



**Gas Purifiers**



**Pressure Regulators**

**GSA** Advantage!<sup>®</sup>  
[www.gsaadvantage.gov](http://www.gsaadvantage.gov)



**Gas Filters**



**Flow Measurement & Control**

# Matheson Gas Handling Equipment Now Available Through GSA



**Gas Detection & Monitors**



**MATHESON  
TRI•GAS**

ask...The Gas Professionals™

[www.mathesontrigas.com](http://www.mathesontrigas.com)



**Gas Generators**



**Gas Delivery Equipment**

## *GSA Price List*

Prices Shown Herein are Net (Discount has been deducted)

GENERAL SERVICES ADMINISTRATION  
FEDERAL SUPPLY SERVICE  
AUTHORIZED FEDERAL SUPPLY SCHEDULE PRICE LIST

On-line access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order are available through GSA *Advantage*™ a menu-driven database system. The INTERNET address for GSA *Advantage*™ is: [www.gsaadvantage.gov](http://www.gsaadvantage.gov).

**Schedule Title:** Schedule 66, Scientific Equipment & Services; Test and Measurement Equipment, Unmanned Scientific Vehicles; Laboratory Instruments, Furnishings and LIMS; Geophysical and Environmental Analysis Equipment; and Mechanical, Chemical, Electrical, and Geophysical Testing Services.

**Contract Number:** GS-07F-0460U

SIN 615-4 Gas Chromatograph (GC) and Chromatograph/Mass Spectrometer (GC-MS) Systems  
SIN 615-9 Liquid Chromatograph (LC) and Liquid Chromatograph/Mass Spectrometer (LC-MS) Systems  
SIN 66-616 Liquid/Gas Flow Measuring Instruments, Liquid Level Measuring Instruments  
SIN 540-21 Filter Elements  
SIN 66-619 Stack Emission Measuring Equipment, Gas Analyzers, Monitors, Particle Analyzers/Detectors

**Contract Period:** July 15, 2008 – July 14, 2013

For more information on ordering from Federal supply schedules click on the FSS Schedules button at [www.fss.gsa.gov](http://www.fss.gsa.gov).

Matheson Tri-Gas, Inc  
166 Keystone Drive  
Montgomeryville, Pa 18936  
Phone: 215-641-2700  
Fax: 215-619-0458  
Email: [icolon@matheson-trigas.com](mailto:icolon@matheson-trigas.com)  
[www.mathesontrigas.com](http://www.mathesontrigas.com)

**BUSINESS SIZE:** Large Manufacturer

**Customer Information**

**1a. TABLE OF AWARDED SPECIAL ITEM NUMBERS (SINs)**

<u>SIN</u>	<u>DESCRIPTION</u>
SIN 615-4	Gas Chromatograph (GC) and Chromatograph/Mass Spectrometer (GC-MS) Systems
SIN 615-9	Liquid Chromatograph (LC) and Liquid Chromatograph/Mass Spectrometer (LC-MS) Systems
SIN 66-616	Liquid/Gas Flow Measuring Instruments, Liquid Level Measuring Instruments
SIN 540-21	Filter Elements
SIN 66-619	Stack Emission Measuring Equipment, Gas Analyzers, Monitors, Particle Analyzers/Detectors

**1b. LOWEST PRICED MODEL NUMBER AND PRICE FOR EACH SIN:**

<u>SIN</u>	<u>MODEL</u>	<u>PRICE</u>
SIN 615-4	MFTR-0287-XX	\$ 20.25
SIN 615-9	MREG-5242-BA	\$111.93
SIN 66-616	MINS-0001-SA	\$ 2.46
SIN 540-21	MFTR-0227-XX	\$ 19.68
SIN 66-619	MDET-0071-XX	\$ 7.38

- 2. MAXIMUM ORDER\*:** \$400,000 per SIN 615-4,615-9, 540-21  
\$300,000 per SIN 66-616, 66-619

\*If the best value selection places your order over the Maximum Order identified in this catalog/pricelist, you have an opportunity to obtain a better schedule contract price. Before placing your order, contact the aforementioned contactor for a better price. The contractor may (1) offer a new price for this requirement (2) offer the lowest price available under this contract or (3) decline the order. A delivery order that exceeds the maximum order may be placed under the schedule contract in accordance with FAR 8.404.

- 3. MINIMUM ORDER:** none

- 4. GEOGRAPHIC COVERAGE:** Domestic 48 states, Alaska, Hawaii, Puerto Rico, Washington, DC and U.S. Territories and to a CONUS port or consolidation point for orders received from overseas activities

- 5. POINT (S) OF PRODUCTION:**

- 6. DISCOUNT FROM LIST PRICES:** For calculation of the GSA Schedule price (price paid by customers ordering from the GSA Schedule, and the price to be loaded in to GSA Advantage), the contractor should deduct the appropriate basic discount from the list price and add the prevailing IFF rate to the negotiated discounted price (NET GSA price). Current IFF rate is 0.75%

- 7. QUANTITY DISCOUNT(S):** NONE

- 8. PROMPT PAYMENT TERMS:** 0% NET 30 DAYS

- 9.a Government Purchase Cards must be accepted at or below the micro-purchase threshold**

- 9.b **Government Purchase Cards are accepted above the micro-purchase threshold.**
- 10. **FOREIGN ITEMS:** none
- 11a. **TIME OF DELIVERY:** Shipped 10 days after receipt of order
- 11b. **EXPEDITED DELIVERY:** with confirming telephone call
- 11c. **OVERNIGHT AND 2-DAY DELIVERY:** with confirming telephone call
- 11d. **URGENT REQUIRMENTS:** Agencies can contact the Contractor’s representative to effect a faster delivery. Customers are encouraged to contact the contractor for the purpose of requesting accelerated delivery.
- 12. **FOB POINT:** Destination to 48 contiguous State, Alaska, Hawaii, Puerto Rico and Washington DC.
- 13a. **ORDERING ADDRESS:** **Matheson Tri-Gas, Inc**  
166 Keystone Drive  
Montgomeryville, Pa 18936
- 14. **PAYMENT ADDRESS:** **Matheson Tri-Gas, Inc**  
21984 Network Place  
Chicago, IL 60673-1219
- 15. **WARRANTY PROVISION:** Standard Commercial Warranty. Customer should contact contractor for a copy of the warranty.
- 16. **EXPORT PACKING CHARGES:** Not applicable
- 17. **TERMS AND CONDITIONS OF GOVERNMENT PURCHASE CARD ACCEPTANCE:**  
below the micro-purchase level
- 18. **TERMS AND CONDITIONS OF RENTAL, MAINTENANCE, AND REPAIR (IF APPLICABLE):** N/A
- 19. **TERMS AND CONDITIONS OF INSTALLATION (IF APPLICABLE):** N/A
- 20. **TERMS AND CONDITIONS OF REPAIR PARTS INDICATING DATE OF PARTS PRICE LISTS AND ANY DISCOUNTS FROM LIST PRICES ( IF AVAILABLE):** N/A
- 20a. **TERMS AND CONDITIONS FOR ANY OTHER SERVICES ( IF APPLICABLE):** N/A
- 21. **LIST OF SERVICE AND DISTRIBUTION POINTS ( IF APPLICABLE):** N/A
- 22. **LIST OF PARTICIPATING DEALERS (IF APPLICABLE):** N/A
- 23. **PREVENTIVE MAINTENANCE (IF APPLICABLE):** N/A



- 24a. SPECIAL ATTRIBUTES SUCH AS ENVIRONMENTAL ATTRIBUTES (e.g. recycled content, energy efficiency, and/or reduced pollutants): N/A**
- 24b. Section 508 Compliance for EIT: N/A**
- 25. DUNS NUMBER: 179092028**
- 26. NOTIFICATION REGARDING REGISTRATION IN CENTRAL CONTRACTOR REGISTRATION (CCR) DATABASE: Registration valid until March 31, 2009**

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## Introduction

### Filters

Filters are used to remove particulate matter from the gas stream in which they are employed. The ideal placement of filters is just before the point-of-use of the gas, in order to trap any particles generated in the delivery line or from the source. They utilize various types of filtration media for a specific application to limit travel of particulates by size through them. The size (diameter) of the smallest particles removed is expressed as the performance rating of the filter, generally expressed as "microns."

Matheson Tri-Gas offers high purity "depth" filters that provide 100% filtration efficiency at a 0.2 micron level. Membrane and ceramic type filters have a 100% filtration efficiency rating at a .01 micron level.

The useful lifespan of filters varies by application. Particulate size and density in the supply line, coupled with active time (duty cycle) being used, are the primary factors that determine the useful life of the filter. In general, when the pressure drop across the filter (upstream to downstream) increases by approximately 50%, the filter is becoming clogged with particulates and should be replaced.

### Purifiers

Purifiers are used to remove specific chemical components from a gas stream. They function by either catalytic action or by adsorption. Several types of purifiers are expendable (when saturated, must be replaced) and some can be regenerated (they can be reactivated). Purifiers are generally named by the substance they are designed to remove. It is important to realize that purifiers are not filters, which function differently.

Matheson Tri-Gas offers a wide range of purifiers including oxygen removing, moisture removing and oil removing types.

To improve and support laboratory performance, Matheson Tri-Gas now offers PUR-Gas™, an innovative series of cartridge-type and in-line purifiers for point-of-use applications. These systems allow easy replacement of the exhausted cartridges within seconds without the use of any hand tools, thus minimizing operating downtime. The PUR-Gas™ purifiers are available to remove moisture, oxygen and hydrocarbons. In addition, a PUR-Gas™ System for Nitrogen is also available to enhance LC/MS instrument operation.



*PUR-Gas™ Purifier Systems*



*Model 64-1000 Series Oxygen Removing Hydrogen Purifier*



*Model 465  
Moisture & Impurity Indicator*



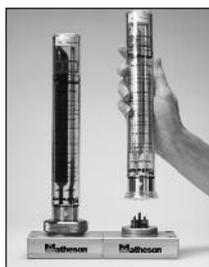
*Model 6410 Series  
Oxygen Absorbing Purifiers*



*Model 450B  
High Pressure / Low Capacity Gas Purifier*



## PUR-Gas™ Cartridge Purifier Systems



*Easy to change cartridge. No tools required.*

### Description

Point-of-use, high-performance gas purifier system designed to provide superior contaminant reduction and utilizes removable purifier cartridges to produce 99.9999% purity. The basic system consists of a purifier cartridge installed on a compatible baseplate. The purifiers can be installed and replaced without interrupting the operating and analytical performance of the system. The metal and glass construction of the purifier cartridges eliminates diffusion of potential contaminants into the gas stream. During replacement of the purifier cartridges, check valves automatically close off the system to the atmosphere, further minimizing the introduction of contaminants.

### Applications

- Point-of-use purification of all gases utilized with the operation of an FID equipped GC.
- Ideal for purification of carrier gases used with GC/MS, ECD, PID and NPD detectors.
- Removal of hydrocarbons and moisture from FID fuel gases.
- Purification of Nitrogen for LC/MS instruments.

### Design Features/Components

- Easy installation enables "no tools required" purifier changeout.
- Multiple purifier baseplates allow customization of the system for specific applications.
- Replacement purifiers can be installed within seconds, minimizing instrument downtime.
- Check valves in baseplate design prevent diffusion of contaminants.
- Removal of hydrocarbons, oxygen and moisture can be performed with a single filter.
- Visual indicator on Moisture and Oxygen cartridges signals changeout to maintain uninterrupted service.

### Baseplate Design & Selection Materials of Construction

	<u>Baseplate</u>	<u>Purifier Cartridge</u>
Body:	Aluminum (Anodized)	Internal Structure: Borosilicate Glass External Housing: Polycarbonate Sleeve
Fittings:	Standard -1/8" Brass Compression Optional - 1/4" Brass, 1/8" or 1/4" SS	—
Locking Ring:	Chrome Plated Aluminum	—
O-Rings:	Viton	—

### Specifications

Maximum Operating Pressure:	150 psig
Maximum Flow Rate:	GCMS Systems: 3 L/min LCMS Systems: 20 L/min

### Dimensions & Weight (L x W x H):

1-position baseplate	3.125" x 3.56" x 1.12" (1.65 lbs)
2-position baseplate	3.125" x 7.87" x 1.12" (3.4 lbs)
3-position baseplate	3.125" x 11.81" x 1.12" (5 lbs)
Purifier Cartridge (new)	1.5" dia. x 10" H (0.60 lbs)
Purifier Cartridge Capacity:	(see table below)

Type of Purifier	Outlet Gas Quality	Usable for	Indicator Color Change	Capacity H <sub>2</sub> O (gr)	O <sub>2</sub> (ml)	Hydrocarbons
Moisture	> 6.0	Inert carrier gas, air, hydrogen	Brown to white	7.2		
Oxygen	> 6.0	Inert carrier gas	Green to grey		1000	
Hydrocarbon	> 6.0	Inert carrier gas, air, hydrogen	No indicator			Not specified
Combi (moisture/hydrocarbon)	> 6.0	Inert carrier gas, air, hydrogen	Brown to white	3.6		Not specified
Triple (moisture/oxygen/hydrocarbon)	> 6.0	Inert carrier gas	Brown to white Green to grey	1.8	500	Not specified

### Purifier System Configurations (refer to illustration below)

The PUR-Gas™ Purifier Systems are available in several baseplate configurations to address a wide variety of analytical applications. The baseplates can be permanently mounted to lab bench surfaces and are available in 1, 2 or 3 purifier positions, allowing the end-user to custom design a gas purifier system for a specific application; or provide the same purifier in a multiple system arrangement to prevent uninterrupted service and changeout convenience.



*Several baseplate designs allow multiple purifier configurations to customize a specific system for your application*

Carrier Gas



**Triple Purifier**  
Moisture/Oxygen/  
HydroCarb

**Triple Kit for MS-ECD-NPD a.o.**  
Triple purifier on 1-position baseplate



1-position baseplate

Hydrogen



**Combi Purifier**  
Moisture/HydroCarb

Air



**Burnergas Kit for FID**  
2x Combi purifier on 2-position baseplate



2-position baseplate

Carrier Gas



**Triple Purifier**  
Moisture/Oxygen/  
HydroCarb

Hydrogen



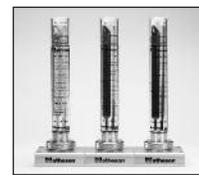
**Combi Purifier**  
Moisture/HydroCarb

Air



**Combi Purifier**  
Moisture/HydroCarb

**Complete Purification Kit I for FID**  
High Capacity: Triple + 2x Combi purifier on 3-position baseplate



3-position baseplate



**Filters & Purifiers**

**Cartridge Changeouts  
are Easy as 1, 2, 3!**



1 Snap cartridge onto base



2 Replace locking ring



3 Tighten locking ring

**Ordering Information**

**Analytical Instrument Gas Purification Systems (Cartridge(s) and Baseplate)**

Model No.	Description	Baseplate Type	Application	Price
PUR-0229	GC/MS Carrier Gas Purification System (includes 1-position baseplate with 1/8" brass fittings and (1) triple purifier cartridge for carrier gas)	1-Position	Standard 1-Position System for purifying the carrier gas used in GC/MS, ECD and NPD detectors	\$247.64
PUR-0233	Same as above with 1/4" Brass fittings			\$340.30
PUR-0237	Same as above with 1/8" SS fittings			\$349.32
PUR-0241	Same as above with 1/4" SS fittings			\$349.32
PUR-0230	GC/MS FID Fuel Gas Purification System (includes 2-position baseplate, with 1/8" brass fittings and (2) combi purifiers for both hydrogen and zero air gases)	2-Position	Standard 2-Position System for purifying both hydrogen and zero air fuel gases used in an FID operated GC	\$469.04
PUR-0234	Same as above with 1/4" Brass fittings			\$506.76
PUR-0238	Same as above with 1/8" SS fittings			\$675.68
PUR-0242	Same as above with 1/4" SS fittings			\$1,060.26
PUR-0231	GC/MS FID Gas Purification System (includes a 3-position baseplate; with 1/8" brass fittings, (1) triple purifier cartridge for carrier gas and (2) combi purifiers for both hydrogen and zero air gases)	3-Position	Standard 3-Position System for purifying all gases used in an FID operated GC	\$697.00
PUR-0235	Same as above with 1/4" Brass fittings			\$749.48
PUR-0239	Same as above with 1/8" SS fittings			\$1,005.32
PUR-0243	Same as above with 1/4" SS fittings			\$1,553.08
PUR-0232	LC/MS Gas Purification System (includes 2-position baseplate, with 1/4" brass fittings and (2) charcoal purifiers for nitrogen gas)	2-Position	Unique 2-Position System for purifying the nitrogen gas utilized in LC/MS instruments	\$477.24
PUR-0244	Same as above with 1/4" SS fittings			\$569.90



Carrier Gas Purification System



FID Fuel Gas Purification System



FID Gas Purification System



LC/MS Nitrogen Gas Purification System

**Replacement Purifier Cartridges**

Model No.	Description	Price
CTG-0050	Moisture Cartridge	\$94.30
CTG-0051	Oxygen Cartridge	\$94.30
CTG-0052	Hydrocarbon Cartridge	\$94.30
CTG-0053	Triple Cartridge (O <sub>2</sub> / H <sub>2</sub> O / HC)	\$104.14
CTG-0054	Combi Cartridge (H <sub>2</sub> O / HC)	\$119.72
CTG-0055	LC/MS Charcoal Cartridge Set (2)	\$184.50
CTG-0056	Moisture 2-Pack Bundle	\$189.42
CTG-0057	Oxygen 2-Pack Bundle	\$189.42
CTG-0058	Hydrocarbon 2-Pack Bundle	\$189.42
CTG-0059	Triple 2-Pack Bundle	\$209.18
CTG-0060	Combi 2-Pack Bundle	\$200.90
CTG-0061	GC/MS Total Gas Purifier Bundle; 1-Triple + 2-Combi Cartridges	\$305.04
CTG-0062	Triple Filter (Helium Packed)	\$129.56
CTG-0063	Triple Filter (Helium Packed), 2 Pack Bundle	\$261.58

Prices and Specifications Subject to Change without Notice



**PUR-Gas™ Cartridge Purifier Systems** *(continued)*

**Ordering Information**

**System Baseplates** *(No purifier cartridges included; customize your own design)*

Model No.	Description	Price
BAS-0014	1-Position Standard Baseplate with 1/8" Brass Fittings	\$195.98
BAS-0015	2-Position Standard Baseplate with 1/8" Brass Fittings	\$279.62
BAS-0016	3-Position Standard Baseplate with 1/8" Brass Fittings	\$402.62
BAS-0017	2-Position LC/MS Baseplate with 1/4" Brass Fittings	\$291.91
BAS-0018	1-Position Standard Baseplate with 1/4" Brass Fittings	\$232.06
BAS-0019	2-Position Standard Baseplate with 1/4" Brass Fittings	\$314.06
BAS-0020	3-Position Standard Baseplate with 1/4" Brass Fittings	\$456.74
BAS-0022	1-Position Standard Baseplate with 1/8" SS Fittings	\$254.20
BAS-0023	2-Position Standard Baseplate with 1/8" SS Fittings	\$475.60
BAS-0024	3-Position Standard Baseplate with 1/8" SS Fittings	\$699.46
BAS-0026	1-Position Standard Baseplate with 1/4" SS Fittings	\$246.82
BAS-0027	2-Position Standard Baseplate with 1/4" SS Fittings	\$797.86
BAS-0028	3-Position Standard Baseplate with 1/4" SS Fittings	\$1,168.32
BAS-0029	2-Position LC/MS Baseplate with 1/4" SS Fittings	\$583.84

**Options**

Model No.	Description	Price
CON-0577	O-ring Replacement Set	\$27.88
CON-0578	Wall-Mount Bracket Fixture	\$85.28



*Baseplate back  
indicating inlet and  
outlet*



**PUR-Gas™ In-Line Purifier Systems**



*Easy to replace.  
No tools required.  
No contamination.*



**Description**

The PUR-Gas™ Purifier product line has been expanded to offer a range of high-performance gas purification products in the traditional “In-Line” (trap) design that is commonly utilized for point-of-use purification within the laboratory environment. The “In-Line” purifier configuration allows the purifier to be installed easily into your gas delivery lines\* or mounted on the wall with mounting clips if bench-top space is limited. The unique “End Connectors” allow you to remove the spent purifier without tools and install a replacement in just seconds. During replacement of the purifiers, check valves within the “End Connectors” automatically seal the gas delivery lines to the atmosphere, eliminating diffusion of potential contaminants into the gas stream and maintaining existing gas purity. Similar to the PUR-Gas™ Cartridge Purifier Systems, the PUR-Gas™ “In-Line” Purifiers provide superior contaminant removal to produce 99.9999% purity.

*\*most purifier positions require no additional support*

**Applications**

- Point-of-use purification of all gases utilized with the operation of an FID equipped GC.
- Ideal for purification of carrier gases used with GC/MS, ECD, PID and NPD detectors.
- Removal of hydrocarbons and moisture from FID fuel gases.
- Purification of Nitrogen for LC/MS instruments.

**Design Features/Components**

- End Connectors eliminate “tools” typically required to install purifier replacements.
- Replacement purifiers can be installed within seconds, minimizing instrument downtime.
- Check valves integral to “End Connectors” prevent introduction of contaminants into gas delivery lines.
- Removal of hydrocarbons, oxygen and moisture can be performed within a single purifier filter.
- Visual “End Point” Indicator available for Moisture and Oxygen breakthrough optimizes purifier performance and signals time for replacement.

**Specifications**

- Maximum Operating Pressure: 160 psig
- Maximum Flow Rate: 25 L/min
- Housing Material: Stainless Steel (std all models)  
Glass w/Polycarbonate Casing (Indicating model only)
- Dimensions: **Standard Models**  
1.26" dia x 7.9" L (w/o End Connectors)  
1.26" dia x 10" L (with End Connectors)
- End Connectors: 1/8" compression, Brass or Stainless Steel  
1/4" compression, Brass or Stainless Steel
- Weight: 2.65 lbs (Standard Models)

**Purifier Cartridge Capacity**

PUR-Gas™ In-Line Model	Gas Purity (outlet)	Carrier Gas	Visual Indicator	H <sub>2</sub> O Capacity (gr.)	O <sub>2</sub> Capacity (ml.)	Hydrocarbon Capacity (gr.)	Estimated Life Span
Moisture Trap	> 6.0	He H <sub>2</sub>	No	21	N.A.	N.A.	> 2 years
Oxygen Trap	> 6.0	He	No	N.A.	3000	N.A.	> 2 years
Hydrocarbon Trap	> 6.0	He H <sub>2</sub> Air	No	N.A.	N.A.	36 (as n-butane)	> 2 years
Triple Indicating Trap (moisture + oxygen + hydrocarbons)	> 6.0	He	Yes	3	400	5 (as n-butane)	> 1 year
Combi Trap (moisture + oxygen + hydrocarbons)	> 6.0	He H <sub>2</sub> Air	No	10	N.A.	18 (as n-butane)	> 2 year
Triple Trap (moisture + oxygen + hydrocarbons)	> 6.0	He	No	6	1000	12 (as n-butane)	> 2 year

*Prices and Specifications Subject to Change without Notice*



## PUR-Gas™ In-Line Purifier Systems (continued)

### In-Line Purifier Selection and Application Configurations (refer to Selection Chart & Application Diagram below)

A clean gas delivered to your analytical instrument supports the ability to produce consistent and reliable results. This also helps to lengthen column life and minimize background detector “noise.” Selecting the proper PUR-Gas™ In-Line Purifiers for your gas application ensures protecting your analytical instruments from exposure to harmful contaminants, which can negatively affect the accuracy of the data and create operating problems. Purifier capacity is a measure of the amount of contaminant a purifier will remove prior to reaching its saturation point; which depends on the adsorbent’s performance and volume within the purifier. Ideally, purifiers need to be replaced before they become fully saturated. Purifier replacements are made by either replacing them at predetermined time intervals or by some form of visual indication if the purifier has this feature.

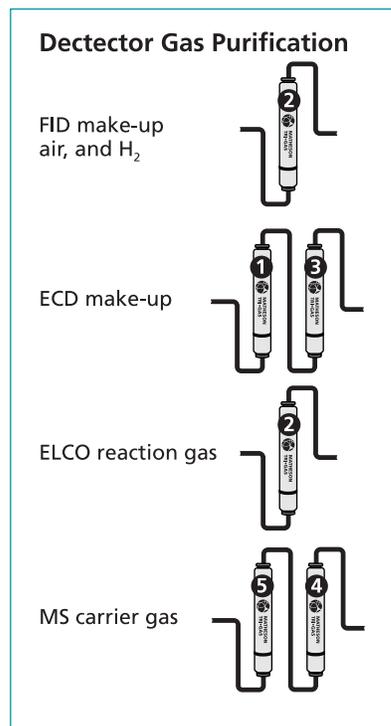
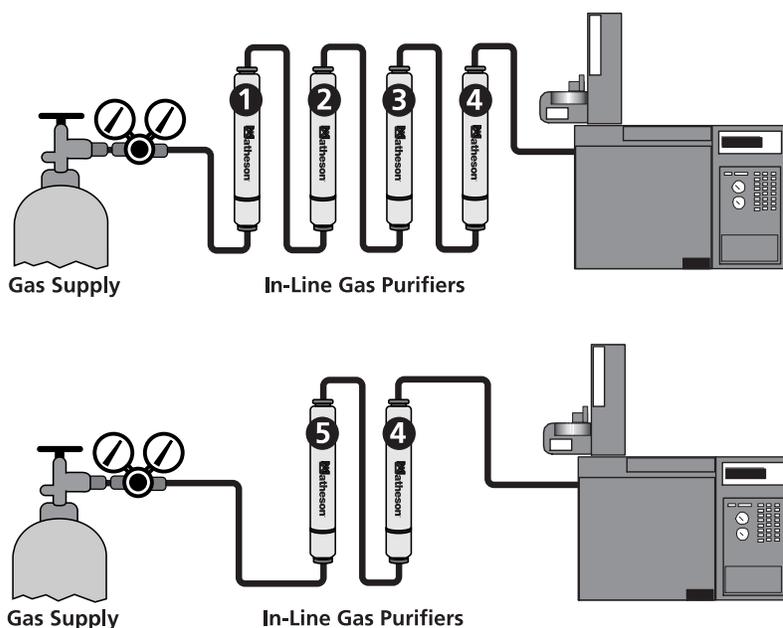
All gas purifiers should be installed in the “vertical” position to optimize contaminant removal and prevent channeling. “Channeling” occurs when a purifier is installed in the horizontal position and there is potential for the adsorbent material to settle within the purifier housing and the gas stream then tends to pass over the adsorbent material rather than through it; thus lowering the contaminant removal efficiency of the purifier.

Matheson Tri-Gas offers several models ideally suited to serve a variety of analytical applications. Use the Selection Chart and Application Diagram below to determine which purifier models are best suited to your application. If you need assistance in selecting a purifier for your application, please call a Matheson Equipment Customer Service Representative at 800-828-4313.

### Gas Purifier Selection Chart

Analytical Instrument/System	Type Detector	Gas Stream	Recommended PUR-Gas™ Purifier
Capillary Column GC	ALL	Carrier Gas	Triple; Moisture, Oxygen and Hydrocarbon
	FID	Make-Up	Hydrocarbon
	FID	Air	Moisture and Hydrocarbon
	FID	Hydrogen	Moisture and Hydrocarbon
	ECD	Make-Up	Triple; Moisture, Oxygen and Hydrocarbon
	ELCD	Reaction Gas	Hydrocarbon
Packed Column GC	ALL	Carrier Gas	Triple; Moisture, Oxygen and Hydrocarbon

### Application Diagram Carrier and FID Gas Purification



#### Purifier Selection Key:

- 1** = Moisture Trap
- 2** = Hydrocarbon Trap
- 3** = Oxygen Trap
- 4** = Indicating Oxygen Trap
- 5** = Combination Trap for moisture, oxygen, and hydrocarbon removal



**PUR-Gas™ In-Line Purifier Systems (continued)**

**Install and Replace Traps  
without Tools and in Seconds!**



1  
Align End Connector  
into Purifier



2  
Screw to Tighten

**Ordering Information**

**STANDARD IN-LINE "TRAP" Models**

Model No.	Description	Price
PUR-IL-MT1	PUR-Gas In-Line Moisture (H <sub>2</sub> O) Trap	\$88.56
PUR-IL-OT1	PUR-Gas In-Line Oxygen (O <sub>2</sub> ) Trap	\$91.84
PUR-IL-HT1	PUR-Gas In-Line Hydrocarbon (HC) Trap	\$86.92
PUR-IL-OMT1	PUR-Gas In-Line <b>Combi</b> Oxygen/Moisture Trap	\$91.84
PUR-IL-TRT1	PUR-Gas In-Line <b>Triple</b> Oxygen/Moisture/HC Trap	\$88.56
PUR-IL-ITRT1	PUR-Gas " <b>Breakthrough</b> " In-Line (He filled) <b>Triple</b> Oxygen/Moisture/HC Indicator*	\$95.12
PUR-IL-TRT2	PUR-Gas In-Line <b>Triple</b> Oxygen/Moisture/HC Trap (He filled)	\$116.44

\* "Indicating" Traps provide visual indication for determining the optimum time for replacement and maximizing operating effectiveness. (a) The housing for the "Indicating" In-Line Triple Trap is made from glass encased with a polycarbonate coating; all other in-line trap housings are stainless steel material and are "Non-Indicating." (b) The term "He filled" applies to those specific traps that have been purged and filled internally with helium gas; all remaining trap models are filled with argon gas and should be purged after installation.

**"END-to-END" Tube Connectors ("1" Set required for each In-Line Purifier purchased)**

Model No.	Description	Price
PUR-IL-CBR2	1/8" Brass In-Line Connector (set of 2)	\$53.30
PUR-IL-CBR4	1/4" Brass In-Line Connector (set of 2)	\$62.32
PUR-IL-CSS2	1/8" Stainless Steel In-Line Connector (set of 2)	\$53.30
PUR-IL-CSS4	1/4" Stainless Steel In-Line Connector (set of 2)	\$64.78
PUR-IL-DTCSS4	1/4" Stainless Steel SERIES In-Line Connector (qty 1)**	\$195.16

\*\*The "SERIES" In-Line Connector is a single connector ONLY used for connecting '2' or more traps in a direct END-to-END series installation arrangement where it is desired to have gas flow from one trap immediately (sequentially) into a second (or even third) trap connected in "SERIES" with the first trap.

**OPTIONAL & REPLACEMENT Parts**

Model No.	Description	Price
PUR-IL-WMC4	Wall-Mount Clamp Set (for Standard Models)	\$49.20
PUR-IL-ORS10	Spare O-Ring Set for In-Line Connectors (pkg of 10)	\$23.78

**PRODUCT APPLICATION RECOMMENDATIONS:**

1. END-to-END Connectors are primarily intended for use with stainless steel and brass tubing; connections to plastic tubing can be made; however, it is recommended that a metal insert be utilized at each inlet/outlet connection point where plastic tubing connections are required.
2. The proper installation orientation for all purifiers is in the "vertical" position.
3. Mounting screws for Wall-Mount Clamps are not included.



In-line Purifier with  
Stainless Steel Housing



1/8" or 1/4" Fittings  
on End Connectors



In-Line Triple Purifier  
with Visual Indication



In-Line Purifier with  
Wall-Mount Clips



## Models 6124, 6134 and 6164

### All Welded 316 Stainless Steel High Purity Depth Filters



#### Description

Matheson Tri-Gas depth filters utilize a fiberglass media and are rated to 250 psig service. They are 100% efficient at a 0.2 micron level. They feature an all welded stainless steel housing and are available in a wide selection of pipe, tubing and VCR connections.

The "all-welded" Models 6124, 6134 and 6164 feature a cylindrical, microporous, fiberglass filter media, molded with an acrylic binder and supported by a perforated 316 stainless steel screen. Matheson Tri-Gas' extensive experience has found this choice of depth filter to be efficient, reliable, effective and economical for non-corrosive gas service.

The gas stream enters the filter, flowing from outside to inside the filter media, trapping particles in the depth of the media, and exits through the center. The operating temperature ranges from 0°F to 165°F.

All Matheson Tri-Gas high purity line filters are leak tested after assembly at the rated pressure with nitrogen.

All filters are capped and sealed in a poly bag to maintain purity.

#### Applications

- Gas Chromatography
- Biological Studies
- Environmental Work
- Gas Sterilization

#### Design Features/Components

- Microporous fiberglass media
- Particles are entrapped by or adsorbed to the filter matrix throughout the depth of the filter
- 100% filtration efficiency at 0.2 micron level
- Used as a prefilter or point-of-use filter in many applications
- Media is compatible with wide range of non-corrosive gases

#### Ordering Information (with specifications)

Model No.	Inlet/Outlet Connections	Max. Flow SLPM**	Dimensions (L x D)	Price
<b>Filters with Pipe Fittings</b>				
6164-P4FF	1/4" FPT x FPT	150	3.0" x 1.66"	\$188.60
6134-P8FF	1/2" FPT x FPT	400	4.1" x 2.38"	\$246.82
6124-P12FF	3/4" FPT x FPT	1000	7.5" x 2.38"	\$241.08
<b>Filters with Standard Swagelok Tube Fittings</b>				
6164-T2FF	1/8" x 1/8"	30	4.9" x 1.66"	\$223.04
6164-T4FF	1/4" x 1/4"	100	4.1" x 1.66"	\$205.82
6164-T6FF	3/8" x 3/8"	150	4.3" x 1.66"	\$228.78
6134-T4FF	1/4" x 1/4"	200	4.8" x 2.38"	\$214.84
6134-T6FF	3/8" x 3/8"	400	5.0" x 2.38"	\$232.88
6134-T8FF	1/2" x 1/2"	400	5.3" x 2.38"	\$383.76
6124-T6FF	3/8" x 3/8"	500	8.0" x 2.38"	\$383.76
6124-T8FF	1/2" x 1/2"	500	8.3" x 2.38"	\$391.14
6164-T4MM*	1/4" tubing, 316SS	75	4.95" x 1.66"	\$191.06
<b>Filters with VCR or VCO Fittings</b>				
6164-V4MF	1/4" VCR M x F	100	4.33" x 1.66"	\$229.60
6164-V4MM	1/4" VCR M x M	100	4.11" x 1.66"	\$241.08
6164-O4MM	1/4" VCO M x M	100	3.81" x 1.66"	\$214.84
6134-V8MM	1/2" VCR M x M	150	5.12" x 2.38"	\$358.34

\*NOTE: This model is supplied with 1/4" tubing only, welded at each end.

\*\* @ 15 psig Inlet, Atmospheric Outlet.

Shipping Weight: 2 lbs



## Model 6187 Series High Pressure Gas Filter



### Description

The 6187 Series is a high pressure gas filter that employs a fine cloth filter media of microporous fiberglass supported between a wire mesh disc and high pressure rated screen. The unit is constructed of all welded 316 stainless steel housing to provide maximum purity. The support screen prevents the filter element from collapsing in the event of a sudden impact of gas at 2500 psig (maximum).

### Applications

Typically, these filters function as "prefilters" for a high purity gas delivery line. Installation is usually between the source cylinder and a regulator, affording an extra measure of filtration protection.

While most Matheson Tri-Gas regulators are supplied with a built-in internal filter at the inlet side, the 6187 Series with 0.2 micron efficiency provides longer service life to the regulator and reduced particulate in the gas stream delivered to the point-of-use. The filter needs to be replaced when saturated.

### Ordering Information (with specifications)

Model No.	Inlet/Outlet Connections	Max. Flow SLPM**	Dimensions	Price
<b>6187-P4FF</b>	1/4" FPT	20	1.25" Hex x 1.87"	\$374.74
<b>6187-T4FF</b>	1/4" Swagelok	20	1.25" Hex x 4.13"	\$444.44

Max. Pressure: 2500 psig  
\*At 5 psi differential pressure  
Shipping Weight: 1 lb

## Model 6190 Series 0.01 Micron Membrane Gas Filter



### Description

Matheson Tri-Gas has provided an efficient solution to control particulates by introducing this Teflon media filter to achieve gas stream filtration efficiency to the 0.01 micron level with a high performance membrane gas filter. This filter may be installed in non-corrosive gas streams that are supplied by either cylinder sources, bulk sources or an on-site generating plant. Installing the membrane filter near the reaction chamber itself affords the best protection in eliminating particulates that can be released into the gas stream.

### Design Features/Components

- Porous Teflon filter medium.
- Excellent compatibility with non-corrosive semiconductor gases
- All welded 316L stainless steel construction...for purity
- Standard units available with VCR and Swagelok connections
- PTFE Teflon membrane; 0.2 micrometer pore size
- Rated at 100% efficiency to 0.01 micron
- Large surface area for longer life and uniform flow characteristics
- Special end fittings available (minimum quantities may apply)

### Specifications

Filtration Rating:	100% efficiency at 0.01 micron level
Medium:	PTFE Teflon medium supported by and sealed into polypropylene end caps
Effective Filter Area:	0.5 ft <sup>2</sup>
Pressure Rating:	1000 psig max.
Temperature Rating:	100°F max.
Internal Seal:	Teflon encapsulated silicone O-ring
Quality Control:	100% test of Teflon filter element prior to assembly in housing
Packaging:	All units are leak tested at 500 psig, capped and packaged in poly bag
Maximum Flow:	250 SLPM at 15 psig inlet, atmosphere outlet
Shipping Weight:	2 lbs

### Ordering Information

Model No.	Inlet/Outlet Connections	Dimensions (L x D)	Price
<b>6190-T4FF</b>	1/4" Swagelok	5.56" x 2.20"	\$428.04
<b>6190-V4MM</b>	1/4" VCR M x M	5.62" x 2.20"	\$508.40



**Filters & Purifiers**

**Model 64-1000 Series  
Oxygen Removing  
Hydrogen Purifier**



**Description**

This Oxygen Removing Purifier removes Oxygen as an impurity from Hydrogen and delivers Hydrogen with less than one ppm of Oxygen. This catalytic combination of Hydrogen and Oxygen is usually accomplished at room temperature and results in the formation of water vapor. This water vapor should also be removed with Model 450B or 460 Purifiers installed on the outlet side of this Purifier.

The catalytic material within the Model 64-1000 Series should last indefinitely unless impacted by contaminants (oil, sulfur compounds, lead, iron salts, organic solvents, etc.)

Since the operating principle of these purifiers requires an abundance of hydrogen, these units are functional with hydrogen gas only.

Maximum O<sub>2</sub> removal = 1% by volume.

**Ordering Information (with specifications)**

Model No.	Max Flow Capacity SCFH	Max Operating Pressure psig	Inlet/Outlet Connections	Dimensions (L x D)	Price
64-1008	8	1800	1/4" FPT	5" x 1-1/2"	\$345.22
64-1015	15	1800	1/4" FPT	5-1/4" x 2"	\$416.56
64-1030	30	1800	1/4" FPT	9" x 2"	\$562.52
64-1050A	50	1800	1/4" FPT	13-3/4" x 2"	\$709.30
64-1100A	100	1800	1/4" FPT	11" x 3-1/2"	\$1,272.64

Shipping Weight: 15 lb

**Model 6406A  
Oxygen Removing  
Inert Gas Purifier**



**Description**

This Inert Gas Purifier consists of a polished aluminum canister containing an oxygen getter and molecular sieve. The canister is fitted with brass 1/4" compression tube fittings for easy in-line hookup to gas delivery lines.

This unit will remove O<sub>2</sub> or water vapor from inert gas carriers such as nitrogen, helium, or argon to less than 1 ppm. Six (6) standard cylinders of 300 cu. ft. are easily treated where the incoming O<sub>2</sub> concentrations are 10 ppm or less.

Laboratory and analytical instruments, such as vapor phase chromatography, where performance can be affected by trace amounts of oxygen, will find the Model 6406A invaluable. The low cost, along with the ability to treat 1800 cu. ft., makes this purifier an economical purifier addition to laboratories.

**Specifications**

Maximum Operating Pressure:	125 psig
Maximum Operating Temperature:	212°F (100°C)
Maximum Flow Rate:	2 slpm
Dimensions:	3" dia x 6-3/4" H
Shipping Weight:	3 lbs

**Ordering Information**

Model No.	Description	Price
6406A	Oxygen Removing Inert Gas Purifier	\$258.30

**Model 465  
Moisture & Impurity Indicator**



**Description**

The Model 465 indicator is used to indicate the downstream presence of moisture in a gas line from the exhaustion of the molecular sieve material in the Model 450B and 460 purifiers.

The indicator is constructed of brass and has a sealed Pyrex window. The unit is furnished with a standard indicating dyed silica gel, which gradually changes from blue (at relative humidities less than 4%) to pink (at relative humidities higher than 40%). At this point the silica gel has absorbed the maximum amount of water. It is easily removed and replaced with the indicator body still in the line. The silica gel can be regenerated by flushing the indicator with a dry gas or by heating the indicating element in an oven at 150°C for 2 to 3 hours. Both connections are 1/4" NPT (female x male). The maximum operating pressure is 500 psig.

**Specifications**

Maximum Pressure:	500 psig
Inlet/Outlet Connections:	1/4" FPT x 1/4" MPT
Overall Dimensions:	2-3/4"L x 1-3/8"W x 1-7/8"H
Shipping Weight:	1 lb.

**Ordering Information**

Model No.	Description	Price
465	Moisture Indicator	\$68.88
PLU-0070-XX	Replacement Indicator Plug	\$36.08

*Prices and Specifications Subject to Change without Notice*



## Model 450B High Pressure / Low Capacity Gas Purifier

### Description

The Model 450B Gas Purifier is ideal for removing oil, water vapor and foreign particles from many\* non-corrosive gases, and is designed for operating at high line working pressures where lower capacities of contaminant removal are required. The Model 450B is constructed of a black anodized aluminum housing that accepts purifier cartridges for specific applications. Removal of foreign matter is accomplished through the use of molecular sieve materials and special filters in replaceable cartridges. Matheson Tri-Gas Model 450B accepts any one of the four cartridges for various applications. The inlet and outlet parts are located at the top of the shell on the cylinder head. The purifier must be used with replaceable cartridges 451, 452, 453 or 454. Cartridges are shipped separately in hermetically sealed cans.



### Specifications

Maximum Operating Pressure:	2000 psig
Maximum Oxygen	
Operating Pressure:	500 psig
Temperature Range:	-40 to 165°F (-40 to 74°C)
Pressure Drop:	0.2 psi for 1 scfm 0.9 psi for 2 scfm 2.4 psi for 3 scfm
Dimensions:	2" dia. x 5-3/4" L
Inlet & Outlet:	1/4" FPT
Water Removal Capacity:	451: 5.4 grams 452: 6 grams
Dew Point Achieved:	-100°F (-73°C) (1 .5 ppm)
Shipping Weight:	2 lbs

### Materials of Construction

Shell Body:	Black anodized aluminum
Cylinder Head:	Nickel plated brass
O-Ring:	Buna N (P/N RNS-0126-BU)
Cartridge:	451: 13X Molecular sieve 452: 4A Molecular sieve 453: Sintered bronze 454: Activated charcoal

### Ordering Information

Model No. (Housing)	Description	Price
450B	Purifier Housing (without cartridge)	\$125.46

Model No. (Cartridge)	Description	Price
451	For Removal of Oil and Water	\$35.26
452	For Removal of Water	\$33.62
453	For Removal of particles over 5 microns**	\$42.64
454	Activated Charcoal Purifier***	\$34.44

\* Consult Matheson Tri-Gas for specific applications.

\*\* Not for Acetylene use

\*\*\* For acetone control in acetylene

## Model 460 Low Pressure / High Capacity Gas Purifier

### Description

The Model 460 Gas Purifier is similar in operation to the Model 450B; however, this purifier is specifically designed for higher capacities of contaminant removal and lower working line pressure. The Model 460 is constructed of an aluminum housing that accepts large capacity cartridges. The housing may be permanently installed in the line and may be serviced without disturbing the line connections (assure 12" clearance space under flanged end). Spring pressure seats the replaceable cartridge tightly against the top gasket to prevent gas from bypassing the cartridge. The inlet is on the side and the outlet is on the top.



The Model 460 purifier must be used with replaceable cartridges 461, 462, or 463. Cartridges are shipped in hermetically sealed cans.

### Specifications

Maximum Operating Pressure:	350 psig
Temperature Range:	-40 to 200°F (-40 to 93°C)
Maximum Flow Rate	10 scfm for short periods (<15 mins) 1 to 3 scfm for extended use
Pressure Drop:	0.12 psi for 3 scfm 1 psi for 7.5 scfm
Capacity:	461: 134 grams H2O 462: 126 grams H2O
Dew Point Achieved:	-100°F (-73°C) (1.5 ppm)
Dimensions:	4-3/4" dia. x 16-3/4" L
Inlet & Outlet:	1/4" MPT, stainless steel (non-removable)
Shipping Weight:	7 lbs

### Materials of Construction

Shell Body:	Aluminum
Strainer Assembly:	Monel & brass
Gaskets:	Neoprene (P/N GSK-0026-NB)
Cartridge:	461: 4A Molecular sieve 462: 13X Molecular sieve 463: Activated charcoal*

### Ordering Information

Model No. (Housing)	Description	Price
460	Purifier Housing (without cartridge)	\$443.62

Model No. (Cartridge)	Description	Price
461	For Removal of Water	\$95.94
462	For Removal of Oil and Water	\$90.20
463	For Removal of Oil and Heavy Hydrocarbons	\$97.58

*This series is not suitable for acetylene*



## Model 6410 Series Oxygen Absorbing Purifiers



Model 6413 without protective lexan cover



Model 6414



Model 6410

### Description

The Model 6410 Series Oxygen Absorbing Purifiers are high-efficiency purifiers that will remove trace contaminants of both oxygen and water vapor from most non-corrosive gases.

These Oxygen Absorbing Purifiers are available in two pressure configurations. A high-pressure model for direct connection between the supply gas cylinder and the pressure-reducing regulator is available in either brass or stainless steel construction, and an economical aluminum low-pressure line model will purify gases up to 90 psig.

The Model 6410 Series uses a disposable cartridge containing an oxygen absorbing media. This media removes oxygen by chemisorption on a highly active metallic surface supported by an inert base. Water vapor is simultaneously removed by adsorption on a molecular sieve. Oxygen and water can be removed from rare gases, nitrogen, helium, argon, hydrogen, carbon monoxide, carbon dioxide, methane, saturated hydrocarbons, nitrous oxide, nitric oxide, hydrogen chloride, ammonia, fluoridated olefines, and halocarbons.

### Design Features/Components

- Effluents of < 0.1 ppm oxygen guaranteed
- Active disposable cartridge treats 250 scf of gas
- Oxygen removed without introduction of other impurities
- High-pressure vessel designed for up to 3000 psig operation (6410 only)

### Specifications

Average Treatment per Cartridge:	250 scf (7000 liters)
Discharge Gas Purity:	O <sub>2</sub> < 0.1 ppm where inlet does not exceed 15 ppm. H <sub>2</sub> O < 0.5 ppm where inlet does not exceed 10 ppm.
Maximum Flow Rate for Purity:	60 slpm
Operating Temperature Range:	-0°C to +100°C
Operating Pressure:	0-3000 psig (6410) 0-90 psig (6412, 6413 & 6414)
Dimensions:	2" dia x 7-3/4"L (6410) 2" dia x 9"L (6412) 2-1/2" dia x 9"L (6413 & 6414)
Inlet & Outlet:	1/4" FPT (6410) 1/4" OD compression (6412, 6413 and 6414)
Shipping Weight:	6 lbs (6410) 2 lbs (6412) 4 lbs (6413 & 6414)
Non-indicating Cartridge:	641-01
Indicating Cartridge:	641-02 (dark blue to brown color change)

*Note: gases to be purified should have <1000 ppm total impurities to avoid oversaturation of the cartridge too quickly.*

### Ordering Information

Model No.	Description	Price
6410	Housing only—High Pressure Stainless Steel	\$1,108.64
6412	Housing only—Low Pressure Aluminum	\$352.60
6413	Housing Lex/Al + two 641-02 Indicating Cartridges	\$442.80
6414	Housing Lex/Al + two 641-01 Non-indicating Cartridges	\$378.02
641-01	Cartridges (two)—for 6410 or 6414	\$246.82
641-02	Cartridges (two)—for 6412 or 6413	\$337.02



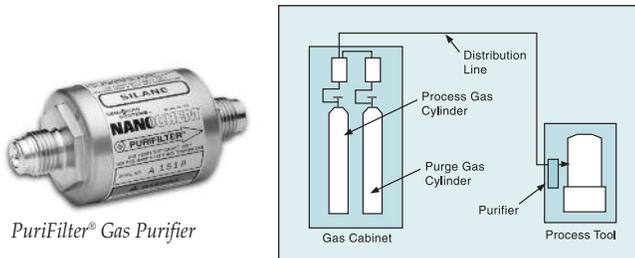
## Introduction/Benefits

NANOCHEM® purifiers integrated into gas delivery systems can provide: process consistency, increased yields, longer equipment lifetimes, and improved overall equipment efficiency (OEE).

Moisture, oxygen, and other impurities decrease yields by forming haze and oxides in films, react with process gases to form particulates, and increase the corrosiveness of gases such as HCl and HBr. Impurities can result from poor gas quality, gas distribution leaks, virtual leaks and inadequate operation/purge procedures. Impurity concentrations can also vary from cylinder to cylinder, as well as with gas usage from the same cylinder.

NANOCHEM® purifiers have led the semiconductor industry in state-of-the-art gas purification technology since the early 1980's. NANOCHEM® purifiers have proven to remove impurities to the lowest levels in the industry, typically below the lower detection limits of the most sophisticated instrumentation. For many gases, PPT levels of H<sub>2</sub>O, O<sub>2</sub>, CO<sub>2</sub>, and CO are achieved. Purifier end point detection is also available for many applications.

*NANOCHEM® purifiers have become the industry standard for UHP welding, and the compound and silicon semiconductor industries. Dominant applications include: Si/SiGe epi, SiN CVD, GaN MOCVD and GaAs MOCVD.*



PuriFilter® Gas Purifier

### Point Of Use Purification

Ensure gas purity at the process tool by installing a purifier on the gas stick immediately before the MFC or the chamber.

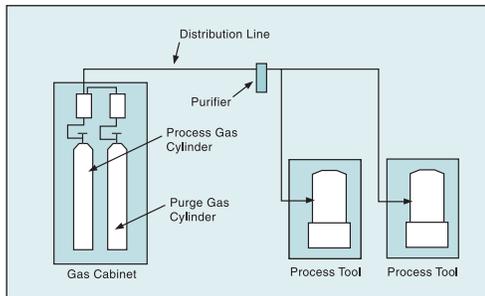
A standard particle filter can be replaced with a NANOCHEM MiniSentry, PuriFilter® (model shown) or BLOC Purifier, to remove both particulates and molecular impurities.

*Models are available for flow rates up to 20 slpm (Model shown up to 3 slpm)*



BLOC Purifier®

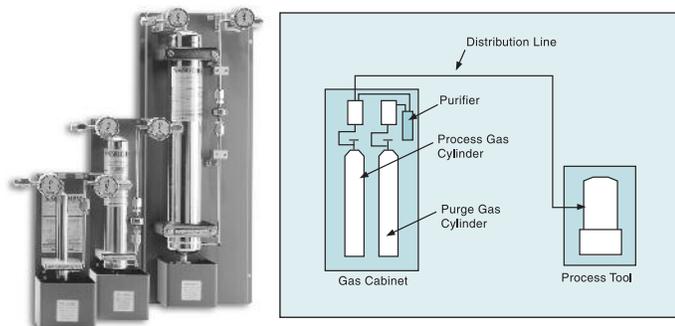
DOC™ Particle Filter



### Proximate Purification

The BLOC Purifier® and DOC™ Particle Filter designs (shown) allow for the flexibility to install the particle filter 'only' first, and when needed, add the purifier at a later date. It is typically installed in the VMB, and can be more economical and the preferred model when size constraints don't allow a purifier at the tool.

