Single Stage Compact Regulator for Ultra High Purity

Series AP500

- **For UHP gas delivery**
- **Flow capacity Standard: to 15 slpm**
  HF (option): to 30 slpm
- **Body material: 316L SS secondary remelt**
- **Hastelloy internals available for corrosion resistance**
- **Sub-atmospheric pressure delivery option**

How to Order

Port Number ① ② ③

AP5 | 02 | S | | | 2PW | FV4 | FV4 | | | | |

Delivery pressure

Code	Delivery pressure
01	0.5 to 10 psig (0.0034 to 0.07 MPa)
	Sub-atmospheric (A): 100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)
02	0.5 to 30 psig (0.0034 to 0.2 MPa)
06	1 to 60 psig (0.007 to 0.4 MPa)
10	1 to 100 psig (0.007 to 0.7 MPa)

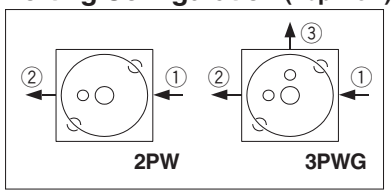
Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	Elgiloy®	316L SS
SH		Hastelloy® C-22		

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Porting Configuration (Top view)



①IN ②OUT ③Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld

Ports

Code	Ports
2PW	2 ports
3PWG	3 ports

Range options *1)

Code	Specification
No code	Standard
A	Sub-atmospheric

*1) Only available with AP501.

Pressure gauge unit *3)

Code	Unit
No code	psig/bar
MPA	MPa

*3) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Option

Code	Specification	Cv
No code	Standard	0.06
FI	Friction dampener *6)	
HF	High flow *7)	0.1

*6) FI is friction dampener to slow response and reduce interaction with MFC.

*7) VS material not available with HF option.

Seat material

Code	Material
No code	PCTFE (Standard)
TF	PTFE *4)
VS	Vespel® *5)

*4) PTFE recommended for applications such as within a process tool.

*5) Not available with SH material.

Gauge port (Outlet③)

Code	Connections or Pressure gauge *2)		
		psig/bar unit	MPa unit
No code	No gauge port		
MV4	No pressure gauge	1/4 inch face seal (Male)	
FV4		1/4 inch face seal (Female)	
TW4		1/4 inch tube weld	
V3	With pressure gauge	-30in.Hg to 30psig	-0.1 to 0.2 MPa
L		-30in.Hg to 60psig	-0.1 to 0.4 MPa
1		-30in.Hg to 100psig	-0.1 to 0.7 MPa

*2) Refer to gauge guide (P.94) for gauge specifications.

Specifications

Operating Parameters		AP501□□A	AP501	AP502	AP506	AP510
Delivery pressure		100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)	0.5 to 10 psig (0.0034 to 0.07 MPa)	0.5 to 30 psig (0.0034 to 0.2 MPa)	1 to 60 psig (0.007 to 0.4 MPa)	1 to 100 psig (0.007 to 0.7 MPa)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 150 psig (1.0 MPa)				
Proof pressure (Inlet)		500 psig (3.4 MPa)				
Burst pressure		1000 psig (6.9 MPa)				
Ambient and operating temperature		–40 to 160°F (–40 to 71 °C) (No freezing) *1)				
Cv		0.06				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec				
	Outboard leakage	2×10^{-10} Pa·m³/sec *2)				
Across the seat leak		4×10^{-9} Pa·m³/sec *2)				
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
Connections		Face seal, Tube weld				
Supply pressure effect		0.2 psig (0.0014 MPa) rise in delivery pressure per 20 psig (0.14 MPa) source pressure drop				
Installation		Bottom mount				
Internal volume		0.15 in³ (2.4 cm³)				
Mass		0.99 lbs (0.45 kg) *3)				

*1) 14 to 194°F (–10 to 90 °C) for Vespel® seat.

*2) Tested with Helium gas inlet pressure 100 psig (0.7 MPa).

*3) Mass, including individual boxed weight, may vary depending on connections or options.

Option

High flow

Higher flow capacity with internal changes only, no change in external dimensions. Changes from the standard type are:

Option	Other Parameters	AP501□□A	AP501	AP502	AP506	AP510
HF	**Cv**	0.1				
	Supply pressure effect	0.4 psig (0.0028 MPa) rise in delivery pressure per 20 psig (0.14 MPa) source pressure drop				

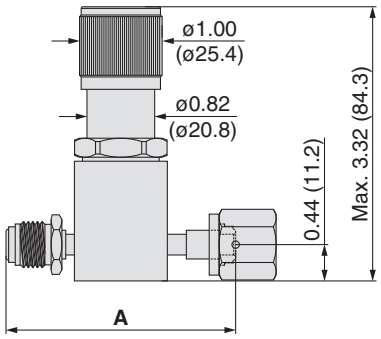
Wetted Parts Material

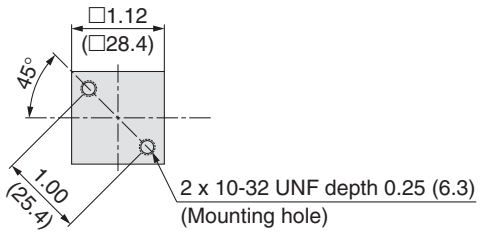
Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Hastelloy® C-22
Diaphragm	Elgiloy®	
Nozzle	316L SS	
Seat	PTFE (Option: PCTFE, Vespel®)	PTFE (Option: PCTFE)

Dimensions

inch (mm)

AP500



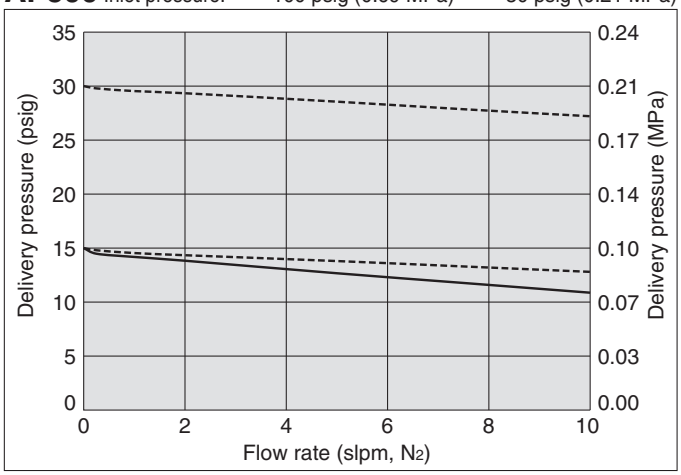


Connections	A	
	inch	(mm)
FV4	2.78	(70.6)
MV4		
TW4	2.12	(53.8)

Flow Characteristics

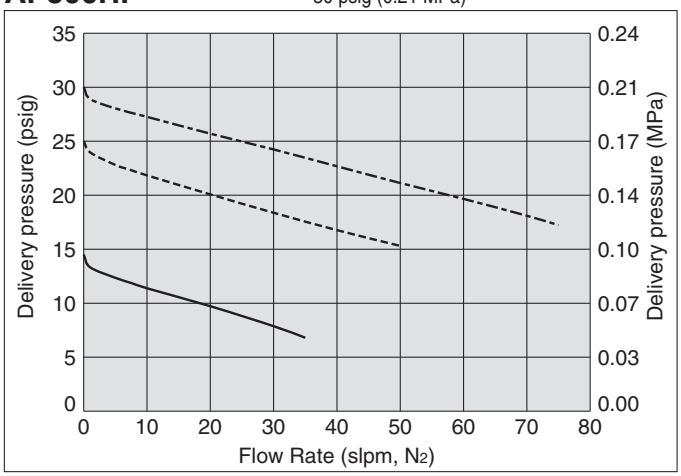
AP500

Inlet pressure: ---- 100 psig (0.69 MPa) —— 30 psig (0.21 MPa)



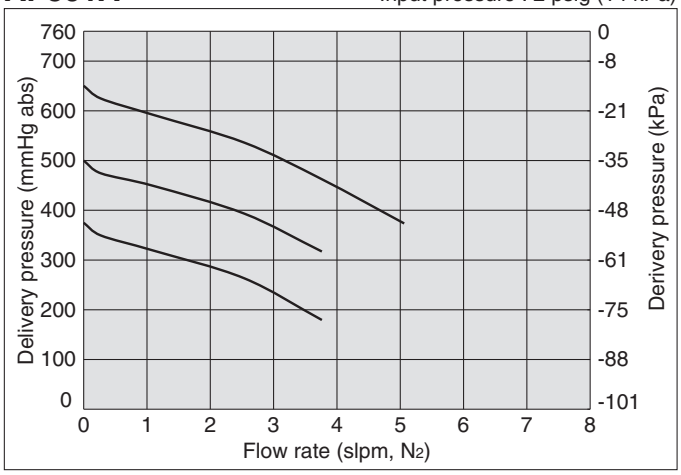
AP500HF

Inlet pressure: - - - 75 psig (0.52 MPa) ---- 45 psig (0.31 MPa)
—— 30 psig (0.21 MPa)



AP501A

Input pressure : 2 psig (14 kPa)



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Single Stage Regulator for Ultra High Purity

Low to intermediate flow

Series AP1000

- **For UHP gas delivery**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Body material: 316L SS secondary remelt**
- **Hastelloy internals available for corrosion resistance**

How to Order

Port Number ① ② ③ ④

AP10 [01] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
01	1 to 10 psig (0.007 to 0.07 MPa)
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
15	5 to 150 psig (0.034 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Hastelloy® C-22	Hastelloy® C-22	
SH				Hastelloy® C-22
H	Hastelloy® C-22			

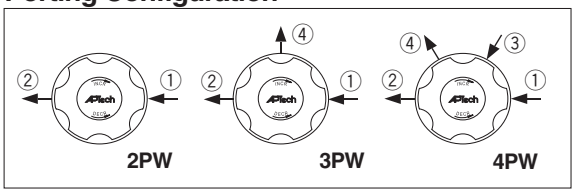
Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Porting Configuration



①IN ②OUT ③Gauge port (Inlet) ④Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port	①	②	③	④	
AP1001S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		V3	MPA
	4PW	FV4	FV4	1	V3	MPA

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗6)

∗6) Panel mounting hole: dia 1.56inch (39.6 mm).

Option

Code	Specification
No code	Standard (Cv: 0.09)
HF	High flow (Cv: 0.15)

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® ∗3)
TF	PTFE ∗4) ∗5)

∗3) Not available with SHP, SH, H materials.

∗4) PTFE recommended for applications such as within a process tool.

∗5) Source pressure rating is limited to 300 psig (2.1 MPa) or less.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Specifications

Operating Parameters		AP1001	AP1002	AP1006	AP1010	AP1015
Delivery pressure		1 to 10 psig (0.007 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 300 psig (2.1MPa)	Vacuum to 3500 psig (24.1 MPa) ∗1)			
Proof pressure (Inlet)		5000 psig (34.5 MPa)				
Burst pressure		10000 psig (69 MPa)				
Ambient and operating temperature		–40 to 160°F (–40 to 71°C) (No freezing) ∗2)				
Cv		0.09				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec				
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗3)				
Across the seat leak		4×10^{-9} Pa·m³/sec ∗4)				
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
Connections		Face seal, Tube weld				
Bonnet port		NPT 1/8 inch ∗5)				
Supply pressure effect		0.38 psig (0.0026 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
Installation		Bottom mount (Option: panel mount)				
Internal volume		0.49 in³ (8 cm³)				
Mass		2.76 lbs (1.25 kg) ∗6)				

∗1) Max 300 psig (2.1 MPa) for PTFE seat.

∗2) 14 to 194°F (–10 to 90°C) for Vespel® seat.

∗3) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

∗4) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

∗5) On panel mount option, bonnet port is not threaded.

∗6) Mass, including individual boxed weight, may vary depending on connections or options.

