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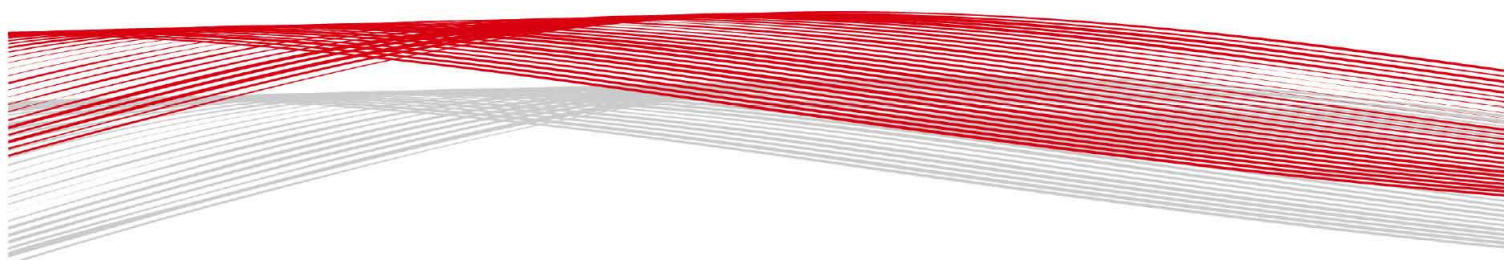
100 Mill Creek Circle/Po Box 175
Lexington, Alabama 35648 USA

Phone: (256)229-6595 Fax: (256)229-6779



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Excellence in seaming



MH 1641

Integrated Upper And Lower Compound Feed
Thick Material Lockstitch Sewing Machine

AHE-59 Operation Manual



AHE-59 Numerical Control AC Servo System

User Manual

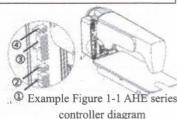
Safety Instructions

- Read the Product Specification and the attached sewing machine specification prior to using this product.
- This product shall be installed or operated by the people who have been trained professionally.
- Please stay away from the arc welding equipment, so as to avoid misoperation caused by the interference with this controller by the generated electromagnetic waves.
- Please do not use this product in the places with ambient temperature above 45°C or below 0°C.
- Please do not use this product in the places with humidity below 30% or above 95% or having dew or acid mist.
- Please turn off the power and pull the plug first prior to the installation of control cabinet and other components.
- In order to prevent interference or electric leakage, please the grounding shall be performed well. The grounding wire of the power line shall be connected to the earth firmly and effectively.
- All the parts for maintenance shall be provided or recognized by our Company.
- The power shall be turned off and the plug be pulled out prior to any maintenance. Only after the power is turned off for five minutes can the control cabinet be opened as the high voltage in it is dangerous.
- The clauses marked with ⚠ in this manual are about safety precautions, which shall be noted and strictly abided by, so as to avoid unnecessary damage.

Section 1 Product Installation

1.1 Product Specifications

Product Model	AHE59	Power Voltage	AC 220±20% V
Power Frequency	50Hz/60Hz	Maximum Power Output	550/750W



1.2 Interface Plug Connection

Insert the pedal and head connector plugs into the corresponding sockets on the back of the controller as shown in Figure 1-1. The names of the outlets are shown in Figure 1-2. After connection, please check if the plug is inserted firmly.

① Pedal socket; ② Lifter electromagnet socket; ③ Automatic electromagnet socket; ④ Head light socket (black); Note: Figure 1-1 taking AHE-58 series as an example, AHE-59 series do not have ④.

⚠: In case of failure to plug in using normal force, please check if the plug and the socket match, and whether the insertion direction or the direction of needle is correct! The interfaces of the lamp and lifter electromagnet are both 1*2 interfaces. Back interface is adopted for the headlight interface. Please note the difference.

