

GLOBAL

BH 783 DD **Buttonhole machine**

Instruction manual for programming

**Always switch off the electricity when working on
the machine.**

Safety Instructions 1

1. Specification	3
1.1 Product Model Definition	3
1.2 Operation environment	3
1.3 Product specification.....	3
1.4 Part list of the product.....	3
2. Installation Instruction	4
2.1 Installation process	4
2.2 Installation precautions	4
3. Basic Operation	5
4. Parameter Setting.....	6
4.1 How to enter basic parameter (area A).....	6
4.2 How to enter system parameter (area B).....	7
4.3 Parameter setting instruction.....	7
4.3.1 Key function definition	7
4.3.2 Parameter setting.....	8
4.4 Parameter setting examples.....	9
4.5 Special function	11
4.5.1 Showing the current processing counter	11
4.5.2 Automatic test function.....	11
Appendix 1 Operation box.....	12
Appendix 2 Display Characters Compare Table.....	14
Appendix 3 AC Power Connection.....	15
Appendix 4 Connector Diagram	17
Appendix 5 System Function Parameter List	19
Appendix 6 System trouble alarm code and troubleshooting	21
Appendix 7 Product part list	23
Appendix 8 Product Exterior Cleanout Supplement.....	24
Appendix 9 Product Shell Unlocking Supplement	24
Appendix 10 Product Accessory and Components Replacing Statement	24

Safety Instructions

1. Please read this manual carefully before use. This product is required to be installed and operated by trained personnel only.
2. Turn off the power when installing and repairing.
3. When connecting power wire to AC power, it's necessary to make sure that the power voltage is lower than 250VAC and matched the rated voltage indicated on the product's nameplate.
4. The grounding wire of power wire must be connected to the system ground of the factory by proper sizes of wire and terminals. This connection should be fixed permanently.
5. The parts provided must guard all the moving parts.
6. After first turning on the power, operate the sewing machine at low speed and check that the direction of rotation is correct.
7. Turn off the power before the following operations:
 - 1)、Uninstall the motor or the control box or plug or unplug any connectors;
 - 2)、Raising the machine arms or change needle, or threading needle;
 - 3)、Repairing or doing any mechanical adjustment;
 - 4)、Machines rest.
8. Repairs and high level maintenance work must be done by the trained personal.
9. All the spare parts for repairing must be provided or approved by the manufacturer.
10. To avoid the false operation, please keep the product away from the high electromagnetic machinery or electro pulse generator.
11. The requirement of temperate, humidity of using products.
 - a)、please don't operate when the temperature is 45°C above or 0°C under.
 - b) Please don't operate in direct sun light.

c) Please don't operate near the heater.

Danger and caution signs:



Risks that may cause personal injury or risk to the machine are marked with this symbol in the instruction manual.



This symbol indicates electrical risks and warnings.

All the instructions marked with those symbols must be observed and executed with the instruction in order to escape unnecessary injuries.

Warranty information:

Manufacturer provide a warranty in respect of the products covered for a period of 1 year use or 1 year and 6 months after the shipping date of the products for any defects arising in the normal course of use of the products by customers.

1. Specification

1.1 Product Model Definition

781D: High-speed Buttonhole Machine Controlling System

1.2 Operation environment

Temperature of operation: 0 ~ 45°C.

Temperature of storage: -20 ~ 70°C.

Humidity of operation: 10%~90 %(without coagulation)

Rated voltage: 220VAC ± 10%, 50 (60) Hz

Grounding system: < 10 Ω.

1.3 Product specification

- Motor Power: 400W/500W/600W/750 Available.
- Pulley Size: 75mm or 100mm Available.
- Pulley of Sewing Machine: 65~130mm
- Sewing Speed: 150r/min~ 4500r/min
- Input Signal Port: 2 channels, including manual reserve switch and safe switch.
- Solenoid Signal Output Port: 4 channels, driving for reverse seam, trimming, wiper, foot lifter.
- Trouble protection: over current, short-circuits, over voltage, power off, overload, etc.
- Time for overload protection: 2s.

1.4 Part list of the product

Please follow with “*Product part list*” and check the product and

accessories in the packing box carefully. Please contact with the supplier as soon as possible if there are some parts omitted.

2. Installation Instruction

2.1 Installation process

Step 1 : Install the control box set and motor

Step 2 : Install the pedal

Step 3: Install the operation box

Step 4 : Install the grounding wire and AC power switch.