SMC

Option

High flow

Higher flow capacity with internal changes only, no change in external dimensions. Changes from the standard type are:

Option	Other Parameters	AP1001	AP1002	AP1006	AP1010	AP1015
HF	Cv	0.15				
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

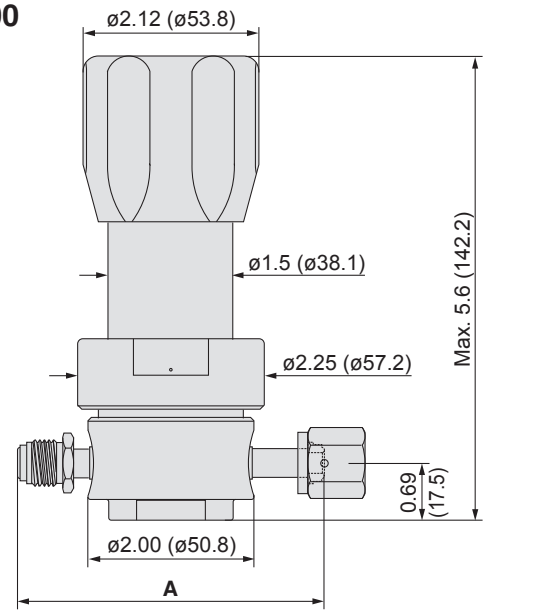
Wetted Parts Material

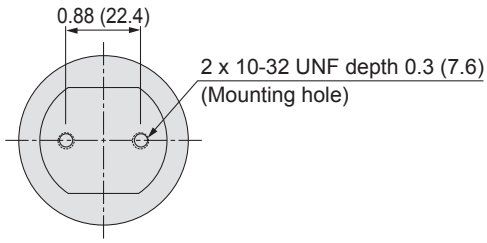
Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Hastelloy® C-22
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Hastelloy® C-22		
Diaphragm	316L SS	Hastelloy® C-22		
Nozzle	316L SS		Hastelloy® C-22	
Seat	PCTFE (Option: Vespel®, PTFE)	PCTFE (Option: PTFE)		

Dimensions

inch (mm)

AP1000

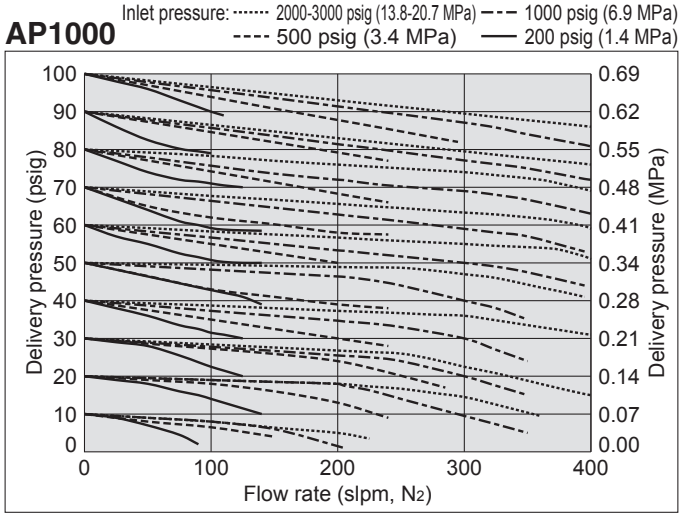




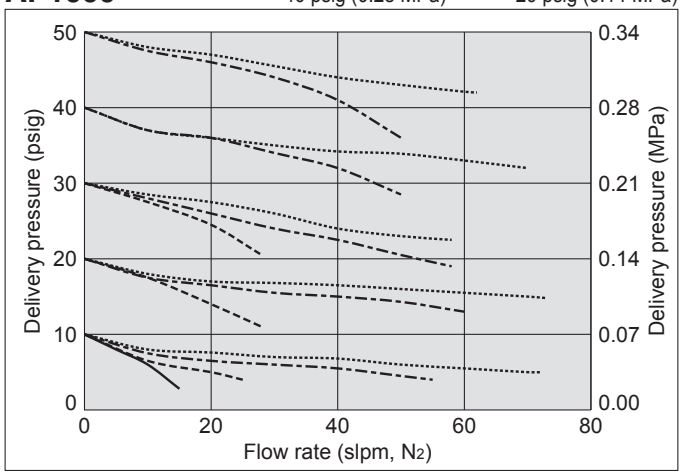
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Characteristics

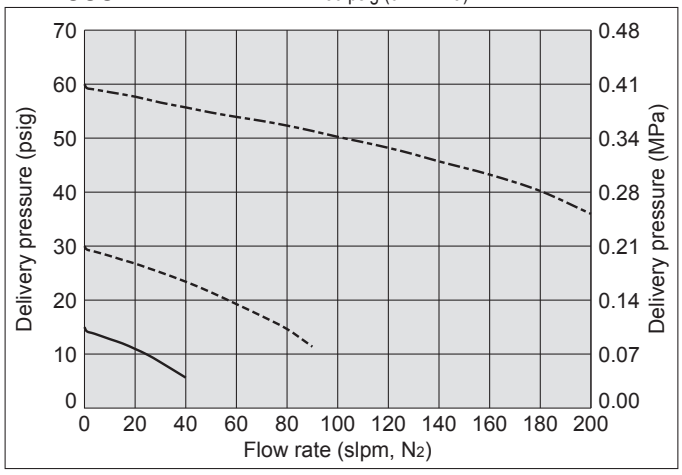
AP1000



AP1000



AP1000HF



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Single Stage Regulator for Ultra High Purity

High flow (Tied-diaphragm)

Series AP1200

- For UHP gas delivery
- High inlet pressure type Standard: Max. 1700 psig(11.7 MPa)
  HR(option): Max. 3000 psig (20.7 MPa)
- Flow capacity Standard: to 800 slpm
  HF (option): to 1000 slpm
  FC (option): to 1500 slpm
- Body material: 316L SS secondary remelt
- Hastelloy internals available for corrosion resistance
- Tied-diaphragm design

How to Order

Port Number ① ② ③ ④

AP12 | 02 | S | | 2PW | FV8 | FV8 | | | | | | |

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
15	5 to 150 psig (0.034 to 1.0 MPa)
25	Preset to 250 psig (1.7 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	Hastelloy® C-22	316L SS
SHP		Hastelloy® C-22		Hastelloy® C-22
SH				

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗7)
SC	Short type ∗8)

∗7) Panel mounting hole: dia. 1.56 inch (39.6 mm).
∗8) Bonnet port is not threaded.
SC option not available with FC or HR option.

Option

Code	Specification
No code	Standard (Cv: 0.9)
HF	High flow (Cv: 1.1)
FC	Force compensation (Cv: 0.65) ∗4)∗5)
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) ∗4)∗6)

∗4) FC and HR options are not available with AP1202, AP1206 and AP1225.
∗5) FC option is available with connection size 1/2 or 3/4 inch.
∗6) 3/4 inch face seal fittings rated to 2400 psig (16.5 MPa) maximum.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

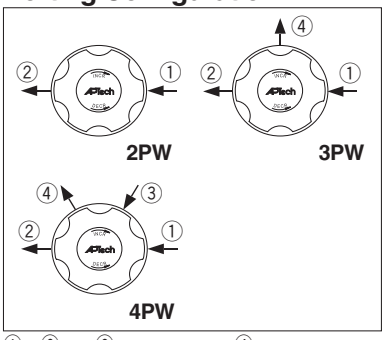
∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® ∗3)

∗3) Not available with SHP and SH materials.

Porting Configuration



①IN ②OUT ③Gauge port (Inlet) ④Gauge port (Outlet)

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port ①	②	③	④		
AP1210S	2PW	FV8	FV8			
	3PW	FV8	FV8		0	
	3PW	FV8	FV8		1	MPA
	4PW	FV8	FV8	40	1	MPA

Specifications

Operating Parameters		AP1202	AP1206	AP1210	AP1215	AP1225
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa) (Source pressure 1000psig or less) ∗1)	Preset to 250 psig (1.7 MPa) ∗2)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 1700 psig (11.7 MPa)				
Proof pressure (Inlet)		2550 psig (17.6 MPa)				
Burst pressure		8000 psig (55.2 MPa)				
Ambient and operating temperature		–40 to 160°F (–40 to 71°C) (No freezing) ∗3)				
Cv		0.65				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/sec				
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗4)				
Across the seat leak		4×10^{-9} Pa·m³/sec ∗5)				
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
Connections		Face seal, Tube weld				
Bonnet port		NPT 1/8 inch ∗6)				
Supply pressure effect		3.5 psig (0.024 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
Installation		Bottom mount (Option: panel mount)				
Internal volume		1.07 in³ (17.6 cm³)				
Mass		4.4 lbs (2.0 kg) ∗7)				

∗1) Source pressure above 1000 psig (6.9 MPa) decreases maximum delivery pressure to less than 150 psig (1 MPa) due to supply pressure effect. When the source pressure is 1700 psig (11.7 MPa), achievable delivery pressure is around 125 psig (0.86 MPa) (HF and FC option 120 psig (0.83 MPa)).
∗2) 250 psig outlet pressure preset at 800 psig (5.5MPa) inlet pressure. Custom inlet/outlet pressure settings available. Please contact SMC.
∗3) 14 to 194°F (–10 to 90°C) for Vespel® seat.
∗4) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗5) Tested with Helium gas inlet pressure 1000 psig (7 MPa).
∗6) On panel mount option, bonnet port is not threaded.
∗7) Mass, including individual boxed weight, may vary depending on connections or options.

Options

1. High flow

Higher flow capacity with internal changes only, no change in external dimensions. Changes from the standard type are:

Option	Other Parameters	AP1202	AP1206	AP1210	AP1215	AP1225
HF	Cv	1.1				
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

2. Force compensation

Force compensation feature added to HF option and has wider flow capacity than HF option. Changes from the standard type are:

Option	Other Parameters	AP1210	AP1215
FC	Source pressure	Vacuum to 300 psig (2.1 MPa)	
	Cv	0.65	
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
	Connections	1/2, 3/4 inch face seal, 1/2, 3/4 inch tube weld	

3. High inlet pressure

Changes from the standard type are:

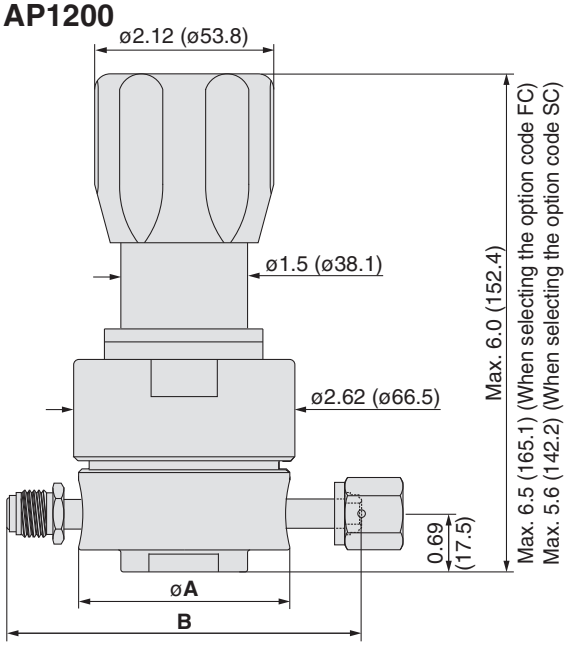
Option	Other Parameters	AP1210	AP1215
HR	Source pressure	Vacuum to 3000 psig (20.7 MPa) *)	
	Proof pressure (Inlet)	4500 psig (31 MPa)	
	Burst pressure	9000 psig (62 MPa)	

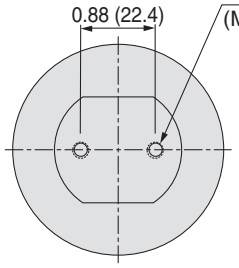
*) 3/4 inch face seal fittings rated to 2400 psig (16.5 MPa) maximum.

