Basic Operations

[short-press] The button press duration is greater than 0.1 seconds and less than 2 seconds.

[long-press] The button press duration is greater than 2 seconds.

- Simultaneously long-press SET and ▲ to enter or exit the debugging interface.
- Simultaneously long-press ▲ and ▼ to enter or exit the training interface.
- Simultaneously long-press SET and ▼ to enter or exit the parameter settings interface for Group A or Group B; short-press ⬡ to switch between Group A and Group B.
- Simultaneously long-press ⬡ and ▲ to enter or exit the parameter settings interface for Group C or Group D; short-press ⬡ to switch between Group C and Group D.
- After entering the parameter settings interface, short-press ▲ and ▼ to switch parameter names, and short-press ⊕ and ⊖ to modify parameter values.
- Parameter groups A, B, C, and D each include their own factory reset function, meaning that each parameter group must be individually reset to factory settings; it is not possible to reset all parameter groups to factory settings at once.

  Specifically:

  1. Enter the parameter settings interface and select the parameter group that needs to be restored to factory settings.
  2. Switch to the interface ready for factory reset by short-press ▼ :  (all digit displays and LED lights are flashing).
  3. Long-press ⊕, and until displaying `-----`, release ⊕. The controller will return to the standby interface, completing the factory reset operation for that parameter group.

NOTE:

1. If the controller is powered on for the first time and has not been trained, it will display the debugging interface, and the controller will not work. If the controller has completed data training, it will be in the standby interface after powering on. Exiting any parameter group will return to the standby interface. Any interface will automatically return to the standby interface after 1 minute of inactivity.

2. Except for the training interface, all other interfaces can be directly switched using the corresponding key combinations. If the controller is in the training interface, it can only exit and return to the standby interface by long-pressing the ▲ + ▼ combination before entering the corresponding parameter settings interface using the key combinations.

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The final interpretation of this specification page belongs to CUH

Instructions for Use

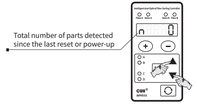
For the parts to be sorted, follow these 5 steps for operation:

STEP 1: Enumerate all possible orientations of the parts and determine which orientations need to be retained and which need to be discarded. Ensure that the parts can be separated and maintained at a certain interval as they sequentially pass through the fiber illumination area.

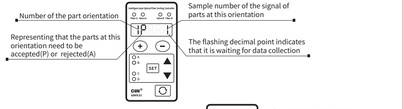
STEP 2: Install and fix the controller, install the input and output air tubes, adjust the gas output flow rate, and connect the power supply.

STEP 3: Further fine-tune the positioning of the fiber optic setup based on the features of the parts, so that the controller can distinguish the parts' orientations with higher accuracy. For specific guidance on fiber optic setup, please refer to Appendix B in the complete version of the manual.

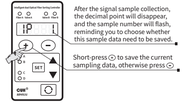
STEP 4: Ensure that the area beneath the fiber optic is clear of any parts or debris, in preparation for the data training process. Long press ▲ and ▼ to enter the training interface.



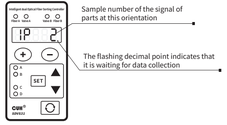
a. After entering the training interface, the first digit on the digital display represents the current orientation number of the parts (maximum of 4); the second digit indicates whether the part at this orientation should be accepted or rejected, where 'P' represents acceptance (pass) and 'A' represents rejection (abandon). Users can switch the second digit on the digital display to 'P' or 'A' by long-pressing SET to determine whether to accept or reject the part at the current orientation (example is orientation 1); the fifth digit on the digital display represents the sample number for the signal of the part at this orientation (maximum of 10); the flashing decimal point in the lower right corner of the digital display indicates that it is waiting for data collection.



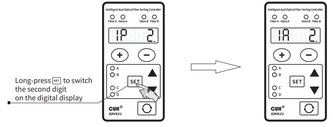
b. Manually place the part that corresponds to the orientation number shown on the display. Let the part pass through the fiber detection area. Once the part leaves that area, the decimal point in the lower right corner on the display will disappear. The fifth digit on the display will flash, reminding the user to either keep or delete that particular sample data.



c. Short-press ⊕ to save the current sampling data, and the digital display will change to 'iP 2' (with the decimal point flashing), indicating that the controller is ready to collect the second sample data for the current orientation.

