1

SAFETY INSTRUCTION

Be sure to read and keep in mind the following instructions before you install and use the FORTUNA SERVO MOTOR

1) Use and Purpose

Keep in mind that the FORTUNA SERVO MOTOR has been designed for industrial sewing machines, and take care for safety of users when using it for any other purpose.

2) Working Environment

① Power Source
- It is desirable that voltage of the power source be kept within the range of ±10% of the rated voltage.
- It is desirable that frequency of the power source be kept within the range of ±1% of the rated frequency.(50/60Hz)
- The SERVO MOTOR can be expected to work normally only in case the foregoing things are kept.

② Electromagnetic Noise
- It is desirable that those equipments causing strong electromagnetic field or high frequency not use the same electrical outlet as this one and stay away from it.

③ Temperature and Humidity
- Keep the ambient temperature above 5 degrees and below 40 degrees Centigrade.
- Never use it outdoors and avoid direct ray of light.
- Keep it away from an hot object like a stove.
- Keep the ambient humidity above 30% and below 95%.

④ Never use it near gases and explosives.

⑤ Do not use it at a spot located 1,000m or higher above sea-level.

⑥ Keep the storage temperature higher than 25 degrees below zero and lower than 55 degrees Centigrade when not in use.

3) Installation

Follow the instruction carefully when installing it.

① Be sure to start installing it after pulling the power plug off the outlet.

② Fix the cable so that it may not move, and do not allow the moving parts like belts to be interfered with. (Keep distance of at least 25mm from them.)

③ Be sure to have the Controller, the Motor and the Sewing Machine grounded.

④ Be sure that the voltage of power source fits the specification of the Controller before the power is on.

⑤ Be sure to use Safety Extra Low Voltage when an extra item or an accessory is fitted into the Controller.

4) Disassembly

① In disassembling it, be sure to wait at least 360 seconds before taking any action after pulling the plug off the power source after turning it off.

② When pulling off the plug from the power source, be sure to hold the plug itself instead of the wire connected to the plug.

5) Service and Maintenance

① Make sure that service and maintenance are carried out by a skilled technician.

② Never try to operate with the Motor and the Controller open.

③ When inserting a thread into or touching the machine, be sure to turn the power off and step down from the platform.

④ Be sure to use standard products specified for replacement of parts.

6) Other Safety Instructions

① Take care not to let your fingers touch any moving parts including belts.

② In case of remodelling or fitting of additional device, be sure to follow safety standards and do not ever try to go ahead based on your own judgments.

③ Do not try to operate with the safety device removed.

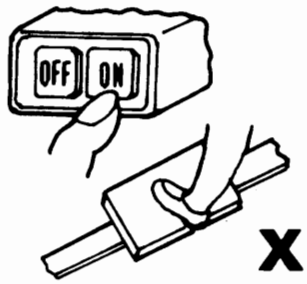
④ Take care not to let water or coffee or something like those admitted into the Controller or the Motor.

⑤ Never drop the Controller or the Motor to the ground.

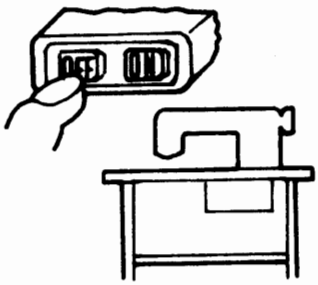
2

PRECAUTIONS BEFORE USE

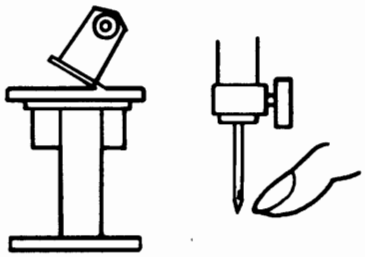
1. Do not turn on the power while stepping on the pedal.



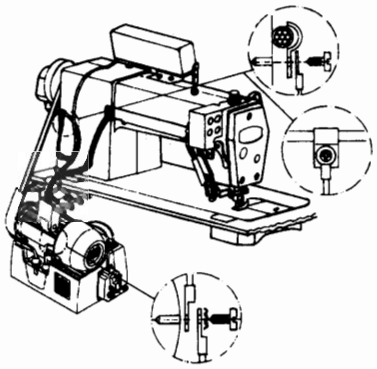
2. Turn off the power when leaving the servomotor overnight.



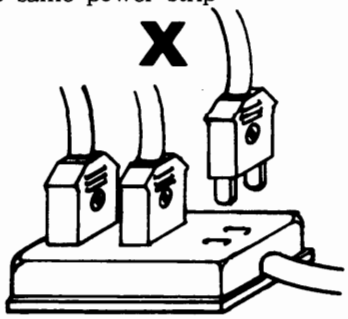
3. Turn off the power when servicing the servomotor or changing the needle.



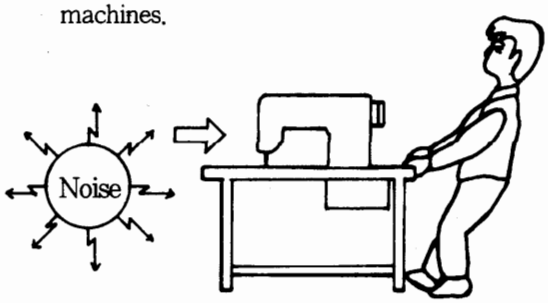
4. Be sure to keep the servomotor securely grouned.



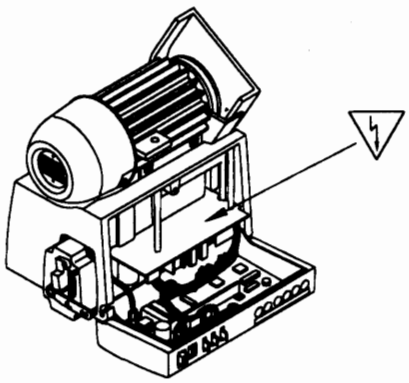
5. Do not connect multiple servomotor power plugs to the same power strip



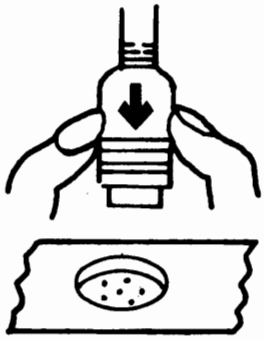
6. Install the servomotor away from noise sources, such as high-frequency equipments and welding machines.



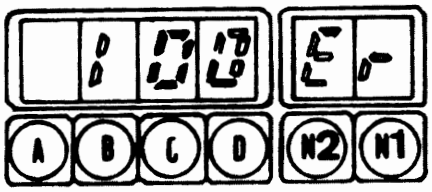
7. Avoid electrical shock when servicing the controller box.(Wait for 6 minutes before opening the cover after turning off the power.)



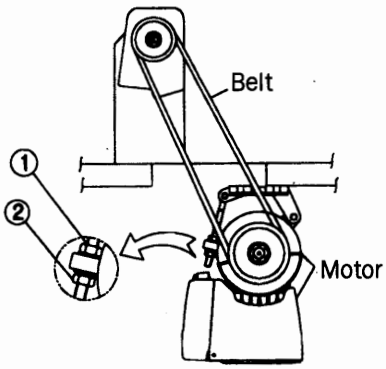
8. Hold connectors such that arrow marks points toward you when connecting and disconnecting them.



9. When an error message "Er" appears on the digital display, take a note of the "Er" code, and then turn on and off before resuming operation(Contact the local dealer if "Er" message persists on the display)

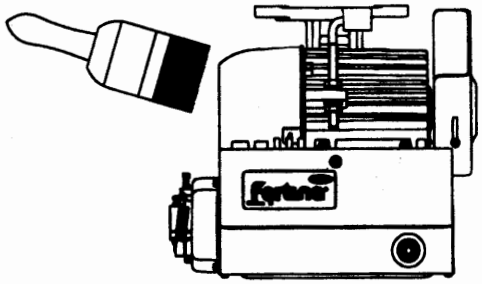


10. Adjust the belt tension to the optimum level.

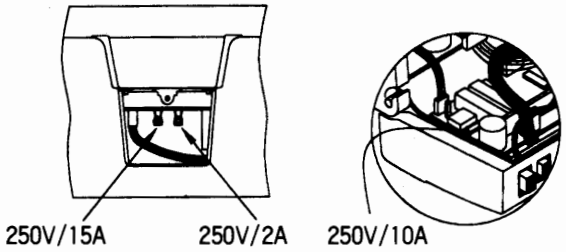


Belt-tension adjustment should be performed after the motor is mounted on the table: First, loosen both the upper and lower anchoring bolts(①,②). The belt tension will then be adjusted by the weight of servo motor itself. Fasten both anchoring bolts.

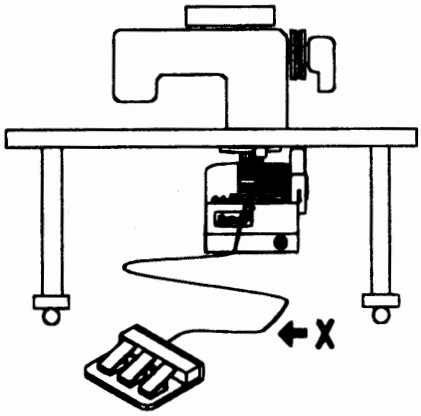
11. Clean it every two or three weeks so that no dirt or a dirty substance may be piled up.



12. When replacing the fuse, use a standard item, opening the cover as shown in the diagram.



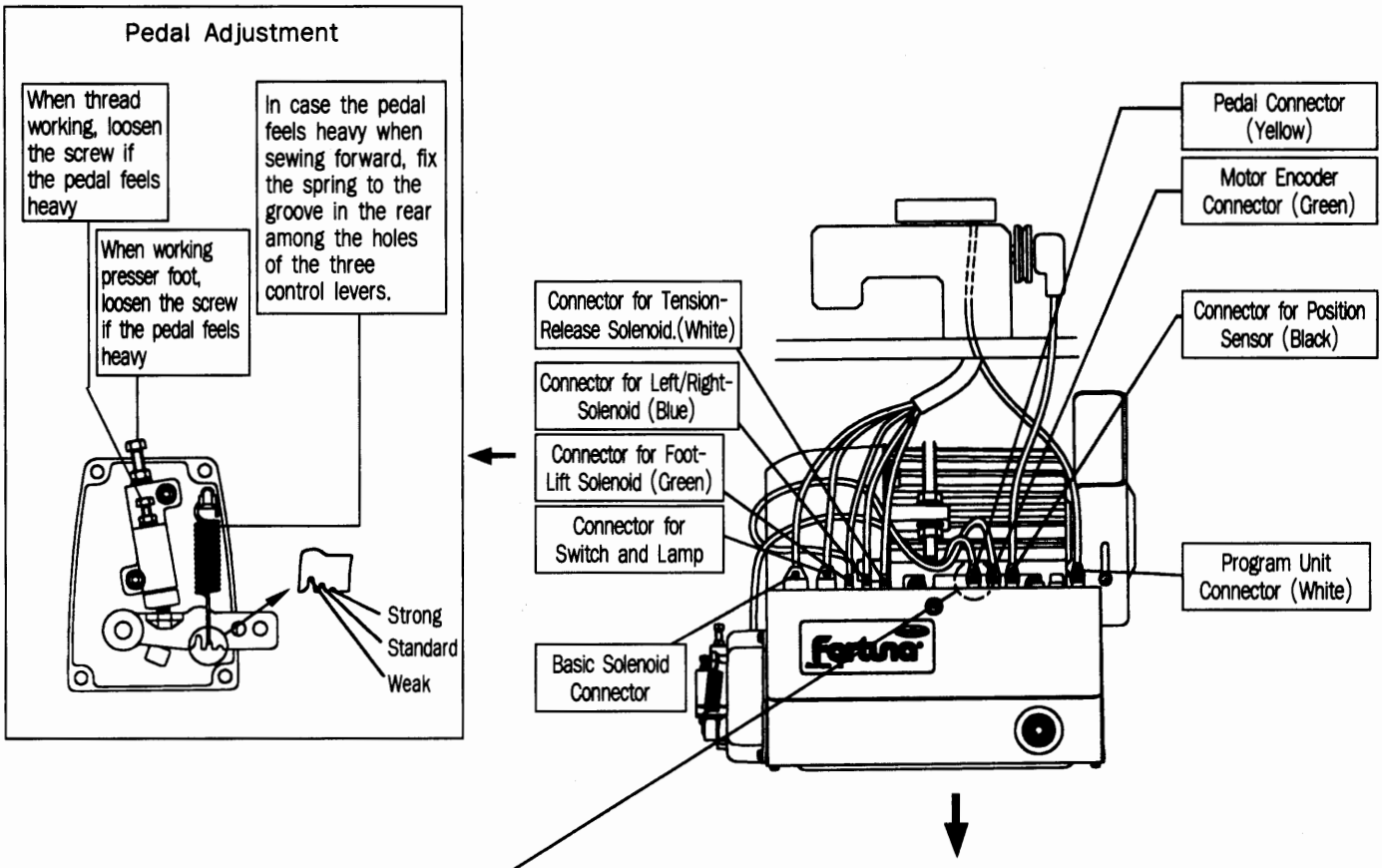
13. Make the length of the cable connected with an outside parts like stand-up pedal as short as possible.

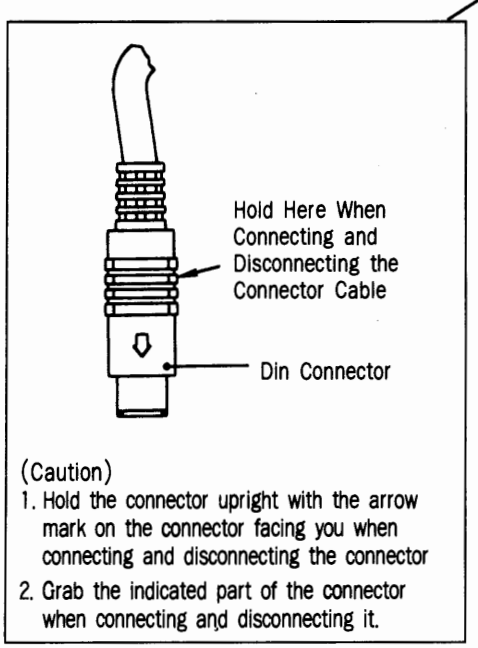


3

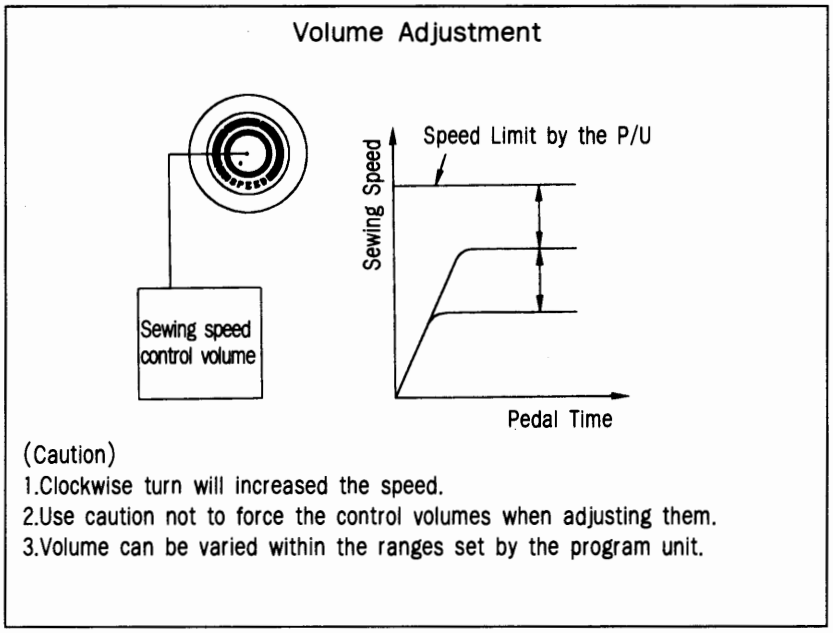
LOCATING AND USING PARTS OF THE CONTROLLER BOX

1) Front panel



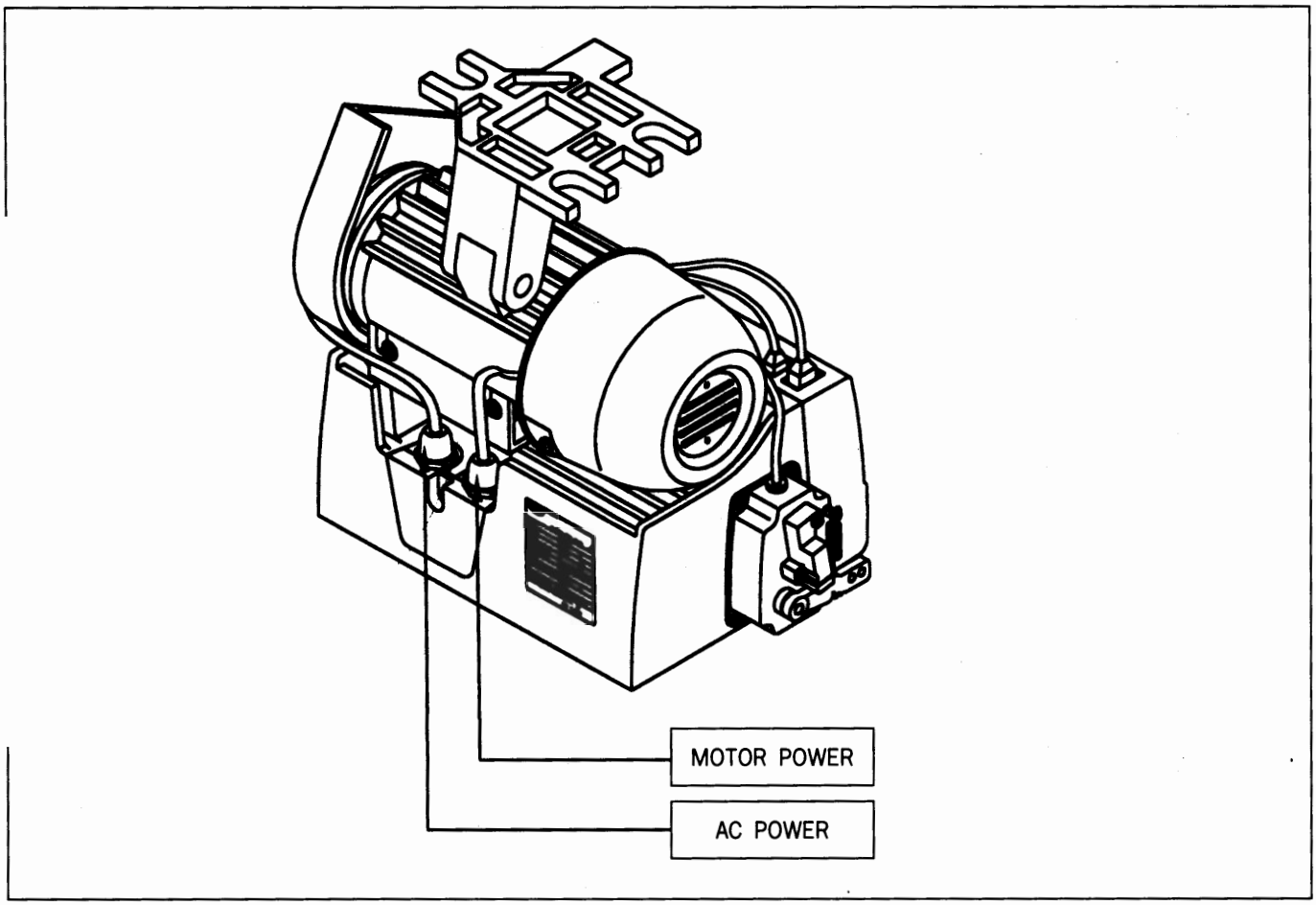


(Caution)
1. Hold the connector upright with the arrow mark on the connector facing you when connecting and disconnecting the connector
2. Grab the indicated part of the connector when connecting and disconnecting it.



