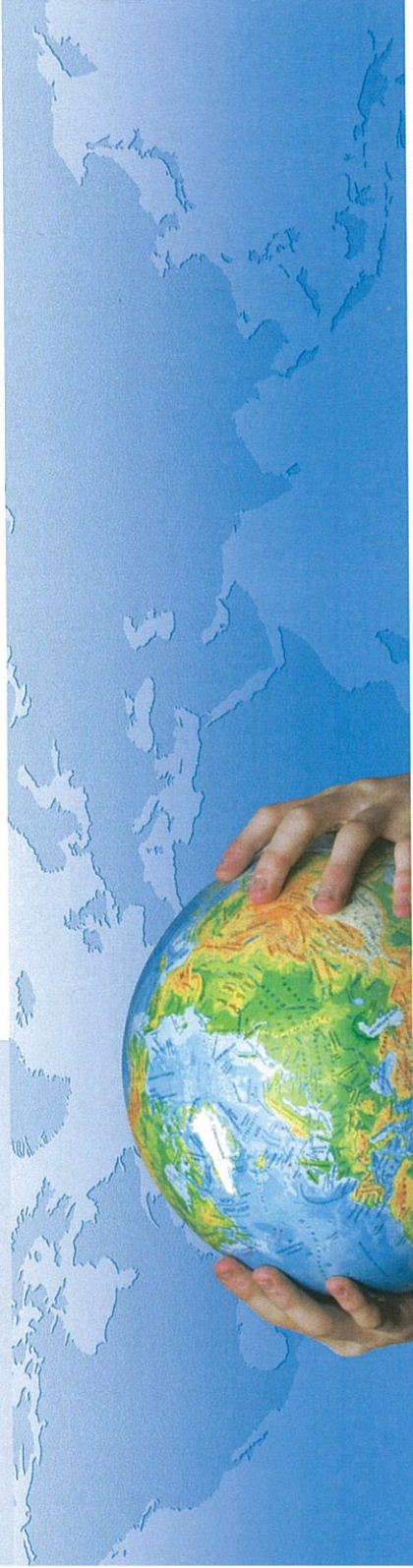


CARTEN[®]
Ultra High Purity Valves

SPDS SERIES

Ultra-High Purity Diaphragm Valves (SPDS)
Pneumatic Diaphragm Valves (SPDSA)
Dual Containment Diaphragm Valves (DCS)



SPDS SERIES

This SPDS (diaphragm Design) is intended for bulk gas distribution where containment, cleanliness and purity are of the utmost importance. Applications for this valve include:

- **High purity gas system control valves**
- **High purity gas control for point-of-use service**
- **Superior containment and cleanliness for your most critical valve applications**
- **Suitable for inert and most spec. gases**

SPDS Series Product Features

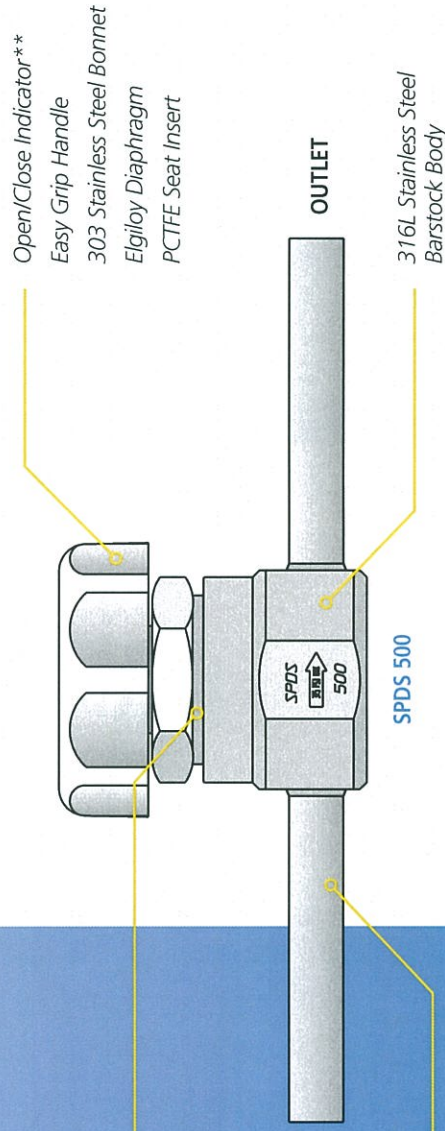
- High Cv and Most Compact Design
- Ultra-High Purity Stainless Steel/PCTFE Gas Construction
- Elgiloy Tied-Diaphragm for Maximum Flow & High Life Cycle
- Springless, Packless Design
- No Internal Particle Shedding Components
- Electropolished Wetted Surfaces to 10 Ra Max (Optional surface finishes available)
- Industry Leading Design for Ultra-High Purity Gas Containment
- Purge Connections and Purge Valves are Integrated in Valve Body
- Assembled and Tested in Class 10 Cleanroom
- Valve Bodies and Tube Stubs are Serialized for Material Certification
- Inboard and Across the Seat Leak Tested with 100% Helium
- Cleaned For Ultra-High Purity Gas Service
- Purged and Final Packaged in Class 1 Cleanroom. Double-Bag Packaging with Ultra-High Purity N₂ Gas Environment
- Field Retrofit Manual or Air Actuated

