



Process valve

Type OR900 / USA-Type Orion 9000



Description

Orion 9000 is an ANSI Class 300 globe style valve with bolted bonnet and post guided innervalve. The body is investment cast 316 SST and is available in three sizes: 1", 1½" and 2". The body can be installed using NPT fittings or clamped between companion flanges. Each valve size is available with multiple Cv's and characteristics. The unique packing/bonnet design provides high performance and easy maintainability. The multi-spring/diaphragm actuator can be either ATO or ATC action. Maximum corrosion protection on all non-stainless components is standard. Spring compression (preload) is fully adjustable.

Actuator

The standard actuator is available in either Air To Open-Spring to Close or Air To Close-Spring to Open. It is also available with either three or six springs for 3-15 psig or 6-30 psig input signals. The action is reversible by a simple change of stem.

Accessories

- Positioner
- I/P positioner
- Gauges
- Regulator
- Solenoid

Features

- Designed to ANSI and ISA standards
- Dual mounting methods (NPT or flangeless)
- Wide range of innervalve sizes
- Replaceable seats on all reduced innervalves
- Choice of linear, equal percent or on-off
- ANSI Class IV seat leakage
- Encapsulated graphite body gasket
- Nylatron actuator stem bushing
- No brass or asbestos components
- TFE chevron ring packing
- Epoxy coated pressure cases inside and out
- Stainless steel hardware
- Adjustable spring preload and up travel stop

Applications

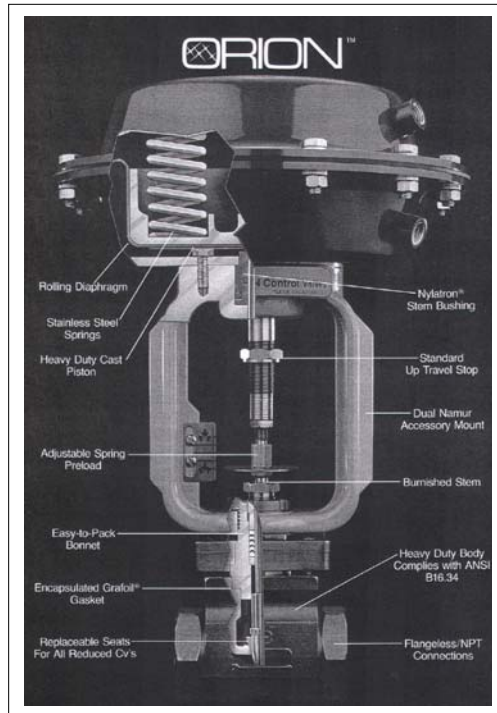
Orion 9000 is designed for modulating control of liquids and vapors in industrial applications where performance, quality and small physical size are important. The unit handles fluids and environments found in chemical plants, pulp and paper mills, refineries and many other demanding industries.

Options

- Stellite or Teflon soft seated innervalve
- Class V or VI seat leakage
- Graphite packing

Design standards

Structural	ANSI B16.34-1988
Bolting	ASME section VIII, Appendix 2 and ANSI B16.34
Seat leakage	ANSI B16.104
Cv	ISA 75.01, 75.02 and 75.11
Face to face	ISA S75.04
Flange finish	ANSI B16.5-1988
Materials	ASTM designations
Accessory mount	IEC 534 (yoke)



Materials

Body-bonnet assembly	
Body	316 SST (CF8M) ASTM A-351
Bonnet	316 SST barstock ASTM A-479
Bonnet flange	316 SST (CF8M) ASTM A-351
Bonnet bolting	Gr 5 Hex Screws-Xylan® coated
Optional bolting	Strain hardened 316 SST
Body gasket	Grafoil® Gr GTA (Union Carbide)
Innervalue (standard)	316 SST ASTM A-479
Innervalue (optional)	TFE soft seat or stellited SST
Packing (standard)	TFE chevron rings
Packing (optional)	Grafoil® (Union Carbide)
Actuator	
Pressure cases and yoke	Steel (epoxy coated)
Springs	17-7PH SST
Diaphragm	Buna
Diaphragm plate	Steel with Xylan coating
Minor fasteners	300 SST

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Grafoil® is a registered trademark of Union Carbide Corporation.