(Caution)
1.Clockwise turn will increased the speed.
2.Use caution not to force the control volumes when adjusting them.
3.Volume can be varied within the ranges set by the program unit.

2) Rear panel



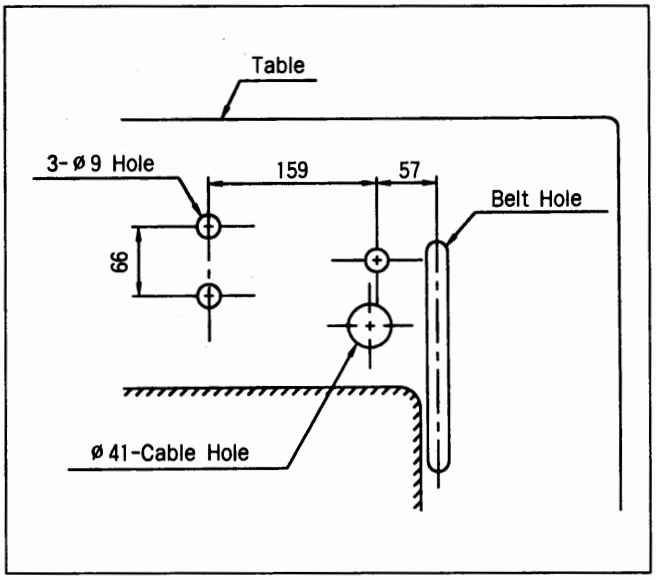
① AC Power input
② Motor power (Motor to control box)

4

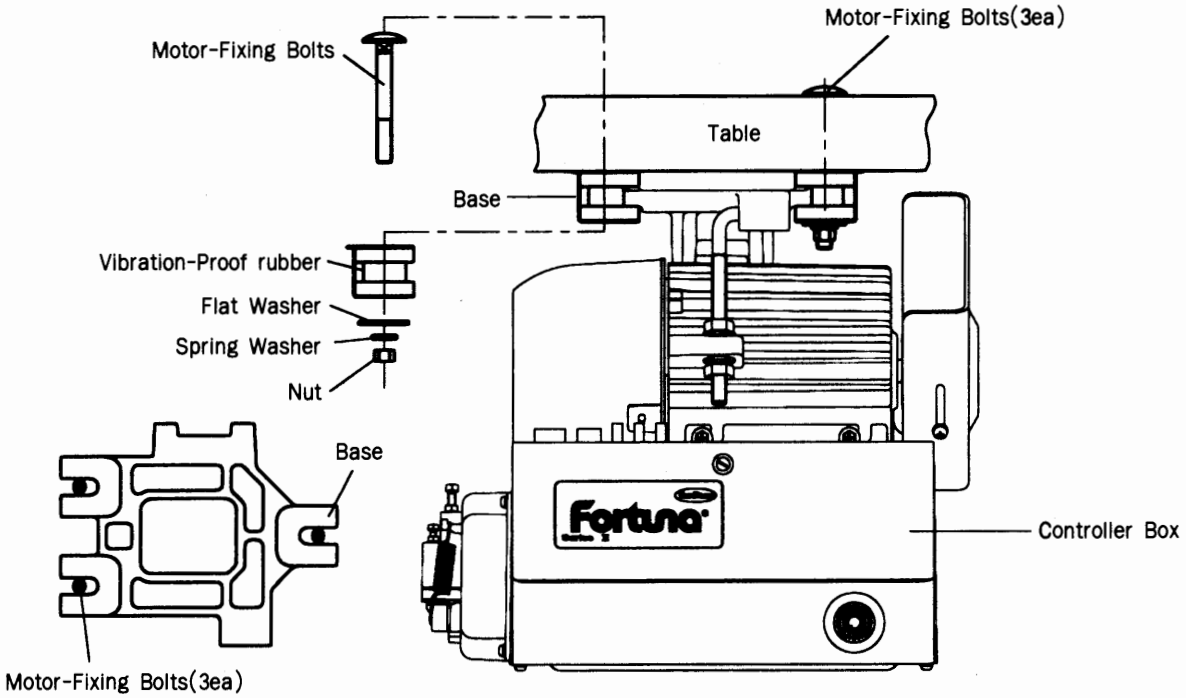
INSTALLATION

1) Mounting your Servo Motor on the table

① Make sure that the holes are bored on the table as shown in the figure.



② Insert three motor-fixing bolts through the three holes on the table. Attach the motor base padded with vibration-proof rubber, and slide flat and spring washers over the bolt stems, and then fasten the bolts with nuts.

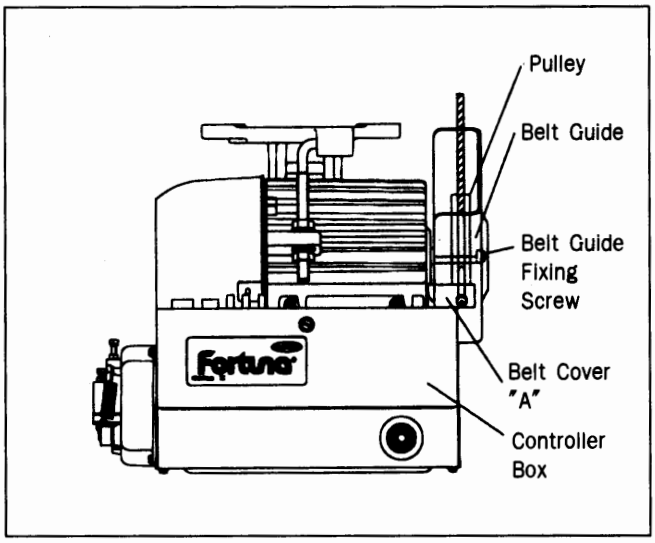


③ Make sure that the center of motor pulley is matched to that of the sewing machine before tightening the motor-fixing bolts and nuts.

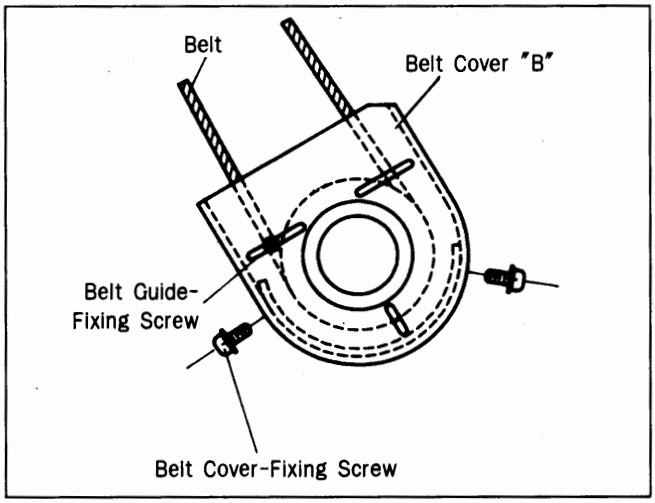
2) Assembling the belt cover and adjusting the belt tension

☐ Belt cover assembling procedure

① Upon the completion of the motor mounting, bring the two pulleys of motor and sewing machine closer to each other, by pulling back the sewing machine. You can then mount the belt easily as shown in the figure.



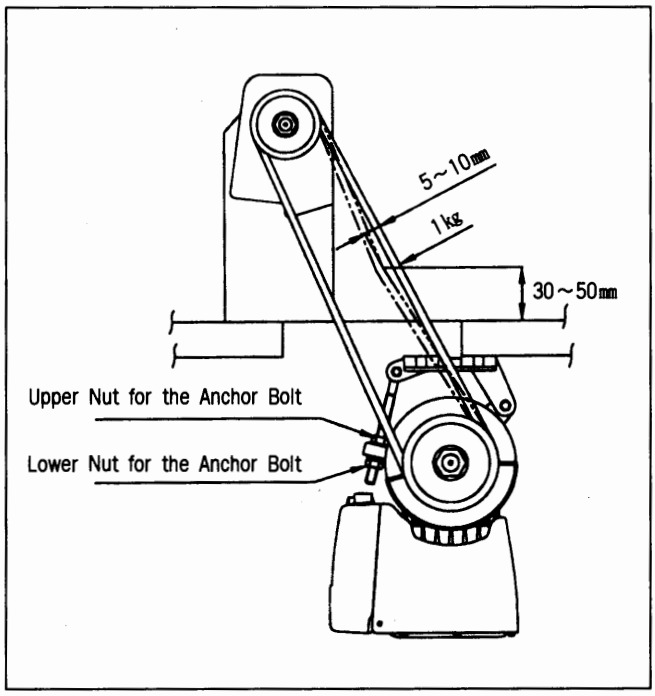
② Place the belt cover "B", making sure that the belt cover does not contact the belt, and then fasten the cover with the fixing screw.



☐ Adjusting the belt tension

▶ Optimum Tension Level:
The optimum tention level is achieved when the belt is pushed by 5-10mm when the top surface portion of the belt at about 30-50mm above the tabletop is pressed by a finger with a force of ~1kgm/sec² or 1 Newton.

▶ Adjusting the Tension Level:
If the tension level is out of the optimum range, adjust the tension as follows. First, loosen both the upper and lower nuts for the anchor bolt, letting the belt be stretched by the motor weight itselt. Second, tighten the upper nut only to the extent that the motor does not move. Third, fasten the bottom nut tightly so that the motor is securely fixed.

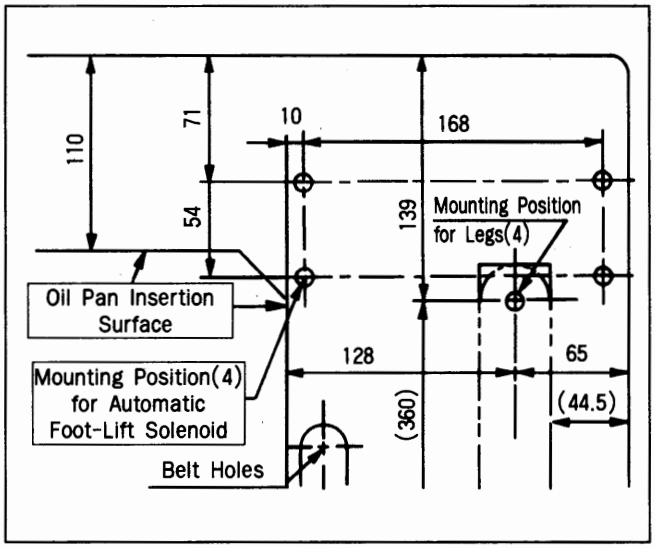


3) Mounting and adjusting the foot-lift solenoid

☐ SunStar KM-235 Model

① Attach the main power switch first since the power switch is located normally in between the solenoid brackets.

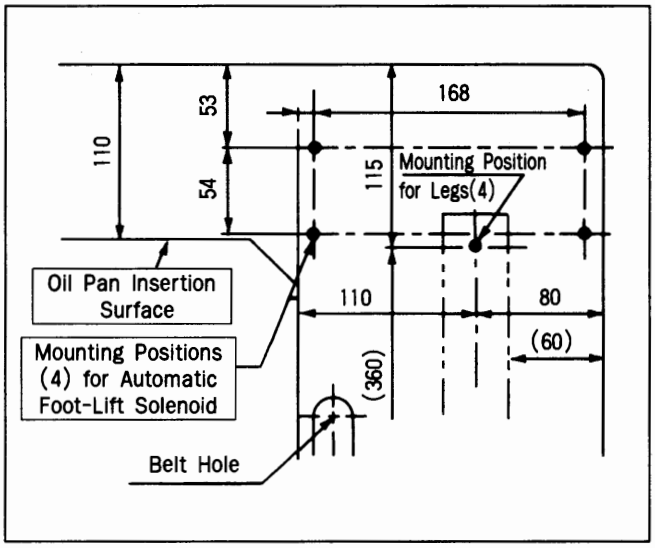
② By referring to the figure on the right and the mounting instructions enclosed in the packaging box, locate the insertion surface of the oil pan, and then attach the foot-lift solenoid.



☐ SunStar Special-specification models

The same mounting procedure for KM-235 model is applicable for other models listed below.

No.	Applicable Models
1	KM-750-7
2	KM-750BL-7
3	KM-790-7
4	KM-790BL-7
5	KM-857-7
6	KM-867-7
7	KM-957-7
8	KM-967-7



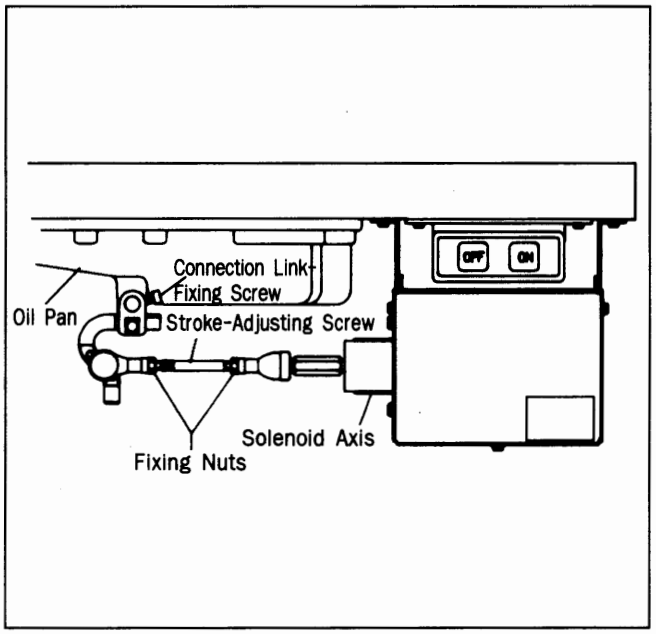
☐ Adjusting the stroke(Gap) of the automatic foot-lift solenoid

▶ Check Point

Check to make sure that the stroke-adjusting screw is located at the center of the solenoid axis, i.e., the solenoid should be assembled in parallel with the bottom surface of the table. If the solenoid is not in parallel, make an adjustment so that the screw is in parallel with the center of the solenoid axis using the connection link-fixing screw.

▶ Adjusting Procedure:

The vertical travel distance of the presser foot can be adjusted by the stroke-adusting screw. First, loosen the two fixing screws, and adjust the verical stroke using the stroke-adjusting screw. Loosening and tightening the stroke-adjusting screw will decrease and increase the verical stroke of the presser foot respectively. After the adjustment, fasten the fixing screw tightly.

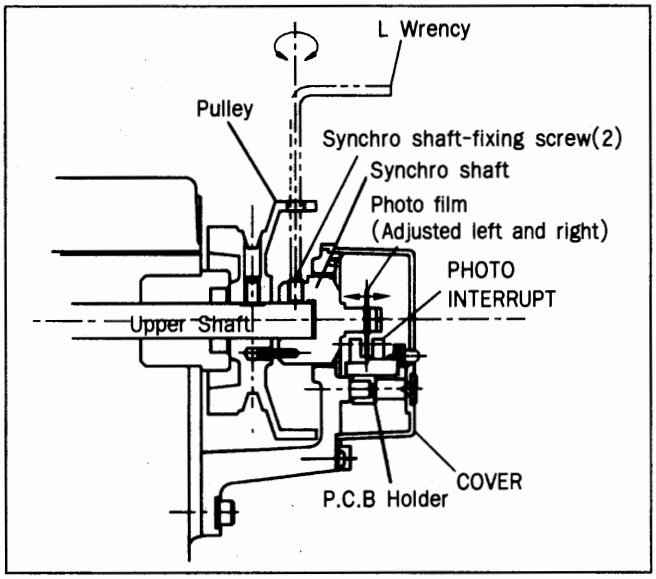


4) Mounting the position sensor (Synchronizer) and setting the film

☐ Mounting the position sensor(Synchronizer)

■ SunStar thread-cutting sewing machine.