316 Stainless Steel Stern
316L Seat Holder
Stainless Steel Purge
Port**

INLET

316L Stainless Steel
Tube Ends*

SPDS Series Construction Materials



*See corresponding Code Charts for available end connections.

**The open/close indicator provides open/close status at the fully open or closed positions. It is not intended to act as a metering or proportioning system.

SPDS Series Technical Data

MATERIAL OF CONSTRUCTION	Wetted Areas Non-Wetted Areas	Elgilloy, 316L Stainless Steel, PCTFE 316L Stainless Steel, 303 Stainless Steel
MAXIMUM OPERATING PRESSURE	SPDS 250 & 375 SPDS 500, 750 & 1000	Vacuum to 375 psig (25.8 bar)
ORIFICE	SPDS 250 & 375 SPDS 500 & 750	0.250 in. (6.35 mm) 0.500 in. (12.7 mm)
MAXIMUM OPERATING TEMPERATURE		-22F (-30°C) to 180°F (82°C)
FLOW COEFFICIENT (C _v)	SPDS 250 & 375 SPDS 500 & 755 SPDS 751 & 1000	0.41 & 0.64 respectively 2.81 & 3.15 respectively 7.0** & 9.0 respectively
HELIUM LEAK TEST	Inboard Across the Seat Outboard Pressure Test	1 x 10 ⁻¹¹ Pa·m ³ /s (1 x 10 ⁻¹⁰ atm·cc (He)/s) 1 x 10 ⁻¹⁰ Pa·m ³ /s (1 x 10 ⁻⁹ atm·cc (He)/s) 1 x 10 ⁻⁷ Pa·m ³ /s (1 x 10 ⁻⁶ atm·cc (He)/s)
INTERNAL VOLUME	SPDS 250 SPDS 375 SPDS 500 & 755 SPDS 751 & 1000	0.124 in ³ (2.032 cm ³) 0.177 in ³ (2.901 cm ³) 0.816 in ³ (13.374 cm ³)
CLEANLINESS	Assembled and tested in Class 10 cleanroom. Purged and final packaged in Class 1 cleanroom. Double-bag packaging (2 mil nylon inner bag, 6 mil polyethylene outer bag) with Ultra-High Purity N ₂ gas environment.	
STANDARD FINISH	Electropolished to 10 Ra (0.25 Ra μm) on all wetted surfaces	
OPTIONS	Surface finish - 5 Ra, 20 Ra Panel Mounting Panel Mounting Angle valve (PMA) Air-Actuated (SPDS 250, 375, 500 & 755) Particle, moisture, THC and O ₂ testing SEM and ESCA testing, AES analysis	Fitting type and location Material: Vespel® seat Handle color (Std. white) JIS tube ends and tube length 1/4 Turn handles (SPDS 250 & 375 only)

Specifications are subject to change without notice. Vespel® is a registered trademark of DuPont Company. **Estimated

SPDS Series Technical Dimensions

Size	A	B	C	D	E	F	G	H	J	K	L
SPDS 250	Ø .250 (6.35mm)	0.035 (.88mm)	0.500 (12.7mm)	2.22 (56.4mm)	7.35 (186.6mm)	2.00 (50.8mm)	2.43 (61.7mm)	4.86 (123.4mm)	1.27 (32.3mm)	3.04 (77.2mm)	1.96 (49.7mm)
SPDS 375	Ø .375 (9.5mm)	0.035 (.88mm)	0.500 (12.7mm)	2.21 (56.4mm)	7.31 (185.6mm)	2.00 (50.8mm)	2.37 (60.2mm)	4.75 (120.3mm)	1.27 (32.3mm)	3.04 (77.2mm)	1.96 (49.7mm)
SPDS 525	Ø .500 (12.7mm)	0.049 (1.2mm)	0.500 (12.7mm)	2.22 (56.4mm)	7.35 (186.6mm)	2.00 (50.8mm)	2.42 (61.7mm)	4.84 (122.9mm)	1.27 (32.3mm)	3.04 (77.2mm)	1.96 (49.7mm)
SPDS 500	Ø .500 (12.7mm)	0.049 (1.2mm)	0.463 (11.7mm)	2.83 (71.8mm)	8.08 (205.2mm)	2.50 (63.5mm)	2.50 (63.5mm)	3.75 (95.2mm)	2.00 (50.8mm)	3.04 (77.2mm)	2.01 (51.1mm)
SPDS 755	Ø .750 (19.0mm)	0.065 (1.6mm)	0.500 (12.7mm)	2.83 (71.8mm)	8.00 (203.2mm)	2.50 (63.5mm)	2.50 (63.5mm)	3.75 (95.2mm)	1.91 (48.5mm)	4.04 (102.6mm)	2.01 (51.1mm)

