SunStar

USER'S MANUAL

SPS/E-Pattern Series

Electronically Controlled
Pattern Sewing Machine
(Electronic Control Part)

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.

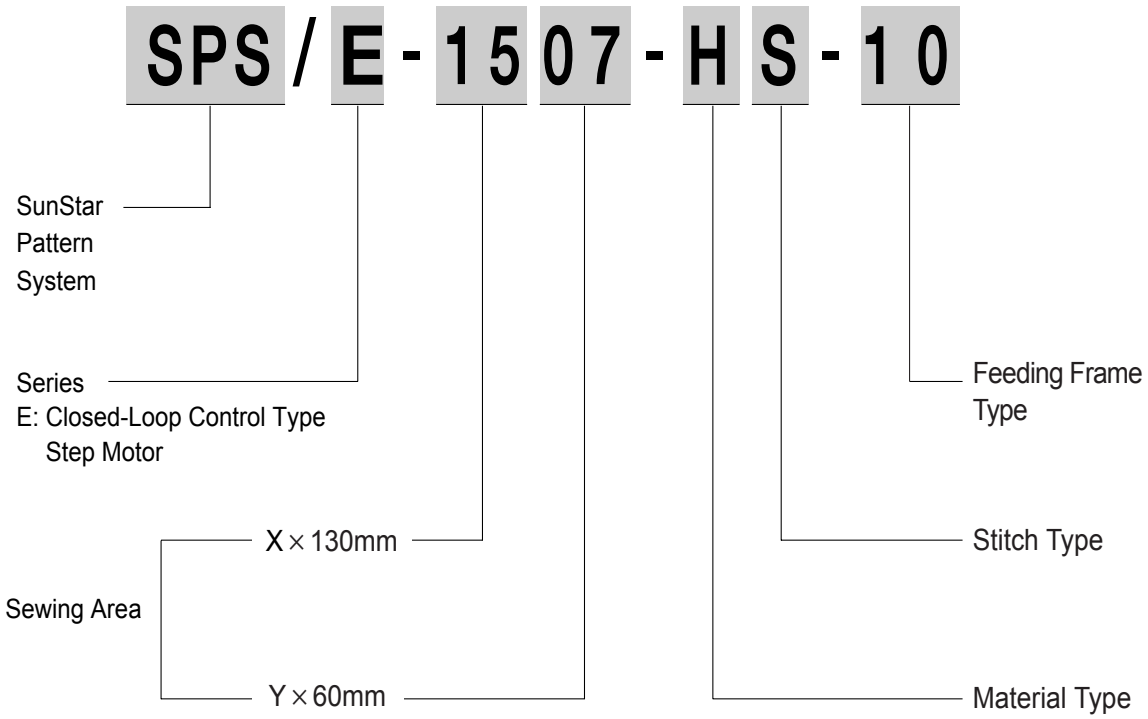
SUNSTAR MACHINERY CO., LTD.

MEE-070216

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 Pattern S/M Model



☐ **Pattern Model**

E : Closed-Loop Control Type Step Motor

☐ **Sewing Area**

1306 : X(130mm), Y(60mm)

1507 : X(150mm), Y(70mm)

☐ **Stitch Type**

S:Standard Stitch

☐ **Feeding Frame Type**

10 : Motor Type Feed Frame

20 : Pneumatic Monolithic Feeding Frame

21 : Pneumatic Monolithic Feeding Frame with Two Step Stroke Device

22 : Pneumatic Separately-Driven Feeding Frame

(22-1 : Pneumatic Separately-Driven Feeding Frame wiht Two Step Stroke Device

23 : Pneumatic Separately-Driven Feeding Frame with Inverting Clamp Device

CONTENT

1

MACHINE SAFETY REGULATIONS

Safety instruction on this manual are defined as Danger, Warning and Notice.
If you do not keep the instructions, 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.

Notice : 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  Warning	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 Mechanical Structure Manual 4. Machine Installment.
1-3) Machine Repair  Notice	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, close down the motive 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 produced 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

Pattern 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.
ⓕ Close down the electric motive 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 noise such as high frequency welding machines
ⓚ Be careful when the upper feed plate comes down to press. Otherwise, the finger or hand might be hurt at smacking.

[Warning]
Make sure to keep the cover on while the machine is in operation to prevent any possible injury. For checkup or adjustment, please turn off the power.

1-5) Devices for Safety

Notice

ⓐ Safety label : It describes cautions during operating the machine.
ⓑ Thread take-up cover : It prevents from any contact between body and take-up lever.
ⓒ Motor cover: This device is to prevent potential accidents which might occur during the motor's rotary movement.
ⓓ Step motor cover : It prevents from accidents during rotation of step motors.
ⓔ Label for specification of power : It describes cautions for safety to protect electric shock during the motors' rotation. (Voltage input / use Hz)
ⓕ Safety plate : It protects eyes against needle breaks.
ⓖ Finger guard : It prevent from contacts between a finger and needle.

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
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2

SPECIFICATIONS OF THE MACHINE

Series type	SPS/E-1306	SPS/E-1507
Sewing Area	130mm × 60mm	150mm × 70mm
Sewing Speed	Max. 2,700 spm (Stitch width 3mm or below	
Stitch Length	0.1 ~ 12.7mm (Min. limit of resolution: 0.05mm)	
Needle	DP × 17, DP × 5	
Needle Bar Stroke	41.2mm	
Hook	Semi-Rotary Large Shuttle Hook	
Bobbin Case	Bobbin Case for Semi-Rotary Large Shuttle Hook	
Bobbin	Bobbin for Large Shuttle Hook	
Presser Foot Stroke	Standard 4mm [0.5~10mm]	
Lifting Amount of Presser Foot	Max. 22mm	
Lifting Amount of Feeding Frame	Max. 25mm	
Feeding System	Full Closed Pulse Motor-based Feed	
Emergency Stop Function	Available During Sewing Operation	
Pattern Select Function	Pattern No. Can be Selected from No.1 to No.999	
Memory	CF Card (Floppy Diskette : Option)	
Memory Backup	The Working Point is Stored in the Memory when the machine stops Abnormally	
2nd Origin Function	Another Origin Point Can be Set by Using Jog Key	
Maximum Speed Limit	The Maximum Speed can be Limited from 200 to 2,700 spm	
Number of Patterns	CF Card (128 Mbyte : Max. 2100 patterns [up to 20000 stitches/pattern])	
Safety Device	Emergency Stop Function, Maximum Speed Limit Function	
Main Motor	Direct drive-type 550W AC servo motor	
Power Consumption	600VA	
Recommended Temperature	5° C ~ 40° C	
Recommended Humidity	20% ~ 80%	
Power	1 ϕ : 100~240V, 3 ϕ : 200~440V, 50/60Hz	

3

POWER VOLTAGE AND CONTROL BOX CABLE CONNECTION

3-1) Power Voltage and Power Cord

1) Voltage Specifications

The voltage information is displayed as below on the tag attached to the power cord.

이 기계의 전기 사양은 공장 출고 시 아래의 [V] 표기대로 결선되어 있습니다.

The Electric Specification of This Machine is Connected Under [V] Marked.

[V] 단상 (1 Phase) [ ] 삼상 (3 Phase)

[ ] 110V [ ] 120V [V] 220V [ ] 240V [ ] 220V [ ] 240V

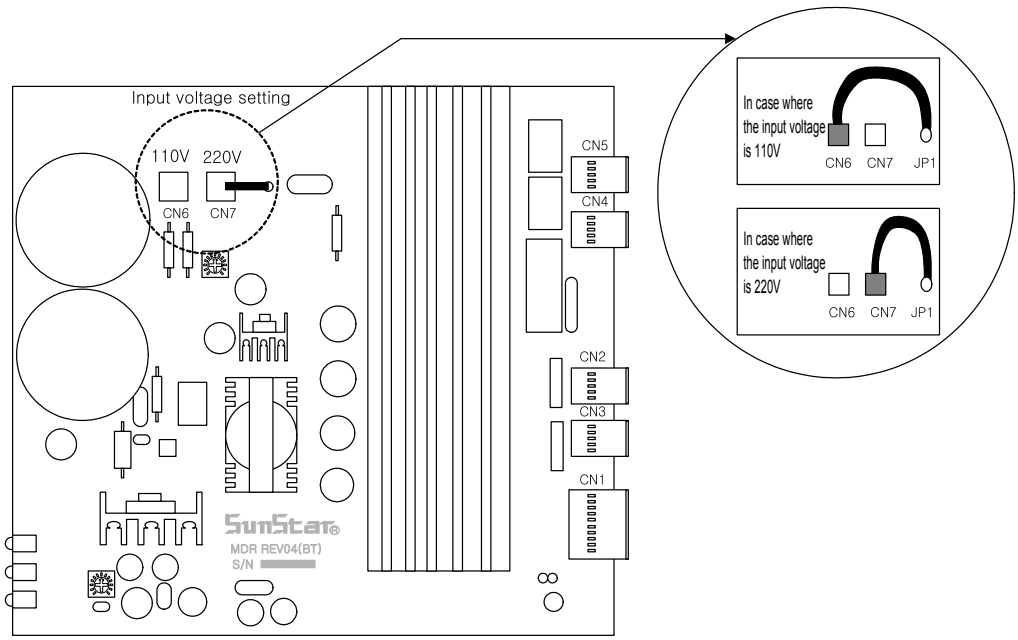
1. Do not use if the voltage specification is different.
2. If voltage change is necessary, see "How to Change Power Voltage."
   - 1-phae connection (100V, 110V, 120V, 200V, 220V, 240V)
   - 3-phase connection (200V, 220V, 240V, 380V)

Notice	· In case of 3-phase 380V, a separate transformer box shall be installed on the table. (Please check it out when placing an order.)

3-2) How to Change Power Voltage

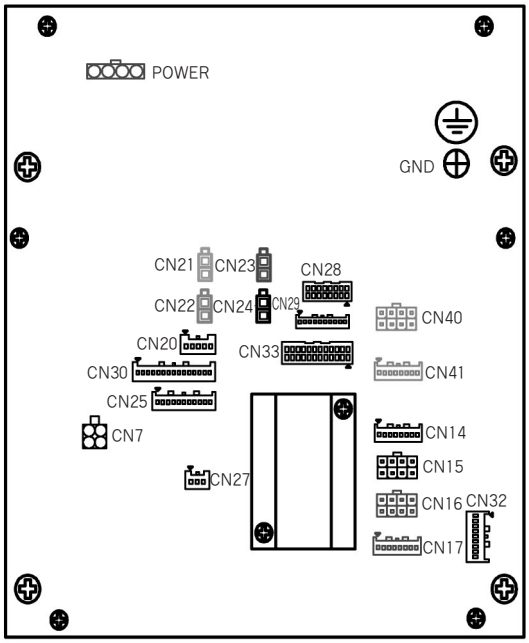
- Use SMPS to maintain constant voltage, while the input voltage is changed.
- Since free voltage is used, according to the input voltage, the switch connector shall be used to change the voltage of the main board between 110V and 220V.

Notice	· If the setting of the voltage switch connector is wrong, it may cause damage to the control box.

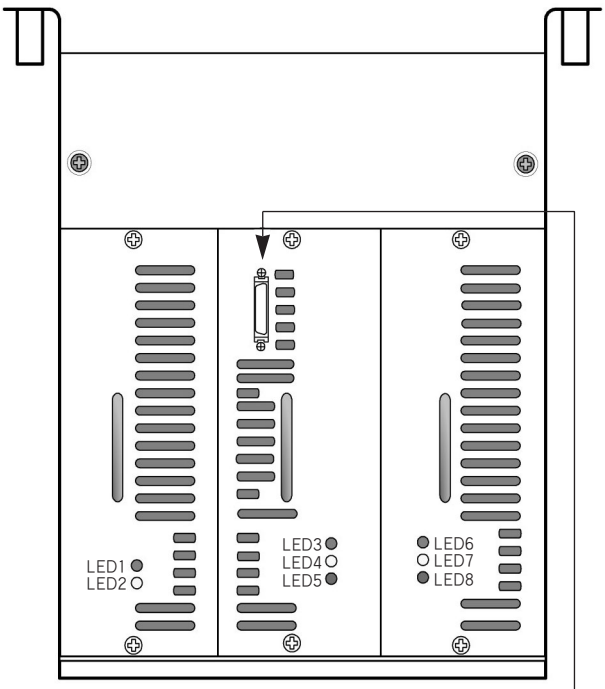


4

CONTROL BOX CABLE CONNECTION



[Rear Cover of Control Box]



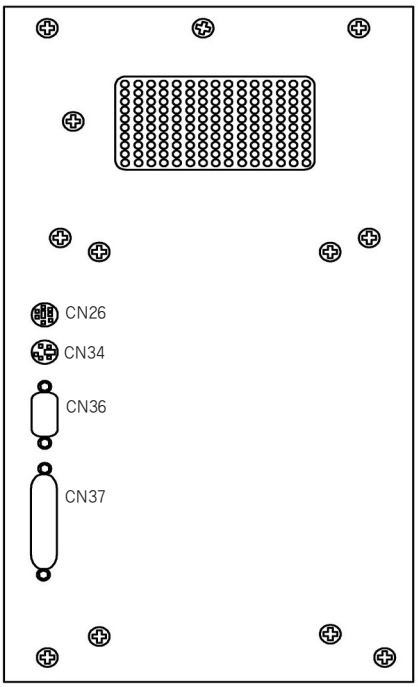
[Front Cover of Control Box]

Product No.	Cable Name
-	External FDD Box Connection Cable

Product No.	Cable Name	Control Box Connector
10	P-shaft Step Motor Connection Cable	CN40, CN41
11	X-shaft Step Motor Connection Cable	CN14, CN15
12	Y-shaft Step Motor Connection Cable	CN16, CN17
13	X-Y Sensor and Emergency Stop Cable	CN30, CN20
14	Sensor Input Cable	CN33
17	Pneumatic Switch Output Cable	CN23
19	P-shaft Proximity Sensor Cable	-
20	Head Safety Switch Cable	-
21	Thread Detection Cable	-
22	Grounding Cable	Connection to GND
-	External Power Input Cable	Connection to Power

※ Specifications of Ancillary I/O Connector

Connector Name	Connector Name
CAN Communication Connector	CN27
Pneumatic Output Connector 2	CN29
Signal Output Connector	CN25



[Right Side Cover of Control Box]

Product No.	Cable Name	Control Box Connector
-	F3 PU Connector	CN26
-	Embedded Synchro Connector	CN34
-	Main Shaft Encoder Connector	CN36
8	OP Unit Connector	CN37

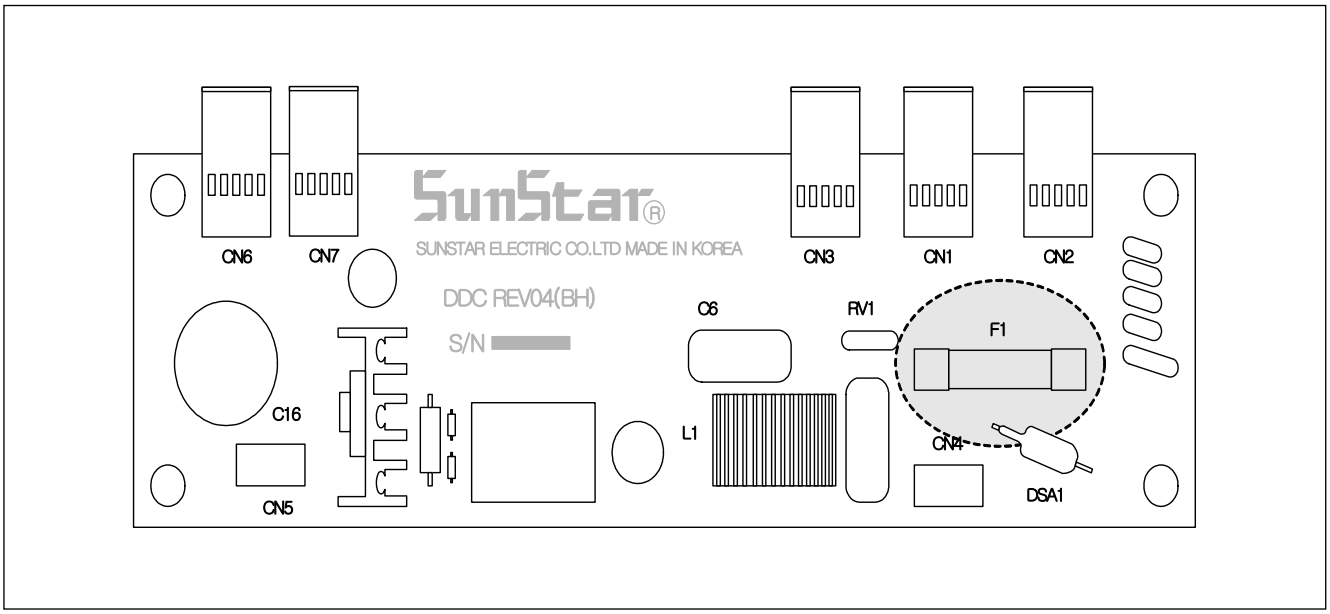
※ When connecting to F3 PU, remove the D-SUB connector, which is linked to the CPU card.

5

FUSE EXCHANGE

Caution	■ Open the cover 5 minutes after a power shutting off in order to prevent an electric shock. ■ You should change for a fuse of the specified capacity to open the control box cover after shutting off the electric power certainly.

1) The parts to connect fuses are shaded.



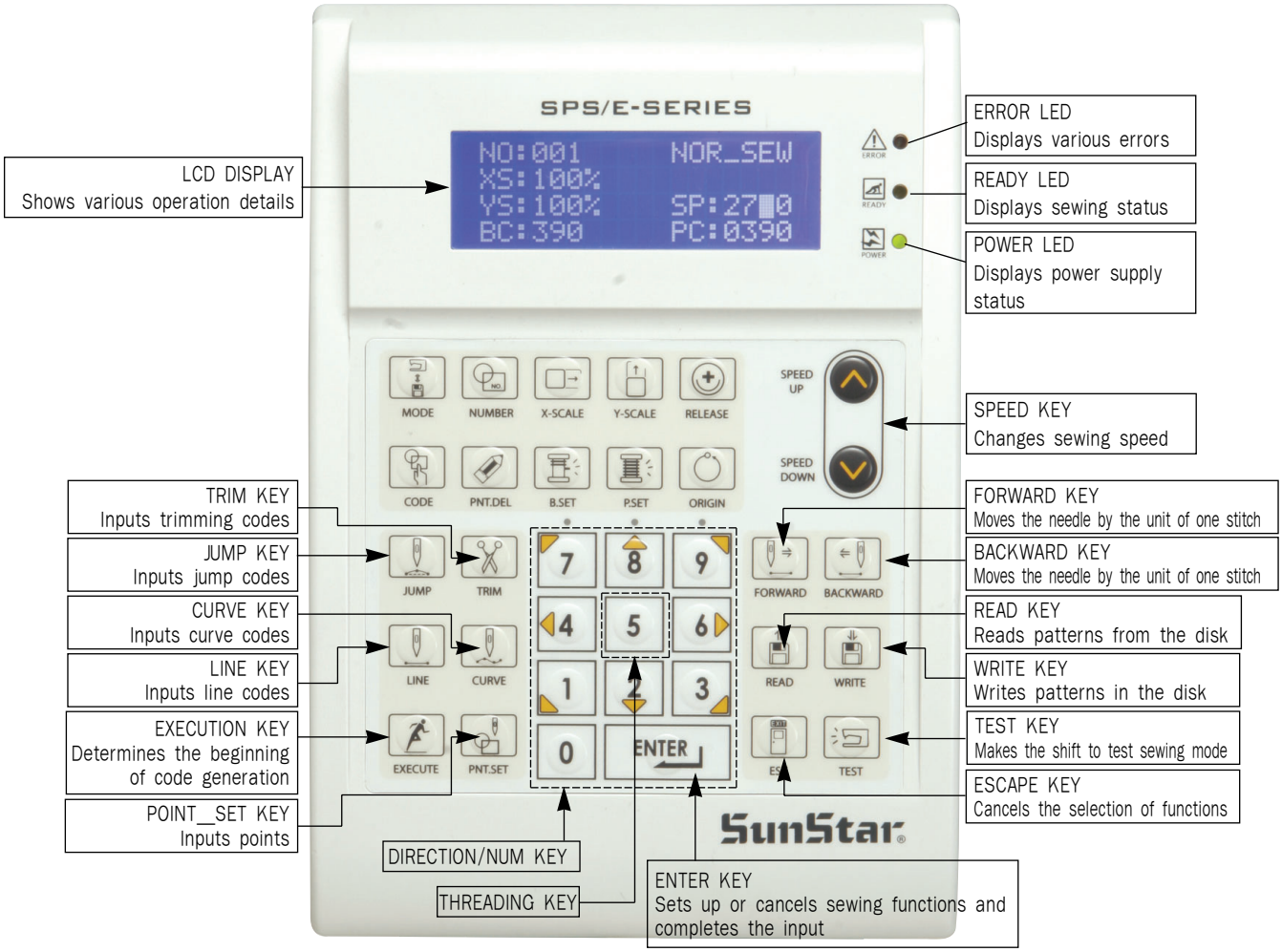
2) Capacity and usage of the fuse

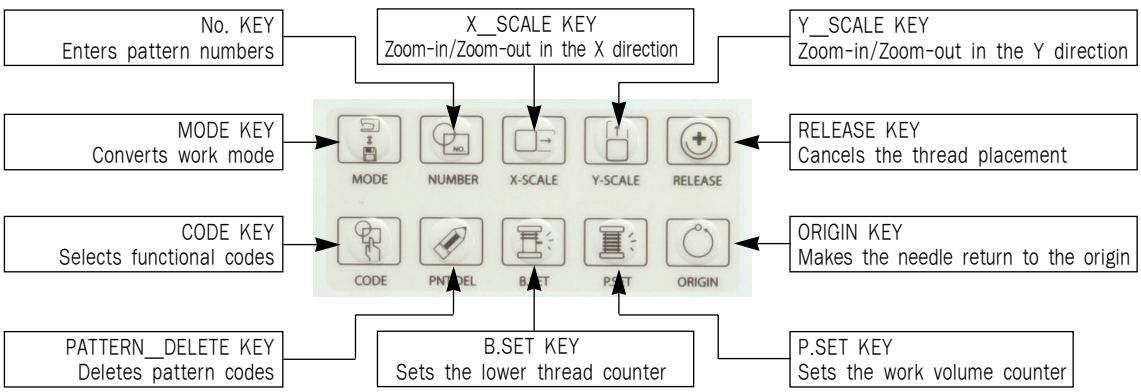
No.	Capacity	Usage
F1	15A	For protection of the main power

6

BASIC OPERATIONAL METHOD

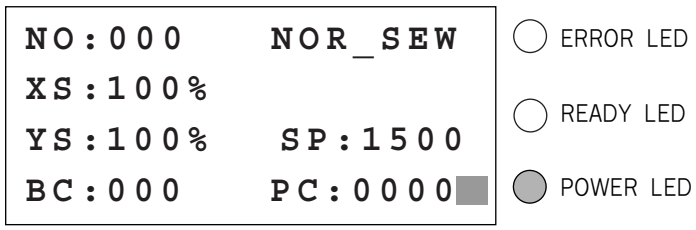
1) Name and Roles of Each Key on Operation Unit





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] ~2700[SPM])
※ Maximum sewing speed varies depending on the sewing machine. See "Setting-Up the Speed".

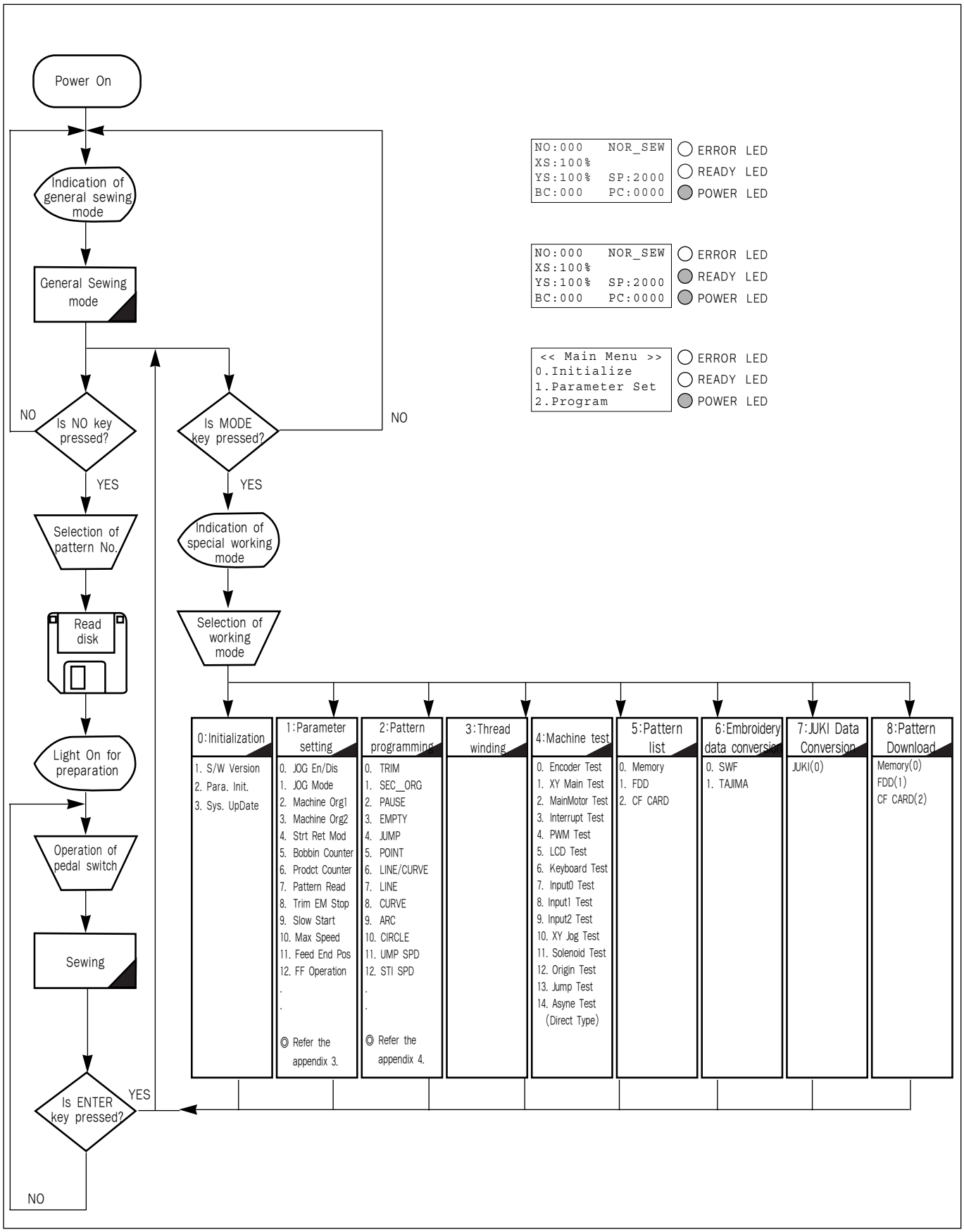
H. "BC" : It indicates setting value of bottom thread exchange counter. You can change the value at your option by using digit key after pressing down B. SET key. (000 ~ 999)

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)

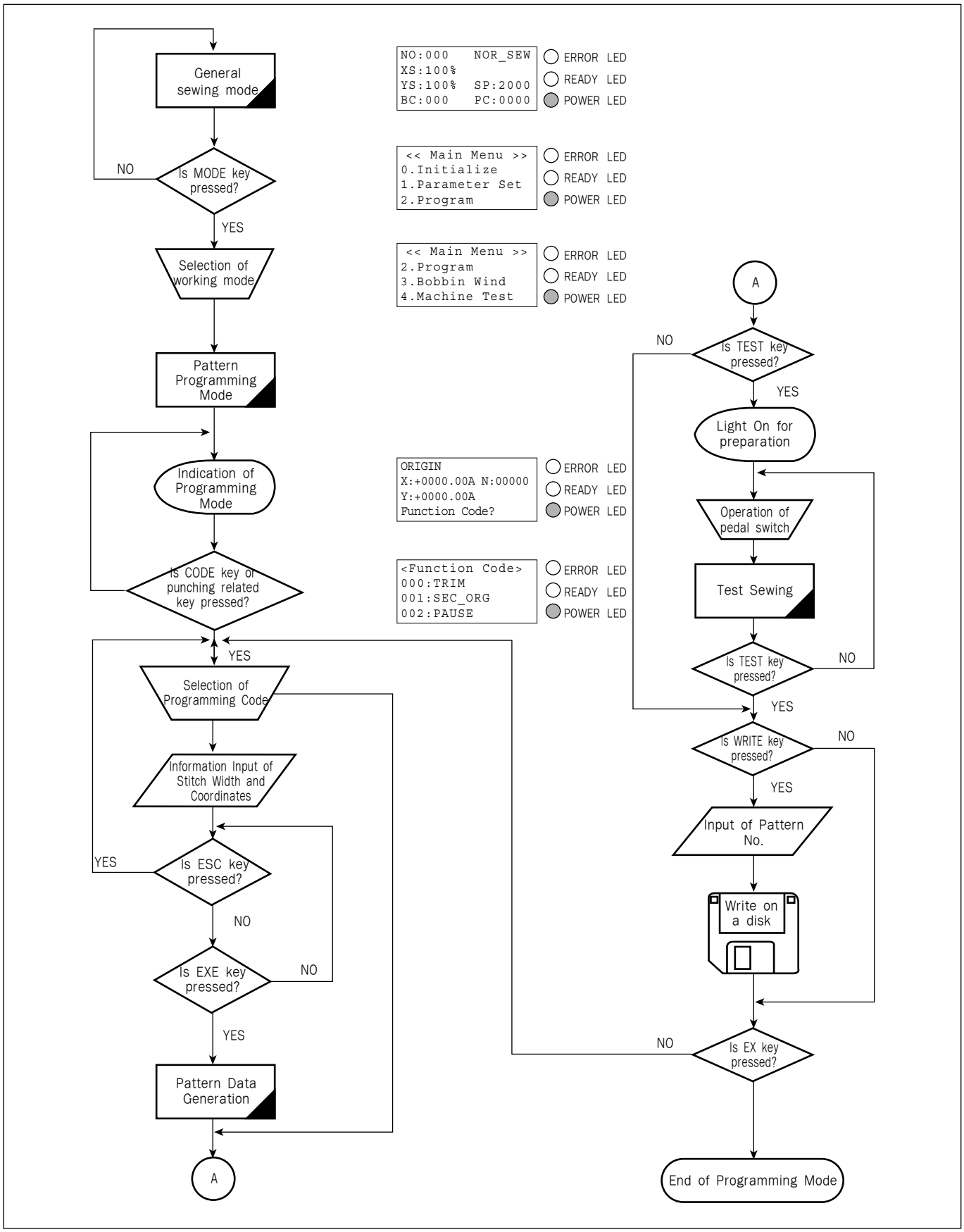
J. "NOR_SEW" : It shows working condition. General sewing and chain sewing are available.
" NOR_SEW" indicates the general sewing and "CHN_XX" means chain sewing.

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

3) Flow Chart of General Operation



4) Work Flow of Pattern Programming



5) Storage Media

5-1) CF CARD

Multi-purpose CF Card can be used. CF Card refers to Compact Flash Memory, and it is widely used as a storage media.
SunStar offers 128M CF Card, which has 90 times bigger capacity compared with a floppy diskette.
Users can purchase CF Card like a floppy diskette. Regardless of the size of patterns, it can be used, but when the pattern has a large capacity, it might tale more time to read and write.

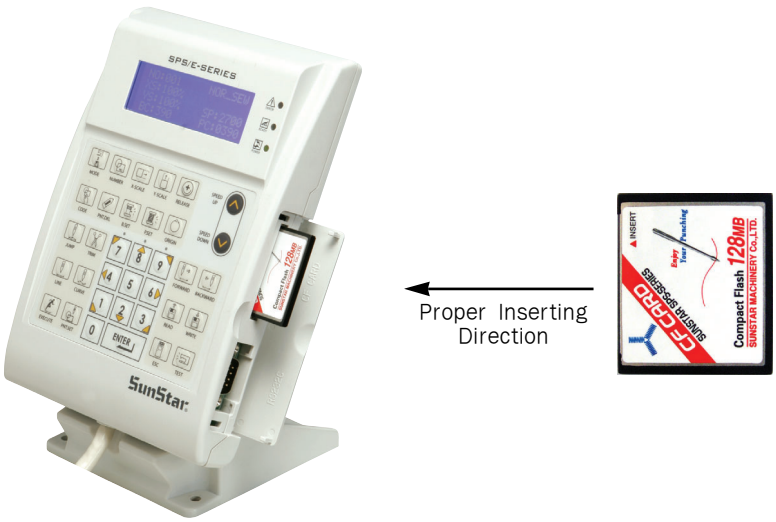
When a user saves designs in CF Card, "SPS" folder is automatically generated, and designs are saved within the "SPS" folder. The method of using it is same to that of a floppy diskette.

In addition, to access CF Card from PC, CF Card reader is required. CF Card Reader is a multi-purpose device and can be easily purchased. For purchase, contact the nearest PC supplies store.

To use a commercial CF Card, make sure the formatting method is either FAT or FAT16. In general, the commercial CF Card is formatted as FAT32. CF Card can be formatted again on PC by using CF Reader.

> **Notice**
>
> Sometimes, the reading error of CF Cards occurs. It may result from the fact that they are manufactured by different companies. When problems occur, replace the CF Cards which developed problems with the CF Cards of other manufacturer.

① Keep CF Card away from the articles emitting magnetism like TV or magnet.
② Keep CF Card away from heat, humidity, and direct sunlight.
③ Do not remove CF Card from the disk drive during formatting or while data input/output is conducted.
④ Check whether CF Card is properly inserted.
⑤ Do not insert CF Card while the machine power is on. If not, error might occur.

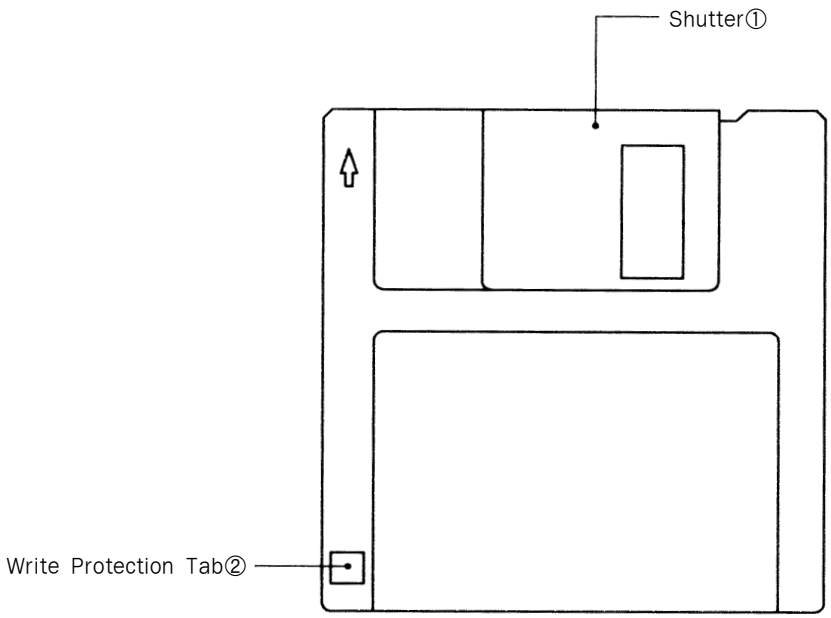


5-2) Floppy Diskette (Option specifications)

When handling a floppy diskette, the following should be strictly observed.

Notice	It is possible to use a floppy diskette available in the market, but make sure to use the certified product.

① Keep a floppy diskette away from the articles emitting magnetism like TV or magnet
② Keep a floppy diskette away from heat, humidity, and direct sunlight.
③ Do not place heavy objects on the floppy diskette.
④ Do not remove the floppy diskette from the disk drive during formatting or while data input/output is conducted.
⑤ Do not keep the cover of the floppy disk drive open.
⑥ If the write protection tab is open, data input to the floppy diskette is not allowed.
⑦ If read and write operations are repeatedly conducted by using one floppy diskette, it might develop an error.
⑧ It is safer to save important design data in two floppy diskettes.



6) Reading design patterns from a floppy diskette or CF Card

※ 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 diskette or CF Card which has sewing patterns into the appropriate 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])

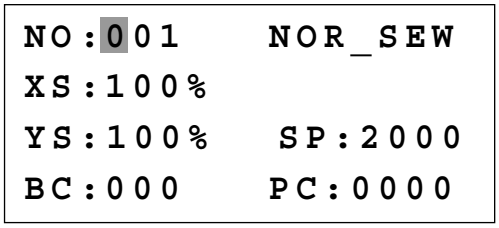
C. Press ENTER↵key. Read the pattern and change to sewing available mode.

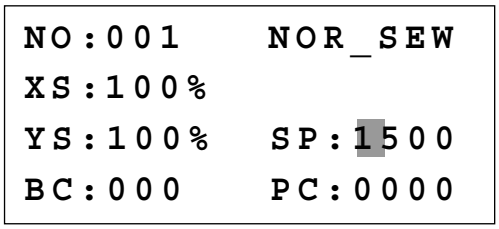
D. At the moment, the upper thread plate comes to descend, then ascend again after moving to the sewing start point. The READY LED comes to light on.

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.





※ Target drive can be set at Parameter 076. SAVE TYPE. To read patterns from CF Card, select 'CF Card'.

7) Checking sewing patterns read from a floppy diskette or CF Card

A. Insert a floppy diskette or CF Card into the floppy drive or CF 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]) To read pattern numbers, the memory type setting should be done in advance to read it on 076. SAVE TYPE.

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.

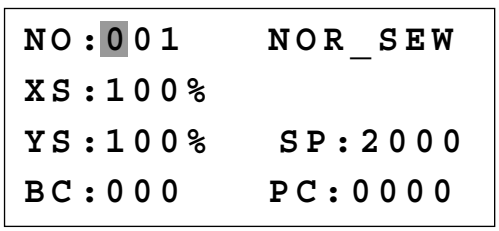
F. If you step on the pedal switch on the right side, the upper feed plate comes to descend.

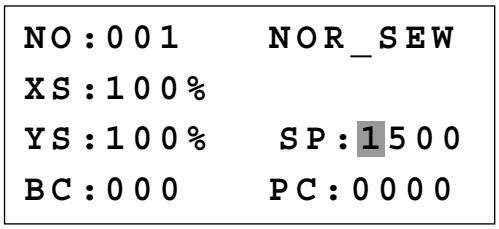
G. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. If you press continuously, it moves to the start or to the end of pattern data consecutively.

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.





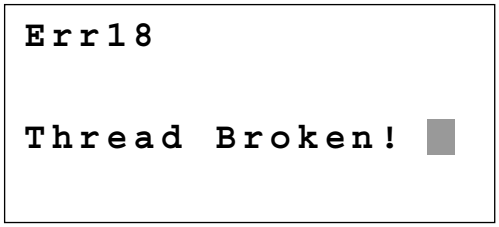
8) When a Machine Stops Operating During Sewing by the Thread Cut

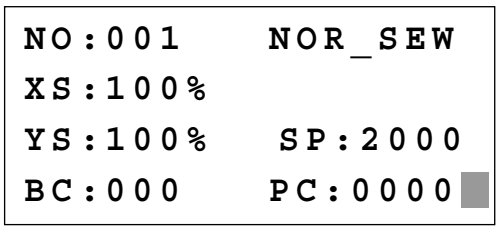
A. You can get the screen like a figure on the right side.

B. If you want to sew continuously at the same position, insert thread again, then step on the left pedal switch. If you want to sew at the 1 stitch forward or backward point, after moving by using FORW and BACK key and 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.

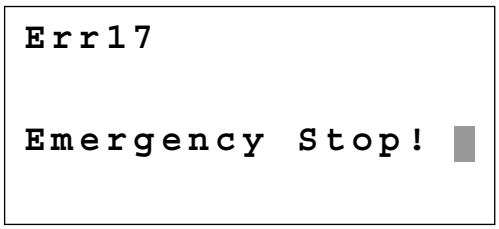
D. When you finish operating, the machine backs to the origin or sewing start point, and the upper feed plate comes to ascend.





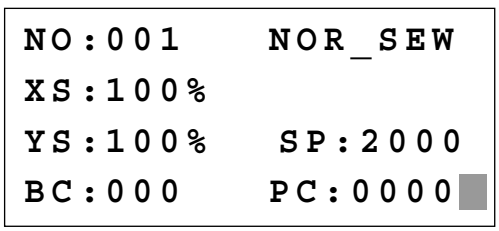
9) Emergency Stop During Operation

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.

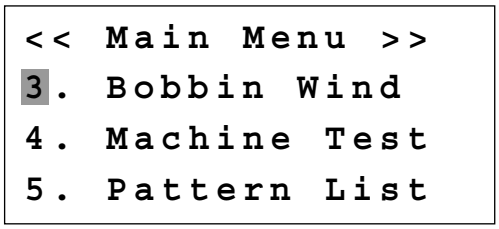


10) Winding the Thread

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

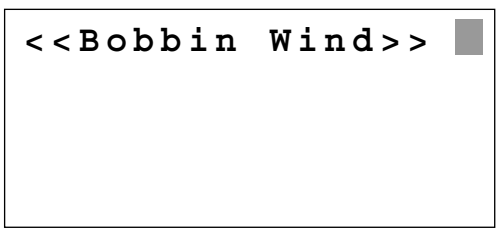
B. Press MODE key.

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 the left pedal switch or ESC key.



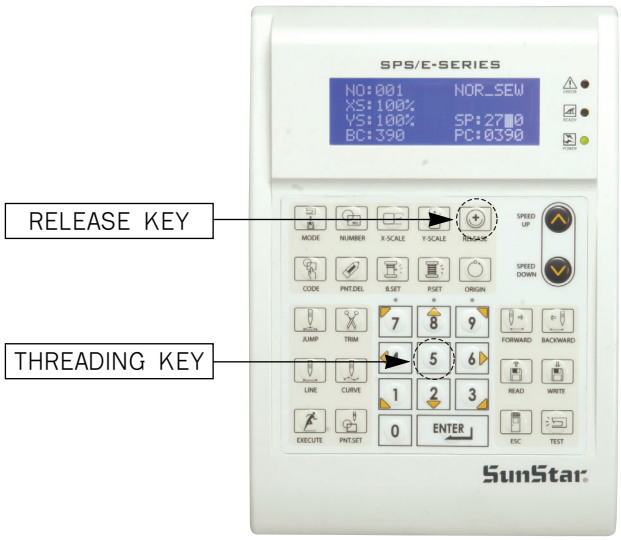
11) Safety Functions

11-1) Threading and Cancellation Key

When the sewing machine is in the ready position, press No. 5 key for threading (the presser foot and the clamp descend). While threading, a user might mistakenly step on the operation pedal, and start the operation, causing a safety problem. To prevent accidents, the function to freeze the operation after threading was added.
However, to cancel, press the release key.

A. Sewing ready position

```
NO:001    NOR_SEW
XS:100%
YS:100%   SP:1500
BC:001    PC:0001
```



B. Press No. 5 key for threading. The following message is displayed on the screen, and all keys become disabled. The sewing operation pedal switch is also disabled.

```
Threading...
  To Release...
Press(5) again!
```

C. However, to cancel, press the release key.

D. When the safety mode is cancelled, the screen returns to the original status.

```
NO:001    NOR_SEW
XS:100%
YS:100%   SP:1500
BC:001    PC:0001
```

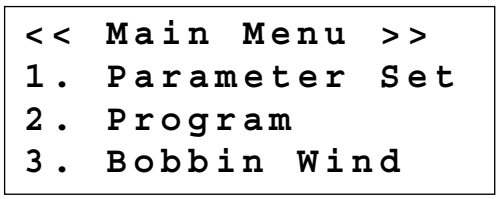
11-2) Emergency Stop, Thread Sensing or Pause Code.

In order to provide maximum safety to users, when a sewing machine is stopped due to emergency stop, thread sensing or pause code, the operation of the pedal start switch, the clamp up/down switch and the operation box keys become disabled. When the safety mode is cancelled, the keys are enabled again and the sewing machine operation is back to normal.
To cancel the safety function, press the "EXCUTE" key on the left bottom of the OP Box. When this key is pressed, the sewing machine operation will go back to normal.

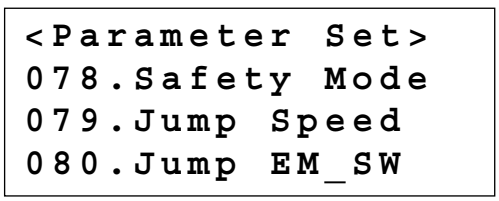
When the sewing machine is stopped in relation to emergency stop, thread sensing or pause code, the clamp takes the down position.

The safety mode can be set as follows:

A. Press MODE and move to "Parameter Set" on the Main Menu.



B. Press ENTER↵ to get into "Parameter Set". Move to "078. Safety Mode".



C. The default value is 1) DISABLE.

D. To activate the safety mode, move the cursor to 2) ENABLE and press ENTER↵.

E. If the setting is completed, the safety mode will be enabled in time of emergency stop, thread sensing or pause code while sewing is conducted.

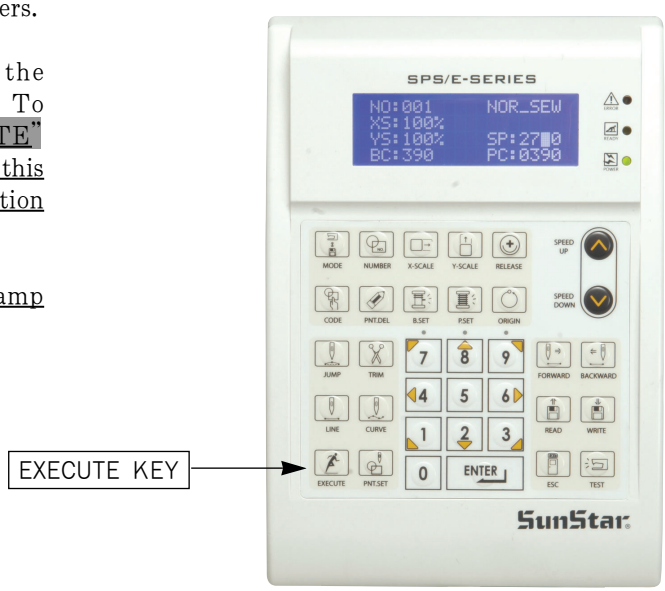
F. The following shows an example of situations where the safety mode is activated. Thread is broken in the middle of sewing.

When the thread is sensed, an alarm is issued and the OP Box displays the following message. While the message is displayed on the OP Box screen, Pedal Start Switch, Clamp Up/Down Switch, and Keys of the OP Box remain disabled in order to protect users.

Only when the exit key is entered, the functions mentioned above are operable. To cancel the safety mode, press "EXECUTE" on the left bottom of the OP Box. When this key is pressed, the sewing machine operation will go back to normal.

While the safety mode is effective, the clamp is located down.

```
Err18

Thread Broken!
Press EXE Key
```



EXECUTE KEY

G. To cancel this function, press EXCUTE Key on the OP Box. This is the message you can see on the OP Box screen.

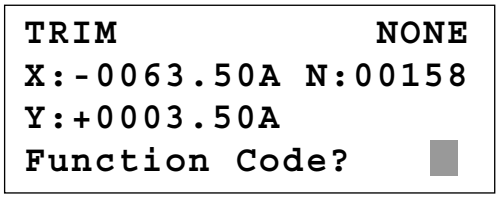
After the function is cancelled, the sewing machine can be operated again.

```
Sewing is ready
OK!
```

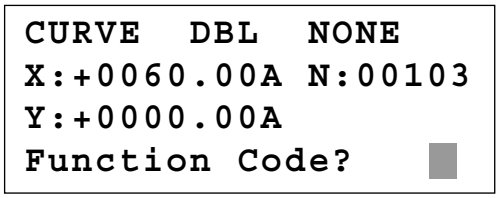
H. Sewing can be started by pressing the Pedal Start Switch.

```
NO:003    NOR_SEW
XS:100%
YS:100%   SP:2000
BC:100    PC:0000
```

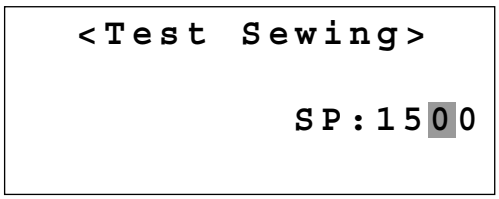
I. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and you can see the screen like a figure on the right side.



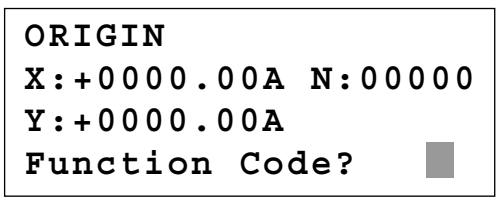
J. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press continuously, it moves to the start or to the end of pattern data consecutively.



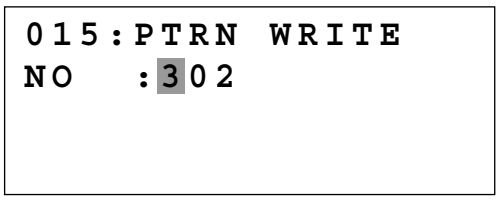
K. Press TEST key.
The upper feed plate comes to ascend and moves to origin, then goes up. After that, READY LED lights up. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch 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.

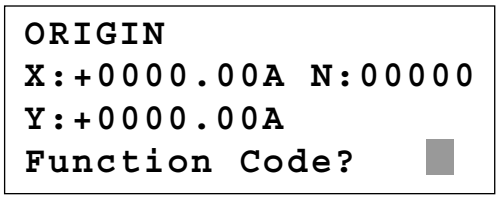


L. Press TEST key one more time and finish the test sewing. Then, the upper feed plate comes to descend and moves to origin with the turning on the READY LED.

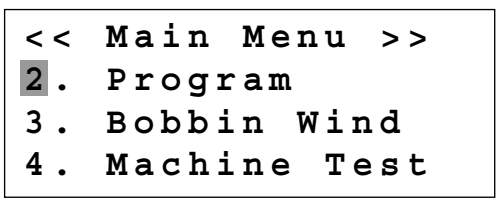


M. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵ key. Then, save the generated pattern data in a floppy diskette as a relevant number.(For example, if you want to save a pattern number as 302, input [3][0][2].)
During saving the data, READY LED flickers.
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.





N. 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.

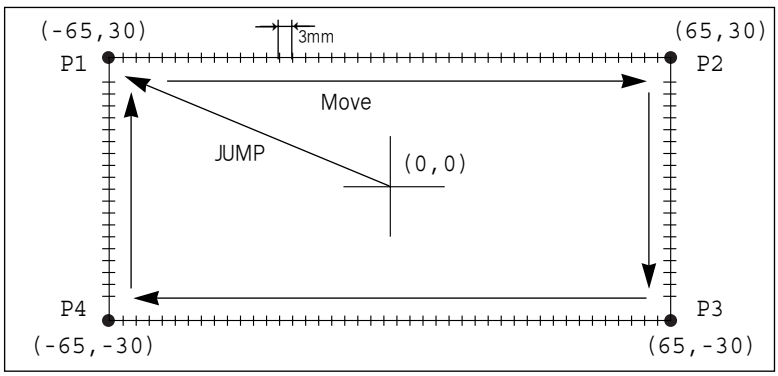


7

APPLICABLE OPERATION

1) Pattern Data Generation Function

1-1) Program Example 1 : Generating the Square Pattern



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.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
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:-0065.00
Y:+0030.00
N:001
```

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

```
JUMP                NONE
X:-0065.00A N:00065
Y:+0030.00A
Function Code?
```

F. After pressing LINE key, 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].)

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

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

```
007:LINE
X:-0065.00
Y:+0030.00
N:004
```

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

```
LINE              NONE
X:-0065.00A N:00193
Y:+0030.00A
Function Code?
```

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.

```
TRIM              NONE
X:-0065.00A N:00194
Y:+0030.00A
Function Code?
```

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 continuously, it moves to the start or to the end of pattern data consecutively.

```
LINE              NONE
X:-0065.00A N:00193
Y:+0030.00A
Function Code?
```

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.

```
  <Test Sewing>

        SP:1200
```

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.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

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.

