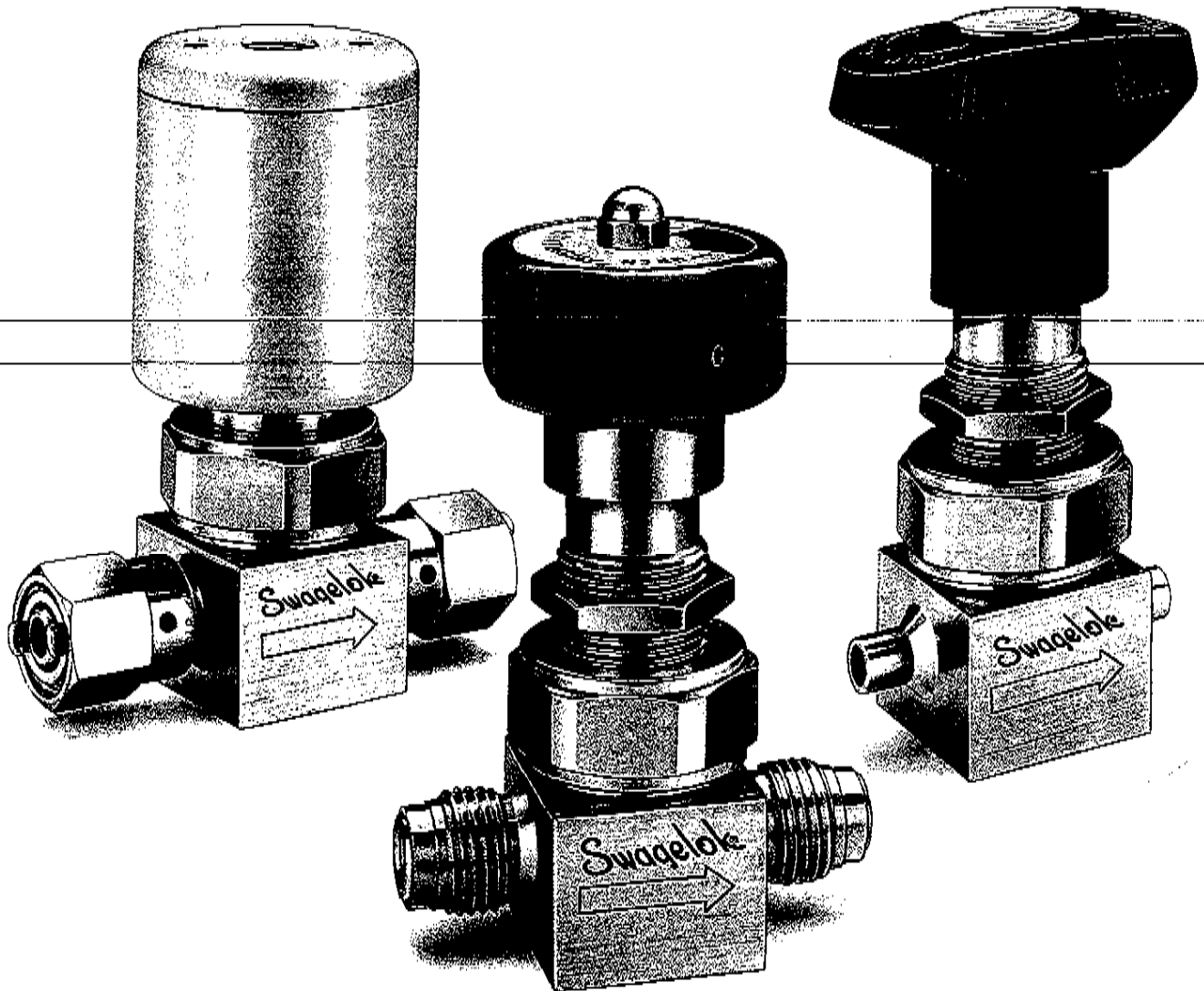


Swagelok®

Ultra-High-Purity Diaphragm Valve



DA Series

- 316L VAR stainless steel body
- Pressures to 145 psig (10 bar)
- Temperature to 150°F (65°C)
- 1/4 in. and 6 mm sizes

Nupro Company
Willoughby, Ohio U.S.A.

