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Parker Vent Master

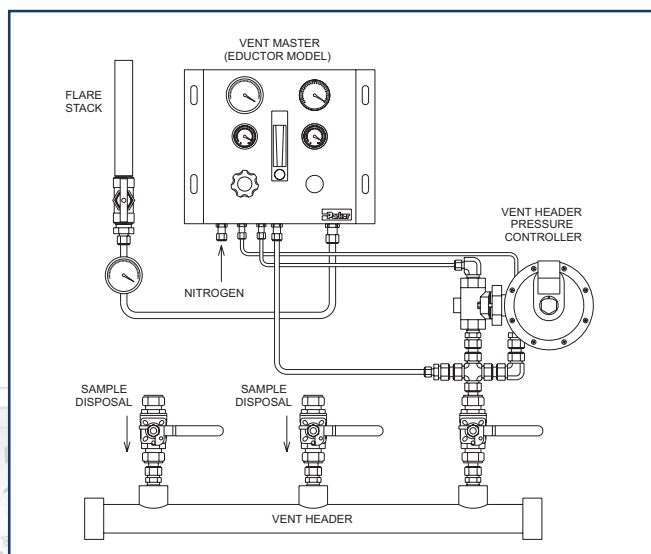
*Bulletin 4142-VM
September 2004*



Introduction

Sample streams discharged from process analyzers have historically been vented to atmosphere for disposal. This method is not only convenient, but also provides a very stable reference pressure necessary to insure accurate and repeatable analysis results. As environmental legislation becomes more stringent, sample discharge to atmosphere is no longer allowable in many cases and analyzer engineers must choose an alternate method. Catalytic burners offer one alternative, however they do not completely eliminate emissions, have a limited flow capacity and require frequent maintenance. Discharge to a vent header that subsequently feeds a flare header and stack offers another choice, but the dynamic nature of the header is not conducive to pressure stability which compromises analysis accuracy. Complex vent systems installed plant-wide are also available, but they are highly engineered and expensive to install.

The Parker Vent Master is a totally mechanical integrated solution that actually creates a stable pressure within the vent header within 0.3" H₂O. Test results prove the Vent Master provides analysis accuracy within 0.06% over a vent header flow range of 0-18 SLPM with a flare header back pressure as high as 20 psig.



Theory of Operation

The Vent Master is comprised of regulators, gauges, a rotometer and an eductor assembled in a compact panel for ease of operation and installation. A separate Pressure Controller is mounted directly to the vent header providing a constant flow of N₂ to the header at a rate sufficient to maintain a constant pressure of approximately 1" H₂O. As multiple analyzers dispose sample gas into the header by varying amounts, the Vent Master senses the header pressure and compensates to maintain a constant pressure regardless of discharge volume. The Vent Master also isolates the vent header from Flare Header pressure fluctuations up to 20 psig with test results indicating stability within 0.3" H₂O.



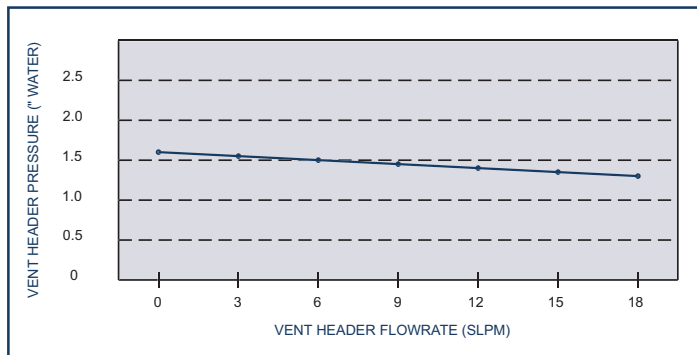
Image courtesy of ABB

Performance

Maximum Vent Header Discharge Volume: 18 SLPM

Maximum Flare Backpressure: 20 psig

Achieved % Error: 0.06%



Vent Master Summary

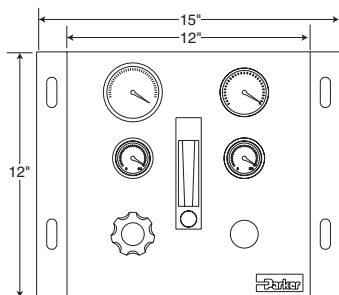
- Simple solution to achieve environmental compliance
- Eliminate costly catalyst procurement, replacement labor and disposal
- Maintains analyzer data integrity during plant upset conditions
- Minimizes N₂ consumption on Eductor models with the Economizer Circuit
- Compact package, easy to install and operate
- Pre-engineered, easy startup and commission steps
- No maintenance required



