

Chapter 4 AKS12L Series Hot Melt Adhesive Machine

4.1 AKS12L-B Touchscreen Hot Melt Adhesive Machine System Overview

The AKS12L-B touchscreen hot melt adhesive machine adopts a human – machine dialogue interface, making the control system simpler and more intuitive. The machine uses a 7-inch touchscreen together with independent temperature control modules to control the temperature of each zone, enabling more precise temperature control.



AKS35-B Touchscreen Hot Melt Adhesive Machine – Main Technical Parameters:

Temperature control range: 0–200 °C

Working temperature: 165 °C

Rated power: 2500 W

Maximum power at full load: 17000 W (when 4 sets of 400 mm spray guns are connected)

Rated voltage: 380 VAC

Rated current: 12.9 A

Machine weight: 55 kg

Dimensions: 850 × 380 × 580 (L × W × H)

4.2 AKS35-B Touchscreen Hot Melt Adhesive Machine Technical Parameters

Working Environment

Storage / Transport Temperature..... -30 ° C to 50 ° C

Normal Operating Ambient Temperature..... -15 ° C to 50 ° C

Ambient Noise..... <30 dB (at 1 m, excluding solenoid valve operating noise)

Performance Parameters

Dimensions..... 950 × 510 × 1150 (L × W × H)

Connectable Outputs..... 1 – 4 spray guns / hoses

Tank Heating Zones..... 2 (extended heating fins optional)

Number of Pumps..... 1 – 2 (single or double layer optional)

Gear Pump Displacement..... 1.5 cc/rev, 3.2 cc/rev or 4.5 cc/rev

Exterior Protection Waterproof, dustproof,

high-temperature-resistant composite material

Electrical Connection..... Standard military aviation connector

Tank Capacity..... AKS12L = 32 L (effective capacity)

Tank Type..... Built-in heater, impregnated Teflon coating

Filter Type..... Primary filter at tank bottom, output filter

Weight (Empty)..... AKS12L = 76 kg

Adhesive Form..... All adhesive forms accepted

Power Supply Requirements

Supply Voltage..... 220/380 VAC depending on the system

Total System Power..... AKS12L = 5700 W

Tank Power..... AKS12L = 4700 W

Tank Heating Method..... Tubular built-in heater (main tank)

External heating with heating plate attached (available on AKS35 series and above)

Temperature Control Method PID
temperature control

Temperature Sensor	K / PT100 thermocouple
Electrical Connection Method	Aviation locking connector
Drive Motor	200 W three-phase AC geared motor
Motor Control Method	VFD (variable frequency)

control

Hose and Spray Gun Fuse Rating	Tank: 25 A
	Hose: 15 A
	Gun: 25 A

Maximum Load per Hose and Spray Gun Circuit	4000 W
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Air Supply:

Air Pressure	≥ 0.7 MPa dry compressed air
Maximum Pump Speed	96 rpm (gear pump)
Maximum Air Consumption	90 L/min

Equipment Parameters:

Temperature Control Range, Standard Mode	10 ° C ~ 220 ° C
Temperature Control Accuracy	± 0.5 ° C
Standby Fallback Cooling Temperature (optional)	80 ° C (setting modifiable)
Backup Temperature Control System Range	10 ° C ~ 220 ° C (optional)
Tank Overtemperature Shutoff	218 ° C (snap-action thermostat, self-resetting)
Spray Gun Overtemperature Shutoff	Miniature contactor; automatically cuts off the main power when 15 ° C overtemperature occurs (parameter adjustable)
Hose Overtemperature	Audible/visual alarm (overtemperature range adjustable)
Low-Temperature Pump Protection	140 ° C (preset, adjustable)
Applicable Adhesive Viscosity	500 to 5000 cP
Maximum Adhesive Viscosity for Spraying	3000 cP
Preheat Time (with Full Tank)	about 0.5 h
Maximum Open-Circuit Adhesive Delivery	0.91 kg/min (single 4.5 cc gear pump)
Melting Rate (depends on the type of adhesive)	10.5 – 32 kg/h
System Adhesive Pressure	max. 100 MPa (closed circuit)

Control Mode

Temperature Control System	10 independent temperature control channels
Number of Backup Temperature Control Points	1 channel (standard on touchscreen version)
Control System	External fully automatic high-speed compensation system or other external analog output points
Display Type	LCD touchscreen / digital panel
Solid State Board	10-channel solid state relay output
Output Power	Tank: 4000 W (max.)
	Each hose / spray gun: 700 – 4000 W
	Four hose / spray gun sets, max. output: 20000 W
Glue Machine VFD Control Signal	0 – 10 VDC linear analog signal
Spray Gun Solenoid Valve Control Signal	24 VDC / 220 VAC
Fuse Specification	Tank: 10 × 38 mm, AC 500 V, 25 A

Gun: 10 × 38 mm, AC 500 V, 25 A

Hose: 10 × 38 mm, AC 500 V, 15 A

Others

Operating Panel..... Simplified icons and numeric keys / temperature controller
 Overtemperature Handling..... Automatically cuts off power to that zone / audible-visual alarm
 Sequential Heating Protection..... Yes
 Programmed Startup Function..... Yes (optional)
 Temperature Sensor Open-Circuit Indication..... Built into the system

4.3 AKS35-B Touchscreen Hot Melt Adhesive Machine System Overview

The H9 intelligent glue machine control system is an intelligent controller launched by our company based on years of experience in the design and production of 'intelligent' hot melt adhesive machine control systems. This integrated unit, together with the intelligent temperature control module, integrates various circuits while using mature, stable circuit designs, delivering the benefits of intelligence, stability and high cost-effectiveness.

The H9 intelligent glue machine integrated unit is equipped with a 7-inch screen and supports three temperature sensor types — K, PT100 and Ni120 — which can be switched freely according to actual needs. It is preloaded with control programs for the standard gear pump model and the air pump model, which can be switched online through software parameters. It also has built-in encoder tracking and spray gun control programs, enabling the glue machine to be used in different applications under different operating conditions.

H9 Intelligent Glue Machine Control System - Main Technical Parameters

Model	H9-AKS	
Screen Size	7-inch	
Temperature Type	Signal	K, Pt100, Ni120
Number of Temperature Channels	Signal	6/8/12
Temperature Range	Input	K: -100.0 ~ 1300.0 °C Pt100: -200.0 ~ 850.0 °C Ni120: -70.0 ~ 300.0 °C
Temperature Measurement Accuracy	Class 0.3	
Temperature Control Output	NPN (withstand voltage 30 VDC), PID control	
Logic Control Output	3 - 4 channels, NPN type	
Encoder/Photoelectric Input	Supports 1 encoder channel + 1 photoelectric channel	
Adhesive Spraying Control Function	4-point adhesive output	

Level Detection	Supported
Communication Interface	1 independent RS485 channel

4.3.1 Temperature Section Wiring Rules

1# Temperature Control Module (6-channel temperature controller) wiring sequence:

Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
Tank Upper (Spare)	Tank Lower	Hose 1	Gun 1	Hose 2	Gun 2

Note: When using a double-layer tank, use Channel 1 as the upper layer of the tank.

2# Temperature Control Module (6-channel temperature controller) wiring sequence:

Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
Hose 3	Gun 3	Hose 4	Gun 4	Hose 5	Gun 5

Temperature Control Module (8-channel temperature controller) wiring sequence:

Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
Tank Upper (Spare)	Tank Lower	Hose 1	Gun 1	Hose 2	Gun 2	Hose 3	Gun 3

4.3.2 Communication Parameters to Set First When Using a VFD

- VFD parameters must be set in advance before connecting touchscreen communication;
- By default, communication control of up to 2 VFDs is supported;
- These parameters are required for communication control. Set other VFD parameters according to your system requirements;
- The VFD must be restarted after parameter setting for the changes to take effect;
 - The list below only provides an example for the S310. For setting methods of other VFDs, please consult our technical department.

TECO S310 VFD Parameter Setting Table

Function Code	Description	Setting Value	Remarks
08-00	VFD Station Number	3~4	Set to 3 when using 1 VFD; Set to 3 and 4 respectively when using 2 VFDs;
08-02	Baud Rate	2	19200
08-03	Stop Bits	0	1 stop bit
08-04	Parity	0	No parity
08-05	Data Bits	0	8 data bits
08-06	Communication Fault Detection Time (s)	5.0	
08-07	Communication Fault Handling	2	Continue running after communication interruption and display COT

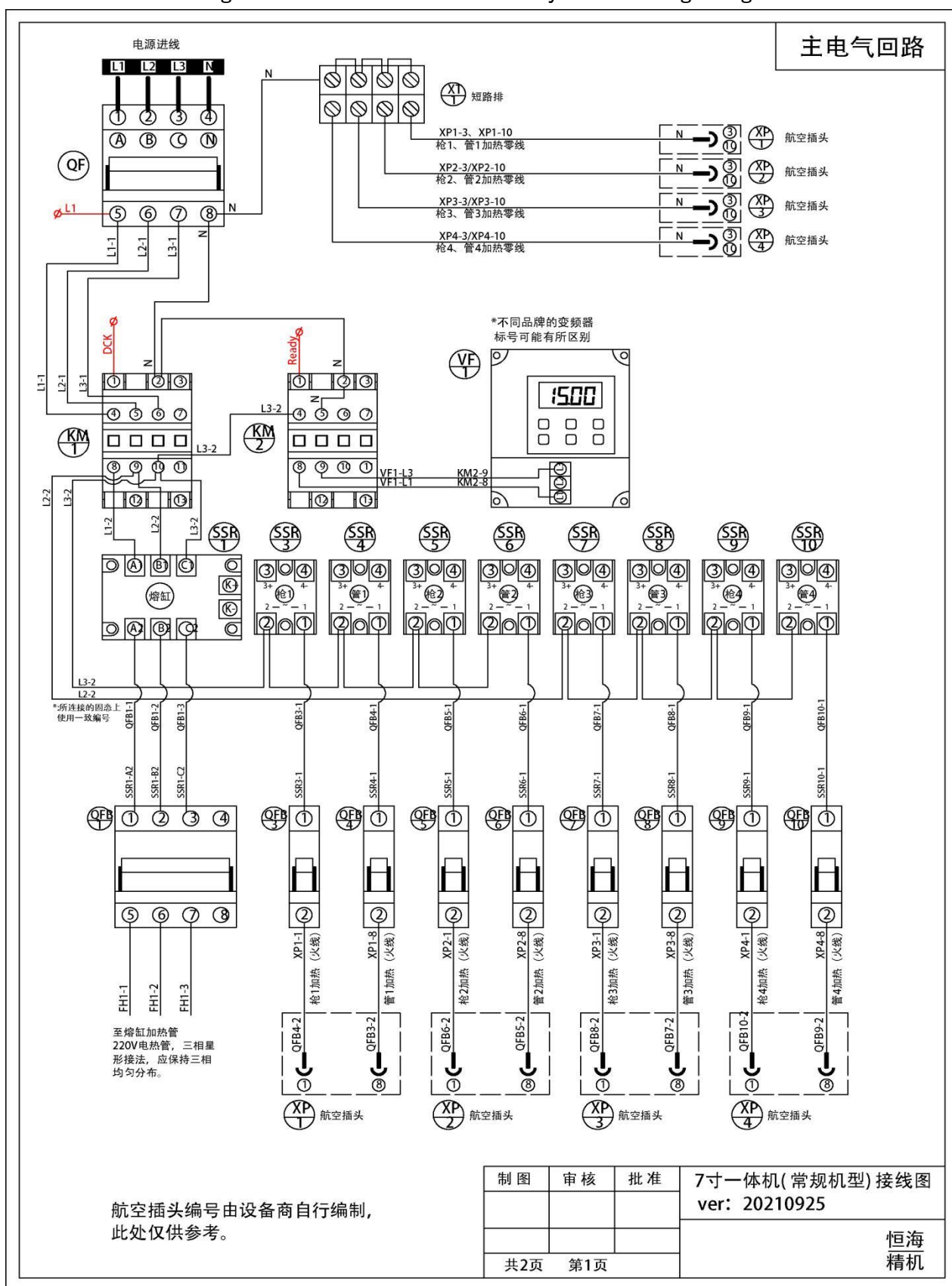
08-08	Err6 Fault Tolerance Count	5	
00-03	Main Run Command Source	2	Communication control
00-05	Main Frequency Command Source	3	Communication control
00-09	Acceleration Time (s)	1.0	Depends on the system; the smaller, the better;
00-10	Deceleration Time (s)	1.0	
04-09	Start Directly After Power-On	0	External command: starts directly when power is applied;