```
015:PTRN WRITE
NO   :300
```

N. If there already exists the pattern number that you want to save in a floppy disk, 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.

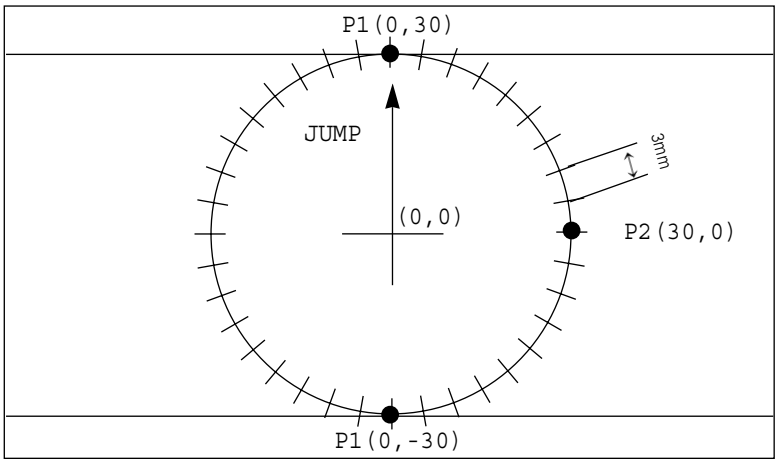
```
Pattern Exist!
OverWrite?
Y(ENTER)/N(ESC)
```

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:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

1-2) 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.

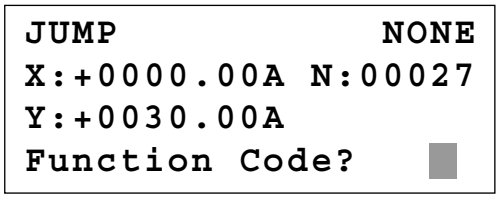
```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

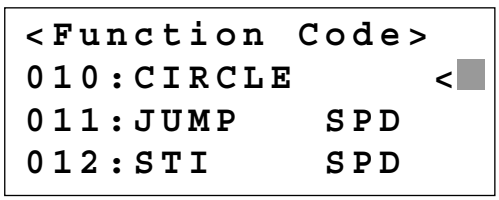
D. After pressing JUMP key, move to a random coordinates (For example, X:0000.00, Y:0030.00) that passes on circle by using direction keys. Then, press PNT SET key.

```
004:JUMP
X:+0000.00
Y:+0030.00
N:001
```

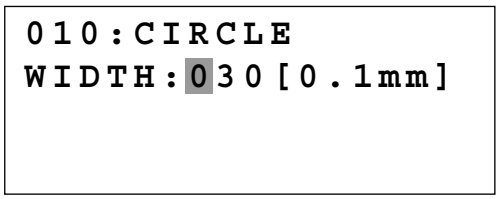
E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



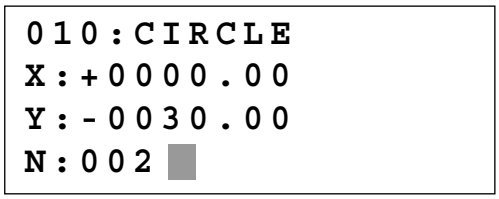
F. After pressing CODE key, if you know function codes related to pattern programming, input three digit number, but if not, move to "10. Circle" by using direction keys ▲ ▼ after pressing ENTER↵key, then press ENTER↵key again.



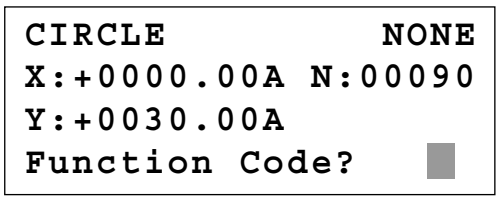
G. Input the stitch width by using the digit keys, then press ENTER↵key. (For example, if you want to set the stitch width as 3mm, input [0][3][0].)



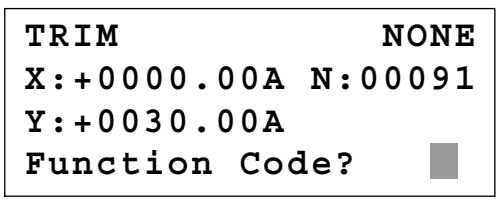
H. Move to the second random coordinates that passes on a circle (For example, X:0030.00 Y:0000.00) by using direction keys, then press PNT SET key. Same as above, move to the third random coordinates that passes on a circle (For example, X:0000.00 Y:-0030.00), then press PNT SET key. Whenever you press PNT SET key, the number of screen increases.



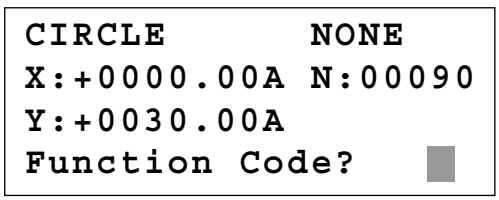
I. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



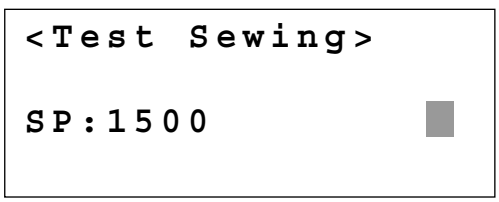
J. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and replace the screen like a figure on the right side.



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 continuously, it moves to the start or to the end of pattern data consecutively.



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.

N. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵key. Then, save the generated pattern data in a floppy diskette as a relevant number. (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.

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:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

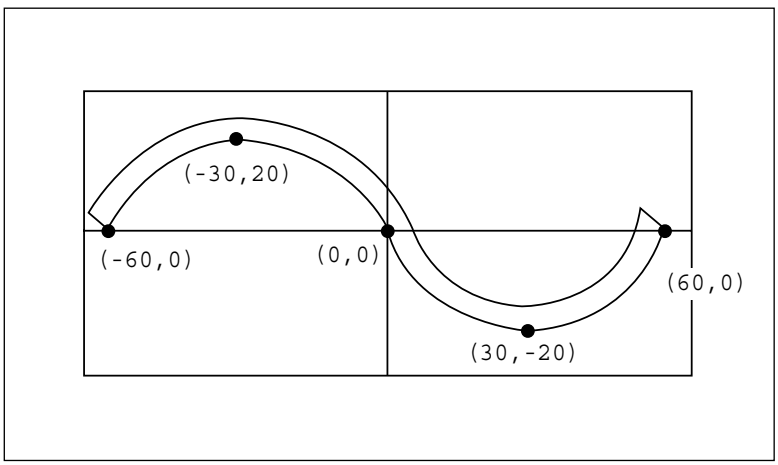
```
015:PTRN WRITE
NO   :301
```

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

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

1-3) 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.

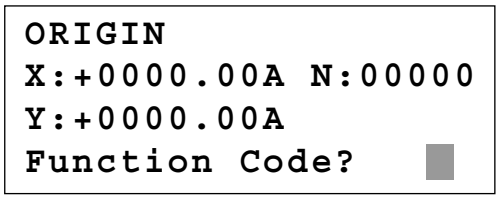


A. Insert a floppy disk into a floppy disk drive.

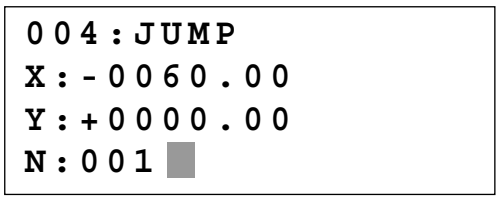
B. Press MODE key.

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

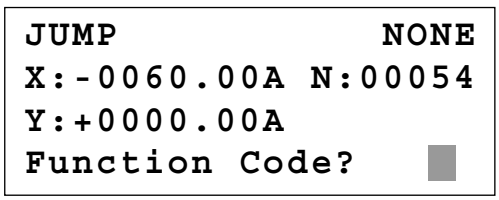
C. Move to "2. Program" by using digit keys ▲ ▼, then press ENTER↵ key. At this time, the upper feed plate comes to descend and moves to the origin.



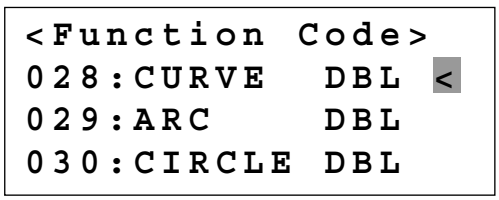
D. After pressing JUMP key, move to a random coordinates (For example X:-0060.00, Y:-0000.00) that passes on a circle by using direction keys. Then, press PNT SET key.



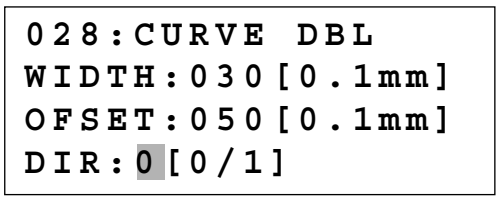
E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



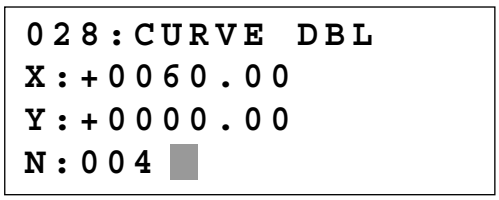
F. After pressing CODE key, If you know function codes related to pattern programming, input three digit number, but if not, move to "28. Curve DBL" by using direction keys ▲ ▼, after pressing ENTER↵ key, then press ENTER↵ key again.



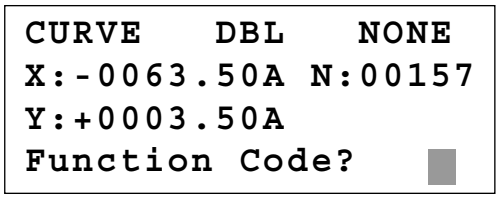
G. Input the stitch width by using the digit keys, then press ENTER↵ key. (For example, if you want to set the stitch width as 3mm, input [0][3][0].) Input the distance between the two curves by using digit keys, then press ENTER↵ key. (For example, if you want to set 5mm, input [0][5][0].) Input a direction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



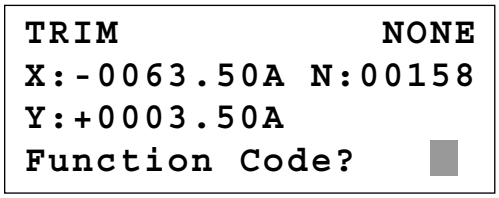
H. Move to the next coordinates (For example, X:-0030.00 Y:0020.00) by using direction keys, then press PNT SET key. Same as above, move to the other three coordinates in turns by using direction keys and press PNT SET key. At this time, whenever you press PNT SET key, the number of screen increases.



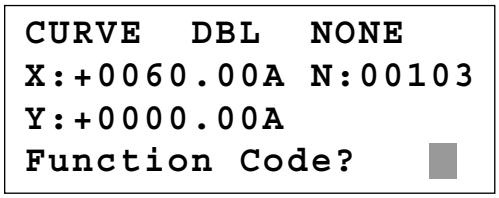
I. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data. At this time, the sewing machine discontinues for a while.



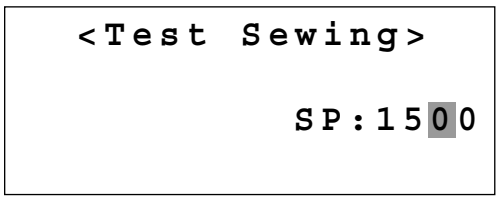
J. Press TRIM key to input the trimming code. Then, "000:TRIM" appears on the screen for a little while, and you can see the screen like a figure on the right side.



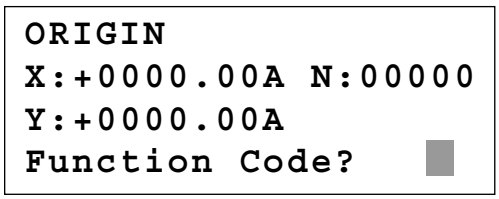
K. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press continuously, it moves to the start or to the end of pattern data consecutively.



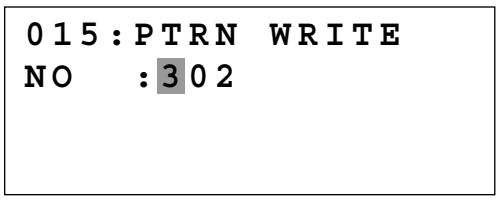
L. Press TEST key.
The upper feed plate comes to ascend and moves to origin, then goes up. After that, READY LED lights up. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch 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.

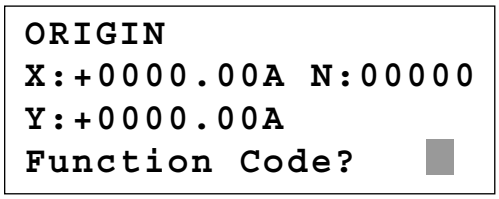


M. Press TEST key one more time and finish the test sewing. Then, the upper feed plate comes to descend and moves to origin with the turning on the READY LED.

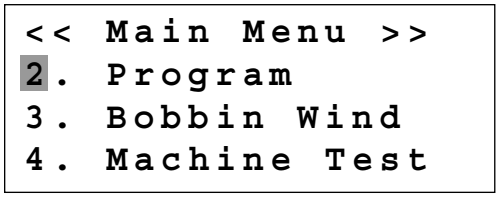


N. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵ key. Then, save the generated pattern data in a floppy diskette as a relevant number.(For example, if you want to save a pattern number as 302, input [3][0][2].)
During saving the data, READY LED flickers.
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.



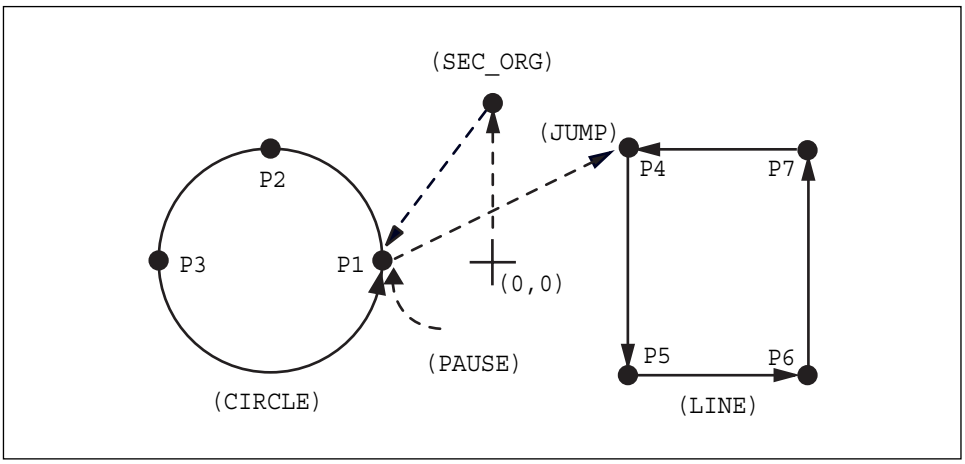


O. For finishing a pattern generation, press MODE key. Then, the upper feed plate comes to ascend after moving to origin. Press ESC key to back to the initial screen.



1-4) 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:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

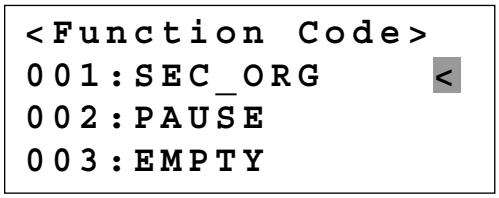
D. After pressing JUMP key, make the second origin move to the coordinates (For example, X:+0000.00 Y:+0030.00) you want by using direction keys, then press PNT SET key.

```
004:JUMP
X:+0000.00
Y:+0030.00
N:001
```

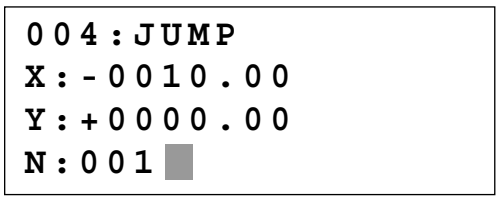
E. By pressing EXE key, after operating the pattern data, the feed plate moves according to the operated pattern data.

```
JUMP                NONE
X:+0000.00A N:00027
Y:+0030.00A
Function Code?
```

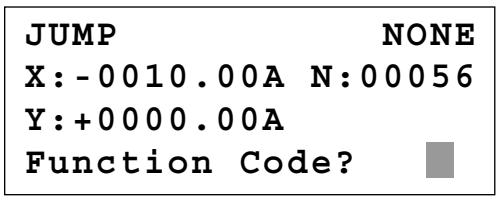
F. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "001: SEC_ ORG" by using direction keys ▲ ▼, then press ENTER↵key again.



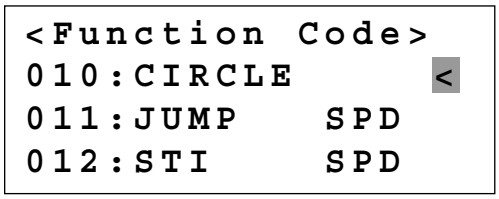
G. After pressing JUMP key, move to one random coordinates that passes through circle (for example, X:-0010.00, Y:+0000.00), then press PNT SET key.



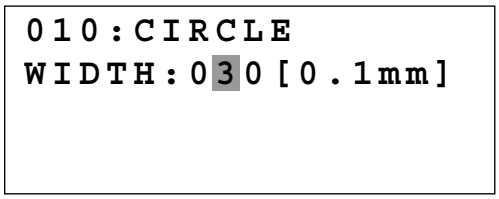
H. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



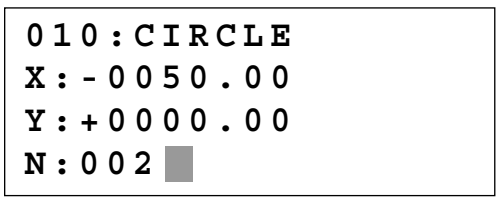
I. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "010: Circle" by using direction keys ▲ ▼, then press ENTER ↵key again.



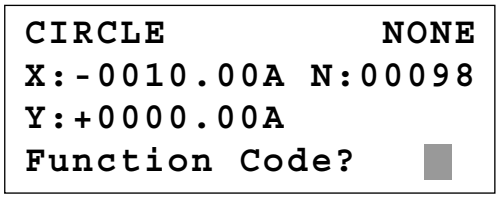
J. By using digit keys, input the stitch width and press ENTER↵key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



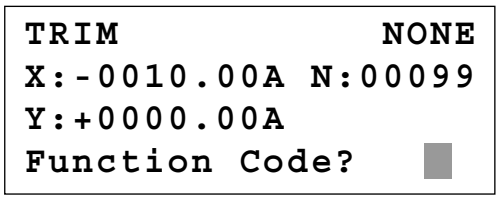
K. By using direction keys, move to the second random coordinates that passes through circle (for example, X:-0030.00 Y:0020.00), then press PNT SET key.
Likewise move to the third coordinates that passes through circle (for example, X:-0050.00 Y:+0000.00), then press PNT SET key.
At this time the number on screen increases whenever you press PNT SET key.



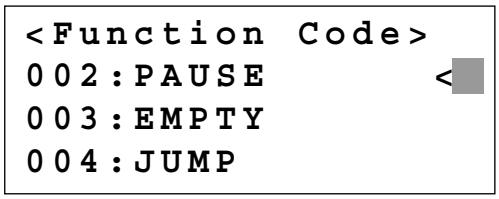
L. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



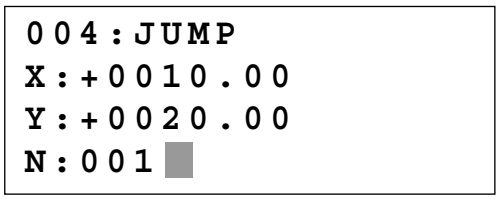
M. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.



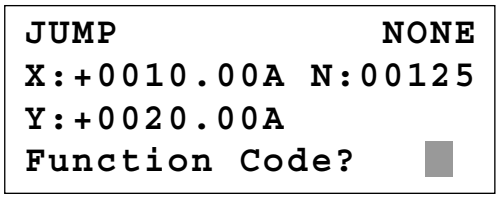
N. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "002: PAUSE" by using direction keys ▲ ▼, then press ENTER ↵key.



O. After pressing JUMP key, move to the one random coordinates of straight line (for example, X:+0010.00 Y:+0020.00)by using direction keys, then press PNT SET key.

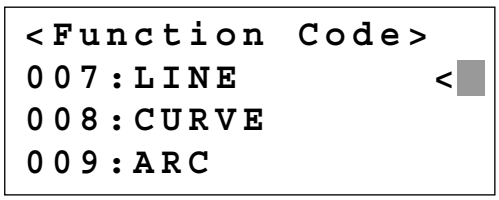


P. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

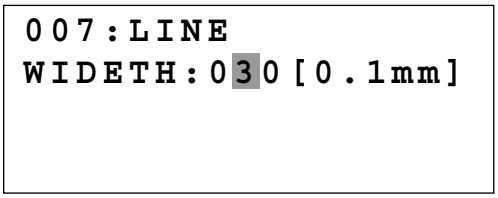


Q. After pressing CODE key.
If you know the function number related to pattern programming, input three-figure number and if you do not know the number, press ENTER↵key and transfer to "007:Line" menu by using direction key ▲ ▼, and then press ENTER↵key.

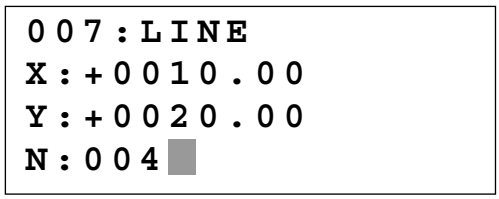
Ref.) "LINE" and "CURVE" function is set to use with hot key on the operation panel and so you may press this key.



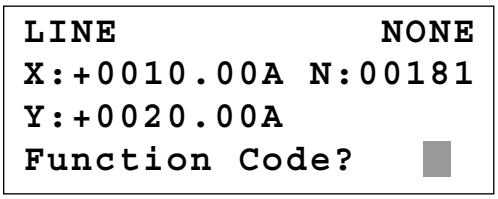
R. By using the digit keys, input the stitch width and press ENTER↵key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



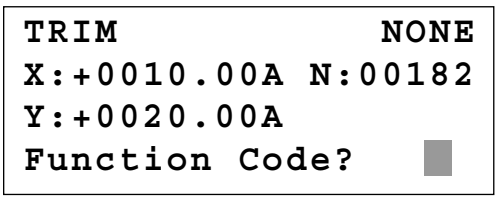
S. By using direction key, move to the another coordinates in turns that passes through line, then press PNT SET key.
At this time the number on screen increases whenever you press PNT SET key.



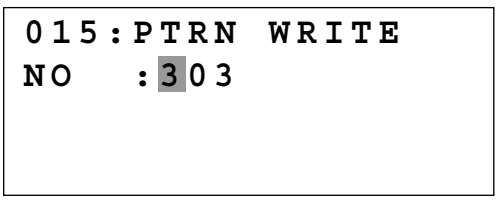
T. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

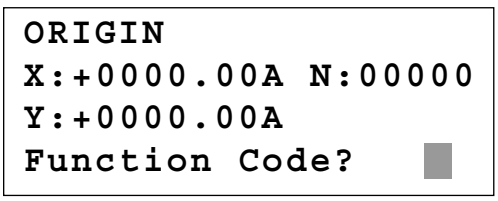


U. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.

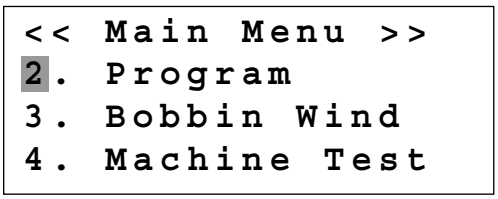


V. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER↵key. Save the generated pattern data in a floppy diskette as a relevant number.
(For example, if you want to save the pattern number as 303, input [3][0][3].) During saving the pattern, the READY LED 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.



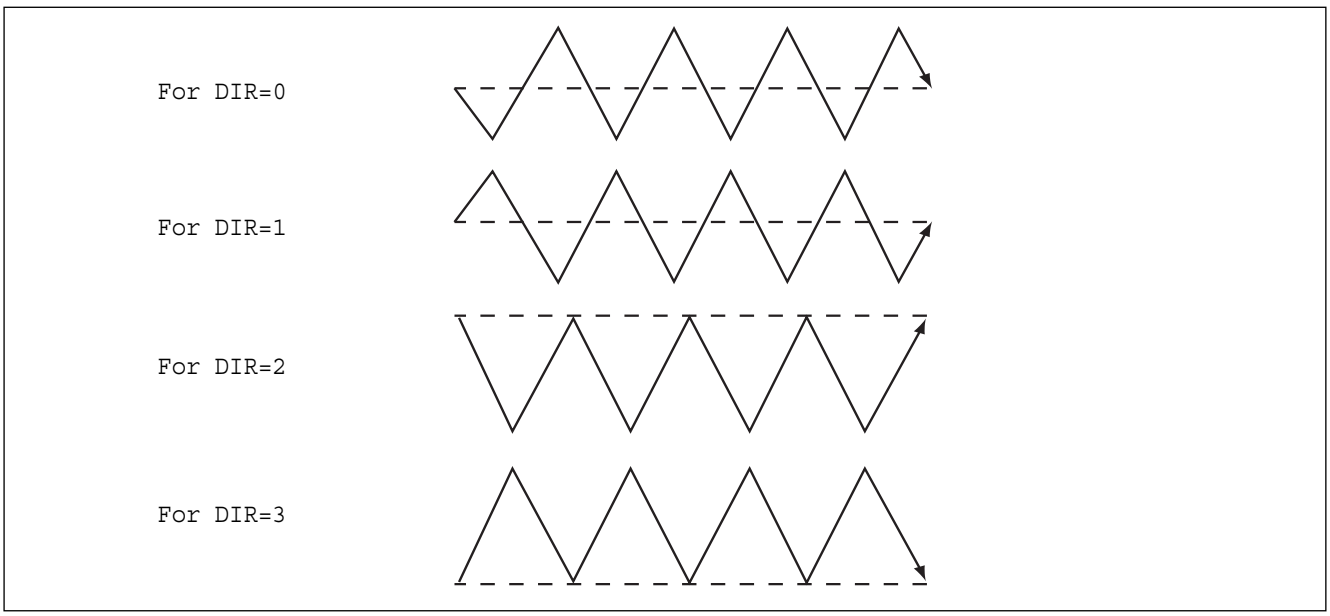


W. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.



1-5) ZigZag Shape Selecting Function to Generate ZigZag

It was made to select 4 kinds of "DIR" values from existing 0/1 to 0/1/2/3 among three parameters inputting to create Line ZigZag, Curve ZigZag, Arc ZigZag, Circle ZigZag and accordingly ZigZag shapes are classified into 4 type.



A. Input floppy diskette into floppy disk driver.

B. Press MODE key.

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

C. Move to "2. Program" menu by using direction key ▲ ▼ and press ENTER↵ key. Then, the upper feed plate comes down and moves the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

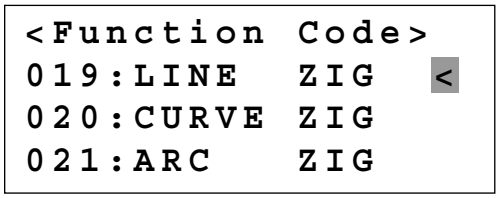
D. After pressing JUMP key, move to the coordinate (for example:X:-0065.00 Y:+0000.00) to locate by using direction key. Then, press PNT SET key.

```
JUMP
X:-0065.00A
Y:+0000.00A
N:001
```

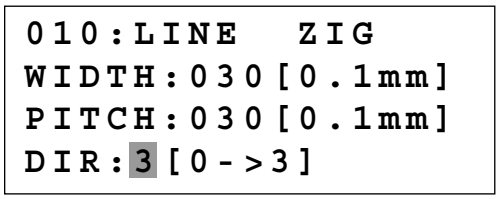
E. If you press EXE key, after calculation on pattern data, feed plate moves according to the calculated data.

```
JUMP              NONE
X:-0065.00A N:00000
Y:+0000.00A
Function Code?
```

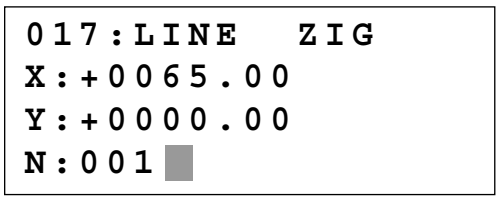
F. After pressing CODE key, if you know the function number related to pattern programming, input three figure digit number and if you do not know the number, press ENTER↵key. Then after moving to "019: LINE ZIG" menu by using direction key, press ENTER↵key.



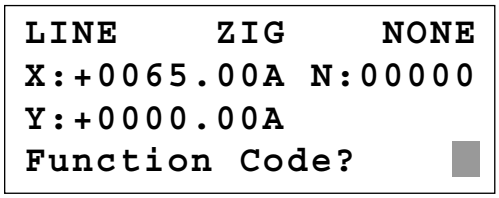
G. Input ZigZag width by using digit key, press ENTER↵key and input ZigZag stitch width. Then, press ENTER↵key and input DIR value by using digit key to select ZigZag shape to create. And press ENTER↵key.



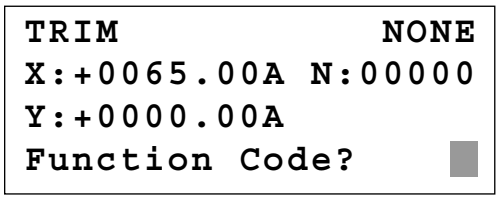
H. Move ZigZag line (Ex: X: +0065.00 Y: +0000.00) to the last sewing coordinate by using direction key again and press PNT SET key.



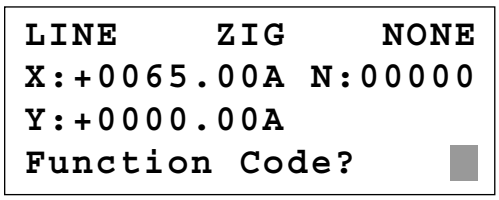
I. If you press EXE key, after calculation on pattern data, feed plate moves according to the calculated data.



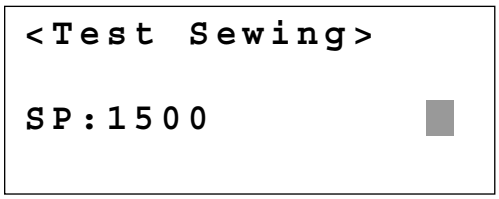
J. Input thread trimmer key by pressing TRIM key. Then "00:TRIM" screen appears for a second and then the screen like the figure in the right side appears again.



K. You can confirm the shape to be actually sewed by pressing FORW key and BACK key. Every time you press once, it moves by one stitch and show work mode and coordinate at the moment. When you want to actually do initial sewing, skip to next. If you press continuously, it moves to the start or to the end of pattern data consecutively.



L. Press TEST key. The upper feed plate moves to the original point or sewing start point and goes up and READY LED is turned on. After adjusting appropriate initial sewing speed by pressing SPEED key, step on the pedal switch in the right. Then, the upper feed plate comes down and stepping on the left pedal, it performs initial sewing. The upper feed plate that completed initial sewing moves to the original point or sewing start point and then goes up.

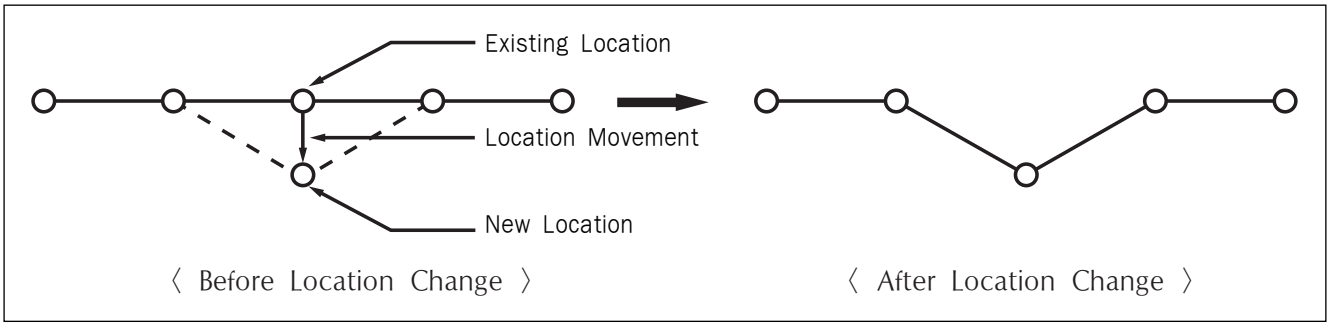


M. The order of saving and completion is the same as the previous example.

2) Pattern Data Edit Function

2-1) One Stitch Movement Function

It uses when correcting the location of one stitch in the formed sewing shape.



A. Insert floppy diskette containing the pattern to change movement of a stitch.

B. Press MODE key.

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

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and move the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to change movement of a stitch by moving the digit key and read in the pattern by pressing ENTER↵key. (For example, to read pattern number 001, input [0][0][1]).

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

E. Go to the location of stitch to correct by using FORW and BACK key.

```
LINE
X:-0000.10A N:00059
Y:+0000.00A
Function Code?
```

F. After pressing CODE key, if you know the function number 051 related to pattern programming, input three figure of digit number and if you do not know the number, press ENTER↵key and move to "051:STITCH DRAG" by using direction key ▲ ▼. Then, press ENTER↵key.

```
<Function Code>
051:STITCH DRAG<
052:STITCH DEL
053:MOV SEWSTAR
```

G. Move to the location desired movement of one stitch by using direction key.

※ X-Y coordinate value is different according to location of needle.

```
051:STITCH  DRAG
X:-0000.10
Y:-0006.00
N:000
```

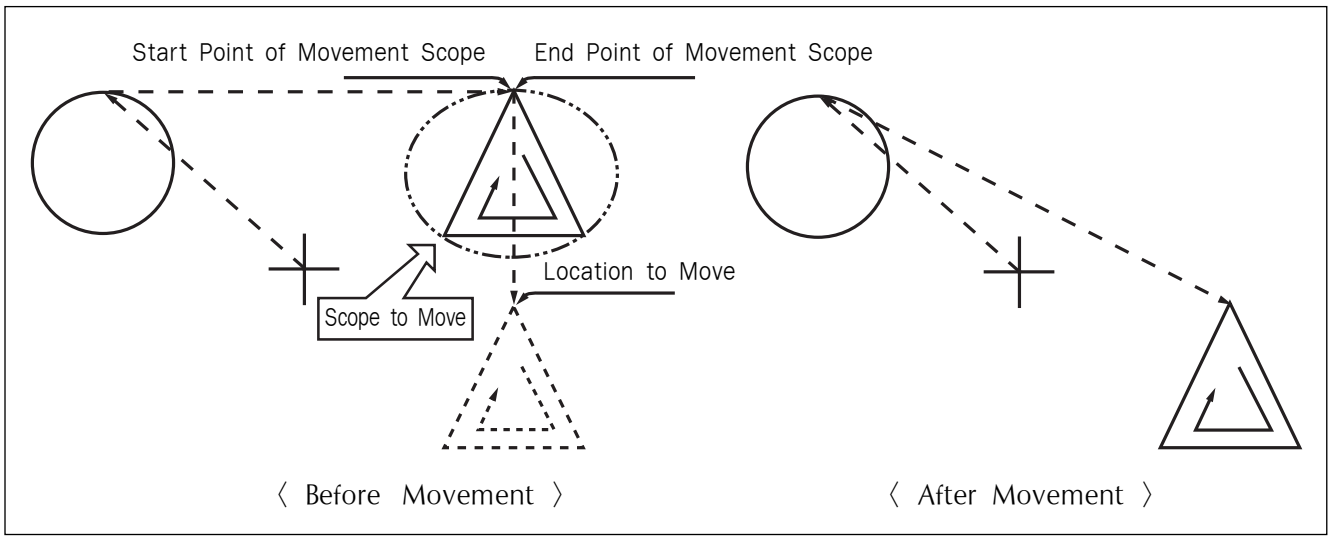
H. If you press EXE key, change to new needle location is completed.

I. Confirm if needle location was changed to the desired location by using FORW and BACK key.

```
LINE
X:-0000.10A N:00059
Y:-0000.60A
Function Code?
```

2-2) Partial Movement Function of Pattern Data

Move part of pattern to different location among the sewing shape.



A. Insert partial pattern data into the floppy diskette containing the pattern to move and change.

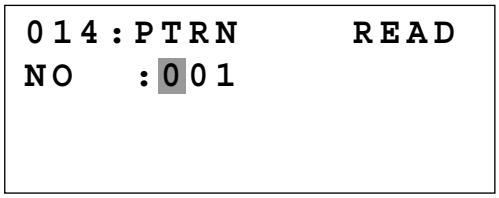
B. Press MODE key.

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

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

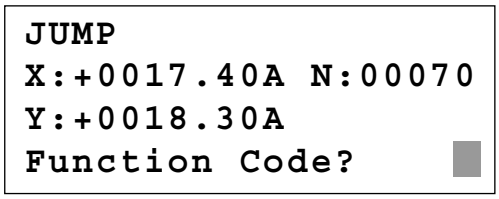
```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to move and change partial pattern data by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)

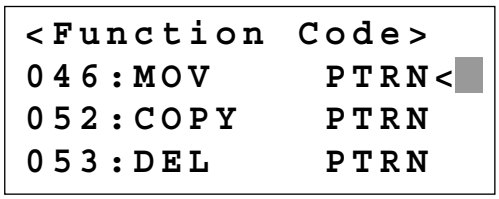


E. Go to the needle location to partially move by using FORW and BACK key.

Reference) Location of the needle for partial movement should be placed at the first start needle location that actually sews. Therefore, if the sewing data that has line property after jump appears, the last location of JUMP data is the first start location of needle correction.

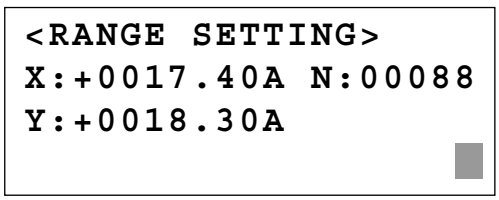


F. After pressing CODE key, if you know the function number related to pattern programming, input three figure digit number 046, but if you do not know the number, press ENTER↵key. Then after move to "046:MOV PTRN" by using direction key ▲ ▼, press ENTER↵key.

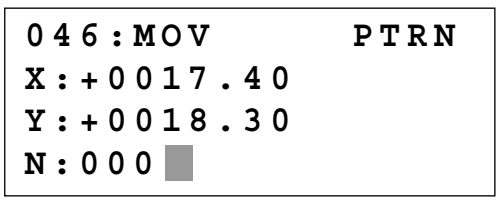


G. Go to the last location of pattern to move by using FORW key.

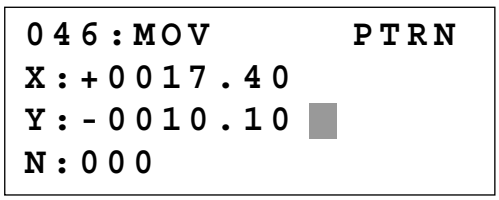
※ The indicated values are different according to current location.



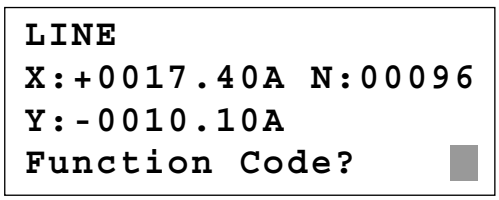
H. If you press EXE key, it becomes the state that the selected pattern for partial movement can move to the optional location.



I. Move to the location to move by pressing direction key.



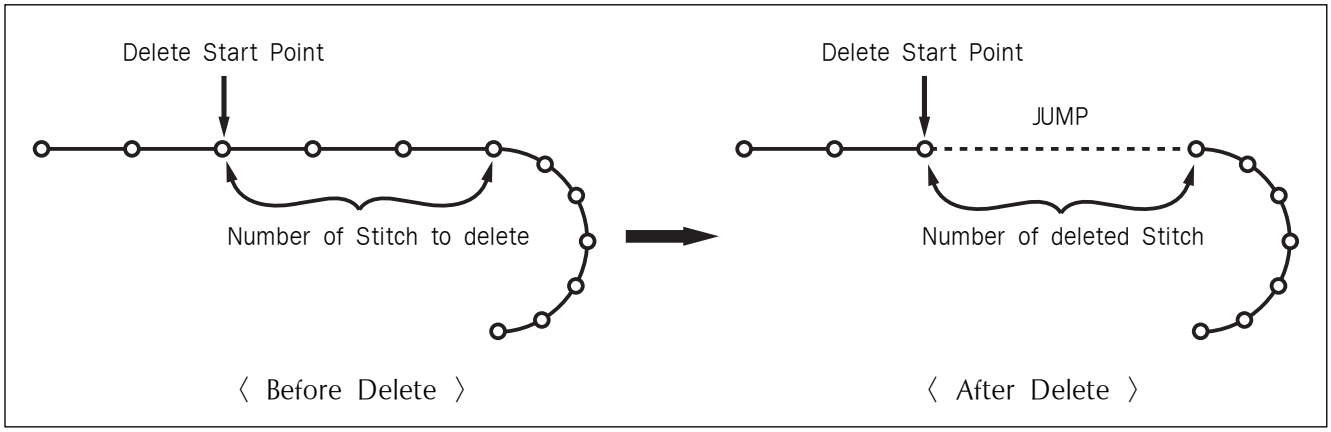
J. If you press EXE key, movement is completed.



K. Confirm if movement was properly made by using FORW and BACK key.

2-3) A Fixed Number of Stitch Delete Function

Delete 1-99 stitch in the pattern data shape after the start point to delete at present.



A. Insert floppy diskette containing the pattern to delete stitches.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to delete stitch by using the digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern 001.)

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

E. Go to needle location to delete by using FORW and BACK key.

※ X-Y coordinate value is different according to needle location.

```
LINE
X:-0002.50A N:00059
Y:+0000.00A
Function Code?
```

F. After pressing CODE key, if you know the function number 052 related to pattern programming, input three-figure digit number and if you do not know, press ENTER↵ key. Then after moving to "052:STITCH_DEL" by using direction key ▲ ▼, press ENTER↵ key.

```
<Function Code>
052:STITCH_DEL <
053:MOV SEWSTRT
054:MOV 2ndORG
```

G. Input the number of stitch to delete behind from current location.

```
052:STITCH   DEL
NUM:10[STITCH]
```

H. Press ENTER↵ key.

I. Stitch is deleted as many as the input number.

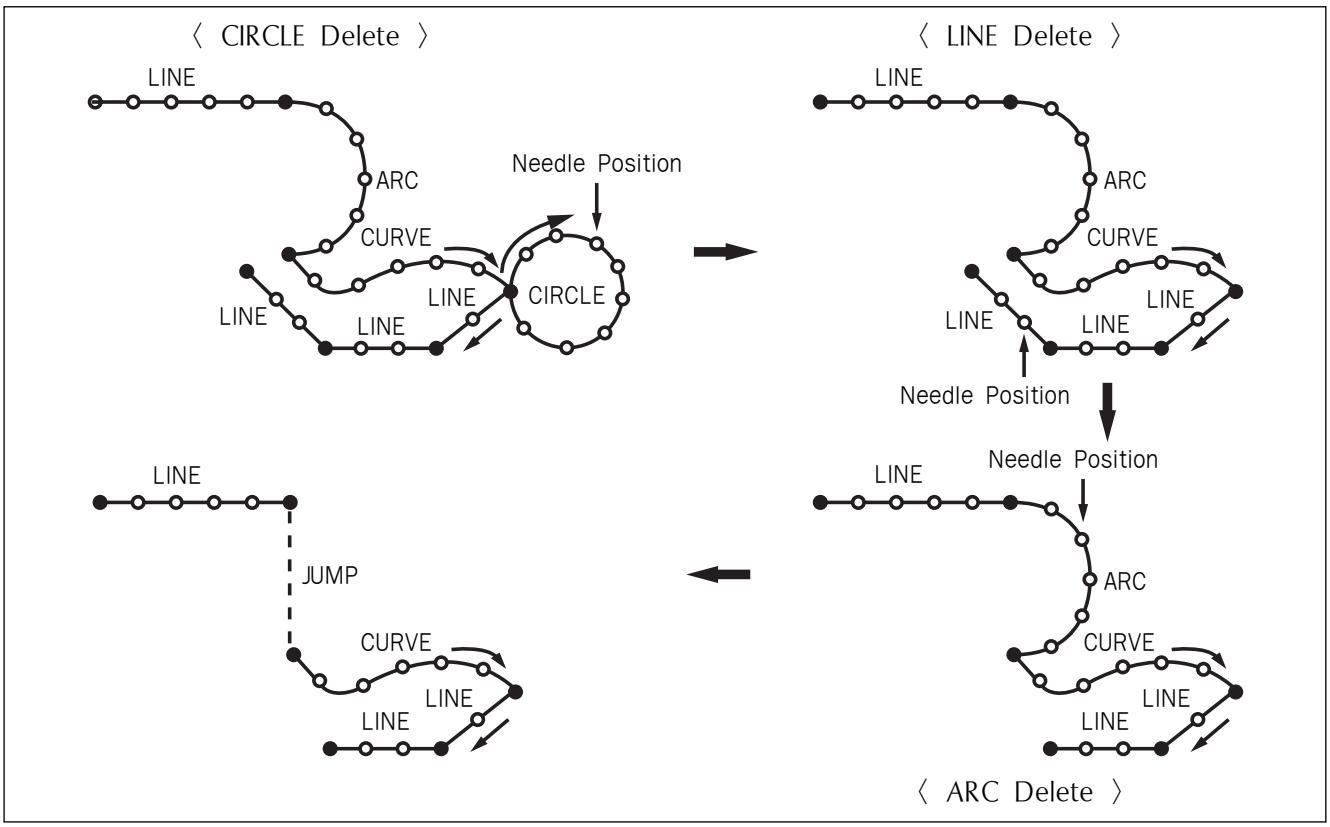
Reference) After deleting as much as the number of defined stitches, if end point and start point of two sewing data existing at both sides do not match and have distances, a jump is automatically made between the two sewing data. If you want to input automatic thread trimming, you can set up at "057:AUTO TRM".

```
TRIM
X:-0023.30A N:00033
Y:+0012.00A
Function Code?
```

J. Confirm if the stitches were deleted as many as desired number by using FORW and BACK key.

2-4) Partial Pattern Data Delete Function

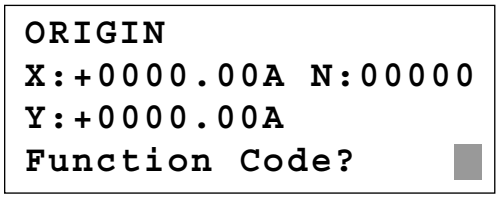
Delete one of the generated pattern data shapes selectively (For example: Jump, Line, Curve, Arc, Circle).



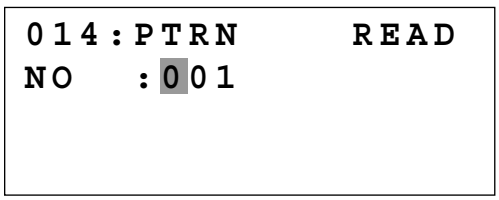
A. Insert floppy diskette containing the partial pattern to delete.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼ press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.

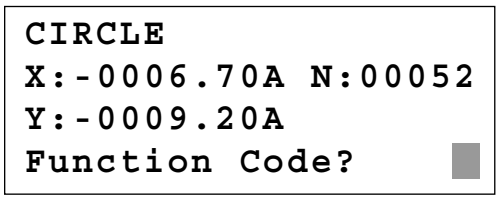


D. After pressing READ key, input the pattern number to delete partial pattern by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001).



E. Go to the pattern that the shape to delete exists by using FORW and BACK key.

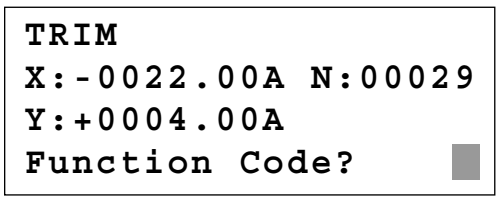
※ X-Y coordinate value is different according to needle location.



F. Delete is available by two methods as below.
- After pressing CODE key, input Function code 039 and press ENTER↵key.
- Or press PTN. DEL key of OP.

G. Press PTN.DEL key on operation box (OP).

Reference) After deleting as much as the number of defined stitches, if end point and start point of two sewing data existing at both sides do not match and have distances, a jump is automatically made between the two sewing data. If you want to input automatic thread trimming, you can set up at "057:AUTO TRM".

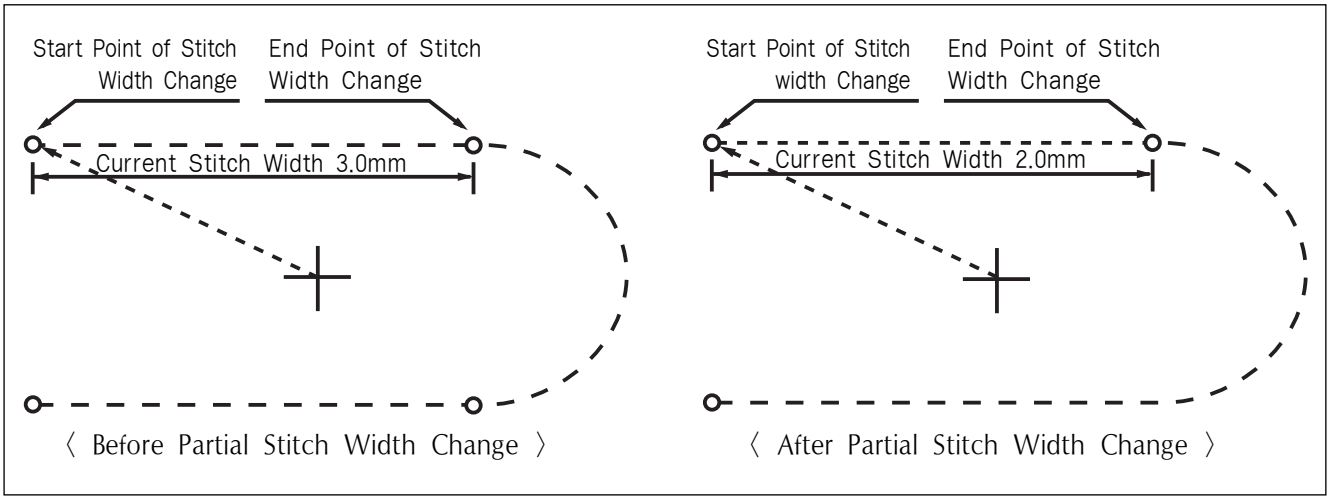


H. Confirm if desired partial pattern shape was deleted by using FORW and BACK key. (Line is deleted by once.)

I. Delete the partial pattern data to delete repeatedly in the order of E-F-G.

2-5) Partial Stitch Width Changing Function

Change stitch width by selecting a fixed part from the pattern shape.



A. Insert floppy diskette containing the pattern to change stitch width.

B. Press MODE key.

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

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to change stitch width by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)

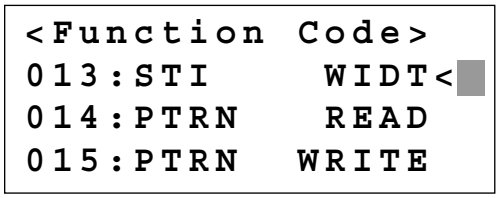
```
014:PTRN     READ
NO   :001
```

E. Go to the location to start change of stitch width by using FORW and BACK key.

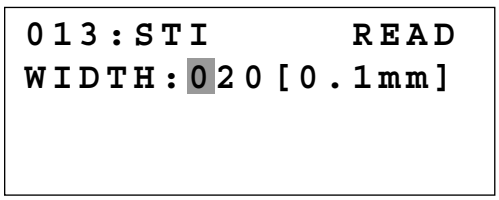
※ X-Y coordinate value is different according to needle location.

