

SEMI-GAS® Centurion™
Gas Source Panels/Manifolds

Matheson Tri-Gas' SEMI-GAS® Gas Source Panels/Manifolds pioneered specialty gas handling technology over 20 years ago. Today, these panels continue to deliver the safety, performance and reliability required in the most advanced semiconductor production and R&D environments. Matheson Tri-Gas now has one of the largest installed bases of gas handling equipment worldwide.

Engineered to Outperform

Gas Source Panels are engineered to deliver the performance required in the manufacturing of the most advanced electronic devices. This is achieved by a streamlined gas flow path with minimized internal volume and unswept space. In addition, only field proven components manufactured from electropolished 316L stainless steel are utilized. Whether the gas is toxic, flammable, corrosive or inert, Matheson Tri-Gas has a gas source panel that will deliver the highest process purity, improving product performance and reducing the overall cost of ownership.

Reliability Built In

With the high cost of downtime, Matheson Tri-Gas recognizes the need for a gas source panel that requires minimal maintenance. Because of this need, Gas Source Panels are engineered for long-term performance. At Matheson Tri-Gas' ISO 9001 certified facility, panels are assembled using only qualified components in a cleanroom environment. As part of a comprehensive quality assurance program, each panel is rigorously tested for proper performance, first at the component level, then on the panel, and finally after installation in the cabinet.

In the field, Matheson Tri-Gas' SEMI-GAS® Gas Source Panels have the best reliability record in the industry. Components are clearly labeled and easily accessible from the front panel for improved serviceability. In addition, the modular design reduces spare part stocking requirements and makes adding options easy.

Features and Benefits

- Compact and efficient internal flow path minimizes dead space for consistent, repeatable, high purity operation.
- Automatic switchover capability provides critical redundancy and guaranteed uptime.
- Vacuum venturi – assisted purging provides quick and efficient evacuation of the manifold.
- Front removable components simplify maintenance.
- Continuous purge gas bleed during cylinder changes prevents atmospheric contamination of the pigtail.
- Modular design reduces lead times and spare part stocking requirements and makes adding options easy.
- Leak tested and certified to $<1 \times 10^{-9}$ sccs
- Isolated electronic components
- All orbital automated butt-welded construction
- Opposing pigtail brackets to prevent the transmission of force to the VCR connection
- Excess flow protection
- Emergency Shutoff Valve (ESO) for all HPM applications
- Intuitive designs reduce the potential for operator error



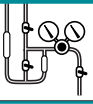
With ever smaller line width challenges in the electronics industries, gas purity is paramount. The CENTURION™ Gas Source Manifold represents the next generation of ultra pure gas source manifolds designed specifically for use in submicron fabrication environments.

Utilizing springless diaphragm valves, pressure transducers, and tied diaphragm regulators, the CENTURION™ Manifold is engineered to eliminate contamination of the source supply of specialty gases. An in-line architecture, unique to Matheson Tri-Gas, and a compact modular design reduce the dead space volume compared to other high-purity manifold configurations.

The result is a manifold with excellent purge efficiency providing maximum protection for both your operators and your processes.

The CENTURION™ Gas Source Manifold design is ideal for supplying specialty gases to process tools that manufacture the most challenging nanotechnology applications. The system is available in a variety of process-specific configurations.

- Auto-Purge Manifolds designed for flammable, toxic, pyrophoric or corrosive HPM gases.
- Safety protected manual manifolds with Emergency Shutoff features for lower cost HPM applications..
- Manual and Auto-Purge Manifolds for inert process gases.



SEMI-GAS® Centurion™ (continued)

Gas Source Panels/Manifolds

Standard Features

- Springless diaphragm valves
- Tied diaphragm regulators
- Pressure transducers
- Gas specific pre-filter
- Excess flow switch
- Purge and vent transducer
- Manifold purity validation

