AS59 AC Servo System

Safely INstruction

- Please read this manual carefully, also with related manual for the machine head before use.
- For perfect operation and safety, installing and operating this product by trained personnel is required.
- To avoid the abnormal running, please keep the product away from the high electromagnetic machine or electro pulse generator.
- Please don't operate when environment temperature is above 45°C or below 0°C.
- Avoid operating in the area where humidity is 30% less and 95% more, also keep away from dew or acid spray area.
- Effective and stable ground connection is a must.
- All the maintenance parts need to be approved or provided by delegation.
- Turn off the power and unplug the cord before mounting motor and any accessories
- To avoid the static interference and current leakage, all grounding must be done. Use the correct connector and extension wire when connecting ground wire to Earth and secure it tightly.
- Power must be turned off first, when:
  (1).Uninstall the motor or the control box, or plug and unplug any connector.
  (2). Turn off the power and wait 5 minutes before opening box cover.
  (3). Raising the machine arms or changing needle, or threading needle. (Shown as above)
  (4). Repairing or doing any mechanical adjustment.
  (5). Machines rest.
- Regulation in Maintenance and Repairs :
  (1). Maintenance and repairs must be done by trained personnel.
  (2). Don't use any objects or force to hit the product.
  (3). All spare parts for repair must be approved or supplied by the manufacturer.

1 Installation Instructions

1.1 Product specifications

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

1.2 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, as shown in Figure 1-1. Please check if the plug is inserted firmly.

① Power supply socket; ② Motor Power; ③ Encoder; ④ Operation Panel;
⑤ Pedal; ⑥ Light; ⑦ Synchronizer; ⑧ Safety SW.; ⑨ Knee SW.; ⑩ Option;
⑪ Machine head solenoid socket;

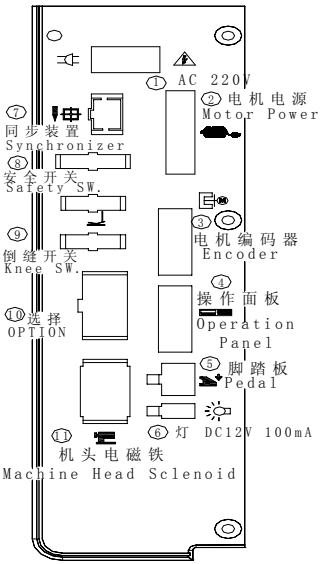

Fig.1-1 Controller Socket Diagram

Machine head of each function signal		
Plug	Pin	Definition
	1	+12V
	2	DIN_1
	3	DIN_3
	4	VDD
	5	DOUT6
	6	AD5
	7	AD2
	8	
	9	AD3
	10	VDD
	11	GND
	12	GND
	13	AD1
	14	+5V
	15	DOUT7

Machine headlights		
	Pin	Description
	1	GND
	2	+12V

press lifter		
Plug	Pin	Description
	1	VDD
	2	TYJ

Presser foot SW.		
Plug	Pin	Description
	1	AD4
	2	GND

Safety SW.		
Plug	Pin	Description
	1	+5V
	2	DIN_2
	3	GND

Machin Head sclenoid		
Plug	Pin	Description
	1	JX
	2	VDD
	3	VDD
	4	BX
	5	DF
	6	VDD
	7	SX
	8	+5V
	9	VDD
	10	GND
	11	
	12	DIN_2

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

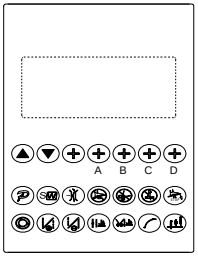

Fig.2-1 Operation Panel

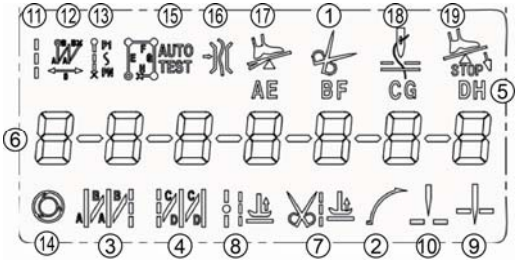

Fig.2-2 LCD Display

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	888888	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	STOP	Start sewing
⑩		Position up			