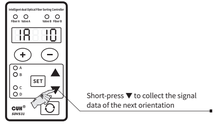


d. Users can switch the second digit on the digital display to 'A' by long-pressing SET to reject the part at the current orientation.

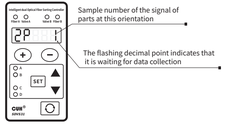


e. Once enough samples (up to 10) have been collected for the current orientation (example being orientation 1), short-press ▼ to collect the signal data of the next orientation.

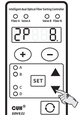
NOTE: In the training interface, short-press ▲ or ▼ to switch the orientation number (the maximum number is 4)



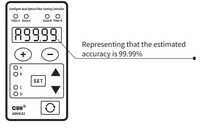
f. After entering the training interface of orientation 2, repeat the above steps until all data of the orientation for the part has been collected.



g. Simultaneously long-press ▲ and ▼ to exit the training interface if enough data has been collected.



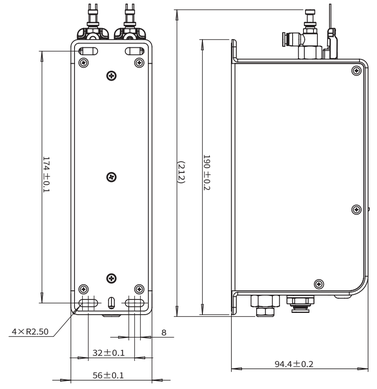
h. The controller will automatically train itself, learning the characteristics of the part signals, and will display the estimated sorting accuracy calculated based on the training set sample data collected during the training processing. If the estimated sorting accuracy does not meet the your requirements, you can long-press ▲ and ▼ simultaneously to re-enter the training interface, short-press - to delete data for each orientation, and then retrain.



STEP 5: Check and set the triggering logic for the actuator of the controller's air valve. Manually place parts with known orientations to verify whether the correct blowing logic can be triggered.

After completing the above operational steps, the controller can begin sorting the orientations of the parts.

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.

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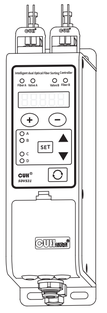
Simplified User Manual of SDVS31 Series

Intelligent dual Optical Fiber Sorting Controller



Applicable controller models:

SDVS31

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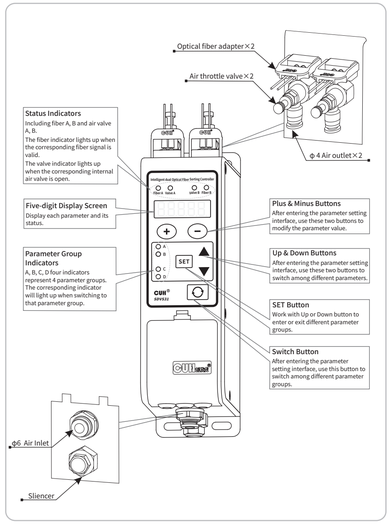
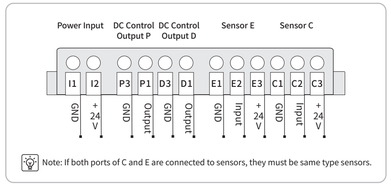
Document No.: IDP1000449_B.2

Indicators, Buttons and External Components

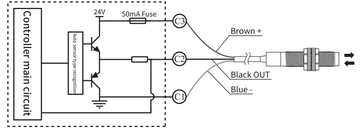


Wiring Ports

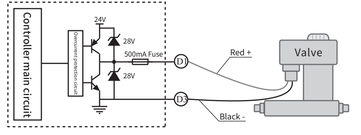


Note: If both ports of C and E are connected to sensors, they must be same type sensors.

