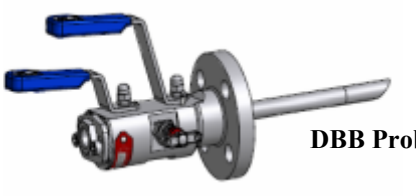
Parker – IPD Analytical Product Review

Gen II R-Max™, Vent Master™ and Intraflow™

Mike Cost – Senior Engineer Analytical Products

Analytical Products: The Big Picture (Chemical/Petrochemical)

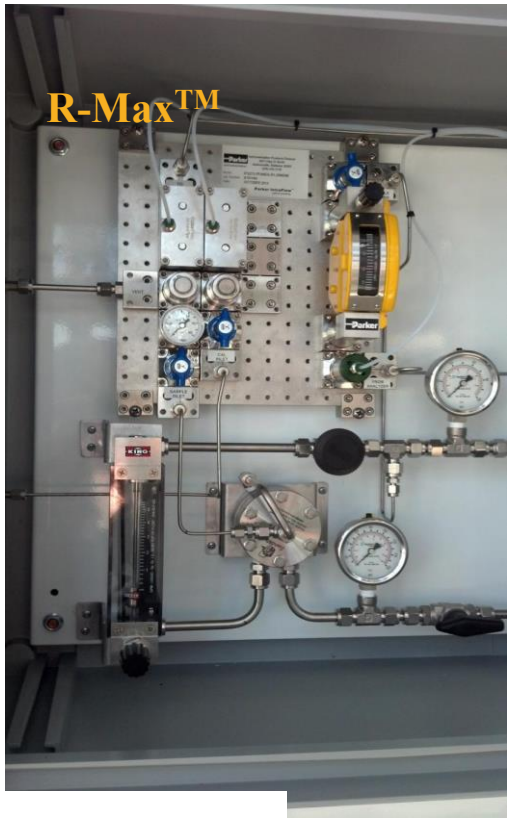


DBB Probe

Sample Extraction
Parker IPD/IPDE

Sample Transport
Heat Traced Tube Bundles

Sample Conditioning
IntraFlow™

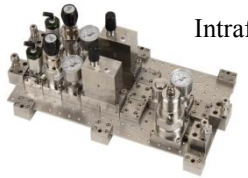


Process analysis requires efficient control of temperature, pressure and flow at all levels of analytical architecture

Key Products:

Gen II R-Max™ - analysis
Vent Master™ - pressure
Intraflow™ – heat/pressure/flow

Sample Disposal
Vent Master™



Intraflow™ Gas Blending

Change Over System
VFD / FY01

Parker

The package = IPD, Veriflo, Porter, IPDE

Parker Analytical Products: Controls for Process Analysis

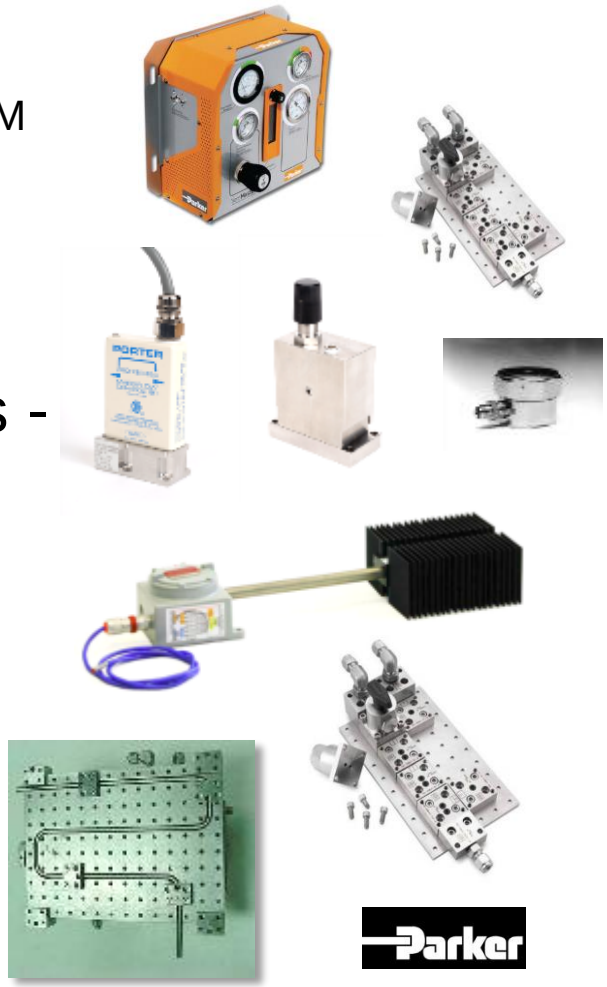
- Most important physical parameters for process analytical monitoring: Pressure, Flow and Temperature

How?

Pressure Control – Parker Vent Master™ or Vent Recovery architecture

Flow Control – Porter Mass Flow, Volumetric or SC423XL Flow Controllers - *Intralfow™*

Temperature Control – Intertec Smart Blocktherm or Varitherm Heaters, steam or fluid flow through pegboard, Veriflo Vaporizing Regulators - *Intraflow™*



Parker - IPD Analytical Products

- **Intraflow™ –** Sample conditioning and control
- **Gen II R-Max™ –** Stream selection, double-block and bleed function, single 3-way operations
- **Vent Master™ –** Sample disposal and pressure control
- *Volumetric Flow Controller (Intraflow™)*
- *Vaporizing Regulator (Intraflow™) – (Parker Veriflo)*

Parker – IPD: Analytical Products Installed Base

Parker Intraflow™ first modular platform installed for major grass roots project ExxonMobil SPT - Singapore

Parker Analytical Product Reach

Analytical, Flanged, Regulation, Flow Control, Valves and Fitting Products

Parker Intraflow™: Market Need?

Sample Conditioning Systems:

* Custom designed, engineered and built
* Lots of tubing/fittings
* Many man-hours designing/building it
* Lots of discrete components

Cost Issue – Irritates the Bean Counters

* Typically not Smart

(Smart = knowing if p,t,f of sample are normal, i.e. validating representative sample)

"Quality of Measurement Issue" - Credibility of analysis

Picture Courtesy
ExxonMobil Chemical

Control Parameter Platform: Intraflow™ Parker Modular Sampling System

ISA/ANSI SP76.00.02 Compliant

Same screw size throughout

Same plane flowpaths

Field connectors (top or end)

Mounting "Pegboard"

Slip-fit intra-fitting connectors

Maintenance can be done with one "tool"

- Design Drivers
  - Simplicity Overcomes Limitations

IntraFlow™ Fitting

IntraFlow™ System

•Design Drivers

- Simplicity Overcomes Limitations

Parker Tube Fitting

Conventional Sampling™ System

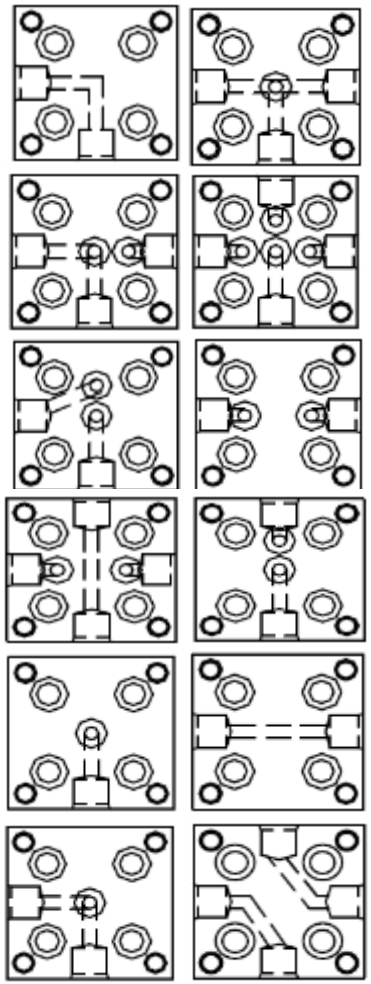
IntraFlow™ Fitting

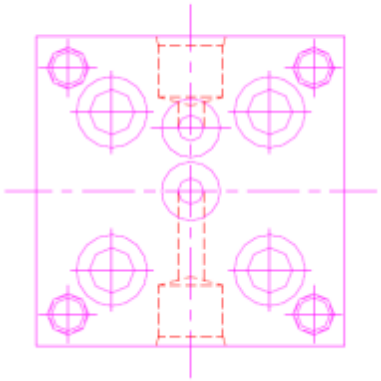
IntraFlow™ System

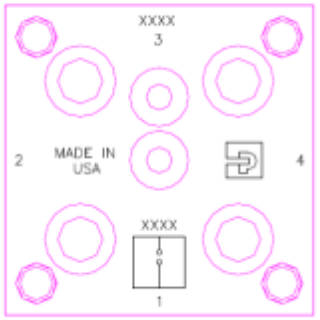
Intraflow™ Substrates/Flowpath Options:

The Library is Has Become Much Larger to Accommodate Laboratory and Process Applications (over 100 flow options)

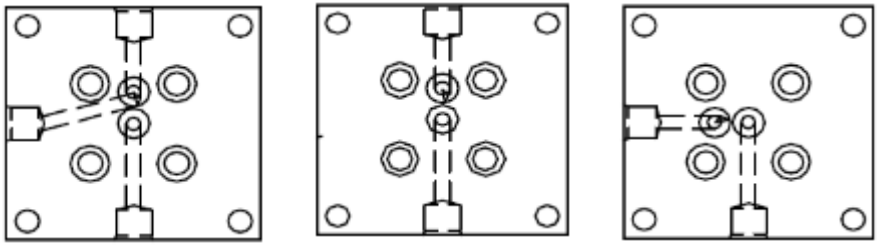
Part Number Configurator/Generator

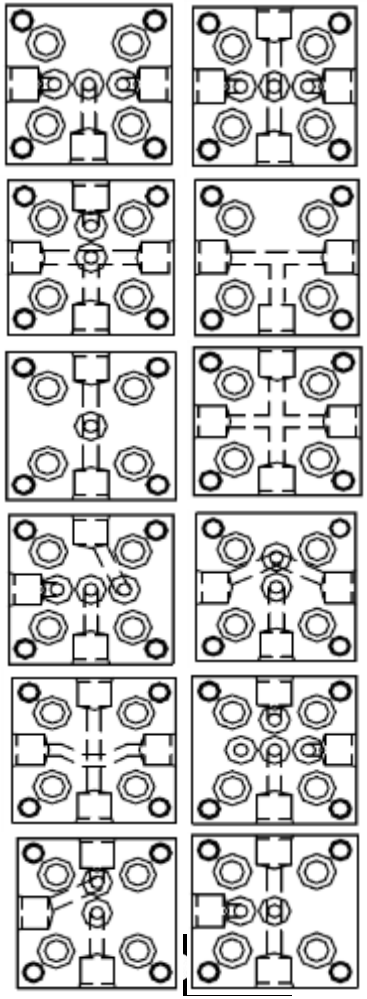






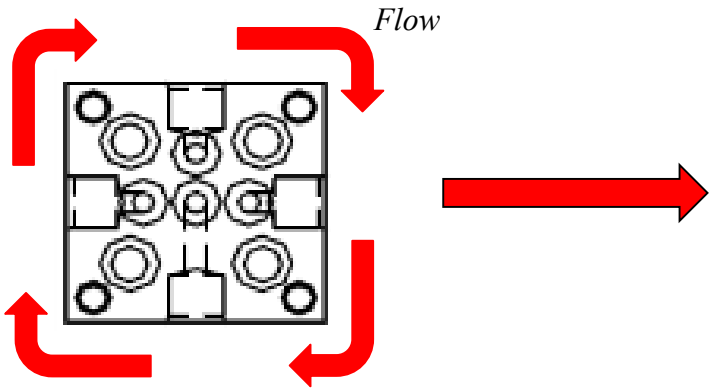
IntraFlow™ Fitting



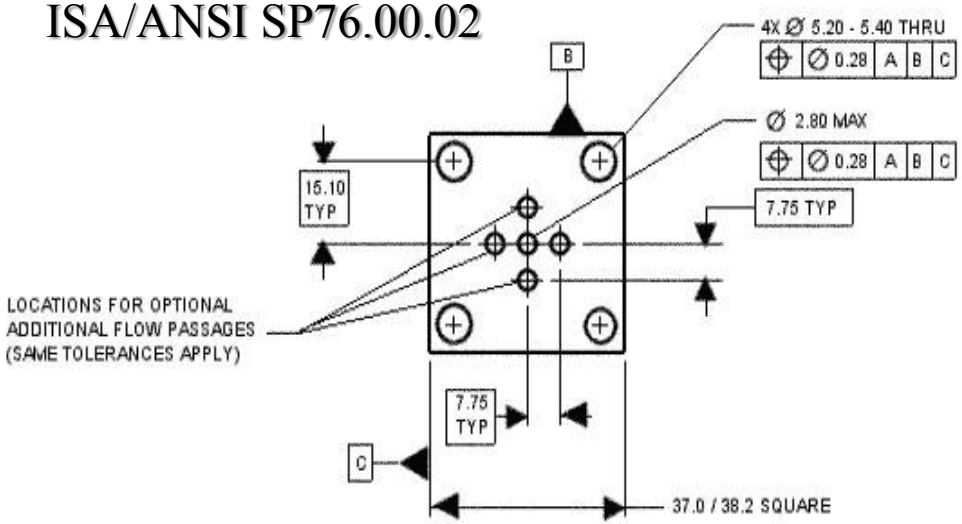


Modular Sampling Review

Intraflow™



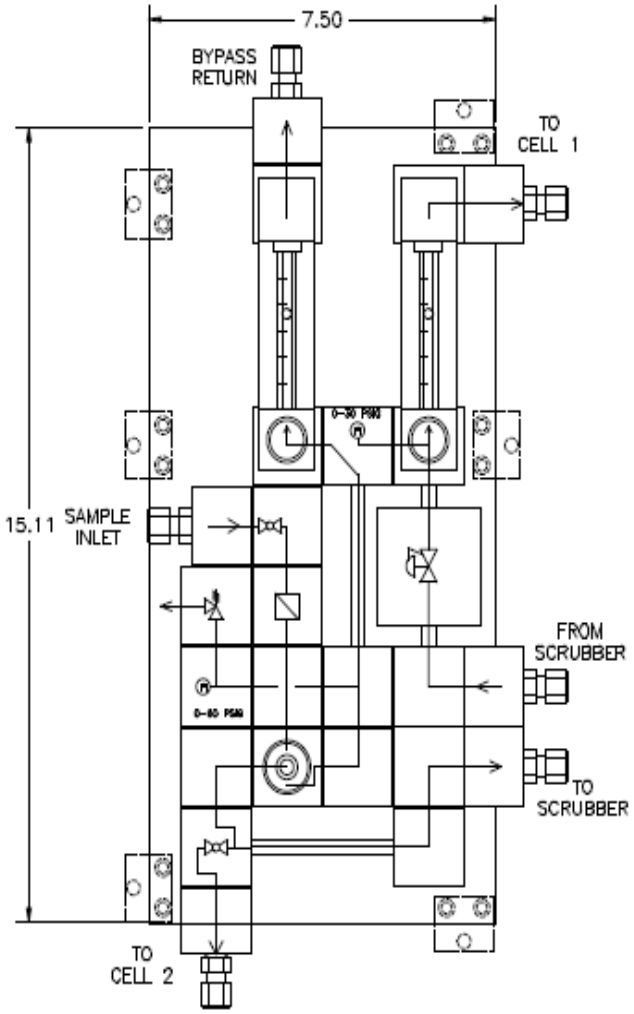
ISA/ANSI SP76.00.02



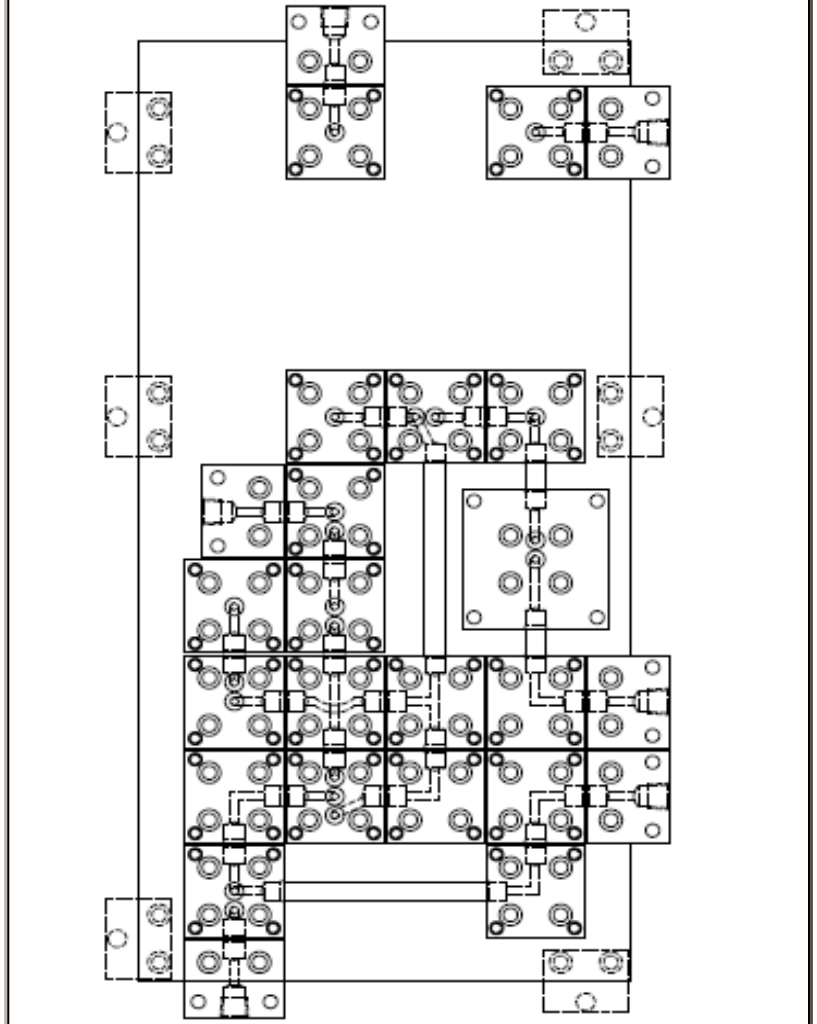
- All ports from ISA SP76 standard are accessible
- Flow in 360 degrees around a substrate is possible
- Flow path in substrate fitting connections are in the same plane – allows for optimum temperature control
- Field expansion is possible with pegboard mounting
- Calibration options are more effective with pegboard mounting
- High flow options are available 3/8” (9.5mm) i.d.
- Larger fittings available for high precision regulators 2.25” (57.2mm)

