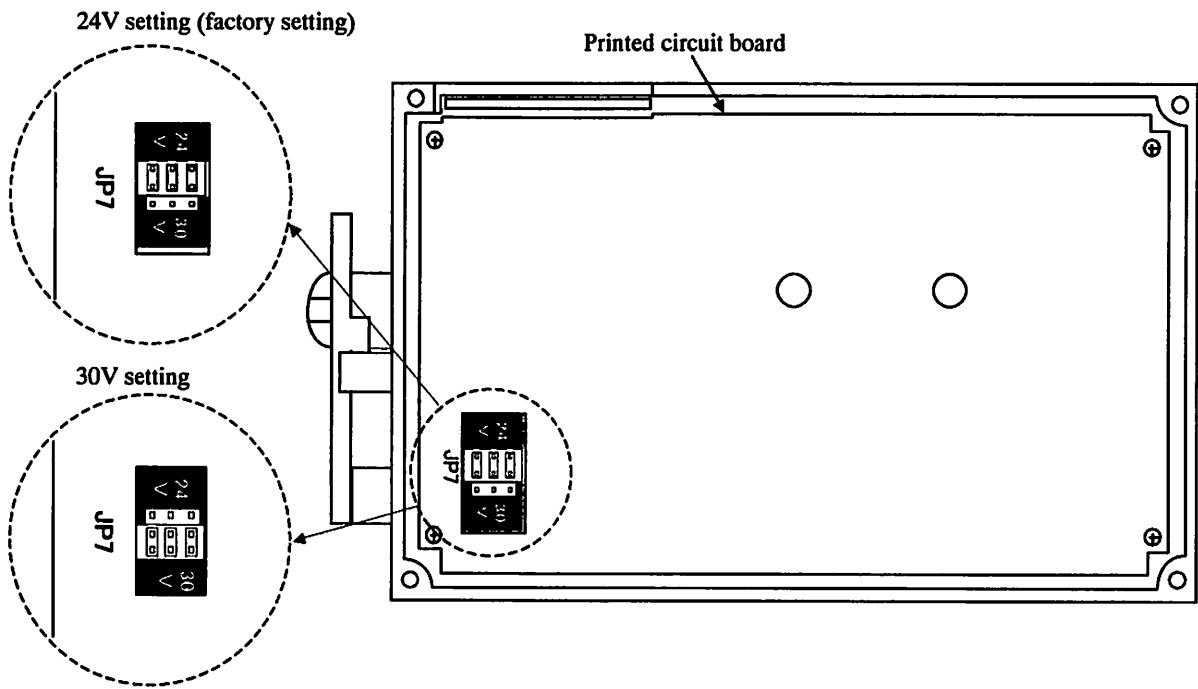
- (1) Remove the cover.
- (2) Reconnect the connector [JP7] from 24V side to 30V side.
- (3) After change, always set the cover to the control box.

To change solenoid voltage from 30V to 24V

- (1) Remove the cover.
- (2) Reconnect the connector [JP7] from 30V side to 24V side.
- (3) After change, always set the cover to the control box.



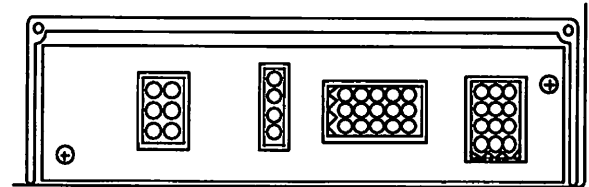
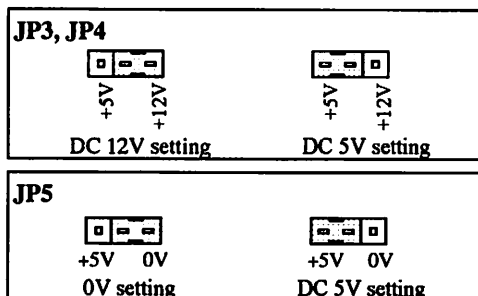
 For safety, turn the power switch OFF before opening cover.



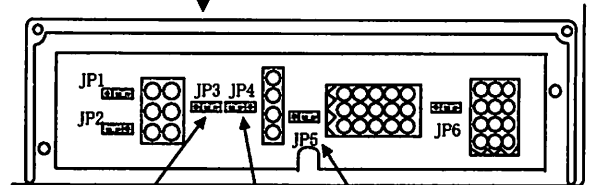
10. How to change voltage of panel connector and solenoid return speed

2. How to change the output voltage DC5V/12V and 0V/DC5V

- (1) Remove the cover of the option connector.
- (2) The DC5V/12V can be changed with the JP3 and JP4 connector on the printed circuit board as shown the right figure. The 0V/DC5V can be changed with the JP5 connector on the printed circuit board as shown the right figure.
- (3) To change the output voltage, pull out the connector and reinsert it into the other side.



Remove the cover of the option connector



Option A (Pin No. 3) DC5V/12V changeover switch

Option B (Pin No. 7) DC5V/12V changeover switch

Sewing machine (Pin No. 10) 0V/DC5V changeover switch

- (4) The factory setting

Connector	Factory setting	Connector (Pin No.)
JP3	DC 12V	No. 3 pin of the Option A
JP4	DC 5V	No. 7 pin of the Option B
JP5	0V	No. 10 pin of the Sewing machine

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

Caution



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



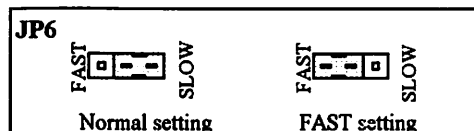
Do not change the JP1 and JP2 from the factory setting.

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

- (1) Remove the cover. **Caution : For safety, turn the power switch OFF before opening cover.**

- (2) The solenoid return speed can be increased with the setting of the JP6 connector on the printed circuit board as shown on the above figure.

- (3) To change the solenoid return speed, pull out the connector and reinsert it into the FAST side.



- (4) Connector factory settings and solenoid return

Connector	Connector factory setting	Output during simple setting	Solenoid return	Output
JP6	SLOW	Sewing machine connector 3-4 pin output.	Normal	OA

- (5) 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 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 JP6 set at FAST (solenoid return is fast)

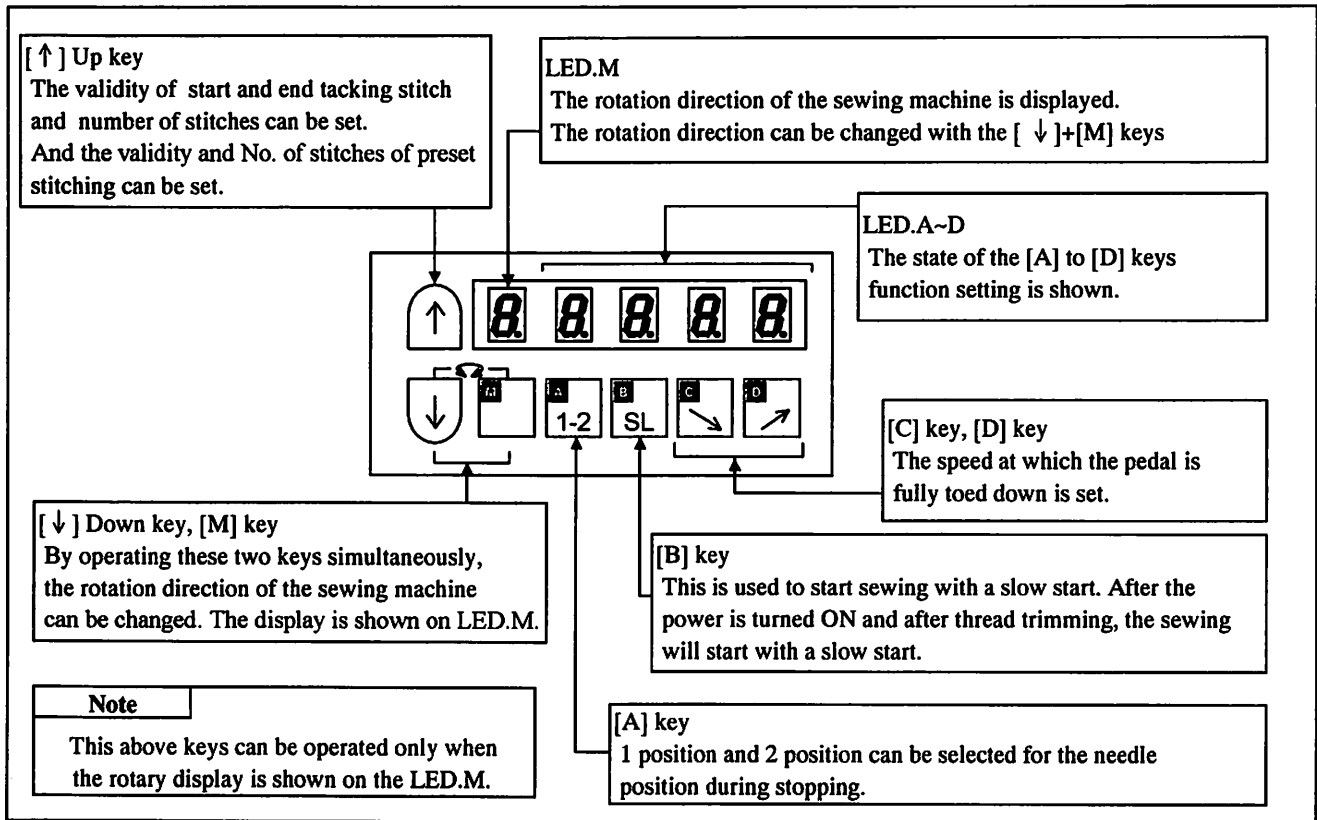
11 Operation of the Operation Panel Keys

1. Displays during normal mode and functions of each key

When the power supply switch is turned ON, the rotation direction will display on the LED.M shown below.

When the rotation direction isn't displayed on LED.M, press the [↓] key any time.

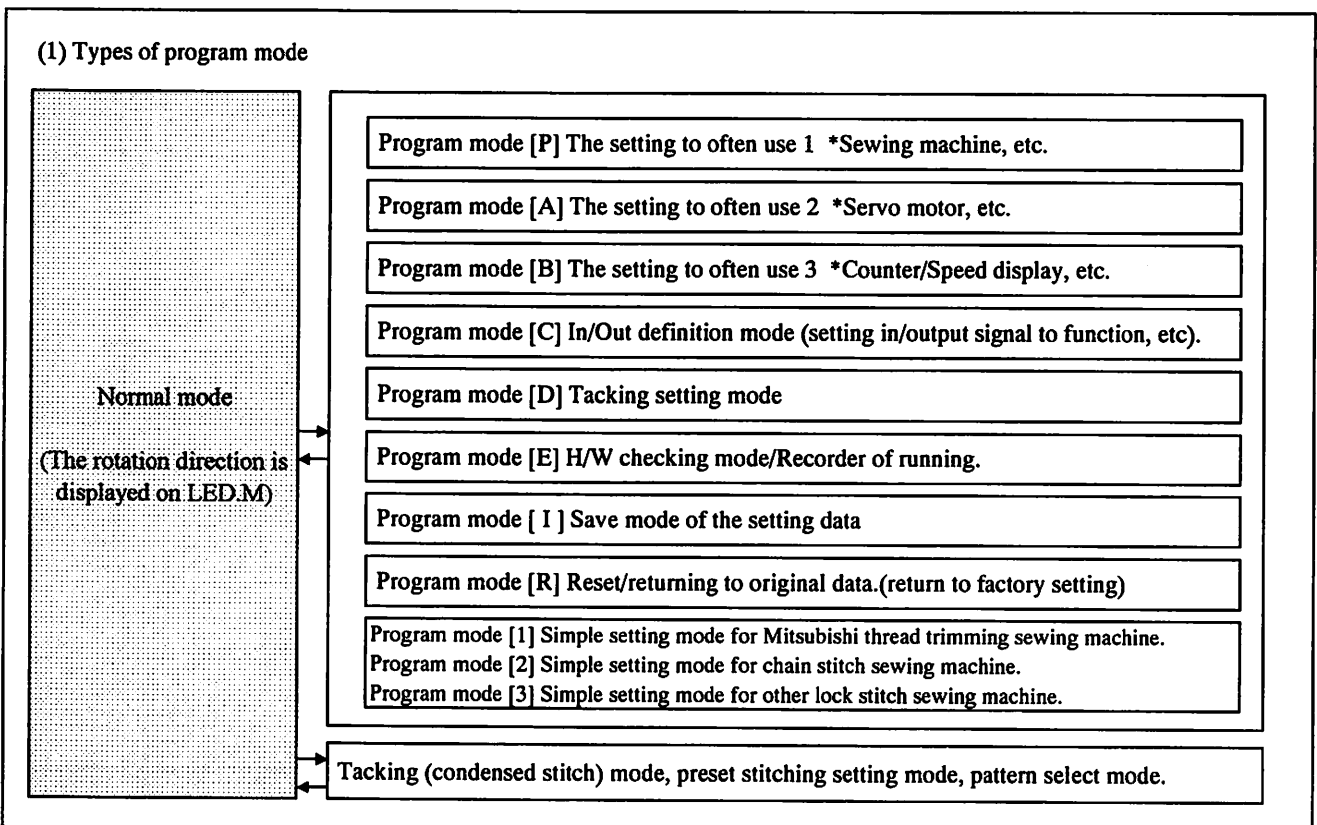
This state is called the normal mode, and the following keys can be operated.



