ADVANCED PRESSURE TECHNOLOGY

SERIES AK 1400T
SINGLE STAGE PRESSURE REGULATOR
TIED DIAPHRAGM—SAFETY AND RELIABILITY

- **Flow capacity***
  200 sccm to 500 slpm (0.007 to 17.6 scfm)
- **Vacuum to 2,300 psig (158 bar) inlet, 100 psig (7 bar) outlet**
- **Absolute version for sub-atmospheric delivery of low vapor pressure gases**
- **Stainless Steel or Brass construction**
- **Poppet attached to diaphragm (tied diaphragm) improves positive shut off across the seat**
- **High leak integrity**
- **Machined from bar stock**
- **Optional accessories**
- **Fine adjustment control**
  (six turns of the knob from off to wide open)
- **Hastelloy® C-22 Internals, 'SH' option, for added corrosion resistance**
- **Cleaned for O2 service**
- **Field repairable**
- **Diffusion resistant Stainless Steel diaphragm**

ENGINEERING DATA

Operating Parameters

Source pressure	vacuum to 2,300 psig (158 bar) vacuum to 300 psig (20 bar) AK 1402TA
Delivery pressure	1 to 30 psig (0.07 to 2 bar) AK 1402T 100 mm Hg absolute (26 in Hg vac) to 30 psig (2 bar) AK 1402TA 2 to 100 psig (0.14 to 7 bar) AK 1410T (optional delivery pressure available)
Proof pressure	4,000 psig (276 bar)
Burst pressure	8,000 psig (552 bar)

Other Parameters

Inlet /outlet ports	1/4", 3/8" and 1/2" NPTF (optional porting available)
Flow coefficient, Cv	0.45
Internal volume	0.65 in^3 (10.6 cm^3)
Operating temperature	-40 to +160F (-40 to +71C)***
Leak rate	1 x 10^{-9} sccs
Delivery pressure rise	1.6 psig per 100 psig source pressure drop

MATERIALS OF CONSTRUCTION

	AK 1400TB	AK 1400TS	AK 1400TSH
Body	brass	SS 316	SS 316
Diaphragm	Hastelloy C-22	Hastelloy C-22	Hastelloy C-22
Nozzle	SS 316	SS 316	Hastelloy C-22
Poppet	Hastelloy C-22	Hastelloy C-22	Hastelloy C-22
Seat	PCTFE**	PCTFE**	PCTFE**

* Flow rating based upon N2 @ 100 psig inlet, varying gas type and, or inlet/outlet pressures may effect rating.

** Optional seat materials available, Vespel®.

*** Optional temperature ranges available. Please consult factory.

All specifications subject to change without notice.

Hastelloy C-22® Haynes

Vespel® DuPont

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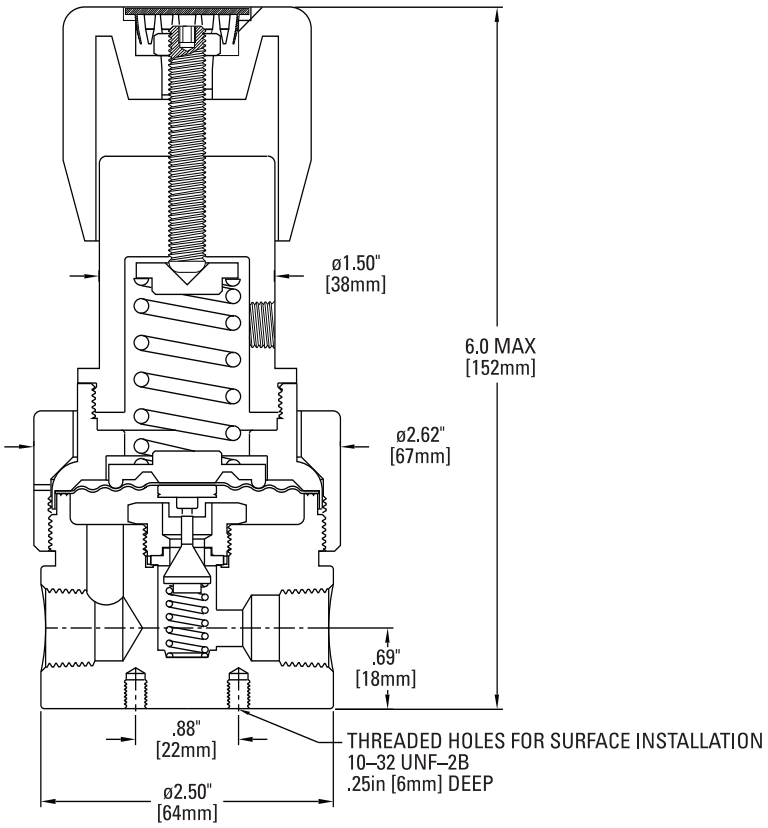
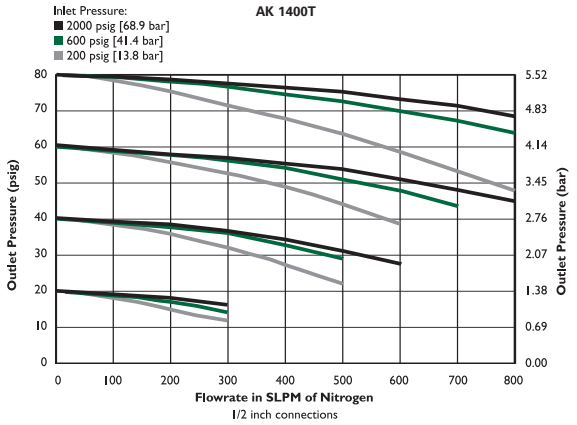
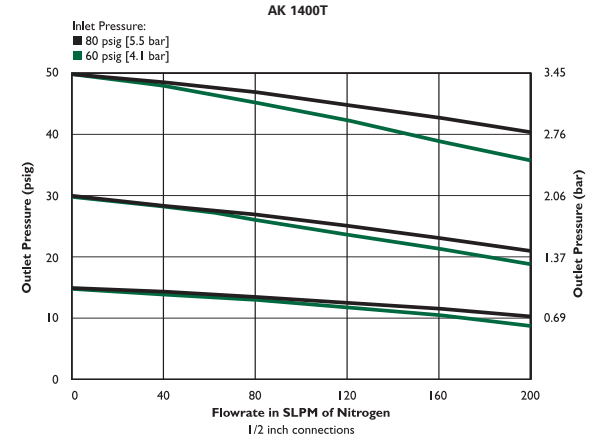
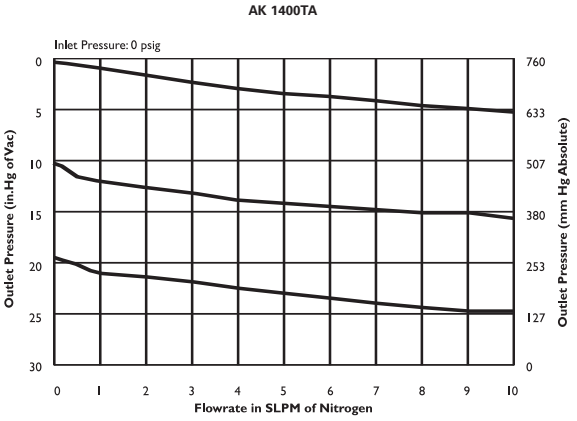
UNCOMPROMISING QUALITY, RELIABILITY & PERFORMANCE FROM A COMPANY KNOWN FOR SERVICE



