

Controller Instruction Manual

Safety Instruction

- Please read this manual carefully, also with related manual for the machinery before use the controller.
- For installing and operating the controller properly and safely, qualified personnel are required.
- Please try to stay away from arc welding equipment, in order to avoid electromagnetic interference and malfunction of the controller.
- Keep in room bellow 45° and above 0°
- Do not humidity below 30% or above 95% or dew and mist of places.
- Install the control box and other components, turn off the power and unplug the power cord.
- To prevent interference or leakage accidents, please do the ground work; the power cord ground wire must be securely connected to an effective way to earth..
- All parts for the repair provided by the Company or approved before use.
- Performing any maintenance action, you must turn off the power and unplug the power cord. There are dangerous high voltage control box, you must turn the power off after one minute before opening the control box.
- This manual marked with the symbol of the Department of Safety Precautions must be aware of and strictly adhered to, so as not to cause unnecessary damage.

1 Installation Instructions

1.1 Product specifications

Maximum motor speed: 5000 r / min; Supply Voltage: AC 220 \pm 44 V; Power frequency: 50Hz/60Hz; Maximum output power: 550W; maximum motor torque: 3Nm.

1.2 Pedal installation

First, With self-tapping screws fastening the pedals①under the proper position of the platen ②.(direct drive servo motor ③and control box④has been fixed on the sewing machine head⑤). Then the two ends of the pedal connecting rod⑥ are connected with the pedals① and the bottom pedal⑦.

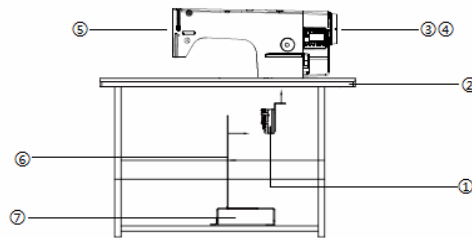



Fig.1-1 Direct drive machine controller installation diagram

: The footboard try to ensure that the installation position is vertical rod pedals, the operator pedal is more comfortable and flexible.

1.3 Interface plug connections

The pedals and the machine head of the connector plug are mounted to the corresponding position in the controller back of socket, the name of each socket shown in Figure 1-2. Once connected, please check if the plug is inserted firmly.

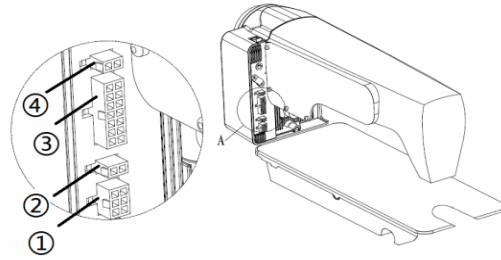


Fig.1-2 Controller Interface diagram

① Pedals; ② Foot lifter solenoid socket ; ③ Machine head solenoid socket; ④ Machine head light socket (black);

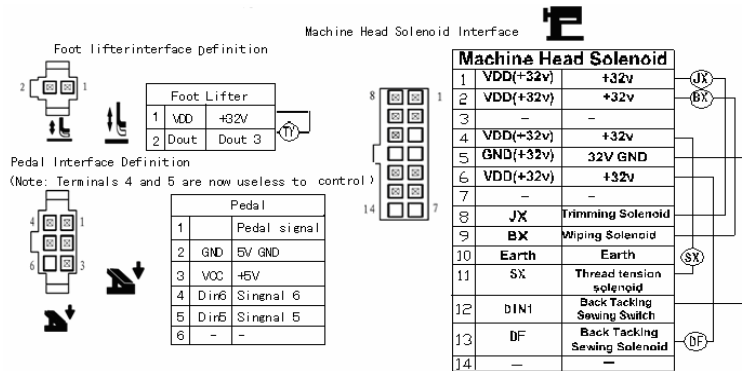



Fig.1-3 Controller Interface Definition

: If the plug does not go in, check the plug and socket matches, needle insertion direction or the direction is correct! Light socket and presser foot lifter solenoid interfaces are 1 * 2 interfaces, head lights black connector interface, please note that distinction.

