SunStar®

USER'S MANUAL

SPS/A-Pattern Series
SPS/B-Pattern Series
SPS/C-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.

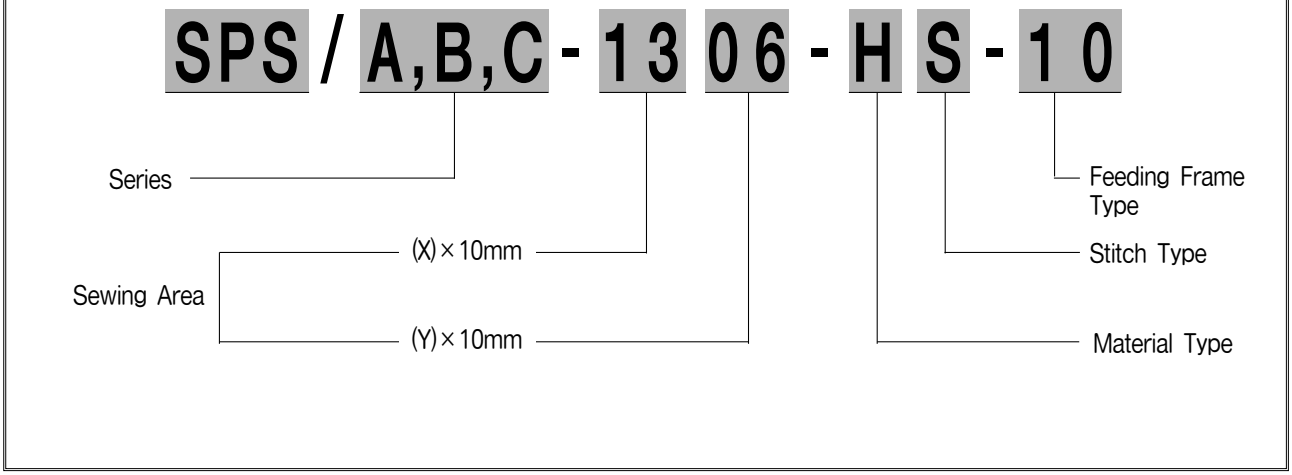
SUNSTAR MACHINERY CO., LTD.

MEE-080701

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 Type
- A : Belt Type
- B : Direct Type
- C : Separated upper and lower operation type

☐ Sewing Type
- 1306 : X(130mm), Y(60mm)
- 1310 : X(130mm), Y(100mm)
- 1507 : X(150mm), Y(70mm)
- 1811 : X(180mm), Y(110mm)
- 2211 : X(220mm), Y(110mm)
- 2516 : X(250mm), Y(160mm)
- 3020 : X(300mm), Y(200mm)
- 5030 : X(500mm), Y(300mm)
- 5050 : X(500mm), Y(500mm)
- 8050 : X(800mm), Y(500mm)

☐ Material Type
- G:General Material
- H:Heavy Material

☐ Stitch
- S:Standard Stitch
- P:Perfect Stich

☐ Feed Frame
- 10:Electronic
- 20:Pneumatic Monolithic Feeding Frame
- 22:Pneumatic Separately-Driven Feeding
- 23:Pneumatic Reverse Device Attach/Separate Feed Frame

☐ SPS/C-Series
- 01:Arm Lifting Type
- 02:Fixed Arm Type

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 5 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

A(B) Pattern Series is made to sew patterns on fabrics and other similar material for manufacturing.
Follow the following indications when operating the machine.

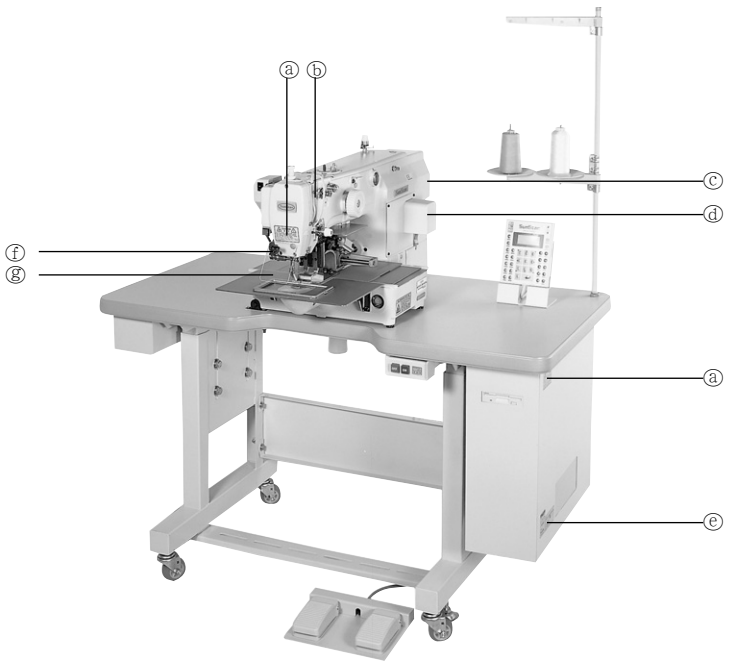
ⓐ Read through this manual carefully and completely before operating the machine.
ⓑ Wear the proper clothes for work.
ⓒ Keep hands or other parts of the body away from the machine operation parts(needle, shuttle, thread take-up lever, and pulley etc.) when the machine is being operated.
ⓓ Keep the covers 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]
Belt will crush or amputate finger or hand, keep cover in place before operating, turn off power before inspecting or adjusting.

1-5) Devices for Safety

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.
ⓒ Belt Cover : It prevents from insertion of hands, feet or clothes by V-belt Motor.
ⓓ 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

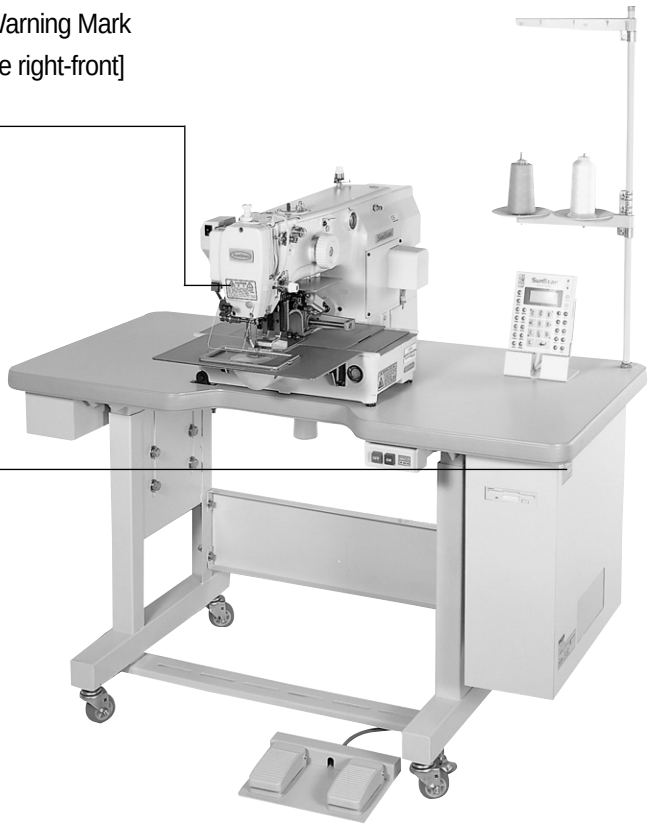
[View from the right-front]

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.
실, 보빈, 바늘교환시나 청소전에는 반드시 주전원의 스위치를 꺼 주십시오.

2)

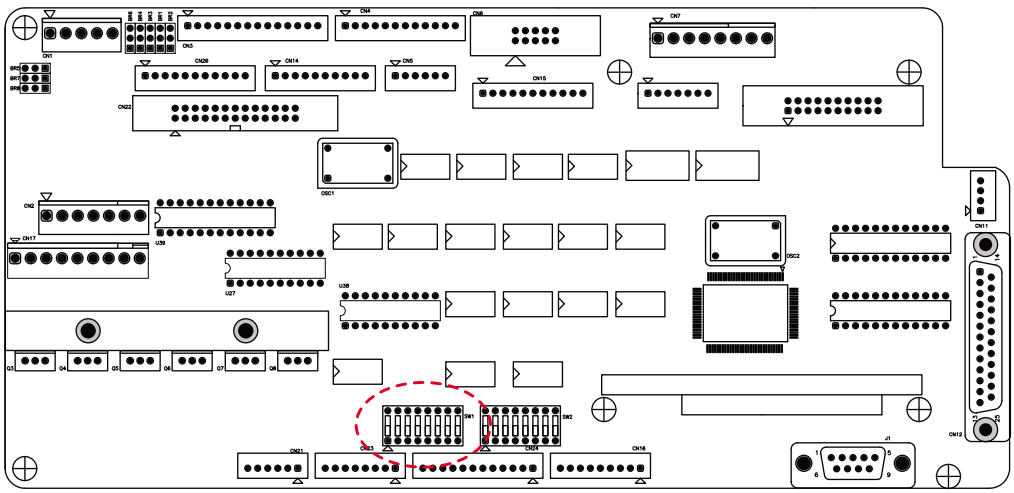
WARNING
경 고

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.

2

I/O Board Dip Switch Setting

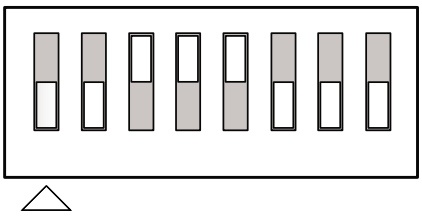
This shows how to set up the dip switch(SW1) on the I/O board.



The figure above is based on the SPS/C-5050 I/O board.

The following describes each dip switch number.

SW1

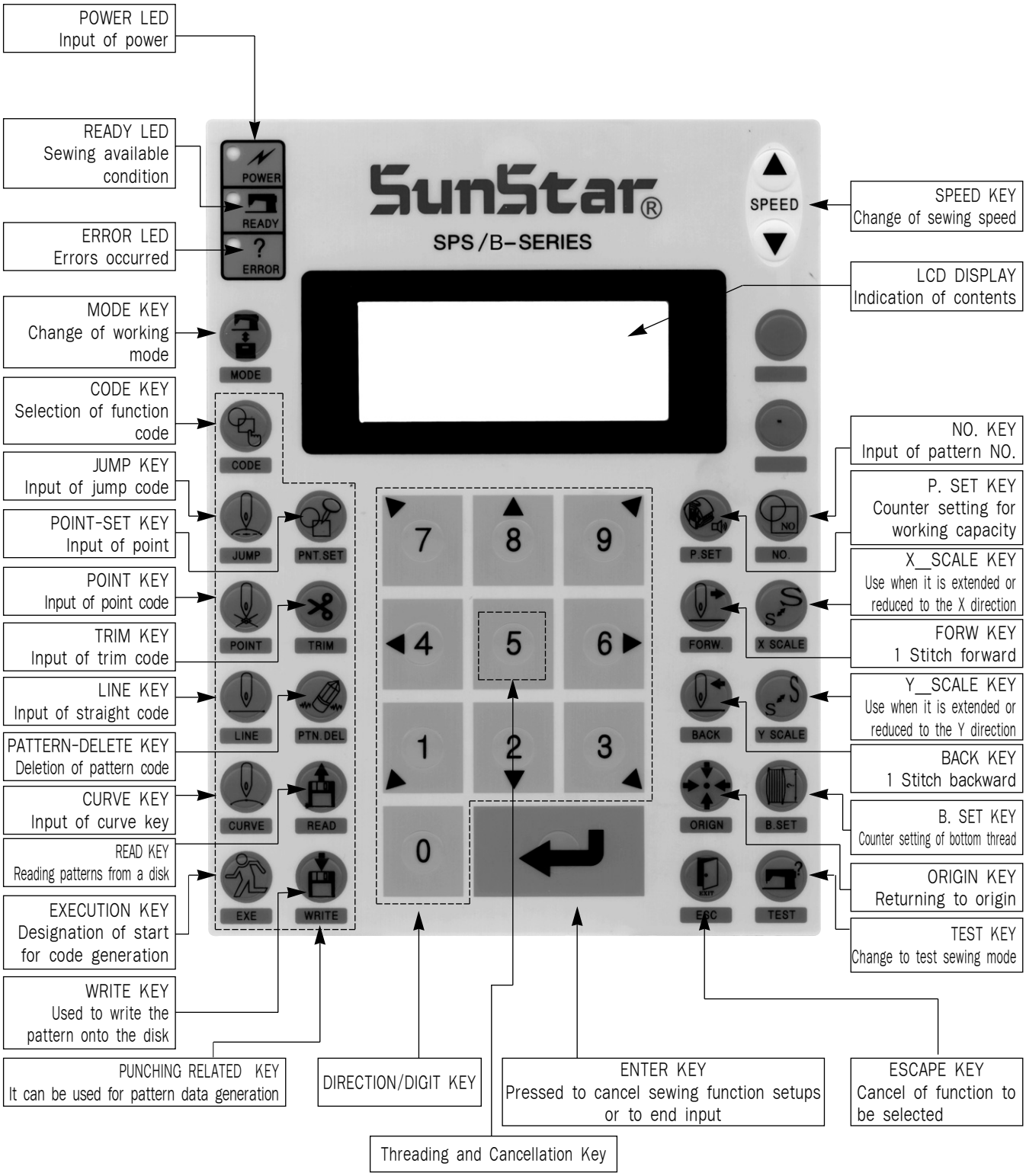


1	Not used
2	Not used
3	Main shaft motor type ON : Direct drive OFF : Belt type
4	If the main shaft motor is a **direct drive type**, activate the serial communication witht he CPU card.
5	New I/O board setting (After REV 21)
6	Not used
7	Distinction between integrated and non-integrated versions ON : Non-integrated version setting OFF : Integrated version setting
8	Not used

3

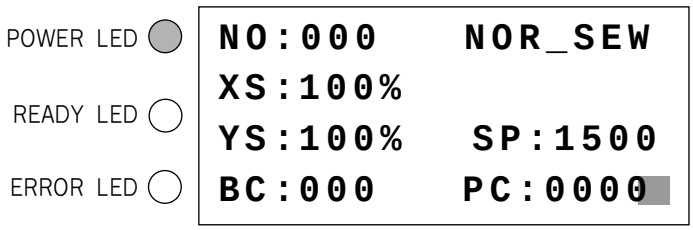
BASIC OPERATIONAL METHOD

1) Name and Roles of Each Key on Operation Unit



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

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



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

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

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

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

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

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

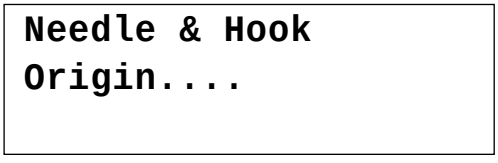
G. "SP" : It indicates sewing speed. You can change the speed you want by pressing down SPEED key. (200[SPM] ~2500[SPM])
※ Maximum sewing speed varies depending on the sewing machine. See "Setting-Up the Speed".

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)

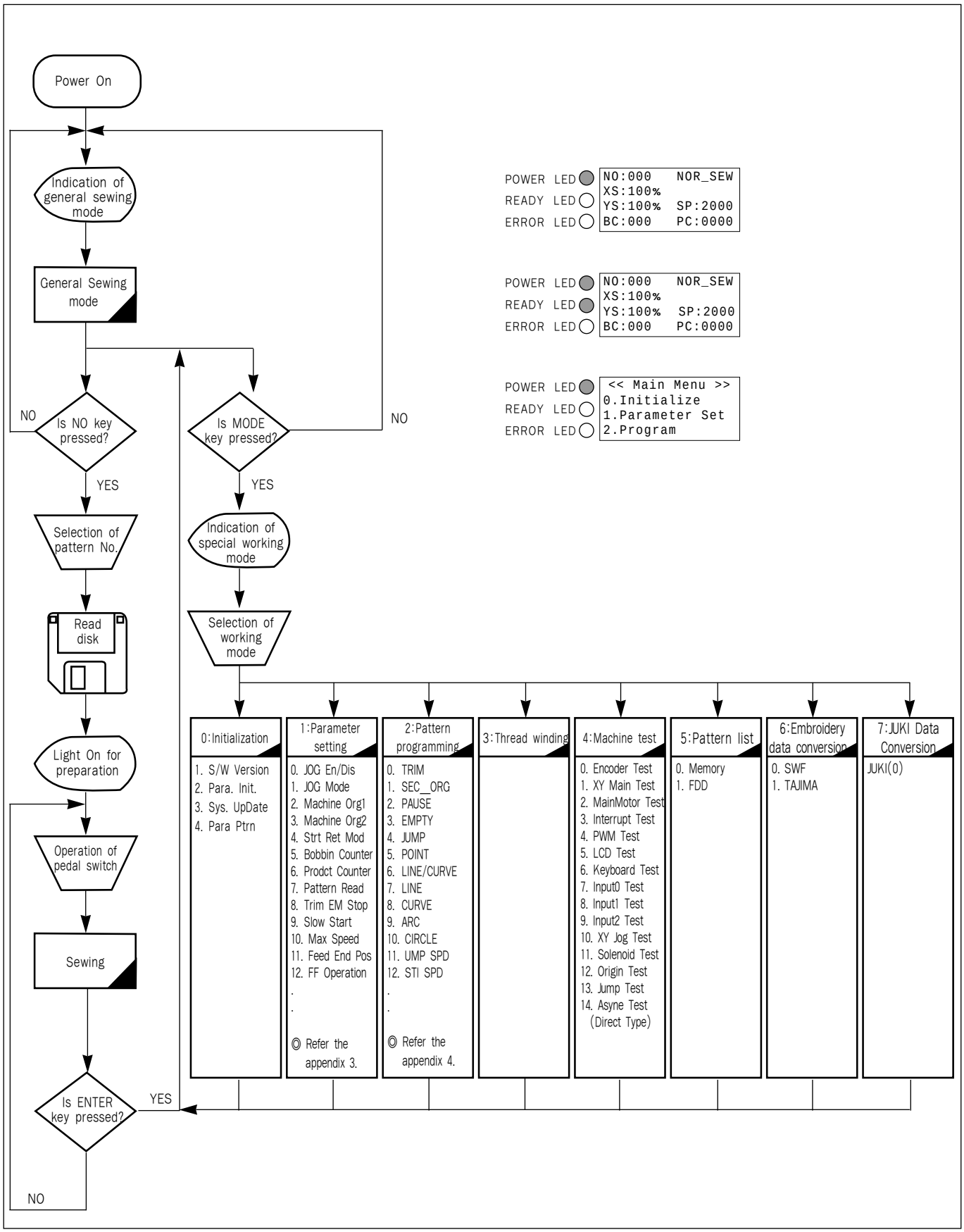
J. "NOR_SEW" : It shows working condition. General sewing and chain sewing are available.
" NOR_SEW" indicates the general sewing and "CHN_XX" means chain sewing.
※ **Reference : 00~15 are available in XX of "CHN_XX"**

※ In case of SPS/C-series :

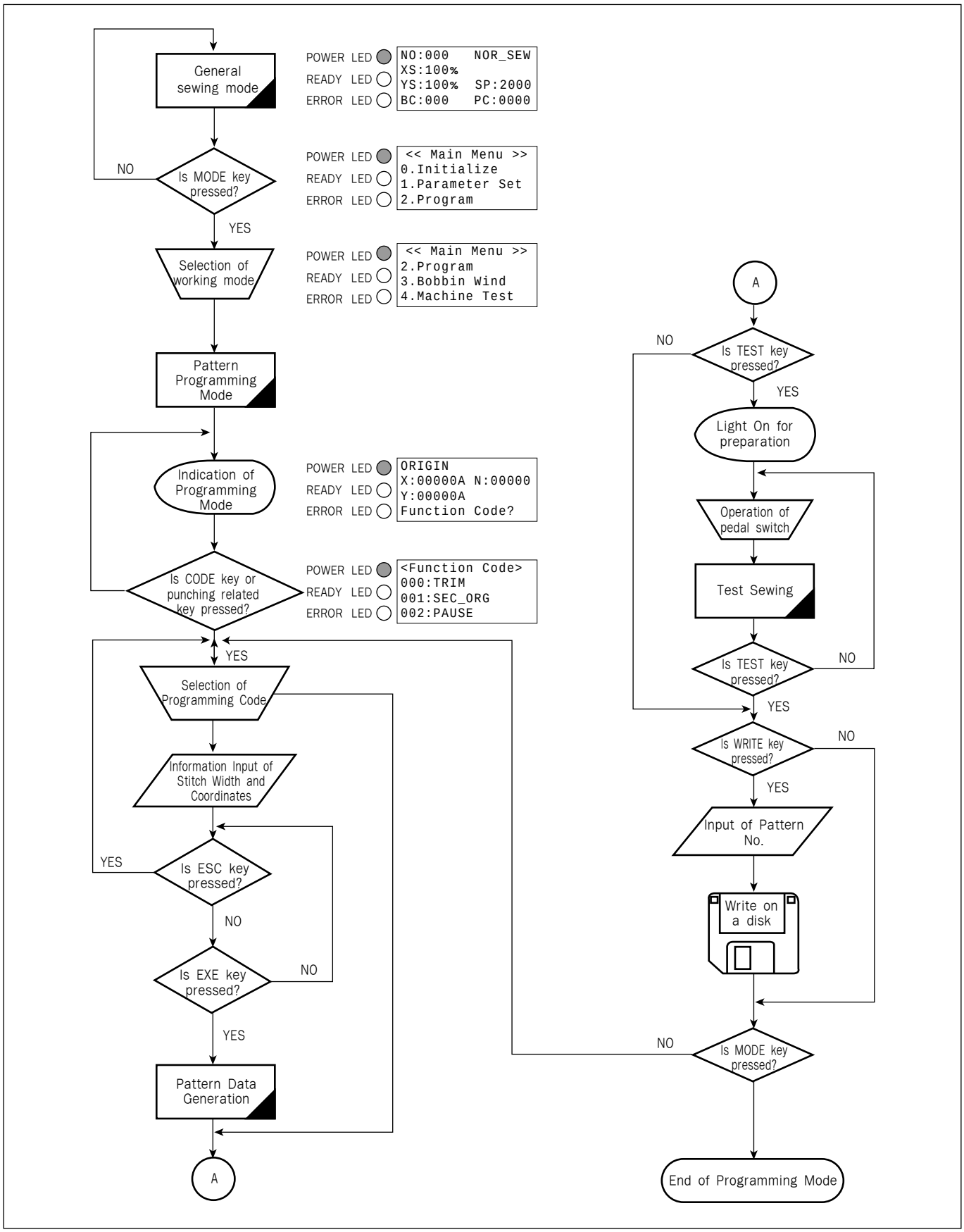


In case of SPS/C-series, when the power is on first, upper-lower shaft origin search motion will start. After origin search motion, the highest position of thread take- up is set as the different way from the existing pattern. Because origin search motion will perform to set upper-lower shaft hook time. This will not cause problem during sewing or trimming. The position will be set as the existing pattern when the machine stops or trims during sewing.

3) Flow Chart of General Operation



4) Work Flow of Pattern Programming



5) Operating After Reading the Patterns from Floppy Disks

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

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

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

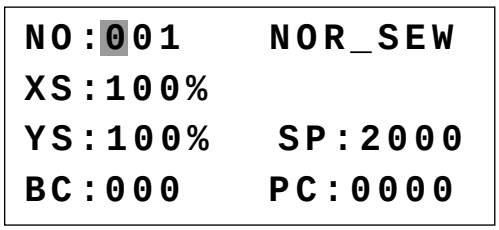
C. Press ENTER↵key. Read the pattern and change to sewing available mode.

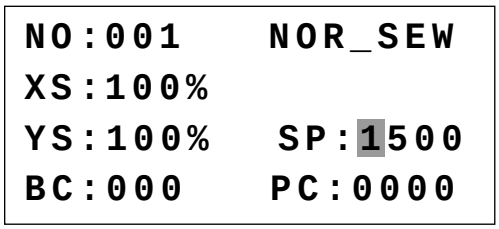
D. At the moment, the upper thread plate comes to descend, then ascend again after moving to the sewing start point. The READY LED comes to light on.

E. Press SPEED key and adjust the speed properly.

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

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





6) Confirming the Working Pattern Read from the Floppy Disks

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

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

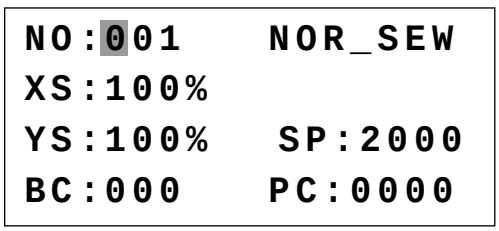
F. If you step on the pedal switch on the right side, the upper feed plate comes to descend.

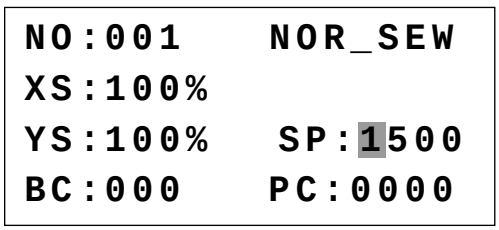
G. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. If you press continuously, it moves to the start or to the end of pattern data consecutively.

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.





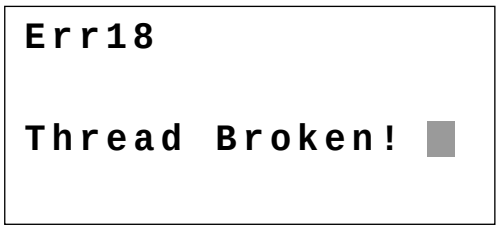
7) When a Machine Stops Operating During Sewing by the Thread Cut

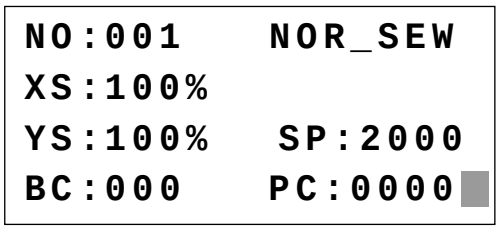
A. You can get the screen like a figure on the right side.

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



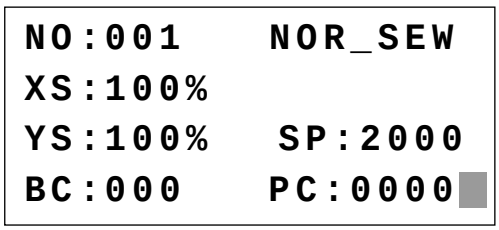


8) Emergency Stop During Operation

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

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

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

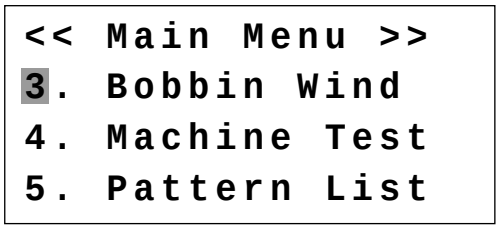


9) Winding the Thread

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

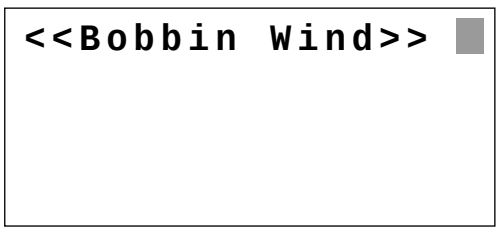
B. Press MODE key.

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



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

E. If you finish the thread winding work, complete the thread winding with the left pedal switch or ESC key.



10) Safety Functions

10-1) 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, the operation freeze status can be canceled by pressing the same No. 5 key again.

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. To cancel the freeze mode, press No. 5 key again.

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
```

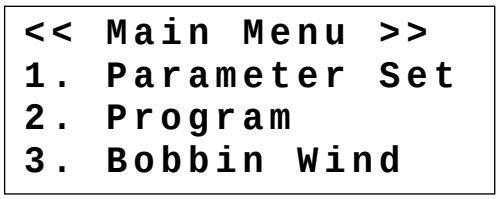
10-2) Emergency Stop, Thread Sensing or Pause Code.

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 "EXE" 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 "095. 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.

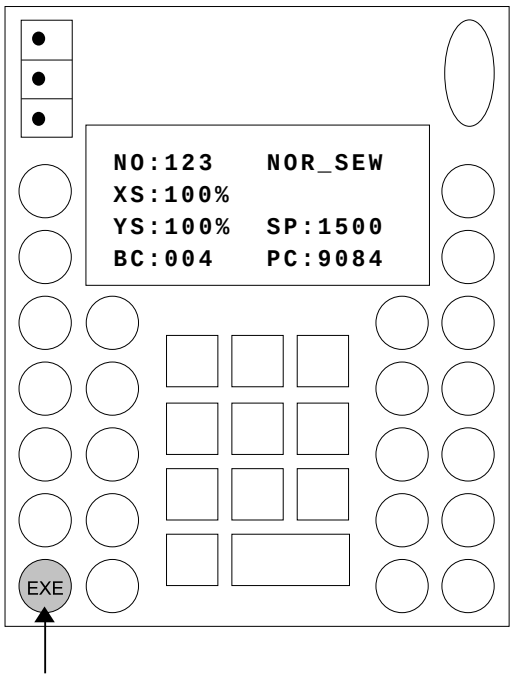
When the thread is sensed, an alarm is issued and the OP Box displays the following message. While the message is displayed on the OP Box screen, Pedal Start Switch, Clamp Up/Down Switch, and Keys of the OP Box remain disabled in order to protect users.

Only when the exit key is entered, the functions mentioned above are operable. To cancel the safety mode, press "EXE" 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
```



G. To cancel this function, press EXE 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.

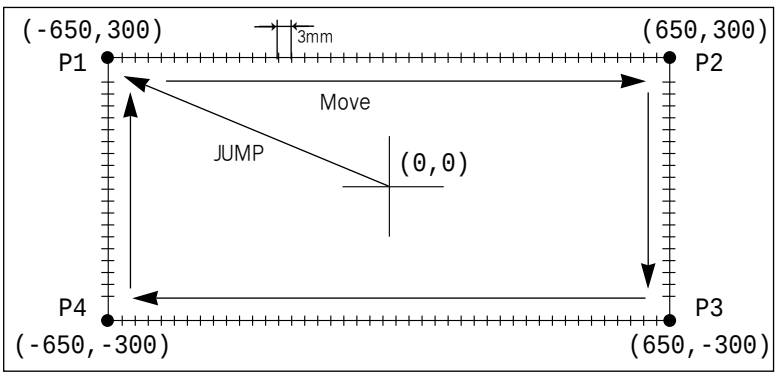
```
NO:003   NOR_SEW
XS:100%
YS:100%  SP:2000
BC:100   PC:0000
```

4

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

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

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

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

```
JUMP          NONE
X:-0650A N:00065
Y:00300A
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:-0650
Y:00300
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:-0650A  N:00193
Y:00300A
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:-0650A  N:00194
Y:00300A
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:-0650A  N:00193
Y:00300A
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:00000A  N:00000
Y:00000A
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.

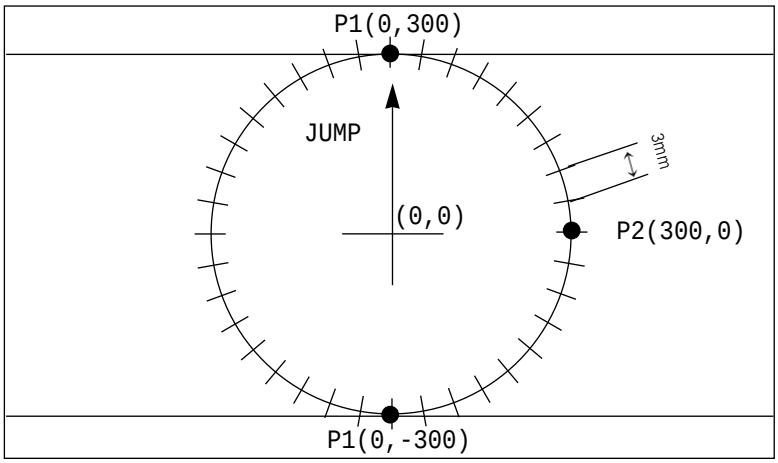
```
Pattern Exist!
OverWrite?
Y(ENTER)/N(ESC)
```

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

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

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

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

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

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

H. Move to the second random coordinates that passes on a circle (For example, X:00300 Y:00000) by using direction keys, then press PNT SET key. Same as above, move to the third random coordinates that passes on a circle (For example, X:00000 Y:-00300), 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.

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

```
<Function Code>
010:CIRCLE      <
011:JUMP    SPD
012:STI     SPD
```

```
010:CIRCLE
WIDTH:030[0.1mm]
```

```
010:CIRCLE
X:00000
Y:-0300
N:002
```

```
CIRCLE        NONE
X:00000A N:00090
Y:00300A
Function Code?
```

```
TRIM          NONE
X:00000A N:00091
Y:00300A
Function Code?
```

```
CIRCLE        NONE
X:00000A N:00090
Y:00300A
Function Code?
```

```
<Test Sewing>

SP:1500
```

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

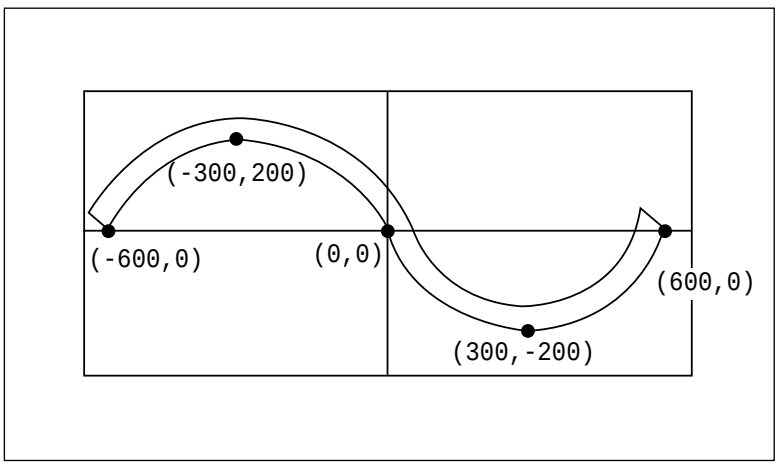
```
015:PTRN WRITE
NO  :301
```

```
ORIGIN
X:00000A N:00000
Y:00000A
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.

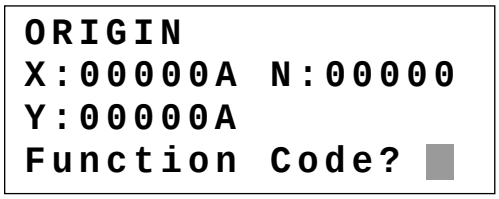


A. Insert a floppy disk into a floppy disk drive.

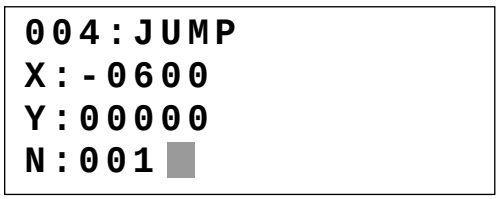
B. Press MODE key.

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

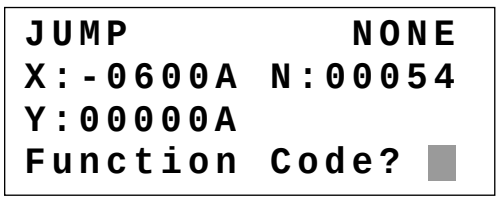
C. Move to "2. Program" by using digit keys ▲ ▼, then press ENTER↵ key. At this time, the upper feed plate comes to descend and moves to the origin.



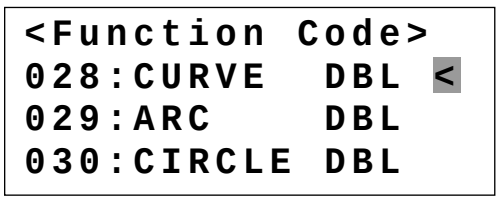
D. After pressing JUMP key, move to a random coordinates (For example X:-0600, Y:00000) that passes on a circle by using direction keys. Then, press PNT SET key.



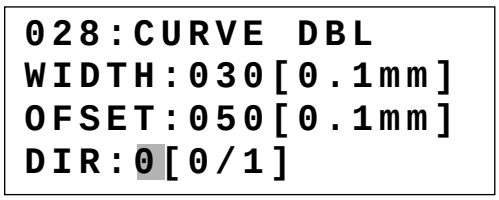
E. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data.



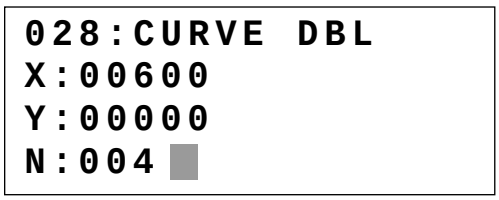
F. After pressing CODE key, If you know function codes related to pattern programming, input three digit number, but if not, move to "28. Curve DBL" by using direction keys ▲ ▼, after pressing ENTER↵ key, then press ENTER↵ key again.



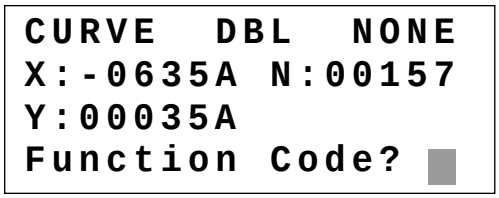
G. Input the stitch width by using the digit keys, then press ENTER↵ key. (For example, if you want to set the stitch width as 3mm, input [0][3][0].) Input the distance between the two curves by using digit keys, then press ENTER↵ key. (For example, if you want to set 5mm, input [0][5][0].) Input a direction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



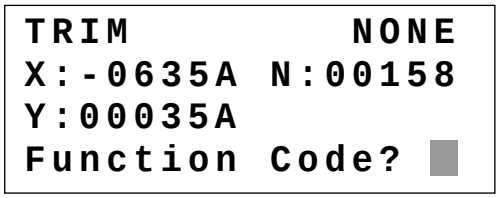
H. Move to the next coordinates (For example, X:-0300 Y:00200) by using direction keys, then press PNT SET key. Same as above, move to the other three coordinates in turns by using direction keys and press PNT SET key. At this time, whenever you press PNT SET key, the number of screen increases.



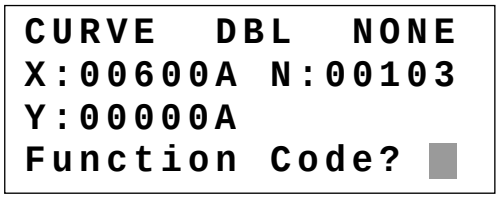
I. If you press EXE key, the machine operates pattern data, then the feed plate moves according to the operated data. At this time, the sewing machine discontinues for a while.



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

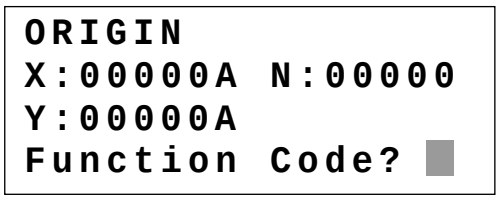


K. If you press FORW and BACK keys to progress and reverse 1 stitch, you can confirm the real shape to be sewn. Whenever you once press the keys, you can see the operating form and coordinates at that time. If you want to perform test sewing, goes to the next step directly. If you press continuously,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

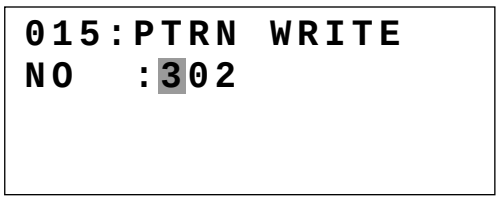


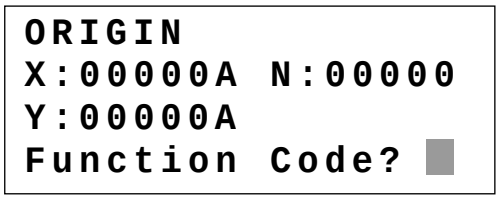
L. Press TEST key.
The upper feed plate comes to ascend and moves to origin, then goes up. After that, READY LED lights up. Press SPEED key and adjust the speed properly. Then if you step on the pedal switch on the right side, the upper feed plate comes to descend, and if you step on the pedal switch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

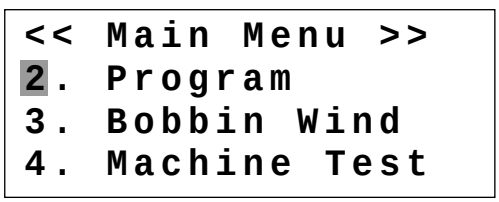


N. Press WRITE key and input the number you want to save by using digit keys, then press ENTER↵ key. Then, save the generated pattern data in a floppy diskette as a relevant number.(For example, if you want to save a pattern number as 302, input [3][0][2].)
During saving the data, READY LED flickers.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



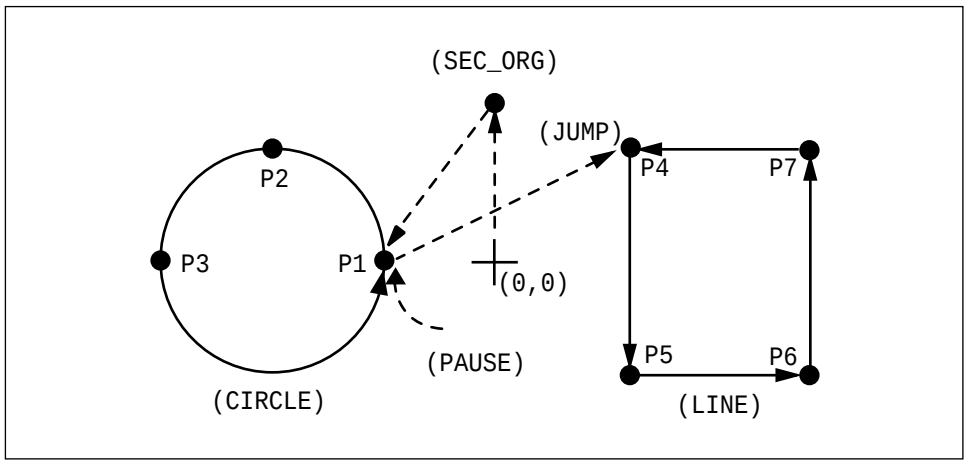


O. For finishing a pattern generation, press MODE key. Then, the upper feed plate comes to ascend after moving to origin. Press ESC key to back to the initial screen.



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

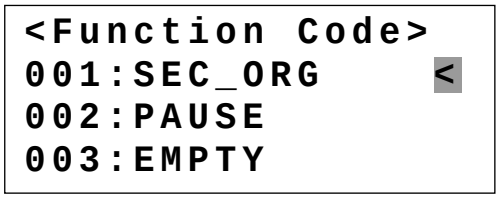
D. After pressing JUMP key, make the second origin move to the coordinates (For example, X:00000 Y:00300) you want by using direction keys, then press PNT SET key.

