AS59 AC Servo System

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

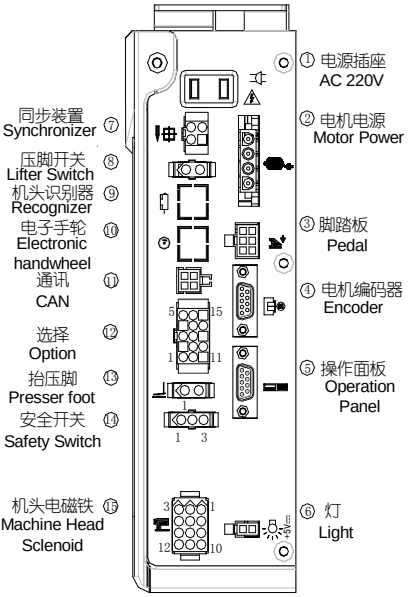
1.1 Product Specifications

Product Type	AS59	Supply Voltage	AC 220 ± 44 V
Power frequency	50Hz/60Hz	Maximum output power	550/750W

1.2 Interface Plug Connections

The pedals and the machine head of the connector plug are mounted to thecorresponding position in the controller back of socket, as shown in figure 1-1. Please check if the plug is inserted firmly.

① Power supply socket; ② Motor Power; ③ Pedal;
④Encoder; ⑤ Operation Panel; ⑥ Light; ⑦ Synchronizer;
⑧ Lifter Switch; ⑨ Recogniter; ⑩ Electronic handwheel;
⑪ CAN; ⑫Option;⑬ Presser foot; ⑭ Safety Switch;
⑮ Machine head solenoid socket;



Note: The internal model is AS59 (A), which is suitable for HMI13 operation panel.

Fig.1-1 Controller Socket Diagram

Machine head of each function signal		
Plug	Pin	Definition
	1	Knew SW
	2	DIN_1
	3	DIN_3
	4	VDD
	5	Trimming
	6	AD5
	7	AD2
	8	
	9	AD3
	10	VDD
	11	GND
	12	GND
	13	AD1
	14	+5V
	15	Clamp

Machin Head sclenoid		
Plug	Pin	Description
	1	TYJ
	2	VDD
	3	VDD
	4	Thread slack
	5	Back sewing
	6	VDD
	7	Line tension
	8	+5V
	9	VDD
	10	Short term head
	11	GND
	12	DIN_2

Machine headlights		
	Pin	Description
	1	GND
	2	+5V

press lifter		
Plug	Pin	Description
	1	VDD
	2	——

Presser foot SW.		
Plug	Pin	Description
	1	AD4
	2	GND

Safety SW.		
Plug	Pin	Description
	1	+5V
	2	Safe SW
	3	GND

Fig.1-2 Controller Interface Definition

1.3 Wiring and Gounding

We must prepare the system grounding project, please a qualified electrical engineer to be construction. Product is energized and ready for use; you must ensure that the power outlet the AC input is securely grounded. The grounding wire is yellow and green lines, it must be connected to the grid and reliable security protection on the ground to ensure 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

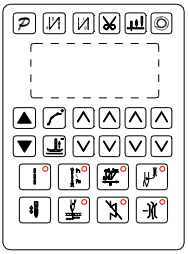


Fig.2-1 Operation Panel

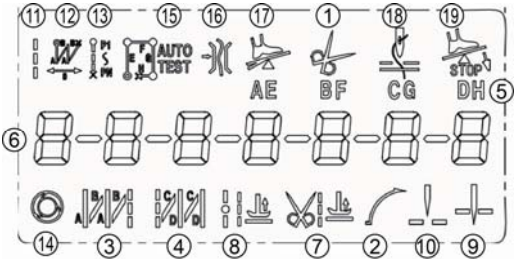


Fig.2-2 LCD Display

Index	Icon	Description	Index	Icon	Description
①		Automatic trimming	⑪		Free sewing
②		Soft start	⑫		W sewing
③		Start back tacking	⑬		Multi-section constant-stitch sewing
④		End back tacking	⑭		One-shot sewing
⑤	AE BF CG DH	Sewing segments index	⑮	AUTO TEST	Automatic test
⑥	8 8 8 8 8 8 8	Number display	⑯		Thread clamp
⑦		Presser foot lifting after trimming	⑰		Back half pedal function
⑧		Presser foot lifting at seam end	⑱		Thread sweeping function
⑨		Position down	⑲		Start sewing
⑩		Position up			

