

Industrial Sewing Machine AC Servo Control System Operation Instruction

1. Important Safety Instructions

- Using Servo Control system and its accessories safely and properly, be sure to read and get the safety instructions before you use the machine.
- Keep the manual for reference whenever necessary.

Keep strictly to the following instruction which should be noted and prohibited when using the machines. Also noted, there will be some serious accidents which is unlisted in the manual if violate the instructions.

Important

- Observe the following safety instruction before use the machine and avoid all the caution and prohibited items.

1.1 Operation Environment

1. Only connect the machine to the power supply which conformed to the specification listed in the label.
2. Keep away from the electromagnetic interference source to avoid malfunction.
3. Do not operate the machine under the site whose temperature is below 5°C or above 45°C.
4. Do not operate the machine under the site whose related humidity is below 30% or above 80%.
5. Keep the machine out of the dust.
6. Keep away from heat and place the machine in the well ventilated environment.

1.2 Installation The Machine

1. Keep strictly to the manual to assemble all the part of the machine.
2. The power supply must be turned off when changing the needle, tilting the head of the machine and connecting/disconnecting the power plug.
3. It's necessary to ground the machine permanently and reliably with appropriate diameter wire and plug to the factory system ground.

1.3 Operation

1. Set the machine on low speed at the first turning on to check whether the rotation direction is correct.
2. Do not press the pedal at the moment the machine is connected to the power supply.
3. Do check the setting parameter and switch status before normal operation.
4. Do not touch the moving parts of the machine, such as hand wheel and needle, while the machine is in operation.
5. On alarm, it is necessary to troubleshoot and confirm the safety, reset the alarm parameter before rerunning the machine.
6. Do not turn on/off the machine power frequently.

1.4 Maintenance

1. As there are high voltage in the control cabinet, avoid to open the cabinet within 5 minutes after turning off.
2. Only the trained expert is allowed to maintain and repair the machine.
3. All the components for maintenance and replacement must be provided or qualified by our company.

1.5 Technology Specification

Rated Input Voltage	220V ± 10%
Rated Input Frequency	50/60HZ
Rated Output Power	550W/750W
Maximum Motor Rotation Speed	5000rpm/3500rpm

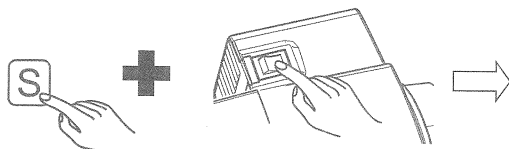
2. Upper Needle Stop Position Setting And Adjustment

IMPORTANT

The needle stop position must be setted before the first operation, or the machine can't operate normally, and there will be needle broken and locked mechanical issues.

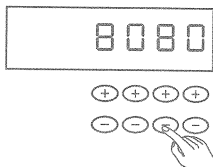
1. Press the key "S" on the same time turn on the Power key to enter function setup mode.

1



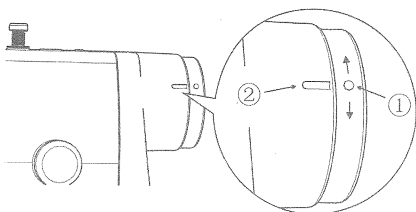
2. While entering into function setup mode, the operation panel LCD displays function code setting interface, then press key +/- to set the code.

2



Set the function code as: 8080,
which stands for the function code of
upper needle stop position.

3



Manual rotates the hand wheel to adjust the
needle to the required position.
Or align the needle position mark
point on the hand wheel (POINT ①)
and the mark point on the machine head
(POINT ②)

This sewing machine needle position IS the
factory standard needle position.

4



Then press the key "S" to save and actuate the function,
four short tones are heard and it hints finishing the setting.

The needle position set in step 3 is just the upper needle position.

If the position and step(3) has a gap, you can enter the step (5) manual fine-tuning.