2.2 Key Functions

Key	Name	Description
	**Enter parameters and return key**	Use the key to switch to the parameter 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 achieve a combination of function.
	**Mode SW. and save changes key**	Under normal mode interface, press the key to SW. the cycle freely seam, W seam, multi-seam. Under the parameter mode, the modified parameters, press the key to save the parameters, and then a return to normal mode.
	**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 the ⊕key and the Ⓟ+⊕key. Interlock mode press this key can not set the start function. Parameters of interface, press once, the parameter NO. plus 1
	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 the ⊕key and the Ⓟ+⊕key. Interlock mode press this key can not set the start function. Parameters of interface, press once, the parameter NO. minus 1
	**Clamp setting key**	Clamp function is enabled (icon on) or disabled.
	**One-Shot-Sewing Selection**	In Constant-stitch sewing：a. One shot to the pedal, automatic performed number of stitches of every section. b. Toe down the pedal again and again to finish rest the sections until it finish pattern.
	**Intermediate presser foot lifting mode**	a. Press the key, indicating that the automatic presser foot valid parking during sewing. b.Click the icon off, show off sewing stop automatic presser foot lift function.
	**Trimmer presser foot lifting mode**	a. Press the key, indicating that automatic presser foot lift after thread trimming effectively b.Click the icon off, show off thread trimming stop automatic presser foot lift function.
	**Soft start setting key**	Soft start at the first seam is enabled (icon on) or disabled.
	**Needle position key**	The sewing halfway function is stop that the system of up/down needle stop position selection
	**Increasing and decreasing motor speed**	Under the multi-slit mode, It can be quickly set up temporary speed governor. Furthermore, when the parameter settings, a single press the key, the corresponding parameter number increases. Ⓟ key+ the key, the corresponding parameters number decreasing.
	**parameters Increase key**	Adjust the corresponding increase in the value of the key. Ⓟ key+ the⊕key, the corresponding value decreases
	**Automatic trimming**	Automatic trimming mode is enabled (icon on) or disabled.
	**After a half step key**	After a half step function is enabled (icon on) or disabled.
	**Thread sweeping key**	Thread sweeping function is enabled (icon on) or disabled.
	**Start sewing**	Start sewing function is enabled (icon on) or disabled.

3 System Parameters Setting List

3.1 Technician Mode

1, In the normal mode, press P key to enter parameter mode A;

2, press the corresponding ▲▼key and + key can be increased to the parameter number and the parameter value. Press the P +▲ ▼ and P ++ keys can be reduced to the parameter number and parameter values;

3, press 4 and 5 keys can add and subtract this paragraph parameter index number

4, when the parameter values are addition and subtraction, the parameter interface flashes. In this case, press S to save the changes, the interface is no longer flashing. Press the S key to exit the parameter interface, return to normal mode;

5, In parameter mode, press the P key, change the value is not saved, return to the normal mode.

NO.	Range	Default	Description
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
104	100-800	200	Complement Needle speed
105	100~500	250	Trimming speed
106	0 / 1	0	Soft start mode: 0：Soft start only after trimming 1：Soft start after both trimming and stop
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
11b	0~4	0	Start and end back tacking type (CD and AB) 0： B->AB->ABAB->none 1： B->none 2： B->AB->none 3： AB->none 4： AB->ABAB->none
11C	0~9999	0	Tens digit for each segment of A/B/C/D
11d	0~9999	0	Tens digit for each segment of E/F/G/H
120	0/ 1/2/3	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/ 1/2/3	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
125	0~99	0	The last C segment is increased needles of NO. (end back tacking)
126	0~99	0	The first A segment is increased number of needles. (start back tacking)
127	0~99	0	The last D segment is increased needles of NO. (end back tacking)

