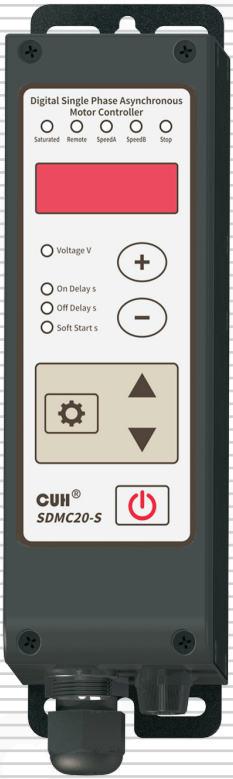
CUH®

Digital Single Phase Asynchronous Motor Controller



SDMC20-S
User Manual

Copyright Statement

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Preface

Thank you for choosing CUH SDMC20-S digital single phase asynchronous motor controller. (The controller for short in the following text). This series of controllers uses high-quality components and incorporates the latest electronic technology, and is carefully designed with high-performance digital signal processors.

This manual introduces the basic operation method, functional technical description and typical application examples of this product. Provide users with relevant information on installation and debugging, parameter setting, abnormal diagnosis, troubleshooting and routine maintenance of the controller. In order to ensure the correct installation and use of this controller, please read this user manual carefully before installation and keep it properly.

Be sure to read the following symbols to alert you to precautions against personal injury and product damage.

Danger	Non-observance of this item will result in personal injury or death.
Warn	Non-observance of this item may result in personal injury or death.
Careful	Non-observance of this item may result in moderate or minor injury to persons.
Notice	Non-observance of this item will result in damage to the product and property damage.
Essential	Indicates precautions and usage restrictions that must be observed during use.

This manual is suitable for the following models of controllers:

- Digital Single Phase Asynchronous Motor Controller SDMC20-S

Safety and Precautions

1. Danger This product is only used to drive single phase asynchronous motor or electromagnet-based vibratory feeding equipment, do not use this product for the purpose of protecting the human body or parts of the human body, etc.

2. Danger This product is not intended to be used as an explosion-proof product, do not use it in hazardous locations and/or potentially explosive gas environment.

3. Warn This product is powered by AC mains, please do not apply AC voltage exceeding 260Vac. Excessive input voltage, such as 380Vac, may cause the product to explode or catch fire, resulting in serious safety accidents.

4. Warn This product is grounded through the power cord. Please ensure that the power distribution facilities for the controller are well grounded, otherwise the controller shell may be charged, resulting in an electric shock accident.

5. Warn Do not input AC power to the output of this controller, it will damage the controller.

6. Warn Do not plug and unplug the wiring with points or touch the contact of each wiring terminal in the wiring compartment to prevent electric shock.

7. Notice Please avoid controlling the output of this product by cutting off the power supply through relays and other devices, which will seriously reduce the life of the controller.

8. Notice The controller is designed to work in a cool and dry environment. Never run the controller outside to avoid soaking and insolation. Operate the controller within the temperature specified electrical characteristic.

9. Essential Be sure to fix this product on a solid platform that is reliably grounded and away from vibrating equipment.

10. Essential Never operate the controller under the condition that beyond its designed limits.

11. Essential Operate the controller in accordance with this instruction book strictly. we will not assume any civil or criminal liability if the equipment damage or personal injury is caused by incorrect operation.

12. Essential Never open the controller shell to avoid electric shock. Contact CUH if the controller break down. Never try to repair the controller yourself which may caused void warranty.

Operating and Storage Environment

Inspection Before Using

Every controller will go through rigorous quality inspection before delivery and is packed with crash-proof packaging, Please check the following items after unpacking:

1. Whether the controller is damaged during transportation.
2. Whether the model of the controller is that you ordered.

Runtime Environment

Please follow the notes below to ensure the better performance and longer lifetime of the controller:

- Well-ventilated environment
- Keep away from water, stream, dust and especially oily dust
- Keep away from the corrosive or flammable gas and liquid
- Keep away from floating dust and metal particles
- Firmly fixed to avoid self vibration
- Keep away from electromagnetic interference
- Ensure ambient temperature is 0~40 °C
- For use at altitude 2000m or lower

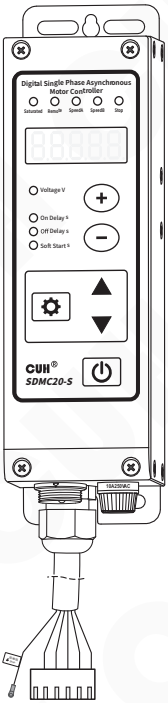
Contents

Chapter Ⅰ Before Use

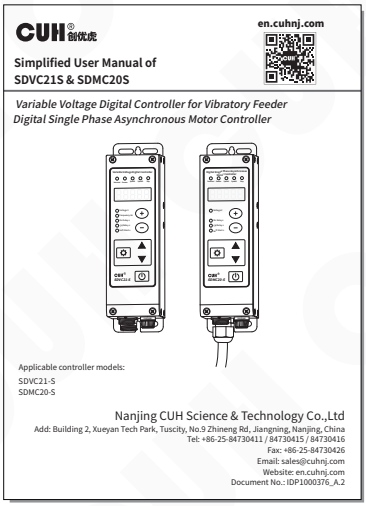
This chapter introduces product package contents, controller appearance description and controller nameplate information.

1.1 Check the Package Contents

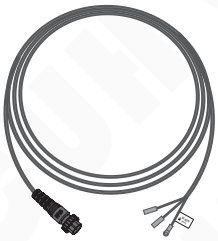
Before using, please check the integrity of the controller and accessories. If you find that the product is defective or damaged, missing accessories, etc., please contact our company.



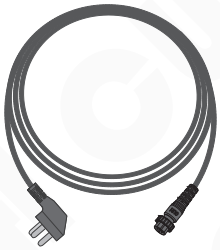
Controller×1
(SDMC20-S include Output Cable)



Simple Manual×1

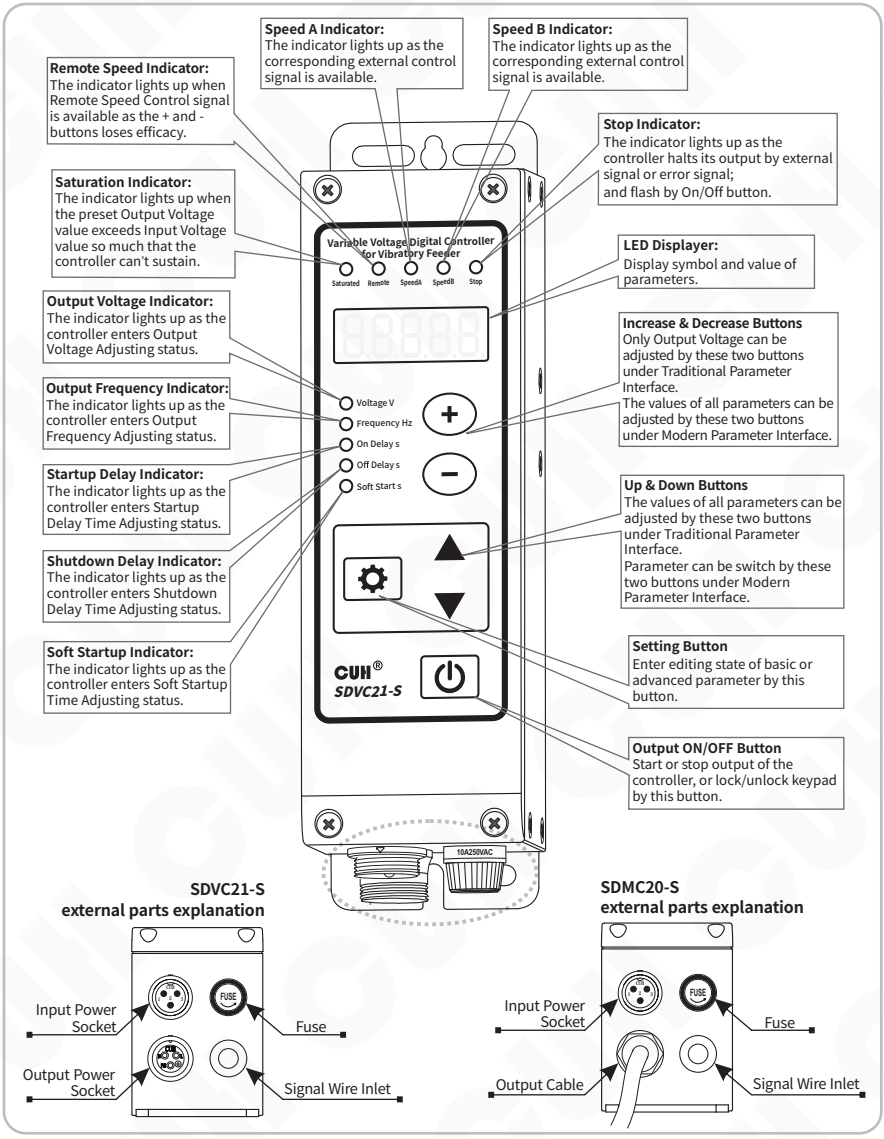


Output Cable×1
(Only SDVC21-S)