2.2 Key Functions

No	Key	Name	Description
1		**Parameter setting key**	Use the key to switch to the program mode. The key is parameters confirm key, and back to the previous menu until the operator sewing mode state. In addition, work with other key to set a higher level of the parameter.
2		**Start back tacking setting key**	Switch during all start tacking type when pressing. (No tacking, once tacking, double tacking, 4 repeat tacking). Tacking stitches A, B can be set using key and key. Show is start back tacking interface,default range 1~F corresponds to the 1~15 pin.
3		**End back tacking setting key**	Switch during all end tacking type when pressing. (No tacking, Once tacking, double tacking, 4 repeat tacking). Tacking stitches C, D can be set using key and key.Show is start back tacking interface,default range 1~F corresponds to the 1~15 pin.
4		**Trimming cycle selection**	Enable or disable the trimming cycle.
5		**Stop position key**	Select up/down stop position.Press key is lit that is called up stop position. Press key again ,the lights went out that is called down stop position.
6		**One-shot sewing selection**	In constant-stitch sewing：a. One shot to the pedal, automatic performed number of stitches of every section. b. To down the pedal again and again to finish rest the sections until it finish pattern.
7		**Free sewing**	1). As the pedal is toed down, machine will start sewing. Once the treadle returned to neutral, machine will stop immediately. 2). As the pedal heeled back, the trimming cycle will be finished automatically.
8		**Multi-section constant-stitch sewing**	As the treadle is toed down, constant-stitch sewing P01, P02, P03 etc. performed section by section. As following, P040 F16, 1st number is total sections, 2nd number is which section, and 3rd number is the stitches of the section. P04 is total segment, use key and the key to adjusting, the default maximum 24 segments, -01 as the current setting segment, -16 as the sewing needle No. of the current segment, they are used key and key to adjusting.
9		**W sewing**	Once the pedal is toed down, all the seams of bar tacking, A, B sections will be completed with D times, and the trimming cycle will be finished automatically. Note：When the bar tack sewing start, it will not stop until the trimming cycle finished, except for the pedal heeled back to cancel the action.
10		**Clamp setting key**	Clamp function is enabled (icon on) or disabled (icon off).
11		**Forward stitch correction**	One touch of this key act as stitch correction.
12		**Trimming short thread key**	Function On or Off (state display at up-right cornor).
13		**Reinforcement reverse key**	Reinforcement reverse function is enabled (icon on) or disabled(icon off).
14		**Thread tension**	Thread tension On or Off (state display at up-right cornor)
15		**Soft start setting**	Soft start at the first seam is enabled (icon on) or disabled.

No	Key	Name	Description
16		**Presser foot lifting mode**	Switch during all presser foot lifting mode when pressing the key. (No lifting, lifting after trimming cycle only, lifting at machine stop only, lifting at machine stop and after trimming cycle both.)
17		**Increasing and decreasing motor speed**	The maximum motor speed can be adjusted using the keys.
18		**Up and down keys**	Adjust the values in plus and minus state.

3 System Parameters Setting List

3.1 Technician Mode

NO.	Range	Default	Description
1、Press + key can modify the technician parameter table; 2、The digital tube display PW 0000, It is required to enter password to the technician mode. The Initial password is 0000. Press the corresponding key and key to change the password value; 3、Press key, If the password is correct, that is enter the technical parameters set mode,show 100-0000. 4、At last press key to exit parameter setting mode,return to sewing work mode.			
100	100~800	200	Minimum speed
101	200~5000	3500	Maximum speed
102	200~5000	3000	Constant-stitch sewing speed
103	200-5000	3000	Manually backstitch maximum speed limit
105	100~500	250	Trimming speed
107	1~9	2	Stitch numbers for soft start
108	100~800	200	Soft start speed
110	200~2200	1800	Start back tacking speed
111	200~2200	1800	End back tacking speed
112	200~2200	1800	Bar tacking speed
113	1~70	24	Stitch balance for start back tacking No.1
114	1~70	20	Stitch balance for start back tacking No.1
115	1~70	24	Stitch balance for end back tacking No.3
116	1~70	20	Stitch balance for end back tacking No.4
120	0~3	0	Start back tacking work mode: 0: Touch the pedal, that automatically performs starting back seam. 1: By pedal control can be arbitrarily stopped. 2: After positioning the needle stop by 119 parameters [CT] time control action 3: After the needle stop position by 119 parameters [CT] time control action
123	0~3	0	End back tacking work mode: 0: Touch the pedal, that automatically performs starting back seam. 1: Invalid 2: After positioning the needle stop by 119 parameters [CT] time control action 3: After the needle stop position by 119 parameters [CT] time control action
134	0~ 1024	90	Trimming point of pedal
135	0~ 1024	300	Footer lifting point of pedal

