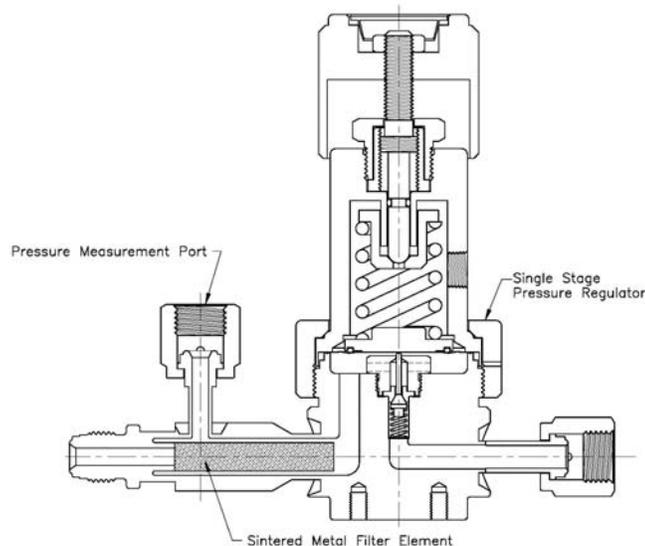


FR Series Filter Pressure Regulator Integrated Gas Stick

- **UHP Pressure Regulator**
AP 1000 and SL 5200 Series
Single Stage Line Regulator
- **All metal filter**
>99.9999999% retention of particles >0.003 μm up to 10 slpm
Filter element: nickel standard / stainless steel optional
- **Transducer or gauge port**
Downstream of regulator, upstream of filter



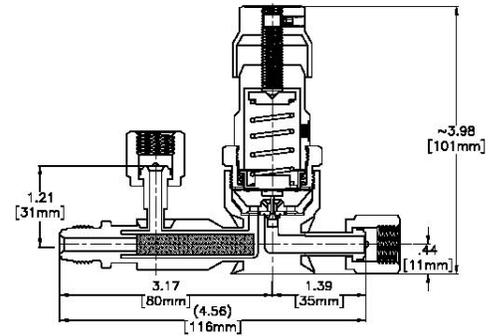
INTEGRATED MODULE

FILTER ~ PRESSURE REGULATOR ~ SENSOR PORT

FR Series Size Comparison

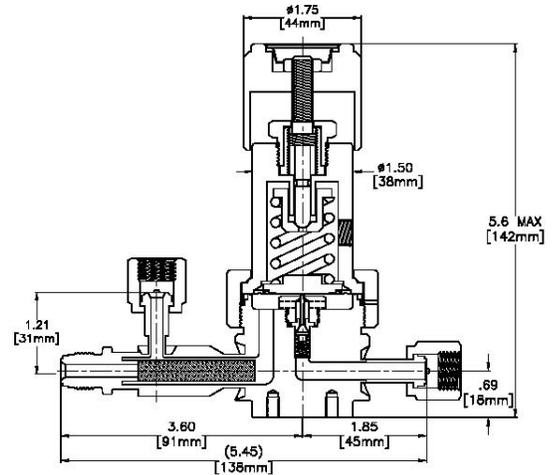
FR 5200

- 4.56 inch face to face
- Equivalent size to 3 IGS or surface mount components
- Gauge must be 1.5 inches or smaller in diameter



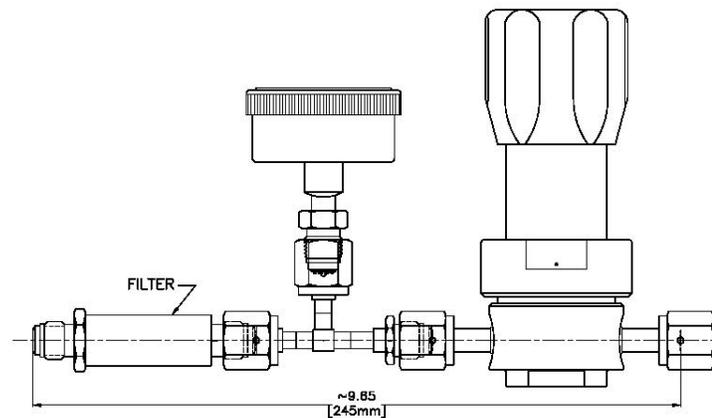
FR 1000

- 5.45 inch face to face
- Gauge must be 1.5 inches or smaller in diameter



Traditional Design Regulator – Sensor Tee – Filter

- 9.65 inch face to face



Important Note:

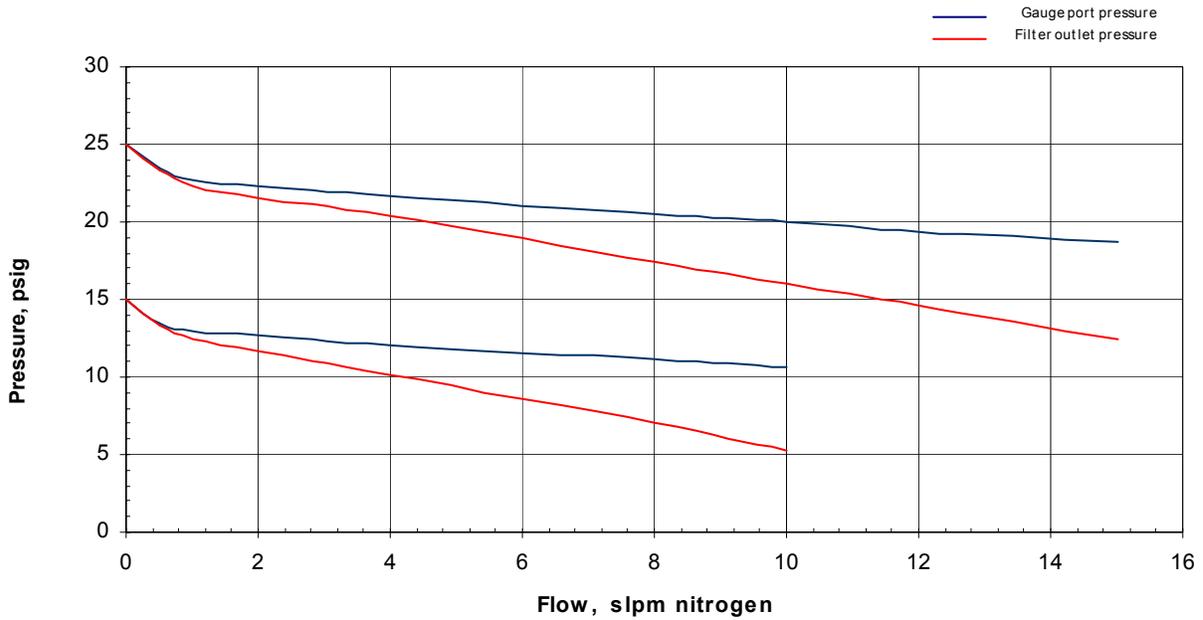
Appropriate materials of construction must be selected for the application. Please insure that the filter element, seat and trim are compatible with the media. Please consult your local representative or the factory if in doubt.

Modular Solution

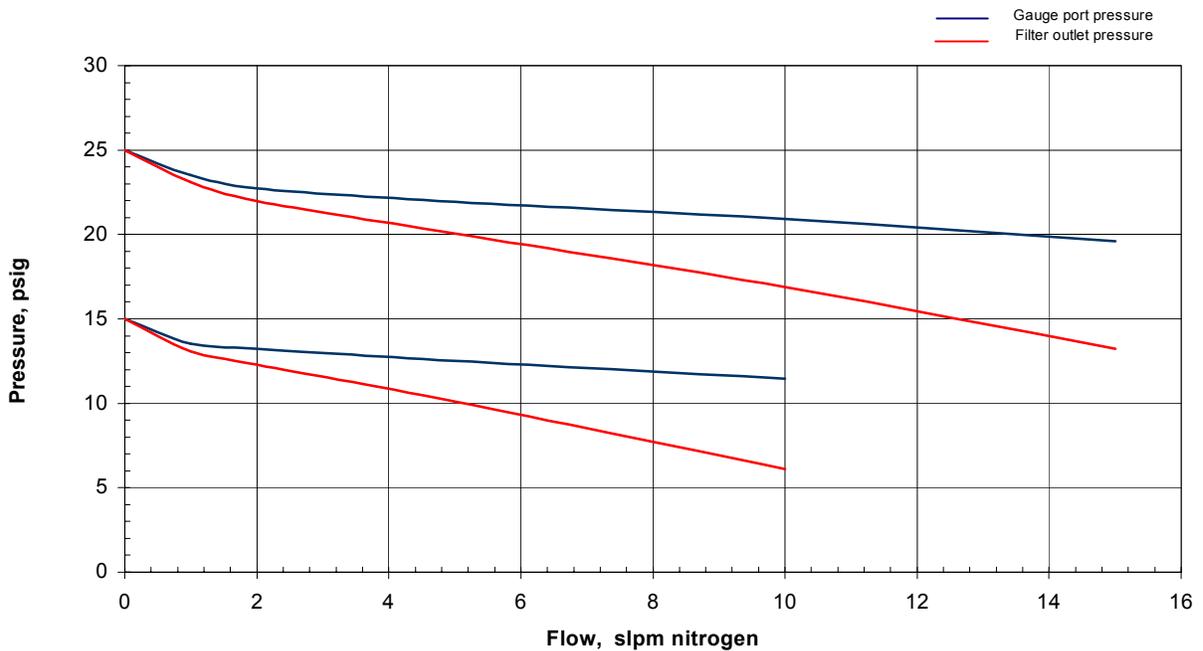
The FR Series integrates the three most critical point-of-use delivery components into one compact package ~ pressure regulator, pressure measurement, and filter. The footprint of the FR is the same as that achieved with surface mount technology but with far fewer mechanical joints and associated seals to atmosphere. Compared to traditional face seal stick assemblies, the FR series consumes only half the space as graphically illustrated above. This is the product of choice for VMB, VMP, and virtually all low flow point-of-use applications.

