Solenoid Valve Manual
--SDXX Series

Product Model:

SD61-2X Series

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Catalog

1 Product Overview

SD61-2X is a diaphragm solenoid valve independently developed by Keyto. Its main function is controlling the switch of fluid flow path, which are suitable for different reagents in different working conditions. The lifetime can reach more than 10 million cycles, is a high-performance, lowcost, maintenance-free diaphragm solenoid valve.

1.1 Main Features of SD61-2

- Structural feature: two-way
- Small dead volume: no dead volume inside the solenoid valve;
- Multiple options for wetted part material:
  Diaphragm material: FFKM, EPDM
  Valve body material: PEEK
- Long lifetime and high performance.
- Small volume.

1.2 Explanation of Terms

◆ **The coefficient of variation (CV)**

It is remarked as CV, but in China we mark it as KV. They are both non-dimensional parameters and replacement. CV means the liquid flow capability of elements. In actual design and use, it has to calculate to a flow dimensional parameter as application condition.

$$C_v = q_v \sqrt{\frac{\rho \times \Delta P}{\rho_0 \times \Delta P_0}}$$

q_v ——The actual flow of medium, unit: gal/min;

ρ_0 ——The density of water under $60^\circ F$, $\rho_0 = 1g/cm^3$;

ΔP_0 ——A constant differential pressure of element, $\Delta P_0 = 1lbf/in^2(psi)$;

ρ, ΔP ——The actual pressure drops of the tested element between inlet and outlet.

When it replaced as common physical dimension parameter in China, then:

Cv=0.04, means under the condition of 25℃, 50KPa, the flow of component is 6.8ml/s.

◆ **Response Time (T)**

Input air/water at 0.25MPa and maximum working pressure drop from inlet port, input rated control electrical signal to make the tested solenoid valve open and close, then we'll get the change of outlet pressure which we can measure from pressure sensor. At the same time, we'll get the lapse of time which starts from power on/off to rise to 90% of max pressure (normally closed valve) and drop to 10% of max pressure (normally open valve) by quick response time measure

devise. Repeatedly test several times and take the average valve as the power on response time and the power off response time.

As engineering experience, it is the design critical value that response time above 50ms. The aspiration of valve may not stable.Therefore, the response time is not beyond 50ms within nominal lifetime.

In addition, there is a response time at current method in this industry. The change of circuit leads to current change, according to the action of solenoid valve. The response time T1, T1 at current method is normally less than the response time(T) which measured by air flow method.

◆ **Seal Capability**

- Pressure strengthen (outside leakage)

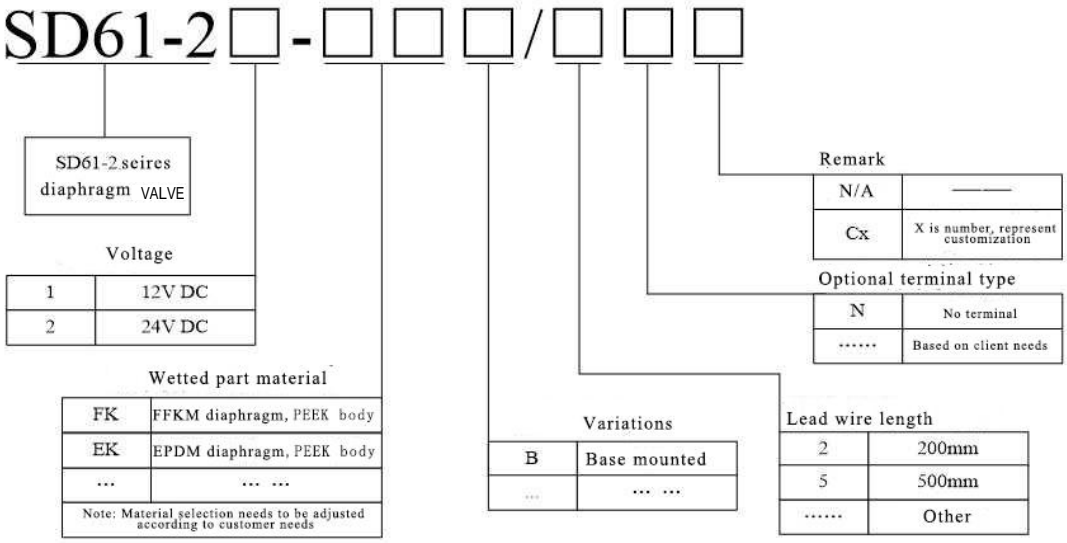
Solenoid valve powers on, the outlet is close,and the inlet water under condition of 5℃~40℃and nominal pressure is 1.5 times. Then ensure all connector won't leak within 1min.