SPDS 1000 Series Technical Dimensions

Size	A	B	C	D	E	F
SPDS 751	Ø .75 (19.0mm)	0.065 (1.6mm)	0.75 (19.0mm)	4.03 (102.7mm)	10.73 (272.5mm)	3.81 (96.7mm)
SPDS 1000	Ø 1.00 (25.4mm)	0.065 (1.6mm)	0.75 (19.0mm)	3.06 (77.7mm)	8.79 (223.2mm)	3.81 (96.7mm)

*Metric tube sizes and wall thicknesses are available on request.
NOTE 1: All tolerances are ±0.06 in. (± 1.52mm) unless otherwise stated;

NOTE 2: Dimensional drawings shown are for reference only.
Please contact CARTEN® for customer drawings.

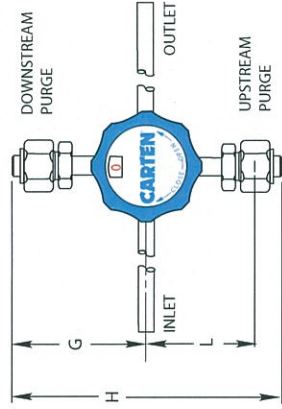
SPDST Series Technical Dimensions

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	
SPDST 250x250	Ø .250 (6.35mm)	0.035 (.88mm)	Ø .250 (6.35mm)	0.035 (.88mm)	4.50 (114.3mm)	2.00 (50.8mm)	3.69 (93.7mm)	7.34 (186.4mm)	1.27 (32.2mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.500 (12.7mm)	2.22 (56.4mm)	1.95 (49.3mm)
SPDST 375x375	Ø .375 (9.5mm)	0.035 (.88mm)	Ø .375 (9.5mm)	0.035 (.88mm)	4.50 (114.3mm)	2.00 (50.8mm)	3.69 (93.7mm)	7.34 (186.4mm)	1.27 (32.2mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.500 (12.7mm)	2.22 (56.4mm)	1.95 (49.5mm)
SPDST 525x250	Ø .500 (12.7mm)	0.049 (1.2mm)	Ø .250 (6.35mm)	0.035 (.88mm)	4.50 (114.3mm)	2.00 (50.8mm)	4.10 (104.1mm)	7.34 (186.4mm)	1.27 (32.2mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.500 (12.7mm)	2.22 (56.4mm)	1.95 (49.5mm)
SPDST 500x375	Ø .500 (12.7mm)	0.049 (1.2mm)	Ø .375 (9.5mm)	0.035 (.88mm)	6.81 (172.9mm)	2.50 (63.5mm)	4.03 (102.3mm)	8.07 (204.9mm)	2.00 (50.8mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.463 (11.8mm)	2.83 (71.8mm)	2.31 (58.6mm)
SPDST 500x500	Ø .500 (12.7mm)	0.049 (1.2mm)	Ø .500 (12.7mm)	0.049 (1.2mm)	6.81 (172.9mm)	2.50 (63.5mm)	4.03 (102.3mm)	8.07 (204.9mm)	2.00 (50.8mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.463 (11.8mm)	2.83 (71.8mm)	2.31 (58.6mm)
SPDST 755x500	Ø .750 (19.0mm)	0.065 (1.6mm)	Ø .500 (12.7mm)	0.049 (1.2mm)	6.81 (172.9mm)	2.50 (63.5mm)	4.03 (102.3mm)	8.07 (204.9mm)	2.00 (50.8mm)	3.04 (77.2mm)	3.04 (77.2mm)	0.463 (11.8mm)	2.83 (71.8mm)	2.31 (58.6mm)

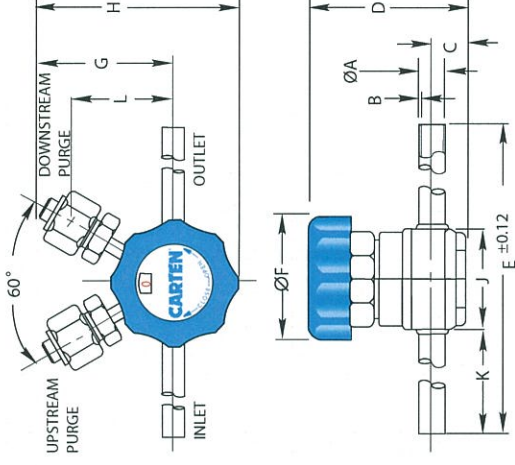
SPDS SERIES

SPDS and SPDST Series Typical Valve Dimensions (1/4" to 3/4")

