Regulators/Back Pressure Regulators

For Ultra High Purity (UHP): AP Series

For Ultra High Purity (UHP): SL Series

For Ultra High Purity (UHP): AZ Series

For General Applications: AK Series

Back Pressure Regulator BP Series

Single Stage Compact Regulator for Ultra High Purity

AP500 Series

- **For UHP gas delivery**
- **High inlet pressure type Standard: Max. 150 psig (1.0 MPa)**
  HR: 3000 psig (20.7 MPa)
- **Flow capacity Standard: to 15 slpm**
  HF (option): to 30 slpm
- **Body material: 316L SS secondary remelt**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Sub-atmospheric pressure delivery option**

RoHS

How to Order (See p. 250 for ordering syntax)

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)
15	2 to 150 psig (0.014 to 1.0 MPa)

∗1) When AP515 is selected, select option "HR."

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	Ni-Co alloy	316L SS
SH	secondary remelt	Ni-Cr-Mo alloy		

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

Ports

Code	Ports
2PW	2 ports
3PWG	3 ports

Range options (Only for AP501)

Code	Specification
No code	Standard
A	Sub-atmospheric

Gauge port (Outlet③)

Code	Connections or Pressure gauge ∗2)		
		psig/bar unit	MPa unit
No code	No gauge port		
FV4	No pressure gauge	1/4 inch face seal (Female)	
MV4		1/4 inch face seal (Male)	
TW4		1/4 inch tube weld	
V3	With pressure gauge	-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

∗2) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Sample Order Number

	Port	①	②	③	
AP502S	2PW	FV4	FV4		
	3PWG	FV4	FV4	FV4	
	3PWG	FV4	FV4	V3	MPA

Option

Code	Specification
No code	Standard
FI	Friction dampener ∗8)∗9)

∗8) FI is friction dampener to slow response and reduce interaction with MFC. Cannot be selected if option "HF" is selected as it comes with a friction dampener as standard

∗9) Cannot be selected if AP515 is selected

Option

Code	Specification
No code	Standard
HF	High flow ∗6)
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) ∗7)

∗6) Cannot be selected if AP501A, AP515, or seat material "VS" is selected

∗7) Cannot be selected if AP501A, seat material "TF," or option "HF" is selected

Seat material

Code	Material
No code	PCTFE (Standard)
TF	PTFE ∗4)
VS	Polyimide ∗5)

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

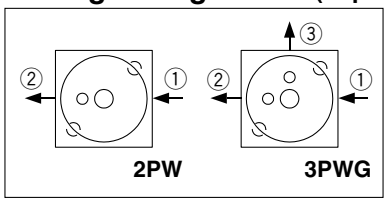
∗5) Not available with SH material.

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.

Porting Configuration (Top view)



①IN ②OUT ③Gauge port (Outlet)

Specifications

Operating Parameters		AP501□□A	AP501	AP502	AP506	AP510	AP515∗4)
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)	2 to 150 psig (0.014 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas					
Source pressure		Vacuum to 150 psig (1.0 MPa)					Vacuum to 3000 psig (20.7 MPa)
Proof pressure	Inlet	1.5 times the maximum source pressure					
	Outlet	1.5 times the maximum delivery pressure					
Burst pressure	Inlet	3 times the maximum source pressure					
	Outlet	3 times the maximum delivery pressure					
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)					
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s					
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)					
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)					
Weight		0.45 kg ∗3)					

∗1) -10 to 90°C for Polyimide seat. In addition, for option "HR," the temperature range is -28 to 48°C.

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

∗3) Weight, including individual boxed weight, may vary depending on connections or options.

∗4) The specifications are for AP515 when option "HR" is selected.

Option

1. High flow

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

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

2. High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AP501	AP502	AP506	AP510	AP515
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)				

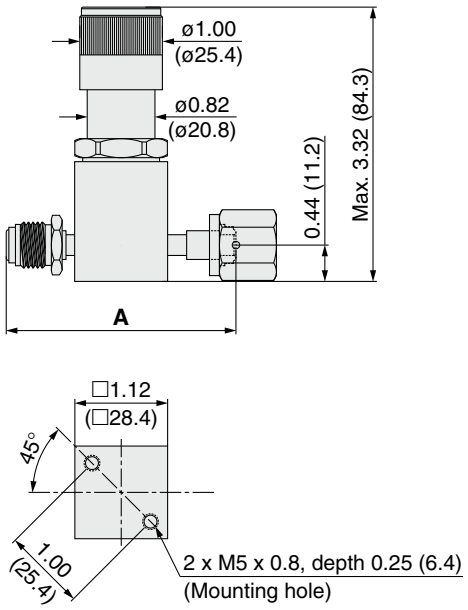
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	Ni-Co alloy	
Nozzle	316L SS	
Seat	PCTFE (Option: PTFE, Polyimide)	PCTFE (Option: PTFE)

Dimensions

inch (mm)

AP500

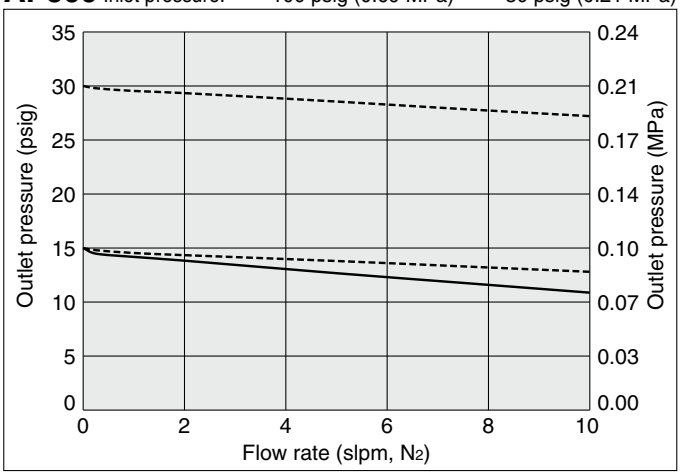


Connections	A	
	inch	(mm)
FV4	2.78	(70.6)
MV4		
TW4	2.12	(53.8)

Flow Rate Characteristics

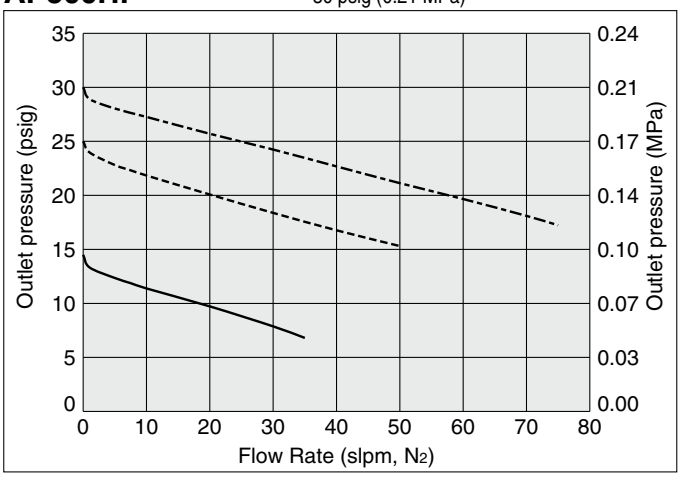
AP500

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



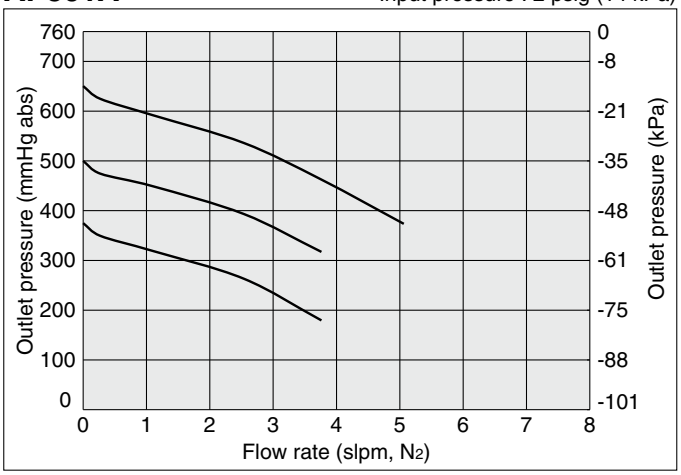
AP500HF

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



AP501A

Input pressure : 2 psig (14 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Low to intermediate flow

AP1000 Series

- **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**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

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

Port Number: ① ② ③ ④

Delivery pressure

Code	Delivery pressure
01	0.5 to 10 psig (0.0034 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)
30	5 to 300 psig (0.034 to 2.1 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy
SH				
H	Ni-Cr-Mo alloy			

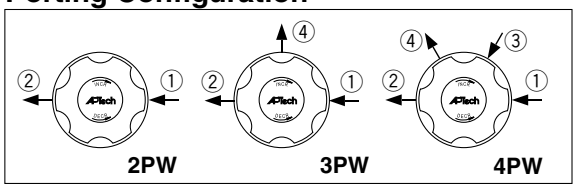
Surface finish

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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

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

∗6) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Option

Code	Specification
No code	Standard
HF	High flow

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗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	AP1030
Delivery pressure		0.5 to 10 psig (0.0034 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)	5 to 300 psig (0.034 to 2.1 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**	1.5 times the maximum source pressure					
	Outlet	1.5 times the maximum delivery pressure					
Burst pressure	**Inlet**	3 times the maximum source pressure					
	Outlet	3 times the maximum delivery pressure					
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)					
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s					
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)					
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)					
Weight		1.25 kg ∗6)					

∗1) Max. 300 psig (2.1 MPa) for PTFE seat.
∗2) -10 to 90°C for Polyimide 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) Weight, 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	AP1030
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop					

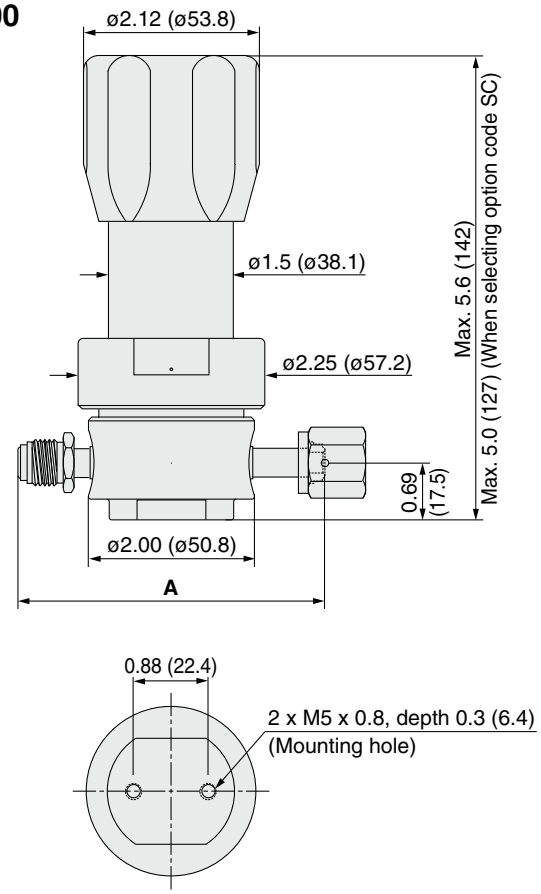
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Ni-Cr-Mo alloy		
Diaphragm	316L SS	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy	
Seat	PCTFE (Option: Polyimide, PTFE)	PCTFE (Option: PTFE)		

Dimensions

inch (mm)

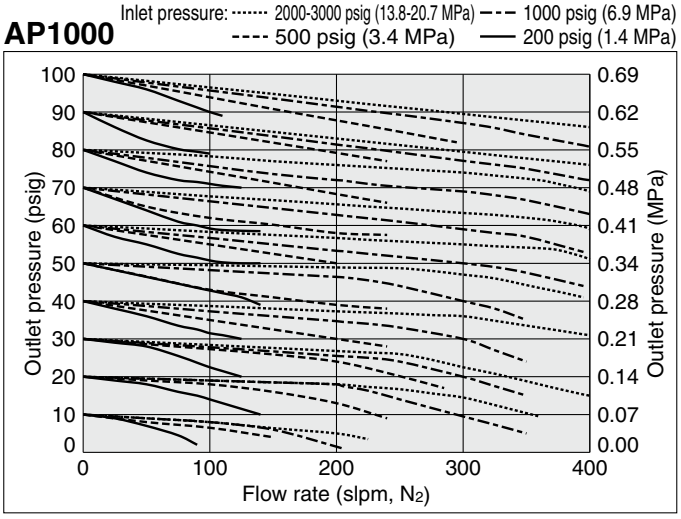
AP1000



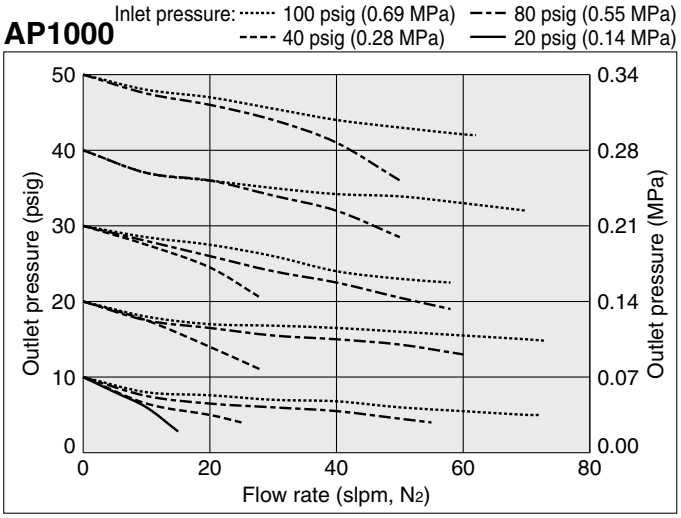
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

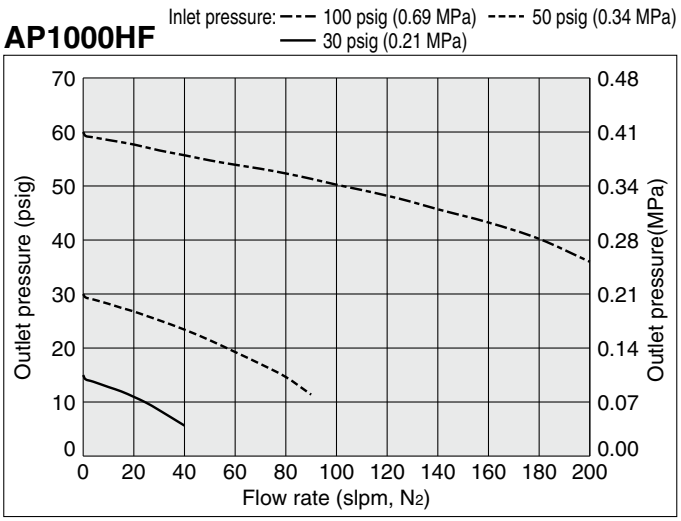
AP1000



AP1000



AP1000HF



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Delivery of sub-atmospheric pressure

AP1100 Series

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

RoHS

How to Order (See p. 250 for ordering syntax)

AP11 01 S □ 2PW FV4 FV4 □ □ □ □ □ □

Port Number: ① ② ③ ④

Delivery pressure

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

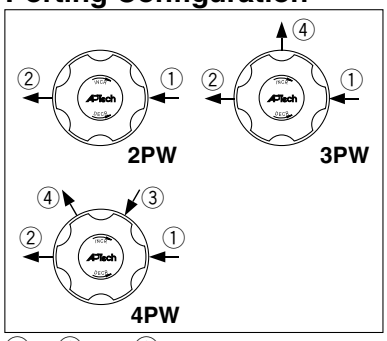
Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	
SH				Ni-Cr-Mo alloy
H	Ni-Cr-Mo alloy			

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)

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

∗1) Other range available. Refer to gauge guide (P.139). Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Ports

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

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)
SC	Short type

∗4) Bonnet port is not threaded. 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.

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
	4PW	FV4	FV4	0	0	

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**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Ambient and operating temperature		-40 to 71°C (No freezing)
Leak rate	**Inboard leakage**	2 x 10^{-11} Pa·m³/s
	Outboard leakage	2 x 10^{-10} Pa·m³/s ∗1)
Across the seat leak		4 x 10^{-9} Pa·m³/s ∗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)
Weight		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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

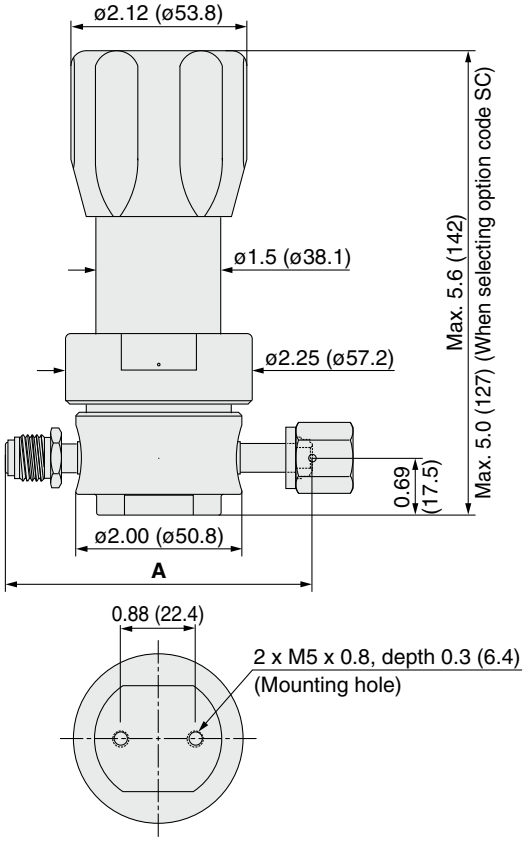
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Ni-Cr-Mo alloy		
Diaphragm	316L SS	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy	
Seat	PCTFE (Option: PTFE)			

Dimensions

inch (mm)

AP1100

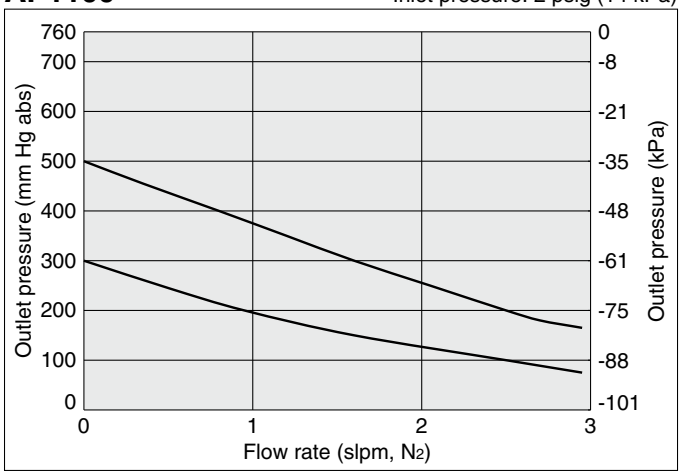


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

AP1100

Inlet pressure: 2 psig (14 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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

AP1500 Series

- For UHP gas delivery
- High inlet pressure type: Max. 3500 psig (24.1 MPa)
  HR (option): Max. 4500 psig (31.0 MPa)
- Flow capacity: to 30 slpm
  HF (option): to 120 slpm
- Body material: 316L SS secondary remelt
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

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		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy
SH				
H	Ni-Cr-Mo alloy			

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
50	0 to 5000 psig	(not applied)

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

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

∗6) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

∗7) SC option is not available with HR option.

Option

Code	Specification
No code	Standard
HF	High flow ∗4)
HR	High inlet pressure (Max. inlet pressure 4500 psig (31 MPa)) ∗4)∗5)

∗4) Options "HF" and "HR" cannot be used in combination.

∗5) The connection is a 1/4 inch face seal.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

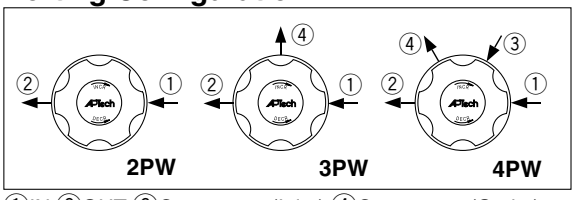
∗3) Not available with SHP, SH, H materials.

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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)			
Weight		1.27 kg ∗5)			

∗1) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

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	AP1502	AP1506	AP1510	AP1515
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			

2. High inlet pressure
Changes from the standard type are:

Option	Other Parameters	AP1502	AP1506	AP1510	AP1515
HR	**Source pressure**	Vacuum to 4500 psig (31 MPa)			

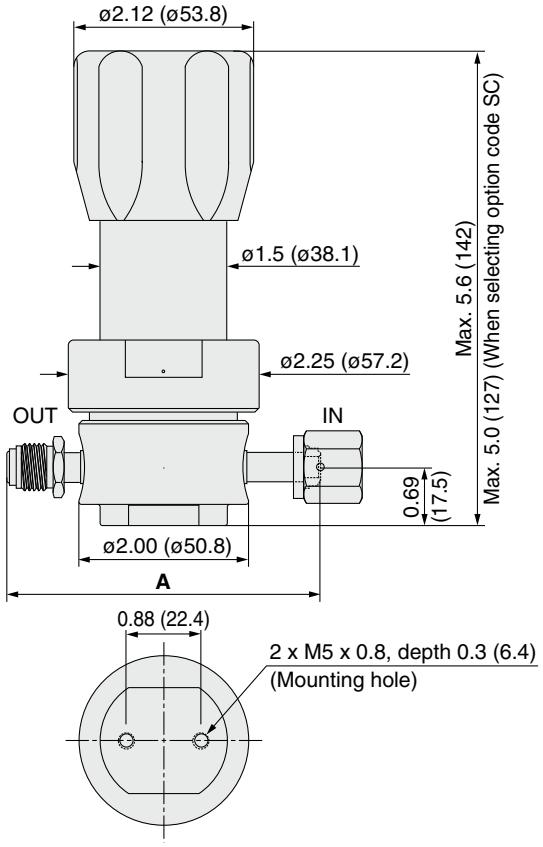
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Ni-Cr-Mo alloy		
Diaphragm	316L SS	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE		

Dimensions

inch (mm)

AP1500

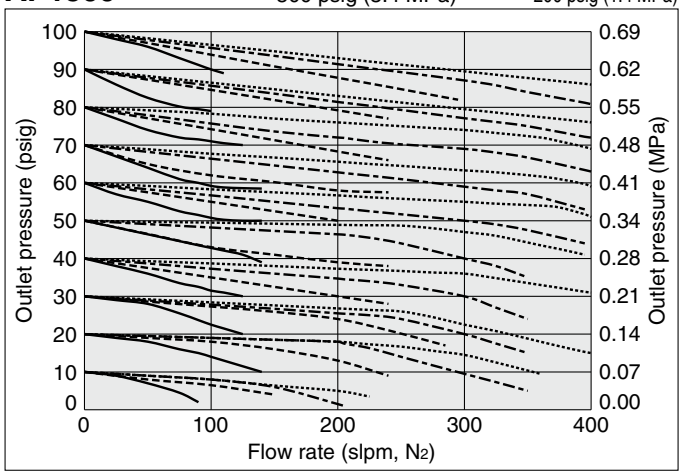


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

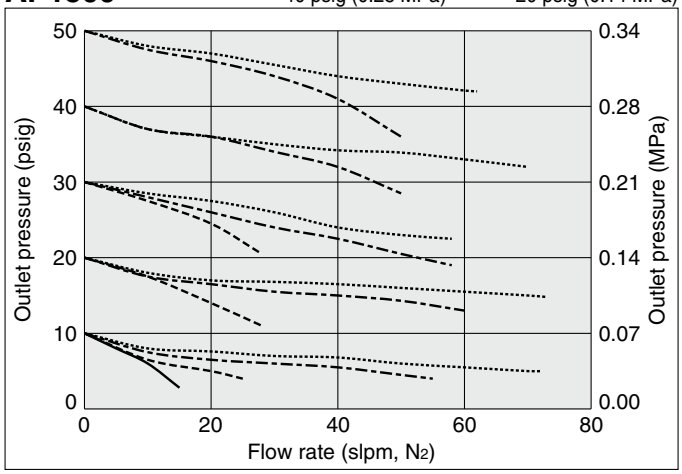
AP1500

Inlet pressure: ····· 2000 to 3000 psig (13.8 to 20.7 MPa) – – – 1000 psig (6.9 MPa)
– – – – 500 psig (3.4 MPa) —— 200 psig (1.4 MPa)



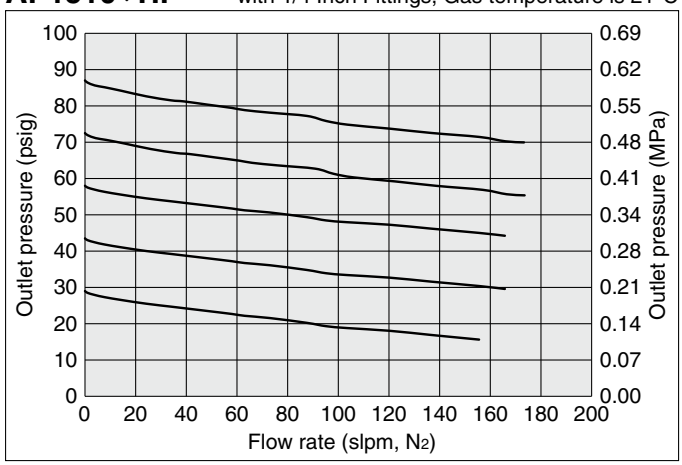
AP1500

Inlet pressure: ····· 100 psig (0.69 MPa) – – – 80 psig (0.55 MPa)
– – – – 40 psig (0.28 MPa) —— 20 psig (0.14 MPa)



AP1510∗HF

Inlet pressure: —— 150 psig (1.0 MPa)
with 1/4 Inch Fittings, Gas temperature is 21°C

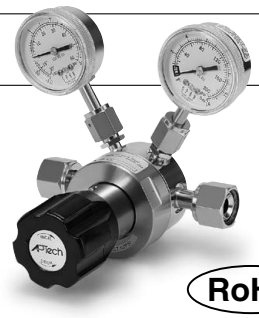


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Low to intermediate flow

AP1600 Series



- **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**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

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		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

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
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

*4) Bonnet port is not threaded. Panel mounting hole: dia. 1.43 inch (36.3 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *3)

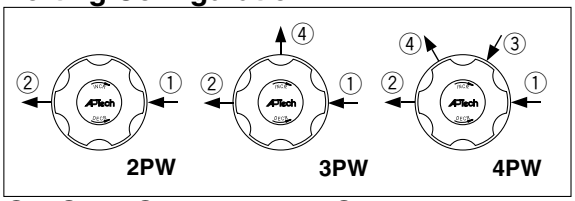
*3) Not available with SH material.

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	MPA
	4PW	FV4	FV4	1	V3	MPA
	4PW	FV4	FV4	0	0	

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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) *1)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s *2)			
Across the seat leak		4×10^{-9} Pa·m³/s *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)			
Weight		1.54 kg *5)			

*1) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

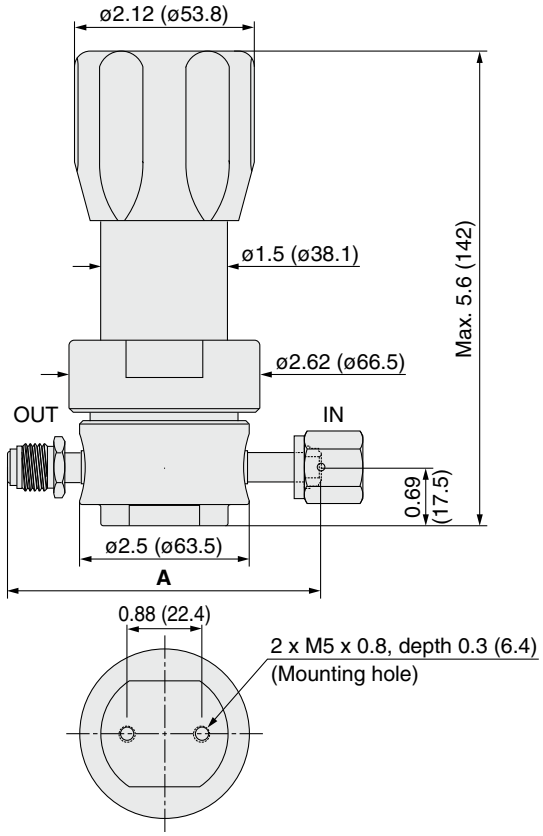
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

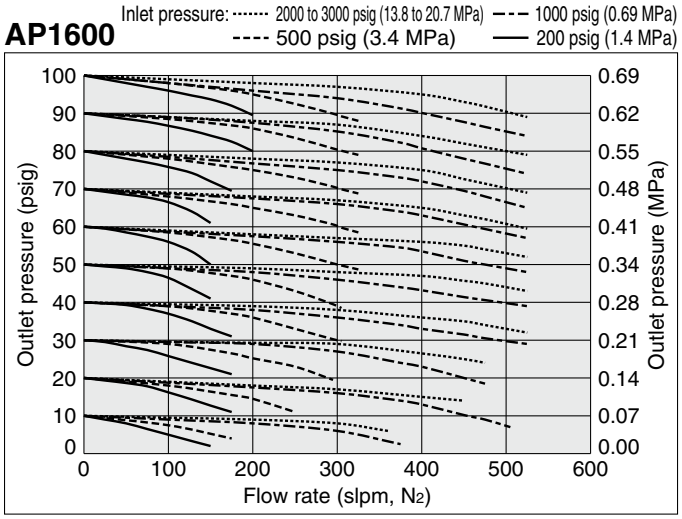
AP1600



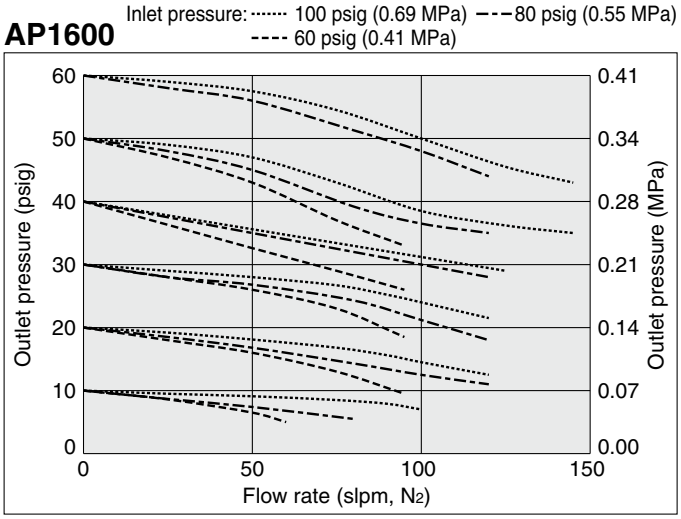
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)

Flow Rate Characteristics

AP1600



AP1600

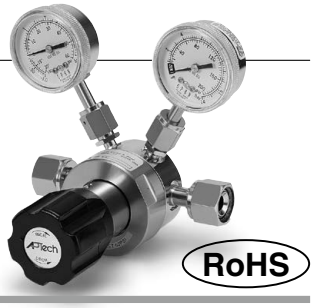


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Low to intermediate flow (Tied-diaphragm)

AP1900 Series



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

RoHS

How to Order (See p. 250 for ordering syntax)

AP19 [01] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Bonnet port is not threaded. Panel mounting hole: dia.1.43 inch (36.3 mm).

Option

Code	Specification
No code	Standard
HF	High flow

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗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.

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	316L SS	316L SS	316L SS
SH	secondary remelt	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

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)

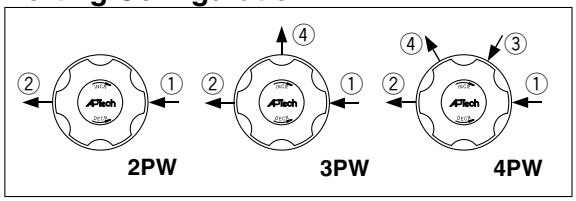
Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

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
H	-30 in.Hg to 160 psig	-0.1 to 1.1MPa
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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
	4PW FV4	FV4	0	0	

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**	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	**Inlet**	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)				
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)				
Weight		1.54 kg ∗5)				

∗1) -10 to 90°C for Polyimide 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) Weight, 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	**Supply pressure effect**	0.6 psig (0.0042 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

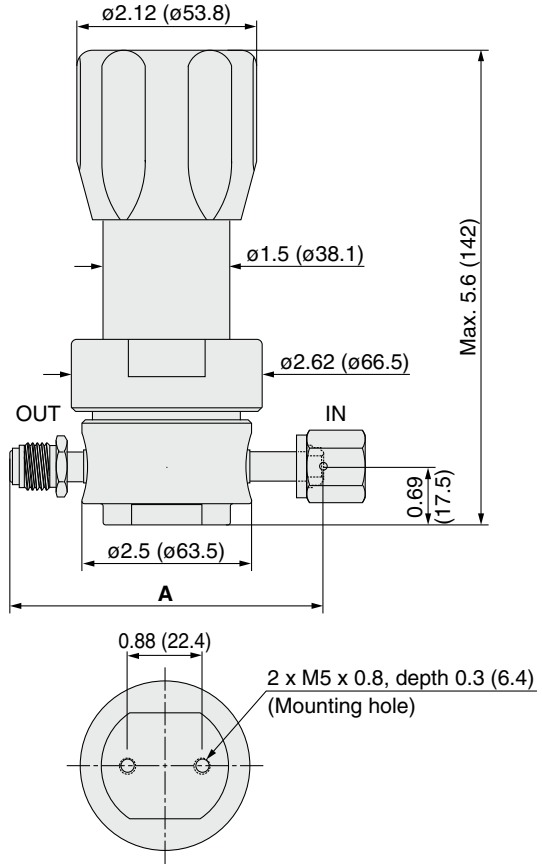
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

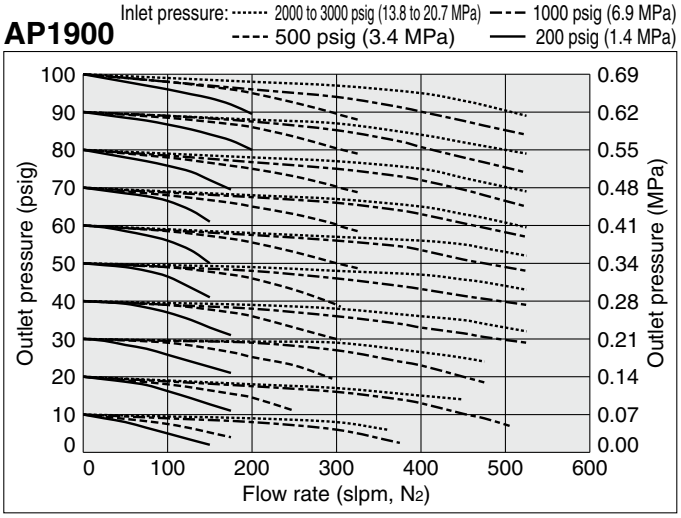
AP1900



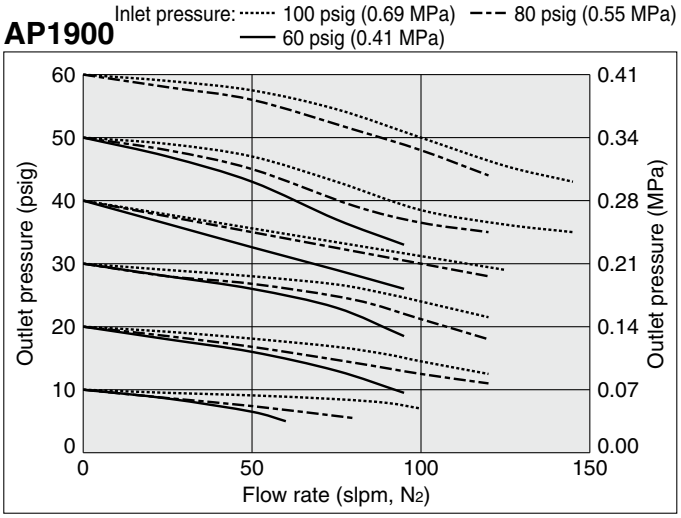
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

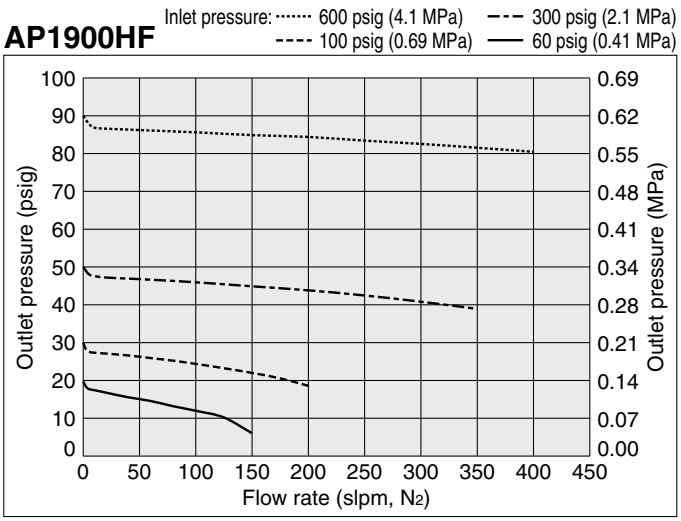
AP1900



AP1900



AP1900HF



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | Intermediate flow (Tied-diaphragm)

AP1400T Series

- 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
- Ni-Cr-Mo alloy internals standard
- Sub-atmospheric pressure delivery option
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

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	1 to 60 psig (0.007 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	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316L SS
SH				Ni-Cr-Mo alloy

Surface finish

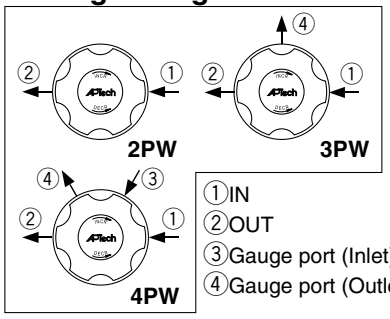
Code	Surface finish Ra max
No code	15 µin. (0.4 µm) Standard
M	10 µin. (0.25 µm)
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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
	4PW FV4	FV4	0	0	

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

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

*6) Bonnet port is not threaded. Panel mounting hole: 1.56 inch (39.6 mm).
*7) SC option is not available with H1402TA and HR option.