5



































Through the "up" and "down" key to trim the position, the motor will be real time rotation, intuitive display whether the adjustment in place.

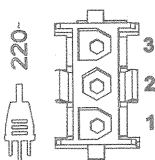
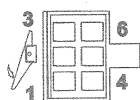
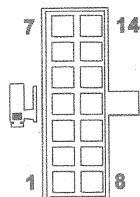
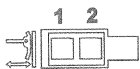
If the stop position be setted on the right position, the set function will be done.

3. Operation Description

3.1 Key Function Definition:

Function	Key	Description	Icon
Function ParameterEdit		Enter function parameter edit mode after pressing the key for 2~3S in the operation mode; Quit function parameter edit mode after press the key for 2~3S in the edit mode.	—
Setting Parameter Check And Save		After setting the function code, press this key to check the preset parameter and then can edit the parameter accordingly; When the parameter is fixed, press key to save the setting and quit.	—
Speed Increase/Decrease		Increase the sewing speed	—
		Slow down the sewing speed.	—
Parameter Increase/Decrease		Increase the parameter	—
		Decrease the parameter	—
Stitch Setting		Press this key to change the needle nubmer section.	—
Auto Function		Automatic function for constant stitch sewing.	
Needle Stop Position Selection		Select needle up/down stop position. The default is up position when the related icon is lighting on the panel LCD.	
Slow Launch Setting		Set slow launch function. When the related icon is display on the panel, the function is activated.	
Auto Lift Presser Foot After Pause		Set presser foot Auto-Lifting after pause function. When the related icon is display on the panel, the function is activated.	
Auto Lift Presser Foot After Trimming		Set presser foot auto-lifting after trimming function. When the related icon is display on the panel, the function is activated.	
Consecutive Reverse sewing		Set consecutive reverse sewing function. When the related icon is display on the panel, the function is activated.	
Free Sewing		Set free sewing function. When the related icon is display on the panel, the function is activated.	
Start Back-Tracking Sewing		Set start back-tracking sewing function. Continuous press the key,the function will in single back-tracking and dual back-tracking between the switch.	
End Back-Tracking Sewing		Set end back-tracking sewing function. Continuous press the key,the function will in single back-tracking and dual back-tracking between the switch.	
Constant Stitch Sewing		Execute section E constant stitch sewing. Continuous press the key,the function will in four section sewing, and user-defined multi-section between the switch.	
Line Trimming		When this function is selected, and this icon will be displayed on the panel LCD,and so line trimming function is activated.	
Lift And Fill Up Needle		Actuate lift and fill up needle function.	—
ClampThread Function		Set the clamp thread function.	

4. System Wire Diagram



Presser foot lift	1	P+32V
	2	Presser foot lifting magnet

Pedal	1	+5V
	2	Digital GND
	3	-
	4	Start signal
	5	Trimming signal
	6	Speed signal

Power	1	AC220
	2	AC220
	3	GND

Integrated machine-Magnet

Magnet	1	+32V
	8	Lines trimming magnet
	2	+32V
	9	Clamp thread /Lines picking magnet
	3	32V digital GND
	10	Fill needle switch
	4	LED 5V GND
	11	LED +5V
	5	32V digital GND
	12	Reverse stitching switch
	6	P+32V
	13	Reverse stitching magnet
	7	P+32V
	14	Lines loosing magnet

External machine-Magnet

Magnet	1	+32V
	8	Lines trimming magnet
	2	+32V
	9	Clamp thread /Lines picking magnet
	3	32V digital GND
	10	Fill needle switch
	4	LED +5V
	11	LED 5V GND
	5	32V digital GND
	12	Reverse stitching switch
	6	P+32V
	13	Reverse stitching magnet
	7	P+32V
	14	Lines loosing magnet

5. Operation Mode Selection

5.1 Sewing Mode

The machine enters into sewing mode as default setting after powering on. In the sewing mode, the user can select various kinds of sewing function after setting technology parameter.