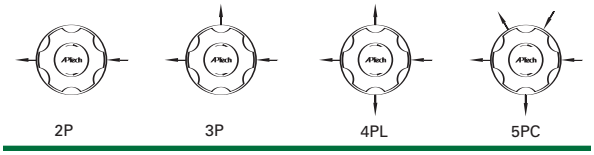
All dimensions in inches (mm).
Metric dimensions are for reference only.







Porting Configurations



NOTE: Gauge and relief ports are 1/4 inch NPTF and are shipped capped from the factory unless device installed.

ORDERING INFORMATION

AK 1400T Series	S Material	A Range Options	5PC Ports	6 6 ① ② Connections Inlet / Outlet	40 V3 ③ ④ ⑤ Ports (Gauge/Accessory)	P Options
AK 1402T = 1-30 psig (.07 to 2 bar) AK 1410T = 2-100 psig (.14 to 7 bar)	S = Stainless steel (SS) SH = SS with Hastelloy internals B = Brass	A = 100 mm Hg absolute (26 in Hg vac) to 30 psig (2 bar) AK 1402T only	2P = 2 Ports 3P = 3 Ports 4PL = 4 Ports 5PC = 5 Ports	4 = 1/4 inch NPTF 6 = 3/8 inch NPTF 8 = 1/2 inch NPTF	0 = No gauge V3 = 30-0-30 psig/bar 1 = 30-0-100 psig/bar 2= 0-200 psig/bar 10 = 0-1000 psig/bar 40 = 0-4000 psig/bar	P = Panel installation CGA = Inlet fitting 320, 330, 326, 660, 678 VS = Vespel seat

NOTE: Designators required for all ports, but "0" not required if there isn't a port. A 2P has designators only for 1 & 2 ports, as example AK 1410T S 2P 44 not AK 1410T S 2P 44 000.

HMI6090/September2006

APTech
ADVANCED PRESSURE TECHNOLOGY

SERIES AK 1500
SINGLE STAGE PRESSURE REGULATOR
TIED DIAPHRAGM—BUILT FOR SAFETY

- **Vacuum to 3,500 psig (241 bar) inlet 0 to 100 psig (7 bar) outlet**
- **Flow capacity* 0 to 30 slpm (0 to 1 scfm)**
- **Stainless Steel or Brass construction**
- **Hastelloy C-22 Internals, 'SH' option, for added corrosion resistance**
- **High leak integrity**
- **Machined from bar stock**
- **Poppet attached to diaphragm (tied diaphragm) improves positive shut off across the seat**
- **Optional accessories**
- **Fine adjustment control (six turns of the knob from off to wide open)**
- **Cleaned for O2 service**
- **Field repairable**
- **Diffusion resistant Stainless Steel diaphragm**

