ISO Registered Company

MODELS PA1/PL1 BIO-SANITARY
PRESSURE REDUCING REGULATORS

MODEL PL1

MODEL PA1

The Models PA1 and PL1 are stainless steel pressure reducing regulators designed to handle small to mid-capacity flow rates in sanitary biotechnical process piping systems. These units are capable of controlling outlet pressure to a level between 2 and 140 psig (.13 and 9.6 Barg).

APPLICATIONS

Used in pharmaceutical industry in production of many health care products for both human and animal consumption. Widely applied for processed food production — candy, beverages, nutritional supplements and artificial sweeteners. May also be used in cosmetics production and specialty chemicals.

Would be found supporting fermenters, batching tanks, cookers, autoclaves, dryers and other similar equipment.

MODEL PA1 FEATURES

Clean-in-Place (CIP): Lock-open feature on the spring chamber area allows the regulator to be cleaned with 50 psig (3.4 Barg) cleaning solution.

Self-Draining: Angle style body with bottom inlet and side outlet.

MODELS PA1and PL1 FEATURES

Adjustment Ease: Adjusting knob for frequent set point changes.

Wetted Materials Construction: All metallic parts are SST. Unit is cleaned to Cashco Spec. #S-1576.

Surface Finish: Interior of body polished per ASME BPE (SF4). Interior and exterior surfaces are electro-polished.

Top Guided: A “non-wetted” guide in the topworks above the diaphragm provides stability at all set points.

STANDARD/GENERAL SPECIFICATIONS

Body Size: 1/2", 3/4" (DN15, 20.)

Body & Spring Chamber Materials: Wrought Barstock; ASTM A479, Type 316L SST.

Body Connection: Standard - Sanitary "Tri-Clamp® ". Designed to seal against weld-type clamp liners per ISO 2852.

Trim:

PART	LE	LF	LG	LH	LR
Diaphragm *	EPDM	EPDM	GYLON	GYLON	GYLON
Piston	316L SST	316L SST	316L SST	316L SST	316L SST
Seat [1] *	316L SST	TFE	316L SST	TFE	RULON 641
Plug	316L SST	316L SST	316L SST	316L SST	316L SST
Plug Tail Piece	--	316L SST	---	316L SST	316L SST
Pusher Plate	316L SST	316L SST	316L SST	316L SST	316L SST
Body Cap **	316L SST	316L SST	316L SST	316L SST	316L SST
Temperature Range °F (°C)	-20 to +275 (-29 to +135)	-20 to +275 (-29 to +135)	-20 to 300 -29 to +149)	-20 to +300 (-29 to +149)	-20 to +300 (-29 to +149)

* Parts conforms with FDA Code of Federal Regulations Title 21, Part 177
** Not required on PA1
[1] The fixed portion of the seat is integral to the body. Indicated seat is the moving portion and is attached or integral with the plug.

NOTE: Cashco, Inc. does not recommend metal seated trim on any service where the flow will be dead ended down stream of the pressure reducing regulator. Use composition seat for dead end service.

Seals: TFE o-ring at pusher plate and at body cap locations. TFE o-ring with Teflon back-up ring at pressure plate. All seals meet USP Class VI requirements.

Operating Temperature: -20 to +275°F (-29° to +135°C)

Inlet Pressure: 400 psig (27.5 Barg) maximum

Range Springs: Standard: SST

Maximum Pressure Drop: Composition Seat - 250 psig (17.2 Barg)

Capacities: PL1 - Inline Wide Open Cv: 1.21
PA1 - Angle Wide Open Cv: 1.41
See Tables 1, (3a-3d and 4a-4d for flow curves.)

Model PA1 - CIP Conditions: Maximum Cleaning Fluid: Pressure = 50 psig (3.4 Barg); Temperature = 300°F (149°C). At max conditions elastomer life is reduced.

Model PA1 - SIP Conditions: Maximum Steaming Fluid: Saturated; Trims LE, LF, LH -Acceptable pressure to 20 psig (1.3 Barg), but with reduced elastomer life.
Trims LG, LR - Pressures up to 55 psig (3.8 Barg),Temperatures to 296 °F (147°C).

Cleaning: All units cleaned per Cashco Spec. #S-1576.

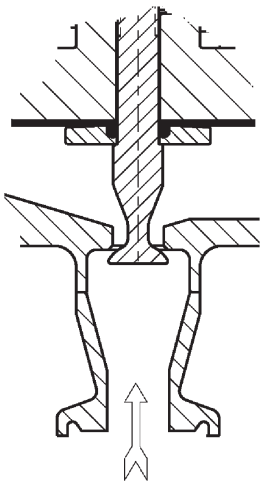


Figure 1
Metal Seat
As Shown with Angle Design

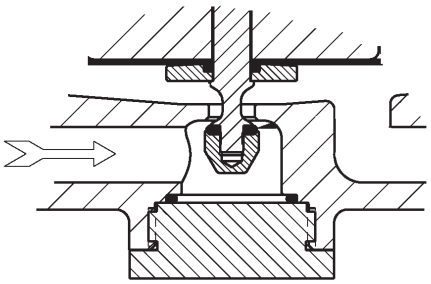


Figure 2
Composition Seat
As Shown with In-Line Design

Opt-1: **CLOSING CAP**. A removable cap discourages tampering with spring setting. Covers the adjusting screw threads to enhance cleanability.

Opt-41: **EXTENDED TUBE END CONN**. Body sizes 1/2" (DN15), PL1 design only. SST extension tube diameter with 0.065 inch (1.65 mm) wall thickness.