Options

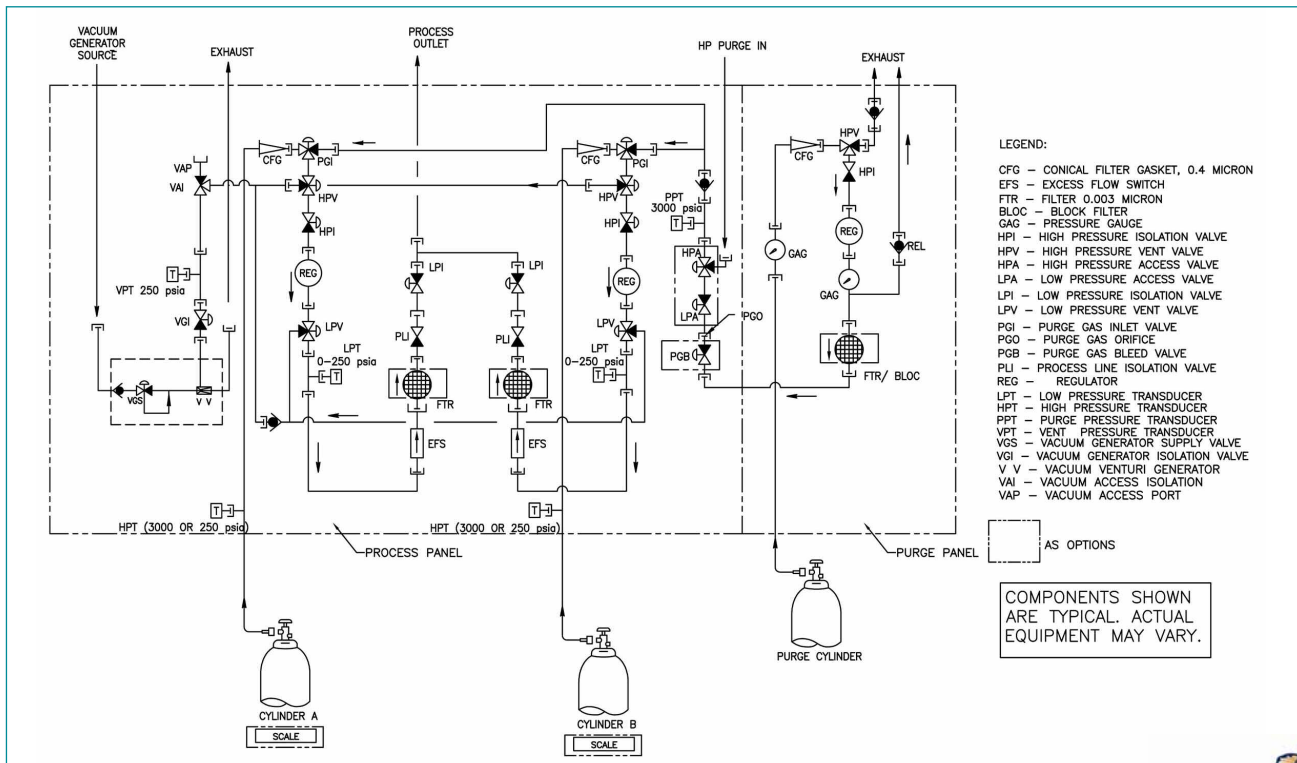
- Manifold purity certification
- High pressure leak test
- Vacuum access port
- Damage control configurations
- Dual isolation valves
- NANO-CHEM® purge gas purification
- All-metal final filter
- Coaxial process outlet
- Auto guard
- Purge gas bleed
- Mass flowmeter

Specifications

| | |
|------------------------------------|----------------------------|
| Inboard leak rate: | <1 x 10 ⁻⁹ sccs |
| Outboard leakage: | <2 ppm He above background |
| Particulates per ft ³ : | |
| 0.1-0.3 μm | <5 Counts |
| >0.3 μm | 0 Count |
| Electropolished surface finish: | 5-7μ in Ra Average |
| Moisture: | <10 ppb |
| Oxygen: | <10 ppb |



Gas Delivery Equipment





SEMI-GAS® Centurion™ Cylinder Enclosure Systems (continued)

Features

• Window

Large self-closing, 114" wire-reinforced safety glass window allows exterior lighting inside cabinet and provides quick access to manifold components

• Face shield

Extremely tough polycarbonate sheet improves viewing angle while protecting the operator's face and eyes from injury.

• User interface

Provides centralized and convenient access to critical cabinet information.

• Door louvers

Provides air intake at door bottom.

• Adjustable damper/filter

Filter diffuses air throughout enclosure. User-selectable damper for control of airflow.

• Steel construction

Enclosures are manufactured from 11 gauge steel, all-welded construction. Paint is polyurethane, light gray with dark gray trim.

• Door

Self-closing, self-latching beveled door with gasket provides tight seal to eliminate leaks.

• Fire sprinkler head

UL approved/beeswax coated with 155° F actuation temperature.

• Cyl-Safe™ cylinder mounting bracket

Heavy steel bracket holds cylinders 6" to 11" in diameter. Equipped with polypropylene strap and chrome steel safety chain.

• Cylinder booster shelf (not shown)

Adjustable shelf for cylinders up to 34" tall. Raises cylinder to properly align with pigtail cylinder connection. Mounts directly to back wall of enclosure.

• Floor material

Durable, corrosion-proof, non-skid material prevents damage to enclosure floor. Also helps secure cylinder scale for easy cylinder removal and replacement.

• Cylinder scale ramp (not shown)

Allows easy installation and removal of cylinder.



