ISO Registered Company

TECHNICAL BULLETIN

SA1-TB
03-24

MODEL SA1
ULTRA HIGH PURITY PRESSURE REDUCING REGULATOR

MODEL SA1

OVERVIEW

Model SA1 is a high performance spring-operated, flow-to-open pressure reducing regulator with internal pressure balancing piston-cylinder that provides medium flow capacity and high pressure drop capability.

FEATURES

- All SST wetted trim materials.
- Electro-polished.
- Tube-end connections.
- High pressure capability.
- Body Finish - Internal Surface Only
  Barstock Body - 10 µ-in R_a average surface finish.
- In-line maintenance.

APPLICATIONS

For “electronic grade” and other ultra high purity fluids. For either gaseous or liquid service. Most common fluids are high purity oxygen, nitrogen, hydrogen, helium and argon.

LINE SIZES AVAILABLE
3/4″ (DN20), 1″ (DN25), 1-1/2″ (DN40), 2″ (DN50)

END CONNECTIONS
TUBE-ENDS FOR BUTTWELDING USING ORBITAL WELDER

COMMON APPLICATIONS
GAS, LIQUID, HIGH PURITY OXYGEN, NITROGEN, HYDROGEN, HELIUM, ARGON

DESIGN PRESSURE
INLET: UP TO 3000 psig (207 Barg)
OUTLET: 5-300 psig (0.34-20.7 Barg)

TECHNICAL SPECIFICATIONS

BODY SIZES

3/4", 1", 1-1/2", 2"
(DN20, 25, 40, 50)

MAXIMUM INLET PRESSURE

Up to 3000 psig (207 Barg)
Function of body size and elastomeric internal materials. See Table 1 for Design Pressure vs. Temperature Ratings, and maximum operating pressures. (Internals can withstand a full vacuum.)

OUTLET PRESSURE RANGE

5 – 300 psig (.34 – 20.7 Barg)
In multiple spring ranges. Maximum available controlled pressure a function of body size. See Position 11 of "Product Coder" for available range springs.

TEMPERATURE RANGE

-20 to +400° F (-29° to +204° C)
Function of elastomeric internal materials. See Table 1.

FLOW CAPACITY

Function of body form:

Body Size		Max Cv
in	(DN)	
3/4", 1"	(20,25)	3.5
1-1/2"	(40)	11.0
2"	(50)	18.0

END CONNECTIONS

Tube-ends for buttwelding using orbital welder.
Wall thickness = 0.065 in. (1.65 mm);
Nominal Body Size = Tube OD.

AGGREGATE INTERNAL LEAKAGE

Combination of dynamic seal and seat leakage rates:
0.000 1% of rated Cv.

HELIUM LEAK TEST

Inboard leakage less than 1 X 10^{-9} std cc/sec, actual test.

MATERIAL SPECIFICATIONS

BODY FORM

BS - Barstock; All sizes.

BODY MATERIALS - SST

BS - ASTM A479, Tp. 316L.

Spring Chamber fabricated from materials of 316L SST.

