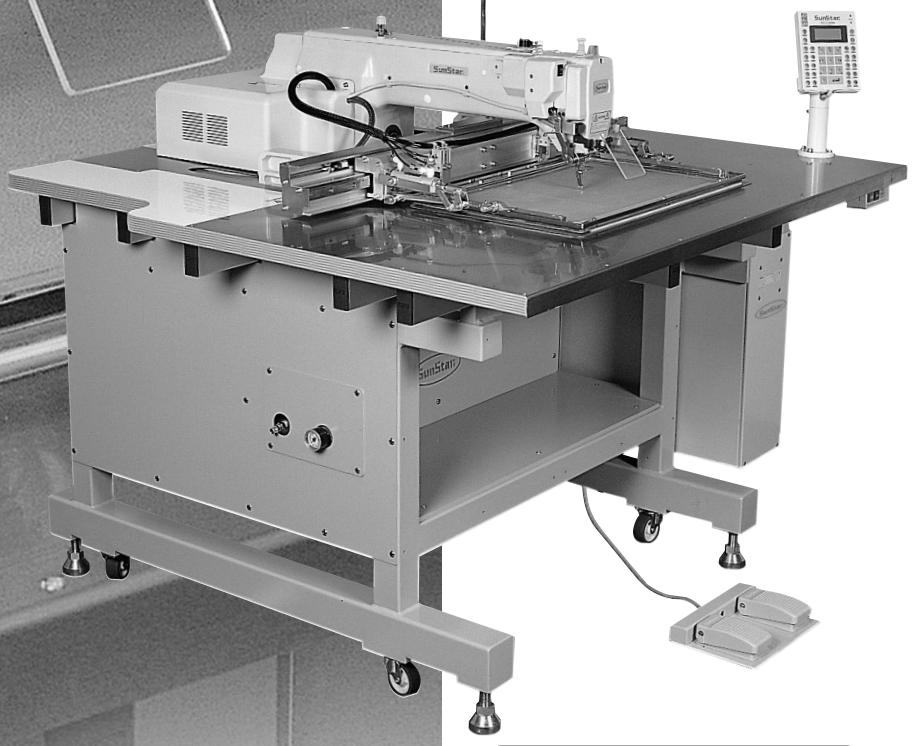
SunStar®

USER'S MANUAL

SPS/A-3020 5030 SERIES

Electronically Controlled
Pattern Sewing Machine



1) FOR AT MOST USE WITH EASINESS, PLEASE CERTAINLY READ THIS MANUAL BEFORE STARTING USE.
2) KEEP THIS MANUAL IN SAFE PLACE FOR REFERENCE WHEN THE MACHINE BREAKS DOWN.

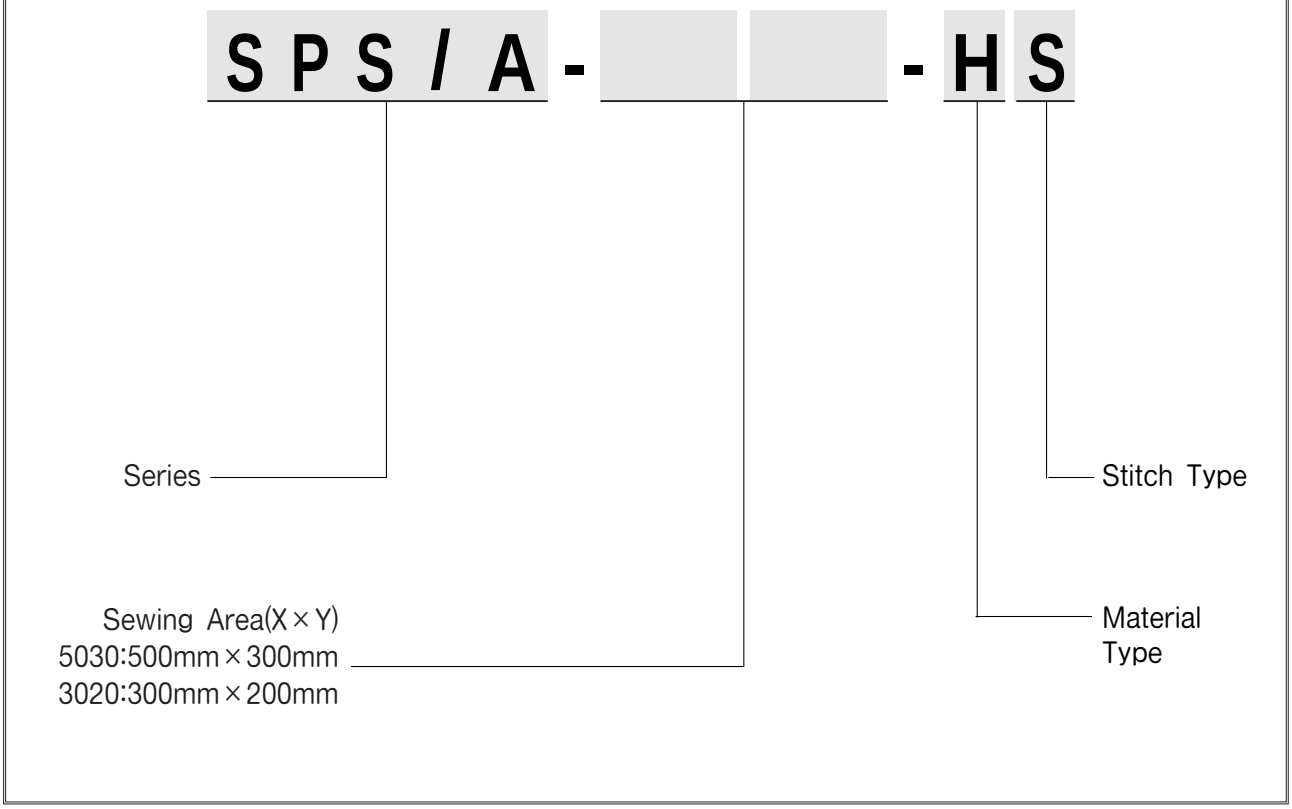
SUNSTAR MACHINERY CO., LTD

MME-050228

1. Thank you for purchasing our product. Based on the rich expertise and experience accumulated in industrial sewing machine production, SUNSTAR will manufacture industrial sewing machines, which deliver more diverse functions, high performance, powerful operation, enhanced durability, and more sophisticated design to meet a number of user's needs.
2. Please read this user's manual thoroughly before using the machine. Make sure to properly use the machine to enjoy its full performance.
3. The specifications of the machine are subject to change, aimed to enhance product performance, without prior notice.
4. This product is designed, manufactured, and sold as an industrial sewing machine. It should not be used for other than industrial purpose.

SUNSTAR MACHINERY CO., LTD.

Organization of the SPS/A-Series Model



☐ Application
G:General Material
H:Heavy Material

☐ Stitch
S:Standard Stitch
P:Perfect Stich

CONTENT

1

MACHINE SAFETY REGULATIONS

Safety instruction on this manual are defined as Danger, Warning and Notice.
If you do not keep the instructoins, physical injury on the human body and machine damage might be occurred.

Danger : This indication should be observed definitely. If not, danger could be happen during the installation, conveyance and maintenance of machines.

Warning : When you keep this indication, injury from the machine can be prevented.

Caution : When you keep this indication, error on the machine can be prevented.

1-1)Machine Transportation  Danger	Those in charge of transporting the machine should know the safety regulations very well. The following indications should be followed when the machine is being transported. ⓐ More than 2 people must transport the machine. ⓑ To prevent accidents from occurring during transportation, wipe off the oil on the machine well.
1-2)Machine Installation  Caution	The machine may not work well or breakdown if installed in certain places, Install the machine where the following qualifications agree. ⓐ Remove the package and wrappings starting from the top. Take special notice on the nails on the wooden boxes. ⓑ Dust and moisture stains and rusts the machine. Install an airconditioner and clean the machine regularly. ⓒ Keep the machine out of the sun. ⓓ Leave sufficient space of more than 50cm behind, and on the right and left side of the machine for repairing. ⓔ EXPLOSION HAZARDS Do not operate in explosive atmospheres. To avoid explosion, do not operate this machine in an explosive atmosphere including a place where large quantities of aerosol spray product are being used or where oxygen is being administered unless it has been specifically certified for such operation. ⓕ The machine were not provided with a local lighting due to the feature of machine. Therefore the illumination of the working area must be fulfilled by end user. [Refer] Details for machine installment are described in 4. Machine Installment.
1-3)Machine Repair  Danger	When the machine needs to be repaired, only the assigned troubleshooting engineer educated at the company should take charge. ⓐ Before cleaning or repairing the machine, turn off the main power and wait 4 minutes till the machine is completely out of power. ⓑ Not any of the machine specifications or parts should be changed without consulting the company. Such changes may make the operation dangerous. ⓒ Spare parts producted by the company should only be used for replacements. ⓓ Put all the safety covers back on after the machine has been repaired.

1-4) Machine Operation

Warning

SPS/A-5030 Series is made to sew patterns on fabrics and other similar material for manufacturing.
Follow the following indications when operating the machine.

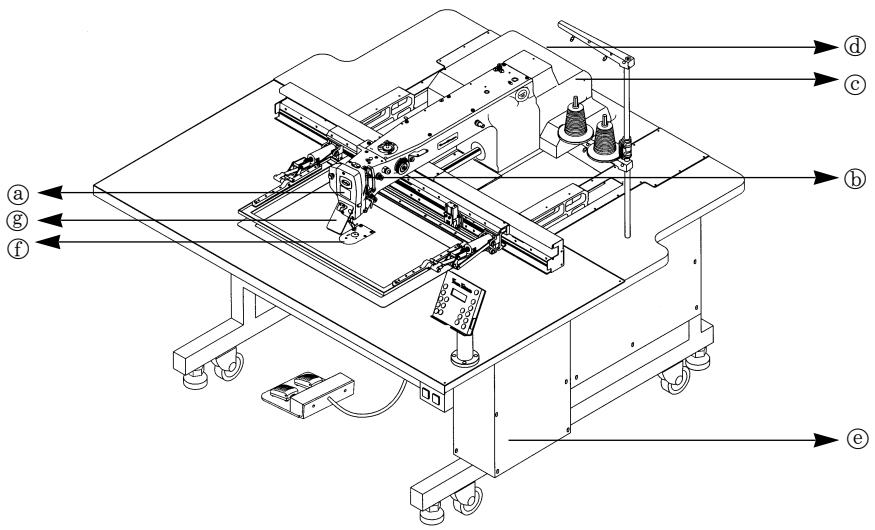
ⓐ Read through this manual carefully and completely before operating the machine.
ⓑ Wear the proper clothes for work.
ⓒ Keep hands or other parts of the body away from the machine operation parts (needle, shuttle, thread take-up lever, and pulley etc.) when the machine is being operated.
ⓓ Keep the covers and safety plates on the machine during operation.
ⓔ Be sure to connect the earthing conductor.
ⓕ turn off the electric main power and check if the switch is turned "off" before opening electric boxes such as the control box.
ⓖ Stop the machine before threading the needle or checking after work.
ⓗ Do not step on the pedal when turning the power on.
ⓘ Do not connect several motors to the same concent.
ⓙ If possible, install the machine away from loud noises such as high frequency welding machines

[Warning]
Belt will crush or amputate finger or hand, keep cover in place before operating, turn off power before inspecting or adjusting.

1-5) Devices for Safety

Caution

ⓐ Safety label : It describes cautions during operating the machine.
ⓑ Thread take-up cover : It prevents from any contact between body and take-up lever.
ⓒ Belt Cover : It prevents from insertion of hands, feet or clothes by belt.
ⓓ Spool Line Shaft cover : It prevents from any accidents that can occur during shaft rotation and straight reciprocation.
ⓔ Label for specification of power : It describes cautions for safety to protect against electric shock during rotating the motors.
ⓕ Finger guard : It prevent from contacts between a finger and needle.
ⓖ Safety plate : It protects eyes against needle breaks.



1-6) Caution Mark Position

Caution mark is attached on the machine for safety.
When you operate the machine, observe the directions on the mark.

Position of Warning Mark

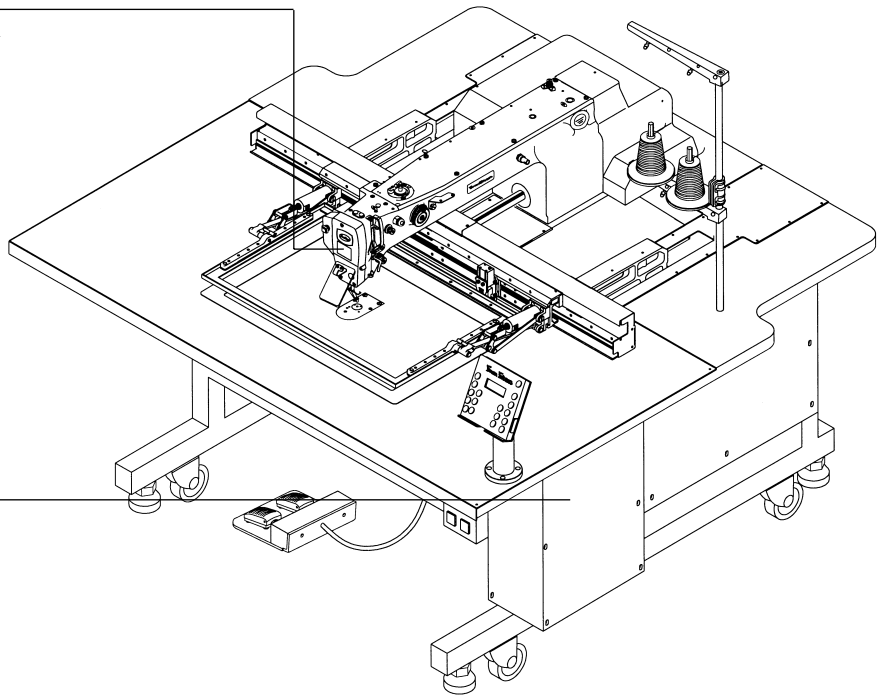
[View from the right-front]

CAUTION
경 고

Do not operate without finger guard and safety devices. Before threading, changing bobbin and needle, cleaning etc. switch off main switch.
손가락 보호대와 안전장치 없이 작동하지 마십시오.
실, 보빈, 바늘교환시나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

WARNING
경 고

Hazardous voltage will cause injury.
Be sure to wait at least 360 seconds before opening this cover after turn off main switch and unplug a power cord.
고압 전류에 의해 감전될 수 있으므로 커버를 열 때는 전원을 내리고 전원 플러그를 뽑고 나서 360초간 기다린 후 여십시오.



1-7) Contents of Marks

Warning

Caution

1)

CAUTION
경 고

Do not operate without finger guard and safety devices. Before threading, changing bobbin and needle, cleaning etc. switch off main switch.
손가락 보호대와 안전장치 없이 작동하지 마십시오.
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2)

WARNING
경 고

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2

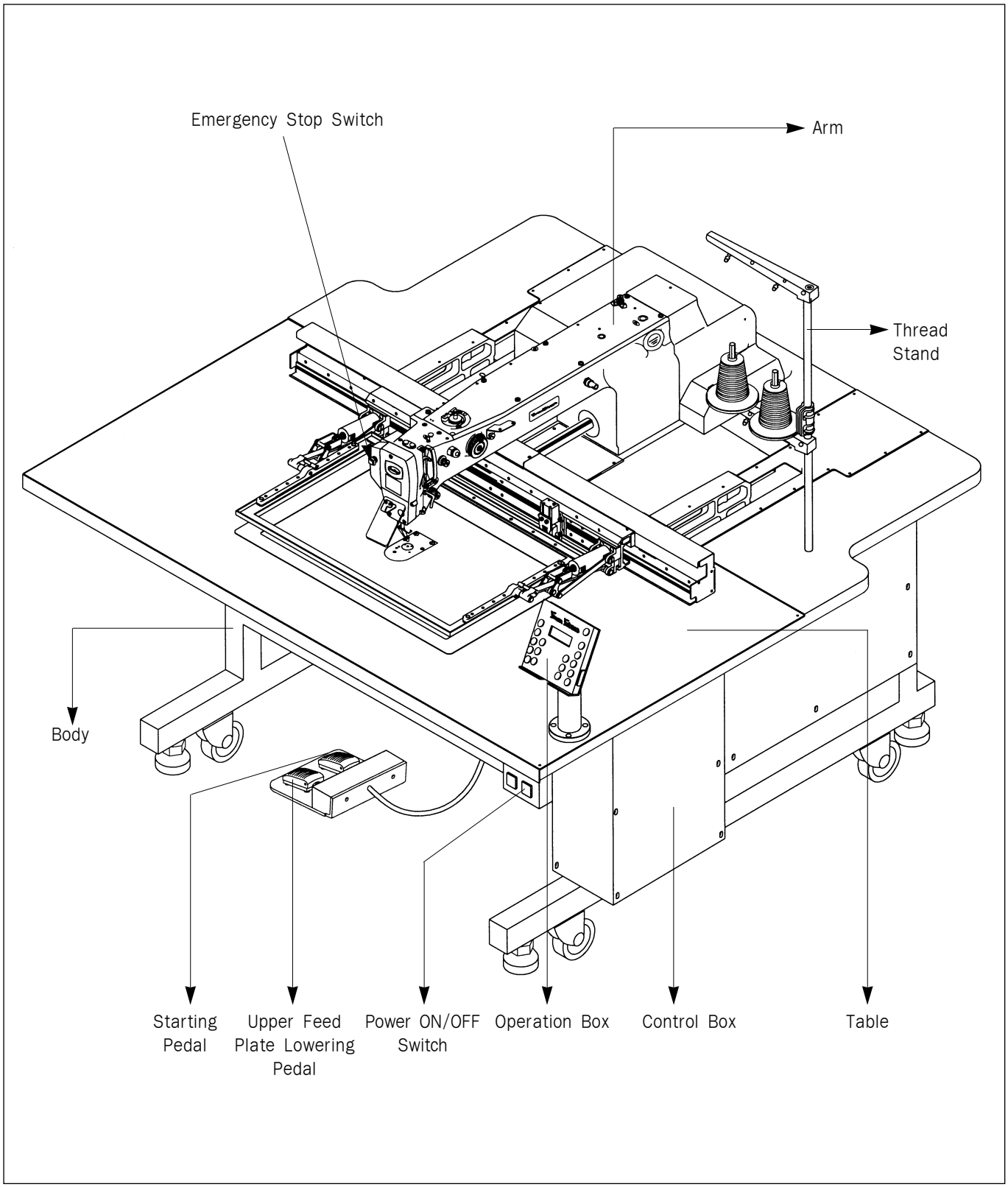
MACHINE SPECIFICATIONS

Series Type	SPS/A-3020	SPS/A-5030
Sewing Range	X(Left and Right) : 300mm Y(Before and After) : 200mm	X(Left and Right) : 500mm Y(Before and After) : 300mm
Maximum Sewing Speed	2,000 spm (Stitch 3mm Shorter)	
Stitch	0.1 ~ 12.7mm	
Feed Plate Transfer Method	Transfer by Stepping Pluse Motor	
Stroke of Needle Bar	41.2mm	
Needle Used	DP×17, DP×5	
Lifting Amount of Feeding Plate	Average 35mm	
Presser Foot Stroke	Standard 4mm(0.3~7mm)	
Lifting Amount of Presser Foot	20mm	
Shuttle	Semi Roatation Doubling Hook	
Bobbin Case	Bobbin Case for Semi Rotation Doubling Hook	
Bobbin	Bobbin for doubling Hokk	
Storing Device	3.5″ Floppy Disk(2DD, 2HD) Storing Pattern : Max. 691 Pattern/Disk	
Emergency Stopping Function	The Emergency Stopping Function Can be Used During Operation	
Maximum Speed Limit	The Speed Can be Limited from 180 to 2,000spm by Operating the Switch Outside	
Selecting the Pattern	Pattern Can be Selected From No. 1 to No. 999	
Memory Backup	Another Original Point Can be Set by Using the Jog Key	
Setup of Another Original Point	2nd Expedition Function that can Set Location of Needle to Optional Location by Using Jog Key in Case of Sewing	
Main Motor	550W Servo Motor	
Consumed Electrical Supply	600VA	
Appropriate Temperature for Machine Operation	5°C ~ 40°C	
Proper Temperature for Machine	20% ~ 80%	
Voltage	Rated, Voltage ±10%, 50/60Hz	
Used Air Pressure	5.0~5.5kgf/㎠(0.49~0.54㎫)	
Option	Palette Clamp (cassette type)	

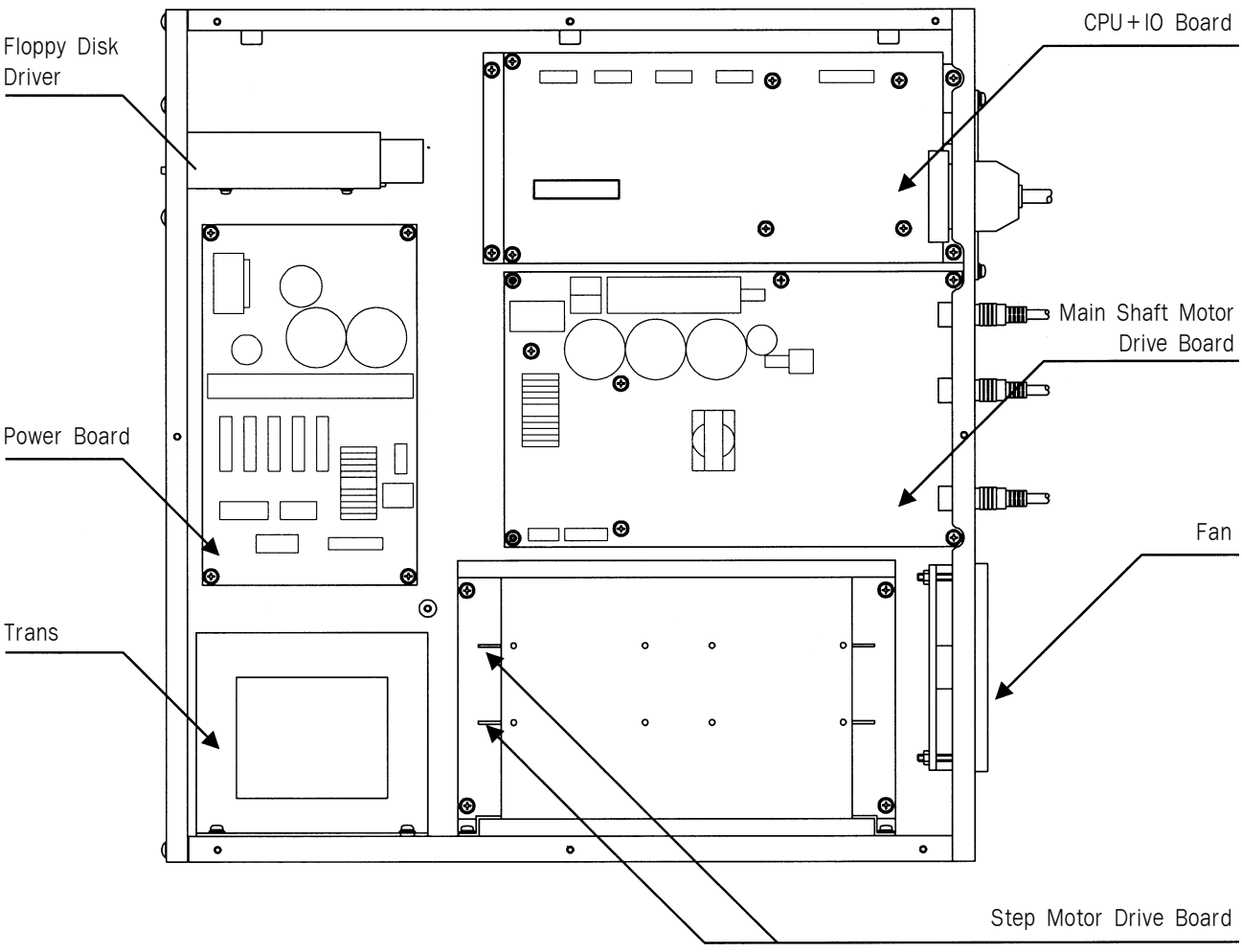
3

MACHINE SPECIFICATIONS

1) Names of Each Part of the Machine



2) Inside Structure of Control Box



4

MACHINE INSTALLATION

1) Machine Installation Conditions

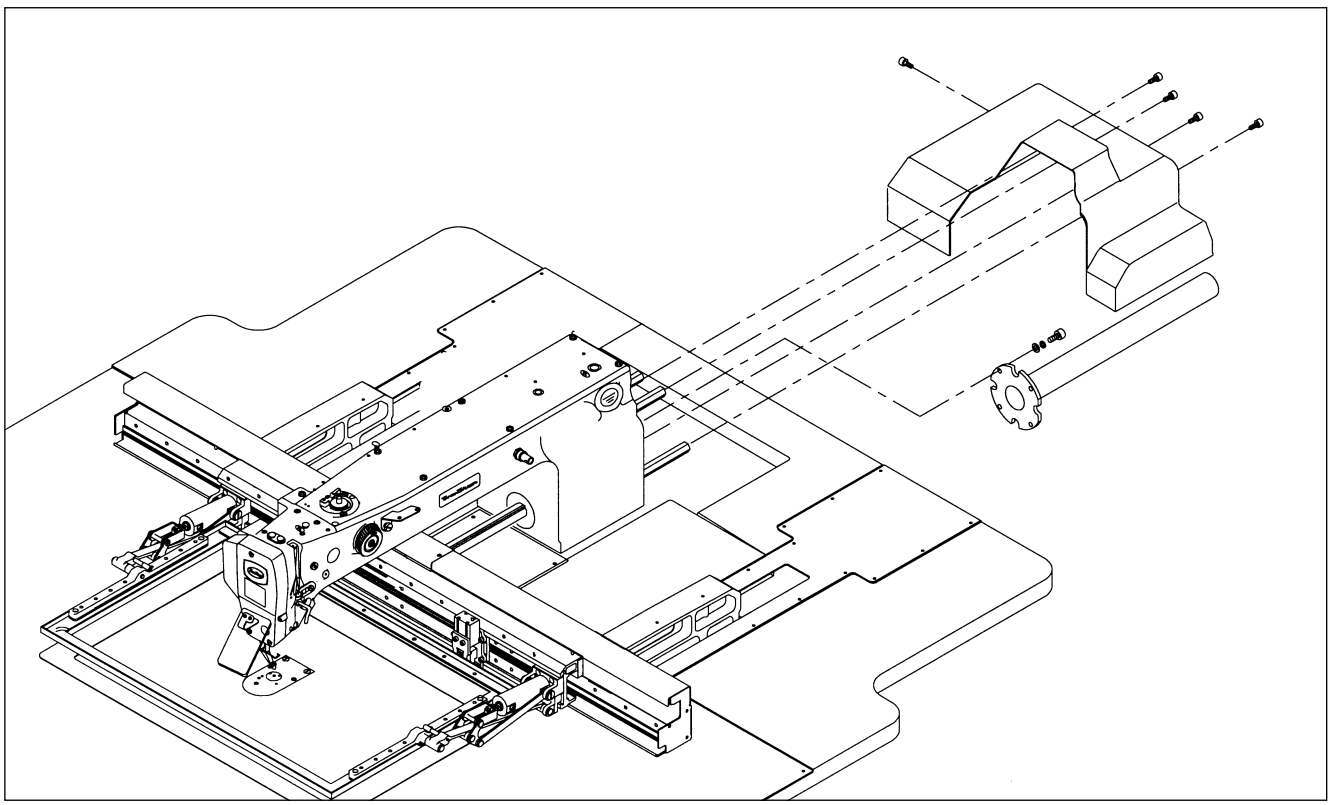
A. Do not use the machine where the voltage is over regular voltage ±10% to prevent accidents.
B. Check the indicated pressure of the devices that use atmospheric pressure such as the air cylinder to prevent any accidents from occurring.
C. For safe operation of the machine, use the machine under the following conditions.
   ⇨ Surrounding Temperature During Operation : 0° ~ 40°C (32° ~ 104° F)
   ⇨ Surrounding Temperature During Maintenance : -10° ~ 60°C (14° ~ 140° F)
D. Humidity : Between 45 ~ 85% (Relative humidity)

2) Electric Installation Conditions

A. Power voltage
   · The power voltage must be between regular voltage ±10%.
   · The frequency of the power should be regular frequency (50/60HZ) ±1%.
B. Electromagnetic Wave Noise
   Use separate power with strong magnetics or high frequency products, and do not leave the machine near them.
C. Use low voltage when supplements or accessories are being adhered.
D. Be careful not to have water or coffee be spilled into the Controller and Motor.
E. Do not drop the Controller or Motor.

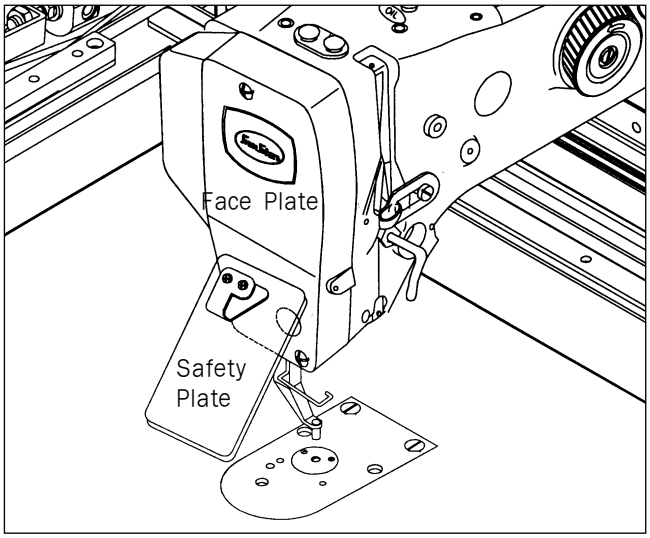
3) Assembly of Peripheral Components

A. Fix belt cover and spool line axis cover to the machine by using fixing screw.



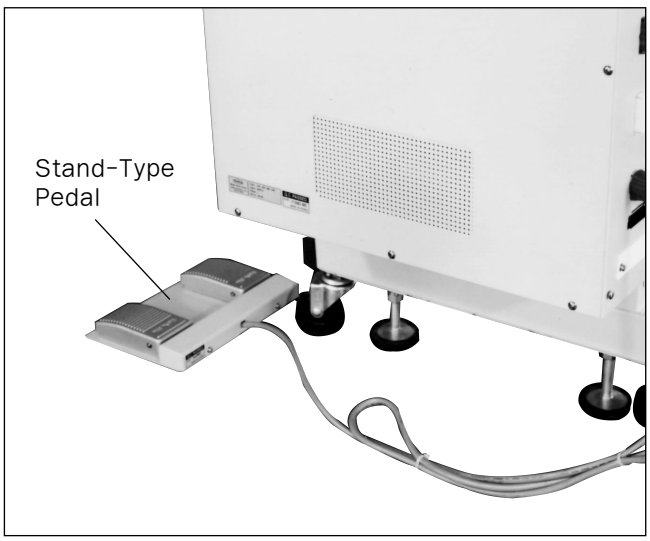
[Fig. 1]

B. Fix the safety plate to face plate.
(Please use after fixing it at the time of operation to prevent safety accident.)



[Fig. 2]

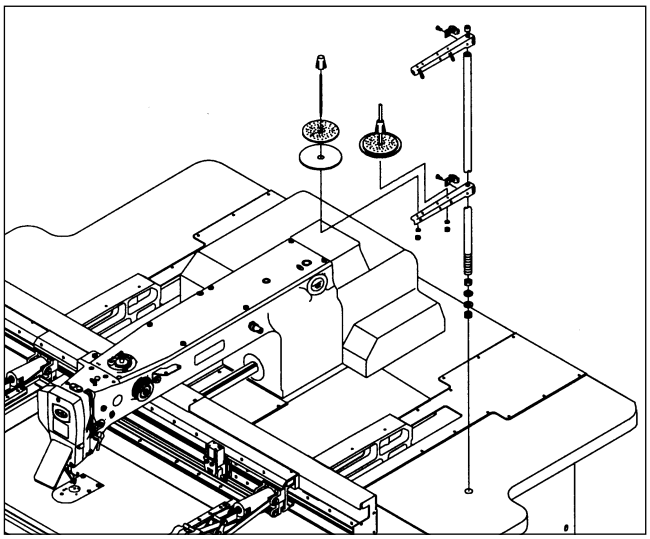
C. Connect the stand-type pedal plug to the control box.



[Fig. 3]

D. Please install thread stand on the table.

[Caution]
Please pay attention that you may get hurt at the moment of fixing from any part being dropped.



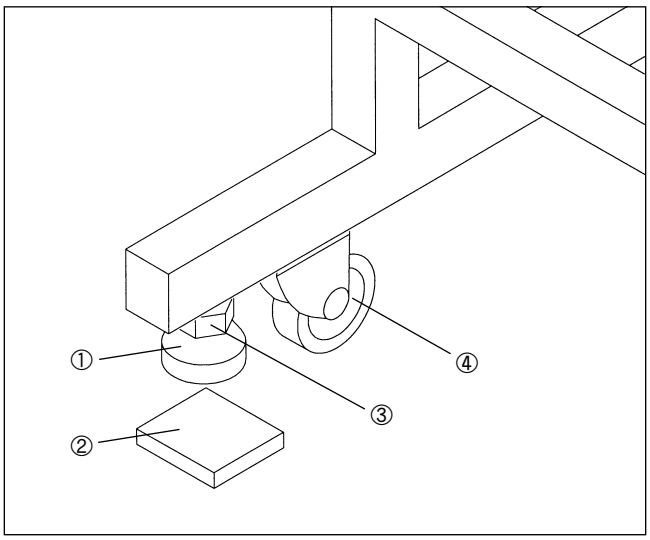
[Fig. 4]

E. Table leg holder

ⓐ Place dustproof rubber ② on the bottom of level adjuster ①.

ⓑ Put up by turning ⓑ level adjuster ① until caster ④ starts no load operation.

ⓒ Fix the level adjuster ① by tightening nut ③ after installation.



[Fig. 5]

F. How to attach air presser control part.

[Caution]

Please work on condition of power off to prevent safety accident.

ⓐ Connect air hose ② to quick joint socket ①.

ⓑ Connect quick joint socket ① and quick joint plug ③.

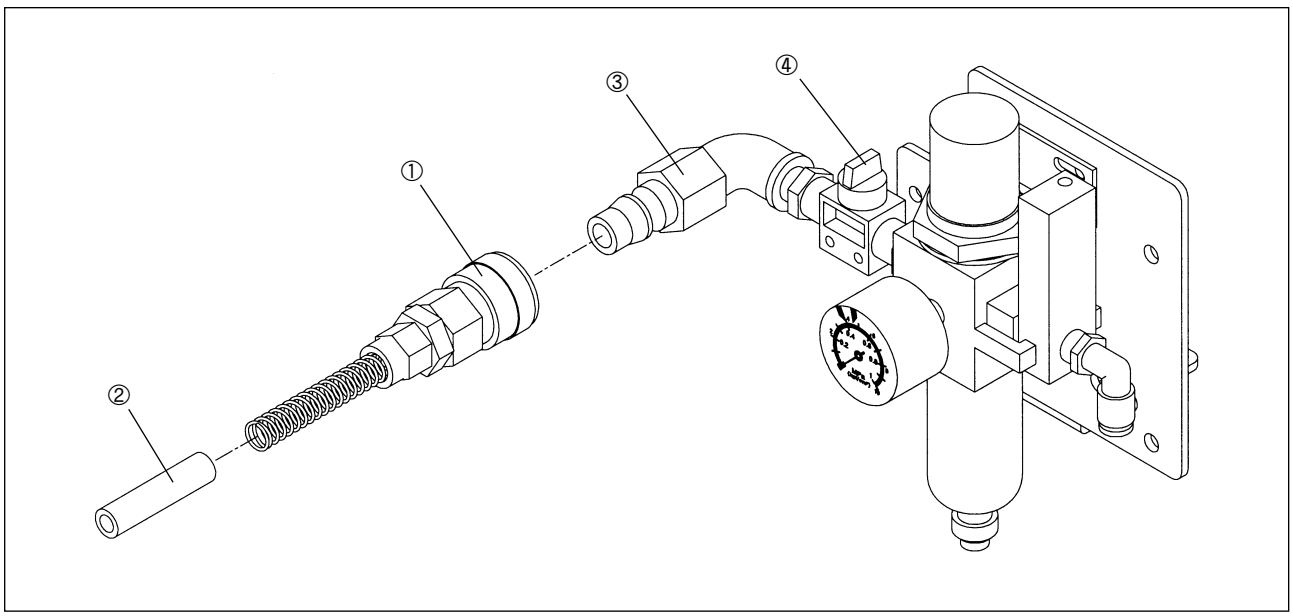
ⓒ After inflow the air by opening ⓒ finger valve ④, adjust air pressure to 5.0 ~ 5.5kgf/cm2 (0.49 ~ 0.54MPa).

[Caution]

In case that the air pressure falls during operation (less 3.5 kgf/cm2), an error message is displayed and operation of machine stops.
error message: Err 24 (Low Pressure!}

[Reference]

Closing the finger valve after using it, the remaining air is automatically exhausted and the remaining pressure is indicated 0kgf/㎠(0MPa).



[Fig. 6]

5

PREPARATION BEFORE USING THE MACHINE

1) Setting the Voltage

A. If a cover of electronically controlled pattern sewing machine is taken off, inside contents are as same as [Fig. 7].

B. Confirm the position of change connector of power voltage on power board [Refer Fig. 1] and transformer if they are properly selected for input voltage like Table 1 and 2.

EX) If power voltage is 220 V:
The model of used transformer is "SPS-□□□□-220" and it is normal for the change connector of power voltage to be placed on "JP5".

※ Sticker for transformer model is attached to the top side of transformer.

Input voltage	Position of change connector of power voltage
95V～105V	JP4
106V～115V	JP3
116V～125V	JP2
200V～230V	JP5
231V～245V	JP4
345V～415V	JP3
416V～480V	JP2

[Table 1. Position of change connector of voltage]

Model / Power Voltage	SPS/A-5030-XX-XX
110V～120V	"SPS-5030～110"
220V～440V	"SPS-5030～220"

[Table 2. Model of used transformer according to the input power voltage]

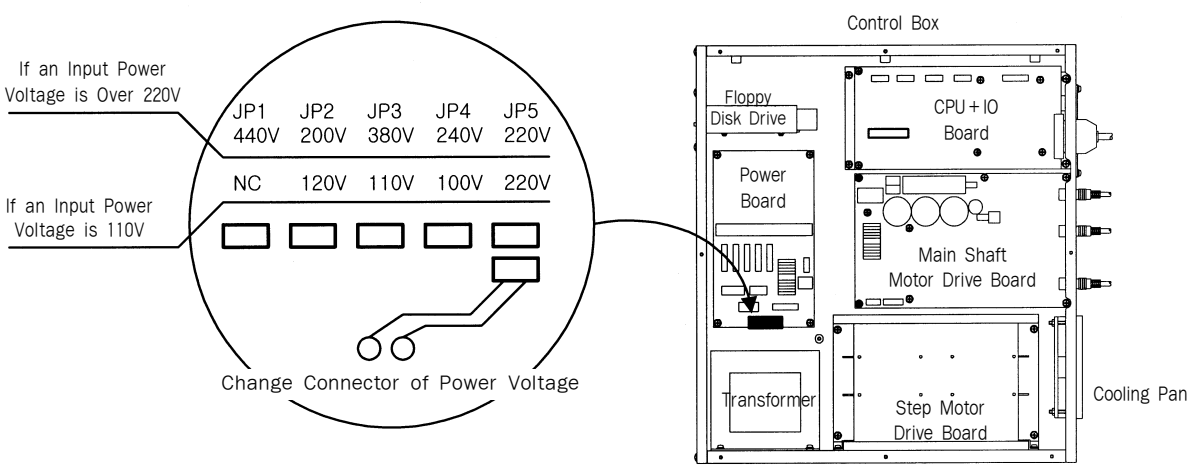
C. Check if a power switch is for 1 phase and 3 phase.

D. If the setting of B and C is not proper, damage from breakdown can be occurred. If there is any problem, follow below direction.

ⓐ If the position of change connector is wrongly placed :
① Separate the connector linked to transformer from CN7, CN8 and CN9 of power borad.
② Insert the power change connector into a proper position on Table 1.
③ Reconnect the connector linked to transformer to CN7, C8 and CN9 of power board.

ⓑ If the specification of used transformer is not in a accord with that of power switch, ask to the place where you purchased for troubleshooting.

[Caution]
Before turning on the power switch, air should be filled with.

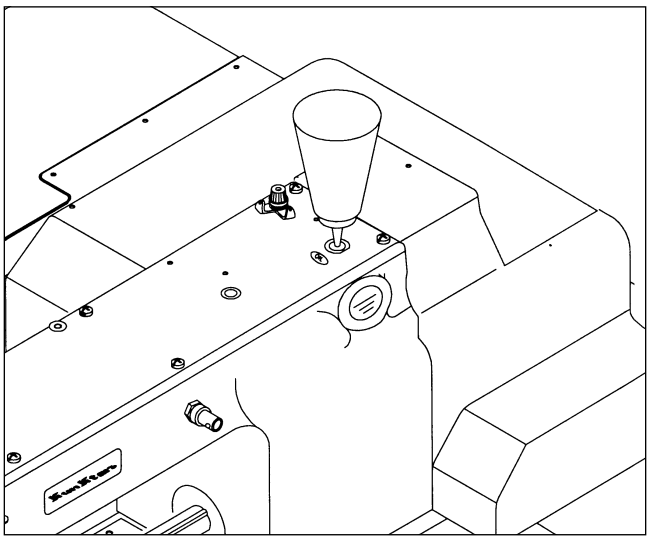


[Setting of change connector of power voltage] [Fig. 7]

2) How to Supply Oil

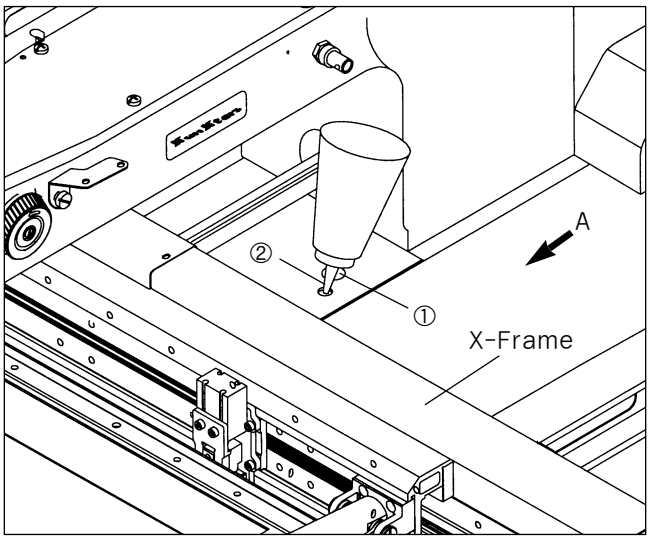
A. Check the amount of oil left in the oil tank which is installed on the arm and supply oil sufficiently.

> [Caution]
> Be sure to supply oil when operating the machine for the first time or when the machine has not been used for a long time.



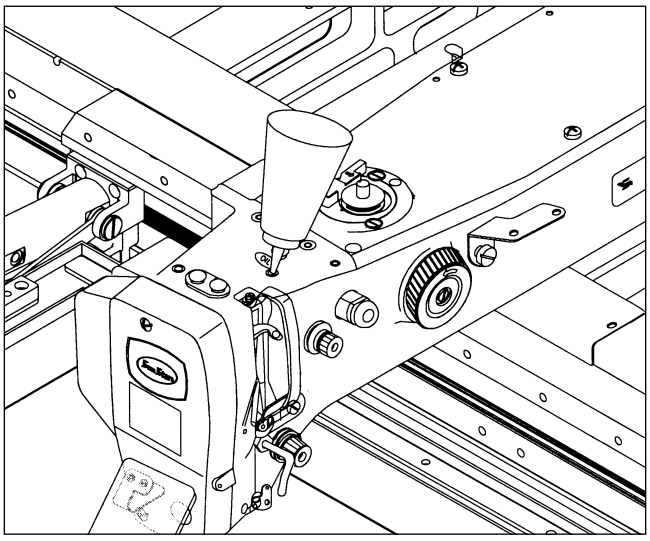
[Fig. 8]

B. After moving the X-frame to "A" direction as shown in the figure, check the remained oil through oil check window ① on the table cover plate and supply enough oil through oil filler ②.