Option

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

*5) Not available with AP1402T and AP1406T.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *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 (-88 kPa to 0.2 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) *2)				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s *3)				
Across the seat leak		4×10^{-9} Pa·m³/s *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)				
Weight		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) -10 to 90°C for Polyimide 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) Weight, 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)	

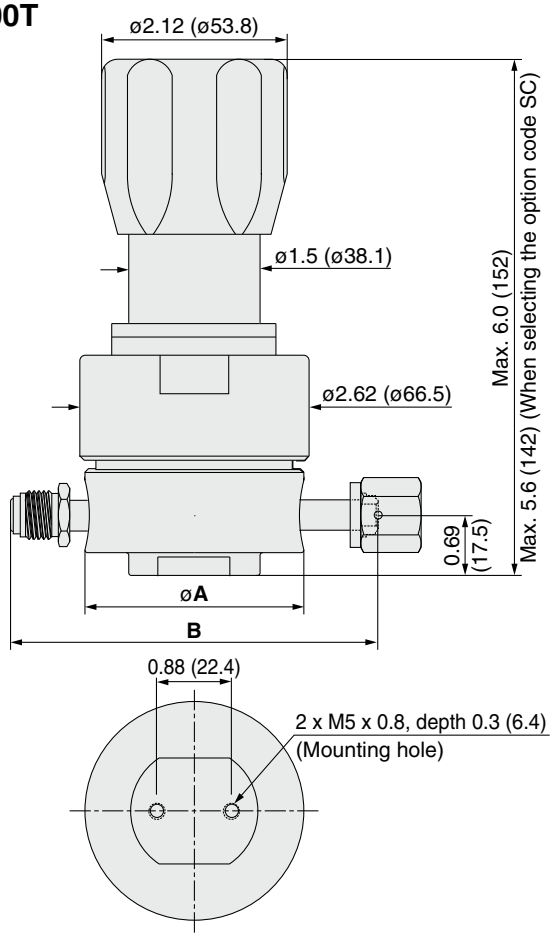
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	Ni-Cr-Mo alloy	
Diaphragm	Ni-Cr-Mo alloy	
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AP1400T

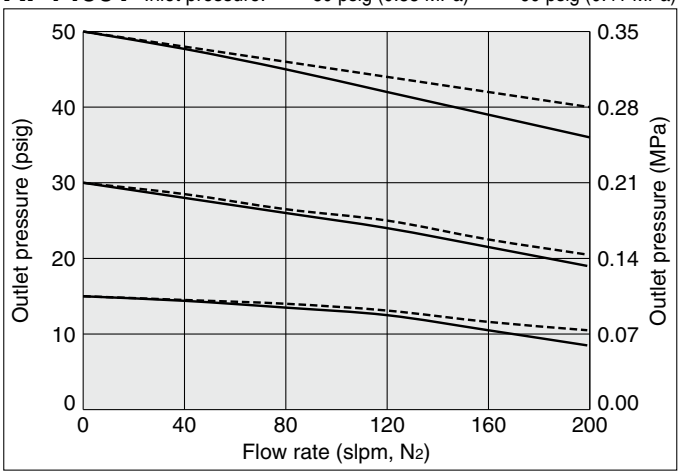


Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6				
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)

Flow Rate Characteristics

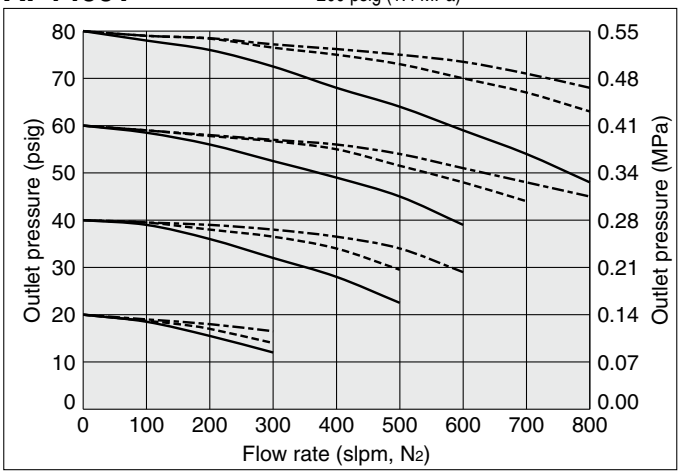
AP1400T

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



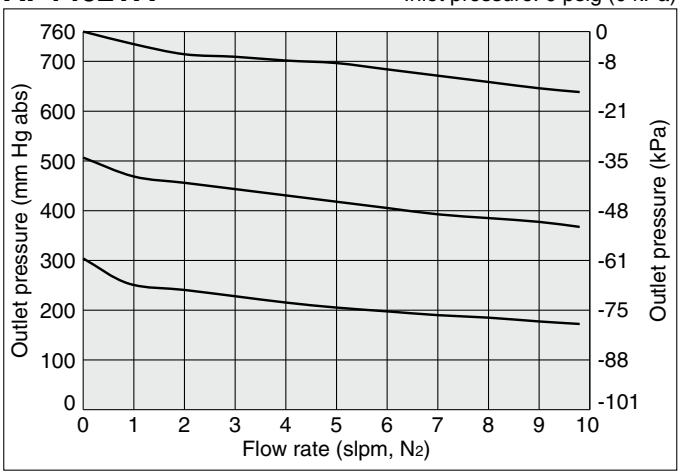
AP1400T

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



AP1402TA

Inlet pressure: 0 psig (0 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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

AP1200 Series

- 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
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

AP12 02 S □ 2PW FV8 FV8 □ □ □ □ □ □ □

Port Number: ① ② ③ ④

Delivery pressure

Code	Delivery pressure
02	1 to 30 psig (0.007 to 0.2 MPa)
06	1 to 60 psig (0.007 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	Ni-Cr-Mo alloy	316L SS
SHP		Ni-Cr-Mo alloy		Ni-Cr-Mo alloy
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) ∗1)
MV12	3/4 inch face seal (Male) ∗1)
TW12	3/4 inch tube weld

∗1) Prepare a suitable mating fitting with a rated pressure.

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.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO ∗10)

∗10) Not available with AP1225.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗8)
SC	Short type ∗9)

∗8) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

∗9) SC option is not available with FC or HR option.

Option

Code	Specification
No code	Standard
HF	High flow ∗7)
FC	Force compensation ∗5)∗7)
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) ∗6)∗7)

∗5) FC option is only available with connection size 1/2 or 3/4 inch, but not available with AP1202, AP1206 and AP1225.

∗6) HR option is not available with AP1202 and AP1206.

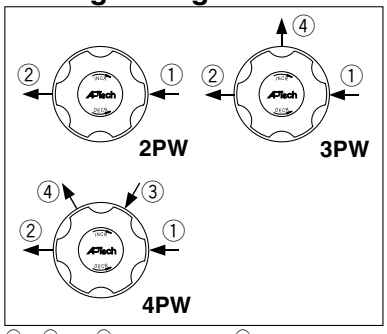
∗7) Options "HF," "FC," and "HR" cannot be used in combination.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

∗4) Not available with SHP and SH materials.

Porting Configuration



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

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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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
	4PW	FV8	FV8	0	0	

Specifications

Operating Parameters		AP1202	AP1206	AP1210	AP1215	AP1225
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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)	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	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) ∗3)				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s ∗4)				
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)				
Weight		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.

∗3) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

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	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)	
	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	

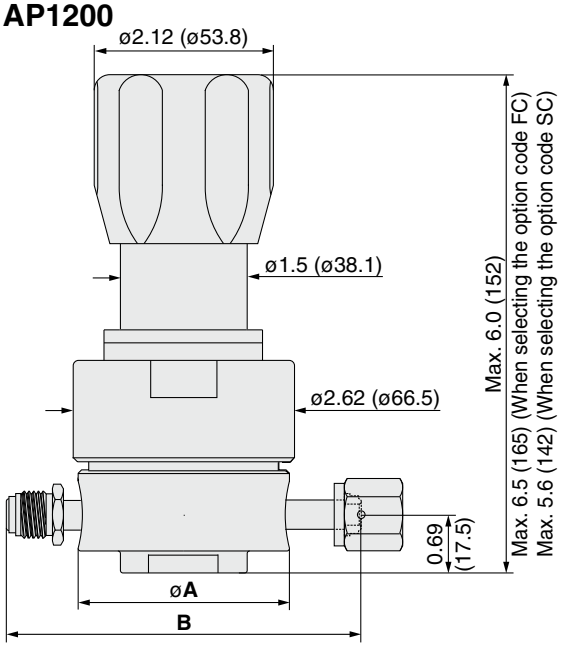
3. High inlet pressure
Changes from the standard type are:

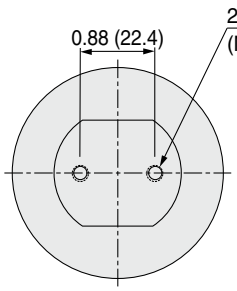
Option	Other Parameters	AP1210	AP1215
HR	Source pressure	Vacuum to 3000 psig (20.7 MPa)	

Dimensions

inch (mm)

AP1200





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)
FV12			6.26	(159.0)
MV12				
TW12			5.00	(127.0)

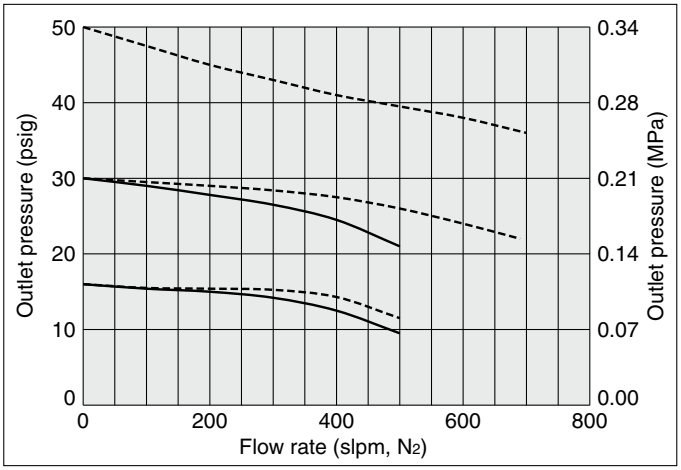
Wetted Parts Material

Wetted Parts	S	SHP	SH
Body	316L SS secondary remelt		
Surface finish	Electropolish + Passivation		
Poppet	316L SS	Ni-Cr-Mo alloy	
Diaphragm	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE	

Flow Rate Characteristics

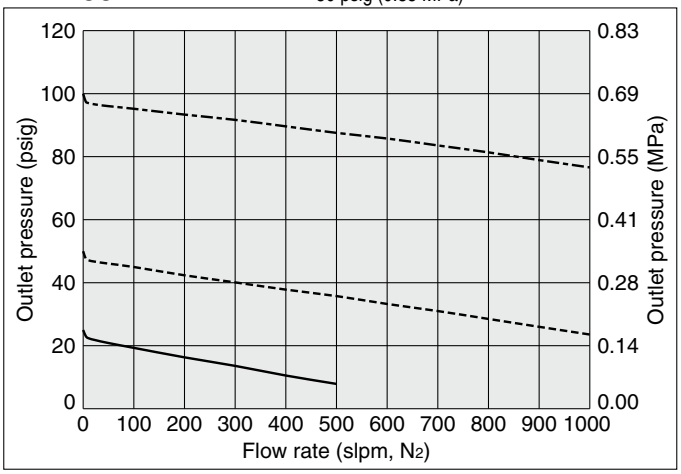
AP1200

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



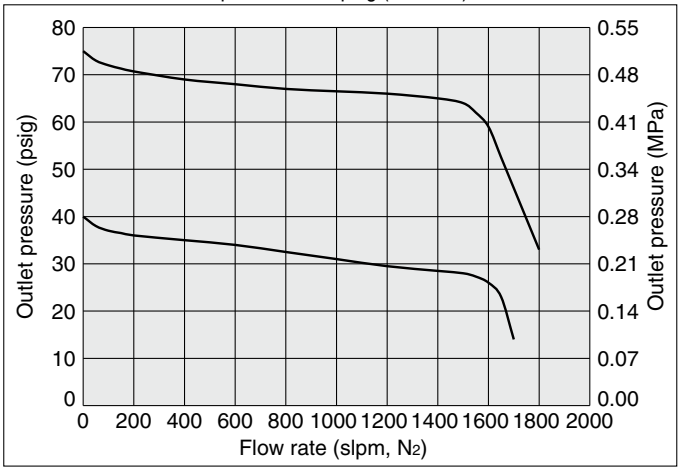
AP1200HF

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 *)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | High flow

AP1300 Series

- **For UHP gas delivery**
- **Flow capacity to 1000 slpm**
- **Body material: 316L SS secondary remelt**
- **Inlet pressure: Max. 300 psig (2.1 MPa)**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③

AP13 [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)

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

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	Ni-Cr-Mo alloy	316L SS
SHP	secondary remelt	Ni-Cr-Mo alloy		

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

Gauge port (Inlet③)

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

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation∗4)
BP	Bonnet port (NPT 1/8 inch)

∗4) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

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

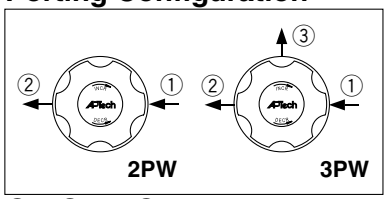
∗3) PTFE recommended for applications such as within a process tool.

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.

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	
AP1302S	2PW	FV8	FV8		
	3PW	FV8	FV8	0	
	3PW	FV8	FV8	V3	MPA

Specifications

Operating Parameters		AP1302	AP1306	AP1310	AP1315
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 300 psig (2.1 MPa)			
Proof pressure	**Inlet**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	1×10^{-10} Pa·m³/s ∗1)			
Across the seat leak		4×10^{-9} Pa·m³/s			
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		4.6 psig (0.031 MPa) delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		1.19 in³ (19.6 cm³)			
Weight		2.0 kg ∗2)			

∗1) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).

∗2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

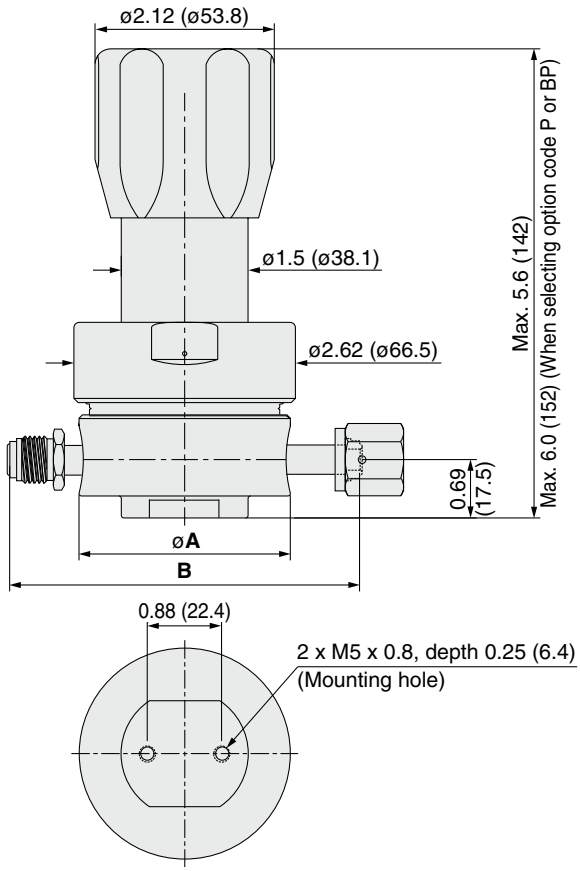
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy	
Nozzle	316L SS	
Seat	PCTFE (Option: PTFE)	

Dimensions

inch (mm)

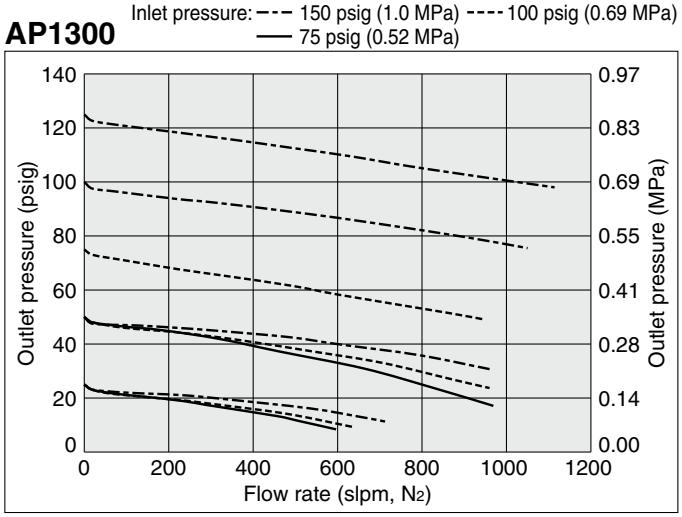
AP1300



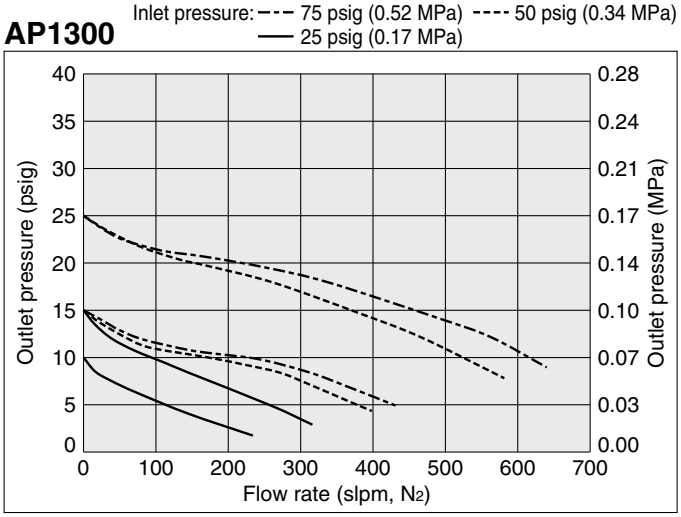
Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6				
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)
FV12			6.26	(159.0)
MV12				
TW12			5.00	(127.0)

Flow Rate Characteristics

AP1300



AP1300



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP9000 & 9100 Series

- 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

RoHS

How to Order (See p. 250 for ordering syntax)

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)	●	—

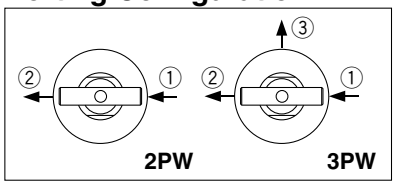
Material

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)

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

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

Sample Order Number

	Port ①	②	③		
AP9010S	2PW	FV16	FV16		
	3PW	FV16	FV16	H	MPA

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

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.139) for gauge specifications.
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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) (Source pressure 250 psig or less)∗5)
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)	
Proof pressure	Inlet	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	Inlet	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)			
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)			
Weight		5.9 kg ∗4)			

∗1) At 800 psig (5.5 MPa) inlet pressure.
∗2) -10 to 90°C for Polyimide seat.
∗3) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).
∗4) Weight, including individual boxed weight, may vary depending on connections or options.
∗5) Source pressure above 250 psig (1.7 MPa) decreases maximum delivery pressure to less than 150 psig (1 MPa) due to supply pressure effect. When the source pressure is 800 psig (5.5 MPa), achievable delivery pressure is around 119 psig (0.82 MPa).

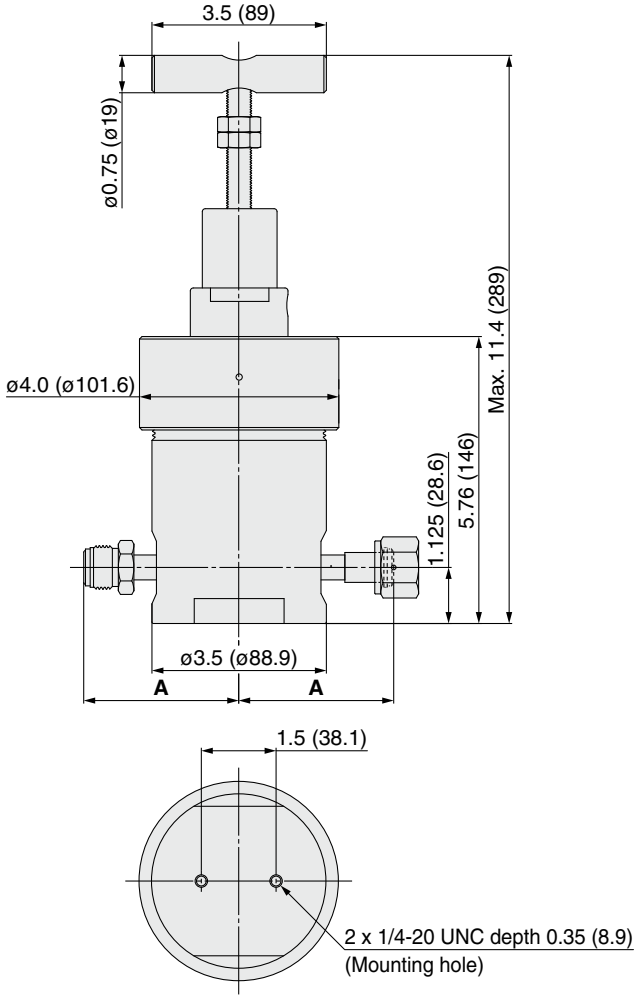
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Bellows	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)
Poppet spring	Ni-Co alloy
Bonnet seal	316 SS

Dimensions

inch (mm)

AP9000/9100

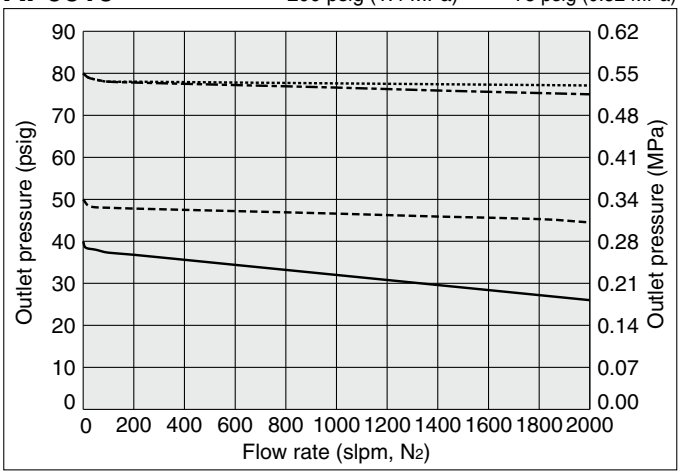


Connections	A	
	inch	(mm)
FV8	3.11	(79.0)
MV8		
TW8	4.75	(120.7)
FV12	3.64	(92.5)
MV12		
TW12	4.75	(120.7)
FV16	3.92	(99.6)
MV16		
TW16	4.75	(120.7)

Flow Rate Characteristics

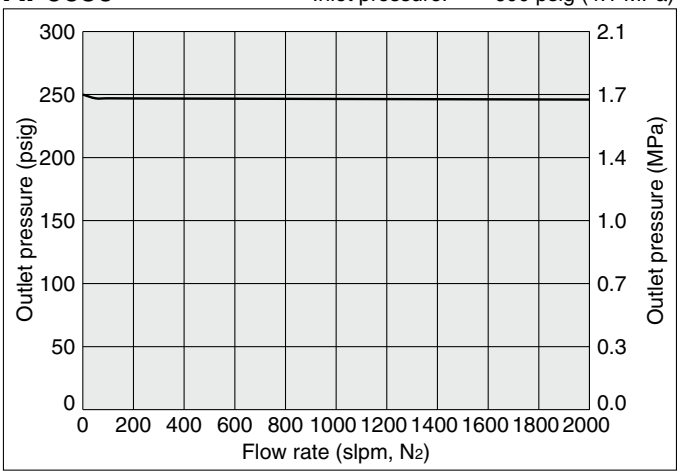
AP9010

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



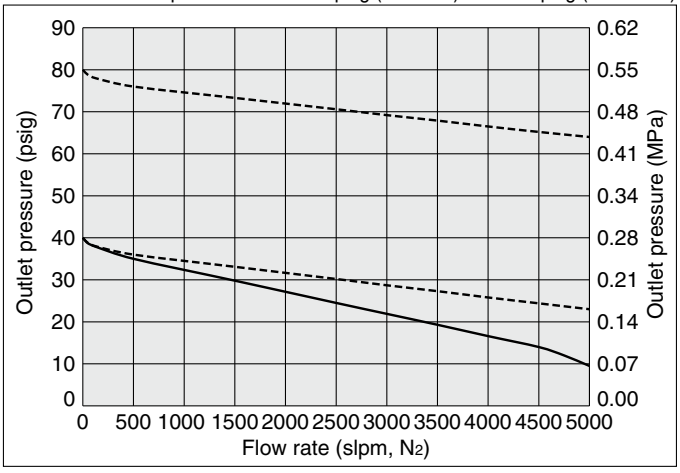
AP9030

Inlet pressure: —— 600 psig (4.1 MPa)



AP9110

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

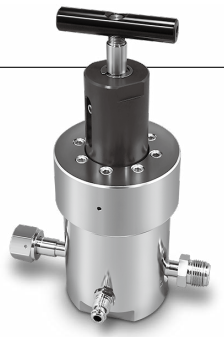


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Bulk gas delivery, High inlet pressure

AP9000VSHR Series



- **For UHP gas delivery**
- **High inlet pressure type VSHR: Max. 3000 psig (20.7 MPa)**
- **Flow capacity: to 4000 slpm**
- **Body material: 316L SS**
- **Tied-diaphragm design**

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③

AP90 [10] [S] [ ] [2PW] [FV12] [FV12] [ ] [ ] [VS] [HR]

Option

Code	Specification
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa))

Delivery pressure

Code	Delivery pressure
10	5 to 100 psig (0.034 to 0.7 MPa)
30	Preset to 300 psig (2.1 MPa)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports

Seat material

Code	Material
VS	Polyimide

Material

Code	Material
S	316L SS

Surface finish

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

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) ∗1)
MV12	3/4 inch face seal (Male) ∗1)
TW12	3/4 inch tube weld

∗1) Prepare a suitable mating fitting with a rated pressure.

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

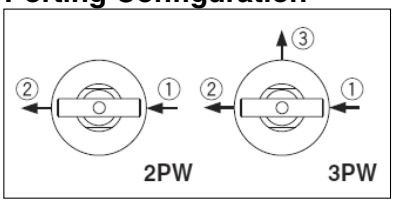
∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Gauge port (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)	
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

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

Sample Order Number

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

Specifications

Operating Parameters		AP9010VSHR	AP9030VSHR
Delivery pressure		5 to 100 psig (0.034 to 0.7 MPa)	Preset to 300 psig (2.1 MPa) ∗1)
Gas		Select compatible materials of construction for the gas	
Source pressure		Vacuum to 3000 psig (20.7 MPa)	
Proof pressure	**Inlet**	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
Burst pressure	**Inlet**	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
Ambient and operating temperature		-29 to 100°C (No freezing)	
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s	
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)	
Across the seat leak		4×10^{-9} Pa·m³/s ∗2)	
Surface finish		Ra max 15 µin (0.4 µm) Option: 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	
Internal volume		12 in³ (197 cm³)	
Weight		5.9 kg ∗3)	

∗1) At 800 psig (5.5 MPa) inlet pressure.
∗2) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).
∗3) Weight, including individual boxed weight, may vary depending on connections or options.

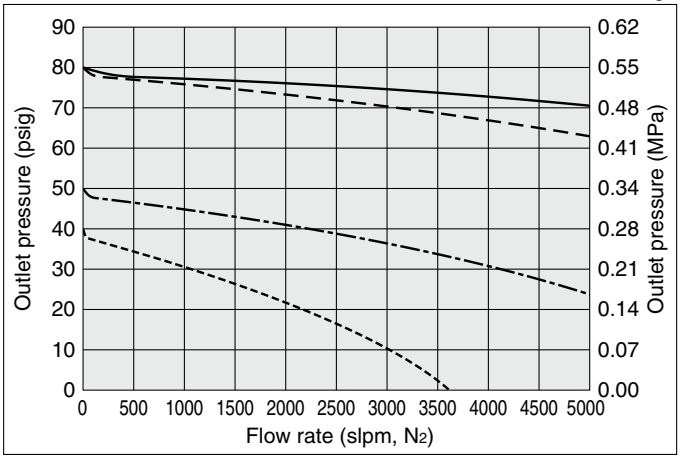
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Bellows	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	Polyimide
Poppet spring	Ni-Co alloy
Bonnet seal	316 SS

Flow Rate Characteristics

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

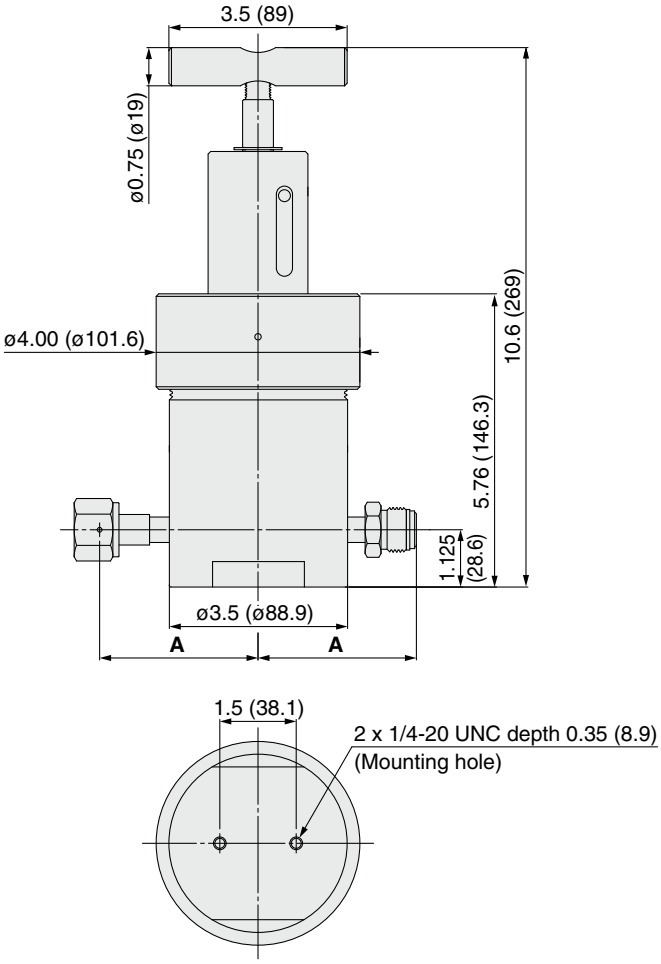
AP9000 VS HR with 3/4 Inch Fittings



Dimensions

inch (mm)

AP9000VSHR



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)

Two Stage Regulator for Ultra High Purity

Low flow (Tied-diaphragm)

AP1700 Series

- **For UHP gas delivery**
- **High inlet pressure type Standard: Max. 3500 psig (24.1 MPa), HR (option): Max. 4500 psig (31 MPa)**
- **Body material: 316L SS secondary remelt**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Minimizes supply pressure effect by two stage regulation**
- **Tied-diaphragm design**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

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)
20	5 to 200 psig (0.035 to 1.4 MPa) ∗1)

∗1) When AP1720 is selected, selecting option "NT" is required.

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	316L SS	316L SS
SH	secondary remelt	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

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

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 (MP port③, Inlet④, Outlet⑤)

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
50	0 to 5000 psig	(not applied)

∗2) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator. Select a range higher than 1.59 MPa for the pressure gauge to be mounted to the MP port.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

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

∗6) Bonnet port is not threaded. Panel mounting hole: dia.1.56 inch (39.6 mm).

∗7) SC option is not available with HR option.

Option

Code	Specification
No code	Standard
HF	High flow
HR	High inlet pressure (Max. inlet pressure 4500 psig (31 MPa)) ∗5)
HRHF	High inlet pressure + High flow ∗5)

∗5) The connection is a 1/4 inch face seal.

Poppet feature option

Code	Feature
No code	Standard (First and second stage tied diaphragm)
NT	First stage tied, second stage free poppet

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

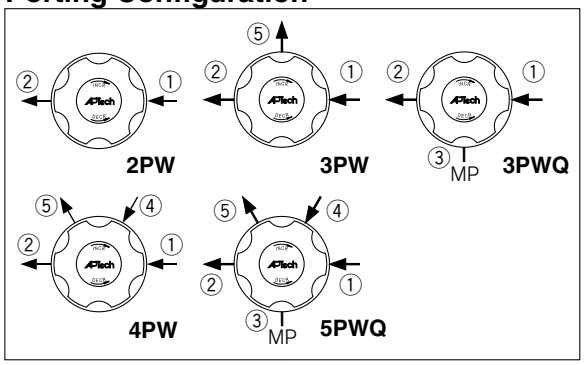
∗4) Not available with SH material.

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.

Porting Configuration



①IN ②OUT
③MP = Monitoring gauge port
④Gauge port (Inlet)
⑤Gauge port (Outlet)

Sample Order Number

Port	①	②	③	④	⑤	
AP1702S 2PW	FV4	FV4				
3PW	FV4	FV4			0	
3PWQ	FV4	FV4	4			MPA
4PW	FV4	FV4		0	0	
5PWQ	FV4	FV4	0	40	V3	MPA

Specifications

Operating Parameters		AP1702	AP1706	AP1710	AP1720
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 200 psig (0.035 to 1.4 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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗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 (15.1 cm³)			
Weight		2.04 kg ∗5)			

∗1) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

Option

High inlet pressure
Changes from the standard type are:

Option	Other Parameters	AP1702	AP1706	AP1710	AP1720
HR	**Source pressure**	Vacuum to 4500 psig (31 MPa)			

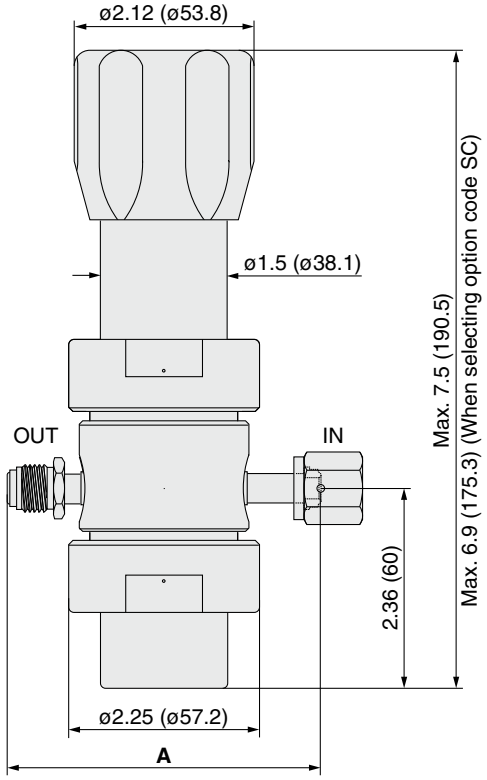
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AP1700

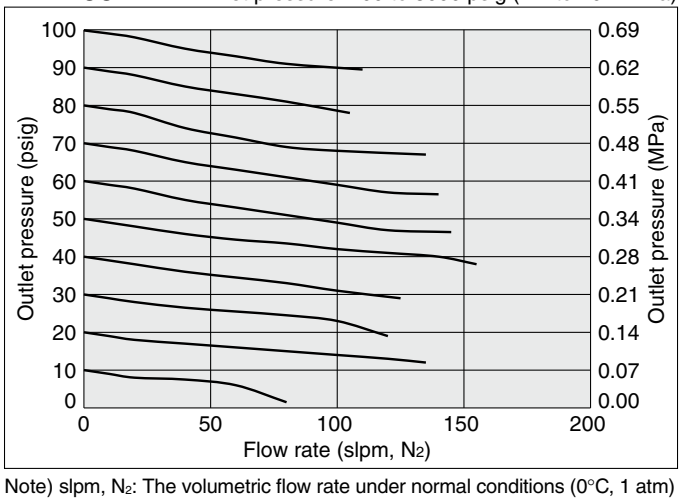


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

AP1700

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

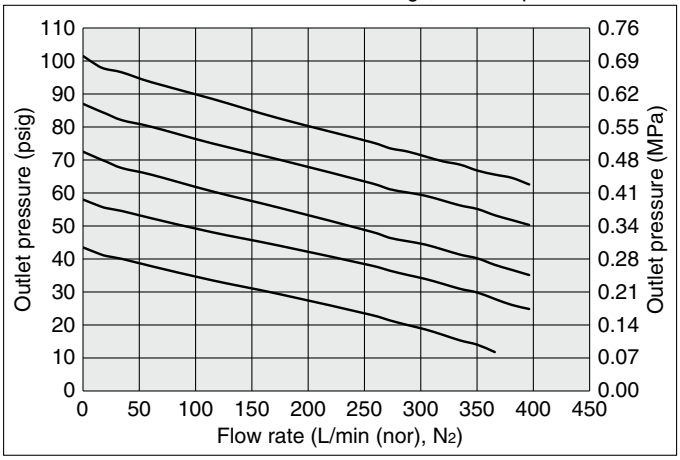


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP1710∗HF

Inlet pressure: —— 220 psig (1.5 MPa)

with 1/4 Inch Fittings, Gas temperature is 21°C



Two Stage Regulator for Ultra High Purity

Intermediate flow (Tied-diaphragm)

AP2700 Series

- 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
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Minimizes supply pressure effect by two stage regulation
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

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	316L SS/ Ni-Cr-Mo alloy	316L SS
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Ports

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

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

Gauge port (MP port③, Inlet④, Outlet⑤)

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

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

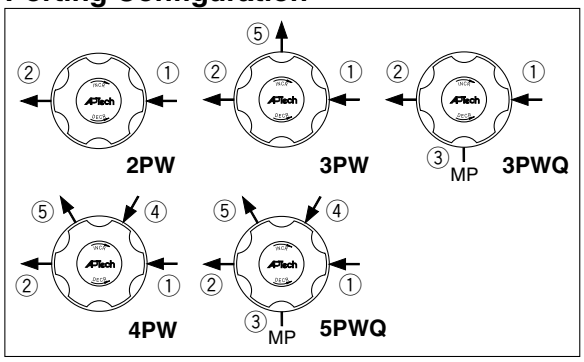
∗3) Not available with SH material.

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 ③MP = Monitoring gauge port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④	⑤	
AP2702S	2PW	FV4	FV4				
	3PW	FV4	FV4			0	
	3PWQ	FV4	FV4	4			MPA
	4PW	FV4	FV4		0	0	
	5PWQ	FV4	FV4	0	40	V3	MPA

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator. Select a range higher than 1.59 MPa for the pressure gauge to be mounted to the MP port.

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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗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)			
Weight		2.27 kg ∗5)			

∗1) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

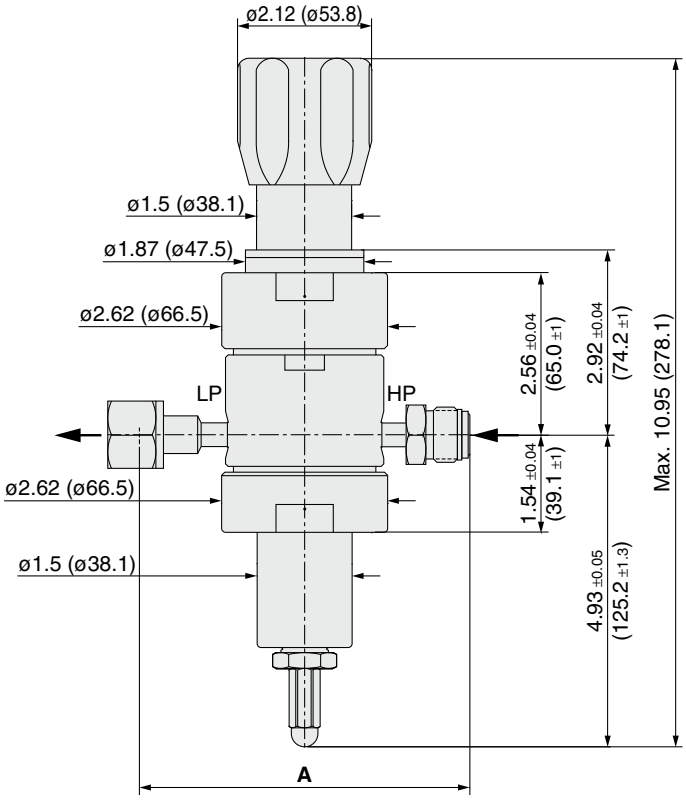
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS/Ni-Cr-Mo alloy	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AP2700

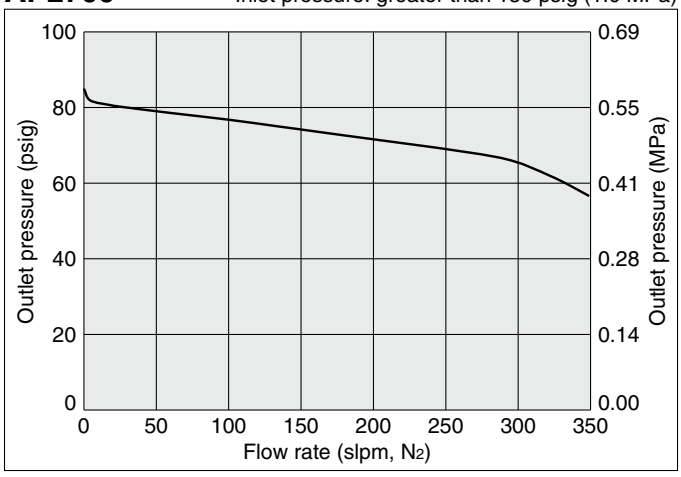


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)

Flow Rate Characteristics

AP2700

Inlet pressure: greater than 150 psig (1.0 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP10PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS secondary remelt**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AP10 PA S 2PW FV4 FV4

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy
SH				
H	Ni-Cr-Mo alloy			

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
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.139) for gauge specifications.
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HF	High flow ∗6)

∗6) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

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

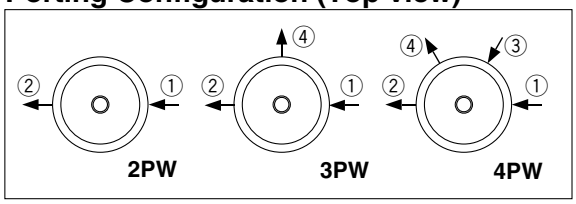
∗3) Not available with SHP, SH, H materials.
∗4) Source pressure rating is limited to 300 psig (2.1 MPa) or less.
∗5) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

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 (Top view)



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

Specifications

Operating Parameters		AP10PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 3500 psig (24.1 MPa) ∗1)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)
Across the seat leak		4×10^{-9} Pa·m³/s ∗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
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.49 in³ (8 cm³)

∗1) Max. 300 psig (2.1 MPa) for PTFE seat.
∗2) -10 to 90°C for Polyimide seat.
∗3) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗4) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

Option

High flow

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

Option	Other Parameters	AP10PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

∗) HF option will not achieve rated outlet pressure at all inlet pressures.

