

#### APPLICATIONS:

Utilizes (any) quarter-turn actuator with ISO-5211 connection in conjunction with Kimray HPCV. To control level, flow, pressure, temperature of process fluid.

#### FEATURES:

- Open-yoke design
- Standard coupling block and mounting hardware to valve
- Weather-tight, maintenance-free design

#### CERTIFICATIONS:

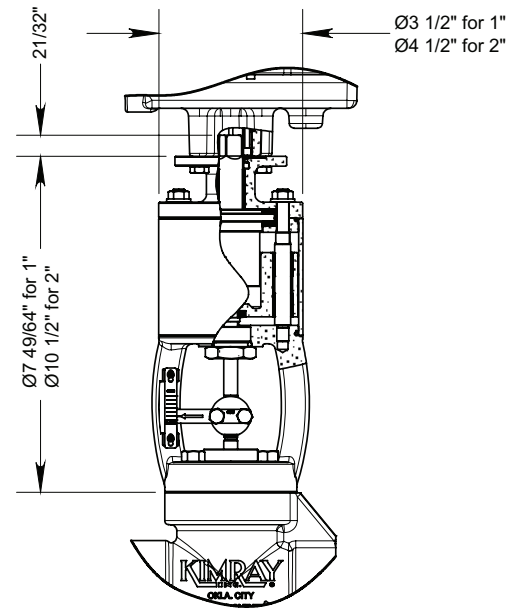
Kimray is an ISO 9001- certified manufacturer.

#### CONNECTIONS:

- R2L-1: ISO F05, 14MM SQ
- R2L-2: ISO F07, 14MM SQ

#### VALVCON ROTARY ACTUATOR (KSRADCWX):

- ON/OFF and Modulating control
- Power input is UNIVERSAL
  - 12/24VDC
  - 24VAC
  - 115/230VAC
- CL I, Div. 1 Explosion Proof Enclosure
- 100% duty cycle
- Battery backup included for fail-safe operation
  - Configurable for fail open, closed or position
  - Park or Continue operation upon power loss
- Inputs
  - 4-20mA
  - 0-10V
  - Resistive control
  - On/off – 2 & 3 wire control
- Feedback
  - Limit switches
  - 0-10V or 4-20mA
  - Battery monitor
- Integral heater for condensation and battery protection
- Options
  - Modbus RS485
  - Handwheel for manual override



#### OPERATION:

Spiral rotation of the ROTARY SHAFT by means of a rotary actuator is translated into linear motion, opening and closing the valve. The stroke length is achieved with 90° rotation of the shaft, clockwise to close. As the plug contacts the seat, a series of springs become loaded to ensure valve closure in the event of seat creep or wear.



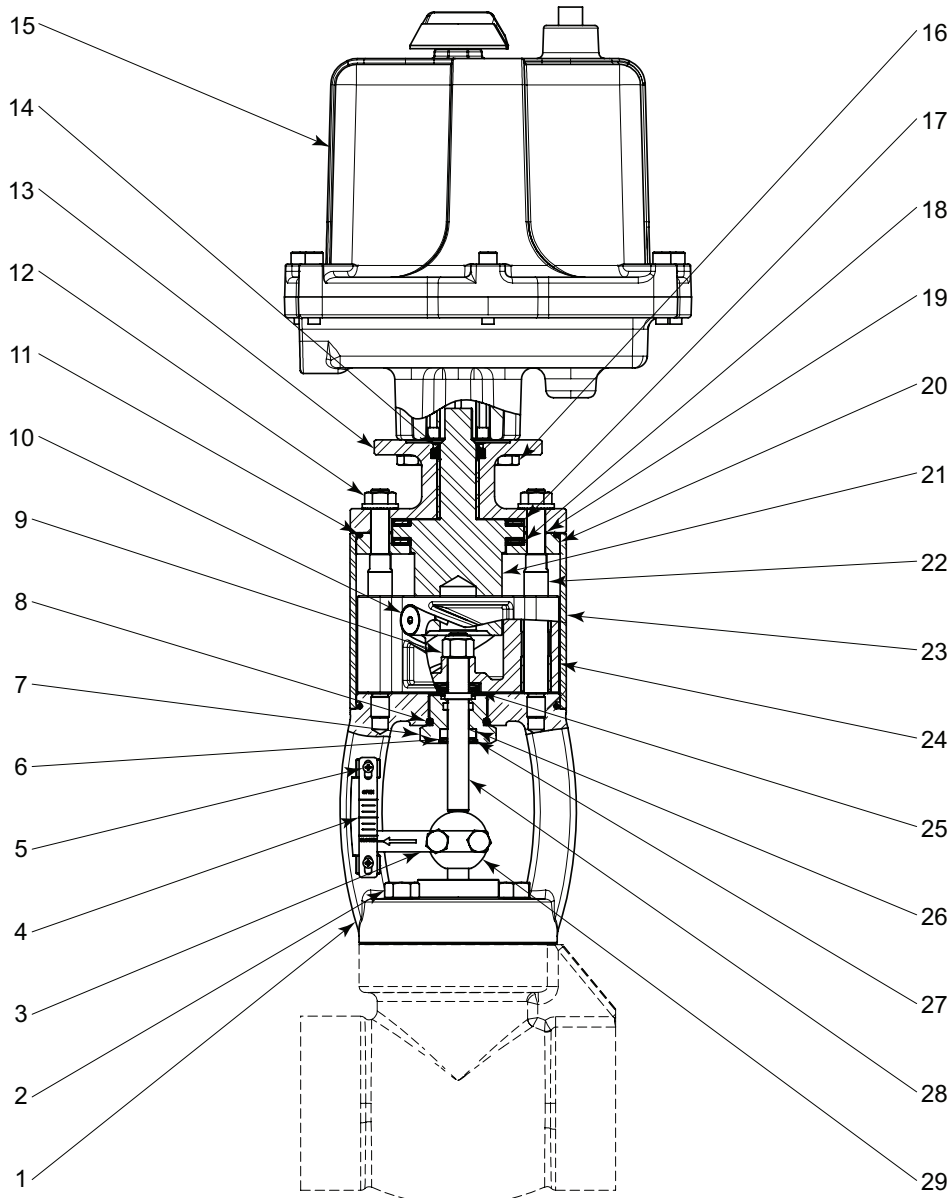
ADAPTERS						
Order Code	Description	Line Size	ISO 5211	Shaft		
YHN	R2L-1	1"	F05	14mm SQ		
YHO	R2L-2	2"	F07	14mm SQ		
ELECTRIC ACTUATORS AVAILABLE						
Order Code	Description	Voltage	ISO 5211	Torque		
KSRADCWX	VALVCON ADC	MULTI	F05/07	600in lb		
		230VAC	115VAC	24VAC	24VDC	12VDC
	CYCLE TIME (SEC/90°)	14	14	13	13	17
	CURRENT DRAW (AMPS)	0.5	0.6	2.5	1.7	2.8
NOTES:						
For standard & optional seals, metals, Cf Cv values, material specifications & dimensions see technical data on pages 01:I - 01:XI						

All Pictures shown are for illustration purpose only. Actual product may vary due to product enhancement.

# HIGH PRESSURE CONTROL VALVES



## R2L ACTUATOR / ADAPTOR PARTS DRAWING



ITEM	QTY.	DESCRIPTION	STANDARD PART NO.	
			1 INCH	2 INCH
1	1	Mounting Yoke	7377	7390
2	4	Bolt	694	524
3	1	Travel Indicator	1659A	535
4	1	Indicator Scale	488	536
5	2	Screw	7534	
6	1	Retainer	486	528
7	1	Lower Adjusting Screw	458	503
8	1	O-Ring *	491	537
9	1	Nylon Lock Nut	7366	7378
10	2	Cam Follower *	7383	7381
11	2	O-Ring *	7425	4238
12	4	Lock Nut	7364	7374
13	1	Flange Adapter	7384	7391
14	1	Rod Wiper *	7370	
15	1	Actuator (Sold Separately)	KSRADCWX	

ITEM	QTY.	DESCRIPTION	STANDARD PART NO.	
			1 INCH	2 INCH
16	4	Screw	7373	7380
17	4	Bearing Race *	7362	7369
18	2	Bearing *	7361	7368
19	4	O-Ring *	7511	7508
20	1	Bearing Support	7388	7395
21	1	Rotary Shaft	7385	7392
22	4	Guide Rod	7387	7394
23	1	Dust Cover	7389	7396
24	1	Stem Carrier	7382	7393
25	(Qty.)	Disc Spring	7363 (3)	7371 (4)
26	1	Wiper *	480	527
27	1	Snap Ring *	938	940
28	1	Stem	7386	7397
29	1	Coupling Block	1659	511
Repair Kits			RXD	RXE

All Pictures shown are for illustration purpose only. Actual product may vary due to product enhancement.