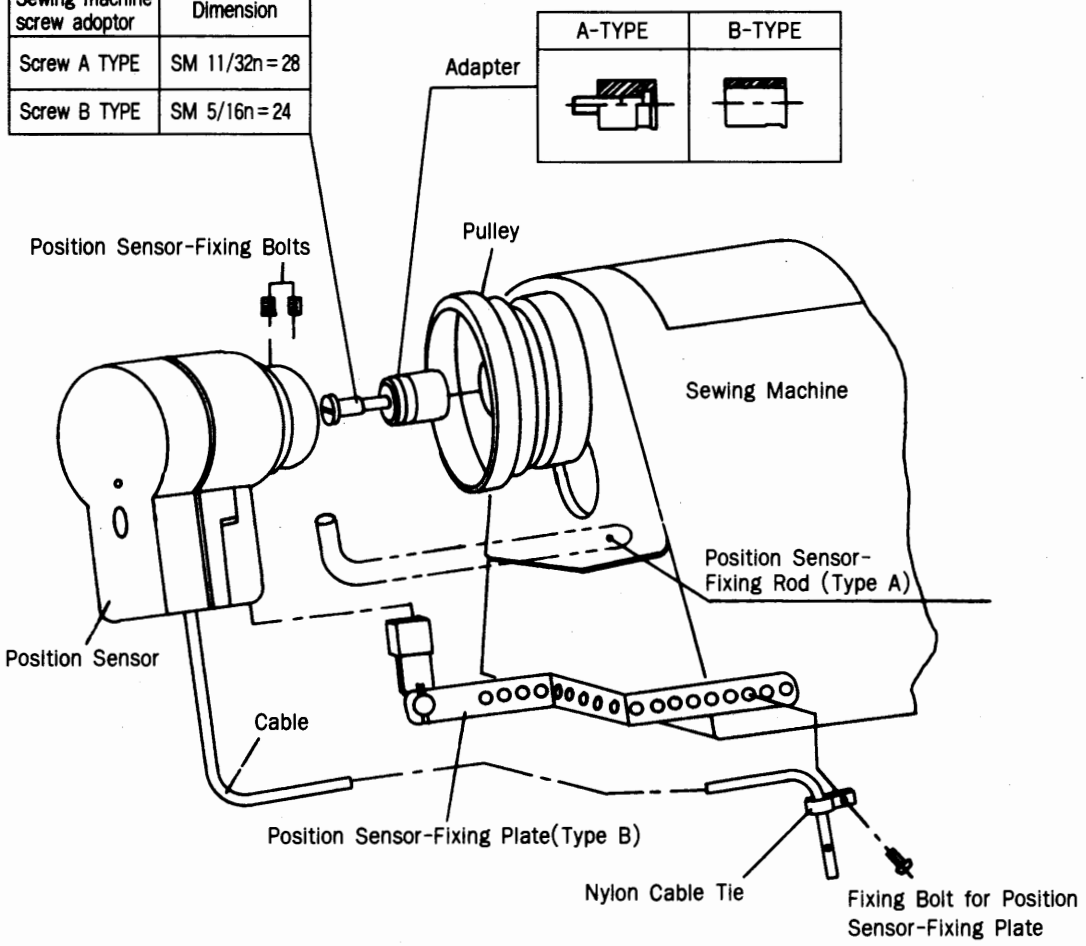
All SunStar thread-cutting sewing machines are equipped with a position sensor. Users, therefore, are required to the adjust the film position, if necessary, as shown in the figure.



■ All other sewing machines(including other manufacturers' brands)

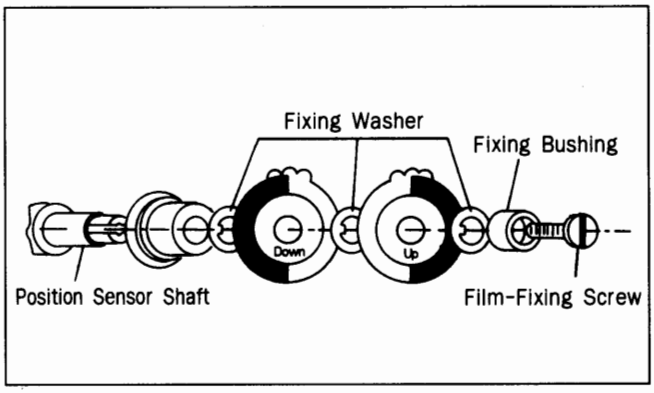
First, attach the position sensor-mounting adapter to the upper shaft of the sewing machine. Second, attach the position sensor-fixing plate to the body of the sewing machine as shown below in the figure. Third, secure the position sensor to the adapter with the fixing screws.

Sewing machine screw adoptor	Dimension
Screw A TYPE	SM 11/32n=28
Screw B TYPE	SM 5/16n=24

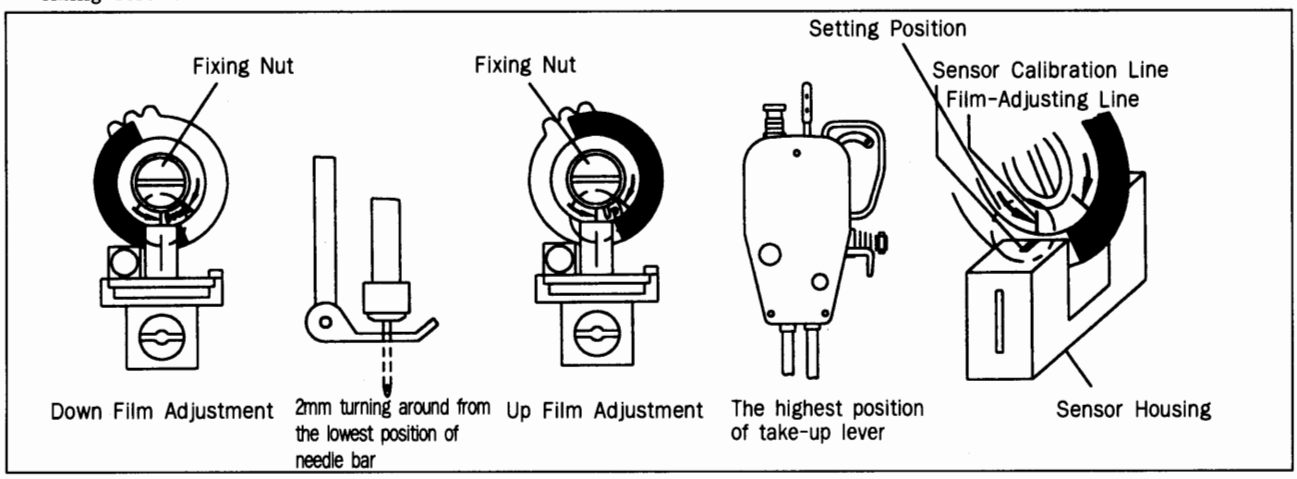


☐ Adjusting the film of the position sensor

① Assemble the films and position sensor in the order as shown in the figure.

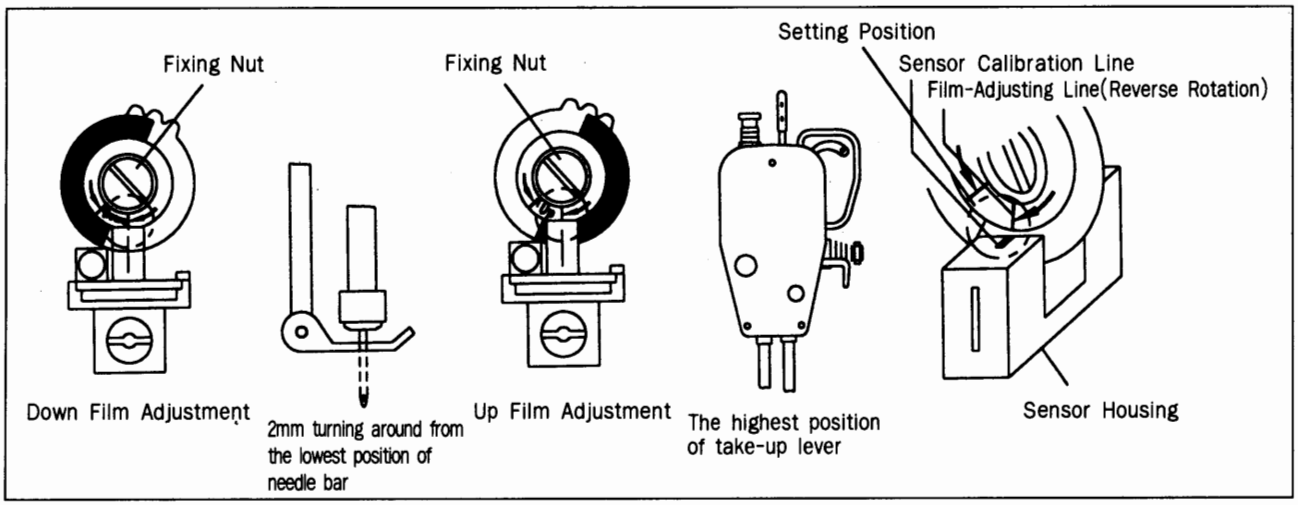


② Upon the completion of the assembling, position the needle shaft right at the rising point from the lowest needle position by manually rotating the pulley. Loosen the film-fixing screw, and adjust the DOWN film so that the film-adjusting line and the sensor housing calibration line are matched. Tighten the film-fixing screw just to the extent that the film can not be rotated. Likewise, position the thread take-up at the highest position. Loosen the film-fixing screw, and adjust the UP film as shown in the figure, while using caution not to move the DOWN film which is already adjusted earlier. Tighten the adjusted film with the fixing screw.



☐ Adjustion the films of reverse rotation sewing machines

※ For reverse-rotation sewing machines, the film-adjusting lines located at right edge of the "UP" and "DOWN" film should be matched to the center line of the sensor.



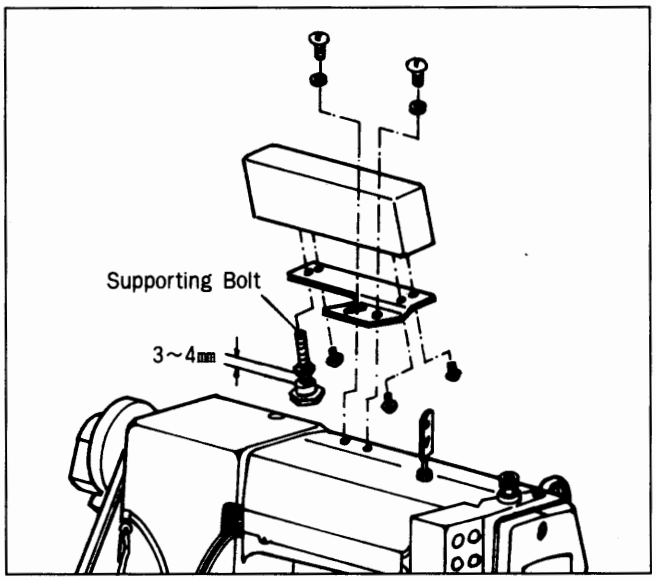
(Caution)

After adjustment the film of the position detector, be sure to rotate the motor for 3~5 seconds by pedalling so that the Controller may remember location of the film.

5) Mouning the Program Unit (P/U)

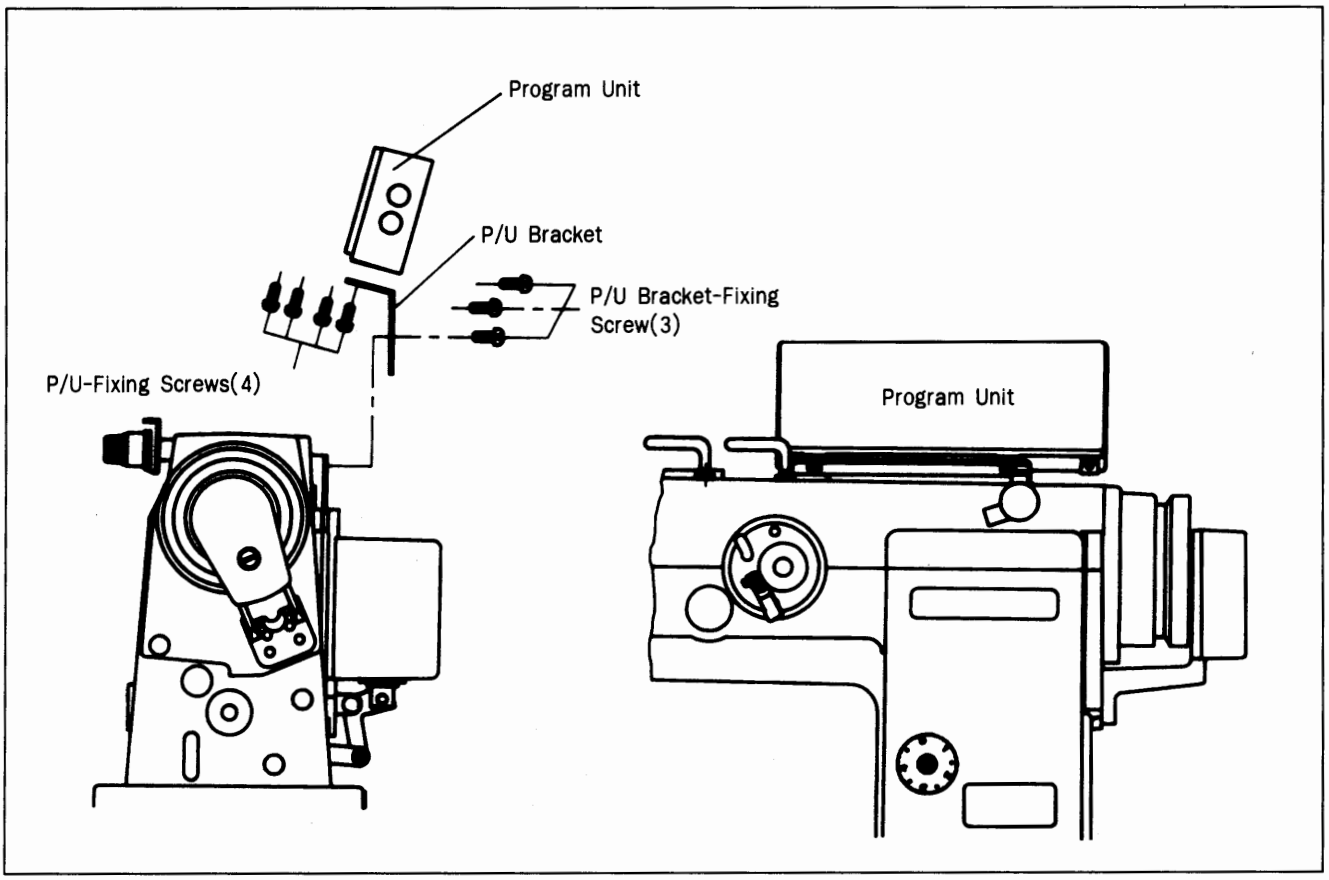
☐ SunStar KM-235 Sewing Machine

First, attach the P/U bracket to the P/U using three fixing screws and a supporting bolt with nut attached on it as shown in the figure. Second, securely attach the P/U to the head of the sewing machine using two fixing screws and washers, keeping a 3~4mm distance between the bottom surface of the nut and the base of the supporting bolt.



☐ Other SunStar thread-machine

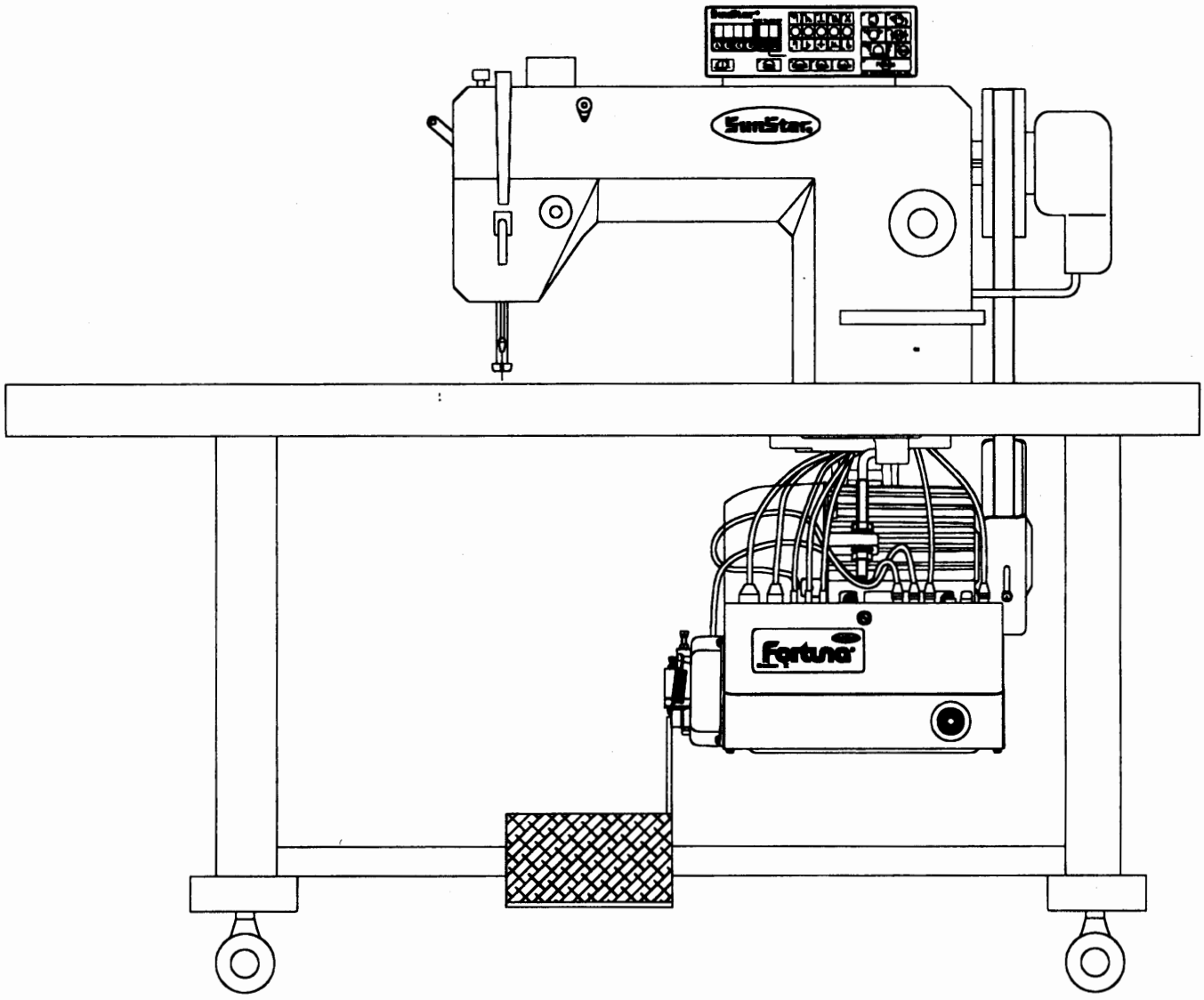
First, attach the P/U bracket to the P/U using the four fixing screws. Second, attach the P/U to the main body of the sewing machine using the three bracket-fixing screws as shown in the figure.