In sewing mode, the users can switch over between various kinds of sewing function according to their need, but can't modify and set all the system technology parameters.

5.2 User Parameter Setting Mode

In user parameter setting mode, users can adjust various kinds of sewing function parameter. The steps are as follows:

1. Press key P for 2~3S in the sewing mode to enter into user parameter setting mode.
2. The interface after entering into user parameter setting mode is function ID selection, press +/- to select the required number.
3. After fixing the function ID, press key S to check and modify the related parameter, press +/- to set the required parameter.
4. After fixing the parameter, press key S to save the setting and quit the interface.
5. Press key P for 2~3S to quit the user parameter setting mode and back to sewing mode.

5.3 System Parameter Setting Mode

In system parameter setting mode, it's available to adjust kinds of the parameter of the electromagnets and system setting. The system parameter ranges from Fn-40 ~79. Details parameter can be set according the following steps. The steps are as follows:

1. Long press key P, in the same time turn on the power switch from off to enter into system parameter setting mode.

In this mode, both system parameter and user parameter can be modified.

2. The default interface after entering into system parameter setting mode is function ID selection, press +/- to select number.
3. After fixing the function ID, press key S to check and modify the related parameter, press +/- to set the required parameter.
4. After fixing the parameter, press key S to save the setting and quit the interface.
5. Press key P for 2~3S to quit the system parameter setting mode and back to sewing mode.

User parameter table:

No.	Items	Default	Range	Contents
Fn - 01	Maximum sewing speed (r/min)	3600	100~5000	Maximum speed adjustments
Fn - 02	Set accelerated curve (%)	120	10~150	Set the acceleration slope
Fn - 03	Start Back-Tacking speed (r/min)	1800	150~2800	Set Start Back-Tacking speed
Fn - 04	End Back-Tacking speed (r/min)	1800	150~2800	Set End Back-Tacking speed
Fn - 05	Bar-Tacking speed (r/min)	1800	150~2800	Set Bar-Tacking speed
Fn - 06	Slow start speed (r/min)	300	150~2800	Set slow start speed
Fn - 07	Number of Stitches for slow start	2	0~99	Number of stitches setting for slow start
Fn - 08	Automatic Constant-Stitch sewing speed (r/min)	3200	300~4500	Speed adjustment for automatic constant-stitch sewing
Fn - 09	Automatic end Back-Tacking sewing	1	0~1	1: After last seam of constant stitch sewing, it will automatic execute the End Back-Tacking sewing function. When turned on, the Stitch-Correction is invalid. 0: Automatic End Back-Tacking will not execute after last seam, but can be done by pedal manually.
Fn - 10	Back-Tacking mode selection	1	0~1	1: JUKI mode (Press TB switch will activate reverse solenoid when either machine is stopped or running). 0: BROTHER mode (Press TB switch will activate reverse solenoid only when machine is running).
Fn - 11	Start Back-Tacking running mode selection	1	0~2	1: Automatically perform actions 0: Could be arbitrarily stop and start. 2: Accurate Mode
Fn - 12	Ending mode of star Back-Tacking	1	0~1	1: Start Back-Tacking is completed automatically continued for next action. 0: After the number of stitches is completed, stop automatically.
Fn - 13	Start Back-Tacking compensation--1	60	1~150	Compensation for A part of Start Back-Tacking
Fn - 14	Start Back-Tacking compensation--2	60	1~150	Compensation for B Part of Start Back-Tacking
Fn - 15	End Back-Tacking running Mode selection	1	0~2	1: Automatically perform actions 0: Could be arbitrarily stop and start. 2: Accurate Mode
Fn - 16	End Back-Tacking compensation--1	60	1~150	Compensation for C part of end Back-Tacking.
Fn - 17	End Back-Tacking compensation--2	60	1~150	Compensation for D part of end Back-Tacking.
Fn - 18	Bar-Tacking running mode selection	1	0~2	1: Automatically perform actions. 0: Could be arbitrarily stop and start. 2: Accurate Mode
Fn - 19	Bar-Tacking compensation--1	60	1~150	Compensation for A,C part of Bar-Tacking
Fn - 20	Bar-Tacking compensation--2	60	1~150	Compensation for B,D part of Bar-Tacking
Fn - 21	Needle stop position selection	1	0~1	Valid only when the operation panel is disconnected, 1(UP)/0 (DOWN)
Fn - 22	Slow start function selection	0	0~1	Valid only when the operation panel is disconnected, 1(ON)/0 (OFF)
Fn - 23	Automatic foot lift after rimming function selection	0	0~1	Valid only when the operation panel is disconnected, 1(ON)/0 (OFF)
Fn - 24	Automatic foot lift when pause	0	0~1	Valid only when the operation panel is disconnected, 1(ON)/0 (OFF)
Fn - 25	Automatic function selection	0	0~1	Valid only when the operation panel is disconnected, 1(ON)/0 (OFF)
Fn - 26	Wipe thread function / clamp thread function selection	3	0~3	0(OFF) / 1(Wipe Thread Function ON) / 2(Clamp Thread Function ON) / 3(Keyboard Control Clamp Thread)
Fn - 27	Clamp thread start angle	180	1~300	Clamp start angle (Thread length control)
Fn - 28	Clamp thread output intensity	80	20~100	Clamp thread output intensity
Fn - 30	The remaining thread Length control	180	120~360	The remaining thread Length control
Fn - 31	Scissors sensitivity	0	0~50	5 lines Pedal: 0: ALL / 1: HALF / 2: Three combinations Pedal 3 lines Pedal: 3-50 Sensitive