© 1991, 1993, 1994, 1996, 1998 Swagelok Marketing Co.

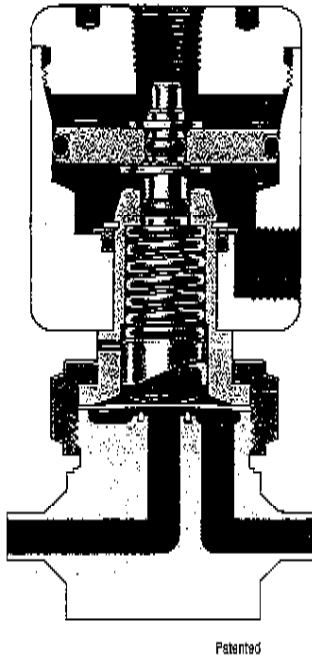
Features

Design

- No springs or threads in wetted area for clean operation
- Low internal volume and fully swept flow path enhances purging and gas replacement
- Metal diaphragms for all-metal containment of system fluid (no gaskets or coatings)
- Minimal PCTFE volume for lower gas adsorption and desorption
- Fully contained seat insert for increased cycle life
- Compact size for efficient use of space

Materials

- Elgiloy® diaphragms for strength
- 316L Vacuum Arc Remelt (VAR) stainless steel body for enhanced material purity
- PCTFE seat for broad chemical compatibility and repetitive, leaktight shutoff



Surface Finish

- Choices include P, PX, or standard finishes for a variety of application requirements.
- P and PX finishes are manufactured to Swagelok Specification SC-01.

Actuation

Pneumatically actuated models

- Remote actuation
- Normally closed and normally open models
- Low actuation pressure with air or nitrogen
- Reliable piston design
- Rotatable air cylinder for ease of piping
- Lightweight aluminum construction

Manually actuated models

- 1/4 turn actuation for quick response
- Spring-actuated closure for consistent shutoff and longer cycle life
- Choice of handle styles
 - Directional handle for visual flow indication
 - Round handle with top and side OPEN and CLOSED indicators for minimum space requirements

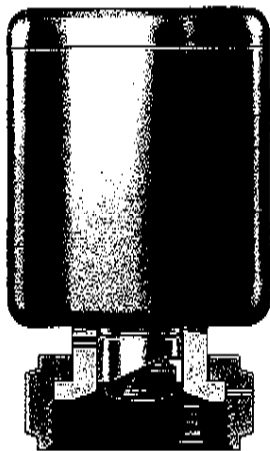
Materials of Construction

Pneumatic Actuator

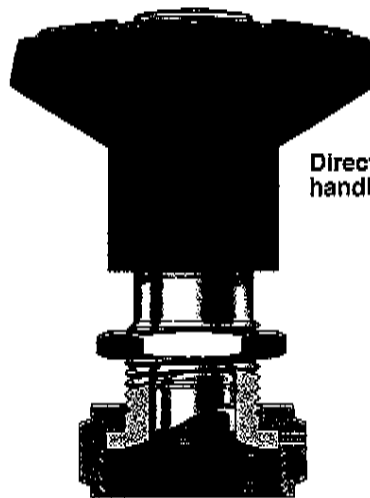
Cap, piston, cylinder	aluminum
O-rings	fluorocarbon FKM
Washers, retaining rings	stainless steel and brass

