

# Regulator and Valve Selection Guide

## Valve and Regulator Recommendations for source and distribution application

This guide is a reference guide to help customers determine an appropriate AP Tech valve and regulator to be used in process gas systems. Before selecting a product, please make sure to read through this guide. For information and specifications related to the specific model, please refer to the catalog data sheet.

### Precautions for selection

The guide's general recommendations are based upon typical applications from material point of view.

Some series are not available depending on the regulations in different countries so the selection should be made complying with the regulations in the countries where the product will be used.

In Japan since using compression fittings for toxic gas is prohibited, AP/AZ series should be used for toxic gas.

The proper regulator and valve selection can be significantly affected by parameters such as system design, flow duration, frequency of use, ambient conditions and outlet pressure. Please consult SMC for a specific recommendation beyond the scope of this document or if any doubt exists. It is important to understand that one may follow this guide's recommendation, yet have a failure due to a parameter specific to the given application, as noted. Restated, one may achieve higher or lower flow capacities than stipulated in this guide due to the parameters and conditions of a specific application and system design.

- **Source valves** are those on the upstream side of the pressure regulator in the source gas cabinet or bulk delivery system.
- **Distribution valves** are those on the downstream side of the pressure regulator in the source gas cabinet or bulk delivery system and used anywhere downstream of the regulator (s) for cylinder applications at point of use (POU) in valve manifold boxes (VMBs) and process tools.
- **Source regulators** are those used in the source gas cabinet or bulk delivery system.
- **Distribution regulators** are those used at point of use (POU) in valve manifold boxes (VMBs) and process tools. Recommendations are based on typical usage. Operating practices at a specific facility may require a different component selection.
- It is assumed that non-liquefied gas cylinders are switched over to a new cylinder when the pressure drops to 150 to 250 psig (1.0 to 1.7 MPa). Therefore, maximum recommended flow rates for source regulators and source valves assume 150 to 250 psig (1.0 to 1.7 MPa) inlet pressure for this gas.
- It is assumed that the cylinder pressure for liquefied gas systems is maintained at or above the vapor pressure at 16 °C. It is assumed that cylinders are switched over before the liquid is all vaporized into gas. Therefore, maximum recommended flow rates for **source regulators** are based on 16 °C vapor pressure at the regulator inlet for these gases.
- Absolute or very low positive pressure delivery bear close scrutiny. The AP1402TA delivers both sub-atmospheric and positive pressure (30 psig) equally well, whereas the AP1101 is strictly intended for sub-atmospheric pressure delivery (10 psig or less). If low flow and very low positive pressure delivery is desired, the AP1001 should be selected instead of the AP1101. The alternative is to select the AP1402TA which provides more flow capacity and the ability to deliver sub-atmospheric and positive pressure.
- The SHP option is for certain point of use applications in lieu of the SH option. The SHP designation provides Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas the SH option includes the nozzle.
- If a source regulator is listed as ① and ②, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.
- Valve recommendations are based on typical cylinder pressures and delivery line pressures. Pressure drop across valves at low pressures may be excessive and required a different valve selection.
- Valve recommendations are for the process line isolation. Purge and vent valves are not addressed in this document but generally an AP3000, AP3650, or AP3540 valve will provide sufficient flow capability. The valve series recommended were purposely limited for the sake of brevity. The model number indicates the basic size and rating. For example, manually operated valves are noted as AP3650 but an AP3600 or AP3625 would also be appropriate and equivalent selections.
- Polyimide seats are recommended for nitrous oxide (N<sub>2</sub>O) and for source applications for carbon dioxide (CO<sub>2</sub>) with either continuous flow demand or flow rates in excess of 100 slpm.
- Heating may be required in the source manifold for some gases even when not stated due to duration of flow, ambient conditions, etc. When heating is recommended, appropriate heating method shall be selected depending on gas type. In general, the gas should be heated upstream of the pressure regulator.
- Distribution line pressure is assumed to be 60 psig (0.4 MPa) minimum or typical source pressure whichever is less. If the actual line pressure is higher, then higher flow rates than listed in this guideline can be obtained.

### Caution

Since the product specified here is used under various operating conditions, its compatibility with fluid and specific equipment must be decided by the person who designs the equipment or decided its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product regardless of any recommendation.

Proper installation, operation and maintenance are also required to assure safe, trouble free performance.

# Recommended Model Selection Table

Please read page 656 before selecting a product.

## How to read model number listed as recommendation.

Example

Valve	Regulator						
AP3650	AP/AZ/AK1200	S	VS	HF	AP/AZ1402T	S	A
①	①	②	③	④	①	②	⑤

### ① Series

AP/AZ/AK1200: 3 series are recommended (AP1200, AZ1200, AK1200).

Valve: Only typical series is shown as recommendation and other models with same specifications (operating pressure, Cv) are also recommended.

For example, other than AP3650, AP3600/3625/3657 are also recommended.

### ② Material

S: Stainless steel body as standard design.

SH: Stainless steel body with Ni-Cr-Mo alloy internals as it further improves corrosion resistance than S (standard design).

Either SH or SHP can be used with AP series regulators and SHP is used with AZ series regulators. (SHP provides Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas SH includes the nozzle.)

Material of stainless steel body varies depending on series.

- AP series (except AP9000&9100) ... 316L SS secondary remelt
- AZ series and AP9000&9100 ... 316L SS
- AK series ... 316 SS

### ③ VS: Seat material is made of Polyimide. (Only for specific series)

No code: PCTFE as standard design.

### ④ Option (Only for specific series)

- HF: High flow
- FC: Force compensation
- HR: High inlet pressure

### ⑤ A: Delivery of sub-atmospheric pressure. (Only for specific series)

For more details, please refer to catalog.

AP

SL

AZ

AK

BP

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Acetylene* (C <sub>2</sub> H <sub>2</sub> )	230	AP3000	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	280	AP3002	45	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650		75	AP/AZ/AK1200S	
				AP3700		95	AP/AZ/AK1200S HF	
				AP3800			AZ/AK1300S	
Air	185	AP3000	90	AP3540	30	AP/AZ/AK1500S	30	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	200	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS
		AP3650		AP4650	800	AP/AZ/AK1200S HR	400	AP/AZ/AK1200S
		AP3100		AP3800			600	AP/AZ/AK1200S HF
				AP3130	AP3700			AZ/AK1300S
475	AP3125	890	AP3800					
Ammonia (NH <sub>3</sub> )	250	AP3540	100	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	450	AP4540	225	AP4540	75	AP/AZ/AK1200S	60	AP/AZ/AK1400TS
		AP4650		AP4650	400	AP/AZ/AK1200S	125	AP/AZ/AK1200S
		AP3113		AP3700	600	AP/AZ/AK1200S HF	250	AP/AZ/AK1200S HF
		AP3125		AP3800	1100	AP9100S		AZ/AK1300S
						500	AP/AZ/AK1200S FC	
						1000	AP9100S	
Argon (Ar)	200	AP3000	80	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	25	AP/AZ/AK1000S HF
	350	AP3002	150	AP4540	300	AP1900S HF	50	AP/AZ/AK1400TS
		AP3650		AP4650	1500	AP/AZ/AK1200S HR	100	AP/AZ/AK1200S
		AP3130		AP3700			200	AP/AZ/AK1200S HF
		AP3125		AP3800			400	AZ/AK1300S
						1000	AP/AZ/AK1200S FC	
							AP9100S	

\* 15 psig (0.1 MPa) maximum source regulator outlet pressure.

■ denotes heating required to achieve stated flow.

# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application		Valve				Regulator			
		Source applications		Distribution applications		Source applications		Distribution applications	
Process Gas	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
		Arsine (AsH <sub>3</sub> )	140	AP3540	55	AP3540	5	AP/AZ/AK1500S	5
AP3650	AP3650			40		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF	
240	AP4540		95	AP4540					
	AP4650			AP4650					
Arsine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP1900S		50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	150	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron Trichloride (BCl <sub>3</sub> )	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.4	AP/AZ/AK1101SH	
		AP4650		AP4650			6	AP/AZ/AK1402TSA	
Boron Trichloride Mix (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S	
		AP3650		AP3650	60	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF	
	225	AP3002	160	AP4540			60	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron Trifluoride (BF <sub>3</sub> )	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF	
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					
Boron 11 Trifluoride (11BF <sub>3</sub> )	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF	
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					
Butadiene (C <sub>4</sub> H <sub>6</sub> )	60	AP4540	60	AP4540	3	AP/AZ1500S	3	AP/AZ1000S	
		AP4625		AP4625	40	AP/AZ1400T	5	AP/AZ1000S HF	
n-butane (C <sub>4</sub> H <sub>10</sub> )	60	AP4540	60	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP4625		AP4625	40	AP/AZ/AK1400T	5	AP/AZ/AK1000S HF	
Butene-1 (C <sub>4</sub> H <sub>8</sub> )	35	AP3540	30	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	65	AP4540	60	AP4540					
		AP4650		AP4650					
Carbon Dioxide (CO <sub>2</sub> )	500	AP3000	75	AP3540	3	AP/AZ/AK1500S	8	AP/AZ/AK1000S	
		AP3650		AP3650	75	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF	
		AP3002		AP4540	150	AP/AZ/AK1200S VS	40	AP/AZ/AK1400TS	
	700	AP3650	140	AP4650	500	① AP/AZ/AK1225S VS	100	AP/AZ/AK1200S	
		AP3113		AP3700		② AP/AZ/AK1200S VS HF	160	AP/AZ/AK1200S HF	
	2500	AP3125	750	AP3800	1000	① AP9030S VS		AZ/AK1300S	
						② AP9100S VS	325	AP/AZ/AK1200S FC	
Carbon Monoxide (CO)	185	AP3000	90	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	15	AP1900S	15	AP/AZ/AK1000S HF	
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS	
		AP3650		AP4650					
Carbonyl fluoride (COF <sub>2</sub> )	115	AP3000	60	AP3540	5	AP/AZ1500S	3	AP/AZ1000S	
		AP3625		AP3625	25	AP/AZ1400TS	10	AP/AZ1000S HF	
	200	AP3625	100	AP4540					
Chlorine (Cl <sub>2</sub> )	75	AP3540	50	AP3540	3	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH	
		AP3650		AP3650	50	AP/AZ/AK1400TS	15	AP/AZ/AK1000SH HF	
	150	AP4540	100	AP4540	75	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS	
		AP4650		AP4650	200	AP/AZ/AK1200SH HF	75	AP/AZ/AK1200SH	
	300	AP3113	400	AP3700			125	AP/AZ/AK1200SH HF	
		AP3125		AP3800				AZ/AK1300S	
Chlorine Trifluoride (ClF <sub>3</sub> )	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S	
		AP4650		AP4650			6	AP/AZ/AK1402TSA	
	185	AP3000	90	AP3540	5	AP1700S	10	AP/AZ/AK1000S	
		AP3650		AP3650	225	AP2700S	20	AP/AZ/AK1000S HF	
Dichlorosilane (SiH <sub>2</sub> Cl <sub>2</sub> )	20	AP4540	20	AP4540	7	AP/AZ1402TSA	1	AP1001S	
		AP4650		AP4650			7	AP/AZ/AK1402TSA	

■ denotes heating required to achieve stated flow. Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application  Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Diethyltelluride (Te(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> )	70	AP3000	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		5		AP1900S
	85	AP3002	60	AP4540	25	AP/AZ/AK1400TS	25	AP/AZ/AK1400TS
AP3650		AP4650						
Vinylidene fluoride (C <sub>2</sub> H <sub>2</sub> F <sub>2</sub> )	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3625		AP3625		50		AP/AZ/AK1400TS
	200	AP3625	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP4625						75
Dimethylsilane (C <sub>2</sub> H <sub>6</sub> )	14	AP4540	7	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650		50		AP/AZ/AK1400TS
	150	AP3700	75	AP3700	75	AP/AZ/AK1200S	75	AP/AZ/AK1200S
AP3800		AP3800						
Disilane (Si <sub>2</sub> H <sub>6</sub> )	14	AP4540	7	AP4540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP4650		AP4650		7		AP/AZ/AK1402TSA
Ethylene (C <sub>2</sub> H <sub>4</sub> )	380	AP3000	90	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	485	AP3002	160	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
AP3650		AP4650						75
Fluorine(F <sub>2</sub> )	10	AP3200	10	AP3200	Consult Factory		Consult Factory	
Fluorine Mixtures (10 %, 3.4 MPa) (Nitrogen Balance)	185	AP3000	90	AP3540	5	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH
		AP3650		AP3650		25		AP/AZ/AK1400TS
	225	AP3002	160	AP4540			25	AP/AZ/AK1400TS
AP3650		AP4650						
Germane (GeH <sub>4</sub> )	10	AP3540	4	AP3540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP3650		AP3650		7		AP/AZ/AK1402TSA
	18	AP4540	7	AP4540				
AP4650		AP4650						
Germane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650		20		AP1900S
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 12 (C <sub>2</sub> Cl <sub>2</sub> F <sub>2</sub> )	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650		50		AP/AZ/AK1400TS
							50	AP/AZ/AK1400TS
Halocarbon 12B2 (CBr <sub>2</sub> F <sub>2</sub> )	15	AP4540	15	AP4540	5	AP/AZ/AK1400TS	0.5	AP/AZ/AK1000S
		AP4650		AP4650				
Halocarbon 13 (CClF <sub>3</sub> )	140	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	170	AP3002	70	AP4540			50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 13B1 (CBrF <sub>3</sub> )	110	AP3540	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	190	AP4540	65	AP4540			50	AP/AZ/AK1400TS
AP4650		AP4650						
Halocarbon 14 (CF <sub>4</sub> )	10	AP3000	50	AP3540	10	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650		40		AP1900S
	200	AP3002	100	AP4540	80	AP1900S HF	30	AP/AZ/AK1400TS
		AP3650		AP4650		500		AP/AZ/AK1200S HR
	600	AP3130	500	AP3700			100	AP/AZ/AK1200S HF
		AP3125		AP3800				
						250	AP/AZ/AK1200S FC	
						500	AP9100S	
Halocarbon 21 (CHCl <sub>2</sub> F)	25	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1000S
		AP4650		AP4650				
							AP1001S	
						5	AP/AZ/AK1402TSA	
Halocarbon 23 (CHF <sub>3</sub> )	115	AP3000	145	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	140	AP3002	250	AP4540			50	AP/AZ/AK1400TS
AP3650		AP4650						
Halocarbon 32 (CH <sub>2</sub> F <sub>2</sub> )	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650		50		AP/AZ/AK1400TS
	175	AP3002	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
AP3650		AP4650						75

AP  
SL  
AZ  
AK  
BP

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# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application	Valve				Regulator					
	Source applications		Distribution applications		Source applications		Distribution applications			
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation		
Halocarbon 114 (C <sub>2</sub> Cl <sub>2</sub> F <sub>4</sub> )	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S		
		AP4650		AP4650		1		AP/AZ/AK1000S		
Halocarbon 115 (C <sub>2</sub> ClF <sub>6</sub> )	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		50		AP/AZ/AK1000S HF		
						75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
Halocarbon 116 (C <sub>2</sub> F <sub>6</sub> )	60	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	100	AP3002	80	AP4540	75	AP/AZ/AK1200S	25	AP/AZ/AK1400TS		
		AP3650		AP4650		125		AP/AZ/AK1200S HF	50	AP/AZ/AK1200S
	275	AP3113	400	AP3700				90	AP/AZ/AK1200S HF	
		AP3125		AP3800				450	AZ/AK1300	
Halocarbon 125 (C <sub>2</sub> HF <sub>6</sub> )	180	AP4540	70	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		25		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
						75		AP/AZ/AK1200S	25	AP/AZ/AK1400TS
Halocarbon 134A (C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> )	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4650		AP4650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
		AP3100		AP3800		75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
	350	AP3700	230	AP3700			75	AP/AZ/AK1200S		
Halocarbon R218 (C <sub>3</sub> F <sub>8</sub> )	35	AP3540	20	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	60	AP4540	40	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS		
Halocarbon C318 (C <sub>4</sub> F <sub>8</sub> )	25	AP4540	20	AP4540	6	AP/AZ/AK1402TSA	1	AP/AZ/AK1101S		
		AP4650		AP4650					6	AP/AZ/AK1402TSA
Helium (He)	750	AP3000	250	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S		
		AP3650		AP3650		500		AP1900S	125	AP/AZ/AK1000S HF
	1000	AP3002	450	AP4540	625	AP1900S HF	275	AP/AZ/AK1400TS		
	2500	AP3650	2500	AP4650	2000	AP/AZ/AK1200S HR	625	AP/AZ/AK1200S		
		AP3130		AP3700		900		AP/AZ/AK1200S HF		
	AP3125	AP3800				2500	AZ/AK1300			
Hexafluoropropane (C <sub>3</sub> H <sub>2</sub> F <sub>6</sub> )	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	6	AP/AZ/AK1402TSA		
Hexafluoropropylene (C <sub>3</sub> F <sub>6</sub> )	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP4625		AP4625		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
						75		AP/AZ/AK1200S	50	AP/AZ/AK1400TS
Hydrogen (H <sub>2</sub> )	800	AP3000	300	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S		
		AP3650		AP3650		500		AP1900S	125	AP/AZ/AK1000S HF
	1600	AP3002	600	AP4540	625	AP1900S HF	275	AP/AZ/AK1400TS		
		AP3650		AP4650		900		AP2700S	625	AP/AZ/AK1200S
	3000	AP3130	3000	AP3700	1200	AP/AZ/AK1200S HR	900	AP/AZ/AK1200S HF		
		AP3125		AP3800					1200	AP/AZ/AK1200S HF
						3000	AZ/AK1300			
							1200	AP/AZ/AK1200S FC		
							3000	AP9100S		
Hydrogen Bromide (HBr)	155	AP3000	55	AP3540	1	AP/AZ/AK1500SH	1	AP/AZ/AK1000SH		
		AP3650		AP3650		30		AP/AZ/AK1400TS	2	AP/AZ/AK1000S HF
	190	AP3002	95	AP4540	50	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS		
Hydrogen Chloride (HCl)	350	AP3650	75	AP4650	2	AP/AZ/AK1500SH	8	AP/AZ/AK1000SH		
		AP3000		AP3540		90		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	500	AP3002	150	AP4540	150	AP/AZ/AK1200SH	40	AP/AZ/AK1400TS		
		AP3650		AP4650		600		① AP1225SH	85	AP/AZ/AK1200SH
	2000	AP3113	850	AP3700	2000	② AP1210SH HF	160	AP/AZ/AK1200S HF		
		AP3125		AP3800		① AP9030S		AZ/AK1300S		
					② AP9110S	300	AP/AZ/AK1200S FC			
						800	AP9100S			

■ denotes heating required to achieve stated flow.  
Please read page 657 regarding how to read model number listed as recommendation.

If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application  Process Gas	Valve				Regulator					
	Source applications		Distribution applications		Source applications		Distribution applications			
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation		
Hydrogen Chloride Mixtures (Nitrogen Balance)	210	AP3000	105	AP3540	10	AP/AZ/AK1500SH	10	AP/AZ/AK1000SH		
		AP3650		AP3540		20		AP1900SH	20	AP/AZ/AK1000SH HF
	265	AP3002	190	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS		
AP3650		AP4650								
Hydrogen Fluoride (HF)	20	AP4540	20	AP4540	5	AP/AZ/AK1402TSA	5	AP/AZ/AK1402TSA		
		AP4650		AP4650						
Hydrogen Selenide (H <sub>2</sub> Se)	125	AP3540	55	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	215	AP4540	95	AP4540			40	AP/AZ/AK1400TS		
AP4650		AP4650								
Hydrogen Selenide Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S		
		AP3650		AP3650		20		AP1900S	20	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS		
AP3650		AP4650								
Hydrogen Sulfide (H <sub>2</sub> S)	210	AP3000	80	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	260	AP3002	140	AP4540			40	AP/AZ/AK1400TS		
AP3650		AP4650								
Krypton (Kr)	105	AP3000	50	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S		
		AP3650		AP3650		60		AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	130	AP3002	90	AP4540			60	AP/AZ/AK1400TS		
AP3650		AP4650								
Methane (CH <sub>4</sub> )	245	AP3000	120	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S		
		AP3650		AP3650		20		AP1900S	20	AP/AZ/AK1000S HF
	295	AP3002	210	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS		
AP3650		AP4650								
Methanol (CH <sub>3</sub> OH)	40	AP3540	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	70	AP4540	40	AP4540						
AP4650		AP4650								
Methyl bromide (CH <sub>3</sub> Br)	25	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	5	AP/AZ/AK1402TSA		
		AP4625		AP4625						
Methyl Chloride (CH <sub>3</sub> Cl)	60	AP4540	45	AP4540	1	AP/AZ/AK1000S	10	AP/AZ/AK1402TSA		
		AP4650		AP4650		10		AP/AZ/AK1402TSA		
Methylsilane (CH <sub>3</sub> SiH <sub>3</sub> )	200	AP3540	70	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	350	AP4540	120	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS		
AP4650		AP4650		75		AP/AZ/AK1200S		75	AP/AZ/AK1200S	
Methyl Fluoride (CH <sub>3</sub> F)	400	AP3000	120	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S		
		AP3650		AP3650		50		AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	490	AP3002	200	AP4540			50	AP/AZ/AK1400TS		
AP3650		AP4650								
Neon (Ne)	215	AP3000	110	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S		
		AP3650		AP3650		40		AP1900S	40	AP/AZ/AK1000S HF
	260	AP3002	190	AP4540	300	AP/AZ/AK1200S HF	100	AP/AZ/AK1400TS		
AP3650		AP4650								
Nitrogen (N <sub>2</sub> )	250	AP3000	100	AP3540	50	AP/AZ/AK1500S	25	AP/AZ/AK1000S		
		AP3650		AP3650		200		AP1900S	50	AP/AZ/AK1000S HF
	400	AP3002	200	AP4540	250	AP1900S HF	150	AP/AZ/AK1400TS		
		AP3650		AP4650		350		AP2700	250	AP/AZ/AK1200S
	1000	AP3130	1000	AP3700	1000	AP/AZ/AK1200S HR	300	AP/AZ/AK1200S HF		
AP3125		AP3800							AZ/AK1300S	
									400	AP/AZ/AK1200S FC
Nitrogen Trifluoride (NF <sub>3</sub> )	75	AP3000	60	AP3540	5	AP/AZ1500S	6	AP/AZ1000S		
		AP3650		AP3650		60		AP/AZ1400TS	15	AP/AZ1000S HF
	100	AP3002	110	AP4540	150	AP/AZ1400TS	30	AP/AZ1400TS		
		AP3650		AP4650					75	AP/AZ1200S
	350	AP3130	500	AP3700	400	AP/AZ1200S HR	125	AP/AZ1200S HF		
		AP3125		AP3800						AZ1300S
										250
					1000	AP9100S				
						600	AP9100S			

AP  
SL  
AZ  
AK  
BP

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If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application  Process Gas	Valve				Regulator				
	Source applications		Distribution applications		Source applications		Distribution applications		
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
Nitric Oxide (NO)	310	AP3000	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF	
	380	AP3002	125	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS	
		AP3650		AP4650			75	AP/AZ/AK1200S	
Nitrous Oxide (N <sub>2</sub> O)	300	AP3000	70	AP3540	3	AP/AZ/AK1500S VS	8	AP/AZ/AK1000S VS	
		AP3650		AP3650	60	AP/AZ/AK1400TS VS	20	AP/AZ/AK1000S VS HF	
	500	AP3002	140	AP4540	100	AP/AZ/AK1200S VS	35	AP/AZ/AK1400TS VS	
		AP3650		AP4650	150	AP/AZ1200S VS HF	85	AP/AZ/AK1200S VS	
	1500	AP3113	750	AP3700	500	① AP/AZ1225S VS	160	AP/AZ/AK1200S VS HF	
		AP3125		AP3800		② AP/AZ1200S VS HF		AZ/AK1300S	
Octafluorocyclopentene (C <sub>5</sub> F <sub>8</sub> )	15	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.3	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ/AK1402TSA	
Oxygen (O <sub>2</sub> )	250	AP3000	75	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S	
		AP3650		AP3650	80	AP1900S	25	AP/AZ/AK1000S HF	
	400	AP3002	150	AP4540	150	AP1900S HF	50	AP/AZ/AK1400TS	
		AP3650		AP4650	1000	AP/AZ/AK1200S HR	120	AP/AZ/AK1200S	
								200	AP/AZ/AK1200S HF
								400	AZ/AK1300S
1000								AP/AZ/AK1200S FC	
Perfluorobutadiene (C <sub>4</sub> F <sub>6</sub> )	25	AP4540	25	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ1402TSA	
Phosphine (PH <sub>3</sub> )	320	AP3000	80	AP3540	5	AP/AZ1500S	5	AP/AZ1000S	
		AP3650		AP3650	40	AP/AZ1400TS	10	AP/AZ1000S HF	
	390	AP3002	145	AP4540					
Phosphine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	225	AP3002	160	AP4540					
Phosphorous Pentafluoride (PF <sub>5</sub> )	15	AP3000	5	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	19	AP3002	9	AP4540					
		AP3650		AP4650					
41	AP3130	52	AP3700						
	AP3125		AP3800						
Propane (C <sub>3</sub> H <sub>8</sub> )	65	AP3540	42	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	115	AP4450	75	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS	
Propene (C <sub>3</sub> H <sub>6</sub> )	185	AP3540	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF	
	320	AP4540	125	AP4540			50	AP/AZ/AK1400TS	
Silane (SiH <sub>4</sub> )	150	AP3000	75	AP3540	5	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	40	AP/AZ1400TS	25	AP/AZ1000S HF	
	250	AP3002	150	AP4540	50	AP2700S	50	AP/AZ1400TS	
		AP3650		AP4650	60	AP/AZ1200S	120	AP/AZ1200S	
	600	AP3130	750	AP3700	100	AP/AZ1200S HF	200	AP/AZ1200S HF	
		AP3125		AP3800	500	① AP/AZ1225S VS	400	AZ1300S	
						② AP/AZ1200S HF	AP/AZ1200S FC		
Silane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S	
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF	
	225	AP3002	160	AP4540	40	AP/AZ1400TS	40	AP/AZ1400TS	
		AP3650		AP4650					
Silicon Tetrachloride (SiCl <sub>4</sub> )	10	AP4540	10	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650			5	AP/AZ1402TSA	

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# Recommended Model Selection Table

Please read page 656 before selecting a product.