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

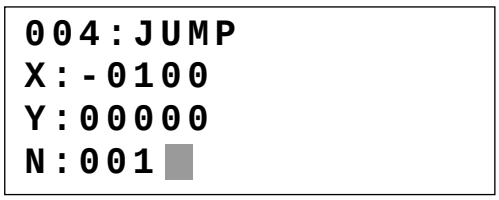
E. By pressing EXE key, after operating the pattern data, the feed plate moves according to the operated pattern data.

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

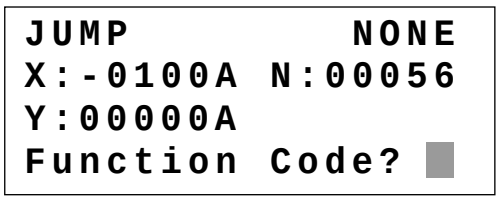
F. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "001: SEC_ ORG" by using direction keys ▲ ▼, then press ENTER↵key again.



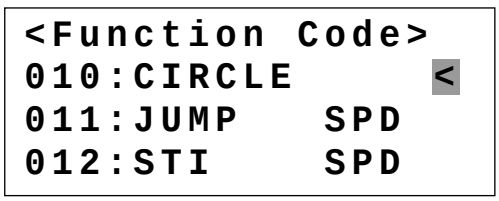
G. After pressing JUMP key, move to one random coordinates that passes through circle (for example, X:-0100, Y:00000), then press PNT SET key.



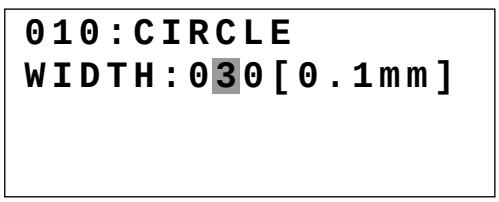
H. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



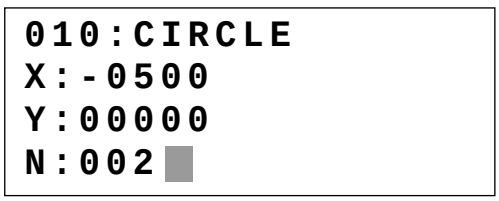
I. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "010: Circle" by using direction keys ▲ ▼, then press ENTER ↵key again.



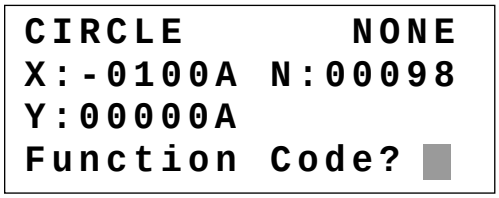
J. By using digit keys, input the stitch width and press ENTER↵key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



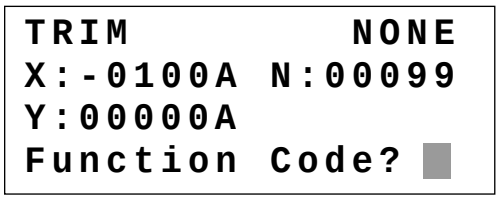
K. By using direction keys, move to the second random coordinates that passes through circle (for example, X:-0300 Y:00200), then press PNT SET key.
Likewise move to the third coordinates that passes through circle (for example, X:-0500 Y:00000), then press PNT SET key.
At this time the number on screen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



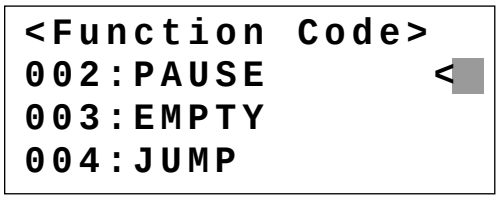
L. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



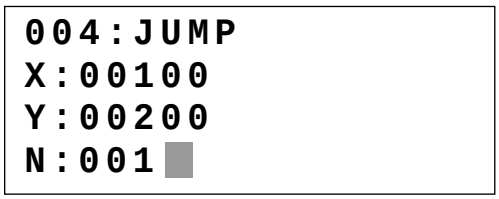
M. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.



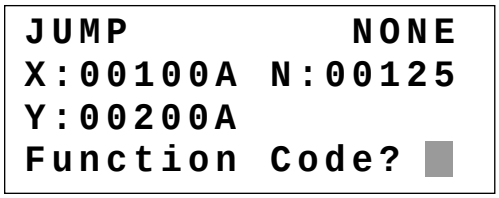
N. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "002: PAUSE" by using direction keys ▲ ▼, then press ENTER ↵key.



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

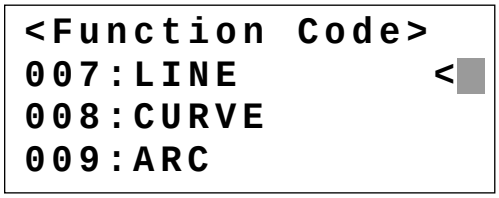


P. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

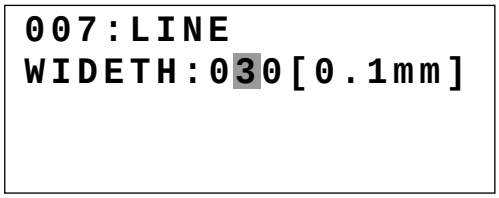


Q. After pressing CODE key.
If you know the function number related to pattern programming, input three-figure number and if you do not know the number, press ENTER↵key and transfer to "007:Line" menu by using direction key ▲ ▼, and then press ENTER↵key.

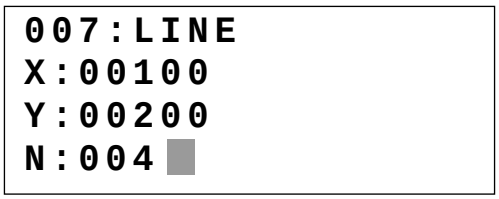
Ref.) "LINE" and "CURVE" function is set to use with hot key on the operation panel and so you may press this key.



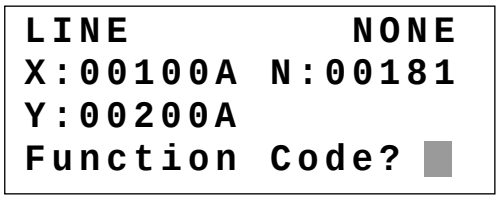
R. By using the digit keys, input the stitch width and press ENTER↵key.
(For example, if you set up the stitch width as 3mm, input [0][3][0].)



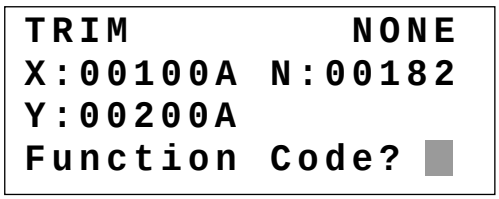
S. By using direction key, move to the another coordinates in turns that passes through line, then press PNT SET key.
At this time the number on screen increases whenever you press PNT SET key.



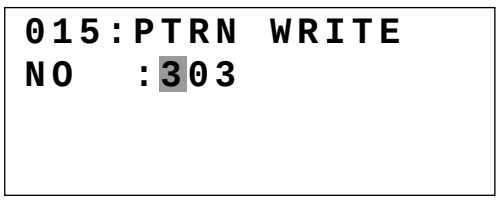
T. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

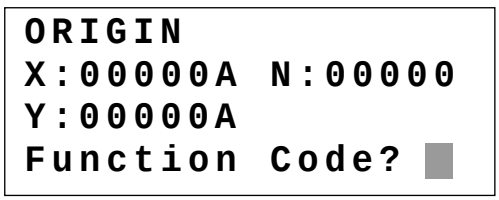


U. By pressing TRIM key, input the code for trim. Then, after appearing "00:TRIM" on the screen for a moment, then a screen of the right side appears.

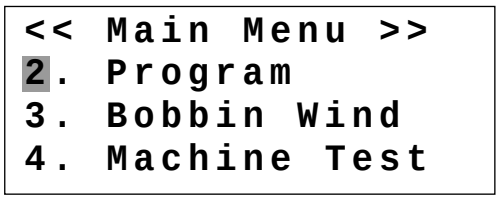


V. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER↵key. Save the generated pattern data in a floppy diskette as a relevant number.
(For example, if you want to save the pattern number as 303, input [3][0][3].) During saving the pattern, the READY LED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



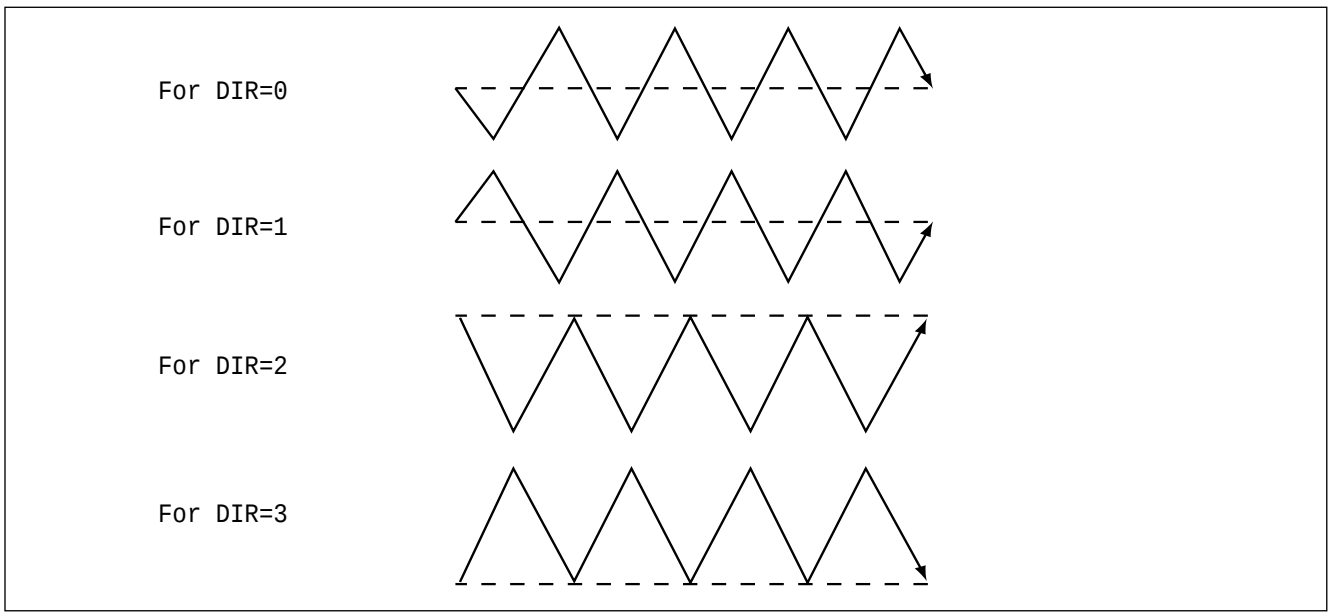


W. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.



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

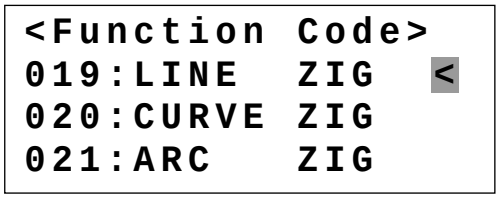
D. After pressing JUMP key, move to the coordinate (for example:X:-0650 Y:00000) to locate by using direction key. Then, press PNT SET key.

```
JUMP
X:-0650A
Y:00000A
N:001
```

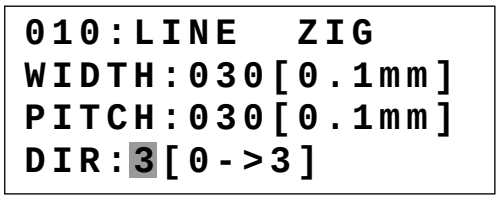
E. If you press EXE key, after calculation on pattern data, feed plate moves according to the calculated data.

```
JUMP          NONE
X:-0650A  N:00000
Y:00000A
Function Code?
```

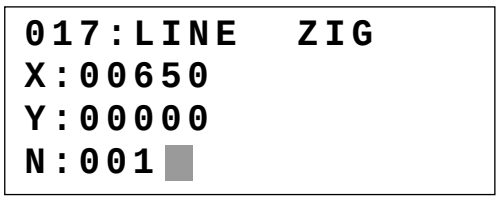
F. After pressing CODE key, if you know the function number related to pattern programming, input three figure digit number and if you do not know the number, press ENTER↵key. Then after moving to "019: LINE ZIG" menu by using direction key, press ENTER↵key.



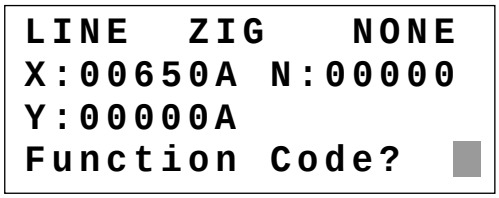
G. Input ZigZag width by using digit key, press ENTER↵key and input ZigZag stitch width. Then, press ENTER↵key and input DIR value by using digit key to select ZigZag shape to create. And press ENTER↵key.



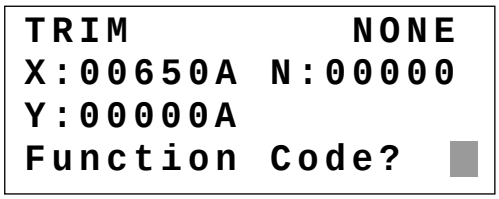
H. Move ZigZag line (Ex: X: 00650 Y: 00000) to the last sewing coordinate by using direction key again and press PNT SET key.



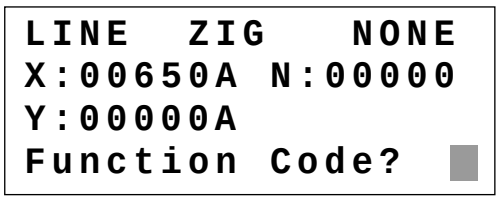
I. If you press EXE key, after calculation on pattern data, feed plate moves according to the calculated data.



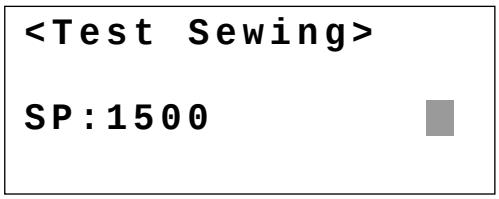
J. Input thread trimmer key by pressing TRIM key. Then "00:TRIM" screen appears for a second and then the screen like the figure in the right side appears again.



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.

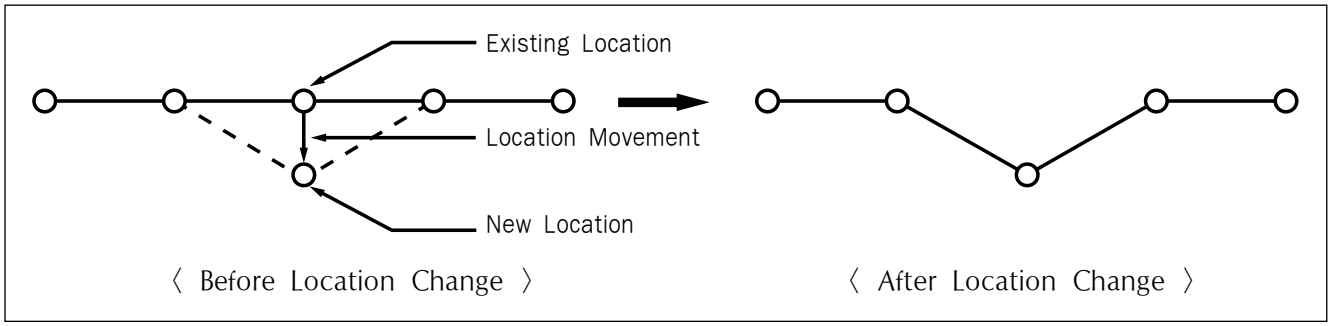


M. The order of saving and completion is the same as the previous example.

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:00000A N:00000
Y:00000A
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:-0001A N:00059
Y:00000A
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:-00001
Y:-00060
N:000
```

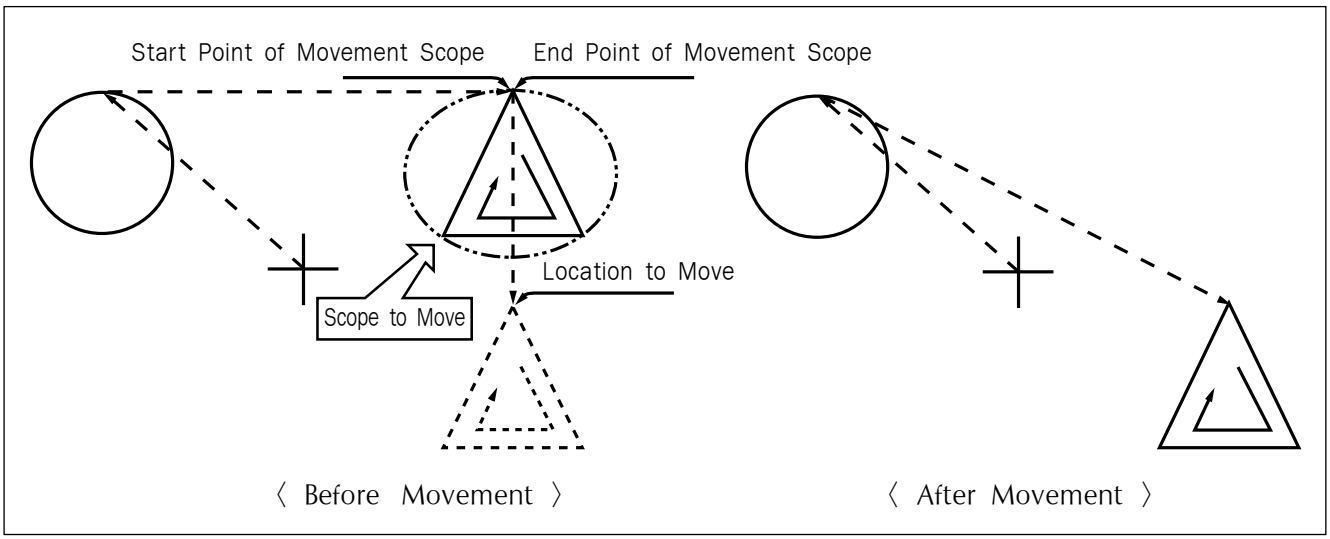
H. If you press EXE key, change to new needle location is completed.

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

```
LINE
X:-0001A N:00059
Y:-0060A
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.

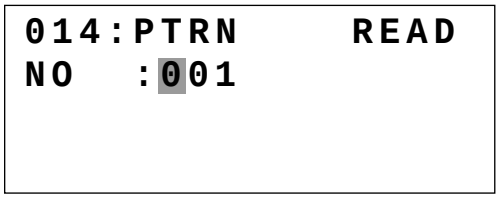
B. Press MODE key.

```
<< 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.

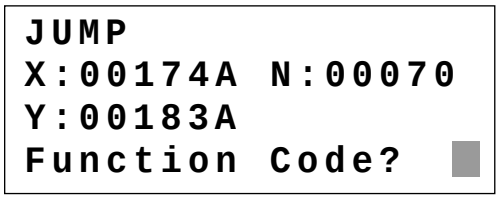
```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

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.)

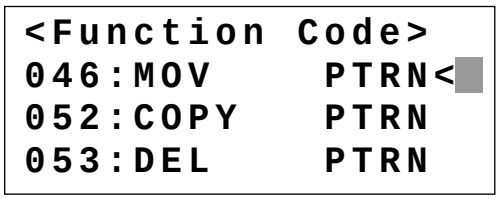


E. Go to the needle location to partially move by using FORW and BACK key.

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.

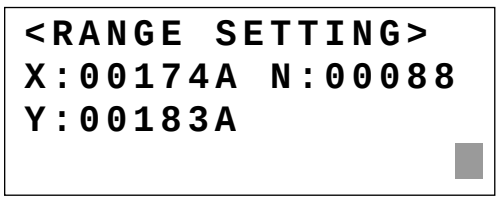


F. After pressing CODE key, if you know the function number related to pattern programming, input three figure digit number 046, but if you do not know the number, press ENTER↵key. Then after move to "046:MOV PTRN" by using direction key ▲▼, press ENTER↵key.

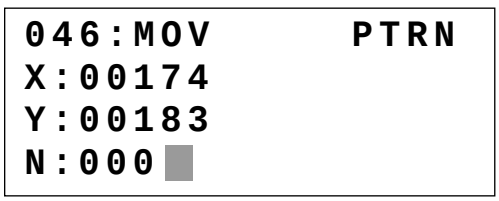


G. Go to the last location of pattern to move by using FORW key.

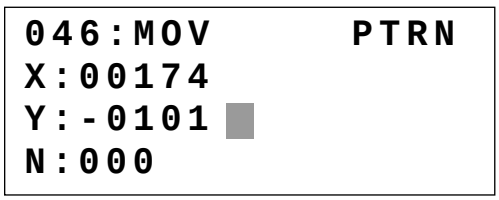
※ The indicated values are different according to current location.



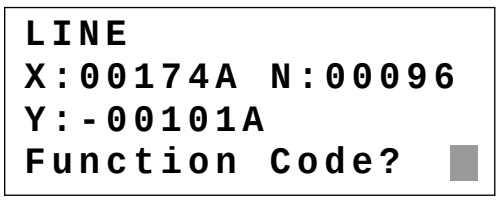
H. If you press EXE key, it becomes the state that the selected pattern for partial movement can move to the optional location.



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



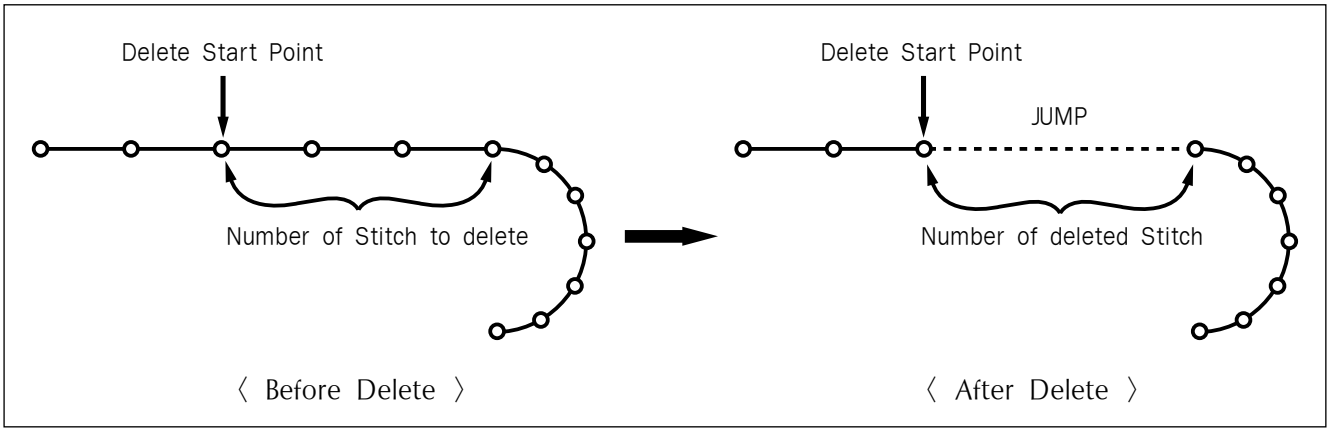
J. If you press EXE key, movement is completed.



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:00000A N:00000
Y:00000A
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:-0025A N:00059
Y:00000A
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.

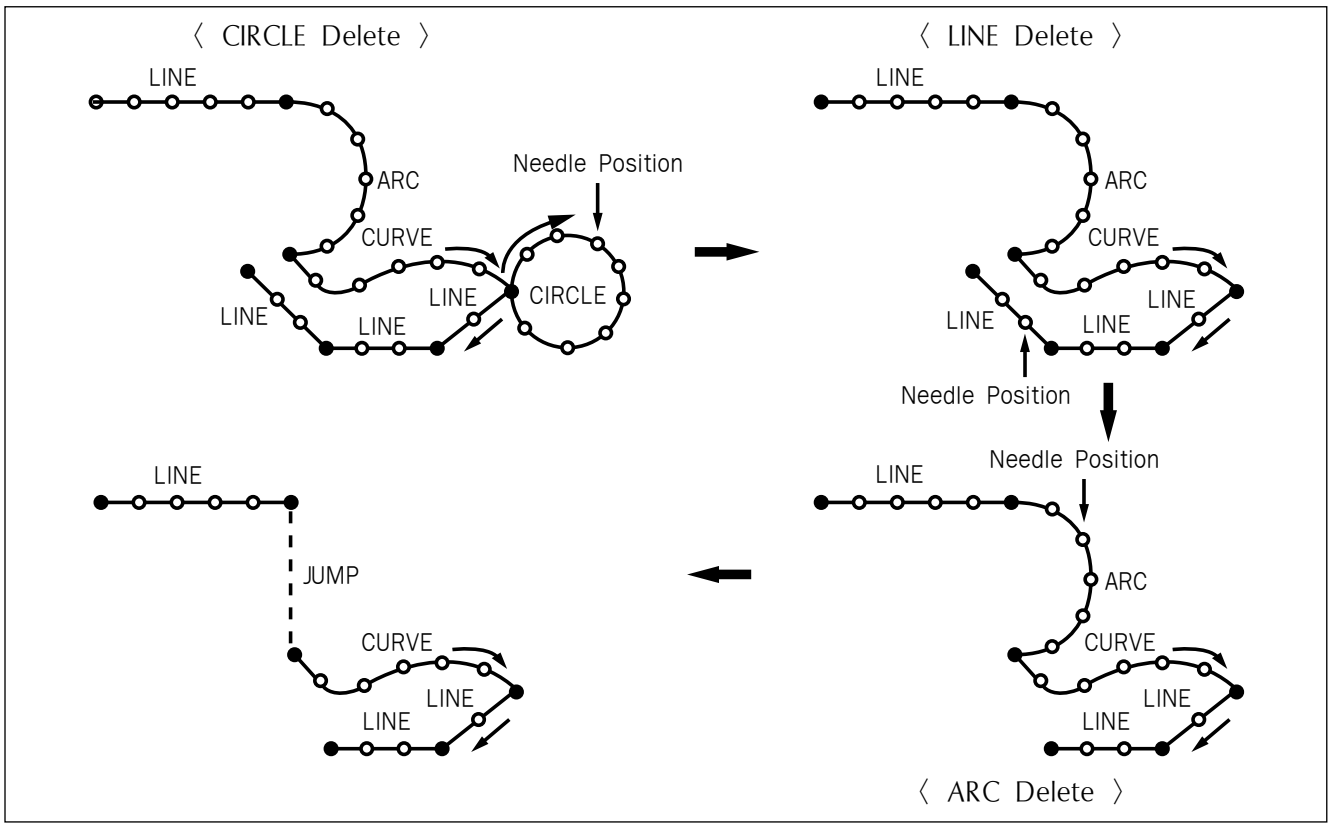
Reference) After deleting as much as the number of defined stitches, if end point and start point of two sewing data existing at both sides do not match and have distances, a jump is automatically made between the two sewing data. If you want to input automatic thread trimming, you can set up at "057:AUTO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

```
TRIM
X:-0233A N:00033
Y:00120A
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

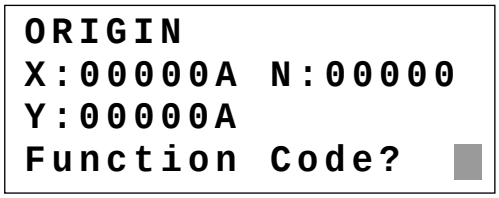
Delete one of the generated pattern data shapes selectively (For example: Jump, Line, Curve, Arc, Circle).



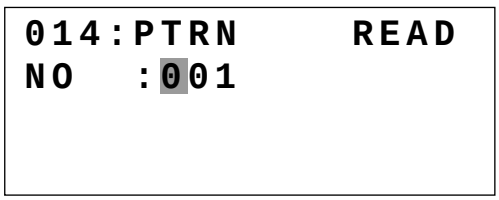
A. Insert floppy diskette containing the partial pattern to delete.

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.

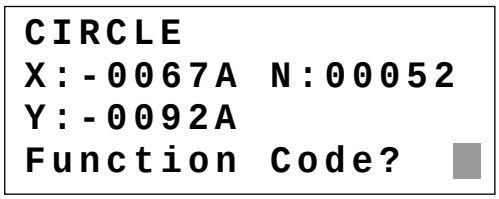


D. After pressing READ key, input the pattern number to delete partial pattern by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001).



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

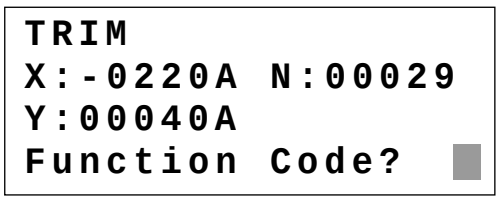
※ X-Y coordinate value is different according to needle location.



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".

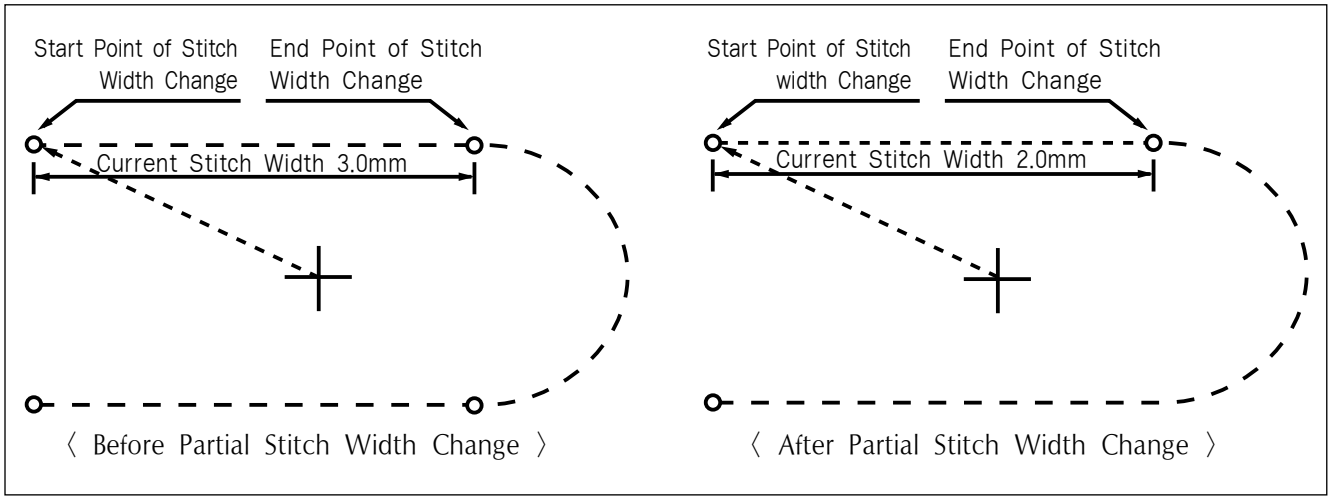


H. Confirm if desired partial pattern shape was deleted by using FORW and BACK key. (Line is deleted by once.)

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:00000A N:00000
Y:00000A
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:-0070A N:00021
Y:00140A
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.

```
<Function Code>
013:STI     WIDT<
014:PTRN    READ
015:PTRN   WRITE
```

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

```
013:STI       READ
WIDTH:020[0.1mm]
```

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

```
<RANGE SETTING>
X:00142A N:00029
Y:00089A
```

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

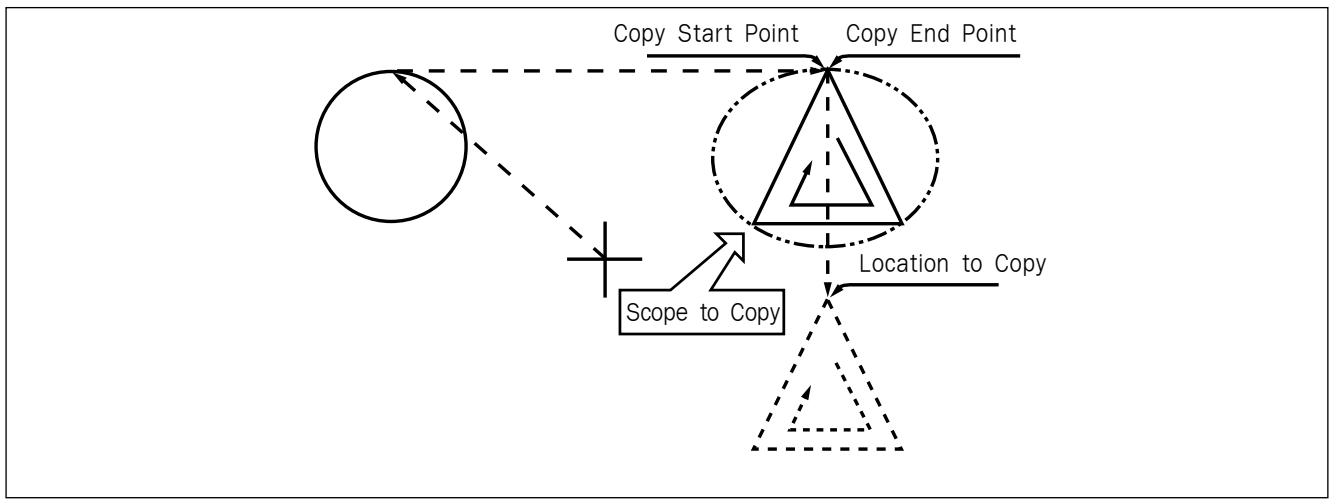
※ X-Y coordinate values are different according to current location.

```
ARC
X:00133A N:00052
Y:00061A
Function Code?
```

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

2-6) Pattern Partial Copy Function

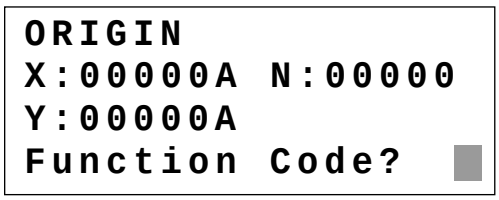
Set a fixed part of pattern shape and copy to desired location.



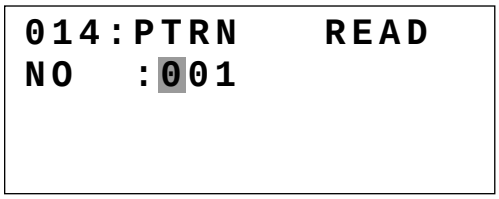
A. Insert floppy diskette containing partial pattern to make partial copy.

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.

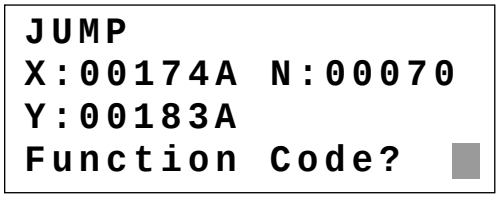


D. After pressing READ key, input the pattern number to copy partial pattern by using digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern number 001.)

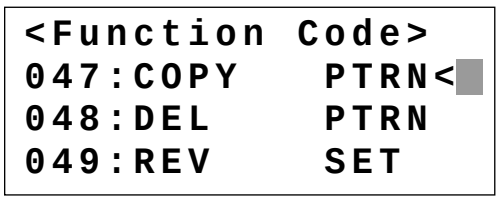


E. Go to copy start location by using FORW and BACK key.

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.

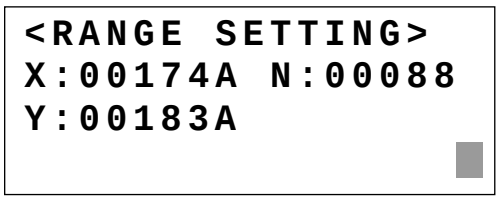


F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 047, and if you do not know the number, press ENTER↵ ey. Then, after moving to "047:COPY PTRN" by using direction key ▲ ▼, press ENTER↵ key.

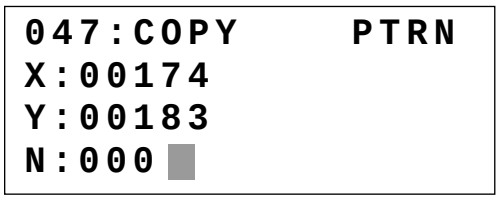


G. Go to the copy completing location of pattern by using FORW key.

※ 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:00174
Y:-0133
N:000
```

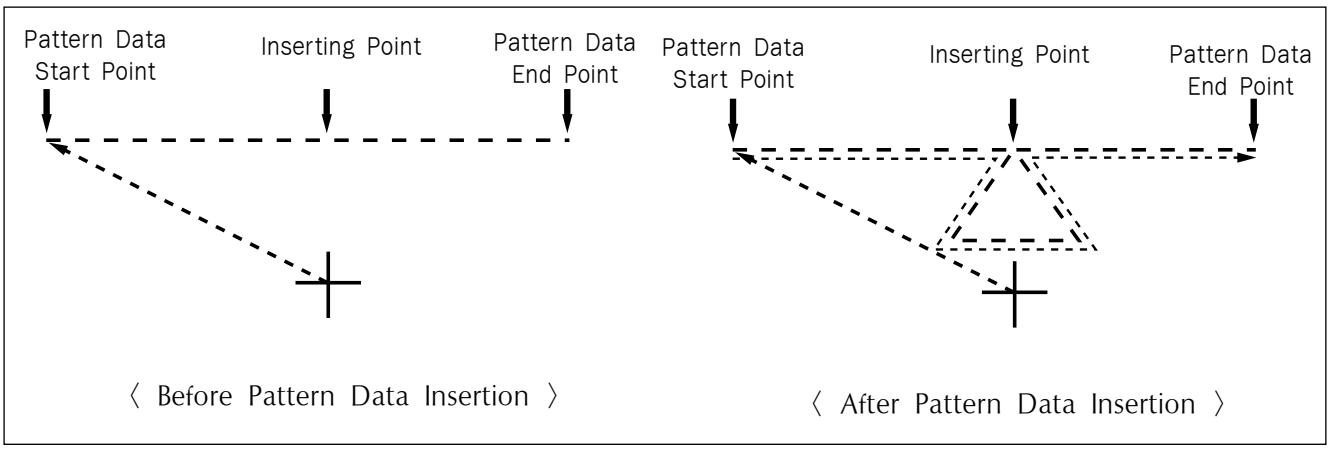
J. If you press EXE key, copy is completed.

```
LINE
X:00174A  N:00088
Y:00183A
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.



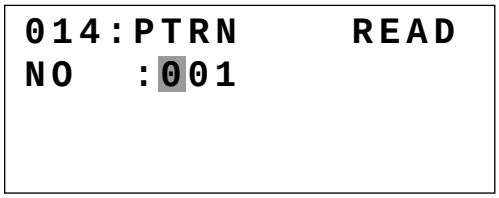
A. Insert floppy diskette containing the pattern to insert.

B. Press MODE key.

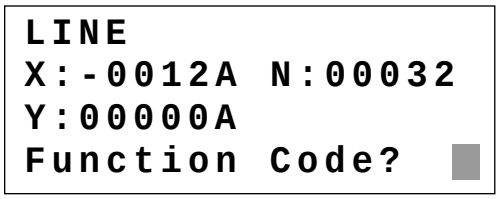
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.

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

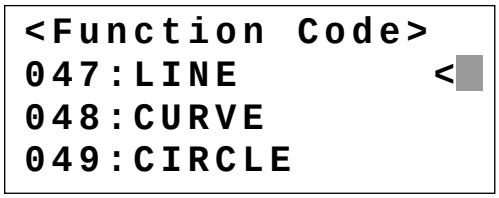
D. After pressing READ key, input the pattern number to insert pattern by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)



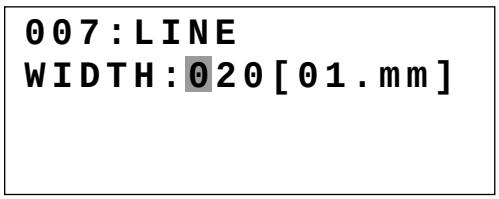
E. Go to the location of data to insert by using FORW and BACK key.



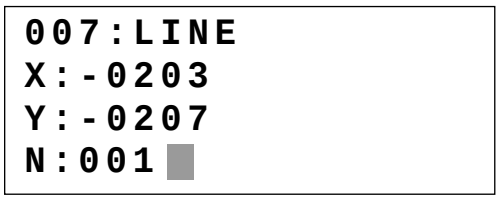
F. Select LINE of operation box (OP) of the function code to insert. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number and if you do not know the number, press ENTER↵key. Then after selecting the function number by using direction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



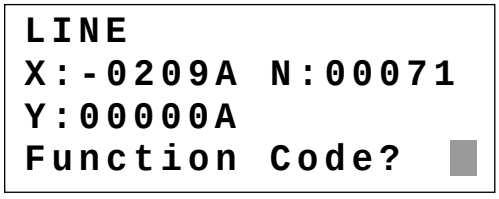
G. Input stitch width and press ENTER↵key.



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.



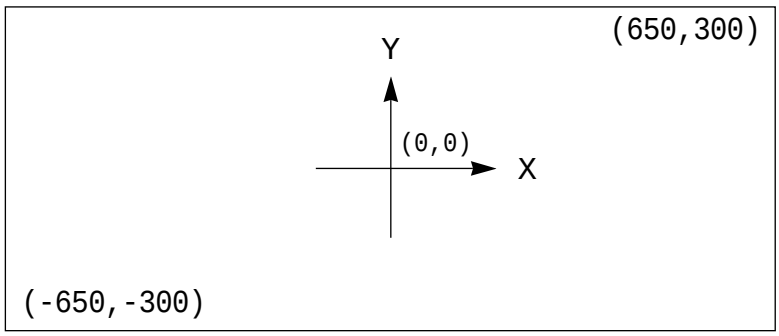
J. Confirm if new pattern data was inserted properly by using FORW and BACK key.

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.

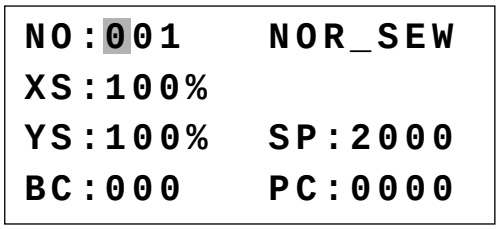
D. The upper feed plate comes to descend and moves to the origin or sewing start point then ascends. READY LED lights up.

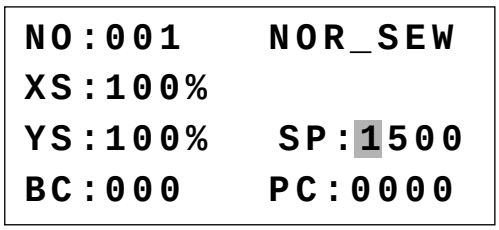
E. Press SPEED key to adjust speed properly.

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.



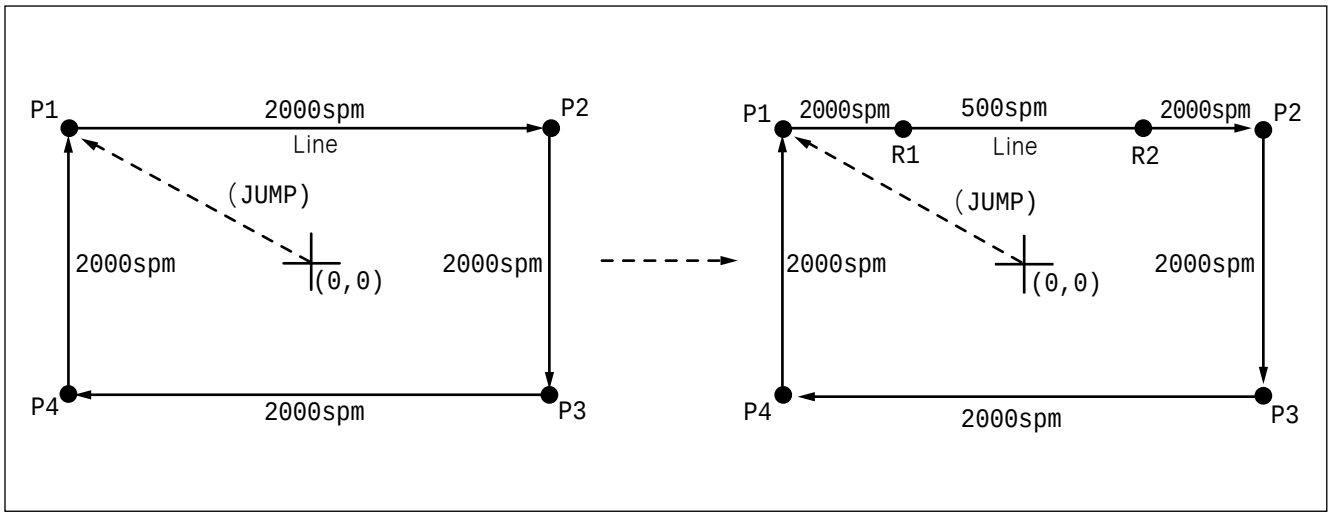


3-2) Program Example 5 : Change of Sewing Speed Within a Pattern

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
```

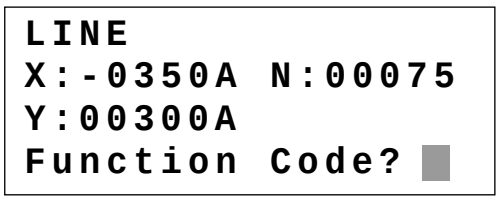
```
ORIGIN
X:00000A N:00000
Y:00000A
Function Code?
```

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

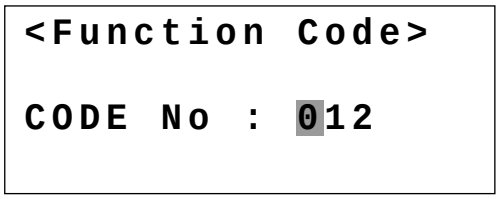
```
014:PTRN   READ
NO  :500
```

(2) Setting up the Range of Sewing Speed Change

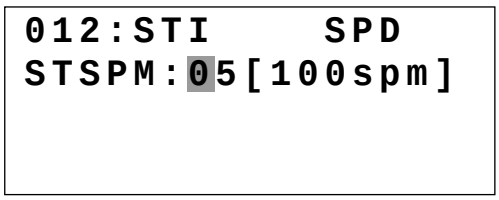
A. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



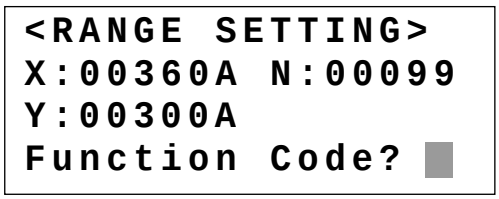
B. After pressing CODE key,
input three digit numbers if you know the pattern programming related function code, but if you don't know it press ENTER↵key and move to the "012: STI SPD" by using direction keys ▲ ▼, then press ENTER↵ again.