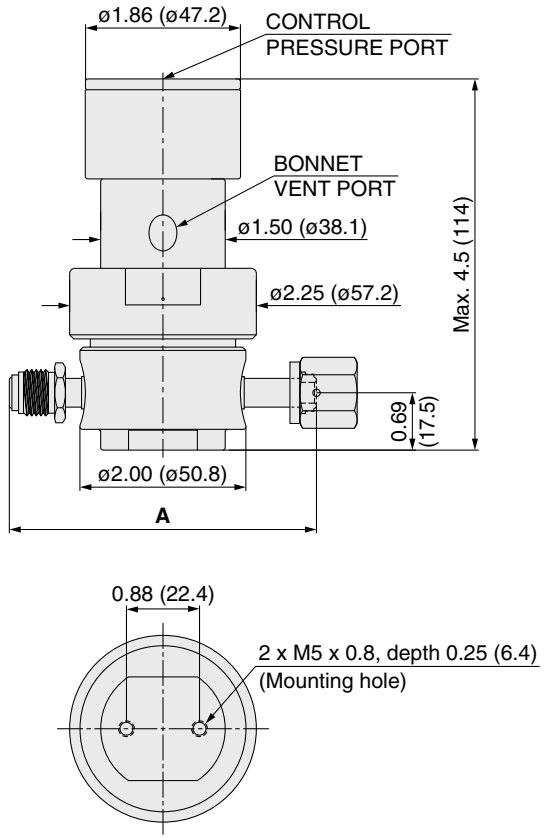
Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Ni-Cr-Mo alloy		
Diaphragm	316L SS	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy	
Seat	PCTFE (Option: Polyimide, PTFE)	PCTFE (Option: PTFE)		

Dimensions

inch (mm)

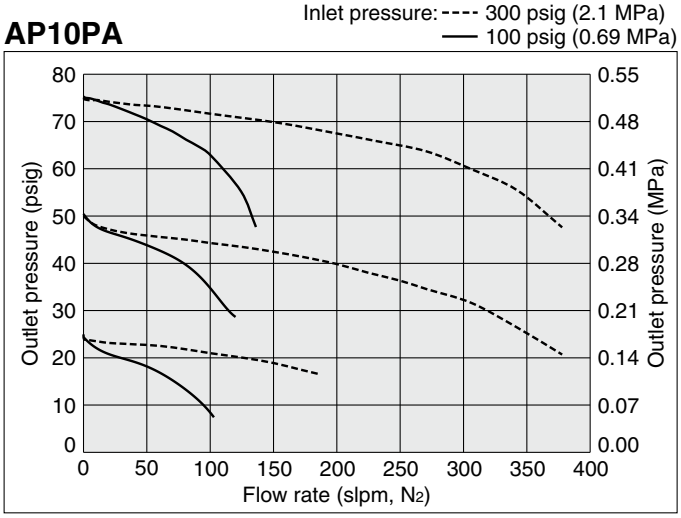
AP10PA



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 Rate Characteristics

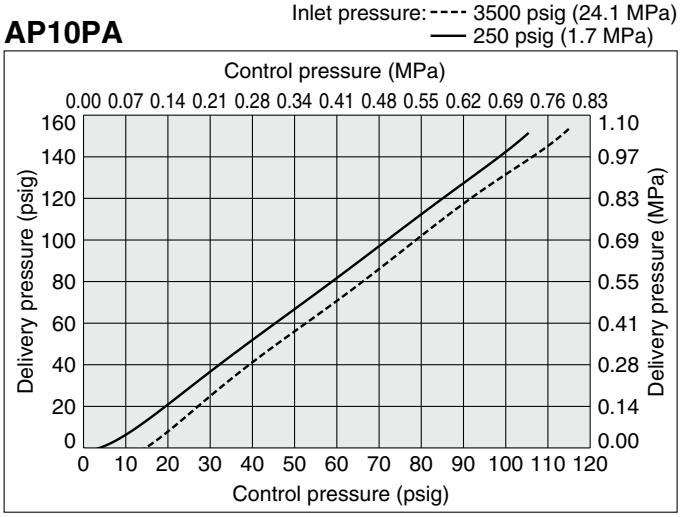
AP10PA



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input/Output Characteristics

AP10PA



Pneumatic Actuation Pressure Regulator

Low flow (Tied-diaphragm)

AP15PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS secondary remelt**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 800 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number: ① ② ③ ④

AP15 PA S □ 2PW FV4 FV4 □ □ □ □

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy
SH				
H	Ni-Cr-Mo alloy			

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
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

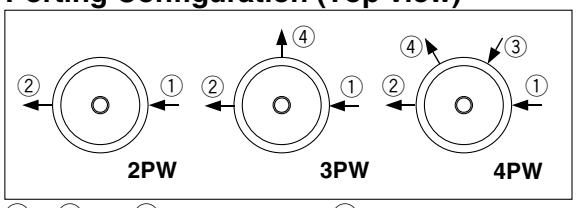
∗3) Not available with SHP, SH, H materials.

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 (Top view)



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

Specifications

Operating Parameters		AP15PA
Delivery pressure		7 to 150 psig (0.05 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**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)
Across the seat leak		4×10^{-9} Pa·m³/s ∗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
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.51 in³ (8.4 cm³)

∗1) -10 to 90°C for Polyimide seat.

∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

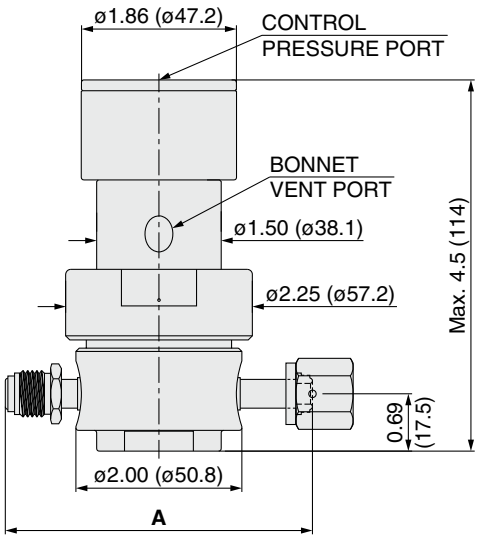
Wetted Parts Material

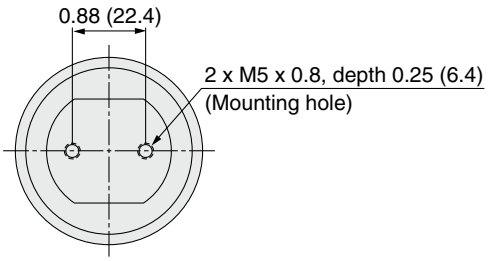
Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation			Electropolish
Poppet	316L SS	Ni-Cr-Mo alloy		
Diaphragm	316L SS	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE		

Dimensions

inch (mm)

AP15PA

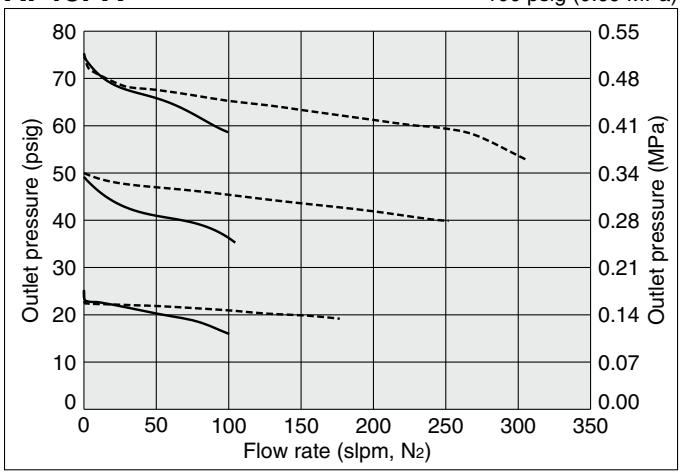




Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

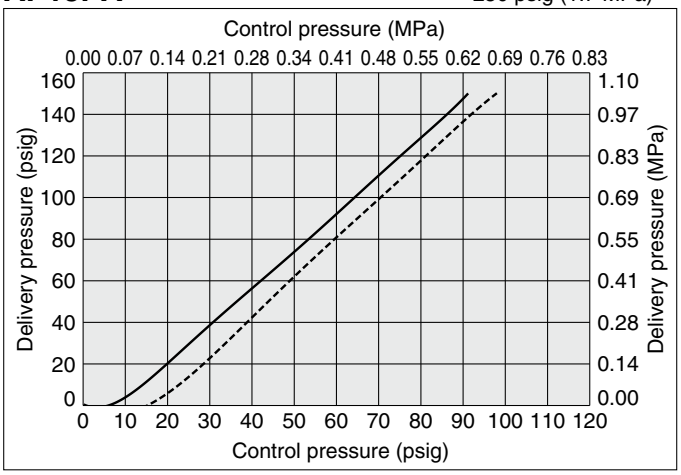
AP15PA



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

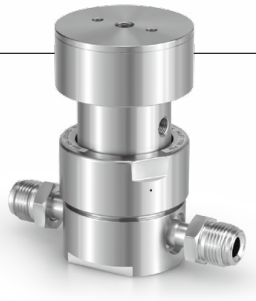
AP15PA



Pneumatic Actuation Pressure Regulator

Intermediate flow (Tied-diaphragm)

AP14PAT Series



- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS secondary remelt**
- **High inlet pressure type Standard: Max. 2300 psig (15.9 MPa)**
  HR (option): Max. 3000 psig (20.7 MPa)
- **Flow capacity: to 400 slpm**
- **Ni-Cr-Mo alloy internals standard**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AP14 PA T S □ □ 2PW FV4 FV4 □ □ □ □ □

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)
	Sub-atmospheric (A): 100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316L SS
SH				Ni-Cr-Mo alloy

Range options

Code	Specification
No code	Standard
A	Sub-atmospheric

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
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.139) for gauge specifications.
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HR	High inlet pressure ∗4) (Max. inlet pressure 3000 psig (20.7 MPa))

∗4) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

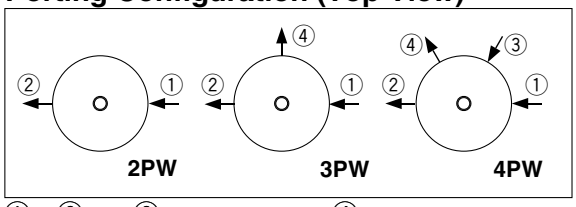
∗3) Not available with SH material.

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 (Top View)



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

Specifications

Operating Parameters		AP14PAT□A	AP14PAT
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	7 to 150 psig (0.05 to 1.0 MPa)
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	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
Burst pressure	Inlet	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
Maximum control pressure		150 psig (1.0 MPa)	
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)	
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s	
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)	
Across the seat leak		4×10^{-9} Pa·m³/s ∗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	
Control pressure port		NPT 1/8 inch	
Bonnet port		NPT 1/8 inch	
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	
Internal volume		1.06 in³ (17.4 cm³)	

∗1) -10 to 90°C for Polyimide seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

SMC

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AP14PAT
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HR option will not achieve rated outlet pressure at all inlet pressures.

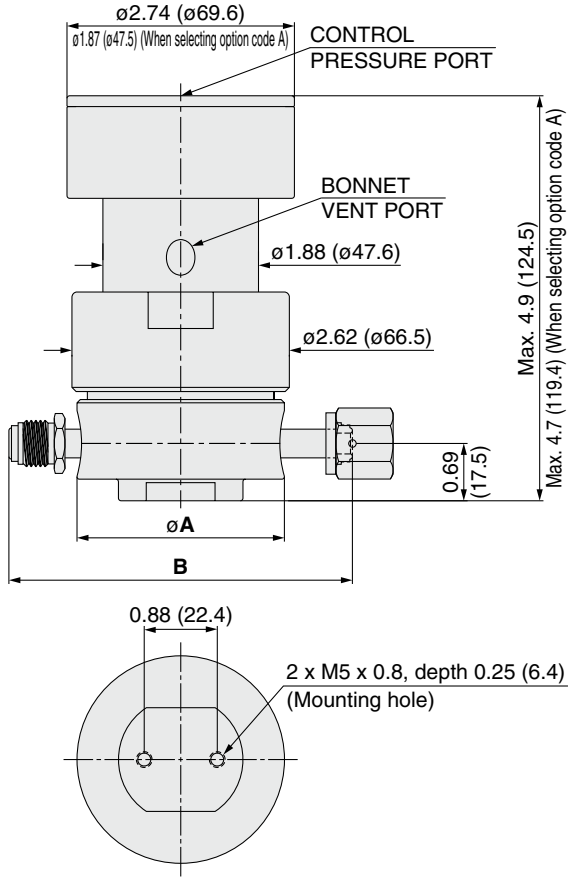
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	Ni-Cr-Mo alloy	
Diaphragm	Ni-Cr-Mo alloy	
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AP14PAT

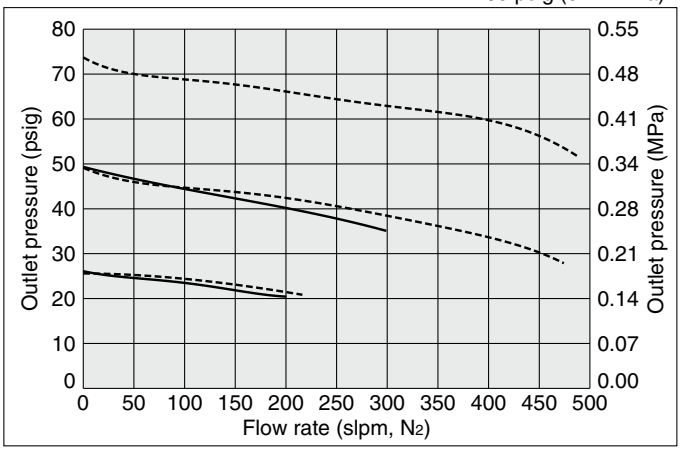


Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6				
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)

Flow Rate Characteristics

AP14PAT

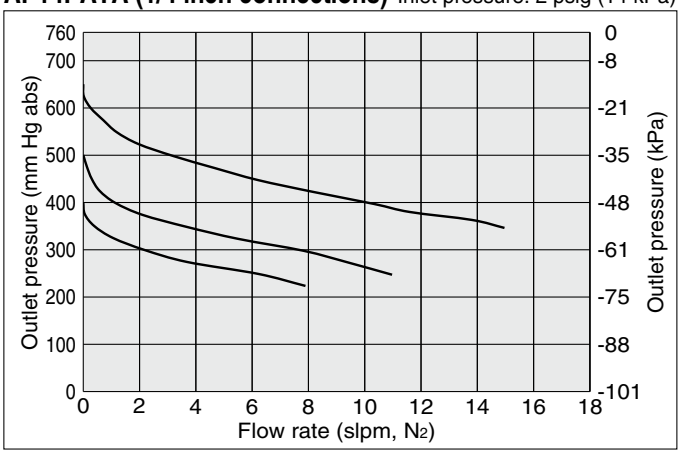
Inlet pressure: ---- 100 psig (0.69 MPa)
—— 60 psig (0.41 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP14PATA (1/4 inch connections)

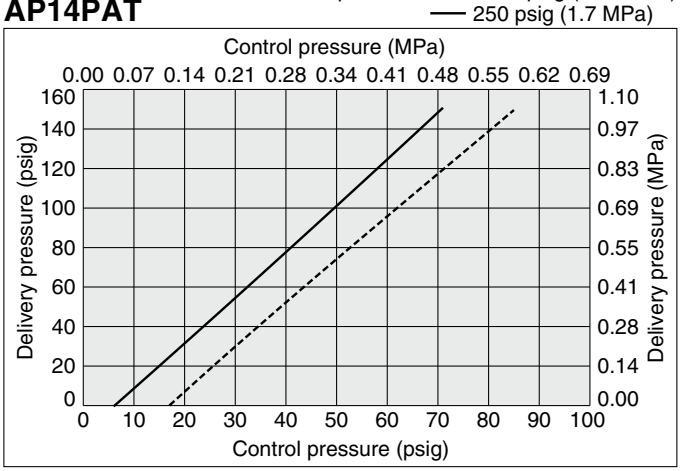
Inlet pressure: 2 psig (14 kPa)



Input / Output Characteristics

AP14PAT

Inlet pressure: ---- 2300 psig (15.9 MPa)
—— 250 psig (1.7 MPa)



Pneumatic Actuation Pressure Regulator

High flow (Tied-diaphragm)

AP12PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS secondary remelt**
- **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
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number: ① ② ③ ④

AP12 PA S [ ] 2PW FV8 FV8 [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS secondary remelt	316L SS	Ni-Cr-Mo alloy	316L SS
SHP		Ni-Cr-Mo alloy		Ni-Cr-Mo alloy
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) ∗1)
MV12	3/4 inch face seal (Male) ∗1)
TW12	3/4 inch tube weld

∗1) Prepare a suitable mating fitting with a rated pressure.

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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HF	High flow ∗5)∗6)
HR	High inlet pressure ∗5)∗6) (Max. inlet pressure 3000 psig (20.7 MPa))

∗5) Full outlet pressure rating may not be achieved at all inlet pressure.

∗6) Options "HF" and "HR" cannot be used in combination.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

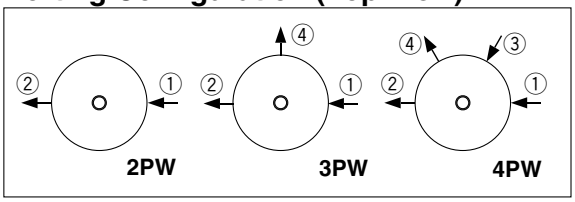
∗4) Not available with SHP and SH materials.

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.

Porting Configuration (Top View)



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

Specifications

Operating Parameters		AP12PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 1700 psig (11.7 MPa)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)
Across the seat leak		4×10^{-9} Pa·m³/s ∗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
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		1.20 in³ (19.6 cm³)

∗1) -10 to 90°C for Polyimide seat.

∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

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	AP12PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

2. High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AP12PA
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HF and HR option will not achieve rated outlet pressure at all inlet pressures.

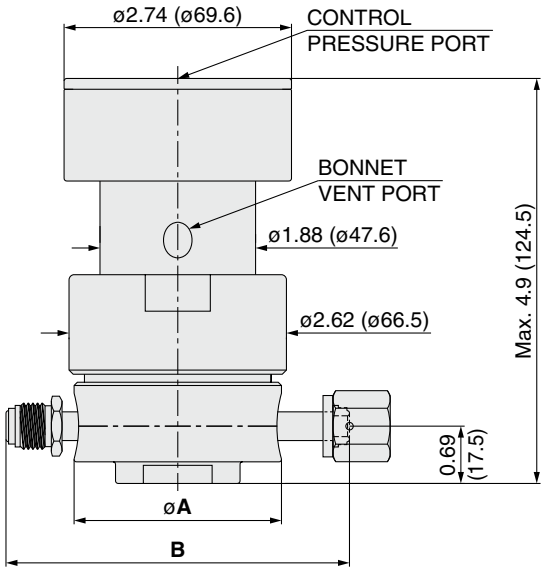
Wetted Parts Material

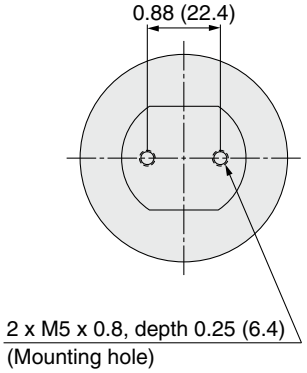
Wetted Parts	S	SHP	SH
Body	316L SS secondary remelt		
Surface finish	Electropolish + Passivation		
Poppet	316L SS	Ni-Cr-Mo alloy	
Diaphragm	Ni-Cr-Mo alloy		
Nozzle	316L SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE	

Dimensions

inch (mm)

AP12PA

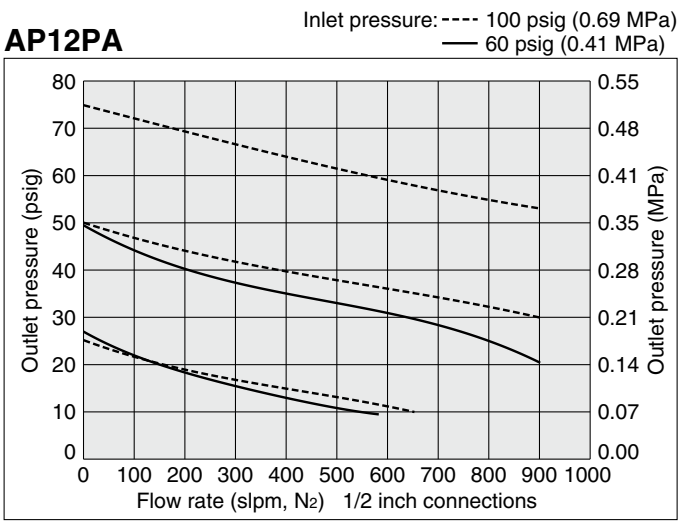




Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6				
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8				
TW8			4.34	(110.2)
FV12			6.26	(159.0)
MV12				
TW12			5.00	(127.0)

Flow Rate Characteristics

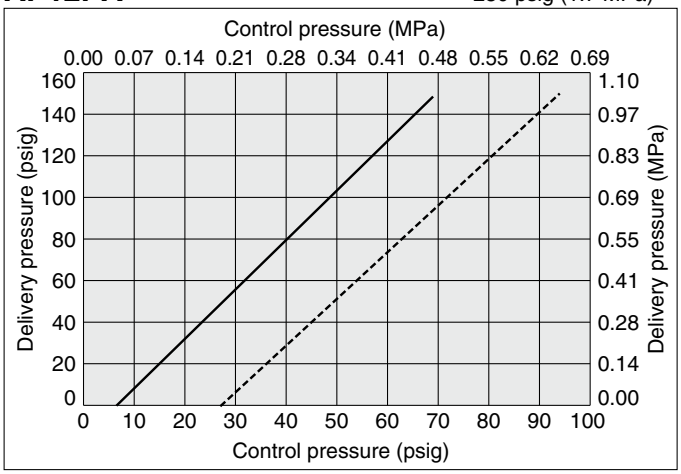
AP12PA



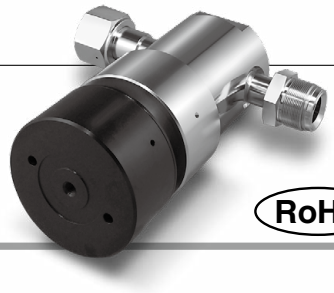
Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

AP12PA



AP90PA & 91PA Series



- Actuation control pressure isolated from process gas by two seals
- Body material: 316L SS
- Flow capacity: to 5000 slpm

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③

AP 90PA S □ 2PW FV16 FV16 □ □ □ □

Size and delivery pressure

Code	Cv	Delivery pressure
90PA	3	10 to 100 psig (0.07 to 0.7 MPa)
91PA	4	10 to 150 psig (0.07 to 1.0 MPa)

Material

Code	Material
S	316L SS

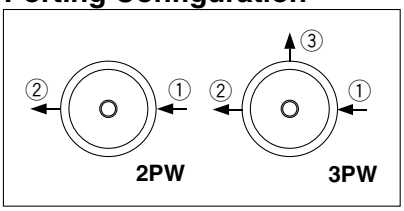
Surface finish

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

Ports

Code	Ports
2PW	2 ports
3PW	3 ports

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

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) ∗1)
MV12	3/4 inch face seal (Male) ∗1)
TW12	3/4 inch tube weld
FV16	1 inch face seal (Female) ∗1)
MV16	1 inch face seal (Male) ∗1)
TW16	1 inch tube weld

∗1) Prepare a suitable mating fitting with a rated pressure.

Gauge port (Inlet③)

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) Refer to gauge guide (P.139) for gauge specifications.

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 (Only for AP90PA)

Code	Specification
No code	Standard
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) ∗4)∗5)

∗4) When "HR" is selected, select seat material "VS."

∗5) Cannot be selected if connection "FV16," "MV16," or "TW16" is selected

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Specifications

Operating Parameters		AP90PA	AP91PA
Delivery pressure		10 to 100 psig (0.07 to 0.7 MPa) ∗1)	10 to 150 psig (0.07 to 1.0 MPa) ∗2)
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)
Proof pressure	**Inlet**	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
Burst pressure	**Inlet**	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
Maximum control pressure		150 psig (1.0 MPa)	
Ambient and operating temperature		-40 to 71°C (No freezing) ∗3)	
Leak rate	**Inboard leakage**	2 x 10^{-11} Pa·m³/s	
	Outboard leakage	2 x 10^{-10} Pa·m³/s	
Across the seat leak		4 x 10^{-9} Pa·m³/s	
Surface finish		Ra max 15 µin (0.4 µm) Option: 10 µin (0.25 µm)	
Connections		Face seal, Tube weld	
Control pressure port		NPT 1/8 inch	
Supply pressure effect		3.7 psig (0.025 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	5.4 psig (0.037 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
Installation		Bottom mount	
Internal volume		12 in³ (197 cm³)	
Weight		5.9 kg ∗4)	

∗1) If the high inlet pressure option is selected, the delivery pressure range is 0.05 to 0.7 MPa.

∗2) When using a delivery pressure of 0.7 MPa or more, use a source pressure of 1.7 MPa or less. When the source pressure is 800 psig (5.5 MPa), the maximum delivery pressure is around 119 psig (0.82 MPa).

∗3) -10 to 90°C for Polyimide seat.

∗4) Weight, including individual boxed weight, may vary depending on connections or options.

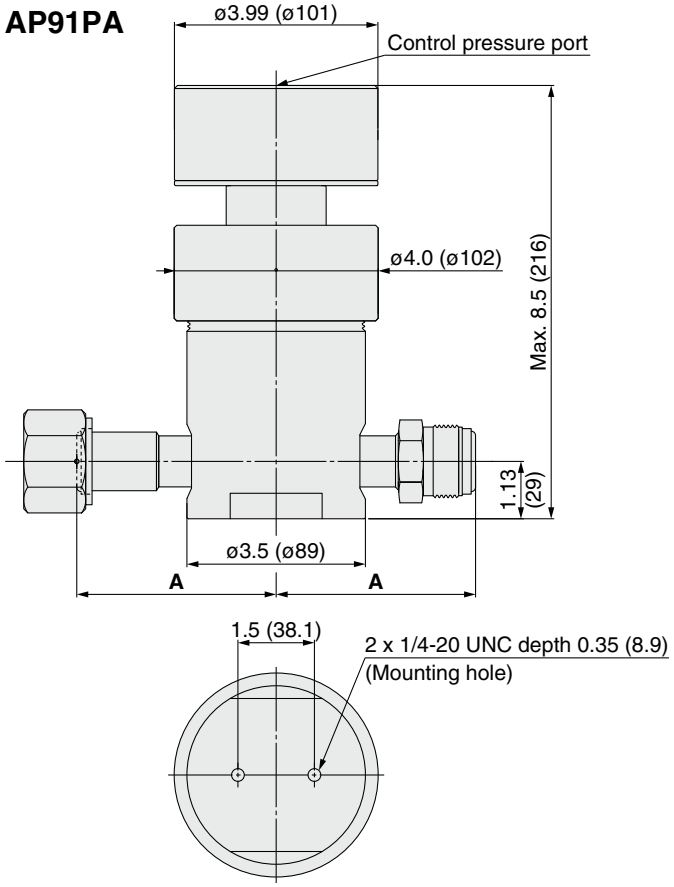
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Bellows	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)
Poppet spring	Ni-Co alloy
Bonnet seal	316 SS

Dimensions

inch (mm)

AP90PA
AP91PA



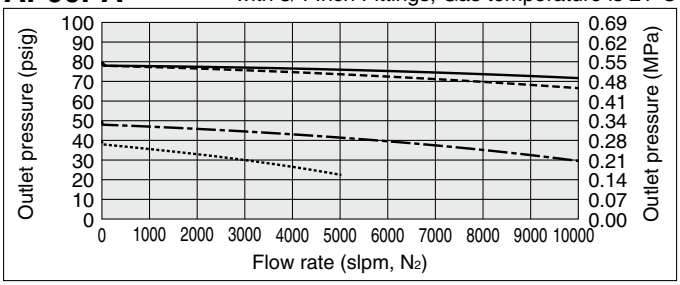
Connections	A	
	inch	(mm)
FV8	3.11	(78.9)
MV8		
TW8	4.75	(120.7)
FV12	3.64	(92.5)
MV12		
TW12	4.75	(120.7)
FV16	3.92	(99.6)
MV16		
TW16	4.75	(120.7)

Flow Rate Characteristics

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

AP90PA

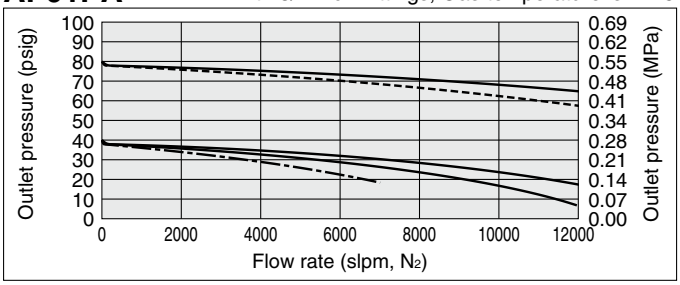
with 3/4 Inch Fittings, Gas temperature is 21°C



Inlet Pressure: —— 300 psig (2.1 MPa) ----- 150 psig (1 MPa) —·— 75 psig (0.52 MPa)

AP91PA

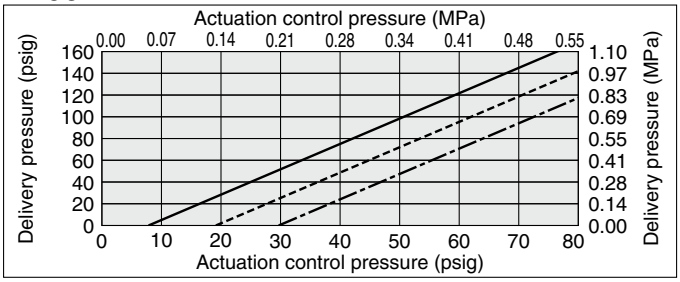
with 3/4 Inch Fittings, Gas temperature is 21°C



Input/Output Characteristics

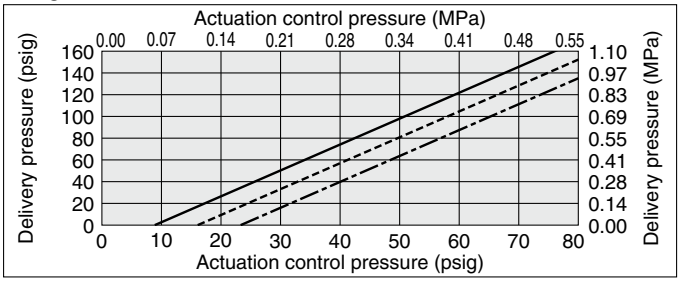
Inlet Pressure: —— 250 psig (1.7 MPa) ----- 1000 psig (6.9 MPa)
—·— 1700 psig (11.7 MPa)

AP90PA



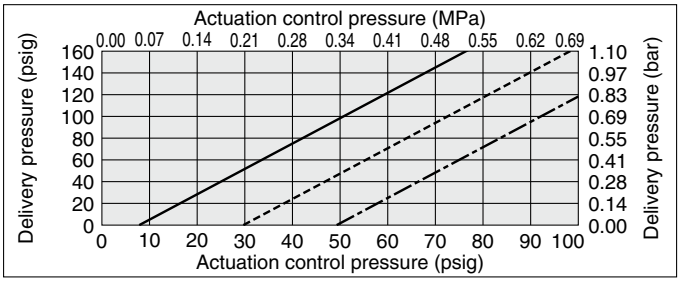
Inlet Pressure: —— 200 psig (1.4 MPa) ----- 500 psig (3.5 MPa)
—·— 800 psig (5.5 MPa)

AP91PA



Inlet Pressure: —— 250 psig (1.7 MPa) ----- 1700 psig (11.7 MPa)
—·— 3000 psig (20.7 MPa)

AP90PA HR



Single Stage Compact Regulator for Ultra High Purity

SL5200 Series

- **For UHP gas delivery**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 130 slpm
- **Body material: 316L SS secondary remelt**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Sub-atmospheric pressure delivery option**
- **Springless design (No poppet spring in the wetted area)**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③

SL52 [02] [S] [M] [ ] [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
S	316L SS secondary remelt	316L SS	316L SS
SH		Ni-Cr-Mo alloy	

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	Specification
No code	Standard
A	Sub-atmospheric

*1) Only available with SL5201.

Ports

Code	Ports
2PW	2 ports
3PW	3 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 (Outlet③)

Code	Connections or Pressure gauge *2)		
		psig/bar unit	MPa unit
No code	No gauge port		
0	No pressure gauge	1/4 inch face seal (Male)	
FV4		1/4 inch face seal (Female)	
V3	With pressure gauge	-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

*2) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *5)

*5) Panel hole 1.25 inch (31.8mm) diameter.

Option

Code	Specification
No code	Standard
HF	High flow

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *4)

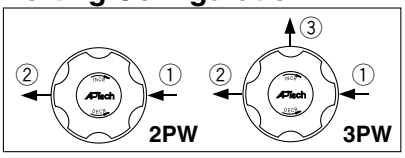
*4) Not available with SH material.

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.

Porting Configuration



①IN
②OUT
③Gauge port (Outlet)

Specifications

Operating Parameters		SL5201□□A	SL5201	SL5202	SL5206	SL5210
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	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) *1)				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s *2)				
Across the seat leak		4×10^{-9} Pa·m³/s *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		0.20 psig (0.0014 MPa) rise in delivery pressure per 20 psig (0.14 MPa) source pressure drop				
Installation		Bottom mount				
Internal volume		0.19 in³ (3.1 cm³)				
Weight		0.45 kg *3)				

*1) -10 to 90°C for Polyimide seat.

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

*3) Weight, 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	SL5201□□A	SL5201	SL5202	SL5206	SL5210
HF	**Supply pressure effect**	0.50 psig (0.0035 MPa) rise in delivery pressure per 20 psig (0.14 MPa) source pressure drop				

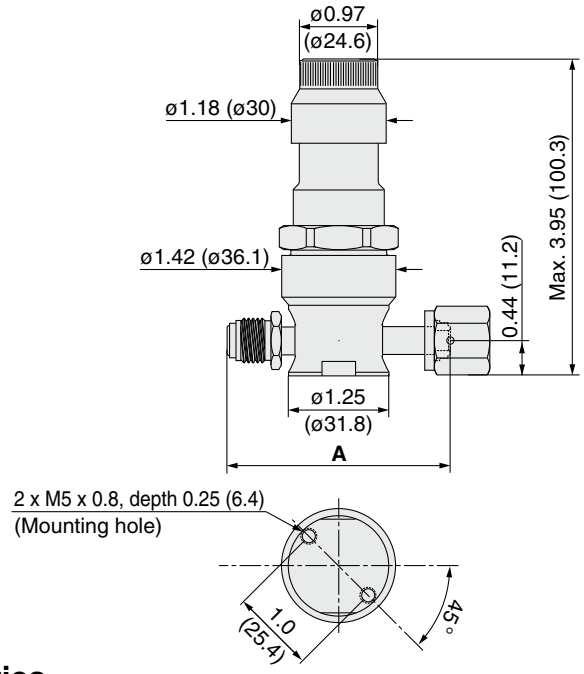
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

SL5200

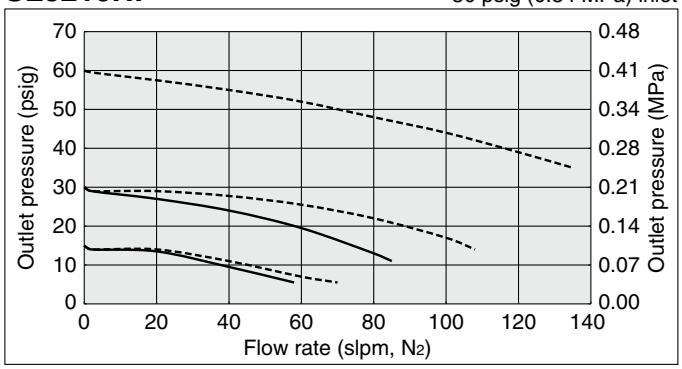


Connections	A	
	inch	(mm)
FV4	2.78	(70.6)
MV4		
TW4	2.12	(53.8)
FV6	3.86	(98.0)
MV6		
TW6	2.65	(67.3)

Flow Rate Characteristics

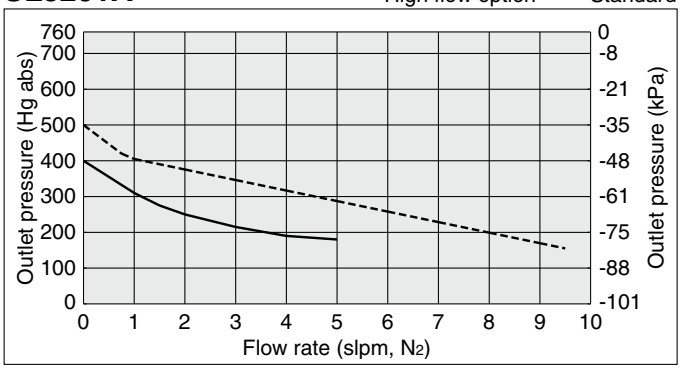
SL5210HF

Inlet pressure: ---- 100 psig (0.69 MPa) inlet
—— 50 psig (0.34 MPa) inlet



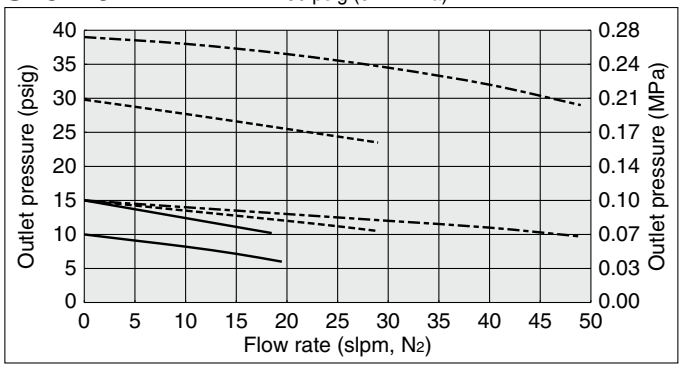
SL5201A

Inlet pressure: 2 psig (14 kPa)
---- High flow option —— Standard



SL5210

Inlet pressure: – – – 100 psig (0.69 MPa) ---- 60 psig (0.41 MPa)
—— 30 psig (0.21 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | Low flow

SL5500 Series

- 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
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Sub-atmospheric pressure delivery option
- Springless design (No poppet spring in the wetted area)

RoHS

How to Order (See p. 250 for ordering syntax)

SL55 [02] [S] [M] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

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	1 to 60 psig (0.007 to 0.4 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)

Material

Code	Body	Poppet	Diaphragm
S	316L SS secondary remelt	316L SS	316L SS
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra max
M	10 µin. (0.25 µm) Standard
V	7 µin. (0.18 µm)
X	5 µin. (0.13 µm)

Range options ∗1)

Code	Specification
No code	Standard
A	Sub-atmospheric

∗1) Only available with SL5502.

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 ∗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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗5)

∗5) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

∗4) Not available with SH material.