ENGINEERING DATA

Operating Parameters

Source pressure	vacuum to 3,500 psig (241 bar)
Delivery pressure	1 to 30 psig (0.07 to 2 bar) AK 1502 2 to 100 psig (0.14 to 7 bar) AK 1510 5 to 150 psig (0.35 to 10 bar) AK 1515
Proof pressure	4,500 psig (307 bar)
Burst pressure	10,000 psig (690 bar)

Other Parameters

Inlet /outlet ports	1/4" NPTF
Flow coefficient, Cv	0.09
Internal volume	0.49 in^3 (8 cm^3)
Operating temperature	-40 to +160F (-40 to +71C) (Optional temperature to 500˚F)
Leak rate	1 x 10^{-9} sccs
Delivery pressure rise	0.25 psig per 100 psig source pressure drop

MATERIALS OF CONSTRUCTION

	AK 1500B	AK 1500S	AK 1500SH
Body	brass	stainless steel 316	stainless steel 316
Poppet and diaphragm	stainless steel 316	stainless steel 316	Hastelloy C-22
Seat	PCTFE (Vespel, PEEK Opt.)	PCTFE (Vespel, PEEK Opt.)	PCTFE (Vespel, PEEK Opt.)
Bonnet	stainless steel 303	stainless steel 303	stainless steel 303

(Hastelloy C-22 or Monel 400 body material available)

*Flow rating based upon N2 @ 100 psig inlet, varying gas type and, or inlet/outlet pressures may effect rating.

All specifications subject to change without notice.
Hastelloy C-22 ® Haynes
Vespel ® DuPont
Monel ® Special Metals Corporation

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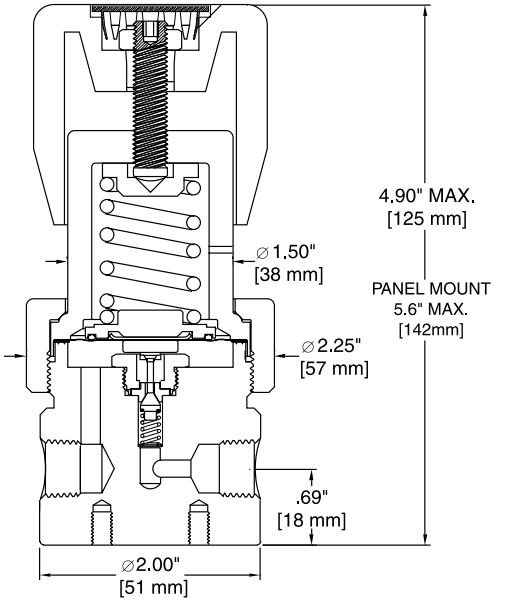
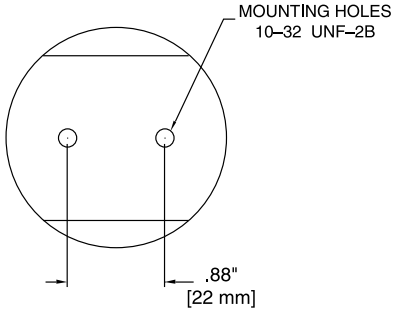
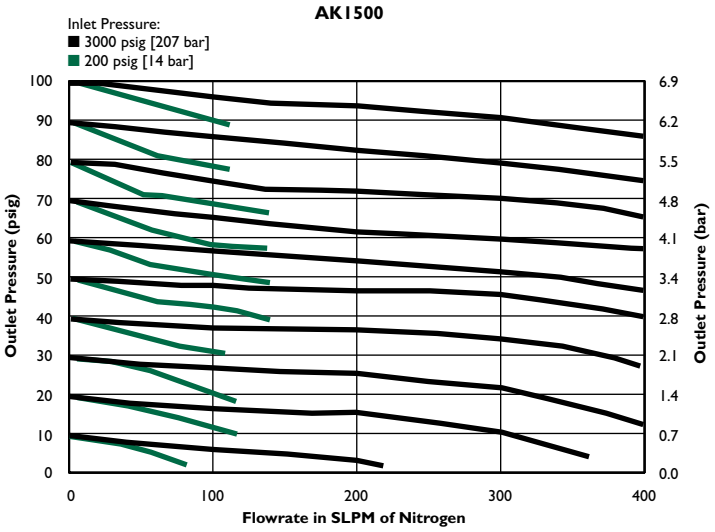
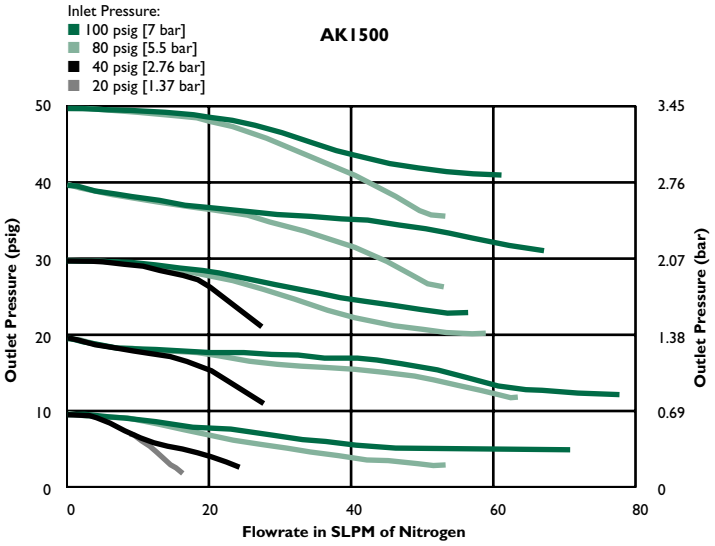


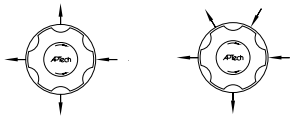


AK 1500





Porting Configurations



4PL 5PC

NOTE: Gauge and relief ports are 1/4 inch NPTF and are shipped capped from the factory unless device installed.