*Models are available for flow rates up to 20 slpm*



L-Series (L-60, L-500, L-2000)

### Source And Purge Gas Purification

This is typically installed in the gas cabinet for source and purge gas purification. Purification of moisture from corrosive gases has proven to reduce corrosion and increase component and piping lifetime. Purification of moisture, oxygen and other impurities from purge gas ensures the cleanest gas is available for purging, reducing tool downtime.

*Models are available for flow rates up to 150 slpm. The most popular L-series models are shown.*

### Bulk Gas Purification

P-series and MS-series model purifiers are available for flow rates up to 1,000 slpm. (not shown)



## Purification Media – Gases Purified and Specifications

### NANOCHEM® Gas Types Purification Summary Table

GASES PURIFIED	CHEMICAL FORMULA	PURIFICATION MEDIUM	PURIFICATION MEDIUM DESCRIPTION	IMPURITIES REMOVED	EFFICIENCY	END POINT DETECTION
<b>Inerts</b>						
Nitrogen Argon Helium Xenon Krypton Neon	N <sub>2</sub> Ar He Xe Kr Ne	OMX-Plus™	Reactive agents on a polymeric support w/ inorganic agent for NMHC removal	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , THC except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL  CO at Low Flow	DC only  < 1 ppb
		HCX™	High surface area inorganic medium	Hydrocarbons except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL	Not available
		In2Go™	Reactive agents on an inorganic support	H <sub>2</sub> O, O <sub>2</sub> , CO, CO <sub>2</sub> THC except CH <sub>4</sub> Halocarbons	< 100 ppt, LDL	DC only
<b>Flammables - Partial List</b>						
Methane Ethane Cyclopropane Propane Butane	CH <sub>4</sub> C <sub>2</sub> H <sub>6</sub> C <sub>3</sub> H <sub>8</sub> C <sub>4</sub> H <sub>10</sub>	OMX-Plus™	Reactive agents on a polymeric support w/ inorganic agent for NMHC removal	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , THC except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL  CO at Low Flow	DC only  < 1 ppb
		OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub>	< 100 ppt, LDL CO at Low Flow	DC only < 1 ppb
		OMX-Plus™	Reactive agents on a polymeric support w/ inorganic agent for NMHC removal	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , THC except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL  CO at Low Flow	DC only  < 1 ppb
Hydrogen Deuterium	H <sub>2</sub> D <sub>2</sub>	HCX™	High surface area inorganic medium	Hydrocarbons except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL	Not available
		In2Go™	Reactive agents on an inorganic support	H <sub>2</sub> O, O <sub>2</sub> , CO, CO <sub>2</sub> THC except CH <sub>4</sub> Halocarbons	< 100 ppt, LDL	DC only

Please contact customer service for other flammables, that can be purified.

### Halocarbons - Partial List

Carbon Tetrafluoride	CF <sub>4</sub>	OMX-Plus™	Reactive agents on a polymeric support w/ inorganic agent for NMHC removal	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , THC except CH <sub>4</sub> & Other Halocarbons CO at Low Flow	< 100 ppt, LDL  < 1 ppb	DC only
Hexafluoroethane	C <sub>2</sub> F <sub>6</sub>	OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> CO	< 100 ppt, LDL < 1 ppb	DC only
Perfluoropropane	C <sub>3</sub> F <sub>8</sub>	OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub>	< 100 ppt, LDL	DC only

Please contact customer service for other halocarbons, that can be purified.

ppb = Part per billion

ppt = Part per trillion

THC = Total Hydrocarbons

LDL = Lower Limit of Detection by state-of-the-art analytical instrumentation.

Please contact customer service for other gases not included in this list



## Purification Media – Gases Purified and Specifications

**NANOCHEM® Gas Types Purification Summary Table (continued)**

GASES PURIFIED	CHEMICAL FORMULA	PURIFICATION MEDIUM	PURIFICATION MEDIUM DESCRIPTION	IMPURITIES REMOVED	EFFICIENCY	END POINT DETECTION
<b>Hydrides</b>						
Ammonia	NH <sub>3</sub>	In2Go™	Reactive agents on an inorganic support	H <sub>2</sub> O	< 45 ppb, LDL	DC only
				CO <sub>2</sub>	< 11 ppb, LDL	
				O <sub>2</sub>	< 5 ppb, LDL	
				GeH <sub>4</sub>	< 1 ppb, LDL	
				SiH <sub>4</sub>	< 1 ppb, LDL	
		TEOS	< 40 ppb, LDL			
		OMA™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> in inert gas, LDL	< 100 ppt, LDL	DC only
Silane	SiH <sub>4</sub>	OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , CO	< 100 ppt, LDL	DC only
Arsine	AsH <sub>3</sub>	ASX-II™	High surface area inorganic medium	< 75 ppb H <sub>2</sub> O in AsH <sub>3</sub> , LDL		Not available
Phosphine	PH <sub>3</sub>	PHX™	Reactive agents on an inorganic support	< 33 ppb H <sub>2</sub> O in PH <sub>3</sub> , LDL		Not available
<b>Hydride/Inert Mixes (N<sub>2</sub>, Ar, He, Xe, Kr, Ne, &amp; H<sub>2</sub>)</b>						
1-10% Arsine	AsH <sub>3</sub>	OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub>	< 1 ppb	Not available
1-10% Germane	GeH <sub>4</sub>					
1-10% Phosphine	PH <sub>3</sub>					
<b>Corrosives</b>						
Boron Trichloride	BCl <sub>3</sub>	Metal-X™	High purity high surface area inorganic medium	H <sub>2</sub> O < 100 ppb, LDL Volatile Metals-Fe, Mo, Cr, Ti, Ni, Mn		Not available
Chlorine	Cl <sub>2</sub>					
Silicon Tetrachloride	SiCl <sub>4</sub>					
Trichlorosilane	SiHCl <sub>3</sub>					
Dichlorosilane	SiH <sub>2</sub> Cl <sub>2</sub>					
Hydrogen Bromide	HBr	CleanCorr™	High high surface area inorganic medium	H <sub>2</sub> O < 2 ppm, LDL		Not available
Hydrogen Chloride	HCl					
Hydrogen Fluoride	HF					
<b>Others</b>						
Carbon Monoxide	CO	Metal-X™	High purity high surface area inorganic medium	H <sub>2</sub> O < 100 ppb, LDL Volatile Metals-Fe, Mo, Cr, Ti, Ni, Mn		Not available
Nitric Oxide	NO					
Carbon Dioxide	CO <sub>2</sub>	OPX™	High surface area inorganic medium	H <sub>2</sub> O	< 10 ppb	Not available
		HCX™	High surface area inorganic medium	Hydrocarbons except CH <sub>4</sub> Halocarbons except CF <sub>4</sub>	< 100 ppt, LDL	Not available
Nitrous Oxide	N <sub>2</sub> O					
Oxygen	O <sub>2</sub>	OPX	High surface area inorganic medium	H <sub>2</sub> O	< 10 ppb	Not available
Dimethyl Ether	(CH <sub>3</sub> ) <sub>2</sub> O	OMX™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub>	< 100 ppt, LDL	DC only
Sulfur Hexafluoride	SF <sub>6</sub>	OMS™	Reactive agents on a polymeric support	H <sub>2</sub> O, O <sub>2</sub>	< 10 ppb, LDL	DC only
Acetylene	C <sub>2</sub> H <sub>2</sub>	AcetyClean™	High high surface area inorganic medium	H <sub>2</sub> O	< 1 ppm, LDL	Not available

ppm = Part per million

ppb = Part per billion

ppt = Part per trillion

THC = Total Hydrocarbons

LDL = Lower Limit of Detection by state-of-the-art analytical instrumentation.

Please contact customer service for other gases not included in this list



## Hardware Mechanical Specifications

(Note that Matheson Tri-Gas reserves the right to change specifications without notice.)

Model	L-Series	L-Series High Flow	H-Series	HP-Series
<b>Model Numbers</b>	L-60 L-300 L-500 L-2000	L-300-HF L-500-HF L-2000-HF	H-500	HP-300 HP-500
<b>Media Bed Volume</b>	60 mL 300 mL 500 mL 2000 mL	300 mL 500 mL 2000 mL	500 mL	300 mL 500 mL
<b>Connection Type</b>	1/4" face seal (female inlet, male outlet)			
<b>Valve Type</b>	1/4" springless diaphragm valve		1/4" springless diaphragm or bellows valve	
<b>Valve Actuation</b>	Manual		Manual or Pneumatic	
<b>Wetted Part Materials</b>	316L Stainless Steel Nickel 200 gaskets Elgiloy diaphragm  PCTFE valve seat		316L Stainless Steel Nickel 200 gaskets 300 Series Stainless Steel bellows, or Elgiloy diaphragm PCTFE valve seat or insert	
<b>Outlet Filter Material</b>	316L Stainless Steel or PTFE			
<b>Outlet Filter Performance</b>	99.9999999% (9-log) of all particles $\geq 0.003 \mu\text{m}$ , except L-500-HF which is 99.99% (4-log) of all particles $\geq 0.003 \mu\text{m}^{(5)}$			
<b>Inboard Leak Rate</b>	$1 \times 10^{-9}$ sccs of helium			
<b>Maximum Pressure (psig)</b>	L-60 L-300 L-500 L-2000	500 500 <sup>(1)</sup> 500 <sup>(1)</sup> 500 <sup>(1)</sup>	500 <sup>(1)</sup>	2,850
<b>Temperature Range</b>	-40°C to 70°C			
<b>Maximum Typical Flow<sup>(2)</sup> (slpm of nitrogen)</b>	L-60 L-300 L-500 L-2000	8 15 50 50	L-300-HF 50 L-500-HF 75 L-2000-HF 150	50 50
<b>Bypass</b>	3-Valve Bypass, Optional and Retrofittable		Standard	
<b>Endpoint Detection</b>	Available for NANOCHEM® OMX, OMX Plus, OMA and OMS media only (except L-60)			N/A
<b>Exhausted Enclosure</b>	Please contact Matheson Tri-Gas Equipment Customer Service Center at (800) 828-4313			

Note 1: The endpoint detector, if fitted, limits the maximum pressure rating to 150 psig.

Note 2: The maximum typical flow is dependent both on the allowable pressure drop through the filter element, and the characteristics of the purification media. Higher flows may be possible. Contact Matheson Tri-Gas Equipment Customer Service Center at (800) 828-4313, for recommendations for specific applications and/or refer to the pressure drop curves for that purifier model.

Note 3: All MS-4, MS-8, MS-16 and MS-32 purifiers for ammonia service come with a filter which removes 99.9999999% (9-log) of all particles  $\geq 0.003\text{mm}$ . This filter limits the maximum flow to 150 slpm of nitrogen.

Note 4: Valves on all MS-Series purifiers have 1/2" VCR type inlet and outlet connections, but are connected to 3/8" Stainless Steel tubing.

Note 5: Filters on all L-Series purifiers provide 9-log retention at the highest rated flow rate for particles  $\geq 0.003\mu\text{m}$ . The exception is the filter on the L-500-HF. While it offers 9-log retention at low flow rates (up to 6 lpm), the removal efficiency decreases to 4-log retention at the maximum rated flow rate of 75 slpm.



## Hardware Mechanical Specifications *(continued)*

*(Note that Matheson Tri-Gas reserves the right to change specifications without notice.)*

Model	MegaShield	A-Series	White Knight	
<b>Model Numbers</b>	MS-4 MS-8 MS-16 MS-32	A-60 A-300 A-500 A-2000	WK-75 WK-500 WK-2500	WK-9000
<b>Media Bed Volume</b>	4 liters 8 liters 16 liters 32 liters	60 mL 300 mL 500 mL 2000 mL	55 mL 500 mL 2500 mL	9000 mL
<b>Connection Type</b>	1/2" face seal (female) <sup>(4)</sup>	1/4" face seal (female inlet, male outlet)	1/4" male face seal (inlet and outlet)	1/2" face seal (female inlet, male outlet)
<b>Valve Type</b>	3/8" springless diaphragm valve <sup>(4)</sup>	1/4" springless diaphragm valve	Poppet valve	3/8" springless diaphragm valve
<b>Valve Actuation</b>	Manual	Manual	Manual during installation	Manual
<b>Wetted Part Materials</b>	316L Stainless Steel Nickel 200 gaskets PCTFE valve seat TFE comp. ring	316L Stainless Steel Nickel 200 gaskets Elgiloy diaphragm PCTFE valve seat	316L Stainless Steel Nickel 200 gaskets	316L Stainless Steel Nickel 200 gaskets Elgiloy diaphragm PCTFE comp. ring
<b>Outlet Filter Material</b>	316L Stainless Steel	316L Stainless Steel or PTFE	316L Stainless Steel	PTFE
<b>Outlet Filter Performance</b>	100 μm	99.9999999% (9-log) of all particles ≥ 0.003 μm		
<b>Inboard Leak Rate</b>	1 x 10 <sup>-9</sup> sccs of helium			
<b>Maximum Pressure (psig)</b>	350	500	WK-75 3000 WK-500 500 WK-2500 150	150
<b>Temperature Range</b>	-40°C to 70°C			
<b>Maximum Typical Flow<sup>(2)</sup> (slpm of nitrogen)</b>	1000	A-60 8 A-300 15 A-500 50 A-2000 150	WK-75 5 WK-500 60 WK-2500 300	1000
<b>Bypass</b>	3-Valve Bypass, Optional and Retrofittable	N/A		
<b>Endpoint Detection</b>	Available for NANOCHEM® OMX, OMA and OMS media only	Available for NANOCHEM® OMX, OMX-Plus, OMA and OMS media only (except A-60)	N/A	
<b>Exhausted Enclosure</b>	Special Order	SideCar	N/A	

Note 1: The endpoint detector, if fitted, limits the maximum pressure rating to 150 psig.

Note 2: The maximum typical flow is dependent both on the allowable pressure drop through the filter element, and the characteristics of the purification media. Higher flows may be possible. Contact Matheson Tri-Gas Equipment Customer Service Center at (800) 828-4313, for recommendations for specific applications and/or refer to the pressure drop curves for that purifier model.

Note 3: All MS-4, MS-8, MS-16 and MS-32 purifiers for ammonia service come with a filter which removes 99.9999999% (9-log) of all particles ≥ 0.003mm. This filter limits the maximum flow to 150 slpm of nitrogen.

Note 4: Valves on all MS-Series purifiers have 1/2" VCR type inlet and outlet connections, but are connected to 3/8" Stainless Steel tubing.

Note 5: Filters on all L-Series purifiers provide 9-log retention at the highest rated flow rate for particles ≥ 0.003μm. The exception is the filter on the L-500-HF. While it offers 9-log retention at low flow rates (up to 6 lpm), the removal efficiency decreases to 4-log retention at the maximum rated flow rate of 75 slpm.



## Basic Flowmeter Principles



### How They Work

Flowmeters are used in fluid systems (liquid and gas) to indicate the rate of flow of the fluid. They can also control the rate of flow if they are equipped with a flow control valve.

Rotameters are a particular kind of flowmeter, based on the variable area principle. They provide a simple, precise and economical means of indicating flow rates in fluid systems.

This variable area principle consists of three basic elements: A uniformly tapered flow tube, a float, and a measurement scale. A control valve may be added if flow control is also desired.

In operation, the rotameter is positioned vertically in the fluid system with the smallest diameter end of the tapered flow tube at the bottom. This is the fluid inlet. The float, typically spherical, is located inside the flow tube, and is engineered so that its diameter is nearly identical to the flow tube's inlet diameter.

When fluid — gas or liquid — is introduced into the tube, the float is lifted from its initial position at the inlet, allowing the fluid to pass between it and the tube wall. As the float rises, more and more fluid flows by the float because the tapered tube's diameter is increasing. Ultimately, a point is reached where the flow area is large enough to allow the entire volume of the fluid to flow past the float. This flow area is called the annular passage. The float is now stationary at that level within the tube, as its weight is being supported by the fluid forces which caused it to rise. This position corresponds to a point on the tube's measurement scale and provides an indication of the fluid's flow rate.

One way to change the capacity, or flow range, of a rotameter is to change the float material, and thus its density, while keeping the flow tube and float size constant. Floats which are made from less dense materials will rise higher in the tube and therefore will yield lower flow capacities for the same diameter flow tube.

Floats made from more dense materials will rise less thereby yielding higher flow capacities. Relative flow capacities for some common float materials are shown in Figure 1.

Another way to change the capacity is to change the diameter of the flow tube and the size of the float.

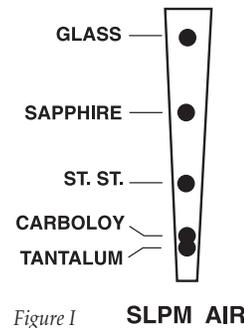


Figure 1

### Selecting The Right Flowmeter Size

There are certain factors which affect the measurement of a fluid's flow rate with a rotameter. The fluid's temperature, pressure and specific gravity all impact gas flow measurements.

Flow capacities (ranges) for the flowmeters described in this catalog are given for air at standard conditions — 14.7 psia (101.3 KPa Abs) and 70°F (21°C). Sizing a meter for a gas other than air, or for your specific application pressure and/or temperature, requires that you first determine the equivalent flow capacity in air at standard conditions. Once determined, the flow capacity tables in this catalog can be applied directly. Reference Scale tables can be requested for each flowmeter ordered which will provide conversion to your desired fluid or conditions.

*Note that for flowmeters calibrated at standard conditions with a valve on the inlet, readings on the tube are correct provided that the outlet pressure is close to atmospheric. When the valve is on the outlet, readings are correct if the inlet gas pressure is equal to the pressure for which the tube was calibrated.*

For your convenience, **Table 1** provides correction factors for gases other than air at standard conditions. Call a customer service representative if you require further assistance in sizing a rotameter for your particular application.



## Basic Flowmeter Principles *(continued)*

Table 1: Flow Rate Factors for Gases other than Air

Gas	Factor	Gas	Factor	Gas	Factor
Acetylene	0.95	Halocarbon-11	2.18	Hydrogen Chloride	1.13
Air	1.00	Halocarbon-12	2.05	Hydrogen Sulfide	1.08
Ammonia	0.77	Halocarbon-13	1.90	Isobutane	1.42
Argon	1.18	Halocarbon-13B	2.27	Isobutylene	1.39
1-3 Butadiene	1.37	Halocarbon-14	1.74	Methane (Natural Gas)	0.75
Butane	1.42	Halocarbon-21	1.89	Methyl Fluoride	1.09
1-Butene	1.39	Halocarbon-22	1.73	Monomethylamine	1.04
Carbon Dioxide	1.23	Halocarbon-23	1.56	Neon	0.83
Carbon Monoxide	0.98	Halocarbon-113	2.54	Nitrogen	0.98
Chlorine	1.57	Halocarbon-114	2.43	Nitrogen Dioxide	1.60
Cracked Ammonia	0.54	Halocarbon-116	2.18	Nitrous Oxide	1.23
Cyclopropane	1.21	Halocarbon-115	2.31	Oxygen	1.05
Difluoroethane	1.51	Halocarbon-142B	1.86	Propane	1.23
Dimethyl Ether	1.26	Halocarbon-152A	1.51	Propylene	1.21
Ethane	1.02	Helium	0.37	Sulfur Dioxide	1.50
Ethylene	0.98	Hydrogen	0.26	Sulfur Hexafluoride	2.25

*For other gases or for non-standard temperatures and pressures, call a customer service representative.*

*Note that for flowmeters calibrated at standard conditions with a valve on the inlet, readings on the tube are correct provided that the outlet pressure is close to atmospheric. When the valve is on the outlet, readings are correct if the inlet gas pressure is equal to the pressure for which the tube was calibrated.*

To estimate which flow tube should be purchased when measuring the flow of a gas other than air, multiply the flow rate desired by its factor above to find the air flow equivalent. The flow tube whose range (capacity) covers this flow rate should be the one purchased. Be sure to keep units consistent. Air Equivalent= Gas Flow Rate Desired x Factor. These factors assume standard operating conditions. Temperature 70°F / 21°C; pressure 14.7 psia (101.3 K Pa Abs).

### Flowmeter Measurement Scales

Depending upon the model, the flowmeter's measurement scale can be either direct reading or in reference scale units.

Direct reading tubes are straightforward. The measurement scale on each of these tubes reads actual flow at standard conditions in a choice of English or Metric units.

Reference scale tubes, on the other hand, provide a uniformly calibrated scale in arbitrary millimeter (mm) units. Obtaining actual flow rates with these tubes requires the use of a reference scale flow correlation table (available from Matheson) which

relates the mm scale reading to an actual flow rate. Reference scale tubes are useful when measuring flow rates for gases other than air, for non-standard conditions, or when conditions or the gas may frequently change.

Variable area flowmeters are often defined by their measurement scale length, that is, the distance between the zero and full scale marking. Scale length is typically indicated in millimeter (mm) units. The FM-1050, for example, uses a 150mm tube and the FM-1000 uses a 65mm tube. *Note that this scale length has no relationship at all with whether the flowmeter is a direct reading or a reference scale tube.*



## Basic Flowmeter Principles *(continued)*

### Flowmeter Calibration and Services

There are many formulas available, which calculate the flow of a fluid through a variable area flowmeter for which it is not calibrated. Moreover, these equations are used to generate correction factors for correlating other fluid flows to some known calibration, as shown in Table 1.

Matheson has conducted extensive experiments to determine the accuracy of these mathematical formulas. At best, calculated values estimate flow rates to about  $\pm 5\%$  accuracy. If you require greater accuracy, it will be necessary to calibrate the flowmeter with the actual gas, or at the particular conditions (temperature/pressure), in question.

Matheson has a fully equipped laboratory and has developed many special procedures for calibrating flowmeters to different gases and/or conditions.

Over the years, we have built an extensive library of flow correlation tables and curves for dozens of gases at numerous conditions. Utilizing these flow correlation tables with a Matheson flowmeter will yield the accuracy specification listed for each flowmeter model in this catalog. (Ex.  $\pm 5\%$  for FM-1050 or FM-1000). Request the tables when you order your flowmeter.

For accuracies better than  $\pm 5\%$ , Matheson can directly calibrate your flowmeter(s) at a cost below what most laboratories would incur to do it themselves. To request a price quotation for your specific flowmeter application, please specify the gas, operating pressure and temperature, and flow rate or flowmeter model number. For more information call a customer service representative.

### Overview Of Flowmeter Models

Matheson offers a complete line of variable area flowmeters to meet your application requirements.

Model Series	Scale Length	Scale Type <sup>1</sup>	Comments	Page No.
<b>Tube-Cube®</b>	—	—	—	22
<b>FM-1050</b>	150mm	Reference	High accuracy	23
<b>FM-1000</b>	65mm	Direct	High accuracy	25
<b>FM-1100</b>	70mm	Direct	High flow capacity	27
<b>FM-1127</b>	127mm	Direct	High flow capacity	27
<b>Mixers</b>	150mm	Reference	2, 3, and 4-tube mixers	29
<b>Replacement Parts</b>	—	—	—	31
<b>PG-1000</b>	50mm	Direct	Economical Acrylic body with glass tube	32
<b>PM-1000</b>	37mm	Direct	Economical Acrylic block and tube	33

<sup>1</sup>Note: Direct Reading scales are available in both English and Metric units.  
Reference scales come with a flow correlation table for air at standard conditions.  
Request a correlation table for the gas(es) or liquid(s) you will be measuring.



## Basic Flowmeter Principles *(continued)*

### General Ordering Information

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	— <input type="checkbox"/>	— <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				

The Model Number Generator Tables (see above example) provided in each Model Series section enable you to build your own custom flowmeter by allowing you to specify the exact model number you wish to purchase. While the Model Number provides all the necessary information in coded form, to ensure that you receive the correct model for your application, it is recommended that you also specify on your order:

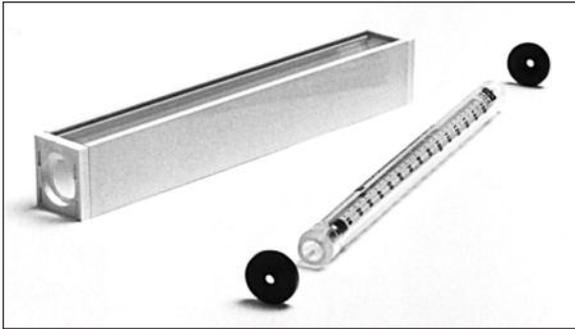
- Model Number, per Model Number Generator Table
- Gas to be measured
- Specific gravity of gas if other than air
- Operating, maximum and minimum flow rates
- Operating and maximum temperatures and pressures
- Scale type: Direct reading or mm reference. If direct reading, English or Metric units. If mm reference, flow correlation table(s) needed
- Number of metering tubes
- End blocks and seal materials
- Valve type, if any: utility, high accuracy or none
- Connection type, size, orientation
- Accessories: bezel, baseplate, higher accuracy calibrations, clean for oxygen service, etc.
- Shipping and billing information

*Please contact Matheson Technical Services at 800-828-4313 for pricing information.*



**Rotameters**

**The Tube-Cube®**



With the Tube-Cube® you can quickly and easily change flow ranges without having to disconnect the flowmeter from your system to change the entire frame.

**Description**

The Tube-Cube® is an innovative design developed and patented by Matheson. It allows the interchange of flow tubes within a single frame. The Tube-Cube® is standard on all Matheson FM-1050 and FM-1000 Series Flowmeters and tube assemblies.

The Tube-Cube® was designed so that it could be fitted into any standard 150mm or 65mm flowmeter unit\*. This includes all meters supplied by Matheson prior to the Tube-Cube® style design as well as those of most other manufacturers. Retro-fit Kits complete with end seal adapters (filler plugs and O-ring) are available.

**The Tube-Cube® offers you:**

- Easier and faster installation
- Automatic centering and alignment
- Elimination of chipped tube ends
- Insurance of safer and proper installation. (whenever the tube is installed the seals are correctly located)

- Protection from tube breakage because the glass tube is always encased in a protective plastic rectangle that can't roll off a bench
- 1.5 X magnification of meter scale and float for easier, more accurate reading

The Tube-Cube® consists of two side plates of ABS resin, two molded end pieces of high density polypropylene, and a clear molded acrylic front shield which also serves as a magnifying lens. This lens magnifies the flowmeter tube numerals and float by a factor of 1.5 to allow more precise flow reading than is possible with conventional flowmeter shields.

The flowmeter tube end seals are also contained in the Tube-Cube® package. These seals assure that the glass tube is precisely centered and positively retained within the Tube-Cube®. These end seals are Viton as standard but are also available with Teflon in fluid contact, Buna N, and EPR (Ethylene Propylene Rubber) when specified as optional extras.

To complete the package, a yellow, flexible, polished vinyl rear panel is fitted into the Tube-Cube®. This panel not only provides a reflective, easy tube reading background, but it also acts as a protective rear cube-cover which keeps dust and dirt out of the Tube-Cube® itself.

**Materials of Construction**

Centering Seal:	Buna-N, Viton, EPR, Teflon or Kalrez
Tube-Cube®:	ABS plastic, polypropylene
End Seal Adapters:	Filler plugs – aluminum, brass,
(Retro-fit Kits)	316 stainless steel or Monel O-rings – Buna-N, Viton or EPR

\*Cannot be used on Fisher and Porter Models, 10A 1450, 10A 1460, 10A 1300, 10A 3135 and Porter Models F65A, and F15A Forged Body Meters.

**Five Easy Steps**



1. Loosen end seal



2. Remove Tube-Cube®



3. Select replacement Tube-Cube®



4. Reposition Tube-Cube®



5. Tighten end seals

**Ordering Information**

**Ordering Tube-Cube®**

The Tube-Cube® is standard equipment with the FM-1050 and FM-1000 series flowmeters. When ordering an entire flowmeter, refer to those pages (356-359). To order a replacement for these flowmeters, please refer to Replacement Parts, on page 31.

**Retro-fit Kits for Non-Matheson 65mm and 150mm Design Frames**

Note: Both this kit and a Tube-Cube® package must be purchased to retrofit other 65mm and 150mm design frames.

**SEAL MATERIAL**

- 0 = Buna-N
- 1 = EPR
- 2 = Viton
- 3 = Teflon
- 4 = Kalrez

**MATERIALS**

- AO = Aluminum
- BO = Brass
- SA = Stainless Steel
- MA = Monel

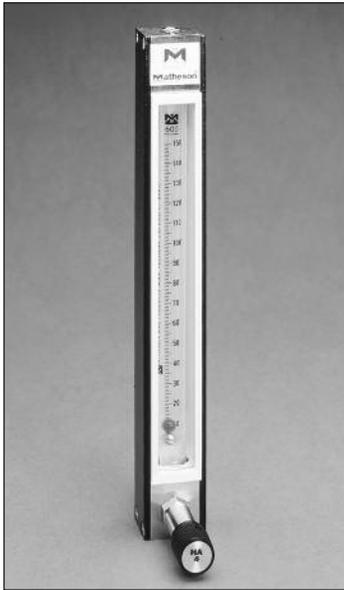
Please contact Matheson Technical Services at 800-828-4313 for pricing information.

Seal Materials	Materials
KIT – 015 <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

Prices and Specifications Subject to Change without Notice



## Model FM-1050 Series High Accuracy Flowmeter (150mm)



### Description

Matheson's FM-1050 Series Flowmeters provide the most accurate indication and precise control of fluids available for a wide range of applications. This versatile meter is functionally and dimensionally interchangeable with other current designs while incorporating many innovative features.

All FM-1050 Series glass metering tubes have integral float guides to ensure a guaranteed  $\pm 5\%$  ( $\pm 1\%$  with optional calibration) of full scale accuracy. Both glass and stainless steel floats are included. The meters are available in a range of 150mm reference indicating scales. Be sure to request calibration data for the gas(es) you will be measuring.

Standard with this series is the uniquely designed Tube-Cube®. The "cube," a unitized tube holder, aligns the tube quickly and easily for simple tube installation or replacement. The Tube-Cube® provides protection during handling, reducing chipped tube ends, broken tubes and misalignment. The 1.5 X scale magnification lens allows for a more accurate reading. End seals in the FM-1050 are direct acting and nonrotating for fast alignment and convenient service access.

### Valve Options

- No valve for those who just want indication
- Utility (six-turn) valve for those who desire control as well as indication
- High accuracy (fifteen-turn) valve, for very precise control and repeatability

### Design Features

- High resolution 150mm scale length
- Precision tapered, fluted metering tube
- Low pressure drop for increased available flow rates at low feed pressures

- Standard front panel mounting requires minimum hardware — easy installation, quick access
- Available utility and high precision metering valves do not require special fittings
- Simplified, direct acting, nonrotating compression plug for quick and easy tube sealing

### Specifications

Pressure Rating:	250 psig maximum
Temperature Rating:	250°F maximum
Accuracy:	$\pm 5\%$ of full scale flow rate
Optional Accuracies:	$\pm 1\%$ and $3\%$ of full scale for reference scales only
Repeatability:	0.25% of scale reading
Range:	10 to 1, i.e., 100% to 10% of full scale mm or linear flow with conversion curves and/or factors
Scale Readings:	Special direct reading scales available
Shipping Weight:	1 lb

### Materials of Construction

Wetted End Blocks, Fittings and Internal Parts:	Brass, 316 stainless steel – standard; Anodized aluminum, Kynar, Monel – optional
Seal Materials:	Buna-N or Viton – standard; EPR, Kalrez or Teflon – optional
Side Plates:	Painted or anodized aluminum
Metering Tube:	Borosilicate glass enclosed in Tube-Cube® holder
Piping Connections:	Brass, 316 stainless steel – standard; Aluminum, Monel – optional
Float Materials:	Black glass and 316 stainless steel – standard; sapphire, Carboloy or Tantalum – optional
Scale:	Ceramic ink on glass tube, length 150mm

### Dimensions FM-1050 Flowmeter

See pages 36 for engineering drawing.

### Don't See It Here?

Matheson offers a complete line of variable area flowmeters. Our standard, more common configuration options are shown here. However, if you don't see what you are looking for, contact us. We manufacture flowmeters for liquids as well as gases, and can use other end block materials, such as aluminum, Kynar and Monel, and other seal materials such as Teflon, EPR and Kalrez. In addition, we offer other connection fittings, including NPT, tube and hose, in a variety of sizes. Lastly, we have an enormous library of flow calibrations and correlation tables for dozens of other gases and a wide range of conditions.

So, if you don't see it here, give us a call. We'll build to suit your specific needs.

- See pages 18 for additional general information.
- See page 22 for Tube-Cube® information.
- See page 31 for Replacement Seal Kits and Parts.



**Rotameters**

**Model FM-1050 Series  
High Accuracy Flowmeter (150mm) (continued)**

**Flow Tube Capacities for FM-1050 Series Flowmeters, Reference Scales**

Tube No.	Float Material	CO <sub>2</sub> Carbon Dioxide (SCCM)	AR Argon (SCCM)	O <sub>2</sub> Oxygen (SCCM)	Air (SCCM)	N <sub>2</sub> Nitrogen (SCCM)	Natural Gas (SCCM)	He Helium (SCCM)	H <sub>2</sub> Hydrogen (SCCM)	Utility Valve Size	HA Valve Size
<b>E910*</b>	Glass	0.34-108	0.23-88	0.25-97	0.13-104	0.29-108	0.47-162	0.26-144	0.56-269	7	1
<b>E100</b>	Glass & Stainless Steel	6.8-200	4.6-140	5.2-145	6-150	6.5-175	9-270	5.3-160	11.7-360	7	2
<b>E200</b>	Glass & Stainless Steel	11-280	7-220	8-240	10-270	10.5-275	14.5-410	9-260	19-560	7	2
<b>E300</b>	Glass & Stainless Steel	36-750	32-690	35-770	38-840	39-850	56-1180	47-1350	99-2500	7	3
<b>E406</b>	Glass & Stainless Steel	72-1450	75-1490	83-1660	88-1800	90-1850	111-2430	163-3680	278-6509	7	4
		<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>	<b>(SLPM)</b>		
<b>E500</b>	Glass & Stainless Steel	0.22-4.4	0.21-4.13	0.24-4.69	0.23-4.6	0.25-5	0.35-6.9	0.51-10.4	0.81-16.2	8	5
<b>E606</b>	Glass & Stainless Steel	0.34-6.6	0.34-6.7	0.38-7.4	0.4-7.6	0.42-7.9	0.53-10	0.81-16.5	1.3-26.4	8	5
<b>E700</b>	Glass & Stainless Steel	0.77-14.4	0.76-14.3	0.85-16.1	0.88-16	0.91-17.2	1.26-22.6	2-39.8	3.09-59.6	9	6
<b>E800</b>	Glass & Stainless Steel	2.05-37.4	2.06-38.1	2.32-43.1	2.4-44	2.47-46	3.21-59.3	5.71-110.7	8.6-161.1	9	6

All flow rates are at 70°F and 14.7 psia

NOTE: Reference tubes are supplied with correlation charts for air and water flow rates at STP. If you require a correlation chart for other gases or liquids, or at pressures or temperatures other than standard, please indicate such when ordering.

\*0-100 calibrated correlated reference tube scale only

Flow charts for tubes are located at [www.mathesontrigas.com/literature](http://www.mathesontrigas.com/literature)

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	— <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> — <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**Model Number Generator For FM-1050 Series Glass Tube Flowmeters**

**MODEL SERIES**

E = Model FM-1050 Glass Tube Flowmeter with 150mm tube

**NUMBER OF METERING TUBES**

1 = Single Tube Unit

**END BLOCKS/SEAL MATERIAL**

3 = Chrome Plated Brass with Buna-N Seals  
4 = 316 Stainless Steel with Viton Seals

**VALVE TYPES**

A = Utility Valve on Inlet  
B = Utility Valve on Outlet  
C = High Accuracy Valve on Inlet  
D = High Accuracy Valve on Outlet  
G = No Valve

**CONNECTIONS**

1 = 1/8" NPT Female (std)  
2 = 1/4" NPT Female  
4 = 1/4" Tube  
6 = 1/4" Hose (3/16"-3/8" Hose Tapered)

**ACCESSORIES (ORDER SEPARATELY)**

0 = None  
1 = Flush Panel Mounting Bezel – Clear  
5 = Base Plate  
7 = Flush Panel Mounting Bezel – Black

**CONNECTION ORIENTATION**

1 = Back In and Back Out

**FLOW TUBE (CAPACITIES)**

EXXX = See Capacity Table For FM-1050 Series Flowmeters

**ADDITIONAL OPTIONS**

- +/- 1% Accuracy, Full Scale, With Certification, Gases, No Direct Read
- +/- 2% Accuracy, Full Scale, With Certification, Gases, No Direct Read
- +/- 3% Accuracy, Full Scale, With Certification, Gases, Direct Read
- +/- 5% Accuracy, Full Scale with Certification, Gases, Direct Read
- MMSP-0003-XX Clean for O<sub>2</sub> Service

*These are Reference Scale Flowmeters. Be sure to request calibration data for the gas(es) you will be measuring*

Please contact Matheson Technical Services at 800-828-4313 for pricing information.



## Model FM-1000 Series Compact High Accuracy Flowmeter (65mm)



### Description

The FM-1000 Series Flowmeters incorporate the innovative design of the FM-1050 in a more compact unit without reducing standards of accuracy. This is the rotameter of choice for those interested in conserving space. The same  $\pm 5\%$  full scale accuracy is guaranteed for the 65mm scale length of these flowmeters.

Unlike the FM-1050 series which uses reference scales, the FM-1000 Series flowmeters are direct reading for air, and are available in either English or Metric units. Choose between a black glass or a stainless steel float. These flow tubes are fluted to provide better float stability.

The FM-1000 Series glass metering tubes are enclosed in the Tube-Cube®. Protection of the tube, magnified tube scale for easy reading and alignment during replacement are afforded with this unitized holder. Integral fluted float guides for optimum float performance are standard with all tubes unless otherwise specified.

### Valve Options

- No valve for those who just want indication
- Utility (six-turn) valve for those who desire control as well as indication
- High accuracy (fifteen-turn) valve for very precise control

### Design Features

- Rugged, compact design
- Precision tapered, fluted metering tube
- Tube Cube® unitized glass tube holding assembly
- Reflective plastic background and 1.5 X magnification lens for excellent readability
- Safety blow-out back panel
- Full 10 to 1 (100% to 10% full scale) metering range
- Low pressure drop for increased flow rates at low feed pressures
- Easy installation and quick service access

- Optional utility and high performance valves do not require special fittings
- Corrosion resistant options: all wetted parts of 316 stainless steel or Monel with Viton or Teflon seals
- Custom scales and flow curves available

### Specifications

Pressure Rating:	250 psig maximum operating pressure
Temperature Rating:	250°F maximum operating temperature
Accuracy:	$\pm 5\%$ of full scale flow rate – consult factory for higher accuracies
Repeatability:	0.25% of scale reading
Range:	10 to 1, i.e., 100% to 10% of full scale
Scale Readings:	Direct reading air (special other scales available)
Shipping Weight:	1 lb

### Materials of Construction

Wetted End Blocks, Fittings and Internal Parts:	Brass, 316 stainless steel – standard; Anodized aluminum, Kynar, Monel – optional
Seal Materials:	Buna-N or Viton – standard; Teflon, EPR, or Kalrez – optional
Side Plates:	Painted or anodized aluminum
Metering Tube:	Borosilicate glass enclosed in Tube-Cube® holder
Piping Connections:	Brass, 316 stainless steel – standard; Aluminum, Monel – optional
Float Materials:	Black glass or 316 stainless steel – standard; sapphire, ceramic, Carboloy or Tantalum – optional
Scale:	Ceramic ink on glass tube, length 65mm

### Dimensions FM-1000 Flowmeter

See pages 36 for engineering drawing.

### Don't See It Here?

Matheson offers a complete line of variable area flowmeters. Our standard, more common configuration options are shown here. However, if you don't see what you are looking for, contact us. We manufacture flowmeters for liquids as well as gases, and can use other end block materials, such as aluminum, Kynar and Monel, and other seal materials such as Teflon, EPR and Kalrez. In addition, we offer other connection fittings, including NPT, tube and hose, in a variety of sizes. Lastly, we have an enormous library of flow calibrations and correlation tables for dozens of other gases and a wide range of conditions.

So, if you don't see it here, give us a call. We'll build to suit your specific needs.

- See pages 18 for additional general information.
- See page 22 for Tube-Cube® information.
- See page 31 for Replacement Seal Kits and Parts.



**Rotameters**

**Model FM-1000 Series**  
**Compact High Accuracy Flowmeter (65mm) (continued)**

**Flow Tube Capacities for FM-1000 Series Flowmeters, Direct Reading**

Float Material	Metric Scale		English Scale		Utility Valve Size†	HA Valve Size†
	Tube No	Air (SLPM)*	Tube No.	Air (SCFH)*		
Glass	J009	10-130ccm	J011	0.02-0.24	7	2
Stainless Steel	J010	20-300ccm	J012	0.05-0.65	7	2
Glass	J109	100-500ccm	J111	0.2-1.1	7	3
Stainless Steel	J110	200-1000ccm	J112	0.4-2.2	7	3
Glass	J209	0.1-1	J211	0.2-2.8	8	4
Stainless Steel	J210	0.1-2.1	J212	0.2-4.4	8	4
Glass	J409	0.5-5	J411	1-11	8	5
Stainless Steel	J410	0.5-9.5	J412	2-20	8	6
Glass	J509	2-24	J512	5-55	9	6
Stainless Steel	J510	2-50	J513	10-100	9	6
Carboloy	J511	5-70	J514	10-150	9	6

\*All air flow rates are at 70°F and 14.7 psia  
†At 10 psig inlet pressure

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	— <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> — <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**Model Number Generator For FM-1000 Series Glass Tube Flowmeters**

**MODEL SERIES**

J = Model FM-1000 Glass Tube Flowmeter with 65mm tube

**NUMBER OF METERING TUBES**

1 = Single Tube Unit

**END BLOCKS/SEAL MATERIAL**

3 = Chrome Plated Brass with Buna-N Seals  
4 = 316 Stainless Steel with Viton Seal

**VALVE TYPES**

A = Utility Valve on Inlet  
B = Utility Valve on Outlet  
C = High Accuracy Valve on Inlet  
D = High Accuracy Valve on Outlet  
G = No Valve

**CONNECTIONS**

1 = 1/8" NPT Female (std)  
2 = 1/4" NPT Female  
4 = 1/4" Tube  
6 = 1/4" Hose (3/16"-3/8" Hose Tapered)

**ACCESSORIES (ORDER SEPARATELY)**

0 = None  
1 = Flush Panel Mounting Bezel – Clear  
5 = Base Plate  
7 = Flush Panel Mounting Bezel – Black

**CONNECTION ORIENTATION**

1 = Back In and Back Out

**FLOW TUBE (CAPACITIES)**

JXXX = See Capacity Table For FM-1000 Series Flowmeters

**ADDITIONAL OPTIONS**

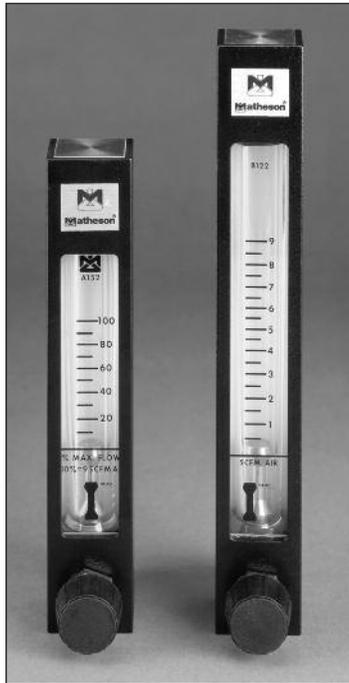
- +/- 1% Accuracy, Full Scale, With Certification, Gases, No Direct Read
- +/- 2% Accuracy, Full Scale, With Certification, Gases, No Direct Read
- +/- 3% Accuracy, Full Scale, With Certification, Gases, Direct Read
- +/- 5% Accuracy, Full Scale with Certification, Gases, Direct Read
- MMSP-0003-XX Clean for O<sub>2</sub> Service

*The FM-1000 Series are direct reading scale flowmeters for air. Inquire for other tube scales available.*

*Please contact Matheson Technical Services at 800-828-4313 for pricing information.*



## Model FM-1100 Series and Model FM-1127 Series High Flow Capacity Flowmeters (70mm, 127mm)



### Description

The FM-1100 and FM-1127 Series Flowmeters are offered as a simplified solution to the problem of fluid flow indication at higher flow capacity levels than the FM-1050 and FM-1000 Series Flowmeters. These meters are designed to withstand the physical abuse and environmental corrosion of industrial applications.

The FM-1100 is available in several ranges of 70mm direct reading scales, and the FM-1127 in 127mm direct reading scales. Choose between English or Metric units.

A one-piece aluminum channel frame encloses the end blocks, fittings and glass metering element for maximum meter protection and safety. Eight standard connection variations are made possible by three off-the-shelf end block configurations.

The precision tapered metering tube has integral float guides to ensure float fidelity. The scale is permanently screened on an acrylic window inset in the meter case which makes it interchangeable for economical alteration of meter applications. A float / scale correlation symbol is marked on the window to eliminate error during application changes. The reading edge of the machined float provides precision read-out delineation. Reading edge instructions are also screened on the scale window.

### Design Features

- Precision tapered, fluted metering tube
- Fully protected assembly using aluminum meter case
- Unobstructed flow path area for low pressure drop increases available flow rates at low feed pressures
- Precision machined float
- Spring float stops absorb line shock
- Float / Scale correlation symbol and float reading edge instructions permanently screened on meter window
- Corrosion resistant option: all wetted parts of 316 stainless steel with Viton or EPR seals
- Custom scales and flow curves available

### Specifications

Pressure Rating:	200 psig maximum operating pressure @ 200°F
Temperature Rating:	250°F maximum operating temperature
Accuracy:	±10% of full scale flow rate
Range:	10 to 1, i.e., 100% to 10% of full scale
Scale Reading:	Direct reading air (special other scales available)
Shipping Weight:	2 lbs

### Materials of Construction

Wetted End Blocks, Fittings and Internal Parts:	Brass or 316 stainless steel
Seal Materials:	Buna-N or Viton – standard; Teflon, Kalrez or EPR – optional
Meter Case:	Black painted or anodized aluminum with acrylic window
Metering Tube:	Borosilicate glass
Piping Connections:	Brass or 316 stainless steel 3/8" NPT Female ( <i>see Accessories for optional connections</i> )
Float Material:	316 stainless steel
Scale:	Permanently screened on inside of meter window, length FM-1100 – 70mm or FM-1127 – 127mm.

### Dimensions FM-1100 and FM-1127 Flowmeters

See pages 37 for engineering drawing.

- See pages 18 for additional general information.
- See page 22 for Tube-Cube® information.
- See page 31 for Replacement Seal Kits and Parts.



**Rotameters**

**Model FM-1100 Series and Model FM-1127 Series  
High Capacity Flowmeters (70mm, 127mm)**

**Flow Tube Capacities For FM-1100 And FM-1127 Series Flowmeters, Direct Reading Scales**

**FM-1100 Series**

Tube No.	Air (SCFM)*	Tube No.	Air (SLPM)*	Tube No.	Water (GPM)	Tube No.	Water (LPM)
A121	0.5-4	A125	10-120	A111	0.1-1	A116	0.5-3.5
A122	1-9	A126	20-260	A112	0.2-2	A117	0.5-8
A123	1-12	A127	20-340	A113	0.2-3	A118	1-10
A124	1-15	A128	50-500	A114	0.5-4	A119	1-15
				A115	0.5-5	A120	2-20

\*All air flow rates are at 70°F and 14.7 psia

**FM-1127 Series**

Tube No.	Air (SCFM)*	Tube No.	Air (SLPM)*	Tube No.	Water (GPM)	Tube No.	Water (LPM)
B121	0.2-4	B125	5-120	B111	0.05-1	B116	0.2-3.5
B122	0.5-9	B126	20-260	B112	0.1-2	B117	0.5-8
B123	0.5-11	B127	20-320	B113	0.2-3	B118	0.5-12
B124	1-16	B128	20-500	B114	0.2-4	B119	1-16
				B115	0.5-5	B120	1-22

\*All air flow rates are at 70°F and 14.7 psia

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Model Number Generator For FM-1100 Series & FM-1127 Series Glass Tube Flowmeters**

**MODEL SERIES**

- A = Model FM-1100 Glass Tube Flowmeter with 70mm tube
- B = Model FM-1127 Glass Tube Flowmeter with 127mm tube

**NUMBER OF METERING TUBES**

- 1 = Single Tube Unit

**END BLOCKS/SEAL MATERIAL**

- 4 = 316 Stainless Steel with Viton Seals
- 8 = Brass with Buna-N Seals

**VALVE TYPES**

- J = Valve on Inlet
- L = Valve on Outlet
- Y = No Valve/No Plug

**CONNECTIONS**

- 2 = 1/4" NPT Female
- 7 = 3/8" NPT Female (std)
- 8 = 1/2" NPT Female

**ACCESSORIES**

- 0 = None
- 8 = Externally Threaded Connections for Panel Mounting

**CONNECTION ORIENTATION**

- 1 = Back In and Back Out

**FLOW TUBE (CAPACITIES)**

- AXXX = See Capacity Table For FM-1100 Series Flowmeters
- BXXX = See Capacity Table For FM-1127 Series Flowmeters

**ADDITIONAL OPTIONS**

- +/- 5% Accuracy, Full Scale, With Certification
- +/- 10% Accuracy, Full Scale, With Certification
- Clean for O<sub>2</sub> Service

*These are Direct Reading Scale Flowmeters. Inquire for other tube scales available.*

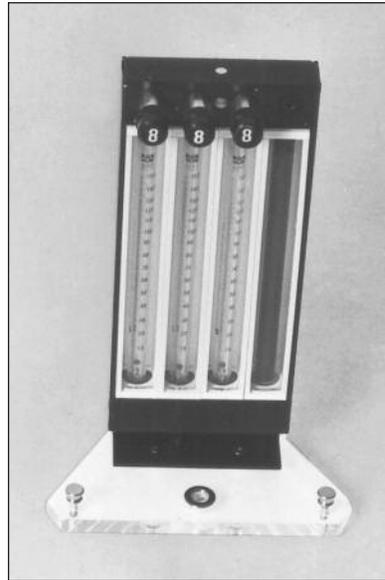
*Please contact Matheson Technical Services at 800-828-4313 for pricing information.*



## Model 7300 Series and Model 7400 Series Proportioners and Mixers



Model 7300 Series

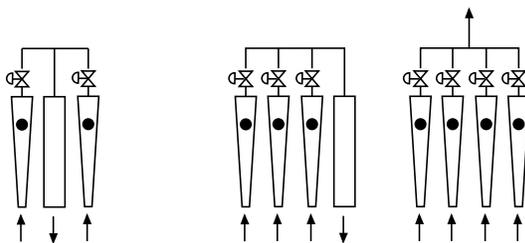


Model 7400 Series

### Description

Matheson's Model 7300 and 7400 Series Flowmeters are 150mm multi-tube flowmeter manifolds used for proportioning or mixing multiple gas streams. They are available in three basic configurations.

- Two gases in – One stream out (proportioner)
- Three gases in – One stream out (mixer)
- Four gases in – One stream out (mixer)



Model 7300 Series

Model 7400 Series

Tubes are available in several 150mm reference scale flow ranges. Be sure to request calibration data for the gases you will be metering. All tubes are supplied with a single glass float.

