SEMI-GAS® Centurion™
Gas Source Panels/Manifolds and Cylinder Enclosure Systems
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 in the panel, and finally after installation on 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 <1x10⁻⁹ 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.

### 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
- NANOCHEMP® purge gas purification
- All-metal final filter
- Coaxial process outlet
- Auto guard
- Purge gas bleed
- Mass flowmeter

### Specifications
- **Inboard leak rate:** $<1 \times 10^{-9}$ sccs
- **Outboard leakage:** $<2$ ppm He above background
- **Particulates per ft³:**
  - $0.1-0.3 \mu m <5$ Counts
  - $>0.3 \mu m$ 0 Count
- **Electropolished surface finish:** 5-7μ in Ra Average
- **Moisture:** $<10$ ppb
- **Oxygen:** $<10$ ppb

---

![Diagram of CENTURION Gas Source Manifold](image.png)

**LEGEND:**
- GFS — CONICAL FILTER GASKET, GA-MOTION
- EP — EXCESS FLOW SWITCH
- BUC — BLOCK FILTER
- HP — HIGH PRESSURE GAUGE
- HPV — HIGH PRESSURE ISO VALVE
- HPV — HIGH PRESSURE ISO VALVE
- HPA — HIGH PRESSURE ISO VALVE
- LPV — LOW PRESSURE ISO VALVE
- LPV — LOW PRESSURE ISO VALVE
- PPR — PURGE GAS INLET VALVE
- PPR — PURGE GAS INLET VALVE
- PGB — PURGE GAS BLEED VALVE
- PPV — PROCESS LINE ISO VALVE
- REG — REGULATOR
- LGT — LOW PRESSURE TRANS. REG.
- HP — HIGH PRESSURE TRANS. REG.
- HP — HIGH PRESSURE TRANS. REG.
- VD — VACUUM GENERATOR VALVE
- VG — VACUUM Generator VALVE
- VP — VACUUM GENERATOR VALVE
- VAP — VACUUM GENERATOR VALVE

**COMPONENTS SHOWN ARE TYPICAL, ACTUAL EQUIPMENT MAY VARY.**
SEMIGAS® Centurion™ Cylinder Enclosure Systems

Matheson Tri-Gas Redefines The Traditional "Gas Cabinet"

As the worldwide leading supplier of specialty gases and equipment for over 75 years, Matheson Tri-Gas understands the safe handling requirements for the gases used in today’s semiconductor manufacturing environment. This legacy continues with the SEMI-GAS® Cylinder Enclosure Systems that pioneered and redefined the storage and handling of toxic, corrosive, flammable and reactive gases and liquids. Today this expertise translates into providing unsurpassed utility, flexibility, performance and safety in the design and manufacture of cylinder enclosures.

Engineered to comply with all building and fire codes SEMI-GAS® Cylinder Enclosure Systems are fabricated from 11-gauge cold rolled sheet steel and are available in one-, two- and three-cylinder configurations.

• Efficient Air Flow, Reduced Exhaust Needs

By improving door and window seals, adding diffused air inlets and repositioning elements within the enclosure, air flow efficiency is maximized, and scrubbed exhaust capacity is minimized. In addition, continuous, efficient ventilation ensures potentially harmful gases do not accumulate within the enclosure.

By reducing exhaust requirements the SEMI-GAS® Cylinder Enclosure Systems translate into substantial cost savings in scrubbed exhaust equipment. And when enclosures are installed in a temperature controlled environment, reductions in conditioned air flow add to the savings.

• Improved Visibility

Limited light sources found in many gas rooms reduce visibility within the cylinder enclosure making manifold operation and maintenance more difficult. Matheson Tri-Gas’ SEMI-GAS® Cylinder Enclosure Systems feature large self-closing windows and a light interior color to maximize internal lighting and improved visibility.

• Central Information Location

Access to information is critical when handling hazardous materials. The SEMI-GAS® Cylinder Enclosure Systems are designed to provide clear, easy-to-read information where it is needed most, on the front of the door. Gas labels are mounted on the safety glass and the controller interface on the door for easy viewing, which meets SEMI S-8 requirements.

• Customer Driven Design

In addition to the minimum industry building, fire and safety codes, the SEMI-GAS® Cylinder Enclosure Systems incorporate numerous customer-driven value-added features that improve operability, reliability, and maintainability.

• High Flow Silane Gas Cabinets

Silane is a pyrophoric gas that has a tendency to accumulate in areas with low air flow, and the result can be explosive. Matheson Tri-Gas provides a gas cabinet specifically engineered to address the hazards of handling silane and silane mixtures. Each cylinder is housed in its own enclosure and a ventilation velocity of 200 feet per minute (fpm) is achieved across manifold connections by using an additional air intake and an enlarged 8-inch diameter exhaust duct.
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.