```
LINE
X:-0007.00A N:00021
Y:+0014.00A
Function Code?
```

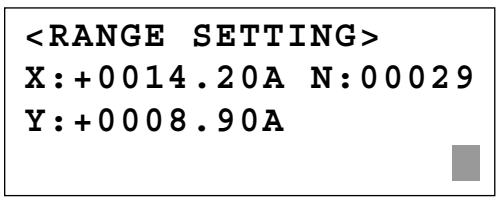
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 013, and if you do not know, press ENTER↵key. Then after moving to "013:STI WIDT" by using direction key ▲ ▼, press ENTER↵key.



G. Input the stitch width value to change and press ENTER↵key.

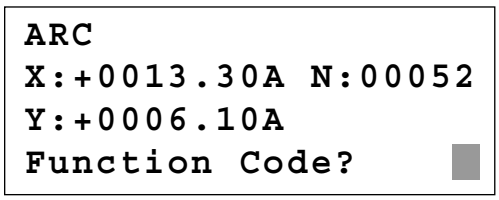


H. Move to the location to complete stitch width change by using FORW and BACK key.



I. If you press EXE key, change of stitch width is completed.

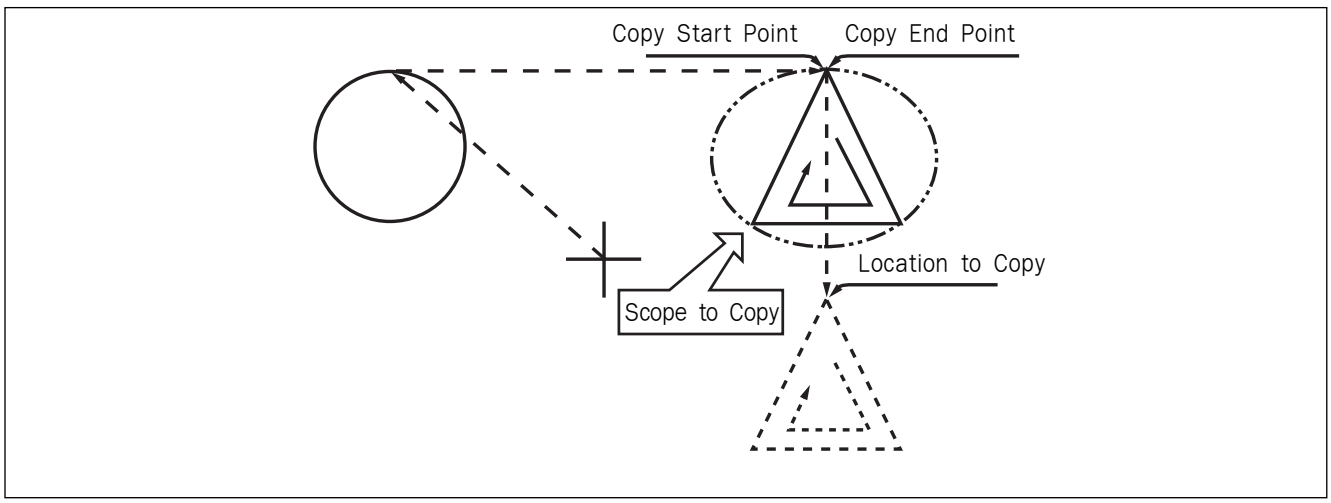
※ X-Y coordinate values are different according to current location.



J. Confirm if change of stitch width was made properly by using FORW and BACK key.

2-6) Pattern Partial Copy Function

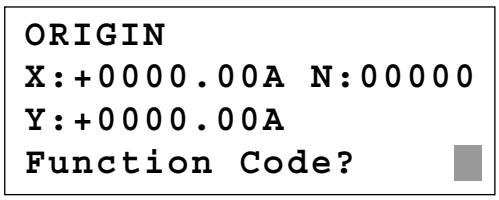
Set a fixed part of pattern shape and copy to desired location.



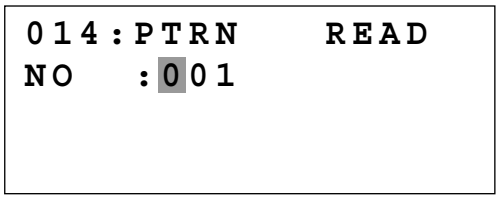
A. Insert floppy diskette containing partial pattern to make partial copy.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.

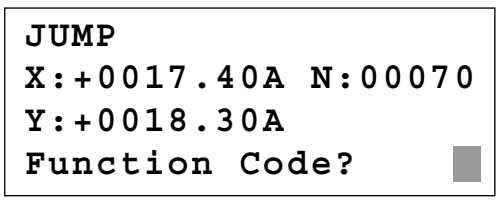


D. After pressing READ key, input the pattern number to copy partial pattern by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)

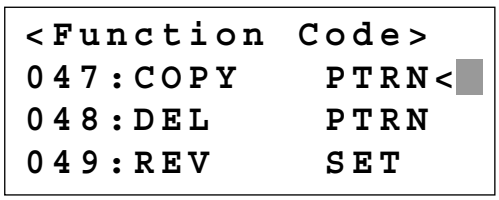


E. Go to copy start location by using FORW and BACK key.

Reference) Location of the needle for partial copy should be placed at the first start needle location that actually sews. Therefore, if the sewing data that has line property next jump appears, the last location of JUMP data is the first start location of needle correction.

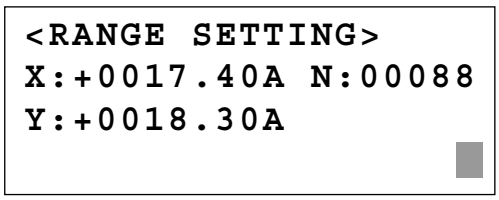


F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 047, and if you do not know the number, press ENTER↵ey. Then, after moving to "047:COPY PTRN" by using direction key ▲ ▼, press ENTER↵key.

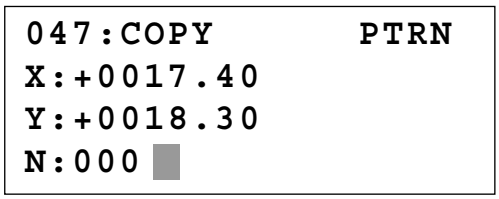


G. Go to the copy completing location of pattern by using FORW key.

※ X-Y coordinate values are different according to current location.



H. If you press EXE key, it becomes the state to move to the location to copy.



I. Move to the location to copy by pressing direction key.

※ The indicated values are different according to current location.

```
047:COPY     PTRN
X:+0017.40
Y:-0013.30
N:000
```

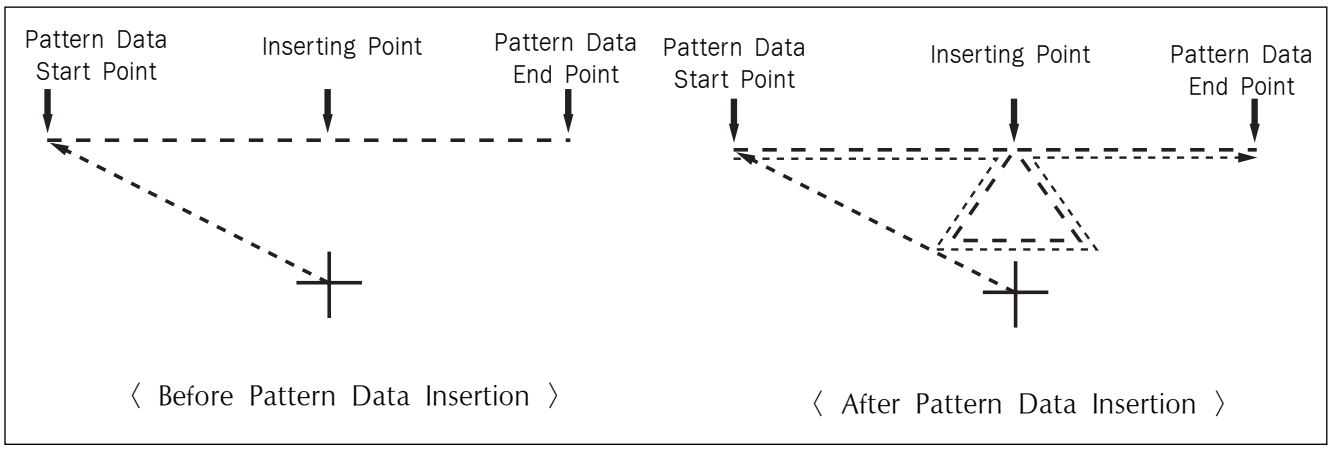
J. If you press EXE key, copy is completed.

```
LINE
X:+0017.40A N:00088
Y:+0018.30A
Function Code?
```

K. Confirm if copy was made properly by using FORW and BACK key.

2-7) Pattern Data Inserting Function

It is the function made that pattern data inserting is available because the behind data is protected though new pattern data is added in the middle of pattern data.



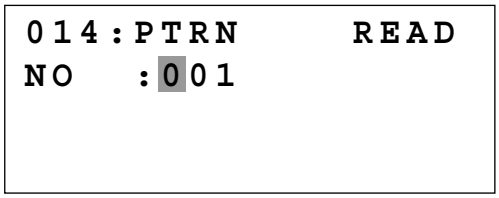
A. Insert floppy diskette containing the pattern to insert.

B. Press MODE key.

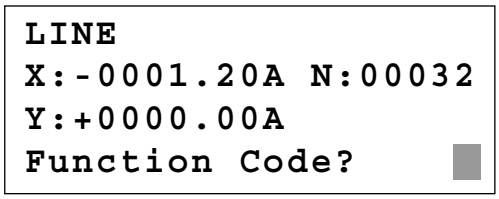
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

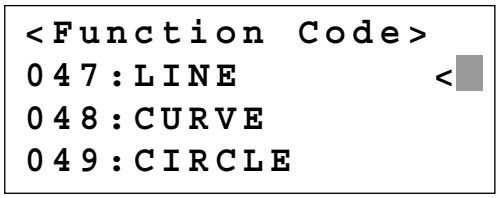
D. After pressing READ key, input the pattern number to insert pattern by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)



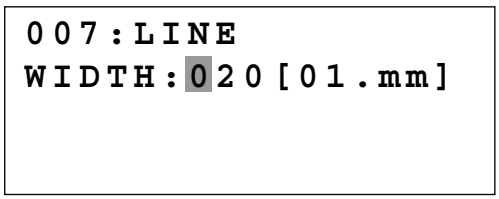
E. Go to the location of data to insert by using FORW and BACK key.



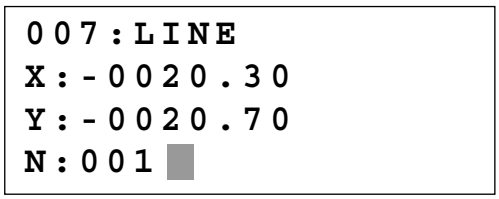
F. Select LINE of operation box (OP) of the function code to insert. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number and if you do not know the number, press ENTER↵key. Then after selecting the function number by using direction key ▲ ▼, press ENTER↵key.



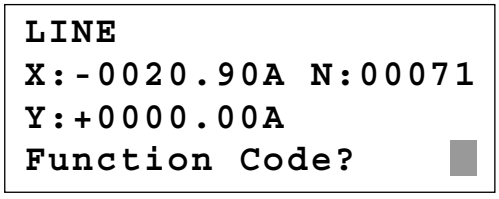
G. Input stitch width and press ENTER↵key.



H. Insert data of the shape to insert by using direction key. (Same as sewing data generation by using LINE)



I. If you input data of the shape to insert each, press EXE key.



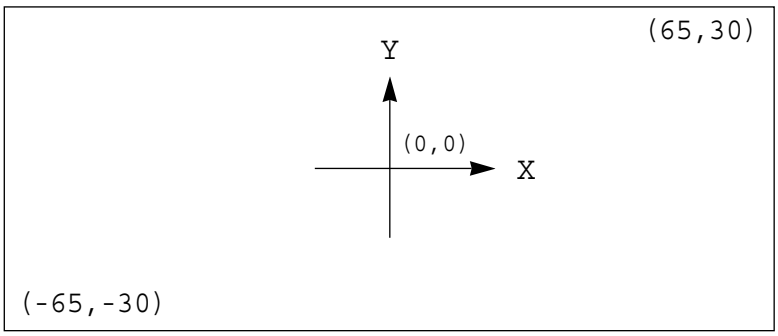
J. Confirm if new pattern data was inserted properly by using FORW and BACK key.

3) Pattern Data Application Function

3-1) 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."

※ Note : 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.

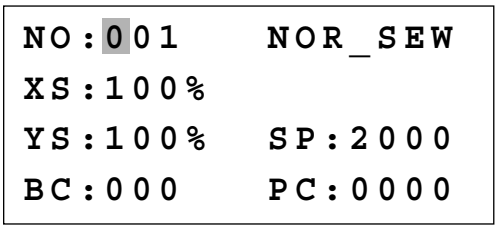
D. The upper feed plate comes to descend and moves to the origin or sewing start point then ascends. READY LED lights up.

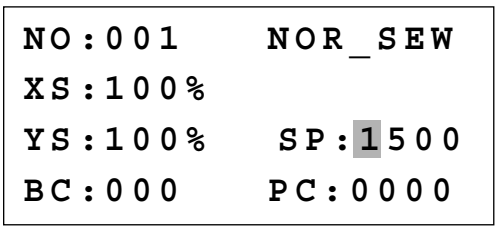
E. Press SPEED key to adjust speed properly.

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.



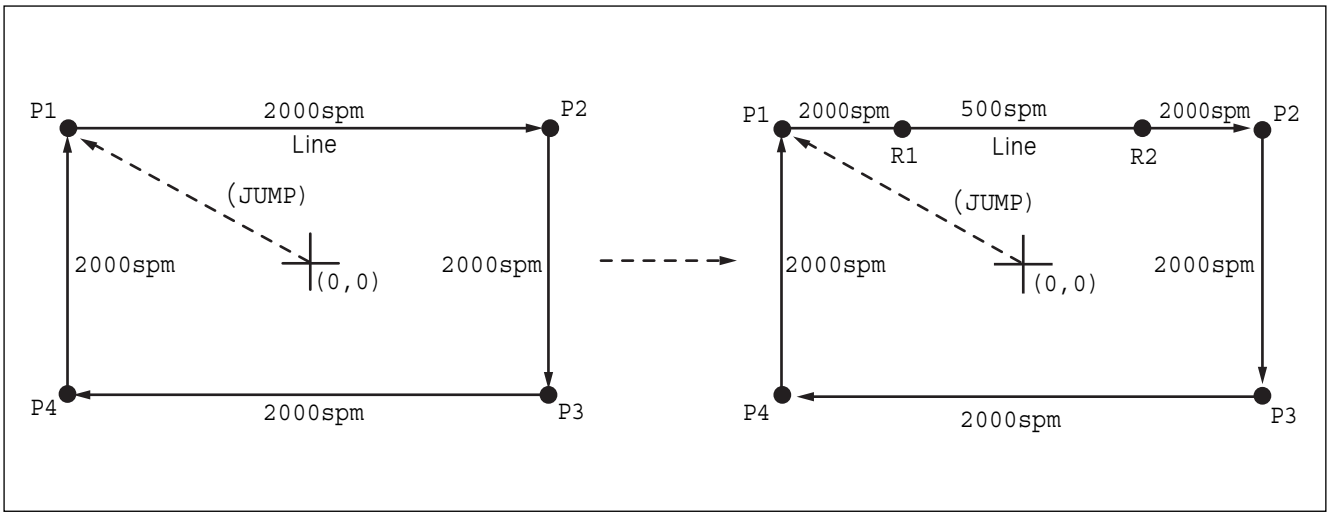


3-2) Program Example 5 : Change of Sewing Speed Within a Pattern

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. Maximum speed varies depending on the pattern of the sewing machine.

3-2-1) 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
```

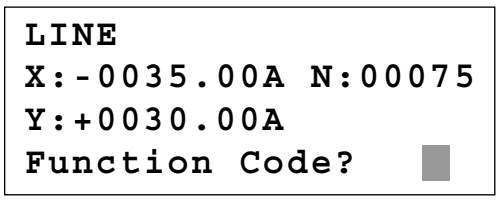
```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

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].)

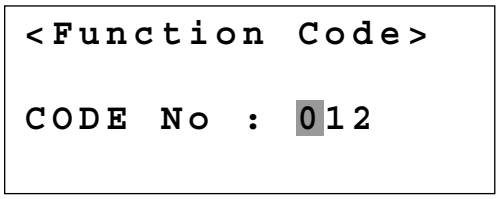
```
014:PTRN    READ
NO   :500
```

(2) Setting up the Range of Sewing Speed Change

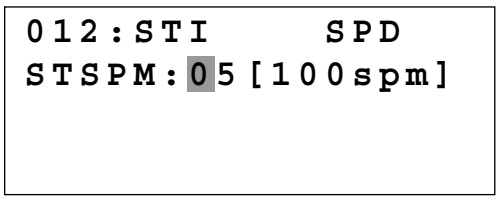
A. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



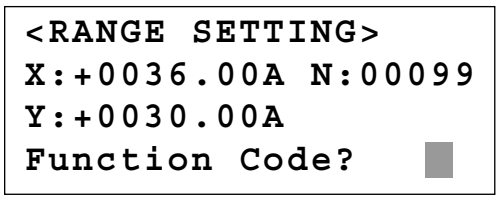
B. After pressing CODE key,
input three digit numbers if you know the pattern programming related function code, but if you don't know it press ENTER↵key and move to the "012: STI SPD" by using direction keys ▲ ▼, then press ENTER↵ again.



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])

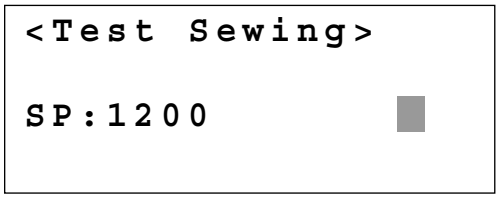


D. By using FORW, BACK keys, move to the end point (R2) of section that the sewing speed is supposed to change.
Then after pressing PNT SET key, press EXE key.

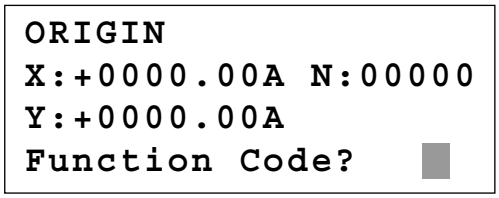


(3) Test Sewing

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 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.

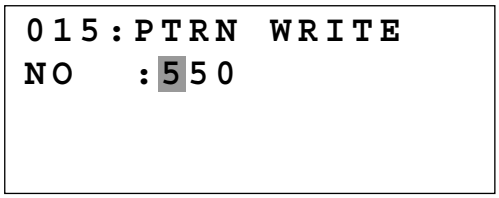


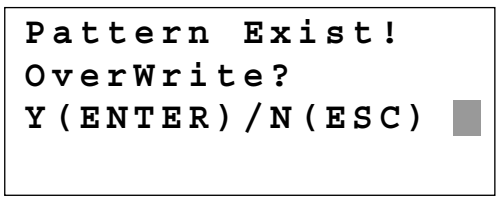
B. By pressing TEST key, complete the test sewing. The upper feed plate descends and moves to the origin, then READY LED turns off.

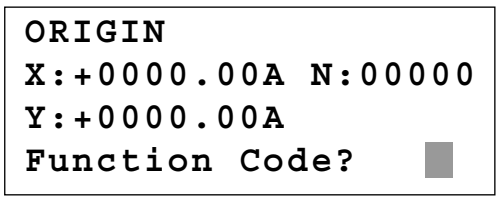


(4) Saving as New Pattern Number

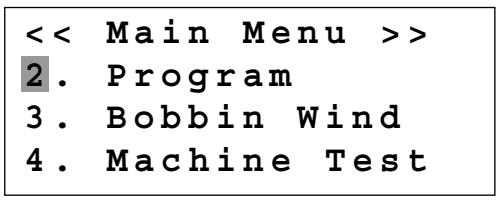
A. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER↵key. Save the generated pattern data in a floppy diskette as a relevant number. (For example, if you want to save the pattern number as 550, input [5][5][0].) During saving the pattern, the READY LED 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.



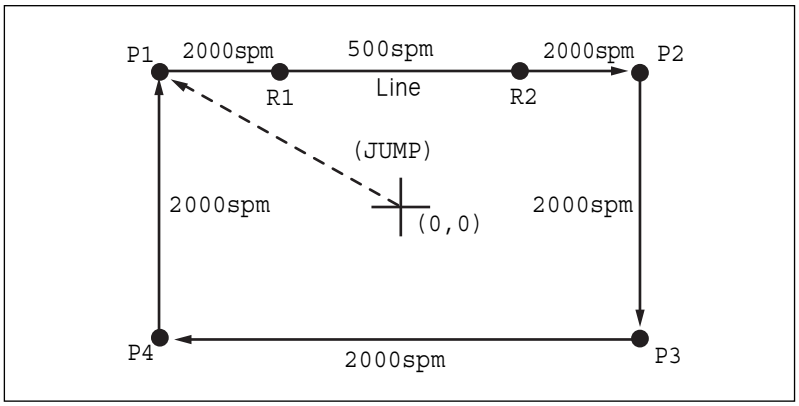




B. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.



3-2-2) 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:+0000.00A N:00000
Y:+0000.00A
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:-0065.00
Y:+0030.00
N:001
```

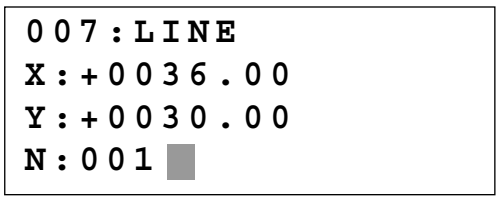
E. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data.

```
JUMP                NONE
X:-0065.00A N:00065
Y:+0030.00A
Function Code?
```

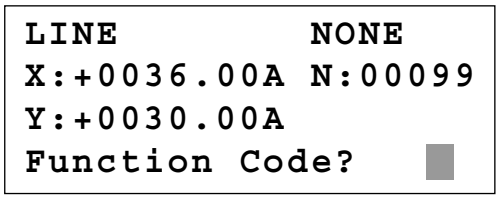
F. After pressing LINE key, input the stitch width by using digit keys, then press ENTER↵ key. (For example, if you want to set up the stitch width as 3mm, input [0][3][0].)

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

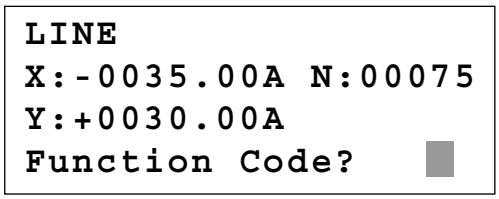
G. By using direction keys, move to the end point(R2) of section that the sewing speed is supposed to change and press PNT SET key.



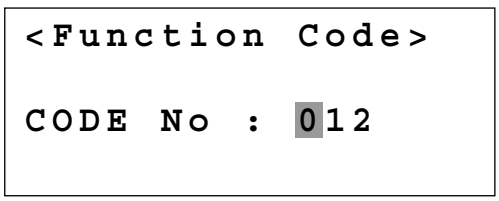
H. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data.



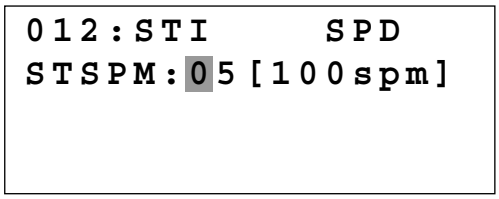
I. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



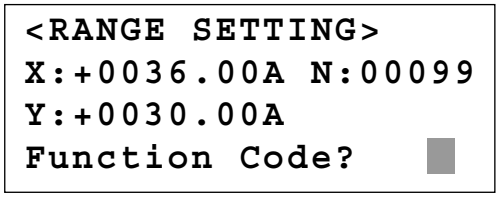
J. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "012. STI SPD" by using direction keys ▲ ▼, then press ENTER↵key.



K. By using digit keys, input the sewing speed you want to change, then press ENTERkey.
(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.

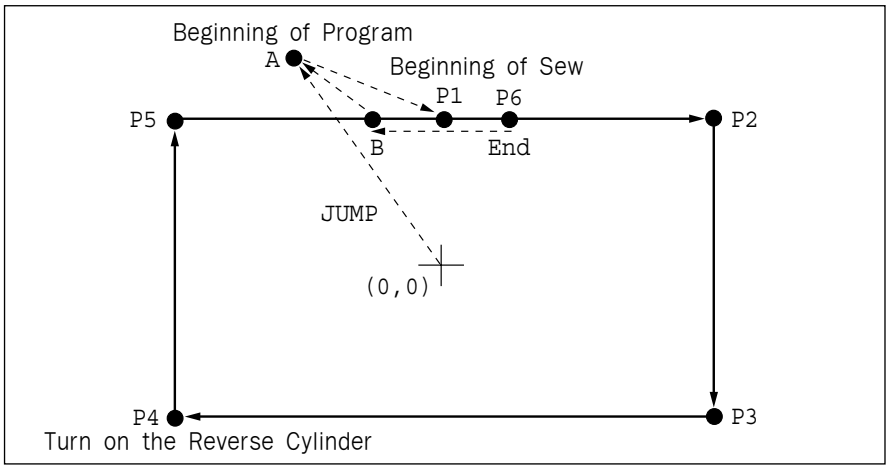
N. After performing test sewing, store the programmed pattern with new number.

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.

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

3-3) Program Example 6 : Use of Reversal

It is used when reversal devices is available. Careful attention must be paid to that reversal pressure plate or reversal cylinder drive part is not to be interfered with needle bar when programming the pattern. There are two ways to input the code for reversal (an order to drive the reversal devices), one is to add only code for reversal after calling the already programmed pattern, and the other is to program newly.



3-3-1) Pattern Programming by Using Reversal

A. Insert a floppy diskette into floppy disk drive.

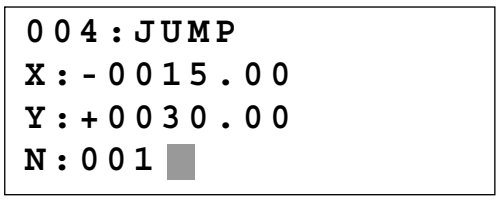
B. Press MODE key.

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.

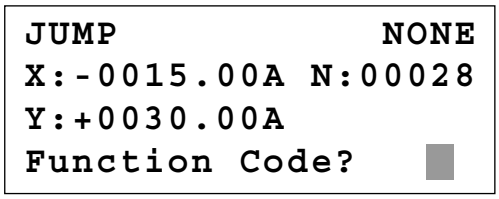
```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:+0000.00A N:00099
Y:+0000.00A
Function Code?
```

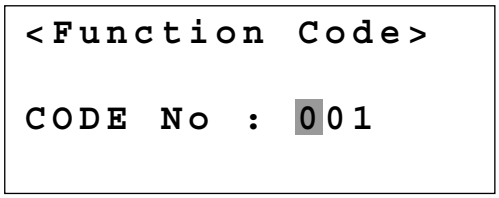
D. After pressing JUMP key, move to the A point by using direction key. Then press PNT SET key.



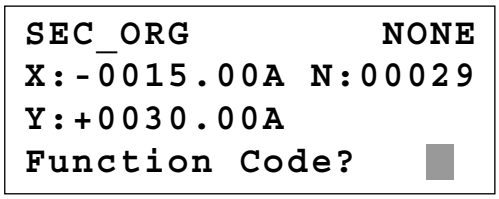
E. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the pattern data.



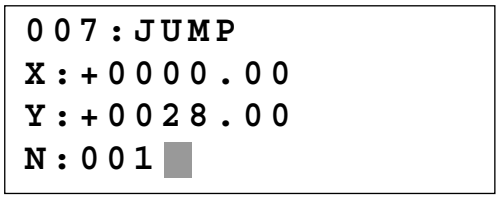
F. After pressing CODE key, set up the second origin by pressing [0][0][1] with digit keys.



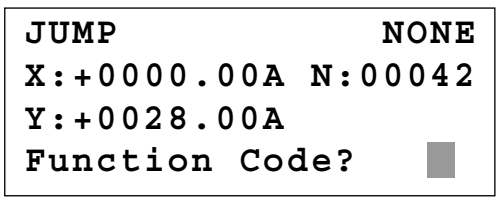
G. Press ENTER↵ key.



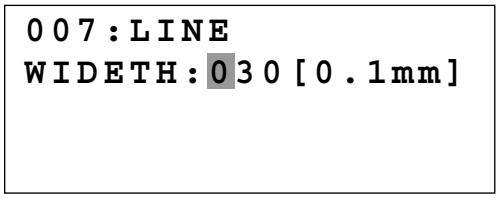
H. After pressing JUMP key, move to the sewing start point P1 by using direction keys. Then press PNT SET key.



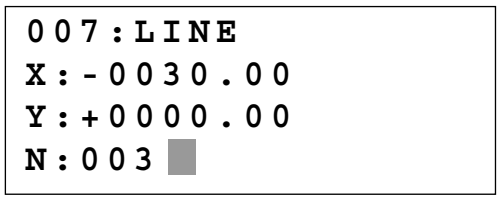
I. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



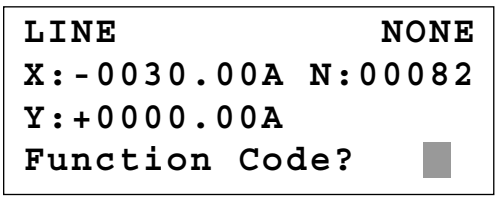
J. After pressing LINE key, input the sewing width by using digit keys, then press ENTER ↵key.(For example, if you set up the stitch width as 3mm, input [0][3][0].)



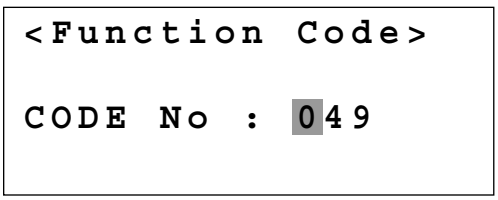
K. Move to P2, P3, P4 by using direction keys, then press PNT SET to input coordinates of each edge.



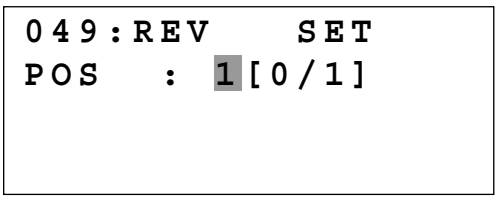
L. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



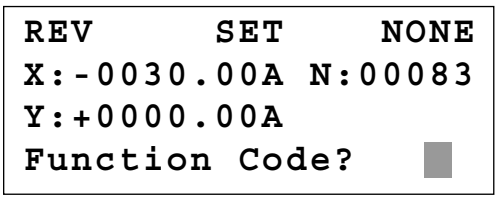
M. After pressing CODE key,
input an order for reversal by pressing digit keys, [0][4][9].



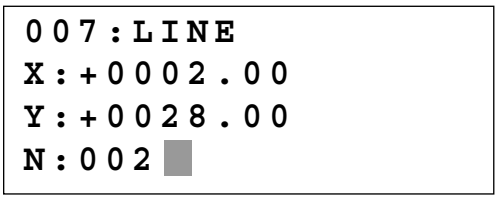
N. Press ENTER↵key.
After pressing digit key 1, press ENTER↵key to operate the reversal cylinder.



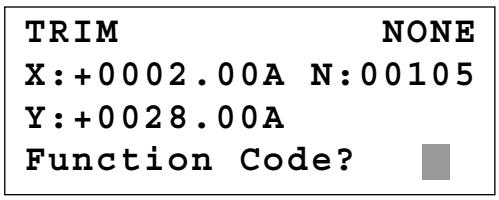
O. After checking for sure, input the code for reversal once again by pressing ENTER↵key.



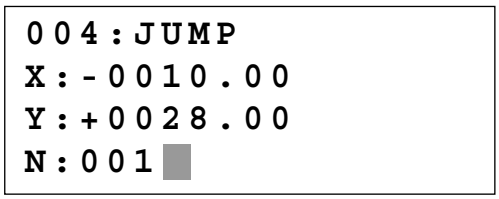
P. By using LINE key, make program the other two points, P5, P6



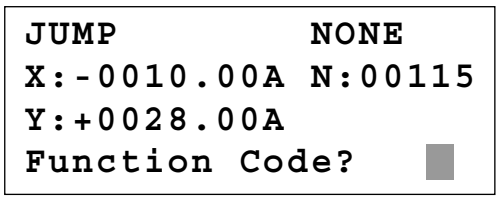
Q. By pressing TRIM key, input the code for trim. "000:TRIM" appears on the screen for a while, then replace it with the screen of the right side.



R. After pressing JUMP key, move to the B point by using direction keys.
Then press PNT SET key.

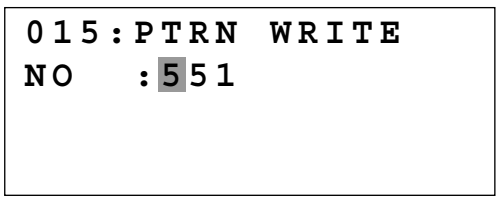


S. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

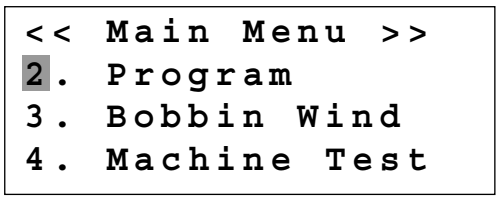


T. Perform test sewing.

U. 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 551, input [5][5][1]).



V. For completing the pattern generation, press MODE key. The upper feed plate moves to origin and ascends. By pressing ESC key, back to the initial screen.



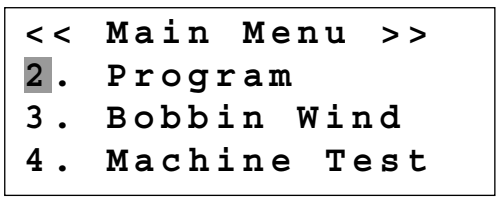
3-3-2) Adding the Code to Already Programmed Pattern

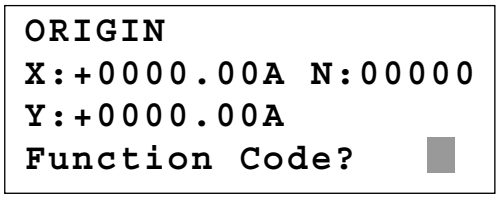
(1) Reading the Pattern that does not have Code for Reversal

A. Insert a floppy diskette holding a pattern that you want to add.

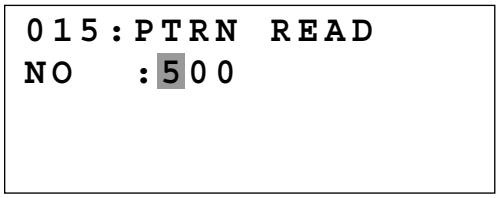
B. Press MODE key.

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.



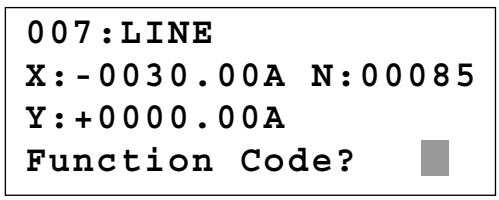


D. After pressing READ key, input the pattern number that sewing speed is supposed to change, then press ENTER↵key to read the pattern.
(For example, input [5][0][0] to read pattern number 500.)

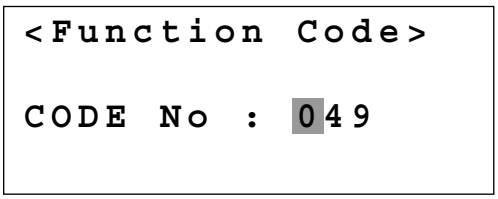


(2) Inserting the Code for Reversal

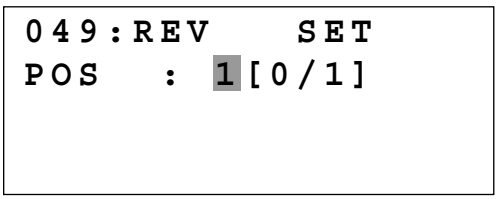
A. By using FORW, BACK keys, move to the point P4 that you want to add code for reversal.



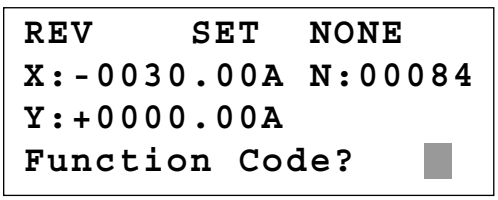
B. After pressing CODE key, input an order for reversal by pressing digit keys, [0][4][9].



C. Press ENTER↵key.
After pressing digit key, 1, and operate the reversal cylinder by pressing ENTER↵key.

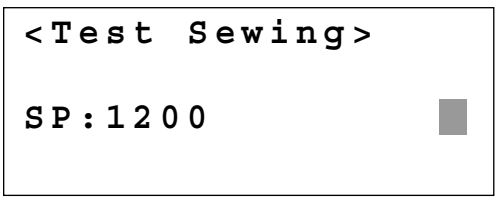


D. After checking for sure, input the code for reversal once again by pressing ENTER↵key.

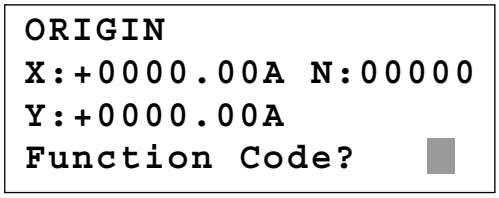


(3) Test Sewing

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 the 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 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.

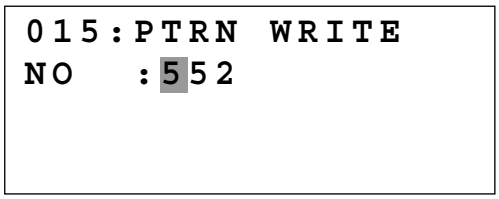


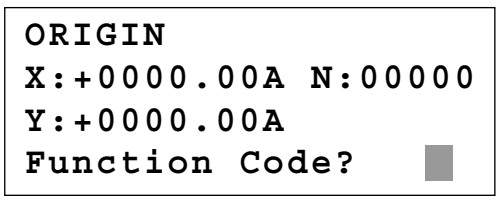
B. By TEST key, complete the test sewing.
The upper feed plate descends and moves to the origin, then READY LED turns off.



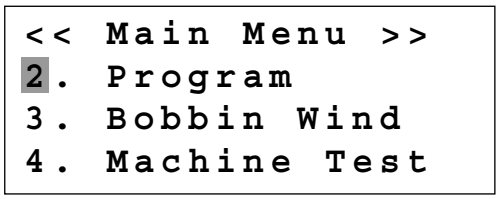
(4) Saving as New Pattern Number

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 552, input [5][5][2].) During saving the pattern, the READY LED flickers. When finishing the save, the READY LED turns off, and 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.



3-4) Using the Extension/Reduction Modes

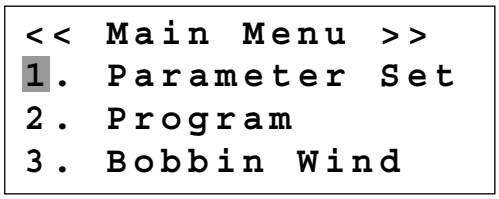
It is used when you want to extend or reduce the already programmed sewing patterns, and you should be careful not to exceed the transfer limit during the setting for rate of extension/reduction. You can extend or reduce with STITCH_LEN by the stitch width, and with STITCH_NUM by the numbers of stitches.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

*The zoom-in/zoom-out according to the number of stitches is not applicable.

(1) Setting the Extension/Reduction Mode

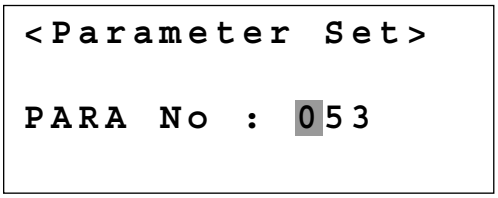
A. Press MODE key.

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

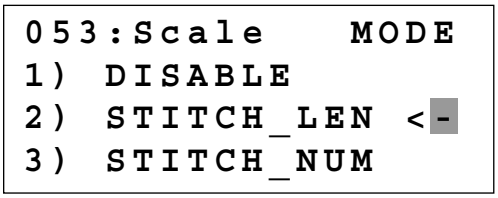


C. If you press ENTER↵, you can get the screen like a figure on the right side, then input [0][5][3].

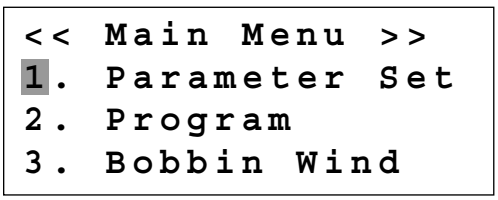
※ Appendix :
Refer "Parameter number related to general sewing."



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".

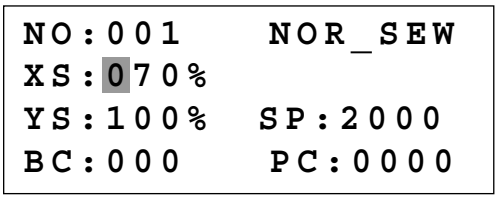


E. Press ENTER↵key.
Press ESC key to back to the initial screen.

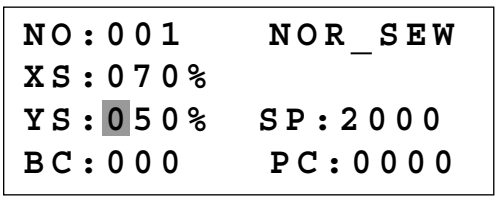


(2) Setting the Rate for Extension/Reduction

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

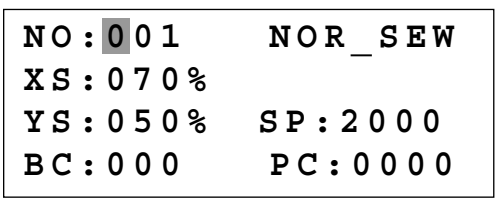


B. Press Y SCALE and set the rate you want. For example, if you want to reduce 50%, input[0][5][0].

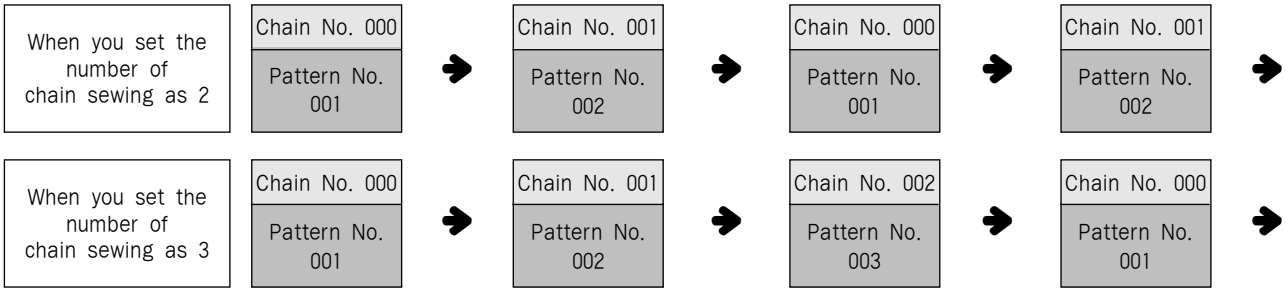


C. Press NO key and input the pattern number by using digit keys. (For example, if you want to work with "001" pattern, input [0][0][1].)

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



3-5) Using the Chain Sewing Mode

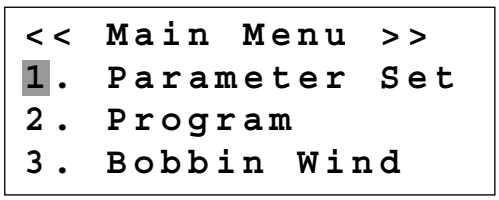


It is used to work with the various patterns randomly. To use the function, the parameter number related to general sewing, "054 Chain No." should be set to the other numbers except "0". Set the parameter number related to general sewing, "055 Chain Select." to be automatic or manual.

(1) Setting the Chain Sewing Environment

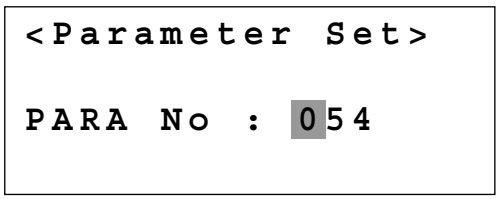
A. Press MODE key.

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

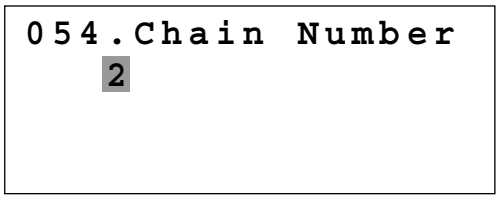


C. If you press ENTER↵ key, you can get the screen like a figure on the right side, then input [0][5][4].

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

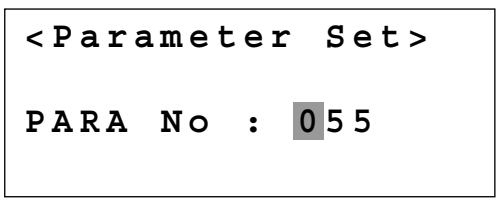


D. After pressing ENTER↵ key, input the number of chain sewing you want by using direction keys ▲ ▼. Here we input 2 for example.

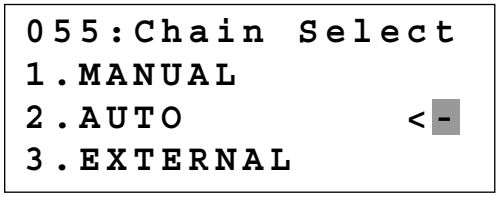


E. Press ENTER↵ key. If you press ENTER↵ key again, you can get the screen like a figure on the right side, then input [0][5][5].

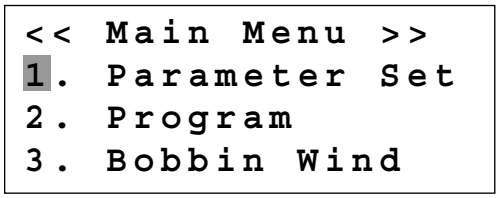
※ Appendix :
Refer "Parameter number related to general sewing."



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

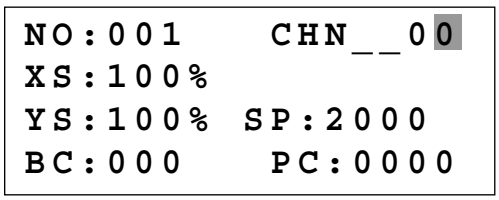


G. After pressing ENTER↵key, and press ESC key to back to the initial screen.

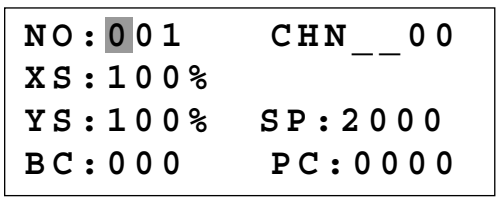


(2) Correspondence of a Chain No. to a Pattern

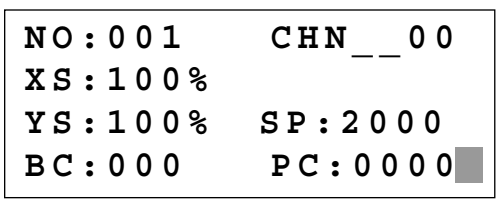
A. Press No key. When the cursor is located on "CHN__XX", input [0][0]. At this time, input less number than the number of chain sewing.



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

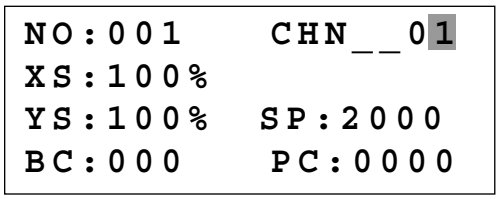


C. Press ENTER↵key. Then the READY LED comes to flicker. After reading a pattern, the machine comes to be in sewing available mode.



D. Press ENTER↵key again.

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

```
NO:002    CHN__01
XS:100%
YS:100%  SP:2000
BC:000    PC:0000
```

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

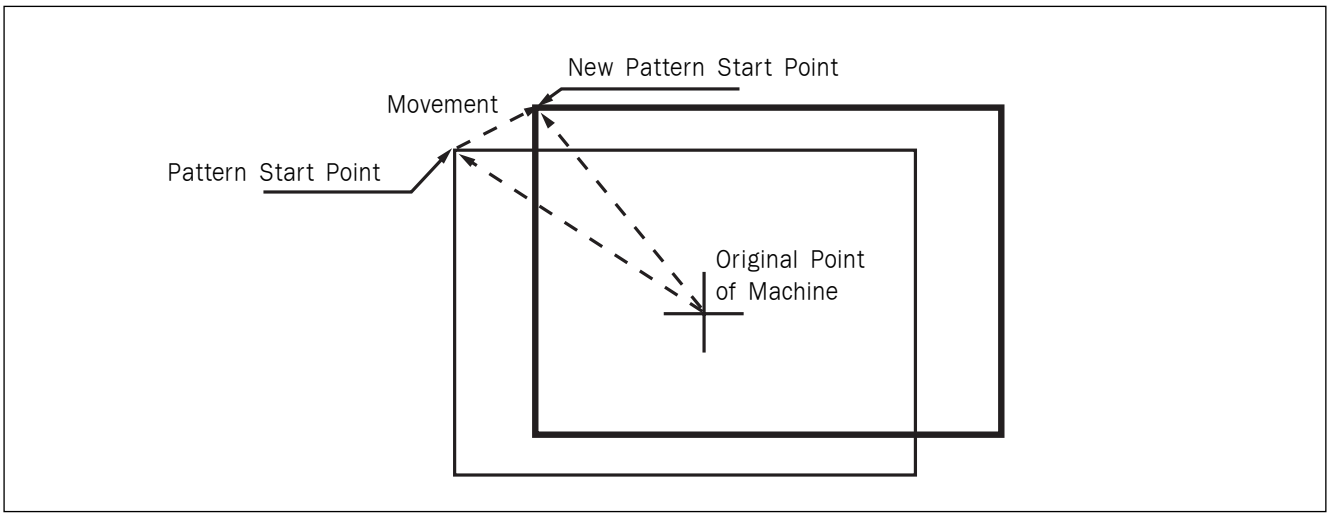
※ If you want to back to the general sewing mode from the chain sewing mode, set "054 Chain No." should be set to "0".

```
NO:002    CHN__01
XS:100%
YS:100%  SP:2000
BC:000    PC:0000
```

H. When setting for chosen chains is completed, press the No. key to set the first CHN__OO and press the Enter key. Then the machine returns to the start position before work begins.

3-6) Change/Saving Function of Pattern Data Start Point

Change and save pattern data start point already set up when punching.



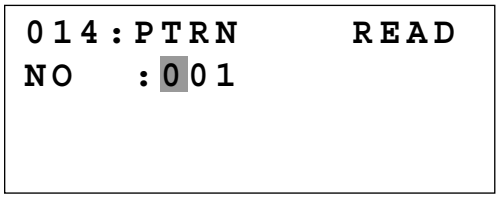
A. Insert floppy diskette containing the pattern to change start point.

B. Press MODE key.

C. After moving "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

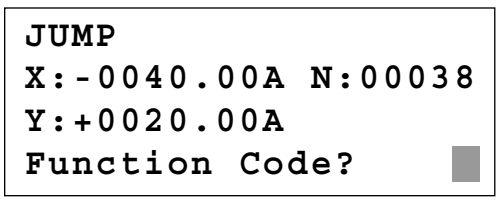
```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to change start point by using digit key and read in the pattern by pressing ENTER key. (For example, input [0][0][1] to read the pattern number 001.)



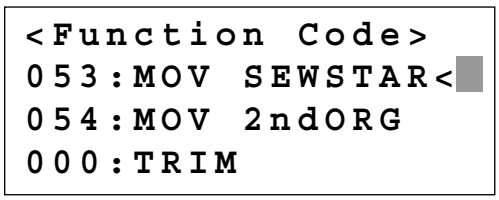
E. Go to sewing start point by using FORW and BACK key.

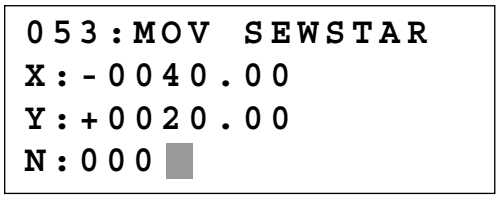
Reference) It does not matter if you place needle location to change start point at the optional location of actual sewing.



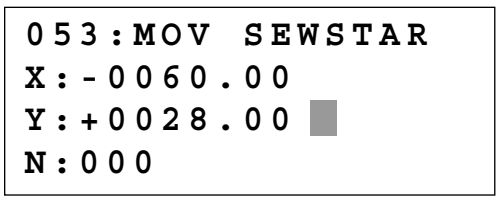
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 053, and if you do not know the number, press ENTER↵key. Then, after moving to "053:MOV SEWSTRT" by using direction key ▲ ▼, press ENTER↵key.

※ X-Y coordinate value is different according to sewing start point.

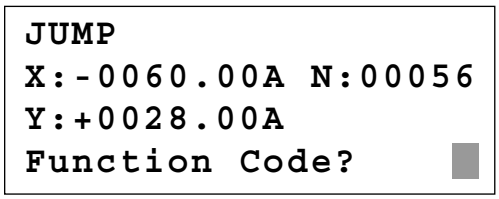




G. Move to new pattern start point by using direction key.

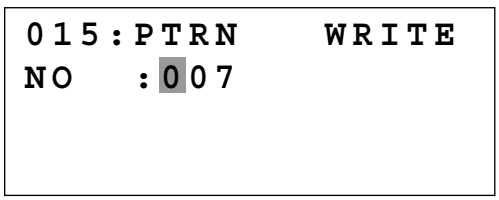


H. Complete input of new pattern start point by pressing EXE key.



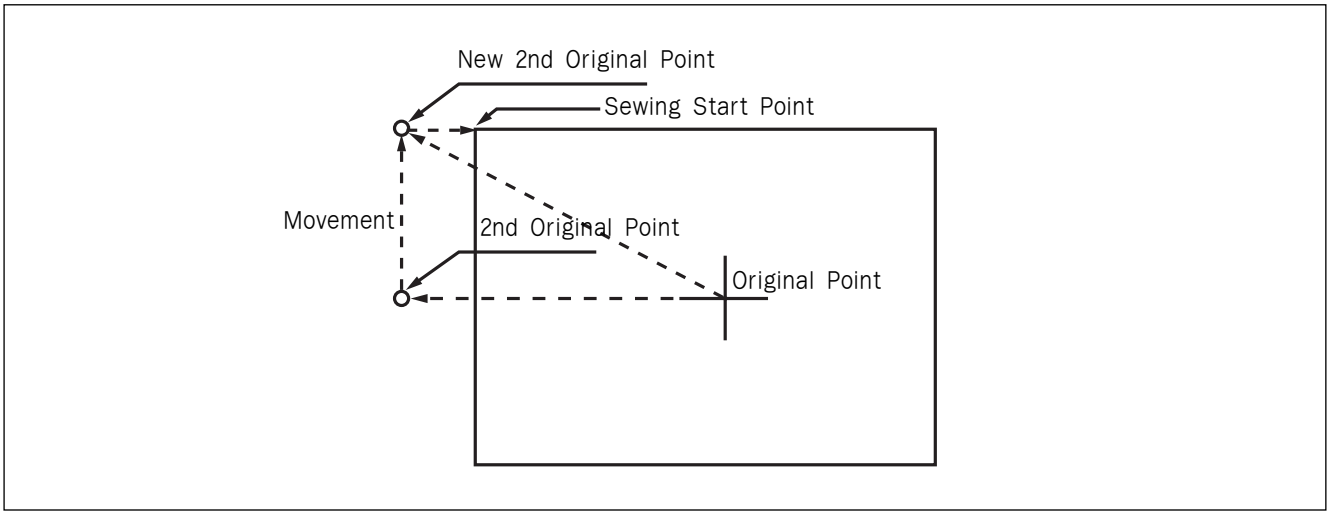
I. Confirm if change was made properly by using FORW and BACK key.

J. Save the pattern of changed start point by pressing WRITE key.



3-7) Change/Saving Function of Pattern 2nd Original Point

Change the already setup 2nd original point to new 2nd original point and save it.



A. Insert floppy diskette containing the pattern to change the 2nd original point.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵Key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to change the 2nd original point by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)

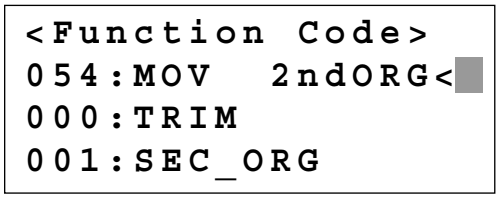
```
014:PTRN     READ
NO   :001
```

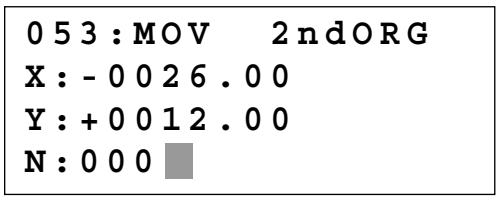
E. Go to the location of 2nd original point by using FORW and BACK key.