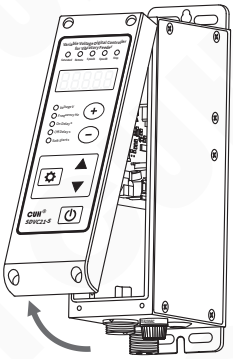


Input Power Cord×1

1.2 Indicators, Buttons and External Parts Explanation

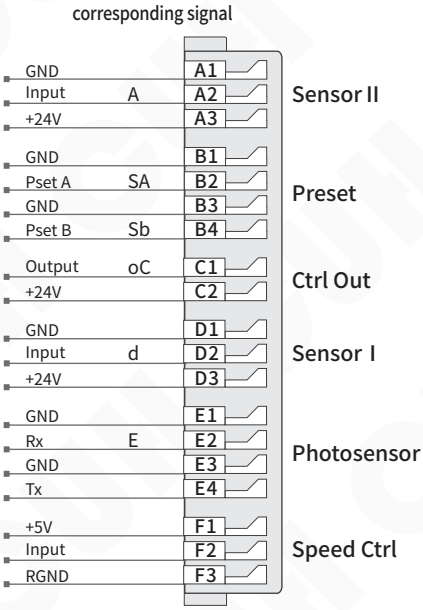


1.3 Wiring Ports Explanation

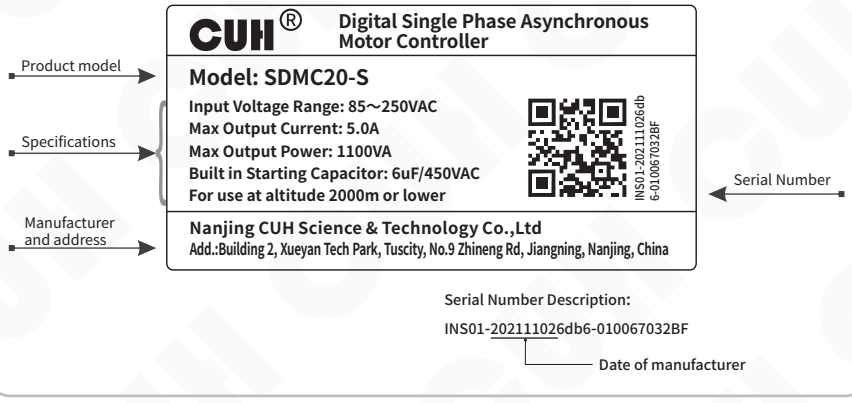


Step 1: Remove the screws on the four corners of the panel.

Step 2: Open the panel upwards, the wiring port is in the back of the panel.



1.4 Nameplate Explanation



Chapter II Featured Functions

This chapter includes a brief introduction and main features of the controller.

2.1 Product Introduction

SDMC20-S controller is used to control single-phase AC asynchronous motor, it has abundant ports and logic functions, and its features include:

Soft startup: When starting, the motor speed will gradually increase from zero to the set speed to eliminate the impact on the motor. Users can set the soft startup time according to their needs.

Soft shutdown: Added a soft shutdown function, which can be set to 0.0~10.0 seconds to slowly stop the motor rotation.

Automatic speed stabilization: built-in digital PID control regulator to eliminate the influence of voltage fluctuation or load change on motor speed.

Control output: The port supports NPN, PNP or push-pull output mode, with over-current and short-circuit protection functions.

Switch sensor ports: 2 groups of overflow control ports, support NPN, PNP or automatic adaptation type.

Intelligent photoelectric port: The on/off delay and sensitivity of intelligent photoelectric sensor can be adjusted.

Motor stall protection: When the motor stalls, the controller stops output to protect the motor.

There are up to three groups of logic signal sources for main output and control output, users can freely combine them according to their needs.

Password lock and parameter lock function: After the controller is debugged, the parameters can be locked to prevent misoperation by personnel.

Various control objects: The parameters of the control objects can be adjusted to realize open-loop or closed-loop control of the motor, and can also control the vibratory feeder.

Complete protection functions include: main output overcurrent protection, overheating or overcooling protection, power supply undervoltage/overvoltage protection, control output short circuit protection, 24V output short circuit protection, speed regulation 5V output short circuit protection, and motor stall protection.

Chapter III Installation Guide

This chapter introduces the necessary conditions for the use of the controller and how to install and connect it correctly.

3.1 Controller Usage Conditions

The controller is powered by AC 110/220V, and the protective ground connection is made through the plug of the power cord. Please provide 110V or 220V, 50Hz/60Hz mains power supply and distribution facilities that meet the standard and ensure that the protective ground wire is correctly connected.

Warn Never connect the controller to 380V AC power, this will cause irreversible serious damage to the controller, possibly resulting in explosion, fire and other safety incidents.

Warn Ensure that the power supply side is reliably grounded. The metal casing of the controller is directly connected to the protective grounding wire. Poor grounding will cause the controller casing to be electrified and cause an electric shock accident.

Notice Long time running will generate heat and cause the temperature of the casing to rise. Please install the controller in a well-ventilated environment and fix it well, away from vibration sources.

Notice The output of this product is formed by the phase cut of the mains supply, and there is no isolation between its input and output. Therefore, the output poles cannot be connected to the protective ground. When connecting the electromagnet, it is necessary to ensure that the electromagnet coil and the casing have basic insulation capability. Otherwise, leakage of electricity may occur, which may cause electric shock and damage to the controller.

Notice This product is a controller used to drive a single-phase AC asynchronous motor or electromagnet. It must not be connected to a piezoelectric vibratory feeder.

3.2 Operation Method of Buttons

Operation method of Modern Parameter Interface:

a. Short press ⊕ or ⊖ to adjust the Output Voltage under standby Interface.

b. Enter or exit the Basic Parameters Interface by long press ⚙, and switch among the basic parameters by short press ▼ or ▲ , and adjust parameter's value by short press ⊕ or ⊖.

c. Enter or exit the Advanced Parameters Interface by long press ⚙ and ▲, and switch among the advanced parameters by short press ▼ or ▲, and adjust parameter's value by short press ⊕ or ⊖ .

d. Enter or exit the Monitoring Parameters Interface by long press ⚙ and ▼, and switch among the monitoring parameters by short press ▼ or ▲, but parameter's value can't be adjusted.

e. Short press ⏻ to start/stop output of controller, and long press ⏻ to lock/unlock keypad.

f. At LED interface of default setting restore parameter, Long press ⊕ button until `------` is displayed on the LED to switch to traditional parameter interface, or long press ⊖ until `_____` is displayed on the LED to switch to modern parameter interface.

g. SDMC20-S defaults to modern parameter interface, SDVC21-S defaults to traditional parameter interface.

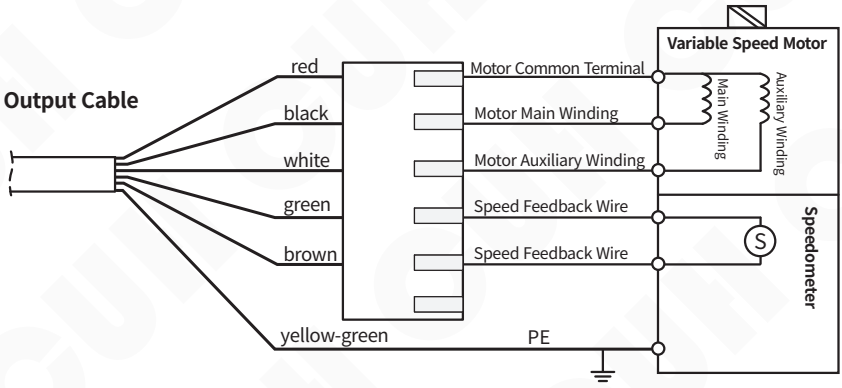
3.3 Install and Use

Step One:

Open the packing box and check the controller and all accessories.

Step Two:

Refer to the motor wiring instructions to connect the motor correctly.



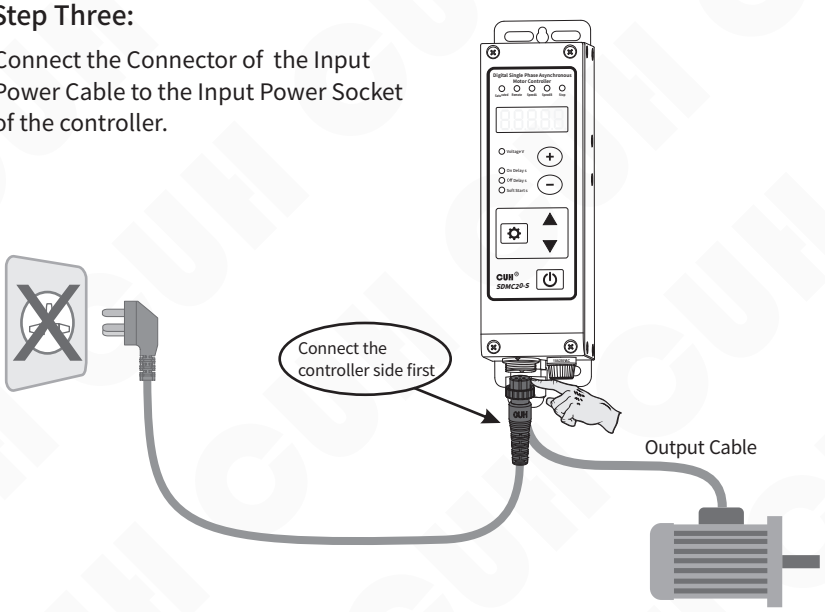
Motor Wiring Instructions

Note

1. Make sure that the output line of the controller is correctly and reliably connected to the motor before powering on.
2. It is forbidden to connect piezoelectric loads to the power output, otherwise it may cause an electric shock safety accident!