Input and Output Circuit Diagrams



Circuit Diagram of Port C/E



Circuit Diagram of Port D/P

Parameter Definition

	Definition	Symbol	Range	Default
Standby Parameters	Display the current orientation number of the part and whether it needs to be discarded.	nP nA	n ∈[1,4] A (Reject), P (Accept)	/
Debugging Parameters Long press MD and ▲	The signal value received by fiber A when fiber A is emitting light.	AA	0~999	/
	The signal value received by fiber B when fiber A is emitting light.	Ab	0~999	/
	The signal value received by fiber A when fiber B is emitting light.	bA	0~999	/
	The signal value received by fiber B when fiber B is emitting light.	bb	0~999	/
	Estimated Sorting Accuracy	A	0~99.99	/
	Speed of Parts	U	0~9999 Number per minute	/
	The Proportion of Each Part Orientation	Pn	0~100 (n ∈[1,4])	/
	Confidence level of one single judgment	r	0~99.99	/
	Total number of parts detected since the last reset or power-up	n	0~9999	/
	Yield Rate	Pr	0~100 (The ratio of the number of parts allowed to pass to the total number of parts detected)	/
	Input Voltage	nU	0~28 V	/
	Signal Voltage at Port C	cU	0~28 V	/
	Signal Voltage at Port E	EU	0~28 V	/
	Output Voltage at Control Output Port D	dU	0~28 V	/
	Ouput Voltage at Control Output Port P	PU	0~28 V	/
	Total number of solenoid valve switches (*10^8 times)	y	0~9999 (*10^8 times)	0
	Total number of solenoid valve switches (*10^4 times)	r	0~9999 (*10^4 times)	0
	Total number of solenoid valve switches (times)	d	0~9999 (times)	0
Parameter Group A/B Long press MD and ▼	Whether to allow unknown parts to pass through	bLr	0 (Reject)，1 (Accept)	0
	The confidence level of part orientation judgment acceptable to the user	r	0~99.99	50.00
	First Signal Source Selection	E	0, 1, Ab, C, E, -Ab, -C, -E, OA, Ob, Od, OP, -OA, -Ob, -Od, -OP	Valve A: 0 Valve B: 0
	Second Signal Source Selection	E	0, 1, Ab, C, E, -Ab, -C, -E, OA, Ob, Od, OP, -OA, -Ob, -Od, -OP	Valve A: Ab Valve B: 0

	Definition	Symbol	Range	Default
Parameter Group A/B Long press MD and ▼	Signal Source Logic Selection	n	And, or, Xor, rS	or
	Output Signal Rising Edge Delay	J	0.00~10.00 s	Group A/B: 0.00
	Output Signal Falling Edge Delay	L	0.00~10.00 s	Group A/B: 0.00
	Output Signal Mode Selection	F	Hold, dLAy	dLAy
	Output Logic Selection	o	...(Same)，.-.(Reversed) On, OFF (Output normally open/close)	Same...
	Air Valve Forced Output Setting Option	U	A0b0: Valve A Close, Valve B Close A0b1: Valve A Close, Valve B Open A1b0: Valve A Open, Valve B Close A1b1: Valve A Open, Valve B Open	A1b1
	Reset to factory default setting	88888	/	/
Parameter Group C/D Long press MD and ▼	Switch sensor type selection Only parameter group C and D)	tA	PnP, nPn, Uto	Uto
	Input Signal Rising Edge Delay	J	0.00~10.00 s	0.05
	Input Signal Falling Edge Delay	L	0.00~10.00 s	0.05
	First Signal Source Selection	E	0, 1, Ab, C, E, -Ab, -C, -E, OA, Ob, Od, OP, -OA, -Ob, -Od, -OP	Group C: 0 Group D: 0
	Second Signal Source Selection	E	0, 1, Ab, C, E, -Ab, -C, -E, OA, Ob, Od, OP, -OA, -Ob, -Od, -OP	Group C: C Group D: E
	Signal Source Logic Selection	n	And, or, Xor, rS	or
	Output Signal Rising Edge Delay	J	0.00~10.00 s	Group C: 0.00 Group D: 0.00
	Output Signal Falling Edge Delay	L	0.00~10.00 s	Group C: 0.10 Group D: 0.10
	Output Signal Mode Selection	F	Hold, dLAy	dLAy
	Mode Switch of Port D Mode Switch of Port P	tP	PSP (Push-Pull), PnP, nPn	nPn
	Output Logic Selection	o	...(Same)，.-.(Reversed) On, OFF (Output normally open/close)	Same...
	Reset to factory default setting	88888	/	/