TABLE 1
CAPACITY - CV
AT FLOWING PRESSURE

Spring Range	Flowing Pressure		CV @ % DROOP		
	psig	(Barg)	10%	20%	30%
5-25	10	(0.69)	0.164	0.325	0.477
	15	(1.03)	0.192	0.371	0.563
	20	(1.38)	0.210	0.408	0.623
	25	(1.72)	0.224	0.436	0.669
20-50	30	(2.07)	0.189	0.360	0.558
	40	(2.76)	0.209	0.408	0.632
	50	(3.45)	0.218	0.426	0.657
40-100	60	(4.14)	0.168	0.326	0.498
	70	(4.83)	0.181	0.353	0.542
	80	(5.52)	0.192	0.377	0.586
	90	(6.20)	0.198	0.387	0.596
	100	(6.89)	0.205	0.406	0.627
85-140	110	(7.58)	0.190	0.375	0.581
	120	(8.27)	0.198	0.394	0.616
	130	(8.96)	0.207	0.416	0.648
	140	(9.65)	0.215	0.439	0.693

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 2
OUTLET PRESSURE LIMIT–
SAFETY RELIEF VALVE SIZING & SETPOINT

RANGE SPRING (psig)	DIAPHRAGM MATERIAL	EMERGENCY [1] OVER-PRESSURE (psig)
2-25, 20-50, 40-100, 80-140	ALL	1.5 x UVRS [2]

[1] "Emergency Over-Pressure" is defined as the level of pressure, which if exceeded, may cause internal mechanical damage.

[2] UVRS - "Upper Value of Range Spring"; i.e. 80-140 psig (5.5 -9.6 Barg) range spring, value would be 210 psig (14.4 Barg).