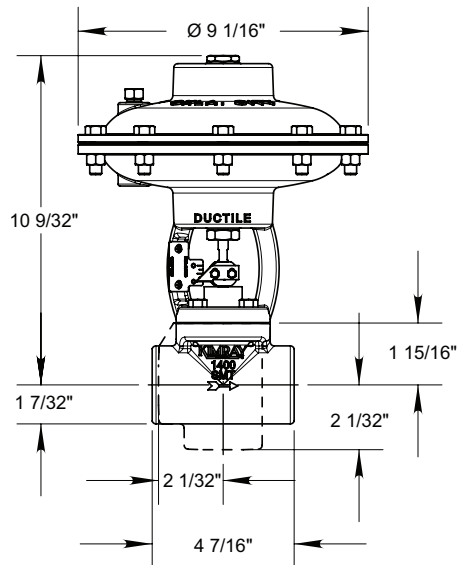
Table 1 - Flow Coefficient(Cv)														
Line Size	Trim Size in. (mm)	Trim Type	Cf	Valve Opening Percentage										
				10	20	30	40	50	60	70	80	90	100	
<b>Stem Guided</b>														
1"	1/8 in (3.17 mm)	Linear (Nominal)	0.58	0.10	0.40	0.50	0.70	0.90	1.00	1.00	1.00	1.10	1.10	
	3/16 in (4.74 mm)		0.59	0.20	0.50	0.77	1.00	1.30	1.40	1.50	1.50	1.50	1.50	
	1/4 in (6.35 mm)		0.78	0.28	0.72	1.11	1.50	1.80	1.95	2.08	2.13	2.15	2.17	
	3/8 in (9.52 mm)		0.91	0.40	1.10	1.60	2.20	2.70	2.90	3.10	3.20	3.20	3.20	
	1/2 in (12.7 mm)		0.94	0.70	1.90	2.90	4.00	4.80	5.20	5.50	5.60	5.70	5.70	
2"	1/4 in (6.35 mm)		0.55	0.40	1.00	1.50	2.00	2.50	2.70	2.80	2.90	2.90	3.00	
	3/8 in (9.52 mm)		0.77	0.53	1.33	2.06	2.80	3.40	3.60	3.90	4.00	4.00	4.00	
	1/2 in (12.7 mm)		0.78	0.94	2.38	3.67	4.97	5.98	6.48	6.91	7.06	7.13	7.20	
	3/4 in (19.0 mm)		0.80	1.60	4.00	6.20	8.40	10.10	11.00	12.00	12.00	12.00	12.00	
	1 in (25.4 mm)		0.77	2.80	7.00	11.00	15.00	18.00	19.00	20.00	21.00	21.00	21.00	
1"	1/8 in (3.17 mm)		Quick Opening (Carbide)	0.73	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
	3/16 in (4.74 mm)			0.74	0.77	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	1/4 in (6.35 mm)			0.68	0.88	1.51	1.67	1.71	1.73	1.73	1.74	1.74	1.74	1.74
	3/8 in (9.52 mm)	0.74		1.02	2.40	3.36	3.64	3.73	3.78	3.82	3.83	3.83	3.86	
	1/2 in (12.7 mm)	0.90		1.09	2.46	4.17	5.03	5.27	5.45	5.60	5.72	5.85	5.93	
2"	1/4 in (6.35 mm)	0.65		1.23	1.82	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	
	3/8 in (9.52 mm)	0.76		1.65	3.41	3.77	3.83	3.84	3.84	3.84	3.84	3.84	3.84	
	1/2 in (12.7 mm)	0.80		2.26	4.35	5.87	6.36	6.51	6.58	6.61	6.63	6.63	6.63	
	3/4 in (19.0 mm)	0.78		2.16	4.61	7.23	9.19	10.2	10.6	10.9	10.9	10.9	10.9	
	1 in (25.4 mm)	0.70		2.54	5.58	9.30	12.3	14.2	15.1	15.5	15.6	15.6	15.8	
1"	1/8 in (3.17 mm)	Equal Percentage		0.73	0.01	0.02	0.03	0.04	0.06	0.09	0.15	0.26	0.32	0.34
	1/4 in (6.35 mm)			0.66	0.05	0.10	0.14	0.19	0.29	0.58	0.93	1.27	1.63	1.99
	1/2 in (12.7 mm)			0.78	0.16	0.32	0.47	0.60	0.93	1.74	2.99	4.41	5.65	6.49
2"	1/4 in (6.35 mm)		0.65	0.10	0.14	0.19	0.23	0.27	0.55	0.82	1.12	1.62	1.72	
	7/16 in (11.1 mm)		0.60	0.10	0.30	0.50	0.70	1.00	1.50	2.60	3.80	4.80	5.40	
	5/8 in (15.8 mm)		0.58	0.30	0.50	0.90	1.10	1.40	2.30	3.90	6.40	8.70	10.80	
	7/8 in (22.2 mm)		0.66	0.40	0.90	1.57	2.10	3.00	4.20	6.30	9.60	13.00	17.00	
<b>Cage Guided</b>														
2"	1 1/2 in (38mm)		Equal Percentage	0.75	0.60	1.30	2.20	3.40	5.00	8.60	14.0	21.0	26.0	28.6
	2 in (51 mm)	0.76		2.00	4.00	6.00	8.00	11.0	20.0	33.0	45.0	51.0	57.0	
3"	2 in (51 mm)	0.75		2.90	4.90	7.40	9.50	12.0	17.4	28.9	40.8	48.1	52.6	
	3 in (76 mm)	0.76		4.00	6.00	10.0	13.0	16.0	26.0	54.0	83.0	97.0	107	
4"	3 in (76 mm)	0.75		4.00	6.00	9.00	12.0	16.0	25.0	52.0	81.0	95.0	115	
	4 in (102 mm)	0.75		9.00	13.0	18.0	26.0	36.0	64.0	104	148	197	222	
6"	4 in (102 mm)	0.75		9.00	13.0	18.0	26.0	36.0	64.0	104	148	197	222	
	6 in (152 mm)	0.75		7.00	20.0	45.0	78.0	108	140	222	318	399	431	
8"	6 in (152 mm)	0.75		47.0	60.0	90.0	106	119	139	173	243	294	453	
	8 in (203 mm)	0.75		51.0	53.0	235	362	485	584	665	699	745	810	
10"	6 in (152 mm)	0.75		26.0	37.0	46.0	53.0	56.0	58.0	104	146	655	655	
	8.5 in (216 mm)	0.75		28.0	72.0	420	509	632	678	769	814	832	1091	
8"	8 in (203 mm)	Modified E.P.		0.75	51.0	55.0	64.0	134	162	330	452	527	571	630
10"	8.5 in (216 mm)		0.75	21.0	22.0	27.0	103	209	429	596	663	695	884	
2"	2 in (51 mm)	Quick Open	0.76	0.80	1.50	6.10	13.0	20.2	27.6	35.6	42.4	48.8	53.0	
3"	3 in (76 mm)		0.76	5.10	21.3	42.4	63.8	83.0	97.7	105	111	113	115	
4"	4 in (102 mm)		0.75	8.20	43.8	80.0	119	170	211	237	247	252	253	