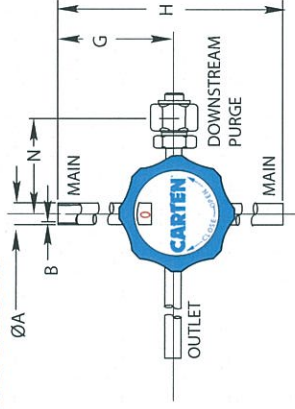
SPDS 250 & 375



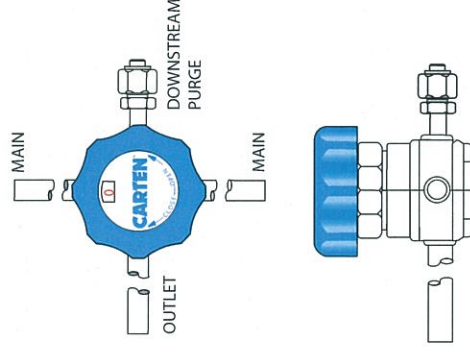
SPDS 500 & 755



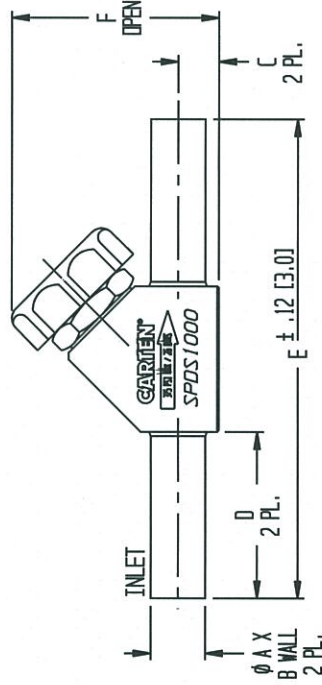
SPDST 250 & 375



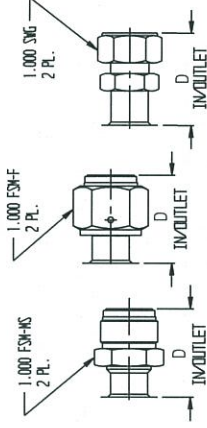
SPDST 500 & 755



SPDS 1000/751



OPTIONAL VALVE END CONNECTIONS AVAILABLE



Size	Dimension "D"		
	FSM-M	FSM-F	SWG
500	1.54 (39.1mm)	1.54 (39.1mm)	2.10 (53.3mm)
750	2.04 (51.8mm)	2.04 (51.8mm)	2.03 (51.6mm)
1000	2.36 (59.9mm)	2.36 (59.9mm)	2.49 (63.2mm)

SPDSA SERIES

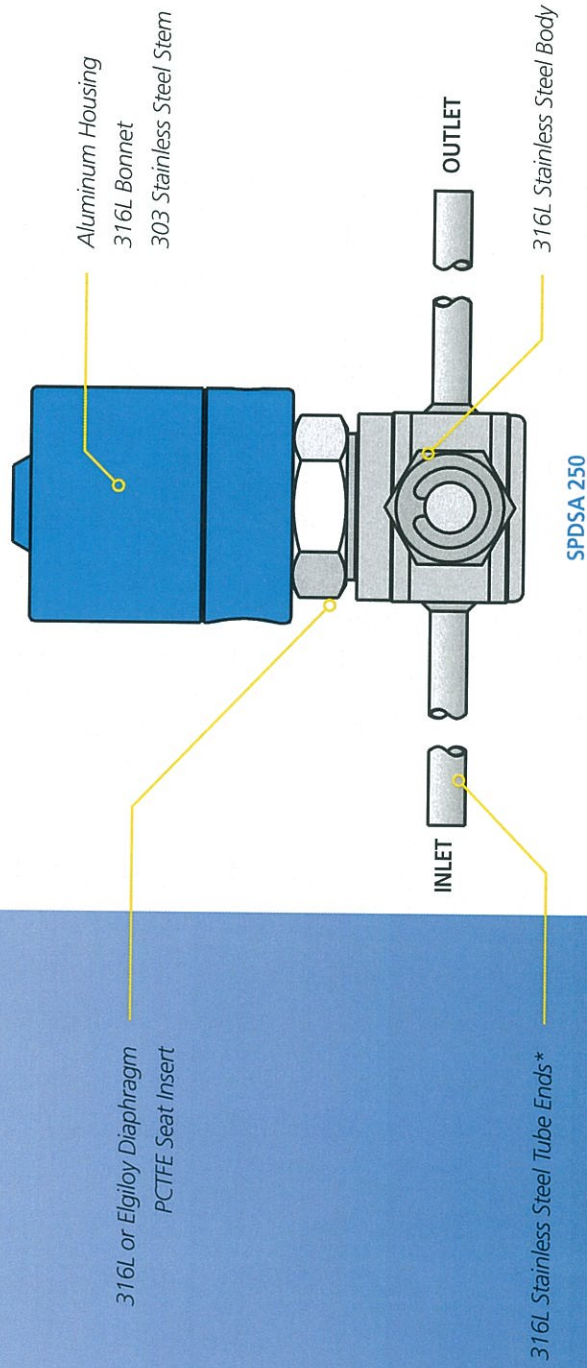
This SPDSA Series Valves are designed for high performance gas and chemical distribution systems combined with the lowest overall operating costs, make this valve an excellent consideration for:

- **High purity gas distribution system control**
- **High purity gas valves for point-of-use service**
- **Superior containment and cleanliness for your most critical valve applications**
- **Suitable for inert and most spec. gases**

SPDSA Series Product Features

- Diaphragm Design for Ultra-High Purity Service and High Cycle Life
- High Purity Stainless/PCTFE Gas Construction
- Elgiloy Tied-Diaphragm for Maximum Flow & High Life Cycle
- Springless, Packless Design
- No Internal Particle Shedding Components
- Electropolished Wetted Surfaces to 10 Ra Max (Optional surface finishes available)
- Industry Leading Design for Ultra-High Purity Gas Containment
- Purge Connections and Purge Valves are Integrated in Valve Body
- Assembled and Tested in Class 10 Cleanroom
- Valve Bodies and Tube Stubs are Serialized for Material Certification
- Inboard and Across the Seat Leak Tested with 100% Helium
- Cleaned For Ultra-High Purity Gas Service
- Purged and Final Packaged in Class 1 Cleanroom. Double-Bag Packaging with Ultra-High Purity N₂ Gas Environment
- Field Retrofit Manual or Air Actuated

SPDSA Series Construction Materials



*See corresponding Code Charts for available end connections.

SPDSA Series Technical Data

MATERIAL OF CONSTRUCTION	Wetted Areas 316L Stainless Steel, Elgiloy Nickel Alloy, PCTFE	
	Non-Wetted Areas 316L Stainless Steel, 303 Stainless Steel	
MAXIMUM OPERATING PRESSURE	SPDSA250/375/525 Vacuum to 375 psig (25.8 bar) SPDSA500/755 Vacuum to 250 psig (0-17.2 bar)	
MAXIMUM OPERATING TEMPERATURE	PCTFE Seat -22F (-30°C) to 180°F (82°C) Vespel® Seat 302°F (150°C)	
FLOW COEFFICIENT (C _v) AND ACTUATOR PRESSURE	Model	Size Act. Pressure
	SPDSA250	1/4" 60-80psig
	SPDSA375	3/8" (4.1-5.5 bar)
	SPDSA525	1/2" 60-80psig
	SPDSA500	1/2" 90-100psig
	SPDSA755	3/4" (6.2-6.9 bar)
HELIUM LEAK TEST	Inboard Across the Seat Outboard Pressure Test	1 x 10 ⁻¹¹ Pa·m ³ /s (1 x 10 ⁻¹⁰ atm·cc (He)/s) 1 x 10 ⁻¹⁰ Pa·m ³ /s (1 x 10 ⁻⁹ atm·cc (He)/s) 1 x 10 ⁻⁷ Pa·m ³ /s (1 x 10 ⁻⁶ atm·cc (He)/s)
CLEANLINESS AND PACKAGING	Assembled and Tested in Class 10 Cleanroom. Purged and Final Packaged in Class 1 Cleanroom. Double-bag packaging (2 mil nylon inner bag, 6 mil polyethylene outer bag) with Ultra-High Purity N ₂ gas environment.	
STANDARD FINISH	Electropolished to 10 Ra (0.25 µm) on all wetted surfaces	
OPTIONS	Normally open, normally closed, dual acting Limit/Proximity Switch Surface finish – 5 Ra optional Testing: Particle, moisture, THC, O ₂ , SEM, ESCA, and AES Purge fitting type and location Inlet/outlet end connection type JIS tube stubs and tube length	