TABLE 3a

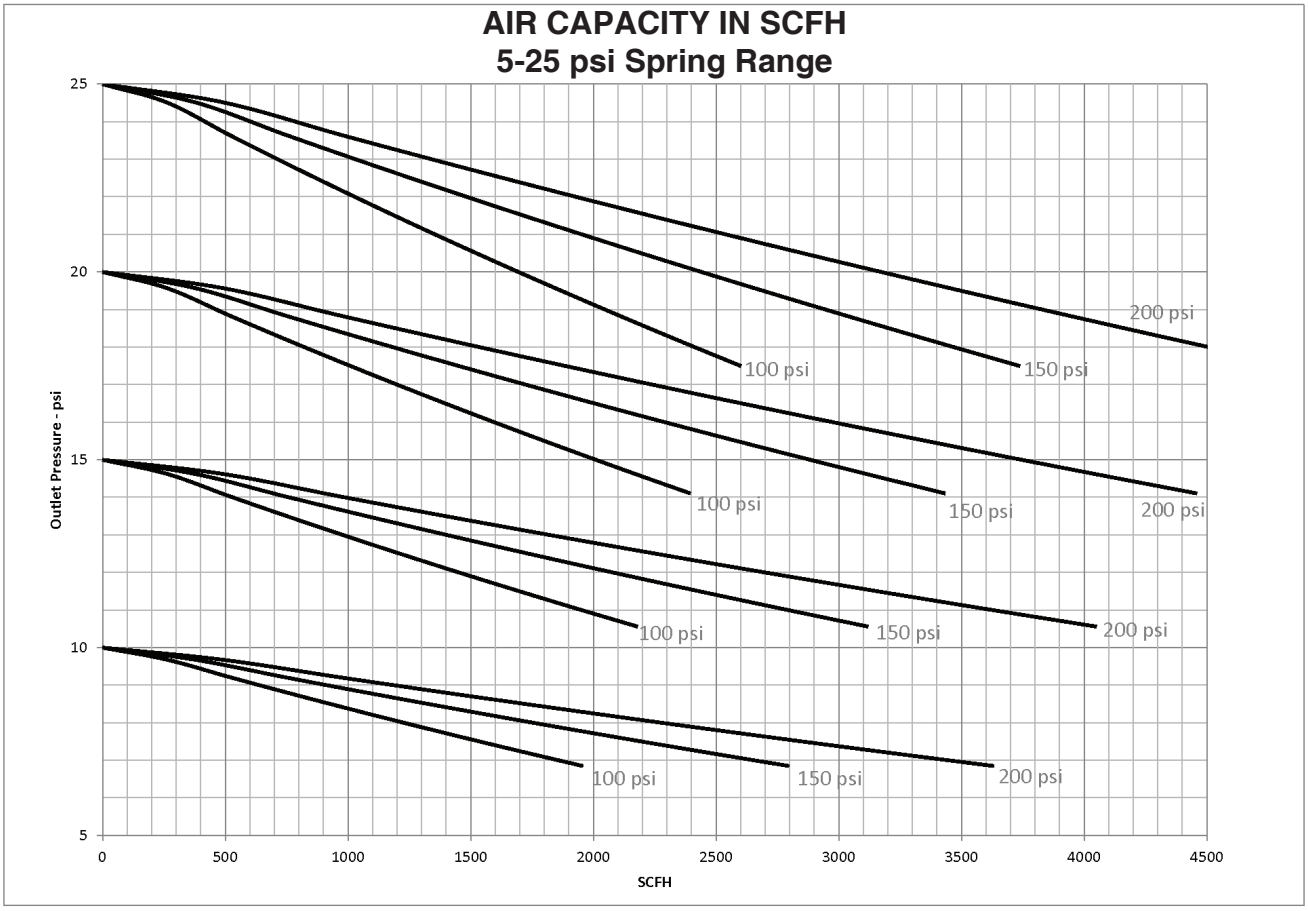


TABLE 3b

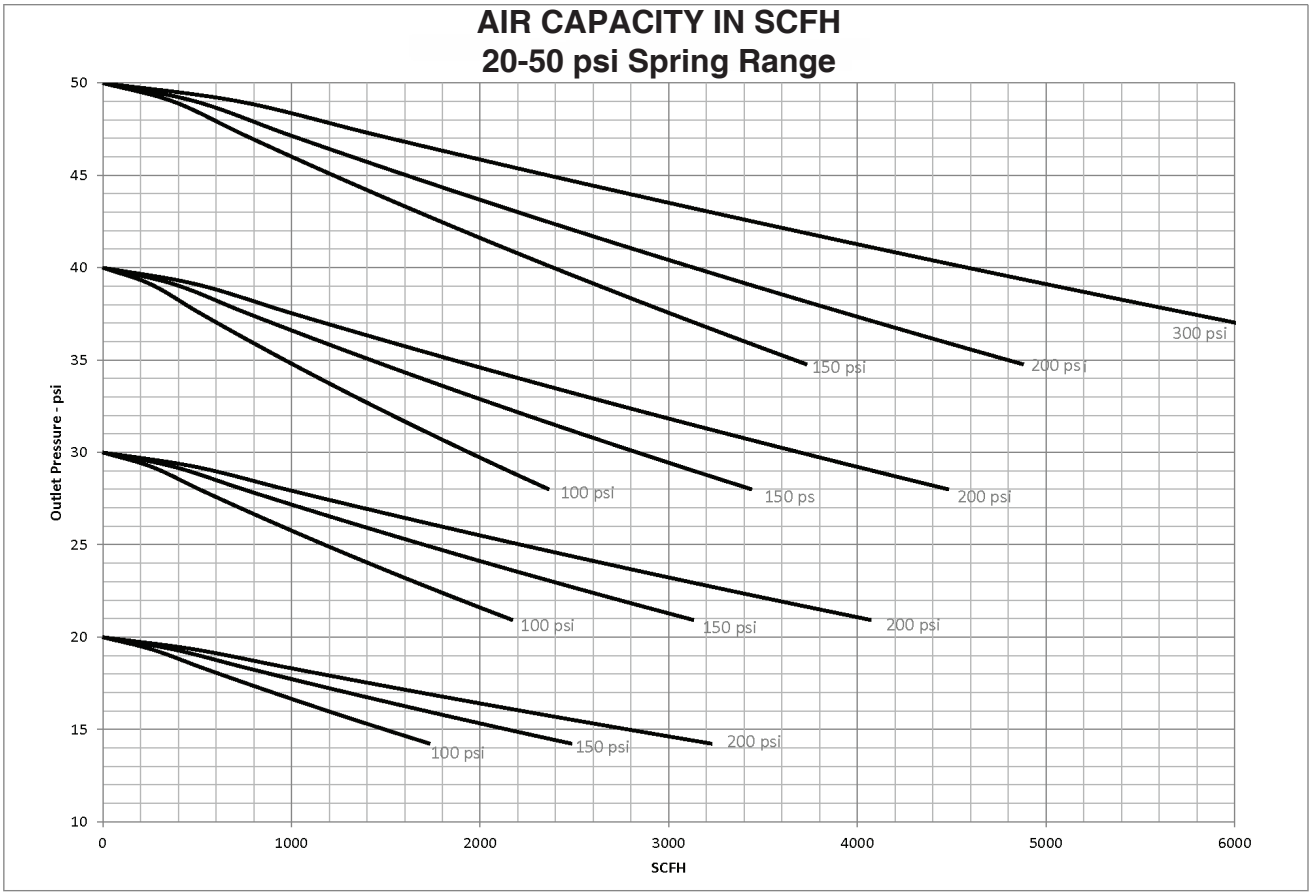


