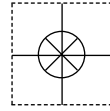


1 YEAR
WARRANTY



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SVH-121 / SVH-122 **High Pressure Solenoid Valves**



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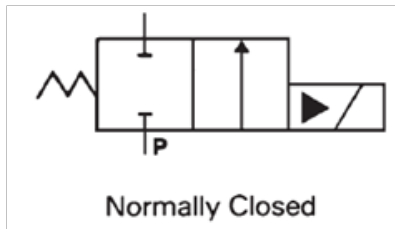
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Product Description:

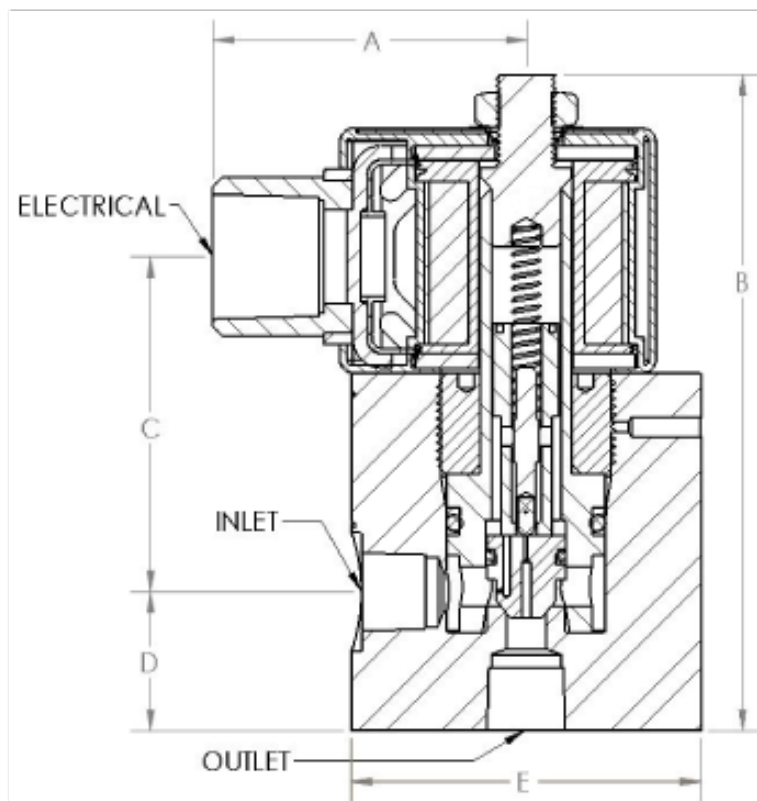
The OMEGA SVH-12 Series encompasses 2-Way, pilot operated, normally closed solenoid valves with a maximum allowable inlet pressure of 10,000 psi [68.9 MPa]. Maximum allowable differential pressure ($P_{inlet} - P_{outlet}$) as well as minimum required differential pressure depends upon the configuration. The valve is designed for water, non-corrosive and non-viscous liquids, gases, and hydrogen.

When the valve is energized, flow occurs from the inlet to outlet. When de-energized, flow stops. The valve will only stop a fluid in the direction of inlet to outlet. It does not stop fluid from moving in the reverse direction, i.e. P_{inlet} must be greater than or equal to P_{outlet} at all times.



Do not use this valve with dirty fluids, or solutions that will leave large amount of deposits.

