

**CARTEN**<sup>®</sup>  
Ultra High Purity Valves

# DUPLEX SERIES

Ultra-High Purity Diaphragm Valves (DPC)  
Ultra-High Purity Bellows Valves (DFC)  
Ultra-High Purity Block Bellows Valves (DBC)



# DUPLEX SERIES

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

- **Ultra-high purity gas system control valves**
- **Ultra-high purity gas control for point-of-use or service for hookups**
- **Superior containment and cleanliness for your most critical valve applications**
- **Suitability for inert and most toxic gases**

## DPC Series Product Features

- Diaphragm Design for Ultra-High Purity and Long Cycle Life
- Elgiloy Tied-Diaphragm for Maximum Flow and 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
- Assembled and Tested in Class 10 Cleanroom
- Valve Bodies and Tube Stubs are Serialized for Material Certification
- Purge Connections and Purge Valves are Integral in Valve Body
- Inboard and Across the Seat Leak Tested with Helium
- Cleaned for Ultra-High Purity Gas Service
- Purged and Final Packaged in Class 1 Cleanroom. Double-Bag Packaging with Ultra-High Purity N<sub>2</sub> Gas Environment

## DPC Construction Materials

Electropolished 316L Seat Holder  
PCTFE Seat Insert  
Elgiloy Diaphragm

Easy Grip Handles  
Open/Close Indicator  
316 Stainless Steel Stem  
303 Stainless Steel Bonnet

**BRANCH-OUTLET**  
Standard Purge Ports\*  
(Downstream, 2 Places)

**BRANCH-OUTLET**  
316L Stainless Steel Tube Stubs\*

316L Stainless Steel Barstock Body

**MAIN-INLET**  
DPC 1000/500

\*See corresponding Code Chart for available end connections.

# DPC 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	DPC Series	Vacuum to 375 psig (25.8 bar)
OPERATING TEMPERATURE RANGE	DPC Series	-22° F (-30°C) to 180° F (82°C)
FLOW COEFFICIENT (C <sub>v</sub> )	DPC Series	2.96
	DPV/DPT Series	3.10
HELIUM LEAK TEST	Inboard	1 x 10 <sup>-11</sup> Pa-m 3/s (1 x 10 <sup>-10</sup> atm-cc (He) /s)
	Across the Seat	1 x 10 <sup>-10</sup> Pa-m 3/s (1 x 10 <sup>-9</sup> atm-cc (He) /s)
	Outboard Pressure Test	1 x 10 <sup>-7</sup> Pa-m 3/s (1 x 10 <sup>-6</sup> atm-cc (He) /s)
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 <sub>2</sub> gas environment.	
STANDARD FINISH	Electropolished to 10 Ra Max (0.25 µm) on all wetted surfaces	
OPTIONS	Surface finish - 10 Ra, 20 Ra, 25 Ra EP, 20 Ra BA	Fitting connections available for up to 1.00" size – inlet/outlet
	Particle, moisture, THC and O <sub>2</sub> testing SEM and ESCA testing, Auger analysis Pneumatic actuators available-types: NC/NO/DA	Material: Vespel® seat Handle color (Std. white) JIS tube stubs and tube length

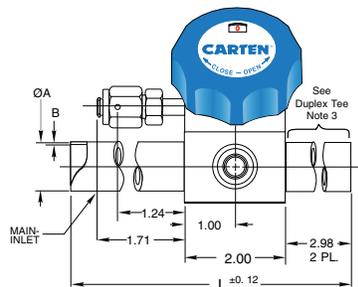
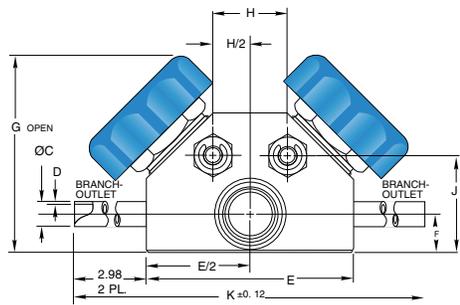
Specifications are subject to change without notice. Vespel® is a registered trademark of the DuPont Company.