Application  Process Gas	Valve				Regulator				
	Source applications		Distribution applications		Source applications		Distribution applications		
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	
Silicon Tetrafluoride (SiF <sub>4</sub> )	95	AP3000	45	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S	
		AP3650		AP3650	40	AP/AZ/AK1400TS		20	AP/AZ/AK1000S HF
	115	AP3002	80	AP4540			40	AP/AZ/AK1400TS	
		AP3650		AP4650					
Sulfur Dioxide (SO <sub>2</sub> )	80	AP4540	30	AP4540	1	AP/AZ/AK1000S	6	AP/AZ/AK1402TSA	
		AP4650		AP4650	6	AP/AZ/AK1402TSA			
Sulfur Hexafluoride (SF <sub>6</sub> )	125	AP3000	35	AP3540	3	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	40	AP/AZ/AK1400TS		12	AP/AZ/AK1000S HF
	200	AP3000	75	AP4540	60	AP/AZ/AK1200S	60	AP/AZ/AK1200S	
		AP3650		AP4650	150	AP/AZ/AK1200S HF		90	AP/AZ/AK1200S HF
	500	AP3113	400	AP3700	500	AP9100S	180	AP/AZ/AK1200S FC	
		AP3125		AP3800				400	AP9100S
Sulfur Tetrafluoride (SF <sub>4</sub> )	200	AP4540	80	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S	
		AP4650		AP4650	15	AP/AZ/AK1400TS		5	AP/AZ/AK1000S HF
								15	AP/AZ/AK1400TS
Trichlorosilane (SiHCl <sub>3</sub> )	35	AP4540	30	AP4540	10	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S	
		AP4650		AP4650				10	AP/AZ/AK1402TSA
Trimethylsilane ((CH <sub>3</sub> ) <sub>3</sub> SiH)	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ1101S	
		AP4650		AP4650				7	AP/AZ/AK1402TSA
Tungsten Hexafluoride (WF <sub>6</sub> )	10	AP4540	10	AP4540	5	AP/AZ/AK1402TSA	0.3	AP/AZ/AK1101SH	
		AP4650		AP4650				5	AP/AZ/AK1402TSA
Xenon (Xe)	85	AP3000	40	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S	
		AP3650		AP3650	25	AP/AZ/AK1400TS		10	AP/AZ/AK1000S HF
	100	AP3002	70	AP4540			25	AP/AZ/AK1400TS	
		AP3650		AP4650					

■ denotes heating required to achieve stated flow. Please read page 657 regarding how to read model number listed as recommendation.

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# Regulators

Series

Page

## ● For ultra high purity (UHP)

Single Stage Compact Regulator	<b>AP500</b>	P.666
Single Stage Regulator: Low to intermediate flow	<b>AP1000</b>	P.668
Single Stage Regulator: Low flow (Tied-diaphragm)	<b>AP1500</b>	P.670
Single Stage Regulator: Low to intermediate flow	<b>AP1600</b>	P.672
Single Stage Regulator: Low to intermediate flow (Tied-diaphragm)	<b>AP1900</b>	P.674
Single Stage Regulator: Intermediate flow (Tied-diaphragm)	<b>AP1400T</b>	P.676
Single Stage Regulator: High flow (Tied-diaphragm)	<b>AP1200</b>	P.678
Single Stage Regulator: Delivery of sub-atmospheric pressure	<b>AP1100</b>	P.680
Two Stage Regulator: Low flow (Tied-diaphragm)	<b>AP1700</b>	P.682
Two Stage Regulator: Intermediate flow (Tied-diaphragm)	<b>AP2700</b>	P.684
Single Stage Regulator: Bulk gas delivery	<b>AP9000 &amp; 9100</b>	P.686
Single Stage Compact Regulator	<b>SL5200</b>	P.688
Single Stage Regulator: Low flow	<b>SL5500</b>	P.690
Single Stage Regulator: Intermediate flow	<b>SL5400</b>	P.692
Single Stage Regulator: Intermediate flow	<b>SL5800</b>	P.694
Single Stage Regulator: Low to intermediate flow	<b>AZ1000</b>	P.696
Single Stage Regulator: Low flow (Tied-diaphragm)	<b>AZ1500</b>	P.698
Single Stage Regulator: Intermediate flow (Tied-diaphragm)	<b>AZ1400T</b>	P.700
Single Stage Regulator: High flow	<b>AZ1300</b>	P.702
Single Stage Regulator: High flow (Tied-diaphragm)	<b>AZ1200</b>	P.704
Single Stage Regulator: High flow (Tied-diaphragm)	<b>AZ9200</b>	P.706
Single Stage Regulator: Delivery of sub-atmospheric pressure	<b>AZ1100</b>	P.708

## ● For general applications

Single Stage Regulator: Low to intermediate flow	<b>AK1000</b>	P.710
Single Stage Regulator: Low flow (Tied-diaphragm)	<b>AK1500</b>	P.712
Single Stage Regulator: Intermediate flow (Tied-diaphragm)	<b>AK1400T</b>	P.714
Single Stage Regulator: High flow	<b>AK1300</b>	P.716
Single Stage Regulator: High flow (Tied-diaphragm)	<b>AK1200</b>	P.718
Single Stage Regulator: High flow (Tied-diaphragm)	<b>AK9200</b>	P.720
Two Stage Regulator: Low flow (Tied-diaphragm)	<b>AK1700</b>	P.722
Back Pressure Regulator	<b>BP1000</b>	P.724

## ● For ultra high purity (UHP)

Back Pressure Regulator	<b>BP1000</b>	P.726
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## ● For air operated applications

Pneumatic Actuation Pressure Regulator: Low flow	<b>AP10PA</b>	P.728
Pneumatic Actuation Pressure Regulator: Low flow (Tied-diaphragm)	<b>AP15PA</b>	P.730
Pneumatic Actuation Pressure Regulator: Intermediate flow (Tied-diaphragm)	<b>AP14PAT</b>	P.732
Pneumatic Actuation Pressure Regulator: High flow (Tied-diaphragm)	<b>AP12PA</b>	P.734
Pneumatic Actuation Pressure Regulator: Low flow	<b>AZ10PA</b>	P.736
Pneumatic Actuation Pressure Regulator: Low flow (Tied-diaphragm)	<b>AZ15PA</b>	P.738
Pneumatic Actuation Pressure Regulator: Intermediate flow (Tied-diaphragm)	<b>AZ14PAT</b>	P.740
Pneumatic Actuation Pressure Regulator: High flow (Tied-diaphragm)	<b>AZ12PA</b>	P.742
Pneumatic Actuation Pressure Regulator: Low flow	<b>AK10PA</b>	P.744
Pneumatic Actuation Pressure Regulator: Low flow (Tied-diaphragm)	<b>AK15PA</b>	P.746
Pneumatic Actuation Pressure Regulator: Intermediate flow (Tied-diaphragm)	<b>AK14PAT</b>	P.748
Pneumatic Actuation Pressure Regulator: High flow (Tied-diaphragm)	<b>AK12PA</b>	P.750

Pressure Gauges	P.752
Regulators and Back Pressure Regulator/Specific Product Precautions	P.754

AP

SL

AZ

AK

BP

# Single Stage Compact Regulator for Ultra High Purity

## AP500 Series

- For UHP gas delivery
- 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

AP5 02 S [ ] [ ] [ ] [ ] 2PW FV4 FV4 [ ] [ ] [ ] [ ]

Port Number  
① ② ③

#### Delivery pressure

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

#### Material

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

#### Surface finish

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

#### Ports

Code	Ports
2PW	2 ports
3PWG	3 ports

#### Range options

Code	Specification
No code	Standard
A	Sub-atmospheric

\*1) Only available with AP501.

#### Pressure gauge unit

Code	Unit
No code	psig/bar
MPA	MPa

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

#### Option

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

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

\*7) VS material not available with HF option.

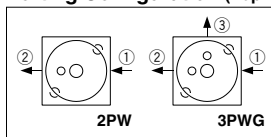
#### Seat material

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

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

\*5) Not available with SH material.

### Porting Configuration (Top view)



① IN ② OUT ③ Gauge port (Outlet)

#### Connections (Inlet ①, Outlet ②)

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

#### Gauge port (Outlet ③)

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

\*2) Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### Specifications

Operating Parameters	AP501□□A	AP501	AP502	AP506	AP510
Delivery pressure	100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)	0.5 to 10 psig (0.0034 to 0.07 MPa)	0.5 to 30 psig (0.0034 to 0.2 MPa)	1 to 60 psig (0.007 to 0.4 MPa)	1 to 100 psig (0.007 to 0.7 MPa)
Gas	Select compatible materials of construction for the gas				
Source pressure	Vacuum to 150 psig (1.0 MPa)				
Proof pressure	Inlet	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)				
Cv	0.06				
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)			
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *2)				
Surface finish	Ra max 15 μm. (0.4 μm) Option: 10 μm. (0.25 μm), 7 μm. (0.18 μm), 5 μm. (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 in <sup>3</sup> (2.4 cm <sup>3</sup> )				
Weight	0.45 kg *3)				

\*1) Max. 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.



# Single Stage Compact Regulator for Ultra High Purity **AP500 Series**

## Option

### High flow

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

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

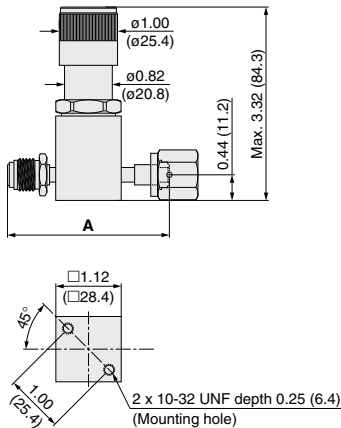
## Wetted Parts Material

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

## Dimensions

inch (mm)

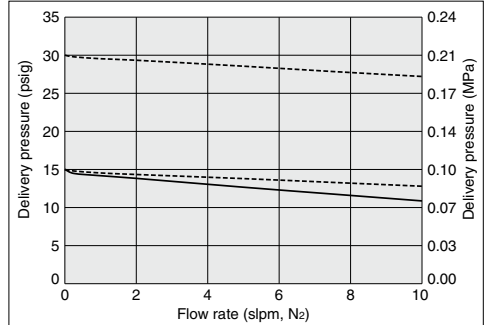
### AP500



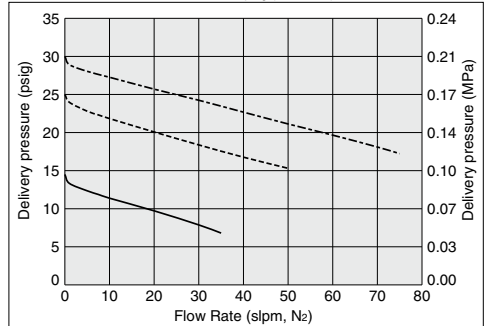
Connections	A	
	inch	(mm)
FV4	2.78	(70.6)
MV4	2.12	(53.8)

## Flow Rate Characteristics

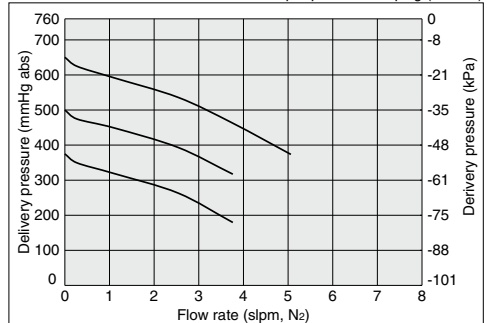
AP500 Inlet pressure: - - - - 100 psig (0.69 MPa) — 30 psig (0.21 MPa)



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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

AK

BP

# 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

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

Port Number  
① ② ③ ④

**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
SHP	secondary			
SH	remelt	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	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)

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

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
40	0 to 4000 psig	0 to 28 MPa

\*1) Refer to gauge guide (P.752) for gauge specifications.  
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

**Sample Order Number**

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

**Bonnet option**

Code	Bonnet
No code	Standard
P	Panel installation *6)

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

**Option**

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

**Seat material**

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

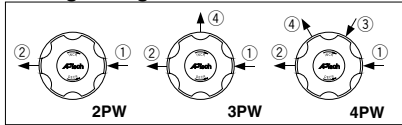
- \*3) Not available with SHP, SH, H materials.
- \*4) PTFE recommended for applications such as within a process tool.
- \*5) Source pressure rating is limited to 300 psig (2.1 MPa) or less.

**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.

### Porting Configuration



### Specifications

Operating Parameters	AP1001	AP1002	AP1006	AP1010	AP1015
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas				
<b>Source pressure</b>	Vacuum to 300 psig (2.1MPa)		Vacuum to 3500 psig (24.1 MPa) *1)		
<b>Proof pressure</b>	1.5 times the maximum source pressure				
<b>Burst pressure</b>	3 times the maximum source pressure				
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *2)				
<b>Cv</b>	0.09				
<b>Leak rate</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
<b>Across the seat leak</b>	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *4)				
<b>Surface finish</b>	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)				
<b>Connections</b>	Face seal, Tube weld				
<b>Bonnet port</b>	NPT 1/8 inch *5)				
<b>Supply pressure effect</b>	0.38 psig (0.0026 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
<b>Installation</b>	Bottom mount (Option: panel mount)				
<b>Internal volume</b>	0.49 in <sup>3</sup> (8 cm <sup>3</sup> )				
<b>Weight</b>	1.25 kg *6)				

- \*1) Max. 300 psig (2.1 MPa) for PTFE seat.
- \*2) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1000 Series**

Low to intermediate flow

## Option

### High flow

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

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

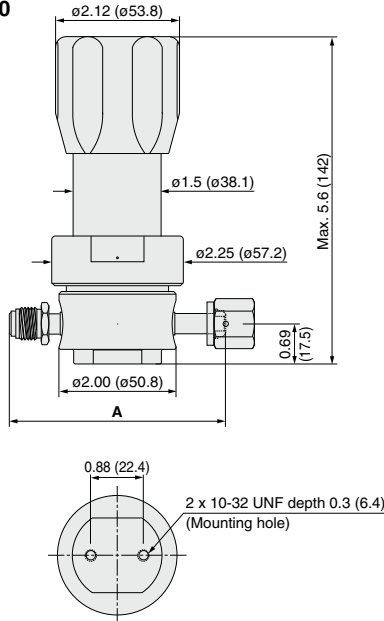
## Wetted Parts Material

Wetted Parts	S	SHP	SH	H
Body	316L SS secondary remelt			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	PTFE (Option: Polyimide, PTFE)		PTFE (Option: PTFE)	

## Dimensions

inch (mm)

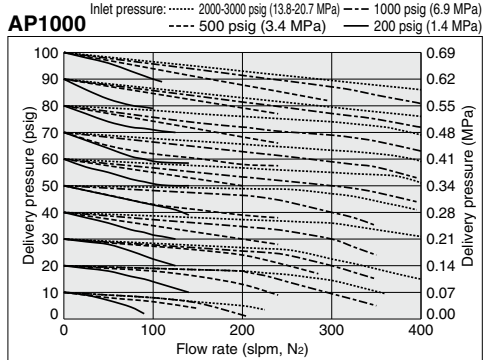
### AP1000



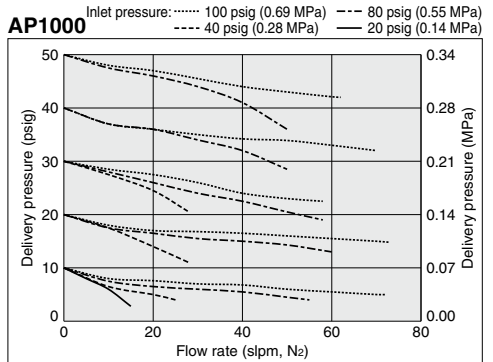
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4	2.96	(75.2)
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6	4.70	(119.4)
TW6	2.96	(75.2)

## Flow Rate Characteristics

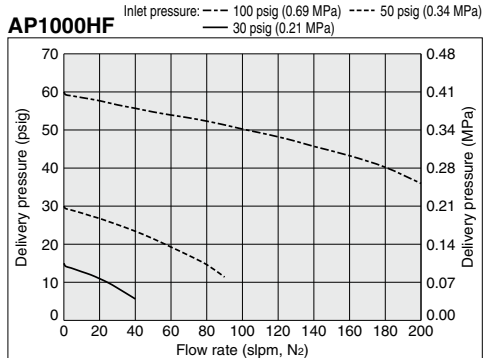
### AP1000



### AP1000



### AP1000HF



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP  
 SL  
 AZ  
 AK  
 BP

# 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)
- Flow capacity: to 30 slpm
- Body material: 316L SS secondary remelt
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Tied-diaphragm design



ROHS

### How to Order

**Port Number**

① ② ③ ④

**AP15 02 S 2PW FV4 FV4**

**Delivery pressure**

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

**Material**

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

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

Code	Pressure gauge *1)	
No code	psig/bar unit	MPa unit
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

**Bonnet option**

Code	Bonnet
No code	Standard
P	Panel installation *4)

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

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	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**

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

**Sample Order Number**

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

### Specifications

Operating Parameters	AP1502	AP1506	AP1510	AP1515
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas			
<b>Source pressure</b>	Vacuum to 3500 psig (24.1 MPa)			
<b>Proof pressure</b>	<b>Inlet</b>	1.5 times the maximum source pressure		
	<b>Outlet</b>	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	<b>Inlet</b>	3 times the maximum source pressure		
	<b>Outlet</b>	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1)			
<b>Cv</b>	0.09			
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)		
<b>Across the seat leak</b>	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)			
<b>Surface finish</b>	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
<b>Connections</b>	Face seal, Tube weld			
<b>Bonnet port</b>	NPT 1/8 inch *4)			
<b>Supply pressure effect</b>	0.41 psig (0.028 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
<b>Installation</b>	Bottom mount (Option: panel mount)			
<b>Internal volume</b>	0.51 in <sup>3</sup> (8.4 cm <sup>3</sup> )			
<b>Weight</b>	1.27 kg *5)			

\*1) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1500 Series**

Low flow (Tied-diaphragm)

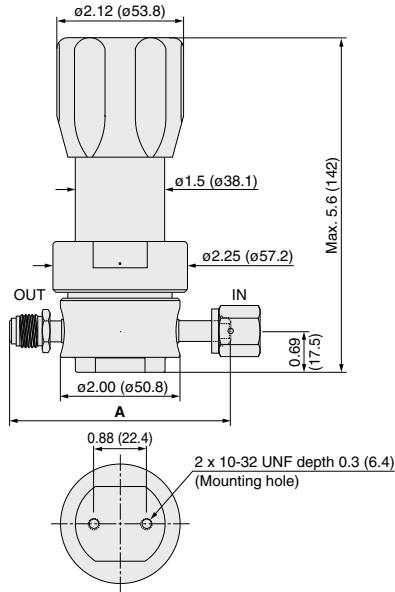
## Wetted Parts Material

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	PTFE (Option: Polyimide)		PTFE	

## Dimensions

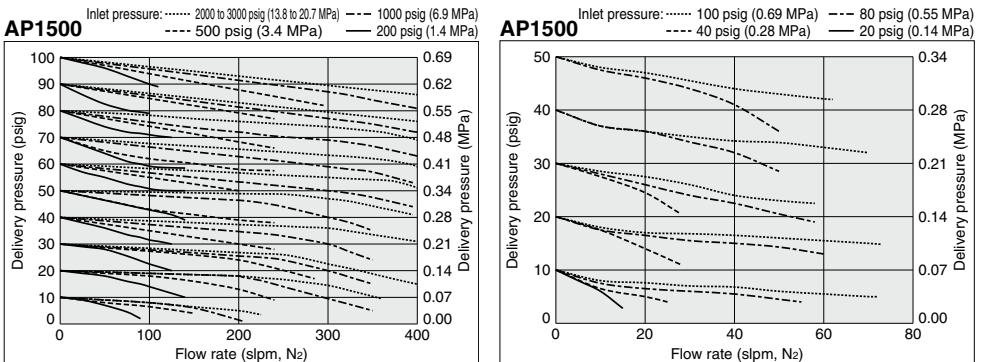
inch (mm)

### AP1500



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

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP  
SL  
AZ  
AK  
BP

# 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

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

Port Number  
① ② ③ ④

#### 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	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 (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

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

#### Seat material

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

\*3) Not available with SH material.

#### Gauge port (Inlet ③, Outlet ④)

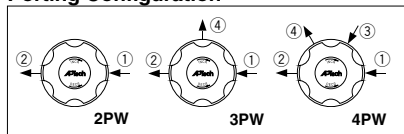
Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
2	0 to 200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

#### 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



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

\*1) Refer to gauge guide (P.752) 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
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)			
Cv	0.13			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)		
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (13.5 cm <sup>3</sup> )			
Weight	1.54 kg *5)			

\*1) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1600 Series**

Low to intermediate flow

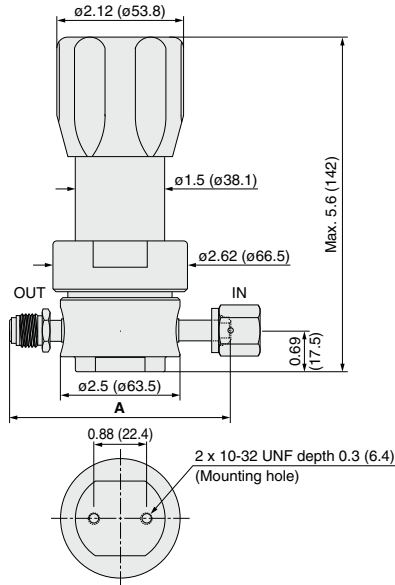
## Wetted Parts Material

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

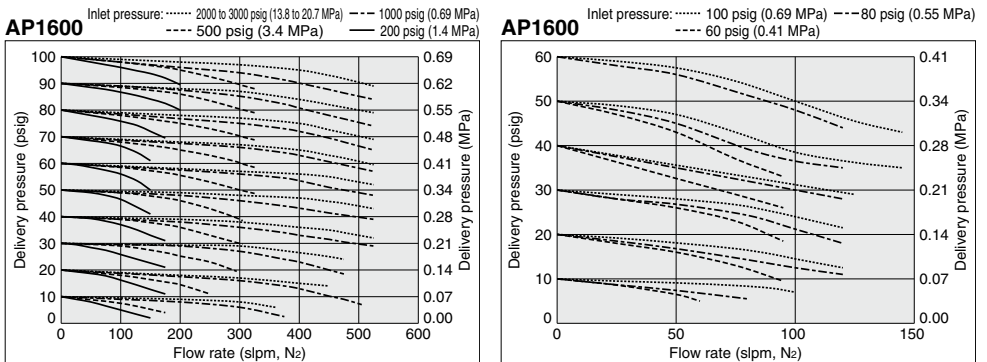
inch (mm)

### AP1600



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

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

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

Port Number  
① ② ③ ④

#### 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 (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

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

\*1) Refer to gauge guide (P.732) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### Sample Order Number

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *4)

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

#### Option

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

#### Seat material

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

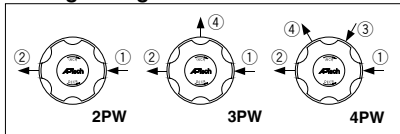
\*3) Not available with SH material.