1.4 Wiring and Grounding

Must prepare the system grounding project, please be a qualified electrical engineer construction. Product is powered and ready for use; you must ensure that the power outlet the AC input is securely grounded. System grounding wire is yellow and green lines, make sure the ground wire is connected to the grid and reliable security protection on the ground to ensure the safe use, and prevent abnormal situation.

⚠: All power lines, signal lines, ground lines, wiring not to be pressed into other objects or excessive distortion, to ensure safe use!

2 Operation Panel Instructions

2.1 Operation Panel Display Instruction

2.1.1 The operation panel composition

Operation Panel is divided with two areas (See Fig2-1): LCD display areas and key words area.

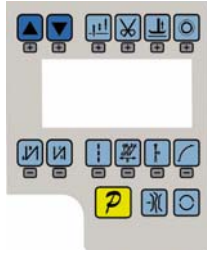


Fig.2-1 Operation Panel

2.1.2 The LCD display

The LCD display areas are position in middle of the whole operation panel. It including pattern, sewing mode, start/end back tacking, and foot lifter, stop-needles and trimming, and slow start operation set. The operation system automatically power on that HMI will a self-test, then all icons will flash once in the LCD display areas and only display the current settings of the system, the other did not choose that the icon will not be lighted, see figure 2-2.

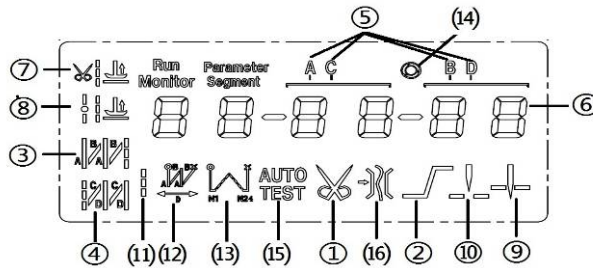








Fig.2-2 LCD Icon

Table 2-1 LCD Icon Display Description











Index	Icon	Description	Index	Icon	Description
1		Automatic trimming	9		Intermediate stops up stop position
2		Soft-start function	10		Intermediate stops down stop position
3		start back tacking	11		Free sewing
4		End back tacking	12		W seam
5	A C B D	Sewing segments index	13		Multi-seam






6		Numeric character display (pin number / parameter)	14		Trigger function
7		Foot lifter after trimming	15		Automatic test
8		Middle stop foot lifter	16		Clamp function

2.2 The operation panel keys of description

A description of each key operation panel shown in Table 2-2.

Table 2-2: Key Functions instruction


No	Appearance	Description
1		Function key: Major operation to determine and confirm working, and work with other key to set a higher level of the parameter.
2		start back tacking key: Every effective press the key once; round with single start back tacking, double start back tacking, four start back tacking and close start back tacking. The current status is displayed on the left of LCD. Detailed see "3.1.2 before and after sewing settings instruction."
3		end back tacking key: Every effective press the key once; round with single end back tacking, double end back tacking, four end back tacking and close end back tacking. The current status is displayed on the left of LCD. Detailed see "3.1.2 before and after sewing settings instruction."
4		Free sewing mode key: Every effective pushed the key once; the system selects free sewing mode. The free sewing status is displayed below LCD. Detailed see "3.1.1 model sets of sewing."
5		W sewing mode key: Every effective pushed the key once; the system selects W sewing mode. The W sewing status is displayed below LCD screen. Detailed see "3.1.1 model sets of sewing."
6		Multi-segment sewing mode key: Every effective pushed the key once; the system selects multi-segment sewing mode, pressed P key into the number of the needed setting. The multi-segment sewing status is displayed below LCD. Detailed see "3.1.1 model sets of sewing."
7		Soft start key: Select soft start function. It will show soft start status on top of LCD screen.
8		Stop position key: Select up/down stop position. The up/down stop position is displayed on top of LCD screen. Detailed see "3.1.7 stop position set. [Note: automatic trimming back, the system is always on the up of needle position.]
9		Cycle key: Switch parameter position when change parameter;
10		Temporary accelerate speed key: Press the button to temporary increased sewing speed.