Intraflow™

Intraflow™: Platform for Standardization



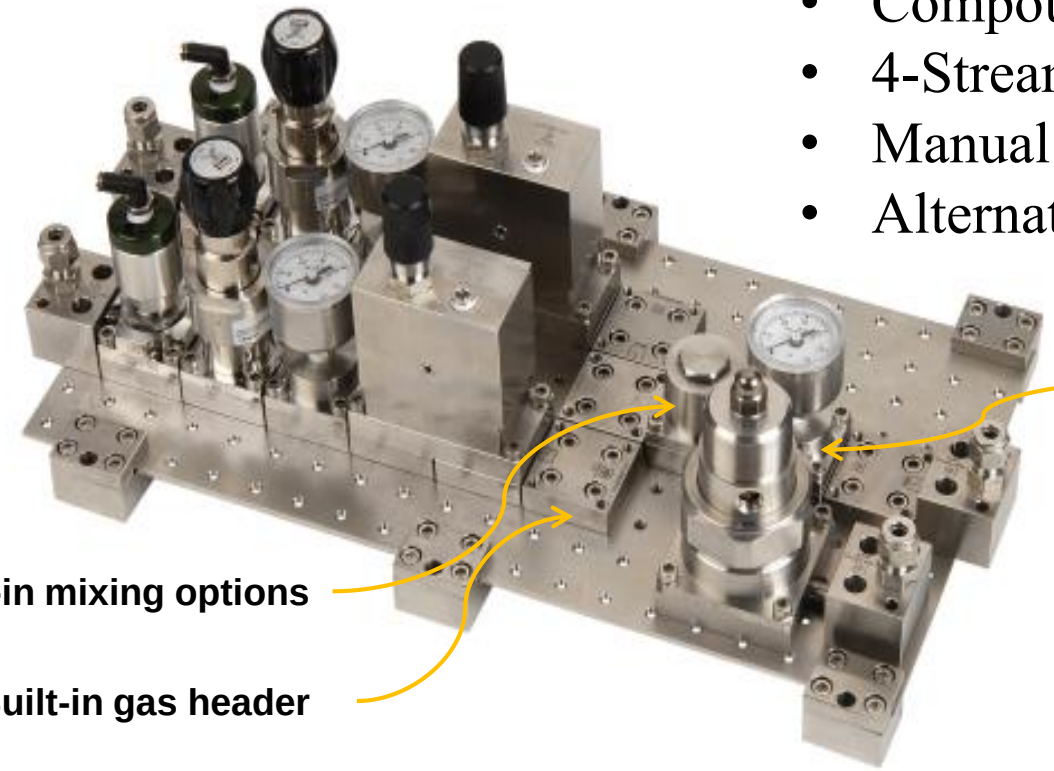
Top Level – Fluidic Control



Substrate Level – Fluidic Control

Blending System Design Flexibility

- Volumetric (Manual) Flow Control
- Mass (Electronic) Flow Control
- Compound Flow Control
- 4-Stream basic design
- Manual or electronic valve control
- Alternative material coating



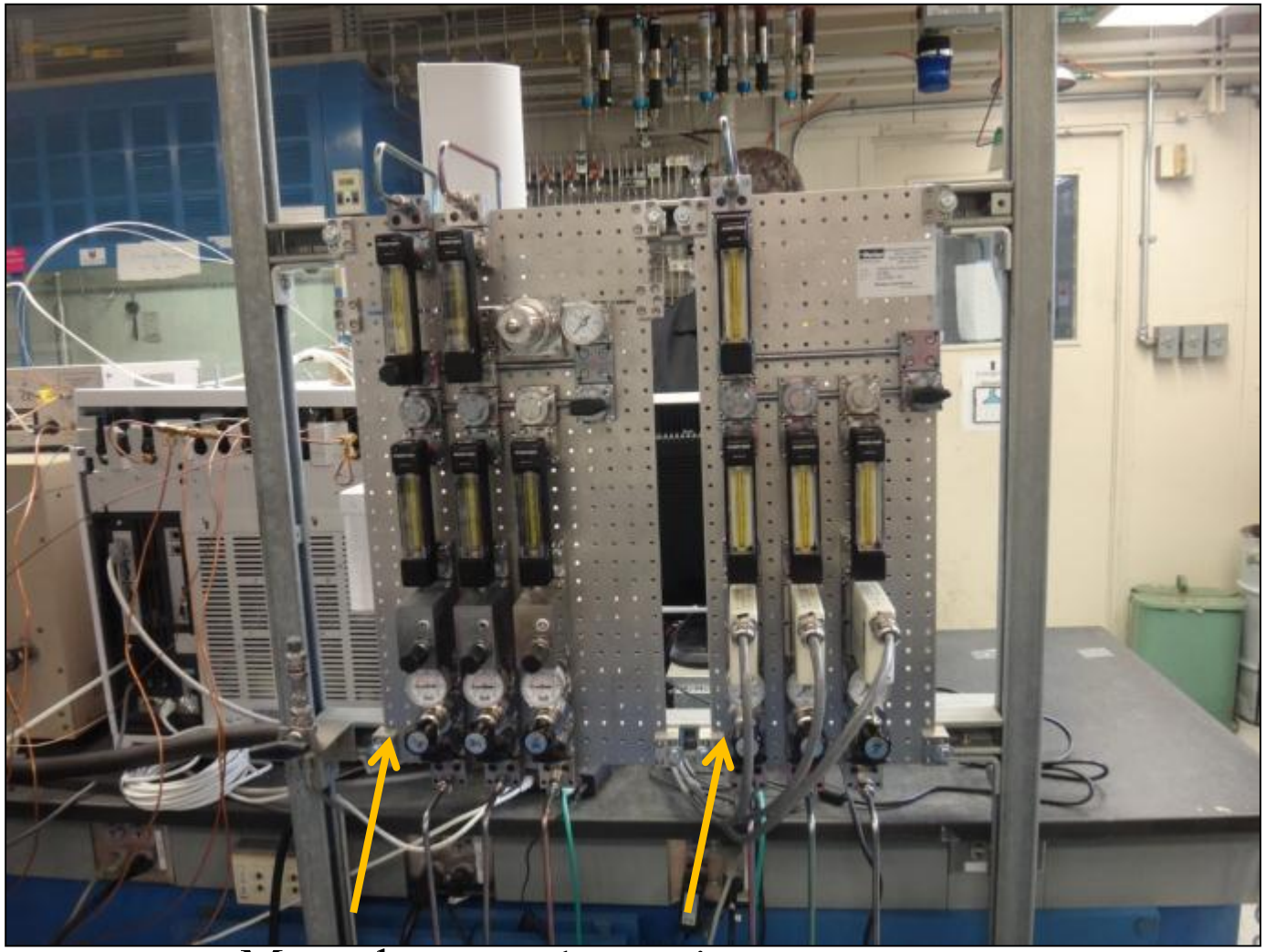
BPR for pressure stabilization and delivery pressure flexibility to analytical systems

Built-in mixing options

Built-in gas header

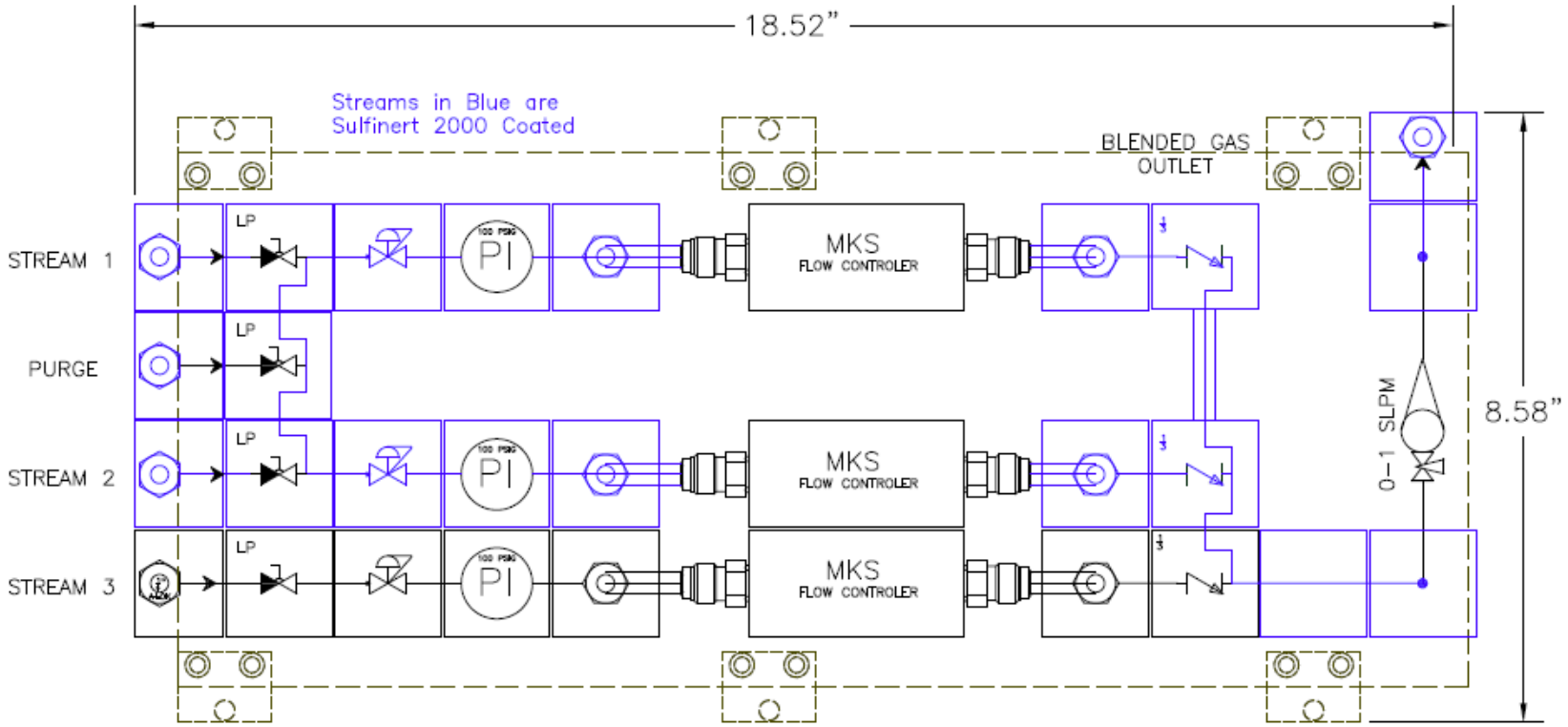
- 500psig maximum inlet pressure
- 3000psig option is available

Laboratory Gas Blending Application



Courtesy of Chevron – Richmond, CA

NeSSI™ Lab Calibration/Dilution System



- Chlorine-based sample matrix
- Addition of purge without space limitation
- Modular and conventional fitting flexibility
- Surface coating common

APPROVED FOR MANUFACTURE:
Part Number: IFSGB-173-R2-3STGB
Issue Date: April 11, 2012

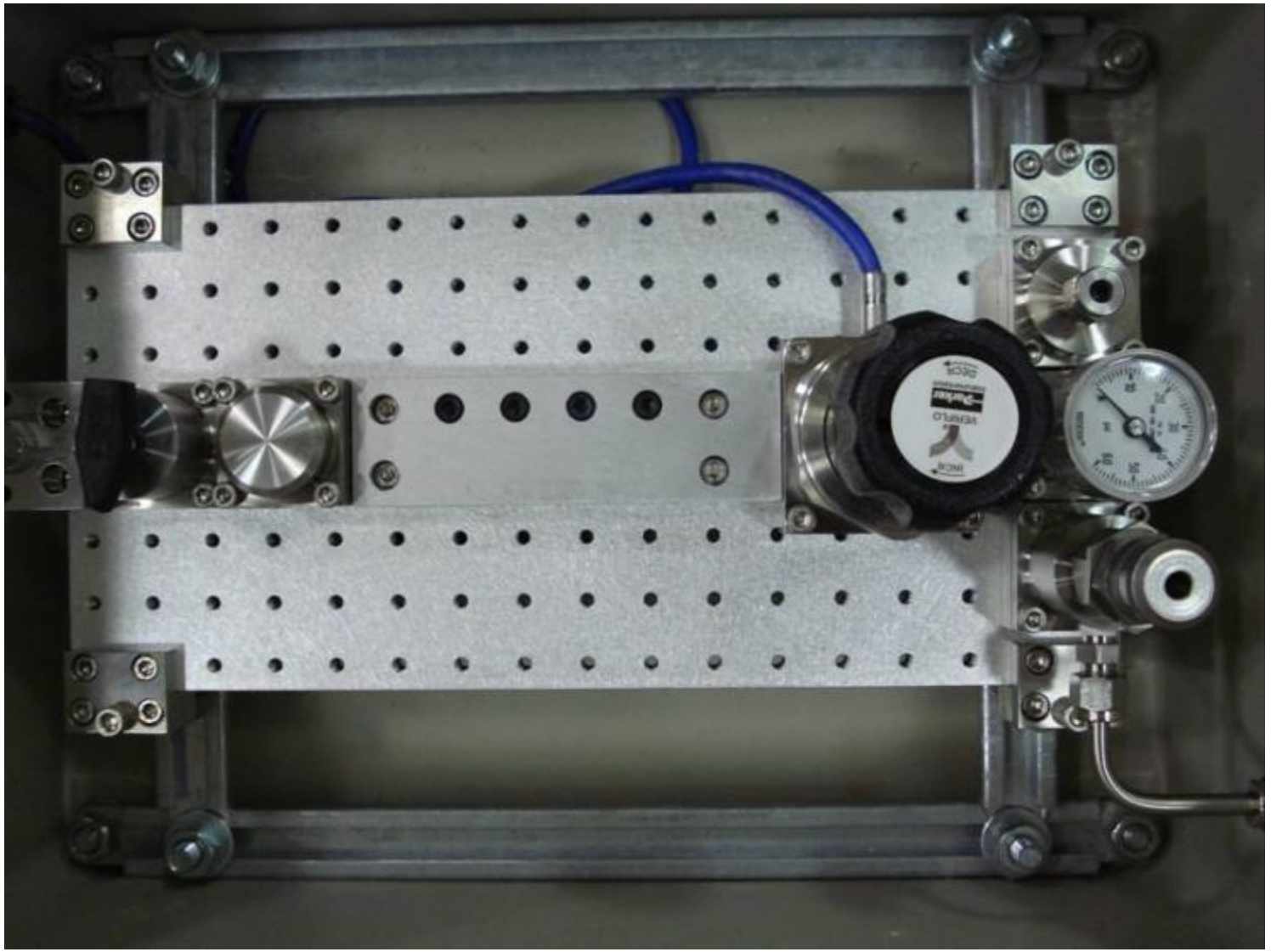
By:_____

COMPANY:_____

DATE:_____ PO:_____

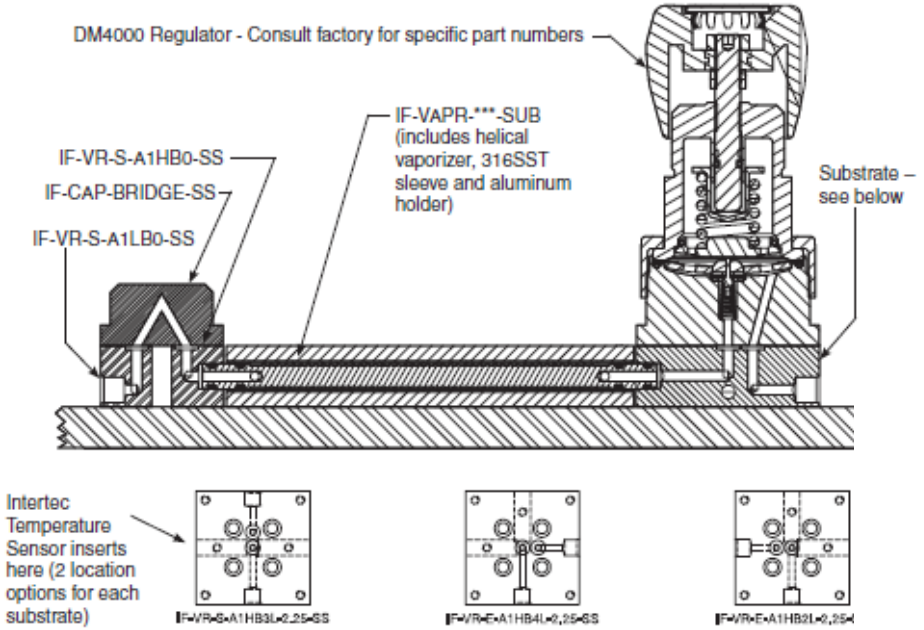
Parker IntraFlow™

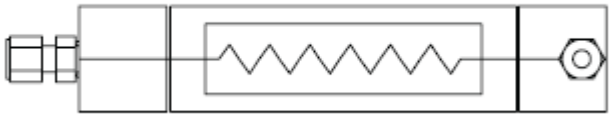
Conventional Sample Extraction Modularized