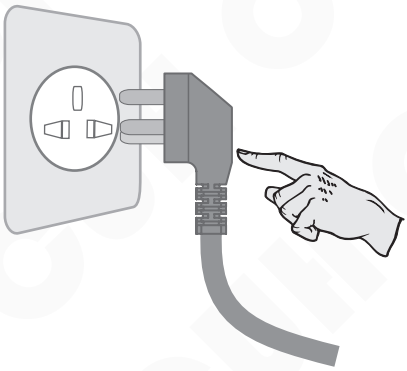
Step Three:

Connect the Connector of the Input Power Cable to the Input Power Socket of the controller.



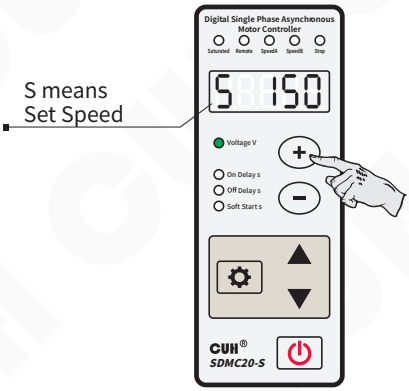
Step Four:

Connect the plug of the Input Power Cable to the mains jack.



Step Five:

Turn on the power switch of the controller, and the motor speed "S 150 " should be displayed. Press ⊕ and ⊖ to adjust the current motor speed.



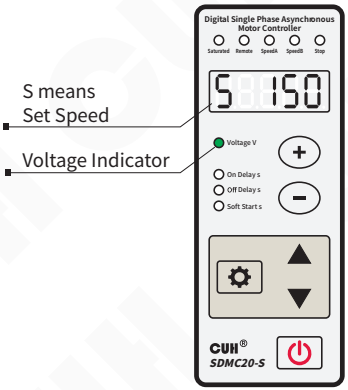
If you need to adjust the forward and reverse rotation of the motor, **please power off the controller first,** then refer to the chapter "5.6 Motor Forward and Reverse Rotation Adjustment" in the advanced function description, and operate in strict accordance with the operation instructions.

Chapter IV Basic Function Description

This chapter introduces basic functions of the controller.

4.1 Output Voltage (Speed) Setting

- Turn on the power switch of the controller.
- The controller enters the set speed parameter. The voltage indicator lights up, and the LED display set speed parameter S and the default value 150.
- Press (+) or (−) to adjust the parameter value.



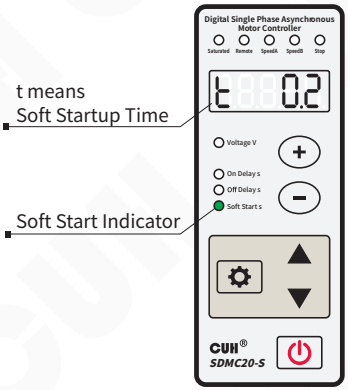
- The default control object of the controller is closed-loop motor mode, and the panel display S is the reference speed of the motor, not the actual speed. The adjustment range of "S" is 0-999, and the default maximum value is 300. When it is adjusted to 300, the saturation light does not light up, and the maximum speed parameter h. can be further set to increase the speed.
- When the parameter SF is set to 0 (vibration plate) or 1 (motor open loop), the interface displays parameter U, which is the rectified average value of the output voltage.
- The controller does not have a boost function. When the controller cannot reach the set voltage due to the limitation of the input power supply voltage, the saturation indicator will light up, and the mains voltage compensation will fail at this time.

4.2 Soft Startup/Shutdown Time

When the controller starts from stop , the motor speed can be gradually increased to the set value to prevent the motor and the controller from being impacted.

Soft Startup Time (t): When the controller starts from the stopped state, the time required for the motor speed to smoothly increase from 0 to the set speed is called the soft startup time.

- Press [⚙] and hold for 2 seconds to enter the basic parameter interface.
- Press ▲ or ▼ to switch to soft startup parameter "t" and the default value 0.2.
- Press ⊕ or ⊖ to adjust the parameter value.



When the controller is stopped from the running state, the motor speed can be gradually reduced to 0 to prevent the motor and controller from being impacted.

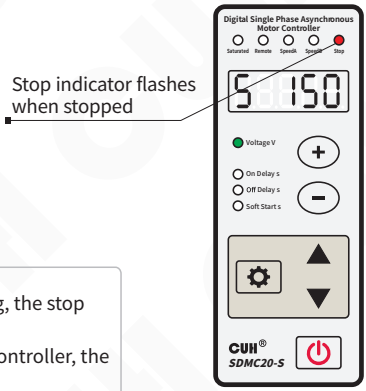
Soft Shutdown Time (↕): When the controller stops from the running state, the time required for the motor speed to smoothly decrease from the set value to 0 is called the soft shutdown time.

The operation method and parameter range of the soft shutdown time are consistent with the soft startup time.

4.3 Output Switch

The ⏻ on the panel can easily and quickly start or stop the output of the controller.

» Using ⏻ on the controller panel, you can control start or stop. When the output is stopped, the stop indicator flashes, indicating that it enters the stop state.



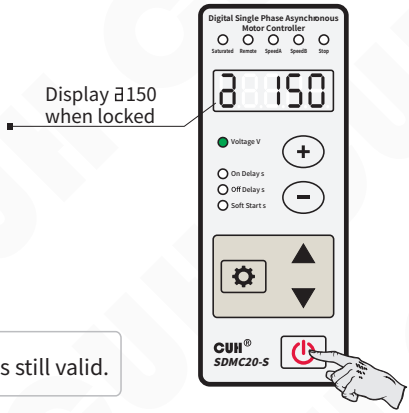
By pressing on/off button to stop outputting, the stop indicator flashes.
By applying an external signal to stop the controller, the stop indicator is always on.

4.4 Keyboard Lock

When the parameters of the controller are set, the keyboard lock function can lock all buttons on the panel to avoid misoperation.
Even if it is turned off and then turned on again, the state of the keyboard lock remains the state it was in the last time it was turned off.

» Press ⏻ and hold for 2 seconds to lock all buttons except ⏻ , and the LED displays "d150".

» Press ⏻ and hold for 2 seconds again to unlock.



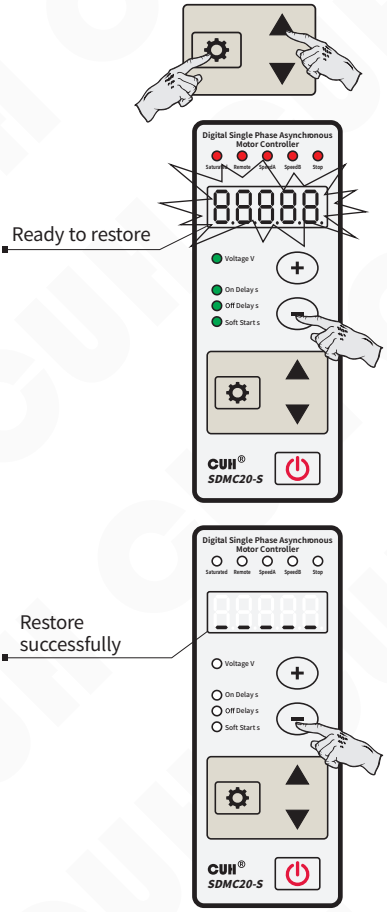
In the locked state, the on/off button is still valid.

4.5 Restore Default Settings

User can quickly restore the controller to the factory default state.

Due to the powerful functions of the controller, many parameters can be adjusted. For beginners, it may not be able to restore the normal working state of the controller after several settings and modifications. Use this function to quickly restore the disordered parameter state to the factory default setting.

- Long press ⚙ and ▲ simultaneously to enter the advanced parameter interface.
- Short press ▼ to switch to the full flashing on the LED displayer, that is, the parameter of "Default setting restoration". And then press ⊖ and hold until the controller displays "-----", indicating that the controller has been restored.
- Release ⊖ , after the controller displays "CUH", then enter the normal speed adjustment state "S". By this time, all parameters have been restored to the factory default settings.



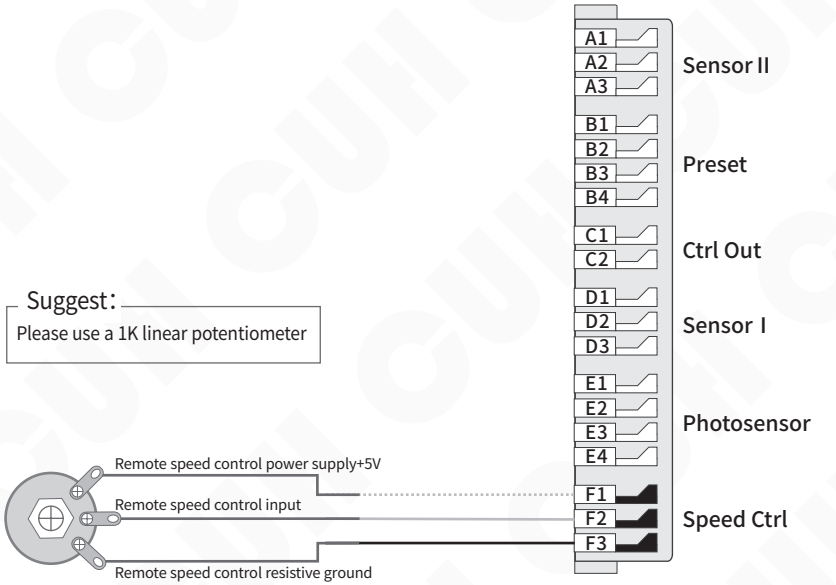
Chapter V Advanced Function Description

This chapter introduces how to use the advanced functions of the controller.

5.1 Remote Speed Control

The controller supports external analog signal to control output voltage, analog signal supports potentiometer, 1~5V voltage, 4~20mA current.