No	Appearance	Description
11		Temporary deceleration speed key: Press the button to temporary reduced sewing speed.
12		Trimming key: Select/Cancel automatic trimming. The trimming status is displayed on top of LCD screen. Detailed see "3.1.5 trimming set.
13		Press foot lifting key: Every effective pushed the key once; round with trimming after press foot lifting, sewing end press foot lifting and manual press foot lifting. The current status is displayed on top of LCD screen. Detailed see "3.1.4 press foot lifting set.
14		One-Shot-Sewing key: Select/Cancel one-Shot-Sewing, it is effective only into multi-segment sewing mode, when chose one-shot sewing, one-shot foot pedal can complete one needle of multi-segment sewing; The one-shot-sewing status is displayed on top of LCD screen. Detailed see "3.1.6 trigger set.
15		Gripper switch key: It is used to select the folder line function on and off, open the clamp function LCD screen below will display folders line status, for details see "3.1.9 clamp set."























3 System Parameter Setting Descriptions

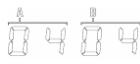














3.1 Operator Mode

In this mode, various sewing modes are available after technical parameters settings. As the default setting, the system enters this mode when it starts. Under this mode, such basic functions as normal sewing work and modes change can be realized but no change inside parameters and setting.

: During working, if long time without press button, HMI will change to idle status automatically, and will cancel the operation before.

3.1.1 Sewing Mode Setup




- **Free sewing mode:** Press  key, free sewing mode icon  is lightened in LCD area. LCD  indicates free sewing mode has been selected; it is ready just step the pedal for operation.
- **Multi-segment sewing mode:** Press  key, constant-stitch sewing icon  is lightened in LCD area. LCD  is multi-segment sewing status. Use   keys and   keys to choice the N segment. and press  key to entry multi-segment sewing stitch number of each segment setup status . You may use   keys and   keys to choice the need to modify number of segment, use   keys and   keys to modify number of needle in multi-segment sewing stitch setup status.
- **W sewing mode:** Press  key, constant-stitch sewing icon  is lightened in LCD area. LCD

 is W sewing setup status. You may use   keys and   keys to choice needle in an area and set rang 1-99 stitches; use   keys and   keys to choice needle in B area and set rang 1-99 stitches. Press  key, can be used to choice A B D segment, LCD , use   keys and   keys to choice needle in B area and set rang 1-99 stitches.









3.1.2 Start/End back tacking setup :

Step 1: Press  key

Start back tacking has following four modes:



- ◆ None start back tacking
- ◆  Single start back tacking
- ◆  Double start back tacking
- ◆  Four start back tacking


Step 2: Stop pressing to confirm, then this back tacking mode has been selected.

Step 3: Change the corresponding parameters values by using   keys and   keys and B values by using   keys and   keys. The value range is 1-99 stitches. It set pin number to be completed before star back tacking.





Note: End back tacking setting method is similar with start back tacking setting method basically, except the key.

3.1.3 Soft start setup :




Press  key, entry into soft start status. If choice soft starts, the icon  is lightened in LCD areas.

Press this key again to exit soft start status, the icon  will off.




3.1.4 Prests foot lifting key :

Press  key, entry into foot lifting status, total four different status, no automatic foot lifting、automatic foot lifting after trimming (), automatic foot lifting if stop during sewing () automatic foot lifting if trimming and stop during sewing. Use  key to choice foot lifting setup status and stop press key to confirm. Foot lifting had compiled.





3.1.5 Trimming key

If press  key entry into press trimming status, select/non-select trimming. Press  key repeat, the icon  is lightened/ disappeared in LCD area. Whether it choice trimming that the icon is lightened or disappeared.


3.1.6 One-Shot-Sewing key

Use  key: select/non-select one-shot-sewing statuses. The icon  will light if select one-shot-sewing in LCD areas, press  will disappear.




3.1.7 Stop position key

Use  key: select up/down stop position. Press  key repeat, between up /down  stop position to switch. Choose need to stop position and stop press key to confirm. Stop position had compiled.