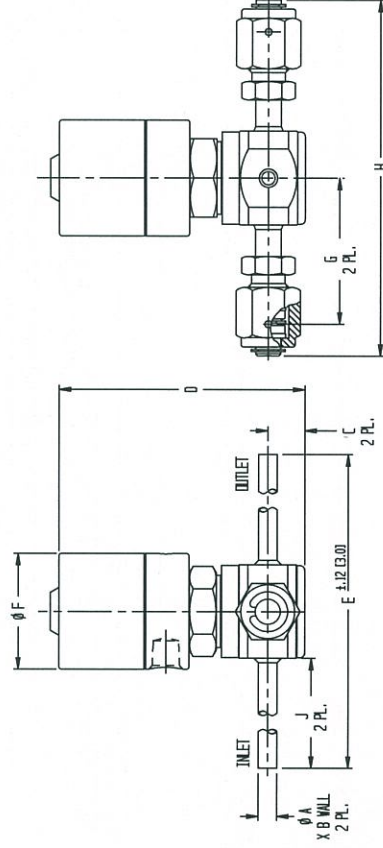
Specifications are subject to change without notice. Cv tests per SEMATECH 901203948-STD standard. *Vespel® is a registered trademark of Dupont Company.

SPDSA Series Technical Dimensions

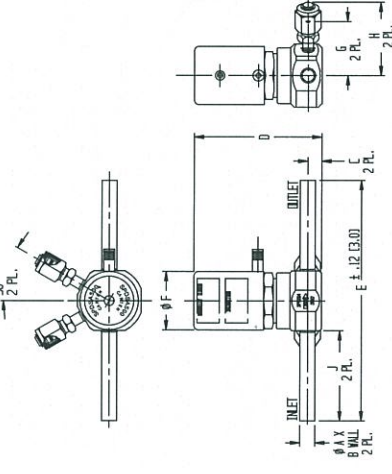
Size	A	B	C	D	E	F	G	H	J
SPDSA 250-NC	Ø .25 (6.35mm)	0.035 (.88mm)	0.50 (12.7mm)	3.34 (84.8mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
SPDSA 250-NO	Ø .25 (6.35mm)	0.035 (.88mm)	0.50 (12.7mm)	3.49 (88.6mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
SPDSA 375-NC	Ø 3.75 (5mm)	0.035 (.88mm)	0.50 (12.7mm)	3.34 (84.8mm)	7.35 (186.6mm)	1.57 (39.8mm)	1.96 (49.7mm)	4.83 (122.6mm)	3.04 (77.2mm)
SPDSA 375-NO	Ø 3.75 (5mm)	0.035 (.88mm)	0.50 (12.7mm)	3.49 (88.6mm)	7.35 (186.6mm)	1.57 (39.8mm)	1.96 (49.7mm)	4.83 (122.6mm)	3.04 (77.2mm)
SPDSA 525-NC	Ø .50 (12.7mm)	0.049 (1.2mm)	0.50 (12.7mm)	3.34 (84.8mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
SPDSA 525-NO	Ø .50 (12.7mm)	0.049 (1.2mm)	0.50 (12.7mm)	3.49 (88.6mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
SPDSA 500-NC	Ø .50 (12.7mm)	0.049 (1.2mm)	0.46 (11.6mm)	4.26 (108.2mm)	8.08 (205.2mm)	1.96 (49.7mm)	2.01 (51.0mm)	2.50 (63.5mm)	3.04 (77.2mm)
SPDSA 500-NO	Ø .50 (12.7mm)	0.049 (1.2mm)	0.46 (11.6mm)	4.26 (108.2mm)	8.08 (205.2mm)	1.96 (49.7mm)	2.01 (51.0mm)	2.50 (63.5mm)	3.04 (77.2mm)
SPDSA 755-NC	Ø .75 (19.0mm)	0.065 (1.6mm)	0.46 (11.6mm)	4.26 (108.2mm)	8.00 (203.2mm)	1.96 (49.7mm)	2.01 (51.0mm)	2.50 (63.5mm)	3.04 (77.2mm)
SPDSA 755-NO	Ø .75 (19.0mm)	0.065 (1.6mm)	0.46 (11.6mm)	4.26 (108.2mm)	8.00 (203.2mm)	1.96 (49.7mm)	2.01 (51.0mm)	2.50 (63.5mm)	3.04 (77.2mm)