Yudian 6-Channel Temperature Control Module Parameter Setting Table

Function Code	Description	Setting Value	Remarks
Addr	Module Station Number	1~2	Set to 1 when using 1 temperature control module; Set to 1 and 2 respectively when using 2 temperature control modules;
bAud	Baud Rate	19.20	19200
AFC	Communication Protocol	0	Standard Modbus protocol

Yudian 8-Channel Temperature Control Module Parameter Setting Table

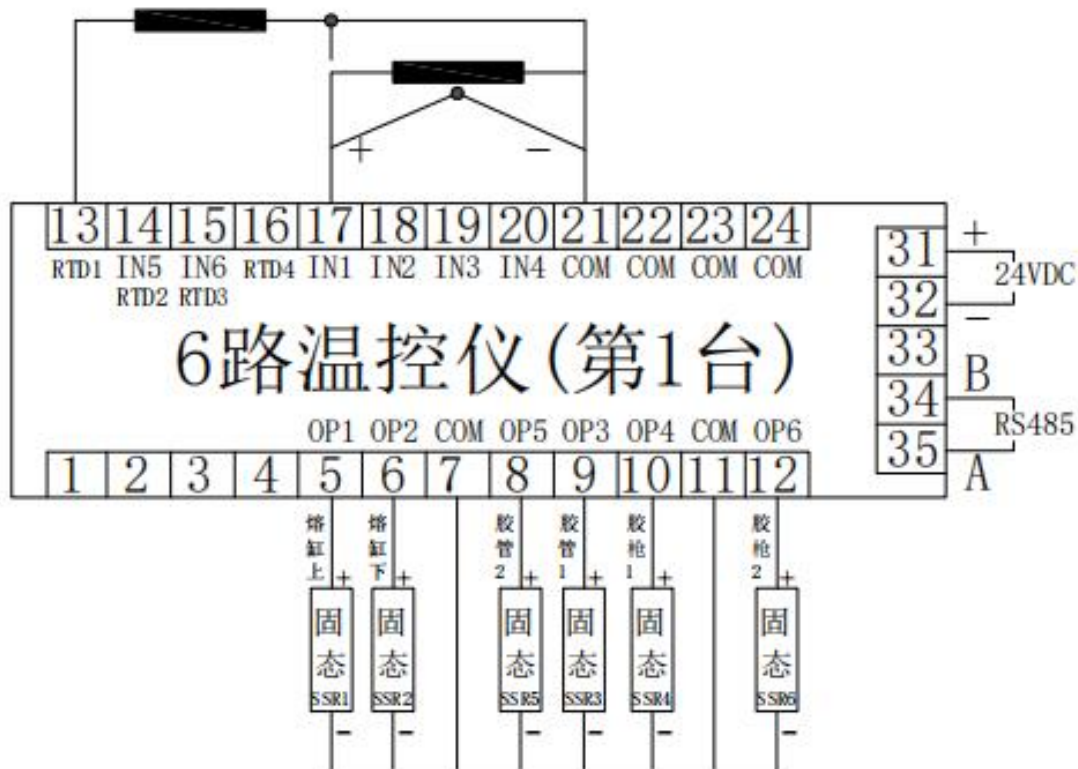
Function Code	Description	Setting Value	Remarks
Addr	Module Station Number	1	Set to 1 when using 1 temperature control module;
bAud	Baud Rate	19.20	19200
AFC	Communication Protocol	0	Standard Modbus protocol



控制回路

传感器输入端子标签:

17: 熔缸上	13:	21: COM
18: 熔缸下	14: 胶管2	22: COM
19: 胶管1	15: 胶枪2	23: COM
20: 胶枪1	16:	24: COM



输出端子（接固态）标签:

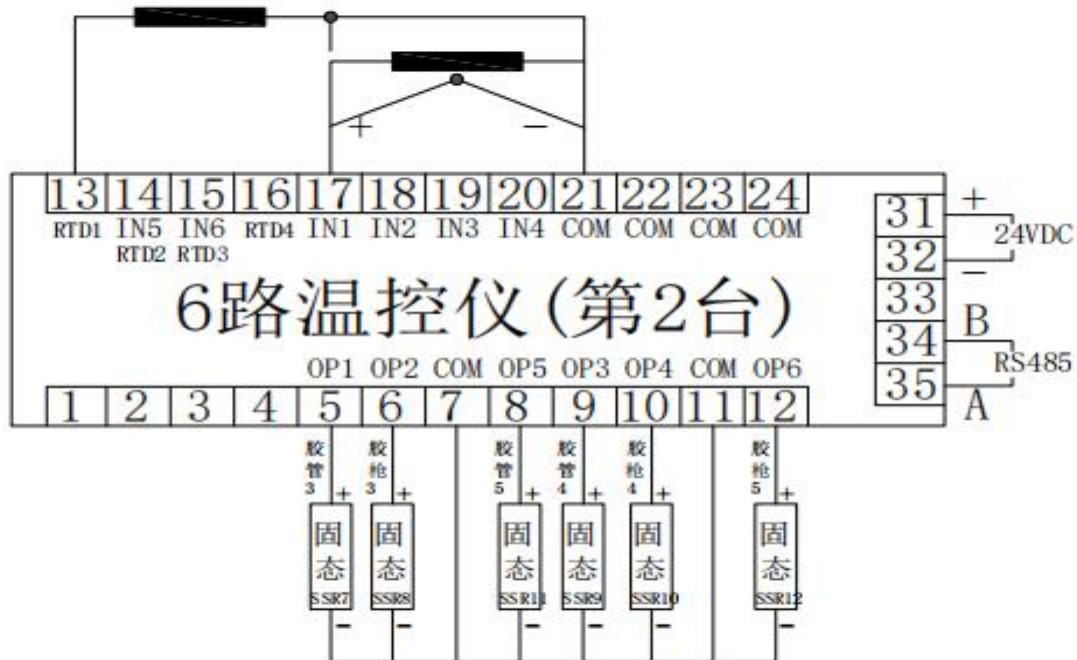
1:	5: 熔缸上	9: 胶管1
2:	6: 熔缸下	10: 胶枪1
3:	7: COM	11: COM
4:	8: 胶管2	12: 胶枪2

制图	审核	批准	6路温控仪 接线图
			恒海 精机
共2页	第1页		

控制回路

传感器输入端子标签:

17: 胶管3	13:	21: COM
18: 胶枪3	14: 胶管5	22: COM
19: 胶管4	15: 胶枪5	23: COM
20: 胶枪4	16:	24: COM



输出端子(接固态) 标签:

1:	5: 胶管3	9: 胶管3
2:	6: 胶枪3	10: 胶枪3
3:	7: COM	11: COM
4:	8: 胶管5	12: 胶枪5

制图 审核 批准

6路温控仪
接线图

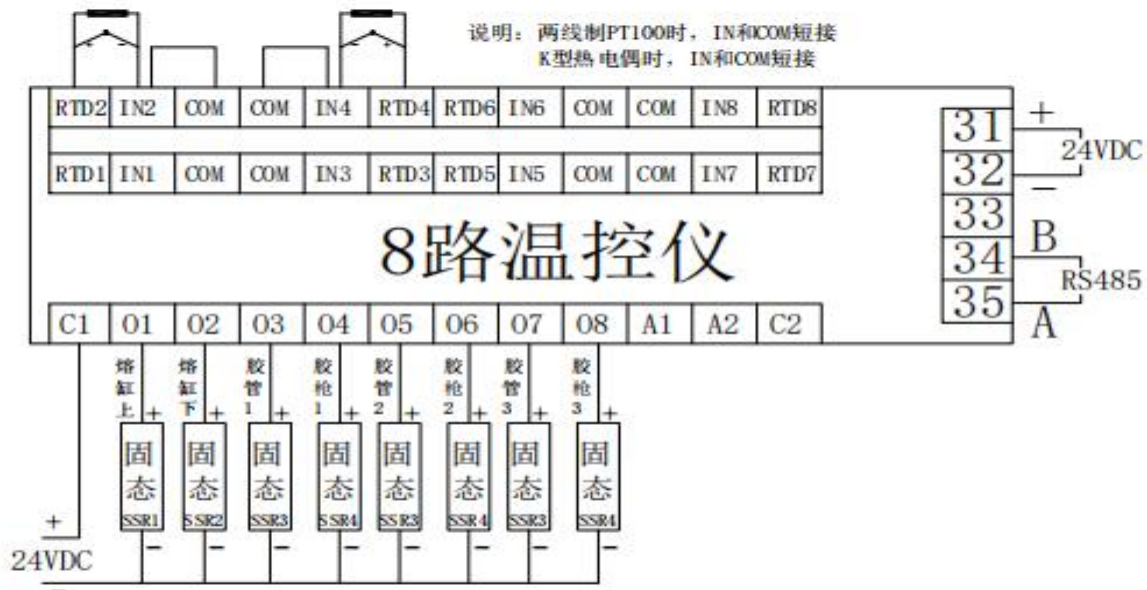
共2页 第2页

恒海
精机

控制回路

输入端子标签:

RTD1: 熔缸上	RTD5: 胶管2
RTD2: 熔缸下	RTD6: 胶枪2
RTD3: 胶管1	RTD7: 胶管3
RTD4: 胶枪1	RTD8: 胶枪3

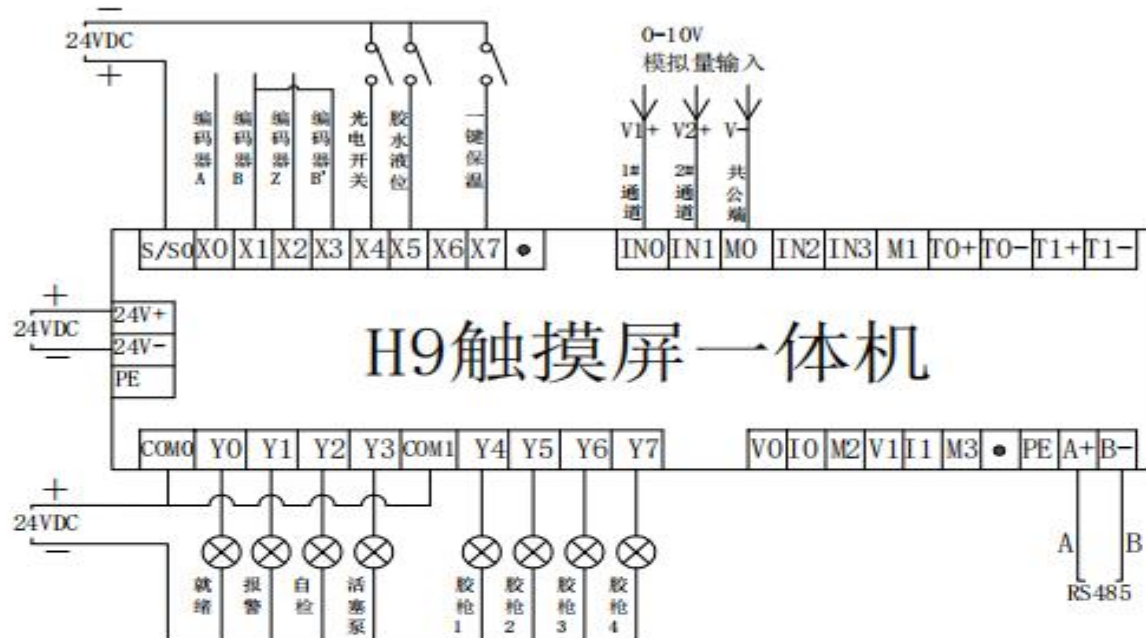


输出端子标签:

C1: 24VDC+	04: 胶枪1	08: 胶枪3
01: 熔缸上	05: 胶管2	
02: 熔缸下	06: 胶枪2	
03: 胶管1	07: 胶管3	

制图	审核	批准	8路温控仪 接线图
共1页 第1页			恒海 精机

控制回路



制图	审核	批准	7寸一体机
			触摸屏接线图
共1页 第1页			恒海 精机

4.4 System Configuration

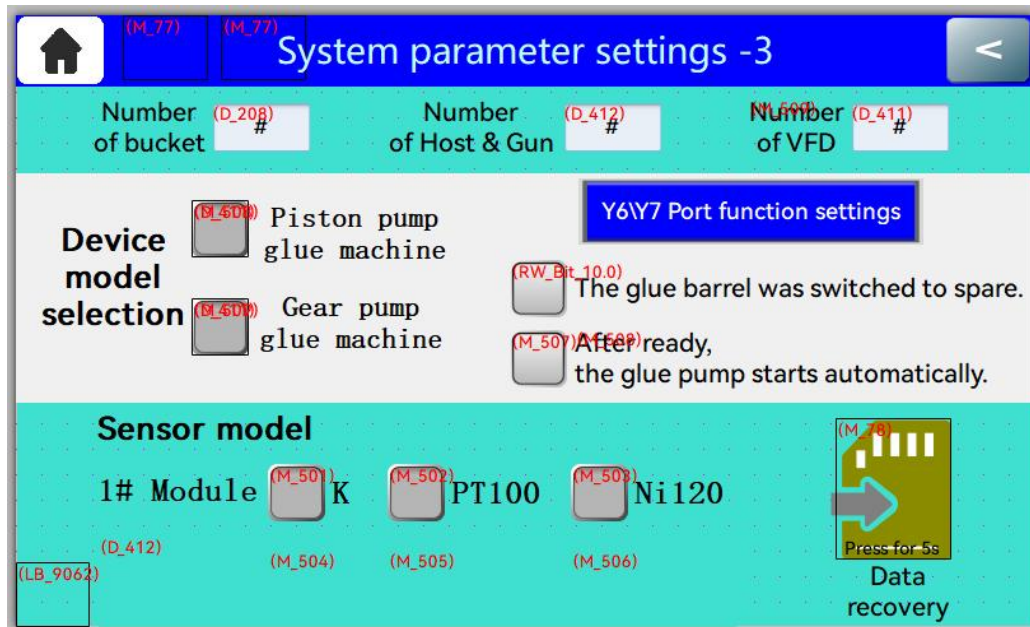
4.4.1 Model Selection

The H9 intelligent hot melt adhesive machine integrated unit supports online switching of the gear pump and air pump control functions.

The model must be confirmed before use.

Operation steps:

Home screen → Parameter Settings → Enter password 9870 → Parameter Settings 1 → Parameter Settings 2 → Press and hold the next-page switch button ">" for 5 seconds → Parameter Settings 3
On the Parameter Settings 3 screen, click to enter system configuration, select the corresponding model on the configuration page, and restart the unit.



4.4.2 Homepage Logo Switching

Enter the home screen, click the area at the bottom-left of the screen, enter the highest-level password (contact the manufacturer to obtain it), and you can select whether to display the manufacturer's logo or the generic logo.



4.4.3 Sampling Filter Coefficient

To filter out interference, a sampling filter coefficient has been added in the configuration page. The default value is 0; do not change it unless necessary.

4.4.4 Selecting the Temperature Sensor Model

Selecting the correct temperature sensor model is a prerequisite for normal operation of the controller; be sure to confirm it before use.

Enter the Parameter Settings 3 screen and select according to the actual situation; The input module Pt100/Ni120/K can be switched.



4.4.5 Selecting the Number of Connected VFDs (skip this section for the air pump model)

This controller allows connection of various VFD models for linked operation; currently up to 2 VFDs can be connected.

Enter the Parameter Settings 3 screen to modify the number of connected VFDs.



Click to select the corresponding VFD model and quantity according to the actual situation.

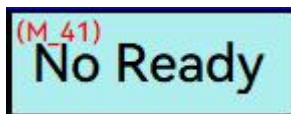
4.5 Basic System Functions

4.5.1 Main Screen Overview



4.5.2 Machine Status Display

The machine status is divided into 4 working states: 'Not Ready', 'Ready', 'Holding' and 'Heating'. These are displayed in the upper-left/upper-right corner of the temperature screen and other screens.



4.5.3 Temperature Setting and Temperature Control Enable

Click the set temperature to enter the temperature setting page of the corresponding channel, then set the temperature and the temperature control enable as needed.



4.5.4 Holding Function

Click the set temperature to enter the temperature parameter setting screen.



Switch between holding and heating via the one-key holding button;

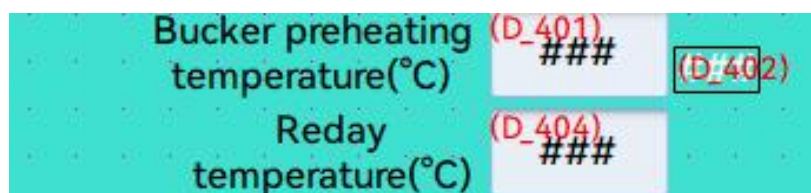
During holding, each channel heats and controls temperature according to the holding temperature.

4.5.5 Ready Determination

Temperature readiness is a prerequisite for the operation of the VFD (or air pump). There are two main conditions for temperature readiness:

- A、The temperature of the tank (lower) reaches the preheat temperature (generally the preheat temperature should be set about 10 ° C lower than the tank temperature set value);
- B、Except for channels with heating disabled and channels without a connected temperature sensor,
the temperature of each channel reaches or exceeds the system ready temperature value (generally the system ready temperature should be set about 10 ° C lower than the tank temperature set value).

The preheat temperature and ready deviation can be set by clicking the 'Parameter Settings' button to enter the Parameter Settings 1 screen.



4.5.6 Overtemperature Protection

The controller provides overtemperature protection, which is divided into two stages:

A. When the temperature of any channel reaches the overtemperature protection value, an alarm is triggered.

B. When the temperature of any channel reaches the overtemperature power-off protection value, an alarm is triggered and the heating power of all channels is cut off until the fault is cleared. Overtemperature protection can be set by clicking the 'Parameter Settings' button to enter the Parameter Settings 1 screen.



4.5.7 Heating Abnormality Alarm

The controller provides a heating abnormality alarm function. Relevant parameters can be set on the System Parameters 1 page; when the relevant conditions are met, the system will issue an alarm.