#### 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



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

### Specifications

Operating Parameters	AP1901	AP1902	AP1906	AP1910	AP1915
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas				
<b>Source pressure</b>	Vacuum to 3500 psig (24.1 MPa)				
<b>Proof pressure</b>	1.5 times the maximum source pressure				
<b>Burst pressure</b>	3 times the maximum source pressure				
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1)				
<b>Cv</b>	0.13				
<b>Leak rate</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
<b>Across the seat leak</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
<b>Surface finish</b>	Ra max 15 µin. (0.4 µm) Option: 10 µin. (0.25 µm), 7 µin. (0.18 µm), 5 µin. (0.13 µm)				
<b>Connections</b>	Face seal, Tube weld				
<b>Bonnet port</b>	NPT 1/8 inch *4)				
<b>Supply pressure effect</b>	0.25 psig (0.0017 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
<b>Installation</b>	Bottom mount (Option: panel mount)				
<b>Internal volume</b>	0.82 in <sup>3</sup> (13.5 cm <sup>3</sup> )				
<b>Weight</b>	1.54 kg *5)				

\*1) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1900 Series**

Low to intermediate flow (Tied-diaphragm)

## Option

### High flow

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

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

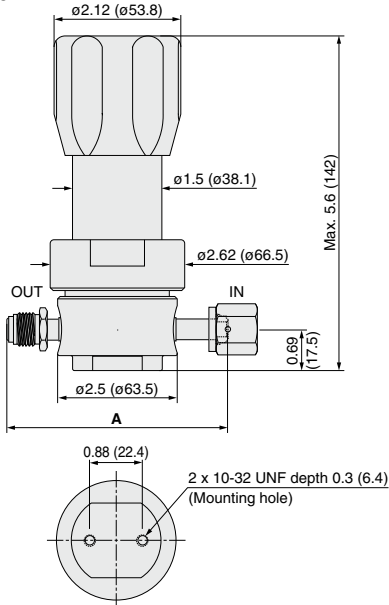
## Wetted Parts Material

Wetted Parts	S	SH
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Poppet	316L SS	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)

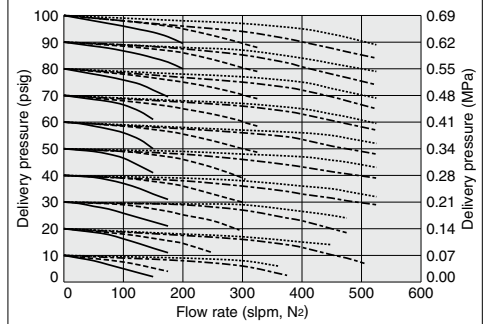
### AP1900



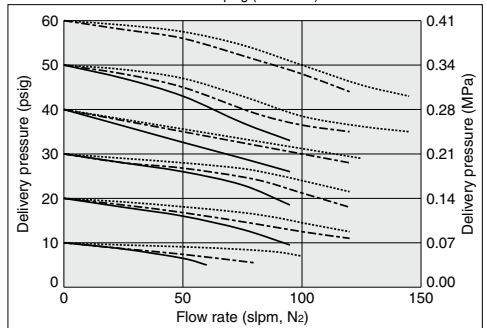
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4	4.30	(109.2)
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6	5.22	(132.6)
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8	5.22	(132.6)
TW8	4.34	(110.2)

## Flow Rate Characteristics

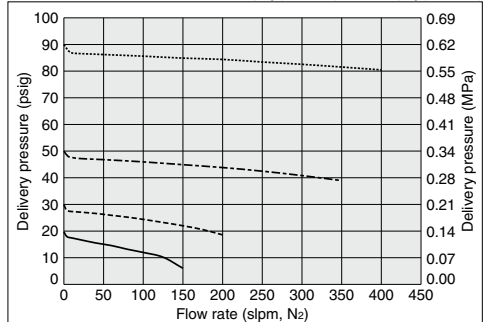
**AP1900** Inlet pressure: ..... 2000 to 3000 psig (13.8 to 20.7 MPa) --- 1000 psig (6.9 MPa)  
 ----- 500 psig (3.4 MPa) ——— 200 psig (1.4 MPa)



**AP1900** Inlet pressure: ..... 100 psig (0.69 MPa) --- 80 psig (0.55 MPa)  
 ——— 60 psig (0.41 MPa)



**AP1900HF** Inlet pressure: ..... 600 psig (4.1 MPa) --- 300 psig (2.1 MPa)  
 ----- 100 psig (0.69 MPa) ——— 60 psig (0.41 MPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP  
 SL  
 AZ  
 AK  
 BP

# 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



#### Delivery pressure

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

#### Material

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

#### Range options

Code	Range
No code	Standard
A	Sub-atmospheric

\*1 Only available with AP1402T.

#### Connections (Inlet, Outlet)

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 (Inlet, Outlet)

Code	Pressure gauge *2
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
40	0 to 4000 psig 0 to 28 MPa

\*2 Refer to gauge guide (P.752) 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

#### Bonnet option

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

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

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

#### Option

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

\*5) Not available with AP1402T and AP1406T.

#### Seat material

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

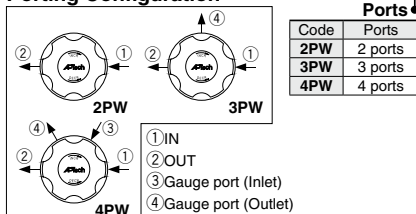
\*4) Not available with SH material.

#### Pressure gauge unit

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



### 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)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa) (Source pressure 1000 psig or less) *1
Gas	Select compatible materials of construction for the gas				
Source pressure	Vacuum to 300 psig (2.1 MPa)	Vacuum to 2300 psig (15.9 MPa)			
Prof 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				
Cv	0.45				
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3			
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (17.4 cm <sup>3</sup> )				
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) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1400T Series**

Intermediate flow (Tied-diaphragm)

## 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)	

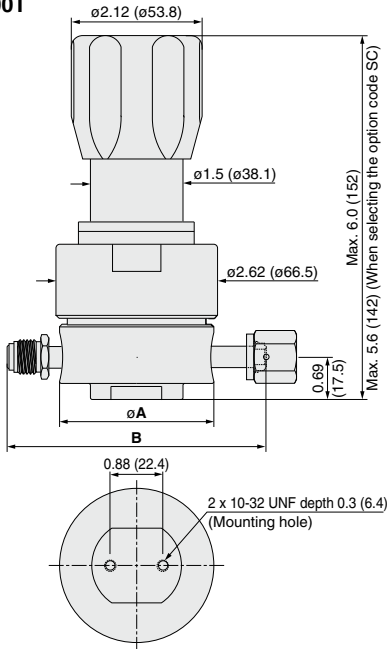
## Wetted Parts Material

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)

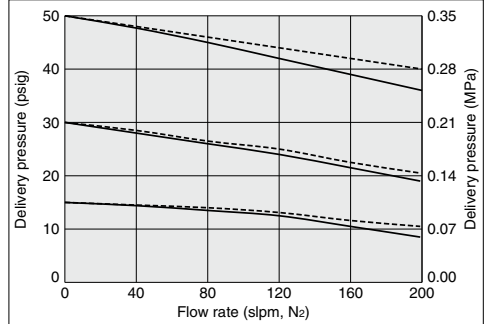
### AP1400T



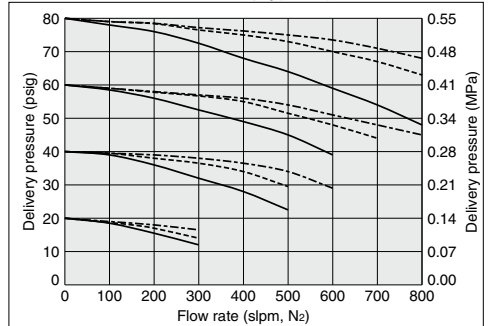
Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6			4.00	(101.6)
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8			5.22	(132.6)
TW8			4.34	(110.2)

## Flow Rate Characteristics

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

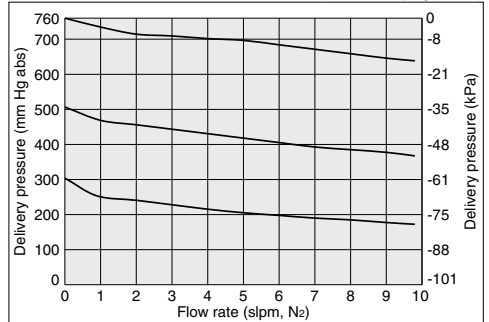


### AP1400T Inlet pressure: - - - 2000 psig (13.8 MPa) - - - 600 psig (4.1 MPa) — 200 psig (1.4 MPa)



### AP1402TA

Inlet pressure: 0 psig (0 kPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

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# Single Stage Regulator for Ultra High Purity

## High flow (Tied-diaphragm)

### AP1200 Series

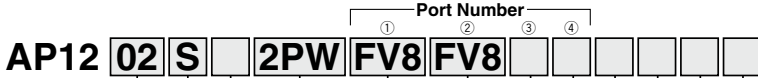
- For UHP gas delivery
- High inlet pressure type Standard: Max. 1700 psig (11.7 MPa)  
HR (option): Max. 3000 psig (20.7 MPa)
- Flow capacity Standard: to 800 slpm  
HF (option): to 1000 slpm  
FC (option): to 1500 slpm

- Body material: 316L SS secondary remelt
- Ni-Cr-Mo alloy internals available for corrosion resistance
- Tied-diaphragm design



ROHS

### How to Order



#### Delivery pressure

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

#### Material

Code	Body	Poppet	Diaphragm	Nozzle
S	316L SS	316L SS	Ni-Cr-Mo alloy	316L SS
SHP	316L SS secondary remelt	Ni-Cr-Mo alloy	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 (Inlet ①, Outlet ②)

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.

#### Bonnet option

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

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

\*8) Bonnet port is not threaded.

SC option not available with FC or HR option.

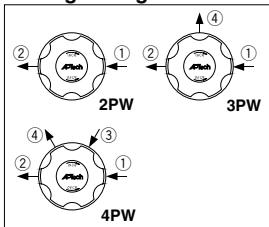
#### Option

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

\*5) FC and HR options are not available with AP1202, AP1206 and AP1225.

\*6) FC option is available with connection size 1/2 or 3/4 inch.

### Porting Configuration



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

#### Gauge port (Inlet ③, Outlet ④)

Code	Pressure gauge *2)
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

\*2) Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### 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
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
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas				
<b>Source pressure</b>	Vacuum to 1700 psig (11.7 MPa)				
<b>Proof pressure</b>	1.5 times the maximum source pressure				
<b>Burst pressure</b>	3 times the maximum source pressure				
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *3)				
<b>Cv</b>	0.65				
<b>Leak rate</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
<b>Across the seat leak</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *4)				
<b>Surface finish</b>	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)				
<b>Connections</b>	Face seal, Tube weld				
<b>Bonnet port</b>	NPT 1/8 inch *6)				
<b>Supply pressure effect</b>	3.5 psig (0.024 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
<b>Installation</b>	Bottom mount (Option: panel mount)				
<b>Internal volume</b>	1.07 in <sup>3</sup> (17.6 cm <sup>3</sup> )				
<b>Weight</b>	2.0 kg *7)				

\*1) Source pressure above 1000 psig (6.9 MPa) decreases maximum delivery pressure to less than 150 psig (1 MPa) due to supply pressure effect. When the source pressure is 1700 psig (11.7 MPa), achievable delivery pressure is around 125 psig (0.86 MPa) (HF and FC option 120 psig (0.83 MPa)).

\*2) 250 psig outlet pressure preset at 800 psig (5.5MPa) inlet pressure. Custom inlet/outlet pressure settings available. Please contact SMC.

\*3) Max. 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.

# Single Stage Regulator for Ultra High Purity **AP1200 Series**

High flow (Tied-diaphragm)

## 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	<b>AP1202</b>	<b>AP1206</b>	<b>AP1210</b>	<b>AP1215</b>	<b>AP1225</b>
	<b>Cv</b>	1.1				
<b>HF</b>	<b>Supply pressure effect</b>	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	<b>AP1210</b>	<b>AP1215</b>
	<b>Source pressure</b>	Vacuum to 300 psig (2.1 MPa)	
	<b>Cv</b>	0.65	
<b>FC</b>	<b>Supply pressure effect</b>	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
	<b>Connections</b>	1/2, 3/4 inch face seal, 1/2, 3/4 inch tube weld	

### 3. High inlet pressure

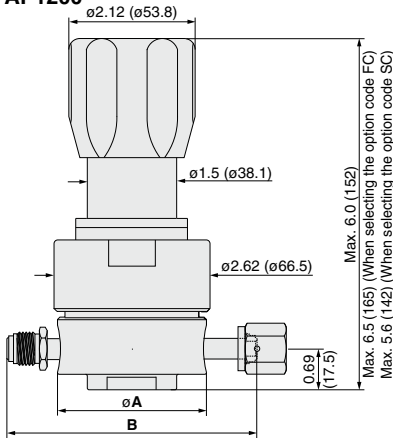
Changes from the standard type are:

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

## Dimensions

inch (mm)

### AP1200



0.88 (22.4)  
2 x 10-32 UNF depth 0.3 (6.4)  
(Mounting hole)

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

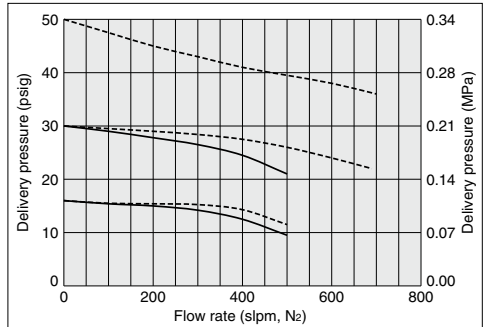
## Wetted Parts Material

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

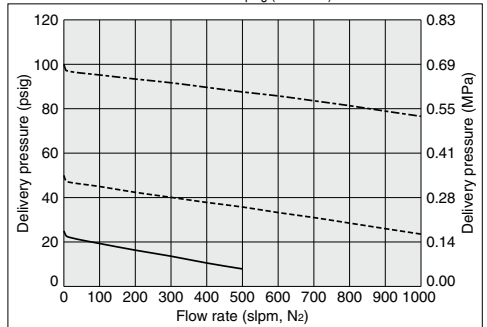
Inlet pressure: ---- 80 psig (0.55 MPa) ——— 60 psig (0.41 MPa)  
1/2 inch connections \*)

### AP1200



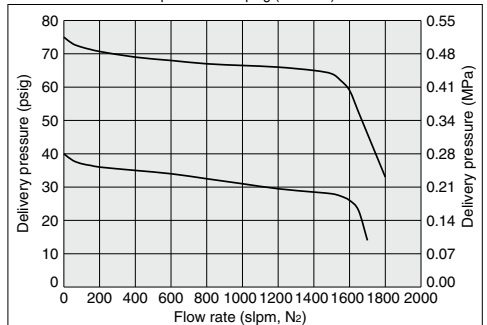
### AP1200HF

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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

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	316L SS	316L SS	316L SS
SHP	secondary remelt	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	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)

**Ports**

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

**Bonnet option**

Code	Bonnet
No code	Standard
P	Panel installation <sup>(*)4</sup>

<sup>(\*)4</sup> Panel mounting hole: dia. 1.56 inch (39.6 mm).

**Seat material**

Code	Material
No code	PCTFE (Standard)
TF	PTFE <sup>(*)3</sup>

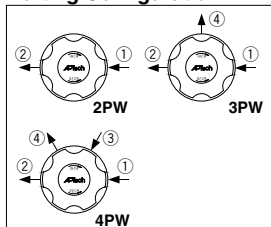
<sup>(\*)3</sup> PTFE recommended for applications such as within a process tool.

**Pressure gauge unit <sup>(\*)2</sup>**

Code	Unit
No code	psig/bar
MPA	MPa

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

### Porting Configuration



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

### Connections (Inlet ①, Outlet ②)

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

**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	

### Gauge port (Inlet ③, Outlet ④)

Code	Pressure gauge <sup>(*)1</sup>	
	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

- <sup>(\*)1</sup> Other range available. Refer to gauge guide (P.752).  
<sup>(\*)2</sup> Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### Specifications

Operating Parameters		AP1101
<b>Delivery pressure</b>		100 mm Hg absolute to 10 psig (-88 kPa to 0.07 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 300 psig (2.1 MPa)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing)
<b>Cv</b>		0.05
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>(*)1</sup>
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>(*)1</sup>
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Bonnet port</b>		NPT 1/8 inch <sup>(*)2</sup>
<b>Installation</b>		Bottom mount (Option: panel mount)
<b>Internal volume</b>		0.49 in <sup>3</sup> (8 cm <sup>3</sup> )
<b>Weight</b>		1.25 kg <sup>(*)3</sup>

<sup>(\*)1</sup> Tested with Helium gas inlet pressure 300 psig (2.1 MPa).

<sup>(\*)2</sup> On panel mount option, bonnet port is not threaded.

<sup>(\*)3</sup> Weight, including individual boxed weight, may vary depending on connections or options.



# Single Stage Regulator for Ultra High Purity **AP1100 Series**

Delivery of sub-atmospheric pressure

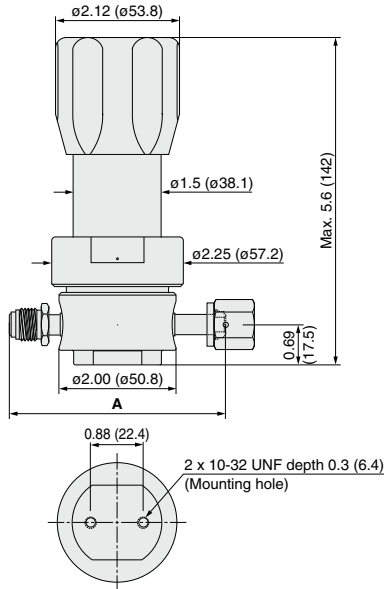
## Wetted Parts Material

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	PTFE (Option: PTFE)			

## Dimensions

inch (mm)

### AP1100

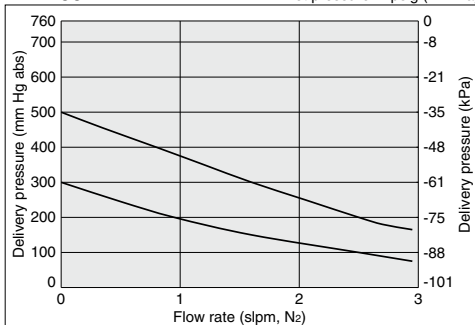


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4	3.70	(94.0)
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6	4.70	(119.4)
TW6	2.96	(75.2)

## Flow Rate Characteristics

### AP1100

Inlet pressure: 2 psig (14 kPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# Two Stage Regulator for Ultra High Purity

Low flow  
(Tied-diaphragm)

## AP1700 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
- Minimizes supply pressure effect by two stage regulation
- Tied-diaphragm design



### How to Order



#### Delivery pressure

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

#### Material

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

#### Connections (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation <sup>(*)4</sup>

<sup>(\*)4</sup> Panel mounting hole: dia.1.56 inch (39.6 mm).

#### Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide <sup>(*)3</sup>

<sup>(\*)3</sup> Not available with SH material.

#### Gauge port (Inlet ③, Outlet ④)

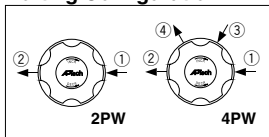
Code	Pressure gauge <sup>(*)1</sup>	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Connections: 1/4 inch face seal male)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
H	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa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

#### Pressure gauge unit <sup>(\*)2</sup>

Code	Unit
No code	psig/bar
MPA	MPa

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

#### Porting Configuration



#### Ports

Code	Ports
2PW	2 ports
4PW	4 ports

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

<sup>(\*)1</sup> Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### Sample Order Number

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

### Specifications

Operating Parameters	AP1702	AP1706	AP1710
Delivery pressure	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)
Gas	Select compatible materials of construction for the gas		
Source pressure	Vacuum to 3500 psig (24.1 MPa)		
First stage pressure	175 psig (1.2 MPa)		
Proof pressure	Inlet	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) <sup>(*)1</sup>		
Cv	0.05		
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>(*)2</sup>	
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>(*)3</sup>		
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 <sup>(*)4</sup>		
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 in <sup>3</sup> (15.1 cm <sup>3</sup> )		
Weight	2.04 kg <sup>(*)5</sup>		

<sup>(\*)1</sup> Max. 90°C for Polyimide seat.

<sup>(\*)2</sup> Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

<sup>(\*)3</sup> Tested with Helium gas inlet pressure 1000 psig (7 MPa).

<sup>(\*)4</sup> On panel mount option, bonnet port is not threaded.

<sup>(\*)5</sup> Weight, including individual boxed weight, may vary depending on connections or options.

# Two Stage Regulator for Ultra High Purity **AP1700 Series**

Low flow (Tied-diaphragm)

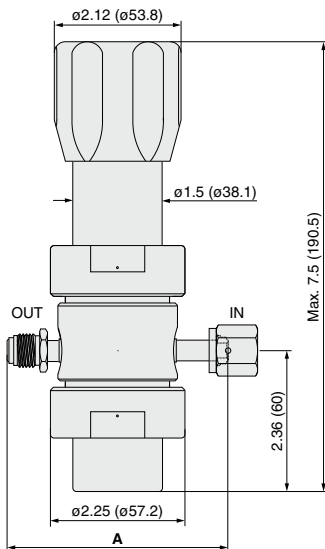
## Wetted Parts Material

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)
<b>FV4</b>	3.70	(94.0)
<b>MV4</b>		
<b>TW4</b>	2.96	(75.2)
<b>FV6</b>	4.70	(119.4)
<b>MV6</b>		
<b>TW6</b>	2.96	(75.2)

AP

SL

AZ

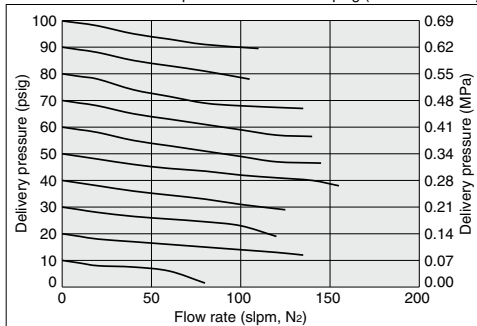
AK

BP

## Flow Rate Characteristics

### AP1700

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



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# 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<sub>3</sub>) to 900 slpm (H<sub>2</sub>)
- 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



#### 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

#### 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 (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation <sup>(*)4</sup>

<sup>(\*)4</sup> Panel mounting hole: dia. 1.56 inch (39.6 mm).

#### Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide <sup>(*)3</sup>

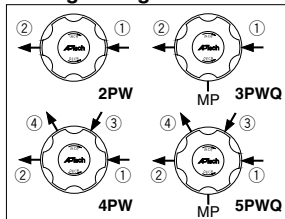
<sup>(\*)3</sup> Not available with SH material.

#### Pressure gauge unit <sup>(\*)2</sup>

Code	Unit
No code	psig/bar
MPA	MPa

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

### Porting Configuration



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

#### Gauge port (Inlet ③, Outlet ④)

Code	Pressure gauge <sup>(*)1</sup>	
	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

<sup>(\*)1</sup> Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### Sample Order Number

Sample Order Number	Port	③	④
AP2702S	2PW FV4 FV4	[ ]	[ ]
	3PWQ FV4 FV4	[ ]	[ ]
	4PW FV4 FV4	40 V3 MPA	[ ]
	5PWQ FV4 FV4	40 V3 MPA	[ ]

### Specifications

Operating Parameters		AP2702	AP2706	AP2710	AP2712
Delivery pressure		1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	3 to 120 psig (0.021 to 0.8 MPa)
Gas		Select compatible materials of construction for the gas			
Source pressure		Vacuum to 3500 psig (24.1 MPa)			
First stage pressure		200 psig (1.4 MPa)			
Proof pressure	Inlet	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) <sup>(*)1</sup>			
Cv		0.105			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>(*)2</sup>			
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>(*)3</sup>			
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 <sup>(*)4</sup>			
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 in <sup>3</sup> (30.6 cm <sup>3</sup> )			
Weight		2.27 kg <sup>(*)5</sup>			

<sup>(\*)1</sup> Max. 90°C for Polyimide seat.

<sup>(\*)2</sup> Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

<sup>(\*)3</sup> Tested with Helium gas inlet pressure 1000 psig (7 MPa).

<sup>(\*)4</sup> On panel mount option, bonnet port is not threaded.

<sup>(\*)5</sup> Weight, including individual boxed weight, may vary depending on connections or options.

# Two Stage Regulator for Ultra High Purity **AP2700 Series**

Intermediate flow (Tied-diaphragm)

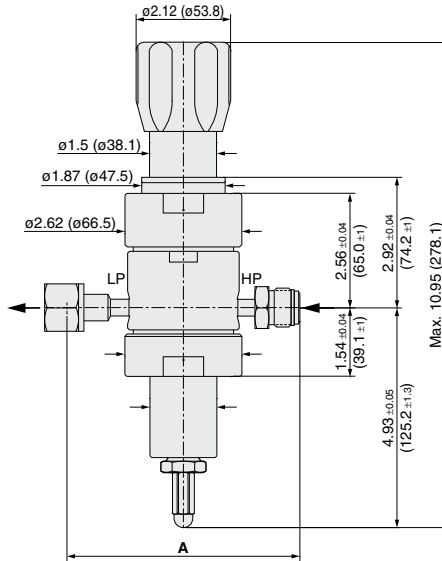
## Wetted Parts Material

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



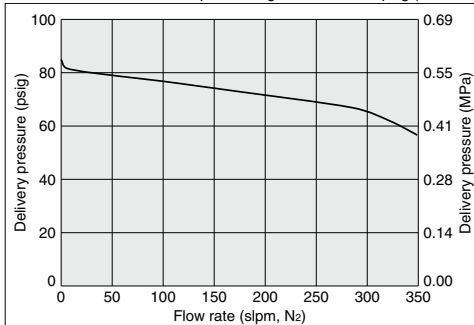
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4	4.30	(109.2)
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6	5.22	(132.6)
TW6	4.00	(101.6)

- AP
- SL
- AZ
- AK
- BP

## Flow Rate Characteristics

### AP2700

Inlet pressure: greater than 150 psig (1.0 MPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# Single Stage Regulator for Ultra High Purity Bulk gas delivery

## 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

**AP9 0 10 S 2PW FV16 FV16**

**Size**

Code	Cv
0	3
1	4

**Delivery pressure**

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

**Material**

Code	Material
S	316L SS

**Surface finish**

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

**Ports**

Code	Ports
2PW	2 ports
3PW	3 ports

**Connections (Inlet ①, Outlet ②)**

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

**Seat material**

Code	Material
No code	PTFE (Standard)
VS	Polyimide

**Pressure gauge unit**<sup>\*2)</sup>

Code	Unit
No code	psig/bar
MPA	MPa

**Gauge ports (Outlet ③)**

Code	Pressure gauge <sup>*1)</sup>
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

**Porting Configuration**

① IN ② OUT ③ Gauge port (Outlet)

**Sample Order Number**

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

<sup>\*1)</sup> Refer to gauge guide (P.752) for gauge specifications.  
<sup>\*2)</sup> 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
<b>Delivery pressure</b>	5 to 100 psig (0.034 to 0.7 MPa)	Preset to 300 psig (2.1 MPa) <sup>*1)</sup>	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) <sup>*5)</sup>
<b>Gas</b>	Select compatible materials of construction for the gas			
<b>Source pressure</b>	Vacuum to 1700 psig (11.7 MPa)		Vacuum to 800 psig (5.5 MPa)	
<b>Proof pressure</b>	<b>Inlet</b>	1.5 times the maximum source pressure		
	<b>Outlet</b>	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	<b>Inlet</b>	3 times the maximum source pressure		
	<b>Outlet</b>	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>	-40 to 71 °C (No freezing) <sup>*2)</sup>			
<b>Cv</b>	3.0		4.0	
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>*3)</sup>		
<b>Across the seat leak</b>	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>*3)</sup>			
<b>Surface finish</b>	Ra max 15 μin (0.4 μm) or 10 μin (0.25 μm)			
<b>Connections</b>	Face seal, Tube weld			
<b>Bonnet port</b>	NPT 1/8 inch			
<b>Supply pressure effect</b>	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	
<b>Internal volume</b>	12 in <sup>3</sup> (197 cm <sup>3</sup> )			
<b>Weight</b>	5.9 kg <sup>*4)</sup>			

<sup>\*1)</sup> At 800 psig (5.5 MPa) inlet pressure. Optional preset pressure available. Please contact SMC.