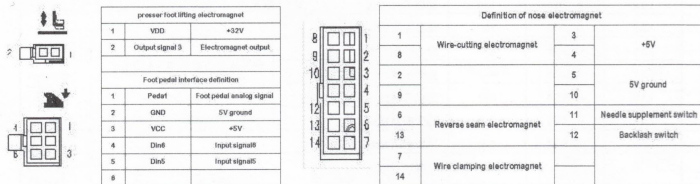


Figure 1-2 Controller Interface Definition

1.3 Wiring and Grounding

The systematic grounding engineering shall be done and constructed by qualified electrical engineer. Prior to the product is energized and put into use, the AC input terminal of power outlet shall be ensured to be grounded in a safe and reliable way. The grounding wire of the system is yellow-green line, which shall be connected to the power grid security grounding, so as to ensure safe use and prevent abnormal conditions.

Protect the power cords, signal cables, ground wires, etc. from being pressed by other objects or over-twisted during wiring to ensure safety in use!

Section 2 Operating panel instructions

2.1 Introduction to the Appearance of Operation Panel

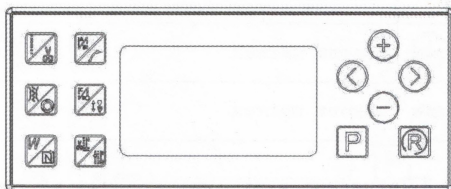


Figure 2-1 Appearance Operation Panel

2.2 Key Function Introduction

No.	Appearance	Name	Function Description
1		menu	1、Press the P key for a long time to enter the menu list, which includes the main functions, parameter setting, counter setting, network setting, maintenance and system setting functions. 2、In menu mode, press the P key once for saving, press it again to return to the next level, and press it again to return to the main interface.
2		Free sewing and thread cutting keys	1、Press this key briefly to select the free sewing mode. 2、Press this key for a long time to select the thread cutting function switch.
3		Front Reinforcement and Soft Start Reuse Keys	1、By pressing this key briefly, the system's front fixing mode will be selected cyclically among no front fixing, front single fixing, front double fixing and front four fixing, and the dot matrix screen will display the corresponding icon. 2、Press this key for a long time to enter the soft start setting interface.
4		Clamping wire and trigger key	1、Press this key briefly to select the wire clamping function switch. 2、Press this key for a long time to select the trigger function switch.
5		Select key for rear reinforcing seam and needle stop	1、Press this key for a short time, and the working mode of the system's rear fixing seam will be cyclically selected among no rear fixing seam, rear single fixing seam, rear double fixing seam and rear four fixing seams, and the corresponding icon will be displayed on the dot matrix screen. 2、Press this key for a long time to select the needle stop position.
6		Reset	Long press to restore factory parameters.

7		W - seam / multi - seam key	1. Press this key briefly to select W - seam operation mode. 2. Press this key for a long time to select the multi-section sewing mode.
8		Lifter key	Also known as automatic lifter after trimming and automatic lifter reuse key in suspension during sewing, including short press and long press. After short press, the system enters trimming lifter  setting interface. After long press 2S, the system enters the automatic lifter  setting interface.
10	 	Increase/decrease key	Adjust the increase/decrease key for the corresponding value
11	 	Left/right switch key	Switch the selected object and switch the operation mode

2.3 Introduction to function of combination key

Adjustment of needle stop position: Press the  +  key panel to display the mechanical angle and then turn the handwheel. After confirming the position, press the  key until the panel displays "0000" and then press the  key again to return to the main interface.

Run and Mode: Press the  +  key to enter the automatic run and mode, and press   in this state to select the run time, stop time and run and total time.

Basic parameter adjustment: press  +  key to quickly enter mechanic parameters.

Advanced Parameter Adjustment: Press the  +  key to quickly enter advanced parameters.