Fn - 32	Accurate Mode spacing angle	100	0~180	The Bigger of the number,the more agily
Fn - 35	Foot lifter fall time	0	0~1000	The longer the foot lifte drop more slowly
Fn - 38	EEPROM selection	2	0~2	0(Internal EEPROM) / 1(Stop position and Bar-Tacking in external EEPROM) / 2(Stop position in External EEPROM)
Fn - 39	Finished sewing piece counter	--	0~9999	Display the quantity of finished sewing piece

System parameter table

No.	Items	Default	Range	Contents
Fn - 40	Direction of Motor Rotation	--	--	Reserved
Fn - 41	Motor Brake Function	0	0~1	1: When motor stopped, Keep it locked / 0: No effect
Fn - 42	Auto running for test function	0	0~1	1: enable / 0: disable When the parameter set as 1,the machine will start auto running as sewing function set on the operation panel.
Fn - 43	Motor auto-running full time(hr.)	8	1~800	Only valid when Fn-42=1,set the full time for motor auto-running
Fn - 44	Motor auto-running on cycle time(s)	3	1~30	Only valid when Fn-42=1, set the motor on time for each running cycle.
Fn - 45	Motor auto-running off cycle times(s)	3	1~60	Only valid when Fn-42=1, set the motor off time for each running cycle.
Fn - 46	The minimum speed(r/min)	300	100~400	Adjust the minimum speed of the motor
Fn - 47	Thread trimming speed(r/min)	300	100~400	Speed is too low may lead to unusual thread, the speed is too high may lead to unstable positioning control
Fn - 48	Foot lifter and back-tracking electromagnet operation time to full output (ms)	300	0~990	Foot lifter and back-tracking electromagnet operation time to full output
Fn - 49	Back-tracking electromagnet operation duty cycle (%)	30	10~90	Back-tracking electromagnet operate in duty cycle to save the electricity and protect the electromagnet from over-heat.
Fn - 50	Motor starting delay time (ms)	50	0~990	Delay the start time, with automatic presser foot down
Fn - 51	Half step release foot lift	3	0~4	0: (OFF)/1: (Half step trigger)/2: (Half step keep) 3: (Half step follow)/4: (Disable Half step foot lift)
Fn - 52	Safety switch signal selection	0	0~1	1: Keep ON / 0: Keep OFF
Fn - 53	Trimming operation delay before the mechanical angle (Degrees)	189	120~250	The degrees between UP position and thread trimming action
Fn - 54	Completion of the mechanical angle of the thread trimming action required (Degrees)	360	250~360	Completion of the mechanical angle of the thread trimming action required
Fn - 55	Thread take action before the delay time n (ms)	10	0~980	The time between UP position and Thread take action
Fn - 56	Thread take action time (ms)	70	0~9990	Completion of the thread take-up action required time
Fn - 57	The time before foot lifter action (ms)	50	0~990	The time between thread take action and Foot lifter action
Fn - 58	The time of foot lifter action maintain (s)	3	1~120	The time of foot lifter action maintain