TABLE 3c

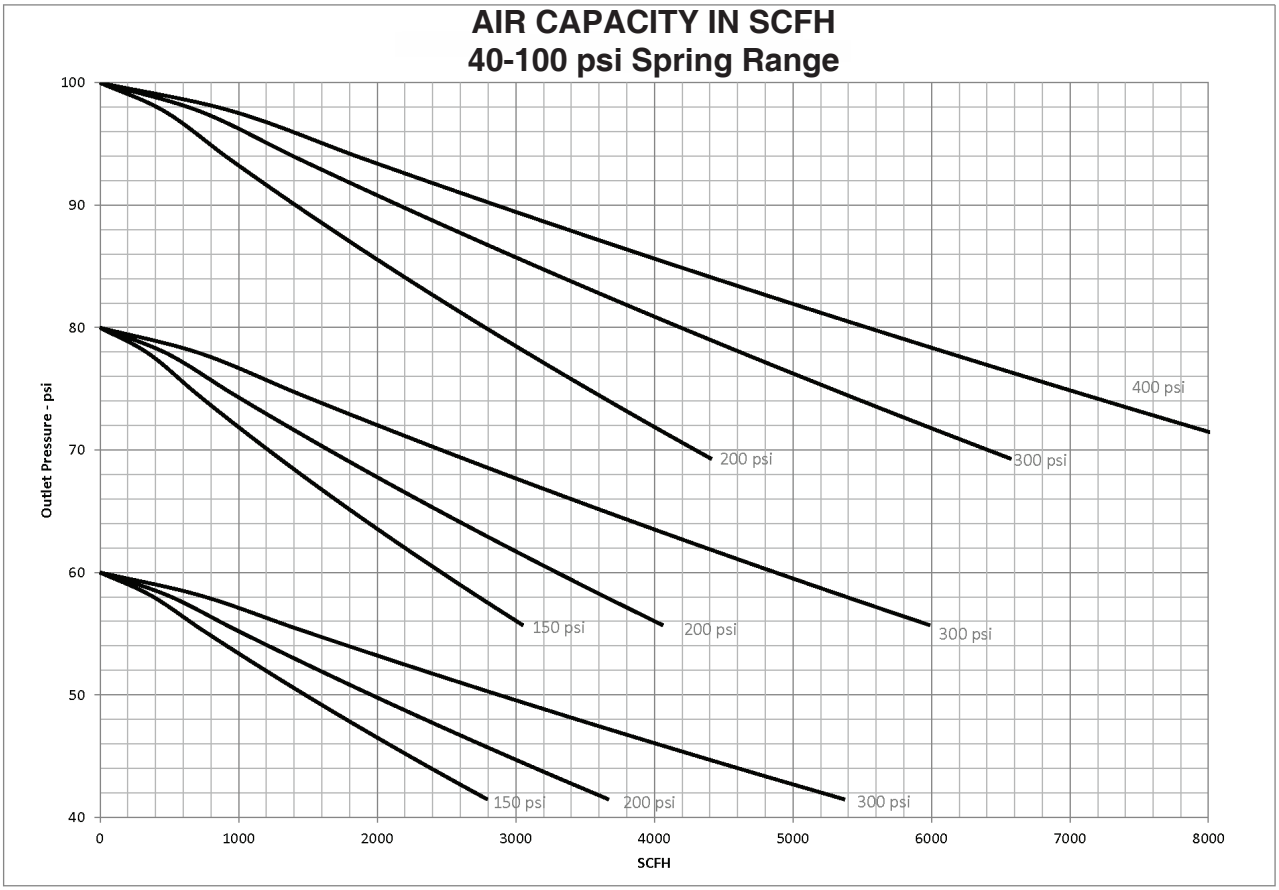


TABLE 3d