# HIGH PRESSURE CONTROL VALVES

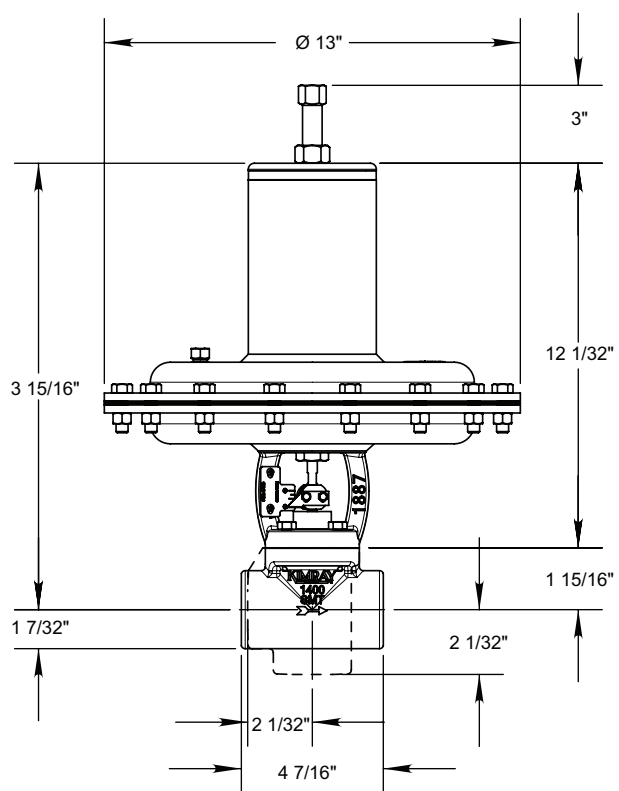


## DIMENSIONS 1" MODEL CVS

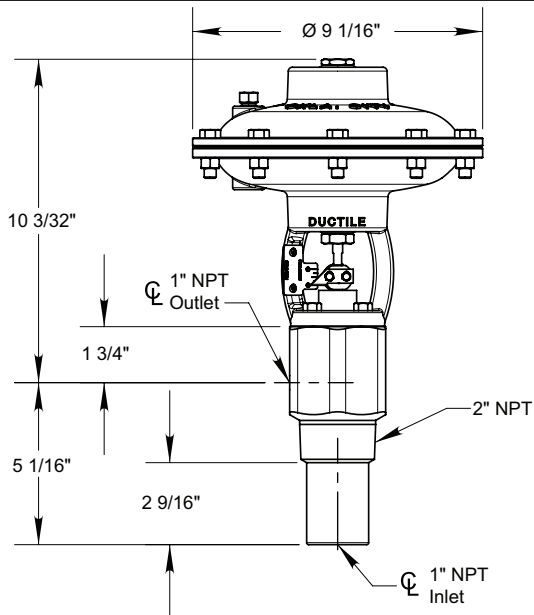
1" HPCV



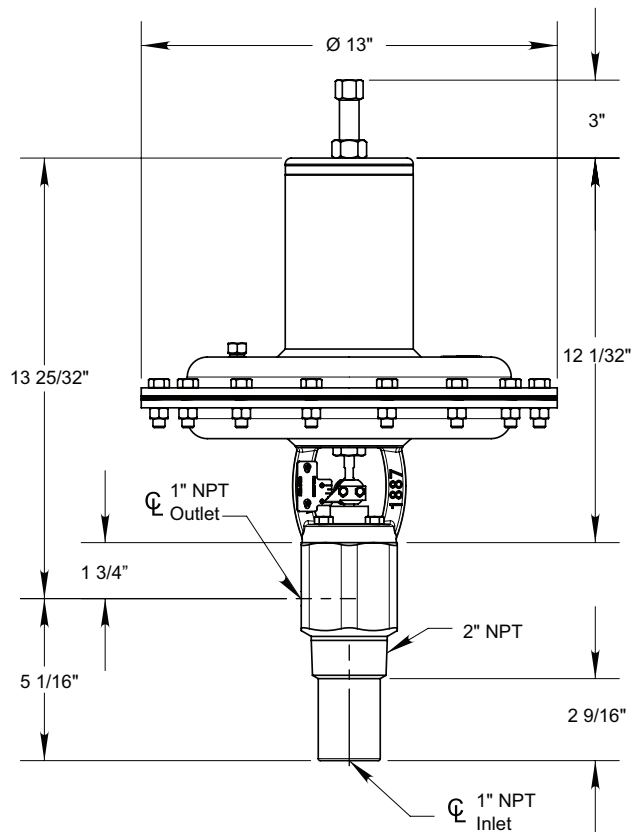
1" HPCV -65 TOPWORKS



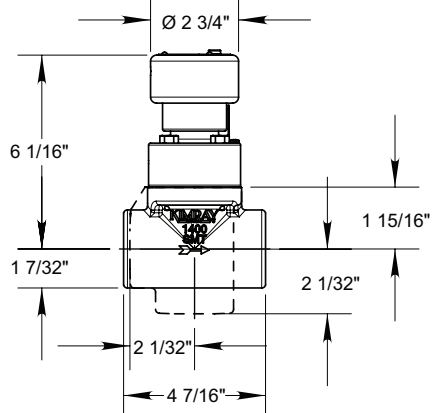
1" SMS



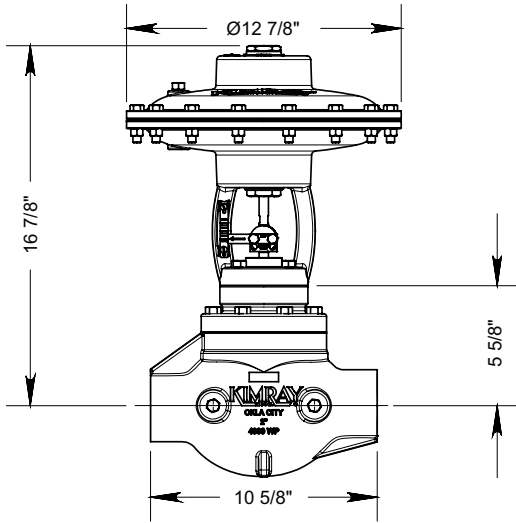
1" SMS -65 TOPWORKS



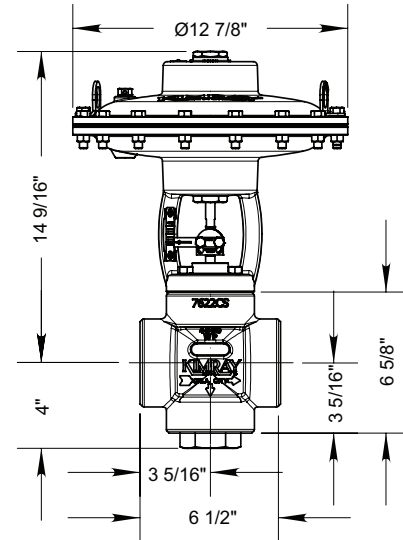
1" SMVA/T



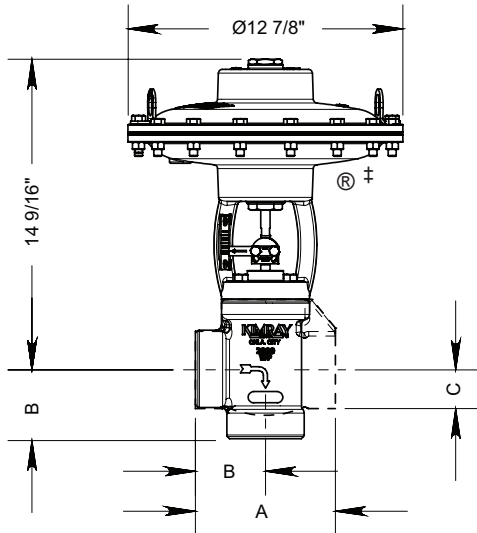
**2" HPCV PB**



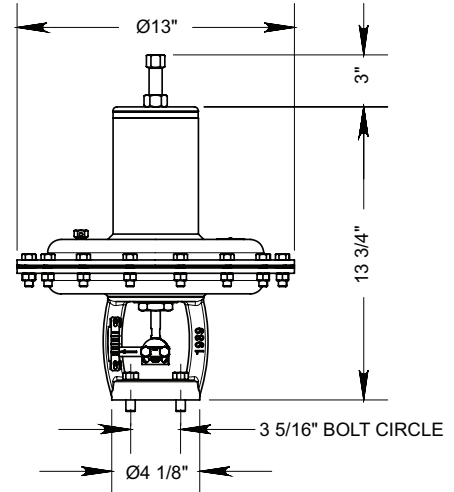
**2" SMD**



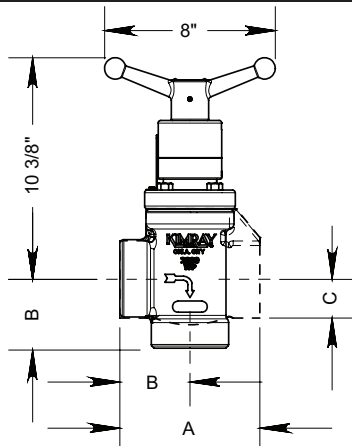
**2" HPCV**



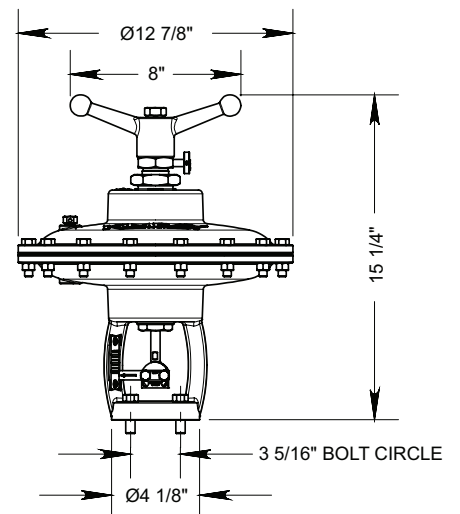
**2" -65 TOPWORKS**



**2" SMVA/T TOPWORKS**



**2" MVP TOPWORKS**



MODEL NO.	A	B	C
2200	6 9/16"	3 9/32"	1 13/16"
2400	6 9/16"	3 9/32"	2 1/16"