Manual Actuators

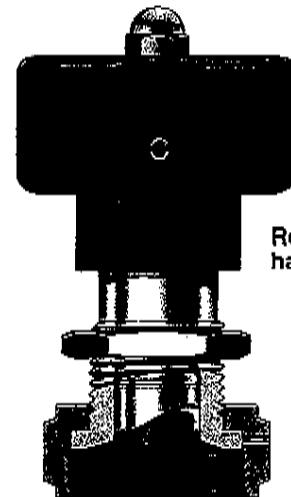
Directional handle	nylon
Round handle	stainless steel, epoxy coated
Cam, lock nut, bearings, shaft, washer	stainless steel



Pneumatic actuator



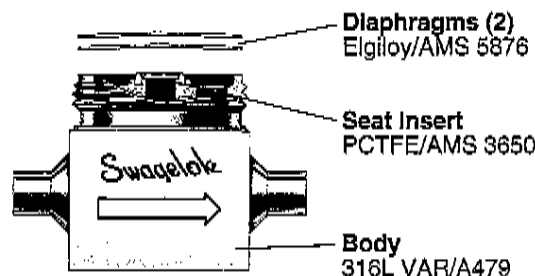
Directional handle



Round handle

Common Parts

Union nut, bonnet, stem	316SS/A479
Spring	17-7PH® SS/A313
Button	Torlon® #4301



Technical Data

Valve

Pressure Rating	operating: vacuum to 145 psig (10 bar) [ⓐ] burst: 3200 psig (220 bar) [ⓐ]
Temperature Range	-10° to 150°F (-23° to 65°C) with PCTFE seat
Flow Coefficient	0.20 (see Air Flow graph)
Internal Volume	0.11 in. ³ (1.8 cm ³) approx (determined using BW4-ended valves)

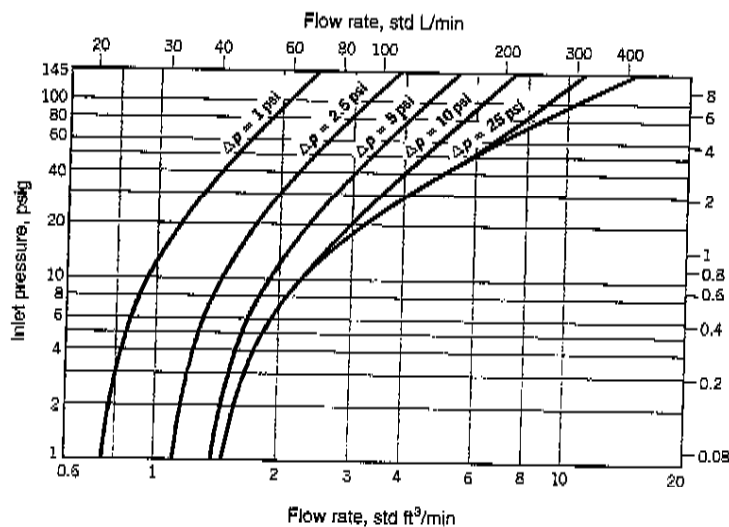
- ⓐ If system pressure exceeds the rating, the valve will open allowing flow across the seat.
- ⓑ The valve will maintain a leaktight seal to atmosphere up to 3200 psig (220 bar). Diaphragm must be replaced before continuing service when valve is exposed to pressure beyond one and one half times its operating pressure rating.

Pneumatic Actuator

Pressure Rating	60 to 100 psig (4.1 to 6.8 bar) [ⓐ] (see Actuator Pressure at System Pressure graph)
Air Displacement	0.058 in. ³ (0.95 cm ³) (actual volume)

- ⓐ Valve is fully actuated at minimum pressure shown. The range allows for variations in supply pressure.

Air Flow[ⓐ]



Example

Parameters:

- system gas = nitrogen
- inlet pressure (p_1) = 25 psig
- outlet pressure (p_2) = 15 psig
- pressure drop (Δp) = 10 psi ($\Delta p = p_1 - p_2$)

1. To determine the flow rate (q) of the valve, enter the vertical scale with the inlet pressure ($p_1 = 25$ psig).
2. Read across to the curve for the pressure drop ($\Delta p = 10$ psi).
3. Read down to the horizontal scale for the flow rate ($q = 3.4$ std ft³/min).