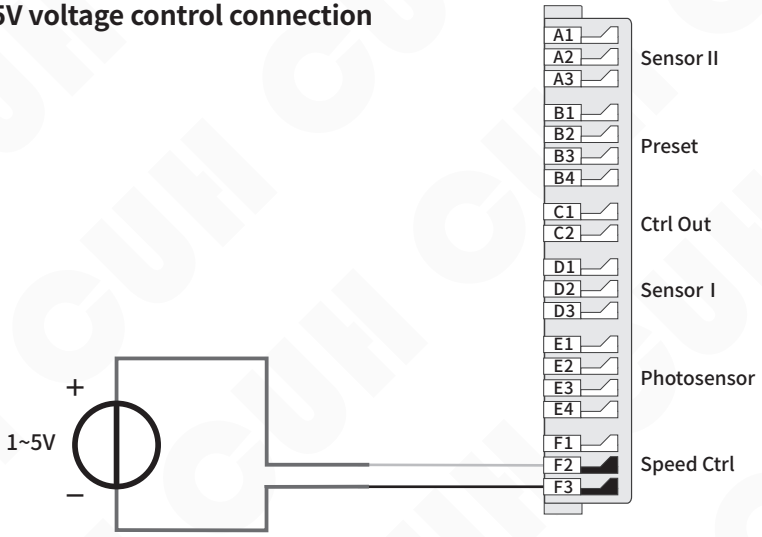
Potentiometer control connection



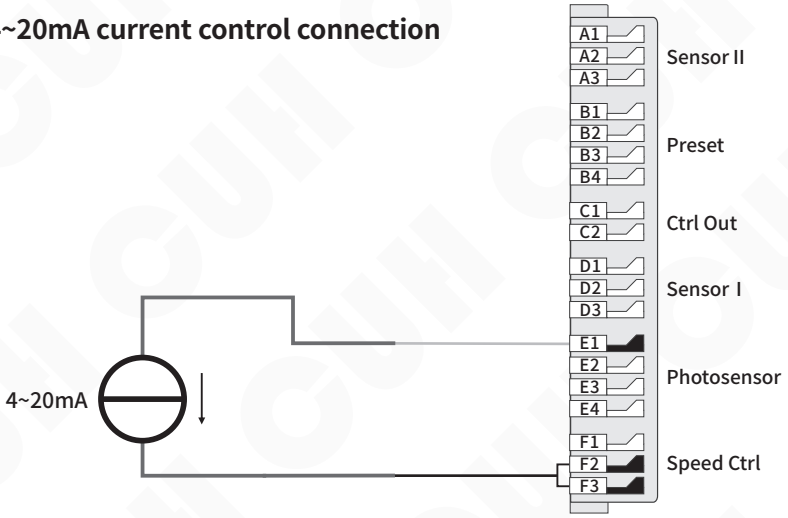
Suggest:
Please use a 1K linear potentiometer

When the remote speed control signal takes effect, the speed control indicator lights on, at the same time regulating the voltage on the panel will fail.

1~5V voltage control connection



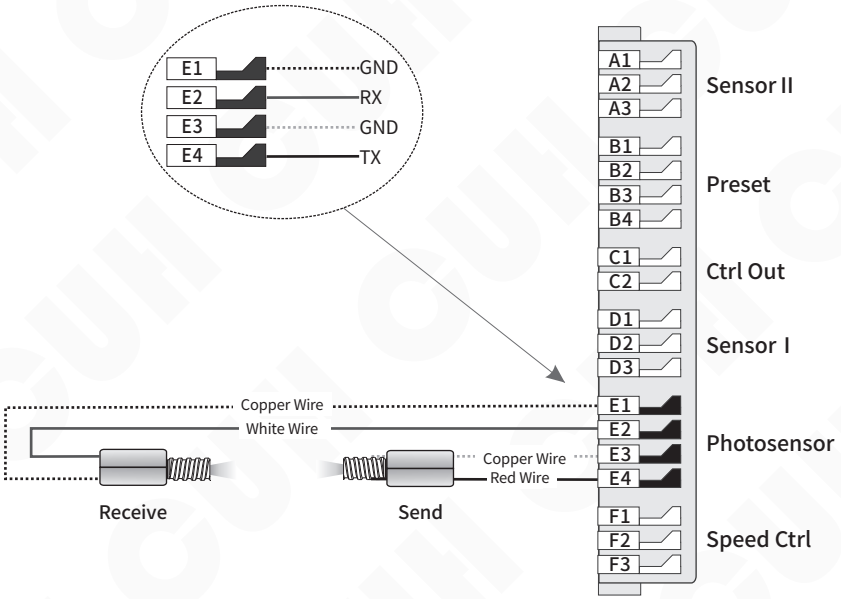
4~20mA current control connection



5.2 Intelligent Photoelectric Sensing

The intelligent photoelectric port of the controller supports photoelectric through-beam or reflection sensors composed of light-emitting diodes and phototransistors. The specific wiring diagram is as follows:

Photoelectric sensor connection method



The working distance of the sensor can be adjusted by setting the P parameter, the smaller the parameter, the more sensitive it is.

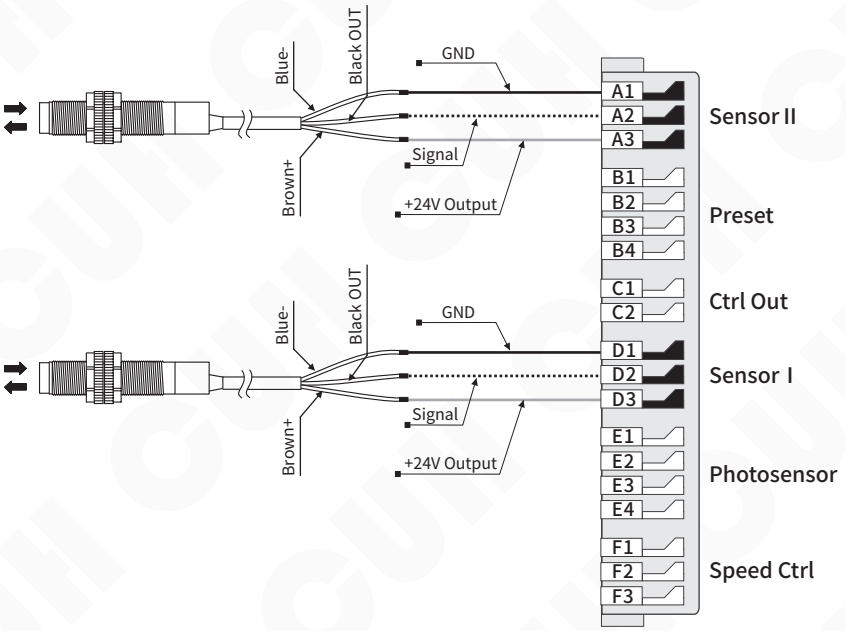
5.3 Switch Sensor

The Switch Sensor port can support NPN, PNP, Ut1, Ut0 modes.

The Ut1 mode is a single scan, that is, before the sensor signal is invalid, the high and low levels are changed to detect whether the port is valid. After finding a valid signal, the port sensor type is determined and no longer scans.

The Ut0 mode is continuous scanning, regardless of the sensor type, it always detects whether the port is connected to a valid signal by changing the high and low levels.

Switch sensor connection method



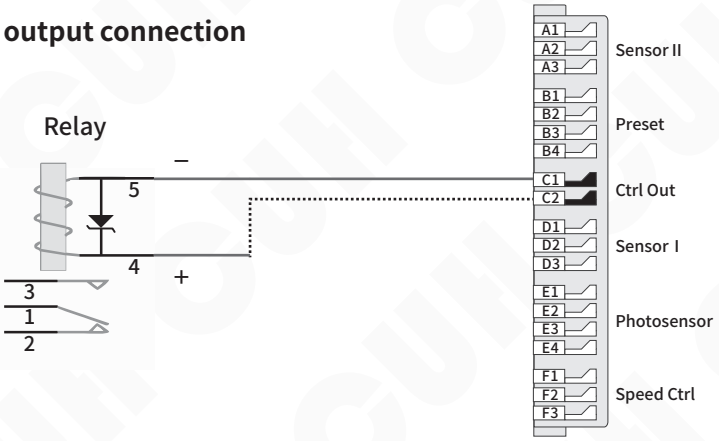
5.4 Control Output

The control output port can support NPN output, PNP output and push-pull output. therein:

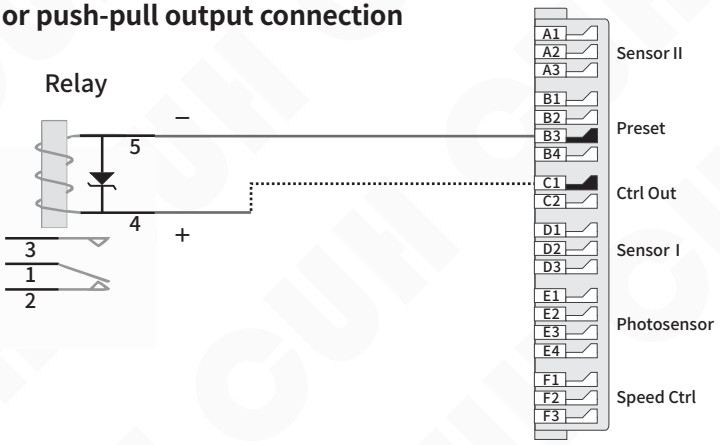
- The NPN output is valid as a low level, and the output is invalid as a high-impedance state;
- The PNP output is valid as a high level, and the output is invalid as a high-impedance state;
- The push-pull output is valid as a high level, and invalid as a low level.