Dimensions

inch (mm)

AP1200





Connections	A inch	A (mm)	B inch	B (mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6			4.00	(101.6)
TW6				
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)
FV12			6.26	(159.0)
MV12				
TW12			5.00	(127.0)

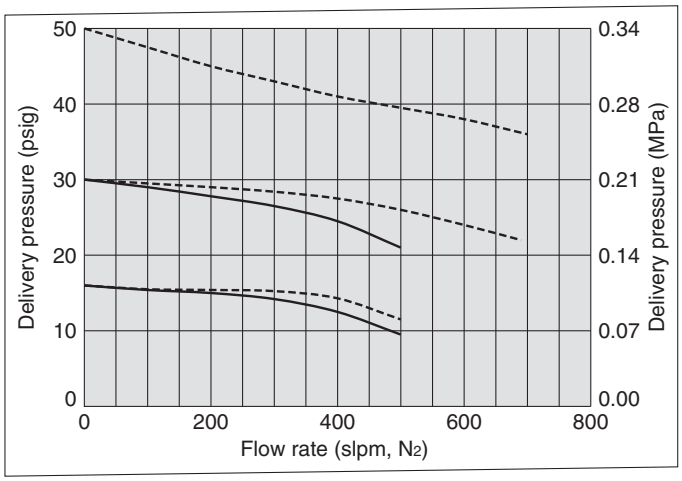
Wetted Parts Material

Wetted Parts	S	SHP	SH
Body	316L SS secondary remelt		
Surface finish	Electropolish + Passivation		
Poppet	316L SS	Hastelloy® C-22	
Diaphragm	Hastelloy® C-22		
Nozzle	316L SS		Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE	

Flow Characteristics

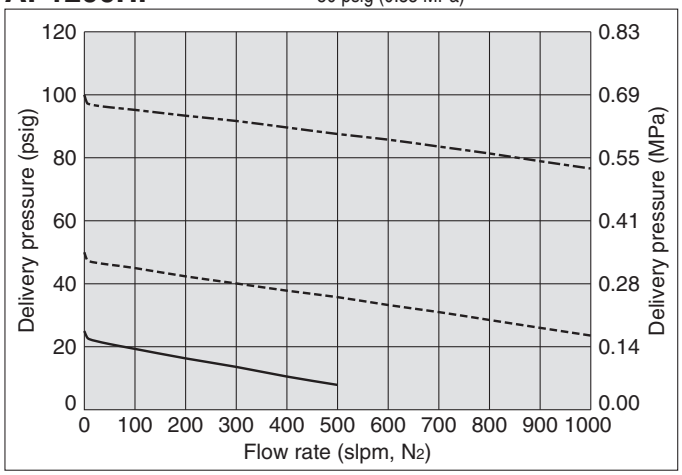
AP1200

Inlet pressure: ---- 80 psig (0.55 MPa) —— 60 psig (0.41 MPa)
1/2 inch connections *)



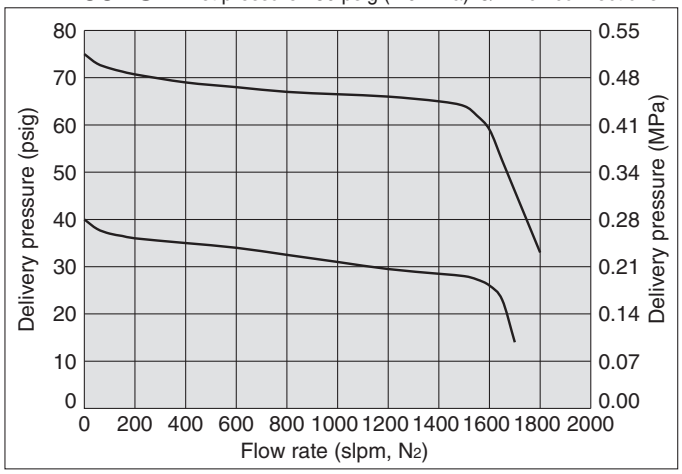
AP1200HF

Inlet pressure: ---- 150 psig (1.0 MPa) ---- 100 psig (0.69 MPa)
—— 50 psig (0.35 MPa)



AP1200FC

Inlet pressure:150 psig (1.0 MPa) 3/4 inch connections *)



*) If connection size differs, flow characteristics also differ.

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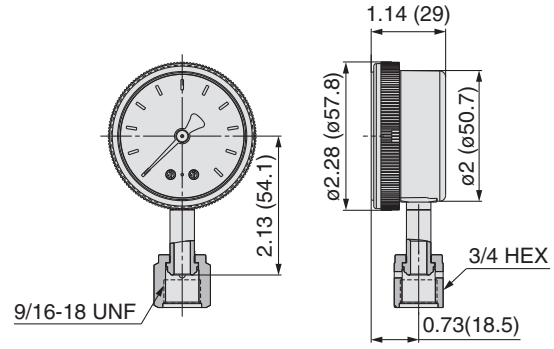
Regulator
Pressure Gauges Guide

For AP/SL/AZ series (Installed before shipment *1) / Order separately)

Specifications

Installation		Lower mount
Gas		Select compatible materials of construction for the gas
Connections		1/4 inch face seal (Female)
Temperature range		–40 to 140°F (–40 to 60°C) (No freezing)
Accuracy		25% to 75% of the scale: ±1%F.S. Other than above: ±2%F.S. (ASME B40.1 Grade A)
Cleanliness		ASME B40.1 level IV
No oil		No oil
Material	**Case**	Stainless steel
	Window	Polycarbonate
	Socket	316L SS
	Bourdon tube	316L SS



inch (mm)

Model

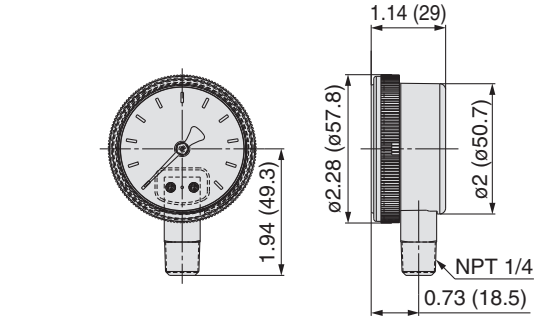
Regulator Code *2) gauge port	Regulator Code *2) unit	Pressurerange	Unit	Part number *3)
V3	**(No code)**	-30 in.Hg to 30 psig	psig/bar *4)	**00-83000023**
L		-30 in.Hg to 60 psig		**00-83000026**
1		-30 in.Hg to 100 psig		**00-83000021**
H		-30 in.Hg to 160 psig		**00-83000116**
2		0 to 200 psig		**00-83000020**
4		0 to 400 psig		**00-83000007**
10		0 to 1000 psig		**00-83000022**
40		0 to 4000 psig		**00-83000024**
V3	**MPA**	-0.1 to 0.2 MPa	MPa	**00-83000304**
L		-0.1 to 0.4 MPa		**00-83000305**
1		-0.1 to 0.7 MPa		**00-83000300**
H		-0.1 to 1.1 MPa		**00-83000297**
2		0 to 1.4 MPa		**00-83000299**
4		0 to 3 MPa		**00-83000301**
10		0 to 7 MPa		**00-83000302**
40		0 to 28 MPa		**00-83000303**

For AK/BP series (Installed before shipment / Order separately)

Stainless steel / Lower mount

Specifications

Installation		Lower mount
Gas		Select compatible materials of construction for the gas
Connections		NPT 1/4 inch
Temperature range		–40 to 140°F (–40 to 60°C) (No freezing)
Accuracy		25% to 75% of the scale: ±2%F.S. Other than above: ±3%F.S. (ASME B40.1 Grade B or better)
Cleanliness		ASME B40.1 level IV
No oil		No oil
Material	**Case**	Stainless steel
	Window	Polycarbonate
	Socket	316L SS
	Bourdon tube	316L SS



inch (mm)

Model

Regulator Code *2) material	Regulator Code *2) gauge port	Regulator Code *2) unit	Pressure range	Unit	Part number *3)
S **SH**	**V15**	**(No code)**	-30 in.Hg to 15 psig	psig/bar *4)	**00-83000102**
	V3		-30 in.Hg to 30 psig		**00-83000184**
	L		-30 in.Hg to 60 psig		**00-83000181**
	1		-30 in.Hg to 100 psig		**00-83000182**
	H		-30 in.Hg to 160 psig		**00-83000196**
	V2		-30 in.Hg to 200 psig		**00-83000033**
	2		0 to 200 psig		**00-83000193**
	4		0 to 400 psig		**00-83000194**
	10		0 to 1000 psig		**00-83000187**
	30		0 to 3000 psig		**00-83000234**
	40		0 to 4000 psig		**00-83000183**
	V15	**MPA**	-0.1 to 0.1 MPa	MPa	**00-83000287**
	V3		-0.1 to 0.2 MPa		**00-83000288**
	L		-0.1 to 0.4 MPa		**00-83000289**
	1		-0.1 to 0.7 MPa		**00-83000290**
	H		-0.1 to 1.1 MPa		**00-83000291**
	V2		-0.1 to 1.4 MPa		**00-83000292**
	2		0 to 1.5 MPa		**00-83000286**
	4		0 to 3 MPa		**00-83000285**
	10		0 to 7 MPa		**00-83000284**
	30		0 to 21 MPa		**00-83000283**
	40		0 to 28 MPa		**00-83000282**

*1) If one prefers shipment with the pressure gauges installed on the regulator, the material of gasket to be used on the connections will be Nickel (no plated). Please contact SMC for details if one prefers changing this material.
*2) When pressure gauge needs to be assembled with regulator when shipment, put this code as gauge port in How to Order.

Process Gas Equipment / Regulator Specific Product Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions and P. 145 and 146 and the "Operation Manual" for common precautions. Operation manual is available from the SMC web site. http://www.smcworld.com

Selection

⚠ Warning

1. Confirm the specifications.

When selecting the product, confirm the operating conditions, such as type of gas, operating pressure (inlet and outlet), flow rate, operating temperature etc., and use within the operating range specified in the catalog. The product may not be suitable for use with specific gases and applications/ environments. Check the compatibility of the product materials with the process gas.

Design the equipment and select the product by understanding the characteristics of gas.

2. Confirm allowable pressure of any pressure gauges.

When installing a pressure gauge to the product, operating pressure should not exceed the maximum allowable pressure of the pressure gauge.

Mounting

⚠ Warning

1. Confirm the mounting direction of the product.

The high pressure (inlet) port is labeled with an "HP" mark and the low pressure (outlet) port is labeled with an "LP" mark. In the case of two stage regulator, the monitor port of first stage outlet pressure is labeled with "MP" mark.

Make sure to connect the port labeled with "HP" mark, to the high pressure. If any of the ports, other than "HP", are connected to the high pressure, it may cause damage or gas leakage.

2. After installation, check internal leakage (leakage across seat) of the product.

Check internal leakage (leakage across seat) with inert gases such as nitrogen, etc., and select the most appropriate test method depending on the application. The following procedures are an example of how a test may be performed. It is intended as an overview and not as an all inclusive description.

1) Rotate the adjustment wheel counterclockwise (DECR) completely to relieve spring force. Then gradually open the valve at inlet side to supply gas to the regulator.
2) Close the valves on the inlet and outlet side and hold for at least 10 minutes. Then confirm the outlet pressure.
3) Rotate the adjustment wheel clockwise (INCR) until the outlet pressure reaches the outlet pressure setting. Then hold for at least 10 minutes and confirm the outlet pressure.

If outlet pressure continues increasing in steps 2) and 3) above, the regulator may have internal leakage (leakage across seat) and you should stop using the regulator immediately and contact SMC or sales representative.

