

### VALVE DESCRIPTION

The U.S. Series 9000 control valve is an ANSI Class 300 globe-style valve with bolted bonnet and post-guided innervalve. It is available in 1 in. (25 mm), 1-1/2 in. (38 mm) and 2 in. (50 mm) pipe size. The body, bonnet and innervalve are standard in 316SST or optional Alloy C. The standard body, configured in the Flangeless/NPT version, can be installed using NPT fittings or clamped between matching companion flanges. Each size valve is also available with conventional flanges in either the same nominal size as the valve body or oversized flanges that can be adapted to smaller bodies.

Each valve is available with several innervalve sizes, the largest having an integral seat for maximum Cv.

Reduced Cv innervalves fit a threaded body with replaceable seat rings. The unique packing/bonnet design provides high performance and quick easy maintenance when necessary. The Series 9000 control valve is also available with extended bonnets for hot or cold service. Optional double packing, in either PTFE or REK, for fugitive emission control is also available.

The high performance Model 9050 actuator, a multi-spring and diaphragm design, is field reversible from air-to-open to air-to-close without additional parts. The yoke and actuator housings are made of carbon steel and coated with epoxy for corrosion resistance.

Standard material for external hardware is 300 series stainless steel.

The 3...15 psi (0.2...1 bar) spring set is adjustable to 8...20 psi (0.5...1 bar) and the 6...30 psi (0.4...2 bar) spring set is adjustable to 16...40 psi (1...2 bar) to allow a wide range of shutoff capability.

### Applications

The Series 9000 control valve is designed for modulating control of liquids and vapors in medium duty industrial applications where performance, quality and small physical size are important. The rugged design offers features and performance levels normally found in more expensive, larger valves.

The unit is designed to handle fluids and environments found in chemical plants, pulp and paper and textile mills, refineries and many other demanding industries.

### Valve Materials

<b>Body</b>	316 stainless steel (CF8M ASTM A351)
<b>Bonnet</b>	316 stainless steel (ASTM A479)
<b>Bonnet Flange</b>	316 stainless steel (CF8M)
<b>Bolting</b>	Gr 5 with Xylan coating
<b>Gasket</b>	Grafoil Gr GTA
<b>Innervalve</b>	316 stainless steel (ASTM A479)
<b>Packing</b>	PTFE chevron ring



### Valve Material Options

<b>Body</b>	Alloy C (CW-2M ASTM A494)
<b>Bonnet</b>	Alloy C276 barstock
<b>Innervalve</b>	Alloy C276, Stellite 316, 316 w/ Teflon PFA soft seat
<b>Packing</b>	Grafoil, Kalrez® (REK)
<b>Bolting</b>	Strain hardened 316 stainless steel

### ACTUATOR DESCRIPTION

The Model 9050 actuator is available in either air-to-open/spring-to-close or air-to-close/spring-to-open and is field reversible. It comes with either 3 springs for a 3...15 psi (0.2...1 bar) signal range or 6 springs for a 6...30 psi (0.4...2 bar) signal range. Both ranges are adjustable to match bench loading with the requirements of the application.

### Actuator Materials

<b>Pressure cases</b>	Steel/epoxy
<b>Yoke</b>	Steel/epoxy
<b>Diaphragm</b>	Nitrile/polyester
<b>Springs</b>	17-7PH stainless steel
<b>Diaphragm Plate/Piston</b>	High strength aluminum with hard anodized coating
<b>Hardware</b>	300 stainless steel
<b>Pressure Cases &amp; Yoke</b>	Electroless nickel coating

### Actuator Features

- Designed to ANSI and ISA standards
- Dual body mounting (NPT/Flangeless)
- Wide range of innervalves
- Linear, Equal Percent or On-Off
- ANSI Class IV seat leak standard
- Encapsulated body gasket
- MoS2 filled nylon stem bushings
- No brass or asbestos
- Epoxy coated steel parts
- Adjustable spring loading
- Replaceable seats (reduced Cv innervalves only)

### Actuator Optional Features

- Stellite innervalue
- Teflon PFA soft seating
- Class V or VI seat test
- Graphite packing
- Extended bonnets, to 18 in. (457 mm), for hot or cryogenic service.
- Double stuffing box

### Actuator Design Standards

<b>Structural</b>	ASME B16.34-1996
<b>Bolting</b>	ASME Section VIII, Appendix 2 and ASME B16.34
<b>Seat leakage</b>	ANSI/FCI 70-2-1991
<b>Cv</b>	ISA- 75.01, 75.02, and 75.11
<b>Face-to-Face (Std)</b>	ISA S75.04
<b>Face-to-Face (Flanged)</b>	ASME B16.10-1992 (Optional F/F dimensions available)
<b>Flange finish</b>	ASME B16.5-1996 (standard is concentric serrations)
<b>Materials</b>	ASTM designations
<b>Code Welding</b>	ASME Section VIII
<b>Accessory Mount</b>	IEC 534 (yoke)