2. Selection of each mode

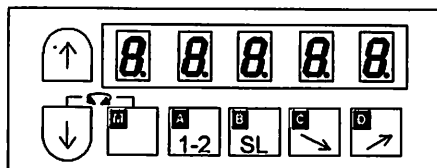
The modes can be changed from the normal mode to various program modes and various basic functions and application functions set with this operation panel.

(For each mode function, refer to a table of program mode function.)



11. Operation of the Operation Panel Keys

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



Mode name	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 [I]	While holding down the [↓] key, press the [↑] key and the [B] and the [C] key and the for 2 seconds or more from normal mode.	*The display will flicker. *The program mode [I] 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]	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]	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]	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.

11. Operation of the Operation Panel Keys

3. How to use the program mode [1]

To set the functions for Mitsubishi thread trimming sewing machine in simple setting.
(ex. To set for the LU2-4410-B1T).....Function setting [410B]

1)

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

2)

* Program mode [1] will be entered.

3)

* Set function to [410B].

4)

* [410B] 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 [410B] display, press the [↓] key while holding down [↑] key.
In this case, [410B] 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][FL][N][LOAD]. (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.

- D) To confirm the set model setting (Simple setting function name)
Function-name corresponding to the sewing machine type name set depending on an undermentioned procedure can be confirmed.

1)

* Enter program mode [E].
([↓]+[↑]+[A] key)

2)

* Program mode [E] will be entered.

3)

* Press [↑] key. Set function to [T].

4)

* Previous selected simple setting is displayed.
(Ex. [3750] is displayed.)

5)

* Return to the normal mode. ([↓]+[↑] key)

11. Operation of the Operation Panel Keys

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	280M	LS2-1280-M1T(W)	4000	250	200	1700	1700	OFF	OFF	L	85	*1
280H	280H	LS2-1280-H1TW	3000	250	200	1200	1200	OFF	OFF	L		
280B	280B	LS2-1280-B1T	3000	250	200	1200	1200	OFF	OFF	L		
210M	210M	LS2-2210-M1T(W)	4000	250	200	1700	1700	OFF	OFF	L	85	
230M	230M	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		
250M	250M	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		
359	359	DY-359-22BZ	2000	250	200	700	700	ON	OFF	L	65	*2
3310	3310	LY2-3310-B1T	2000	250	225	700	700	ON	OFF	H		
3750	3750	LY2-3750-B1T	2000	250	200	700	700	ON	OFF	L		
6840	6840	LY3-6840-B0T	2000	250	120	700	700	ON	OFF	H		
6850	6850	LY3-6850-B0T	2000	250	120	700	700	ON	OFF	L		
410B	410B	LU2-4410-B1T	2000	250	175	700	700	ON	OFF	L		
430B	430B	LU2-4430-B1T	2000	250	175	700	700	ON	OFF	L		
4610	4610	LU2-4610-B1T	3000	250	175	700	700	ON	OFF	L		
4710	4710	LU2-4710-B1T	3000	250	175	700	700	ON	OFF	L	85	
4730	4730	LU2-4730-B1T	2500	250	175	700	700	ON	OFF	L		
630	630	LX2-630-M1	800	280	160	500	500	ON	ON	L	65	
280E	280E	LS2-1280-M1T(W)	5000	250	200	1700	1700	OFF	OFF	H	110	*3
FL	FL	*6	5000	250	200	1700	1700	OFF	OFF	L		
N	n	*7	5000	250	200	1700	1700	OFF	OFF	L		
LOAD	LOAD	*8	*	*	*	*	*	*	*	*		

*1 Factory setting is [280M].

*2 The effective diameter of the sewing machine pulley is 70 mm.

(Note : In case of LY2-3310/3750 is 80 mm, LU2-4410/4430/4610/4710/4730 is 85 mm.)

*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.

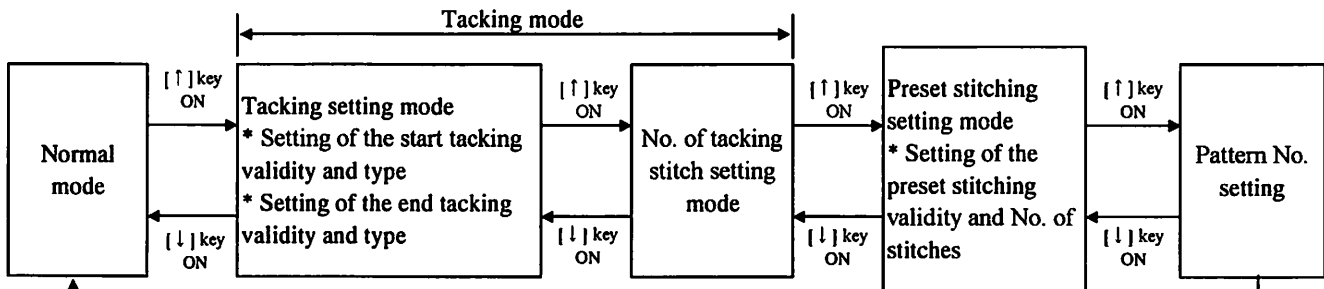
*8 It is possible to load the saved setting data by the function of [SAVE] in the program mode [I].

(Program mode [I] : [↓]+[↑]+[B]+[C] key)

(The factory setting of [LOAD] is the setting data of [280M].)

11. Operation of the Operation Panel Keys

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



Note) At the time of pattern No.=4 (continuous tack), the tacking setting mode will be skipped.
At the time of pattern No.=A to H (program stitching), the preset stitching mode will be skipped.

[↑]key ON

(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.

	start tacking	end tacking
0 : No tacking
1 : V tacking (Once tacking)
2 : N tacking (Double tacking)
3 : M tacking (Triple tacking)
4 : W tacking (4 repeat tacking)
5 : 5 repeat tacking
6 : 6 repeat tacking

(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) When the except pattern No.4

2) When the pattern No.4

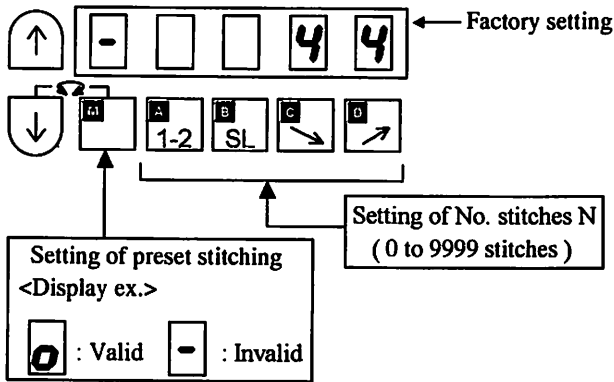
Each setting value can be changed from 0 to 9 stitches, A,B,C,D,E,F stitches.

A is 10 stitches
B is 11 stitches
C is 12 stitches
D is 13 stitches
E is 14 stitches
F is 15 stitches

11.Operation of the Operation Panel Keys

(3) Preset stitching setting mode

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



Start tacking



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

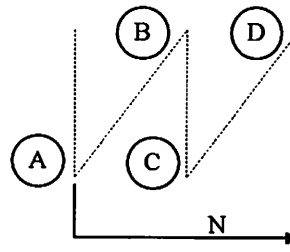
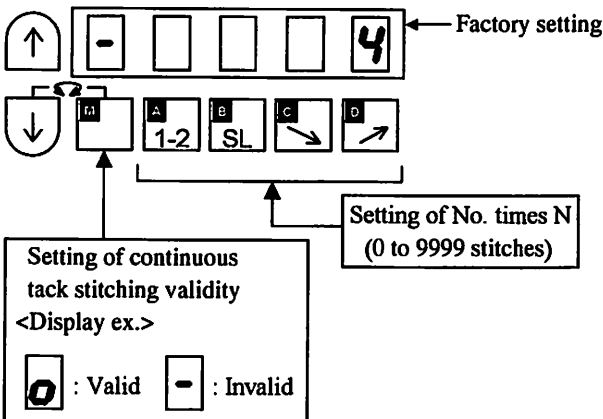
N



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

End tacking

2) When the pattern is No.4



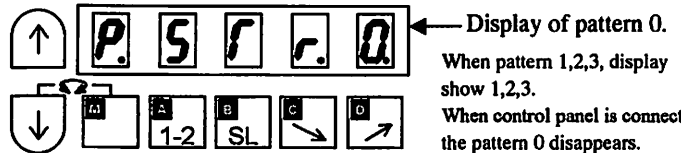
In the No. of times (N) setting is N=3, the stitching will be in the order or A,B and C. If the setting is N=5, the stitching will be in the order of A,B,C,D,C. If the N is 6 or more, the order will be A,B,C,D,C,D.....
(If N=0, tacking will continue in the order ABCDCD... while the pedal is pressed down.)

(4) Pattern No. selection mode

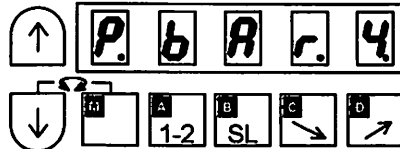
When the [↑] key is turned ON again, and the pattern No. selection mode will be entered.

Selecting of preset stitching setting, continuous tack stitching, program stitching (pattern No. A to H).

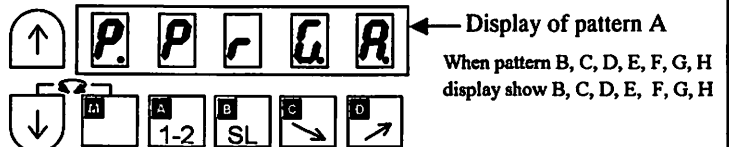
1) Display of preset stitching (Pattern 0 to 3)



2) Display of continuous tack stitching (Pattern 4)



3) Display of program stitching (Pattern A to 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]

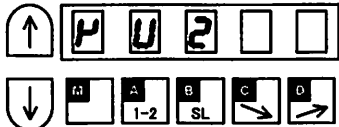
No.1 To set the functions for chain stitch sewing machine in simple setting

(Ex. to set for the VC2800, VC3800 class, "YAMATO").....Function setting [YU4]

1)

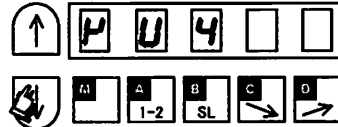
Enter program mode [2] ([↓] + [C] + [D]) (Indicates key operation. Refer to Page 15.)

2)



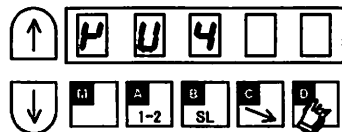
Program mode [2] will be entered.