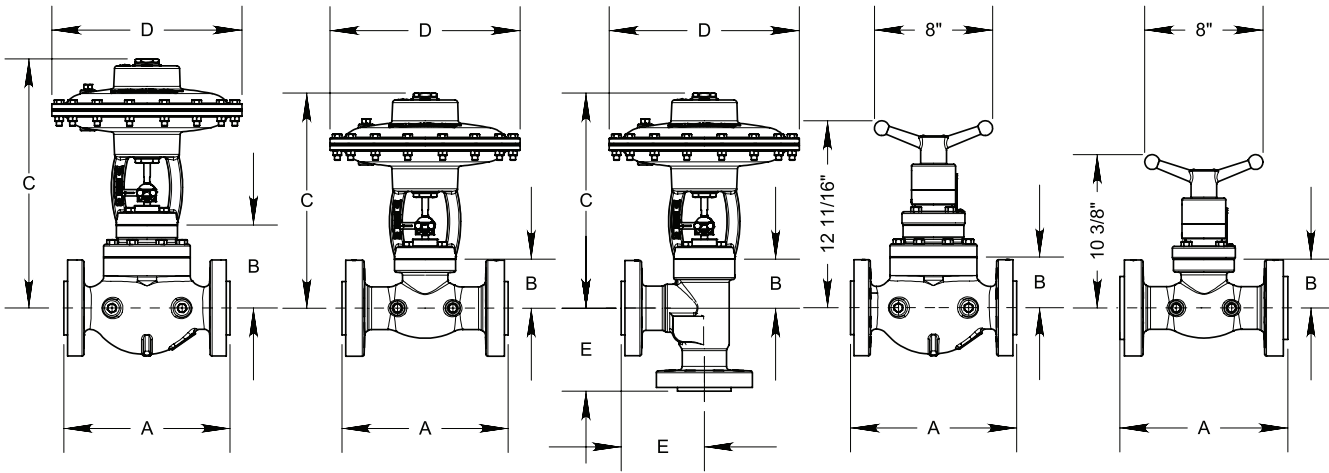
All dimensions are in inches  
Flanged body dimensions available on request.

# HIGH PRESSURE CONTROL VALVES



## DIMENSIONS

### FLANGED BODY MODEL CVS & CVC



	SIZE	BODY STYLE	A	B	C	D	E
STEM GUIDED	1"	150RF	7 1/4"	1 15/16"	10 1/2"	9 1/8"	
		150RTJ	7 5/8"	1 15/16"	10 1/2"	9 1/8"	
		300RF	7 3/4"	1 15/16"	10 1/2"	9 1/8"	
		300RTJ	8 1/8"	1 15/16"	10 1/2"	9 1/8"	
		600RF	8 1/4"	1 15/16"	10 1/2"	9 1/8"	
		600RTJ	8 1/4"	1 15/16"	10 1/2"	9 1/8"	
		1500RF	10 3/4"	1 15/16"	10 1/2"	9 1/8"	
	1500RTJ	10 3/4"	1 15/16"	10 1/2"	9 1/8"		
	2"	150RF	10"	3 3/16"	14 1/2"	12 7/8"	5"
		150RTJ	10 3/8"	3 3/16"	14 1/2"	12 7/8"	5"
		300RF	10 1/2"	3 3/16"	14 1/2"	12 7/8"	5 1/2"
		300RTJ	11"	3 3/16"	14 1/2"	12 7/8"	5 1/4"
		600RF	11 1/4"	3 3/16"	14 1/2"	12 7/8"	5 5/8"
		600RTJ	11 3/8"	3 3/16"	14 1/2"	12 7/8"	5 5/8"
		1500RF	13 3/8"	3 3/16"	14 1/2"	12 7/8"	7 13/32"
	1500RTJ	13 1/2"	3 3/16"	14 1/2"	12 7/8"	7 13/32"	
	2500RTJ	16 3/8"	3 3/16"	14 1/2"	12 7/8"		
2-1/16 API 5000	14 3/4"	4 1/4"	14 1/2"	12 7/8"	7 3/8"		
CAGE GUIDED	2"	150RF	10"	5 5/8"	17"	12 7/8"	
		300RF	10 1/2"	5 5/8"	17"	12 7/8"	
		600RF	11 1/4"	5 5/8"	17"	12 7/8"	
		1500RF	13 3/8"	5 5/8"	17"	12 7/8"	
		1500RTJ	13 1/2"	5 5/8"	17"	12 7/8"	
	3"	150RF	11 3/4"	7 1/4"	27"	15 3/4"	
		300RF	12 1/2"	7 1/4"	27"	15 3/4"	
		600RF	13 1/4"	7 1/4"	27"	15 3/4"	
		600RTJ	13 3/8"	7 1/4"	27"	15 3/4"	
	4"	150RF	13 7/8"	11"	30"	15 3/4"	
		300RF	14 1/2"	11"	30"	15 3/4"	
		600RF	15 1/2"	11"	30"	15 3/4"	
	6"	150RF	17 3/4"	11 3/16"	34 1/2"	20 7/16"	
		300RF	18 5/8"	11 3/16"	34 1/2"	20 7/16"	
		600RF	20 1/16"	11 3/16"	34 1/2"	20 7/16"	
	8"	150RF	21 3/8"	11 5/16"	34 1/2"	20 1/2"	
		300RF	22 3/8"	11 5/16"	34 1/2"	20 1/2"	
600RF		24"	11 5/16"	34 1/2"	20 1/2"		
10"	150RF	26 1/2"	11 5/16"	34 1/2"	20 1/2"		
	300RF	27 7/8"	11 5/16"	34 1/2"	20 1/2"		
	600RF	29 9/16"	11 5/16"	34 1/2"	20 1/2"		

All Pictures shown are for illustration purpose only. Actual product may vary due to product enhancement.

Table 2 - Seal Options		
Part	Standard Material	Optional Material
Diaphragm	Nitrile	FKM
Packing Rings	Nitrile	FKM, Aflas, HSN, Graphite
Packing Sleeve	Teflon	
O-rings	Nitrile	FKM, Aflas, HSN
Seal Ring	Polyurethane	Aflas

Table 3 - Seal Specifications							
		NITRILE	HIGHLY SATURATED NITRILE	FKM	AFLAS®	TEFLON	GRAPHITE PACKING
	Kimray Suffix	-	HSN	V	AF	T	G
Resistance	Abrasion	G	G-E	G	G	E	PF
	Acid	F	G-E	G-E	E	E	G
	Chemical	F	F	E	E	E	E
	Cold	G	G	P	P	E	E
	Flame	P	P	E	E	P	E
	Heat	G	E	E	E	E	E
	Oil	G-E	E	E	E	E	E
	Ozone	P	G	G-E	E	E	F
	Set	G	G	G-E	P	P	G
	Tear	F	F	F	P	E	P
	Water/Steam	F	E	P	G	E	E
	Weather	F	G	E	E	E	E
	CO2	F-G	G	G	G	E	E
	H2S	P	F	P	E	E	E
Methanol	F	E	P	P	E	E	
Properties	Dynamic	G	G	G	G	P	E
	Electrical	F	F	F	G-E	E	Conductive
	Impermeability	G	G	G	G	E	G
	Tensile Strength	G	G-E	G	F	E	P
Temp. Range		-20° to +250°F	-20° to +300°F	-15° to +400°F	+15° to +450°F	-450° to +500°F	-328° to +850°F
		-29° to +121°C	-29° to +149°C	-26° to +204°C	-9° to +232°C	-268° to +260°C	-200° to +455°C
RATINGS: P-POOR, F-FAIR, G-GOOD, E-EXCELLENT							