5.4.1 Wiring Method of Control Output

NPN output connection



PNP or push-pull output connection



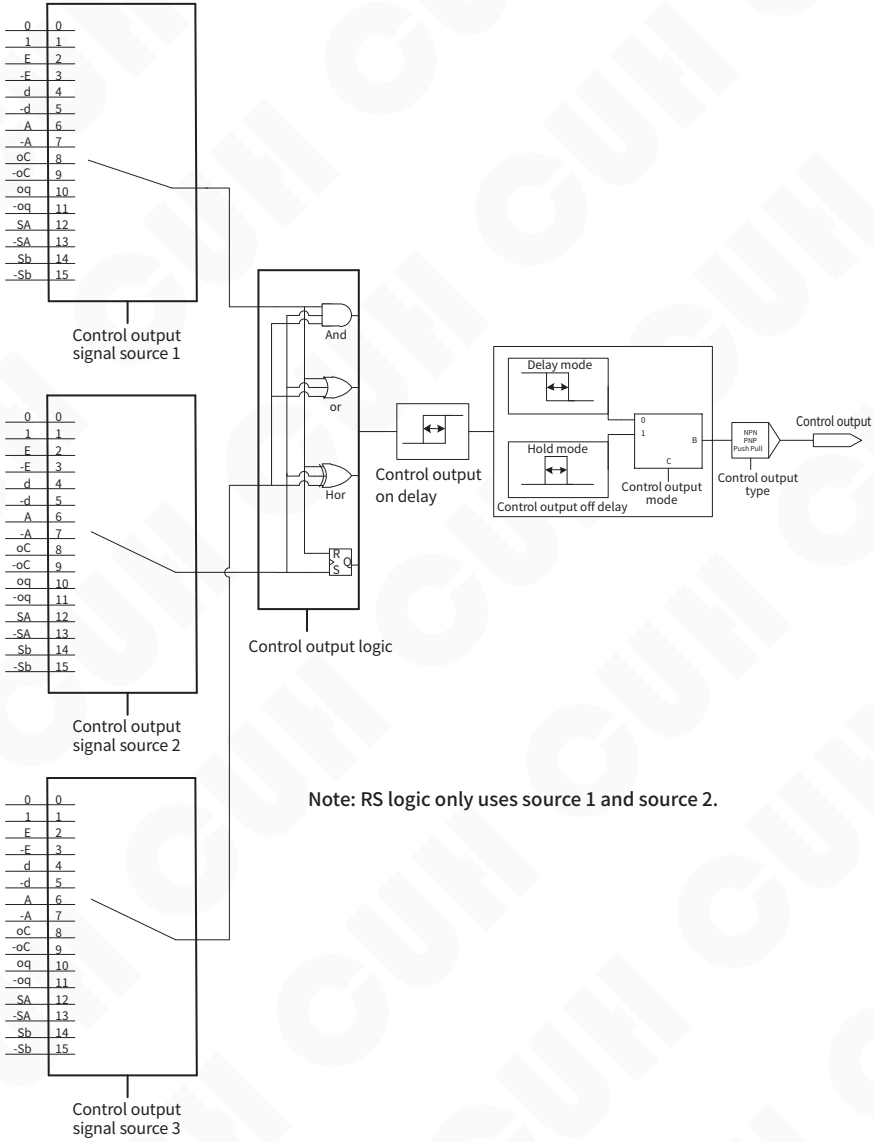
If connecting a 24V relay, be sure to confirm the positive and negative poles of the coil to make sure they are connected correctly. Because the output current capability of this port is 400mA, the internal protection diode of the relay will short-circuit the port of this controller after reverse connection, triggering the short-circuit protection Err07.

5.4.2 Control Output Signal Source and Logic Diagram

The control of the main output and the control output is controlled by the result of the logical relationship of the three signal sources. The following signal sources can be selected:

Signal Source	Implication
0	invalid signal
1	valid signal
E	Intelligent photoelectric port signal of channel E
-E	Intelligent photoelectric port signal of channel E is inverted
d	Switch sensor port signal of channel D
-d	Switch sensor port signal of channel D is inverted
A	Switch sensor port signal of channel A
-A	Switch sensor port signal of channel A is inverted
oC	Control output port signal of channel C
-oC	Control output port signal of channel C is inverted
oq	Power main output port signal
-oq	Power main output port signal is inverted
SA	Speed preset A port signal of channel B
-SA	Speed preset A port signal of channel B is inverted
Sb	Speed preset B port signal of channel B
-Sb	Speed preset B port signal of channel B is inverted

Control Output Logic Diagram



Note: RS logic only uses source 1 and source 2.

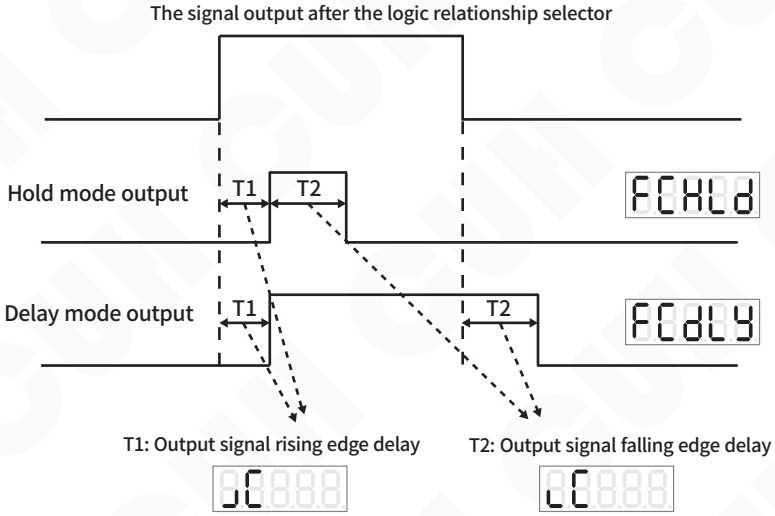
5.4.3 Control Output Mode Description

Customers can choose 2 control output modes: delay mode, hold mode.

Delay mode: It means that after the controller output drive signal changes from valid to invalid, the control output turns off after a period of off delay time.

Hold mode: After the controller output drive signal becomes valid, the control output remains on during the off-delay time, and turns off after the off-delay time is exceeded.

The difference between the two modes is expressed in the form of a timing diagram as follows, where the input signal is the signal output after the logic relationship selector.



5.4.4 Main Output Signal Control Function

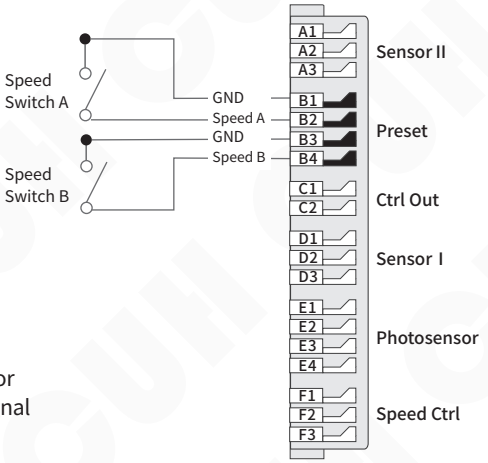
The main output signal control is similar to that of the control output. After selecting three signal sources for logic relationship operation, the control signal is obtained through on/off delay mode selection and logic direction control. The control signal is logically with the on/off signal of the panel, than send to the power board to control the main output.

The main output signal control wiring method, signal source and logic diagram can refer to the control output function.

5.5 Speeds Preset Function

Speed preset function is to directly select the preset speed through external control signal. By using this function, external control equipment, such as PLC, computer, sensor and other signal sources can easily form a multi-speed feeding control system with this controller.

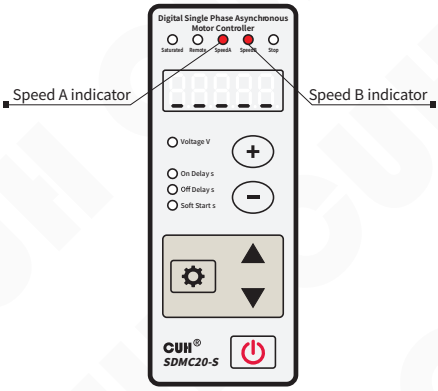
The controller has two speed preset switch control signals, which control speed switch A and speed switch B, both of which are active low.



The status of each control line is displayed by corresponding indicator lights on the panel. When a valid signal is applied to the control line, the corresponding indicator lights up.

The combination of the on-off states of the two indicators has 4 states (A is on and B is off, A is off and B is on, AB is all on, and AB is all off).

By selecting the control signal, the controller will enter the corresponding preset speed. At this time, the output of the controller can be adjusted by ⊕ or ⊖ The speed will be automatically recorded. Any time the preset speed control signal sets the controller into this state, it will switch to this speed immediately.