2.2 Installation precautions

1)、Controller Shape and Size:

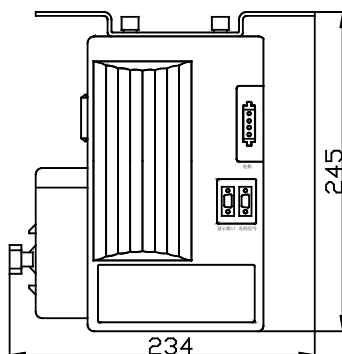


Fig 2-3: Buttonhole Machine Controller Shape and Size

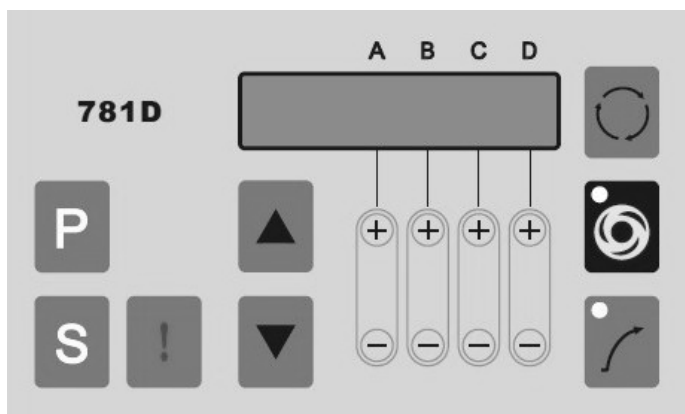
2)、Motor specifications according to the sewing machine factory's request, the motor has been configured synchronizer and encoder.

3)、While connecting, please pay attention the label on the controller in order to make some mistakes. Attention:1. Insert the pin according to the




correct direction;2. If the pin is not matched to the socket, please check according to the instruction of Appendix. Please do not use this controller but to connect with the supplier; 3. All the signal wires must be far away from the sewing machine's hand wheel and belt. Escape the troubles caused by the damage of the signal wires, it is better to guard these signal wires.




3. Basic Operation

The following figure illustrates the Buttonhole Machine operation box:



Function Introduction

Function	Key	Operation
Emergency Stop		In the operation process, press this key to stop current action.
Reset		Perform a reset operation
Auto		<ol style="list-style-type: none"> 1. When the LED is off, motor is running by a pedal real-time control. 2. When the LED is on, step on the pedal, then complete one buttonhole function automatically.

Slow soft Start		Slow start setting key, turning on when LED is on, turning off when LED is off.
Speed Setting		Press this key, the speed increase of 50.
		Press this key, the speed decrease of 50.

4. Parameter Setting

The servo control system has multi-function parameters, range in the serial number. More detailed parameter contents、 Chinese names、 ranges、 initial value and setting numerical value instruction are enclosed in *Appendix 5 System Function Parameter List*. Function parameter including basic parameter area and system parameter area, all the parameters settings are all carried out in the operation box, generally sewing operation box is as Fig. 4-1.

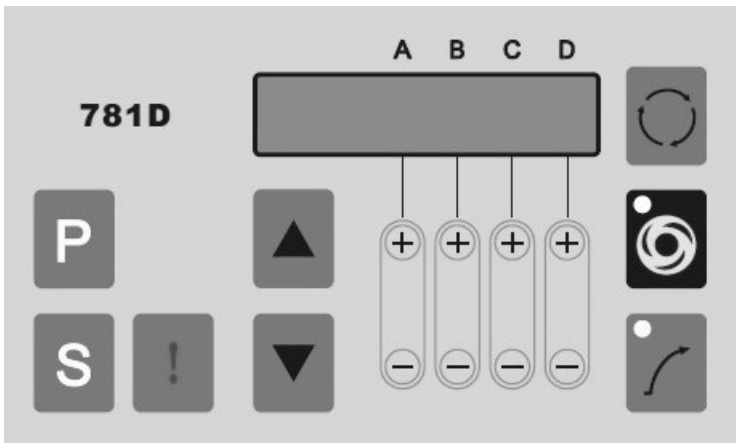


Fig. 4-1: Sewing operation

4.1 How to enter basic parameter (area A)

In normal sewing mode, press program key **P** for 2~3 seconds, the system enter basic parameter area (area A), and is able to edit basic parameter including parameter 1~46#, but disabled in system parameter.