Fn - 59	UP needle position adjustment (Degrees)	15	1~30	UP needle position adjustment (15 is the central location)
Fn - 60	Down needle position adjustment (Degrees)	180	140~220	Down needle position adjustment
Fn - 61	Power on and positioning	1	0~1	1:ON / 0:OFF
Fn - 62	The rate of normal stop (%)	925	1~1999	Set the rate of normal stop
Fn - 63	The rate of thread trimming stop (%)	925	1~1999	Set the rate of thread trimming stop
Fn - 64	Hold time of Back-Tacking (s)	30	1~120	Forced shut-down after hold time.
Fn - 65	Low-speed maximum output torque (%)	30	10~80	Low-speed maximum output torque
Fn - 66	Low-speed start-up time Selection (UP position enable)	0	0~5	The higher the gear, and start to accelerate the faster 0:OFF
Fn - 67	Foot lifter electromagnet operation duty cycle (%)	30	10~90	Foot lifter electromagnet operate in duty cycle to save the electricity and protect the electromagnet from over-heat.

Fn - 68	Sewing machine maintenance cycle (hr.)	0	0~9999	Set the sewing machine maintenance cycle time. Input [0], turn off the maintenance prompt function.
Fn - 69	Direct drive UP position deviation angle (degrees x10)	---	0~3600	Direct drive UP position deviation angle (Relative to [Z] signal)
Fn - 70	System fault information code	---	---	---
Fn - 71	Encoder pulse number	---	0~1599	Display encoder pulse number.
Fn - 72	Mechanical angle information	---	0~359	Display mechanical angle.
Fn - 73	Output current for electromagnet(A) (A)	---	0.0~9.9	Display output current for electromagnet
Fn - 74	The pedals speed level (V)	---	0.0~3.3	Display the pedals speed level
Fn - 75	Input monitoring of the servo system (IO)	--	--	See note ①
Fn - 78	Total running time of the sewing machine during the maintenance cycle (hr.)	--	0~9999	Display the total running time of the sewing machine during the maintenance cycle. Input [0], you can clear the total running time.
Fn - 79	Reset to factory initial parameter	--	--	See Section 6.1

Note ① Description of the contents of Fn-75 parameter monitoring

Different spots-light represents a different meaning, the following table shown below:

A[10]	A[07]	A[04]	A[01]
G[11]	G[08]	G[05]	G[02]
D[12]	D[09]	D[06]	D[03]

[01]	Pedal Forward signal input
[02]	Pedal backward signal input
[03]	Back-Tacking control switch input
[04]	The safety control switch input
[05]	(SYNUP) UP position input
[06]	(SYNDN) down position input
[07]	(Hall) (U) signal
[08]	(Hall) (v) signal
[09]	(Hall) (w) signal
[10]	Bus voltage is too high signal
[12]	Encoder (Z) signal

6. Auxiliary Function

6.1 Factory Parameter Initialization

- 1.Refer to clause5.3 to enter system parameter setting mode.
- 2.Set function ID to Fn-79, Press key S to view and edit parameter.
- 3.Set different code to execute factory parameter initialization in different way. Details refer to the right table.Press key S to activate the initialization.