<sup>\*2)</sup> Max. 90 °C for Polyimide seat.

<sup>\*3)</sup> Tested with Helium gas inlet pressure 300 psig (2.1 MPa).

<sup>\*4)</sup> Weight, including individual boxed weight, may vary depending on connections or options.

<sup>\*5)</sup> 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**

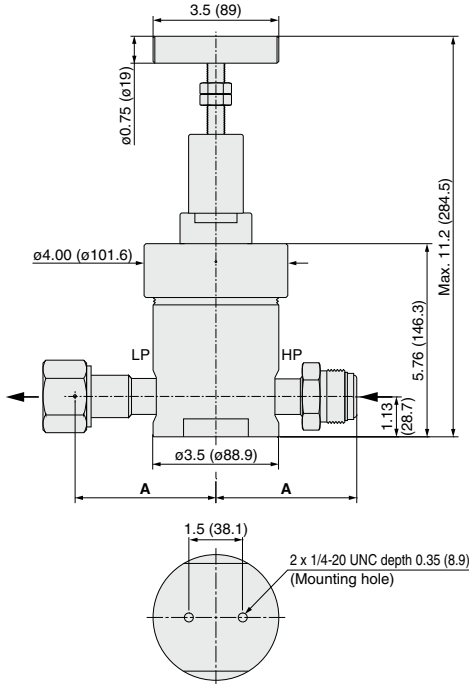
Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Poppet	Ni-Cr-Mo alloy
Bellows	Ni-Cr-Mo alloy
Nozzle	316L SS
Seat	PCTFE (Option: Polyimide)
Poppet spring	Ni-Co alloy
Bonnet seal	Nickel 200 <sup>*)</sup> (Silver plated)

<sup>\*)</sup> 316 SS silver plated for AP9030

**Dimensions**

inch (mm)

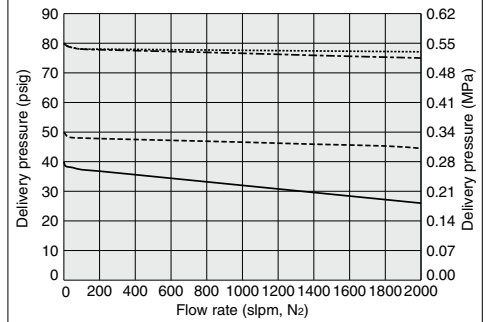
**AP9000 & 9100**



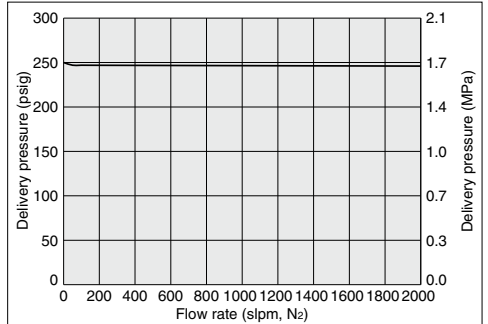
Connections	A	
	inch	(mm)
FV8	3.11	(79.0)
MV8	3.11	(79.0)
TW8	4.75	(120.7)
FV12	3.64	(92.5)
MV12	3.64	(92.5)
TW12	4.75	(120.7)
FV16	3.92	(99.6)
MV16	3.92	(99.6)
TW16	4.75	(120.7)

**Flow Rate Characteristics**

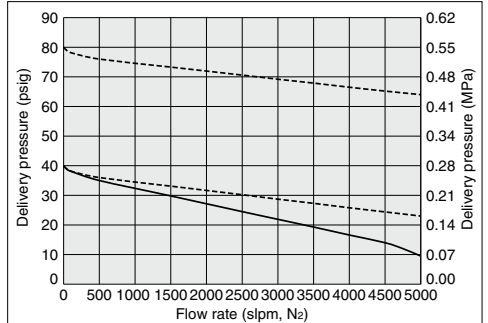
**AP9010** Inlet pressure: ..... 1000 psig (6.9 MPa) --- 300 psig (2.1 MPa)  
----- 200 psig (1.4 MPa) — 75 psig (0.52 MPa)



**AP9030** Inlet pressure: — 600 psig (4.1 MPa)



**AP9110** Inlet pressure: ---- 150 psig (1.0 MPa) — 75 psig (0.52 MPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

AK

BP



# 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

SL52 02 S M 2PW FV4 FV4

Port Number: ① ② ③

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

Surface finish	
Code	Surface finish Ra max
No code	15 $\mu$ m. (0.4 $\mu$ m) Standard
M	10 $\mu$ m. (0.25 $\mu$ m)
V	7 $\mu$ m. (0.18 $\mu$ m)
X	5 $\mu$ m. (0.13 $\mu$ m)

Range options *1)		Ports	
Code	Specification	Code	Ports
No code	Standard	2PW	2 ports
A	Sub-atmospheric	3PW	3 ports

\*1) Only available with SL5201.

Connections (Inlet ①, Outlet ②)	
Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

Bonnet option	
Code	Bonnet
No code	Standard
P	Panel installation *5)

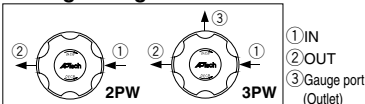
\*5) Panel mounting hole:  
dia. 1.25 inch (31.8 mm).

Option	
Code	Specification
No code	Standard
HF	High flow

Seat material	
Code	Material
No code	PTFE (Standard)
VS	Polyimide *4)

\*4) Not available with SH material.

### Porting Configuration



### Gauge port (Outlet ③)

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

### 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.

\*2) Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### 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)						
Cv 0.07						
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
Across the seat leak 4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *2)						
Surface finish		Ra max 10 $\mu$ m. (0.25 $\mu$ m) Option: 7 $\mu$ m. (0.18 $\mu$ m), 5 $\mu$ m. (0.13 $\mu$ m)				
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 in <sup>3</sup> (3.1 cm <sup>3</sup> )						
Weight 0.45 kg *3)						

\*1) Max. 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				

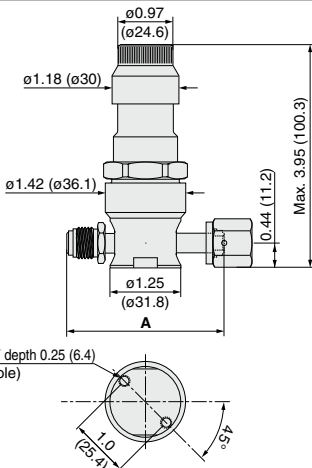
## Wetted Parts Material

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)

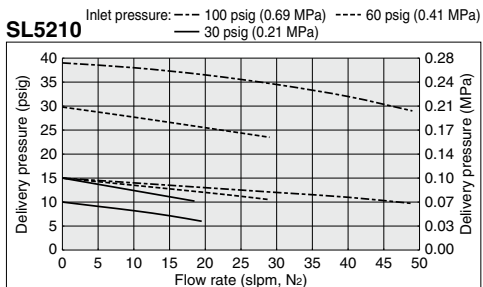
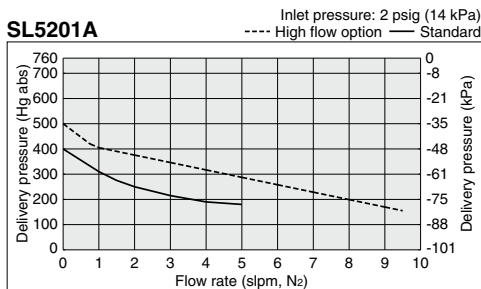
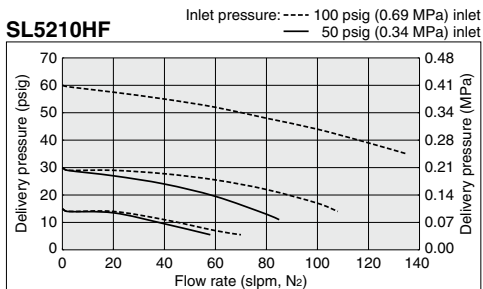
### SL5200



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

**AP**
**SL**
**AZ**
**AK**
**BP**

## Flow Rate Characteristics


 Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

Port Number

① ② ③ ④

**SL55 02 S M 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)

#### 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 μm. (0.25 μm) Standard
V	7 μm. (0.18 μm)
X	5 μm. (0.13 μm)

#### Range options

Code	Specification
No code	Standard
A	Sub-atmospheric

\*1) Only available with SL5502.

#### Connections (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *5)

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

#### Gauge port (Inlet ③, Outlet ④)

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	
40	0 to 4000 psig	0 to 28 MPa	

\*2) Refer to gauge guide (P.752) 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 *4)

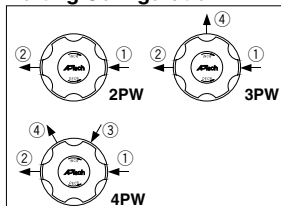
\*4) Not available with SH material.

#### 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



#### Ports

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

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

#### Sample Order Number

SL55	Port	①	②	③	④
	2PW	**	**		
	3PW	**	**	0	
	3PW	**	**	1	MPA
	4PW	**	**	0	0
	4PW	**	**	40	1 MPA

### 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)			
Cv		0.09			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)			
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)			
Surface finish		Ra max 10 μm. (0.25 μm) Option: 7 μm. (0.18 μm), 5 μm. (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) pressure pressure drop			
Installation		Bottom mount (Option: panel mount)			
Internal volume		0.55 in <sup>3</sup> (9 cm <sup>3</sup> )			
Weight		1.63 kg *5)			

\*1) Max. 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.

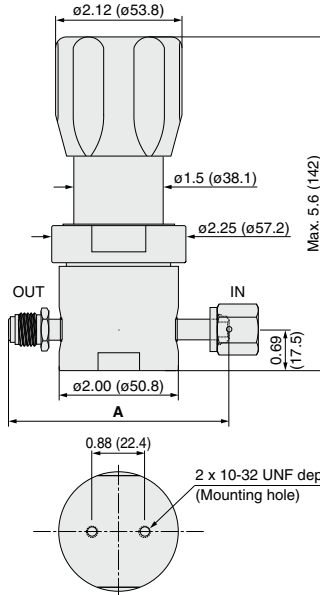
### Wetted Parts Material

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

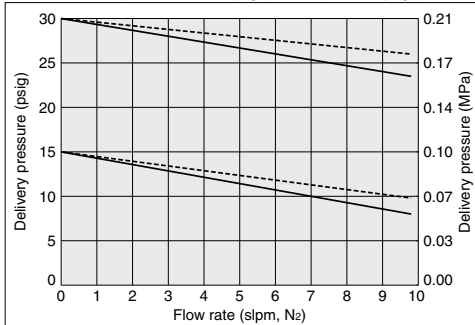


Connections	A	
	inch	(mm)
<b>FV4</b>	3.70	(94.0)
<b>MV4</b>	2.96	(75.2)
<b>TW4</b>	4.70	(119.4)
<b>FV6</b>	2.96	(75.2)
<b>MV6</b>		
<b>TW6</b>		

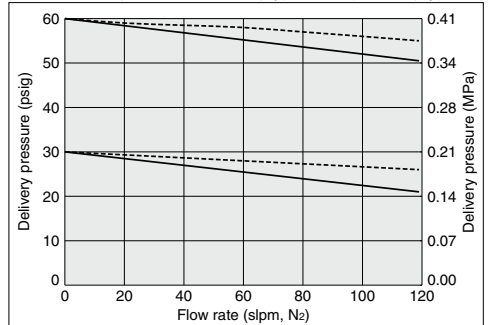
AP  
**SL**  
 AZ  
 AK  
 BP

### 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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

SL54 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
SH		Ni-Cr-Mo alloy	

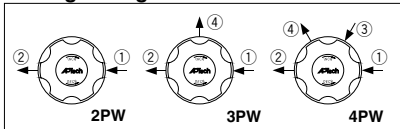
#### Surface finish

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

#### Porting Configuration



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

#### Connections (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

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
2	0 to 200 psig	0 to 1.4 MPa
10	0 to 1000 psig	0 to 7 MPa

\*1) Other range available. Refer to gauge guide (P.752).

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) 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.

#### Sample Order Number

SL54	Port	③	④
** * *	2PW	**	
	3PW	**	0
	3PW	**	1 MPa
	4PW	**	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)		
Cv	0.23		
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (19.7 cm <sup>3</sup> )		
Weight	1.91 kg *4)		

\*1) Max. 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.

# Single Stage Regulator for Ultra High Purity **SL5400 Series**

Intermediate flow

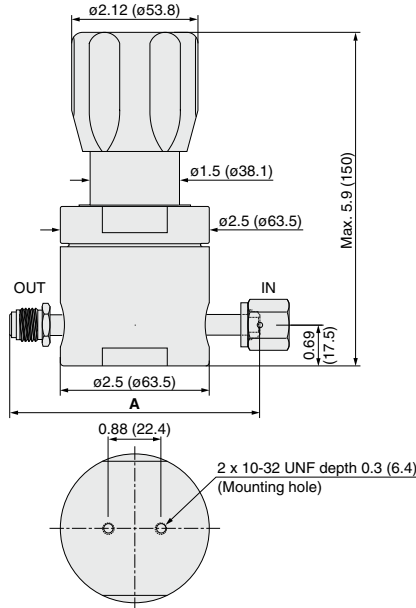
## Wetted Parts Material

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

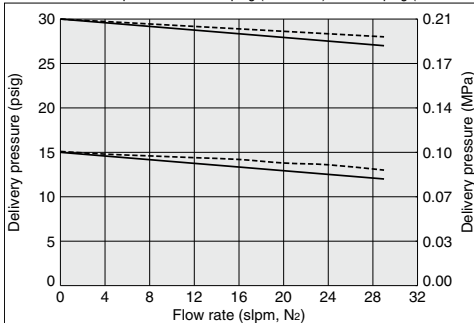


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4	3.46	(87.9)
FV6	5.22	(132.6)
MV6	4.00	(101.6)
FV8	5.22	(132.6)
MV8	4.34	(110.2)

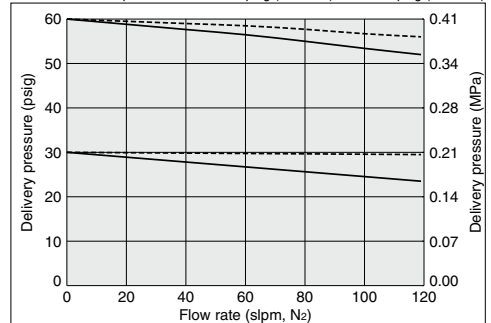
- AP
- SL**
- AZ
- AK
- BP

## 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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# Single Stage Regulator for Ultra High Purity Intermediate flow

## 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

SL58 **02** **S** **M** **2PW** **FV4** **FV4**            

#### Delivery pressure

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

#### Material

Code	Body	Poppet	Diaphragm
<b>S</b>	316L SS secondary remelt	316L SS	316L SS

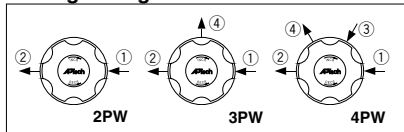
#### Surface finish

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

#### Ports

Code	Ports
<b>2PW</b>	2 ports
<b>3PW</b>	3 ports
<b>4PW</b>	4 ports

#### Porting Configuration



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

#### Connections (Inlet ①, Outlet ②)

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

#### Gauge port (Inlet ③, Outlet ④)

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

\*1) Other range available. Refer to gauge guide (P.752).

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
<b>P</b>	Panel installation *3)

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

#### Seat material

Code	Material
No code	PCTFE (Standard)
<b>VS</b>	Polyimide

#### Pressure gauge unit \*2)

Code	Unit
No code	psig/bar
<b>MPA</b>	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	③	④
SL58 [ * ] [ * ] [ * ] <b>2PW</b> [ * ] [ * ] [ * ] [ * ] [ * ] [ * ]	0	0
3PW [ * ] [ * ] [ * ] [ * ] [ * ] [ * ]	1	MPA
4PW [ * ] [ * ] [ * ] [ * ] [ * ] [ * ]	0	0

### Specifications

Operating Parameters		SL5802	SL5806	SL5810
<b>Delivery pressure</b>		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)
<b>Gas</b> Select compatible materials of construction for the gas				
<b>Source pressure</b> Vacuum to 300 psig (2.1 MPa)				
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure		
	Outlet	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure		
	Outlet	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)		
<b>Cv</b>		0.4		
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)		
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)		
<b>Surface finish</b>		Ra max 10 μin. (0.25 μm) Option: 7 μin. (0.18 μm), 5 μin. (0.13 μm)		
<b>Connections</b>		Face seal, Tube weld		
<b>Bonnet port</b>		NPT 1/8 inch *4)		
<b>Supply pressure effect</b>		5 psig (0.035 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop		
<b>Installation</b>		Bottom mount (Option: panel mount)		
<b>Internal volume</b>		1.2 in <sup>3</sup> (19.7 cm <sup>3</sup> )		
<b>Weight</b>		1.91 kg *5)		

\*1) Max. 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.

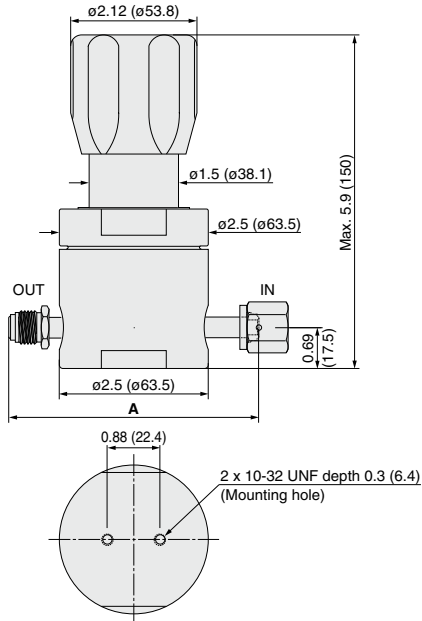
### Wetted Parts Material

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

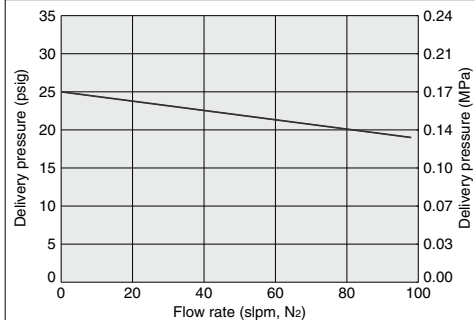


Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4	4.30	(109.2)
TW4	3.46	(87.9)
FV6	5.22	(132.6)
MV6	5.22	(132.6)
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8	5.22	(132.6)
TW8	4.34	(110.2)

### Flow Rate Characteristics

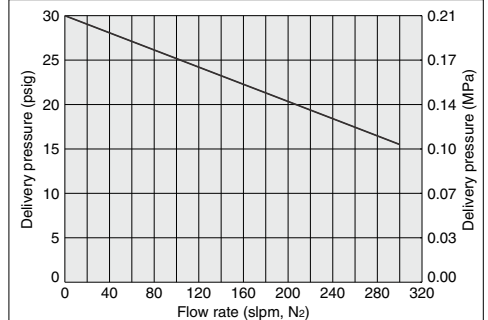
#### SL5800

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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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



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

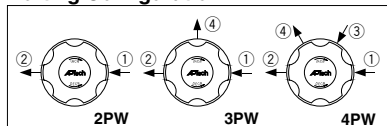
#### Surface finish

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

#### Ports

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

#### Porting Configuration



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

#### Connections (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

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
40	0 to 4000 psig 0 to 28 MPa

\*1 Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### Sample Order Number

AZ1001S	Port ①	②	③	④
2PW	FV4	FV4		
3PW	FV4	FV4	V3	MPA
4PW	FV4	FV4	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 (Cv: 0.09)
HF	High flow (Cv: 0.15)

#### 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
Delivery pressure	1 to 10 psig (0.007 to 0.07 MPa)	1 to 30 psig (0.007 to 0.2 MPa)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa)
Gas	Select compatible materials of construction for the gas				
Source pressure	Vacuum to 300 psig (2.1 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)				
Cv	0.09				
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)			
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *4)				
Surface finish	Ra 10 μm. (0.25 μm) Option: 25 μm. (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 in <sup>3</sup> (8 cm <sup>3</sup> )				
Weight	1.25 kg *5)				

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

\*2) Max. 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.

# Single Stage Regulator for Ultra High Purity **AZ1000 Series**

Low to intermediate flow

## 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
HF	Cv	0.15				
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

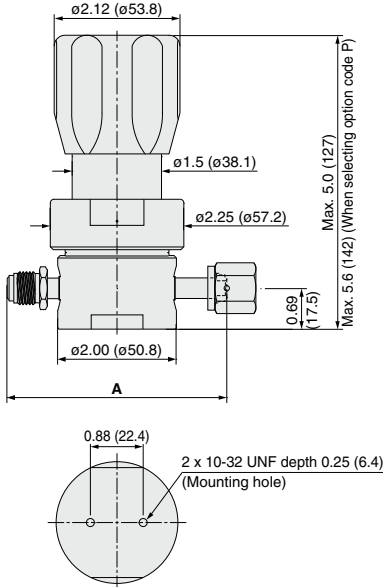
## Wetted Parts Material

Wetted Parts	S	SHP
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

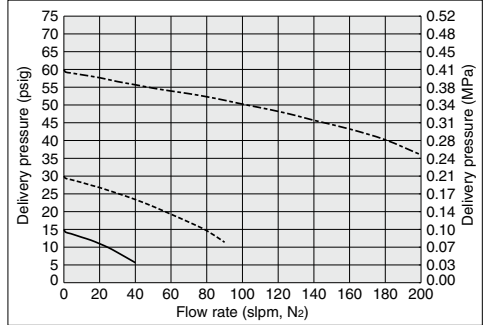


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4	3.70	(94.0)
FV6	4.70	(119.4)
MV6	4.70	(119.4)
TW6	2.96	(75.2)

## Flow Rate Characteristics

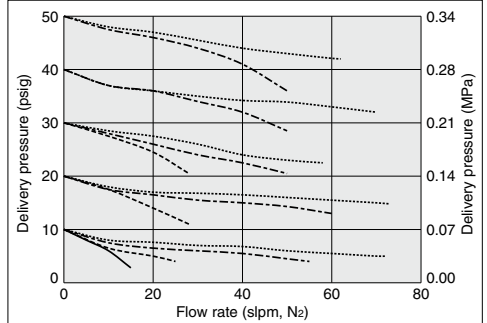
Inlet pressure: --- 100 psig (0.69 MPa) ---- 50 psig (0.34 MPa)  
 — 30 psig (0.21 MPa)

### AZ1000HF



### AZ1000

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



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

AK

BP

# Single Stage Regulator for Ultra High Purity

Low flow  
(Tied-diaphragm)

## AZ1500 Series

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



RoHS

### How to Order

AZ15 02 S [ ] 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	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	
SHP	316L SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316L SS

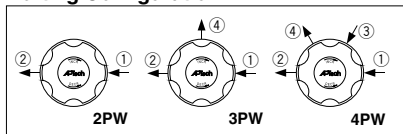
#### Surface finish

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



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

#### Connections (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

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

\*1) Refer to gauge guide (P.752) 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)
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)
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.

#### Sample Order Number

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

### 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)			
Cv	0.09			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)		
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (8.4 cm <sup>3</sup> )			
Weight	1.27 kg *4)			

\*1) Max. 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.

# Single Stage Regulator for Ultra High Purity **AZ1500 Series**

Low flow (Tied-diaphragm)

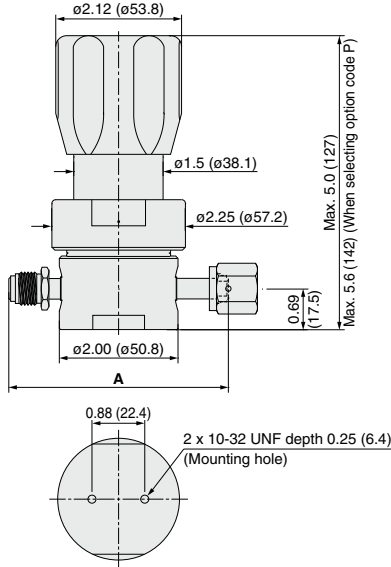
## Wetted Parts Material

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)

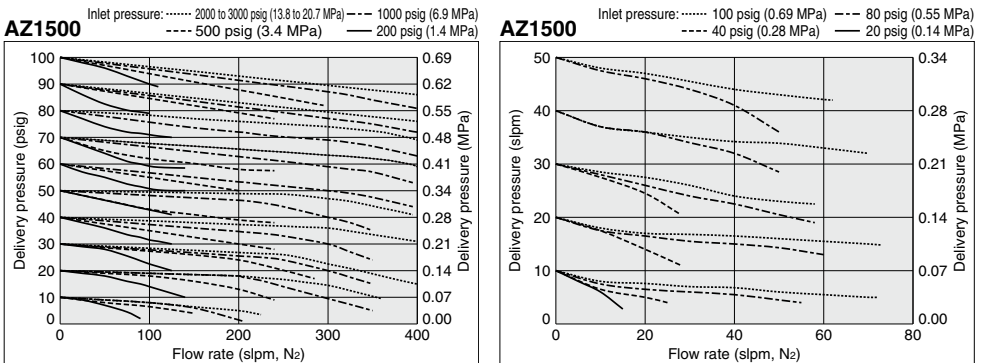
### AZ1500



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

AP  
SL  
**AZ**  
AK  
BP

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

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	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)

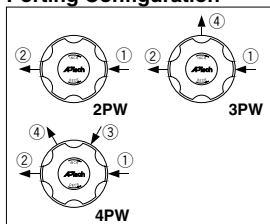
Material		
Code	Body	Poppet
S	316L SS	Ni-Cr-Mo alloy
		Diaphragm
		Ni-Cr-Mo alloy

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



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

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

### Connections (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

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
40	0 to 4000 psig	0 to 28 MPa

\*2) Refer to gauge guide (P.732) 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
AZ1402TS	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*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)	2 to 60 psig (0.014 to 0.4 MPa)	2 to 100 psig (0.014 to 0.7 MPa)	5 to 150 psig (0.034 to 1.0 MPa) (Source pressure 1000 psig or less) *1)
Gas	Select compatible materials of construction for the gas				
Source pressure	Vacuum to 300 psig (2.1 MPa)	Vacuum to 2300 psig (15.9 MPa)			
Proof pressure	Inlet	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)				
Cv	0.45				
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)			
Across the seat leak	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (17.4 cm <sup>3</sup> )				
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) Max. 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.