Pressure gauge unit ∗3)

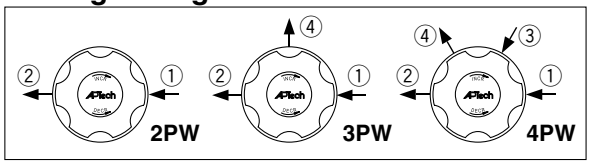
Code	Unit
No code	psig/bar
MPA	MPa

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

Sample Order Number

	Port	①	②	③	④	
SL5510S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	0	0	
	4PW	FV4	FV4	40	1	MPA

Porting Configuration



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

Specifications

Operating Parameters		SL5502□□A	SL5502	SL5506	SL5510
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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)			
Proof pressure	Inlet	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	Inlet	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)			
Surface finish		Ra max 10 µin. (0.25 µm) Option: 7 µin. (0.18 µm), 5 µin. (0.13 µm)			
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		0.55 in³ (9 cm³)			
Weight		1.63 kg ∗5)			

∗1) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

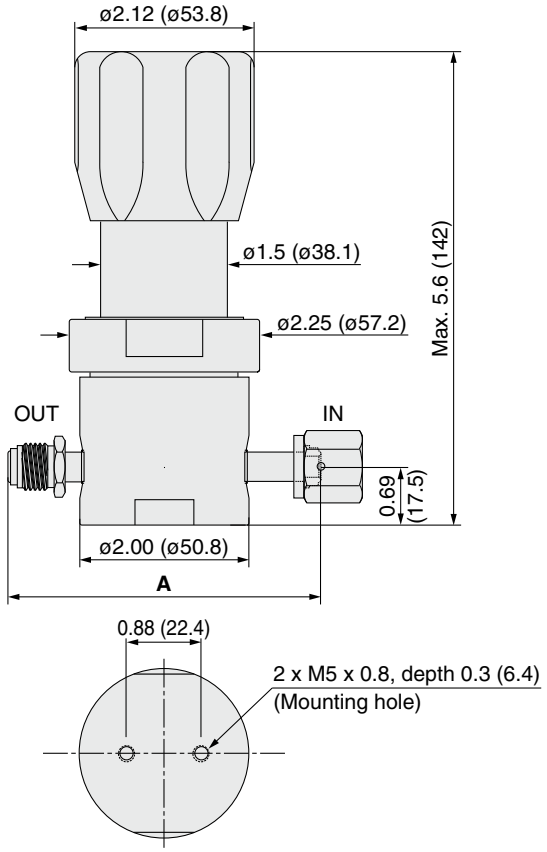
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

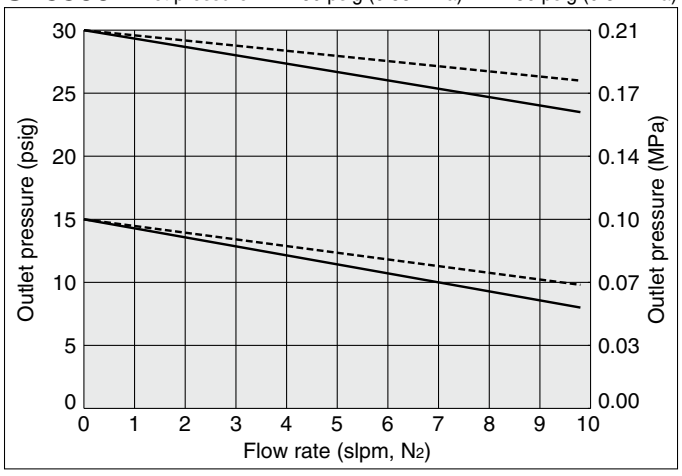
SL5500



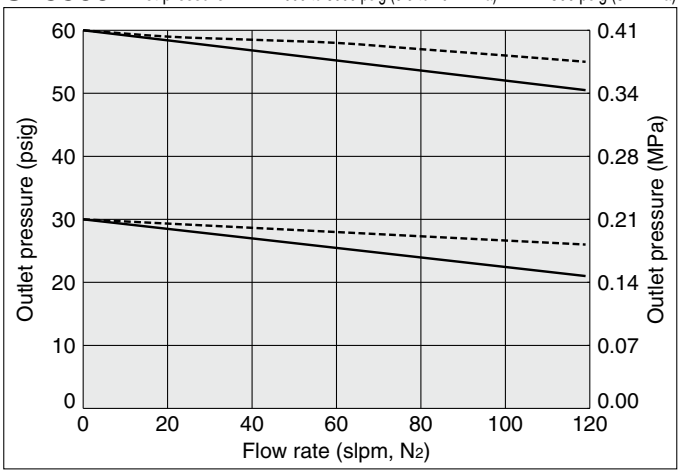
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

SL5500 Inlet pressure: ---- 80 psig (0.55 MPa) —— 50 psig (0.34 MPa)



SL5500 Inlet pressure: ---- 1000 to 3000 psig (6.9 to 20.7 MPa) —— 500 psig (3.4 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | Intermediate flow

SL5400 Series

- **For UHP gas delivery**
- **Body material: 316L SS secondary remelt**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Springless design (No poppet spring in the wetted area)**

RoHS

How to Order (See p. 250 for ordering syntax)

SL54 [02] [S] [M] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Delivery pressure

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

Material

Code	Body	Poppet	Diaphragm
S	316L SS secondary remelt	316L SS	316L SS
SH		Ni-Cr-Mo alloy	

Surface finish

Code	Surface finish Ra max
M	10 µin. (0.25 µm) Standard
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
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

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)

∗4) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

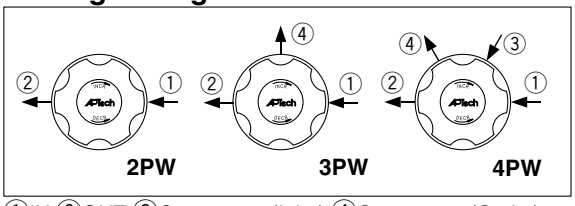
∗3) Not available with SH material.

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	
SL5410S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	0	0	

Specifications

Operating Parameters		SL5402	SL5406	SL5410
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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 1000 psig (6.9 MPa)		
Proof pressure	**Inlet**	1.5 times the maximum source pressure		
	Outlet	1.5 times the maximum delivery pressure		
Burst pressure	**Inlet**	3 times the maximum source pressure		
	Outlet	3 times the maximum delivery pressure		
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)		
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s		
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)		
Across the seat leak		4×10^{-9} Pa·m³/s ∗2)		
Surface finish		Ra max 10 µin. (0.25 µm) Option: 7 µin. (0.18 µm), 5 µin. (0.13 µm)		
Connections		Face seal, Tube weld		
Bonnet port		NPT 1/8 inch ∗3)		
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		1.2 in³ (19.7 cm³)		
Weight		1.91 kg ∗4)		

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

SMC

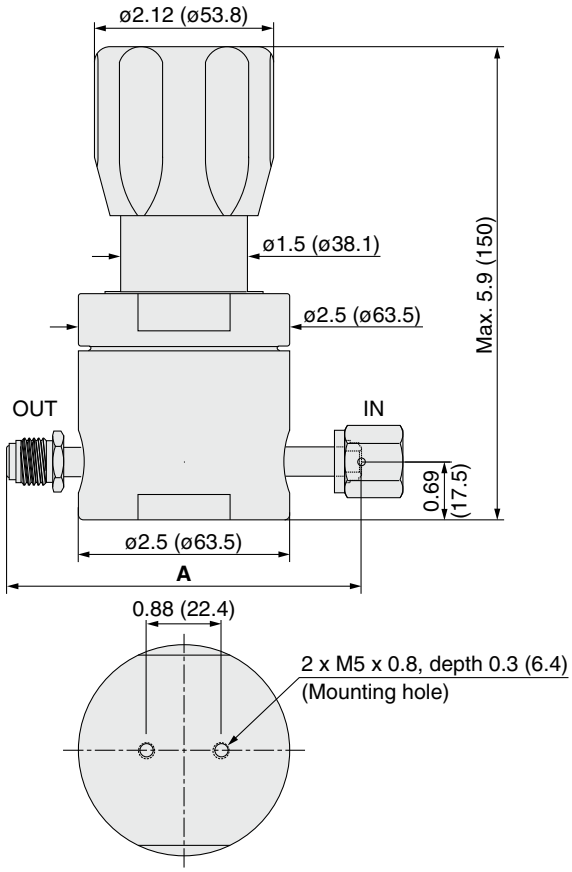
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

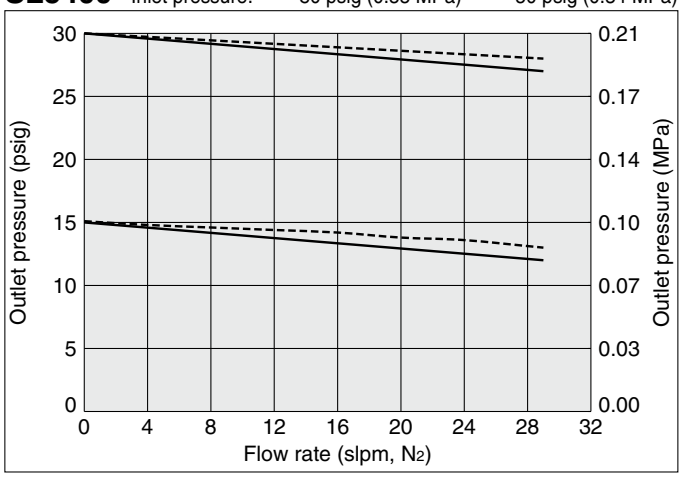
SL5400



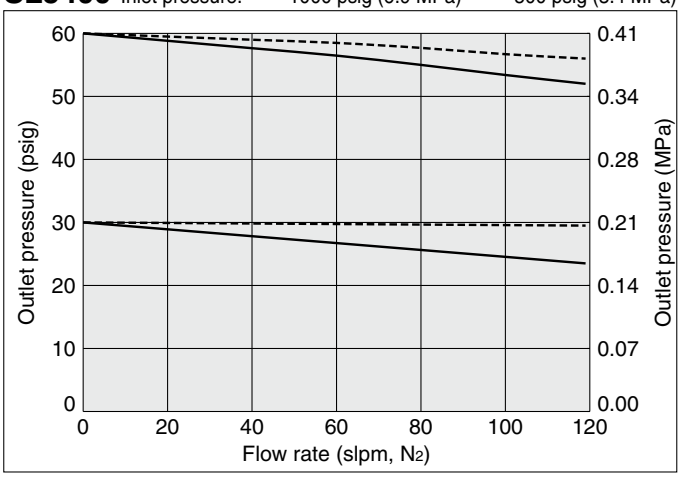
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

SL5400 Inlet pressure: ---- 80 psig (0.55 MPa) —— 50 psig (0.34 MPa)



SL5400 Inlet pressure: ---- 1000 psig (6.9 MPa) —— 500 psig (3.4 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

SL5800 Series

- For UHP gas delivery
- Inlet pressure: Max. 300 psig (2.1 MPa)
- Flow capacity to 200 slpm
- Body material: 316L SS secondary remelt
- Springless design (No poppet spring in the wetted area)

RoHS

How to Order (See p. 250 for ordering syntax)

SL58 [02] [S] [M] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Delivery pressure

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

Material

Code	Body	Poppet	Diaphragm
S	316L SS secondary remelt	316L SS	316L SS

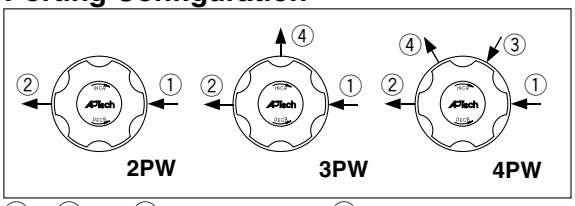
Surface finish

Code	Surface finish Ra max
M	10 µin. (0.25 µm) Standard
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
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
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

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗3)

∗3) Bonnet port is not threaded. Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

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

Sample Order Number

	Port	①	②	③	④	
SL5810S	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	0	0	

Specifications

Operating Parameters		SL5802	SL5806	SL5810
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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 300 psig (2.1 MPa)		
Proof pressure	**Inlet**	1.5 times the maximum source pressure		
	Outlet	1.5 times the maximum delivery pressure		
Burst pressure	**Inlet**	3 times the maximum source pressure		
	Outlet	3 times the maximum delivery pressure		
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)		
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s		
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)		
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)		
Surface finish		Ra max 10 µin. (0.25 µm) Option: 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		5 psig (0.035 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop		
Installation		Bottom mount (Option: panel mount)		
Internal volume		1.2 in³ (19.7 cm³)		
Weight		1.91 kg ∗5)		

∗1) -10 to 90°C for Polyimide seat.
∗2) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).
∗3) Tested with Helium gas inlet pressure 100 psig (0.7 MPa).
∗4) On panel mount option, bonnet port is not threaded.
∗5) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

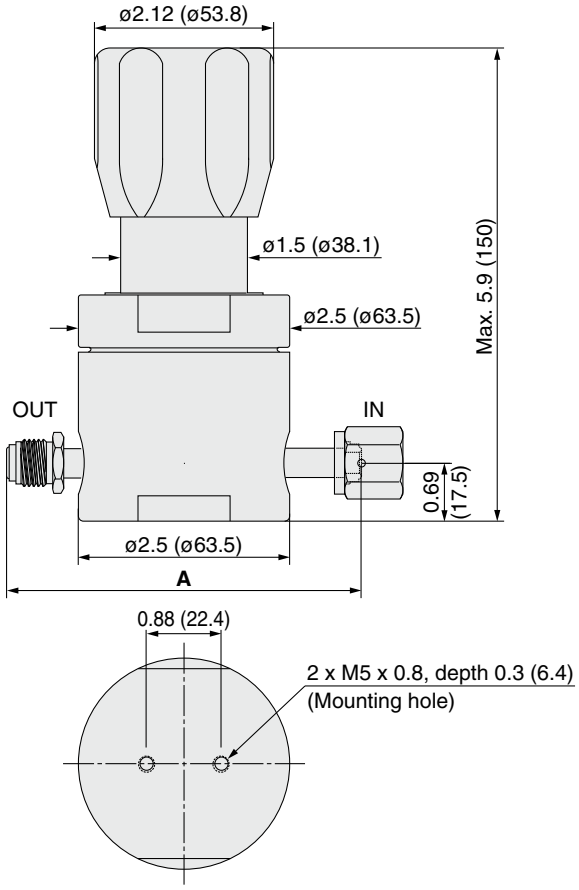
Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Poppet	316L SS
Diaphragm	316L SS
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)

Dimensions

inch (mm)

SL5800

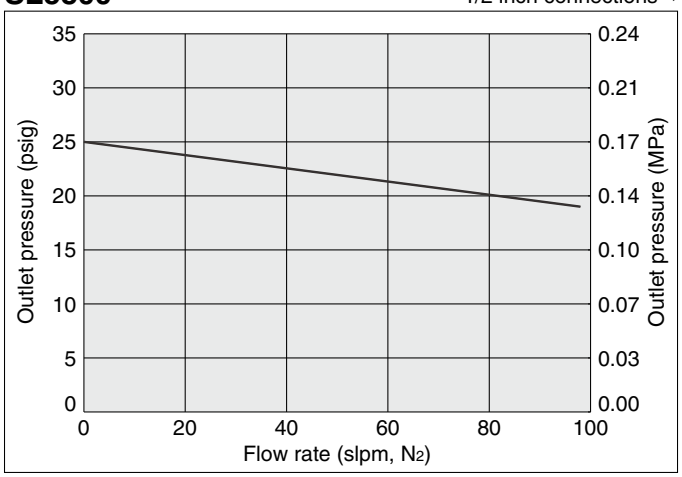


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

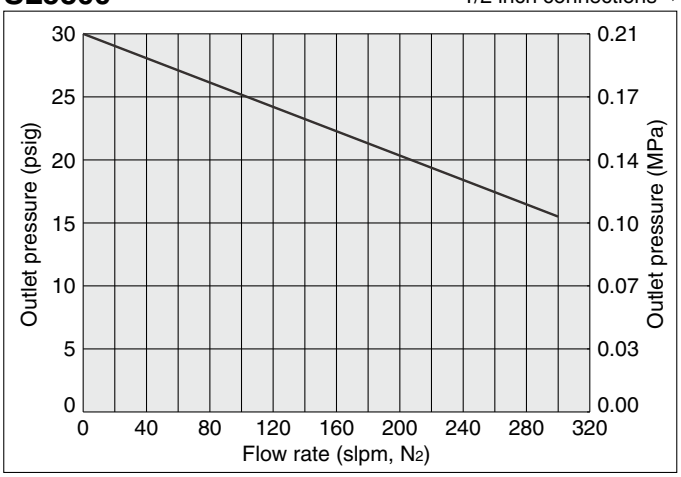
SL5800

Inlet pressure: 30 psig (0.21 MPa)
1/2 inch connections *)



SL5800

Inlet pressure: 100 psig (0.69 MPa)
1/2 inch connections *)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Low to intermediate flow

AZ1000 Series

- **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**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

AZ10 [01] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

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)
30	5 to 300 psig (0.034 to 2.1 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	

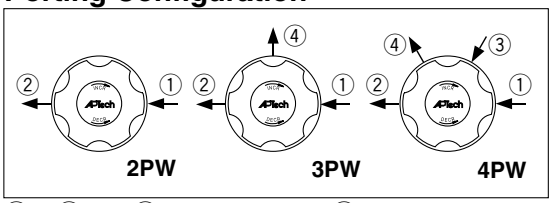
Surface finish

Code	Surface finish Ra
No code	10 μin. (0.25 μm) Standard
Q	25 μin. (0.62 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)
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Sample Order Number

	Port ①	②	③	④		
AZ1001S	2PW	FV4	FV4			
	3PW	FV4	FV4		V3	MPA
	4PW	FV4	FV4	1	V3	MPA
	4PW	FV4	FV4	0	0	

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗6)
BP	Bonnet port (NPT 1/8 inch)

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

Option

Code	Specification
No code	Standard
HF	High flow

Seat material

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

∗3) Not available with SHP material.
∗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		AZ1001	AZ1002	AZ1006	AZ1010	AZ1015	AZ1030
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)	5 to 300 psig (0.034 to 2.1 MPa)
Gas		Select compatible materials of construction for the gas					
Source pressure		Vacuum to 300 psig (2.1 MPa)	Vacuum to 3500 psig (24.1 MPa) ∗1)				
Proof pressure	**Inlet**	1.5 times the maximum source pressure					
	Outlet	1.5 times the maximum delivery pressure					
Burst pressure	**Inlet**	3 times the maximum source pressure					
	Outlet	3 times the maximum delivery pressure					
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)					
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s					
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)					
Across the seat leak		4×10^{-9} Pa·m³/s ∗4)					
Surface finish		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)					
Connections		Face seal, Tube weld					
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)					
Weight		1.25 kg ∗5)					

∗1) Max. 300 psig (2.1MPa) for PTFE seat.
∗2) -10 to 90°C for Polyimide 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) Weight, 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	AZ1001	AZ1002	AZ1006	AZ1010	AZ1015	AZ1030
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop					

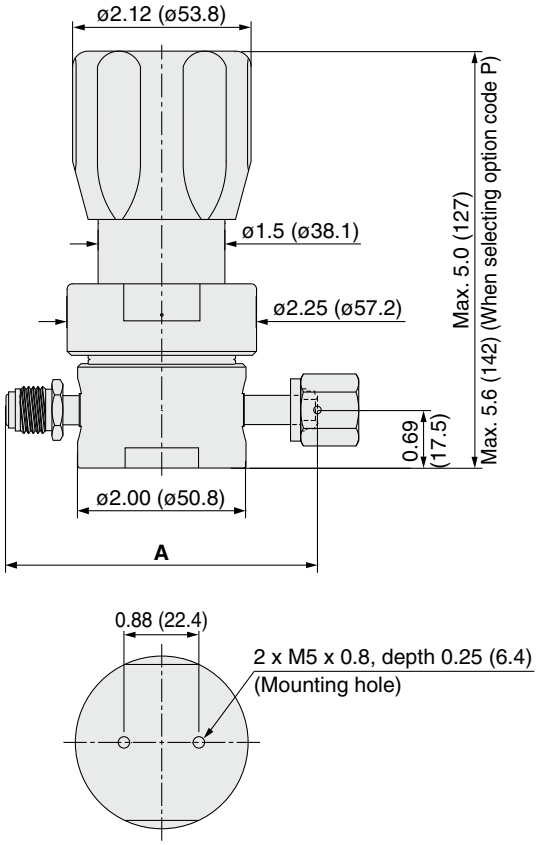
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide, PTFE)	PCTFE (Option: PTFE)

Dimensions

inch (mm)

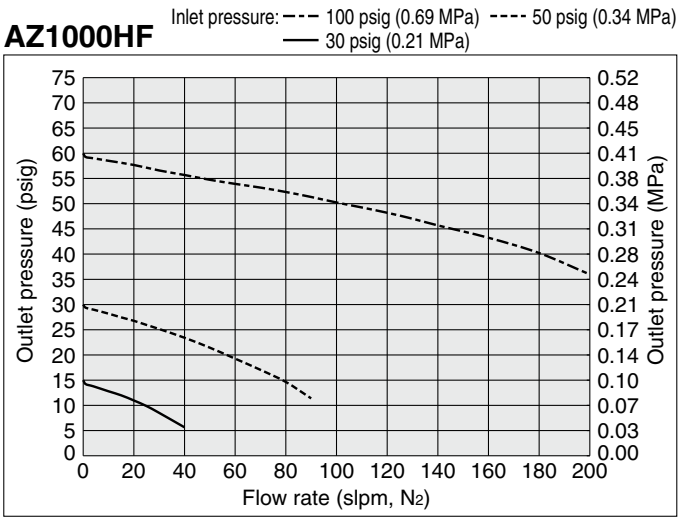
AZ1000



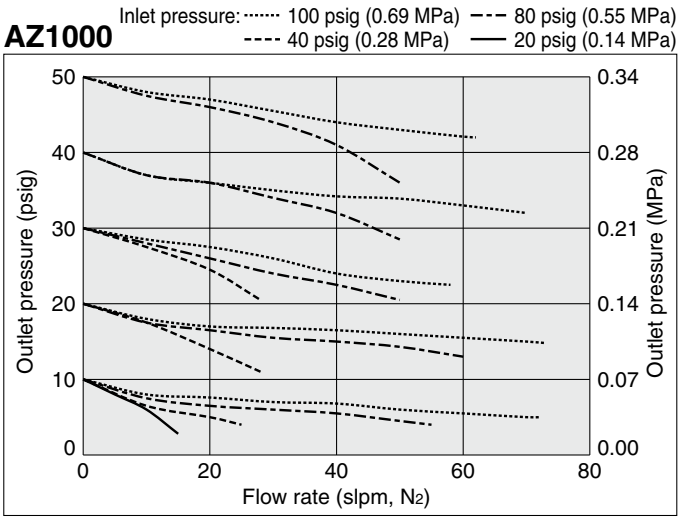
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

AZ1000HF



AZ1000



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity

Delivery of sub-atmospheric pressure

AZ1100 Series

- **For UHP gas delivery**
- **Sub-atmospheric to low positive pressure delivery**
- **Flow capacity to 0.5 slpm**
- **Body material: 316L SS**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

AZ11 01 S □ 2PW FV4 FV4 □ □ □ □ □ □

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

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	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗4)
BP	Bonnet port (NPT 1/8 inch)

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

Surface finish

Code	Surface finish Ra
No code	10 μin. (0.25 μm) Standard
Q	25 μin. (0.62 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)
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

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

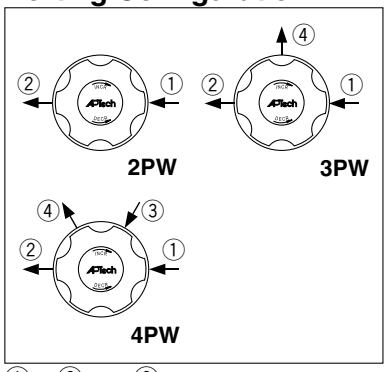
∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

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)	
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

∗1) Refer to gauge guide (P.139) for gauge specifications.
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Porting Configuration



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

Sample Order Number

	Port ①	②	③	④	
AZ1101S	2PW	FV4	FV4		
	3PW	FV4	FV4		0
	3PW	FV4	FV4		V3	MPA
	4PW	FV4	FV4	V3	V3	MPA
	4PW	FV4	FV4	0	0	

Specifications

Operating Parameters		AZ1101
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**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Ambient and operating temperature		-40 to 71°C (No freezing)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗1)
Across the seat leak		4×10^{-9} Pa·m³/s ∗1)
Surface finish		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)
Connections		Face seal, Tube weld
Installation		Bottom mount (Option: panel mount)
Internal volume		0.49 in³ (8 cm³)
Weight		1.25 kg ∗2)

∗1) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).
∗2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

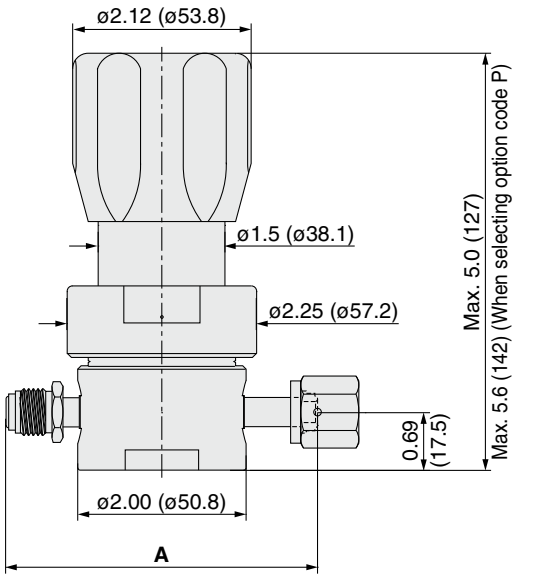
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	
Seat	PCTFE (Option: PTFE)	

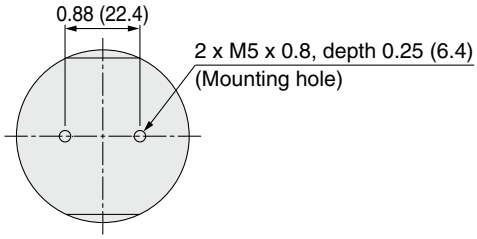
Dimensions

inch (mm)

AZ1100



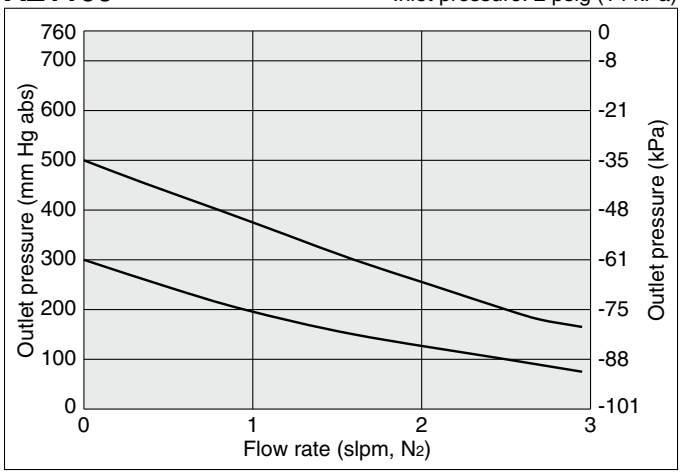
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)



Flow Rate Characteristics

AZ1100

Inlet pressure: 2 psig (14 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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

AZ1500 Series

- **For UHP gas delivery**
- **High inlet pressure type Standard: Max. 3500 psig (24.1 MPa), HR (option): Max. 4500 psig (31 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Body material: 316L SS**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Tied-diaphragm design**

RoHS

How to Order (See p. 250 for ordering syntax)

AZ15 [02] [S] [ ] [2PW] [FV4] [FV4] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

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	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	

Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 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)
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
40	0 to 4000 psig	0 to 28 MPa
50	0 to 5000 psig	(not applied)

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Sample Order Number

	Port	①	②	③	④		
AZ1510S	2PW	FV4	FV4				
	3PW	FV4	FV4		0		
	3PW	FV4	FV4		1	MPA	
	4PW	FV4	FV4	40	1	MPA	
	4PW	FV4	FV4	0	0		

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗6)
BP	Bonnet port (NPT 1/8 inch)

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

Option

Code	Specification
No code	Standard
HF	High flow ∗4)
HR	High inlet pressure (Max. inlet pressure 4500 psig (31 MPa)) ∗4)∗5)

∗4) Options "HF" and "HR" cannot be used in combination.
∗5) The connection is a 1/4 inch face seal.

Seat material

Code	Material
No code	PCTFE(Standard)
VS	Polyimide ∗3)

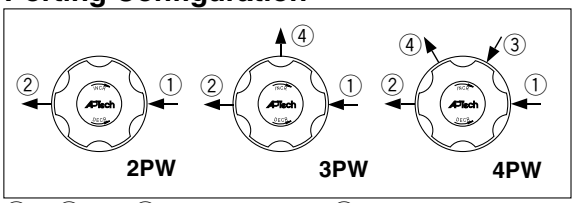
∗3) Not available with SHP material.

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)

Specifications

Operating Parameters		AZ1502	AZ1506	AZ1510	AZ1515
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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)			
Surface finish		Ra 10 µin.(0.25 µm) Option: 25 µin.(0.62 µm)			
Connections		Face seal, Tube weld			
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)			
Weight		1.27 kg ∗4)			

∗1) -10 to 90°C for Polyimide 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) Weight, 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	AZ1502	AZ1506	AZ1510	AZ1515
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			

2. High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AZ1502	AZ1506	AZ1510	AZ1515
HR	**Source pressure**	Vacuum to 4500 psig (31 MPa)			

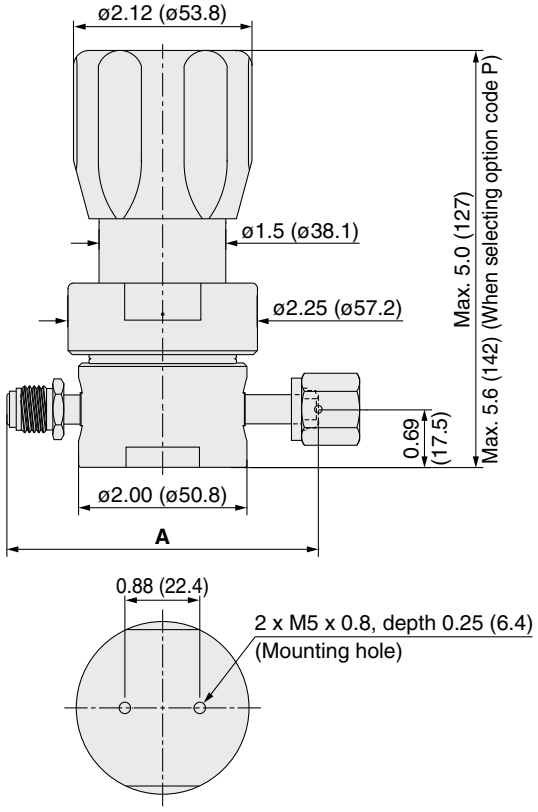
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AZ1500

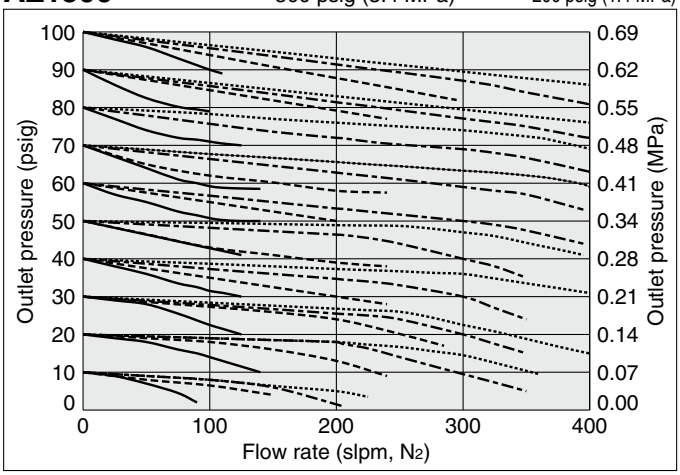


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)

Flow Rate Characteristics

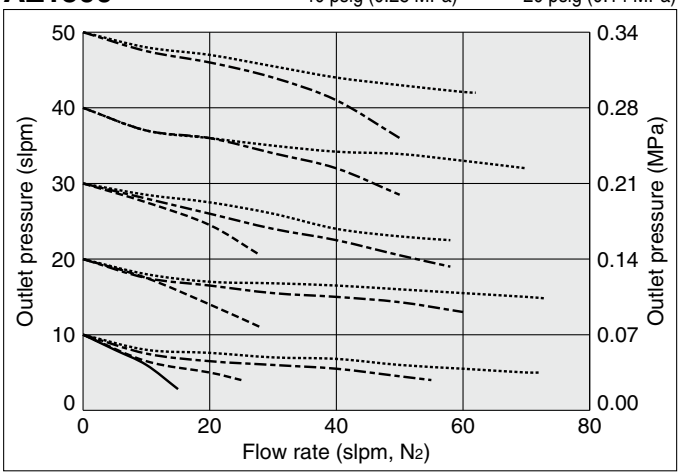
AZ1500

Inlet pressure: ····· 2000 to 3000 psig (13.8 to 20.7 MPa) – – – 1000 psig (6.9 MPa) ---- 500 psig (3.4 MPa) —— 200 psig (1.4 MPa)



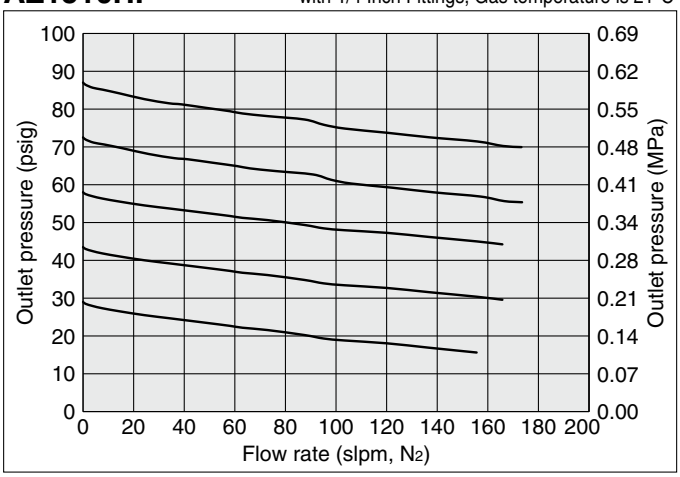
AZ1500

Inlet pressure: ····· 100 psig (0.69 MPa) – – – 80 psig (0.55 MPa) ---- 40 psig (0.28 MPa) —— 20 psig (0.14 MPa)



AZ1510HF

Inlet pressure: —— 150 psig (1.0 MPa)
with 1/4 Inch Fittings, Gas temperature is 21°C



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | Intermediate flow (Tied-diaphragm)

AZ1400T Series

- 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
- Ni-Cr-Mo alloy internals standard
- Sub-atmospheric pressure delivery option
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ14 [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	1 to 60 psig (0.007 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
S	316L SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Surface finish

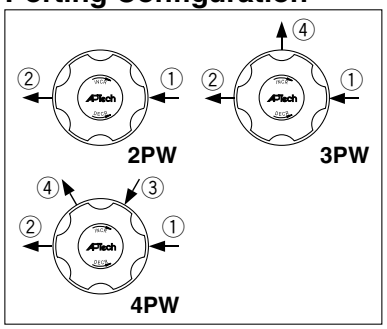
Code	Surface finish Ra
No code	10 μin. (0.25 μm) Standard
Q	25 μin. (0.62 μm)

Range options *1)

Code	Specification
No code	Standard
A	Sub-atmospheric

*1) Only available with AZ1402T.

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)
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Sample Order Number

	Port ①	②	③	④		
AZ1402TS	2PW	FV4	FV4			
	3PW	FV4	FV4		0	
	3PW	FV4	FV4		1	MPA
	4PW	FV4	FV4	40	1	MPA
	4PW	FV4	FV4	0	0	

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation*5)
BP	Bonnet port (1/8 inch)

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

Option

Code	Specification
No code	Standard
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) *4)

*4) Not available with AZ1402T and AZ1406T.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

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		AZ1402T□□A	AZ1402T	AZ1406T	AZ1410T	AZ1415T
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) *2)				
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s *3)				
Across the seat leak		4×10^{-9} Pa·m³/s *4)				
Surface finish		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)				
Connection		Face seal, Tube weld				
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)				
Weight		2.04 kg *5)				

*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) -10 to 90°C for Polyimide 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) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AZ1410T	AZ1415T
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)	

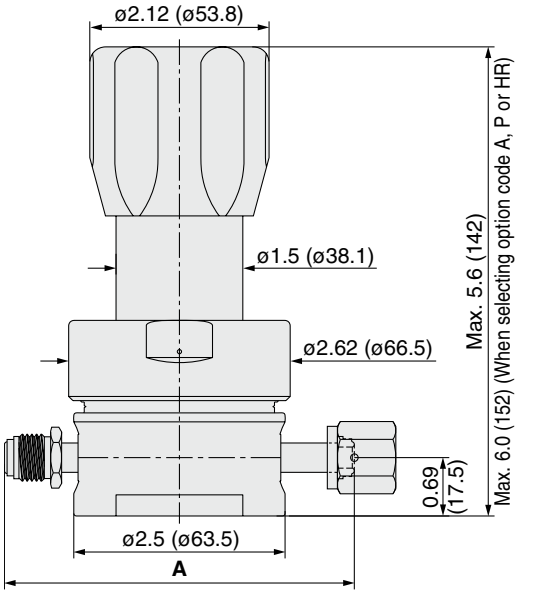
Wetted Parts Material

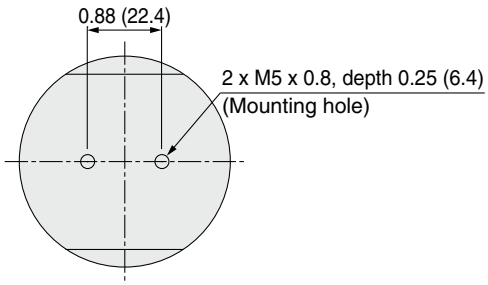
Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)

Dimensions

inch (mm)

AZ1400T



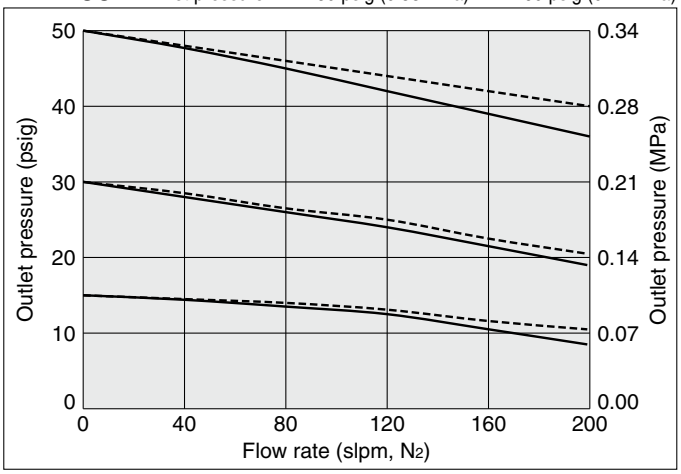


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

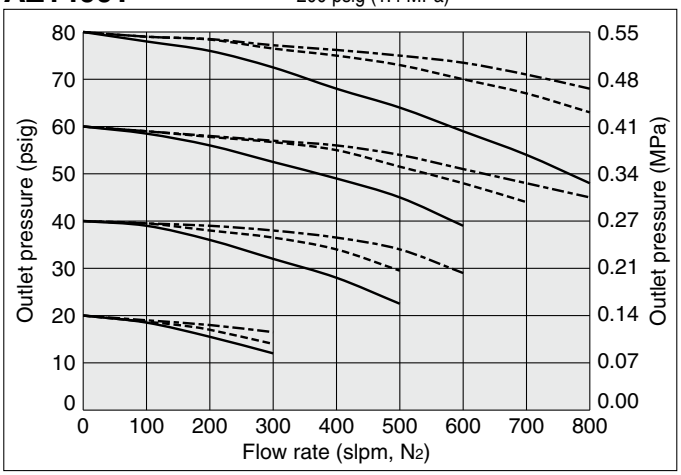
AZ1400T

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



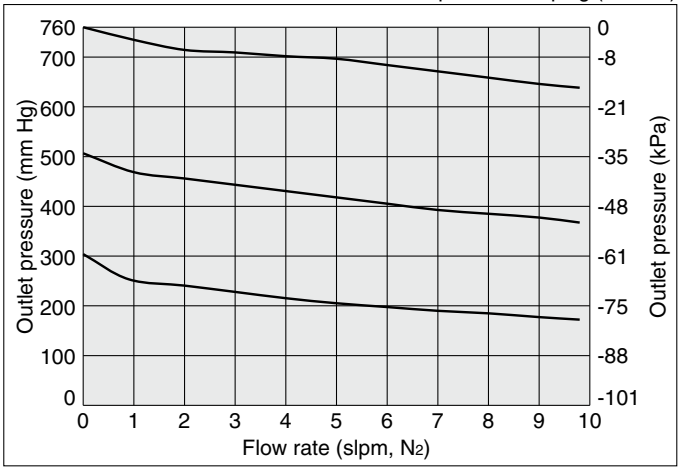
AZ1400T

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



AZ1402TA

Inlet pressure: 2 psig (14 kPa)



Note) slpm N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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

AZ1200 Series

- **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**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ12 [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 (Preset))

Material

Code	Body	Poppet	Diaphragm
S	316L SS	316L SS	Ni-Cr-Mo alloy
SHP		Ni-Cr-Mo alloy	

Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 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)
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
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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	Polyimide ∗3)

∗3) Not available with SHP material.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO ∗8)

∗8) Not available with AZ1225.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation∗7)
BP	Bonnet port (NPT 1/8 inch)

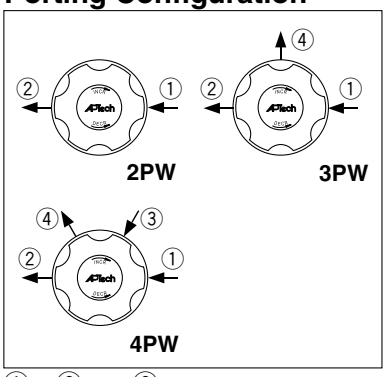
∗7) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Option

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

∗4) FC option is only available with connection size 1/2 inch, but not available with AZ1202, AZ1206 and AZ1225.
∗5) HR option is not available with AZ1202 and AZ1206.
∗6) Options "HF," "FC," and "HR" cannot be used in combination.

