## ⚠ Safety Instruction

1. Users are required to read the operation manual completely and carefully before installation or operation.
2. The product should be installed and pre-operated by well-trained persons. All power supplies must be turned off during the installation work, remember not to operate with power on.
3. All the instruction marked with sign ⚠ must be observed or executed; otherwise, bodily injuries might occur.
4. For perfect operation and safety, it is prohibited that using extension cable with multi-outlet for power connection.
5. When connecting the power cord, it must be determined that the operating voltage conforms to the rated voltage value specified in the product identification.
6. Don't operate in direct sun light, outdoors area and where the room temperature is over 45°C or below 0°C.
7. Please avoid operating near the heater at dew area or at the humidity below 10% or above 90%.
8. Don't operate in area with heavy dust, corrosive substance or volatile gas.
9. Avoid power cord being applied by heavy objects or excessive force, or over bend.
10. The earth wire of power cord must be connected to the system ground of the production plant by proper size of conductions and terminals. This connection should be fixed permanently.
11. All the moving portions must be prevented to be exposed by the parts provided.
12. Turing on the machine in the first time, operate the sewing machine at low speed and check the correct rotation direction.
13. Turn off the power before the following operation:
   1. Connecting or disconnecting any connectors on the control box or motor.
   2. Threading needle.
   3. Raising the machine head.
   4. Repairing or doing any mechanical adjustment.
   5. Machines idling.
14. Repairs and high level maintenance work should only be carried out by electronic technicians with appropriate training.
15. All the spare parts for repair must be provided or approved by the manufacturer.
16. Don't use any objects or force to hit or ram the product.

**Guarantee Time**

Warranty period of this product is 1 year dated from purchasing, or within 2 years from ex-factory date.

**Warranty Detail**

Any trouble found within warranty period under normal operation, it will be repaired free of charge. However, maintenance cost will be charged in the following cases even if within warranty period:

1. Inappropriate use, including: wrong connecting high voltage, wrong application, disassemble, repair, modification by incompetent personnel, or operation without the precaution, or operation out of its specification range, or inserting other objects or liquids into the product.
2. Damage by fire, Earth quake, lighting, wind, flood, salt corrosive, moisture, abnormal power voltage and any other damage cause by the natural disaster or by the inappropriate environments.
3. Dropping after purchasing or damage in transportation by customer himself or by customer's shipping agency

* We make our best effort to test and manufacture the product for assuring the quality. However, it is possible that this product can be damaged due to external magnetic interference and electronic static or noise or unstable power source more than expected; therefore the grounding system of operate area must guarantee the good earth and it's also recommended to install a failsafe device (Such as residual current breaker).

# 1 Button Displays and Operating Instructions

## 1.1 Key Description

| Name | key | Indicate |
|---|---|---|
| Function Parameter Edit | P | If click, enter or exit the user parameter setting interface. If long-press, it will switch to the password input interface. Enter the correct password, press S key to confirm, you can enter the advanced parameter setting interface. |
| Setting Parameter Check and Save | S | For the content of the selected parameters check and save: after select parameter press this key to check and modify operation, after modified parameter value press this key to exit and save the parameter. |
| Parameter Increase | + | If click, increase the parameter. If long-press, continuously Increase the parameter. |
| Parameter Decrease | − | If click, decrease the parameter. If long-press, continuously decrease the parameter. |
| Reset | Reset | Long-press can restore factory setting. |
| Start Back-tacking Selection / Slow Launch Setting | | If click, switch AB start back-tacking→ABAB start back-tacking→function off→B start back-tacking successively. If long-press, set used or cancelled slow launch function. |
| End Back-tacking Selection / Needle Stop Position Selection | | If click, switch CD end back-tacking→CDCD end back-tacking→function off→C end back-tacking successively. If long-press, the needle stop position after shift the sewing mode (up position / down position). |
| Free Sewing / Constant Stitch Sewing | E | If click, set to free sewing mode. If long-press, set to constant stitch sewing mode. |
| Consecutive Reverse Sewing / Multi-segment Sewing | M | If click, set to consecutive reverse sewing mode. If long-press, set to multi-segment sewing mode (switch to four-segment sewing, seven-segment sewing, eight-segment sewing, and fifteen-segment sewing in sequence). |
| Presser Foot Lifting Setting / Auto Function | | If click, switch function off→automatic presser foot lifting after trimming→automatic presser foot lifting after pause→full function successively. If long-press, set used or cancelled auto function. |
| Trimming Setting / Clamp Function Setting | | If click, set used or cancelled trimming function. If long-press, set used or cancelled clamp function. |
| Pattern Freedom Sewing Setting | Patt | If click, switch to pattern freedom sewing mode selection interface. If long-press, switch to pattern freedom sewing mode editing interface. |
| Tight Seam Setting | | If click, switch starting tight seam, ending tight seam, full function and function off successively. If long-press, switch to tight seam mode editing interface. |
| Pattern Backing-tacking Setting | | If click, set used or cancelled pattern backing-tacking function. If long-press, switch to pattern backing-tacking mode editing interface. |
| Pattern Constant-stitch Sewing Setting | X1~XN | In multi-segment sewing mode, if click, set used or cancelled pattern constant-stitch sewing function. In multi-segment sewing mode, if long-press, switch to pattern constant-stitch sewing mode editing interface. |
| Stitch Length Setting | + ≣ − | If click, increase or decrease stitch length. If long-press, continuously increase or decrease stitch length. |