4.2 How to enter system parameter (area B)


Press key **P** when system is power on, it enters system parameter (area B). In this area, it is able to edit parameter both area A and B.

4.3 Parameter setting instruction

4.3.1 Key function definition

After the system enters “parameter setting panel”, the keys are redefined, and is different from the original function, more detailed definition is as follows:

Key	Definition	Remark
	Parameter number “+”1	Parameter numbers increase continually.
	Parameter number “- ”1	Parameter numbers decrease continually.
	To Save the changed value or to enter editing the selected parameter	Press this key to look over or modify parameter after parameter numbers are selected; press this key to save and exit parameter after modification.
	Program key to enter or exit parameter area	Press this key for 2-3 sec to enter parameter edit state in normal sewing panel and to exit in parameter edit state.

	<p>Value increment or decrement key to edit the parameter value.</p>	<p>Value increment(+) or decrement(-) key To adjust by the key in the parameter value, and digital Scale are 1000, 100,10,1 according to “A”, “B”, “C”, “D” and minus.</p> <p>Note: Be sure to press the “S” key to save the changed values ; otherwise they will be lost.</p>
---	--	--

4.3.2 Parameter setting

There are 6 segment digit code displays in the operation box, they represent different meanings in different state.

In parameter number selecting mode (Fig. 4-2), display number and name code of parameter. The first three are parameter number, and the later three are the English name code. In Fig. 4-2, “001” is the parameter number, “H” is the parameter name code, press key **S** to enter parameter value editing.

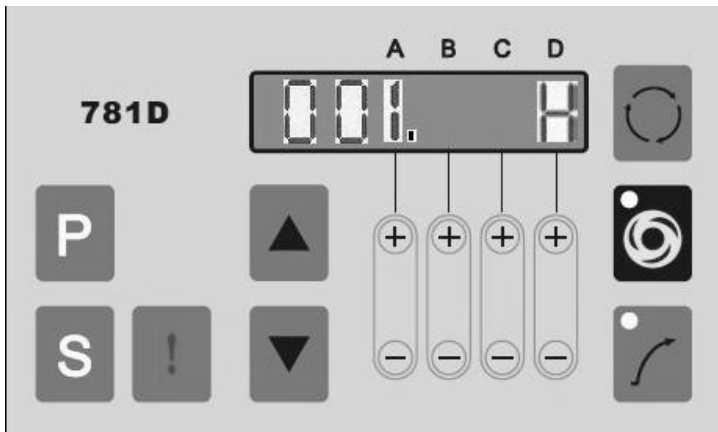


Fig.4-2: Maximum sewing speed parameter code

After entering parameter area, from segment 1 to 3 display parameter name; from segment 3 to 6 display the detailed parameter value. In Fig.

4-3, “H” is the parameter name code, and “4500” is the parameter value, shows Maximum sewing speed of 4500r/min.

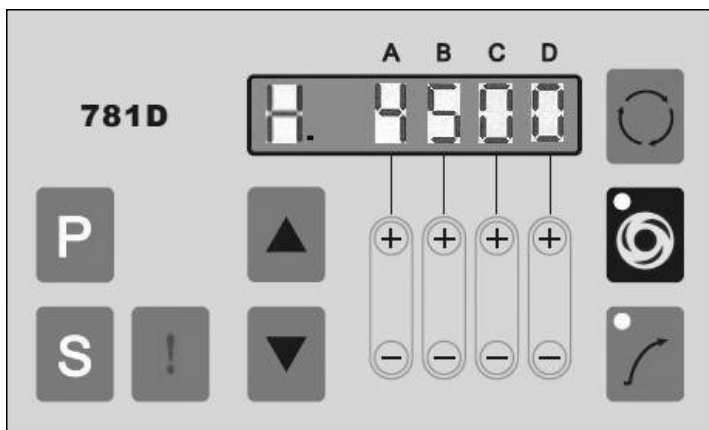




Fig.4-3: Maximum sewing speed value

4.4 Parameter setting examples

1) For example, when setting “Speed Curve Adjustment%” of 80, according to Appendix 5 *System Function Parameter List*, you can find “Speed Curve Adjustment%” in “002.PSL” of parameter area.