### Actuator Accessories

- Positioner
- i/P positioner
- i/P transducer
- Gauges
- Filter-regulator
- Solenoid
- Limit switches (1 or 2)
- Position transmitter

## SPECIFICATIONS

### Parts and Material List

Unless otherwise noted, standard material is 316 SST. (Item numbers refer to items in *Figure 1 on page 3.*)

Item No.	Description	Part Numbers		
		1 in. (DN 25)	1-1/2 in. (DN 40)	2 in. (DN 50)
1a	Body (for replaceable seat)	525966-0001	526149-0001	526151-0001
1b	Body (with integral seat)	525956-0001	526148-0001	526150-0001
2	Bonnet (standard length)	525949-0001	526152-0001	525952-0001
3a	Stem, innervalue	Innervalue part numbers vary with Cv and material. Consult the factory for complete innervalue set part numbers.		
3b	Innervalue and guide			
3c	Seat (if applicable)			
4	Gasket (Grafoil)	512711-0001	512702-0001	512726-001
5	Packing gland	525950-0001	525950-0001	525950-0001
6	Packing kit (PTFE)	543242-0001	543242-0001	543242-0001
7	Packing adapter	525951-0001	525951-0001	525951-0001
8	Hex screws (Gr 5 Steel)	526119-0001	526119-0003	526119-0004
9	Bonnet flange	512681-0001	512723-0001	512722-0001
10	Yoke locknut	525944-0001	525944-0001	525944-0001

### Pressure vs Temperature Rating

psig	Temperature		barg	Notes
	°F	°C		
720	100	38	49.6	• Below -20° F (28° C) and above 500° F (260° C), use optional SST bonnet studs
620	200	93	42.7	
560	300	149	38.6	• Consult factory for cryogenic service
515	400	204	35.5	
480	500	260	33.1	• Max. temp for TFE packing is 450° F (232° C)
450	600	316	31.0	
430	700	371	29.6	• Consider extended bonnets for Grafoils packing above 450° F (232° C)
415	800	427	28.6	
395	900	482	27.2	• Consult factory for limits on TFE soft seat
365	1000	538	25.1	
• Consider Stellite for +600° F (315° C) service				

Above information taken from ANSI Class 300 pressure vs temperature data for CF8M 316SST. For information or part numbers on other materials, consult the factory.

Detailed actuator and valve assembly drawings are available on request from the factory.

**DIMENSIONS**

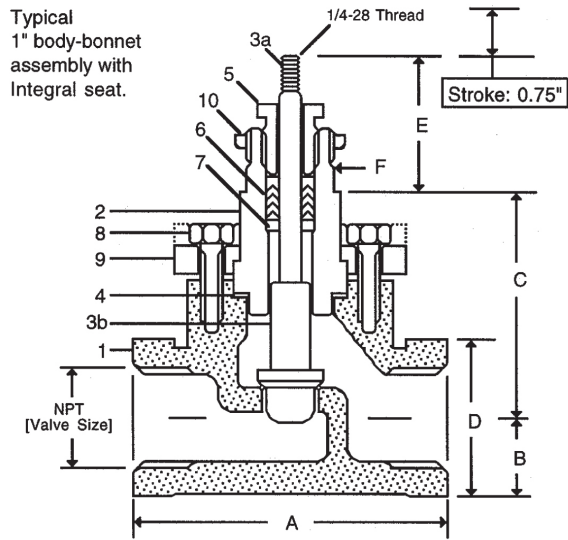


Figure 1: Dimensions

**Body Assembly Dimensions**

For complete valve dimensions, see "Outline Dimensions For Common Series 9000 Valves" on page 4.

Dim.	1 in. (25.4 mm) (DN 25)		1-1/2 in. (38.1 mm) (DN 40)		2 in. (50.8 mm) (DN 50)	
	in.	mm	in.	mm	in.	mm
A	4.0	102	4.5	115	4.875	124
B	1.0	25.4	1.5	38.1	1.75	44.5
C	3.2	81.3	3.46	87.9	3.59	91.2
D	2.0	50.8	2.88	73.1	3.625	92.1
E	1.68	42.7	1.68	42.7	1.68	42.7
F	1.125	28.6	1.125	28.6	1.125	28.6

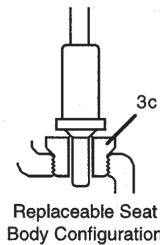


Figure 2: Seat configuration

**Approximate Valve Weight**  
NPT Body with Size 35 Actuator

Size	lb	kg
1 in. (25.4 mm)	28	12.8
1-1/2 in. (38.1 mm)	31	14.1
2 in. (50.8 mm)	34	15.5

Stroke (All Sizes of M9000): 0.75 in.