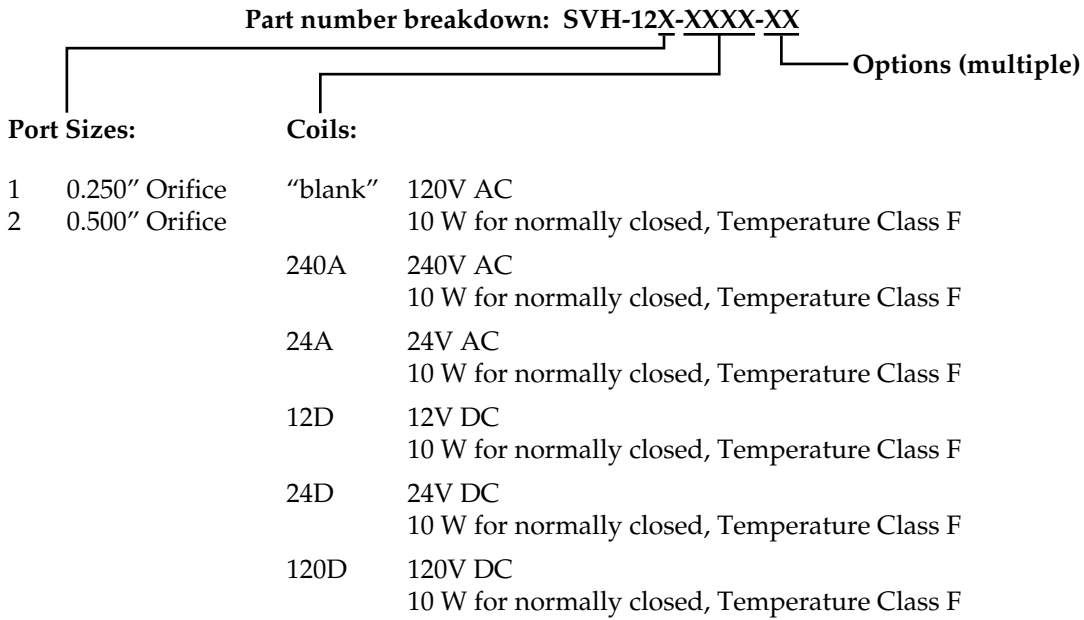
Schematic:



Normally Closed

	Weight (lbs.)	A	B	C	D	E
SVH-121	2.9	2.0	4.1	2.1	0.9	ø2.20
SVH-122	6.1	2.0	4.7	2.2	1.3	ø3.00

Configurations:



Standard lead length for all coils is 18". Explosion Proof coils are available with NEMA Type 7 & 9 protection. Standard coils including integrated DIN connector, have NEMA type 1, 2, 3, 4, and 4x protection.

Valve Body Connections:

1/4-18 NPT or 1/2-14 NPT per ANSI/ASME B1.20.1 at the inlet and outlet. The connection matches the orifice size.

Pressures:

Maximum Allowable Differential Pressure (psi) For Normally Closed Valve		
	AC Coil	DC Coil
SVH-121	7,500	3,500
SVH-122	7,500	3,600

Maximum Allowable Differential Pressure (psi) For Normally Open Valve		
	AC Coil	DC Coil
SVH-121	7,500	n/a
SVH-122	n/a	n/a

A minimum pressure differential is required on the SVH-12 Series to move the valve piston and open the valve. The SVH-121 requires 50 psi. The SVH-122 requires 100 psi.

The SVH-12 was designed to withstand pressures approaching four times maximum allowable inlet pressure at room temperature without bursting. However, the inlet pressure should NEVER be allowed to exceed 10,000 psi. In actual usage, the connections would begin to leak far below the burst pressure.

Open/Close times will depend upon the differential pressure and fluid. The response time is typically less than 0.5 seconds, and is significantly faster towards the high end of the allowable differential pressure.

Materials:

- Valve Body – 316 Stainless Steel
- Bonnet Tube – 316 and 430 Stainless Steel
- Piston – Polyether ether ketone
- Other wetted components – 302, 303, and 430 stainless, PTFE, copper (AC powered only)

Flow Rate:

The flow rate of a fluid through a valve is a function of the inlet and outlet conditions, liquid or gas properties, and properties of the specific valve. Pressure, temperature, and piping geometry are inlet and outlet conditions. Pertinent liquid properties are composition, density, vapor pressure, viscosity, surface tension, and thermodynamic critical pressure. Pertinent gas properties are composition, density, and ratio of specific heats. Valve characteristics such as flow path, valve travel, and of course size influence flow rate. ANSI/ISA-75.01-1985 (R1995) provides equations to approximate flow.

Through a standard test procedure, a Valve Flow Coefficient "Cv" can be assigned to a particular valve. This coefficient can then be used to approximate flow rates with reasonable accuracy for different fluids and gases at any inlet and outlet conditions. Cv is essentially the number of gallons of water that will flow through a particular valve in 1 minute at exactly 1.0 psi of differential pressure between the inlet and outlet.

	Orifice (in)	Approximate C _v
SVH-121	0.250	1.1
SVH-122	0.500	4.5

The flow rate through an SVH-12 valve can be **approximated** as follows:

P1 = Inlet Pressure (psi)

P2 = Outlet Pressure (psi)

C_v = Valve flow coefficient (no units)

SG = Specific Gravity (no units) at standard conditions

For a gas:

Calculate P_{Critical} = 0.53*P1

For a constant P1, flow will increase as P2 decreases until reaching P_{Critical}

As P2 falls below P_{Critical}, no further increase of flow rate occurs.