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

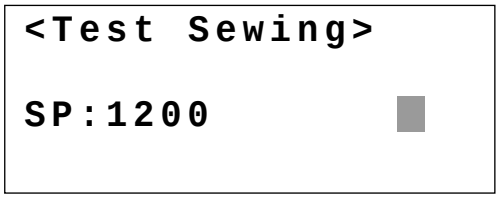


D. By using FORW, BACK keys, move to the end point (R2) of section that the sewing speed is supposed to change.
Then after pressing PNT SET key, press EXE key.

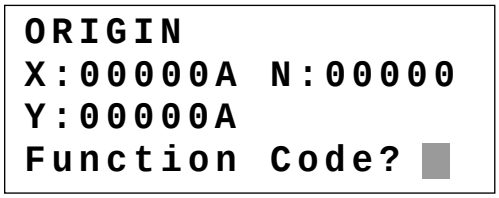


(3) Test Sewing

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

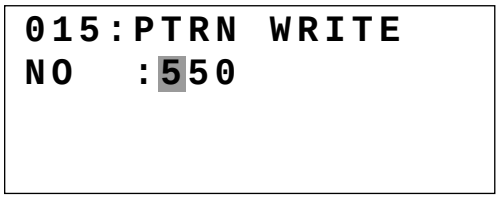


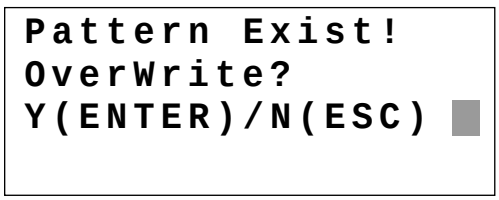
B. By pressing TEST key, complete the test sewing. The upper feed plate descends and moves to the origin, then READY LED turns off.

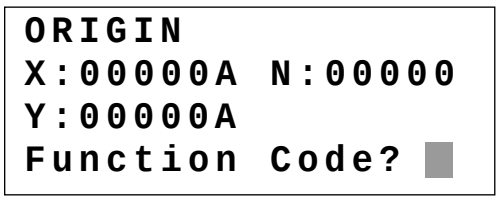


(4) Saving as New Pattern Number

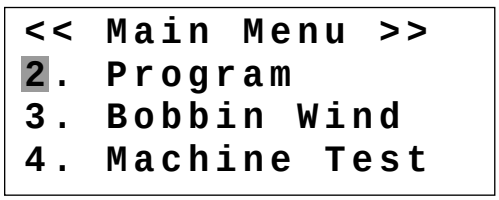
A. After pressing WRITE key, input the number you want to save by using digit keys. then press ENTER↵key. Save the generated pattern data in a floppy diskette as a relevant number. (For example, if you want to save the pattern number as 550, input [5][5][0].) During saving the pattern, the READY LED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



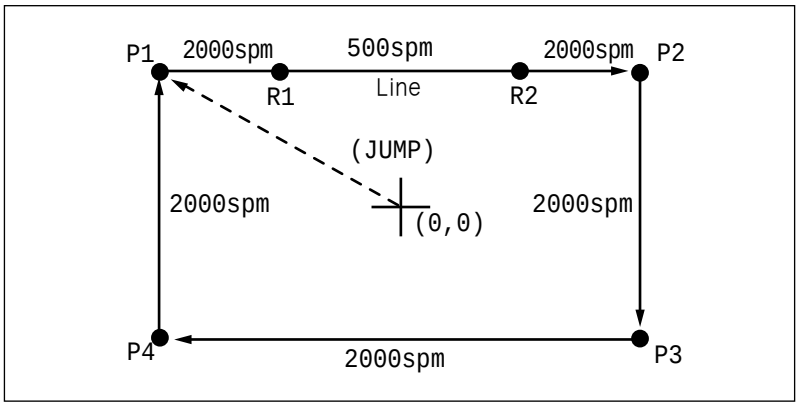




B. For finishing pattern generation, press MODE key. Then the upper feed plate moves to the origin and ascends. Press ESC key to back to the initial screen.



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

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

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

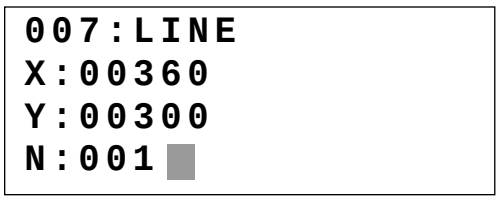
E. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data.

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

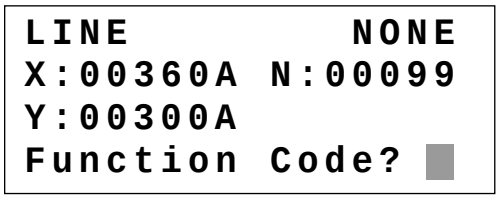
F. After pressing LINE key, input the stitch width by using digit keys, then press ENTER↵key. (For example, if you want to set up the stitch width as 3mm, input [0][3][0].)

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

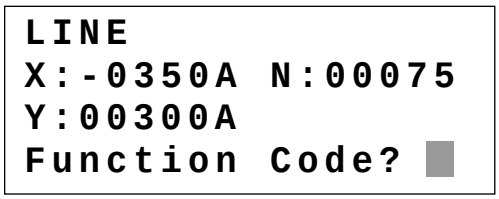
G. By using direction keys, move to the end point(R2) of section that the sewing speed is supposed to change and press PNT SET key.



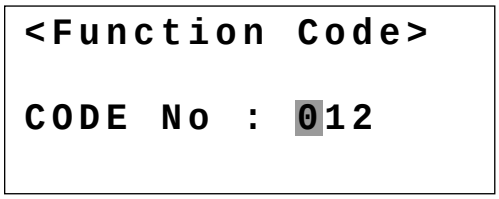
H. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the data.



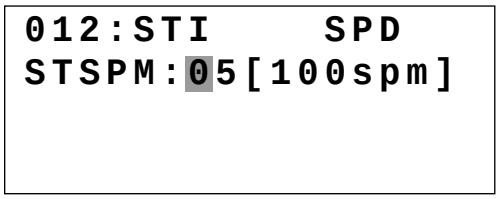
I. By using FORW, BACK keys, move to the start point (R1) of section that the sewing speed is supposed to change.



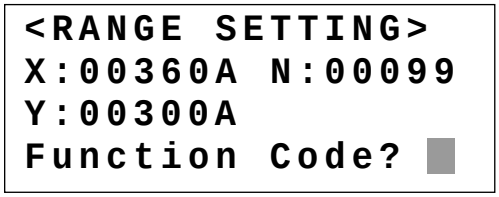
J. After pressing CODE key, input the three digit numbers if you know the pattern programming related function code, but if you don't know it, press ENTER↵key and move to "012. STI SPD" by using direction keys ▲ ▼, then press ENTER↵key.



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.

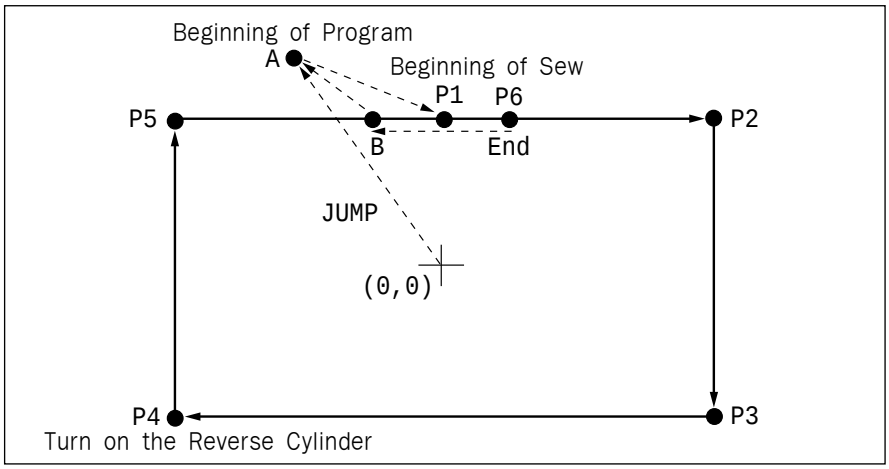
N. After performing test sewing, store the programmed pattern with new number.

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.

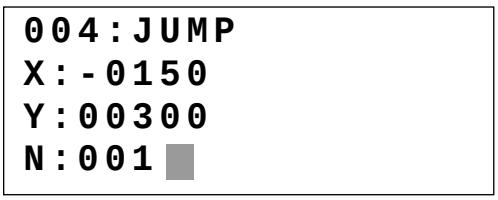
B. Press MODE key.

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.

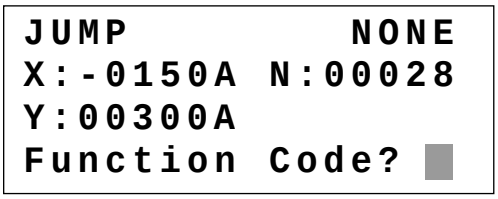
```
<< Main Menu >>
2. Program
3. Bobbin Wind
4. Machine Test
```

```
ORIGIN
X:00000A N:00099
Y:00000A
Function Code?
```

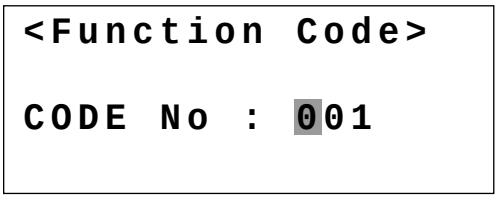
D. After pressing JUMP key, move to the A point by using direction key. Then press PNT SET key.



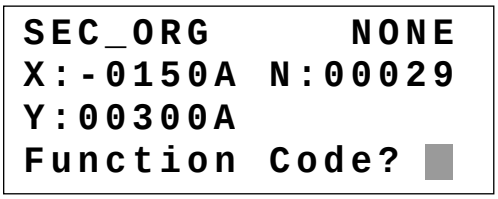
E. By pressing EXE key, the feed plate moves according to the operated pattern data after operating the pattern data.



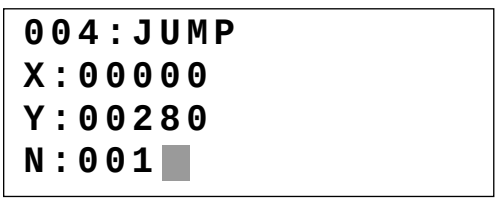
F. After pressing CODE key, set up the second origin by pressing [0][0][1] with digit keys.



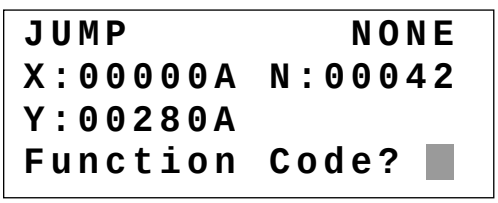
G. Press ENTER↵key.



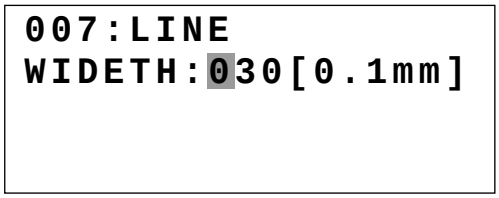
H. After pressing JUMP key, move to the sewing start point P1 by using direction keys. Then press PNT SET key.



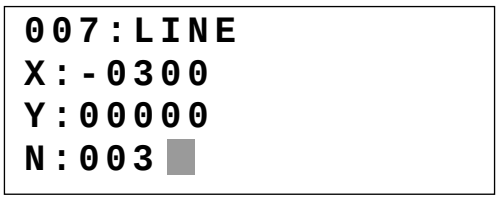
I. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



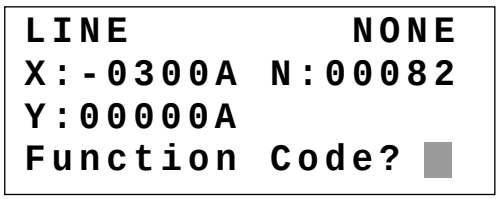
J. After pressing LINE key, input the sewing width by using digit keys, then press ENTER ↵key.(For example, if you set up the stitch width as 3mm, input [0][3][0].)



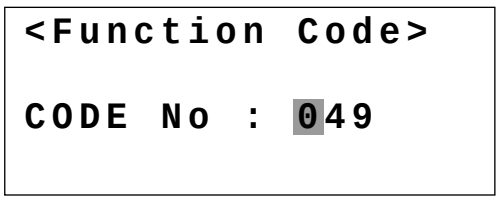
K. Move to P2, P3, P4 by using direction keys, then press PNT SET to input coordinates of each edge.



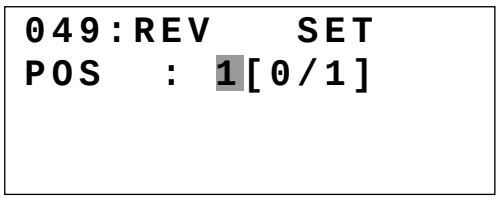
L. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.



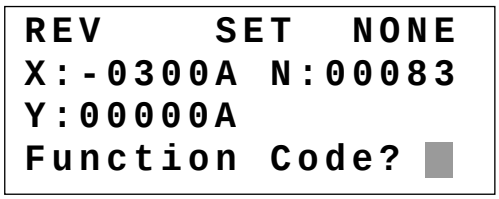
M. After pressing CODE key,
input an order for reversal by pressing digit keys, [0][4][9].



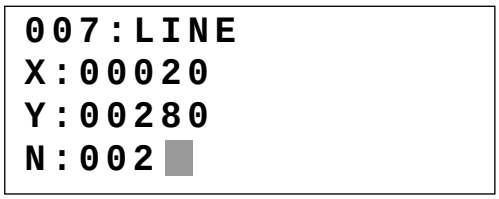
N. Press ENTER↵key.
After pressing digit key 1, press ENTER↵key to operate the reversal cylinder.



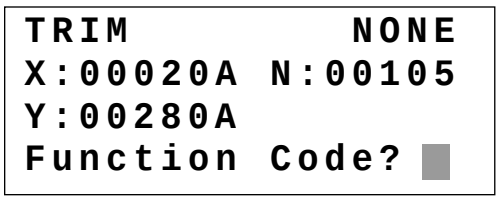
O. After checking for sure, input the code for reversal once again by pressing ENTER↵key.



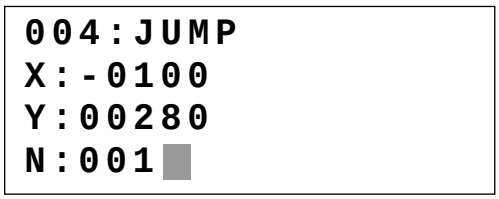
P. By using LINE key, make program the other two points, P5, P6



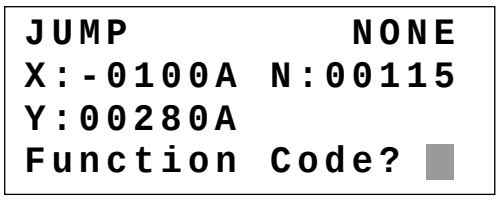
Q. By pressing TRIM key, input the code for trim. "000:TRIM" appears on the screen for a while, then replace it with the screen of the right side.



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

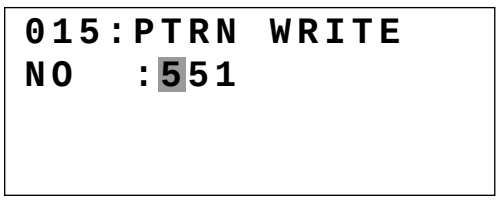


S. By pressing EXE key, the feed plate moves according to the operated data after operating the pattern data.

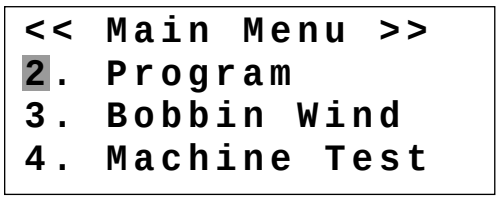


T. Perform test sewing.

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.



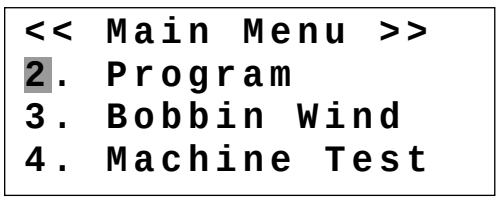
3-3-2) Adding the Code to Already Programmed Pattern

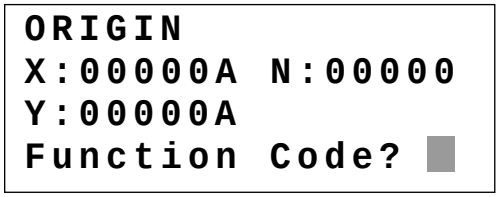
(1) Reading the Pattern that does not have Code for Reversal

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

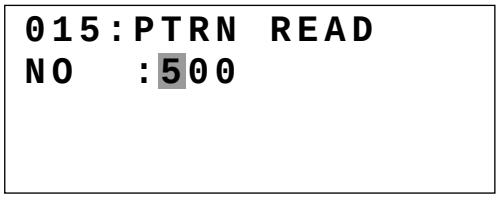
B. Press MODE key.

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.



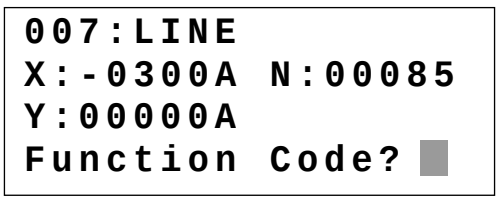


D. After pressing READ key, input the pattern number that sewing speed is supposed to change, then press ENTER↵key to read the pattern.
(For example, input [5][0][0] to read pattern number 500.)

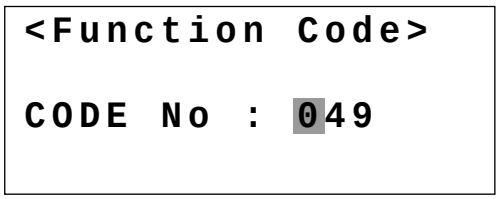


(2) Inserting the Code for Reversal

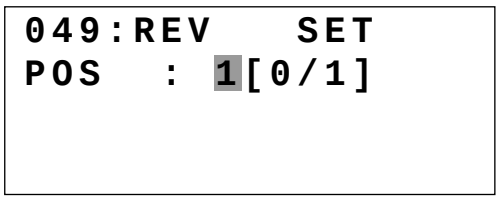
A. By using FORW, BACK keys, move to the point P4 that you want to add code for reversal.



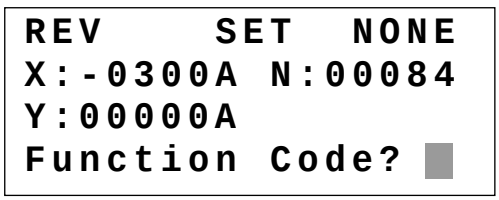
B. After pressing CODE key, input an order for reversal by pressing digit keys, [0][4][9].



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

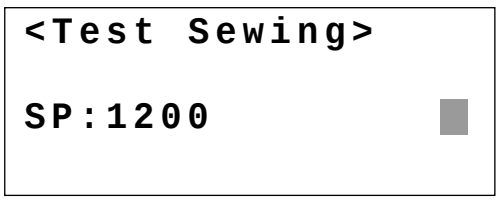


D. After checking for sure, input the code for reversal once again by pressing ENTER↵key.

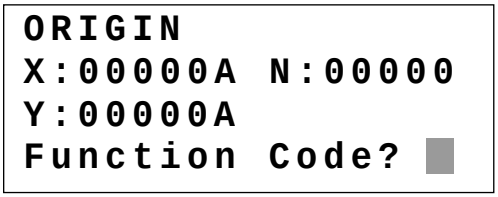


(3) Test Sewing

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.

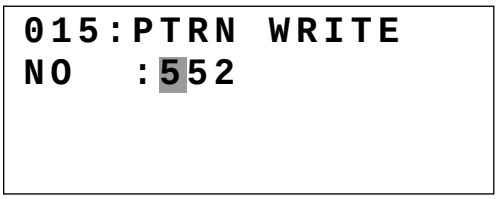


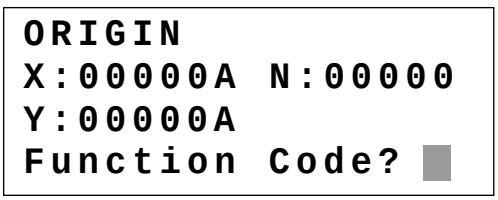
B. By TEST key, complete the test sewing.
The upper feed plate descends and moves to the origin, then READY LED turns off.



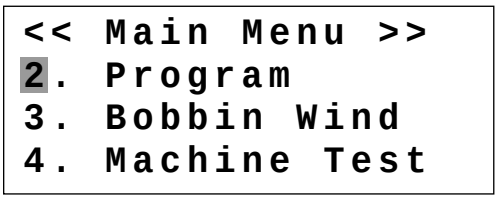
(4) Saving as New Pattern Number

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.



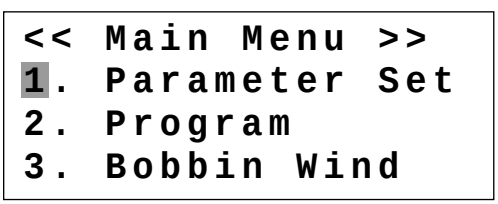
3-4) Using the Extension/Reduction Modes

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".

(1) Setting the Extension/Reduction Mode

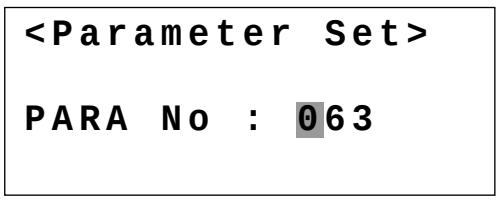
A. Press MODE key.

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

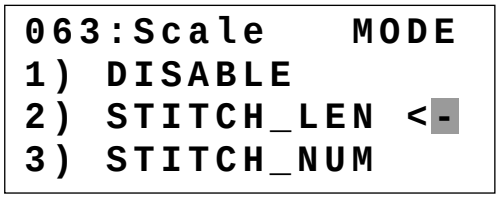


C. If you press ENTER↵, you can get the screen like a figure on the right side, then input [0][6][3].

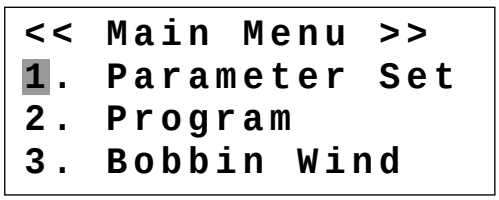
※ Appendix :
Refer "Parameter number related to general sewing."



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".

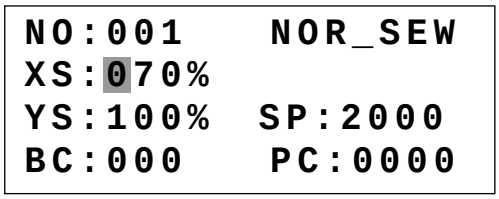


E. Press ENTER↵key.
Press ESC key to back to the initial screen.

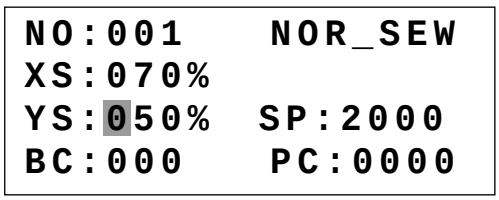


(2) Setting the Rate for Extension/Reduction

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

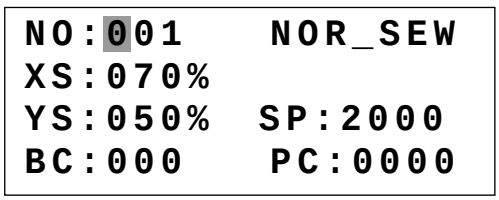


B. Press Y SCALE and set the rate you want. For example, if you want to reduce 50%, input[0][5][0].

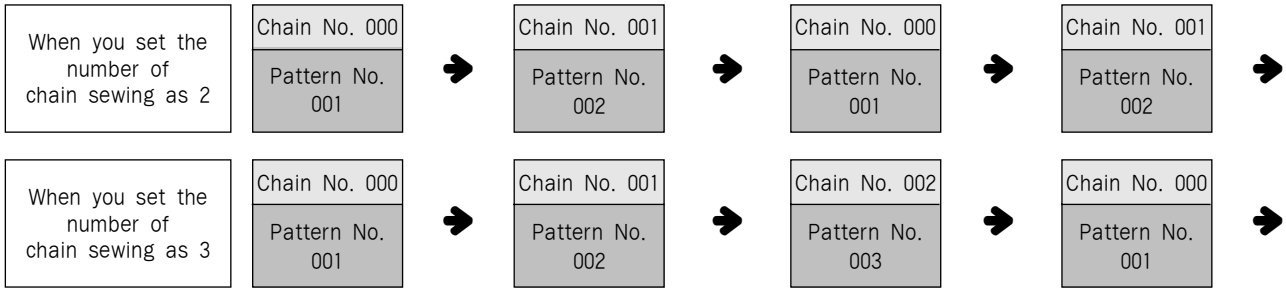


C. Press NO key and input the pattern number by using digit keys. (For example, if you want to work with "001" pattern, input [0][0][1].)

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 ▲ ▼.

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

C. If you press ENTER↵ key, you can get the screen like a figure on the right side, then input [0][6][4].

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

```
<Parameter Set>

PARA No : 064
```

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

```
064.Chain Number
    2
```

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][6][5].

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

```
<Parameter Set>

PARA No : 065
```

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.

```
065:Chain Select
1.MANUAL
2.AUTO          <-
3.EXTERNAL
```

G. 066. Chain Clamp Setting selects up or down of the clamp for chain work. In other words, if user conducts a chain work having four patterns, it is done in the order of 000, 001, 002, and 003. If '1) DISABLE' is chosen, when the first chain work of 000 is finished, it moves to 001 and the clamp ascends.
As such, when '1) DISABLE' is chosen, the move to the next pattern occurs, and then the clamp ascends.
If "2) ENABLE" is chosen, a cycle of a chain work is completed and the chain number returns to 000 to keep the clamp in the lifted position.

```
066:Chain Clamp
1.DISABLE       <-
2.ENABLE
```

```
066:Chain Clamp
1.DISABLE
2.ENABLE        <-
```

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

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

(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.

```
NO:001    CHN__00
XS:100%
YS:100% SP:2000
BC:000    PC:0000
```

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].

```
NO:001    CHN__00
XS:100%
YS:100%  SP:2000
BC:000    PC:0000
```

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

```
NO:001    CHN__00
XS:100%
YS:100%  SP:2000
BC:000    PC:0000
```

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.

```
NO:001    CHN__01
XS:100%
YS:100%   SP:2000
BC:000    PC:0000
```

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.

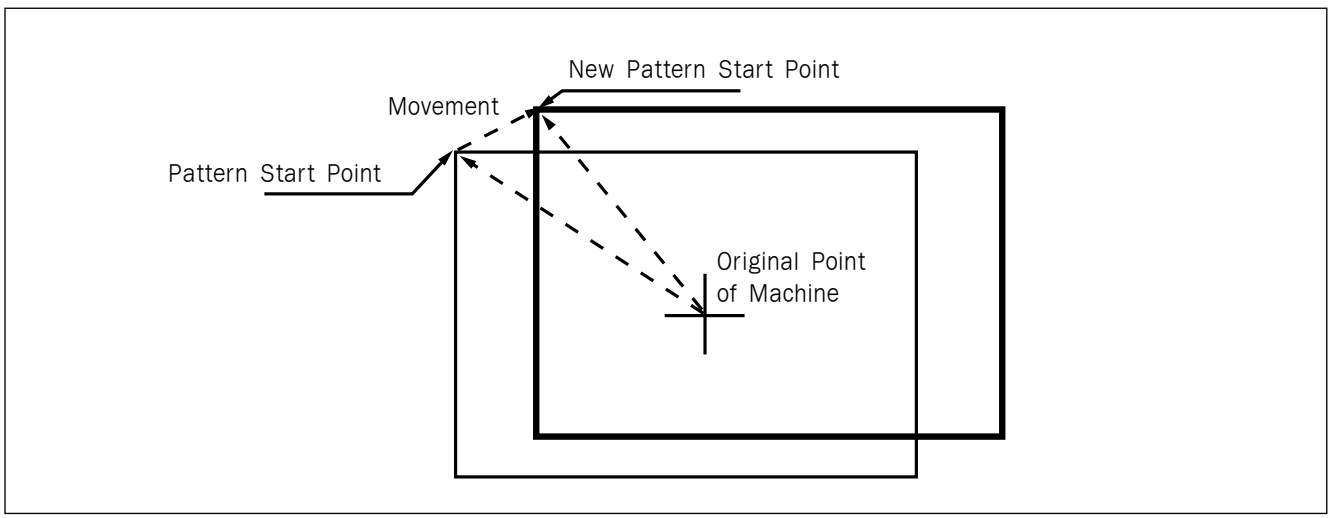
※ If you want to back to the general sewing mode from the chain sewing mode, set "054 Chain No." should be set to "0".

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

H. If the setting is conducted for all selected chains, press number keys and select the first CHN__00. Press ENTER↵ and return to the original position where the work was initially started for a new work.

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

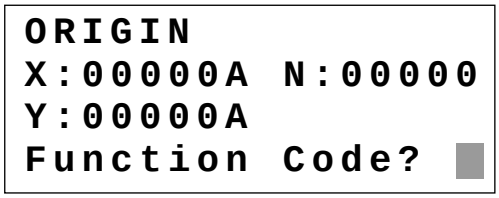
Change and save pattern data start point already set up when punching.



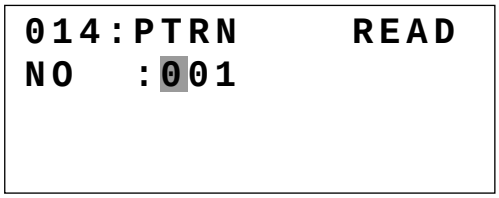
A. Insert floppy diskette containing the pattern to change start point.

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.

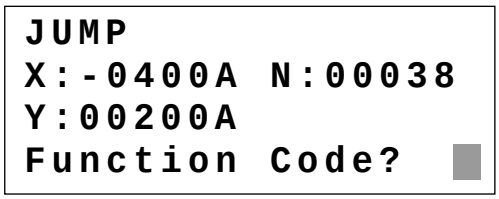


D. After pressing READ key, input the pattern number to change start point by using digit key and read in the pattern by pressing ENTER key. (For example, input [0][0][1] to read the pattern number 001.)



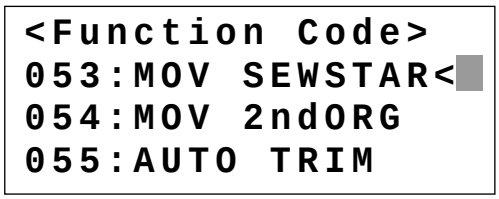
E. Go to sewing start point by using FORW and BACK key.

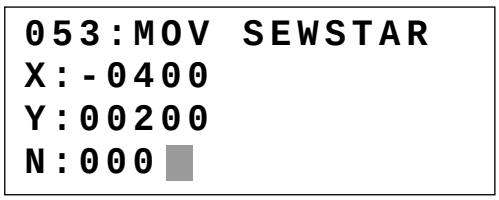
Reference) It does not matter if you place needle location to change start point at the optional location of actual sewing.



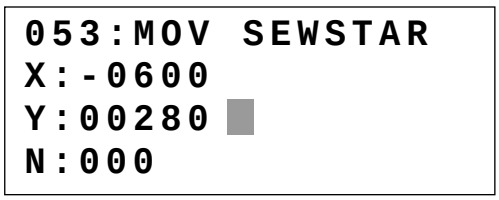
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 053, and if you do not know the number, press ENTER↵ key. Then, after moving to "053:MOV SEWSTRT" by using direction key ▲ ▼, press ENTER↵ key.

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

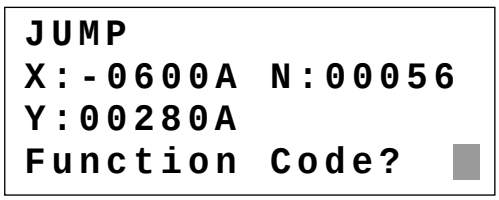




G. Move to new pattern start point by using direction key.

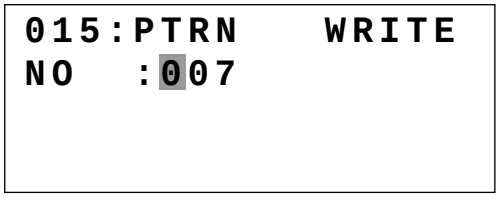


H. Complete input of new pattern start point by pressing EXE key.



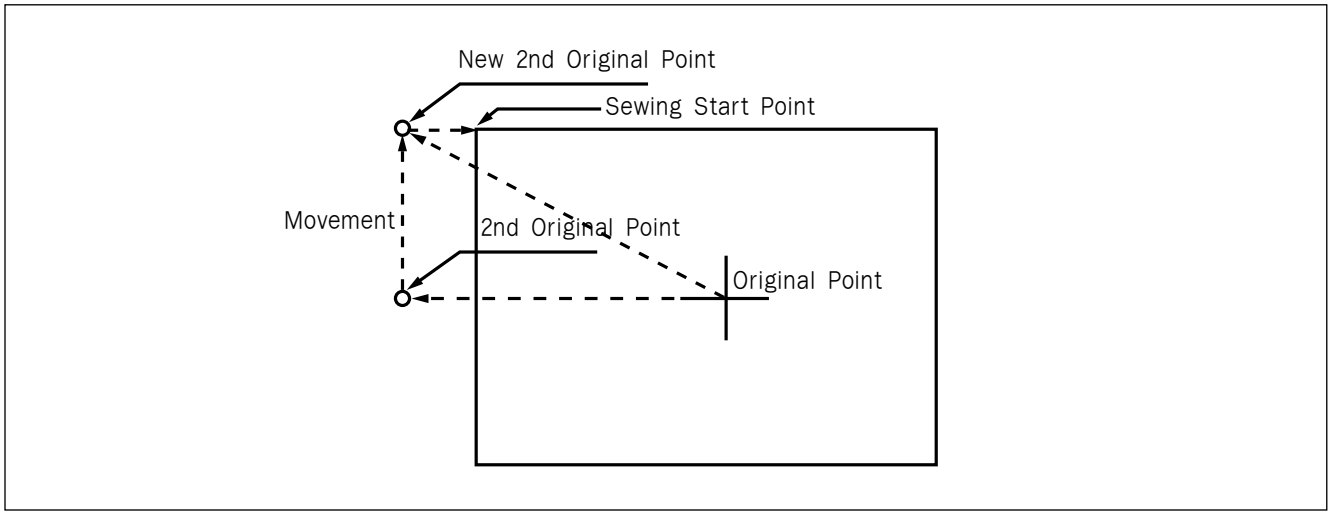
I. Confirm if change was made properly by using FORW and BACK key.

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:00000A  N:00000
Y:00000A
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.)

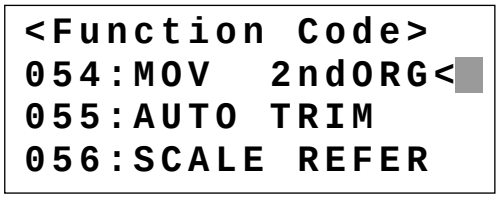
```
014:PTRN      READ
NO  :001
```

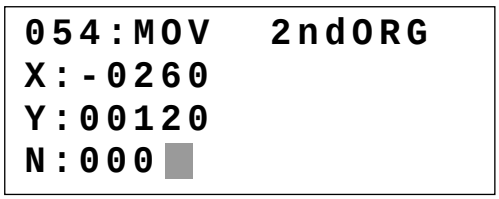
E. Go to the location of 2nd original point by using FORW and BACK key.

```
SEC_ORG       NONE
X:-0260A  N:00025
Y:00120A
Function Code?
```

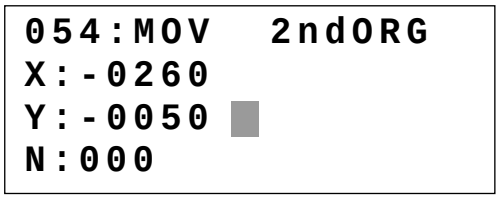
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 054 and if you do not know the number, press ENTER↵key. Then, after moving to "054:MOV 2nd ORG" by using direction key ▲ ▼, press ENTER↵key.

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

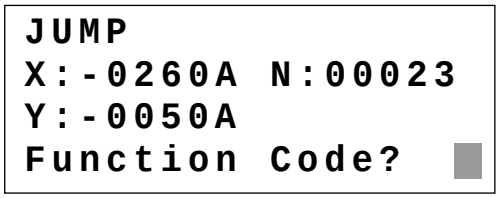




G. Move to new 2nd original point by using direction key.

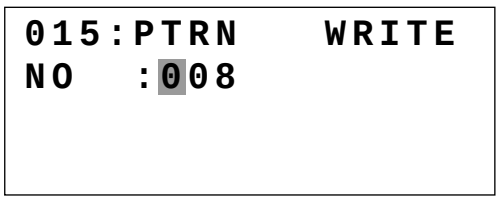


H. Complete input of new 2nd original point by pressing EXE key.



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.

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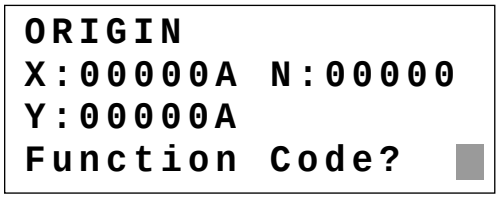
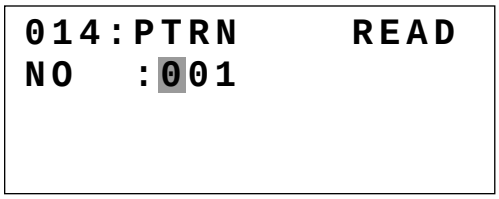
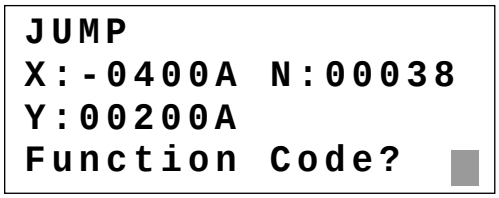
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.



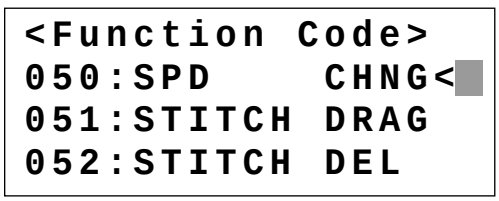
D. After pressing READ key, input the pattern number to change maximum sewing sped and extension/reduction rate by using digit key and read in the pattern by pressing ENTER↵key. (For example, input [0][0][1] to read the pattern number 001.)