### Cylinder Enclosure Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1CE</td>
<td>6&quot;</td>
<td>350</td>
<td>1,780</td>
<td>72</td>
<td>150</td>
<td>50</td>
<td>15x23x87 (38x58x221cm)</td>
</tr>
<tr>
<td>2CE</td>
<td>6&quot;</td>
<td>350</td>
<td>1,780</td>
<td>187</td>
<td>200</td>
<td>75</td>
<td>25x23x87 (64x58x221cm)</td>
</tr>
<tr>
<td>3CE</td>
<td>8&quot;</td>
<td>550</td>
<td>1,575</td>
<td>259</td>
<td>320</td>
<td>100</td>
<td>40x23x87 (102x58x221cm)</td>
</tr>
<tr>
<td>1CE-200</td>
<td>8&quot;</td>
<td>850</td>
<td>2,435</td>
<td>72</td>
<td>500</td>
<td>425</td>
<td>15x23x87 (38x58x221cm)</td>
</tr>
</tbody>
</table>

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.
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 feedback 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
- 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.

<table>
<thead>
<tr>
<th>Component</th>
<th>Size or Quantity</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmable Logic</td>
<td>128 K Memory</td>
<td>Performs all automated operations, Monitors, annunciates and responds to all alarm conditions, Provides MPI serial communication</td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital inputs</td>
<td>24</td>
<td>Monitors internal and external alarm sensors</td>
</tr>
<tr>
<td>Digital outputs</td>
<td>48</td>
<td>Controls status lights, horns, and valves</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>12</td>
<td>Monitors scales and pressure transducers</td>
</tr>
<tr>
<td>Graphical user interface</td>
<td>12” diagonal TFT color LCD touch screen</td>
<td>Active graphical operator interface, built into the door, monitors and controls all equipment operations</td>
</tr>
<tr>
<td></td>
<td>7.4” diagonal passive matrix touch screen</td>
<td>Reduced size for single cylinder enclosures</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Value Added Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet module</td>
<td>• Provides connectivity with Ethernet/IP SCADA systems</td>
</tr>
<tr>
<td>NANOCHENM® purification</td>
<td>• Integrates purification into a CENTURION™ purge gas panel</td>
</tr>
<tr>
<td>Z-PURGE</td>
<td>• Provides Class I Div 2 controller compliance</td>
</tr>
<tr>
<td>Fire detector</td>
<td>• Fully integrated sensor for real time monitoring and control of flammable or pyrophoric gas flames</td>
</tr>
<tr>
<td>Auto-Guard</td>
<td>• Covers CGA nut until proper prepurge is complete</td>
</tr>
</tbody>
</table>
To place an order, or to obtain more information, please contact our Customer Service Center for your area:

**CUSTOMER SERVICE CENTERS**

**GAS SYSTEMS AND EQUIPMENT**

**WORLDWIDE EQUIPMENT TECHNOLOGY CENTER**

166 Keystone Drive
Montgomeryville, PA 18936
Phone: 800-828-4313
Fax: 215-619-0458
Email: info@matheson-trigas.com

**SPECIALTY GAS AND EQUIPMENT GROUP**

166 Keystone Drive
Montgomeryville, PA 18936
Phone: 215-641-2700

**ELECTRONIC GAS GROUP**

1525 Walnut Hill Lane, Suite 100
Irving, TX 75038
Phone: 972-870-7000

**ELECTRONIC GASES**

16775 Central Avenue
Newark, CA 94560
Phone: 510-793-2559
Fax: 510-790-6241
Email: mtgnewark@matheson-trigas.com

22200 Houston Avenue
Houston, TX 77007
Phone: 713-869-7351
Fax: 713-869-0994
Email: mtghouston@matheson-trigas.com

166 Keystone Drive
Montgomeryville, PA 18936
Phone: 800-416-2505
Fax: 215-619-0458
Email: info@matheson-trigas.com

**INTERNATIONAL**

6775 Central Avenue
Newark, CA 94560
Phone: 510-793-2559
Fax: 510-790-6241
Email: mtgexports@matheson-trigas.com

**MATERIAL SAFETY DATA SHEETS (MSDS)**

Data Sheets for gases can be downloaded from the Matheson Tri-Gas, Inc. Web site at www.mathesontrigas.com/msds

**ELECTRONIC GAS GROUP**

6775 Central Avenue
Newark, CA 94560
Phone: 510-793-2559
Fax: 510-790-6241
Email: mtgnewark@matheson-trigas.com

2550 Kyle Crossing
Kyle, TX 78640
Phone: 512-262-2129
Fax: 512-262-4011
Email: mtgkyle@matheson-trigas.com

**EUROPE**

Linde Nippon Sanso GmbH & Co. KG
Hoeffgeshofweg 10
47807 Krefeld
Germany
Phone: +49 2151 82097 0
Fax: +49 2151 82097 98
Email: contact@linde-nippon-sanso.de

**KOREA**

Matheson Gas Products Korea
91 Samgu-ri
Enmboong-myon
Asan, Choongnam
Phone: +82-41-539-7400
Fax: +82-41-539-7499
Email: cynthia@mgpk.co.kr

**OTHER INTERNATIONAL LOCATIONS**

6775 Central Avenue
Newark, CA 94560
Phone: 510-793-2559
Fax: 510-790-6241
Email: mtgexports@matheson-trigas.com

**GENERAL INQUIRIES**

info@matheson-trigas.com

**24 HOUR EMERGENCY ASSISTANCE**

CHEMTREC
Phone: 800-424-9300