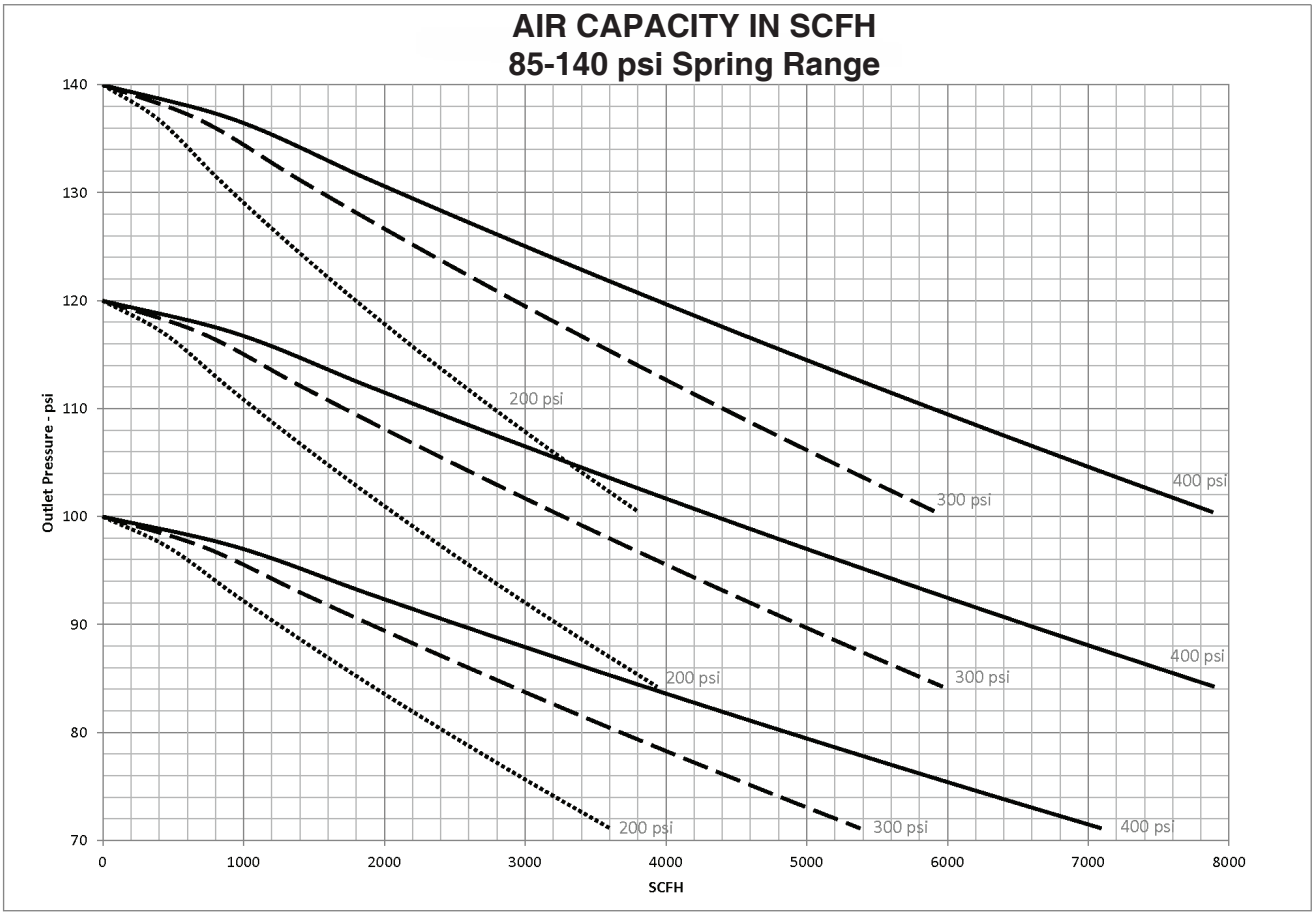


TABLE 4a

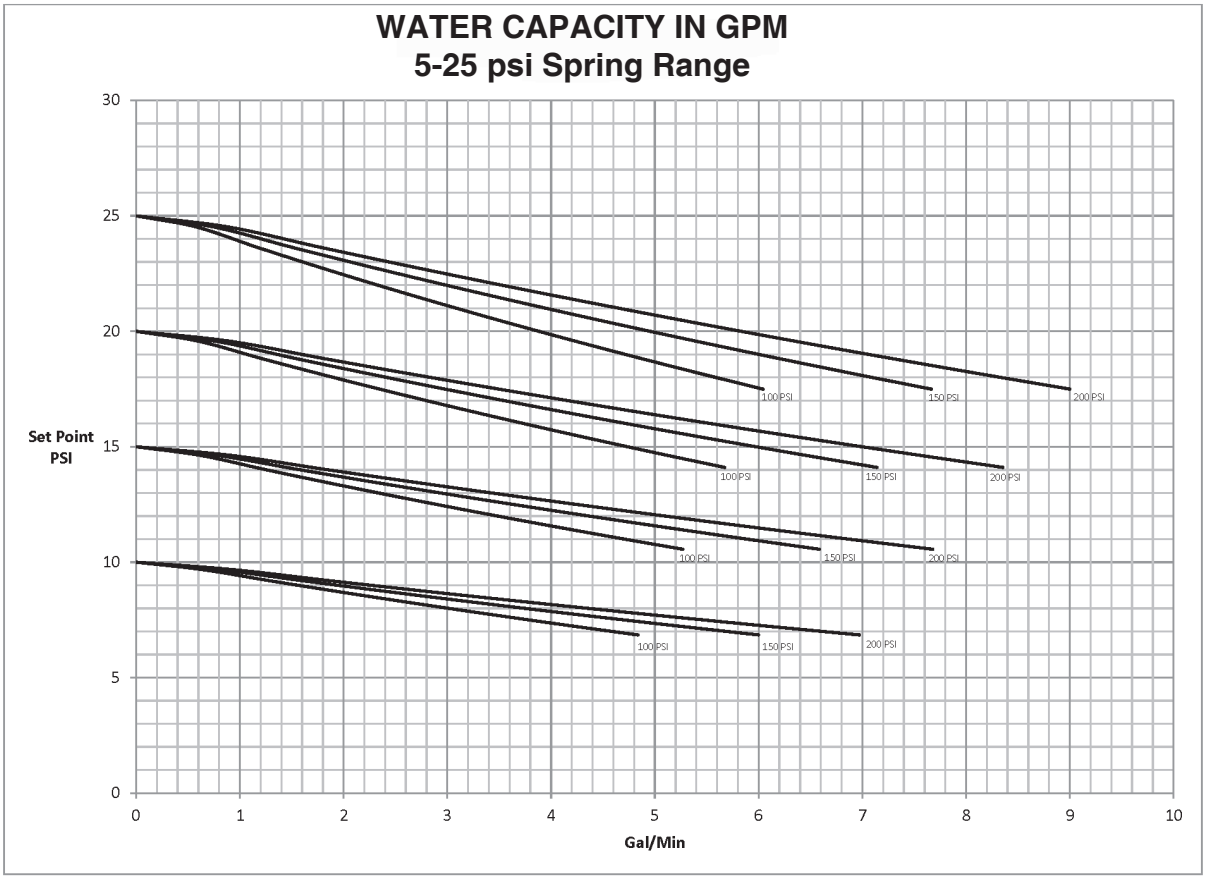


TABLE 4b

