

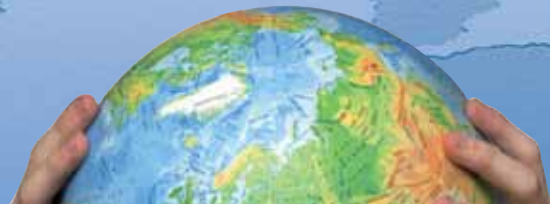
CARTEN[®]
Ultra High Purity Valves

SPDS SERIES

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



SPDS SERIES



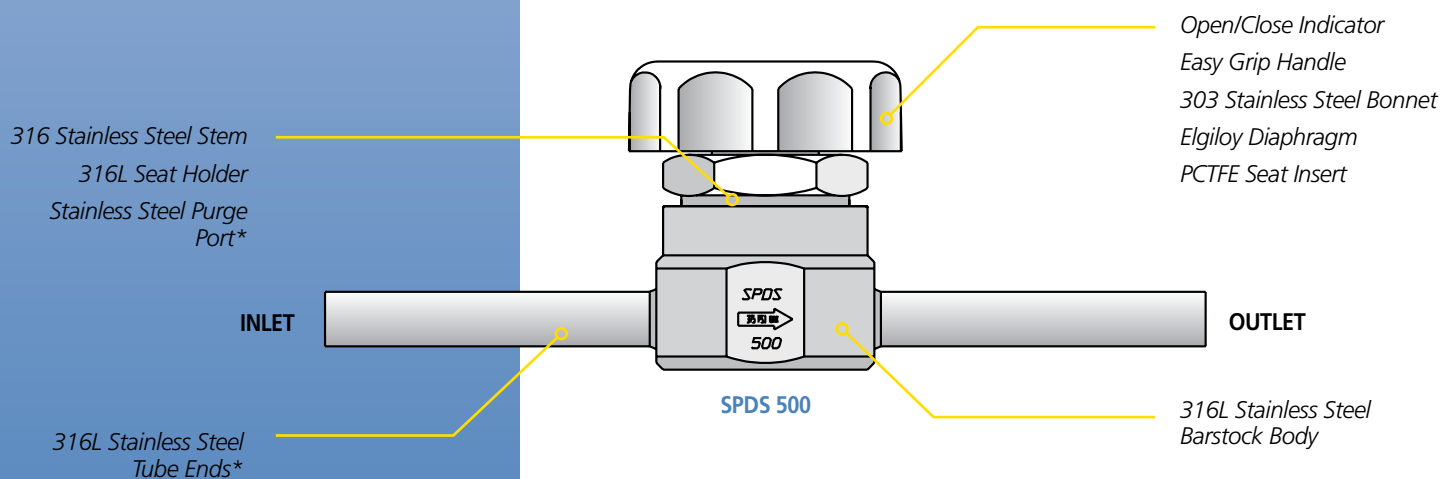
This SPDS (diaphragm design) valve series is intended for bulk gas distribution where containment, cleanliness and purity are of the utmost importance. Applications for this valve include:

- **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 in 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

SPDS Construction Materials



*See corresponding Code Charts for available end connections.

SPDSA SERIES

SPDS Series Technical Data

MATERIAL OF CONSTRUCTION	Wetted Areas	Elgiloy, 316L Stainless Steel, PCTFE
	Non-Wetted Areas	316L Stainless Steel, 303 Stainless Steel
MAXIMUM OPERATING PRESSURE	SPDS 250 & 375 SPDS 500, 750 & 1000	Vacuum to 375 psig (25.8 bar)
MAXIMUM OPERATING TEMPERATURE		-22F (-30°C) to 180°F (82°C)
ORIFICE	SPDS 250 & 375	0.250 in. (6.35 mm)
	SPDS 500 & 750	0.500 in. (12.7 mm)
FLOW COEFFICIENT (C _v)	SPDS 250 & 375	0.41 & 0.64 respectively
	SPDS 500 & 755	2.81 & 3.15 respectively
	SPDS 751 & 1000	7.0 & 9.0 respectively
HELIUM LEAK TEST	Inboard	1 x 10 ⁻¹¹ Pa·m ³ /s (1 x 10 ⁻¹⁰ atm·cc (He) /s)
	Across the Seat	1 x 10 ⁻¹⁰ Pa·m ³ /s (1 x 10 ⁻⁹ atm·cc (He) /s)
	Outboard Pressure Test	1 x 10 ⁻⁷ Pa·m ³ /s (1 x 10 ⁻⁶ atm·cc (He) /s)
INTERNAL VOLUME	SPDS 250	0.124 in ³ (2.032 cm ³)
	SPDS 375	0.177 in ³ (2.901 cm ³)
	SPDS 500 & 755	0.816 in ³ (13.374 cm ³)
	SPDS 751 & 1000	1.881 in ³ (30.824 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 Max (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	Material: Vespel® seat Handle color (Std. white) 1/4 Turn handles (SPDS 250 & 375 only) Fitting connections available for up to 1.00" size – inlet/outlet JIS tube ends and tube length