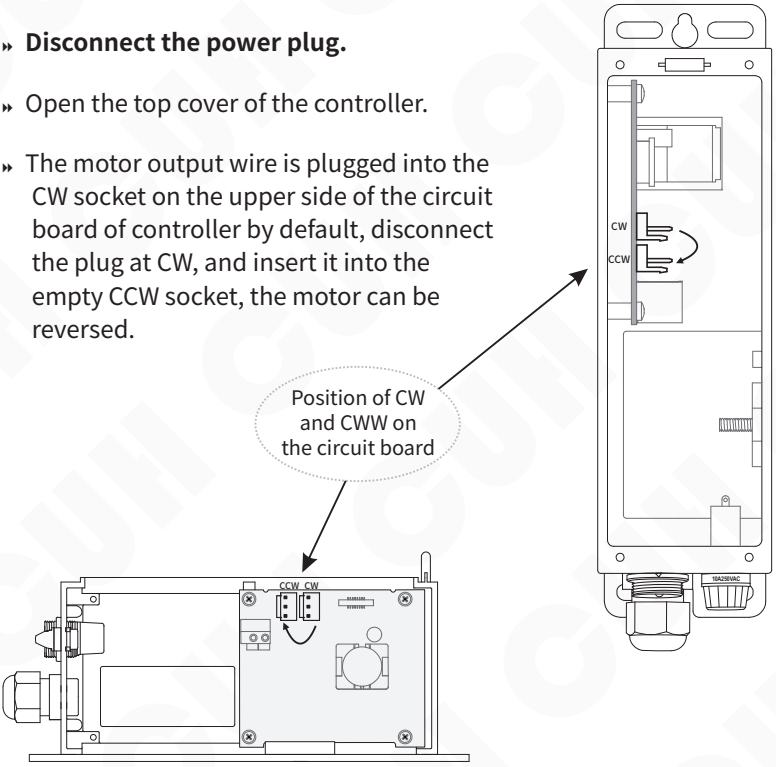


State when both control lines have valid signals applied.

5.6 Motor Forward and Reverse Adjustment

The controller can realize the forward and reverse rotation of the motor by adjusting the position of the output connector.

- **Disconnect the power plug.**
- Open the top cover of the controller.
- The motor output wire is plugged into the CW socket on the upper side of the circuit board of controller by default, disconnect the plug at CW, and insert it into the empty CCW socket, the motor can be reversed.



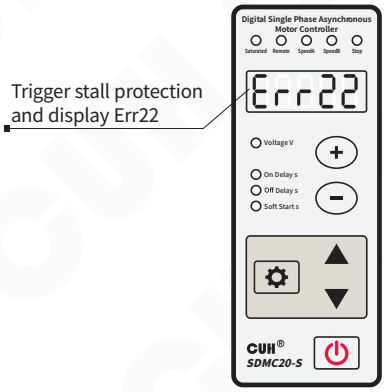
Note: Be sure to power off the controller!

5.7 Motor Stall Protection

The controller has the function of motor stall protection. When the controller has output and detects that the motor stalls for 3 seconds, it will start the stall protection and stop the controller output, and report Err22 , until the fault is eliminated, press on/off button again to resume motor start.

The user can limit the possibility of the motor to be stalled by setting the minimum speed of the motor, such as the current setting speed of the motor is 150, the minimum speed is set to 70. When the motor is overloaded and the speed is lower than 70, it will trigger stall protection.

- Long press [⚙] and ▲ simultaneously to enter the advanced parameter interface.
- Short press ▲ or ▼ to switch to motor minimum speed parameter "SS" .
- Press ⊕ or ⊖ to adjust the parameter value.
- When the motor speed is lower than the set minimum speed value, the stall protection is triggered, and the LED displays Err22, the controller stops output.
- After eliminating the stall fault, press [⏻] again to restore the output.

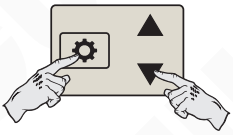


- During the soft startup time, the stall protection function does not intervene.
- Make sure that the set speed is not lower than the set minimum speed, otherwise the stall protection will be triggered.
- There is no stall protection function under the open-loop control of the motor.

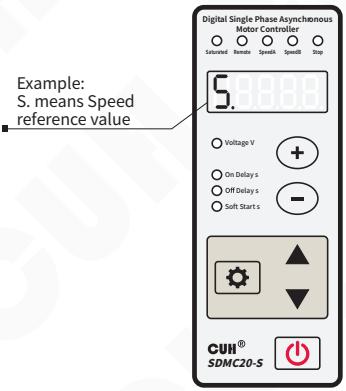
5.8 Parameter Monitoring Function

The controller can monitor some operating parameters, provide reference for operators, and facilitate debugging.

- Long press ⚙ and ▼ simultaneously to enter the monitoring parameter interface.



- Short press ▲ or ▼ to select the parameter to be monitored.
- The parameter value of the monitoring parameter cannot be modified.



The monitoring parameters of this controller include:

Analog speed regulation F port voltage FU, Intelligent photoelectric E port signal difference EU, Sensor A port signal voltage AU, Sensor D port signal voltage dU, Control output C port output voltage CU, 24V port voltage nU, Speed reference value S. .

5.9 Parameter Password Lock Function

The controller can lock key parameters to prevent users from misoperation. The parameters marked with "*" in the parameter table can be locked with the parameter password lock.

- Long press [☼] and ▲ to enter the advanced parameter interface.
- Short press ▲ or ▼ to switch to F., which is used to set the password.
- Press (+) and (−) to Adjust parameter values.
- After setting the parameter password, exit the current interface and enter again, you can see that the parameter value disappears.
- Enter the advanced parameter interface, switch to F, enter the previously entered password, you can see the disappearing set password parameter, and then change the password.

The password lock parameter value follows the 421 code rule:

Lock parameter	Sensor Type	Maximum output voltage limit	Control Output Type	Logic operation of signal sources of Control output	The third signal source of Control output	The second signal source of Control output	The first signal source of Control output	Logic operation of signal sources of Main output	The third signal source of Main output	The second signal source of Main output	The first signal source of Main output	Output Frequency
1: Locked	1	1	1	1	1	1	1	1	1	1	1	1
0: Unlocked	0	0	0	0	0	0	0	0	0	0	0	0
multiplication factor	4	2	1	4	2	1	4	2	1	4	2	1
Password value range (summation)	0~7 (1st digit of password value)			0~7 (2nd digit of password value)			0~7 (3rd digit of password value)			0~7 (4th digit of password value)		
Example 1	0	0	0	0	0	0	0	0	0	0	0	1
	0			0			0			1*1=1		
Example 2	1	0	0	0	0	1	0	0	0	0	0	1
	1*4=4			1*1=1			0			1*1=1		
Example 3	0	0	0	0	0	0	0	0	0	1	1	1
	0			0			0			1*4+1*2+1*1=7		

Example 1: To lock the output frequency, 12 groups of binary codes are 000000000001, and the set password value is 0001.

Example 2: Lock the output frequency, sensor type and the second signal source of control output, 12 groups of binary codes are 100001000001, and the set password value is 4101.

Example 3: Lock output frequency, the first signal source of main output and the second signal source of main output, 12 groups of binary codes are 000000000111, and the set password value is 0007.

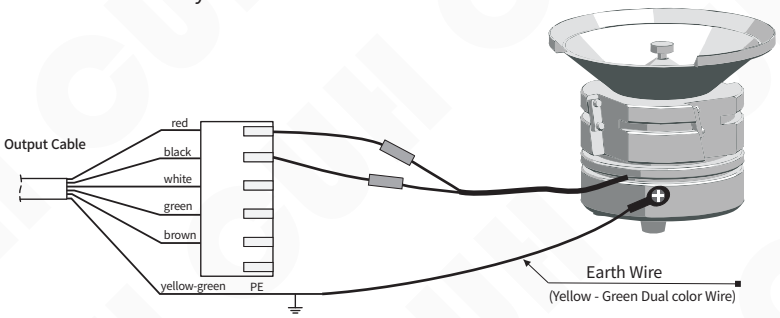
When "Password Lock Parameter Range" is set to 9999, all parameters marked with "*" will be locked.

5.10 Control Vibratory Feeder Mode

The controller can be connected to the vibratory feeder, and the connection method is as follows:

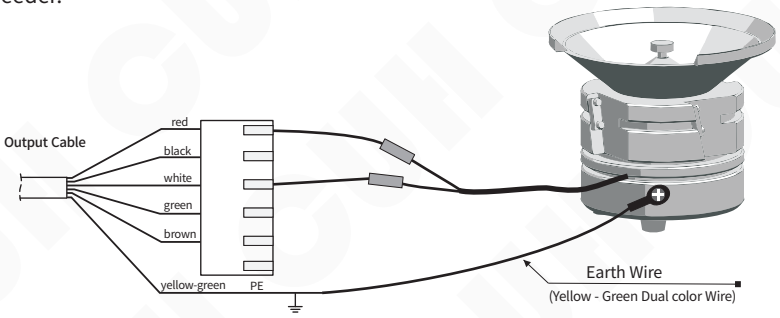
The output cable is connected to the CW position of the circuit board by default

Disconnect the power supply and connect the red and black wires of the output cable to the vibratory feeder.

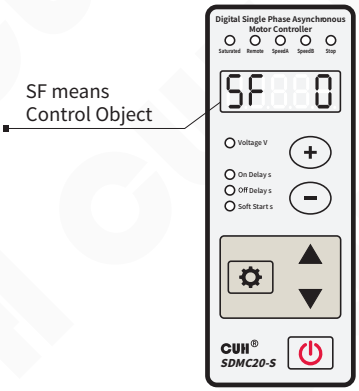


Adjust the output cable connected to the CCW position of the circuit board

If you previously opened the cover and adjusted the output wire from CW to CCW position, connect the red wire and white wire of the output cable to the vibratory feeder.



- Long press ⚙ and ▲ simultaneously to enter the advanced parameter interface.
- Short press ▲ or ▼ to switch to control object parameter "SF" and adjust the parameter value to 0, it means to control the vibratory feeder mode.
- After returning to the main interface, the controller displays "U", you can adjust the voltage value.



Attention

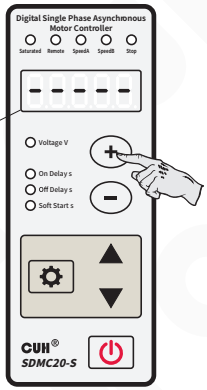
1. Make sure that the output cable of the controller is wired correctly, otherwise it may damage the controller due to the inductance is connected in series with the internal capacitor to cause resonance !
2. It is forbidden to connect piezoelectric loads to the power output, otherwise it may lead to electric shock safety accidents!