## 1.2 Auxiliary Function
### 1.2.1 Debugging Mode

| No. | Items | Range | Default | Description |
|---|---|---|---|---|
| P42~N01 | The control system version number | | | |
| P42~N02 | The panel version number | | | |
| P42~N03 | Speed | | | |
| P42~N04 | The pedal AD | | | |
| P42~N05 | The mechanical angle(up position) | | | |
| P42~N07 | Bus bar voltage AD | | | |
| P42~N15 | Step drive version number | | | |
| P44 | Brake strength during stopover | 1~45 | 16 | |
| P45 | Pattern freedom sewing mode selection | 0~1 | 0 | 0: Controlled by foot pedal, can be stopped and started at will 1: Touch the foot pedal to automatically execute a pattern sewing action |
| P46 | Motor stop with a reverse angle after trimming function | ON/OFF | OFF | |
| P47 | Adjust the reverse angle when motor stop after trimming | 10~50 | 40 | Start from the upper needle position and adjust the angle of the needle lift in reverse operation after trimming. |
| P48 | The minimum speed (positioning speed) [rpm ] | 100~500 | 210 | Adjust the minimum speed |
| P49 | Thread trimming speed (rpm) | 100~500 | 300 | Adjust thread trimming speed |
| P50 | Foot lifter operation time to full output (ms) | 10~990 | 200 | |
| P51 | Presser foot lifter operation duty cycle (%) | 1~50 | 25 | Presser foot lifter operate in duty cycle to save electricity and protect the electromagnet from over-heat. |
| P52 | Delay the start of the motor to protect the lowering time of presser foot (ms) | 10~990 | 120 | Delay the start time, with automatic presser foot down. |
| P53 | Half back pedaling lifting presser foot function to cancel | 0~2 | 1 | 0: OFF 1: Back pedaling and half back pedaling with lifting presser foot 2: half back pedaling without lifting presser foot, back pedaling with lifting presser foot |
| P54 | Thread trimming action time (ms) | 10~990 | 200 | |
| P55 | Thread wiping action time (ms) | 10~990 | 10 | |
| P56 | Power on and positioning | 0~2 | 0 | 0: Always not to find the up needle position 1: Always to find the up needle position |
| P57 | Presser foot solenoid protection time (s) | 1~60 | 5 | Forced shutdown after hold time to prevent the electromagnet from being hot for a long time |
| P58 | Up needle position adjustment | 0~359 | 90 | Up position adjustment, the needle will advance stop when the value decreased, the needle will delay stop when the value increased. |
| P59 | Down needle position adjustment | 0~359 | 260 | Down position adjustment, the needle will advance stop when the value decreased, the needle will delay stop when the value increased. |
| P60 | Testing speed (rpm ) | 100~3700 | 3500 | Setting testing speed. |
| P61 | Testing A | ON/OFF | OFF | Continuous running testing. |
| P62 | Testing B | ON/OFF | OFF | Start and stop testing with all functions. |
| P63 | Testing C | ON/OFF | OFF | Start and stop testing without all function. |
| P64 | Test run time | 1~250 | 30 | |
| P65 | Test stop time | 1~250 | 10 | |
| P66 | Machine protection switch selection | 0~1 | 1 | 0: Disable 1: Testing zero signal |
| P69 | Pattern freedom sewing speed | 100~3000 | 2000 | |
| P70 | Type | | 24 | |
| P71 | Correction stitches distance of manual button A | 0~5.0 | 0 | |
| P72 | Up needle position adjustment | 0~359 | | Adjust up needle position, the displayed value will change with the position of the handwheel, press "S" key to save the current position (value) as up needle position. |
| P73 | Down needle position adjustment | 0~359 | | Adjust down needle position, the displayed value will change with the position of the handwheel, press "S" key to save the current position (value) as down needle position. |
| P74 | Tacking stitch length compensation | −50~50 | 0 | |
| P75 | Back-tacking stitch length compensation | −50~50 | 0 | |
| P77 | Opportunity point of back-tacking for end back-tacking in high speed in free sewing mode | 0~350 | 75 | |
| P78 | The start angle of thread clamping | 5~359 | 100 | |
| P79 | The stop angle of thread clamping | 5~359 | 270 | |
| P80 | Trimming engage angle | 0~359 | 5 | |
| P81 | Presser foot release buffer working time (ms) | 0~800 | 60 | |
| P83 | Stopping strength after trimming | 10~100 | 20 | |
| P84 | Trimming full output time (ms) | 10~990 | 60 | |
| P85 | Periodic signal of trimming output (%) (±10%) | 1~10 | 7 | |
| P86 | Up and down needle position distance | 15~345 | 170 | Up and down positioning distance angle (1 degree for every 4 values) |

