

1. Important Safety Instructions

- Using Servo Control system and its accessories safely and properly, be sure to read and get the safety instructions before you use the machine.
- Keep the manual for reference whenever necessary.

Keep strictly to the following instruction which should be noted and prohibited when using the machines. Also noted, there will be some serious accidents which is unlisted in the manual if violate the instructions.

Important

- Observe the following safety instruction before use the machine and avoid all the caution and prohibited items.

1.1 Operation Environment

1. Only connect the machine to the power supply which conformed to the specification listed in the label.
2. Keep away from the electromagnetic interference source to avoid malfunction.
3. Do not operate the machine under the site whose temperature is below 5°C or above 45°C.
4. Do not operate the machine under the site whose related humidity is below 30% or above 80%.
5. Keep the machine out of the dust.
6. Keep away from heat and place the machine in the well ventilated environment.

1.2 Installation The Machine

1. Keep strictly to the manual to assemble all the part of the machine.
2. The power supply must be turned off when changing the needle, tilting the head of the machine and connecting/disconnecting the power plug.
3. It's necessary to ground the machine permanently and reliably with appropriate diameter wire and plug to the factory system ground.

1.3 Operation

1. Set the machine on low speed at the first turning on to check whether the rotation direction is correct.
2. Do not press the pedal at the moment the machine is connected to the power supply.
3. Do check the setting parameter and switch status before normal operation.
4. Do not touch the moving parts of the machine, such as hand wheel and needle, while the machine is in operation.
5. On alarm, it is necessary to troubleshoot and confirm the safety, reset the alarm parameter before rerunning the machine.
6. Do not turn on/off the machine power frequently.

1.4 Maintenance

1. As there are high voltage in the control cabinet, avoid to open the cabinet within 5 minutes after turning off.
2. Only the trained expert is allowed to maintain and repair the machine.
3. All the components for maintenance and replacement must be provided or qualified by our company.

1.5 Technology Specification

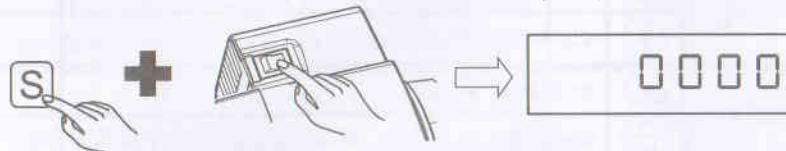
| | |
|------------------------------|-----------------|
| Rated Input Voltage | 220V ± 10% |
| Rated Input Frequency | 50/60HZ |
| Rated Output Power | 550W/750W |
| Maximum Motor Rotation Speed | 5000rpm/3500rpm |

2. Upper Needle Stop Position Setting And Adjustment

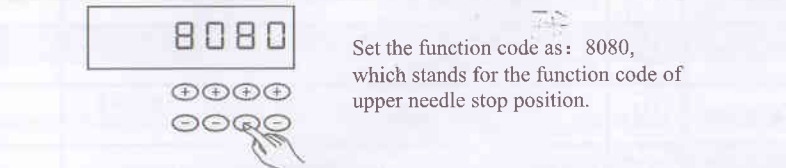
IMPORTANT

The needle stop position must be setted before the first operation, or the machine can't operate normally, and there will be needle broken and locked mechanical issues.

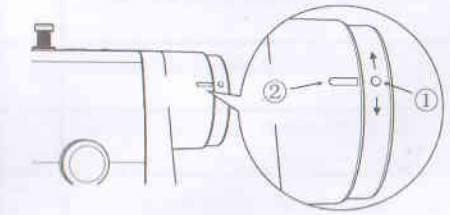
1. Press the key "S" on the same time turn on the Power key to enter function setup mode.



2. While entering into function setup mode, the operation panel LCD displays function code setting interface, then press key +/- to set the code.




Set the function code as: 8080, which stands for the function code of upper needle stop position.



Manual rotates the hand wheel to adjust the needle to the required position. Or alignment the needle position mark point on the hand wheel (POINT ①) and the mark point on the machine head (POINT ②)


This sewing machine needle position IS the factory standard needle position.

Then press the key "S" to save and actuate the function, four short tones are heard and it hints finishing the setting.



The needle position set in step 3 is just the upper needle position.

If the position and step(3) has a gap, you can enter the step (5) manual fine-tuning.



Through the "up" and "down" key to trim the position, the motor will be real time rotation, intuitive display whether the adjustment in place.