2) Referring to “How to Enter basic Parameter area”, enter basic Parameter area, use key  or  to select parameter number to “002.PSL”, as Fig.4-4

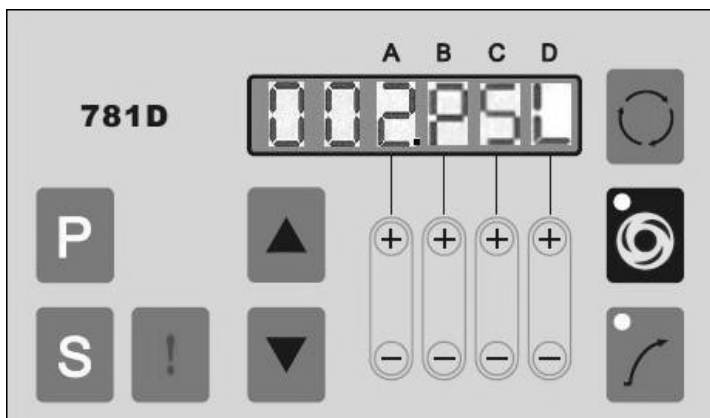


Figure4-4: Speed Curve Adjustment%

- 3) Press key **S** to enter parameter value editing mode, show as Fig.4-5

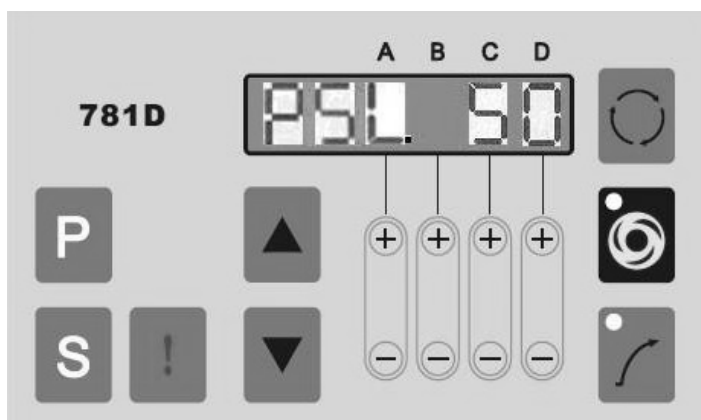




Fig. 5-5: parameter value of Speed Curve Adjustment%

- 4) Press key  to edit parameter value to 3200
- 5) Press key **S** to save parameter value.
- 6) Press key **P** for 2~3 sec, to return to normal sewing operation mode.

4.5 Special function

4.5.1 Showing the current processing counter

In normal sewing operation mode, once press key , it displays processing count as “PN.002”;

4.5.2 Automatic test function

For the settings of parameter “ 055.TOT、 056.TM1、 057.TM2、 058.UTD”, it will test automatically.

[055. TOT]: When UTD=ON, it is able to set the limited time of motor running, the range for setting is 1~800Hrs, the longest time is about 33 days (800h);


[056. TM1]: When UTD=ON, during the time of automatic running ,the setting range of free sewing working time is 1~60s, but the sewing mode during the automatic running, set according to the operation box testing programs.

[057. TM2]: When UTD=ON, during the time of automatic running, to set the stop interval time of motor, the setting range is 1~60s;

[058. UTD]: Automatic running test function setup, when parameter setting is ON, automatic running test starts, operate in the sewing mode of selected needle box.

During the process of the test, if there's need to edit the parameter above, keep treadle to toe forward, and the automatic test pauses; when the pedal return to the neutral, the system will keep on automatic testing in the edited parameters mode. During the automatic testing, toeing treadle backward or set 058.UTD as OFF to stop automatic runing.

4.6 The system default parameter recovery

- 1) Press key , when power on the system, and change the last two

parameters to “08”.