| No. | Items | Range | Default | Description |
|---|---|---|---|---|
| P87 | Wiping thread return delay time | 10~990 | 50 | Make sure the wiper returns to its original position |
| P88 | Stopover distance | 10~100 | 30 | |
| P89 | AC overvoltage setting | 500~1023 | 880 | |
| P92 | Correct the electrical angle of motor | | 160 | Reading the initial Angle of encoder, the factory default was set, please do not change the values (parameter value cannot be changed manually, random change it will result the control box and motor abnormal or damaged). |
| P93 | The starting time of the half back pedaling function (ms) | 10~990 | 100 | |
| P95 | Periodic signal of the presser foot first output action (%) | 10~100 | 100 | |
| P99 | Starting tight seam stitch length | 0~5.0 | 0.5 | |
| P100 | Direction of starting tight seam | 0~1 | 0 | |
| P101 | The Start angle of thread slacking | 1~359 | 30 | Song line start angle (defined as 0°under calculation) |
| P102 | The stop angle of thread slacking | 1~359 | 180 | Loose wire end angle (defined as 0°under calculation, must be greater than P101 parameter value) |
| P103 | Thread slacking strength | 1~5 | 3 | |
| P105 | Pattern freedom sewing mode selection | 0~9 | 0 | 0: OFF 1~9: Pattern freedom sewing mode |
| P107 | Starting tight seam speed | 100~1200 | 500 | |
| P108 | Starting tight seam stitch number | 0~12 | 1 | |
| P109 | The delay time before thread wiping | 5~990 | 5 | Interval time before entering thread wiping action after finding the upper positioning |
| P110 | Trimming back time (ms) | 60~990 | 65 | Make sure the thread trimming device returns to its original position |
| P111 | Clamp function without any thrum switch | 0~1 | 0 | |
| P112 | The delay time before hook thread with clamp function without any thrum | 0~990 | 100 | |
| P113 | The hook thread action time with clamp function without any thrum | 0~990 | 30 | |
| P114 | The return back time of hook thread with clamp function without any thrum | 0~990 | 30 | |
| P115 | Duty cycle for hook thread with clamp function without any thrum | 0~100 | 80 | |
| P116 | The suction time for clamp function without any thrum | 0~5000 | 1000 | |
| P117 | Duty cycle for pull thread with clamp function without any thrum | 0~100 | 80 | |
| P118 | Function selection of manual back-tacking button in pattern mode | 0~1 | 0 | |
| P129 | Back-tacking step motor zero-point correction | −500~500 | 0 | |
| P131 | Normal stitch length | 0~5.0 | 3.0 | |
| P132 | Manual close stitches distance | 0~5.0 | 2.0 | |
| P138 | Foot lifting release buffer duty cycle (%) | 0~100 | 2 | |
| P139 | Foot lifting release buffer delay time (ms) | 0~200 | 8 | |
| P143 | Tight seam mode selection | 0~3 | 0 | 0: OFF 1: Starting tight seam 2: Ending tight seam 3: Full function |
| P144 | Tacking stitch length compensation in high speed | −50~50 | 0 | |
| P145 | Back-tacking stitch length compensation in high speed | −50~50 | 0 | |
| P149 | Back-tacking step motor steady current | 0~12 | 6 | |
| P151 | Back-tacking step motor maximum current | 0~12 | 8 | |
| P153 | Ending tight seam stitch length | 0~5.0 | 0.5 | |
| P154 | Ending tight seam speed | 100~1200 | 500 | |
| P159 | Direction of ending tight seam | 0~1 | 0 | 0: Forward 1: Backward |
| P160 | Ending tight seam stitch number | 0~12 | 1 | |
| P170 | Correction stitches distance of manual button B | 0~5.0 | 0 | |
| P171 | Correction stitches distance of manual button C | 0~5.0 | 0 | |
| P173 | Correction stitches distance of manual button D | 0~5.0 | 0 | |