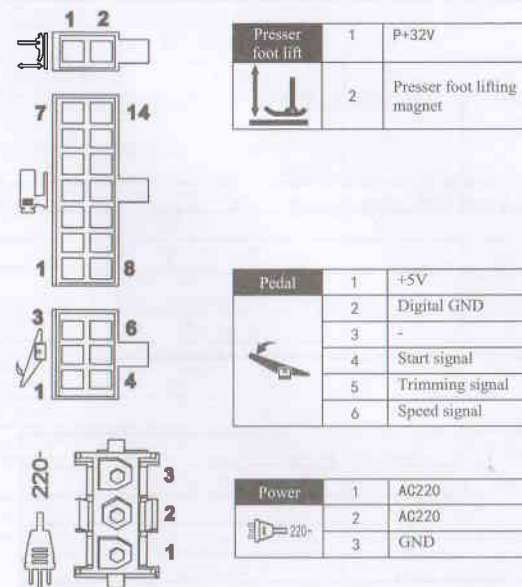
If the stop position be setted on the right position, the set function will be done.

3. Operation Description


3.1 Key Function Definition:

| Function | Key | Description | Icon |
|---------------------------------------|-----|--|------|
| Function ParameterEdit | | Enter function parameter edit mode after pressing the key for 2~3S in the operation mode; Quit function parameter edit mode after press the key for 2~3S in the edit mode. | — |
| Setting Parameter Check And Save | | After setting the function code, press this key to check the preset parameter and then can edit the parameter accordingly; When the parameter is fixed, press key to save the setting and quit. | — |
| Speed Increase/Decrease | | Increase the sewing speed | — |
| | | Slow down the sewing speed. | — |
| Parameter Increase/Decrease | | Increase the parameter | — |
| | | Decrease the parameter | — |
| Stitch Setting | | Press this key to change the needle nubmer section. | — |
| Auto Function | | Automatic function for constant stitch sewing. | |
| Needle Stop Position Selection | | Select needle up/down stop position. The default is up position when the related icon is lighting on the panel LCD. | |
| Slow Launch Setting | | Set slow launch function. When the related icon is display on the panel, the function is activated. | |
| Auto Lift Presser Foot After Pause | | Set presser foot Auto-Lifting after pause function. When the related icon is display on the panel, the function is activated. | |
| Auto Lift Presser Foot After Trimming | | Set presser foot auto-lifting after trimming function. When the related icon is display on the panel, the function is activated. | |
| Consecutive Reverse sewing | | Set consecutive reverse sewing function. When the related icon is display on the panel, the function is activated. | |
| Free Sewing | | Set free sewing function. When the related icon is display on the panel, the function is activated. | |
| Start Back-Tracking Sewing | | Set start back-tracking sewing function. Continuous press the key,the function will in single back-tracking and dual back-tracking between the switch. | |
| End Back-Tracking Sewing | | Set end back-tracking sewing function. Continuous press the key,the function will in single back-tracking and dual back-tracking between the switch. | |
| Constant Stitch Sewing | | Execute section E constant stitch sewing. Continuous press the key,the function will in four section sewing, and user-defined multi-section between the switch. | |
| Line Trimming | | When this function is selected, and this icon will be displayed on the panel LCD, and so line trimming function is activated. | |
| Lift And Fill Up Needle | | Actuate lift and fill up needle function. | — |
| ClampThread Function | | Set the clamp thread function. | |


4. System Wire Diagram



Integrated machine-Magnet

|  | Magnet | 1 | +32V |
|---|--------|------------------------------------|------|
| | 8 | Lines trimming magnet | |
| | 2 | +32V | |
| | 9 | Clamp thread /Lines picking magnet | |
| | 3 | 32V digital GND | |
| | 10 | Fill needle switch | |
| | 4 | LED 5V GND | |
| | 11 | LED +5V | |
| | 5 | 32V digital GND | |
| | 12 | Reverse stitching switch | |
| | 6 | P+32V | |
| | 13 | Reverse stitching magnet | |
| | 7 | P+32V | |
| | 14 | Lines loosing magnet | |