<b>Table 5 - Material Options Stem Guided</b>			
<b>Part Description</b>	<b>Standard Material</b>	<b>Erosive Material</b>	<b>Corrosive Material</b>
Body	WCB (ASTM A216)		WCB (ASTM A216) ‡
Actuator	Ductile (ASTM A395)		
Stuffing Box	Carbon Steel (ASTM A105)		316SS (ASTM A479)
Cage	Alloy Steel (ASTM A108)		316SS (ASTM A479)
Stem	303SS (ASTM A582)		316SS (ASTM A479)
Plug*	Chrome Alloy	Tungsten Carbide	316SS (ASTM A479)
Seat	D-2 (ASTM A681)	Zirconia	316SS (ASTM A479)
Cover Bonnet (Metering Valve)	WCB (ASTM A216)		

\*Material can vary by trim size. See Page 01:200.2

‡ Coated Parts available with "K" service type

<b>Table 6 - Material Options Cage Guided</b>			
<b>Part Description</b>	<b>Standard Material</b>	<b>Erosive Material</b>	<b>Corrosive Material</b>
Body	WCB (ASTM A216)		WCB (ASTM A216) ‡
Actuator	Ductile (ASTM A395)		
Stuffing Box	2" - 4"	Carbon Steel (ASTM A105)	316SS (ASTM A479)
	6" - 10"	316SS (ASTM A479)	
Cover Bonnet (Upper Housing)	WCB (ASTM A216)		WCB (ASTM A216) ‡
Cage	2 & 3 inch 316SS (ASTM A479)	4-10 inch 316SS (ASTM A351 CF8M)	
Stem	316SS (ASTM A479)	303SS (ASTM A582)	316SS (ASTM A479)
Piston	316SS (ASTM A479)	D-2 (ASTM A597)	316SS (ASTM A479)
Seat Disc	D2 (ASTM A681)	Zirconia	316SS (ASTM A479)
Ratio Plug	D-2 (ASTM A597)		316SS (ASTM A351 CF8M)
Seat	D-2 (ASTM A681)		316SS (ASTM A479)
Bonnet (Metering Valve)	WCB (ASTM A216)		

‡ Coated Parts available with "K" service type



**Table 6 - 1" Stem Guided HPCV**

Valve Description	ΔP	0 psig (0 bar)		100 psig (6.8 bar)		500 psig (34.4 bar)		1000 psig (68.9 bar)		1500 psig (103.4 bar)	
	Spring	Crack	Full	Crack	Full	Crack	Full	Crack	Full	Crack	Full
1400 SMT PO 1/8" IV	621 (10 lbs)	3 psig (0.21 bar)	9.5 psig (0.66 bar)	3 psig (0.21 bar)	9 psig (0.62 bar)	3 psig (0.21 bar)	8.5 psig (0.59 bar)	2 psig (0.13 bar)	7 psig (0.48 bar)	2 psig (0.13 bar)	6 psig (0.41 bar)
	463 (20 lbs)	6.5 psig (0.44 bar)	20.5 psig (1.41 bar)	6 psig (0.41 bar)	20 psig (1.37 bar)	6 psig (0.41 bar)	19.5 psig (1.34 bar)	5.5 psig (0.37 bar)	18 psig (1.24 bar)	5.5 psig (0.37 bar)	17.5 psig (1.20 bar)
	464 (30 lbs)	9.5 psig (0.65 bar)	34 psig (2.34 bar)	9.5 psig (0.65 bar)	34 psig (2.34 bar)	9 psig (0.62 bar)	33 psig (2.27 bar)	9 psig (0.62 bar)	32 psig (2.20 bar)	8.5 psig (0.58 bar)	31 psig (2.13 bar)
1400 SMT PO 1/8" IV EP	621 (10 lbs)	3.5 psig (0.23 bar)	10 psig (0.68 bar)	3.5 psig (0.23 bar)	10 psig (0.68 bar)	3 psig (0.21 bar)	8.5 psig (0.58 bar)	2.5 psig (0.17 bar)	7.5 psig (0.51 bar)	2 psig (0.13 bar)	6 psig (0.41 bar)
	463 (20 lbs)	7 psig (0.48 bar)	21.5 psig (1.48 bar)	7 psig (0.48 bar)	21 psig (0.44 bar)	6.5 psig (0.44 bar)	19.5 psig (1.34 bar)	6 psig (0.41 bar)	18.5 psig (1.27 bar)	6 psig (0.41 bar)	17.5 psig (1.20 bar)
	464 (30 lbs)	12.5 psig (0.86 bar)	38 psig (2.61 bar)	12.5 psig (0.86 bar)	38 psig (2.61 bar)	11 psig (0.75 bar)	35.5 psig (2.44 bar)	10.5 psig (0.72 bar)	34.5 psig (2.37 bar)	10 psig (0.68 bar)	33 psig (2.27 bar)
1400 SMT PO 3/16" IV	621 (10 lbs)	3.5 psig (0.23 bar)	10.5 psig (0.72 bar)	3.5 psig (0.23 bar)	10 psig (0.68 bar)	3.5 psig (0.23 bar)	9 psig (0.62 bar)	3.5 psig (0.23 bar)	7.5 psig (0.51 bar)	3 psig (0.21 bar)	6.5 psig (0.44 bar)
	463 (20 lbs)	6.5 psig (0.44 bar)	21.5 psig (1.48 bar)	6.5 psig (0.44 bar)	21 psig (1.44 bar)	7.5 psig (0.51 bar)	21 psig (1.44 bar)	7 psig (0.48 bar)	19.5 psig (1.34 bar)	7 psig (0.48 bar)	18.5 psig (1.27 bar)
	464 (30 lbs)	11 psig (0.75 bar)	36 psig (2.48 bar)	10.5 psig (0.72 bar)	36 psig (2.48 bar)	11 psig (0.75 bar)	35 psig (2.41 bar)	11 psig (0.75 bar)	34 psig (2.34 bar)	10.5 psig (0.72 bar)	32.5 psig (2.23 bar)
1400 SMT PO 1/4" IV	621 (10 lbs)	3 psig (0.21 bar)	9.5 psig (0.65 bar)	3 psig (0.21 bar)	9 psig (0.62 bar)	3 psig (0.21 bar)	8.5 psig (0.58 bar)	2.5 psig (0.17 bar)	7.5 psig (0.51 bar)	2.5 psig (0.17 bar)	6.5 psig (0.44 bar)