Standard with the 7300 and 7400 series is the uniquely designed Tube Cube®. Also, FM-1050 150mm flow tubes are used.

Tubes are backpressure compensated by mounting the control valve (utility or high accuracy) on the outlet side of the tube. A highly sensitive pressure regulator is recommended for each of the inlet gas streams to avoid fluctuations in gas flow which could cause inaccuracies in mixing concentration.

### Specifications

Maximum Pressure: 200 psig  
Temperature Ranges: 20° to 250°F (-30° to 120°C)

To ensure that you receive the correct model for your application, please specify:

- Pressure (20 or 50 psig)
- Total flow rate
- Percent of each gas
- Special calibration



**Rotameters**

**Model 7300 Series and Model 7400 Series  
Proportioners and Mixers (continued)**

**Flow Tube Capacities for 7300 and 7400 Series Proportioners and Mixers,  
150mm Reference Scale**

Tube No.	Float Material	Air (SCCM)	Utility Valve Size	HA Valve Size
<b>E910*</b>	Glass	0.13-104	7	1
<b>E101</b>	Glass	6-60	7	1
<b>E201</b>	Glass	10-100	7	1
<b>E301</b>	Glass	38-380	7	3
<b>E401</b>	Glass	88-880	7	3
<b>(SLPM)</b>				
<b>E501</b>	Glass	0.23-2.3	8	4
<b>E601</b>	Glass	0.4-4	8	5
<b>E701</b>	Glass	0.88-8.8	9	6
<b>E801</b>	Glass	2.4-24	9	6

All flow rates are at 70°F and 14.7 psia  
\*0-100 calibrated correlated reference tube scale only

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	— <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> —	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**Model Number Generator For 7300 And 7400 Series Proportioners & Mixers**

**MODEL SERIES**

F = Three and four tube Model FM-1050  
Glass Tube MultiTube  
Mixers with 150mm tube

G = Two tube Model FM-1050 Glass Tube  
Proportioners with 150mm tube

**NUMBER OF METERING TUBES\***

2 = Two Tube Unit  
3 = Three Tube Unit  
4 = Four Tube Unit

\*Two Tube Only for Proportioners

**END BLOCKS/SEAL MATERIAL**

1 = Aluminum with Buna-N Seals  
4 = 316 Stainless Steel with Viton Seals  
6 = 316 Stainless Steel with Teflon Seals  
A = Aluminum with Viton Seals  
D = 316 Stainless Steel with Buna-N Seals  
E = 316 Stainless Steel with EPR Seals  
N = 316 Stainless Steel with Kalrez Seals

**VALVE TYPES**

B = Utility Valve on Outlet  
D = High Accuracy Valve on Outlet  
K = Hole Only

**CONNECTIONS**

1 = 1/8" NPT Female  
2 = 1/4" NPT Female  
3 = 1/8" Tube  
4 = 1/4" Tube  
5 = 1/8" Hose  
6 = 1/4" Hose (3/16"-3/8" Hose Tapered)

**ACCESSORIES**

0 = None  
5 = Base Plate Assembly  
• MMSP-003-XX Clean for Oxygen Service  
• +/- 1% Accuracy, Full Scale, With Certification, Gases, Direct Read  
• +/- 2% Accuracy, Full Scale, With Certification, Gases, Direct Read  
• +/- 3% Accuracy, Full Scale, With Certification, Gases, Direct Read  
• +/- 5% Accuracy, Full Scale with Certification, Gases, Direct Read

**CONNECTION ORIENTATION**

1 = Back In/Back Out

**FLOW TUBE (CAPACITIES)**

EXXX = See Capacity Table For 7300 and 7400 Series Flowmeters

**ADDITIONAL OPTIONS**

• Silk Screen Charge

Please contact Matheson Technical Services at 800-828-4313 for pricing information.



**Rotameters**

**Replacement Parts**

**FM-1050, FM-1000, FM-1100 and FM-1127 Series**

**FM-1050/FM-1000 Series**

The HCJ series Tube-Cube® is used in the FM-1000 and comes with either a glass (GL), stainless steel (SS) or carboloy (CA) float. The HCE series is used in the FM-1050 and, except for the 0910 tube, comes with both glass and stainless steel floats.

Flow Range Air	Tube Cube®	Float	Utility Value Size, P/N	High Accuracy Valve Size	Seal Kit Size
<b>FM-1050 Series</b>					
0.13-104 SCCM	<b>HCE-0910</b>	GL	7, 1	1	1
6-150 SCCM	<b>HCE-0100</b>	GL, SS	7, 1	2	1
10-270 SCCM	<b>HCE-0200</b>	GL, SS	7, 1	2	1
38-840 SCCM	<b>HCE-0300</b>	GL, SS	7, 1	3	1
88-1800 SCCM	<b>HCE-0406</b>	GL, SS	7, 1	4	1
0.23-4.6 SLPM	<b>HCE-0500</b>	GL, SS	8, 2	5	1
0.4-7.6 SLPM	<b>HCE-0606</b>	GL, SS	8, 2	5	1
0.88-16 SLPM	<b>HCE-0700</b>	GL, SS	8, 3	6	2
2.4-44 SLPM	<b>HCE-0800</b>	GL, SS	8, 3	6	3

**FM-1000 Series**

10-130 SCCM	<b>HCJ-0009</b>	GL	7, 1	2	1
20-300 SCCM	<b>HCJ-0010</b>	SS	7, 1	2	1
100-500 SCCM	<b>HCJ-0101</b>	GL	7, 1	3	1
200-1000 SCCM	<b>HCJ-0110</b>	SS	7, 1	3	1
0.1-1 SLPM	<b>HCJ-0209</b>	GL	8, 2	4	1
0.1-2.1 SLPM	<b>HCJ-0210</b>	SS	8, 2	4	1
0.5-5 SLPM	<b>HCJ-0409</b>	GL	8, 2	5	4
0.5-9.5 SLPM	<b>HCJ-0410</b>	SS	8, 2	6	4
2-24 SLPM	<b>HCJ-0509</b>	GL	9, 3	6	3
2-50 SLPM	<b>HCJ-0510</b>	SS	9, 3	6	3
5-70 SLPM	<b>HCJ-0511</b>	CA	9, 3	6	3
0.02-0.24 SCFH	<b>HCJ-0011</b>	GL	7, 1	2	1
0.05-0.65 SCFH	<b>HCJ-0012</b>	SS	7, 1	2	1
0.2-1.1 SCFH	<b>HCJ-0111</b>	GL	7, 1	3	1
0.4-2.2 SCFH	<b>HCJ-0112</b>	SS	7, 1	3	1
0.2-2.2 SCFH	<b>HCJ-0211</b>	GL	8, 2	4	1
0.2-4.4 SCFH	<b>HCJ-0212</b>	SS	8, 2	4	1
1-11 SCFH	<b>HCJ-0411</b>	GL	8, 2	5	4
2-20 SCFH	<b>HCJ-0412</b>	SS	8, 2	6	4
5-55 SCFH	<b>HCJ-0512</b>	GL	9, 3	6	3
10-100 SCFH	<b>HCJ-0513</b>	SS	9, 3	6	3
10-150 SCFH	<b>HCJ-0514</b>	CA	9, 3	6	3

Flow Range Air	Flow Tube	Window/Scale	Float
<b>FM-1100/FM1127 Series</b>			
0.2-4.0 SCFM	<b>TBE-XXXX-GB</b>	YYY-0121-PC	FLT-0001-SA
0.5-9.0 SCFM	<b>TBE-XXXX-GB</b>	YYY-0122-PC	FLT-0002-SA
0.5-11.5 SCFM	<b>TBE-XXXX-GB</b>	YYY-0123-PC	FLT-0002-SA
1-16 SCFM	<b>TBE-XXXX-GB</b>	YYY-0124-PC	FLT-0003-SA
5-120 SLPM	<b>TBE-XXXX-GB</b>	YYY-0125-PC	FLT-0001-SA
20-260 SLPM	<b>TBE-XXXX-GB</b>	YYY-0126-PC	FLT-0002-SA
20-320 SLPM	<b>TBE-XXXX-GB</b>	YYY-0127-PC	FLT-0002-SA
20-500 SLPM	<b>TBE-XXXX-GB</b>	YYY-0128-PC	FLT-0003-SA

**FM-1100 Series:**

XXXX = 0400

YYY = WNA

**FM-1127 Series:**

XXXX = 0066

YYY = WNB

Changing your Tube-Cube® size may also necessitate the changing of the valve to maintain an acceptable degree of flow control. Matheson valves are self-contained cartridges permitting easy interchange.

**Ordering Information**

Model Series	Seal Materials
HC <input type="checkbox"/> — <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> — <input type="checkbox"/> <input type="checkbox"/>	

To build a Rotameter Part Number, use our Rotameter Model Number Builder.

HCE-XXXX = Replacement Tube-Cube® for FM-1050 Series. See Table for 'HCE' Tube-Cube® number.

HCJ-XXXX = Replacement Tube-Cube® for FM-1000 Series. See Table 'HCJ' Tube-Cube® number.

**SEAL MATERIAL**

VA = Viton

BU = Buna-N

EB = EPR

PB = Teflon

KA = Kalrez

Valve Type	Valve Size	Materials
VLV-01 <input type="checkbox"/> — <input type="checkbox"/> <input type="checkbox"/>		

**Replacement Valves for FM-1050 and FM-1000**

**VALVE TYPES**

1 = Utility Valve

2 = High Accuracy Valve

**VALVE SIZES**

X = See Table for Valve Size

**MATERIALS**

AA = Aluminum (Utility Only)

BA = Brass (Utility and High Accuracy)

SA = Stainless Steel (Utility and High Accuracy)

MA = Monel (Utility Only)

Seal Materials	Materials
KIT - 010 <input type="checkbox"/> — <input type="checkbox"/> <input type="checkbox"/>	

**Replacement Seal Kits for FM-1050 and FM-1000 Seal Size**

X = See Table for Seal Size

**SEAL MATERIAL**

VA = Viton

BU = Buna-N

EB = EPR

PB = Teflon

KA = Kalrez

Please contact Matheson Technical Services at 800-828-4313 for pricing information.

Prices and Specifications Subject to Change without Notice



## Model PG-1000 Series Economical Acrylic Flowmeter with Glass Flow Tube



### Description

The PG-1000 Series Flowmeters are designed to allow reliable flow indication of gases at low capacities, while maintaining a rugged, economical plastic construction. A glass metering tube ensures dependable, accurate performance throughout the meter's capacity range.

The PG-1000 Series flowmeters are direct reading for air, and are available in either English or Metric units. Choose between a black glass or stainless steel float.

The superior construction features of the PG-1000 Series Flowmeters result in a sturdy design with optimum gas metering characteristics. Complete annealing during production ensures each meter body is stress free. Threadless plastic blocks eliminate crazing and fracture, and the metal support frame absorbs all connection strain.

The glass metering tube is sealed directly into the acrylic body by means of a spring-loaded O-ring, and is interchangeable. The scale is permanently fused on the metering tube, close to the flow area, to reduce parallax and improve readout.

### Design Features

- Precision tapered glass metering tube
- Reduced scale parallax
- Removable tube for capacity change
- 50mm scale length
- Low end flow measurement of 0.06 SCFH
- 10 to 1 or greater meter range
- Low pressure drop
- Meter support frame flanges allow variety of panel mounting positions
- Control valve available installed at inlet or outlet

### Specifications

Pressure Rating:	100 psig maximum operating pressure
Temperature Rating:	160°F maximum operating temperature
Accuracy:	±10% of full scale flow rate
Repeatability:	1% of scale reading
Range:	10 to 1 or greater, i.e., 100% to 10% of full scale
Scale Readings:	Direct reading for air (special other direct reading scales available)
Shipping Weight:	1 lb

### Materials of Construction

Wetted End Plugs and Valve Parts:	Brass, 316 stainless steel – standard; Aluminum – optional
Valve Stem:	316 stainless steel
Seal Materials:	Buna-N, Viton – standard; EPR, Kalrez – optional
Meter Block:	Clear, cast acrylic plastic with removable glass metering tube; extruded aluminum support frame
Piping Connections:	Brass or 316 stainless steel – standard; Aluminum – optional
Float Materials:	Black glass or 316 stainless steel
Scale:	Ceramic ink on glass tube, length 50mm

### Dimensions PG-1000 Flowmeter

See pages 38 for engineering drawing.

### Don't See It Here?

Matheson offers a complete line of variable area flowmeters. Our standard, more common configuration options are shown here. However, if you don't see what you are looking for, contact us. We manufacture flowmeters for liquids as well as gases, and can use other end block materials, such as aluminum, Kynar and Monel, and other seal materials such as Teflon, EPR and Kalrez. In addition, we can provide the valve on the outlet of the meter rather than the inlet, and we offer other connection fittings, including NPT, tube and hose, in a variety of sizes. Lastly, we have an enormous library of flow calibrations and correlation tables for dozens of other gases and a wide range of conditions.

So, if you don't see it here, give us a call. We'll build to suit your specific needs.



**Rotameters**

**Model PG-1000 Series**  
**Economical Flowmeters (continued)**

**Flow Tube Capacities For PG-1000 Series Flowmeters, 50mm, Direct Reading**

English Scale		Metric Scale		Float Material
Tube No.	Air (SCFH)*	Tube No.	Air (SCCM)*	
U005	0.01-0.06	U001	2.5-25	Glass
U006	0.02-0.1	U002	5-50	Glass
U007	0.02-0.18	U003	20-100	Glass
U008	0.1-0.4	U004	50-200	Stainless Steel
U203	0.1-1	U201	50-500	Glass
U204	0.2-2	U202	100-1000	Stainless Steel
(SLPM)*				
U305	0.2-4.4	U301	0.1-2	Glass
U306	1-6	U302	0.2-3	Stainless Steel
U307	1-8	U303	0.2-4	Stainless Steel
U308	1-10	U304	0.5-5	Stainless Steel

\*All flow rates are at 70°F and 14.7 psia

A 37mm scale is available, please consult Matheson.

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Model Number Generator For PG-1000 Series Flowmeters**

**MODEL SERIES**

U = Model PG-1000 Plastic Flowmeter with Glass Flow Tube

**NUMBER OF METERING TUBES**

1 = Single Tube Unit

**END BLOCKS/SEAL MATERIAL**

3 = Chrome Plated Brass with Buna-N Seals  
4 = 316 Stainless Steel with Viton Seals

**VALVE TYPES**

E = Valve on Inlet  
G = No Valve

**CONNECTIONS**

1 = 1/8" NPT Female (std)  
6 = 1/4" Hose (3/16"-3/8" Hose Tapered)

**ACCESSORIES (ORDER SEPARATELY)**

0 = None  
5 = Base Plate

**CONNECTION ORIENTATION**

1 = Back In and Back Out

**FLOW TUBE (CAPACITIES)**

UXXX = See Capacity Table Above

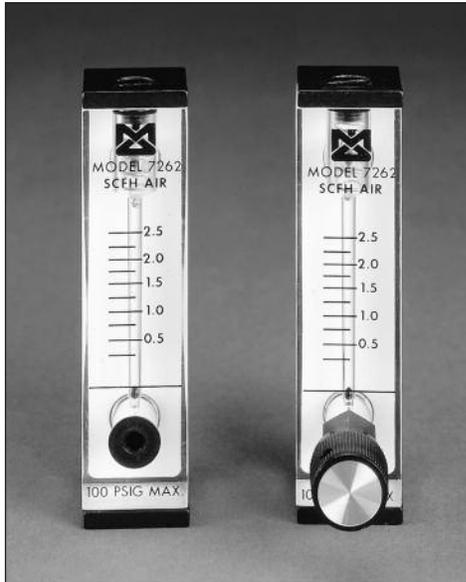
**ADDITIONAL OPTIONS**

- Bezel and bracket assemblies are available for mounting PG-1000 meters. Contact Matheson for details
- +/- 5% Accuracy, Full Scale, With Certification
- +/- 10% Accuracy, Full Scale, With Certification
- Silk Screen Charge
- Clean for O<sub>2</sub> Service

Please contact Matheson Technical Services at 800-828-4313 for pricing information.



## Model PM-1000 Series Economical Acrylic Flowmeters



### Description

The PM-1000 Series acrylic flowmeters are a practical, low-cost approach to low flow rate indication of gases. A broad range of industrial applications involving non-corrosive fluids, normal atmospheres and less stringent accuracy demands are within the scope of this simplified, plain tapered tube design. State-of-the-art manufacturing techniques ensure each meter meets the performance demands of these applications.

The PM-1000 Series are direct reading for air, and are available in either English or Metric units. Choose between a black glass or stainless steel float.

Complete annealing during production ensures each meter body is stress free. No plastic threading is used, eliminating crazing and fracture of the acrylic. An extruded aluminum support frame for the meter body absorbs all connection strain. Support frame flanges and lock nuts provide for a variety of panel mounting arrangements. The simplified design of this meter allows quick, easy maintenance. High impact strength of the acrylic meter block completes this dependable design.

### Design Features

- Reduced scale parallax
- 37mm scale length
- Low end flow measurement of 0.2 SCFH
- 10 to 1 or greater meter range
- Low pressure drop
- Meter support frame flanges allow variety of panel mounting positions
- Control valve available installed at inlet or outlet

### Specifications

Pressure Rating:	100 psig maximum operating pressure
Temperature Rating:	160°F maximum operating temperature
Accuracy:	±10% of full scale flow rate
Repeatability:	1% of scale reading
Range:	10 to 1 or greater, i.e., 100% to 10% of full scale
Scale Readings:	Direct reading air (special other direct reading scales available)
Shipping Weight:	1 lb

### Materials of Construction

Wetted End Plugs and Valve Parts:	Brass, 316 stainless – standard; Aluminum – optional
Valve Stem	316 stainless steel
Seal Materials:	Buna-N, Viton – standard; EPR, Kalrez – optional
Meter Block:	Clear, cast acrylic plastic with plain tapered bore
Piping Connections:	Brass, or 316 stainless steel – standard; Aluminum – optional
Float Materials:	Black glass or 316 stainless steel
Scale:	Permanently screened on meter body, length 37mm

### Dimensions PM-1000 Flowmeter

See pages 38 for engineering drawing.

### Don't See It Here?

Matheson offers a complete line of variable area flowmeters. Our standard, more common configuration options are shown here. However, if you don't see what you are looking for, contact us. We manufacture flowmeters for liquids as well as gases, and can use other end block materials, such as aluminum, Kynar and Monel, and other seal materials such as Teflon, EPR and Kalrez. In addition, we can provide the valve on the outlet of the meter rather than the inlet, and we offer other connection fittings, including NPT, tube and hose, in a variety of sizes. Lastly, we have an enormous library of flow calibrations and correlation tables for dozens of other gases and a wide range of conditions.

So, if you don't see it here, give us a call. We'll build to suit your specific needs.



**Rotameters**

**Model PM-1000 Series**  
**Economical Flowmeters (continued)**

**Flow Tube Capacities For PM-1000 Series Flowmeters, 37mm, Direct Reading**

English Scale		Metric Scale		Float Material
Tube No.	Air (SCFH)*	Tube No.	Air (SLPM)*	
N203	0.2-2.6	N201	0.1-1.2	Glass
N204	0.5-5	N202	0.2-2.4	Stainless Steel
P403	1-14	P401	0.5-6	Glass
P404	2-26	P402	1-12	Stainless Steel
Q603	5-60	Q601	2.5-30	Glass
Q604	20-120	Q602	10-55	Stainless Steel

\*All air flow rates are at 70°F and 14.7 psia

**Ordering Information**

Model Series	Number of Metering Tubes	End Blocks/ Seal Material	Valve Types	Connections	Accessories	Connection Orientation	Flow Tube (Capacities)
<input type="checkbox"/>	<input type="checkbox"/> — <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> — <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**Model Number Generator For PM-1000 Series Flowmeters**

**MODEL SERIES**

N = Model PM-1000 Plastic Flowmeter with NXXX Flow Tube Capacity  
 P = Model PM-1000 Plastic Flowmeter with PXXX Flow Tube Capacity  
 Q = Model PM-1000 Plastic Flowmeter with QXXX Flow Tube Capacity

**NUMBER OF METERING TUBES**

1 = Single Tube Unit

**END BLOCKS/SEAL MATERIAL**

3 = Chrome Plated Brass with Buna-N Seals  
 4 = 316 Stainless Steel with Viton Seals

**VALVE TYPES**

E = Valve on Inlet  
 G = No Valve

**CONNECTIONS**

1 = 1/8" NPT Female (std)  
 6 = 1/4" Hose (3/16"-3/8" Hose Tapered)

**ACCESSORIES (ORDER SEPARATELY)**

0 = None  
 5 = Base Plate

**CONNECTION ORIENTATION**

1 = Back In and Back Out

**FLOW TUBE (CAPACITIES)**

XXXX = See Capacity Table For PM-1000 Series Flowmeters

**ADDITIONAL OPTIONS**

- Bezel and bracket assemblies are available for mounting PM-1000. Contact Matheson for details
- +/- 5% Accuracy, Full Scale, With Certification
- +/- 10% Accuracy, Full Scale, With Certification
- Silk Screen Charge
- Clean for O<sub>2</sub> Service

Please contact Matheson Technical Services at 800-828-4313 for pricing information.



**Engineering Drawings**

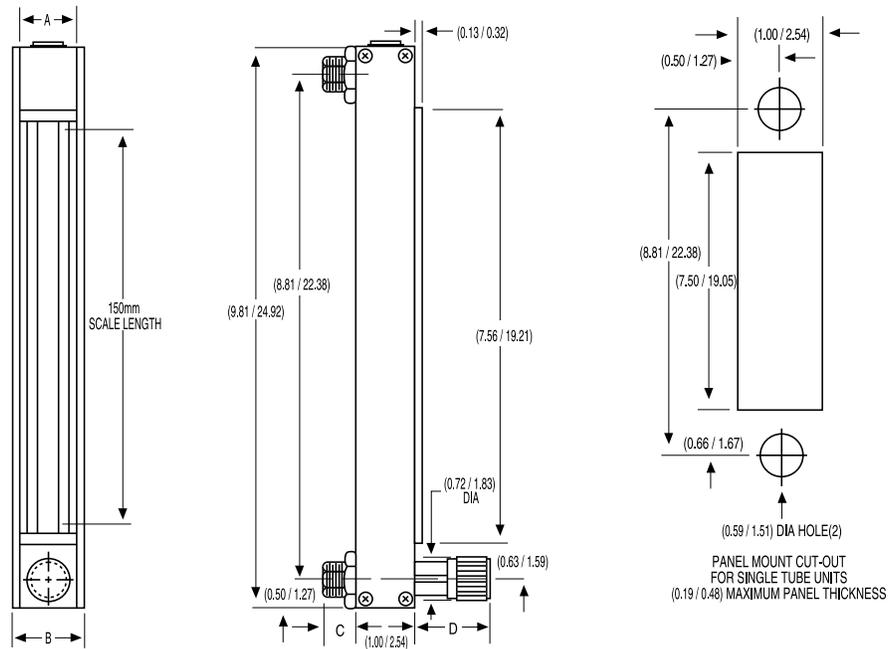
**FM-1050 Series Flowmeter (in/cm)**

NUMBER OF TUBES	A		B	
	in	cm	in	cm
1	1.00	2.54	1.25	3.17
2	2.00	5.08	2.25	5.71
3	3.00	7.62	3.25	8.25
4	4.00	10.16	4.25	10.79

CONNECTIONS	C	
	in	cm
1/8" Female NPT	0.63	1.60
1/4" Female NPT	0.74	1.88
1/8" Tube Fitting*	1.33	3.38
1/4" Tube Fitting*	1.38	3.51
1/4" Hose (3/16"-3/8" Tapered)	1.78	4.52
1/8" Hose	1.30	3.30

\*Dimension includes nut – hand tight (not at full compression)

VALVE OPTIONS	D	
	in	cm
Utility Valve (Full Open)	1.25	3.18
High Accuracy (Full Open)	1.80	4.57



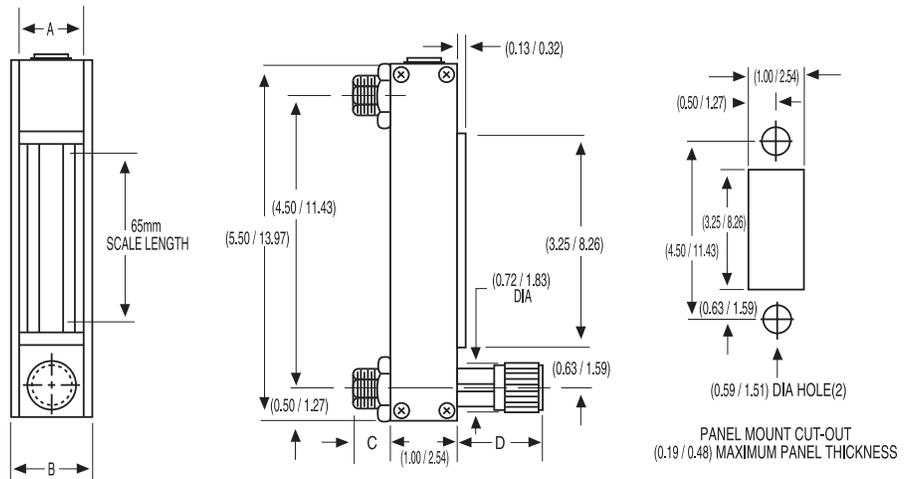
**FM-1000 Series Flowmeter (in/cm)**

NUMBER OF TUBES	A		B	
	in	cm	in	cm
1	1.00	2.54	1.25	3.17
2	2.00	5.08	2.25	5.71
3	3.00	7.62	3.25	8.25
4	4.00	10.16	4.25	10.79

CONNECTIONS	C	
	in	cm
1/8" Female NPT	0.63	1.60
1/4" Female NPT	0.74	1.88
1/8" Tube Fitting*	1.33	3.38
1/4" Tube Fitting*	1.38	3.51
1/4" Hose (3/16"-3/8" Tapered)	1.78	4.52
1/8" Hose	1.30	3.30

\*Dimension includes nut – hand tight (not at full compression)

VALVE OPTIONS	D	
	in	cm
Utility Valve (Full Open)	1.25	3.18
High Accuracy (Full Open)	1.80	4.57

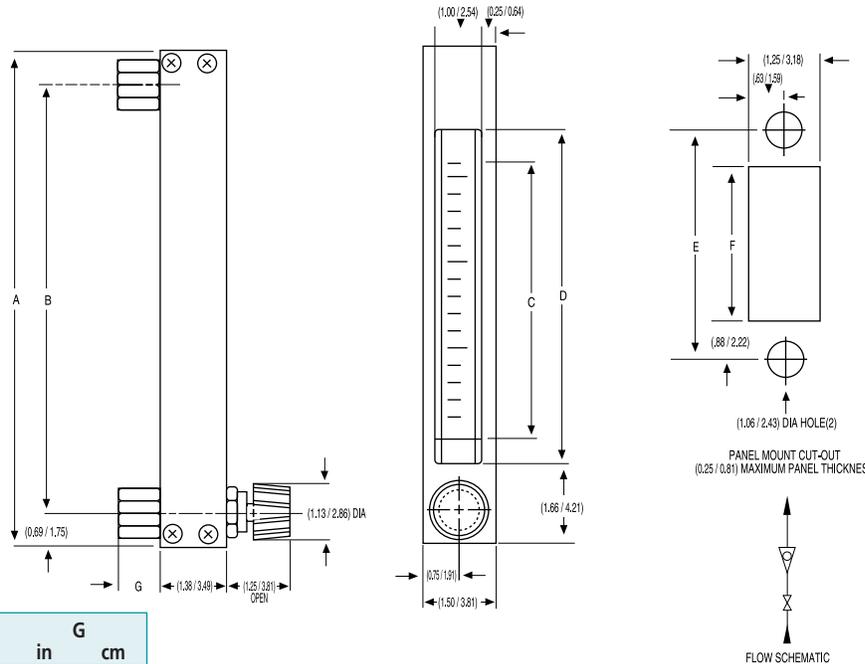




**Rotameters**

**Engineering Drawings** (continued)

**FM-1100 Series and FM-1127 Series Flowmeter (in/cm)**



CONNECTIONS	G	
	in	cm
1/4" Female NPT*	1.75	4.45
3/8" Female NPT	0.88	2.24
1/2" Female NPT**	2.25	5.72

\*Includes 3/8" FNPT - 1/4" FNPT adapter  
\*\*Includes 3/8" FNPT - 1/2" FNPT adapter

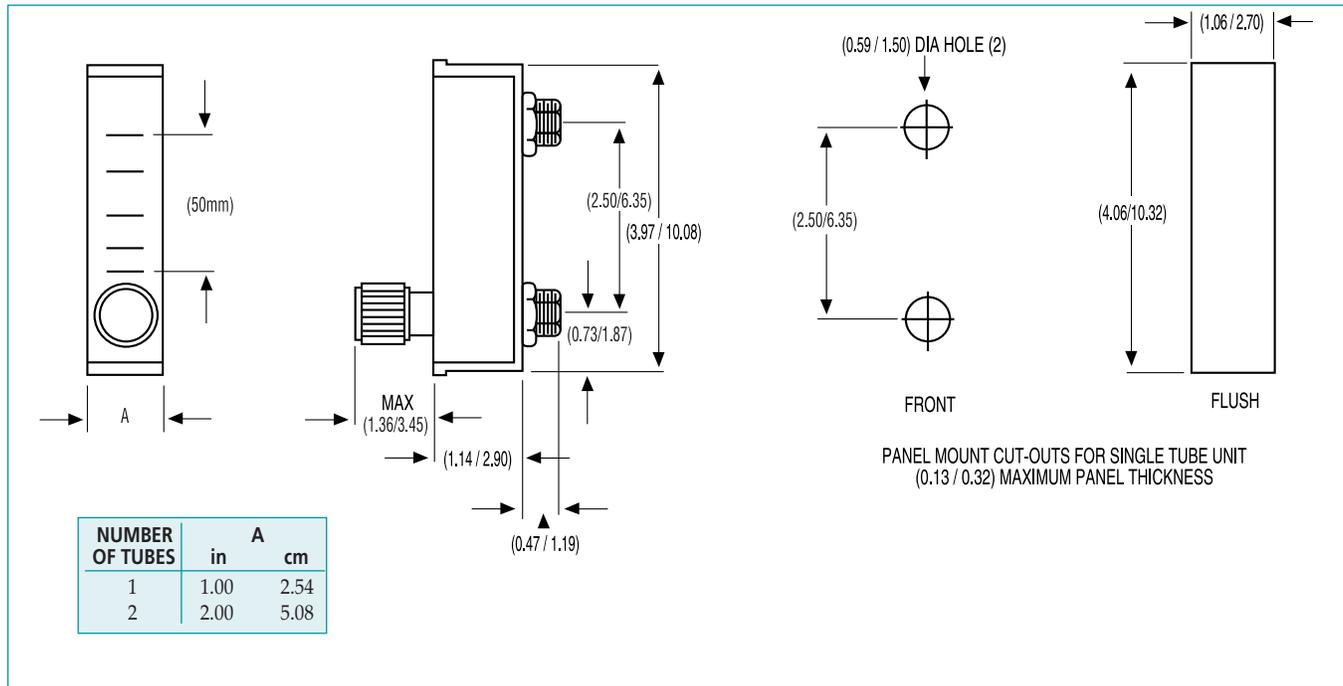
MODEL NO.	A		B		C mm	D		E		F	
	in	cm	in	cm		in	cm	in	cm	in	cm
FM-1100	8.38	21.27	7.00	17.78	70mm scale	5.00	12.70	7.00	17.78	5.25	13.35
FM-1127	10.38	26.35	9.00	22.86	127mm scale	7.00	17.78	9.00	22.86	7.25	18.41



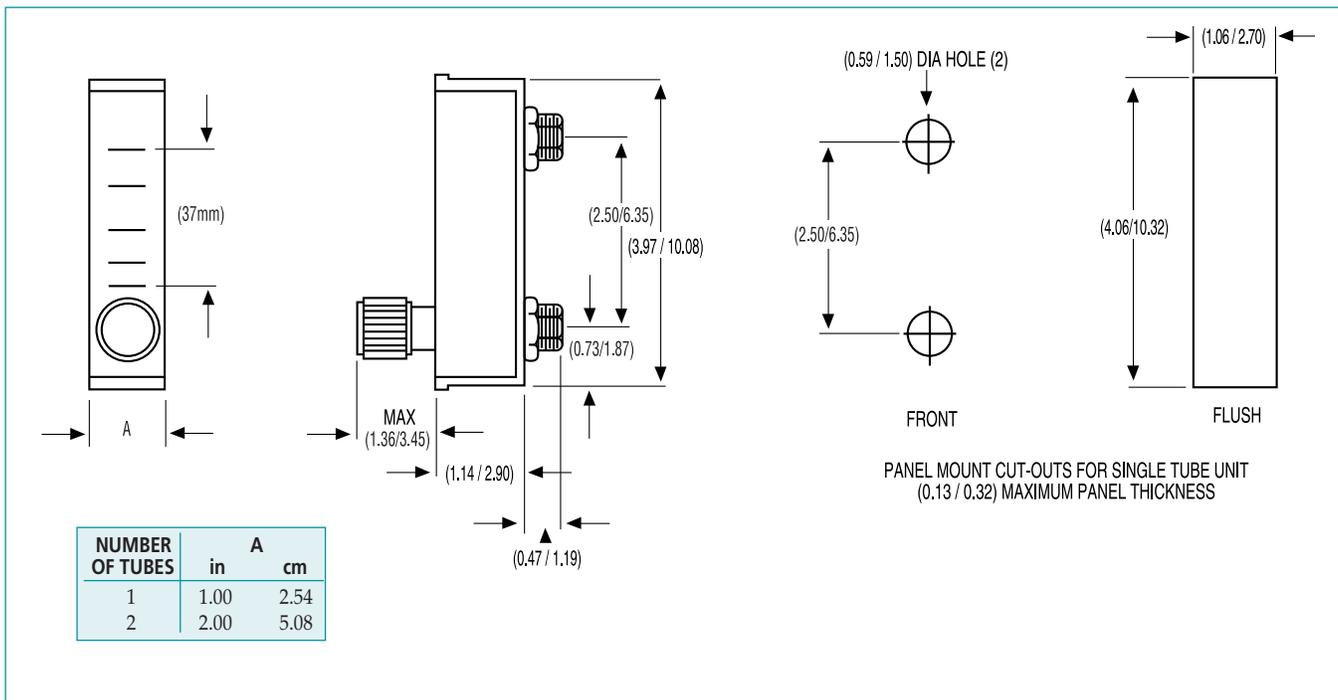
**Rotameters**

**Engineering Drawings (continued)**

**PG-1000 Series Flowmeter (in/cm)**



**PM-1000 Series Flowmeter (in/cm)**





## Introduction

Matheson mass flow controllers and mass flowmeters are among the most sophisticated flow sensing and control systems available. These units feature 316 stainless steel flow sensing transducers and control valves, which are an integral part of the controllers.

Mass flow measuring devices generate a signal, which is proportional to the mass flow of gas, by detecting heat transport in an area of the gas stream. Since the specific heat of any gas is a unique property of the gas, and is essentially independent of pressure considerations, mass flow devices are absolute measuring instruments.

If the signal voltage is used only to indicate flow, the unit is considered a mass flowmeter. If the signal is used in conjunction with a reference signal and a controlling valve, the unit is considered a mass flow controller.

**Matheson's 8170 Mass Flowmeter System** consists of a flow transducer which senses the flow of gas, and a digital readout box that converts the analog signal to a direct reading digital display. Accuracy is  $\pm 1\%$  full scale or one digit accuracy in flow control.

**Matheson's 8270 Mass Flow Controller System** consists of a flow transducer that senses the flow of the gas, an electronically linked control valve, and a digital readout and control box that converts the analog signal to a direct reading digital display. Accuracy is  $\pm 1\%$  (up to 30 slpm) full scale or one digit accuracy in flow control.

Since these systems sense or control mass flow of a gas, the indicated flow is independent of system pressure or minor temperature variations. The systems are also calibrated to specific customer requirements.

Matheson offers many innovative mass flow configurations. The **Model 8280 Series Dynamic Gas Blending Systems**, used in conjunction with additional mass flowmeters or mass flow controllers, are used to prepare accurate mixtures of different gases. **Matheson's Cal-MAT™ 4000 and 4040 Series** provide gas blending or dilution capabilities, and are controlled via communication with an end-user's PC system.



*8170 Mass Flowmeter System*



*Cal-MAT™ 4040 Series Gas Dilution System*



## Mass Flow Product Overview

Application	Features	Specifications	Function	Page No.
<b>8112 Self-Contained Mass Flowmeter</b>				
<b>Application:</b> Flow measurement; bridges the gap between standard rotameters and higher priced mass flowmeters	<b>Includes:</b> • VDC or mA (optional) output signal • Adjustable zero • Power supply • Threaded mounting holes in body • Self-contained direct reading of flow rate • 3 1/2 digital display	<b>Accuracy:</b> • ±1.5% full scale <b>Repeatability:</b> • ±0.5% full scale	<b>Function:</b> Use with non-corrosive gases to monitor flow rate.	43
<b>8124 Series Totalizer</b>				
<b>Application:</b> Compiles total amount of gas used over a period of time	<b>Includes:</b> • 6 digit LED readout • 2 alarm setpoints • Half rack or bench mountable	<b>Accuracy:</b> • ±1% full scale	<b>Function:</b> Use with 8170 Mass Flowmeter System, 8270 Mass Flow Controller System, or 8280 Dyna-Blender to compile the total amount of gas used, regardless of varying flow rates over a period of time.	44
<b>8170 Series Mass Flowmeter System</b>				
<b>Application:</b> Flow Measurement	<b>Includes:</b> • Flowmeter transducer (Model 8172/8173 Series) • 8170 digital readout power supply box • Control cables and connectors • Swagelok fittings on inlet and outlet • High/low alarm setpoints (user selectable) • Half rack or bench mountable	<b>Accuracy:</b> • ±1% full scale for units up to 30 slpm • ±2% for units 50 - 300 slpm • ±3% over 300 slpm <b>Repeatability:</b> • 0.2% for units up to 200 slpm • 0.5% for units over 200 slpm	<b>Function:</b> Applications requiring monitoring of a single gas flow. May also be used with Model 8124 Totalizer and Model 8280/8284 (see pages 368 and 374). This model provides flow monitoring only; no flow control.	44
<b>8175 Series Multiple Mass Flowmeter Readout Box</b>				
<b>Application:</b> Digital readout for flow measurement of up to four gas streams	<b>Includes:</b> • 4 position selector switch • Digital display - % of range • 4 individual cables for transducers • High/low alarm setpoints for each channel (user selectable) • Full rack or bench mountable <b>Required:</b> • A Model 8172 or 8173 Series Mass Flowmeter for each channel to be used	<b>Resolution:</b> • 3.5 digit display <b>Power:</b> • 110 VAC standard, 220 VAC optional <b>Output:</b> • 0-5 VDC • 4-20 mA (optional)	<b>Function:</b> Continuously monitors up to 4 mass flowmeters (one flowmeter displayed at a time). It is not required to use all 4 channels; they may be reserved for future expansion.	46
<b>8270 Series Mass Flow Controller System</b>				
<b>Application:</b> Flow Measurement and Flow Control	<b>Includes:</b> • Flow controller transducer (Model 8272/8273 Series) • 8270 digital readout/power supply box • Feedback circuit for flow control • Integral control valve • Control cables and connectors • High/low alarm setpoints (user selectable) • Half rack or bench mountable	<b>Accuracy:</b> • ±1% full scale for units up to 30 slpm • ±2% for units 50 - 300 slpm <b>Repeatability:</b> • 0.2% for units up to 200 slpm • 0.5% for units over 200 slpm	<b>Function:</b> Applications requiring monitoring and controlling a single gas flow. May also be used with Model 8124 Totalizer and Model 8280/8284 (see pages 368 and 374).	47



## Mass Flow Product Overview *(continued)*

Application	Features	Specifications	Function	Page No.
<b>8274 Series Multiple Mass Flow Controller Box</b>				
<p><b>Application:</b> Flow measurement and flow control of up to four gas streams</p>	<p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• 8 position selector switch (4 read and 4 set)</li> <li>• Digital display – % of range</li> <li>• Individual override control valve switches</li> <li>• Individual flow potentiometers for setting flow rate</li> <li>• 4 individual control cables for transducers</li> <li>• High/low alarm setpoints for each channel (user selectable)</li> <li>• Full rack or bench mountable</li> </ul> <p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• A Model 8272 or 8273 Series Mass Flow Controller for each channel to be used</li> </ul>	<p><b>Resolution:</b></p> <ul style="list-style-type: none"> <li>• 3.5 digit display</li> </ul> <p><b>Power:</b></p> <ul style="list-style-type: none"> <li>• 110 VAC standard, 220 VAC optional</li> </ul> <p><b>Output:</b></p> <ul style="list-style-type: none"> <li>• 0-5 VDC</li> <li>• 4-20 mA (optional)</li> </ul>	<p><b>Function:</b> Continuously monitors and controls up to 4 mass flow controllers (one controller displayed at a time). Each channel requires the use of a Model 8272 or 8273 Series Mass Flow Controller. It is not required to use all 4 channels; they may be reserved for expansion.</p>	49
<b>8280 Series Modular Dyna-Blender</b>				
<p><b>Application:</b> Gas blending</p>	<p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• Mass flow controller transducer</li> <li>• 8280 control box with digital readout</li> <li>• Control cables for transducer</li> <li>• Patch cords for inputs</li> <li>• Half rack or bench mountable</li> </ul> <p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• Additional flow monitoring or control systems (8170, 8270, or 8280).</li> </ul>	<p><b>Accuracy:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale for units up to 30 slpm</li> <li>• ±2% for units 50 - 300 slpm</li> </ul> <p><b>Repeatability:</b></p> <ul style="list-style-type: none"> <li>• 0.2% for units up to 200 slpm</li> <li>• 0.5% for units over 200 slpm</li> </ul>	<p><b>Function:</b> Each 8280 system controls one gas stream only. Use in conjunction with additional 8170, 8270, or 8280 systems for blending of multiple streams. Several units may be used together to blend additional streams.</p>	50
<b>8284 Series Multichannel Dyna-Blender</b>				
<p><b>Application:</b> Gas blending</p>	<p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• 4 channels with individual potentiometers and control switches</li> <li>• 8 position set switch displays reading in % of range</li> <li>• Control cables for transducers</li> <li>• Patch cords for inputs</li> <li>• Full rack or bench mountable</li> </ul> <p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• Model 8272 or 8273 Mass Flow Controller transducer for each channel</li> </ul>	<p><b>Accuracy:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale for units up to 30 slpm</li> <li>• ±2% for units 50 - 300 slpm</li> </ul> <p><b>Repeatability:</b></p> <ul style="list-style-type: none"> <li>• 0.2% for units up to 200 slpm</li> <li>• 0.5% for units over 200 slpm</li> </ul>	<p><b>Function:</b> Low cost blending of up to 4 gas streams for laboratory and process applications. It is not required to use all 4 channels, they may be reserved for expansion.</p>	50



## Mass Flow Product Overview *(continued)*

Application	Features	Specifications	Function	Page No.
<b>Cal-MAT™ Series 4000 Multi-Component Gas Blending System</b>				
<p><b>Application:</b> Gas blending via integral mass flow controllers and the user's PC</p>	<p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• One balance gas mass flow controller and one component gas mass flow controller standard (up to 4 mass flow controllers available as an option)</li> <li>• RS-232 interface</li> <li>• 3 modes of operation:               <ul style="list-style-type: none"> <li>– Concentration mode (user enters target gas concentrations for each cylinder and desired output flow for the mix)</li> <li>– Flow mode (user specifies the flow rate out of each cylinder)</li> <li>– Program mode (the instrument may be programmed for unattended operation)</li> </ul> </li> </ul> <p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• User supplied PC</li> </ul>	<p><b>Accuracy:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul> <p><b>Repeatability:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul> <p><b>Flow:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul>	<p><b>Function:</b> Blends up to 4 gas streams (3 component gases, 1 balance gas) to create calibration standards for calibration of analytical instruments or process instruments. The standard unit blends 2 gases; 4 gases available as an option.</p>	53
<b>Cal-MAT™ Series 4040 Gas Dilution System</b>				
<p><b>Application:</b> Gas dilution</p>	<p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• One dilution gas mass flow controller and one component gas mass flow controller standard (up to 4 mass flow controllers available as an option)</li> <li>• RS-232 interface</li> <li>• 4 modes of operation:               <ul style="list-style-type: none"> <li>– Concentration mode (user enters target gas concentrations for each cylinder and desired output flow for the mix)</li> <li>– Divider mode (user operates the unit as an automated 10-step gas divider)</li> <li>– Flow mode (user specifies the flow rate out of each cylinder)</li> <li>– Program mode (the instrument may be programmed for unattended operation)</li> </ul> </li> </ul> <p><b>Required:</b></p> <ul style="list-style-type: none"> <li>• User supplied PC</li> </ul>	<p><b>Accuracy:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul> <p><b>Repeatability:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul> <p><b>Flow:</b></p> <ul style="list-style-type: none"> <li>• ±1% full scale</li> </ul>	<p><b>Function:</b> Dilutes a high concentration gas with a balance gas to create calibration standards for multi-point calibration of analytical instruments.</p>	54

See the individual product descriptions that follow for detailed specifications.



**Mass Flow Equipment**

**Model 8112 Series  
Self-Contained Mass Flowmeter**



*Shown with optional 1/4" tube connections*

**Description**

The Model 8112 Series Mass Flowmeters are offered as a more accurate alternative to Matheson's Standard Tube Cube® flowmeters. This series bridges the gap between standard flowmeters and higher priced mass flowmeters.

**Applications**

The Model 8112 Series is designed to measure flow rates of non-corrosive gases. The 8112 Series is available in eight convenient ranges calibrated for nitrogen and can be used in most applications where a standard flowmeter was utilized previously. Typical applications include:

- Flow measurement of purge gases
- General laboratory or instrument flow monitoring
- Flow measurement of calibration standards used in environmental monitoring

**Design Features**

- Self-contained direct reading of the flow rate
- Optional 9-pin connector for output data transmission
- Adjustable zero

**Specifications**

Maximum Operating Pressure:	150 psig (1035 kPa)
Optimum Operating Pressure:	20 psig (138 kPa)
Temperature Range:	0° to 50°C (32° to 122°F)
Temperature Coefficient:	0.15% full Scale/1°C
Standard Calibration	
Temperature:	0°C (32°F)
Response Time:	2 seconds to 98% of final flow (25-100% full scale)
Accuracy:	+/-1.5% full scale
Repeatability:	+/-0.5% full scale
Flow Capacity	20 sccm-20 slpm: 1 sccm to 20 slpm Nitrogen
Voltage Input:	12 VDC (12-15 VDC nominal); 100 mA max
Voltage Output:	0-5 VDC; 4-20 mA (optional)
End Connections:	1/4" NPT Female
Shipping Weight:	2 lbs

*Each unit is shipped calibrated for Nitrogen at 0°C. Each unit is also supplied with the power pack to supply voltage to the unit*

**Materials in the Flowpath**

Body and Sensor:	10% glass-filled Nylon 6/6 316 stainless steel Viton O-rings
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**Ordering Information**

Model Number	Range in Nitrogen	End Fittings	Price
8112-0421	20 sccm	1/4" FNPT	\$702.74
8112-0412	100 sccm	1/4" FNPT	\$702.74
8112-0422	200 sccm	1/4" FNPT	\$702.74
8112-0452	500 sccm	1/4" FNPT	\$702.74
8112-0423	2 slpm	1/4" FNPT	\$702.74
8112-0453	5 slpm	1/4" FNPT	\$702.74
8112-0414	10 slpm	1/4" FNPT	\$702.74
8112-0424	20 slpm	1/4" FNPT	\$702.74

**Options**

Model Number	Description	Price
8113-XXXX*	4-20 mA Output	\$702.74
CON-0070-SA	1/4" Tube Connection (2 required)	\$12.30
PWR-0009-XX	110 VAC Replacement Power Pack	\$91.84

*\*use last 4 digits from 8112 series for required flow*

*Prices and Specifications Subject to Change without Notice*



## Model 8124 Series Totalizer



### Ordering Information

Model Number	Description	Price
8124	Totalizer	\$1,300.52
8124-232	Totalizer with RS-232	\$1,431.72

## Model 8170 Series Mass Flowmeter System



### Description

The complete 8170 Mass Flowmeter System offered by Matheson consists of a flowmeter transducer (Model 8172/8173 Series), a digital readout/power supply box and the necessary cable and connectors. These flowmeters can be supplied with either Swagelok tube connections (standard) or optional male VCR compatible connections for easy installation into tubing and piping systems.

The Mass Flowmeter System produces a 0-5 VDC signal proportional to 0-100% of flow rate. This output signal from the digital readout box makes the 8170 Series Mass Flowmeters ideal for use with integrators, totalizers and data logging equipment. The Model 8124 Totalizer is used to compile the total amount of gas used over a period of time, regardless of varying flow rates.

The 8170 Mass Flowmeter Digital Readout Box is available standard for rack mounting in a 1/2 EIA rack or for benchtop use. Other standard features are high and low alarm setpoints selected by the user.

### Description

The Model 8124 Totalizer is used to compile the total amount of gas used, regardless of varying flow rates over a period of time. The total is continuously displayed on a six digit LED readout and the resolution can be changed, depending upon the length of time required. Please specify full scale flow range of mass flow equipment or range of counts per time frame for factory set-up.