```
SEC_ORG      NONE
X:-0026.00A N:00025
Y:+0012.00A
Function Code?
```

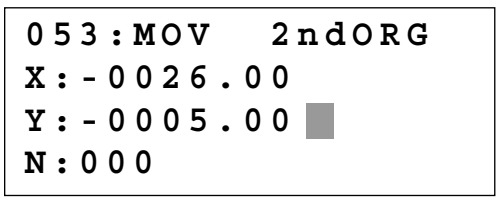
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 054 and if you do not know the number, press ENTER↵key. Then, after moving to "054:MOV 2nd ORG" by using direction key ▲ ▼, press ENTER↵key.

※ X-Y position value may differ according to the 2nd original point.

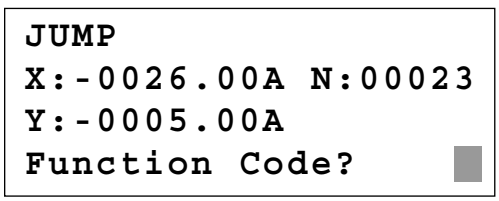




G. Move to new 2nd original point by using direction key.

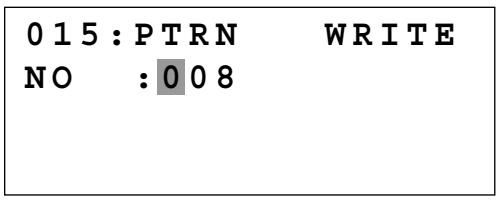


H. Complete input of new 2nd original point by pressing EXE key.



I. Confirm if change was made properly by using FORW and BACK key.

J. Save the pattern of the changed 2nd original point by pressing WRITE key.



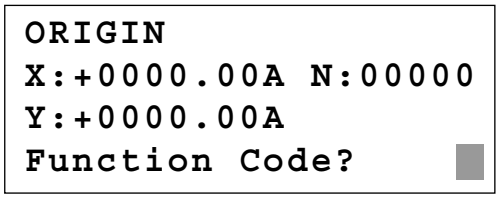
3-8) Change/Saving Function of Maximum Pattern Sewing Speed and Extension/ Reduction Rate

Set up maximum sewing speed and extension/reduction rate by pattern.

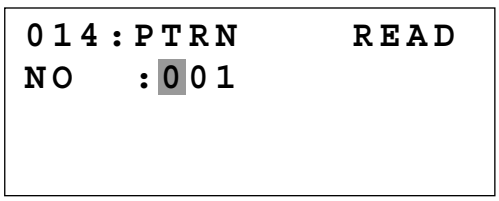
A. Insert floppy diskette containing the pattern to change maximum sewing speed and extension/ reduction rate.

B. Press MODE key.

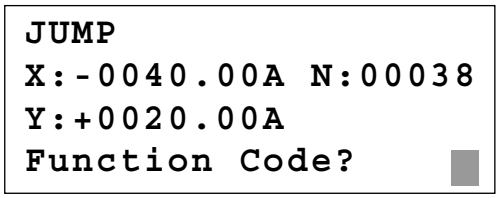
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.



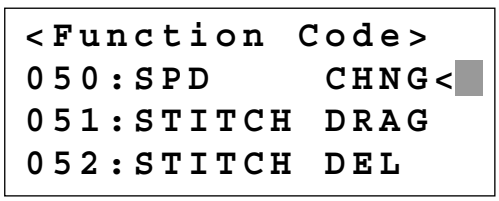
D. After pressing READ key, input the pattern number to change maximum sewing sped and extension/reduction rate by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)



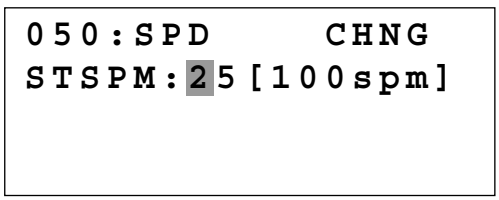
E. Go to pattern data start location by using FORW and BACK key.



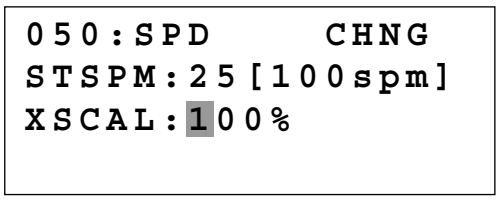
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 050 and if you do not know, press ENTER↵key. Then, after moving to "050:SPD CHNG" by using direction key ▲ ▼, press ENTER↵key.



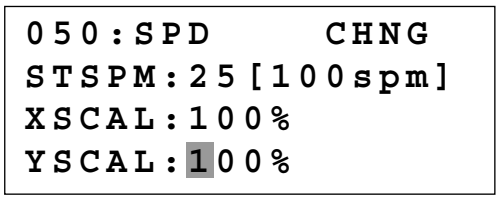
G. Input maximum sewing speed value STSPM and press ENTER↵key.



H. Input XSCAL, the extension/reduction rate for X-direction and press ENTER↵key.



I. Input YSCAL, the extension/reduction rate for Y-direction and if you press ENTER↵key, all setting is completed.

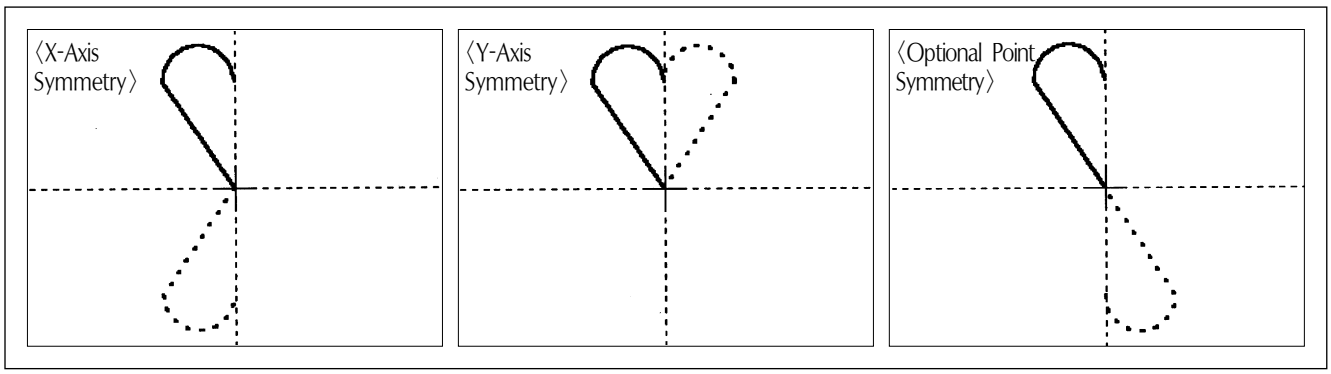


J. Save the pattern by pressing WRITE key.

```
015:PTRN      READ
NO   :009
```

3-9) Symmetrical Shape Creating Function of Pattern

Make three types of symmetrical shapes for optional point in X and Y axes.



A. Insert floppy diskette containing the pattern to create symmetrical shape.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to create symmetrical shape by using digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern number 001.)

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

E. Go to pattern data start location by using FORW and BACK key.

(Reference) You may place the needle location to create symmetrical shape in X and Y axes at the optional needle location to sew. However, symmetry by the optional point becomes symmetric on the basis of the end point of sewing data and so you should place needle location at the end point of sewing data.

```
CURVE
X:-0006.00A N:00005
Y:+0005.90A
Function Code?
```

F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 043 and if you do not know the number, press ENTER↵key. Then, after moving to "043:SYMMETRY X" by using direction key ▲ ▼, press ENTER↵key.
-X-axis symmetry is Function Code 043
-Y-axis symmetry is Function Code 044
-Optional point symmetry is Function Code 045

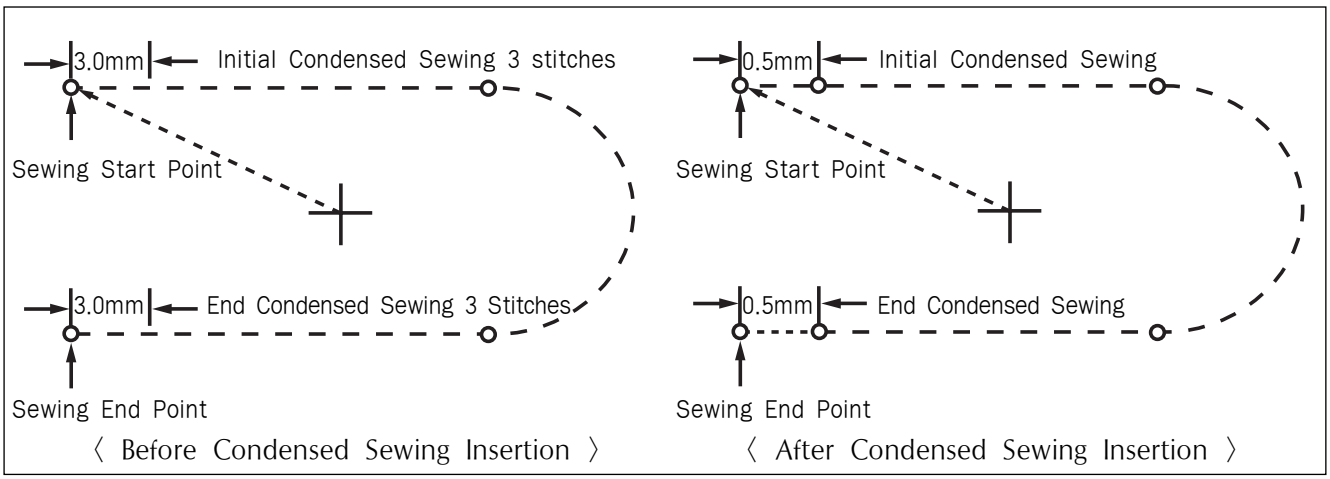
```
<Function Code>
043:SYMMETRY   X<
044:SYMMETRY   Y
045:SYMMETRY   P
```

G. Confirm if symmetrical shape was made properly by using FORW and BACK key.

```
CURVE
X:+0000.00A N:00023
Y:+0005.90A
Function Code?
```

3-10) Condensed Sewing Stitch Inserting Function

It is the function to prevent stitches from being untangled by making stitch width condensed in sewing start part and sewing end part of pattern data.



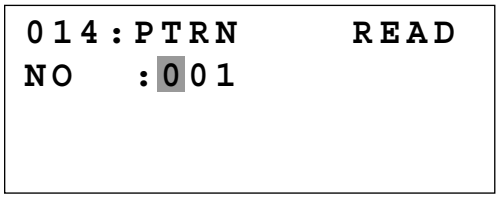
A. Insert floppy diskette containing the pattern to insert condensed sewing stitch.

B. Press MODE key.

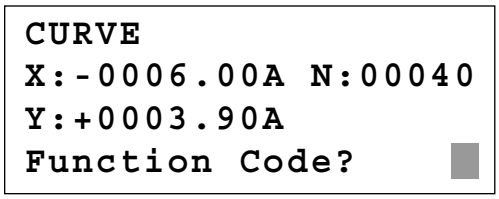
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

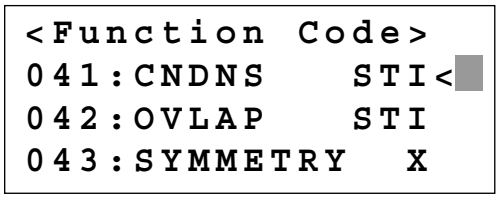
D. After pressing READ key, input the pattern number to insert condensed sewing stitch by using digit key and read in the pattern by pressing ENTER↵ey. (For example, input [0][0][1] to read the pattern number 001.)



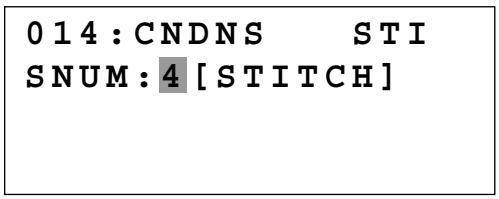
E. Go to pattern data end location by using FORW and BACK key.



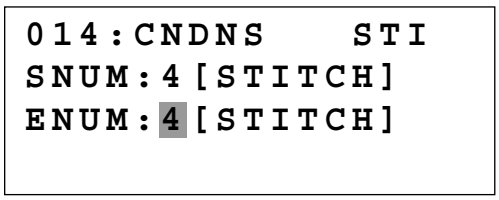
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 041 and if you do not know the number, press ENTER↵key. Then, after moving to "041:CONDNS STI" by using direction key ▲▼, press ENTER↵key.



G. After inputting the number of initial condensed sewing stitch(1~9 stitch), press ENTER↵Key.

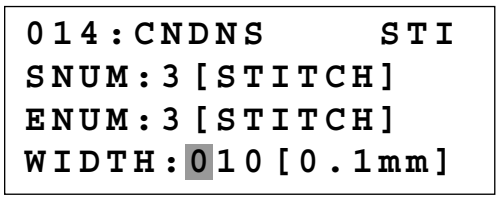


H. After inputting the number of final condensed sewing stitch(1~9 stitch), press ENTER↵key.

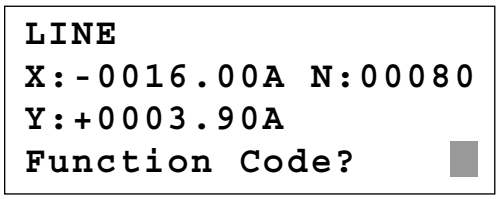


I. After inputting condensed stitch width, if you press EXE or ENTER↵Key, input of condensed sewing stitch is completed.

※ The stitch width of the number of stitches set up at sewing start point(the number of initial condensed sewing stitch) and sewing end point(the number of end condensed sewing stitch) is changed into condensed stitch sixth.

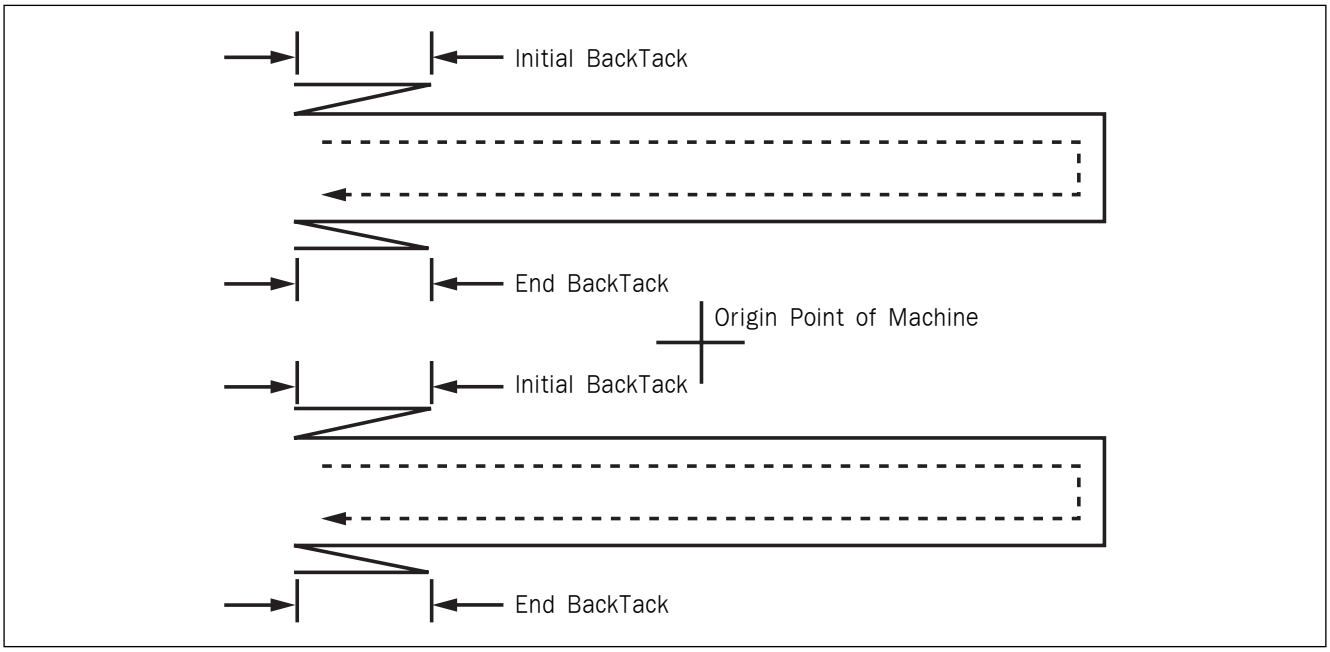


J. Confirm if the number of condensed sewing stitch was made properly by using FORW and BACK key.



3-11) Automatic Back Tack(B/T) Inserting Function

You can apply automatic back tack inserting function for several pattern.



A. Insert floppy diskette containing the pattern to insert automatic back tack.

B. Press MODE key.

C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number to insert automatic back tack by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)

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

E. Go to the location that pattern data ends by using FORW and BACK key.

```
LINE
X:-0016.00A N:00040
Y:+0003.90A
Function Code?
```

F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 040 and if you do not know the number, press ENTER↵key. Then, after moving to "040:BACK TACK" by using direction key ▲ ▼, press ENTER↵key.

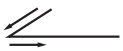
```
<Function Code>
040:BACK   TACK<
041:CNDNS  STI
042:OVLAP  STI
```

G. Input the number of back tack to insert and press ENTER↵key.

```
040:BACK     TACK
BTNUM:4[STITCH]
```

H. Input back tack mode. Press ENTE↵key.

Mode Type

Mode 0: 

Mode 1: 

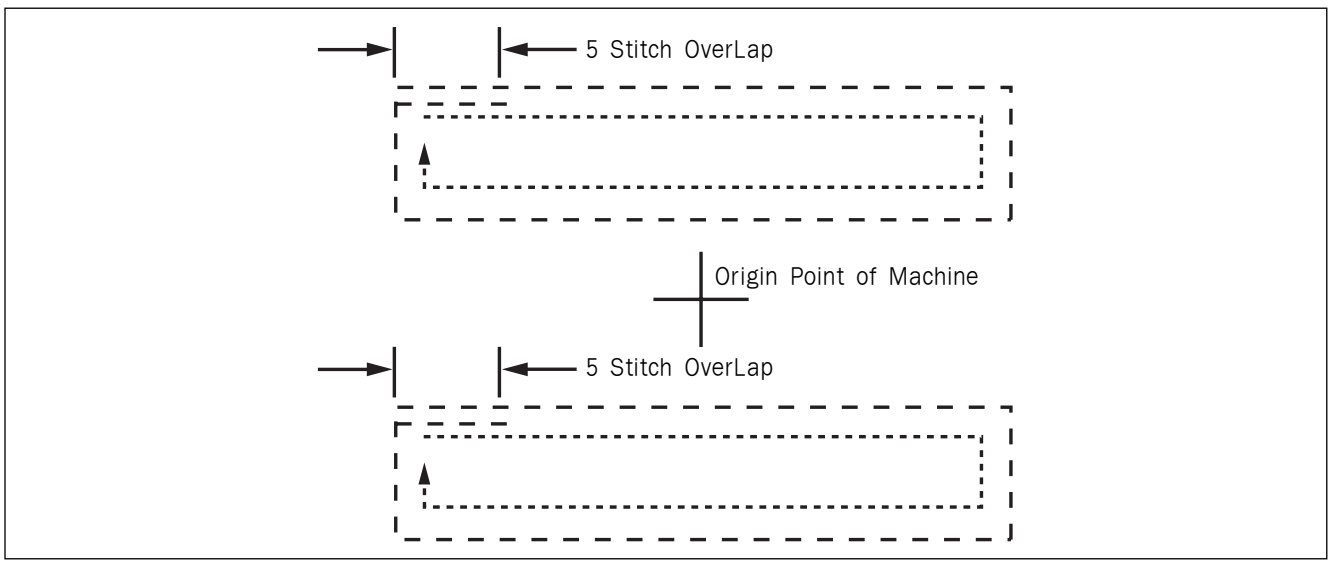
```
040:BACK     TACK
BTNUM:4[STITCH]
BTMOD:0[0/1]
```

I. Confirm if back tack was made properly by using FORW and BACK key.

```
LINE
X:-0016.00A N:00040
Y:+0003.90A
Function Code?
```

3-12) OverLap Sewing Stitch Inserting Function

You can apply automatic overlap sewing stitch inserting function for several patterns.



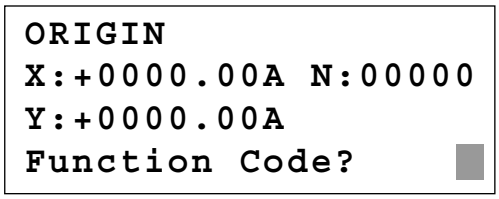
OverLap function can apply to the pattern design of closed roof that start point and end point meet. Except, though it is not closed roof type of pattern and start point and end point have 1mm of distance, OverLap function can use.

Be able to select a maximum of 20 stitch.

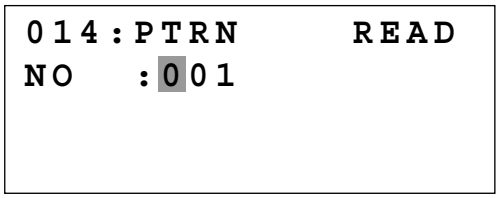
A. Insert floppy diskette containing the pattern to insert overlap sewing stitch.

B. Press MODE key.

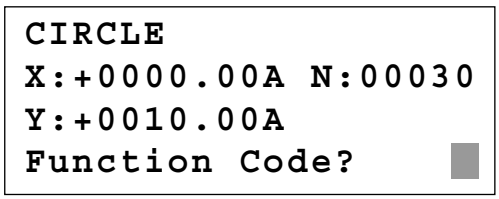
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.



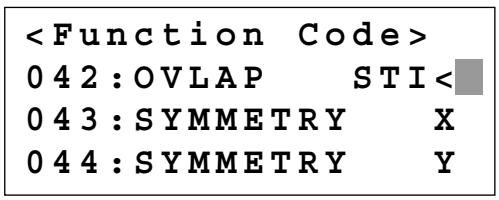
D. After pressing READ key, input the pattern number to insert overlap sewing stitch by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)



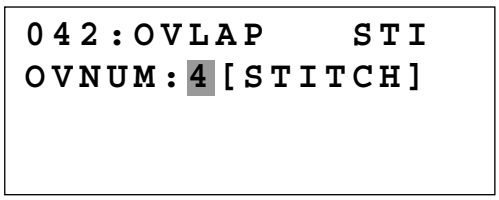
E. Go to the location that pattern data ends in order to apply overlap function by using FORW and BACK key.



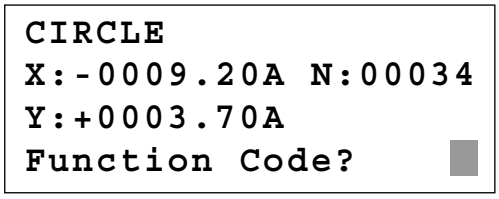
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 042 and if you do not know the number, press ENTER↵key. Then, after moving to "042:OVLAP STI" by using direction key ▲ ▼, press ENTER↵key.



G. Input the number of overlap stitch to insert and press ENTER↵key.

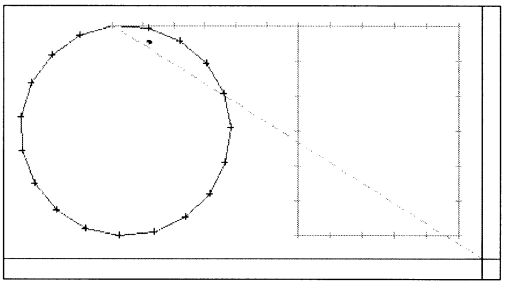


H. Confirm if back tack was made properly by using FORW and BACK key.

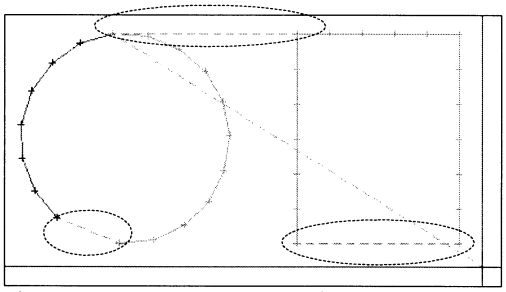


3-13) Automatic Insertion of Thread Trimmer Code when Deleting Stitches

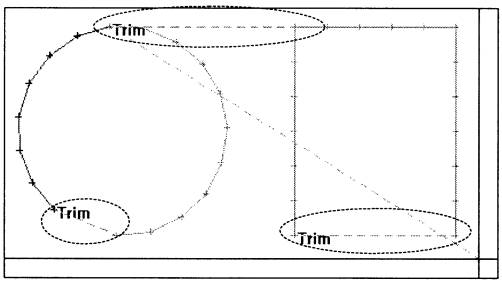
If the user deletes any section of pattern or the stitches, the user can define whether to insert thread trimmer code on the related location.



〈 Pattern Design 〉



〈 Deleted Stitches or Pattern (Before Setting-Up Automatic Insertion of Thread Trimmer 〉



〈 After Setting-Up Automatic Insertion of Thread Trimmer 〉

A. Use direction key ▲ ▼ to select "2. Program", and then press ENTER↵.

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

B. Press code key again on the Operation Box.

```
ORIGIN          NONE
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

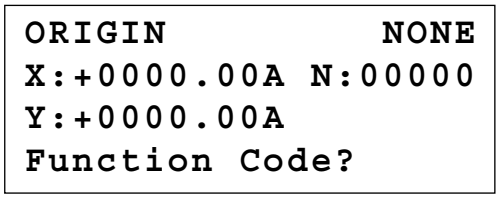
C. If the function code No. related to the pattern programming were known, enter three digits of number, 055. If not, press ENTER↵ and use direction key ▲ ▼ to move the cursor on "055: AUTO TRIM", and then press ENTER↵.

```
<Function Code>

CODE NO   :055
```

D. On the following screen, press "1" to change "0" to "1", and then press ENTER↵ to set automatic thread trimmer function.

```
055:AUTO TRIM

TRIM:1[0/1]
```

E. When deleting stitches or pattern, the user can confirm the automatic insertion of thread trimmer by either making new design or retrieving the existing design saved in a disk. Please refer to "2-3) Delete Number of Stitches" and "2-4) Partially Delete Pattern Data".

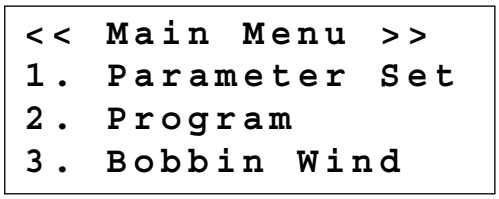


3-14) Setting-Up Reference Point for Zooming

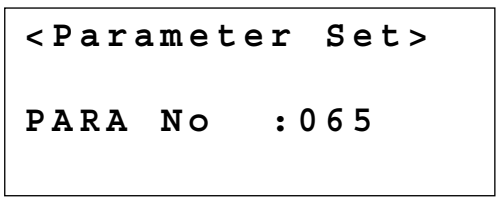
On the sewing mode, the user can zoom design based on machine origin, second origin, sewing starting point or user-defined reference point. However, the second origin and user-defined reference point must be set in the pattern design before zooming based on those reference points.

A. Press MODE.

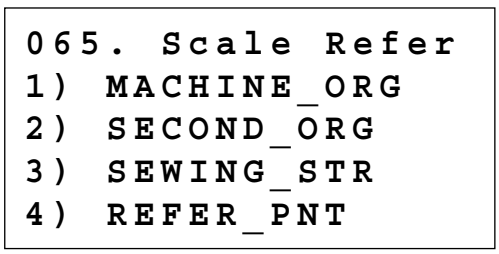
B. Use direction key ▲ ▼ to select "1. Parameter Set" menu.



C. Press ENTER↵ to open a screen shown on the right. Input [0][6][5] and press ENTER↵ to move onto the 065. Scale Refer item.



D. The following four items of zooming reference point are displayed.
By default, it is set on MACHINE_ORG. Use direction key ▲ ▼ to select the item desired, and then press ENTER↵ to set.



Descriptions of each item are as follows:
MACHINE_ORG : Zooming based on the machine origin.
SECOND_ORG : Zooming based on the second origin.
SEWING_STR : Zooming based on the sewing starting point.
REFER_PNT : Zooming based on the point defined by user at program code No. 056 of Function Code.

E. Setting-Up Reference Point for Punching.

① After creating any pattern design, use back/forth stitch function to move it to the reference point to be set, and then press code key.

```
<Function Code>

Code No   :056
```

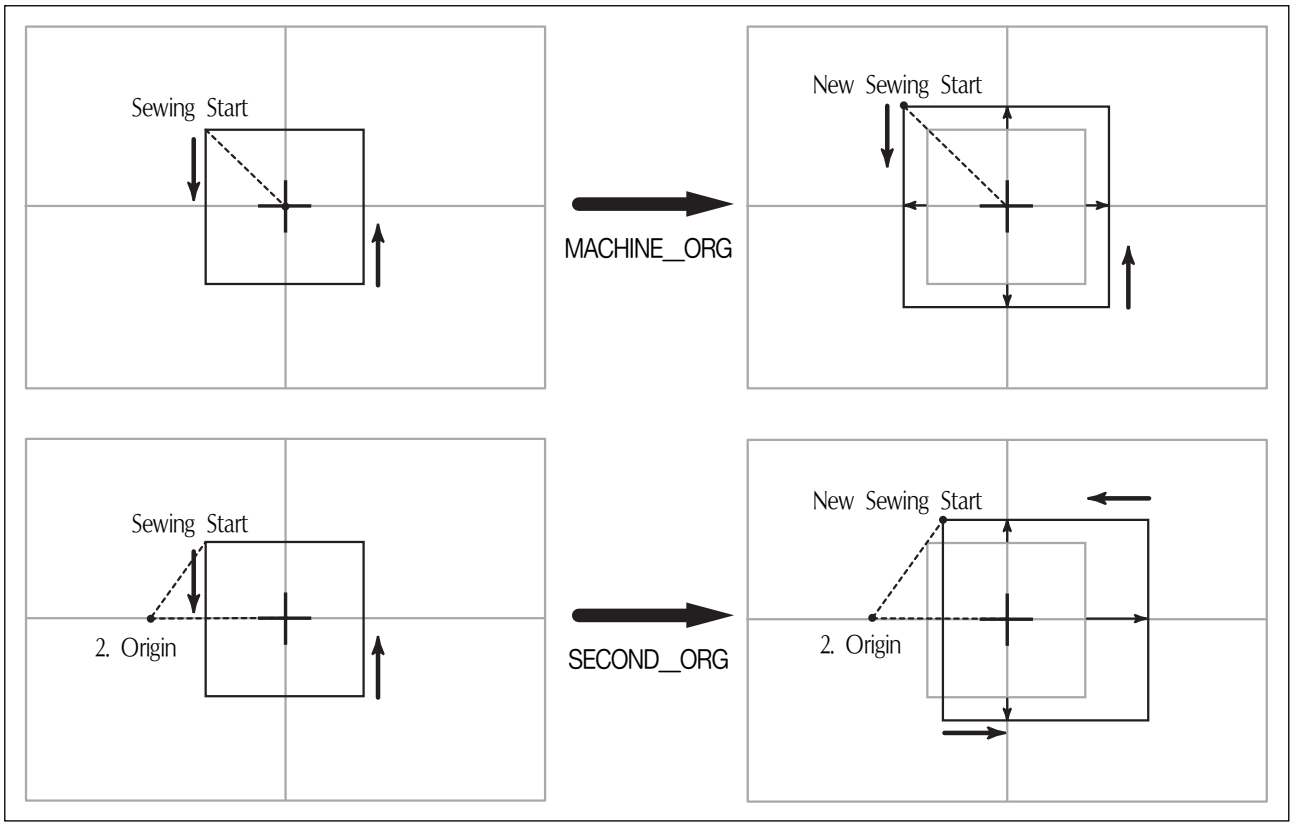
② Input 056 for the code No., and press ENTER↵.

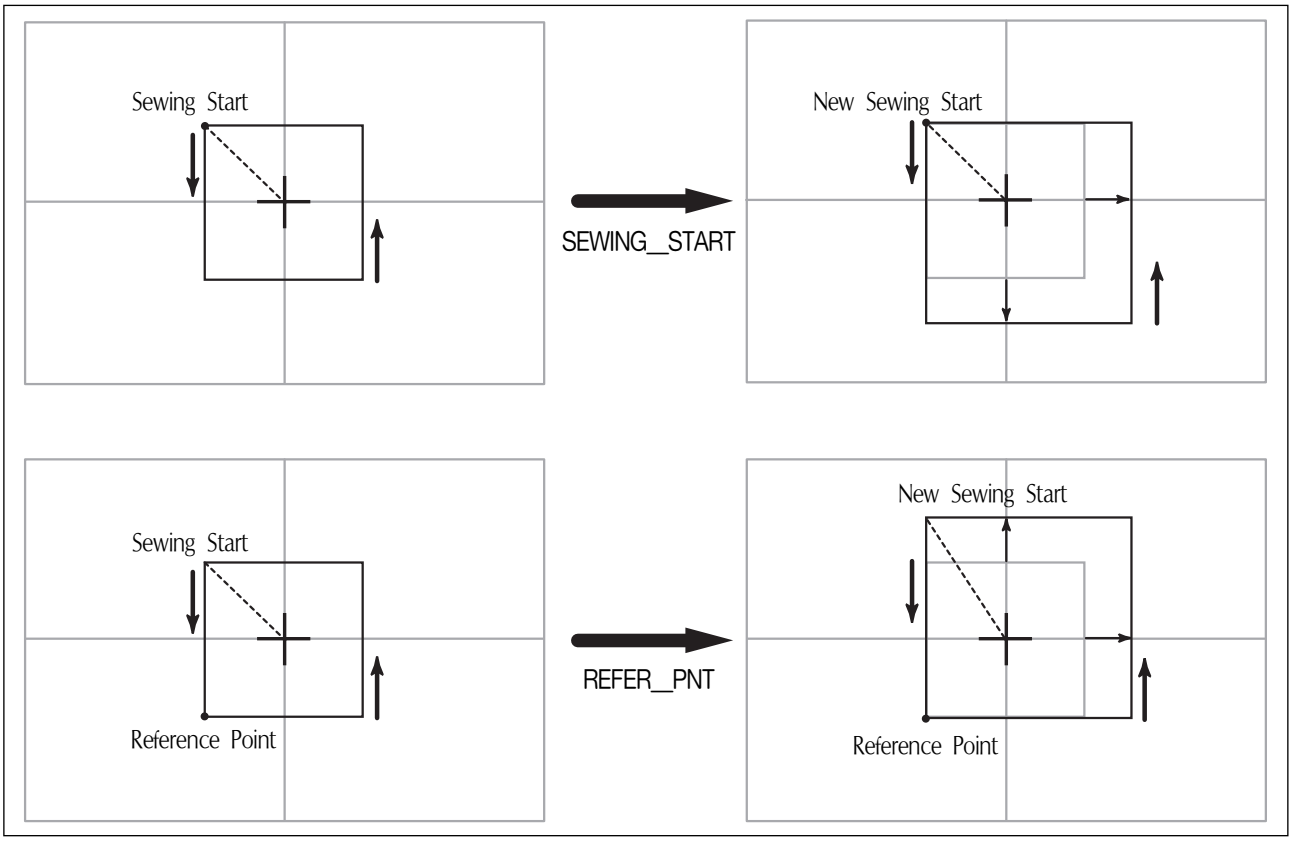
```
SCALE REFER NONE
X:-0030.00A N:00097
Y:-0030.00A
Function Code?
```

③ On the following SCALE REFER item, use back/forth stitch function to confirm whether the reference point would be inserted.

F. After setting-up the reference point item and the reference point, store the decided design into floppy diskette, press ESC to return to the sewing mode, and then apply the scale desired.

The following illustration shows the zooming functions for each reference point item.





3-15) Embroidery Design Call Function

It means the function converting to sew by calling SunStar's "*.SST Sewing Design File" and TAJIMA's "*.DST Sewing Design File".

A. Insert floppy diskette containing the sewing design into floppy disk driver.

B. Press MODE key.

C. After moving to "6. EMB Call" by using direction key ▲ ▼, press ENTER↵ key.

D. The next screen appears and READY LED light of operation box flickers. Select TAJIMA sewing design by pressing Number 1 key.

E. The next screen appears again. (Current screen can be difference according to sewing design in the diskette.) After selecting the design to convert by using direction key, press ENTER↵ key.

```
<< Main Menu >>
0. Initialize
1. Parameter Set
2. Program
```

```
<< Main Menu >>
6. EMB Call
```

```
Insert Disk
SWF(0)/TAJIMA(1)

To Exit (ESC)...
```

```
<< FILE LIST >>
G013.dst          <
```

F. Then screen changes again and input the design number by using digit key to save into pattern file. And press ENTER↵key.

```
Enter Number to
be stored

NO  :001
```

G. READY LED on operation box flickers continue-ously and there comes the sounds reading floppy diskette.

H. If you converted and read sewing design into pattern file, the next screen appears.

```
<< Main Menu >>
6. EMB Call
```

I. Return to initial sewing screen by pressing ESC key. (The screen in the next can be different according to sewing design type, user's working order and environment.

```
NO:000    NOR_SEW
XS:100%
YS:100%   SP:2500
BC:058    PC:0058
```

J. After inputting pattern file number saved in the front by pressing No. key button on the operation box, call the design by pressing ENTER↵key.

```
NO:001    NOR_SEW
XS:100%
YS:100%   SP:2500
BC:058    PC:0058
```

K. Fasten the working material by pressing foot plate of right pedal and start sewing by stepping start pedal.

3-16) JUKI Design Call

This function is to convert JUKI's AMS-series design files.

※ Sometimes conversion might not be properly conducted. We will correct the problem to enable normal operation as soon as possible.

A. Select No. 7 "OtherPtrnCall" from the main menu.

```
<< Main Menu >>
7. OtherPtrnCall <
```

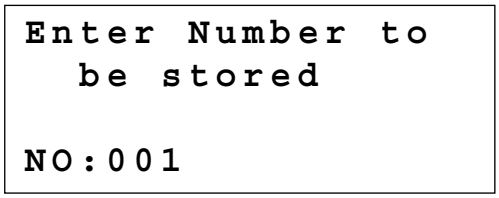
B. Insert a diskette, and press No. 0.

```
Insert Disk
JUKI/Press(0)
To Exit(ESC)...
```

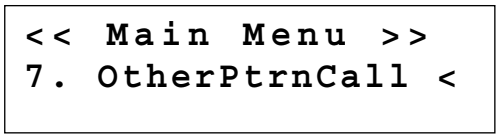
C. The list of JUKI files saved in the diskette shows up on the screen.
Move the cursor to the conversion target file, and press "Enter."

```
<< FILE List >>
100.M3       <
200.M3
300.M3
```

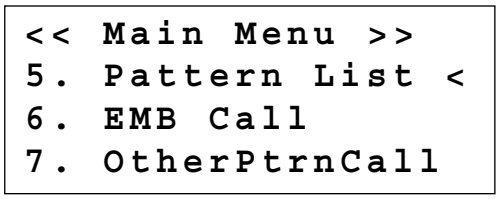
D. Enter a new name for the file, which will be converted and saved, and press "Enter."



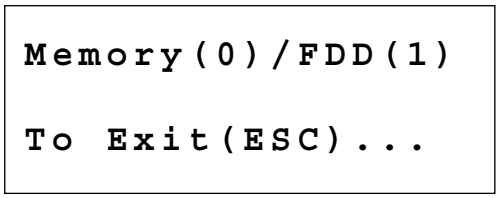
E. When conversion is finished, the screen returns to the original status.



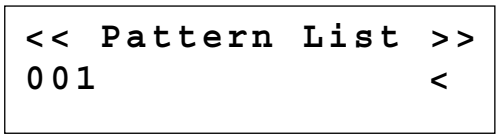
F. Press No. 5 "Pattern List" from the main menu, and check whether the converted file from the diskette is properly saved.



G. Press No. 1.



H. The list of design patterns saved is displayed.

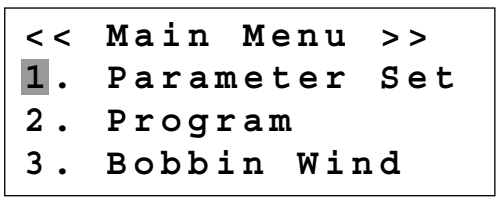


3-17) Sewing Limit Function

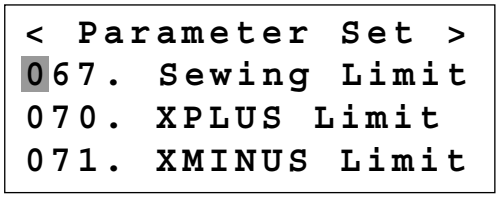
This function for setting sewing limit is designed to expand the mechanical sewing limit of the machine. First mechanically expand the X-Y feeding area of the machine, and set the sewing limit in the parameter in accordance with the expanded area.

Refer to the following for set-up.

A. Press MODE and select Parameter Set in Main Menu.



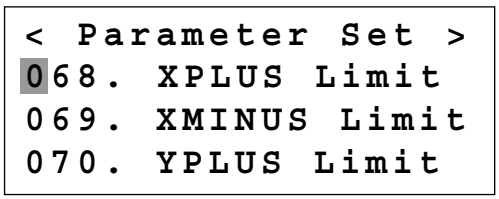
B. Use the direction change cursor in the Parameter Set and select 067. Sewing Limit.



C. Sewing Limit is defaulted at 1) DISABLE.

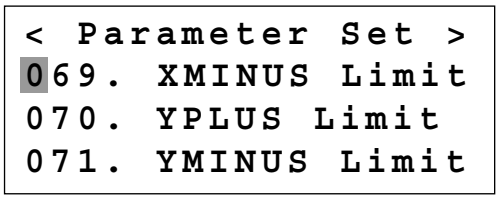
D. Use the direction change cursor to select 2) ENABLE and press ENTER↵.

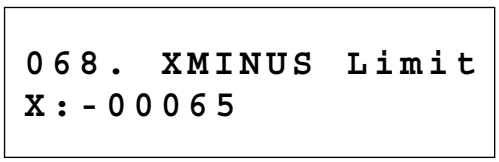
E. Use the direction change cursor to select 068. XPLUS Limit.
The default value is set at 65mm (for SPS-1306 machines). Use the up/down direction key ▲ ▼ to increase the limit as desired.



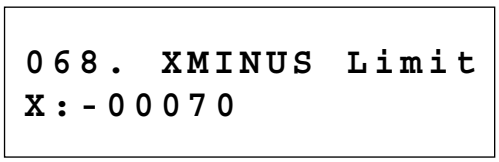
※ Ex) If you increase the X-axis mechanical feeding limit to a maximum 140mm, you can set up to 70mm in the X-axis plus direction.

F. To increase limit in the opposite direction, select 069. XMINUS Limit.
The default value is set at -65mm (for SPS-1306 machines). Use the up/down direction key ▲ ▼ to increase the limit as desired.

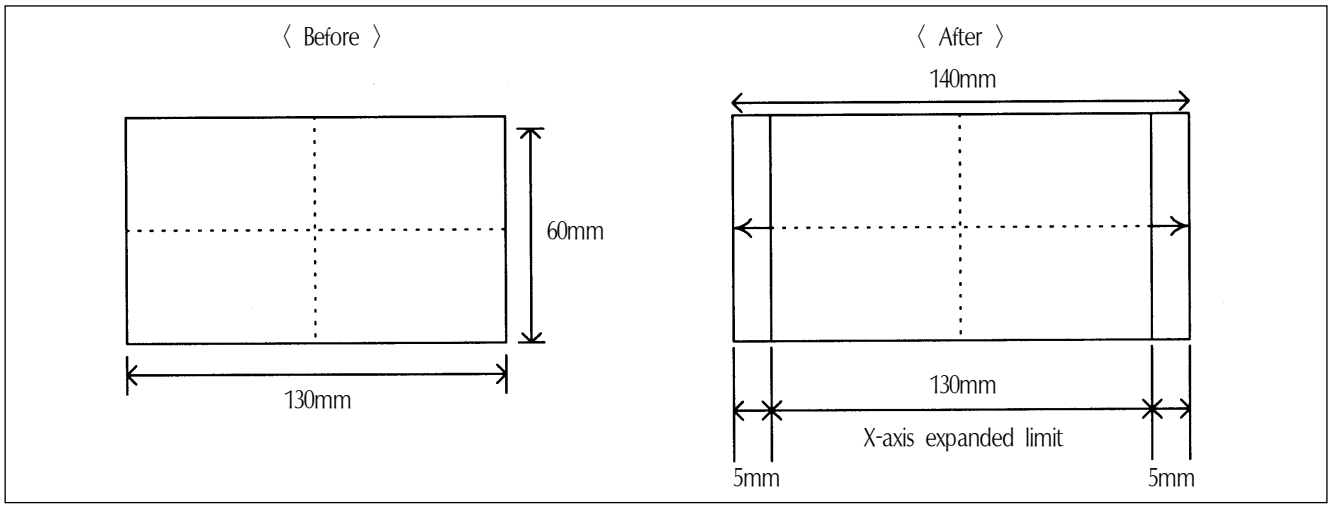




※ Ex) If you increase the X-axis mechanical feeding limit to a maximum 140mm, you can set up to -70mm in the X-axis minus direction.

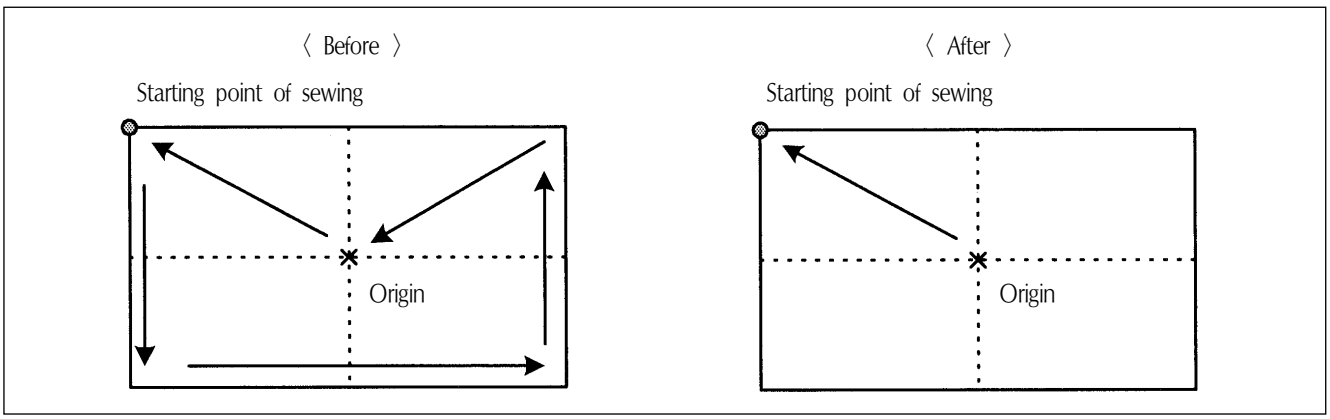


G. If you increased the mechanical feeding limit of Y-axis, refer to the above instructions to expand the feeding limit.
After setting the sewing limit in accordance with the mechanically expanded limit, you can check if the machine feeds to the actual expanded limit. Use the X-Y Jog Test function in Machine Test function to check whether the machine feeds to the actual expanded limit.



Caution) The sewing limit function is always defaulted at DISABLE and the sewing limit is set at the standard size for each type at the factory.

3-18) Quick Origin Search Motion Function for 1811 Machines



As SPS-1811 machines is equipped with reverse devices, origin search motion is performed as shown in the Before picture and feeds back to the starting point of sewing. However, if there is no reverse device, search motion takes place very slowly. This quick origin search motion function ensures fast origin search as shown in the After picture and feeding back to the starting point of sewing.

Refer to the following for set-up.

A. Press MODE to select Parameter Set in Main Menu.

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

B. Use the direction change cursor in Parameter Set and select 073. FFOrign 1811.

```
< Parameter Set >
073. FFOrign 1811
074. RevAfterTrim
075. Reverse Angle
```

C. FFOrign 1811 is defaulted at 1) DISABLE. This setting ensures slow origin search motion all the time.

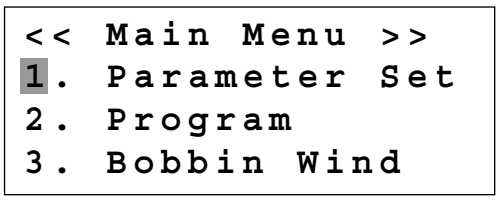
D. Use the direction change button ▲ ▼ to select 2) ENABLE and press ENTER ↵. This setting ensures fast origin search motion all the time.

3-19) Setting Reverse Rotation after Trimming

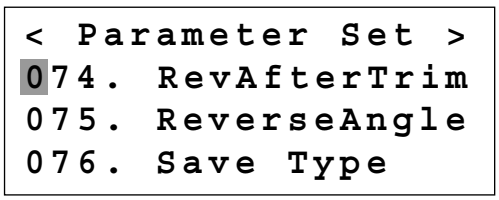
Function of Reverse rotation after trimming is as follows. When sewing material is thick, the thick material can interfere with needle if the needle is placed at the highest point of thread take-up. In that case, the interference will be prevented if the needle is placed in reverse order. Therefore, after trimming, set the point of reverse rotation as the applicable angle by using the reverse rotation function. If sewing material is not thick, don't use the function.

Setting method is as follows.

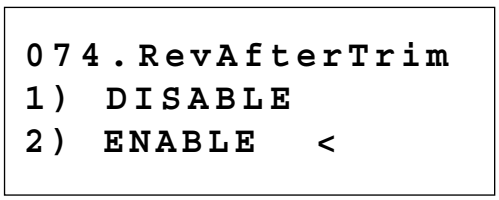
A. Choose Parameter Set from Main Menu by pushing MODE key.



B. Choose 074. RevAfterTrim from Parameter Set by using direction keys ▲ ▼.



C. When choosing, 074. RevAfterTrim is set at 1)DISABLE.
1)DISABLE : After trimming, don't use the reverse rotation function after trimming.
2)ENABLE : After trimming, use the reverse rotation function after trimming.