3. Purge hazardous gases from system before removing regulator from system.

Before removing regulators from system, fully open regulator by turning adjustment wheel clockwise (INCR), and follow proper procedures to flush system with inert gas such as nitrogen to remove any residual hazardous gases.

Maintenance

⚠ Warning

1. If a regulator requires repair, contact SMC.

Operation

⚠ Warning

1. Do not use the regulator as shutoff valve or safety valve.

2. Do not rotate the adjustment wheel counterclockwise (DECR) under no flow conditions.

If the adjustment wheel is rotated counterclockwise (DECR) under no flow conditions but there is residual pressure remaining in outlet side, it may cause damage to the regulator. Decreasing of the setting pressure should be done under flow conditions.

3. Do not pressurize the regulator from outlet side. If high pressure, which exceeds the setting pressure, is supplied from outlet side, it may cause damage to the regulator.

4. Supply gas to the regulator.

Rotate the adjustment wheel counterclockwise (DECR) completely to relieve spring force. Then, gradually open the valve at inlet side to supply gas to the regulator. When operating the valve, do not stand in front of the regulator and pressure gauge. If the valve at inlet side is opened rapidly, high pressure gas might be supplied into outlet side of the regulator and it may cause severe damage or burst the device.

5. Adjust pressure.

When rotating the adjustment wheel clockwise (INCR), outlet pressure will increase.

In order to adjust precisely, the wheel should be adjusted at the desired flow conditions.

6. Decreasing the setting pressure under flow conditions.

When decreasing the setting pressure, make sure to open the valve at outlet side to keep flow conditions. When rotating the adjustment wheel counterclockwise (DECR) under flow conditions, setting pressure will decrease.

7. Stop using the regulator immediately if resonance occurs.

Loud audible noise as well as vibration of device or fluctuation of outlet pressure (resonance) may occur depending on operating conditions etc. If this situation occurs, stop using the regulator immediately and contact SMC or sales representative.

Process Gas Equipment / Back Pressure Regulator Specific Product Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions and P. 145 and 146 and the "Operation Manual" for common precautions. Operation manual is available from the SMC web site. http://www.smcworld.com

Selection

⚠ Warning

1. Confirm the specifications.

When selecting the product, confirm the operating conditions, such as type of gas, operating pressure (inlet and outlet), flow rate, operating temperature etc., and use within the operating range specified in the catalog. Verify flow capacity of regulator and vent or return line, are large enough to vent off gas source without creating excessive backpressure. The product may not be suitable for use with specific gases and applications/environments. Check the compatibility of the product materials with the process gas.
Design the equipment and select the product by understanding the characteristics of gas.

2. Confirm allowable pressure of any pressure gauges.

When installing pressure gauges to the product, operating pressure should not exceed the maximum allowable pressure of the pressure gauge.

Mounting

⚠ Warning

1. Confirm the mounting direction of the product.

The high pressure (inlet) port is labeled with an "IN" mark and the low pressure (outlet) port is labeled with an "OUT" mark. Make sure to connect the port labeled with "IN" mark, to the high pressure. If any of the ports, other than "IN", is connected to the high pressure, it may cause damage or gas leakage.

Maintenance

⚠ Warning

1. If a back pressure regulator requires repair, contact SMC.

Operation

⚠ Warning

1. Do not use the back pressure regulator as shutoff valve or safety valve.

2. Pressure control

1) Rotate the adjustment wheel counterclockwise completely to relieve spring force.
2) Partially open the valve at inlet side to supply gas to the back pressure regulator.
3) Increase the inlet pressure to the setting pressure by rotating the adjustment wheel clockwise.
4) Continue opening the valve at inlet side monitoring the inlet pressure. When the inlet pressure increases above the setting pressure, rotate the adjustment wheel counterclockwise to relieve the inlet pressure to the setting pressure.
5) Open the valve at inlet side completely and confirm that the inlet pressure reaches the setting pressure.

3. Decreasing the setting pressure.

When decreasing the setting pressure, make sure to gradually rotate the adjustment wheel counterclockwise until the inlet pressure reaches the setting pressure.

4. Stop using the regulator immediately if resonance occurs.

Loud audible noise as well as vibration of device or fluctuation of outlet pressure (resonance) may occur depending on operating conditions, etc. If this situation occurs, stop using the regulator immediately and contact SMC or sales representative.

Single Stage Regulator for Ultra High Purity

Low flow (Tied-diaphragm)

Series AP1500

- **For UHP gas delivery**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity : to 30 slpm**
- **Body material: 316L SS secondary remelt**
- **Hastelloy internals available for corrosion resistance**
- **Tied-diaphragm design**

How to Order

Port Number ① ② ③ ④

AP15 | **02** | **S** | | **2PW** | **FV4** | **FV4** | | | | | | |

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
15	5 to 150 psig (0.034 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Hastelloy® C-22	Hastelloy® C-22	
SH				Hastelloy® C-22
H	Hastelloy® C-22			

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 port
3PW	3 port
4PW	4 port

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® ∗3)

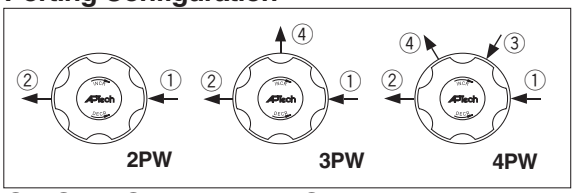
∗3) Not available with SHP, SH, H materials.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Porting Configuration



①IN ②OUT ③Gauge port (Inlet) ④Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④	
AP1510S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	40	1	MPA

Specifications

Operating Parameters		AP1502	AP1506	AP1510	AP1515
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas			
Source pressure		Vacuum to 3500 psig (24.1 MPa)			
Proof pressure (Inlet)		5000 psig (34.5 MPa)			
Burst pressure		10000 psig (69MPa)			
Ambient and operating temperature		–40 to 160°F (–40 to 71 °C) (No freezing) ∗1)			
Cv		0.09			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec			
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/sec ∗3)			
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)			
Connections		Face seal, Tube weld			
Bonnet port		NPT 1/8 inch ∗4)			
Supply pressure effect		0.41 psig (0.0028 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		0.51 in³ (8.4 cm³)			
Mass		2.8lbs (1.27 kg) ∗5)			

∗1) 14 to 194°F (-10 to 90 °C) for Vespel® seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).
∗4) On panel mount option, bonnet port is not threaded.
∗5) Mass, including individual boxed weight, may vary depending on connections or options.

SMC

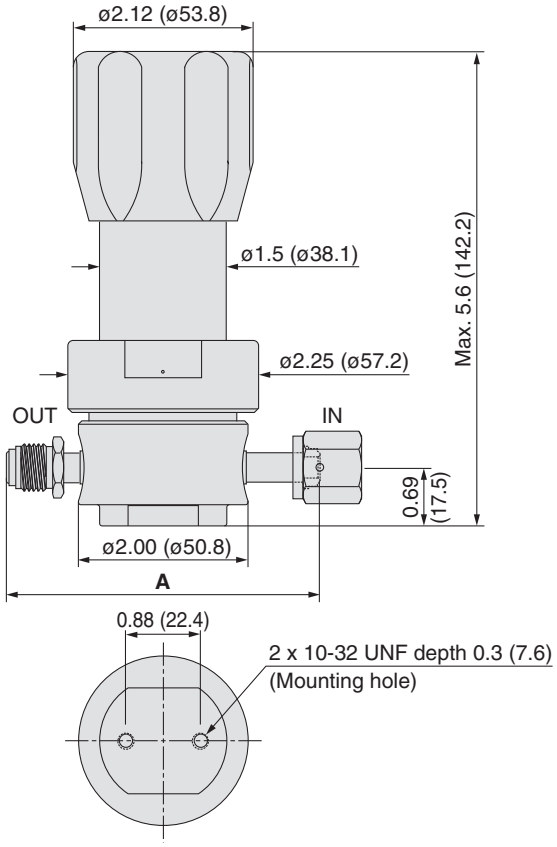
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Hastelloy® C-22
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Hastelloy® C-22		
Diaphragm	316L SS	Hastelloy® C-22		
Nozzle	316L SS		Hastelloy® C-22	
Seat	PCTFE (Option: Vespel®)	PCTFE		

Dimensions

inch (mm)

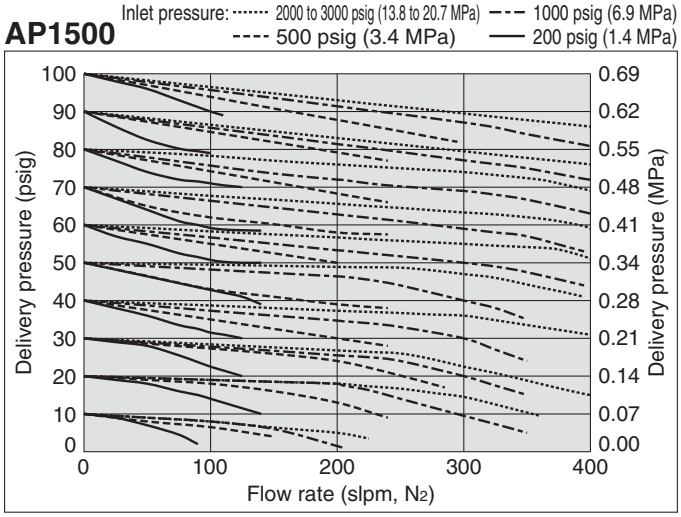
AP1500



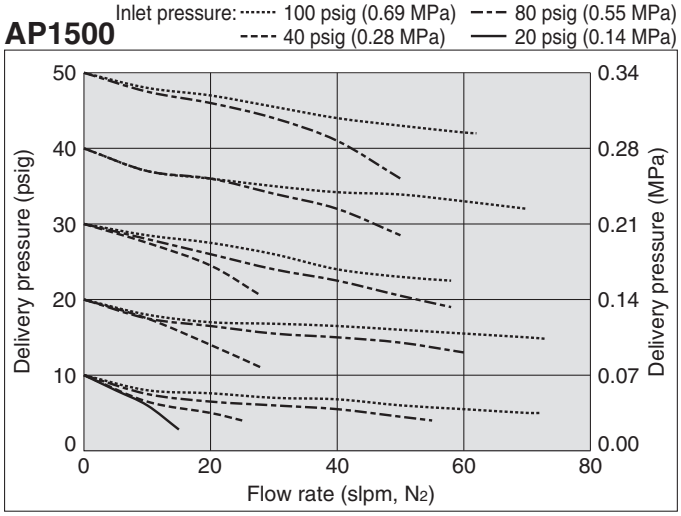
	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Characteristics

AP1500



AP1500



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Vespel® is a registered trademark of DuPont.

Single Stage Regulator for Ultra High Purity

Low to intermediate flow

Series AP1600

- For UHP gas delivery
- High inlet pressure type: Max. 3500 psig (24.1 MPa)
- Flow capacity: to 100 slpm
- Body material: 316L SS secondary remelt
- Hastelloy internals available for corrosion resistance

How to Order

Port Number ① ② ③ ④

AP16 [01] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
01	1 to 10 psig (0.007 to 0.07 MPa)
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SH		Hastelloy® C-22	Hastelloy® C-22	Hastelloy® C-22

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

*1) Refer to gauge guide (P.94) for gauge specifications.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

*4) Panel mounting hole: dia. 1.43 inch (36.3 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® *3)

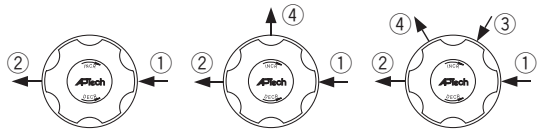
*3) Not available with SH material.