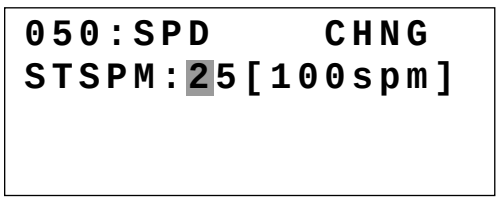
E. Go to pattern data start location by using FORW and BACK key.



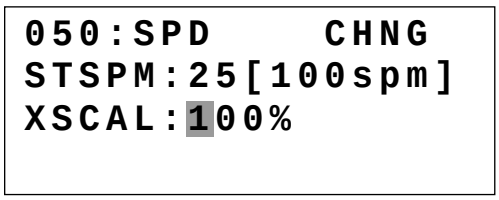
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 050 and if you do not know, press ENTER↵key. Then, after moving to "050:SPD CHNG" by using direction key ▲ ▼, press ENTER↵key.



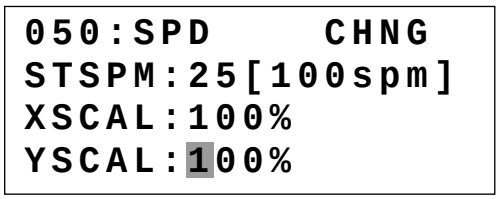
G. Input maximum sewing speed value STSPM and press ENTER↵key.



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.

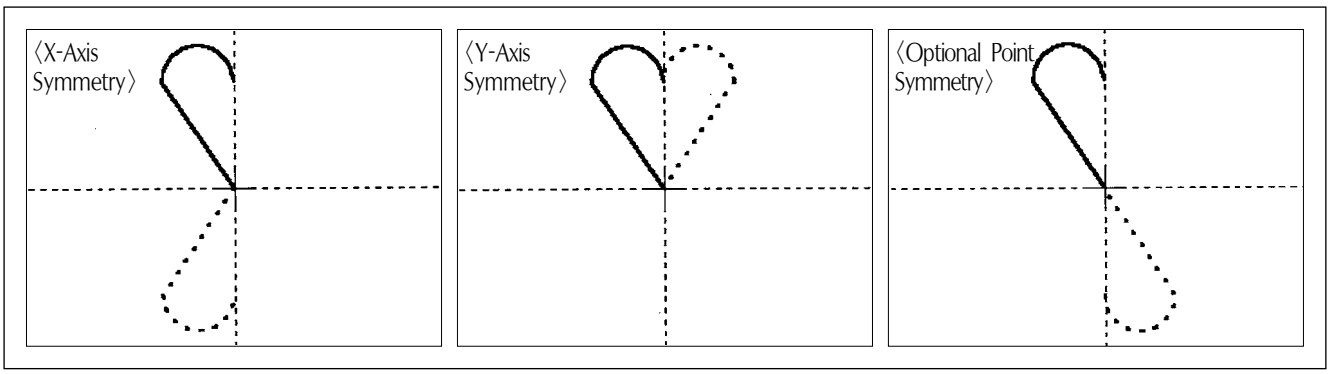


J. Save the pattern by pressing WRITE key.

```
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:00000A  N:00000
Y:00000A
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:-0060A  N:00005
Y:00059A
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

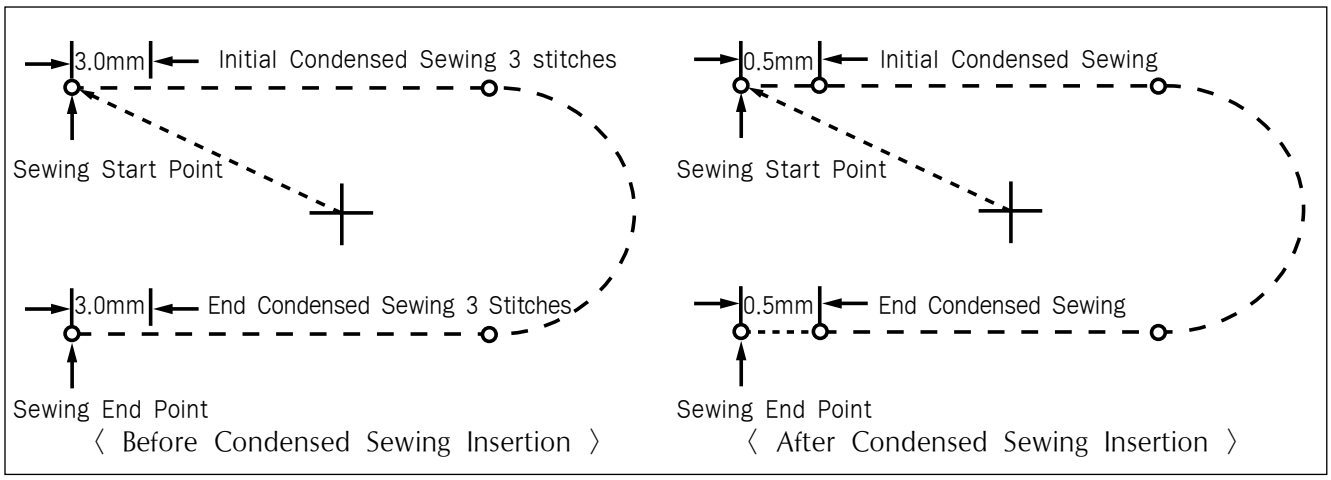
```
<Function Code>
043:SYMMETRY  X<
044:SYMMETRY  Y
045:SYMMETRY  P
```

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

```
CURVE
X:00000A N:00023
Y:00059A
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.



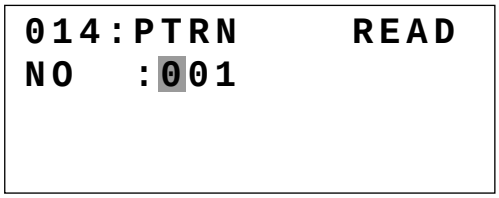
A. Insert floppy diskette containing the pattern to insert condensed sewing stitch.

B. Press MODE key.

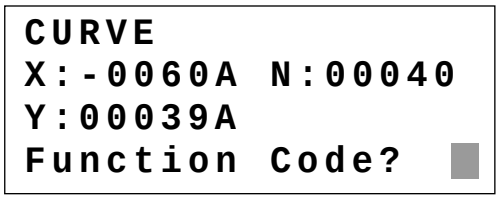
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵key. At this time, the upper feed plate comes down and moves to the original point.

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

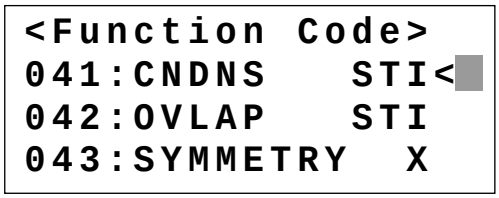
D. After pressing READ key, input the pattern number to insert condensed sewing stitch by using digit key and read in the pattern by pressing ENTER↵ey. (For example, input [0][0][1] to read the pattern number 001.)



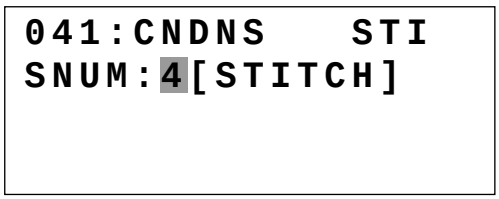
E. Go to pattern data end location by using FORW and BACK key.



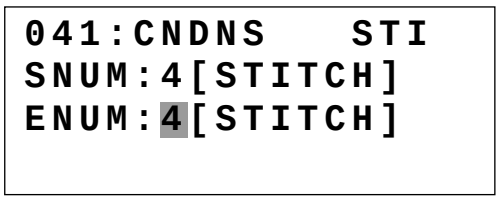
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 041 and if you do not know the number, press ENTER↵key. Then, after moving to "041:CONDNS STI" by using direction key ▲ ▼, press ENTER↵key.



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

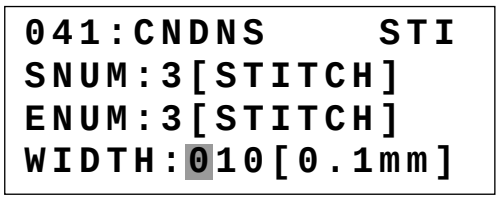


H. After inputting the number of final condensed sewing stitch(1~9 stitch), press ENTER↵key.

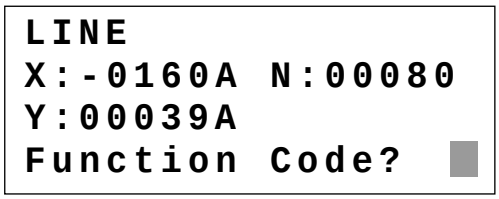


I. After inputting condensed stitch width, if you press EXE or ENTER↵Key, input of condensed sewing stitch is completed.

※ 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.

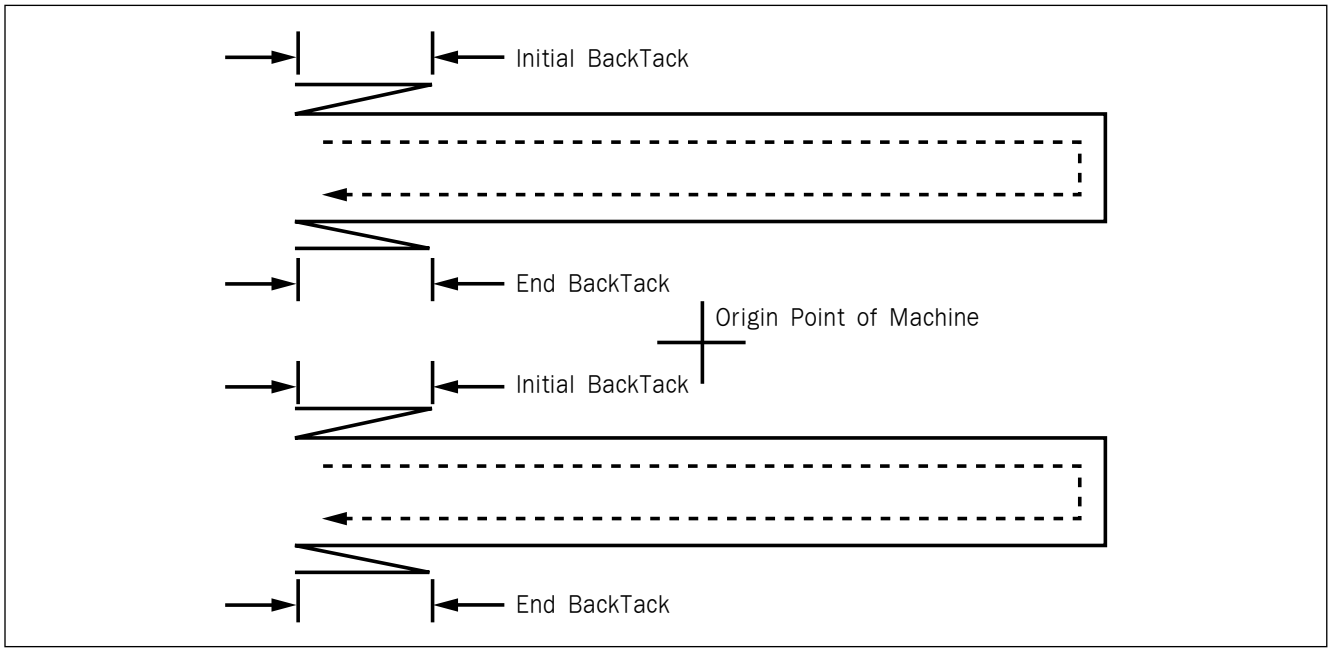


J. Confirm if the number of condensed sewing stitch was made properly by using FORW and BACK key.



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:00000A N:00000
Y:00000A
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:-0160A N:00040
Y:00039A
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.

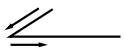
```
<Function Code>
040:BACK   TACK<
041:CNDNS  STI
042:OVLAP  STI
```

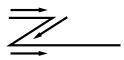
G. Input the number of back tack to insert and press ENTER↵key.

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

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

Mode Type

Mode 0: 

Mode 1: 

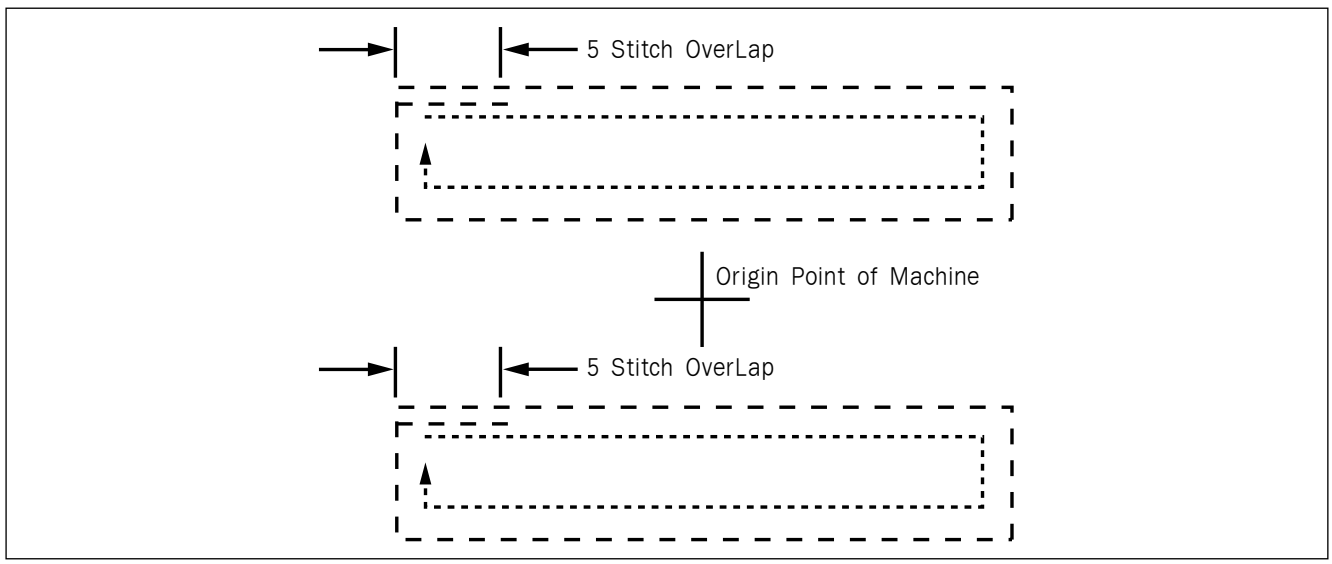
```
040:BACK    TACK
BTNUM:4[STITCH]
BTMOD:0[0/1]
```

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

```
LINE
X:-0160A N:00040
Y:00039A
Function Code?
```

3-12) OverLap Sewing Stitch Inserting Function

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

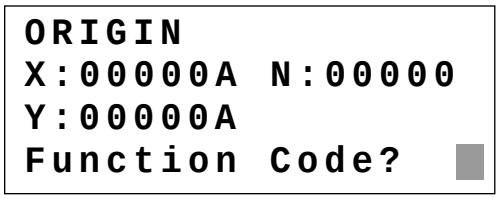


OverLap function can apply to the pattern design of closed roof that start point and end point meet.
Except, though it is not closed roof type of pattern and start point and end point have 1mm of distance, OverLap function can use.
Be able to select a maximum of 20 stitch.

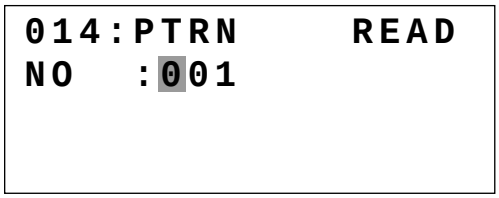
A. Insert floppy diskette containing the pattern to insert overlap sewing stitch.

B. Press MODE key.

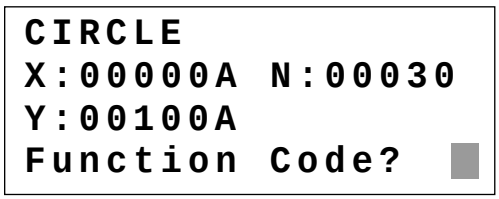
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.



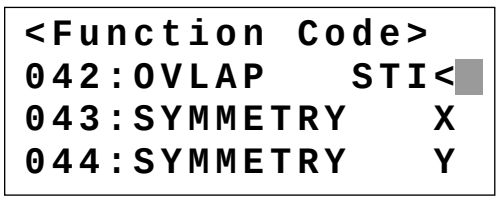
D. After pressing READ key, input the pattern number to insert overlap sewing stitch by using digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern number 001.)



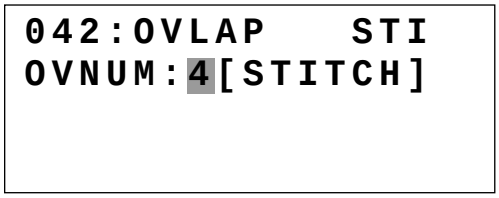
E. Go to the location that pattern data ends in order to apply overlap function by using FORW and BACK key.



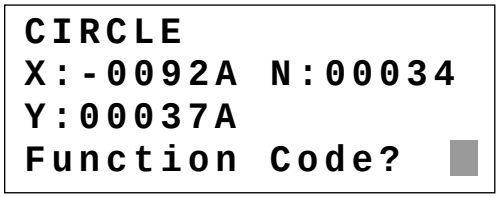
F. After pressing CODE key, if you know the function number related to pattern programming, input three-figure digit number 042 and if you do not know the number, press ENTER↵ key. Then, after moving to "042:OVLAP STI" by using direction key ▲ ▼, press ENTER↵ key.



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

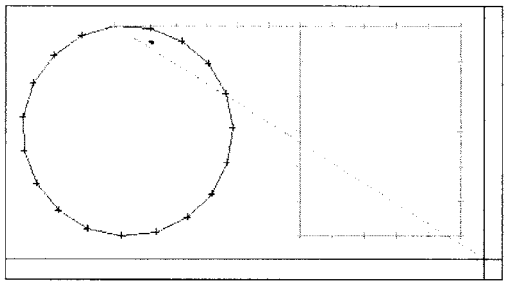


H. Confirm if back tack was made properly by using FORW and BACK key.

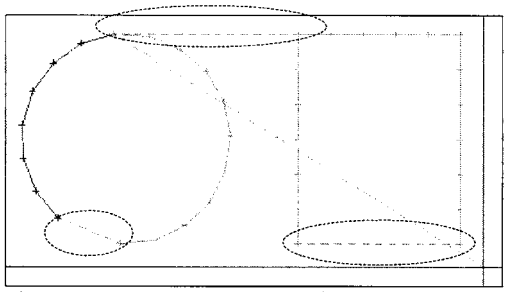


3-13) Automatic Insertion of Thread Trimmer Code when Deleting Stitches

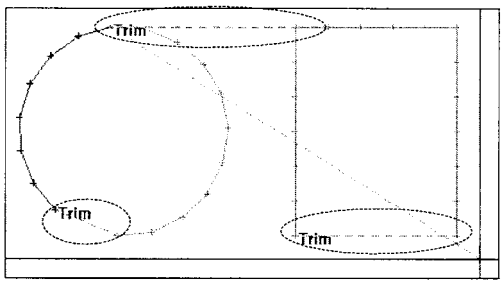
If the user deletes any section of pattern or the stitches, the user can define whether to insert thread trimmer code on the related location.



〈 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:00000A N:00000
Y:00000A
Function Code?
```

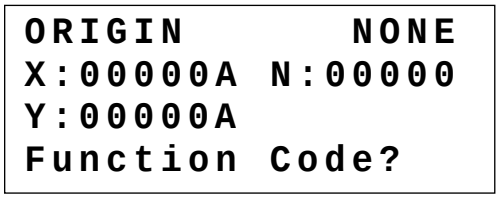
C. If the function code No. related to the pattern programming were known, enter three digits of number, 055. If not, press ENTER↵ and use direction key ▲ ▼ to move the cursor on "055: AUTO TRIM", and then press ENTER↵.

```
<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".

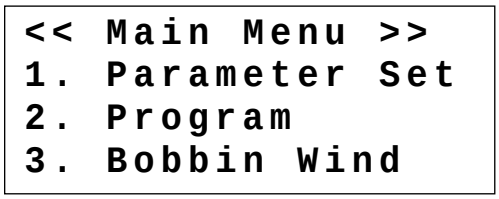


3-14) Setting-Up Reference Point for Zooming

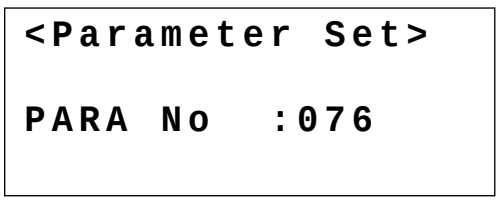
On the sewing mode, the user can zoom design based on machine origin, second origin, sewing starting point or user-defined reference point. However, the second origin and user-defined reference point must be set in the pattern design before zooming based on those reference points.

A. Press MODE.

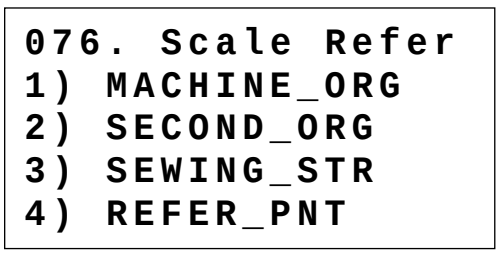
B. Use direction key ▲ ▼ to select "1. Parameter Set" menu.



C. Press ENTER↵ to open a screen shown on the right. Input [0][7][6] and press ENTER↵ to move onto the 076. 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. 076 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  :076
```

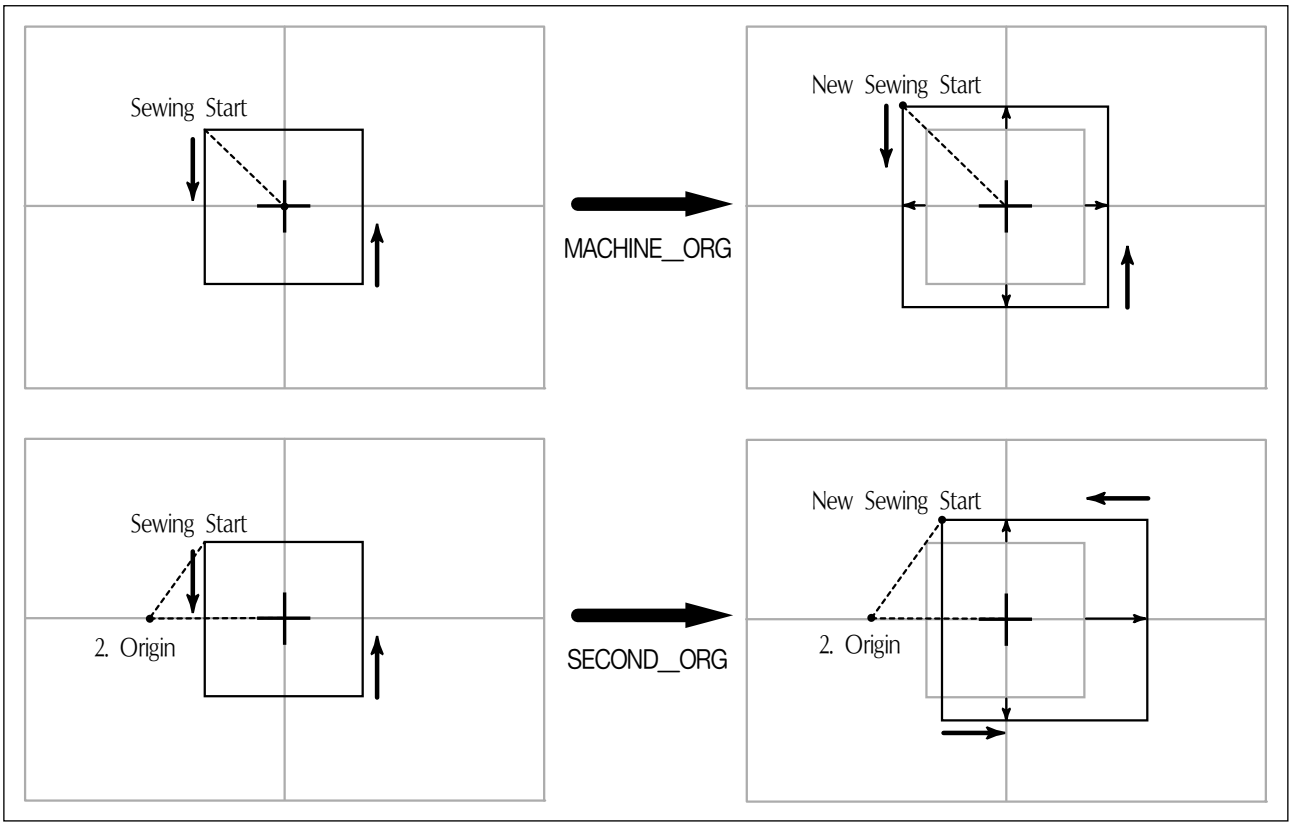
② Input 076 for the code No., and press ENTER↵.

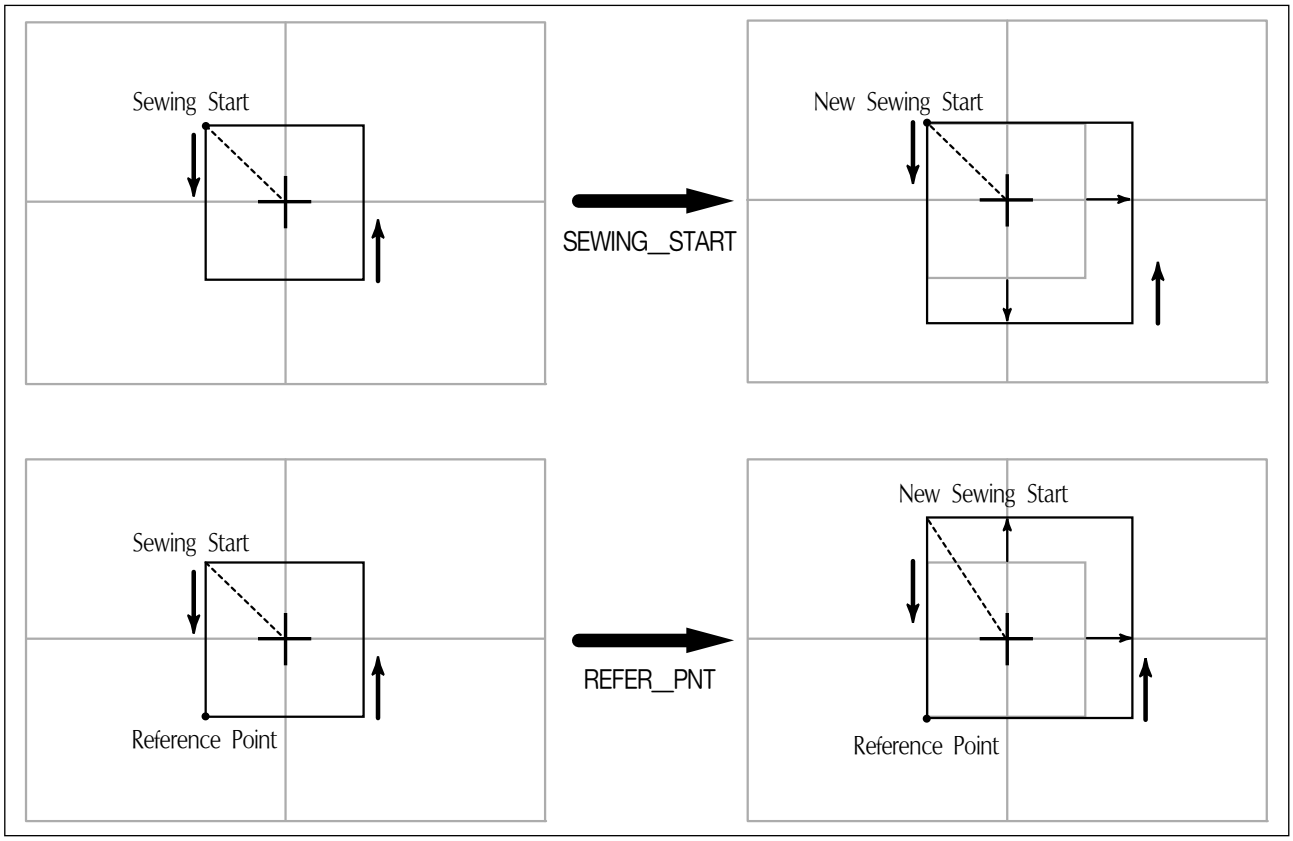
```
SCALE REFER NONE
X:-0300A N:00097
Y:-0300A
Function Code?
```

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

The function of converting JUKI's AMS-Series design files was added.

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

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

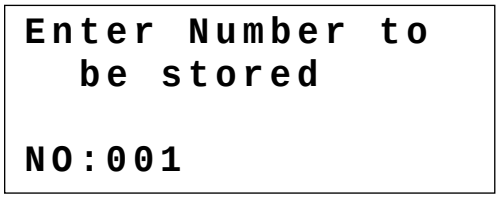
B. Insert a diskette, and press No. 0.

```
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."

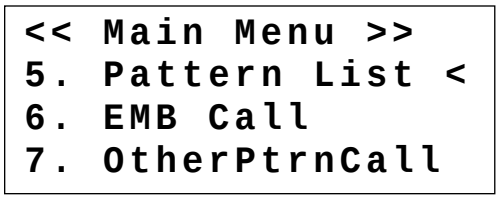
```
<< FILE List >>
100.M3       <
200.M3
300.M3
```

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

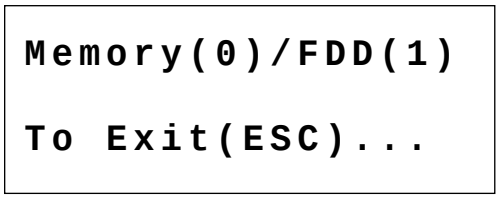


E. When conversion is finished, the screen returns to the original status.

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.

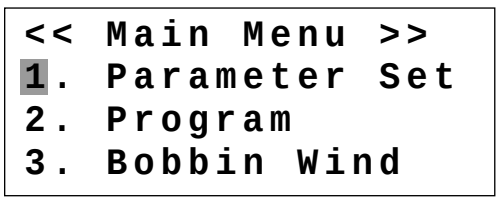
3-17) Sewing Limit Function

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.

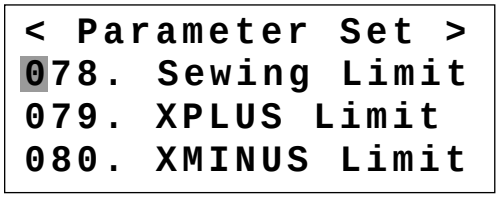
※In case of C-Series, the area can be expanded up to 25000×25000mm.

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 078. Sewing Limit.

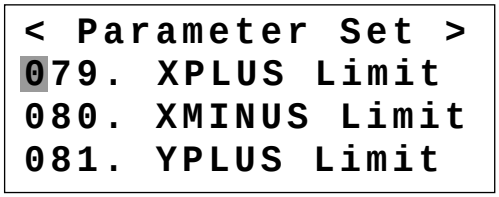


C. Sewing Limit is defaulted at 1) DISABLE.

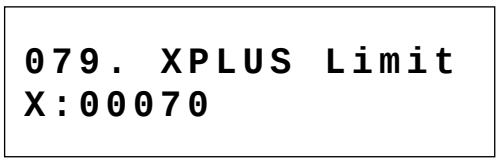
D. Use the direction change cursor to select 2) ENABLE and press ENTER↵.

E. Use the direction change cursor to select 079. 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.

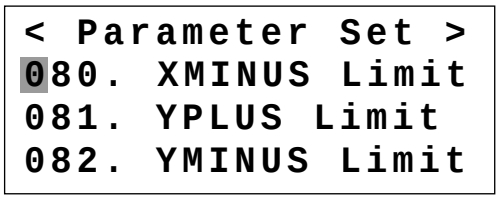
※ In case of C-Series, the unit can be set by the unit of [50mm]. As such, in case of 5050, it is displayed as X : 00050. In other words, 50×50[mm] equals 2500mm. Likewise, if the maximum expansion is X: 00250, it means 250×50[mm]=12500mm.

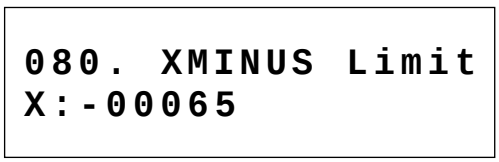


※ Ex) If you increase the X-axis mechanical feeding limit to a maximum 140mm, you can set up to 70mm in the X-axis plus direction.

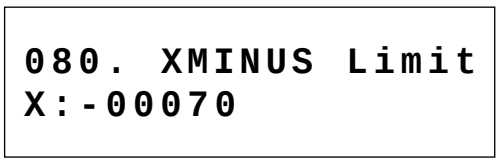


F. To increase limit in the opposite direction, select 080. XMINUS Limit.
The default value is set at -65mm (for SPS-1306 machines). Use the up/down direction key ▲ ▼ to increase the limit as desired.

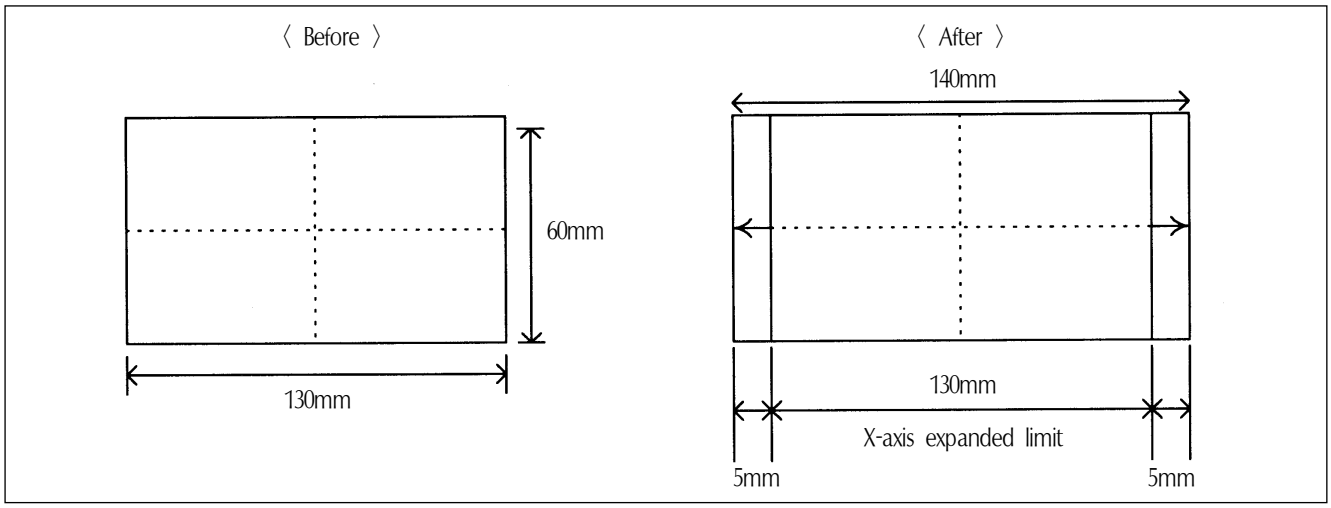




※ Ex) If you increase the X-axis mechanical feeding limit to a maximum 140mm, you can set up to -70mm in the X-axis minus direction.

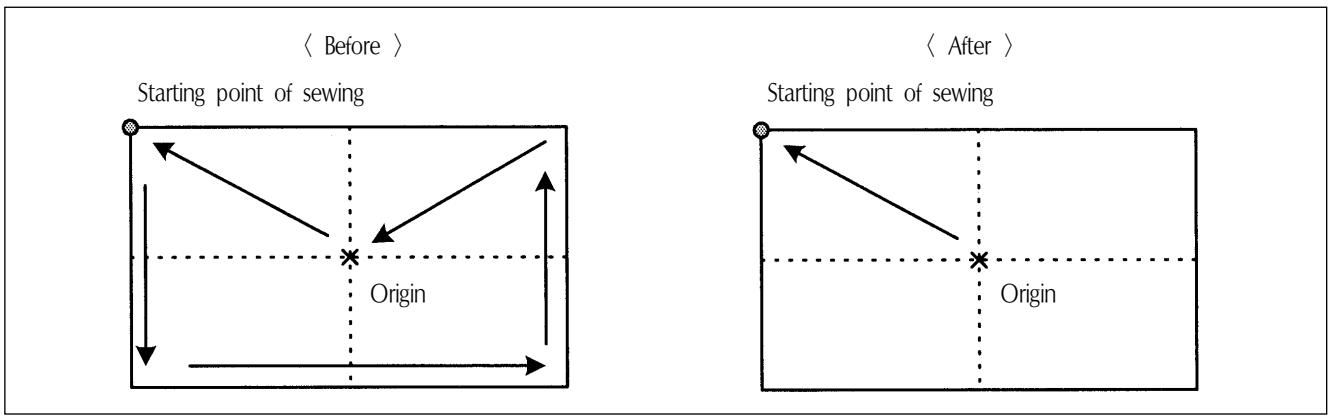


G. If you increased the mechanical feeding limit of Y-axis, refer to the above instructions to expand the feeding limit.
After setting the sewing limit in accordance with the mechanically expanded limit, you can check if the machine feeds to the actual expanded limit. Use the X-Y Jog Test function in 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 083. FFOrign 1811.

```
< Parameter Set >
083. FFOrign 1811
084. AFC Down Time
085. AFC Up Time
```

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

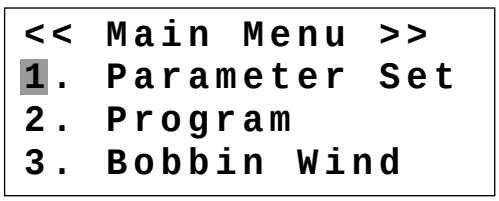
D. Use the direction change button ▲ ▼ to select 2) ENABLE and press ENTER↵. This setting ensures fast origin search motion all the time.

3-19) Setting Origin Search Function of Upper and Lower Shafts after Finishing Sewing [only applied for SPS/C-Series]

How to set origin search motion of upper and lower shafts (hook timing) is described below. Upper and lower shafts of SPS/5050 Series are separated with each other, operating independently, which means that hook timing by the operation of both shafts is important. If the timing becomes improperly set during operation or trimming process, this function can always guarantee the proper hook timing by resetting it through origin search motion of upper and lower shafts after completion of sewing.

How to set origin search function of upper and lower shaft.

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



B. Select 084. HOOKORG MODE from Parameter Set by pressing direction keys ▲ ▼.

C. 084. HOOKORG MODE is originally set at 2)JOB_READY.

1) 1)JOB_SETUP : After completion of sewing, origin search motion gets deleted.

2) 2)JOB_READY : After completion of sewing, origin search motion gets set.

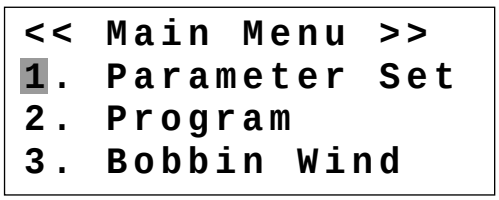
D. Deleting origin search motion move to 1)JOB_SETUP and press ENTER↵ key.

3-20) Setting Machine Head up or Down Function [only for SPS/C-Series]

How to set machine Head up or down function is described below. Vertical control of Head is easy, because Head of SPS/C-Series is connected with air pressure cylinder. Parameter is originally set not to raise machine Head after completion of sewing. However, change in setting will raise machine Head after completion of sewing. This function is available, depending on material and operating environment.

How to set machine Head up or down function:

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

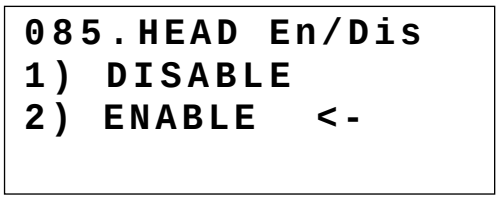


B. Choose 085. HEAD En/Dis from Parameter Set by using direction keys ▲ ▼.

C. When choosing, 085. HEAD En/Dis is set at 1)DISABLE.

1)DISABLE : After finishing sewing, leave the Head of machine down.

2)ENABLE : After finishing sewing, leave the Head of machine up.



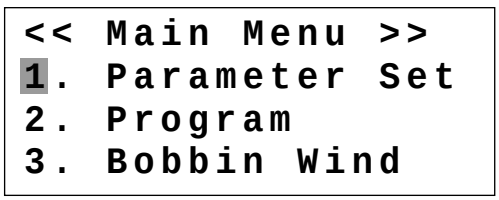
D. To up the Head, move to 2)ENABLE, and then ENTER ↵ key.

3-21) Setting Reverse Rotation after Trimming [Only applied for SPS/B/C-Series]

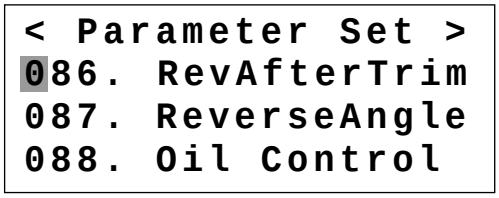
Function of Reverse rotation after trimming is as follows. When sewing material is thick, the thick material can interfere with needle if the needle is placed at the highest point of thread take-up. In that case, the interference will be prevented if the needle is placed in reverse order. Therefore, 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.



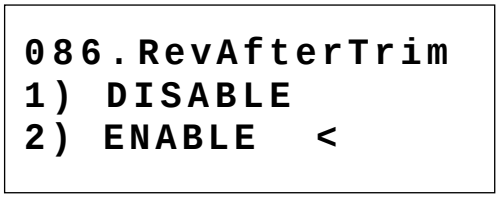
B. Choose 086. RevAfterTrim from Parameter Set by using direction keys ▲ ▼.



C. When choosing, 086. 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



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

3-22) Setting the Angle of Reverse Rotation after Trimming [only applied for SPS/B/C-Series]

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 076. 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 087. ReverseAngle from Parameter Set by pressing direction keys ▲ ▼.

```
< Parameter Set >
087. ReverseAngle
088. Oil Control
089. OillOffTime
```

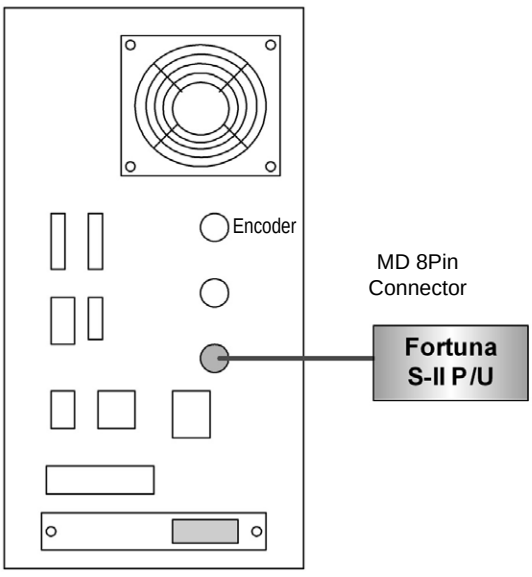
C. 087. ReverseAngle is originally set at 15[degree]. The angle can be reset from 1 to 40[degree]. Angle can be reset by pressing direction keys ▲ ▼ on the OP box.