2) Press key **S** once, then change the option to “096.RS”

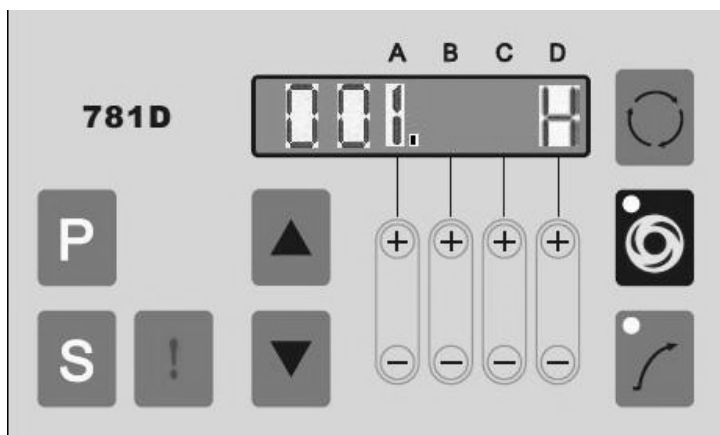
3) Press key **S** once, change the parameters to “5550”, Press key

S to confirm and quit.

Appendix 1 Operation box

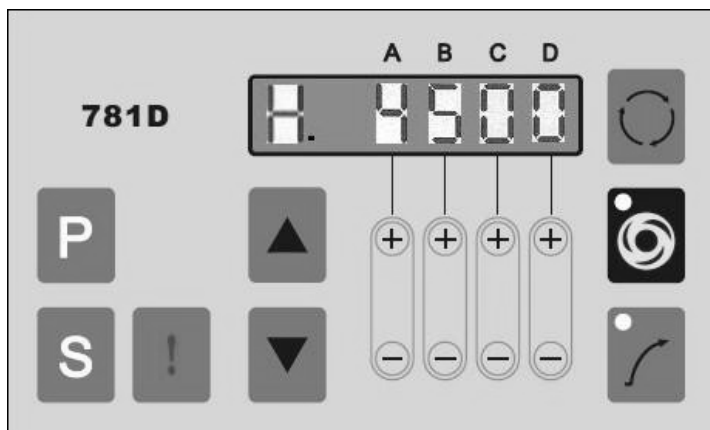
1 Parameter number and code (001.H)

As follow Figure, the maximum sewing speed parameter code: 001.H:



2 Parameter value editing

As follow Figure, the maximum sewing speed parameter value: 001.H
= 4500r/min



Appendix 2 Display Characters Compare Table

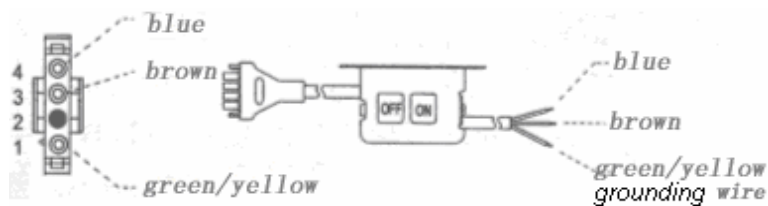
1. Arabic Numerals

Actual	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9


2 .English Alphabets


Actual	A	B	C	D	E	F	G	H	I	J
Display	A	b	C	d	E	F	G	H	I	J
Actual	K	L	M	N	O	P	Q	R	S	T
Display	t	L	n	n	o	P	q	r	S	r
Actual	U	V	W	X	Y	Z				
Display	U	v	W	X	Y	Z				


Appendix 3 AC Power Connection



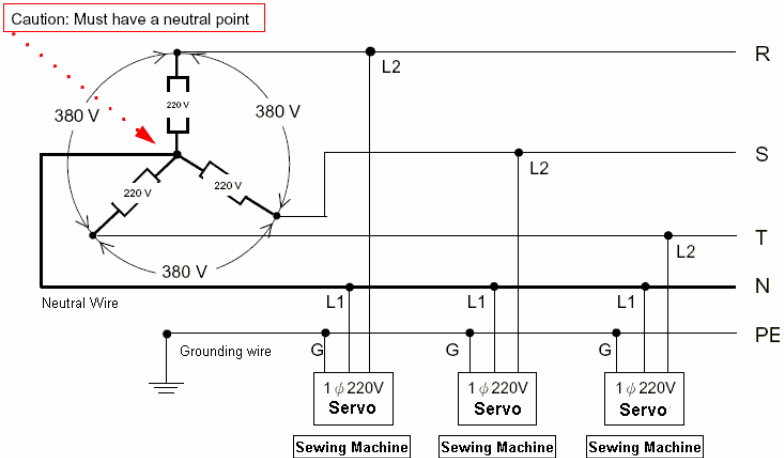
AC power switch of servo motor has been showed as the figure ,where “ON” means power on, “OFF” means power off.