Section 3 Parameter Code Table

3.1 Mechanic parameter table

Parameter Number	Parameter Range	Typical Value	Parameter Description
100	100~800	200	Initial stitching speed
101	200~5000	4000	Maximum free sewing speed (global maximum speed limit)
102	200~5000	3000	Maximum multi-segment sewing speed
103	200~5000	3000	Manual top down speed limit
104	200~5000	200	Stitch compensate speed
105	100~500	250	Trimming speed
106	0/1	0	Slow start mode
107	1~9	1	Number of slow initial stitches
108	100~800	400	Slow sewing speed
110	200~2200	1800	Start back tacking speed
111	200~2200	1800	End back tacking speed
112	200~2200	1800	Continuous stitching speed (W-sewing)

113	1~70	24	Start back tacking (and W) stitch trajectory compensate 1 (Absorption compensation, increased numerical value means accelerated absorption)
114	1~70	20	Start back tacking (and W) stitch trajectory compensate 2 (Release compensation, increased numerical value means accelerated release)
115	1~70	24	End back tacking stitch trajectory compensate 1 (Absorption compensation, increased numerical value means accelerated absorption)
116	1~70	20	End back tacking stitch trajectory compensate 2 (Release compensation, increased numerical value means accelerated release)
140	0 / 1	0	Power on automatic needle position search: 0: not searching; 1: searching
141	0 / 1	1	Automatic tacking function selection: (head without automatic tacking function, disabling the function is recommended) 0: Fixing prohibited; 1: Fixing allowed
142	0 / 1	0	Manual press backstitch function selection 0: Juki mode. It operates when it stops in the middle of sewing or halfway. 1: Brother mode. It only operates during sewing.

3.2 Advanced Parameter Table

Parameter Number	Parameter Range	Typical Value	Parameter Description
109	1~20	18	Accelerate sensitivity
10A	1~20	18	Decelerate sensitivity
117	1~100	90	Stitch speed compensation (P107-A segment stitch number = 1)
118	1~100	30	Stitch speed compensation (P107-A segment stitch number = 1)
11B	0-4	0	Start and end back tacking mode type. (CD is similar to AB) 0: B->AB->ABAB->None. 1: B->Nothing. 2: B->AB->None. 3: AB->None. 4: AB->ABAB->None.
11C	0~9999	0	Ten digits of ABCD segments (allocations by bit)
11D	0~9999	0	Ten digits of EFGH segments (allocations by bit)
11E	0~9999	0	Ten digits of ABD segments (allocations by bit)
11F	0~359	0	Manual backstitch angle control
130	0 / 1 / 2 / 3	2	Pedal curve mode: 0: Automatic linear slope (automatic calculation according to the maximum speed) 1: two slopes; 2: power curve; 3: S curve
131	200~4000	3000	Two slopes: Mid-speed RPM (turning point speed for two slopes)
132	0~1024	800	Two slopes: Mid-range pedal simulation (between parameter 138 and 139)
133	1 / 2	1	Power curve: 1: Square curve; 2: Square root curve;
134	0~1024	150	Pedal trimming position
135	0~1024	300	Pedal lifter position
136	0~1024	450	Pedal back position
137	0~1024	465	Stepped forward stepping operation position
138	0~1024	680	Pedal low speed operation position (upper limit)
139	0~1024	940	Pedal simulation maximum value
13A	0~800	300	Pedal lifter confirmation time