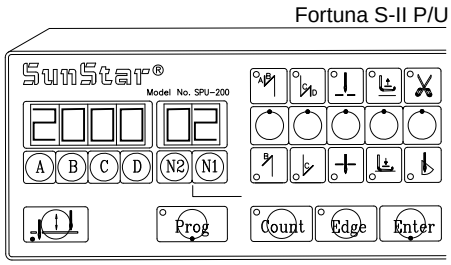
```
087.ReverseAngle
  15[degree]
```

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

```
087.ReverseAngle
  40[degree]
```

[Post-trimming Reverse Rotation Function Setting In Case Of SPS/A-Series Belt-type Machine]





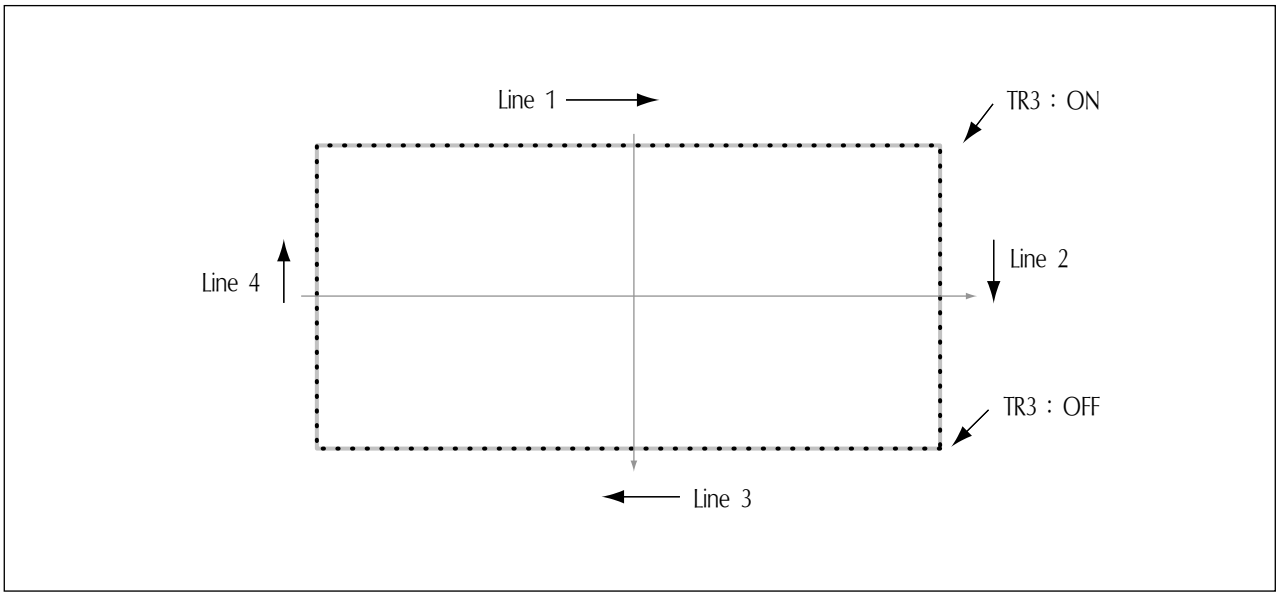
1. Turn off the power and connect with Fortuna S-II P/U.
2. Turn on the power while pressing the Prog button of P/U.
3. Wait until the beep sound is heard.
4. Move the A-Group parameter by pressing the A button and the Prog button of P/U at the same time.
5. Move to A-Group #60 by pressing the N2 button (to determine whether to use the post-trimming reverse rotation function)
6. Press the C button to change the value from "0" to "1".
7. Press the ENTER button to save the setting.
8. Press the N2 button again to go to A-Group #61 (to determine the volume of post-trimming reverse rotation)
9. Press the C button to set the volume of post-trimming reverse rotation. The maximum volume is 40.
10. Press the ENTER button to save the setting.
11. Press the Prog button to end the parameter setting.
12. Turn the power off and remove the cable.
13. Then, after trimming, the reverse rotation function will be applied according to the set value.

※ For more information, see the Fortuna S-II P/U manual.

3-23) Setting Output Port [Only applied for SPS/C-Series]

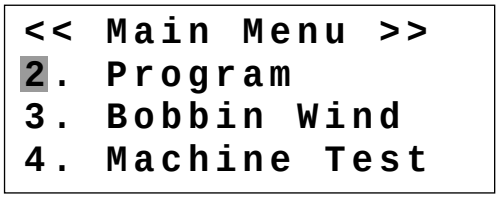
The function is that a user can program devices that are set to certain places when punching. The list of the devises is as follows.

NO	Device	Content
00	PF	Presser Feet
01	FF	Feed Plate
02	TT	Trimming
03	TH	Thread Holder
04	WP	Wiper
05	FF_L	Left Feed Plate
06	TWO_STG	Two-Step Stroke Feed Plate
07	REV_DEV	Inverting Device
08	REAR_FF	Rear Feed Plate
09	TR	Thread Release
10	AFC	Material Conveying Pressing Device
11	TR3	Thread Release 3
12	HEAD	Machine Head
13	OP55~OP57	Other Ports [Don't use]
14	OP60~OP67	Other Ports [Don't use]

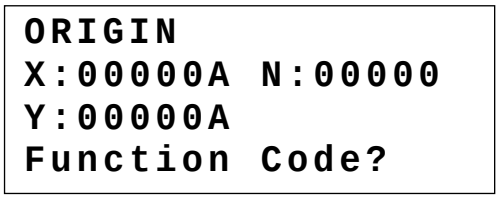


The process of program to operate thread control device 3 in specific range of general square pattern is as follows.

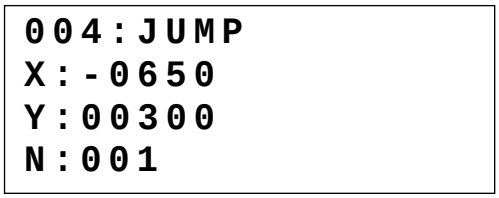
A. Press MODE key.



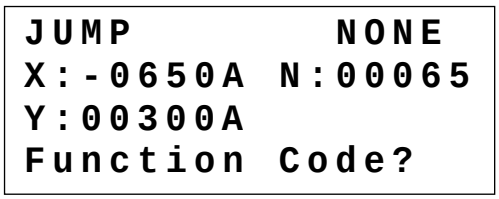
B. Move to "2. Program" by pressing direction keys ▲ ▼ and press ENTER ↵ key.
Upper feed plate will come down and move to original point.



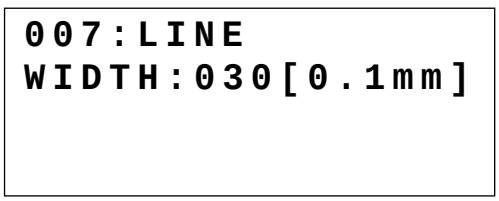
C. Press JUMP key and move to the original position of the square by pressing direction keys ▲ ▼.
And then press PNT.SET key.



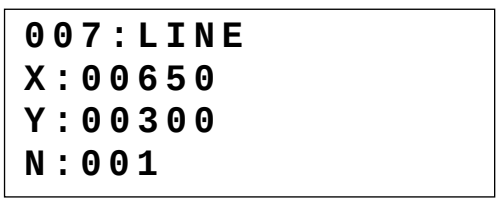
D. Pressing EXE key will move feed plate according to the computed data after computing pattern data.



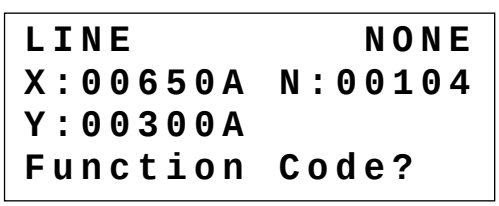
E. Press LINE key, input stitch width by pressing number keys and then press ENTER ↵ key.
(Ex. Press [0][3][0] to set stitch width at 3mm.)



F. Move to the first point position of LINE by pressing direction keys ▲ ▼.
Press PNT.SET key.

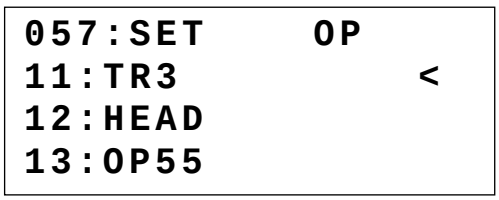


G. Register the first point position of square by pressing EXE key. After computing pattern data, feed plate will move according to the computed data.



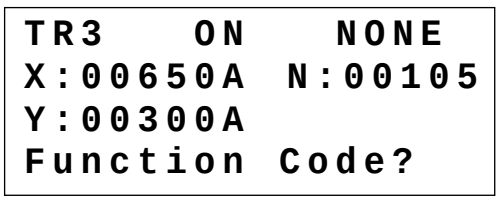
H. Press CODE key to program TR3(Thread Release 3)
Function code is number 057. If function code number is not identified, press ENTER ↵ key to see function code list and then move to number 057 SET OP by pressing direction keys ▲ ▼.

I. Move to number 11 TR3 in SET OP functions list by pressing ENTER ↵ key. Press ENTER ↵ key.

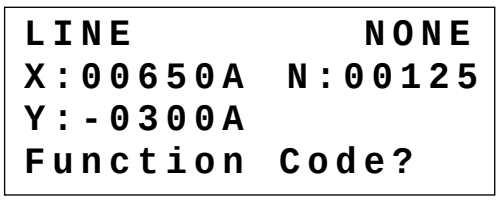


J. Pressing ENTER ↵ key shows the following screen. Move to ON and then press ENTER ↵ key.
At the same time, the thread control device 3 is programmed at the end of the created Line.

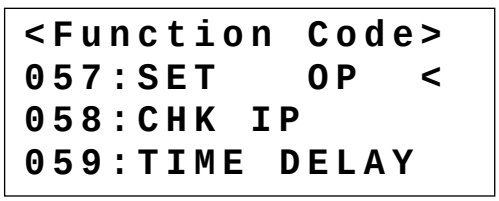
K. Return to the initial screen. To create Second Line, input switch width by using Line key.



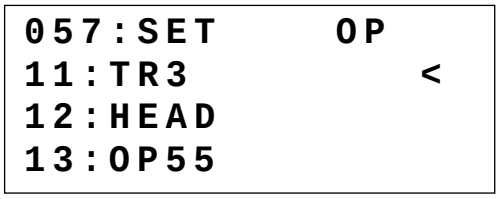
L. Press PNT.SET key and then resister Second Line by using EXE key.
After computing pattern data, feed plate moves according to the data.



M. To program TR3, press CODE key. Function is 57. If the code number is not identified, press ENTER ↵ key to indicate function code list and move to 57 SET OP by using direction keys ▲ ▼.



N. Move to number 11 TR3 in the SET OP function list by using ENTER ↵ key. Press ENTER ↵ key.



O. Pressing ENTER key shows the following screen. To delete the set TR3, go to OFF and then press ENTER key. At the same time, the thread control device 3 is programmed at the end of the created Line.

```
057:SET     OP
TR3:OFF       <
    ON
```

P. Return to the initial screen.

```
TR3    OFF   NONE
X:00650A  N:00126
Y:-0300A
Function Code?
```

Q. Create third and fourth line as the way the first and second lines are created. And then press TEST to check whether TR3 is operating or not.
TR3 is set at OFF in the first LINE. TR3 will be at ON at the beginning of the second LINE and OFF at the end of the second LINE.

R. If there is no problem with sewing, press TEST key again, and then press WRITE key to save design.

3-24) Setting Time Delay when Output Port is Being Used [only applied for SPS/C-Series]

The function is to program applicable time delay when output port is being used.

The program will be explained later in J. of 3-23) Setting Output Port.

A. Pressing ENTER key will show following page. Move to ON and press ENTER key. At the same time, thread control device 3 will be programmed at the end of the created line.

```
057:SET     OP
TR3:OFF
    ON        <
```

B. Return to the initial page of program.
Program Time Delay before creating second LINE.

```
TR3     ON   NONE
X:00650A  N:00105
Y:00300A
Function Code?
```

C. Press CODE key to program Time Delay.
Function code is number 58. If function code number is not identified, press ENTER key to see function code list and then move to number 059 TIME DELAY by pressing direction keys ▲ ▼.

```
<Function  Code>
059:TIME DELAY <
060:SET TR3
000:TRIM
```

D. Press ENTER key to set Time Delay.
Time Delay is originally set at 0[ms].
Time delay unit is 4[ms]. Set desired Time delay by using number keys. Input 50[ms]. If 50[ms] is input, the real Time Delay is 200[ms].

```
059:TIME DELAY
DELAY:0050[x4ms]
```

E. Return to the initial screen.
To create Second Line, input switch width by using Line key.

```
TIME DELAY  NONE
X:00650A  N:00106
Y:00300A
Function Code?
```

F. After pressing PNT.SET key, register Second Line by using EXE.
After computing pattern data, feed plate moves according to the data.

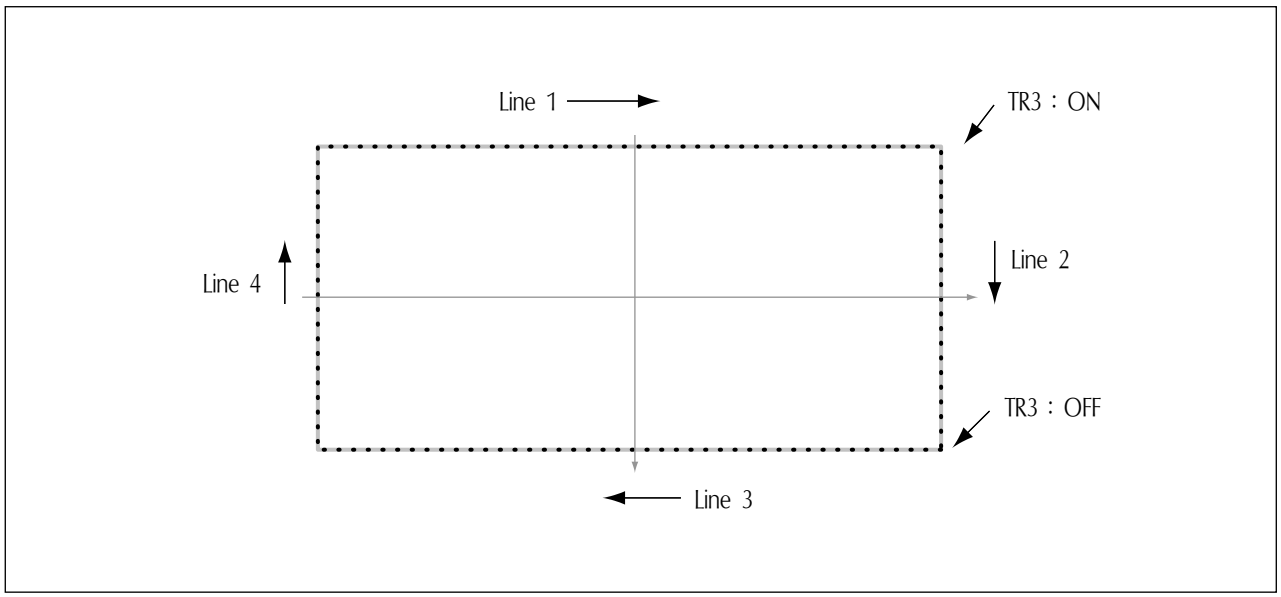
```
LINE        NONE
X:00650A  N:00126
Y:-0300A
Function Code?
```

G. The rest part is the same with L~R in 3-23) Output Port Setting Function.

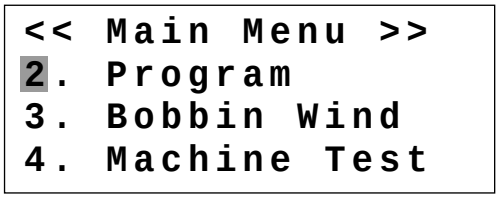
So, when time delay is programmed, TR3 will operate shortly before second Line sewing following first Line sewing. And the operation will discontinue for 200[ms] shortly before sewing and then second Line sewing will start. By doing so, a user can set delay time at each designated device and take motion when operating device related output port.

3-25) 3rd Thread Adjusting Device (TR3) Setting

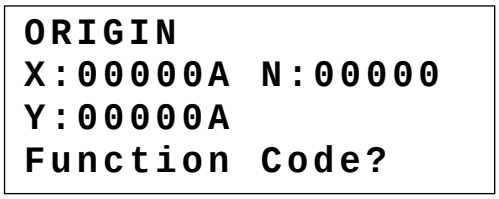
This function allows users to make additional adjustment of the upper thread tension for a certain section.



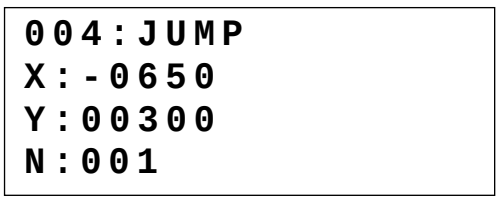
A. Press MODE key.



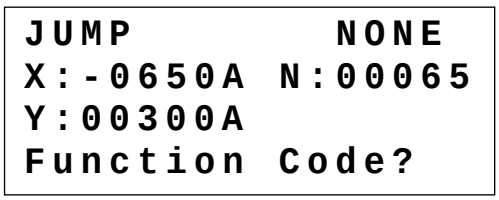
B. Move to "2. Program" by pressing direction keys ▲ ▼ and press ENTER ↵ key.
Upper feed plate will come down and move to original point.



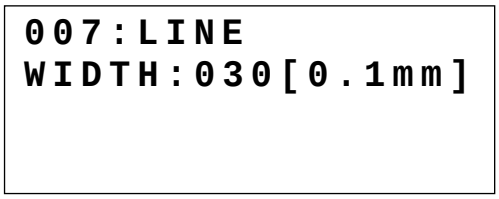
C. Press JUMP key and move to the original position of the square by pressing direction keys ▲ ▼.
And then press PNT.SET key.



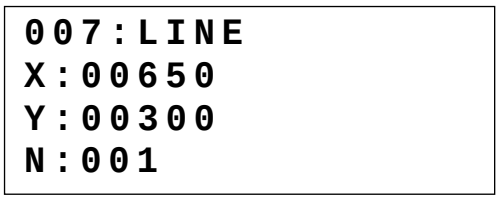
D. Pressing EXE key will move feed plate according to the computed data after computing pattern data.



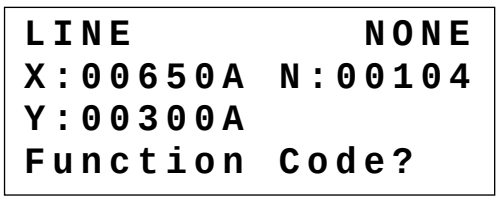
E. Press LINE key, input stitch width by pressing number keys and then press ENTER ↵ key.
(Ex. Press [0][3][0] to set stitch width at 3mm.)



F. Move to the first point position of LINE by pressing direction keys ▲ ▼.
Press PNT.SET key.



G. Register the first point position of square by pressing EXE key. After computing pattern data, feed plate will move according to the computed data.



H. Press CODE key to program TR3(Thread Release 3)
The concerned function code is 063. If you want to search it from the function code list, press ENTER ↵ and move to 063 SET TR3 with direction keys ▲ ▼.

I. When ENTER ↵ is pressed, the following screen appears. Move the cursor to ON and press ENTER ↵. Upon striking ENTER ↵, the 3rd line adjuster code is created at the end of the line.

```
063:SET     TR3
TR3 :OFF
      ON          <
```

J. Return to the initial screen. To create Second Line, input switch width by using Line key.

```
TR3    ON    NONE
X:00650A  N:00105
Y:00300A
Function Code?
```

K. Press PNT.SET key and then resister Second Line by using EXE key.
The feed plate moves to the set position in accordance with the data calculation result.

```
LINE          NONE
X:00650A  N:00125
Y:-0300A
Function Code?
```

L. To program TR3, press CODE key. Function is 63. The concerned function code is 063. If you want to search it from the function code list, press ENTER ↵ and move to 063 SET TR3 with direction keys ▲ ▼.

```
<Function Code>
063:SET    TR3 <
```

M. When ENTER ↵ is pressed, the following screen appears. To cancel the TR3 setting, move the cursor to OFF and press ENTER ↵. At the same time, the thread control device 3 is programmed at the end of the created Line.

```
063:SET     TR3
TR3:OFF        <
    ON
```

N. Return to the initial screen.

```
TR3    OFF    NONE
X:00650A  N:00126
Y:-0300A
Function Code?
```

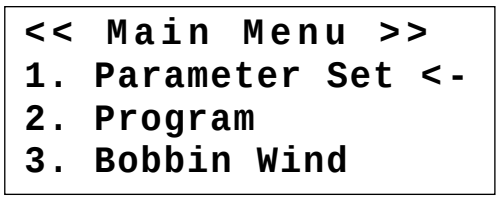
O. Create third and fourth line as the way the first and second lines are created. And then press TEST to check whether TR3 is operating or not.
TR3 is set at OFF in the first LINE. TR3 will be at ON at the beginning of the second LINE and OFF at the end of the second LINE.

P. If there is no problem with sewing, press TEST key again, and then press WRITE key to save design.

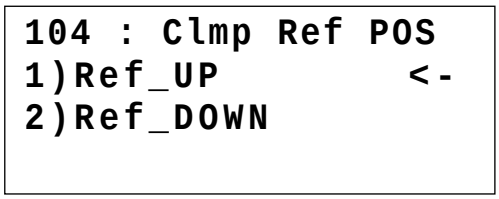
3-26) Basic Clamp Position Setting

※ This function is to set the basic position of the clamp. When parameters need to be changed, clamp's pneumatic lines A and B shall be exchanged in accordance with conditions.

A. Select Parameter Set.



B. To change the basic position of the clamp to Down, go to Parameter 104. Clmp Ref POS and select 2)Ref_DOWN.
(Default is 1) Ref_UP.)



※ Key Points

1. If the value of 104.Clmp Ref POS is changed to Ref_DOWN, the two pneumatic tubes connected to the clamp shall be exchanged.

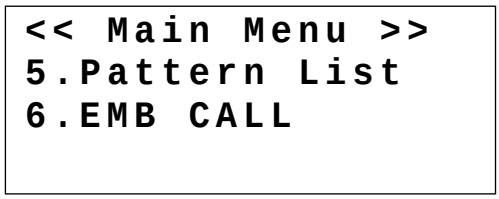
4) Pattern Data General Function

4-1) Checking and Deleting the Pattern Number

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

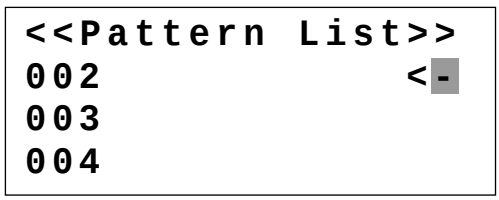
A. Press MODE key.

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



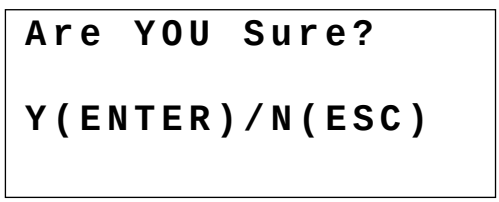
C. If you press ENTER↵key, the screen of the right sides appears. To check the pattern number in inner memory, press digit key, 0, and to check the pattern number in a floppy diskette, press digit key, 1

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



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

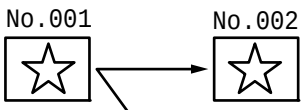
F. After moving to the pattern number that you want to delete by using direction keys ▲▼, if you press PTN DEL key, the screen of the right side appears. To delete the pattern, press ENTER↵key, and to cancel, press ESC key.



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

4-2) Making a Copy the Pattern to Another Number or Diskette

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

No. 1 Floppy Diskette		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:00000A N:00000
Y:00000A
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. Press ENTER↵key. The READY LED flickers during reading the pattern data.

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

F. 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".)
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
```

G. 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
```

4-3) Pattern Store Function

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. To store design, the machine has to be in 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.

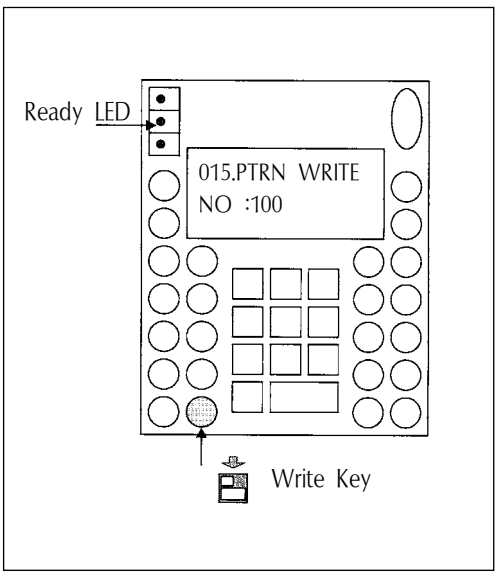
D. Press ENTER↵ again. The sewing mode will be turned off and the light will go off in Ready LED.

E. By following the step A, B, C, D only once, stored designs in CPU memory can be stored in floppy disks.

F. Insert a disk into the floppy drive and press a key at the left bottom of the OP Box to store.

G. In the LCD display of the OP Box, the sewing mode will be changed to storing mode.

H. Key in desired design number and press ENTER↵ to store design in the disk.



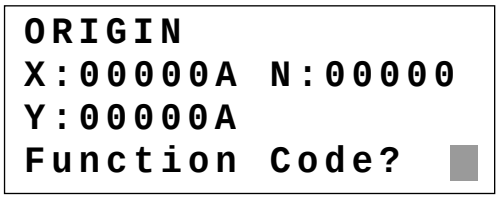
4-4) Pattern Information Displaying Function

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

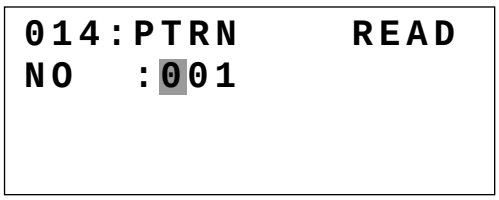
A. Insert floppy diskette containing the pattern to use pattern information displaying function.

B. Press MODE key.

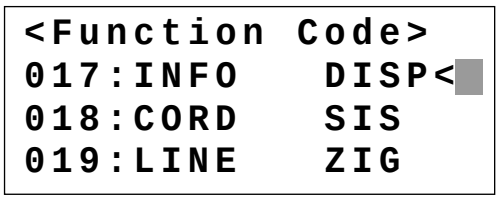
C. After moving to "2. Program" menu by using direction key ▲ ▼, press ENTER↵ key. At this time, the upper feed plate comes down and moves to the original point.



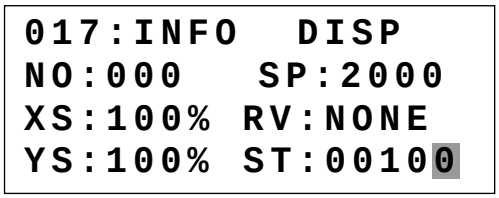
D. After pressing READ key, input the pattern number to display pattern information by using digit key and read in the pattern by pressing ENTER↵ key. (For example, input [0][0][1] to read the pattern number 001.)



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



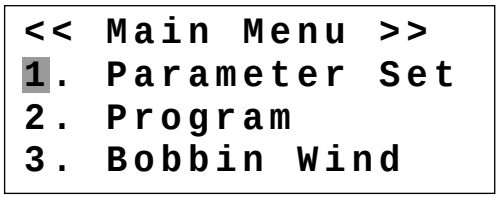
G. If you press ESC key, return to previous state.

4-5) 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.

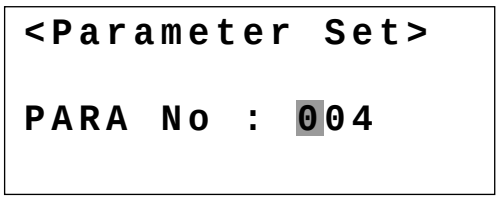
A. Press MODE key.

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



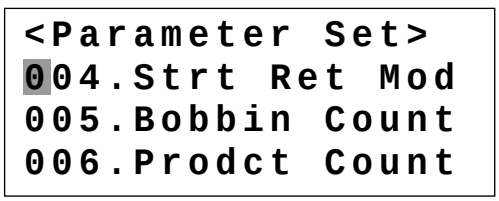
C. When you press ENTER↵ key, you can get the screen like a figure on the right side. If you know the parameter number related to general sewing, input the three digit parameter number. For example, if you want to change "004:Strt Ret Mod", input [0][0][4]. At this time, you should input [0] twice for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

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

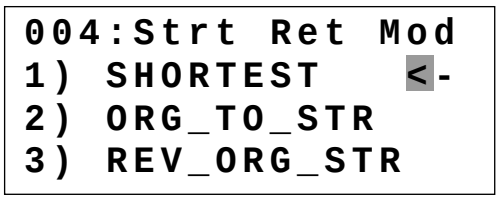


D. If you don't know any relevant number, press ENTER↵ key to move to the parameter number you want by using direction keys ▲ ▼.

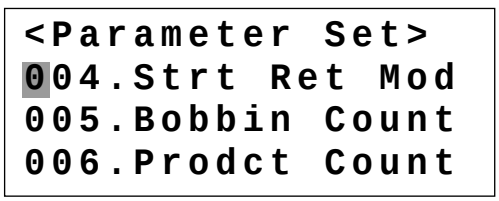
※ Appendix :
Refer "Parameter number related to general sewing."



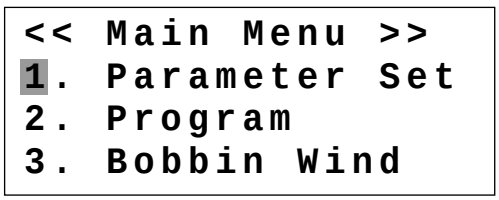
E. After pressing ENTER↵ key, change the setting value or any state you want by using direction keys ▲ ▼.



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.

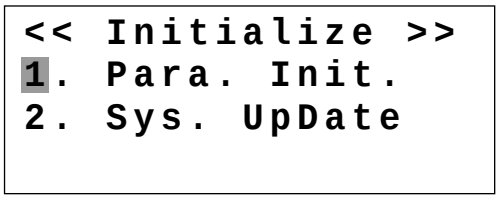
※ You can confirm the machine backs to the sewing start point directly without passing through the origin after finishing sewing.

4-6) Initialization of Parameter Related to General Sewing

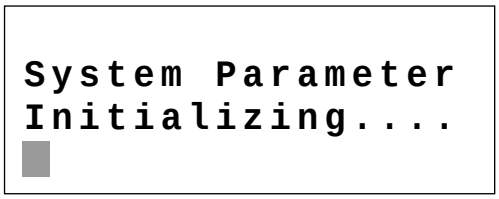
It is used for parameter related to general sewing to back to the factory-installed setting value. It is recommendable that only professional A/S engineer handles it.

A. Press MODE key.

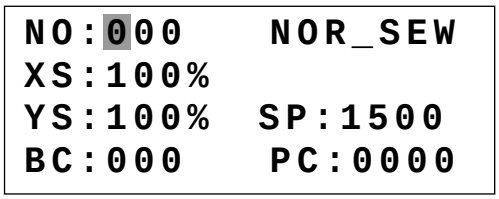
B. Press ENTER↵ key.



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.



4-7) 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.

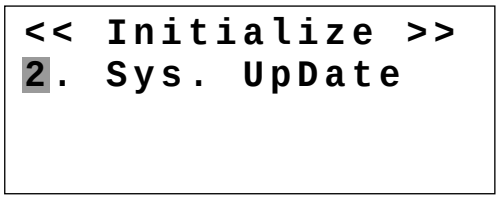
A. Insert a floppy disk having system program that you want to update into a floppy disk drive.

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

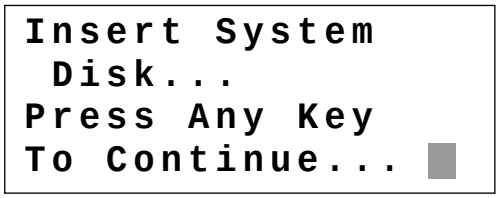
※ Caution

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.



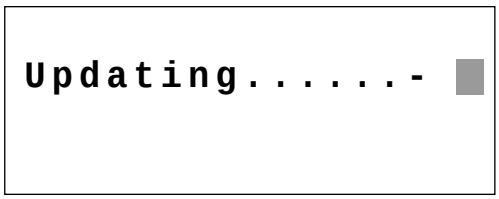
D. You can see the screen like a figure on the right side.



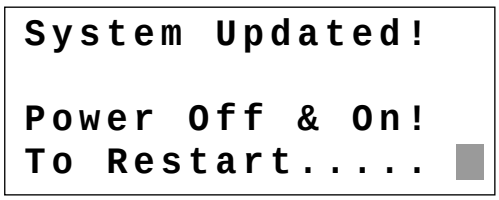
E. If you press any key, the system program will be updated after reading a floppy disk. During updating, READY LED flicker.

※ Caution

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



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

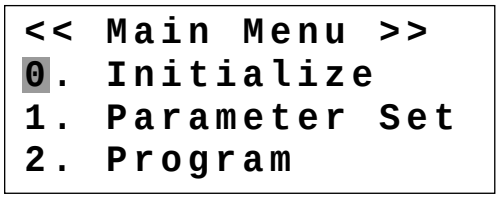


4-8) Confirmation for Version of System Program

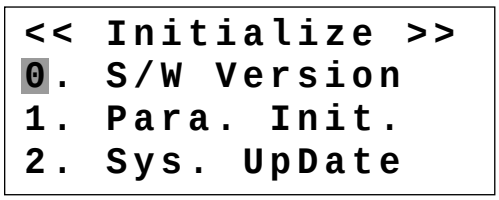
A. Press MODE key.

※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.

※ Here XXXX means machine model.

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

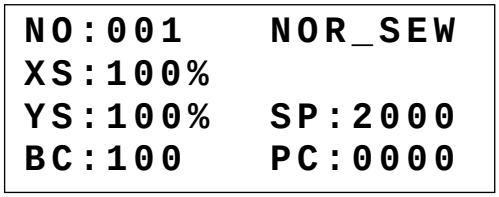
4-9) Bobbin counter setting by design

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.

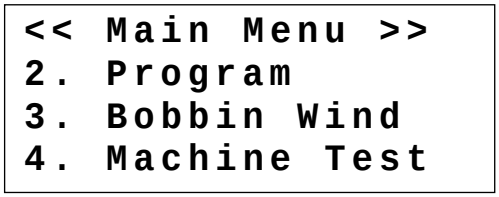
There are two ways to set bobbin counter.

Method 1: Setting during design creation.

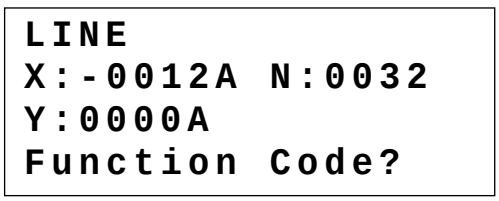
A. In the initial screen, press B.SET to set the value of bobbin counter as the user desires.



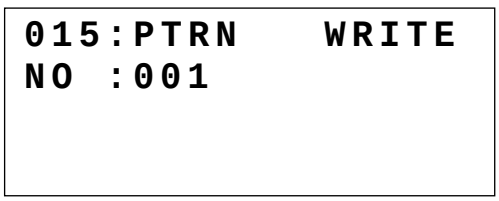
B. Go to Program Mode in Main Menu.



C. Create a design as desired.



D. Save the design in FDD.



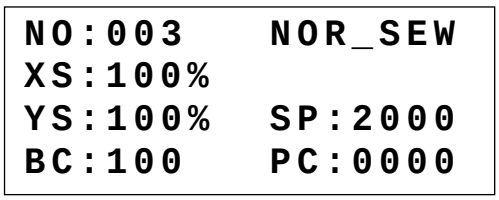
E. In 001 design created, the value of bobbin counter will be saved as 100.

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

Method 2: Setting by saving pattern stored in internal memory into floppy disc.

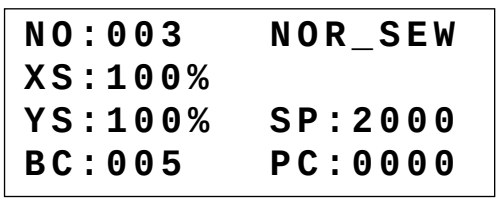
A. Insert design disc into FDD.

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

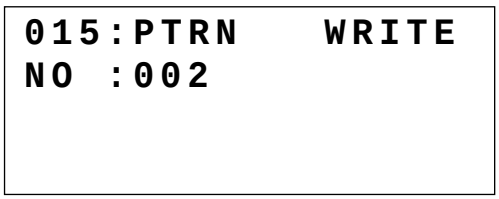


C. With READY LED activated on OP box, press Enter↵ to turn off READY.

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



E. Click WRITE save button in the OP box to save onto FDD. Re-write under the same name, or save under a different name.



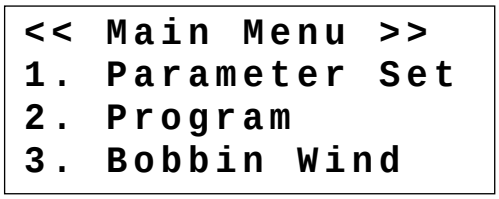
F. New value of bobbin counter will be saved in design

4-10) Saving in the Internal Memory after Creating Pattern Designs

Previously, users are required to save pattern designs, which are created with OP, in FDD only. However, the added function can allow them to save the pattern designs in the internal memory. Users can choose the place of storage from the parameter menu following the direction below.

Setting method is as follows.

A. Press the MODE key to move to the Parameter Set of the Main Menu.



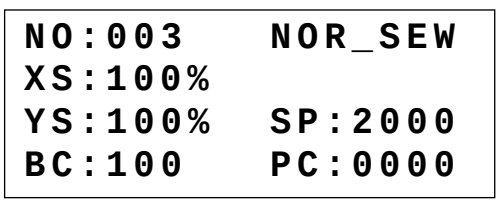
B. Press Enter↵ and move to 090. Save Type.

C. The default value is set at 1) SAVE FDD, which is a previously used method.

D. Move the cursor to 2) SAVE FLASH to save the patterns in the internal memory and press Enter↵.

E. Since the setting is complete, when users save the pattern designs created using OP, they will be saved in the internal memory (Flash Memory), not in FDD.

F. Return to the main screen and press the number of saved pattern and then Enter↵. The concerned pattern design will be read for sewing.



5

HIGH OPERATING METHOD

1) Understanding the Function of Machine Test : The order can be different depending on SPS/A/B/C-Series.

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 = 01150
```

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

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

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.

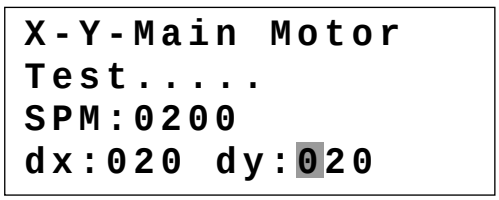
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.

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

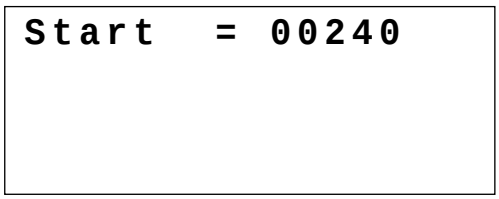
C. After moving to "1. XY-Main Test" by using direction keys ▲ ▼, press ENTER↵ key. The upper feed plate descends and moves to the origin.

```
<< 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.



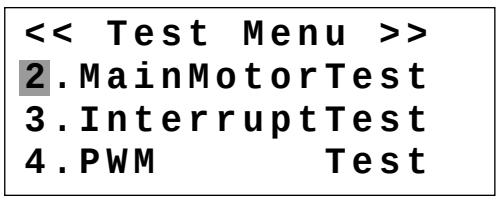
1-3) Main Motor Test

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

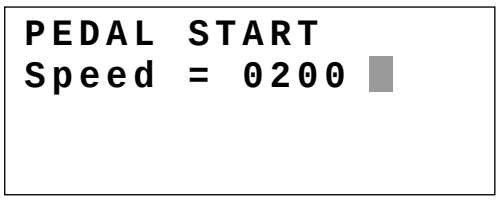
A. Press MODE key.

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.

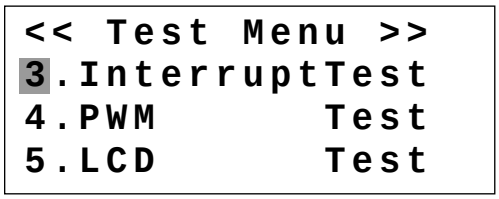
1-4) Interrupt Test

It is to test if the CPU board operates properly.

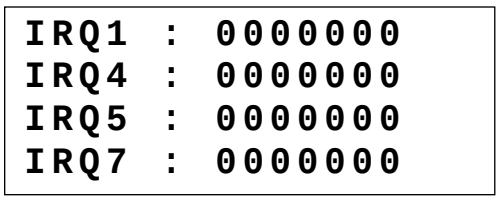
A. Press MODE key.

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

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



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.



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

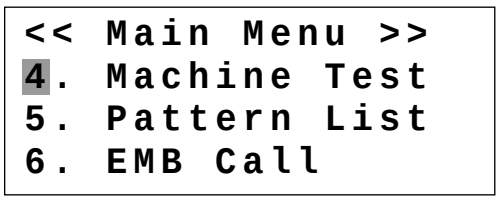
F. Back to the initial screen by pressing ESC key.

1-5) PWM Test

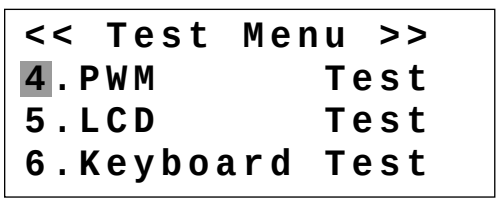
It is to test if solenoid works properly. Only professional A/S engineers allow to handle it.