Pressure gauge unit *2)

Code	Unit
No code	psig/bar
MPA	MPa

*2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Porting Configuration



①IN ②OUT ③Gauge port (Inlet) ④Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④	
AP1601S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		V3	
	4PW	FV4	FV4	1	V3	MPA

Specifications

Operating Parameters		AP1601	AP1602	AP1606	AP1610
Delivery pressure		1 to 10 psig (0.007 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)
Gas		Select compatible materials of construction for the gas			
Source pressure		Vacuum to 100 psig (0.7 MPa)	Vacuum to 3500 psig (24.1 MPa)		
Proof pressure (Inlet)		4000 psig (27.6 MPa)			
Burst pressure		8000 psig (55.2 MPa)			
Ambient and operating temperature		–40 to 160°F (–40 to 71 °C) (No freezing) *1)			
Cv		0.13			
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/sec			
	Outboard leakage	2×10^{-10} Pa·m³/sec *2)			
Across the seat leak		4×10^{-9} Pa·m³/sec *3)			
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)			
Connections		Face seal, Tube weld			
Bonnet port		NPT 1/8 inch *4)			
Supply pressure effect		0.25 psig (0.0017 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		0.82 in³ (13.5 cm³)			
Mass		3.39 lbs (1.54 kg) *5)			

*1) 14 to 194°F (-10 to 90°C) for Vespel® seat.
*2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
*3) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).
*4) On panel mount option, bonnet port is not threaded.
*5) Mass, including individual boxed weight, may vary depending on connections or options.

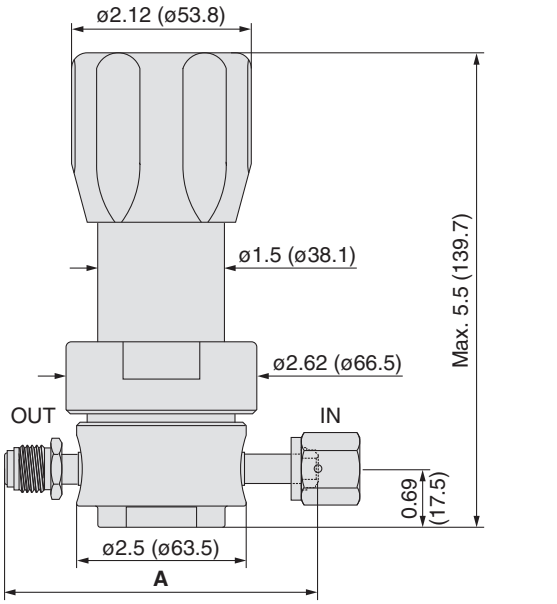
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Hastelloy® C-22
Diaphragm	316L SS	Hastelloy® C-22
Nozzle	316L SS	Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE

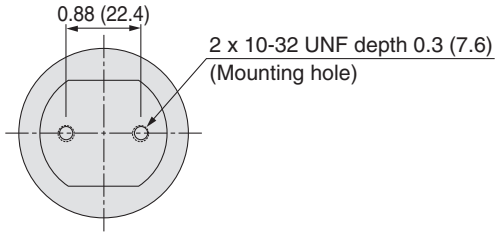
Dimensions

inch (mm)

AP1600

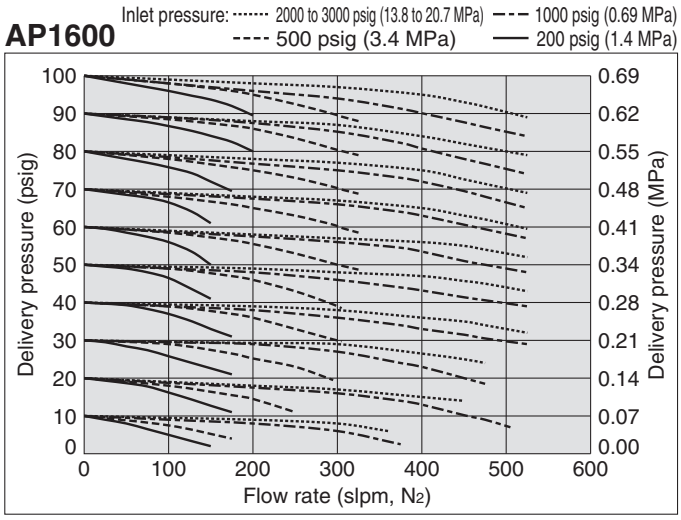


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)

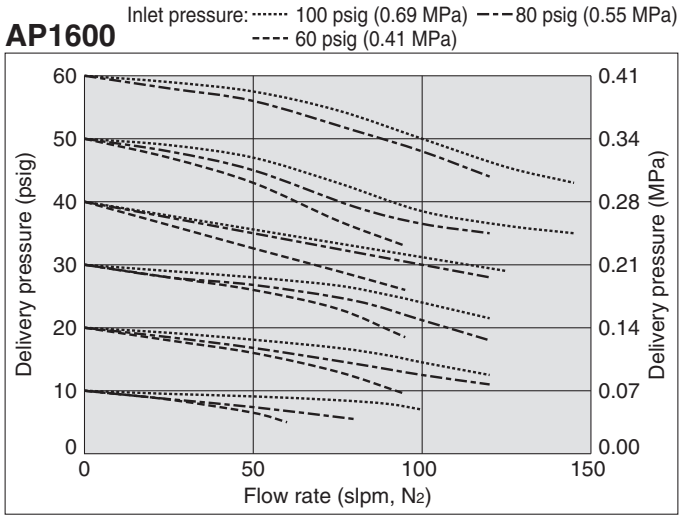


Flow Characteristics

AP1600



AP1600



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Single Stage Regulator for Ultra High Purity

Low to intermediate flow (Tied-diaphragm)

Series AP1900

- **For UHP gas delivery**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Body material: 316L SS secondary remelt**
- **Hastelloy internals available for corrosion resistance**
- **Tied-diaphragm design**

How to Order

Port Number ① ② ③ ④

AP19 | 01 | S | | 2PW | FV4 | FV4 | | | | | | | |

Delivery pressure

Code	Delivery pressure
01	1 to 10 psig (0.007 to 0.07 MPa)
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
15	5 to 150 psig (0.034 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SH		Hastelloy® C-22	Hastelloy® C-22	Hastelloy® C-22

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

*1) Refer to gauge guide (P.94) for gauge specifications.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

*4) Panel mounting hole: dia.1.43 inch (36.3 mm).

Option

Code	Specification
No code	Standard (Cv: 0.13)
HF	High flow (Cv: 0.16)

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® *3)

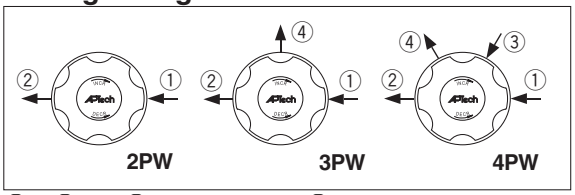
*3) Not available with SH material.

Pressure gauge unit *2)

Code	Unit
No code	psig/bar
MPA	MPa

*2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Porting Configuration



①IN ②OUT ③Gauge port (Inlet) ④Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④	
AP1901S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		V3	MPA
	4PW	FV4	FV4	40	V3	MPA

Specifications

Operating Parameters		AP1901	AP1902	AP1906	AP1910	AP1915
Delivery pressure		1 to 10 psig (0.007 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 3500 psig (24.1 MPa)				
Proof pressure (Inlet)		4000 psig (27.6 MPa)				
Burst pressure		8000 psig (55.2 MPa)				
Ambient and operating temperature		–40 to 160°F (–40 to 71 °C) (No freezing) *1)				
Cv		0.13				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec				
	Outboard leakage	2×10^{-10} Pa·m³/sec *2)				
Across the seat leak		4×10^{-9} Pa·m³/sec *3)				
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
Connections		Face seal, Tube weld				
Bonnet port		NPT 1/8 inch *4)				
Supply pressure effect		0.25 psig (0.0017 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
Installation		Bottom mount (Option: panel mount)				
Internal volume		0.82 in³ (13.5 cm³)				
Mass		3.39lbs (1.54 kg) *5)				

*1) 14 to 194°F (–10 to 90 °C) for Vespel® seat.
*2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
*3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).
*4) On panel mount option, bonnet port is not threaded.
*5) Mass, including individual boxed weight, may vary depending on connections or options.

SMC

Option

High flow

Higher flow capacity with internal changes only, no change in external dimensions. Changes from the standard type are:

Option	Other Parameters	AP1901	AP1902	AP1906	AP1910	AP1915
HF	**Cv**	0.16				
	Supply pressure effect	0.6 psig (0.0042 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

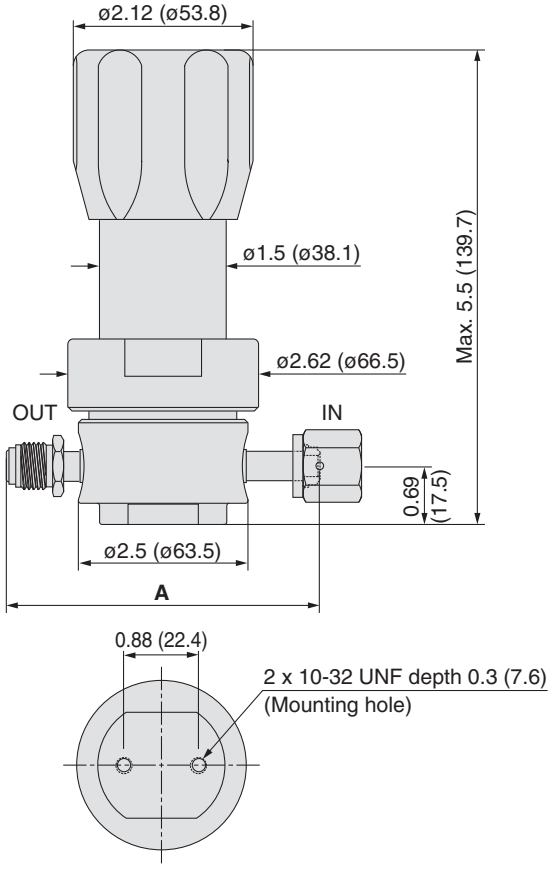
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Hastelloy® C-22
Diaphragm	316L SS	Hastelloy® C-22
Nozzle	316L SS	Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE

Dimensions

inch (mm)

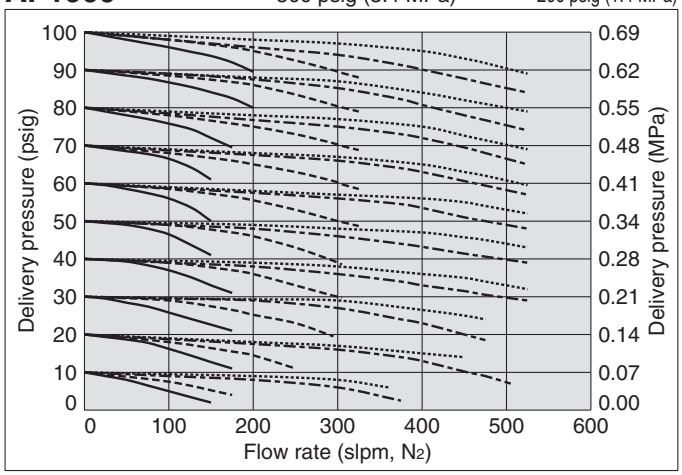
AP1900



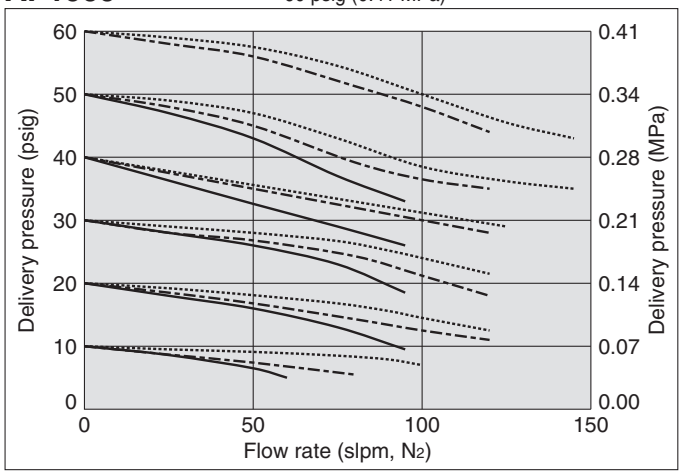
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Characteristics