ORDERING INFORMATION

Series AK 1500	S Material	5PC Ports	4 - 4 Connections Inlet / Outlet	40 - V3 Gauges Source / Delivery	P Options
AK 1502 = 1-30 psig (.07 to 2 bar) AK 1510 = 2-100 psig (.14 to 7 bar) AK 1515 = 5-150 psig (.35 to 10 bar)		4PL = 4 Ports 5PC = 5 Ports	4 = 1/4 inch NPTF	0 = No gauge V3 = 30-0-30 psig/bar 1 = 30-0-100 psig/bar 2 = 0-200 psig/bar 10 = 0-1000 psig/bar 40 = 0-4000 psig/bar	P = Panel installation CGA = Inlet fitting 320, 330, 350, 580, 660, 678 VS = Vespel seat PK = PEEK Seat HTP = High Temperature
	S = Stainless steel SH = Stainless steel with Hastelloy internals B = Brass				

ADVANCED PRESSURE TECHNOLOGY

SERIES AK 1000
SINGLE STAGE PRESSURE REGULATOR
QUALITY, RELIABILITY AND PERFORMANCE

- **Vacuum to 3,500 psig (241 bar) inlet, 500 psig (35 bar) outlet**
- **Flow capacity* 0 to 100 slpm (0 to 3.5 scfm) HF Option**
- **Stainless Steel or Brass construction**
- **Hastelloy® C-22® Internals, 'SH' option, for added corrosion resistance**
- **High leak integrity**
- **Machined from bar stock**
- **Optional accessories**
- **Fine adjustment control (six turns of the knob from off to wide open)**
- **Cleaned for O2 service**
- **Field repairable**
- **Diffusion resistant Stainless Steel diaphragm**

ENGINEERING DATA

Operating Parameters

Source pressure	vacuum to 3,500 psig (241 bar) (AK1001, 300 psig [21 bar] max)
Delivery pressure	0.5 to 10 psig (0.03 to 0.7 bar) AK 1001 1 to 30 psig (0.07 to 2 bar) AK 1002 2 to 100 psig (0.14 to 7 bar) AK 1010 5 to 200 psig (0.3 to 14 bar) AK 1020 5 to 300 psig (0.3 to 21 bar) AK 1030 **10 to 500 psig (0.7 to 35 bar) AK 1050
Proof pressure	4,500 psig (307 bar)
Burst pressure	10,000 psig (690 bar)

Other Parameters

Inlet /outlet ports	1/4" NPT; 1/4" & 3/8" compression (optional porting available)
Flow coefficient, Cv	0.09 (HF option 0.15)
Internal volume	0.49 in^3 (8 cm^3)
Operating temperature	-40 to +160F (-40 to +71C)***
Leak rate	1 x 10^{-9} sccs
Delivery pressure rise	0.25 psig per 100 psig source pressure drop (HF 0.75 psi per 100 psig)

MATERIALS OF CONSTRUCTION

	AK 1000B	AK 1000S	AK 1000SH
Body	brass	SS 316	SS 316
Poppet and diaphragm	SS 316	SS 316	Hastelloy C-22
Seat	PCTFE (Vespel® and PEEK Opt)	PCTFE (Vespel and PEEK Opt)	PCTFE (PEEK Opt)
Bonnet	SS 303	SS 303	SS 303

* Flow rating based upon N2 @ 100 psig inlet, varying gas type and, or inlet/outlet pressures may effect rating.
** AK 1050 and panel mount height dimension different
*** Optional temperature ranges available. Please contact factory.

All specifications subject to change without notice.
Hastelloy® C-22® Haynes Corporation
Vespel® DuPont