136	0~1024	460	Neutral point of pedal	Figure 4-1 shows the specific setting method
137	0~1024	480	Motor running point of pedal in low speed	
138	0~1024	580	Accelerated point of pedal	
139	0~1024	962	Max speed point of pedal	
13E	1~800	100	After trimmer the press lifter delay time (dial line).	
140	0~1	1	Soft start at the first cycle of power ON. 0: Disable 1: Enable	
142	0~1	0	Bar tacking mode selection: 0: Juki mode. Active when motor stop or running. 1: Brother mode. Active only when motor running.	
143	0~3	0	Special mode: 0: Normal mode 1: Simply sewing mode 2: Motor initial angle measurement (Do not remove the belt) 3: Automatically setting the pulley ratio by the CPU. (Synchronizer is necessary and the belt not removed.)	
144	0~31	0	Feedforward torque of motor: 0: Normal functions 1-31: Feedforward torque level	
148	0~2	0	Mode of stitch correction 0: continuous; 1:half stitch; 2: one stitch	
149	0~10	0	The time of chopping on for the presser foot slow down (uint is 100us).	
150	1~100	1	The proportion coefficient of the stitches counter	
151	1~9999	1	Maximum stitches of the counter	
152	0~6	0	Count mode selection (For bobbin thread) 0: The counter is invalid 1: Count up by stitches. When count over, counter will be auto-reset.2: Count down by stitches. When count over, counter will be auto- reset. 3: Count up by stitches. When count over, motor stops and the counter must be reset by the external switch or the P key on the panel. 4: Count down by stitches. When count over, motor stops and the counter must be reset by the external switch or the P key on the panel. 5: Count up by trimming. When count over, panel alarms and motor stops after trimming. 6: Count down by trimming. When count over, panel alarms and motor stops after trimming.	
153	1~100	1	The proportion coefficient of the pieces counter	
154	1~9999	1	Maximum pieces of the counter	
155	0~4	0	Count mode selection (For sewing piece) 0: The counter is invalid 1: Count up by pieces. When count over, counter will be auto-reset. 2: Count down by pieces. When count over, counter will be auto- reset. 3: Count up by pieces. When count over, motor stops and the counter must be reset by the external switch or the P key on the panel. 4: Count down by pieces. When count over, motor stops and the counter must be reset by the external switch or the P key on the panel.	
161	0~2		Direction of parameter transfer: 0: No action 1: From operation panel to controller 2: From controller to operation panel.	
162	1~2		Restore factory setting	
163	1~2		Save current parameters as user-defined default parameters.	

3.2 Administrator Mode

NO.	Range	Default	Description
1、Press P+ ◎ ey can modify the administrator parameter table;			
2、The digital tube display PdOOOO, It is required to enter password to the administrator mode. The Initial password is □□□□.			

Press the corresponding [^] key and [v] key to change the password value;

3、Press [P] key, If the password is correct, that is enter the administrator parameters set mode,show 200-0000;

4、At last press [S] key to exit parameter setting mode,return to sewing work mode.

203	5-359	10	Trimming output start angle TS (Down needle position angle as the reference point)
204	10-359	120	Trimming output end angle TE (Down needle position angle is the reference and this value should be bigger than TS)
205	1-999	10	Trimmer start delay T1 (ms)
206	1-999	120	Trimmer end delay T2 (ms)
211	5-359	25	Thread release output start angle LS (Down needle position angle as the reference point)
212	10-359	350	Thread release output end angle LE (Down needle position angle is the reference and this value should be bigger than LS)
216	1~999	10	Wiper output delay time (ms)
217	1~9999	70	Wiper duration time (ms)
218	1~999	50	Wiper recovery time (ms)
219	0~1	0	Thread clamp function 0: Disable 1: Enable
21A	10-359	120	Thread clamp start angle
21b	11-359	318	Thread clamp end angle
21E	11-359	160	The angle of presser foot solenoid off during thread clamping
220	200～360	360	Stop position after trimming (Motor can stop with a reverse angle)
221	0~240	0	Front sewing reverse angle (increase in thickness of material)
231	0~1	0	Auto test mode: 0: Stitches mode 1: Time mode
234	0~1	0	Motor direction: 1: CCW 0: CW
240	0~9999	1000	The ratio between motor and machine (1000 stands for 1:1)
242	0~359	0	Up needle stop angle (After detecting the synchronizer signal)
243	0~359	175	Down needle stop angle
244	0~800	200	Running delay time when presser footer comes down (ms)
247	0~2000	0	The alarm time for adding oil (hours), disabled when setting 0
248	0~400	0	The alarm time for adding oil, no running time (hours) 0: close the function

3.3 Monitor Mode

No.	Description	No.	Description	No.	Description
010	Counter for stitches	023	Initial electrical angle	029	Software version
011	Counter for sewing pieces	024	Machine angle	02A	Analog input 1 sample value
013	State of encoder	025	The sampling voltage of pedal	02b	Analog input 2 sample value
020	DC voltage	026	The ratio between motor and machine	02C	Error counter
021	Machine speed	027	The total used time(hours) of motor	02d	QP ultra-state
022	The phase current	028	The sampling voltage of interaction	030-037	The history record of error codes

3.4 The Warning Message

Alarm Code	Description	Corrective
ALA-1	Fuel filling warning	Fuel filling. Press P key to clear.