- Sealing (inside leakage)

For two normally closed ports, give one port pressures; put the other port into water. Under the nominal pressure, there is no bubble come out in 1min.

2 Product Performance

2.1 How to Order



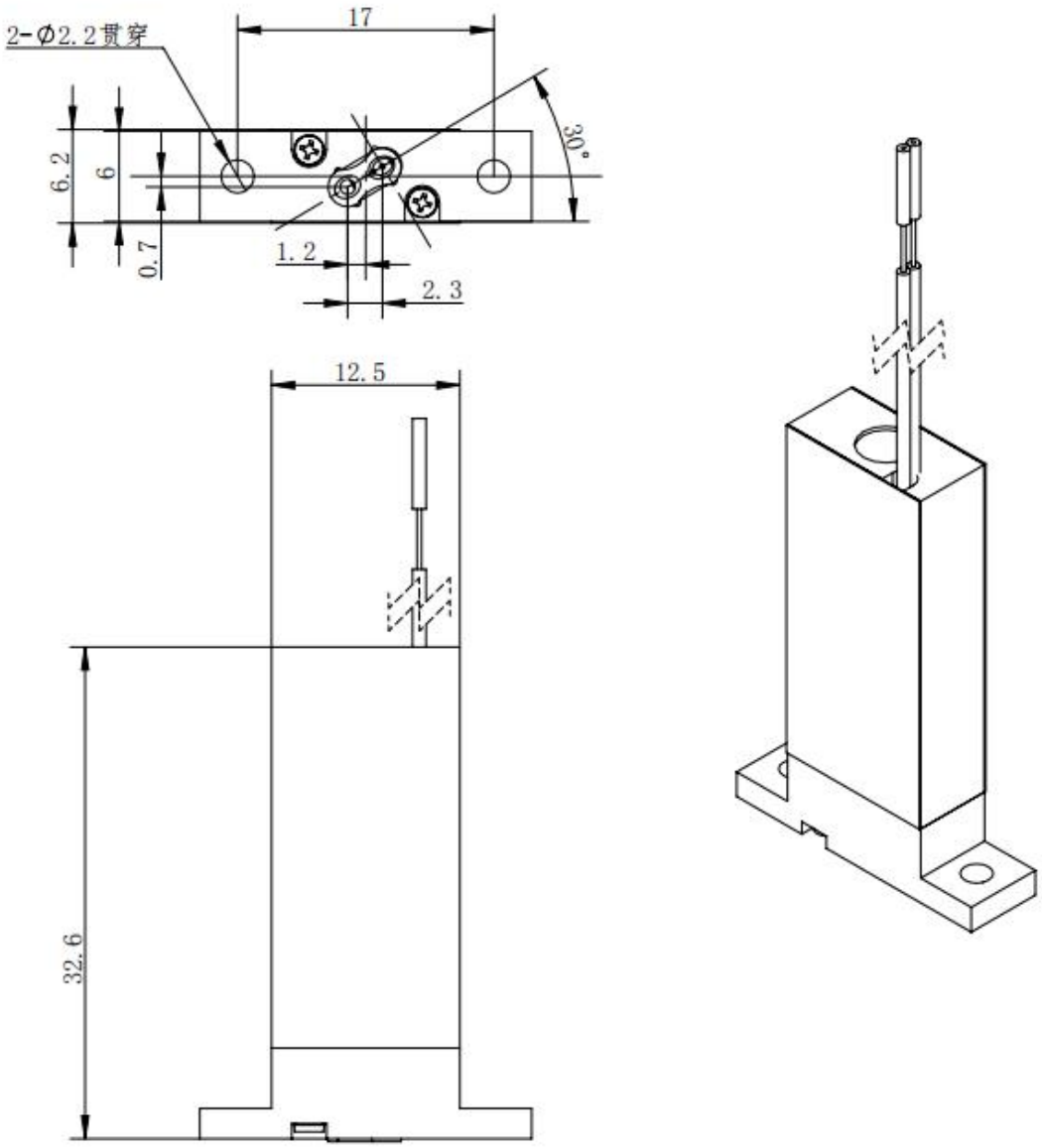
2.2 SD61-2 Naming Rules Table

Valve structure	Direct acting diaphragm valve
Valve type	Two-way
Number of ports	2
Passage diameter	1.0mm
Flow CV value	0.012