SPDSA Series Typical Valve Dimensions

SPDSA 250, 375 & 525



SPDSA 500 & 755



DCS SERIES

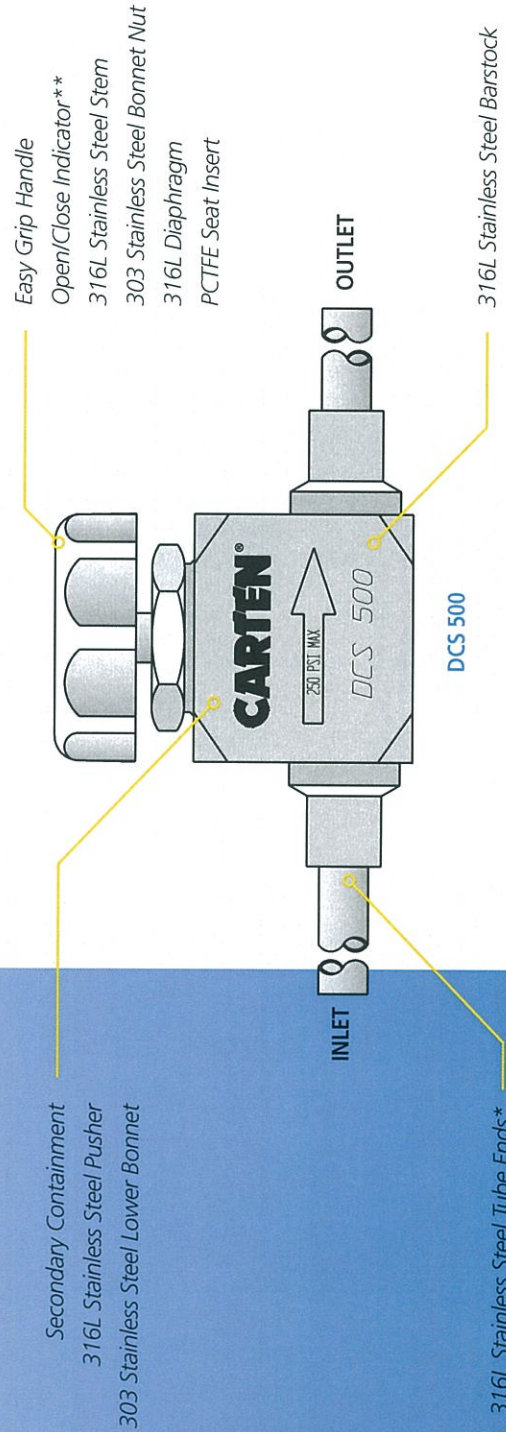
This DCS (Diaphragm Design)

valve series is intended for bulk gas or solvent double containment distribution service where cleanliness and purity are of the utmost importance. These springless, packless, diaphragm valves control the passage of gas or solvent through the primary tube while providing a complete secondary containment flow path. The secondary flow path remains open regardless of the primary passage being opened or closed.

DCS Series Product Features

- Dual Containment Directly Through the Valve
- Diaphragm Design for Ultra-High Purity and Long Cycle Life
- High Purity Stainless/CTFE Gas Construction
- Elgiloy Tied-Diaphragm for Maximum Flow & High Life Cycle
- Springless, Packless Design
- No Internal Particle Shedding Components
- Electropolished Wetted Surfaces to 10 Ra Max (Optional surface finishes available)
- Industry Leading Design for Ultra-High Purity Gas Containment
- Purge Connections and Purge Valves are Integrated in Valve Body
- Assembled and Tested in Class 10 Cleanroom
- Valve Bodies and Tube Stubs are Serialized for Material Certification
- Inboard and Across the Seat Leak Tested with 100% Helium
- Cleaned For Ultra-High Purity Gas Service
- Purged and Final Packaged in Class 1 Cleanroom. Double-Bag Packaging with Ultra-High Purity N₂ Gas Environment
- Field Retrofit Manual or Air Actuated

DCS Series Construction Materials



*See corresponding Code Charts for available end connections.

**The open/close indicator provides open/close status at the fully open or closed positions. It is not intended to act as a metering or proportioning system.
U.S. Patent # 4,867,201

DCS Series Technical Data

MATERIAL OF CONSTRUCTION	Primary Wetted Areas Secondary Non-Wetted Areas	316L Stainless Steel, PCTFE 316L Stainless Steel, 303 Stainless Steel
MAXIMUM OPERATING PRESSURE	Primary and Secondary	Vacuum to 250 psig (0-17.2 bar) (See Application Note)
MAXIMUM OPERATING TEMPERATURE	PCTFE Seat Vespel® Seat	-22° F (-30° C) to 180°F (82°C) 302°F (150°C)
ORIFICE	DCS 250 & 375 DCS 500 & 750	0.250 in. (6.35 mm) 0.437 in. (10.96 mm)
FLOW COEFFICIENT (C _v)	DCS 250 DCS 375 DCS 500 DCS 750	0.41 0.41 1.2 1.2
HELIUM LEAK TEST	Inboard Across the Seat Outboard Pressure Test	1 x 10 ⁻¹¹ Pa·m ³ /s (1 x 10 ⁻¹⁰ atm·cc (He)/s) 1 x 10 ⁻¹⁰ Pa·m ³ /s (1 x 10 ⁻⁹ atm·cc (He)/s) 1 x 10 ⁻⁷ Pa·m ³ /s (1 x 10 ⁻⁶ atm·cc (He)/s)
CLEANLINESS AND PACKAGING	Assembled and tested in Class 10 Cleanroom. Purged and Final Packaged in Class 1 Cleanroom. Double-bag packaging (2 mil nylon inner bag, 6 mil polyethylene outer bag) with Ultra-High Purity N ₂ gas environment.	
STANDARD FINISH	Electropolished to 10 Ra (0.25 µm) on all wetted surfaces	
OPTIONS	Surface finish – 5 Ra Testing: Particle, moisture, THC and O ₂ SEM and ESCA testing, AES analysis Air-actuated versions (DCS 250 and 375 only) Handwheel color	