 Please use Power Voltage indicated on the name plate of the product in $\pm 10\%$ ranges.

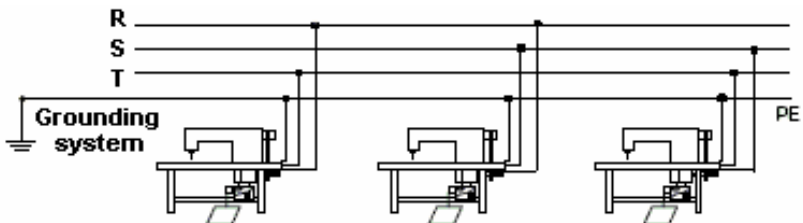
 The grounding wire must be connected to the grounding of the factory with a proper size wire. The grounding resistance must be less than $10\ \Omega$ and this connection must be fixed permanently.

 How to connect this product with a $1\ \Phi / 220\ \text{V}$ power from a $3\ \Phi / 380\ \text{V}$ power source.

Caution: If the power source have no neutral point, then this product is not suitable for this connection.



The load balance for 1Φ / 220 V motors used on a 3 Φ / 220 V power source. See the following figure for the load balance.



Fuse type and location:

Power PCB, fuse F2: 8A/250V for AC power protection;

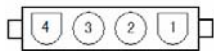
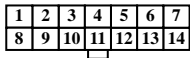
Power PCB, fuse F1: 1A/250V for brake protection;

Caution of fuse replacement: Turn off the power, unplug the cord and wait 10 minutes before opening the control box cover. And when fuse fused, find out the cause and fix it before replace new one.

Appendix 4 Connector Diagram

1 Control box connector panel

A. 5557-14

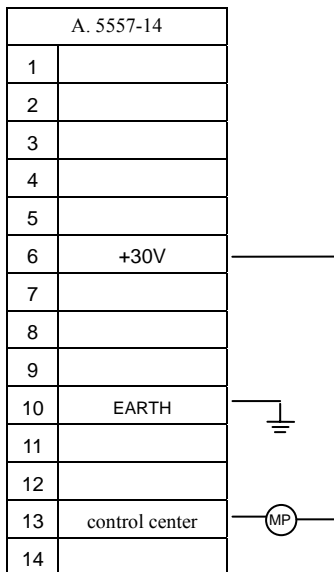


Motor output

Operation box

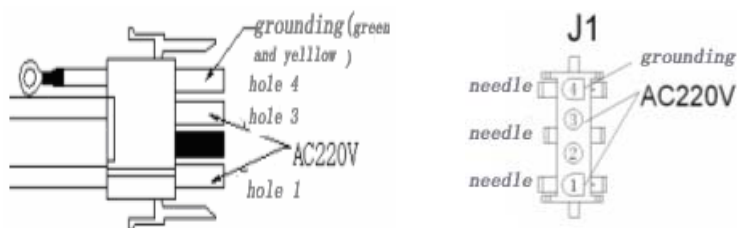


Motor encoder

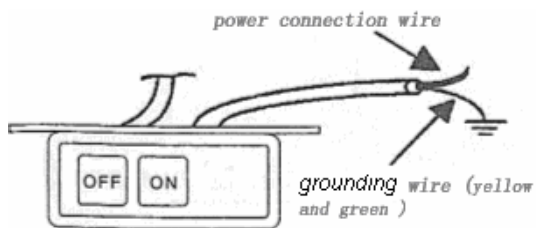


MP: presser foot

2 AC power connector and grounding



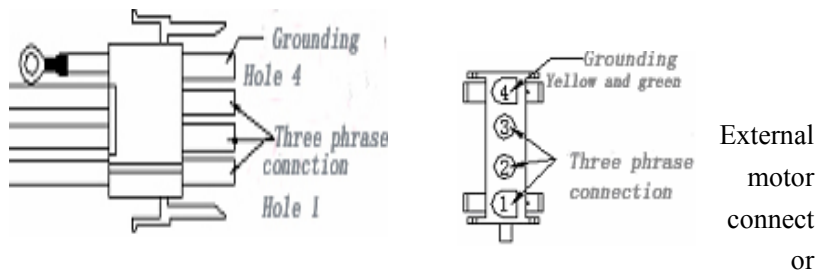
AC Power connector



AC power switch

To avoid the static interference and current leakage, all grounding must be done correctly. Please prepare the grounding system correctly, and the grounding wire must be connected well.