On the main interface, long-press S key to enter to the debugging parameter interface. P92 correct the electrical angle of motor, P72 up needle position adjustment, P129 back-tacking step motor zero-point correction, P74 tacking stitch length compensation and P75 Back-tacking stitch length compensation parameter setting.

### 1.2.2 Tight Seam Mode Editing

On the main interface, long-press tight seam key to display "F-1" (start back-tacking), and press the 4th column ⊞ , ⊟ to switch between "F-1" (start back-tacking) and "d-2" (end back-tacking), press S to confirm, switch to the editing interface "01 0 0.5", press the 1st or 2nd column ⊞ , ⊟ to adjust the number of stitches of 00-12, press the 4th column ⊞ , ⊟ to adjust 0 ( Normal sewing） -1 (reverse sewing). Press ⊞ ⌙ ⊟ to adjust the stitch length. After the setting is completed, press S key to confirm. Click P key to exit to the main interface.

### 1.2.3 Pattern Freedom Sewing Mode

On the main interface short-press [Patt] to shift pattern freedom sewing mode selection interface "n1", press ⊞ ⌙ ⊟ to adjust n1-n9.

### 1.2.4 Pattern Freedom Sewing Editing

On the main interface long-press [Patt] to shift pattern freedom sewing mode editing interface "n-01 01", short-press the 4th column ⊞ , ⊟ to adjust n01-n09, short-press ⊞ ⌙ ⊟ adjust 01-10 segment number, adjust to setting pattern number, segment number, short-press S key to confirm, shift to corresponding pattern number editing interface "01 1 3.0", short press 1st column or 2nd column ⊞ , ⊟ to adjust 00-99 stitches, short-press 4th column ⊞ , ⊟ 1-9 repeat times, short-press ⊞ ⌙ ⊟ to adjust needle distance, after finished setting short-press S key to confirm. Press P key can exit to interface.

### 1.2.5 Pattern Backing-tacking Sewing Editing

On the main interface, long press [Patt] to switch the pattern style editing interface "H-01 01", press the 4th column ⊞ , ⊟ to adjust the H01-H09 pattern number, and short press ⊞ ⌙ ⊟ to adjust the 01-10 segment number, segment number, short press S key to confirm, switch to the corresponding pattern number editing interface "01 13.0", press the 1st or 2nd column ⊞ , ⊟ to adjust the number of 00-99 stitches, press the 4th column ⊞ , ⊟ to adjust Repeat 1-9 times, press ⊞ ⌙ ⊟ to adjust the stitch length. After the setting is completed, press the S key to confirm. Short press P key to exit to the main interface.

### 1.2.6 Pattern Constant-stitch Sewing Editing

In the multi- segment sewing mode, long-press pattern constant-stitch sewing key on the main interface to switch to pattern constant-stitch sewing editing interface "d-01 3.0", press the fourth column ⊞ , ⊟ to adjust the d01-d15 segment number, and press ⊞ ⌙ ⊟ to adjust the current segment Stitch length. Short press P key to exit to the main interface.