3.1.8 Stitch compensation key

Use  key: press this key to start stitch compensation. Compensation half needle or a half needle due to the press time. If you keep press that compensation needle always until release button.





3.1.9 Clamp function set












Use  keys: Select clamp function  is displayed below the LCD screen, and then click Folder line function can be turned off,  the bottom of the LCD screen off.





3.2 Technician Mode

Technician mode is used for sewing speed and pedal speed control such as the use of performance adjustments.

3.2.1 How to enter the technician mode

Step 1: Under operator mode, press  key and  key, the LCD will display Pd , and then set the password  to enter technician mode.

Step 2: Use     keys and     keys to input the password, and then press  key. If the password is correct then enter technician mode, the LCD will display  . otherwise, it will return to operator mode.

Step 3: Change technician parameters by   keys and   keys. The parameters are shown in table 2.

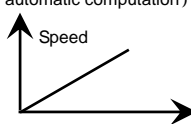
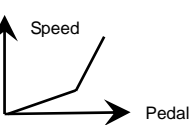
Step 4: Parameters values can be changed by     keys and     keys

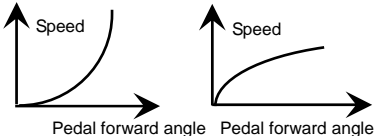
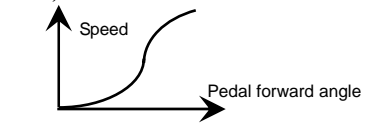
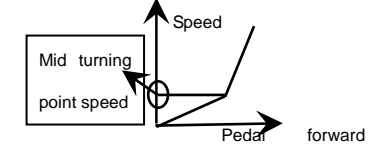
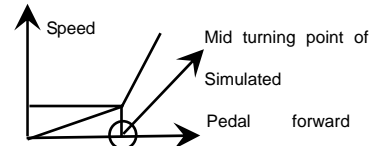
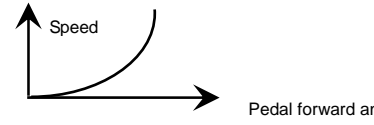
Step 5: Under technician mode, press  key, the panel will return to operator mode.

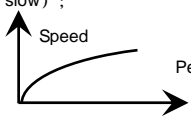
3.2.2 Technician mode parameter:

Table3-1: Technician mode parameter

Mode	Parameter	Default	Rang	Comment
speed	0 0	200	100 ~800	Minimum sewing speed
	0 1	3500	200 ~5000	Maximum sewing speed
	0 2	3000	200 ~5000	Maximum constant sewing speed
	0 3	3000	200 ~5000	Maximum manual back tacking speed
	0 4	200	100 ~800	Stitch compensation speed

Mode	Parameter	Default	Rang	Comment
	05	250	100~500	Trimming speed
	06	0	0 / 1	Soft start Mode setup: 0: Soft start only after trimming 1: Soft start after both trimming and stop
	07	2	1~9	Soft start stitch number
	08	200	100~800	Soft start speed
	09	20	1~20	System accelerate sensitivity (Direct drive transmission can be set up to a large value ; belt transmission don't set large value or too much noise and vibration. This parameter do not affect the electrical)
	0A	20	1~20	System decelerate sensitivity (Direct drive transmission can be set up to a large value ; belt transmission don't set large value or too much noise and vibration. This parameter do not affect the electrical)
Back tacking setup	10	1800	200~2200	Start back tacking speed
	11	1800	200~2200	End back tacking speed
	12	1800	200~2200	Continuous back tacking speed
	13	24	0~70	Start back tacking stitch compensation 1
	14	20	0~70	Start back tacking stitch compensation 2
	15	24	0~70	End back tracking stitch compensation 1
	16	20	0~70	End back tracking stitch compensation 2
	30	0	0/1/2/3	<p>Pedal Curve mode setup: 0: Auto Calculated liner Curve (According to the highest speed automatic computation)</p> 
Pedal	30	0	0/1/2/3	<p>1: Two segment liner Curve.(You shall be free to set slow start after fast or fast start after slow, the parameters "31"and"32"cooperate with use)</p> 