**Innervolve Information**

Valve Size	Orific Dia. in. (mm)	Orif. area in. <sup>2</sup> (mm <sup>2</sup> )	F <sub>L</sub>	Seat Config.	Cv (Linear)	Cv (%)	Max. Oper. ΔP psi (bar)	Max ΔP Shutoff
2 in. (50.8 mm)	1.500 (38.1)	1.77 (1141.9)	0.85	Integr.	25	20	150 (10.3)	300*
	1.125 (28.6)	1.00 (645.2)	0.86	Repl.	21	17	275 (19.0)	550*
	0.812 (20.9)	0.52 (335.5)	0.88	Repl.	15	14	540 (37.2)	720*
	0.625 (15.9)	0.31 (200.0)	0.90	Repl.	7	6.5	660 (45.5)	720
1-1/2 in. (38.1 mm)	1.250 (31.8)	1.23 (793.5)	0.85	Integr.	15.5	13	225 (15.5)	450*
	0.812 (20.9)	0.52 (335.5)	0.87	Repl.	11	10	540 (37.2)	720*
	0.625 (15.9)	0.31 (200.0)	0.90	Repl.	7	6.5	660 (45.5)	720
1 in. (25.4 mm)	0.625 (15.9)	0.31 (200.0)	0.92	Repl.	4	4	660 (45.5)	720
	0.812 (20.9)	0.52 (335.5)	0.85	Integr.	8.3	7.0	540 (37.2)	720*
	0.500 (12.7)	0.20 (129.0)	0.87	Repl.	5.3	4.5	660 (45.5)	720
	0.500 (12.7)	0.20 (129.0)	0.89	Repl.	2	2	660 (45.5)	720
	0.500 (12.7)	0.20 (129.0)	0.91	Repl.	1	1	660 (45.5)	720
	0.156 (4.0)	0.02 (12.9)	0.93	Repl.	0.5	0.5	720 (49.6)	720
	0.156 (4.0)	0.02 (12.9)	0.94	Repl.	0.2	0.2	720 (49.6)	720
	0.156 (4.0)	0.02 (12.9)	0.95	Repl.	0.1	0.1	720 (49.6)	720
0.156 (4.0)	0.02 (12.9)	0.96	Repl.	0.05	0.05	720 (49.6)	720	
0.156 (4.0)	0.02 (12.9)	0.97	Repl.	0.02	N/A	720 (49.6)	720	

The largest Cv in each valve size has an integral seat. All other Cv's have replaceable seats.