[Fig. 9]

C. Supply oil into the hole in the upper part of the arm.

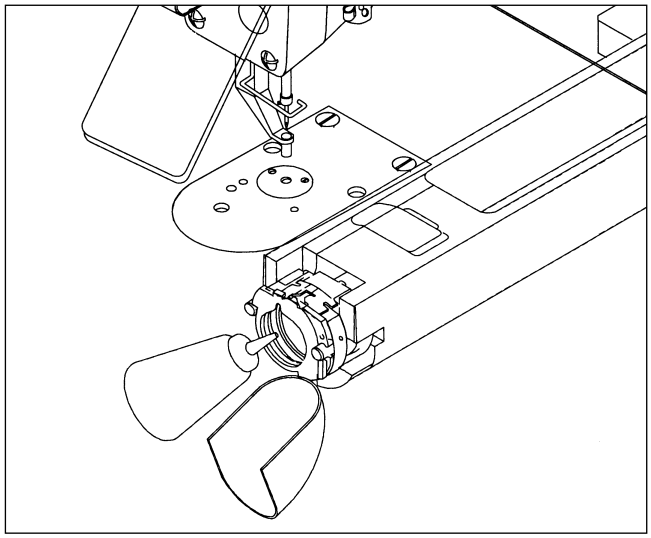


[Fig. 10]

D. Open the hook cover and supply oil till the shuttle race ring is surrounded by oil. Put the hook cover back on after finishing.

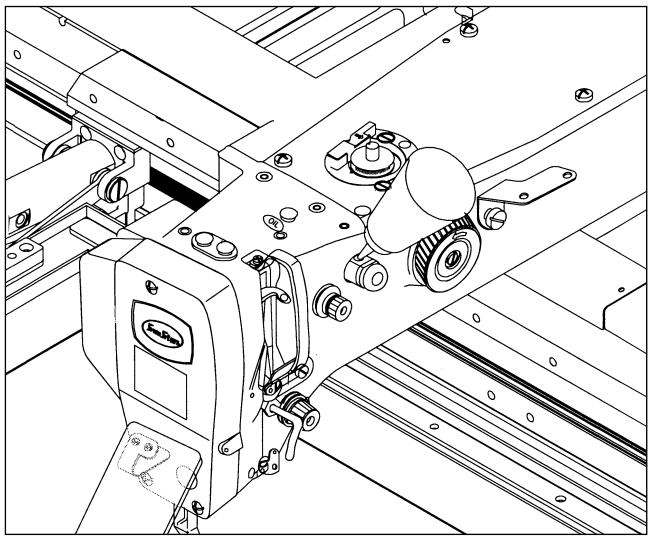
[Caution]

For safety, keep the hook cover covered during operating.



[Fig. 11]

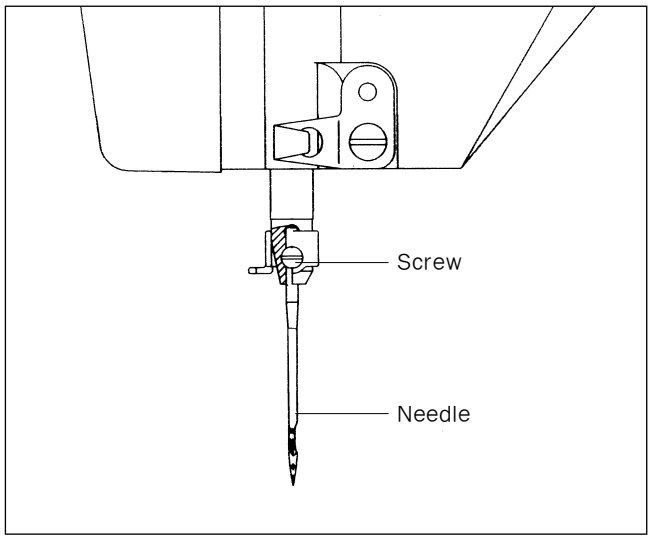
E. Supply sillicon oil into the sillicon oil tank which is installed on the right side of the arm.



[Fig. 12]

3) How to Install the Needle Bar

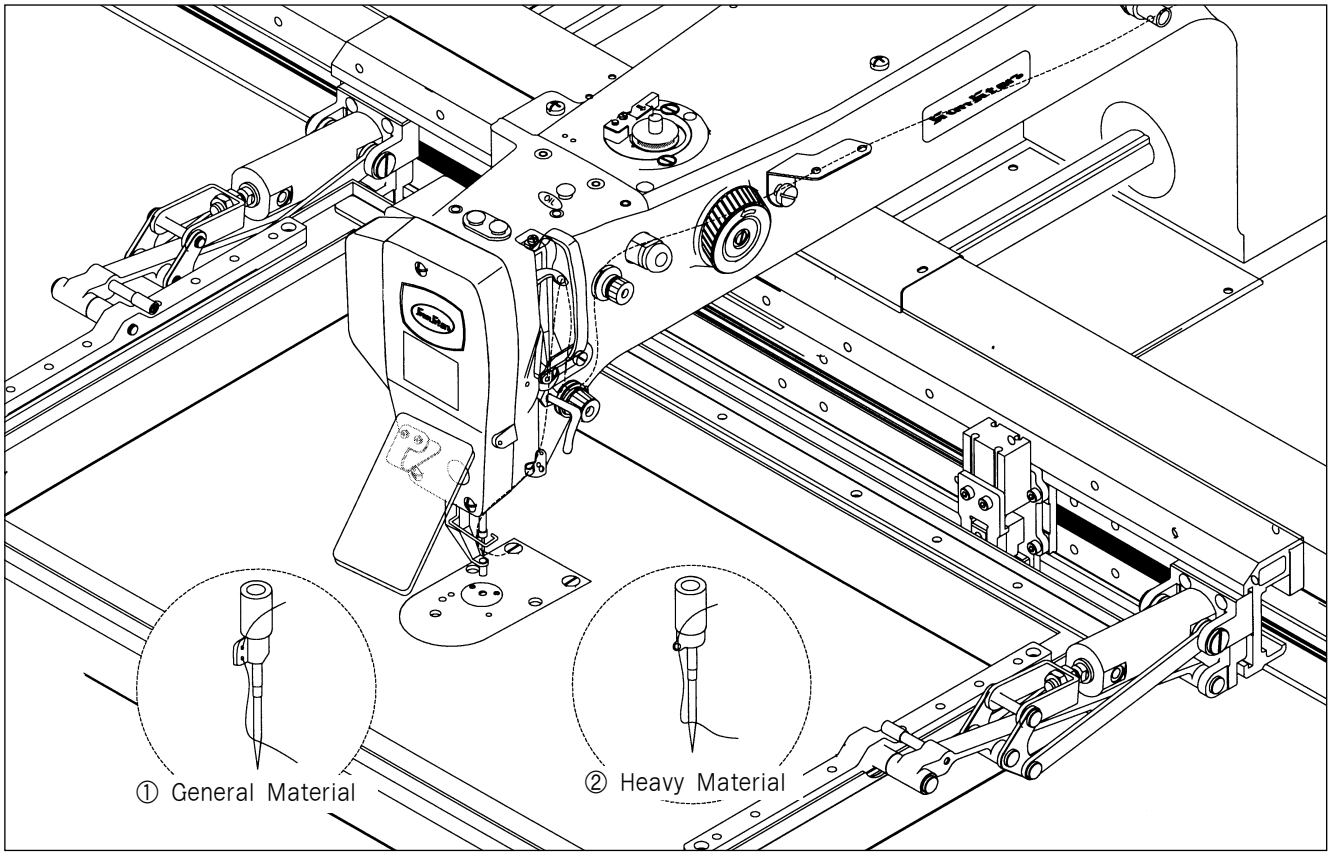
Unfasten the needle fixing screw on the needle bar. Then, with the needle groove facing forward, push the needle until the upper end touches the needle hole of the needle bar. Fix the needle in with the needle fixing screw.



[Fig. 13]

4) How to Pass Upper Thread

A. After placing the thread take-up lever at its highest location, hang the upper thread as shown in the figure. Dependent upon needle bar thread guide, hang the thread as ① for the general and ② for heavy material.



[Fig. 14]

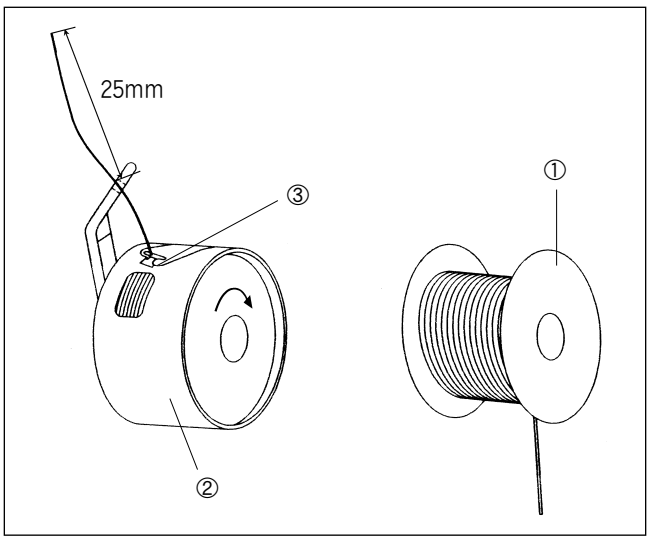
5) Threading the Lower Thread

A. Insert bobbin ① into bobbin case ② as shown in the picture.

> [Caution]
> Insert the bobbin to turn clockwise when seen from behind the bobbin case

B. After setting the lower thread through the crack of the bobbin case, insert the thread through thread hole ③.

C. Adjust the lower thread to hang 25mm out of thread hole ③.



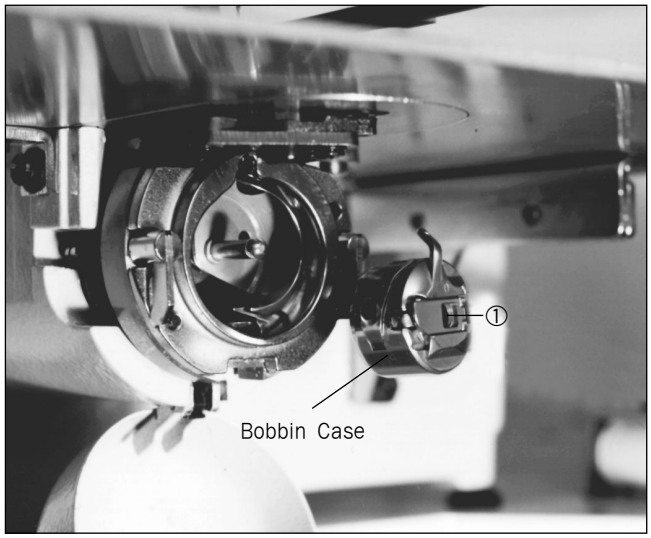
[Fig. 15]

6) How to Take the Bobbin Case On and Off

Hold knob ① of the bobbin case and push into the shuttle until a click sound is heard.

[Caution]

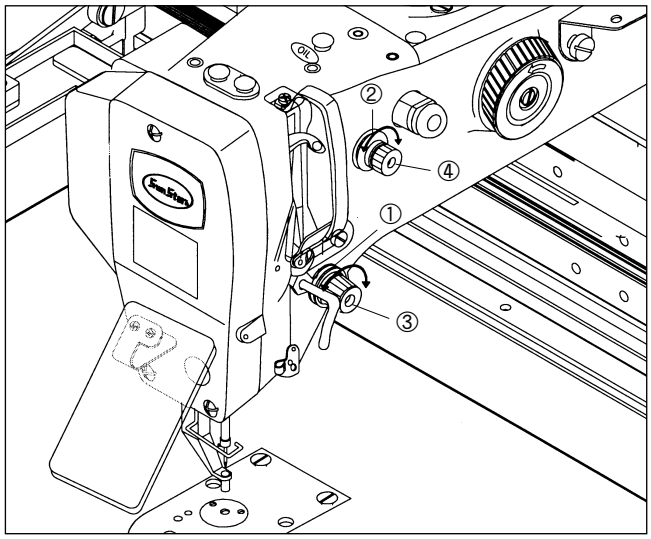
If you start operating the machine when a bobbin case is not perfectly installed, thread can be tangled or the bobbin case would come out.



[Fig. 16]

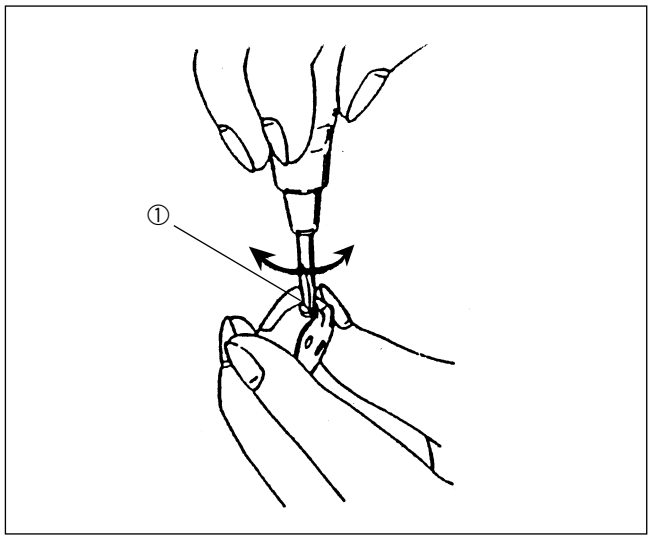
7) How to Adjust the Tension of the Upper Thread and the Lower Thread

A. Adjusting the tension of the upper thread.
When the tension adjusting nuts ③ and ④, of thread tension adjusting unit ① and sub-tension adjusting unit ②, are turned clockwise the upper thread is tightened. And loosens when turned the other way around.



[Fig. 17]

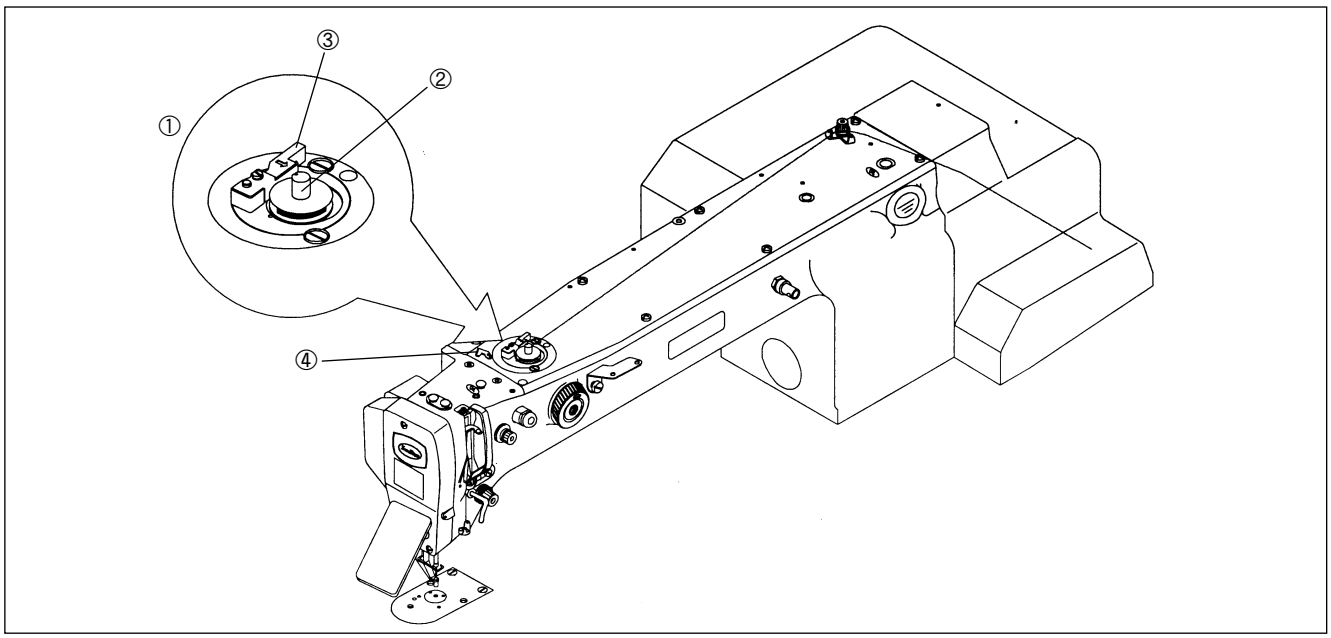
B. Adjusting the tension of the lower thread.
The lower thread becomes tight when tension adjusting screw ① is turned clockwise, as shown in the picture. When the screw is turned the other way the lower thread is loosened.



[Fig. 18]

8) How to Wind the Lower Thread

A. Insert bobbin thread winding driving shaft ② of thread winding base ① attached to top cover.
B. Wind the thread located at thread winding mess ④ to bobbin to counter clockwise direction.
C. Put close the thread winding lever ③ to bobbin paying attention that the wound thread should not get loose and operate the machine.
D. After thread winding lever took off from bobbin, cut the thread on the bobbin by using thread winding mess ④.



[Fig. 19]

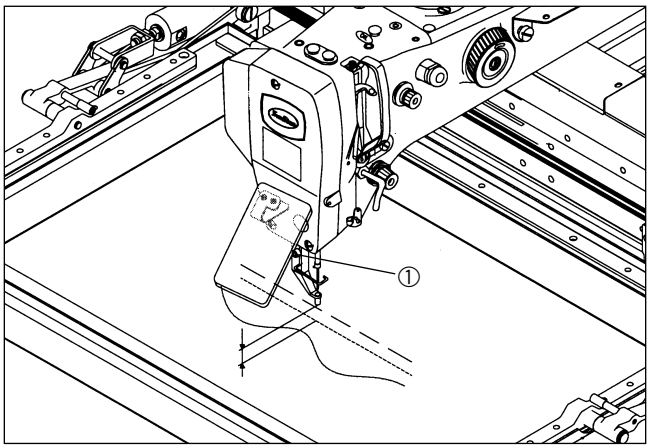
9) Adjusting the Height of the Presser Foot

A. Unfasten presser foot screw ① with the needle bar at the lowest position.
B. Adjust the height so that the presser foot bottom comes 0.5mm(the thickness of the thread used) above the sewing material. Then, tighten the screw.

[Caution]

Please make sure to check location of wiper after height adjustment of presser foot.

- It becomes the cause of separation in case of wide interval.
- It becomes the cause of inferior thread adjustment in case of narrow interval.



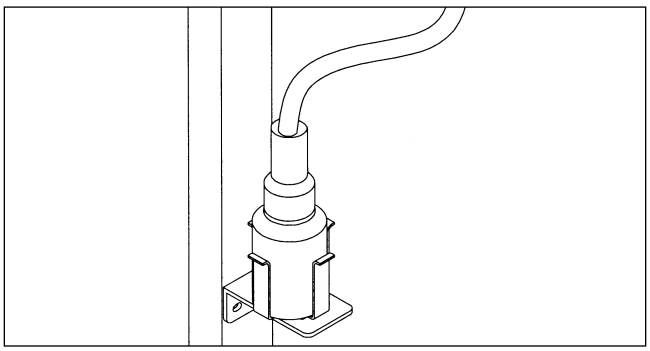
[Fig. 20]

10) Disposing the Waste Oil

Upon the oil is fully filled in oil bucket located in the bottom of the body, take out the connected hose and remove the oil by taking out the oil filler bucket.

[Caution]

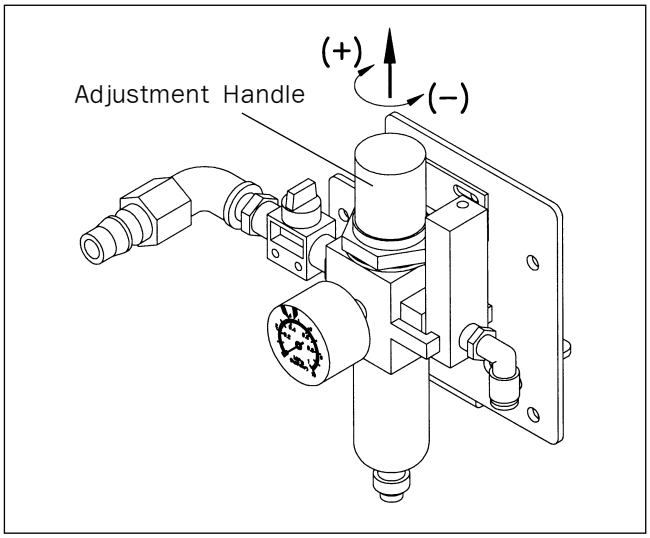
If oil cup is dismounted, oil can be dropped on the floor and so prepare cloth, paper or oil bucket on the flo



[Fig. 21]

11) How to Adjust Air Pressure

After pulling back the adjustment handle located on the upper part of the filter adjuster attached to the body side as shown in the figure, turning to the clockwise direction, the pressure increases and turning to the counter clockwise direction, the pressure drops. Therefore, after adjusting to the proper pressure (5.0~5.5kgf/㎠) indicated in the pressure gauge, press the adjustment handle to the location where it was and fix it.

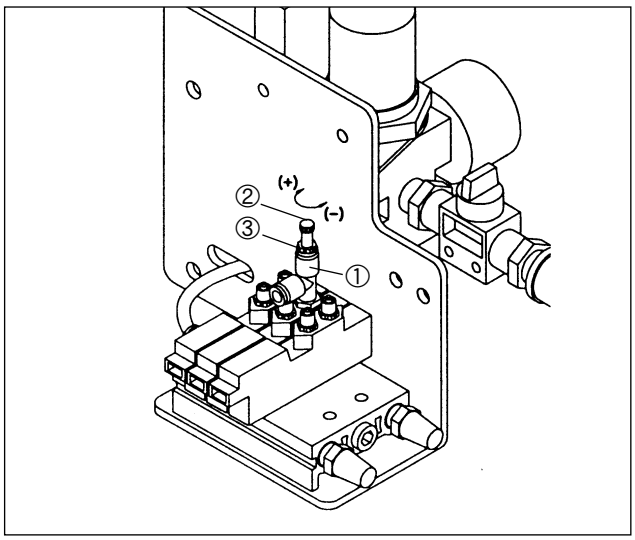


[Fig. 22]

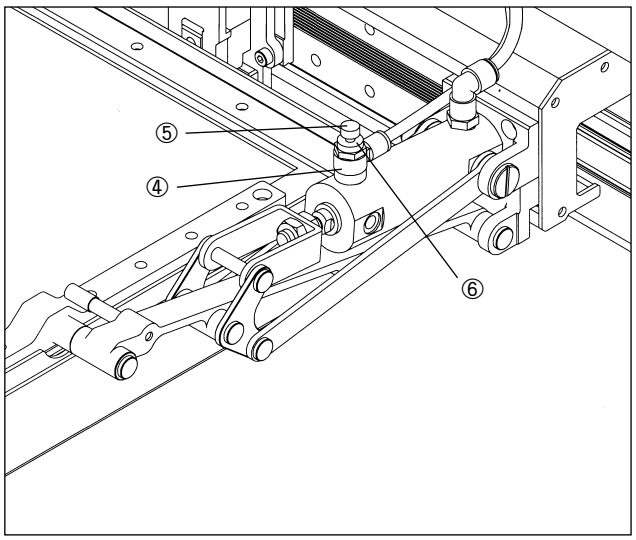
12) How to Adjust Rising and descending Speed of the Upper Feed Plate

A. Turning to clockwise direction the handle ② of pressure reduction valve of solenoid valve attached to the body side as shown in the figure ⓐ, rising speed and support pressure at rising of the upper feed plate increases, turning to the counter clockwise direction, the speed drops. Therefore, after adjusting to proper speed, fix with fixing nut ③.
(Adjustment pressure at the moment of shipping the machine: 2.5~3.0kgf/㎠)

B. As for descending speed, turning the handle ⑤ of speed controller ④ as shown in the figure ⓑ to clockwise direction, the descending speed decreases, turning to the counter clockwise direction, descending speed of upper feed plate increases. After adjusting to proper speed, fix with fixing nut ⑥.
(Left and right should be equally adjusted.)



[Fig. a]



[Fig. b]

[Fig. 23]

13) How to Use Pallet

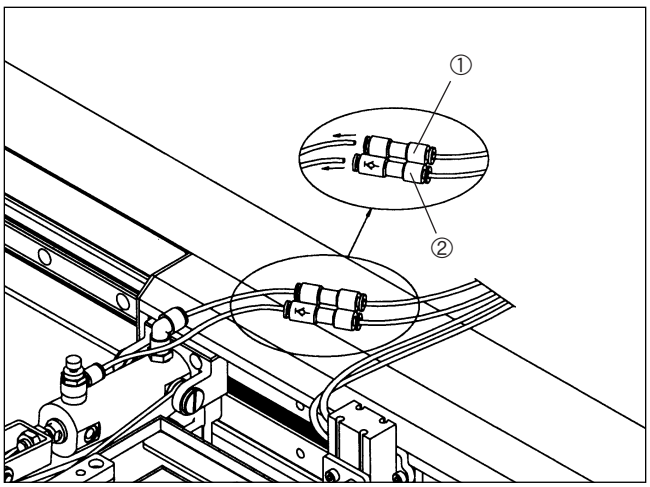
This device is divided into 2 types according to clamping method of sewing material.
Generally it is divided into Upper/Lower Clamp Device (See Figure 26) and Pallet Clamp Device (see Figure 28) for cassette work and unless particular order is made at the moment of purchase, Upper/Lower Clamp Device is attached and shipped out. This chapter describes how to remove Upper/Lower Clamp Device and how to attach Pallet in case of using pallet being provided in the accessory box.

A. Removal of Upper Clamp Device

a) First, turn off the power and cut off influx of air by turning the finger valve (See Figure 6 on page 14) to counter clockwise direction.

b) Disassemble the hose connected to the left and right upper clamp cylinder as shown in the figure.

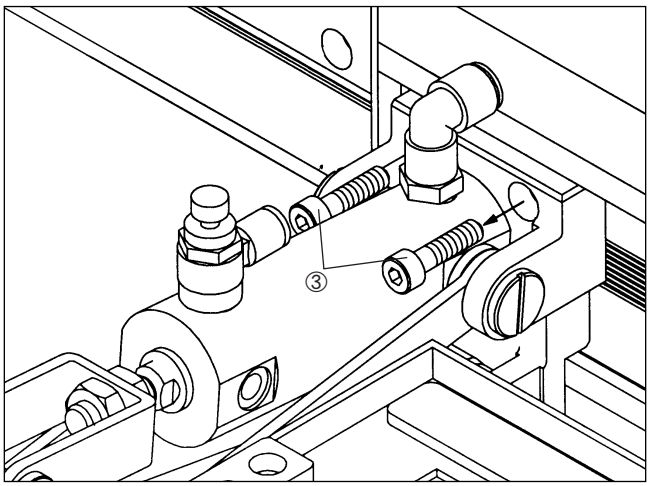
[Caution]
After disassembly, fix the remained straight union (①, ②) and hose part not to enter into driving part in case of X-Y transfer.



[Fig. 24]

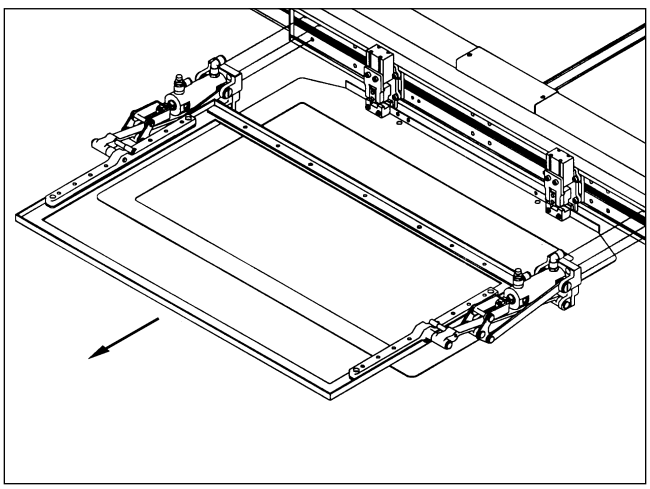
c) Unscrew 3 fixing screw③ of Upper Clamp Device attached to left/right of X-transfer frame.

[Caution]
In case of screw disassembly, if the screw and washer enter into x-driving part, a material trouble can occur in operation of the machine. Please pay attention in disassembling.

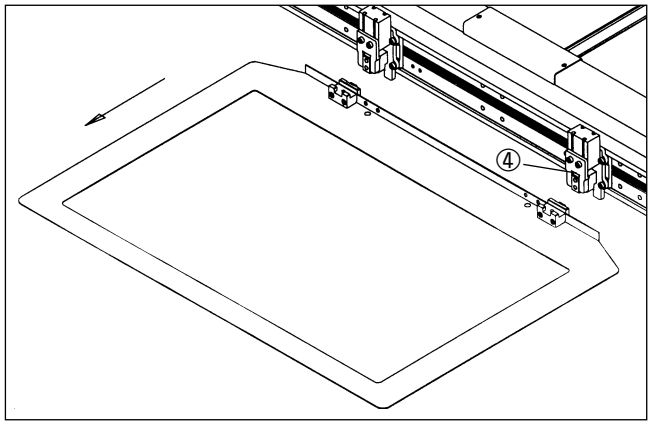


[Fig. 25]

d) Separate upper clamp device from X-transfer frame.


[Fig. 26]

e) Separate lower feed plate from main body. As it is the state that cut off the influx of air, separate lower feed plate after vertically pushing up the cylinder knuckle④ of lower feed plate.

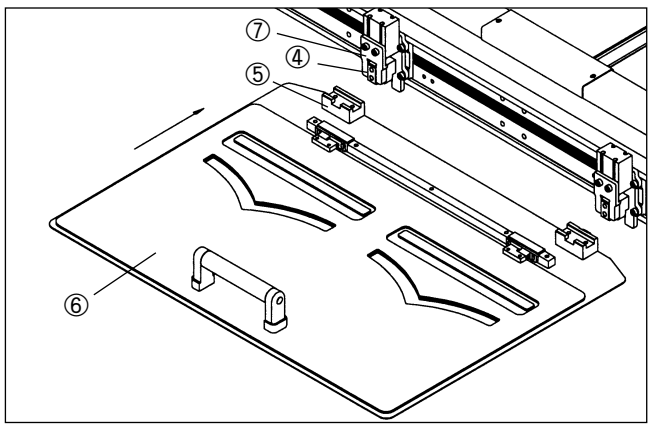


[Fig. 27]

B. Attachment of Pallet

a) Make the basic pallet provided in the accessory box to comply with the shape of working material.

b) Push in the pallet⑥ so that stopper⑤ can be inserted into the "ㄷ" shaped groove in the guiding plate⑦.



[Fig. 28]

C. Preparations prior to Sewing Start

a) Turn on the power.

b) As soon as the power on, cylinder knuckle④ in Figure 28 falls and stopper⑤ is fixed.
(Ref. : If cylinder knuckle④ is not properly inserted into stopper⑤, adjust it to be inserted to the right location by putting up/down by using "0" key on the operation panel.)

c) Insert the diskette containing the pattern to sew into floppy disk driver and call out the shape to sew.

d) In pallet work, the pallet can strike the machine when opening the pallet after completion of sewing work according to using method. In such case, set the 2nd original point and after completing pattern work, move the pallet to one end of the left/right and then open the pallet. For setting method of the 2nd original point, see the content in page 33.

e) Setting the 2nd original point ends and pressing "EXE" key on the operation panel, pallet transfers to the 2nd original point and waits the work.

f) Stepping on the left footplate switch, pallet transfers to sewing start point and performs sewing work immediately. When sewing work is completed, pallet transfers to the 2nd original point and the machine stops.

[Caution]

At the moment of shipping, generally the machine is set to use Upper/Lower /Clamp Device. In case of using pallet, you should change the setting from "1) DISABLE" to "2) ENABLE" in parameter number "013, whether to maintain constant fall of upper feed plate". After initialization of parameter, you must change this setting to "2) ENABLE". If parameter change is completed, you may perform the work by using the left footplate switch only.

g) Completing the work, store the pattern data by pressing "WRITE" key before taking out the diskette containing the pattern to sew from floppy disk driver. As the data of the 2nd original point is stored as well, you don't need to reset the 2nd original point when you call it out gain.

D. Replacement of Upper Feed Plate being used for cushion sewing material like bed(Option)

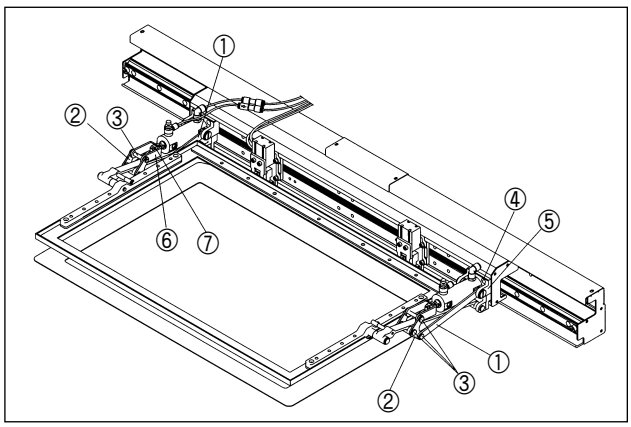
a) This machine, unless there is separate order, is shipped with average 36mm of rise for the upper feed plate. For the sewing materials that cushioned materials are used such as bed/sofa, specification is prepared that increased grade of rise up to 70 mm for easy insertion of the working material.

b) Upon separate order at the moment of machine order, it is shipped with the specification that the upper feed plate is raised up to 70 mm and in case of requesting replacement while using the basic type, you can replace as shown in the figure.
(Make separate order by referring to page 43 in Parts Book.)

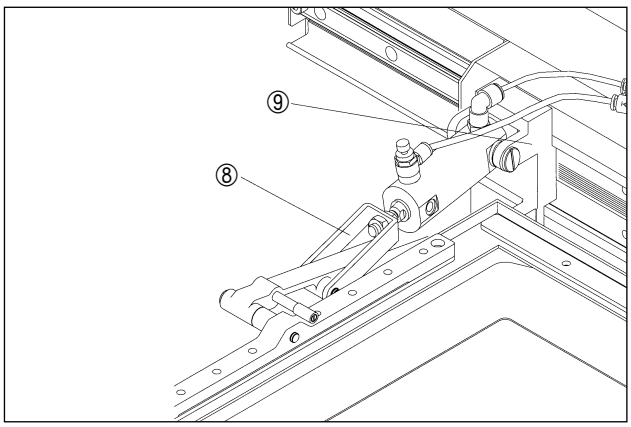
c) As the [Figure A], disassemble shaft③ connecting upper clamp link A① and upper clamp link B② and remove them.

d) Unfasten 3 screw⑤ that fixed upper clamp bracket④ and remove upper clamp bracket④, and unscrew 2 nuts⑦ that fixed cylinder knuckle ⑥ and remove the cylinder knuckle ⑥.

e) As shown in [Figure B], replacing with cylinder knuckle⑧ and upper clamp bracket⑨, assembly of the specification with 70mm of rise for upper feed plate is completed.



[Fig. A]



[Fig. B]

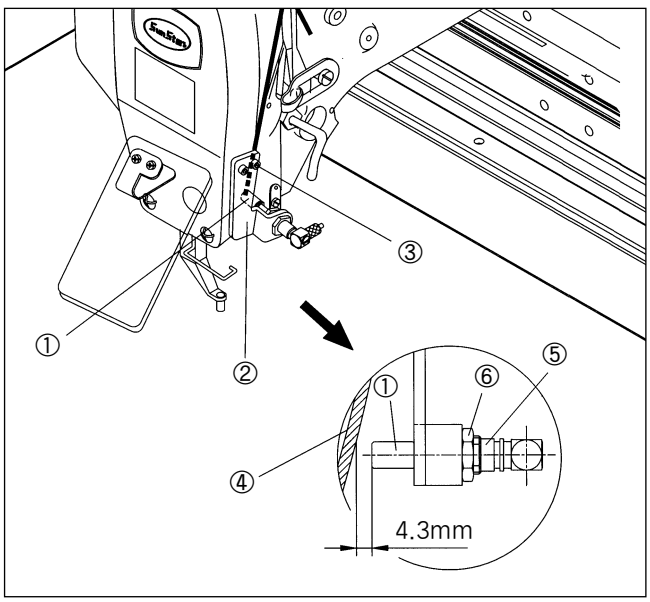
14) How to Adjust Upper Thread Holding Device

A. Please check if pin cylinder knuckle ① of upper thread holder is located in the center of the upper thread path.

B. If the knuckle ① is not located in the center of the upper thread path, unscrew 2 fixing screw ③ of bracket ② and adjust to locate at the center and then fasten the fixing screw ③ tightly.

C. Standard distance between end of knuckle ① and arm ④ is 4.3mm.

D. In order to adjust this, unscrew 2 nuts ⑥ of pin cylinder ⑤ and after adjusting the front and rear distance, fasten nut ⑥ tightly.



[Fig. 29]

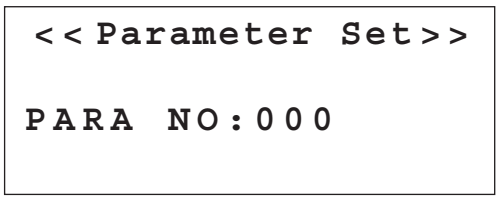
E. How to set upper thread holder in operation box

a) In order to use upper thread holder, set the Parameter NO. 62 at ENABLE.

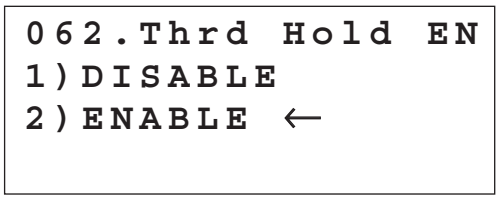
- Setting Method:After turning the power on, press MODE KEY immediately.

- After turning the power on, press MODE KEY immediately.
- Select Parameter Set by pressing key number 2 and press ENTER↵ key.

- Input "062" and press ENTER↵ key.



- Select ENABLE by pressing key number 2, input and press ENTER↵ key.



b) After returning to general work by pressing ESC key twice, work normally.

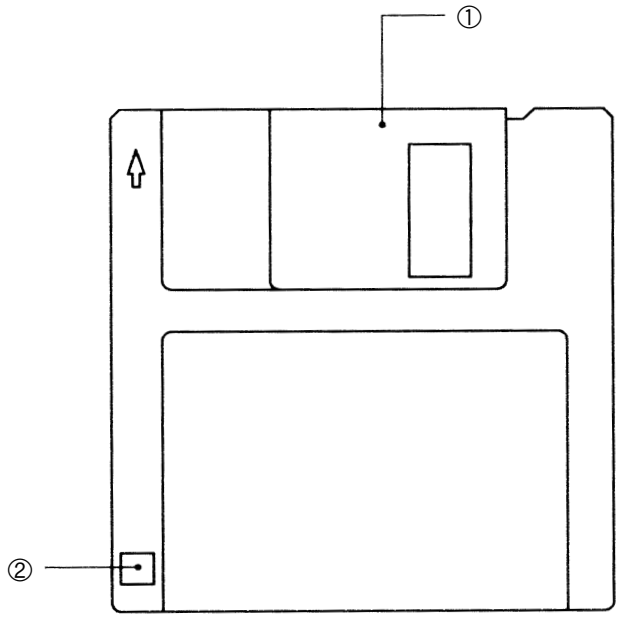
c) However, upon performing thread inserting function by pressing key number 5 on condition of stop, the upper thread holder opens.

15) Caution When Using the Floppy Disks

Observe the following principles thoroughly when you treat floppy disks.

> [Caution]
> Use the identified floopy disks after formatting when you get them in market.

ⓐ Do not put floppy disks near magnetic-related materials such as television.
ⓑ Keep away from overheat, humidity or direct ray of light.
ⓒ Do not put any heavy materials on a floppy disk.
ⓓ During formatting or inputting and outputting, do not take out the floppy disk from a disk drive.
ⓔ Do not open a cover of floppy disk.
ⓕ If a write protected tab is opened, you can't input data in a disk
ⓖ If yo repeat read and write in a disk many times, error can be occurred in a disk.
ⓗ It is safe to keep important design data in two disks.

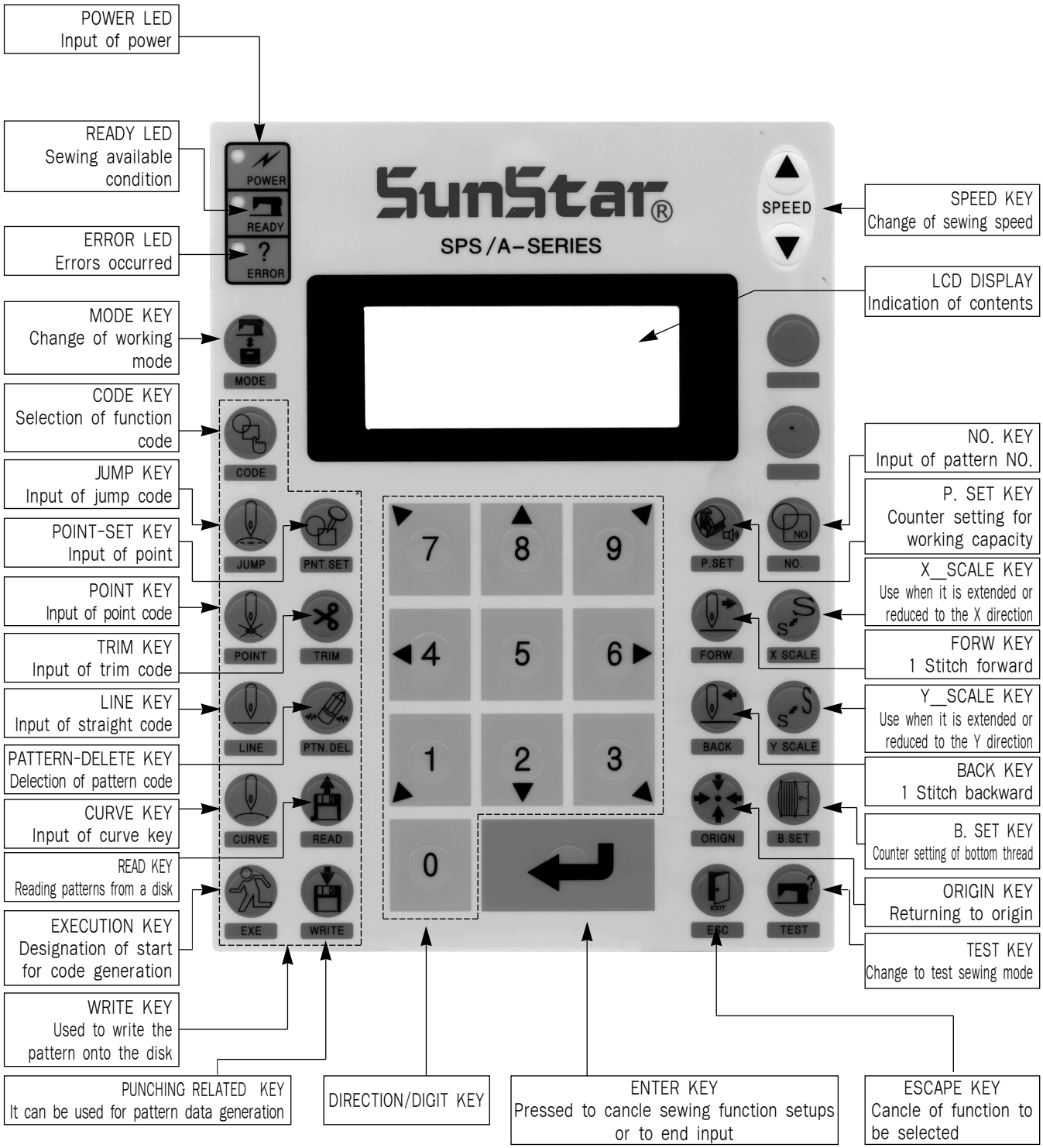


① Shutter ② Write Protect tab

6

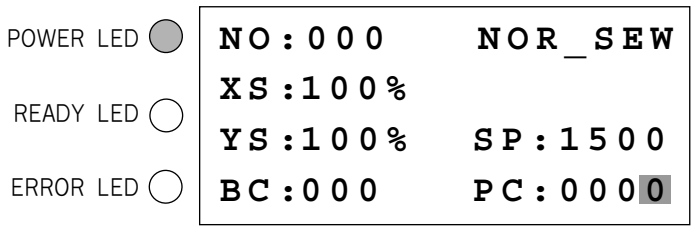
BASIC OPERATIONAL METHOD

1) Name and Roles of Each Key on Operation Unit



2) Name and Description of Each Display Contents on General Operation Mode

It is an initial screen when power is on for the first time, but display of screen can be changed according to the general sewing related parameter.