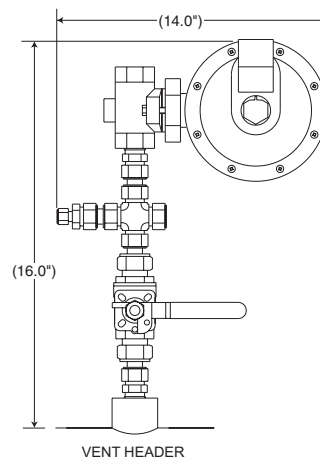
Parker Vent Master



**Vent Master
(all models)**



**Vent Header Pressure Controller
(isolation valve not included)**



Design Options & How to Order

VENT-MASTER-EDR-xx (see layout, below left)

The EDR model employs an eductor, sized to accommodate maximum flow rates of 0-6, 0-12 or 0-18 SLPM vent header flow rates with a worst-case flare header back pressure of 20 psig. All EDR models incorporate a unique economizer circuit that conserves N_2 consumption when header back pressure conditions are low by reducing the eductor motive force flow to the amount necessary to maintain minimum vacuum on the eductor suction. Specify eductor flow range by choosing one of the following suffixes on the part number:

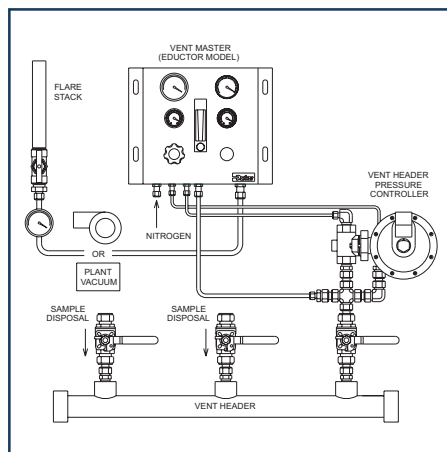
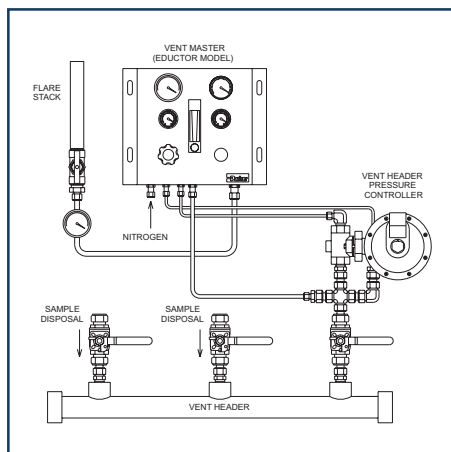
06 = 0-6 SLPM, 12 = 1- 12 SLPM, 18 = 0-18 SLPM. (Example: VENT MASTER-EDR-18)

VENT MASTER-PMP (see layout, below right)

The PMP model is designed for use in applications where a sample pump is already in place.

VENT-MASTER-NPE (see layout, below right)

The NPE model is designed for use in applications where a plant vacuum source is available.



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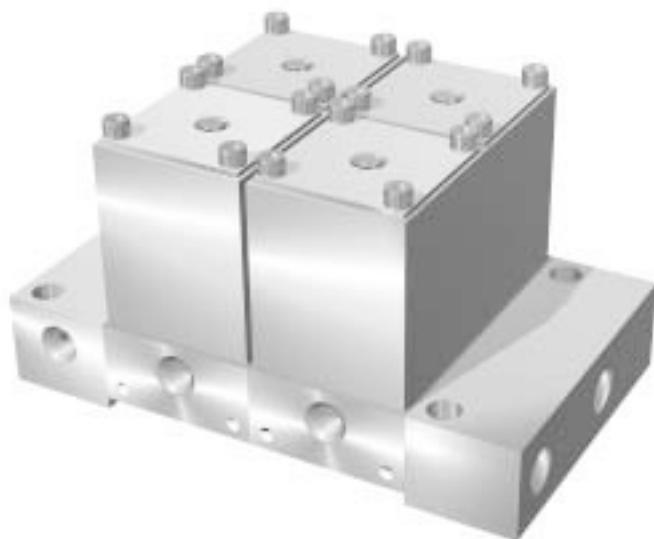
*Bulletin 4145-IS
August 2002*

Parker Instrumentation Valve Division specializes in designing and building the valves and systems you need to meet the special requirements and exacting specifications of the applications in your plant and your process.