## DPC Series Technical Dimensions

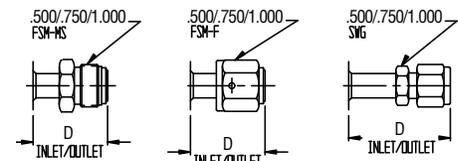
Size	A	B	C	D	E	F	G	H	J	K	L
DPC/DPV 750/500	Ø 0.75 (19.1mm)	0.065 (1.6mm)	Ø 0.50 (12.7mm)	0.049 (1.2mm)	4.16 (105.6mm)	0.75 (19.1mm)	3.81 (96.7mm)	1.50 (38.1mm)	1.92 (48.8mm)	10.10 (256.5mm)	7.94 (201.6mm)
DPC/DPV 750/750	Ø 0.75 (19.1mm)	0.065 (1.6mm)	Ø 0.75 (19.0mm)	0.065 (1.6mm)	4.16 (105.6mm)	0.75 (19.1mm)	3.81 (96.7mm)	1.50 (38.1mm)	1.92 (48.8mm)	10.10 (256.5mm)	7.94 (201.6mm)
DPC/DPV 1000/500	Ø 1.00 (25.4mm)	0.065 (1.6mm)	Ø 0.50 (12.7mm)	0.049 (1.2mm)	4.16 (105.6mm)	0.75 (19.1mm)	3.81 (96.7mm)	1.50 (38.1mm)	1.92 (48.8mm)	10.10 (256.5mm)	7.94 (201.6mm)
DPC/DPV 1000/750	Ø 1.00 (25.4mm)	0.065 (1.6mm)	Ø 0.75 (19.0mm)	0.065 (1.6mm)	4.16 (105.6mm)	0.75 (19.1mm)	3.81 (96.7mm)	1.50 (38.1mm)	1.92 (48.8mm)	10.10 (256.5mm)	7.94 (201.6mm)
DPC/DPV 1500/500	Ø 1.50 (38.1mm)	0.065 (1.6mm)	Ø 0.50 (12.7mm)	0.049 (1.2mm)	4.86 (118.4mm)	1.13 (28.7mm)	4.42 (112.2mm)	2.00 (50.8mm)	2.55 (64.7mm)	10.58 (268.7mm)	7.94 (201.6mm)
DPC/DPV 1500/750	Ø 1.50 (38.1mm)	0.065 (1.6mm)	Ø 0.75 (19.0mm)	0.065 (1.6mm)	4.86 (118.4mm)	1.13 (28.7mm)	4.42 (112.2mm)	2.00 (50.8mm)	2.55 (64.7mm)	10.58 (268.7mm)	7.94 (201.6mm)
DPC/DPV 2000/500	Ø 2.00 (50.8mm)	0.065 (1.6mm)	Ø 0.50 (12.7mm)	0.049 (1.2mm)	4.86 (118.4mm)	1.13 (28.7mm)	4.42 (112.2mm)	2.00 (50.8mm)	2.55 (64.7mm)	10.58 (268.7mm)	9.92 (251.9mm)
DPC/DPV 2000/750	Ø 2.00 (50.8mm)	0.065 (1.6mm)	Ø 0.75 (19.0mm)	0.065 (1.6mm)	4.86 (118.4mm)	1.13 (28.7mm)	4.42 (112.2mm)	2.00 (50.8mm)	2.55 (64.7mm)	10.58 (268.7mm)	9.92 (251.9mm)

## DPC Series Typical Valve Dimensions

### DPC 750/500 (DUPLEX CROSS)

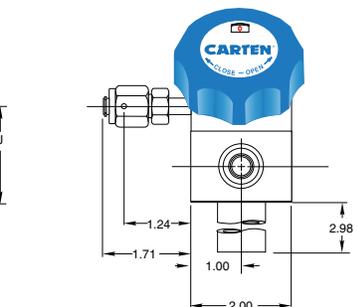
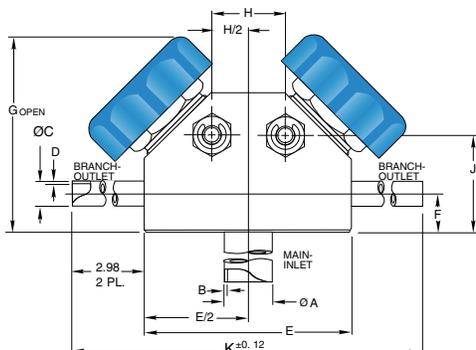


### OPTIONAL VALVE END CONNECTIONS AVAILABLE ON DPC BODY SIZES



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)

### DPV 750/500 (DUPLEX VERTICAL)



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.

NOTE 3: This tube stub is not applicable for the DPT version.