A. Press MODE key.

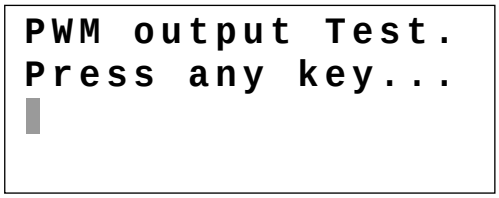
B. After move to "4. Machine Test" by using direction keys ▲ ▼, then press ENTER↵key.



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



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.

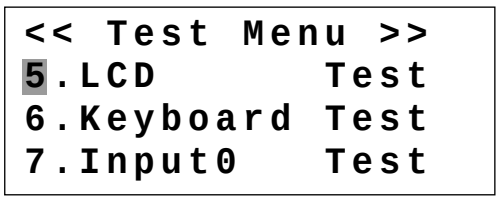
1-6) LCD Test

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

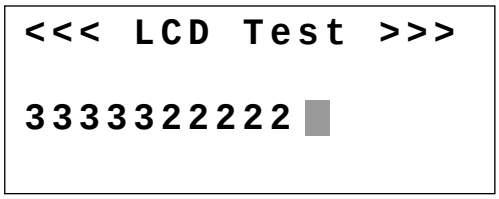
A. Press MODE key.

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.

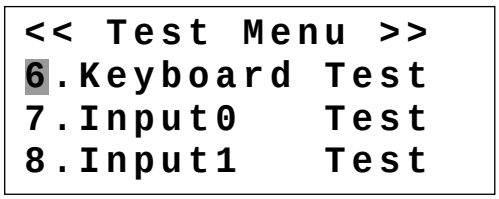
1-7) Keyboard Test

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

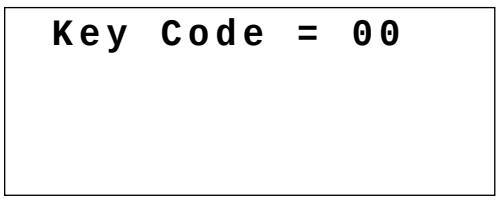
A. Press MODE key.

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.

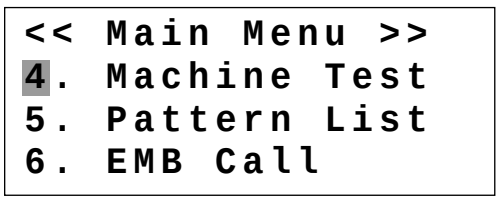
F. Back to the general sewing mode by pressing ESC key.

1-8) Input 0 Test

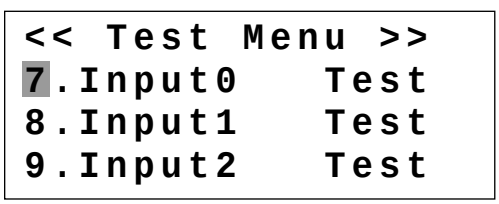
It is to test if each sensor input signal works properly. For testing, separate step motor output connector from control box.

A. Press MODE key.

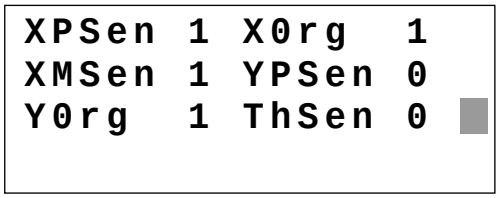
B. After moving to "4. Machine Test" by using direction keys ▲ ▼, press ENTER↵ key.



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.

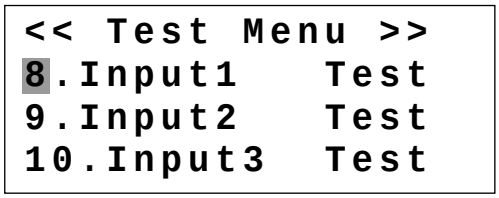
1-9) Input 1 Test

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

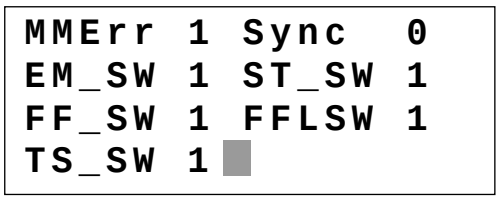
A. Press MODE key.

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.



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

```
LOWPR  1 BDNEW  0
DIRECT 0 ASYNC  0
IOB21  0 NEWOP  1
IP26   1 IP27   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.

```
IP30    1 IP31    1
IP32    1 IP33    1
IP34    1 IP35    1
IP36    1 IP37    1
```

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 [only applied for SPS/C-Series]

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

A. Press MODE key.

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

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.

```
<< Test Menu >>
11. Input4  Test
12. Input5  Test
13. Input6  Test
```

D. YMErr: Error signal of Y shaft Servo Motor (Normal: 1)
XMErr: Error signal of X shaft Servo Motor (Normal: 1)
Other Input ports are not in use.

```
YMErr   1 XMErr   1
IP42    1 IP43    1
IP44    1 IP45    1
IP46    1 IP47    1
```

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 [only applied for SPS/C-Series]

This function can be used to check whether or not each input signal is working properly.

A. Press MODE key

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

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

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. Input 5 is not in use.

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

E. Press ESC key to end Input 5 Test. Press ESC key to end Test Menu.

F. Press ESC key to return to initial page.

1-14) Input 6 Test [only applied for SPS/C-Series]

This function can be used to check whether or not lower shaft motor input signal is working properly.

A. Press MODE key.

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

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

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. Sync1 : Check whether or not detecting signal from lower motor sync.
MErr1 : Detect unusual signal related lower motor shaft (Normal: 1)
Other Input signals are used.

```
Sync1   1 MErr1   1
IP62    1 IP63    1
IP64    1 IP65    1
IP66    1 IP67    1
```

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) Lower Shaft Encoder Test (Encoder1 Test) [Only applied for SPS/C-Series]

This is used to check whether or not Input of Lower Shaft Encoder and Synch is normal and test the current position of needle bar.

A. Press MODE key.

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

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

C. Move to "14.Encoder1 Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
14.Encoder1 Test
15.Solenoid Test
16.Output4  Test
```

D. Press ENTER ↵ key. Upper feed plate will descend and go to the original point. At this time, turning upper shaft pulley by hand will indicate pulse value of lower encoder, distance from synch sensor, and rotation number.

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

E. To end lower shaft encoder test, press ESC key. To end test menu, press ESC key.

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

1-16) Solenoid Test

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

A. Press MODE key.

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

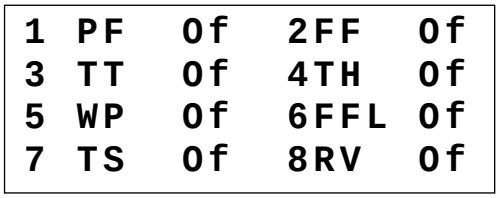
B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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

```
<< Test Menu >>
15.Solenoid Test
16.Output4  Test
17.Output5  Test
```

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



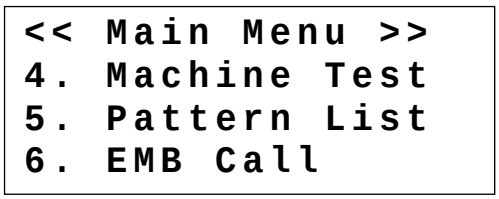
E. Press ESC key to end solenoid test. Press ESC key to end Test Menu.

F. Press ESC key to return to initial page.

1-17) Output 4 Test [only applied for SPS/C-Series]

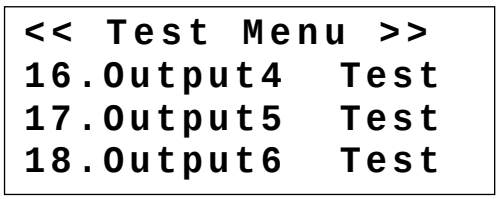
This function can be used to check whether or not air pressure devices are working properly.

A. Press MODE key.



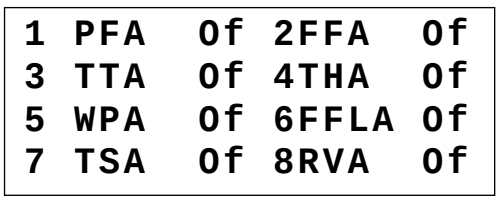
B. Move to "4. Machine Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

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.

1-18) Output5 Test [Only applied for SPS/C-Series]

This is used to check whether or not air pressure device related to SPS/C-Series is working properly.

A. Press MODE key.

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

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

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

```
<< Test Menu >>
17.Output5  Test
18.Output6  Test
19.Output7  Test
```

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

```
1 RFF  Of 2TRS  Of
3 AFC  Of 4TRS3 Of
5 HEAD Of 6LPT  Of
7 AX6  Of 8AX7  Of
```

1. RFF : Rear Clamp
2. TRS : Thread Release device
3. AFC : material conveying pressing device
4. TRS3 : Thread Release device 3
5. HEAD : Head of machine
6. LPT : Laser Point
7. AX6 : not in use
8. AX7 : not in use

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.

1-19) Other Output Ports [Only applied for SPS/C-Series]

Following output port tests are not in use.

```
18.Output6 Test
19.Output7 Test
20.DAC0
21.DAC1
```

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 "22.XY-Jog Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
22.XY-Jog   Test
23.Origin   Test
24.Jump     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  Y:0000
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.

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

C. Move to "23.Origin Test" by using direction keys ▲ ▼ and press ENTER ↵ key.

```
<< Test Menu >>
23.Origin    Test
24.Jump      Test
25.MotorType Test
```

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

```
Origin  Test.
Press AnyKey
```

E. To end test menu, press ESC key.

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

1-22) Jump Test

This is used to check whether or not XY step motor is working properly and do jump test.

A. Press MODE key.

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

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.

```
<< Test Menu >>
24.Jump      Test
25.MotorType Test
26.Async     Test
```

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.

```
X-Y Jump Test
Delay : 0007[ms]
jmp_dx : 0020
jmp_dy : 0020
```

E. Press ESC key to end Test Menu.

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

1-23) 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.

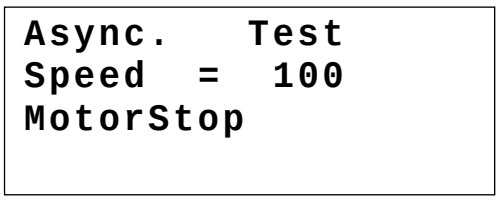
A. Press MODE key.

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

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

C. Move to "25.Async Test" by pressing direction keys ▲ ▼ and press ENTER ↵ key.

D. Initial speed setting value has been set up by 100, it is shown by "MotorStop". Press ENTER ↵ key.



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.

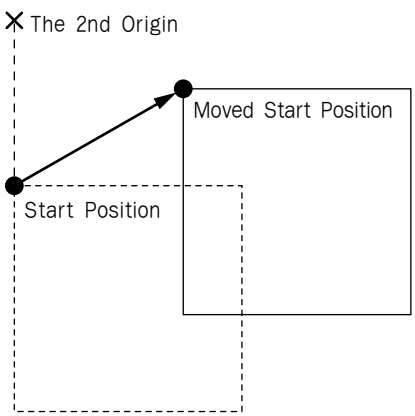
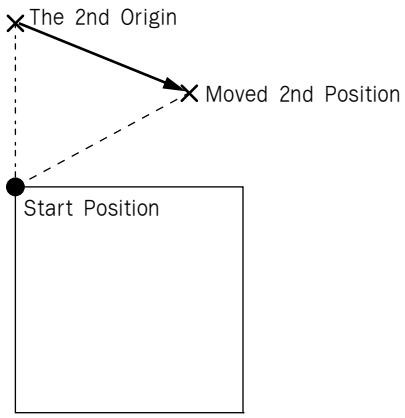
G. Press ESC key to return to initial page.

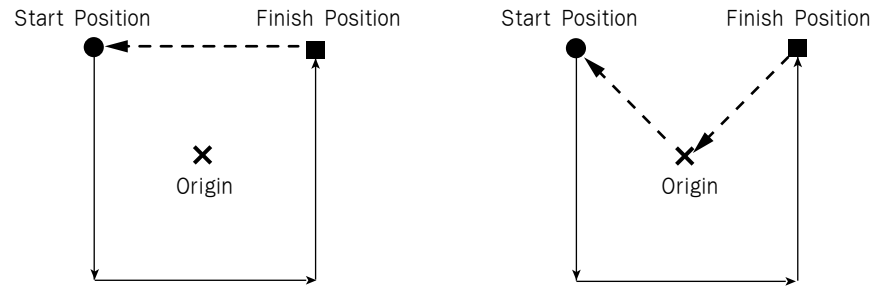
6

DESCRIPTION ON PARAMETER RELATED TO GENERAL SEWING OPERATION

※ The order can be different depending on SPS/A/B/C-Series.
※ The shadow area indicates factory-installed condition.

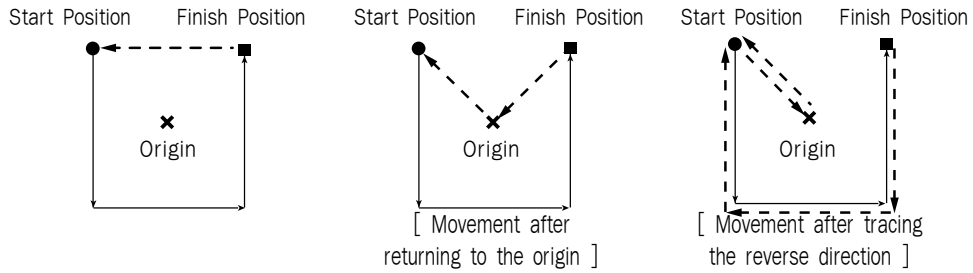
Function No. : 000		Function Name : Manual Operation En/Dis
000. Jog En/Dis		It is to set moving of feed plate manually by using direction keys.
Setting Value	1) DISABLE	It is impossible for feed plate to move by using direction keys.
		[Contents] It is impossible to make the feed plate move manually 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.

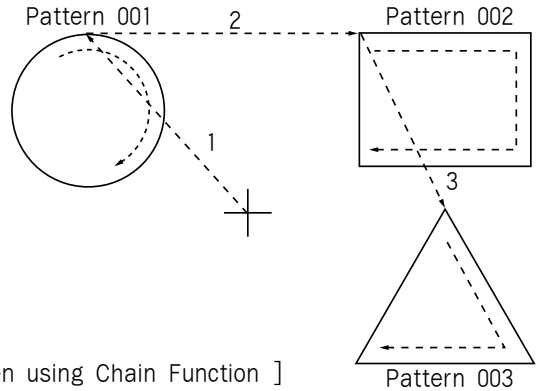
Function No. : 001		Function Name : Moving to start position/the 2nd origin by manual drive
001. Jog Mode		It is to set to move to the sewing start position or the 2nd origin by using direction keys after making the feed plate move manually in the sewing available mode.
Setting Value	1) PTN__STR__POS	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.
	2) SECND__ORG	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.
		 [Setup for sewing start Position]  [Setup for the 2nd origin]

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 : Lower thread counter counting method
005. Bobbin Count		The method of counting for the lower thread shall be determined.
Setting Value	1) UP__COUNT	Counting by adding the number of finished sewing until reaching the target number (default value)
		[Contents] Whenever sewing of a design is fully completed, the number is counted up. [Caution] The timing for lower thread replacement is not indicated.
	2) DN__COUNT	Counting by reducing the number of finished sewing from the target number
		[Contents] Whenever sewing of a design is fully completed, the number is counted down.
	3) DESIGN__UP	Counting by adding the number of finished sewing by design
		[Contents] When there are many identical designs included within a pattern, the number is counted by raising up the number whenever sewing of the design is completed. [Caution] The timing for lower thread replacement is not indicated.
	4) DESIGN__DN	Counting by lowering the number of finished sewing from the target number
		[Contents] When there are many identical designs included within a pattern, the number is counted by lowering the number whenever sewing of the design is completed. The initial value of the lower thread counter shall be set before use.

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.

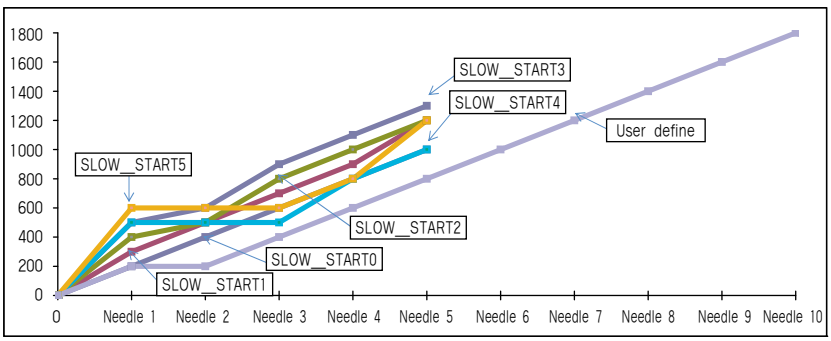
Function No. : 009	Function Name : Main shaft speed acceleration
009. Slow Start	It sets the sewing speed acceleration when sewing starts. Default value: SLOW__START3 (In case of SPS/A/B-1507, SLOW__START1)

	Needle speed / Series / Features	1st Needle Speed		2nd Needle Speed		3rd Needle Speed		4th Needle Speed		5th Needle Speed		6th Needle Speed		7th Needle Speed		8th Needle Speed		Remarks
		A/B	C	A/B	C	A/B	C	A/B	C	A/B	C	A/B	C	A/B	C	A/B	C	
Setting Value	1) SLOW__START0	200	200	400	200	600	400	800	800	1000	1200		1600		1800		2000	
	2) SLOW__START1	300	200	500	200	700	400	900	800	1200	1000		1200		1400		1600	
	3) SLOW__START2	400	200	500	200	800	200	1000	400	1200	600		800		1000		1200	
	4) SLOW__START3	500	200	600	200	900	400	1100	400	1300	600		800		1200		1400	
	5) SLOW__START4	500	200	500	400	500	400	800	600	1000	800		1200		1600		1800	
	6) SLOW__START5	600	200	600	400	600	400	800	600	1200	800		1200		1600		2000	During embroidery work
	7) USER__START																	User define

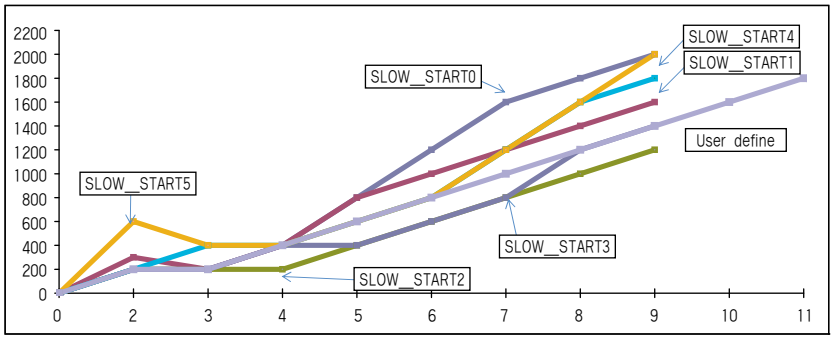
[Caution] In the case where the sewing speed set by user is slower than the stitching speed, the user-defined sewing speed will prevail.

※ The set value may vary depending on models. For functional enhancement, it can be changed.

[Features of sewing speed acceleration]



[SPS/A/B-Series]



[SPS/C-Series]

Function No. : 010		1st Needle Speed Setting
010. USER__SLOW__1		**User sets the speed for the 1st needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 1st needle (default value: 2[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 011		2nd Needle Speed Setting
011. USER__SLOW__2		**User sets the speed for the 2nd needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 2nd needle (default value: 2[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 012		3rd Needle Speed Setting
012. USER__SLOW__3		**User sets the speed for the 3rd needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 3rd needle (default value: 4[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 013		4th Needle Speed Setting
013. USER__SLOW__4		**User sets the speed for the 4th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 4th needle (default value: 6[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is ") User Define."

Function No. : 014		5th Needle Speed Setting
014. USER__SLOW__5		**User sets the speed for the 5th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 5th needle (default value: 8[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 015		6th Needle Speed Setting
015. USER__SLOW__6		**User sets the speed for the 6th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 6th needle (default value: 10[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

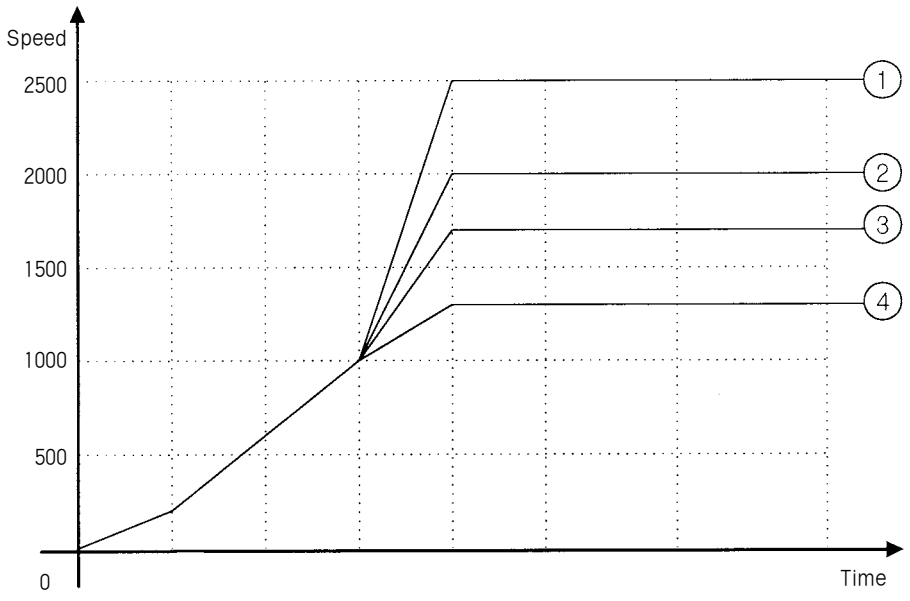
Function No. : 016		7th Needle Speed Setting
016. USER__SLOW__7		**User sets the speed for the 7th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 7th needle (default value: 12[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 017		8th Needle Speed Setting
017. USER__SLOW__8		**User sets the speed for the 8th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 8th needle (default value: 14[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 018		9th Needle Speed Setting
018. USER__SLOW__9		**User sets the speed for the 9th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 9th needle (default value: 16[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

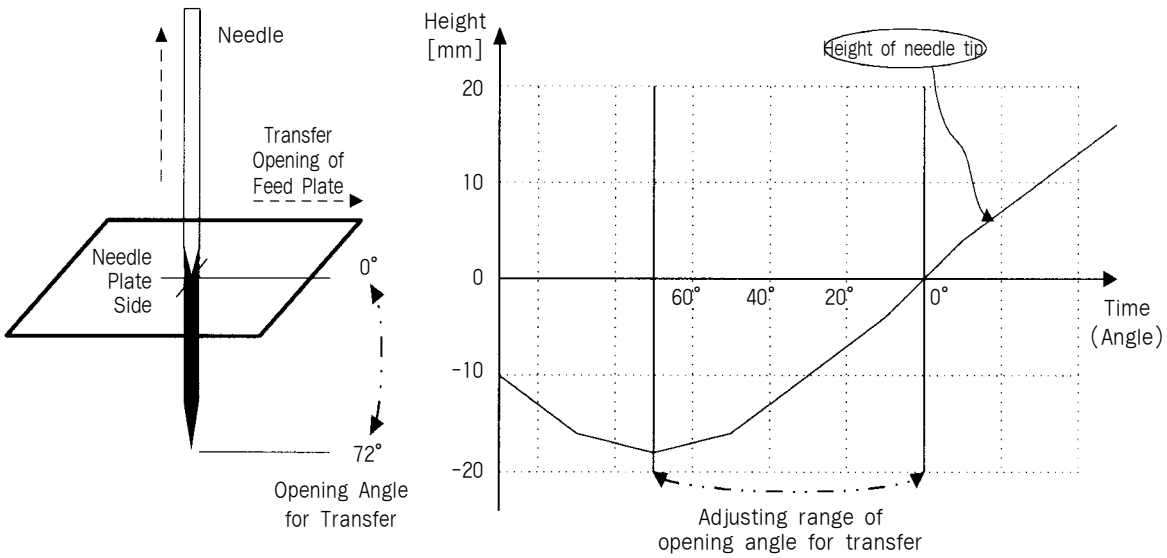
Function No. : 019		10th Needle Speed Setting
019. USER__SLOW__10		**User sets the speed for the 10th needle.**
Setting Value	2~25[100ms]	**User sets the speed for the 10th needle (default value: 18[100ms])**
		[Contents] This function is used when the set value of Parameter "009. Slow Start Main Shaft Acceleration" is "7) User Define."

Function No. : 020		Function Name : Maximum speed limit of sewing
020. Max Speed		It limits the maximum speed of sewing machine.
Setting Value	1) 2500spm(1306)	It limits the speed under 2500spm. (Factory installed condition)
	2) 2000spm	It limits the speed under 2000spm.
	3) 1700spm	It limits the speed under 1700spm.
	4) 1300spm	It limits the speed under 1300spm.
		[Caution] The sewing speed set within patterns has priority than maximum sewing speed. For example, though the maximum speed of sewing set as 1700spm if the sewing speed within patterns is set as 2100spm, the real speed of sewing is 2100spm. Maximum speed of the sewing machines other than 1306 would be 2000 spm.



[Limit of maximum sewing speed]

Function No. : 021		Function Name : Opening angle of feed plate transfer
021. Feed End Pos		It is to adjust an opening angle of feed plate transfer based on needle bar.
Setting Value	0~100°	It is to adjust an opening angle of feed plate transfer according to the thickness of sewing materials. (Factory default : SPS/A-Series 0°, SPS/B-Series 24°, SPS/C-Series 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. : 022		Function Name : Operation condition of feed plate when sewing operation finishes
022. 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. : 023		Function Name : Descent maintenance of upper feed plate
023. 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. : 024		Function Name : Signal mode of Pedal 1
024. 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. : 025		Function Name : Signal mode of pedal 2
025. 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. : 026		Function Name : Setup for presser foot operation
026. 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. : 027		Function Name : Setup for descent time of presser foot
027. 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. : 028		Function Name : Setup for wiper operation
028. 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. : 029		Function Name : Setup for wiper operation position
029. 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. : 030		Function Name : Setup for thread detection
030. 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.

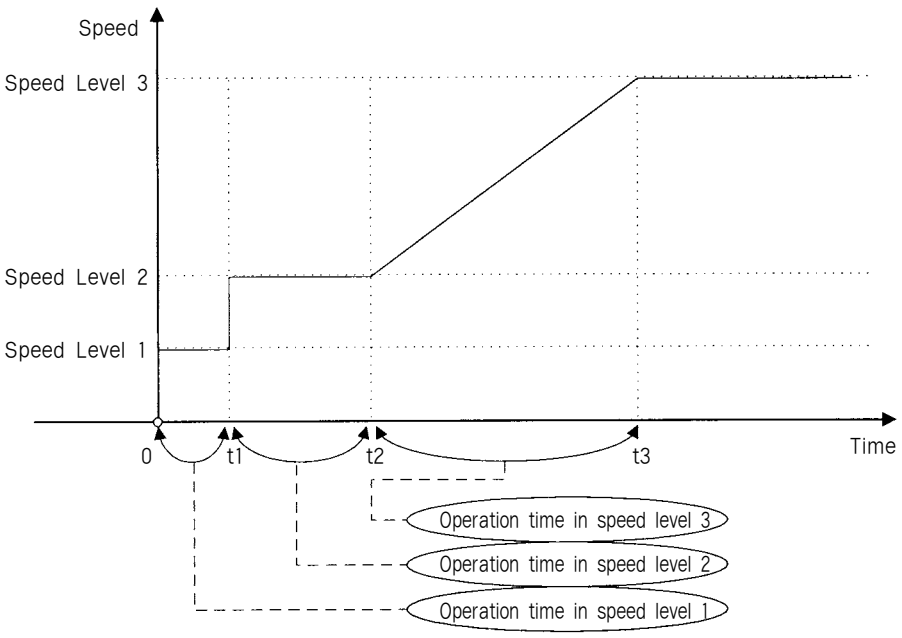
Function No. : 031		Function Name : Detecting the stitch number in starting sewing
031. Thrd Stitch 1		It is to set the number of stitches when sewing operation starts. [Caution] This function is not available of Function No. 020. "Thrd Dectect" sets as "1) DISABLE".
Setting Value	0~15	It is to set to detect the number of stitches. (Factory installed condition : "5"), (SPS/C-5050, 8050 : 10)
		[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. : 032		Function Name : Detecting the stitch number during sewing
032. 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"), (SPS/C-5050, 8050 : 5)
		[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. : 033		Function Name : Use of trimming function
033. 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. : 034		Function Name : Manual operation time in speed level 1
034. 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. : 035		Function Name : Manual operation time in speed level 2
035. Jog Time 2		It is to set the manual operation of the feed plate to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 2. (Factory installed condition : "1000ms")
		[Contents] When the feed plate is manually operated by the direction keys, it sets the time for feed plate transfer speed level 2.

Function No. : 036		Function Name : Manual operation time in speed level 3
036. Jog Time 3		It is to set the manual operation of the feed plate to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 3. (Factory installed condition : "2000ms")
		[Contents] When the feed plate is manually operated by the direction keys, it sets the time for feed plate transfer speed level 3.
		

Function No. : 037		Function Name : Time for function of the speed level 1 key
037. Con Key Tm 1		It is to set the feed plate transfer to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 1. (Factory installed condition:"400ms")
		[Contents] When pressing the FORW, BACK keys continuously to move the feed plate, set the time for the transfer speed at level 1.

Function No. : 038		Function Name : Time for function of the speed level 2 key
038. 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. : 039		Function Name : Time for function of the speed level 3 key
039. Con Key Tm 3		It is to set the feed plate transfer to speed up.
Setting Value	0~9900ms	It is to set the time for operation in speed level 3. (Factory installed condition:"3000ms")
		[Contents] When pressing the FORW, BACK keys continuously to move the feed plate, set the time for the transfer speed at level 3.

Function No. : 040		Function Name : Electric wiper operation time
040. 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. : 041		Function Name : Electric wiper standby time
041. 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. : 042		Function Name : Pneumatic wiper operation time
042. 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.

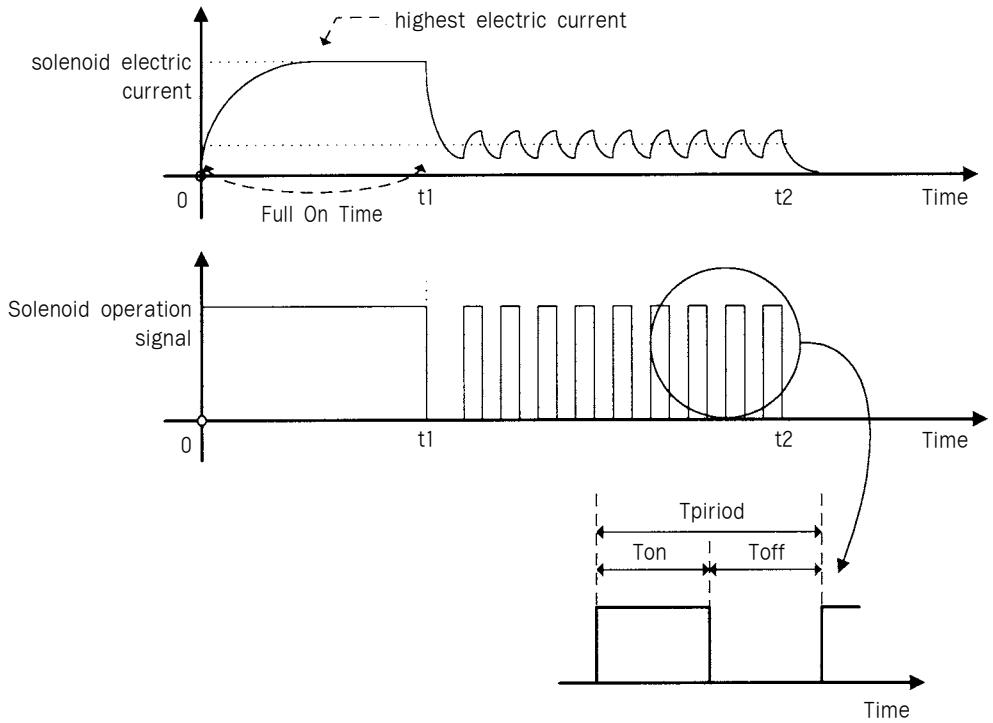
Function No. : 043		Function Name : Pneumatic wiper standby time
043. Air WP Off Tm		It is to set the standby time until the next operation of the pneumatic wiper.
Setting Value	0~5ms	It is to set the standby time until the next operation of the pneumatic wiper. (Factory installed condition : "100ms")
		[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. : 044		Function Name : Standby time for completely lowered presser foot
044. PF Down Time		It is to set the standby time till the next step after the presser foot has been lowered.
Setting Value	0~1020ms	Set the standby time till the next step after the presser foot has been lowered. (Factory installed condition : "152ms")
		[Contents]

Function No. : 045		Function Name : Standby time for completely uplifted presser foot
045. PF Up Time		It is to set up the standby time till the next operation after the presser foot has been lifted.
Setting Value	0~1020ms	Set up the standby time until the next step after lifting the presser foot. (Factory installed condition : "152ms")
		[Contents]

Function No. : 046		Function Name : Presser foot full on time
046. PF Full On Tm		It is to set the beginning strength of the presser foot solenoid.
Setting Value	0~1020ms	It is to set the time period the highest electric current passes through the solenoid. (Factory installed condition : "200ms")
		[Contents] In cases of electric solenoids, set the beginning strength of the presser foot by adjusting the time period high current flows through (Full on time). [Caution] If set too low, the solenoid may not operate, and when set too high, too much electric current may overheat and damage the solenoid and fuse. [Reference] The operation time and strength of the actuators (presser foot, trimmer, wiper) which use the solenoid, can be adjusted by adjusting the electric current of the solenoid. Full on time is the period when the solenoid's electric current is at the highest point.

0~t1 : Full On Time (Period of highest electric 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. : 047		Function Name : Feed plate full on time
047. 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. : 048		Function Name : Thread trimming full on time
048. 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. : 049		Function Name : Thread Retaining Full On Time
049. 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. : 050		Function Name : Wiper full on time
050. 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.

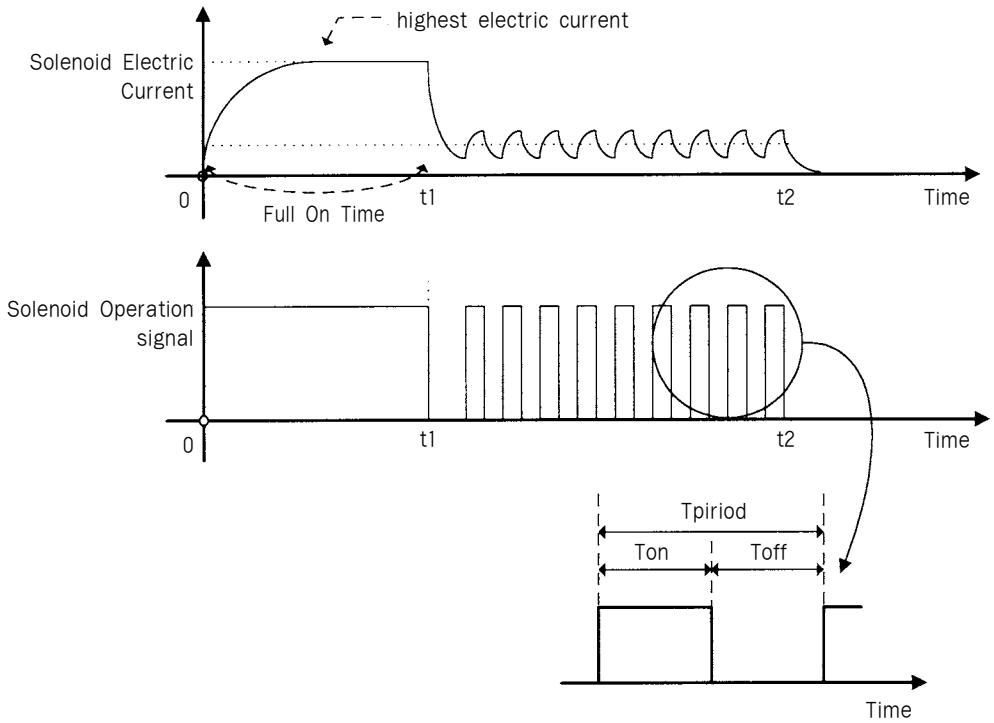
Function No. : 051		Function Name : Left feed plate full on time
051. FFLFull On Tm		It is to set the operation starting power of solenoid in left feed plate.
Setting Value	0~1020ms	It is to set the time when the maximum current is permitted to solenoid. (Factory installed condition : "200ms")
		[Contents] 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. : 052		Function Name : 2 step stroke full on time
052. 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. : 053		Function Name : Inverting device full on time
053. 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. : 054		Function Name : Presser foot duty
054. 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 : 80%), (SPS/A/B-1306, 1507 : 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. : 055		Function Name : Feed plate duty
055. 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 : 80%), (SPS/A/B-1306, 1507 : 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. : 056		Function Name : Thread trimming duty.
056. 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. : 057		Function Name : Thread retaining duty
057. 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.

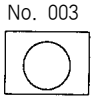
Function No. : 058		Function Name : Wiper duty
058. WP Duty		It is to set the maintenance capacity of the wiper solenoid.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 50%)
		[Contents] In case of wiper used with electronic solenoid, it sets the power that keeps wiper operation by permitting the adjusted current through duty to the solenoid.

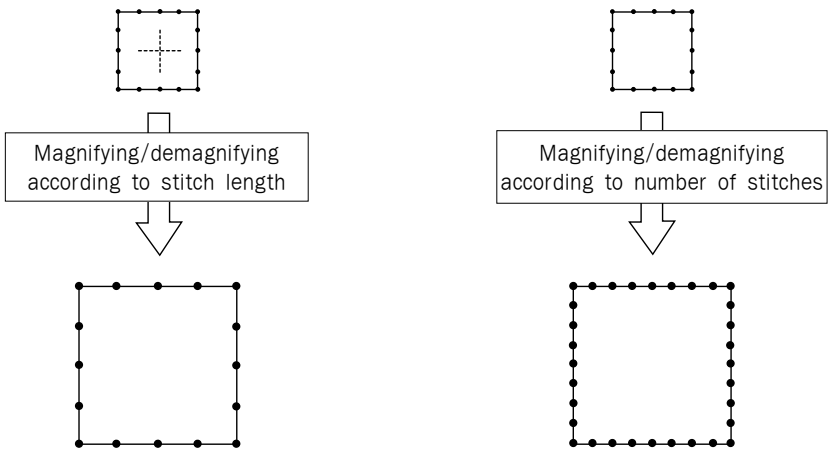
Function No. : 059		Function Name : Left feed plate duty
059. FFL Duty		It is to set the maintenance capacity of solenoid in left feed plate.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid in left feed plate, it sets the power that keeps the relevant operation by permitting the adjusted current through duty to the solenoid.

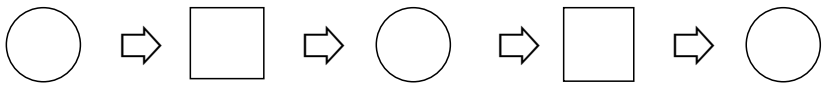
Function No. : 060		Function Name : 2 step stroke duty
060. TS Duty		It is to set the maintenance capacity of solenoid in 2 step stroke.
Setting Value	30~80%	It is to set the amount of maintenance current permitted to solenoid. (Factory installed condition : 80%)
		[Contents] In case of using solenoid 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. : 061		Function Name : Reverting device duty
061. 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. : 062		Function Name : Pattern data reading mode
062. 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. : 063		Function Name : Setting the magnifying/demagnifying mode
063. 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.
		

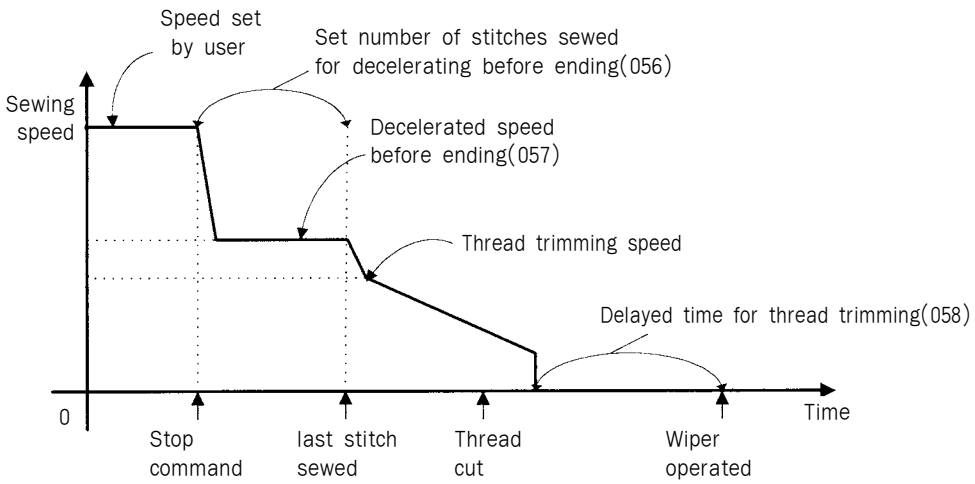
Function No. : 064		Function Name : Number of chain sewings
064. Chain Number		It is to set the sewing mode and number of patterns to chain sew.
Setting Value	0~16	It is to set the number of patterns to chain sew. (Factory installed condition : 0)
		[Contents] When the number is set as "0", one pattern 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. : 065		Function Name : Transferring chain numbers
065. 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. : 066		Function Name : Set the clamp when the chain is used.
066. 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. : 067		Function Name : Number of stitches to decelerate before ending work
067. 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 : SPS/A/B-1306, 1507, 1310, 1811, 5030 : 2 SPS/A/B-2516 : 5 SPS/C-Series : 4)
		[Contents] It is to set the number of stitches when the machine should start decelerating before ending the operation.

Function No. : 068		Function Name : Decelerating speed before ending work
068. 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", SPS/C-Series : Factory installed condition "200")
		[Contents] The speed must be decelerated before ending the work. The decelerating speed is set here.

Function No. : 069		Function Name : Thread trimming delayed time
069. 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. : 070		Function Name : The selection of the low pressure detecting device
070. 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. (Except for 1306, 1507, 1310, they will have default values.)
		[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. : 071	Function Name : Feed plate control
071. 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.