# Single Stage Regulator for Ultra High Purity **AZ1400T Series**

Intermediate flow (Tied-diaphragm)

## 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)	

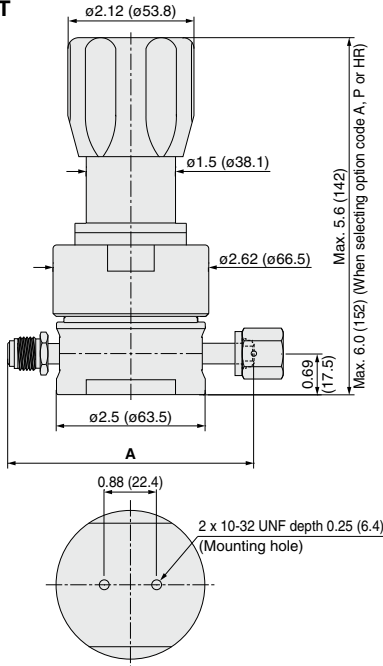
## Wetted Parts Material

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)

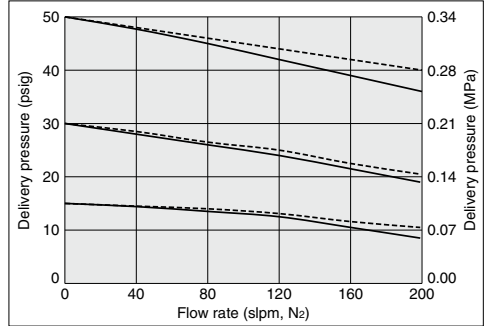
### AZ1400T



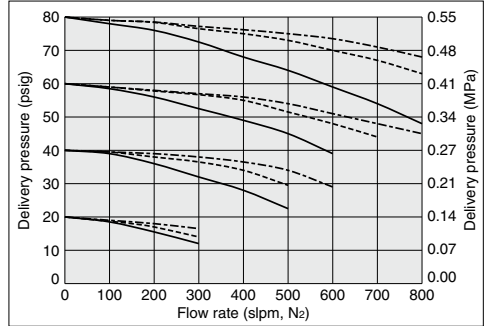
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

## Flow Rate Characteristics

**AZ1400T** Inlet pressure: - - - - 80 psig (0.55 MPa) — 60 psig (0.41 MPa)

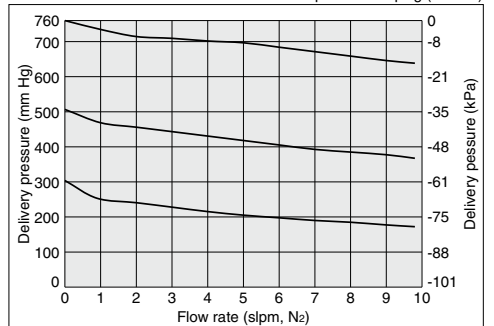


**AZ1400T** Inlet pressure: - - - - 2000 psig (13.8 MPa) - - - - 600 psig (4.1 MPa) — 200 psig (1.4 MPa)



### AZ1402TA

Inlet pressure: 2 psig (14 kPa)



Note) slpm N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

**AZ**

AK

BP

# 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

AZ13 **02** S **2PW** **FV8** **FV8** **Port Number** ① ② ③

#### Delivery pressure

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

#### Material

Code	Body	Poppet	Diaphragm
<b>S</b>	316L SS	316L SS	Ni-Cr-Mo alloy

#### Surface finish

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

#### Ports

Code	Ports
<b>2PW</b>	2 ports
<b>3PW</b>	3 ports

#### Connections (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
<b>No code</b>	Standard
<b>P</b>	Panel installation <sup>*4)</sup>
<b>BP</b>	Bonnet port (NPT 1/8 inch)

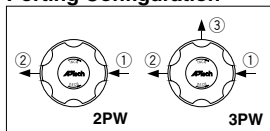
<sup>\*4)</sup> Panel mounting hole: dia. 1.56 inch (39.6 mm).

#### Seat material

Code	Material
<b>No code</b>	PCTFE (Standard)
<b>TF</b>	PTFE <sup>*3)</sup>

<sup>\*3)</sup> PTFE recommended for applications such as within a process tool.

#### Porting Configuration



① IN ② OUT ③ Gauge port (Outlet)

#### Gauge port (Inlet ③)

Code	Pressure gauge <sup>*1)</sup>	
	psig/bar unit	MPa unit
<b>No code</b>	No gauge port	
<b>0</b>	No pressure gauge (Connections: 1/4 inch face seal male)	
<b>V3</b>	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
<b>L</b>	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
<b>1</b>	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
<b>H</b>	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
<b>2</b>	0 to 200 psig	0 to 1.4 MPa

<sup>\*1)</sup> Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

#### Pressure gauge unit <sup>\*2)</sup>

Code	Unit
<b>No code</b>	psig/bar
<b>MPA</b>	MPa

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

#### Sample Order Number

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

### Specifications

Operating Parameters	AZ1302	AZ1306	AZ1310	AZ1315
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas			
<b>Source pressure</b>	Vacuum to 300 psig (2.1 MPa)			
<b>Proof pressure</b>	<b>Inlet</b>	1.5 times the maximum source pressure		
	<b>Outlet</b>	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	<b>Inlet</b>	3 times the maximum source pressure		
	<b>Outlet</b>	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing)			
<b>Cv</b>	1.1			
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>*1)</sup>		
<b>Across the seat leak</b>	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s			
<b>Surface finish</b>	Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)			
<b>Connections</b>	Face seal, Tube weld			
<b>Supply pressure effect</b>	4.6 psig (0.031 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
<b>Installation</b>	Bottom mount (Option: panel mount)			
<b>Internal volume</b>	1.19 in <sup>3</sup> (19.6 cm <sup>3</sup> )			
<b>Weight</b>	2.0 kg <sup>*2)</sup>			

<sup>\*1)</sup> Tested with Helium gas inlet pressure 300 psig (2.1 MPa).

<sup>\*2)</sup> Weight, including individual boxed weight, may vary depending on connections or options.

# Single Stage Regulator for Ultra High Purity **AZ1300 Series**

High flow

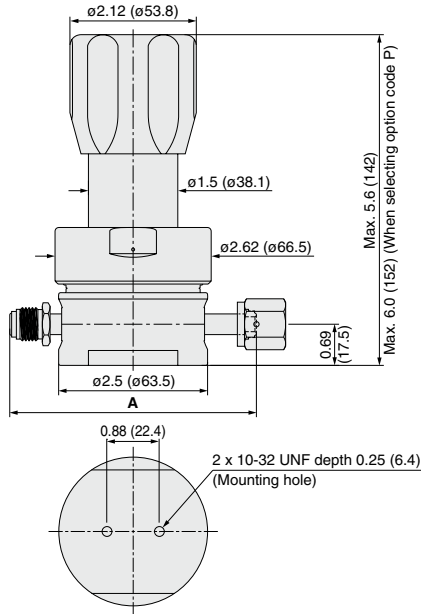
## Wetted Parts Material

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



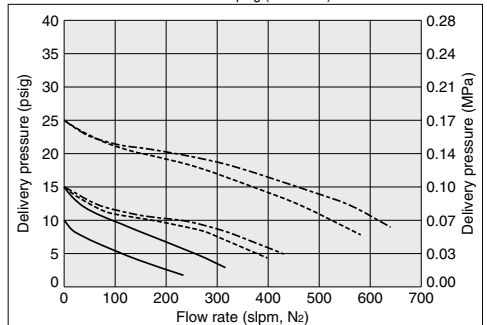
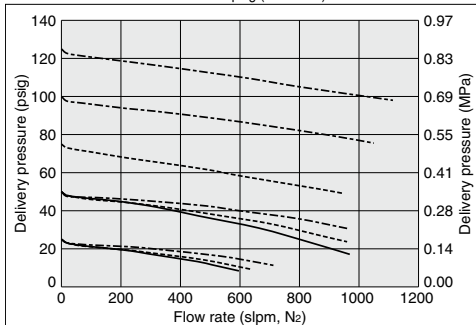
Connections	A	
	inch	(mm)
<b>FV4</b>	4.30	(109.2)
<b>MV4</b>	4.30	(109.2)
<b>FV6</b>	5.22	(132.6)
<b>MV6</b>	5.22	(132.6)
<b>TW6</b>	4.00	(101.6)
<b>FV8</b>	5.22	(132.6)
<b>MV8</b>	5.22	(132.6)
<b>TW8</b>	4.34	(110.2)

AP  
SL  
**AZ**  
AK  
BP

## 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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.



# Single Stage Regulator for Ultra High Purity

## High flow (Tied-diaphragm)

### AZ1200 Series

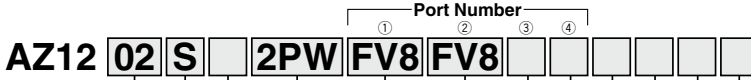
- For UHP gas delivery
- High inlet pressure type Standard: Max. 1700 psig (11.7 MPa)  
HR (option): Max. 3000 psig (20.7 MPa)
- Flow capacity Standard to 800 slpm  
HF (option): to 1000 slpm  
FC (option): to 1500 slpm

- Body material: 316L SS
- Ni-Cr-Mo alloy internals available for corrosion resistance



ROHS

### How to Order



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

#### Surface finish

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

#### Ports

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

#### Connections (Inlet ①, Outlet ②)

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

#### 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 (Cv: 0.65)
HF	High flow (Cv: 1.1)
FC	Force compensation (Cv: 0.65) *4)*5)
HR	High inlet pressure (Max. inlet pressure 3000 psig (20.7 MPa)) *4)

\*4) FC and HR options are not available with AZ1202, AZ1206 and AZ1225.

\*5) FC option is available with 1/2 inch face seal or 1/2 inch tube weld.

#### Seat material

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

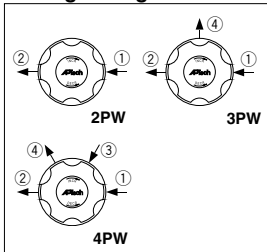
\*3) Not available with SHP material.

#### 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



① IN ② OUT ③ Gauge port (Inlet)

④ Gauge port (Outlet)

#### Gauge port (Inlet ③, Outlet ④)

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
40	0 to 4000 psig	0 to 28 MPa

\*1) Refer to gauge guide (P.752) 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		
	①	②	③ ④
AZ1210S	2PW	FV8	FV8
	3PW	FV8	0
	3PW	FV8	FV8 1 MPa
	4PW	FV8	FV8 40 1 MPa

### Specifications

Operating Parameters	AZ1202	AZ1206	AZ1210	AZ1215	AZ1225
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas				
<b>Source pressure</b>	Vacuum to 1700 psig (11.7 MPa)				
<b>Proof pressure</b>	<b>Inlet</b>	1.5 times the maximum source pressure			
	<b>Outlet</b>	1.5 times the maximum delivery pressure			
<b>Burst pressure</b>	<b>Inlet</b>	3 times the maximum source pressure			
	<b>Outlet</b>	3 times the maximum delivery pressure			
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *3)				
<b>Cv</b>	0.65				
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *4)			
<b>Across the seat leak</b>	4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *5)				
<b>Surface finish</b>	Ra 10 μm. (0.25 μm) Option: 25 μm. (0.62 μm)				
<b>Connections</b>	Face seal, Tube weld				
<b>Supply pressure effect</b>	3.5 psig (0.024 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				
<b>Installation</b>	Bottom mount (Option: panel mount)				
<b>Internal volume</b>	1.07 in <sup>3</sup> (17.6 cm <sup>3</sup> )				
<b>Weight</b>	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 (5.5 MPa) inlet pressure. Custom inlet/outlet pressure settings available. Please contact SMC.

\*3) Max. 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.

# Single Stage Regulator for Ultra High Purity **AZ1200 Series**

High flow (Tied-diaphragm)

## 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
	<b>Cv</b>			1.1		
<b>HF</b>	<b>Supply pressure effect</b>	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
	<b>Source pressure</b>	Vacuum to 300 psig (2.1 MPa)	
	<b>Cv</b>	0.65	
<b>FC</b>	<b>Supply pressure effect</b>	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
	<b>Connections</b>	1/2 inch face seal 1/2 inch tube weld	

### 3. High inlet pressure

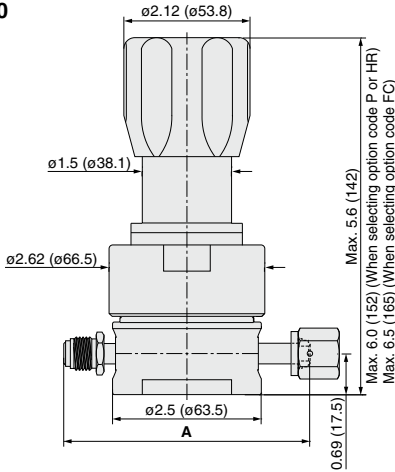
Changes from the standard type are:

Option	Other Parameters	AZ1210	AZ1215
<b>HR</b>	<b>Source pressure</b>	Vacuum to 3000 psig (20.7 MPa)	

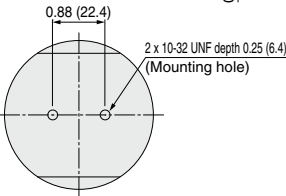
## Dimensions

inch (mm)

### AZ1200



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

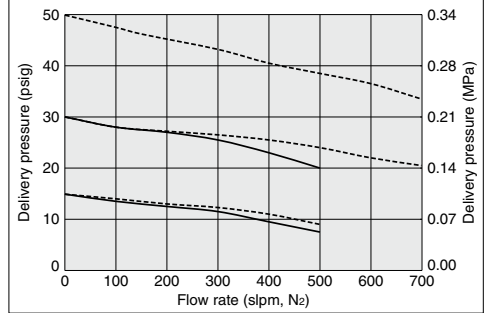


## Wetted Parts Material

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 \*)



AP

SL

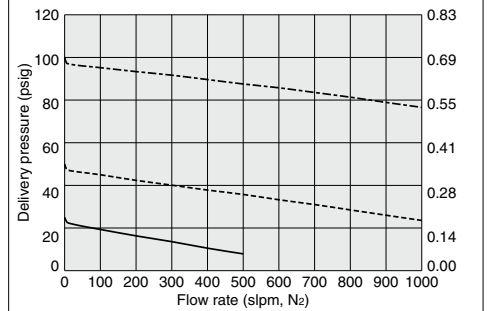
AZ

AK

BP

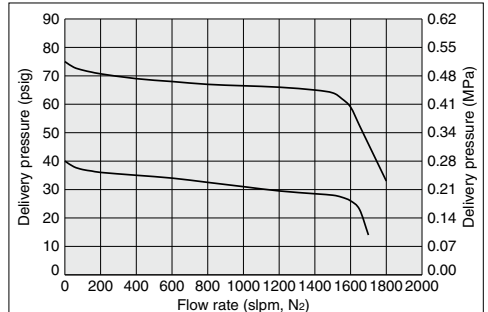
### AZ1200HF

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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

AZ92 **02** **S** **2PW** **FV12** **FV12**         

#### 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)

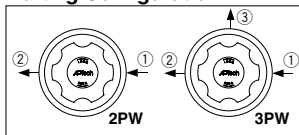
#### Material\*

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

#### Ports\*

Code	Ports
2PW	2 ports
3PW	3 ports

#### Porting Configuration



① IN ② OUT ③ Gauge port (Outlet)

#### Connections (Inlet ①, Outlet ②)\*

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation <sup>*3)</sup>
BP	Bonnet port (NPT 1/8 inch)

<sup>\*3)</sup> Panel mounting hole: dia. 39.6 mm.

#### Pressure gauge unit <sup>\*2)</sup>

Code	Unit
No code	psig/bar
MPA	MPa

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

#### Gauge port <sup>\*1)</sup> (Outlet ③)

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

<sup>\*1)</sup> Other range available. Refer to gauge guide (P.752).

## 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)			
Cv		1.6			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>*1)</sup>			
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>*2)</sup>			
Surface finish		Ra 10 μm (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 in <sup>3</sup> (36 cm <sup>3</sup> )			

<sup>\*1)</sup> Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

<sup>\*2)</sup> Tested with Helium gas inlet pressure 1000 psig (7 MPa).

# Single Stage Regulator for Ultra High Purity **AZ9200 Series**

High flow(Tied-diaphragm)

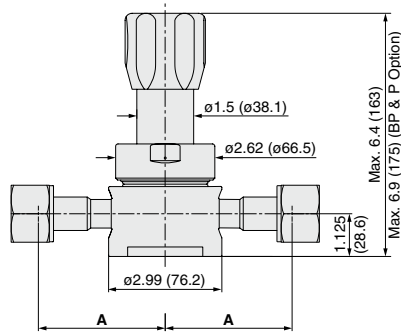
## Wetted Parts Material

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

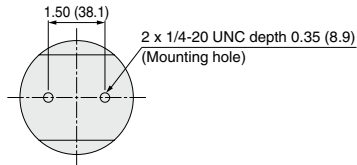
## Dimensions

inch (mm)

### AZ9200



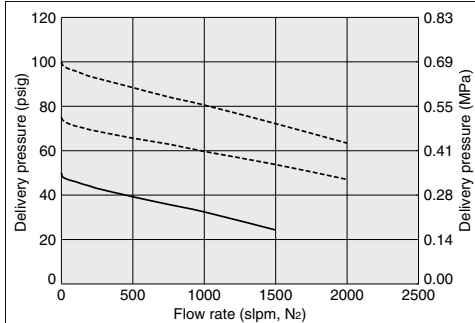
Connections	A	
	inch	(mm)
<b>FV12</b>	3.39	(86.1)
<b>MV12</b>	3.00	(76.2)
<b>TW12</b>	3.67	(93.2)
<b>FV16</b>	3.00	(76.2)
<b>MV16</b>		
<b>TW16</b>		



AP  
SL  
**AZ**  
AK  
BP

## Flow Rate Characteristics

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



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

**AZ11 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	316L SS	316L SS	
SHP	316L SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316L SS

#### 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 (Inlet ①, Outlet ②)

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

#### Sample Order Number

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

#### 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

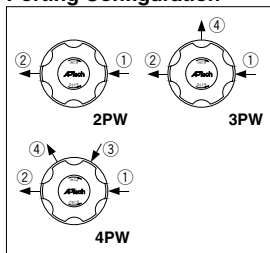
\*2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

#### Gauge port (Inlet ③, Outlet ④)

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.752).  
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### Porting Configuration



① IN ② OUT ③ Gauge port (Inlet)

④ Gauge port (Outlet)

### 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)
Cv		0.05
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *1)
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (8 cm <sup>3</sup> )
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.

# Single Stage Regulator for Ultra High Purity **AZ1100 Series**

Delivery of sub-atmospheric pressure

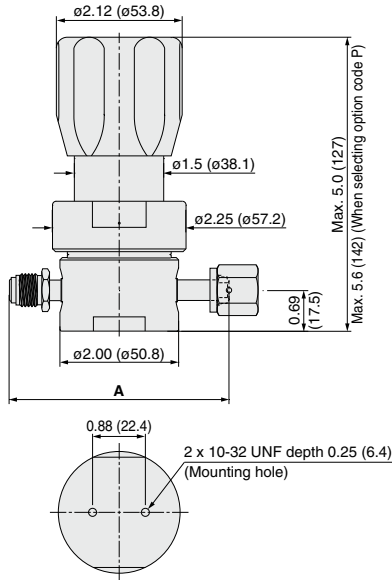
## Wetted Parts Material

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

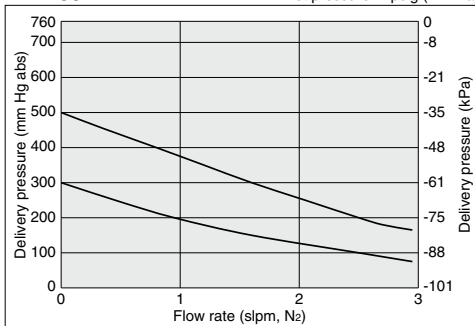


Connections	A	
	inch	(mm)
<b>FV4</b>	3.70	(94.0)
<b>MV4</b>	3.70	(94.0)
<b>FV6</b>	4.70	(119.4)
<b>MV6</b>	4.70	(119.4)
<b>TW6</b>	2.96	(75.2)

## Flow Rate Characteristics

### AZ1100

Inlet pressure: 2 psig (14 kPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# 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

### How to Order

AK10 01 S 4PL 4 4 0 0

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

Ports			
Code	Ports	Material	S, SH
2P			●
3P			●
4P			●
4PL			●
5PC			●

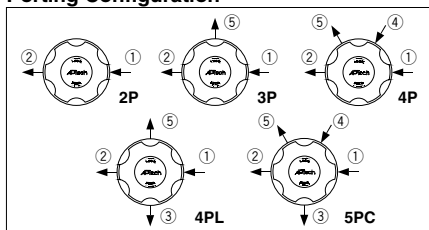
  

Connections (Inlet ①, Outlet ②)	
Code	Connections
4	NPT 1/4 inch
4T	1/4 inch compression
6T	3/8 inch compression

#### Delivery pressure

Code	Delivery pressure	Code	Delivery pressure
01	0.5 to 10 psig (0.034 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 3.4 MPa)

#### Porting Configuration



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.

#### 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 (Cv: 0.09)
HF	High flow (Cv: 0.15)

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

Pressure gauge *1)		
Code	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	-30 in.Hg to 160 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.752) 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.

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

#### 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

AK1002S	Port (① ② ③ ④ ⑤)				
	2P	4 4	4 4	4 4	V3 MPa
	3P	4 4	4 4	1	V3 MPa
	4P	4 4	4 4	1	V3 MPa
	4PL	4 4	4 0	1	V3 MPa
	4PL	4 4	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 (0.034 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 3.4 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)							
Cv	0.09							
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (8 cm <sup>3</sup> )							
Weight	1.09 kg *3)							

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

\*2) Max. 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.

# Single Stage Regulator for General Applications **AK1000 Series**

Low to intermediate flow

## 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	Cv	0.15							
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop							

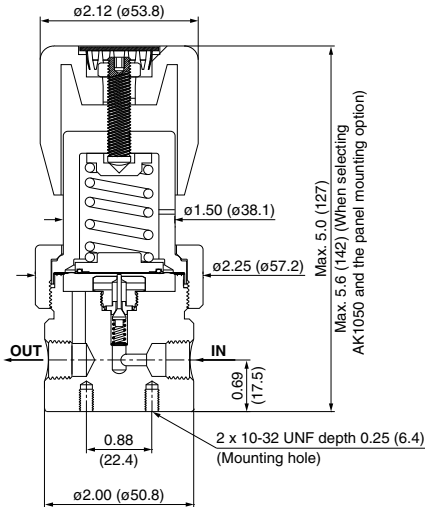
## Wetted Parts Material

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

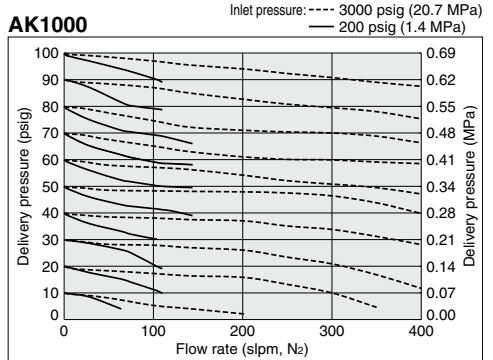
## Dimensions

inch (mm)

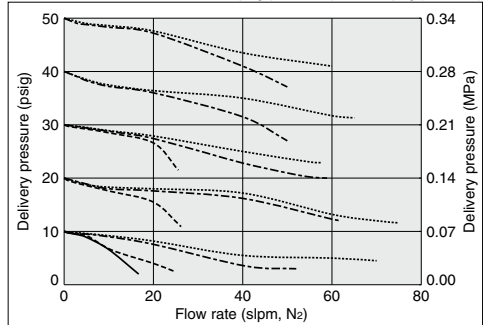
### AK1000



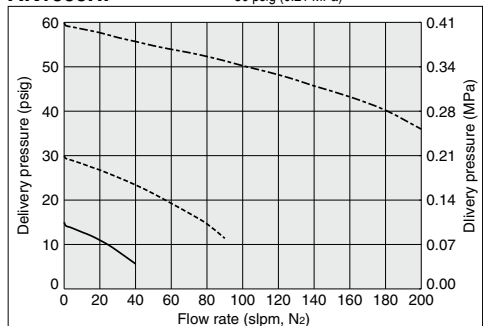
## Flow Rate Characteristics



### AK1000



### AK1000HF



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP  
SL  
AZ  
AK  
BP



# Single Stage Regulator for General Applications

Low flow  
(Tied-diaphragm)

## AK1500 Series

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



ROHS

### How to Order

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

#### Ports

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

#### Port Number

① ② ③ ④ ⑤

#### Connections (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation <sup>(*)4</sup>

<sup>(\*)4</sup> Panel mounting hole: dia. 1.42 inch (36.1 mm).