D. Move to 2)ENABLE and press ENTER ↵ key in order to use this function

3-20) Setting the Angle of Reverse Rotation after Trimming

How to set the angle of reverse rotation, after trimming, is described below.
This function is available only when post-trimming reverse rotation function of 074. RevAfterTrim mentioned above is set at Enable.

Setting method is as follows.

A. Press MODE key and choose Parameter Set from Main Menu.

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

B. Choose 075. ReverseAngle from Parameter Set by pressing direction keys ▲ ▼.

```
< Parameter Set >
075. ReverseAngle
076. Save Type
077. DsgnOpnCtrl
```

C. 075. ReverseAngle is originally set at 15[degree]. The angle can be reset from 1 to 40[degree]. Angle can be reset by pressing direction keys ▲ ▼ on the OP box.

```
075.ReverseAngle
  15[degree]
```

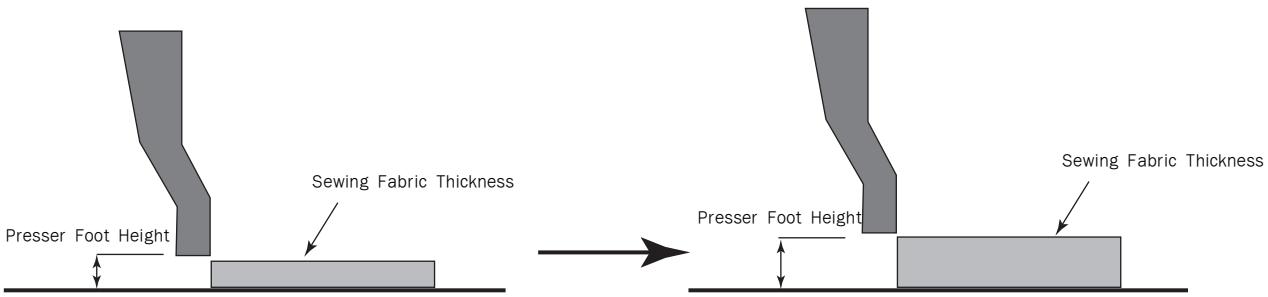
D. Press ENTER ↵ key to save the reset angle.

```
075.ReverseAngle
  40[degree]
```

4) User's Presser Foot Height Setting (in case of motor-type)

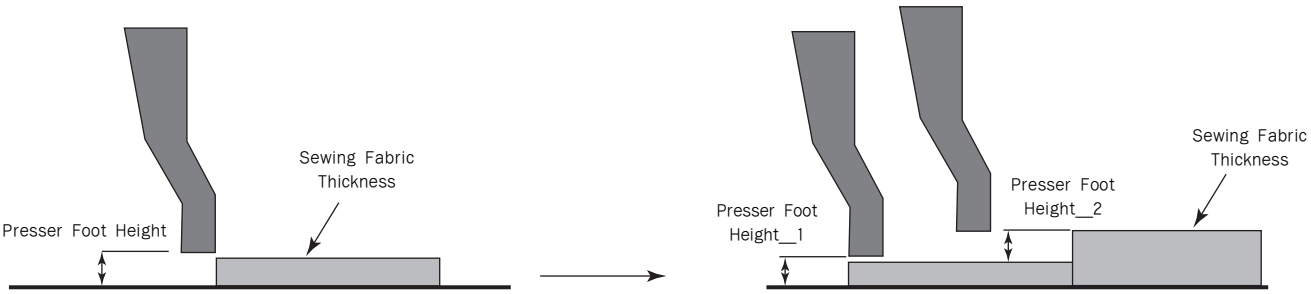
Users can adjust the presser foot height depending on the thickness of sewing fabric. Two methods can be used.
First, adjustment can be made with parameter setting.
Second, adjustment can be made in the punching program mode.

The first method is applicable to the case where there is no change in fabric thickness, and the fabric thickness for sewing work is maintained same.
In other words, as in the figure below, when there is a shift in sewing from thin fabric in the left to thick fabric in the right, this is how to set the vertical moving range of the presser foot in an easy manner.



〈Presser Foot Height Setting Depending On Sewing Fabric Height Change〉

Second, as in the figure below, when sewing fabric has difference in thickness. In this case, users can set the height difference of the presser foot when creating designs to conveniently control the height difference of the presser foot.



〈Presser Foot Height Setting for 2-Step Sewing Fabric Height Change〉

The following is about setting each function.

First, functions can be set by using parameters.

A. Press the MODE key and select Parameter Set on the main menu.

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

B. Use the direction cursors on Parameter Set and select 085. PF En/Dis.

```
<Parameter Set>
085. PF En/Dis
086. Clamp Range
087. Pf Range
```

C. When 084.PF En/Dis is selected, 1) DISABLE was selected. Change it to 3) USER_SET to enable users to adjust the location of the presser foot.

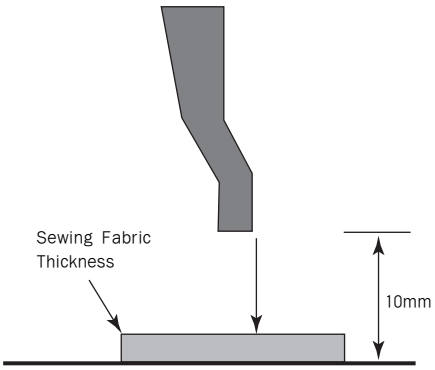
```
085. PF En/Dis
1) DISABLE
2) ENABLE
3) USER_SET    <
```

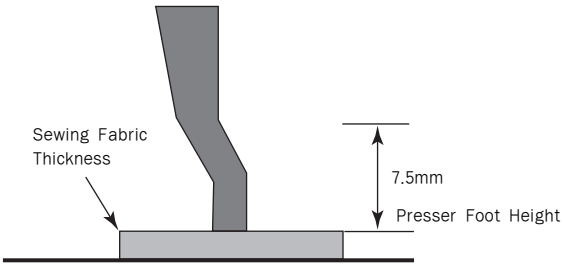
D. Select 087.PF Range among parameter items and press the ENTER↵ key.

```
<Parameter Set>
087. Pf Range
088. Auto Call
089. Auto Ready
```

E. In case where the motor-type clamp is used, set the origins for the clamp and the presser foot. Then the clamp descends, while the presser foot stops at the origin.
Turn the pulley of the sewing machine to set the lowest point of the presser foot. Press the ▲ DIRECTION key ("8") and the ▼ direction key ("2") to set the height of the presser foot depending on the thickness of sewing fabric.
▲ : Presser foot descends,
▼ : Presser foot ascends

```
PF Set : 000
Esc to Exit
P:0000[0.05mm]
```





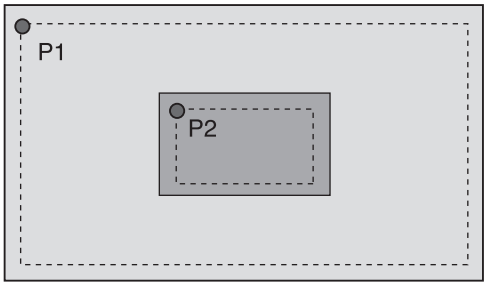
When the button is pressed once, the presser foot's feed moves by 0.05mm.
Whenever the button is pressed, the details are displayed on the counter.
When the figure on the counter shows 150, it means that the presser foot has moved 7.5mm. [150×0.05mm/pulse]

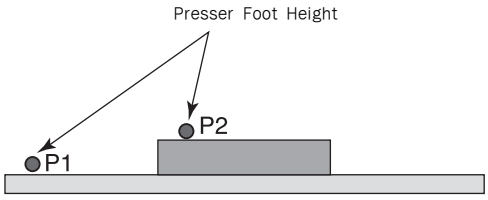
```
PF Set : 000
Esc to Exit
P:0150[0.05mm]
```

F. When the presser foot is properly positioned, press the ENTER↵ Key to save the set values. Press the ESC key to exit. When the initial screen appears, press the threading function five times to check the move of the presser foot. Likewise, the presser foot maintains its position at the set value.

```
<Parameter Set>
087. Pf Range
088. Auto Call
089. Auto Ready
```

Second, functions can be set at the punching program mode.
The figure below shows the thickness of sewing fabric viewed from the top and side based on the assumption that sewing fabric is placed. P1 is the sewing start position of the large sewing fabric, and P2 is the sewing start position of another sewing fabric located in the middle of the large sewing fabric. Therefore, the thickness difference occurs between sewing fabrics. Users can set the program of adjusting fabric thickness when conducting the consecutive sewing from P1 to P2.





A. Set the height of the presser foot for P1 following the parameter setting method.

Note) When setting the height of P1 presser foot, set Parameter 084. PF EN/DIS as 2) ENABLE, and then set the height of the initial sewing fabric of P1 using Parameter 086. PF Range.

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

B. Press the MODE key and select 2.Program for the entry into the program mode.
The initial setting position of the presser foot is P1.

```
ORIGIN
X:+0000.00A  00000
Y:+0000.00A
Function Code?
```

C. Primary, create designs for P1 and P2. Use line codes to create P1 and P2. Enter trimming when P1 and P2 end.

```
LINE
X:-0030.00A  00074
Y:+0025.00A
Function Code?
```

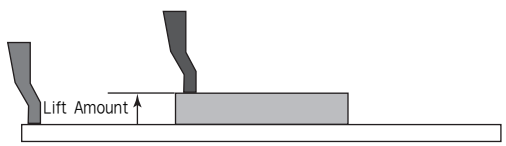
D. After P1 and P2 are created, use the forward and backward stitch functions to check the shapes of designs created. For the regular stitch-type data excluding jump, the presser foot automatically descends. Therefore, the presser foot descends following the value set at the first parameter. The presser foot which descended to the P1 data position ascends when jumping to P2. Again when the first stitch of P2 begins, the presser foot descends again. In other words, regarding the data with regular stitch attribute, the presser foot will descend except for jump.

```
<Function Code>
060. PF CONTROL
000. TRIM
001. SEC_ORG
```

E. Then users can adjust the presser foot height according to fabric thickness of P2. When the presser foot descends, press the CODE key at the first stitch of P2 and then select 060.PF CONTROL. Press the Enter key, and then while the presser foot is frozen at the current position, the screen moves to the presser foot setting screen.

```
PF Set : -100
Esc to Exit
P:0000[0.05mm]
```

F. Press the ▲ key ("8") and ▼ key ("2") to set the height of the presser foot according to the thickness of the sewing fabric.




```
PF Set : -100
Esc to Exit
P:-0150[0.05mm]
```

If the initial position of P1 presser foot is -100, PF Set is displayed as -100 on the screen. Therefore, using -100 as the basis, press ▼ twice to set the different height of the presser foot of P2. When the button is pressed once, the presser foot's feed changes by 0.05mm. Whenever the button is pressed, the number of button press is marked on the counter. If the figure is -150, it means the presser foot has moved from -100 to -150. It means 50 pulse will move after ascending 2.5mm.

G. When the presser foot position is accurately set, press the ENTER↵ key to save the set value. The set presser foot height will be maintained until the P2 sewing is completed.

H. Press the FORWARD and BACKWARD keys to check the design, and check the fabric thickness difference for the presser foot.

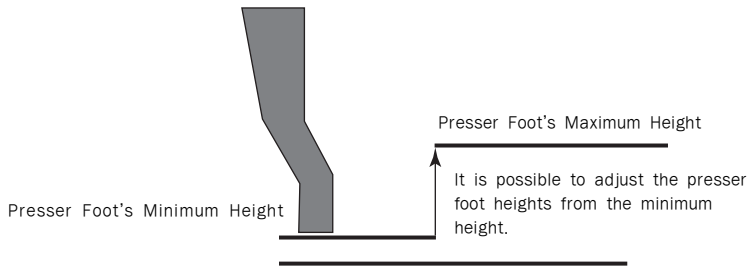
```
PF_CONTROL
X:-0030.00A   00074
Y:+0025.00A
Function Code?
```

※ Note
When the presser foot is lifted to the highest position, the presser foot might interfere with the needle bar. As such, it is recommended to lift the presser foot up to 7.5mm as maximum.

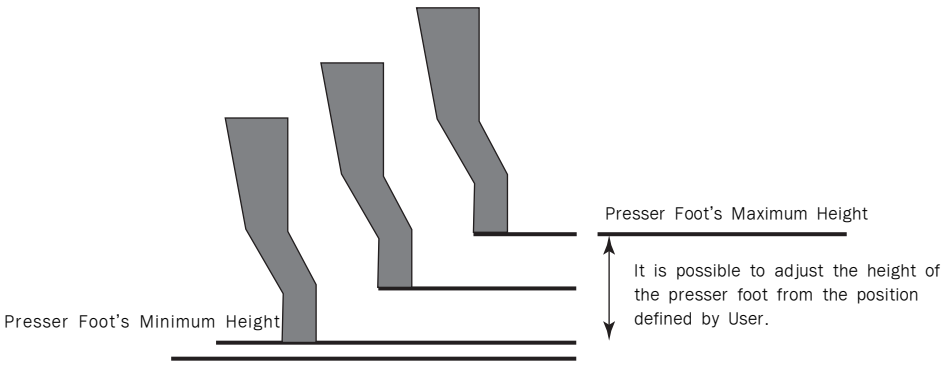
※Additional Information on Presser Foot's Height Control

1. In case where the presser foot height is adjusted upon design data creation

1) DISABLE : Set the moving range of the presser foot upward from the minimum base position.
This is a default value. Since the base position of the presser foot is set at the minimum height, this setting can be comprehensively used from general designs to designs with thickness difference. However, the presser foot cannot move below the base position initially set.

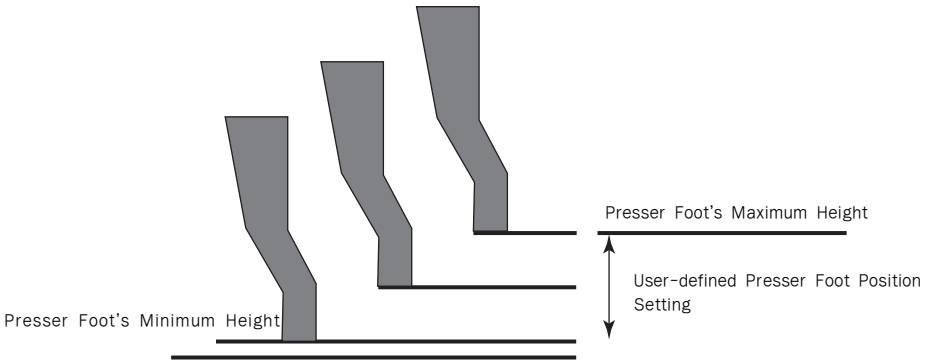


2) ENABLE : The presser foot height can be adjusted from the position defined by User. This is a suitable function when the height difference exists during sewing.
The presser foot can be lifted and pulled down from the presser foot position defined by Use.



2. Adjustment of Presser Foot's Base Position Without Presser Foot Height Change in Design Data

1) USER_SET : The height difference of the presser foot previously saved in the design data is ignored, and User sets the fixed position for the presser foot.
If various sewing fabrics are used, and the thickness of sewing fabrics frequently changes, the base height of the presser foot can be easily adjusted. However, the thickness difference control code, which was set previously, will be ignored, and the sewing will be conducted based on the position of the current presser foot.



※ Information

Choose either 1) DISABLE or 2) ENABLE at Parameter 084. PF En/Dis (The base position of the presser foot can be set by using 086. PF Range). And then, the control code of presser foot moving range can be entered on the setting program.

Therefore, although the value of 086. PF Range was already set in the sewing mode, if all designs with thickness difference are called, the presser foot's height can be controlled in line with the fabric thickness difference based on the base position of the presser foot, which is saved in designs.

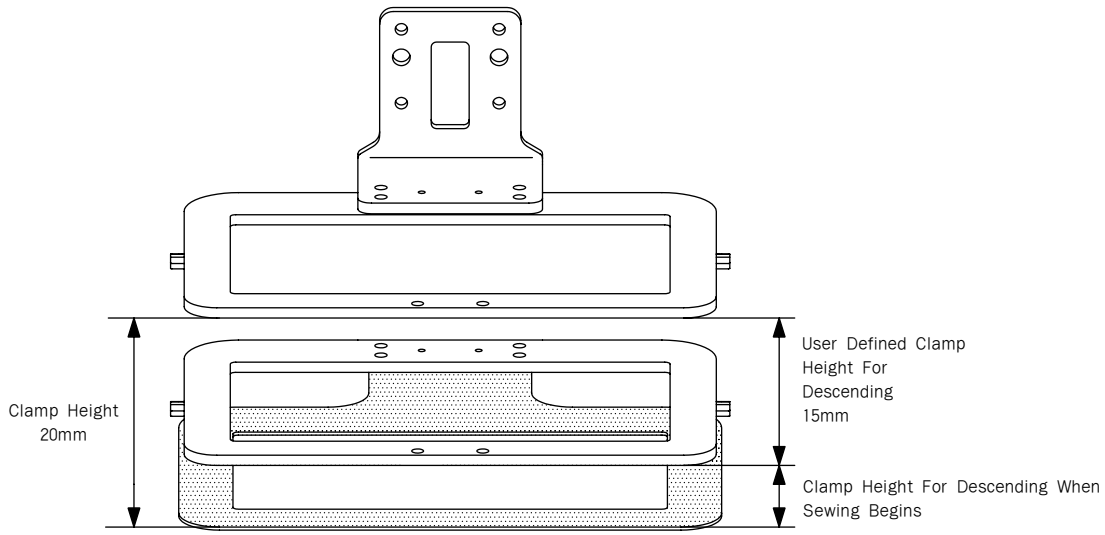
However, this function will be available only after making a choice between 1) DISABLE and 2) ENABLE at 084. PF En/Dis.

If 3) USER_SET is selected at 084. PF En/Dis, the entry of presser foot's height difference is ineffective. The code of fabric thickness control will be ignored, and the position of the presser foot will be set based on the current position value of the presser foot (086. PF Range).

5) User's Clamp Height Setting (in case of motor type)

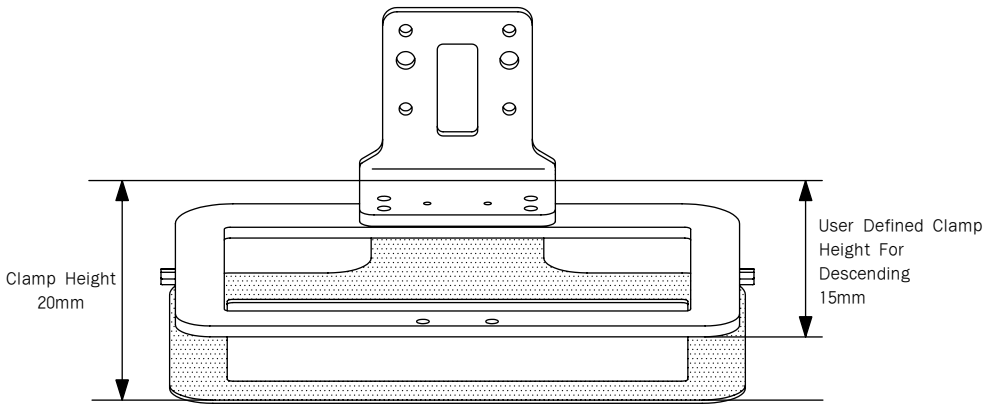
Users can adjust the height of the clamp.
There are two methods of setting.
The first method is to set the stop position when the clamp descends (2-step function setting).
The second method is the arbitrary height setting of the clamp by users.

First, if the clamp stop position is set when it descends, users can set the clamp height at their will when it descends. After the setting, the clamp is located at the normal position. When the clamp pedal on the right foot pedal is pressed after the sewing preparation, the clamp will be stopped after it descends to the pre-set stop position. When the sewing start pedal is pressed, the clamp will descend to the lower feed plate and then sewing will begin. In case where the sewing fabric is thin, and the accurate position was not set while the clamp descends, this function can be useful.



〈Clamp Stop Position Setting While Descending〉

Second, when the clamp height is arbitrarily set by a user, the set clamp height will be steadily maintained. Even after the sewing is completed, the clamp height will be maintained to be same.

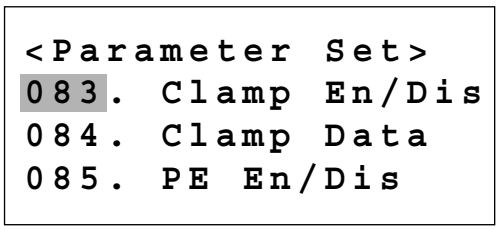


〈User's Arbitrary Setting〉

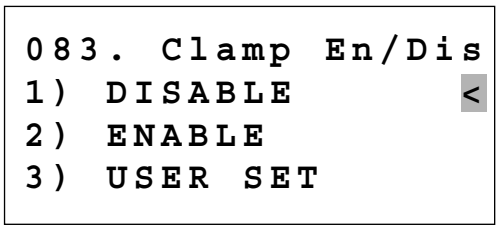
First, clamp Stop Position Setting While Descending

A. Press the MODE key and select Parameter Set from the main menu.

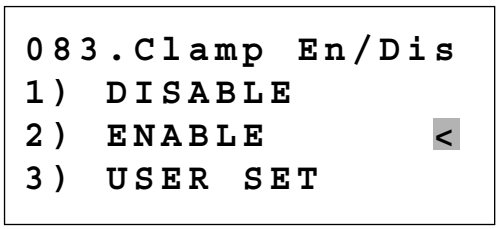
B. Use the direction cursors from Parameter Set and select 083. Clamp En/Dis.



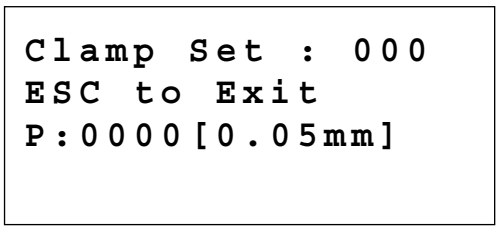
C. When 083. Clamp En/Dis is selected, the default value is '1) DISABLE.' The meanings of Disable and Enable are as follows:
   1) DISABLE: It is a default value, and when it is selected, the stop position is not used when the clamp descends.
   2) ENABLE: The stop position is set when the clamp descends. When the sewing is completed, the clamp returns to the default position.
   3) USER SET : Sets the initial stop position of the clamp. The set position will be maintained after the sewing work is completed.



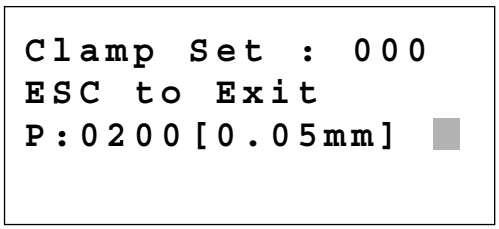
D. Use the direction buttons to select '2) ENABLE' and press the ENTER↵ key.
This is to set the stop position when the clamp descends.



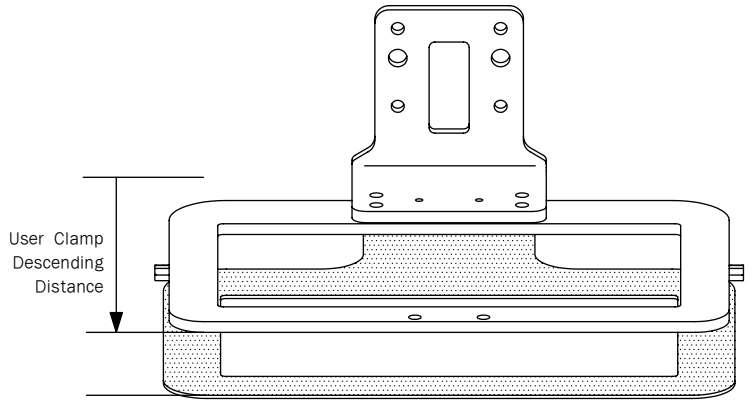
E. Go to '086. Clamp Range' from Parameter Set, and press the ENTER↵ key. Then the clamp finds the origin and stops.



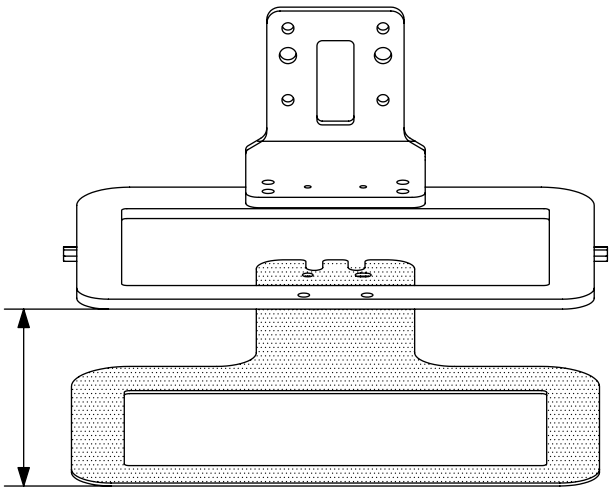
F. Press the "8" and "2" keys respectively to set the clamp stop position when the clamp descends. Whenever the button is pressed, the clamp feed moves by 0.05mm. Whenever the button is pressed, the count is displayed on the screen. If 200 times are pressed, the clamp moves by 10mm [10 = 200 × 0.05mm/pulse].
For reference, the value to place the clamp at the lowest position is 350(17.5mm)



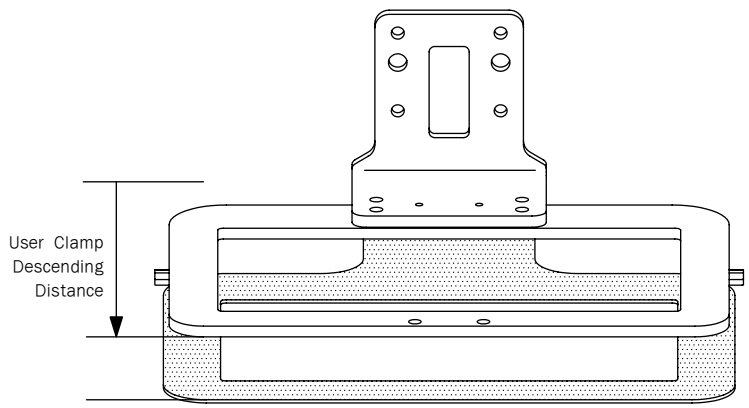
G. When the clamp position is accurately set, press the ENTER↵ key to save the set value.



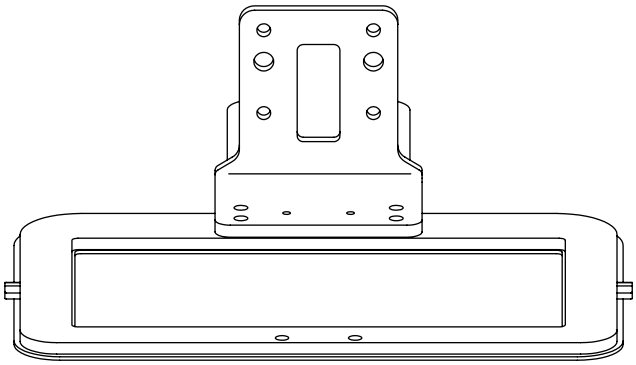
H. Read the sewing designs to get ready for sewing. In this case, the clamp is located at the highest position.



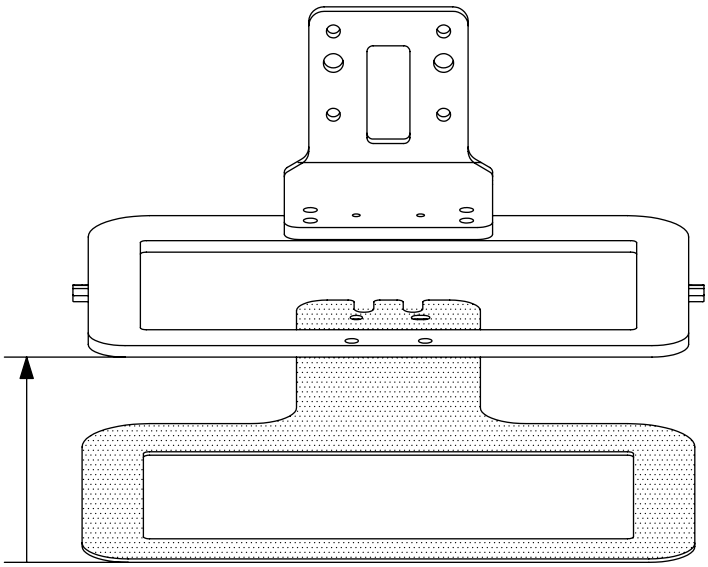
I. Press the right foot pedal to lower the clamp. Then the clamp descends until it reaches the set height and stops.



J. When the left sewing foot pedal is pressed, the remaining clamp descends, and the sewing begins.



K. When the sewing work is completed, the clamps return to their previous positions.



※ The moving range of clamp feed is P: 0000 ~0350. In other words, the distance between the highest point and the lowest point is 17.5mm.

Second, users can set the clamp height at their discretion.

A. Press the MODE key and select "Parameter Set" from "Main Menu."

B. Use the direction cursors and select "083. Clamp En/Dis."

```
<Parameter Set>
083. Clamp En/Dis
084. Clamp Data
085. PF En/Dis
```

C. When 083. Clamp En/Dis is selected, the default value is '1) DISABLE.' The meanings of Disable and Enable are as follows:
   1) Disable: It is a default value, and when it is selected, the stop position is not used when the clamp descends.
   2) Enable: The stop position is set when the clamp descends. When the sewing is completed, the clamp returns to the default position.
   3) User Set: The stop position is set when the clamp descends. When the sewing is completed, the user set position is maintained.

```
083. Clamp En/Dis
1) DISABLE      <
2) ENABLE
3) USER SET
```

D. Use the direction buttons to select '3) USER SET' and press the ENTER↵ key.
   This is to set the stop position when the clamp descends. In this case, even after the sewing is completed, the user set stop position will be maintained.

```
083. Clamp En/Dis
1) DISABLE
2) ENABLE
3) USER SET     <
```

E. Go to "086. Clamp Range" from "Parameter Set," and press the ENTER↵ key.
   Then the clamp finds the origin and stops.

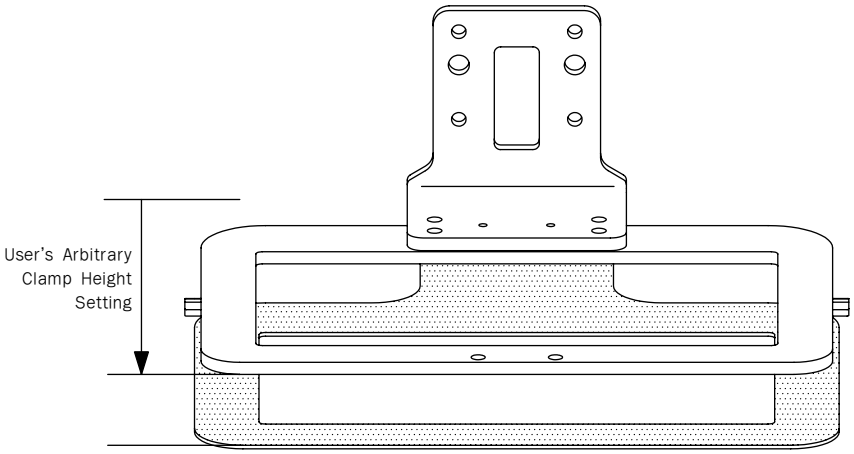
```
Clamp Set : 000
ESC to Exit
P:0000[0.05mm]
```

F. Press the "8" and "2" keys respectively to set the stop position when the clamp descends. Whenever the button is pressed, the clamp moves by 0.05mm. Whenever the button is pressed, the count is displayed on the screen. If 200 times are pressed, the clamp moves by 10mm [10 = 200 × 0.05mm/pulse].
   For reference, the value to place the clamp at the lowest position is 350(17.5mm).

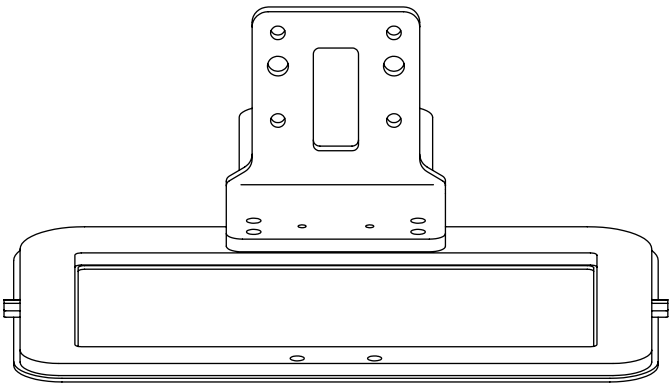
```
Clamp Set : 000
ESC to Exit
P:0200[0.05mm]
```

G. When the clamp position is accurately set, press the ENTER↵ key to save the set value.

H. Read the sewing designs to get ready for sewing. In this case, the clamp is located at the position set by the users.

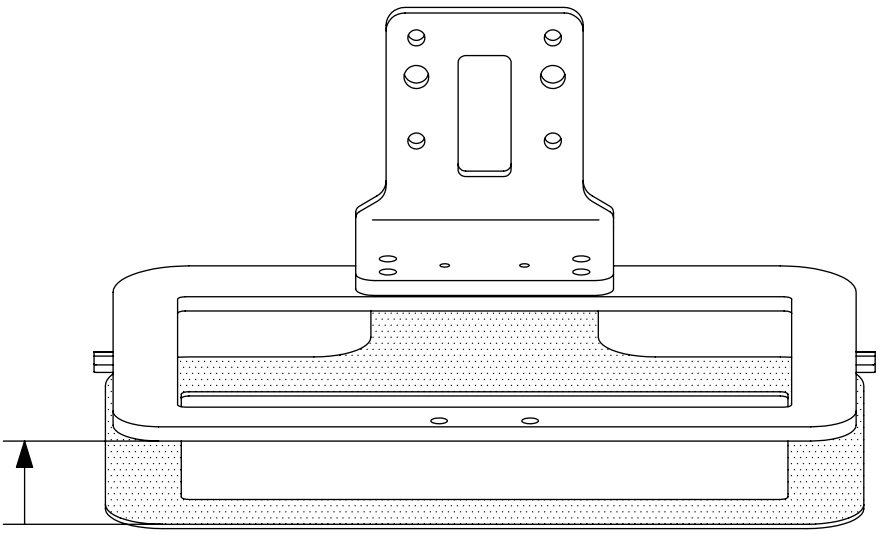


I. Press the right foot pedal to lower the clamp.



J. When the left sewing foot pedal is pressed, and the sewing begins.

K. When the sewing work is completed, the clamps return to the user set position.



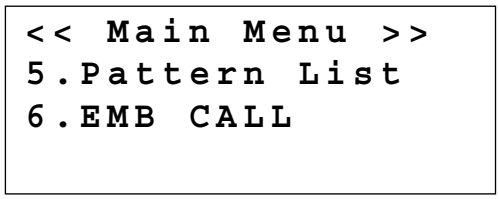
6) Pattern Data General Function

6-1) Checking and Deleting the Pattern Number

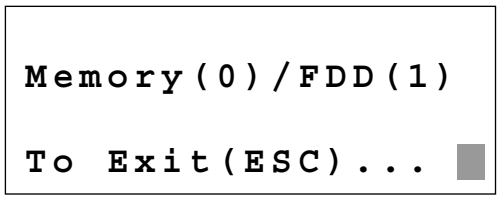
It is used to check or delete the pattern number in floppy diskette and inner memory.

A. Press MODE key.

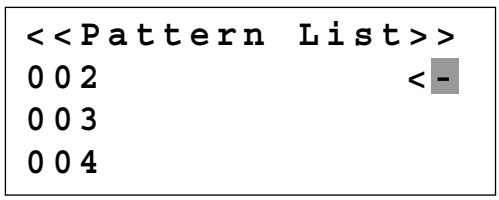
B. By using direction keys ▲▼, move to "5. Program List" menu.



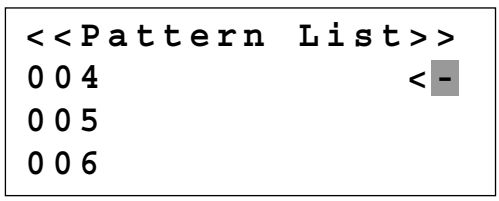
C. When ENTER↵ key is pressed, the screen as in the right side appears. To check the pattern numbers in the flash memory, press "0" To check the pattern number in the floppy diskette, press "1" and to check the pattern number in CF Card, press "2"



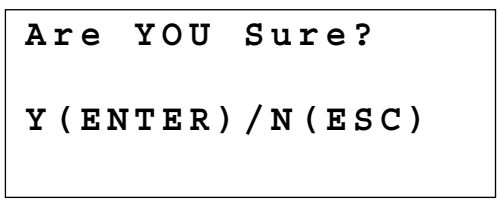
D. If you press digit key, 1. the pattern number in a floppy diskette is shown.



E. If a pattern number is not indicated on one screen, check it by using direction key ▲▼, with moving forward and downward.



F. After moving to the pattern number that you want to delete by using direction keys ▲▼, if you press PTN DEL key, 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, back to the initial screen.

6-2) Making a Copy the Pattern to Another Number or Diskette (Floppy drive: Optional)

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		Make a copy the pattern to the same diskette as another pattern number.
No. 2 Floppy Diskette		Make a copy the pattern to another diskette as 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 origin.

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

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

D. After pressing READ key, input the pattern number that is to be copied by using digit keys. (For example, to make a copy "001", input [0] [0][1].)

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

E. The setting details of the chosen memory appears. Press "0" and select FDD.

```
014 : PTRN READ
NO  : 001
FDD(0)/Memory(1)
CF CARD(2)
```

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

```
ORIGIN
X:+0000.00A N:00000
Y:+0000.00A
Function Code?
```

G. After the READY LED turns 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".)
Press "0" to select the floppy drive for copy.
The copy to the inserted floppy begins.
To make a copy to other floppy diskette, take out the existing diskette and insert other floppy diskette, then press WRITE key to 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"001".)

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

```
015:PTRN WRITE
NO   :002
FDD(0)/Memory(1)
CF CARD(2)
```

H. After leaving the programming menu by pressing MODE key, back to the initial 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
```

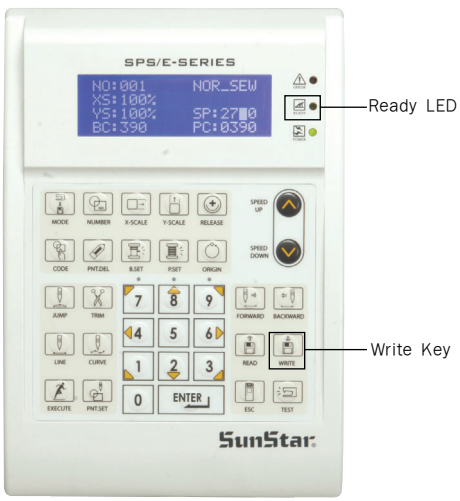
6-3) Pattern Store Function (Floppy drive: Optional)

This function is designed to summon pattern design data stored in CPU memory and store it in the floppy disk while the machine is in sewing mode. In the past, users themselves punched designs in the program mode and stored in floppy disk, but could not call design data in CPU memory and store them in floppy disk during sewing mode.

Refer to the following for set-up.

A. Design saving should be conducted on the sewing mode.
B. While the machine is in the sewing mode, key in the desired pattern design number and press ENTER↵.
C. If the machine is in the sewing mode, a light will come up in Ready LED located at the upper left corner.
D. Press ENTER↵ again. The sewing mode will be turned off and the light will go off in Ready LED.
E. By following the step A, B, C, D only once, stored designs in CPU memory can be stored in floppy disks.
F. After inserting a diskette into a floppy drive, press the save key at the right-side bottom of the OP Box.
G. In the LCD display of the OP Box, the sewing mode will be changed to storing mode.
H. Enter the design number for saving and press the Enter key. Then, the item allowing memory choice appears. Press "0" and select a floppy drive. Then the design is saved in the diskette as the set number.

```
015:PTRN WRITE
NO   :XXX
FDD(0)/Memory(1)
CF CARD(2)
```



6-4) Pattern Copy from Flash Memory to CF CARD

This function is to save pattern design data from CPU memory to CF Card on the sewing mode.

The saving methods are as follows:

A. Make sure CF Card is inserted in the CF slot of the OP Box before saving designs.

B. Call the target designs for copying and make the machine ready for sewing.

C. When the machine is in the sewing mode, the light is on the Ready LED at the upper left side.

D. When ENTER is pressed, the sewing mode is canceled, and Ready LED is turned off.

E. Press the save key at the right bottom of OP Box.

F. OP Box's LCD shows the change from the sewing mode to the saving mode.

G. Enter the design number to be saved and press the ENTER key. Then the item asking the desirable memory device for saving appears. Press "2" to select CF Card. The design will be saved in CF Card as the set number.

```
015 : PTRN WRITE
NO : XXX
FDD(0)/Memory(1)
CF CARD(2)
```

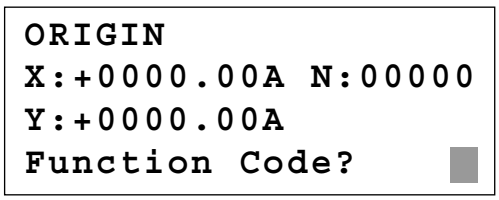
6-5) Pattern Information Displaying Function

Upon punching, it displays various information on the pattern currently saved in the memory.

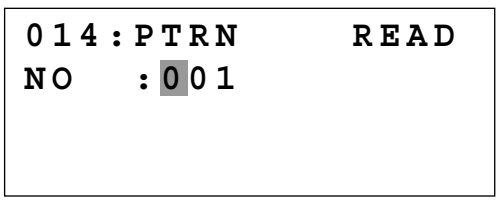
A. Insert floppy diskette containing the pattern to use pattern information displaying function.

B. Press MODE key.

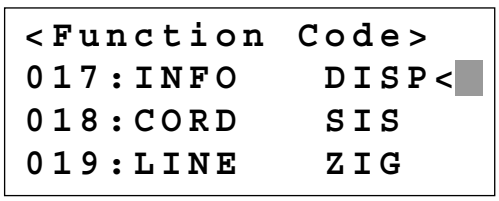
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.



D. After pressing READ key, input the pattern number to display pattern information by using digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern number 001.)

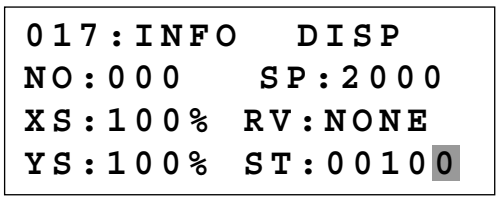


E. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 017 and if you do not know the number, press ENTER↵ key. Then, after moving to "017:INFO DISP" by using direction key ▲ ▼, press ENTER↵ key.



F. The meaning of information being displayed on the screen is as follows:

NO - Pattern number
XS - Extension/reduction rate of X-axis direction.
YS - Extension/reduction rate of Y-axis direction.
SP - Maximum sewing speed
RV - Whether to use a reversal device.
NONE (not use) YES (use)
ST - Total number of actually sewed stitches



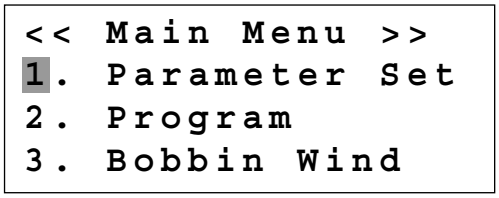
G. If you press ESC key, return to previous state.

6-6) Change of Parameter Related to General Sewing

It is used when you want to change the working condition of electrically controlled pattern sewing machine to be best for working efficiency and user's need.

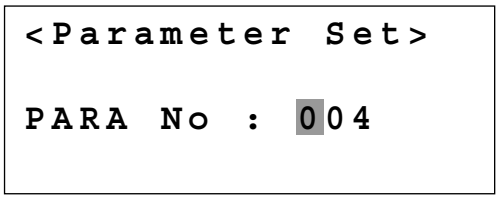
A. Press MODE key.

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



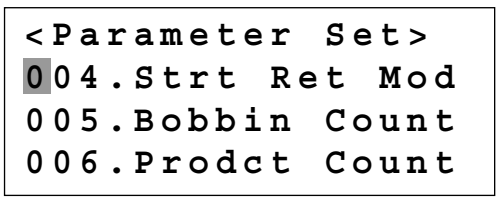
C. When you press ENTER↵ key, you can get the screen like a figure on the right side. If you know the parameter number related to general sewing, input the three digit parameter number. For example, if you want to change "004:Strt Ret Mod", input [0][0][4]. At this time, you should input [0] twice for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

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

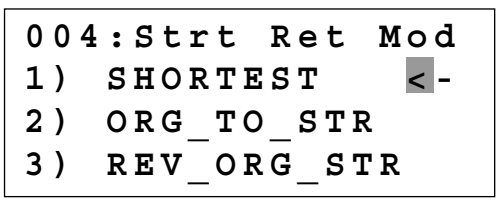


D. If you don't know any relevant number, press ENTER↵ key to move to the parameter number you want by using direction keys ▲ ▼.

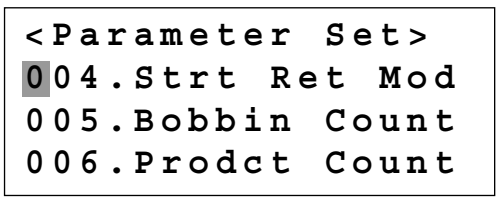
※ Appendix :
Refer "Parameter number related to general sewing."



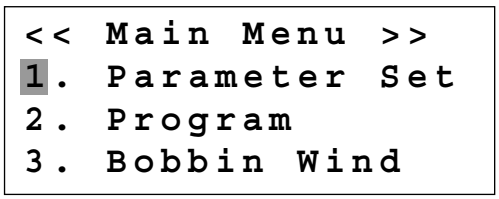
E. After pressing ENTER↵ key, change the setting value or any state you want by using direction keys ▲ ▼.



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.



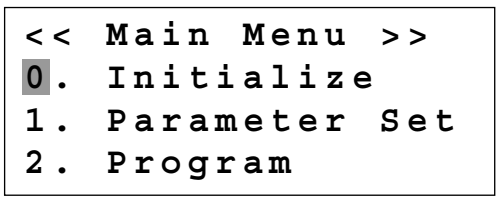
H. Press ESC key to back to the initial screen.

※ You can confirm the machine backs to the sewing start point directly without passing through the origin after finishing sewing.

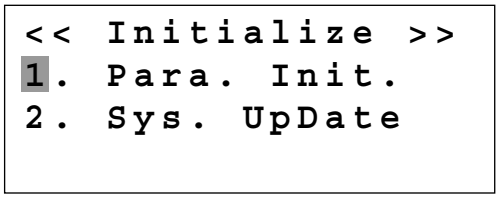
6-7) Initialization of Parameter Related to General Sewing

It is used for parameter related to general sewing to back to the factory-installed setting value. It is recommendable that only professional A/S engineer handles it.

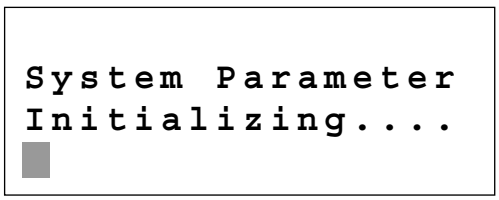
A. Press MODE key.



B. Press ENTER↵ key.

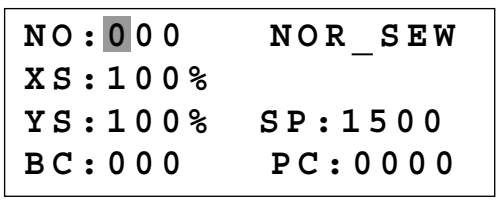


C. After moving to "1. Para. Init." menu by using direction keys ▲ ▼, press ENTER↵ key. Then you can see the screen like a figure on the right side. When a parameter initialization is finished, previous screen appears.



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

※ Even after initialization, some parameter values are maintained as the last set values.



6-8) System Program Update

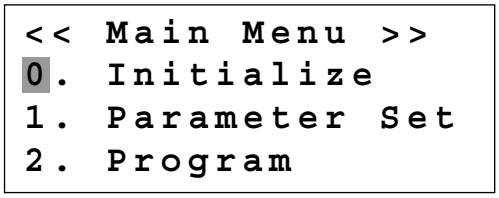
It is used for the system program that handles electrically controlled pattern sewing machine to be updated. Only professional A/S engineers allow to operate it.

A. Insert the CF Card which contains the system program to be updated.

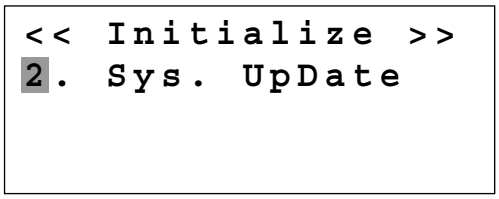
B. After pressing MODE key, press ENTER↵key.

※ Caution

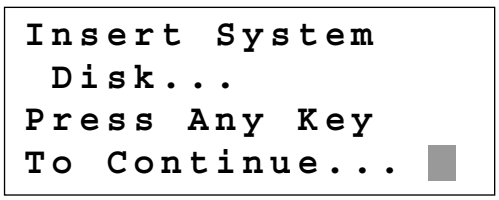
If READY LED turns on or upper feed plate is under, some keys are not available. It happened, operate the keys after lifting the upper feed plate or pressing ENTER↵keys.



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



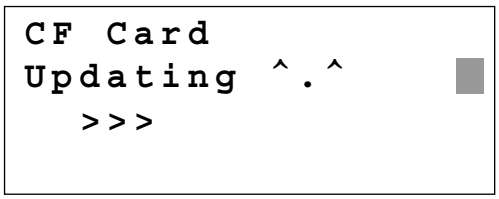
D. You can see the screen like a figure on the right side.



E. When any key is entered, system program is read from CF Card and updated. During the update, READY LED blinks.

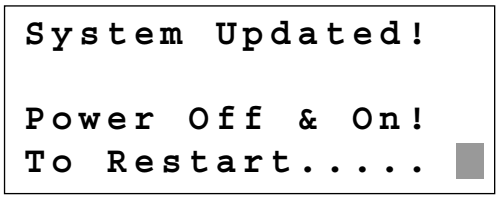
※ Caution

Do not take out CF Card or turn the power off during CF Card update or while CF Card is being read.



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 update on the system program is completed.

※ If system update to FDD is desired, insert FDD and start an update. Although the default value of parameter 076. SAVE TYPE is 3) CF CARD, if there is no CF Card inserted, FDD is automatically read and updated.

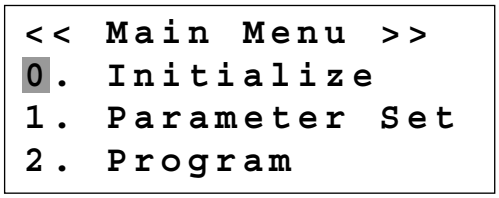


6-9) Confirmation for Version of System Program

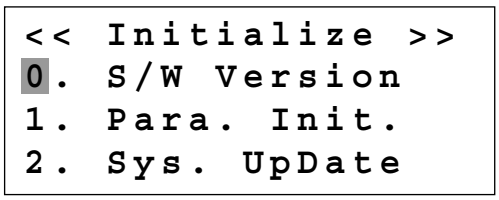
A. Press MODE key.

※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↵keys.



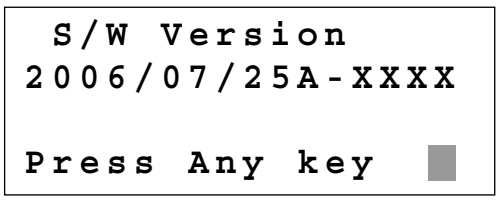
B. Press ENTER↵key.



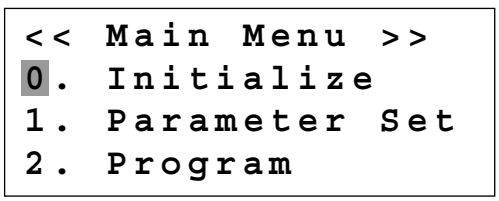
C. If you press ENTER↵key, you can get the screen like a figure on the right side. You can confirm the date when the system program was made.

※ XXX refers to machine type.
"A" after date refers to the presser foot clamp driving method.

A: Presser Foot - Motor Type
Clamp - Pneumatic Type
M: Presser Foot - Motor Type
Clamp - Pneumatic Type
S: Presser Foot - Solenoid Type
Clamp - Motor Type



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



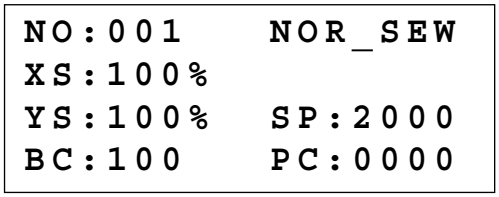
6-10) Bobbin counter setting by design

In the old versions, the value of bobbin counter, once set, stayed the same regardless of pattern design unless the user changed the value. (Except for initialization) However, for updated versions, the user can set and store the value of bobbin counter for the pattern design created.

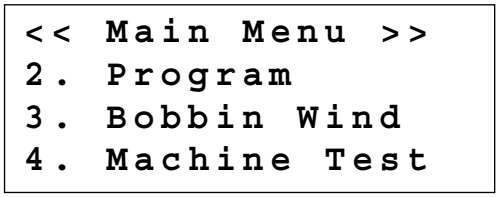
There are two ways to set bobbin counter.

Method 1: Setting during design creation.

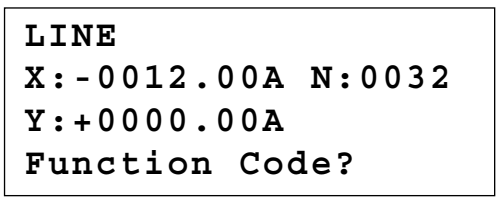
A. In the initial screen, press B.SET to set the value of bobbin counter as the user desires.



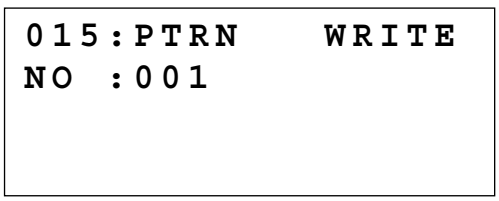
B. Go to Program Mode in Main Menu.



C. Create a design as desired.



D. Save the design in FDD.



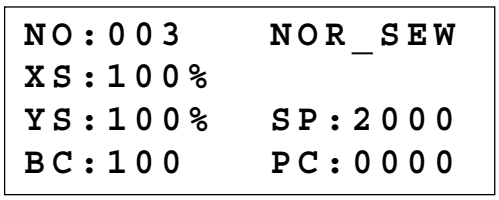
E. In 001 design created, the value of bobbin counter will be saved as 100.

When reading 001 design, the value of bobbin counter in the initial screen will be set as 100.

Method 2: Pattern Copy from Flash Memory to CF Card

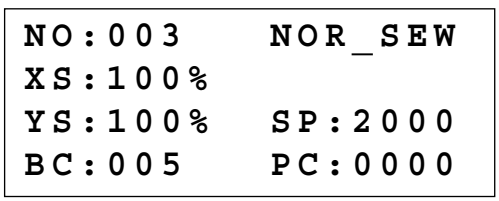
A. Insert CF Card into the CF slot.

B. Input pattern number you wish to read from the initial screen, and press ENTER↵ to read design.

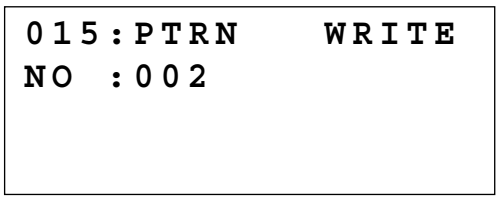


C. With READY LED activated on OP box, press ENTER↵ to turn off READY.

D. Press B. SET bobbin counter button in the initial screen to set the desired value of bobbin counter.



E. Press WRITE from OP Box to save designs into CF CARD. Make the copy with same or different names.



F. New value of bobbin counter will be saved in design

6-11) PC-based Pattern Design Download

When the SSP punching software is used, it is possible to transfer the design data from PC to the pattern M/C in an easy manner.

The details on SSP will not be additionally provided, and see the SSP punching software for reference.

The following is how to download designs:

A. Use the RS-232c serial communication connector to link OP Box to PC.

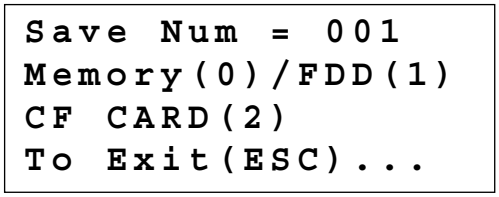
B. Press the MODE key and move the cursor to the last item on the menu list.