Innervalue information

Valve size	Orifice dia.	Orif. area mm ²	FL	Seat config.	Cv (linear)	Cv (percent)	Max. Oper. Δp (bar)	Max. Δp Shut-off
2"	1.500"	1142	.85	Integr.	25	20	10	20
2"	1.125"	645	.86	Repl.	21	17	18,9	37,9
2"	0.812"	335	.88	Repl.	15	14	35	49
2"	0.625"	200	.90	Repl.	7	6.5	40	49
1,5"	1.250"	793	.85	Integr.	15.5	13	15	30
1,5"	0.812"	335	.87	Repl.	11	10	35	49
1,5"	0.625"	200	.90	Repl.	7	6.5	40	49
1,5"	0.625"	200	.92	Repl.	4	4	40	49
1"	0.812"	335	.85	Integr.	8.3	7.0	35	49
1"	0.500"	129	.87	Repl.	5.3	4.5	45	49
1"	0.500"	129	.89	Repl.	2	2	45	49
1"	0.500"	129	.91	Repl.	1	1	45	49
1"	0.156"	13	.93	Repl.	0.5	0.5	49	49
1"	0.156"	13	.94	Repl.	0.2	0.2	49	49
1"	0.156"	13	.95	Repl.	0.1	0.1	49	49
1"	0.156"	13	.96	Repl.	0.05	0.005	49	49
1"	0.156"	13	.97	Repl.	0.02	N/A	49	49

Rangeability: Linear character: 50:1, Percentage character: 60:1

Notes:

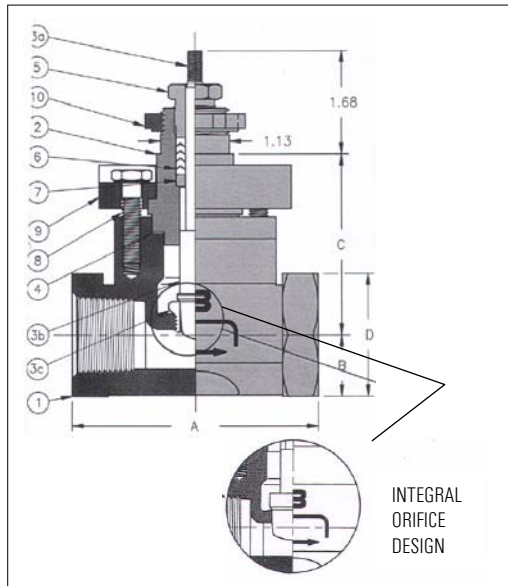
*Pressure drop limits for soft seated trims are 50% of those listed.

*Body recovery coefficient (FsubL) per ISA 75.02-1988 at maximum innervalue opening.

Shut-off pressures marked with an asterisk () require six (6) actuator springs to obtain required preload. Pressures listed under max. oper. Δp or max. shut-off Δp relate to actuator preload requirements and innervalue guide limits. Since fluid and application criteria have a bearing on innervalue performance, some applications may require hardened trim and/or extra preload. In certain applications, the pressures listed may wear, or erode the innervalue material.



Body sub-assembly



Dimensions (in mm)

Valve size	A	B	C	D	Actuator Removal Clearance
1"	101	25	81	50	44
1.5"	114	38	88	73	44
2"	124	44	91	92	44

Installation dimensions

Bolting Dimensions (mm)	1"		1.5"		2"
	20 bar	50 bar	20 bar	50 bar	20 bar
Body face to face	101	101	114	114	124
Flange thickness x2	31	38	38	44	40
Nut height x2	25	32	25	40	32
Gaskets (0.063 ea) x2	3	3	3	3	3
Suggested stud length	165	177	190	192	209
Add for lock washers x2	-	-	-	-	-
Add for flat washers x2	-	-	-	-	-
Stud diameter & thread	1/2-13	5/8-11	1/2-13	3/4-10	5/8-11