143	0 / 1 / 2 / 3	0	Special operation mode: 0: Operator selection (normal) 1: Simple sewing mode 2: Measure the initial angle of motor (no need to remove the belt) 3: Calculate gear ratio mode (needle stop sensor is required, and the belt cannot be removed)
144	0~31	0	Motor low-speed booster function switch: 0: Normal function; 1~31: Low-speed booster over-thickness gear position
148	0 / 1 / 2	0	Key complement mode: 0: press to control time; 1: compensate for half stitch; 2: compensate for one stitch
149	0~10	5	Slow release presser pedal opening time (100us units)
14C	1~9999	0	Slow release presser pedal closing time (100us units)
150	1~100	1	Stitch counting function ratio setting
151	1~9999	1	Stitch counting upper limit setting value
152	0~6	0	Counting mode selection: 0: No count 1: Count up by the number of stitches, re-count automatically after the counter is full 2: Count down by the number of stitches, re-count automatically after the counter is full 3: Count up by the number of stitches. After the counter is full, the motor stops automatically. Start recount by reset key setting or e P key on the panel 4: Count down by the number of stitches. After the counter is full, the motor stops automatically. Start recount by reset key setting or e P key on the panel 5: Count up by the number of stitches. When the counter is full, an alarm is issued. And the motor locks after trimming 6: Count down by the number of stitches. When the counter is full, an alarm is issued. And the motor locks after trimming.
153	1~100	1	Piece count function ratio value setting
154	1~9999	1	Piece count upper limit setting
155	0~4	0	Piece count mode selection: 0: No count 1: Count up the number of piece count and automatically re-count after the counter is full 2: Count down the number of piece count and automatically re-count after the counter is full 3: Count up by the number of stitches. After the counter is full, the motor stops automatically. Start recount by reset key setting or e P key on the panel 4: Count down by the number of stitches. After the counter is full, the motor stops automatically. Start recount by reset key setting or e P key on the panel
156	0~9999	0	Corresponding to 1/2/3/4 solenoid chop duty cycle time selection (0 in ms, 1 in 0.1ms)
157	0~9999	0	Corresponding to 5/6/7/8 solenoid chop duty cycle time selection (0 in ms, 1 in 0.1ms)
158	0~1	0	Count adjustable switch (stitch count number and piece count number) (0 adjustable, 1 not adjustable)
161	0 / 1 / 2	2	Parameter transmission: 0: No action; 1: Down parameter; 2: Upload parameter
162	1/2	6217	Restore factory parameter
163	1/2		Save current parameters as user-defined machine repair parameters (recoverable)
164	-		Password
200	0 / 1 / 2	0	Trimming motor operation mode selection: 0: Flat type; 1: Stretch type (normal stretch trim: trimming at needle position); 2: Overedge: Manual trimming
201	0~359	0	Mechanical angle at the end of trimming
203	5~359	10	Trimming start angle TS (relative to lower needle angle)

204	10~359	180	Trimming end angle TE (relative to the lower needle angle, greater than TS)
20A	10~60	50	Trimming boost coefficient (motor boost)
20 B	0/1	1	Locking function switch
211	5~359	30	Release electromagnet start angle LS (relative to lower position angle)
212	10~359	300	Release electromagnet end angle LE (relative to lower needle angle, greater than LS)
213	1~999	1	Release electromagnet start delay time L1(ms)
214	1~999	10	Release electromagnet delay time L2 (ms) at needle position
215	0 / 1	0	Sweep function selection: 0: off; 1: on
216	1~999	10	Wiping/sweep delay ms
217	1~9999	30	Wiping/sweep duration ms
219	0 / 1	1	Tension function selection: 0: off; 1: on
21A	10~359	120	Tension start angle
21B	11~359	320	Tension end angle
21E	11~359	120	Lowering angle after lifting the presser in stitching
220	200~360	360	Stop position after trimming (trimming pullback function)
231	0 / 1	0	Automatic test mode selection: (Test mode setting represented by the previous two digits) 0: e number of fixing stitches; 1: fixing time (×100ms)
232	0~1000	300	Safety switch alarm confirmation time ms (direct drive switch and stretch sewing protection switch can be processed in the same way)
234	0 / 1	0	Motor steering: 1: reverse; 0: forward
240	0~9999	1000	Motor/head ratio: X0.001 (If gear ratio is calculated automatically, the parameter in the controller may be different from HMI)
242	0~359	209	Upper needle stop position adjustment angle (relative to position offset of upper needle position sensor)
243	0~359	179	Lower needle stop position mechanical angle
244	0~800	50	Presser delay (ms)
247	850~1350	1030	Refuel reminder time (hours) 0: Close this function
248	0~300	220	Refuel alarm, running time prohibited (hours) 0: Close the function
249	0~50	25	Solenoid duty ratio

3.3 Monitoring Parameter Table

Parameter Number	Parameter Range	Typical Value	Parameter Description	Remark	Parameter Description
010	Number of stitches	022	Phase current	027	Accumulated motor running time (Hour)
011	Number of pieces	023	Initial angle	028	Head interaction voltage sampling value
013	Hall state	024	Mechanical angle	029	DSP software version number
020	Busbar voltage	025	Pedal voltage sampling value	030-037	Historical error code
021	Head speed	026	Actual value of head drive ratio		