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

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)

SPDST Series Technical Dimensions

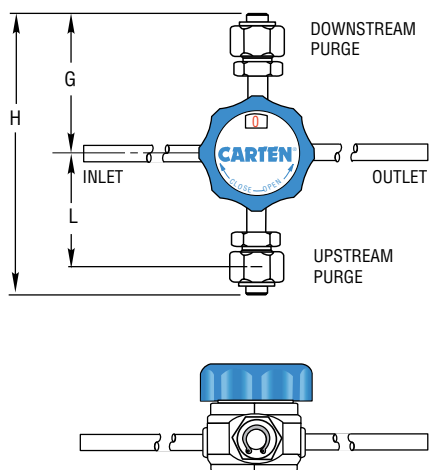
Size	A	B	C	D	E	F	G	H	J	K	L	M	N
SPDST 250x250	Ø .250 (6.35mm)	0.035 (.88mm)	Ø .250 (6.35mm)	0.035 (.88mm)	4.50 (114.3mm)	2.00 (50.8mm)	3.69 (93.7mm)	7.34 (186.4mm)	1.27 (32.2mm)	3.04 (77.2mm)	0.500 (12.7mm)	2.22 (56.4mm)	1.95 (49.3mm)
SPDST 375x375	Ø .375 (9.5mm)	0.035 (.88mm)	Ø .375 (9.5mm)	0.035 (.88mm)	4.50 (114.3mm)	2.00 (50.8mm)	3.69 (93.7mm)	7.34 (186.4mm)	1.27 (32.2mm)	3.04 (77.2mm)	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)	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)	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)	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)	0.463 (11.8mm)	2.83 (71.8mm)	2.31 (58.6mm)

SPDS SERIES

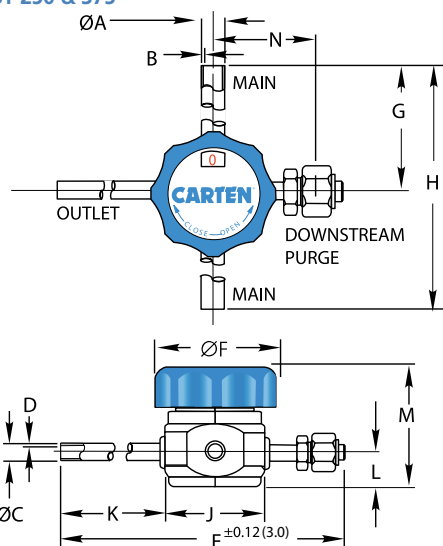


SPDS and SPDST Series Typical Valve Dimensions (1/4" to 1")