	463 (20 lbs)	6 psig (0.41 bar)	20.5 psig (1.41 bar)	6 psig (0.41 bar)	20 psig (1.37 bar)	6 psig (0.41 bar)	19.5 psig (1.34 bar)	5.5 psig (0.37 bar)	18 psig (1.24 bar)	5.5 psig (0.37 bar)	17 psig (1.20 bar)
	464 (30 lbs)	10 psig (0.68 bar)	35 psig (2.41 bar)	10 psig (0.68 bar)	35 psig (2.42 bar)	10 psig (0.68 bar)	34 psig (2.34 bar)	9.5 psig (0.65 bar)	33 psig (2.27 bar)	9 psig (0.62 bar)	32 psig (2.20 bar)
1400 SMT PO 1/4" IV EP	621 (10 lbs)	3 psig (0.20 bar)	10 psig (0.68 bar)	3 psig (0.20 bar)	9.5 psig (0.65 bar)	2.5 psig (0.17 bar)	8 psig (0.55 bar)	2.5 psig (0.17 bar)	7 psig (0.48 bar)	2 psig (0.13 bar)	6 psig (0.41 bar)
	463 (20 lbs)	6.5 psig (0.44 bar)	21.5 psig (1.48 bar)	6.5 psig (0.44 bar)	20 psig (1.37 bar)	6 psig (0.41 bar)	20 psig (1.37 bar)	6 psig (0.41 bar)	18.5 psig (1.27 bar)	6 psig (0.41 bar)	17.5 psig (1.20 bar)
	464 (30 lbs)	12 psig (0.83 bar)	40 psig (2.75 bar)	11.5 psig (0.79 bar)	39 psig (2.68 bar)	9.5 psig (0.66 bar)	35 psig (2.42 bar)	9 psig (0.62 bar)	33 psig (2.27 bar)	9 psig (0.62 bar)	32 psig (2.20 bar)
1400 SMT PO 3/8" IV SNAP	621 (10 lbs)	4.5 psig (0.31 bar)	10.5 psig (0.72 bar)	4.5 psig (0.31 bar)	10.5 psig (0.72 bar)	5.5 psig (0.38 bar)	9.5 psig (0.66 bar)	6.5 psig (0.44 bar)	8 psig (0.55 bar)	7.5 psig (0.51 bar)	7 psig (0.48 bar)
	463 (20 lbs)	7 psig (0.48 bar)	21.5 psig (1.48 bar)	7 psig (0.48 bar)	21 psig (1.44 bar)	9.5 psig (0.65 bar)	21 psig (0.44 bar)	10.5 psig (0.72 bar)	20 psig (1.37 bar)	11 psig (0.75 bar)	19 psig (1.31 bar)
	464 (30 lbs)	11 psig (0.75 bar)	35 psig (2.41 bar)	11 psig (0.75 bar)	35 psig (2.41 bar)	13 psig (0.89 bar)	35 psig (2.42 bar)	14 psig (0.97 bar)	33 psig (2.27 bar)	15.5 psig (1.06 bar)	32 psig (2.20 bar)
1400 SMT PO 3/8" IV	621 (10 lbs)	3 psig (0.20 bar)	9 psig (0.62 bar)	3 psig (0.20 bar)	9 psig (0.62 bar)	5 psig (0.34 bar)	9 psig (0.62 bar)	6.5 psig (0.44 bar)	7.5 psig (0.51 bar)	7.5 psig (0.51 bar)	6.5 psig (0.44 bar)
	463 (20 lbs)	6 psig (0.41 bar)	20.5 psig (1.41 bar)	6 psig (0.41 bar)	20 psig (1.37 bar)	8.5 psig (0.58 bar)	21 psig (0.44 bar)	9.5 psig (0.65 bar)	20 psig (1.37 bar)	10.5 psig (0.72 bar)	18.5 psig (1.27 bar)
	464 (30 lbs)	9.5 psig (0.66 bar)	34 psig (2.34 bar)	9.5 psig (0.66 bar)	34 psig (2.34 bar)	11.5 psig (0.79 bar)	33 psig (2.27 bar)	12.5 psig (0.85 bar)	32 psig (2.20 bar)	13.5 psig (0.93 bar)	31 psig (2.14 bar)
1400 SMT PO 1/2" IV	621 (10 lbs)	3 psig (0.20 bar)	10.5 psig (0.72 bar)	3 psig (0.20 bar)	10 psig (0.68 bar)	5.5 psig (0.38 bar)	8.5 psig (0.58 bar)	7 psig (0.48 bar)	7.5 psig (0.51 bar)	9 psig (0.62 bar)	6.5 psig (0.44 bar)
	463 (20 lbs)	6.5 psig (0.44 bar)	21 psig (0.44 bar)	6 psig (0.41 bar)	20.5 psig (1.41 bar)	8.5 psig (0.58 bar)	19.5 psig (1.34 bar)	10 psig (0.68 bar)	18.5 psig (1.27 bar)	12 psig (0.83 bar)	17.5 psig (1.20 bar)
	464 (30 lbs)	11.5 psig (0.79 bar)	37 psig (2.54 bar)	11 psig (0.75 bar)	36 psig (2.48 bar)	13.5 psig (0.93 bar)	35 psig (2.41 bar)	15 psig (1.03 bar)	34 psig (2.34 bar)	17 psig (1.20 bar)	33 psig (2.27 bar)
1400 SMT PO 1/2" IV EP	621 (10 lbs)	3.5 psig (0.24 bar)	10 psig (0.68 bar)	3.5 psig (0.24 bar)	9.5 psig (0.66 bar)	7 psig (0.48 bar)	10 psig (0.68 bar)	7.5 psig (0.52 bar)	7.5 psig (0.51 bar)	9.5 psig (0.65 bar)	6 psig (0.41 bar)
	463 (20 lbs)	7 psig (0.48 bar)	21.5 psig (1.48 bar)	7.5 psig (0.51 bar)	21.5 psig (1.48 bar)	10.5 psig (0.72 bar)	21 psig (0.44 bar)	12.5 psig (0.86 bar)	20.5 psig (1.41 bar)	14 psig (0.97 bar)	19 psig (1.31 bar)
	464 (30 lbs)	11 psig (0.75 bar)	37 psig (2.54 bar)	11 psig (0.75 bar)	37 psig (2.54 bar)	14 psig (0.97 bar)	35 psig (2.41 bar)	16 psig (1.10 bar)	34 psig (2.34 bar)	18 psig (1.24 bar)	33 psig (2.27 bar)