3.4 Safety Alarm Table

Alarm Code	Code Definition	Solutions
Warm: 01	Refuel reminder	Press P key to cancel the alarm temporarily. Please refuel and perform time reset operation timely
Warm:02	Stitch count alarm	Indicate that the number of stitches has reached the upper limit. Press P key to cancel the alarm and count again

Warm:03	Piece count alarm	Indicate that the number of pieces has reached the upper limit. Press P key to cancel the alarm and count again
Warm:04	Emergency stop	Press the emergency stop key again to cancel the emergency stop state
Warm:05	Needle lifting lock	Press the needle lifting lock key again to cancel the needle lifting lock status
Warm:06	Power off reminder	Please wait for 30 seconds before turning the power back on

3.5 Error Code Table

If the system shows error or alarm, please check the following items first:

Error Code	Code Definition	Solutions
Error:01	Hardware over-current	Turn off the system power. Turn on the power again after 30 seconds. If the controller still does not work, replace the controller and inform the factory.
Error:02	Software over-current	
Error:03	System under-voltage	Disconnect the controller power and check if the input supply voltage is too low (lower than 176V). If the power supply voltage is too low, restart the controller after the voltage returns to normal. If the voltage is restored to normal but the system still does not work after starting the controller, please replace the controller and inform the factory
Error:04	Over-voltage at shutdown	Disconnect the controller power and check if the input supply voltage is too high (above 264V). If the power supply voltage is too high, restart the controller after the voltage has returned to normal. If the voltage is restored to normal but the system still does not work after starting the controller, please replace the controller and inform the factory
Error:05	Over-voltage at operation	
Error:06	Electromagnet circuit failure	Turn off the system power and check if the solenoid wiring is correct, loose or damaged. Replace if necessary. After confirming the error, restart the system. If it still does not work, replace the controller and inform the factory.
Error:07	Current detection circuit failure	Turn off the system power. Turn on the power again after 30 seconds and observe whether it can work normally. Retry several times. If the fault occurs frequently, replace the controller and inform the factory.
Error:08	Motor stalled	Disconnect the controller power and check if the motor power input plug is loose or damaged, and if any foreign objects are wrapped around the machine head. After eliminating the issue and restarting the system. If it still does not work normally, please replace the controller and inform the factory.
Error:09	Brake circuit failure	Turn off the system power and check if the white brake resistor connector on the power board is loose or off. After plugging it in tightly, restart the system. If it still does not work, replace the controller and inform the factory.
Error:10	HMI communication failure	Check if the connection between the control panel and the controller is detached, loose or broken, it is restored to normal and the system is restarted. If it still does not work, replace the controller and inform the factory.
Error:11	Head needle stop signal failure	Check if the connection between the head synchronization signal device and the controller is loose, and restart the system after returning it to normal, but the system still does not work, replace the controller and inform the factory.
Error:12	Motor initial angle detection failure	Please try again 2-3 times after power off. If the fault is still reported, please replace the controller and inform the factory.
Error:13	Motor HALL failure	Turn off the system power and check if the motor sensor connector is loose or detached. Return it to normal and restart the system. If it still does not work, replace the controller and inform the factory.
Error:14	DSP read and write EEPROM failure	Turn off the system power. Restart the system after 30 seconds. If the system still does not work, replace the controller and notify the factory.
Error:15	Motor over-speed protection	
Error:16	Motor reversal	
Error:17	HMI read and write EEPROM failure	
Error:18	Motor overload	
Error:19	Turn over the alarm	
Error:23	Motor stalled sector error	Disconnect the power from the controller and check if the motor power input plug is detached, loose or damaged, and if any foreign objects are wrapped around the machine head. After restarting and the system still cannot work normally, please replace the controller and inform the factory.



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Maximum speed:
2200mm

Presser foot interaction:
2—5.5mm

Thread take-up stroke:
73mm

Motor:
Servo motor 750W



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