A. "POWER LED" : When you turn on the power, this lamp also comes to light on.

B. "READY LED" : This lamp comes to light on when a machine is ready to work by reading patterns. During reading or writing the patterns, the lamp flickers. If you press ENTER, you can get out of the "READY" state.

C. "ERROR LED" : When errors including sensing thread and emergency stop happen this lamp comes to light on.

D. "NO" : It indicates pattern No. Press NO key and input the pattern number you want by pressing digit keys. (000 ~ 999)

E. "XS" : It indicates a rate of enlargement and reduction for width. You can change the value at your option by using digit keys after pressing down X SCALE key. (001[%] ~400[%])

F. "YS" : It indicates a rate of enlargement and reduction for length. You can change the value at your option by using digit keys after pressing down Y SCALE key. (001[%] ~400[%])

G. "SP" : It indicates sewing speed. You can change the speed you want by pressing down SPEED key. (200[SPM] ~2500[SPM])

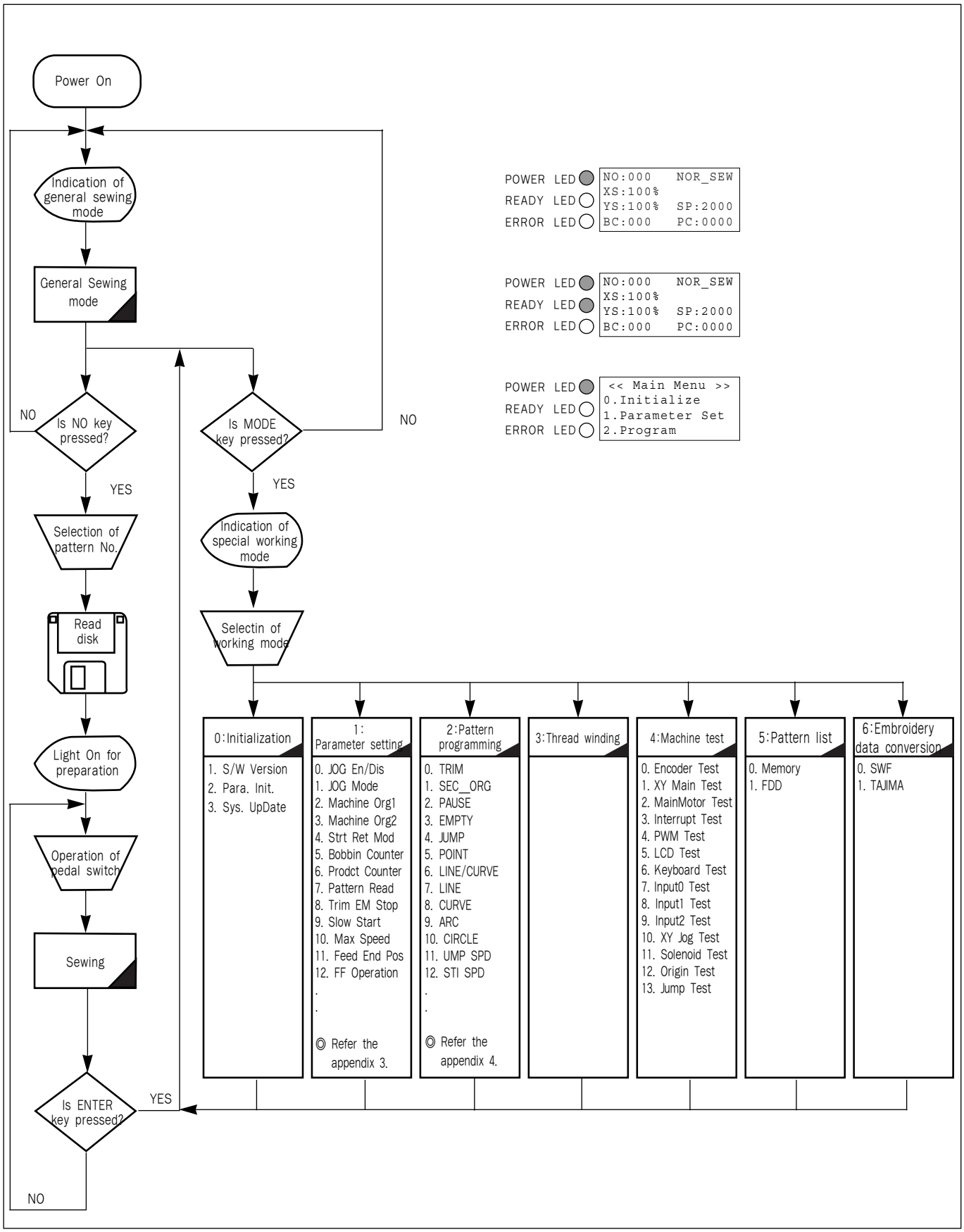
H. "BC" : It indicates setting value of bottom thread exchange counter. You can change the value at your option by using digit key after pressing down B. SET key. (000 ~ 999)

I. "PC" : It indicates setting value of working capacity. You can change the value at your option by using digit keys after pressing down P. SET key. (0000 ~9999)

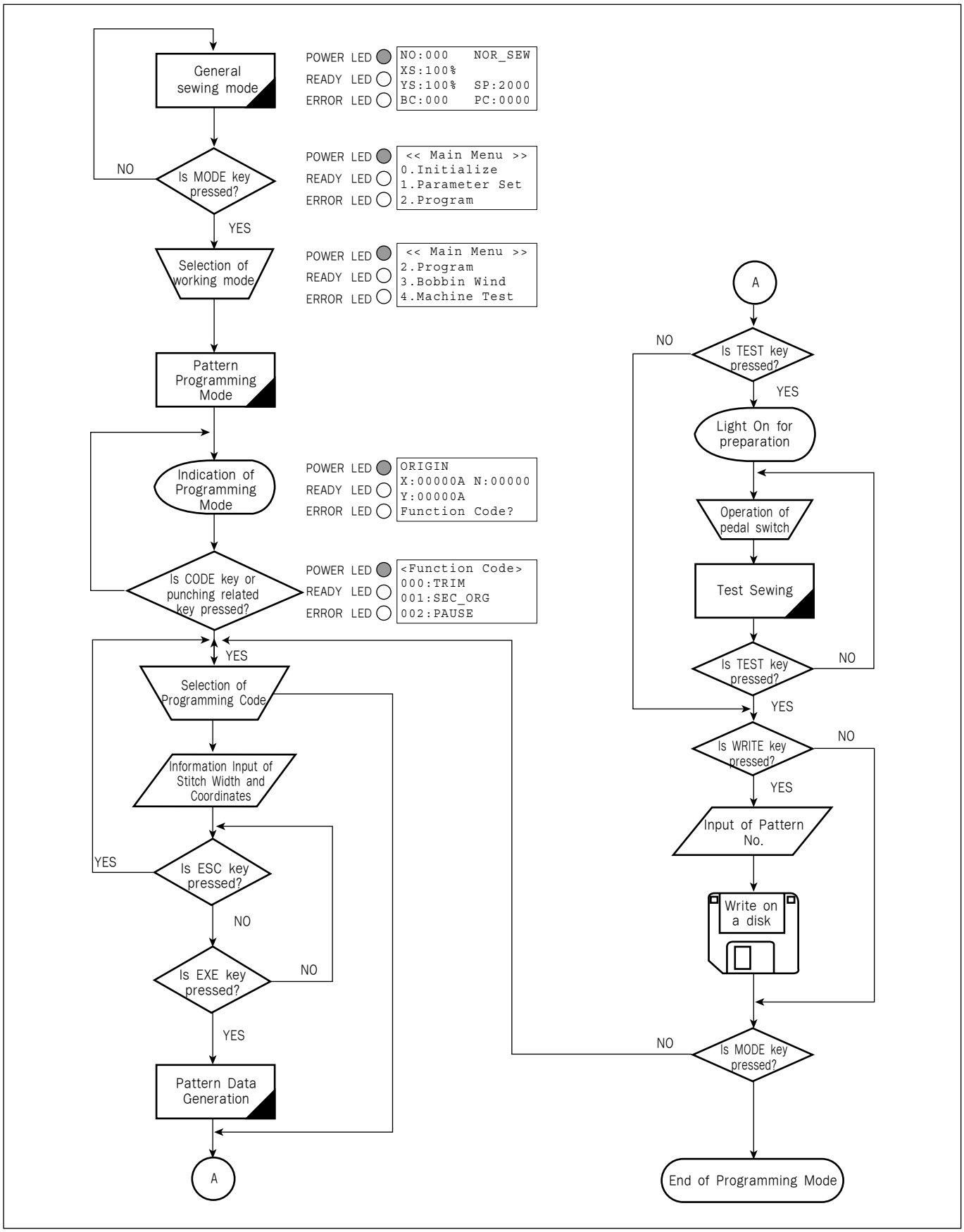
J. "NOR_SEW" : It shows working condition. General sewing and chain sewing are available.
" NOR_SEW" indicates the general sewing and "CHN_XX" means chain sewing.

※ **Reference : 00~15 are available in XX of "CHN_XX"**

3) Flow Chart of General Operation



4) Work Flow of Pattern Programming



5) Operating After Reading the Patterns from Floppy Disks

※ Caution : If READY LED turns on or upper feed plate is under, some keys are not available. It happened, operate the keys after lifting the upper feed plate or pressing ENTER ↵ key.

A. Insert a floppy disk having patterns that you want to use into a floppy disk drive.

B. After pressing NO key, input the pattern number by using digit keys. (If you want to work with "001" pattern, press [0][0][1])

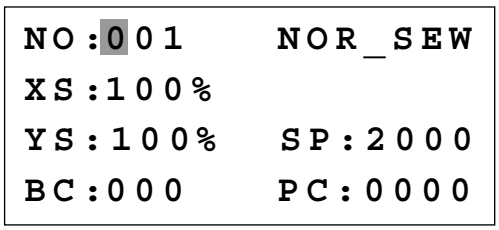
C. Press ENTER ↵ key. Read the pattern and change to sewing available mode.

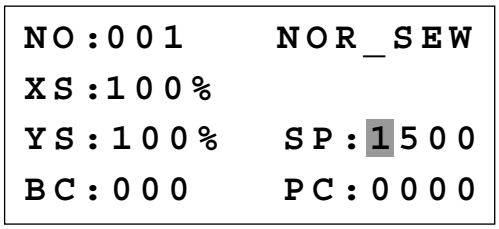
D. At the moment, the upper thread plate comes to descend, then ascend again after moving to the sewing start point. The READY LED comes to light on.

E. Press SPEED key and adjust the speed properly.

F. If you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch on the left side, the machine starts relevant work.

G. When you finish operating, the machine backs to the origin or sewing start point, and the upper feed plate comes to ascend.





6) Confirming the Working Pattern Read from the Floppy Disks

A. Insert a floppy disk into a floppy disk drive.

B. After pressing NO key, input the pattern number by using digit keys. (If you want to work with "001" pattern)

C. Press ENTER ↵ key. Read the pattern and change to sewing available mode.

D. At the moment, the upper thread plate comes to descend, then ascend again after moving to the sewing start point. The READY LED comes to light on.

E. Press SPEED key and adjust the speed properly.

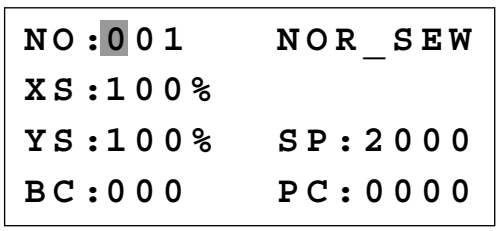
F. If you step on the pedal switch on the right side, the upper feed plate comes to descend.

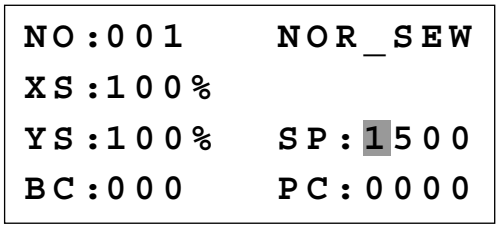
G. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. If you press the keys without cease, a needle moves to the beginning or ending point.

H. If you want to finish working, press ORIGIN key.

I. If you want to continue sewing at the forward or backward point, step on the left pedal switch.

J. When you finish operating, the machine backs to the origin or sewing start point, and the upper feed plate comes to ascend.

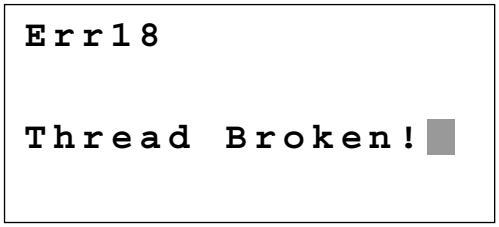




7) When a Machine Stops Operating During Sewing by the Thread Cut

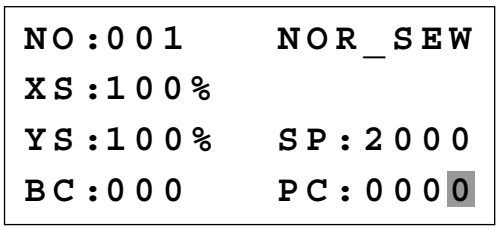
A. You can get the screen like a figure on the right side.

B. If you want to sew continuously at the same position, insert thread again, then step on the left pedal switch.



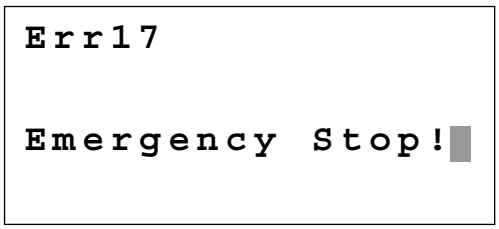
C. If you want to stop operation and restart sewing from the beginning, press ORIGIN key. The feed plate moves to the origin or sewing start point and ascend.

D. When you finish operating, the machine backs to the origin or sewing start point, and the upper feed plate comes to ascend.



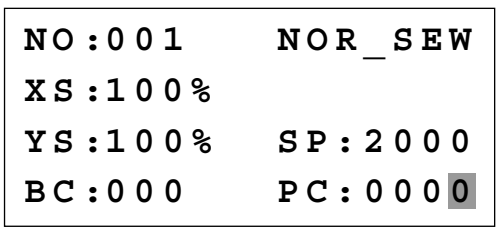
8) Emergency Stop During Operation

A. The machine stops operating immediately by pressing EMERGENCY STOP switch during sewing. Then you can get the screen like a figure on the right side.



B. If you want to restart sewing from the beginning after discontinuing it, Press the EMERGENCY STOP switch once more to perform trimming. (When manual trimming is set after emergency stop) then press ORIGIN key. The feed plate moves to origin then comes to ascend.

C. If you want to continue sewing, step on the left pedal switch. If you finish every working, a needle moves to origin and the upper feed plate ascends.

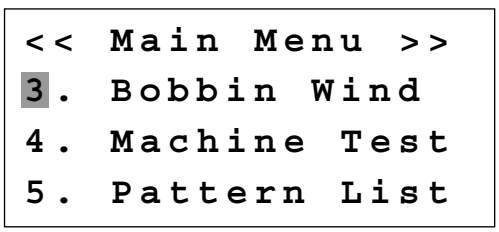


9) Winding the Thread

A. Inset the empty bobbin into a head of the sewing machine.

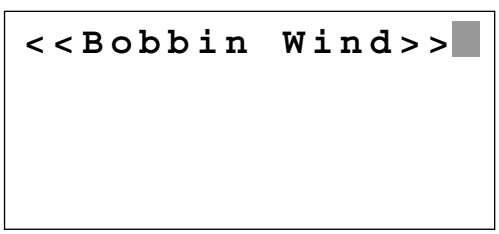
B. Press MODE key.

C. Move to "3. Bobbin Wind" by using direction keys ▲ ▼, then press ENTER↵ key. At this time, the upper feed plate comes to descend.



D. If you step on the left pedal switch, thread winding starts to progress, and if you step on the left pedal switch one more time, thread winding comes to discontinue temporarily.

E. If you finish the thread winding work, complete the thread winding with ESC key.



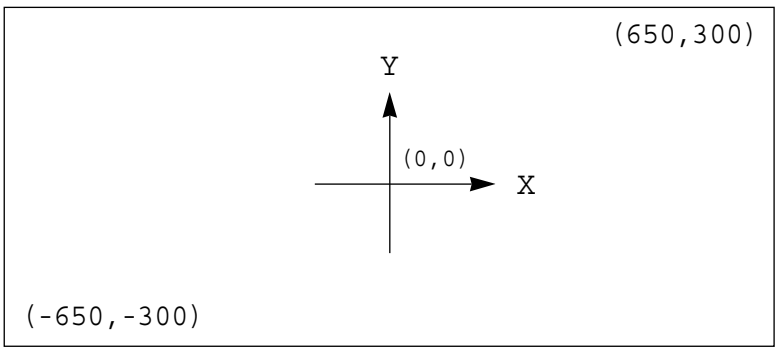
7

APPLICABLE OPERATION

1) Operating After Moving to a Random Start Point to Sew or the Second Origin

It is possible to move to the sewing start point or the second origin by using direction keys in the sewing available state. To decide the moving point, whether it is the sewing start point or the second origin, set up 1) PNT_STR_POS or 2) SECND_ORG at the general sewing related parameter No. "001. Move to starting point/the second origin manually."

※ Caution : It is available when READY LED turns on, and this function is used for movement to the temporary sewing start point or the second origin. By setting up the second origin within pattern data, the same position can be set up as the second origin.



A. Insert a floppy disk into a floppy disk drive.

B. Press NO key, then input the pattern number by using digit keys. (If you want to work with "001" pattern, input [0][0][1].)

C. Press ENTER ↵ key to read a pattern and to change to sewing available mode.

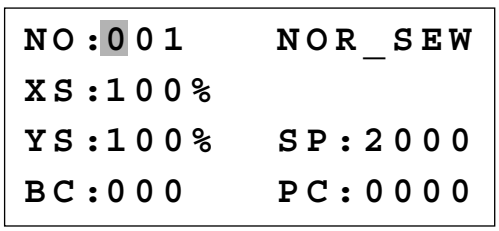
D. The upper feed plate comes to descend and moves to the origin or sewing start point then ascends. READY LED lights up.

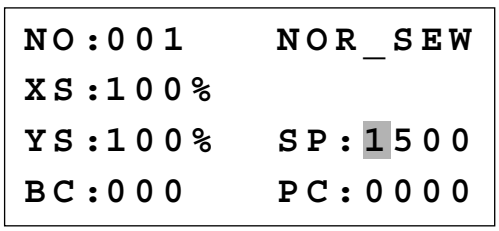
E. Press SPEED key to adjust speed properly.

F. If you step on the pedal switch on the right side, the upper feed plate comes to descend.

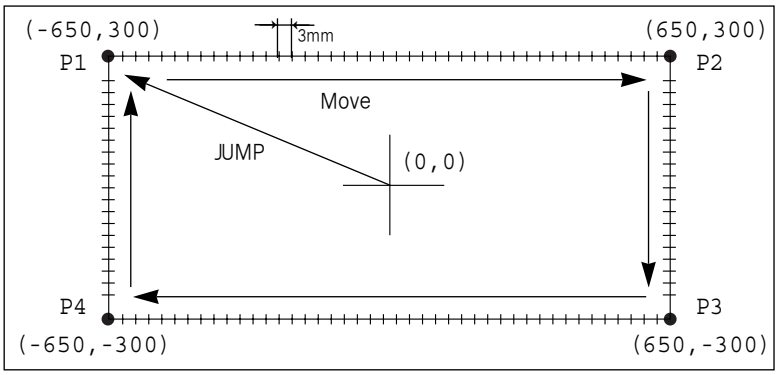
G. After moving to a random second origin by using direction keys, if you step on the pedal switch on the left side, the machine moves to the sewing start point or the second origin and starts relevant works. At this time, be careful not to exceed the transfer limit of feed plate.

H. If the work is finished, a needle moves to the origin or the sewing start point and the upper feed plate comes to ascend. If you want to back to the initial sewing start point or the first origin, press ENTER ↵ key to read the pattern to work one more time.





2) Program Example 1 : Generating the Square Pattern



A. Insert a floppy disk into a floppy disk drive.

B. Press MODE key.

C. Move to "2. Program" by using direction keys ▲ ▼, then press ENTER↵ key. At this time, the upper feed plate comes to descend and needle returns to its initial position.

D. After pressing JUMP key, move to the initial point of square by using direction keys. Then, press PNT SET key.

E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.

F. After pressing LINE key, input the stitch lenght by using the digit keys, then press ENTER↵ key. (For example, if you want to set the stitch length as 3mm, input [0][3][0].)

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

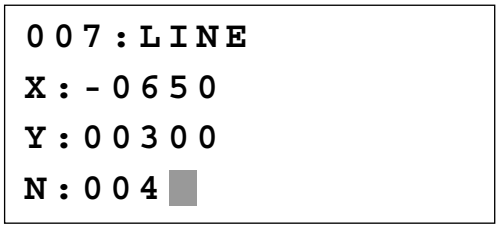
```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

```
004:JUMP
X:-0650
Y:00300
N:001
```

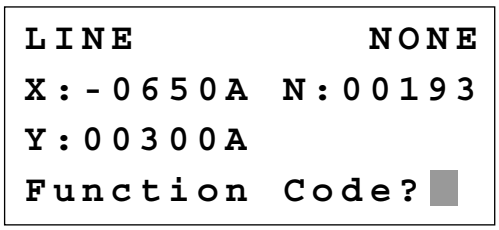
```
JUMP          NONE
X:-0650A N:00065
Y:00300A
Function Code?
```

```
007:LINE
WIDTH:030[0.1mm]
```

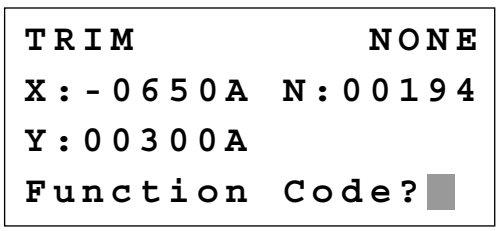
G. Move to each point of the square by using direction keys, then press PNT SET key respectively to input coordinates of each edge point. Whenever you press the PNT SET key, the number on screen will be increased.



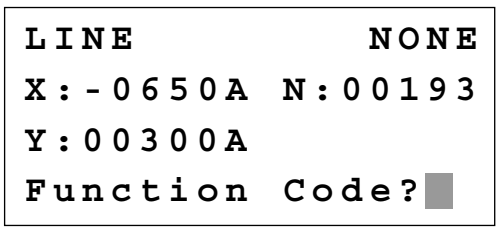
H. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



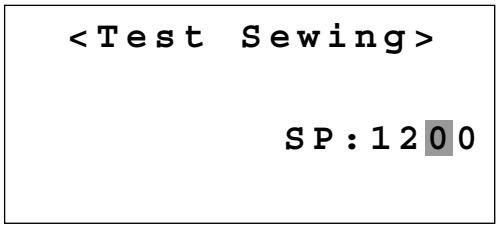
I. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and you can see the screen like a figure on the right side.



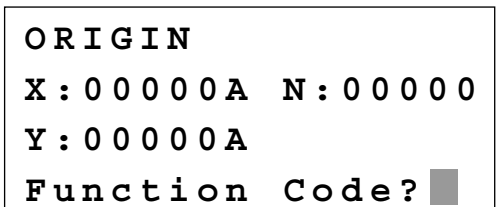
J. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press the keys without cease, a needle moves to the beginning or ending point.



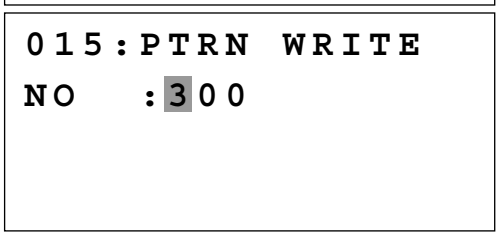
K. Press TEST key.
The upper feed plate moves to origin and to the sewing start point, then goes up again. READY LED lights up. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch on the left side, the machine starts test sewing. If the test sewing is finished, the upper feed plate moves to the sewing start point, then comes to ascend.



L. Press TEST key one more time and finish the test sewing. Then, the upper feed plate comes to descend and moves to origin with the turning off the READY LED.



M. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵ key. (For example, if you want to save a pattern number as 300, input [3][0][0].) It you do that, the generated pattern data will be saved in a floppy disk to that number. During saving the pattern, the READY LED flickers.



N. If there already exists the pattern number that you want to save in a floppy fisk, you can see the screen like a figure on the right side. If you want to save the pattern with the same number, just press ENTER↵ key, but if you want to save it with another number, press ESC key and save to the other number.

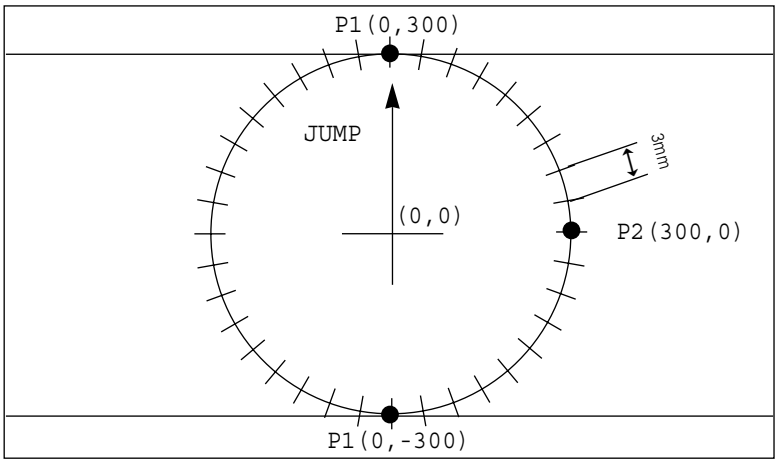
```
Pattern Exist!
OverWrite?
Y(ENTER)/N(ESC)
```

O. For finishing a pattern generation, press MODE key. Then, the upper feed plate moves to the origin and comes to ascend. Press ESC key to back to the initial screen.

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

3) Program Example 2 : Generating the Circle Pattern

To generate circle patterns, input 3 random coordinates that pass on the circle.



A. Insert a floppy disk into a floppy disk drive.

B. Press MODE key.

C. Move to "2. Program" by using direction keys ▲ ▼, then press ENTER↵ key. At this time, the upper feed plate comes to descend.

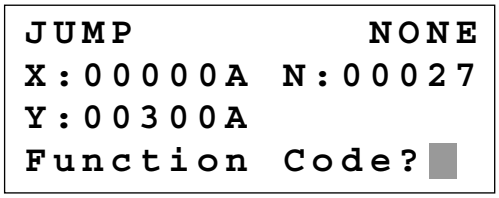
```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

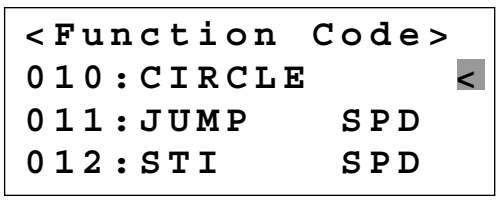
D. After pressing JUMP key, move to a random coordinates (For example, X:00000, Y:00300) that passes on circle by using direction keys. Then, press PNT SET key.

```
004:JUMP
X:00000
Y:00300
N:001
```

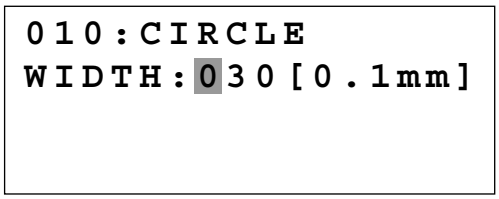
E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



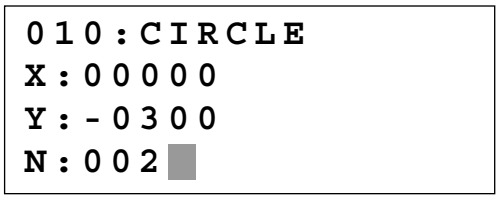
F. After pressing CODE key, if you know function codes related to pattern programming, input three digit number, but if not, move to "10. Circle" by using direction keys ▲ ▼ after pressing ENTER ↵ key, then press ENTER ↵ key again.



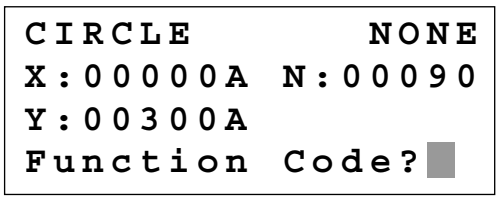
G. Input the stitch width by using the digit keys, then press ENTER ↵ key. (For example, if you want to set the stitch width as 3mm, input [0][3][0].)



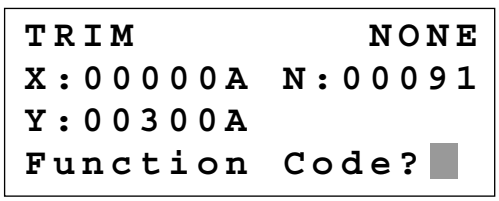
H. Move to the second random coordinates that passes on a circle (For example, X:00300 Y:00000) by using direction keys, then press PNT SET key. Similary, move to the third random coordinates tht passes on a crcle(For example, X:00000 Y:-0300)by using direction key, then press PNT SET key. Whenever you press PNT SET key, the number of screen increases.



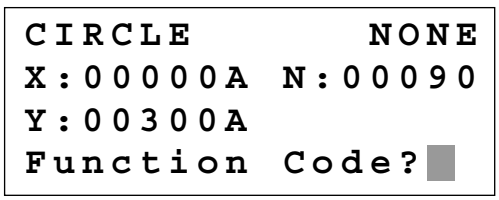
I. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



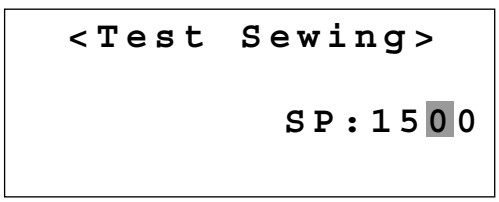
J. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and replace the screen like a figure on the right side.



K. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press the keys without cease, a needle moves to the beginning or ending point.



L. Press TEST key.
The upper feed plate comes to ascend and moves to the origin or sewing start point, then goes up. After that, READY LED turns on. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch on the left side, the machine starts test sewing. If the test sewing is finished, the upper feed plate moves to origin and comes to ascend.



M. Press TEST key one more time and finish the test sewing. Then, the upper feed plate comes to descend and move to origin with the turning off the READY LED.

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

N. Press WRITE key and input the number you want to save by using digit keys, then press ENTER key. (For example, if you want to save a pattern number as 301, input [3][0][1].) During saving the data, READY LED flickers. If you want to save the pattern with the same number, just press ENTER key, but if you want to save it with another number, press ESC key and save to the other number. After finishing saving process, the upper feed plate backs to the origin.

```
015:PTRN WRITE
NO   :301
```

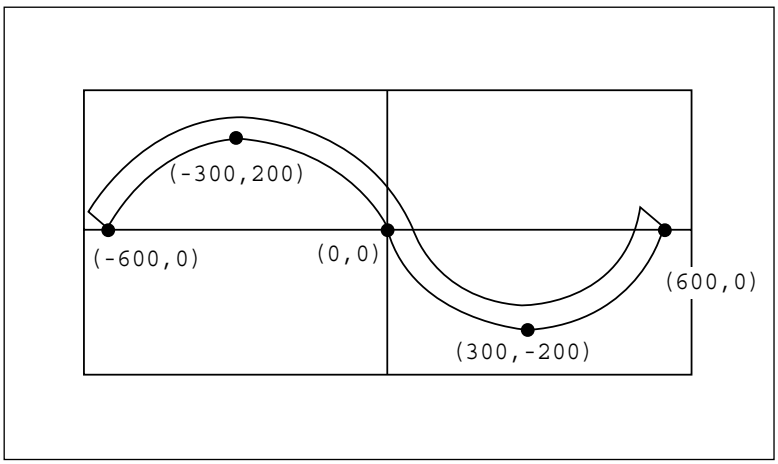
```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

O. For finishing a pattern generation, press MODE key. Then, the upper feed plate moves to the origin and comes to ascend. Press ESC key to back to the initial screen.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

4) Program Example 3 : Generating the Double Curve Pattern

Input a curving spot that inclines largely among spots that pass on a curve. We give 5 curving lines for examples here.

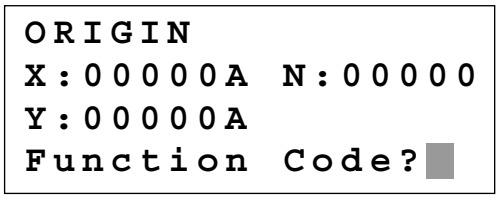


A. Insert a floppy disk into a floppy disk drive.

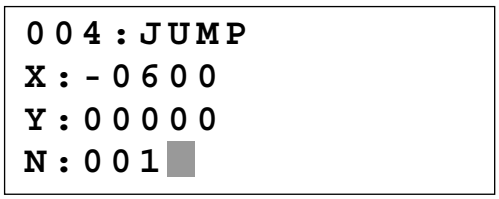
B. Press MODE key.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

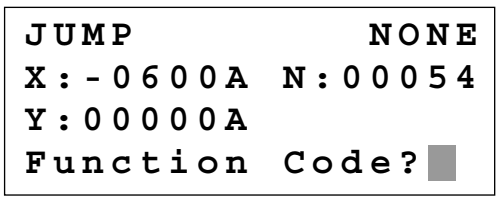
C. Move to "2. Program" by using direction keys ▲ ▼, then press ENTER ↵ key. At this time, the upper feed plate comes to descend and moves to the origin.



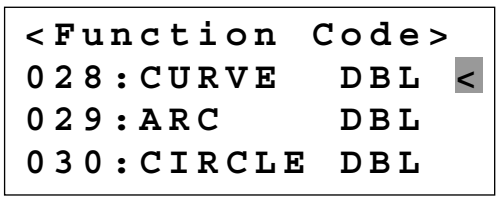
D. After pressing JUMP key, move to a random coordinates (For example X:-0600, Y:00000) that passes on a circle by using direction keys. Then, press PNT SET key.



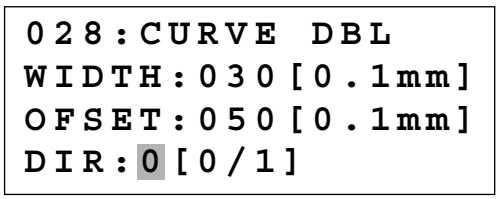
E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



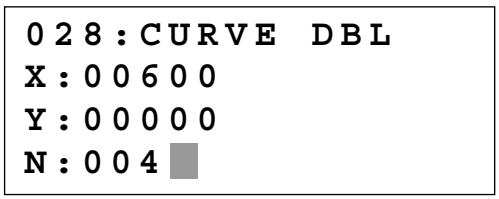
F. After pressing CODE key, If you know function codes related to pattern programming, input three digit number, but if not, move to "28. Curve DBL" by using direction keys ▲ ▼, after pressing ENTER ↵ key, then press ENTER ↵ key again.



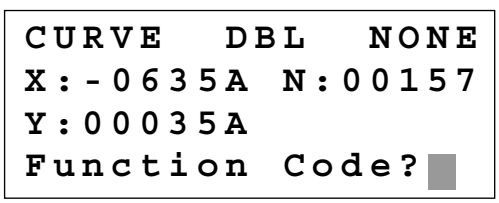
G. Input the stitch width by using the digit keys, then press ENTER ↵ key. (For example, if you want to set the stitch width as 3mm, input [0][3][0].) Input the distance between the two curves by using digit keys, then press ENTER ↵ key. (For example, if you want to set 5mm, input [0][5][0].) Input a direction from standard curve by using digit keys, then press ENTER ↵ key. (For example, if you want to place another curve on above the standard curve, input [0].)



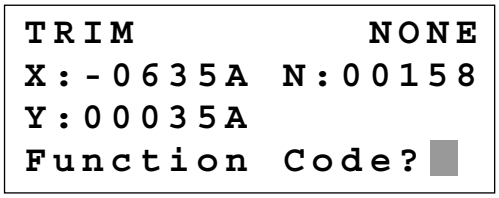
H. Move to the next coordinates (For example, X:-0300 Y:00200) by using direction keys, then press PNT SET key. Same as above, move to the other three coordinates in turns by using direction keys and press PNT SET key. At this time, whenever you press PNT SET key, the number of screen increases.



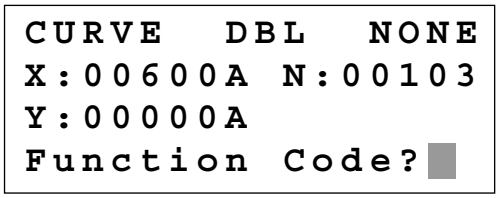
I. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data. At this time, the sewing machine discontinues for a while.



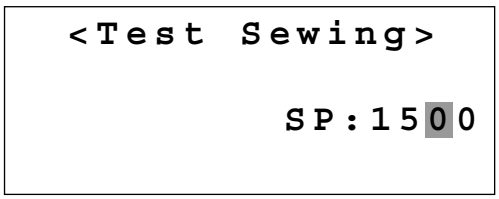
J. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and you can see the screen like a figure on the right side.



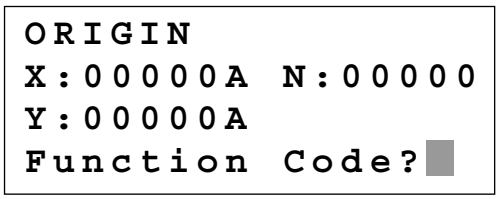
K. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press the keys without cease, a needle moves to the beginning or ending point.



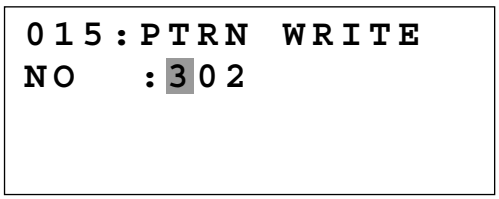
L. Press TEST key.
The upper feed plate comes to ascend and moves to origin, then goes up. After that, READY LED lights up. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch on the left side, the machine starts test sewing. If the test sewing is finished, the upper feed plate moves to origin or sewing start point and comes to ascend.

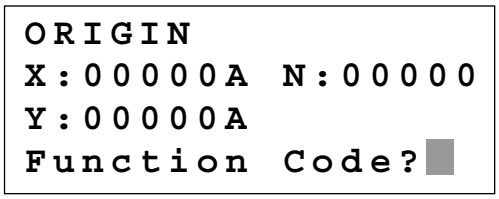


M. Press TEST key one more time and finish the test sewing. Then, the upper feed plate comes to descend and moves to origin with the turning on the READY LED.

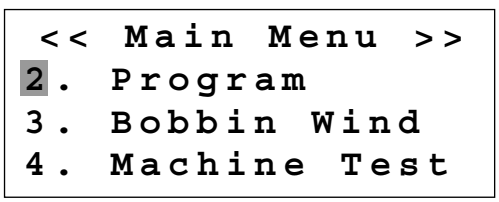


N. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵ key. (For example, if you want to save a pattern number as 302, input [3][0][2].) During saving the data, READY LED flickers. If you want to save the pattern with the same number, just press ENTER↵ key, but if you want to save it with another number, press ESC key and save to the other number. After finishing saving process, the upper feed plate backs to the origin.



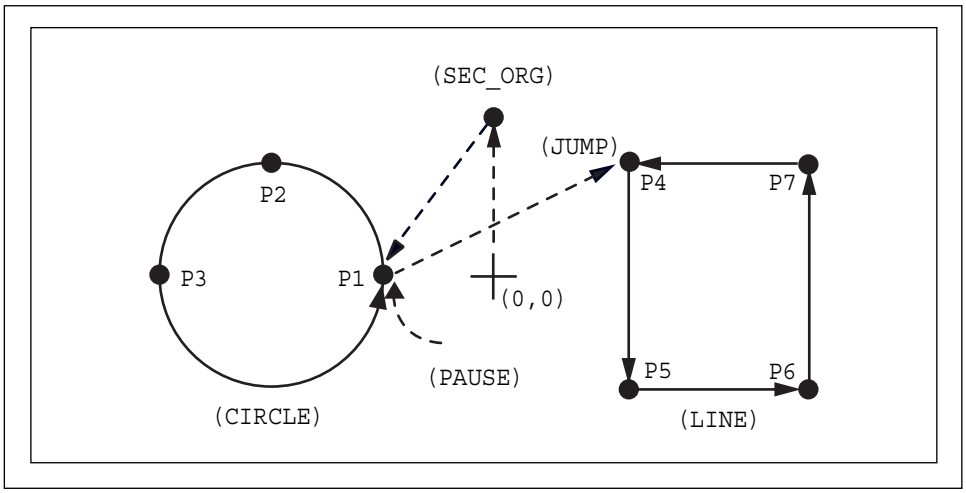


O. For finishing a pattern generation, press MODE key. Then, the upper feed plate comes to ascend after moving to origin. Press ESC key to back to the initial screen.



5) Program Example 4 : Pattern Generation by Using the Second Origin and Pause

To program as below, input as the following orders : JUMP → SEC_Org → JUMP → CIRCLE → TRIM → PAUSE → JUMP → LINE → TRIM



A. Insert a floppy diskette into floppy disk drive.

B. Press MODE key.

C. By using direction keys ▲ ▼, move to "2. Program" menu, then press ENTER key. At this time the upper feed plate descends, and moves to the origin.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

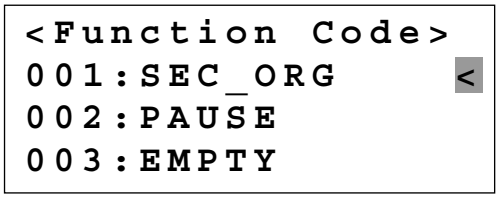
D. After pressing JUMP key, make the second origin move to the coordinates you want by using direction keys, then press PNT SET key.

```
004:JUMP
X:00000
Y:00300
N:001
```

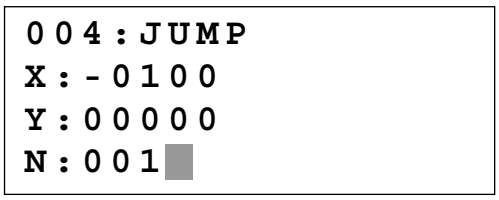
E. By pressing EXE key, after operating the pattern data, the feed plate moves according to the operated pattern data.