(Caution)

Secure the cable using the cable tie so that cable is not in the way of the belt

6) An example of installing the SunStar sewing machine

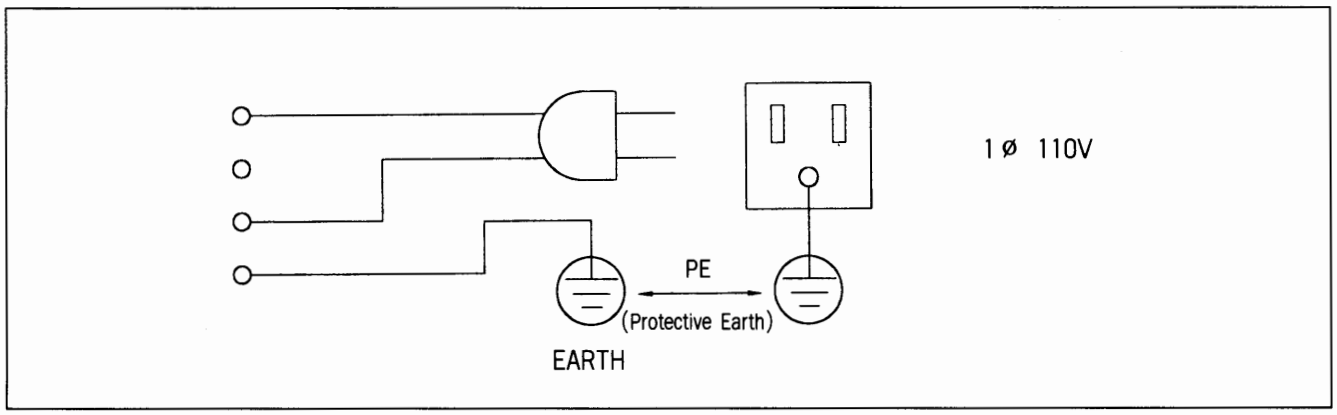


5

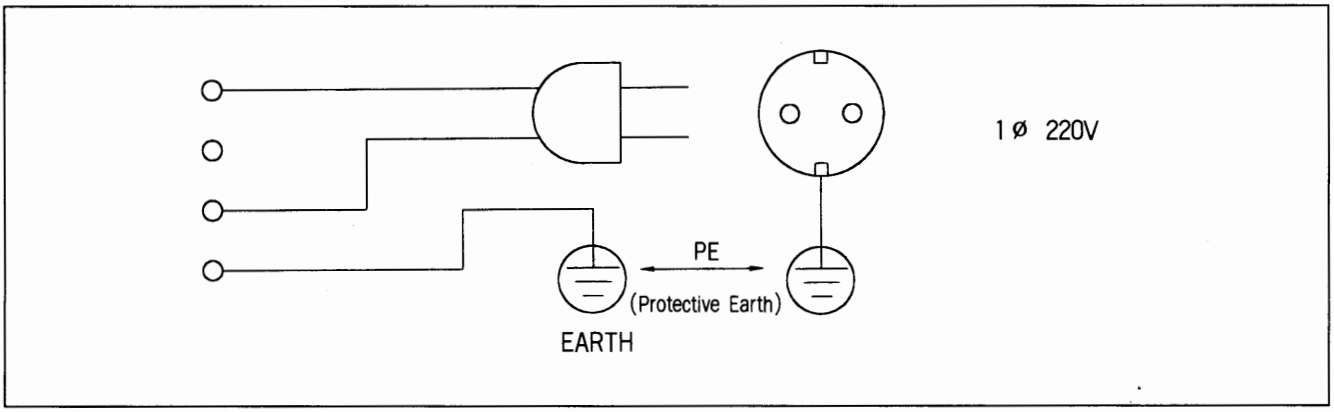
WIRING AND GROUNDING

1) Specification of the power plug

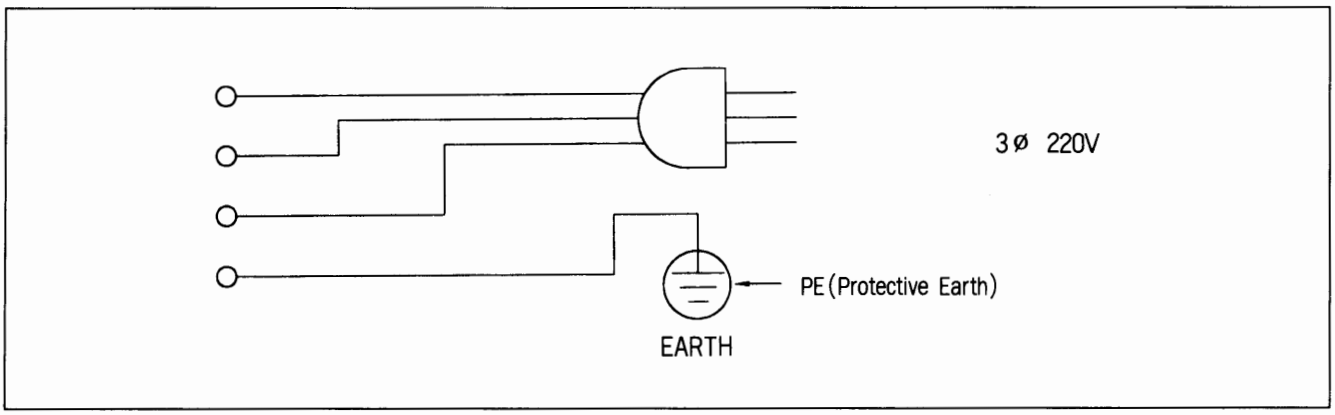
① Single phase 100V ~ 120V



② Single phase 200V ~ 240V



③ Three phase 200V ~ 240V



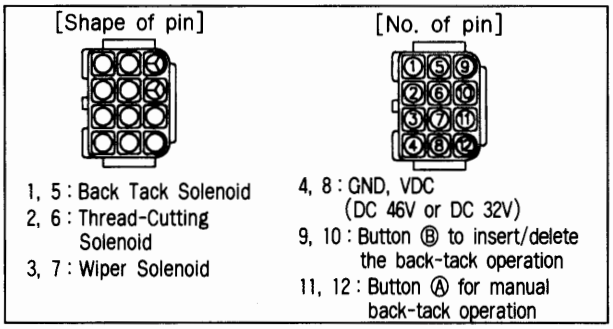
※ Be sure to connect Protective Earthing

2) Specification of electric current in wiring of power plug

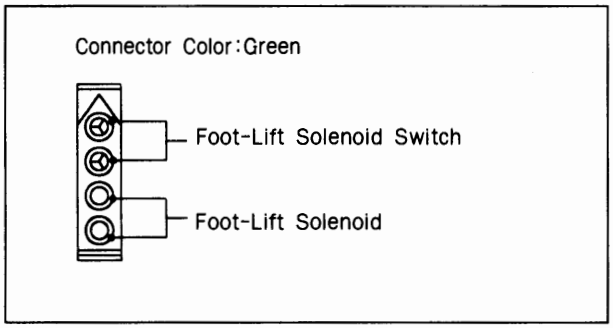
Be sure to use wiring materials which can stand electric current of higher than 15A

3) Name and description on the outside connector of control box

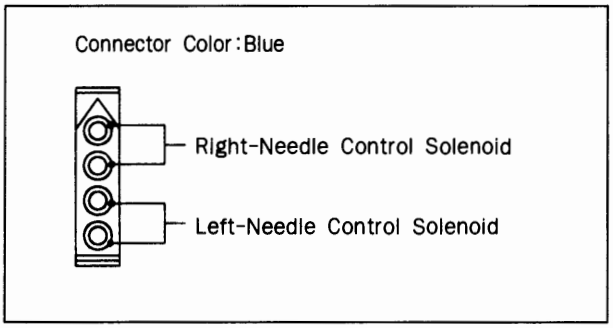
① Standard solenoid connector



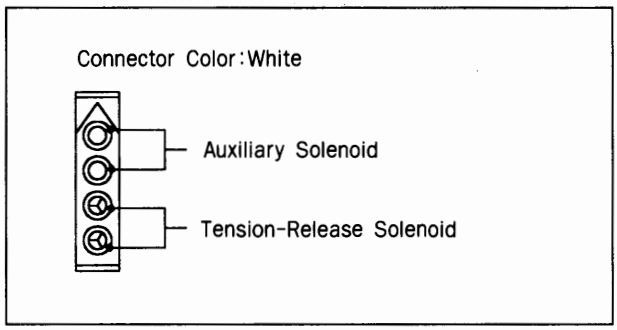
② Foot-lift solenoid



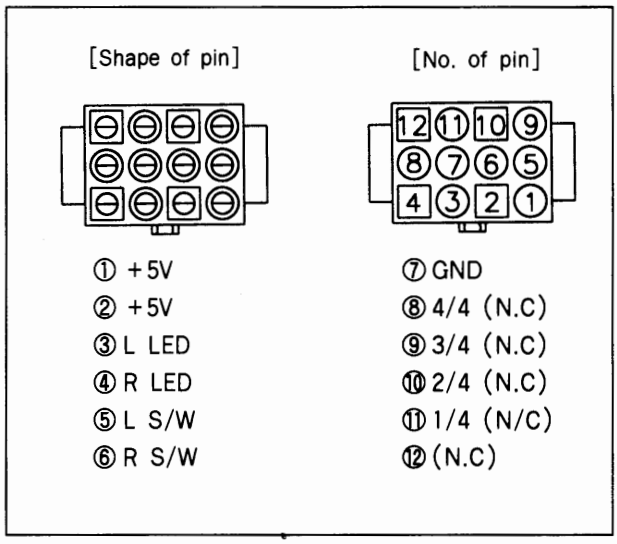
③ Right/ left solenoid
(Used in twin-needle sewing machine)



④ Tension-release and auxiliary solenoid



⑤ Switch and lamp(Used in twin-needle sewing machine)



4) How to change the electric voltage supplied for solenoid (The factory installed setting is : J2)

This is to make the movement of solenoid smooth in times of fluctuation in the incoming electric voltage.
① Set Value for electric voltage supplied (for 220V series) for Solenoid against the incoming voltage.

For 30V-regular Solenoid

Incoming Voltage	Set Value
Below 210V	J 1
210V~230V	J 2
Above 230V	J 3

For 24V-regular Solenoid

Incoming Voltage	Set Value
Below 180V	J 1
180V~190V	J 2
Above 190V	J 3

② Set Value for electric voltage supplied (for 110V series) for Solenoid against the incoming voltage.

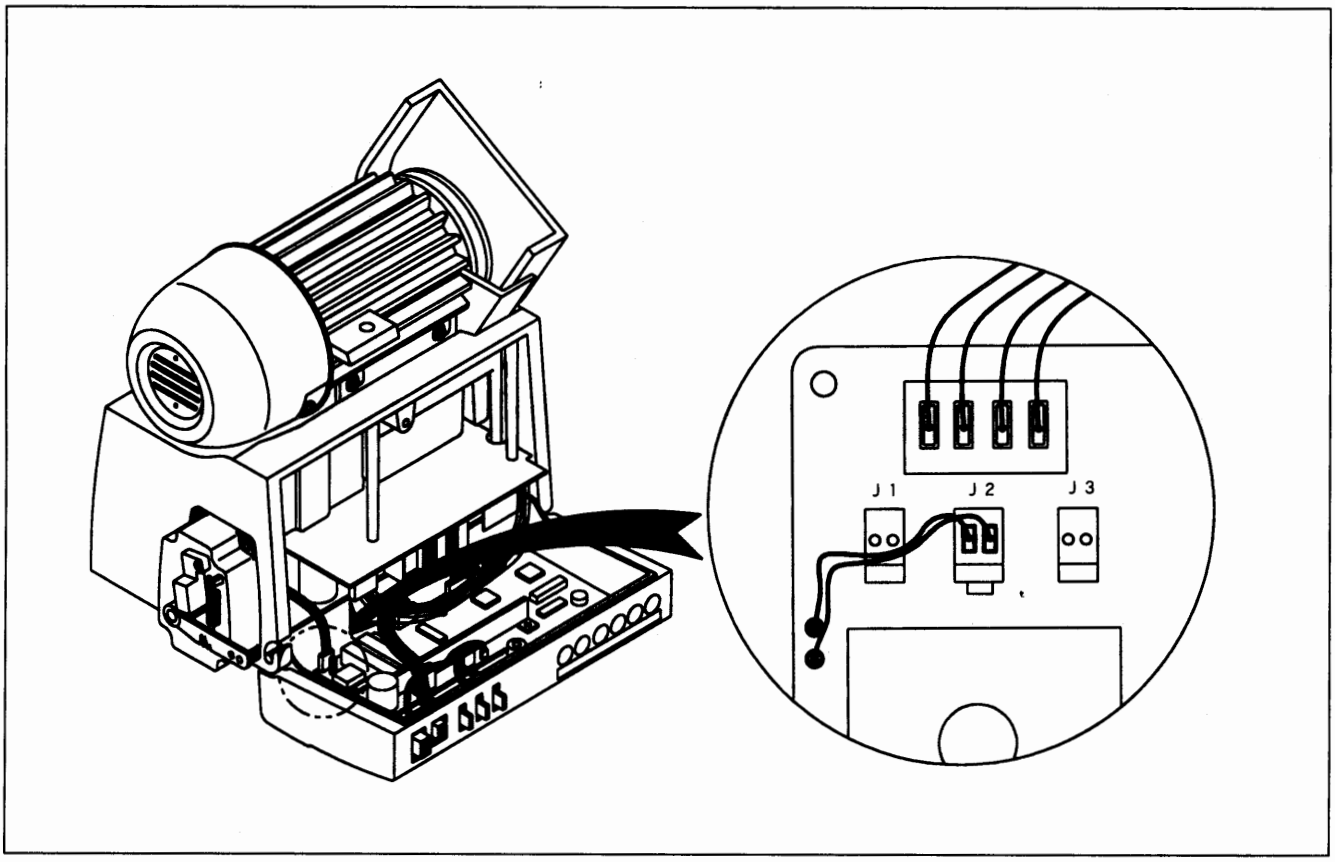
For 30V-regular Solenoid

Incoming Voltage	Set Value
Below 100V	J 1
100V~120V	J 2
Above 120V	J 3

For 24V-regular Solenoid

Incoming Voltage	Set Value
Below 90V	J 1
90V~100V	J 2
Above 100V	J 3

③ Setting of pin

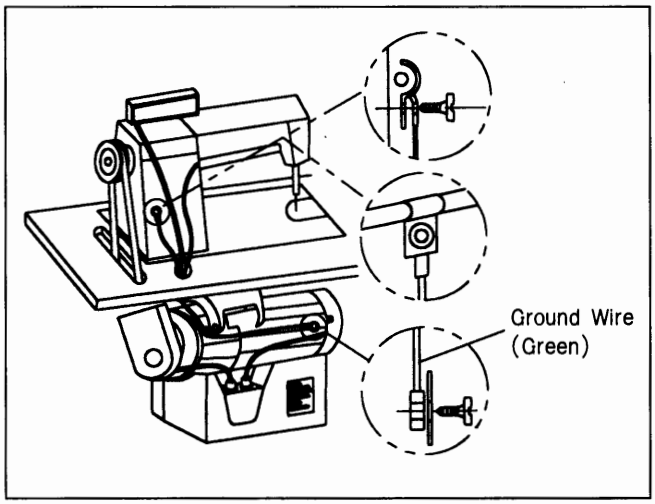


6

CONNECTION THE EARTH WIRE OF THE SEWING MACHINE AND MOTOR

▶ Method
Connect the motor and sewing mahine using the ground wire (green, green/yellow) as shown in the figure. Make sure that the factory-connected ground wire between the controller box and motor is securely in place.

▶ Caution
Failure to ground the motor can cause abnormal operations, such as over-speed rotation or unwanted stitching



7

THINGS TO BE CHECKED AFTER INSTALLATION

1) Before the power is on...

① Make sure that the incoming voltage is in accordance with that shown in the name plate of the Control Box.
② Check whether the following connectors are connected.
- Connector for incoming AC power source
- Connector for motor power
- Connector for motor encoder
- Connector for pedal
- Connector for position detector
- Connectors for others (option, knee-lift, program unit etc.)

③ Check to see whether the belts are in touch with the wiring.
④ Check the tensile strength of the belts.
⑤ Check to see the fixing nuts for pulley are tightly fastened.
⑥ Check whether the sewing machines are right kinds (Chain Stitch Sewing Machine and Lock Stitch Sewing Machine)
⑦ Check the rated voltage for Solenoid (Refer to "How to change the electric voltage supplied for Solenoid")

2) After the power is on...