### Design Features

- 6 digits for accuracy
- ±1% accuracy
- 2 alarm setpoints
- Output contacts for alarms
- 0-5 VDC inputs
- Programmable from front panel or front panel with optional RS-232 connector
- Local and remote reset
- Local and remote hold (split timing)
- Bench mount or 1/2 EIA rack mount standard

### Specifications

Materials	
Body:	316 stainless steel
By-pass:	316 stainless steel
Fittings:	316 stainless steel
Standard Seals:	Viton
Proof Pressure:	1500 psig (10,350 kPa)
Minimum Differential Pressure:	5 psid (19.5 kPa) (nominal)
Maximum Operating Pressure:	500 psig (3450 kPa)
(All models)	
Temperature Range:	0° to 50°C (32° to 122°F)
Accuracy:	
≤ 30 slpm:	±1% full scale
50-300 slpm:	±2% full scale
>300 slpm:	±3%
Standard Calibration	
Temperature:	0°C (32°F)
Temperature Coefficient:	0.05% per °C
Response Time:	0.5 seconds to 98% of scale (typical)
Repeatability	
≤ 200 slpm:	0.2%
> 200 slpm:	0.5%
Flow Capacity:	2%-100% of range selected
Signal Voltage Output:	0-5 VDC
Voltage Input :	115 VAC, 5 Watts; 230 VAC (optional)
Cable Lengths	
Power Cord:	6 ft
Signal Cable:	8 ft
Alarm Contacts (Each Channel):	1 amp at 30 VDC maximum
Shipping Weight:	8 lbs



**Model 8170 Series** *(continued)*  
**Mass Flowmeter System**

**Ordering Information**

Model Number	Range in Nitrogen @ 0°C and 14.7 psia	Standard End Fittings	Price
8170-0411	0-10 sccm	1/4" Swagelok	\$1,777.76
8170-0421	0-20 sccm	1/4" Swagelok	\$1,777.76
8170-0431	0-30 sccm	1/4" Swagelok	\$1,777.76
8170-0451	0-50 sccm	1/4" Swagelok	\$1,777.76
8170-0412	0-100 sccm	1/4" Swagelok	\$1,777.76
8170-0422	0-200 sccm	1/4" Swagelok	\$1,777.76
8170-0432	0-300 sccm	1/4" Swagelok	\$1,777.76
8170-0452	0-500 sccm	1/4" Swagelok	\$1,777.76
8170-0413	0-1 slpm	1/4" Swagelok	\$1,777.76
8170-0423	0-2 slpm	1/4" Swagelok	\$1,777.76
8170-0433	0-3 slpm	1/4" Swagelok	\$1,777.76
8170-0453	0-5 slpm	1/4" Swagelok	\$1,777.76
8170-0414	0-10 slpm	1/4" Swagelok	\$1,777.76
8170-0424	0-20 slpm	1/4" Swagelok	\$1,777.76
8170-0434	0-30 slpm	1/4" Swagelok	\$1,777.76
8170-0454	0-50 slpm	3/8" Swagelok	\$2,310.76
8170-0415	0-100 slpm	3/8" Swagelok	\$2,310.76
8170-0425	0-200 slpm	3/8" Swagelok	\$3,193.08
8170-0435	0-300 slpm	1/2" Swagelok	\$3,034.00
8170-0455	0-500 slpm	1/2" Swagelok	\$3,108.62
8170-0416	0-1000 slpm	3/4" Swagelok	\$3,108.62

**Options**

Model Number	Description	Price
8291	Specific Gas Calibrations (Limitations Apply); Standard Calibration on Nitrogen, Corrected for Direct Reading.	\$318.98

**Additional Signal**

**Cable Lengths**

CBL-0125-XX	25 ft	\$49.20
CBL-0126-XX	50 ft	\$91.84
CBL-0127-XX	100 ft	\$254.20
8292	230 VAC Models	\$61.50
8293-4	1/4" VCR Compatible End Fittings	\$172.20
8293-6	3/8"/1/2" VCR Compatible End Fittings	\$172.20
8294	4-20 mA Output	\$100.04
8295	PTFE Teflon Seals	\$500.20
MKIT-0015-NB	Neoprene Seal Kit for Ammonia Service, up to 30 slpm	\$44.28
8124	Totalizer for Mass Flowmeter	\$1,300.52
HAN-0007-AA	Full Rack Mounting Adapter	\$73.80



## Model 8175 Multiple Channel Mass Flowmeter Monitoring System



### Description

The monitoring system box may be used with as many as four separate mass flowmeters to independently monitor up to four separate gas streams. The user of the flowmeters can order these separately and match the appropriate channel display to the individual application.

This unit allows the continuous monitoring of up to four mass flowmeters. The individual flow rates can be indicated on the digital readout by positioning the selector switch to the desired transducer. The system includes a four position selector switch, a 0 to 100% of range digital display (only one channel can be read at a time), a power cord and four individual cables for the transducers. Also standard are high and low alarm setpoints (for each channel) selected by the user.

It is not necessary to employ all four channels on the initial system. Positions may be reserved for future expansion. Each individual channel requires a Model 8172 or 8173 Series flowmeter transducer, which must be ordered separately.

### Ordering Information

Model Number	Description	Price
8175	Multiple Mass Flowmeter Monitoring System	\$1,798.20

### Options

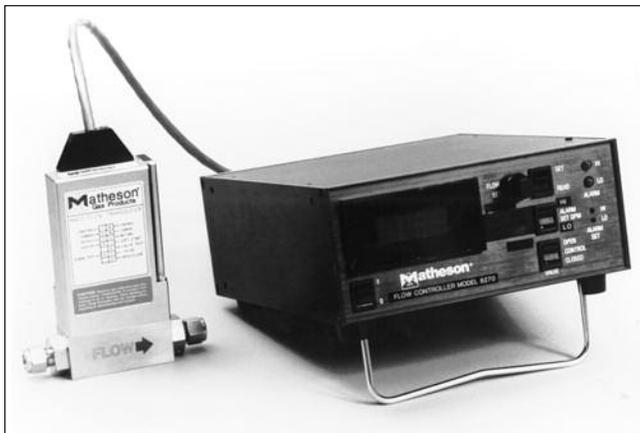
Model Number	Description	Price
8292	230 VAC	\$61.50
8175-8294	8175 w/ 4-20 mA Output	\$2,227.94

### Specifications

Voltage Input:	115 VAC, 20 Watts
Signal Voltage Output:	0-5 VDC
Cable Lengths	
Power Cord:	6 ft
Signal Cable:	8 ft
Alarm Contacts	
(Each Channel):	1 amp at 30 VDC maximum
Rack Mounting:	Full 19" rack
Shipping Weight:	13 lbs



## Model 8270 Series Mass Flow Controller System



### Description

The complete 8270 Mass Flow Controller System offered by Matheson consists of a flow controller transducer (Model 8272/8273 Series), a digital readout/power supply box, a feedback circuit to control the flow, an integral control valve and the necessary cable and connectors. An additional feature of the control box is a three position selector switch to allow the user to conveniently switch between an open position (valve fully open), a closed position (valve fully closed) and a control position (unit functioning as a controller). The first two positions mentioned are override positions. These flow controllers can be supplied with either Swagelok tube connections (standard) or optional male VCR compatible connections for easy installation into tubing and piping systems.

In the "operating" or "control" mode the unit functions similar to a mass flowmeter but with the addition of a feedback circuit and control valve, which continuously monitor and control the flow of gas passing through the unit. When there is a flow imbalance sensed, an electronic logic circuit sends power to the control valve to maintain the flow setpoint by either throttling open or closed.

The 8270 Mass Flow Controller Digital Readout Box is available standard for rack mounting in a 1/2 EIA rack or for benchtop use. Other standard features are high and low alarm setpoints selected by the user. The transducer portion of the unit is supplied standard with Swagelok connections. The Model 8124 Totalizer is also available and can be used to compile the total amount of gas used over a period of time, regardless of varying flow rates.

### Specifications

Materials:	
Body:	316 stainless steel
By-pass:	316 stainless steel
Fittings:	316 stainless steel
Valve:	316 stainless steel
Standard Seals:	Viton
Valve Shut-off:	Normally closed; bubble tight
Standard Valve Seat:	Viton
Proof Pressure:	1500 psig (10,350 kPa)
Minimum Differential Pressure:	5 psid (34.5 kPa) (nominal)
Maximum Differential Pressure:	50 psid (345 kPa)
Maximum Operating Pressure	
< 500 sccm:	300 psig (2070 kPa)
500 sccm-30 slpm:	500 psig (3450 kPa)
> 30 slpm:	150 psig (1035 kPa)
Temperature Range:	0 to 50°C (32° to 122°F)
Accuracy	
≤ 30 slpm:	±1% full scale
50-300 slpm:	±2% full scale
>300 slpm:	±3%
Standard Calibration	
Temperature:	0°C (32°F)
Temperature Coefficient:	< 0.1% per °C
Response Time:	0.5 seconds to 98% of scale
Repeatability	
≤ 200 slpm:	0.2%
> 200 slpm:	0.5%
Control Range	
Series:	0.2 ccm to 1000 slpm
Individual Unit:	2% to 100% full scale
Signal Voltage Output:	0-5 VDC; 4-20 mA (optional)
Voltage Input:	115 VAC, 10 Watts; 230 VAC (optional)
Cable Lengths	
Power Cord:	6 ft
Signal Cable:	8 ft
Alarm Contacts (Each Channel):	1 amp at 30 VDC maximum
Shipping Weight:	8 lbs



**Mass Flow Equipment**

**Model 8270 Series** *(continued)*  
**Mass Flow Controller System**

**Ordering Information**

Model Number	Range in Nitrogen @ 0°C and 14.7 psia	Standard End Fittings	Price
8270-0411	0-10 sccm	1/4" Swagelok	\$2,566.60
8270-0421	0-20 sccm	1/4" Swagelok	\$2,566.60
8270-0431	0-30 sccm	1/4" Swagelok	\$2,566.60
8270-0451	0-50 sccm	1/4" Swagelok	\$2,566.60
8270-0412	0-100 sccm	1/4" Swagelok	\$2,566.60
8270-0422	0-200 sccm	1/4" Swagelok	\$2,566.60
8270-0432	0-300 sccm	1/4" Swagelok	\$2,566.60
8270-0452	0-500 sccm	1/4" Swagelok	\$2,566.60
8270-0413	0-1 slpm	1/4" Swagelok	\$2,566.60
8270-0423	0-2 slpm	1/4" Swagelok	\$2,566.60
8270-0433	0-3 slpm	1/4" Swagelok	\$2,566.60
8270-0453	0-5 slpm	1/4" Swagelok	\$2,566.60
8270-0414	0-10 slpm	1/4" Swagelok	\$2,566.60
8270-0424	0-20 slpm	1/4" Swagelok	\$2,566.60
8270-0434	0-30 slpm	1/4" Swagelok	\$2,566.60
8270-0454	0-50 slpm	3/8" Swagelok	\$4,194.30
8270-0415	0-100 slpm	3/8" Swagelok	\$3,924.52
8270-0425	0-200 slpm	3/8" Swagelok	\$3,382.50
8270-0435	0-300 slpm	1/2" Swagelok	\$4,370.60
8270-0455	0-500 slpm	1/2" Swagelok	\$4,431.28
8270-0416	0-1000 slpm	3/4" Swagelok	\$4,254.98

**Options**

Model Number	Description	Price
8291	Specific Gas Calibrations (Limitations Apply)	\$318.98
<b>Additional Signal Cable Lengths</b>		
CBL-0125-XX	25 ft	\$49.20
CBL-0126-XX	50 ft	\$91.84
CBL-0127-XX	100 ft	\$254.20
8292	230 VAC Models	\$61.50
8293-4	1/4" VCR Compatible End Fittings	\$172.20
8293-6	3/8"/1/2" VCR Compatible End Fittings	\$172.20
8294	4-20 mA Output	\$100.04
8295	PTFE Teflon Seals	\$500.20
KIT-0015-NB	Neoprene Seal Kit for Ammonia Service, up to 30 slpm	\$44.28
8124	Totalizer for Mass Flow Controller	\$1,300.52
HAN-0007-AA	Full Rack Mounting Adapter	\$73.80



## Model 8274 Multiple Channel Mass Flow Controller System



### Description

This unit allows the independent monitoring and control of up to four mass flow controllers in use. The system continuously and simultaneously adjusts to maintain the preset point for each gas flow rate. The individual setpoint and flow rates can be indicated on the digital readout by positioning the selector switch to the desired controller. The control system includes an eight position (four read and four set) selector switch, a 0 to 100% of range digital display (only one channel can be read at a time), individual override control valve switches, flow potentiometers for setting flow rate, a power cord and four individual cables for the controllers. Also standard are high and low alarm setpoints selected by the user.

It is not necessary to employ all four channels on the initial system. Positions may be reserved for future expansion of the system. Each individual channel requires a Model 8272 or 8273 Series controller transducer, which must be ordered separately.

### Ordering Information

Model Number	Description	Price
8274	Multiple Mass Flow Controller System	\$2,346.02

### Options

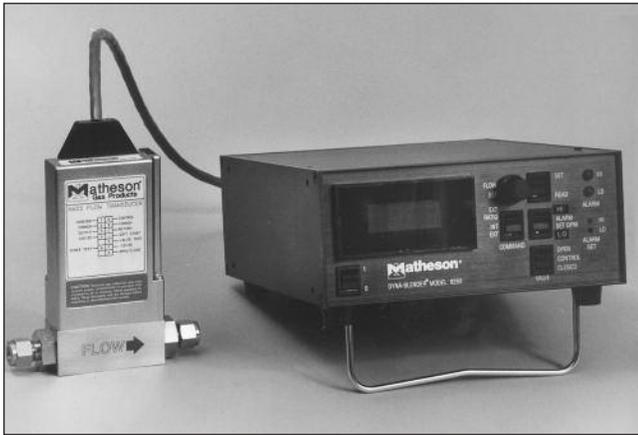
Model Number	Description	Price
8292	230 VAC	\$61.50
8274-8294	8274 w/ 4-20 mA Output	\$2,974.14

### Specifications

Voltage Input:	115 VAC, 40 Watts
Signal Voltage Output:	0-5 VDC
Cable Lengths	
Power Cord:	6 ft
Signal Cable:	8 ft
Alarm Contacts (Each Channel):	1 amp at 30 VDC maximum
Rack Mounting:	Full 19" rack
Shipping Weight:	13 lbs



## Model 8280 and 8284 Series Dyna-Blenders Dynamic Gas Blending Systems



### Description

The 8280 and 8284 Series of Dynamic Gas Blending Systems are used to prepare accurate mixtures of different gases. These systems are dynamic with respect to flow conditions and have no ability to store gas for demand usage. These control systems function utilizing the Matheson 8272/8273 Series Controller Transducers. There are two basic types of units: a Modular Dyna-Blender and a Multichannel Dyna-Blender.

### Modular Dyna-Blender Model 8280

Matheson's Modular Dyna-Blender, when used with an existing mass flowmeter or controller, accurately blends gases in a dynamic flowing system. Several units can be utilized to make multiple component mixtures. The unit requires the presence of an existing mass flowmeter or mass flow controller for mixing operations, or can be used as a stand alone controller.\*

The basis of the system is a mass flow controller transducer, which either responds to an external command signal or can be slaved to another mass flowmeter, mass flow controller or even another

8280 Dyna-Blender. This unit can also be used in conjunction with other equipment interfaced through user supplied circuitry via a 0-5 VDC signal or 4-20 mA signal (optional) for dynamic flow systems. The Model 8124 Totalizer is also available and can be used to compile the total amount of gas used over a period of time, regardless of varying flow rates.

The 8280 control box may be ordered as a stand alone item, or as part of a system (8280 control box, transducer assembly, and cable-see table for ordering information).

### Multichannel Dyna-Blender Model 8284

Matheson's Multichannel Dyna-Blender accurately controls the flow rates of four different gases in a dynamic flowing system. Each of the four channels has individual potentiometers and control switches. The single display is operated by an eight position switch and reads in percent of range. The unit can control gas mixtures up to four components in composition, with user supplied manifolds.

The gas flow of the system can be controlled by the individual controller, or an external 0-5 VDC or 4-20 mA signal (optional) for remote operation. **Each individual channel requires a mass flow controller transducer which must be ordered separately.**

### Specifications

	Model 8280	Model 8284
Voltage Input:	115 VAC, 10 Watts	115 VAC, 40 Watts
Signal Voltage Output:	0-5 VDC; 4-20 mA (optional)	0-5 VDC; 4-20 mA
Cable Lengths		
Power Cord:	6 ft	6 ft
Signal Cable:	8 ft	8 ft (4)
Alarm Contacts Maximum (Each Channel):	1 amp at 30 VDC	1 amp at 30 VDC
Rack Mounting:	1/2 rack (9-1/2")	Full rack (19")
Shipping Weight:	8 lbs	13 lbs

\*Use of supplied piping is required to blend gases.



## Model 8280 and 8284 Series Dyna-Blenders *(continued)* Dynamic Gas Blending Systems

### Ordering Information

Model Number	Description	Price
8280	Modular Dyna-Blender Control Box	Call for price
8284	Multichannel Dyna-Blender Control Box	\$2,381.28

*The 8280 control box may be ordered as a stand alone item, or as part of a system (8280 control box, transducer assembly, and cable - see the following table for system ordering information).*

Modular Dyna-Blender Model Number	Range in Nitrogen @ 0°C and 14.7 psia	Standard End Fittings	Price
8280-0411	0-10 sccm	1/4" Swagelok	\$2,653.52
8280-0421	0-20 sccm	1/4" Swagelok	\$2,653.52
8280-0431	0-30 sccm	1/4" Swagelok	\$2,653.52
8280-0451	0-50 sccm	1/4" Swagelok	\$2,653.52
8280-0412	0-100 sccm	1/4" Swagelok	\$2,653.52
8280-0422	0-200 sccm	1/4" Swagelok	\$2,653.52
8280-0432	0-300 sccm	1/4" Swagelok	\$2,653.52
8280-0452	0-500 sccm	1/4" Swagelok	\$2,653.52
8280-0413	0-1 slpm	1/4" Swagelok	\$2,653.52
8280-0423	0-2 slpm	1/4" Swagelok	\$2,653.52
8280-0433	0-3 slpm	1/4" Swagelok	\$2,653.52
8280-0453	0-5 slpm	1/4" Swagelok	\$2,653.52
8280-0414	0-10 slpm	1/4" Swagelok	\$2,653.52
8280-0424	0-20 slpm	1/4" Swagelok	\$2,653.52
8280-0434	0-30 slpm	1/4" Swagelok	\$2,883.12
8280-0454	0-50 slpm	3/8" Swagelok	\$4,279.58
8280-0415	0-100 slpm	3/8" Swagelok	\$4,165.60
8280-0425	0-200 slpm	3/8" Swagelok	\$3,465.32
8280-0435	0-300 slpm	1/2" Swagelok	\$4,453.42
8280-0455	0-500 slpm	1/2" Swagelok	\$4,510.82
8280-0416	0-1000 slpm	3/4" Swagelok	\$4,337.80

*Note: Model numbers listed above consist of a complete single channel Dyna-Blender System which includes a transducer assembly and 8280 control box with connecting cable.*

### Options

Model Number	Description	Price
8292	230 VAC Models	\$61.50
8284-8294**	8284 with 4-20 mA Input/Output – Modular Dyna-Blender (4 channel)*	\$3,038.10
8280-8294**	8280 with 4-20 mA Input/Output*	\$3,038.10
8295	PTFE Teflon Seals	\$500.20
HAN-0007-AA	Full Rack Mounting Adapter	\$73.80

*\*Note: 0-5 VDC signal included*

*\*\*Requires one 8272/8273 series controller to be ordered separately.*



## Transducers and Components for 8170 Mass Flowmeter Systems and 8270 Mass Flow Controller Systems



*Transducer Assembly*

### Description

Matheson affords the user the ability to mix and match components to achieve a customized system. Listed below are the individual model numbers for the transducer assemblies for Matheson's Mass Flowmeters and Mass Flow Controllers.

### Specifications

Please Refer to Specifications as listed below.

### Electrical Components

#### Model

8170, 8175

8124

8270, 8274

CBL-0124-XX

CBL-0125-XX

CBL-0126-XX

CBL-0127-XX

#### Description

Control Box for Mass Flowmeters

Totalizer for Mass Flowmeters

Control Box for Mass Flow  
Controllers

8 ft standard signal cable

25 ft signal cable

50 ft signal cable

100 ft signal cable

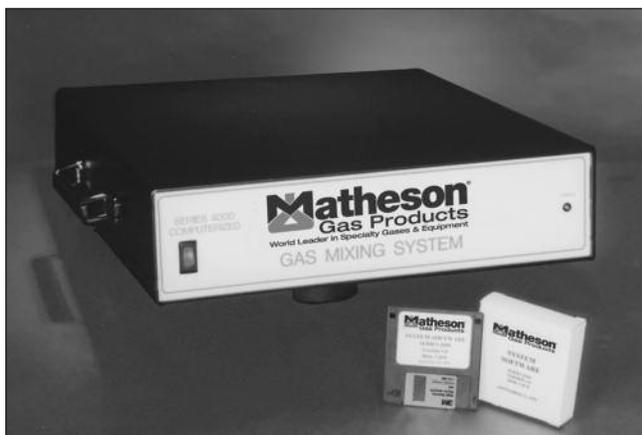
### Transducer Assemblies for Controllers and Flowmeters

Flowmeter Transducer Model Number	Price	Controller Transducer Model Number	Price	Range in Nitrogen @ 0°C and 14.7 psia	Standard End Fittings
8172-0411	\$993.84	8272-0411	\$1,493.22	0-10 sccm	1/4" Swagelok
8172-0421	\$993.84	8272-0421	\$1,493.22	0-20 sccm	1/4" Swagelok
8172-0431	\$993.84	8272-0431	\$1,493.22	0-30 sccm	1/4" Swagelok
8172-0451	\$993.84	8272-0451	\$1,493.22	0-50 sccm	1/4" Swagelok
8172-0412	\$993.84	8272-0412	\$1,493.22	0-100 sccm	1/4" Swagelok
8172-0422	\$993.84	8272-0422	\$1,493.22	0-200 sccm	1/4" Swagelok
8172-0432	\$993.84	8272-0432	\$1,493.22	0-300 sccm	1/4" Swagelok
8172-0452	\$993.84	8272-0452	\$1,493.22	0-500 sccm	1/4" Swagelok
8172-0413	\$993.84	8272-0413	\$1,493.22	0-1 slpm	1/4" Swagelok
8172-0423	\$993.84	8272-0423	\$1,493.22	0-2 slpm	1/4" Swagelok
8172-0433	\$993.84	8272-0433	\$1,493.22	0-3 slpm	1/4" Swagelok
8172-0453	\$993.84	8272-0453	\$1,493.22	0-5 slpm	1/4" Swagelok
8172-0414	\$993.84	8272-0414	\$1,493.22	0-10 slpm	1/4" Swagelok
8172-0424	\$993.84	8272-0424	\$1,493.22	0-20 slpm	1/4" Swagelok
8172-0434	\$993.84	8272-0434	\$1,493.22	0-30 slpm	1/4" Swagelok
8173-0454	\$1,532.58	8273-0454	\$3,114.36	0-50 slpm	3/8" Swagelok
8173-0415	\$1,476.00	8273-0415	\$3,005.30	0-100 slpm	3/8" Swagelok
8173-0425	\$2,496.08	8273-0425	\$2,301.74	0-200 slpm	3/8" Swagelok
8173-0435	\$2,198.42	8273-0435	\$3,291.48	0-300 slpm	1/2" Swagelok
8173-0455	\$2,274.68	8273-0455	\$3,351.34	0-500 slpm	1/2" Swagelok
8173-0416	\$2,274.68	8273-0416	\$3,351.34	0-1000 slpm	3/4" Swagelok

Note: transducer assemblies can be purchased as stand alone units or as part of the 8170, 8270, or 8280 Mass Flow Systems.



## Cal-MAT™ 4000 Series Multi-Component Gas Mixing System



### Description

The Matheson Cal-MAT™ 4000 Series is a multi-component gas mixing system that automatically blends up to three individual gases in a balance gas. The gas mixes can be used to generate precise gas calibration standards, create gaseous atmospheres, or produce gas mixes for analytical research or production purposes. The Cal-MAT™ 4000 can produce gas concentrations from percent to ppb levels for single or multi-point calibrations.

The system consists of two components, the 4000 Series instrument and the user's personal computer. The user interface is a Microsoft Windows application that communicates with the Cal-MAT™ 4000 via an RS-232 serial interface.

### Features

- Blends up to three gases in a balance gas at user set concentrations
- Internally stored mass flow controller calibration tables improve accuracy
- Modular design allows for additional gas circuits to be added, increasing system flexibility
- User definable cylinder library allows for easy selection of frequently used gas cylinders.
- Each cylinder may contain an unlimited number of component gases, with automatic K-factor calculation

### Ordering Information

Please contact Matheson Technical Services at 800-828-4313 for pricing information.

### Software

The Windows-based software for the Cal-MAT™ 4000 offers three basic modes of operation:

- **Concentration Mode:** Allows user to create a blend by entering target gas concentrations for each source gas cylinder and the desired total output flow for the mixture.
- **Flow Mode:** Allows user to specify the flow rate of each gas cylinder.
- **Program Mode:** Provides the ability to program the instrument for unattended operation. Programs can be recalled and run in any sequence, at various times/dates.

### Specifications

Accuracy:	From 10-100% of full scale flow
Concentration:	±1%
Flow:	±1%
Repeatability:	±1%
Warm-up Time:	30 minutes
Inlets:	1/4" Swagelok
Outlet:	1/4" Swagelok
Operating Pressures	
Minimum:	10 psig (69 kPa)
Recommended:	25 psig (173 kPa)
Maximum:	75 psig (518 kPa)
Wetted Surfaces	
Tubing:	Electropolished 316 stainless steel
Mass Flow Controllers:	Stainless steel
Seals:	Viton
Operating Temperatures:	32-122°F (0-50°C)
Dimensions (WxHxD):	17" x 4-1/4" x 20" (43 cm x 11 cm x 51 cm)
Electrical:	110 to 240 VAC, 50/60 Hz
Electronics:	12 Bit A/D and D/A conversion RS-232 serial interface
Software:	Instrument control software (supplied on 3-1/2" floppy disks)
PC Requirements:	IBM PC or compatible (486-33 or higher) Microsoft Windows 3.1(or higher) 8 MB RAM 10 MB hard disk space 3-1/2" floppy drive RS-232 communication port
Shipping Weight:	18 lbs with 2 mass flow controllers 23 lbs with 4 mass flow controllers



## Cal-MAT™ 4040 Series Computerized Gas Dilution System



### Description

The Matheson Cal-MAT™ 4040 Series is a computerized gas dilution system that automatically generates precise gas standards for rapid multi-point calibration of analyzers. The gas mixes can be used to generate precise gas calibration standards, create gaseous atmospheres, or produce gas mixes for analytical research or production purposes. The Cal-MAT™ 4040 can produce gas concentrations from percent to ppb levels for single or multi-point calibration.

The system consists of two components, the 4040 Series instrument and the user's personal computer. The user interface is a Microsoft Windows application that communicates with the Cal-MAT™ system via an RS-232 serial interface.

The Cal-MAT™ 4040 consists of a single chassis supporting up to four mass flow controllers. Two mass flow controllers are standard; additional mass flow controllers may be ordered as options.

### Features

- Broad range of dilution ratios (up to 1,000:1) allows the user to significantly reduce the number of cylinders needed to perform compliance tests
- Modular design allows for additional circuits to be added, increasing system flexibility
- Internally stored mass flow controller calibration tables improve accuracy
- User definable cylinder library allows for easy selection of frequently used gas cylinders.
- Each cylinder may contain an unlimited number of component gases, with automatic K-factor calculation

### Software

The Windows based software for the Cal-MAT™ 4040 offers four basic modes of operation:

- Concentration Mode: Allows the user to create a blend by entering the target gas concentrations for each source gas cylinder and the desired total output flow for the mix.
- Divider Mode: Allows the user to operate the instrument as an automated ten step gas divider
- Flow Mode: Allows the user to specify the flow rate of each gas cylinder
- Program Mode: Provides the ability to program the instrument for unattended operation. Programs can be recalled and run in any sequence, at various times/dates.

### Specifications

Accuracy:	From 10-100% of full scale flow
Concentration:	±1%
Flow:	±1%
Repeatability:	±1%
Warm-up Time:	30 minutes
Inlets:	1/4" Swagelok
Outlet:	1/4" Swagelok
Operating Pressures at Inlets	
Minimum:	10 psig (69 kPa)
Recommended:	25 psig (173 kPa)
Maximum:	75 psig (518 kPa)
Wetted Surfaces	
Tubing:	Electropolished 316 stainless steel
Mass Flow Controllers:	Stainless steel
Seals:	Viton
Operating Temperatures:	32-122°F (0-50°C)
Dimensions (W x H x D):	17" x 4-1/4" x 20" (43 cm x 11 cm x 51 cm)
Electrical:	110 to 240 VAC, 50/60 Hz
Electronics:	12 Bit A/D and D/A conversion RS-232 serial interface
Software:	Instrument control software (supplied on 3-1/2" floppy disks)
PC Requirements:	IBM PC or compatible (486-33 or higher) Microsoft Windows 3.1 (or higher) 8 MB RAM 10 MB hard disk space 3-1/2" floppy drive RS-232 communication port
Shipping Weight:	18 lbs with 2 mass flow controllers 23 lbs with 4 mass flow controllers

### Ordering Information

Please contact Matheson Technical Services at 800-828-4313 for pricing information.



## Gas Detection Products Overview

### Introduction

Matheson Tri-Gas offers an extensive line of quality gas detection products specifically designed to assure your working environment is a safe place. We have been handling gases safely for more than seventy-five years. This experience translates directly to you through new product ideas and innovations.

Nearly two hundred gases can now be detected or monitored with Matheson gas detection instrumentation. Whether your application calls for **Air Samplers**, **Leak Detectors**, or **Personal Monitors**, Matheson has a product that will fit your needs.

### Air Samplers

- **Kitagawa Detector Tube System**  
A cost effective solution to air analysis. Measures concentrations of hundreds of hazardous gases and vapors, on-the-spot. See pages 56-59.
- **Qualitative Analysis and HazMat Kit**  
Identifies unknown gases and vapors quickly and on-the-spot. See page 60.
- **Indoor Air Quality Test Kit**  
An air analysis kit for conducting IAQ investigations. See page 62.
- **Compressed Breathing Air Analysis Kit**  
Ensures your breathing air quality meets regulatory specifications. See page 61.

### Leak Detectors

- **LeakHunter Plus™**  
Thermal conductivity based detector pinpoints and measures leaks for many non-toxic gases. Portable and benchtop application in one product. See pages 72-73.
- **Toxic Gas Leak Detector**  
Plug-and-Play electrochemical sensor based detector can detect 23 different toxic gases. See pages 70-71.
- **VOC Leak Detector**  
Ideal for EPA Method 21 fugitive emission monitoring of volatile organic compound (VOC) leaks from process equipment. See pages 74-77.
- **Liquid Solution Leak Detector**  
Detect-A-Leak™ is a foaming surfactant based solution for non-critical applications. See page 78.



*Matheson-Kitagawa Toxic Gas Detector System*

### Personal Monitors

- **MEGA-Channel Gas Detector**  
This unique microprocessor based monitor detects over a hundred gases and vapors in a single portable compact instrument. See pages 66-67.
- **Personal Monitors**  
Choose from more than 140 available sensors to customize your own monitor. See pages 64-65.
- **General Purpose Gas Detector**  
Personal monitor and leak detector detects a variety of different gases and vapors without the need for multiple detectors. See pages 68-69.

### Safety Seminar

Matheson is genuinely concerned with your ability to handle gases safely. To assist you, we conduct informative safety seminars at our customer's facilities, free of charge. To request a presentation at your facility, simply contact Matheson to arrange a visit from the Sales Engineer in your area.



## Matheson-Kitagawa Toxic Gas Detector System



**New ergonomic pump with contoured padded grip**

### Description

The Matheson-Kitagawa Toxic Gas Detector System is a complete “sampling and analysis” kit for on-the-spot readings. It is an excellent method for day-to-day checking, screening, QC in the lab or plant and spot testing. Non-technical employees can operate the Matheson-Kitagawa System with a minimum of training.

The Model 8014KB Toxic Gas Detector System provides accurate, dependable, and reproducible results in determining concentrations of toxic gases and vapors. It has been proven through extensive use by leading industrial companies and government agencies. One constant and reproducible sample volume reduces sampling and analysis errors — as opposed to other pump designs, there are no orifice changes or multiple strokes to keep track of. The same basic sampling technique applies to all Matheson-Kitagawa Precision Detector Tubes.

Only three easy steps are required to operate the detector: (1) break off the tips of a fresh detector tube, (2) insert the tube with arrow pointing toward the pump into the pump’s sample inlet,

(3) pull out the pump handle to automatically lock, drawing a 100 cc sample. A proprietary Sample Vue™ indicator shows when sampling is completed. Only one stroke is needed for most analyses; no need for multiple volumes or stroke counters.

Matheson-Kitagawa precision detector tubes are formulated with high purity chemical reagents which absorb and react with the gas or vapor being measured. The reaction causes a colorimetric stain which varies in length to the concentration of the gas or vapor being measured. The length of stain is normally read directly off a scale printed on each tube. Four types of Matheson-Kitagawa tubes provide the needed flexibility for different gases and sampling conditions.

Request Brochure BR-56 and Tech-Brief TB-102-1 for complete product specifications.

### SEI Certification

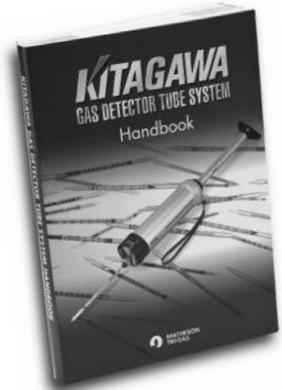
The Matheson-Kitagawa precision sampling pump and several detector tubes are certified by the Safety Equipment Institute (SEI). SEI is a recognized organization that offers certification programs to assist the industrial safety equipment industry in providing the American worker protective equipment that meets recognized standards and current state of the art.



### Fourth Edition Handbook

This handbook printed in 2001 contains all the information you need to know concerning the Matheson-Kitagawa Toxic Gas Detector System. Detailed specifications for every tube, applications, system operating principles and much more, are all included in this comprehensive source of information.

This book is a valuable reference guide for anyone using a Matheson-Kitagawa Toxic Gas Detector System.



### Ordering Information

Model Number	Description	Price
8014KB	Toxic Gas Detector Kit - with 400B Pump (SEI approved), Spare Parts, Carrying Case and Instruction Card. Order tubes separately.	\$392.78
8014-400B	Precision Sampling Pump (replacement only)	\$341.12
8014-002	Rubber Inlet Flange and Ring for 400A Pump (pkg 6) (replacement)	\$14.76
8014-002B	Rubber Inlet Flange and Ring for 400B Pump (pkg 2) (replacement)	\$17.22
8014-003B	Sampling Pump Lubricant for both 400A and 400B Pumps (replacement)	\$17.22
8014-017	5 Meter Extension Hose for 400A Pump (with tube holder)	\$111.52
8014-017B	5 Meter Extension Hose for 400B Pump (with tube holder)	\$36.08
8014-018	10 Meter Extension Hose for 400A Pump (with tube holder)	\$143.50
8014-018B	10 Meter Extension Hose for 400B Pump (with tube holder)	\$48.38
8014-300K	AirFlow Indicator Kit - with Aspirator Bulb, Case, and one box 8014-300 Smoke Tubes	\$96.76
8014-300K2	Continuous Air Flow Indicator Kit	\$159.90
8014-BOOK	Kitagawa Handbook	\$31.16

Prices and Specifications Subject to Change without Notice



## Matheson-Kitagawa Precision Detector Tubes

Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price
Acetaldehyde	0.004-1%	8014-133A	\$48.38
Acetaldehyde	5-140	8014-133SB <sup>3</sup>	\$48.38
Acetic Acid	1-50	8014-216S <sup>1</sup>	\$48.38
Acetone	0.1-5.0%	8014-102SA	\$49.20
Acetone	0.01-4.0%	8014-102SC <sup>3</sup>	\$49.20
Acetone	20-5000	8014-102SD <sup>1</sup>	\$49.20
Acetylene	50-1000	8014-101S	\$49.20
Acetylene/Ethylene	20-300/200-2000	8014-280S	\$48.38
Acrolein	0.005-1.8%	8014-136 <sup>3</sup>	\$48.38
Acrylonitrile	0.1-3.5%	8014-128SA	\$48.38
Acrylonitrile	10-500	8014-128SB	\$48.38
Acrylonitrile	1-120	8014-128SC <sup>*3</sup>	\$48.38
Acrylonitrile	0.25-20	8014-128SD <sup>*</sup>	\$48.38
Allyl alcohol	20-500	8014-184S	\$48.38
Ammonia	0.5-10.0%	8014-105SA	\$49.20
Ammonia	50-900	8014-105SB	\$49.20
Ammonia	10-260 5-130	8014-105SC <sup>1</sup>	\$49.20
Ammonia	1-20 0.2-1	8014-105SD	\$49.20
Ammonia	0.5-30%	8014-105SH	\$49.20
Ammonia	0.1-1.0%	8014-105SM	\$49.20
Aniline	2-30 1-15	8014-181S	\$48.38
Arsine	5-160	8014-140SA	\$48.38
Arsine	0.05-2.0	8014-121U	\$56.58
Benzene — in presence of gasoline and/or other aromatic hydrocarbons	0.2-80	8014-118SE <sup>*</sup>	\$49.20
Benzene	1-100	8014-118SC <sup>1</sup>	\$48.38
Benzene	0.1-75	8014-118SD	\$48.38
Bromine	1-20	8014-114	\$48.38
Butadiene	0.03-2.6%	8014-168SA	\$48.38
Butadiene	30-600	8014-168SB	\$48.38
Butadiene	2.5-100	8014-168SC	\$48.38
n-Butane	0.05-0.6%	8014-221SA	\$48.38
1-Butanol	5-100	8014-190U	\$56.58
2-Butanol	4-300	8014-189U	\$56.58
Butyl acetate	0.01-1%	8014-139SB	\$48.38
Butyl acetate	15-400	8014-138U	\$56.58
Butyl acrylate	5-60	8014-211U	\$56.58
Butyl cellosolve	10-1000	8014-190U	\$56.58
Carbon dioxide	300-7000 100-1500	8014-126B	\$48.38
Carbon dioxide	0.1-2.6%	8014-126SA <sup>1</sup>	\$48.38
Carbon dioxide	0.05-1.0%	8014-126SB	\$48.38
Carbon dioxide	100-4000	8014-126SF	\$48.38
Carbon dioxide	0.02-1.4%	8014-126SG	\$48.38
Carbon dioxide	1.0-20.0%	8014-126SH	\$48.38
Carbon dioxide	5-50%	8014-126UH	\$56.58
Carbon dioxide/Oxygen	1-20%/2-10%	8015-281S	\$48.38
Carbon disulfide	30-500	8014-141SA <sup>*3</sup>	\$48.38
Carbon disulfide	2-50 1-25	8014-141SB <sup>*1,3</sup>	\$56.58
Carbon monoxide	5-1000	8014-100	\$49.20
Carbon monoxide	10-250	8014-106S <sup>1</sup>	\$49.20
Carbon monoxide	0.1-2.0%	8014-106SH	\$49.20
Carbon monoxide	0.1-20%	8014-106UH	\$56.58
Carbon monoxide	10-1000	8014-106B	\$49.20
Carbon monoxide — in presence of ethylene and nitrogen oxides	10-100	8014-106C	\$49.20
Carbon monoxide	10-1000	8014-106SA	\$49.20
Carbon monoxide	1-50	8014-106SC	\$48.38

Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price
Carbon tetrachloride	0.5-60	8014-147S <sup>*3</sup>	\$48.38
Chlorine	1-40	8014-109SA	\$48.38
Chlorine	0.5-10 0.1-0.5	8014-109SB <sup>1</sup>	\$48.38
Chlorine	0.05-2	8014-109U	\$56.58
Carbonyl sulfide	5-60	8014-239S <sup>*</sup>	\$48.38
Free residual chlorine	0.4-5	8014-234SA	\$48.38
Chlorine dioxide	1-20	8014-116	\$48.38
Chlorobenzene	5-140	8014-178SB	\$48.38
Chloroform	70-500 23-100	8014-152S <sup>*3</sup>	\$48.38
Chloropicrin	0.1-16	8014-172S <sup>*3</sup>	\$48.38
Chloroprene	0.5-32	8014-169S	\$48.38
Cresol	0.5-25	8014-183U	\$56.58
Cyclohexane	0.01-0.6%	8014-115S	\$48.38
Cyclohexanol	5-500	8014-206U	\$56.58
Cyclohexanone	2-100	8014-197U	\$48.38
Diacetone alcohol	10-250	8014-190U	\$56.58
Diborane	0.02-5	8014-242S	\$48.38
o-Dichlorobenzene	5-100	8014-214S	\$48.38
p-Dichlorobenzene	10-150	8014-215S	\$48.38
1,1-Dichloroethane	10-160	8014-235S <sup>*3</sup>	\$48.38
1,2-Dichloroethane	5-50	8014-230S <sup>*3</sup>	\$48.38
1,2-Dichloroethylene	5-400	8014-145S <sup>*3</sup>	\$48.38
Dichloromethane	30-1000 10-200	8014-180S <sup>*3</sup>	\$48.38
1,3-Dichloropropane	10-500	8014-194S <sup>*3</sup>	\$48.38
Diethylamine	1-20	8014-222S	\$48.38
Diethyl ether	0.04-1.4%	8014-107SA	\$48.38
Diethyl ether	20-400	8014-107U	\$56.58
Dimethyl ether	0.01-1.2%	8014-123S	\$48.38
N,N-Dimethylacetamide	5-70	8014-229S	\$48.38
N,N-Dimethyl formamide	1-30	8014-196S	\$48.38
Dioxane	0.05-2.5%	8014-139SB	\$48.38
Dioxane	20-500	8014-119U	\$56.58
Epichlorohydrin	5-50	8014-192S <sup>*</sup>	\$48.38
Ether	0.04-1.4%	8014-107SA	\$48.38
Ether	20-400	8014-107U	\$56.58
Ethyl acetate	0.1-5.0%	8014-111SA	\$22.96
Ethyl acetate	10-1000	8014-111U	\$56.58
Ethyl acrylate	5-60	8014-211U	\$56.58
Ethyl alcohol	0.05-5.0%	8014-104SA	\$49.20
Ethyl benzene	10-500	8014-179S	\$48.38
Ethyl cellosolve	5-500	8014-190U	\$56.58
Ethyl cellosolve acetate	5-150	8014-190U	\$56.58
Ethyl mercaptan	1-160	8014-165SA	\$56.58
Ethyl mercaptan in LP Gas	2.5-80	8014-165SB	\$72.16
Ethylene	0.5-100 0.1-20	8014-108B	\$48.38
Ethylene	20-1200	8014-108SA	\$48.38
Ethylene/Acetylene	200-2000/20-30	8014-280S	\$51.66
Ethylene dibromide	1-50	8014-166S <sup>*3</sup>	\$48.38
Ethylene glycol	20-250 mg/m <sup>3</sup>	8014-232SA <sup>*</sup>	\$48.38
Ethylene glycol	3-40 mg/m <sup>3</sup>	8014-232SB <sup>*</sup>	\$48.38
Ethylene oxide	0.05-2.2%	8014-122SA <sup>*</sup>	\$48.38
Ethylene oxide	1-15	8014-122SC	\$48.38
Ethylene oxide	0.1-14	8014-122SD	\$48.38
Ethylene oxide	5-100	8014-122SM	\$48.38
Formaldehyde	1-35	8014-171SB <sup>*1</sup>	\$48.38
Formaldehyde	20-1500	8014-171SA <sup>*3</sup>	\$48.38
Formaldehyde	0.1-4	8014-171SC	\$48.38



**Matheson-Kitagawa Precision Detector Tubes (continued)**

Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price	Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price
Formic acid	1-50	8014-216S	\$48.38	Methyl bromide	10-500	8014-157SA* <sup>3</sup>	\$48.38
Furan	0.01-1.0% 0.2-2.0%	8014-161S	\$56.58	Methyl bromide	0.4-80	8014-157SB* <sup>1,3</sup>	\$48.38
Furfural	2-60	8014-190U	\$56.58	Methyl bromide	0.5-10	8014-157SC*	\$48.38
Furfuryl alcohol	2-25	8014-238S	\$48.38	Methyl cellosolve	5-500	8014-190U	\$56.58
Gasoline	0.05-0.6%	8014-110S	\$48.38	Methyl chloroform	15-400	8014-160S* <sup>3</sup>	\$48.38
General hydrocarbons	50-1400	8014-187S	\$48.38	(1,1,1-Tri-chloroethane)			
Heptane	100-2000	8014-113SB	\$48.38	Methyl cyclohexanol	5-200	8014-199U	\$48.38
n-Hexane	0.05-0.6%	8014-113SA	\$48.38	Methyl cyclohexanone	2-100	8014-198U	\$48.38
n-Hexane	50-1400	8014-113SB*	\$48.38	Methyl ethyl ketone	0.05-2.2%	8014-122SA	\$48.38
n-Hexane	5-800	8014-113SC	\$48.38	Methyl ethyl ketone	0.01-1.4%	8014-139SB	\$48.38
Hydrazine	0.05-10	8014-219S	\$48.38	Methyl ethyl ketone	20-1500	8014-139U	\$56.58
Hydrogen	0.05-0.8%	8014-137U**	\$56.58	Methyl iodide	5-40	8014-176S* <sup>3</sup>	\$48.38
Hydrogen chloride	20-600 40-1200	8014-173SA	\$48.38	Methyl isobutyl ketone	0.01-0.6%	8014-155S	\$48.38
Hydrogen chloride	0.4-40	8014-173SB* <sup>1</sup>	\$56.58	Methyl isobutyl ketone	5-300	8014-155U	\$48.38
Hydrogen cyanide	0.01-3.0%	8014-112SA	\$48.38	Methyl mercaptan	5-140	8014-164SA	\$48.38
Hydrogen cyanide	0.5-100	8014-112SB <sup>1,3</sup>	\$48.38	Methyl mercaptan	50-1000	8014-164SH	\$48.38
Hydrogen cyanide	0.3-8	8014-112SC	\$72.16	Methyl methacrylate	10-160	8014-184S	\$48.38
Hydrogen fluoride	0.17-30	8014-156S <sup>1</sup>	\$48.38	Methyl styrene	10-500	8014-193S	\$48.38
Hydrogen peroxide	0.5-10	8014-247S	\$56.58	Naphthalene	10-100	8014-153U	\$56.58
Hydrogen selenide	5-600 1-100	8014-167S	\$48.38	Nickel carbonyl	20-700	8014-129	\$48.38
Hydrogen sulfide	1-60	8014-120SD <sup>1</sup>	\$48.38	Nitric Acid vapor	1-20	8014-233S <sup>3</sup>	\$48.38
Hydrogen sulfide	0.2-6.0	8014-120U	\$56.58	Nitrogen dioxide	20-1000	8014-117SA	\$48.38
Hydrogen sulfide	.05-1.2%	8014-120SM	\$48.38	Nitrogen dioxide	0.5-30	8014-117SB <sup>1</sup>	\$48.38
Hydrogen sulfide	3-150 0.75-37.5	8014-120SB	\$48.38	Nitrogen dioxide	0.1-1.0	8014-117SD**	\$48.38
Hydrogen sulfide — in presence of sulfur dioxide	0.005-0.16%	8014-120SC	\$48.38	Nitrogen oxide and dioxide — separately measurable NO <sub>2</sub> 1-40	NO 10-300	8014-174A <sup>1</sup>	\$48.38
Hydrogen sulfide	0.5-40	8014-120SE	\$48.38	Nitrogen oxides	20-250	8014-175SA*	\$48.38
Hydrogen sulfide	50-2000	8014-120SF	\$48.38	Nitrogen oxides	100-2500	8014-175SH	\$48.38
Hydrogen sulfide	0.1-4.0%	8014-120SH	\$48.38	Nitrogen oxides	0.5-30	8014-175U <sup>3</sup>	\$56.58
Hydrogen sulfide	2-20%	8014-120UH	\$56.58	Organic compounds	5-2500	8014-186	\$48.38
Hydrogen sulfide	2.5-40%	8014-120UT**	\$56.58	Organic gases, qualitative	—	8014-186B	\$56.58
Hydrogen sulfide	.025-0.4 gr/100cf	8014-120GR	\$72.16	Oxygen (flame req'd)	2-24%	8014-159SA*	\$48.38
Hydrogen sulfide	0.25-2 gr/100cf	8014-120GT	\$72.16	Oxygen (no flame)	2-24%	8014-159SB**	\$56.58
Hydrogen sulfide/Mercaptans	1-30/0.5-5	8014-282S	\$48.38	Oxygen (non-heating type)	1.5-24%	8014-159SC*	\$56.58
Inorganic gases, qualitative	—	8014-131	\$56.58	Oxygen/Carbon dioxide	2-10%/1-20%	8014-281S	\$48.38
Isoamyl acetate	10-400	8014-188U	\$56.58	Ozone	0.05-3.0	8014-182U <sup>1</sup>	\$56.58
Isobutane	50-1200	8014-113SB	\$48.38	Ozone	50-1000	8014-182SA	\$48.38
Isobutyl acetate	0.01-1.4%	8014-139SB	\$48.38	Ozone	2.5-100	8014-182SB	\$48.38
Isobutyl acetate	10-400	8014-153U	\$56.58	Pentane	50-1000	8014-113SB*	\$48.38
Isobutyl acrylate	5-60	8014-211U	\$56.58	Pentyl acetate	10-100	8014-210U	\$56.58
Isobutyl alcohol	5-100	8014-208U	\$56.58	Perchloroethylene	5-300	8014-135SA* <sup>3</sup>	\$48.38
Isopentyl alcohol	5-100	8014-209U	\$56.58	Phenol	0.5-25	8014-183U	\$56.58
Isoprene	1-16	8014-190U	\$56.58	Phosgene	0.1-0.5 0.5-20	8014-146S <sup>3</sup>	\$48.38
Isopropyl acetate	0.01-1.2%	8014-139SB	\$48.38	Phosphine	0.05-2.0	8014-121U <sup>1</sup>	\$56.58
Isopropyl acetate	10-1000	8014-111U	\$56.58	Phosphine	20-700	8014-121SC	\$48.38
Isopropyl alcohol	0.05-2.5%	8014-150SA	\$48.38	Phosphine	0.25-10	8014-121SD	\$48.38
Isopropyl alcohol	20-1200	8014-150U	\$56.58	Phosphine	100-3200	8014-121SH	\$72.16
Isopropyl mercaptan	0.5-10	8014-130U	\$56.58	Phosphine in acetylene	20-800	8014-121SA*	\$48.38
Mercaptans	0.5-10	8014-130U	\$56.58	Phosphine in acetylene	5-90	8014-121SB*	\$48.38
Mercaptans/H <sub>2</sub> S	0.5-5/1-30	8014-282S	\$56.58	Propane	0.02-0.5%	8014-125SA	\$48.38
Mercury vapor	0.5-10 0.1-2.0 mg/m <sup>3</sup>	8014-142S	\$48.38	Propyl acetate	0.01-1.4%	8014-139SB	\$48.38
Mesityl oxide	5-100	8014-190U	\$56.58	Propyl acetate	20-1000	8014-151U	\$56.58
Methyl acetate	0.01-3.0%	8014-111SA	\$22.96	Propylene	50-1000	8014-185S	\$48.38
Methyl acrylate	5-60	8014-211U	\$56.58	Propylene oxide	0.05-5.0%	8014-163SA	\$72.16
Methyl alcohol	0.05-6.0%	8014-119SA	\$48.38	Silane	0.5-50	8014-240S	\$48.38
Methyl alcohol	20-1000	8014-119U	\$56.58	Smoke tube (Air Flow Indicator)	—	8014-300	\$48.38
Methyl amine	1-20	8014-227S	\$48.38	Styrene	2.5-300	8014-158S	\$48.38



## Matheson-Kitagawa Precision Detector Tubes (continued)

Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price.
Styrene	1-100	8014-158SB	\$48.38
Sulfur dioxide	0.1-3.0%	8014-103SA	\$49.20
Sulfur dioxide	0.02-0.3%	8014-103SB	\$49.20
Sulfur dioxide — in flue gas	0.02-0.3%	8014-103SF	\$49.20
Sulfur dioxide	20-300	8014-103SC	\$49.20
Sulfur dioxide	1-60	8014-103SD <sup>1</sup>	\$49.20
Sulfur dioxide	0.25-10	8014-103SE	\$48.38
Tetrachloroethylene	5-300	8014-135SA* <sup>3</sup>	\$48.38
Tetrachloroethylene	5-160	8014-243U	\$72.16
Tetrachloroethylene	0.2-10	8014-135SB <sup>3</sup>	\$48.38
Tetrachloroethylene	0.05-2%	8014-135SH	\$72.16
Tetraethoxysilane	5-160	8014-243U	\$72.16
Tetrahydrofuran	0.05-5.0%	8014-102SA	\$49.20
Tetrahydrofuran	20-500	8014-162U	\$56.58
Toluene	10-500	8014-124SA* <sup>1</sup>	\$56.58
Toluene	2-100	8014-124SB	\$48.38
Toluene	100-3000	8014-124SH	\$48.38
1,1,2-Trichloroethane	10-100	8014-236S* <sup>3</sup>	\$48.38
Trichloroethylene	0.2-36	8014-134SB <sup>3</sup>	\$48.38
Trichloroethylene	5-300	8014-134SA* <sup>1,3</sup>	\$48.38
Trichloroethylene	0.05-2%	8014-134SH	\$72.16
Triethylamine	1-20	8014-213S	\$48.38
Trimethylamine	1-20	8014-222S	\$48.38
Trimethylbenzene	10-250	8014-111U	\$56.58
Vinyl acetate	5-120	8014-237S	\$48.38
Vinyl chloride	0.05-1%	8014-132SA	\$48.38
Vinyl chloride	5-500	8014-132SB* <sup>3</sup>	\$48.38
Vinyl chloride	0.1-12	8014-132SC* <sup>1</sup>	\$48.38
Water vapor	1.7-33.8 mg/l	8014-177SA	\$48.38
Water vapor	0.05-2.0 mg/l	8014-177U	\$56.58
Water vapor	2-12 LB/MMCF	8014-177UR	\$49.20
Water vapor	3-80 LB/MMCF	8014-177UL	\$56.58
Xylene	5-1000	8014-143SA <sup>1</sup>	\$48.38
Xylene	5-200	8014-143SB	\$48.38



## Matheson-Kitagawa Detector Tubes Used for Dissolved Substances In Solution

Substance To Be Measured	Measuring Range (ppm)	Tube No.	Price
Formaldehyde	0.1-4	8014-171SC	\$48.38
Chloride Ion	10-2000/5-40	8014-201SA <sup>3</sup>	\$48.38
Chloride Ion	3-200	8014-201SB	\$48.38
Chlorine, residual	0.4-5	8014-234SA	\$48.38
Copper Ion	1-100	8014-203S <sup>3</sup>	\$48.38
Cyanide Ion	.2-5	8014-204S <sup>3</sup>	\$48.38
Iron Ion	50-400	8014-202 <sup>3</sup>	\$48.38
Salinity	0.01-0.8%	8014-205SL	\$48.38
Sulfide Ion	2-1000	8014-200SA	\$48.38
Sulfide Ion	0.5-10	8014-200SB	\$48.38

Notes: Most tubes are in stock for immediate delivery. Matheson guarantees all tubes will have a minimum of three months shelf life remaining when shipped, although they will typically contain more.