Parker Vaporizing Regulator

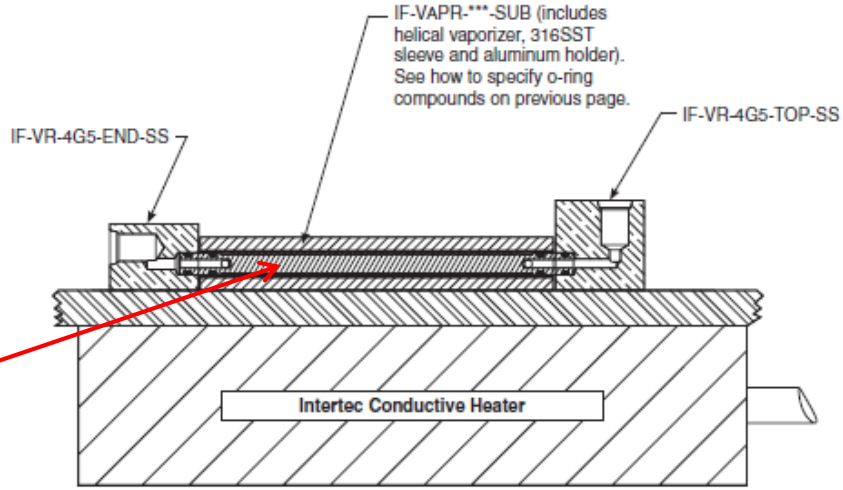
Intraflow™ Vaporizing Regulator Detail





Vaporizer

The Intraflow™ VPR may be used as a heat exchange system or vaporizer



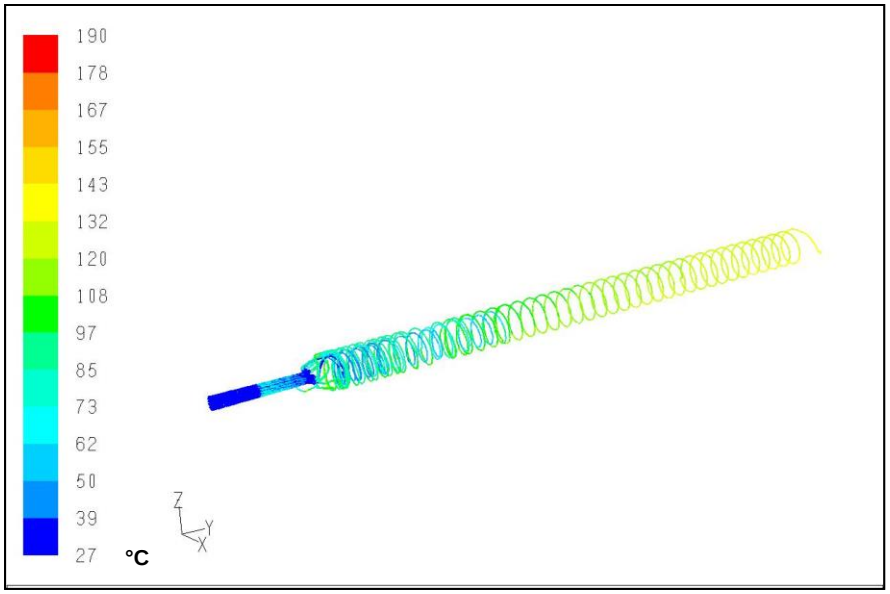
For more information on the CSA version, visit www.intertec.info/common/pdf/cdn/HD127c.pdf

For more information on the ATEX version, visit www.intertec.info/common/pdf/en/HD126e.pdf

Intertec products for IntraFlow applications can be supplied through Parker Distribution channels or Intertec Distribution Channels. To locate an Intertec Distributor, visit www.intertec.info

IntraFlow™ Vaporizing Regulator

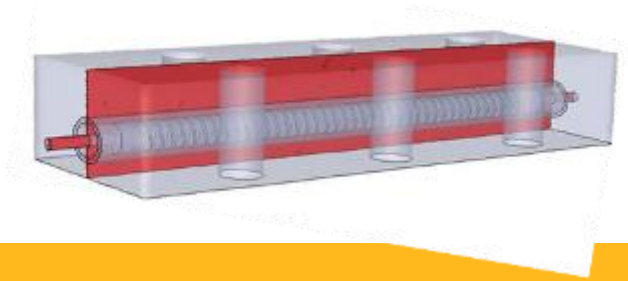
- CFD modeling of the vaporizer indicates that room temp water vaporizes at around 80% through the heat exchanger



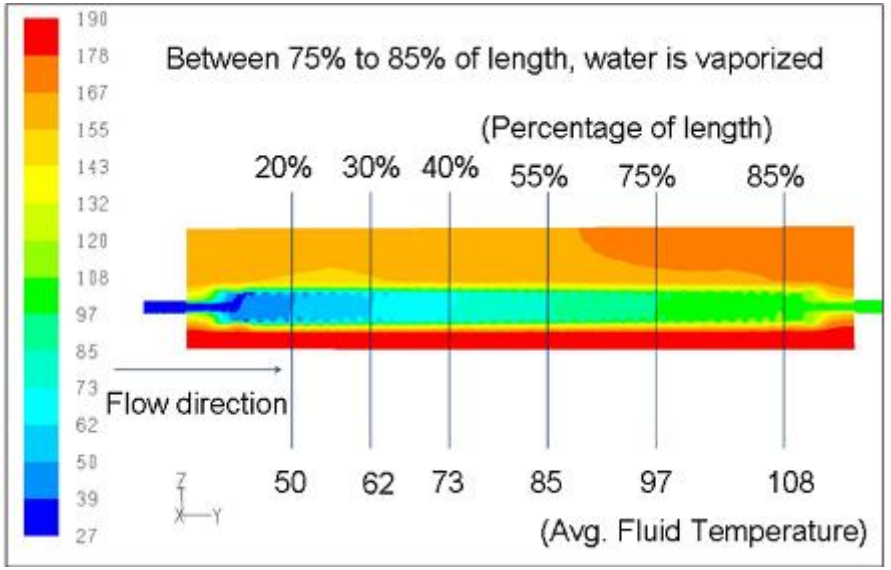
Number of Tetrahedral Elements = .42 million
Pressure Inlet: 25 psi
Pressure outlet : 5 psi
Temperature input to aluminum block: 190 °C
All other external walls are considered as adiabatic walls
Fluid: Water

Solver:

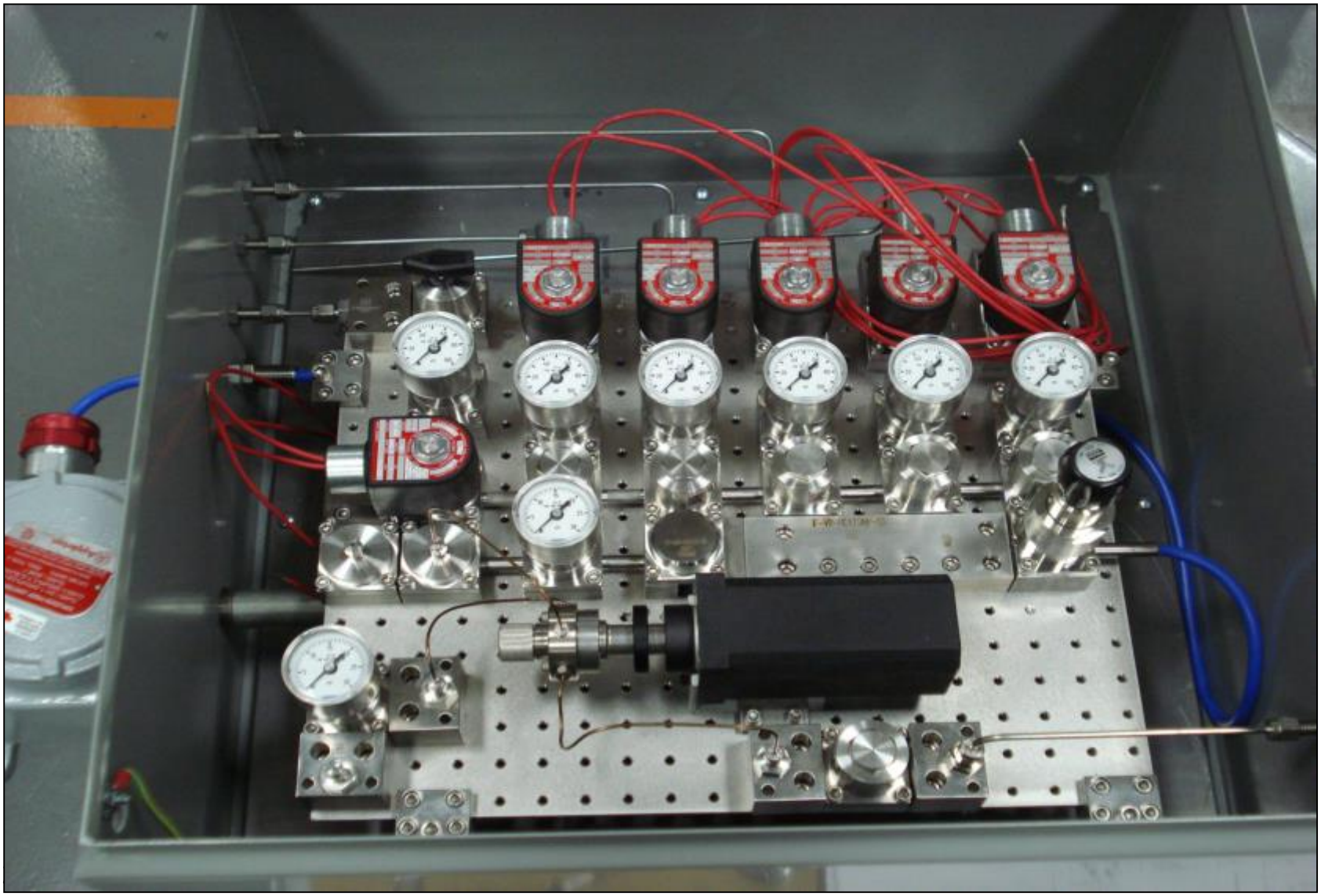
Segregated 3D steady solver with SIMPLE pressure-velocity coupling with standard k-e turbulence model.



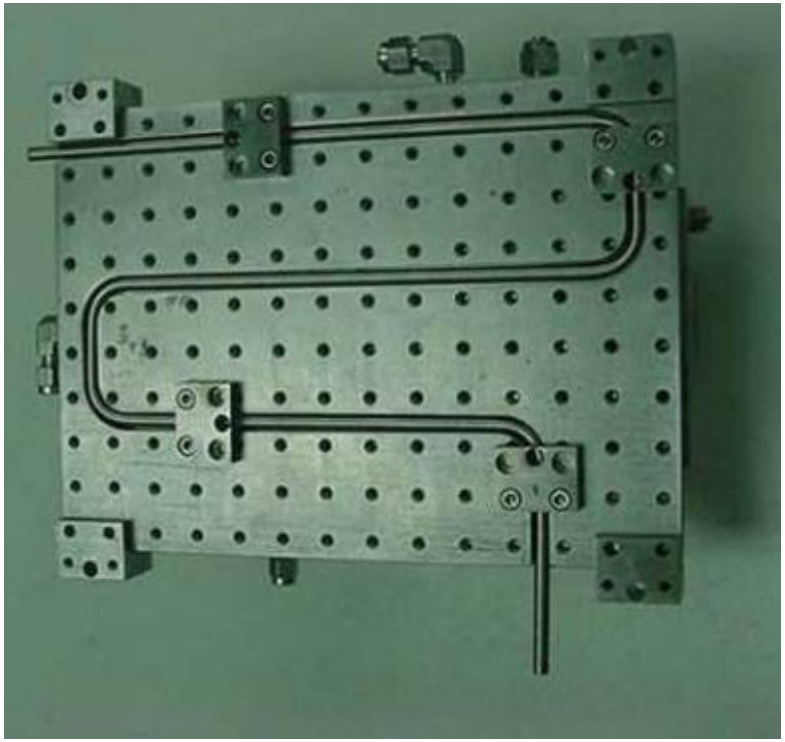
Location of Post Processing Plane

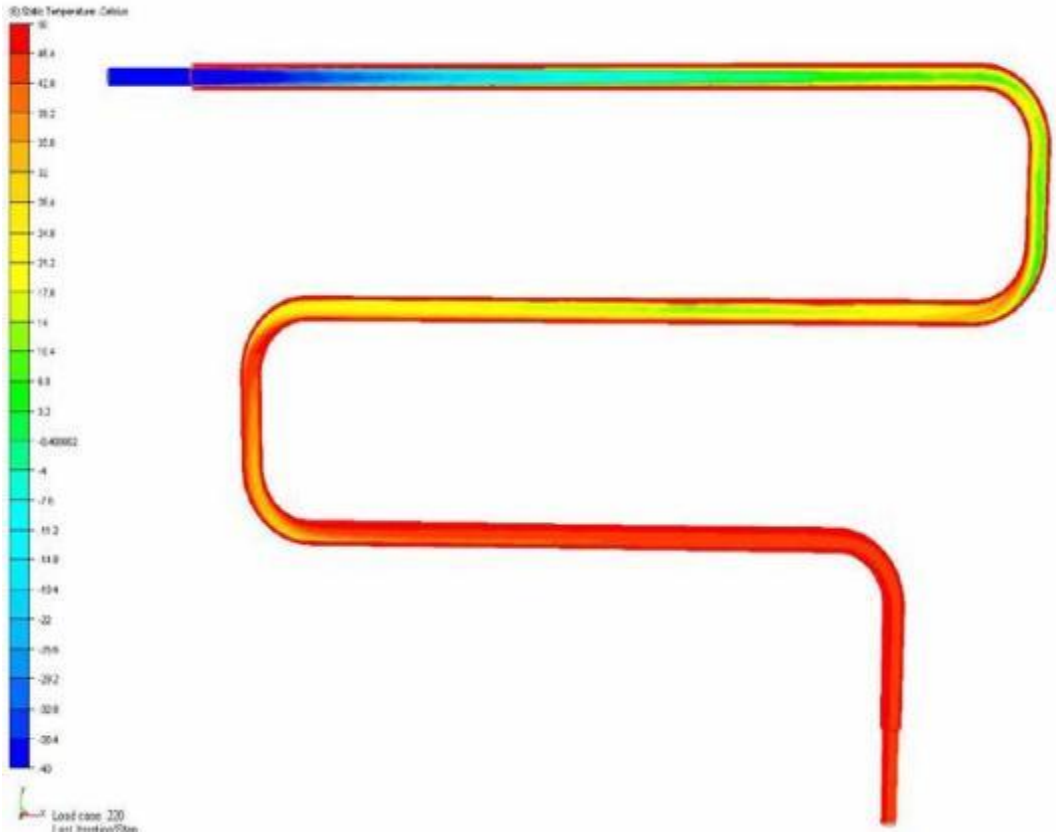


Concept to Functionality: Vaporizer



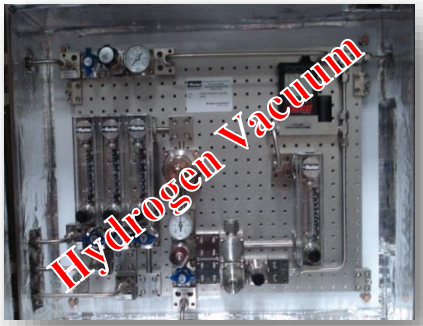
Pegboard Heating Option: Low Pressure Steam