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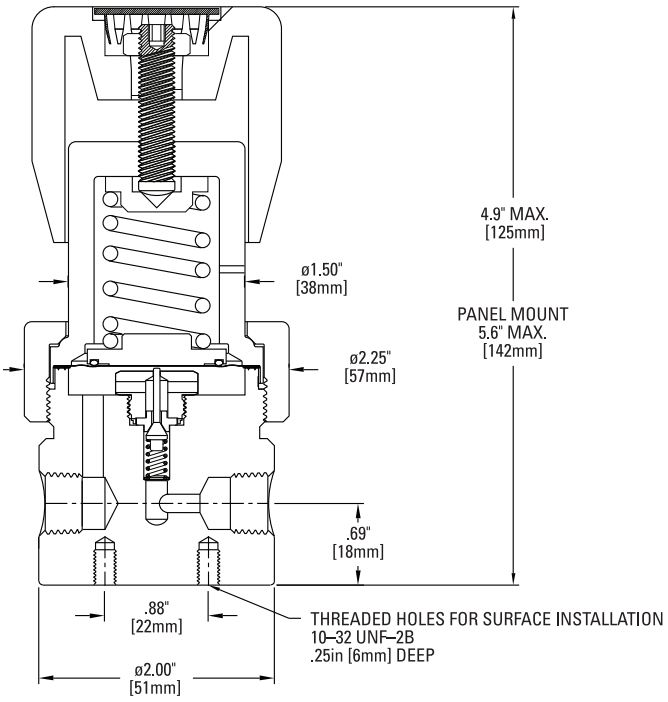
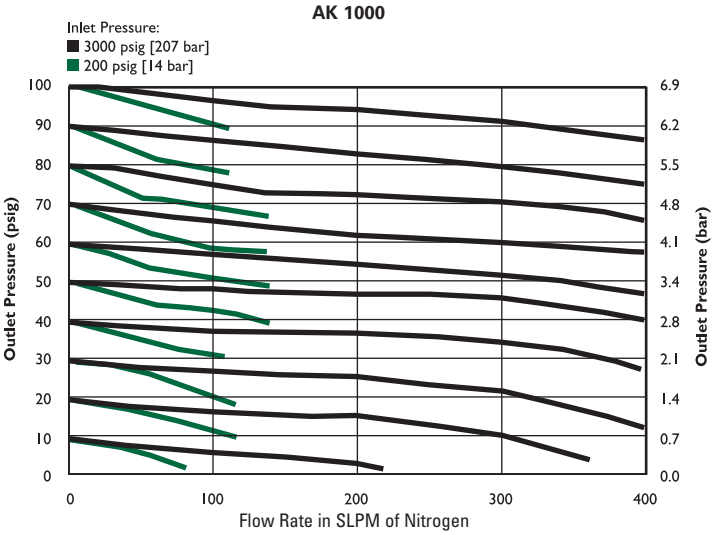
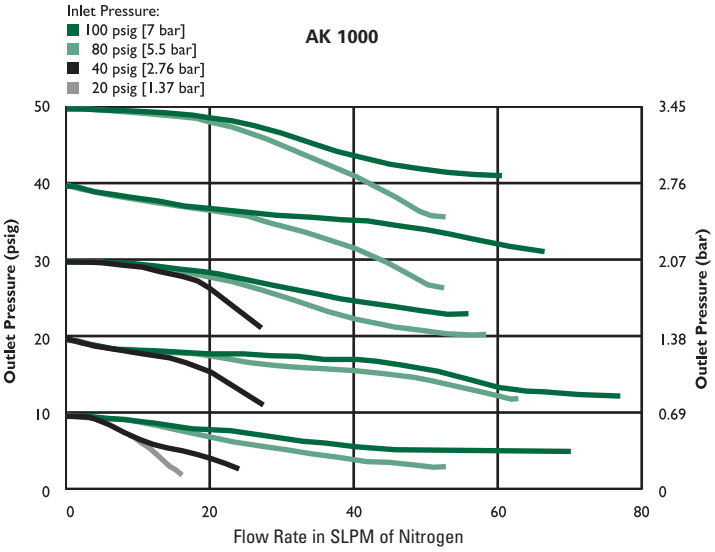
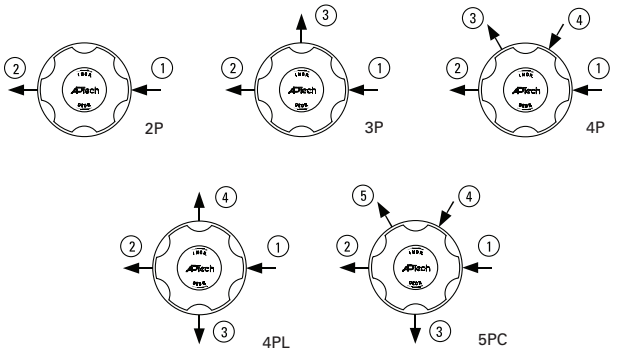


All dimensions in inches (mm).
Metric dimensions are for reference only.





Porting Configurations



NOTE: Not all porting configurations available in brass.

ORDERING INFORMATION

AK 1002 Series	S Material	3P Port Configuration	4 4 ① ② Ports	0 ③ ④ ⑤ Ports (Gauge/Accessory)	P Options
AK 1001= 0.5-10 psig (.03 to .7 bar)		2P = 2 Ports	4 = 1/4 inch NPT	0 = No gauge or device installed	P = Panel installation*
AK 1002= 1-30 psig (.07 to 2 bar)		3P = 3 Ports	4T = 1/4 inch compression	V3 = 30-0-30 psig/bar	CGA = Inlet fitting 320, 330, 350, 580, 660, 678
AK 1010= 2-100 psig (.14 to 7 bar)		4PL = 4 Ports	6T = 3/8 inch compression	1 = 30-0-100 psig/bar	VS = Vespel seat
AK 1020= 5-200 psig (.3 to 14 bar)		5PC = 5 Ports		2 = 0-200 psig/bar	PK = PEEK seat
AK 1030= 5-300 psig (.3 to 21 bar				10 = 0-1000 psig/bar	HF = High flow
AK 1050= 10-500 psig (.7 to 35 bar)				40 = 0-4000 psig/bar	
	S = Stainless steel (SS)				
	SH = SS with Hastelloy internals				
	B = Brass				

NOTE: Designators required for all ports, but "0" not required if there isn't a port. A 2P has designators only for ① & ② ports, as example AK 1010 S 2P 44 not AK 1010 S 2P 44 000.