3)



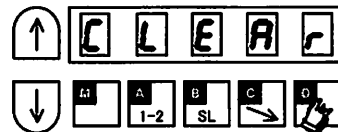
Set function to [YU4].

4)



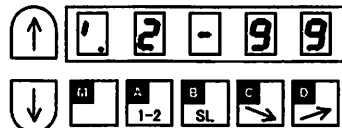
[YU4] will flicker when [D] is pressed.

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 21. 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 21.)
- B) To return to the normal mode from the [YU4] display, press the [↑] key while holding down [↓]. In this case, [YU4] 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].

Caution

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

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

Simple setting table for chain stitch sewing machine

Simple setting table for chain stitch sewing machine									
Function name	Digital display	Sewing machine maker	Model name of sewing machine and device	Needle position	High speed [H]	Low speed [L]	Trimming speed [T]	Start condensed speed [N]	End condensed speed [V]
YU2	PU2	YAMATO	VC2600, VC2700 class Solenoid-operated under thread trimmer	2	6000	200	200	1400	1400
YU3	PU3	YAMATO	VC2600, VC2700 class Air-operated under thread trimmer with air wiper	2	6000	200	200	1400	1400
YU4	PU4	YAMATO	VC3845P,2845P,2840P class Air-operated under thread trimmer with air wiper	2	6000	200	200	1400	1400
YU5	PU5	YAMATO	Solenoid-operated under thread trimmer with solenoid wiper	2	6000	200	200	1400	1400
NO1	no1	PEGASUS	W(T) series /UT device Pneumatic under thread trimmer with pneumatic top cover thread trimmer electric under thread trimmer	1	6000	200	200	1400	1400
NO2	no2	PEGASUS	W(T) series /UT device Electric under thread trimmer with electric top cover thread trimmer	2	6000	200	200	1400	1400
NO3	no3	PEGASUS	FW series /UT device	1	4500	200	200	1400	1400
NO4	no4	PEGASUS	W674/UT device Super tack	1	4000	200	200	1400	1400
NO5	no5	PEGASUS	W(T)562-82/UT device Angled stitch Pneumatic under thread trimmer with pneumatic top cover thread trimmer	1	6000	200	200	1400	1400
NO6	no6	PEGASUS	W562-82/UT device Angled stitch Pneumatic under thread trimmer with electric top cover thread trimmer	2	6000	200	200	1400	1400
NO7	no7	PEGASUS	W(T)600,200 series /UT/MS device Condensed stitch Pneumatic under thread trimmer pneumatic under thread trimmer with pneumatic top cover thread trimmer	1	6000	200	200	1400	1400
NO8	no8	PEGASUS	Do not use !!						
NO9	no9	PEGASUS	Do not use !!						
NOA	noA	PEGASUS	Do not use !!						
NOC	noC	PEGASUS	W(T)600 series /UT device Skipless Pneumatic under thread trimmer	1	4000	200	200	1400	1400
NOD	nod	PEGASUS	W(T)600 series /UT device Stitch lock Pneumatic under thread trimmer pneumatic under thread trimmer with pneumatic under thread trimmer	1	6000	200	200	1400	1400
NOE	noE	PEGASUS	Do not use !!						
NOF	noF	PEGASUS	BL500 series	1	6000	200	200	1400	1400
PFL	PFL	PEGASUS	For sewing machine with foot lifter, without thread trimmer	1	6000	200	200	1400	1400
PN	Pn	PEGASUS	For needle positioner	1	6000	200	200	1400	1400
KA1	KA1	KANSAI	M, RX series Automatic thread trimmer with solenoid wiper	2	6000	250	250	1400	1400
KA2	KA2	KANSAI	D series Automatic thread trimmer with air wiper	2	6000	250	250	1400	1400
KA3	KA3	KANSAI	F series Air-operated under thread trimmer with air wiper	2	6000	250	250	1400	1400
KA4	KA4	KANSAI	DX series Air-operated under thread trimmer with air wiper	2	6000	250	250	1400	1400
UN1	Un1	UNION SPECIAL	33700, 34500 class Solenoid-operated under thread trimmer	2	4000	200	200	1400	2999
UN2	Un2	UNION SPECIAL	34800skcc class Solenoid-operated under thread trimmer	2	5500	200	200	1400	2999
UN3	Un3	UNION SPECIAL	34700 class Push and Pull air-operated under thread trimmer with air wiper	2	4000	200	200	1400	2999
U345	U345		Do not use !!						
U346	U346		Do not use !!						
U348	U348		Do not use !!						
U347	U347		Do not use !!						
U160	U160		Do not use !!						
U16	U16		Do not use !!						
U362	U362		Do not use !!						
UFCW	UFCW		Do not use !!						
BR1	br1	BROTHER	FD3, FD4 series	2	6000	200	200	1400	1400
RM1	RM1	RIMOLDI	----	1	6000	200	200	1400	1400
SRB1	Srb1	SIRUBA	----	2	6000	200	200	1700	1700
JMH	JMH	JUKI	MH-481-4-4, MH-484-4-4 class	2	5500	200	200	1700	1900

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

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

Note : Please refer to the "TECHNICAL INFORMATION MANUAL" for the Junction wiring, I/O signals and details.

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)

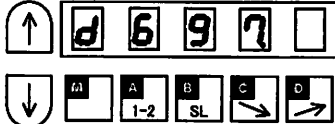
No.1 To set the functions for the DÜRKOPP ADLER thread trimming sewing machine in one step (For example, to set for the 271 class, "DÜRKOPP ADLER").....Function setting [D271]

1)

Enter program mode [3] ([↓] + [A] + [D])

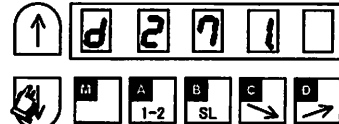
(Indicates key operation. Refer to page 15.)

2)



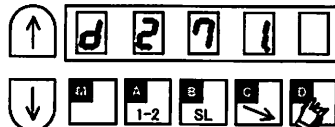
Program mode [3] will be entered.

3)



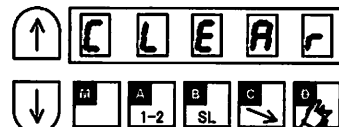
Set function to [D271].

4)



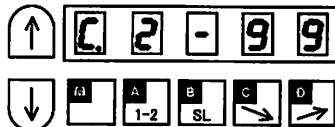
[D271] will flicker when [D] is pressed.

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] [750].

Caution

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

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

Simple setting table for thread trimming sewing machine

Simple setting table for thread trimming sewing machine									
Function name	Digital display	Sewing machine maker	Model name of sewing machine and device	Needle position	High speed [H]	Low speed [L]	Trimming speed [T]	Start tacking speed [N]	End tacking speed [V]
D697	0697	DÜRKOPP ADLER	697-15000 class	2	1500	250	150	700	700
D271	0271	DÜRKOPP ADLER	271-14000,272-14000 class	2	3000	170	250	1500	1500
D273	0273	DÜRKOPP ADLER	273-14000,274-14000 class	2	3000	170	250	1500	1500
B715	0715	BROTHER	DB2-B705,DB2-B707,DB2-B715 class	2	4300	215	215	1800	1800
B716	0716	BROTHER	DB2-B716-?,DB2-B716-1,DB2-B716-?,DB2-B716-5 class	2	3500	215	215	1800	1800
B737	0737	BROTHER	DB2-B737-1,DB2-B737-3,DB2-B737-5 class	2	4000	215	215	1800	1800
B740	0740	BROTHER	DB2-B746-5,DB2-B746-7,DB2-B746-8,DB2-B747-5,DB2-B748-5,DB2-B748-7 class	2	2000	215	215	1800	1800
B757	0757	BROTHER	DB2-B757 class	2	5000	215	215	1800	1800
B770	0770	BROTHER	DB2-B772,DB2-B774,DB2-B7740,DB2-B778 class	2	4500	215	215	1800	1800
B790	0790	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	2	3500	215	215	1800	1800
B830	0830	BROTHER	DB2-B837,DB2-B838 class	2	3000	215	215	1800	1800
BLT	061	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	2	3000	185	185	1000	1000
BLZ	061	BROTHER	LZ2-B852,LZ2-B853,LZ2-B854,LZ2-B856,LZ2-B857 class	2	3000	185	185	1800	1800
J500	0500	JUKI	DDL-500,DMN-5420NFA-6-WB class	2	5000	200	200	1700	1900
J505	0505	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	2	4000	200	200	1700	1900
J555	0555	JUKI	DDL-555-2-2B,DDL-555-2-4B,DDL-555ON,DDL-5570,DDL-5571,DDL-5580 class	2	4000	200	200	1700	1900
JDL	061	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	2	4200	200	200	1700	1900
JDU	061	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	2	2000	200	200	1700	1900
JLH	061	JUKI	LH-1172,LH-1180-5,LH-1182-5,LH-1150,LH-1152,LH-1160,LH-1162 class	1	2300	200	200	1700	1900
JLU1	061	JUKI	DDL-5560NL-6,LU-1114-5,LU-1114-6,LZH-1290-6 class	2	2800	200	200	1700	1900
JLU2	061	JUKI	LU-2210-6-0B class	2	3500	200	200	1700	1900
T100	1100	TOYOTA	AD1012,AD1012B,AD1012G,AD1013,AD1013A,AD1013G,AD1020,AD1102,AD1102B,AD1102G,AD1103,AD1103A,AD1202,AD1203,AD1204S,AD1205,AD1205S,AD1212G,AD1213,AD2200,AD5010S class	2	3500	200	200	1700	1700
T157	1157	TOYOTA	AD157,AD157G class	2	4000	200	200	1700	1700
T158	1158	TOYOTA	AD158,AD158-2,AD158-22,AD158A-3,AD158A-32,AD158B-2,AD158B-22,AD158G-2,AD158G-22,AD158-3,AD158-32 class	2	3500	200	200	1700	1700
T300	1300	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	2	1900	200	200	1700	1700
U639	0639	UNION SPECIAL	Class 63900 Solenoid-operated needle feed under trimmer	2	4000	250	180	1700	1700
SLH2	0639	SEIKO	SLH-2B	2	570	100	100	1700	1700
457G	457G	SINGER	457 Wiper	2	4000	250	160	1500	1500
457F	457F	SINGER	457 Thread pull	2	4000	250	160	1500	1500
591	591	SINGER	591, 1591	2	4000	250	200	1500	1500
211A	211A	SINGER	211A	2	2300	200	180	1000	1000
212A	212A	SINGER	212A	2	3500	200	180	1000	1000
411U	411U	SINGER	411U	2	4000	250	180	1500	1500
412U	412U	SINGER	412U	2	4500	250	180	1500	1500
591V	591V	SINGER	591V	2	4000	250	200	1500	1500
691A	691A	SINGER	1691D250	2	4000	250	200	1500	1500
691B	691B	SINGER	1691D210, 1691D200	2	4000	250	200	1500	1500
750	750	SINGER	750	2	4500	250	215	1500	1500

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













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

Note : Please refer to the "TECHNICAL INFORMATION MANUAL" for the Junction wiring, I/O signals and details.

From the library of: Superior Sewing Machine & Supply LLC

14 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)  H 4 0 0 0 3)  4
 M A B C D  M A B C D
 * Program mode [P] will be entered. * Set to [4].
- 4)  5 5)  0
 M A B C D  M A B C D
 * Set to [5]. * Set to [0].
- 6)  0 7)  H 4 5 0 0
 M A B C D  M A B C D
 * Set to [0]. * 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].
- 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 set the standing work type function setting [AT.ON]

- 1) Enter program mode [P] ([↓] + [↑])
- 2)  H 4 0 0 0 3)  A r .
 M A B C D  M A B C D
 * Program mode [P] will be entered. * Set function to [AT].
- 4)  ON 5)  A r . ON
 M A B C D  M A B C D
 * Set to [ON]. * 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])

14.How to use program mode (example of most frequently using)

3. To operate Half-stitch operation with a backstitching switch function setting [IE.UDS]

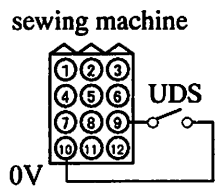
- 1)

Enter program mode [C] ([↓]+[C])
- 2)
 * Program mode [C] will be entered.
- 3)
 * Set function to [IE].
- 4)
 * Set to [UDS].
- 5)
 * Complete the [IE] function setting.
- 6)

Return to the normal mode ([↓]+[↑])

Description

- A. Turning ON the backstitching switch connected No.9 pin in sewing machine connector, 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.
 - B. The setting value will be changed with each press of the [D] key in step 4). (Factory setting is [S7])
- Note) When using this function, always return to the normal mode before starting operations.