Gas Delivery Equipment

Cylinder Enclosure Specifications

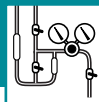
| Cabinet Model | Exhaust Duct Diameter Size | (With Window Open) | | Window Opening (sq. inches) | (With Window Closed) | | Dimensions in inches (cm) W x D x H | |
|---------------|----------------------------|--------------------|---------------------|-----------------------------|----------------------|-----------------|--|----------------|
| | | Duct Flow (scfm) | Duct Velocity (fpm) | | Max Flow (scfm) | Min Flow (scfm) | | |
| 1CE | 6" | 350 | 1,780 | 72 | 150 | 50 | 15x23x87 | (38x58x221cm) |
| 2CE | 6" | 350 | 1,780 | 187 | 200 | 75 | 25x23x87 | (64x58x221cm) |
| 3CE | 8" | 550 | 1,575 | 259 | 320 | 100 | 40x23x87 | (102x58x221cm) |
| 1CE-200 | 8" | 850 | 2,435 | 72 | 500 | 425 | 15x23x87 | (38x58x221cm) |

Maximum flow is with fully-open damper on door. Minimum flow is with closed damper. Exhaust sizing should be based on maximum flow.

Minimum static pressure requirement at enclosure exhaust connection is -0.4 in. H₂O except for 1CE-200 which is at -1.00 in. H₂O.

Damper on 1CE-200 must be adjusted to meet the 200 fpm ventilation velocity as required by the Uniform Fire Code.

Height dimension includes controller.



SEMI-GAS® CONSUL™ Programmable Logic Controller Powered by a Siemens S7-300 PLC



Matheson Tri-Gas' newest line of fully automated SEMI-GAS® Gas Cabinet Systems are designed to meet the industry needs for totally integrated systems. The CONSUL™ System is a proven PLC design that is the benchmark throughout the industry today. Integration of the Programmable Controller ensures customers the highest reliability, safety, ultra high purity and ease of use with cost effectiveness. It also provides the flexibility in control and communication with today's building safety systems.

For years, thousands of users have used Siemens products in industrial and electronic control systems. These robust PLC controllers were reserved for the more complex industrial tasks where uptime, repeatability and reliability were key factors. Now, with new compact packaging, Matheson Tri-Gas engineering successfully achieves all of the customer quality requirements identified for total industry acceptance. From the simplest single source system to highly integrated process and purge panel assemblies, the CONSUL™ System is ready to meet the most stringent demands.

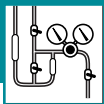
The new CONSUL™ System brings forward all the safety and operating features you have come to expect from Matheson Tri-Gas.

Features and Benefits

Integrated menu driven color touch screen display monitors critical parameters and performs all operations

- Feature-based password access
- Proven automated purge procedures for all aspects of maintenance and operations
- Multi-source switchover for uninterrupted gas supply
- Flexible communications capabilities for ease of integration into building control systems
- Modular architecture to tailor each controller to the equipment requirements
- Full time graphical status of the panel and operation parameters
- Fully automated procedures for cylinder change, component replacement and tool relocation and additions
- Comprehensive alarm log for post incident troubleshooting
- Sensor feed back tests each procedure step to ensure all critical parameters are met each time
- Full operator prompts to ensure each operation is performed correctly regardless of personnel experience level
- Strong field service support with worldwide capability
- Low pneumatic pressure detection prevents process gas interruption
- PLC and touch screen are approved and certified for UL, CSA, NEC Class 1 Div 2 and CE Marked

The following describes the hardware available on the CONSUL™ controller. Thanks to the modular design of these controllers additional input or output features can be added for each customer specific application.



SEMI-GAS® CONSUL™ Programmable Logic Controller *(continued)*

| Component | Size or Quantity | Purpose |
|-------------------------------|---|--|
| Programmable Logic Controller | 128 K Memory | <ul style="list-style-type: none"> • Performs all automated operations. Monitors, annunciates and responds to all alarm conditions. Provides MPI serial communication |
| Digital inputs | 24 | <ul style="list-style-type: none"> • Monitors internal and external alarm sensors |
| Digital outputs | 48 | <ul style="list-style-type: none"> • Controls status lights, horns, and valves |
| Analog inputs | 12 | <ul style="list-style-type: none"> • Monitors scales and pressure transducers |
| Graphical user interface | 12" diagonal TFT color LCD touch screen | <ul style="list-style-type: none"> • Active graphical operator interface, built into the door, monitors and controls all equipment operations |
| | 7.4" diagonal passive matrix touch screen | <ul style="list-style-type: none"> • Reduced size for single cylinder enclosures |

These are available engineered options to any CONSUL™ controller to enhance its control capabilities.

| Option | Value Added Benefits |
|------------------------|--|
| Ethernet module | <ul style="list-style-type: none"> • Provides connectivity with Ethernet/IP SCADA systems |
| NANOCHEM® purification | <ul style="list-style-type: none"> • Integrates purification into a CENTURION™ purge gas panel |
| Z-PURGE | <ul style="list-style-type: none"> • Provides Class I Div 2 controller compliance |
| Fire detector | <ul style="list-style-type: none"> • Fully integrated sensor for real time monitoring and control of flammable or pyrophoric gas flames |
| Auto-Guard | <ul style="list-style-type: none"> • Covers CGA nut until proper prepurge is complete |