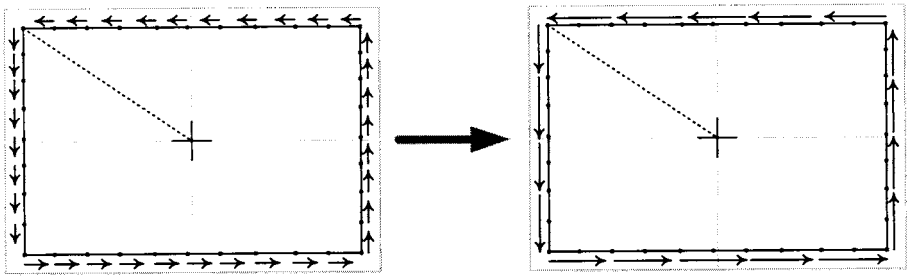
Item / DEFAULT		Upper Reed Plates	Level 2 strokes	Upper feed plate controls for pause	Upper feed plate control with pedal
Setting Value	0	Single body feed plate	×	Feed plate raised and stopped	
	1	Single body feed plate	○	Feed plate raised and stopped	
	2	Two part feed plate	×	Both parts raised and stopped	
	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			

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

Function No. : 072		Function Name : Upper feed plate control when paused
072. 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. : 073		Function Name : Whether to use thread tension adjusting plate after thread trimming.
073. 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.
		[Contents]
	2) ENABLE	Use thread tension adjusting plate after thread trimming. (Factory Default)
		[Contents]

Function No. : 074		Function Name : Upper feed plate control
074. 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. : 075		Function Name : Back/Forth jump stitches
075. 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. : 076		Function Name : Setting-up reference point for zooming
076. 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. : 077		Function Name : Palette signal check
077. 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. : 078		Function Name : Sewing limit set-up
078. Sewing Limit		Designed to ensure the user to increase the mechanical sewing limit of the machine as desired SPS/C-Series can not be used.
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. : 079		Function Name : X-axis forward direction sewing limit set-up
079. XPLUS Limit		The user can increase the X-axis forward direction as desired.
Setting Value	1～250mm	**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: 13mm for 1306 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. : 080		Function Name : X-axis reverse direction sewing limit set-up
080. XMINUS Limit		**The user can increase the X-axis reverse direction of the sewing limit**
Setting Value	-1～-250mm	**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: -13mm for 1306 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. : 081		Function Name : Y-axis forward direction sewing limit set-up
081. YPLUS Limit		The user can increase the Y-axis forward direction of the sewing limit
Setting Value	1～250mm	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: 6mm for 1306 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. : 082		Function Name : Y-axis reverse direction sewing limit set-up
082. YMINUS Limit		The user can increase the Y-axis reverse direction of the sewing limit
Setting Value	-1～-250mm	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: -6mm for 1306 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. : 083		Function Name : Quick origin search motion selection for 1811
083. 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.

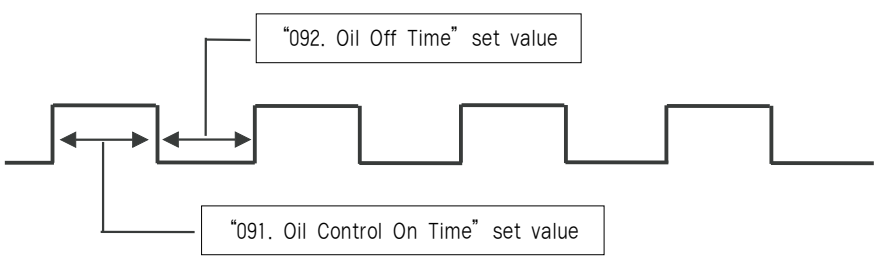
Function No. : 084		Function Name: Upper-Lower Shaft Origin Search Motion Setting after finishing sewing [SPS/C- Series]
084. HOOKORG MODE		To set the function of upper-lower shaft origin search motion after finishing sewing.
Setting Value	1) JOB__SETUP	Not in use.
		[Contents] Do not apply the function of upper-lower shaft origin search motion.
	2) JOB__READY	In Use (at the factory)
		[Contents] Use the function of upper-lower shaft origin search motion. Unlike the existing pattern machines, upper shaft and lower shaft are separated and operated independently in case of SPS/C-Series. Therefore, this function allows setting origin search motion mode to set right time of upper-lower shaft hook time.

Function No. : 085		Function Name: Up-Down Setting Function of Machine Head [SPS/C-Series]
085. HEAD En/Dis		To set ascending of Machine Head after finishing sewing.
Setting Value	1) HEAD__DOWN	Not in use
		[Contents] Do not apply the ascending of machine head after finishing sewing.
	2) HEAD__UP	In Use (at the factory)
		[Contents] Apply the ascending of machine head after finishing sewing. Unlike the existing pattern machines, machine head can ascend and descend in case of SPS/C-Series. Therefore, if the head ascending is necessary for a user after finishing sewing, use the ascending function.
	3) JUMP__HEADUP	[Contents] Always let the head lifted when it is in the jump motion.

Function No. : 086		Function Name: Setting of reverse rotation after trimming [SPS/B/C-Series]
086. RevAfterTrim		The function is to set the reverse rotation after trimming.
Setting Value	1) DISABLE	Disabled (Default)
		[Contents] This disables the function of reserve rotation after trimming.
	2) ENABLE	In use
		[Contents] This enables the function of reverse rotation after trimming. With SPS/C-Series, reverse rotation can be made after trimming unlike other existing pattern machines. Therefore, for very thick sewing materials, during the jump motion after trimming, the needle may be interfered by the sewing materials or the clamp. In this case, user can avoid interruption by enabling the reverse rotation function.
	3) END__SEW	To be activated after the last trimming is conducted.
		[Contents] After the last trimming of sewing, the reverse rotation function shall be applied.

Function No. : 087		Function Name: Set reverse rotation angles after trimming [SPS/B/C-Series]
087. 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. : 088		Function name: Oil control (SPS/C/S-Series)
088. Oil Control		Set up a time for hook lubrication after trimming.
Setting Value	0°～10°	Set up oil control time (Set-up value at the factory: "4")
		[Contents] This function is designed to supply oil to the hook after trimming for a set period of time, using pneumatic pressure. The unit of programmed set-up value is 25ms, and the set-up value at the time of the factory release is 4, or 0.1 seconds (25*4=100ms). Set the value at "0" when the function is not used.

Function No. : 089		Function name: Oil spray cycle off-time setting (C-Series model)
089. OilOffTime		It sets the oil spray cycle off-time.
Setting Value	00～50[ms]	The off-time of oil spraying cycle can be set (default value: 5).
		[Contents] To prevent dust and thread scraps from sticking to the hook, oil is sprayed into the hook. The spraying frequency is set at "091. Oil Control."
		

Function No. : 090		Function Name: Save Type Setting
090. Save Type		It determines the place of saving design patterns.
Setting Value	1) SAVE FDD	Save in FDD (Default value)
		[Contents] Save patterns in FDD.
	2) SAVE FLASH	Save in Flash Memory
		[Contents] When FDD has errors or there is no FDD, design patterns can be conveniently saved in Flash Memory.

Function No. : 091		Function Name: When opening a design, the design internally memorized can be deleted.
091. 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. : 092		Function Name: Setting the Safety Mode
092. 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. : 093		Function Name: Jump Speed Setting [Applied to SPS/C-Series only]
093. 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. : 094		Function Name: Design Auto Call Setting [Possible when SPS/C-Series I/O Board is used]
094. 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. : 095		Function Name: Sewing Ready Setting Upon Design Auto Call [Possible when SPS/C-Series I/O Board is used]
095. 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. : 096		Function Name: External Control Signal Use Setting [Possible when SPS/C-Series I/O Board is used]
096. Attatch 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. : 097		Function Name: Design Call Sensor Time Setting [Possible when SPS/C-Series I/O Board is used]
097. AutoCall TM		This function is to set the time of the design auto call sensor (SEN__0~SEN__3). * Sensor connection method may differ by model types.
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. : 098		Function Name: Upper thread holder setting (C-Series AIR BAG model)
098. ThHold En/Dis		It sets whether to make the upper thread holder hold the needle thread after trimming.
Setting Value	1) DISABLE	**The upper thread holder function is not used.**
		[Contents] After trimming, the needle thread is not held.
	2) ENABLE	**The upper thread holder function is used.**
		[Contents] After trimming, the upper thread holder holds the needle thread for the time set at "110. ThreadHoleTm."

Function No. : 099		Function Name: Upper thread holding time setting (C-Series AIR BAG model)
099. ThreadHoldTm		Set the needle thread holding time by the upper thread holder after trimming.
Setting Value	0~5	**The upper thread holder's holding time is set. (Default: 1[sec])**
		[Contents] The function prevents the remaining thread on the needle from being sown to the sewing materials or being entangled after trimming, affecting the sewing quality negatively. In general, when 1ms is set, the thread is released after one stitching.

Function No. : 100		Function Name: Clamp sensor setting
100. Clamp Sensor		The left, right sensors detect the proper attachment of the clamp. If more than one sensor fails to detect the clamp, the machine does not start operating. This function is applied to the removable clamp [for Air bag model].
Setting Value	1) DISABLE	**The clamp sensor is not used.**
		[Contents] Without sensor's clamp detection, forced sewing can be conducted.
	2) ENABLE	The clamp sensor is used.
		[Contents] When either one of the left and right sensors fails to detect the clamp, sewing cannot be performed.

Function No. : 101		Function Name: Airbag mode setting
101. Cassette Type		If the clamp is removable (Cassette type), set the airbag mode.
Setting Value	1) DISABLE	**The airbag mode is not used.**
		[Contents] Regular clamp, not removable clamp (Cassette Type), is used.
	2) ENABLE	The airbag mode is used.
		[Contents] Removable clamp (Cassette type) is used.

Function No. : 102		Function Name: Program mode lock
102. Program Lock		This function locks the program mode of the main menu.
Setting Value	1) DISABLE	**Disabled (Default)**
		[Contents] When the function is disabled, the usage of program mode is as same as before.
	2) ENABLE	**In use**
		[Contents] When the function is enabled, it is impossible to enter the program mode.

Function No. : 103		Function Name: Semi-auto removal of lower feed plate(SPS-3020, 5030, 5034)
103. Low Feed Set		When sewing is completed, the lower feed plate is automatically removed.
Setting Value	1) DISABLE	**Disabled (Default)**
		[Contents] When the function is disabled, the usage of program mode is as same as before.
	2) ENABLE	**In use**
		[Contents] When the function is enabled, the lower feed plate is automatically removed.

Function No. : 104		Function Name: Basic clamp position setting
104. CImp Ref POS		This function sets the basic position of the clamp.
Setting Value	1) Ref__UP	**Disabled (Default)**
		[Contents] When the function is disabled, the usage of program mode is as same as before.
	2) Ref__DOWN	**In use**
		[Contents] For use, the clamp's pneumatic lines A and B shall be exchanged before connection.

Function No. : 105		Function Name: Set up the positions to stop the needle bar
105. 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°. However, value of SPS/C-Series is originally set at 97°, upon shipment.)
		[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.

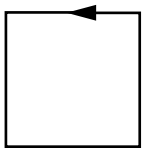
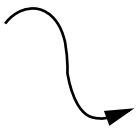
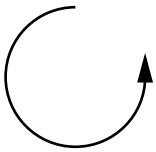
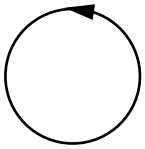
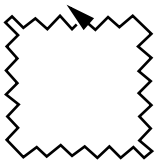
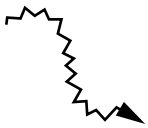
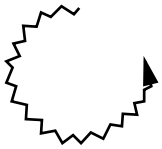
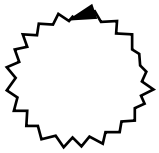
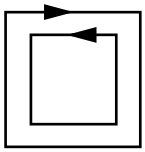
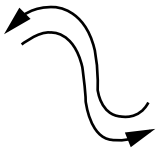
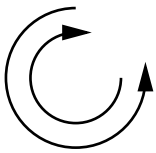
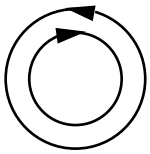
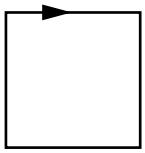
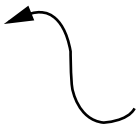
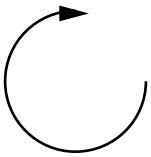
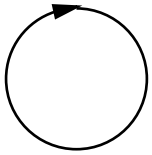
1) Function No. Related to Pattern Programming

(Function numbers might be different depending on machine type.)

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	Output Port Setting Function [Applicable when the SPS/C-Series board is attached]	The function is that a user can program devices that are set to certain places when punching.
058	Input port user setting function[Applicable when the SPS/C-Series board is attached]	The function can program devices set at arbitrary positions when conducting punching.
059	Time Delay Setting Function when using output port [Applicable when the SPS/C-Series board is attached]	The function is that a user can program applicable time delay when using output port.
063	Third thread adjusting device setting [Applicable when the SPS/C-Series board is attached]	These functions are programmable when the 3rd thread adjusting device is attached.

2) Pattern chart (Function numbers might be different depending on machine type.)

	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 

3) Parameter Number Related to General sewing

(Parameter numbers can be different depending on machine type.)

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	Counting method of the lower thread counter	1) UP__COUNT	1) Counting by increasing the sewing completion number		0～3
		2) DN__COUNT	2) Counting by lowering the sewing completion number		
		3) DESIGN__UP	3) Counting by increasing the sewing completion number by design		
		4) DESIGN__DN	4) Counting by lowering the sewing completion number by design		
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	Main shaft speed acceleration setting	1) SLOW__STRT0	A/B-Series	200→400→600→800→1000	1spm
			C-Series	200→200→400→800→1200→1600→1800→2000	
		2) SLOW__STRT1	A/B-Series	300→500→700→900→1200	
			C-Series	200→200→400→800→1000→1200→1400→1600	
		3) SLOW__STRT2	A/B-Series	400→500→800→1000→1200	
			C-Series	200→200→200→400→600→800→1000→1200	
		4) SLOW__STRT3	A/B-Series	500→600→900→1100→1300	
			C-Series	200→200→400→400→600→800→1200→1400	
		5) SLOW__STRT4	A/B-Series	500→500→500→800→1000	
			C-Series	200→400→400→600→800→1200→1600→1800	
		6) SLOW__STRT5	A/B-Series	600→600→600→800→1200	
			C-Series	200→400→400→600→800→1200→1600→2000	
		7) USER__STRT	User define		
010	1st needle speed setting	200ms	Set the speed for the 1st needle. 2～25[100ms]		1[100ms]
011	2nd needle speed setting	200ms	Set the speed for the 2nd needle. 2～25[100ms]		1[100ms]
012	3rd needle speed setting	400ms	Set the speed for the 3rd needle. 2～25[100ms]		1[100ms]
013	4th needle speed setting	600ms	Set the speed for the 4th needle. 2～25[100ms]		1[100ms]

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
014	5th needle speed setting	800ms	Set the speed for the 5th needle. 2~25[100ms]	1[100ms]
015	6th needle speed setting	1000ms	Set the speed for the 6th needle. 2~25[100ms]	1[100ms]
016	7th needle speed setting	1200ms	Set the speed for the 7th needle. 2~25[100ms]	1[100ms]
017	8th needle speed setting	1400ms	Set the speed for the 8th needle.	1[100ms]
018	9th needle speed setting	1600ms	Set the speed for the 9th needle. 2~25[100ms]	1[100ms]
019	10th needle speed setting	1800ms	Set the speed for the 10th needle. 2~25[100ms]	1[100ms]
020	Limit to maximum sewing speed	1) 2500spm/3.0mm(for 1306)		0~4
		2) 2000spm/3.0mm		
		3) 1700spm/3.0mm		
		4) 1300spm/3.0mm		
021	Transfer starting angle of the feed plate	50 [DEGREE]	Setting it to fit the thickness of sewing materials : 0~100°	1
022	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	
023	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	
024	Signal treatment of pedal 1	1) LATCH		0/1
		2) FLIP		
025	Signal treatment of pedal 2	1) LATCH		0/1
		2) FLIP		
026	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	
027	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	
028	Wiper operation	1) ALWAYS_OFF	Operation prohibition	0~2
		2) ELEC_TYPE	Electronic type wiper	
		3) AIR_TYPE	Air type wiper	
029	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	
030	Thread broken sensor mode	1) DISABLE	1) No use	0/1
		2) ENABLE	2) Use	
031	Detected no. of broken stitches when starting sewing	5[STITCH], (SPS-5050/8050 : 10)	0~15 Stitches	1
032	Detected no. of broken stitches during the normal sewing	3[STITCH], (SPS-5050/8050 : 5)	0~15 Stitches	1
033	Trimming mode	1) DISABLE	No use	0/1
		2) ENABLE	Use	
034	Time of 1st-step jog speed	400[ms]	1~99×100ms	100
035	Time of 2nd-step jog speed	1000[ms]	1~99×100ms	100
036	Time of 3sd-step jog speed	2000[ms]	1~99×100ms	100
037	1st-step key-continued pressing time	400[ms]	1~99×100ms	100
038	2nd-step key-continued pressing time	100[ms]	1~99×100ms	100
039	3rd-step key-continued pressing time	3000[ms]	1~99×100ms	100

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
040	Operating time of elec' type wiper	52[ms]	0～1020ms	4
041	Returning time of elec' type wiper	100[ms]	0～1020ms (Waiting time for next operation)	4
042	Operating time of air type wiper	100[ms]	0～1020ms	4
043	Returning time of air type wiper	100[ms]	0～1020ms (Waiting time for next operation)	4
044	Waiting time descending completion of presser foot	152[ms]	0～1020ms	4
045	Waiting time ascending completion of presser foot	152[ms]	0～1020ms	4
046	Presser Full On Time	200[ms]	0～1020ms	4
047	Feeding plate Full On Time	200[ms]	0～1020ms	4
048	Trimming Full On Time	200[ms]	0～1020ms	4
049	Loosening thread Full On Time	200[ms]	0～1020ms	4
050	Wiper Full On Time	200[ms]	0～1020ms	4
051	Left feed plate Full On Time	200[ms]	0～1020ms	4
052	2 step stroke Full On Time	200[ms]	0～1020ms	4
053	Inverting device Full On Time	200[ms]	0～1020ms	4
054	Presser foot Duty	80%, (SPS-1306/SPS-1507/1310 : 33)	33～40%	1
055	Feeding plate Duty	80%, (SPS-1306/SPS-1507/1310 : 43)	40～48%	1
056	Trimming Duty	50%	30～80%	10
057	Loosening thread Duty	50%	30～80%	10
058	Wiper Duty	50%	30～80%	10
059	Left feed plate Duty	80%	30～80%	10
060	2 step stroke Duty	80%	30～80%	10
061	Inverting device Duty	80%	30～80%	10
062	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	
063	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	
064	Number to be performed chain stitch	0	0～16 0:General sewing, Over 1: Chain sewing	1
065	Change of chain number	1) MANUAL	Automatic change	0～2
		2) AUTO	Manual change by enter key	
		3) EXTERNAL	Change by outward input	
066	Clamp Setting for Chain Sewing	1) DISABLE	Disabled (default)	
		2) ENABLE	Enabled	
067	Reduction stitch before work completion	2[STITCH], (SPS-5050/8050 : 4, SPS-2211/2516 : 5)	Change to 2～16	1
068	Reduction speed before work completion	400[spm] SPS/C-Series : 200[spm]	200～500spm	100
069	Thread trimming delayed time	72[ms]	52～1020[ms]	4
070	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.	
071	Feed control	0	0～31 See "Parameter description related to general embroidery".	1
072	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	Control the top feed plate according to Article 060	
073	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.	

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
074	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.	
075	Back/forth jump stitches	1	User can define stitch value to move. 1～100 [Stitch]	0/1
076	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.	
077	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.	
078	Sewing limit set-up	1) DISABLE	Not used (at the factory)	
		2) ENABLE	Used	
079	X-axis forward direction sewing limit set-up	13(mm) (For 1306)	Sets the size of X-axis forward direction as desired (1mm～250mm)	1
080	X-axis reverse direction sewing limit set-up	-13(mm) (For 1306)	Sets the size of X-axis backward direction as desired (-1mm～-250mm)	1
081	Y-axis forward direction sewing limit set-up	6(mm) (For 1306)	Sets the size of Y-axis forward direction as desired (1mm～250mm)	1
082	Y-axis reverse direction sewing limit set-up	-6(mm) (For 1306)	Sets the size of Y-axis backward direction as desired (-1mm～-250mm)	1
083	Quick origin search motion for 1811	1) DISABLE	Quick origin search motion not used	
		2) ENABLE	Quick origin search motion used	
084	Upper-lower shaft origin search motion after finishing sewing Setting [SPS/C-Series]	1) JOB_SETUP	Do not use upper-lower shaft origin search motion after finishing sewing	
		2) JOB_READY	Do use upper-lower shaft origin search motion after finishing sewing	
085	Machine Head Up-Down Setting Function [SPS/C-series]	1) HEAD_DOWN	Do not use the ascending of machine head after finishing sewing.	
		2) HEAD_UP	Do use the ascending of machine head after finishing sewing.	
		3) JUMP_HEADUP	Use the head lift function when it is in the jump motion.	
086	Reverse rotation setting after trimming	1) DISABLE	1) Disabled	0～2
		2) ENABLE	2) Enabled	
		3) END_SEW	3) To be activated after the last trimming is performed	
087	Reverse Rotation Angle after Trimming Setting Function	15°	Reverse Rotation Angle after Trimming Setting (1～40 °)	1°
088	Oil control [SPS/C-Series]	4[ms]	Set the hook lubrication time after trimming (0°～10°)	1
089	Oil spray off-time cycle setting	5	This function sets the oil spray off-time cycle. (00～50[sec])	1[sec]
090	Designate the place of saving pattern designs	1) SAVE FDD	Save in FDD (Default value)	
		2) SAVE FLASH	Save in Flash Memory	
091	Deleting Flash Memory Designs When New Designs Are Opened	1) SAVE	Enabled (default)	
		2) DELETE	Disabled	
092	Setting the Safety Mode	1) DISABLE	Not used (at the factory)	
		2) ENABLE	Used	
093	Jump Speed Setting	1) SLOW_SPEED	Lowest Jump Speed	
		2) MIDDLE_SPEED	Medium Jump Speed	
		3) FAST_SPEED	Highest Jump Speed	
094	Design Auto Call Setting	1) DISABLE	This sets the design auto call function.	
		2) ENABLE		
095	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		
096	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		
097	Design Call Sensing Time Setting	10	This sets the sensing time for the design auto call sensors (SEN_0～SEN_3).	1 [100ms]

NO.	Function name	Contents	Explanation and factory-installed setting value	Unit
098	Upper thread holder setting (C-Series AIR BAG model)	1) DISABLE	The upper thread holder function is not used.	
		2) ENABLE	The upper thread holder function is used.	
099	Upper thread holder time setting	1	It sets the time of holding the remaining needle thread after trimming by the upper thread holder.(0~5)	500[ms]
100	Clamp sensor setting (C-Series AIR BAG model)	1) DISABLE	The clamp sensor is disabled.	
		2) ENABLE	The clamp sensor is enabled.	
101	Airbag mode setting	1) DISABLE	The regular clamp is used.	
		2) ENABLE	The removable (Cassette type) clamp is used.	
102	Program mode lock	1) DISABLE	1) Disabled	0/1
		2) ENABLE	2) Enabled	
103	Semi-automatic removal of lower feed plate	1) DISABLE	1) Disabled	0/1
		2) ENABLE	2) Enabled	
104	Setting of basic clamp position	1) Ref_UP	1) Disabled	0/1
		2) Ref_DN	2) Enabled	
105	Setting of the needle bar stop position	0° (In case of SPS/C-series, 97°)	When the motor is stopped, the needle bar is positioned and stopped at the set value (0~360°)	1°

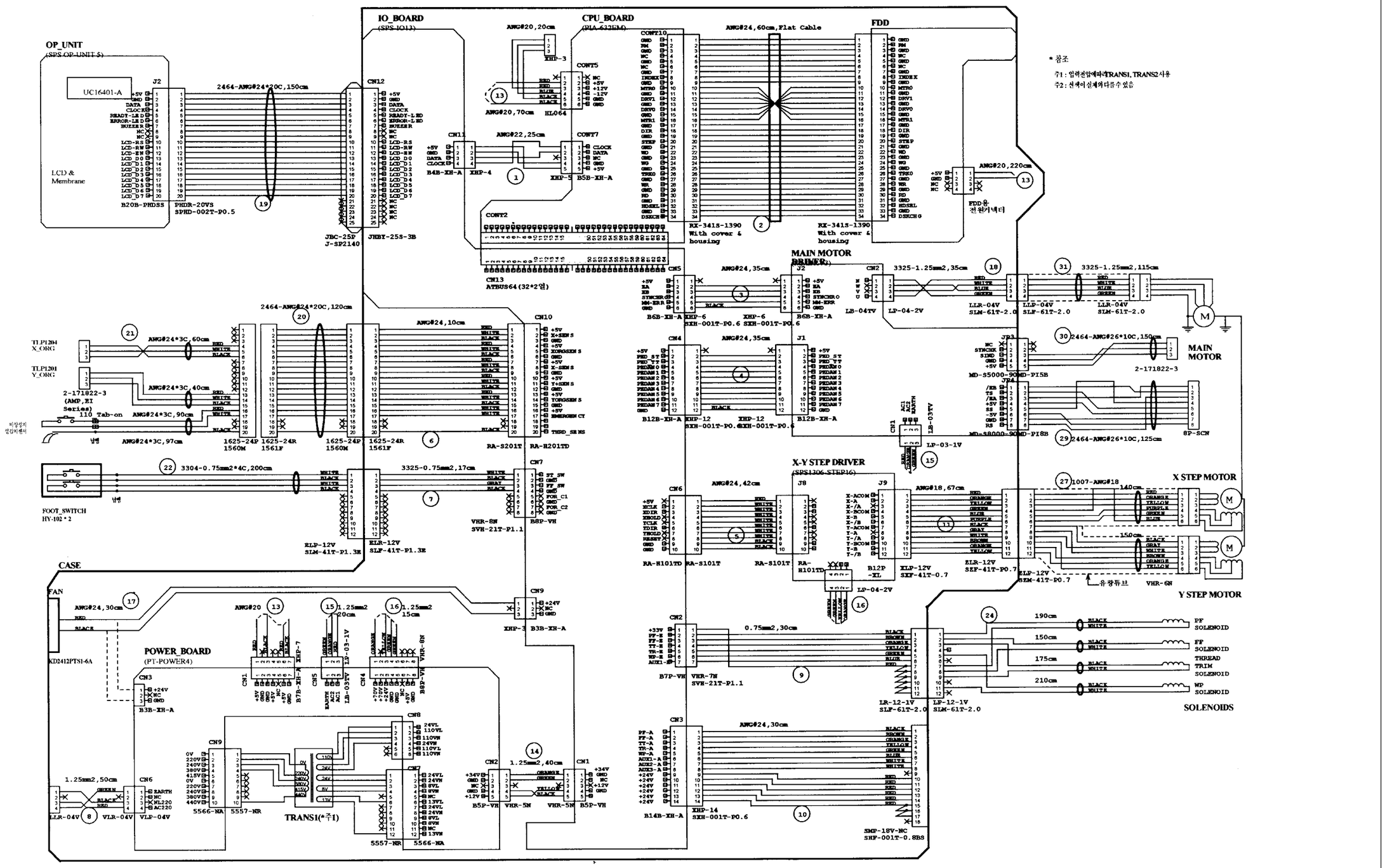
4) Error List

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	Needle Position Err!	Needle bar is not in the proper position
14	Err 14	Limit Over!	it exceeds X-Y limit
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	Main Moroer Err! Dismatch! 999!	The main shaft motor type is not appropriate.

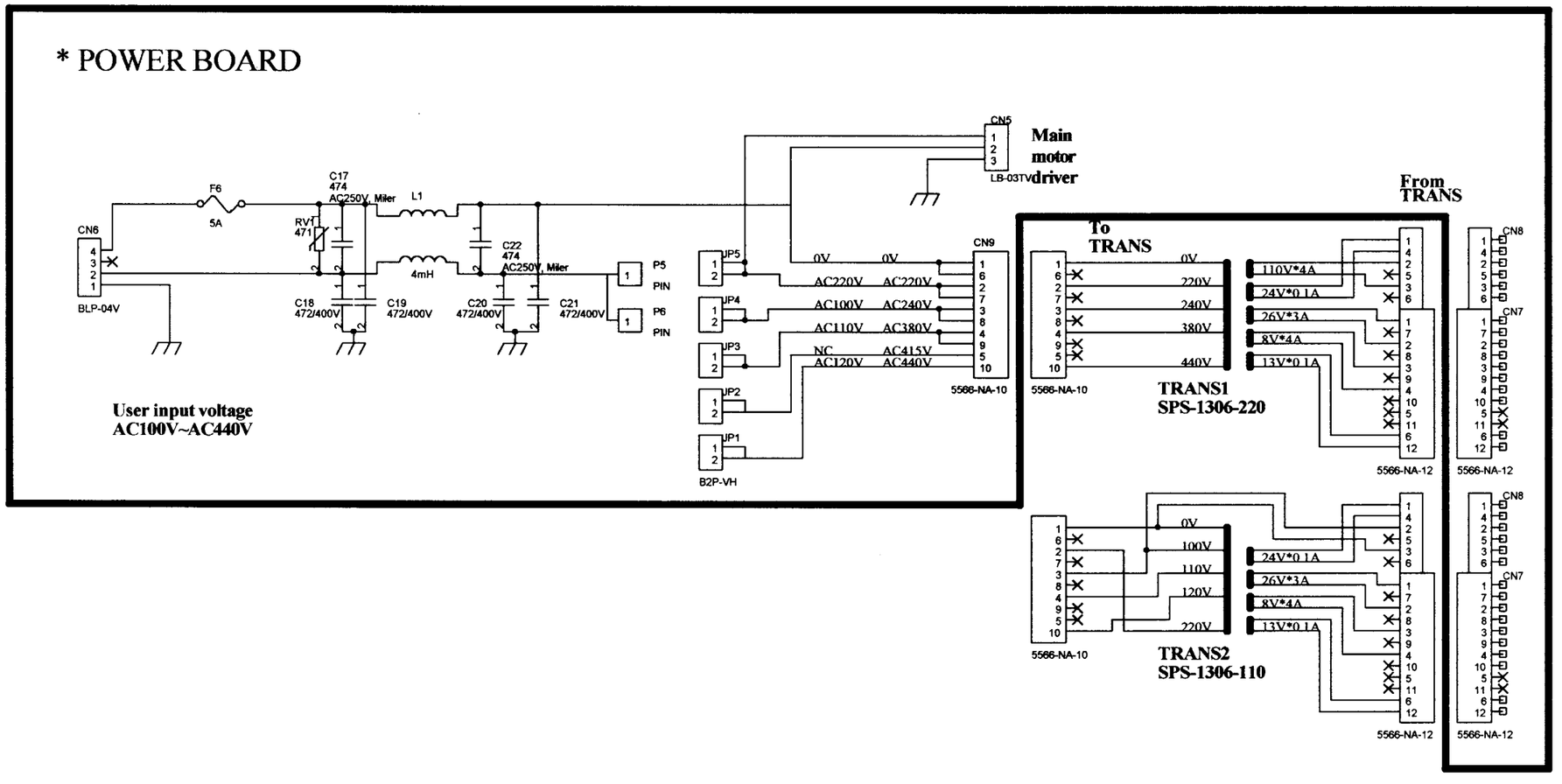
No.	Err List	Message	Meaning
35	Err 35	Over Current Over tem 133!	Cutoff of IPM overcurrent to the main shaft board IPM
36	Err 36	Over Current Abnormal 131!	Motor overcurrent and connector abnormality
37	Err 37	Over Load Err! 129!	Motor overload error
38	Err 38	EncoderRET Err! 128!	No encoder RST signal
39	Err 39	EncoderAB Err! 127	Inconsistency between encoder RST direction and AB direction
40	Err 40	Sybchro! Con.Inserted! 60!	Accessing the location detector while the power is on
41	Err 41	Synchro! Con.Pulled Out! 61!	Removing the location detector while the power is off
42	Err 42	Reverse! Comm. Error! 126!	Mismatch in direction between the motor's rotor magnet and the stator current coil
43	Err 43	EEPROM! Access Error! EEPR!	ROM access error
44	Err 44	Ser.Com.Err! Motor Info Err!	Motor type communication error
45	Err 45	Unknown Err!	Unknown error
46	Err 46	Unknown Err!	Unknown error
47	Err 47	Hook Origin Error!	Failure to set the lower shaft origin
48	Err 48	Hook Motor Err. Push EXIT Key, Or Power Off/On!	Problem found at the lower shaft motor (for SPS/C-Series only)
49	Err 49	Y Motor Err. Push EXIT Key, Or Power Off/On!	Problem found at the Y-shaft motor (for SPS/C-Series only)
50	Err 50	X Motor Err. Push EXIT Key, Or Power Off/On!	Problem found at the X-shaft motor (for SPS/C-Series only)
51	Err 51	Timer Err. Push Power S/W Or Power Off/On!	Problem detected at the timer signal (for SPS/C-Series only)
52	Err 52	Main Origin Error!	Main shaft communication problem during the initial upper/lower shaft origin motion (for SPS/C-Series only)

5) SPS/A/B/C-Series block diagram

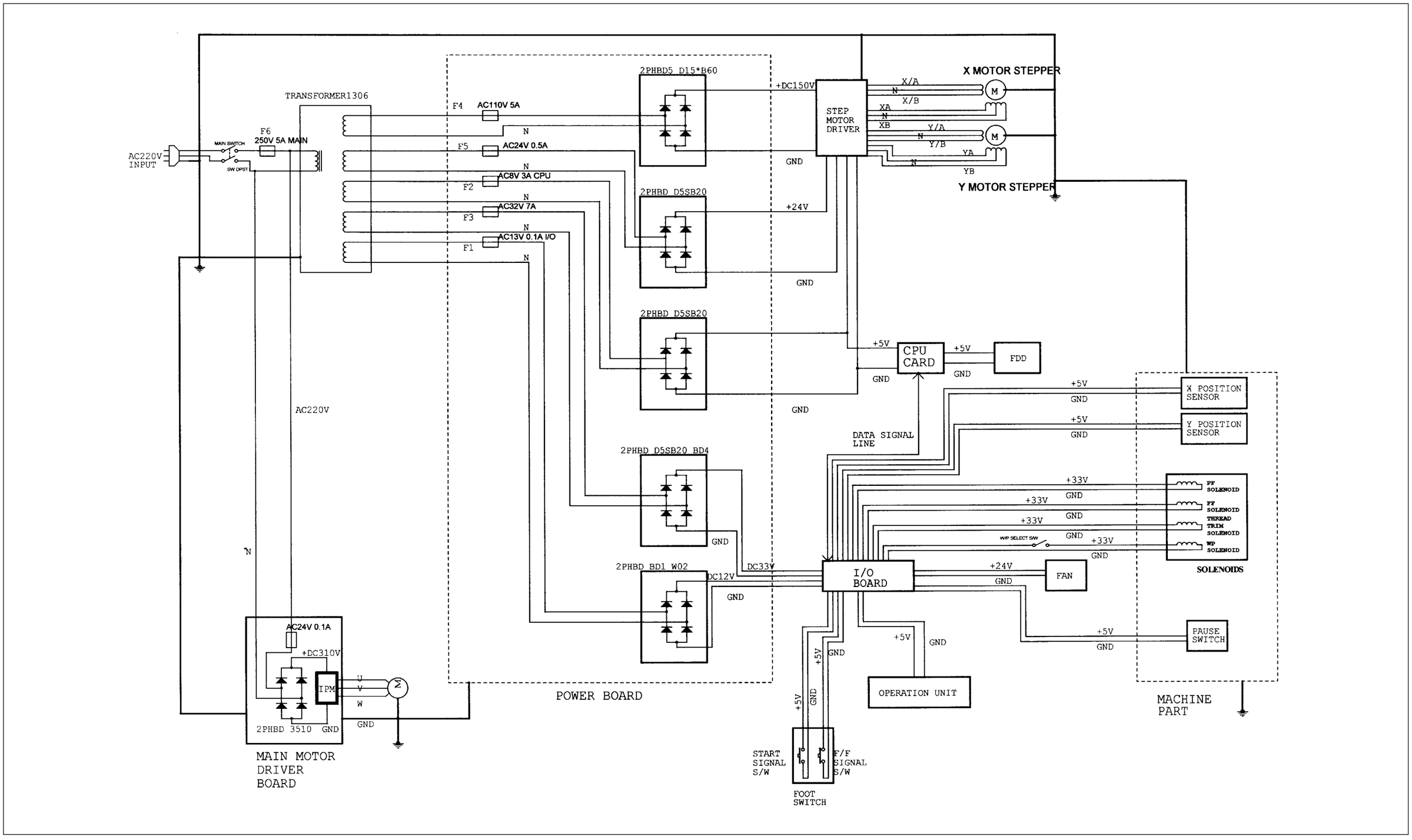
▶ SPS/B-1306 BLOCK DIAGRAM



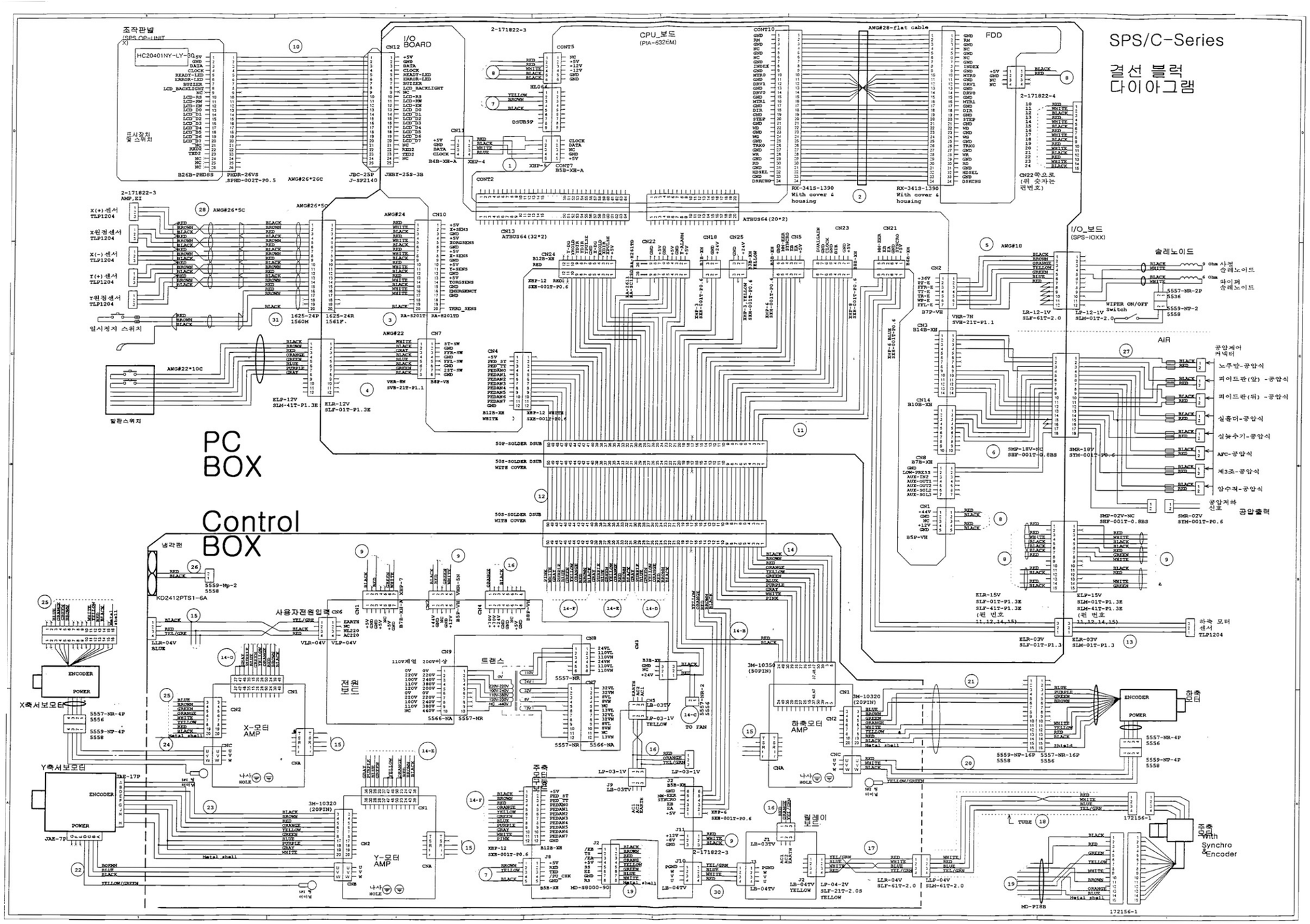
▶ Input Voltage Type POWER DIAGRAM 1306



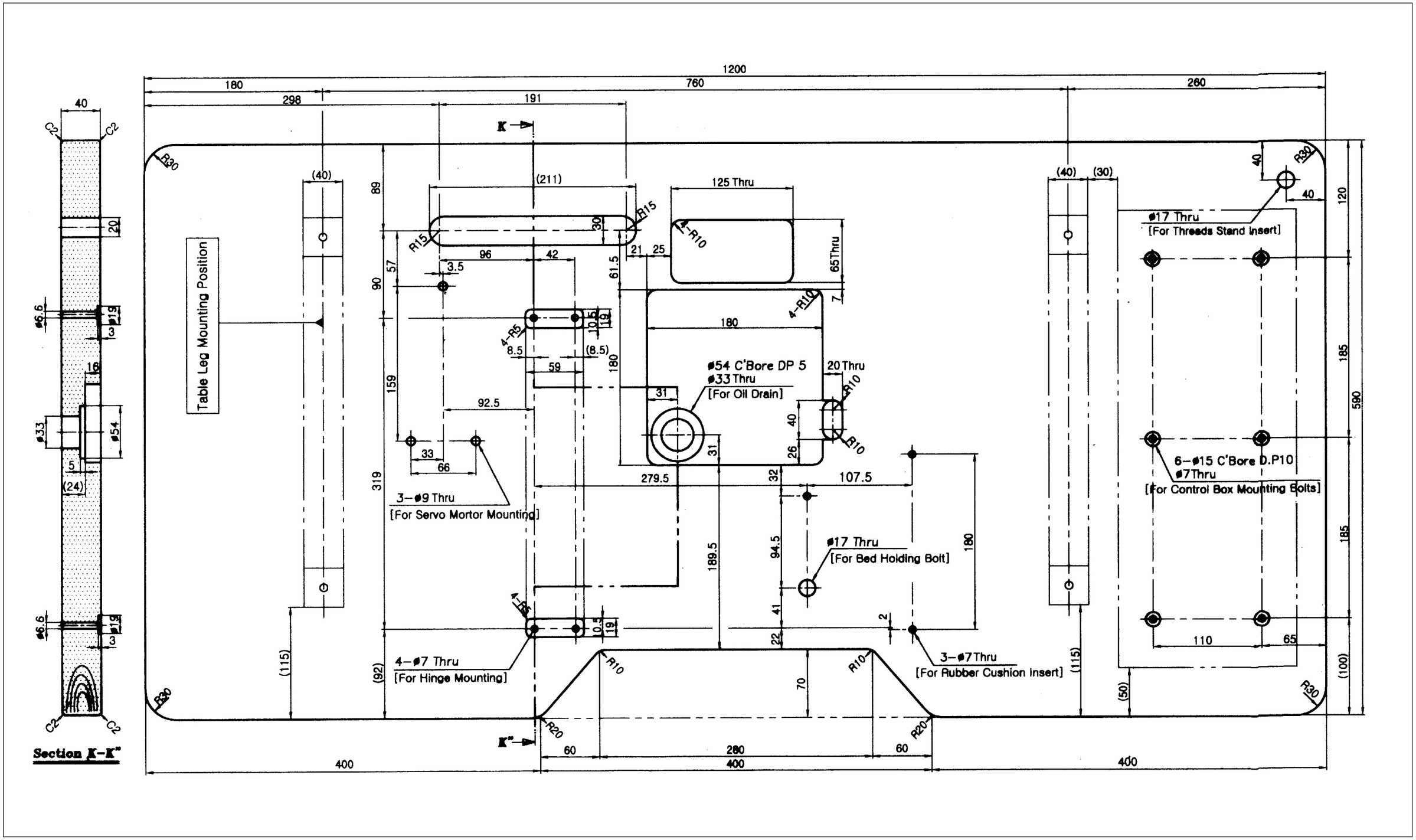
▶ SPS/A-1306 Series BLOCK DIAGRAM



▶ SPS/C-Series BLOCK DIAGRAM



6) Table Drawing



BASIC MANUAL

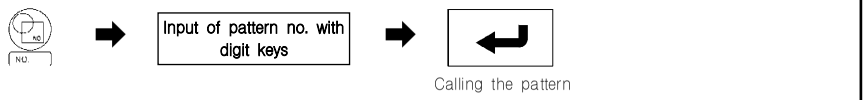
SunStar

SPS/A Series

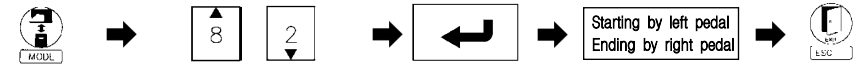
Reference

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

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



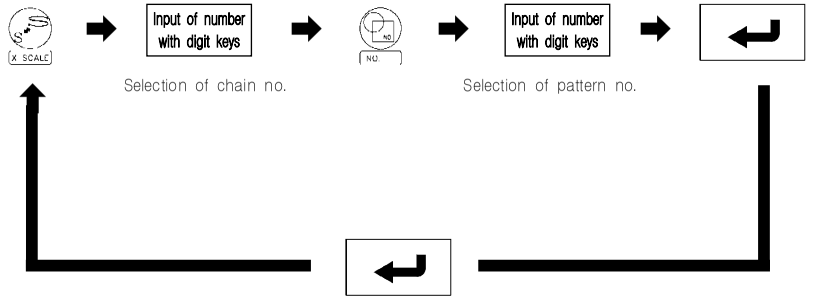
2 Bobbin wind



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

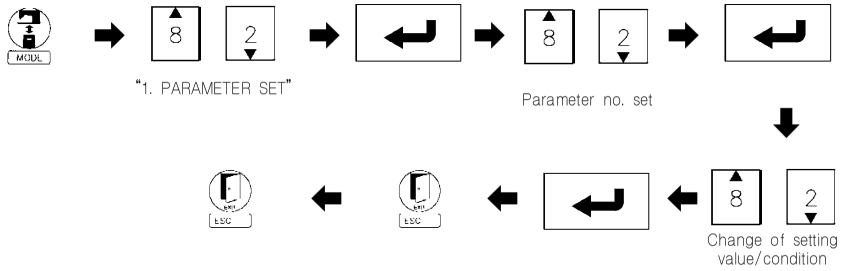
4 Setting the extension and reduction

5 Chain sewing : Performing the chain sewing



Function numbers can be different depending on machine type.