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

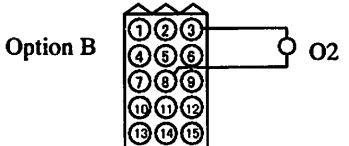
- 1)

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 [O2C] function setting.
- 9)

Return to the normal mode ([↓]+[↑])

Description

- A. Select the setting to connect [O2] and [PUL].
- B. Spare output solenoid [O2] will be turned on, while presser foot lifter is operated.



14.How to use program mode (example of most frequently using)

5. 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) 3)

* Program mode [C] will be entered. * Set to [PSU].

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

* Complete the [IA] function setting. Factory setting [IA.PSU]

6) Enter program mode [P] ([↓] + [↑])

7) 8)

* Program mode [P] will be entered. * Set function to [PSU].

9) 10)

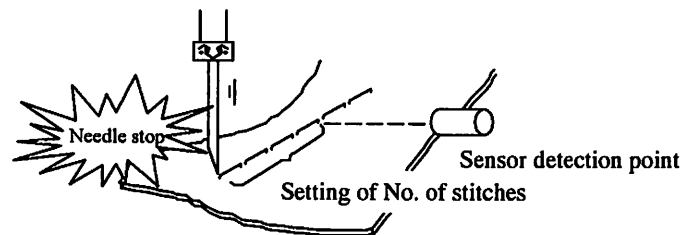
* Set to [1]. * Set to [0].

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

* Complete the [PSU] function setting.

Description

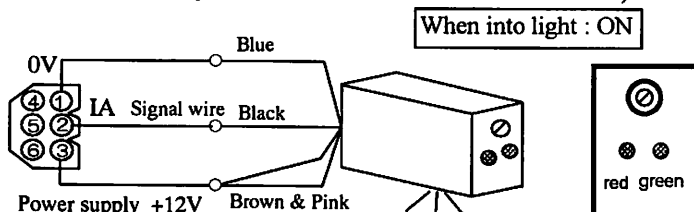
A. Set both [C] mode [IC] and [P] mode [PSU] function.
B. Connect photoelectric sensor to No.2 pin in option A connector, and photoelectric sensor is turned ON, the needle will stop at the UP position after 10 stitches and then the thread will be trimmed.



C. Each time the [D] key is pressed in step 3), 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 9) or [D] key in step 10) is pressed, the set value will change between 0 to 9.

Connection example

(* For example, use the optical sensor made in OMRON E3V3-D62.)



Option A connector (Optical sensor : E3V3-D62)

(*Please read the instruction manual of the optical sensor for handling.)

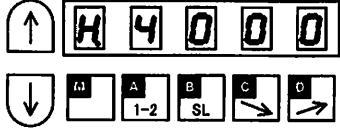
SENSOR SENSITIVITY SETTING

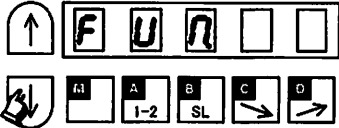
- 1) With a small screw driver, set the minimum sensitivity. (under clock wise).
The green LED is ON.
The red LED is OFF.
- 2) Slowly increase the sensitivity.
The red LED is ON.
- 3) Put a white paper or material piece under the sensor.
The red LED must go OFF.

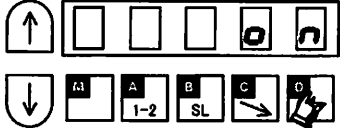
14. How to use program mode (example of most frequently using)

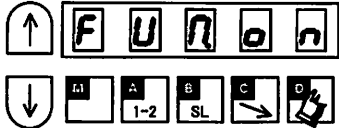
6. To continue presser foot lifting after the thread trimming, and to bring down the presser foot after the time set on the timer has passed function setting [FUM.ON] + [FU.C]

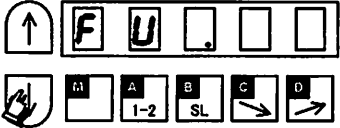
- 1)

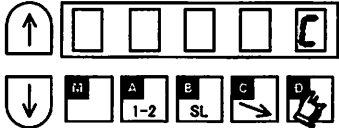
Enter program mode [P] ([↓] + [↑])
- 2) 

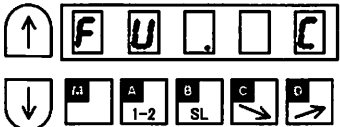
* Program mode [P] will be entered.
- 3) 

* 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)

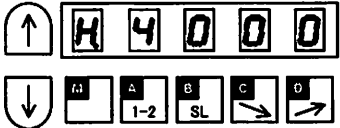
Return to the normal mode ([↓] + [↑])

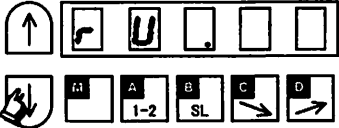
Description

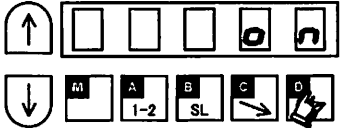
- A. Set both [FUM] and [FU] functions.
- B. Each time of the [D] key is pressed in step 4), the set value will alternate between [OF] and [ON]. (factory setting is [OF])
- C. Each time the [D] key is pressed in step 7), the set value will change in order of [M][C][A][T]. (factory setting is [M])
- D.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

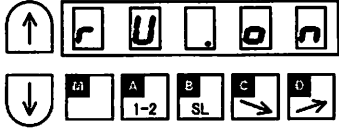
7. To set needle position higher than usual after thread trimming function setting [RU.ON]

- 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])

14. How to use program mode (example of most frequently using)

8. To display the rotational speed of the sewing machine be in running function setting [S.****]

- 1)

Enter program mode [B] ([↓]+[B])

- 2)

* Program mode [B] will be entered.
The first function of B mode is a speed display function of the sewing machine speed.

- 3) Run the sewing machine by the pedal toe down.

- 4)

* For instance, if the maximum speed setting is 4000 rotations, the speed when the pedal is fully toe down displays [S.4000] as shown in a left chart.

- 5) When the confirmation ends,

Return to the normal mode ([↓]+[↑])

Description

- A. The rotational speed of the sewing machine be in running is displayed.
- B. When differing from forecast speed, please confirm the maximum speed setting [H.] of P mode or the speed adjustment of the normal mode.

9. 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


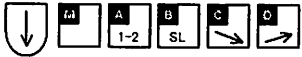

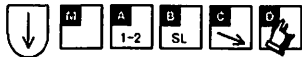

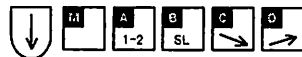
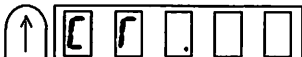
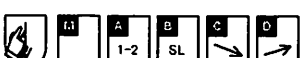


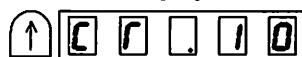
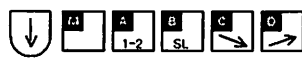
- A. Only variable-speed operation will be possible. Set position stopping and thread trimming will not be possible
- B. Each time the [D] key is pressed, the setting will alternate between [OF] and [ON]

14. How to use program mode (example of most frequently using)

10. To adjust tacking accurately

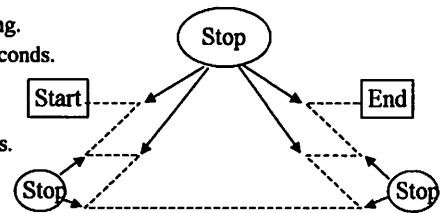
(1) To adjust tacking surely [D1. CST] + [CT. 10]

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


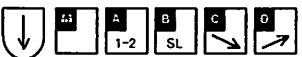

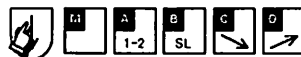
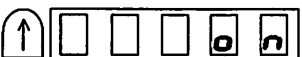
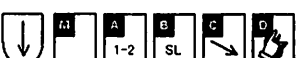

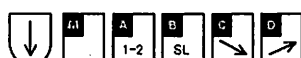
- 1) Enter program mode [D] ([↓] + [D])
- 2)   * Program mode [D] will be entered.
- 3)   * Set to [CST]
- 4)   * Complete the [D1] function setting
- 5)   * Set function to [CT]
- 6)   * Set to [10]
- 7)   * Complete the [CT] function setting
- 8) Return to the normal mode ([↓] + [↑])

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

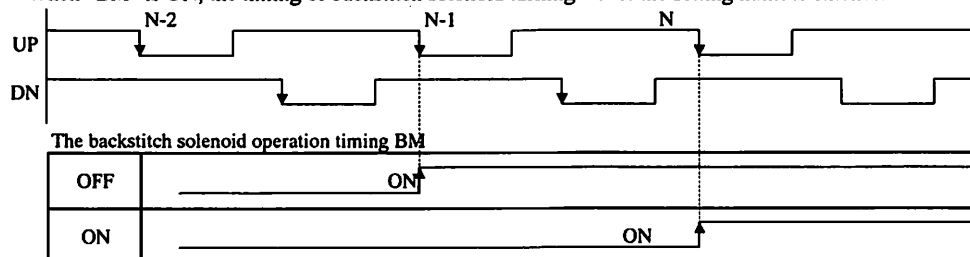
- A. Set function [BM] to [ON] when start/end tacking speed is less than 1000rpm
- B. Set function [BM] to [OF] when start/end tacking speed is 1000rpm or higher.
This BM function can be used for a rough tacking alignment of the start and end tacking.
- C. Each time the [D] key is pressed, the setting will alternate between [OF] and [ON]. (The factory setting is [OF].)
Note) This function can be used when a stop is not made at each corner when tacking.

When the function setting [D1. CST] is set, this function setting [BM. ON] will be invalidated.

D. Set to the tack alignment

When "BM" is OFF, the timing of backstitch solenoid turning ON is one stitch before the setting number stitches. (as shown below.)

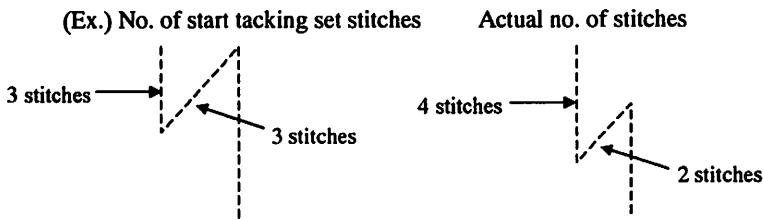
When "BM" is ON, the timing of backstitch solenoid turning ON is the setting number stitches.



14. How to use program mode (example of most frequently using)

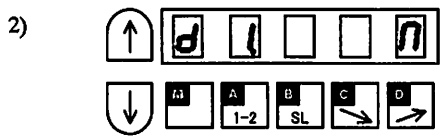
(3) To set the no. of stitch compensation for start tacking alignment BT1

(To correct the no. of advance stitches during start tacking)Function setting [BT1.4]

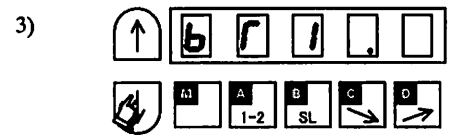


(Note) This no. of stitch correction can be used when a stop is not made at each corner when tacking.

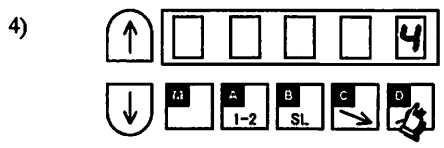
1) Enter program mode [D] ([↓] + [D])



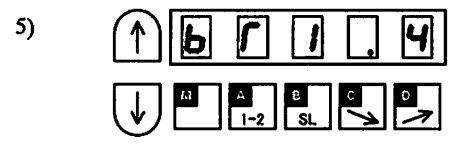
* Program mode [D] will be entered.