**Typical Innervolve Rangeability**

Linear: 50:1

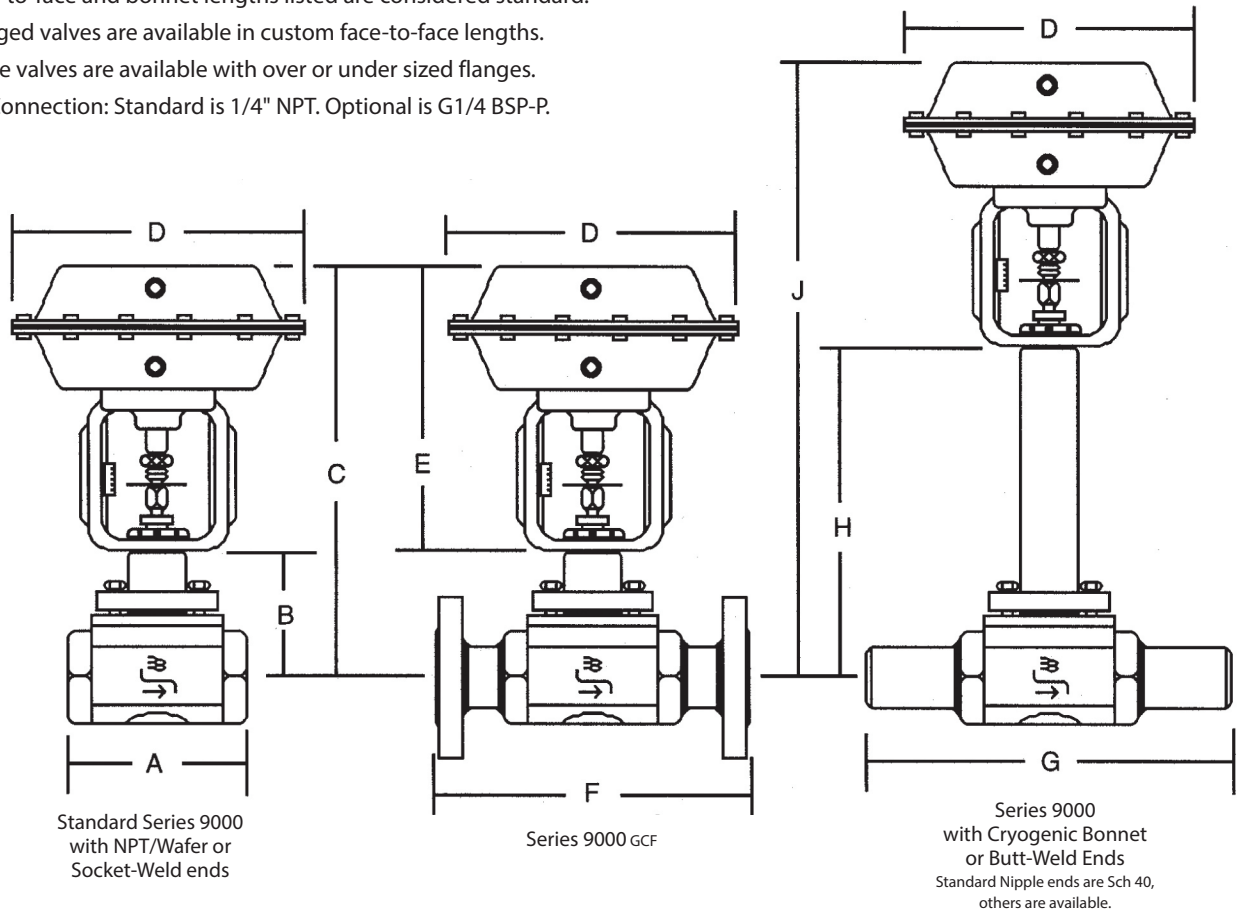
Equal Percent: 60:1

**NOTES:**

- Pressure drop limits for soft seated trims are 50% of those listed.
- Body recovery coefficient (FsubL) per ISA 75.02-1988 at maximum innervolve opening.
- Shutoff pressures marked with an asterisk (\*) require six (6) actuator springs to obtain required preload.
- Pressures listed under *Max. Oper. DeltaP* or *Max. DeltaP Shutoff* relate to the actuator preload requirements and innervolve guide limits. Since fluid and application criteria have a bearing on innervolve performance, some applications may require hardened trim and/or extra preload. In certain applications, the pressures listed may wear or erode the innervolve material.

## OUTLINE DIMENSIONS FOR COMMON SERIES 9000 VALVES

- Face-to-face and bonnet lengths listed are considered standard.
- Flanged valves are available in custom face-to-face lengths.
- Some valves are available with over or under sized flanges.
- Air Connection: Standard is 1/4" NPT. Optional is G1/4 BSP-P.



Description	Dimensions					
	1 in. (25.4 mm) DN 25		1-1/2 in. (38.1 mm) DN 40		2 in. (50.8 mm) DN 50	
	in.	mm	in.	mm	in.	mm
A	Standard body length (incl. Flangeless/NPT and Socket Weld)					
B1	Centerline of body to yoke mounting point (standard bonnet)					
B2	Centerline of body to yoke mounting point (1" ext. or Dbl. Pack.)					
C1	Centerline of body to top of actuator (standard bonnet)					
C2	Centerline of body to top of actuator (1" ext. or Dbl. Pack.)					
D	Size 35 actuator Diameter					
E	Size 35 actuator Height					
F1	Flanged body length (with ANSI CL 150 Flanges)					
F2	Flanged body length (with ANSI CL 300 Flanges)					
G	Butt-Weld body length (any pipe schedule, per ISA75.15-1993 Long Pattern)					
H1	Centerline of body to yoke mounting point (10" Cryo bonnet)					
H2	Centerline of body to yoke mounting point (14" Cryo bonnet)					
H3	Centerline of body to yoke mounting point (18" Cryo bonnet)					
J1	Centerline of body to top of actuator (10" Cryo bonnet)					
J2	Centerline of body to top of actuator (14" Cryo bonnet)					
J3	Centerline of body to top of actuator (18" Cryo bonnet)					

Dimensions are subject to change. Detailed engineering drawings of valves and actuators are available from the factory on request.

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