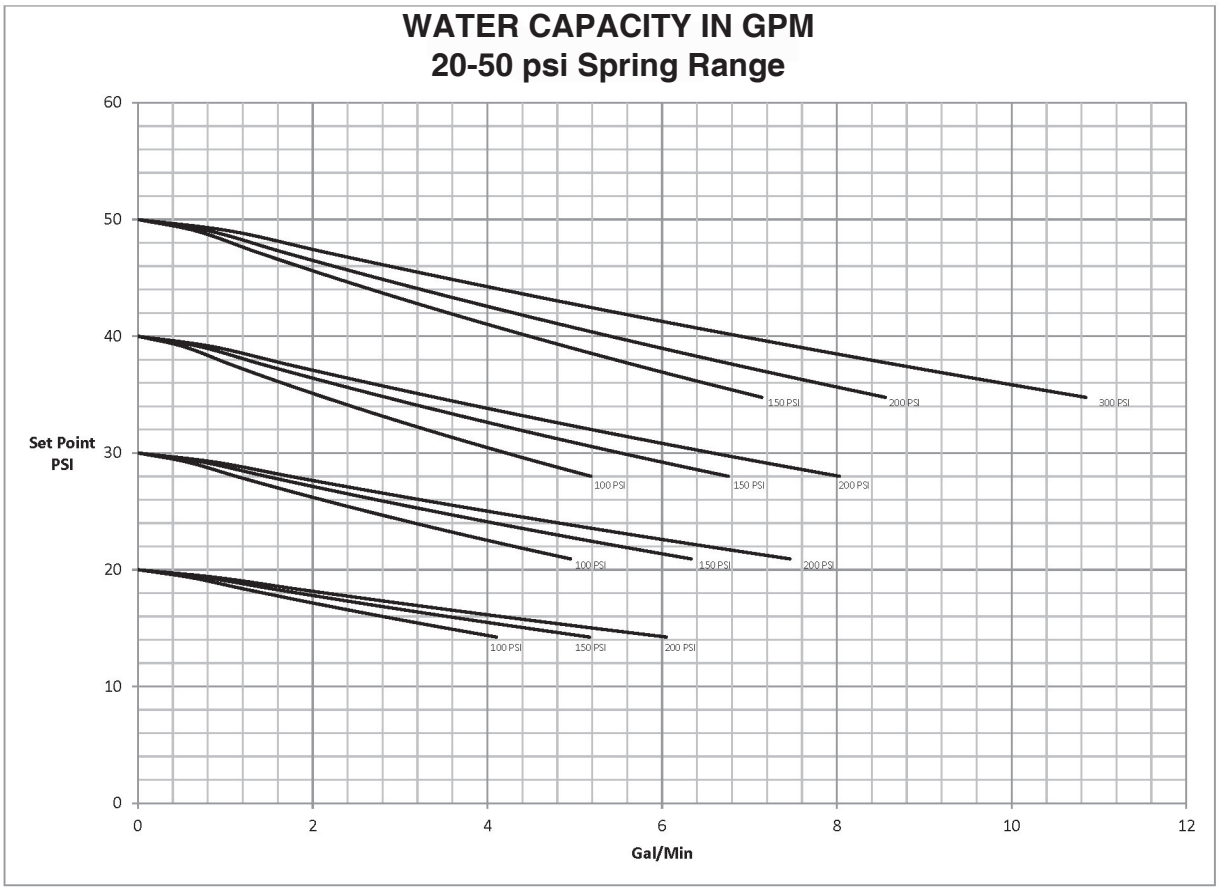


TABLE 4c

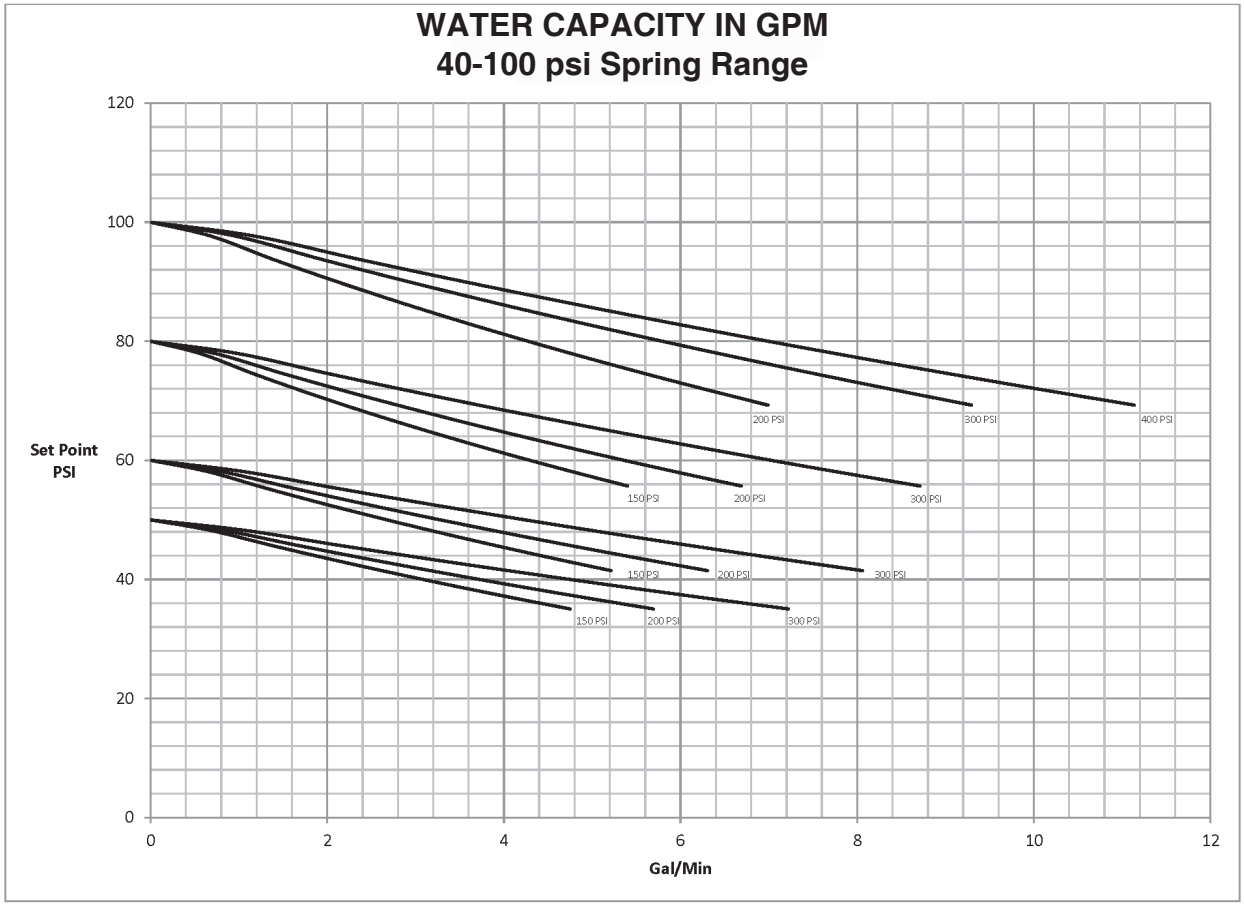