```
<< Main Menu >>
8. Download Ptrn
```

C. Press the ENTER ↵ key on "8. Download Ptrn." When the screen changes, it is asked to enter the pattern number to be transferred and saved. Then press the pattern number for saving.

```
Save Num = 001
```

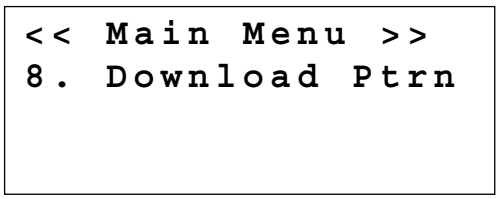
D. When the pattern number is pressed, press the ENTER↵ key.
Select the memory type for saving.
Press "0" to choose a memory.



E. Press the ENTER↵ key. The "beep" sound is issued, signaling that it is ready to receive design data from PC.

F. Download designs from SSP in PC.
When the designs are downloaded without problem, the beep sound is issued three times.

G. When the download is successful, the screen returns to "Main Menu."



H. Check whether the data is properly saved in the memory.

8

HIGH OPERATING METHOD

1) Understanding the Function of Machine Test

1-1) Encoder Test

It is a test if input of encoder and synchronizer is proper along with 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. Press ENTER↵key. Upper feed plate comes to descend, and moves to origin. At this time, if you slowly turn the upper shaft pulley manually, the pulse value of encoder, relative position of the upper shaft synchronizer sensor, and turning times of upper shaft will be marked.

```
Enc Val = 00000
Pos Val = 00000
Syn Num = 00000
PulySize = 01440
```

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.

1-2) Step Motor-Main Shaft Motor Test (X-Y Main Test)

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

A. Press MODE key.

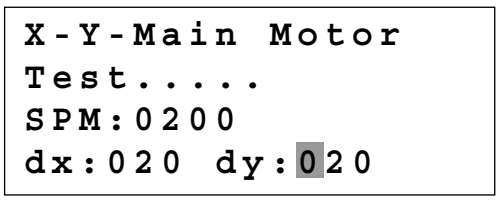
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵key.

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

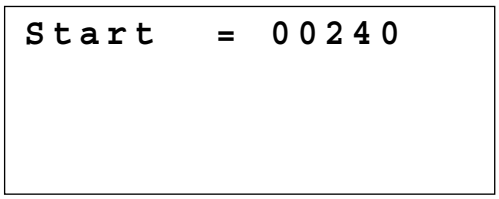
C. After moving to "1. XY-Main Test" by using direction keys ▲ ▼, press ENTER↵key. The upper feed plate descends and moves to the origin.

```
<< 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, turning 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.

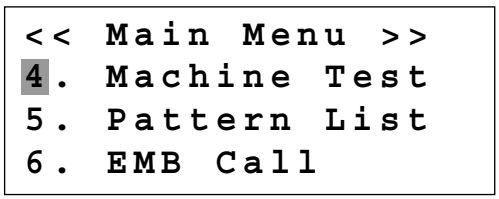


1-3) Main Motor Test

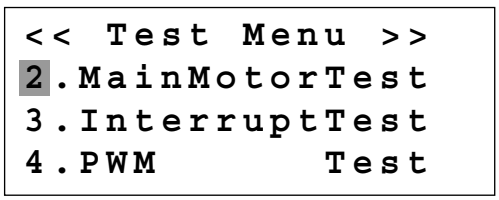
It is to test if the main shaft motor operates properly.

A. Press MODE key.

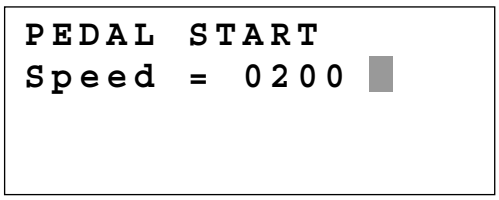
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.



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 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.

1-4) Interrupt Test

It is to test if the CPU board operates 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 means the times of synchronizer counted. IRQ5 indicates the sensing times of main power off, IRQ7 shows the timer operation of inside 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.

1-5) PWM Test

It is to test if solenoid works properly. Only professional A/S engineers allow to handle it.

A. Press MODE key.

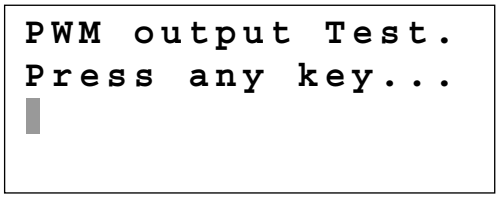
B. After move to "4. Machine Test" by using direction keys ▲ ▼, then press ENTER↵key.

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

C. After move 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.

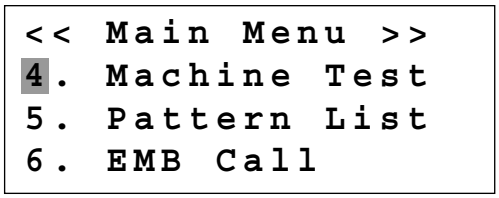
F. Back to the initial screen by pressing ESC key.

1-6) LCD Test

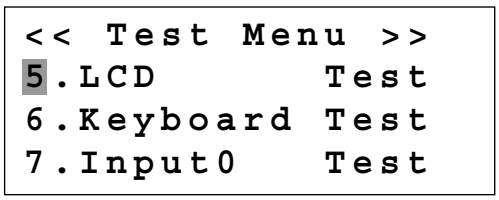
It is to test if LCD works properly. If you press a key, the relevant key appears on the screen.

A. Press MODE key.

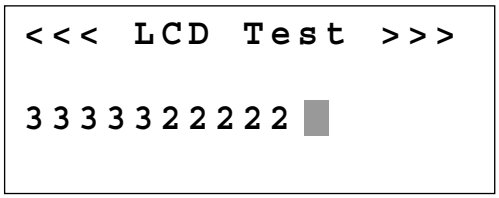
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵key.



C. After moving to "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.

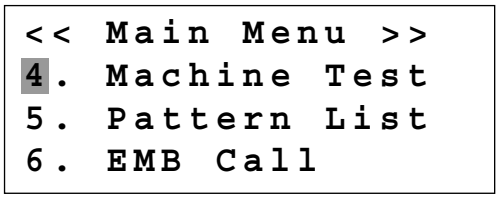
F. Back to the initial screen by pressing ESC key.

1-7) Keyboard Test

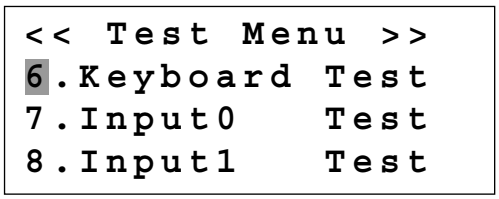
It is to test if key work properly. If you press a key, value of the relevant key appears on the screen.

A. Press MODE key.

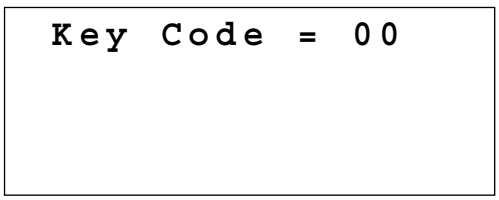
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.



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



D. If you press a key, value of the relevant 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.

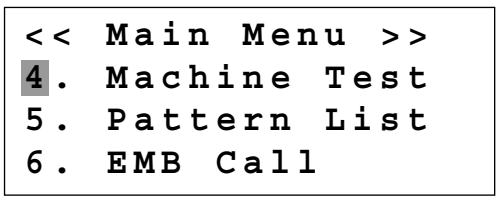
F. Back to the general sewing mode by pressing ESC key.

1-8) Input 0 Test

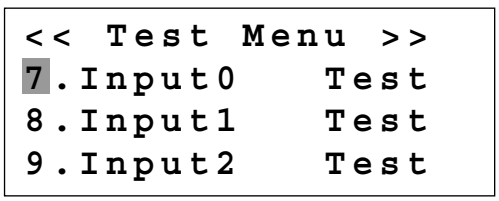
It is to test if each sensor input signal works properly. For testing, separate step motor output connector from control box.

A. Press MODE key.

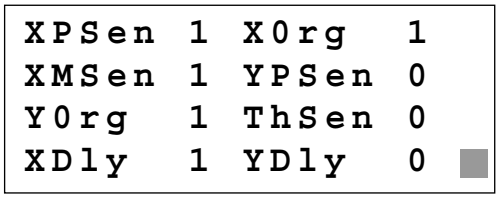
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.



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.

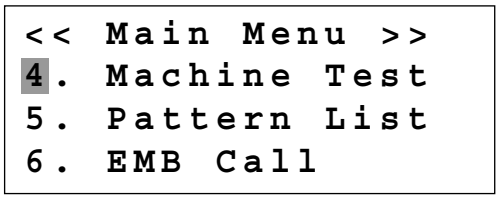
F. Back to the initial screen by pressing ESC key.

1-9) Input 1 Test

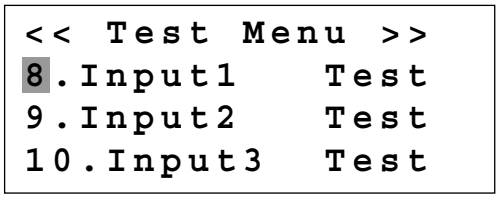
It is to test if peripheral switch input among all input signals works properly.

A. Press MODE key.

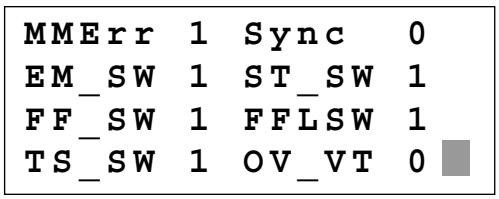
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵key.



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.
OV-VT: It changes to "1" when the over-voltage is approved.



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.

1-10) Input 2 Test

This function can be used to check whether, of the input signals, air pressure input signals and inputs related to direct connection are working properly.

A. Press MODE key.

B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "9. Input2 Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
9. Input2   Test
10. Input3  Test
11. Input4  Test
```

D. LOWPR : Air pressure error (normal: 1)
BDNEW : New I/O Board (0)
DIRECT : Direct connection type (0)
ASYNC : Communication between main shaft board and main shaft motor (0), if direct connection is used.
IOB21 : If IO Board is number 21, (0).
NEWOP : If OP is old, it is set at (1). If OP is new, it is set at (0).
IP26,27 : Not in use
UV_VT : It changes to "1" when the low voltage is approved.

```
LOWPR   1 BDNEW   0
DIRECT  0 ASYNC   0
IOB21   0 NEWOP   1
IP26    1 UV_VT   0
```

E. Press ESC key to end Input 2 Test. Press ESC key to end Test Menu.

F. Press ESC key to return to the initial page.

1-11) Input 3 Test

This function is to test whether or not each input signal is working properly.

A. Press MODE key.

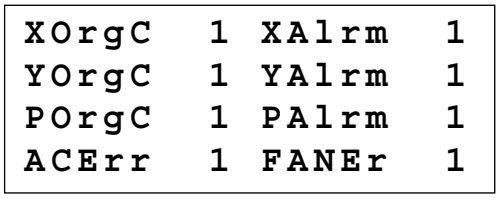
B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "10.Input3 Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
10. Input3  Test
11. Input4  Test
12. Input5  Test
```

D. Now Input3 is not in use.



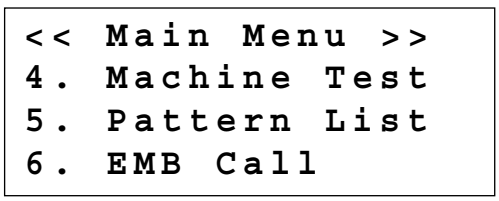
E. To end Input3 Test, press ESC. To end Test Menu, press ESC.

F. Return to the initial screen by pressing ESC.

1-12) Input 4 Test

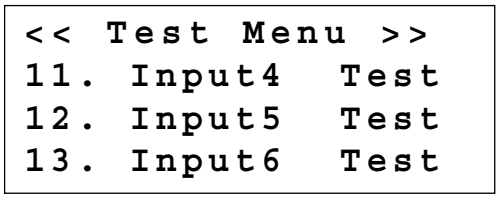
This is used to check whether or not X-Y Motor Error input signal is working properly.

A. Press MODE key.

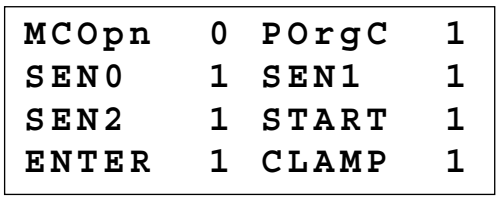


B. Move to "4 Machine Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

C. Move to "11.Input4 Test" by using direction keys ▲ ▼ and press ENTER ↵ key.



D. MCOpn : Error signal when the machine body is separated from the table (1) (normal: 0)
POrgC : When the origin signals of the presser foot and clamp are detected (0)
SEN0 : First signal for Auto Call
SEN1 : Second signal for Auto Call
SEN2 : Third signal for Auto Call
START : Sewing start signal for Auto Call
ENTER : Enter key signal for Auto Call
CLAMP : Clamp signal for Auto Call



E. To end Input 4 Test, press ESC. To end Test Menu, press ESC.

F. Return to the initial screen by pressing ESC.

1-13) Input 5 Test

The is used to check whether the DIP switch is properly operating.

A. Press MODE key

B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "12.Input5 Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
12. Input5  Test
13. Input6  Test
14.Encoder1 Test
```

D. It shows the setting of the DIP switch.

```
DIP10   1 DIP11   1
DIP12   1 DIP13   1
DIP14   1 DIP15   1
DIP16   1 DIP17   1
```

E. Press the ESC key to finish the DIP switch test. To exit the test menu, press the ESC key.

F. Press ESC key to return to initial page.

1-14) Input 6 Test

This is used to check whether the margin input signal is properly operating.

A. Press MODE key.

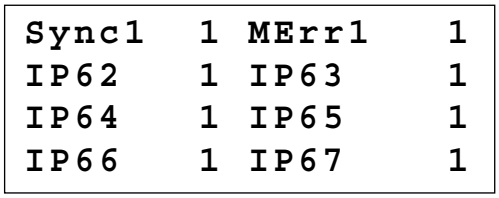
B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "13.Input6 Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
13. Input6  Test
14.Encoder1 Test
15.Solenoid Test
```

D. Currently, the in-port 6 is not used.



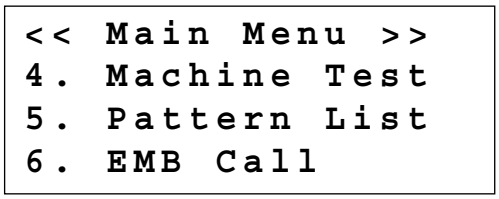
E. To end Input 6 Test, press ESC. To end Test Menu, press ESC

F. Return to the initial screen by pressing ESC.

1-15) Solenoid Test

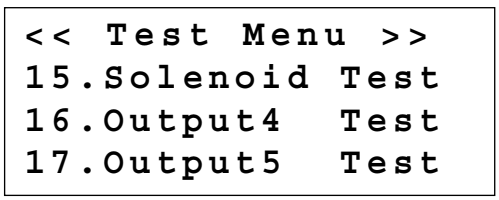
This is used to check whether or not Solenoid is working properly.

A. Press MODE key.

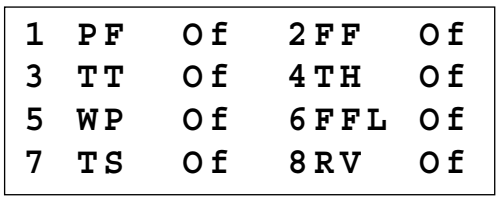


B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

C. Move to "15.Solenoid Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.



D. Repeat turning on and off relevant solenoid by pressing the number of solenoid to be tested.



1. PF : Presser Foot
2. FF : Upper feed plate
3. TT : Trimming
4. TH : Thread Holder
5. WP : Wiper
6. FFL : Detachable left upper feed plate
7. TS : Two step Stroke
8. RV : Reverse device

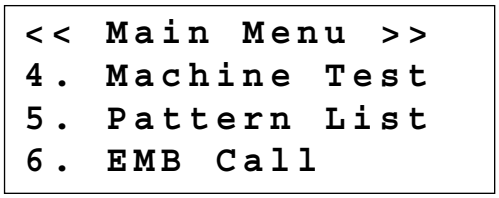
E. Press ESC key to end solenoid test. Press ESC key to end Test Menu.

F. Press ESC key to return to initial page.

1-16) Output 4 Test

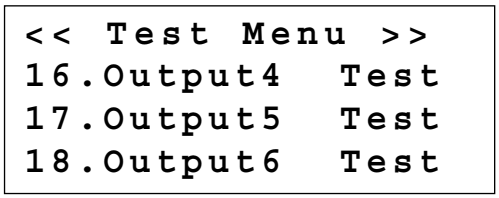
This function can be used to check whether or not air pressure devices are working properly.

A. Press MODE key.

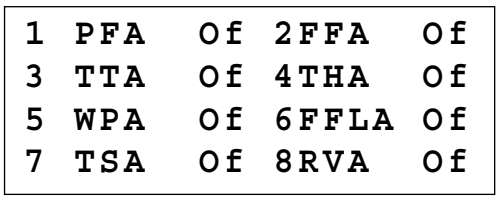


B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

C. Move to "16.Output4 Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.



D. Repeat turning on and off relevant air pressure port by pressing the number of air pressure port to be tested.



1. PFA : Presser Foot
2. FFA : Upper Feed Plate
3. TTA : Thread Trimming
4. THA : Thread Holder
5. WPA : Wiper
6. FFLA : Detachable Left Upper Feed Plate
7. TSA : Two-Step Stroke
8. RVA : Reverse Device

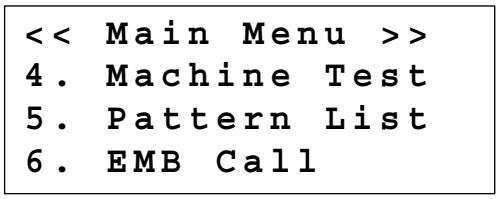
E. To end air pressure port test, press ESC key. To end test menu, press ESC key.

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

1-17) Output5 Test

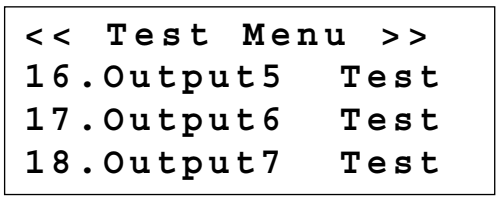
This is used to check whether the pneumatic device is properly operating.

A. Press MODE key.

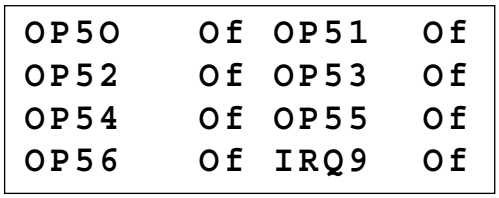


B. Move to "4 Machine Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

C. Move to "16.Output5 Test" by using direction keys ▲ ▼ and press ENTER ↵ key.



D. Currently, Output 5 is not used.
However, the OP57 port is connected to IRQ9.



E. Press ESC key to end air pressure port test. Press ESC key to end Test Menu.

F. Press ESC key to return to initial page.

1-18) XY Drive Output Port (Output 6)

Output 6 is used as the XY motor drive output signal.
Do not use the port except relevant technical engineers.

A. Press the MODE key.

B. Use the direction keys ▲ ▼ to move to "4. Machine Test" and press the ENTER ↵ key.

C. Use the direction keys ▲ ▼ to move to "17.XYDrive Test" and press the ENTER ↵ key.

```
<< Test Menu >>
017.XYDrive Test
025.Output7 Test
026.Output8 Test
```

```
1XACrOf  2XOrPOf
3YACrOf  4YOrPOf
5PACrOf  6PDGnOf
7XYGnOf  8XYPeOf
```

D. The following is about the XY motor drive output signals.
1. XACr: X-shaft drive alarm clear signal
2. XOrP: X-shaft drive origin signal
3. YACr: Y-shaft drive alarm clear signal
4. YOrP: Y-shaft drive origin signal
5. PACr: P-shaft drive alarm clear signal
6. PDGn: P-shaft dual gain
7. XYGn: XY-shaft dual gain
8. XYPe: XYP motor drive enable signal

Each of XY motor drive output signals is a very important setting item, so that they shall not be changed or tested by the people other than technical engineers.

1-19) Output 7, 8 Test

The Output 7, 8 test the reserve output ports, which are in normal conditions.

A. Press the MODE key.

B. Use the direction keys ▲ ▼ to move to "4.Machine Test" and press the ENTER ↵ key.

C. Use the direction keys ▲ ▼ to move to "18.Output7 Test" and press the ENTER ↵ key.

```
<< Test Menu >>
025.Output7 Test
026.Output8 Test
027.XY-Jog  Test
```

D. The current output port is a reserve, and is currently unused.
Output 8 is unused as well.

```
1OP70Of 2OP71Of
3OP72Of 4OP73Of
5OP74Of 6OP75Of
7OP76Of 8OP77Of
```

1-20) Manual Operation Test of Step Motor (XY Jog Test)

This function can be used to manually test XY step motor.

A. Press MODE key.

B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "20.XY-Jog Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
20.XY-Jog   Test
21.Origin   Test
22.PF-Jog   Test
```

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

```
X-Y jogging Test
ESC to Exit
X:+0000.00 Y:+0000.00
Xsen:1  Ysen:1
```

E. To end manual operation of step motor, press ESC key. To end test menu, press ESC key.

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

1-21) Origin Test

This is used to check whether or not movement of original point is working properly.

A. Press MODE key.

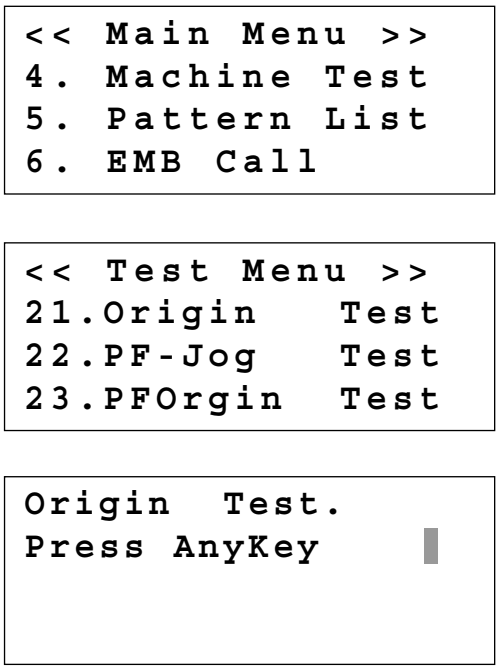
B. Move to "4 Machine Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

C. Move to "21.Origin Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

D. Pressing any key will go to original point and original test automatically.

E. To end test menu, press ESC key.

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



1-22) Presser Foot & Clamp Manual Operation Test (In case of motor type)

Check whether the clamp and the presser foot are properly operating by using the job key.

A. Press the MODE key to select "Machine Test" on Main Menu.

B. Use the direction keys of OP Box to move to "21. PF&Clamp" and press the ENTER ↵ key.

C. The clamp and the presser foot move to the origin. In case where it is the pneumatic clamp, the presser foot only moves to the origin.

D. When the initial setting screen appears, press the ENTER ↵ key again. The min. value is to set the jog speed of immediate response when the key is pressed once, and then press the ENTER ↵ key again. The max. value is to set the jog speed when the key is consecutively pressed.

E. It is possible to move the clamp and the presser foot by pressing the "2" key ▲ and the "8" key ▼. During jog, the clamp moves first, and then the presser foot follows suit. However, in case where the clamp is the pneumatic type, the presser foot only will move.

F. If the clamp and presser foot origin sensor signals are issued during jog, "PFClampSens" is changed to "0."

```
<< Test Menu >>
021. PF&Clamp Test
022. PFClmpOrg Test
023. Jump Test
```

```
PF&Clamp Test
ESC to Exit
min : 0350[pps]
```

```
PF&Clamp Test
ESC to Exit
min : 0350[pps]
max : 2900[pps]
```

```
PF&Clamp Test
ESC to Exit
P : 0930 [0.05mm]
PFClampSens : 0
```

1-23) Presser Foot & Clamp Origin Test (In case of the motor type)

The clamp and the presser foot move to the origin.

A. Press the MODE key and select "Machine Test" on the main menu.

B. Press the direction keys of OP Box to move to "22. PFClampOrg Test" and press the ENTER ↵ key.

C. The screen displays the messages below.

D. Press any key. The clamp and the presser foot move to the origin. However, in case where the clamp is the pneumatic type, the presser foot only moves to the origin.

```
<< Test Menu >>
022. PFClmpOrg Test
023. Jump Test
024. MotorTypeTest
```

```
PF Origin Test
Press Any Key
```

1-24) Jump Test

This is used to check whether or not XY step motor is working properly and do jump test.

A. Press MODE key.

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

C. Move to "24.Jump Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

D. Input the time for repeating Jump transfer distance of XY and press ENTER ↵ key. Just press ENTER ↵ key to conduct test with the factory-installed setting value.

E. Press ESC key to end Test Menu.

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

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

```
<< Test Menu >>
24.Jump      Test
25.Async     Test
```

```
X-Y Jump Test
Delay : 0007[ms]
jmp_dx : 0020
jmp_dy : 0020
```

1-25) Motor Type Test

The function above is to check the type of the currently linked main shaft motor.

A. Press the MODE key and select "Machine Test" on the main menu.

B. Press the direction keys of OP Box to move to "025. Motor Type Test" and press the Enter key.

C. The screen displays the messages below.
In case of DIRECT F-IV, Fortuna IV Motor is displayed.
In case of DIRECT Sanyo, Sanyo motor is displayed.

D. Turn the hand pulley.

E. When the hand pulley is turned two circles, the pulley size is displayed.
PulySize: 1440 refers to the pulley size for Fortuna IV.
PulySize: 8000 refers to the pulley size for Sanyo.

```
<< Test Menu >>
025.MotorTypeTest
026.Async Test
```

```
Motor Type...
DIRECT F-IV
SynNum = 1
PulySize = 1440
```

1-26) Communication Test between the Main Shaft Board and the CPU/IO Board (Async Test)

The communication function with the main shaft driver has been added to set up the phase stopping position as parameter in the direct models. The test shall be done according to the following procedure.

A. Press MODE key.

B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

C. Move to "25.Async Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
26.Async    Test
```

D. Initial speed setting value has been set up by 100, it is shown by "MotorStop". Press ENTER ↵ key.

```
Async.   Test
Speed  =  100
MotorStop
```

E. At the moment the ENTER ↵ key is pressed, the main shaft will turn one time. And it will show "MotorRun" on the LCD characters.

When you will press the ENTER ↵ key continually as above, the main shaft motor will turn one time. Therefore, to progress such movements signifies to go on the communication between the main shaft board and the I/O board normally.
(This function is applied only for the direct type motors, for reference.)

F. Press ESC key to end Test Menu.

G. Press ESC key to return to initial page.

9

DESCRIPTION ON PARAMETER RELATED TO GENERAL SEWING OPERATION

※ The shadow area indicates factory-installed condition.

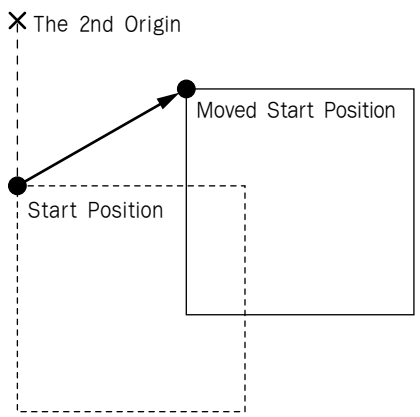
Function No. : 000		Function Name : Manual Operation En/Dis
000. Jog En/Dis		It is to set moving of feed plate manually by using direction keys.
Setting Value	1) DISABLE	It is impossible for feed plate to move by using direction keys.
		[Contents] It is impossible to make the feed plate move manually 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)

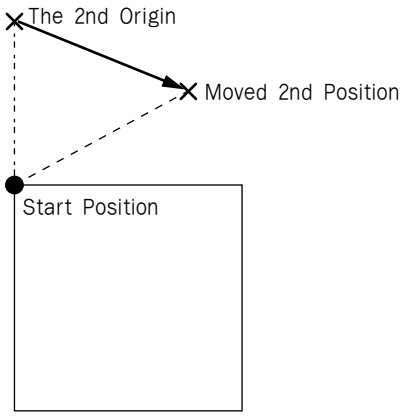
[Contents] Provided that the feed plate moves manually by using direction keys in the sewing available mode, the sewing operation will be started in that point without relation to the programmed sewing start position.

[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.

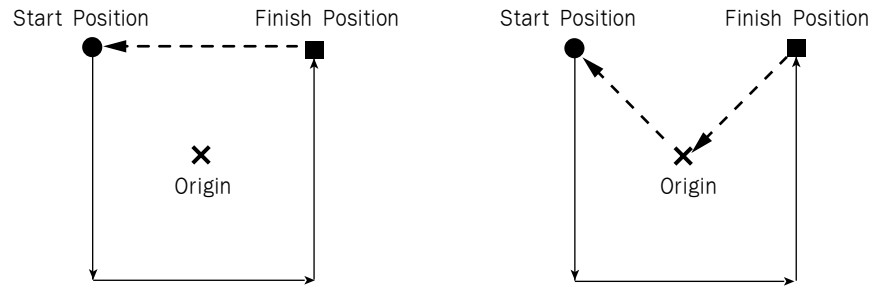
[Contents] Provided that the feed plate moves manually by using direction keys in the sewing available mode, the sewing operation will be started in that point without relation to the programmed the 2nd origin.

[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]

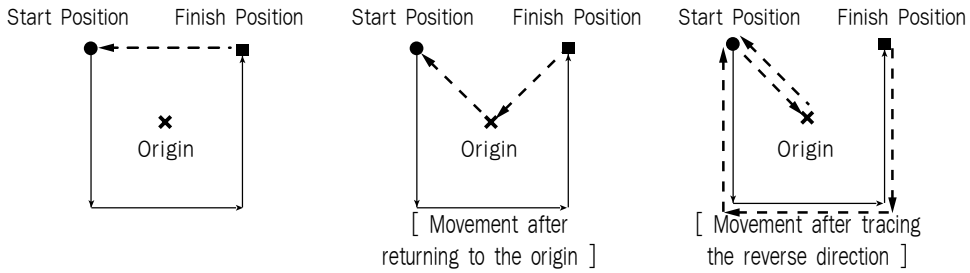
 

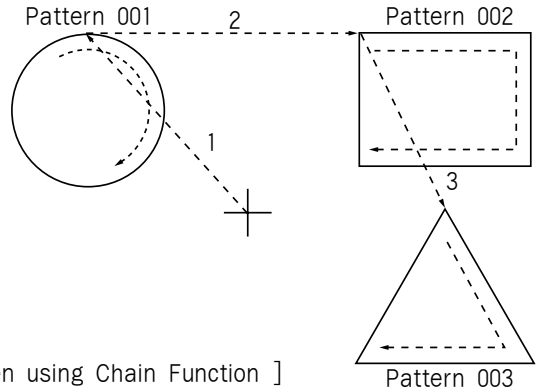
[Setup for the 2nd origin]</td></tr>
</table>

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 through 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 finishing 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 position through the shortest route.(Factory installed condition)
		[Contents] It moves directly to the sewing start position without passing through 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 available.
	2) ORG__TO__STR	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__STR	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 machine moves in reverse according to the sewing patterns, then it passes through the machine origin to move to the sewing start position.
	4) Strt Ret Mod	Change of return method to sewing start point when using chain function
		[Contents] In the past, when working on several patterns by using chain function, always should pass through the original point of machine to go to sewing start point when skipping from one pattern to another. But it reduces working hour by enabling direct movement to sewing start point according to setup of [Parameter 004. Strt Ret.Mod].





[Return Method when using Chain Function]

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. Upon 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 preparation.(Factory installed condition)
		[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.

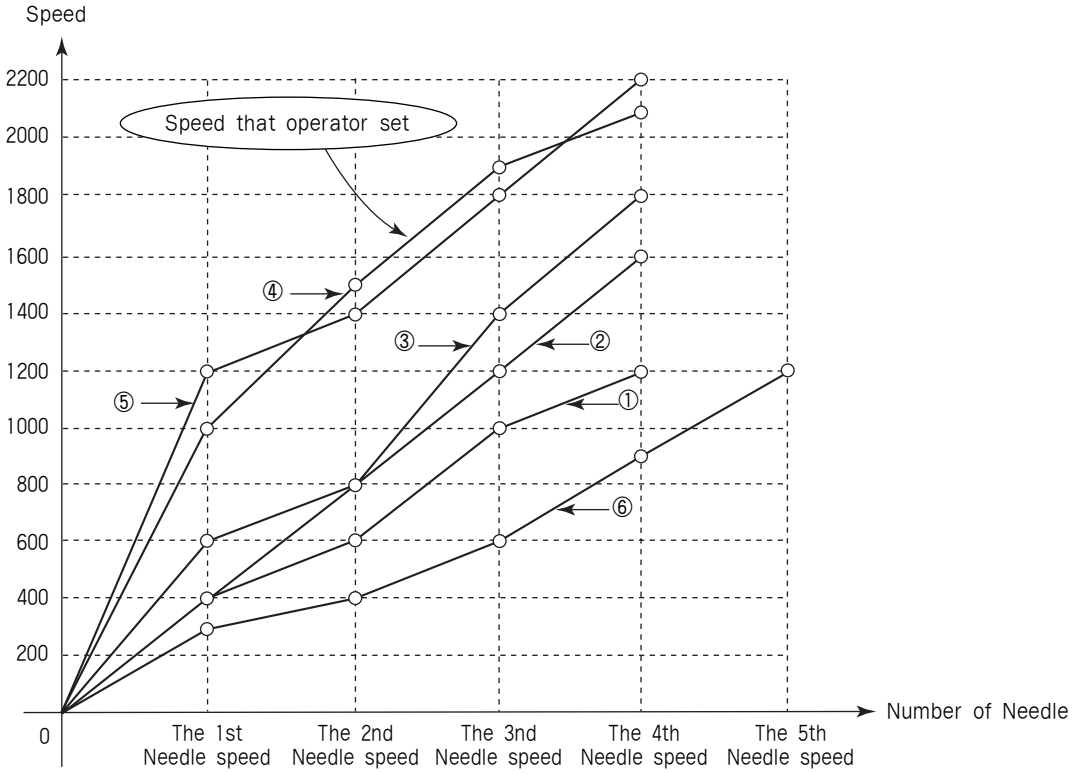
Function No. : 009	Function Name : Acceleration characteristics of main-shaft speed
009. Slow Start	It is to set acceleration characteristics of sewing speed when sewing operation starts. Factory default : SLOW_STRT2 The set values below are the values for 1306 and 1507 respectively

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	400	600	1000	1200		
2) SLOW_STRT1	400	800	1200	1600		
3) SLOW_STRT2	600	800	1400	1800		
4) SLOW_STRT3	1000	1500	1900	2100		
5) SLOW_STRT4	1200	1400	1800	2200		
6) SLOW_STRT5	300	400	600	900	1200	For embroidery

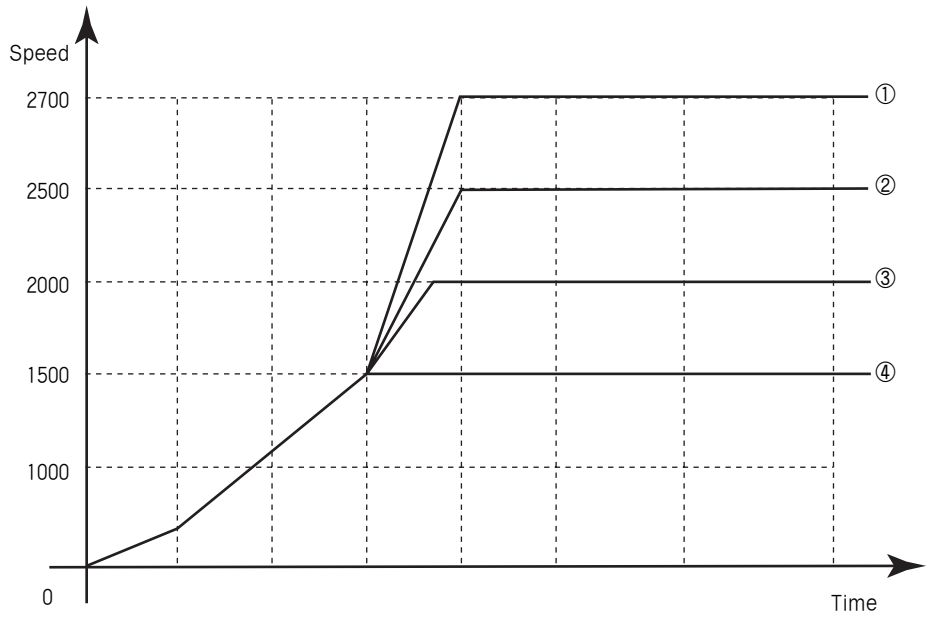
[Caution] When sewing speed that operator set is less than needle speed, the sewing speed has priority.

※ The set values could vary depending on machine type, and are up to change to improve the machine function.



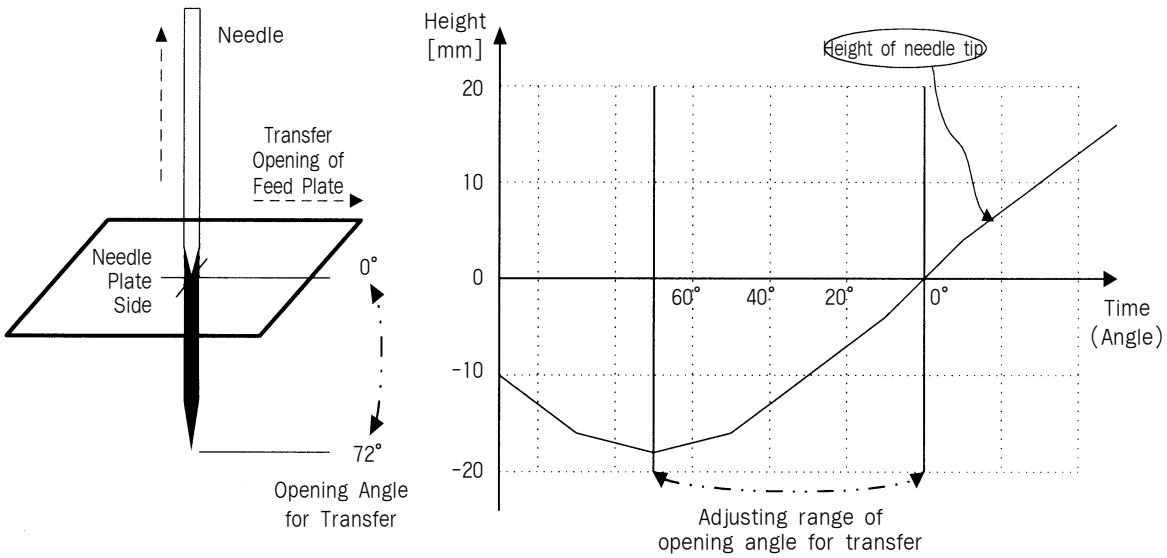
[Acceleration characteristics of sewing speed]

Function No. : 010		Function Name : Maximum speed limit of sewing
010. Max Speed		It limits the maximum speed of sewing machine.
Setting Value	1) 2700spm	It limits the speed under 2700spm. (Factory installed condition)
	2) 2500spm	It limits the speed under 2500spm.
	3) 2000spm	It limits the speed under 2000spm.
	4) 1500spm	It limits the speed under 1500spm.
		[Caution] The sewing speed set within patterns has priority than maximum sewing speed. For example, though the maximum speed of sewing set as 2700spm if the sewing speed within patterns is set as 2500spm, the real speed of sewing is 2500spm.



[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 default : 50°)
		[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 after 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 after finishing sewing operation. [Caution] The setup of 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 finishing 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. (Factory installed condition)
		[Contents] The machine moves to the sewing start position after finishing sewing operation according to the setup of Function No. 012 "Operation 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 effective one though the signal is cancelled (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 signal 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. Pf 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. WP 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 finishes 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. "Thrd Dectect" sets as "1) DISABLE".
Setting Value	0~15	It is to set to detect the number of stitches. (Factory installed condition : "5")
		[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 available, the machine stops operation. [Caution] In case that set value is small, misdetection can occur.

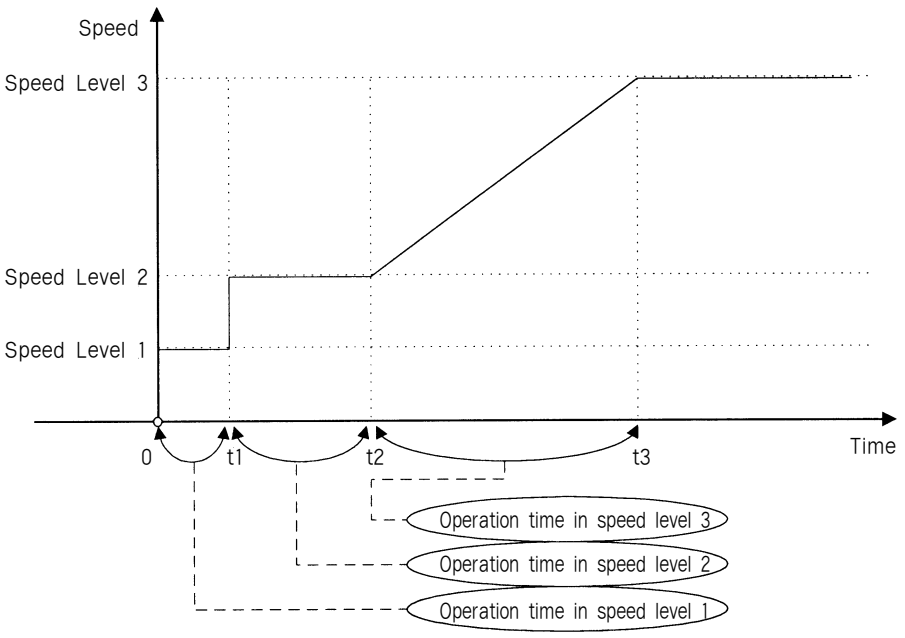
Function No. : 022		Function Name : Detecting the stitch number during sewing
022. Thrd Stitch 2		It is to set the number of stitches during operation. [Caution] This function is not available if Function No. 020. "Thrd Detect" sets as "1) DISABLE".
Setting Value	0~15	It is to set to detect the number of stitches. (Factory installed condition : "3")
		[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 manually 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 : "900ms")
		[Contents] When the feed plate is manually 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 : "1500ms")
		[Contents] When the feed plate is manually 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 : "200ms")
		[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 : "1000ms")
		[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.

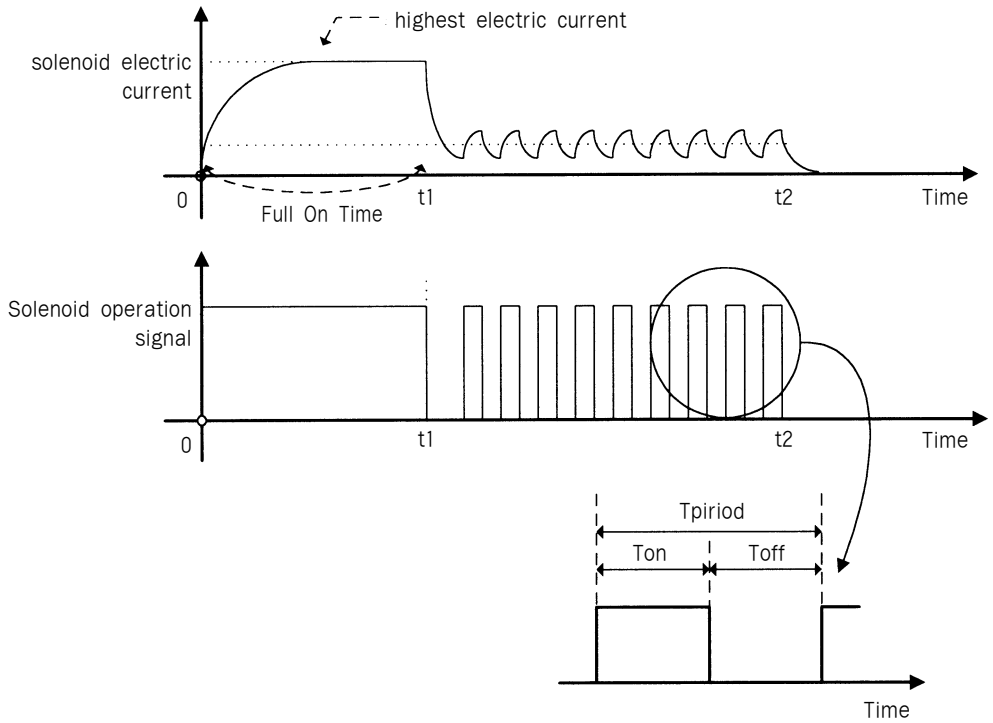
Function No. : 033		Function Name : Pneumatic wiper standby time
033. Air WP Off Tm		It is to set the standby time until the next operation of the pneumatic wiper.
Setting Value	0~1020ms	It is to set the standby time until the next operation of the pneumatic wiper. (Factory installed condition : "100ms")
		[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. (default value: 20ms in case of motor type, and 152ms in case of solenoid and pneumatic types)
		[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. (default value: 20ms in case of motor type, and 152ms in case of solenoid and pneumatic types)
		[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 : "100ms")
		[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 current)
0~t2 : Solenoid operation time
t1~t2 : Period when electric current flows from duty



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

*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.

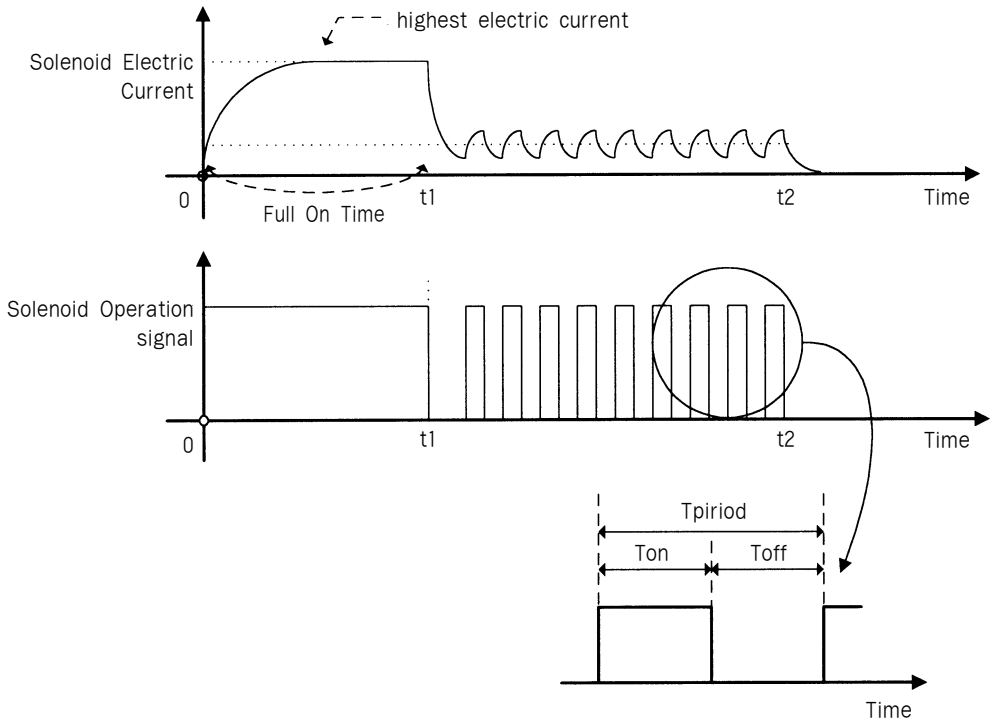
Function No. : 040		Function Name : Wiper full on time
040. WP Full On Tm		It is to set the beginning strength of the wiper solenoid.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of wipers 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. TSFull 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. RVFull 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 is 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	33~40%	It is to set the amount of holding current permitted to solenoid. (Factory installed condition :33%)
		[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. In the area with low voltage input, raise the duty value of failure by 5%.
		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	40～48%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 43%)
		[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. [Reference] In the area with low voltage input, raise the duty value of failure by 5%.

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 amount 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 solenoid, it sets the power that keeps thread retaining operation by permitting the adjusted current through duty to the solenoid.