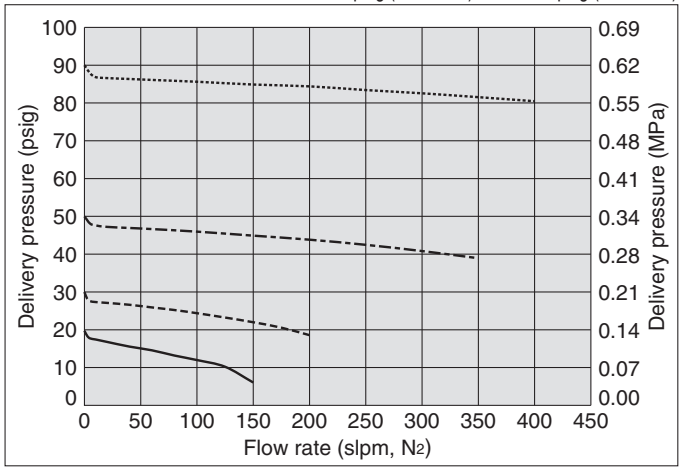
AP1900



AP1900



AP1900HF



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Single Stage Regulator for Ultra High Purity

Intermediate flow (Tied-diaphragm)

Series AP1400T

- For UHP gas delivery
- High inlet pressure type Standard: Max. 2300 psig(15.9 MPa)
  HR(option): Max. 3000 psig (20.7 MPa)
- Flow capacity : to 400 slpm
- Body material: 316L SS secondary remelt
- Hastelloy internals standard
- Sub-atmospheric pressure delivery option
- Tied-diaphragm design

How to Order

Port Number ① ② ③ ④

AP14 [02] T [S] [ ] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa) Sub-atmospheric(A):100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
15	5 to 150 psig (0.034 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	Hastelloy® C-22	Hastelloy® C-22	316L SS
SH				Hastelloy® C-22

Surface finish

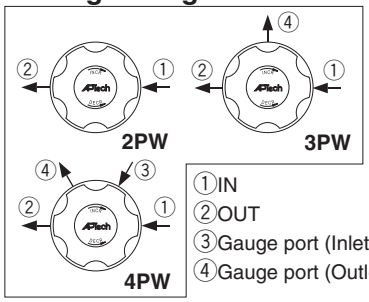
Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Range options *1)

Code	Range
No code	Standard
A	Sub-atmospheric

*1) Only available with AP1402T.

Porting Configuration



Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge *2)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

*2) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port	①	②	③	④	
AP1410T	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	40	1	MPA

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *6)
SC	Short type *7)

*6) Panel mounting hole: 1.56 inch (39.6 mm).

*7) Bonnet port is not threaded. SC option not available with 1402TA option.

Option

Code	Specification
No code	Standard
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7MPa)) *5)

*5) Not available with AP1402T and AP1406T.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® *4)

*4) Not available with SH material.

Pressure gauge unit *3)

Code	Unit
No code	psig/bar
MPA	MPa

*3) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Specifications

Operating Parameters		AP1402T□□A	AP1402T	AP1406T	AP1410T	AP1415T
Delivery pressure		100 mm Hg absolute to 30 psig (-88kPa to 0.2MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa) (Source pressure 1000 psig or less) *1)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 300 psig (2.1 MPa)	Vacuum to 2300 psig(15.9 MPa)			
Proof pressure (Inlet)		4000 psig (27.6 MPa)				
Burst pressure		8000 psig (55.2 MPa)				
Ambient and operating temperature		–40 to 160°F (–40 to 71°C) (No freezing) *2)				
Cv		0.45				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/sec				
	Outboard leakage	2×10^{-10} Pa·m³/sec *3)				
Across the seat leak		4×10^{-9} Pa·m³/sec *4)				
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
Connections		Face seal, Tube weld				
Bonnet port		NPT 1/8 inch *5)				
Supply pressure effect		1.6 psig(0.011 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
Installation		Bottom mount (Option: panel mount)				
Internal volume		1.06 in³ (17.4 cm³)				
Mass		4.5 lbs (2.04 kg) *6)				

*1) Source pressure above 1000 psig (6.9 MPa) decreases maximum delivery pressure to less than 150 psig (1 MPa) due to supply pressure effect. When the source pressure is 2300 psig (15.9 MPa), achievable delivery pressure is around 129 psig (0.89 MPa).

*2) 14 to 194°F (–10 to 90°C) for Vespel® seat.

*3) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

*4) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

*5) On panel mount option, bonnet port is not threaded.

*6) Mass, including individual boxed weight, may vary depending on connections or options.

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AP1410T	AP1415T
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)	
	Proof pressure (Inlet)	4500 psig (31 MPa)	
	Burst pressure	9000 psig (62 MPa)	

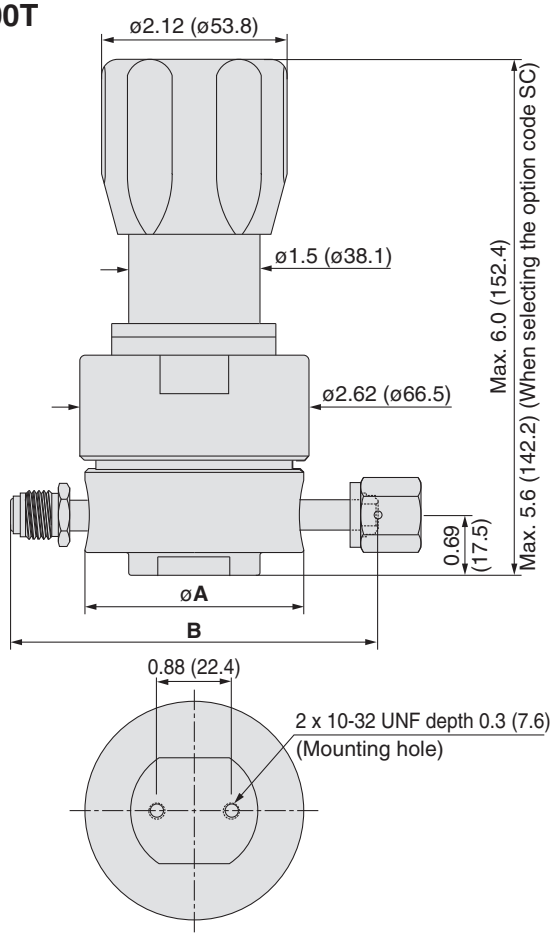
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	Hastelloy® C-22	
Diaphragm	Hastelloy® C-22	
Nozzle	316L SS	Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE

Dimensions

inch (mm)

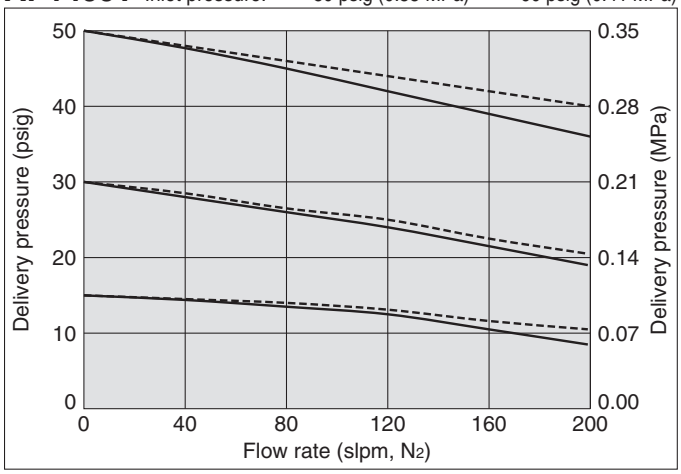
AP1400T



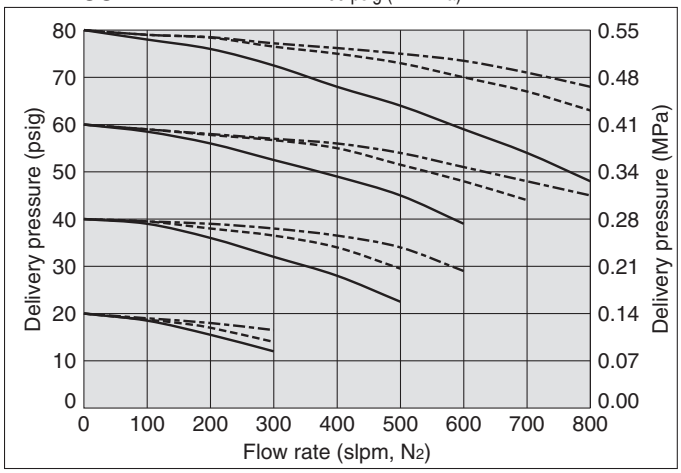
Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6				
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)

Flow Characteristics

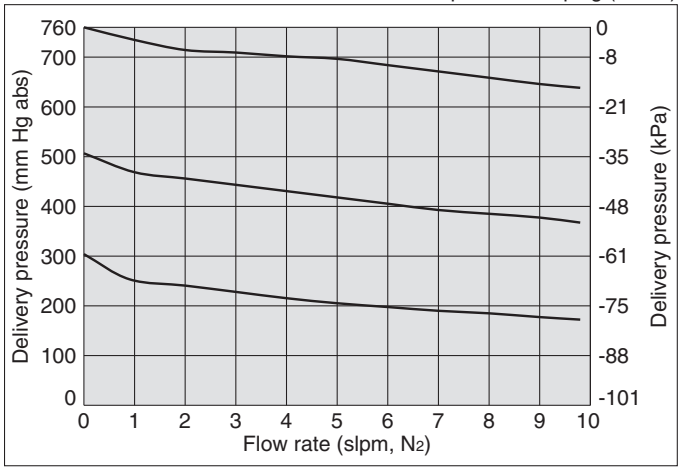
AP1400T Inlet pressure: ---- 80 psig (0.55 MPa) —— 60 psig (0.41 MPa)



AP1400T Inlet pressure: ---- 2000 psig (13.8 MPa) ---- 600 psig (4.1 MPa) —— 200 psig (1.4 MPa)



AP1402TA Inlet pressure: 0 psig (0 kPa)



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Single Stage Regulator for Ultra High Purity

Delivery of sub-atmospheric pressure

Series AP1100

- **For UHP gas delivery**
- **Sub-atmospheric to low positive pressure delivery**
- **Flow capacity : to 0.5 slpm**
- **Body material: 316L SS secondary remelt**
- **Hastelloy internals available for corrosion resistance**

How to Order

Port Number ① ② ③ ④

AP11 01 S [ ] 2PW FV4 FV4 [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
01	100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)

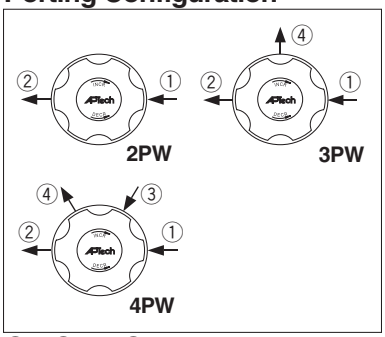
Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Hastelloy® C-22	Hastelloy® C-22	
SH				Hastelloy® C-22
H	Hastelloy® C-22			

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Porting Configuration



①IN ②OUT ③Gauge port (Inlet)
④Gauge port (Outlet)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

*4) Panel mounting hole: dia 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
TF	PTFE *3)

*3) PTFE recommended for applications such as within a process tool.

Pressure gauge unit *2)

Code	Unit
No code	psig/bar
MPA	MPa

*2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa

*1) Other range available. Refer to gauge guide (P.94).