3. Motor output Connector



internal motor connector

In order to guarantee the safety of the operator and servo system,

please connect the AC power, motor connector and grounding wire correctly.

Power grounding wire must be connected correctly, and make sure that the resistance grounding be as little as possible ; External motor plug grounding must be connected to the motor shell tightly. If the grounding of the motor shell is not connected, it will cause the unstably running even cause its malfunction.

Appendix 5 System Function Parameter List

1. Basic Parameter (Area A)

Parameter code	Parameter Function	Range/unit	Default	Description
001.H	Maximum sewing speed (r/min)	150~5000	3600	Maximum sewing speed adjustments.
002.PSL	Speed curve adjustment (%)	1~100%	80%	The larger the value the faster to up speed.
005.V	End Back-Tacking speed (r/min)	150~5000	1800	End Back-Tacking speed adjustment.
008.SLS	Stitch number for soft start (SLS)	0~99 针	2	Slow start stitches setting.
009.A	Automatic Constant-Stitch sewing speed (r/min)	300~5000	3000	Constant-Stitch sewing speed adjustments

2. System Parameter (Area B)

Parameter code	Parameter function	Range/unit	Default	Description
046.DIR	Direction of motor rotation	CW/CCW	CCW	CCW: Counterclockwise; CW: Clockwise.
048.SYM	Synchronizer type setting	0~2	1	0: Type H Synchronizer, compatible mode 1: Type B Synchronizer, improving Synchronize 2: Type DD(Direct Drive) mode Synchronizer 3: Synchronizer no connected

054.BK	Motor braked at normal stop	OFF/ON	OFF	ON: Enable. OFF: Disable.
055.TOT	When UTD=ON, the total limited time of motor automatic running	1~800Hrs	2	The limit time setting of automatic running test 33 days (800h) for the longest
056.TM1	When UTD=ON, running time of the motor	1~60s	3	During automatically test, the running time of free sewing.
057.TM2	When UTD=ON, the stop time of motor	1~60s	3	During automatically running test, every interval time.
058.UTD	Automatically running test function	OFF/ON	OFF	Automatically running test function ON: active, OFF: not active
059.T	trimmer sewing speed (r/min)	120~400	300	Speed adjustment when trimming stop
060.L	Low sewing speed (r/min)	120~400	200	speed adjustment for low sewing speed
062.FC	Duty cycle time setting for foot lifting solenoid (%)	10~90	25	For solenoids switching power adjustment. Note : Wrongly adjustment will cause the solenoid unable to lift or over-heating
063.FD	Running-Delay time setting(ms)	0~990	50	If Foot Lifter is installed, set time(ms) to ensure the presser foot will come down first.
075.UEG	Needle position stop angle(0.25°)	5~250	40	Fine adjust the needle stops position. (40 is the central value)
077.ANU	Needle goes up as power turned on	OFF/ON	OFF	ON: Power turned on, needle goes up automatically. OFF: Function invalid
079.ERR	Error code for last trouble	0~999	0	0- no trouble happened

Note: Please read the chapter “5. Parameter setting” in this manual for the detailed instruction of editing parameter.

Appendix 6 System trouble alarm code and troubleshooting

The system has the function of showing malfunction code automatically. Once it meets the trouble, the controller makes the beep sound, and the related error code will be displayed on the operation box. Then, the protection of the controller will start automatically; all the sewing functions stop in order to escape the unnecessary accident.

The error code, error description, possible cause and measurement show as follow list:

Error Code	Description	Cause of the Problem	Status and Measurement	
Error	ERR-00	Input Signal check error	<ol style="list-style-type: none"> 1. The problem exists in the speed control unit of the pedal or when power on the system find the pedal in a state of toeing forward、toeing backward and fail to return to the neutral intermediate; 2. Low voltage of AC power ; 3. IPM module is abnormal. 	<ol style="list-style-type: none"> 1. Loosen the pedal and return to the neutral; 2. Check whether the signal wire of pedal is well connected.
	ERR-01	Abnormal signal feedback of sewing machine	<ol style="list-style-type: none"> 1. The Synchronizer is abnormal and failed to check the up needle position; 2. The magnet of the Synchronizer falls off; 3. The belt falls off or too loose. 	Check the synchronizer connector on control box, and check magnet of the synchronizer
	PWROFF	Power off	<ol style="list-style-type: none"> 1. Low voltage of AC power t; 2. System is power off. 	Turn off power, check all the fuse and turn on the power again
	ERR-03	Abnormal running of the sewing machine	<ol style="list-style-type: none"> 1. The synchronizer is abnormal and failed to check the down needle position; 2. The magnet of the synchronizer falls off; 3. The belt falls off. 	Check the synchronizer connector on control box, and check magnet of the synchronizer