* Set function to [BT1]

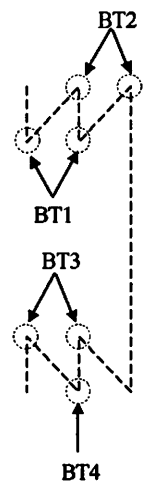


* Set to [4]



* 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 $\frac{1}{4}$	-2	-1 $\frac{3}{4}$	-1 $\frac{2}{4}$	-1 $\frac{1}{4}$	-1	- $\frac{3}{4}$	- $\frac{2}{4}$	- $\frac{1}{4}$	0	+ $\frac{1}{4}$	+ $\frac{2}{4}$	+ $\frac{3}{4}$	1	+1 $\frac{1}{4}$	+1 $\frac{2}{4}$

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

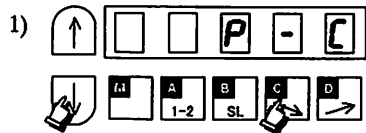
14. How to use program mode (example of most frequently using)

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

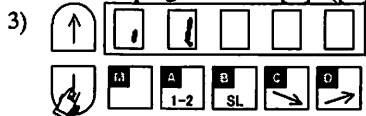
[1] Down counter "D" is subtracted at each ten stitches.

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

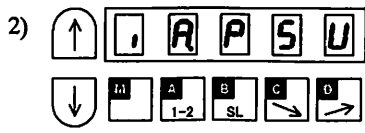
[3] When the input signal "I1" is turned on, down counter amount become "N" stitch and sewing become possible.



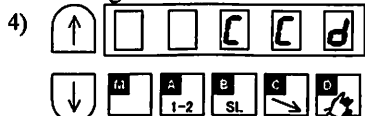
* Enter program mode [C]. ((↓)+[C])



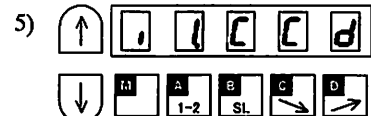
* Set to "I1" (Input signal)



* Program mode "C" will be entered.

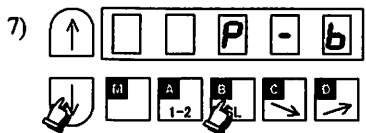


* Set to "CCD" (Input function)

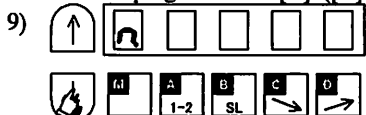


* Complete the "I1" function setting.

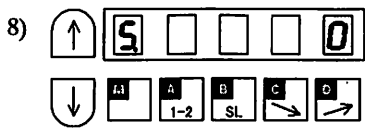
6) **Return to the normal mode((↓)+[↑])**



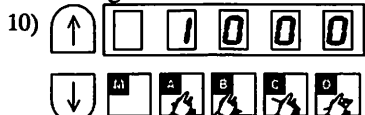
* Enter program mode [B]. ((↓)+[B])



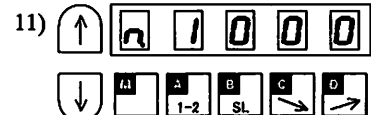
* Set to "N"



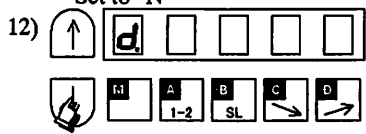
* Program mode "B" will be entered.



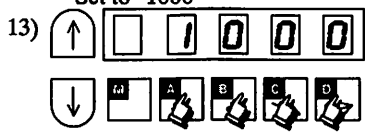
* Set to "1000"



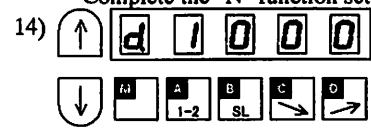
* Complete the "N" function setting.



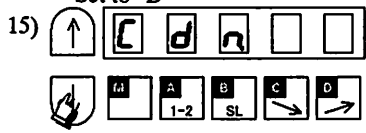
* Set to "D"



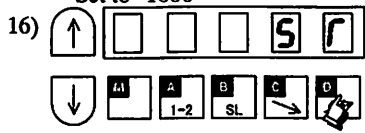
* Set to "1000"



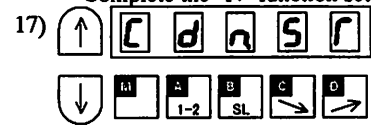
* Complete the "N" function setting.



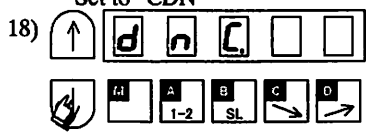
* Set to "CDN"



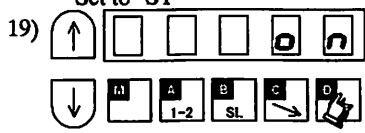
* Set to "ST"



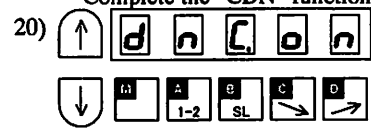
* Complete the "CDN" function setting.



* Set to "DNC"



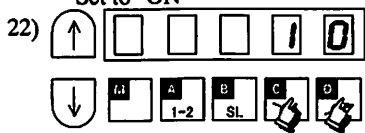
* Set to "ON"



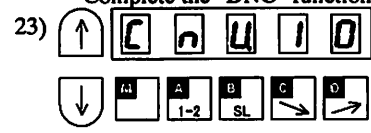
* Complete the "DNC" function setting.



* Set to "CNU"



* Set to "I0"



* Complete the "CNU" function setting.

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

Description

Selection the function on program mode "C".

[I1.CCD] : Input signal "I1" is set to down counter clear function.

Selection the function on program mode "B".

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

[D. 1000] : Current Down counter amount "1000"

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

[DSC. ST] : When the amount of current down counter become zero, sewing will be prohibited. (Mark "" is factory setting.)
Input signal "I1" is set to the following function. When it is turned on, sewing become possible.

[DNC.ON] : Set "DNC" to "ON" to use down counter.

[CNU_10] : Ten stitches subtract one count amount.

Note) [P] key function selection

[C] mode [IP]=[CCD] : Clear down counter
(counter with control panel [P] key clearness)

14. How to use program mode (example of most frequently using)

12. 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 42 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)

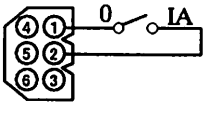
* Program mode [E] will be entered.
- 3)

* Select input function to see
- 4)

* 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 ([↓] + [↑])



Input signal (Factory setting)	Display
Variable speed run signal (SI)	IG
Thread trimming (S2)	IH
Presser foot lifter signal (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 (SD)	IC
Input signal (IO1)	I1
Needle lift signal (U)	I2
No setting (NO)	I4
No setting (NO)	I5
Encoder signal display (A phase)	ECA
Encoder signal display (B phase)	ECB
Detector signal display (UP signal)	UP
Detector signal display (DOWN signal)	DN
Display the angle from down position	DR
Display the voltage of VC	PD
Display the voltage of VCI	V1
Display the voltage of VC2	V2

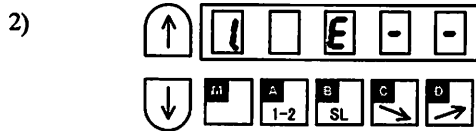
Description

- 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.

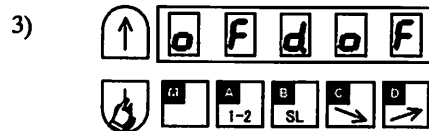
14. How to use program mode (example of most frequently using)

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

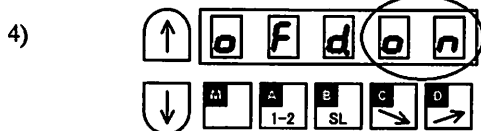
1) Enter program mode [E] ([↓] + [↑] + [A])



* Program mode [E] will be entered.



* Select output function to check.



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

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

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

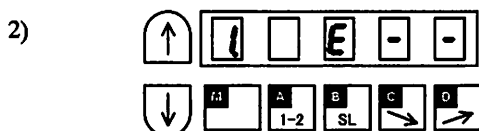
5) Return to the normal mode ([↓] + [↑])

Description

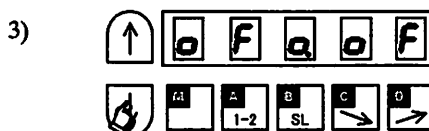
- A. It is useful function for check a operation before wiring solenoid.
- B. The input terminal refer to the explanation of the input/output signal.

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

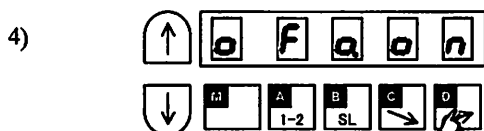
1) Enter program mode [E] ([↓] + [↑] + [A])



* Program mode [E] will be entered.



* Select output function to check.



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

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

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

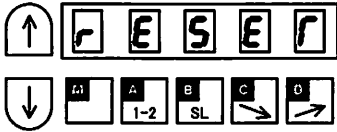
Description

- A. It is useful function for check a wiring.
- B. The input terminal refer to the explanation of the input/output signal.

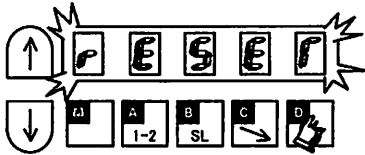
14.How to use program mode (example of most frequently using)

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

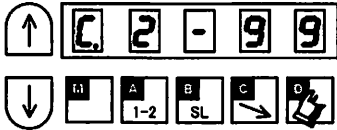
1) Enter program mode [R] ([↓] + [B] + [C])

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


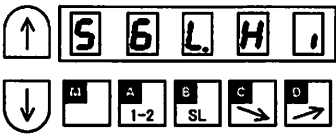
- A. When the normal mode will be entered pressing the [D] key when displayed [RESET],
all settings will be returned to the factory settings.
- B. To return the normal mode from the [RESET], press the [↓] key while holding down the [↑] key.
In this case, the settings will not be returned to the factory setting.

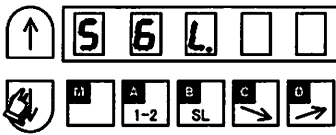
Caution

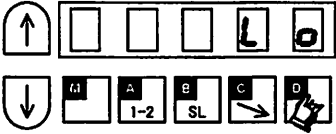
*When this function is set, the contents of all settings to this point will be cleared,
and will return to the factory settings. Please take care when using this function.*

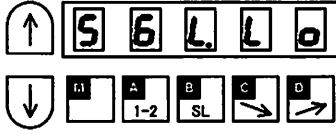
14. How to use program mode (example of most frequently using)

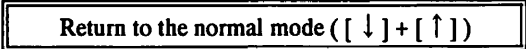
14. To set the ON/OFF operation of the thread trimming protective signal (S6) Function setting [S6L.LO] (Ex. To stop the machine by short circuiting (ON) the thread trimming protective signal (S6).)

- 1) 
- 2) 

* Program mode [P] will be entered.
- 3) 

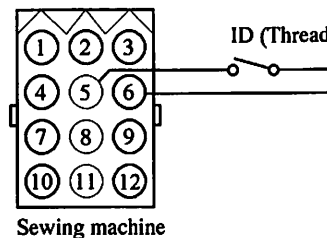
* Set function to [S6L].
- 4) 

* Set to [LO].
- 5) 

* The [S6L] function setting has been completed.
- 6) 

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 [LO], 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 stop when the sewing machine stops.)
- D. Connection example



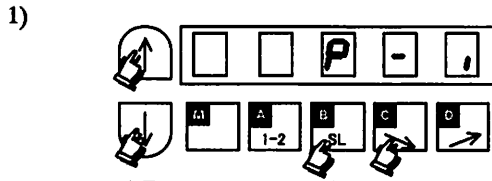
- [HI] setting.....Stops when S6 is open.
[LO] setting.....Stops when S6 is short circuited.