- ⓐ Inlet and outlet pressures are measured at the valve. Restrictions in the inlet or outlet piping will reduce the flow rate. Flow rates are calculated for a C_v of 0.20.

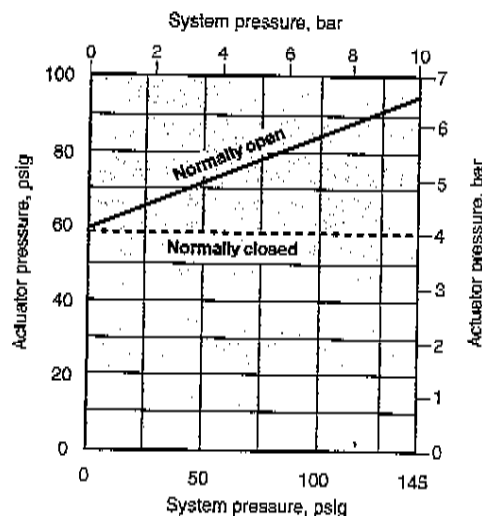
Process Specifications

See *Swagelok Specification SC-01* and *Swagelok Specification SC-11* for details on the processes, process controls, and process verification.

See *Nupro DA Series Diaphragm Valve Technical Report, NC-600DA*, for details on lab cycle testing, particle counting, moisture and hydrocarbon analysis, ionic cleanliness, and surface finishes.

Finish	P	PX	Standard
Specification	Swagelok SC-01	Swagelok SC-01	Swagelok SC-11
Surface Roughness Average (R_a)	Electropolished and finished to 5 μ m. (0.13 μ m) avg.	Electropolished and finished to 4 μ m. (0.10 μ m) avg.	Finished to of 10 μ m. (0.25 μ m) avg.
Cleaning	High-purity cleaning in a continuously monitored, deionized water, ultrasonic cleaning system.		Special cleaning with non-ozone depleting chemicals
Assembly and Packaging	Performed in Class 100 work areas, valves are individually double bagged and vacuum sealed in cleanroom bags.		Performed in specially cleaned areas, valves are individually double bagged.
Testing, Standard	Inboard helium leak tested at the seat, envelope, and all seals to a rate of: 4×10^{-9} std cm ³ /s for pneumatic valves, 1×10^{-9} std cm ³ /s for manual valves.		
Testing, Optional	Inboard helium leak testing to 1×10^{-9} std cm ³ /s available for pneumatic valves. Outboard helium leak testing to 5×10^{-7} std cm ³ /s available for all valves.		

Actuator Pressure at System Pressure Minimum Values



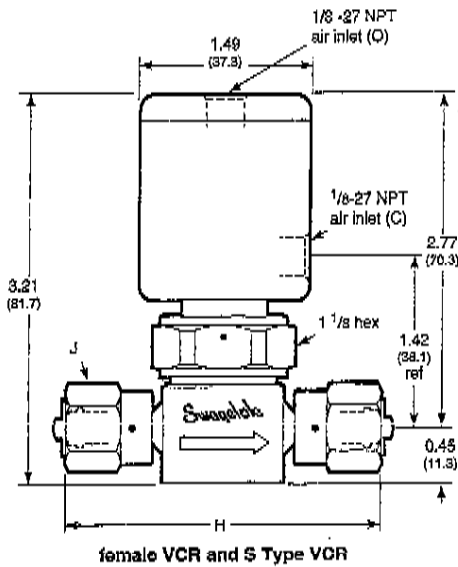
Notes:

1. kPa = psig \times 6.89
2. Laboratory test results show increased service life when minimum rather than maximum actuator pressure is used.