#### Seat material

Code	Material
No code	PTFE (Standard)
VS	Polyimide <sup>(*)3</sup>
PK	PEEK

<sup>(\*)3</sup> Not available with SH material.

#### Gauge port

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

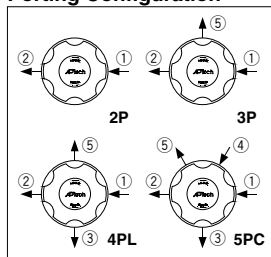
Code	Pressure gauge <sup>(*)1</sup>	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge (Gauge port: 1/4 inch NPT) <sup>(*)2</sup>	
C	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
V3	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
L	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
1	-30 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	-30 in.Hg to 160 psig	0 to 1.5 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

#### Pressure gauge unit <sup>(\*)2</sup>

Code	Unit
No code	psig/bar
MPA	MPa

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

### Porting Configuration



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

<sup>(\*)1</sup> Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

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

#### Sample Order Number

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

### 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) <sup>(*)1</sup>			
Cv	0.09			
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 <sup>3</sup> (8 cm <sup>3</sup> )			
Weight	1.18 kg <sup>(*)2</sup>			

<sup>(\*)1</sup> Max. 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.

<sup>(\*)2</sup> Weight, including individual boxed weight, may vary depending on connections or options.

# Single Stage Regulator for General Applications **AK1500 Series**

Low flow (Tied-diaphragm)

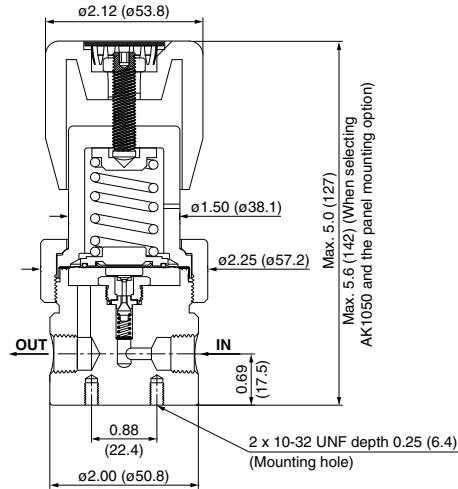
## Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass		316 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)

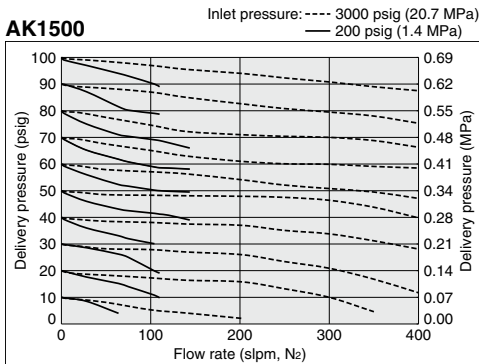
### AK1500



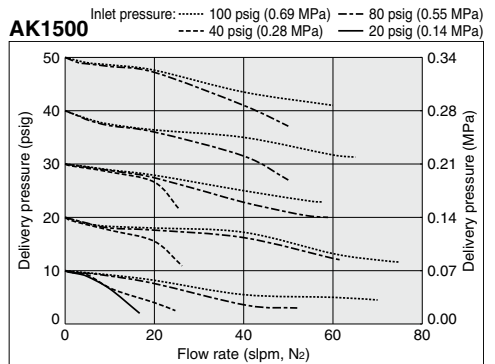
AP  
SL  
AZ  
**AK**  
BP

## Flow Rate Characteristics

### AK1500



### AK1500



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

# Single Stage Regulator for General Applications

Intermediate flow  
(Tied-diaphragm)

## 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



### How to Order

RoHS

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	316 SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

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

Code	Specification
No code	Standard
A	Sub-atmospheric

\*1) Only available with AK1402T.

#### Port Number

① ② ③ ④ ⑤

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.

#### Bonnet option

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

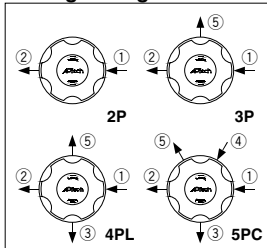
\*6) Panel mounting hole: dia. 1.56 inch (39.6 mm).

#### Option

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

\*5) Not available with AK1402T and AK1406T.

### Porting Configuration



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

#### Connections

(Inlet ①, Outlet ②)

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 port ③, Inlet ④, Outlet ⑤)

Code	Pressure gauge *2)	
	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
V2	-30 in.Hg to 200 psig	-0.1 to 1.4 MPa
2	-30 in.Hg to 160 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.752) 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	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)
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)				
Cv	0.45				
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (10.6 cm <sup>3</sup> )				
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) Max. 90°C for Polyimide seat.

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

# Single Stage Regulator for General Applications

Intermediate flow (Tied-diaphragm)

# AK1400T Series

## 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)	

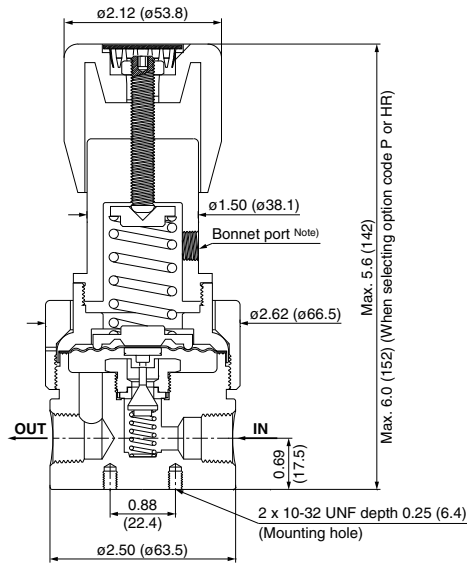
## Wetted Parts Material

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

## Dimensions

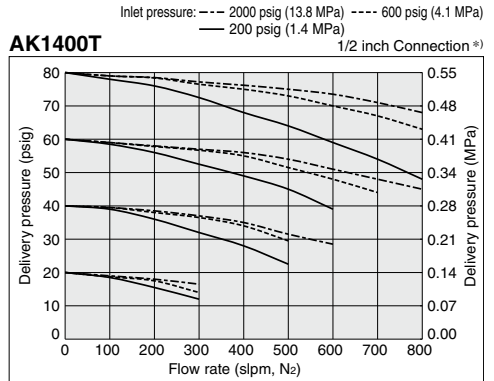
inch (mm)

### AK1400T

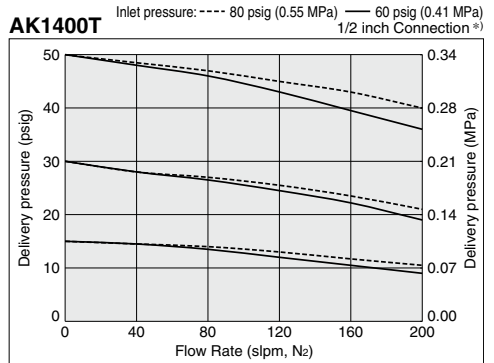


Note) The standard port is  $\phi 1.5$ . When selecting the AK1402TA or the option code P or HR, the connection is NPT1/8 female thread.

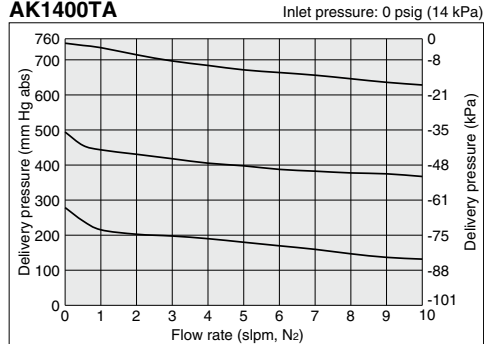
## Flow Rate Characteristics



### AK1400T



### AK1400TA



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

AK

BP

## 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



**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	316 SS	316 SS	Ni-Cr-Mo alloy

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Outlet ③, ④)**

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	-30 in.Hg to 160 psig	0 to 1.5 MPa

**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)

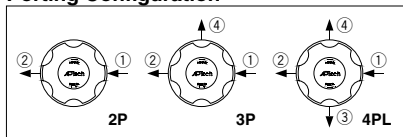
\*3) PTFE seats reduce seat abrasion for flow cycle application. Gas permeation is greater with PTFE than PCTFE.

**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



**Sample Order Number**

Order Number	Port			
	①	②	③	④
AK1302S	2P	6 6		
	3P	6 6	V3	MPA
	4PL	6 6	0	V3 MPA
	4PL	8 8	0	0

### Specifications

Operating Parameters	AK1302	AK1306	AK1310	AK1315
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas			
<b>Source pressure</b>	Vacuum to 300 psig (2.1 MPa)			
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure		
	Outlet	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure		
	Outlet	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing)			
<b>Cv</b>	1.1			
<b>Leak rate</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
<b>Connections</b>	NPT female, Compression			
<b>Supply pressure effect</b>	4.6 psig (0.031 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
<b>Installation</b>	Bottom mount (Option: panel mount)			
<b>Internal volume</b>	0.65 in <sup>3</sup> (10.6 cm <sup>3</sup> )			
<b>Weight</b>	2.0 kg*			

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

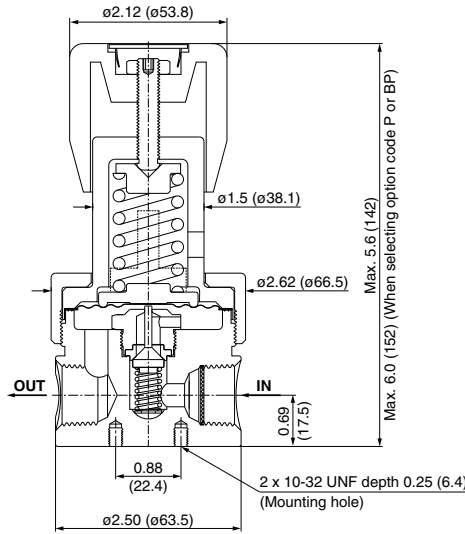
### Wetted Parts Material

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

**Dimensions**

inch (mm)

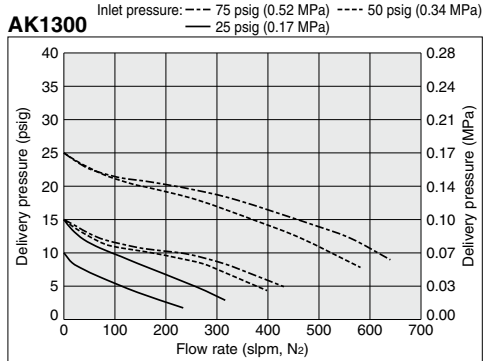
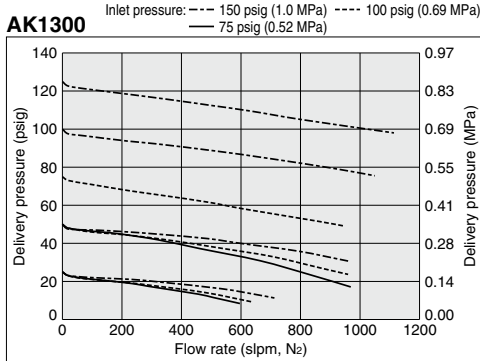
**AK1300**



- AP
- SL
- AZ
- AK**
- BP

Note) The standard port is  $\phi 1.5$ . When selecting the option code P, the connection is NPT1/8 female thread.

**Flow Rate Characteristics**



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

AK12 02 S 4PL 8 8 0 0

Port Number: ① ② ③ ④ ⑤

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

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).

#### 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 (Inlet ①, Outlet ②)

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

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

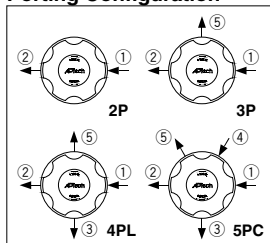
#### Option

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

\*4) FC option is not available with AK1202, AK1206 and AK1225.

\*5) FC option is available with 1/2 inch NPT or 1/2 inch compression.

#### Porting Configuration



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

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	-30 in.Hg to 160 psig	0 to 1.5 MPa
10	0 to 1000 psig	0 to 7 MPa
40	0 to 4000 psig	0 to 28 MPa

#### Seat material

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

\*3) Not available with SH material.

#### Sample Order Number

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

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

\*1) Refer to gauge guide (P.752) 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		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)				
Cv		0.65				
Leak rate		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (10.6 cm <sup>3</sup> )				
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 (5.5 MPa) inlet pressure. Custom inlet/outlet pressure settings available. Please contact SMC.

\*3) Max. 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.

# Single Stage Regulator for General Applications **AK1200 Series**

High flow (Tied-diaphragm)

## 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	Cv				1.1	
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop				

**2. Force compensation** Force compensation feature added to HF option and has 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)	
	Cv	0.65	
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
	Connections	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)	

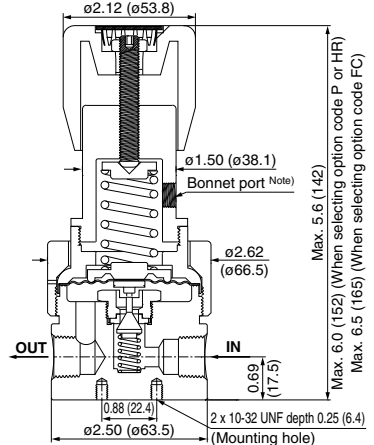
## Wetted Parts Material

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

## Dimensions

inch (mm)

### AK1200



Note) The standard port is  $\phi 1.5$ . When selecting the option code P, HR, or FC, the connection is NPT 1/8 female thread.

AP

SL

AZ

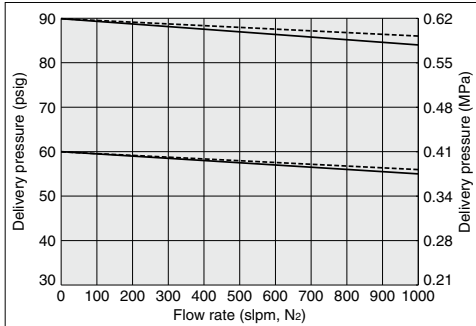
AK

BP

## Flow Rate Characteristics

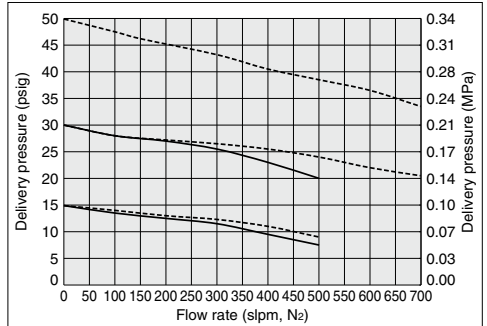
### AK1200

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



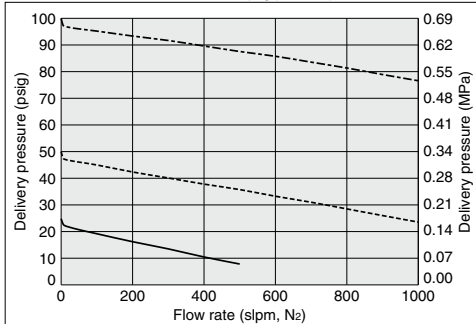
### AK1200

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



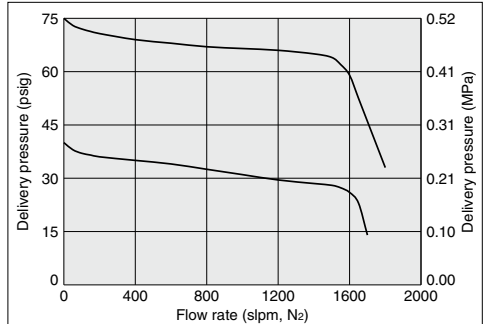
### AK1200HF

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



### AK1200FC

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



Note) slpm, Nz: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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: 316 SS



ROHS

### How to Order

AK92 **02** S 4PL 1212 **00** **00**

**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	316 SS	316 SS	Ni-Cr-Mo alloy

**Ports**

Code	Ports
4PL	4 ports

**Connections (Inlet ①, Outlet ②)**

Code	Connections
12	NPT 3/4 inch

**Bonnet option**

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

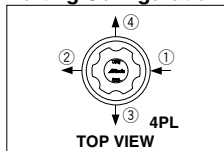
\*3) Panel mounting hole: dia.39.6 mm.

**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.

### Porting Configuration



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

**Gauge port (Outlet ③, 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	-30 in.Hg to 160 psig	0 to 1.5 MPa

\*1) Refer to gauge guide (P.752) 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)			
Cv	1.6			
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Connections	NPT 3/4 inch			
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 in <sup>3</sup> (36 cm <sup>3</sup> )			

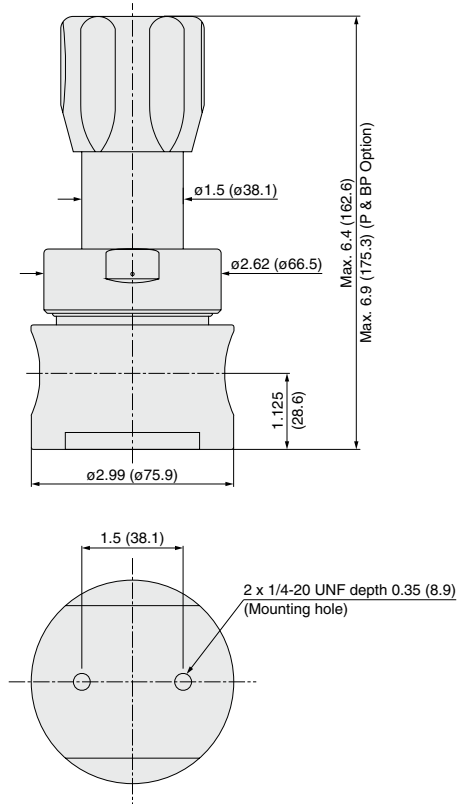
### Wetted Parts Material

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

**Dimensions**

inch (mm)

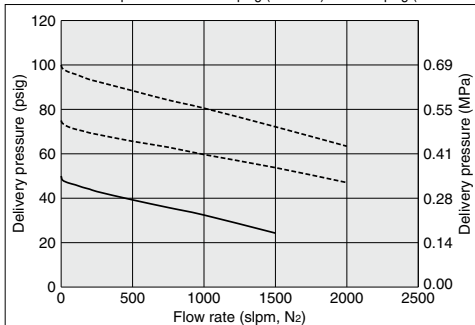
**AK9200**



- AP
- SL
- AZ
- AK**
- BP

**Flow Rate Characteristics**

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



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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)
- 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

### How to Order

AK17 **02** **S** **5PC** **4** **4** **0** **0** **0** **0** **0** **0** **0**

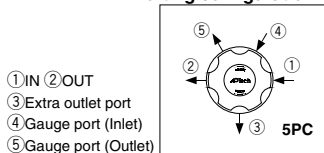
#### Delivery pressure

Code	Delivery pressure
<b>02</b>	1 to 30 psig (0.007 to 0.2 MPa)
<b>06</b>	2 to 60 psig (0.014 to 0.4 MPa)
<b>10</b>	2 to 100 psig (0.014 to 0.7 MPa)
<b>20</b>	5 to 200 psig (0.034 to 1.4 MPa)

#### Material

Code	Body	Poppet	Diaphragm
<b>B</b>	Brass	316 SS	316 SS
<b>S</b>	316 SS		
<b>SH</b>		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

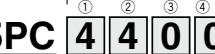
#### Porting configuration



#### Sample Order Number

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

#### Port Number



#### Connections (Inlet ①, Outlet ②)

Code	Connections
<b>4</b>	NPT 1/4 inch
<b>4T</b>	1/4 inch compression

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

Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
<b>No code</b>	No gauge port	
<b>0</b>	No pressure gauge (Gauge port: 1/4 inch NPT) *2)	
<b>C</b>	No pressure gauge (1/4 inch NPT plug is installed before shipment.)	
<b>V3</b>	-30 in.Hg to 30 psig	-0.1 to 0.2 MPa
<b>L</b>	-30 in.Hg to 60 psig	-0.1 to 0.4 MPa
<b>1</b>	-30 in.Hg to 100 psig	-0.1 to 0.7 MPa
<b>H</b>	-30 in.Hg to 160 psig	-0.1 to 1.1 MPa
<b>2</b>	-30 in.Hg to 160 psig	0 to 1.5 MPa
<b>10</b>	0 to 1000 psig	0 to 7 MPa
<b>40</b>	0 to 4000 psig	0 to 28 MPa

\*1) Refer to gauge guide (P.752) 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.

#### Bonnet option

Code	Bonnet
<b>No code</b>	Standard
<b>P</b>	Panel installation *4)

\*4) Panel mounting hole: dia. 1.42 inch (36.1 mm).

#### Poppet feature option

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

#### Seat material

Code	Material
<b>No code</b>	PCTFE (Standard)
<b>VS</b>	Polyimide *3)
<b>PK</b>	PEEK

\*3) Not available with SH material.

#### Pressure gauge unit \*2)

Code	Unit
<b>No code</b>	psig/bar
<b>MPA</b>	MPa

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

## Specifications

Operating Parameters	AK1702	AK1706	AK1710	AK1720
<b>Delivery pressure</b>	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)
<b>Gas</b>	Select compatible materials of construction for the gas			
<b>Source pressure</b>	Vacuum to 3500 psig (24.1 MPa)			
<b>First stage pressure</b>	175 psig (1.2 MPa)			
<b>Proof pressure</b>	<b>Inlet</b>	1.5 times the maximum source pressure		
	<b>Outlet</b>	1.5 times the maximum delivery pressure		
<b>Burst pressure</b>	<b>Inlet</b>	3 times the maximum source pressure		
	<b>Outlet</b>	3 times the maximum delivery pressure		
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1)			
<b>Cv</b>	0.05			
<b>Leak rate</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
<b>Connections</b>	NPT female, Compression			
<b>Supply pressure effect</b>	0.05 psig (0.00035 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop			
<b>Installation</b>	Option: panel mount			
<b>Internal volume</b>	0.9 in <sup>3</sup> (15 cm <sup>3</sup> )			
<b>Weight</b>	1.95 kg *2)			

\*1) Max. 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.

# Two Stage Regulator for General Applications **AK1700 Series**

Low flow (Tied-diaphragm)

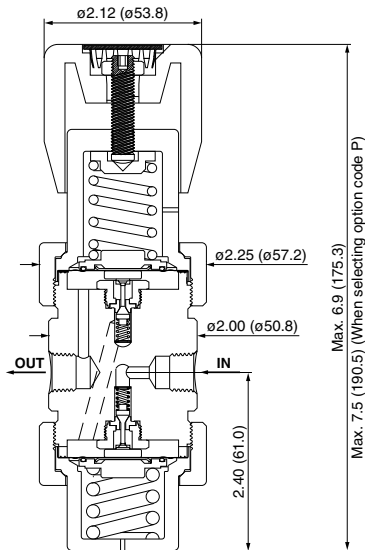
## Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316 SS	316 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)

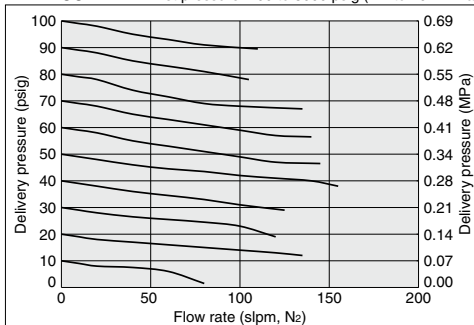
### AK1700



- AP
- SL
- AZ
- AK**
- BP

## Flow Rate Characteristics

### AK1700 Inlet pressure: 200 to 3000 psig (1.4 to 20.7 MPa)



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> 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

### How to Order

Port Number  
 ① ② ③ ④  
**BP10 01 S 4PL 4 4 0 0**

#### Operating pressure

Code	Operating 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)

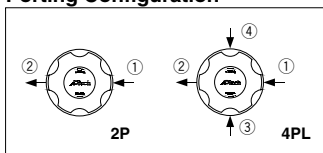
#### Material

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

#### Ports

Code	Ports	Material	
		B	S, SH
2P	Please refer to the following porting configurations.		●
4PL		●	●

#### Porting Configuration



① IN ② OUT ③ ④ Gauge port (Inlet)

#### Connections

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

#### Gauge port (Inlet ③, ④)

Code	Pressure gauge <sup>*1</sup>	
	psig/bar unit	MPa unit
No code	No gauge port	
0	No pressure gauge <sup>*2</sup> (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	-30 in.Hg to 160 psig	0 to 1.5 MPa
4	0 to 400 psig	0 to 3 MPa
10	0 to 1000 psig	0 to 7 MPa

<sup>\*1</sup> Refer to gauge guide (P.752) for gauge specifications.

Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

<sup>\*2</sup> 1/4 inch NPT plug is included only for port code 4PL.

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation <sup>*3</sup>

<sup>\*3</sup> Panel mounting hole: dia. 1.42 inch (36.1 mm).

#### Seat material

Code	Material
No code	FKM (Standard)
TF	PTFE
KZ	FFKM

#### Pressure gauge unit <sup>\*2</sup>

Code	Unit
No code	psig/bar
MPA	MPa

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

#### Sample Order Number

Port		③	④
BP10	01 S	2P	4 4
		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) <sup>*1</sup>					
Cv		0.3					
Leak rate		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
Connections		NPT female, Compression					
Installation		Bottom mount (Option: panel mount)					
Internal volume		0.49 in <sup>3</sup> (8 cm <sup>3</sup> )					
Weight		1.2 kg <sup>*2</sup>					

<sup>\*1</sup> Min. -30°C for PTFE seat. Optional ambient and operating temperature range available. Please contact SMC.

<sup>\*2</sup> Weight, including individual boxed weight, may vary depending on connections or options.

