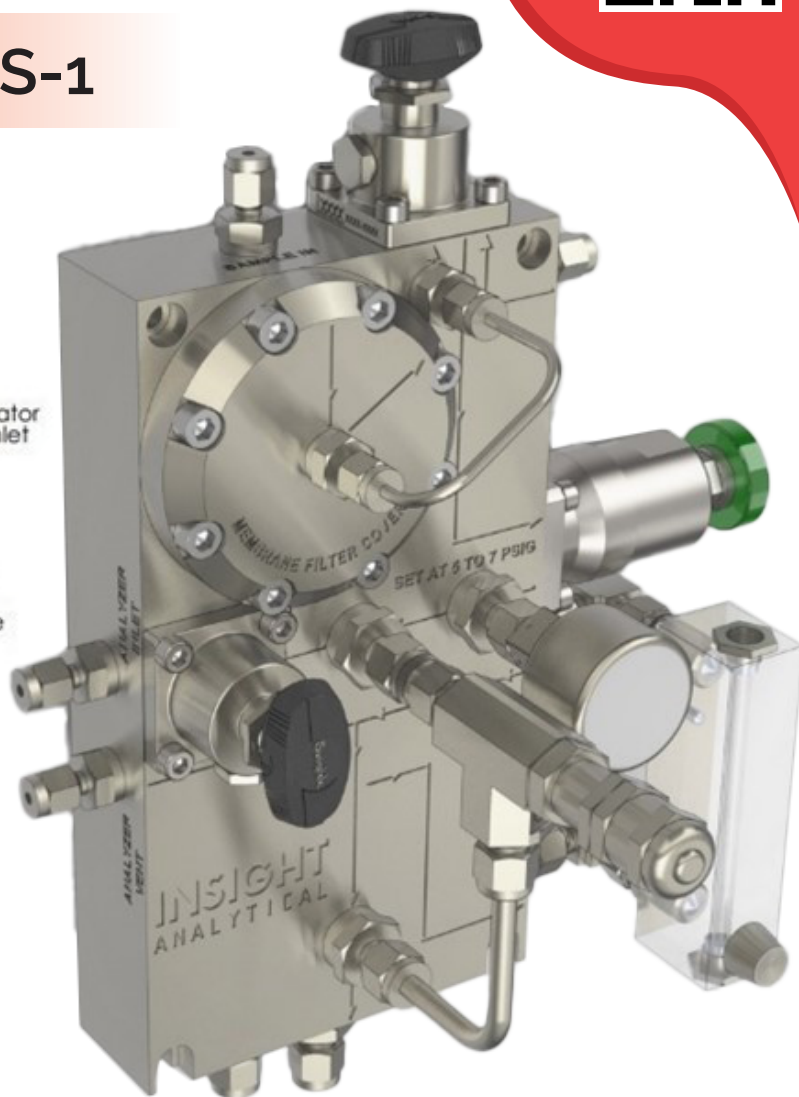
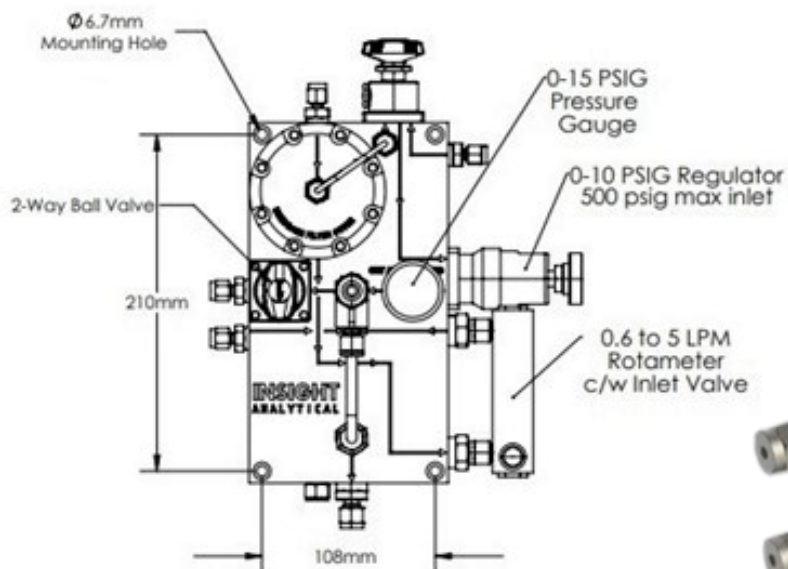




Fast Sample System FSS-1



The Insight Analytical Type 1 Sample System Block (Patent Pending) is a self-contained sample conditioning system for gas analyzers built into a compact machined block that can be used with either portable or fixed gas analyzers.