5.11 Set to SDVC21-S Interface

This controller is compatible with all functions of SDVC21-S. If the user needs to use the controller to control the electromagnetic bowl feeder but is not used to using the current interface (modern parameter interface) , user can restore the factory settings to the traditional SDVC21-S interface, which is convenient for old users to regulate the vibratory bowl feeder.

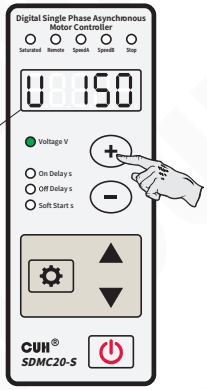
- Long press ⚙ and ▲ simultaneously to enter the advanced parameter interface.

Restore successfully



- Short press ▼ to switch to the full flashing on the LED displayer, that is, the parameter of "Default setting restoration". And then press ⊕ and hold until the controller displays "-----", indicating that the controller has been restored.
- Release ⊕ , after the controller displays "CUH", then enter the output voltage adjustment state "U". By this time, the operation method of the controller and the parameter set is exactly the same as the traditional SDVC21-S.

Restore to traditional parameter interface



Operation method of Traditional Parameter Interface:

a. Short press ⊕ or ⊖ to adjust the Output Voltage of the controller at any LED Interface.

b. Enter or exit the Basic Parameters Interface by long press [SET], and switch among the basic parameters by short press [SET], and adjust parameter's value by short press ▼ or ▲.

c. Enter or exit the Advanced Parameters Interface by long press [SET] and ▲, and switch among the advanced parameters by short press [SET], and adjust parameter's value by short press ▼ or ▲.

d. Short press [⏻] to start or stop output of controller, and long press [⏻] to lock or unlock keypad.

e. At LED interface of default setting restore parameter, long press ▲ button until [-----] is displayed on the LED to switch to traditional parameter interface, or long press ▼ button until [_____] is displayed on the LED to switch to modern parameter interface.

f. SDVC21S defaults to the traditional parameter interface, SDMC20S defaults to the modern parameter interface.

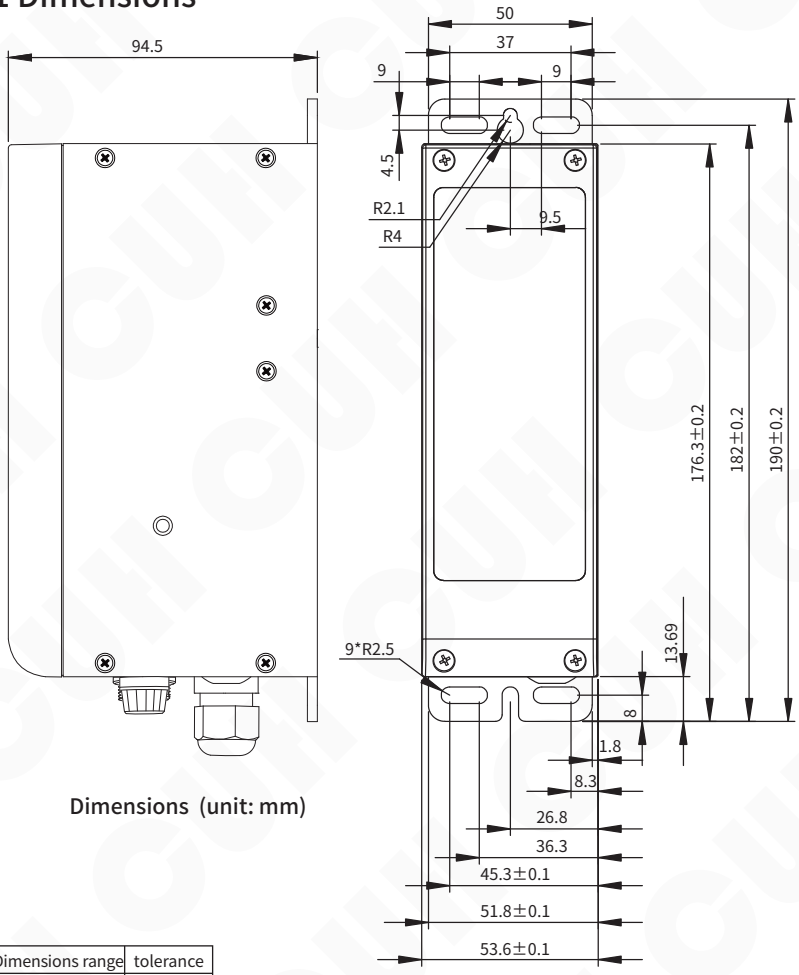
The parameters of SDVC21S traditional interface are as follows:

	Definition	Symbol	Range	Default
Common parameter	Output Voltage	U	0~250 V	150
Basic Parameter	Output Frequency	F	FULL，HALF	FULL
	On Delay of the Intelligent Photoelectric Sensor	J	0.0~9.9 s	0.2
	Off Delay of the Intelligent Photoelectric Sensor	L	0.0~9.9 s	0.2
	Soft Startup	t	0.0~9.9 s	1.0
Advanced Parameter	On Delay of the NPN Switch Sensor	J-	0.0~9.9 s	--- same as J
	Off Delay of the NPN Switch Sensor	L-	0.0~9.9 s	--- same as L
	On Delay of the second NPN Switch Sensor	J_	0.0~9.9 s	--- same as J
	Off Delay of the second NPN Switch Sensor	L_	0.0~9.9 s	--- same as L
	Logical Direction of the Intelligent Photoelectric Sensor	r1	Normal Close_ _ _, Normal Open _ - _	_ _ _
	Logical Direction of the NPN Switch Sensor	r2	Normal Close_ _ _, Normal Open _ - _	_ _ _
	Logical Direction of the Controlling Output	r3	Normal Close_ _ _, Normal Open _ - _	_ _ _
	Logical Direction of the second NPN Switch Sensor	r4	Normal Close_ _ _, Normal Open _ - _	_ _ _
	Logical Relation of the Control Signal	n	or ¯¯¯, And _ - ¯, Hor ¯ ¯	_ - ¯
	Maximum Output Voltage	h	0~250 V	220
	Intelligent photoelectric sensor sensitivity	P	0~1000	80
	Default Settings Restore	8.8.8.8.	——	——

Specific operating instructions, please refer to the user manual of SDVC21 series controller.

Chapter VI Technical Specifications

6.1 Dimensions



Dimensions (unit: mm)

Dimensions range	tolerance
0~3	±0.05
3~10	±0.1
10~30	±0.15
30~80	±0.2
80~180	±0.3
>180	±0.5

This tolerance table is applicable to all products in this series.

6.2 Technical Specifications

Item	Min	Typical	Max	Unit	Note
Input Voltage	85	220	250	V	AC RMS
Adjustable Output Voltage Range	35	——	Vin-10	V	Half Wave
	45		Vin-5		Full Wave
Voltage Adjustment Accuracy	1			V	
Voltage Regulation Accuracy	——	——	30	V	Vset = 150V △Vin+ = 70V
Voltage Regulation Response Time	0	0.01	0.02	s	
Adjustable Output Current Range	0	——	5	A	
Output Power	0	——	1100	VA	
Output Frequency	45	50/60	65	Hz	Half Wave
	90	100/120	130		Full Wave
Output Waveform	Phase Angle Control				
Soft Start Time	0	——	9.9/10.0 *	s	Default value: 1.0
On/Off Delay Time Range	0	——	9.9/99.9 *	s	Default value: 0.2
On/Off Delay Time Accuracy	0. 1			s	
Overheat Protection Trigger Temperature	58	60	66	℃	
DC Control Output Voltage	22	24	26	V	
DC Control Output Current	0	——	400	mA	
Analog Control Signal	1~5/4~20			V/mA	Remote Speed Control signal
Digital Control Signal	24			V	Switching Signal
Adjustment Method	6			Button	
Fuse Capacity	6.3			A	
Standby Power Consumption	——	2	——	W	
Display Method	5			Digit	LED
Ambient Temperature	0	25	40	℃	No Condensation
Ambient Humidity	10	60	85	%	
Storage Ambient Temperature	-20	25	85	℃	

Note: The technical specification values with * symbol , "xxx/xxx" indicates "Traditional Parameter values / Modern Parameter values" .

6.3 Reference Standard

Absolute Parameters: Above the standard will damage the controller, obey it strictly.					
Item	**GB Standard**	**IEC Standard**	**Grade**	**Standard Requirement**	**Note**
Electrostatic Discharge	GB/T 17626.2-2006	IEC 61000-4-2:2001	4	±8 kV	Contact Discharge
			4	±15 kV	Air Discharge
Electrical Fast Transient Test	GB/T 17626.4-2008	IEC 61000-4-4:2004	4	±4 kV	
DC Power Line Wave Immunity	GB/T 17626.17-2005	IEC 61000-4-17:2002	4	15%	Rating A

Warning
In a residential environment, this product may cause radio interference in which case supplementary mitigation measures may be required.