Mode	Parameter	Default	Rang	Comment
				<p>2: Arithmetic Curve (the parameters [33] cooperate with use)</p>  <p>Speed</p> <p>Pedal forward angle</p> <p>Speed</p> <p>Pedal forward angle</p>
				<p>3: S curve (the operate control is very well, slow start after fast)</p>  <p>Speed</p> <p>Pedal forward angle</p>
	31	3000	200 ~ 4000	<p>Two segment controls the speed slope: mid turning point speed RPM (two segment of turning point speed) , the parameter[30] set to 1 effective.</p>  <p>Speed</p> <p>Pedal forward</p> <p>Mid turning point speed</p>
	32	800	0 ~ 1024	<p>Two segment controls the speed slope: mid turning point of pedal Simulated value, the parameter[30] set to 1 effective, the value is between[38]and[39].</p>  <p>Speed</p> <p>Pedal forward</p> <p>Mid turning point of pedal Simulated</p>
	33	2	1/2	<p>Arithmetic Curve supplementary parameter : The parameter [30] set to 2 effective.</p> <p>1 : Square (the low speed control is very well, slow start after fast) :</p>  <p>Speed</p> <p>Pedal forward angle</p>

Mode	Parameter	Default	Rang	Comment
				2: Square root (Responding speed is fast, fast start after slow) ; 
	34	90	0 ~ 1024	Pedal trimming position set, See 5-1. (the value is not higher than the parameter [35])
	35	300	0 ~ 1024	Press foot lifting, See 5-1. (the value is between[34]and[36].)
	36	419	0 ~ 1024	Pedal back mid position, see 5-1. (the value is between[35]and[37].)
	37	510	0 ~ 1024	Pedal step upon running position, see 5-1. (the value is between[36]and[38])
	38	578	0 ~ 1024	Pedal low speed running position (upper) ,see5-1 (the value is between[37]and[39])
	39	962	0 ~ 1024	Pedal simulation the largest of value, see 5-1 (the value is not lower than the parameter [38])
	3R	100	0 ~ 800	Pedal press foot lifting confirm time
custom setup	40	1	0 / 1	Run to up needle position after Power on: 0: no action 1: action
	41	1	0 / 1	Automatically reinforcing functions chose : (the machine head is not automatically reinforcing functions, the best way is prohibit) 0: prohibit 1: allow
	42	0	0 / 1	Back to sewing by hand when the function mode selection: 0: Juki mode. In sewing or in the end of the action 1: Brother mode. It acts only in sewing.
	43	0	0 / 1 / 2 / 3	Special Running Mode setup: 0: operator select 1: simple sewing mode 2: calculate initial angle of motor (do not uninstall strap) 3: calculate motor/machine head run rate mode (synchronizer, do not uninstall strap)

Mode	Parameter	Default	Rang	Comment
	44	0	0~31	Torque boost up at low speed : 0: no action 1~31: 31 levels Torque boost up
	45	1	0 / 1	Stop pin mode : 0: Constant speed tackle mode (in the belt transmission, Parking is not precision) 1: back pull mode (PMX)
	46	100	0~800	Command button to fill half-needle time
	47	150	0~800	Command button to fill a needle time
Count Mode	50	1	1~100	Stitch counting proportion set up
	51	1	1~9999	Stitch counting value set up
	52	0	0~4	Stitch counting mode selection: 0: no counting 1: Counting up according to stitch bit, after reaching set value then restart. 2: Counting down according to stitch bit, after reaching set value then restart. 3: Counting up according to stitch bit, after reaching set value, motor should stop automatically, recounting should be restart by S4 [152.INI] =CRS or the button A on operation panel. 4: Counting down according to stitch bit, after reaching set value, motor should stop automatically, recounting should be restart by S4 [152.INI] =CRS or the button A on operation panel.
	53	1	1~100	Trimming counting proportion set up
	54	1	1~9999	Trimming counting value set up
	55	0	0~4	Trimming counting mode selection: 0: no counting 1: Counting up according to stitch bit, after reaching set value then restart. 2: Counting down according to stitch bit, after reaching set value then restart.