External machine-Magnet

| | | | |
|---|--------|------------------------------------|------|
|  | Magnet | 1 | +32V |
| | 8 | Lines trimming magnet | |
| | 2 | +32V | |
| | 9 | Clamp thread /Lines picking magnet | |
| | 3 | 32V digital GND | |
| | 10 | Fill needle switch | |
| | 4 | LED +5V | |
| | 11 | LED 5V GND | |
| | 5 | 32V digital GND | |
| | 12 | Reverse stitching switch | |
| | 6 | P+32V | |
| | 13 | Reverse stitching magnet | |
| | 7 | P+32V | |
| | 14 | Lines loosing magnet | |

5. Operation Mode Selection

5.1 Sewing Mode

The machine enters into sewing mode as default setting after powering on. In the sewing mode, the user can select various kinds of sewing function after setting technology parameter. In sewing mode, the users can switch over between various kinds of sewing function according to their need, but can't modify and set all the system technology parameters.

5.2 User Parameter Setting Mode

In user parameter setting mode, users can adjust various kinds of sewing function parameter. The steps are as follows:

1. Press key P for 2~3S in the sewing mode to enter into user parameter setting mode.
2. The interface after entering into user parameter setting mode is function ID selection, press +/- to select the required number.
3. After fixing the function ID, press key S to check and modify the related parameter, press +/- to set the required parameter.
4. After fixing the parameter, press key S to save the setting and quit the interface.
5. Press key P for 2~3S to quit the user parameter setting mode and back to sewing mode.

5.3 System Parameter Setting Mode

In system parameter setting mode, it's available to adjust kinds of the parameter of the electromagnets and system setting. The system parameter ranges from Fn-40 ~79. Details parameter can be set according the following steps. The steps are as follows:

1. Long press key P, in the same time turn on the power switch from off to enter into system parameter setting mode.
- In this mode, both system parameter and user parameter can be modified.
2. The default interface after entering into system parameter setting mode is function ID selection, press +/- to select number.
3. After fixing the function ID, press key S to check and modify the related parameter, press +/- to set the required parameter.
4. After fixing the parameter, press key S to save the setting and quit the interface..
5. Press key P for 2~3S to quit the system parameter setting mode and back to sewing mode.

User parameter table:

| No. | Items | Default | Range | Contents |
|-------|--|---------|----------|---|
| Fn-01 | Maximum sewing speed (r/min) | 3600 | 100~5000 | Maximum speed adjustments |
| Fn-02 | Set accelerated curve (%) | 120 | 10~150 | Set the acceleration slope |
| Fn-03 | Start Back-Tacking speed (r/min) | 1800 | 150~2800 | Set Start Back-Tacking speed |
| Fn-04 | End Back-Tacking speed (r/min) | 1800 | 150~2800 | Set End Back-Tacking speed |
| Fn-05 | Bar-Tacking speed (r/min) | 1800 | 150~2800 | Set Bar-Tacking speed |
| Fn-06 | Slow start speed (r/min) | 300 | 150~2800 | Set slow start speed |
| Fn-07 | Number of Stitches for slow start | 2 | 0~99 | Number of stitches setting for slow start |
| Fn-08 | Automatic Constant-Stitch sewing speed (r/min) | 3200 | 300~4500 | Speed adjustment for automatic constant-stitch sewing |
| Fn-09 | Automatic end Back-Tacking sewing | 1 | 0~1 | 1: After last seam of constant stitch sewing, it will automatic execute the End Back-Tacking sewing function. When turned on, the Stitch-Correction is invalid. 0: Automatic End Back-Tacking will not execute after last seam, but can be done by pedal manually. |
| Fn-10 | Back-Tacking mode selection | 1 | 0~1 | 1: JUKI mode (Press TB switch will activate reverse solenoid when either machine is stopped or running). 0: BROTHER mode (Press TB switch will activate reverse solenoid only when machine is running). |
| Fn-11 | Start Back-Tacking running mode selection | 1 | 0~2 | 1: Automatically perform actions 0: Could be arbitrarily stop and start. 2: Accurate Mode |
| Fn-12 | Ending mode of star Back-Tacking | 1 | 0~1 | 1: Start Back-Tacking is completed automatically continued for next action. 0: After the number of stitches is completed, stop automatically. |
| Fn-13 | Start Back-Tacking compensation--1 | 60 | 1~150 | Compensation for A part of Start Back-Tacking |
| Fn-14 | Start Back-Tacking compensation--2 | 60 | 1~150 | Compensation for B Part of Start Back-Tacking |
| Fn-15 | End Back-Tacking running Mode selection | 1 | 0~2 | 1: Automatically perform actions 0: Could be arbitrarily stop and start. 2: Accurate Mode |
| Fn-16 | End Back-Tacking compensation--1 | 60 | 1~150 | Compensation for C part of end Back-Tacking. |
| Fn-17 | End Back-Tacking compensation--2 | 60 | 1~150 | Compensation for D part of end Back-Tacking. |
| Fn-18 | Bar-Tacking running mode selection | 1 | 0~2 | 1: Automatically perform actions. 0: Could be arbitrarily stop and start. 2: Accurate Mode |
| Fn-19 | Bar-Tacking compensation--1 | 60 | 1~150 | Compensation for A,C part of Bar-Tacking |
| Fn-20 | Bar-Tacking compensation--2 | 60 | 1~150 | Compensation for B,D part of Bar-Tacking |
| Fn-21 | Needle stop position selection | 1 | 0~1 | Valid only when the operation panel is disconnected, 1(UP)/0 (DOWN) |
| Fn-22 | Slow start function selection | 0 | 0~1 | Valid only when the operation panel is disconnected, 1(ON)/0 (OFF) |
| Fn-23 | Automatic foot lift after rimming function selection | 0 | 0~1 | Valid only when the operation panel is disconnected, 1(ON)/0 (OFF) |
| Fn-24 | Automatic foot lift when pause | 0 | 0~1 | Valid only when the operation panel is disconnected, 1(ON)/0 (OFF) |
| Fn-25 | Automatic function selection | 0 | 0~1 | Valid only when the operation panel is disconnected, 1(ON)/0 (OFF) |
| Fn-26 | Wipe thread function / clamp thread function selection | 3 | 0~3 | 0(OFF) / 1(Wipe Thread Function ON) / 2(Clamp Thread Function ON) / 3(Keyboard Control Clamp Thread) |
| Fn-27 | Clamp thread start angle | 180 | 1~300 | Clamp start angle (Thread length control) |
| Fn-28 | Clamp thread output intensity | 80 | 20~100 | Clamp thread output intensity |
| Fn-30 | The remaining thread Length control | 180 | 120~360 | The remaining thread Length control |
| Fn-31 | Scissors sensitivity | 0 | 0~50 | 5 lines Pedal: 0: ALL / 1: HALF / 2: Three combinations Pedal 3 lines Pedal: 3-50 Sensitive |