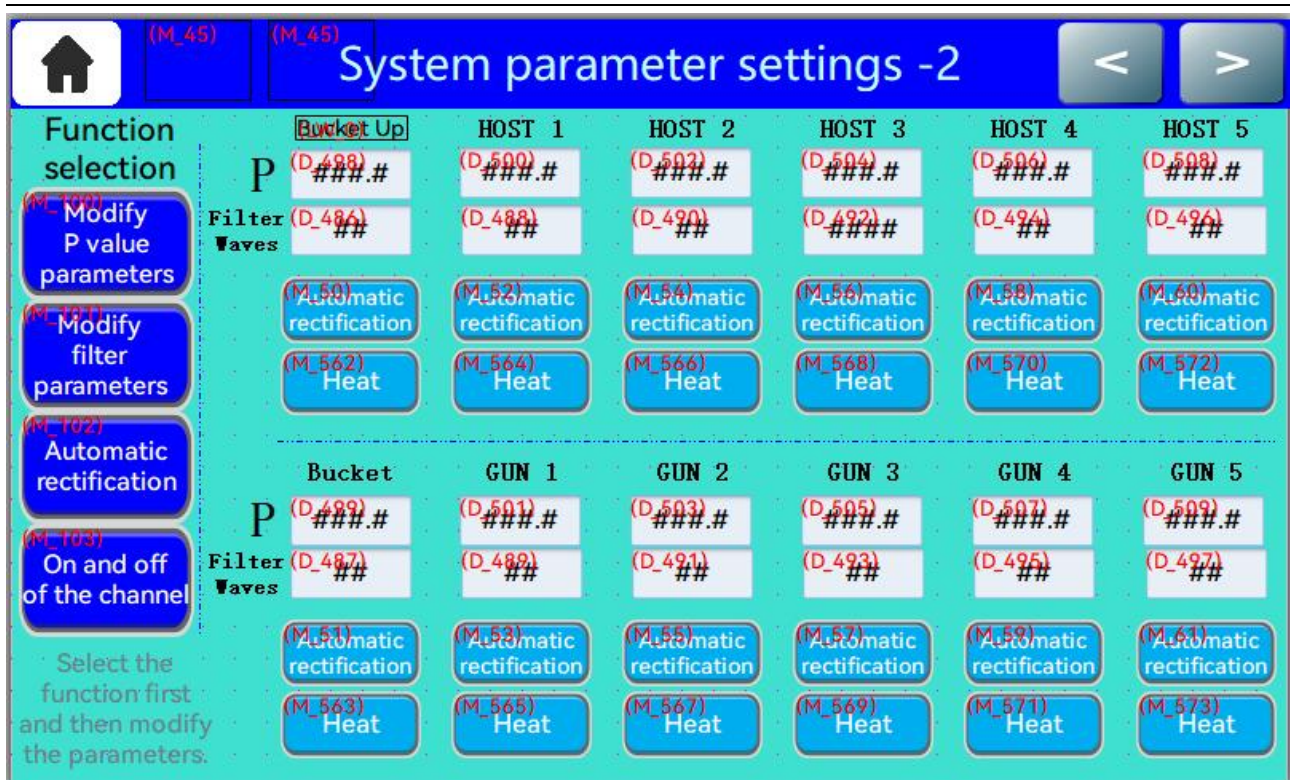
4.5.8 PID Parameter Adjustment

PID parameters affect the stability of temperature control. Improper setting may cause loss of temperature control or overtemperature. Please have the settings done by a professional engineer.

When a channel heats too slowly or overshoots too much, the problem can be improved by adjusting the PID parameters of that channel.

Consult our technical department before making settings.

Click the 'Parameter Settings' button to enter the Parameter Settings 2 screen, then click 'Modify P Value' on the left to adjust:



If heating is too slow, appropriately reduce the parameter value; if there is too much overshoot, increase the parameter value.

Modify filter value: the input signal is filtered to remove jitter noise, producing a more stable response. Generally set to 0.

Switch auto-tuning: the instrument automatically calculates the PID values internally; after running for a period of time, the instrument automatically turns off the auto-tuning function.

Channel switch: manually turn the output of a channel on or off.

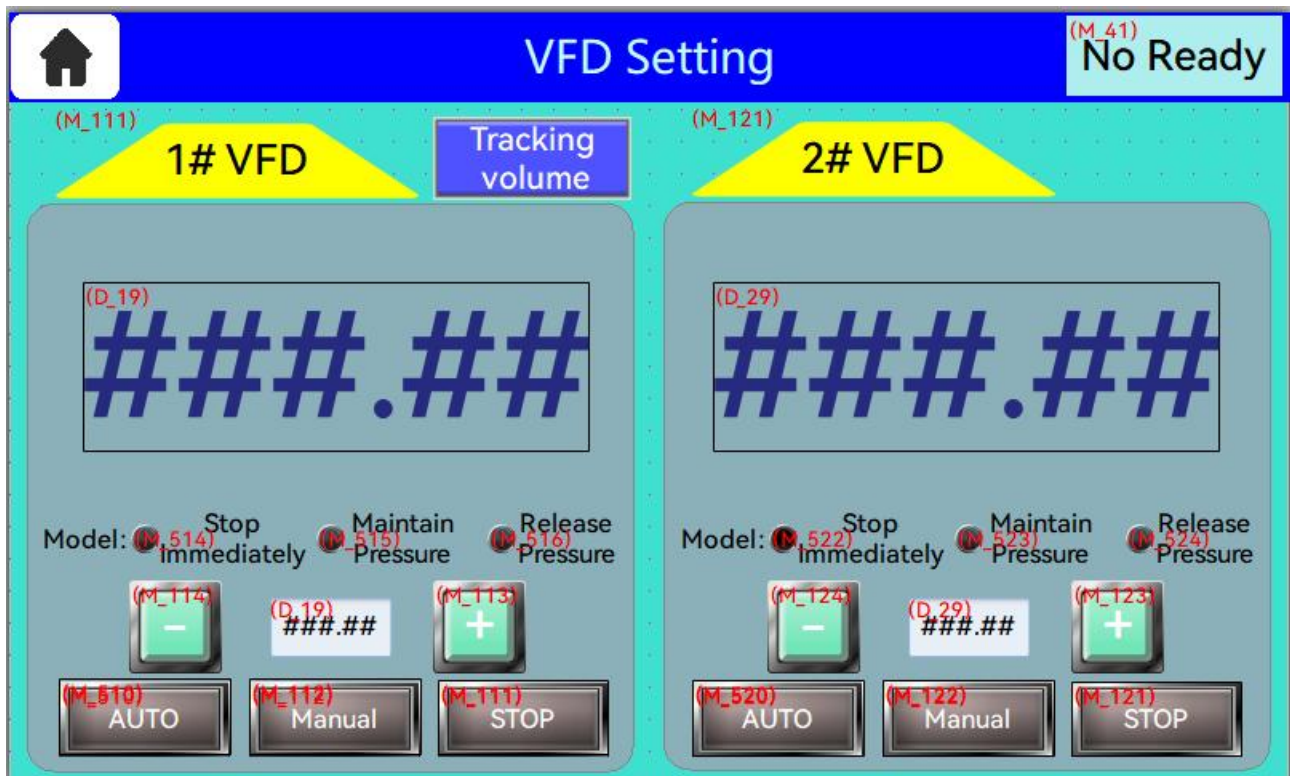
4.5.9 Chinese/English Switching

On the contact information display page, click 中文/English to switch between Chinese and English.



4.5.10 VFD Speed Control for the Gear Pump Model

VFD speed control takes effect after temperature readiness. Click the VFD speed control button to enter the speed control screen.

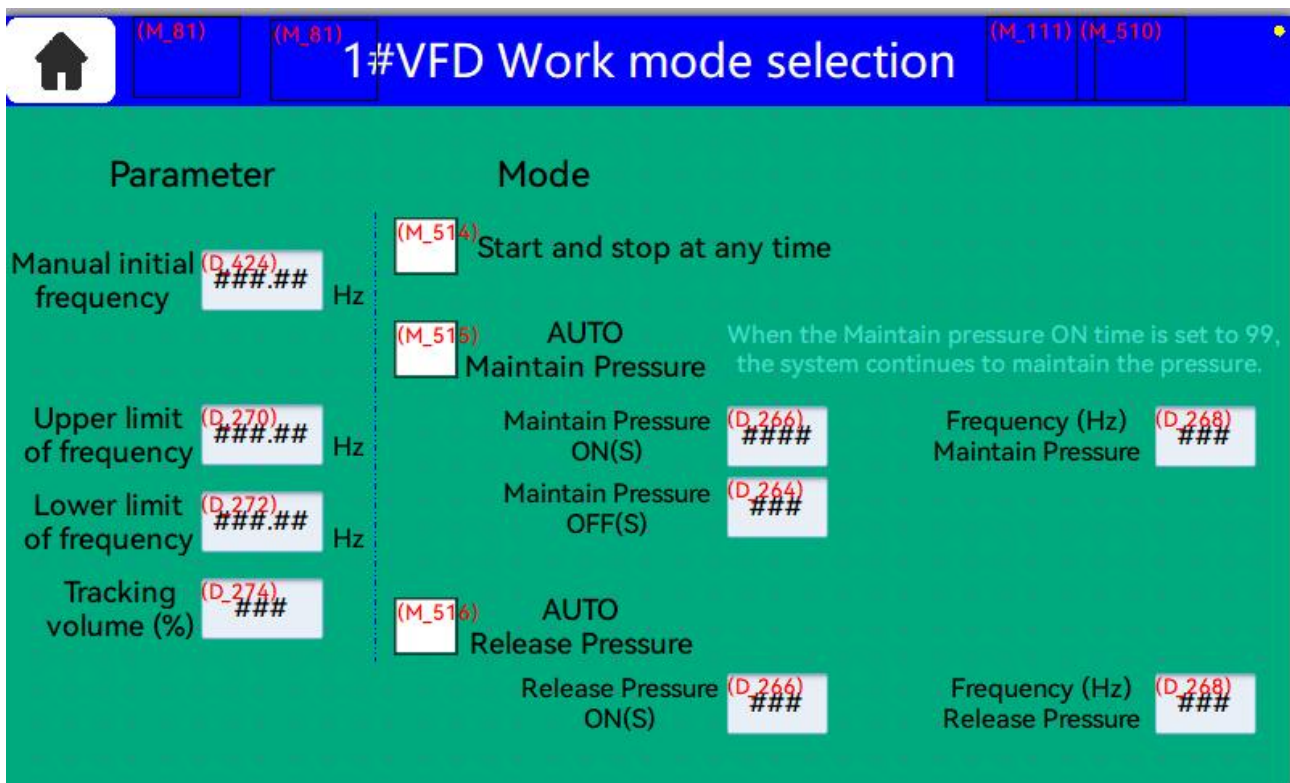


There are 3 working modes:

- A. Stop mode: the VFD is prevented from controlling the motor.
- B. Manual mode: after temperature readiness, the VFD runs at the set manual value. The speed value can be set through the manual speed setting. This button has no effect when the temperature is not ready.
- C. Auto mode: after temperature readiness, the VFD starts, stops and adjusts speed according to the external voltage input (0~10 V, connected to external terminal block 0V-10V) or encoder signals.

★ The signal method can be selected and set on the Parameter Settings 1 page.