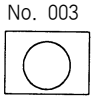
Function No. : 048		Function Name : Wiper duty
048. WP Duty		It is to set the maintenance capacity of the wiper solenoid.
Setting Value	30～80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of wiper used with electronic solenoid,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

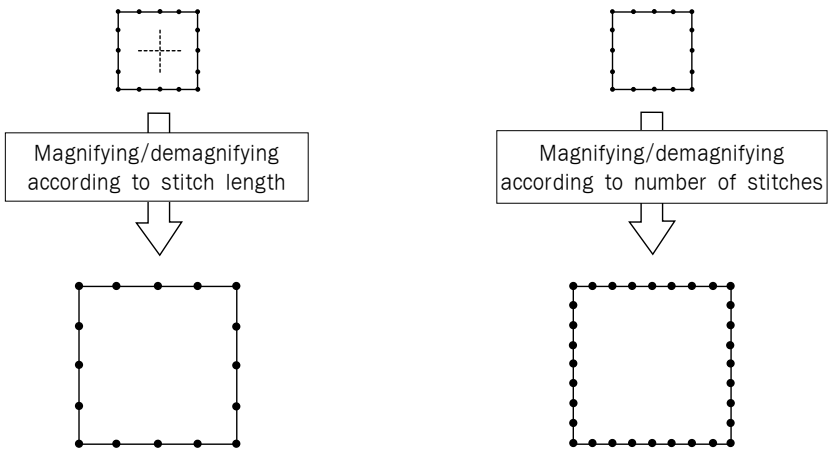
Function No. : 049		Function Name : Left feed plate duty
049. FFL Duty		It is to set the maintenance capacity of solenoid in left feed plate.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid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

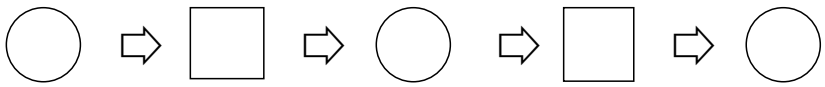
Function No. : 050		Function Name : 2 step stroke duty
050. TS Duty		It is to set the maintenance capacity of solenoid in 2 step stroke.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid 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 : Reverting device duty
051. RV Duty		It is to set the maintenance capacity of solenoid in reverting 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.

Function No. : 052		Function Name : Pattern data reading mode
052. PTRN RD MODE		It is to set the mode of searching and reading the pattern 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] If you want to exit from the current sewing work and move to the programming status to program new pattern, you can store your new pattern in the same pattern number as the one before on the floppy disc. However, internal memory will still retain the previous pattern shapes, thus the previous pattern will be called and you might think that your new programmed pattern is not stored properly. Refer to 2~3 "Check and delete pattern number" to delete pattern number stored in internal memory. Please keep in mind that it is most desirable to use a different number to store your new patterns to prevent such mix-up with the previous patterns.

Floppy Diskette	Memory	About the Processes
No. 003  No. 003 	No. 003  No. 003 	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.
	* It is not applied (It is going to apply later)	[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.
		

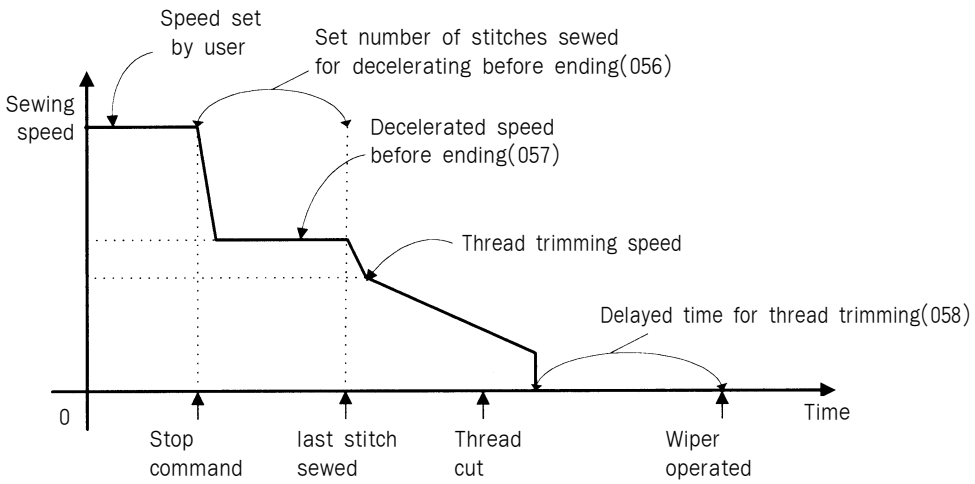
Function No. : 054		Function Name : Number of chain sewings
054. Chain Number		It is to set the sewing mode and number of patterns to chain sew.
Setting Value	0~16	It is to set the number of patterns to chain sew. (Factory installed condition : 0)
		[Contents] When the number is set as "0", one pattern 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.(Factory Installed Condition)
		[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 : Set the clamp when the chain is used.
056. Chain Clamp		When the chain function is used, the clamp up/down can be set.
Setting Value	1)DISABLE	The clamp down setting is unused (default).
		[Contents] In case where three patterns are used consecutively, when the first pattern work is finished, the second pattern is automatically called, and the clamp ascends. Therefore, after the pattern work, the clamp ascends.
	2)ENABLE	The clamp down setting is used.
		[Contents] In case where three patterns are used consecutively, when the first pattern work is finished, the second pattern is automatically called, and the clamp descends. When the second pattern work is finished, the third pattern is automatically called, and the clamp descends. After the last third pattern work is finished and the machine returns to the first pattern, the clamp ascends.

Function No. : 057		Function Name : Number of stitches to decelerate before ending work
057. Decel Stitch		It is to set the stitch number of when to decelerate before 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. : 058		Function Name : Decelerating speed before ending work
058. 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. : 059		Function Name : Thread trimming delayed time
059. 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. : 060		Function Name : The selection of the low pressure detecting device
060. 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. : 061	Function Name : Feed plate control
061. 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, "Feed Plate Control When Paused" first.

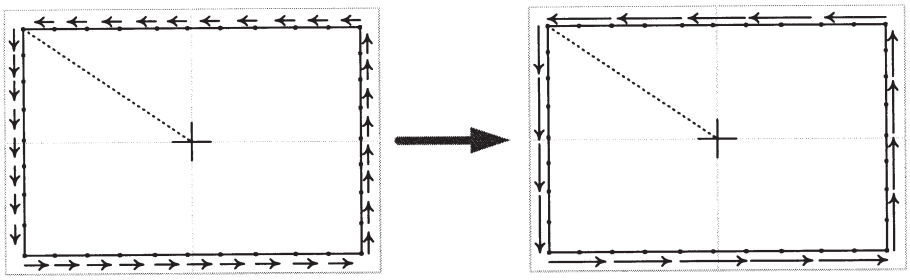
Item / DEFAULT		Upper Reed Plates	Level 2 strokes	Upper feed plate controls for pause	Upper feed plate control with pedal
Setting Value	0	Single body feed plate	×	Feed plate raised and stopped	
	1	Single body feed plate	○	Feed plate raised and stopped	
	2	Two part feed plate	×	Both parts raised and stopped	
	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			

In the item of 2-step stroke, ○ means the 2-step stroke can be used, and × means it cannot be used. In case of a motor type, the left-right separate type feed plates are not in use.

Function No. : 062		Function Name : Upper feed plate control when paused
062. 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"

Function No. : 063		Function Name : Whether to use thread tension adjusting plate after thread trimming.
063. Trim Hold En		Define whether to use thread tension adjusting plate after thread trimming.
Setting Value	1) DISABLE	Do not use thread tension adjusting plate after thread trimming. (Factory Default)
		[Contents]
	2) ENABLE	Use thread tension adjusting plate after thread trimming.
		[Contents]

Function No. : 064		Function Name : Upper feed plate control
064. Upper Clamp En		Define whether to use upper feed plate.
Setting Value	1) DISABLE	Sewing will be allowed when the upper feed plate is opened.
		[Contents] In either case of opening or closing the upper feed plate, press the left switch on the stepping stand to start sewing.
	2) ENABLE	Sewing will not be allowed when the upper feed plate is opened. (Factory Default)
		[Contents] Only in case of closing the upper feed plate, press the left switch on the stepping stand to start sewing.

Function No. : 065		Function Name : Back/Forth jump stitches
065. ConKey3 Num		User can define stitch value to move. 1~100[Stitch]
Setting Value	1	[Contents] To confirm the pattern with the back/forth stitch function, the user can set the stitch value to reduce the time to retrieve stitches.
	 ConKey3 Num = 1 [Before Setting-Up] ConKey3 Num = 3 [After Setting-Up]	

Function No. : 066		Function Name : Setting-up reference point for zooming
066. Scale Refer		On sewing mode, the user can zoom design based on machine origin, second origin, sewing starting point and user-defined reference point.
Setting Value	1) MACHINE_ORG	**Zooming based on the machine origin (Factory Default)**
		[Contents] Scaling up/down based on the current machine origin.
	2) SECOND_ORG	**Zooming based on the second origin set by user.**
		[Contents] Scaling up/down based on the second origin set by user at any location.
	3) SEWING_STRT	**Zooming based on the reference on the sewing starting point**
		[Contents] Zooming based on the first stitch of any pattern design.
	4) REFER_PNT	**Zooming based on th reference point defined by user at any location.**
		[Contents] Zooming based on the reference point defined by user at program code No.058 of 〈Function Code〉.

Function No. : 067		Function Name : Palette signal check
067. Palette Chk		If there would be sensor attached on the upper feed plate, define whether to user the signal check.
Setting Value	1) DISABLE	No signal checking (Factory Default)
		[Contents]
	2) ENABLE	Signal checking
		[Contents]

Function No. : 068		Function Name : Sewing limit set-up
068. Sewing Limit		Designed to ensure the user to increase the mechanical sewing limit of the machine as desired
Setting Value	1) DISABLE	Not in use (When shipped out from the factory)
		[Contents] The sewing limit cannot be expanded. Use the sewing limit as defined by type.
	2) ENABLE	In use
		[Contents] The user can expand the sewing limit. [Caution] On condition that sewing limit is changed in accordance with mechanically expanded limit. Otherwise, the machine can be damaged.

Function No. : 069		Function Name : X-axis forward direction sewing limit set-up
069. XPLUS Limit		The user can increase the X-axis forward direction as desired.
Setting Value	1～255mm	Set the size of X-axis forward direction as desired. (At the time of the factory shipping, machines are set in line with their sewing limit by type) Ex: 75mm for 1507 type
		[Contents] The user can expand the size of sewing limit in the program. [Caution] The feeding axis must be changed in line with the size of sewing limit where mechanical feeding is possible. If the user increases the set-up value in the program and begins feeding, the machine can be severely damaged.

Function No. : 070		Function Name : X-axis reverse direction sewing limit set-up
070. XMINUS Limit		The user can increase the X-axis reverse direction of the sewing limit
Setting Value	-1～-255mm	Set the size of X-axis reverse direction as desired. (At the time of the factory shipping, machines are set in line with their sewing limit by type) Ex: -75mm for 1507 type
		[Contents] The user can expand the size of sewing limit in the program. [Caution] The feeding axis must be changed in line with the size of sewing limit where mechanical feeding is possible. If the user increases the set-up value in the program and begins feeding, the machine can be severely damaged.

Function No. : 071		Function Name : Y-axis forward direction sewing limit set-up
071. YPLUS Limit		The user can increase the Y-axis forward direction of the sewing limit
Setting Value	1～255mm	Set the size of Y-axis forward direction as desired. (At the time of the factory shipping, machines are set in line with their sewing limit by type) Ex: 35mm for 1507 type
		[Contents] The user can expand the size of sewing limit in the program. [Caution] The feeding axis must be changed in line with the size of sewing limit where mechanical feeding is possible. If the user increases the set-up value in the program and begins feeding, the machine can be severely damaged.

Function No. : 072		Function Name : Y-axis reverse direction sewing limit set-up
072. YMINUS Limit		The user can increase the Y-axis reverse direction of the sewing limit
Setting Value	-1～-255mm	Set the size of Y-axis reverse direction as desired. (At the time of the factory shipping, machines are set in line with their sewing limit by type) Ex: 35mm for 1507 type
		[Contents] The user can expand the size of sewing limit in the program. [Caution] The feeding axis must be changed in line with the size of sewing limit where mechanical feeding is possible. If the user increases the set-up value in the program and begins feeding, the machine can be severely damaged.

Function No. : 073		Function Name : Quick origin search motion selection for 1811
073. FFOrign 1811		As for SPS-1811 machines, origin search motion is performed due to reverse devices. However, if there is no reverse device, search motion takes place very slowly. This quick origin search motion function ensures fast origin search and feeding back to the starting point of sewing.
Setting Value	1) DISABLE	Quick origin search motion is not in use (at the factory)
		[Contents] Generally, search is done on overall sewing limit before implementation of origin motion and feeding back to the starting point of sewing.
	2) ENABLE	Quick origin search motion is in use.
		[Contents] No search done on overall sewing limit. Starts with origin motion right away and feeding back to the starting point of sewing.

Function No. : 074		Function Name: Setting reverse rotation after trimming
074. RevAfterTrim		It is to set reverse rotation after trimming.
Setting Value	1) DISABLE	Not in use (at the factory)
		[Contents] It will not apply reverse rotation after trimming.
	2) ENABLE	In use
		[Contents] It will apply reverse rotation after trimming. In case of SPS/C-Series, it is possible to apply reverse rotation after trimming, contrary to existing pattern machines. Therefore, if sewing materials are too thick, motion of needle may be interfered with by sewing materials and clamp during the jump motion after trimming. In this case user can avoid the interference by setting reverse rotation.

Function No. : 075		Function Name: Set reverse rotation angles after trimming
075. ReverseAngle		The function is to set reverse rotation angles during reverse rotation operation of machine.
Setting Value	1°～40°	It is available to set reverse rotation angles. (Factory installed condition: "15°")
		[Contents] It is possible to set reverse rotation angle. The reverse rotation angle, set when reverse rotation after trimming mentioned in Function No.: 76 is set at ENABLE, will be applied.

Function No. : 076		Function Name: Save Type Setting
076. Save Type		This function is to decide the place of saving the pattern design after the design is created.
Setting Value	1) SAVE__FDD	The design will be saved in FDD.
		[Contents It is same as FDD saving.
	2) SAVE FLASH	The design will be saved in Flash Memory.
		[Contents If FDD is faulty or there is no FDD, the design can be saved in Flash Memory.
	3) CF CARD	The design will be saved in CF Card (default).
		[Contents IInsert CF Card first before turning on the power of the machine. When CF Card is set, designs will be saved in CF Card.

Function No. : 077		Function Name: Deleting Other Designs When Opening New Design
077. DsgnOpnCtrl		This function is to set whether other designs will be deleted when a new design is opened.
Setting Value	1)SAVE	Design Saving in Flash Memory (default)
		[Contents] When a design is opened from a floppy diskette or CF Card, save the designs opened from Flash Memory. If other designs need to be opened continuously, they could be saved in Flash Memory and it might cause memory save shortage. Therefore it would be better to save up to 16 designs (100kbyte per design).
	2) DELETE	Deleting Designs from Flash Memory
		[Contents] When designs are opened from Flash Memory, the designs will be deleted consecutively one by one. Therefore, whenever designs are opened from Flash Memory continuously, the current design will remain saved, while other designs are deleted.

Function No. : 078		Function Name: Setting the Safety Mode
078. Safety Mode		This is a function to offer safety to users.
Setting Value	1) DISABLE	Not in use (at the time of the factory release)
		[Contents] The safety mode has not been set.
	2) ENABLE	Used.
		[Contents] When the function is set, if the sewing machine is stopped because of emergency stop, thread sensing or pause code, the sewing machine remains stalled even when the pedal start switch or the clamp up/down switch is pressed or when any OP box keys are entered. To cancel the safety mode, press "EXE" on the left bottom of the OP Box. When the "EXE" key is pressed, the sewing machine can be operated again.

Function No. : 079		Function Name: Jump Speed Setting
079. Jump Speed		This function is to set the jump speed.
Setting Value	1) SLOW__SPEED	It sets the slowest jump speed.
		[Contents]
	2)MIDDLE__SPEED	It sets the medium jump speed (default).
		[Contents]
	3)FAST__SPEED	It sets the highest jump speed.
		[Contents]To shorten the working hours, set the highest jump speed. It could save plenty of time.

Function No. : 080		Function Name: Emergency Stop Switch Setting During Jump Motion
080. Jump EM__SW		This function is to set whether the emergency stop switch is used during the jump motion.
Setting Value	1) DISABLE	The emergency stop switch is not used during the jump motion (default).
		[Contents] If the emergency stop switch is pressed during the jump motion, the emergency stop is not activated. When the jump motion is completed, the emergency stop is conducted.
	2) ENABLE	The emergency stop switch is used during the jump motion.
		[Contents] If the emergency stop switch is pressed during the jump motion, the emergency stop is immediately activated.

Function No. : 081		Function Name: Presser Foot Lift Setting During Jump Motion (depending on the presser foot motor specifications)
081. Jump PF Ctrl		The function is to set whether the presser foot is lifted during the jump motion.
Setting Value	1) DISABLE	The presser foot lift function is not used during the jump motion.
		[Contents] During the jump motion, the jump motion is conducted without the lift of the presser foot. If the interference of the presser foot is not concerned during the jump motion, this function can be used to save work hours.
	2) ENABLE	The presser foot lift function is used during the jump motion (default).
		[Contents] During the jump motion, the jump motion is conducted with the presser foot lifted. If the interference of the presser foot occurs during the jump motion, this function can be used.

Function No. : 082		Function Name: Presser Foot's Thickness Difference Control Code Setting (depending on the presser foot motor specifications)
082. PF Code Ctrl		This function is to set whether the presser foot's thickness difference control code value applied to the sewing data is used or not.
Setting Value	1)DISABLE	The presser foot's thickness difference control code is not used.
		[Contents] The presser foot's thickness difference control code value, which is created when the sewing data is made, is not used. Sewing can be conducted without the presser foot's feed for fabric thickness difference control.
	2) ENABLE	The presser foot's thickness difference control code is used (default).
		[Contents] The presser foot's thickness difference control code value, which is created when the sewing data is made, is used. Sewing can be conducted while the presser foot ascends or descends by the user set feed.

Function No. : 083		Function Name: User's Clamp Position Setting (depending on the clamp motor specifications)
083. Clamp En/Dis		The user can set the position of the clamp.
Setting Value	1) DISABLE	The user cannot set the position of the clamp (default).
		[Contents]
	2) ENABLE	Clamp Stop Position Setting While Descending (2-step setting)
		[Contents] When the clamp descends, its stop position can be set. In other words, when the clamp descends, and the pedal switch is pressed, the clamp stops at the pre-set position. When the sewing start pedal switch is pressed, the clamp descends to the lowest point and then sewing begins. When the work is finished, the clamp returns to the normal position. To set the clamp stop position while descending, use "086. Clamp Range."
	3) USER_SET	User's Arbitrary Clamp Height Setting
		[Contents] Once the clamp height is set by the user, the pre-set height will be constantly maintained. Even after the sewing work is finished, the clamp height will be maintained as same. To set the arbitrary height of the clamp, the user can use "086. Clamp Range."

Function No. : 084		Function Name: The user clamp location value needs to be set primarily. (clamp motor type only)
084. Clamp Data		The user-defined clamp position value saved in design can be used.
Setting Value	1)DISABLE	The user-defined clamp position value saved in design is not used. This is a default value.
		[Contents] When the primary setting is not used, go to 083. Clamp En/Dis and 086. Clamp Range for setting.
	2) ENABLE	The user-defined primary clamp position setting which is saved in design is used.
		[Contents] The clamp position value saved in design will be primarily used. In other words, although user goes to 083. Clamp En/Dis to enable the device and changes value in 086. Clamp Range, the clamp range value and the clamp En/Dis value which were set at the time of saving the design will be primarily applied.

Function No. : 085		Function name: User-defined presser foot height adjustment. (limited to the presser foot's motor specifications)
085. PF En/Dis		User-defined presser foot height adjustment.
Setting Value	1) DISABLE	User's Moving Range Setting of Presser Foot from the Lowest Position in Line with Fabric Thickness (default value)
		[Contents] This is a default value. Since the base position of the presser foot is at the lowest position, it can be used to handle regular designs as well as designs with fabric thickness difference. However, if the presser foot's position is set, the presser foot cannot move below the initially set position
	2) ENABLE	Presser Foot's Moving Range Setting Based On User-Defined Positio
		[Contents] If thickness difference occurs within one sewing fabric, this function is the most suitable to use. The presser foot can be pulled up or down according to the user-defined base positio
	3)USER SET	Presser Foot Position Setting with User Defined Fixed Value While Ignoring Presser Foot's Moving Range Saved in Design Data
		[Contents] Due to the use of different sewing fabrics, their thickness could be different. In this case, the base position of the presser foot can be adjusted easily. If this value is set, the fabric thickness control codes will be completely ignored, and the sewing will be conducted primarily based on the current position of the presser foot.

Function No. : 086		Function Name: User's Clamp Height Setting (depending on the clamp motor specifications)
086. Clamp Range		This function is to enable the user to set the clamp height.
Setting Value	000 ~ 350 [0.05mm]	The user can set the clamp height (default value: "000").
		[Contents] Use the direction keys "2" and "8" to set the clamp height and save the value. After the setting, the clamp will stop at the set position when it descends.

Function No. : 087		Function Name: User's Presser Foot Height Setting (depending on the presser foot motor specifications)
087. PF Range		This function is to enable the user to set the height of the presser foot.
Setting Value	000 ~ 200 [0.05mm]	The user can set the height of the presser foot (default value: "000").
		[Contents] Use the direction keys "2", "8" to set the presser foot height depending on the thickness of the sewing fabric. The presser foot is located at the set height.

Function No. : 088		Function Name: Design Auto Call Setting
088. Auto Call		This function is to set the design auto call.
Setting Value	1) DISABLE	The design auto call is disabled (default).
		[Contents] When the function is disabled, it is same as the Nor__Sew mode.
	2) ENABLE	The design auto call is enabled.
		[Contents] The designs from 900 to 914 can be automatically called by using the external sensor input mixture.

Function No. : 089		Function Name: Sewing Ready Setting Upon Design Auto Call
089. Auto Ready		This function is to set whether the sewing ready function is used upon the design auto call.
Setting Value	1) DISABLE	The function is disabled (default).
		[Contents] When the function is disabled, the sewing ready is not conducted when the design auto call is made by the external sensor. The design number only is automatically changed.
	2) ENABLE	The sewing ready is enabled.
		[Contents] When this function is set, the sewing preparation is automatically conducted upon the design auto call.

Function No. : 090		Function Name: External Control Signal Use Setting
090. Auto Set		This function is to use the external input signals to use Sewing Start, Emergency Switch, Clamp and Enter Key.
Setting Value	1) DISABLE	The function is disabled (default).
		[Contents] When the function is disabled, it is same as the previous usage.
	2) ENABLE	The function is enabled.
		[Contents] When the function is enabled, it is possible to use the external input signals to use Sewing Start, Emergency Switch, Clamp Up/Down, and Enter key.

Function No. : 091		Function Name: Design Call Sensor Time Setting
091. AutoCall TM		This function is to set the time of the design auto call sensor (SEN__0~SEN__2).
Setting Value	10	10 [Unit 100ms] (default)
		[Contents] The sensing time between the first sensor and the next sensor can be set. The basic unit is 100ms. When "10" is set at the parameter, it means 1000ms or 1 second. This function is aimed to set the time difference between the sensing acts of different sensors to ensure accurate sensing.

Function No: 092		Function Name: Design call group setting
092. AutoNumSet		The function divides design numbers into groups to use them in the design auto call function.
Setting Value	001~007	Use the designs from No. 001 to No. 007 for the design auto call function.
	008~014	Use the designs from No. 008 to No. 014 for the design auto call function.
	015~021	Use the designs from No. 015 to No. 021 for the design auto call function.
	022~028	Use the designs from No. 022 to No. 028 for the design auto call function.
	029~035	Use the designs from No. 029 to No. 035 for the design auto call function.
	036~042	Use the designs from No. 036 to No. 042 for the design auto call function.

Function No: 093		Function Name: Extended Input/Output Port
093. EX__IO BD SET		The function determines the input or output of a signal.
Setting Value	1) DISABLE	Not used (default status)
		[Contents] When not used, the using method is as same as before.
	2) ENABLE	Use the input/output signals.
		[Contents] The sewing could begin after receiving an input signal or an output signal can be issued during sewing.

Function No: 094		Function Name: Design Preview Setting
094. Thumbnail Set		The default value is NO. Press the button to check the saved designs and set the way of design calling.
Setting Value	1) DISABLE	Not used (default status)
		[Contents] When not used, the using method is as same as before.
	2) ENABLE	Preview function can be used.
		[Contents] The default value is NO. Press the button to select one out of Memory, FDD, and CF Card. Saved designs can be checked and called.

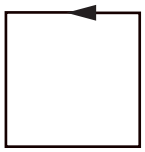
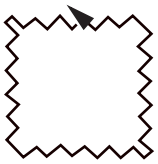
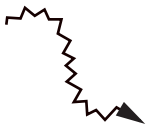
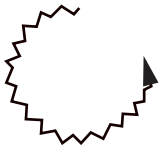
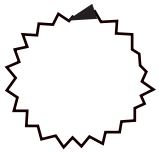
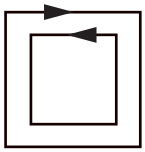
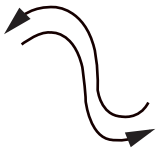
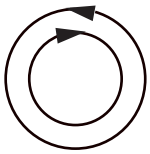
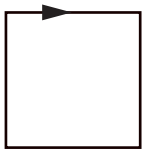
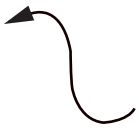
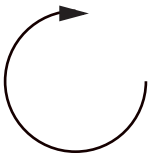
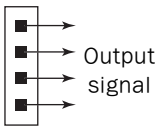
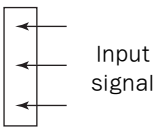
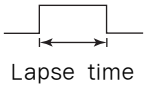
Function No. : 095		Function Name: Set up the positions to stop the needle bar
095. UpStop Pos		**The function to set up the positions to stop the needle bar is to stop the needle bar at the positions of the established values when the motor stops. (It is applied only for the Direct Models.)**
Setting Value	0° ~360°	**It is available to set up the values within a range of 0° ~360°. (Factory installed condition: 0°.)**
		[Contents] The angles of the needle bar positions shall be changed as follows. It will show the change of the angle values when turning the hand pulley counterclockwise. The current angle values will be set up at the changed position by pressing the ENTER key. However, value of SPS/C-Series is originally set at 97°, upon shipment, because main shaft motor is installed at the 90° changed position due to the rise of HEAD.

1) Function No. Related to Pattern Programming

NO.	Function	Contents
000	Trimming	Addition of 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	User inputs every stitch to create the sewing data.
006	Linear/Curving line sewing	Use straight line/curve to create the sewing data.
007	Linear sewing	Use Straight line to create the sewing data.
008	Spline sewing	use curve to create the sewing data.
009	Arc sewing	use arc to create the sewing data.
010	Circle sewing	Use circle to create the sewing data.
011	Change of jump speed	
012	Change of stitching speed	Use when changing embroidery speed within one work pattern.
013	Partial Sewing Stitch Width Change	Change stitch width by selecting a fixed part of sewing shape.
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 indication 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	Use straight line to create the zigzag sewing data.
020	Spline zig-zag sewing	Use curve to create the zigzag sewing data.
021	Arc zig-zag sewing	Use arc to create the zigzag sewing data.
022	Circle zig-zag sewing	Use circle to create the zigzag sewing data.
023	Linea offset sewing	Set the distance based on straight line to create the offset sewing data.
024	Spline offset sewing	Set the distance based on curve to create the offset sewing data.
025	Arc offset sewing	Set the distance based on arc to create the offset sewing data.
026	Circle offset sewing	Set the distance based on circle to create the offset sewing data.
027	Linear double sewing	Create the same sewing data as that created by straight line.
028	Spline double sewing	Create the same sewing data as that created by curve.
029	Arc double sewing	Create the same sewing data as that created by arc.
030	Circle double sewing	Create the same sewing data as that created by circle.
031	Linear double reverse sewing	Set the offset based on straight line to create the same type of sewing data.
032	Spline double reverse sewing	Set the offset based on curve to create the same type of sewing data.

NO.	Function	Contents
033	Arc double reverse sewing	Set the offset based on arc to create the same type of sewing data.
034	Circle double reverse sewing	Set the offset based on circle to create the same type of sewing data.
035	Linear reverse sewing	Create the opposite sewing data of the straight line data.
036	Spline reverse sewing	Create the opposite sewing data of curve data.
037	Arc reverse sewing	Create the opposite sewing data of arc data.
038	Circle reverse sewing	Create the opposite sewing data of circle data.
039	Partial Pattern Data Delete Function	Delete by selecting one from created pattern shapes.
040	Addition of automatic back-tack	Automatic back tacking.
041	Condensed Sewing Stitch Adding	It is the function to prevent stitches from being untangled by making stitch width condensed in sewing start part and sewing end part of pattern data.
042	Addition of overlap stitch	Additionally proceed sewing as many numbers of stitches as the user wants.
043	X-axis Symmetrical Data Addition	Add pattern data selected on the basis of X-axis.
044	Y-axis Symmetrical Data Addition	Add pattern data selected on the basis of Y-axis.
045	Point Symmetrical Data Addition	Add by making symmetric pattern data on the basis of end point of pattern data.
046	Partial Movement of Pattern Data	Move part of pattern to different location among the sewing shape.
047	Copying Function of Pattern Data to Specific Location	Set a fixed part of pattern shape and copy to desired location.
048	Deletion of pattern data	Delete sewing data on any part of pattern.
049	Partial Pattern Data Delete Function	Delete one of the generated pattern data shapes selectively (For example: Jump, Line, Curve, Arc, Circle).
050	Change/Saving Function of Maximum Pattern Sewing Speed and Extension/Reduction Rate	Set up maximum sewing speed and extension/reduction rate by pattern.
051	One Stitch Movement Function	It uses when correcting the location of one stitch in the formed sewing shape.
052	A Fixed Number of Stitch Delete Function	Delete 1-99 stitch in the pattern data shape after the start point to delete at present.
053	Change/Saving Function of Pattern Data Start Point	Change and save pattern data start point already set up when punching.
054	Change/Saving Function of Pattern 2nd Original Point	Change the already setup 2nd original point to new 2nd original point and save it.
055	Setting-up automatic thread trimmer	Delete stitch or pattern to automatically insert thread trimmer code.
056	Setting-up user-defined reference point for zooming	Scaling up/down based on the reference point set on any pattern.
057	User Output Port Setting Upon Programming	The signal of the output port can be turned On/Off.
058	User Input Port Setting Upon Programming	The signal of the input port can be turned On/Off.
059	Entry of User Lapse Time Upon Programming	The lapse time can be set to adjust the beginning time of the next motion.
060	User's Presser Foot Height Setting	This function is to enable the user to adjust the presser foot height depending on sewing fabric thickness, and the sewing data is produced accordingly.

2) 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 
Presser Foot's Fabric Thickness Difference Sensing	No. : 057 Name : Output port control 	No. : 058 Name : Input port control 	No. : 059 Name : Lapse time control 	No. : 060 Name : Presser foot's vertical moving range control 

3) Parameter Number Related to General sewing

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
000	Manual moving		★ Transfer of the feed plate by using direction keys	0/1
		1) DISABLE	1) Disable	
		2) ENABLE	2) Enable	
001	Starting position 2nd origin by manual moving	1) PTRN__STRT__POS	1) Moving the sewing starting position by using direction keys	0/1
		2) SECND__ORG	2) Setting to the 2nd origin by using direction keys	
002	Returning to the origin 1 after completing work		★ Returning to the origin 1 after completing work	0/1
		1) DISABLE	1) It does not return	
		2) ENABLE	2) It returns	
003	Returning when limit error happens		★ If it reaches transfer limit of the feed plate, it returns	0/1
		1) DISABLE	1) It does not return to the origin of machine	
		2) ENABLE	2) It returns to the origin of machine	
004	Returning method of starting point	1) SHORTEST	1) Returning through the shortest route	0～2
		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	Counter mode of bottom thread	1) UP__COUNT	1) Count up	0/1
		2) DN__COUNT	2) Count down	
006	Mark of product counter	1) DISABLE	1) No use	0/1
		2) ENABLE	2) Use	
007	Time for pattern counter	1) JOB__SETUP	1) Before completion for sewing preparation	0/1
		2) JOB__READY	2) After completion for sewing preparation	
008	Trimming in emergency stop during the operation	1) AUTO__TRIM	1) Performing the automatic trimming	0/1
		2) MANU__TRIM	2) Performing the manual trimming	
009	Speed setting of main shaft	1) SLOW__STRT0	1) 400 → 600 → 1000spm	0～5
		2) SLOW__STRT1	2) 400 → 800 → 1200 → 1600spm	
		3) SLOW__STRT2 : SPS-2516	3) 500 → 1000 → 1400 → 1800spm	
		4) SLOW__STRT3	4) 600 → 800 → 1200 → 1600spm	
		5) SLOW__STRT4	5) 700 → 900 → 1400 → 1800spm	
		6) SLOW__STRT5 : SPS/C-Series	6) 300 → 400 → 600 → 900 → 1200spm	
010	Limit to maximum sewing speed	1) 2700spm/3.0mm(for 1306)		0～4
		2) 2500spm/3.0mm		
		3) 2000spm/3.0mm		
		4) 1500spm/3.0mm		
011	Transfer starting angle of the feed plate	50	Setting it to fit the thickness of sewing materials : 0~72°	1
012	Operating situation of the feed plate when finishing work	1) STRT__OPEN	1) Opening after returning to the starting point	0/1
		2) STRT__HOLD	2) Keeping the closing state even after returning to the starting position(Lifting by pedal)	
		3) OPEN__STRT	3) Returning to the starting position in fliting 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	Keep the close of the feed plate	1) DISABLE	1) It does not always keep descending	0/1
		2) ENABLE	2) It always keep descending	
014	Signal treatment of pedal 1	1) LATCH		0/1
		2) FLIP		
015	Signal treatment of pedal 2	1) LATCH		0/1
		2) FLIP		
016	Operation state of presser foot	1) ALWAYS__DN	Prohibiting the operation(Keeping the downward suspension all the time)	0/1
		2) SEW__DN	Keeping the downward suspension during sewing	
		3) TRIAL__DN	Keeping the downward suspension When a stitch proceeding /reversing	
017	Lowering timing of presser foot	1) WITH__STRT	Descending whit the main shaft turn at the same time	0/1
		2) WITH__FEED	Descending whit the feeding at the same time	
018	Wiper operation	1) ALWAYS__OFF	Operation prohibition	0～2
		2) ELEC__TYPE	Electronic type wiper	
		3) AIR__TYPE	Air type wiper	

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
019	Position of wiper operation	1) BET__NEDL__PF	1) Operating between a needle and middle presser foot	0/1
		2) BELW__PF	2) Operation below middle presser foot	
020	Thread broken sensor mode	1) DISABLE	1) No use	0/1
		2) ENABLE	2) Use	
021	Detected no. of broken stitches when starting sewing	5[STITCH]	0~15 Stitches	1
022	Detected no. of broken stitches during the normal sewing	3[STITCH]	0~15 Stitches	1
023	Trimming mode	1) DISABLE	No use	0/1
		2) ENABLE	Use	
024	Time of 1st-step jog speed	400[ms]	1~99×100ms	100
025	Time of 2nd-step jog speed	900[ms]	1~99×100ms	100
026	Time of 3sd-step jog speed	1500[ms]	1~99×100ms	100
027	1st-step key-continued pressing time	200[ms]	1~99×100ms	100
028	2nd-step key-continued pressing time	100[ms]	1~99×100ms	100
029	3rd-step key-continued pressing time	1000[ms]	1~99×100ms	100
030	Operating time of elec' type wiper	52[ms]	0~1020ms	4
031	Returning time of elec' type wiper	100[ms]	0~1020ms (Waiting time for next operation)	4
032	Operating time of air type wiper	100[ms]	0~1020ms	4
033	Returning time of air type wiper	100[ms]	0~1020ms (Waiting time for next operation)	4
034	Waiting time descending completion of presser foot	152[ms]	0~1020ms	4
035	Waiting time ascending completion of presser foot	152[ms]	0~1020ms	4
036	Presser Full On Time	100[ms]	0~1020ms	4
037	Feeding plate Full On Time	200[ms]	0~1020ms	4
038	Trimming Full On Time	200[ms]	0~1020ms	4
039	Loosening thread 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	33%	33~40%	1
045	Feeding plate Duty	43%	40~48%	1
046	Trimming Duty	50%	30~80%	10
047	Loosening thread 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	Reading order when number of same pattern data exist in memory		★ The reading order when the same pattern data numbers exist in the internal memory	0/1
		1) DISABLE	1) Read first from a floppy disk	
		2) ENABLE	2) Read first from a internal memory	
053	Extension/Reduction mode Stitch-NUM:It is not applied (It is going to apply later)		★ It settles the way of reduction and extension for pattern	0~2
		1) DISABLE	Extension and reduction are impossible	
		2) STITCH__LEN	Extension and reduction by a stitch width	
		3) STITCH__NUM	Extension and reduction by a number of stitch	
054	Number to be performed chain stitch	0	0~16 0:General sewing, Over 1: Chain sewing	1
055	Change of chain number	1) MANUAL	Automatic change	0~2
		2) AUTO	Manual change by enter key	
		3) EXTERNAL	Change by outward input	
056	Clamp Setting for Chain Sewing	1) DISABLE	Disabled (default)	
		2) ENABLE	Enabled	
057	Reduction stitch before work completion	3[STITCH]	Change to 2~16	1
058	Reduction speed before work completion	400[spm] SPS/C-Series : 200[spm]	200~500spm	100
059	Thread trimming delayed time	72[ms]	52~1020[ms]	4

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
060	Whether to use the function to detect fall of pressure	1) DISABLE(for 1306)	1) Do not use pressure reduction sensor.	
		2) ENABLE	2) Use pressure reduction sensor.	
061	Feed control	0	0～31 See "Parameter description related to general embroidery".	1
062	In case of temporary stop, control Pan feed plate		In case of meeting temporary stop code while embroidering, control top feed plate	
		1) CLOSE	Put down the top feed plate	
		2) OPEN	Hold up the top feed plate	
		3) FF__NUMBER	Control the top feed plate according to Article 060	
063	Thread tension adjusting after thread trimming.	1) DISABLE	Do not use thread tension adjusting plate after thread trimming.	0/1
		2) ENABLE	Use thread tension adjusting plate after thread trimming.	
064	Upper feed plate control	1) DISABLE	Sewing will be allowed whether the upper feed plate is opened or closed.	0/1
		2) ENABLE	Sewing will not be allowed when the upper feed plate is opened.	
065	Back/forth jump stitches	1	User can define stitch value to move. 1～100 [Stitch]	0/1
066	Setting-up reference point for zooming	1) MACHINE__ORG	Zooming based on the machine origin.	0～3
		2) SECOND__ORG	Zooming based on the second origin set by user.	
		3) SEWING__STRT	Zooming based on sewing starting point.	
		4) REFER__PNT	Zooming based on the reference point defined by user at any location.	
067	Palette signal check	1) DISABLE	Do not use signal on the upper feed plate sensor.	
		2) ENABLE	Use signal on the upper feed plate sensor.	
068	Sewing limit set-up	1) DISABLE	Not used (at the factory)	
		2) ENABLE	Used	
069	X-axis forward direction sewing limit set-up	75 (mm) (For 1507)	Sets the size of X-axis forward direction as desired (1mm～255mm)	1
070	X-axis reverse direction sewing limit set-up	-75 (mm) (For 1507)	Sets the size of X-axis backward direction as desired (-1mm～-255mm)	1
071	Y-axis forward direction sewing limit set-up	35 (mm) (For 1507)	Sets the size of Y-axis forward direction as desired (1mm～255mm)	1
072	Y-axis reverse direction sewing limit set-up	-35 (mm) (For 1507)	Sets the size of Y-axis backward direction as desired (-1mm～-255mm)	1
073	Quick origin search motion for 1811	1) DISABLE	Quick origin search motion not used	
		2) ENABLE	Quick origin search motion used	
074	Reverse Rotation after Trimming Setting Function	1) DISABLE	Do not set function of reverse rotation after trimming	
		2) ENABLE	Do set function of reverse rotation after trimming	
075	Reverse Rotation Angle after Trimming Setting Function	15°	Reverse Rotation Angle after Trimming Setting (1～40 °)	1°
076	Designate the place of saving pattern designs	1) SAVE FDD	Disabled	
		2) SAVE FLASH	Disabled	
		3) CF CARD	Enabled (default)	
077	Deleting Flash Memory Designs When New Designs Are Opened	1) SAVE	Enabled (default)	
		2) DELETE	Disabled	
078	Setting the Safety Mode	1) DISABLE	Not used (at the factory)	
		2) ENABLE	Used	
079	Jump Speed Setting	1) SLOW__SPEED	Lowest Jump Speed	
		2) MIDDLE__SPEED	Medium Jump Speed	
		3) FAST__SPEED	Highest Jump Speed	
080	Emergency Stop Switch Use Setting for Jump Motion	1) DISABLE	Emergency stop switch disabled during jump motion.	
		2) ENABLE	Emergency stop switch enabled during jump motion	
081	Presser Foot Lift Setting During Jump Motion	1) DISABLE	The presser foot lift function during jump motion is disabled.	
		2) ENABLE	The presser foot lift function during jump motion is enabled.	
082	Presser Foot's Fabric Thickness Control Code Setting	1) DISABLE	The presser foot's fabric thickness control code is not used.	
		2) ENABLE	The presser foot's fabric thickness control code is used.	
083	User Defined Clamp Height Setting Use	1) DISABLE	Disabled.	
		2) ENABLE	The clamp stop position while it descends is set.	
		3) USER__SET	The user has arbitrarily set the clamp height.	

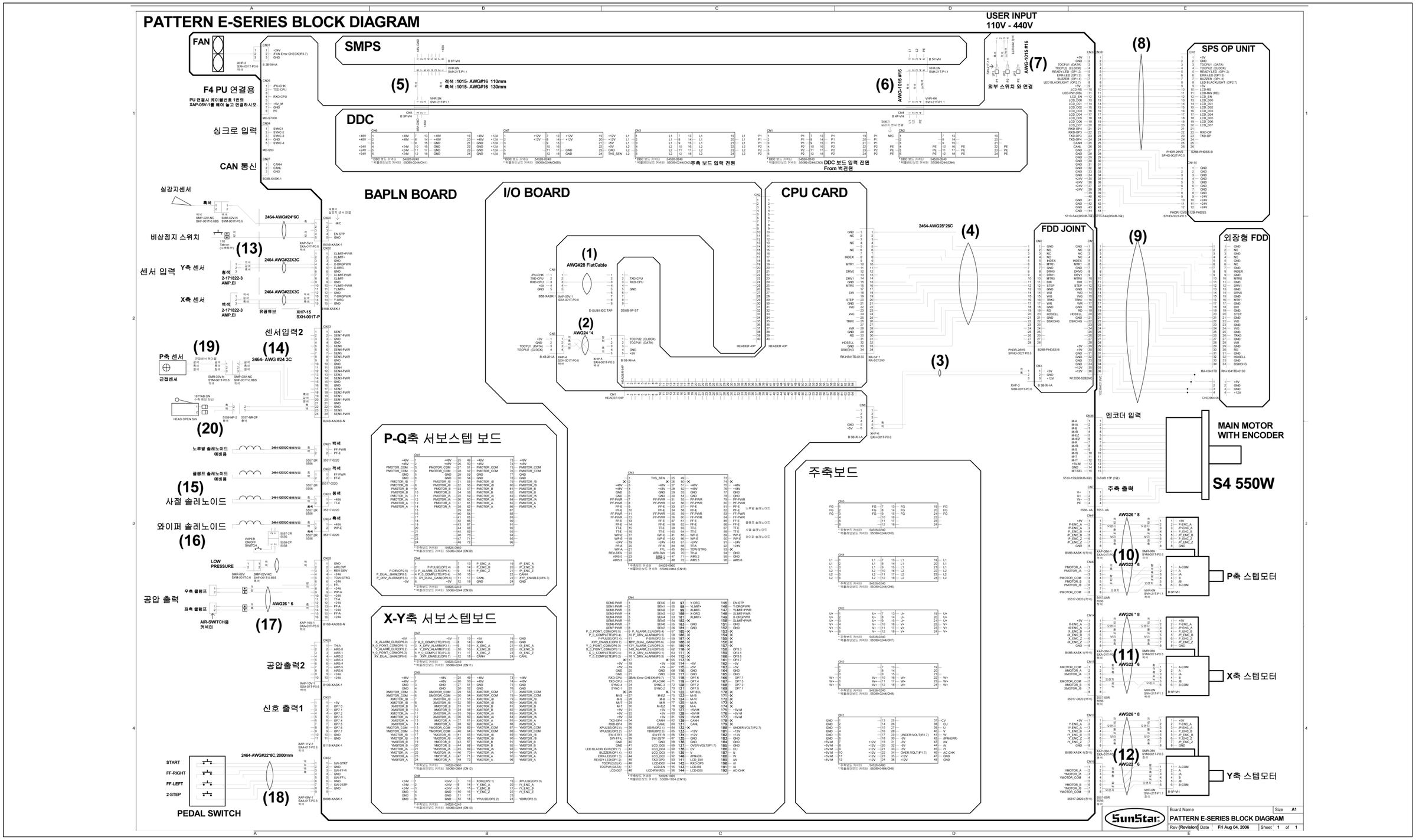
NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
084	The user clamp location value needs to be set primarily.	1) DISABLE	Not used (at the factory)	
		2) ENABLE	Used	
085	User-defined presser foot height adjustment	1) DISABLE	User's Moving Range Setting of Presser Foot from the Lowest Position in Line with Fabric Thickness	
		2) ENABLE	Presser Foot's Moving Range Setting Based On User-Defined Position	
		2) ENABLE	Presser Foot Position Setting with User Defined Fixed Value While Ignoring Presser Foot's Moving Range Saved in Design Data	
086	User's Clamp Height Setting	0～300	The user can set the clamp height.	1 [0.05mm]
087	User's Presser Foot Height Setting	0～200	The user can set the presser foot height.	1 [0.05mm]
088	Design Auto Call Setting	1) DISABLE	This sets the design auto call function.	
		2) ENABLE		
089	Sewing Ready Function Setting Upon Design Auto Call	1) DISABLE	This sets whether the machine becomes ready for sewing, when designs are automatically called.	
		2) ENABLE		
090	External Control Signal Use Setting	1) DISABLE	This sets whether the external input signals are used to activate Sewing Start, Emergency Switch, Clamp, and Enter key.	
		2) ENABLE		
091	Design Call Sensing Time Setting	10	This sets the sensing time for the design auto call sensors (SEN_0~SEN_2).	1 [100ms]
092	Design call group setting	001～007	Classify every seven design numbers into one group to use them for the design auto call function.	
		008～014		
		015～021		
		022～028		
		029～035		
		036～042		
093	Extended Input/Output Port	022～028	The function determines the input or output of a signal.	
		029～035		
094	Design Preview Setting	036～042	The default value is NO. Press the button to check the saved designs and set the way of design calling.	
		2) ENABLE		
095	Needle Bar Stop Position Setting	0°	When motor stops, stop the position of needle bar at the set mode (0~360°)	1°

4) Error List

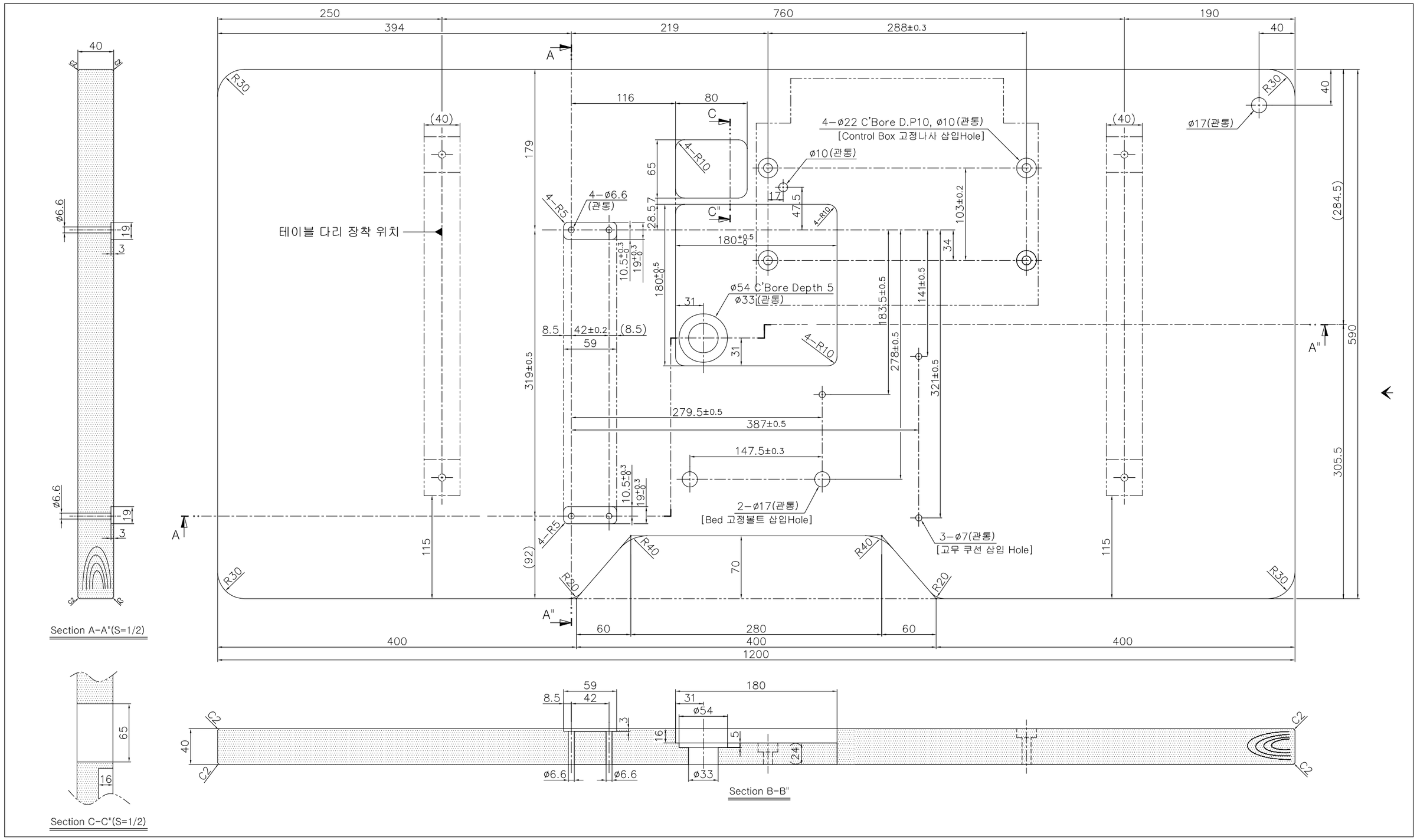
No.	Err List	Message	Meaning
1	Err 1	Main Motor Err!	Error occurs in main motor
2	Err 2	Synchro Err!	Error occurs in synchronizer
3	Err 3	Pattern Not Found!	Related pattern is not available on the diskette
4	Err 4	FDD Empty	Floppy disk drive is empty
5	Err 5	Disk-Read Err!	Machine can't read a diskette
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!	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 update does not exist in the diskette
21	Err 21	Internal Memory Err!	Internal operation error occurs
22	Err 22	Write Protected!	Diskette is write 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
25	Err 25	Drag-Limit Over!	When it gets out of the sewing area after moving a stitch during editing stitch.
26	Err 26	Low-Feed-Plate\n Open!	When the clamp on the lower feed plate is raised.(It is applied only for 5030)
27	Err 27	Palette Open!	When the clamp cover on the lower feed plate is opened.(It is applied only for 5030)
28	Err 28	Emergency Sw\n Not Released!	In case that the Emergency Switch is pressed when Power On.
29	Err 29	Start Sw\n Not Released!	In case that the Start Switch is pressed when Power On.
30	Err 30	Right Sw\n Not Released!	In case that the Right Switch is pressed when Power On.
31	Err 31	Left Sw\n Not Released!	In case that the Left Switch is pressed when Power On.
32	Err 32	TwoStage Sw\n Not Released!	In case that the TwoStage Switch is pressed when Power On.
33	Err 33	Ser. Com. Err!	Abnormalities on the communication between the main shaft and the I/O board.
34	Err 34	Unknown Err!	Unknown error
35	Err 35	Unknown Err!	Unknown error
36	Err 36	Hook Origin\n Error!	Lower shaft origin is not found. [SPS/C-Series]
37	Err 37	Hook Motor Err\n Push EXIT Key\n Or Power Off / On!	A problem detected in lower shaft motor. [SPS/C-Series]
38	Err 38	Y Motor Err\n Push EXIT Key\n Or Power Off / On!	A problem detected in Y shaft motor. [SPS/C-Series]
39	Err 39	X Motor Err\n Push EXIT Key\n Or Power Off / On!	A problem detected in X shaft motor. [SPS/C-Series]
40	Err 40	Timer Err\n Push POWER S/W\n Or Power Off / On!	In case where errors are found in timer signals [SPS/C-Series]