Technical Data

Item	Min	Typica	Max	Unit	Remark
Input DC Voltage	22	24	26	V	Note 1
Output DC Current	——	——	400	mA	Note 2
NPN Output Residual Voltage	——	——	1.0	V	400mA
PNP Output Residual Voltage	——	——	1.5	V	400mA
Response Time	4	6	10	ms	When air pressure is 5 bar
Air Valve Blowing Time Unit	10	——	——	ms	
Flow Regulation Range	0	——	20	L/min	
Digital Photoelectric Gain	——	7.8 ×10^3	——	No Unit	Note 3
Digital Photoelectric Resolution	——	4096:1	——	No Unit	
Standby Power	——	——	1.2	W	Note 4
Applicable Fiber Diameter	2.1	2.2	2.3	mm	
Input Air Pressure Range	——	5	7	Bar	Note 5
Input Air Pipe Outer Diameter	——	6	——	mm	
Output Air Pipe Outer Diameter	——	4	——	mm	
Anti-sunlight Interference	——	——	50000	Lux	
Anti-incandescent Interference	——	——	30000	Lux	Note 6
Ambient Temperature	0	25	45	℃	No condensation
Ambient Humidity	10	60	85	%	
Storage Temperature	-40	25	85	℃	

Note 1: If input power exceeds 30 V, display screen will go out to protect the controller.
Max input voltage must not exceed 36 V.
Note 2: Do not connect to capacitive load.
Note 3: The digital photoelectric gain is defined as the product of the average power of the emitted light and the receiving sensitivity.
Diameter of the optical sensor core is 0.5mm.
Note 4: Standby Power is the power consumption when the internal solenoid valves are not operating.
Note 5: The maximum air supply pressure must not exceed 10 Bar when the controller is not powered.
Note 6: Do not work under glare LED lighting.

Features

SDVS31 Series is a universal controller for material sorting in vibratory feeding systems. Its special features include:

- Dual-fiber optic amplifiers and valves are integrated in one controller.
- Relying on the time domain characteristics of optical fiber signals to identify parts' orientations, it is capable to identify parts with complex shapes.
- It is easy and simple to collect parts' signal data and train the controller, eliminating complex parameter settings.
- Sunlight and incandescent light immune optical fiber amplifiers.
- Dual independent air flow volume adjustment.
- Dual self-adapting NPN/PNP switch sensor interfaces.
- Dual push-pull type 24V/400mA DC output.
- Comprehensive protection functions including undervoltage, overvoltage, inverse wiring, overcurrent and short-circuit protections.
- Parameter group quick switch.
- Input-output matrix combination and complex logical relation setting.
- Input-output timing sequence definable output mode selection.
- Independent parameter reset functions help to avoid resetting all parameters.
- Built-in air valve action counting function helps you evaluate the lifetime of the valves.
- Dual anti-jamming capability allows two fibers to work together in close proximity.
- The built-in ability to learn the distribution of material characteristics can significantly improve the reliability of feeding parts sorting.

Error Code Definition and Trouble Shooting Methods

Error Code	Definition	Trouble Shooting Methods
Err01	Input Overvoltage	Make sure input voltage value ranges between 22V and 26V
Err02	Input Undervoltage	
Err03	Port D high level output overcurrent	Make sure load current value does not exceed 400mA
Err04	Port P high level output overcurrent	
Err05	Port D low level output overcurrent	
Err06	Port P low level output overcurrent	
Err07	Port D high level output short-circuit	Make sure the load is not shorted
Err08	Port D low level output short-circuit	
Err09	Port P high level output short-circuit	
Err10	Port P low level output short-circuit	
Err20	Valve A input signal logical error	Make sure the rs trigger inputs are not valid at the same time
Err21	Valve B input signal logical error	
Err22	Port D input signal logical error	
Err23	Port P input signal logical error	