## 2 User Parameter

| No. | Items | Range | Default | Description |
|---|---|---|---|---|
| P01 | Maximum sewing speed (rpm) | 100~3700 | 3700 | Maximum speed of machine sewing |
| P02 | Set accelerated curve (%) | 10~100 | 80 | Set the acceleration slope. The greater the slope value, the steeper the speed; the smaller the slope value, the slower the speed |
| P03 | Needle UP/ DOWN | UP/DN | DN | UP: Needle stops at up position. DN: Needle stops at down position |
| P04 | Start back-tacking speed (rpm) | 200~3200 | 2000 | |
| P05 | End back-tacking speed (rpm) | 200~3200 | 2000 | |
| P06 | Bar-tacking speed (rpm) | 200~3200 | 2000 | |
| P07 | Soft start speed (rpm ) | 200~1500 | 1500 | |
| P08 | Stitch numbers for soft start | 1~15 | 2 | |
| P09 | Automatic constant-stitch sewing speed (rpm) | 200~4000 | 3700 | Speed adjustment for automatic constant-stitch sewing |
| P10 | Automatic end back-tacking sewing after constant-stitch sewing | ON/OFF | ON | ON: After executing the constant-stitch sewing, the back-tacking sewing will be executed automatically. In any sewing mode, mending stitch function cannot be used. OFF: After executing the last constant-stitch sewing, the back-tacking sewing function will not be automatically executed, and the front step or full back step must be performed again. |
| P12 | Start back-tacking running mode selection | 0~1 | 1 | 0: Controlled by foot pedal, can be stopped and started at will. 1: Touch the foot pedal to automatically execute back-tacking action |
| P13 | Ending mode of start back-tacking | CON/STP | CON | CON: Start back-tacking is completed automatically continued for next action. STP: After the number of stitches is completed, stop automatically. |
| P14 | Slow start function selection | ON/OFF | OFF | |
| P15 | Manual Switch A | 0~6 | 5 | 0: OFF 1: half stitch 2: one stitch 3: continuous half stitch 4: continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function |
| P16 | Speed limit of manual back-tacking | 0~3200 | 3000 | The function is disabled when the value is less than 100. |
| P17-N04 | Language setting | 0~6 | 1 | 0: OFF 1: Chinese 2: English 3: Vietnamese 4: Portuguese 5: Turkish 6: Spanish |
| P17-N05 | Voice broadcast selection | 0~3 | 1 | 0: No key tone, no error voice 1: With key tone and error voice 2: Key tone only 3: Error voice only |
| P17-N06 | Automatic piece counting function | 0~50 | 1 | 0: OFF 1-50: Trimming counting times setting |
| P17-N12 | Boot counter interface selection | 0~1 | 0 | 0: OFF 1: ON |
| P17-N13 | Automatic piece counting mode selection | 0~1 | 0 | 0: Incremental piecework mode 1: Diminishing piecework mode |
| P29 | The strength of thread trimming stop | 1~45 | 20 | |
| P32 | Bar-tacking compensation | 0~200 | 167 | |
| P34 | Constant-stitch sewing running mode selection | A/M | A | A: Touch the foot pedal to automatically execute constant-stitch sewing action. M: Controlled by foot pedal, can be stopped and started at will |
| P35 | Loose thread function setting when presser foot lifting | 0~2 | 0 | 0: OFF 1: Loose thread output function ON when presser foot lifting, Loose thread output function OFF when stopover 2: Full function |
| P36 | Thread slacking function selection | 0~1 | 0 | 0: OFF 1: ON |
| P37 | Thread wiping function / Thread clamping function selection | 0~11 | 6 | 0: OFF 1: Thread wiping function 2~11: Thread clamping Function and the strength of automatic thread clamping. |
| P38 | Automatic thread trimming function selection | ON/OFF | ON | |
| P39 | Automatic presser foot lifting when pause function selection | UP/DN | DN | |
| P40 | Automatic presser foot lifting after trimming function selection | UP/DN | DN | |
| P41 | Counter display | 0~9999 | 0 | Display the quantity of finished sewing piece. Long-press ⌙ key to clear the count |

| No. | Items | Range | Default | Description |
|---|---|---|---|---|
| P174 | Manual Switch B | 0~6 | 3 | 0: OFF 1: half stitch 2: one stitch 3: continuous half stitch 4: continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function |
| P175 | Manual Switch C | 0~6 | 0 | 0: OFF 1: half stitch 2: one stitch 3: continuous half stitch 4: continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function |
| P176 | Manual Switch D | 0~6 | 0 | 0: OFF 1: half stitch 2: one stitch 3: continuous half stitch 4: continuous one stitch 5: Back-tacking when machine stop or pause 6: Tight seam function |
| P177 | 1mm forward stitch length reference value setting | 0~300 | | |
| P178 | 1mm backward stitch length reference value setting | 0~300 | | |
| P179 | 2mm forward stitch length reference value setting | 0~300 | | |
| P180 | 2mm backward stitch length reference value setting | 0~300 | | |
| P181 | 3mm forward stitch length reference value setting | 0~300 | | |
| P182 | 3mm backward stitch length reference value setting | 0~300 | | |
| P183 | 4mm forward stitch length reference value setting | 0~300 | | |
| P184 | 4mm backward stitch length reference value setting | 0~300 | | |
| P185 | 5mm forward stitch length reference value setting | 0~300 | | |
| P186 | 5mm backward stitch length reference value setting | 0~300 | | |