- E. The simple setting value is [LO] during function settings [NOE], [NOF], [PFL], [PN], [BR1], [RM1], [SRB1] and [JMH]. During the other function setting [YU2] ~ [YU5], [NO1] ~ [NO9], [NOA] ~ [NOD], [KA1] ~ [KA4], [UN1], [UN2], and [UN3] is [HI].

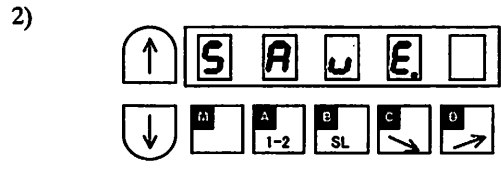
15 To save the setting data

1. How to use the program mode [I] (SAVE mode)

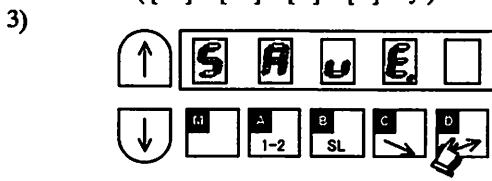
To save the setting data function setting [SAVE]



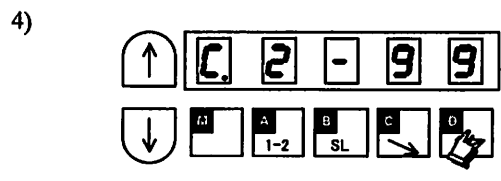
* Enter program mode [I]
 ([↓] + [↑] + [B] + [C] key)



* Program mode [I] will be entered.



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



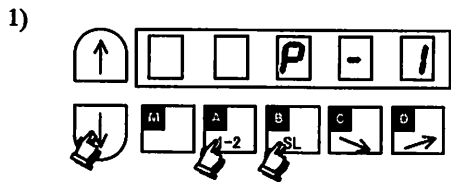
* Press [D] key (2 seconds or more) to return to the normal mode.

Description

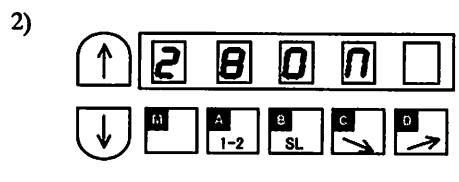
- A. It is possible to save the present data into the "Simple setting table".
 When the normal mode will be entered pressing the [D] key when displayed [SAVE], all setting data will be saved.
- B. To return to the normal mode from the [SAVE] display, press the [↓] key while holding down [↑] key.
 In this case, the setting data will not be saved.
- C. When this [SAVE] function is set, the setting data will be saved into the [LOAD] on the program mode [1].
 It is possible to load the saved data by the selection of [LOAD] in the program mode [1].
 (The factory setting of [LOAD] is the setting data of [280M].)

NOTE
 When this [SAVE] function is set, the setting data of [LOAD] to this point will be cleared, and will save into the [LOAD] newly. Please take care when using this function.

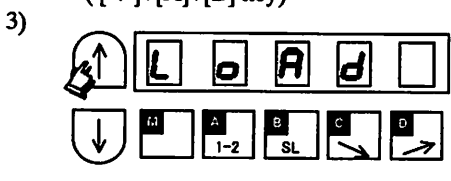
D. To load the saved data



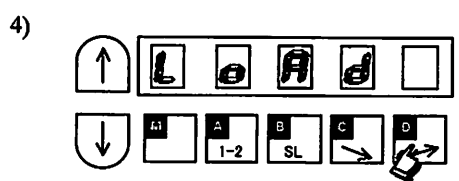
* Enter program mode [1]
 ([↓] + [A] + [B] key)



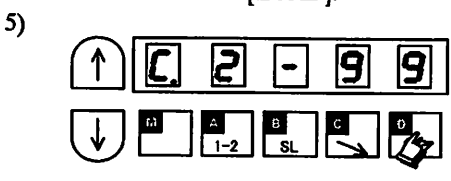
* Program mode [1] will be entered.



* Set function to [LOAD].



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

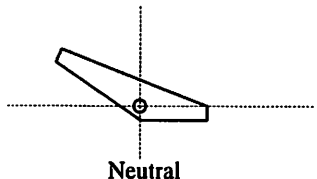



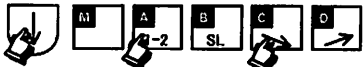
* Press [D] key (2 seconds or more) to return to the normal mode.


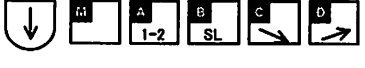
16 To adjust the neutral, toe down, heeling position data of the pedal


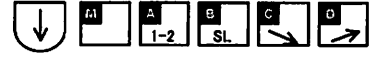
1. How to use the program mode [Q]


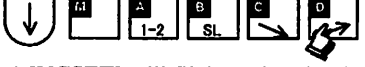
To adjust the neutral, toe down, heeling position data of the pedal function setting [VCSET]
(When the error code is "MA".)


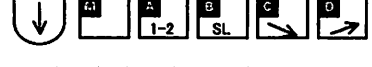
- 1) The pedal is neutralized.
 

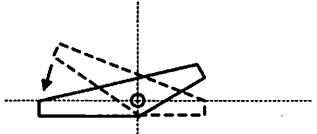
Neutral
- 2)
 


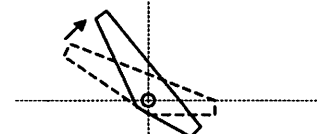
* Enter program mode [Q]
([↓] + [A] + [C] key)
- 3)
 


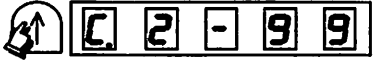
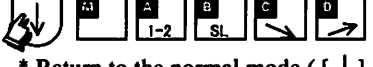
* Program mode [Q] will be entered.
- 4)
 


* Set function to [VCSET].
- 5)
 


* [VCSET] will flicker when [D] key is pressed.
- 6)
 


* The display changes into [START].
(At this point, the neutral position is memorized.)
- 7) Toe down the pedal in the maximum.
(The maximum toe down position is memorized.)
 

Neutral → Toe down in the maximum
- 8) Full heeling the pedal in the maximum.
(The maximum heeling position is memorized.)
 

Neutral → Full heeling in the maximum
- 9)
 


* Return to the normal mode ([↓] + [↑] key)
Complete the adjustment

Description

- A. The neutral of the internal lever unit, toe down, and the heeling position can be adjusted.
If the pedal keeps neutralizing and the [D] key be pushed in the state, it changes into the display of [START] after the display blinks.
(At this point, a neutral position is memorized.)
Afterwards, it is done to toe down and to operate the heeling about the pedal.
(At this time, the maximum toe down position and the maximum heeling position are memorized.)
It can be done to toe down and to operate the heeling about the pedal times how many.
Finally, return to the normal mode pushing [↓] key at the same time pushing [↑] key.
- B. To return to the normal mode from the [VCSET] display, press the [↓] key while holding down [↑] key.
In this case, it will not adjust the neutral, toe down, heeling position data of the internal lever unit.

NOTE

When the position data of the internal lever unit is defective, error "MA" is displayed.
Please do again, the memory of the position data of the neutral, toe down and heeling by operating the above-mentioned after confirming a neutral position of the pedal (lever unit).

Function name	Function	Mode
H.	Maximum speed	P01
L.	Low speed	P02
T.	Thread trimming speed	P03
N.	Start tacking speed	P04
V.	End tacking speed	P05
M.	Medium speed	P06
S.	Slow start speed	P07
SLN.	No. of slow start stitches	P08
SLM.	Slow start operation mode	P09
SLP.	Slow start when power is turned ON	P10
SH.	One shot	P11
SHM.	One shot operation mode	P12
PSU.	No. of stitches after PSU input	P13
PSD.	No. of stitches after PSD input	P14
PS1.	Sensor input signal PS1 operation mode	P15
1.	No. of stitches after PS1 input	P16
PS2.	Sensor input signal PS2 operation mode	P17
2.	No. of stitches after PS2 input	P18
PSN.	Restart after PSD,PSU input PSN	P19
SEN.	Input sensor function valid / invalid	P20
SE.	Setting stitch amount to stop by "SEN"	P21
FUM.	Presser foot lift momentary	P22
FU.	FUM operation mode	P23
FCT.	Time setting for FUM operation mode	P24
FD.	Time to motor drive after presser foot lifter bring down	P25
FO.	Full wave time of presser foot lifter output	P26
S3D.	Delay time of presser foot signal S3 input	P27
FUD.	Presser foot lifting output chopping duty	P28
PFU.	Presser foot lifting output when power is turned ON	P29
FL.	Cancel the presser foot lifting with full heeling	P30
S3L.	Cancel presser foot lifting with light heeling	P31
S2L.	Cancel of thread trimming operation	P32
S6L.	Thread trimming protection signal (S6) logical changeover	P33
AT.	Automatic operation	P34
TL.	Thread trimmer cancel	P35
TLS.	Auto-stop of preset stitch sewing before trim	P36
RU.	Reverse run needle lifting after thread trimming	P37
RB.	RU reverse run angle	P38
TB.	Thread trimming with reverse feed	P39
TBJ.	Not used.	P40
S2R.	Full heeling, S2 signal operation mode	P41
IL.	Cancel of interlock after full pedal heeling	P42
TR.	Thread trimming mode	P43
POS.	Thread trimming validity at neutral pedal	P44
P1P.	Operation when power is turned ON during 1 position setting	P45
P2P.	Operation when power is turned ON during 2 position setting	P46
C8.	Needle stop position before fabric	P47
D8.	Needle DOWN position stop angle	P48
U8.	Needle UP position stop angle	P49
K8.	Reverse run angle from DOWN position to UP position	P50
E8.	ON angle of virtual "TM"	P51
S8.	ON start angle of virtual "TM"	P52
SNM.	Setting sensor "SEN" input function	P53
KD.	Virtual down Setting	P54
KDU.	Virtual width of up and down signal	P55
PSJ.	Not used.	P56

P mode (For sewing machine) : [↓][↑] key

Function name	Function	Mode
GA.	Gain high/low selection	A01
PDC.	Pedal curve	A02
AC.	Acceleration time simple setting	A03
ACT.	Acceleration time	A04
DC.	Deceleration time simple setting	A05
DCT.	Deceleration time	A06
SC.	S-character cushion	A07
SCT.	S-character cushion time setting	A08
S2M.	Full heeling S2 signal operation mode when power is turned on or after thread trimming	A09
PL.	Sewing machine shaft/motor shaft speed setting selection	A10
MR.	Setting motor pulley diameter	A11
SR.	Setting sewing machine pulley diameter	A12
NOS.	No detector mode	A13
MSP.	Motor maximum speed	A14
STM.	First priority stop => speed control	A15
BKT.	Brake time	A16
BB.	Weak brake angle	A17
BNR.	Reduction of weak brake sound	A18
BKS.	Weak brake force	A19
BKM.	Weak brake mode	A20
BK.	Weak brake	A21
S.	Display sewing speed	B01
N.	Down counter setting count amount	B02
D.	Down counter display count amount	B03
P.	Up counter setting count amount	B04
U.	Up counter display count amount	B05
CUP.	Up counter the selection of setting mode	B06
USC.	Up counter the selection of counter operation	B07
UCM.	Up counter changing sewing pattern	B08
UPC.	Up counter valid / invalid	B09
NXU.	Up counter operation after counting over	B10
CDN.	Down counter the selection of setting mode	B11
DSC.	Down counter the selection of counter operation	B12
DCM.	Down counter changing sewing pattern	B13
DNC.	Down counter valid / invalid	B14
NXD.	Down counter operation after counting over	B15
PCM.	Counter condition turning on power switch	B16
PRN.	Setting Thread trimming times "N"	B17
CNU.	Setting Number of stitches "N"	B18
CCI.	Count modification (to use IO1, IO2)	B19
PMD.	Display condition turning on power switch	B20