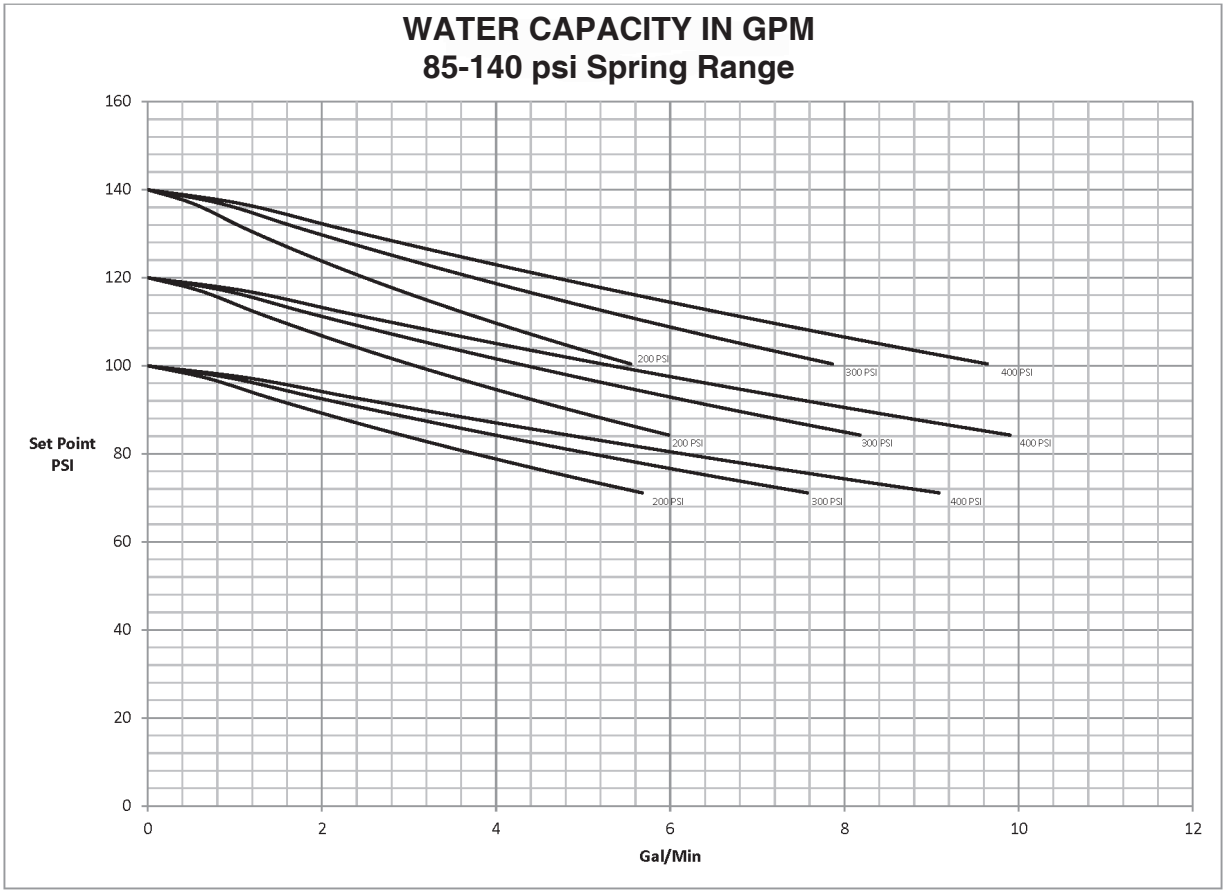
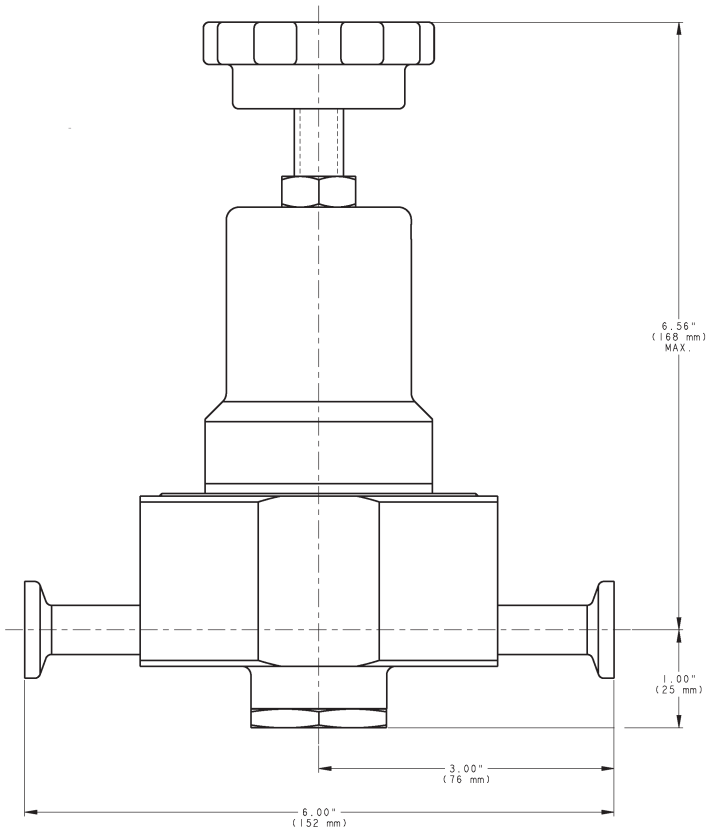