```
JUMP          NONE
X:00000A N:00027
Y:00300A
Function Code?
```

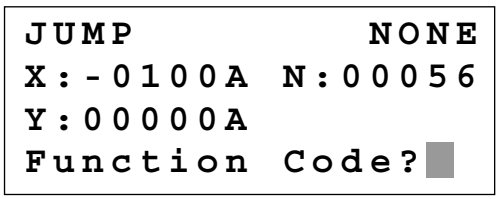
F. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER key and move to "001: SEC_ ORG" by using direction keys ▲ ▼ , then press ENTER ↵ key again.



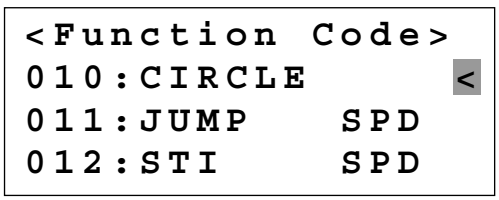
G. After pressing JUMP key, move to one random coordinates that passes through circle (for example, X:-0100, Y:00000)by using direction key, then press PNT SET key.



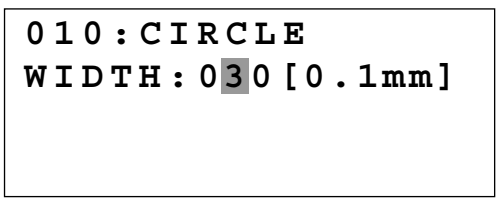
H. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



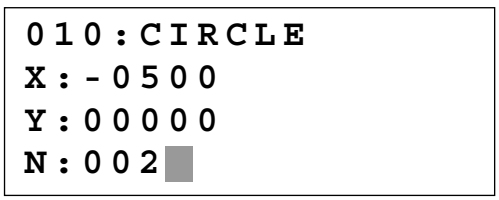
I. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER key and move to "010: Circle" by using direction keys ▲ ▼ , then press ENTER ↵ key again.



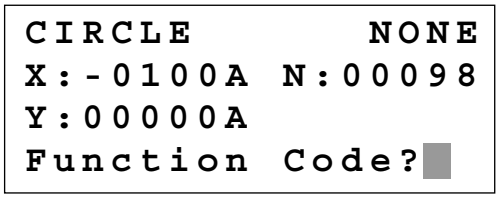
J. By using digit keys, input the stitch width and press ENTER ↵ key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



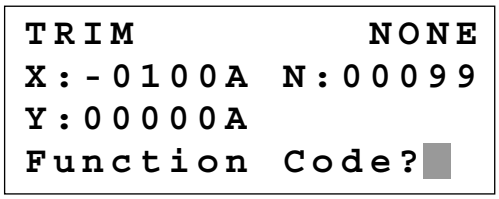
K. By using direction keys, move to the second random coordinates that passes through circle (for example, X:-0300 Y:00200), then press PNT SET key.
Likewise move to the third coordinates that passes through circle (for example, X:-0500 Y:00000), then press PNT SET key.
At this time the number on screen increases whenever you press PNT SET key.



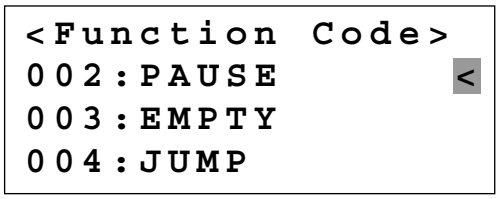
L. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



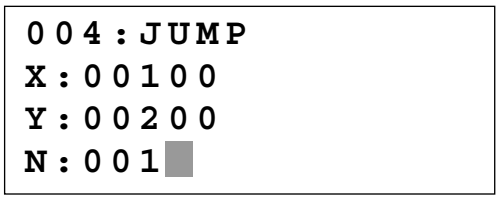
M. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.



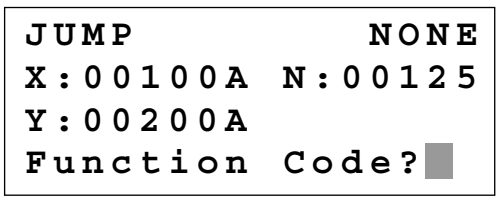
N. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER key and move to "002: PAUSE" by using direction keys ▲ ▼, then press ENTER ↵ key.



O. After pressing JUMP key, move to the one random coordinates of straight line (for example, X:00100 Y:00200)by using direction keys, then press PNT SET key.

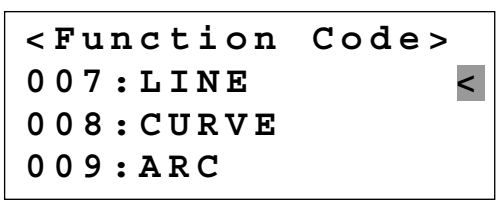


P. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

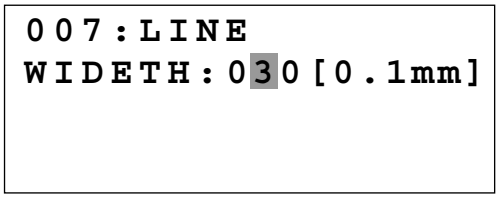


Q. After pressing CODE key.
If you know the function number related to pattern programming, input three-figure number and if you do not know the number, press ENTER key and transfer to "007:Line" menu by using direction key ▲ ▼ , and then press ENTER↵ key.

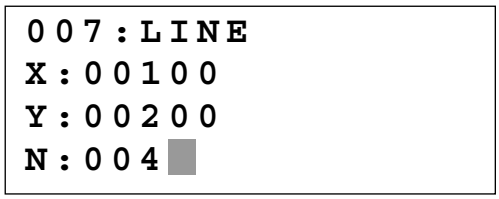
Ref.) "LINE" and "CURVE" function is set to use with hot key on the operation panel and so you may press this key.



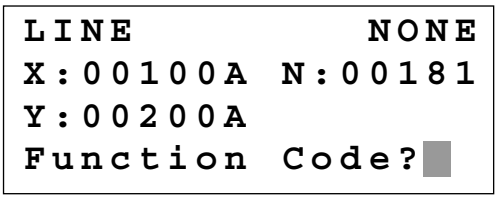
R. By using the digit keys, input the stitch width and press ENTER ↵ key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



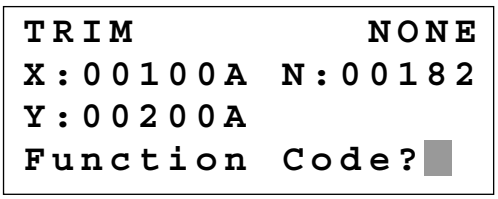
S. Move to the another coordinates in turns that passes through line, then press PNT SET key. At this time the number on screen increases whenever you press PNT SET key.



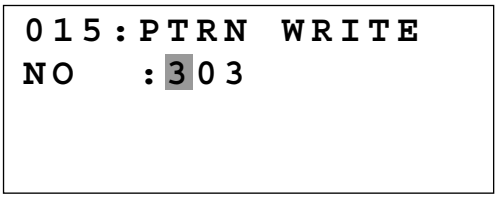
T. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

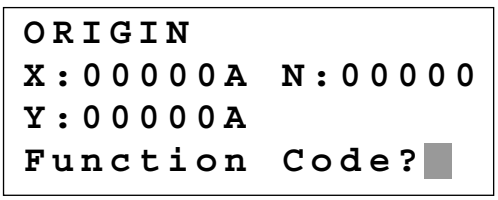


U. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.

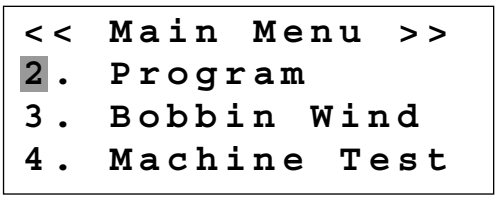


V. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER ↵ key. Save the generated pattern data in a floppy diskette as a relevant number.
(For example, if you want to save the pattern number as 303, input [3][0][3].) During saving the pattern, the READY LED flickers. When a pattern of same number is in a floppy diskette and if you want to save another pattern as same number, press ENTER key. If you want to save the pattern as another number, press ESC key and save it as another number. After finishing saving, the upper feed plate moves to the origin again.





W. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.

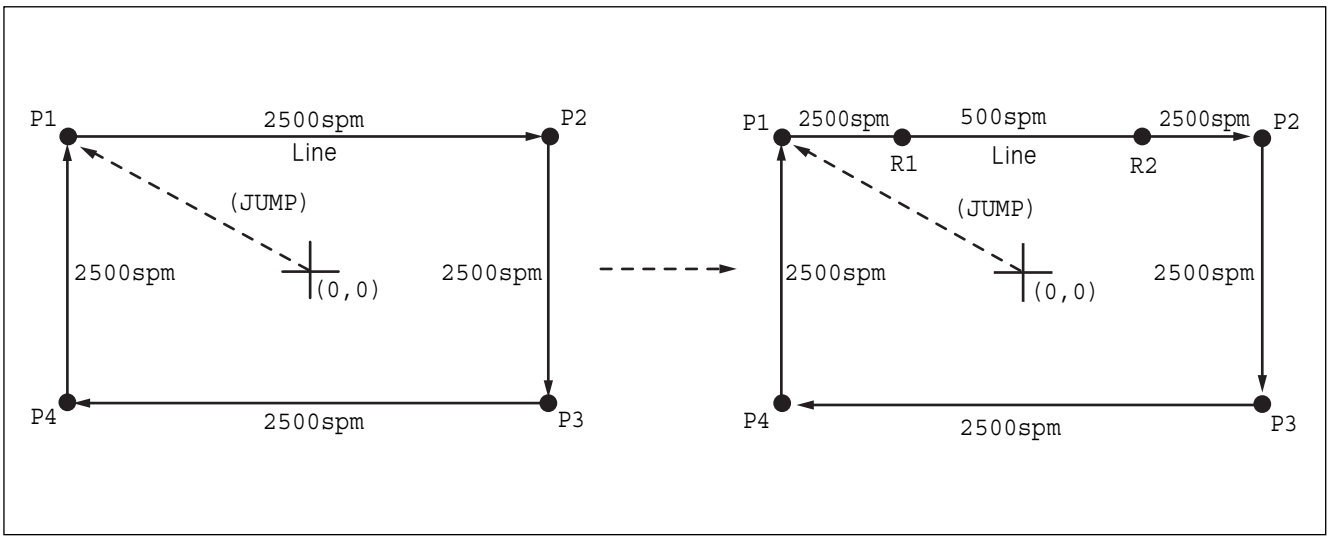


6) Program Example 5 : Change of Sewing Speed Within a Pattern

There are two ways to change sewing speed within a pattern.
1) Changing the sewing speed from an existing pattern data
2) Changing the sewing speed with creating new pattern data

※ Ref. : Several sections of speed change is available, but they should be within real sewing range.

6-1) Changing the Sewing Speed from an Existing Pattern Data



(1) Reading the Pattern that is Supposed to Change the Sewing Speed

A. Insert the floppy diskette of a pattern that is supposed to change the sewing speed

B. Press MODE key.

C. By using direction keys ▲ ▼, move to "2. Program" menu, then press ENTER↵ key. At this time the upper feed plate descends, and moves to the origin.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

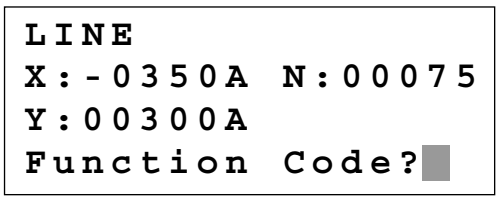
```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

D. After pressing READ key, input the pattern number that is supposed to change the sewing speed by using digit keys, then press ENTER to read the pattern.
(For example, to read the pattern number 500, input [5][0][0].)

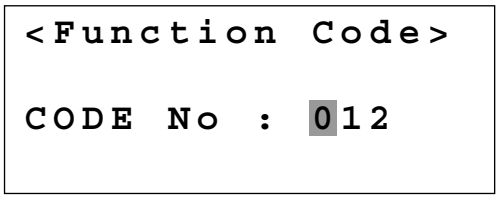
```
014:PTRN    READ
NO:500
```

(2) Setting up the Range of Sewing Speed Change

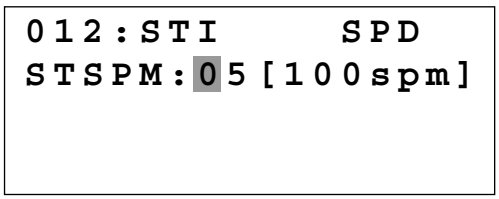
A. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



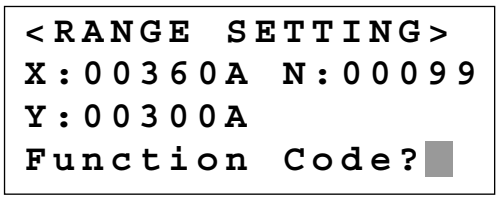
B. After pressing CODE key, input three digit numbers if you know the pattern programming related function code, but if you don't know it press ENTER key and move to the "012: STI SPD" by using direction keys ▲ ▼, then press ENTER↵ again.



C. By using digit keys, input the sewing speed you want to change, then press ENTER key. (For example, if you want to change the speed into 500spm, input [0][5].)

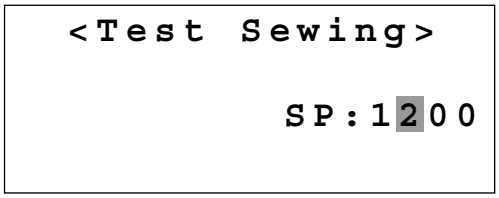


D. By using FORW, BACK keys, move to the end point (R2) of section that the sewing speed is supposed to change.
Then after pressing PNT SET key, press EXE key.

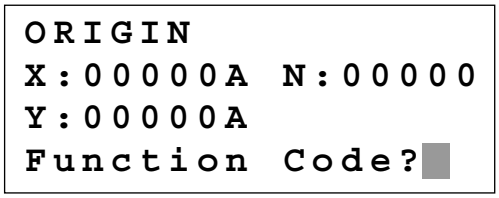


(3) Test Sewing

A. Press Test key.
After moving to the origin, the upper feed plate moves to the sewing start point, then ascends and the READY LED turns on. After adjusting proper test sewing speed by pressing SPEED key, if you press down once the foot plate on the right side, the upper feed plate descends, and if press down once the foot plate on the left side, the test sewing is performed.
After completing the test sewing, the upper feed plate moves to the sewing start point, then ascends.

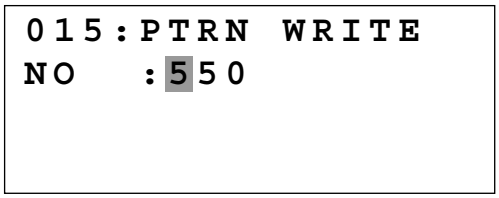


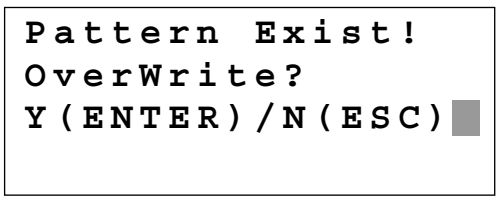
B. By pressing TEST key, complete the test sewing. The upper feed plate descends and moves to the origin, then READY LED turns off.

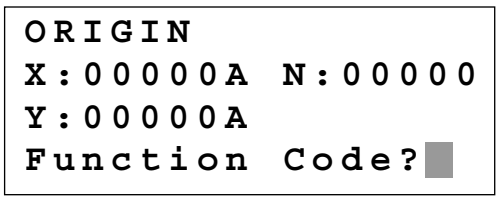


(4) Saving as New Pattern Number

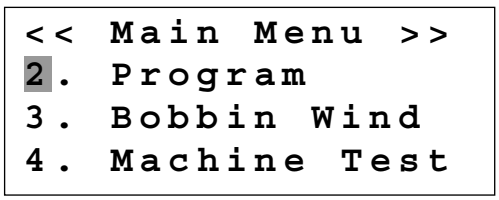
A. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER ↵ key. Save the generated pattern data in a floppy diskette as a relevant number. (For example, if you want to save the pattern number as 550, input [5][5][0].) During saving the pattern, the READY LED flickers. When a pattern of same number is in a floppy diskette and if you want to save another pattern as same number, press ENTER key. If you want to save the pattern as another number, press ESC key and save it as another number. After finishing saving, the READY LED turns off, the upper feed plate moves to the origin again.



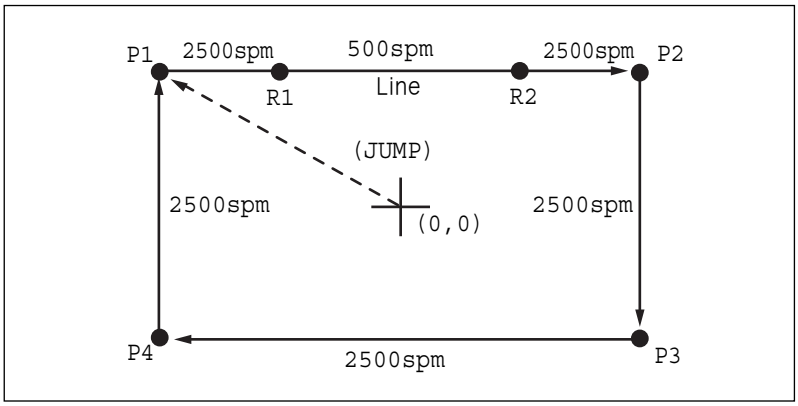




B. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.



6-2) Changing the Sewing Speed by Making New Pattern Data



A. Insert a floppy diskette into floppy disk drive.

B. Press MODE key.

C. By using direction keys ▲ ▼, move to "2. Program" menu, then press ENTER ↵ key. At this time the upper feed plate descends, and moves to the origin.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

D. After pressing JUMP key, move to the initial point of square by using direction keys, then press PNT SET key.

```
004:JUMP
X:-0650
Y:00300
N:001
```

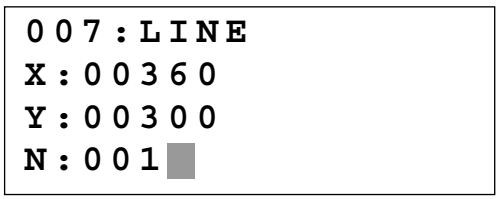
E. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data

```
JUMP              NONE
X:-0650A N:00065
Y:00300A
Function Code?
```

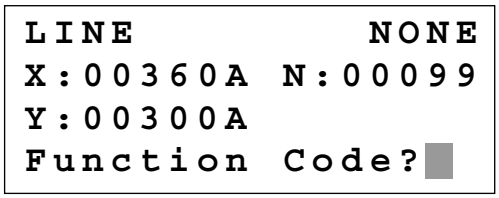
F. After pressing LINE key, input the stitch width by using digit keys, then press ENTER ↵ key. (For example, if you want to set up the stitch width as 3mm, input [0][3][0].)

```
007:LINE
WIDTH:030[0.1mm]
```

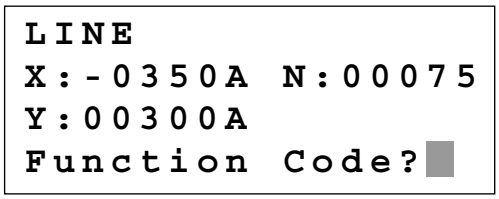
G. By using direction keys, move to the end point(R2) of section that the sewing speed is supposed to change, then press PNT SET key.



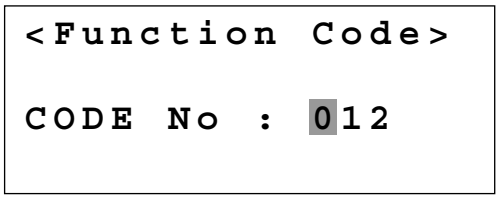
H. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data.



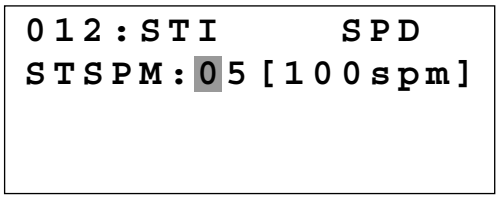
I. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



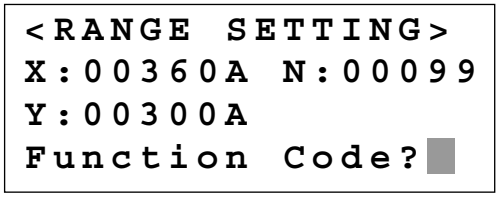
J. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER key and move to "012. STI STPD" by using direction keys ▲ ▼, then press ENTER [↵] key.



K. By using digit keys, input the sewing speed you want to change, then press ENTER key.
(For example, if you want to change the speed into 500spm, input [0][5])



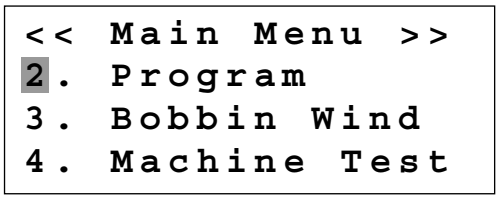
L. By using FORW, BACK keys, move to the end point (R2) of section that the sewing speed is supposed to change.
Then after pressing PNT SET key, press EXE key.



M. Complete the program for the rest part of the square by using LINE.

N. After performing test sewing, store the programmed pattern with new number.

O. To complete pattern creation, press MODE key. The upper feed plate moves up after returned to the origin. Return to the initial screen by pressing ESC key.



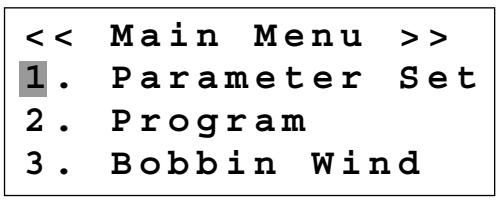
7) Using the Extension/Reduction Modes

It is used when you want to extend or reduce the already programmed sewing patterns, and you should be careful not to exceed the transfer limit during the setting for rate of extension/reduction. You can extend or reduce with STITCH_LEN by the stitch width, and with STITCH_NUM by the numbers of stitches. To use these functions, the parameter number related to general sewing, "053. Setting the magnifying /demagnifying mode" should be set to "2)STITCH_LEN" or "3)STITCH_NUM".

(1) Setting the extension/reduction mode

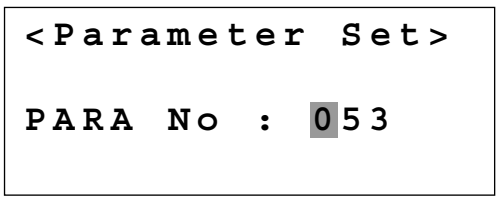
A. Press MODE key.

B. Move to "1. Parameter Set" by using direction keys ▲ ▼.

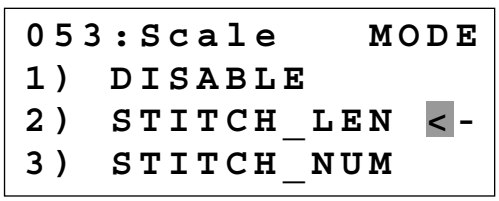


C. If you press ENTER ↵, you can get the screen like a figureon the right side, then input [0][5][3].

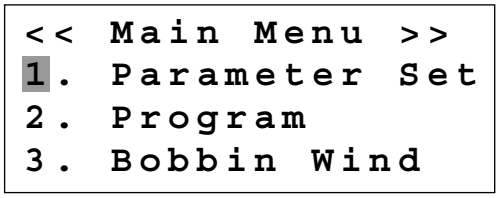
※ Appendix :
Refer "Parameter number related to general sewing."



D. After pressing ENTER ↵ key, decide whether you use extension/reduction or not by using direction keys ▲ ▼.
Here set we "2)STITCH_LEN: Extension/ Reduction by stitch length".

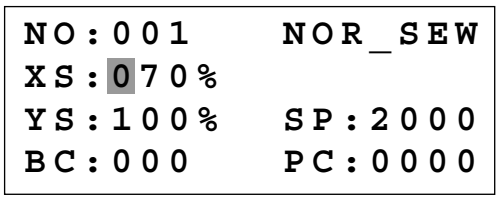


E. Press ENTER↵ key.
Press ESC key to back to the initial screen.

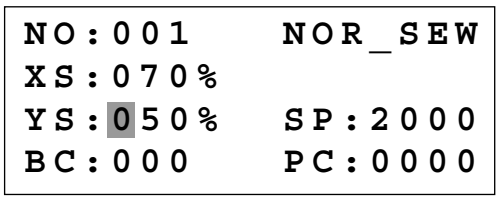


(2) Setting the rate for extension/reduction

A. Press X SCALE and set the rate you want. For example, if you want to reduce 70%, input [0][7][0].

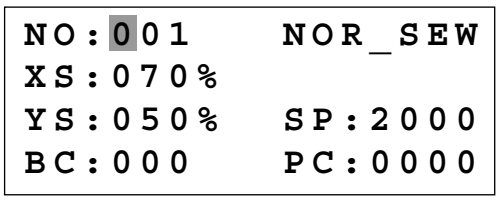


B. Press Y SCALE and set the rate you want. For example, if you want to reduce 50%, input[0][5][0].

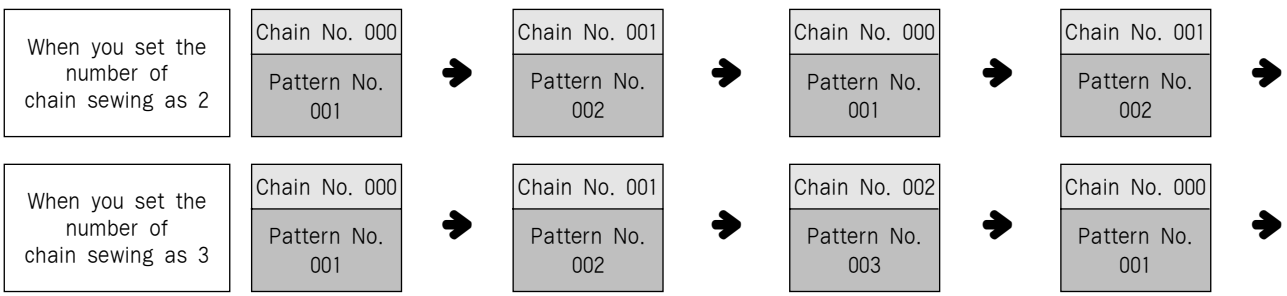


C. Press NO key and input the pattern number by using digit keys. (For example, if you want to work with "001" pattern, input [0][0][1].)

D. Press ENTER↵ key to read patterns and to be sewing available mode.



8) Using the Chain Sewing Mode

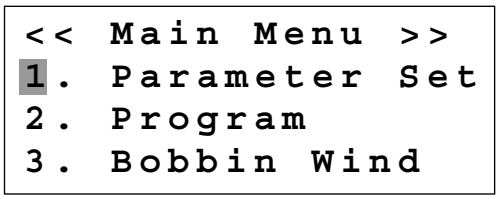


It is used to work with the various patterns randomly. To use the function, the parameter number related to general sewing, "054 Number of Chain Sweing." should be set to the other numbers except "0". Set the parameter number related to general sewing, "055 Transferring Chain Number." to be automatic or manual.

(1) Setting the chain sewing environment

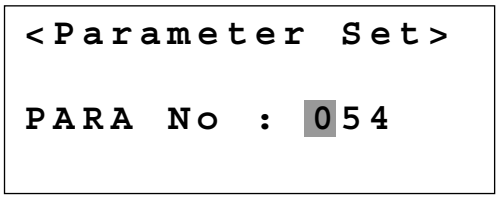
A. Press MODE key.

B. Move to " 1. Parameter Set " by using direction keys ▲ ▼ .

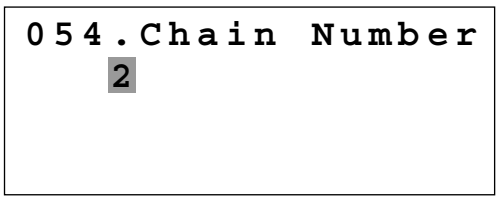


C. If you press ENTER↵ key, you can get the screen like a figure on the right side, then input [0][5][4].

※ Appendix :
Refer "Parameter number related to general sewing."

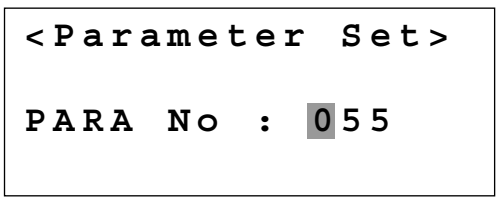


D. After pressing ENTER↵ key, input the number of chain sewing you want by using direction keys ▲ ▼ . Here we input 2 for example.



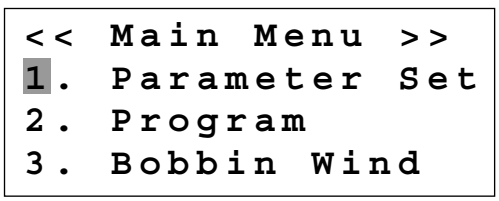
E. Press ENTER↵ key. If you press ENTER↵ key again, you can get the screen like a figure on the right side, then input [0][5][5].

※ Appendix :
Refer "Parameter number related to general sewing."



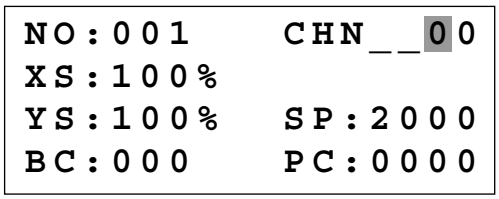
F. Input if you want an automatic operation or manual for the change of chain number by using direction keys ▲ ▼ press ENTER key. And then, after pressing ENTER ↵ key.

G. After pressing ENTER↵ key, and press ESC key to back to the initial screen.

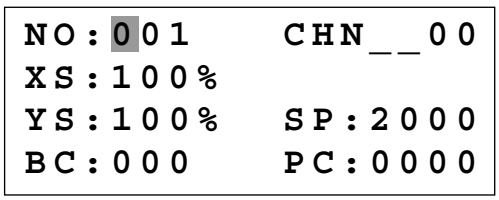


(2) Correspondence of a chain No. to a pattern

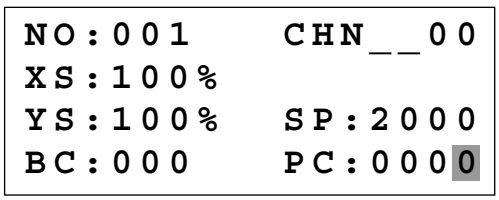
A. Press No key. When the cursor is located on "CHN__XX", input [0][0]. At this time, must input less number than the number of chain sewing.



B. Press NO key. When the cursor is located on "NO:XXX", input the pattern No. corresponds to the chain No. "00". For example, if you want to work with No."001" pattern, input [0][0][1].

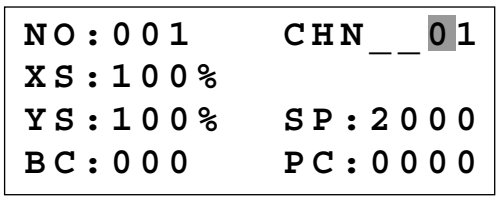


C. Press ENTER↵ key. Then the READY LED comes to flicker. After reading a pattern, for working the machine comes to be in sewing available mode

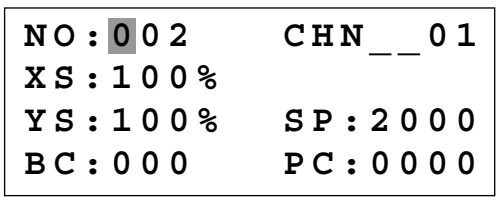


D. Press ENTER↵ key again.

E. Press NO key. If the cursor is located on "CHN__XX", input [0][1] for chain No. At this time, input less number than the number of practical chain sewing.

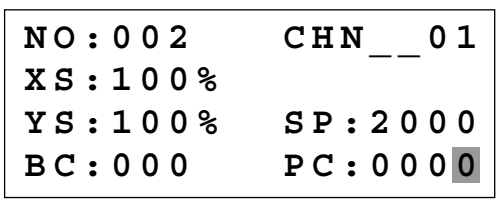


F. Press NO key. When the cursor is located on "NO:XXX", input the pattern No. that corresponds to the chain No. "00". For example, if you want to work with No. "002" pattern, input [0][0][2].



G. Press ENTER↵ key.
Then the READY LED comes to flicker. After reading a pattern, for woring the machine comes to be in sewing available mode.

※ If you want to back to the general sewing mode from the chain sewing mode, set "054 Number of Chain Sewing" should be set to "0".

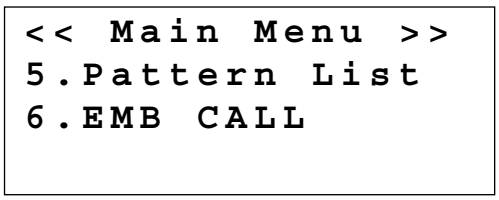


9) Checking and Deleting the Pattern Number

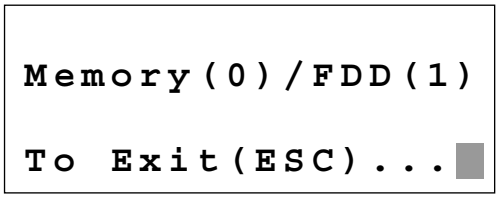
It is used to check or delete the of pattern number in floppy diskette and inner memory.

A. Press MODE key.

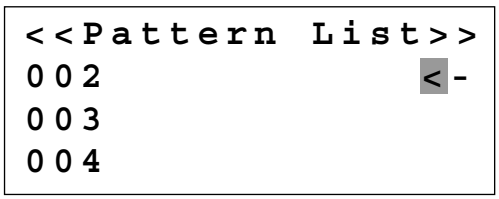
B. By using direction keys ▲ ▼, move to "5. Pattern List" menu.



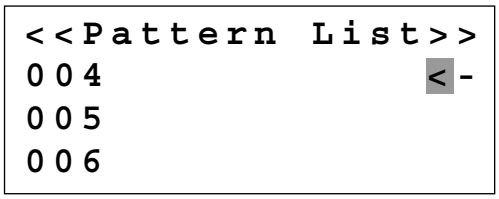
C. If you press ENTER ↵ key, the screen of the right sides appears. To check the pattern number in inner memory, press digit key, 0, and to check the pattern number in a floppy diskette, press digit key, 1.



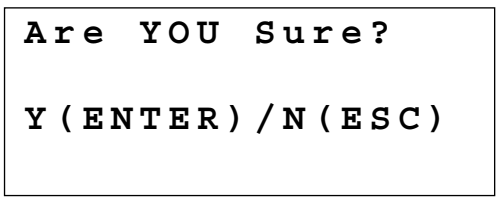
D. If you press digit key, 1, the pattern number in a floppy diskette is shown.



E. If the pattern number is not indicated on one screen, check it by using direction key ▲ ▼ .



F. After moving the direction key to the pattern number that you want to delete by using direction keys ▲ ▼, if you press PTN DEL key on the program unit the screen of the right side appears. To delete the pattern, press ENTER key, and to cancel, press ESC key.



G. By pressing ESC key, complete the check of pattern number. By pressing ESC key again, back to the initial screen.

10) Making a Copy the Pattern to Another Number or Diskette

It is used to make a copy the pattern to another number or diskette. It is available to check, make a copy or delete the pattern number.

No. 1 Floppy Diskette		Copy one pattern to another pattern number in same diskette.
No. 2 Floppy Diskette		Copy one pattern to same pattern number or different one.

A. Insert a floppy diskette that you want to make a copy.

B. Press MODE key.

C. By using direction keys ▲ ▼, move to "2. Program" menu, then press ENTER ↵ key. At this time the upper feed plate descends, and moves to the starting point

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

D. After pressing READ key, input the pattern number you want to make a copy. (For example, to make a copy "001", input [0] [0][1].)

```
014:PTRN READ
NO  :001
```

E. Press ENTER key. The READY LED flickers during reading the pattern data.

```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

F. After copy the READY LED is turned off, if you want to make a copy the pattern to the same floppy diskette as another pattern number, press WRITE key and input the pattern number that is to be copied by using digit keys. (For example, input [0][0][2] to make a copy as "002".)
To make a copy to other floppy diskette, take out the existing diskette and insert other floppy diskette, then press WRITE key input the pattern number you want to make a copy by using digit keys.
(For example, input [0][0][1] to make a copy as of "001".)

```
015:PTRN WRITE
NO   :002
```

G. After leaving the programming menu by pressing MODE key, back to the intial screen by pressing ESC key.
※ Referring to "Pattern Number Check", check the copied pattern number.

```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

11) Change of Parameter Related to General Sewing

It is used when you want to change the operating system of electrically controlled pattern sewing machine for optimum working condition.

A. Press MODE key.

B. Move to "1. Parameter Set" by using direction keys ▲ ▼.

```
<< Main Menu >>
1. Parameter Set
2. Program
3. Bobbin Wind
```

C. IF you press ENTER↵ key, you can get the screen like a figure on the right side. If you know the parameter number related to general sewing, input the three digit parameter number. For example, if you want to change "004:Strt Ret Mod", input [0][0][4]. At this time, you should input [0] twice for the first and second digits.
※ Appendix :
Refer "Parameter number related to general sewing."

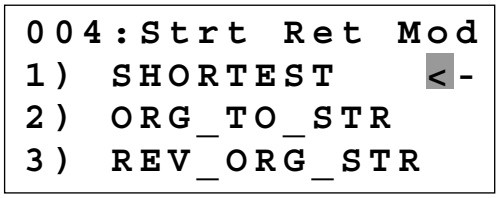
```
<Parameter Set>

PARA No : 004
```

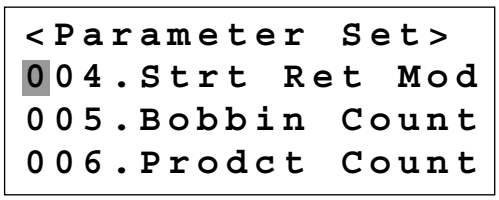
D. If you don't know any relevant number, press ENTER↵ key and then, move to the parameter number you want by using direction keys ▲ ▼.
※ Appendix :
Refer "Parameter number related to general sewing."

```
<Parameter Set>
004.Strt Ret Mod
005.Bobbin Count
006.Prodct Count
```

E. After pressing ENTER ↵ key, change the setting value or any condition you want by using direction keys ▲ ▼.



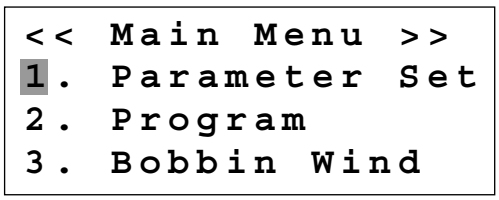
F. If you press ENTER ↵, the changed condition will be valid and the machine backs to the previous menu. If you don't want any change, press ESC to cancel it.



G. If you want to back to the previous menu, press ESC key.

H. Press ESC key to back to the initial screen.

※ You can confirm the machine backs to the starting point for sewing directly without dropping in the origin after finishing sewing.

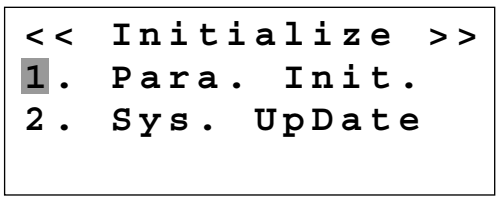


12) Initialization of Parameter Related to General Sewing

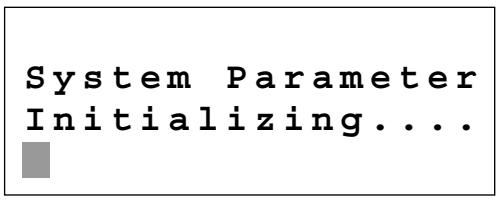
It is used that you want to return sewing to the factroy-installed setting value. Just handle it by professional A/S engineer as soon as possible.

A. Press MODE key.

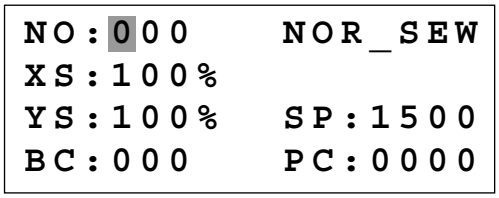
B. Press ENTER ↵ key.



C. After moving the cursor to "1. Para. Init." menu by using direction keys ▲ ▼, press ENTER ↵ key. Then you can see the screen like a figure on the right side. If a parameter initialization is finished, previous screen appears.



D. Press ESC key to back to the general sewing mode.



13) System Program Update

It is used that you want to updata the existing version of system program to the latest one.

※ Caution

Please do not handle it without operating by professional A/S engineer.

A. Insert a floppy disk having system program that you want to update into a floppy disk drive.

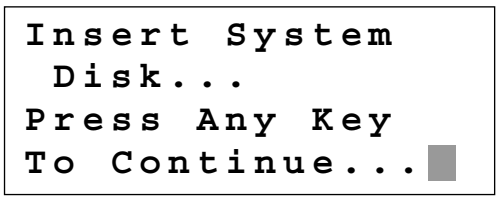
B. After pressing MODE key, press ENTER ↵ key.

※ Caution

In case READY LED is turned on or upper feed plate is under, some keys are not available. So you have to operate the keys after lifting the upper feed plate or pressing ENTER ↵ keys.

C. Move to "2. Sys. Update" by using direction keys ▲ ▼ , then press ENTER ↵ key.

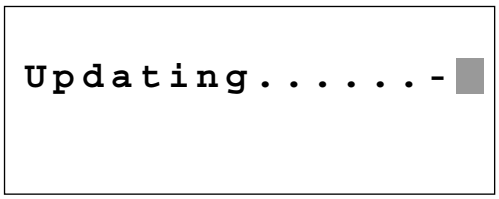
D. You can see the screen like a figure on the right side.



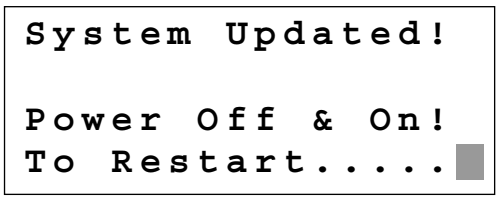
E. If you press any key the system program is updated through a floppy diskette. During updating, READY LED flicker.

※ Caution

During reading a floppy disk, do not take out the floppy disk from a disk drive or do not turn off the main power.



F. When update is finished, you can see the screen like a figure on the right side. By rebooting after turning off the power. The system program is updated completely.



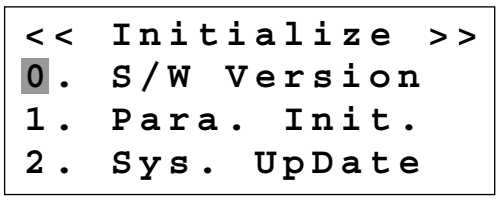
14) Confirmation for Version of System Program

A. Press MODE key.

※Caution

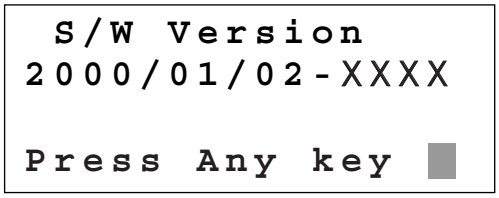
In case READY LED is turned on or upper feed plate is under, some keys are not available. So you have to operate the keys after lifting the upper feed plate or pressing ENTER ↵ keys.

B. Press ENTER ↵ key.



C. If you press ENTER ↵ key, you can get the screen like a figure on the right side. You can confirm the date when the system program was made.

※ XXXX means machine model.



D. Press any key to confirm the version, then back to the initial screen by pressing ESC key.

8

OPERATING METHOD OF HIGH TECHNOLOGY

1) Understanding the Function of Machine Test

(1) Encoder Test

It is a test if input of encoder and syncronizer is operated properly or nto the present position of needle bar.

A. Press MODE key.

B. After moving to "4. Machine Test" by using direction keys ▲ ▼ , press ENTER↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

```
<< Test Menu >>
0.Encoder  Test
1.XY-Main  Test
2.MainMotorTest
```

C. If you press ENTER ↵ key. Upper feed plate comes to descend, and moves to origin. At this time, if you slowly turn the upper shaft pulley by hand the pulse value of encoder, and rotating times of upper shaft will be marked.

```
Enc Val = 00000
Pos Val = 00000
Syn Num = 00000
PulySize = 01150
```

D. If you want to finish encoder test, press ESC key. If you want to finish test menu, press ESC also.

E. Back to the general sewing mode by pressing ESC key.

(2) Step motor-Main shaft motor Test (X-Y Main Test)

It is a test if a step motor and main shaft motor is operated properly at the same time.

A. Press MODE key.

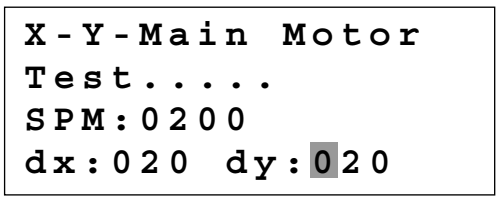
B. After moving to "4. Machine Test" by using direction keys ▲ ▼ , press ENTER ↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

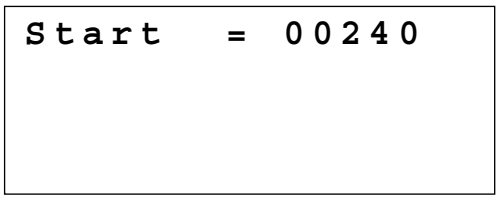
C. After moving to "1. XY-Main Test" by using direction keys ▲ ▼ , press ENTER↵ key. The upper feed plate descends and moves to the origin.

```
<< Test Menu >>
1.XY-Main  Test
2.MainMotorTest
3.InterruptTest
```

D. Input the speed of main shaft and distance of transfer, then press ENTER↵ key. If you want to test with the factory-installed setting value, just press ENTER↵ key. You can see the beginning angle of upper shaft transfer, rotating times of upper shaft and number of stitches. Drive the step motor and main shaft motor SPM/10times, then finish the step motor-main shaft motor test automatically.



E. If you want to finish test menu, press ESC key. Press ESC one more time to back to the initial screen.

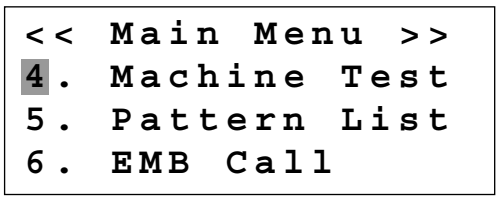


(3) Main Motor Test

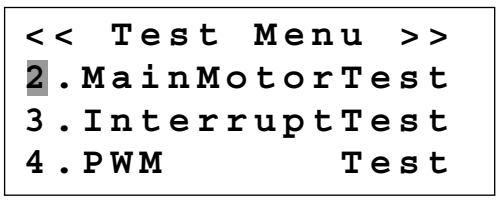
It is to test if the main shaft motor is operated properly.