Sample Order Number

	Port	①	②	③	④	
AP1101S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		V3	MPA
	4PW	FV4	FV4	V3	V3	MPA

Specifications

Operating Parameters		AP1101
Delivery pressure		100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 300 psig (2.1 MPa)
Proof pressure (Inlet)		500 psig (3.4 MPa)
Burst pressure		8000 psig (55.2 MPa)
Ambient and operating temperature		–40 to 160°F (–40 to 71°C) (No freezing)
Cv		0.05
Leak rate	**Inboard leakage**	2 x 10^{-11} Pa·m³/sec
	Outboard leakage	2 x 10^{-10} Pa·m³/sec *1)
Across the seat leak		4 x 10^{-9} Pa·m³/sec *1)
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)
Connections		Face seal, Tube weld
Bonnet port		NPT 1/8 inch *2)
Installation		Bottom mount (Option: panel mount)
Internal volume		0.49 in³ (8 cm³)
Mass		2.76 lbs (1.25 kg) *3)

*1) Tested with Helium gas inlet pressure 300 psig (2.1 Mpa).
*2) On panel mount option, bonnet port is not threaded.
*3) Mass, including individual boxed weight, may vary depending on connections or options.

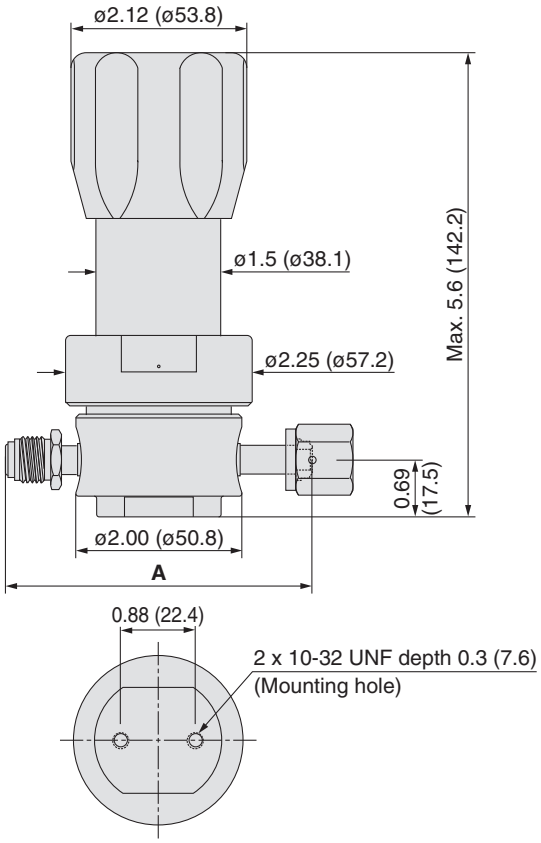
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Hastelloy® C-22
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Hastelloy® C-22		
Diaphragm	316L SS	Hastelloy® C-22		
Nozzle	316L SS		Hastelloy® C-22	
Seat	PCTFE (Option: PTFE)			

Dimensions

inch (mm)

AP1100

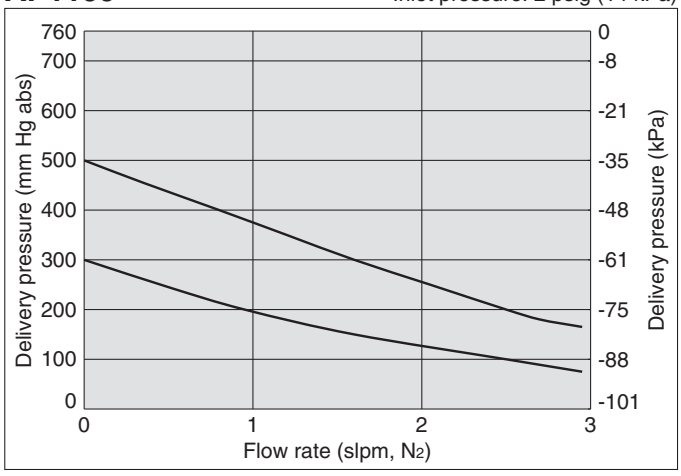


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Characteristics

AP1100

Inlet pressure: 2 psig (14 kPa)



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Two Stage Regulator for Ultra High Purity | Low flow (Tied-diaphragm)

Series AP1700

- For UHP gas delivery
- High inlet pressure type: Max. 3500 psig (24.1 MPa)
- Body material: 316L SS secondary remelt
- Hastelloy internals available for corrosion resistance
- Minimizes supply pressure effect by two stage regulation
- Tied-diaphragm design

How to Order

Port Number ① ② ③ ④

AP17 02 S □ 2PW FV4 FV4 □ □ □ □ □

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)

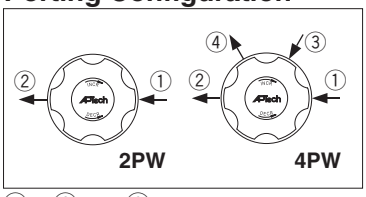
Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SH		Hastelloy® C-22	Hastelloy® C-22	Hastelloy® C-22

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Porting Configuration



①IN ②OUT ③Gauge port (Inlet)
④Gauge port (Outlet)

Ports

Code	Ports
2PW	2 ports
4PW	4 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port	①	②	③	④		
AP1702S	2PW	FV4	FV4				
	4PW	FV4	FV4	0	0		
	4PW	FV4	FV4	40	V3	MPA	

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Panel mounting hole: dia.1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® ∗3)

∗3) Not available with SH material.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Specifications

Operating Parameters		AP1702	AP1706	AP1710
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)
Gas		Select compatible materials of construction for the gas		
Source pressure		Vacuum to 3500 psig (24.1 MPa)		
First stage pressure		175 psig (1.2 MPa)		
Proof pressure (Inlet)		4000 psig (27.6 MPa)		
Burst pressure		8000 psig (55.2 MPa)		
Ambient and operating temperature		–40 to 160°F (–40 to 71°C) (No freezing) ∗1)		
Cv		0.05		
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec		
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗2)		
Across the seat leak		4×10^{-9} Pa·m³/sec ∗3)		
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)		
Connections		Face seal, Tube weld		
Bonnet port		NPT 1/8 inch ∗4)		
Supply pressure effect		0.05 psig (0.00035 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop		
Installation		Option: panel mount		
Internal volume		0.92 in³ (15.1cm³)		
Mass		4.50 lbs (2.04 kg) ∗5)		

∗1) 14 to 194°F (–10 to 90°C) for Vespel® seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).
∗4) On panel mount option, bonnet port is not threaded.
∗5) Mass, including individual boxed weight, may vary depending on connections or options.

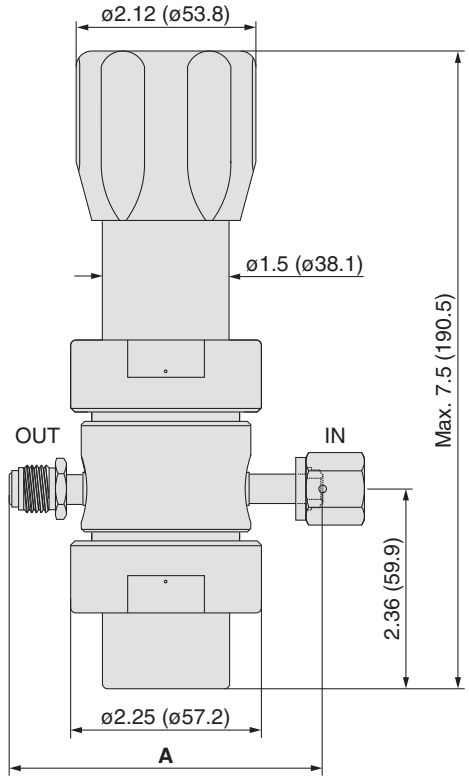
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Hastelloy® C-22
Diaphragm	316L SS	Hastelloy® C-22
Nozzle	316L SS	Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE

Dimensions

inch (mm)

AP1700

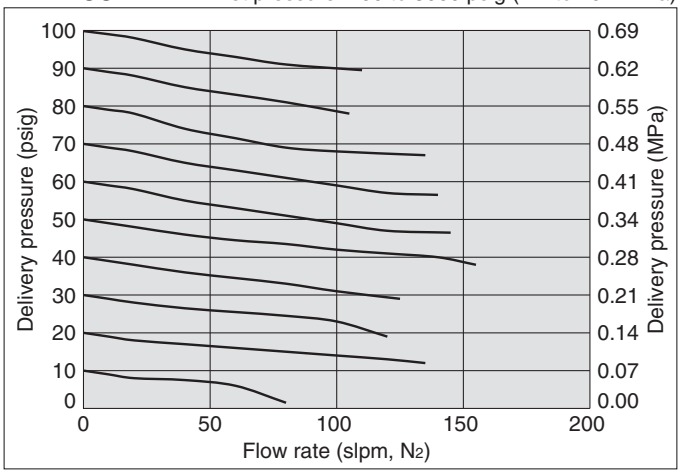


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Characteristics

AP1700

Inlet pressure: 200 to 3000 psig (1.4 to 20.7 MPa)



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Two Stage Regulator for Ultra High Purity

Intermediate flow (Tied-diaphragm)

Series AP2700

- For UHP gas delivery
- High inlet pressure type: Max. 3500 psig (24.1 MPa)
- Flow capacity to 150 slpm (NF_3) to 900 slpm (H_2)
- Body material: 316L SS secondary remelt
- Hastelloy internals available for corrosion resistance
- Minimizes supply pressure effect by two stage regulation
- Tied-diaphragm design

How to Order

Port Number ① ② ③ ④

AP27 [02] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)
12	3 to 120 psig (0.021 to 0.8 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	Hastelloy® C-22	316L SS
SH		Hastelloy® C-22		Hastelloy® C-22

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Ports

Code	Ports
2PW	2 ports
3PWQ	3 ports (1 pressure monitor port (MP))
4PW	4 ports
5PWQ	5 ports (1 pressure monitor port (MP))

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel® ∗3)

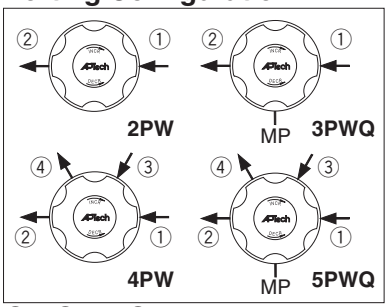
∗3) Not available with SH material.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Porting Configuration



①IN ②OUT ③Gauge port (Inlet)
④Gauge port (Outlet) MP=Monitoring gauge port

Gauge port (Inlet③, Outlet④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port			③	④	
AP2702S	2PW	FV4	FV4			
	3PWQ	FV4	FV4			
	4PW	FV4	FV4	40	V3	MPA
	5PWQ	FV4	FV4	40	V3	MPA

Specifications

Operating Parameters		AP2702	AP2706	AP2710	AP2712
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	3 to 120 psig (0.021 to 0.8 MPa)
Gas		Select compatible materials of construction for the gas			
Source pressure		Vacuum to 3500 psig (24.1 MPa)			
First stage pressure		200 psig (1.4 MPa)			
Proof pressure (Inlet)		4000 psig (27.6 MPa)			
Burst pressure		8000 psig (55.2 MPa)			
Ambient and operating temperature		–40 to 160°C (–40 to 71°C) (No freezing) ∗1)			
Cv		0.105			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec			
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/sec ∗3)			
Surface finish		Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)			
Connections		Face seal, Tube weld			
Bonnet port		NPT 1/8 inch ∗4)			
Supply pressure effect		0.01 psig (0.00007 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Option: panel mount			
Internal volume		1.87 in³ (30.6 cm³)			
Mass		5 lbs (2.27 kg) ∗5)			

∗1) 14 to 194°F (–10 to 90°C) for Vespel® seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 Mpa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).
∗4) On panel mount option, bonnet port is not threaded.
∗5) Mass, including individual boxed weight, may vary depending on connections or options.