Getting that done means applying some advanced expertise and sophisticated capabilities. We have already manufactured valves for literally every instrumentation application and have specialty valving and equipment serving dependably around the world.

All that expertise is ready now to apply to your own special needs. Whenever you need anything in the following categories – and especially when you need something beyond – call us.

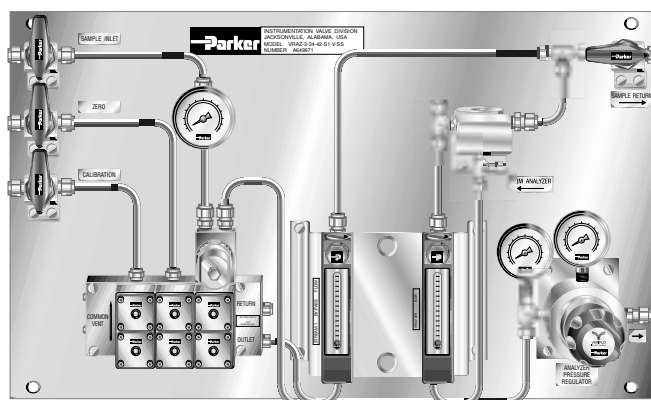
- Instrumentation Valve Assemblies
- Sample Loops
- Recovery Systems
- Stream Switches
- Manifolds
- Surface Mount Systems



Stream Switching System

TECNI-AR

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Analyzer Pressure Regulation and Vent Recovery System

All our resources apply to meeting your specifications

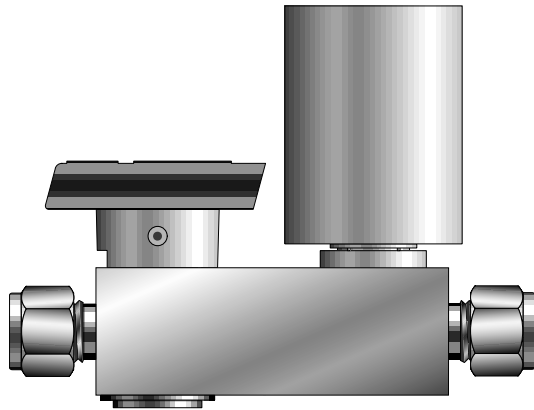
Our facilities are completely equipped to handle your standard and special needs – rapidly, responsively, and reliably. We have assembled all the necessary CNC machining centers, CNC lathes, secondary machines, chemical finishing, QA equipment, and assembly / test / packaging capabilities in one location. We have also created partnerships with our subcontractors to assist us in meeting your specifications.

Custom responses to special challenges

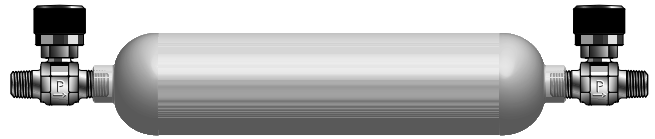
We welcome the challenge of designing, engineering, and manufacturing cost-effective and reliable solutions to your special process and equipment problems. When you need to contain or control process fluids...and particularly when standard devices and stock answers aren't the real solution – call us. Our responses have already included a wide variety of systems – from a simple sample loop with two needle valves and a sample cylinder to sophisticated control systems such as the vent recovery system pictured above.