Specifications are subject to change without notice. *Vespel® is a registered trademark of Dupont Company.

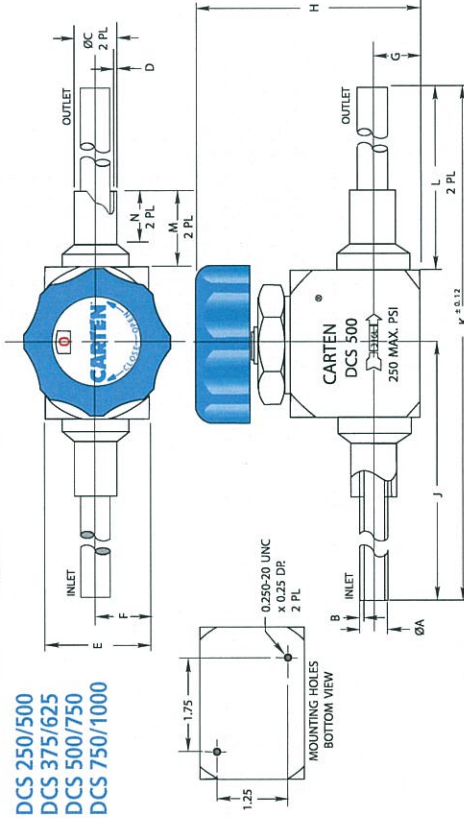
DCS Series Technical Dimensions

Size	A	B	C	D	E	F	G	H	J	K	L	M	N
DCS 250-035 500-049	0.250	0.035	0.500	0.049	1.75 (44.5mm)	0.85 (22.2mm)	0.625 (15.8mm)	3.08 (78.2mm)	4.00 (101.6mm)	8.00 (203.2mm)	3.00 (76.2mm)	1.11 (28.1mm)	0.75 (19.05mm)
DCS 375-035 625-049	0.375	0.035	0.625	0.049	1.75 (44.5mm)	0.85 (22.2mm)	0.625 (15.8mm)	3.08 (78.2mm)	4.00 (101.6mm)	8.00 (203.2mm)	3.00 (76.2mm)	1.11 (28.1mm)	0.75 (19.05mm)
DCS 500-049 750-065	0.500	0.049	0.750	0.065	2.00 (50.8mm)	1.000 (25.4mm)	0.687 (17.4mm)	3.52 (89.4mm)	4.25 (107.9mm)	8.50 (215.9mm)	3.00 (76.2mm)	1.11 (28.1mm)	0.75 (19.05mm)
DCS 750-065 1000-065	0.750	0.065	1.000	0.065	2.00 (50.8mm)	1.000 (25.4mm)	0.687 (17.4mm)	3.52 (89.4mm)	4.25 (107.9mm)	8.50 (215.9mm)	3.00 (76.2mm)	1.11 (28.1mm)	0.75 (19.05mm)

*Metric tube sizes and wall thicknesses are available on request. NOTE 1: All tolerances are ±0.06 in. (± 1.52mm) unless otherwise stated. NOTE 2: Dimensional drawings shown are for reference only. Please contact CARTEN® for customer drawings.

DCS Series Typical Valve Dimensions

DCS 250/500
DCS 375/625
DCS 500/750
DCS 750/1000



Application Note (DCS Series):

A typical application utilizes a vacuum on the secondary line. However, the secondary line pressure can exceed the primary if desired. As the secondary pressure increases to more than 60 psi over the primary (for DCS 250) or 20 psi (for DCS 500), reduced primary flow rate could result. Increasing secondary pressure to more than 110 psi over the primary (for DCS 250) or 50 psi (for DCS 500), the flow in the primary will be essentially shut off.

Application Note (DCSA Series):

The DCSA series is not intended for use in a vacuum application. Secondary line pressure should not exceed 14.5 psi (1 bar). Air-actuator is supplied with quick disconnect fitting to suite 1/4" O.D. pipe. Air-actuator requires 90-100 psi air to open.

CARTEN®
Ultra High Purity Valves

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