12A	0~99	0	The first section reduce or increase the number of stitches; range 0-99, default 0 (W seam)
12b	0~99	0	The last section reduce or increase the number of stitches; range 0-99, default 0 (W seam)
12C	0/1	0	The first section supplement or reduced mode; 0 reduce, 1 supplement. Default 0 (W seam)
12d	0/1	0	The last section supplement or reduced mode; 0 reduce, 1 supplement. Default 0 (W seam)
12E	0/1	0	Constant-stitch sewing of section count on and off: 0: ON 1:OFF range 0-1, default 0
130	0 / 1 / 2 / 3	2	Speed curve adjustments: 0：ramp curve 1：polygonal curve. 2：quadric curve 3：S-type curve
131	200~4000	3000	The turning point speed of two segment curve.
132	0~1024	800	The turning point sampling voltage of the pedal when two segment curve (Between parameter 138 and 139)
133	1 / 2	1	The type of polygonal curve: 1: square 2：rooting
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
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
			Figure 4-1 shows the specific setting method
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 / 1 / 2 / 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 / 1 / 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)
14d	0~1	1	Panel Mode: 1: interlock sewing 0: flat sewing
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.
156	0～9999	0	The output chopping duty cycle of No. 1/2/3/4 solenoid in each bit.
157	0～9999	0	The output chopping duty cycle of No. 5/6/7/8 solenoid in each bit.
158	0～1	0	Counter adjustable: 0:adjustable, 1:not adjustable
160		0	Running time reset
161	0 / 1 / 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.
165	-		Restore the default factory setting, and cover the user defined para setting,.
200	0 / 1 / 2	0	Trimming mode selection:0: lockstitch machine1: interlock machine: Needle stops at the up position and trim. 2: overlock machine: manual trimming
202	0 / 1 / 2 / 3 / 4 / 5 / 6	1	trimming timing options: 0: 203 parameter setting angle [TS] Department to conduct a tangent, until up needle stop after the delay time set by 206 parameter [T2] so far. 1: 203 parameter setting angle [TS] Department to conduct a tangent, until No. 204 parameter setting angle [TE] so far. 2: 203 Number parameter setting angle [TS] Department to conduct a tangent, set the delay time parameter 206 [T2] so far. 3: After the needle position signal delay time set by parameter No. 205 [T1] be the tangent, the delay time set by parameter 206 [T2] to set the time so far. 4: find the needle position signal delay time set by parameter No. 205 [T1] be the tangent, the delay time set by parameter 206 [T2] to set the time until the majority applied stretch sewing machine. 5: find the next needle position signal after start tangent action-oriented stop needle stop. Then set the delay time parameter No. 205 [T1] and then set the parameters for the 206 tangent time [T2]. (Mostly used for general flat car models, and most of the T1 and T2 set values are set to 0) Toshiba tangentially oriented needle stop only 203 parameters set by the angle [TS] Office: 6. Then set the delay time parameter No. 205 [T1] and then set the parameters for the 206 tangent time [T2].
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)
213	1-999	1	Thread release output start delay time T1 (ms)
214	1～999	10	Thread release output end delay time T2 (ms) after up needle position
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)
231	0 / 1	0	Auto test mode: 0: stitches mode 1: time mode
232	0～1000	300	Safe switch filtering time (ms)
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

3.2 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

3.3 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.

3.4 Error 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	

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.

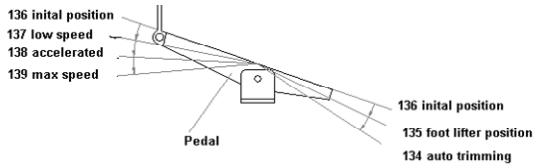

Fig. 4-1 pedal movement of each position parameter