| | | | | |
|-------|-------------------------------|-----|--------|--|
| Fn-32 | Accurate Mode spacing angle | 100 | 0~180 | The Bigger of the number, the more agility |
| Fn-35 | Foot lifter fall time | 0 | 0~1000 | The longer the foot lifter drop more slowly |
| Fn-38 | EEPROM selection | 2 | 0~2 | 0(Internal EEPROM) / 1(Stop position and Bar-Tacking in external EEPROM) / 2(Stop position in External EEPROM) |
| Fn-39 | Finished sewing piece counter | — | 0~9999 | Display the quantity of finished sewing piece |

System parameter table

| No. | Items | Default | Range | Contents |
|-------|---|---------|---------|---|
| Fn-40 | Direction of Motor Rotation | — | — | Reserved |
| Fn-41 | Motor Brake Function | 0 | 0~1 | 1: When motor stopped, Keep it locked / 0: No effect |
| Fn-42 | Auto running for test function | 0 | 0~1 | 1: enable / 0: disable When the parameter set as 1, the machine will start auto running as sewing function set on the operation panel. |
| Fn-43 | Motor auto-running full time(hr.) | 8 | 1~800 | Only valid when Fn-42=1, set the full time for motor auto-running |
| Fn-44 | Motor auto-running on cycle time(s) | 3 | 1~30 | Only valid when Fn-42=1, set the motor on time for each running cycle. |
| Fn-45 | Motor auto-running off cycle times(s) | 3 | 1~60 | Only valid when Fn-42=1, set the motor off time for each running cycle. |
| Fn-46 | The minimum speed(r/min) | 300 | 100~400 | Adjust the minimum speed of the motor |
| Fn-47 | Thread trimming speed(r/min) | 300 | 100~400 | Speed is too low may lead to unusual thread, the speed is too high may lead to unstable positioning control |
| Fn-48 | Foot lifter and back-tracking electromagnet operation time to full output (ms) | 300 | 0~990 | Foot lifter and back-tracking electromagnet operation time to full output |
| Fn-49 | Back-tracking electromagnet operation duty cycle (%) | 30 | 10~90 | Back-tracking electromagnet operate in duty cycle to save the electricity and protect the electromagnet from over-heat. |
| Fn-50 | Motor starting delay time (ms) | 50 | 0~990 | Delay the start time, with automatic presser foot down |
| Fn-51 | Half step release foot lift | 3 | 0~4 | 0: (OFF)/1: (Half step trigger)/2: (Half step keep) 3: (Half step follow)/4: (Disable Half step foot lift) |
| Fn-52 | Safety switch signal selection | 0 | 0~1 | 1: Keep ON / 0: Keep OFF |
| Fn-53 | Trimming operation delay before the mechanical angle (Degrees) | 189 | 120~250 | The degrees between UP position and thread trimming action |
| Fn-54 | Completion of the mechanical angle of the thread trimming action required (Degrees) | 360 | 250~360 | Completion of the mechanical angle of the thread trimming action required |
| Fn-55 | Thread take action before the delay time n (ms) | 10 | 0~980 | The time between UP position and Thread take action |
| Fn-56 | Thread take action time (ms) | 70 | 0~9990 | Completion of the thread take-up action required time |
| Fn-57 | The time before foot lifter action (ms) | 50 | 0~990 | The time between thread take action and Foot lifter action |
| Fn-58 | The time of foot lifter action maintain (s) | 3 | 1~120 | The time of foot lifter action maintain |