Pressure vs. temperature rating

Pressure in PSI	Temp. °F	Temp. °C	Pressure in bar	NOTES
720	100	38	49,6	Can be used to -100°F with TFE packing
620	200	93	42,7	
560	300	149	38,6	
515	400	204	35,5	Max. process temp. for TFE soft seat
480	500	260	33,1	Max. process temp. for TFE packing is 450°F
450	600	196	31,0	Above 450°F. Use Grafoil packing
430	700	371	29,6	Depending on Δ p. Consider stellited trim above 600°F
415	800	427	28,6	Above 750°F. Use strain hard 316 SST bonnet bolts
395	900	482	27,2	
365	1000	538	25,1	

Approximate valve weight with size 35 actuator

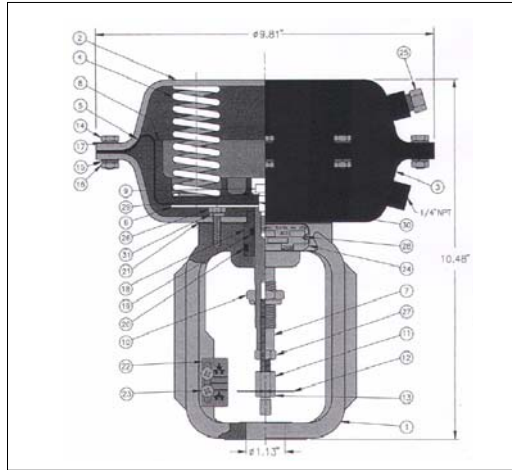
1" unit	15.5 kg
1½" unit	16 kg
2" unit	17.3 kg

Parts and material list

Item n°.	Description	Standard material	Part numbers (for optional items, consult factory)		
			1"	1.5"	2"
1a	Body (replaceable seat)	316 SST	525966-0001	526149-0001	526151-0001
1b	Body (integral seat)	316 SST	525956-0001	526148-0001	526150-0001
2	Bonnet	316 SST	525949-0001	526152-0001	525952-0001
3a	Stem (innervalve)	316 SST	Innervalve part numbers vary with Cv and material. Consult the factory for complete innervalve set part number.		
3b	Innervalve	316 SST			
3c	Seat	316 SST			
4	Gasket	Grafoil®	512711-001	512702-0001	512726-0001
4	Packing gland	316 SST	525950-0001	525950-0001	525950-0001
5	Packing set	TFE	543242-0001	543242-0001	543242-0001
7	Packing adapter	316 SST	525951-0001	525951-0001	525951-0001
8	Flange screws	Gr5 Steel/Xylan®	526119-0001	526119-0003	526119-0004
9	Bonnet flange	316 SST	512681-0001	512723-0001	512722-0001
10	Yoke locknut	316 SST	525944-0001	525944-0001	525944-0001

Quantities are for one (1) unit only

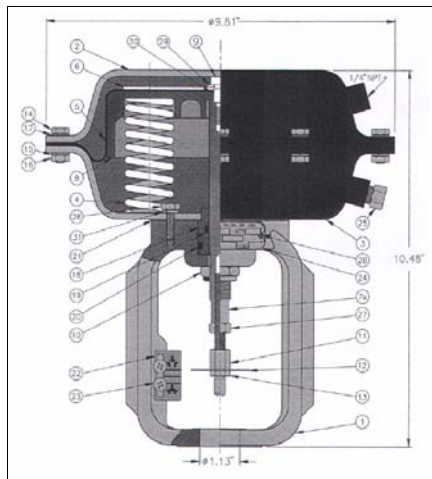
Air To Open actuator



Description

The size 35 spring and diaphragm actuator is designed specifically to fit the Orion 9000 control valve. It is available in either Air To Open-Fail Close or Air To Close-Fail Open action. The preformed diaphragm and multi-springs provide extremely linear travel vs. input signal performance. The single "O" ring and Nylatron guide bushing is designed to provide minimum hysteresis. Spring preload can be adjusted to suit closing force requirements. The unit also features adjustable travel stops. Constructed of epoxy coated steel, the unit provides added protection against abuse and corrosion.