A. Press MODE key.

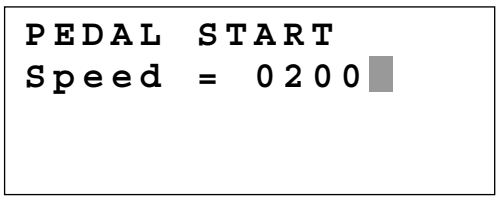
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.



C. After moving to "2. Main Motor Test" by using direction keys ▲ ▼, press ENTER↵ key.



D. Upper feed plate comes to descend. Press ENTER↵ key. If you want to change the speed of main shaft, press SPEED key.



E. If you want to finish the main shaft motor test, press ESC key.
If you want to finish test menu, press ESC key.

F. Back to the initial screen by pressing ESC key.

(4) Interrupt Test

It is to test if the CPU board is operated properly.

A. Press MODE key.

B. Move to "4. Machine Test" by using direction keys ▲ ▼ , then press ENTER↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

C. Move to "3. Interrupt Test" by using direction keys ▲ ▼, then press ENTER↵ key.

```
<< Test Menu >>
3.InterruptTest
4.PWM      Test
5.LCD      Test
```

D. IRQ1 indicates the times that key is pressed, and IRQ4 shows the times that sychronizer counted. IRQ5 indicates the sensing times main power is off, IRQ7 shows the timer operation were inside of CPU. At this time, if you press a key or turn the upper shaft manually, the relevant value will be changed.

```
IRQ1 : 0000000
IRQ4 : 0000000
IRQ5 : 0000000
IRQ7 : 0000000
```

E. If you want to finish Interrupt Test, press ESC key. If you want to finish test menu, press ESC key also.

F. Back to the initial screen by pressing ESC key.

(5) PWM Test

It is to test if solenoid is operated properly. Do not handle it except professional A/S engineer.

A, Press MODE key.

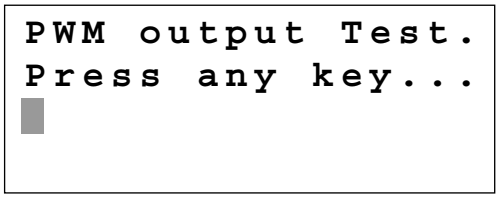
B. After move to "4. Machine Test" by using direction keys ▲ ▼, then press ENTER↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

C. After moving to "4. PWM Test" by using direction keys ▲ ▼ , then press ENTER↵ key.

```
<< Test Menu >>
4.PWM      Test
5.LCD      Test
6.Keyboard Test
```

D. Press any key to perform the test.



E. If you want to finish PWM test, press ESC key.
If you want to finish test menu, press ESC key.

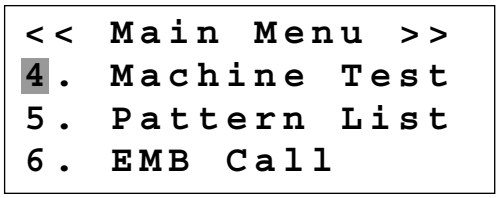
F. Back to the initial screen by pressing ESC key.

(6) LCD Test

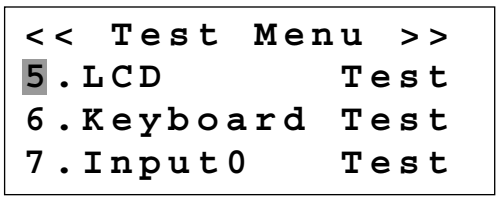
It is to test if LCD is operated properly. If you press a key, the relevant thing is shown on on the screen.

A. Press MODE key.

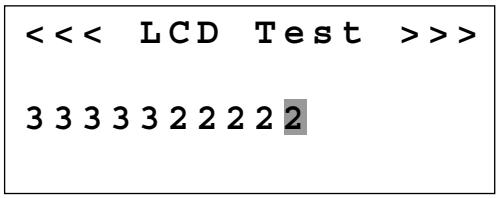
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.



C. After moving to "5. LCD Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. If you press a key, relevant key value appears on the screen.



E. If you want to finish LCD test, press ESC key.
If you want to finish test menu, press ESC key.

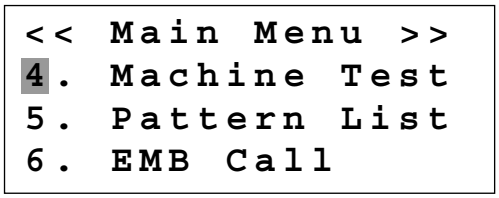
F. Back to the initial screen by pressing ESC key.

(7) Keyboard Test

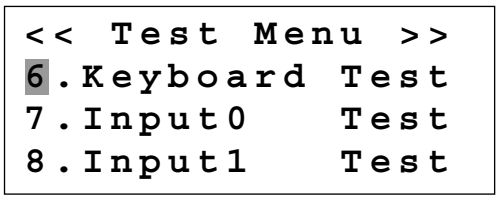
It is to test if key is operated properly. If you press a key, value of the relevant value is shown on key appears on the screen.

A. Press MODE key.

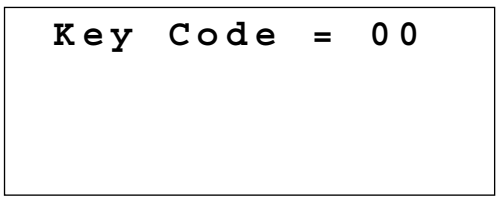
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.



C. After moving to "6. Keyboard Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. If you press a key, the relevant of the key appears on the screen.



E. If you want to finish keyboard test, press ESC key.
If you want to finish test menu, press ESC key.

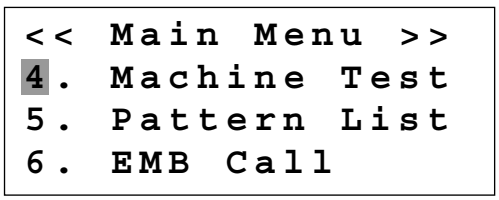
F. Back to the general sewing mode by pressing ESC key.

(8) Input 0 Test

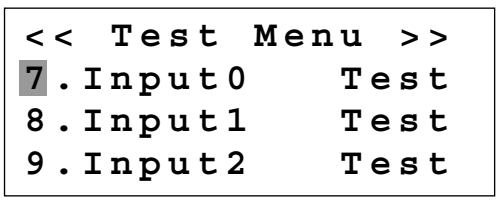
It is to test if sensor input signal is operated properly. For testing, separate step motor output connector from control box.

A. Press MODE key.

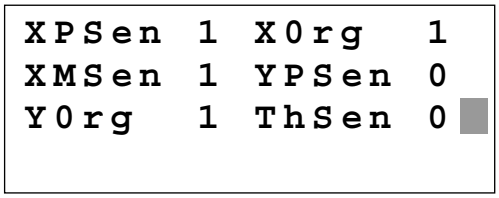
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.



C. After moving to "7. Input 0 Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. Check if the values of X0rg and Y0rg are changed when the feed plate passes on origin making it move manually to X and Y shaft.
Confirm if the value of ThSen is changed when you release a take up lever spring after pulling slightly.



E. If you want to finish Input0 test, press ESC key.
If you want to finish test menu, press ESC key.

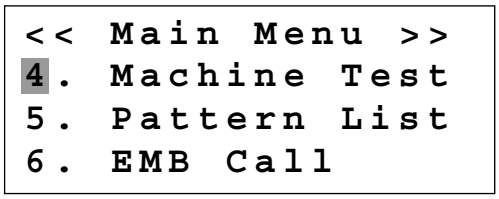
F. Back to the initial screen by pressing ESC key.

(9) Input 1 Test

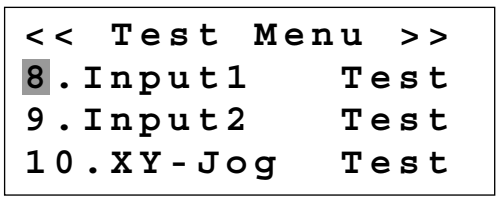
It is to test if peripheral switch input among all input signals works properly.

A. Press MODE key.

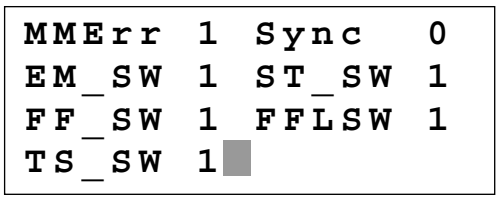
B. After moving to "4. Machine Test" by using direction keys ▲ ▼ , press ENTER ↵ key.



C. After moving to "8. Input 1 Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. Check if the value of EM_SW is changed when we press EMERGENCY STOP switch.
Check if the value of FF_SW is changed when we step on the right pedal switch or ST_SW when we step on the left pedal switch.



E. If you want to finish Input1 test, press ESC key.
If you want to finish test menu, press ESC key.

F. Back to the initial screen by pressing ESC key.

(10) Input 2 Test

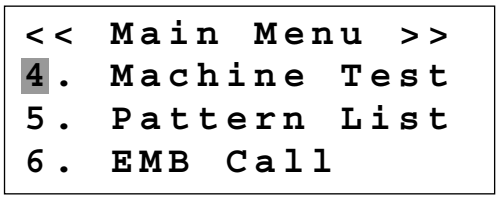
It is to test if auxiliary input signal works properly.

(11) XY Jog Test

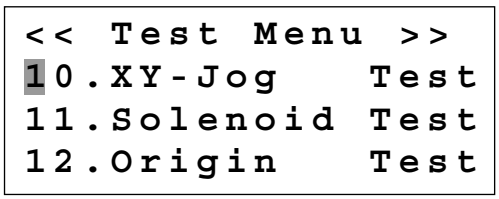
It is a test of X Y step motors operation by manual drive.

A. Press MODE key.

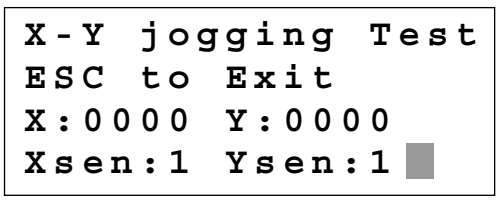
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.



C. After moving to "10. XY-jog Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. If you press direction keys, the position coordinates of X and Y shaft and present position among 4 sections moving to a step each.



E. If you want to finish XY jog Test, press ESC key. If you want to finish test menu, press ESC key.

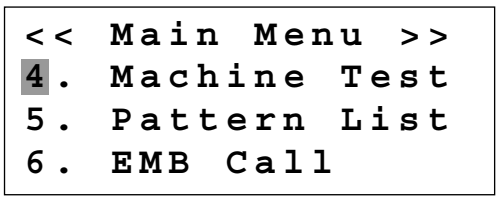
F. Back to the initial screen by pressing ESC key.

(12) Solenoid Test

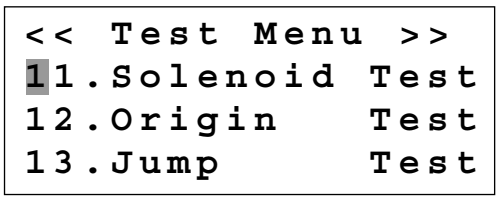
It is to test if each solenoid works properly.

A. Press MODE key.

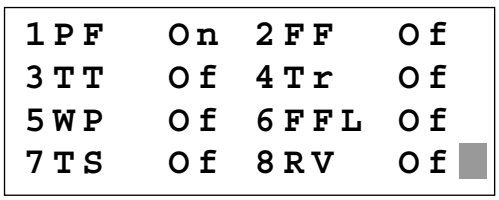
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.



C. After moving to "11. Solenoid Test" by using direction keys ▲ ▼, press ENTER ↵ key.



D. If you press a solenoid number that you want to test, the relevant solenoid repeats turning on and off.



E. If you want to finish Solenoid Test, press ESC key.
If you want to finish test menu, press ESC key.

F. Back to the initial screen by pressing ESC key.

(13) Origin Test

It is to test if the function of moving to origin works properly.

A. Press MODE key.

B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

C. After moving to "12. Origin Test" by using direction keys ▲ ▼, press ENTER ↵ key.

```
<< Test Menu >>
12.Origin Test
13.Jump Test
```

D. If you press any key, the Origin Test is automatically finished after moving to the origin.

```
Origin Test.
Press AnyKey
```

E. If you want to finish test menu, press ESC key.

F. Back to the initial screen by pressing ESC key.

(14) Jump Test

It is to test if the XY step motor works properly and to perform jump test.

A. Press MODE key.

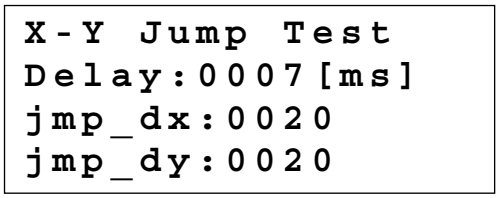
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER ↵ key.

```
<< Main Menu >>
4. Machine Test
5. Pattern List
6. EMB Call
```

C. After moving to "13. Jump Test" by using direction keys ▲ ▼, press ENTER ↵ key.

```
<< Test Menu >>
13.Jump    Test
```

D. Input the time for repeating Jump and transfer distance of XY, then press ENTER↵ key. If you want to test with the factory-installed setting value, just press ENTER↵ key.



E. If you want to finish test menu, press ESC key.

F. Back to the initial screen by pressing ESC key.

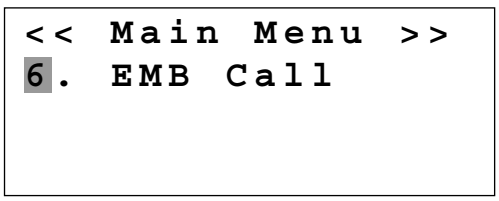
2) It is Able to Convert from Embroidery Design

Enable embroidery work by converting embroidery design into pattern program. After reading in SST type of SWF and DST type of TAJIMA, convert into pattern type and store it on the floppy diskette. Then perform embroidery work by calling the converted pattern type.

A. Insert the floppy diskette with the embroidery design into floppy disk driver.

B. Press MODE key.

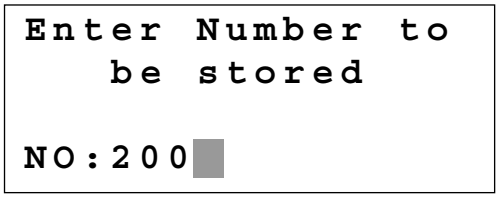
C. Move to "6. EMB. Call" menu by using the direction key ▲ ▼.



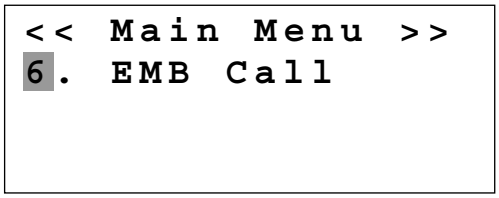
D. Pressing ENTER↵ key, the right screen shall appear and preparation lamp (READY LED) shall flicker. If embroidery design is SST type of SWF embroidery machine, press '0' and if it is DST type of TAJIMA, press '1'.

E. After selecting desired design by using direction key ▲ ▼, press ENTER↵ key.

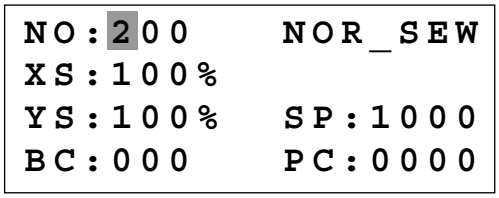
F. After input the pattern number to store, press ENTER↵ key.
(For example, in order to store the pattern no 200, input [2][0][0].)



G. If storage is completed, the screen shall change and the preparation lamp (READY LED) won't blicker any more.



H. Return to initial screen by pressing ESC key. Upon the above process completed, you can use by calling the stored number same as the general pattern.



9

DESCRIPTION ON PARAMETER RELATED TO GENERAL SEWING OPERATION

※ The shadow area indicates factory-installed condition.

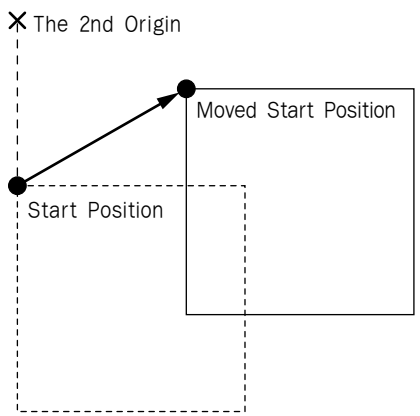
Function No. : 000		Function Name : Manual Operatoin En/Dis
000. Jog En/Dis		It is to set moving of feed plate manually by using direction keys.
Setting Value	1) DISABLE	It is impossible for feed plate to move by using direction keys.
		[Contents] It is impossible to make the feed plate move manually by using direction keys in the sewing available mode. [Caution] It is possible to make the feed plate move manually by using direction keys without having relation to setup, under the condition of pattern programming. It you set up for "Disable", you can't use the Function No 001 'Moving to start position/the 2nd origin by manual drive'.
	2) ENABLE	It is possible to make the feed plate move by using direction keys. (Factory installed condition)
		[Contents] It is possible to make the feed plate move manually by using direction keys in the sewing available mode. [Caution] It is only possible when upper feed plate is down.

<table>
<tr><th colspan="2">Function No. : 001</th><th>Function Name : Moving to start position/the 2nd origin by manual drive</th></tr>
<tr><td colspan="2">001. Jog Mode</td><td>It is to set to move to the sewing start position or the 2nd origin by using direction keys after making the feed plate move manually in the sewing available mode.</td></tr>
<tr><td rowspan="2">Setting Value</td><td>1) PTN__STR__POS</td><td>It is to set up for sewing start position. (Factory installed condition)

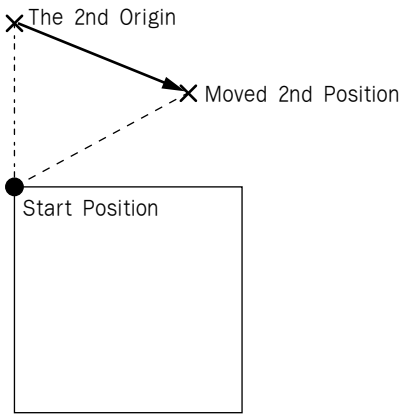
[Contents] Provided that the feed plate moves manually by using direction keys in the sewing available mode, the sewing operation will be started in that point without relation to the programmed sewing start position.

[Caution] Before getting out of the sewing available mode after setup, the sewing operation starts at the position where the feed plate moves manually. However, if you once get out of the sewing available mode, the set sewing available mode becomes unavailable and the machine starts from the sewing operation starts machine for programmed pattern.</td></tr>
<tr><td>2) SECND__ORG</td><td>It is to set up for the second origin.

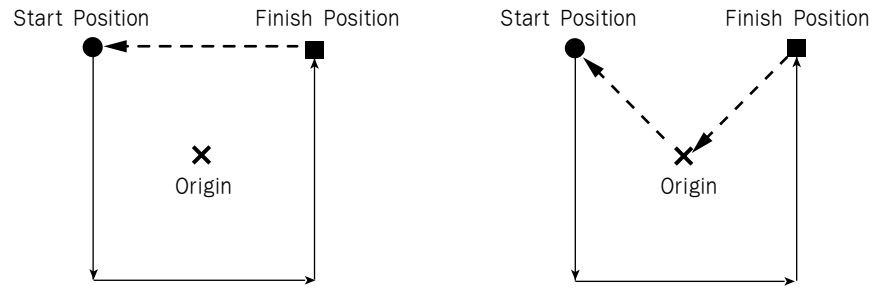
[Contents] Provided that the feed plate moves manually by using direction keys in the sewing available mode, the sewing operation will be started in that point without relation to the programmed the 2nd origin.

[Caution] Before getting out of the sewing available mode after setup, the sewing operation starts as a 2nd position at the position where the feed plate moves manually. However, if you once get out of the sewing available mode, the set 2nd origin becomes unavailable whereas the programmed 2nd origin becomes available.</td></tr>
<tr><td></td><td colspan="2"> 

[Setup for sewing start Position]

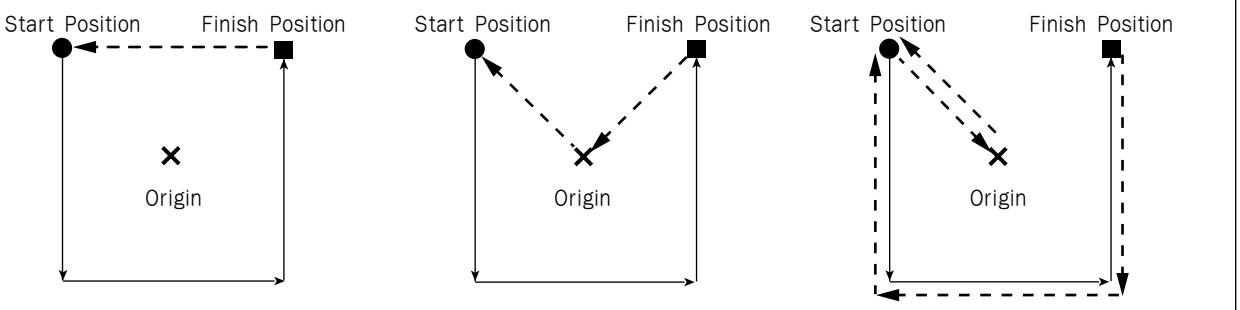
 

[Setup for the 2nd origin]</td></tr>
</table>

Function No. : 002		Function Name : Return to the machine origin after finishing sewing operation
002. Machine Org1		It is to decide whether it moves directly to the sewing start position without passing through the machine origin after finishing sewing operation or it moves to the sewing start position throught the machine origin.
Setting Value	1) DISABLE	It is to move directly to the sewing start position without passing through machine origin. (Factory installed condition)
		[Contents] It moves directly to the sewing start position without passing through machine origin after finishing sewing operation. But if it reads patterns newly, the machine moves to the sewing start position after passing through origin. [Caution] You should set a return mode for sewing start in the Function No. 004 as '1) SHORTEST' for making the above setup available
	2) ENABLE	It is to move to the sewing start position after passing through the machine origin.
		[Contents] The machine moves to the sewing start position after passing through the origin every after finshing sewing
		 [The moves to the start position directly without passing through the machine origin] [The moves to the start position after passing through machine origin

Function No. : 003		Function Name : Return to the origin when limit error occurs
003. Machine Org2		When a feed plate exceed transfer limit during sewing operation, limit error occurs. At this time, if you press ESC key, you can decide whether the machine moves to the sewing start position without passing through the machine origin, or moves to the sewing start position after passing through the machine origin.
Setting Value	1) DISABLE	It is to move directly to the sewing start position without passing through machine origin.
		[Contents] When a feed plate exceed transfer limit during sewing operation, limit error occurs. At this time, if you press ESC key, you can move directly to the sewing start position without passing through the machine origin.
	2) ENABLE	It is to move to the sewing position after passing through the machine origin. (Factory installed condition)
		[Contents] When a feed plate exceed transfer limit during sewing operation, limit error occurs. At this time, if you press ESC key, you can move directly to the sewing start position after passing through the machine origin.

Function No. : 004		Function Name : Return mode to the sewing start position
004. Strt Ret Mod		It is to set the moving mode to the sewing start position after finishing sewing operation.
Setting Value	1) SHORTEST	It is to moves to the sewing start posiiton through the shortest route.(Factory installed condition)
		[Contents] It moves directly to the sewing start position without passing throught machine origin after finishing sewing operation by the shortest route. But if it reads patterns newly, the machine moves to the sewing start position after passing through origin. [Caution] You should set return to the machine origin after finishing sewing operation in the Function No. 002 as '1) DISABLE' for making the above setup avaible.
	2) ORG__TO__STRT	It is to move to the sewing start position after passing through the machine origin.
		[Contents] The machine moves to the sewing start position after passing through the machine origin everytime after finishing sewing.
	3) REV__ORG__STRT	It is to move to the sewing start position after returning to the machine origin by the reverse tracing of sewing patterns.
		[Contents] After finishing the sewing operation, the machhine moves in reverse according to the sewing patterns, then it passes through the machine origin to move to the sewing start position.



[Movement by the shortest route] [Movement after returning to the origin] [Movement after tracing the reverse direction]

Function No. : 005		Function Name : Counting method for bobbin count
005. Bobbin Count		It is to set the counting mode for bobbin counter.
Setting Value	1) UP__COUNT	It counts with rising figures. (Factory installed condition)
		[Contents] Whenever each operation finishes, count the bobbin counter which indicates how many times the machine sews same patterns after winding the bobbin once with rising figures. When you use the bobbin for the first time after winding, set the bobbin counter as "0". As the bobbin runs out, let the bobbin counter remember the figure of that time, and set the counting method as "DN__COUNT' and set the figure as an initial default for bobbin counter. [Caution] It does not indicate the time of bobbin exchange.
	2) DN__COUNT	It counts with getting down figures.
		[Contents] Whenever each operation finishes, count the bobbin counter marked on the LCD screen with getting down figures. Use that after properly setting the initial default of bobbin counter. [Caution] When the bobbin counter reaches "0", sewing operation will be stopped and "Reset Counter" appears to indicate the exchange time of bobbin. Uppon that showing, exchange the bobbin and press ESC, then the initial default of bobbin counter will return to the previous default. The initial default of bobbin counter should be set upon changing the patterns.

Function No. : 006		Function Name : Use of products counter
006. Prodct Count		It is to set use of products counter.
Setting Value	1) DISABLE	It is not to use the products counter
		[Contents] Products counter is not used that informs products quantity whenever each operation finishes figure increases once by one. [Caution] Products counter on the LCD screen is not used.
	2) ENABLE	It is to use the products counter. (Factory installed condition)
		[Contents] Products counter is used that informs products quantity whenever each operation finishes figure increases one by one.

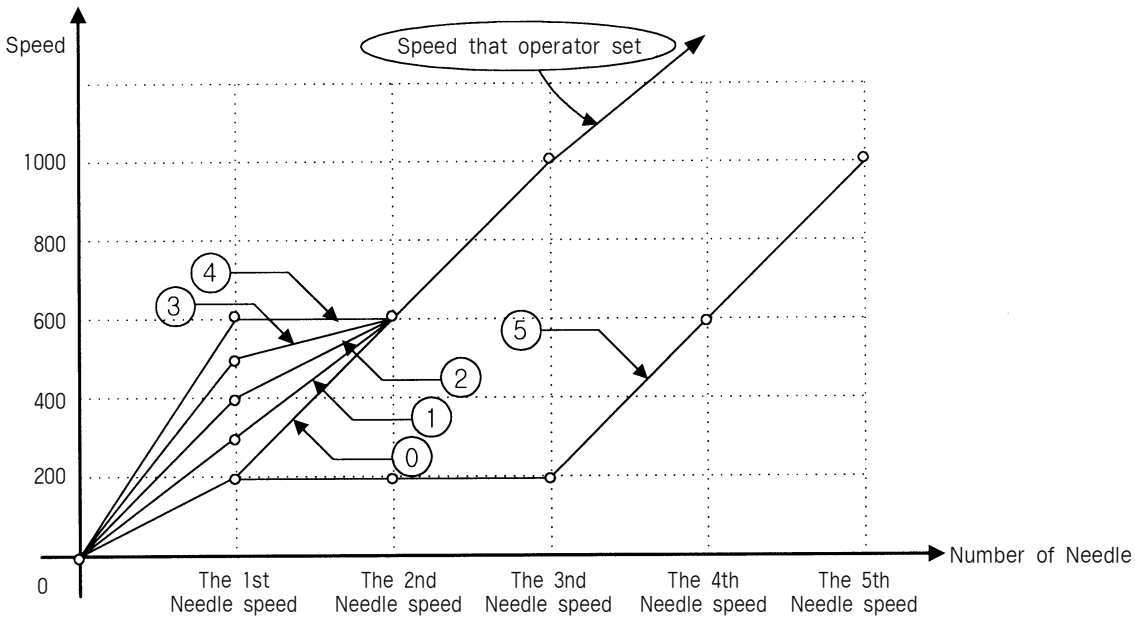
Function No. : 007		Function Name : Time for reading patterns
007. Pattern Read		It is to set the time to read pattern from floppy diskettes or memory.
Setting Value	1) JOB__SETUP	It is available to read patterns just before the preparation for sewing operation.
		[Contents] The machine can read patterns under the condition that ready lamp for sewing operation turns off. Upon reading patterns, the ready lamp for sewing operation turns on and becomes sewing available condition. Under the condition, NO key does not operate. [Caution] After Pressing ENTER key to make the ready lamp turn off, you can read the pattern again.
	2) JOB__READY	It can read patterns even after finishing sewing preparatiion.(Factory installed condintion)
		[Contents] The machine can read patterns in the sewing available mode just as sewing ready lamp turns off. Upon reading patterns, the ready lamp turns on and becomes sewing available condition. Under the condition, if you press NO key, the preparation lamp turns off, and the machine can read the patterns again.

Function No. : 008		Function Name : Trimming during emergency stop
008. Trim EM Stop		It is to set trimming method, either automatic or manual, when you stop the machine by pressing the emergency stop switch.
Setting Value	1) AUTO__TRIM	It is to trim automatically when emergency stop occurs.
		[Contents] The machine performs trimming automatically if you press the emergency stop switch during sewing operation.
	2) MANU__TRIM	It trims by pressing emergency stop switch. (Factory installed condition)
		[Contents] The machine stops if you press emergency stop switch during sewing operation. If you press emergency stop switch one more time to perform trimming after the machine stops. [Caution] If you step on pedal for starting operation under the condition that trimming is not available, the sewing operation will be restarted. The ORIGIN key does not operate.

Function No. : 009	Function Name : Acceleration characteristics of main-shaft speed
009. Slow Start	It is to set acceleration characteristics of sewing speed when sewing operation starts.

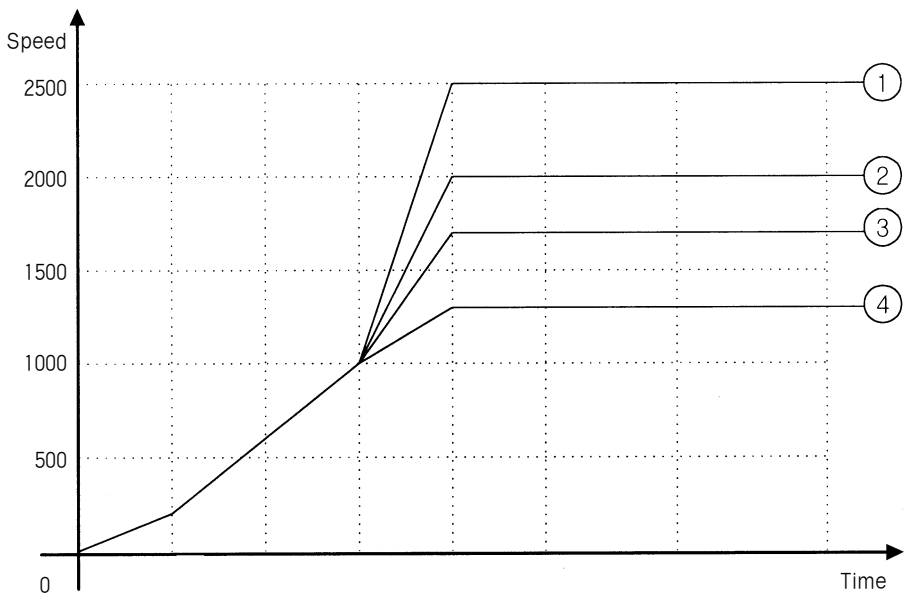
Setting Value

Speed of Needle / Characteristics	The 1st Needle Speed	The 2st Needle Speed	The 3st Needle Speed	The 4st Needle Speed	The 5st Needle Speed	Ref.
1) SLOW_STRT0	200	600	1000			
2) SLOW_STRT1	300	600	1000			
3) SLOW_STRT2	400	600	1000			
4) SLOW_STRT3	500	600	1000			
5) SLOW_STRT4	600	600	1000			
6) SLOW_STRT5	200	200	200	600	1000	For embroidery
	[Caution] When sewing speed that operator set is less than needle speed, the sewing speed has priority.					



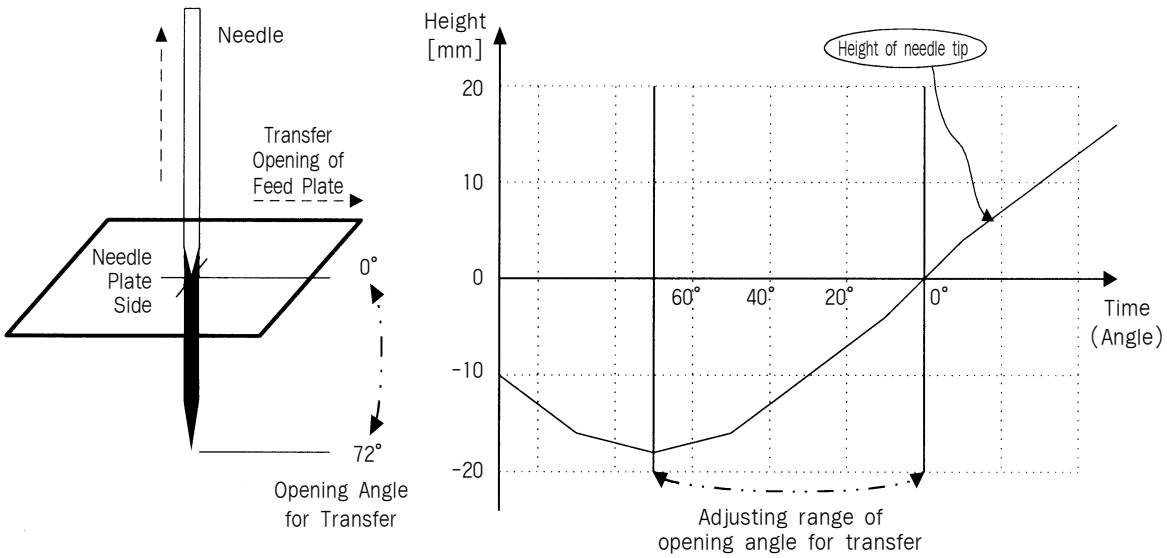
[Acceleration characteristics of sewing speed]

Function No. : 010		Function Name : Limit of maximum sewing speed
010. Max Speed		It limits the maximum speed of sewing machine.
Setting Value	1) 2500spm	It limits the speed under 2500spm. (Factory installed condition)
	2) 2000spm	It limits the speed under 2000spm.
	3) 1700spm	It limits the speed under 1700spm.
	4) 1300spm	It limits the speed under 1300spm.
		[Caution] The sewing speed set within patterns has priority than maximum sewing speed. For example, though the maximum speed of sewing set as 1700spm if the sewing speed within patterns is set as 2100spm, the real speed of sewing is 2100spm.



[Limit of maximum sewing speed]

Function No. : 011		Function Name : Opening angle of feed plate transfer
011. Feed End Pos		It is to adjust an opening angle of feed plate transfer based on needle bar.
Setting Value	0~72°	It is to adjust an opening angle of feed plate transfer according to the thickness of sewing materials. (Factory installed default is 0)
		[Contents] You should adjust the opening angle of feed plate transfer based on needle bar according to the thickness of sewing materials. As seen in the below fig. the opening angle of feed plate transfer indicates relative position of needle tip based on the needle plate side. Set as 0° when the needle tip is positioned on the needle plate side. [Caution] Below figure shows not the real time of feed plate transfer, but an adjustment of time(angle) which an order for feed plate transfer. Until the transfer starts afer transmitting the order of feed plate transfer, delay time exists, so the real time(angle) to start the feed plate transfer is when a needle is positioned on the needle plate side.



[Opening angle of feed plate transfer]

Function No. : 012		Function Name : Operation condition of feed plate when sewing operation finishes
012. FF Operation		It is to set a condition of upper feed plate when the feed plate moves again to the sewing start position afer finishing sewing operation. [Caution] The setup of the Function No. 013 "Descent maintenance of upper feed plate" has a priority.
Setting Value	1) STRT__OPEN	It is to raise the upper feed plate, after moving to the start position under the condition that the upper feed plate is down. (Factory installed condition)
		[Contents] After finishing sewing operation, the upper feed plate moves to the start position under the condition that the upper feed plate is down, and after moving to the start position, you can put into sewing materials with raising upper feed plate.
	2) STRT__HOLD	After moving to the sewing start position, the machine maintains the condition that the upper feed plate is down.
		[Contents] The machine moves to the start position under the condition that the upper feed plate is down, and even after moving to the sewing start position, the condition is maintained. At this time, it is possible to operate the upper feed plate by the foot switch.
	3) OPEN__STRT	It is to move to the sewing start position under the condition that the upper feed plate is up.
		[Contents] The machine moves to the sewing start position after finishing sewing operation under the condition that the upper feed plate is up.
	4) OPEN__STRT1	It is to move to the sewing start position under the condition that the upper feed plate raises to the first stage.
		[Contents] This setup is effective when you use the function for two stage stroke. The machine moves to the sewing start position after finishing sewing operation under the condition that the upper feed plate raises to the first stage in the second stage. After moving, raises the upper feed plate to the end to insert sewing materials.
	5) OPEN__STRT2	It is to move to the sewing start position under the condition that the upper feed plate raises to the second stage.
		[Contents] This setup is effective when you use the function for two stage stroke. The machine moves to the sewing start position after finshing sewing operation under the condition that the upper feed plate raises to the second stage in the second stage.

Function No. : 013		Function Name : Descent maintenance of upper feed plate
013. FF Close En		It is to set descent maintenance of upper feed plate after finishing sewing is down.
Setting Value	1) DISABLE	The machine does not maintain always the condition that the upper feed plate is down.
		[Contents] The machine moves to the sewing start position after finishing sewing operation according to the setup of Function No. 012 "Operatiion condition of feed plate when sewing operation finishes", then the upper feed plate goes up.
	2) ENABLE	The machine always maintains the condition that the upper feed plate is down.
		[Contents] After finishing sewing operation, the machine always maintains the condition that the upper feed plate is down. [Caution] It is impossible to operate the upper feed plate by the foot switch. For raising the upper feed plate, change the setup as DISABLE.

Function No. : 014		Function Name : Signal mode of Pedal 1
014. Pedal 1 Mode		It is to set how to treat signal of pedal 1(pedal for upper feed plate).
Setting Value	1) LATCH	The upper feed plate goes down when you step on a pedal once and take off your foot from the pedal. (Factory installed condition)
		[Contents] If you step on the pedal 1(pedal for upper feed plate) once, the signal is treated as effective one even though you take off foot from the pedal, and the machine maintains the condition that the upper feed plate is down. If you want to raise the upper feed plate, step on the pedal 1 just one more time. [Ref.] As above LATCH means a signal system that if once a signal comes (when you step on a pedal), the signal is treated as an effecitve one though the signal is canelled (even when you take off foot from the pedal).
	2) FLIP	The upper feed plate goes down just when you step on a pedal.
		[Contents] The upper feed plate goes down just when you step on the pedal 1 (pedal for upper feed plate), but if you take off foot from the pedal 1, the upper feed plate goes up again. [Ref.] As above, FLIP means a signal system that the signal is treated as an effective one just when the signal is coming (just when you step on a pedal).

Function No. : 015		Function Name : Signal mode of pedal 2
015. Pedal 2 Mode		It is to set how to treat the signal of pedal 2(Pedal for sewing start).
Setting Value	1) LATCH	Sewing operation starts when you step on a pedal once and take off your foot from the pedal. (Factory installed condition)
		[Contents] If you step on the pedal 2(pedal for sewing start) once, the signal is treated as effective one even though you take off foot from the pedal, and the sewing operation will be started. [Ref.] As above LATCH means a signal system that if once a signal comes(when you step on a pedal), the signal is treated as an effective one though the siganl is cancelled(even when you take off foot from the pedal).
	2) FLIP	The sewing operation performs just when you step on a pedal.
		[Contents] The sewing operation performs just when you step on the pedal 2(pedal for sewing start), but if you take off foot from the pedal 2, the sewing operation will be stopped. [Ref.] As above, FLIP means a signal system that the signal is treated as an effective one just when the signal is coming(just when you step on a pedal).

Function No. : 016		Function Name : Setup for presser foot operation
016. PF Operation		It is to set the operation condition of presser foot.
Setting Value	1) ALWAYS__DN	It is to maintain the presser foot down all the time.
		[Contents] The machine maintains the presser foot down all the time even not in use.
	2) SEW__DN	The presser foot is up except during sewing operation. (Factory installed condition)
		[Contents] The machine goes down the presser foot just when the sewing operation performs. When the sewing operation stops or finishes, the presser foot goes up. [Ref.] If you press 5 key, the presser foot goes down to make thread inserted.
	3) TRIAL__DN	The machine goes down the presser foot in the progress or reverse of one stitch as well as in the sewing operation.
		[Contents] The presser foot goes down not only in the progress and reverse of one stitch but during the sewing operation.

Function No. : 017		Function Name : Setup for descent time of presser foot
017. PF Down Mode		It is to set the descent time of presser foot. [Caution] This function is not available if Function No. 016. "Setup for presser foot operation" sets as 1)ALWAYS__DN.
Setting Value	1) WITH__STRT	The presser foot goes down at the same time as main shaft turns. (Factory installed condition)
		[Contents] When the main shaft turns, the presser foot goes down simultaneously.
	2) WITH__FEED	The presser foot goes down at the same time as the upper feed plate descend.
		[Contents] When the upper feed plate descends, the presser foot goes down simultaneously.

Function No. : 018		Function Name : Setup for wiper operation
018. WP Operation		It is to set the operation and kinds of wiper.
Setting Value	1) ALWAYS__OFF	It is to prohibit the operation of wiper.
		[Contents] Operation of wiper is prohibited. You can set this function when you don't want to use the wiper.
	2) ELEC__TYPE	It is to use wiper electronically. (Factory installed condition)
		[Contents] It is to set use of electronic wiper. [Caution] If the setup is not proper, operation of wiper can be unavailable.
	3) AIR__TYPE	Wiper is used pneumatically
		[Contents] It is set when pneumatic wiper is used. [Caution] If the setup is not proper, operation of wiper can be unavailable.

Function No. : 019		Function Name : Setup for wiper operation position
019. WP Position		It is setup the position of wiper operation. [Caution] This function is not available if Function No. 018. "Setup for wiper operation" sets as 1) ALWAYS__OFF.
Setting Value	1) BET__NEDL__PF	It is to set the position between needle and middle presser foot. (Factory installed condition)
		[Contents] The position of wiper operation is set between needle and middle presser foot.
	2) BELW__PF	It is to set the position under the presser foot.
		[Contents] The wiper is set to operate under the middle presser foot.

Function No. : 020		Function Name : Setup for thread detection
020. Thrd Detect		It is not to set to detect thread [Related functions] Function No. 021 "Thrd. Stitch 1" Function No. 022 "Thrd. Stitch 2"
Setting Value	1) DISABLE	It is not to use the function of thread detection.
		[Contents] The machine does not stop working till pattern working finiches even though thread runs out or cuts.
	2) ENABLE	It is to use the function of thread detection. (Factory installed condition)
		[Contents] If thread runs out or cuts, the machine stops working with a message on the LCD screen.

Function No. : 021		Function Name : Detecting the stitch number in starting sewing
021. Thrd Stitch 1		It is to set the number of stitches when sewing operation starts. [Caution] This function is not available of Function No. 020. "Setup for thread" sets as "1) DISABLE".
Setting Value	0~15	It is to set to detect the number of stitches. (Factory installed condition : "8")
		[Contents] If you start sewing operation under the condition that there's no thread or thread is cut, the machine detects the condition directly and make a decision when operation stops. For example, if you set "0", as soon as the machine detects no thread avaiable, the machine stops operation. [Caution] In case that set value is small, misdetection can occur.