Initialization code and way


Input (1111): Initialize the parameters from default parameter region.

Input(5555): The keyboard to restore the default parameter.

6.2 The Number Of Processing Statistics

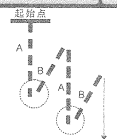
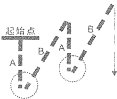
Under sewing mode, press S key, The display will show the processing statistics for the number.

6.3 Real-time Motor Speed Monitor

Under user parameter setting mode or system parameter setting mode, press the accelerate adjustment key , the display will show the real-time speed of motor.

6.4 Stitch Tracking Remedial Measure

The following description is based on A=4,B=4 for dual start back-tracking sewing remediation

Issue description	Remedial measure
	<p>Root cause: The stitch number of section A is beyond the set value, or the length of section A last stitch is increased, the length of section B first stitch is decreased, which cause the final stitch of B can't overlap with the initial stitch of section A. Measure: Turn up the parameter of Fn-13 properly.</p>
	<p>Root cause: The stitch number of section A is less than the set value, or the length of the section A last stitch is decreased, the length of section B first stitch increased, which cause the final stitch of section B is over the initial stitch of section A. Measure: Turn down the parameter of Fn-13 properly.</p>



Root cause:
The stitch number of section B is beyond the set value, or the length of the section B last stitch is increased, the length of following section first stitch decreased, which cause the final stitch of section B is over the initial stitch of section A.

Measure: Turn up the parameter of Fn-14 properly.



Root cause:
The stitch number of section B is less than the set value, or the length of the section B last stitch is decreased, the length of following section first stitch increased, which cause the final stitch of section B can't overlap with the initial stitch of section A.

Measure: Turn down the parameter of Fn-14 properly.

■ End back-tracking, Consecutive back-tracking adjustment following the same way.

■ End back-tracking parameter: Fn-16, Fn-17。Consecutive back-tracking parameter: Fn-19, Fn-20。

7. Troubleshooting And Maintenance

When there is error in the system, the error information will be shown on the panel, in the same time, the indicator led will light red. The user can handle the error by the error code according the manual.If the error can't be settled, please contact our technician for support.Error code will be indicated in HEX on the panel.

Refer to the following picture for Err-1 display:



Error code	Problem description	Measure
Err-0	Input signal self test error (power on pedal fault detect)	1. Check the connectivity of pedal signal. 2. Release the pedal to neutral position.
Err-1	Stop position signal error	UP-Stop position signal error.
Err-2	EEPROM read/write data error	Check up external the card reader
Err-3	EEPROM built-in parameter error	Power-on reset
Err-4	Over-current, over-voltage, over-heat, low-voltage	1. Turn off the machine for at least 30S, and then restart. 2. There maybe some malfunction for the motor power control module. 3. Check whether there are transient interference.
Err-5	Detect high voltage on the DC busbar	1. Turn off the machine for at least 30S, and then restart. 2. Check the power supply voltage.
Err-6	Detect over current for the power supply for electromagnet	1. Turn off the machine for at least 30S, and then restart. 2. Turn off the machine, and check the connectivity of the electromagnet circuit.
Err-7	Stalling	Turn off the machine and check the mechanical parts
Err-8	Motor decoder output signal error	Check the motor output signal line whether there is broken or poor contact.
Err-9	Synchronizer self test error	1.Turn off the machine, and check the connectivity of synchronizer. 2.Replace synchronizer
Err-E	Machine(head) maintenance prompt	The operation time reaches the maintenance period, Please do maintenance for the head, and then enter FN-78 to reset the accumulated operation time.
Err-F	Safety switch alarming	1. Check whether the head of the machine is turned over. 2. Check the connectivity of the circuit of safety switch.