<sup>1</sup> SEI certified.

<sup>3</sup>Pending SEI certification.

ppm: parts per million

mg/m<sup>3</sup>: approximate milligrams of substance per cubic meter of air.

All "S" and "U" tubes are direct reading.

All tubes are packaged 10 tubes per box unless otherwise noted.

\* Five detector tubes, five pretreat tubes per box.

\*\*Five detector tubes per box.

+ Five detector tubes per box, each tube for one NO/NO<sub>2</sub> test.

• Orifice to be inserted in 8014-400A or 8014-400B pump before sampling (P/N 8014-001).

<sup>3</sup> Requires refrigeration (2-10°C.) for storage

Request Brochure BR-56 and Tech/Brief TB-102-1 and associated tube listing for complete product specifications on Matheson-Kitagawa Gas Detection products.



## Model 8070

### Qualitative Analysis Tubes and HazMat Kit



#### Description

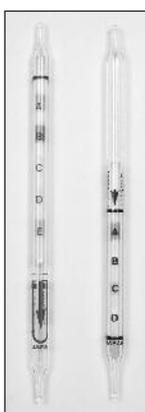
Matheson's Qualitative Detector Tubes provide fast on-the-spot identification of unknown gases and vapors. There is no need for cumbersome grab samples, time delayed laboratory analyses, expensive analytical instrumentation or complex decision-tree matrix approaches. And since calibration, electricity and battery charging are not necessary, the tubes are always ready for immediate use.

Two types of tubes are available. Model 8014-186B identifies a broad range of organic compounds, such as gasoline, alcohols, hydrocarbons, etc. Model 8014-131 identifies inorganic compounds, such as carbon monoxide, sulfur dioxide, chlorine, etc. Typically, both models are used in concert, to assure detection of both organic and inorganic compounds.

#### Principle of Operation

In operation, Matheson's Qualitative Tubes are used in the same way as conventional detector tubes. That is, the high precision Matheson-Kitagawa pump, Model 8014-400A, is used to draw the sample air through the tubes.

However, unlike conventional tubes which are "length of stain" providing quantitative measurements, these tubes are comprised of several sections. Each section contains a unique, high purity blend of reagents that will absorb and react with a particular gas or vapor, or family of gases and vapors. The resulting reaction causes a color change. The unknown gas or vapor is determined by which section(s) changed color, and to what color they changed to.



131 186B

Model 8014-131 is used to detect inorganic compounds and consists of 5 sections, labelled "A" to "E". Only one tube is needed to provide a complete analysis for inorganics.

Model 8014-186B is used to detect organic compounds and consists of 4 sections, labelled "A" to "D". Because of the extensive number of detectable organic compounds, two tubes are required

for a complete analysis. One tube is used for "A" side sampling (section A closest to pump), and is followed by a second, fresh tube for "D" side sampling (section D closest to pump). The combined results are used to identify unknown substances.

#### Compounds Detected and Detectable Limits (parts-per-million)

##### Inorganic Tube Model 8014-131

Acetic Acid (15)	Hydrogen Chloride (20)
Acetylene (10)	Hydrogen Sulfide (10)
Amines (5)	Methyl Mercaptan (10)
Ammonia (5)	Nitrogen Dioxide (5)
Carbon Monoxide (10)	Phosphine (2)
Chlorine (5)	Sulfur Dioxide (10)

##### Organic Tube Model 8014-186B

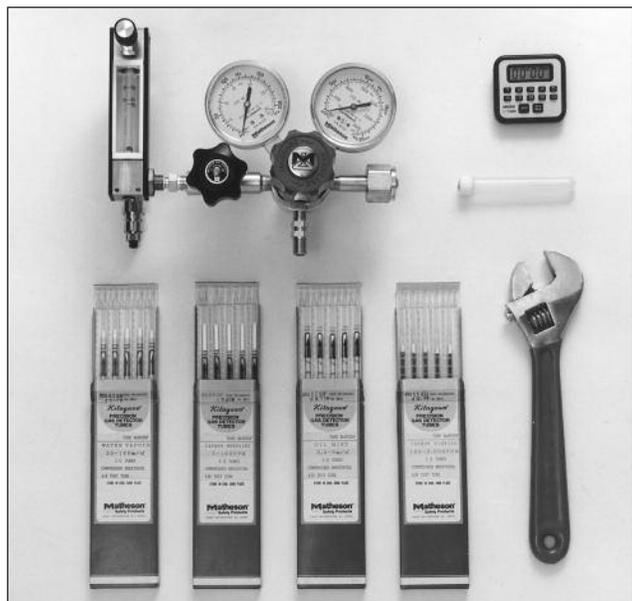
Acetaldehyde (100)	Heptane (10)
Acetone (500)	Hexane (10)
Acetylene (100)	Isopropyl Alcohol (500)
Aniline (50)	Kerosene (0.1 mg/l)
Benzene (100)	Methyl Alcohol (100)
Butadiene (1000)	Methyl Ethyl Ketone (100)
Butane (10)	Methyl Isobutyl Ketone (100)
1-Butanol (100)	Methyl Mercaptan (20)
Butyl Acetate (100)	Pentane (10)
Carbon Disulfide (100)	Phenol (10)
Cresol (20)	Propane (100)
Ethyl Acetate (500)	Styrene (100)
Ethylamine (100)	Tetrachloroethylene (100)
Ethyl Benzene (400)	Tetrahydrofuran (100)
Ethyl Cellosolve (100)	Toluene (200)
Ethylene (10)	Trichloroethane (1000)
Ethylene Oxide (100)	Trichloroethylene (1000)
Formaldehyde (10)	Vinyl Chloride (10)
Gasoline (0.1 mg/l)	Xylene (1000)

#### Ordering Information

Model Number	Description	Price
8070	Basic Qualitative Analysis Kit, Complete with 8014-400A Sampling Pump, Maintenance Items, 1 box 8014-131 Inorganic Tubes, 2 boxes 8014-186B Organic Tubes, and Hard Shell Carrying Case with Shoulder Strap	\$428.86
8014-131	Inorganic Gas Detector Tubes, 10/box	\$56.58
8014-186B	Organic Gas Detector Tubes, 10/box	\$56.58
8014-017	5 Meter Extension Sampling Hose	\$111.52
8014-018	10 Meter Extension Sampling Hose	\$143.50
8014-300	Air Flow Indicator Tubes, 10/box	\$48.38
8014-300K	Air Flow Indicator Kit - with Aspirator Bulb, Case, and one box 8014-300 Tubes	\$97.76



## Model 8014BAK Compressed Breathing Air Analysis Kit



### Description

The Matheson Model 8014BAK is an on-line analysis kit for ensuring the quality of compressed breathing air. It quickly and easily measures the levels of carbon monoxide, carbon dioxide, oil mist, water vapor, and oxygen.

Unlike other methods, there is no need to take a grab sample and analyze it off line; the 8014BAK is designed to connect directly to the compressed breathing air source. It is available with a choice of three connections—CGA 346, CGA 347, and 1/4" NPT Female.

It is very important that the correct connection type be selected to match the application:

The Model 8014BAK-01 is fitted with a CGA 346 connection, and is rated for inlet pressures of 0-3000 psig. This model should be selected for analyzing compressed air in U.S. D.O.T. approved cylinders with a Stamped Service Pressure in the range of 0-3000 psig.

The Model 8014BAK-03 is fitted with a CGA 347 connection, and is rated for inlet pressures of 3001-5500 psig. This model should be selected for analyzing compressed air in U.S. D.O.T. approved cylinders with a Stamped Service Pressure in the range of 3001-5500 psig.

The Model 8014 BAK-02 is fitted with a 1/4" NPT Female connection, and is rated for inlet pressures of 0-400 psig. This model should be selected for analyzing compressed air from non-cylinder sources having pressures no greater than 400 psig.

**CAUTION:** *Adapters must not be used that connect a high pressure source to equipment rated at a lower pressure.*

### Some Typical Applications

The Model 8014BAK is ideal for anyone involved with the filling, generating, or usage of compressed breathing air. It has been proven through use in a variety of industries and applications.

- Emergency air packs/respirators
- Fire departments/rescue squads
- Scuba/diving
- Hazardous waste cleanup

Components Measured	Range	Sampling Time
Carbon Monoxide	5-100 ppm	2 min.
Carbon Dioxide	100-3000 ppm	2 min.
Oil Mist (Hydrocarbon)	0.3-5 mg/m <sup>3</sup>	25 min.
Water Vapor	20-160 mg/m <sup>3</sup>	1 min.
Oxygen	2-24%	1 min.

### Principle of Operation

The Model 8014BAK system is essentially comprised of a pressure regulator, flowmeter, and a variety of detector tubes.

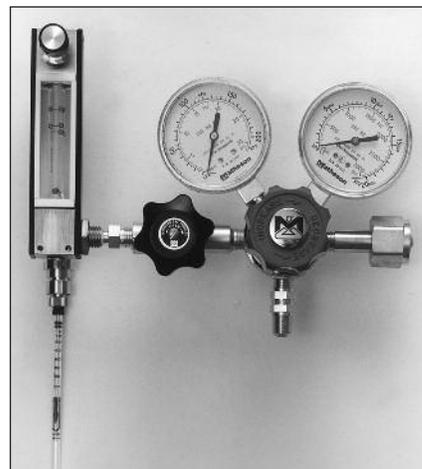
In operation, measurements are made by passing the breathing air through each detector tube at a specified flow rate, pressure, and time interval. Each detector tube is formulated with a high purity reagent which absorbs and reacts with the component being measured. This causes a colorimetric stain whose length is directly proportional to the amount of component in the breathing air. Its concentration can be read directly from the scale printed on each tube.

### Ordering Information

Model Number	Description	Price
8014BAK-01	Compressed Breathing Air Analysis Kit, complete with CGA 346 Connection, Regulator, Flowmeter, Tube Connector, Tube Tip Cutter, Timer, Wrench, and Carrying Case. No Detector Tubes Included.	\$809.34
8014BAK-02	Same as above except with 1/4 NPT Connection	\$809.34
8014BAK-03	Same as above except with CGA 347 Connection	\$919.22
8014-600SP	Carbon Monoxide Detector Tubes*	\$56.58
8014-601SP	Carbon Dioxide Detector Tubes*	\$56.58
8014-602SP	Oil Mist Hydrocarbon Detector Tubes*	\$56.58
8014-603SPA	Water Vapor Detector Tubes*	\$56.58
8014-604SP	Oxygen Detector Tubes*	\$56.58
8014-002	Replacement Rubber Tube Connector (pkg 6)	\$14.76

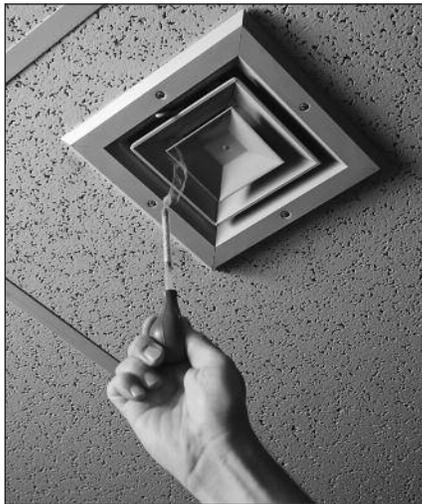
\*1 box containing 10 detector tubes

For more information, request Matheson Brochure, BR-56.





## Model 8078 Indoor Air Quality Test Kit



### What is Indoor Air Quality?

Indoor Air Quality (IAQ) is normally associated with non-industrial environments such as office buildings, schools, hotels, residences, etc. As these structures typically do not employ readily identifiable hazardous materials, the cause of a poor indoor air quality condition can be difficult to troubleshoot.

Tighter building envelopes (designed to minimize heat and air conditioning losses), and HVAC systems balanced to recirculate a greater percentage of their air and bring in less fresh air from outside, tend to concentrate air contaminants over time rather than exhaust them outside or dilute them with fresh air. The contaminants are not actually due to new sources, but are now more noticeable because of their tendency to accumulate. For example, the following contaminants existed long before the problems associated with poor indoor air quality:

Formaldehyde:	Particle board furniture and sub-flooring, foam insulation
Carbon Monoxide:	Leaky furnaces/boilers, vehicle exhaust entrainment into building
Carbon Dioxide:	Human respiration
Volatile Organic Carbons (VOC's):	Carpeting, adhesives, paints
Ozone:	Photocopiers, Laser printers
Ammonia:	Blueprint duplicators, cleaners
Trichloroethylene:	Dry cleaning residue



### Product Description

The Matheson Model 8078 is a complete kit for analyzing many parameters pertaining to indoor air quality. All of the items included are also available as standalone products and are described elsewhere in this catalog. Please refer to the pages 56 - 59 for more complete details of each item.

The heart of the Model 8078 kit is the Matheson-Kitagawa precision air sampling pump. It is used in conjunction with a variety of detector tubes. Included in the kit are tubes for measuring the concentration of formaldehyde, carbon monoxide, carbon dioxide and organic hydrocarbons. And although not included in the kit as standard, tubes are available for ammonia, ozone and a host of other gases and vapors. Qualitative tubes are also included for analysis of unknown materials. An air flow indicator kit (smoke tubes) is provided for determining ventilation patterns and efficiencies. And a 10 meter extension sampling hose is provided for remote sampling in hard to reach places. All of these products are packaged with relevant maintenance items in a convenient, extremely durable carrying case.



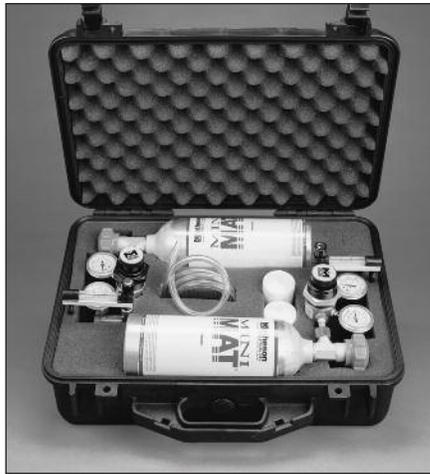
### Ordering Information

Model Number	Description	Price
8078	Indoor Air Quality Test Kit, complete with the following items:	\$1,693.30
(1) 8014-400A	Air Sampling Pump	\$341.12
(1) 8014-002	Spare Rubber Inlet Flanges (6)	\$14.76
(1) 8014-003	Maintenance Pump Lubricant	\$17.22
(5) 8014-106SB	Carbon Monoxide Tubes, 5-50 ppm	\$49.20
(7) 8014-126SC	Carbon Dioxide Tubes, 300-7000 ppm	\$48.38
(5) 8014-187S	General Hydrocarbons Tubes, 50-1400 ppm	\$48.38
(10) 8014-171SB	Formaldehyde Tubes, 1-35 ppm	\$48.38
(1) 8014-131	Qualitative Inorganic Tubes	\$56.58
(2) 8014-186B	Qualitative Organic Tubes	\$56.58
(1) 8014-300K	Air Flow Indicator Kit	\$96.76
(1) 8014-018	10m Extension Sampling Hose	\$143.50
(1) MCAS-0020-XX	Hard Shell Carrying Case	\$49.20

Prices and Specifications Subject to Change without Notice



## Model CK2000 Series Portable Calibration Kits



### Description

Matheson's Model CK2000 Series Calibration Kits are designed for use with the Matheson MiniMAT™ size 6R aluminum refillable cylinder. They are ideal for small volume gas applications such as field calibration of gas detection systems or portable instrumentation.

The CK2000 Calibration Kits primarily consist of a pressure regulator and flowmeter combination. This enables the user to adjust the calibration gas to the instrument manufacturer's pressure and flow rate specifications.

The kits utilize the Matheson Model 3571-180 pressure regulator. This miniature high purity regulator features corrosion resistant construction, compact size and lightweight materials. Two pressure gauges monitor cylinder contents and delivery pressure.

The kits also utilize the Matheson Model PM-1000 Series flowmeter. This provides optimum performance in a sturdy, lightweight acrylic meter. Two flowmeter ranges (1.6 and 3.4 SLPM) are available to give you the flexibility for low and high flow applications.

All CK2000 Calibration Kits come in a rugged watertight case made of a strong structural resin with a neoprene O-ring seal. A die cut foam insert assures safe transportation and storage of the equipment.

The MiniMAT™ is not included in the kit and needs to be purchased separately. However, there are cutouts in the foam

insert to accommodate up to two (2) MiniMAT™ cylinders per kit. They, of course, may be filled with the same or different gases/mixtures.

Several kit configurations are available to meet your particular requirements. Each CK2000 Series kit will accommodate up to two (2) regulator/flowmeter combination modules, one for each MiniMAT™ cylinder. Furthermore, there are two flowmeter ranges available making for a total of five possible kit configurations. See Ordering Information for exact kit contents. Each kit also comes with an adjustable wrench and either one or two sets of gas detection sensor cup adapters and tubing (4 feet).

### Regulator Specifications

Matheson Part No.: 3571-180  
 Regulator Series: Miniature High Purity  
 Regulator Type: Single stage  
 Maximum Inlet Pressure: 3000 psig  
 Delivery Pressure Range: 0-50 psig  
 Pressure Gauges: Cylinder contents and delivery pressure gauges  
 Flow Capacity: Cv = 0.06  
 Weight: 2 lbs (908 gm)  
 Warranty: 1 Year

### Materials of Construction

Body: 316 stainless steel  
 Diaphragm: 316 stainless steel  
 Seat: Kel-F81  
 Seal: Teflon

### Flowmeter Specifications

	Type A	Type B
Matheson Part No.:	R1-AED01-R201	R1-AED01-R202
Flow Rate:	0.1-1.6 SLPM	0.2-3.4 SLPM
Accuracy:	±10% full scale	±10% full scale
Repeatability:	±1% scale reading	±1% scale reading
Valve Resolution:	5 Turns	5 Turns
Maximum Pressure:	100 psig	100 psig
Maximum Temperature:	160° F (65° C)	160° F (65° C)
Warranty:	1 Year	1 Year

### Materials of Construction

End Blocks:	Aluminum	Aluminum
Seals:	Viton	Viton
Valve Stem:	Stainless steel	Stainless steel
Metering Tube:	Acrylic	Acrylic
Float Material:	Glass	Stainless steel

### Ordering Information

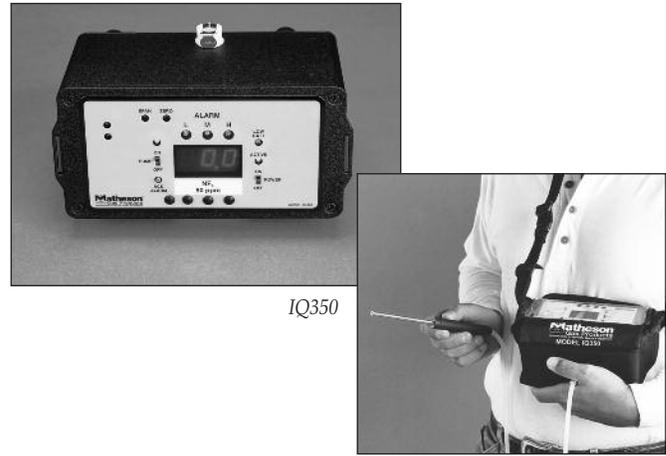
Description	Model Number CK2000-A	Model Number CK2000-B	Model Number CK2000-AA	Model Number CK2000-BB	Model Number CK2000-AB	Price
Regulator, 3561-180	1	1	2	2	2	\$296.02 ea
Flowmeter, PM-1000	1	-	2	-	1	Call for quote
Flowmeter, PM-1000	-	1	-	2	1	Call for quote
Sensor Cup Adapter, Tubing, ATH-0101	1	1	2	2	2	\$65.60
Adjustable Wrench, 8014BAK-H2 612	1	1	1	1	1	\$44.28 ea
Carrying Case with Foam Insert, CAS-0105	1	1	1	1	1	\$159.90 ea
Carrying Case can accommodate up to 2 Size 6R Cylinders (not included)						\$190.24



**Models IQ250, IQ350  
Personal Monitors**



*IQ250*



*IQ350*

If you don't see a personal monitor elsewhere in our Gas Detection & Monitor Section, we can customize one for you here.

**Description**

The Matheson Models IQ250 and IQ350 are portable single sensor gas detection instruments. By selecting one of the more than 140 gas and vapor sensors that are available, you can customize your detector to meet your personal monitoring requirements.

The IQ250 is an extremely compact and lightweight unit, utilizing diffusion sampling to monitor the air. The sensor is attached via a coiled cable providing a reach of 24 inches. The IQ350 is equipped with an internal sampling pump and wand assembly, resulting in a slightly larger device.

Both units feature a bright LED digital concentration display and three user-adjustable alarm levels (low, mid and high). An alarm acknowledgement button and low battery alarm are additional features.

The IQ250 and IQ350 are powered by alkaline batteries (although NiCads may be substituted), and come in a protective carrying case with detachable shoulder strap.

**Specifications**

Detection Principle:	Solid-state
Sampling Method:	IQ250: Diffusion IQ350: Built-in sampling pump
Power:	IQ250: 4 AA alkaline batteries IQ350: 4 C alkaline batteries
Operating Time:	IQ250: 14 hours (8 hrs NiCad) IQ350: 20 hours (12 hrs NiCad)
Temperature:	4° F to 122° F (-20° C to 50° C)
Humidity:	0-99% RH, non-condensing
Display:	3 digit LED
Alarms:	3 user-adjustable setpoints (low, mid, high) with LED's and buzzer LED and continuous buzzer
Low Battery Alarm:	Buzzer and active LED extinguishes
Fault Alarm:	Active (power) LED
Indicators:	Low, mid, high alarm LED's Low battery LED Pump LED (IQ350 only)
Dimensions:	IQ250: 6.25"L x 3"W x 2.2"H (159mm x 76mm x 56mm) IQ350: 7.13"L x 3.4"W x 4."H (181mm x 86mm x 102mm)
Weight (incl. batteries):	IQ250: 22 oz. (625g) IQ350: 40 oz. (1135g)
Warranty:	1 year

**Ordering Information**

Model Number	Description	Price
IQ250-01	Portable Single-Gas Detector with Diffusion Based Sensor, Alkaline Batteries and Carrying Case with Detachable Shoulder Strap. LEL Range Sensor. Specify Gas from Table.	\$828.20
IQ250-02	Same as IQ250-01 except with ppm Range Sensor. Specify Gas and Range from Table.	\$1,571.12
IQ350-01	Portable Single-Gas Detector with Integral Pump and Sampling Wand, Alkaline Batteries and Carrying Case with Detachable Shoulder Strap. LEL Range Sensor. Specify Gas from Table.	\$964.32
IQ350-02	Same as IQ350-01 except with ppm Range Sensor. Specify Gas and Range from Table.	\$1,695.76
IQ250-04	Optional size AA NiCad Batteries for IQ250	\$44.28
IQ250-05	Optional (UL App) Battery Charger for IQ250	\$79.54
IQ350-04	Optional Size C NiCad Batteries for IQ350	\$111.52
IQ350-05	Optional (UL App) Battery Charger for IQ350	\$79.54

*Prices and Specifications Subject to Change without Notice*



**Listing of Solid State Sensor Gases and Ranges  
Available for Models IQ250, IQ350, IQ1000**

Gas or Vapor	Full Scale Ranges
Acetic Acid	100, 200 ppm
Acetone	100, 200, 500, 1000, 5000 ppm, % LEL
Acetonitrile	100 ppm
Acetylene	50 ppm, % LEL, 3% Vol
Acrolein Acrylaldehyde	50 ppm
Acrylic Acid	100 ppm
Acrylonitrile	50, 60, 80, 100, 200, 500 ppm and % LEL
Allyl Alcohol	% LEL
Allyl Chloride	200 ppm
Ammonia	50, 75, 100, 200, 500, 1000, 2000, 5000 ppm, 1%, 2%, 10% by Volume, 10%, 25%, 100% LEL
Anisole	100 ppm
Arsenic Pentafluoride	5 ppm
Arsine	1, 10 ppm
Benzene	50, 75, 100, 1000 ppm, 100% LEL
Biphenyl	100% LEL
Boron Trichloride	500 ppm
Boron Trifluoride	500 ppm
Bromine	20 ppm
Butadiene	50, 100, 3000 ppm, % LEL
Butane	400, 1000 ppm, 100% LEL
Butanol	1000 ppm, % LEL
Butene	100% LEL
Butyl Acetate	100 ppm, % LEL
Carbon Disulfide	50, 60, 100 ppm, 5% Vol
Carbon Monoxide	50, 100, 200, 500, 1000, 3000, 5000 ppm, 3%, 5% by Vol, % LEL
Carbon Tetrachloride	50, 100, 1000 ppm
Cellosolve Acetate	100 ppm
Chlorine	10, 20, 50, 100, 200 ppm
Chlorine Dioxide	10, 20 ppm
Chlorobutadiene	100% LEL
Chloroethanol	200 ppm
Chloroform	50, 100, 200 ppm
Chlorotrifluoroethylene	100% LEL
Cumene	100% LEL
Cyanogen Chloride	20 ppm
Cyclohexane	100 ppm, % LEL
Cyclopentane	50 ppm
Deuterium	50%, 100% LEL
Diborane	10, 50 ppm
Dibromoethane	50 ppm
Dibutylamine	100% LEL
Dichlorobutene	1% by Volume
Dichloroethane (EDC)	50, 100 ppm, % LEL
Dichlorofluoroethane	100, 1000 ppm
Dichloropentadiene	50 ppm
Dichlorosilane	50, 100, 200, 500 ppm
Diesel Fuel	50 ppm, % LEL
Diethyl Benzene	100% LEL
Diethyl Sulfide	10 ppm
Difluorochloroethane	100% LEL
Difluoroethane (152A)	100% LEL
Dimethyl Ether	100% LEL
Dimethylamine (DMA)	30, 50 ppm
Disilane	50 ppm
Epichlorohydrin	50, 100, 500, 1000 ppm
Ethane	1000 ppm

Gas or Vapor	Full Scale Ranges
Ethanol	200, 1000, 2000 ppm, 100% LEL
Ethyl Acetate	200, 1000 ppm, % LEL
Ethyl Benzene	200ppm, % LEL
Ethyl Chloride	100 ppm, % LEL
Ethyl Chlorocarbonate	1% by Volume
Ethyl Ether	100, 1000 ppm, % LEL
Ethylene	100, 1000, ppm, % LEL
Ethylene Oxide	5, 10, 20, 30, 50, 75, 100, 200, 300, 1000, 1500, 2000, 3000 ppm, % LEL
Fluorine	20, 100 ppm
Formaldehyde	15, 50, 100, 500, 1000 ppm
Freon 11	1000, 2000, 5000 ppm
Freon 12	1000, 2000, 3000 ppm
Freon 22	100, 200, 500, 1000, 2000 ppm
Freon 113 (TF)	100, 200, 500, 1000, 2000 ppm, 1% by Vol
Freon 114	1000, 2000, 20000 ppm
Freon 1113	1000 ppm
Fuel Oil (Kerosene)	100% LEL
Gasoline	100, 1000, 2000, 20000 ppm, % LEL
Germane	10, 50 ppm
Heptane	1000 ppm, % LEL
Hexane	50, 100, 200, 2000, 2500, 3000 ppm, % LEL
Hexene	100% LEL
Hydrazine	5, 10, 20, 100, 1000 ppm, 1% by Volume
Hydrogen	50, 100, 200, 500, 1000, 2000, 5000 ppm, 3%, 5% by Volume, 2% to 100% LEL
Hydrogen Bromide	50 ppm
Hydrogen Chloride	50, 100, 200, 400, 500, 1000 ppm
Hydrogen Cyanide	20, 30, 50, 100, 200, 1000, 10000 ppm
Hydrogen Fluoride	20, 50, 100, 200 ppm
Hydrogen Sulfide	5, 10, 20, 30, 50, 100, 300, 1000 ppm, % LEL
Isobutane	1000, 3000 ppm, % LEL
Isobutylene	100% LEL
Isopentane	1000 ppm
Isoprene	100% LEL
Isopropanol	200, 500, 1000 ppm, % LEL
JP 4	1000 ppm, % LEL
JP5	1000, 5000 ppm, % LEL
Kerosene	300, 500 ppm, % LEL
Methane	100, 200, 1000, 1500, 2000, 5000 ppm, 1%, 2% by Vol, % LEL
Methanol	200, 500, 1000, 2000, 5000 ppm, 15%, 100% LEL
Methyl Acetate	30 ppm
Methyl Acrylate	60 ppm
Methyl Bromide	20, 50, 60, 100, 500, 1000, 10000, 40000 ppm
Methyl Butanol	100% LEL
Methyl Cellosolve	100% LEL

Gas or Vapor	Full Scale Ranges
Methyl Chloride	100, 200, 300, 2000, 10000 ppm, % LEL
Methyl Ethyl Ketone	100, 500, 1000, 4000 ppm, 100% LEL
Methyl Hydrazine	5 ppm
Methyl Isobutyl Ketone	200, 500, 2000 ppm, 50%, 100% LEL
Methyl Mercaptan	30 ppm
Methyl Methacrylate	100ppm, % LEL
Methyl-Tert Butyl Ether	100% LEL
Methylene Chloride	20, 100, 200, 300, 400, 500, 600, 1000, 2000, 3000, 5000 ppm, % LEL
Mineral Spirits	200, 3000 ppm, % LEL
Monochlorobenzene	100% LEL
Monoethylamine	30, 100, 1000 ppm
Morpholine	500 ppm
Naphtha	1000 ppm, 100% LEL
Natural Gas	1000, 2000 ppm, 2%, 4% VOL, 100% LEL
Nitric Oxide	20, 50 ppm
Nitrogen Dioxide	20, 50, 100 ppm
Nitrogen Trifluoride	50, 500, 1000 ppm
Nonane	2000 ppm
Pentane	200, 1000 ppm, % LEL
Perchloroethylene	200, 1000, 2000, 20000 ppm
Phenol	100 ppm
Phosgene	50 ppm
Phosphine	3, 5, 10, 20, 30, 50 ppm
Phosphorus Oxychloride	200 ppm
Phosphorus Pentafluoride	5ppm
Picoline	100% LEL
Propane	100, 1000 ppm, % LEL
Propylene	100, 200, 1000, 5000 ppm and % LEL
Propylene Oxide	100 ppm, % LEL
Silane	10, 20, 50 ppm
Silicon Tetrachloride	1000 ppm
Silicon Tetrafluoride	1000 ppm
Styrene	200, 300 ppm, % LEL
Sulfur Dioxide	50, 100 ppm
TEOS	50, 100 ppm
Tetrahydrofuran	200, 300, 1000 ppm, 100% LEL
Tetraline	100 ppm
Toluene	50, 100, 200, 500, 2000, 5000 ppm and % LEL
Toluene Diisocyanate	15 ppm
Trichloroethane	50, 100, 500, 1000 ppm, 1% by Volume
Trichloroethylene	50, 100, 200, 300, 500, 1000, 2000 ppm, % LEL
Triethylamine	100 ppm
Trifluoroethanol	25, 100 ppm
Trimethylamine (TMA)	50 ppm
Tungsten Hexafluoride	50 ppm
Turpentine	100% LEL
Vinyl Acetate	1000 ppm, %LEL
Vinyl Chloride	20, 50, 100, 500, 1000, 10000 ppm, % LEL
Vinylidene Chloride	50 ppm
Xylene	100, 200, 300, 1000 ppm, 1% by Volume

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**Model IQ1000  
MEGA-CHANNEL Gas Detector**



**Description**

The Matheson Model IQ1000 is a very unique gas detection instrument offering features not found in any other portable multi-channel monitor. Its innovative technology gives you the flexibility to monitor for more than 100 gases and vapors, without having to change sensors.

While the IQ1000 is a 1-4 channel instrument that can accommodate several types of sensors, units equipped with the MEGA-Gas sensor offer an exclusive "Gas Search" feature. This innovation enables the IQ1000 to scan the air to quickly determine if any of more than 100 gases or vapors are present. Additionally, ordering the IQ1000-14 provides a calibration curve for specific gases so the MEGA-Gas sensor can be set to monitor for a particular gas or vapor.

The IQ1000 is an intelligent, microprocessor based instrument that is operated through easy to follow menu driven controls. The viewing screen is a large 8 line, 40 character per line LCD supertwist display, with backlight switch and display contrast adjustment for easy viewing in any lighting condition.

The IQ1000 furnishes three user-adjustable alarm setpoints (low, mid, high) for each sensor, with both audible and visual alarm indicators. An alarm acknowledgement function silences the audible alarm while keeping the visual alarm active as long as the alarm condition exists.

An optional data logging feature stores months of readings for all four sensors, which can easily be downloaded to a printer or computer at a later date using its RS 232 serial interface. The IQ1000's optional data management software allows you to plot accumulated data and calculate time weighted averages. Data can also be exported to your favorite spreadsheet.

The IQ1000 will operate approximately 20 hours on its standard six size D alkaline batteries, or 14 hours on optional rechargeable NiCad batteries. The amount of battery power remaining is monitored on the LCD display.

Other features include touch of a button calibration, a built-in sampling pump with sampling wand, and weatherproof case. The IQ1000 also has UL Intrinsic Safety Approval for use in Class 1, Division 1, Group B, C, D.

**Sensor Technologies**

The IQ1000 can accommodate several kinds of sensor technologies. Which ones to select depends upon your application requirements.

The revolutionary MEGA-Gas Sensor is a specially developed solid state sensor capable of detecting over 100 gases and vapors. While it cannot readily differentiate between these gases, the MEGA-Gas sensor does enable you to perform a "Gas Search" of the air, as described above. In addition, because the IQ1000 is microprocessor controlled with 256K memory, it contains a complete library of the setup and calibration parameters for all 100+ gases that the MEGA-Gas sensor can detect. At the touch of a button, you can configure the instrument to monitor specifically for any one of these gases, and can then switch gases as frequently as you like without changing any sensors. See the table on the facing page for the MEGA-Gas sensor gas list.

Any of the more than 140 gas specific Solid State Sensors can be selected to provide more selective gas detection than the MEGA-Gas solid state sensor. (See the preceding page for a complete listing of available solid state sensors.)

Electrochemical Sensors, a popular sensor used in many gas detection instruments, can also be accommodated by the IQ1000. Choose from 11 available gases and vapors (ranges in ppm):

Ammonia (0-50, 0-100)	Hydrogen Sulfide (0-20, 0-50)
Carbon Monoxide (0-50, 0-100)	Nitric Oxide (0-50)
Chlorine (0-5, 0-10)	Nitrogen Dioxide (0-10)
Hydrogen (0-500)	Oxygen (0-25%)
Hydrogen Chloride (0-25)	Sulfur Dioxide (0-10, 0-20)
Hydrogen Cyanide (0-25)	

For combustibles, a Catalytic Bead Sensor is available to detect for LEL levels of most combustible gases and vapors.

While there are hundreds of sensor combinations, keep the following guidelines in mind when customizing your Model IQ1000 detector: Channels 1 and 2 can be equipped with any of the four sensor types listed; Channels 3 and 4 can only be equipped with electrochemical sensors.





**Model IQ1000**  
**MEGA-CHANNEL Gas Detector (continued)**

**MEGA-GAS Sensor Gas List** (gases with an \* have a 100% LEL range)

Gas	PPM Range(s)	Gas	PPM Range(s)	Gas	PPM Range(s)	Gas	PPM Range(s)
Acetic Acid	1000	Cyanogen Chloride	100	*Hexane	1000	Monoethylamine	500
Acetic Aldehyde	1000	*Cyclohexane	1000	Hexene	1000	*Naphtha	500
Acetone	1000	Cyclohexanol	2000	Hydrogen	500	Nonane	2000
Acetonitrile	200, 1000	Cyclopentane	1000	Hydrogen Bromide	100	*Pentane	1000
*Acetylene	1000	Diborane	10	Hydrogen Chloride	200	Pentanol	1000
Acrolein	50, 200	Dibromomethane	100	Hydrogen Cyanide	100	Pentene	1000
Acrylonitrile	1000	Dichlorobutane	1000	Hydrogen Sulfide	50	Phosphine	10
Allyl Methacrylate	1000	Dichloroethane	500	Isobutane	1000	*Propane	1000
Ammonia	200, 500	Dichlorosilane	100	Isobutanol	1000	*Propanol	500
Anisole	4000	Diesel Fuel	2000	*Isobutylene	1000	*Propylene	1000
Arsine	10	Diethyl Benzene	2000	*Isopropanol	1000	Propylene Oxide	100, 1000
Benzene	100	Epichlorohydrin	100	JP-4	2000	Silane	50
Boron Trichloride	1000	*Ethane	1000	JP-5	2000	*Styrene	100% LEL
Boron Trifluoride	2000	*Ethanol	1000	*Methane	1000	Sulfur Dioxide	50
Butadiene	100	*Ethyl Acetate	500	*Methanol	500	Tetrahydrofuran	200, 1000
*Butane	1000	*Ethyl Benzene	1000	Methyl Acrylate	500	Toluene	200
*Butanol	2000	Ethyl Chloride	100	Methyl Bromide	50	Trichloroethane	100
*Butene	1000	*Ethyl Ether	500	Methyl Butanol	2000	Trichloroethylene	500
Butyl Acetate	1000	*Ethylene	1000	Methyl Chloride	100, 1000	Triethylamine	200
Carbon Disulfide	50, 1000	Ethylene Oxide	50	*Methyl Ethyl Ketone	100	Trifluoroethanol	1000
Carbon Monoxide	500	Formaldehyde	100	Methyl Isobutyl Carbinol	2000	Trimethylamine	500
Carbon Tetrachloride	1000	Formic Acid	2000	Methyl Isobutyl Ketone	1000	Vinyl Acetate	50
Carbonyl Sulfide	100	Freon 22	1000	Methyl Mercaptan	50	Vinyl Chloride	50
Cellosolve Acetate	2000	Freon 502	1000	*Methyl Methacrylate	500	Xylene	1000
Chloroform	200	Gasoline	1000	Methylene Chloride	100, 500		

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**Specifications**

Power:	6 size D alkaline batteries standard, Optional rechargeable NiCad system
Operating Time:	20 hours on alkaline batteries, 14 hours on NiCad battery
Sampling:	Built-in sample pump with sampling wand draws up to 1000 cc/ min
Controls:	Touch button. Optional magnetic switches
Display:	Backlit LCD supertwist with contrast adjustment. 8 lines, 40 characters per line.
External Interface:	With optional data logging feature, RS-232 using a DB-9 connector (1200-38400 baud)
Temperature:	32° F to 122° F (0° C to 50° C) operating 4° F to 140° F (-20° C to 60° C) storage
Humidity:	0-95% RH non-condensing
Size:	9.0"L x 4.5"W x 5.4"H (229mm x 114mm x 137mm)
Weight:	6 lbs (2.7kg) including batteries
Approvals:	UL Intrinsic Safety Approval for Class 1, Division 1, Group B, C, D locations
Warranty:	1 Year

**Ordering Information**

Model Number	Description	Price
<b>IQ1000-01</b>	Mega-Channel Gas Detector with One Sensor	\$4,449.32
<b>IQ1000-02</b>	Mega-Channel Gas Detector with Two Sensors	\$5,164.36
<b>IQ1000-03</b>	Mega-Channel Gas Detector with Three Sensors	\$5,882.68
<b>IQ1000-04</b>	Mega-Channel Gas Detector with Four Sensors	\$6,605.92
<b>IQ1000-11</b>	Optional Rechargeable NiCad Battery System	\$687.16
<b>IQ1000-12</b>	Optional Data Logging System	\$714.22
<b>IQ1000-13</b>	Optional Data Management Software	\$506.76
<b>IQ1000-14</b>	Optional Special Gas Calibration. Order for each gas desired.	\$53.30

Prices and Specifications Subject to Change without Notice



## Model 8057A General Purpose Gas Detector



### Description

The Model 8057A General Purpose Gas Detector effectively monitors the workplace air for potentially dangerous gas leaks from tubing, equipment, containers, reaction vessels, cylinder valves, and pressurized systems. The Threshold Limit Value (TLV) for most gases can be detected.

Weighing only 14 ounces (400 gms), this truly portable and personal detector can be conveniently worn on a belt or over the shoulder with its carrying strap.

The unit continuously samples the air for hazardous gases and vapors. It sounds an audible alarm and flashes an LED lamp when a potentially dangerous concentration of gas is detected. Headphones are provided for use in noisy environments. The entire unit is protected in a leather outer case and comes with shoulder strap and belt loop. Each unit is factory calibrated for maximum sensitivity. Rechargeable NiCad batteries (with charger) are standard.

The Model 8057A uses a solid state/thermal conductivity sensor with a semiconductor platinum filament. The new sensor design allows low concentrations of gases to be detected.

The Model 8057A sensor design is sensitive to a wide variety of gases and vapors. This design, in combination with the alarm set wheel, allows you to minimize interferences from ambient background vapors.

### Design Features

- Small, portable unit weighs only 14 oz. (400 gms).
- Detects gas leaks at ppm and sub-ppm levels.
- Audible alarm and flashing LED alerts wearer of potentially dangerous gas levels.
- Easily worn on the belt or over shoulder.
- Probe allows unit to be used as point source leak detector for tubing, fittings, valves, containers, etc.
- Rechargeable NiCad batteries (supplied with charger) give long operating life



### Gas Detected - Partial List of Detectable Gases/Vapors

Acetone . . . . .	.10 cc/min.	Hydrogen Chloride . . . . .	.1 ppm
Ammonia . . . . .	.5 ppm	Hydrogen Selenide . . . . .	.05 ppm
Arsine . . . . .	.03 ppm	Hydrogen Sulfide . . . . .	.1 ppm
Benzene . . . . .	.10 cc/min.	Isopropyl Alcohol . . . . .	.10 cc/min.
Carbon Monoxide . . . . .	.1 ppm	Methane . . . . .	.1 cc/min.
Chlorine . . . . .	.7 ppm	Methyl Alcohol . . . . .	.10 cc/min.
Diborane . . . . .	.015 ppm	Methyl Bromide . . . . .	.40 ppm
Dichloroethane . . . . .	.10 cc/min.	Methyl Chloride . . . . .	.50 ppm
Ethanol . . . . .	.10 cc/min.	Methyl Ethyl Ketone . . . . .	.10 cc/min.
Ethylene . . . . .	.1 cc/min.	Phosphine . . . . .	.013 ppm
Ethylene Oxide . . . . .	.350 ppm	Propane . . . . .	.1 cc/min.
Formaldehyde . . . . .	.10 cc/min.	Silane . . . . .	.03 ppm
Freon 12 . . . . .	.1 cc/min.	Sulfur Dioxide . . . . .	.1 ppm
Germane . . . . .	.2 ppm.	Toluene . . . . .	.10 cc/min.
Hexane . . . . .	.10 cc/min.	Trichloroethylene . . . . .	.10 cc/min.
Hydrogen . . . . .	.5 ppm	Vinyl Chloride . . . . .	.10 ppm
Hydrogen Bromide . . . . .	.1 ppm	Xylene . . . . .	.10 cc/min.



## Model 8057A General Purpose Gas Detector (continued)

### Applications

The Model 8057A functions as a personal gas leak detector for production, QC, maintenance, and engineering personnel in a wide variety of process and laboratory locations and environments. Personnel no longer need be within the "sphere of influence" of a large multipoint gas detection system. They can now take their personal gas leak detectors with them, on site where needed.

Since personal protection is only as good as the sampling procedure used, different areas should be checked for gas leaks that could lead to potential worker exposure.

### Leak Detection

The Model 8057A also functions as a point source leak detector for process and instrumentation gases. With the accessory probe attached, it can give an early warning indication of small leaks in cylinder or piping connections, or other gas handling hardware before they become large, potentially dangerous leaks. A comprehensive floor-to-ceiling scan procedure should be used for maximum effectiveness in leak detection. The 8057A functions much as a Geiger counter does. Close to a gas leak, it beeps with increased frequency to alert the user.

### Gas Cabinet Cylinder Changeover

The Model 8057A has applications in leak detection of valves, fittings, purge assemblies and other hardware during cylinder changes in gas cabinets.

### Process Vessels and Enclosures

The Model 8057A can be used to detect leaks from process vessels, storage tanks, reaction vessels, and associated piping. It is good practice to periodically check process and associated equipment and materials for leakage before serious, potentially dangerous leaks have developed.

### Remote Enclosed Areas/Ductwork Leak Detection

It is also good practice to check the workplace air in remote and/or enclosed unmonitored areas before workers enter them.

The same holds for large ductwork and ventilation systems that, during shutdown for maintenance and engineering work, can contain trapped pockets of hazardous gases. The Model 8057A can be used to sample these and other areas for leaks of potentially hazardous gases to help ensure a safe environment both before and during work tasks. Proper oxygen concentration should also be determined in remote or enclosed areas before workers enter.

### Cylinder Storage Areas

It is also good practice to screen incoming gas cylinders (both on receipt and return shipments) for possible leakage around cylinder valves. The Model 8057A with probe simplifies this process because of its small size and weight. The probe can be inserted into the slots in the cylinder cap for fast leak detection.

Because gas leaks can stratify, a comprehensive floor-to-ceiling scan procedure should be used to detect accumulations of potentially hazardous gas leaks in cylinder storage areas.

### Specifications

Detection Principle:	Solid state/thermal conductivity sensor with low power drain: automatic and continuous sampling
Detection Time:	5-10 seconds depending on gas, concentration, and sensitivity setting
Detection Indication:	Intermittent buzzer and LED lamp.
Power Source:	Size "AA" rechargeable NiCad batteries (4), continuous operating time approx. 3 hrs. with full charge (charger included)
Recharging Time:	14 hours from a fully discharged state
Operating Temperature:	32° F - 104° F (0° C - 40° C)
Size:	2.7" W x 6.1" H x 1.2" D (68mm x 155 mm x 32mm)
Weight:	14 oz (397gm)
Warranty	1 Year

### Ordering Information

Model Number	Description	Price
8057A	General Purpose Gas Detector, Complete with Detector Unit, 110 VAC Battery Charger, Four NiCad Batteries, Earphone, Filter Housing with Filter Element, Check Gas Vial, Sampling Probe and Leather Case.	\$2,045.90
8057-01	Pump Assembly (replacement)	\$902.00
8057-02	Sensor Assembly (replacement)	\$956.12
8057-03	Frame Assembly (replacement)	\$145.14
8057-04	Filter (pkg 10) (replacement)	\$33.62
8057-05	Printed Circuit Board (replacement)	\$1,066.00
8057-06	Check Gas Vial (replacement)	\$151.70
8057-08	Replacement 110 VAC Charger	\$56.58
8057-09	Replacement 220 VAC Charger	\$83.64
8057-10	Viton Probe Tip (replacement)	\$53.30
8057-11	Battery Door (replacement)	\$14.76



## Model 8081A Toxic Gas Leak Detector



### Description

Matheson's PortaSens Series of detectors provide compound specific leak detection of a wide variety of toxic gases and chemicals. Choose from twenty-three available sensors to suit your particular application. Each is optimized to provide maximum sensitivity with minimum interference from other gases.

A unique feature of the PortaSens detector is its ability to measure a variety of different gases by simply inserting the appropriate sensor for that gas. This means that one detector can be used to measure 23 different gases or vapors, reducing the need to purchase individual detectors for each type of gas. And sensors can be changed quickly and easily, without the need for calibration when a sensor change is made.

Sensors used in the PortaSens are our newest miniaturized smart sensor modules. Each sensor module is actually a sensor, amplifier, and memory module in one compact package. Because of this design, sensor modules can be calibrated independently and simply plugged into any detector, calibration data is loaded into the microprocessor so that no adjustments are needed. The result is that a detector can, for example, go from phosgene measurement to ammonia measurement in less than one minute.

The PortaSens is extremely useful for locating gas leakage from process piping, tubing, pumps, valves, storage cylinders or any other vessel containing toxic gas. It will also accurately measure ambient concentrations in confined spaces or open areas. The detachable sample inlet extension wand allows samples to be drawn from the precise spot being tested. A durable, waterproof casing protects the detector from harsh environments.

An internal miniature pump, which delivers a positive and constant sample flow, provides a sampling advantage over slower diffusion based units. A compact sensing manifold further enhances rapid response times.

A backlit LCD provides a clear, easy-to-read gas concentration readout in any ambient lighting condition. Three user-adjustable alarms give visual and audible indications of alarm conditions. Low flow and low battery alarms are also provided.

Computer interface is a standard feature of the PortaSens. An RS-232 output allows stored data to be downloaded to a PC through an interface cable supplied with the unit. Software is provided to allow simple data transfer.

Each PortaSens Toxic Gas Leak Detector is supplied in its own padded storage case. Also included in the case are an alkaline battery, a NiCad battery, battery charger, a detachable sampling extension wand and a wall mounting bracket for those applications requiring the detector to be close at hand and ready for use.