A mode (For servo motor) : [↓][↑][A] key

B mode (For counter/speed display) : [↓][↑][B] key

Program mode [I] (Save mode of the setting data)

: [↓][↑][I]+[B]+[C] key

Function name	Function	Mode
SAVE.	Save mode of the setting data	I01

Program mode [R] (Reset) : [↓][↑][R]+[B]+[C] key

Function name	Function	Mode
RESET.	Reset	R01

Program mode [1] (Mitsubishi sewing machine) : [↓][↑][A]+[B] key

Function name	Function	Mode
280M.	LS2-1280-M1T(W)	1-01
:	:	:
LOAD.	Load of the saved setting data	1-24

Program mode [2] (Chain stitch sewing machine) : [↓][↑][C]+[D] key

Function name	Function	Mode
YU2.	YAMATO VC26000, VC2700 class	2-01
:	:	:
JMH.	JUKI	2-34

Program mode [3] (other lock stitch sewing machine) : [↓][↑][A]+[D] key

Function name	Function	Mode
D697.	DURKOPP ADLER 697-45000 class	3-01
:	:	:
750.	SINGER	3-38

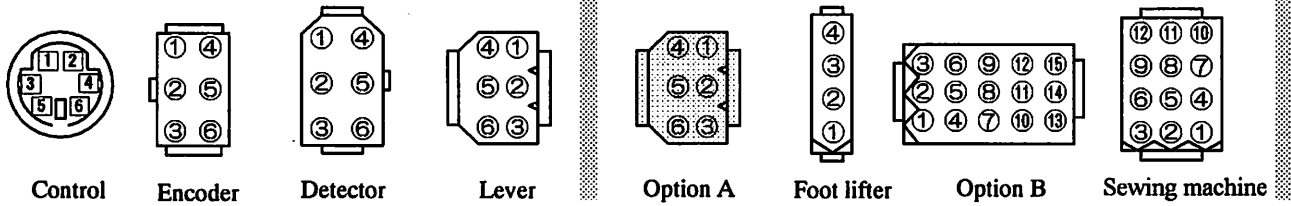
	Function name	Function name	Mode
C mode (For setting input/output signal to function) : [] + [C] key	I#	Selection of input signal function	C01
	IA. ~ 1P.	:	:
	I1., I2., I4. ~ 17.	:	:
	I#L	Input signal logical changeover function	C02
	IAL. ~ 1PL.	:	:
	I1L., I2L., I4L. ~ 17L.	:	:
	I#A	Input signal alternating operation	C03
	IAA. ~ 1EA., I6A. ~ 1PA.	:	:
	I4A. ~ 17A.	:	:
	I#M	Setting the function for IF, I1 and I2	C18
	IFM., I1M., I2M.	:	:
	R#S	Set condition of RS F/F for IF, I1 and I2	C19
	RFS., R1S., R2S.	:	:
	R#R	Reset condition of RS F/F for IF, I1 and I2	C20
	RFR., R1R., R2R.	:	:
	R#N	RS F/F reset stitch amount for IF, I1 and I2	C21
	RFN., R1N., R2N.	:	:
	I1O.	Special setting for input signal "I1" (Neglecting of signal)	C55
	I1F.	Special setting for input signal "I1" is ON	C56
	I#C	RS F/F clear setting	C57
	I1C., I2C.	:	:
	#CT	RS F/F delay time setting	C58
	I1CT., 2CT.	:	:
	F1P.	Input signal I1 virtual F/F circuit operation 1	C59
	F1C.	Input signal I1 virtual F/F circuit operation 2	C60
	F1S.	Input signal I1 virtual F/F circuit operation 3	C61
	O#	Selection of output signal function	C85
	OA. ~ 0D., 0F.	:	:
	01. ~ 07., 0M. ~ 0P.	:	:
	O#L	Output signal logical changeover function	C86
	OAL. ~ 0DL., 0FL.	:	:
	01L. ~ 07L., 0ML. ~ 0PL.	:	:
	O#C	Output chopping function	C87
	OAC. ~ 0DC.	:	:
	01C. ~ 03C., 06C., 07C.	:	:
	O#T	Output signal forced OFF function	C88
	OAT. ~ 0DT.	:	:
	01T. ~ 07T., 0MT. ~ 0PT.	:	:
	D#	Output signal delay time setting function	C89
	DA. ~ 0D., 0F.	:	:
	D1. ~ 07., 0M. ~ 0P.	:	:
	FUD.	Presser foot lifter output chopping duty	C107
	FO.	Presser foot lifter FU full wave output time	C108
	FU.	Presser foot lifter FU momentary mode	C109
	PO.	Full wave output time for each output	C158
	POD.	Output chopping duty except of FU output	C159
	OTT.	Forced OFF timer setting function for each output	C160
	FCT.	FUM operation mode timer setting function	C161
	A#	Logic [AND] module	C162
	A1. ~ A3.	input function selection	:
	A#L	Logic [AND] module	C163
	A1L. ~ A3L.	setting of Hi /Low logic	:
	A#A	Logic [AND] module	C164
	A1A. ~ A3A.	Alternate	:
	N#	Logic [AND] module	C165
	N1. ~ N6.	output function selection	:
	N#L	Logic [AND] module	C166
	N1L. ~ N6L.	setting of Hi /Low logic	:
	OR.	Logic [OR] module input function selection	C183
	ORL.	Logic [OR] module setting of Hi /Low logic	C184
	ORA.	Logic [OR] module Alternate	C185
	R#	Logic [OR] module	C186
	R1., R2.	output function selection	:
	R#L	Logic [OR] module	C187
	R1L., R2L.	setting of Hi /Low logic	:
	CSP.	Variable speed command for digital input	C190
	CSG.	Variable speed command for digital input (Gray code)	C191
	LB.	Thread release + backstitch output	C192
	T#C	Virtual output (OT1 ~ OT3) forced OFF	C193
	T1C. ~ T3C.	function	:
	T#T	Forced OFF timer setting function for virtual	C194
	T1T. ~ T3T.	outputs (OT1 ~ OT3)	:
	D11.	ON delay time setting function for virtual	C199
		output OT1	:
	D12.	OFF delay time setting function for virtual	C200
		output OT1	:

	Function name	Function name	Mode	
C mode	D21.	ON delay time setting function for virtual output OT2	C201	
	D22.	OFF delay time setting function for virtual output OT2	C202	
	D31.	ON delay time setting function for virtual output OT3	C203	
	D32.	OFF delay time setting function for virtual output OT3	C204	
	CPK.	Feed pulse output (CP) cancel function	C205	
	CP.	Setting CP pulse amount	C206	
	CPC.	Prohibited angle of output CP pulse	C207	
	PSW.	Panel switch operation prohibit	C208	
	CKB.	O4, O5 output cancel during backtack term	C209	
	CPB.	CP output cancel during backtack term	C210	
	C.	Speed setting for the [SPC] output	C211	
	D.	Speed setting for the [SPD] output	C212	
	E.	Speed setting for the [SPE] output	C213	
	CNF.	F key function on control panel	C214	
	D mode (For tacking setting mode) : [] + [D] key	D1.	Operation mode during tacking	D01
		D2.	Operation mode during start tacking completion	D02
		CT.	Stop time at each corner during start and backtacking	D03
		BM.	Tack alignment	D04
		BT1.	No. of stitch compensation for start tacking alignment	D05
		BT2.	No. of stitch compensation for start tacking alignment	D06
		BT3.	No. of stitch compensation for end tacking alignment	D07
		BT4.	No. of stitch compensation for end tacking alignment	D08
		BTP.	No. of tacking stitches (+) 15 stitches function	D09
		BTO.	No. of tacking stitches addition stitches function	D10
BTT.		Full heeling function immediately after start tacking stop	D11	
CSJ.		Not used.	D12	
SPN.		The speed operation mode when both the medium speed signal and SSV signal is ON	D13	
BTM.		Set table types of tacking	D14	
S7M.		Input signal S7 operation mode during preset stitching	D15	
S7U.		Manual backstitch ON timing 1	D16	
S7D.		Manual backstitch ON timing 2	D17	
7BD.		The OFF timing setting of output B when the backstitching signal (S7) is OFF setting.	D18	
BTN.		The maximum tacking stitches (maximum stitches is 99 stitches)	D19	
BCC.		No. of end tacking stitches during direct heeling	D20	
TLS.		Operation mode during thread trimmer cancel signal [TL] setting	D21	
BTS.		Input signal BTL quick pressing operation	D22	
BS.		Input signal SB and EB quick pressing operation	D23	
BTD.		Operation when input signal BTL is ON	D24	
BD.		Operation when input signal SB and EB tacking OFF are set	D25	
PNE.		End tacking cancel mode with input signal PSU	D26	
BZ.		The buzzer of control panel validity	D27	
E mode (For H/W checking mode) : [] + [] + [A] key	1.-4.	Error code (The last error code)(The fourth to last code)	E01	
		:	:	
	P.	Total integration time of power on	E05	
	M.	Total integration time of motor run	E06	
	I#	Input display	E07	
	IA. ~ 1L., IP.	:	:	
	I1., I2.	:	:	
	I4., I5.	:	E23	
	ECA.	Encoder signal display (A phase)	E24	
	ECB.	Encoder signal display (B phase)	E25	
	UP.	Detector signal display (UP signal)	E26	
	DN.	Detector signal display (DOWN signal)	E27	
	DR.	Display the angle from down position	E28	
	PD.	Display the voltage of VC	E29	
	V1.	Display the voltage of VC1	E30	
	V2.	Display the voltage of VC2	E31	
	O#D	Output signal display	E32	
	OAD. ~ 0DD.	:	:	
	OPD.	:	:	
	01D. ~ 03D.	:	:	
	06D., 07D., 0PD.	:	E42	
	O#O	Solenoid output	E43	
	0A0. ~ 0D0.	:	:	
	0F0.	:	:	
	010. ~ 030.	:	:	
	060., 070., 0P0.	:	E53	
	WT.	Rated output display	E54	
VL.	Voltage display	E55		
TP.	Model display	E56		
DV.	Data version No.	E57		
RV.	Software version No.	E58		
T.	Display previous simple setting selected.	E59		

18 How to Use the Option Connector

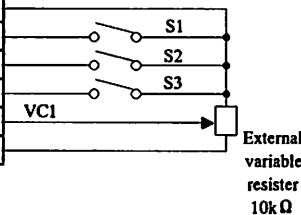
Variable operation are possible by adding external signals to the option connector.
 A current of approximately 1.5 mA flows through the switches used for the input signal, so please use switch for minute current.

1. Connector Layout XC-FMFY



Lever (White)

Signal name	Factory setting	
0V	0V	1
IG	S1 : Run (Variable speed)	2
IH	S2 : Thread trimming	3
II	S3 : Presser foot lifter	4
VC1	VC1 : Variable speed command	5
+12V(5V)	+12V	6

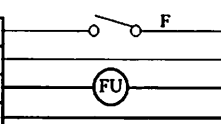


Communication / Control panel

RXD1	1
RXD0	2
TXD1	3
0V	4
+12V	5
TDX0	6

Presser foot lifter

0V	0V	1
IF	F : presser foot input	2
OF	FU+ : presser foot lifter output +	3
	FU- : presser foot lifter output -	4

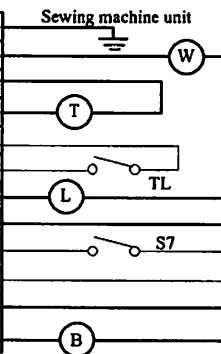


Encoder

0V	1
EA	2
EB	3
+12V	4
Ground	5
---	6

Sewing machine

Ground	Ground	1
OB	W : Wiper output	2
+24V/+30V	+24V	3
OA	T : Thread trimming output	4
0V	0V	5
ID	TL : Thread trimmer cancel input	6
OD	L : Thread release output	7
+24V/+30V	+24V	8
IE	S7 : Backstitch input	9
0V(+5V)	0V	10
+24V/+30V	+24V	11
OC	B : Backstitch output	12



Detector

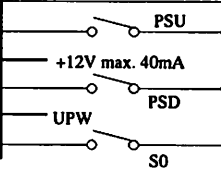
0V	1
---	2
Ground	3
UP	4
DN	5
+12V	6

Lever (internal)

VC	1
+12V	2
0V	3

Option A (Black)

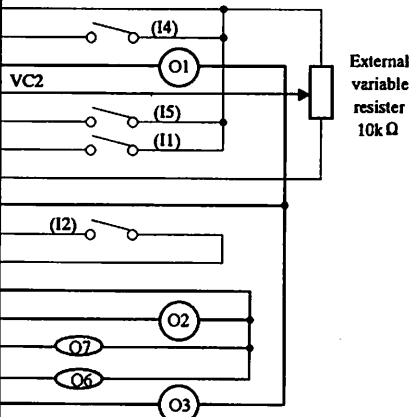
0V	0V	1
IA	PSU : Up position stop input	2
+12V(+5V)	+12V	3
IB	PSD : Down position stop input	4
O4	UPW : Needle Up position output	5
IC	S0 : Low speed input	6



Note 1 : Pin number 5 is for the signal output.