If P2 > P_{Critical}:

$$Q_m = C_v * \sqrt{\frac{P * (P1 - P2)}{SG}} * \sqrt{\frac{520}{T}} \quad \text{SCFM (14.7 psi and 60° F)}$$

If P2 < P_{Critical}:

$$Q_m = C_v * \frac{P1}{\sqrt{2 * SG}} * \sqrt{\frac{520}{T}} \quad \text{SCFM}$$

For a liquid:

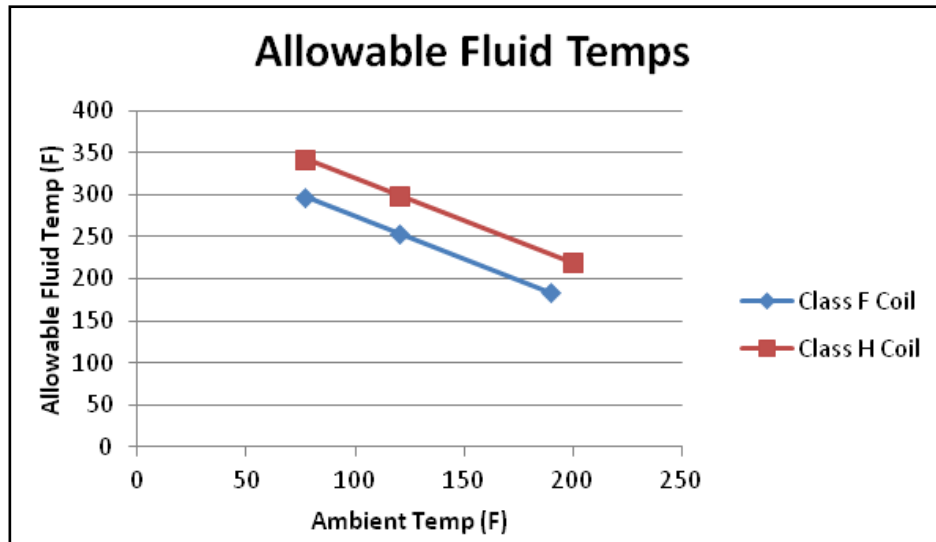
$$Q = C_v * \sqrt{\frac{P1 - P2}{SG}} \quad \text{gal/min}$$

Operating Temperatures:

Solenoids will get very hot from normal usage (>250°F). The high temperature limit of the valve is based upon the coil wire insulation. If the temperature limit is exceeded, permanent and self-perpetuating damage will result.

As solenoid coil wire temperature rises, electrical resistance goes up and less current flows. Since pull force of a solenoid is directly proportional to amperage, a solenoid operating at its upper temperature limit may produce less pull force.

The 22 watt coils are temperature Class H. The 10 watt coils are temperature Class F. The charts below give guidelines for allowable fluid temperature for a given ambient temperature assuming that the coil is being **held in the energized state**.



If the coil is only being powered intermittently for short periods of time, the allowable fluid temperature is 400°F when in an ambient temperature of 77°F.

AC powered coils experience a current "inrush" upon each energize cycle. The number of allowable energize cycles per minute is dependent upon fluid and ambient temperature. It is strongly advised to use DC coils if frequent cycling (>5 time per minute), particularly if fluid temperatures are elevated.

There are other factors not taken into account for maximum allowable fluid temperature. It is suggested that if a fluid temperature is going to be near the high limit, the application should be thoroughly tested to ensure a robust design.

Installation:

The SVH-12 must be mounted in the vertical orientation with the coil on top. This is because gravity is used to reset an internal component upon closing.

The ¼-18 NPT or ½-14 NPT valve body threads per ANSI/ASME B1.20.1 require a sealant, such as OMEGA PTFE tape, by design. Follow the sealant manufacturer installation instructions. Do not use an excessive amount on the inlet, as this may go into the valve and cause problems. After applying 175 in*lbs of torque to the NPT connection, pressurize and look for leaks. Re-tighten slightly if necessary.

Make sure that connecting pipes or tubes are clean and free of particulates.

Install a filter upstream and close to the solenoid valve (see details in Filter section).

No lubrication is required.

Filters:

Foreign matter such as particulates, rust flakes, PTFE tape, pipe dope, etc., can jam moving parts within a solenoid valve, clog the small orifices, or damage softer sealing surfaces. The result can be a failure to open, close, and seal. A strainer/filter with 60 mesh (0.009" gaps) or finer is recommended for the SVH-12.