| Fn-59 | UP needle position adjustment (Degrees) | 15 | 1~30 | UP needle position adjustment (15 is the central location) |
| Fn-60 | Down needle position adjustment (Degrees) | 180 | 140~220 | Down needle position adjustment |
| Fn-61 | Power on and positioning | 1 | 0~1 | 1:ON / 0:OFF |
| Fn-62 | The rate of normal stop (%) | 925 | 1~1999 | Set the rate of normal stop |
| Fn-63 | The rate of thread trimming stop (%) | 925 | 1~1999 | Set the rate of thread trimming stop |
| Fn-64 | Hold time of Back-Tacking (s) | 30 | 1~120 | Forced shut-down after hold time. |
| Fn-65 | Low-speed maximum output torque (%) | 30 | 10~80 | Low-speed maximum output torque |
| Fn-66 | Low-speed start-up time Selection (UP position enable) | 0 | 0~5 | The higher the gear, and start to accelerate the faster 0:OFF |
| Fn-67 | Foot lifter electromagnet operation duty cycle (%) | 30 | 10~90 | Foot lifter electromagnet operate in duty cycle to save the electricity and protect the electromagnet from over-heat. |

| | | | | |
|-------|---|---|---------|---|
| Fn-68 | Sewing machine maintenance cycle (hr.) | 0 | 0~9999 | Set the sewing machine maintenance cycle time. Input [0], turn off the maintenance prompt function. |
| Fn-69 | Direct drive UP position deviation angle (degrees x10) | — | 0~3600 | Direct drive UP position deviation angle (Relative to [Z] signal) |
| Fn-70 | System fault information code | — | — | — |
| Fn-71 | Encoder pulse number | — | 0~1599 | Display encoder pulse number. |
| Fn-72 | Mechanical angle information | — | 0~359 | Display mechanical angle. |
| Fn-73 | Output current for electromagnet(A) (A) | — | 0.0~9.9 | Display output current for electromagnet |
| Fn-74 | The pedals speed level (V) | — | 0.0~3.3 | Display the pedals speed level |
| Fn-75 | Input monitoring of the servo system (IO) | — | — | See note ① |
| Fn-78 | Total running time of the sewing machine during the maintenance cycle (hr.) | — | 0~9999 | Display the total running time of the sewing machine during the maintenance cycle. Input [0], you can clear the total running time. |
| Fn-79 | Reset to factory initial parameter | — | — | See Section 6.I |

Note ① Description of the contents of Fn-75 parameter monitoring

Different spots-light represents a different meaning, the following table shown below:

| | | | |
|-------|-------|-------|-------|
| A[10] | A[07] | A[04] | A[01] |
| G[11] | G[08] | G[05] | G[02] |
| D[12] | D[09] | D[06] | D[03] |

| | |
|------|-----------------------------------|
| [01] | Pedal Forward signal input |
| [02] | Pedal backward signal input |
| [03] | Back-Tacking control switch input |
| [04] | The safety control switch input |
| [05] | (SYNUP) UP position input |
| [06] | (SYNDN) down position input |
| [07] | (Hall) (U) signal |
| [08] | (Hall) (v) signal |
| [09] | (Hall) (w) signal |
| [10] | Bus voltage is too high signal |
| [12] | Encoder (Z) signal |

6. Auxiliary Function

6.1 Factory Parameter Initialization

- 1.Refer to clause5.3 to enter system parameter setting mode.
- 2.Set function ID to Fn-79, Press key S to view and edit parameter.
- 3.Set different code to execute factory parameter initialization in different way. Details refer to the right table.Press key S to activate the initialization.