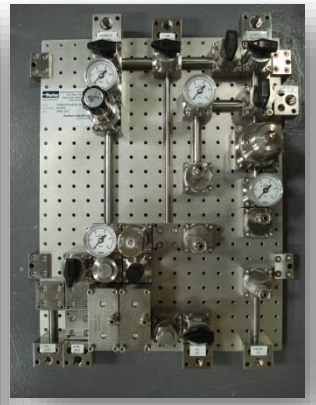


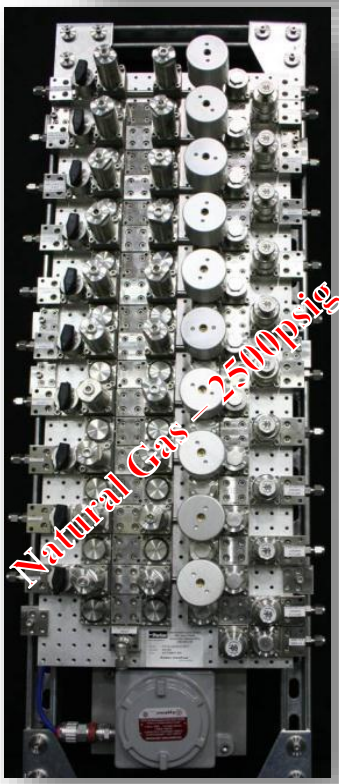


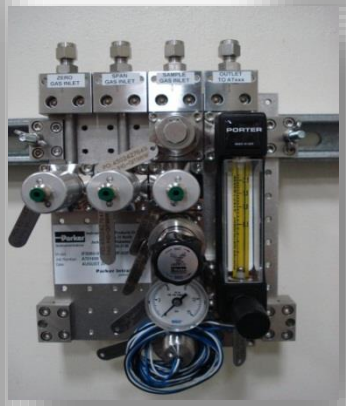
-40°C air purge supply @ 60psig / 4 bar & 20 SLPM, outlet temp 46°C

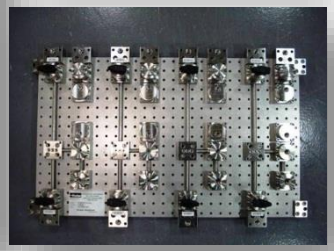
Intraflow™: Applications Review-What can it do?

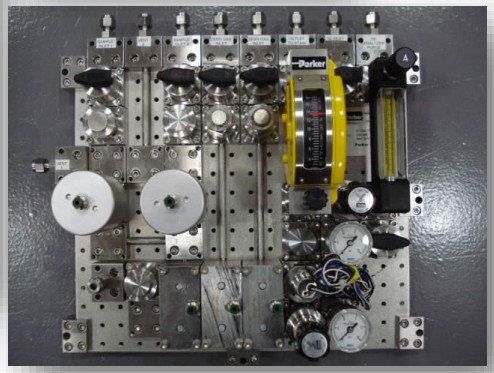


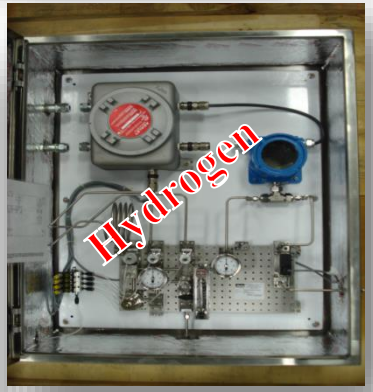






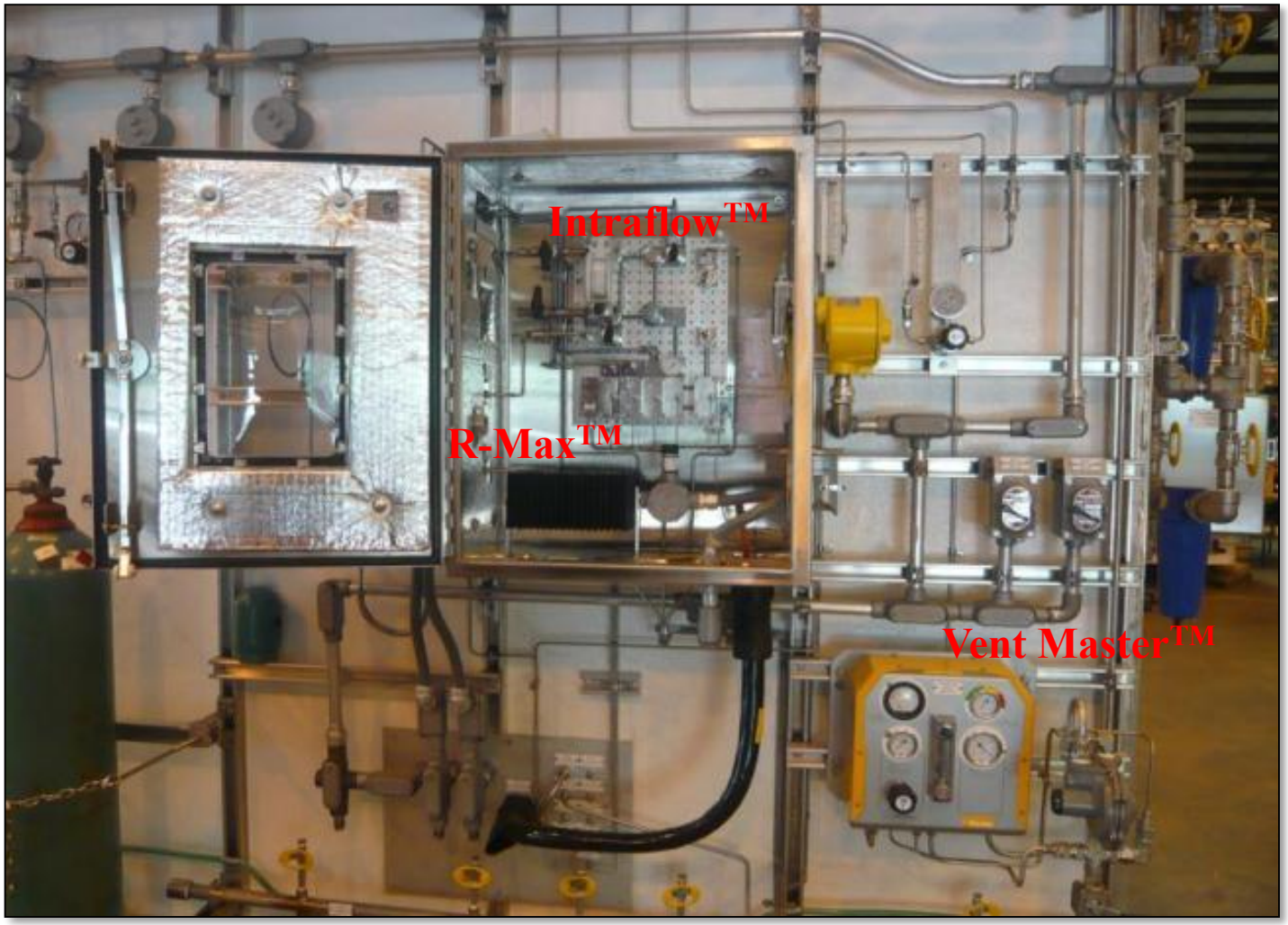




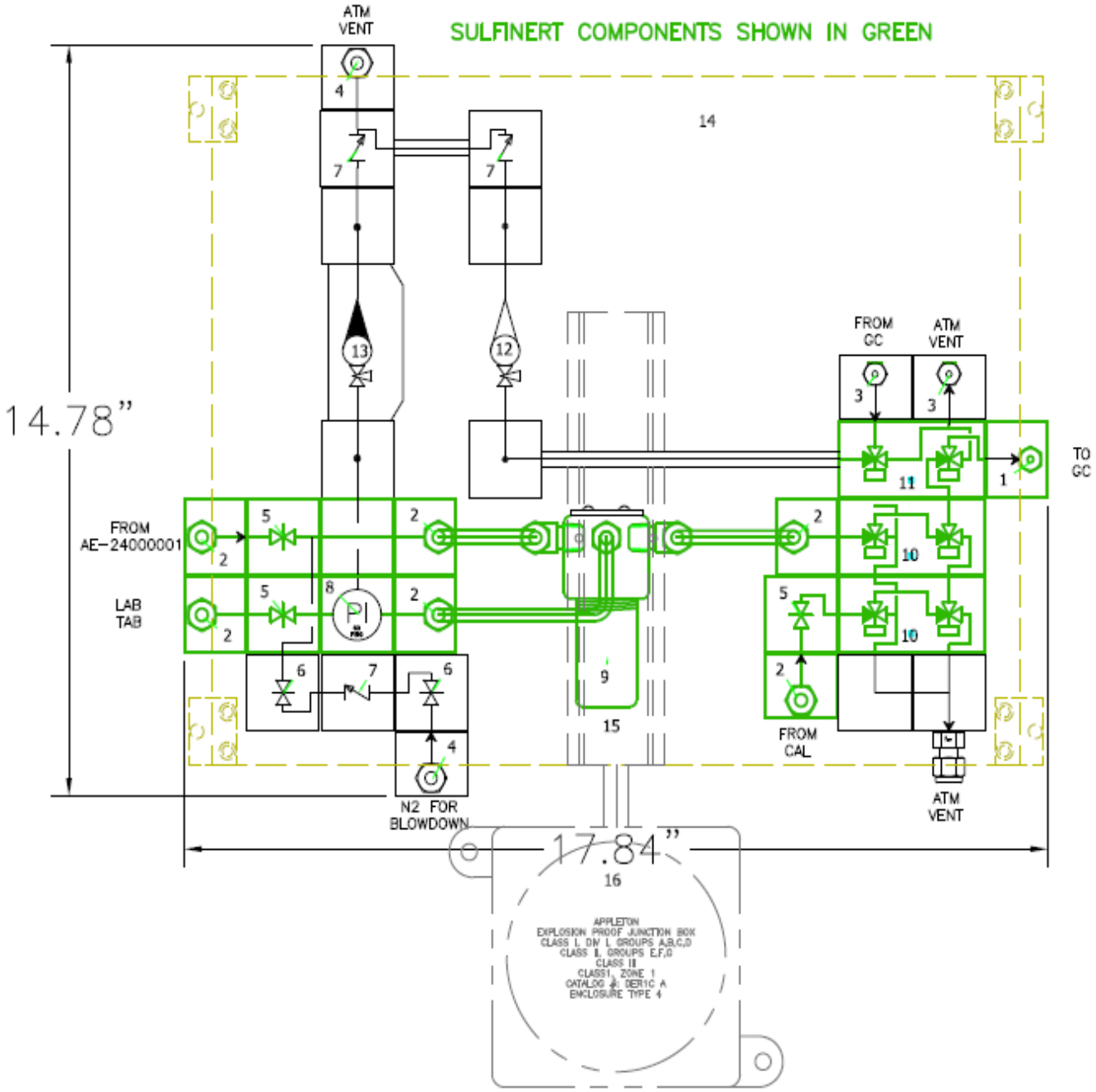


Complete Modular Concept Implemented

Intraflow™, R-Max™ and Vent Master™



Note: Parker components supplied to customer selected Integrator



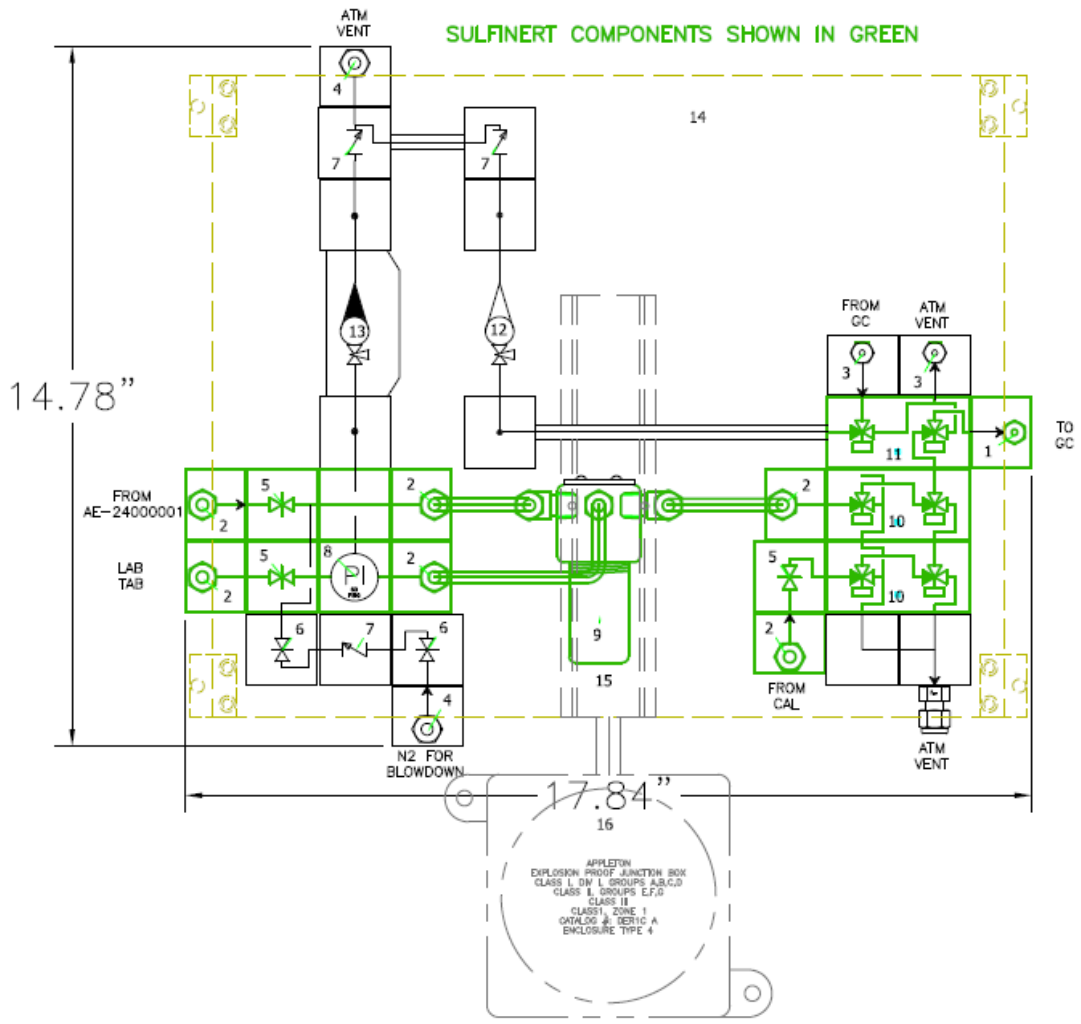
APPROVED FOR MANUFACTURE:
Part Number: IFS012–R1–3STM1CAL
Issue Date: 10/31/2013