Porting Configuration



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

Sample Order Number

	Port	①	②	③	④		
AZ1210S	2PW	FV8	FV8				
	3PW	FV8	FV8		0		
	3PW	FV8	FV8		1	MPA	
	4PW	FV8	FV8	40	1	MPA	

Specifications

Operating Parameters		AZ1202	AZ1206	AZ1210	AZ1215	AZ1225
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 1000 psig 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**	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	**Inlet**	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) ∗3)				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s ∗4)				
Across the seat leak		4×10^{-9} Pa·m³/s ∗5)				
Surface finish		Ra 10 µin.(0.25 µm) Option: 25 µin.(0.62 µm)				
Connections		Face seal, Tube weld				
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)				
Weight		2.0 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 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.
∗3) -10 to 90°C for Polyimide 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) Weight, 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	AZ1202	AZ1206	AZ1210	AZ1215	AZ1225
HF	**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	AZ1210	AZ1215
FC	**Source pressure**	Vacuum to 300 psig (2.1 MPa)	
	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 inch face seal 1/2 inch tube weld	

3. High inlet pressure

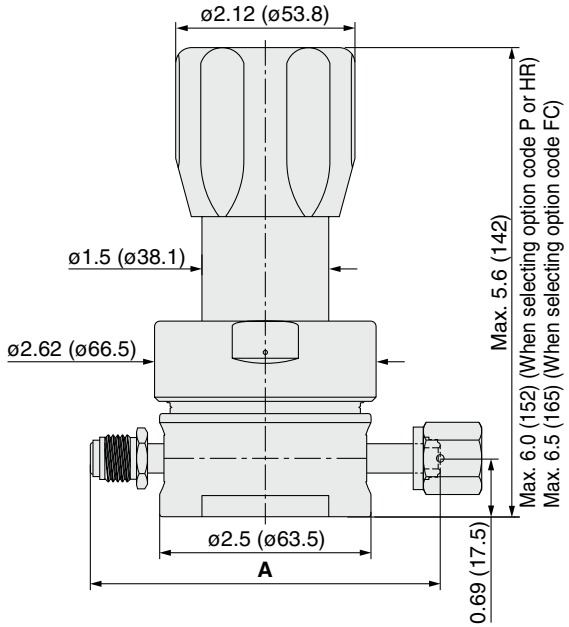
Changes from the standard type are:

Option	Other Parameters	AZ1210	AZ1215
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)	

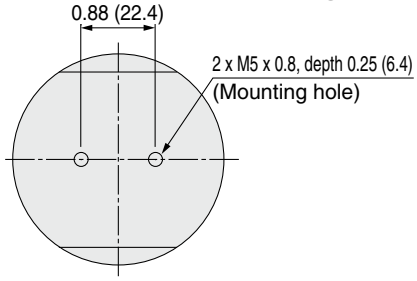
Dimensions

inch (mm)

AZ1200



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



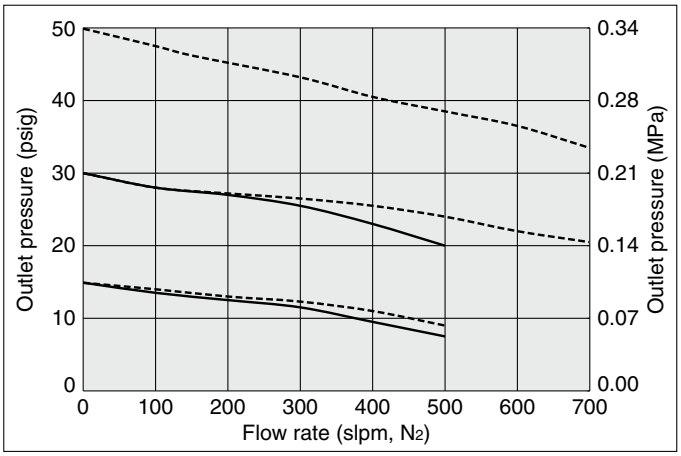
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy	
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

Flow Rate Characteristics

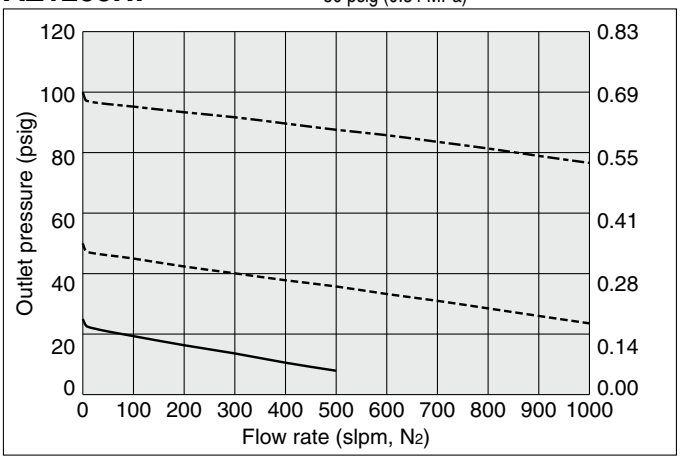
AZ1200

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



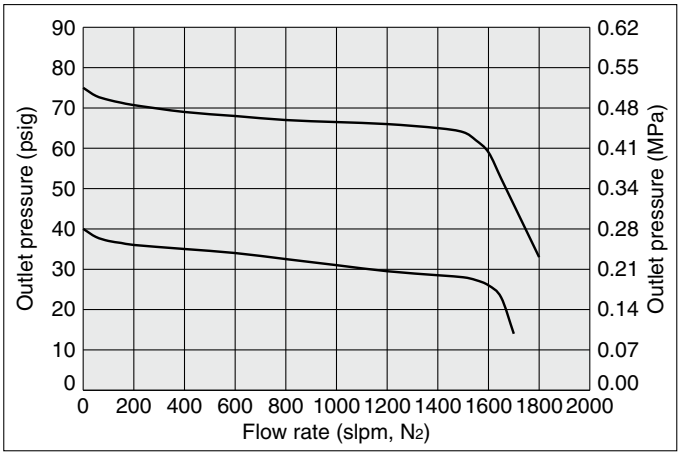
AZ1200HF

Inlet pressure: ---- 150 psig (1.0 MPa) ---- 100 psig (0.69 MPa)
—— 50 psig (0.34 MPa)



AZ1200FC

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



*1) If connection size differs, flow rate characteristics also differ.
*2) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for Ultra High Purity | High flow

AZ1300 Series

- **For UHP gas delivery**
- **Flow capacity to 1000 slpm**
- **Body material: 316L SS**
- **Inlet pressure: Max. 300 psig (2.1 MPa)**

RoHS

How to Order (See p. 250 for ordering syntax)

AZ13 [02] [S] [ ] [2PW] [FV8] [FV8] [ ] [ ] [ ] [ ] [ ]

Port Number: ① ② ③

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
S	316L SS	316L SS	Ni-Cr-Mo alloy

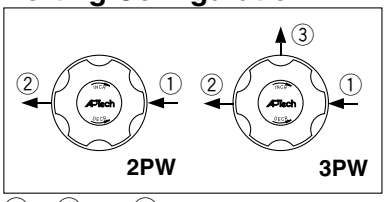
Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 µm)

Ports

Code	Ports
2PW	2 ports
3PW	3 ports

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
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 (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
2	0 to 200 psig	0 to 1.4 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Sample Order Number

	Port	①	②	③	
AZ1302S	2PW	FV8	FV8		
	3PW	FV8	FV8	0	
	3PW	FV8	FV8	V3	MPA

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation∗4)
BP	Bonnet port (NPT 1/8 inch)

∗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.

Specifications

Operating Parameters		AZ1302	AZ1306	AZ1310	AZ1315
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 300 psig (2.1 MPa)			
Proof pressure	**Inlet**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	1×10^{-10} Pa·m³/s ∗1)			
Across the seat leak		4×10^{-9} Pa·m³/s			
Surface finish		Ra 10 µin. (0.25 µm) Option: 25 µin. (0.62 µm)			
Connections		Face seal, Tube weld			
Supply pressure effect		4.6 psig (0.032 MPa) delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		1.19 in³ (19.6 cm³)			
Weight		2.0 kg ∗2)			

∗1) Tested with Helium gas inlet pressure 300 psig (2.1 MPa).

∗2) Weight, including individual boxed weight, may vary depending on connections or options.

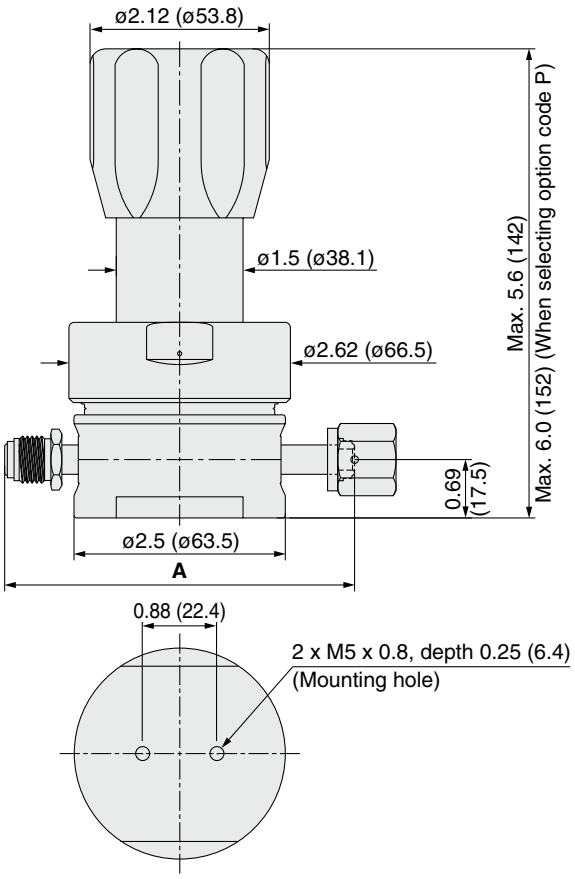
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Nozzle	316L SS
Poppet	316L SS
Diaphragm	Ni-Cr-Mo alloy
Seat	PCTFE (Option: PTFE)

Dimensions

inch (mm)

AZ1300

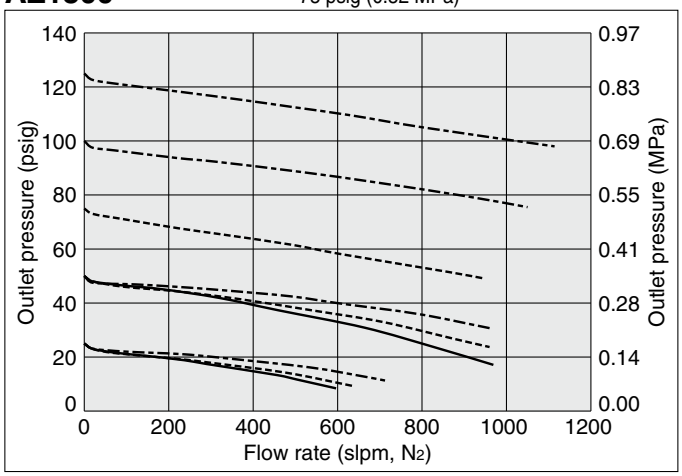


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

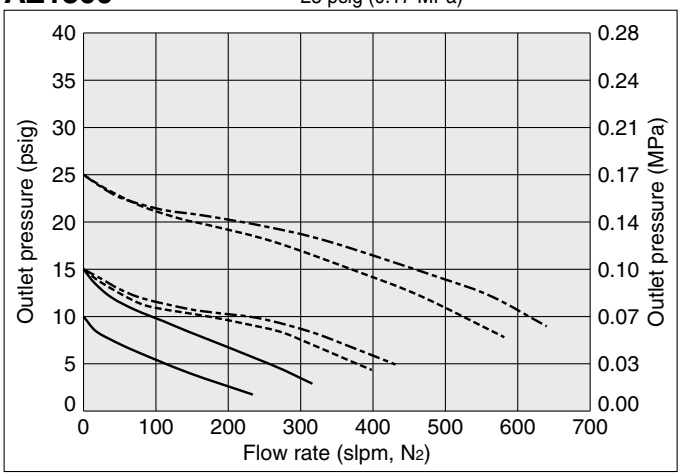
AZ1300

Inlet pressure: 150 psig (1.0 MPa) 100 psig (0.69 MPa) 75 psig (0.52 MPa)



AZ1300

Inlet pressure: 75 psig (0.52 MPa) 50 psig (0.34 MPa) 25 psig (0.17 MPa)

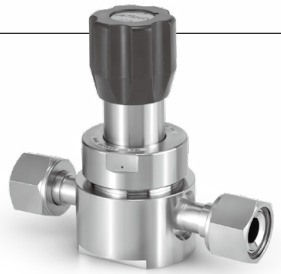


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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

AZ9200 Series

- For UHP gas delivery
- Inlet pressure: Max. 300 psig (2.1 MPa)
- Flow capacity to 2000 slpm
- Body material: 316L SS



RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ②

AZ92 [02] [S] [2PW] [FV12] [FV12] [ ] [ ] [ ] [ ] ③

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
S	316L SS	316L SS	Ni-Cr-Mo alloy

Ports

Code	Ports
2PW	2 ports
3PW	3 ports

Connections (Inlet①, Outlet②)

Code	Connections
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

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗3)
BP	Bonnet port (NPT 1/8 inch)

∗3) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Pressure gauge unit ∗2)

Code	Unit
No code	psig/bar
MPA	MPa

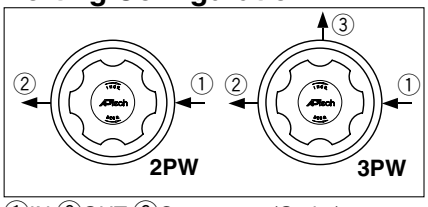
∗2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Gauge port ∗1) (Outlet③)

Code	Pressure gauge	
	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

∗1) Refer to gauge guide (P.139) for gauge specifications.

Porting Configuration



①IN ②OUT ③Gauge port (Outlet)

Specifications

Operating Parameters		AZ9202	AZ9206	AZ9210	AZ9215
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 300 psig (2.1 MPa)			
Proof pressure	**Inlet**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing)			
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s			
	Outboard leakage	1×10^{-10} Pa·m³/s ∗1)			
Across the seat leak		4×10^{-9} Pa·m³/s ∗2)			
Surface finish		Ra 10 µin. (0.25 µm)			
Connections		Face seal, Tube weld			
Supply pressure effect		7 psig (0.048 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		2.2 in³ (36 cm³)			

∗1) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗2) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

SMC

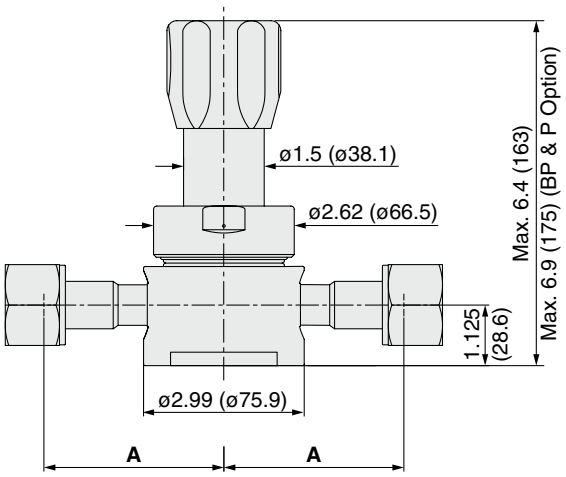
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Nozzle	316L SS
Poppet	316L SS
Diaphragm	Ni-Cr-Mo alloy
Seat	PFA

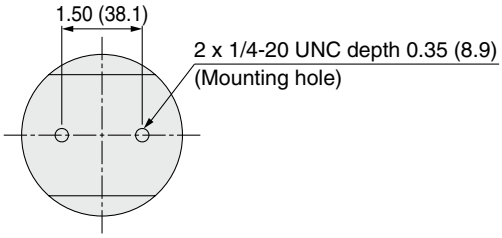
Dimensions

inch (mm)

AZ9200

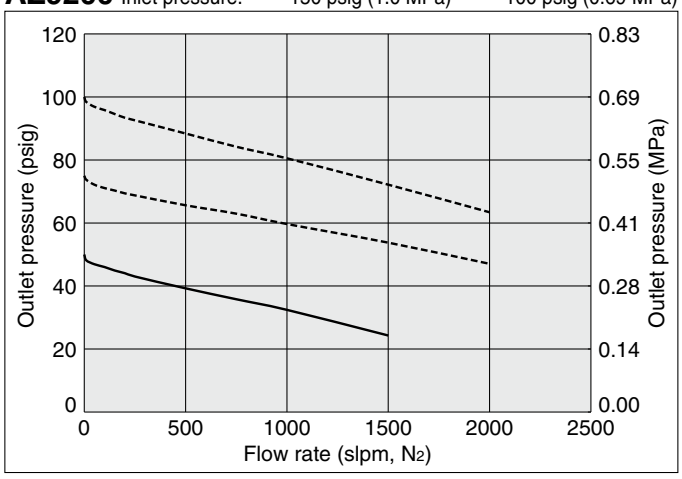


Connections	A	
	inch	(mm)
FV12	3.39	(86.1)
MV12		
TW12	3.00	(76.2)
FV16	3.67	(93.2)
MV16		
TW16	3.00	(76.2)



Flow Rate Characteristics

AZ9200 Inlet pressure: ---- 150 psig (1.0 MPa) —— 100 psig (0.69 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Pneumatic Actuation Pressure Regulator | Low flow

AZ10PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ10 PA S [ ] 2PW FV4 FV4 [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	

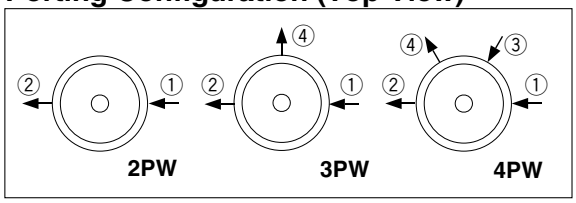
Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 µm)

Ports

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

Porting Configuration (Top View)



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)
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HF	High flow ∗6)

∗6) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

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

∗3) Not available with SHP material.
∗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		AZ10PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 3500 psig (24.1 MPa) ∗1)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)
Across the seat leak		4×10^{-9} Pa·m³/s ∗4)
Surface finish		Ra 10 µin. (0.25 µm) Option: 25 µin. (0.62 µm)
Connections		Face seal, Tube weld
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.49 in³ (8 cm³)

∗1) Max. 300 psig (2.1 MPa) for PTFE seat.
∗2) -10 to 90°C for Polyimide seat.
∗3) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗4) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

Option

High flow

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

Option	Other Parameters	AZ10PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

∗) HF option will not achieve rated outlet pressure at all inlet pressures.

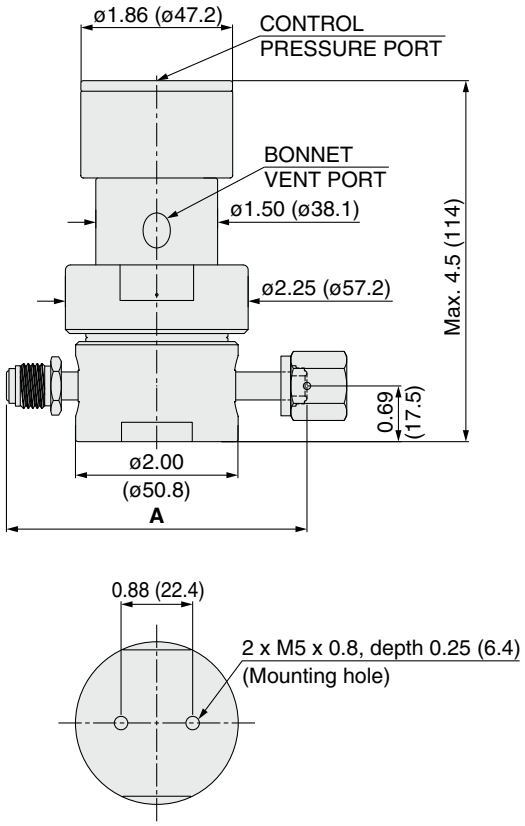
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide, PTFE)	PCTFE (Option: PTFE)

Dimensions

inch (mm)

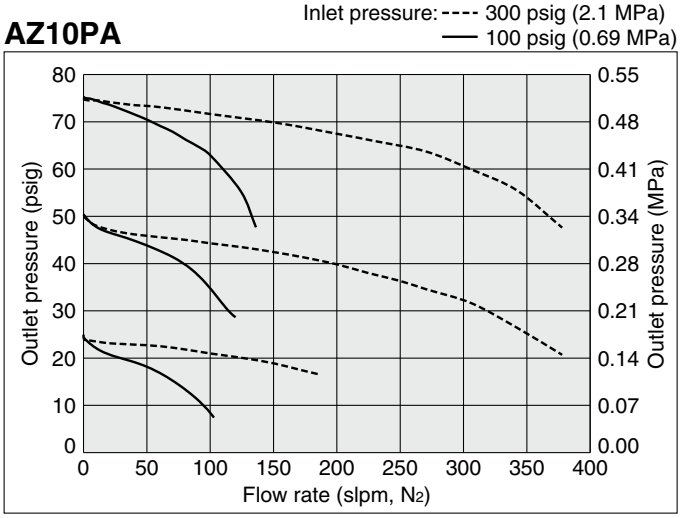
AZ10PA



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

Flow Rate Characteristics

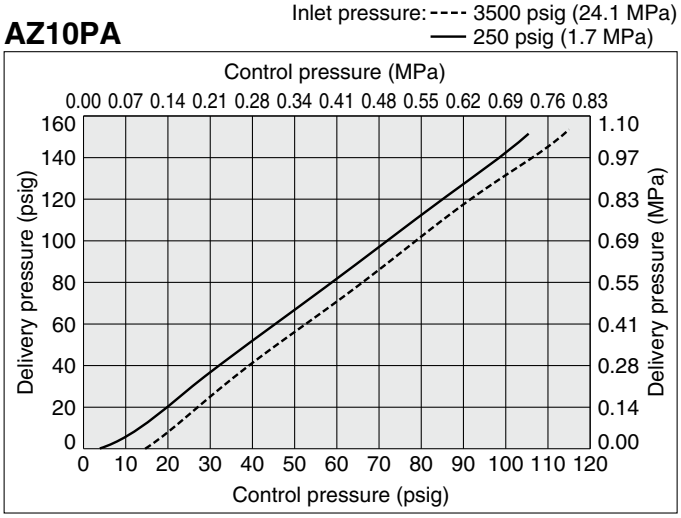
AZ10PA



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

AZ10PA



Pneumatic Actuation Pressure Regulator | Low flow (Tied-diaphragm)

AZ15PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS secondary remelt**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ15 PA S [ ] 2PW FV4 FV4 [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	316L SS	316L SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	

Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 µm)

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

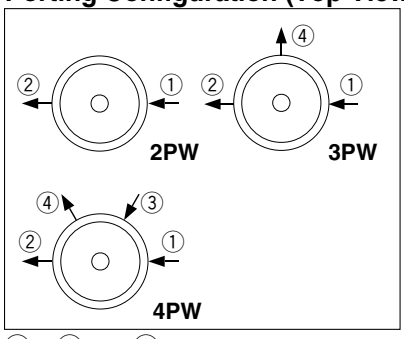
∗3) Not available with SHP material.

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 (Top View)



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)
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) Other range available. Refer to gauge guide (P.139). Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Specifications

Operating Parameters		AZ15PA
Delivery pressure		7 to 150 psig (0.05 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**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)
Surface finish		Ra 10 µin. (0.25 µm) Option: 25 µin. (0.62 µm)
Connections		Face seal, Tube weld
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.51 in³ (8.4 cm³)

∗1) -10 to 90°C for Polyimide seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

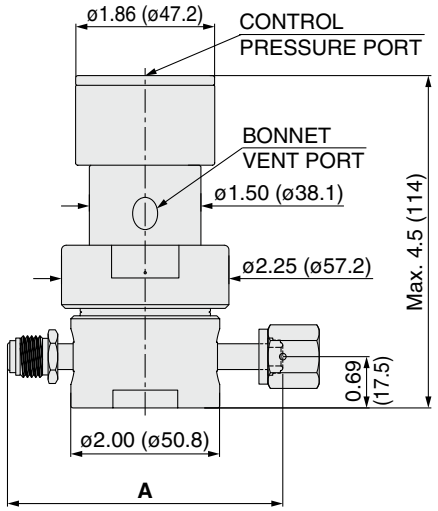
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

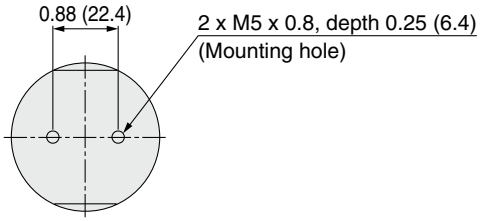
Dimensions

inch (mm)

AZ15PA



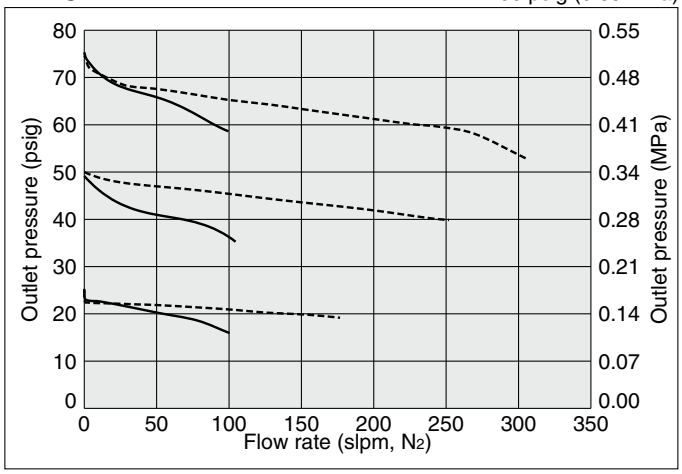
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4		
FV6	4.70	(119.4)
MV6		
TW6	2.96	(75.2)



Flow Rate Characteristics

AZ15PA

Inlet pressure: ---- 300 psig (2.1 MPa)
—— 100 psig (0.69 MPa)

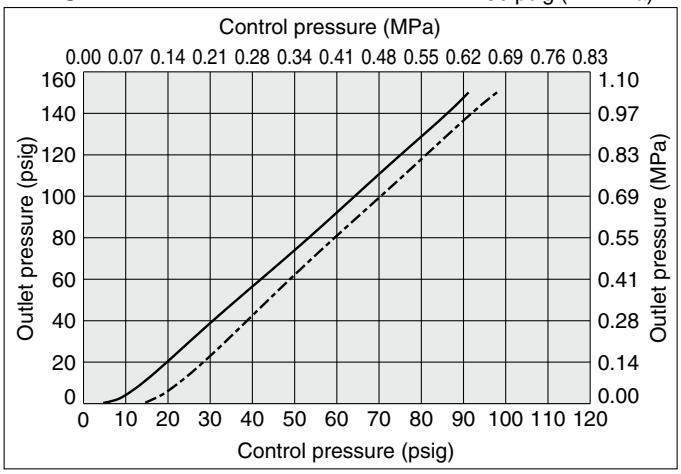


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

AZ15PA

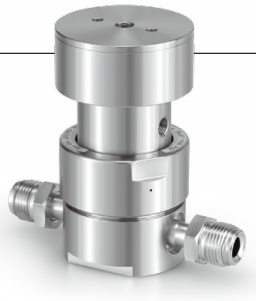
Inlet pressure: --- 3500 psig (24.1 MPa)
—— 250 psig (1.7 MPa)



Pneumatic Actuation Pressure Regulator

Intermediate flow (Tied-diaphragm)

AZ14PAT Series



- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316 SS secondary remelt**
- **High inlet pressure type Standard: Max. 2300 psig (15.9 MPa)**
  HR (option): Max. 3000 psig (20.7 MPa)
- **Flow capacity: to 400 slpm**
- **Ni-Cr-Mo alloy internals standard**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ14 PA T S □ □ 2PW FV4 FV4 □ □ □ □ □

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)
	Sub-atmospheric (A): 100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)

Material

Code	Body	Poppet	Diaphragm
S	316L SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 µm)

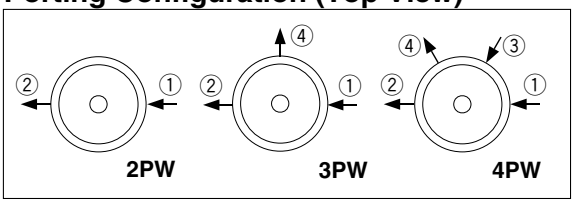
Range options

Code	Specification
No code	Standard
A	Sub-atmospheric

Ports

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

Porting Configuration (Top View)



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)
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
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.139) for gauge specifications.
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HR	High inlet pressure ∗3) (Max. inlet pressure 3000 psig (20.7 MPa))

∗3) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

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		AZ14PAT□A	AZ14PAT
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	7 to 150 psig (0.05 to 1.0 MPa)
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	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
Burst pressure	Inlet	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
Maximum control pressure		150 psig (1.0 MPa)	
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)	
Leak rate	Inboard leakage	2×10^{-11} Pa·m³/s	
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)	
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)	
Surface finish		Ra 10 µin. (0.25 µm) Option: 25 µin. (0.62 µm)	
Connections		Face seal, Tube weld	
Control pressure port		NPT 1/8 inch	
Bonnet port		NPT 1/8 inch	
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	
Internal volume		1.06 in³ (17.4 cm³)	

∗1) -10 to 90°C for Polyimide seat.
∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).
∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

SMC

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AZ14PAT
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HR option will not achieve rated outlet pressure at all inlet pressures.

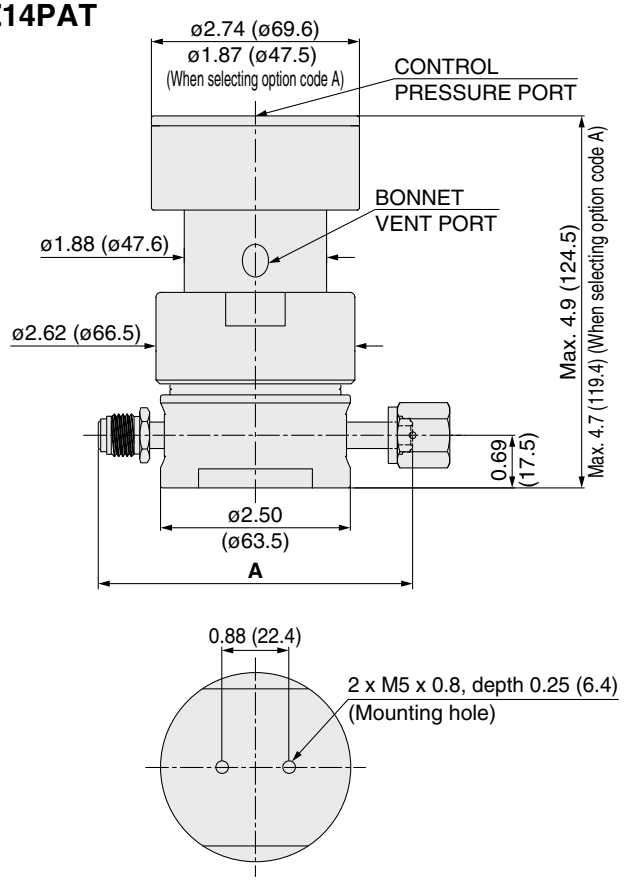
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)

Dimensions

inch (mm)

AZ14PAT

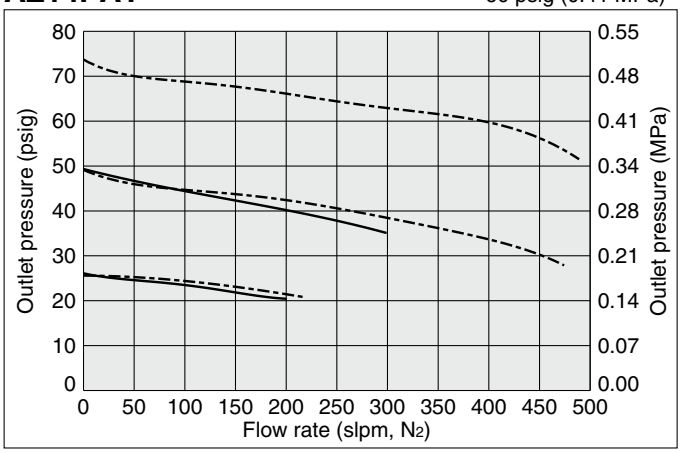


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

AZ14PAT

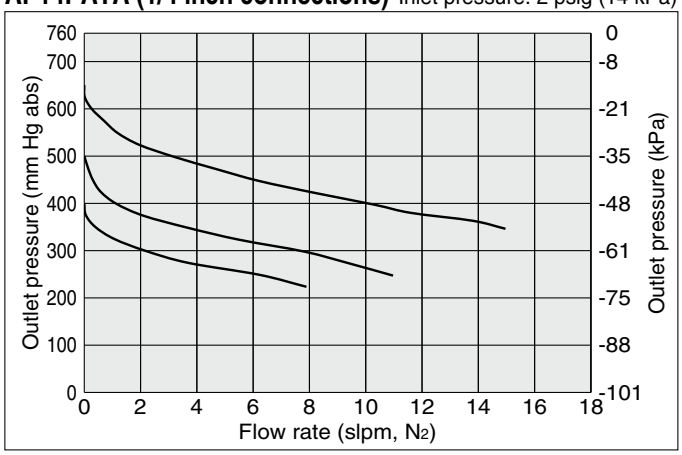
Inlet pressure: --- 100 psig (0.69 MPa)
—— 60 psig (0.41 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP14PATA (1/4 inch connections)

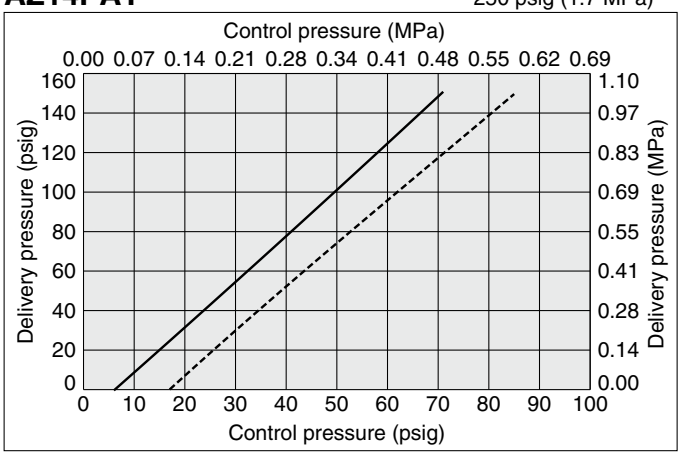
Inlet pressure: 2 psig (14 kPa)



Input / Output Characteristics

AZ14PAT

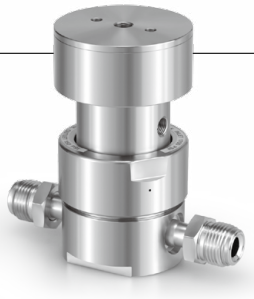
Inlet pressure: ---- 2300 psig (15.9 MPa)
—— 250 psig (1.7 MPa)



Pneumatic Actuation Pressure Regulator

High flow (Tied-diaphragm)

AZ12PA Series



- **Actuation control pressure isolated from process gas by two seals**
- **Body material: 316L SS**
- **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
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AZ12 PA S [ ] 2PW FV8 FV8 [ ] [ ] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm
S	316L SS	316L SS	Ni-Cr-Mo alloy
SHP		Ni-Cr-Mo alloy	

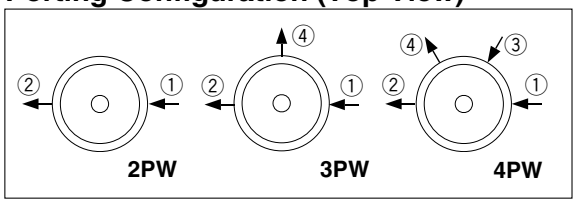
Surface finish

Code	Surface finish Ra
No code	10 µin. (0.25 µm) Standard
Q	25 µin. (0.62 µm)

Ports

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

Porting Configuration (Top View)



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)
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
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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Option

Code	Specification
No code	Standard
HF	High flow ∗4)
HR	High inlet pressure ∗4) (Max. inlet pressure 3000 psig (20.7 MPa))

∗4) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

∗3) Not available with SHP 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		AZ12PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 1700 psig (11.7 MPa)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-10} Pa·m³/s ∗2)
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)
Surface finish		Ra 10 µin. (0.25 µm) Option: 25 µin. (0.62 µm)
Connections		Face seal, Tube weld
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		1.20 in³ (19.6 cm³)

∗1) -10 to 90°C for Polyimide seat.

∗2) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

∗3) Tested with Helium gas inlet pressure 1000 psig (7 MPa).

SMC

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	AZ12PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

2. High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AZ12PA
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HF and HR option will not achieve rated outlet pressures at all inlet pressures.

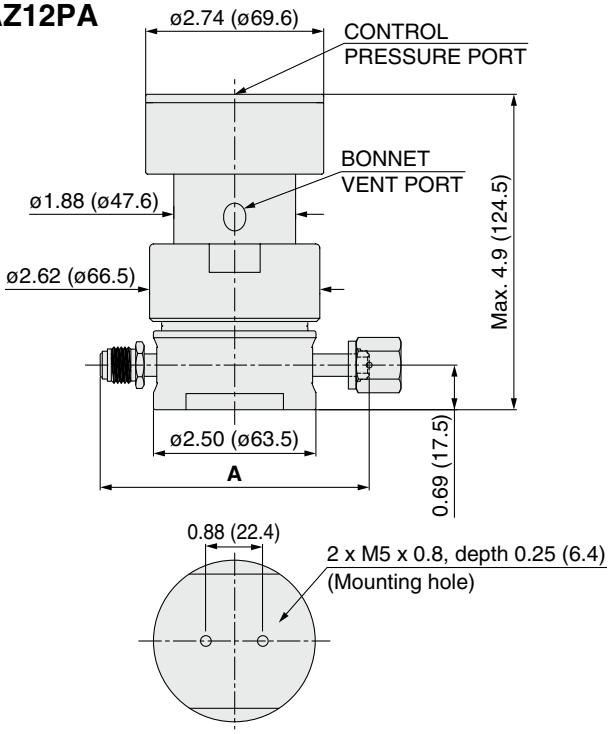
Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy	
Nozzle	316L SS	
Seat	PCTFE (Option: Polyimide)	PCTFE

Dimensions

inch (mm)

AZ12PA

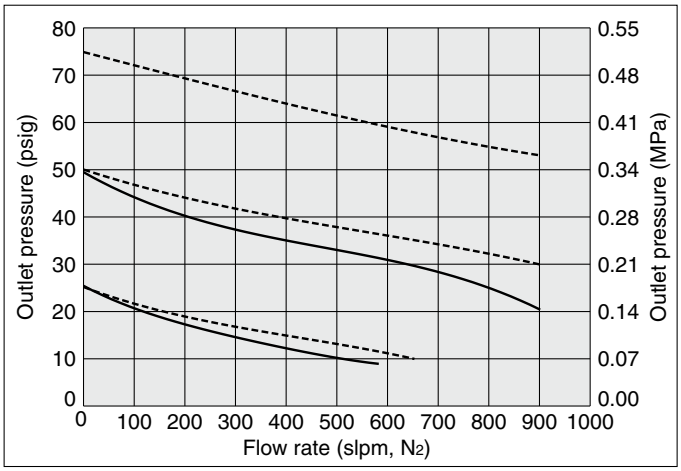


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

Flow Rate Characteristics

AZ12PA

Inlet pressure: ---- 100 psig (0.69 MPa) —— 60 psig (0.41 MPa)
1/2 inch connections

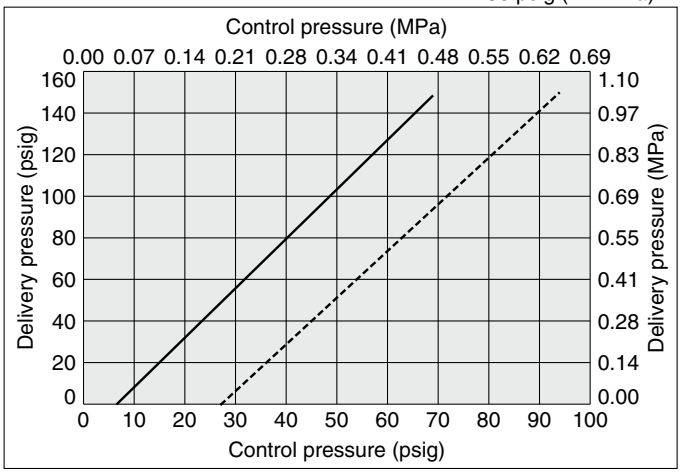


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

AZ12PA

Inlet pressure: ---- 1700 psig (11.7 MPa)
—— 250 psig (1.7 MPa)



AK100 Series

- **High inlet pressure type: Max. 3000 psig (20.7 MPa)**
- **Flow capacity: to 30 slpm**
- **Body material: 316L SS**
- **Sub-atmospheric pressure delivery option**

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AK1 [02] [S] [ ] [4PL] [4] [4] [0] [0] [ ] [ ]

Delivery pressure

Code	Delivery pressure
01	0.5 to 10 psig (0.003 to 0.07 MPa)
	Sub-atmospheric (A): 100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)
02	1 to 30 psig (0.007 to 0.2 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
S	316L SS	316 SS	

Range options*1)

Code	Specification
No code	Standard
A	Sub-atmospheric

*1) Only available with AK101.