	ERR-04	Over-current, over-voltage, low-voltage	1. The power drive IPM module is abnormal; 2. Instant interference.	Turn off power, and turn on the power again
	ERR-05	Over voltage	1.Brake resistance breaks or the brake fuse fused; 2. Instant interference.	Turn off the system power check-up
	ERR-06	solenoid power over-current	1.solenoid is overload or short circuit; 3.Instant interference	Turn off the system power check-up solenoids on the sewing machine
	ERR-07	Machine Not running or not running correctly	1.The motor is locked; 2.A problem exists in the trimming tool; 3.The encoder of motor signal is abnormal; 4. The output signal of HALL is abnormal.	Turn off the power check all the connector of motor, and check sewing machine
Normal Warning	A	Position stop error	1. Parameter setting of MPD、SPD is incorrect; 2.Over load; 3.Signal of the encoder is abnormal; 4.The signal of the synchronizer is unstable; 5.the belt is too loose	Turn off power, check whether the machine is well connected with the motor.
	B	Exceed the limited safe speed	1. The motor speed is abnormal. Exceed the maximum speed or Exceed 300r/min in the opposite direction; 2. The signal of the encoder is abnormal;	1. Whether the drive wire of U/V/W between the control box and the drive is well connected; 2. Whether the grounding is well connected.
	C	Synchronizer check error	Synchronizer is failed to plug in	1. Turn off power, plug the synchronizer and turn on the power again. 2. Check the synchronizer.
	D	EEPROM read/write data error	A problem exists in EEPROM which saves the parameter.	Replacing EEPROM

E	Parameter in EEPROM setting error.	Parameter setting in EEPROM is incorrect.	Turn off power and restart.
F	Encoder of the motor is error	If “F” keeps alarming shows, there exists the problem in encoder of motor.	Check whether the connector of motor Encoder is connected well

After occur a trouble, turn off the power firstly; check whether the control grounding and connector are well performed. Restart the power after 30 seconds and check whether the system is able to work normally. If the problem is not solved, please try again. If still not, please contact with the supplier.

Appendix 7 Product part list

No.	Name	Number	Unit	Remark
1	Servo controller	1	pcs	
2	Servo motor	1	pcs	
3	Operation Box	1	pcs	
4	Mounting set for Operation Box	1	pcs	
5	Pedal rod set	1	set	
6	Setscrew for mounting motor	1	set	
7	AC power switch	1	pcs	
8	Belt cover set	1	set	
9	Synchronizer	1	set	
10	Belt	1	set	
11	User Manual	1	copy	

Appendix 8 Product Exterior Cleanout Supplement

If the product surface needs to clean, please turn off the power, and pull out the AC power connector for the ten-minutes wait. Scrub away the surface moderately using the absorbent cotton which dipped the alcohol. It mustn't make the alcohol leak into the connector or controller, in order to avoid the electric impurity going into the controller, which will destroy the controlling system. After natural dryness, it can be powered on.

Appendix 9 Product Shell Unlocking Supplement

If you want to open the controller in common condition, it must be executed by mechanical and electrical technician who has been disciplined. He must use the tool with insulated protect, but empty-handed knocking down the bolts, in order to prevent accidents.

Appendix 10 Product Accessory and Components Replacing Statement

Accessory and components listed bellows should be offered and changed by our company or appointed agent. If they have been changed by yourself, resulting any aftereffect, our company does not take the consequences.

Number	accessory and components
1	Power supply board (Model: PS2202)
2	Main controlling board (Model: MC2102)
3	Power supply input board (Model: PFV2202)
4	Brake resistance (160 ohm/60W)
5	Operation Box
6	Pedal Box
7	Synchronizer

8	Servo Motor and connector
9	Controller brackets(contain aluminum die-casting, plastic, etc.)
10	Connecting wire
11	Alnico and alnico seat