Option B

0V	0V	1
I4	No setting	2
O1	OT1 : Virtual output	3
VC2	VC2 : Variable speed command	4
I5	No setting	5
I1	IO1 : Virtual input	6
+5V(+12V)	+5V	7
+24V/+30V	+24V	8
I2	U : Needle lift signal	9
0V	0V	10
+24V/+30V	+24V	11
O2	NCL : Needle cooler output	12
O7	No setting	13
O6/CP	No setting	14
O3	TF : "TF" output	15



Note 2 : Pin number 3,12,15 are for the solenoid output.

Note 3 : Pin number 13,14 are for the air valve output. (not for the solenoid output)

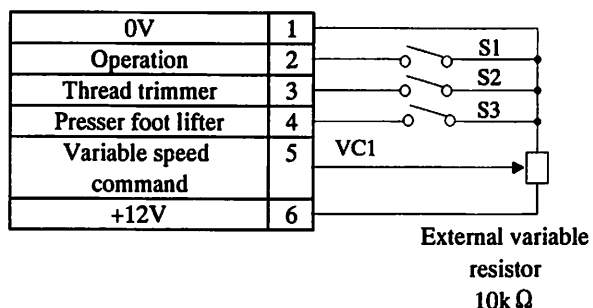
18. How to Use the Option Connector

2. 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.

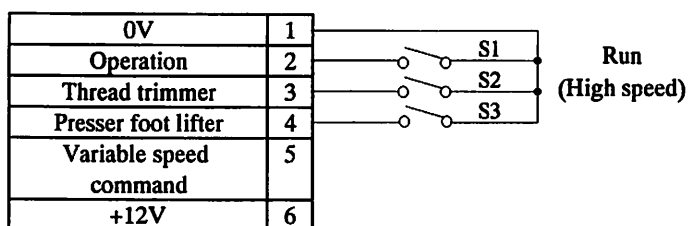
- (1) When operating with an external variable resistor
(Control panel [auto] and AT in [P] mode is OFF)

Lever (white connector)



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

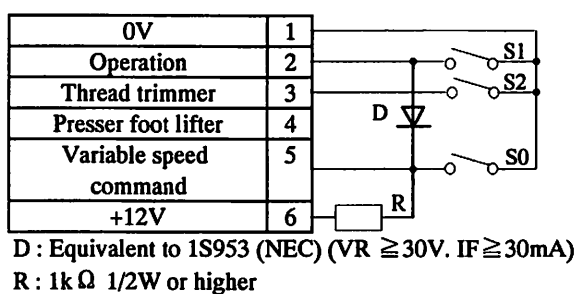
Lever (white connector)



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

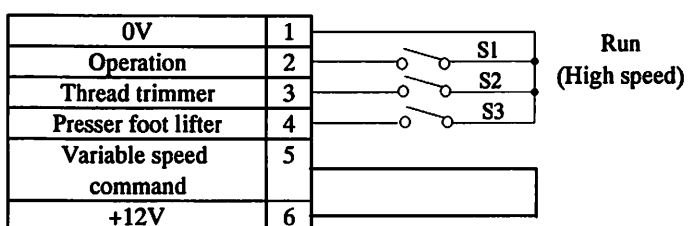
(a) When using the lever connector

Lever (white connector)

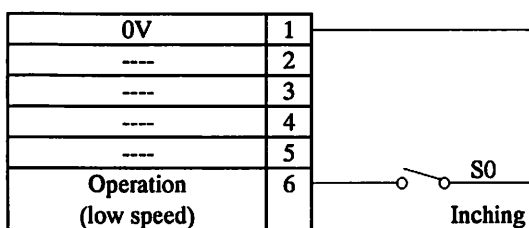


(b) When using the lever connector and option connector

Lever (white connector)




Option A (black connector)



19 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
Pwr.oF	Is the power voltage too low? Is the power supply capacity too small? <div style="border: 1px solid black; padding: 2px; text-align: center;">Note : It does this display when power supply is turned OFF, but this is not an error.</div>	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.
MA	The position data of the internal lever unit is defective. When power supply is turned ON, the pedal is not neutral position.	The pedal is neutralized. (It returns automatically 1 second later.)

Others	Probable cause	Inspection
The sewing does not run when the pedal pressed.	Are the operation signals from the lever unit broken? Is the fuse for +12V power supply broken?	Check the lever unit signal. (Refer to [E] mode.) Replace the fuse, when the position detector lamp does not light. (Refer to item 3.12.)
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? Is the trim key  of the control switch panel OFF?	Check the signal S2. (Refer [E] mode.) Set S2L to OFF. (Refer [P] mode.) Set the trim key to ON.
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.)

20 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(Y)	XL-554-20(Y)	
	Voltage (V)		100 to 120V	200 to 240V	
	Rated output (W)		550W		
	Rated torque (N·m)		1.76N·m (0.18Kg·m)		
	Rated speed (rpm)		3,000rpm		
	Maximum speed (rpm)		3,600rpm		
	Weight (kg)		8.7 kg		
Control box	Model name	General purpose automatic thread trimmer	XC-FMFY-10-05	XC-FMFY-20-05	
	Voltage (V)		100 - 120V	200 - 240V	
	Speed control range	With sewing machine shaft (rpm)	70 to 4,000 (MAX 8,999) rpm		
		With motor shaft (rpm)	50 to 3,600 rpm		
	Solenoid voltage		DC 24V/30V		
	Range of rating Voltage		±10%		
	Ambient temperature		5°C ~ 40°C		
	Ambient humidity		30% ~ 95%		
	Storage temperature		-25°C ~ 55°C		
	Altitude		Under 1000m above mean sea level		
	Weight (kg)		3.6 kg		
Position detector			XC-KE-01P (XC-FMFY for Mitsubishi sewing machine is option)		

(DC 24V Setting)

Solenoid	OF (Presser foot lifter output FU)	OA (Thread trimming output T)	OB (Wiper output W)	OC (back stitch output B)
Specifications				
Impedance (Ω)	8 or more (continuous time rating)	4 or more (short time rating)	5 or more (short time rating)	4 or more (short time rating)
Solenoid	OD (Thread release L)	O1 (Virtual output1)	O2 (needle cooler output)	O3 (TF output TF)
Specifications				
Impedance (Ω)	4 or more (short time rating)	4 or more (short time rating)	5 or more (short time rating)	4 or more (short time rating)

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

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

Note 3) Total maximum current is 3.0A.

(DC 30V Setting)

Solenoid	OF (Presser foot lifter output FU)	OA (Thread trimming output T)	OB (Wiper output W)	OC (back stitch output B)
Specifications				
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	OD (Thread release L)	O1 (Virtual output1)	O2 (needle cooler output)	O3 (TF output TF)
Specifications				
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) In the brackets, it is a factory setting.

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

Note 3) Total maximum current is 2.4A.

(Rated output current of valve output)

Rated maximum output current	O6, O7 : Total maximum current is 0.3A.
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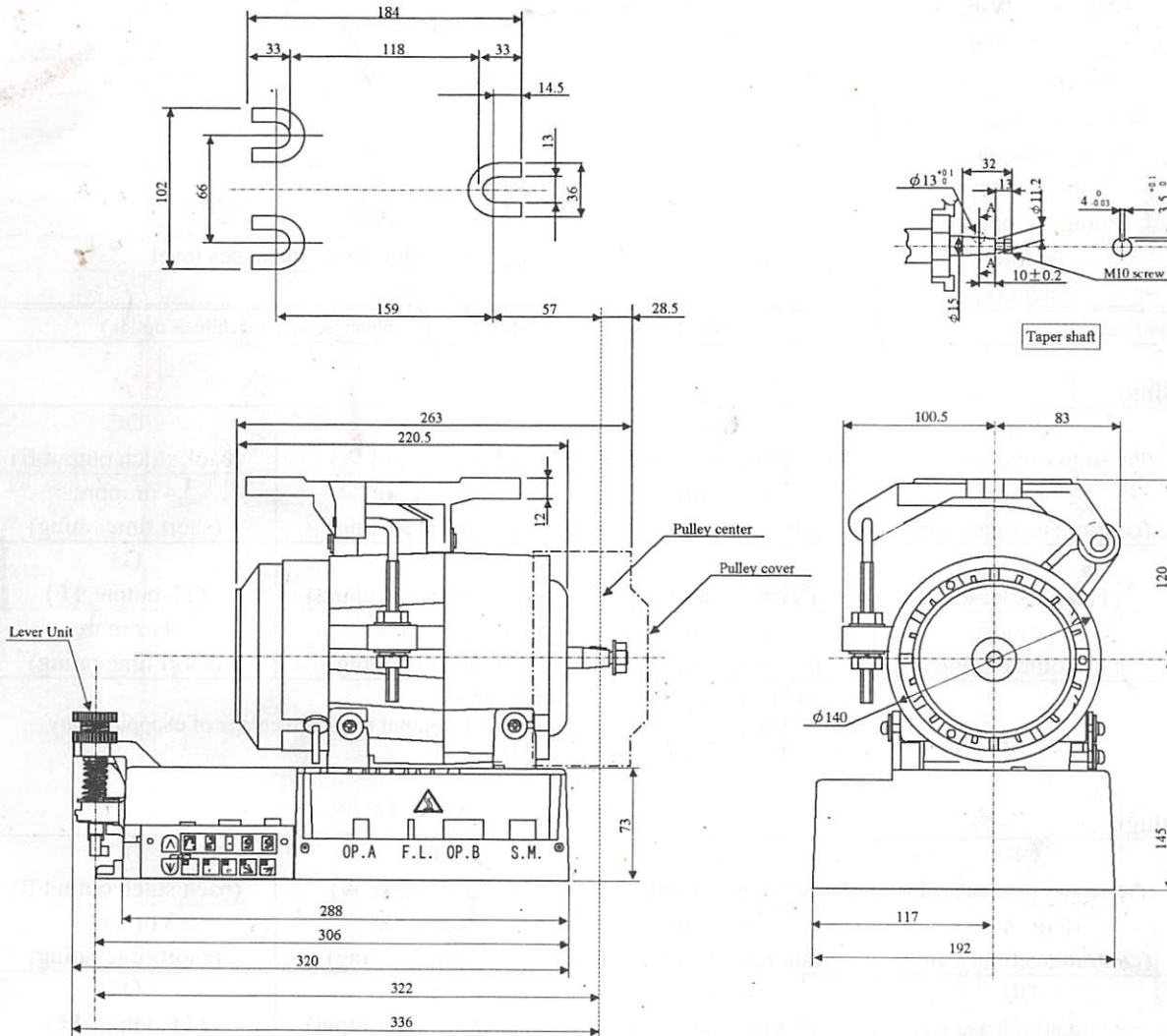
21 Table of digital display and Dimensions

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	t	L	n	n	o	P	q	r	S	T
Character	U	V	W	X	Y	Z				
Digital display	U	v	W	X	Y	Z				

Dimensions

● MOTOR and CONTROL BOX



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