Mode	Parameter	Default	Rang	Comment
				3: Counting up according to stitch bit, after reaching set value, motor should stop automatically, recounting should be restart by S4 [152.INI] =CRS or the button A on operation panel. 4: Counting down according to stitch bit, after reaching set value, motor should stop automatically, recounting should be restart by S4 [152.INI] =CRS or the button A on operation panel.
Operation	E1	0	0 / 1 / 2	Translating Parameter 0: no action 1: Download parameters(the panel will parameter from panel to controller) 2: Upload parameters (the panel will parameter from controller to panel)
	E2	0	1, 2, XXXX	Restore storage parameter(Only restore parameters to operators, and vendors and maintenance) Belt flat 1000/ Direct drive flat 2000
	E3	0	1, 2	Backup current parameter as user parameter for restore (restore)
Note: Above such "6x" parameter to operate is not saved.				

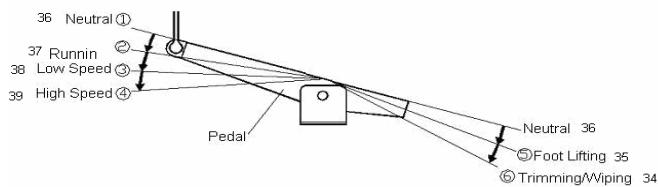


Fig.3-1 Pedal action parameter the position of the diagram





3.3 Administrator mode

Administrator mode is used for functions such as sewing machine head solenoid adjustment.

3.3.1 How to enter administrator mode

Step 1: Under operator mode, press and keys to enter administrator mode in LCD Pd 0000, and then set the password 0000 to enter administrator mode.

Step 2: The password is entered using keys and keys, then press key. If the password is correct then enter administrator mode, the LCD will display 00 0000, or return to the operator mode.

Step 3: Change administrator parameters index by   keys and   keys under administrator mode. The details of administrator parameters are shown in table3.

Step 4: Parameters values can be changed by     keys and     keys.

Step 5: Under administrator mode, press  key, the panel will return to operator mode.

3.3.2 Administrator parameter table

Table 3-2: Administrator mode parameter:






Mode	Parameter	Default	Rang	Comment
Trimming mode	02	1	0 / 1 / 2 / 3	Mode selection for trimming sequence. 0: According to the parameters 【03】 set angles is trimming, until up position delayed 【06】 time off. 1: According to the parameters 【03】 set angles is trimming, until 【04】 set angles off. 2: According to the parameters 【03】 set angles is trimming, it delayed 【06】 off. 3: Down position signal delayed the parameter【05】set angles is trimming, it delayed 【06】 off.
	03	10	5-359	The start angles of trimming (relative down position of angle)
	04	120	10-359	The end angles of trimming (relative down position of angle, Need to greater than the system of parameters 【03】)
	05	10	1-999	Trimming start delay time T1 (ms)
	06	60	1-999	Trimming end delay time T2 (ms)
Tension release 、 Wiper and Clamp mode	10	0	0 / 1 / 2 / 3 / 4	Mode selection for tension release sequence. 0: According to the parameters 【11】 set angles is tension release, until up position delayed 【14】 time off. 1: According to the parameters 【11】 set angles is tension release, until 【12】 set angles off. 2: According to the parameters 【11】 set angles is tension release, it delayed 【14】 off. 3: Down position signal delayed the parameter【13】set angles is tension release, it delayed 【14】 off. 4:Up position signal delayed the parameter 【13】 set angles is tension release, it delayed 【14】 off.