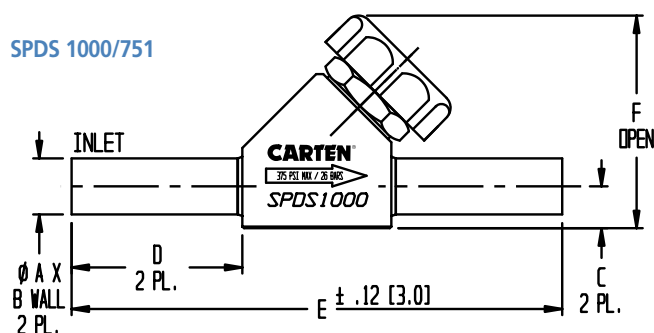
SPDS 250 & 375



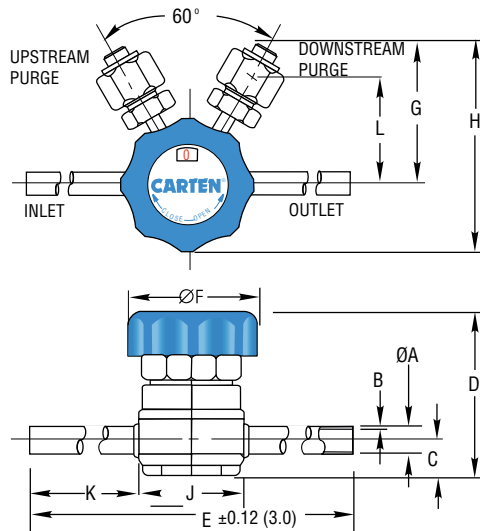
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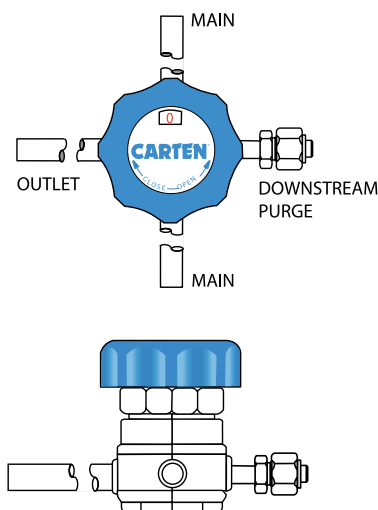
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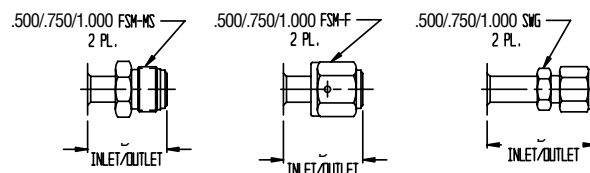
SPDS 500 & 755



SPDST 500 & 755



OPTIONAL VALVE END CONNECTIONS AVAILABLE ON SPDS 1/2" - 1" BODY SIZES



Size	Length		
	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)

NOTE 1: All tolerances are ± 0.06 in. (± 1.52 mm) unless otherwise stated;

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

SPDSA SERIES

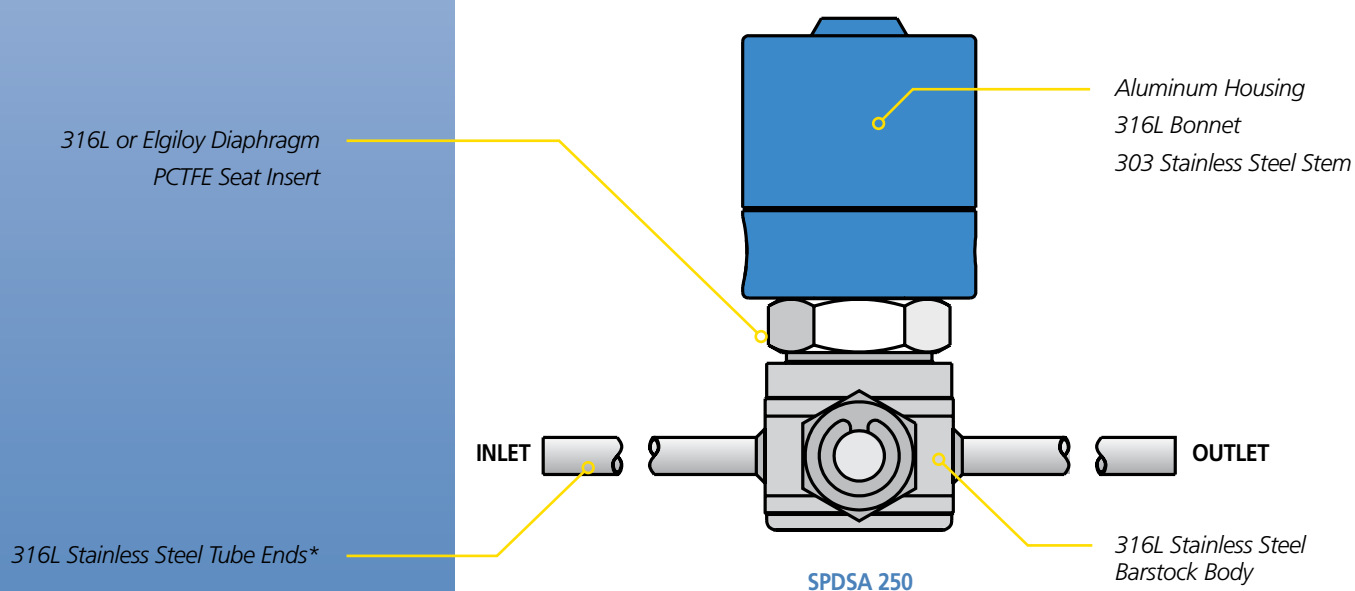
This SPDSA Valve Series is designed for high performance gas and chemical distribution systems combined with the lowest overall operating costs, make this valve an excellent consideration for:

- **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 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 SPDSA500/755		Vacuum to 250 psig (0-17.2 bar)	
MAXIMUM OPERATING TEMPERATURE	PCTFE Seat Vespel® Seat		-22F (-30°C) to 180°F (82°C) 302°F (150°C)	
FLOW COEFFICIENT (C _v) AND ACTUATOR PRESSURE	Model	Size	Cv	Act. Pressure
	SPDSA250	1/4"	0.41	60-80psig
	SPDSA375	3/8"	0.64	(4.1-5.5 bar)
	SPDSA525	1/2"	0.68	60-80psig
	SPDSA500	1/2"	2.81	90-100psig
	SPDSA755	3/4"	3.15	(6.2-6.9 bar)
HELIUM LEAK TEST	Inboard Across the Seat Outboard Pressure Test		1 x 10 ⁻¹¹ Pa·m³/s (1 x 10 ⁻¹⁰ atm·cc (He) /s) 1 x 10 ⁻¹⁰ Pa·m³/s (1 x 10 ⁻⁹ atm·cc (He) /s) 1 x 10 ⁻⁷ Pa·m³/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 Max (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 Fitting connections available for inlet/outlet JIS tube stubs and tube length	

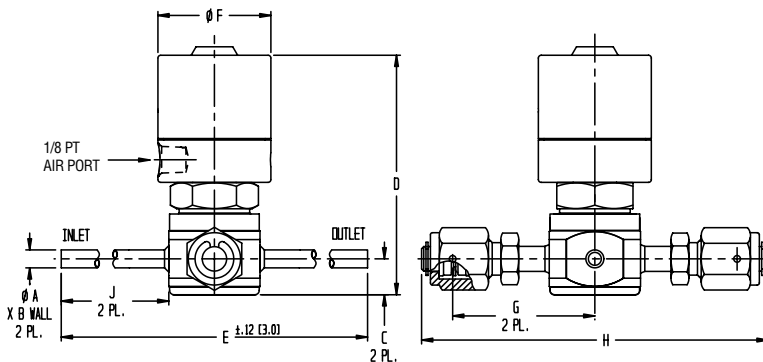
Specifications are subject to change without notice. *Vespel® is a registered trademark of Dupont Company.

SPDSA Series Technical Dimensions

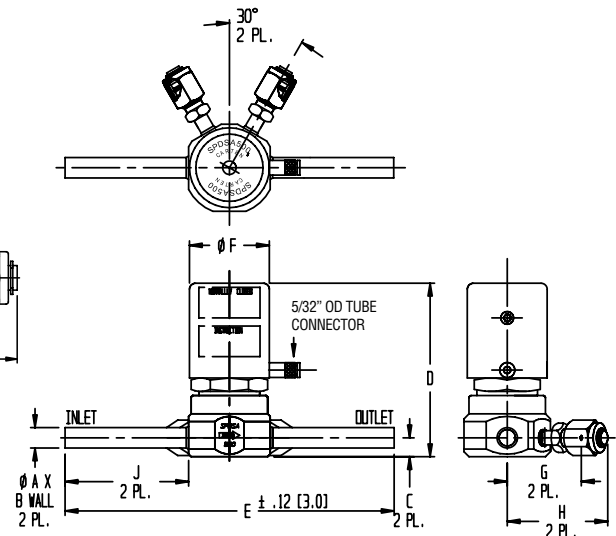
Size	A	B	C	D	E	F	G	H	J
SPDSA 250-NC	Ø .25 (6.35mm)	0.035 (.88mm)	0.50 (12.7mm)	3.34 (84.8mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
SPDSA 250-NO	Ø .25 (6.35mm)	0.035 (.88mm)	0.50 (12.7mm)	3.49 (88.6mm)	7.37 (187.1mm)	1.57 (39.8mm)	1.94 (49.2mm)	4.83 (122.6mm)	3.05 (77.4mm)
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