Instrumentation Systems

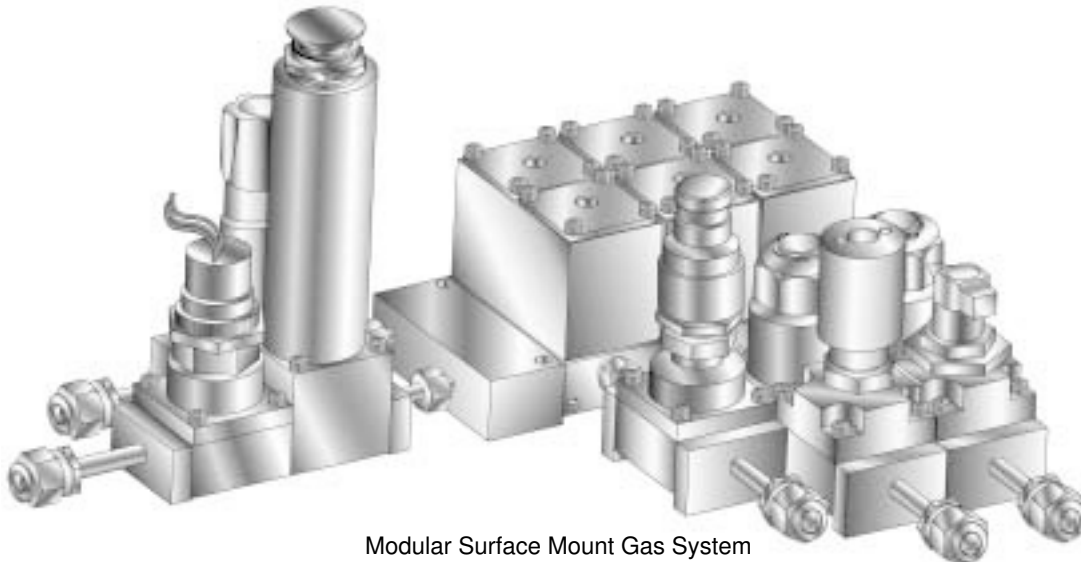
Custom Responses



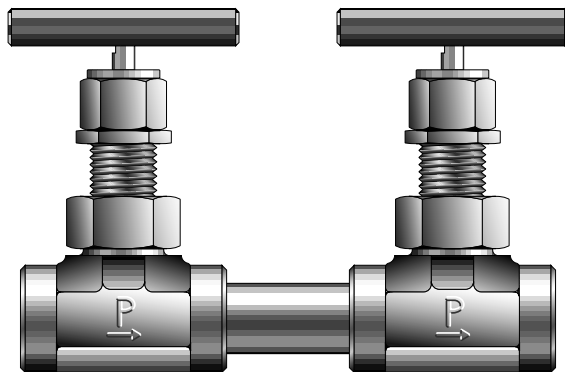
Valve and Flow Sensor Manifold



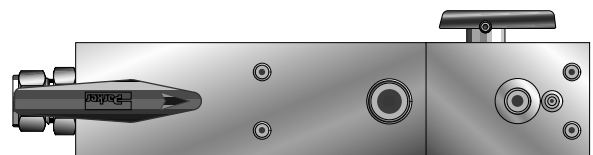
Sample Loop



Modular Surface Mount Gas System
with Stream Switching



Needle Valve Assembly