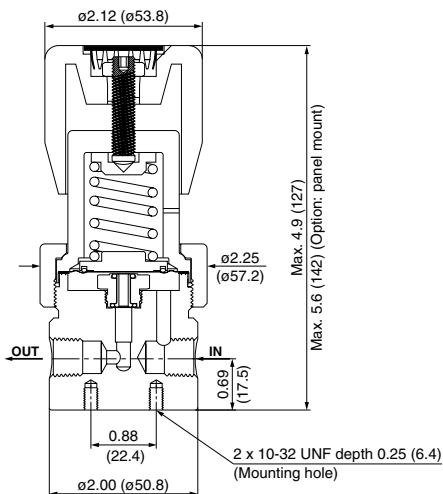
# Back Pressure Regulator for General Applications **BP1000 Series**

## Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316 SS	
Diaphragm	316 SS		Ni-Cr-Mo alloy
Nozzle	316 SS		Ni-Cr-Mo alloy
Seat	FKM (Option: PTFE, FFKM)		
Seal	PTFE		

## Dimensions

### BP1000



AP

SL

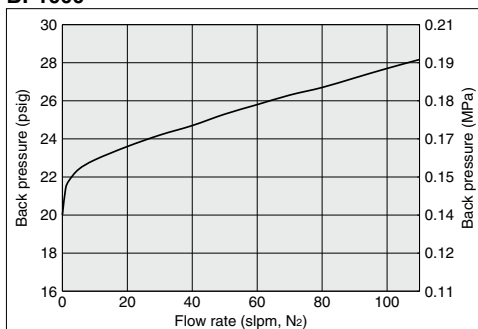
AZ

AK

BP

## Flow Rate Characteristics

### BP1000



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

# Welded Connection Series Back Pressure Regulator for Ultra High Purity

## BP1000 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

BP10 01 S 2PW FV4 FV4

Port Number  
① ② ③

#### 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)
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)

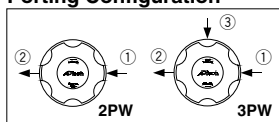
#### Material

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)

#### Porting Configuration



① IN ② OUT ③ Gauge port (Inlet)

#### Ports

Code	Ports
2PW	2 ports
3PW	3 ports

#### Connections (Inlet ①, Outlet ②)

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

#### Bonnet option

Code	Bonnet
No code	Standard
P	Panel installation *3)

\*3) Panel mounting hole: dia. 1.42 inch (36.1 mm).

#### Seat material

Code	Material
No code	FKM (Standard)
TF	PTFE
KZ	FFKM

#### Gauge port (Inlet ③)

Code	Pressure gauge *1)	
	psig/bar unit	MPa unit
No code	No pressure gauge	
0	No gauge port	
V3	No pressure gauge (Connections: 1/4 inch face seal male)	
0	-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	-30 in.Hg to 160 psig	0 to 1.4 MPa
4	0 to 400 psig	0 to 3 MPa

#### 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.

\*1) Refer to gauge guide (P.752) 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	③
BP10	01 S 2PW FV4 FV4
	3PW FV4 FV4 V3 MPA

## 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)				
Cv		0.3				
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s He				
Across the seat leak		Bubble tight				
Surface finish		Ra max x 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 in <sup>3</sup> (8 cm <sup>3</sup> )				
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.

# Welded Connection Series Back Pressure Regulator for Ultra High Purity **BP1000 Series**

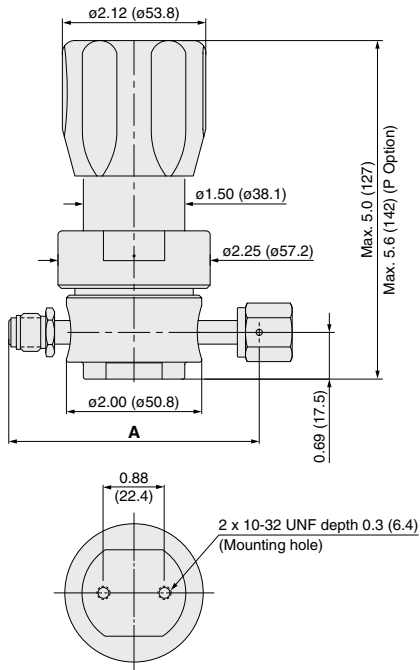
## Wetted Parts Material

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)

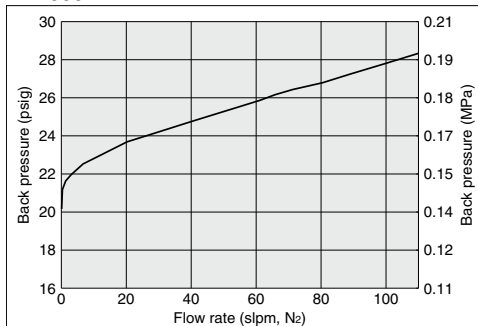
### BP1000



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



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

AZ

AK

BP



## 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



### How to Order

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

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

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
2	0 to 200 psig    0 to 1.4 MPa
40	0 to 4000 psig    0 to 28 MPa

**Option**

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

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

### Specifications

Operating Parameters		AP10PA
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 3500 psig (24.1 MPa) *1)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Maximum control pressure</b>		150 psig (1.0 MPa)
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *2)
<b>Cv</b>		0.09
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *4)
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm)    Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Control pressure port</b>		NPT 1/8 inch
<b>Bonnet port</b>		NPT 1/8 inch
<b>Supply pressure effect</b>		0.38 psig (0.0026 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.49 in <sup>3</sup> (8 cm <sup>3</sup> )

\*1) Max. 300 psig (2.1 MPa) for PTFE seat.    \*3) Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

\*2) Max. 90°C for Polyimide seat.

\*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) <sup>*)</sup>
	Cv	0.15
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

<sup>\*)</sup> HF option will not achieve rated outlet pressure at all inlet pressures.

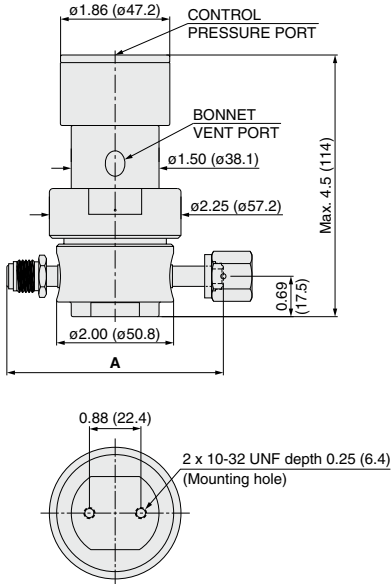
## Wetted Parts Material

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

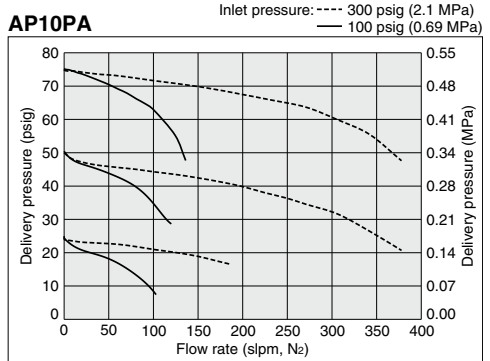
inch (mm)

### AP10PA



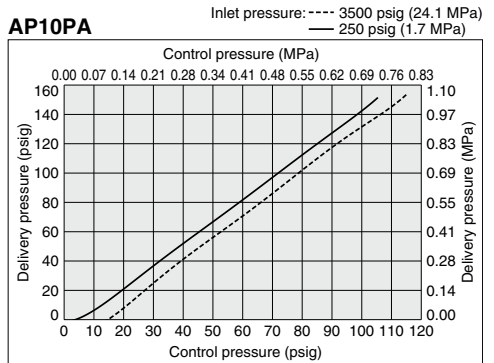
Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4	2.96	(75.2)
FV6	4.70	(119.4)
MV6	2.96	(75.2)

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input/Output Characteristics



AP

SL

AZ

AK

BP

# 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



### How to Order

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

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

Code	Pressure gauge *1)
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
2	0 to 200 psig 0 to 1.4 MPa
40	0 to 4000 psig 0 to 28 MPa

**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)**

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

### Specifications

Operating Parameters		AP15PA
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 3500 psig (24.1 MPa)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Maximum control pressure</b>		150 psig (1.0 MPa)
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)
<b>Cv</b>		0.09
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Control pressure port</b>		NPT 1/8 inch
<b>Bonnet port</b>		NPT 1/8 inch
<b>Supply pressure effect</b>		0.41 psig (0.0028 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.51 in <sup>3</sup> (8.4 cm <sup>3</sup> )

\*1) Max. 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).

# Pneumatic Actuation Pressure Regulator **AP15PA Series**

Low flow (Tied-diaphragm)

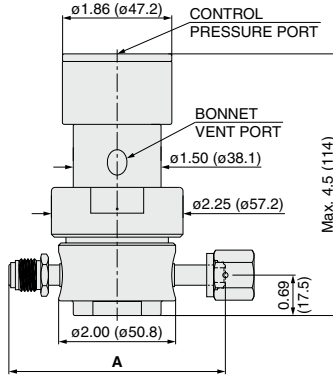
## Wetted Parts Material

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	PTFE (Option: Polyimide)		PTFE	

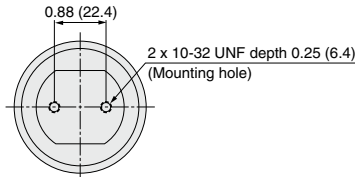
## Dimensions

inch (mm)

### AP15PA

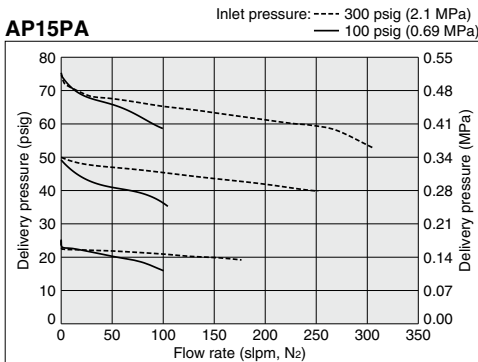


Connections	A	
	inch	(mm)
FV4	3.70	(94.0)
MV4	3.70	(94.0)
TW4	2.96	(75.2)
FV6	4.70	(119.4)
MV6	4.70	(119.4)
TW6	2.96	(75.2)



## Flow Rate Characteristics

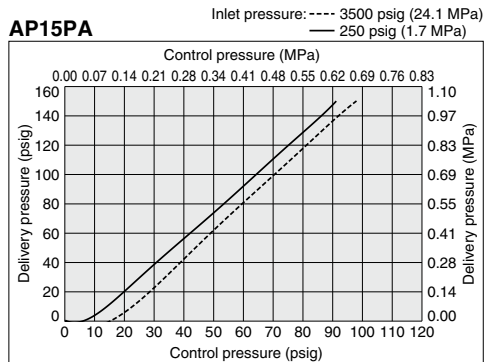
### AP15PA



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics

### AP15PA



AP  
SL  
AZ  
AK  
BP

### 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

#### How to Order



**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	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)

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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

**Option**

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

<sup>\*4)</sup> Full outlet pressure rating may not be achieved at all inlet pressure.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide <sup>*4)</sup>

<sup>\*3)</sup> Not available with SH material.

**Gauge port (Inlet ③, Outlet ④)**

Code	Pressure gauge <sup>*1)</sup>	
	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
2	0 to 200 psig	0 to 1.4 MPa
40	0 to 4000 psig	0 to 28 MPa

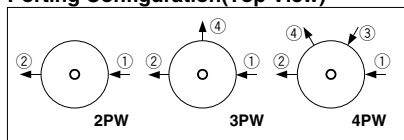
<sup>\*1)</sup> Refer to gauge guide (P.752) for gauge specifications.  
Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

**Pressure gauge unit<sup>\*2)</sup>**

Code	Unit
No code	psig/bar
MPA	MPa

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

#### Porting Configuration(Top View)



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

#### Specifications

Operating Parameters		AP14PAT	
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 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) <sup>*1)</sup>	
Cv		0.45	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s <sup>*2)</sup>	
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s <sup>*3)</sup>	
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 in <sup>3</sup> (17.4 cm <sup>3</sup> )	

<sup>\*1)</sup> Max. 90°C for Polyimide seat.

<sup>\*2)</sup> Tested with Helium gas inlet pressure 1500 psig (10.5 MPa).

<sup>\*3)</sup> Tested with Helium gas inlet pressure 1000 psig (7 MPa).

## 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.

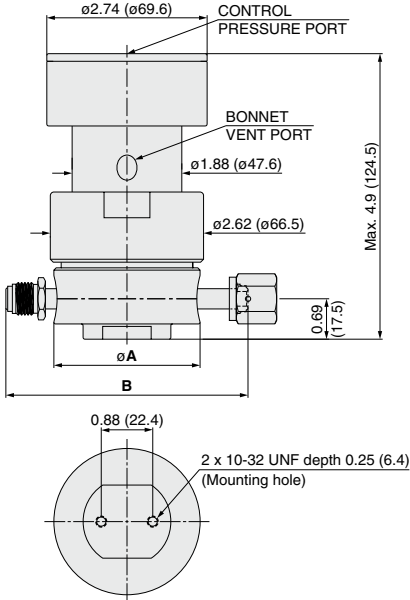
## Wetted Parts Material

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

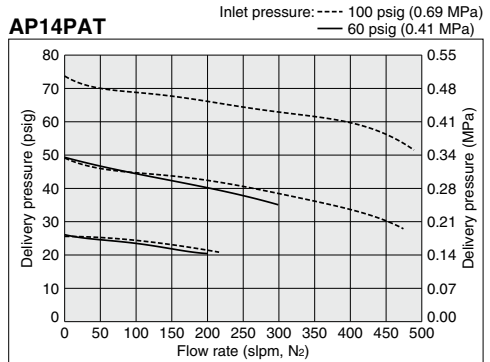
inch (mm)

### AP14PAT



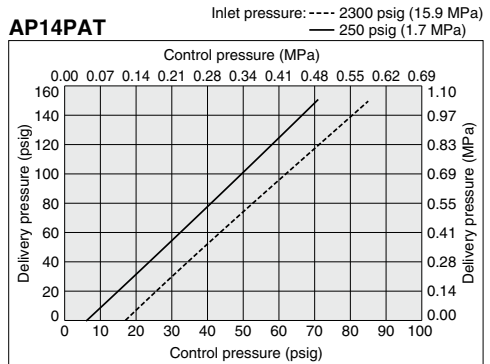
Connections	A		B	
	inch	(mm)	inch	(mm)
FV4	2.00	(50.8)	3.70	(94.0)
MV4			4.00	(101.6)
TW4			3.46	(87.9)
FV6	2.50	(63.5)	5.22	(132.6)
MV6			4.00	(101.6)
TW6			4.00	(101.6)
FV8			5.22	(132.6)
MV8			5.22	(132.6)
TW8			4.34	(110.2)

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics



AP  
SL  
AZ  
AK  
BP

# 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

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	316L SS		316L SS
SHP	316L SS secondary remelt		Ni-Cr-Mo alloy	
SH		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 (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

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
40	0 to 4000 psig	0 to 28 MPa

\*2) Refer to gauge guide (P.752) 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 (Cv: 0.65)
HF	High flow (Cv: 1.1) *5)
HR	High inlet pressure *5) (Max. inlet pressure 3000 psig (20.7 MPa))

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

**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)**

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

### Specifications

Operating Parameters		AP12PA	
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)	
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Source pressure</b>		Vacuum to 1700 psig (11.7 MPa)	
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
<b>Maximum control pressure</b>		150 psig (1.0 MPa)	
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)	
<b>Cv</b>		0.65	
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)	
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
<b>Connections</b>		Face seal, Tube weld	
<b>Control pressure port</b>		NPT 1/8 inch	
<b>Bonnet port</b>		NPT 1/8 inch	
<b>Supply pressure effect</b>		3.5 psig (0.024 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		1.20 in <sup>3</sup> (19.6 cm <sup>3</sup> )	

\*1) Max. 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) *)
	Cv	1.1
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

### 2. 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.

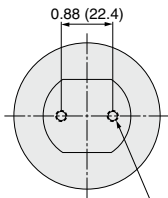
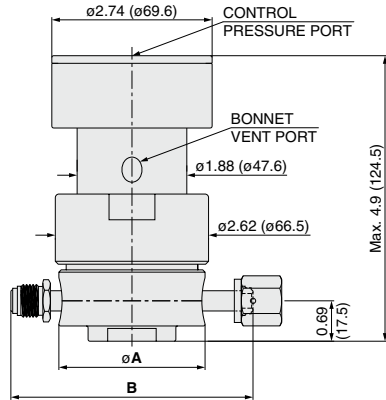
## Wetted Parts Material

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)

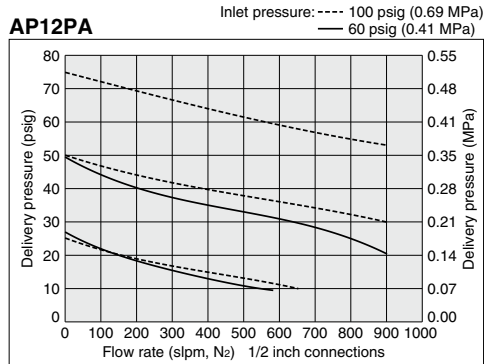
### AP12PA



2 x 10-32 UNF depth 0.25 (6.4)  
(Mounting hole)

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			5.22	(132.6)
MV6	2.50	(63.5)	4.00	(101.6)
TW6			5.22	(132.6)
FV8			4.34	(110.2)
MV8			6.26	(159.0)
TW8	2.50	(63.5)	5.00	(127.0)
FV12			6.26	(159.0)
TW12			5.00	(127.0)

## Flow Rate Characteristics

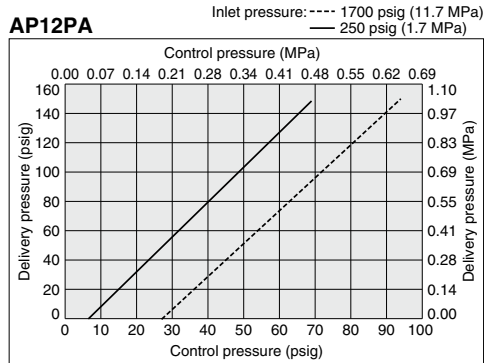


Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP  
SL  
AZ  
AK  
BP

## Input / Output Characteristics

### AP12PA





### 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



### How to Order



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

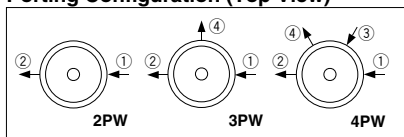
**Surface finish**

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)



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

### Option

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

### Connections (Inlet ①, Outlet ②)

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 (Inlet ③, Outlet ④)

Code	Pressure gauge *1)
No code	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.752) 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.

### 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)
Cv		0.09
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)
Across the seat leak		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (8 cm <sup>3</sup> )

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

\*2) Max. 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) *)
	Cv	0.15
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

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

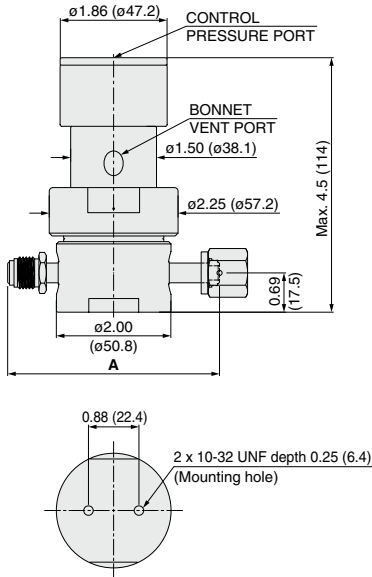
## Wetted Parts Material

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	PTFE (Option: Polyimide, PTFE)	PTFE (Option: PTFE)

## Dimensions

inch (mm)

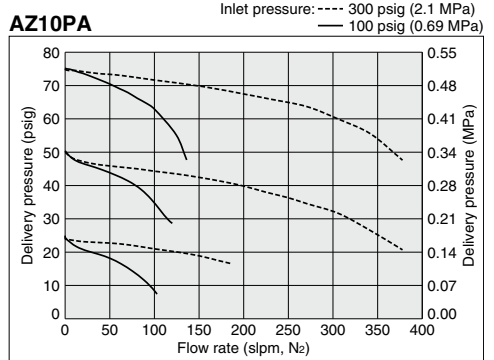
### AZ10PA



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<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

AP

SL

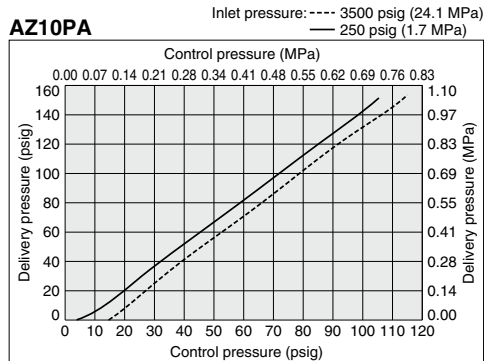
AZ

AK

BP

## 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

**Port Number**

①      ②      ③      ④

**AZ15PA 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	316L SS	Ni-Cr-Mo alloy	Ni-Cr-Mo alloy	316L SS

**Surface finish**

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

**Seating material**

Code	Material
No code	PTFE (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)**

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

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	-30 in.Hg to 160 psig	0 to 1.4 MPa
40	0 to 4000 psig	0 to 28 MPa

\*1) Other range available. Refer to gauge guide (P.752). Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### Specifications

Operating Parameters		AZ15PA
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 3500 psig (24.1 MPa)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Maximum control pressure</b>		150 psig (1.0 MPa)
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)
<b>Cv</b>		0.09
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)
<b>Surface finish</b>		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Control pressure port</b>		NPT 1/8 inch
<b>Bonnet port</b>		NPT 1/8 inch
<b>Supply pressure effect</b>		0.41 psig (0.0028 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.51 in <sup>3</sup> (8.4 cm <sup>3</sup> )

\*1) Max. 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).

# Pneumatic Actuation Pressure Regulator **AZ15PA Series**

Low flow (Tied-diaphragm)

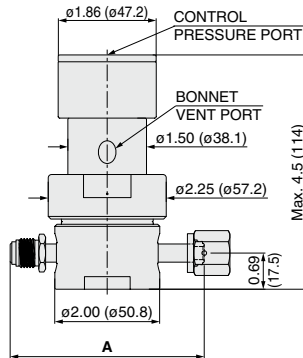
## Wetted Parts Material

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

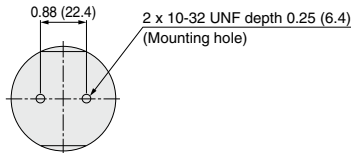
inch (mm)

### AZ15PA

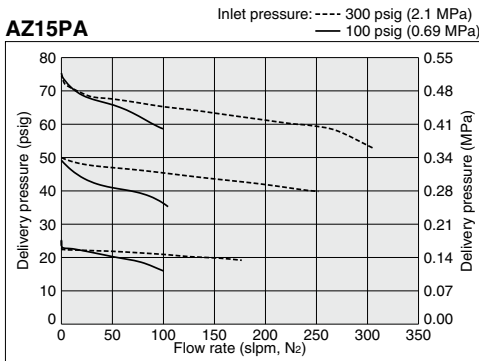


AP  
SL  
**AZ**  
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BP

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

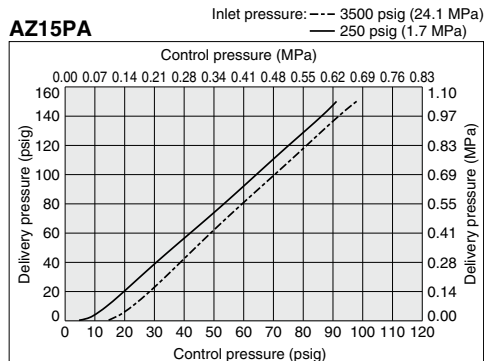


## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics



# 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



### How to Order

**AZ14 PA T S** 2PW FV4 FV4        

Port Number  
① ② ③ ④

**Delivery pressure**

Code	Delivery pressure
PA	7 to 150 psig (0.05 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)

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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 (Inlet ③, Outlet ④)**

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
2	0 to 200 psig	0 to 1.4 MPa
40	0 to 4000 psig	0 to 28 MPa

**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.

**Porting Configuration (Top View)**

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

### Specifications

Operating Parameters		AZ14PAT	
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)	
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Source pressure</b>		Vacuum to 2300 psig (15.9 MPa)	
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure	
	Outlet	1.5 times the maximum delivery pressure	
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure	
	Outlet	3 times the maximum delivery pressure	
<b>Maximum control pressure</b>		150 psig (1.0 MPa)	
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)	
<b>Cv</b>		0.45	
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)	
<b>Surface finish</b>		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)	
<b>Connections</b>		Face seal, Tube weld	
<b>Control pressure port</b>		NPT 1/8 inch	
<b>Bonnet port</b>		NPT 1/8 inch	
<b>Supply pressure effect</b>		1.6 psig (0.011 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		1.06 in <sup>3</sup> (17.4 cm <sup>3</sup> )	

\*1) Max. 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).