① Check whether the lamp for the position detector is on. (Except in the case of built-in positon detector)
② Check whether the program unit is working.
③ Check the direction of rotation of the Sewing Machine.
- In case the direction of rotation is not right, action shall be taken to change set it right, referring to "the methods of changing the program and the list of changing functions" (No. 65 in Group "A").

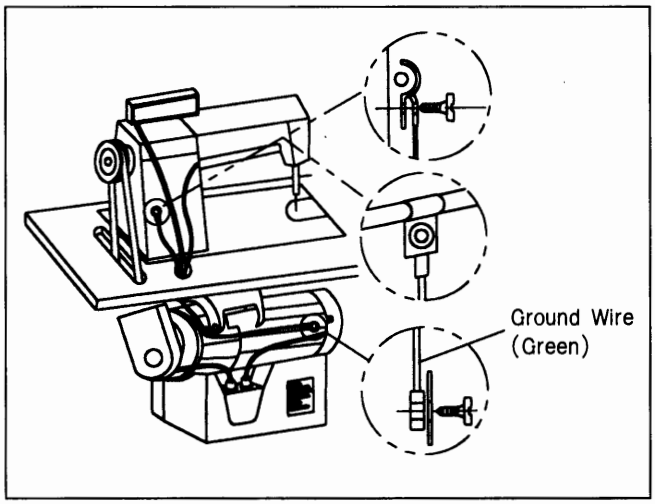
④ Check to see whether there are abnormal heat, smell or noise nearby.
- In case there are, turn the power off and call our regional office.

6

CONNECTION THE EARTH WIRE OF THE SEWING MACHINE AND MOTOR

▶ Method
Connect the motor and sewing mahine using the ground wire (green, green/yellow) as shown in the figure. Make sure that the factory-connected ground wire between the controller box and motor is securely in place.

▶ Caution
Failure to ground the motor can cause abnormal operations, such as over-speed rotation or unwanted stitching



7

THINGS TO BE CHECKED AFTER INSTALLATION

1) Before the power is on...

① Make sure that the incoming voltage is in accordance with that shown in the name plate of the Control Box.
② Check whether the following connectors are connected.
- Connector for incoming AC power source
- Connector for motor power
- Connector for motor encoder
- Connector for pedal
- Connector for position detector
- Connectors for others (option, knee-lift, program unit etc.)

③ Check to see whether the belts are in touch with the wiring.
④ Check the tensile strength of the belts.
⑤ Check to see the fixing nuts for pulley are tightly fastened.
⑥ Check whether the sewing machines are right kinds (Chain Stitch Sewing Machine and Lock Stitch Sewing Machine)
⑦ Check the rated voltage for Solenoid (Refer to "How to change the electric voltage supplied for Solenoid")

2) After the power is on...

① Check whether the lamp for the position detector is on. (Except in the case of built-in positon detector)
② Check whether the program unit is working.
③ Check the direction of rotation of the Sewing Machine.
- In case the direction of rotation is not right, action shall be taken to change set it right, referring to "the methods of changing the program and the list of changing functions" (No. 65 in Group "A").

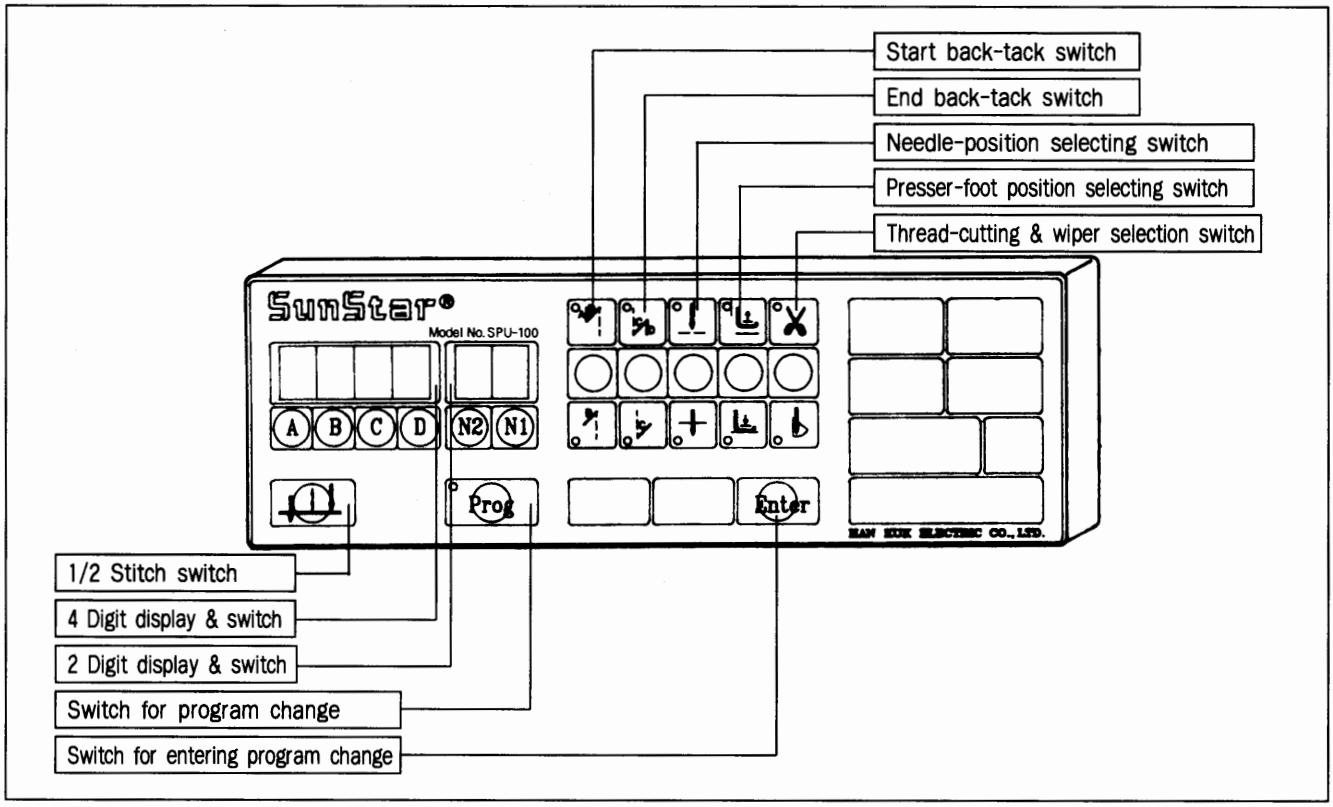
④ Check to see whether there are abnormal heat, smell or noise nearby.
- In case there are, turn the power off and call our regional office.

8

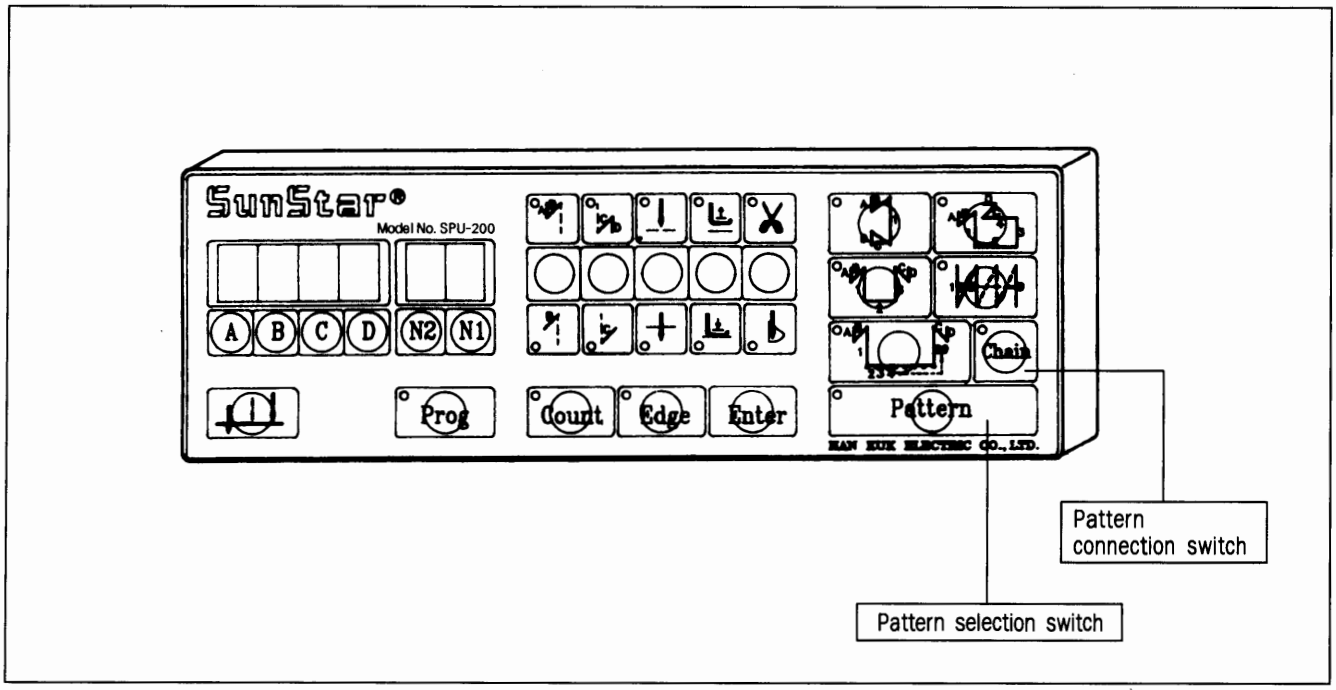
LOCATING AND OPERATING THE PROGRAM UNIT(P/U) FUNCTIONS

1) Locating the P/U function switches

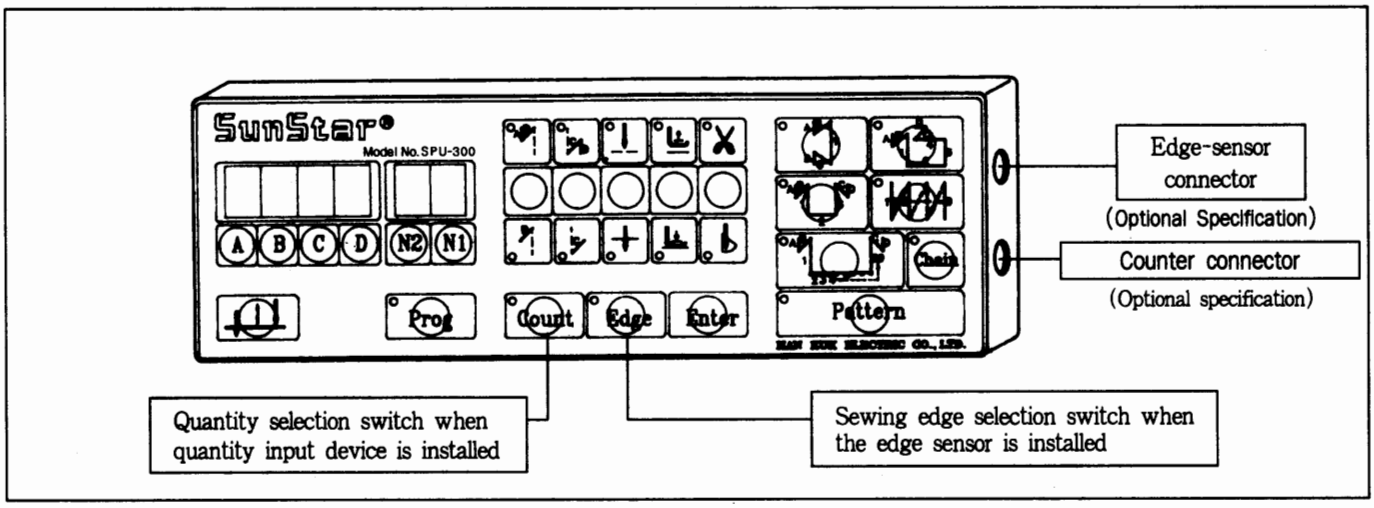
☐ SPU-100 Model



☐ SPU-200 Model



☐ SPU-300 (Optional Specification) model



2) Operating the Program Unit (P/U)

☐ Setting normal sewing speed and upper speed limit

※ Adjust the sewing speed for a proper operation of the P/U as follows.

Setting Model	Setting Procedure
① Using the sewing speed volume	Turn the "Sewing Speed Control Volume" clockwise to increase the sewing speed as shown in the figure. 
② Changing the default P/U sewing speed limits	Press the Ⓐkey while pressing [Prog] key after thread-cutting in to be in the program change mode as shown in the figure. Change the display code above the Ⓝ1 and Ⓝ2 key to "02" set the desired speed by pressing the Ⓒ and Ⓓ keys and press the [Enter] key. Finally, press the [Prog] key to turn off the blinking light, which well set the machine ready to operate with the new speed parameters. 

▶ Checking point when the setting speed of sewing machine is not availably.

The speed which can be changed from ① among the above adjusting methods is only variable between the minimum speed and maximum speed, which was inputted from 1 and 2 in the program "A" group. If the machine is set for too low speed, you should adjust it for proper speed.

☐ Operating the SPU-100 P/U

■ 4-and 2-digit display

▶ 4-digit display

Ⓐ Ⓑ : Display the number of the back tack stitches at the start of sewing.

Ⓒ Ⓓ : Display the number of the back tack stitches at the end of sewing.

The picture shows that the back tack stitches at the start and the end of sewing are both three.

▶ 2-digit display

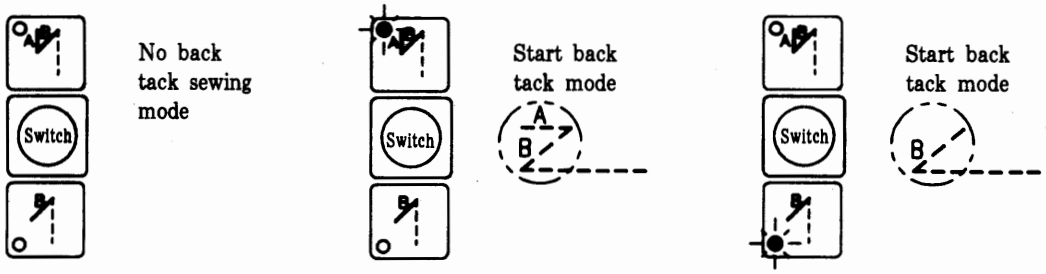
Ⓝ1 Ⓝ2 : Display the codes for particular program changes.

■ Switch:Used for Changing The Program

■ Switch:Used to Input The Content of The Changed Program.

■ Start Back Tack Switch:

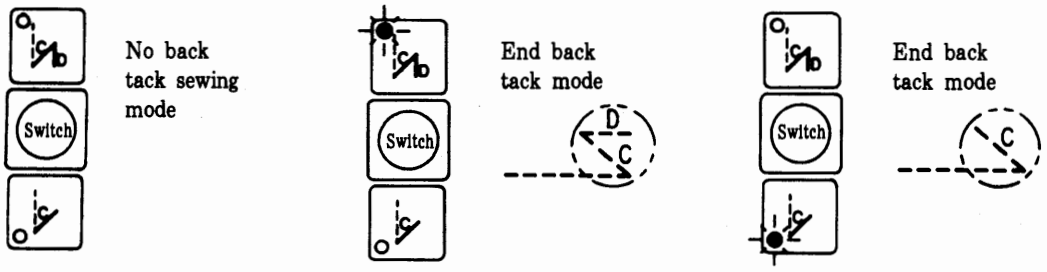
Used to prevent the fabric loosening at start edges of sewing work. Pressing the switch will shift the lighting sequentially to one of the following three back tack modes.



※ Set the number of B/T stitches before operating at B/T modes.

■ End back tack switch:

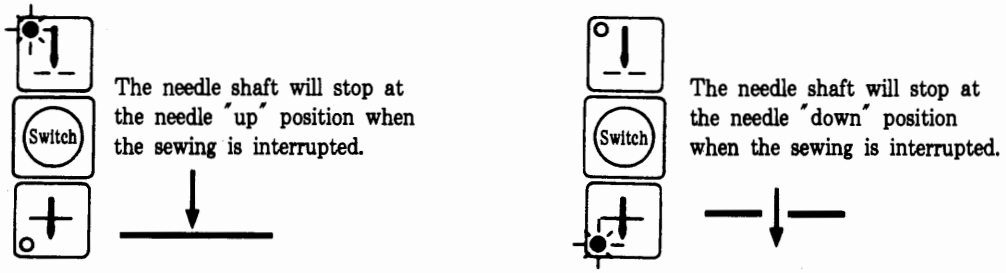
Used to prevent the fabric loosening at end edges of sewing work. Pressing the switch will shift the lighting sequentially to one of the following three back tack modes.



※ Set the number of B/T stitches before operting at B/T modes.

■ Needle stop-position selection switch when sewing is interrupted:

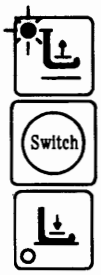
The lighting is one of the two position modes whenever the power is on. Pressing the switch will shift one position mode to another.



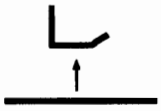
■ Presser foot stop-position selection switch when sewing is interrupted:

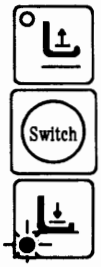
※ This function is available only with the optional foot-lift solenoid specification.

The lighting is one of the two position modes whenever the power is on. The two foot-positioning modes are as follows:



The presser foot will stop at the "up" position when sewing is interrupted



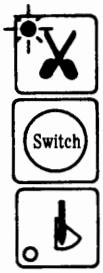


The presser foot will stop at the "down" position when sewing is interrupted

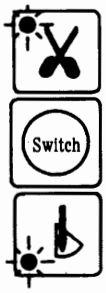
■ Automatic thread-cutting & wiper Selection Switch:

If you press switchs in order, the position of light will be changed as seen in the figure. Three types of works are available according to the lamp condition.