Mode	Parameter	Default	Rang	Comment
	11	25	5-359	The start angles of tension release(relative down position of angle)
	12	350	10-359	The end angles of tension release (relative down position of angle, Need to greater than the system of parameters 【11】)
	13	1	1-999	Tension release solenoid start delay timeT1 (ms)
	14	10	1-999	Tension release solenoid up position delay time T2 (ms)
	15	1	0/1	selection for Wiper function 0: off 1: on
	16	10	1-999	Clamp /Wiper delay time ms
	17	70	1-9999	Clamp /Wiper holding time ms
	18	50	1-999	Clamp /Wiper revert time ms
	19	0	0/1	Thread Clamp function : 0: off 1: on
	1R	70	0-359	Clamp start angle
	1b	140	0-359	Clamp end angle
Stop mode	31	0	0/1	The automatic test mode selection : 0: order stitches 1: order time
	32	300	0~1000	The safety SW alarm confirm time ms(the same way does not distinguish between direct-drive safety SW and flat lock trim of protection SW)
	33	50	0~1000	The safety SW restore confirm time ms
	34	0	0/1	Motor rotation direction setup: 1: Forward 0: Reverse
Machine head parameter				motor/machine head run rate: 0.001
	40	1000	0-9999	(if automatic calculation of motor/machine head run rate has done, the Parameter value in control box maybe different with that in HMI)
	42	0	0-359	Up needle position adjusted angle (compare to up position sensor position excursion)
	43	175	0-359	Down needle position mechanical angle

Mode	Parameter	Default	Rang	Comment
	44	200	0 - 800	Press down delay time(ms)

3.4 Monitor mode

3.4.1 How to enter monitor mode

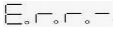
During HMI idle, Press  key, then press  key, entry monitor mode. Use   keys and  keys to switch to watch the parameters. About the monitor parameter, please refer the sheet 4, HMI will back to idle if no wheel or no press the key in regulates time.

3.4.2 Monitor mode parameter table


Table 3-3 monitor mode parameter

Name	Parameter	unit	comment
Monitor status	10		Counter stitches
	11		Counter trimming
	20	V	DC Bus Voltage
	21	RPM	Motor speed
	22	0.01A	One phase current
	23	degree	Initial angle
	24	degree	Mechanical angle
	25	—	Sampling value of pedal voltage
	26	0.001	motor/machine head run ratio
	27	hour	Motor total run time
38	—	Sampling value of potentiometer at machine head	

3.5 Wrong warning mode

If the HMI detects something wrong from controller, it will jump automatically to warning mode, and show error code by 8-segment. see . During wrong warning mode, the user can set technician parameter change, administrator parameter and HMI parameter self-change or monitor mode. Exit these modes not back to idle but back to wrong warning mode. It will return normal status after fixing error and resetting power.










3.6 Safety switch warning mode











If HMI test safety switch warning, it will jump automatically to safety switch warning mode, see . During wrong safety switch warning mode, the user can set technician parameter, administrator parameter and HMI parameter self-change or monitor mode. Exit these modes not back to idle but back to wrong warning mode. (It is reunification with the switch input, does not distinguish between safety switch, scissors protection switch)

4 Parameter reset to factory settings

4.1 Restore storage parameter for factory of control



Step 1: Under operator mode, press  and  keys, LCD Pd 0000; and then set the password 0000 to enter technician mode.

Step 2: The password is entered using     keys and     keys, then press  key. If the password is correct, enter into the technician mode, or return to the technician mode.



Step 3: Change technician parameters index to 【62】 by   keys and   keys under technician mode. Restore storage parameter for factory of control can be changed by   keys and     keys, usually its four bit.

Step 4: the parameter confirms correct, press  key until the red light of HMI are bright or buzz produces a long loud, release  key, HMI and the whole system restore storage parameter.

4.2 Adjust the up needle position

Step 1: Press  and  keys, enter monitor mode to the NO. 24th monitoring parameters. As shown in Figure 4-2

Step 2: Turn the hand wheel so that the wiper to the position of the up needle position, LCD will show a mechanical angle of deviation. As shown in Figure 4-2 Legend.

Step 3: Press the  and  keys, LCD display 240000 (previous step mechanical deflection angle zero) to prove that the needle position set. As shown in Figure 4-2 Legend:

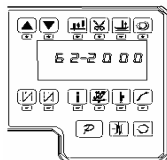


Fig.4-1

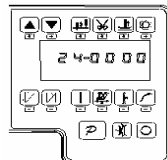


Fig.4-2

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