*Panel hole 1.42 diameter

APTech
ADVANCED PRESSURE TECHNOLOGY

SERIES AP 500

MINI REGULATOR

Ultra Compact / Ultra Clean

- Single stage
- Stainless steel 316L VAR secondary remelt construction
- Compact size with low internal volume
- High performance with low hysteresis
- Vacuum to 150 psig (10 bar) inlet
- Surface mount (IGS) configurations
- 15 slpm flow capacity HF option to 30 slpm
- Designed and manufactured exclusively for UHP semiconductor applications
- Sub-atmospheric to low positive pressure delivery

Operating Parameters

Source pressure		vacuum to 150 psig (10 bar)
Delivery pressure	AP 501A	100 mm Hg absolute to 10 psig (0.7 bar)
	AP 502	0.5 to 30 psig (0.034 to 2 bar)
	AP 510	1 to 100 psig (0.07 to 7 bar)
Proof pressure		500 psig (34 bar)
Burst pressure		1,000 psig (69 bar)

Other Parameters

Inlet/outlet connectors	1/4 or 3/8 inch face seal or tube weld
Flow coefficient (Cv)	0.06 (0.1 HF option)
Internal volume	0.15 in^3 (2.4 cm^3)
Operating temperature	-40° to +160°F (-40° to +71°C)
Surface finish	15 µin. (0.4 µm) Ra max standard; 10 µin (0.25 µm); 7 µin (0.18 µm); and 5 µin (0.13 µm) optional
Inboard leakage	2 x 10^{-10} sccs
Outboard leakage	2 x 10^{-9} sccs He at 100 psig inlet pressure
Leakage across seat	4 x 10^{-8} sccs He at 100 psig inlet pressure
Delivery pressure rise	0.20 psig per 20 psig source pressure drop (0.4 psig per 20 psig source pressure drop HF option)
Installation	Surface

Materials

	Series AP 500 S	**Series AP 500 SH**
Type of Service	Noncorrosive	Corrosive
Wetted Parts		
Body	SS 316L secondary remelt	SS 316L secondary remelt
Poppet/diaphragm	SS 316L / Elgiloy®	Hastelloy® alloy C-22® / Elgiloy
Finish	electropolished and passivated	electropolished and passivated
Seat	PCTFE (Vespel® optional)	PCTFE

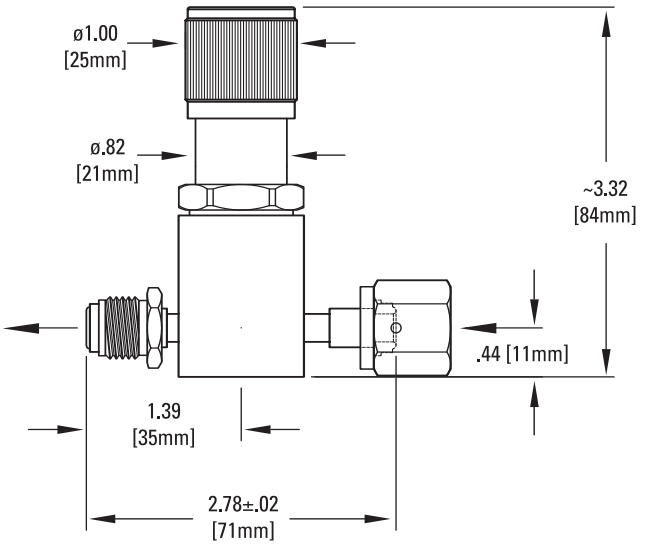
All specifications subject to change without notice.

Vespel® DuPont Elgiloy® Elgiloy Corporation Hastelloy® C-22® Haynes Corporation

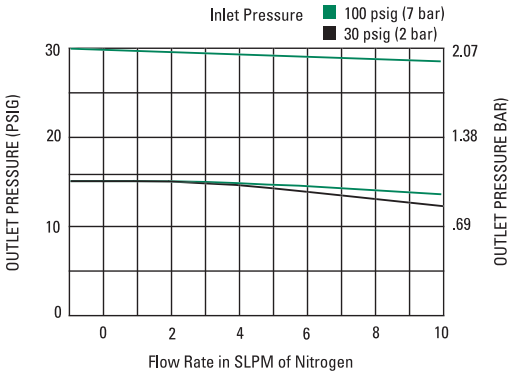
ENGINEERING DATA — SERIES AP 500 MINI REGULATOR