First click the Stop button, then click the 1# VFD tab to enter the speed control page:



Parameters: Upper limit: the upper frequency limit of the VFD.

Lower limit: the lower frequency limit of the VFD.

Tracking gain: $\text{system-calculated output frequency} \times \text{tracking gain} = \text{final VFD output frequency}$

This function is used when the hot melt adhesive machine is equipped with two VFDs and the actual operation requires the two VFDs

to output frequencies asynchronously. Generally set to 100.

Stop mode: A. Immediate start/stop — in auto mode, the motor starts and stops immediately following

the signal of the external tracker/encoder.

B. Automatic pressure relief — when the motor changes from running to stop, the motor reverses at the pressure-relief frequency for the pressure-relief ON time to relieve a certain amount of pressure.

C. Automatic pressure holding — in auto mode, after the external start condition is removed, the motor keeps running at the pressure-holding frequency for the pressure-holding ON time, then stops for the pressure-holding OFF time, repeating until the external start condition is met, in order to maintain a certain pressure. This is generally used when the hose is long.

5.11 Abnormal Alarm

Alarms are divided into general alarms and critical alarms. Both types are connected to external audible/visual alarm devices and are displayed on the screen,

but only critical alarms cut off the heating power to protect the equipment, for example

when overtemperature occurs.

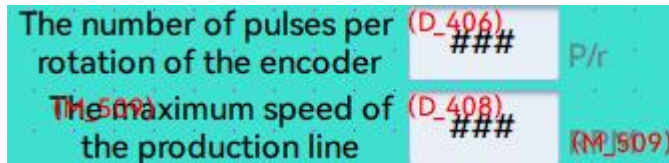
变频器过载

恒海精密机械

4.6 Glue Break (Cut-off) Setting

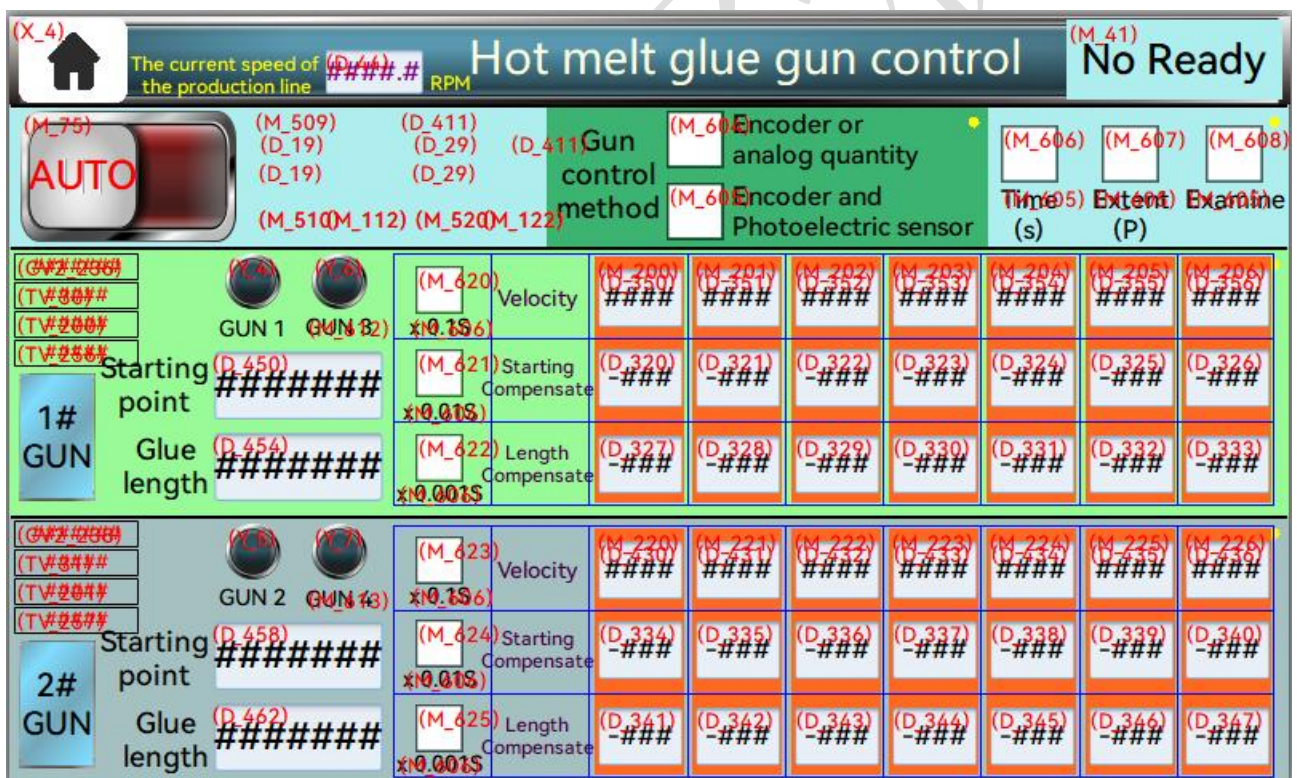
4.6.1 Basic Glue Break Parameter Setting

Enter the spray gun control page. When using an encoder, set the following parameters:



Encoder Resolution	120~600, depending on the encoder actually used. It is recommended to choose a 360-pulse encoder. Set according to the actual encoder; otherwise the subsequent speed measurement accuracy will be affected.
Maximum Production Speed	The speed during normal operation of the equipment. This value can be queried on the spray gun control page. Usually the maximum speed is about 10% higher than the normal operating speed.

Select the corresponding working mode according to the actual situation:



Spray gun control method: the spray gun has two control methods — continuous spraying and glue break (cut-off).

1. When Encoder/Analog is selected, the spray gun is in continuous-spray mode: the spray gun port outputs immediately when the system receives an encoder rotation signal, or when the analog voltage received by the system is greater than the analog threshold voltage set in Parameter Settings 1.
2. When Encoder + Photoelectric Switch is selected, the spray gun is in glue-break mode and must be controlled using one of three methods: Spray Time / Spray Length /

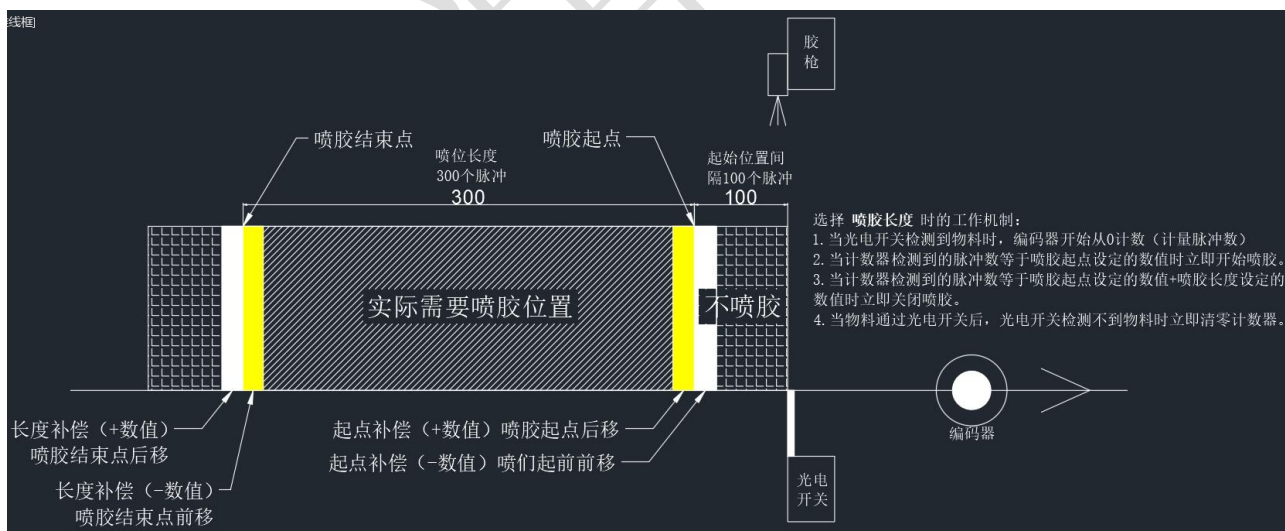
Photoelectric Detection. The specific definitions are shown in the table below:

Spray Time	Using the encoder for speed measurement: when the photoelectric switch detects material, timing starts and spraying begins immediately; when the set time elapses, the spray gun is automatically turned off. Wait for the next material detection.
Spray Length	Using the encoder for speed measurement: when the photoelectric switch detects material, counting (number of pulses) starts and spraying begins immediately; when the count reaches the set number of pulses, the spray gun is automatically turned off. Wait for the next material detection.
Photoelectric Detection	Using the encoder for speed measurement: spraying starts immediately when the photoelectric switch detects material, and the spray gun is automatically turned off when the photoelectric switch no longer detects material.

Due to mechanical inertia and other factors, the actual spraying position of the spray gun may change the spraying start point and spraying length as the equipment operating speed changes. This system introduces dynamic tracking technology for the spray gun action. The specific settings are as follows:

(G#2#236#)	(TV#30#)	(TV#200#)	(TV#250#)	GUN 1	GUN 2	(M_620)	Velocity	(M_280)	(M_281)	(M_282)	(M_283)	(M_284)	(M_285)	(M_286)
Starting point	(D_450)	#####	#####	(M_621)	Starting Compensate	(D_320)	(D_321)	(D_322)	(D_323)	(D_324)	(D_325)	(D_326)	(D_327)	(D_328)
Glue length	(D_454)	#####	#####	(M_622)	Length Compensate	(D_327)	(D_328)	(D_329)	(D_330)	(D_331)	(D_332)	(D_333)	(D_334)	(D_335)

The spray gun action function is shown in the figure below:



Working mechanism when Spray Length is selected:

1. When the photoelectric switch detects material, the encoder starts counting from 0 (counting pulses).
2. When the number of pulses detected by the counter equals the set spray start value, spraying begins immediately.
3. When the number of pulses detected by the counter equals the set spray start value + the set spray length value, spraying stops immediately.
4. After the material passes the photoelectric switch and the switch no longer detects

material, the counter is immediately cleared.

The working mechanism when Spray Time is selected is the same, except that the counter is replaced by a timer. The function operating by spray time is only applicable when the equipment runs at a constant speed.

4.6.2 Wiring of the Encoder, Photoelectric Switch and Current Expansion Board

For the relevant wiring ports, refer to the wiring diagram. Note in particular: when the encoder and photoelectric signals share a power supply with the touchscreen, the wires must be taken separately from the switching power supply and must not be connected in parallel directly to the touchscreen power supply terminals. The solenoid valve power supply must also be wired separately and must not be mixed.