By:_____

COMPANY:_____

DATE:_____ PO:_____

Parker IntraFlow™



Parts List			
ITEM	QTY	NAME	DESCRIPTION
1	1	IF-4G5-TOP-SS-SUL	TOP ACCESS FIELD CONNECTOR WITH 1/8" COMPRESSION FITTING SULFINERT COATED
2	6	IF-4G5-TOP-SS-SUL	TOP ACCESS FIELD CONNETION WITH 1/4" COMPRESSION FITTING SULFINERT COATED
3	2	IF-4G5-TOP-SS	TOP ACCESS FIELD CONNECTOR WITH 1/8" COMPRESSION FITTING
4	2	IF-4G5-TOP-SS	TOP ACCESS FIELD CONNETION WITH 1/4" COMPRESSION FITTING
5	3	IF-V4LQ-KZ-SS-SUL	TOGGLE VALVE SULFINERT COATED
6	2	IF-V4LQ-KZ-SS	TOGGEL VALVE
7	3	IF-CO4L-1-KZ-SS	CHECK VALVE 1 PSIG CRACK
8	1	GAUGE-9118101	0-60 PSIG INCLUDES SULFINERT COATED BASE
9	1	90-509-SS-H	AVENGER 91 SERIES FILTER BRACKET
9	1	91-4/1-0-07CFS-SS-SUL	AVENGER 91 SERIES FILTER SULFINERT COATED
10	2	IF-RD3K-KZ-SS-SUL	GEN II DBB R-MAX SULFINERT COATED
11	1	IF-RD3GCK-KZ-SS-SUL	GEN II R-MAX GC MODULE SULFINERT COATED
12	1	P430A3314610	PORTER GLASS TUBE ROTAMETER, 68 SLPH, INLET VALVE, KZ
13	1	7101451003A	PORTER ARMORED ROTAMETER 155 SLPH, ,INLET VALVE, KZ
14	1	IF-PEGBOARD-18X22-SS	INTRAFLOW PEGBOARD WITH MOUNTING FEET
15	1	HEATER (ACTUAL PART NUMBER T0 BE DETERMINED)	INTERTEC BLOCKTHERM HEATER
16	1	CONTROLLER (ACTUAL PART NUMBER T0 BE DETERMINED)	INTERTEC CONTROLLER

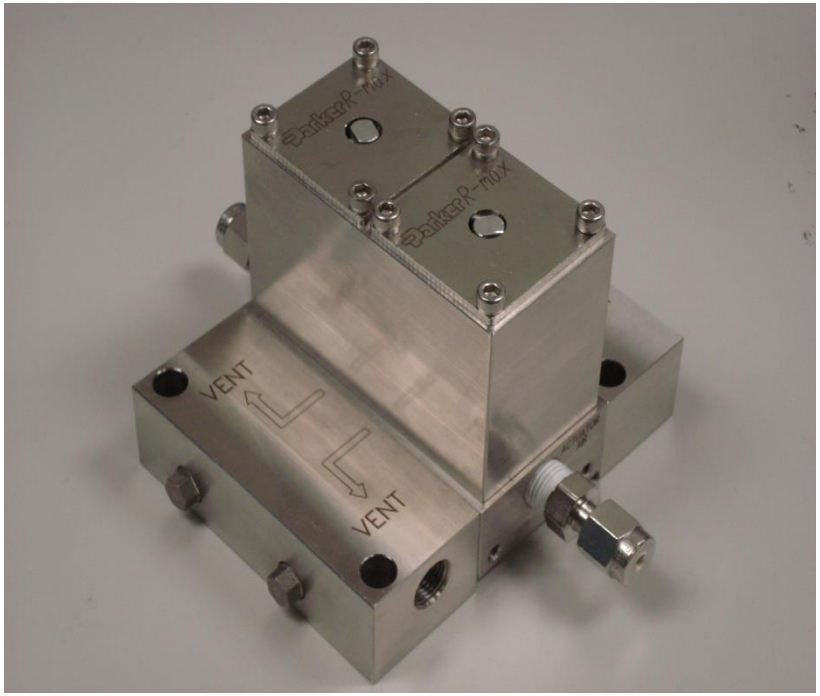
The History of R-Max™ Stream Switching Valve

Released March 2001

2,100 units annually

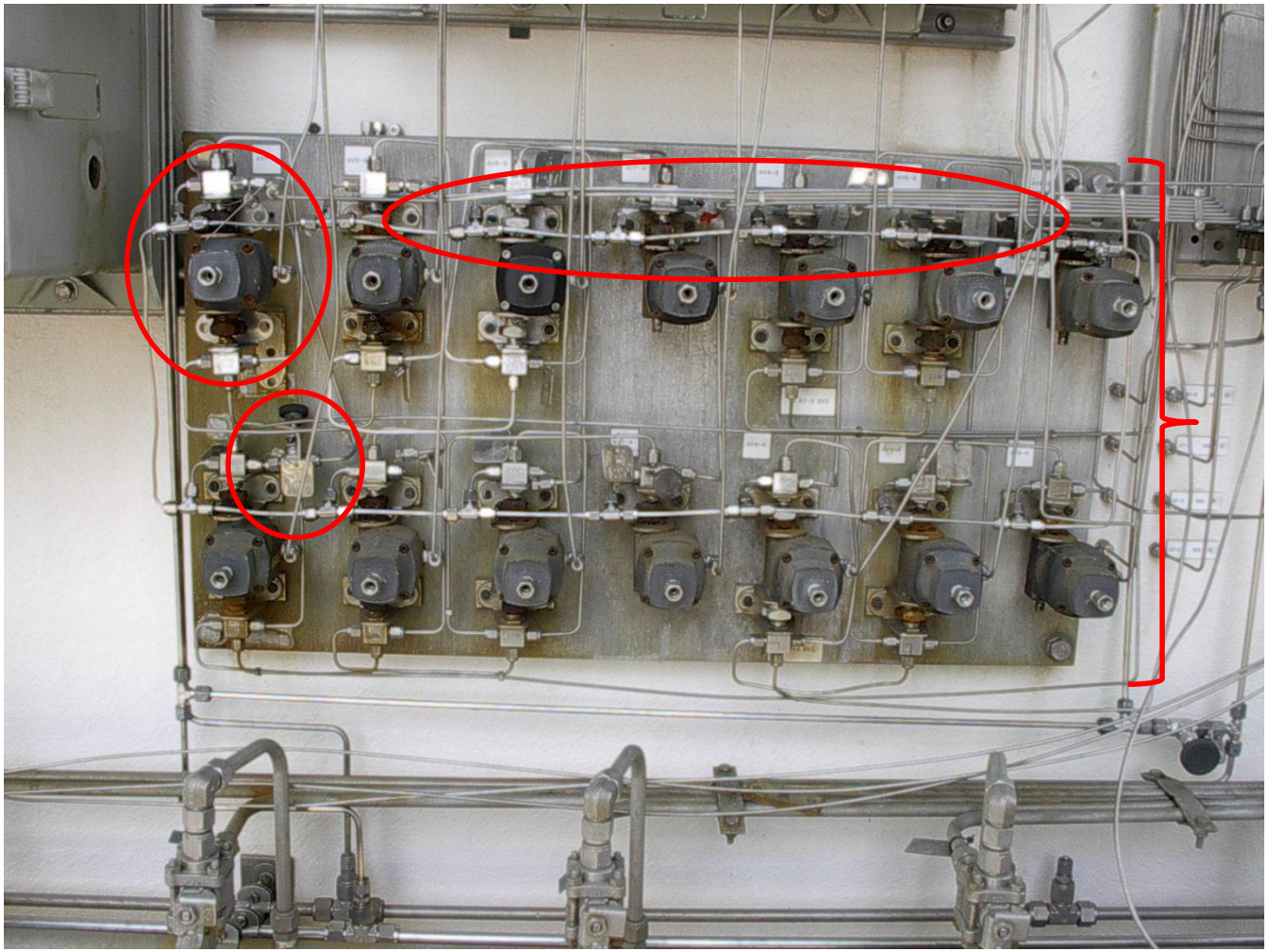
52,000 total units

Foundation of Parker's process sample conditioning products such as Parker IntraFlow™ and Vent Master™



Note: Most process analyzers utilize some form of stream switching architecture

R-Max™: Why?



Leaks?
Compression connections/remakes can leak

Operation?
Maintenance is not optimized

Space?
Actuators are equivalent to 2 R-Max™ valves

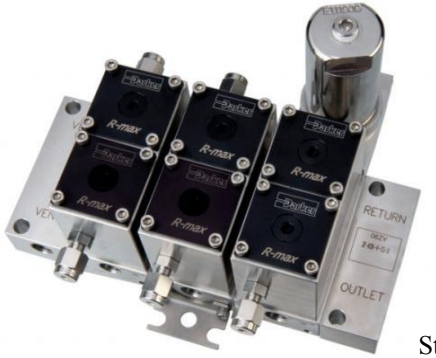
Simplicity?
Feet of tubing for each stream

Stream Selection: Application Addressed

Refining, Chemical Manufacturing Operations

Calibration/Validation Fluids

Sample Transport



Sample Analysis

Stream Selection allows process analyzer technicians and engineers to calibrate/validate analyzers without manually accessing the sampling system

R-Max II: Extension of R-Max™ with Enhanced Functionality

R-Max™

R-Max II *

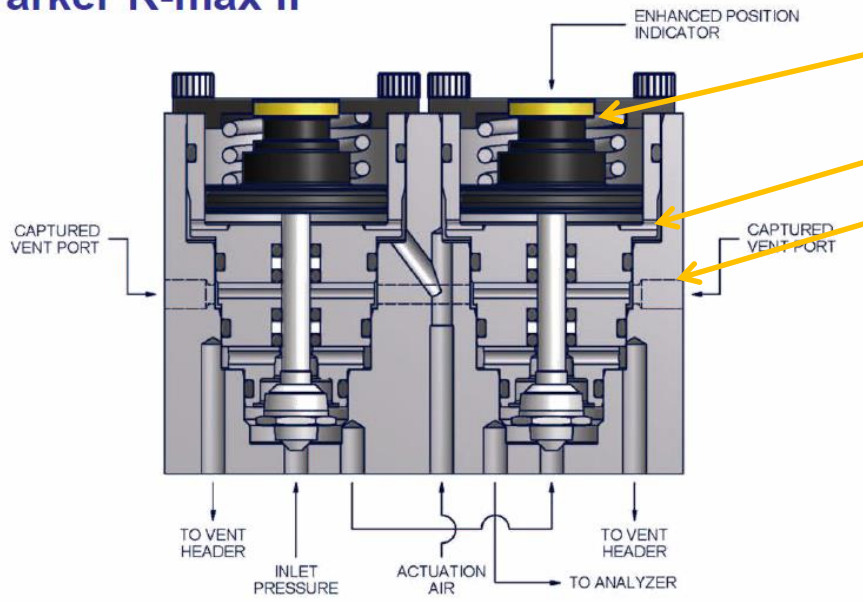
R-Max II Enhancements

- Improved Position Indication
- Captured Vent
- Alternate GC Reference
- Easier Maintenance
- Backward Compatibility

* 4 Million + Cycle Life

What's Different?

Parker R-max II



Captured Vent Option

The **captured vent** has 10-32 threads.

Porting options include fittings for use with:

- 1/8" and 1/4" plastic tubing
- 1/8" and 1/4" SS tubing
- 10-32 Plug

R-Max II available for **Parker IntraFlow™** Surface Mount Systems.

Specifications

- Pressure Rating:
  500 psig (34 bar)
- Temperature Ratings:

Fluorocarbon Rubber
-15°F to 400°F (-26°C to 204°C)
Buna-N Rubber
-30°F to 275°F (-34°C to 135°C)
Ethylene Propylene Rubber
-70° to 275°F (-57°C to 135°C)
Neoprene Rubber
-45°F to 250°F (-43°C to 121°C)
Highly Fluorinated Fluorocarbon Rubber
-25°F to 300°F (-32°C to 150°)

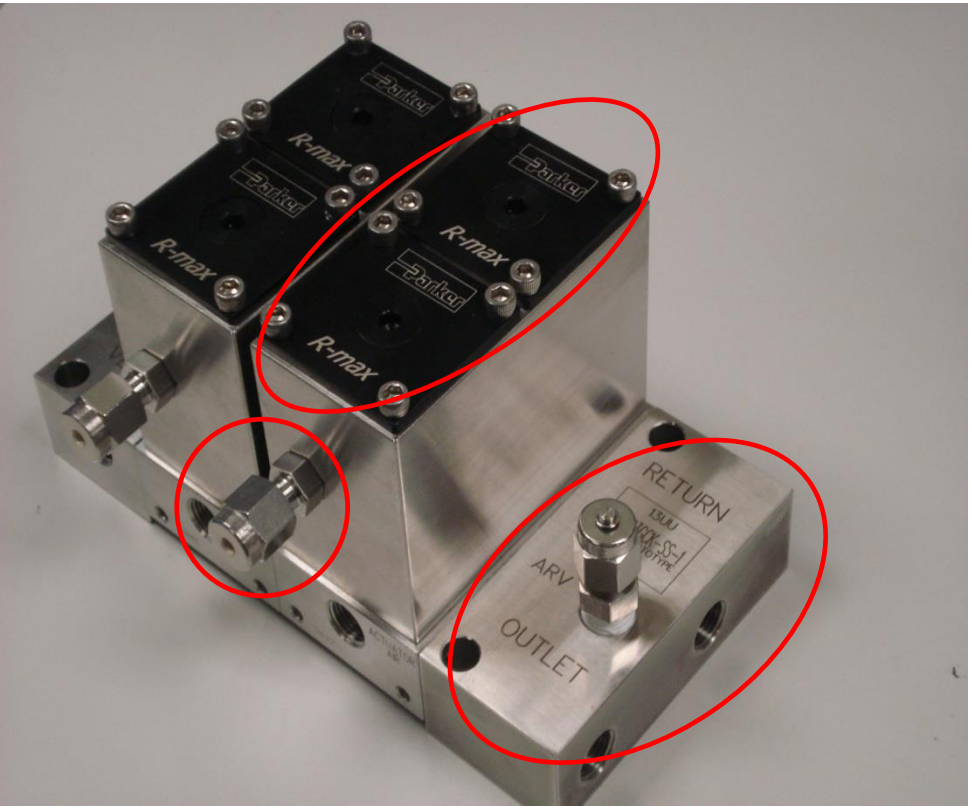
Enhanced position indicator

Extra Valve Bonnet Needed to accommodate Captured Vent

Captured Vent and fitting port

Temperature and Pressure Specifications have not changed. Only difference is the captured vent option

Enhancements Implemented: R-Max II



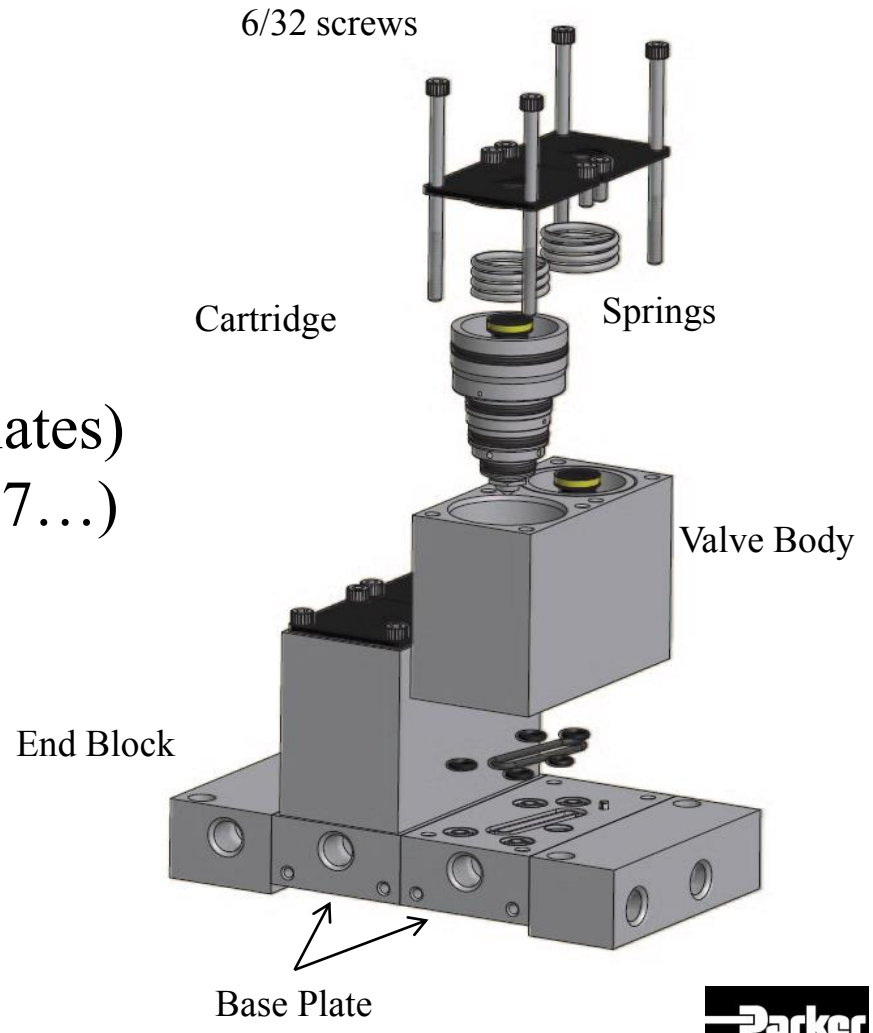
Enhanced Design Features

- Captured Vent
- Position Indicator
- Effortless Cartridge Removal
- Alternate Ref GC