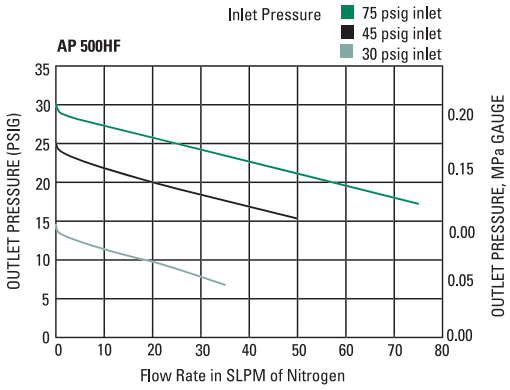
SERVICE AND SUPPORT BEYOND COMPARE

DIMENSIONAL INFORMATION

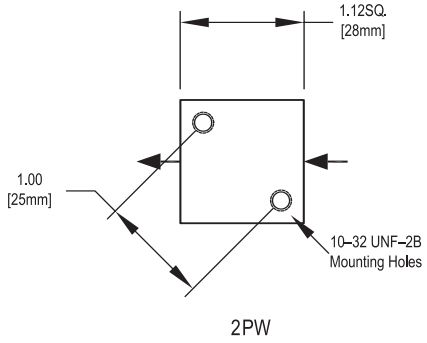


All dimensions in inches (mm). Metric dimensions are for reference only.

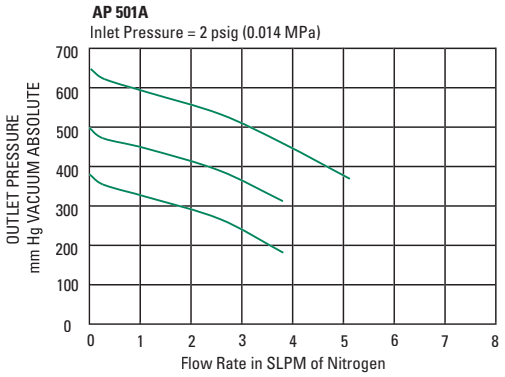




PORTING CONFIGURATIONS



2PW



ORDERING INFORMATION

Sample Order Number	AP 502SM 2PW FV4 FV4		
AP 502 | Series	AP 501 = .5-10 psig (0.034 to 0.7 bar) AP 502 = .5-30 psig (0.034 to 2 bar) AP 510 = 1-100 psig (0.07 to 7 bar)	FV4 FV4 | Connections Inlet / Outlet	FV4 = 1/4 inch face seal female MV4 = 1/4 inch face seal male 3/8" connections or tube weld available
S | Material	S = Stainless steel (SS) SH= SS / Hastelloy internals	| Options	VS = Vespel seat HF = High flow
M | Surface Finish Options	M = 10 µin. Ra max V = 7 µin. Ra max X = 5 µin. Ra max		
A | Range Options	A = 100 mm Hg absolute to 10 psig (AP 501 only)		
2PW | Ports	2PW = 2 ports Consult factory for other porting options or Technical Bulletin 206 for 1.125 inch C-seal surface mount (IGS) options		

APTech
ADVANCED PRESSURE TECHNOLOGY

SERIES AP 1500

TIED DIAPHRAGM REGULATOR

Low Flow — High Pressure

- Single stage
- Hastelloy® alloy C-22® or SS 316L VAR secondary remelt construction
- Cleaned, assembled and packaged for high purity semiconductor applications
- 15 µin. surface finish (10, 7 and 5 µin. opt)
- Vacuum to 3,500 psig (241 bar) inlet
- No threads in contact with fluid media
- Industry standard for cylinder applications

Operating Parameters

Source pressure		vacuum to 3,500 psig (241 bar)
Delivery pressure	AP 1502	1 to 30 psig (0.07 to 2 bar)
	AP 1506	2 to 60 psig (0.14 to 4 bar)
	AP 1510	2 to 100 psig (0.14 to 7 bar)
Proof pressure		5,000 psig (345 bar)
Burst pressure		10,000 psig (690 bar)

Other Parameters

Inlet/outlet connectors	1/4 or 3/8 inch face seal or tube weld
Bonnet port	1/8 inch NPT
Flow coefficient (Cv)	0.09
Internal volume	0.51 in^3 (8.4 cm^3)
Operating temperature	-40° to +160°F (-40° to +71°C)
Surface finish	15 µin. (0.4 µm) Ra max standard; 10 µin (0.25 µm); 7 µin (0.18 µm); and 5 µin (0.13 µm) optional
Inboard leakage	2 x 10^{-10} sccs
Outboard leakage	2 x 10^{-9} sccs He at 1,500 psig inlet pressure
Leakage across seat	4 x 10^{-8} sccs He at 1,000 psig inlet pressure
Installation	surface or panel (optional)
Delivery pressure rise	0.25 psig per 100 psig source pressure drop

Materials

Type of Service	Series AP 1500 S Noncorrosive	Series AP 1500 SH Corrosive	Series AP 1500 H Corrosive
Wetted Parts			
Body	SS 316L secondary remelt	SS 316L secondary remelt	Hastelloy alloy C-22
Poppet, nozzle, diaphragm	SS 316L	Hastelloy alloy C-22	Hastelloy alloy C-22
Finish	electropolished and passivated	electropolished and passivated	electropolished
Seat	PCTFE (Vespel® optional)	PCTFE	PCTFE