Field of Application:

Most gas analyzers will only work reliably and provide accurate measurements with clean, dry, non-corrosive samples delivered within their design conditions for temperature, pressure, and flow rate, so analyzers making measurements of chemical composition or physical properties on samples extracted from processes require some form of sample conditioning system. The functions of basic sample systems typically include at least the following: filtration, pressure regulation, a method of introducing calibration gases, and maintaining the safety of the system which may require limiting the maximum pressure in the event of a pressure regulator failure for applications with analyzers with low pressure ratings. Some sample systems may also require some form of flow control when being used with a gas analyzer that does not have internal flow control and possibly more sophisticated processing such as condensing liquids.

A well-designed sample system will accomplish these functions while meeting the requirements for timeliness (required speed of response time), accuracy, and other requirements of the analysis system, and optimizing the balance between meeting the above performance factors with the cost of the equipment, installation, operation, and maintenance which are inherent in any analyzer system installation.



The Type 1 Sample System Block is intended for use in gas phase applications where condensing of liquids is not required and includes the best features of both conventional sample systems built from discrete sample conditioning components and SP76/NeSSI substrate style systems. Most of the fittings in this system are made with o-ring type Swagelok fittings rather than NPT threads to reduce the possibility of leaks – the only NPT threads in the system are on the pressure gauge and rotameter connections.

A 2"/50mm diameter membrane filter built into the machined block with proprietary geometry to both reduce the internal volume and increase the mixing compared to other commercially available designs, with the result being significantly faster response time without compromising the effectiveness of the filtering.

The standard version is configured for use with analyzers such as gas chromatographs or other analyzers that require clean, dry sample gas delivered at pressure just above atmospheric and that have their own internal flow control. Alternate versions of this system are available with the 2-way shut off valve replaced with a metering valve for flow control and an additional rotameter added to the vent for applications with analyzers requiring external flow control.

Advantages:

- More economical than SP76/NeSSI style sample systems but with better performance.
- More compact than sample systems using conventional discrete components connected with tubing.
- It has no electrical components, so it is suitable to be used in explosive gas atmospheres, such as natural gas plants or metering stations without additional certifications.
- Easier to work on and understand than SP76/NeSSI style sample systems.
- Incorporates a larger diameter membrane filter than SP76/NeSSI style systems can accommodate and the novel geometry inside of the membrane filter results in faster response time than conventional membrane filter housings.
- Reduces the likelihood of gas leaks because of reduced connections and replacing NPT/sealant type connections with o-ring seals.
- Reduced issues with contamination from liquid thread sealant.
- Reduced issues with thread galling which is common with NPT threads – increased life for fittings, components, and other connections because of the reduction in the use of NPT threads.
- Low internal volume of passages in machined block and seamless connections between components results in faster response time than either conventional or SP76 based systems.
- Area and mass of the machined aluminum block increases heat transfer to the SP76 type pressure regulator which helps to counter the cooling created by the Joule-Thomson effect, thereby keeping the pressure reduction closer to isothermal conditions compared to conventional or SP76 based systems without actively heated pressure regulators.
- Faster response time for a given sample flow rate means that lower sample flow rates can be used for a given sample response time resulting in lower fugitive/engineered emissions.
- Modular nature of system means it is possible to replace the entire system with a spare and perform repair/maintenance in the shop rather than in the field, resulting in less downtime.
- Use of electroless nickel plating on the machined aluminum block provides a hard, corrosion resistant and inert surface while still providing the advantages of aluminum including high thermal conductivity, light weight and reasonable cost.