# DUPLEX SERIES



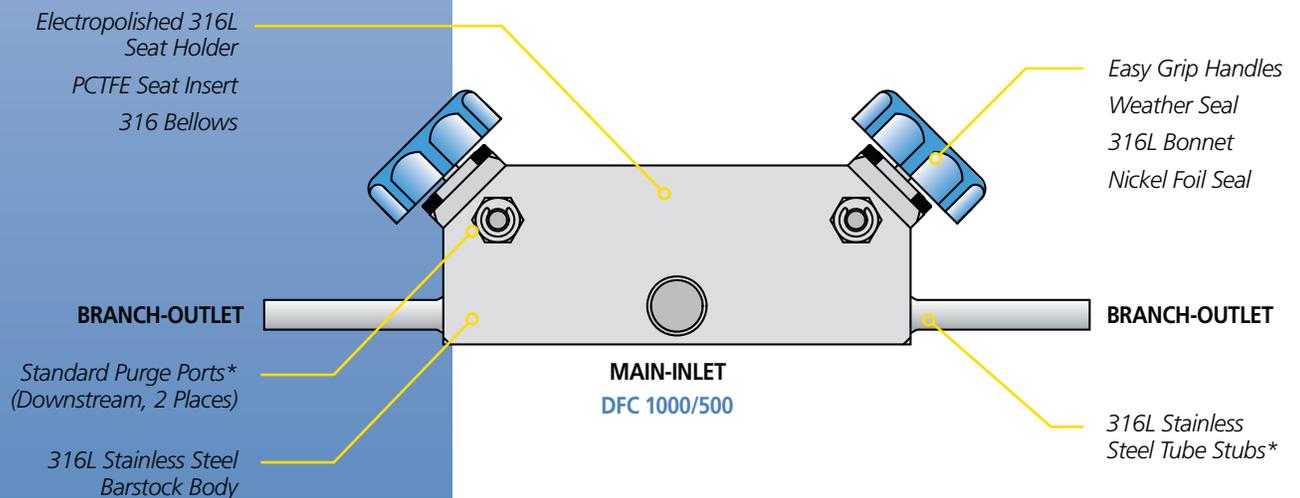
This Duplex series is bellows designed for high performance applications which require high flow rates and superior leak, moisture and particle capabilities. Applications for this valve include:

- **Highest Cv available**
- **Ultra-high purity gas distribution system control valves**
- **Superior containment and cleanliness for your most critical valve applications**
- **Suitability for inert and most toxic gases**

## DFC Series Product Features

- High Performance, Compact Design
- 316 Bellows Design for Ultra-High Purity and Long Cycle Life
- Electropolished Wetted Surfaces to 10 Ra Max (Optional surface finishes available)
- Industry Leading Design in Ultra-High Purity Gas Containment
- Purge Connections are Integral to Valve Body
- Assembled and Tested in Class 10 Cleanroom
- Inboard and Across the Seat Leak Tested with Helium
- Valve Bodies and Tube Stubs are Serialized for Material Certification
- Purged and Final Packaged in Class 1 Cleanroom, Double-Bag Packaging with Ultra-High Purity N<sub>2</sub> Gas Environment

## DFC Construction Materials



\*See corresponding Code Chart for available end connections.

# DFC Series Technical Data

MATERIAL OF CONSTRUCTION	Wetted Areas	316, 316L Stainless Steel, Nickel/PCTFE
	Non-Wetted Areas	316L Stainless Steel, 17-4 PH Stainless Turcite
MAXIMUM OPERATING PRESSURE	DFC/DBC Series	Vacuum to 375 psig (25.8 bar)
MAXIMUM OPERATING TEMPERATURE	DFC/DBC Series	-22° F (-30° C) to 180° F (82° C)
FLOW COEFFICIENT (C <sub>v</sub> )	DFC/DFT/DFV 500/500	3.26
	DFC/DFT/DFV 750/500	3.52
	DFC/DFT/DFV 1000/500	3.67
	DFC/DFT/DFV 1500/500	3.95
	DFC/DFT/DFV 2000/500	4.15
HELIUM LEAK TEST	Inboard	1 x 10 <sup>-11</sup> Pa-m 3/s (1 x 10 <sup>-10</sup> atm-cc (He) /s)
	Across the Seat	1 x 10 <sup>-10</sup> Pa-m 3/s (1 x 10 <sup>-9</sup> atm-cc (He) /s)
	Outboard Pressure Test	1 x 10 <sup>-7</sup> Pa-m 3/s (1 x 10 <sup>-6</sup> 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 <sub>2</sub> gas environment.	
STANDARD FINISH	Electropolished to 10 Ra Max (0.25 µm) on all wetted surfaces	
OPTIONS	Surface finish – 5 Ra, 20 Ra Testing: Particle, moisture, THC, O <sub>2</sub> , SEM, ESCA and Auger Pneumatic actuators available-types: NC/NO/DA	Fitting connections available for up to 1.00" size – inlet/outlet Handle colors JIS tube stubs and tube length