### Specifications

Range:	Dependent on sensor module used
Display:	Back-lit graphics liquid crystal display
Accuracy:	Sensor dependent but generally $\pm 5\%$ of value (limited by cal. gas)
Sensitivity:	1% of sensor module range
Outputs:	RS-232 output of stored gas values 0-1 VDC analog (requires optional output cable)
Memory:	12,000 data points
Storage Interval:	Programmable from 1 minute to 60 minutes
Typical Capacity:	8 days at 1 minute storage interval
Alarms:	Three concentration alarms (caution, warning, and alarm with adjustable setpoints) Low flow and low battery alarms Alarms displayed on LCD & indicated by audible beeper
Power:	D cell battery. Alkaline recommended, 75 hours operation Internal rechargeable Nicad for backup power, 6 hours operation 120 or 220 VAC chargers available
Operating Temp.:	-25° C to +55° C
Humidity:	0-95% Non-condensing
Detector Material:	Glass Filled Polycarbonate
Size:	3.5"(W) x 9"(H) x 5.5"(D) 89 mm x 229 mm x 140 mm
Shipping Weight:	7 lbs. (3.2 kg)



Model 8081 in Carrying Case



## Model 8081A

### Toxic Gas Leak Detector (continued)

#### Ordering Information

Gas	Range	Detector Unit with Sensor	Price	Sensor Only	Price
Ammonia	0-200 ppm	8081A-15	\$1,831.88	MSEN-3610-15	\$478.88
Arsine	0-1000 ppb	8081A-28	\$2,029.50	MSEN-3624-28	\$682.24
Bromine	0-2 ppm	8081A-10	\$1,766.28	MSEN-3600-10	\$407.54
Carbon Monoxide	0-200 ppm	8081A-16	\$1,705.60	MSEN-3612-16	\$341.12
Chlorine	0-20 ppm	8081A-11	\$1,766.28	MSEN-3603-11	\$407.54
Chlorine Dioxide	0-2 ppm	8081A-12	\$1,766.28	MSEN-3604-12	\$407.54
Diborane	0-1000 ppb	8081A-29	\$2,029.50	MSEN-3626-29	\$682.24
Fluorine	0-2 ppm	8081A-13	\$1,766.28	MSEN-3606-13	\$407.54
Germane	0-1000 ppb	8081A-30	\$2,029.50	MSEN-3628-30	\$682.24
Hydrogen	0-2000 ppm	8081A-18	\$1,831.88	MSEN-3641-18	\$478.88
Hydrogen Chloride	0-20 ppm	8081A-21	\$1,831.88	MSEN-3617-21	\$478.88
Hydrogen Cyanide	0-20 ppm	8081A-22	\$1,831.88	MSEN-3618-22	\$478.88
Hydrogen Fluoride	0-20 ppm	8081A-23	\$1,831.88	MSEN-3619-23	\$478.88
Hydrogen Selenide	0-1000 ppb	8081A-31	\$2,029.50	MSEN-3630-31	\$682.24
Hydrogen Sulfide	0-50 ppm	8081A-24	\$1,766.28	MSEN-3620-24	\$407.54
Nitric Oxide	0-200 ppm	8081A-25	\$1,766.28	MSEN-3621-25	\$407.54
Nitrogen Dioxide	0-20 ppm	8081A-26	\$1,766.28	MSEN-3622-26	\$407.54
Oxygen	0-25 %	8081A-19	\$1,705.60	MSEN-3614-19	\$341.12
Ozone	0-2 ppm	8081A-14	\$1,766.82	MSEN-3608-14	\$407.54
Phosgene	0-2 ppm	8081A-20	\$1,968.82	MSEN-3615-20	\$610.90
Phosphine	0-1000 ppb	8081A-32	\$2,029.50	MSEN-3632-32	\$682.24
Silane	0-10 ppm	8081A-33	\$2,029.50	MSEN-3635-33	\$682.24
Sulfur Dioxide	0-20 ppm	8081A-27	\$1,766.28	MSEN-3623-27	\$407.54

Note: Model 8081A provides 120 VAC charger. For 220 VAC charger, substitute 8082A



## Model 8066 LeakHunter Plus™



### Description

The Matheson Model 8066 is a truly universal leak detector. Extensive R&D efforts have resulted in a multi-functional leak detector specially engineered to perform superbly in both portable and benchtop applications. It is designed to both locate and measure a wide variety of gas leaks quickly, precisely and cleanly.

The LeakHunter Plus™ is so universal that it replaces three previous Matheson models by combining the best features of the Model 8065 Leak Hunter, the Model 8067 Quantitative Leak Detector and the Model 8017 Benchtop Leak Detector. Moreover, its advanced electronic design improves upon these products by producing more sensitive, more stable and more accurate readings.

As a portable detector, the 8066 offers the convenience and flexibility of either one or two handed operation. The probe easily attaches to the body of the instrument giving you a free hand. Or, simply detach the flex-and-stay probe to gain access to even the most difficult to reach places. Even pinpoint leaks in areas where several connections are grouped together. The flex-and-stay probe allows you to bend the probe to sniff around obstacles. An extension flex-and-stay probe is also included to extend your reach. The rechargeable NiCad batteries (included with charger) provide four hours of portable operation.

As a benchtop detector, the 8066's detachable probe allows you to position the body of the unit on the bench and perform leak detection procedures with just the probe in hand. The body's no-slip feet and a built-in incline stand make for a stable setup and easy viewing. The 8066's power adapter enables continuous AC operation; there's no need to periodically recharge the batteries.

The LeakHunter Plus™ can be used to simply locate leaks so they can be corrected, or it can be used to also measure how big they are. The following features make it an excellent quantitative leak detector:

- Calibration data for thirteen gases is stored in memory. At the touch of a button, the appropriate calibration data is selected depending upon the target gas to be detected.
- Leak rates are displayed in a large LCD readout. The user easily switches between units of cc/sec, cc/min, ft<sup>3</sup>/min or ppm.
- A peak hold function records and displays the maximum leak rate encountered as the probe passes through the suspect leak area.
- Built-in autoranging automatically adjusts the instrument's sensitivity to the leak rate.

The 8066 is highly sensitive and able to locate leaks too small to bubble with a soap solution. And as the detector cell is located in the probe itself, it exhibits excellent response and recovery times. Great attention has also been paid to ergonomics and durability, and the 8066's controls have been kept simple so it can be operated with little or no training.

### Applications

- **In the Laboratory:** Instruments such as chromatographs and GC/MS, reaction vessels, sampling cylinders, research apparatus, manifolds, regulators, and valves.
- **In the Plant:** Pressurized containers and storage vessels, piping, process and gas transfer lines, pilot plant reactions, tracer studies, refrigeration systems.
- **On Production Lines:** Quality assurance procedures in manufacturing, welds, seals and connectors, valves, waterproof enclosures, refrigeration and air conditioning units and military equipment.
- **In the Hospital:** Medical gas systems and piping, fittings and apparatus.
- **In the Field:** Tracer studies, helium and CO<sub>2</sub> pipelines, refrigeration lines.
- **Environmental Compliance:** Fugitive emissions.

**CAUTION.** The 8066 is not designed as intrinsically safe and should not be used to detect leaks of combustible gases which may exceed their lower explosive limit (LEL).





## Model 8066

### LeakHunter Plus™ (continued)

#### Gases Detected

The LeakHunter Plus™ will detect any gas that has a thermal conductivity that differs from that of the ambient air on which it was zeroed. The larger the difference, the greater the sensitivity. As the instrument will normally be zeroed in ambient air comprised mostly of nitrogen and oxygen, the 8066 will not be very sensitive to leaks of these gases. A gas may have a higher or lower thermal conductivity than air and thus produce a positive or negative reading on the display.

The LeakHunter Plus™ groups gases with similar thermal conductivities into one of four Gas Groups. Each of the Groups has a calibration curve stored in memory. While the 8066 will detect any gas with a thermal conductivity different from air, the thirteen gases in the table below have been tested for sensitivity and assigned to a particular Gas Group.



#### Minimum Detectable Leak Concentration

Group	Gas	Pos/neg	cc/sec	cc/min	ft <sup>3</sup> /min	ppm
1	Hydrogen	+	8.10E-06	4.9E-04	1.7E-08	1.3E+02
	Helium	+	1.00E-05	6.0E-04	2.1E-08	1.6E+02
	Sulfur Hexafluoride	+	1.0E-04	6.4E-03	2.2E-07	1.8E+03
2	Neon	+	5.80E-05	3.5E-03	1.2E-07	9.3E+02
	Xenon	-	5.81E-05	3.5E-03	1.2E-07	9.3E+02
3	R11	-	6.84E-05	4.1E-03	1.5E-07	1.0E+03
	R12	-	7.90E-05	4.7E-03	1.7E-07	1.3E+03
	R21	-	7.98E-05	4.8E-03	1.7E-07	1.3E+03
	R22	-	9.46E-05	5.7E-03	2.0E-07	1.5E+03
4	Methane	+	1.06E-04	6.4E-03	2.2E-07	1.8E+03
	Argon	-	1.37E-04	8.2E-03	2.9E+07	2.2E+03
	CO <sub>2</sub>	-	1.53E-04	9.2E-03	3.2E-07	2.4E+03
	Water Vapor	-	1.75E-04	1.1E-02	3.7E-07	2.8E+03

Note: e.g.: 1.00E-05 = 1 x 10<sup>-5</sup>

#### Specifications

Detection Principle:	Dual cell micro volume thermal conductivity
Power:	1 x size 9V NiCad battery. (Alkaline battery, not included, may be substituted)
Charger/Adapter:	115V: Combination charger/AC adapter 220V: Charger only
Operating Time:	4 hours NiCad; 9 hours alkaline
Response Time:	Approximately 1 second
Recovery Time:	Approximately 1 second
Audio:	Fixed volume, variable frequency proportional to leak rate
Diagnosics:	Low battery indicator Detector cell failure alarm
Temperature:	32° F - 113° F (0° C - 45° C)
Operating:	Storage: 14° F - 122° F (-10° C - 50° C)
Humidity:	0-90% RH non-condensing
Size:	Console: 6.75" L x 3" W x 1" D (172 mm x 77 mm x 26 mm) Probe: 8" L x 1.75" D (204 mm x 28 mm)
Weight	15.5 ounces (440 gm) Including case: 3.3 lb (1.5 kg)
Warranty:	1 year

#### Ordering Information

Model Number	Description	Price
<b>8066</b>	LeakHunter Plus™ Complete with "Flex-and-Stay" Standard and Extension Probes, 115 VAC Adapter/Charger w/NiCad Battery, Durable Carrying Case	\$1,977.02
<b>8066-220</b>	Same as above except with 220 VAC Charger in Lieu of Charger/Adapter	\$1,954.88
<b>8066-02</b>	Calibrated Leak Hardware	\$675.68
<b>8066-03</b>	Replacement Standard Probe	\$79.54
<b>8066-04</b>	Replacement Extension Probe	\$189.42
<b>8066-05</b>	Replacement 115 VAC Charger/Adapter	\$111.52
<b>8066-06</b>	Replacement 220 VAC Charger	\$177.94



## The Gas Sniper Portable Gas Detector VOC Leak Detector (EPA Method 21) – Monitors ‘1’ to ‘6’ Gases Simultaneously



Gas Sniper-01 Model for EPA Method 21



“Optional” carrying case shown with Gas Sniper accessories

### Application

The Gas Sniper Portable Gas Detector is one of the most versatile portable gas monitors available in the market today. The Gas Sniper has the capability to monitor up to ‘6’ gases simultaneously and is ideal for performing EPA Method 21 fugitive emission monitoring of volatile organic compound (VOC) leaks from process equipment. Potential leak sources include:

- Valves, seals, drains, other connections
- Pressure relief devices and vents
- Pumps and compressors

EPA Method 21 requires the use of a monitoring instrument that meets a series of specifications and performance criteria. Additional information can be found under EPA 40 CFR Ch.1, Pt.60, App.A, Method 21.

### Description

The Gas Sniper features PPM, %LEL or %Volume measurement capability to address a wide range of monitoring requirements. The Gas Sniper detects and monitors a wide range of standard gases including many toxic gases (refer to Gas Sensor Selection Table). In addition, the Gas Sniper’s ability to simultaneously detect up to ‘6’ gases provides users with the ability to configure multiple gas monitoring combinations never before offered in a portable gas monitor. For quick response and recovery from distant sampling locations, the Gas Sniper utilizes an internal pump to draw samples up to 125 feet and utilizes hydrophobic filters to prevent moisture contamination. The Gas Sniper will continuously operate for up to 30 hours on alkaline batteries or 18 hours on Ni-Cad batteries.

A high resolution LCD screen provides easy viewing of all measurements, alarms and operating status. The Gas Sniper offers convenient access to all control functions such as auto-calibration, alarm silence, demand zero, peak hold and other features. Each standard gas monitoring channel has ‘2’ alarm levels (setpoints) plus TWA and STEL alarms for the toxic channels. The alarm levels are adjustable and can be latching or self-resetting.

The Gas Sniper is furnished with several standard accessory items including: shoulder strap, alkaline batteries, hydrophobic probe, sampling hose, internal hydrophobic filter, and instruction manual. Certain toxic gas applications are equipped with a special probe, inlet fitting and teflon sampling hose (for HF and O<sub>3</sub> versions, the Teflon hose is used without a probe).

### Product Features

- Simultaneous detection of up to ‘6’ different gases
- Detects over ‘25’ gases including a wide range of toxic gases
- Ergonomic design allows easy handling and transport
- PPM & LEL hydrocarbon detection
- High resolution LCD operating screen provides clear display of gas concentrations, alarms and diagnostic data
- Low flow alarm shuts pump off to avoid damage
- Hydrophobic filters standard in sensing probe
- Autocalibration
- Single gas calibration capability
- Methane elimination switch for environmental applications
- Security “Adjustment Lockout” Switch
- Alkaline or Ni-Cad battery operation
- Up to 30 hours of continuous operation
- Data-logging Kit option (up to ‘4’ gases only)
- Remote alarm(s) option
- Carry Case option (for base unit and accessories)
- Extension Sensing Probes

The Gas Sniper meets or exceeds the specifications and performance criteria required by EPA Method 21.

	EPA Method 21 Model	Gas Sniper
Portable	Yes	Yes
Sampling Type	Suction	Suction
Response Time	<30 seconds	<30 seconds
Response Factor to Reference VOC	<10	<10
Scale Readable to +/-2.5% of leak concentration	Yes	Yes
Sensor Output	Linear	Linear
Intrinsically Safe	Yes	Yes



## The Gas Sniper Portable Gas Detector *(continued)* VOC Leak Detector (EPA Method 21) – Monitors ‘1’ to ‘6’ Gases Simultaneously

The Gas Sniper can be calibrated on any number of compounds; however, methane is most typical as it provides the best response factors to other substances.

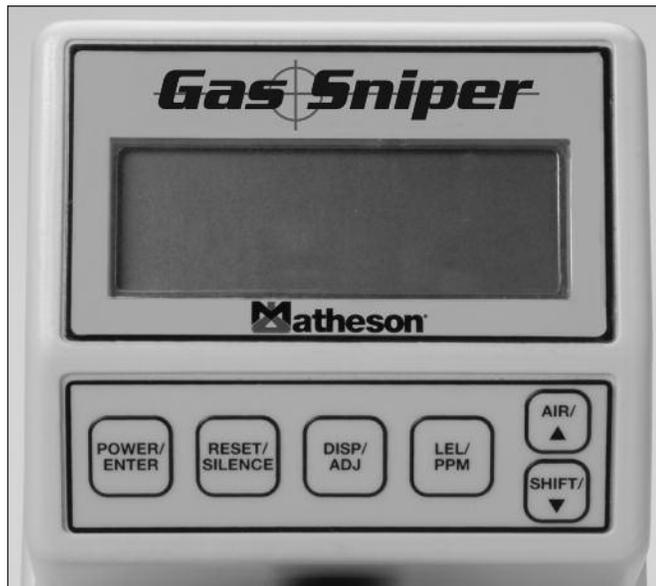
Once the instrument is turned on, the internal system automatically checks the battery voltage and selects the sensitivity range desired. A maximum of 30 seconds is all that is needed for instrument warm up. And although not required by EPA Method 21, the Gas Sniper is constructed with a built-in audible/visual alarm, as well as a Serial port for downloading data from the optional Data Logging System.

### Principle of Operation

Depending on the specific gas being monitored, the Gas Sniper utilizes catalytic combustion, electrochemical cell, galvanic cell and infrared sensor technologies to accurately detect gases within several full scale ranges. These sensors provide accurate measurement for the target gas being monitored and are designed for continuous duty with the following features:

- **Linear Output**
- **High Accuracy; Superior Repeatability**
- **Immune to Ambient Temperature Changes**
- **Low Power Consumption**

An integral, extremely low power suction pump provides a continuous, steady sample flow to provide accurate and repeatable measurements. Sample flow to the gas sensor is regulated and consistently monitored.



*Large LCD Viewing Screen provides operating status*

### Specifications

Detection Principle:	Catalytic Combustion, Electrochemical Cell, Galvanic Cell & Infrared
Enclosure:	Casing is constructed from chemical and weather resistant RFI/EMI coated high impact polycarbonate-polyester material; can function in rain or immersed in 2.5" of water without damage. Ergonomically designed with top mounted handle.
Sampling Method:	Auto-Suction (integral pump)
Sampling Distance:	Up to 125 feet
Safety Rating:	Intrinsically safe, Class I, Division 1; Groups A, B, C and D. CSA (C/US) & UL Classified (most versions)
Display:	LCD based, 4 x 20 viewing screen; displays readings and status of all monitoring channels simultaneously; backlight is automatic with alarms and on demand with timed adjustment
Measuring Range:	Dual scale
Sensor Output:	Linear
Sensor Lifespan:	2 Years under normal operating conditions
Calibration Gas:	Customer to specify on order (typically Methane (CH <sub>4</sub> ))
Accuracy:	Maximum variance +/- 5% f.s.
Alarms:	2' alarms per channel plus TWA and STEL alarms for toxic gases. The '2' alarms are fully adjustable for levels, latching or self-reset and are silencable
Alarm Method:	Audio alarm at 85 db at 30 cm distance; dual high intensity LED's and flashing screen display
Warm Up Time:	30 seconds maximum
Response Time:	<30 seconds to 90% with 5 foot hose
Operating Time:	30 hours with alkaline; 18 hours with Ni-Cad batteries
Power Source:	4 Alkaline or Ni-Cad Size "D" batteries
Operating Temperature:	14 °F to 104 °F
Operating Humidity:	0 to 95% RH (non-condensing)
Dimensions:	10.5" L x 5.9" W x 7" H
Weight:	5 lbs.
Warranty:	1 Year



**The Gas Sniper Portable Gas Detector** *(continued)*

**VOC Leak Detector (EPA Method 21) – Monitors '1' to '6' Gases Simultaneously**

**Ordering Information**

**Standard Gas Sniper Models**

Model Number	Description	Price
SNIPER-01	Gas Sniper Portable Gas Detector with LEL/ppm (Methane) Sensor*	\$1,895.02
SNIPER-02	Gas Sniper Portable Gas Detector with O <sub>2</sub> Sensor	\$1804.82
SNIPER-03	Gas Sniper Portable Gas Detector with LEL (Methane), O <sub>2</sub> , H <sub>2</sub> S & CO Sensor	\$2,501.82
SNIPER-04	Gas Sniper Portable Gas Detector with '1' Toxic Sensor	\$2,528.88
SNIPER-05	Gas Sniper Portable Gas Detector with '2' Toxic Sensors†	\$3,341.50

**Special Configured Gas Sniper Models**

Model Number	Description	Price
SNIPER-SC2	Gas Sniper Portable Gas Detector with '2' Sensors Configured†	
SNIPER-SC3	Gas Sniper Portable Gas Detector with '3' Sensors Configured†	Call
SNIPER-SC4	Gas Sniper Portable Gas Detector with '4' Sensors Configured†	for
SNIPER-SC5	Gas Sniper Portable Gas Detector with '5' Sensors Configured†	Quote
SNIPER-SC6	Gas Sniper Portable Gas Detector with '6' Sensors Configured†	

\*Gas Sniper-01 model suitable for EPA Method 21 applications.

†The Gas Sniper can be ordered with up to '6' sensors installed. Please specify the gas or gas combinations when ordering (Refer to Gas Sensor Selection Table for gases). For Gas Sniper models requiring '2' toxic sensors and special configured models containing up to '6' sensors – please consult factory for availability, pricing and delivery. In models where multiple gas sensors are desired, some gas combinations may not be available due to cross-interference/compatibility considerations.

**Accessories and Replacement Parts**

Model Number	Description	Price
SNIFE-SSPC	Shoulder Strap w/padded cushion	\$35.26
SNIFE-CCF1	Carry Case with foam for Gas Sniper and accessories	\$231.24
SNIFE-INFIT	Standard Inlet Metal Fitting – Quick Disconnect (Female)	\$44.28
SNIFE-PUMP	Pump (internal) with connector RP-GX-94	\$217.30
SNIFE-HSP10M	10" Standard Hydrophobic Sensing Probe with Metal Fittings	\$67.24
SNIFE-HSP10P	10" Hydrophobic Sensing Probe with Plastic Fittings (Toxic Gases)	\$63.14
SNIFE-RFE5	Hydrophobic Filter Element (Set of 5)	\$13.12
SNIFE-DLB	Data Logging Board (Factory Installed)*	\$162.36
SNIFE-DLDK	Data Logging Downloading Kit*	\$199.26
SNIFE-CHAR12	12 V-DC Battery Charger with Cigarette Lighter Plug	\$134.48
SNIFE-ALKBATD	Set of '4' Alkaline Batteries (Size D)	\$13.12
SNIFE-NCBATD	Set of '4' Rechargeable Ni-Cad Batteries (Size D)	\$69.70
SNIFE-NCCHAR115	Ni-Cad Battery Charger, 115 VAC with alkaline recognition	\$134.48
SNIFE-HT5	5 ft Teflon Sampling Hose	\$53.30
SNIFE-HT10	10 ft Teflon Sampling Hose	\$72.16
SNIFE-HP6	6 ft Polyurethane Sampling Hose with 1641 Fittings	\$50.02
SNIFE-HP10	10 ft Polyurethane Sampling Hose with 1641 Fittings	\$54.12
SNIFE-HP15	15 ft Polyurethane Sampling Hose with 1641 Fittings	\$59.04
SNIFE-HP20	20 ft Polyurethane Sampling Hose with 1641 Fittings	\$67.24
SNIFE-CH115C	115 VAC Cont. Operation Adapter/Battery Charger with 20 ft Cable	\$191.06
SNIFE-ORP-1	O-Ring for Hydrophobic Sensing Probe	\$4.10
SNIFE-IA90	Internal Alarm-Extra Loud (90 db @ 2 ft) feature, added to Gas Sniper	\$104.14
SNIFE-MES	External Methane Elimination Switch, Added to Gas Sniper	\$117.26
SNIFE-RAA20	Remote Audible Alarm with 20 ft Cable	\$116.44

\*Data Logging Feature requires both SNIFE-DLB and SNIFE-DLDK components; this feature is only available for up to '4' gases; this option is not available on Gas Sniper units with '5' or '6' gas sensors installed or more than '2' toxic sensors installed.  
NOTE: Polyurethane hose recommended for standard gases and selected toxic gases; Teflon hose required for the following gases: HF, HCL & O<sub>3</sub>



Shoulder Strap



10" Hydrophobic Sensing Probe



Polyurethane Sampling Hose  
(Hydrophobic Sensing Probe Separate)



115 VAC Adapter/Battery Charger



**The Gas Sniper Portable Gas Detector** *(continued)*  
VOC Leak Detector (EPA Method 21) – Monitors ‘1’ to ‘6’ Gases Simultaneously

**Gas Sensor Selection Table**

Model Number	Description	Full Scale Range	Price
<b>STANDARD Confined Space Gases</b>			
SGS-CO2-5K	Carbon Dioxide	0-5000 ppm	\$810.16
SGS-CO2-10K	Carbon Dioxide	0-10,000 ppm	\$810.16
SGS-CO2-20V	Carbon Dioxide	0-20% Vol	\$810.16
SGS-CO2-60V	Carbon Dioxide	0-60% Vol	\$810.16
SGS-CH4-L/P	Hydrocarbons <sup>†</sup>	0-100% LEL/0-50,000 ppm	\$217.30
SGS-O2	Oxygen	0-40% Vol	\$168.10
<b>TOXIC Gases<sup>▲</sup></b>			
SGS-NH3-75	Ammonia	0-75 ppm	\$502.66
SGS-ASH3-1	Arsine	0-1 ppm	\$502.66
SGS-ASH3-2	Arsine	0-0.2 ppb	\$502.66
SGS-BR-1	Bromine	0-1 ppm	
SGS-CO-150	Carbon Monoxide	0-150 ppm	\$502.66
SGS-CO-500	Carbon Monoxide	0-500 ppm	\$217.30
SGS-CL2-3	Chlorine	0-3 ppm	\$502.66
SGS-CLO2-1	Chlorine Dioxide	0-1 ppm	\$502.66
SGS-B2H6-03	Diborane	0-0.3 ppm	\$502.66
SGS-B2H6-30	Diborane	0-30 ppm	\$502.66
SGS-F2-5	Fluorine	0-5 ppm	\$502.66
SGS-N2H4-5	Hydrazine	0-5 ppm	\$502.66
SGS-HC-L/AR <sup>‡</sup>	Hydrocarbons <sup>†</sup>	100% LEL	\$502.66
SGS-HBR-9	Hydrogen Bromide	0-9 ppm	\$502.66
SGS-HCL-15/R <sup>■</sup>	Hydrogen Chloride	0-15 ppm	\$502.66
SGS-HCL-15	Hydrogen Chloride	0-15 ppm	\$502.66
SGS-HCN-30	Hydrogen Cyanide	0-30 ppm	\$502.66
SGS-HF-9	Hydrogen Fluoride	0-9 ppm	\$502.66
SGS-H2S-1	Hydrogen Sulfide	0-1 ppm	\$502.66
SGS-H2S-30	Hydrogen Sulfide	0-30 ppm	\$502.66
SGS-H2S-100	Hydrogen Sulfide	0-100 ppm	\$217.30
SGS-CH4-L/AR <sup>‡</sup>	Methane <sup>†</sup>	0-100% LEL	\$810.16
SGS-NO2-15	Nitrogen Dioxide	0-15 ppm	\$502.66
SGS-NO-100	Nitric Oxide	0-100 ppm	\$502.66
SGS-O3-1	Ozone	0-1 ppm	\$502.66
SGS-PH3-1	Phosphine	0-1 ppm	\$502.66
SGS-SIH4-15	Silane	0-15 ppm	\$502.66
SGS-SO2-10	Sulfur Dioxide	0-10 ppm	\$502.66



Gas Sensors

<sup>▲</sup>The Gas Sniper can be configured with up to ‘6’ gas sensors; only a maximum of ‘2’ toxic sensors may be used in the Gas Sniper with any configuration.

<sup>†</sup> Flammable gas

<sup>‡</sup>“AR” denotes gas sensor has “autoranging” capability; the sensor automatically ranges from % LEL to % Vol in concentration.

<sup>■</sup>“R” indicates sensor also has capability to detect CL<sub>2</sub>.

If a gas or detection range is not listed above for a specific gas detection application, please consult with a Customer Service Representative by calling 800-828-4313 to determine product availability.



## Model BUBL Liquid Solution Leak Detector



### Description

Matheson's DETECT-A-LEAK liquid solution leak detector is ideal for those less demanding applications not requiring a more sensitive, sophisticated, electronic leak detector.

Applied through a convenient 12" pull-out extension tube, a special surfactant helps spread the solution quickly and uniformly around the joint or area being tested. Long lasting bubbles or foam is readily visible as it is produced at any leakage point.

DETECT-A-LEAK is available in two formulas. The regular temperature formulation exceeds MIL-L-25567D Type I specifications. The low temperature formulation exceeds MIL-L-25567D Type II specifications. Both exceed ASME Section V specifications.

DETECT-A-LEAK is oxygen systems compatible, and is halogen and chloride free.

DETECT-A-LEAK solution comes in 8 ounce plastic squeeze bottles and is conveniently packaged in individual boxes. It can also be purchased at volume pricing in packages of 12.

### Ordering Information

Model Number	Description	Price
BUBL-01	Regular Temperature, Type I, pkg of 1	\$4.92
BUBL-02	Regular Temperature, Type I, pkg of 12	\$59.04
BUBL-03	Low Temperature, Type II, pkg of 1	\$6.56





**Regulators**

**Introduction**

**Regulators**

Regulators are used in gas delivery systems to reduce the pressure from a high pressure source to a safe working pressure for use. A pressure regulator should always be used when positive control of the pressure in a gas stream is required. A pressure regulator is as much a safety device as it is an important tool. All Matheson regulators are cleaned for oxygen service except as noted.

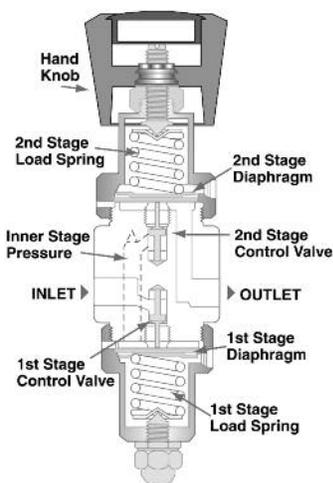
**Basic Regulator Types**

There are two basic types of pressure regulators: a single stage type and a dual stage type. The outward appearance of the two distinctly different types is somewhat similar and may be difficult to distinguish. Most pressure regulators are fitted with two gauges to monitor pressures (most line regulators only have one). Established convention in the United States and Canada has situated the high pressure gauge being connected internally to the inlet side of the regulator (the right side of the regulator when facing from the front). This gauge is used to monitor the source pressure. The low pressure gauge connected internally to the outlet side of the regulator is situated on the left side of the regulator when facing from the front. This gauge is used to monitor the outlet pressure (this is the gauge commonly installed on most regulators).

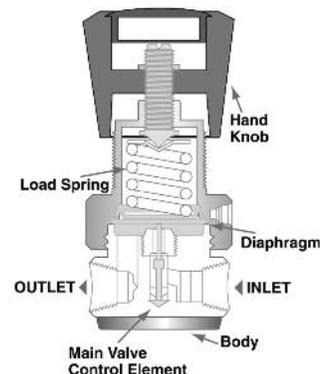
On occasion, an outlet valve is affixed to the outlet port of the regulator. This valve is to be used to turn the flow of gas on or off for brief periods of time. It should never be used to throttle or control the flow of gas emitted from a regulator. This practice could cause serious damage to both the regulator and its operator. Flow should always be controlled by some other piece of equipment such as a rotameter or mass flowmeter.

**DUAL STAGE** regulators reduce the source pressure down to the desired delivery pressure in two steps. Each stage consists of a spring, diaphragm, and control valve. The first stage reduces the inlet pressure to about three times the maximum working pressure. The final pressure reduction occurs in the second stage.

The advantage of a dual stage regulator is its ability to deliver a constant pressure, even with a decrease in inlet pressure. For example, as a cylinder of gas is depleted, the cylinder pressure drops. Under these conditions, single stage regulators exhibit a "decaying inlet characteristic"; where the delivery pressure increases as a result of the decrease in inlet pressure. In a dual stage regulator, the second stage compensates for this increase, providing a constant delivery pressure regardless of inlet pressure conditions. The dual stage regulator is recommended for applications where a continuous supply of gas is required; such as the gas supplied to analytical instruments where constant delivery pressure is critical.



**SINGLE STAGE** regulators perform the same function as the two stage regulator using a single step reduction of source to outlet pressure. For this reason, the outlet pressure cannot be as accurately controlled as the source pressure decays. We highly recommend single stage regulators only be used in circumstances where the operator can monitor and adjust the regulator as needed or where the regulator is supplied a nearly constant source pressure.



**LINE REGULATORS** are single stage regulators that are used to provide point-of-use pressure monitoring and control. For example, a lab may have gas cylinders located in a room on the first floor. The gas may be piped to instruments located in a lab on the second floor. In this case, it is difficult to monitor the gas pressure directly at the instruments, since the regulators are located on the cylinders on the first floor. A line regulator may be installed near the instruments for convenience of monitoring the delivery pressure at the point of use. These regulators are installed directly into gas lines, and have a single delivery pressure gauge.

**Gauges**

Gauges are used to monitor the pressure within a gas delivery system. The basic component of a gauge is a hollow metal tube that expands and contracts a very exact amount under varying pressures. This tube is connected to the part of the gauge usually screwed into a regulator and is also connected to a series of gears. These gears are further connected to a needle, which is what the user can view at the front of the gauge.

**Matheson Regulators**

**GENERAL PURPOSE** – These products are suitable for applications where cost is an overriding factor. Generally, these products are best suited to applications involving gases that are less than 99.995% purity level (for pure gases) or unanalyzed mixtures. Also, these products should not be used when there is a concern of moisture, air or hydrocarbon contamination to the gases under control.

**HIGH PURITY** – These products are suitable for applications where maintaining the purity of a gas or mixture is the overriding concern. Generally, these products are best suited to applications involving gases that are greater than 99.995% purity level (for pure gases) or analyzed mixtures. These products are also highly recommended when dealing with more hazardous gases that are either corrosive, toxic or pyrophoric. Typically these products are used in analytical laboratory applications or special process situations.



## Introduction (continued)

**ULTRA-LINE®** – Primarily Semiconductor Grade, these products are suitable and highly recommended for applications where the highest obtainable purity and the least risk of contamination is absolutely necessary. Typically, this describes all of the applications associated with the Semiconductor manufacturing industry and also has applications in the Pharmaceutical and Chemical Processing industries.

### High Purity Features

The features of a regulator determine the type of service for which it can be used. A regulator intended for a high purity application has different features than a unit designed for general purpose use. Three main features determine the suitability of a regulator for high purity applications:

**Body Type:** Regulator bodies may be of forged or barstock construction. Barstock bodies are used for high purity applications for the following reasons:

- **Reduced internal volumes:** Because barstock bodies are machined, it is possible to achieve a small internal cavity in the regulator body. The low internal volume makes purging the regulator easy, allowing for removal of contaminants like moisture and oxygen.
- **Tight grain structure of the metal:** The cold drawing process produces metal barstock with a very tight grain structure. This tight grain structure prevents the regulator's internal surfaces from adsorbing moisture and contaminants, allowing them to be purged easily.
- **Low Ra surface finish:** The machining process allows for very low Ra (Roughness Average) surface finishes on the barstock. The low Ra finish minimizes particle shedding, which contributes to contamination.

**Diaphragm Material:** Diaphragms may be constructed of elastomers (neoprene, Viton, etc.) or stainless steel. Stainless steel diaphragms are used in high purity regulators because they do not adsorb and release (or "offgas") contaminants. When a regulator is removed from a cylinder, it is exposed to ambient air. An elastomeric diaphragm will adsorb moisture and any other contaminants from the air. When the regulator is put back into service, the elastomeric diaphragm releases these contaminants, which are diffused back into the gas delivery system. A stainless steel diaphragm is unable to adsorb any contaminants, so it does not contribute to system contamination.

**Type of Seals:** The seal between the body of the regulator and the diaphragm is important in maintaining purity. A poor seal creates a leakage point through which contaminants may enter the gas delivery system. A metal to metal seal (metal regulator body sealing to a metal diaphragm) is the most reliable, leak-free type of seal. An elastomeric diaphragm can degrade over time, compromising the integrity of this seal.

### Helium Leak Testing

A complete Helium Leak Test involves the monitoring of both the inboard leakage of an item and the outboard leakage of an item. Inboard leak tests are performed by drawing an internal vacuum on the equipment (under test), while surrounding it with helium, then monitoring the helium leakage rate from the outside to the inside. Outboard leak tests are performed by pressurizing the subject item with helium and analyzing the surrounding space for the presence of helium. Upon completion of the test, a certificate is written and forwarded with the item to the customer. In the case where 100% of the items are leak tested, a Certificate of Conformance can be requested for the item.

**NOTE:** *Economy regulators with rubber diaphragms cannot be helium leak tested.*



## Regulator Selection and Performance

### Evaluating Regulators for Reliability and Performance

The following criteria are used:

- **Pressure regulation as a function of flow.** All regulators have some delivery pressure drop with increased flow rate. The smaller the drop as flow is increased, the better the performance.
- **Pressure regulation as a function of inlet pressure.** As the inlet pressure source is reduced, regulator delivery pressure may either rise or fall depending upon the regulator design. In both cases this is known as regulator "droop." Two stage regulators generally provide better regulation under these circumstances.
- **"Lockup" of a regulator.** This is the difference in pressure between a flowing and non-flowing condition. If a regulator has its delivery pressure set while gas is flowing, and flow is suddenly stopped, a small rise in delivery pressure (lockup) will occur before the regulator's valve closes fully. The lower the lockup, the better the performance.
- **Seat leakage of the regulator.** This is the tendency of the regulator to leak across the seat, with the regulator valve knob closed fully (counter-clockwise) and high pressure on the inlet side. A low leakage value is preferred.
- **Leakage rate across the diaphragm or fittings on the regulator.** This value is normally measured using helium gas and a mass spectrometer or other type of helium detector. Regulators for specialty gas service may have published values of typical leakage rates either inboard (from the atmosphere into the regulator) or outboard (from inside the regulator to the atmosphere). For safety, it is important that this leak rate value be as low as possible in order to prevent possible contamination by ambient air and moisture or escape of hazardous gases.

### Choosing a Regulator for a Particular Gas or System

Several important factors must be considered when choosing a regulator for a particular application:

- **Gas pressure.** Some regulators are designed for lower pressures and should not be connected to sources of pressure greater than they are rated for. The inlet pressure gauge should be inspected for suitable range of inlet source pressure.
- **Regulator materials of construction.** Consideration should be given to the gas being used and the requirements of the system. Brass regulators are typically used with inert gases since brass is attacked by corrosive gases. Many regulators designed for controlling gases used in semiconductor processes are constructed of low tensile strength stainless steel (usually type 316 or 316L). This material displays good corrosion resistance and is not prone to hydrogen embrittlement problems. However, stainless steel can be corroded when exposed to some of the corrosive gases with small amounts of water present. For severe corrosive conditions, Monel or Hastelloy material should be used. Regulators may also be plated with corrosion resistant coatings when controlling some gases. Another important factor to consider is soft plastic material, or elastomers, used in regulators for seat and sealing surfaces. For example, some regulators use an elastomer called Viton which is a fluorocarbon. Viton is compatible with many gases, but gases such as ammonia will cause it to dissolve. When choosing a regulator for a

particular gas, all internal regulator parts should be compatible with that gas under normal operating conditions.

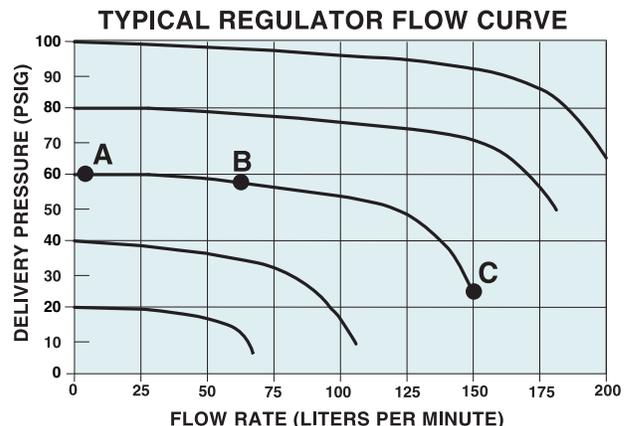
- **Regulator cleaning prior to use.** Most regulators used in specialty gas applications are cleaned to very tight specifications to match the purity needs of the process. If oil or other combustible residue is left inside the regulator, spontaneous combustion may result when certain gases, such as oxygen, are introduced into the regulator.
- **Regulators should be used in a specific gas service, for maximum safety.** Once a regulator is used for a specific gas, it should not be used for any other gas unless it has been thoroughly cleaned, or the operator is absolutely sure that using the regulator in this condition presents no hazard. For example, an explosion could result if a regulator was used on an oxidizer and then placed in flammable gas service.

Always follow the manufacturer's instructions and warnings when installing, operating, purging, or shutting down a pressure regulator.

### Reading Flow Curves

#### Flow Performance:

The flow properties of a pressure regulator are illustrated by the flow curve. The vertical axis indicates the delivery pressure at which the regulator is set and the horizontal axis indicates the gas flow that the regulator passes. The curves are made by setting the delivery pressure while there is no gas flow and then slowly opening the outlet valve downstream while measuring both the flow and the delivery pressure. Typically, as flow increases, delivery pressure drops. The portion of the curve to the far left is fairly flat and it is in this range that the regulator demonstrates a stable pressure regulation even though the flow is changing. For example, increasing the flow from point "A" to point "B" shows only a slight decrease in pressure. The portion of the curve to the right shows a rapid drop in pressure with increasing flow rate, indicating that the regulator valve seat is almost wide open. If flow is increased from point "B" to point "C", there is a large drop in pressure that is typical for all regulators.



For more information on regulators and Matheson's regulator product line, please order brochure BR-71, Matheson's Guide to Regulators.



**Regulators**

**Basic Regulator Selection Chart**

Regulator Family	Model Series	Gas Service	Stages	Max. Inlet (psig)	Outlet Range (psig) <sup>1</sup>	Design Features	Applications	Page No.
<b>General Purpose</b>	18	Non-corrosive	1	3000	0-500	<ul style="list-style-type: none"> <li>• Low cost forged brass bodies and neoprene diaphragms</li> <li>• Rugged construction</li> <li>• Large diaphragms provide good pressure control</li> </ul>	<ul style="list-style-type: none"> <li>• Calibration of pressure gauges, rotameters, and mass flow controllers</li> <li>• Applications with high duty cycle/ demanding operating conditions</li> </ul>	86
	18A	Acetylene	1	400	0-15			86
	81	Non-corrosive	2	3000	2-250			87
	81-F (with flowmeter)	Non-corrosive	2	3000	2-50			89
<b>Economical High Purity Brass</b>	1250	Non-corrosive	2	3000	2-250	<ul style="list-style-type: none"> <li>• Low cost forged brass body with high purity stainless steel diaphragm</li> <li>• PTFE seals</li> <li>• Rugged construction</li> <li>• 320, 350, 580, 590 CGA's only</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of carrier gas or detector support gas for gas chromatography and other applications where low cost is the most important factor. The models 3120 (brass) and 3810 (stainless steel) should be used for the highest purity demanding applications as these models use barstock bodies and metal to metal seals.</li> </ul>	90
<b>High Purity Brass</b>	3530	Non-corrosive	1	3000	2-250	<ul style="list-style-type: none"> <li>• Nickel plated brass barstock bodies</li> <li>• 316 stainless steel diaphragms</li> <li>• Metal to metal seals</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of carrier gas/ detector support gas for a variety of gas chromatography applications (see chart on regulators for chromatography applications in 3530/3120 section)</li> <li>• Supply of calibration standards to on-line process analyzers, emission monitoring standards, etc.</li> </ul>	107
	3120	Non-corrosive	2	3000	2-350			93
<b>High Purity Stainless Steel</b>	3510	Semi- & non-corrosive	1	3000	2-500	<ul style="list-style-type: none"> <li>• 316 stainless steel barstock bodies</li> <li>• 316 stainless steel diaphragms</li> <li>• Metal to metal seals</li> <li>• Tied diaphragm (3610) for safety</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of carrier gas/ detector support gas for a variety of gas chromatography applications (see chart on regulators for gas chromatography applications in 3510/3810 section)</li> <li>• Supply of calibration standards to on-line process analyzers, emission monitoring standards, etc.</li> </ul>	106
	3610A Tied Seat	Corrosive, toxic, and pyrophoric	1	3000	2-100			110
	3810	Semi- & non-corrosive	2	3000	2-350			112
<b>High Purity Miniature</b>	3550 Brass	Non-corrosive	1	3000	0-100	<ul style="list-style-type: none"> <li>• Brass or 316 stainless steel barstock bodies</li> <li>• 316 stainless steel diaphragms</li> <li>• Compact size</li> </ul>	<ul style="list-style-type: none"> <li>• Applications requiring high purity gases and a compact regulator due to space limitations</li> </ul>	108
	3570 Stainless Steel	Corrosive	1	3000	0-100			108
	3850 Brass	Non-corrosive	2	3000	0-100			108
	3870 Stainless Steel	Corrosive	2	3000	0-100			108



**Regulators**

**Basic Regulator Selection Chart (continued)**

Regulator Family	Model Series	Gas Service	Stages	Max. Inlet (psig)	Outlet Range (psig) <sup>1</sup>	Design Features	Applications	Page No.
<b>ULTRA-LINE® Ultra High Purity</b>	9300	Semiconductor	1	3000	0-100	<ul style="list-style-type: none"> <li>• 316L stainless steel or Hastelloy C-22 internals</li> <li>• Autogeneous butt-welded connections</li> <li>• 10-15 Ra surface finish</li> <li>• Assembled in class 100 clean room</li> </ul>	• All semiconductor industry gas applications	115
	9360	Semiconductor	1	3000	0-100			117
	Tied Seat	corrosive, toxic, and pyrophoric						
	9370	Semiconductor	1	3000	0-100		117	
	Tied Seat	corrosive, toxic, and pyrophoric						
9460	Semiconductor	2	3000	0-100	118			
Tied Seat	corrosive, toxic, and pyrophoric							
9470	Semiconductor	2	3000	0-100	118			
Tied Seat	corrosive, toxic, and pyrophoric							
<b>Basic Line Regulators</b>	3470	Non-corrosive	1	350	2-200	<ul style="list-style-type: none"> <li>• Cast zinc (3470), brass barstock (3420), 316 stainless steel (3430), or 316L stainless steel (9330) bodies</li> <li>• Neoprene (3470) or stainless steel diaphragms</li> <li>• Tied diaphragm (9330) for safety</li> </ul>	• 3470: Point of use regulation of inert gases	104
	General Purpose							
	3420	Non-corrosive	1	400	2-250		• 3420 & 3430: Point of use regulation of high purity gases used in chromatography or other analytical applications (see chart on regulators for gas chromatography applications in 3420/3430 sections)	101
	High Purity Brass							
	3430	Semi- & non-corrosive	1	400	2-200			102
High Purity Stainless Steel								
9330	Semiconductor	1	3000	0-100	116			
Ultra Line Tied Seat	corrosive, toxic, or pyrophoric					• 9330: Point of use regulation in semiconductor applications		

<sup>1</sup>The outlet pressure ranges shown above include the minimum and maximum pressures available with respect to the entire model series. For delivery pressure ranges of individual regulator models, refer to appropriate catalog sections.



**Regulators**

**Specialty Regulator Selection Chart**

Regulator Family	Model Series	Gas Service	Stages	Max. Inlet (psig)	Outlet Range (psig) <sup>1</sup>	Design Features	Applications	Page No.
<b>High Pressure</b>	3020 Brass	Non-corrosive	1	3000	20-500	<ul style="list-style-type: none"> <li>• Brass or stainless steel barstock bodies</li> <li>• 316 stainless steel diaphragm (3020) or piston (all other models)</li> </ul>	<ul style="list-style-type: none"> <li>• Applications requiring up to 6000 psig delivery pressure</li> <li>• Manufacturing processes, charging of systems, purging</li> </ul>	91
	3030 Brass	Non-corrosive	1	3000	100-1500			91
	3040 Brass	Non-corrosive	1	3000	100-2500			91
	3060 Brass	Non-corrosive	1	6000	200-6000			92
	3060S Stainless Steel	Non-corrosive	1	10,000	200-6000			92
<b>Standard Corrosive Service</b>	3900	Corrosives: HBr, HF, Cl <sub>2</sub>	1	3000	2-200	<ul style="list-style-type: none"> <li>• Economical nickel plated forged brass body</li> <li>• Monel, Kel-F, and Teflon internals for corrosion resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Use with acid forming halogen compounds (HBr, HF, Cl<sub>2</sub>)</li> <li>• Use with low vapor pressure gases</li> </ul>	113
<b>Deluxe Corrosive Service</b>	3210	Corrosives: HCl, HF, HBr, Cl <sub>2</sub>	1	3000	1-200	<ul style="list-style-type: none"> <li>• Monel construction and Monel/Kel-F internals for superior corrosion resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Applications requiring extended regulator lifespan in severe conditions</li> </ul>	95
<b>Fluorine Corrosive Service</b>	3225A	Corrosives: F <sub>2</sub> and F <sub>2</sub> mixtures	1	1000	1-50	<ul style="list-style-type: none"> <li>• Monel construction with bronze filled Teflon seat and Kel-F seals</li> </ul>	<ul style="list-style-type: none"> <li>• Use with fluorine and fluorine mixtures</li> </ul>	95
<b>High Flow</b>	3200	Non-corrosive	1	3000	0-250	<ul style="list-style-type: none"> <li>• Brass (3240) or stainless steel (3200) barstock bodies</li> <li>• 1/2" NPTF inlet and outlet ports</li> </ul>	<ul style="list-style-type: none"> <li>• Applications requiring a high flow rate, such as purging of large reactor or storage vessels</li> </ul>	94
	3240	Non-corrosive	1	3000	0-250			94
<b>Low Pressure</b>	81-2 General Purpose	Non-corrosive	2	3000	0.1-2	<ul style="list-style-type: none"> <li>• Economical forged brass (8-2) or high purity brass barstock (3396) bodies</li> <li>• Economical Viton (8-2) or 316 stainless steel (3396) diaphragms</li> </ul>	<ul style="list-style-type: none"> <li>• 8-2: Applications requiring a reduction of full cylinder pressure down to a low working pressure, such as fuel supply to burners or purging low pressure environmental chambers</li> <li>• 3396: Applications requiring subatmospheric pressure control</li> </ul>	88
	3396 Absolute Pressure	Non-corrosive	1	3000	28" Hg- 15 psig			100
<b>Back Pressure</b>	6342A	Corrosive & non-corrosive	1	100	0-100	<ul style="list-style-type: none"> <li>• 316L stainless steel body</li> <li>• 316 stainless steel diaphragm</li> </ul>	<ul style="list-style-type: none"> <li>• Used to relieve system overpressure, like a relief valve</li> </ul>	114
<b>Low Dead Volume</b>	3590A	Non-corrosive	1	3000	2-100	<ul style="list-style-type: none"> <li>• 7 cc internal volume minimizes contamination and adsorption</li> <li>• 316 stainless steel body &amp; diaphragm</li> </ul>	<ul style="list-style-type: none"> <li>• Use with mixtures containing trace quantities of reactive and/or adsorptive gases or vapors</li> <li>• 3590-TO specially cleaned for use with TO-14 calibration standards</li> </ul>	109
	3590-TO	High purity TO-14 calibration standards	1	3000	2-100			109
<b>Lecture Bottle<sup>2</sup></b>	3320	Non-corrosive	1	3000	2-60	<ul style="list-style-type: none"> <li>• Forged brass (3230) or PVC (3330) bodies</li> <li>• Neoprene (3230) or Teflon (3330) diaphragm</li> </ul>	<ul style="list-style-type: none"> <li>• Use with lecture bottles. 3330 designed for use with low pressure applications (1-6 psig); if higher pressures are required, use 3570 Series Mini Regulators</li> </ul>	96
	3330	Corrosive	1	3000	1-6			96



**Regulators**

**Specialty Regulator Selection Chart** *(continued)*

Regulator Family	Model Series	Gas Service	Stages	Max. Inlet (psig)	Outlet Range (psig) <sup>1</sup>	Design Features	Applications	Page No.
<b>MicroMATE™ Preset Flow Rate</b>	3345 Brass	Non-corrosive	1	240-1000 depending on model	30 psig (fixed)	<ul style="list-style-type: none"> <li>• Brass or 316 stainless steel bodies</li> <li>• Fixed flow rate 0.3 slpm to 2.5 LPM</li> <li>• Push button (brass) or control knob (SS) on/off</li> <li>• Hose barb outlet</li> <li>• 3347: selectable flow rates from 0-3 slpm</li> </ul>	<ul style="list-style-type: none"> <li>• Used with MicroMAT™-14, -58, -105, -221 cylinders for delivery of calibration gases at a fixed flow rate</li> </ul>	97
	3359 Stainless Steel	Non-corrosive or Semi-corrosive	1	500 psig	30 psig (fixed)			99
	3347 Brass Variable Flow	Non-corrosive	1	3000 psig	50 psig (fixed)			98
<b>Specialty Line Regulators</b>	3450 High flow line regulator	Semi-corrosive: dichlorosilane, ammonia, amines	1	500	2-100	• High purity stainless steel body and diaphragm	• High purity, high flow applications (up to 730 SCFH)	103
	3491 Low delivery pressure line regulator	Non-corrosive	1	120	1 mm Hg - 1.8 psig	• Economical brass body and butyl rubber diaphragm	• Non-corrosive, absolute pressure applications	104
	3494 Absolute pressure line regulator	Corrosive/high purity gases	1	120	28" Hg - 15 psig	• High purity stainless steel body and diaphragm	• Corrosive/high purity absolute pressure applications	105
	3700 Low pressure line regulator	Non-corrosive	1	250	2" wc <sup>3</sup> - 10 psig	• Cast zinc body and natural rubber diaphragm • "Pancake" design	• Non-corrosive, low inlet pressure/low delivery pressure applications	111

<sup>1</sup>The outlet pressure ranges shown above include the minimum and maximum pressures available with respect to the entire model series. For delivery pressure ranges of individual regulator models, refer to appropriate catalog sections.