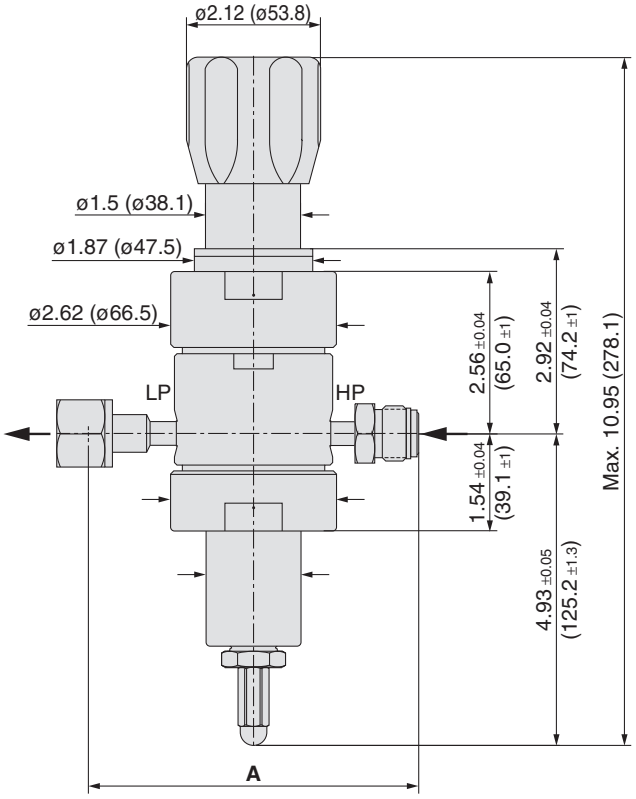
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Hastelloy® C-22
Diaphragm	316L SS / Hastelloy® C-22	Hastelloy® C-22
Nozzle	316L SS	Hastelloy® C-22
Seat	PCTFE (Option: Vespel®)	PCTFE

Dimensions

inch (mm)

AP2700

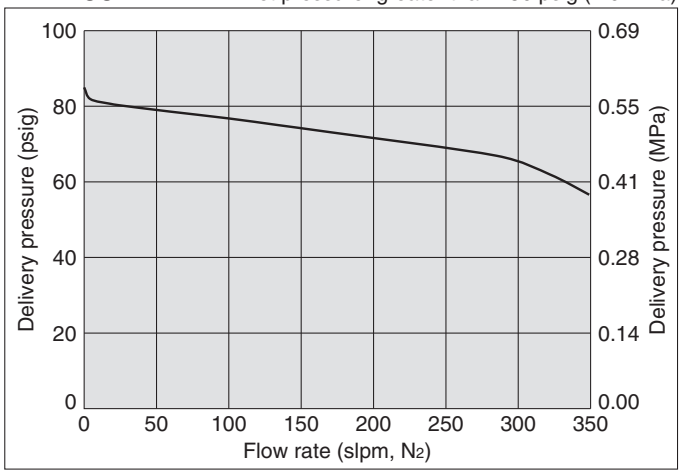


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)

Flow Characteristics

AP2700

Inlet pressure: greater than 150 psig (1.0 MPa)



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Single Stage Regulator for Ultra High Purity | Bulk gas delivery

Series AP9000 & 9100

- For UHP gas delivery
- Inlet pressure AP9000: Max. 1700 psig (11.7 MPa)
  AP9100: Max. 800 psig (5.5 MPa)
- Flow capacity AP9000: to 2000 slpm
  AP9100: to 5000 slpm
- Body material: 316L SS
- Tied-diaphragm design

How to Order

Port Number ① ② ③

AP9 [0] [10] [S] [ ] [2PW] [FV16] [FV16] [ ] [ ] [ ]

Size

Code	Cv
0	3
1	4

Delivery pressure

Code	Delivery pressure	Size 0	Size 1
10	5 to 100 psig (0.034 to 0.7 MPa)	●	●
15	5 to 150 psig (0.034 to 1.0 MPa)		●
30	Preset to 300 psig (2.1 MPa)	●	

Material

Code	Material
S	316L SS

Surface finish

Code	Surface finish Ra max
No code	15 µin. (0.4 µm)
M	10 µin. (0.25 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports

Connections (Inlet①, Outlet②)

Code	Connections
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld
FV16	1 inch face seal (Female)
MV16	1 inch face seal (Male)
TW16	1 inch tube weld

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Vespel®

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Gauge ports (Outlet③)

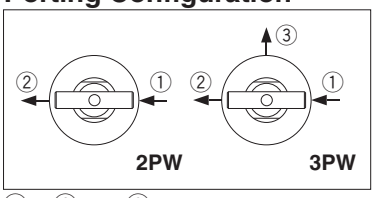
Code	Pressure gauge∗1) psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
4	0 to 400 psig	0 to 3 MPa

∗1) Refer to gauge guide (P.94) for gauge specifications.

Sample Order Number

	Port ①	②	③		
AP9010S	2PW	FV12	FV12		
	3PW	FV12	FV12	H	MPA

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

Specifications

Operating Parameters		AP9010	AP9030	AP9110	AP9115
Delivery pressure		5 to 100 psig (0.034 to 0.7 MPa)	Preset to 300 psig (2.1 MPa) ∗1)	5 to 100 psig (0.034 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas			
Source pressure		Vacuum to 1700 psig (11.7 MPa)		Vacuum to 800 psig (5.5 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure (Inlet)		2550 psig (17.6 MPa)			
Burst pressure		6800 psig (46.9 MPa)			
Ambient and operating temperature		–40 to 160°C (–40 to 71°C) (No freezing) ∗2)			
Cv		3.0		4.0	
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/sec			
	Outboard leakage	2×10^{-10} Pa·m³/sec ∗3)			
Across the seat leak		4×10^{-9} Pa·m³/sec ∗3)			
Surface finish		Ra max 15 µin (0.4 µm) or 10 µin (0.25 µm)			
Connections		Face seal, Tube weld			
Bonnet port		NPT 1/8 inch			
Supply pressure effect		3.7 psig (0.026 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop		5.4 psig (0.038 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
Internal volume		12 in³ (197 cm³)			
Mass		13 lbs (5.9 kg) ∗4)			

∗1) At 800 psig (5.5 MPa) inlet pressure. Optional preset pressure available. Please contact SMC.
∗2) 14 to 194°F (–10 to 90°C) for Vespel® seat.
∗3) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).
∗4) Mass, including individual boxed weight, may vary depending on connections or options.

Wetted Parts Material

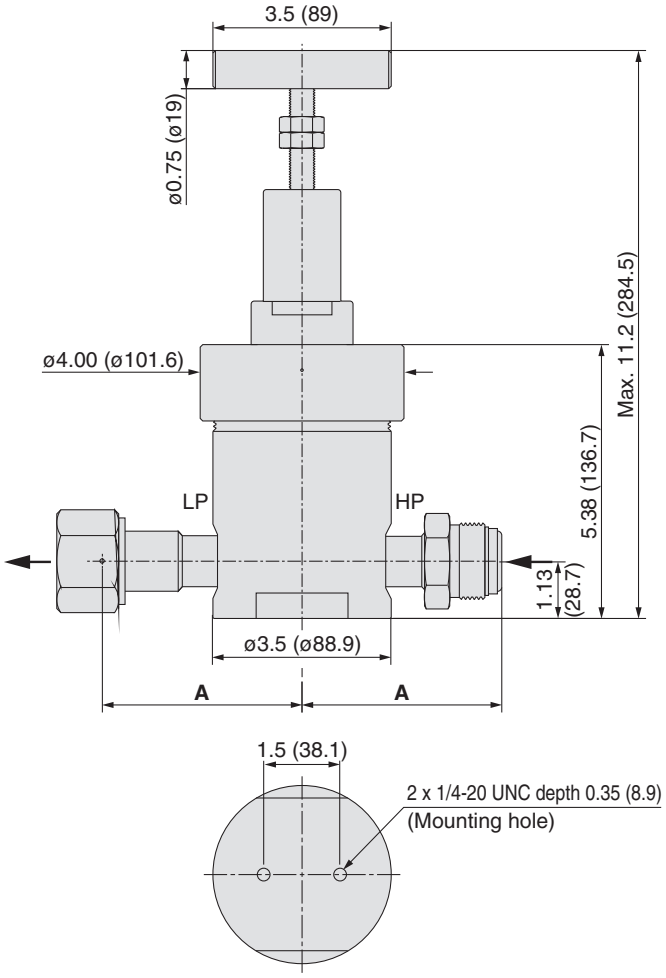
Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Hastelloy® C-22
Bellows	Hastelloy® C-22
Nozzle	316L SS
Seat	PCTFE (Option: Vespel®)
Poppet spring	Elgiloy®
Bonnet seal	Nickel 200 *) (Silver plated)

*) 316 SS silver plated for AP9030

Dimensions

inch (mm)

AP9000 & 9100

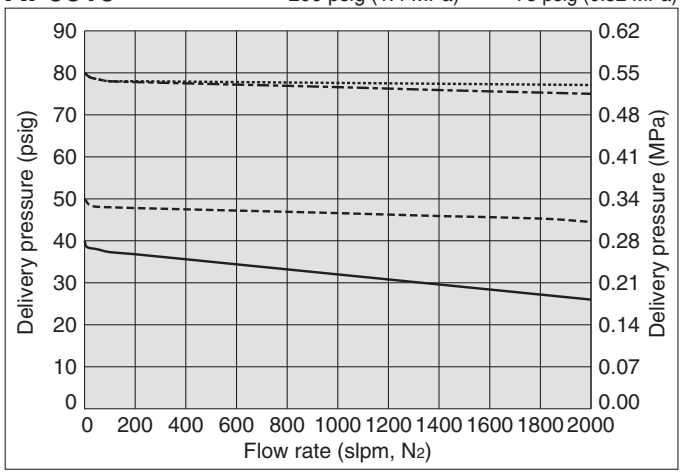


Connections	A	
	inch	(mm)
FV8	3.11	(79.0)
MV8		
TW8	4.75	(120.7)
FV12	3.64	(92.5)
MV12		
TW12	4.75	(120.7)
FV16	3.92	(99.6)
MV16		
TW16	4.75	(120.7)

Flow Characteristics

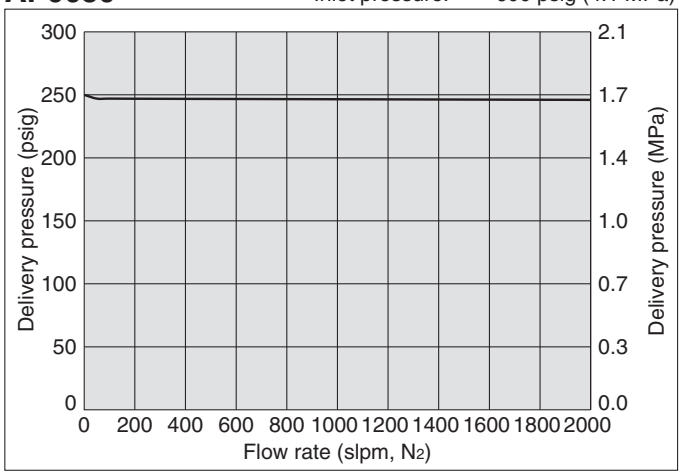
AP9010

Inlet pressure: ····· 1000 psig (6.9 MPa) – – – 300 psig (2.1 MPa)
– – – – 200 psig (1.4 MPa) —— 75 psig (0.52 MPa)



AP9030

Inlet pressure: —— 600 psig (4.1 MPa)



AP9110

Inlet pressure: – – – – 150 psig (1.0 MPa) —— 75 psig (0.52 MPa)