Technical Specifications

Maximum Inlet Pressure Rating	100 psig (690 kPag) for standard system, up to 1000 psig (6895 kPag) rating upon request
Temperature Range	-6°C to 65°C
Delivery Pressure Range	0 to 10 psig (0 to 69 kPag) for standard system, higher delivery pressure ranges available upon request
Flow Rate Range	See Figure 3
Filter Drain Rotameter Material and Range	Acrylic rotameter body, 0 to 2 NLPM Air Calibration, other ranges available
Inlet and Outlet Connection Size	1/8" Tube Swagelok Compression Fitting for inlet and analyzer connections, 1/4" Tube Vent Fitting
Pressure Relief Valve	Swagelok SS-RL3S4 Relief Valve set at 12 psig (83 kPag)
Wetted Materials	Electroless Nickel Plated Aluminum and 316 Stainless Steel, FKM o-rings. Other o-ring material options available
NACE compliance	NACE MR0175/ISO 15156 and MR0103 Compliant.

Figure 1 – Fast Sample System FSS-1 General Arrangement Drawing

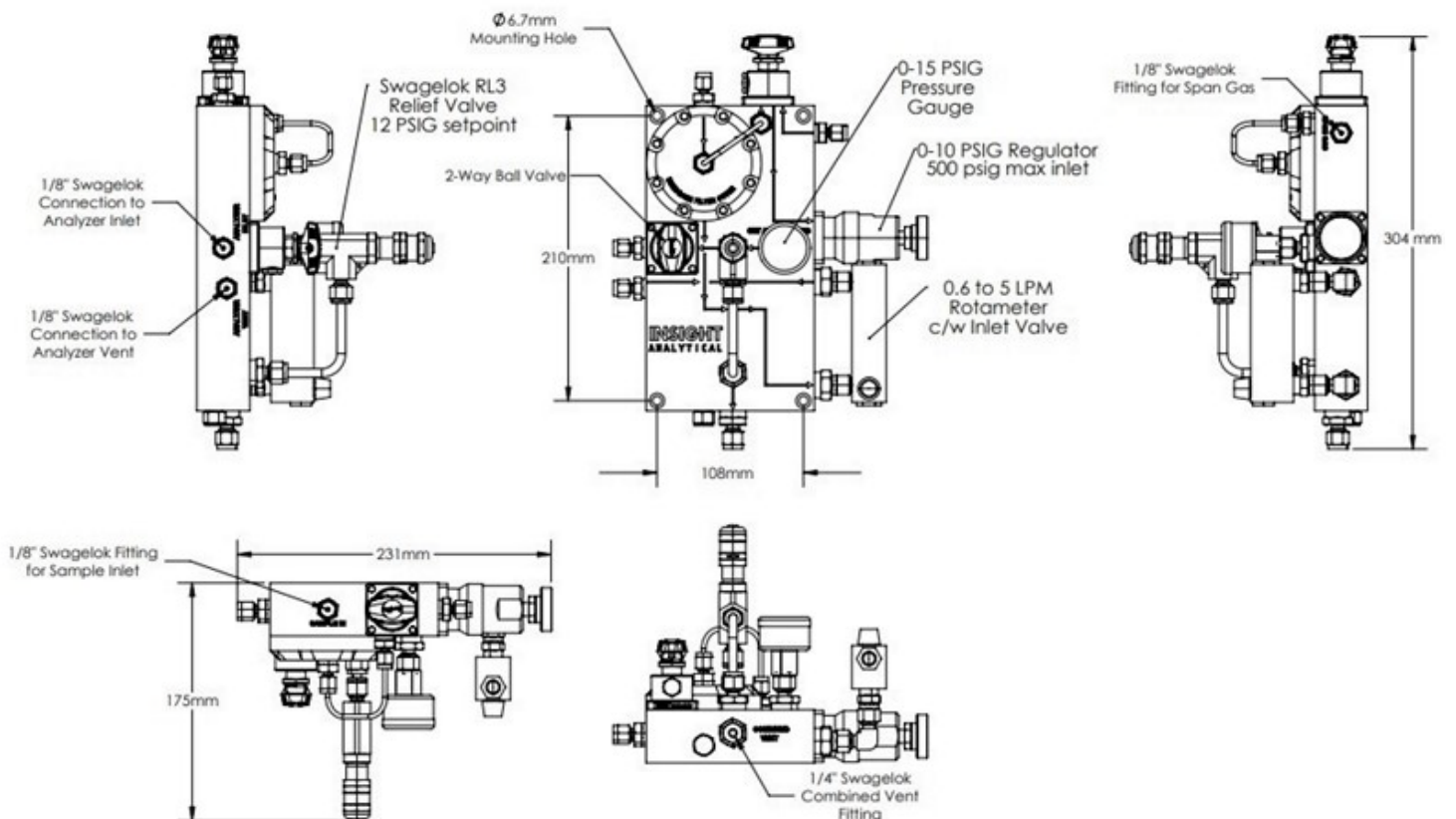


Figure 2 – Flow Schematic for Fast Sample System FSS-1 Standard Version

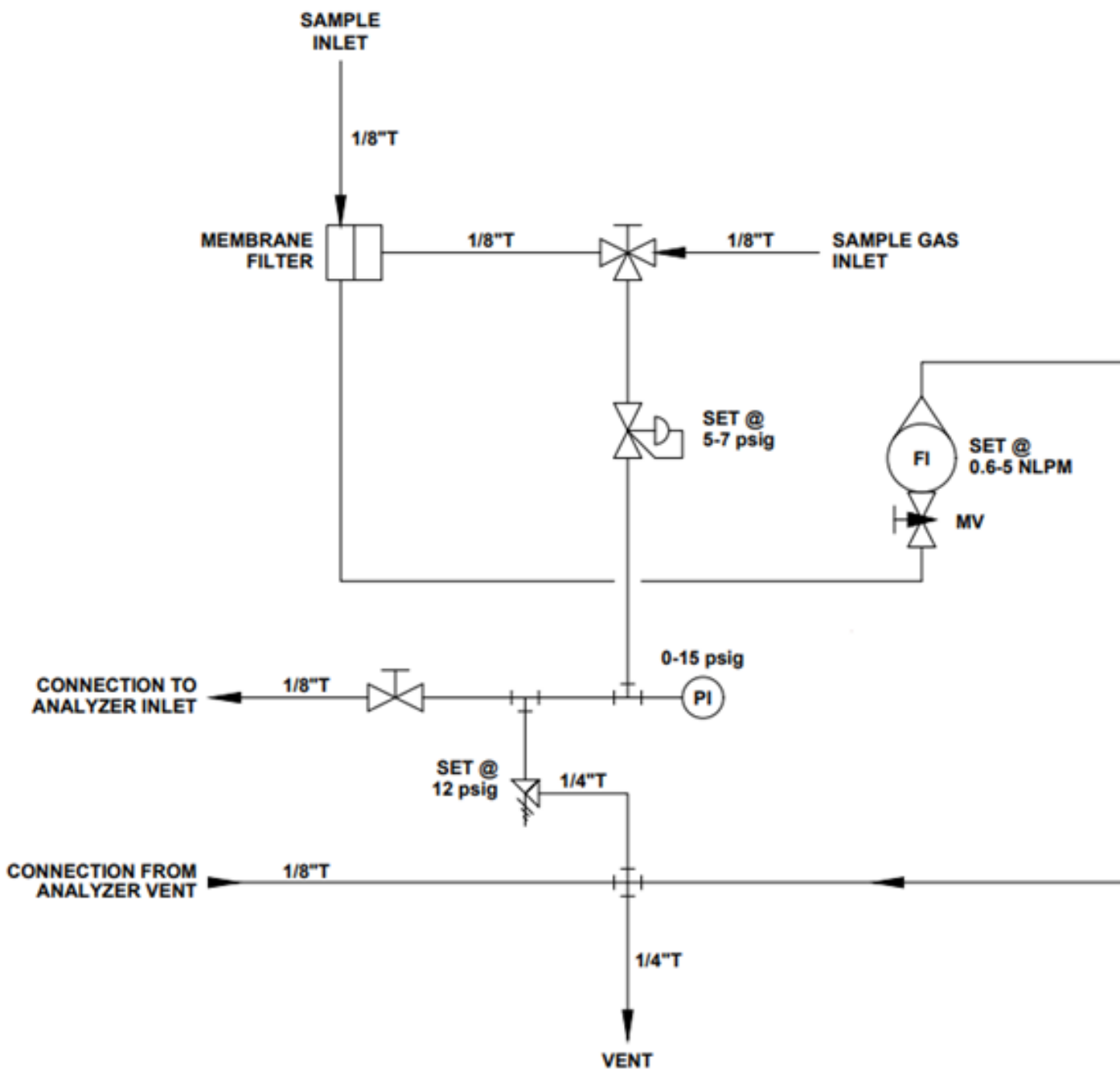


Figure 3 – Maximum Recommended Sample Flowrates Thru Membrane Filter