4.6.3 Level Input

For the H9 hot melt adhesive machine intelligent control system, X6 can be used as the level input.

4.6.4 External One-Key Holding

For the H9 hot melt adhesive machine intelligent control system, X7 can be used as the external one-key holding button input.

4.6.5 Multi-Segment Speed Tracking

The H9 hot melt adhesive machine intelligent control system introduces multi-segment speed tracking, allowing up to 7 tracking curves to be set freely.

It can be freely configured on the spray gun control page according to actual production needs.

多段速胶量跟踪设置
Multi-segment speed spray glue quantity tracking setting

生产线当前速度 (D.44) ####.# RPM 最高生产速度 (D.408) #### RPM 最低启动频率 (D.386) ##.## Hz

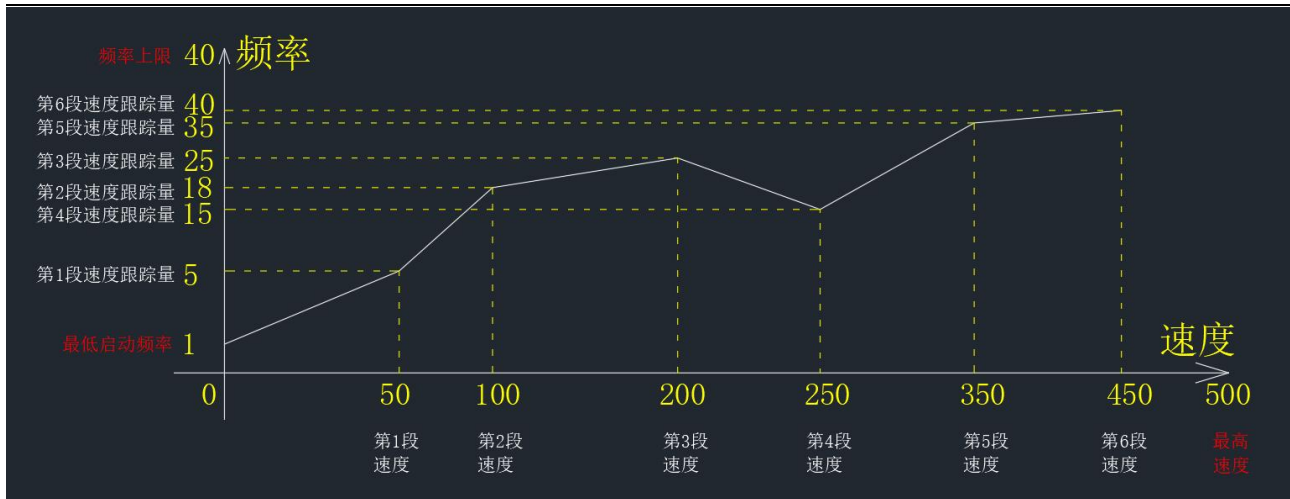
多段速胶量跟踪 当前输入模拟量电压(V) (D.24) ##.##
Multi-segment speed spray glue quantity tracking Current input analog voltage

速度 Velocity	(D.238) #####	(D.232) #####	(D.234) #####	(D.233) #####	(D.238) #####	(D.238) #####	(D.238) #####
频率 Frequency	(D.220) ###.##	(D.224) ###.##	(D.228) ###.##	(D.232) ###.##	(D.236) ###.##	(D.240) ###.##	(D.244) ###.##

Minimum start frequency: the minimum frequency output by the VFD when the system meets the start condition.

Meaning of multi-segment adhesive volume tracking:

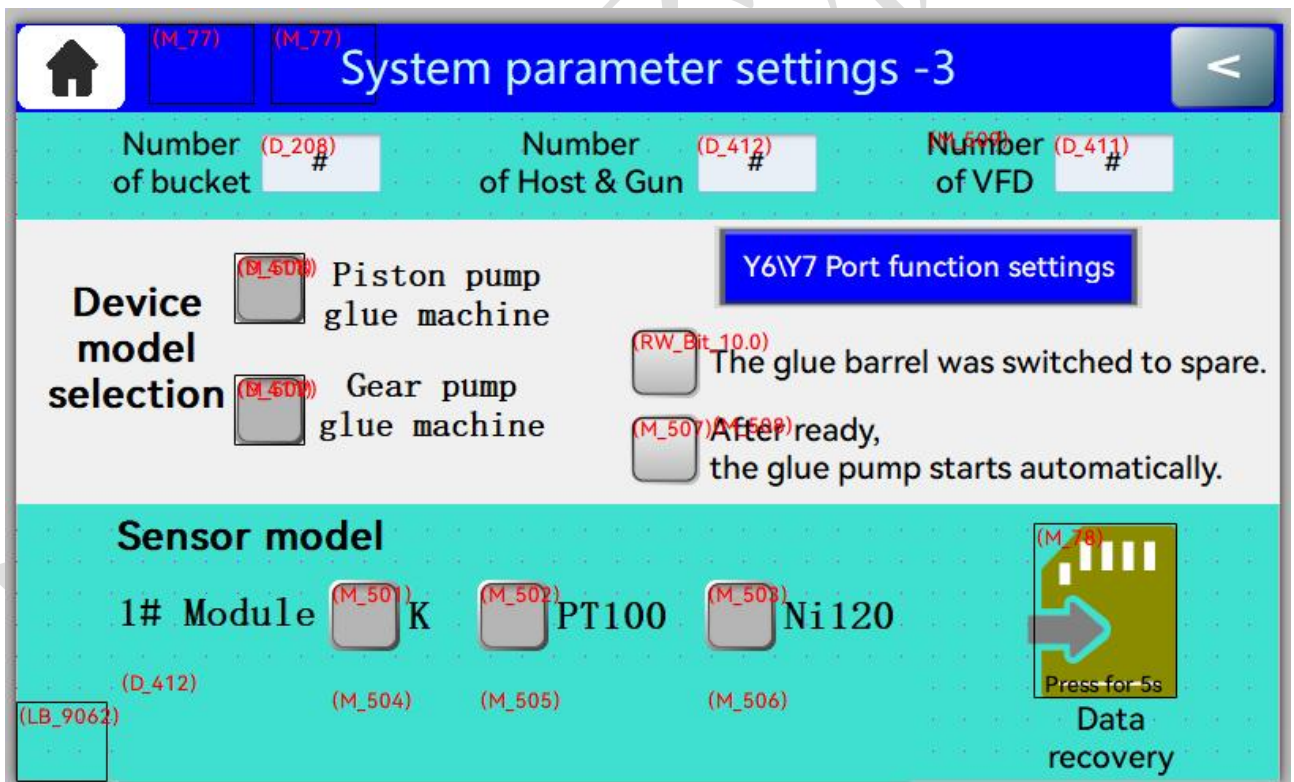
1. If only one linear tracking amount is needed, only the parameters of the 1st speed and tracking amount group need to be set. All other parameter groups are set to 0 (the speed value must not exceed the maximum production line speed; the tracking amount refers to the frequency output by the VFD when the speed reaches the actual maximum operating speed of the equipment).
2. In actual use, two or more linear tracking amounts may be required. In this case, set the parameters of the 2nd group, 3rd group, etc. according to actual needs. The system automatically calculates the VFD output frequency corresponding to the real-time speed. Set unused parameter groups to 0.



4.6.6 Output Port Configuration

Due to the requirements of the online interlock mechanism, this system reserves two output ports, Y6 and Y7, which the user can configure freely.

Enter the Parameter Settings 3 page, as shown in the figure below:



Click the Y6/Y7 Port Function Setting button; in the pop-up dialog box, the port functions can be freely configured according to actual production needs.

As shown in the figure below:



4.7 Installation, Operation and Storage of the AKS12L Series Hot Melt Adhesive Machine

4.7.1 Installation and First Use

1) Moving the hot melt adhesive machine:

The main unit can be moved by one person. Hold the machine steady and push it gently. If ropes or hooks are used, make sure they are firmly secured. Do not stand on the machine.

2) Securing the hot melt adhesive machine:

The machine can be placed on a flat floor. After gently moving it to the desired position, step lightly on the locking pedal of the casters to secure the casters. The main power circuit and other control/communication wiring can pass through the bottom.

3) Installing the hot melt adhesive machine:

After the machine is secured, install it as follows:

1. Make sure both the power supply switch and the main power switch of the machine are in the OFF position.

2. Open the electrical box cover, connect the correct power supply wires to the residual current (leakage) protection switch, and connect the ground wire.

3. Connect the hose to the glue outlet of the machine and plug the hose's aviation connector into aviation socket No. 1–4 of the main unit. The bending

radius of the hose must not be less than 20 cm. Do not apply heavy pressure to or bind the hose with metal. There are 4 glue outlets and aviation socket positions on the main unit, which can connect 4 hoses and one optional glue pressure gauge. The 4 outlets are arranged side by side for convenient hose installation. Pay attention

to the sequence numbers of the hoses and guns. For example, outlet No. 1 connects to hose/gun No. 1, using main unit aviation socket No. 1, and so on.

4.7.2 Adding Hot Melt Adhesive:

The adhesive level in the tank should be kept 30 to 50 mm below the top cover. When the adhesive output is large, add adhesive more frequently.

When the tank is emptied, adding a large amount of adhesive at once will cause the tank temperature to drop below the machine ready temperature.

4.7.3 Changing the Hot Melt Adhesive:

When changing between two different types of adhesive, or adhesives that may react with each other, the system must be thoroughly cleaned.

4.7.4 Startup

1. Add clean hot melt adhesive into the tank and close the tank lid immediately to prevent dirt from entering.
2. Turn on the main power switch on the control panel. The display starts up and the machine begins heating.
3. Wait for the preheat time (about 20–30 minutes) until the adhesive is melted.
4. Once all zones reach the set temperature, the machine is ready for operation.

4.7.5 Temporary Storage of the Equipment

1. Clean the system with cleaning fluid (see Maintenance for details).
2. Release the pressure and switch off all power.
3. Clean or replace the filter screen assembly (see Maintenance for details).
4. Release any residual air pressure.
5. Remove residual hot melt adhesive and clean the parts.
6. Remove all air lines and power cables.
7. Pack the equipment.
8. Store it in a safe place.

4.7.6 Disposal of the Equipment

1. Switch off all air pressure and power supply devices.
2. Release any remaining adhesive pressure.
3. Remove all remaining hot melt adhesive.
4. Remove all remaining hot melt adhesive from the hoses and other accessories.
5. Dismantle all accessories and sort them into mechanical parts and electronic parts.
6. Arrange for all parts to be recycled.