Applicable media	Water, air, weak acids, weak alkalis (selected according to the needs of the medium, strong acids and bases and the factory to communicate specific specifications)
Application temperature	5℃~80℃
Pressure resistance (in - out)	-70kpa~200kpa
Leakage volume	0
Response time	<25ms
dead product	0
Voltage fluctuation range	From -10% to +10%
Power	24V:2W; 12V:2W

Note: Please contact our technical staff for any outstanding issues and special applications.

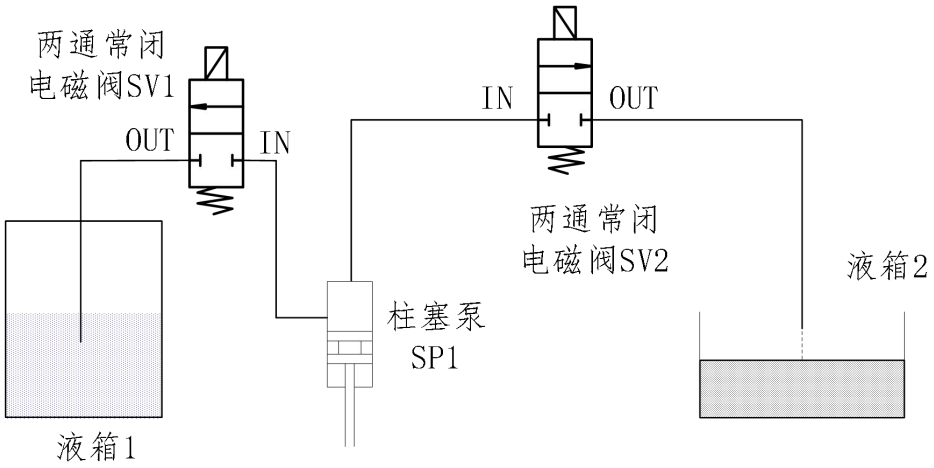
2.3 SD61-22-FKB/5N Solenoid Valve Structure

