

Smooth Vent Valve

XVD Series

- Valve / needle valve integrated construction – requires only 1/4 the piping space of previous models.
- Particulates significantly reduced through the use of a metal diaphragm in the sheet portion
- Flow of both initial air supply and main air supply can be adjusted.



Model	Valve type	Piping size	Orifice (mmø)	Effective area (mm ²)	Operating pressure (Pa)	Leakage (Pa·m ³ /s) (He)			Service life cycles (10 thousand)
						Internal	External	Fitting	
XVD2-02V	Single acting (N.C.)	1/4	3	Main air supply: 4.6 Initial air supply: 0.2 to 4.6	0.2 MPa (G) to 1 x 10 ⁻⁶	5 x 10 ⁻⁹	1.3 x 10 ⁻¹¹	For VCR® 1.3 x 10 ⁻¹¹	50
XVD2-02S						Values at normal temperature, excluding gas permeation		For Swagelok® 1.3 x 10 ⁻¹⁰	

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Smooth Vent Valve (Supply Line) *XVD Series*



How to Order



XVD 2 — 02 V

Smooth vent valve

Orifice size (ø3)

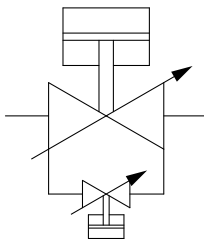
Fitting type

V	For VCR®
S	For Swagelok®

Fitting size (1/4)

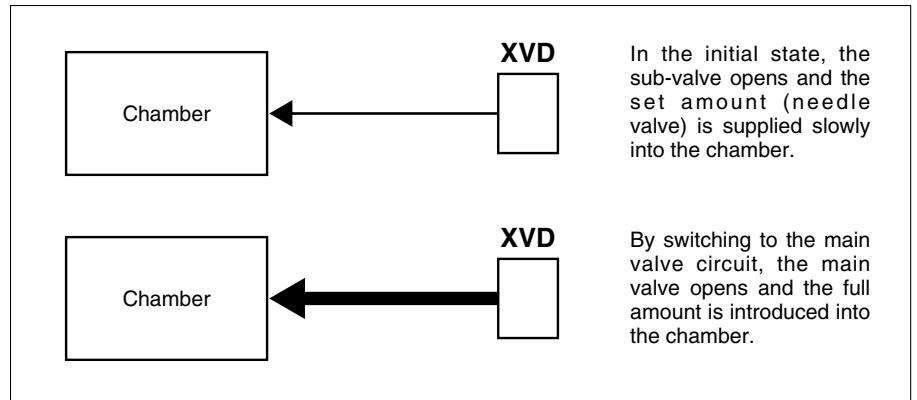
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- **Space-saving**
Valve / needle valve integrated construction – requires only 1/4 the piping space of previous models.
- **Particulates significantly reduced** through the use of a metal diaphragm in the sheet portion
- **Flow of both initial air supply and main air supply can be adjusted.**