4.8 Maintenance and Care of the AKS12L Series Hot Melt Adhesive Machine

4.8.1 General Cleaning

The machine is finished with a high-strength exterior coating and can be cleaned by various common methods. To prevent the coating from peeling or being damaged, do not use strongly corrosive solvents. The cover and panel can be wiped with industrial alcohol or a dedicated hot melt adhesive cleaning agent.

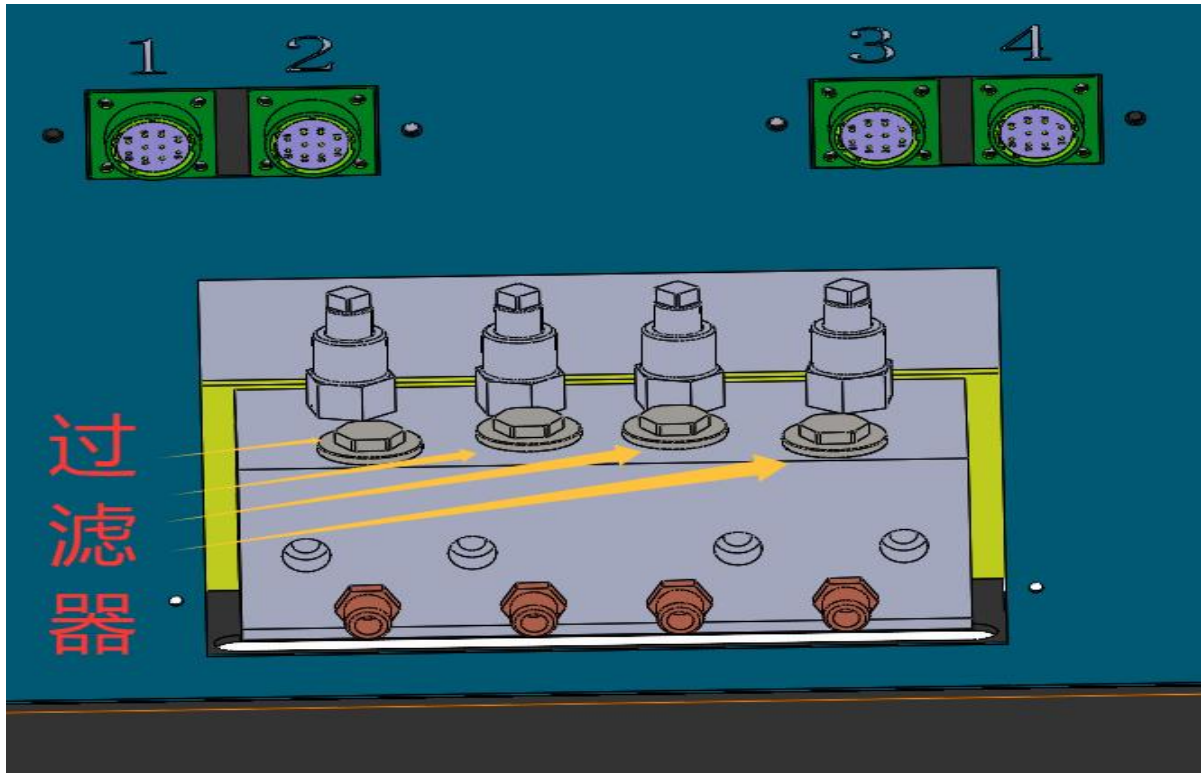
4.8.2 Care

The machine requires only minimal maintenance. The tank has a built-in primary filter to prevent large particles of debris from entering the system,

which normally does not need frequent cleaning. Other parts requiring care should be serviced according to the following procedures.

4.8.2.1 Output Filter

The pump output filter should be replaced monthly during the first few months. Once you gain experience, you can set your own cleaning and replacement schedule. The output filter is located in the manifold block (where the hose is connected); see the attached figure.



Replace the output filter screen as follows:

1. First bring the system up to operating temperature;
2. Release the adhesive pressure in the manifold block;
3. Unscrew the filter cover;
4. Use a hook-shaped tool to lift the filter screen out of the manifold block;
5. Inspect the filter screen for carbon deposits and debris; replace it if necessary;
6. When replacing the filter screen, also replace the sealing O-ring, and apply silicone grease to the O-ring;
7. Apply silicone grease to the threads of the filter cover, install it in the manifold block and tighten it.

6.6.2.2 Hose Connections — all connections must be checked every three months to ensure they are tight.

6.6.2.3 Cleaning the Primary Filter

1. Pump out the hot melt adhesive from the tank;
2. Lower the tank temperature to the softening point of the adhesive;
3. Remove the side cover plate, but do not disconnect the ground wire;
4. Put on protective gloves, unscrew the filter mounting bolts and remove the primary filter;
5. Soak the filter in cleaning fluid for a period of time, then take it out and clean the dirt off the filter with a hot air gun and a cloth;
6. Apply silicone grease to the filter threads and reinstall the filter in the machine;
7. When installing the filter, make sure the opening faces the pump;
8. Reinstall the side cover.

6.6.3 General Maintenance Rules

6.6.3.1 Monthly Maintenance

1. Check the output filter screen and replace it if necessary;
2. Check the base for adhesive leakage; replace the seal if it is damaged or has failed.

6.6.3.2 Quarterly Maintenance

1. Check that the hose connectors are tight;
2. Check that the bolts are tight;
3. Check the primary filter screen; clean or replace it.

6.6.4 Relieving the Adhesive Pressure

For safety, the adhesive pressure must be relieved before replacing the filter screen or removing the hose or spray gun. Proceed as follows: bring the machine to operating temperature, with the pump stopped and the air pressure switched off.

1. Locate the pressure relief valve.
2. Use a tool to slowly unscrew the relief valve (do not completely remove it) until adhesive comes out.
The adhesive will flow out of the outlet into a container placed in advance.
3. After the adhesive pressure is relieved, retighten the relief valve.

6.6.5 Cleaning the System

If dirt has entered the adhesive, or if you need to change the adhesive brand, the machine should be cleaned. At least 6 litres of cleaning fluid is required.

1. Drain as much hot melt adhesive as possible;
2. Reduce the adhesive pressure to zero;
3. Disconnect the hose from the gun's adhesive connection and place one end of the hose into a container;
4. Pour the cleaning fluid into the tank and hold the temperature for 15 minutes, carefully mixing the cleaning fluid with the remaining adhesive;
5. Slowly start the pump and pump half of the cleaning fluid out through the hose;
6. Reduce the adhesive pressure to zero;
7. Replace the filter screen and sealing rings;
8. Add new hot melt adhesive and bring it up to operating temperature;
9. Connect the hose and spray gun and drain out the remaining cleaning fluid (drain it after the new adhesive has stabilized);
10. Fill the tank with new hot melt adhesive; the system is then ready.

6.6.6 Installation Requirements:

1. Before installing the hose, make sure the power of the machine is switched off.
2. The hose connects to the main unit with an 8-pin electrical connector; the hose connects to the spray gun with a 4-pin connector.

6.6.7 Removal Requirements:

Note: Before removing the hose, make sure the adhesive pressure inside it has been released. First stop the piston pump, then open the spray gun to release the system pressure.

6.6.8 Temperature Sensor Inspection:

When the resistance value of the temperature sensor changes, check it against the resistance table. The PT100 RTD is used by default.

4.9 Troubleshooting for the AKS12L Series Hot Melt Adhesive Machine

4.9.1 Precautions

Service personnel must be familiar with the instruments and tools used for troubleshooting, such as multimeters, temperature meters and soldering irons. To check electrical faults in the hose or spray gun, simply unscrew the aviation connector and check the wiring and internal resistance.

4.9.1.1 Preparations Before Detailed Inspection

- A. Check whether the machine is in the startup state.
- B. Check whether the main power cable is loose or whether power is present.
- C. Check whether compressed air is supplied to the machine.
- D. Check whether the air and electrical components are correctly connected.
- E. Check whether there is hot melt adhesive in the tank.

4.9.1.2 Quick Diagnosis of Hose or Spray Gun Faults

Hose or spray gun damage is usually caused by poor electrical contact, so the operator can first test it by themselves. Switch off the power of the machine, unplug the aviation connector of the faulty hose or gun, and plug it into a known-good aviation socket;

then observe whether it works normally. If it works, the circuit of the hose or gun is fine; otherwise the hose or gun has a problem and requires repair.

4.9.1.3 Resetting the Motor Speed Control

4.9.1.4 Overtemperature Protection Setting (see 4.5.6 Overtemperature Protection for details)

4.9.1.5 Adhesive Pump Start Protection Setting

The pump protection switch is designed to open (cut off) at low temperature to prevent the gear pump from running before the adhesive is melted. The protection switch circuit is installed on the gear pump and is set to 130 ° C at the factory. [The gear pump start protection is set on the Parameter Settings A page.]

4.9.1.6 Removal, Installation and Replacement of Electrical Components

A. The control system and electrical components of the machine are sensitive to static electricity. Switch off the main power before servicing.

B. When approaching or touching these electrical components during inspection, strictly follow the procedures to prevent human body static from damaging the electronic components.

C. When installing or removing internal circuit boards, an ESD (static discharge) wrist strap must be worn. If one is not available, frequently touch the exposed metal parts of the machine.

4.9.2 Troubleshooting Tables

4.9.2.1 Common Fault Symptoms and Troubleshooting Methods – Machine Section

Fault Symptom	Fault Cause	Inspection and Remedy
Main unit cannot be powered on	1. External power not switched on 2. Internal residual current (leakage) protection device of the machine tripped or damaged 3. Main power button of the machine damaged 4. Main contactor of the machine damaged	1. Check whether the external power supply is correctly switched on. 2. Open the side cover of the machine and check whether the residual current (leakage) protection device has tripped. If it has tripped, first press the blue button on the protection device, then reset (switch on) it once. If it trips again after resetting, unplug all aviation connectors from the machine and power it on again to determine whether the leakage is in the machine or in the hoses and guns. Do not power the machine on again until the leakage location is identified, to prevent electric shock. 3. Check whether the indicator light of the power button is lit; if not, the button is damaged and must be replaced. 4. Measure the voltage across the contactor coil; it should be 220 VAC. If the voltage is normal, the contactor is damaged and must be replaced.