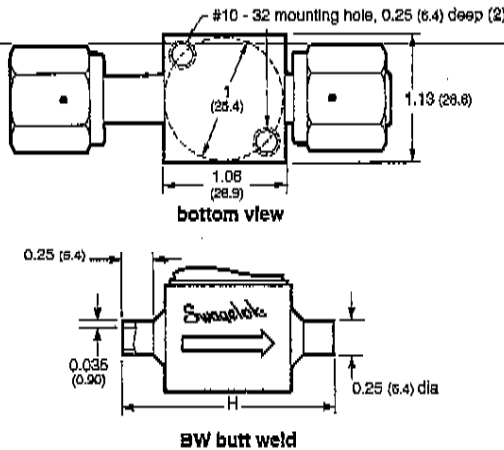
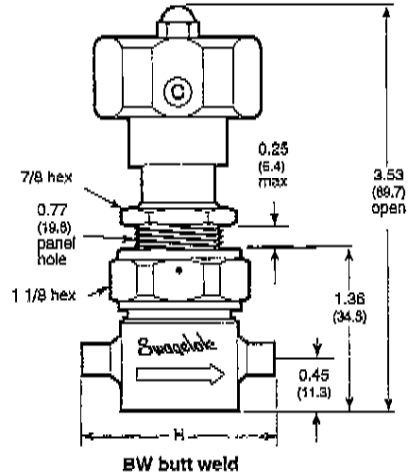
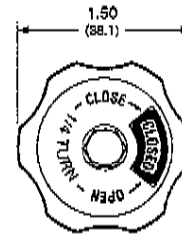
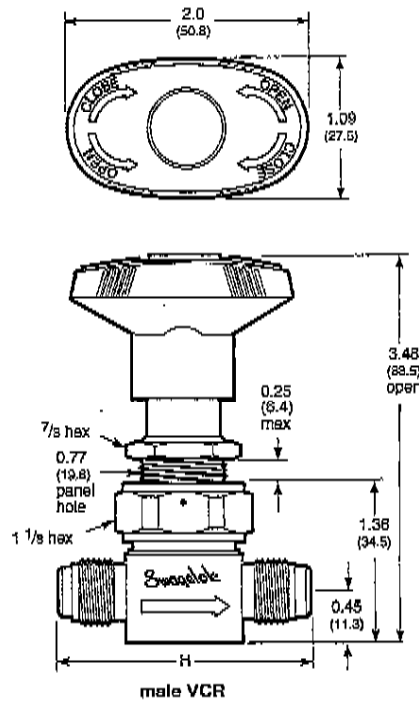
Dimensions/Ordering Information

Round Handle

Pneumatic Actuator



Directional Handle



Dimensions, in. (mm)			
Basic Ordering Number	End Connection Size and Style	H	J Hex
6LV-DABW4-	1/4 in. butt weld	1.74 (44.2)	-
6LV-DABW6M-	6 mm butt weld	1.74 (44.2)	-
6LV-DAFR4-	1/4 in. female VCR	2.76 (70.2)	3/4
6LV-DAVR4-	1/4 in. male VCR	2.30 (58.5)	-
6LV-DAFS4-	1/4 in. female S Type VCR	2.78 (70.6)	5/8

For a complete ordering number, add the desired Surface Finish designator, followed by the Actuator designator to the Basic Ordering Number.

Surface Finishes

- high purity surface finishes
- standard surface finish

- Designators
- P
 - PX
 - no designator

Pneumatic Actuators

- normally closed
- normally open

- C
- O

Manual Actuators

- round handle, green
- round handle, blue
- round handle, black
- round handle, orange
- round handle, red
- round handle, white
- round handle, yellow
- directional handle, green

- GR
- BL
- BK
- OR
- RD
- WH
- YW
- no designator

Examples:

- 6LV-DABW4 — standard surface finish, directional handle
- 6LV-DAFR4-PX-C — PX surface finish, normally closed actuator
- 6LV-DAVR4-P-BL — P surface finish, round handle, blue

Safe Component Selection
When selecting a component, the total system design must be considered to ensure safe, trouble-free performance. Component function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.