Valve Detail: Design Benefits

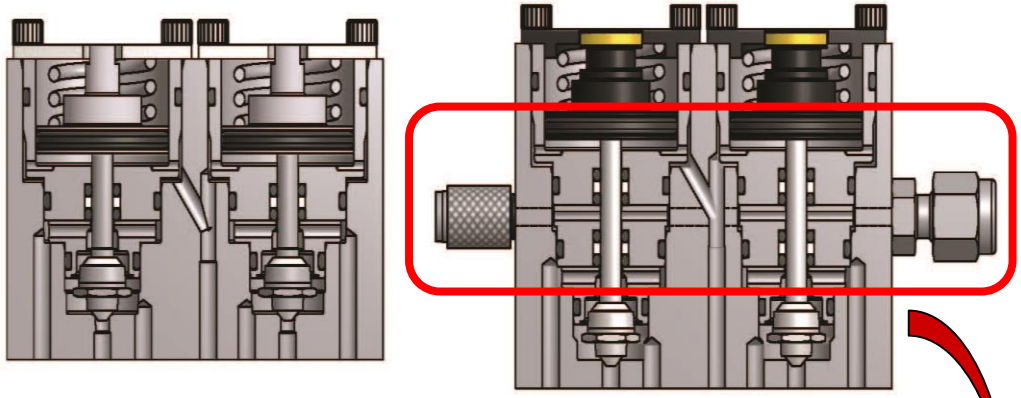
Simplicity of Design Benefits:

- Maintenance (cartridge)
- Adaptability (NC,NO, IF, DM)
- Compatibility (common base plates)
- Modularity (expansion, 4, 5, 6, 7…)
- Versatility (applications)
- Alloys and Coatings Available

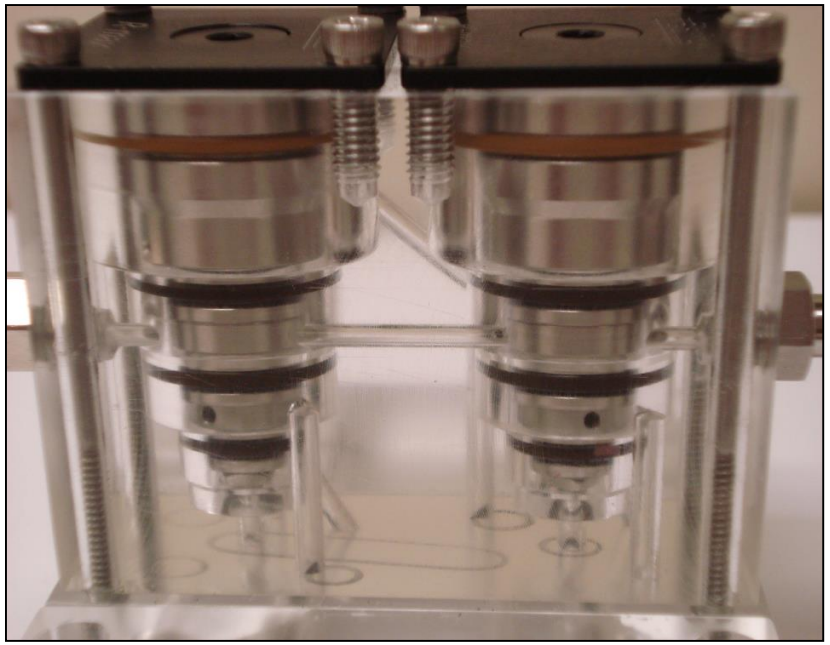


R-Max II: Captured Vent

- Eliminates cross contamination
- Threaded connection
- 1/8” & ¼” SS tubing //
- 1/8” & ¼” plastic tubing // plug

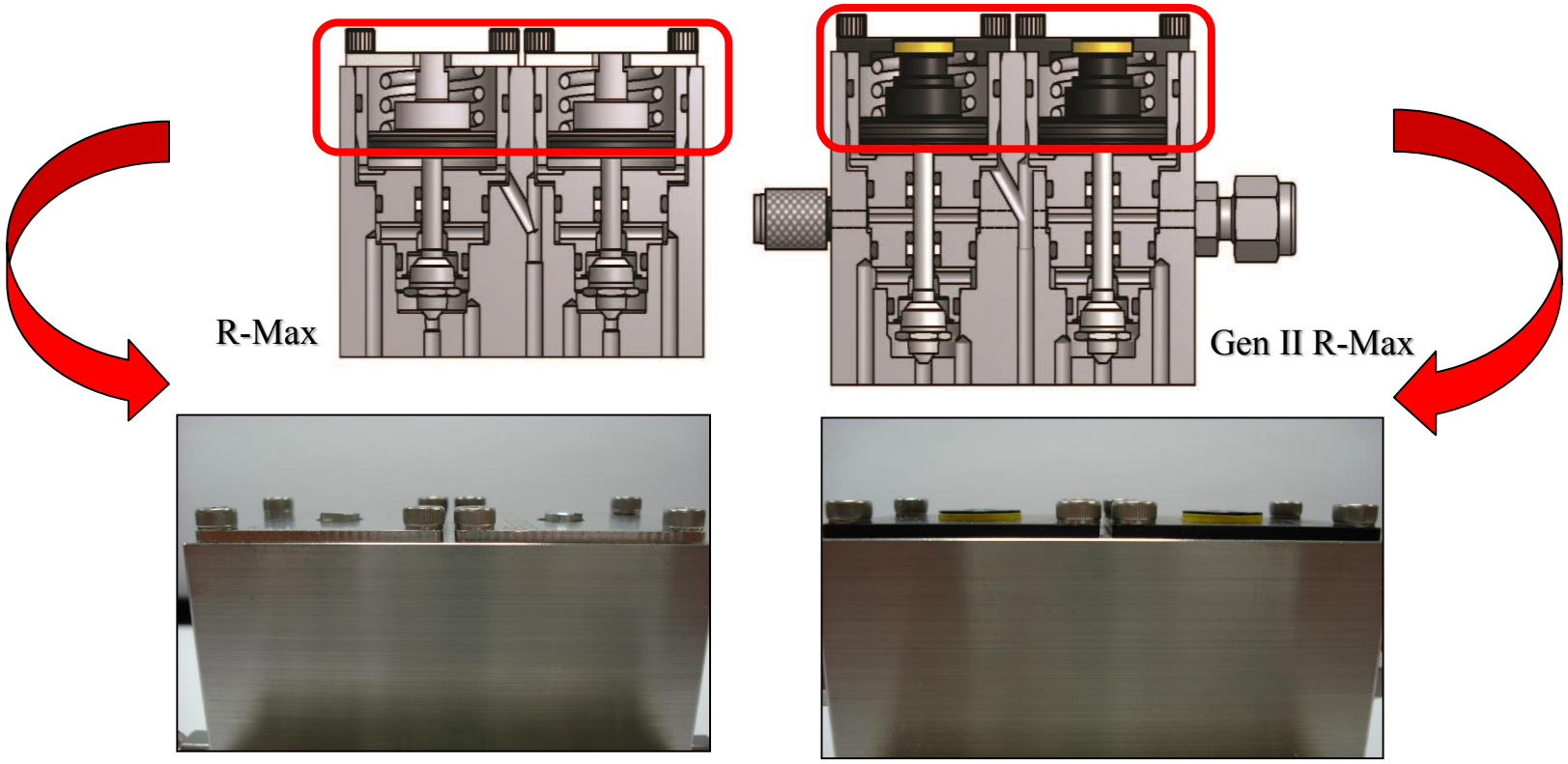


- The vent fittings may be on opposite sides of the valve, the same side or connected in series



R-Max II: Enhanced Position Indicator

- Positive Identification Color Band
- Backward compatible
- Available on all R-Max versions (except Single IntraFlow)

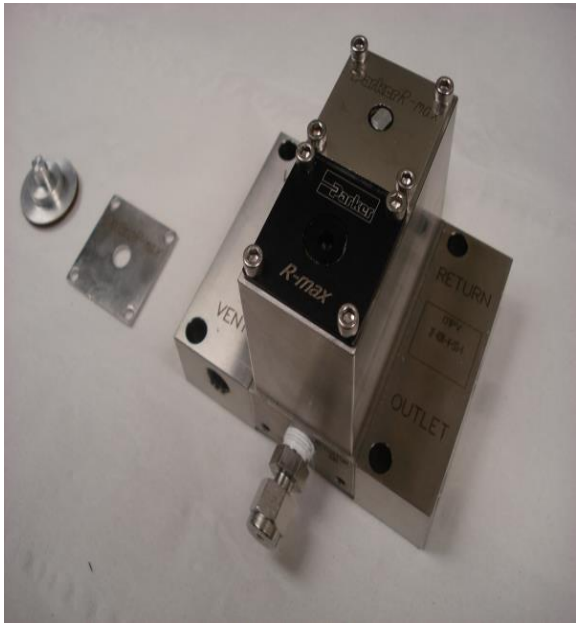


R-Max II: Replacing Position Indicator (Backward Compatibility)

- Backward compatible

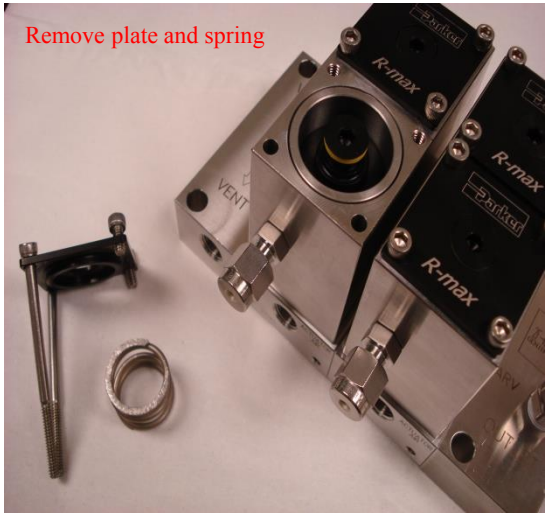
1.) Remove plate screws

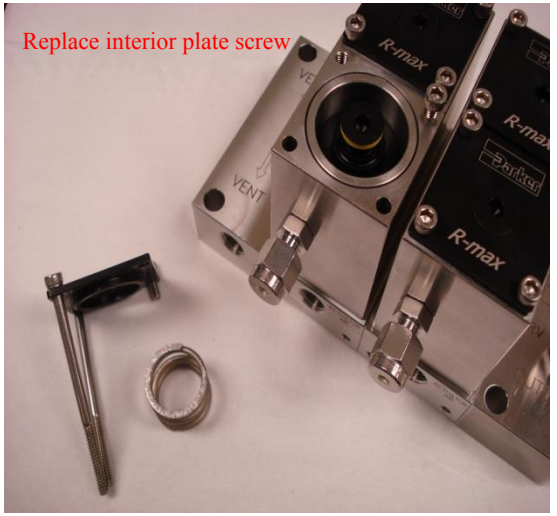
2.) Unscrew indicator from cartridge

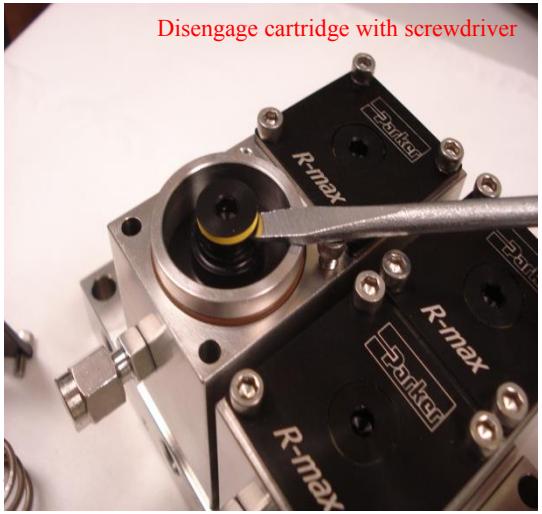


3.) Replace with new indicator and tighten plate screws

R-Max II: Cartridge Removal Steps (Hands-on cartridge removal)



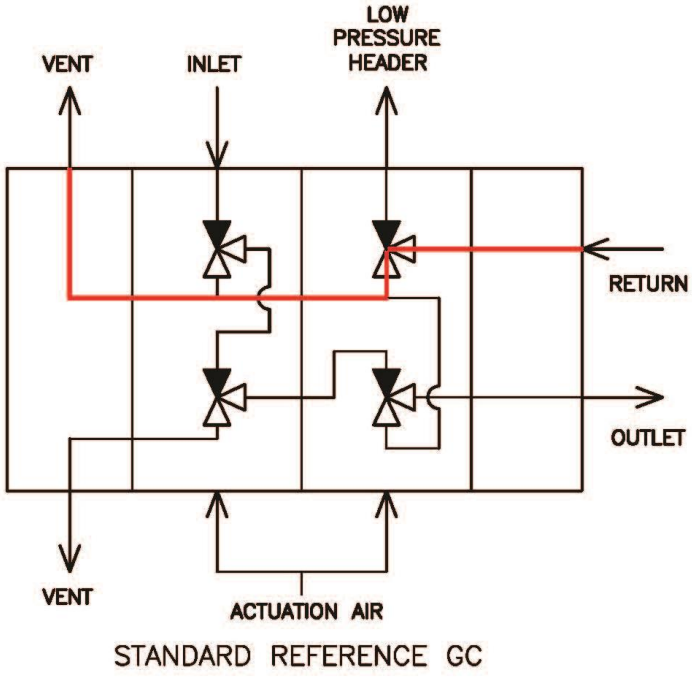




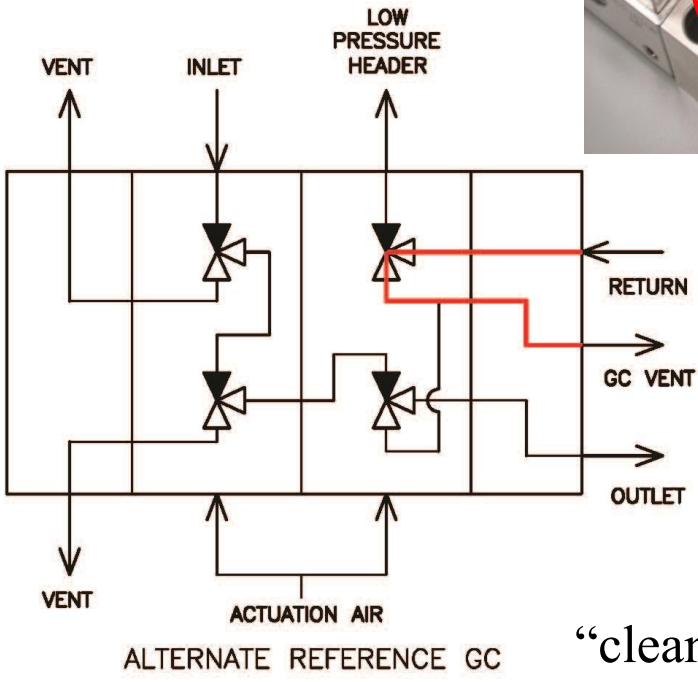
- **Position Indicator design allows for easier removal of cartridges for maintenance**

R-Max II: Alternate Reference GC - Why?