Initialization code and way


Input (1111): Initialize the parameters from default parameter region.

Input(5555): The keyboard to restore the default parameter.

6.2 The Number Of Processing Statistics



Under sewing mode, press S key, The display will show the processing statistics for the number.



6.3 Real-time Motor Speed Monitor

Under user parameter setting mode or system parameter setting mode, press the accelerate adjustment key , the display will show the real-time speed of motor.

6.4 Stitch Tracking Remedial Measure

The following description is based on A=4,B=4 for dual start back-tracking sewing remediation

| Issue description | Remedial measure |
|---|--|
|  | Root cause: The stitch number of section A is beyond the set value, or the length of section A last stitch is increased, the length of section B first stitch is decreased, which cause the final stitch of B can't overlap with the initial stitch of section A. Measure: Turn up the parameter of Fn-13 properly. |
|  | Root cause: The stitch number of section A is less than the set value, or the length of the section A last stitch is decreased, the length of section B first stitch increased, which cause the final stitch of section B is over the initial stitch of section A. Measure: Turn down the parameter of Fn-13 properly. |

| | |
|---|---|
|  | Root cause: The stitch number of section B is beyond the set value, or the length of the section B last stitch is increased, the length of following section first stitch decreased, which cause the final stitch of section B is over the initial stitch of section A. Measure: Turn up the parameter of Fn-14 properly. |
|  | Root cause: The stitch number of section B is less than the set value, or the length of the section B last stitch is decreased, the length of following section first stitch increased, which cause the final stitch of section B can't overlap with the initial stitch of section A. Measure: Turn down the parameter of Fn-14 properly. |

■ End back-tracking, Consecutive back-tracking adjustment following the same way.

■ End back-tracking parameter: Fn-16, Fn-17. Consecutive back-tracking parameter: Fn-19, Fn-20.

7. Troubleshooting And Maintenance

When there is error in the system, the error information will be shown on the panel, in the same time, the indicator led will light red. The user can handle the error by the error code according the manual.If the error can't be settled, please contact our technician for support.Error code will be indicated in HEX on the panel.

Refer to the following picture for Err-1 display:

Err-1

| Error code | Problem description | Measure |
|------------|--|--|
| Err-0 | Input signal self test error (power on pedal fault detect) | 1. Check the connectivity-of-pedal signal. 2. Release the pedal to neutral position. |
| Err-1 | Stop position signal error | UP-Stop position signal error. |
| Err-2 | EEPROM read/write data error | Check up external the card reader |
| Err-3 | EEPROM built-in parameter error | Power-on reset |
| Err-4 | Over-current, over-voltage, over-heat, low-voltage | 1. Turn off the machine for at least 30S, and then restart. 2. There maybe some malfunction for the motor power control module. 3. Check whether there are transient interference. |
| Err-5 | Detect high voltage on the DC busbar | 1. Turn off the machine for at least 30S, and then restart. 2. Check the power supply voltage. |
| Err-6 | Detect over current for the power supply for electromagnet | 1. Turn off the machine for at least 30S, and then restart. 2. Turn off the machine, and check the connectivity of the electromagnet circuit. |
| Err-7 | Stalling | Turn off the machine and check the mechanical parts |
| Err-8 | Motor decoder output signal error | Check the motor output signal line whether there is broken or poor contact. |
| Err-9 | Synchronizer self test error | 1.Turn off the machine, and check the connectivity of synchronizer. 2.Replace synchronizer |
| Err-E | Machine(head) maintenance prompt | The operation time reaches the maintenance period, Please do maintenance for the head, and then enter FN-78 to reset the accumulated operation time. |
| Err-F | Safety switch alarming | 1. Check whether the head of the machine is turned over. 2. Check the connectivity of the circuit of safety switch. |