4.9.2.2 Common Fault Symptoms and Troubleshooting Methods – Tank Section

Fault Symptom	Fault Cause	Inspection and Remedy
Main tank overtemperature	1. High/low alarm temperature range too narrow 2. Temperature sensor damaged 3. Solid state relay damaged 4. Temperature control module damaged	1. Reset the high/low alarm temperature range; a range of $\pm 10^{\circ}\text{C}$ is recommended. 2. Measure the resistance of the temperature sensor (refer to the P51 resistance table); if incorrect, replace with a temperature sensor of the same model. 3. With the SSR indicator light off, measure whether there is 220 V between the SSR output terminals L1 and T1; if not, the SSR is damaged and must be replaced with the same model. 4. Use a temperature measuring gun to check whether the actual tank temperature exceeds the set temperature; if so, the temperature control module is damaged and must be replaced with the same model.
Main tank does not heat up	1. Heating fuse blown 2. Solid state relay damaged 3. Overtemperature protection thermostat tripped 4. Heating contactor damaged 5. Temperature control module damaged	1. Check whether the indicator light on the fuse holder is lit; if so, replace the fuse. Measure whether the fuse resistance is infinite; if so, replace the fuse. 2. With the SSR indicator light on, measure whether there is 220 V between the SSR output terminals L1 and T1; if so, the SSR is damaged and

	6. Heating element damaged	must be replaced with the same model. 3. Measure the resistance of the tank overtemperature protection thermostat; if the resistance is infinite, replace the thermostat. 4. Check whether the tank heating contactor pulls in; if not, replace the contactor. 5. Measure whether there is 12 – 24 VDC at the output of the temperature control module; if not, replace the module. 6. Measure the resistance of the tank heating elements (about 15 Ω). If it is infinite, all heating elements are damaged and must all be replaced. (If it is significantly higher than 15 Ω, some are damaged.)
Main tank temperature displayed abnormally or flickering	1. Temperature sensor damaged or open circuit 2. Temperature control module damaged	1. Measure whether the temperature sensor resistance is abnormal; replace the sensor or restore the open circuit. 2. Replace the temperature control module.
Main tank adhesive leakage	1. Gear pump sealing ring aged, shaft seal worn	1. Replace the gear pump sealing ring, or replace the gear pump.

4.9.2.3 Common Fault Symptoms and Troubleshooting Methods – Hose and Spray Gun Section

Fault Symptom	Fault Cause	Inspection and Remedy
Hose does not heat up	1. Heating fuse blown 2. Solid state relay damaged 3. Temperature control module damaged 4. Aviation connector damaged 5. Hose heating element damaged	1. Check whether the indicator light on the fuse holder is lit; if so, replace the fuse. Measure whether the fuse resistance is infinite; if so, replace the fuse. 2. With the SSR indicator light on, measure whether there is 220 V between the SSR output terminals L1 and T1; if so, the SSR is damaged and must be replaced with the same model. 3. Measure whether there is 12 – 24 VDC at the output of the temperature control module; if not, replace the module. 4. Check whether the pins inside the aviation connector are burnt or blackened; if so, replace the aviation connector. 5. Connect the aviation connector to a socket with another number to see whether it heats normally. If it still does not heat, replace the hose.
Hose overtemperature	1. High/low alarm temperature range too narrow 2. Temperature sensor damaged 3. Solid state relay damaged 4. Temperature control module	1. Reset the high/low alarm temperature range; a range of $\pm 10^{\circ}\text{C}$ is recommended. 2. Measure the resistance of the temperature sensor (refer to the P51 resistance table); if incorrect, replace with a temperature

	damaged	sensor of the same model. 3. With the SSR indicator light off, measure whether there is 220 V between the SSR output terminals L1 and T1; if not, the SSR is damaged and must be replaced with the same model. 4. Connect the aviation connector to a socket with another number to see whether the temperature can be controlled within the normal range. If it can, replace the temperature control module.
Spray gun does not heat up	1. Heating fuse blown 2. Solid state relay damaged 3. Temperature control module damaged 4. Aviation connector damaged 5. Spray gun heating element damaged	1. Check whether the indicator light on the fuse holder is lit; if so, replace the fuse. Measure whether the fuse resistance is infinite; if so, replace the fuse. 2. With the SSR indicator light on, measure whether there is 220 V between the SSR output terminals L1 and T1; if so, the SSR is damaged and must be replaced with the same model. 3. Measure whether there is 12 – 24 VDC at the output of the temperature control module; if not, replace the module. 4. Check whether the pins inside the aviation connector are burnt or blackened; if so, replace the aviation connector. 5. Connect the aviation connector to a socket with another number to see whether it heats normally. If it still does not heat, replace the spray gun heating element.
Spray gun overtemperature	1. High/low alarm temperature range too narrow 2. Temperature sensor damaged 3. Solid state relay damaged 4. Temperature control module damaged	1. Reset the high/low alarm temperature range; a range of $\pm 10^{\circ}\text{C}$ is recommended. 2. Measure the resistance of the temperature sensor (refer to the P51 resistance table); if incorrect, replace with a temperature sensor of the same model. 3. With the SSR indicator light off, measure whether there is 220 V between the SSR output terminals L1 and T1; if not, the SSR is damaged and must be replaced with the same model. 4. Connect the aviation connector to a socket with another number to see whether the temperature can be controlled within the normal range. If it can, replace the temperature control module.

4.9.2.4 Common Fault Symptoms and Troubleshooting Methods – Abnormal Adhesive Spraying

Spray gun does not dispense adhesive	1. Tank adhesive used up 2. Machine motor not started 3. Spray gun solenoid valve not	1. Check the adhesive level in the tank and add adhesive so that it at least covers the bottom of the tank.
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	energized 4. Spray gun needle valve not opened 5. Coupling between gear pump and motor disengaged or damaged 6. Gear pump damaged	2. Check whether the VFD in the machine is running (the VFD display panel should show a number and not be flashing). 3. Check whether the spray gun solenoid valve wiring is disconnected, whether the switch on the circuit is on, and whether the solenoid coil is damaged. 4. Check whether the compressed air pressure is greater than 6 MPa, and check the needle valve for foreign matter, rust, etc. Clean the needle valve promptly. 5. Check whether the coupling needs to be replaced. 6. Check whether the gear pump is damaged or jammed; repair or replace it.
Adhesive drips from the spray gun nozzle	1. Atomizing solenoid valve not opened 2. Air volume too small 3. Too much moisture in the compressed air 4. Gun temperature too low 5. Nozzle blocked 6. Sealing ring aged	1. Check whether the atomizing solenoid valve wiring is disconnected, whether the switch on the circuit is on, and whether the solenoid coil is damaged. 2. Adjust the throttle valve on the atomizing air circuit to increase the air volume. 3. Drain the water in the air reservoir, and disconnect the air hose on the gun to drain the moisture in the hose. 4. Appropriately raise the gun temperature. 5. Remove the nozzle and clean out impurities. 6. Check whether the sealing ring is aged; replace it if so.
Adhesive output too small	1. Tank adhesive used up 2. Pump output too small 3. Needle valve gap adjusted too small 4. Filter screen blocked 5. Return valve pressure too low	1. Check the adhesive level in the tank and add adhesive so that it at least covers the bottom of the tank. 2. Increase the tracking amount of the controller, or increase the upper frequency limit of the VFD. 3. Turn the adhesive volume adjusting screw on the needle valve counterclockwise slightly (only applicable when the output of a certain nozzle group among multiple needle valves is small). 4. Clean the filter screen on the spray gun. 5. Turn the return valve clockwise to increase the adhesive output pressure.
Adhesive output too large	1. Pump output too large 2. Needle valve gap adjusted too large	1. Reduce the tracking amount of the controller, or reduce the upper frequency limit of the VFD. 2. Turn the adhesive volume adjusting screw on the needle valve clockwise slightly (only applicable when the output of a certain nozzle group among multiple needle valves is large).

4.10 Equipment Disassembly Procedures

4.10.1 Removing the Motor/Electrical Box

1. Loosen the four fastening screws (on the bottom edge of the motor/electrical box, two on each side).
2. Open the box cover; be careful to disconnect the ground wire.

4.10.2 Removing the Tank Box Cover

1. Loosen the four fastening screws (two on the side cover plate and two on the bottom of the tank box cover).
2. Lift the tank box cover upward and remove it.

4.10.3 Removing the Tank Cover

Remove the four flat-head screws and take off the tank cover. See the figure for the location of the cover sealing ring.

4.10.4 Removing the Overtemperature Protection Switch and Motor Protection Switch

1. Loosen the two screws at the bottom of the side cover plate (be careful to disconnect the ground wire).
 - a. Replacing the overtemperature protection switch: remove the two screws securing the protection switch to the tank, disconnect the two wires on the protection switch, and replace the switch.

b. Replacing the motor protection switch: disconnect the two wires on the protection switch and replace the switch.

4.10.5 Inspecting the Temperature Sensor

1. Remove the motor/electrical box cover.

a. Tank temperature sensor: located between the two terminals of the heater, secured with bolts and connected with quick-connect wiring.

b. Extended heating nozzle sensor: if the extended heating nozzle is fitted as an option, a second sensor is installed on the nozzle, also secured with bolts and quick-connect wiring.

4.10.6 Inspecting Electrical Components

1. First make sure the main power is switched off.

2. Open the motor/electrical box cover, loosen the display panel fixing screws and move the panel forward to its maximum position.

a. Replacing the main power switch: the main switch is located on the display panel and can be removed from the back of the panel.

b. Replacing fuses: the fuse holders on the circuit boards have indicator lights. If a fuse is blown, its indicator lights up, and the fuse must be replaced.

c. Replacing the relay: there is only one relay in the whole machine, mounted on the terminal block.

d. Replacing circuit boards: remove the main unit's electrical box cover to access the circuit boards, including the CPU board, control computer board, power control board, auxiliary control board, signal control board and motor speed control board.

4.10.7 Removing the Pump or Motor

Remove the motor/electrical box cover, and open the side cover plate and the front panel.

a. Removing the piston pump: disconnect the air circuit and electrical wiring of the solenoid valve on the 4-way valve, remove the four bolts securing the pump to the body, and take down the pump and the 4-way valve. Installation: reinstall the piston pump in place; the bolt tightening torque is 21 N • m (at room temperature). When the tank temperature is 177 ° C, the maximum tightening torque is 49 N • m.

b. Removing the gear pump and motor: disconnect the motor's electrical connections, loosen the locking screws of the retaining pin, and remove the shaft retaining pin.

c. Replacing the gear pump motor brushes: the motor brushes are on the side of the motor near the panel; remove the brush cover to replace them.

d. Replacing the pump seal: remove the pump from the machine, take out the sealing ring and install a new one.