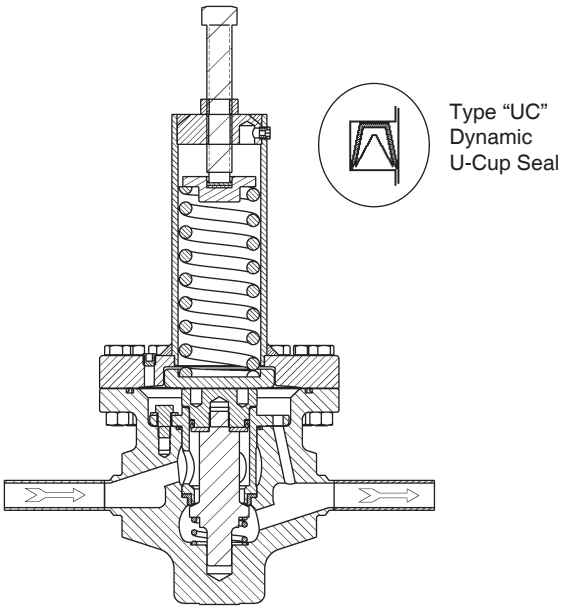
INTERNAL TRIM & MISC MATERIALS

Trim -	316L SST
Diaphragm -	17-7PH SST
Static Seals -	U-CUP: TFE/SST
Dynamic Seal -	Type "UC": TFE/SST or CTFE/SST
Seat -	PolyAll (GN2, He, Ar, H2) V-TFE (All above fluids) CTFE (All above fluids)
Lower Piston Spring -	17-7PH SST;
Cap Screws -	Ag-plated SST
Flange Bolting -	SST
Adjusting Screw -	Ag-plated SST
Diaphragm Seal -	FFKM-Perfluoroelastomer Elastomer O-ring

SURFACE FINISH

Metallic parts are electro-polished, passivated, and cleaned to Cashco cleaning spec. #S-1662.

Surface Finish - µ-in.		
Barstock	Metal Trim Parts	10 R_a Avg



OPTION SPECIFICATIONS

OPT-1: CLOSING CAP. Modification to top of spring chamber to include a 316L SST closing cap to cover adjusting screw and discourage frequent adjusting of the set point.

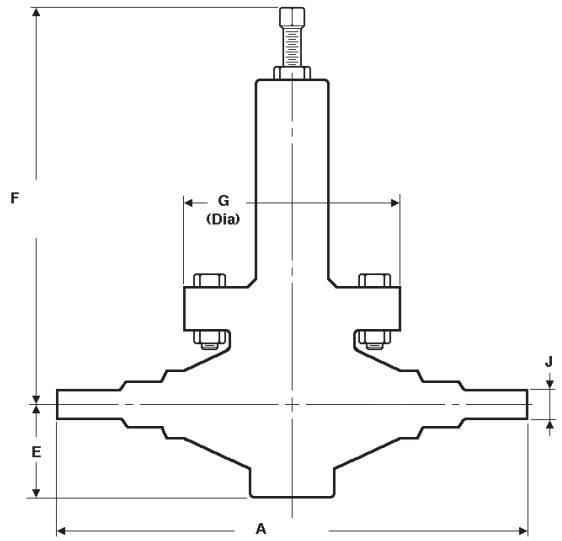
TABLE 1
MAXIMUM DESIGN PRESSURE vs. TEMPERATURE: MAXIMUM OPERATING PRESSURES, TEMPERATURES, PRESSURE DROPS AND Cv FLOW CAPACITY

NOTE: The below ratings may be further "derated" by limitations through the Pressure Equipment Directive (2014/68/EU)

Size	Design Pressure *		Temperature Range °F	Seat	Maximum Operating Pressures						Max Flow Capacity			
					GAS			LIQUID **			Form			
in (DN)	Inlet psig	Outlet psig			Inlet psig	Outlet psig	ΔP psid	Inlet psig	Outlet psig	ΔP psid	Wideopen		20% Droop Cv	
											IC	BS	IC	BS
3/4' (20)	3000	600	-20 to +225	PolAll	1050	300	750	900	300	600	3.5	3.5	3.0	3.0
	3000	600	-20 to +300	V-TFE	900	300	600	600	300	300				
	2895	600	400											
	3000	600	-20 to +300	CTFE	3000	300	2950	900	300	600				
	2945	600	350		2945	300	2895							
1" (25)	2400	600	-20 to +225	PolyAll	1050	300	750	900	300	600	3.5	3.5	3.0	3.0
	2400	600	-20 to +300	V-TFE	900	300	600	600	300	300				
	2230	600	400											
	2400	600	-20 to +300	CTFE	2400	300	2350	900	300	600				
	2315	600	350		2315	300	2265							
1-1/2" (40)	1600	600	-20 to +225	PolyAll	1050	300	750	900	300	600	_	11.0	_	9.8
	1600	600	-20 to +300	V-TFE	900	300	600	600	300	300				
	1485	600	400											
	1600	600	-20 to +300	CTFE	1600	300	1550	900	300	600				
	1540	600	350		1540	300	1490							
2" (50)	1200	600	-20 to +225	PolyAll	1050	300	750	900	300	600	_	18.0	_	16.0
	1200	600	-20 to +300	V-TFE	900	300	600	600	300	300				
	1115	600	400											
	1200	600	-20 to +300	CTFE	1200	300	1150	900	300	600				
	1155	600	350		1155	300	1105							