ALA-2	Count over for stitches	The counter reaches the limit. Press P key to reset the counter.
ALA-3	Count over for sewing pieces	The counter reaches the limit. Press P key to reset the counter.
ALA-4	Emergency stop	Press the key of emergency stop to clear.
ALA-5	Lift needle locking	Then press the needle lifting locking button, can eliminate the needle lifting locking state.
PoWoFF	Power is off	Please wait for 30 seconds, then turn on the power switch.
ArM UP	Safety switch alarm	Adjust the machine to the correct position.

3.5Error Mode

If the error code appears, please check the following items first:

1. Make sure the machine has been connected correctly; 2. Reload the factory setting and try again.

Error Code	Description	Solution
Err-01	Hardware overcurrent	Turn off the power switch, and restart after 30 seconds. If the controller still does not work, please replace it and inform the manufacturer.
Err-02	Software overcurrent	
Err-03	Under-voltage	- Check mains voltage - Stabilize mains voltage
Err-04	Over-voltage when the machine is off	Disconnect the controller power and check if the input voltage is too high (higher than 264V). If yes, please restart the controller when the normal voltage is resumed. If the controller still does not work when the voltage is at normal level, please replace the controller and inform the manufacturer.
Err-05	Over-voltage in operation	
Err-06	Short circuit of solenoid voltage 24V	- Take plug out, if error continues, replace control box - Test inputs/ outputs for 24V short circuit
Err-07	Motor current measuring failure	Turn off the system power, restart after 30 seconds to see if it works well. If such failure happens frequently, seek technical support.
Err-08	Sewing motor blocked	- Eliminate sluggish movement in the sewing machine - Replace encoder - Replace sewing motor
Err-09	Brake circuit failure	Check the brake resistor plug on the electric board. Replace the control box
Err-10	Communication failure	Check the connection and if necessary plug in. Replace the control box.
Err-11	Machine head needle positioning failure	Check if the connection line between machine head synchronizer and controller is loose or not, restore it and restart the system. If it still does not work, please replace the controller and inform the manufacturer.
Err-12	Initial motor electrical angle failure	- Try 2 to 3 more times after power down. - If it still does not work, please replace the controller and inform the manufacturer.
Err-13	Motor HALL failure	Turn off the system power, check if the motor sensor plug is loose or dropped off, restore it and restart the system. If it still does not work, please replace the controller and inform the manufacturer.
Err-14	DSP Read/Write EEPROM failure	Turn off the system power, restart the system after 30 seconds, if it still does not work, please replace the controller and inform the manufacturer.
Err-15	Motor over-speed protection	
Err-16	Motor reversion	
Err-17	HMI Read/Write EEPROM failure	
Err-18	Motor overload	
Err-19	Lack of oil alarm	Add oil to the needle rod, and set the P22 parameter at 4000, resume the working time after the last oil adding; or you can press button P to close the alarm and continue to use.
Err-23	locked motor roller is	Disconnect the controller power, check if the motor input plug is off, loose or

	Encoder fault	damaged, or if there is something twined on the machine head. After checking and correction, if the system still does not work, please replace the controller and inform the manufacturer.
Err-24	Stop needle overproof	The ability response of the speed is insufficient, adjust to the P109 and the P10A
Err-25	Running overproof	Excessive load or blockage. Adjust speed loop Kp、Ki of parameter and P109 、P10A to solution

4 Pedal Sensitivity Adjustment

Pedal starts moving from the initial position (p.136) where the motor stops, slowing forward to the low speed point (p.137) where the motor run as the minimum speed (p.100), continuing to the accelerated point (p.138) where the motor start to speed up, until the max speed point (p.139) where the motor run up to the maximum speed (p.101). And when the pedal steps back to the foot lifter position (p.135), the presser foot lift. Continuing back to the auto trimming position (p.134), the line is cut. Adjusting the corresponding parameters, user can acquire the proper pedal response to fit the personal habit.

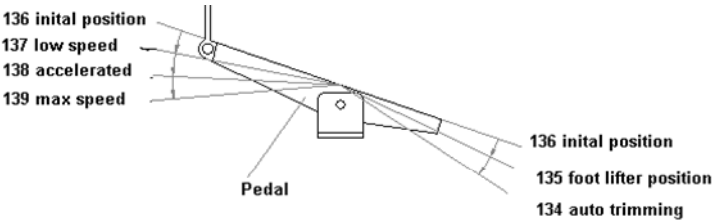


Fig. 4-1 pedal movement of each position parameter

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