The strainer should be placed upstream (inlet side) and as close to the valve as possible. Be sure to select a model that is safe for the inlet pressure. Size the filter so that the pressure drop across it is acceptable for the flow rate.

Sealing:

Six different valve seat leakage classifications are defined by ANSI/FCI 91-2-2001. All valves must pass a leakage test prior to the leaving the factory based on the requirements of this specification.

This standard leakage for this product is Class 2.

Class 2 (Allowable Leakage/Min)		
Size	Water (cc)	Air (cc)
0.019	0.08	0.38
0.032	0.13	0.64
0.250	1.00	5.00
0.500	2.00	10.00
0.750	3.00	15.00
1.000	4.00	20.00
1.500	6.00	30.00
2.000	8.00	40.00
2.500	10.00	50.00
3.000	12.00	60.00
4.000	16.00	80.00
6.000	24.00	120.00

Class 4 (Allowable Leakage/Min)		
Size	Water (cc)	Air (cc)
0.019	0.10	0.04
0.032	0.10	0.06
0.250	0.10	0.50
0.500	0.10	1.00
0.750	0.10	1.50
1.000	0.10	2.00
1.500	0.10	3.00
2.000	0.10	4.00
2.500	0.10	5.00
3.000	0.10	6.00
4.000	0.10	8.00
6.000	0.10	12.00

Class 5 (Allowable Leakage/Min)		
Size	Water (cc)	Air (cc)
0.019	.1 / 10 Min	0.00
0.032	.1 / 10 Min	0.01
0.250	.1 / 10 Min	0.05
0.500	.1 / 10 Min	0.10
0.750	.1 / 10 Min	0.15
1.000	.1 / 10 Min	0.20
1.500	.1 / 10 Min	0.30
2.000	.1 / 10 Min	0.40
2.500	.1 / 10 Min	0.50
3.000	.1 / 10 Min	0.60
4.000	.1 / 10 Min	0.80
6.000	.1 / 10 Min	1.20

Electrical:

Electrical wiring must conform to the nameplate rating. Connect the coil leads to electrical circuit using standard electrical practice. If the coil is located in an inconvenient location, it may be re-oriented as described in the SAFETY section of this manual. Either coil lead can be hot or neutral.

Safety:

Depressurize a system before trying to remove the valve.

Do not remove the coil from the valve and pressurize. While the valve is designed to not burst at pressures approaching four times the rated maximum inlet pressure, the coil actually provides a portion of that inherent strength.

If the wires from the coil need to be directed a certain way, loosen the nut on top of the coil before trying to position. Do not grab any portion of the bonnet tube with a wrench or pliers. Doing so can damage the tube, loosen the retainer causing leakage, or damage an o-ring.

The surface temperature of some coils may be >250 degrees Fahrenheit (!) when running hot fluids and held in the energized state.

Troubleshooting:

1. The valve must be mounted in a horizontal pipe run with the solenoid vertical and on top. Other orientations will prevent proper operation.
2. The valve must be mounted in the correct 'flow direction' as indicated by the arrow on the side of the valve body. The valve should be mounted with the high-pressure side piping at the back of the arrow (inlet) and the low-pressure side piping at the front of the arrow (outlet).
3. This valve will not act as a check valve. It only blocks flow in the direction of inlet to outlet.
4. Foreign matter such as particulates, PTFE tape, pipe dope, etc., can jam moving parts within the valve or clog very small orifices. The result can be a failure to open and/or close completely. 60 mesh (0.009" opening) filters/strainers are recommended.
5. The operating pressure must not exceed the pressure rating on the valve nameplate.
6. Verify that the power supplied to the solenoid matches the specification that is displayed on the valve nameplate. Valves cannot be converted from DC to AC or AC to DC by simply changing the coil.
7. Check the coil leads for continuity. If there is no continuity or no resistance at all, you will need to replace the coil. A jammed plunger can cause coil burnout. Replacing the coil may temporarily cure the symptom but not the actual cause.
8. Regulators mounted upstream from the valve can cause problems. Regulators should be mounted downstream.
9. This valve is designed and tested for use with gases, water, and fluids with viscosity similar to water.
10. If chatter or buzzing is ever noticed, remove power and consult customer service. This could indicate jammed components and could eventually burn out a coil or fatigue sealing surfaces.



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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