***** For fluid containment only. - Exceeding these levels of pressure will damage internals and may render unit inoperable.
****** Non-Cavitating Liquid.

DIMENSIONS & WEIGHTS



ENGLISH UNITS							
Size in	Dimension (inches)						Weight (lbs.)
	A	E	F	F-Opt-1	G	J	
3/4"	10.75	2.75	11.75	12.92	6.00	.75	30
1"	11.75	2.75	11.75	12.92	6.00	1.00	
1-1/2"	13.50	3.19	14.00	15.81	8.00	1.50	55
2"	16.75	3.88	18.00	18.75	10.00	2.00	85

METRIC UNITS							
Size (DN)	Dimension (mm)						Weight (kg)
	A	E	F	F-Opt-1	G	J	
(20)	273	70	298	328	152	19.1	14
(25)	298	70	298	328	152	25.4	
(40)	343	81	356	402	203	38.1	25
(50)	425	99	457	476	254	50.8	39

MODEL SA1 PRODUCT CODER 03/28/24

B1	POS 3	–	S	L	POS 7	7	–	T	POS 11	3	0	POS 14	0	0	0	D

POSITION 3 - SIZE & STYLE		
Size		CODE
in.	(DN)	
3/4"	(20)	B
1"	(25)	C
1-1/2"	(40)	E
2"	(50)	F

POSITION 7 - TRIM MATERIALS							
Inlet Pressure	Service	Diaphragm	Seat	Seals			CODE
				Static	Dynamic	Diaphragm Seal	
$P_1 \leq 375$ [1] PSIG	GOX	17-7 PH SST	V-TFE	U-CUP SST/TFE	U-CUP SST/TFE	FFKM	C
$P_1 \leq 750$ PSIG	ALL [2]		V-TFE		U-CUP SST/TFE		N
	ALL [2]		POLLYALL		U-CUP SST/TFE		E
$P_1 \leq 3000$ PSIG	ALL [2]		CTFE		U-CUP SST/TFE		R
	ALL [2]		CTFE		U-CUP SST/CTFE		Z

[1]: PER CGA-4.4
[2]: GN2, Ar, H2, and He

POSITION 11 - RANGE SPRING							
Body Size	Pressure Range		CODE	Body Size	Pressure Range		CODE
	psig	(barg)			psig	(barg)	
3/4" & 1" (DN20 & DN25)	5-20	(.34-1.4)	A	2" (DN50)	5-15	(.34-1.0)	M
	10-35	(.69-2.4)	B		10-30	(.69-2.1)	N
	20-80	(1.4-5.5)	C		15-50	(1.0-3.4)	P
	30-150	(2.1-10.3)	D		30-90	(2.1-6.2)	Q
	70-200	(4.8-13.8)	E		50-150	(3.4-10.3)	R
	100-300	(6.9-20.7)	F				
1-1/2" (DN40)	5-20	(.34-1.4)	A				
	15-45	(1.0-3.1)	H				
	10-70	(.69-4.8)	J				
	40-125	(2.8-8.6)	K				
	70-200	(4.8-13.8)	E				

POSITION 14 - SPRING CHAMBER OPTION OPTIONS		
Description	Option	CODE
None	–	0
Closing Cap.	-1	Y

*** For information on ATEX see pages 11 & 12 on the IOM.**

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