No automatic thread cutting or wiper functions



Only the automatic thread cutting is activated



Both automatic thread cutting and wiper functions are activated

■ 1/2 Stitch Switch:

If you press switches in order, the machine turns 1/2 time, and if you press a switch for 0.5 second, the machine turns 1 time. If you press it continuously, slow speed sewing will be progressed.

□ Re-adjusting the number of start and end B/T stitches

Use the following procedure to re-adjust the number of B/T stitches since the actual number of B/T stitches can be different from the set value due to varying default setting conditions of different models of sewing machines.

① Obtain the desired number of stitches, say 3 each on each path, by experimenting different numbers the above buttons Ⓐ Ⓑ Ⓒ and Ⓓ of the 4-digit displays as shown in the example below.

⇒

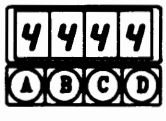
⇒

Example:

〈The initial P/U setting〉 〈Re-adjusted setting to obtain 3 stitches〉 〈Sewing result after the re-adjstment〉

② After confirming that B/T stitching numbers are all three each for B/T paths Ⓐ Ⓑ Ⓒ and Ⓓ after the re-adjustment is made in ① , press both the [Free] and [⏎] switches simultaneously. You will hear a beep and initial setting, [3333] will then reappear on the 4 digit display.

③ After the above sequential steps, you will now be able to abtain correct numbers of B/T stitches set by the input values.



⇒

Example:

〈User-input stitch values〉 〈Actual B/T sewing result〉

☐ Operating the SPU-200, 300 (Optional Model) P/U

※ Switches functions are all the same as in the SPU-100 model unless otherwise stanted here.

■ Count Switch : Used for setting the production quantity (Optional specification spu 300)

■ Edge Switch : Used for sewing material edge-detecting sensor (Optional specification spu 300)

■ "Pattern Selection" switch

Used for multiple pattern-sewing. Turn "on" or "off" the pattern mode by pressing the button.

Pattern mode "OFF"

Pattern mode "ON"

■ Operating Procedure for the Pattern Sewing.

▶ Precautions when using the pattern sewing feature.

① Execute thread cutting before turning on the switch for the pattern sewing.

② The pattern lamp will not go out until the completion of the current patterning work even if you press the button "OFF"

③ Each pattern mode setting will be saved even if the power is turned off. Thus, just press the particular mode button to use the previously set pattern setting at later time. Initialization, however, erases all the pattern sewing input parameters, requiring new parameter inputs.

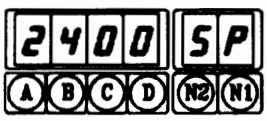
④ Adjust the pattern-sewing speed to an optimum level beforehand because high-speed pattern sewing can often result in incorrect numbers of stitches on each pattern.

▶ Adjusting the pattern-sewing speed:

※ First, confirm the pattern-sewing switch is turned on. and then adjust the set the number of stitches of esch path. Do not set the speed at too high level because the actual number of stitches may come out different from the requested value.

① Factory speed setting is 2400 SPM.

② Press the (N1) button to obtain the following setting display. Then, set the desired pattern-sewing speed using buttons (C) and (D).



③ Start the pattern sewing.

▶ Setting the number of stitches in pattern sewing.

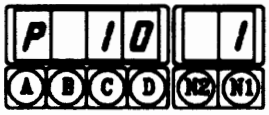
① Turn on the pattern mode by pressing the pattern mode switch

② Select a desired pattern, and the 4 and 2-digit display will change as shown in the figure

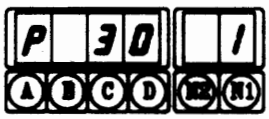
③ For back-tack stitching, set the numbers of stitches for the start and end back-tack using the " Ⓐ Ⓑ Ⓒ Ⓓ " buttons. Press on the start and end back-tack button to turn on the light.

Set the path(1, 2, 3...) and the corresponding number of stitches.

④ Press the [Func] switch to get the following display. Then set paths of the corresponding pattern using the Ⓝ1 and Ⓝ2 switches.



⑤ Set the number of stitches for each path using the Ⓒ Ⓓ buttons of the 4-digit display. Press the [Enter] key to input the selected number of stitches. If you do not know the required number of stitches, step on the pedal until the sewing proceeds to a desired point. The number of stitches will then be displayed automatically on the 4-digit display. Press the [Enter] key to input the measured number of stitches for the particular path.
(Automatic measurement of the number of stitch.)



The current display of the figure indicates "30" stitches for the measured number of stitches along the path "1"

⑥ Upon completioin of setting the number of stitches of each path, turn off the blinking light by pressing the [Func] key.

■ Pattern sewing of variolus designs:

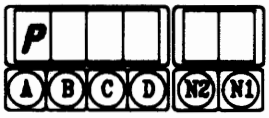
※ Each programmed pattern can be entered in the same manner as you enter the number of stitches for patterning paths as described previously.

Pattern	
	0-255 stitches are the available number of stitches for path 1
	Useful for straight sewing where the sewing requires repeated stitching of a single path.
	0-255 stitches are the available number of stitches for each of the paths 1, 2 and 3.
	Useful for sewing a pattern where the sewing requires a repeated stitching of three consecutive paths as shown on the left.
	0-255 stitches can be entered for each of path1, 2, 3 and 4
	Useful for the four sides sewing.
	0-255 stitches are the available number of stitches for each of paths 1-9.
	Useful for continuous back-tack stitching such as belt hook sewing.
	0-255 stitches are the available number of stitches for each of paths 1-20.
	used for programmed sewing of user-designed polygon patterns.

■ One-Touch Auto/Manual Switching in Pattern Sewing:

※ In the automatic pattern mode, stitching of one path precedes to completion even if you take your step off the pedal in the middle of the patterning work, while you need to keep pushing down the pedal until the end of stitching in the manual pattern mode.

① Press the [Prog] button to obtain the display as shown in the figure.



② Press (A) and select the auto or manual pattern.

Display	Mode
P	Manual
A	Auto

③ Press the [Enter] key.

④ Turn off the blinking light by pressing the button, [Prog] which completes the mode selection.

■ Chain-Sewing Multiple Patterns:

① Program and input each pattern.

② Press the [Mode] key, and then [Prog] key to obtain the following 4-digit display as shown.

③ Press appropriate pattern modes in the order of desired pattern sewing sequence, and then press the [Prog] key to turn off the blinking light, which completes the chain programming.

※ In the chain-sewing the light of the start mode and a mode in progress blinks, and the lamp of the next mode to be executed is on constantly. If you want to cancel the chain-sewing mode, wait until the current mode is over, and then press [Mode] key. The lamp will be turned off.

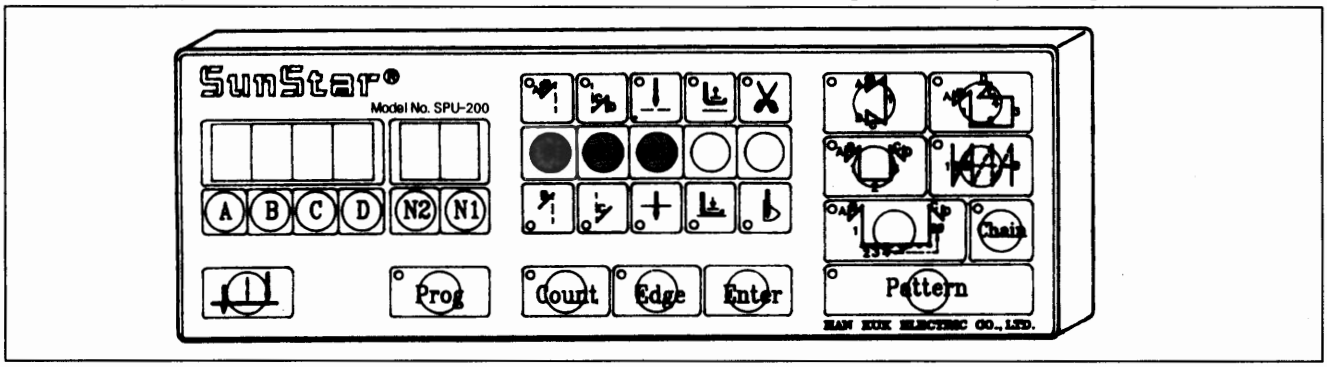
FULL FUNCTION SOFTWARE

1) Basic operation

■ Initializing

Use in case that user forgot original value by changing value at will.

· In pressing "Start Back-Tack" + "End Back-Tack" + "NEEDLE Up/Down Key", the power must be on.



※ Caution : · If initiallizing was done, all value set-up by user is changed into the factory-set-up-value. So, if not necessary, do not use the initializing.

· After initializing, user must toe down the pedal over 1,000RPM for 5sec so that controller may memorized the position of synchronizer-film.

■ Inertia adjustment

Inertia-adjusting is done to get optimal control-gains suitable to the sewing machine inertia.

· User is recommanded not to do the Inertia-adjustment if the sewing machine do stop without any abnormal motion.

· Press " Prog " and " Enter " keys simultaneously until twinkling "tUne" on the panel, and toe down the pedal until hearing the buzz.

(During the Inertia-adjustment is done, the sewing machine will repeat running and stoping automatically 8 times.)

■ Automatic memorizing of the position synchronizer-film

· Before sewing very after user purchases the controller, user is recommanded to attach the controller to the sewing machine and toe down the pedal so that controller may memorize the position of synchronizer-film attached to the sewing machine pulley. (But it is not necessary in case without synchronizer.)

■ Usage of dip switches

· Dip switches is used when the user do not have Program-Unit(P/U). Therefore in having the Program-Unit, the motor is working on the values set by Program-Unit.

○ 8Pin dip switch

NO / ON/OFF	1	2	3	4	5	6	7	8
ON	Select	Select	Up position	Up	Select	Select	Reward	Change
OFF	Deselect	Deselect	Down position	Down	Deselect	Deselect	Forward	Not change
	A/B Start Back-Tack	C/D End Back-Tack	Needle stop position	Presser foot	Thread trimming	Wiper	Motor direction	Button A/B change

○ 4Pin dip switch

NO / ON/OFF	1	2	3	4
ON	Up dip switches	↑ Inertia adjustment	Max speed limit of the sewing machine	
OFF	Use values set by P/u			
	Without program unit	Tuning	Speed 1	Speed 2

○ Setting method of max speed limit

NO	ON/OFF			
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	ON
SPEED [SPM]	2,000	3,000	4,000	5,480

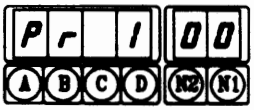
※ Inertia-adjustment can be done only after thread trimming by the pedal.

2) Changing the P/U setup

① Group "A" : Ordinary Functions of the Sewing Machine.

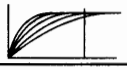
※ Various additional sewing functions of Fortuna AC Servo Motor can be used by changing the P/U default codes. The group "A" programs described below correspond to the initial sewing functions of appropriate codes. The user can modify these initial sewing setups to meet the varying sewing needs.

■ Procedure for the program change



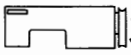
- Execute the thread-cutting before you make any program changes.
- Press the [Prog] and Ⓐ keys simultaneously in order to get the P/U ready for program changes as shown in the figure.
- Press Ⓝ2 and/or Ⓝ1 to get the code to be modified on the 2-digit display. Then, change the initial setup by pressing the Ⓒ, Ⓓ keys. Hit the [Enter] key to enter the program modifications. Finally, hit the [Prog] key to turn off the blinking light.

※ For returning to the initial set-value, press [SB/T]+[EB/T]+[ND UP/DN] keys at the same time.

No.	Function	Initial Setting	Range	Step
1	Pedal minimum sewing speed (Limit minimum speed)	250 spm	20~510	2 spm
2	Pedal maximum sewing speed (Limit maximum speed)	4000 spm	40~9960	40 spm
3	Thread trimming speed (CAM type trimming)	300 spm	20~510	2 spm
4	"+1/2 Stitch" speed on Program Unit (Speed when [1/2] key pressed)	100 spm	20~510	2 spm
5	Needle up/down speed by "Button A" (button A)	300 spm	20~510	2 spm
6	Pedal curve 	255	0~255	1
7	Start back-tack speed	1704 spm	24~2040	8 spm
8	End back-tack speed	1704 spm	24~2040	8 spm
9	Thread trimming time (Must be A24=1 and use for pneumatic Type) (T/T solenoid working time)	100 ms	4~1020	A9+A10= Total working time
10	Tension release working time (Must be A24=1 and use for pneumatic Type) (T/R Solenoid working time)	200 ms	4~1020	
11	Tension release time (Must be A24=0 and use for pneumatic type) (Tension release working section in CAM type)	255	0~255	1
12	Wait time for next operation after thread trimming completed	4 ms	4~1020	
13	Wiper working time (Wiper solenoid working time)	48 ms	4~1020	4 ms
14	Thread-wiper-return completing time	40 ms	4~1020	4 ms
15	Wait-time after thread-wiper return completed	100 ms	4~1020	4 ms

No.	Function	Initial Setting	Range	Step
16	Keep-Up time of presser foot (After the time, presser foot is down automatically)	300×0.1 sec	5~1275	0.5 sec
17	Presser-foot-down completing time	100 ms	4~1020	4 ms
18	Presser-foot lift after thread trimming	0	0/1	1=Select
19	Thread trimming validity position by pedal	0	0/1/2	0=at rev.2 1=at rev.1 2=at neutral
20	Not Used			
21	Not Used			
22	Double start back tack /\/→/\/\/	0	0/1	1=Select
23	Double end back tack /\/→/\/\/	0	0/1	1=Select
24	Thread trimming mode (For the sewing machine model)	0	0/1/2	0=CAM type 1=After up-stop 2=After down stop
25	The usage of the Default Sequence when A24=1. (It is a sequence settled by the value of A9 and A10.)	0	0/1	Use the exclusive sequence of 0=Af1~AF64. Use the sequence of 1=Default.
26	Not Used			
27	Not Used			
28	Not Used			
29	Not Used			
30	Semi-auto-conering select	0	0/1	1=Select
31	Semi-auto-conering speed (Must be A30=1)	200 spm	24~2040	8 spm
32	1st stitches of left needle selected (Must be A30=1)	3 Stitch	0~64	1 Stitch
33	2nd stitches of left needle selected (Must be A30=1)	3 Stitch	0~64	1 Stitch
34	1st stitches of right needle selected (Must be A30=1)	3 Stitch	0~64	1 Stitch
35	2nd stitches of right needle selected (Must be A30=1)	3 Stitch	0~64	1 Stitch
36	Keep-up time of R/L solenoid (After the time, the solenoid is off automatically)	450×0.1 sec	5~1275	0.5 sec
37	Not Used			
38	Not Used			
39	Not Used			
40				
41				
42				
43	One touch(Automatic) function select (Applied to the sewing mode use automatic function)	0	0/1	1=Auto Mode

No.	Function	Initial Setting	Range	Step
44				
45				
46				
47	Pre-stitch sewing (The sewing done before doing each sewing mode)	0	0/1	1 = Select
48	Pre-stitch stitches	3 Stitch	0 ~ 255	1 Stitch
49	Pre-stitch speed	2040 spm	24 ~ 2040	8 spm
50	Select of the mode of start back tack	1	0 = Stop enable during back tack when pedal poses at neutral 1 = Stop disable during back tack even when pedal poses at neutral 2 = Back tack done accurately	
51	Select of the mode of end back tack	0	0/1	1 = Back tack done accurately
52	Speed of the 1st stitch in "Accurate back tack mode"	200 spm	24 ~ 1020	8 spm
53	Speed manual back-tack switch in sewing (Button A or B)	0	0/1	0 = Button A 1 = Button B
54	Select of button A function	2	0:Manual-back-tack only 1:One-touch needle down 2:Two-touch needle up 3:Slow sewing at stop	
55	Select of button B function	0	0:Insert/delete back-tack 1:One-touch needle down 2:Slow sewing at stop 3:Manual-back-tack only	
56	Speed standard for manual back-tack during the sewing (KM-967B-7)	0	0:Present sewing speed 1:Initial B/T speed	
57	Not Used			
58	Not Used			
59	Not Used			
60	Reverse run after thread trimming (Motor will reverse run after thread trimming, and the needle stop at the highest dead point)	0	0/1	1 = Enable
61	Reverse-run distance(Encoder pulse value)	80 Pulse	0 ~ 255	1 Pulse
62	Pulley-lock in stop	0	0/1	1 = Select
63	Power for pulley-lock (Valid in case of A62 = 1)	40	10 ~ 100	1
64	Restorate distance (Valid in case of A62 = 1)	20	10 ~ 100	1

No.	Function	Initial Setting	Range	Step
65	Motor rotating direction( CCW CW)	1	0/1	1:Forward 0:Reward
66	Target speed:speed that "Target speed" signal is output. ("Target speed" is allocated to Aux(Output06) in default)	1000 spm	40~9960	40 spm
67~	Not Used			
99	Not Used			

※ Explanation for shaded section

· Each shaded section in previous page has priority about 3 sewing modes.
Priority 1: A40~A42 : The sewing mode with edge sensor
Priority 2: A44~A45 : One-Shot sewing mode
Priority 3:A46: N-Stitch sewing mode

Sewing modes is not used in "Pattern sewing mode", except "The sewing mode with edge sensor"

② Group "B" : You can confirm the parameter in relation to every solenoid and all kinds of signals for input and output.

※ It is a function which does not exist for general users, but for engineers after sales service. If you want to correct 'B, C, D' Group, the Power should be On in a state that 'Prog' is pressed down.