**Table 7 - 2" Stem Guided HPCV**

Valve Description	ΔP	0 psig (0 bar)		100 psig (6.8 bar)		500 psig (34.4 bar)		1000 psig (68.9 bar)		1500 psig (103.4 bar)	
		Spring	Crack	Full	Crack	Full	Crack	Full	Crack	Full	Crack
2400 SMT PO 1/4" EP IV	1245 (15 lbs)	3.5 psig (0.24 bar)	15.5 psig (1.06 bar)	3 psig (0.20 bar)	15 psig (1.03 bar)	2.5 psig (0.17 bar)	15 psig (1.03 bar)	2 psig (0.13 bar)	14.5 psig (1.00 bar)	1.5 psig (0.10 bar)	13 psig (0.89 bar)
	538 (20 lbs)	3.5 psig (0.24 bar)	18 psig (1.24 bar)	3.5 psig (0.24 bar)	17.5 psig (1.20 bar)	3.5 psig (0.24 bar)	17.5 psig (1.20 bar)	2.5 psig (0.17 bar)	16.5 psig (1.13 bar)	1.5 psig (0.10 bar)	15 psig (1.03 bar)
	508 (30 lbs)	7.5 psig (0.52 bar)	32 psig (2.20 bar)	7 psig (0.48 bar)	32 psig (2.20 bar)	6.5 psig (0.44 bar)	31 psig (2.14 bar)	6 psig (0.41 bar)	30 psig (2.07 bar)	5.5 psig (0.38 br )	29 psig (2.00 bar)
2400 SMT PO 1/4" IV	1245 (15 lbs)	3.5 psig (0.24 bar)	16 psig (1.10 bar)	3.5 psig (0.24 bar)	16 psig (1.10 bar)	3 psig (0.20 bar)	14.5 psig (1.00 bar)	3 psig (0.20 bar)	13 psig (0.89 bar)	3 psig (0.20 bar)	12.5 psig (0.85 bar)
	538 (20 lbs)	4 psig (0.27 bar)	18.5 psig (1.27 bar)	3.5 psig (0.24 bar)	18.5 psig (1.27 bar)	3.5 psig (0.24 bar)	18 psig (1.24 bar)	3 psig (0.20 bar)	17.5 psig (1.20 bar)	3 psig (0.20 bar)	16.5 psig (1.13 bar)
	508 (30 lbs)	6.5 psig (0.44 bar)	32 psig (2.20 bar)	6.5 psig (0.44 bar)	33 psig (2.27 bar)	7 psig (0.48 bar)	31 psig (2.14 bar)	6.5 psig (0.44 bar)	30 psig (2.07 bar)	6.5 psig (0.44 bar)	29 psig (2.00 bar)
2400 SMT PO 1/4" IV SNAP	1245 (15 lbs)	3.5 psig (0.23 bar)	15.5 psig (1.06 bar)	4 psig (0.27 bar)	15.5 psig (1.06 bar)	3 psig (0.20 bar)	15 psig (1.03 bar)	2.5 psig (0.17 bar)	14.5 psig (1.00 bar)	2 psig (0.13 bar)	14 psig (0.97 bar)
	538 (20 lbs)	4 psig (0.27 bar)	18 psig (1.24 bar)	4 psig (0.27 bar)	18 psig (1.24 bar)	3 psig (0.20 bar)	17 psig (1.22 bar)	2.5 psig (0.17 bar)	17 psig (1.22 bar)	2 psig (0.13 bar)	16.5 psig (1.13 bar)
	508 (30 lbs)	6.5 psig (0.44 bar)	32 psig (2.20 bar)	7 psig (0.48 bar)	32 psig (2.20 bar)	6 psig (0.41 bar)	31 psig (2.14 bar)	5 psig (0.34 bar)	30 psig (2.07 bar)	4 psig (0.27 bar)	29 psig (2.00 bar)
2400 SMT PO 3/8" IV	1245 (15 lbs)	4 psig (0.27 bar)	16.5 psig (1.13 bar)	4 psig (0.27 bar)	16 psig (1.10 bar)	3.5 psig (0.23 bar)	16 psig (1.10 bar)	3.5 psig (0.23 bar)	15.5 psig (1.06 bar)	3.5 psig (0.23 bar)	15 psig (1.03 bar)
	538 (20 lbs)	4.5 psig (0.31 bar)	18 psig (1.24 bar)	4 psig (0.27 bar)	18 psig (1.24 bar)	4 psig (0.27 bar)	17 psig (1.22 bar)	4 psig (0.27 bar)	16.5 psig (1.13 bar)	4 psig (0.27 bar)	16.5 psig (1.13 bar)
	508 (30 lbs)	8 psig (0.55 bar)	32 psig (2.20 bar)	8 psig (0.55 bar)	32 psig (2.20 bar)	7.5 psig (0.51 bar)	32 psig (2.20 bar)	7.5 psig (0.51 bar)	31 psig (2.13 bar)	7.5 psig (0.51 bar)	30 psig (2.07 bar)
2400 SMT PO 3/8" IV SNAP	1245 (15 lbs)	4 psig (0.27 bar)	14.5 psig (1.00 bar)	3.5 psig (0.23 bar)	14.5 psig (1.00 bar)	4.5 psig (0.31 bar)	14 psig (0.97 bar)	4.5 psig (0.31 bar)	14 psig (0.97 bar)	4.5 psig (0.31 bar)	13.5 psig (0.93 bar)
	538 (20 lbs)	4 psig (0.27 bar)	17.5 psig (1.20 bar)	4 psig (0.27 bar)	17 psig (1.22 bar)	5 psig (0.34 bar)	17 psig (1.22 bar)	5 psig (0.34 bar)	16.5 psig (1.13 bar)	5 psig (0.34 bar)	16 psig (1.10 bar)
	508 (30 lbs)	7.5 psig (0.51 bar)	32 psig (2.20 bar)	7 psig (0.48 bar)	32 psig (2.20 bar)	8 psig (0.55 bar)	31 psig (2.13 bar)	8.5 psig (0.58 bar)	30 psig (2.07 bar)	8.5 psig (0.58 bar)	29 psig (2.00 bar)
2400 SMT PO 7/16" EP IV	1245 (15 lbs)	4 psig (0.27 bar)	15.5 psig (1.06 bar)	4 psig (0.27 bar)	15.5 psig (1.06 bar)	3.5 psig (0.23 bar)	15 psig (1.03 bar)	3.5 psig (0.23 bar)	14.5 psig (1.00 bar)	3.5 psig (0.23 bar)	14 psig (0.97 bar)
	538 (20 lbs)	4.5 psig (0.31 bar)	18.5 psig (1.31 bar)	4.5 psig (0.31 bar)	18.5 psig (1.27 bar)	4.5 psig (0.31 bar)	17.5 psig (1.20 bar)	4 psig (0.27 bar)	16 psig (1.10 bar)	4 psig (0.27 bar)	15 psig (1.03 bar)
	508 (30 lbs)	8 psig (0.55 bar)	32 psig (2.20 bar)	8 psig (0.55 bar)	31 psig (2.13 bar)	7.5 psig (0.51 bar)	30 psig (2.07 bar)	7.5 psig (0.51 bar)	29 psig (2.00 bar)	7.5 psig (0.51 bar)	28 psig (1.93 bar)
2400 SMT PO 1/2" IV	1245 (15 lbs)	4 psig (0.27 bar)	15 psig (1.03 bar)	4 psig (0.27 bar)	15 psig (1.03 bar)	4.5 psig (0.31 bar)	14.5 psig (1.00 bar)	5 psig (0.34 bar)	13.5 psig (0.93 bar)	5 psig (0.34 bar)	12 psig (0.83 bar)
	538 (20 lbs)	4 psig (0.27 bar)	17 psig (1.22 bar)	3.5 psig (0.23 bar)	16.5 psig (1.13 bar)	4.5 psig (0.31 bar)	16.5 psig (1.13 bar)	4.5 psig (0.31 bar)	15.5 psig (1.06 bar)	5 psig (0.34 bar)	14 psig (0.97 bar)
	508 (30 lbs)	7 psig (0.48 bar)	30 psig (2.07 bar)	7 psig (0.48 bar)	30 psig (2.07 bar)	8 psig (0.58 bar)	30 psig (2.07 bar)	8 psig (0.55 bar)	28 psig (1.93 bar)	8.5 psig (0.58 bar)	27 psig (1.86 bar)
2400 SMT 1/2" IV SNAP	1245 (15 lbs)	3 psig (0.20 bar)	16 psig (1.10 bar)	3 psig (0.20 bar)	15 psig (1.03 bar)	4.5 psig (0.31 bar)	14.5 psig (1.00 bar)	5 psig (0.34 bar)	14 psig (0.97 bar)	5 psig (0.34 bar)	13.5 psig (0.93 bar)
	538 (20 lbs)	3.5 psig (0.23 bar)	17 psig (1.22 bar)	3 psig (0.20 bar)	16.5 psig (1.13 bar)	4.5 psig (0.31 bar)	16 psig (1.10 bar)	5 psig (0.34 bar)	15 psig (1.03 bar)	5 psig (0.34 bar)	14.5 psig (1.00 bar)
	508 (30 lbs)	7 psig (0.48 bar)	32 psig (2.20 bar)	7.5 psig (0.51 bar)	32 psig (2.20 bar)	7.5 psig (0.51 bar)	31 psig (2.14 bar)	7.5 psig (0.51 bar)	30 psig (2.07 bar)	8 psig (0.55 bar)	29 psig (2.00 bar)
2400 SMT PO 5/8" EP IV	1245 (15 lbs)	4 psig (0.27 bar)	16 psig (1.10 bar)	4 psig (0.27 bar)	16 psig (1.10 bar)	6 psig (0.41 bar)	16.5 psig (1.13 bar)	7.5 psig (0.51 bar)	16 psig (1.10 bar)	8.5 psig (0.58 bar)	15.5 psig (1.06 bar)
	538 (20 lbs)	4 psig (0.27 bar)	19 psig (1.31 bar)	4 psig (0.27 bar)	19 psig (1.31 bar)	6.5 psig (0.44 bar)	18.5 psig (1.27 bar)	7.5 psig (0.51 bar)	17.5 psig (1.20 bar)	9 psig (0.62 bar)	17 psig (1.22 bar)
	508 (30 lbs)	8 psig (0.55 bar)	32 psig (2.20 bar)	8.5 psig (0.58 bar)	32 psig (2.20 bar)	10 psig (0.68 bar)	31 psig (2.14 bar)	11.5 psig (0.79 bar)	30 psig (2.06 bar)	12.5 psig (1.48 bar)	29 psig (2.00 bar)