Compressed Natural Gas Vehicle Fueling Manifold



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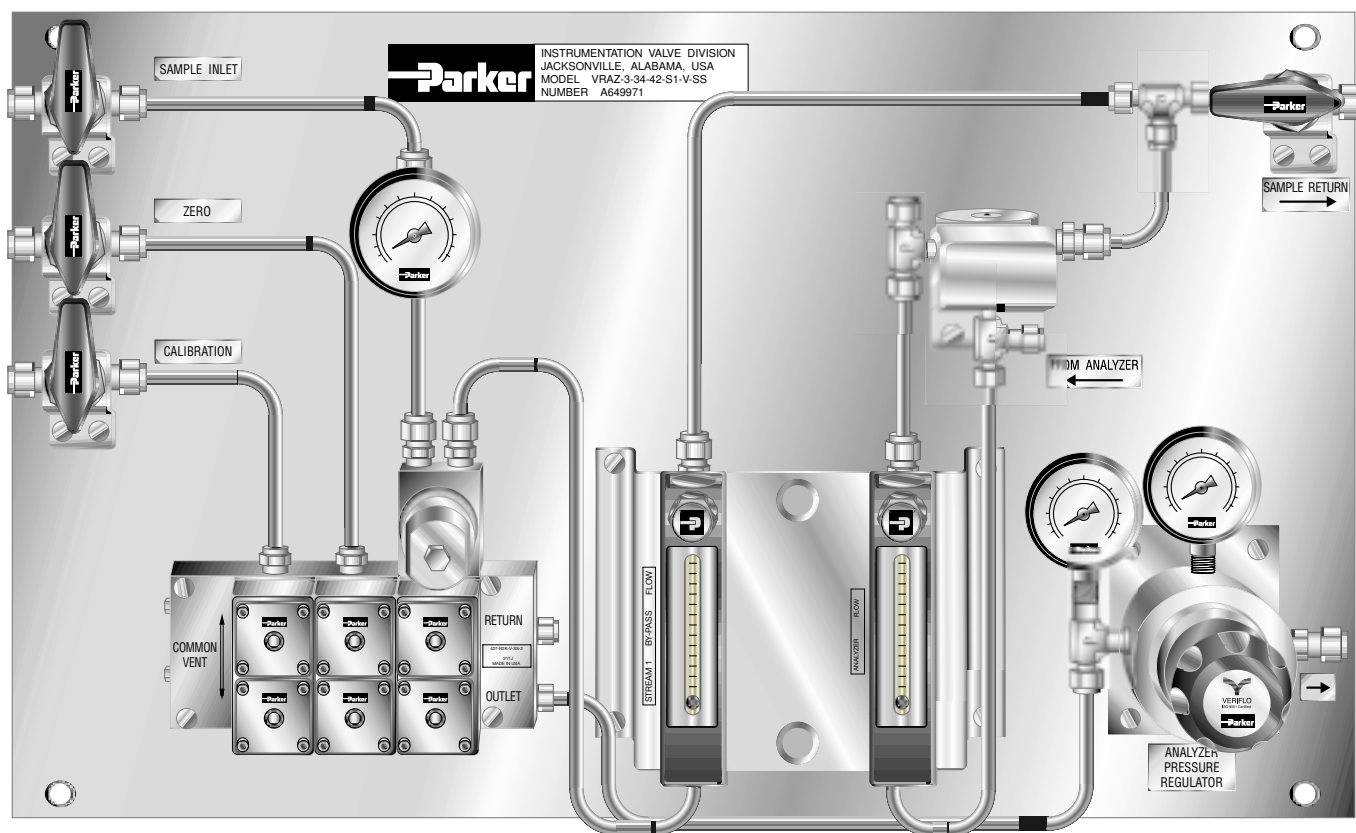
Bulletin 4145-IS, 5M, 08/02

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Analyzer Pressure Regulation and Vent Recovery System