No.	Function	Initial Setting	Range	Step
1	Chopping duty ratio for back tack solenoid	500×0.1%	0.5~1000	0.5%
2	Full wave output time for back tack solenoid	1020 ms	4~1020	4 ms
3	Chopping duty ratio for presser foot solenoid	50%	0~100	10%
4	Full wave output time for presser foot solenoid	200 ms	4~1020	4 ms
5	Chopping duty ratio for wiper solenoid	100%	0~100	10%
6	Full wave output time for wiper solenoid	100 ms	4~1020	4 ms
7	Chopping duty ratio for right solenoid(for twin needle)	50%	0~100	10%
8	Full wave output time for right solenoid(for twin needle)	100 ms	4~1020	4 ms
9	Chopping duty ratio for left solenoid(for twin needle)	50%	0~100	10%
10	Full wave output time for left solenoid(for twin needle)	100 ms	4~1020	4 ms
11	Chopping duty ratio for tension release solenoid	100%	0~100	10%
12	Full wave output time for tension release solenoid	100 ms	4~1020	4 ms
13	Chopping duty ratio thread trimming solenoid	100%	0~100	10%
14	Full wave output time for thread trimming solenoid	100 ms	4~1020	4 ms
15	Chopping duty ratio Aux solenoid	100%	0~100	10%
16	Full wave output time for Aux solenoid	100 ms	4~1020	4 ms
17	Not Used			

No.	Function	Initial Setting	Range	Step
18	Not Used			
19	Not Used			
20	Compensation of "Start back-tack A" (Alias "B/T A")	0 Stitch	0 ~ 64	1 Stitch
21	Compensation of "Start back-tack B" (Alias "B/T B")	0 Stitch	0 ~ 64	1 Stitch
22	Compensation of "End back-tack C" (Alias "B/T C")	0 Stitch	0 ~ 64	1 Stitch
23	Compensation of "End back-tack D" (Alias "B/T D")	0 Stitch	0 ~ 64	1 Stitch
24	Keep-on of back-tack solenoid in thread-trimming (Must be "B/T C" enable and "B/T D" disable)	0	0/1	1 = Select
25	Count mode (Select "Count by counter" or "Count after thread-trimming)	0	0/1	0 = By counter 1 = After trimming
26	Up/down count in "Count after thread-trimming" (Must be "Thread-trimmin" enable)	0	0/1	1 = Up count 0 = Down count
27	The action after count over	0	0/1/2	0 = Buzzer, Sewing 1 = Buzzer only 2 = Sewing only
28	Counter auto clear/preset after "Count over"	0	0/1	1 = Auto clear/Presser
29	Not Used			
30	B/T Solenoid check ("7" Displayed-output00)	※ Press "+1/2( ) " key on P/U after setting function No. of solenoid to be checked.		
31	T/T Solenoid check ("6" Displayed-output07)			
32	W/P Solenoid check ("1" Displayed-output02)			
33	P/F Solenoid check ("0" Displayed-output01)			
34	T/R Solenoid check ("4" Displayed-output05)			
35	Left Solenoid check ("3" Displayed-output04)			
36	Right Solenoid check ("2" Displayed-output03)			
37	Aux. Solenoid check ("5" Displayed-output06)			
38	Left LED check ("8" Displayed-output10)			
39	Light LED Check ("9" Displayed-output11)			
40	Select of non-order-made sewing machine - Enter the No. in "Non-order-made sewing machine List" - Trimming sequence and some functions value is copied - If user want to change the trimming-sequence, user should change AF1 ~ AF64. (But if initialization done, all functions are reset for "SunStar 235/250 machine"	0	0 ~ 255	1

※ B20 ~ B23 : Function used to compensate in case that Back-Tack stitch is not correct
※ B30 ~ B39 : Output-Pin test functions

	Function		Range	Step
41	[redacted] sequence No. - DEFAULT value is "0" and if user want to use another trimming sequence beside DEFAULT, enter the No. of trimming sequence made additionaly. (Refer "Usage of trimming-sequence")	0	0~64	1
42	Select of [redacted] sewing machine - Enter the No. in "Order-made sewing machine list" - Trimming sequence and come functions value is copied. - If user want to change the trimming sequence, user should change AF1~AF64. (But if initialization done, all functions are reset for "SunStar 235/250 machine)	0	0~255	1
43	Not Used			
44	Not Used			
45	Not Used			
46	Not Used			
47	Not Used			
48	Not Used			
49	Not Used			
50	Input00 input-pin check (Button A)		Off/On	Input "On" displayed
51	Input01 input-pin check (Button B)		Off/On	Input "On" displayed
52	Input02 input-pin check (1/4 Stitch switch)		Off/On	Input "On" displayed
53	Input03 input-pin check (2/4 Stitch switch)		Off/On	Input "On" displayed
54	Input04 input-pin check (3/4 Stitch switch)		Off/On	Input "On" displayed
55	Input05 input-pin check (4/4 Stitch switch)		Off/On	Input "On" displayed
56	Input06 input-pin check (Right switch)		Off/On	Input "On" displayed
57	Input07 input-pin check (Left switch)		Off/On	Input "On" displayed
58	Input10 input-pin check (Presser foot switch)		Off/On	Input "On" displayed
59	Input11 input-pin check (+1/2 Stitch button on P/U)		Off/On	Input "On" displayed
60	Input12 input-pin check (Pedal forward step 1)		Off/On	Input "On" displayed
61	Input13 input-pin check (Pedal reverse step 2)		Off/On	Input "On" displayed
62	Input14 input-pin check (Pedal reverse step 1)		Off/On	Input "On" displayed
63	Input15 input-pin check (P/U Edge sensor)		Off/On	Input "On" displayed

No.	Function	Initial Setting	Range	Step
64	Pedal analog value input-pin check		0~255	
65	Pedal max volume input-pin check		0~255	
66	Synchronizer signal check(Increase by per rotation)			
67	Encoder A/B phase signal check(The absolute position of the machine pulley)			
68~	Not Used			
99	Version of EEPROM			nXXX Displayed

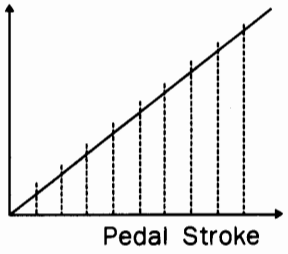
※ B50~B67:Input-pin(Input signal) test functions.

③ Group "C" : Speed curve by pedal distance and slow start function

※ User is recommanded not to use the functions at will. The functions should be adjusted by technician.

No.	Function	Initial Setting	Range	Step
1	Range of pedal Forward step 1 (Pedal toe-down distance 1)	10/64	0~64	1/64
2	Range of pedal Forward step 2 (Pedal toe-down distance 2)	15/64	0~64	1/64
3	Range of pedal Forward step 3 (Pedal toe-down distance 3)	31/64	0~64	1/64
4	Range of pedal Forward step 4 (Pedal toe-down distance 4)	40/64	0~64	1/64
5	Range of pedal Forward step 5 (Pedal toe-down distance 5)	36/52	0~64	1/64
6	Max sewing speed in pedal forward step 1	440 spm	40~9960	40 spm
7	Max sewing speed in pedal forward step 2	920 spm	40~9960	40 spm
8	Max sewing speed in pedal forward step 3	4000 spm	40~9960	40 spm
9	Max sewing speed in pedal forward step 4	5480 spm	40~9960	40 spm
10	Max sewing speed in pedal forward step 5	9960 spm	40~9960	40 spm
11	Not Used			
12	Not Used			
13	Not Used			
14	Not Used			

※ C1~C5:Deviding pedal-distance by 64 step 5 range, set max speed of each range. So user can make curve of "Speed . vs. pedal-distance" at will.



No.	Function	Initial Setting	Range	Step
15	Not Used			
16	Not Used			
17	Not Used			
18	Not Used			
19	Not Used			
20	Slow-start after thread-trimming	0	0/1	1 = Select
21	Slow-start in restart after stop by pedal	0	0/1	1 = Select
22	Slow-sewing-speed change in slow start	0	0/1	1 = Select
23	The 1st stitch speed in slow start	400 spm	40 ~ 9960	40 spm
24	The 2nd stitch speed in slow start	400 spm	40 ~ 9960	40 spm
25	The 3rd stitch speed in slow start	640 spm	40 ~ 9960	40 spm
26	The 4th stitch speed in slow start	1000 spm	40 ~ 9960	40 spm
27	The 5th stitch speed in slow start	1680 spm	40 ~ 9960	40 spm
28	Not Used			
29	Not Used			
30	Limit of motor maximum speed	3405 rpm	15 ~ 3405	15 rpm
31	Check-time of synchronizer output signal (130Er)	40 × 0.1 sec	5 ~ 1275	0.5 sec
32	Check-time of motor over-load (129Er)	30 × 0.1 sec	5 ~ 1275	0.5 sec
33	Check-time of solenoid over-current	100 ms	4 ~ 1020	4 ms
34	Check-time of power-off	300 ms	4 ~ 1020	4 ms
35 ~	Not Used			
99				

※ C31 : Error is occured if sincronizer signal is not detected in given time.
※ C32 : Error is occured if motor speed not reach at the speed in given time.

④ Group "D" : Solenoids working position in CAM-Type-Trimming

※ User is recommanded not to use the functions at will. The functions should be adjusted by technician.
※ Set thread-trimming (T/T) & tension-release(T/R) working positions needed in CAM-Type-Trimming.
※ Functions are invalid in case of general-sequence not used in CAM-Type-Trimming.

No.	Function	Initial Setting	Range	Step
1	Select auto point setting of T/T & T/R working in CAM-type-trimming	1	0/1	0 = User define 1 = Auto
2	Pulley-size detected by controller	(?)		
3	Needle-up position detected by controller	(?)		
4	T/T solenoid working position	(?)		
5	T/T solenoid releasing position	(?)		
6	Operating position of T/R solenoid	(?)		
7	Cancellation Position of T/R solenoid operation	(?)		
8	Position for stitch-counting, B/T-working and needle-Position detecting in twin-needle-sewing	(?)		Not Used
9	Not Used			
10	Not Used			
11	Not Used			
12	Not Used			
13	Not Used			
14	Not Used			
15	Not Used			
16	Not Used			
17	Not Used			
18	Not Used			
19	Not Used			
20	Not Used			
21	Not Used			
22	Not Used			
23	Not Used			
24	Not Used			
25	Not Used			
26	Not Used			
27	Not Used			
28	Not Used			
29	Not Used			
30	Not Used			
31	Not Used			

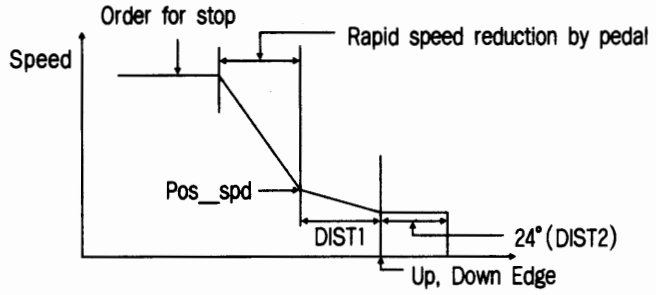
	Not Used			
	Not Used	(85) Hex	00 ~ FF	1/Hex(Not used)
	Not Used	(00) Hex	00 ~ FF	1/Hex(Not Used)
	Not Used	(00) Hex	00 ~ FF	1/Hex(Not Used)
	Not Used			
	Not Used			

⑤ Group "AF" : [Thread-Trimming Sequence] and motor control gains

※ User is recommanded not to use the functions at will. The functions should be adjusted by technician.

No.	Function	Initial Setting	Range	Step
1	The 1st address of thread-trimming sequence	03 Hex	00 ~ FF	01 Hex
2	The 2nd address of thread-trimming sequence	F8 Hex	00 ~ FF	01 Hex
3	The 3rd address of thread-trimming sequence	00 Hex	00 ~ FF	01 Hex
4 ~ 64	※ AF1 ~ AF64 are the sequential address of user-oriented "Thread-trimming sequence" program. ※ This function gives user many facility which can program many user-defined "Thread-trimming sequence". ※ Thread-trimming sequence programming method ① Start from next address of the "End" of previous sequence. ② Value of the 1st address of each sequence means total bytes of sequence to be programmed, including itself. ③ From the 2nd address of each sequence. The sequence can be programed sequentially reffering "Usage of trimming-sequence". ④ "End command" must be written when the sequence is end.			
65	Not Used			
66	Not Used			
67	Not Used			
68	Not Used			
69	Not Used			
70	Position sensing speed for stop (pos_spd)	220 spt	2 ~ 510	2 spt
71	Wait-time for position stop completed (Stopdelay)	80 ms	4 ~ 1020	4 ms
72				
73	Distance gain KC1A	10	0 ~ 255	1
74	Distance gain KC1B	2	0 ~ 255	1
75	Distance gain KC1C	10	0 ~ 255	1
76				
77	Speed gain A KF1A	160	0 ~ 255	1

No.	Function		Initial Setting	Range	Step
78	Speed gain B	KF1B	80	0~255	1
79	Speed gain C	KF1C	180	0~225	1
80					
81					
82	Deceleration from "Position sensing speed" to "Stop speed" after stop-signal input	accelD	4	2~100	2
83					
84					
85	Speed just before stop	end_spd2	16spt	0~225	1spt
86	Inertia value detected by controller	Inertia		0~255	Use "Inertia tuning"
87~	Not Used				
99	Not Used				



※ Explanation for shaded section

AF72 (DIST1)- Distance from up/down edge for immediate deceleration completed when motor stop. This value more large, "Stable immediate stop" more enable. But stop motion may be slightly slow.

AF76 (KC2)-This can be obtained by "Inertia tuning" and this value more large, distance pursuit more slow. (User is recommanded not to use the functions at will. The functions should be adjusted by technician)

AF80 (KF2)-This can be obtained by "Inertia tuning"and this value more large, speed pursuit more slow (User is recommanede not to use the functions at will. The functions should be adjusted by technician.)

AF81 (accel A)- This can be obtained by "Inertia tuning" and, means the deceleration until immediate deceleration completed after stop signal input. This value more large, immediate stop more fast, but excessively large, immediate stop may be ratherly slow.

AF83 (accel B)- This value means how fast speed acceleration is done. And this valus more large speed acceleration by pedal more fast, but over shoot may be occured slightly.

AF84 (accel C)- This value means how fast speed deceleration is done. And this valus more large speed deceleration by pedal more fast, but under shoot may be occured slightly.

※ Example of using above shaded functions

① When immediate stop is not good and additional one stitch is occured
- This case may be occured in case that the sewing machine is run at very high speed or "Inertia" of the sewing Machine is very large, motor may not do immediate deceleration. In this case, user can make the problem correct by increasing AF72 and increasing/decreasing AF81 properly.

② When speed acceleration/deceleration by pedal is slow
- This case may be occured in case the speed acceleration/decelertion is not suitable to "Inertia" of the sewing machine. In this case, user can make the problem correct by increasing AF83 and A84 properly.

⑥ Group "BF" : Changing of input/output signal functions

※ User is recommanded not to use the functions at will. The functions should be adjusted by technician.

No.	Function	Initial Setting	Note
1	OUTPUT03 (Right solenoid)	0	◎ Refering below table, user can set the function of each output pin.
2	OUTPUT04 (Left solenoid)	1	
3	OUTPUT05 (Tension release solenoid)	2	
4	OUTPUT06 (Aux solenoid)	3	
5	OUTPUT07 (Thread trimming solenoid)	4	
6	OUTPUT10 (Left LED)	5	
7	OUTPUT11 (Right LED)	6	

▶ A : Out-pin function table

Fun. No	Function	Fun. No.	Function
0	Right solenoid	100	inv. Right solenoid
1	Left solenoid	101	inv. Left solenoid
2	Tension release solenoid	102	inv. Tension release solenoid
3	AUX solenoid (or needle cooler)	103	inv. AUX solenoid (or needle cooler)
4	Thread trimming solenoid	104	inv. Thread trimming solenoid
5	Left LED	105	inv. Left LED
6	Right LED	106	inv. Right LED
7	"Needle up-stop" Signal	107	inv. "Needle up-stopped" Signal
8	"Needle down-stop" Signal	108	inv. "Needle down-stopped" Signal
9	"Motor running" Signal	109	inv. "Motor running" Signal
10	"Target speed" Signal	110	inv. "Target speed" Signal
11	"Trimming" Signal	111	inv. "Trimming" Signal
12	"End back tack & trimming" Skgnal	112	inv. "End back tack & trimming" Signal
13	Not available	113	Not available
14	Not available	114	Not available
15	"Emergency stopped" Signal	115	inv. "Emergency stopped" Signal
16	Not available	116	Not available
17	Roller lift solenoid	117	inv. roller lift solenoid
		200	Low
		201	High

※ Caution : In case any other function except above Function, is set, the pin function is not available.