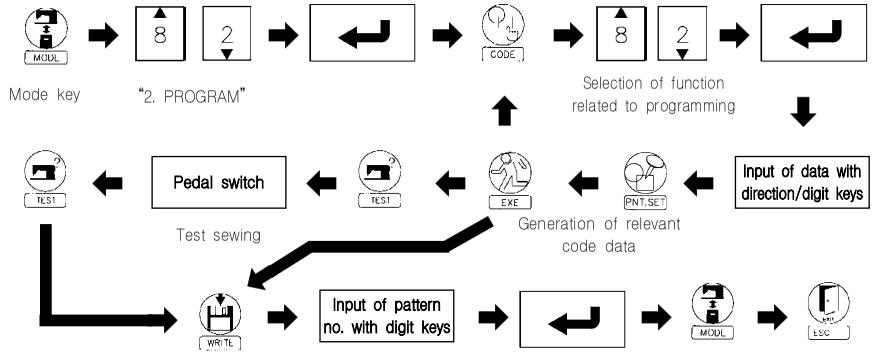
6 Setting the parameter related to general sewing



Parameter number related to general sewing

000	Jog En/Dis	Manual Operation En/Dis
001	Jog Mode	Moving to start position/the 2nd origin by manual drive
002	Machine Org1	Return to the machine origin after finishing sewing operation
003	Machine Org2	Return to the origin when limit error occurs
004	Strt Ret Mod	Return mode to the sewing start position
005	Bobbin Count	Counting method for bobbin count
006	Prodct Count	Use of products counter
007	Pattern Read	Time for reading patterns
008	Trim EM Stop	Trimming during emergency stop
009	Slow Start	Main shaft speed acceleration
010	USER_SLOW_1	1st Needle Speed Setting
011	USER_SLOW_2	2nd Needle Speed Setting
012	USER_SLOW_3	3rd Needle Speed Setting
013	USER_SLOW_4	4th Needle Speed Setting
014	USER_SLOW_5	5th Needle Speed Setting
015	USER_SLOW_6	6th Needle Speed Setting
016	USER_SLOW_7	7th Needle Speed Setting
017	USER_SLOW_8	8th Needle Speed Setting
018	USER_SLOW_9	9th Needle Speed Setting
019	USER_SLOW_10	10th Needle Speed Setting
020	Max Speed	Maximum speed limit of sewing
021	Feed End Pos	Opening angle of feed plate transfer
022	FF Operation	Operation condition of feed plate when sewing operation finishes
023	FF Close En	Descent maintenance of upper feed plate
024	Pedal1 Mode	Signal mode of Pedal 1
025	Pedal2 Mode	Signal mode of pedal 2
026	PF Operation	Setup for presser foot operation
027	PF Down Mode	Setup for descent time of presser foot
028	WP Operation	Setup for wiper operation
029	WP Position	Setup for wiper operation position
030	Thrd Detect	Setup for thread detection
031	Thrd Stitch1	Detecting the stitch number in starting sewing
032	Thrd Stitch2	Detecting the stitch number during sewing
033	Trim En/Dis	Use of trimming function
034	Jog Time1	Manual operation time in speed level 1
035	Jog Time2	Manual operation time in speed level 2
036	Jog Time3	Manual operation time in speed level 3
037	Con Key Tm1	Time for function of the speed level 1 key
038	Con Key Tm2	Time for function of the speed level 2 key
039	Con Key Tm3	Time for function of the speed level 3 key
040	Elc WP On Tm	Electric wiper operation time
041	Elc WP OffTm	Electric wiper standby time
042	Air WP On Tm	Pneumatic wiper operation time
043	Air WP OffTm	Pneumatic wiper standby time
044	PF Down Time	Standby time for completely lowered presser foot
045	PF Up Time	Standby time for completely uplifted presser foot
046	PF FullOn Tm	Presser foot full on time
047	FF FullOn Tm	Feed plate full on time
048	TT FullOn Tm	Thread trimming full on time
049	TH FullOn Tm	Thread Retaining Full On Time
050	WP FullOn Tm	Wiper full on time
051	FFLFullOn Tm	Left feed plate full on time
052	TS FullOn Tm	2 step stroke full on time
053	RV FullOn Tm	Inverting device full on time
054	PF Duty	Presser foot duty
055	FF Duty	Feed plate duty
056	TT Duty	Thread trimming duty
057	TH Duty	Thread retaining duty
058	WP Duty	Wiper duty
059	FFL Duty	Left feed plate duty
060	TS Duty	2 step stroke duty
061	RV Duty	Reverting device duty
062	PTRN RD MODE	Pattern data reading mode
063	Scale MODE	Setting the magnifying/demagnifying mode
064	Chain Number	Number of chain sewings
065	Chain Select	Transferring chain numbers
066	Chain Clamp	Set the clamp when the chain is used
067	Decel Stitch	Number of stitches to decelerate before ending work
068	Trim SPM	Decelerating speed before ending work
069	Trim Delay	Thread trimming delayed time
070	Low Pressure	The selection of the low pressure detecting device
071	FF Number	Feed plate control
072	FF PauseCtrl	Upper feed plate control when paused
073	Thrd Hold En	Whether to use thread tension adjusting plate after thread trimming
074	Uper Clmp En	Upper feed plate control
075	ConKey3 Num	Back/Forth jump stitches
076	Scale Refer	Setting-up reference point for zooming
077	Palette Chk	Palette signal check
078	Sewing Limit	Sewing limit set-up
079	XPLUS Limit	X-axis forward direction sewing limit set-up
080	XMINUS Limit	X-axis reverse direction sewing limit set-up
081	YPLUS Limit	Y-axis forward direction sewing limit set-up
082	YMINUS Limit	Y-axis reverse direction sewing limit set-up
083	FFOrign 1811	Quick origin search motion selection for 1811
084	HOOKORG MODE	Upper-Lower Shaft Origin Search Motion Setting after finishing sewing [SPS/C- Series]
085	HEAD En/Dis	Up-Down Setting Function of Machine Head [SPS/C-Series]
086	RevAfterTrim	Setting reverse rotation after trimming [SPS/B/C-Series]
087	ReverseAngle	Set reverse rotation angles after trimming [SPS/B/C-Series]
088	OiL Control	Oil control (SPS/C/S-Series)
089	OiLOffTime	Oil spray cycle off-time setting (C-Series model)
090	Save Type	Save Type Setting
091	DsgnOpnCtrl	When opening a design, the design internally memorized can be deleted
092	Safety Mode	Setting the Safety Mode
093	Jump Speed	Jump Speed Setting [Applied to SPS/C-Series only]
094	Auto Call	Design Auto Call Setting [Possible when SPS/C-Series I/O Board is used]
095	Auto Ready	Sewing Ready Setting Upon Design Auto Call [Possible when SPS/C-Series I/O Board is used]
096	Attach Set	External Control Signal Use Setting [Possible when SPS/C-Series I/O Board is used]
097	AutoCall TM	Design Call Sensor Time Setting [Possible when SPS/C-Series I/O Board is used]
098	ThHoldEn/Dis	Upper thread holder setting (C-Series AIR BAG model)
099	ThreadHoldTM	Upper thread holding time setting (C-Series AIR BAG model)
100	ClampSensor	Clamp sensor setting (C-Series AIR BAG model)
101	Cassette Type	Airbag mode setting (C-Series AIR BAG model)
102	Program Lock	Program mode lock
103	Low Feed Set	Semi-automatic removal of lower feed plate
104	Clmp Ref POS	Basic clamp position
105	UpStop Pos	Set up the positions to stop the needle bar

7 Pattern programming : Generating the pattern that users want



Function number related to pattern programming

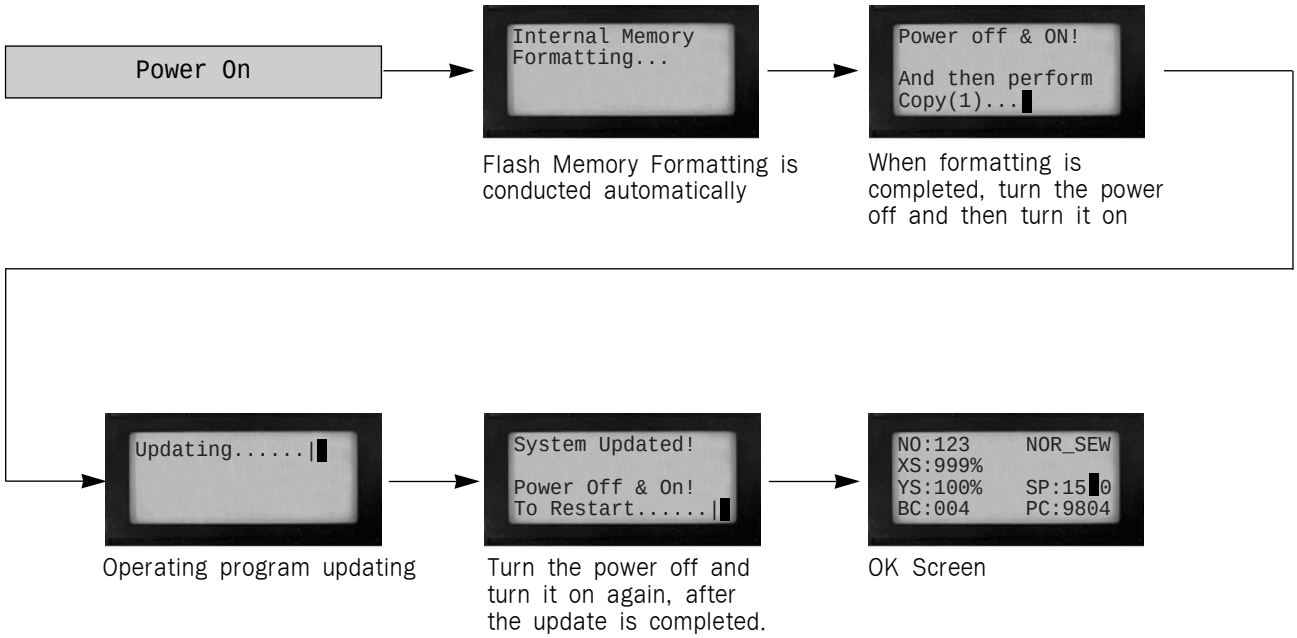
0)	TRIM	Trimming
1)	SEC-ORG	2nd origin
2)	PAUSE	Temporary suspension
3)	EMPTY	One turn of sewing machine
4)	JUMP	JUMP
5)	POINT	Point sewing
6)	LINE/CURVE	Linear/Curving line sewing
7)	LINE	Linear sewing
8)	CURVE	Spline sewing
9)	ARC	Arc sewing
10)	CIRCLE	Circle sewing
11)	JUMP SPD	Change of jump speed
12)	STI SPD	Change of stitching speed
13)	STI WIDT	Partial Sewing Stitch Width Change
14)	PTRN READ	Pattern data reading from floppy diskette
15)	PTRN WRITE	Pattern data writing to floppy diskette
16)	FORMAT	Floppy diskette formatting
17)	INFO DISP	Information indication of present pattern data
18)	CORD SYS	Coordinates setting
19)	LINE ZIG	Linear zig-zag sewing
20)	CURVE ZIG	Spline zig-zag sewing
21)	ARC ZIG	Arc zig-zag sewing
22)	CIRCLE ZIG	Circle zig-zag sewing
23)	LINE OFST	Linea offset sewing
24)	CURVE OFST	Spline offset sewing
25)	ARC OFST	Arc offset sewing
26)	CIRCLE OFST	Circle offset sewing
27)	LINE DBL	Linear double sewing
28)	CURVE DBL	Spline double sewing
29)	ARC DBL	Arc double sewing
30)	CIRCLE DBL	Circle double sewing
31)	LINE DREV	Linear double reverse sewing
32)	CURVE DREV	Spline double reverse sewing
33)	ARC DREV	Arc double reverse sewing
34)	CIRCLE DREV	Circle double reverse sewing
35)	LINE REV	Linear reverse sewing
36)	CURVE REV	Spline reverse sewing
37)	ARC REV	Arc reverse sewing
38)	CIRCLE REV	Circle reverse sewing
39)	PTRN DEL	Partial Pattern Data Delete Function
40)	BACK TACK	Addition of automatic back-tack
41)	CNDNS STI	Condensed Sewing Stitch Adding
42)	OVLAP STI	Addition of overlap stitch
43)	SYMMETRY X	X-axis Symmetrical Data Addition
44)	SYMMETRY Y	Y-axis Symmetrical Data Addition
45)	SYMMETRY P	Point Symmetrical Data Addition
46)	MOVE PTRN	Partial Movement of Pattern Data
47)	COPY PTRN	Copying Function of Pattern Data to Specific Location
48)	DEL PTRN	Deletion of pattern data
49)	REV SET	Partial Pattern Data Delete Function
50)	SPD CHNG	Change/Saving Function of Maximum Pattern Sewing Speed and Extension/Reduction Rate
51)	STITCH DRAG	One Stitch Movement Function
52)	STITCH DEL	A Fixed Number of Stitch Delete Function
53)	MOV SEWSTRT	Change/Saving Function of Pattern Data Start Point
54)	MOV 2ndORG	Change/Saving Function of Pattern 2nd Original Point
55)	Auto TRIM	Setting-up automatic thread trimmer
56)	SCALE REFER	Setting-up user-defined reference point for zooming
57)	SET OP	Output Port Setting Function[Applicable when the SPS/C-Series board is attached]
58)	CHK IP	Input port user setting function[Applicable when the SPS/C-Series board is attached]
59)	TIME DELAY	Time Delay Setting Function when using output port [Applicable when the SPS/C-Series board is attached]
60)	SET TR3	Third thread adjusting device setting[Applicable when the SPS/C-Series board is attached]

7

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

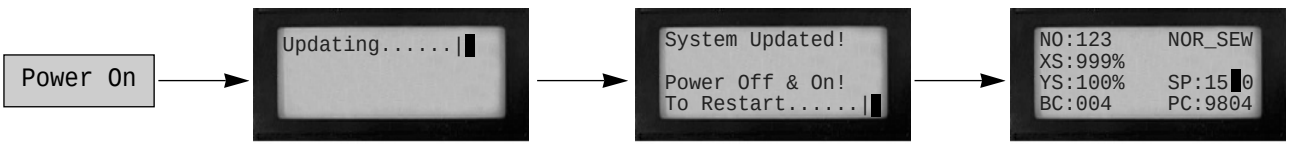
When formatting is completed, turn the power off and then turn it on

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)



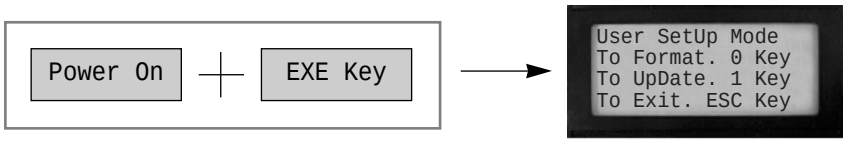
Operating program updating

Turn the power off and turn it on again, after the update is completed.

OK Screen

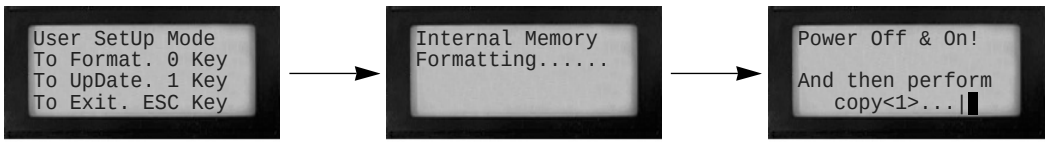
2) User's emergency self-restoration and operating program installation

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

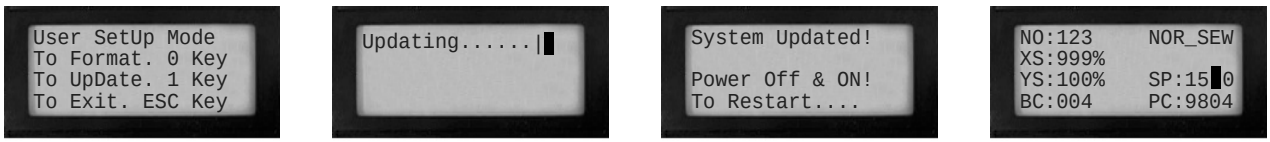


Press "0"

Flash Memory Formatting...

Turn the power off and turn it on again after formatting is completed.

2-2) Program Updating



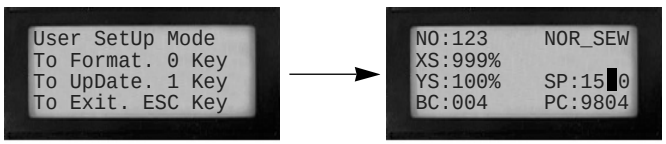
Press "1"

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

8

SPECIAL FUNCTIONS

1) Auto Call Function

Description:

The function that a user can automatically call designs through the external input port can be added. In addition, the user can control the signals for Clamp, Emergency Switch, Enter Key, Sewing Start Pedal, and so on via the external input port.
This function is useful when the user desires it.

Therefore, since the specification is special, make sure to apply the function when there is a request only. When using it, call for the assistance from Technical Assistant.

Take extra care to prevent the regular user from using this function.
This function is applicable to the machine types as below.

① Applicable Model

SPS/A/B - 1306, 1310, 1507, 1811, 2211, 2516,
SPS/A - 3020, 5030, 5034,
SPS/C - 5050, 8050

② Requirements for Application

In case of SPS/A/B-Series, the existing I/O board cannot be used since the number of external input ports is small. In this case, the I/O board of SPS/C-Series should be used.
In case of SPS/C-series, there is no need to change.
As such, when the special specifications are requested for SPS A/B series, make sure to replace its I/O board with the I/O Board of C-Series before release.
In some cases where the installation of SPS/C-Series' Operation Box is requested, the replacement can be conducted before release (To use the OP, lift Dip Switch 6 on the I/O board.)

③ Cautions for Application

The specification of the main shaft motor is FORTUNA-IV's main shaft motor. Previously, SANYO's main shaft motor was used. Therefore, the currently applied pattern's version is the integrated version which is applicable to both FORTUNA-IV and SANYO.
In order to use the two motors, the main shaft board's specification was changed to the integrated version.
If the user applies the Auto Call function in the prevision version, not the integrated version, he/she should replace the C-Series I/O board and ROM BIOS (not the integrated specifications).
When the integrated specification is applied, C-Series I/O Board and ROM BIOS(integrated version) need to be replaced.
In the event that the integrated specification version is applied when the Sanyo motor is used, replace the C-Series I/O Board, the main shaft board of the integrated board (apply the Jumper setting in line with the motor), and ROM BIOS of the integrated version.

④ Version Application

When using this function, the previous version ROM BIOS should be fully replaced.
(notified ROM BIOS versions by model)
To check out the version, see the version mark on ROM BIOS.

How to Use AUTO CALL (For SPS/A/B-Series)

Description : This is a function to call designs automatically. A total of 15 designs can be automatically called by using the four input sensors. It can be controlled by external inputs such as sewing start, emergency switch, clamp, and the enter key.

▶ In order to use the Auto Call function from SPS/A/B-Series, the existing I/O Board should be replaced with the I/O Board of SPS/C-Series. Otherwise, the function is unavailable.

Caution

The auto call cable is an optional item.
Please request the item when the function will be used.

1-1) Signal information related to input port connection

① External sensor's input signal list-up for design auto call

NO.	SEN__3	SEN__2	SEN__1	SEN__0	Design Number
1	0	0	0	1	900
2	0	0	1	0	901
3	0	0	1	1	902
4	0	1	0	0	903
5	0	1	0	1	904
6	0	1	1	0	905
7	0	1	1	1	906
8	1	0	0	0	907
9	1	0	0	1	908
10	1	0	1	0	909
11	1	0	1	1	910
12	1	1	0	0	911
13	1	1	0	1	912
14	1	1	1	0	913
15	1	1	1	1	914

※ For auto design call, an internal memory or a diskette must have the patterns from #900 to #906 saved.

② Definition and explanation of external input ports

Name	Input Port	Connector	Explanation
SEN__0	IP4.0	CN22	Sensor connection for auto call function (low active)
SEN__1	IP4.1	CN22	
SEN__2	IP4.2	CN22	
SEN__3	IP4.3	CN22	
Clamp	IP4.4	CN22	Clamp drive signal (low active)
Emergency S/W	IP4.5	CN22	Emergency stop switch signal (low active)
Sewing Start	IP4.6	CN22	Sewing start signal (low active)
Enter Key	IP4.7	CN22	Ready signal (low active)

③ Cables connected by user

Cable name	Product No.	Cable connecting position
(SPS/B, A-Series) Auto call function cable	CA-003043,00	CN22 on the I/O board
Adjacent sensor cable	CA-002857,00	SMR-03V-N of the auto call function cable

※ Connect the RA2611 connector of the auto call function cable to CN22 on the I/O board.
▶ See the 'Description on connector and jumper pin locations' below regarding the connector locations on the I/O board.
▶ See the cable specifications for cable connectors.

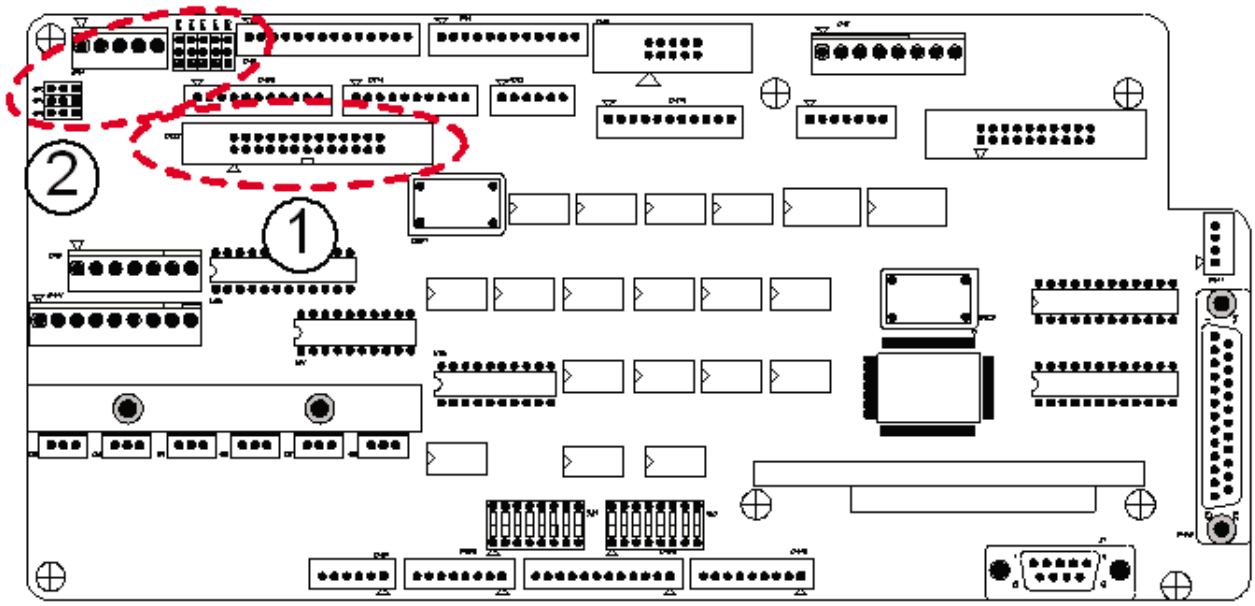
※ A total of 8 adjacent cables are used. Please request the desired number of adjacent sensor cables.

④ Cable signal input information

Signal name	Connector pin number (SMR-03V-N)	Description	Jumper pin for voltage change
SEN__0	1	+5V or +24V	BR1
	2	SEN__0	
	3	GND	
SEN__1	1	+5V or +24V	BR2
	2	SEN__1	
	3	GND	
SEN__2	1	+5V or +24V	BR3
	2	SEN__2	
	3	GND	
SEN__3	1	+5V or +24V	BR4
	2	SEN__3	
	3	GND	
CLAMP	1	+5V or +24V	BR5
	2	Clamp driving signal	
	3	GND	
EM-STOP	1	+5V or +24V	BR6
	2	Emergency stop signal	
	3	GND	
START	1	+5V or +24V	BR7
	2	Signal line for sewing start signal	
	3	GND	
ENTER	1	+5V or +24V	BR8
	2	Signal line for ready signal	
	3	GND	

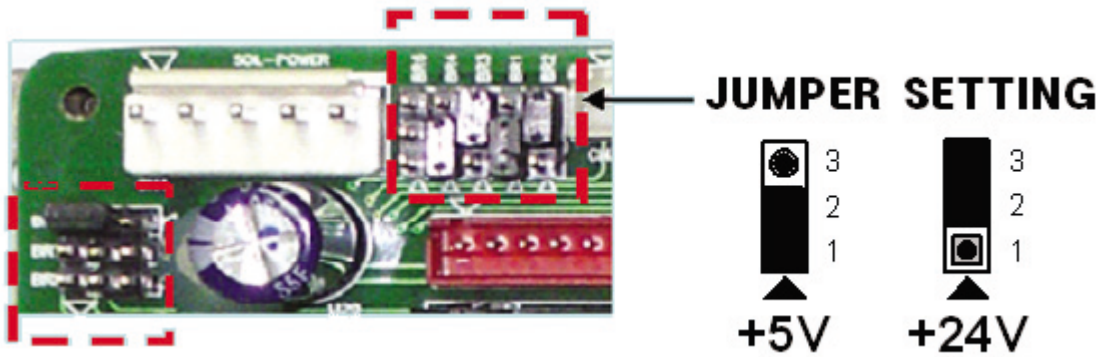
⑤ Connector and jumper pin position

Connector and jumper pin position on I/O board



No.	Description	Remarks
①	Connector for signal input (CN 22)	Connecting the auto call function cable (connector: RA2611)
②	Jumper pin for changing signal input power	

⑥ Changing jumper for sensor input power change



▶ The input power supply to the sensor can be altered to +5V / +24V by changing the BR jumper at the upper left side of the I/O board.

Caution

The auto call function uses the adjacent sensor. Therefore connect the jumper pin to No. 2 and No. 3. (Jumper pins for change: BR1, BR2, BR3, BR4, BR5, BR6, BR7, BR8)
When changing the sensor specifications depending on the user needs, change the input power supply.

How to Use AUTO CALL (For SPS/C-5050,8050)

Description : This is a function to call designs automatically. A total of 15 designs can be automatically called by using the four input sensors. It can be controlled by external inputs such as sewing start, emergency switch, clamp, and the enter key.

▶ The description below is related to 5050 and 8050.

Caution

The auto call cable is an optional item.
Please request the item when the function will be used.

1-1) Signal information related to input port connection

① External sensor's input signal list-up 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

※ For design auto call, pattern numbers from 900 to 906 should be saved in the internal memory or diskette.

② Definition and description of external input ports

Signal name	Input port	Connector	Description
SEN__0	IP4.5	Sensor input connector	Sensor connection for auto call function (low active)
SEN__1	IP4.6		
SEN__2	IP4.7		
Clamp	IP3.4	CN16	Signal for clamp drive (low active)
Emergency S/W	IP3.5		Signal for emergency stop switch (low active)
Sewing Start	IP3.6		Signal for sewing start (low active)
Enter Key	IP3.7		Ready signal (low active)

③ Cables connected by user

Cable name	Product No.	Cable connecting location
(SPS/C-5050,8050) Auto call function cable	CA-003044,00	Connector on the rear PC box side for sensor input CN16 on the I/O board
Adjacent sensor cable	CA-002857,00	SMR-03V-N of the auto call function cable

※ Connect 1625-15Plug of the auto call function cable to the sensor input connector on the rear PC box. Connect XHP-9 to CN16 on the I/O board.

▶ See 'Description on connector and jumper pin location' for the connector locations on the I/O board.

▶ See the cable specifications for cable connector.

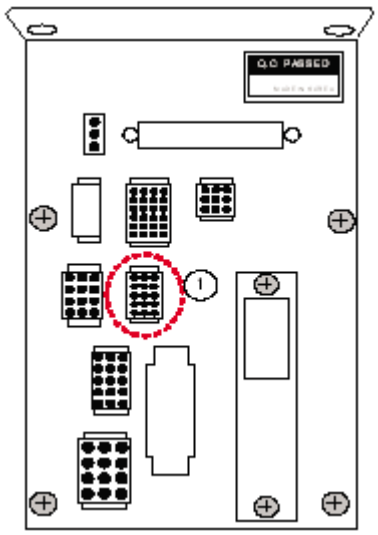
※ A total of 7 adjacent sensor cables are used. Please request the desired number of the cables depending on user need.

④ Cable signal input information

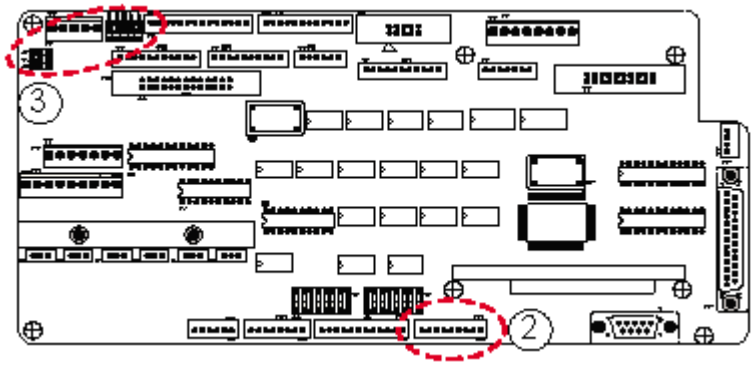
Signal name	Connector pin number (SMR-03V-N)	Description	Jumper pin for voltage change
SEN__0	1	+5V or +24V	BR6
	2	SEN__0	
	3	GND	
SEN__1	1	+5V or +24V	BR7
	2	SEN__1	
	3	GND	
SEN__2	1	+5V or +24V	BR7
	2	SEN__2	
	3	GND	
CLAMP	1	+5V or +24V	BR8
	2	Clamp driving signal	
	3	GND	
EM-STOP	1	+5V or +24V	BR8
	2	Emergency stop signal	
	3	GND	
START	1	+5V or +24V	BR8
	2	Signal line for sewing start signal	
	3	GND	
ENTER	1	+5V or +24V	BR8
	2	Signal line for ready signal	
	3	GND	

⑤ Connector and jumper pin position

Connector position on the rear side of the PC box

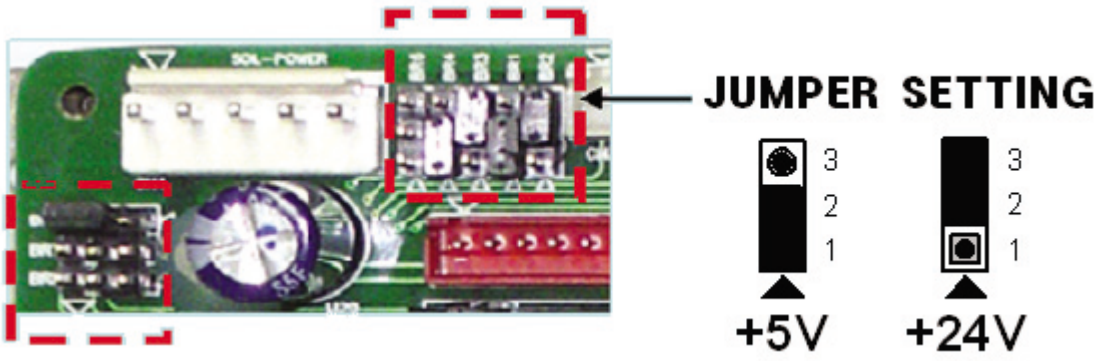


Connector and jumper pin positions on the I/O board



No.	Description	Remarks
①	Connector for sensor signal input	Connecting the auto call function cable (connector: 1625-15Plug)
②	Connector for signal input [CN16]	Connecting the auto call function cable (connector: XHP-9)
③	Jumper pin for changing sensor input power supply	

⑥ Changing jumper for sensor input power change



▶ The input power supply to the sensor can be altered to +5V / +24V by changing the BR jumper at the upper left side of the I/O board.

Caution

The auto call function uses the adjacent sensor. Therefore connect the jumper pin to No. 2 and No. 3. (Jumper pins for change: BR6, BR7, BR8)
When changing the sensor specifications depending on the user needs, change the input power supply.

1-2) Function description upon using the operating program

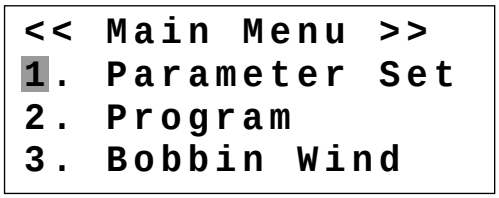
If the external input sensor signals explained above are properly connected, the user can automatically call the designs from #900 to #914 with the sensor signal, and it is possible to use Sewing Start, Clamp, Enter Key, and Emergency Switch.

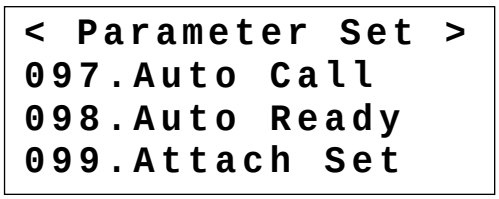
To use the function, some parameter functions should be set in advance.

The following is how to set the functions.

A. On the initial screen, press MODE. On Main Menu, select Parameter Set.
Parameter should be set to use the auto design call function.
The relevant parameter setting is as follows:

097. Auto Call : Set the auto design call function.
098. Auto Ready : Set the auto ready function after calling a design.
099. Attach Set : Determine whether to use Sewing Start, Clamp, Enter Key, and Emergency Switch or not.

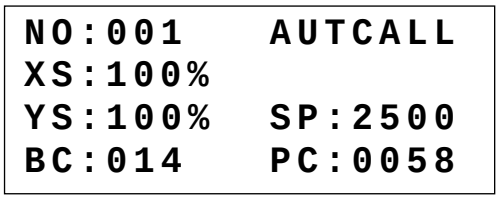




B. Select '097. Auto Call' and move the cursor to 'ENABLE'. Press ENTER.

C. Conduct the setting for 098 and 099 as above.

D. When the sewing returns to the initial mode, "NOR_SEW" is changed to "AUTCALL."



E. Use the external input sensor connected by the user.

2) Design auto call through handy 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

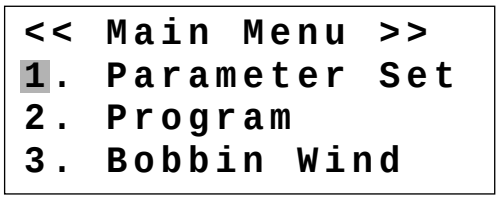
The figure shows the system connection of Metrologic MS5100 Eclipse Series. The serial port of barcode is inserted into the serial port on the side of the OP Box.

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.

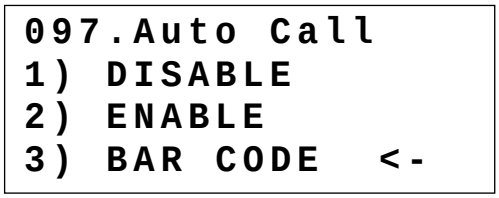
The production of barcode label requires dedicated software and a barcode label printer. They are commercial products, so that user can purchase them in the market. For more inquires, please contact the sales team.

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.
097. Auto Call : Sets automatic design call using barcodes.
098. Auto Ready : Sets automatic sewing ready status after design call.
099. Attach Set : Sets enable or disable of sewing start, clamp, and enter key.
100. AutoCall TM : Sets the lapse time of input sensor upon design auto call. (This function is meaningless in the barcode system.)



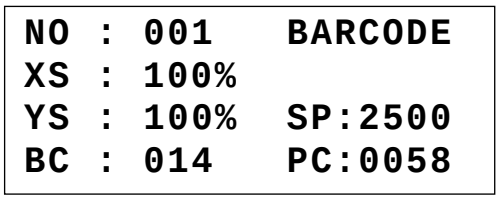
B. Select 097. Auto Call, and move the cursor to BARCODE. Press the enter key to save the value.



C. Set 098, 099 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.

9

Parameter save function

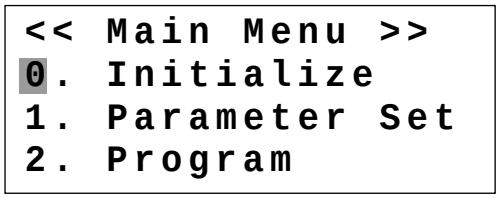
This function enables user to save user-defined parameter data in external storage devices (FDD) while using the pattern device.
The parameter data saved in external storage devices (FDD) can be used to replace the current parameter data all the time.

> **Caution**
> When using the parameter data saved in external storage device (FDD), the parameter data of the current device is replaced with the parameter data of external storage device (FDD).

1) Parameter Write

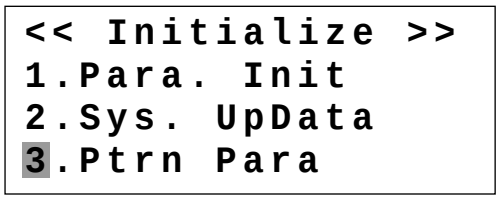
This is how to save changed parameters in line with user setting in external storage device.
The procedures are as follows:

A. Press the MODE key on the initial screen and select Initialize on the main menu.



B. Select No.3 Ptrn Para.

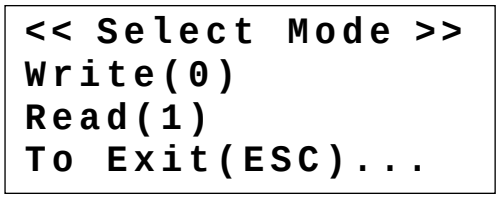
Then the Select Mode screen is displayed.
To write parameter data, select 0. Write.



C. Select 0 on the keypad.

D. Ready LED blinks, and the device's data is saved in the external storage device (FDD).
Data is automatically saved in the set route as below:

FDD route) A:\\SPS\\PARA



2) Parameter Read

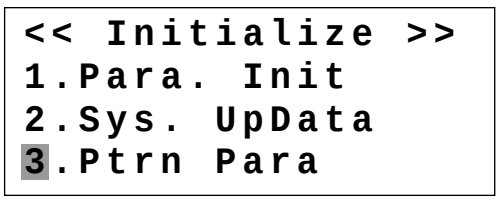
This is how to replace the revised parameter data in the pattern device with the parameter data saved in the external storage device. The procedures are as follows.

The procedures are as follows:

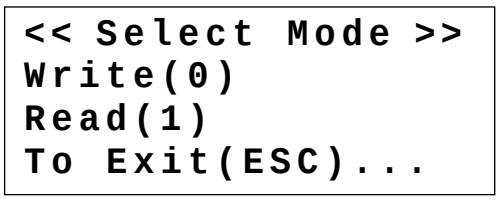
A. Press the MODE key on the initial screen and select Initialize on the main menu.

B. Select No.3 Ptrn Para.

Then the Select Mode screen is displayed.
To read parameter data, select 1. Read.



C. Select No. 1 on the key pad.



D. Ready LED blinks, and the parameter data saved in the device is replaced with the parameter data saved in the external device (FDD).