Ports

Code	Ports
2P	Refer to the following porting configurations.
4P	
4PL	

Connections (Inlet①, Outlet②)

Code	Connections
2	NPT 1/8 inch*2)
4	NPT 1/4 inch
4T	1/4 inch compression

*2) Cannot be selected if port code "4P" is selected

Gauge port (4P: Inlet③, Outlet④, 4PL: Outlet③④)

Code	Pressure gauge
No code	No gauge port
0	No pressure gauge (Gauge port: 1/8 inch NPT)

Bonnet option

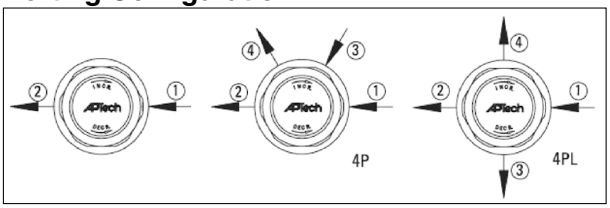
Code	Bonnet
No code	Standard
P	Panel installation*3)

*3) Panel mounting hole: dia. 0.92 inch (23.4 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Porting Configuration



①IN ②OUT
4P: ③Gauge port (Inlet) ④Gauge port (Outlet)
4PL: ③④Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④
AK102S	2P	4	4		
	4P	4	4	0	0
	4PL	4	4	0	0

Specifications

Operating Parameters		AK101□A	AK101	AK102	AK110	AK115
Delivery pressure		100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)	0.5 to 10 psig (0.003 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 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 (2.1 MPa)		Vacuum to 3000 psig (20.7 MPa)		
Proof pressure	Inlet	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing)				
Leak rate		1×10^{-10} Pa·m³/s				
Connections		NPT female, Compression				
Supply pressure effect		0.4 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		0.23 in³ (3.7 cm³)				
Weight		0.45 kg *1)				

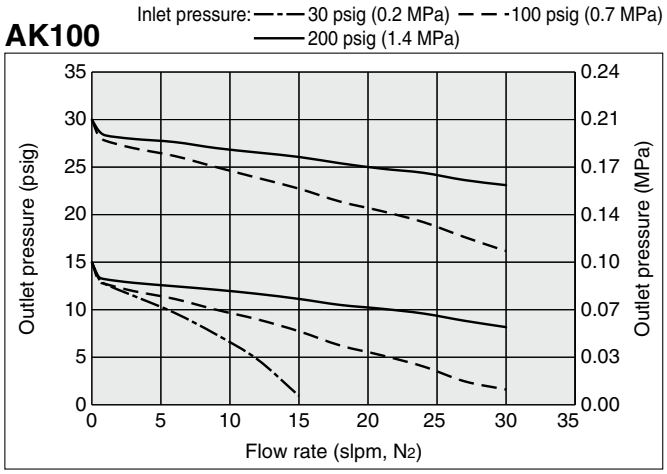
*1) Weight, including individual boxed weight, may vary depending on connections or options.

Wetted Parts Material

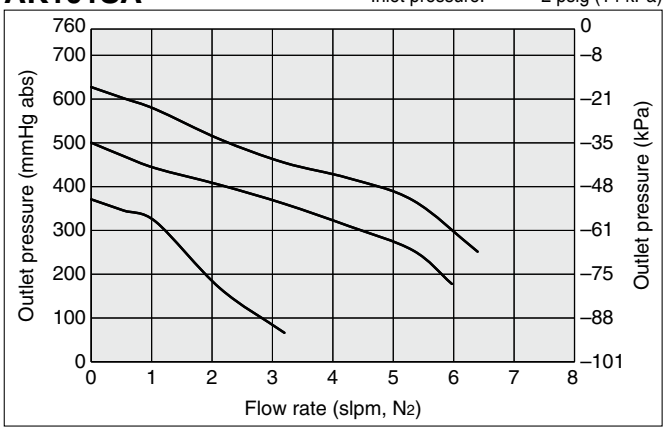
Wetted Parts	S
Body	316L SS
Poppet	316 SS
Diaphragm	316 SS
Bonnet	303 SS
Seat	PCTFE (Option: Polyimide)

Flow Rate Characteristics

AK100



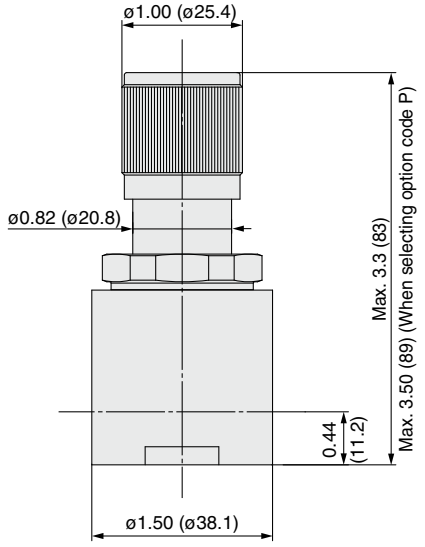
AK101SA



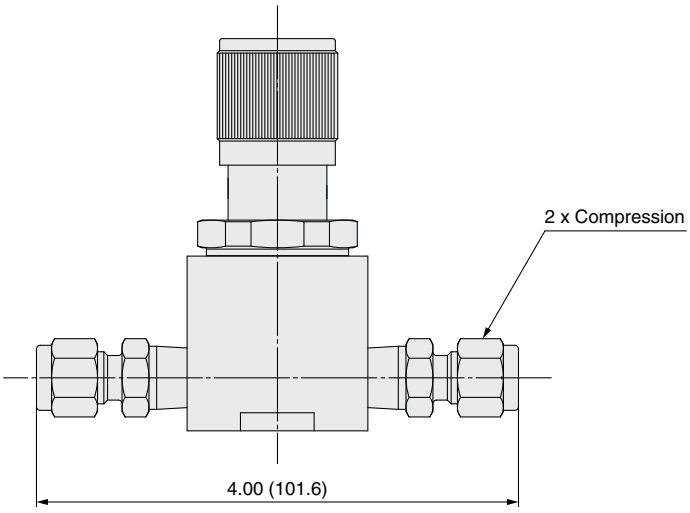
Dimensions

inch (mm)

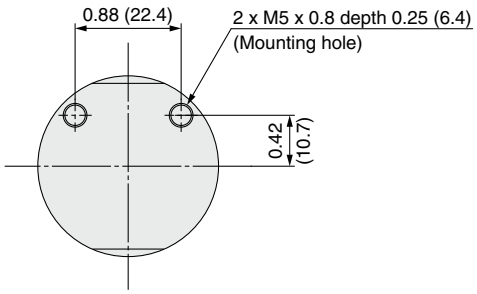
AK100



Connections: 2, 4



Connections: 4T



Single Stage Regulator for General Applications | Low to intermediate flow

AK1000 Series

- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Body material: Stainless steel and Brass available**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK10 [01] [S] [4PL] [4] [4] [0] [ ] [0] [ ] [ ] [ ] [ ] [ ]

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	316 SS
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4P		—	●
4PL		●	●
5PC		●	●

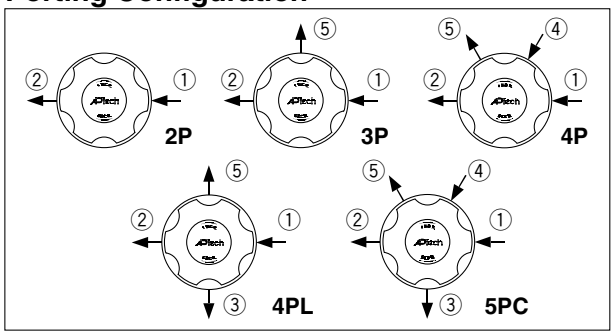
Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

Delivery pressure

Code	Delivery pressure	Code	Delivery pressure
01	0.5 to 10 psig (0.0034 to 0.07 MPa)	**15**	5 to 150 psig (0.034 to 1.0 MPa)
02	1 to 30 psig (0.007 to 0.2 MPa)	**20**	5 to 200 psig (0.034 to 1.4 MPa)
06	2 to 60 psig (0.014 to 0.4 MPa)	**30**	5 to 300 psig (0.034 to 2.1 MPa)
10	2 to 100 psig (0.014 to 0.7 MPa)	**50**	10 to 500 psig (0.07 to 3.5 MPa)

Porting Configuration



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

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 (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge *1) psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) *2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
*2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *6)

*6) Panel mounting hole: dia. 1.42 inch (36.1 mm).

Option

Code	Specification
No code	Standard
HF	High flow

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *3)
PK	PEEK
TF	PTFE *4) *5)

*3) Not available with SH material.
*4) Source pressure rating is limited to 300 psig (2.1 MPa) or less.
*5) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

Sample Order Number

	Port ①	②	③	④	⑤		
AK1002S	2P	4	4				
	3P	4	4			V3	MPA
	4P	4	4		1	V3	MPA
	4PL	4	4	0		V3	MPA
	4PL	4	4	0		0	
	5PC	4	4	0	1	V3	MPA

Specifications

Operating Parameters		AK1001	AK1002	AK1006	AK1010	AK1015	AK1020	AK1030	AK1050
Delivery pressure		0.5 to 10 psig (0.0034 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)	5 to 200 psig (0.034 to 1.4 MPa)	5 to 300 psig (0.034 to 2.1 MPa)	10 to 500 psig (0.07 to 3.5 MPa)
Gas		Select compatible materials of construction for the gas							
Source pressure		Vacuum to 300 psig (2.1 MPa)	Vacuum to 3500 psig (24.1 MPa) *1)						
Proof pressure	**Inlet**	1.5 times the maximum source pressure							
	Outlet	1.5 times the maximum delivery pressure							
Burst pressure	**Inlet**	3 times the maximum source pressure							
	Outlet	3 times the maximum delivery pressure							
Ambient and operating temperature		-40 to 71°C (No freezing) *2)							
Leak rate		1×10^{-10} Pa·m³/s							
Connections		NPT female, Compression							
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)							
Weight		1.09 kg *3)							

*1) Max. 300 psig (2.1 MPa) for PTFE seat.
*2) -10 to 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.
*3) Weight, 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	AK1001	AK1002	AK1006	AK1010	AK1015	AK1020	AK1030	AK1050
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop							

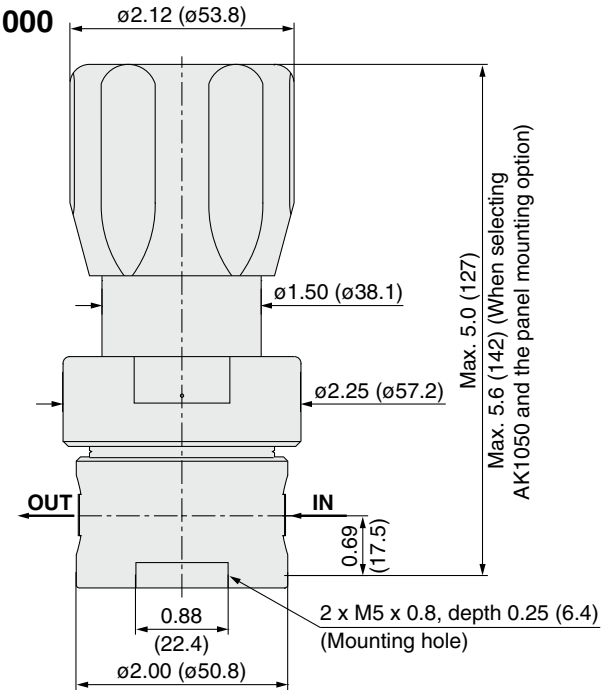
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK, PTFE)		PCTFE (Option: PEEK, PTFE)

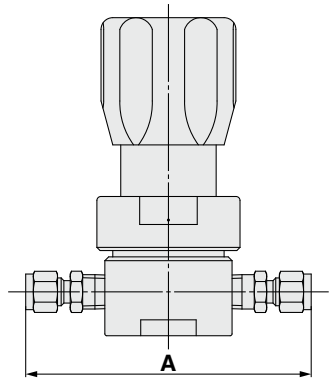
Dimensions

inch (mm)

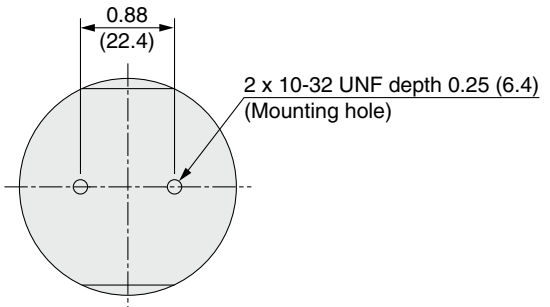
AK1000



AK1000 series compression fitting dimensions

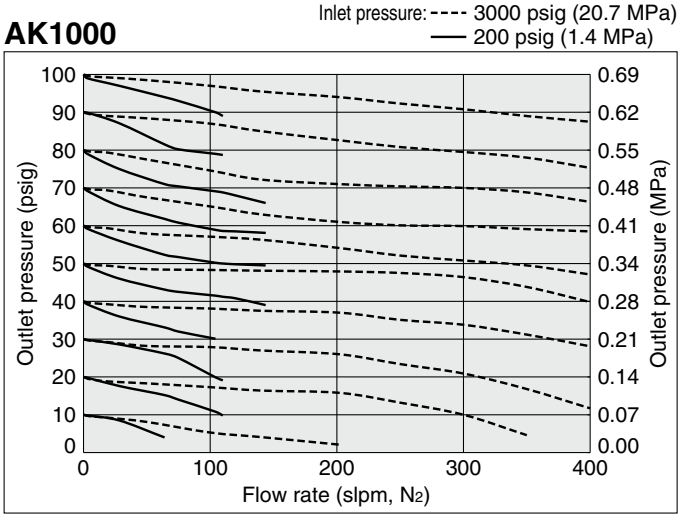


Connections	A	
	inch	(mm)
4T	4.5	(114)
6T	4.7	(119)

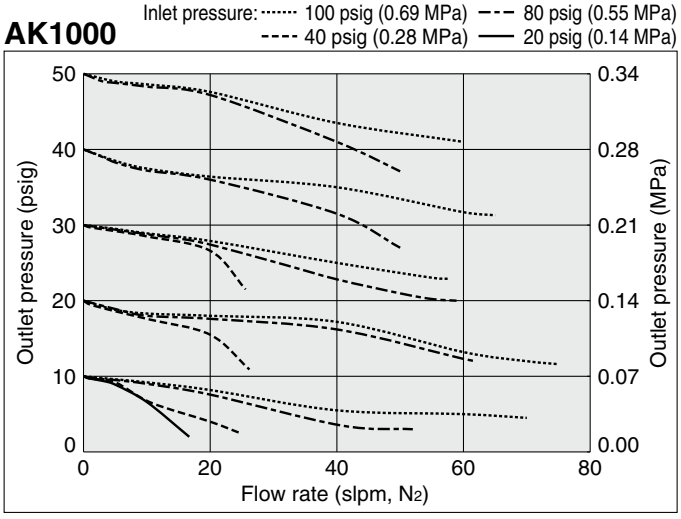


Flow Rate Characteristics

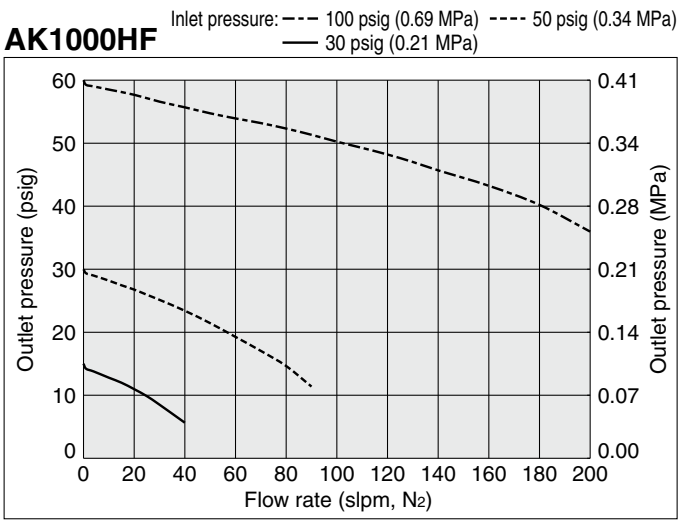
AK1000



AK1000



AK1000HF



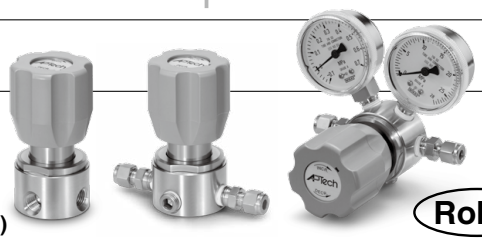
Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Regulator for General Applications

Low to intermediate flow

AK1000T Series

- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity < 120 slpm**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**



RoHS

How to Order (See p. 250 for ordering syntax)

Ports

Code	Ports	Ports	Connections			
			4	4BR	4T	6T
4PL	4 ports	Refer to the following porting configurations.	●	●	●	●
5PC	5 ports		●	—	●	●

Port Number ① ② ③ ④ ⑤

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

AK10 [01] T [S] [4PL] [4] [4] [0] [ ] [0] [ ] [ ] [ ]

Delivery pressure

Code	Delivery pressure
01	0.5 to 10 psig (0.0034 to 0.07 MPa)
02	1 to 30 psig (0.007 to 0.2 MPa)
06	1 to 60 psig (0.007 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
S	316L SS	316 SS	316 SS
SHP		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Connections (Inlet ①, Outlet ②)

Code	Connections	Connections			
		4	4BR	4T	6T
4	NPT1/4	●	—	●	●
4BR	Rc1/4	—	●	—	—
4T	1/4 inch compression	●	—	●	●
6T	3/8 inch compression	●	—	●	●

Pressure gauge unit Note)

Code	Unit
No code	psig/bar
MPA	MPa

Note) 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	Polyimide Note)

Note) Not available with SHP material.

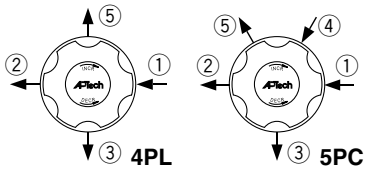
Gauge port (Extra outlet port ③, Inlet ④, Outlet ⑤) Note1)

Code	Pressure gauge		Connections Note 3)			
	psig/bar unit	MPa unit	4	4BR	4T	6T
No code	No gauge port		●	●	●	●
0	No pressure gauge Note 2)		●	●	●	●
C	No pressure gauge (Shipped with port plug installed)		●	●	●	●
V15	–30 in.Hg to 15 psig	–0.1 to 0.1 MPa	●	—	●	●
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	●	—	●	●
V2	–30 in.Hg to 200 psig	–0.1 to 1.4 MPa	●	—	●	●
2	0 to 200 psig	0 to 1.5 MPa	●	—	●	●
4	0 to 400 psig	0 to 3 MPa	●	—	●	●
10	0 to 1000 psig	0 to 7 MPa	●	—	●	●
30	0 to 3000 psig	0 to 21 MPa	●	—	●	●
40	0 to 4000 psig	0 to 28 MPa	●	—	●	●

Note 1) Other range available. Refer to gauge guide (P.139).
Note 2) If no pressure gauge, gauge port is NPT1/4 for connections 4, 4T, 6T and Rc1/4 for 4BR. And port plugs will be shipped bagged.

Note 3) If connection 4BR, pressure gauges cannot be installed.

Porting Configuration



Sample Order Number

	Port	①	②	③	④	⑤	
AK1002TS	4PL	4	4	0		0	
	5PC	4T	4T	0	40	1	MPA

①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Wetted Parts Material

Wetted Parts	S	SHP
Body	316L SS	
Poppet	316 SS	Ni-Cr-Mo alloy
Diaphragm	316 SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

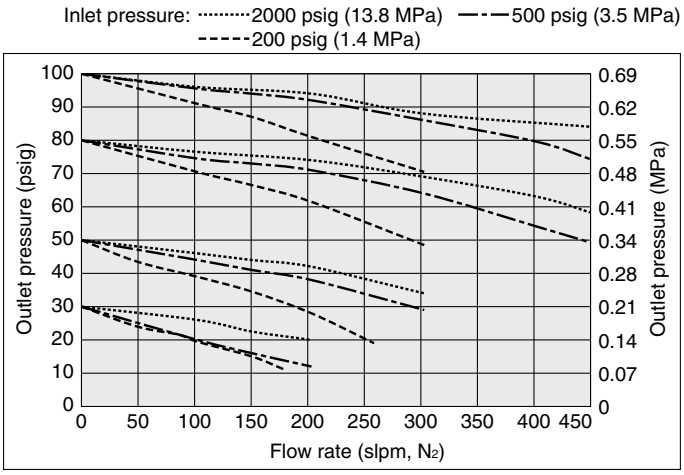
Specifications

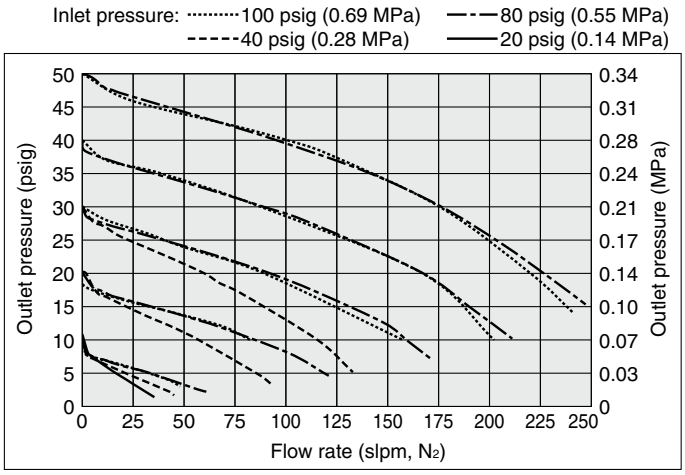
Operating Parameters		AK1001T	AK1002T	AK1006T	AK1010T	AK1015T
Delivery pressure		0.5 to 10 psig (0.0034 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas				
Source pressure		Vacuum to 300 psig (2.1 MPa)	Vacuum to 3500 psig (24.1 MPa)			
Proof pressure	**Inlet**	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	**Inlet**	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		–40 to 71°C (No freezing) Note 1)				
Leak rate		1 x 10^{-10} Pa·m³/s				
Connections		NPT female, Rc thread, Compression				
Supply pressure effect		1.2 psig (0.008 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
Installation		Bottom mount (Option: Bracket mount/Order separately)				
Internal volume		0.3 in³ (4.8 cm³)				
Weight		0.52 kg Note 2)				

Note 1) -10 to 90°C for Polyimide seat. Note 2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

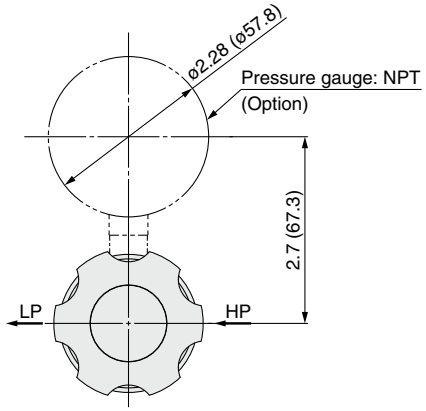
Flow Rate Characteristics



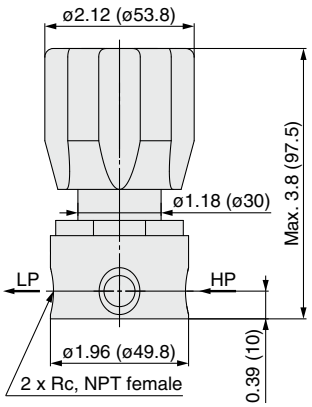


Dimensions

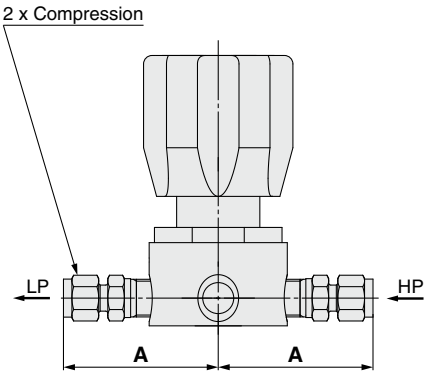
inch (mm)



Connections	A	
	inch	(mm)
4T	2.25	(57.2)
6T	2.35	(59.7)

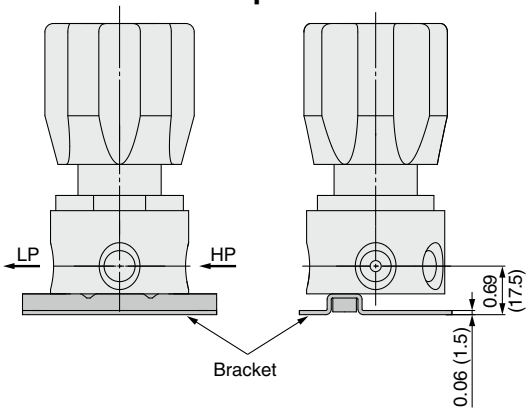


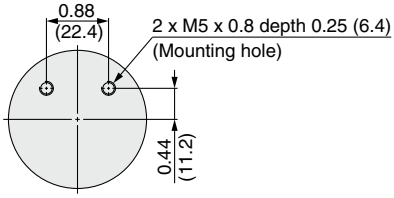
Connections: 4, 4BR

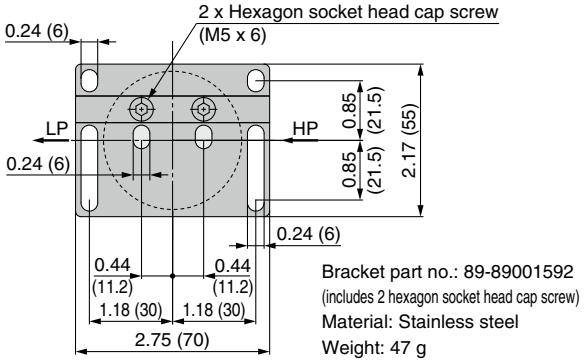


Connections: 4T, 6T

Bracket mount/Option







Bracket part no.: 89-89001592
(includes 2 hexagon socket head cap screw)
Material: Stainless steel
Weight: 47 g

AK1100 Series

- Sub-atmospheric to low positive pressure delivery
- Flow capacity: to 0.5 slpm
- Body material: Stainless steel and Brass available
- Ni-Cr-Mo alloy internals available for corrosion resistance

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK11 01 S 4PL 4 4 0 0

Delivery pressure

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

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	SUS316
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4P		—	●
4PL		●	●
5PC		●	●

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge*1) psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT)*2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 MPa
4	0 to 400 psig	0 to 3 MPa

*1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

*2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation*6)

*6) Panel mounting hole: dia. 1.42 inch (36.1 mm).

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide*4)
PK	PEEK
TF	PTFE*5)

*4) Not available with SH material.

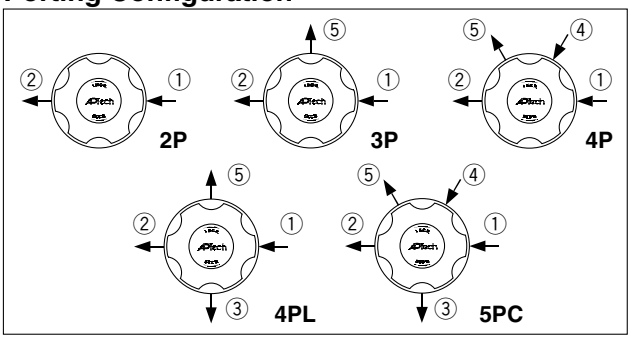
*5) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

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.

Porting Configuration



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

Sample Order Number

	Port ①	②	③	④	⑤		
AK1101S	2P	4	4				
	3P	4	4			V3	MPA
	4P	4	4		1	V3	MPA
	4PL	4	4	0		V3	MPA
	4PL	4	4	0		0	
	5PC	4	4	0	1	V3	MPA

Specifications

Operating Parameters		AK1101
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	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Ambient and operating temperature		-40 to 71°C (No freezing) *1)
Leak rate		1 x 10^{-10} Pa·m^3/s
Connections		NPT female, Compression
Installation		Bottom mount (Option: panel mount)
Internal volume		0.49 in^3 (8 cm^3)
Weight		1.09 kg *2)

*1) -10 to 90°C for Polyimide and PEEK seat.

*2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

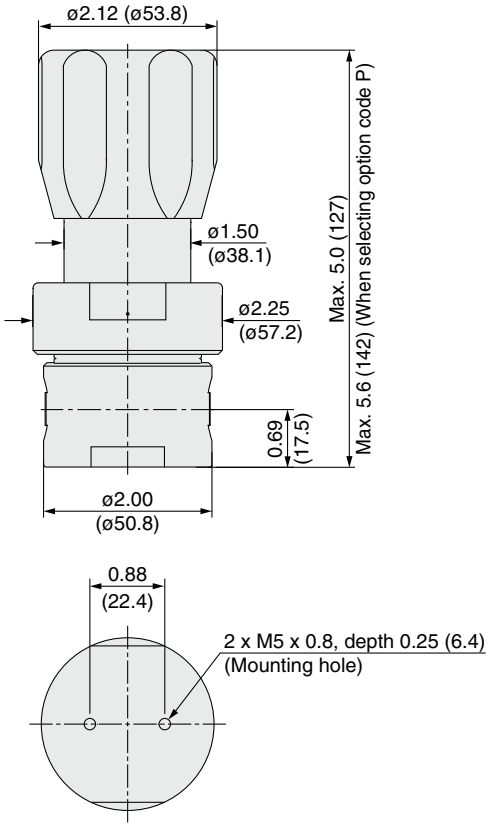
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK, PTFE)		PCTFE (Option: PEEK, PTFE)

Dimensions

inch (mm)

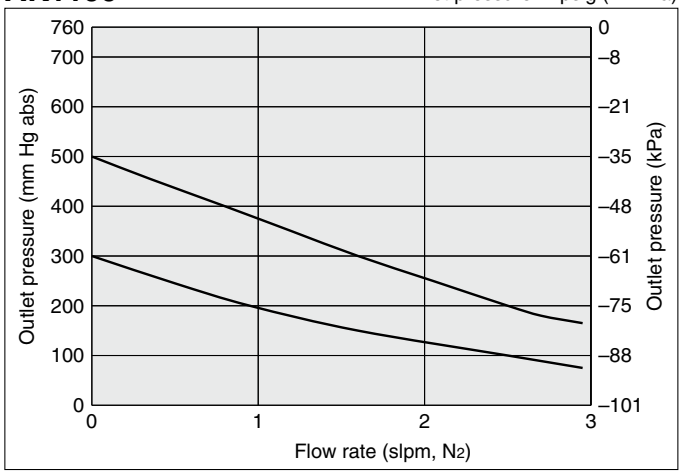
AK1100



Flow Rate Characteristics

AK1100

Inlet pressure: 2 psig (14 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for General Applications | Low flow (Tied-diaphragm)

AK1500 Series

- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
  HR (option): Max. 4500 psig (31 MPa)
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Body material: Stainless steel and Brass available**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Tied-diaphragm design**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK15 [02] [S] [4PL] [4] [4] [0] [ ] [0] [ ] [ ] [ ] [ ] [ ]

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)

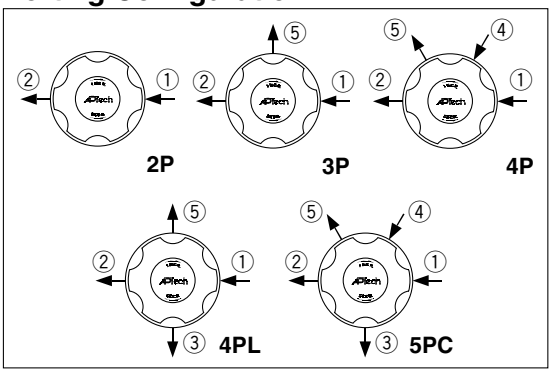
Material

Code	Body	Poppet	Diaphragm
B	Brass	316L SS	316 SS
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4P		—	●
4PL		●	●
5PC		●	●

Porting Configuration



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗1) psig/bar unit	Pressure gauge ∗1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa
60	0 to 6000 psig	(not applied)

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Sample Order Number

	Port	①	②	③	④	⑤	
AK1510S	2P	4	4			1	MPA
	3P	4	4			1	MPA
	4PL	4	4	0		1	MPA
	4PL	4	4	0		0	
	5PC	4	4	0	40	1	MPA

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗7)

∗7) Panel mounting hole: dia. 1.42 inch (36.1 mm).

Option

Code	Specification
No code	Standard
HF	High flow ∗5)
HR	High inlet pressure (Max. inlet pressure 4500 psig (31 MPa)) ∗5)∗6)

∗5) Options "HF" and "HR" cannot be used in combination.
∗6) Not available with B material.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)
PK	PEEK

∗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		AK1502	AK1506	AK1510	AK1515
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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate		1 x 10^{-10} Pa·m^3/s			
Connections		NPT female, Compression			
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		0.49 in^3 (8 cm^3)			
Weight		1.18 kg ∗2)			

∗1) -10 to 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.
∗2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

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	AK1502	AK1506	AK1510	AK1515
HF	**Supply pressure effect**	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			

2. High inlet pressure
Changes from the standard type are:

Option	Other Parameters	AK1502	AK1506	AK1510	AK1515
HR	**Source pressure**	Vacuum to 4500 psig (31 MPa)			

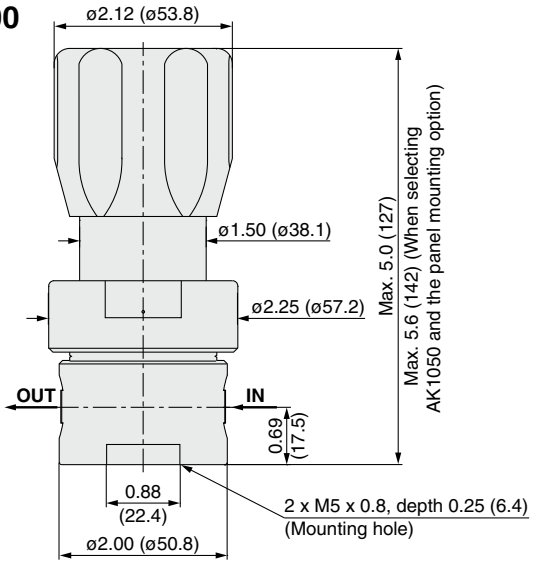
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK)		PCTFE (Option: PEEK)

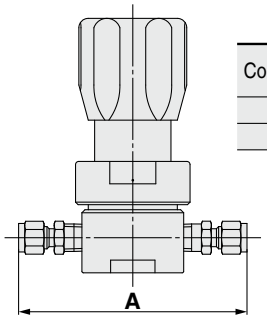
Dimensions

inch (mm)

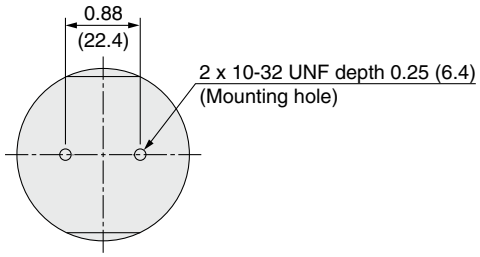
AK1500



AK1500 series compression fitting dimensions

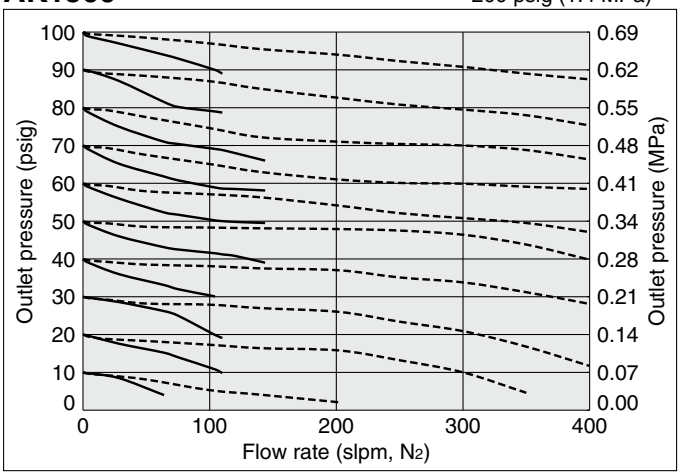


Connections	A	
	inch	(mm)
4T	4.5	(114)
6T	4.7	(119)

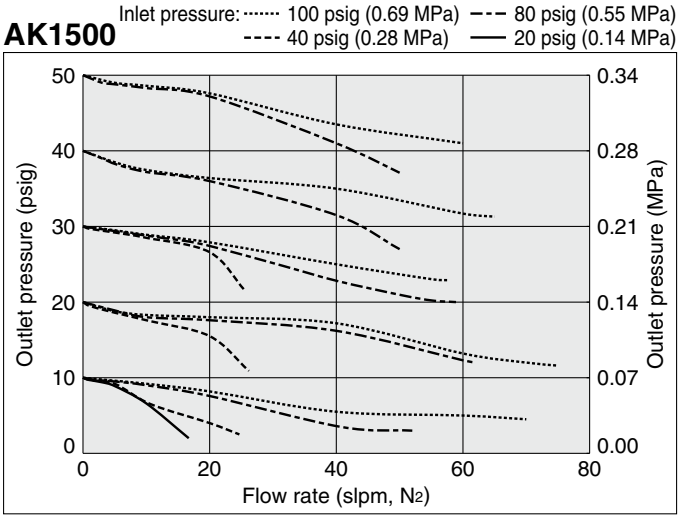


Flow Rate Characteristics

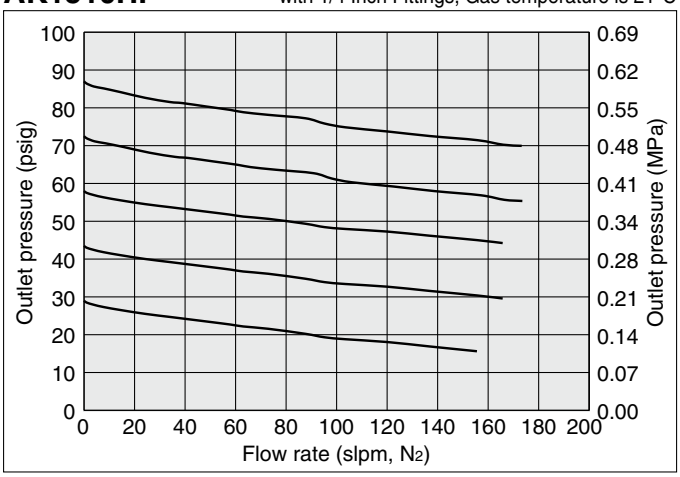
AK1500



AK1500



AK1510HF



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AK1400T Series

- 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: Stainless steel and Brass available
- Ni-Cr-Mo alloy internals standard
- Sub-atmospheric pressure delivery option
- Tied-diaphragm design

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK14 [02] T [S] [ ] [4PL] [6] [6] [0] [ ] [0] [ ] [ ] [ ] [ ] [ ]

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	1 to 60 psig (0.007 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
B	Brass	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316 SS
S	316L SS			
SH				Ni-Cr-Mo alloy

Range options ∗1)

Code	Specification
No code	Standard
A	Sub-atmospheric

∗1) Only available with AK1402T.

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●
5PC		●	●

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.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗4)

∗4) Not available with SH material.

Knob

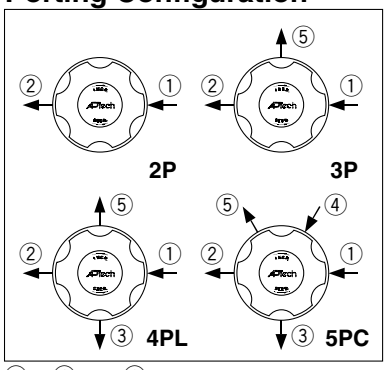
Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation∗6)
BP	Bonnet port (NPT 1/8 inch)

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

Porting Configuration



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
6	NPT 3/8 inch
8	NPT 1/2 inch
4T	1/4 inch compression
6T	3/8 inch compression
8T	1/2 inch compression

Sample Order Number

AK1410TS

Port	①	②	③	④	⑤	
2P	6	6				
3P	6	6			1	MPA
4PL	6	6	0		1	MPA
4PL	6	6	0		0	
5PC	6	6	0	40	1	MPA

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗2) psig/bar unit	Pressure gauge ∗2) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Option

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

∗5) Not available with AK1402T and AK1406T.

Specifications

Operating Parameters		AK1402T□A	AK1402T	AK1406T	AK1410T	AK1415T
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	1 to 60 psig (0.007 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	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	Inlet	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)				
Leak rate		1×10^{-10} Pa·m³/s				
Connections		NPT female, Compression				
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		0.65 in³ (10.6 cm³)				
Weight		2.04 kg ∗3)				

∗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) -10 to 90°C for Polyimide seat.
∗3) Weight, including individual boxed weight, may vary depending on connections or options.