2400 SMT PO 3/4" IV	1245 (15 lbs)	5 psig (0.34 bar)	17 psig (1.72 bar)	5 psig (0.34 bar)	17 psig (1.72 bar)	7.5 psig (0.51 bar)	14.5 psig (1.00 bar)	8.5 psig (0.58 bar)	13 psig (0.89 bar)	10 psig (0.68 bar)	12 psig (0.83 bar)
	538 (20 lbs)	5.5 psig (0.37 bar)	19 psig (1.31 bar)	5.5 psig (0.37 bar)	19 psig (1.31 bar)	7 psig (0.48 bar)	17 psig (1.72 bar)	9 psig (0.62 bar)	16 psig (1.10 bar)	11 psig (0.75 bar)	14 psig (0.97 bar)
	508 (30 lbs)	9 psig (0.62 bar)	34 psig (2.34 bar)	9 psig (0.62 bar)	34 psig (2.34 bar)	11 psig (0.75 bar)	33 psig (2.27 bar)	13 psig (0.89 bar)	32 psig (2.20 bar)	15 psig (1.03 bar)	30 psig (2.07 bar)
2400 SMT PO 3/4" IV SNAP	1245 (15 lbs)	4 psig (0.27 bar)	15 psig (1.03 bar)	4 psig (0.27 bar)	15 psig (1.03 bar)	6.5 psig (0.44 bar)	14.5 psig (0.96 bar)	8 psig (0.55 bar)	13.5 psig (0.93 bar)	9 psig (0.62 bar)	12 psig (0.83 bar)
	538 (20 lbs)	5 psig (0.34 bar)	18.5 psig (1.27 bar)	5 psig (0.34 bar)	18.5 psig (1.27 bar)	6.5 psig (0.44 bar)	16.5 psig (1.13 bar)	8 psig (0.55 bar)	15.5 psig (1.06 bar)	9.5 psig (0.66 bar)	14 psig (0.97 bar)
	508 (30 lbs)	9 psig (0.62 bar)	32 psig (2.20 bar)	9 psig (0.62 bar)	32 psig (2.20 bar)	10 psig (0.68 bar)	31 psig (2.14 bar)	11 psig (0.75 bar)	30 psig (2.07 bar)	12.5 psig (0.86 bar)	29 psig (2.00 bar)
2400 SMT PO 7/8" EP IV	1245 (15 lbs)	3.5 psig (0.23 bar)	15 psig (1.03 bar)	4 psig (0.27 bar)	15 psig (1.03 bar)	7 psig (0.48 bar)	14.5 psig (1.00 bar)	11 psig (0.75 bar)	14 psig (0.97 bar)	13.5 psig (0.93 bar)	13.5 psig (0.93 bar)
	538 (20 lbs)	3.5 psig (0.23 bar)	17.5 psig (1.20 bar)	4 psig (0.27 bar)	17.5 psig (1.20 bar)	7.5 psig (0.51 bar)	17 psig (1.72 bar)	10.5 psig (0.72 bar)	16.5 psig (1.13 bar)	13.5 psig (0.93 bar)	16 psig (1.10 bar)
	508 (30 lbs)	7 psig (0.48 bar)	30 psig (2.07 bar)	7.5 psig (0.51 bar)	30 psig (2.07 bar)	10.5 psig (0.72 bar)	29 psig (2.00 bar)	14 psig (0.97 bar)	28 psig (1.93 bar)	17 psig (1.72 bar)	27 psig (1.86 bar)
2400 SMT PO 1" IV	1245 (15 lbs)	4.5 psig (0.31 bar)	14.5 psig (1.00 bar)	5 psig (0.34 bar)	14 psig (0.97 bar)	8.5 psig (0.58 bar)	13 psig (0.89 bar)	12.5 psig (0.86 bar)	11.5 psig (0.79 bar)	16 psig (1.10 bar)	11 psig (0.75 bar)
	538 (20 lbs)	4.5 psig (0.31 bar)	17 psig (1.72 bar)	5 psig (0.34 bar)	17 psig (1.72 bar)	8.5 psig (0.58 bar)	16 psig (1.10 bar)	12.5 psig (0.86 bar)	15 psig (1.03 bar)	17 psig (1.72 bar)	14 psig (0.97 bar)
	508 (30 lbs)	7 psig (0.48 bar)	31 psig (2.14 bar)	7.5 psig (0.51 bar)	31 psig (2.14 bar)	12 psig (0.83 bar)	30 psig (2.07 bar)	16 psig (1.10 bar)	29 psig (2.00 bar)	19.5 psig (1.34 bar)	28 psig (1.93 bar)
2400 SMT PO 1" IV SNAP	1245 (15 lbs)	4.5 psig (0.31 bar)	16.5 psig (1.13 bar)	4.5 psig (0.31 bar)	16.5 psig (1.13 bar)	8.5 psig (0.58 bar)	15.5 psig (1.06 bar)	11.5 psig (0.79 bar)	15 psig (1.03 bar)	15 psig (1.03 bar)	15 psig (1.03 bar)
	538 (20 lbs)	4.5 psig (0.31 bar)	19 psig (1.31 bar)	4.5 psig (0.31 bar)	19 psig (1.31 bar)	8.5 psig (0.58 bar)	16 psig (1.10 bar)	11.5 psig (0.79 bar)	15.5 psig (1.06 bar)	15 psig (1.03 bar)	15 psig (1.03 bar)
	508 (30 lbs)	8 psig (0.55 bar)	32 psig (2.20 bar)	8 psig (0.55 bar)	32 psig (2.20 bar)	12 psig (0.83 bar)	31 psig (2.14 bar)	16 psig (1.10 bar)	30 psig (2.07 bar)	19.5 psig (1.34 bar)	29 psig (2.00 bar)

Table 8 - 2", 3", 4", 6", 8" & 10" Cage Guided HPCV											
Valve Description	ΔP	0 psig (0 bar)		100 psig (6.8 bar)		500 psig (34.4 bar)		1000 psig (68.9 bar)		1500 psig (103.4 bar)	
	Spring	Crack	Full	Crack	Full	Crack	Full	Crack	Full	Crack	Full
2150 SMT PB 2 IN IV	15 lbs	3 psig (0.21bar)	16 psig (1.1bar)	3.5 psig (0.24bar)	16 psig (1.1bar)	5.5 psig (0.38bar)	15 psig (1.03bar)	7.5 psig (0.52bar)	14 psig (0.97bar)	9.5 psig (0.66bar)	12 psig (0.83bar)
	20 lbs	3 psig (0.21bar)	19 psig (1.31bar)	3 psig (0.21bar)	18 psig (1.24bar)	5.5 psig (0.38bar)	17 psig (1.17bar)	8 psig (0.55bar)	16 psig (1.1bar)	8.5 psig (0.59bar)	15 psig (1.03bar)
	30 lbs	6 psig (0.41bar)	32 psig (2.21bar)	7 psig (0.48bar)	31 psig (2.14bar)	8 psig (0.55bar)	30 psig (2.07bar)	10.5 psig (0.72bar)	29 psig (2bar)	12.5 psig (0.86bar)	28 psig (1.93bar)
3150 FMT PB 3" IV	30 lbs	6 psig (0.41bar)	30 psig (2.07bar)	6.5 psig (0.45bar)	27.5 psig (1.9bar)	10.5 psig (0.72bar)	27 psig (1.86bar)	13.5 psig (0.93bar)	25 psig (1.72bar)	17 psig (1.17bar)	22 psig (1.52bar)
3150 FMT PB 3" IV- PC	30 lbs	Shut	27 psig (1.86bar)	Shut	28 psig (1.93bar)	Shut	30.5 psig (2.1bar)	Shut	33 psig (2.28bar)	Shut	36.5 psig (2.52bar)
4150 FMT PB	30 lbs	8.5 psig (0.59bar)	32 psig (2.21bar)	8.5 psig (0.59bar)	32 psig (2.21bar)	8 psig (0.55bar)	29.5 psig (2.03bar)	7.5 psig (0.52bar)	27 psig (1.86bar)	6 psig (0.41bar)	24.5 psig (1.69bar)
4150 FMT PB 4 IN IV PC	30 lbs	Shut	31 psig (2.14bar)	Shut	32.5 psig (2.24bar)	Shut	34.5 psig (2.38bar)	Shut	37 psig (2.55bar)	Shut	39.5 psig (2.72bar)
6150 FMT PB 6 IN IV	30 lbs	8 psig (0.55bar)	29 psig (2bar)	9.5 psig (0.66bar)	28 psig (1.93bar)	10.5 psig (0.72bar)	27 psig (1.86bar)	11 psig (0.76bar)	25 psig (1.72bar)	11.5 psig (0.79bar)	22 psig (1.52bar)
8150 FMT PB 8 IN IV	30 lbs	8 psig (0.55bar)	29 psig (2bar)	8.5 psig (0.59bar)	27.5 psig (1.9bar)	10 psig (0.69bar)	26.5 psig (1.83bar)	10.5 psig (0.72bar)	24 psig (1.65bar)	10.5 psig (0.72bar)	21.5 psig (1.48bar)
10150 FMT PB 8 IN IV	30 lbs	7.5 psig (0.52bar)	28.5 psig (1.97bar)	8.5 psig (0.59bar)	27.5 psig (1.9bar)	9.5 psig (0.66bar)	26 psig (1.79bar)	10 psig (0.69bar)	24 psig (1.65bar)	10.5 psig (0.72bar)	21.5 psig (1.48bar)