Air To Close actuator



Item n°.	Part n°.	Qty	Description	Material
1	526020-0001	1	Yoke	Steel
2	526041-0001	1	Case, spring	Steel
3	526042-0001	1	Case, pressure	17-7 PH S/S
4	510031-0149	3	Spring	Buna-N
5	512698-0001	1	Diaphragm	Steel
6	512705-0001	1	Plate, diaphr.	316 S/S
7	525991-0001	1	Stem (ATO)	316 S/S
7a	525993-0001	1	Stem (ATC)	Steel
8	526038-0001	1	Piston	Steel
9	526018-0001	1	Screw, shoulder	Steel
10	526147-0001	1	Locknut	300 series SS
11	525992-0001	1	Connector, ste.	316 SS

Preload/bench range for Air To Open actuators

Depending on innervalve size and shut-off pressure, the spring loading can be adjusted to provide adequate closing force. The size 35 actuator can be ordered with either 3 or 6 springs. Three springs cause the actuator to stroke 0.75" with a 12 psig change in instrument signal. The bench range can be adjusted from 3-15 psig up to 8-20 psig and still provide proper stroke with a 12 psi change.

Six springs cause the actuator to stroke 0.75" with a 24 psig change in instrument signal. The bench range can be adjusted from 6-30 psig to 16-40 psig.

Calculating preload

To determine the amount of spring loading required, multiply the shut-off pressure (psi) times the orifice area and divide by the actuator area.

NOTE: Do NOT exceed maximum Δp amounts shown on the innervalve chart. If the signaling device does not get to zero pressure upon reaching minimum signal, the preload required must be added to the minimum signal figure.

Adjusting preload

Adjusting spring tension on the Orion 9000 is simple.

- Input an air pressure signal equal to, or slightly greater than, the calculated preload. This raises the stem, compressing the actuator springs.
- Loosen the connector jam nut and unthread the connector until the innervalve touches the seat. Tighten jam nut.
- Adjust the up travel stop nut so that the innervalve does not travel more than 0.75" from the seated position.

Specifications

Diaphragm effective area	225 cm ²
Stroke	19 mm
Max. operating pressure	4 bar @ 21 °C
Max. overpressure	6 bar @ 21 °C
Upper ambient temp. limit	71 °C @ 2 bars
Lower ambient temp. limit (non-condensing)	-29 °C @ 2 bars

Item n°.	Part n°.	Qty	Description	Material
12	523334	1	Pointer, travel	300 series SS
13	410001-0062	1	Nut, 1/4-28	300 series SS
14	400013-0002	12	Screw, 5/16-18	300 series SS
15	430004-0021	12	Lock washer, 5/16	300 series SS
16	410001-0060	12	Nut, 5/16	300 series SS
17	430002-0107	24	Washer, 5/16	300 series SS
18	525994-0001	1	Bushing, guide	Nylatron
19	490018-0001	1	O-ring, small	Elf nitrile
20	490018-0002	1	O-ring, large	Elf nitrile
21	512712-0001	1	Gasket	#2150 NA
22	512700-0001	1	Scale, travel	300 series SS
23	400014-0010	2	Screw, 8-32	300 series SS
24	512701-0001	1	Nameplate	300 series SS
25	526037-0001	1	Plug, vent	Plastic
26	526119-0002	6	Screw, 1/4-20	Steel, Xylan coat
27	410001-0058	1	Nut, jam 5/16	300 series SS
28	400018-0012	2	Screw, drive	300 series SS
29	430002-0108	1	Washer, 3/8	300 series SS
30	490003-0011	1	O-ring, piston	Neoprene
31	430004-0014	1	Washer, lock	300 series SS