Note: the initial value of parameters is for reference only, and the actual value of parameters is subject to the real object.

### 3 Error Code List

| Error Code | Problem | Measure |
|---|---|---|
| E01 | Over-voltage | Turn off the system power and check whether the power supply voltage is correct. (Or whether it exceeds the specified rated voltage). |
| E02 | Low-voltage | Turn off the system power and check whether the power supply voltage is correct. ( Or whether it is lower than the specified rated voltage). |
| E03 | Abnormal communication between the main CPU and the panel CPU | Turn off the power and check whether the connector is connected to the operation panel and the cable condition. |
| E05 | Speed control unit connection is abnormal. | Please turn off the power and check whether the connector is connected to the speed controller and the cable condition. |
| E07 | Main shaft motor rotating abnormally | Please rotate handwheel to check if the spindle motor is locked. Check if the encoder cable of the motor and the power cable of the motor are connected to the connector. Check if the power supply voltage is normal and whether the sewing speed is too high. |
| E10 | Solenoid over-current protection | Turn off the system power supply, please check the solenoid (solenoid valve) connector or solenoid (solenoid valve) is broken or not. |
| E09 E11 | Positioning signal error | Turn off the machine, please check if the encoder in bad connection or is too loose. To get it right and turn on. If there are still errors, please replace the control box and call for customer service. |
| E14 | Encoder signal error. | Turn off the system power supply, please check motor encoder connector if loose or fall off, renew to normal then restart system. |
| E15 | Main shaft motor overcurrent error | Turn off the power, and then turn it on again. |
| E17 | Head fall error | Please raise machine head and turn on the power again. Check if the head down switch is damaged. |
| E20 | Main shaft motor rotating abnormally at startup | Turn off the power and check whether the encoder cable of the motor and the power cable of the motor are connected to the connector. |
| E80 | Abnormal communication between the main CPU and the driver CPU | Turn off the power, and then turn it on again. |
| E82 | Back-tacking step motor overcurrent | Turn off the power, and then turn it on again. |

| | | |
|---|---|---|
| E84 | Back-tacking step motor encoder Z signal abnormal | Turn off the power and check whether the encoder cable of the step motor is connected to the connector. |
| E85 | Back-tacking step motor encoder AB signal abnormal | Turn off the power and check whether the encoder cable of the step motor is connected to the connector. |
| E86 | Back-tacking step motor failed to start | Turn off the power and check whether the encoder cable of the motor and the power cable of the motor are connected to the connector. |
| E87 | Back-tacking step motor locked-rotor | Please check if the step motor is locked. |

### 4 Port Diagram

**12P Function Port Description**

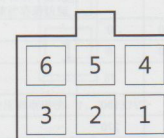| 14 | 13 | 12 | 11 | 10 | 9 | 8 |
|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 |
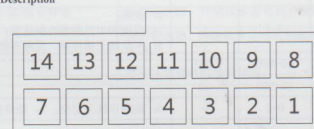
1. Thread trimming electromagnet: 1, 8 (+32V)
2. Thread wiping/ thread clamping electromagnet: 2, 9 (+32V)
3. Thread slacking electromagnet: 3, 10 (+32V)
4. LED Light: 4 (DGND), 11 (+5V)
5. Reverse stitch key: 5 (signal)
6. Mending stitch key: 7 (signal)

**2P Function Port Description**

| 2 |
|---|
| 1 |
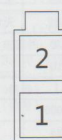
1. Presser foot electromagnet: 1, 2 (+32V)

**6P Function Port Description**

| 6 | 5 | 4 |
|---|---|---|
| 3 | 2 | 1 |

1. Pull thread air valve: 1(+24V), 4
2. Hook thread air valve: 2(+24V), 5
3. Suction air valve: 3(+24V), 6