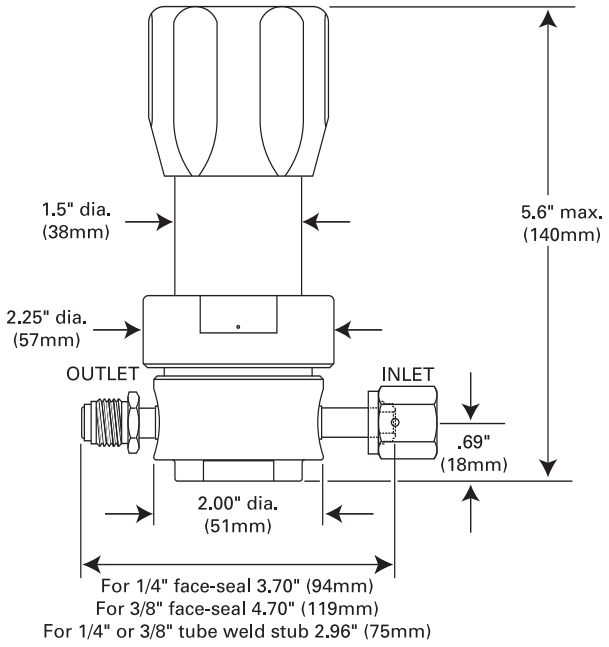
All specifications subject to change without notice.

Hastelloy® C-22® Haynes Corporation Vespel® DuPont

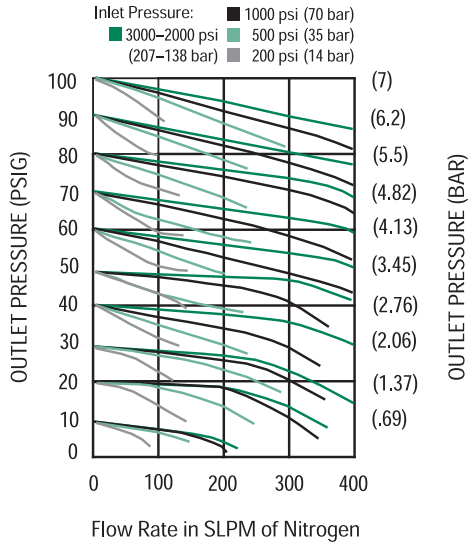
ENGINEERING DATA — SERIES AP 1500 TIED DIAPHRAGM REGULATOR

ULTRACLEAN TECHNOLOGY BACKED BY SERVICE AND SUPPORT

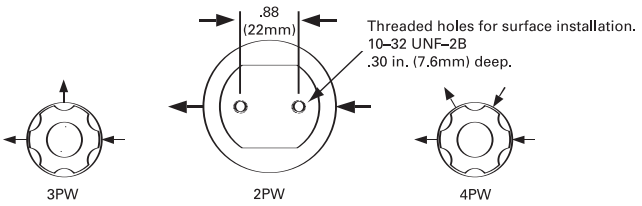
DIMENSIONAL INFORMATION

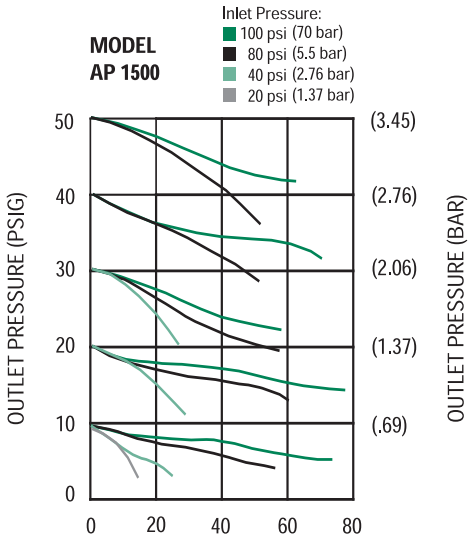


All dimensions in inches (mm). Metric dimensions are for reference only.



PORTING CONFIGURATIONS





ORDERING INFORMATION

Sample Order Number **AP 1510SM 4PW FV4 FV4 40 1 P**

AP 1510 | Series

AP 1502 = 1-30 psig (.07 to 2 bar)
AP 1506 = 2-60 psig (.14 to 4 bar)
AP 1510 = 2-100 psig (.14 to 7 bar)

S | Material

S = Stainless steel (SS)
SH = SS/Hastelloy internals
H = Hastelloy alloy C-22

M | Surface Finish Options

M = 10 µin. Ra max
V = 7 µin. Ra max
X = 5 µin. Ra max

4PW | Ports

2PW = 2 ports butt weld
3PW = 3 ports butt weld
4PW = 4 ports butt weld

FV4 FV4 | Connections Inlet / Outlet

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

Tube weld stub available

40 1 | Gauges* Source / Delivery

0 = No gauge
V3 = 30-0-30 psig/bar
L = 30-0-60 psig/bar
1 = 30-0-100 psig/bar
2 = 0-200 psig/bar
4 = 0-400 psig/bar
10 = 0-1000 psig/bar
40 = 0-4000 psig/bar

* Standard gauge ports are 1/4 inch face seal male (1/4 inch female available).

P | Options

P = Panel installation**
VS = Vespel seat

** On panel mount option, bonnet port is not threaded. Panel hole 1.56″ diameter.