<sup>2</sup>Other regulators can be supplied with CGA 170/180 for use with lecture bottles. Consult Matheson technical support for more information.

<sup>3</sup>wc=water column



## Model 18 Series Single-Stage General Purpose Brass Regulator



### Description

General purpose regulators with rugged construction for use with non-corrosive gases.

### Applications

- Use with gases that are 99.995% or lower purity.
- Regulation of air supply to valves and actuators.
- Inert gas supply for purging applications.
- Calibration of pressure gauges, rotameters, and mass flowmeters.
- Applications with high duty cycle/demanding operating conditions.

### Design Features/Components

- Forged brass body
- Neoprene diaphragm
- 2" inlet and delivery pressure gauges
- Equipped with outlet needle valve
- 1/4" NPTM outlet connection with loose hose barb
- Porous metal filter to protect seat from contamination
- Model 18R uses Tee handle for pressure adjustment; all others use black knob shown

### Materials of Construction

Gauges:	Brass, Painted steel covers
Body:	Forged brass
Bonnet:	Chrome plated brass
Diaphragm:	Neoprene
Seat:	PTFE Teflon
Seals:	Neoprene

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
	Model 18A: 400 psig (2,760 kPa)
Maximum Flow Rate:	Model 18B: 900 CFH (425 LPM)
(At 2000 psig, N <sub>2</sub> )	Model 18: 2000 CFH (944 LPM)
	Model 18L: 4000 CFH (1890 LPM)
	Model 18H: 5000 CFH (2360 LPM)
	Model 18R: 5000 CFH (2360 LPM)
(At 400 psig, N <sub>2</sub> )	Model 18A: 500 SCFH (236 LPM)
Flow Capacity (Cv):	0.17 without outlet valve
Operating Temperature:	-20°F to 140°F (-29°C to 60°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	4 lbs

### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
18A-510**	0-15 psig	0-30 psig	0-400 psig	\$125.46
18B-CGA	0-15 psig	0-30 psig	0-4000 psig	\$125.46
18-CGA	2-50 psig	0-60 psig	0-4000 psig	\$125.46
18L-CGA	4-100 psig	0-150 psig	0-4000 psig	\$125.46
18H-CGA	10-200 psig	0-400 psig	0-4000 psig	\$125.46
18R-CGA***	20-500 psig	0-1000 psig	0-4000 psig	\$154.16

\*Note: Some CGA limitations may apply.

\*\*For Acetylene Service Only

\*\*\*Uses Tee handle. All other models use black knob as shown.

### Options

Model Number	Description	Price
CON-0208-BO	1/4" Compression Tube Outlet Connection (Brass)	\$13.12
400V	Check Valve	\$49.20
6103A-F	Flash Arrestor for Flammable Gases	\$141.04



**Regulators**

**Model 81 Series  
Dual-Stage Deluxe General Purpose Brass Regulator**



**Design Features/Components**

- Chrome plated brass body
- Neoprene diaphragms (1st and 2nd stages)
- 2-1/2" inlet and delivery pressure gauges
- Equipped with outlet needle valve
- 1/4" NPTM outlet connection
- One-piece encapsulated seat with (10µ) internal fitter to protect against contamination

**Materials of Construction**

Gauges:	Chrome plated brass
Body:	Forged brass
Bonnet:	Chrome plated brass (1st and 2nd stages)
Diaphragm:	First Stage – neoprene Second Stage – neoprene
Seats:	First Stage – PTFE Second Stage – PTFE
Seals:	Neoprene

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Flow Capacity (Cv):	0.15
Operating Temperature:	-20°F to 140°F (-29°C to 60°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low, 1 Interstage
Shipping Weight:	6 lbs

**Description**

General purpose regulators constructed for use with non-corrosive gases.

**Applications**

- Calibration of pressure gauges, rotameters, and mass flow controllers.
- General purpose applications where a constant delivery pressure is required.
- Applications with high duty cycle/demanding operating conditions.

<b>Ordering Information</b>				
Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
81L-CGA	2-15 psig	0-30 psig	0-3000 psig	\$218.12
81LA-510**	2-15 psig	0-15 psig	0-400 psig	\$218.12
81-CGA	4-50 psig	0-100 psig	0-3000 psig	\$218.12
81H-CGA	10-125 psig	0-200 psig	0-3000 psig	\$218.12
81-250-CGA	20-250 psig	0-400 psig	0-3000 psig	\$218.12

*\*Note: Some CGA limitations may apply.  
\*\*Acetylene service only*

<b>Options</b>		
Model Number	Description	Price
CON-0208-BO	1/4" Compression Tube Outlet Connection (Brass)	\$13.12
400V	Check Valve	\$49.20



## Model 81-2

### Dual-Stage General Purpose Low Delivery Brass Pressure Regulator



#### Design Features/Components

- General purpose forged brass body
- 2-1/2" inlet and delivery pressure gauges
- Equipped with outlet needle valve
- Porous metal filter protects seat from contamination
- 1/4" NPTM outlet connection

#### Materials of Construction

Gauges:	Chrome plated brass
Body:	Chrome plated forged brass
Bonnet:	Chrome plated forged brass (1st and 2nd stages)
Diaphragms:	First Stage – Neoprene Second Stage – Neoprene
Seats:	First Stage – PTFE Second Stage – PTFE
Seals:	Neoprene/Teflon

#### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Flow Capacity (Cv):	0.53
Operating Temperature:	-20°F to 140°F (-29°C to 60°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	7 lbs

#### Description

General purpose regulators designed to reduce full cylinder pressure (maximum 3000 psig) down to very low working pressures (0.1 to 2 psig).

#### Applications

- Regulation of fuel supply to burners.
- Purging low pressure environmental chambers.
- Maintaining low pressure blankets of inert gas on fuel and chemical storage facilities.

#### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
81-2-CGA	0.1-2 psig	0.1-3 psig	0-3000 psig	\$296.02

\*Note: Some CGA limitations may apply.

#### Options

Model Number	Description	Price
CON-0208-BO	1/4" Compression Tube Outlet Connection (Brass)	\$13.12



## Model 81-F

### Dual-Stage General Purpose Regulator with Flowmeter Combination



#### Description

The Model 81 general purpose regulator combined with flowmeters to service applications requiring flow monitoring capabilities.

#### Design Features/Components

- Two-stage regulator construction same as Model 81 Series
- Incorporates Matheson FM-1000 Series brass flowmeter
- Permits convenient adjustment of pressure and flow with good resolution
- Manual shut-off and control valves included
- Hose barb connection on outlet included

#### Ordering Information

Model Number*	Flow Range (SLPM)	Price
81-AF-CGA	0.05-0.7	\$396.88
81-BF-CGA	0.2-2.2	\$396.88
81-CF-CGA	0.5-5.0	\$396.88
81-DF-CGA	1.0-10.0	\$396.88
81-EF-CGA	2.5-25.0	\$396.88

\*Note: Some CGA limitations may apply.



## Model 1250 Series Dual-Stage Brass Regulator



### Description

High purity regulators constructed for use with non-corrosive gases.

### Applications

- Supply of carrier gas/ detector support gas for gas chromatography applications
- Calibration of pressure gauges, rotameters, and mass flow controllers.
- Applications where a constant delivery pressure is required.
- Applications with high duty cycle/ demanding operating conditions.

### Design Features/Components

- Forged brass body
- Stainless steel diaphragms (1st and 2nd stages)
- 2" inlet and delivery pressure gauges
- Equipped with outlet diaphragm valve
- 1/4" NPTF outlet connection
- One-piece encapsulated seat with (10 $\mu$ ) internal filter to protect against contamination

### Materials of Construction

Gauges:	Chrome plated brass
Body:	Forged brass
Bonnet:	Chrome plated brass (1st and 2nd stages)
Diaphragm:	First Stage – stainless steel Second Stage – stainless steel
Seats:	First Stage – PTFE Second Stage – PTFE
Seals:	PTFE

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Flow Capacity (Cv):	0.15
Operating Temperature:	-20°F to 140°F (-29°C to 60°C)
Valve Outlet Connection:	1/4" NPTF
Porting (Regulator Body):	1/4" NPTF
Porting Configuration:	2 High, 2 Low, 1 Interstage
Shipping Weight:	6 lbs

### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
1251-CGA	2-15 psig	0-30 psig	0-4000 psig	\$235.34
1252-CGA	4-50 psig	0-100 psig	0-4000 psig	\$235.34
1253-CGA	10-125 psig	0-200 psig	0-4000 psig	\$235.34
1254-CGA	20-250 psig	0-400 psig	0-4000 psig	\$235.34

\*Note: 350, 580, 590 CGA only

### Options

Model Number	Description	Price
CON-0213-BO	1/4" Compression Tube Outlet Connection (Brass)	\$13.12
400V	Check Valve, 1/4" NPTF x 1/4" NPTF	\$49.20



**Regulators**

**Model 3020, 3030 and 3040 Series  
Single-Stage High-Purity/High Delivery Pressure Brass Regulators**



**Description**

High-purity brass regulators designed for delivery pressures up to 2500 psig.

**Applications**

- Applications requiring delivery pressures up to 2500 psig.
- Delivery of gas to manufacturing processes, charging of systems, purging.

**Design Features/Components**

- High-purity brass barstock body
- High-purity 316 stainless steel diaphragm (Model 3020 Series) or 316 stainless steel piston (Model 3030 and 3040 Series)
- Metal to metal seals (Model 3020 Series) minimize diffusion of contaminants
- 2-1/2" inlet and delivery pressure gauges
- Equipped with outlet needle valve
- 1/4" NPTM outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable

**Materials of Construction**

	<u>Model 3020 Series</u>	<u>Model 3030-3040 Series</u>
Gauges:	Chrome plated brass	Chrome plated brass
Body:	Nickel plated brass	Nickel plated brass
	barstock	barstock
Bonnet:	Nickel plated brass	Nickel plated brass
Diaphragm:	316 stainless steel	—
Piston:	—	316 stainless steel
Seat:	PFA Teflon	Kel-F 81
Seals:	Metal to metal	Teflon & Viton A

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3020: 5000 SCFH (2360 SLPM)
(At 2500 psig, N <sub>2</sub> )	Model 3030: 4600 SCFH (2170 SLPM)
	Model 3040: 4600 SCFH (2170 SLPM)
Flow Capacity (Cv):	0.06
Operating Temperature:	-15°F to 165°F (-26°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	5 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3020-CGA	20-500 psig	0-1000 psig	0-3000 psig	\$233.70
3030-CGA	100-1500 psig	0-2000 psig	0-4000 psig	\$319.80
3040-CGA	100-2500 psig	0-3000 psig	0-4000 psig	\$319.80

**Options**

Model Number	Description	Price
ADP-0163-BO	Bonnet Vent Fitting to 1/8" Hose	\$9.84
ADP-0162-BO	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
MSP-0012-XX	Inboard Helium Leak Rate Certification (Model 3020 only)	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification (Model 3020 only)	\$160.72



**Regulators**

**Model 3060, 3060S Series  
Single-Stage High-Purity/High Delivery Pressure Brass and  
Stainless Steel Regulator**



**Description**

High purity brass or stainless steel regulators designed for delivery pressures up to 6000 psig.

**Applications**

- Applications requiring up to 6000 psig delivery pressure
- Delivery of gas to manufacturing processes, charging of systems, purging

**Design Features/Components**

- High purity brass (3060 Series) or stainless steel barstock (3060S) body
- High-purity 303 stainless steel pistons
- 2-1/2" (3060 Series) or 2" (3060S Series) inlet and delivery pressure gauges
- Equipped with outlet needle valve (models with CGA connections)
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Cleaned for oxygen service to 3000 psig maximum
- Self-relieving (for use with inert gases)

**Materials of Construction**

	<u>Model 3060 Series</u>	<u>Model 3060S Series</u>
Gauges:	Nickel plated brass	316 stainless steel
Body:	Nickel plated brass barstock	303 stainless steel
Bonnet:	Nickel plated brass	Nickel plated brass
Piston:	303 stainless steel	303 stainless steel
Seat:	Vespel	Vespel
Seals:	Viton/Teflon	Viton/Teflon

**Specifications**

Maximum Inlet Pressure:	Model 3060 Series: 6,000 psig (41,400 kPa)
	Model 3060S Series: 10,000 psig (69,000 kPa)
Maximum Flow Rate:	Model 3064: 160 SCFM (4531 SLPM)
(At 5000 psig, N <sub>2</sub> )	Model 3066: 250 SCFM (7080 SLPM)
Flow Capacity (Cv):	0.06
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	8 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
<b>Brass Regulators*</b>				
3064-1/4	200-4000 psig	0-5000 psig	0-7500 psig	\$564.98
3066-1/4	200-6000 psig	0-7500 psig	0-7500 psig	\$564.98
3064-CGA	200-4000 psig	0-5000 psig	0-7500 psig	\$824.10
3066-677	200-6000 psig	0-7500 psig	0-7500 psig	\$1,191.46

\*Note: Some CGA limitations may apply.

**Stainless Steel Regulators\***

3064S-1/4	200-4000 psig	0-5000 psig	0-10,000 psig	\$1,012.70
3066S-1/4	200-6000 psig	0-10,000 psig	0-10,000 psig	\$564.98
3064S-CGA	200-4000 psig	0-5000 psig	0-10,000 psig	\$1,191.46
3066S-677	200-6000 psig	0-10,000 psig	0-10,000 psig	\$1,191.46

\*Note: Some CGA limitations may apply.



**Regulators**

**Model 3120 Series  
Dual-Stage High-Purity Brass Regulator**



**Description**

High-purity brass regulators designed for use with analytical applications. For use with non-corrosive gases.

**Applications**

- Supply of carrier gas/detector support gas for a variety of gas chromatography applications (see table below for details).
- Supply of calibration standards to on-line process analyzers, emission monitoring systems, etc.
- High purity applications with non-corrosive gases requiring a constant delivery pressure.

**Gas Chromatography Detectors requiring the Dual-Stage Model 3120 Series Regulator**

Detector Type	Detection Level
Flame Ionization Detector (FID)	All levels
Thermal Conductivity Detector (TCD)	All levels
Nitrogen Phosphorus Detector (NPD)	All levels
Flame Photometric Detector (FPD)	All levels
Photoionization Detector (PID)	All levels
Helium Ionization Detector (HID)	All levels
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels >50 ppm
Electron Capture Detector (ECD)	Levels >50 ppm

**Design Features/Components**

- High-purity nickel plated brass barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2-1/2" inlet and delivery pressure gauges
- Equipped with outlet diaphragm valve
- Bonnet ported and threaded to pipe gases away from work area
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable
- Optional interstage relief valve available

**Materials of Construction**

Gauges:	Chrome plated brass
Body:	Nickel plated brass barstock
Bonnets:	Stainless steel
Diaphragms:	316 stainless steel
Seats:	1st Stage – Teflon 2nd Stage – Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3121: 130 SCFH (60 SLPM) Model 3122: 300 SCFH (140 SLPM) Model 3126: 500 SCFH (235 SLPM) Model 3128: 500 SCFH (235 SLPM)
(At 2500 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.05
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low, 1 Interstage
Shipping Weight:	5 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3121-CGA	2-30 psig	30" vac-0-60 psig	0-3000 psig	\$318.98
3122-CGA	4-100 psig	30" vac-0-200 psig	0-3000 psig	\$318.98
3126-CGA	10-250 psig	0-400 psig	0-3000 psig	\$318.98
3128-CGA	15-350 psig	0-1000 psig	0-3000 psig	\$318.98

\*Note: Some CGA limitations may apply.

**Options**

Model Number	Description	Price
4753-CGA	Tee Purge Assembly	\$227.14
4774-CGA	Cross Purge Assembly	\$726.52
ADP-0162-BO	Bonnet Venting Adapter to 1/8" NPT (2 Required)	\$9.84
ADP-0163-BO	Bonnet Vent Fitting to 1/8" Hose Barb (2 Required)	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
CON-0070-BO	Swagelok 1/4" Tube Fitting (Brass)	\$20.50
QCA(CGA)-4-B	Cylinder Quick Coupler Inlet	\$40.18
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72

Prices and Specifications Subject to Change without Notice



**Regulators**

**Model 3200 Series  
Single-Stage High-Purity/High Flow Brass and Stainless Steel Regulator**



**Description**

High-purity regulators for use with high flow rate applications.

**Applications**

- Applications requiring a high flow rate, such as purging of large reactor or storage vessels.

**Design Features/Components**

- High-purity nickel plated brass barstock or 316 stainless steel body
- 316 stainless steel diaphragm
- Panel mountable
- Bonnets are ported and threaded to pipe gases away from the work area
- Available as an in-line regulator or a cylinder regulator

**Materials of Construction**

Body: 316 stainless steel or nickel plated brass barstock  
 Bonnet: Stainless steel  
 Diaphragm: Teflon lined 316 stainless steel  
 Seat: Kel-F 81  
 Seals: Teflon

**Specifications**

	<u>In-Line Regulator</u>	<u>Cylinder Regulator</u>
Maximum Inlet Pressure:	3000 psig (20,700 kPa)	3000 psig (20,700 kPa)
Maximum Flow Rate:	See Table Below*	
Flow Capacity (Cv):	1.0	1.0
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)	-40°F to 165°F (-40°C to 74°C)
Inlet Ports:	1/2" NPT Female	1/2" NPT Female
Outlet Ports:	1/2" NPT Female	1/2" NPT Female
Outlet Connection:	None	1/2" tube fitting
Gauge Ports:	1/4" NPT Female	1/4" NPT Female
Bonnet Vent Port:	1/16" FNPT	1/16" FNPT
Shipping Weight:	4 lbs	5 lbs

\* Maximum Flow Rates for In-Line Regulators and Cylinder Regulators (at 2500 psig inlet pressure)

<u>Delivery Pressure</u>	<u>Flow Rate</u>
50 psig	100 SCFM (2832 SLPM)
100 psig	150 SCFM (4248 SLPM)
125 psig	200 SCFM (5664 SLPM)
200 psig	250 SCFM (7080 SLPM)

**Ordering Information**

**In-Line Regulator Models**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
<b>Stainless Steel Models</b>			
3200	0-50 psig	0-100 psig	\$775.72
3201	0-100 psig	30"-0-200 psig	\$775.72
3203	0-150 psig	30"-0-300 psig	\$775.72
3204	0-250 psig	0-400 psig	\$775.72
<b>Brass Models</b>			
3240	0-50 psig	0-100 psig	\$479.70
3241	0-100 psig	30"-0-200 psig	\$479.70
3243	0-150 psig	0-400 psig	\$479.70
3244	0-250 psig	0-400 psig	\$479.70

**Cylinder Regulator Models**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
<b>Stainless Steel Models</b>				
3200-CGA	0-50 psig	0-100 psig	0-3000 psig	\$775.72
3201-CGA	0-100 psig	30"-0-200 psig	0-3000 psig	\$775.72
3203-CGA	0-150 psig	30"-0-300 psig	0-3000 psig	\$775.72
3204-CGA	0-250 psig	0-400 psig	0-3000 psig	\$775.72
<b>Brass Models</b>				
3240-CGA	0-50 psig	0-100 psig	0-3000 psig	\$479.70
3241-CGA	0-100 psig	30"-0-200 psig	0-3000 psig	\$479.70
3243-CGA	0-150 psig	0-400 psig	0-3000 psig	\$479.70
3244-CGA	0-250 psig	0-400 psig	0-3000 psig	\$479.70

Available CGA's:

Brass: 320, 346, 580, 590

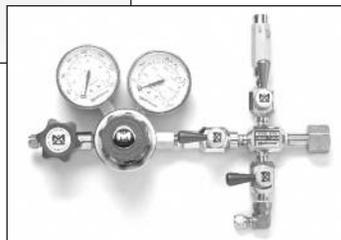
Stainless Steel: 320, 326, 330, 346, 580, 590, 660, 705

**Options**

Model Number	Description	Price
63-2233	Inlet Pressure Gauge, 0-3000 psig –	\$79.54
316 Stainless Steel Gauge	For use with Model 3200-3204 Stainless Steel In-Line Regulators	
63-3133	Inlet Pressure Gauge, 0-3000 psig –	\$28.70
Chrome Plated Brass Gauge	For use with Model 3240-3244 Brass In-Line Regulators	
KIT-0204-SA	Panel Mounting Kit	\$33.62
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72



## Model 3210 Series Single-Stage Deluxe Corrosion Resistant Monel Regulator



*Shown with optional cross purge.*

### Description

Corrosive service regulators constructed of Monel for superior corrosion resistance.

### Applications

- Pressure regulation of acid forming halogen gases, such as hydrogen chloride, chlorine, hydrogen fluoride, hydrogen bromide, and silicon tetrafluoride; and fluorine (Model 3225A)
- Dispensing of corrosive calibration gases.
- Research and development applications where a corrosion resistant regulator is required for either corrosive ambient conditions or corrosive gas service.
- Applications requiring extended regulator lifespan in severe conditions.

### Design Features/Components

- Monel construction for excellent corrosion resistance
- Kel-F seat material for use with chlorinated compounds
- Bronze filled Teflon® for fluorinated compounds (Model 3225A)
- 2-1/2" Monel gauges
- Equipped with Monel needle valve on outlet
- Porous metal filter protects seat from contamination
- 1/4" NPTM outlet connection
- 1/4" compression tube outlet connection available as an option

### Materials of Construction

Gauges:	Monel
Body:	Monel
Bonnet:	Chrome-plated brass
Diaphragm:	Monel
Valve Stem:	Monel
Valve Spring:	Monel
Seat:	Kel-F
Seat (Model 3225A):	Bronze filled Teflon®
Seals:	Kel-F

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa) Model 3225A: 1000 psig (6900 kPa)
Maximum Flow Rate: (at 2000 psig, N <sub>2</sub> )	Model 3215A, 3217A, and 3219A: 1500 SCFH (700 SLPM) Model 3216A, 3218A, 3220A: 600 SCFH (280 SLPM) Model 3225A: 450 SCFH (210 SLPM)
Flow Capacity (Cv):	0.195
Operating Temperature:	-20°F to 150°F (7°C to 66°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	6 lbs

### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3215A-CGA	1-50 psig	0-100 psig	none	\$922.50
3216A-CGA	3-200 psig	0-300 psig	none	\$922.50
3217A-CGA	1-50 psig	0-100 psig	0-1000 psig	\$922.50
3218A-CGA	3-200 psig	0-300 psig	0-1000 psig	\$922.50
3219A-CGA	1-50 psig	0-100 psig	0-3000 psig	\$922.50
3220A-CGA	3-200 psig	0-300 psig	0-3000 psig	\$922.50
3225A-670	1-50 psig	0-100 psig	0-1000 psig	\$1,717.08
3225A-679	1-50 psig	0-100 psig	0-1000 psig	\$1,717.08
3225A-DIN8	1-50 psig	0-100 psig	0-1000 psig	\$1,648.20

\*Note: Some CGA limitations may apply.

### Options

Model Number	Description	Price
4755-CGA	Tee Purge Assembly	\$227.14
4775-CGA	Cross Purge Assembly	\$726.52
CON-0208-MA	1/4" Compression Tube Outlet Fitting (Monel)	\$13.12
402	Check Valve – Monel	\$106.60

*Prices and Specifications Subject to Change without Notice*



**Regulators**

**Models 3320 Series  
Single-Stage Economy Non-Corrosive  
Lecture Bottle Regulator**



**Description**

An economical and compact regulator for use with non-corrosive gases in lecture bottles.

**Applications**

- Non-corrosive gases in lecture bottles

**Design Features/Components**

- Forged brass body
- Neoprene diaphragm
- 1-1/2" inlet and delivery pressure gauges
- Equipped with needle valve
- 1/8" NPTM outlet connection
- Porous metal filter protects seat from contamination
- Hose barb supplied for outlet
- CGA 170 connection is standard

**Materials of Construction**

Gauges:	Chrome plated brass
Body:	Brass
Bonnet:	Chrome plated die cast zinc
Diaphragm:	Neoprene
Seat:	Kel-F
Seals:	Neoprene

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3320: 175 SCFH (83 SLPM)
(At 2000 psig, N <sub>2</sub> )	Model 3321: 175 SCFH (83 SLPM)
	Model 3322: 50 SCFH (24 SLPM)
Flow Capacity (Cv):	0.08 (without needle valve)
Operating Temperature:	-20°F to 140°F (-29°C to 60°C)
Porting (Regulator Body):	1/8" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	7 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3320 (CGA 170)*	4-60 psig	0-100 psig	0-3000 psig	\$169.74
3321 (CGA 170)	4-60 psig	0-100 psig	None	\$169.74
3322 (CGA 170)	2-15 psig	0-30 psig	0-3000 psig	\$169.74

Other CGA Connections Available for 3320 Series: 320, 350, 510, 540, 580, 590

**Options**

Model Number	Description	Price
WAS-0038-NA	Gaskets for CGA 170	\$4.10

**Model 3330 Series  
Economy Corrosive Service Lecture  
Bottle Regulator**



**Description**

Compact and economical regulator for use with most corrosive gases sold in lecture bottles.

**Applications**

- Use with low pressure (1-6 psig) applications with corrosive gases in lecture bottles; if higher pressures are required, use the 3570 Series Mini Regulator

**Design Features/Components**

- PVC body
- Teflon diaphragm
- 1-1/2" delivery pressure gauge
- Porous metal filter protects seat from contamination
- Equipped with outlet needle valve
- 1/4" NPTM outlet connection

**Materials of Construction**

Gauge:	316 stainless steel
Body:	Polyvinyl chloride
Bonnet:	Polyvinyl chloride
Diaphragm:	Teflon
Seat:	Kel-F
Seals:	Teflon
Trim:	316 stainless steel

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3331: 500 SCCM
(At 2000 psig, N <sub>2</sub> ):	Model 3332: 90 SCFH (40 SLPM)
Flow Capacity (Cv):	0.011
Operating Temperature:	30°F to 120°F (-1°C to 49°C)
Porting (Regulator Body):	Inlet - 1/8" NPT Female
	Gauge/Outlet - 1/4" NPT Female
Porting Configuration:	1 High, 2 Low
Shipping Weight:	2 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
3331 (CGA 180)	0-18" water column	None	\$756.04
3332 (CGA 180)	1-6 psig	0-15 psig	\$756.04

**Options**

Model Number	Description	Price
4754-180	Tee Purge Assembly	\$266.50
401V	Outlet Check Valve - Stainless/Viton	\$67.24
WAS-0039-PB	Gaskets for CGA 180	\$1.64
504	Wall Mount Bracket for Lecture Bottles	\$43.46
505	Non-Tip Stand for Lecture Bottles	\$42.64

Prices and Specifications Subject to Change without Notice



**Regulators**

**Models 3344 and 3345  
MicroMATE™ Portable Cylinder Regulators  
Brass Preset Flow Rate Regulators**



**Description/Application**

Preset flow regulators for use with MicroMAT™-58 and MicroMAT™-105 cylinders. For use with portable and/or laboratory instrumentation that requires calibration.

**Design Features**

- Brass bodies
- Brass pistons
- Hose barb outlet – 3/16"
- Push button on/off mechanism
- 0.3 SLPM standard preset flow rate; also available: 0.5, 1.0, 1.5, 2.5 SLPM
- 30 psig delivery pressure
- Cylinder pressure gauge:

3344: 0 - 500 psig  
3345: 0 - 1200 psig

**Materials of Construction**

Body: Nickel plated brass  
Piston: Brass  
Seat: Teflon  
Seals: Viton  
Gauge: Nickel plated brass

**Ordering Information**

Model Number*	Description	Price
3344-C10	3344 Regulator with C10 Fitting and 0.3 SLPM Flow Rate	\$84.46
3344-C10C	3344 Regulator with C10 Fitting and 0.5 SLPM Flow Rate	\$84.46
3344-C10E	3344 Regulator with C10 Fitting and 1.0 SLPM Flow Rate	\$84.46
3344-C10F	3344 Regulator with C10 Fitting and 1.5 SLPM Flow Rate	\$84.46
3344-C10G	3344 Regulator with C10 Fitting and 2.5 SLPM Flow Rate	\$84.46
3345-C10	3345 Regulator with C10 Fitting and 0.3 SLPM Flow Rate	\$84.46
3345-C10C	3345 Regulator with C10 Fitting and 0.5 SLPM Flow Rate	\$84.46
3345-C10E	3345 Regulator with C10 Fitting and 1.0 SLPM Flow Rate	\$84.46
3345-C10F	3345 Regulator with C10 Fitting and 1.5 SLPM Flow Rate	\$84.46
3345-C10G	3345 Regulator with C10 Fitting and 2.5 SLPM Flow Rate	\$84.46

\* Models available with other CGA's

**Accessories**

Model Number	Description	Price
<b>MicroMATE™ Accessory Kit</b>		
CKIT-GENL	Complete MicroMATE™ Accessory Kit, Including Carrying Case, Tygon Tubing with Sensor Head Assembly, and Wrench (individual components listed below)	\$205.82
<b>Individual Kit Components</b>		
CAS-0030-XX	Carrying Case	\$103.32
TBG-0077-QF	Tygon Tubing	\$4.10
SEN-0021-PD	Sensor Head Assembly	\$61.50
WRC-0013-XX	Wrench	\$21.32



**Regulators**

**Models 3347 Series  
MicroMATE™ Portable Cylinder Regulators  
Variable Flow Rate Brass Regulator**



**Description/Applications**

Variable flow regulators for use with MicroMAT™ 14, MicroMAT™ 105, and MicroMAT™ 221 cylinders. For use with portable and/or laboratory instrumentation that requires calibration.

**Design Features/Components**

- Brass body
- Stainless steel pistons
- Hose barb outlet
- Selectable flow rates from 0-3 SLPM: 0.3, 0.5, 0.7, 0.9, 1.2, 1.5, 2.0, 2.5, 3.0
- 50 psig delivery pressure

**Materials of Construction**

Body: Nickel plated brass  
Piston: 316 stainless steel  
Seat: Teflon  
Seals: Viton  
Gauge: Nickel plated brass

**Ordering Information**

Model Number	Description	Price
3347-160	3347 Regulator with CGA 160, Variable Flow	\$121.36
3347-C10	3347 Regulator with C10 fitting, Variable Flow	\$121.36
3347-165	3347 Regulator with CGA 165, Variable Flow	\$121.36

**Models RFM-0029-XX and RFM-0030-XX  
MicroMATE™ Portable Cylinder Regulators  
Low Flow / Low Pressure Aluminum Regulator**



RFM-0030-XX  
(without flowmeter)

**Description/Applications**

Aluminum regulators for use with MiniMAT™ cylinders. Air monitoring for PEL and LEL levels.

**Design Features/Components**

- Aluminum body
- Hose barb outlet – 1/4"
- 30 psig delivery pressure
- Available with 0-1.5 SLPM adjustable flow rate and flowmeter (RFM-0029-XX), 0.5 SLPM preset flow rate (RFM-0030-XX)

**Materials of Construction**

Body: Anodized aluminum  
Diaphragm: 316 stainless steel  
Seat: Teflon PFA  
Seals: Teflon  
Gauge: 316 stainless steel

**Ordering Information**

Model Number	Description	Use with these Cylinders	Cylinder Pressure	Cylinder Outlet Connection	Cylinder Pressure Gauge	Price
RFM-0029-XX	RFM Regulator with flowmeter	MiniMAT™, MiniMAT™-MS	1800 psig	CGA 180	0-3000 psig	\$633.86
RFM-0030-XX	RFM Regulator with 0.5 SLPM preset flow rate	MiniMAT™, MiniMAT™-MS	1800 psig	CGA 180	0-3000 psig	\$231.24



## Models 3359 MicroMATE™ Portable Cylinder Regulator Stainless Steel Preset Flow Rate Regulator



### Description/Applications

Preset flow rate regulators for use with MicroMAT™ 58 cylinders. For use in the calibration of gas detection instrumentation.

### Design Features

- Stainless steel body
- Stainless steel pistons
- Hose barb outlet – 3/16"
- Control Knob on/off
- 0.3 SLPM standard preset flow rate; also available: 0.5, 1.0, 1.5, 2.5 SLPM
- 30 psig delivery pressure

### Materials of Construction

Body:	316 stainless steel
Piston:	316 stainless steel
Seat:	Teflon
Seals:	Viton
Gauge:	316 stainless steel

### Ordering Information

Model Number*	Description	Price
3359-C10	3359 Regulator with C10 Fitting and 0.3 SLPM Flow Rate	\$169.74
3359-C10C	3359 Regulator with C10 Fitting and 0.5 SLPM Flow Rate	\$169.74
3359-C10E	3359 Regulator with C10 Fitting and 1.0 SLPM Flow Rate	\$169.74
3359-C10F	3359 Regulator with C10 Fitting and 1.5 SLPM Flow Rate	\$169.74
3359-C10G	3359 Regulator with C10 Fitting and 2.5 SLPM Flow Rate	\$169.74

\*Models available with other CGA's

### Accessories

Model Number	Description	Price
<b>MicroMATE™ Accessory Kit</b>		
CKIT-GENL	Complete MicroMATE™ Accessory Kit, Including Carrying Case, Tygon Tubing with Sensor Head Assembly, and Wrench (individual components listed below)	\$205.82
<b>Individual Kit Components</b>		
CAS-0030-XX	Carrying Case	\$103.32
TBG-0077-QF	Tygon Tubing	\$4.10
SEN-0021-PD	Sensor Head Assembly	\$61.50
WRC-0013-XX	Wrench	\$21.32



## Model 3396

### Single-Stage High-Purity Absolute Pressure Brass Regulator



#### Description

High-purity brass regulators designed for control of subatmospheric pressures with non-corrosive gases.

#### Applications

- Applications requiring subatmospheric pressure control (28" Hg vac - 15 psig)

#### Design Features/Components

- High-purity brass barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals
- 2-1/2" inlet and delivery pressure gauges
- Equipped with nickel plated brass packless outlet valve with diaphragm seal
- Porous metal filter protects seat from contamination
- 1/4" compression tube outlet connection
- Body threaded for panel mounting
- Body screw thread tapped for back mounting

#### Materials of Construction

Gauges:	Chrome plated brass
Body:	Nickel plated brass
Bonnet:	Stainless steel
Diaphragm:	316 stainless steel
Spring:	316 stainless steel
Seat:	Teflon
Seals:	Metal to metal

#### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Inlet Pressure Gauge:	0-3000 psig
Maximum Flow Rate:	254 SCFH (120 SLPM)
	(At 2000 psig inlet, 15 psig delivery)
Flow Capacity (Cv):	0.06
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	5 lbs

#### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Price
3396-CGA	28" Hg vac-15 psig (728 mm Hg vac-103 kPa)	30" Hg vac-30 psig (100 kPa vac-200 kPa)	\$383.76

\*Available CGA connections: 296, 320, 326, 346, 350, 540, 580 and 590.



**Regulators**

**Model 3420 Series  
High-Purity Brass Line Regulator**



**Description**

High-purity brass line regulator designed for analytical applications with non-corrosive gases.

**Applications**

- Point-of-use regulation of high-purity gases used in chromatography or other analytical applications (see table below for details)

**Design Features/Components**

- High purity nickel plated brass barstock bodies
- High purity 316 stainless steel diaphragms
- Metal to metal seals minimize diffusion of contaminants
- 2-1/2" delivery pressure gauge
- Equipped with outlet diaphragm valve
- 1/4" compression tube inlet/outlet connection
- Porous metal filter protects seat from contamination
- Bonnet threaded for panel mounting
- Body screw thread tapped for back mounting

**Materials of Construction**

Gauge:	Chrome plated brass
Body:	Nickel plated brass barstock
Bonnet:	Stainless steel
Diaphragm:	316 stainless steel
Seat:	PFA Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	400 psig (2,760 kPa)
Maximum Flow Rate:	Model 3421: 180 SCFH (85 SLPM)
(At 400 psig, N <sub>2</sub> ):	Model 3423: 630 SCFH (300 SLPM)
	Model 3425: 850 SCFH (400 SLPM)
Flow Capacity (Cv):	0.15
Operating Temperature:	-15°F to 165°F (-26°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	1 High, 3 Low
Shipping Weight:	5 lbs

**Gas Chromatography Detectors requiring the Model 3420 Series Line Regulator**

Detector Type	Detection Level
Flame Ionization Detector (FID)	All levels
Thermal Conductivity Detector (TCD)	All levels
Nitrogen Phosphorus Detector (NPD)	All levels
Flame Photometric Detector (FPD)	All levels
Photoionization Detector (PID)	All levels
Helium Ionization Detector (HID)	All levels
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels >50 ppm
Electron Capture Detector (ECD)	Levels >50 ppm

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Description	Price
3421	2-30 psig	30" vac-0-60 psig	3421 w/valve, 1/4" compression	\$261.58
3421-2	2-30 psig	30" vac-0-60 psig	3421 w/valve, 1/8" compression	\$165.64
3421-NV	2-30 psig	30" vac-0-60 psig	3421 no valve, 1/4" compression	\$136.94
3421-NV-2	2-30 psig	30" vac-0-60 psig	3421 no valve, 1/8" compression	\$138.58
3423	4-100 psig	30" vac-0-200 psig	3423 w/valve, 1/4" compression	\$182.04
3423-2	4-100 psig	30" vac-0-200 psig	3423 w/valve, 1/8" compression	\$183.68
3423-NV	4-100 psig	30" vac-0-200 psig	3423 no valve, 1/4" compression	\$132.03
3423-NV-2	4-100 psig	30" vac-0-200 psig	3423 no valve, 1/8" compression	\$134.48
3425	10-250 psig	0-400 psig	3425 w/valve, 1/4" compression	\$184.50
3425-2	10-250 psig	0-400 psig	3425 w/valve, 1/8" compression	\$186.14
3425-NV	10-250 psig	0-400 psig	3425 no valve, 1/4" compression	\$134.48
3425-NV-2	10-250 psig	0-400 psig	3425 no valve, 1/8" compression	\$136.94

**Options**

Model Number	Description	Price
ADP-0163-BO	Bonnet Vent Fitting to 1/8" Hose	\$9.84
ADP-0162-BO	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
CON-0070-BO	Swagelok 1/4" Tube Fitting (Brass) (2 Required)	\$20.50
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72

Note: These regulators cannot be supplied with CGA connections



**Regulators**

**Model 3430 Series  
High-Purity Stainless Steel Line Regulator**



**Description**

High-purity stainless steel line regulators designed for analytical applications with non-corrosive or semi-corrosive gases.

**Applications**

- Point-of-use pressure regulation of high-purity gases used in chromatography or other analytical applications (see table below for details)

**Gas Chromatography Detectors requiring the Model 3230 Series Line Regulator**

Detector Type	Detection Level
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels <50 ppm
Electron Capture Detector (ECD)	Levels <50 ppm
Mass Selective Detector or Mass Spec (MSD or MS)	All levels
Atomic Emission Detector (AED)	All levels

*Note: A small amount of polychlorotrifluoroethylene is added to the threads to facilitate assembly. For ECD, MS or AED applications where method detection limits are sub-ppm, it is recommended to use a No Lube (-NL) model.*

**Design Features/Components**

- High-purity 316 stainless steel barstock body construction.
- High-purity 316 stainless steel diaphragms
- Metal to metal seals minimize diffusion of contaminants
- 2" delivery pressure gauge
- Bonnet ported and threaded to pipe gases away from work area
- Bonnet threaded for panel mounting
- Body screw thread tapped for back mounting
- Equipped with outlet diaphragm valve
- Porous metal filter protects seat from contamination
- 1/4" compression tube inlet/outlet connection (1/4" FPT optional)
- Additional low pressure port is included

**Materials of Construction**

Gauge:	316 stainless steel
Body:	316 stainless steel
Bonnets:	Stainless steel
Diaphragm:	316 stainless steel
Seat:	Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	400 psig (2,760 kPa)
Maximum Flow Rate:	Model 3431: 180 SCFH (85 SLPM)
(At 400 psig, N <sub>2</sub> ):	Model 3432: 630 SCFH (300 SLPM)
	Model 3433: 850 SCFH (400 SLPM)
Flow Capacity (Cv):	0.15
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	1 High, 3 Low
Shipping Weight:	5 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
3431	2-30 psig	30" vac-0-60 psig	\$372.28
3431-NV (No Valve)	2-30 psig	30" vac-0-60 psig	\$264.86
3432	4-100 psig	30" vac-0-200 psig	\$446.90
3432-NV (No Valve)	4-100 psig	30" vac-0-200 psig	\$275.52
3433	10-250 psig	0-400 psig	\$372.28
3433-NV (No Valve)	10-250 psig	0-400 psig	\$213.20

*Note: These regulators cannot be supplied with CGA connections rated higher than 400 psig.*

**Options**

Model Number	Description	Price
ADP-0162-SA	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
CON-0070-SA	Swagelok 1/4" Tube Fitting (2 Required)	\$20.50
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72

*Prices and Specifications Subject to Change without Notice*



**Regulators**

**Models 3450 Series**  
**High-Purity/High Flow Stainless Steel Line Regulator**



**Design Features/Components**

- High-purity 316L stainless steel body
- 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2" delivery pressure gauge
- Bonnet ported and threaded to pipe gases away from work area
- Equipped with outlet diaphragm valve
- 1/4" compression tube inlet/outlet connection
- Porous metal filter protects seat from contamination
- Bonnet threaded for panel mounting
- Body screw thread tapped for back mounting

**Materials of Construction**

Gauges:	316 stainless steel
Body:	316L stainless steel
Bonnet:	Stainless steel
Diaphragm:	316 stainless steel
Seat:	Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	500 psig (3,450 kPa)
Maximum Flow Rate:	Model 3452: 900 SCFH (425 SLPM) Model 3454: 1800 SCFH (850 SLPM)
(At 500 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.6
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	1 High, 2 Low
Shipping Weight:	5 lbs

**Description**

A high purity line regulator for use with non-corrosive or semi-corrosive gases including dichlorosilane, ammonia, or amines in high flow applications.

**Applications**

- Point-of-use regulation of gases in high purity, high flow applications (up to 730 SCFH).

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Price
3452	2-30 psig	30" vac-0-60 psig	\$702.74
3454	4-100 psig	30" vac-0-200 psig	\$673.22
3452-678**	2-30 psig	30" vac-0-60 psig	\$722.42

\*Note: This Series cannot be supplied with CGA connections rated higher than 500 psig.

\*\*For Dichlorosilane only

**Options**

Model Number	Description	Price
ADP-0162-SA	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
OPN-0301-SA	Swagelok 1/4" Tube Fitting (Stainless Steel) (2 Required)	\$84.46
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72



**Regulators**

**Model 3470 Series  
Economy General Purpose  
Line Regulator**



**Description**  
Economical line regulators for general purpose applications.

**Applications**  
• Point-of-use pressure regulation of inert gases.

**Design Features/Components**

- General purpose brass body
- General purpose neoprene diaphragm
- 2" delivery pressure gauge
- Rear inlet with bottom outlet for easy installation
- Equipped with an outlet needle valve
- Porous metal filter protects seat from contamination
- 1/4" NPTM inlet and outlet connections

**Materials Of Construction**

Gauge: Chrome plated brass  
 Body: Brass  
 Bonnet: Chrome plated die-cast zinc  
 Diaphragm: Neoprene  
 Seat: Neoprene  
 Seals: Neoprene

**Specifications**

Maximum Inlet Pressure: 350 psig (2,415 kPa)  
 Maximum Flow Rate: Model 3471: 280 SCFH (132 SLPM)  
 (At 300 psig, N<sub>2</sub>) Model 3473: 750 SCFH (354 SLPM)  
 Model 3476: 1600 SCFH (755 SLPM)  
 Model 3478: 2300 SCFH (1085 SLPM)  
 Flow Capacity (Cv): 0.53  
 Operating Temperature: -20°F to 140°F (-29°C to 60°C)  
 Porting (Regulator Body): 1/4" NPT Female  
 Porting Configuration: 1 High, 2 Low  
 Shipping Weight: 7 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
3471-A	2-15 psig	0-30 psig	\$169.74
3473-A	4-50 psig	0-60 psig	\$169.74
3476-A*	4-125 psig	0-200 psig	\$169.74
3478-A*	20-200 psig	0-400 psig	\$169.74

\*Supplied with T-Bar instead of black knob handle.  
 Note: The Model 3470 Series cannot be supplied with CGA connections.

**Model 3491  
Economy Vacuum Line Regulator**



**Description**  
Economical line regulator for vacuum applications.

**Applications**

- Point-of-use regulation of non-corrosive gases (1.8 psig – 1 mm Hg absolute)
- Atmospheric chamber studies
- Biological research
- Environmental atmosphere studies

**Design Features/Components**

- Economical brass body
- Butyl rubber diaphragm
- 3-1/2" delivery pressure gauge
- 1/4" NPTM inlet and outlet connections
- Porous metal filter protects seat from contamination
- Hose connections supplied as standard
- Rear inlet with bottom outlet for easy installation

**Materials of Construction**

Gauge: Chrome plated brass  
 Body: Brass  
 Diaphragm: Butyl rubber  
 Seat: Viton

**Specifications**

Maximum Inlet Pressure: 120 psig\*  
 Operating Temperature: -20°F to 140°F (-30°C to 60°C)  
 Flow Capacity (Cv): 0.64  
 Shipping Weight: 5 lbs

\*Recommended minimum inlet pressure 20 psig to attain full delivery pressure range. Optimum inlet pressure 50 psig.  
 Note: Hose connection for outlet supplied as standard.

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
3491A	1.8 psig to 1 mm Hg abs.	760 mm Hg vac/0-5 psig	\$209.10

**Options**

Model Number	Description	Price
6005-3232	2 ft. Hose Assembly - to connect the inlet of the Model 3491 regulator to the outlet of a high pressure regulator (such as a Model 1L) when supply gas pressure exceeds 120 psig (828 kPa). Maximum pressure: 250 psig	\$27.06



**Regulators**

**Models 3494**

**High-Purity Absolute Pressure Line Stainless Steel Regulator**



**Description**

High-purity stainless steel line regulator for absolute pressure applications.

**Applications**

- Corrosive or high purity absolute pressure applications (delivery pressure from sub-atmospheric to 15 psig).

**Design Features/Components**

- High-purity 316 stainless steel body
- 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2" delivery pressure gauge
- 1/4" compression tube inlet/outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable
- Adjustable stop limits maximum delivery pressure

**Materials of Construction**

Body: 316L stainless steel  
 Seat: Teflon  
 Remaining Components: 316 stainless steel & Elgiloy

**Specifications**

Gauge: 316 stainless steel  
 Inlet Pressure: Atmospheric to 120 psig (828 kPa)  
 Outlet Pressure: 760 mm Hg vacuum to 15 psig (103 kPa)  
 Operating Temperature: -40°F to 165°F (-40°C to 74°C)  
 Porting Configuration: 1 High, 2 Low  
 Max. Inboard Leakage:  $2 \times 10^{-8}$  cc/sec Helium  
 Flow Capacity (Cv): 0.24  
 Shipping Weight: 4 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
3494	28" Hg vac-0-15 psig	30" Hg vac-0-30 psig	\$734.72
	728 mm Hg vac-0-103 kPa	100 kPa vac-0-200 kPa	

**Options**

Model Number	Description	Price
6042	1.5 ft Flex Hose Assembly - to connect inlet of the Model 3494 regulator to the outlet of a high pressure regulator when supply gas pressure exceeds 120 psig (828 kPa).	\$123.82



**Regulators**

**Model 3510 Series  
Single-Stage High-Purity Stainless Steel Regulator**



**Description**

High purity regulators designed for analytical applications using non-corrosive or semi-corrosive gases.

**Applications**

- Supply of carrier gas/detector support gas for a variety of gas chromatography applications (see table below for details).
- Supply of calibration standards to on-line process analyzers, emission monitoring systems, etc.

**Gas Chromatography Detectors requiring the Single-Stage Model 3510 Series Regulator**

Detector Type	Detection Level
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels <50 ppm
Electron Capture Detector (ECD)	Levels <50 ppm
Mass Selective Detector or Mass Spec (MSD or MS)	All levels
Atomic Emission Detector (AED)	All levels

*Note: A small amount of polychlorotrifluoroethylene is added to the threads to facilitate assembly. For ECD, MS or AED applications where method detection limits are sub-ppm, it is recommended to use a No Lube (-NL) model.*

**Design Features/Components**

- High-purity 316 stainless steel barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2" inlet and delivery pressure gauges
- Bonnet ported and threaded to pipe gases away from work area
- Equipped with outlet diaphragm valve
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable

**Materials of Construction**

Gauges:	316 stainless steel
Body:	316 stainless steel
Bonnets:	Stainless steel
Diaphragms:	316 stainless steel
Seat:	Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3510: 550 SCFH (260 SLPM) (At 2500 psig, N <sub>2</sub> ) Model 3511: 135 SCFH (60 SLPM) (At 300 psig, N <sub>2</sub> ) Model 3512: 210 SCFH (100 SLPM) (At 1000 psig, N <sub>2</sub> ) Model 3513: 210 SCFH (100 SLPM) (At 2500 psig, N <sub>2</sub> ) Model 3515: 550 SCFH (At 1000 psig, N <sub>2</sub> ) Model 3516: 1350 SCFH (640 SLPM) (At 2500 psig, N <sub>2</sub> )
Flow Capacity (Cv):	0.06
Operating Temperature:	-15°F to 165°F (-26°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Optional Porting:	3 High, 3 Low
Shipping Weight:	5 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3510-CGA	4-100 psig	30" vac-0-200 psig	0-3000 psig	\$479.70
3511-N/I	2-30 psig	30" vac-0-60 psig	30" vac-0-300 psig	\$479.70
3512-CGA	2-30 psig	30" vac-0-60 psig	0-1000 psig	\$479.70
3513-CGA	2-30 psig	30" vac-0-60 psig	0-3000 psig	\$479.70
3515-CGA	4-100 psig	30" vac-0-200 psig	0-1000 psig	\$479.70
3516-CGA	10-250 psig	30" vac-0-300 psig	0-3000 psig	\$479.70
3517-CGA	20-500 psig	0-1000 psig	0-3000 psig	\$479.70

For No Lube applications, specify Model Numbers 35XX-NL-CGA.

\*Note: Some CGA limitations may apply.