FR Flow Curves – gauge vs filter outlet pressure

FR5206SM 3PW FV4 MV4 FV4
Flow Curve at 50 psig Inlet Pressure



FR1010SM 3PW FV4 MV4 FV4
Flow Curve at 50 psig Inlet Pressure



Products by AP Tech

AP Tech manufactures a wide array of products exclusively for the semiconductor industry. Pressure regulators, valves, check valves and a variety of flow devices are available for applications ranging from the source cylinder cabinet, and bulk delivery systems through point-of-use including VMB distribution boxes and process tool gas trays. Products can be tailored for specific needs with custom fittings, dimensions, porting or testing with an option of multiport, monoblock or surface mount configurations.

Engineering data – Series FR Operating parameters

FR 1000

FR 5200

Source Pressure	Vacuum to 3500 psig (241 bar)	Vacuum to 150 psig (10 bar)
Delivery pressure (FR 5201A)	N/A	100mm Hg absolute to 10 psig (0.7 bar)
Delivery pressure (FR 1002 / FR 5202)	1 to 30 psig (0.07 to 2 bar)	0.5 to 30 psig (0.035 to 2 bar)
Delivery pressure (FR 1006 / FR 5606)	2 to 60 psig (0.14 to 4 bar)	1 to 60 psig (0.14 to 4 bar)
Delivery pressure (FR 1010 / FR 5010)	2 to 100 psig (0.14 to 7 bar)	1 to 100 psig (0.07 to 7 bar)
Proof pressure	5,000 psig (345 bar)	500 psig (35 bar)
Burst pressure	10,000 psig (690 bar)	1,000 psig (70 bar)

Other parameters

Inlet port connectors	¼ inch face seal	¼ inch face seal
Outlet port connectors	¼ inch male face seal fixed	¼ inch male face seal fixed
Gauge port connectors	¼ inch face seal	¼ inch face seal
Actuation/relief port	1/8 inch NPT	Vent port only
Flow coefficient (Cv)	0.09 (regulator)	0.07 (regulator)
Internal volume	0.73 in ³ (11.9 cm ³)	0.48 in ³ (7.8 cm ³)
Operating temperature	-40° to +160°F (-40° to +71°C)	-40° to +160°F (-40° to +71°C)
Surface finish	10µin. (0.25µm) standard	10µin. (0.25µm) standard
Inboard leakage	2 x 10 ⁻¹⁰ sccs	2 x 10 ⁻¹⁰ sccs
Outboard leakage	2 x 10 ⁻⁹ sccs He at 1500 psig inlet pressure	2 x 10 ⁻⁹ sccs He at 100 psig inlet
Leakage across seat	4 x 10 ⁻⁸ sccs He at 1000 psig inlet pressure	4 x 10 ⁻⁸ sccs He at 100 psig inlet
Delivery pressure rise	0.25 psig per 100 psig source pressure drop	0.20 per 20 psig source pressure drop

Materials

Type of service	Series FR S Noncorrosive	Series FR SH Corrosive
Wetted Parts		
Body	Stainless steel 316L secondary remelt	Stainless steel 316L secondary remelt
Poppet, nozzle, diaphragm	Stainless steel 316L	Hastelloy® alloy C-22
Finish	Electropolished and passivated	Electropolished and passivated
Seat	PCTFE (Vespel® optional)	PCTFE
Filter	Nickel (Stainless steel optional)	Nickel (Stainless steel optional)

All specifications subject to change without notice

Vespel® DuPont
Hastelloy® Haynes Corporation

Cleaning and packaging

Cleaning is a multi-step process performed in a Class 100 clean room. Parts are ultrasonically cleaned with a wetting agent initially and then progressively with hot and cold DI water. Cleaned parts are then blown dry with ultra pure nitrogen prior to being baked completely dry in a nitrogen atmosphere.

Each regulator is then individually assembled, pressure tested, functionally tested and helium leak tested. Labels, including a unique serial number, are installed prior to products being double packaged under ultra pure nitrogen.

ORDERING INFORMATION

FR 10 FR 52	10 Range	SM Material	FV4 Inlet	MV4 Connections Outlet	FV4 Gauge	VS Option SS = Stainless steel filter element VS = Vespel seat 0 = No gauge V3 = 30-0-30 psig/bar gauge* L = 30-0-60 psig/bar gauge* 1 = 30-0-100 psig/bar gauge* <small>* If a gauge is specified, gauge port must be FV4</small>
			Inlet/Gauge FV4 = ¼ inch face seal female MV4 = ¼ inch face seal male Outlet MV4 = ¼ inch face seal male			
01A = 100mm Hg 10 psig (.7 bar) (FR 5200 only) 02 = 1 – 30 psig (.07 - 2 bar) 06 = 2 – 60 psig (.14 – 4 bar) 10 = 2 – 100 psig (.14 – 7 bar)		SM = Stainless steel / 10 Ra Max SHM = Stainless steel with Hastelloy® internals / 10 Ra Max				