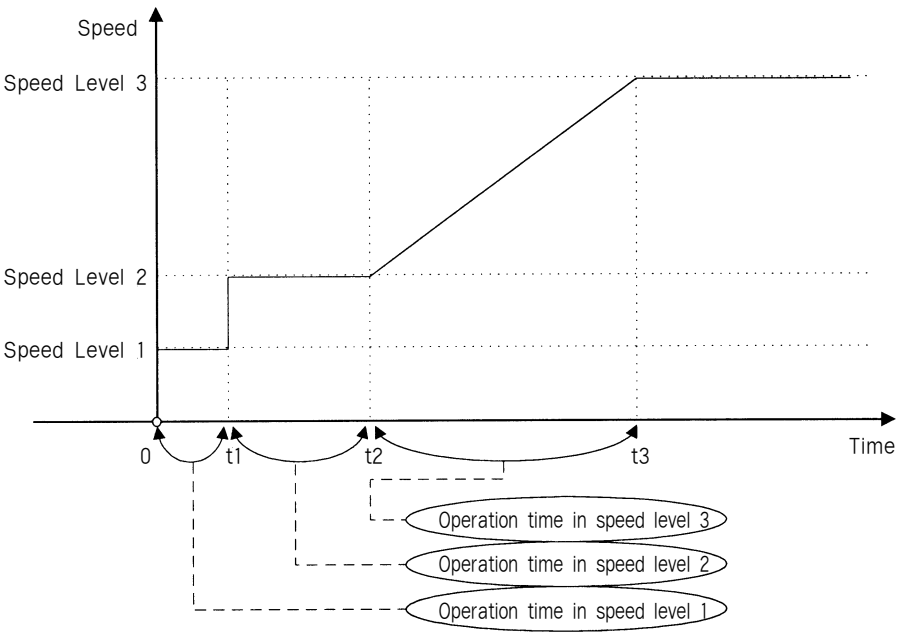
Function No. : 022		Function Name : Detecting the stitch number during sewing
022. Thrd Stitch 2		It is to set the number of stitches during operation. [Caution] This function is not available if Function No. 020. "Setup for thread" sets as "1) DISABLE".
Setting Value	0~15	It is to set to detect the number of stitches. (Factory installed condition : "8")
		[Contents] If thread is cut during operation, the machine detecting the condition directly and make a decision when operation stops, For example, if you set "0", as soon as the machine detects no thread available, the machine stops operation. [Caution] In case that set value is small, misdetection can occur.

Function No. : 023		Function Name : Use of trimming function
023. Trim En/Dis		It is to set if the machine uses the trimming function or not.
Setting Value	1) DISABLE	Trimming function is not available.
		[Contents] If the machine gets trimming code within pattern data or detects thread cut during operation, the machine does not perform the trimming function.
	2) ENABLE	Trimming function is available. (Factory installed condition)
		[Contents] If the machine gets trimming code within pattern data or detects thread cut during operation, the machine performs the trimming function.

Function No. : 024		Function Name : Manual operation time in speed level 1
024. Jog Time 1		It is to set the manual operation of the feed plate to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 1. (Factory installed condition : "400ms")
		[Contents] When the feed plate is manuallley operated by the direction keys, it sets the time for feed plate transfer speed level 1.

Function No. : 025		Function Name : Manual operation time in speed level 2
025. Jog Time 2		It is to set the manual operation of the feed plate to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 2. (Factory installed condition : "1000ms")
		[Contents] When the feed plate is manuallley operated by the direction keys, it sets the time for feed plate transfer speed level 2.

Function No. : 026		Function Name : Manual operation time in speed level 3
026. Jog Time 3		It is to set the manual operation of the feed plate to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 3. (Factory installed condition : "2000ms")
		[Contents] When the feed plate is manuallley operated by the direction keys, it sets the time for feed plate transfer speed level 3.



Function No. : 027		Function Name : Time for function of the speed level 1 key
027. Con Key Tm 1		It is to set the feed plate transfer to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 1. (Factory installed condition:"400ms")
		[Contents] When pressing the FORW, BACK keys continuously to move the feed plate, set the time for the transfer speed at level 1.

Function No. : 028		Function Name : Time for function of the speed level 2 key
028. Con Key Tm 2		It is to set the feed plate transfer to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 2. (Factory installed condition:"100ms")
		[Contents] When pressing the FORW, BACK keys continuously to move the feed plate, set the time for the transfer speed at level 2.

Function No. : 029		Function Name : Time for function of the speed level 3 key
029. Con Key Tm 3		It is to set the feed plate transfer to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 3. (Factory installed condition:"3000ms")
		[Contents] When pressing the FORW, BACK keys continuously to move the feed plate, set the time for the transfer speed at level 3.

Function No. : 030		Function Name : Electric wiper operation time
030. Elc WP On Tm		It is to set the time for the electric wiper operation.
Setting Value	0~1020ms	It is to set the time for the electric wiper operation. (Factory installed condition :"52ms")
		[Contents] When using the electric wiper, set the time for operation. The higher the level, the longer the operation. The wiper may not operate when the time is set too short.

Function No. : 031		Function Name : Electric wiper standby time
031. Elc WP Off Tm		It is to set the standby time for the electric wiper operation.
Setting Value	0~1020ms	It is to set up the standby time until the next operation of the electric wiper. (Factory installed condition : "100ms")
		[Contents] The interval until the next operation after the electric Wiper has operated. The higher the level, the longer the interval between operations. On the other hand, the wiper may not operate, if the level is too low

Function No. : 032		Function Name : Pneumatic wiper operation time
032. Air WP On Tm		It is to set the time for the pneumatic wiper operation.
Setting Value	0~1020ms	It is to set the time for the wiper operation. (Factory installed condition : "100ms")
		[Contents] When using the pneumatic wiper, set the time for its operation. The higher the level, the longer the operation. But when the level is too low, the wiper may not operate.

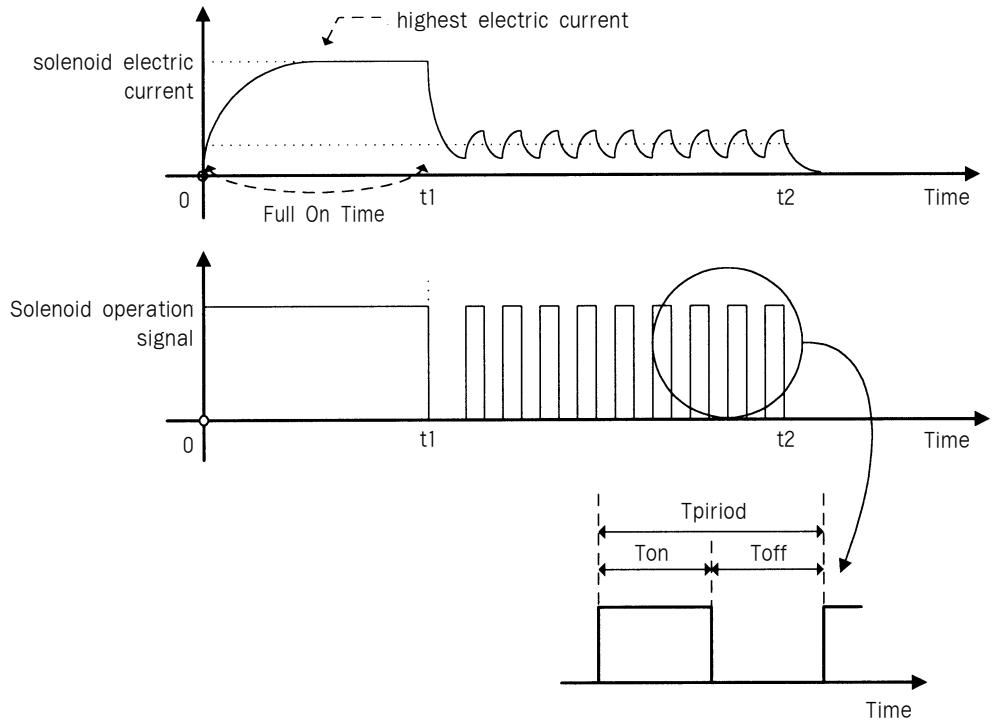
Function No. : 033		Function Name : Pneumatic wiper standby time
033. Air WP Off Tm		It is to set the standby time until the next operation of the pneumatic wiper.
Setting Value	0~1020ms	It is to set the standby time until the next operation of the pneumatic wiper. (Factory installed condition : "100ms")
		[Contents] The interval until the next operation when using the pneumatic wiper. The higher the level, the longer the operation. But if the level is too low, the wiper may not operate.

Function No. : 034		Function Name : Standby time for completely lowered presser foot
034. PF Down Time		It is to set the standby time till the next step after the presser foot has been lowered.
Setting Value	0～1020ms	Set the standby time till the next step after the presser foot has been lowered. (Factory installed condition : "152ms")
		[Contents]

Function No. : 035		Function Name : Standby time for completely uplifted presser foot
035. PF Up Time		It is to set up the standby time till the next operation after the presser foot has been lifted.
Setting Value	0～1020ms	Set up the standby time until the next step after lifting the presser foot. (Factory installed condition : "152ms")
		[Contents]

Function No. : 036		Function Name : Presser foot full on time
036. PF Full On Tm		It is to set the beginning strength of the presser foot solenoid.
Setting Value	0~1020ms	It is to set the time period the highest electric current passes through the solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of electric solenoids, set the beginning strength of the presser foot by adjusting the time period high current flows through (Full on time). [Caution] If set too low, the solenoid may not operate, and when set too high, too much electric current may overheat and damage the solenoid and fuse. [Reference] The operation time and strength of the actuators (presser foot, trimmer, wiper) which use the solenoid, can be adjusted by adjusting the electric current of the solenoid. Full on time is the period when the solenoid's electric current is at the highest point.

0~t1 : Full On Time (Period of highest electric currenct)
0~t2 : Solenoid operation time
t1~t2 : Period when electric current folws from duty



*Duty- $\frac{\text{Ton}}{\text{Tpiriod}} \times 100(\%)$

*Duty is the rate of time the signal light is lighted during a period of time. For example, when the duty is 50%, Ton and Toff are the same.

Function No. : 037		Function Name : Feed plate full on time
037. FF Full On Tm		It is to set the operation beginning strength of the feed plate solenoid.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of feed plates with electric solenoids, the trimming strength at the beginning part can be adjusted by adjusting the Full on time.

Function No. : 038		Function Name : Thread trimming full on time
038. TT Full On Tm		It is to set the time strength of the thread trimming solenoid at the beginning of the operation.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] When thread trimming with electric solenoids, the strength of the trimming operation at the beginning can be adjusted by adjusting the Full on time.

Function No. : 039		Function Name : Thread Retaining Full On Time
039. TR Full On Tm		It is to set the strength of the thread retaining solenoid operation at the beginning.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of thread retaining with electric solenoids, the operation strength at the beginning can be adjusted by adjusting the full on time. [Caution] The function is not used on SPS/A-Series Electronic Control Sewing Machines.

Function No. : 040		Function Name : Wiper full on time
040. WP Full On Tm		It is to set the beginning strength of the wiper solenoid.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of wipers with electric solenoids, the strength of the wiper operation at the beginning can be adjusted by adjusting the Full on time.

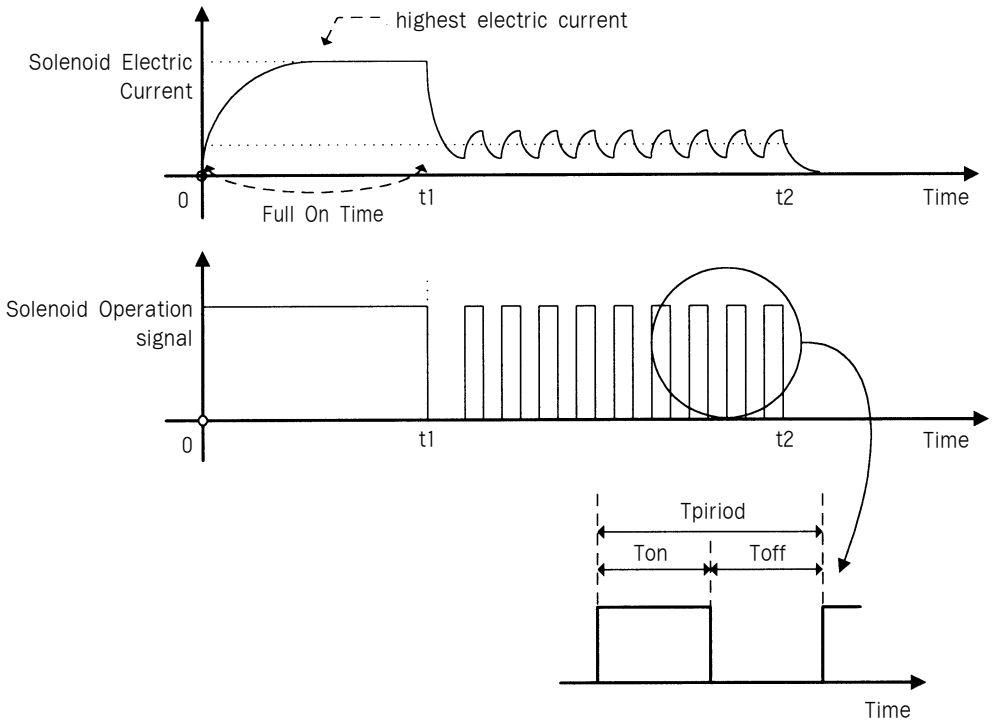
Function No. : 041		Function Name : Left feed plate full on time
041. FFLFull On Tm		It is to set the operation starting power of solenoid in left feed plate.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In case of using solenoid in left feed plate, the machine adjusts the time when the maximum current is permitted to solenoid (Full on time) for setting the power when relevant actuator starts operation.

Function No. : 042		Function Name : 2 step stroke full on time
042. 2SPFull On Tm		It is to set the operation starting power of solenoid in 2step stroke.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In case of using solenoid in 2 step stroke, the machine adjusts the time when the maximum current os permitted to solenoid (Full on time) for setting power when relevant actuator starts operation.

Function No. : 043		Function Name : Inverting device full on time
043. INVFull On Tm		It is to set the operation starting power of solenoid in auxiliary output 2.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In case of using solenoid in auxiliary output 2, the machine adjusts the time when the maximum current os permitted to solenoid (Full on time) for setting power when relevant actuator starts operation.

Function No. : 044		Function Name : Presser foot duty
044. PF Duty		It is to set the maintenance capacity of presser foot solenoid.
Setting Value	30～80%	It is to set the amount of holding current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of presser foot used with electronic solenoids, it sets the power that maintains the raised presser foot by permitting the adjusted current through duty to the solenoid. [Caution] If the default is too small, the solenoid may operate only once and spring back to its origin to make sewing impossible. On the other hand, if it is too large, the solenoid may be overheated and it can lead to the damage of solenoid and fuse. [Reference] As seen in the figure, duty means a rate of time when signal is lighted on during a period of time.

0～t1 : Full On Time (point of highest electric currenct)
0～t2 : Solenoid operation time
t1～t2 : Permissive time of current by duty



$$*\text{Duty} = \frac{\text{Ton}}{\text{Tpiriod}} \times 100\ [\%]$$

*Duty is the rate of time the signal is lighted during a period of time. For example, when the duty is 50%, Ton and Toff are the same.

Function No. : 045		Function Name : Feed plate duty
045. FF Duty		It is to set the maintenance capacity of feed plate solenoid.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoind. (Factory installed condition : 50%)
		[Contents] In case of feed plate used with electronic solenoid, it sets the maintenance power that presses the feed plate by permitting the adjusted current through duty to the solenoid.

Function No. : 046		Function Name : Thread trimming duty
046. TT Duty		It is to set the maintenance capacity of the thread trimming solenoid.
Setting Value	30~80%	It is to set the amout of maintenance current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of thread trimming used with electronic solenoid, it sets the power that keeps trimming operation by permitting the adjusted current through duty to the solenoid.

Function No. : 047		Function Name : Thread retaining duty
047. TR Duty		It is to set the maintenance capacity of the thread retaining solenoid.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of thread retaining used with electronic solenoind, it sets the power that keeps thread retaining operation by permitting the adjusted current through duty to the solenoid.

Function No. : 048		Function Name : Wiper duty
048. WP Duty		It is to set the maintenance capacity of the wiper solenoid.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of wiper used with electronic solenoid, it sets the power that keeps wiper operation by permitting the adjusted current through duty to the solenoid.

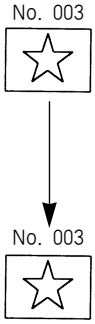
Function No. : 049		Function Name : Left feed plate duty
049. FFL Duty		It is to set the maintenance capacity of solenoid in left feed plate.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid in left feed plate, it sets the power that keeps the relevant operation by permitting the adjusted current through duty to the solenoid.

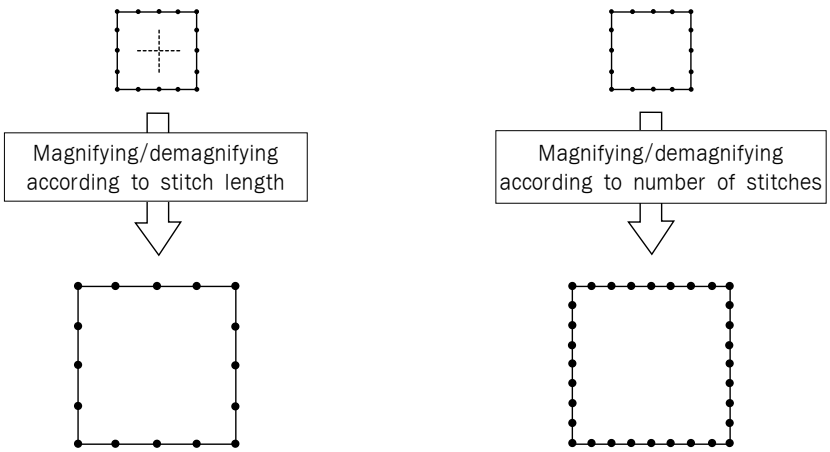
Function No. : 050		Function Name : 2 step stroke duty
050. 2SP Duty		It is to set the maintenance capacity of solenoid in 2 step stroke.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid in 2 step stroke, it sets the power that keeps the relevant operation by permitting the adjusted current through duty to the solenoid.

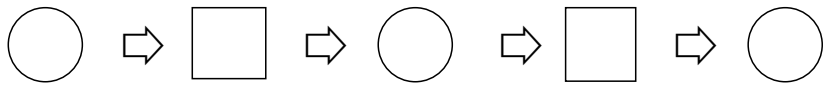
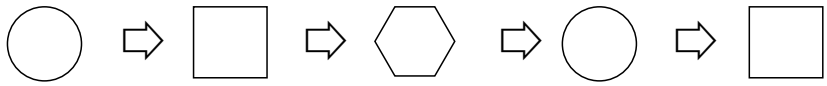
Function No. : 051		Function Name : Inverting device duty
051. INV Duty		It is to set the maintenance capacity of solenoid in inverting device.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid in reverting device, it sets the power that keeps the relevant operation by permitting the adjusted current through duty to the solenoid.

※ If Duty is electronic machine, factory installed condition is 50.

Function No. : 052		Function Name : Pattern data reading mode
052. PTRN RD MODE		It is to set the mode of searching and reading the patterm data.
Setting Value	1) DISABLE	Searches and reads from the floppy diskette. [Contents] When reading a new pattern data, in other words, when the pattern data is being read while the ready lamp is off, the pattern data is searched and read only from the floppy diskette. After a pattern data has once been read from the disk, the data is saved in the internal memory. And the pattern is sewn with the data from the internal memory while the ready lamp is on. [Caution] The work may take long, as it takes relatively long time in reading data from the diskette.
	2) ENABLE	The pattern is first read from the internal memory. (Factory installed condition) [Contents] When a new pattern data is read, it is first searched from the internal memory. If the data does not exist in the internal memory, it is searched and read from the floppy disk. [Contents] When a new pattern is saved in the same index number as the pervious one, it may be saved in the floppy diskette but not in the internal memory. In this case, refer to items 2 to 8 on pattern number identification and deletion, and delete the previous pattern number saved in the internal memory system. But, it should be best to save the second pattern in another index number.

Floppy Diskette	Memory	About the Processes
		There is star pattern No. 003 in the floppy diskette. When the pattern is read, the data is copied and saved into the internal memory. And the pattern is sewn with the data read from the internal memory. In the programming mode, a circle pattern is written and saved as No. 003. When pattern No. 003 is read from the internal memory, the star pattern which had already existed before the circle pattern, is called. As the star pattern is sewn, it seems as though the circle pattern has not been saved in floppy disk.

Function No. : 053		Function Name : Setting the magnifying/demagnifying mode
053. Scale Mode		It is to select and set the magnifying /demagnifying mode.
Setting Value	1) DISABLE	The Magnifying /demagnifying function is not used.
		[Contents] The machine uses the pattern data in the programmed size. As the magnifying/demagnifying function is not selected, the X scale , Y scale keys are not operated. Adjust the "XS" and "YS" indicated on the screen to 100%
	2) STITCH__LEN	It is to set the magnifying/demagnifying mode using the stitch length. (Factory installed condition)
		[Contents] While the number of stitches are the same, the length of the stitches along the X and Y axis are adjusted according to the magnifying/demagnifying rate. Set the rate within the feed plate transfer limit.
	3) STITCH__NUM	It is to set the magnifying/demagnifying mode using the number of stitches.
		[Contents] While the length of stitches are the same, the number of stitches are adjusted along the X and Y axis. Set the rate within the feed plate transfer limit.
		

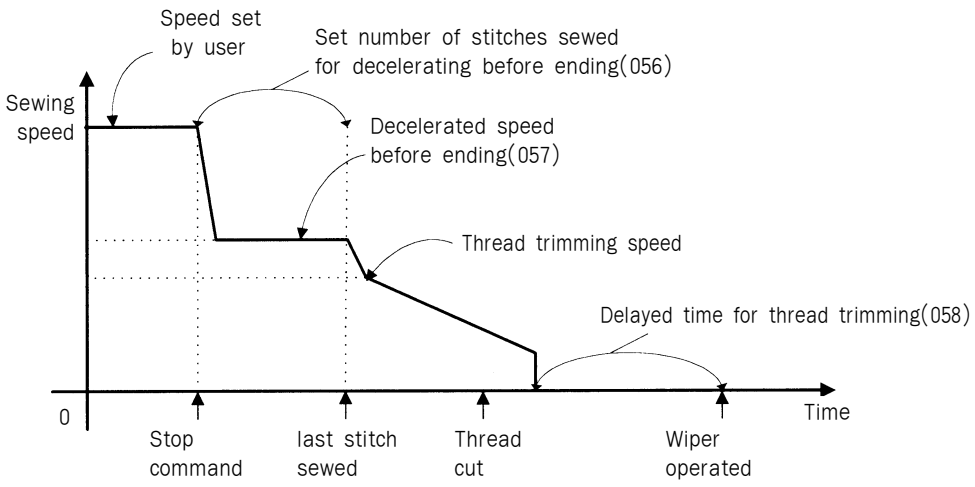
Function No. : 054		Function Name : Number of chain sewings
054. Chain Number		It is to set the sewing mode and number of patterns to chain sew.
Setting Value	0~16	It is to set the number of patterns to chain sew. (Factory installed condition : 0)
		[Contents] When the number is set as "0", one pattern is repeated and the screen indicates "NOR__SEW". When set as other than "0", it is set for chain sewing. This function is used to sew several patterns in certain amount of numbers. The mode is indicated as "CHN__XX" on the screen.
	Number set as 2 	
	Number set as 3 	

Function No. : 055		Function Name : Transferring chain numbers
055. Chain Select		It is to set the mode of stopping one pattern and transferring to the next pattern.
Setting Value	1) MANUAL	The pattern is read and transferred manually.
		[Contents] While chain sewing, the machine stops when the pattern is stopped. Press the ENTER key to read and sew the next pattern.
	2) AUTO	The next pattern is read and transferred automatically.
		[Contents] When a pattern is stopped during chain sewing, the machine stops and the next pattern is automatically read. Sewing can be started by controlling the foot plate switch.
	3) EXTERNAL	The next pattern is read and transferred by an external signal.
		[Contents] After the machine stops when a pattern is stopped during chain sewing, there must be a signal from outside to read the next pattern.

Function No. : 056		Function Name : Number of stitches to decelerate before ending work
056. Decel Stitch		It is to set the stitch number of when to deceleratebefore ending the work.
Setting Value	2~16 Stitch	It is to set the number of stitches when the machine should decelerate. (Factory installed condition : "2")
		[Contents] It is to set the number of stitches when the machine should start decelerating before ending the operation.

Function No. : 057		Function Name : Decelerating speed before ending work
057. Decel SPM		It is to set the speed the machine should decelerate before ending the work.
Setting Value	200~500spm	It is to set the speed to decelerate before ending the work. (Factory installed condition : "400")
		[Contents] The speed must be decelerated before ending the work. The decelerating speed is set here.

Function No. : 058		Function Name : Thread trimming delayed time
058. Trim Delay		It is to set the delayed time before the wiper is operated after the thread is trimmed.
Setting Value	52~1020ms	It is to set the delayed time after thread trimming. (Factory installed condition : "72")
		[Contents] It is to set the delayed time of the wiper operation after the thread has been cut.



[The ending Process of Sewing]

Function No. : 059		Function Name : The selection of the low pressure detecting device
059. Low Pressure		With machines using air pressure, it is selected whether to use the low pressure detecting device or not.
Setting Value	1) DISABLE	Low pressure detecting device is not used. (Factory installed condition)
		[Contents] With machines using air pressure, it is ignored when the pressure of the compressor goes below the principle limit.
	2) ENABLE	The low pressure detecting device is used.
		[Contents] If the pressure of compressure is below regulations, in case pneumatic kinds, the error is marked on the screen to inform users.

Function No. : 060	Function Name : Feed plate control
060. FF Number	The operation control of the feed plate is set as shown in the table below.
	[Contents] The feed plate and operation orders are set according to what kind of machine you have. Set the control order for paused pattern data operations and pedal control of the upper feed plate. [Caution] When the 'pause during operation' code appears, set the upper feed plate control at Function Number 061, "Upper feed plate control when pause" first.

Item / DEFAULT		Upper Reed Plates	Level 2 strokes	Upper feed plate controls for pause	Upper feed plate control with pedal
Setting Value	0	Single body feed plate	×	Feed plate raised and stopped	
	1	Single body feed plate	○	Feed plate raised and stopped	
	2	Two part feed plate	×	Both parts raised and stopped	
	3	Two part feed plate	×	Left side raised and stopped only	
	4	Two part feed plate	×	Right side raised and stopped only	
	5	Two part feed plate	○	Both parts raised and stopped	
	6	Two part feed plate	○	Left side raised and stopped only	
	7	Two part feed plate	○	Right side raised and stopped only	
	8	Two part feed plate	○	Both parts raised and stopped	Right feed plate lowered first
	9	Two part feed plate	○	Left side raised and stopped only	Right feed plate lowered first
	10	Two part feed plate	○	Both parts raised and stopped	Left feed plate lowered first
	11	Two part feed plate	○	Right side raised and stopped only	Left feed plate lowered first
	12	Two part feed plate	×	Both parts raised and stopped	Right feed plate lowered first
	13	Unused			
	. .	Unused			
	. .	Unused			
	31	Unused			

[Caution] Among the items of level 2 strokes, the stroke can be used when idicated.

Function No. : 061		Function Name : Upper feed plate control when paused
061. FF PauseCntl		When a pause code occurs, it is to set the operation condition of the upper feed plate.
Setting Value	1) CLOSE	It keeps the upper feed plate in the lowered position.
		[Contents] When the operations is paused, the upper feed plates are all kept in the lowered position. In this case, the upper feed plates can be controlled with the pedal.
	2) OPEN	It keeps the upper feed plate in the raised position.
		[Contents] When paused during operation, the upper feed plates are all kept in the raised position. In this case, the upper feed plates can be controlled with the pedal.
	3) FF__NUMBER	Follow the instructions in 060 : "Upper Feed Plate Control When Paused" (Factory installed condition)
		[Contents] Follow the instructions in 060 : "Upper Feed Plate Control When Paused"

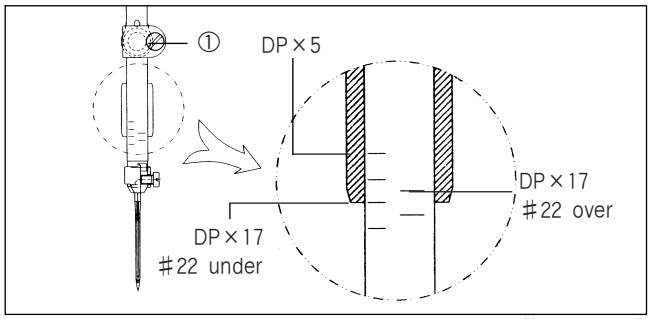
10

HOW TO REPAIR THE MACHINE

Caution	The machine is set to be the best condition at the factory. Do not make any discrete adjustments on the machine and replace genuine parts approved by the company only.

1) Adjusting the Height of the Needle Bar

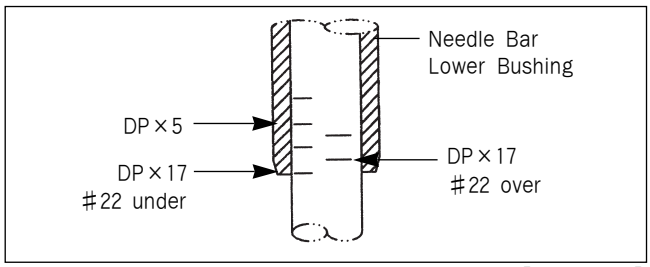
When the needle bar is at its lowest position, unfasten the needle bar holder screw ①. Adjust the desired height by making the specified upper carving line fit in with the needle bar bushing. Then, tighten the needle bar holder screw back on firmly.



[Fig. 30]

2) Adjusting the Needle and the Shuttle

A. Have the lower carving line for the needle that is applied when the needle bar goes up fit in with the lower side of the needle bar bushing as shown in the picture.



[Fig. 31]

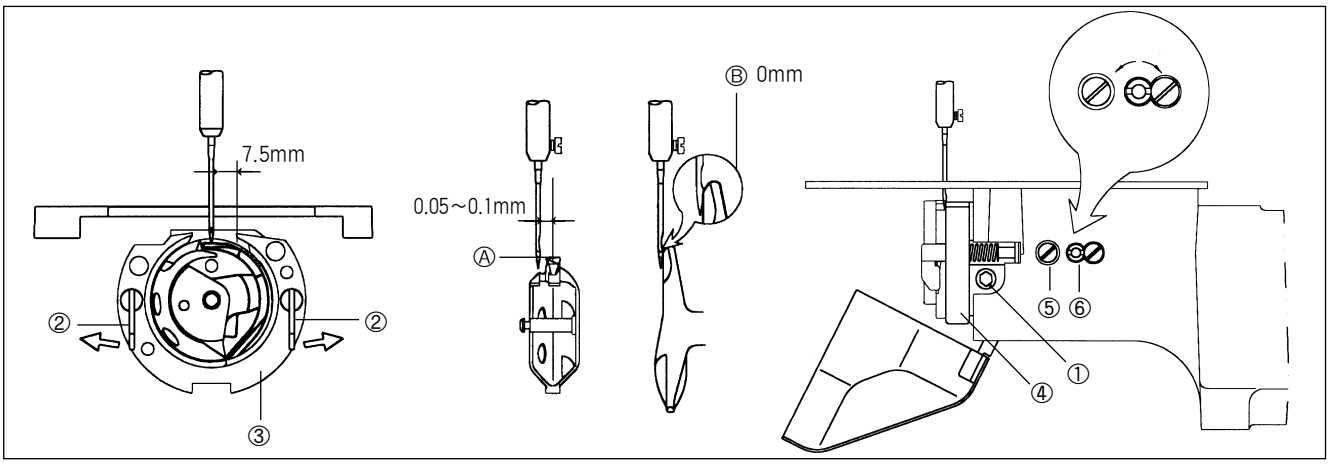
B. After unfastening the shuttle drive screw ①, open the inner hook pressure bar ② left to right and remove the shuttle Race ring ③ from the (large) shuttle ④.

C. Make the shuttle hook point Ⓐ accord with the center of the needle. And make the needle and the front face of the shuttle drive Ⓑ connect each other to prevent the needle from curving. Then, tighten the drive screw ① firmly.

D. After unfastening the (large) shuttle screw ⑤, turn the large hook adjustment shaft ⑥ to the left to right and adjust the (large) shuttle ④ so that the needle and the shuttle hook point Ⓐ is 0.05~0.1mm apart from each other.

E. After adjusting the (large) shuttle ④ in place, adjust the rotary direction of the (large) shuttle ④ so the needle and the (large) shuttle ④ is 7.5mm apart from each other. Then, tighten the (large) shuttle screw ①.

[Caution]
For safety, make sure all the screws are tightened firmly after adjusting the (large) shuttle.



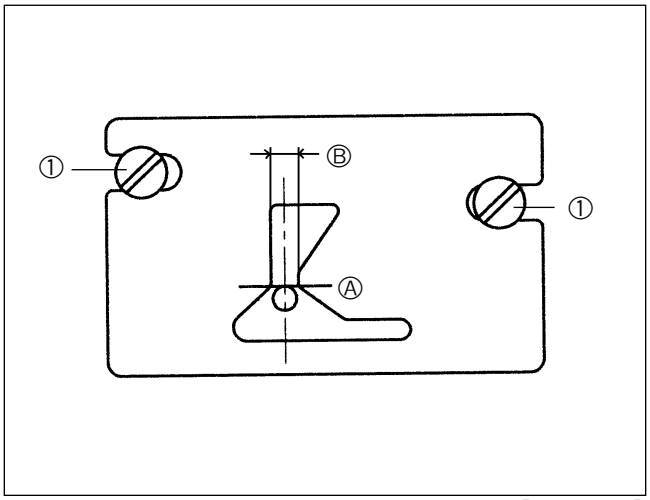
[Fig. 32]

3) Adjusting the Spring on the Upper Side of the Shuttle

After removing the lower feed plate and the needle plate from the machine, unfasten the screw of the spring on the upper side. Then, adjust the spring on the upper side of the shuttle so that the backside of the needle and comes to point Ⓐ in the vertical direction, and the center of the needle will come to the middle of interval Ⓑ horizontally. After the adjustment is done, tighten the screw back on firmly.

[Caution]

The thread may be disconnected or the thread strand may be unfastened if there are scratches or if the surface is rough around the spring groove on the upper side of the shuttle. Always check the surface of the spring before operating the machine.



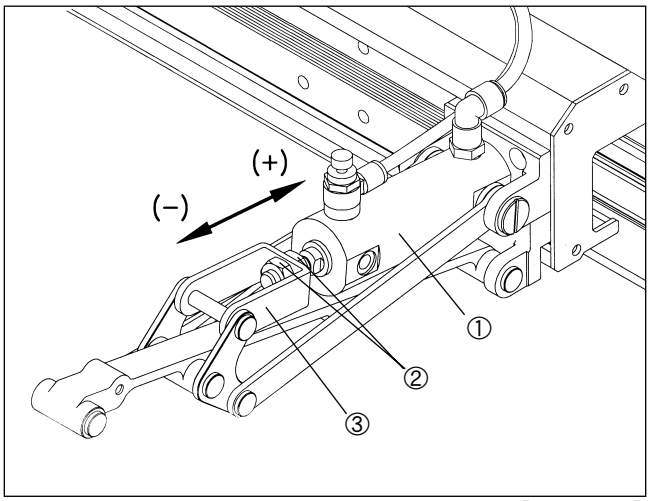
[Fig. 33]

4) Height Adjustment of Feed Plate

Unscrew fixing nut ② located at the end of axis of air cylinder ① located in the right and left of upper clamp device, move the cylinder knuckle ③ to cylinder axis, then, amount of rise increases and moving to the counter direction, the amount of rise reduces. After moving the cylinder knuckle to proper location, fix the fixing nut firmly.

[Caution]

Unless the amount of rise of upper clamp device in the right and left make equal, it may become the cause of damage to the machine.



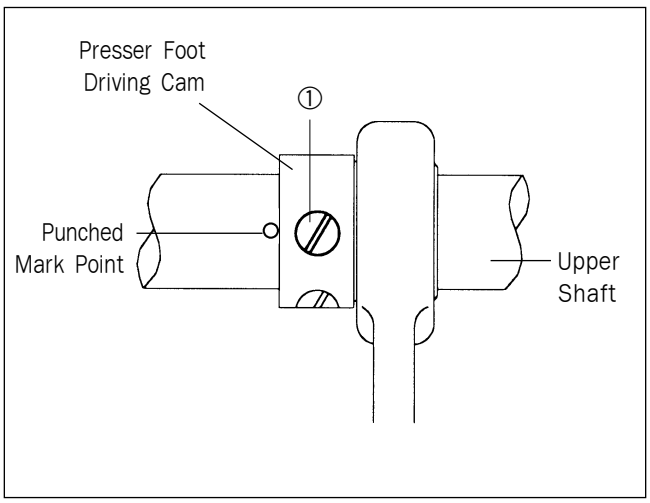
[Fig. 34]

5) Adjustment of Presser Foot

A. Adjustment of Presser Foot Driving Cam
Place the driving cam that end point of presser foot driving cam and end of punched mark of No. 1 joint screw① of cam and the punched mark of the upper shaft to be matched and then fasten the joint screw①.

[Caution]

If the location of presser foot driving cam is not proper, timing of rise and descending of presser foot does not meet and so it may cause collision of needle bar and presser foot.



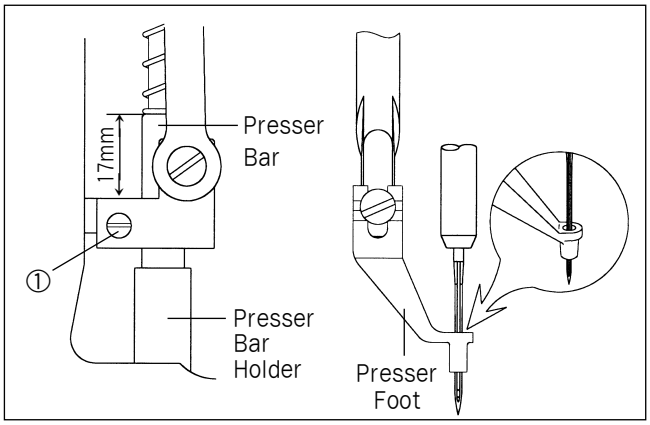
[Fig. 35]

B. Height Adjustment of Presser Bar

Adjust the presser bar that end of presser bar should come out about 17mm from presser bar handle and check if the needle passes through center of presser bar. If checking ends, fasten joint screw①.

[Caution]

Fasten joint screw① of presser bar with the pressure about 40-45kgf/㎠. If connection pressure is excessive, it becomes cause of deformation of presser bar and cause trouble to machine operation.



[Fig. 36]

C. Adjustment of Presser Foot Adjusting Arm

a) Unscrew location link stopper screw to make space between location link stopper④ and fixing stud screw of presser foot motion link③.

b) After unscrewing fork link joint screw① and placing stud screw of presser foot link to the right side of presser foot adjusting arm, fasten stud screw② of presser foot link tightly.

c) Place the needle bar to the lowest point by turning the hand pulley.

d) Raise the presser bar so that the distance between presser bar handle and presser bar bushing is to be 4mm and fasten the joint screw① of fork link tightly.

[Caution]

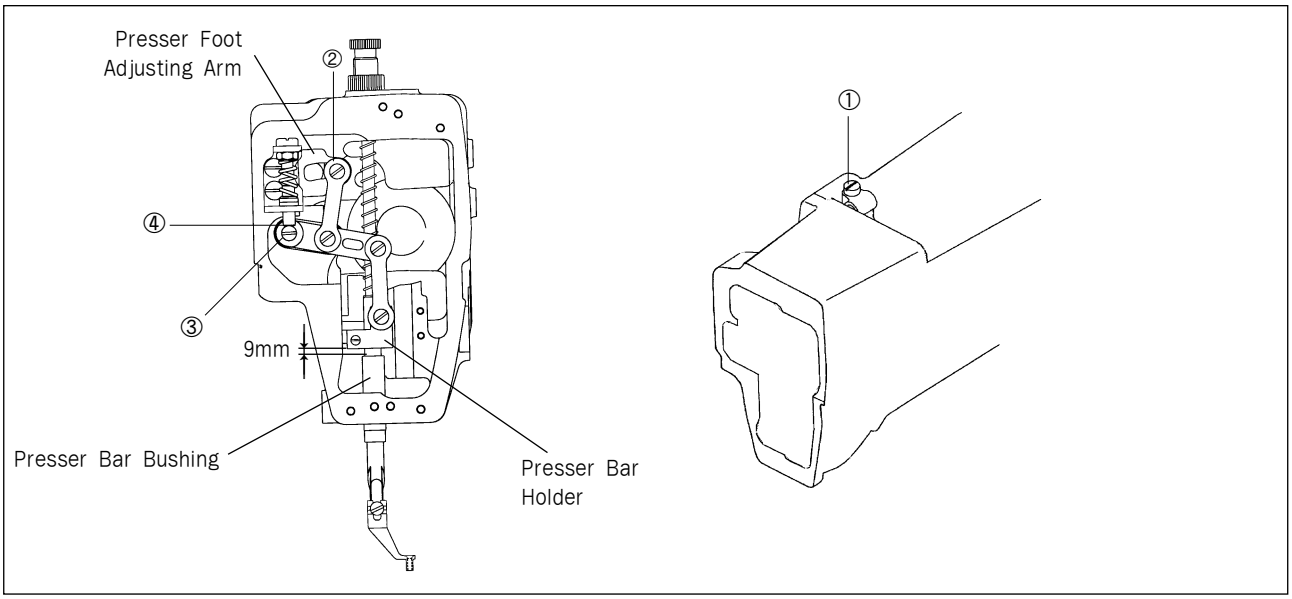
If there is space between presser bar handle and presser bar bushing, interference and noise is occurring during machine operation. Screws are not fastened tightly after adjustment; it can cause breakage during operation.

e) Adjust so that location link stopper④ and fixing stud screw of presser foot motion link③ get close by turning stopper screw of location link.

[Caution]

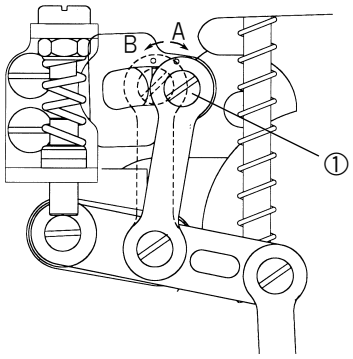
If fixing stud screw③ of presser foot motion link and end of the location link stopper ④ did not get perfectly close, trembling phenomenon occurs during operation and noise can increase.

f) After fastening fork link joint screw① tightly, check if there is play to vertical direction in presser foot adjusting arm. Checking fastening status of screws, adjust presser foot stroke.



[Fig. 37]

D. Adjustment of Presser Foot Stroke(Adjustment of Presser Foot UP/DOWN Motion)
After unfastening stud screw① of presser foot adjusting arm, placing it to A direction, presser foot stroke increases. Placing to direction B, stroke decreases.(It is set to 4mm at the moment of factory shipping).



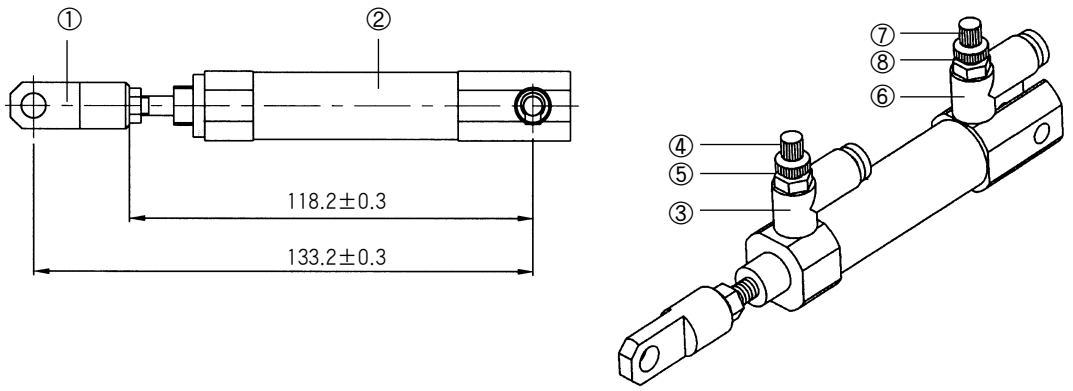
[Fig. 38]

6) Adjustment of Presser Foot Related Parts

A. Make the distance of hole center of cylinder knuckle ① and hole center of presser foot lifting cylinder as shown in the figure.

B. Rising speed of presser foot increases if turning the handle ④ of speed controller ③ of presser foot lifting cylinder to clockwise direction. and turning to counter clockwise direction, the rising speed increases. After adjusting to proper speed, fix with fixing nut ⑤.

C. Descending speed of presser foot decreases if turning the handle ⑦ of speed controller ⑥ of presser foot lifting cylinder to the clockwise direction and turning to counter clockwise direction, descending speed decreases. After adjusting to proper speed, fasten the fixing nut ⑧.