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AK1410T	AK1415T
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)	

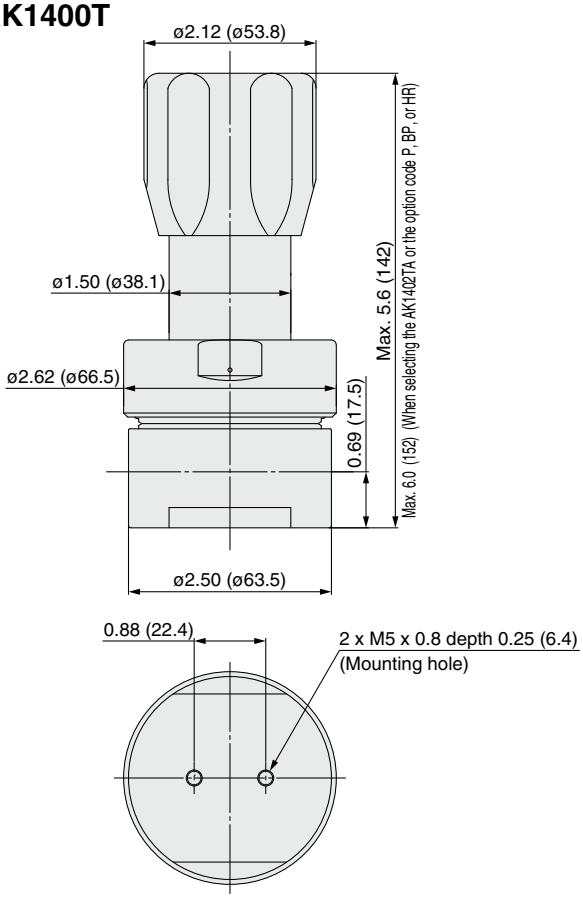
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	Ni-Cr-Mo alloy		
Diaphragm	Ni-Cr-Mo alloy		
Nozzle	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)		PCTFE

Dimensions

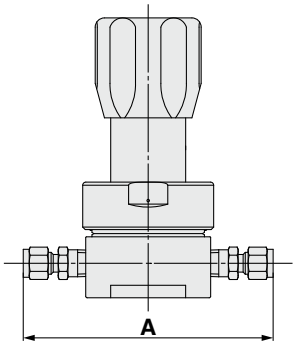
inch (mm)

AK1400T



Note) The standard port is ø1.5. When selecting the AK1402TA or the option code P, BP, or HR, the connection is NPT1/8 female thread.

AK1400T series compression fitting dimensions

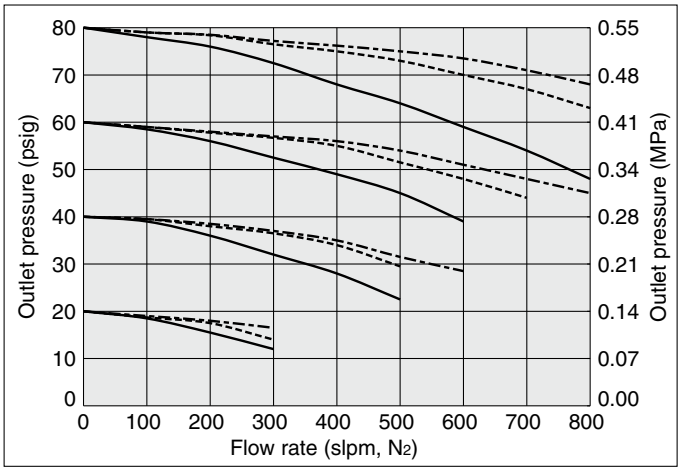


Connections	A	
	inch	(mm)
4T	5.0	(127)
6T	5.2	(132)
8T	5.7	(145)

Flow Rate Characteristics

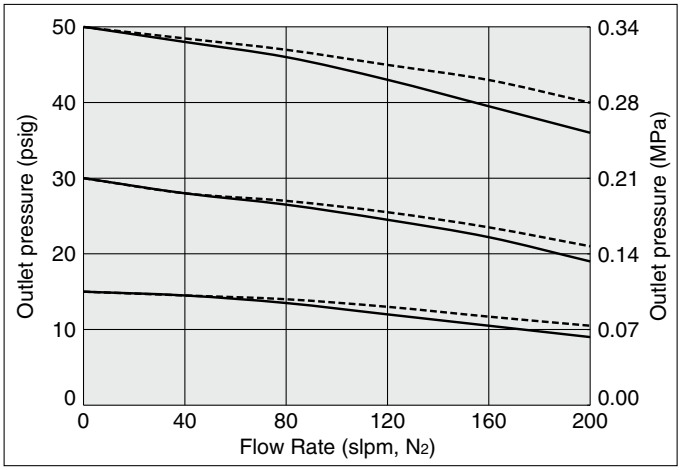
Inlet pressure: 2000 psig (13.8 MPa) 600 psig (4.1 MPa) 200 psig (1.4 MPa)

AK1400T 1/2 inch Connection *)

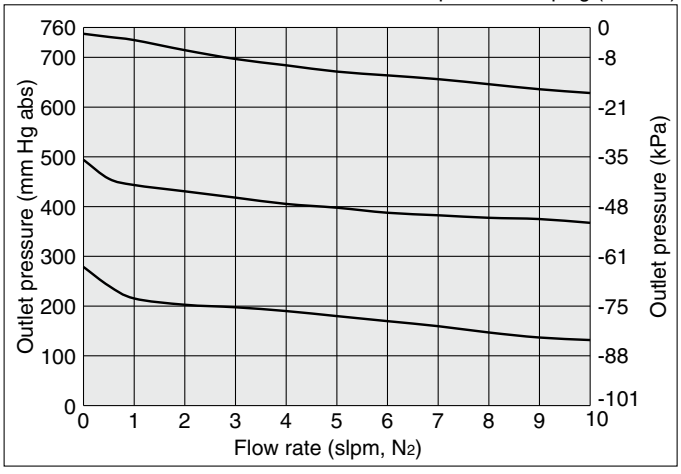


Inlet pressure: 80 psig (0.55 MPa) 60 psig (0.41 MPa)

AK1400T 1/2 inch Connection *)



AK1400TA Inlet pressure: 0 psig (14 kPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for General Applications | High flow (Tied-diaphragm)

AK1200 Series

- **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: Stainless steel and Brass available**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Tied-diaphragm design**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK12 [02] [S] [4PL] [8] [8] [0] [ ] [0] [ ] [ ] [ ] [ ] [ ]

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	Ni-Cr-Mo alloy
S	316L SS	Ni-Cr-Mo alloy	
SH			

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●
5PC		●	●

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)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
6	NPT 3/8 inch
8	NPT 1/2 inch
4T	1/4 inch compression
6T	3/8 inch compression
8T	1/2 inch compression

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗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.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO ∗8)

∗8) Not available with AK1225.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗7)
BP	Bonnet port (NPT 1/8 inch)

∗7) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Option

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

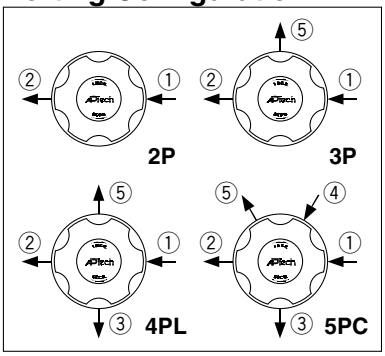
∗4) FC option is only available with connection size 1/2 inch, but not available with AK1202, AK1206 and AK1225.
∗5) HR option is not available with AK1202 and AK1206.
∗6) Options "HF", "HC" and "HR" cannot be used in combination.

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗1) psig/bar unit	Pressure gauge ∗1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Porting Configuration



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Sample Order Number

	Port ①	②	③	④	⑤		
AK1202S	2P	8	8				
	3P	8	8			V3	MPA
	4PL	8	8	0		V3	MPA
	4PL	8	8	0		0	
	5PC	8	8	0	40	V3	MPA

Specifications

Operating Parameters		AK1202	AK1206	AK1210	AK1215	AK1225
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 1000 psig 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**	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	**Inlet**	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-40 to 71°C (No freezing) ∗3)				
Leak rate		1×10^{-10} Pa·m³/s				
Connections		NPT female, Compression				
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		0.65 in³ (10.6 cm³)				
Weight		2.0 kg ∗4)				

∗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.
∗3) -10 to 90°C for Polyimide seat. Optional ambient and operating temperature range available. Please contact SMC.
∗4) Weight, 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	AK1202	AK1206	AK1210	AK1215	AK1225
HF	**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 higher flow capacity than HF option. Changes from the standard type are:

Option	Other Parameters	AK1210	AK1215
FC	**Source pressure**	Vacuum to 300 psig (2.1 MPa)	
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
	Connections	NPT 1/2 inch, 1/2 inch compression	

3. High inlet pressure Changes from the standard type are:

Option	Other Parameters	AK1210	AK1215
HR	**Source pressure**	Vacuum to 3000 psig (20.7 MPa)	

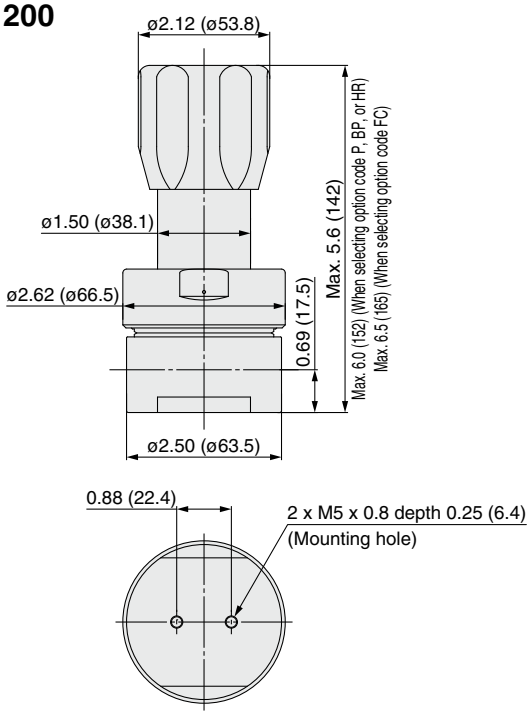
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy		
Seat	PCTFE (Option: Polyimide)		PCTFE

Dimensions

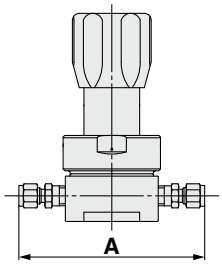
inch (mm)

AK1200



Note) The standard port is ø1.5. When selecting the option code P, BP, HR, or FC, the connection is NPT1/8 female thread.

AK1200 series compression fitting dimensions

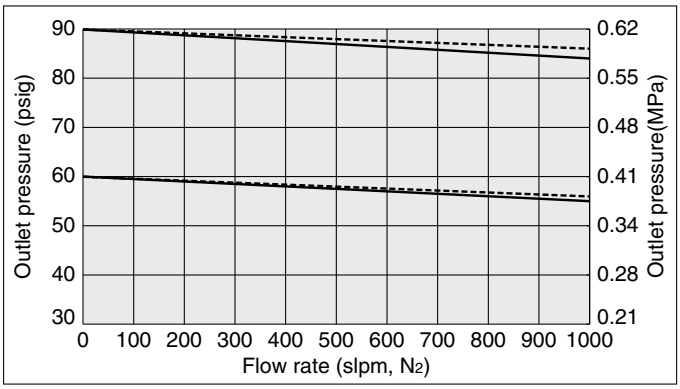


Connections	A	
	inch	(mm)
4T	5.0	(127)
6T	5.2	(132)
8T	5.7	(145)

Flow Rate Characteristics

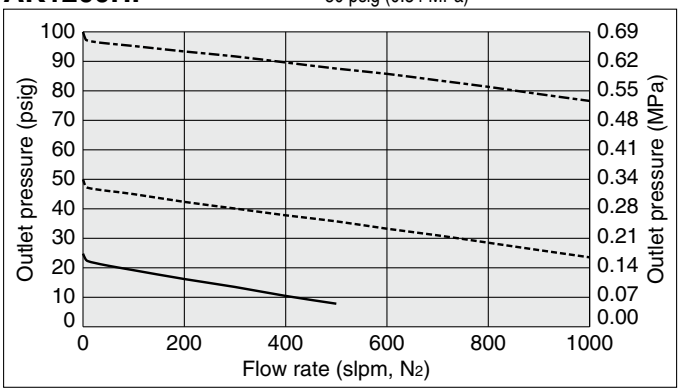
AK1200

Inlet pressure: ---- 1700 psig (11.7 MPa) —— 500 to 1000 psig (3.4 to 6.9 MPa)
1/2 inch connections *)



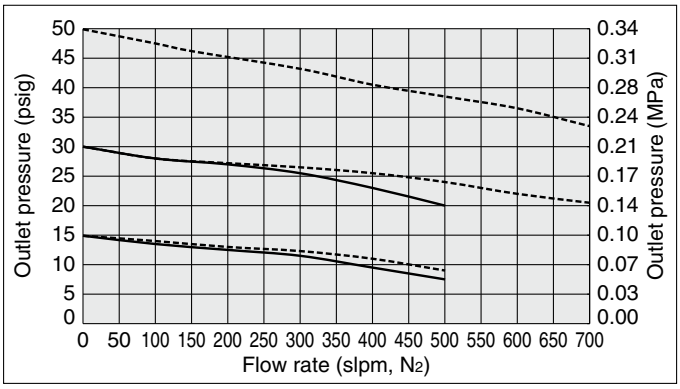
AK1200HF

Inlet pressure: - - - 150 psig (1.0 MPa) ---- 100 psig (0.69 MPa)
—— 50 psig (0.34 MPa)



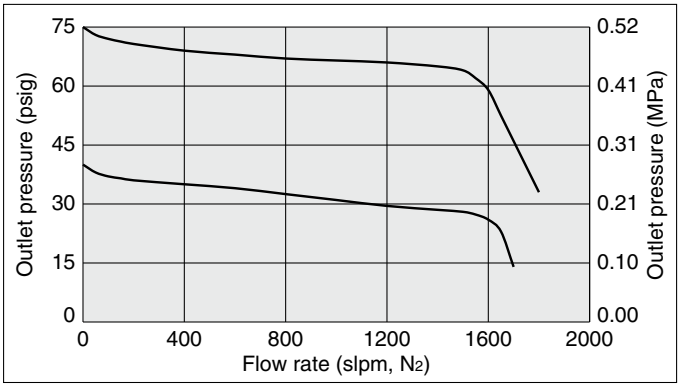
AK1200

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



AK1200FC

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



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AK1300 Series

- Flow capacity to 1000 slpm
- Body material: Stainless steel and Brass available
- Inlet pressure: Max. 300 psig (2.1 MPa)

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④

AK13 [02] [S] [4PL] [8] [8] [0] [0] [ ] [ ] [ ] [ ]

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
B	Brass	316 SS	Ni-Cr-Mo alloy
S	316L SS		

Ports

Code	Ports	Material B	Material S
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
6	NPT 3/8 inch
8	NPT 1/2 inch
4T	1/4 inch compression
6T	3/8 inch compression
8T	1/2 inch compression

Gauge port (Outlet③, ④)

Code	Pressure gauge ∗1) psig/bar unit	Pressure gauge ∗1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

∗2) 1/4 inch NPT plug is included only for port code 4PL.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation∗4)
BP	Bonnet port (NPT 1/8 inch)

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

Seat material

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

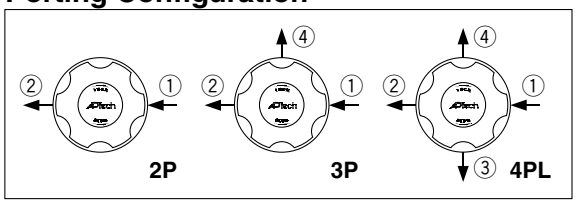
∗3) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

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 ③④Gauge port (Outlet)

Sample Order Number

	Port	①	②	③	④	
AK1302S	2P	8	8			
	3P	8	8		V3	MPA
	4PL	8	8	0	V3	MPA
	4PL	8	8	0	0	

Specifications

Operating Parameters		AK1302	AK1306	AK1310	AK1315
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 300 psig (2.1 MPa)			
Proof pressure	Inlet	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	Inlet	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing)			
Leak rate		1 x 10^{-10} Pa·m³/s			
Connections		NPT female, Compression			
Supply pressure effect		4.6 psig (0.032 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		0.65 in³ (10.6 cm³)			
Weight		2.0 kg ∗			

∗ Weight, including individual boxed weight, may vary depending on connections or options.

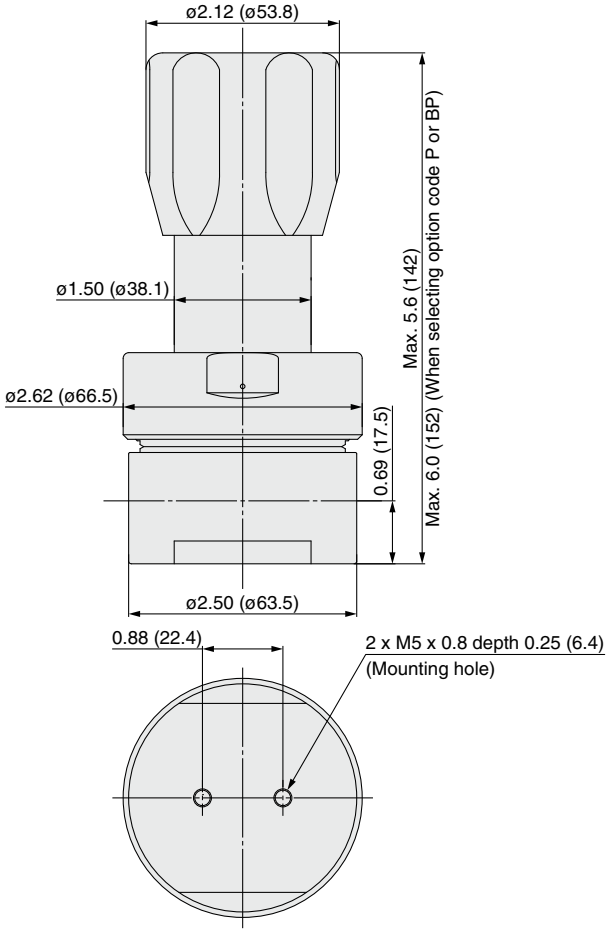
Wetted Parts Material

Wetted Parts	B	S
Body	Brass	316L SS
Poppet	316 SS	
Diaphragm	Ni-Cr-Mo alloy	
Seat	PCTFE (Option: PTFE)	

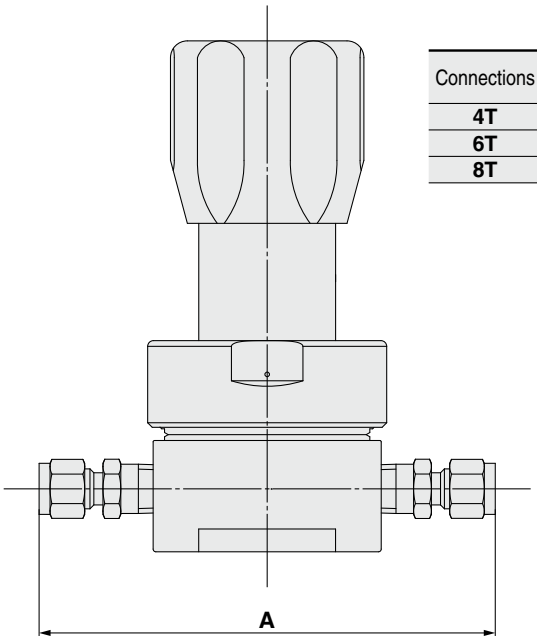
Dimensions

inch (mm)

AK1300



AK1300 series compression fitting dimensions

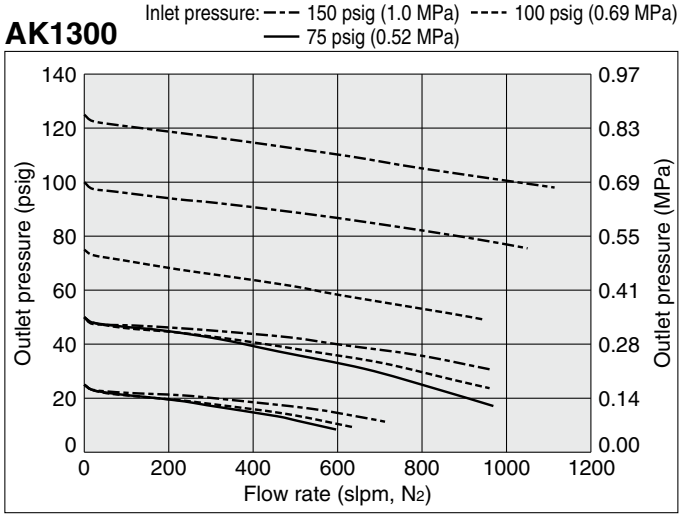


Connections	A	
	inch	(mm)
4T	5.0	(127)
6T	5.2	(132)
8T	5.7	(145)

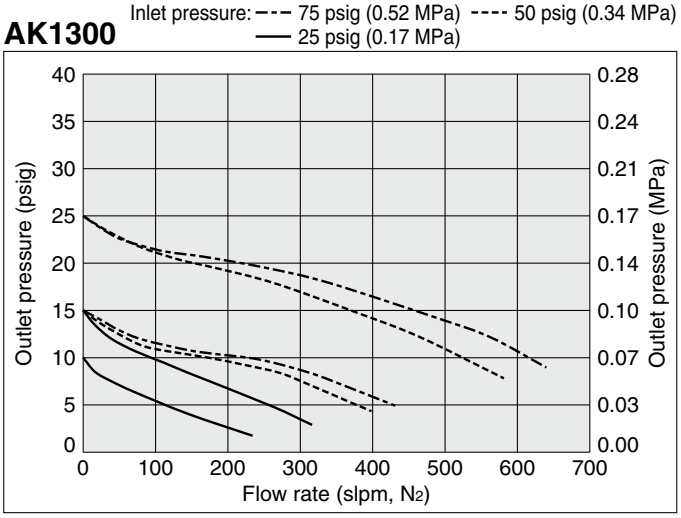
Note) The standard port is ø1.5. When selecting the option code P or BP, the connection is NPT1/8 female thread.

Flow Rate Characteristics

AK1300



AK1300



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Single Stage Regulator for General Applications | High flow (Tied-diaphragm)

AK9200 Series

- **3/4 inch port size**
- **Inlet pressure: Max. 300 psig (2.1 MPa)**
- **Flow capacity: to 2000 slpm**
- **Body material: 316L SS**

RoHS

How to Order (See p. 250 for ordering syntax)

AK92 [02] [S] [4PL] [12] [12] [0] [0] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

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
S	316L SS	316 SS	Ni-Cr-Mo alloy

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗3)
BP	Bonnet port (NPT 1/8 inch)

∗3) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Ports

Code	Ports
4PL	4 ports

Connections (Inlet①, Outlet②)

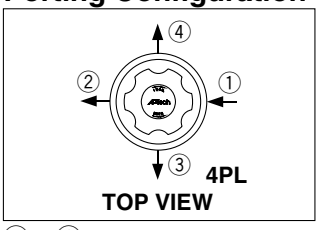
Code	Connections
12	NPT 3/4 inch
12T	3/4 inch compression

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
③④Gauge port (Outlet)

Gauge port (Outlet③, ④)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
∗2) 1/4 inch NPT plug is included.

Specifications

Operating Parameters		AK9202	AK9206	AK9210	AK9215
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 300 psig (2.1 MPa)			
Proof pressure	**Inlet**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing)			
Leak rate		1×10^{-10} Pa·m³/s			
Connections		NPT female, Compression			
Supply pressure effect		7 psig (0.048 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		2.2 in³ (36 cm³)			

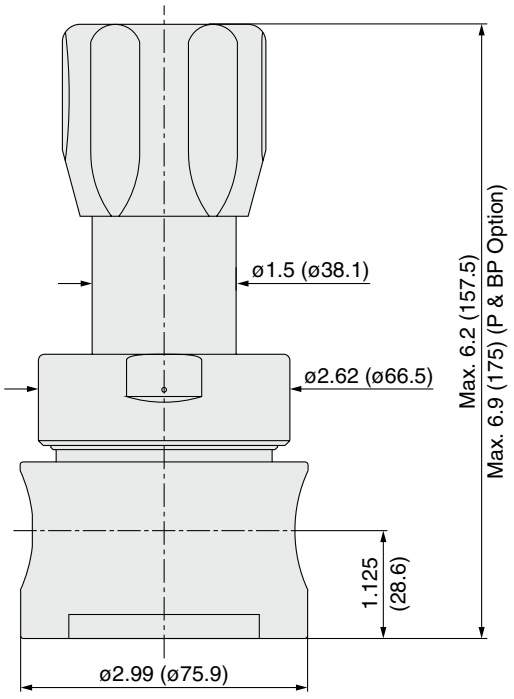
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Nozzle	316L SS
Poppet	316 SS
Diaphragm	Ni-Cr-Mo alloy
Seat	PFA

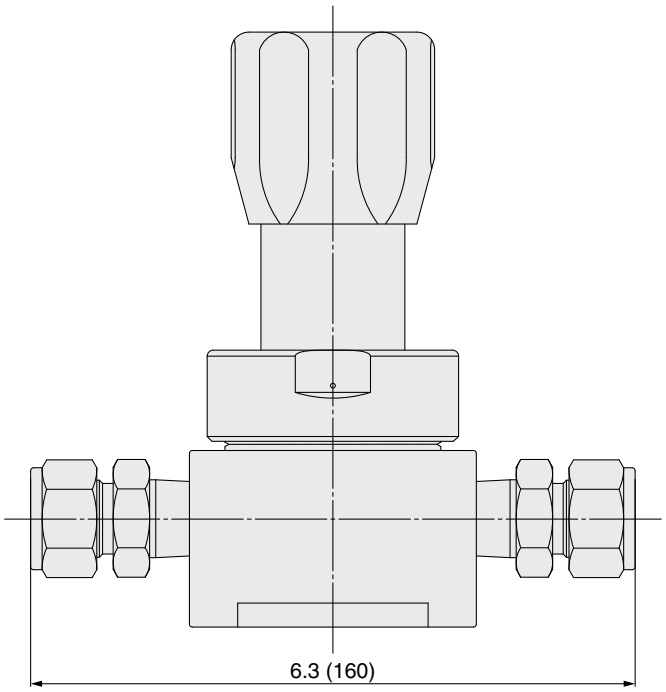
Dimensions

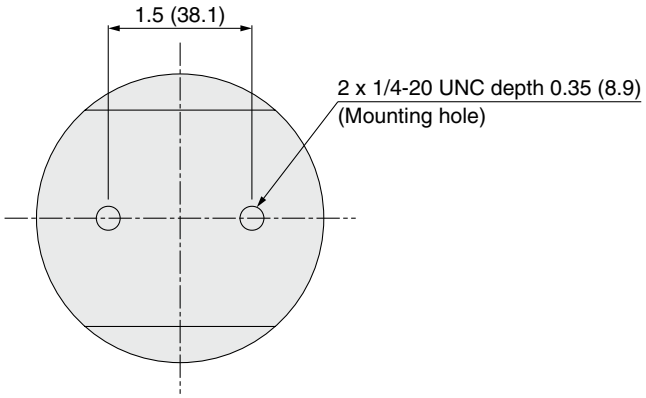
inch (mm)

AK9200



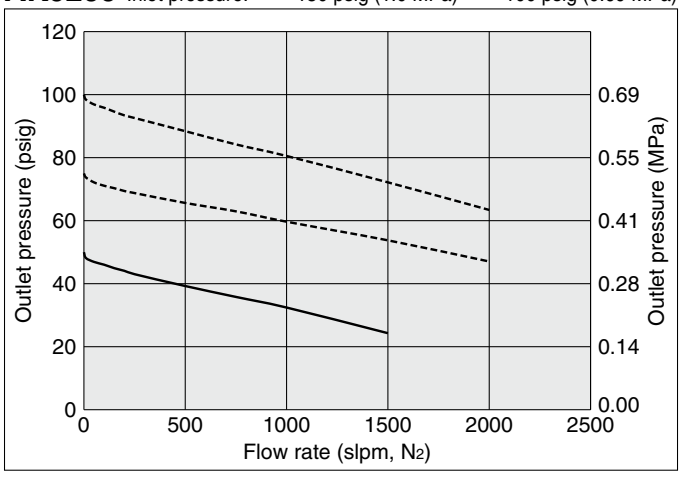
AK9200 series compression fitting dimensions





Flow Rate Characteristics

AK9200 Inlet pressure: ---- 150 psig (1.0 MPa) —— 100 psig (0.69 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Two Stage Regulator for General Applications | Low flow (Tied-diaphragm)

AK1700 Series

- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
  HR (option): Max. 4500 psig (31 MPa)
- **Flow capacity Standard: to 30 slpm**
- **Body material: Stainless steel and Brass available**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **Minimizes supply pressure effect by two stage regulation**
- **Tied-diaphragm design**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK17 [02] [S] [5PC] [4] [4] [0] [0] [0] [ ] [ ] [ ] [ ] [ ] [ ]

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	316 SS
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

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)
20	5 to 200 psig (0.034 to 1.4 MPa) ∗1)

∗1) When AK1720 is selected, selecting option "NT" is required.

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression

Pressure gauge unit ∗4)

Code	Unit
No code	psig/bar
MPA	MPa

∗4) 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	Polyimide ∗5)
PK	PEEK

∗5) Not available with SH material.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗7)

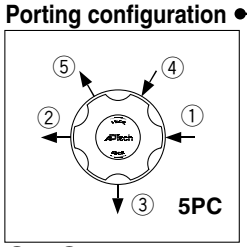
∗7) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Option

Code	Specification
No code	Standard
HF	High flow
HR	High inlet pressure (Max. inlet pressure 4500 psig (31 MPa))∗6)
HRHF	High inlet pressure + High flow∗6)

∗6) Not available with B material.

Porting configuration



①IN ②OUT
③Extra outlet port
④Gauge port (Inlet)
⑤Gauge port (Outlet)

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗2)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗3)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
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 1.5 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.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

∗3) 1/4 inch NPT plug is included.

Poppet feature option

Code	Feature
No code	Standard (First and second stage tied diaphragm)
NT	First stage tied, second stage free poppet

Sample Order Number

	Port ①	②	③	④	⑤		
AK1702S	5PC	4	4	0	0	0	
	5PC	4	4	0	40	V3	MPA

Specifications

Operating Parameters		AK1702	AK1706	AK1710	AK1720
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 200 psig (0.034 to 1.4 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**	1.5 times the maximum source pressure			
	Outlet	1.5 times the maximum delivery pressure			
Burst pressure	**Inlet**	3 times the maximum source pressure			
	Outlet	3 times the maximum delivery pressure			
Ambient and operating temperature		-40 to 71°C (No freezing) ∗1)			
Leak rate		1 x 10^{-10} Pa·m³/s			
Connections		NPT female, Compression			
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		0.9 in³ (15 cm³)			
Weight		1.95 kg ∗2)			

∗1) -10 to 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.

∗2) Weight, including individual boxed weight, may vary depending on connections or options.

Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK)		PCTFE (Option: PEEK)

Options

1. High inlet pressure

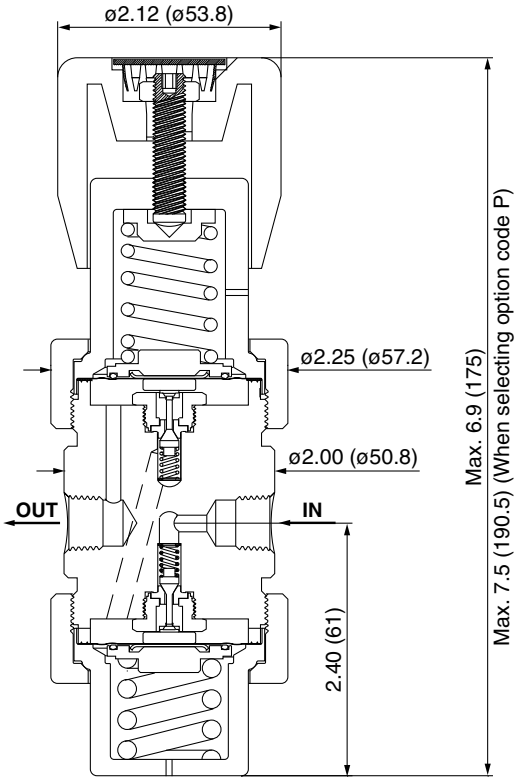
Changes from the standard type are:

Option	Other Parameters	AK1702	AK1706	AK1710	AK1720
HR	**Source pressure**	Vacuum to 4500 psig (31 MPa)			

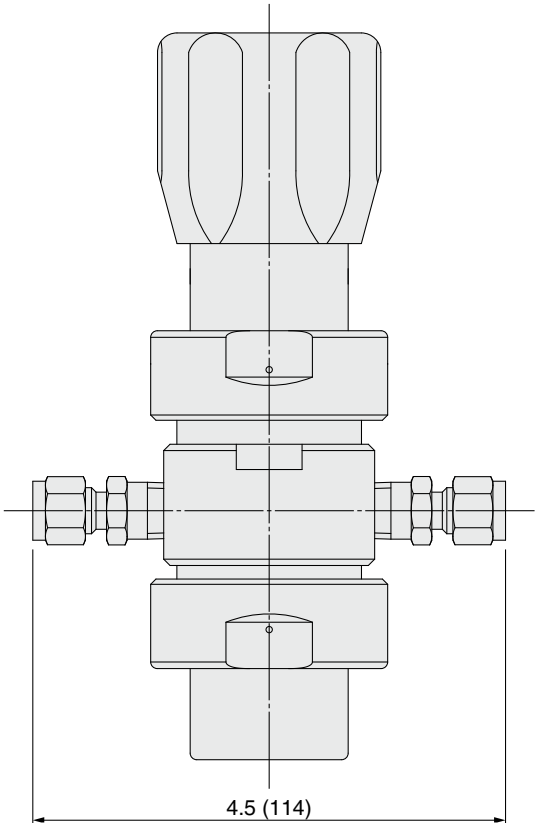
Dimensions

inch (mm)

AK1700



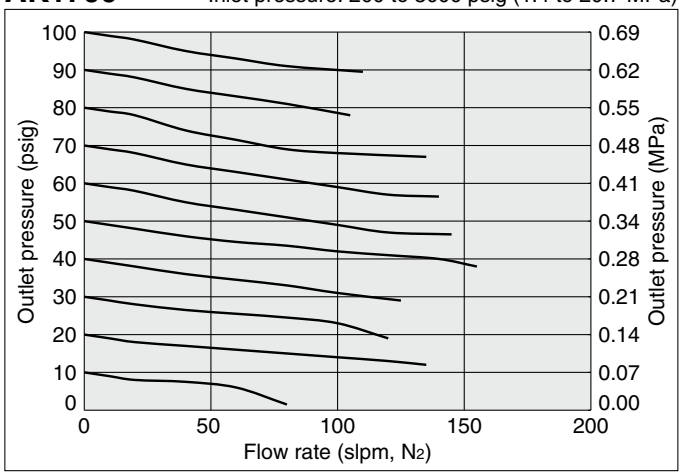
AK1700 series compression fitting dimensions



Flow Rate Characteristics

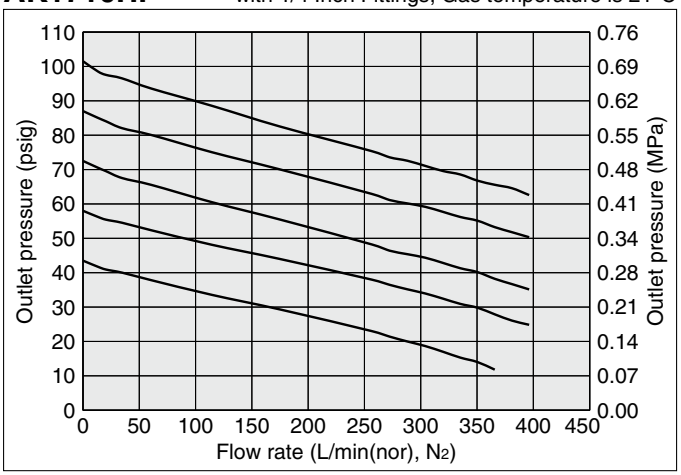
AK1700

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



AK1710HF

Inlet pressure: —— 220 psig (1.5 MPa)
with 1/4 Inch Fittings, Gas temperature is 21°C



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AK10PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: Stainless steel and Brass available**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
  HF (option): to 120 slpm
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK10 PA S 4PL 4 4 0 0

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

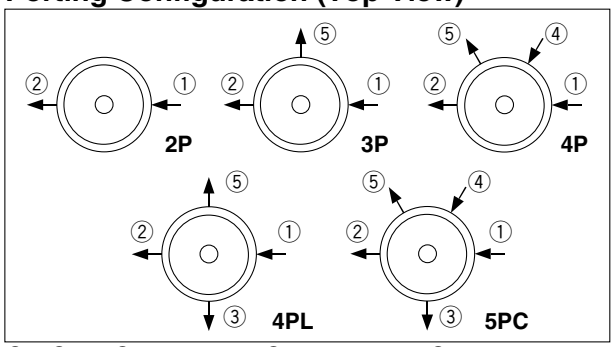
Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	316 SS
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4P		—	●
4PL		●	●
5PC		●	●

Porting Configuration (Top View)



①IN ②OUT ③Extra outlet port ④Gauge port (Inlet) ⑤Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗1) psig/bar unit	Pressure gauge ∗1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V15	-30 in.Hg to 15 psig	-0.1 to 0.1 MPa
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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
30	0 to 3000 psig	0 to 21 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Option

Code	Specification
No code	Standard
HF	High flow ∗6)

∗6) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)
PK	PEEK
TF	PTFE ∗4) ∗5)

∗3) Not available with SH material.

∗4) Source pressure rating is limited to 300 psig (2.1 MPa) or less.

∗5) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

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		AK10PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 3500 psig (24.1 MPa) ∗1)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗2)
Leak rate		1 x 10^{-10} Pa·m³/s
Connections		NPT female, Compression
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.5 in³ (8.2 cm³)

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

∗2) -10 to 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact 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	AK10PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

∗) HF option will not achieve rated outlet pressure at all inlet pressures.

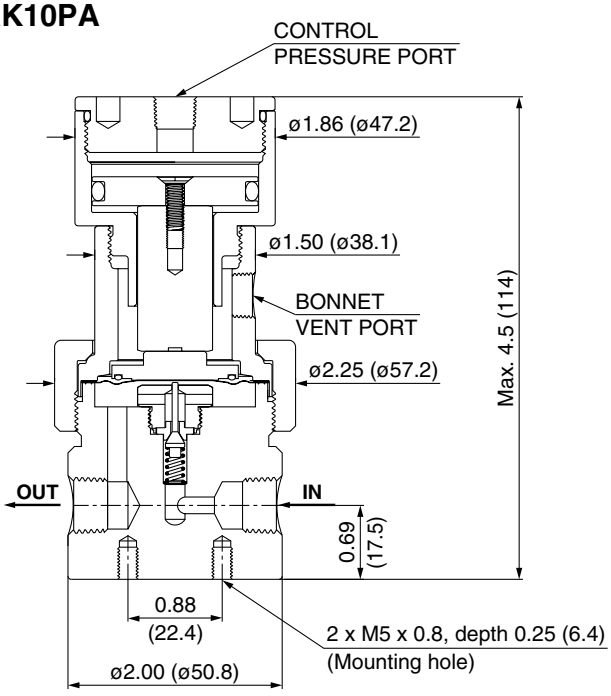
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK, PTFE)		PCTFE (Option: PEEK, PTFE)

Dimensions

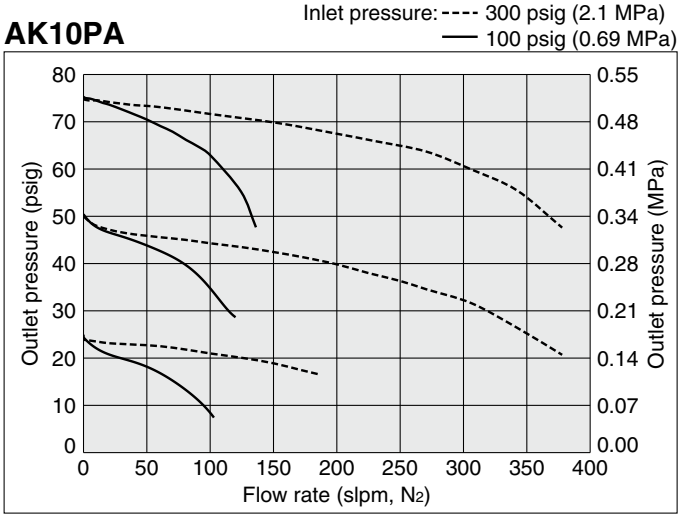
inch (mm)

AK10PA



Flow Rate Characteristics

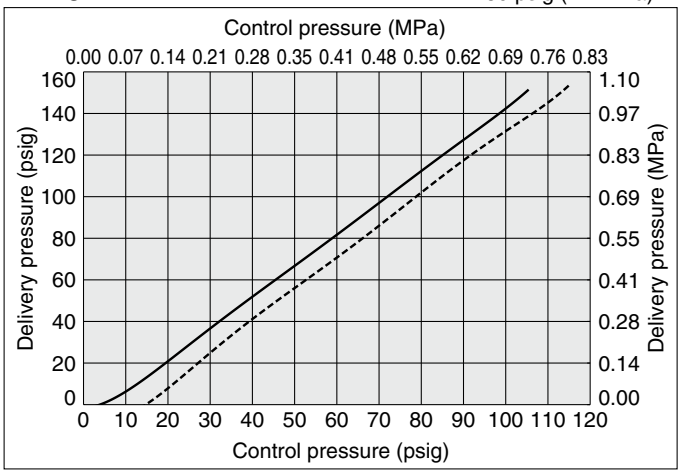
AK10PA



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input / Output Characteristics

AK10PA



Pneumatic Actuation Pressure Regulator

Low flow (Tied-diaphragm)

AK15PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: Stainless steel and Brass available**
- **High inlet pressure type: Max. 3500 psig (24.1 MPa)**
- **Flow capacity Standard: to 30 slpm**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK15 PA S 4PL 4 4 0 0

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	316 SS
S	316L SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

Seat material

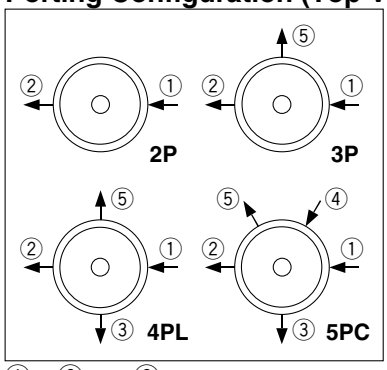
Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)
PK	PEEK

∗3) Not available with SH material.