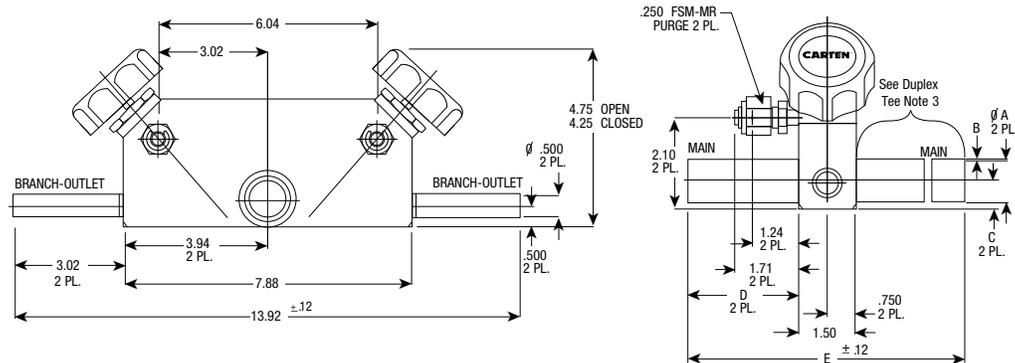
Specifications are subject to change without notice.

## DFC Series Technical Dimensions

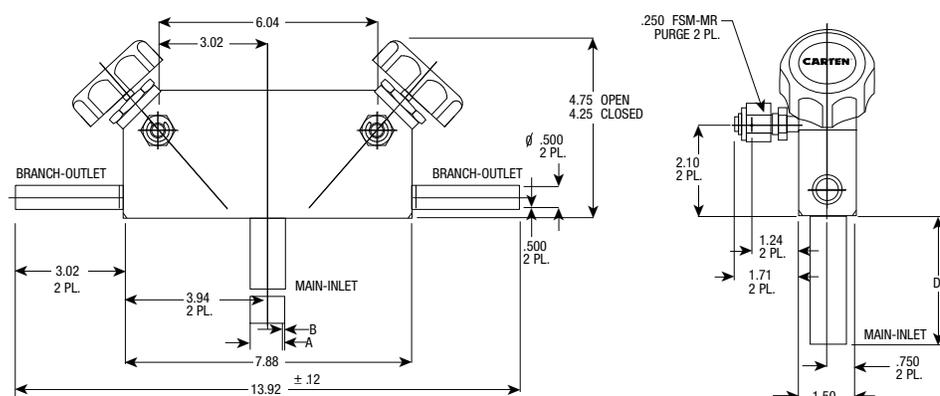
Size	A	B	C	D	E
DFC/DFT/DFV 500/500	Ø 0.50 (12.7mm)	0.049 (1.2mm)	0.50 (12.7mm)	3.96 (100.5mm)	9.42 (239.2mm)
DFC/DFT/DFV 750/500	Ø 0.75 (19.1mm)	0.065 (1.6mm)	0.50 (12.7mm)	2.95 (74.9mm)	7.40 (187.9mm)
DFC/DFT/DFV 1000/500	Ø 1.00 (25.4mm)	0.065 (1.6mm)	0.65 (16.5mm)	2.95 (74.9mm)	7.40 (187.9mm)
DFC/DFT/DFV 1500/500	Ø 1.50 (38.1mm)	0.065 (1.6mm)	0.90 (22.8mm)	2.95 (74.9mm)	7.40 (187.9mm)
DFC/DFT/DFV 2000/500	Ø 2.00 (50.8mm)	0.065 (1.6mm)	1.50 (38.1mm)	2.95 (74.9mm)	7.40 (187.9mm)

## DFC Series Typical Valve Dimensions

### DFC 1000/500 (DUPLEX CROSS)



### DFV 1000/500 (DUPLEX VERTICAL)



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.

NOTE 3: This tube stub is not applicable for the DFT version.