2.3.1 External dimensions

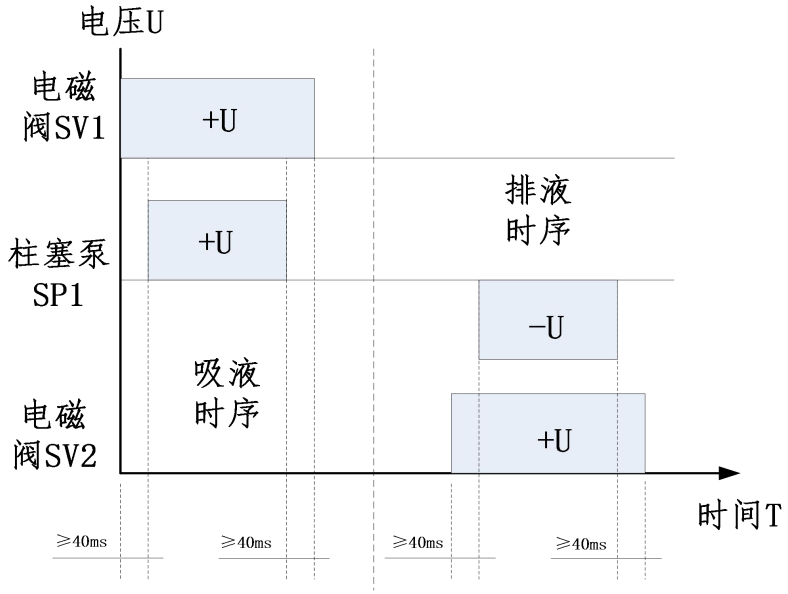


3 Application Notes

3.1 Typical Applications



Schematic diagram of a typical liquid path application



Corresponding action timing diagram

I. Description of aspiration timing:

STEP1: The two-way normally closed solenoid valves SV1 are power-on, and both ports of the two-way valves SV1 are open.

STEP2: After 40ms, the piston pump SP1 sends a pulse to control the plunger to aspirate (Note: In this sequence, +U means plunger back control);

STEP3: After finishing the aspiration command, the piston pump SP1 is power-off and stops working.

STEP4: After 40ms, the two-way valve SV1 is power-off and both ports are disconnected.

II. Description of the dispense sequence.

STEP1: The two-way normally closed solenoid valves SV2 are power-on, and both ports of the two-way valves SV2 are open.
STEP2: After 40ms, the piston pump SP1 sends a pulse to control the plunger to aspirate (Note: In this sequence, -U means plunger extend control);
STEP3: After finishing the aspiration command, the piston pump SP1 is power-off and stops working.
STEP4: After 40ms, the two-way valve SV2 is power-off and both ports are disconnected.
Note 1: Regardless of positive or negative pressure, the pressure side is applied at the inlet.
Note 2: Control sequence, valve action and pump action need to have a delay to prevent the "water hammer" phenomenon, reducing the stability of the flow path system, where the delay safety value of 40ms.

3.2 Environmental Conditions

Project	Unit	Value
Working environment temperature	Degrees Celsius	5℃~40℃
Humidity of working environment	RH%	30%~80%
Storage temperature	Degrees Celsius	-20℃~+60℃
Storage humidity	RH%	10%~85%

4 Common Faults and Their Troubleshooting Methods

Failure	Reason	Exclusion method
Do not work when devices power on	1、The working voltage is not in the qualified range	Detects deviations between actual pin voltage and rated voltage
	2、The connection line has loose or broken line	Manual testing for good contact, or multimeter check the wiring
	3、External liquid leakage corrodes the solenoid	Visual inspection, whether there is liquid crystallization or water immersion traces outside the solenoid valve
	4 、 The solenoid coil overload burned out	Multimeter check
	5、Reagent crystalline adhesion	Increase the voltage to start, and at the same time, flush with water or reagent
Poor sealing	1、Too much work pressure	Check liquid path pressure
	2、With impurities	Repeatedly turn on and off the power, at the same time, rinse with water or reagent pressure

5 Safety Precautions

For your personal safety and that of other users, please read the safety precautions carefully.
This manual uses the following symbols. Please fully understand what they mean before reading on.

Warning	Please apply as specification, or it may cause fire and electric shock.
Caution	Product with this sign must attention with operator; misoperation may cause damage of product and other loss.

Sign description

	Warning or caution		Forbidden
	Instruction (Must implement)		

Caution			
	Please turn off the power during maintenance and idling, or it may causes electric leakage or fire.		Do not put the product in dam, dusty, oilness or next to heat sources, or it may cause product failure, electric leakage or fire.

Warning			
	Do not disassemble Repair or reconstruct the product may cause failure of product, electric leakage or fire.		**Avoid to use in damp environment** Or it may cause electic leakage.
	Turn off the power during abnormal operating. Shut down the product if operation is not stable, or it may cause electric leakage or fire.		**Fully protection when using corrosive medium.** Adoption of the medium must follow the construction. Complete protection is necessary when using corrosive medium.

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