*Bulletin 4141-VR
November 2001*



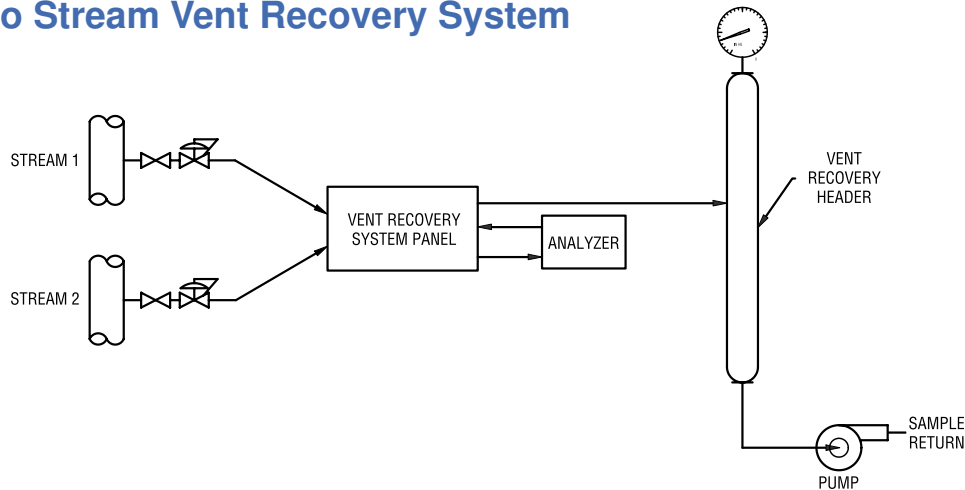
Model Shown: VRAZ3-01-22-DX-V-SS

Unparalleled pressure and flow stability

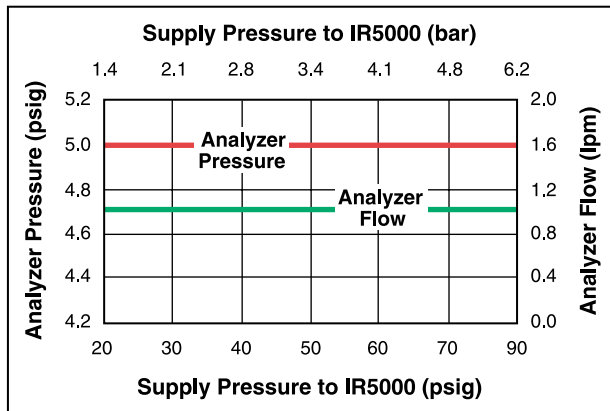
The Parker Analyzer Pressure Regulation and Vent Recovery System automatically and continuously adjusts for variations in gas supply pressures and flows. This system has been engineered to meet the requirement of continuous analyzers designed to operate at constant pressure in order to provide accurate analyses of gases. The combination of pressure and flow regulation provides the required stability even with greatly varying inlet and outlet pressures.

Analyzer Pressure Regulation and Vent Recovery System

Typical Two Stream Vent Recovery System

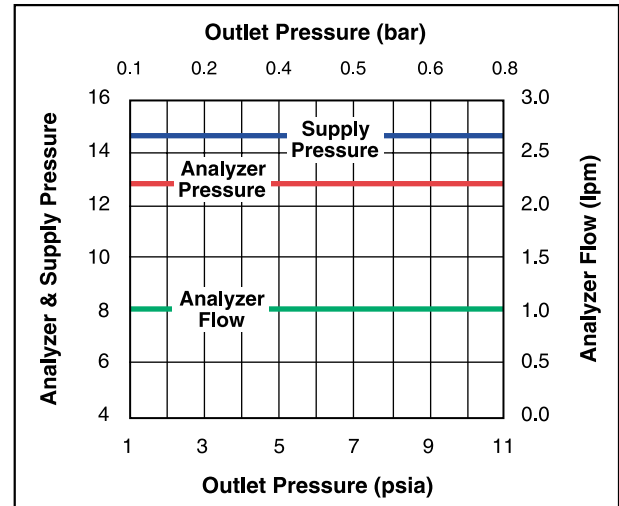


Performance Example 1 - Varying Inlet Pressure with Constant Outlet Pressure



Analyzer Pressure set to 5 psig (0.3 bar);
Supply Pressure varied from 20 to 90 psig (1.4 to 6.2 bar)

Performance Example 2 - Varying Outlet Pressure with Constant Inlet Pressure



Analyzer Pressure set to 12.7 psia (0.87 bar);
Supply Pressure set to 14.5 psia (1.01 bar);
Outlet Pressure varied from 1 to 11 psia (0.07 to 0.76 bar)

Options

By-pass Filter - Approximately 90% of the inlet flow by-passes the cartridge filter and exists the filter bowl. This provides three benefits: 1) It reduces the transport time of the sample stream from the process line to the analyzer; 2) Provides a continuous flushing action on the filter element; and, 3) The life of the filter element is greatly extended since only a small percentage of the flow is filtered - and only when the stream is selected for analysis.

Manual Stream Switching - The *R-Max™* Stream Switching System is replaced with two-way and three-way MB Series manual Ball Valves. The optional By-pass Filter(s), if ordered, is mounted as a stand-alone unit downstream of the sample inlet MB Series manual Ball Valve(s).

Integral Aspirator - A Parker VC Vacuum Generator is added between the Flow Controller and MB Series Ball Valve on the Sample Return line. A Parker IR4000 Pressure Regulator is also added to control the vacuum generated.

Filter Purge Valve - A three-way MB Series manual Ball Valve is placed upstream of the Filter to enable switching between sample and purge gas.

Aspirator and Filter Purge Valve - Adds both the Integral Aspirator and the Filter Purge components to the panel.

Analyzer Pressure Regulation and Vent Recovery System

How to Order

System Series

VRA = Automatic Stream Switch
VRM = Manual Stream Switch

System Options

A = Integral Aspirator
B = Filter Purge Valve
C = Aspirator & Filter Purge Valve
Z = None of the above

Number of Streams

3 = Three
4 = Four

Inlet Pressure Gauge

0 = 30 psig
1 = 60 psig
2 = 100 psig
3 = 200 psig

Pressure Regulator

0 = 0 - 5 psig
1 = 1 - 30 psig
2 = 1 - 60 psig
3 = 2 - 100 psig
4 = 2 - 250 psig

* Systems without a By-pass Filter will have a Tee branching from the Sample Stream Switch inlet to the By-pass Flowmeter.