Application

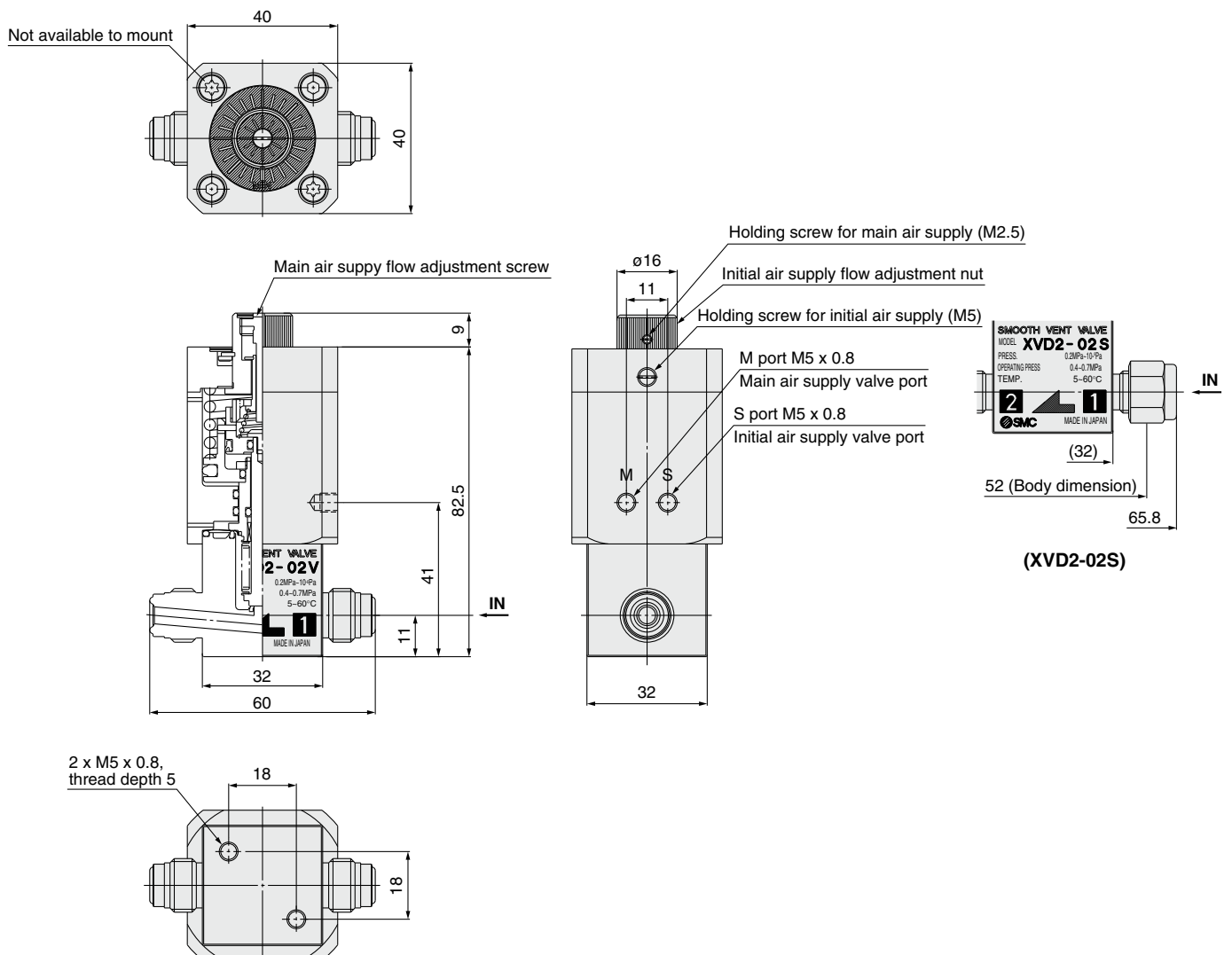
Introducing the full amount of supply pressure (Clean air / N₂) all at once when returning the vacuum chamber to the atmosphere will cause particulates to get into the chamber. To prevent this, after slowly introducing the initial air supply and setting the pressure, switch to the main valve circuit to supply the full amount.