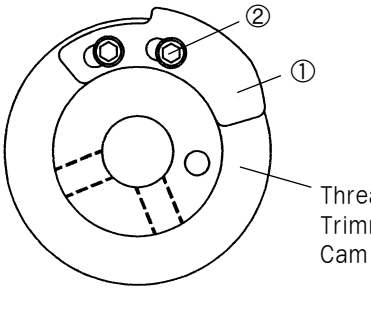


[Fig. 39]

7) Adjusting Accessories for Thread Delay

A. How to set the thread delay notch.
Place the notch so that the right side of the slot of the thread delay notch ① touches circumference of the notch screw ②, and then fix with a screw.

[Caution]
The remaining amount of thread may not be enough or not be regular and the thread may be unfastened from the needle if the notch is not set in the right position.



[Fig. 40]

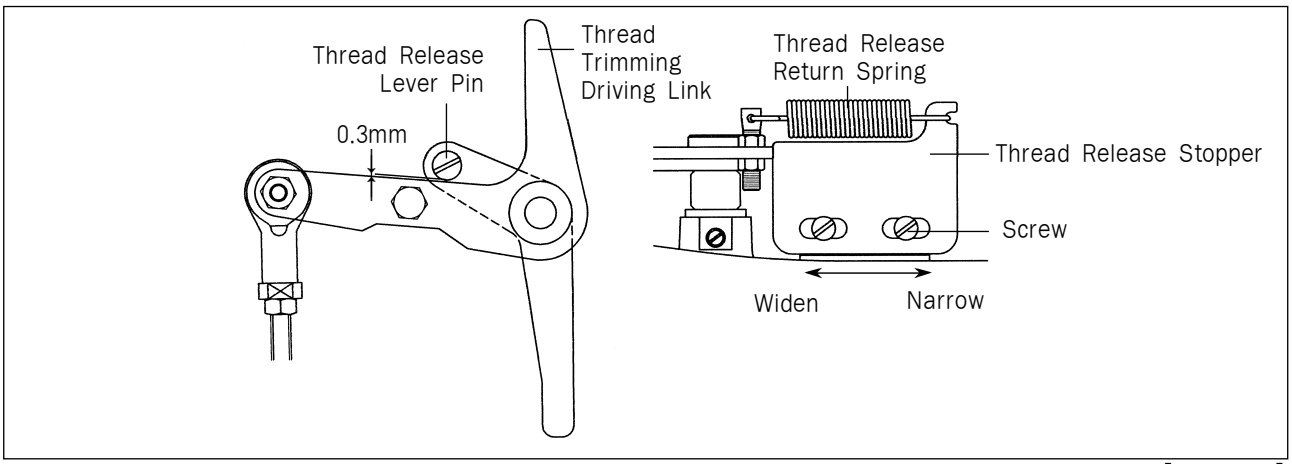
B. How to set the thread release stopper

ⓐ Remove the thread release return spring.

ⓑ After unfastening the thread release stopper screw, adjust the trimming drive link and the thread release lever pin 0.3mm apart from each other. Then, attach the arm to the thread delay stopper completely. When the thread release stopper is pushed to the right, the space between the trimming drive link and the thread release lever pin is reduced. And it is enlarged when the stopper is pushed to the left.

ⓒ Hang on the thread release return spring.

[Caution]
Use a tool when removing or attaching the thread delay spring to prevent accidents.



[Fig. 41]

C. How to adjust the opening capacity of the thread guide disk

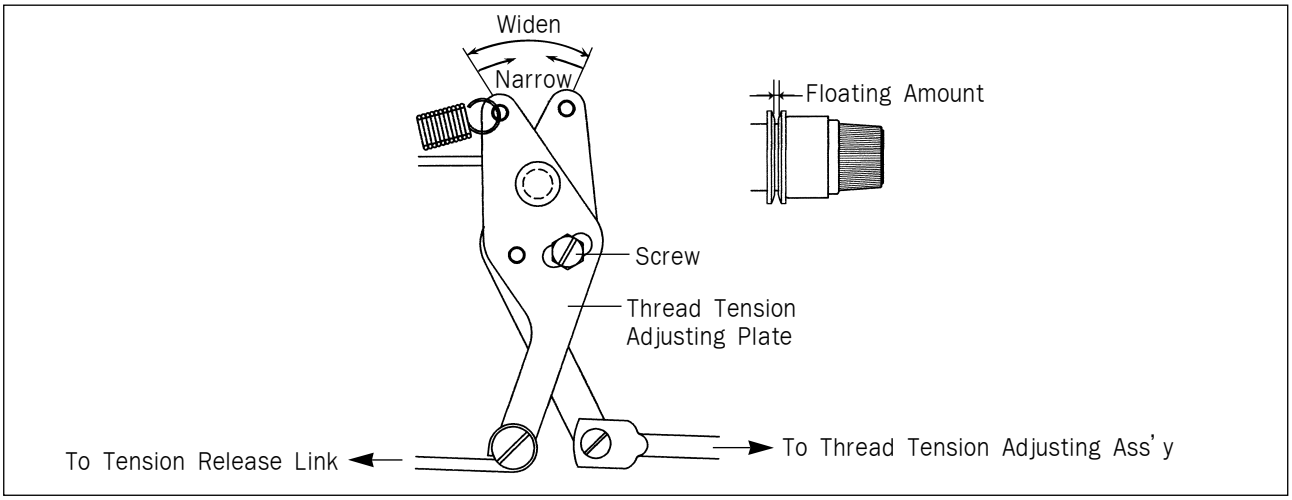
ⓐ Unfasten the thread release adjusting plate screw.

ⓑ Open the thread guide disk by operating the trimming devices.

ⓒ Adjust the opening capacity to 0.6~0.8mm for normal material and 0.8~1mm for heavy material. To increase the opening capacity, widen the angle between the thread release plate and narrow the angle to reduce the opening capacity.

ⓓ Tighten the screw after the adjustment.

[Caution]
If the disk is not opened appropriately, the amount of remaining thread may be not enough or not regular, and the disk may not be closed completely.



[Fig. 42]

8) Adjusting Parts for the Wiper

A. Adjustment method of wiper location

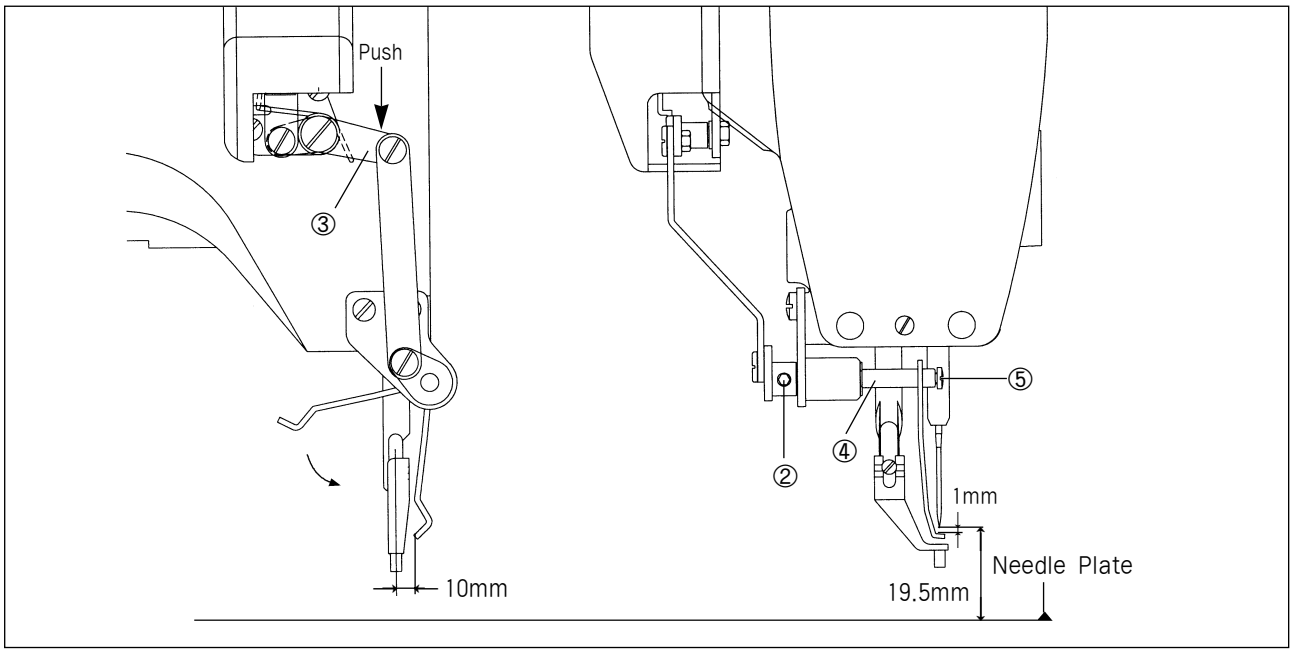
ⓐ When height of needle end on needle plate is 19.5mm, unscrew wiper crank joint screw.

ⓑ After pressing wiper rolling link ③, adjust wiper shaft ④ that the next wiper and needle get separated about 10mm.

ⓒ Fasten wiper crank joint screw ②.

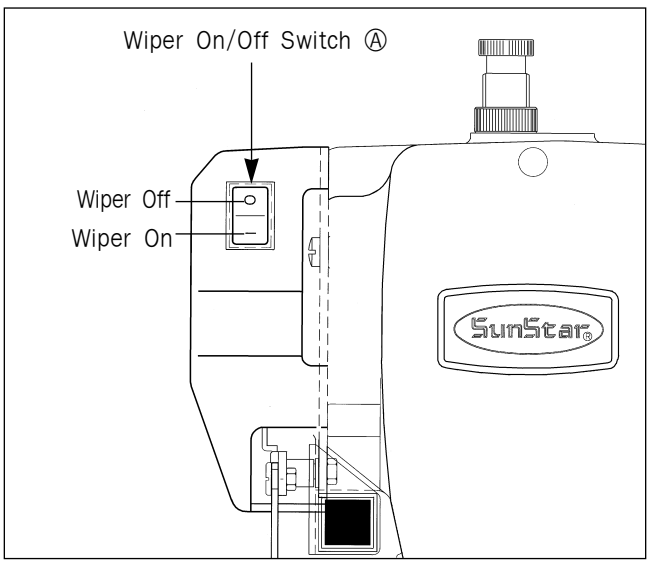
ⓓ After adjusting the gap between wiper bottom and needle end becomes about 1mm by unfastening wiper joint screw ⑤, fasten wiper joint screw tightly.

[Caution]
If the wiper is not placed in the right position, the wiper may collide with the presser foot or needle during the operation, and the wiper may not move properly.



[Fig. 43]

B. Wiper on/off switch
If you want to use the wiper, press the Wiper On/Off Switch Ⓐ —, if you don't, press the Wiper Operating Switch Ⓐ O.



[Fig. 44]

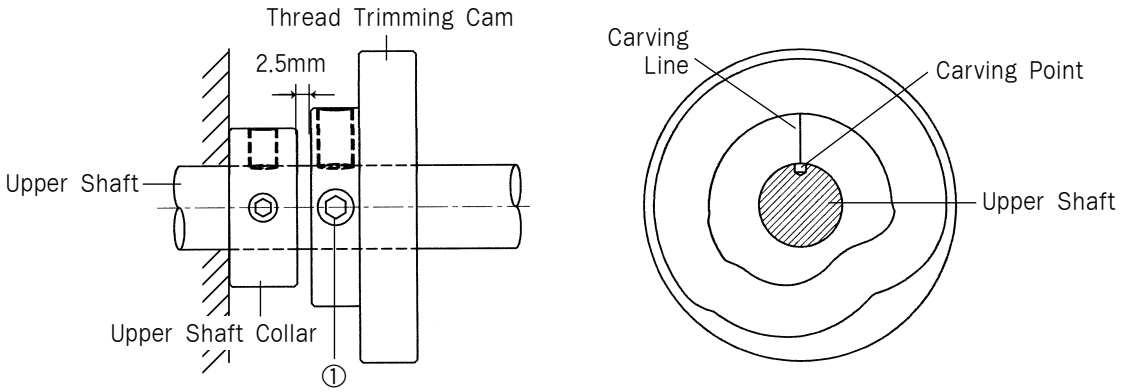
9) Adjusting the Thread Trimming Accessories

A. Setting the position of the thread trimming cam

Set the upper shaft collar and the thread trimming cam 2.5mm apart from each other and place the trimming cam where the trimming cam carving line accords with the upper shaft carving point. Then, tighten screw ①.

[Caution]

If the thread trimming cam is not placed in the right position, the thread trimming operation may not be made correctly or the machine may be lock.



[Fig. 45]

B. How to adjust the link stopper

ⓐ With the needle bar in its lowest position, check if there is enough clearance between the thread trimming cam roller and both ends of the thread trimming cam when the thread trimming drive link is pushed in the direction of the arrow(⇐) within the thread trimming cam moving part.

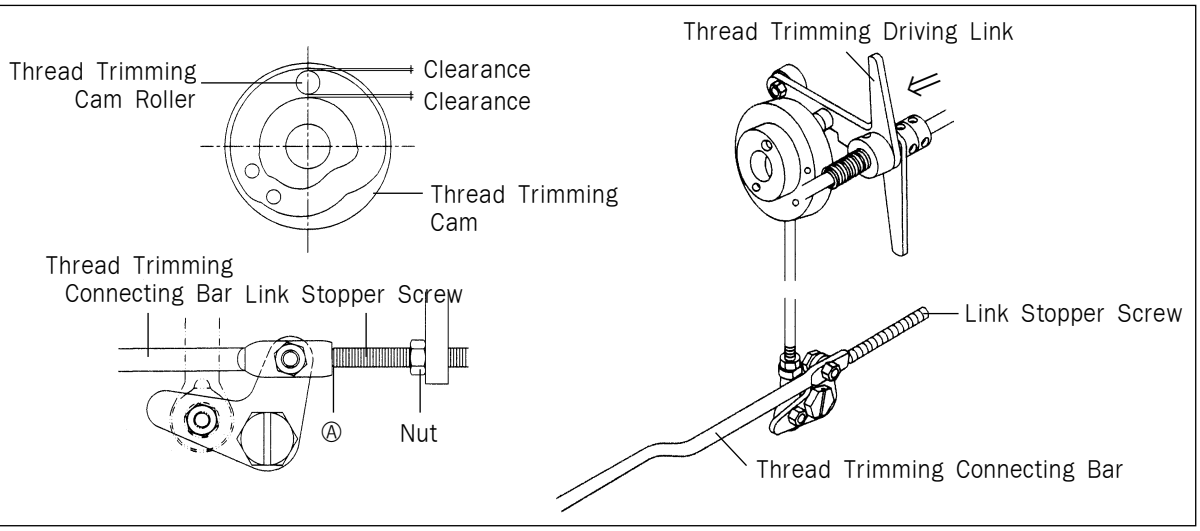
[Caution]

If there is not enough clearance between the thread trimming cam roller and both ends of the thread trimming cam, thread trimming may not be operated correctly or the machine may be lock when beginning to sew or thread trimming.

ⓑ Make the end of the link stopper screw touch part Ⓐ of the thread trimming link stick when the trimming cam roller is inserted into the thread trimming cam moving part. Then, tighten the nut.

[Caution]

If the position is not set appropriately, the return to the previous point after thread trimming may be delayed and the first stitch may not be tight enough.



[Fig. 46]

C. Setting the thread trimming shaft in place

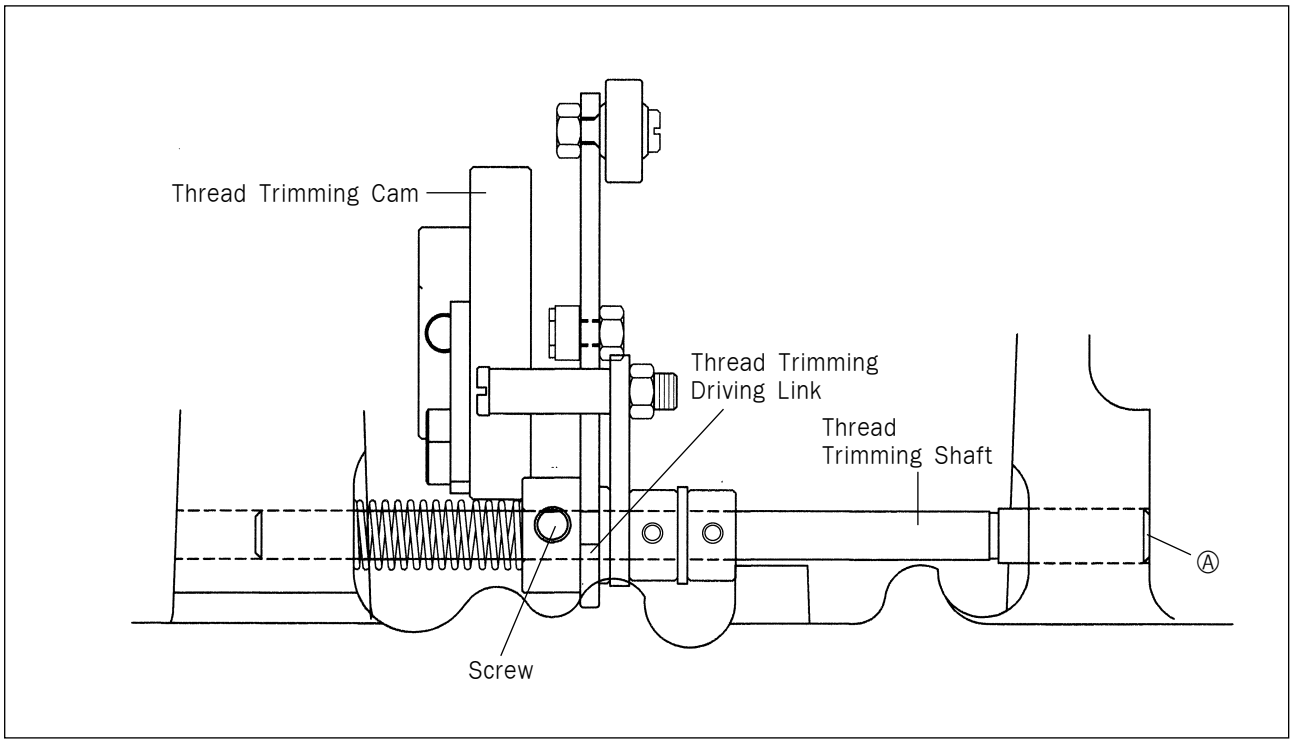
ⓐ Unfasten the thread trimming drive link screw and the trimming shaft collar screw.

ⓑ Make the thread trimming shaft tip accord with part Ⓐ of the arm.

ⓒ Tighten the screws.

[Caution]

If the position is not adjusted appropriately, thread trimming may not be operated correctly or the machine may be lock.



[Fig. 47]

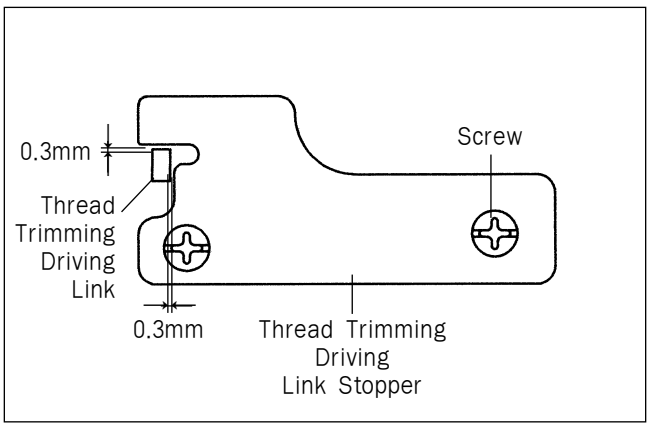
D. Setting the link stopper in place

ⓐ Unfasten the thread trimming drive link stopperscrew while thread trimming is not operated and have the thread trimming drive link and the thread trimming drive link stopper notch 0.3mm apart from each other.

ⓑ Tighten the screw.

[Caution]

If the link stopper is not set in the right position, thread trimming may not be operated correctly and the machine may be lock.



[Fig. 48]

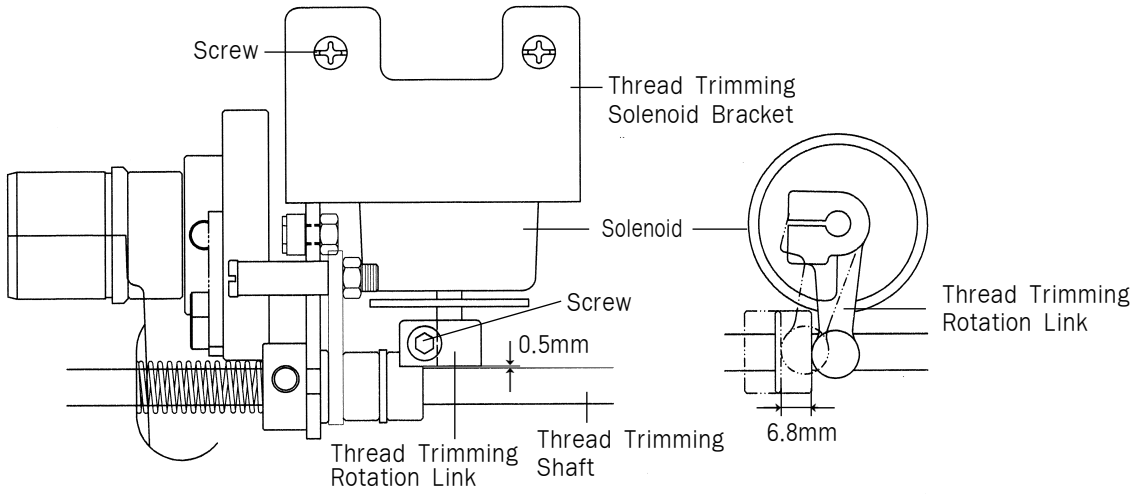
E. Setting the thread trimming solenoid in place

ⓐ After unfastening the thread trimming solenoid bracket screw, have the thread trimming shaft and the thread trimming solenoid rotary link 0.5mm apart from each other and tighten the screw back on.

ⓑ Unfasten the thread thread trimming solenoid rotary link screw and drive the thread trimming solenoid rotary link manually to move the trimming shaft collar 6.8mm in the direction of the arrow. Then, tighten the screw back on.

ⓒ Check if the thread trimming shaft collar returns to its place when the thread trimming solenoid rotary link returns.

[Caution]
If the position is not set right, the thread trimming return or the thread delay may be delayed to bring poor sewing quality.



[Fig. 49]

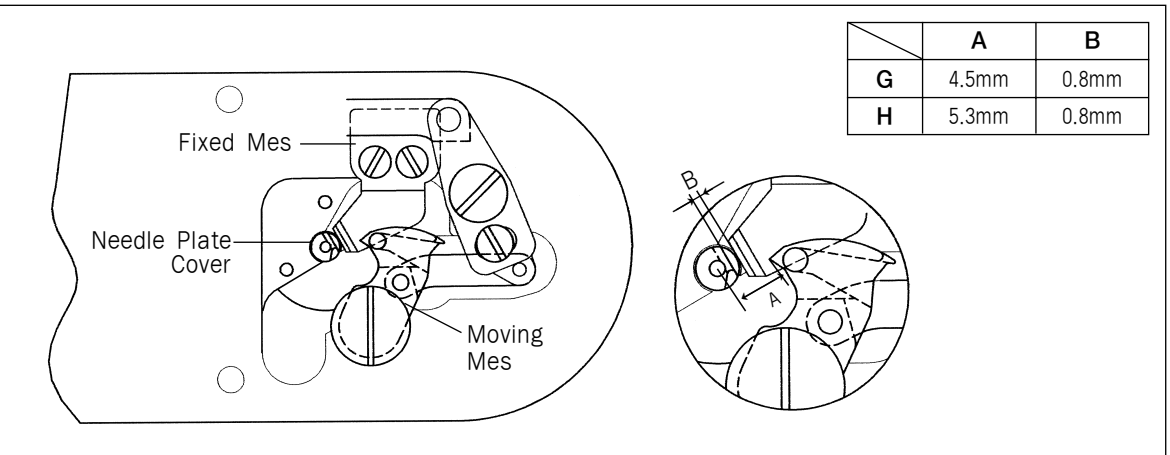
F. Adjusting the moving mes and the fixed mes

ⓐ When the needle bar stops at the upper position, use the thread trimming lever adjustment screw to adjust space A between the thread separation point of the moving mes and the throat plate hole as indicated in the table.

ⓑ Use the fixed mes screw to adjust space B between the fixed plate and the throat plate cover as indicated in the table.

ⓒ after the adjustment, check the position of the mes by manual thread trimming operation.

[Caution]
Thread trimming may not be operated or there may not be enough remaining thread if the mes is not set appropriately.



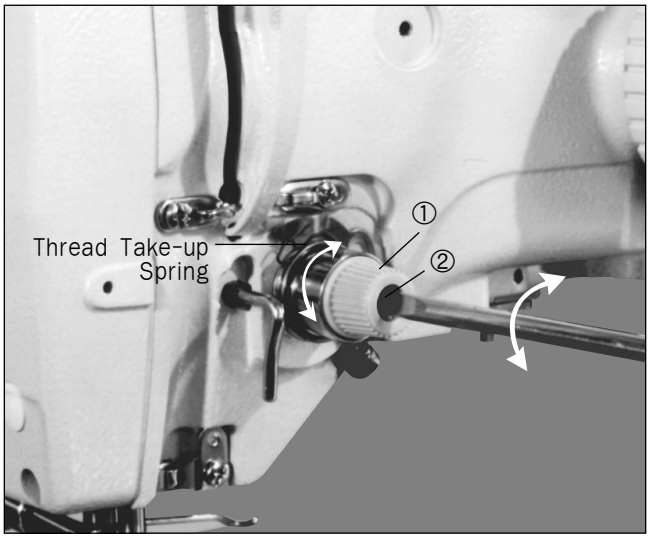
	A	B
G	4.5mm	0.8mm
H	5.3mm	0.8mm

[Fig. 50]

10) Adjusting the Main Thread Control Device

A. When the tension control nut ① of the thread control device is turned clockwise, the upper thread is tightened and becomes loose as the nut is turned counterclockwise. Adjust the tension according to the sewing conditions such as material, thread, number of stitches etc.

B. To tighten the take-up lever spring, use a driver to turn the groove ② on the edge face of the thread tension control device shaft clockwise. And to make the spring relax, turn it couner-clockwise.



[Fig. 51]

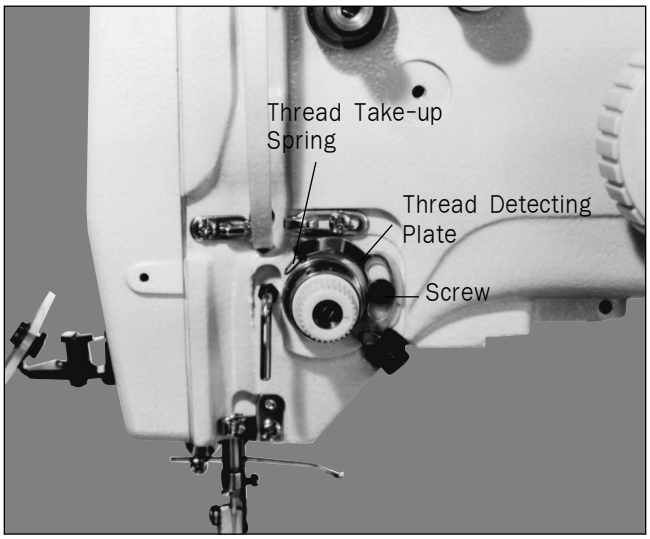
11) Adjusting the Upper Thread Detecting Device

A. Unfasten the thread detecting plate screw with the thread off the take-up spring and make the take-up lever spring touch the detecting plate. Then, tighten the screw.

B. Be sure to adjust the detecting plate so the take-up lever spring and the detecting plate will connect with each other even when the take-up lever spring stroke changes.

[Caution]

Be careful not to touch with any other metals except take-up lever spring. If it does, detection may be failed.



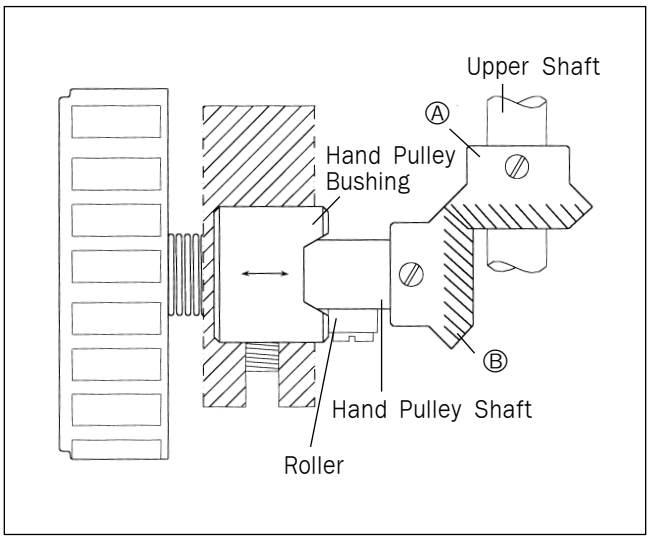
[Fig. 52]

12) Adjusting the Hand Pulley Device

A. Tighten the screw after putting the hand pulley gear Ⓑ and the hand pulley shaft tip in accord.

B. Adjust the clearance of hand pulley gears Ⓐ and Ⓑ and tighten the screws.

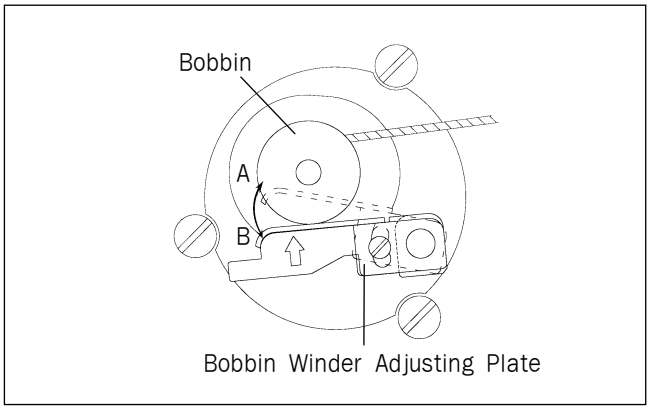
C. Move the bushing in the direction of the arrow to reduce the backlash between gears Ⓐ and Ⓑ when the roller is on the end of the pulley bushing.



[Fig. 53]

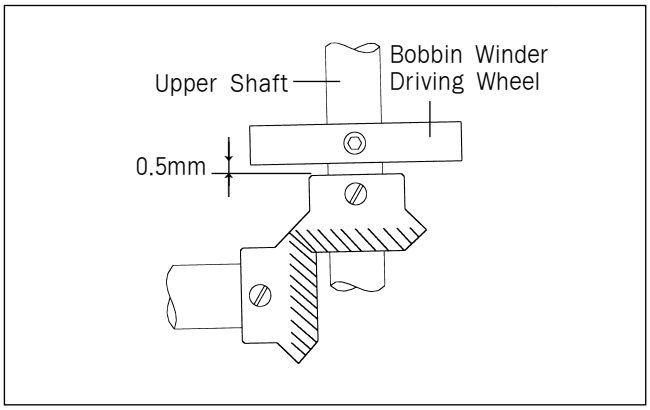
13) Adjusting the Winding Device

A. To adjust the winding capacity of the bobbin, use the beginning position of the winding control plate, and after unfastening the screw, turn the plate in direction A for large winding capacity and turn in direction B for small winding capacity.



[Fig. 54]

B. Place the winding drive wheel 0.8mm away from the hand pulley gear and tighten the screw.



[Fig. 55]

14) Tension Adjustment of Driving Belt

[Caution]

1. If tension adjustment of each driving belt is required, it may affect on embroidery quality and driving of the machine. Therefore, please perform tension adjustment through service staff of the company or a equivalent field engineer who received training of the company.
2. In case of tension adjustment of each driving belt, turn "OFF" the power for sure.

A. Specifications of tension adjuster of each driving belt (sound wave type of belt tension meter)

ⓐ Model Name : U-305 Series Sound Wave Type of Standard Belt Tension Meter
ⓑ Manufacturer : UNITTA

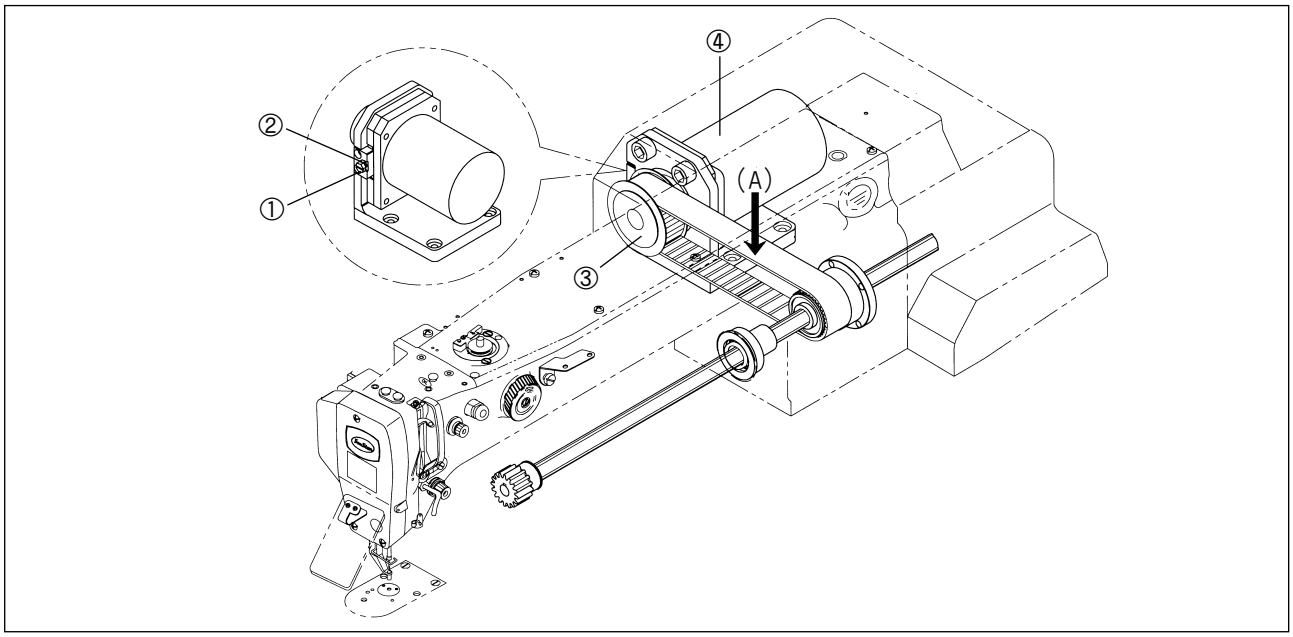
B. X-Axis Timing Belt

ⓐ Check tension of X-axis timing belt by using sound wave type of belt tension meter after separating belt cover from main body.

ⓑ Adjust tension of X-axis timing belt that the measured value of sound wave type of belt tension meter should become 38~40kgf when giving impact on the end of feed bracket and center of driving pulley belt like plucking belt by using a finger or a similar tool.

ⓒ Input data of sound wave type of belt tension meter in case of adjusting X-axis timing belt tension
Weight : 004.0gf/m
Wide : 020.0mm/#R
Span : 0180mm

ⓓ In case of adjusting X-axis timing belt tension, first unscrew nut ② connected to adjust bolt ① and turn the adjust bolt ① to clockwise direction. Then timing belt tension increases while driving pulley ③ and motor ④ being pulled toward volt and turning to counter clockwise direction, belt tension decreases.



[Fig. 56]

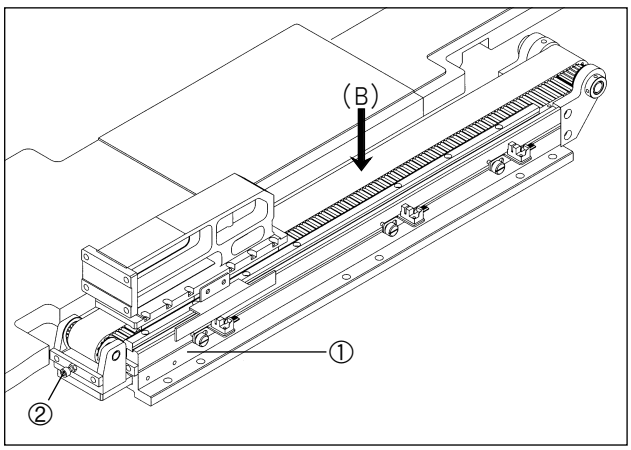
C. Y-axis timing belt

ⓐ In case of confirming Y-axis timing belt tension, confirm by using sound wave type of belt tension meter after forwarding x-fixing/transfer frame to the maximum as shown in the figure.

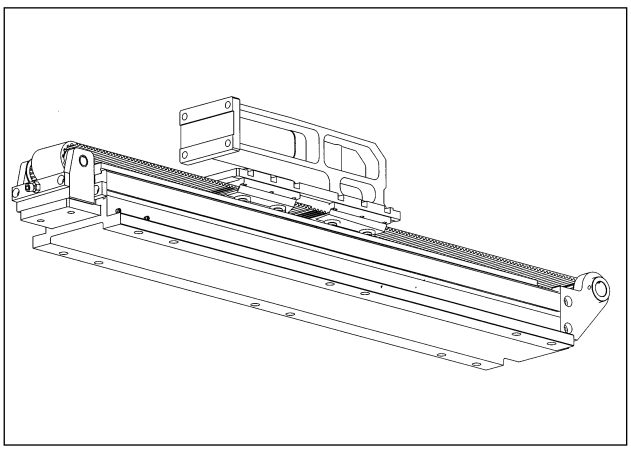
ⓑ Adjust tension of Y-axis timing belt that the measured value of sound wave type of belt tension meter should become 27～28kgf when giving impact on the end of feed bracket and center of driving pulley belt like plucking belt by using a finger or a similar tool.

ⓒ Input data of sound wave type of belt tension meter in case of adjusting Y-axis timing belt tension.
Weight : 004.0gf/m
Wide : 048.0mm/＃R
Span : 0485mm

ⓓ In case of adjusting Y-axis timing belt tension, first unscrew tension base joint screw ① and adjust to proper tension by turning the tension adjusting bolt ②. Turning the tension adjusting volt ② to clockwise direction, belt tension increases and turning to counter clockwise direction, the tension decreases.



[Fig. 57]



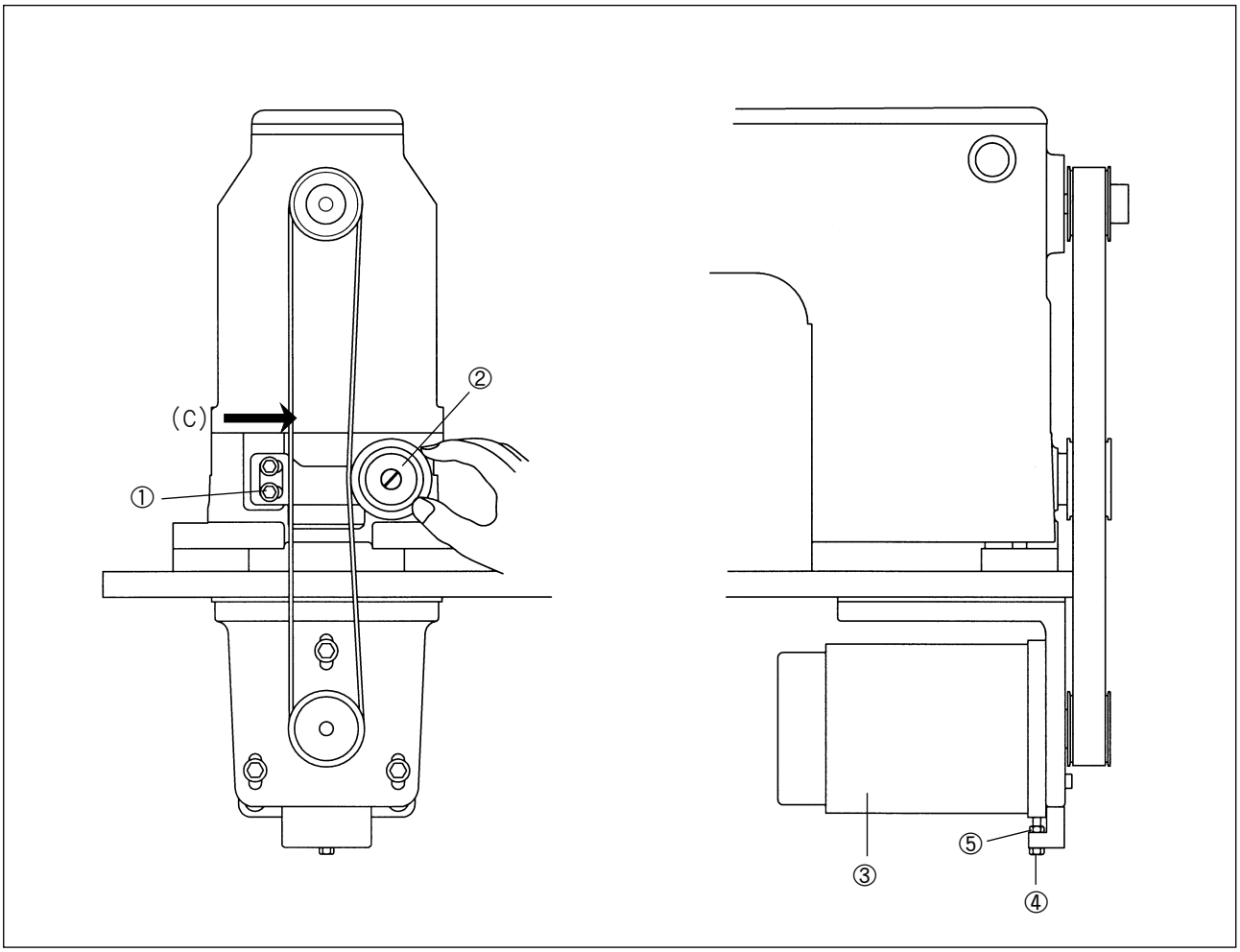
[Fig. 58]

D. Timing belt of main motor

ⓐ Adjust timing belt tension of main motor that the measured value of sound wave type of belt tension meter should become 15~16kgf when giving impact on belt span center (C) like plucking belt by using a finger or a similar tool.

ⓑ Input data of sound wave type of tension meter in case of adjusting timing belt tension of main motor.
Weight : 004.0gf/m
Wide : 025.0mm/#R
Span : 0410mm

ⓒ When adjusting timing belt tension of main motor, unfasten idler bracket fixing screw(2 points) ① and pushing idler ② to the left, tension increases and pushing to the right, tension decreases. Also turning the tension adjusting bolt ④ connected to main motor ③ to clockwise direction, tension increases and turning to the opposite direction, tension decreases. After tension adjustment is completed, fasten nut ⑤ tightly.



[Fig. 59]

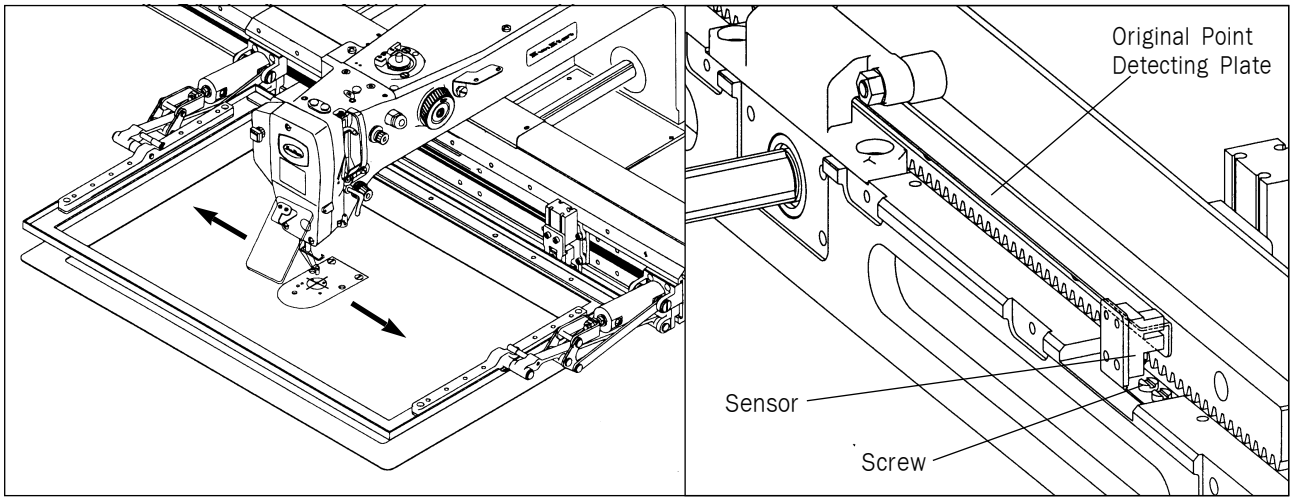
15) How to Set the Original Point of X-Y

A. How to set the original point of the X-axis

ⓐ Remove the lower feed plate, X-fixed cover, and transport cover.

