For Use with Liquids, Steam, Gases, and Hot Water
The OMEGA® SV-100 and SV-200 Series solenoid valves for liquids and gases cover most industrial and laboratory applications. The valves are available in sizes ranging from ¼ to 2 NPT, with Cv’s as high as 38. OMEGA also offers general purpose 2-, 3-, and 4-way valves made of brass or stainless steel, and specialty valves for hot water and steam applications.

The SV-100/200 valves are modularly constructed from 3 basic parts: the valve body, the electrical coil, and the coil enclosure. The valve bodies are normally stainless steel or brass for greatest media compatibility, while the wetted parts consist of the shading ring, valve material, and O-ring. The standard electric coils are all rated as “continuous duty” to eliminate overheating. Each coil is in a protective encapsulated material that resists moisture, fungus, and extreme environmental conditions. The standard electrical enclosures meet NEMA 4 (IP65) ratings and have a ½” conduit port.

OMEGA’s SV-100/200 Series valves are of poppet, piston, or diaphragm design.

PILOT OPERATED
A pilot-operated solenoid valve uses the energy stored in the pressurized fluid to actuate the valving mechanism. A direct-acting solenoid valve is an integral part of the pilot-operated valve and is used to affect the balance of pressure above and below a diaphragm or piston.

DIRECT LIFT
Direct-lift valves combine the features of a direct-acting valve with those of a pilot-operated valve. Because of a flexible link between the solenoid plunger and the diaphragm, the valve functions as a direct-acting valve at low pressures and as a pilot-operated valve at high pressures. It is sometimes referred to as a zero delta P (pressure) valve or a hung diaphragm valve.

DIRECT ACTING
In this construction, the magnetic force of the solenoid acts directly on the valve’s sealing mechanism. The pressure and flow capabilities of these valves are limited by the power of the solenoid.
SELECTING A SOLENOID VALVE
TO YOUR SYSTEM SPECIFICATIONS

SELECTION GUIDELINES
General purpose solenoid valves are used with a wide variety of liquids and gases in a broad spectrum of applications. Rating the valve capacity in terms that relate to all operating conditions is done by determining the flow factor (Cv) of the valve. The Cv value is the number of U.S. gallons of 60°F water per minute that, when flowing through the valve, causes a pressure drop of 1 psi. This measure of capacity is stated for each model in this handbook.

There are 5 main parameters to consider when selecting a valve: Cv, media compatibility, pressure, temperature, and process fitting. For each of these parameters, maximum values are listed for each valve. To choose the correct valve, compare each parameter and check that it is less than the maximum value listed.

LIQUID APPLICATIONS
For most applications, liquids are considered incompressible and only the following factors need be considered in sizing a valve:

- Cv = Flow factor
- Q = Flow expressed in U.S. gallons per minute (GPM)
- ΔP = Pressure drop across the valve (inlet to outlet) in psid

For each of these parameters, maximum values are listed for each valve. To choose the correct valve, compare each parameter and check that it is less than the maximum value listed.

Sample Problem: A 2-way normally closed valve is needed to control the transfer of a liquid (G = 1.1) at a rate of 2 GPM. The pressure available is 10 psi; downstream pressure is 0 psi.

Solution:

ΔP = P₁ - P₂ = 10 - 0 = 10 PSI

Cv = Q √(G/ΔP) = 2 √(1.1/10) = 0.66

Therefore, a valve is needed with a Cv of at least 0.67, and a maximum operating pressure differential of at least 10 psid.

GAS APPLICATIONS
When compressible media such as air or gases are used, the sizing of the valve must include additional factors that affect performance:

- Cv = Flow factor
- Q = Flow expressed in standard cubic feet per hour (SCFH)
- ΔP = Pressure drop across the valve (inlet to outlet) in psid
- P₁ and P₂ = Inlet and outlet absolute pressures, respectively (psia)

G = Specific gravity of gas (G = 1 for air at 55°F)

These factors relate as shown in the following equations:

If (0.53) P₁ < P₂

Cv = Q √[(460 + t) x G] / ΔP x P₂

If (0.53) P₁ ≥ P₂

Cv = Q √[(460 + t) x G] / 704 x P₁

Sample Problem: A normally closed 2-way valve is needed to control gas entering a furnace. Also known:

- Q = 500 SCFH
- G = 0.7 t = 60°F
- P₁ = 35 psia or (20 psig + 14.7)
- P₂ = 15 psia or (10 psig + 14.7)

Solution:

ΔP = 35 - 15 = 20 psi

Therefore, use the formula

Cv = Q √[(460 + t) x G] / ΔP x P₂

Cv = 0.58

Therefore, a valve is needed with a Cv ≥0.58 and a maximum operating pressure differential ≥5 psid.

Again, the general purpose stainless steel SV105 with a Cv = 0.75 is sufficient, and temperature and media compatibility are good.

Sample Problem: A 3-way normally closed valve is needed to control a single-acting spring return cylinder. Known are:

- Qₐ = 28.3 cubic in/s at 56 psig to obtain 2" stroke of a 6" diameter cylinder in 2 s
- P₁ = 115 psia or (100 psig + 14.7)
- P₂ = 71 psia or (56 psig + 14.7) (for a 1600 lb force)
- G = 1 for air, t = 90°F

Solution:

ΔP = 115 - 71 = 44 psid

Convert this to SCFH:

Qₛ = Qₐ x (P₁/Pₛ) x (515/t + 460)

= 127 standard cubic inches per second

Where Q is flow
P is pressure in psia
A is for actual conditions
S is for standard conditions

Converting the flow to SCFH:

Q = 127 in³/s x (208 ft³/hr / 315 ft³/hr)

= 265 SCFH

Select the Cv formula using:

P₁ (0.53) = 115 (0.53) = 60.95 < P₂

The valve requires a Cv of 0.58. Therefore, valve SV241, which has a Cv = 0.18, max MODP = 150 psid, and max temp = 165°F, will work.
More than 100,000 Products Available!

- **Temperature**

- **Flow and Level**
  Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

- **pH and Conductivity**
  Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

- **Data Acquisition**

- **Pressure, Strain and Force**
  Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

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