## 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.

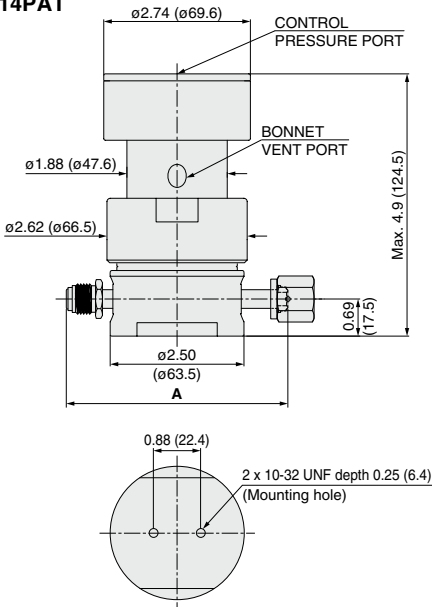
## Wetted Parts Material

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

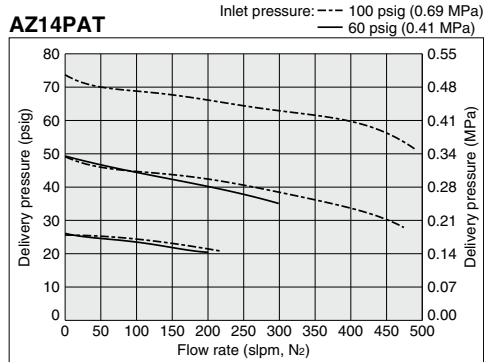
inch (mm)

### AZ14PAT



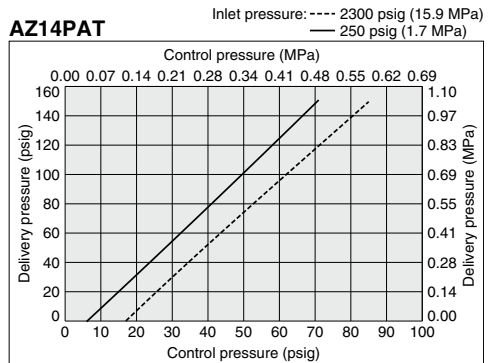
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4		
FV6	5.22	(132.6)
MV6		
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8		
TW8	4.34	(110.2)

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics



AP  
SL  
AZ  
AK  
BP

# Pneumatic Actuation Pressure Regulator

## High flow (Tied-diaphragm)

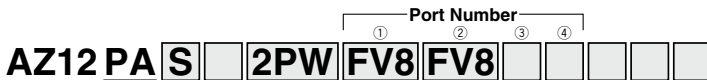
### AZ12PA Series

- 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



**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	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)

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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

**Option**

Code	Specification
No code	Standard (Cv: 0.65)
HF	High flow (Cv: 1.1) *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)

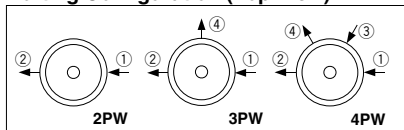
\*3) Not available with SHP material.

**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.

### Porting Configuration (Top View)



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

**Gauge port (Inlet ③, Outlet ④)**

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	-30 in.Hg to 160 psig	0 to 1.4 MPa
40	0 to 4000 psig	0 to 28 MPa

\*1) Refer to gauge guide (P.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

### Specifications

Operating Parameters		AZ12PA
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 1700 psig (11.7 MPa)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Maximum control pressure</b>		150 psig (1.0 MPa)
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)
<b>Cv</b>		0.65
<b>Leak rate</b>	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)
<b>Across the seat leak</b>		4 x 10 <sup>-9</sup> Pa·m <sup>3</sup> /s *3)
<b>Surface finish</b>		Ra 10 μin. (0.25 μm) Option: 25 μin. (0.62 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Control pressure port</b>		NPT 1/8 inch
<b>Bonnet port</b>		NPT 1/8 inch
<b>Supply pressure effect</b>		3.5 psig (0.024 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		1.20 in <sup>3</sup> (19.6 cm <sup>3</sup> )

\*1) Max. 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	AZ12PA
HF	Delivery pressure	7 to 150 psig (0.05 to 1.0 MPa) *)
	Cv	1.1
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

### 2. 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.

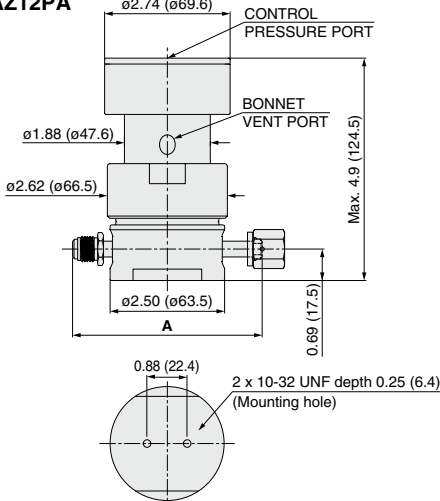
## Wetted Parts Material

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

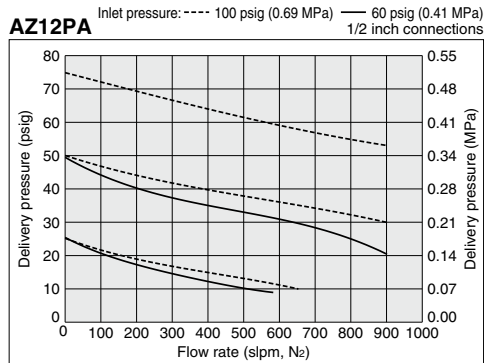
inch (mm)

### AZ12PA



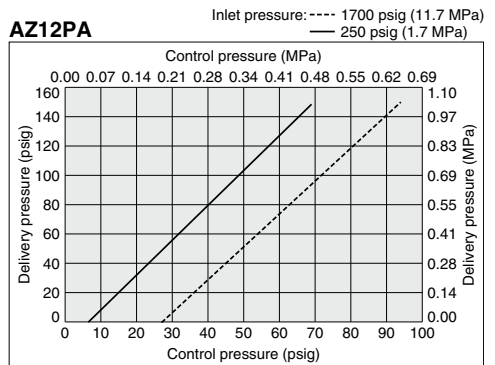
Connections	A	
	inch	(mm)
FV4	4.30	(109.2)
MV4	4.30	(109.2)
FV6	5.22	(132.6)
MV6	5.22	(132.6)
TW6	4.00	(101.6)
FV8	5.22	(132.6)
MV8	5.22	(132.6)
TW8	4.34	(110.2)

## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics



AP

SL

AZ

AK

BP



### AK10PA Series

- Actuation control pressure isolated from process gas by two seals
- Body material: 316 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



**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	316 SS		
SH		Ni-Cr-Mo alloy	Ni-Cr-Mo alloy

**Ports**

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

**Connections (Inlet ①, Outlet ②)**

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

**Option**

Code	Specification
No code	Standard (Cv: 0.09)
HF	High flow (Cv: 0.15) *6)

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

**Seat material**

Code	Material
No code	PTCFE (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.

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

Code	Pressure gauge unit *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 30 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	-30 in.Hg to 160 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.752) for gauge specifications. Select a pressure gauge, which has a larger pressure range than the delivery pressure range of the regulator.

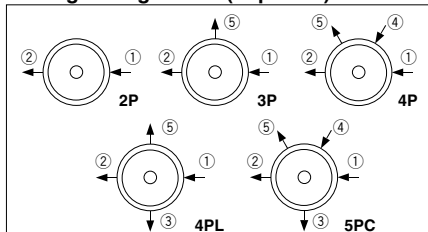
\*2) 1/4 inch NPT plug is included only for port code 4PL and 5PC.

**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.

#### Porting Configuration (Top View)



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

#### Specifications

Operating Parameters		AK10PA
<b>Delivery pressure</b>		7 to 150 psig (0.05 to 1.0 MPa)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Source pressure</b>		Vacuum to 3500 psig (24.1 MPa) *1)
<b>Proof pressure</b>	Inlet	1.5 times the maximum source pressure
	Outlet	1.5 times the maximum delivery pressure
<b>Burst pressure</b>	Inlet	3 times the maximum source pressure
	Outlet	3 times the maximum delivery pressure
<b>Maximum control pressure</b>		150 psig (1.0 MPa)
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *2)
<b>Cv</b>		0.09
<b>Leak rate</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s
<b>Connections</b>		NPT female, Compression
<b>Control pressure port</b>		NPT 1/8 inch
<b>Bonnet port</b>		NPT 1/8 inch
<b>Supply pressure effect</b>		0.38 psig (0.0026 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.49 in <sup>3</sup> (8 cm <sup>3</sup> )

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

\*2) Max. 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) *)
	Cv	0.15
	Supply pressure effect	0.75 psig (0.0052 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

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

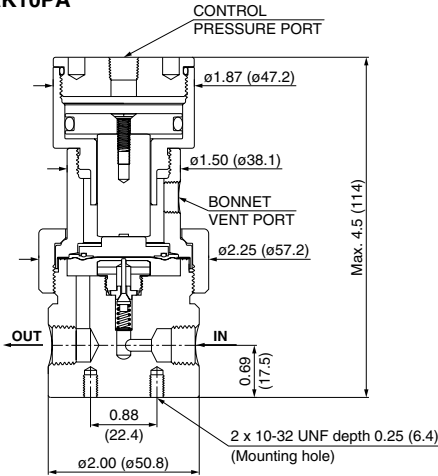
## Wetted Parts Material

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

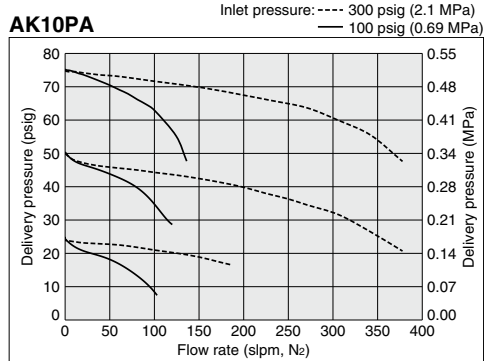
## Dimensions

inch (mm)

### AK10PA

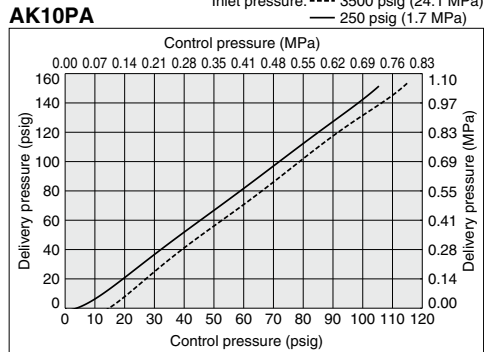


## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input / Output Characteristics



AP  
 SL  
 AZ  
**AK**  
 BP

# Pneumatic Actuation Pressure Regulator

Low flow  
(Tied-diaphragm)

## AK15PA 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

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

#### Connections

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 S, SH
2P		● ●
3P	Refer to the following porting configurations.	● ●
4PL		● ● ● ●
5PC		● ● ● ●

#### Pressure gauge unit \*2)

Code	Unit
No code	psig/bar
MPA	MPa

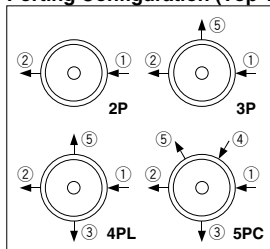
\*2) Pressure gauge unit MPa or psig/bar selectable. However under Japanese regulation, only MPa is available in Japan.

#### Gauge port

	Pressure gauge *1)	
Code	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 30 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	-30 in.Hg to 160 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.752) 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)



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

### 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) *1)
Cv		0.09
Leak rate		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (8.7 cm <sup>3</sup> )

\*1) Max. 90°C for Polyimide and PEEK seat. Optional ambient and operating temperature range available. Please contact SMC.

# Pneumatic Actuation Pressure Regulator **AK15PA Series**

Low flow (Tied-diaphragm)

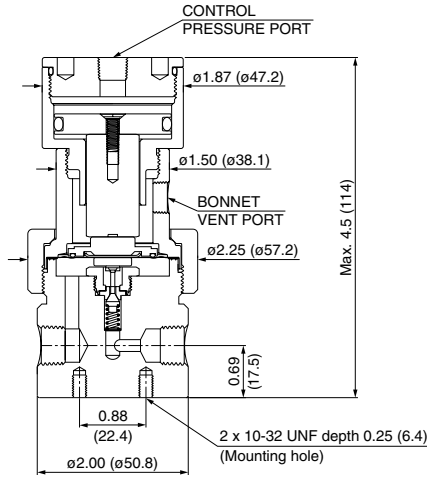
## Wetted Parts Material

Wetted Parts	B	S	SH
Body	Brass	316 SS	316 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



AP

SL

AZ

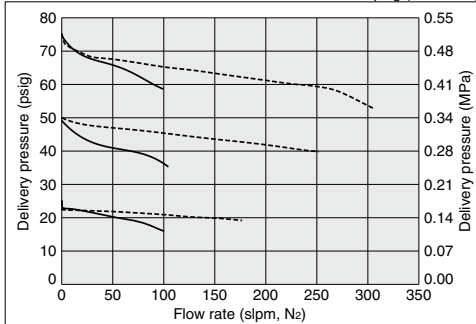
AK

BP

## Flow Rate Characteristics

### AK15PA

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

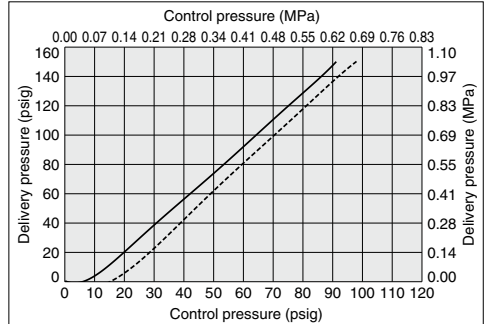


Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input/Output Characteristics

### AK15PA

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



# Pneumatic Actuation Pressure Regulator

Intermediate flow  
(Tied-diaphragm)

## AK14PAT Series



RoHS

- Actuation control pressure isolated from process gas by two seals
- Body material: 316 SS
- 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)

### How to Order

AK14 PAT S 4PL 6 6 0 0

#### Delivery pressure

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

#### Material

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

#### Ports

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

#### 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.

#### 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 SH material.

#### Gauge port

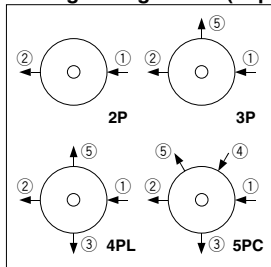
(Extra outlet port ③, Inlet ④, Outlet ⑤)

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 30 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	-30 in.Hg to 160 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.752) 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

(Inlet ①, Outlet ②)

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

① IN ② OUT ③ Extra outlet port

④ Gauge port (Inlet) ⑤ Gauge port (Outlet)

### Specifications

Operating Parameters		AK14PAT
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 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) *)
Cv		0.45
Leak rate		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 in <sup>3</sup> (18.7 cm <sup>3</sup> )

\*) Max. 90°C for Polyimide seat.

## 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.

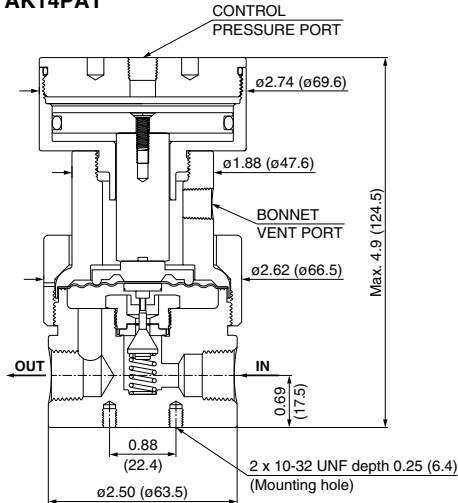
## Wetted Parts Material

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

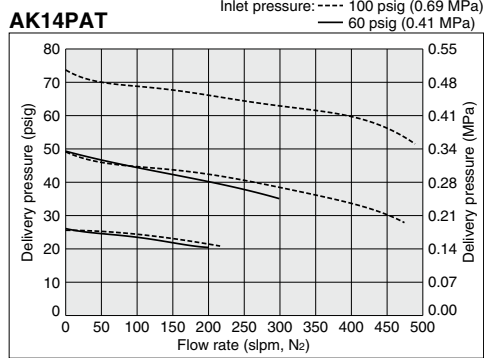
## Dimensions

inch (mm)

### AK14PAT

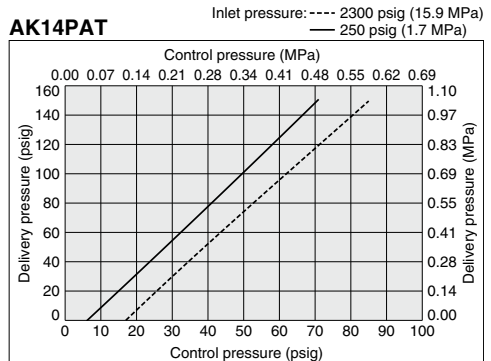


## Flow Rate Characteristics



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input/Output Characteristics



- AP
- SL
- AZ
- AK
- BP

# Pneumatic Actuation Pressure Regulator

## High flow (Tied-diaphragm)

### AK12PA Series



- Actuation control pressure isolated from process gas by two seals
- Body material: 316 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

#### How to Order



**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	316 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 (Cv: 0.65)
HF	High flow (Cv: 1.1) *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 SH material.

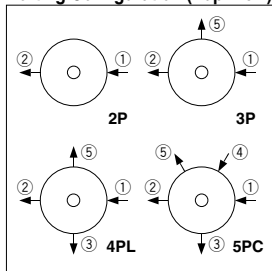
#### Gauge port

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

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 30 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	-30 in.Hg to 160 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.752) 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

(Inlet ①, Outlet ②)

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

- ① IN ② OUT
- ③ Extra outlet port
- ④ Gauge port (Inlet)
- ⑤ Gauge 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) *1)
Cv		0.65
Leak rate		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /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 <sup>3</sup> (21.6 cm <sup>3</sup> )

\*1) Max. 90°C for Polyimide seat. Optional ambient and operating temperature range available. Please contact 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) *)
	Cv	1.1
	Supply pressure effect	4.2 psig (0.029 MPa) rise in delivery pressure per 100 psig (0.7 MPa) source pressure drop

### 2. 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.

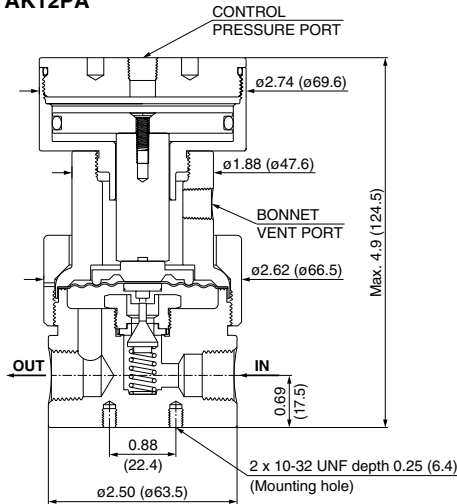
## Wetted Parts Material

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

## Dimensions

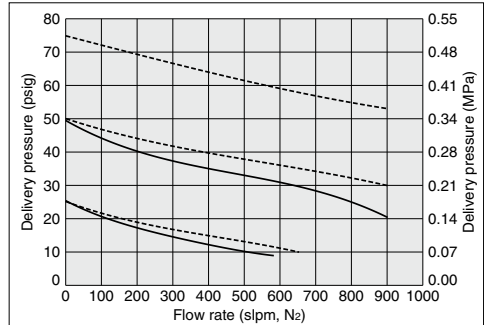
inch (mm)

### AK12PA



## Flow Rate Characteristics

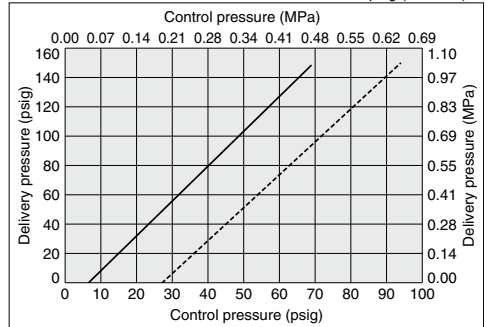
AK12PA Inlet pressure: ---- 100 psig (0.69 MPa) — 60 psig (0.41 MPa)  
 1/2 inch connections



Note) slpm, N<sub>2</sub>: The volumetric flow rate under normal conditions (0°C, 1 atm) when N<sub>2</sub> gas is flowing.

## Input/Output Characteristics

AK12PA Inlet pressure: ---- 1700 psig (11.7 MPa) — 250 psig (1.7 MPa)



AP  
 SL  
 AZ  
**AK**  
 BP

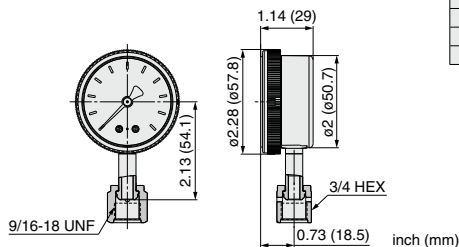


# Regulator Pressure Gauges Guide

For AP/SL/AZ series (Installed before shipment <sup>\*1)</sup> / Order separately)

## Specifications

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



## Model

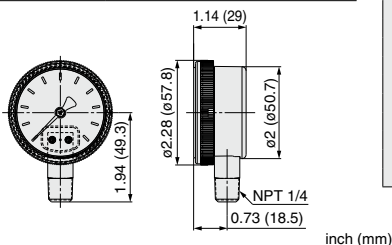
Regulator Code <sup>*2)</sup>		Pressure range	Unit	Part number <sup>*3)</sup>			
gauge port	unit						
V3 L 1 H 2 4 10 40	(No code)	-30 in.Hg to 30 psig	psig/bar <sup>*4)</sup>	00-8300023			
		-30 in.Hg to 60 psig		00-8300026			
		-30 in.Hg to 100 psig		00-8300021			
		-30 in.Hg to 160 psig		00-8300116			
		0 to 200 psig		00-8300020			
		0 to 400 psig		00-8300007			
		0 to 1000 psig		00-8300022			
		0 to 4000 psig		00-8300024			
		V3 L 1 H 2 4 10 40		MPA	-0.1 to 0.2 MPa	MPa	00-8300304
					-0.1 to 0.4 MPa		00-8300305
-0.1 to 0.7 MPa	00-8300300						
-0.1 to 1.1 MPa	00-8300297						
0 to 1.4 MPa	00-8300299						
0 to 3 MPa	00-8300301						
0 to 7 MPa	00-8300302						
0 to 28 MPa	00-8300303						

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

## Stainless steel / Lower mount

## Specifications

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



## Model

Regulator Code <sup>*2)</sup>		Pressure range	Unit	Part number <sup>*3)</sup>	
material	gauge port				
S SH	V15	(No code)	psig/bar <sup>*4)</sup>	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	00-8300033
	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	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			

<sup>\*1)</sup> If one prefers shipment with the pressure gauges installed on the regulator, the material of gasket to be used on the connections will be Nickel (no plated). Please contact SMC for details if one prefers changing this material.

<sup>\*2)</sup> When pressure gauge needs to be assembled with regulator when shipment, put this code as gauge port in How to Order.

# Regulator / Pressure Gauges Guide

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

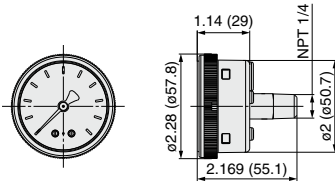
## Stainless steel / Center back mount

### Specifications

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

### Model

Regulator Code	Pressure range	Unit	Part number *3)
*5)	-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)

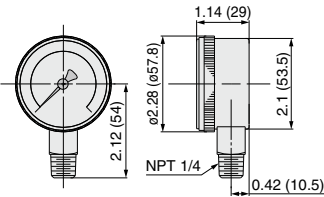
## Brass / Lower mount

### Specifications

<b>Installation</b>	Lower mount	
<b>Gas</b>	Select compatible materials of construction for the gas	
<b>Connections</b>	NPT 1/4 inch	
<b>Temperature range</b>	-40 to 60°C (No freezing)	
<b>Accuracy</b>	25% to 75% of the scale: ±2%F.S. Other than above: ±3%F.S. (ASME B40.1 Grade B or better)	
<b>Cleanliness</b>	ASME B40.1 level IV	
<b>No oil</b>	No oil	
<b>Material</b>	<b>Case</b>	Brass or Stainless steel + Zn Coating
	<b>Window</b>	Polycarbonate
	<b>Socket</b>	Brass
	<b>Bourdon tube</b>	Phosphor bronze

### Model

Regulator Code *2)		Pressure range	Unit	Part number *3)
material	gauge port unit			
B	V3	-30 in.Hg to 30 psig -30 in.Hg to 60 psig -30 in.Hg to 100 psig -30 in.Hg to 160 psig	psig/bar *4)	00-83000265
	L			00-83000177
	1			00-83000178
	H			00-83000239
	2			00-83000218
	4			00-83000205
	10	00-83000186		
	40	00-83000179		
	V3	-0.1 to 0.2 MPa -0.1 to 0.4 MPa -0.1 to 0.7 MPa -0.1 to 1.1 MPa 0 to 1.5 MPa 0 to 3 MPa 0 to 7 MPa 0 to 28 MPa	MPa	00-83000278
	L			00-83000279
	1			00-83000280
	H			00-83000281
	2			00-83000277
	4			00-83000276
10	00-83000275			
40	00-83000274			



inch (mm)

\*3) Part number of pressure gauge itself. Gauge are shipped separately.

\*4) Under Japanese regulation, psig/bar unit gauge is not sold in Japan.

\*5) Available for special order. Please contact SMC.



# Process Gas Equipment/Regulator Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 633 and 634 for Process Gas Equipment Precautions.

## Selection

### Warning

#### 1. Confirm the specifications.

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

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

#### 2. Confirm allowable pressure of any pressure gauges.

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

## Mounting

### Warning

#### 1. Confirm the mounting direction of the product.

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

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

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

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

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

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

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

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

## Maintenance

### Warning

#### 1. If a regulator requires repair, contact SMC.

## Operation

### Warning

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

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

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

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

#### 4. Supply gas to the regulator.

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

#### 5. Adjust pressure.

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

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

#### 6. Decreasing the setting pressure under flow conditions.

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

#### 7. Stop using the regulator immediately if resonance occurs.

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



# Process Gas Equipment/Back Pressure Regulator Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 633 and 634 for Process Gas Equipment Precautions.

## 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. Confirm allowable pressure of any pressure gauges.

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

## Mounting

### Warning

#### 1. Confirm the mounting direction of the product.

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

## Maintenance

### Warning

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

## Operation

### Warning

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

#### 2. Pressure control

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

#### 3. Decreasing the setting pressure.

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

#### 4. Stop using the regulator immediately if resonance occurs.

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

AP

SL

AZ

AK

BP