ⓑ Place the upper feed plate center in the middle of the X-axis direction.

ⓒ Unfasten the two screws of the X-axis original point detecting sensor supporting plate and have the X-axis original point detecting plate on the X-Y transfer system placed in the center of the sensor as shown in the picture. Then, tighten the screw with the + driver.

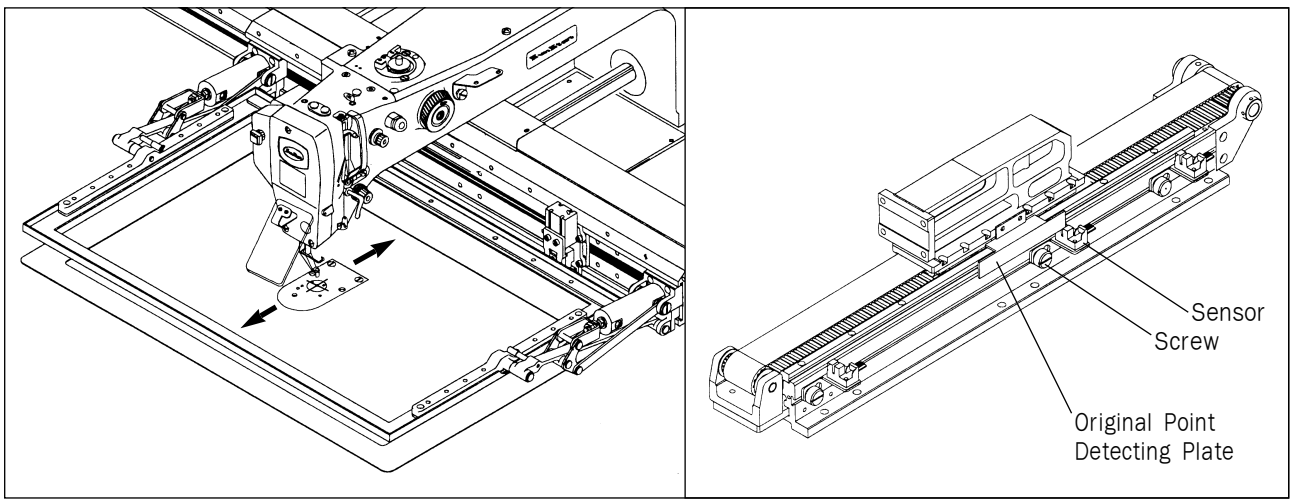


[Fig. 60]

B. How to set the Y-axis original point

ⓐ Move the upper feed plate to the middle of the Y-axis direction.

ⓑ After adjusting Y axis expedition detection plate comes to center of sensor by unfastening joint screw of Y sensor bracket, fasten the joint screw as shown in the figure.

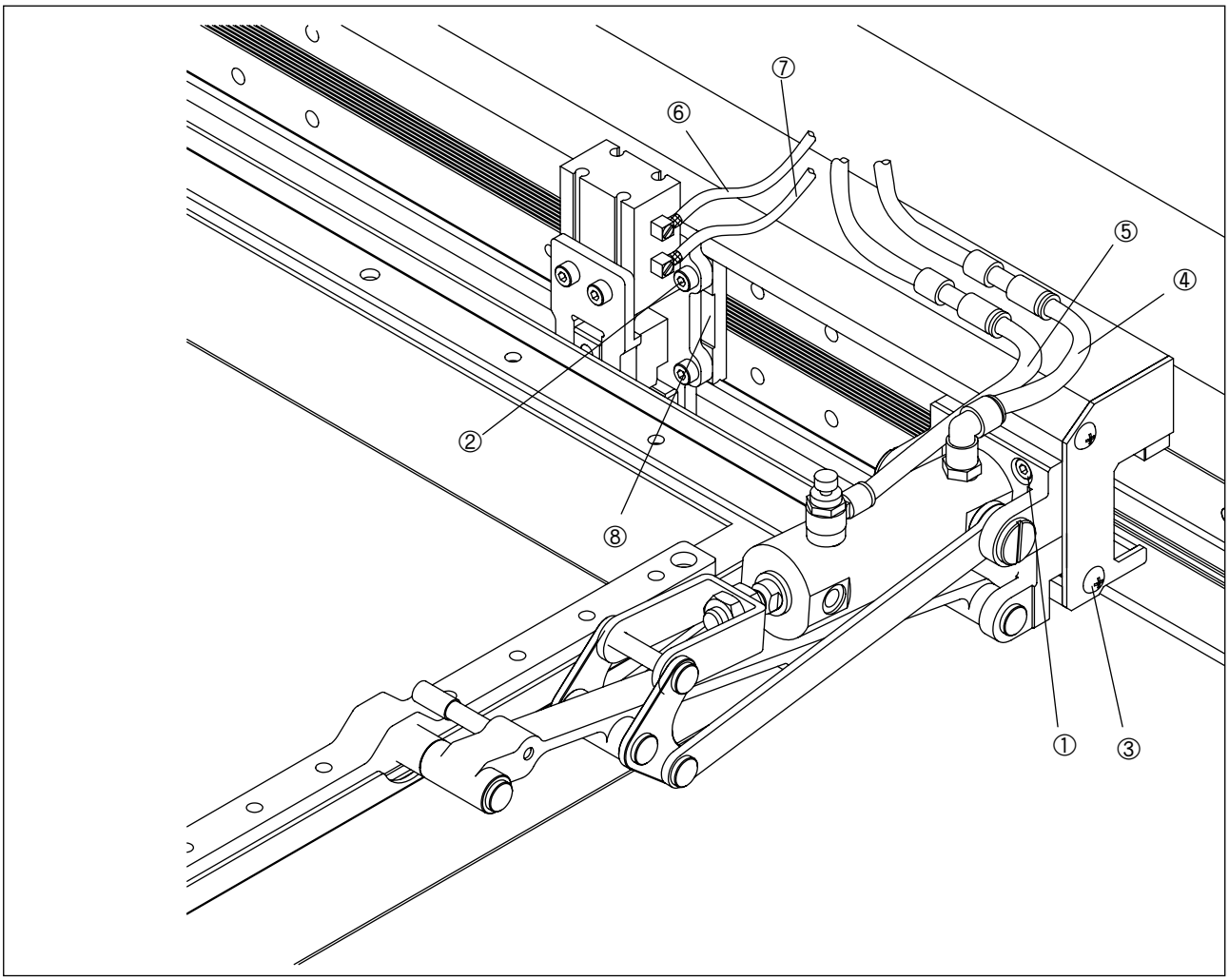


[Fig. 61]

16) Upper/Lower Clamp Disassembly and Cassette Assembly

A. Disassembling the upper and lower clamps

ⓐ Loosen the fixing screw ① for the upper clamp bracket.
ⓑ Loosen the fixing screw ② for the lower clamp bracket.
ⓒ Loosen the fixing screw ③ for the X-feed frame cover.
ⓓ Loosen the upper feed air cylinder cable ④.
ⓔ Loosen the upper feed air cylinder cable ⑤.
ⓕ Pull out the lower clamp air cylinder cable ⑥.
ⓖ Pull out the lower clamp air cylinder cable ⑦.
ⓗ Disassemble the upper clamp from the lower clamp.
ⓘ Remove the lower clamp bracket holder ⑧ from the X-feed frame.
ⓙ Remove the upper-feed air cylinder cables ④, ⑤.



[Fig. 62]

B. Assembling the Cassette

ⓐ Assemble the palette cylinder bracket holder bushingⓚ, the screw ⓛ, and the palette cylinder bracket holder ⓜ. Put together the palette cylinder bracket holder assembled as above and the palette customized for the user's working environment using screws.

ⓑ Assemble the X-feed frame ⓐ and the palette cylinder bracket holder ⓑ.

ⓒ Assemble the palette cylinder bracket ⓒ by using the fixing screw ⓔfor the palette cylinder bracket and the fixing screw washer ⓓ for the palette cylinder bracket.

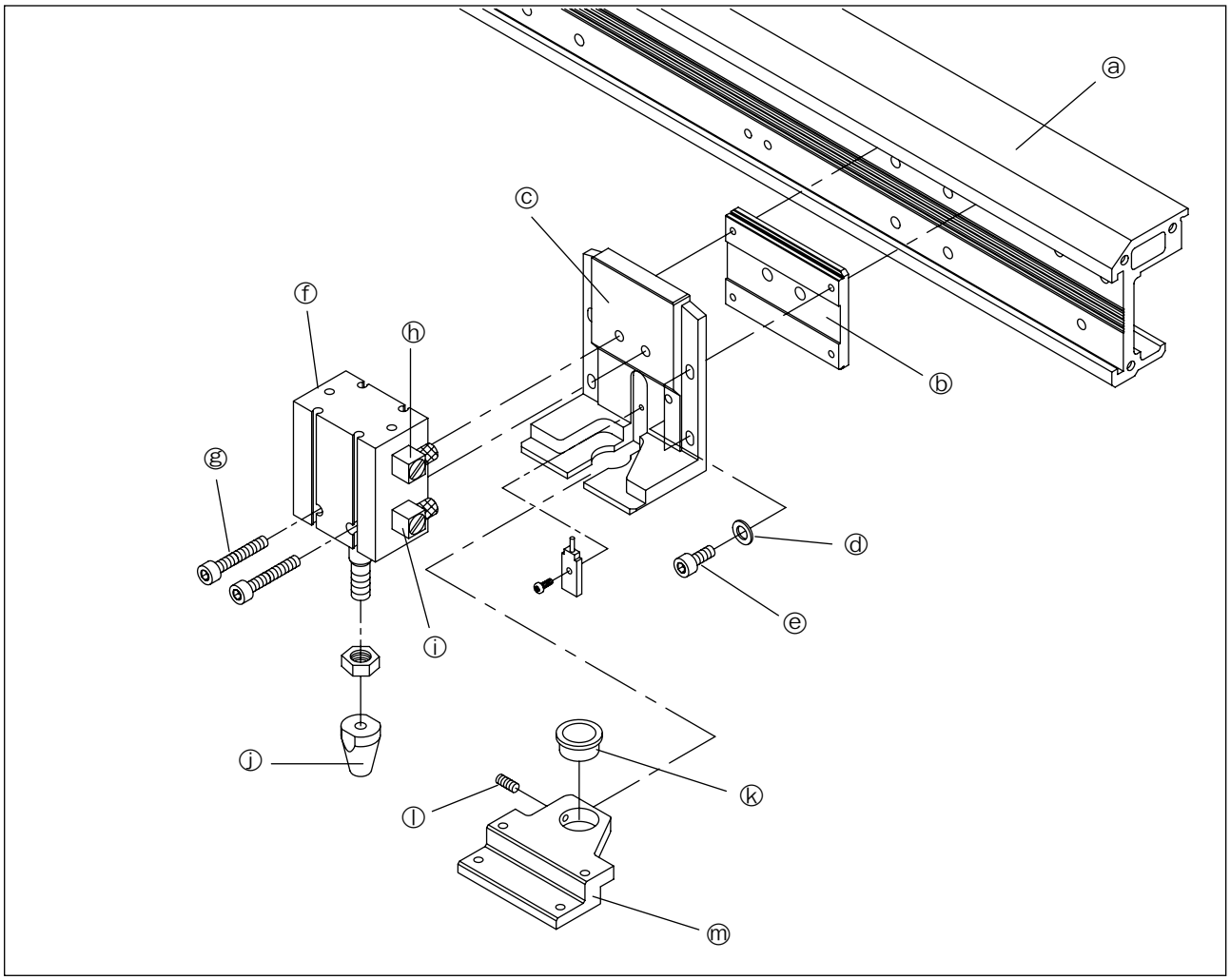
ⓓ Assemble the palette air cylinder ⓕ using the fixing screw ⓖ for the palette air cylinder.

ⓔ Assemble the palette cylinder shaft ⓙ.

ⓕ Insert the upper-feed air cylinder cable ⑥ as in Fig. 62 into the fitting part ⓗ of the palette air cylinder ⓕ.

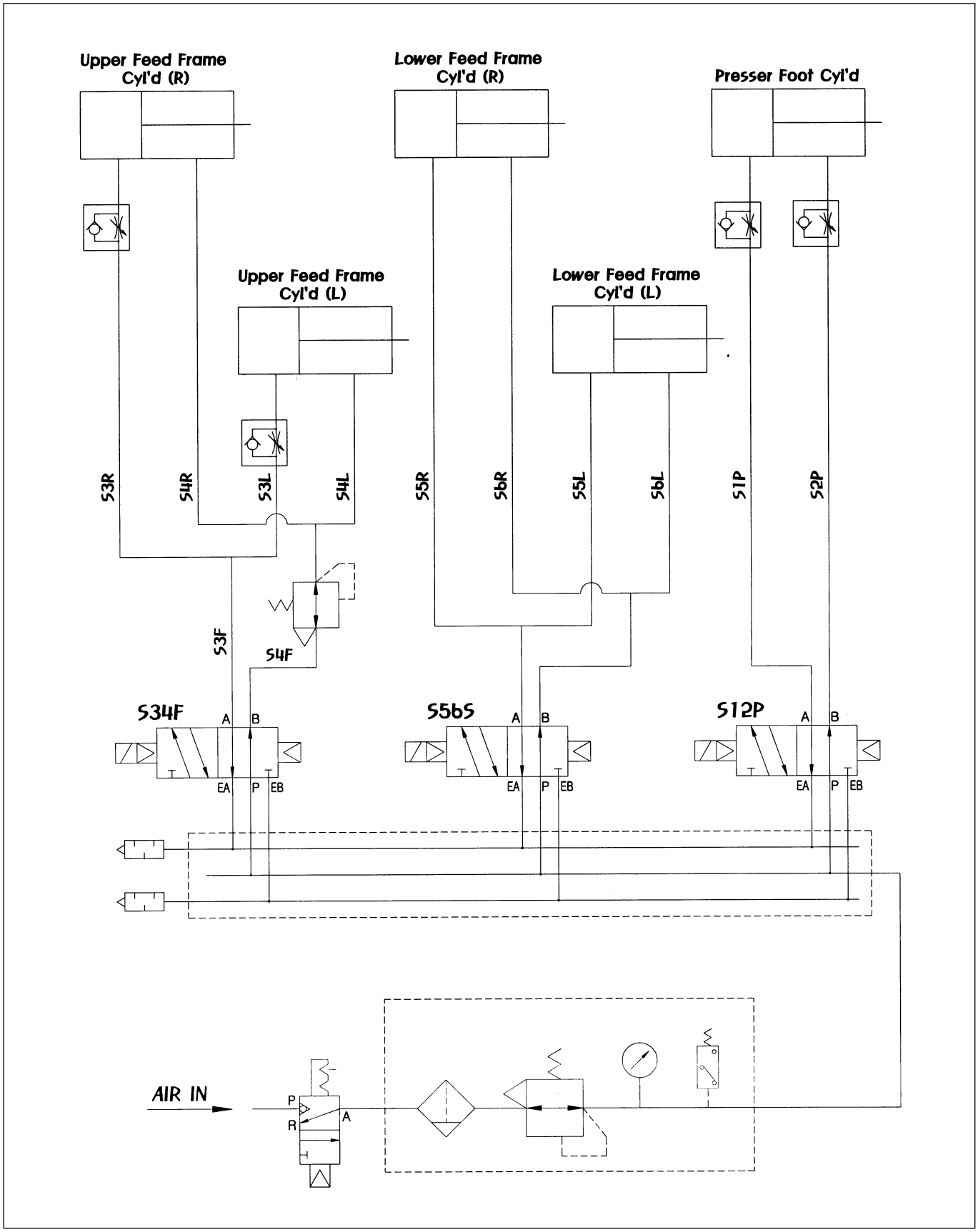
ⓖ Insert the upper-feed air cylinder cable ⑦ as in Fig. 62 into the fitting part ⓘ of the palette air cylinder ⓕ.

ⓗ When the assembly is completed, adjust the Y-shaft origin following "「15) How to Set the Original Point of X-Y」 of Chapter 10. HOW TO REPAIR THE MACHINE" of the manual.



[Fig. 63]

17) Air System Circuit Diagram



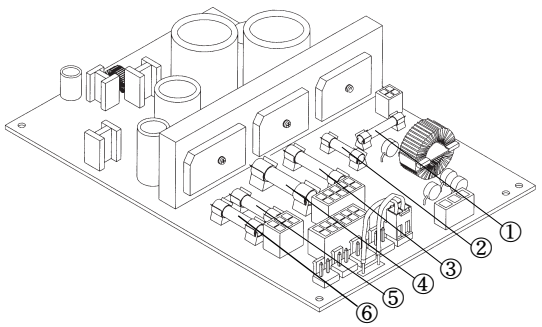
18) Exchanging the Fuse

Caution	■ To prevent from electrice shook, turn off the power and wait 5 minutes, then open the cover ■ Be sure to turn off the power and exchange into the fuse of the designated quantity after opening the cover of control box.

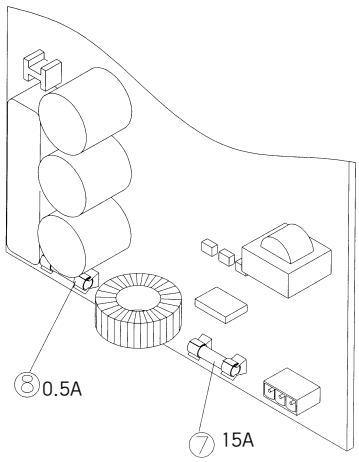
8 Fuses are used.

No.	Quality		Use
①	0.5A		For the Protection of thread sensor
②	3A		For the Protection of control power
③	7A		For the Protection of actuator
④	8A		For the Protection of step driver
⑤	0.5A		For the Protection of step-aux
⑥	INPUT 110V	7A	For the Protection of main power
	INPUT 220V	5A	
⑦	15A		For the Protection of servo motor
⑧	0.5A		For the Protection of servo motor drive

<Power Board>



<Main shaft Mator Drive Board>



[Fig. 64]

11

CAUSE OF BREAK-DOWN AND TROUBLESHOOTING

No.	Type of Breakdown	Cause	Troubleshooting
1	Error on operation or drive of machine	Loosing of belt tension and damage on belt	Adjust the belt tension or exchange it
		Fuse shortage for main power or circuit	Check the fuse shortage of main shaft drive motor in a controller box or exchange it
		Deviation from X and Y limit of feed bracket	Move the feed bracket to normal place (inside limit switch)
2	Bad position of stopping position	Slackness of main drive belt	Adjust the belt tension
		Wrong position of upper shaft sensor plate or photo sensor	Adjust the position of upper shaft sensor plate or exchange the photo sensor
3	Needle bent	Damage on needle(Bending of needle, cracks on needle hole or groove, and abrasion or transformation of needle tip)	Exchange the needle
		Wrong installation of needle	Install the needle properly
		Contact of needle with shuttle	Adjust the distance properly between a needle and shuttle
4	Thread is cut	Wrong insertion of thread	Insert the thread properly
		Wrong installation of needle (Height of needle or direction of needle)	Reinstall the needle
		Damage on needle (Bending of needle, cracks on needle hole or groove, and abrasion or transformation of needle tip)	Exchange the needle
		Excessive tension of upper thread and lower thread	Adjust the tension
		Excessive tension and stroke of take-up lever spring	Adjust the tension and stroke of take-up lever spring
		Crack on the controlling hole of shuttle surface spring	Exchange the shuttle surface spring
5	Stitch skipping	Use of bending needle	Exchange the needle
		Use of improper sized needle compared with using thread	Exchange the needle
		Wrong installation of needle	Reinstall of needle
		Improper timing for a needle and shuttle	Readjust the timing for a needle and shuttle
		Large interval between a needle groove and shuttle point	Readjust the timing for a needle and shuttle
		Excessive tension of take-up lever spring and stroke	Adjust the tension of take-up lever spring and stroke

No.	Type of Breakdown	Cause	Troubleshooting
6	Ineffective sense of upper thread	Bad connection between take-up lever spring and detecting plate	Clean up the take-up lever spring and detecting plate. Adjust the tension of take-up lever spring and connecting condition of detecting plate
		Bad connection of wire with thread sensor plate	Reconnect the wire with thread sensor plate
7	Poor quality of thread tightening	Weak tension of upper thread	Adjust the tension of upper thread
		Weak tension of lower thread	Adjust the tension of lower thread
		Improper timing of needle and shuttle	Readjust the timing of needle and shuttle
8	Mistakes of Trimming	Slackness of exchange tension between moving mes and fixed mes	Adjust the tension of fixed mes
		Groove abrasion on blade of moving mes and fixed mes	Exchange the moving and fixed mes
		Wrong position of thread trimming cam	Readjust the position of thread trimming cam

Appendix

1) Error List

NO.	Err List	Message	Meaning
1	Err 1	Main Motor Err!	Error occurs in main shaft motor
2	Err 2	Synchro Err!	Error occurs in synchronizer
3	Err 3	Pattern Not Found!	Related pattern is not available on the diskette
4	Err 4	FDD Empty	Floppy disk drive is empty
5	Err 5	Disk-Read Err!	Machine can't read a diskette
6	Err 6	Disk-Write Err!	Machine can't write any data on the diskette
7	Err 7	Disk-Format Err!	A diskette is not formatted
8	Err 8	Disk-Full!	Diskette is full
9	Err 9	Scale Over!	Error occurs in enlargement and reduction
10	Err 10	Too Many Stitch !	It exceeds maximum number of stitches
11	Err 11	Reset Counter !	Counter should be reset
12	Err 12	Combination Not Completed!	Design combination is not completed
13	Err 13	Limit Over!	it exceeds X-Y limit
14	Err 14	Needle Position Err!	Needle bar is not in the proper position
15	Err 15	Calculation Err!	Calculation error occurs inside
16	Err 16	The Data Bad!	Pattern data is damaged
17	Err 17	Emergency Stop!	Emergency stop switch is pressed during the operation
18	Err 18	Thread Broken!	Upper thread is broken
19	Err 19	X-Y Error!	X-Y transferring is not performed
20	Err 20	System Program not Found	Program that you want to updata does not exist in the diskekett
21	Err 21	Internal Memory Err!	Internal operation error occurs
22	Err 22	Write Protected!	Diskette is wirte protected
23	Err 23	Insufficient Internal Memory	Internal memory is insufficient
24	Err 24	Low Pressure!	When air pressure is weak in case of pneumatic type

2) Parameter Number Related to General Sewing

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
000	Manual Operatoin En/Dis		★ Transfer of the feed plate by using direction keys	
		1) DISABLE	1) Disable	
		2) ENABLE	2) Enable	
001	Moving to start position/the 2nd origin by manual drive	1) PTN__STR__POS	1) Moving the sewing starting position by using direction keys	
		2) SECND__ORG	2) Setting to the 2nd origin by using direction keys	
002	Return to the machine origin after finishing sewing operation		★ Returning to the machine origin after completing work	
		1) DISABLE	1) It does not return	
		2) ENABLE	2) It returns	
003	Return to the origin when limit error occurs		★ If it reaches transfer limit of the feed plate, it returns	
		1) DISABLE	1) It does not return to the origin of machine	
		2) ENABLE	2) It returns to the origin of machine	
004	Return mode to the sewing start position	1) SHORTEST	1) Returning through the shortest route	
		2) ORG__TO__STRT	2) After returning to the original point, return to the starting point	
		3) REV__ORG__STRT	3) After returning to the origin point by tracing the pattern shape back	
005	Counting method for bobbin count	1) UP__COUNT	1) Count up	
		2) DN__COUNT	2) Count down	
006	Use of products counter	1) DISABLE	1) No use	
		2) ENABLE	2) Use	
007	Time for reading pattern	1) JOB__SETUP	1) Before completion for sewing preparation	
		2) JOB__READY	2) After completion for sewing preparation	
008	Trimming during emergency stop	1) AUTO__TRIM	1) Performing the automatic trimming	
		2) MANU__TRIM	2) Performing the manual trimming	
009	Acceleration characteristics of main-shaft speed	1) SLOW__STRT0	1) 200 → 600 → 1000spm	
		2) SLOW__STRT1	2) 300 → 600 → 1000spm	
		3) SLOW__STRT2	3) 400 → 600 → 1000spm	
		4) SLOW__STRT3	4) 500 → 600 → 1000spm	
		5) SLOW__STRT4	5) 200 → 600 → 1000spm	
		6) SLOW__STRT5	6) 200 → 200 → 200 → 600 → 1000spm	
010	Limit of maximum sewing speed	1) 2500spm/3.0mm		
		2) 2000spm/3.0mm		
		3) 1700spm/3.0mm		
		4) 1300spm/3.0mm		
011	Opening angle of feed plate transfer	0[DEGREE]	Setting it to fit the thickness of sewing materials : 0~72°	1
012	Operation condition of feed plate when sewing operation finishes	1) STRT__OPEN	1) Opening after returning to the starting point	
		2) STRT__HOLD	2) Keeping the closing state even after returning to the starting position(Lifting by pedal)	
		3) OPEN__STRT	3) Return to the starting position in lifting state	
		4) OPEN__STRT1	4) Return to start point in condition of 1 step rise	
		5) OPEN__STRT2	5) Return to start point in condition of 2 step rise	
013	Descent maintenance of upper feed plate	1) DISABLE	1) It does not always keep descending	
		2) ENABLE	2) It always keep descecding	
014	Signal mode of pedal 1	1) LATCH		
		2) FLIP		
015	Signal mode of pedal 2	1) LATCH		
		2) FLIP		
016	Setup for presser foot operation	1) ALWAYS__DN	1) Prohibiting the operation(Keeping the downward suspension all the time)	
		2) SEW__DN	2) Keeping the downward suspension during sewing	
		3) TRIAL__DN	3) Keeping the downward suspension When a stitch proceeding /reversing	
017	Setup for descent time of presser foot	1) WITH__STRT	1) Descending whit the main shaft turn at the same time	
		2) WITH__FEED	2) Descending whit the feeding at the same time	
018	Setup for wiper opertion	1) ALWAYS__OFF	1) Operation prohibition	
		2) ELEC__TYPE	2) Electronic type wiper	
		3) AIR__TYPE	3) Air type wiper	

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
019	Setup for wiper operation position	1) BET__NEDL__PF	1) Operating between a needle and middle pressser foot	
		2) BELW__PF	2) Operation below middle presser foot	
020	Setup for thread detection	1) DISABLE	1) No use	
		2) ENABLE	2) Use	
021	Detecting the stitch number in starting sewing	8[STITCH]	0～15 Stitches	1
022	Detecting the stitch number during sewing	8[STITCH]	0～15 Stitches	1
023	Use of trimming function	1) DISABLE	1) No use	
		2) ENABLE	2) Use	
024	Manual operation time in speed level 1	400[ms]	1～99×100ms	100
025	Manual operation time in speed level 2	1000[ms]	1～99×100ms	100
026	Manual operation time in speed level 3	2000[ms]	1～99×100ms	100
027	Time for function of the speed level 1 key	400[ms]	1～99×100ms	100
028	Time for function of the speed level 2 key	100[ms]	1～99×100ms	100
029	Time for function of the speed level 3 key	3000[ms]	1～99×100ms	100
030	Electric wiper operation time	52[ms]	0～1020ms	4
031	Electric wiper standby time	100[ms]	0～1020ms (Waiting time for next operation)	4
032	Pneumatic wiper operation time	100[ms]	0～1020ms	4
033	Pneumatic wiper standby time	100[ms]	0～1020ms (Waiting time for next operation)	4
034	Standby time for completely lowered presser foot	152[ms]	0～1020ms	4
035	Standby time for completely uplifted presser foot	152[ms]	0～1020ms	4
036	Presser foot Full On Time	200[ms]	0～1020ms	4
037	Feed plate Full On Time	200[ms]	0～1020ms	4
038	Thread trimming Full On Time	200[ms]	0～1020ms	4
039	Thread retaining Full On Time	200[ms]	0～1020ms	4
040	Wiper Full On Time	200[ms]	0～1020ms	4
041	Left feed plate Full On Time	200[ms]	0～1020ms	4
042	2 step stroke Full On Time	200[ms]	0～1020ms	4
043	Inverting device Full On Time	200[ms]	0～1020ms	4
044	Presser foot Duty	50%	30～80%	10
045	Feed plate Duty	50%	30～80%	10
046	Thread trimming Duty	50%	30～80%	10
047	Thread retaining Duty	50%	30～80%	10
048	Wiper Duty	50%	30～80%	10
049	Left feed plate Duty	80%	30～80%	10
050	2 step stroke Duty	80%	30～80%	10
051	Inverting device Duty	80%	30～80%	10
052	Pattern data reading mode		★ The reading order when the same pattern data numbers exist in the internal memory	
		1) DISABLE	1) Read first from a floppy disk	
		2) ENABLE	2) Read first from a internal memory	
053	Setting the magnifying/demagnifying mode		★ It settles the way of reduction and extension for pattern	
		1) DISABLE	1) Extension and reduction are impossible	
		2) STITCH__LEN	2) Extension and reduction by a stitch width	
		3) STITCH__NUM	3) Extension and reduction by a number of stitch	
054	Number of chain sewings	0	0～16 0:General sewing, Over 1: Chain sewing	1
055	Transferring chain numbers	1) MANUAL	1) Automatic change	
		2) AUTO	2) Manual change by enter key	
		3) EXTERNAL	3) Change by outward input	
056	Number of stitches to decelerate before ending work	2[STITCH]	Change to 2～16	1
057	Decelerating speed before ending work	400[spm]	200～500spm	100
058	Thread trimming delayed time	72[ms]	52～1020ms	4

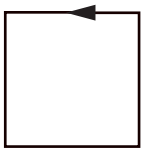
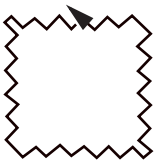
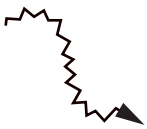
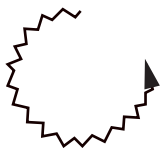
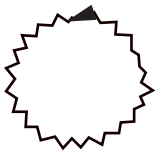
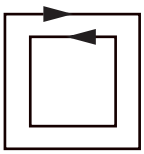
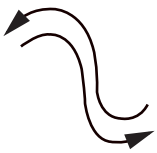
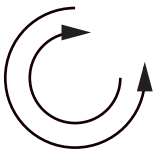
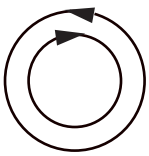
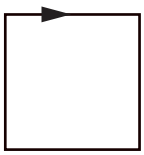
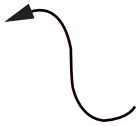
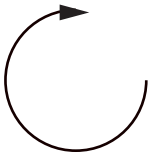
NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
059	The selection of the low pressure detecting device	1) DISABLE	1) Operate between needle and intermediate presser foot	
		2) ENABLE	2) Operate under the intermediate presser foot	
060	Feed plate control	0	0~31 See "Parameter description related to general embroidery".	1
061	Upper feed plate control when paused		In case of meeting temporary stop code while embroidering, control top feed plate	
		1) CLOSE	1) Put down the top feed plate	
		2) OPEN	2) Hold up the top feed plate	
		3) FF__NUMBER	3) Control the top feed plate according to Article 060	

3) Function No. Related to Pattern Programming

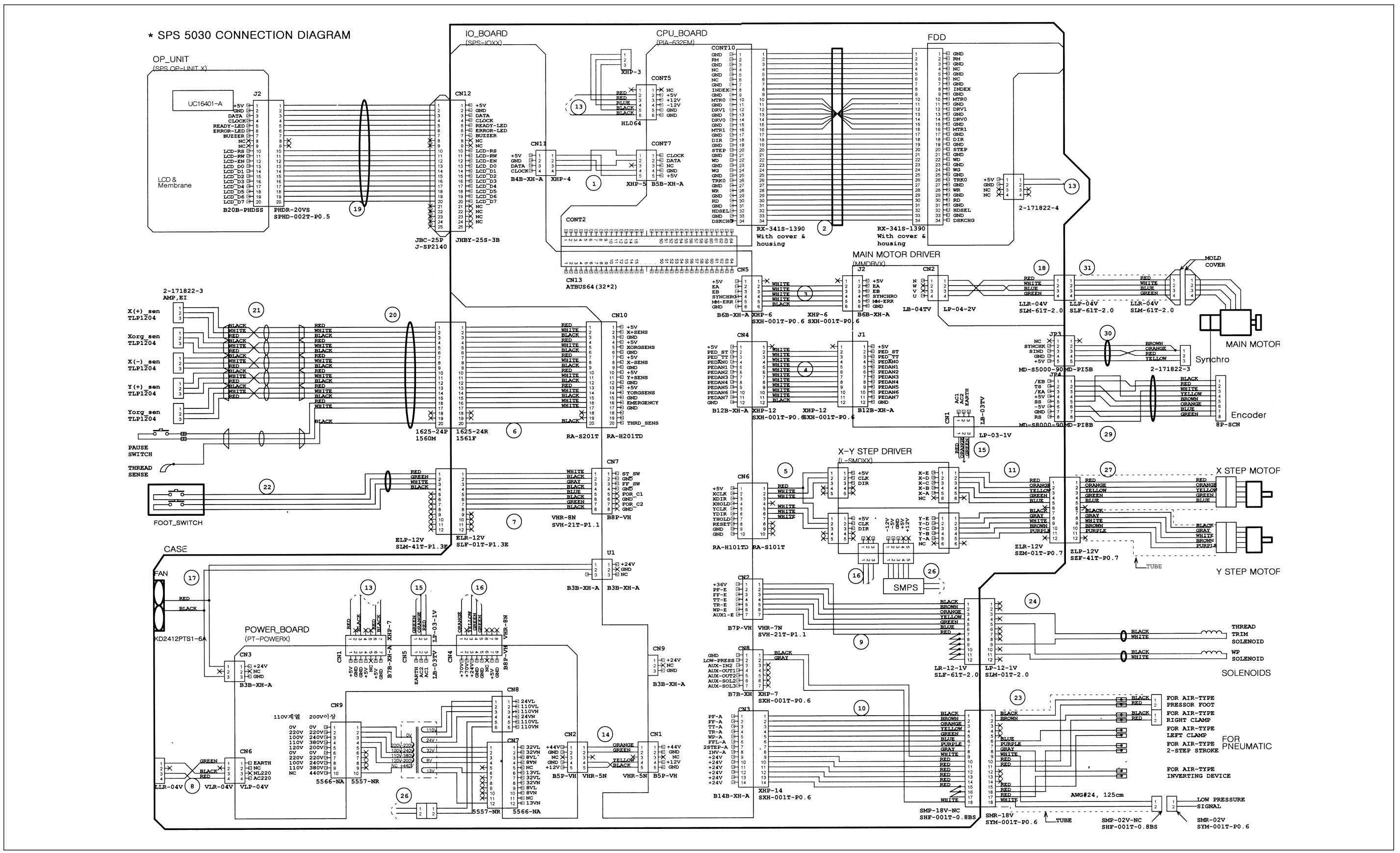
NO.	Function	Contens
000	Thread trimming	Addition of thread trimming code
001	2nd origin	Set of the 2nd origin
002	Temporary suspension	Temporary suspension in a particular point
003	One turn of sewing machine	Processing without sewing
004	JUMP	Feed needle bar without sewing
005	Point sewing	
006	Linear/Curving line sewing	
007	Linear sewing	
008	Spline sewing	
009	Arc sewing	
010	Circle sewing	
011	Change of jump speed	
012	Change of stitching speed	Use when changing embroidery speed within one work patten.
013	Change of stitching speed	
014	Pattern data reading from floppy diskette	Read the stored pattern from floppy diskette.
015	Pattern data writing to floppy diskette	Store the programmed pattern into floppy diskette.
016	Floppy diskette formatting	Format the floppy diskette.
017	Information indicatioin of present pattern data	Number of stitches, Speed, Backlash, X-magnification, Y-magnification, Tracing, R-Pattern N0. W-Pattern No.
018	Coordinates setting	Absolute coordinate system/relative coordinate system
019	Linear zig-zag sewing	
020	Spline zig-zag sewing	
021	Arc zig-zag sewing	
022	Circle zig-zag sewing	
023	Linear offset sewing	
024	Spline offset sewing	

NO.	Function	Contents
025	Arc offset sewing	
026	Circle offset sewing	
027	Linear double sewing	
028	Spline double sewing	
029	Arc double sewing	
030	Circle double sewing	
031	Linear double reverse sewing	
032	Spline double reverse sewing	
033	Arc double reverse sewing	
034	Circle double reverse sewing	
035	Linear reverse sewing	
036	Spline reverse sewing	
037	Arc reverse sewing	
038	Circle reverse sewing	
039	Delection of pattern data	
040	Addition of automatic back-tack	Automatic back tacking.
041	Addition of condensed stitch	
042	Addition of overlap stitch	Additionally proceed sewing as many numbers of stitches as the user wants.
043	Addition of X-axis symmetry data	
044	Addition of Y-axis symmetry data	
045	Addition of spot symmetry data	
046	Movement of pattern to the starting position	
047	Copy of pattern into a special	
048	Deletion of pattern data	
049	Reverse setting	Need extra optional devices
050	Change of speed	

4) Pattern Chart

	Linear sewing	Spline sewing	Arc sewing	Circle sewing
Basic Sewing	NO. : 007 Name : Linear sewing 	No. : 008 Name : Spline sewing 	NO. : 009 Name : Arc sewing 	No. : 010 Name : Circle sewing 
Zig-Zag Sewing	No. : 019 Name : Linear zig-zag sewing 	No. : 020 Name : Spline zig-zag sewing 	No. : 021 Name : Arc zig-zag sewing 	No. : 022 Name : Circle zig-zag sewing 
Double Sewing	No. : 027 Name : Linear double sewing 	No. : 028 Name : Spline double sewing 	No. : 029 Name : Arc double sewing 	No. : 030 Name : Circle double sewing 
Reverse Sewing	No. : 035 Name : Linear reverse sewing 	No. : 036 Name : Spline reverse sewing 	No. : 037 Name : Arc reverse sewing 	No. : 038 Name : Circle reverse sewing 

5) Electronic Circuit Diagram [SPS/A-5030-HS]



BASIC MANUAL

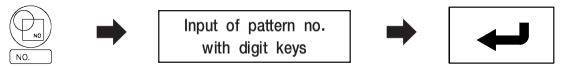
SunStar

SPS/A Series

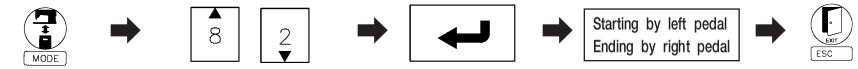
Reference

1. If the READY LAMP turns on or the upper feed plate is on the bottom, it can be impossible to use a specific key. In that case, operate the machine after pressing [↵] key.
2. After pressing, [5] key, perform thread insertion.

1 Calling the pattern : Calling patterns from memory or floppy disks



2 Bobbin wind



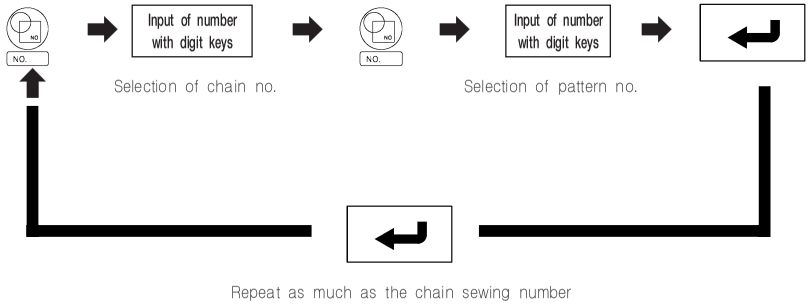
3 Using the counter : Using the bottom thread counter and quantity control counter

4 Setting the extension and reduction

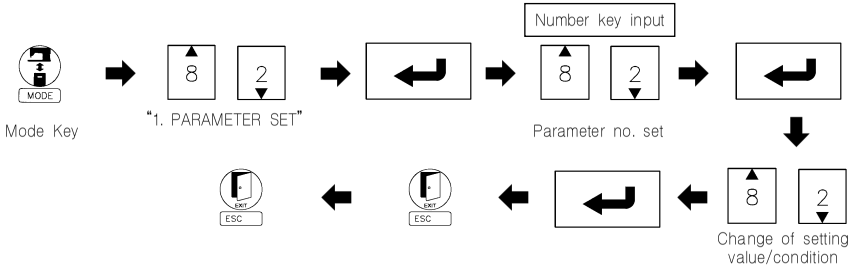
Use after setting the general sewing related parameter No. 53, extension/reduction mode, to "STITCH_LEN

5 Chain sewing : Performing the chain sewing

Use after setting the general sewing related parameter No. 54, changing sewing number to over

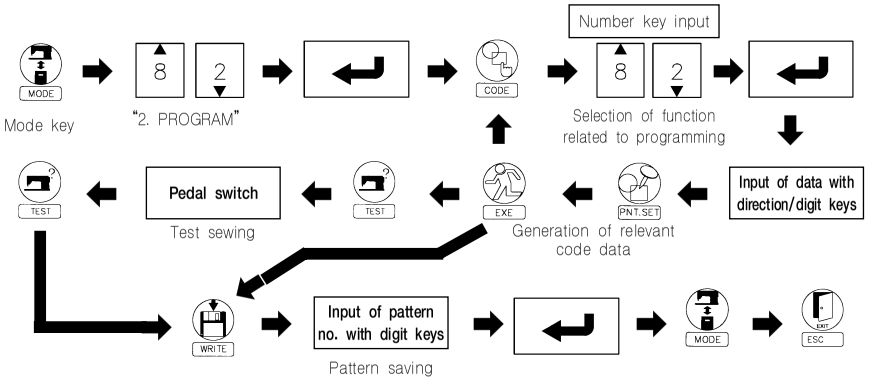


6 Setting the parameter related to general sewing



Parameter number related to general sewing	
0) JOG En/Dis	31) Elc WP Off Tm
1) JOG Mode	32) Air WP On Tm
2) Machine Org1	33) Air WP Off Tm
3) Machine Org2	34) PF Down Time
4) Strt Ret Mod	35) PF Up Time
5) Bobbin Count	36) PF FullOn Tm
6) Prodct Count	37) FF FullOn Tm
7) Pattern Read	38) TT FullOn Tm
8) Trim EM Stop	39) TR FullOn Tm
9) Slow Start	40) WP FullOn Tm
10) Max Speed	41) FFLFullOn Tm
11) Feed End Pos	42) 2SPFullOn Tm
12) FF Operation	43) INVFullOn Tm
13) FF Close En	44) PF Duty
14) Pedal1 Mode	45) FF Duty
15) Pedal2 Mode	46) TT Duty
16) PF Operation	47) TR Duty
17) PF Down Mode	48) WP Duty
18) WP Operation	49) FFL Duty
19) WP Position	50) 2SP Duty
20) Thrd Detect	51) INV Duty
21) Thrd Stitch1	52) PTRN RD MODE
22) Thrd Stitch2	53) Scale MODE
23) Trim En/Dis	54) Chain Number
24) Jog Time1	55) Chain Select
25) Jog Time2	56) Decel Stitch
26) Jog Time3	57) Decel SPM
27) Con Key Tm1	58) Trim Delay
28) Con Key Tm2	59) Low Pressure
29) Con Key Tm3	60) FF Number
30) Elc WP On Tm	61) FF Pausecntl

7 Pattern programming : Generating the pattern that users want



Function number related to pattern programming	
0) TRIM	27) LINE DBL
1) SEC-ORG	28) CURVE DBL
2) PAUSE	29) ARC DBL
3) EMPTY	30) CIRCLE DBL
4) JUMP	31) LINE DREV
5) POINT	32) CURVE DREV
6) LINE/CURVE	33) ARC DREV
7) LINE	34) CIRCLE DREV
8) CURVE	35) LINE REV
9) ARC	36) CURVE REV
10) CIRCLE	37) ARC REV
11) JUMP SPD	38) CIRCLE REV
12) STI SPD	39) PTRN DEL
13) STI WIDT	40) BACK TACK
14) PTRN READ	41) CNDNS STI
15) PTRN WRITE	42) OVLAP STI
16) FORMAT	43) SYMMETRY X
17) INFO DISP	44) SYMMETRY Y
18) CORD SYS	45) SYMMETRY P
19) LINE ZIG	46) MOVE PTRN
20) CURVE ZIG	47) COPY PTRN
21) ARC ZIG	48) DEL PTRN
22) CIRCLE ZIG	49) REV SET
23) LINE OFST	50) SPD CHNG
24) CURVE OFST	
25) ARC OFST	
26) CIRCLE OFST	