- Atmospheric reference separated from sample stream vent
- Internal fast loop available with this option
- Backward Compatible to Original R-Max



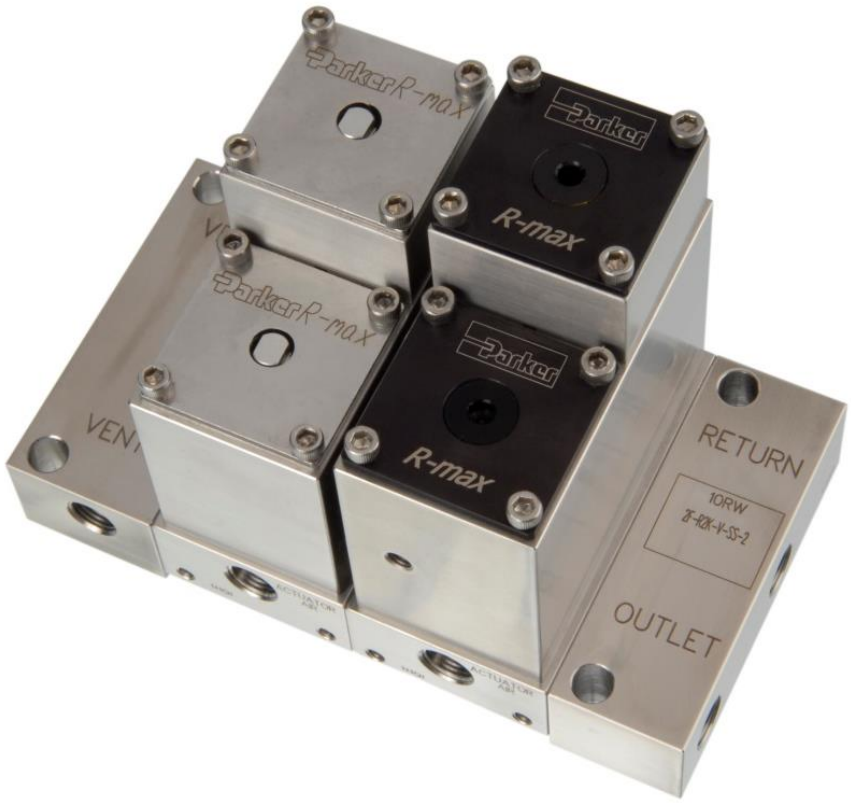
STANDARD REFERENCE GC



ALTERNATE REFERENCE GC

"cleaner more reliable atmospheric ~~reference~~"

The Next Feature Enhancement?:Low Pressure Actuation

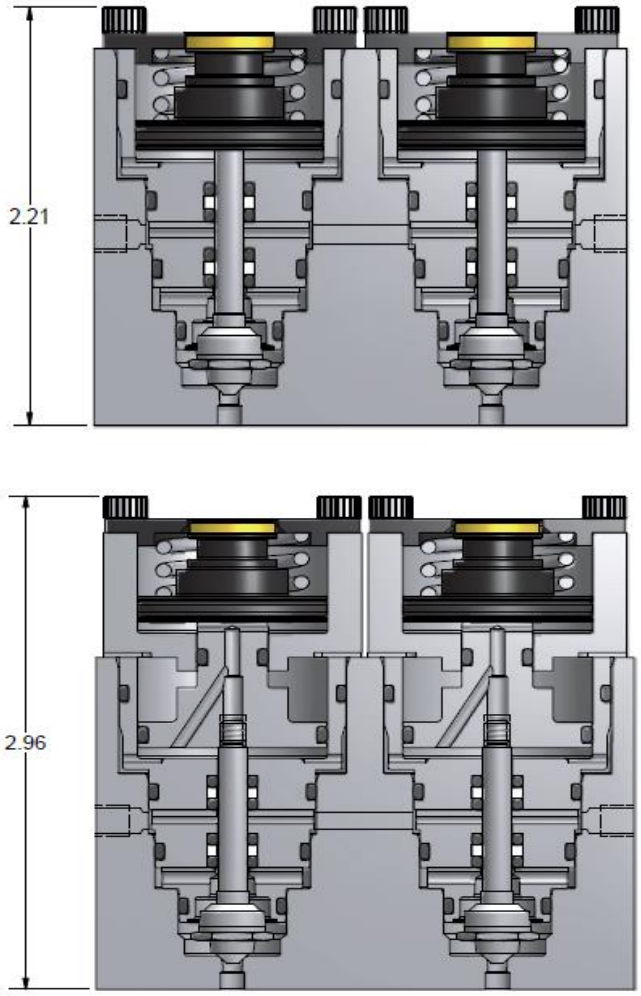


The double piston design also incorporates the new Gen II R-Max features including the captured vent, enhanced visual indicator and backward compatibility.

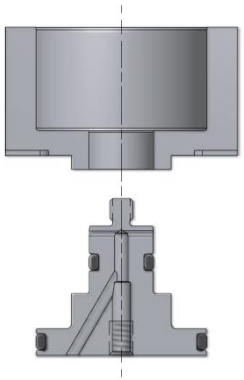
- 35 psig actuation air pressure
- Compatible with R-Max™ and Gen II R-Max™ units
- Kits available for retrofit onto existing units
- Wide variety of elastomeric seals available
- 316 stainless steel construction
- 100% factory tested

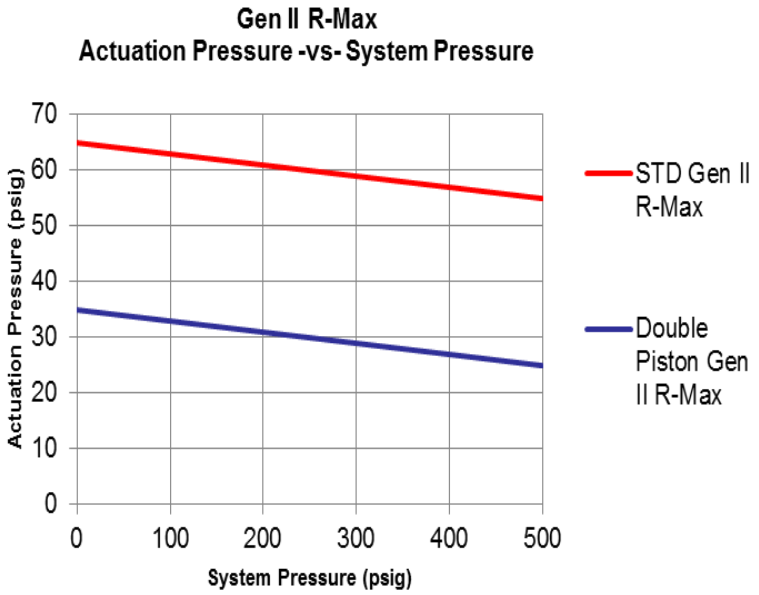
Backward compatible with original R-Max valve

Low Pressure Actuator Addition Detail



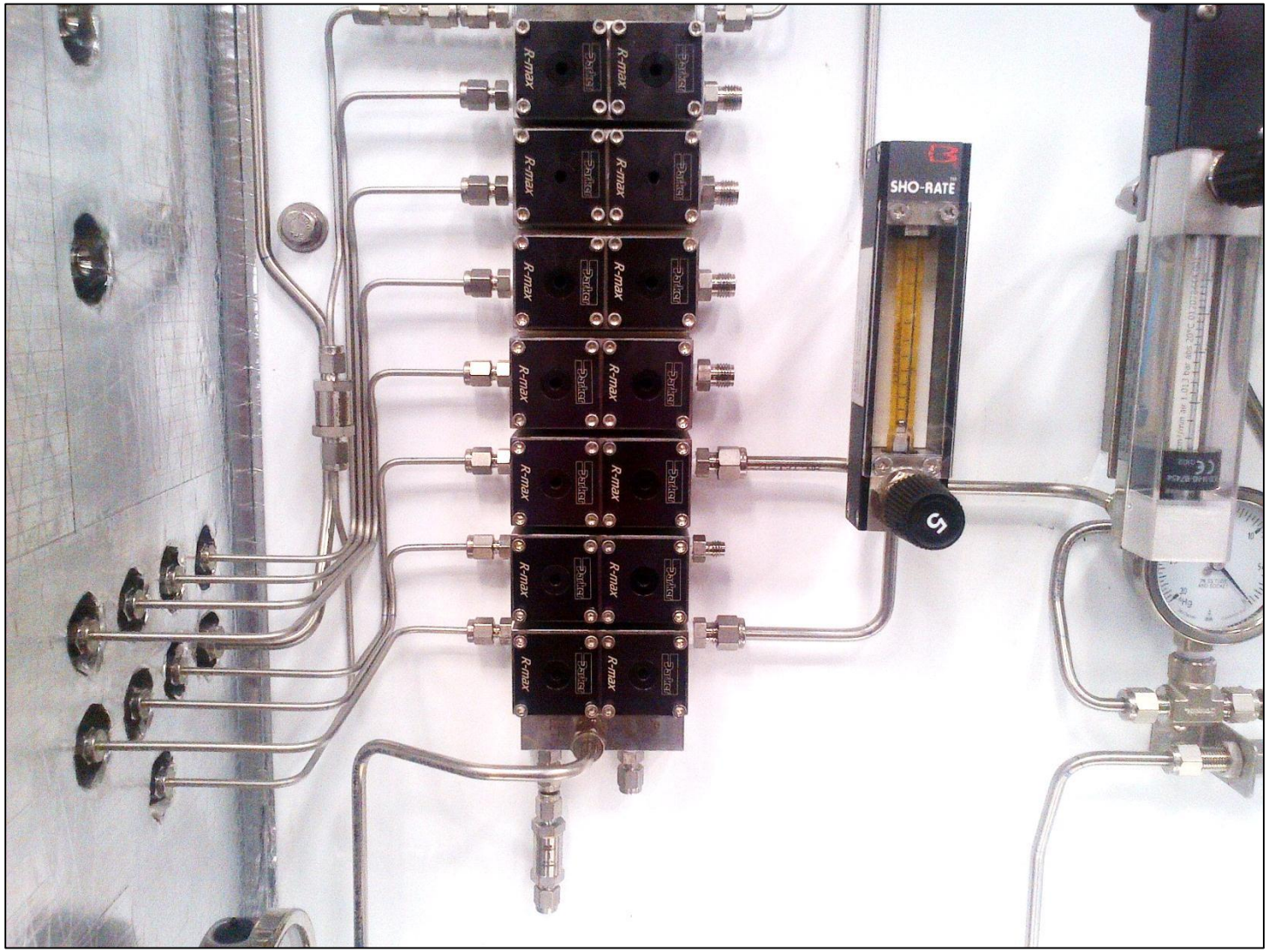
Gen II R-Max™ Low Pressure Actuator





- Bulletin in July 2013
- Backward compatible to R-Max™ and Gen II R-Max™

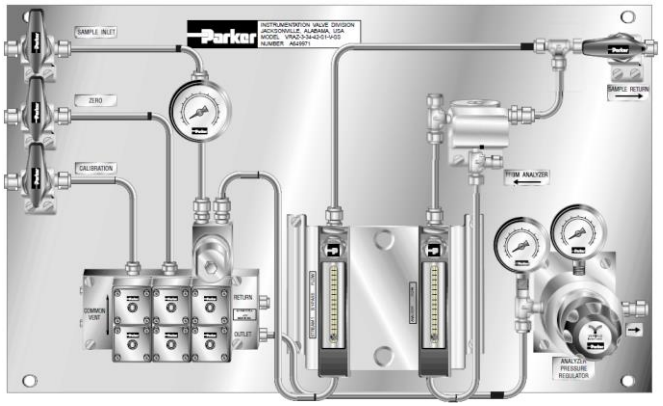
Gen II R-Max™: Field Application



CEMS/Stack Gas Measurement Application

Courtesy of ConTech Engineering

Parker Vent Master™ : Pressure Control



ENGINEERING YOUR SUCCESS.

Parker Vent Master™ Function

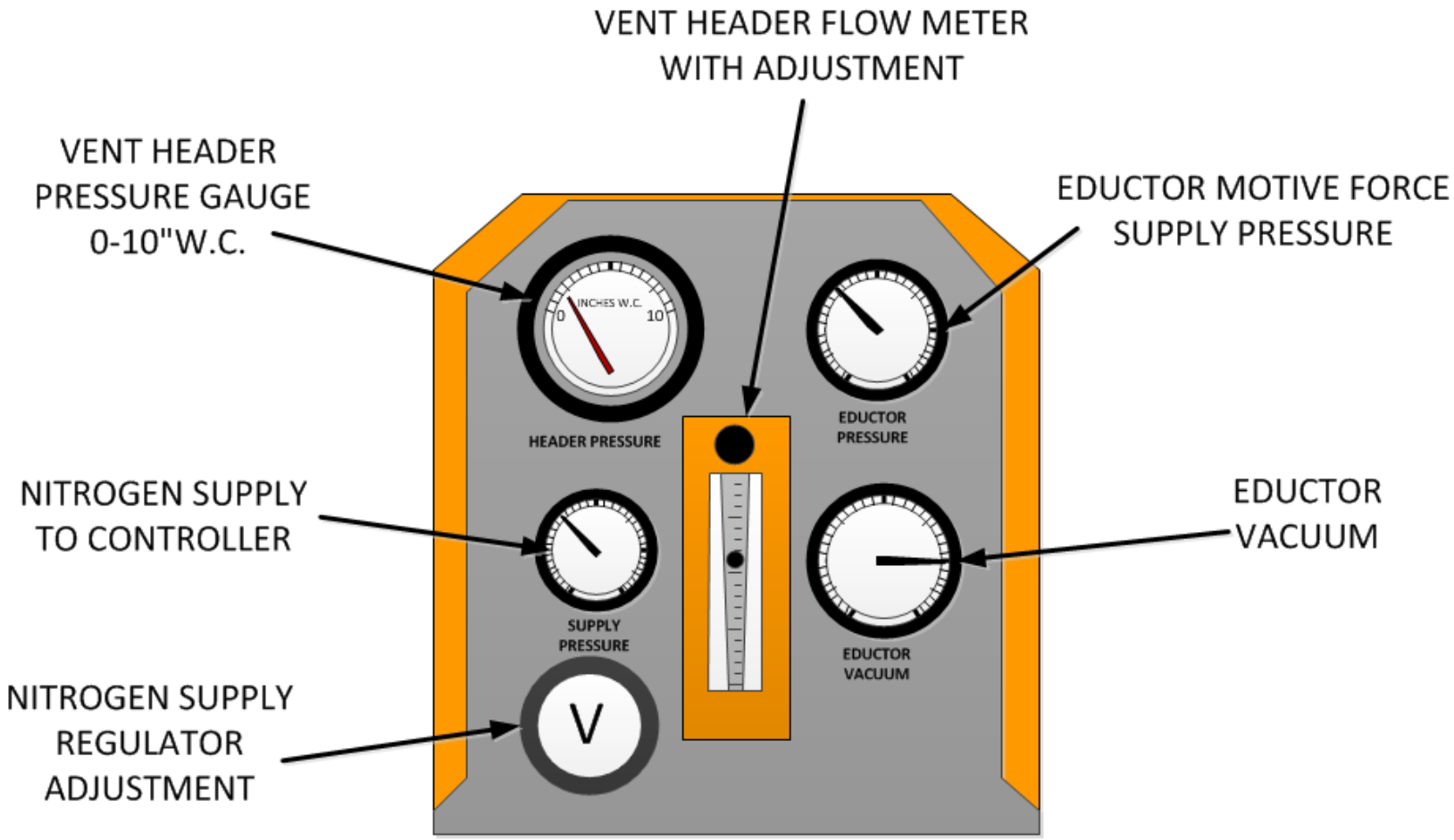
Why? Some analyzers (i.e. O_2, IR, H_2, etc.) are sensitive to pressure fluctuations and require precise pressure control for consistent results. Also, consistent presentation to Analyzers for routine sampling and calibration are essential.

- The Vent Master™ is designed to stabilize analyzer sample return header pressure

How? The Vent Master™ is available with different configurations to address different flow and pressure requirements.