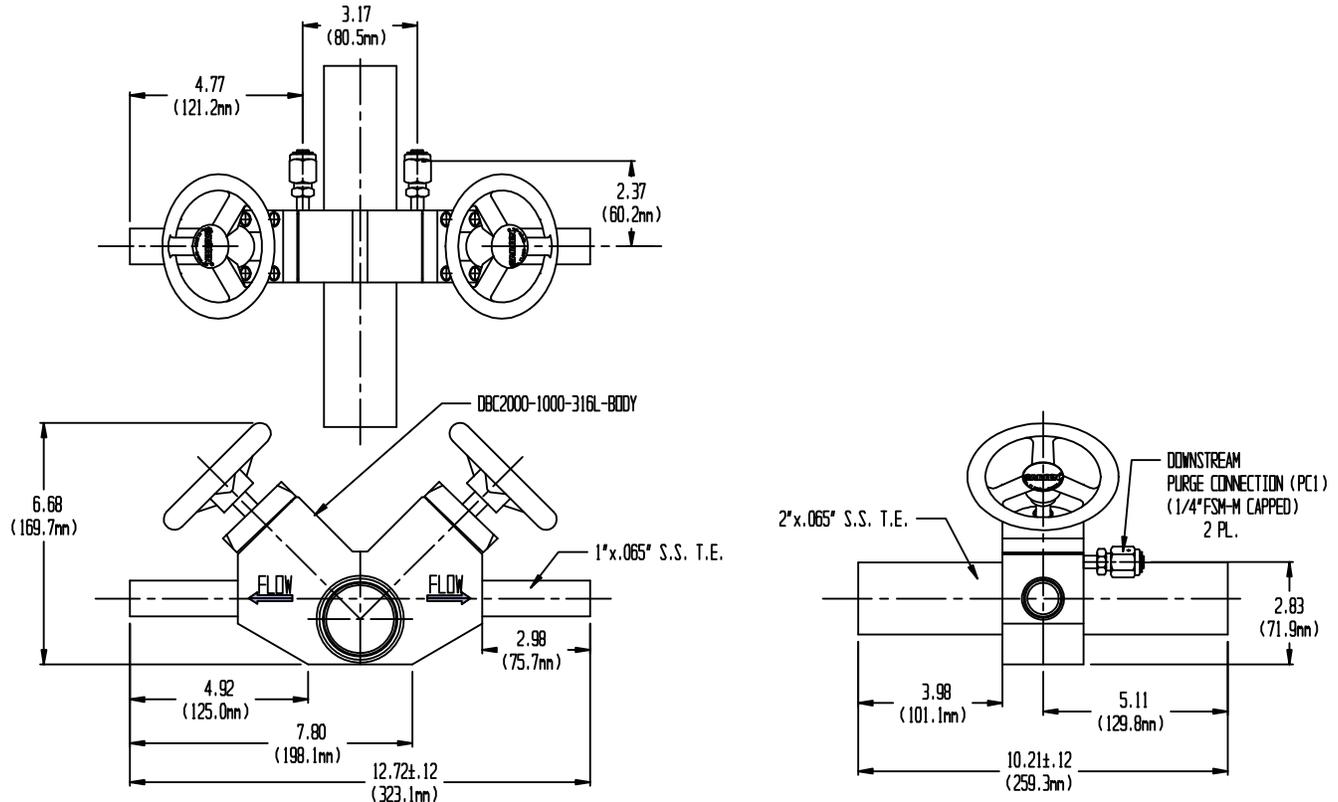
# DBC Series Technical Data

MATERIAL OF CONSTRUCTION	Wetted Areas	321, 316L Stainless Steel, PCTFE
	Non-Wetted Areas	316L Stainless Steel, Nickel Foil, 303 Stainless Steel
MAXIMUM OPERATING PRESSURE	DBC Series	Vacuum to 375 psig (25.8 bar)
MAXIMUM OPERATING TEMPERATURE	DBC Series	-22° F (-30°C) to 180° F (82°C)
FLOW COEFFICIENT (C <sub>v</sub> )	DBC 1000/750	10.20
	DBC 1500/750	10.20
	DBC 1000/1000	14.30
	DBC 1500/1000	14.30
	DBC 2000/1000	14.30
	DBC 2000/1500	16.60
HELIUM LEAK TEST	Inboard	1 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s (1 x 10 <sup>-10</sup> atm·cc (He) /s)
	Across the Seat	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s (1 x 10 <sup>-9</sup> atm·cc (He) /s)
	Outboard Pressure Test	1 x 10 <sup>-7</sup> Pa·m <sup>3</sup> /s (1 x 10 <sup>-6</sup> 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 <sub>2</sub> gas environment.	
STANDARD FINISH	Electropolished to 10 Ra Max (0.25 µm) on all wetted surfaces	
OPTIONS	Surface finish – 5 Ra, 15 Ra, 20 Ra, 30 Ra Testing: Particle, moisture, THC and O <sub>2</sub> Handwheel color options available Air acutated operation available all sizes	Fitting type and location – Inlet and Outlet Optional seat material available for higher temperature applications

Specifications are subject to change without notice.

## DBC Series Typical Valve Dimensions

DBC 2000/1000



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**<sup>®</sup>  
Ultra High Purity Valves

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