Specifications

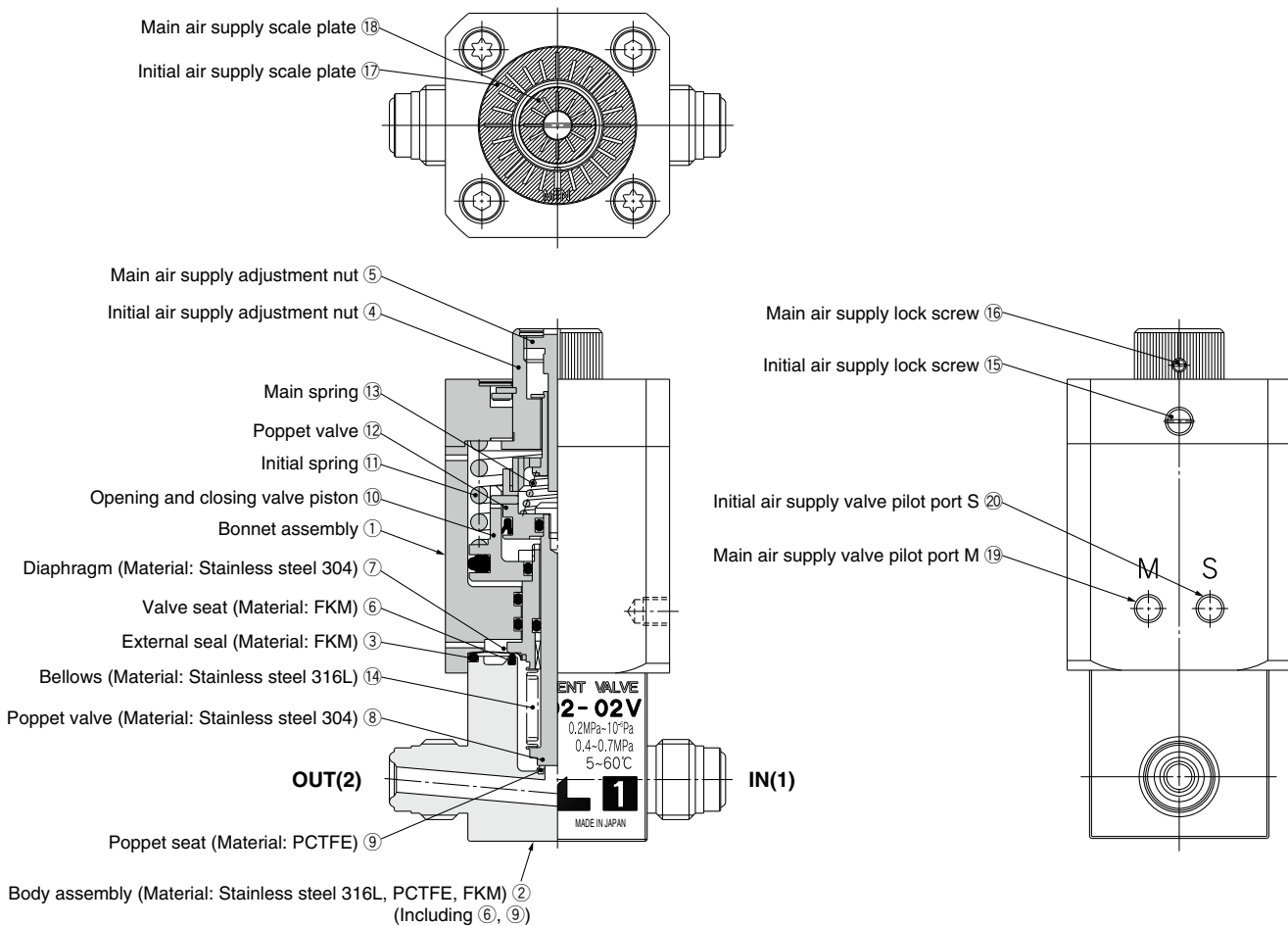
Model	XVD2-02V	XVD2-02S
Valve type	Normally closed (Pressurize to open, Spring seal)	
Fluid	Nitrogen, Air, Inert gas, etc.	
Operating temperature (°C)	5 to 60°C (Baking temperature 150°C or less)	
Operating pressure (Pa)	1 x 10 ⁻⁶ (abs) to 0.2 MPa (G)	
Orifice diameter (mm)	ø3	
Effective area (mm ²)	Main air supply	4.6
	Initial air supply	0.2 to 4.6
Leakage (Pa·m ³ /s) (He)	Internal	5 x 10 ⁻⁹
	External	1.3 x 10 ⁻¹¹
	Fitting	1.3 x 10 ⁻¹¹
Piping connection type	For VCR®	For Swagelok®
Connection size	1/4	
Principal materials	Body: Stainless steel 316L, Main part: Stainless steel 316L, Stainless steel 304, FKM (Seal material)	
Internal surface treatment	Body EP treatment	
Pilot pressure (MPa) (G)	0.4 to 0.7 (Both main & initial supply valves)	
Pilot port (M, S) size	M5 x 0.8	
Weight (kg)	0.5	

Dimensions



XVD Series

Construction/Operation



<Initial air supply flow adjustment> XVD Series

Use a flat head screwdriver to gently turn the initial air supply lock screw ⑮ to the left, loosening it until it stops. Keep rotating the initial air supply adjustment nut ④ to the right, and the minimum possible initial air supply flow is the point at which the name plate and adjustment nut mark align closest to where torque is felt. (The initial air supply adjustment nut ④ is set at the minimum flow rate position at factory shipment. Tightening the nut further from this position may cause the fluid not to flow or damage to internal parts.)

After confirming the position of the initial air supply adjustment nut ④ and the angle alignment scale of the initial air supply scale plate ⑰, adjust the initial air supply amount by rotating the nut to the left. According to the "Number of rotations and flow rate characteristics" as shown, set the initial air supply flow. After setting, lock by tightening the initial air supply lock screw ⑮ with a torque of 0.5 N·cm.

Main air supply flow adjustment

Use a flat head screwdriver to gently loosen the main air supply lock screw ⑯, and also to confirm that the main air supply adjustment nut ⑤ is rotating freely. Keep rotating the main air supply adjustment nut ⑤ to the right, and the point at which it stops is the "initial air supply adjustment amount." After confirming the position of the main air supply adjustment nut ⑤ and the angle alignment scale of the main air supply scale plate ⑱, set the main air supply amount by rotating the nut to the left. After setting, lock by tightening the main air supply lock screw ⑯ with a torque of 0.3 N·cm.