- The Vent Master™ is used to "pump" sample to a low pressure return or flare – eductor, non-bleed eductor, pump or vacuum configurations

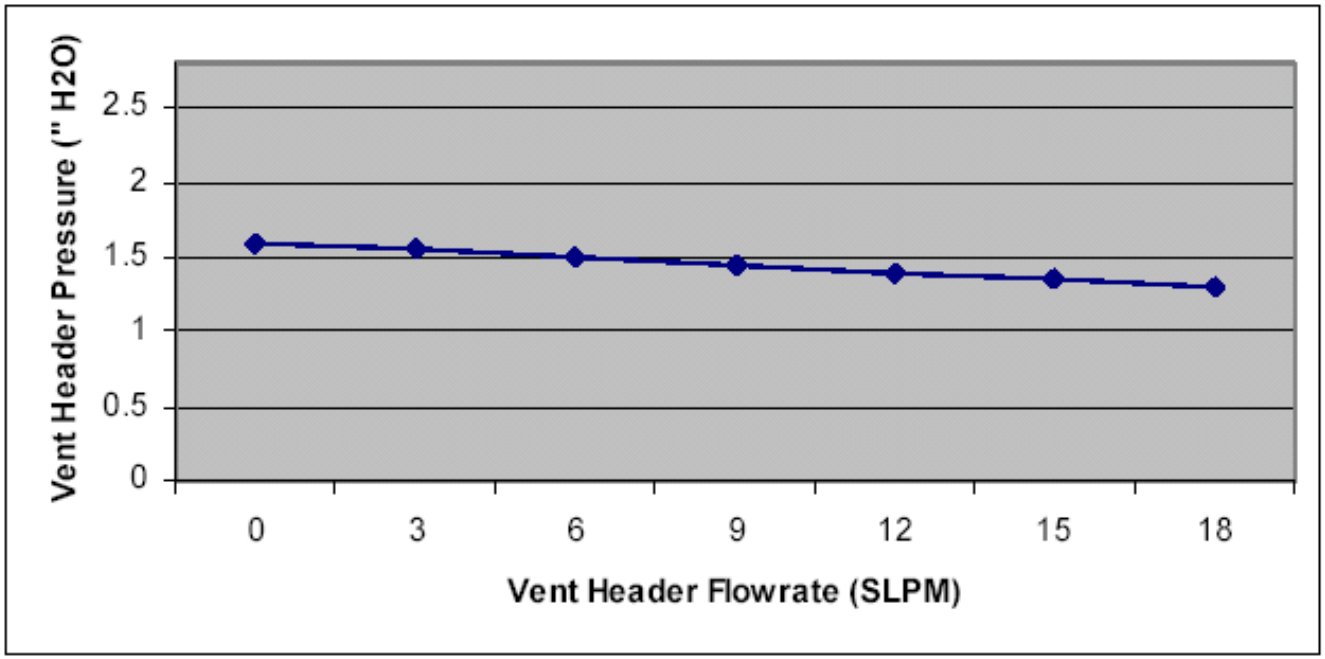
Parker Vent Master™ Components



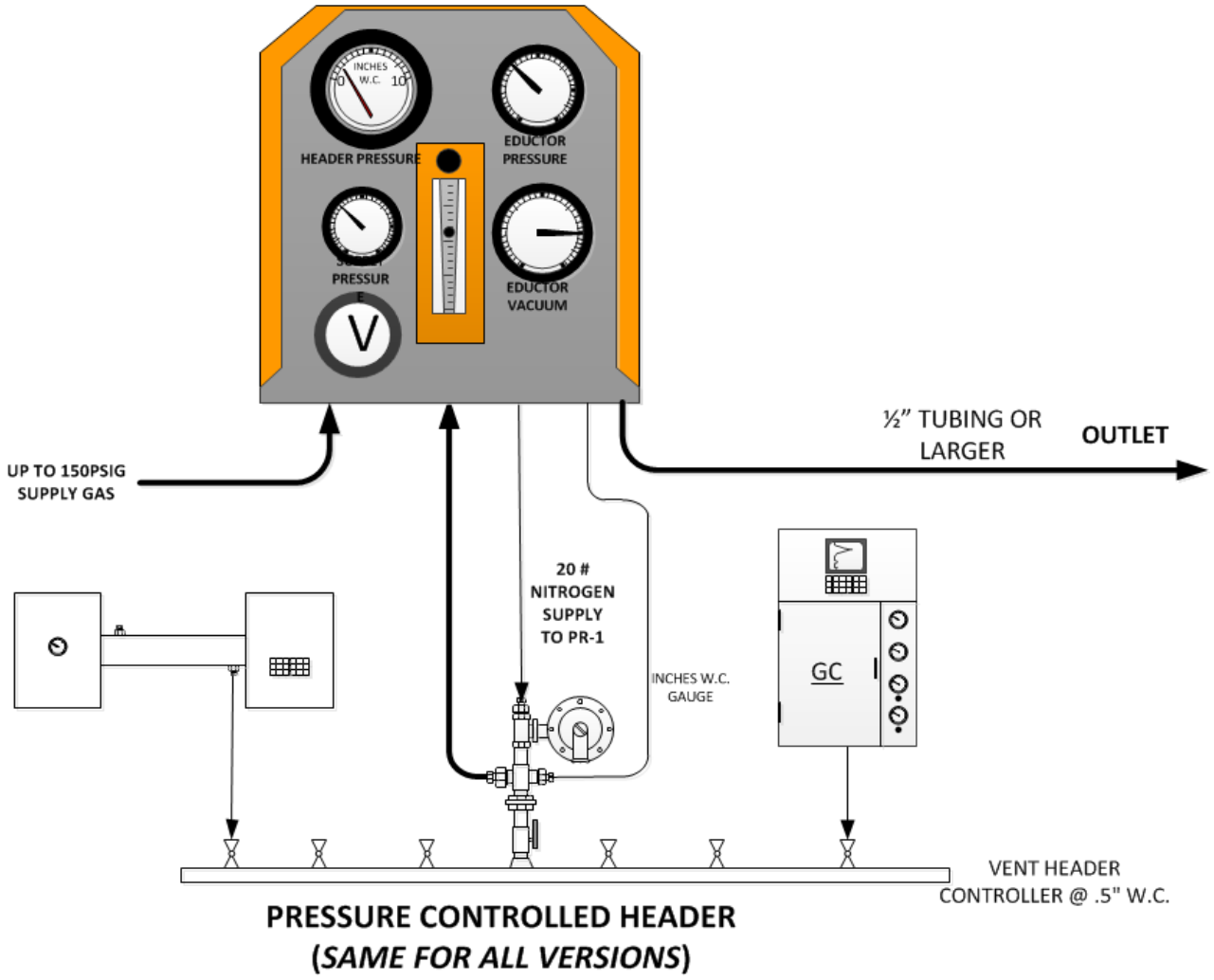
"EDR" MODEL

Parker Vent Master

- **Maintains Vent Header Pressure within 0.3” H_2O pressure over flow rate and pressure fluctuation range parameters**



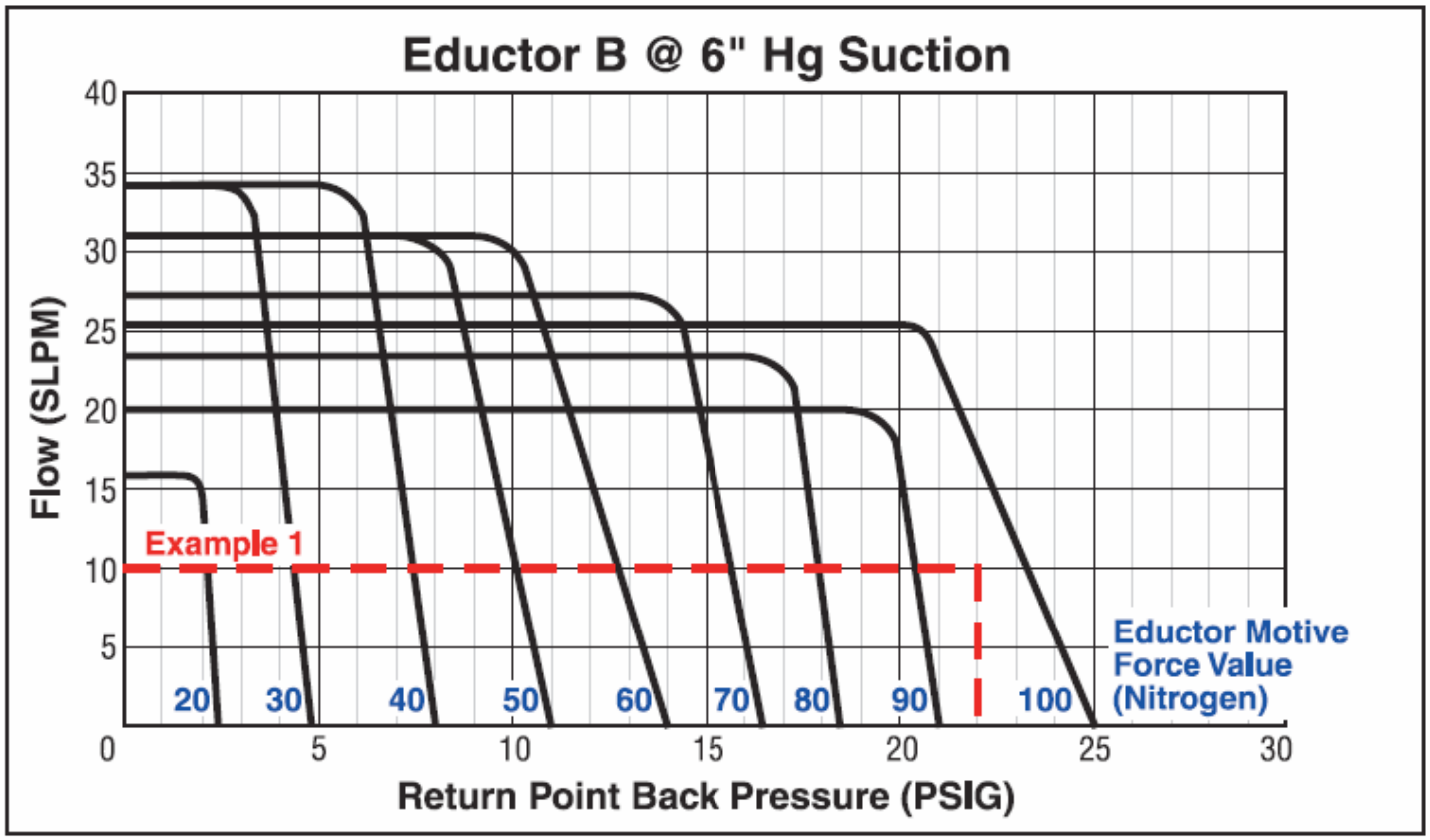
EDUCTOR MODEL (EDR)



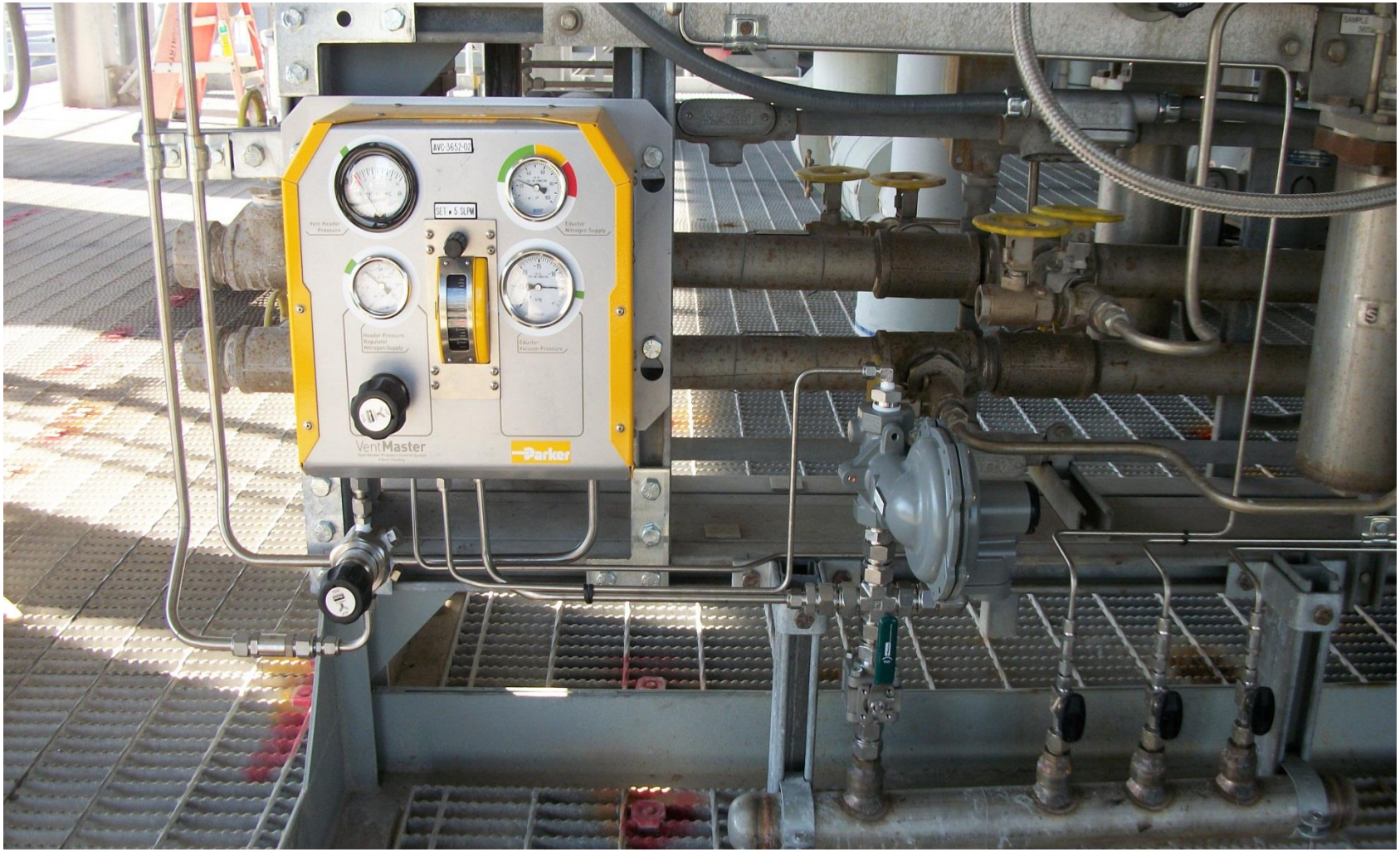
PRESSURE CONTROLLED HEADER
(SAME FOR ALL VERSIONS)

Vent Master™ Application Example

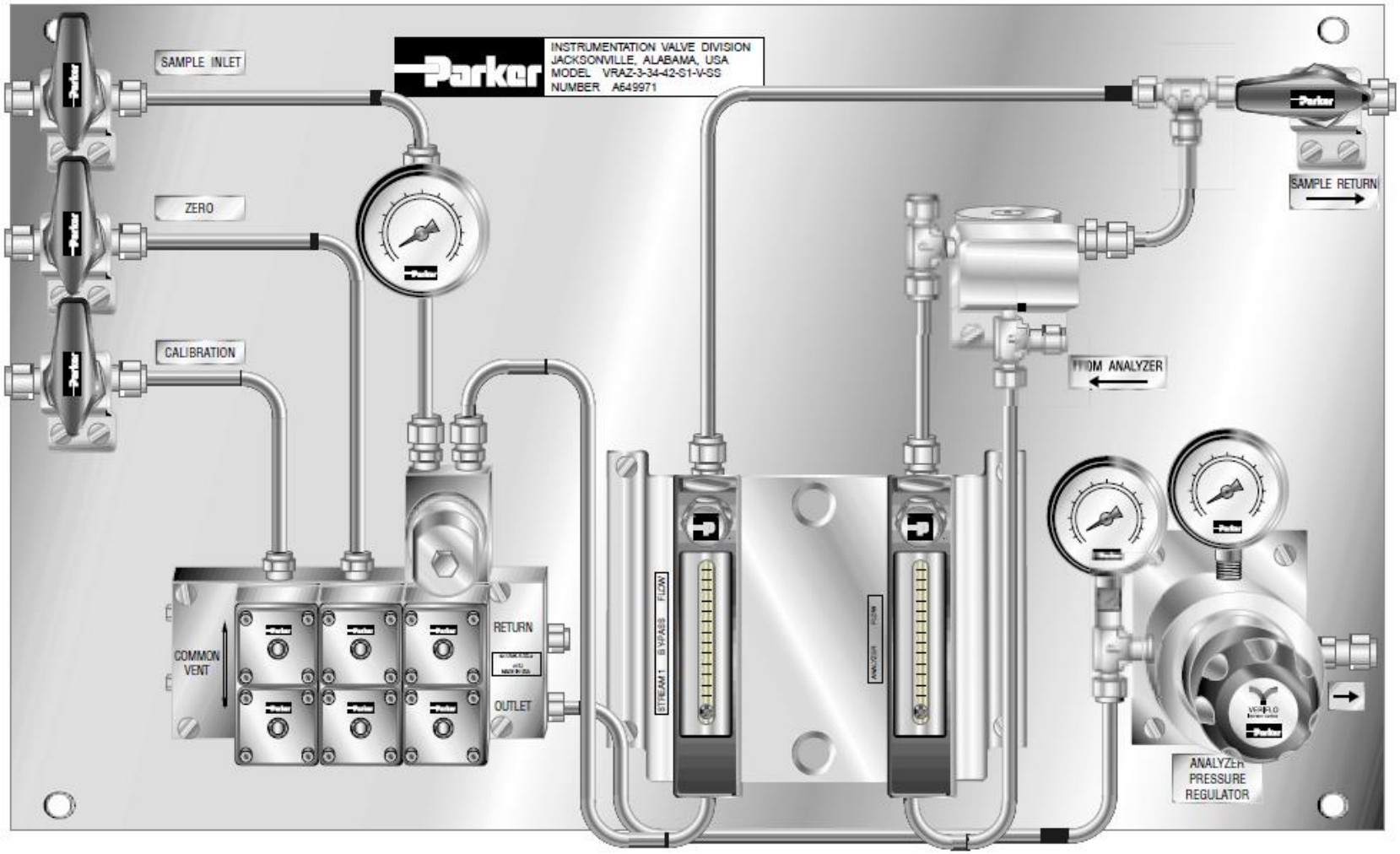
An analyzer shelter has 8 different continuous analyzers each flowing 1 SLPM; allowing for a Nitrogen makeup cushion of 2 SLPM, the total flow is 10 SLPM. The return point is the flare header that typically runs at a pressure of 1-2 psig, but process upsets can spike this pressure as high as 22 psig. A bulk Nitrogen source with 90 psig is available for the motive force.



Application Example



Parker Vent Recovery Panel: Pressure Control



Questions?