Component Materials

SS = Stainless Steel

Seal Material

V = Fluorocarbon Rubber

By-pass Filter

0 - No Filter*
S5 - 5 Micron Sintered Metal
S1 - 10 Micron Sintered Metal
S2 - 20 Micron Sintered Metal
S4 - 40 Micron Sintered Metal
S7 - 70 Micron Sintered Metal
S0 - 100 Micron Sintered Metal
DQ - 93% Microfibre @ 0.01 Micron
DX - 99.99% Microfibre @ 0.01 Micron

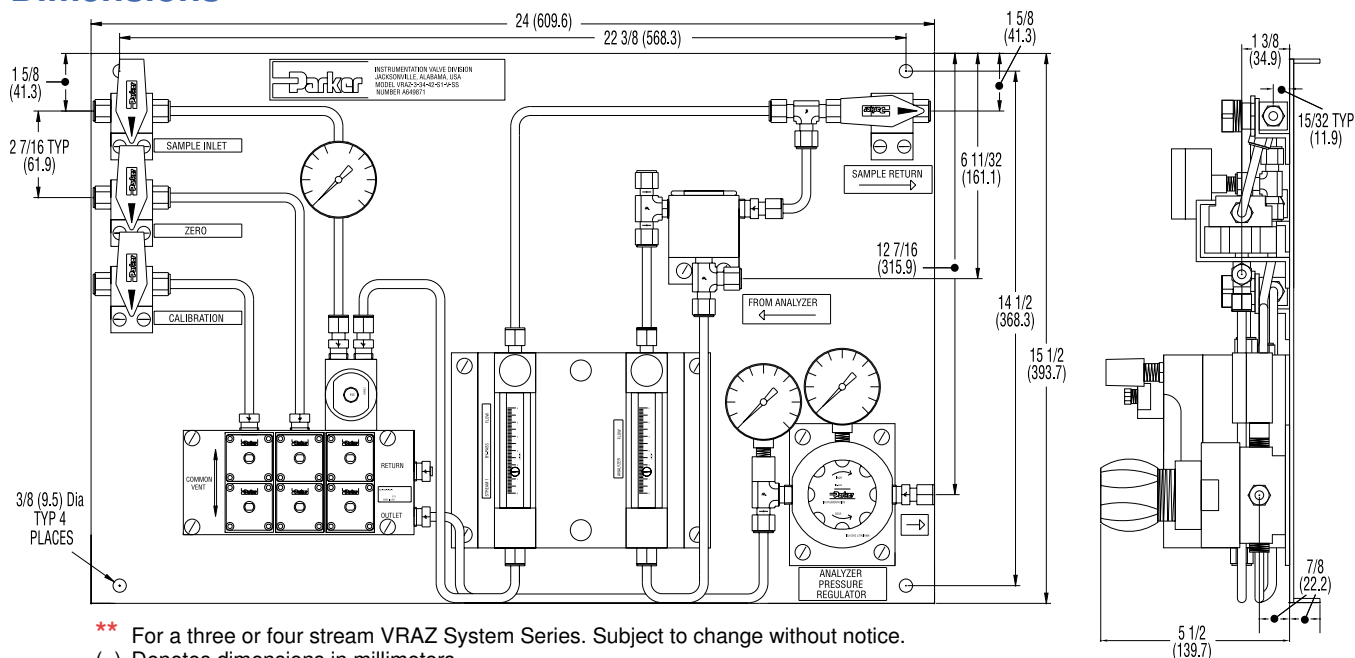
Analyzer Flowmeter Range (LPM)

0 = 0 - 2.2
2 = 0 - 4.5
4 = 0 - 6.1
6 = 0 - 10.7

By-pass Flowmeter Range (LPM)

0 = 0 - 2.2
2 = 0 - 4.5
4 = 0 - 6.1
6 = 0 - 10.7

Dimensions**



Parker
Instrumentation

Bulletin 4141-VR, 5M, 11/01

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