Initial air supply feed

Gas filling in from the IN (1) port side pushes the initial spring ⑪ down the opening and closing valve piston ⑩, and seals the diaphragm ⑦ and valve seat ⑥ to stop the gas. The pilot pressure is applied to the pilot port S ⑳. The pilot pressure is loaded into the lower part of the opening and closing piston ⑩, and the opening and closing valve piston ⑩ stops after it has moved by the specified amount. The movement of the opening and closing valve piston ⑩ causes the diaphragm ⑦ to remove from the valve seat ⑥, and the gas to flow. When the gas begins to flow, it passes through the opening between the poppet valve ⑧ and poppet seat ⑨ (initial air supply set amount) and flows to the OUT (2) port.

Main air supply feed

With the pilot pressure applied to the pilot port S ⑳ for the initial air supply valve, the pilot pressure is applied to the pilot port M ⑲. The pilot pressure fills into the lower part of the poppet valve piston ⑫, and the poppet valve piston ⑫ moves upward and stops when it is in contact with the main air supply adjustment nut ⑤. The movement of the poppet valve piston ⑫ causes the connected poppet valve ⑧ to move further from the initial air supply adjustment position, and a greater volume of gas flows to the OUT (2) port.

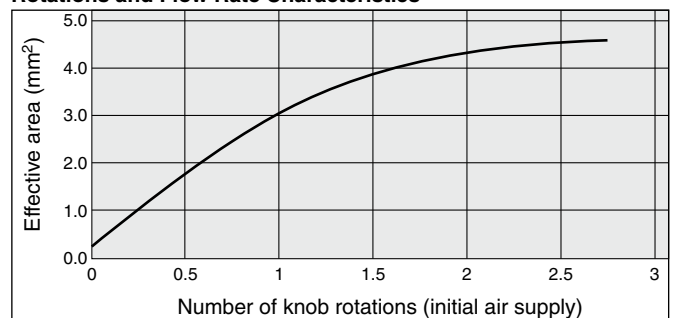
Stoppage of the initial and main air supply

It is possible for the initial and main air supply to stop at the same time. The force of the main spring ⑬ activated by the exhaust from the pilot port S ⑳ causes the opening and closing valve piston ⑩ to move downward, and the diaphragm ⑦ and valve seat ⑥ to close, stopping the gas feed. The force of the initial spring ⑪ activated by the exhaust from the pilot port M ⑲ causes the poppet valve piston ⑫ to move downward, and the initial air supply to revert to its previous adjusted position.

Remarks 1: The feeding of the main air supply is carried out with the initial air supply pilot valve port S ⑲ in a pressurized state.

2: Increasing the initial air supply amount in the mechanism will cause a decrease in the range of the main air supply amount.

Rotations and Flow Rate Characteristics





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Specific Product Precautions

Be sure to read this before handling the products.

Smooth Vent Valve/XVD Series

Design

Warning

1. The body material and bellows are stainless steel 316L, the other materials that may be exposed to fluids are stainless steel 304 and PCTFE, and the seal material is FKM. Please check the material used, and only fluids that will not interfere with the material.

Selection

Caution

1. Please use within the operating pressure range.
2. Leaks may result when the supplied pressure exceeds 0.2 MPa(G). When adjusting the pressure on the supply side with a regulator, etc., please take precautions against rising pressure to prevent leakage from the regulator.
3. Do not tighten the initial air supply flow any further than the "minimum supply flow" position, as this may result in component damage, or in increased time needed to attain a vacuum in the vacuum chamber due to a decline in the displacement capabilities of the gas accumulation part (bellows chamber).

Mounting

Caution

1. In high humidity environments, keep valves packaged until the time of installation.

Piping

Caution

1. Before mounting, clean the sealing surface with ethanol, etc.
2. Fasten the VCR® and Swagelok® properly, in accordance with the specified torque and methods prescribed by Swagelok. Reference) For VCR®: 1/8 turn after tightening by hand
For Swagelok®: 1 1/4 turns after tightening by hand
3. Attach the valve using body bottom mounting screws (2 x M5).

Maintenance

Caution

1. Replace the bonnet assembly part and body assembly part when the end of their service life is approached.
2. If damage is suspected prior to the end of the service life, perform early maintenance.
3. SMC specified parts should be used for service parts.

Maintenance Parts

XVD Smooth Vent Valve

Construction No.	Description	Part no.
1	Bonnet assembly	XVD2-02A-30-1
2	Body assembly	XVD2-02V-30-2 (For VCR®)
		XVD2-02S-30-2 (For Swagelok®)
3	Exterior seal	AS568-024V