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●
5PC		●	●

Porting Configuration (Top View)



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗1) psig/bar unit	Pressure gauge ∗1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V15	-30 in.Hg to 15 psig	-0.1 to 0.1 MPa
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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
30	0 to 3000 psig	0 to 21 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

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		AK15PA
Delivery pressure		7 to 150 psig (0.05 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**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗)
Leak rate		1 x 10^{-10} Pa·m³/s
Connections		NPT female, Compression
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		0.53 in³ (8.71 cm³)

∗) -10 to 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.

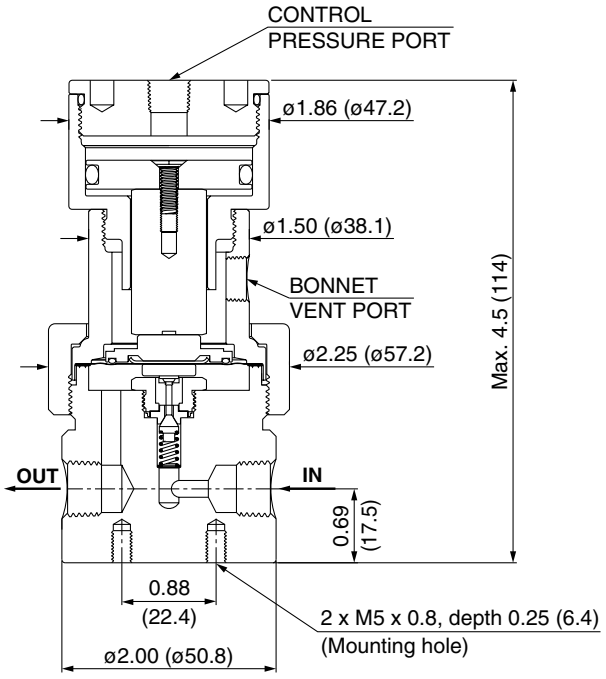
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide, PEEK)		PCTFE (Option: PEEK)

Dimensions

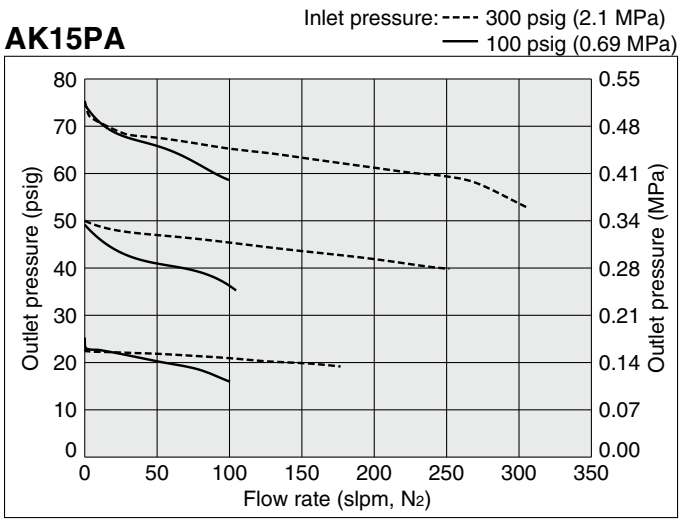
inch (mm)

AK15PA



Flow Rate Characteristics

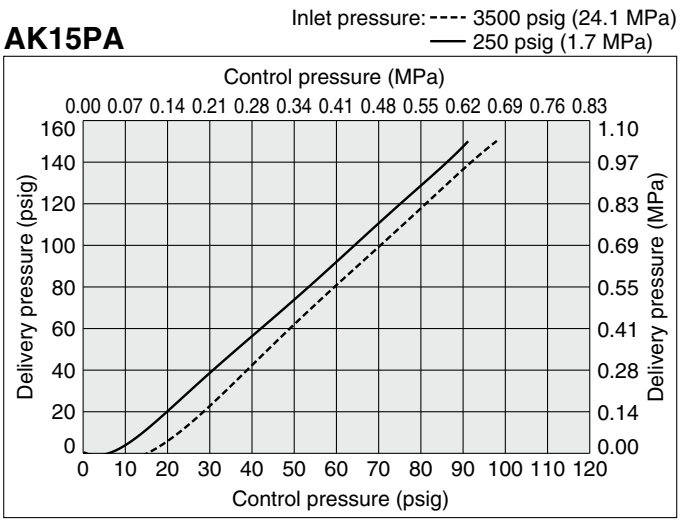
AK15PA



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input/Output Characteristics

AK15PA



Pneumatic Actuation Pressure Regulator

Intermediate flow (Tied-diaphragm)

AK14PAT Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: Stainless steel and Brass available**
- **High inlet pressure type Standard: Max. 2300 psig (15.9 MPa)**
  HR (option): Max. 3000 psig (20.7 MPa)
- **Flow capacity: to 400 slpm**
- **Ni-Cr-Mo alloy internals standard**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa)**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK14 PA T S □ 4PL 6 6 0 □ 0 □ □ □

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)
	Sub-atmospheric (A): 100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)

Material

Code	Body	Poppet	Diaphragm	Nozzle
B	Brass	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316 SS
S	316L SS			
SH				Ni-Cr-Mo alloy

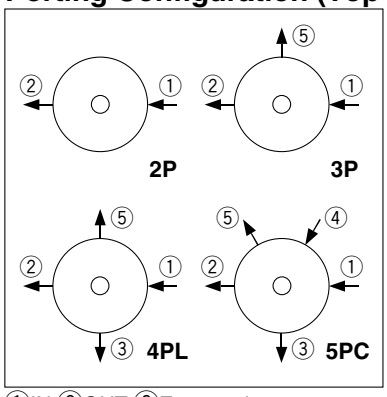
Range options

Code	Specification
No code	Standard
A	Sub-atmospheric

Ports

Code	Ports	Material B	Material S, SH
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●
5PC		●	●

Porting Configuration (Top View)



①IN ②OUT ③Extra outlet port
④Gauge port (Inlet) ⑤Gauge port (Outlet)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
6	NPT 3/8 inch
8	NPT 1/2 inch
4T	1/4 inch compression
6T	3/8 inch compression
8T	1/2 inch compression

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.

Option

Code	Specification
No code	Standard
HR	High inlet pressure *4) (Max. inlet pressure 3000 psig (20.7 MPa))

*4) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *3)

*3) Not available with SH material.

Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge *1) psig/bar unit	Pressure gauge *1) MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) *2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V15	-30 in.Hg to 15 psig	-0.1 to 0.1 MPa
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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
30	0 to 3000 psig	0 to 21 MPa
40	0 to 4000 psig	0 to 28 MPa

*1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.
*2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Specifications

Operating Parameters		AK14PAT□A	AK14PAT
Delivery pressure		100 mm Hg absolute to 30 psig (-88 kPa to 0.2 MPa)	7 to 150 psig (0.05 to 1.0 MPa)
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	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
Burst pressure	Inlet	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
Maximum control pressure		150 psig (1.0 MPa)	
Ambient and operating temperature		-40 to 71°C (No freezing) *)	
Leak rate		1 x 10^{-10} Pa·m³/s	
Connections		NPT female, Compression	
Control pressure port		NPT 1/8 inch	
Bonnet port		NPT 1/8 inch	
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	
Internal volume		1.14 in³ (18.7 cm³)	

*) -10 to 90°C for Polyimide seat.

SMC

Option

High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AK14PAT
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HR option will not achieve rated outlet pressure at all inlet pressures.

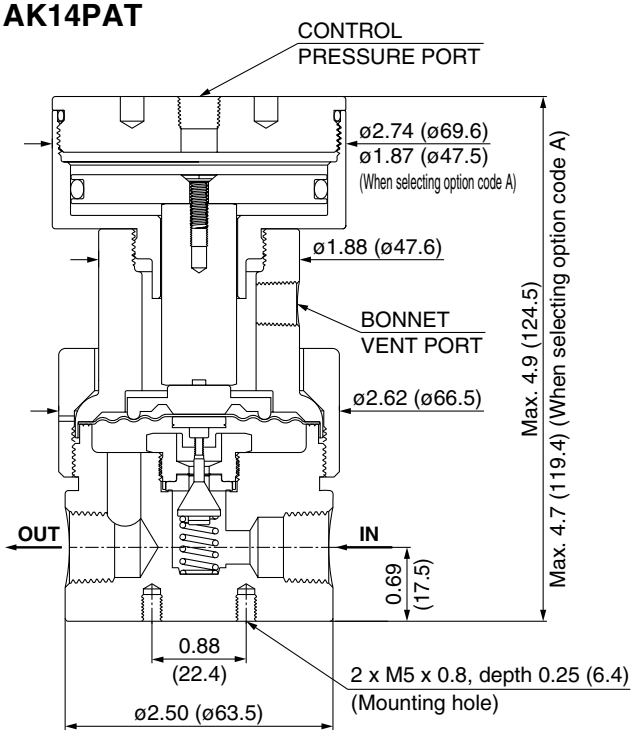
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	Ni-Cr-Mo alloy		
Diaphragm	Ni-Cr-Mo alloy		
Nozzle	316 SS		Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)		PCTFE

Dimensions

inch (mm)

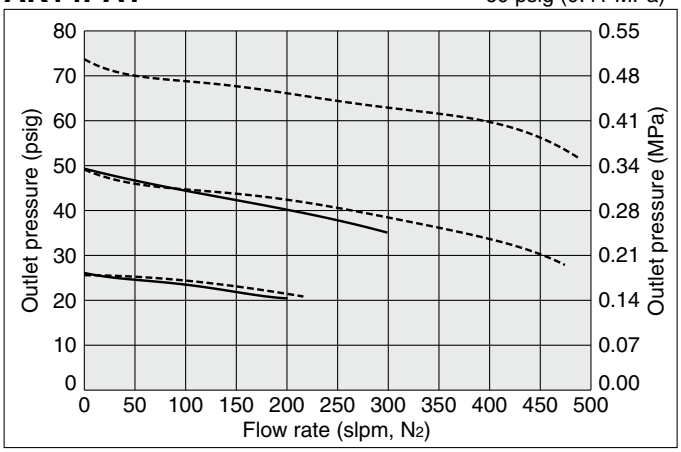
AK14PAT



Flow Rate Characteristics

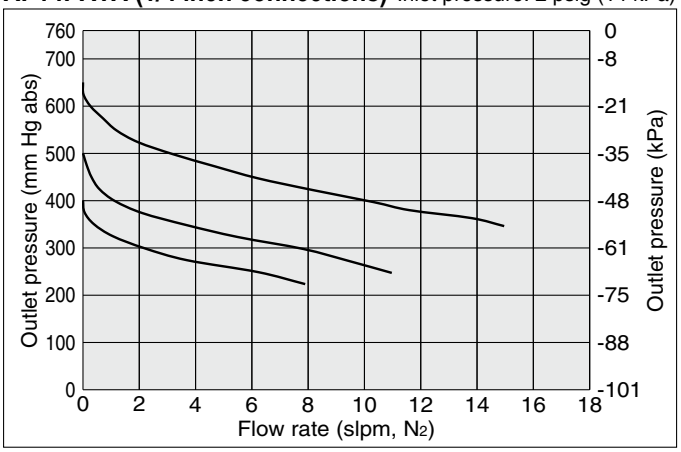
AK14PAT

Inlet pressure: ---- 100 psig (0.69 MPa)
—— 60 psig (0.41 MPa)



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

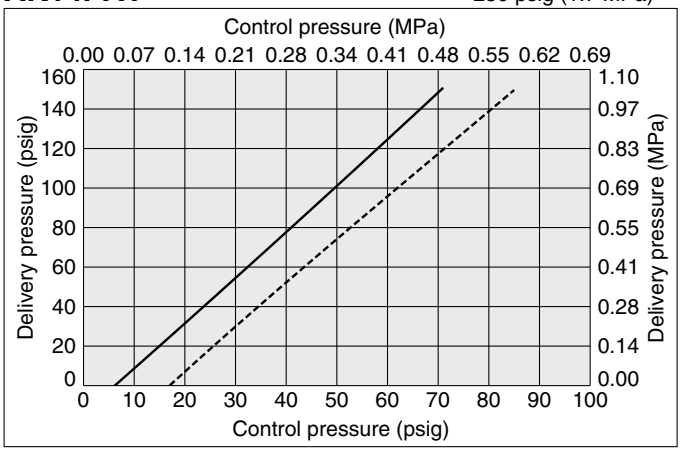
AP14PATA (1/4 inch connections) Inlet pressure: 2 psig (14 kPa)



Input/Output Characteristics

AK14PAT

Inlet pressure: ---- 2300 psig (15.9 MPa)
—— 250 psig (1.7 MPa)



Pneumatic Actuation Pressure Regulator

High flow (Tied-diaphragm)

AK12PA Series

- **Actuation control pressure isolated from process gas by two seals**
- **Body material: Stainless steel and Brass available**
- **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
- **Ni-Cr-Mo alloy internals available for corrosion resistance**
- **100 psig (0.69 MPa) outlet pressure achievable with 80 psig (0.55 MPa) control pressure or less**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

AK12 PA S 4PL 8 8 0 0

Delivery pressure

Code	Delivery pressure
PA	7 to 150 psig (0.05 to 1.0 MPa)

Material

Code	Body	Poppet	Diaphragm
B	Brass	316 SS	Ni-Cr-Mo alloy
S	316L SS		
SH		Ni-Cr-Mo alloy	

Ports

Code	Ports	Material	
		B	**S, SH**
2P	Refer to the following porting configurations.	—	●
3P		—	●
4PL		●	●
5PC		●	●

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.

Option

Code	Specification
No code	Standard
HF	High flow ∗4) ∗5)
HR	High inlet pressure ∗4) ∗5) (Max. inlet pressure 3000 psig (20.7 MPa))

∗4) Options "HF" and "HR" cannot be used in combination.

∗5) Full outlet pressure rating may not be achieved at all inlet pressure.

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide ∗3)

∗3) Not available with SH material.

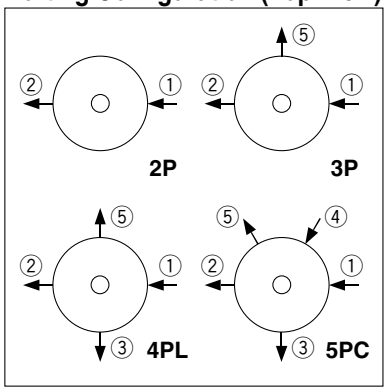
Gauge port (Extra outlet port③, Inlet④, Outlet⑤)

Code	Pressure gauge ∗1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) ∗2)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V15	-30 in.Hg to 15 psig	-0.1 to 0.1 MPa
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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa
30	0 to 3000 psig	0 to 21 MPa
40	0 to 4000 psig	0 to 28 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

∗2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

Porting Configuration (Top View)



Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
6	NPT 3/8 inch
8	NPT 1/2 inch
4T	1/4 inch compression
6T	3/8 inch compression
8T	1/2 inch compression

①IN ②OUT
③Extra outlet port
④Gauge port (Inlet)
⑤Gauge port (Outlet)

Specifications

Operating Parameters		AK12PA
Delivery pressure		7 to 150 psig (0.05 to 1.0 MPa)
Gas		Select compatible materials of construction for the gas
Source pressure		Vacuum to 1700 psig (11.7 MPa)
Proof pressure	**Inlet**	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
Burst pressure	**Inlet**	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
Maximum control pressure		150 psig (1.0 MPa)
Ambient and operating temperature		-40 to 71°C (No freezing) ∗)
Leak rate		1 x 10^{-10} Pa·m^3/s
Connections		NPT female, Compression
Control pressure port		NPT 1/8 inch
Bonnet port		NPT 1/8 inch
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
Internal volume		1.32 in^3 (21.6 cm^3)

∗) -10 to 90°C for Polyimide seat. Optional ambient and operating temperature range available. Please contact SMC.

SMC

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	AK12PA
HF	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

2. High inlet pressure

Changes from the standard type are:

Option	Other Parameters	AK12PA
HR	**Delivery pressure**	7 to 150 psig (0.05 to 1.0 MPa) ∗)
	Source pressure	Vacuum to 3000 psig (20.7 MPa)

∗) HR and HF options will not achieve rated outlet pressure at all inlet pressures.

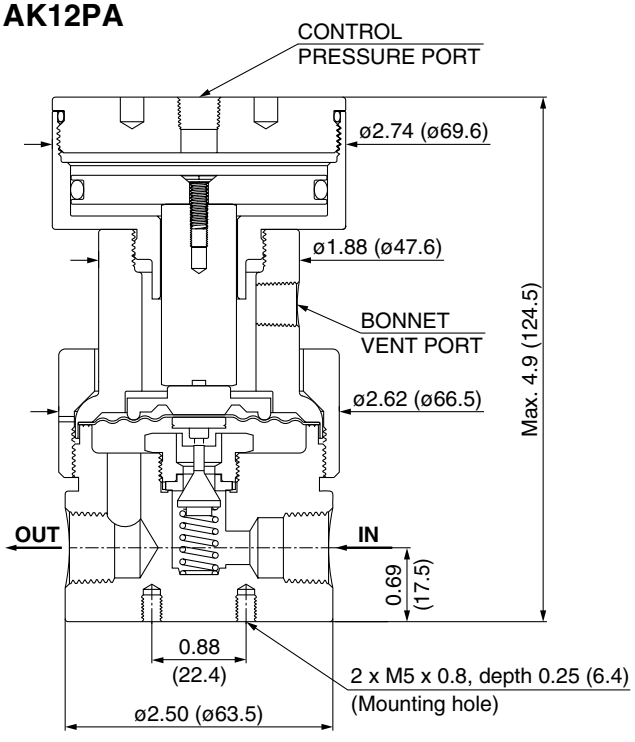
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316L SS	
Poppet	316 SS		Ni-Cr-Mo alloy
Diaphragm	Ni-Cr-Mo alloy		
Seat	PCTFE (Option: Polyimide)		PCTFE

Dimensions

inch (mm)

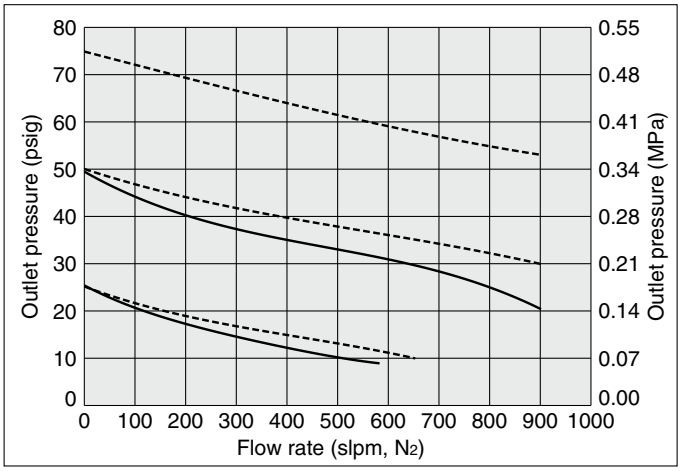
AK12PA



Flow Rate Characteristics

AK12PA

Inlet pressure: ---- 100 psig (0.69 MPa) —— 60 psig (0.41 MPa)
1/2 inch connections

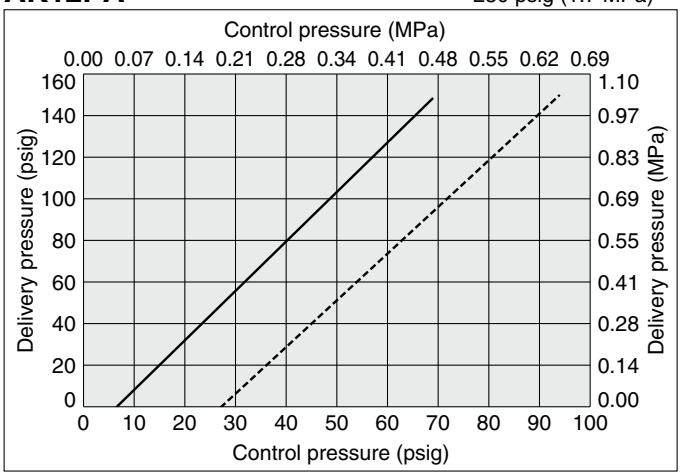


Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Input/Output Characteristics

AK12PA

Inlet pressure: ---- 1700 psig (11.7 MPa)
—— 250 psig (1.7 MPa)



Welded Connection Series Back Pressure Regulator for Ultra High Purity

BP1000 Welded Series

- **For UHP gas delivery**
- **Operating pressure: 0.5 to 300 psig (0.0034 to 2.1 MPa)**
- **Body material: 316L SS secondary remelt**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

Port Number ① ② ③ ④ ⑤

BP10 | 01 | S | | 2PW | FV4 | FV4 | | | | | | | |

Operating pressure

Code	Pressure
01	0.5 to 10 psig (0.0034 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	5 to 100 psig (0.034 to 0.7 MPa)
20	15 to 200 psig (0.1 to 1.4 MPa)
30	15 to 300 psig (0.1 to 2.1 MPa)

Material

Code	Body	Nozzle	Diaphragm
S	316L SS	316L SS	
SH	secondary remelt	Ni-Cr-Mo alloy	

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

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 (Extra outlet port③, Inlet④, Outlet⑤)

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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa

∗1) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗3)

∗3) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	FKM (Standard)
TF	PTFE
KZ	FFKM

Pressure gauge unit ∗2)

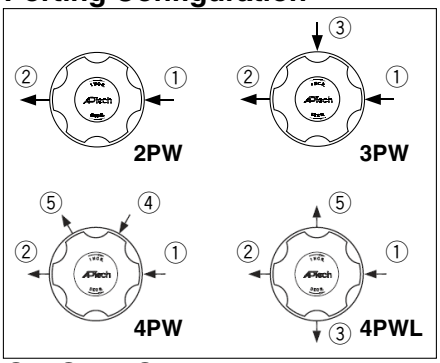
Code	Unit
No code	psig/bar
MPA	MPa

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

Sample Order Number

	Port	①	②	③		
BP1001S	2PW	FV4	FV4			
	3PW	FV4	FV4	V3	MPA	

Porting Configuration



①IN ②OUT ③Gauge port (Inlet)

Specifications

Operating Parameters		BP1001	BP1002	BP1010	BP1020	BP1030
Operating pressure		0.5 to 10 psig (0.0034 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	5 to 100 psig (0.034 to 0.7 MPa)	15 to 200 psig (0.1 to 1.4 MPa)	15 to 300 psig (0.1 to 2.1 MPa)
Gas		Select compatible materials of construction for the gas				
Proof pressure	**Inlet**	1.5 times the maximum source pressure				
	Outlet	1.5 times the maximum delivery pressure				
Burst pressure	**Inlet**	3 times the maximum source pressure				
	Outlet	3 times the maximum delivery pressure				
Ambient and operating temperature		-10 to 71°C (No freezing) ∗1)				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s He				
Across the seat leak		Bubble tight				
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				
Installation		Bottom mount (Option: panel mount)				
Internal volume		0.49 in³ (8 cm³)				
Weight		1.2 kg ∗2)				

∗1) Min. -30°C for PTFE seat. Optional ambient and operating temperature range available. Please contact SMC.

∗2) Weight, including individual boxed weight, may vary depending on connections or options.

SMC

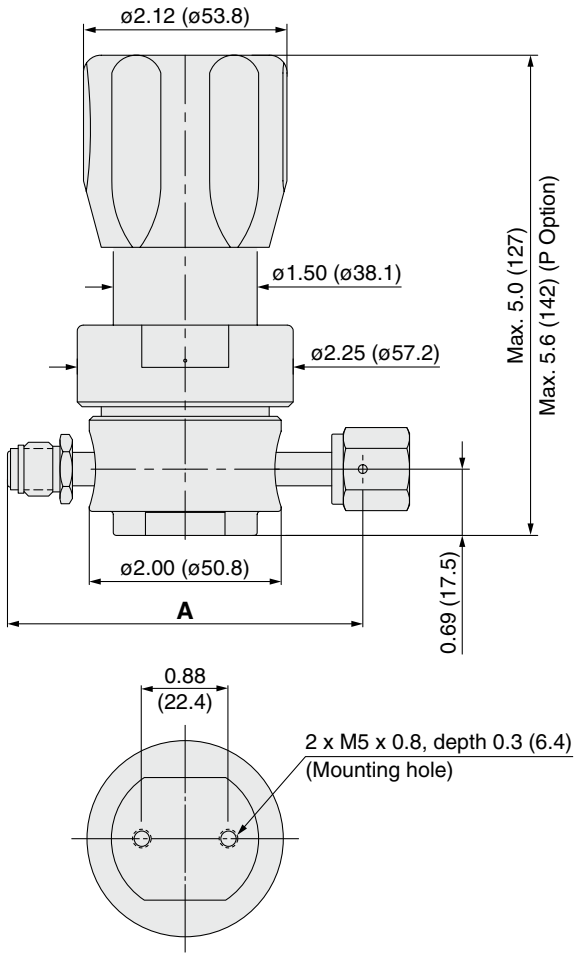
Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Diaphragm	316L SS	Ni-Cr-Mo alloy
Nozzle	316L SS	Ni-Cr-Mo alloy
Seat	FKM (Option: PTFE, FFKM)	
Seal	PTFE	

Dimensions

inch (mm)

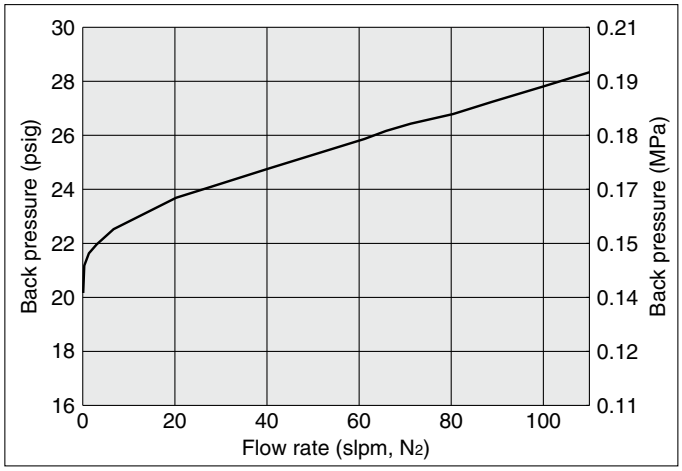
BP1000



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 Rate Characteristics

BP1000 with FKM seat



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Back Pressure Regulator for General Applications

BP1000 Series

- **Operating pressure: 0.5 to 300 psig (0.0034 to 2.1 MPa)**
- **Body material: Stainless steel and Brass available**
- **Ni-Cr-Mo alloy internals available for corrosion resistance**

RoHS

How to Order (See p. 250 for ordering syntax)

BP10 [01] [S] [4PL] [4] [4] [0] [0] [ ] [ ] [ ] [ ]

Port Number: ① ② ③ ④

Operating pressure

Code	pressure
01	0.5 to 10 psig (0.0034 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	5 to 100 psig (0.034 to 0.7 MPa)
20	15 to 200 psig (0.1 to 1.4 MPa)
30	15 to 300 psig (0.1 to 2.1 MPa)

Material

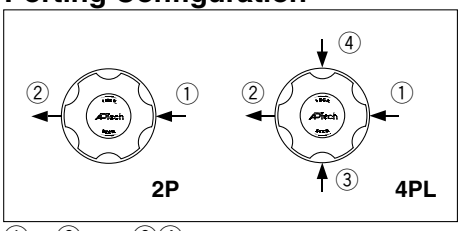
Code	Body	Nozzle	Diaphragm
B	Brass	316 SS	316 SS
S	316 SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy ∗1)

∗1) Stainless steel is used for the BP1020SH and BP1030SH.

Ports

Code	Ports	Material B	Material S, SH
2P	Please refer to the following porting configurations.	—	●
4PL		●	●

Porting Configuration



①IN ②OUT ③④Gauge port (Inlet)

Connections (Inlet①, Outlet②)

Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression

Gauge port (Inlet③, ④)

Code	Pressure gauge ∗2) psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge ∗3) (Gauge port: 1/4 inch NPT)	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	0 to 200 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa

∗2) Refer to gauge guide (P.139) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

∗3) 1/4 inch NPT plug is included only for port code 4PL.

Pressure gauge unit ∗4)

Code	Unit
No code	psig/bar
MPA	MPa

∗4) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation ∗5)

∗5) Panel mounting hole: dia. 1.56 inch (39.6 mm).

Seat material

Code	Material
No code	FKM (Standard)
TF	PTFE
KZ	FFKM

Knob

Code	Knob
No code	Standard
KL	Knob LOTO

Sample Order Number

	Port	①	②	③	④	
BP1001S	2P	4	4			
	4PL	4	4	0	0	
	4PL	4	4	0	1	MPA

Specifications

Operating Parameters		BP1001	BP1002	BP1006	BP1010	BP1020	BP1030
Operating pressure		0.5 to 10 psig (0.0034 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	5 to 100 psig (0.034 to 0.7 MPa)	15 to 200 psig (0.1 to 1.4 MPa)	15 to 300 psig (0.1 to 2.1 MPa)
Gas		Select compatible materials of construction for the gas					
Proof pressure	**Inlet**	1.5 times the maximum source pressure					
	Outlet	1.5 times the maximum delivery pressure					
Burst pressure	**Inlet**	3 times the maximum source pressure					
	Outlet	3 times the maximum delivery pressure					
Ambient and operating temperature		-10 to 71°C (No freezing) ∗1)					
Leak rate		1 x 10^{-10} Pa·m³/s					
Connections		NPT female, Compression					
Installation		Bottom mount (Option: panel mount)					
Internal volume		0.49 in³ (8 cm³)					
Weight		1.2 kg ∗2)					

∗1) Min. -30°C for PTFE seat. Optional ambient and operating temperature range available. Please contact SMC.

∗2) Weight, including individual boxed weight, may vary depending on connections or options.

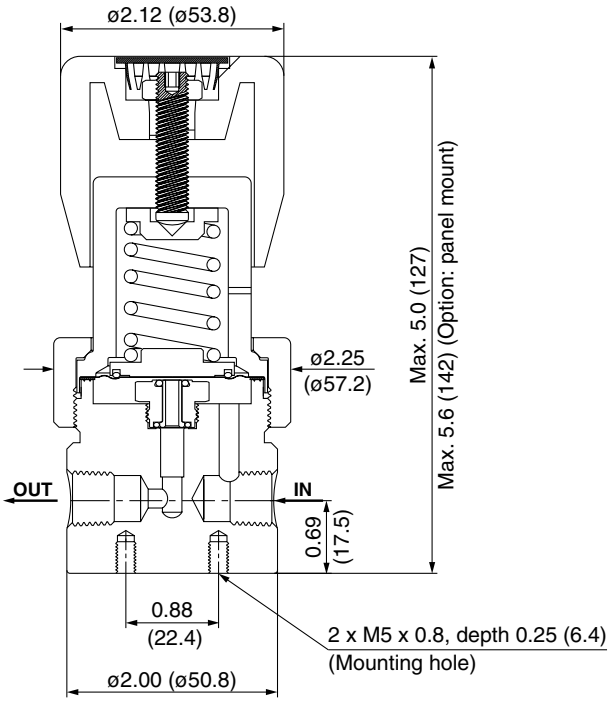
Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316 SS	
Diaphragm	316 SS		Ni-Cr-Mo alloy*1)
Nozzle	316 SS		Ni-Cr-Mo alloy
Seat	FKM (Option: PTFE, FFKM)		
Seal	PTFE		

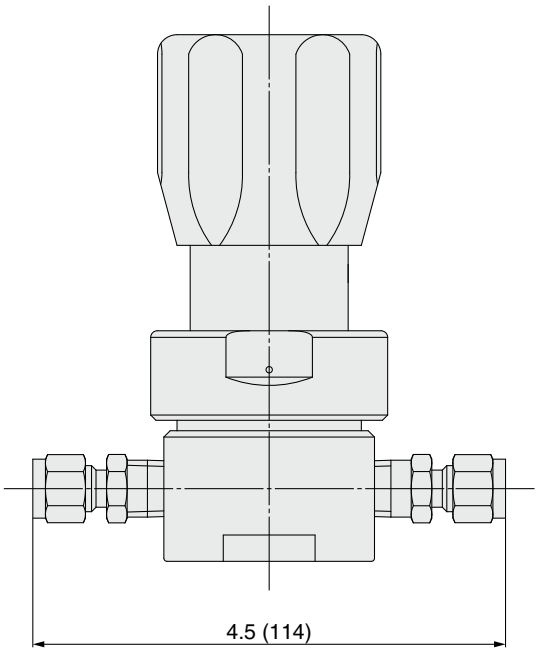
*1) Stainless steel is used for the BP1020SH and BP1030SH.

Dimensions

BP1000

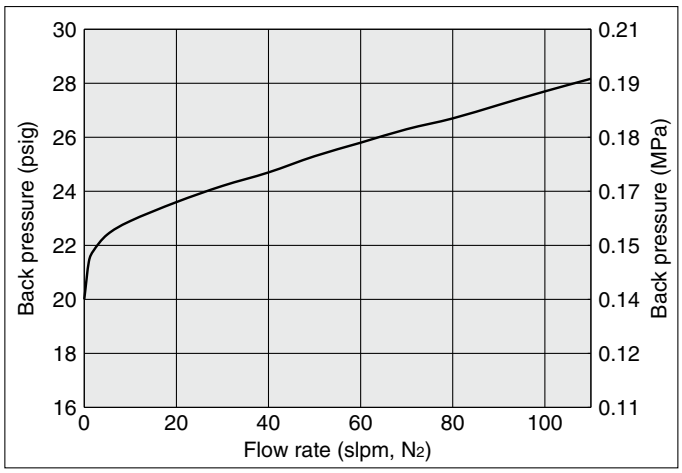


BP1000 series compression fitting dimensions



Flow Rate Characteristics

BP1000 with FKM seat



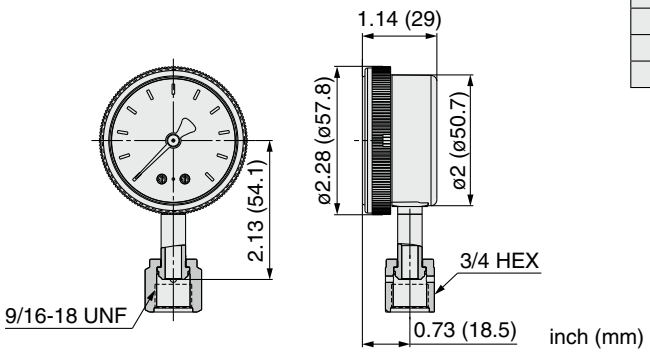
Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

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 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

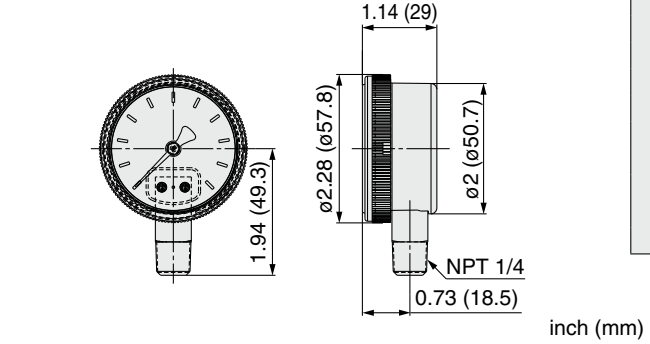
Regulator Code *2)		Pressure range	Unit	Part number *3)
gauge port	unit			
V3	**(No code)**	-30 in.Hg to 30 psig	psig/bar *4)	**00-83000023**
L		-30 in.Hg to 60 psig		**00-83000026**
1		-30 in.Hg to 100 psig		**00-83000021**
H		-30 in.Hg to 160 psig		**00-83000116**
2		0 to 200 psig		**00-83000020**
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 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)			Pressure range	Unit	Part number *3)
material	gauge port	unit			
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).
*2) When pressure gauge needs to be assembled with regulator when shipment, put this code as gauge port in How to Order.

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

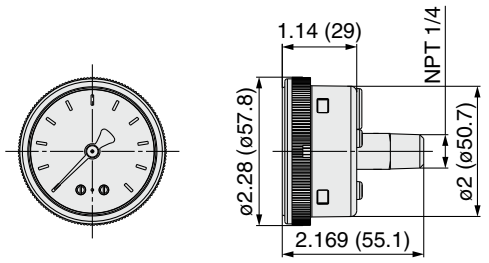
Stainless steel / Center back mount

Specifications

Installation		Center back mount
Gas		Select compatible materials of construction for the gas
Connections		NPT 1/4 inch
Temperature range		-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

Model

Regulator Code	Pressure range	Unit	Part number *3)
(Not applied)	-30 in.Hg to 100 psig	psig/bar *4)	**00-83000224**
	-30 in.Hg to 160 psig		**00-83000272**
	-0.1 to 0.7 MPa	MPa	**00-83000293**
	-0.1 to 1.1 MPa		**00-83000294**



inch (mm)

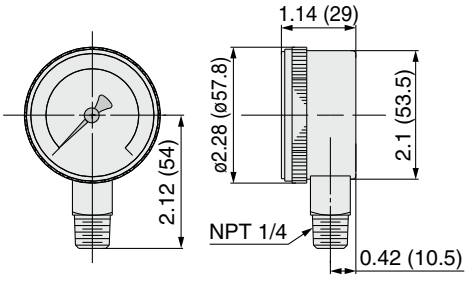
Brass / Lower mount

Specifications

Installation		Lower mount
Gas		Select compatible materials of construction for the gas
Connections		NPT 1/4 inch
Temperature range		-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**	Brass or Stainless steel + ZrN Coating
	Window	Polycarbonate
	Socket	Brass
	Bourdon tube	Phosphor bronze

Model

Regulator Code *2)			Pressure range	Unit	Part number *3)
material	gauge port	unit			
B	**V3**	**(No code)**	-30 in.Hg to 30 psig	psig/bar *4)	**00-83000265**
	L		-30 in.Hg to 60 psig		**00-83000177**
	1		-30 in.Hg to 100 psig		**00-83000178**
	H		-30 in.Hg to 160 psig		**00-83000239**
	2		0 to 200 psig		**00-83000218**
	4		0 to 400 psig		**00-83000205**
	10		0 to 1000 psig		**00-83000186**
	40		0 to 4000 psig		**00-83000179**
	V3	**MPA**	-0.1 to 0.2 MPa	MPa	**00-83000278**
	L		-0.1 to 0.4 MPa		**00-83000279**
	1		-0.1 to 0.7 MPa		**00-83000280**
	H		-0.1 to 1.1 MPa		**00-83000281**
	2		0 to 1.5 MPa		**00-83000277**
	4		0 to 3 MPa		**00-83000276**
	10		0 to 7 MPa		**00-83000275**
	40		0 to 28 MPa		**00-83000274**



inch (mm)

⚠ Warning

1. Use the pressure gauge within the rated pressure range.
2. When install the pressure gauge, verify the port (HP/LP), then install the gauge refer to page 141 for precautions.
3. After installation, perform a leak test.

*3) Part number of pressure gauge itself. Gauge are shipped separately.
*4) Under Japanese regulation, psig/bar unit gauge is not sold in Japan.

Process Gas Equipment/Regulator Specific Product Precautions

Be sure to read this before handling the products. Refer to page 248 for safety instructions. For process gas equipment precautions, refer to pages 249, 250, and the "Operation Manual" on the SMC website: https://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. Use the pressure gauge within the rated pressure range.

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 this before handling the products. Refer to page 248 for safety instructions. For process gas equipment precautions, refer to pages 249, 250, and the "Operation Manual" on the SMC website: https://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 back pressure. 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. Use the pressure gauge within the rated pressure range.

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.

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.