※ Roller Lift Solenoid = Presser Foot-Lift Solenoid + Back Tack Solenoid + Roller Lift Switch

No.	Function	Initial Setting	Note
8	Not Used		
9	Not Used		
10	Not Used		
11	INPUT00 (Button A)	0	◎ Refering below table, user can set the function of each input pin.
12	INPUT01 (Button B)	1	
13	INPUT02 (1/4 Stitch switch)	2	
14	INPUT03 (2/4 Stitch switch)	3	
15	INPUT04 (3/4 Stitch switch)	4	
16	INPUT05 (4/4 Stitch switch)	5	
17	INPUT06 (Right sol. switch)	6	
18	INPUT07 (Left sol. switch)	7	
19	INPUT10 (Presser foot-lift switch)	8	
20	INPUT11 (+1/2 stitch switch on P/U)	9	
21	INPUT12 (Start signal by pedal)	10	
22	INPUT13 (Trimming signal by pedal)	11	
23	INPUT14 (Presser foot-lift signal by pedal)	12	
24	INPUT15 (Edge sensor attached to P/U optionally)	13	

▶ B : Input pin function table

Fun. No.	Function	Fun. No.	Function
0	Button A switch	100	inv Button A switch
1	Button B switch	101	inv Button B switch
2	1/4 Stitch switch	102	inv 1/4 Stitch switch
3	2/4 Stitch switch	103	inv 2/4 Stitch switch
4	3/4 Stitch switch	104	inv 3/4 Stitch switch
5	4/4 Stitch switch	105	inv 4/4 Stitch switch
6	Right solenoid switch	106	inv Right solenoid switch
7	Left solenoid switch	107	inv Left solenoid switch
8	Presser foot-lift switch	108	inv Presser foot-lift switch
9	+1/2 Stitch switch on P/U	109	inv +1/2 Stitch switch on P/U
10	Pedal start signal	110	inv Pedal start signal
11	Pedal thread trimming signal	111	inv Pedal thread trimming signal
12	Pedal presser foot-lift signal	112	inv Pedal presser foot-lift signal
13	Edge sensor attached to P/U optionally	113	inv Edge sensor attached to P/U optionally
14	External signal	114	inv External signal
15	Safety switch	115	inv Safety switch
16	Trimming disable signal	116	inv Trimming disable signal
17	Roller lift switch	117	inv Roller lift switch

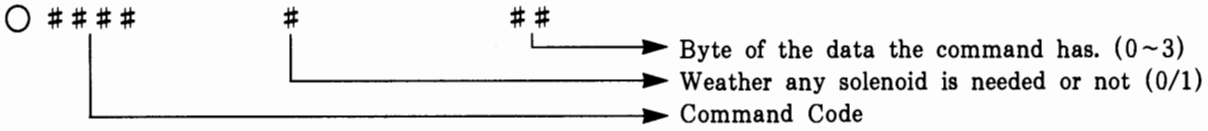
※ Caution : If each function of input coincides each other. The functions of coinciding Input Pins, are not available.
In case that any other function except above Function, is set, the pin function is not available.

※ Standard of Input Device's output level is Active High.

25~30	Not Used			
31	Collective Logical Change-Over of Output Signal Level	0	0/1	1=Select
32	Collective Logical Change-Over of Input Signal Level	0	0/1	1=Select
33~	Not Used			
99	Not Used			

☐ Usage of thread-trimming sequence

1) Structure of a command



2) Structure of a data

① Solenoide :

	Programmable Port					Fixed Port		
Bit	7	6	5	4	3	2	1	0
Solenoid	T/T	AUX	T/R	L SOL	R SOL	W/P	P/F	B/T

※ User can make the solenoid active by '1' & inactive by '0'

② When 2 byte data : Low byte of the data first, high byte of the data after

3) Command Code

Dec.	Bin	Hex	C.P.U Function Command	Data	ANS2 Output
0	00000	0*	End of sequence		
1	00001	0*	Wait until ANS2=1		
2	00010	1*	Wait position, check skip	1Byte (1=1.5°)	
3	00011	1*	Wait position, not check skip	1Byte (1=1.5°)	
4	00100	2*	Time delay	2Byte (0.5ms/Unit)	
5	00101	2*	Wait external signal (PINP 1.5=0)		
6	00110	3*	Wait pos1 (T/T Start)		
7	00111	3*	Wait pos2 (T/T End)		
8	01000	4*	Wait needle down pos		
9	01001	4*	Wait needle up pos		
10	01010	5*	L move stop	1Byte (1=1.5°)	
11	01011	5*	On hold		
12	01100	6*	Off hold		
13	01101	6*	On motor		
14	01110	7*	Off motor		
15	01111	7*	Change speed	1Byte (1=25rpm)	
16	10000	8*	Set speed (Target speed)	1Byte (1=25rpm)	Active
17	10001	8*	Set direction	1Byte (1cw)	Active
18	10010	9*	Top stop down		Active
19	10011	9*	Top stop up		Active
20	10100	A*	Up stop (Pos-spd)	1Byte (1=25rpm)	Active
21	10101	A*	Down stop	1Byte (1=25rpm)	Active

Dec.	Bin	Hex	C.P.U Function Command	Data	ANS2 출력
22	10110	B *	DACC down edge (End-spd)	1Byte (1 = 25rpm)	Active
23	10111	B *	DACC up edge (End-spd)	1Byte (1 = 25rpm)	Active
24	11000	C *	Move down edge (pos-spd)	1Byte (1 = 25rpm)	Active
25	11001	C *	Move up edge (pos-spd)	1Byte (1 = 25rpm)	Active
26	11010	D *	Pos stop down (pos-spd)	2 Byte O 1 = 25rpm O Stitch No	Active
27	11011	D *	Pos stop up (pos-spd)	2 Byte O 1 = 25rpm O Stitch No	Active
28	11100	E *	Pos DACC down (pos-spd)	3 Byte O Pos-spd O End-spd1 O Stitch No	Active
29	11101	E *	Pos DACC up	3 Byte O Pos-spd O End-spd1 O Stitch No	Active
30	11110	F *	Random stop		
31	11111	F *	Gerneral operation		

4) Meaning of the main commands
   ① End of Sequence : The end of thread-trimming sequence
   ② Wait Unit ANS2=1 : Wait until excution of the command which has ANS2-Output, is completed.
   ③ Time Delay : Make time-delay as much as given time data with solenoid being on/off.
   ④ Wait External Sig : Wait for "External Signal" input.
   ⑤ L Move Stop : Stop after rotating in given angle from down-edge of synchronizer
   ⑥ Change Speed : Change motor speed into different speed
   ⑦ Top Stop Up : Immediate stop at needle-up position
   ⑧ Up Stop : Stop at needle-up position as close as possible from current position in rotating,
   ⑨ DACC Down Edge : For immediate stop, decelerate motor immediately to down-edge of synchronizer
   ⑩ Move Down Edge : Make speed "pos-spd" in down-edge of synchronizer, decelerating current speed
   ⑪ Pos Stop Down : Stop in down-edge of synchronizer after sewing as many as given stitches with "pos-spd"
   ⑫ On Hold : Lock the sewing machine pulley for motor not to rotate.
   ⑬ Pos DACC Down : Decelerate immediately up to down-edge of synchronizer after sewing as many as given stitches.

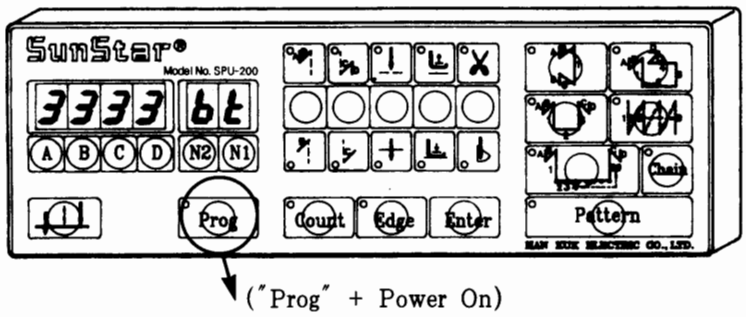
5) Caution when user programs thread-trimming sequence
   ① Thread-trimming sequence always starts from next address of the "End" of previous sequence.
   ② Value of the 1st address of each sequence means total bytes of sequence to be programmed, including itselt.
   ③ "End command" must be written when the sequence is ended.
   ④ Thread-trimming sequence No. in B41, is determined from '0' in turn without any relation to the length of the sequence.

⑦ Selection method for use of other company's machine

1) For the selection above mentioned, you are able to do it at no. 42 of B-GROUP On P.U.Box.
   - ENCL. : Application list of our motor for other company's machine.

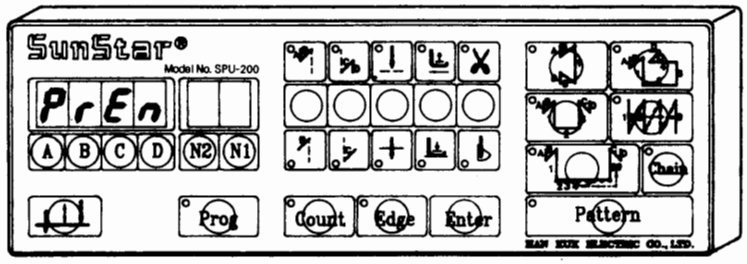
2) Use of B-GROUP

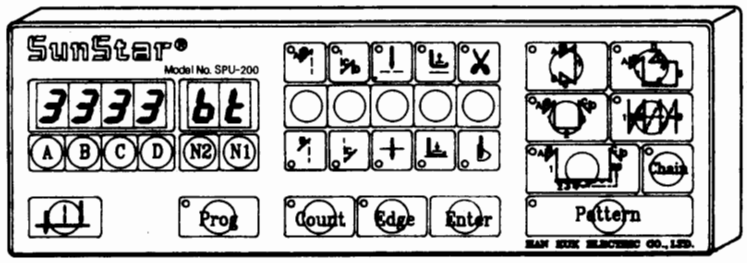
ⓐ Whill you are pressing "Prog" button On P.U.Box. Power On. You are required to do it before you Power On.



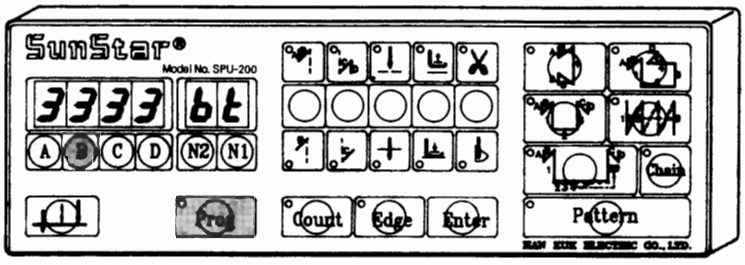
("Prog" + Power On)

ⓑ After "Pren" will be shown on screen for several seconds, then 3, 3, 3, 3, will be shown.

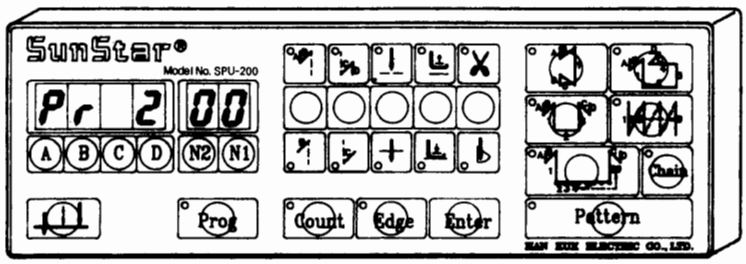




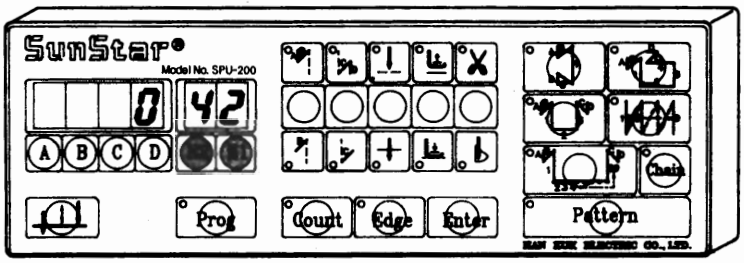
ⓒ While you are pressing "Prog" button, press "B" button.



ⓓ "Pr 2" will be shown on screen.



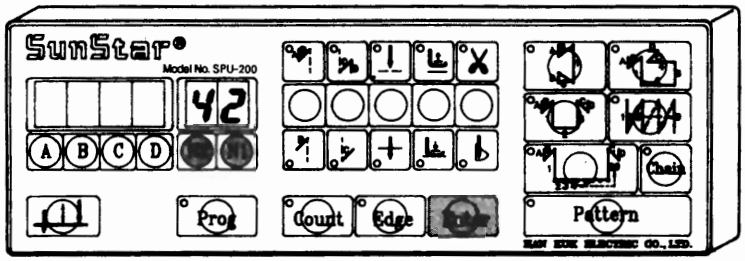
ⓔ Set "42" by pressing N1, N2 buttons.



"0" means setting for single needle lockstitch M/C (EX 〉 KM-235).

ⓕ After you select number 42, select the model number of sewing machine which you want.
- List of sewing machines.

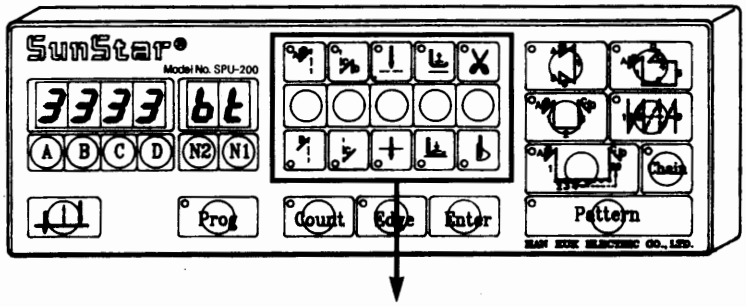
ⓖ After you select the desired model number of sewing machine, insert the changed parameter by pressing "Enter" On P.U.Box.



Only after you press "Enter" button, the changed parameter might be saved.

ⓗ After the changed parameter is completely saved and press "Prog" button On P.U.Box.
Then, first stitch number(3, 3, 3, 3) will be shown.

3) Setting method of P.U.Box after you change single needle lockstitch M/C into 3 thread cover stitch M/C.
- The condition of P.U.Box after you select other company's machine.



No.	Start B/T	End B/T	Needle	Press Foot	Thread Trm.	Wiper
Contents	OFF	OFF	UP	DOWN	ON	ON/OFF

The above setting should be done by manual. That is to say, if you select a desired model number of sewing machine, the program will be automatically changed suitable for specification of selected sewing machine but, the setting of P.U.Box is required to do by user.

⑧ Series 2 another sewing machine order No. List

Sewing Machine Select Code	Sewing Machine	Speed	Type	Order No.
0	KM-235A/B	4000	A	SA55-□A
2	KM-235A	4520	OEM	AC40-□A
3	KM-506-7 etc.	2400	B	SAC55-□B
4	KM-750-7, KM-750BL-7, KM-650-7	2800	OEM	AC40-□B
5	KM-790-7, KM-790BL-7	2400	C	SAC55-□C
6	KM-790-7, KM-790BL-7	2800	OEM	AC40-□C
7	UNION 34700, SIRUBA UTP/UTQ	6000	ELEC	SAC55-□ X-007
8	UNION 34700, YAMATO VC2700, SIRUBA UTC/UTQ	4520	AIR	SAC55-□ X-008
10	Maier Unitas D1376	1720		SAC55-□ X-010
11	PFAFF 563			SAC55-□ X-011
13	YAMATO VC2700	6000	ELEC	SAC55-□ X-013
14	BROTHER DB2-B737, JukiDDL550N	4000		SAC55-□ X-014
16	DURKOPP 273-140042/E9	3000		SAC55-□ X-016
18	DAE WOO DLS-640	4000		SAC55-□ X-018
19	TOYOTA LS2-AD341-102	4000		SAC55-□ X-019
21	STROBEL KL170-2-FD	2480		SAC55-□ X-021
22	KM-250 AU, BH	5000		AC40-□B-022
24	KANSAI RX, DX,WX Series	5400	ELEC	SAC5-□ X-024
25	DURKOPP 271-140042	4800		SAC-□ X-025
26	PEGASUS W500/UT100, 400, W600/UT100, 400	6000	AIR	SAC55-□ X-026
27	PEGASUS W500/UT200, W600/UT200	6000	ELEC	SAC55-□ X-030
28	KANSAI RX, DX WX Series	5400	AIR	SAC55-□ X-031
29	KINGTEX CT6500-0-56M	4480	AIR	SAC55-□ X-032
30	KM-640BL-7	2000		SAC55-□ X-033
31	KM-967BL-7	3000		SAC55-□ X-034

9

PROBLEM CODES AND TROUBLESHOOTING

※ Fortuna AC Servo Motor buzzes and displays codes, which are listed below, by its self-checking mechanism for any abnormal condition changes. Check those points recommended below for each displayed code for problems, and resume the sewing work. If the problem still persists, contact our sales offices.

No.	Problem Code and Buzz	Possible Cause	Check/Do the following
1	100 Er intermittent buzz six times	Operation of the protection circuits against	· Check the solenoid wire is improper condition · Check if the inadequate solenoid(below 5Ω)is used · Check if it is exposed to cold weather long time
2	128 Er intermittent buzz twice	Bad connection of the motor encoder	· Confirming the breakage of motor Encoder cable · Check the connection of motor encoder
3	129 Er intermittent buzz three times	Overload of the sewing machine	· Check the machine by manully rotating it
		Internal circuit problem of the controll box	· Check the connector connection and the intelligent power module for damage · Check the internal fuse of the contoller
4	130 Er intermittent buzz three times	The position detecting sensor is not properly functioning	· Check the connector of the controller box · Check for mechanical problems of position-detections sensor
5	SN 60 Er continuous intermittent buzz	It occurs when connecting the position detecting sensor when the power is on.	· Turn off the power and turn it again. Resume the sewing work
6	SN 61 Er continuous intermittent buzz	It occurs when disconnecting the position detecting sensor when the power is on	· Turn off the power and turn it again. Resume the sewing work
7	132 Er intermittent buzz once	External noise	· Keep the servo motor far away from high-current equipments · Damaging of internal fuse that occurs immediately after the power turned on
8	No code continuous buzz	It occurs when connecting or disconnecting the P/U connector power is on.	· Turn off the power and turn it again. Resume the sewing work
9	Cnnd Er long continuous buzz	C.P.U Problem with in the P/U	· Check if the P/U cables are interfering with the belt
10	AC 19 Er BC 20 Er CE 17 Er intermittent buzz four times	Internal communication error on the controller box	· Turn off the power and turn it again. Resume the sewing work
11	PU 26 Er intermittent buzz five times	Internal communication error on the controller box	· Turn off the power and turn it again. Resume the sewing work
12	1000~9999 Er long continuous buzz	Internal circuit problem due to noise	· Turn off the power and turn it again. Resume the sewing work