TABLE 4d



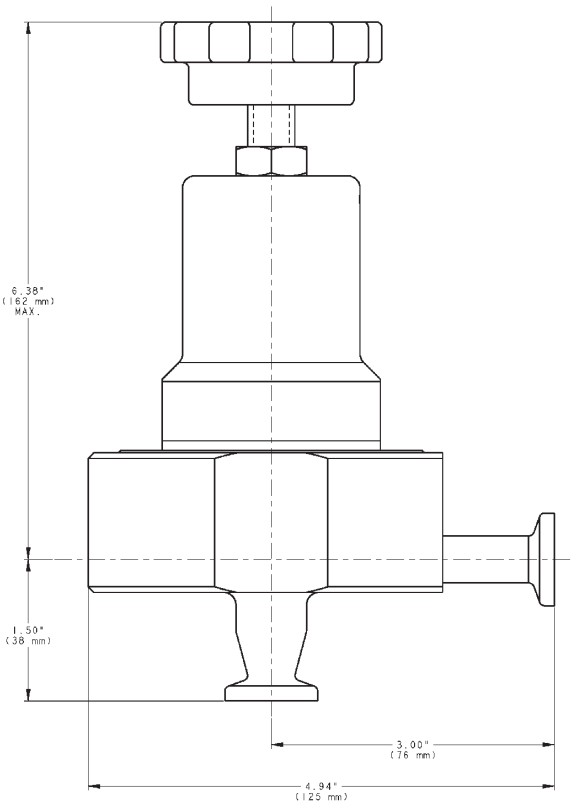
DIMENSIONS AND WEIGHTS

MODEL PL1

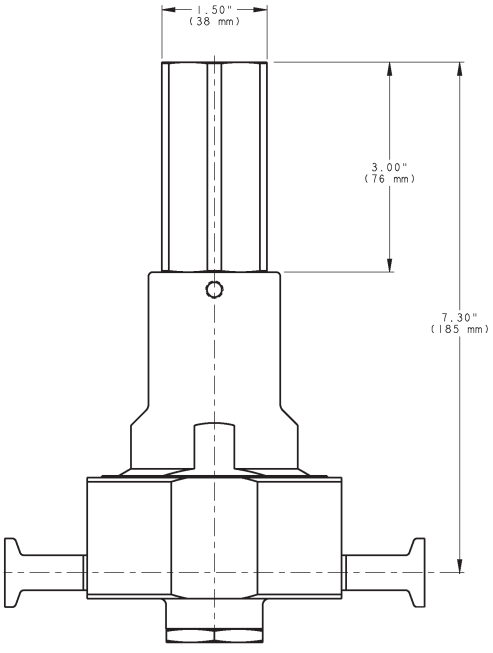


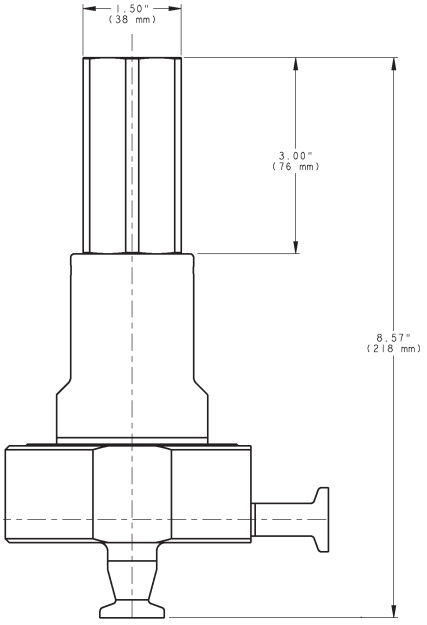
Weight = 7 Lbs. (3.18 kgs)

MODEL PA1



Weight = 6 Lbs. (2.72 kgs)





Opt-1 CLOSING CAP

MODELS PA1/PL1 PRODUCT CODER 02/07/20

FOR THE BIO / SANITARY INDUSTRY

C	N	POS 3	–	A	POS 6 & 7	7	–	POS 10	POS 11	0	POS 13	0	0	0	0	A

POSITION 3 - SIZE				
Model	**Connection Orientation**	**Size**	**ASME**	**ISO 2852**
		in	**CODE**	**CODE**
PL1	In-Line — side inlet / side outlet	1/2"	**4**	**G**
PA1	Angle — bottom inlet * / side outlet		**5**	**J**
PL1	In-Line — side inlet / side outlet	3/4"	**6**	**K**
PA1	Angle — bottom inlet / side outlet		**7**	**L**
* Bottom Inlet is bored to 3/4" size.				

POSITION 6 & 7 – TRIM DESIGNATION NUMBERS	
Desig.	**CODE**
LE	**LE**
LF (TFE)	**LF**
LG	**LG**
LH (TFE)	**LH**
LR (RULON 641)	**LR**
Comply w/ FDA 21 CFR 177. & USP Class VI material classification.	

POSITION 10 - END CONNECTIONS		
Description	Option	**CODE**
Sanitary Tri-Clamp End Connections	**-**	**1**
Tube End Connections - 1/2" size PL1 only	**-41**	**T**

*** For information on ATEX see pages 9 & 10 on the IOM.**

POSITION 11 – RANGE SPRINGS		
SST Range Spring		**CODE**
psig	**(Barg)**	
2-25	(.13-1.7)	**1**
20-50	(1.4-3.4)	**2**
40-100	(2.7-6.9)	**3**
80-140	(5.5-9.6)	**4**

POSITION 13 - OPTIONS		
Description	Option	**CODE**
None	**-**	**0**
Closing Cap	**-1**	**1**

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