No.	Err List	Message	Meaning
41	Err 41	Main Motor Err!\nDismatch!\n999!	If the main shaft motor type is inappropriate, the following errors occur:
42	Err 42	Over Current\nOver tem\n133!	The IPM over-current on the main shaft board will be cut off.
43	Err 43	Over Current\nAbnormal\n131!	The motor over-current and connector errors occur.
44	Err 44	Over Load Err!\n129!	The motor overload occurs.
45	Err 45	EncoderRST Err!\n128!	When there is no encoder RST signal, an error occurs.
46	Err 46	Encoder AB Err!\n127!	When the encoder RST's upward direction and the AB direction mismatch,
47	Err 47	Synchro!\nCon.Inserted!\n60!	When the position detecting sensor is touched while the machine power is on,
48	Err 48	Synchro!\nCon.Pulled Out!\n61!	When the position detecting sensor is removed while the machine power is on,
49	Err 49	Reverse!\nComm. Error!\n126!	When the revolving magnet and the fixed current coil mismatch in their direction,
50	Err 50	EEPROM!\nAccess error!\nEEPR!	the ROM access error occurs.
51	Err 51	Ser.Com.Err!\nMotor Info Err!	The motor type communication error occurs.
52	Err 52	Bobbin Stitch!\Reset Counter	When the bobbin stitch counter is reset according to the number of stitches,
53	Err 53	Enlargement!\Reduction \ Err!	the error in zoom-in/zoom-out occurs.
54	Err 54	P Motor Err\nPush Power S/W!	The P-shaft motor error occurs.
55	Err 55	M/C Open Err\nPush Power S/W!	When the machine body is separated from the table while the power is on, an error occurs.
56	Err 56	P Motor Err\nOrg Check Err!\nPower Off!	When the P-shaft motor origin signal is detected, an error occurs.
57	Err 57	FAN Error!\nPush Power S/W!	When the FAN signal does not operate, an error occurs.
58	Err 58	AC Check Err!\nPush Power S/W!	When there is abnormality in AC power, an error occurs.
59	Err 59	Over Voltage Err!\nPush Power S/W!	Over-current error
60	Err 60	Under Voltage Err!\nPush Power S/W!	Low-voltage error

5) SPS/E-Series block diagram



6) Table Drawing



BASIC MANUAL

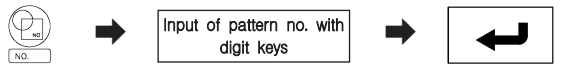
SunStar

SPS/E Series

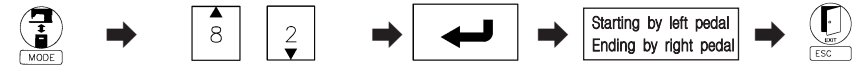
Reference

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



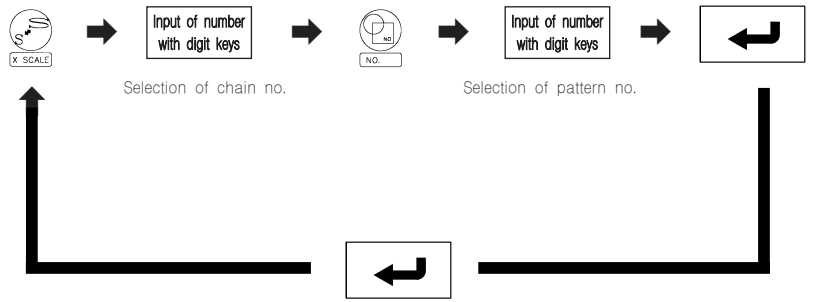
2 Bobbin wind



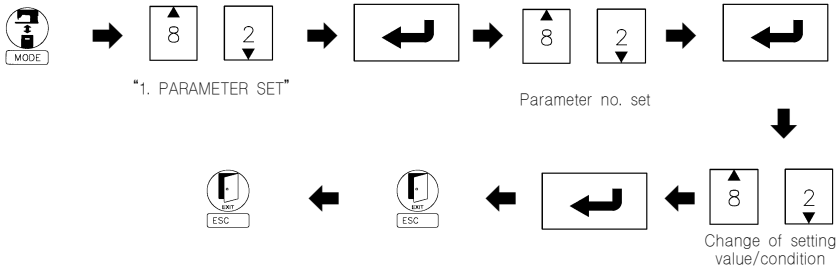
3 Using the counter : Using the bottom thread counter and quantity control counter

4 Setting the extension and reduction

5 Chain sewing : Performing the chain sewing

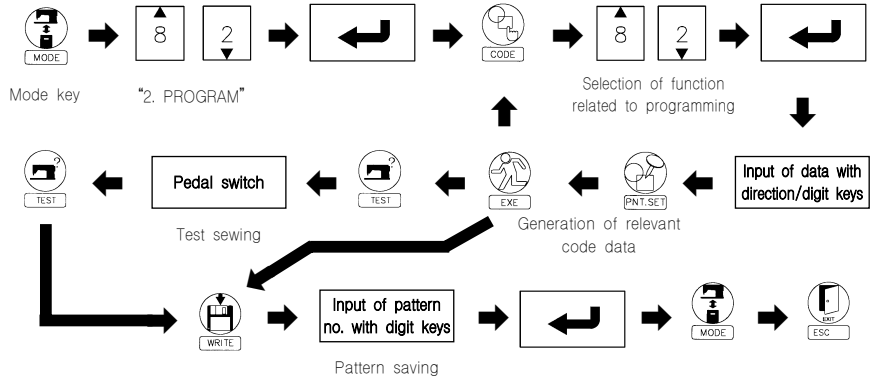


6 Setting the parameter related to general sewing



Parameter number related to general sewing	
0) JOG En/Dis	47) TR Duty
1) JOG Mode	48) WP Duty
2) Machine Org1	49) FFL Duty
3) Machine Org2	50) 2SP Duty
4) Strt Ret Mod	51) INV Duty
5) Bobbin Count	52) PTRN RD MODE
6) Prodct Count	53) Scale MODE
7) Pattern Read	54) Chain Number
8) Trim EM Stop	55) Chain Select
9) Slow Start	56) Chain Clamp
10) Max Speed	57) Decel Stitch
11) Feed End Pos	58) Decel SPM
12) FF Operation	59) Trim Delay
13) FF Close En	60) Low Pressure
14) Pedal1 Mode	61) FF Number
15) Pedal2 Mode	62) FF Pausecntl
16) PF Operation	63) Thrd Hold En
17) PF Down Mode	64) Uper Clmp EN
18) WP Operation	65) Conkey3 Eum
19) WP Position	66) Scale Refer
20) Thrd Detect	67) Palett Chk
21) Thrd Stitch1	68) Sewing Limit(User sewing limit set-up)
22) Thrd Stitch2	69) XPLUS Limit(X-axis forward direction sewing limit)
23) Trim En/Dis	70) XMINUS Limit(X-axis reverse direction sewing limit set-up)
24) Jog Time1	71) YPLUS Limit(Y-axis forward direction sewing limit set-up)
25) Jog Time2	72) YMINUS Limit(Y-axis reverse direction sewing limit set-up)
26) Jog Time3	73) FFOrign 1811(Quick origin search motion selection for 1811)
27) Con Key Tm1	74) RevAfterTrim(Backlashing set-up after trim:SPS/C-Series)
28) Con Key Tm2	75) ReverseAngle(Backlashing set-up angle after trim:SPS/C-Series)
29)Con Key Tm3	76) Save Type(Designate the place of saving pattern designs)
30) Elc WP On Tm	77) DsgnOpnCtrl (Deleting other designs when new designs are opened)
31) Elc WP Off Tm	78) Safety Mode (Safety function setting)
32) Air WP On Tm	79) Jump Speed (Jump speed setting)
33) Air WP Off Tm	80) Jump EM__SW (Emergency stop switch use setting during jump motion)
34) PF Down Time	81) Jump PF Ctrl (Presser foot lift use setting during jump motion)
35) PF Up Time	82) PF Code Ctrl (Presser foot's fabric thickness control code use setting)
36) PF FullOn Tm	83) Clamp En/Dis (User's clamp position use setting)
37) FF FullOn Tm	84) Clamp Data (The user clamp location value needs to be set primarily)
38) TT FullOn Tm	85) PF En/Dis (User Defined Presser Foot Height Use Setting)
39) TR FullOn Tm	86) Clamp Range (User's Clamp Height Setting)
40) WP FullOn Tm	87) PF Range (User's Presser Foot Height Setting)
41) FFLFullOn Tm	88) Auto Call (Design Auto Call Function Setting)
42) 2SPFullOn Tm	89) Auto Ready (Sewing ready setting upon design auto call)
43) INVFullOn Tm	90) Auto Set (External control signal use setting)
44) PF Duty	91) AutoCall TM (Design call sensor time setting)
45) FF Duty	92) UpStop Pos (Needle bar stop position setting)
46) TT Duty	

7 Pattern programming : Generating the pattern that users want



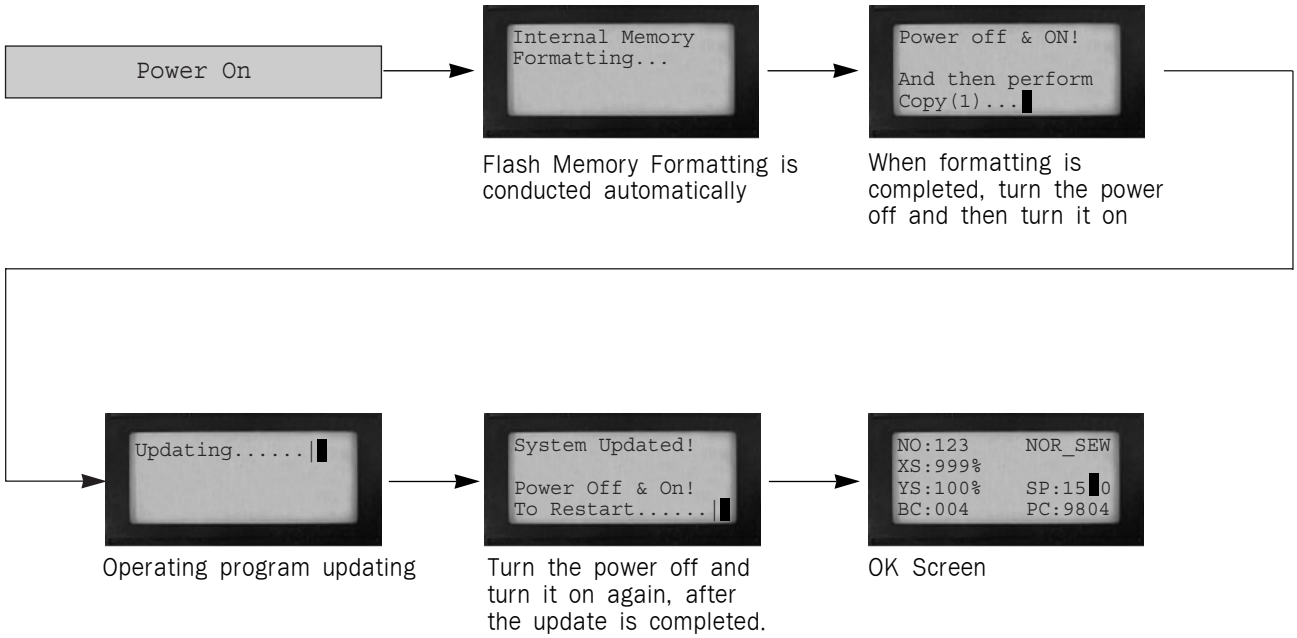
Function number related to pattern programming	
0) TRIM	31) LINE DREV
1) SEC-ORG	32) CURVE DREV
2) PAUSE	33) ARC DREV
3) EMPTY	34) CIRCLE DREV
4) JUMP	35) LINE REV
5) POINT	36) CURVE REV
6) LINE/CURVE	37) ARC REV
7) LINE	38) CIRCLE REV
8) CURVE	39) PTRN DEL
9) ARC	40) BACK TACK
10) CIRCLE	41) CNDNS STI
11) JUMP SPD	42) OVLAP STI
12) STI SPD	43) SYMMETRY X
13) STI WIDT	44) SYMMETRY Y
14) PTRN READ	45) SYMMETRY P
15) PTRN WRITE	46) MOVE PTRN
16) FORMAT	47) COPY PTRN
17) INFO DISP	48) DEL PTRN
18) CORD SYS	49) REV SET
19) LINE ZIG	50) SPD CHNG
20) CURVE ZIG	51) STITCH DRAG
21) ARC ZIG	52) STITCH DEL
22) CIRCLE ZIG	53) MOV SEWSTRT
23) LINE OFST	54) MOV 2ndORG
24) CURVE OFST	55) Auto TRIM
25) ARC OFST	56) SCALE REFER
26) CIRCLE OFST	57) SET__OPnn (Output port setting function)
27) LINE DBL	58) CHK__IPnn (Input port setting function)
28) CURVE DBL	59) TIME__DELAY (Lapse time setting function)
29) ARC DBL	60) PF__CONTROL (Presser foot's fabric thickness control setting)
30) CIRCLE DBL	

10

EMERGENCY RECOVERY

1) Emergency Recovery When Problems Occur in Flash Memory

1-1) When the Flash Memory (D:\> Drive) is not recognized



Flash Memory Formatting is conducted automatically

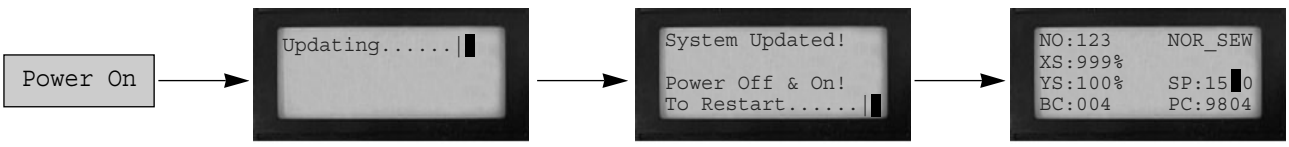
When formatting is completed, turn the power off and then turn it on

Operating program updating

Turn the power off and turn it on again, after the update is completed.

OK Screen

1-2) When Pattern0.exe is deleted in Flash Memory (D:\> Drive)



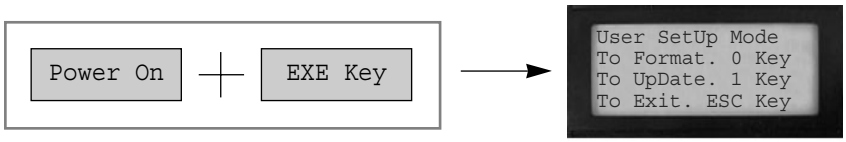
Operating program updating

Turn the power off and turn it on again, after the update is completed.

OK Screen

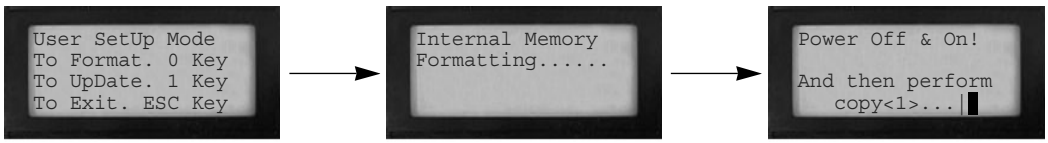
2) User's emergency self-restoration and operating program installation

Follow the order as below.



Turn the power on and press the "EXE" key of the Operation Box at the same time. Then, the screen as below appears.

2-1) Flash Memory Formatting

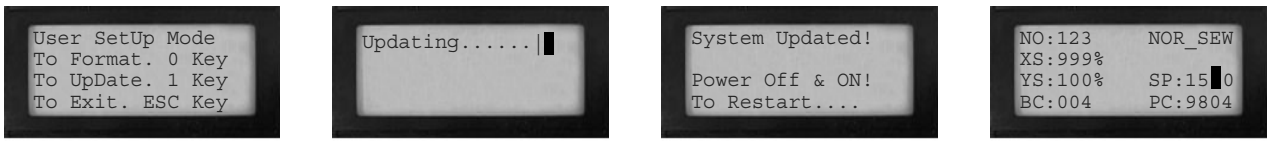


Press "0"

Flash Memory Formatting...

Turn the power off and turn it on again after formatting is completed.

2-2) Program Updating



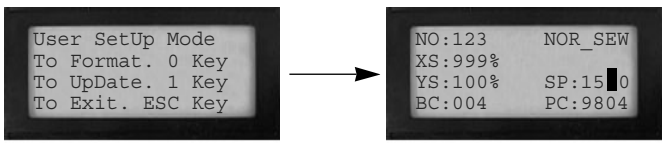
Press "1"

Operating program updating

Turn the power off and turn it on again, after the update is completed.

OK Screen

2-3) Return to the initial program screen



Press "ESC"

OK Screen

11

Special functions

1) Auto Call

Description: This function is to call designs automatically. A total of seven designs can be automatically called via three input sensors. In addition, Sewing Start, Clamp, and Enter key can be controlled by external input signals.

This function should be used only by skilled engineers. Otherwise, damage might be incurred to the system.

Notice

The user's input port setting and the port use cannot be used simultaneously.

1-1) Signals related to input port connection

▶ External input signals for design auto call

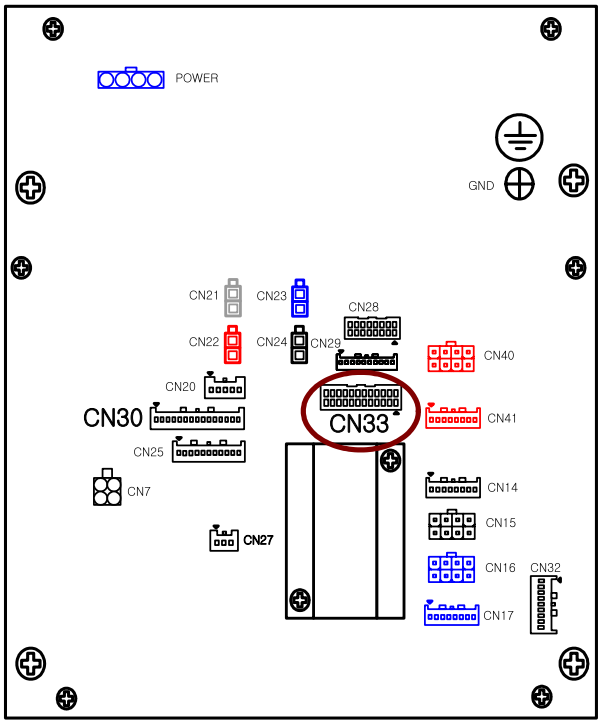
NO.	SEN__2	SEN__1	SEN__0	Design Number
1	0	0	1	900
2	0	1	0	901
3	0	1	1	902
4	1	0	0	903
5	1	0	1	904
6	1	1	0	905
7	1	1	1	906

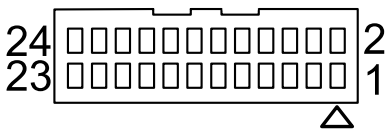
※ To execute the design auto call, the pattern numbers from 900 to 906 should be saved in Flash Memory or a floppy diskette.

▶ Definition and explanation on external input ports

Name	Input Port	Connector	Explanation
SEN__0	IP4.2	CN33	Input : +5V or +24V (Low Active)
SEN__1	IP4.3	CN33	Input : +5V or +24V (Low Active)
SEN__2	IP4.4	CN33	Input : +5V or +24V (Low Active)
Sewing Start	IP4.5	CN33	Input : +5V or +24V (Low Active)
Enter Key	IP4.6	CN33	Input : +5V or +24V (Low Active)
Clamp	IP4.7	CN33	Input : +5V or +24V (Low Active)

The connector information for CN33 is as follows. The figure below is the rear cover of the control box.



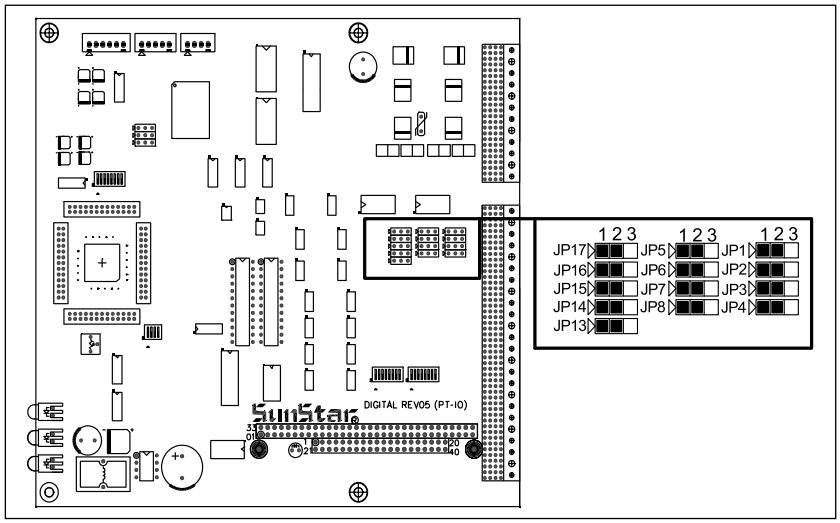


※ The place where a triangle is located is Pin No. 1.

■ Connection Information for CN33 Connector Pin

PIN	Information	NAME	Jumper	Description
1	IP4.7	SEN5		Choose the jumper of JP8 and select +5V or +24V for application in line with the input sensor type.
2	+5V or +24V	SEN5-PWR	JP8	
3	GND			
4	GND			Choose the jumper of JP7 and select +5V or +24V for application in line with the input sensor type.
5	IP4.6	SEN4		
6	+5V or +24V	SEN4-PWR	JP7	
7	IP4.5	SEN3		Choose the jumper of JP6 and select +5V or +24V for application in line with the input sensor type.
8	+5V or +24V	SEN3-PWR	JP6	
9	GND			
10	GND			Choose the jumper of JP5 and select +5V or +24V for application in line with the input sensor type.
11	IN4.4	SEN2		
12	+5V or +24V	SEN2-PWR	JP5	
13	IP4.3	SEN1		Choose the jumper of JP4 and select +5V or +24V for application in line with the input sensor type.
14	+5V or +24V	SEN1-PWR	JP4	
15	GND			
16	GND			Choose the jumper of JP3 and select +5V or +24V for application in line with the input sensor type.
17	IP4.2	SEN0		
18	+5V or +24V	SEN0-PWR	JP3	
19	IP4.1	PF&CLAMP ORG	Used	Used (for other purpose)
20	+5V or +24V	SEN1-PWR	JP2	
21	GND			
22	GND			Used (for other purpose)
23	IP4.0	M/C Open	Used	
24	+5V or +24V	SEN0-PWR	JP1	

※ The figure below shows how to change the output voltage by selecting the jumper (JPxx) on the digital board.



Jumper Setting	Output Voltage
1 2 3 1-2 Pin Connection (Photo Sensor)	DC +5V
1 2 3 2-3 Pin Connection (Proximity Sensor)	DC +24V

■ Information on User's Connector

Connector Name	Connector Product Name	Contact Name	Manufacturer
CN33	XADRP-24V	SXA-001T-P0.6	JST

1-2) How to Use

If the external input sensor signals as described above are properly connected, the user can automatically call designs from #900 to #906 with the sensor signal only, and use Sewing Start, Clamp, and Enter Key.

However, to automatically call designs, CF Card, a floppy diskette, and Flash Memory shall contain designs from #900 to #906.

To use this function, several parameter settings are required. The following is how to conduct the parameter settings.

A. Press the MODE key on the initial screen and select "Parameter Set" on the main menu to set parameters for the auto call function.
The parameter items applied are as follows:
088. Auto Call: Sets the design auto call
089. Auto Ready: Sets the auto sewing ready function after calling designs.
090. Attach Set: Sets whether Sewing Start, Clamp, and Enter key are used or not.
091. AutoCall TM: Sets the input sensor lapse time upon design auto call.

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

```
<Parameter Set>
088.Auto Call
089.Auto Ready
090.Attach Set
```

B. Select "088. Auto Call". Move the cursor to "Enable" and press the Enter key. The unit of change is 100[ms]. The default value is 10, and it means 1 second lapse time. This time lapse is designed to ensure accurate sensing.

```
088.Auto Call
1) DISABLE
2) ENABLE     <-
```

C. Set 089, 090 to be Enable using the same method above.

D. When it is returned to the initial sewing mode, it can be checked that "NOR_SEW" was changed to "AUTOCALL."

```
NO : 001    AUTCALL
XS : 100%
YS : 100%   SP:2500
BC : 014    PC:0058
```

E. If the user utilizes the connected external input sensors, designs can be automatically called.

Note) When using the Auto Call function, if the user uses the pedal and the enter key manually as if in the regular sewing mode (NOR_SEW), the motion of the pedal and enter key might be slightly slow.

2) Design Auto Call Group Setting (Auto Num Set)

The function is in addition to the Autocall function. One of the three design groups including 1) 001~255, 2) 301~555, and 3) 601~855 can be automatically called by the function.

The function setting method is described as below:

A. Press MODE and select "1. Parameter Set" from the main menu.

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

B. Use direction keys to select "092. AutoNum Set."

C. When selected, the AutoNum Set is set at 1)001~007. Use direction keys to select a desired number group and press ENTER.

```
<Parameter Set>
092. AutoNum Set<-
093. Ex_IO BD Set
094. Thumbnail set
```

D. Press ESC to return to the main menu.

```
092. AutoNum Set
1)001~007     <-
2)008~014
3)015~021
```

3) Automatic Design Call Using Barcode

The function enables automatic design call using the commercial barcode system, which provides various barcode specifications based on diverse formats. However, among the formats, only those with applicable specifications can be used.

There are various types of barcode reading system. As long as they are compatible, they can be used. If barcode types are different, they may not be recognized. Therefore, users are recommended to use the barcode systems provided by the company.

■ Barcode System Specifications

NO.	Item	Description
1	Scanning Method	Fixed or Handy Type
2	Communication Type	RS-232C
	Communication Speed (Baud Rate)	9600 bps
3	Barcode Type	CODE39 CODE93 CODE128
4	Barcode Command Details	0001～0999 (4 digits) - 000000000001～000000000999(12 digits)
5	Recommended Products	Metrologic MS5100 Eclipse Series

■ System Connection

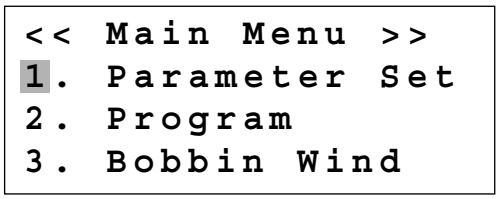
The figure shows the system connection of Metrologic MS5100 Eclipse Series. The serial port of barcode is inserted into the serial port on the side of the OP Box.

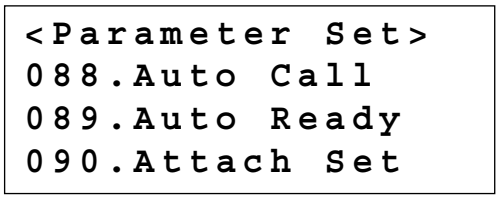
The barcode label below is CODE39 and its barcode command is A003. A003 recognizes design number 003, and since up to three numerical digits can be recognized all the time, character information such as "A" is ignored in reading.

The production of barcode label requires dedicated software and a barcode label printer. They are commercial products, so that user can purchase them in the market. For more inquires, please contact the sales team.

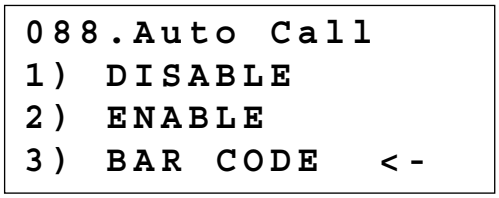
Before use, some parameters should be set up. The setting details are as follows:
(Except for the barcode setting function, it is same to the existing AutoCall function.)

A. Press the MODE key on the initial screen and select Parameter Set on the Main Menu.
The following is related to setting parameters for design auto call.
The parameters below needed to be set.
088. Auto Call : Sets automatic design call using barcodes.
089. Auto Ready : Sets automatic sewing ready status after design call.
090. Attach Set : Sets enable or disable of sewing start, clamp, and enter key.
091. AutoCall TM : Sets the lapse time of input sensor upon design auto call. (This function is meaningless in the barcode system.)





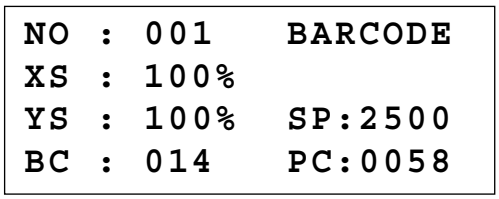
B. Select 088. Auto Call, and move the cursor to BARCODE. Press the enter key to save the value.



C. Set 089, 090 depending on situations.

D. When the sewing returns to the initial mode, user can check that "NOR_SEW" is changed to "BARCODE".

E. If a barcode device is used and barcode labels are scanned, the design numbers are automatically converted. As such, designs can be automatically read.



Reference) When the barcode-based auto call function is used, if user uses the pedal and enter key manually as of in the regular sewing mode (NOR_SEW), the motions activated by the pedal and enter key might be a bit delayed.

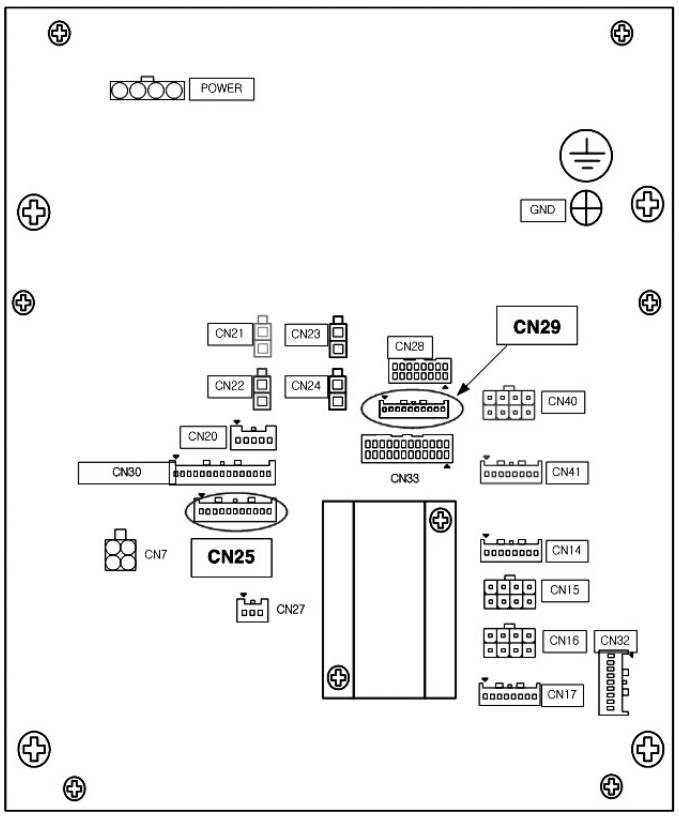
4) User's Output Port Setting [when connected to the external device]

This function is to program the device connected to a selected output port upon punching.
In other words, during sewing, signals are provided through the selected output port to operate the connected user device. The programmable output ports include the following:

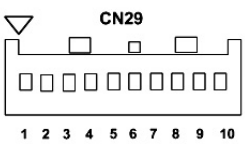
▶Definition and Explanation on Output Port

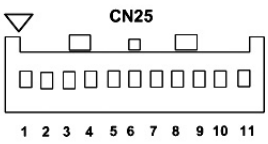
NO	Output Port	Connector	Description
00	OP5.0	CN29	Pneumatic output +24V
01	OP5.1	CN29	Pneumatic output +24V
02	OP5.2	CN29	Pneumatic output +24V
03	OP5.3	CN29	Pneumatic output +24V
04	OP5.4	CN29	Pneumatic output +24V
05	OP5.5	CN29	Pneumatic output +24V
06	OP5.6	CN29	Pneumatic output +24V
07	OP7.0	CN25	Output +5V
08	OP7.1	CN25	Output +5V
09	OP7.2	CN25	Output +5V
10	OP7.3	CN25	Output +5V
11	OP7.4	CN25	Output +5V
12	OP7.5	CN25	Output +5V
13	OP7.6	CN25	Output +5V
14	OP7.7	CN25	Output +5V

The following is the connector information for CN29 and CN25. The figure below shows the rear cover of the control box.



※The place where a triangle is located is Pin No. 1.





▶Connection Information of CN29 Connector Pin

PIN	Information	Description
1	USED	
2	OP5.0	User output port setting signal (+24V)
3	OP5.1	
4	OP5.2	
5	OP5.3	
6	OP5.4	
7	OP5.5	
8	OP5.6	
9	+24V	
10	+24V	

▶Connection Information of CN25 Connector Pin

PIN	Information	Description
1	+5V	
2	OP7.0	User output port setting signal (+5V)
3	OP7.1	
4	OP7.2	
5	OP7.3	
6	OP7.4	
7	OP7.5	
8	OP7.6	
9	OP7.7	
10	GND	
11	GND	

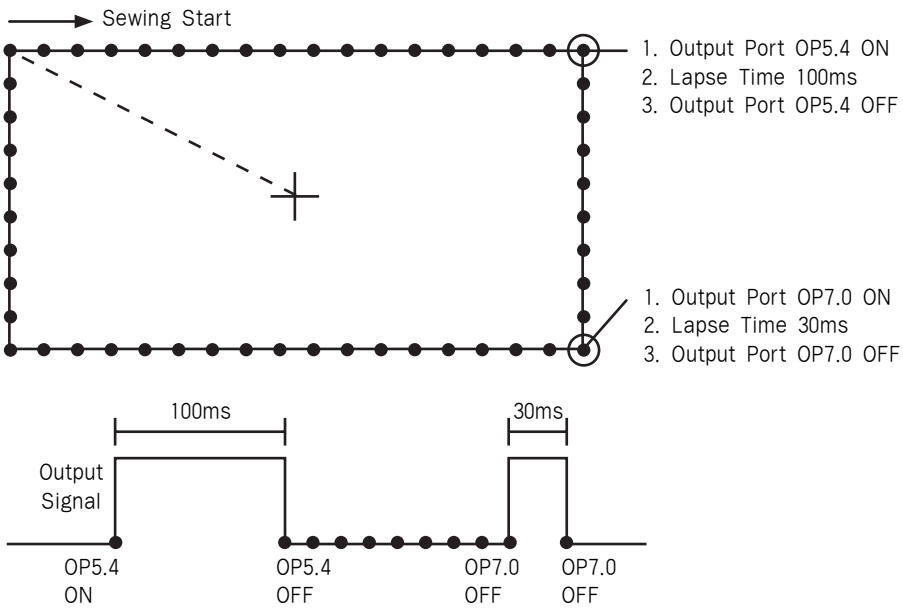
■ Information on User's Connector

Connector Name	Connector Product Name	Contact Name	Manufacturer
CN29	XAP-10V-1	SXA-01T-P0.6	JST
CN25	XAP-11V-1	SXA-01T-P0.6	JST

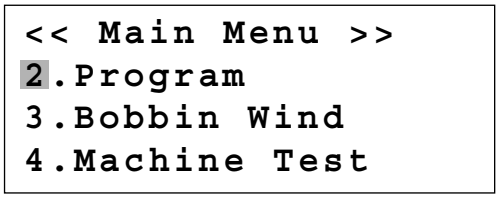
Notice

This function shall be used only by skilled technicians. If things go wrong, it may damage the control system.

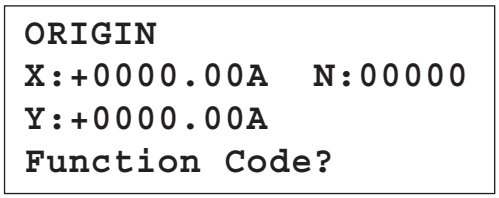
The following is the description on how to use the function.
Assuming that there is a square design as below, each output port and lapse time can be set as follows:



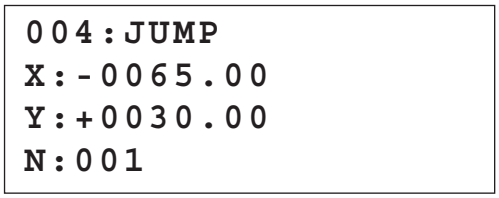
A. Press the MODE key.



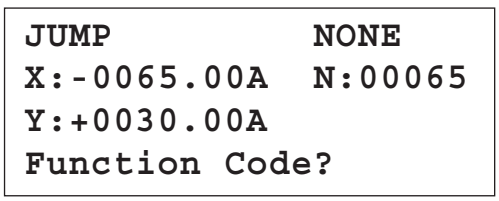
B. Use the direction keys (▲▼) to move to "2.Program" and press the enter key.
Then the upper feed plate descends, and moves to the origin.



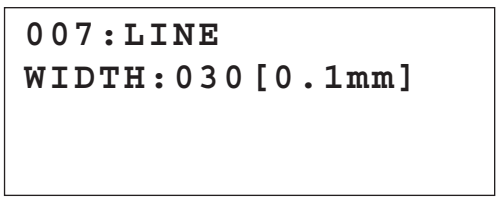
C. Use the direction keys to move to the starting point of the square design, while the jump key is pressed. And then press the PNT SET key.



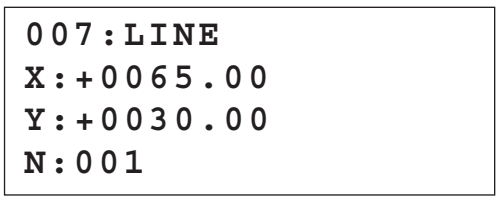
D. When the EXE key is pressed, the pattern data is calculated. Based on the calculated data result, the feed plate moves accordingly.



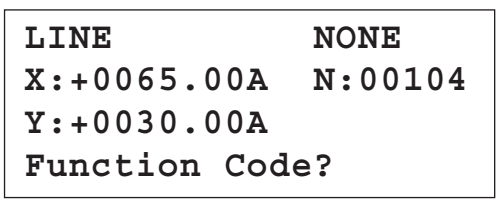
E. Press the line key. Use the number keys to enter the stitch width value, and then press the enter key.
(i.e. If the stitch length is desired to be set at 3mm, enter [0],[3], and [0] in order.)



F. Use the direction keys to move to the first point of the line.
Press the PNT.SET key.



G. Press the EXE key to register the first point of the square design.
After calculating the pattern design, move the feed plate based on the calculation result.



H. Press the code key to program OP5.4 ON.
Function code is #57. If the code number is unknown, press the enter key to display the list of function codes and move to #57 SET OP.

```
<Function  Code>
057:SET    OP   <
058:CHK    IP
060:TIME  DELAY
```

I. Press the enter key and move the cursor to #03 OP54 on the SET OP function list.
Press the enter key.

```
057:SET    OP
03:OP54       <-
04:OP55
05:OP56
```

J. Afterwards, the following screen is displayed.
Locate the cursor on "ON" and then press the enter key.
Simultaneously, the #3 thread pressing device is programmed to be located at the end of the created line.

```
057:SET    OP
OP54:OFF
     ON         <-
```

K. The initial screen is returned.
To create the lapse time, press the code key and use 059. TIME DELAY to enter the lapse time value.

```
OP54    ON    NONE
X:+0065.00A  N:00105
Y:+0030.00A
Function Code?
```

L. The "059. TIME DELAY" screen appears as below. The time delay can be set by the unit of [4ms]. To enter 100ms in total, enter 25. [25×4=100ms]

```
<Function  Code>
059:TIME DELAY <
060:PF CONTROL
000:TRIM
```

```
059:TIME DELAY
DELAY:0025[x4ms]
```

```
TIME DELAY    NONE
X:+0065.00A  N:00106
Y:+0030.00A
Function Code?
```

M. Go back to H and set OP5.4 to be off.

```
057:SET     OP
OP54:OFF       <-
      ON
```

```
OP54    OFF     NONE
X:+0065.00A  N:00105
Y:+0030.00A
Function Code?
```

N. Create the second line following E, F, and G.

O. Use the method from H to M to set OP7.0 at ON. Enter "20ms" for time delay and "OFF" for OP7.0.

P. Create the third and fourth lines applying the same method of creating the first and second lines. Press the test key to check whether the selected output port is operating.

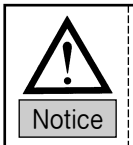
Q. If there is no problem in sewing, press the test key again to exit. Then press the write key to save the design.

5) User Setting of Input Port [used to connect to the external device of the user]

This function is to program the device connected to a selected input port upon punching.

In other words, if sewing is temporarily suspended from the set input port, the sewing can be resumed when the operating signal is sent by the device connected to the input port.

The programmable input ports are as follows:

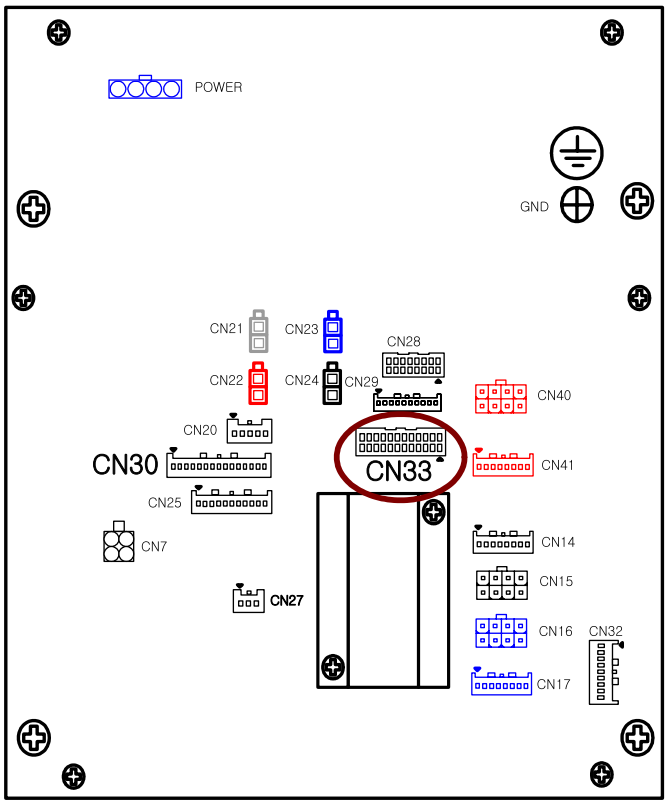


The auto call function and the input port function cannot be simultaneously used.

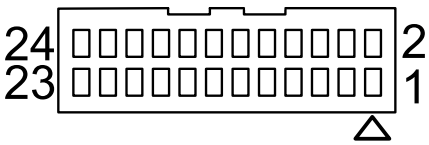
▶Definition and Description on External Input Port

Name	Input Port	Connector	Explanation
SEN__0	IP4.2	CN33	Input : +5V or +24V (Low Active)
SEN__1	IP4.3	CN33	Input : +5V or +24V (Low Active)
SEN__2	IP4.4	CN33	Input : +5V or +24V (Low Active)
Sewing Start	IP4.5	CN33	Input : +5V or +24V (Low Active)
Enter Key	IP4.6	CN33	Input : +5V or +24V (Low Active)
Clamp	IP4.7	CN33	Input : +5V or +24V (Low Active)

The following is the information on the CN33 connector. The figure below shows the rear cover of the control box.



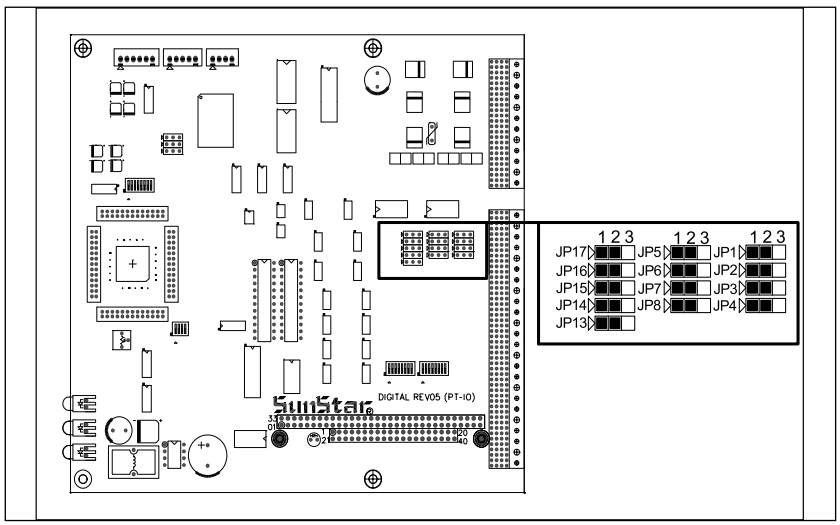
※The place where a triangle is located is Pin No. 1.



▶Connection Information for CN33 Connector Pin

PIN	Information	NAME	Jumper	Description
1	IP4.7	INPUT		Choose the jumper of JP8 and select +5V or +24V for application in line with the input sensor type.
2	+5V or +24V	Power	JP8	
3	GND			
4	GND			Choose the jumper of JP7 and select +5V or +24V for application in line with the input sensor type.
5	IP4.6	INPUT		
6	+5V or +24V	Power	JP7	
7	IP4.5	INPUT		Choose the jumper of JP6 and select +5V or +24V for application in line with the input sensor type.
8	+5V or +24V	Power	JP6	
9	GND	GND		
10	GND	GND		Choose the jumper of JP5 and select +5V or +24V for application in line with the input sensor type.
11	IN4.4	INPUT		
12	+5V or +24V	Power	JP5	
13	IP4.3	INPUT		Choose the jumper of JP4 and select +5V or +24V for application in line with the input sensor type.
14	+5V or +24V	Power	JP4	
15	GND	GND		
16	GND	GND		Choose the jumper of JP3 and select +5V or +24V for application in line with the input sensor type.
17	IP4.2	INPUT		
18	+5V or +24V	Power	JP3	

※ The figure below shows how to change the output voltage by selecting the jumper (JPxx) on the digital board.



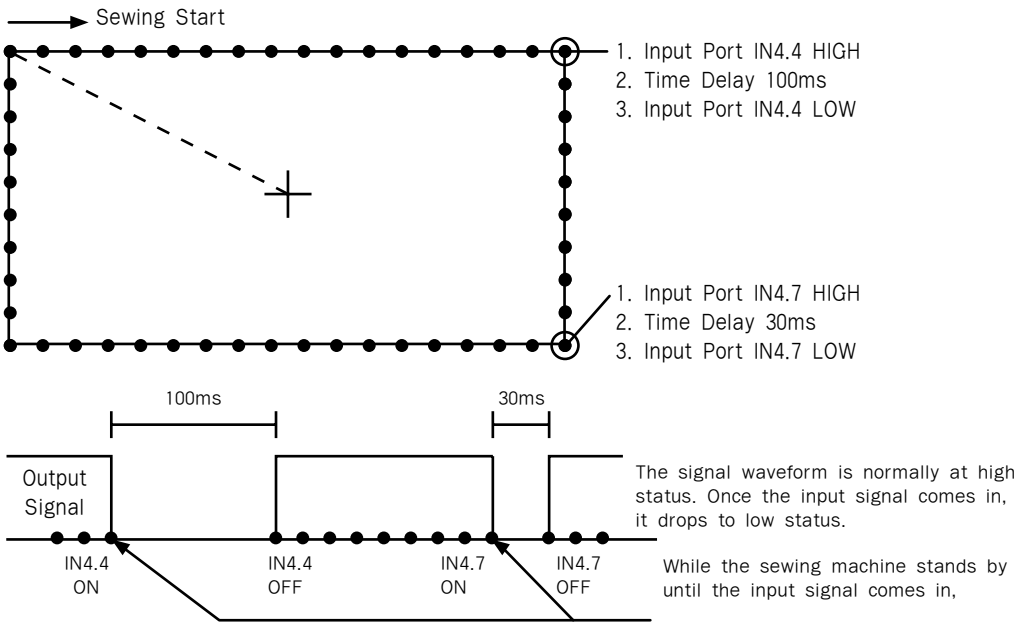
Jumper Setting	Output Voltage
 1 2 3 1-2 Pin Connection (Photo Sensor)	DC +5V
 1 2 3 2-3 Pin Connection (Proximity Sensor)	DC +24V

▶Information on User's Connector

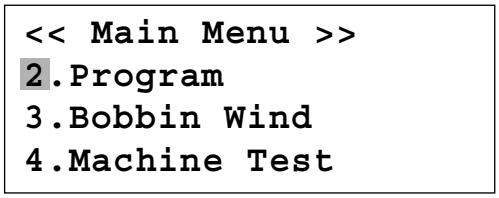
Connector Name	Connector Product Name	Contact Name	Manufacturer
CN33	XADRP-24V	SXA-001T-P0.6	JST

Notice

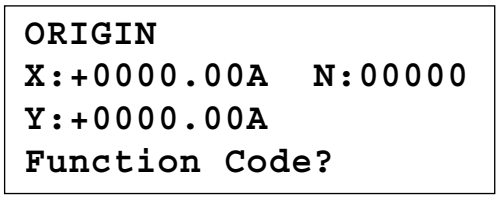
The following is how to use the port.
Assuming there is a square design as below, each output port and time delay can be set as follows:



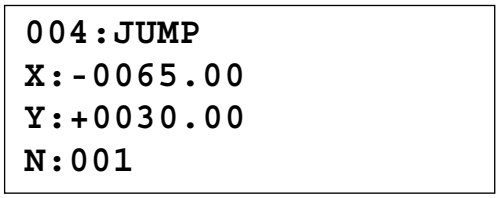
A. Press the mode key.



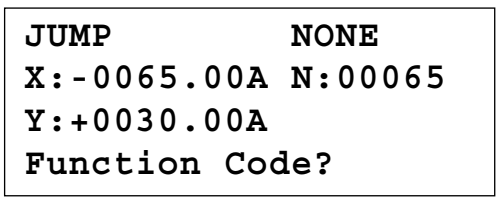
B. Use the direction keys (▲▼) to move to "2.Program," and press the enter key.
Then the upper feed plate descends, and moves to the origin.



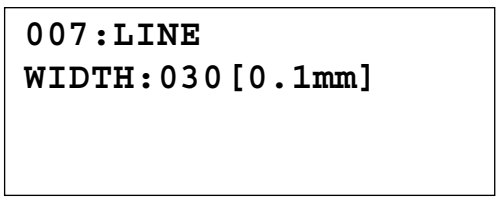
C. Press the jump key and use the direction keys to move to the starting point of the square design.
Then press the PNT SET key.



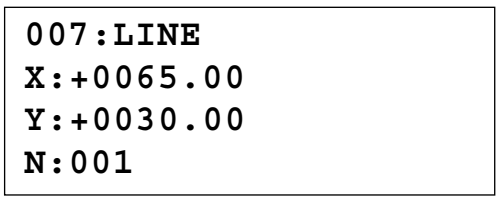
D. When the EXE key is pressed, the pattern data is calculated. Based on the result, the feed plate moves accordingly.



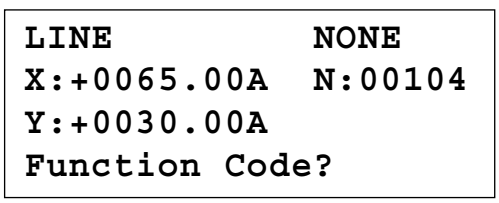
E. Press the LINE key and use the number keys to enter the stitch width, and press the enter key. (i.e. to set the stitch width at 3mm, enter [0], [3], and [0] in order.)



F. Use the direction keys to move to the first point of the line.
Press the PNT.SET key.



G. Press the EXE key to register the position of the first point of the square design.
After calculating the pattern data, the feed plate moves based on the calculation result.



H. Press the code key to program IP4.4 HIGH.
The function code is 58. If the function code is unknown, press the enter key to display the list of function codes and use the cursor to move to No. 58 CHK IP.

```
<Function  Code>
058:CHK    IP   <
059:TIME  DELAY
060:PF CONTROL
```

I. Press the enter key and move to No. 2 IP44 on the CHK IP function list.
Then press the enter key.

```
058:CHK    IP
02:IP44       <-
03:IP45
04:IP46
```

J. The following screen is displayed. Move the cursor to High and press the enter key.
The input signal generated upon the pressing of the enter key will be programmed at the end of the line.

```
058:CHK    IP
IP44:LOW
     HIGH    <-
```

K. The screen returns to the initial program screen. The programmed screen is displayed on the right side.
To generate the second lapse time, press the code key to move to 059. IME DELAY and enter the lapse time.

```
IP42  HIGH    NONE
X:+0065.00A  N:00105
Y:+0030.00A
Function Code?
```

L. The screen of 059. TIME DELAY is displayed as below. The unit of time is [4ms], and to enter 100ms in total, enter 25. [25×4=100ms]

```
<Function  Code>
059:TIME DELAY <
060:PF CONTROL
000:TRIM
```

```
059:TIME DELAY
DELAY:0025[x4ms]
```

```
TIME DELAY    NONE
X:+0065.00A  N:00106
Y:+0030.00A
Function Code?
```

M. Use the same method as in H to set IP4.4 HIGH at Low.

```
058:CHK     IP
OP44:LOW        <-
     HIGH
```

```
IP44    LOW     NONE
X:+0065.00A  N:00105
Y:+0030.00A
Function Code?
```

N. Create the second line repeating E,F, and G.

O. Use the same method as in H to M to set IP4.7 at HIGH, and enter 20ms for lapse time and Low for IP4.0.

P. After creating the third and fourth lines just like the first and second lines, press the test key to check the proper operation of the set output port.

Q. If there is no problem in sewing, press the test key to exit and press the write key to save the design.