Chapter VII Appendix

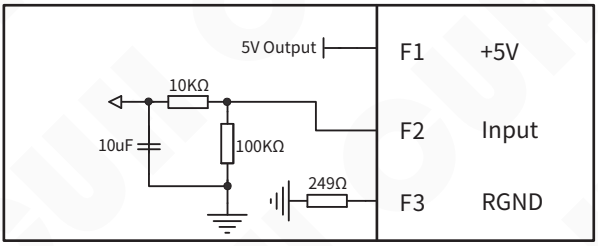
7.1 Parameter Table

	Definition	Symbol	Range	Default
Common parameter	Output Voltage	U	0~250 V	150
	Set Speed (only when SF is set to 2)	S	0~999	150
Basic Parameter	Output Frequency * (adjustable only for SDVC21S)	F	FULL，HALF	FULL
	On Delay of the Intelligent Photoelectric Sensor	J	0.0~99.9 s	0.2
	Off Delay of the Intelligent Photoelectric Sensor	L	0.0~99.9 s	0.2
	Soft Startup	t	0.0~10.0 s	1.0
	Soft Shutdown	J	0.0~10.0 s	1.0
Advanced Parameter	On Delay of Port D	J-	0.0~99.9 s	--- same as J
	Off Delay of Port D	L-	0.0~99.9 s	--- same as L
	On Delay of Port A	J_	0.0~99.9 s	--- same as J
	Off Delay of Port A	L_	0.0~99.9 s	--- same as L
	The first signal source of Main output *	E9	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	E
	The second signal source of Main output *	E9.	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	d
	The third signal source of Main output *	E.9	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	A
	Logic operation of signal sources of Main output *	n9	And, or, Hor, rS	or
	On Delay of Main output	J9	0.0~99.9 s	0.0
	Off Delay of Main output	L9	0.0~99.9 s	0.0
	Output Mode of Main output	F9	dLy (Delay Mode), HLd (Hold Mode)	dLy
	Logic direction of Main output	b9	--- (Same phase), -_- (Reverse) on (always active), oFF (always inactive)	-_-
	The first signal source of Control output *	EC	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	0
	The second signal source of Control output *	EC.	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	0
	The third signal source of Control output *	E.C	0, 1, E, -E, d, -d, A, -A, oC, -oC, oq(main output status), -oq, SA, -SA, Sb, -Sb	oq
	Logic operation of signal sources of Control output *	nC	And, or, Hor, rS	or
	On Delay of Control output	JC	0.0~99.9 s	0.0
	Off Delay of Control output	LC	0.0~99.9 s	0.0

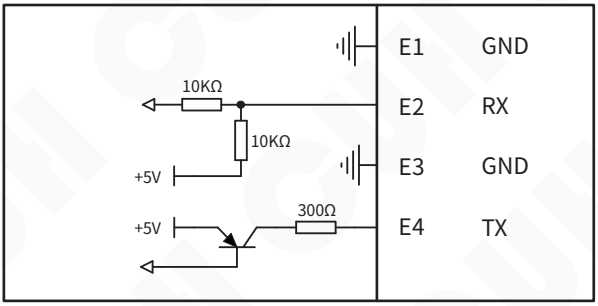
	Definition	Symbol	Range	Default
Advanced Parameter	Output Mode of Control output	FC	dLy (Delay Mode), HLd (Hold Mode)	dLy
	Logic direction of Control output	oC	- - - (Same phase), _ - _ (Reverse) on (always active), oFF (always inactive)	- - -
	Control Output Type *	rC	nPn, PnP, PSP (Push & Pull), In	nPn
	Maximum output voltage limit *	h	0~250 V	220
	Sensor Type *	rA	nPn, PnP ut1 (Single scan), ut0 (Continuous scan)	ut0
	Intelligent photoelectric sensor sensitivity	P	0~1000	80
	Maximum Speed	h.	0~999	300
	Speed adjustment scale factor	PA	0~999	70
	Speed adjustment integral coefficient	iA	0~999	180
	Speed adjustment differential coefficient	dA	0~999	50
	Motor Minimum Speed	SS	0~999	70
	Control Object	SF	0: vibratory feeder, 1: Motor (speed open loop), 2: Motor (speed closed loop)	SDVC21S: 0 SDMC20S: 2
	Parameter Range of Disable Adjustment function	3.	0~9999	0
	Lock of Disable Parameter Adjustment function	3	0~9999	0
	Default setting restoration	8.8.8.8.8.	——	——
Monitoring Parameter	Voltage of Port F	FU	0.0~5.0 V	——
	signal difference of Port E	EU	1~1000	——
	Signal Voltage of Port A	AU	0.0~28.0 V	——
	Signal Voltage of Port D	dU	0.0~28.0 V	——
	Output Voltage of Port C	CU	0.0~28.0 V	——
	Voltage of 24V Port	nU	0.0~28.0 V	——
	Speed reference value	S.	0~999	——

Note: The parameter with * symbol can be locked by 3.
All parameters with * symbol of the controller are locked, when 3 is 9999.

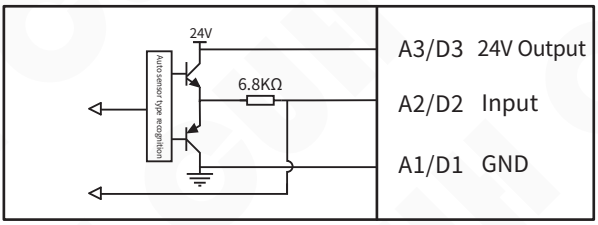
7.2 Input and Output Circuit Diagrams



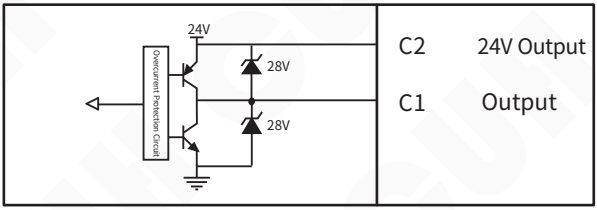
Remote Speed Control Port F



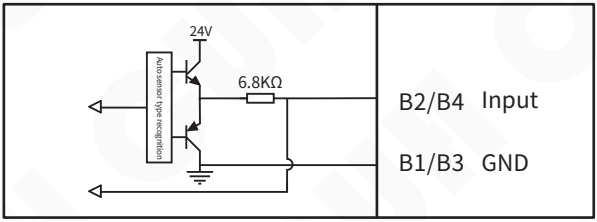
Intelligent Photosensor Port E



Switch Sensor Port A/D



Control Output Port C



Speeds Preset Port B

7.3 Troubleshooting Suggestions and Error Explanations

Error Code	Definition	Troubleshooting Methods
No display after power on		Make sure the power outlet is live Make sure the Input power Cable is reliably connected to the power outlet?
Display normally, but no output		Make sure the Output Cable is reliably connected to the vibrator. Make sure the output voltage is not small. Make sure the Stop Indicator is not light up. Please check whether Normal Close of parameter has been set, causing controller output to stop.
Control signal loses effectiveness		Make sure the control signal is correctly inputted. Make sure the ground wire of the control signal is correctly connected to the controller. Make sure the Logical Relation of the control signals is set correctly as your expectation.
Beat phenomena		Avoid vibration coupling among the vibrators. Heighten the resonant frequency of the vibrators.
Display normally, no output, but sound can be heard		Adjust all parameters as this book instructed.
	Over Current	Reduce output voltage appropriately, then restart the output.
	Over Heat	Install the controller in a well-ventilated environment.
	Internal Communication abnormal	Make sure no extern power supply connect to the 24V power port or contact our technical support.
	Temperature sensor abnormal	Make sure the work temperature not under -20°C or contact our technical support.
	Over Current protection of Port D	Make sure the load of Port D is not short-circuit and the current does not exceed 400mA, then try to restart the output of Port D.
	24V power output abnormal	Make sure 24V port is not short-circuit and the current does not exceed 400mA.
	5V power output of Port A abnormal	Make sure the 5V power of Port A is not short-circuit or not connected to external power voltage more than 5V.
	Input signal logic abnormal of RS Trigger of Main output	Make sure two input signals of RS trigger of Main output are not valid at the same time.
	Input signal logic abnormal of RS Trigger of Control output	Make sure two input signals of RS trigger of Port D are not valid at the same time.
	Motor stall fault	Make sure the motor is not overloaded or the motor is not locked. Make sure that the actual speed of the motor is not lower than the set minimum speed value.

Chapter Ⅷ Product Warranty Information

8.1 Warranty Period

The warranty period provided by the company for this product is 3 years from the date of delivery of the product to the location designated by the purchaser.

8.2 Warranty Coverage

(1) If there is a failure caused by our company during the above warranty period, we will repair the product free of charge. However, The following situations are not covered by the warranty:

a. Failure to comply with the conditions specified in the simple manual, user manual or technical requirements specifically agreed between the purchaser and the company, improper operation, or failure caused by improper use.

b. Failure is not due to a product defect, but to the purchaser's equipment or software design.

c. Malfunctions caused by modifications or repairs not performed by the company's personnel.

d. The failure that can be totally avoided by correct maintenance or replacement of wearing parts according to the simple operation guide or user manual.

e. After the product is shipped from our company, it is caused by factors such as unforeseen changes in the level of science and technology failure.

f. Due to natural disasters such as fire, earthquake, flood, or external factors such as abnormal voltage failure, the company is not responsible for the warranty.

(2) The scope of warranty is limited to the situation stipulated in (1)， Indirect losses (such as equipment damage, opportunities, loss of profit, etc.) or other losses, the company do not bear any responsibility.

8.3 Product Suitability

The controller of our company is designed and produced for general use in the vibratory feeding industry. Therefore, this controller of our company shall not be used for the following applications and is not suitable for its use.

(1) Facilities that have a serious impact on life and property, such as nuclear power plants, airports, railways, ships, motorized devices and medical equipment.

(2) Public utilities, including electricity, gas, water supply, etc.

(3) Outdoor use in similar conditions or environments.

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