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

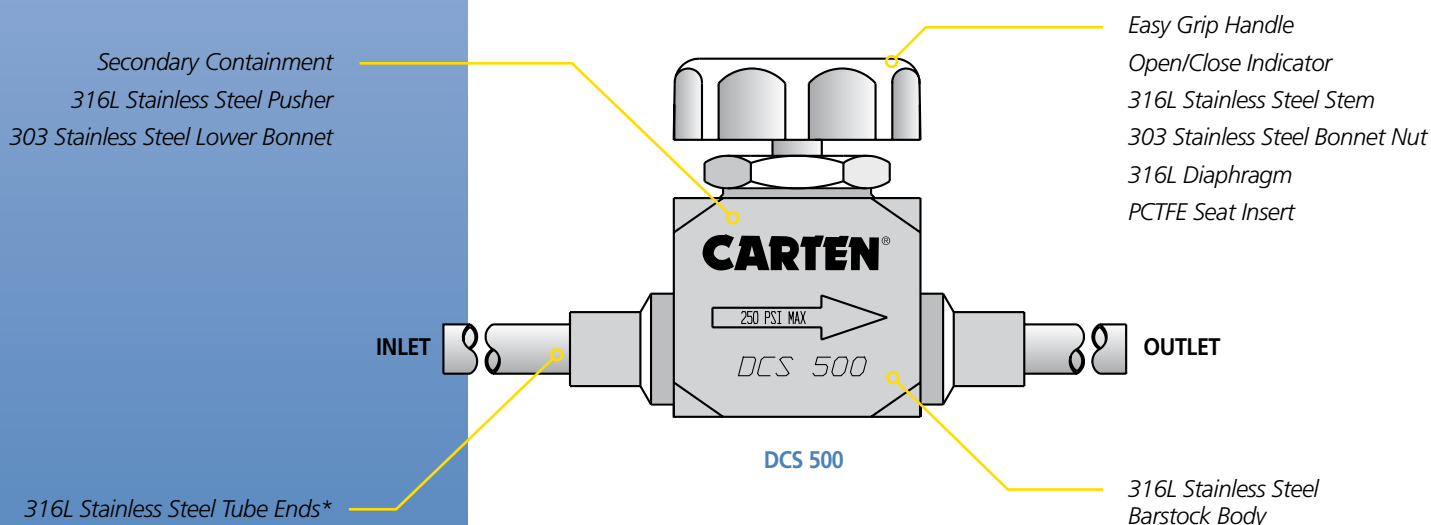


This DCS (diaphragm design) valve series is intended for bulk gas or solvent double containment distribution service where cleanliness and purity are of the utmost importance. These springless, packless, diaphragm valves control the passage of gas or solvent through the primary tube while providing a 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/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

DCS Construction Materials



*See corresponding Code Charts for available end connections.
U.S. Patent # 4,867,201

DCS Series Technical Data

MATERIAL OF CONSTRUCTION	Primary Wetted Areas	316L Stainless Steel, PCTFE
	Secondary Non-Wetted Areas	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	-22° F (-30° C) to 180°F (82°C)
	VespeI® Seat	302°F (150°C)
ORIFICE	DCS 250 & 375	0.250 in. (6.35 mm)
	DCS 500 & 750	0.437 in. (10.96 mm)
FLOW COEFFICIENT (C _v)	DCS 250	0.41
	DCS 375	0.41
	DCS 500	1.2
	DCS 750	1.2
HELIUM LEAK TEST	Inboard	1 x 10 ⁻¹¹ Pa·m ³ /s (1 x 10 ⁻¹⁰ atm·cc (He) /s)
	Across the Seat	1 x 10 ⁻¹⁰ Pa·m ³ /s (1 x 10 ⁻⁹ atm·cc (He) /s)
	Outboard Pressure Test	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 Max (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 Handwheel color	

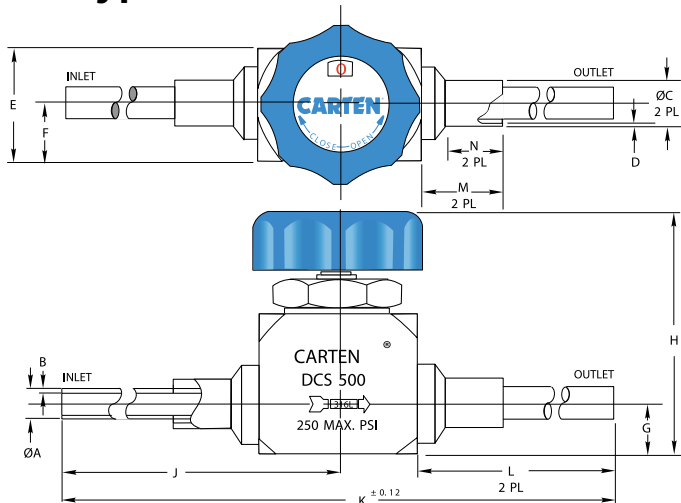
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DCS Series Technical Dimensions

Size	A	B	C	D	E	F	G	H	J	K	L	M	N
DCS 250/500	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 375/625	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 500/750	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 750/1000	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)

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.

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.

CARTEN®
Ultra High Purity Valves

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