**Options**

Model Number	Description	Price
4754-CGA	Tee Purge Assembly	\$227.14
4774-CGA	Cross Purge Assembly	\$726.52
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
ADP-0162-SA	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
OPN-0301-SA	Swagelok 1/4" Tube Fitting (Stainless Steel)	\$84.46
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72

*Prices and Specifications Subject to Change without Notice*



**Regulators**

**Model 3530 Series  
Single-Stage High-Purity Brass Regulator**



**Description**

High-purity regulators designed for analytical applications. Use with non-corrosive gases.

**Applications**

- Supply of carrier gas / detector support gas for a variety of gas chromatography applications (see table below for details)
- Supply of calibration standards to on-line process analyzers, emission monitoring systems, etc.

**Gas Chromatography Detectors requiring the Single-Stage Model 3530 Series Regulator**

Detector Type	Detection Level
Flame Ionization Detector (FID)	All levels
Thermal Conductivity Detector (TCD)	All levels
Nitrogen Phosphorus Detector (NPD)	All levels
Flame Photometric Detector (FPD)	All levels
Photoionization Detector (PID)	All levels
Helium Ionization Detector (HID)	All levels
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels >50 ppm
Electron Capture Detector (ECD)	Levels >50 ppm

**Design Features/Components**

- High-purity nickel plated brass barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2-1/2" inlet and delivery pressure gauges
- Equipped with outlet diaphragm valve
- Bonnet ported and threaded to pipe gases away from work area
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable

**Materials of Construction**

Gauges:	Chrome plated brass
Body:	Nickel plated brass barstock
Bonnet:	Stainless steel
Diaphragm:	316 stainless steel
Seat:	Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3536: 1350 SCFH (600 SLPM) Model 3537: 215 SCFH (95 SLPM) Model 3538: 215 SCFH (95 SLPM) Model 3539: 550 SCFH (240 SLPM)
(At 2500 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.06
Operating Temperature:	-15°F to 165°F (-26°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low Model 3539: 3 High, 3 Low
Optional Porting:	3 High, 3 Low (Models 3536, 3537, 3538)
Shipping Weight:	5 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3537-CGA	2-30 psig	30" vac-0-60 psig	0-3000 psig	\$242.72
3538-CGA	2-30 psig	30" vac-0-60 psig	0-1000 psig	\$242.72
3539-CGA	4-100 psig	30" vac-0-200 psig	0-3000 psig	\$242.72
3536-CGA	10-250 psig	0-400 psig	0-3000 psig	\$242.72

\*Note: Some CGA limitations may apply.

**Options**

Model Number	Description	Price
4753-CGA	Tee Purge Assembly	\$227.14
4774-CGA	Cross Purge Assembly	\$726.52
ADP-0163-BO	Bonnet Vent Adapter to 1/8" Hose	\$9.84
ADP-0162-BO	Bonnet Vent Adapter to 1/8" FNPT	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
CON-0070-BO	Swagelok 1/4" Tube Fitting (Brass)	\$20.50
QCA(CGA)-4-B	Cylinder Quick Coupler Inlet	\$40.18
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72



**Regulators**

**Model 3550, 3570 Series**  
**Single-Stage High-Purity Miniature Regulators**

**Model 3850, 3870 Series**  
**Dual-Stage High-Purity Miniature Regulators**



**Description**

Compact, high-purity regulators for use with small cylinders.

**Applications**

- Applications requiring high-purity gases and a compact regulator due to space limitations.

**Design Features/Components**

- High-purity nickel plated brass barstock or 316L stainless steel body available
- High-purity 316 stainless steel diaphragm
- 1-1/2" inlet and delivery pressure gauges
- 1/4" NPTF outlet connection
- Porous metal filter protects seat from contaminants
- Panel mountable
- 0-3000 psig cylinder pressure gauge

**Materials of Construction**

- Gauges: Chrome plated brass or 316 stainless steel
- Body: 316L stainless steel or nickel plated brass
- Diaphragm: 316 stainless steel
- Seat: Kel-F 81
- Seals: Teflon

**Specifications**

- Maximum Inlet Pressure: 3000 psig (20,700 kPa)
- Maximum Flow Rate: 11 SCFH (5 SLPM)
- Flow Capacity (Cv): 0.06
- Operating Temperature: -40°F to 140°F (-40°C to 60°C)
- Porting (Regulator Body): 1/4" NPT Female
- Gauge Ports: 1/8" NPT Female
- Porting Configuration: 2 Low, 2 High
- Shipping Weight: 2 lbs

**Ordering Information**

Model Number*	Regulator Type	Body Construction	Delivery Pressure Range	Delivery Pressure Gauge	Price
3551-CGA	Single-Stage	Brass	0-30 psig	0-60 psig	\$192.70
3552-CGA	Single-Stage	Brass	0-60 psig	0-100 psig	\$192.70
3553-CGA	Single-Stage	Brass	0-100 psig	0-200 psig	\$192.70
3571-CGA	Single-Stage	Stainless Steel	0-30 psig	0-60 psig	\$296.02
3572-CGA	Single-Stage	Stainless Steel	0-60 psig	0-100 psig	\$296.02
3573-CGA	Single-Stage	Stainless Steel	0-100 psig	0-200 psig	\$296.02
3851-CGA	Dual-Stage	Brass	0-30 psig	0-60 psig	\$296.02
3852-CGA	Dual-Stage	Brass	0-60 psig	0-100 psig	\$296.02
3853-CGA	Dual-Stage	Brass	0-100 psig	0-200 psig	\$296.02
3871-CGA	Dual-Stage	Stainless Steel	0-30 psig	0-60 psig	\$508.40
3872-CGA	Dual-Stage	Stainless Steel	0-60 psig	0-100 psig	\$508.40
3873-CGA	Dual-Stage	Stainless Steel	0-100 psig	0-200 psig	\$508.40

\*Note: Some CGA limitations may apply.



**Regulators**

**Model 3590 Series  
Low Dead Volume Stainless Steel Regulator**



**Design Features/Components**

- High-purity stainless steel body
- High-purity stainless steel diaphragm
- Metal to metal seals
- Low dead volume minimizes contamination and adsorption
- 1/8" compression tube outlet connection
- 3590-TO model specially cleaned to remove all VOC compounds

**Materials of Construction**

Body:	316 stainless steel
Bonnet:	Nickel plated brass
Diaphragm:	316 stainless steel
Seat:	Kel-F
Seals:	Silver

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	21 SCFH (10 SLPM)
(At 2000 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.04
Operating Temperature:	-40°F to 200°F (-40°C to 93°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	1 High, 1 Low
Shipping Weight:	4 lbs

**Description**

High-purity stainless steel regulator with a minimal (7 cubic centimeters) internal volume to minimize contamination.

**Applications**

- Use with mixtures containing trace quantities of reactive and/or adsorptive gases or vapors
- Use with EPA protocols, NIST traceability experiments, and trace impurity analysis
- The 3590-TO is specially cleaned for use with TO-14 calibration standards

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3590A-CGA	2-100 psig	None	None	\$594.50
3590-TO-CGA	2-100 psig	None	None	\$897.08

\*Note: Some CGA limitations may apply.

**Options**

Model Number	Description	Price
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72



## Model 3610A Series Single-Stage High-Purity Stainless Steel Regulator with Tied Diaphragm



### Description

High-purity regulators designed for analytical applications using corrosive, toxic, or pyrophoric gases.

### Applications

- Supply of corrosive, toxic, or pyrophoric gases where a positive closure of the regulator is desired.
- Supply of corrosive/toxic gases to semiconductor manufacturing processes.

### Design Features/Components

- High-purity 316 stainless steel barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2" inlet and delivery pressure gauges
- Bonnet ported and threaded to pipe gases away from the work area

- Tied seat design helps to ensure regulator closure
- Equipped with outlet diaphragm valve
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Panel mountable from rear with two threaded holes

### Materials of Construction

Gauges:	316 stainless steel
Body:	316 stainless steel
Bonnet:	Nickel plated brass
Diaphragm:	316 stainless steel
Seat:	Kel-F 81
Seals:	Metal to metal

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3610A: 550 SCFH (320 SLPM) (At 2500 psig, N <sub>2</sub> ) Model 3611A: 135 SCFH (100 SLPM) (At 300 psig, N <sub>2</sub> ) Model 3612A: 195 SCFH (250 SLPM) (At 2500 psig, N <sub>2</sub> ) Model 3613A: 400 SCFH (250 SLPM) (At 2500 psig, N <sub>2</sub> ) Model 3615A: 550 SCFH (320 SLPM) (At 2500 psig, N <sub>2</sub> )
Flow Capacity (Cv):	0.09
Operating Temperature:	-40°F to 160°F (-40°C to 71°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Optional Porting:	3 High, 3 Low (For relief valve)
Shipping Weight:	5 lbs

### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3610A-CGA	4-100 psig	30" vac-0-200 psig	0-3000 psig	\$615.00
3611A-N/I	2-30 psig	30" vac-0-60 psig	30" vac-0-300 psig	\$615.00
3612A-CGA	2-30 psig	30" vac-0-60 psig	0-1000 psig	\$615.00
3613A-CGA	2-30 psig	30" vac-0-60 psig	0-3000 psig	\$615.00
3615A-CGA	4-100 psig	30" vac-0-200 psig	0-1000 psig	\$615.00

\*Note: Some CGA limitations may apply.

### Options

Model Number	Description	Price
4754-CGA	Tee Purge Assembly	\$227.14
4774-CGA	Cross Purge Assembly	\$726.52
ADP-0019-BO	Bonnet Vent Adapter 1/8" NPT to 1/4" Compression	\$9.84
OPN-0301-SA	Swagelok 1/4" Tube Fitting (Stainless Steel)	\$84.46
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72



## Model 3700 Series Low Pressure Line Regulator



### Design Features/Components

- Zinc body
- Rubber diaphragm
- 2-1/2" delivery pressure gauge
- Porous metal filter protects seat from contamination
- 1/4" NPTM inlet/outlet connection with loose hose barb
- Pressure adjusting screw protected by "security cap"

### Materials of Construction

Gauges:	Chrome plated brass
Body:	Cast zinc
Bonnet:	Die cast zinc
Diaphragm:	Natural rubber
Seat:	Natural rubber
Seals:	Natural rubber

### Description

A general purpose line regulator designed for low inlet pressure and low delivery pressure applications with non-corrosive gases.

### Applications

- Control of constant fuel burner flame.
- Inert gas blanketing at low pressures.

### Specifications

Maximum Inlet Pressure:	250 psig (1,725 kPa)
Maximum Flow Rate:	Model 3701: Less than 35 SLPM Model 3702: 260 SCFH (123 SLPM) Model 3703: 350 SCFH (165 SLPM)
(At 200 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.8
Operating Temperature:	-40°F to 150°F (-40°C to 65°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	1 High, 1 Low
Shipping Weight:	7 lbs

### Ordering Information

Model Number**	Delivery Pressure Range	Delivery Pressure Gauge	Price
3701	2-25" water column	0-35" water column	\$253.38
3702	0.5-5.0 psig	0-10-30 psig*	\$191.06
3703	5-10 psig	0-10-30 psig*	\$191.06

\*Compressed resolution between 10-30 psig

\*\*The Model 3700 Series cannot be supplied with CGA connections.

Model 3701 has a built in relief valve; relieves at 16" to 39" water column above set pressure.

Model 3702 has a built in relief valve; relieves at 7 to 9 psig.

Models 3702 and 3703 do not shut-off when adjusting screw is completely turned out.

### Options

Model Number	Description	Price
6005-3232	Hose Assembly to connect inlet of Model 3700 Series to outlet of other regulators. Maximum pressure: 250 psig	\$27.06



**Regulators**

**Model 3810 Series**

**Dual-Stage High-Purity Stainless Steel Regulator**



**Description**

High-purity regulators designed for analytical applications using non-corrosive or semi-corrosive gases.

**Gas Chromatography Detectors requiring the Dual-Stage Model 3810 Series Regulator**

Detector Type	Detection Level
Electrolytic Conductivity Detector (ELCD or Hall Detector)	Levels <50 ppm
Electron Capture Detector (ECD)	Levels <50 ppm
Mass Selective Detector or Mass Spec (MSD or MS)	All levels
Atomic Emission Detector (AED)	All levels

*Note: A small amount of polychlorotrifluoroethylene is added to the threads to facilitate assembly. For ECD, MS or AED applications where method detection limits are sub-ppm, it is recommended to use a No Lube (-NL) model.*

**Applications**

- Supply of carrier gas / detector support gas for a variety of gas chromatography applications (see table below for details).
- Supply of calibration standards to on-line process analyzers, emission monitoring systems, etc.
- Supply of high-purity non-corrosive or semi-corrosive gases to applications requiring constant delivery pressure.

**Design Features/Components**

- High-purity 316 stainless steel barstock body
- High-purity 316 stainless steel diaphragm
- Metal to metal seals minimize diffusion of contaminants
- 2" inlet and delivery pressure gauges
- Bonnet ported and threaded to pipe gases away from work area
- Equipped with outlet diaphragm valve
- 1/4" compression tube outlet connection
- Porous metal filter protects seat from contamination
- Optional interstage relief valve available
- Panel mountable

**Materials of Construction**

Gauges:	316 stainless steel
Body:	316 stainless steel
Bonnets:	Stainless steel
Diaphragms:	316 stainless steel
Seats:	1st Stage – Teflon 2nd Stage – Teflon
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	Model 3810: 300 SCFH (140 SLPM) Model 3813: 130 SCFH (60 SLPM) Model 3816: 500 SCFH (235 SLPM)
(At 2500 psig, N <sub>2</sub> )	
Flow Capacity (Cv):	0.05
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low, 1 Interstage
Shipping Weight:	5 lbs

**Ordering Information**

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3810-CGA	4-100 psig	30" vac-0-200 psig	0-3000 psig	\$553.50
3813-CGA	2-30 psig	30" vac-0-60 psig	0-3000 psig	\$493.64
3816-CGA	10-250 psig	0-400 psig	0-3000 psig	\$674.04
3818-CGA	15-350 psig	0-600 psig	0-3000 psig	\$674.04

*For No Lube applications, specify Model Numbers 35XX-NL-CGA.*

*\*Note: Some CGA limitations may apply.*

**Options**

Model Number	Description	Price
4754-CGA	Tee Purge Assembly	\$227.14
4774-CGA	Cross Purge Assembly	\$726.52
ADP-0162-BO	Bonnet Vent Adapter to 1/8" FNPT (2 Required)	\$9.84
KIT-0204-SA	Bonnet Panel Mounting Kit	\$33.62
OPN-0301-SA	Swagelok 1/4" Tube Fitting (Stainless Steel)	\$84.46
MSP-0012-XX	Inboard Helium Leak Rate Certification	\$82.00
MSP-0013-XX	Combination Inboard/Outboard Helium Leak Rate Certification	\$160.72

*Prices and Specifications Subject to Change without Notice*



## Model 3900 Series Single-Stage Corrosion Resistant Nickel-Plated Brass Regulator

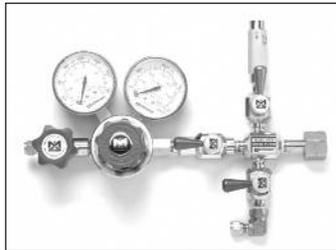


### Description

Regulators with design features to resist attack from corrosive gases.

### Applications

- Pressure regulation of acid forming halogen gases, such as chlorine, hydrogen fluoride, hydrogen bromide, and silicon tetrafluoride.
- Large Cv provides higher flow with low vapor pressure gases



*Shown with optional cross purge.*

### Design Features/Components

- Nickel plated brass body provides good corrosion resistance in halogen services
- 2" inlet and delivery pressure gauges
- Bonnet ported and threaded to pipe gases away from work area
- Porous metal filter protects seat from contamination
- Supplied with a stainless steel diaphragm valve
- 1/4" compression tube outlet connection

### Materials of Construction

Gauges:	Stainless steel
Body:	Nickel plated brass barstock
Bonnet:	Stainless steel
Diaphragm:	Stainless steel
Seat:	Kel-F
Seals:	TFE Teflon
Inlet Connection:	Stainless steel

### Specifications

Maximum Inlet Pressure:	Model 3905, 3120: 3000 psig (20,700 kPa)
	Model 3915, 3921: 1000 psig (6,900 kPa)
	Model 3903: 300 psig (2,070 kPa)
Maximum Flow Rate: (At 2000 psig, N <sub>2</sub> )	Model 3905: 1100 CFH (520 LPM)
	Model 3915: 750 CFH (354 LPM)
	Model 3920: 2000 CFH (945 LPM)
	Model 3921: 1200 CFH (565 LPM)
	Model 3903: 400 CFH (188 LPM)
Flow Capacity (Cv):	0.6
Operating Temperature:	-40°F to 165°F (-40°C to 74°C)
Porting (Regulator Body):	1/4" NPT Female
Porting Configuration:	2 High, 2 Low
Shipping Weight:	6 lbs

### Ordering Information

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Cylinder Pressure Gauge	Price
3905-CGA	2-50 psig	0-100 psig	0-3000 psig	\$615.00
3915-CGA	2-50 psig	0-100 psig	0-1000 psig	\$615.00
3920-CGA	10-200 psig	0-300 psig	0-3000 psig	\$615.00
3921-CGA	10-200 psig	0-300 psig	0-1000 psig	\$507.58
3903-660	2-50 psig	0-100 psig	0-300 psig	\$615.00

\*Note: Some CGA limitations may apply.

### Options

Model Number	Description	Price
4775-CGA	Cross Purge Assembly*	\$227.14
4755-CGA	Tee Purge Assembly	\$726.52
KIT-0202-BK	Bonnet Venting Kit	\$57.40
402V	Check Valve, Viton Seat, Monel	\$106.60
402E	Check Valve, EPR Seat, Monel	\$106.60

\*Recommended for use with corrosive gases.



**Regulators**

**Models 6342A  
Back Pressure Regulator**



**Description**

High-purity stainless steel back pressure regulator designed to relieve system overpressure. May be used with non-corrosive or corrosive gases.

**Applications**

- Used to relieve system overpressure, like a relief valve
- May be used in place of relief valves in many applications requiring high sensitivity and close tolerances on “crack-reseat” pressure relationships

**Design Features/Components**

- High-purity 316L stainless steel body
- High-purity 316 stainless steel diaphragm
- Metal to metal seal
- Porous metal filter protects seat from contamination

**Materials of Construction**

Body: 316L stainless steel  
Diaphragm: 316 stainless steel  
Bonnet: Stainless steel  
Seat: Kel-F81  
Seals: Metal to metal

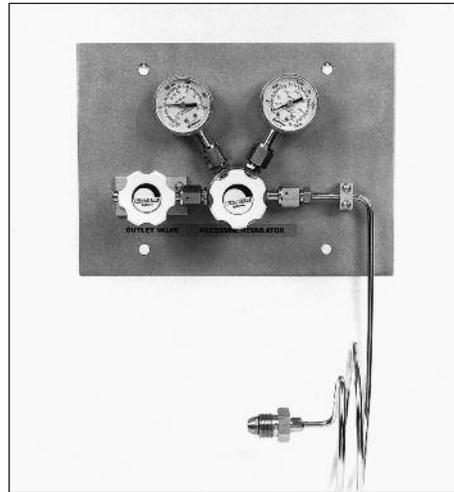
**Specifications**

Maximum Pressure Rating: 100 psig (690 kPa)  
Maximum Flow Rate: 185 SCFH (85 SLPM) @ 100 psig  
Flow Capacity (Cv): 0.08  
Porting: 1/4" NPT Female  
Shipping Weight: 5 lbs

**Ordering Information**

Model Number	Delivery Pressure Range	Price
6342A	0-100 psig	\$392.78

**Model 9001  
ULTRA-LINE® Pressure Control  
Module**



*Model 9001 ULTRA-LINE® Pressure Control Module shown with regulator and outlet valve (regulator and outlet valve sold separately).*

**Description**

The ULTRA-LINE® Pressure Control Module provides a safe high-purity connection (VCR type) between system, gas supply and the ULTRA-LINE® regulators.

**Design Features/Components**

The Model 9001 Pressure Control Module includes the following features / components:

- 316 stainless steel panel
- 3 foot electropolished 316 stainless steel pigtail
- Male VCR type and butt-welded CGA connection on pigtail
- Aluminum plumbing mounting brackets
- Expert assembly in class 100 clean room
- Helium leak testing of components to 1 x 10<sup>9</sup> scc/sec
- Panel mounting holes to fit Matheson Gas Cabinet

**Sold as separate items:**

- Selection of ULTRA-LINE® single stage regulators
- Selection of ULTRA-LINE® diaphragm isolation valves

The ULTRA-LINE® regulators and valves are sold as separate items, and are shipped separate from the 9001 Pressure Control Module. Instructions for assembly of regulators and valves are included with the Pressure Control Module. To order a completely assembled system please contract Matheson Technical Services.

**Ordering Information**

Model Number	Description	Price
9001-CGA	Stainless Steel Pressure Control Module with Pigtail	\$391.96
9001-NP	Stainless Steel Pressure Control Module without Pigtail	\$156.62
5405-CGA	Pigtail Only – Stainless Steel butt welded CGA by 1/4" Male VCR compatible	\$235.54

*Available CGA connections: 320, 330, 350, 540, 580, 590, 660  
Please order regulators and valves as separate line items.*



## Model 9300 and 9310 Series ULTRA-LINE® Single-Stage Ultra High-Purity Stainless Steel Regulator



### Description

Ultra high-purity stainless steel regulators for use with semiconductor applications.

### Applications

- All semiconductor industry gas applications, such as dispensing of forming gases, blanketing procedures, or etching operations.

### Design Features/Components

- Available in two choices of materials: 316L stainless steel with 316 stainless steel internals (Model 9300 Series), or 316L stainless steel with Hastelloy C-22 internals (Model 9310 Series).
- 2" inlet and delivery pressure gauges
- Autogeneous butt-welded connections
- Only one non-metallic seal in the process stream
- Standard 10 Ra surface finish
- Sealed and ventable bonnet
- Helium leak tested to  $1 \times 10^{-9}$  scc/sec
- Assembled, tested and packaged in a class 100 clean area
- Body screw thread tapped for back mounting

### Materials of Construction

	<u>Model 9300 Series</u>	<u>Model 9310 Series</u>
Gauges:	316L stainless steel	316L stainless steel
Body:	316L stainless steel	316L stainless steel
Bonnet:	Nickel plated brass	Nickel plated brass
Diaphragm:	316 stainless steel	Hastelloy C-22
Seat:	Kel-F 81	Kel-F 81
Linkage:	316 stainless steel	Hastelloy C-22
Spring:	316 stainless steel	Hastelloy C-22
Seals:	Metal to metal	Metal to metal

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700) kPa
Maximum Flow Rate:	11 SCFM (320 SLPM)
(At 3000 psig Inlet, N <sub>2</sub> )	
Flow Capacity (Cv):	0.09
Operating Temperature:	-40°F to 160°F (-40°C to 71°C)
Porting:	1/4" VCR compatible
Porting Configuration:	2 High, 2 Low
Shipping Weight:	5 lbs

### Ordering Information

All of the Model 9300 and 9310 Series are shipped double bagged under purified Argon. All gauges used are 100% Helium leak tested and have 1/4" VCR connections.

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Inlet Pressure Gauge	Price
<b>316L Stainless Steel Regulators</b>				
9303-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$785.56
9303-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$785.56
9307-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$785.56
9307-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$785.56
<b>316L Stainless Steel Regulators with Hastelloy C-22 Internal Parts</b>				
9313-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$998.76
9313-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$998.76
9317-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$998.76
9317-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$998.76

Inlet/Outlet:  
F = Female M = Male



**Regulators**

**Model 9330 Series  
ULTRA-LINE® Ultra High-Purity Stainless Steel Line Regulator  
with Tied Diaphragm**



**Description**

Ultra high-purity line regulators with a tied seat design for use with corrosive, toxic, or pyrophoric gases.

**Applications**

- Point of use regulation of gases used in semiconductor manufacturing, such as etchant or dopant gases.

**Design Features/Components**

- Tied seat design ensures regulator closure under extreme circumstances
- 2" delivery pressure gauge
- Autogeneous butt-welded connections
- Only one non-metallic component in the process stream
- Standard 10 Ra surface finish
- Sealed and ventable bonnet
- Helium leak tested to  $1 \times 10^{-9}$  scc/sec
- Assembled, tested and packaged in a Class 100 clean area
- Body screw thread tapped for back mounting

**Materials of Construction**

Gauge:	316 stainless steel
Body:	316L stainless steel
Bonnet:	Nickel plated brass
Diaphragm:	316 stainless steel
Seat:	Kel-F 81
Linkage:	316 stainless steel
Spring:	316 stainless steel
Seals:	Metal to metal

**Specifications**

Maximum Inlet Pressure:	300 psig (2070 kPa)
Maximum Flow Rate:	14 SCFM (400 SLPM)
(At 300 psig Inlet, N <sub>2</sub> )	
Flow Coefficient (Cv):	0.36
Operating Temperature:	-40°F to 160°F (-40°C to 71°C)
Porting:	1/4" VCR compatible 3/8" VCR compatible
Porting Configuration:	1 High, 2 Low
Shipping Weight:	5 lbs

**Ordering Information**

All of the Model 9330 Series are shipped double bagged under purified Argon. All gauges used are 100% Helium leak tested and have 1/4" VCR connections.

Model Number	Delivery Pressure Range	Delivery Pressure Gauge	Price
<b>316L Stainless Steel Regulators</b>			
9332-3-V4FM	0-30 psig	30" vac-0-60 psig	\$785.56
9332-3-V4MM	0-30 psig	30" vac-0-60 psig	\$785.56
9332-3-V4FF	0-30 psig	30" vac-0-60 psig	\$871.66
9332-3-V6FM	0-30 psig	30" vac-0-60 psig	\$922.50
9332-3-V6MM	0-30 psig	30" vac-0-60 psig	\$922.50
9332-3-V6FF	0-30 psig	30" vac-0-60 psig	\$922.50
9333-3-V4FM	0-100 psig	30" vac-0-200 psig	\$785.56
9333-3-V4MM	0-100 psig	30" vac-0-200 psig	\$785.56
9333-3-V4FF	0-100 psig	30" vac-0-200 psig	\$871.66
9333-3-V6FM	0-100 psig	30" vac-0-200 psig	\$922.50
9333-3-V6MM	0-100 psig	30" vac-0-200 psig	\$922.50
9333-3-V6FF	0-100 psig	30" vac-0-200 psig	\$922.50

Outlet F=Female  
Inlet M=Male  
4=1/4 VCR compatible  
6=3/8 VCR compatible



## Model 9360 and 9370 Series ULTRA-LINE® Single-Stage Ultra High-Purity Stainless Steel Regulator with Tied Diaphragm



- 2" inlet and delivery pressure gauges
- Autogeneous butt-welded connections
- Only one non-metallic seal in the process stream
- Standard 10 Ra surface finish
- Sealed and ventable bonnet
- Helium leak tested to  $1 \times 10^{-9}$  scc/sec
- Assembled, tested and packaged in a class 100 clean area
- Body screw thread tapped for back mounting

### Materials of Construction

	<u>Model 9360 Series</u>	<u>Model 9370 Series</u>
Gauges:	316L stainless steel	316L stainless steel
Body:	316L stainless steel	316L stainless steel
Bonnet:	Nickel plated brass	Nickel plated brass
Diaphragm:	316 stainless steel	Hastelloy C-22
Seat:	Kel-F 81	Kel-F 81
Linkage:	316 stainless steel	Hastelloy C-22
Spring:	316 stainless steel	Hastelloy C-22
Seals:	Metal to metal	Metal to metal

### Description

Ultra high-purity stainless steel regulators with a tied seat design, for use with corrosive, toxic, or pyrophoric gases.

### Applications

- All semiconductor industry gas applications, such as dispensing of dopant or etchant gases, or handling hazardous gases.

### Design Features/Components

- Available in two choices of materials: 316L stainless steel with 316 stainless steel internals (Model 9360 Series), or 316L stainless steel with Hastelloy C-22 internals (Model 9370 Series).
- Tied seat design ensures regulator closure under extreme conditions.

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700 kPa)
Maximum Flow Rate:	9367 - 11 SCFM (320 SLPM)
(At 3000 psig Inlet, N <sub>2</sub> )	9363 - 7 SCFM (200 SLPM)
Flow Capacity (Cv):	0.09
Operating Temperature:	-40°F to 160°F (-40°C to 71°C)
Porting:	1/4" VCR compatible
Porting Configuration:	2 High, 2 Low
Shipping Weight:	5 lbs

### Ordering Information

All of the Model 9360 and 9370 Series are shipped double bagged under purified Argon. All gauges used are 100% Helium leak tested and have 1/4" VCR type connections.

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Inlet Pressure Gauge	Price
<b>316L Stainless Steel Regulators</b>				
9363-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$998.76
9363-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$998.76
9367-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$998.76
9367-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$998.76
<b>316L Stainless Steel Regulators with Hastelloy C-22 Internal Parts</b>				
9373-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,281.66
9373-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,281.66
9377-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,281.66
9377-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,281.66

Inlet/Outlet:

F = Female M = Male



## Model 9460 and 9470 Series ULTRA-LINE® Dual-Stage Ultra High-Purity Stainless Steel Regulator with Tied Diaphragms



### Description

Ultra high-purity stainless steel regulators for use with semiconductor applications.

### Applications

- All semiconductor industry applications requiring precise pressure control.

### Design Features/Components

- Available in two choices of materials: 316L stainless steel with 316 stainless steel internals (Model 9460 Series), or 316L stainless steel with Hastelloy C-22 internals (Model 9470 Series).
- Dual tied seat design ensures regulator closure under extreme conditions
- 2" inlet and delivery pressure gauges
- Autogeneous butt-welded connections
- The seats are the only non-metallic components in the process stream
- Standard 10 Ra surface finish
- Sealed and ventable bonnets
- Helium leak tested to  $1 \times 10^{-9}$  scc/sec
- Assembled, tested and packaged in a Class 100 clean area

### Materials of Construction

	<u>Model 9460 Series</u>	<u>Model 9470 Series</u>
Gauges:	316L stainless steel	316L stainless steel
Body:	316L stainless steel	316L stainless steel
Bonnets:	Nickel plated brass	Nickel plated brass
Diaphragms:	316 stainless steel	Hastelloy C-22
Seats:	Kel-F 81	Kel-F 81
Linkages:	316 stainless steel	Hastelloy C-22
Springs:	316 stainless steel	Hastelloy C-22
Seals:	Metal to metal	Metal to metal

### Specifications

Maximum Inlet Pressure:	3000 psig (20,700)
Maximum Flow Rate:	5 SCFM (150 SLPM)
(At 3000 psig Inlet, N <sub>2</sub> )	
Flow Capacity (Cv):	0.05
Operating Temperature:	-40°F to 160°F (-40°C to 71°C)
Porting:	1/4" VCR compatible
Shipping Weight:	5 lbs

### Ordering Information

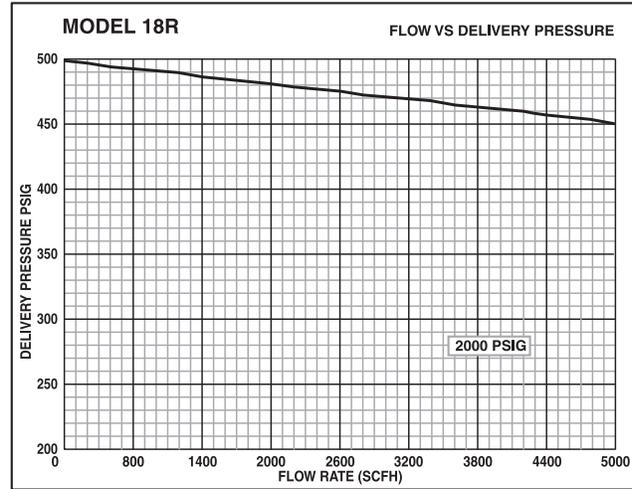
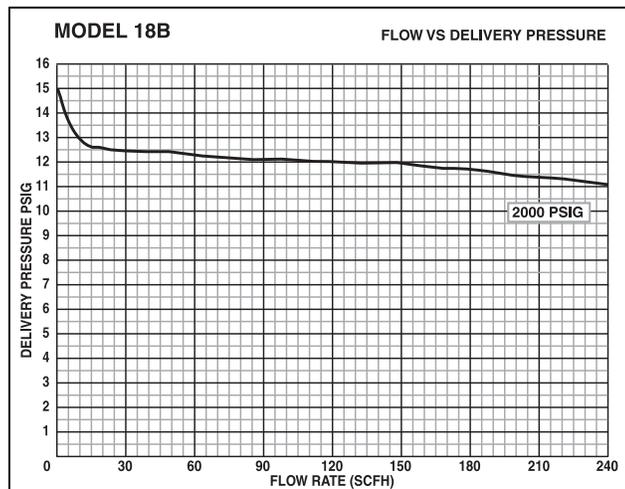
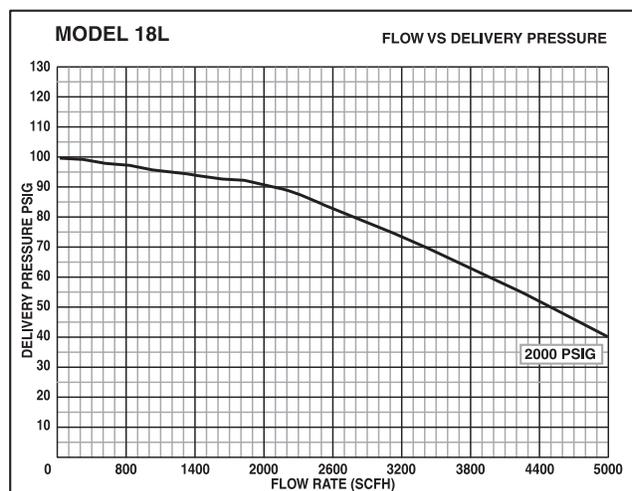
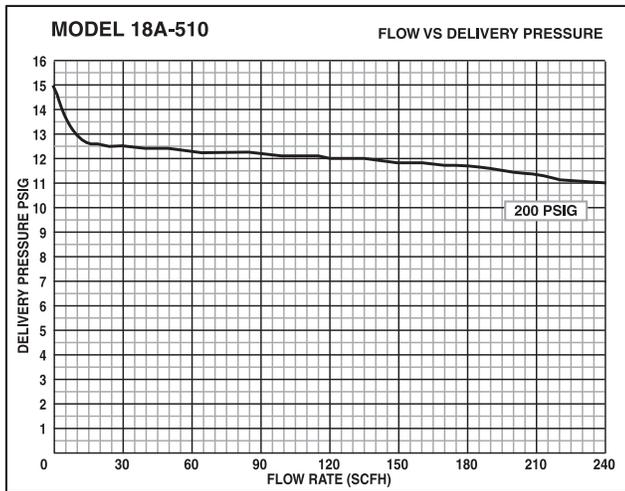
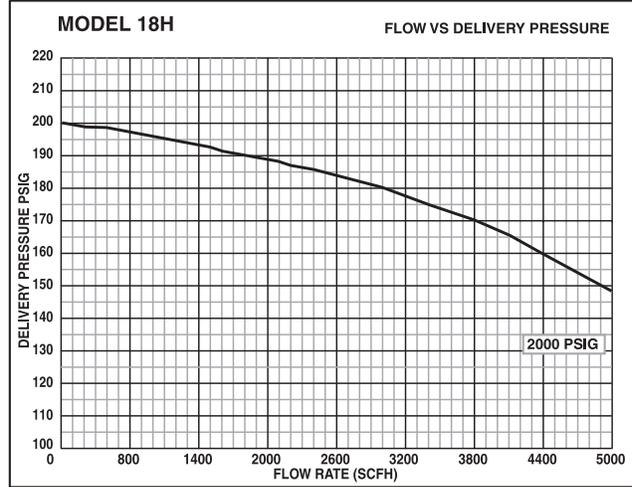
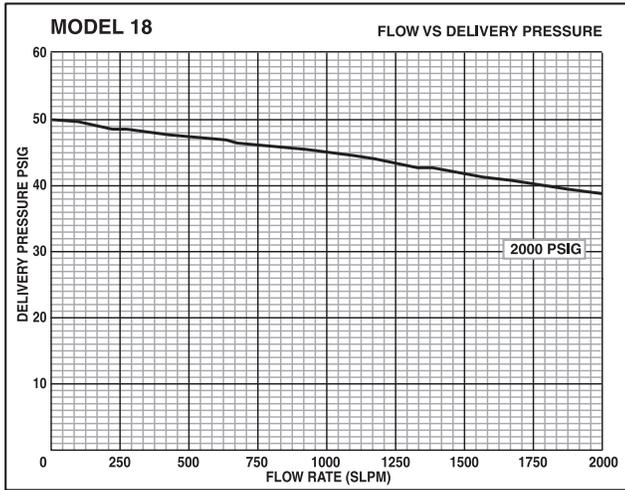
All of the Model 9460 and 9470 Series are shipped double bagged under purified Argon.  
All gauges used are 100% Helium leak tested and have female 1/4" VCR compatible connections.

Model Number*	Delivery Pressure Range	Delivery Pressure Gauge	Inlet Pressure Gauge	Price
<b>316L Stainless Steel Regulators</b>				
9463-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,035.66
9463-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,035.66
9467-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,035.66
9467-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,035.66
<b>316L Stainless Steel Regulators with Hastelloy C-22 Internal Parts</b>				
9473-4-V4FM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,635.08
9473-4-V4MM	0-30 psig	30" vac-0-60 psig	0-3000 psig	\$1,635.08
9477-4-V4FM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,635.08
9477-4-V4MM	0-100 psig	30" vac-0-200 psig	0-3000 psig	\$1,635.08

Inlet/Outlet:  
F = Female M = Male

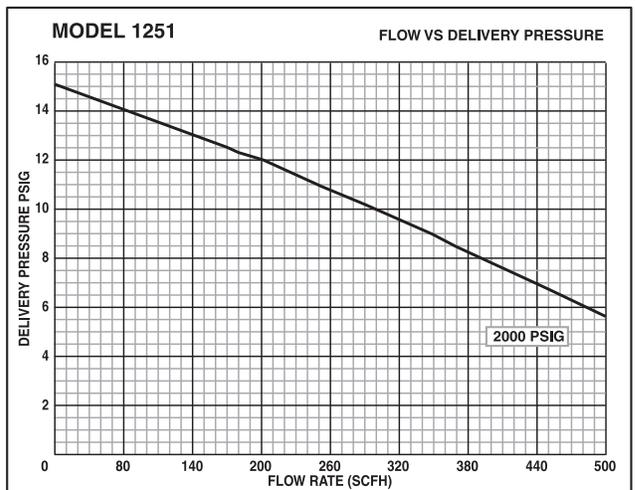
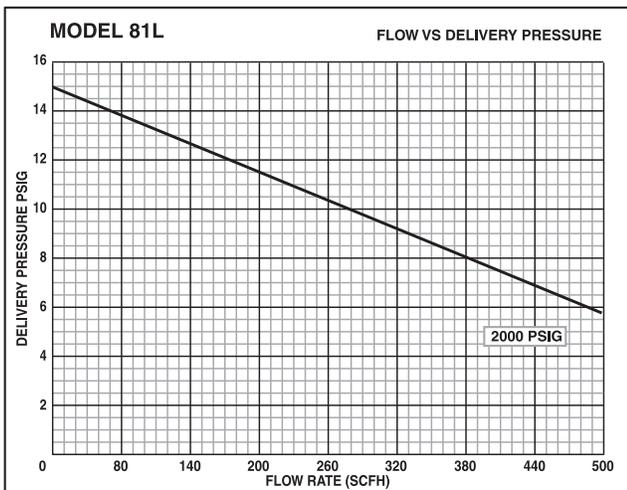
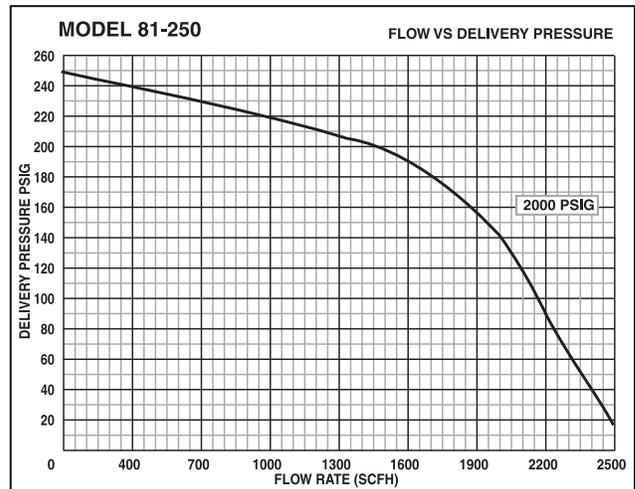
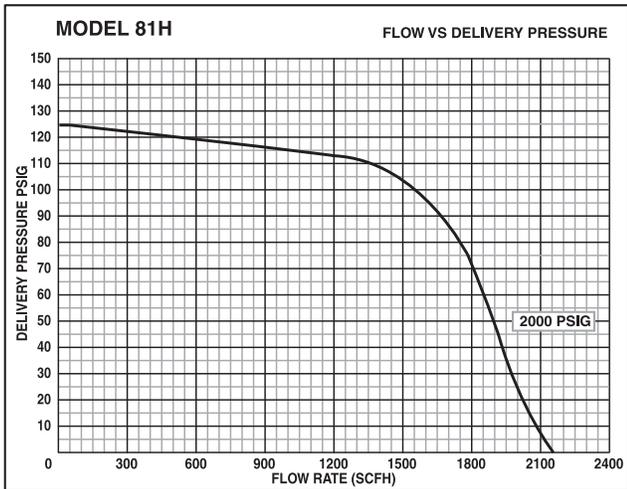
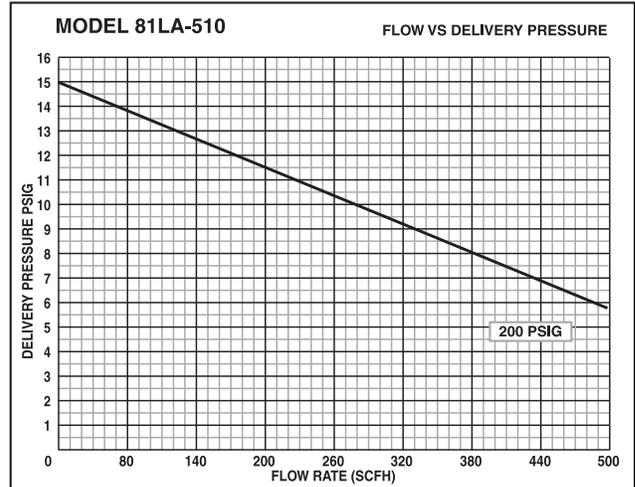
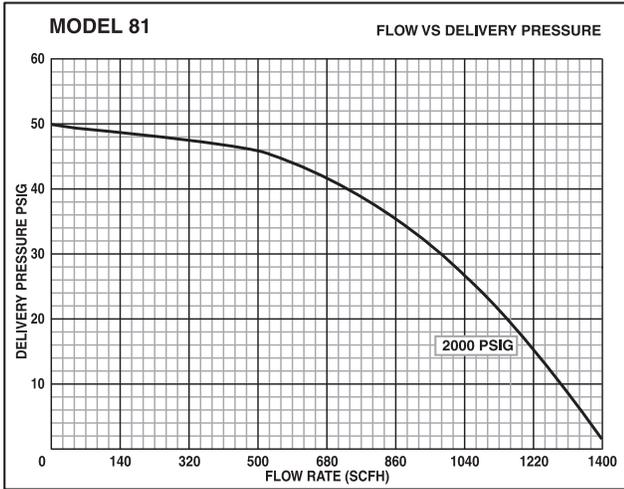


# Regulator Flow Curves



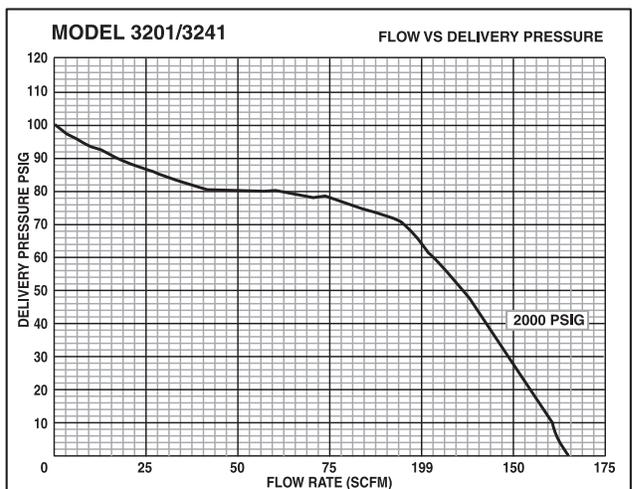
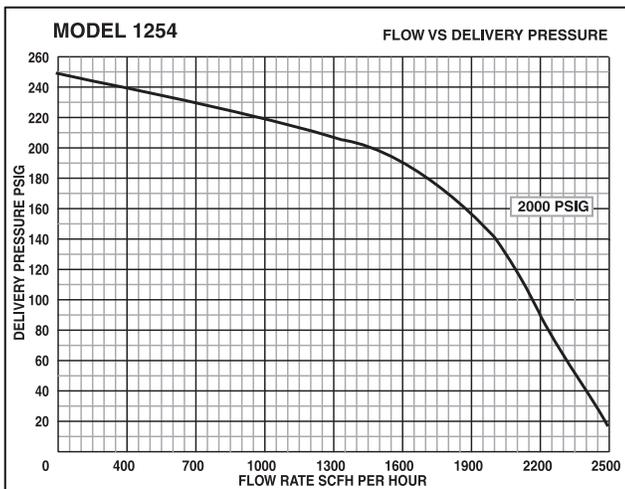
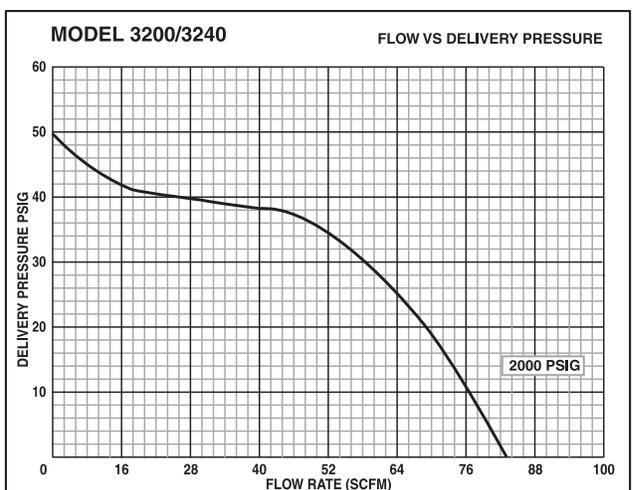
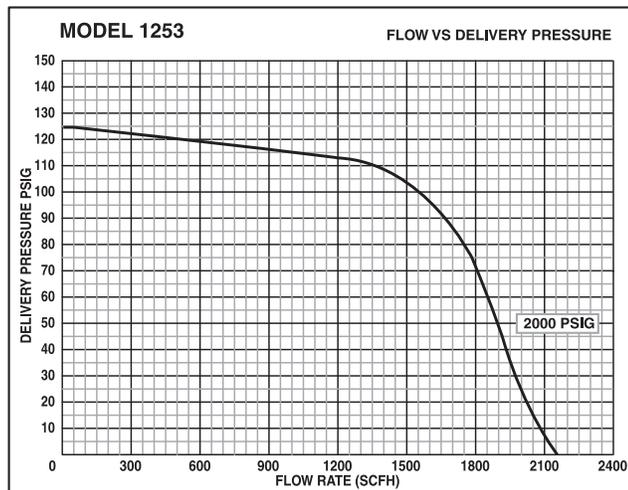
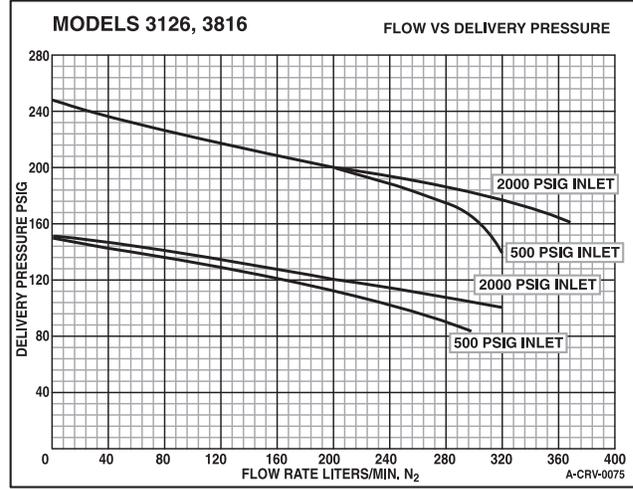
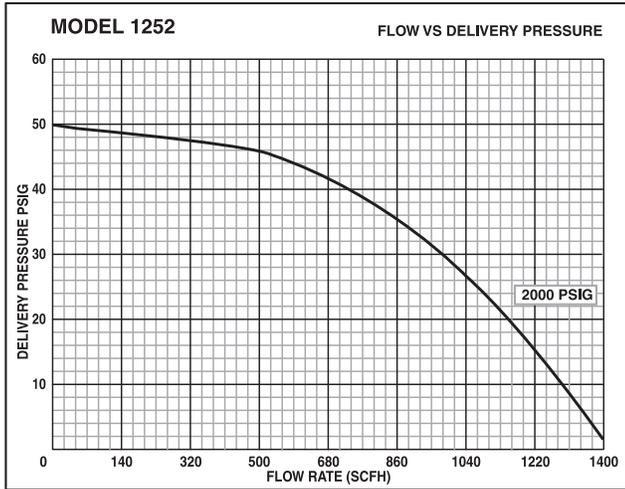


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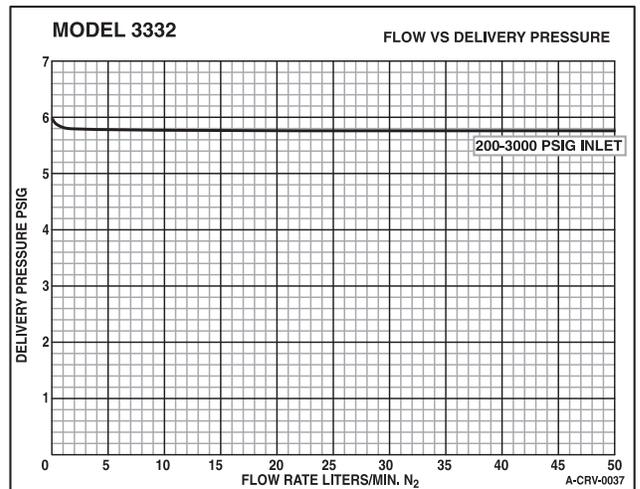
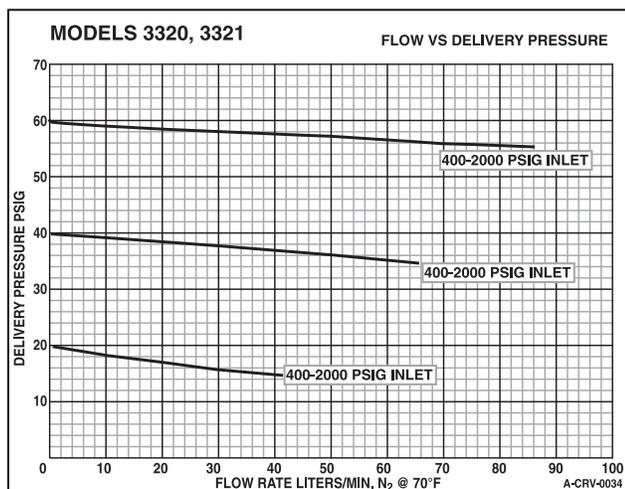
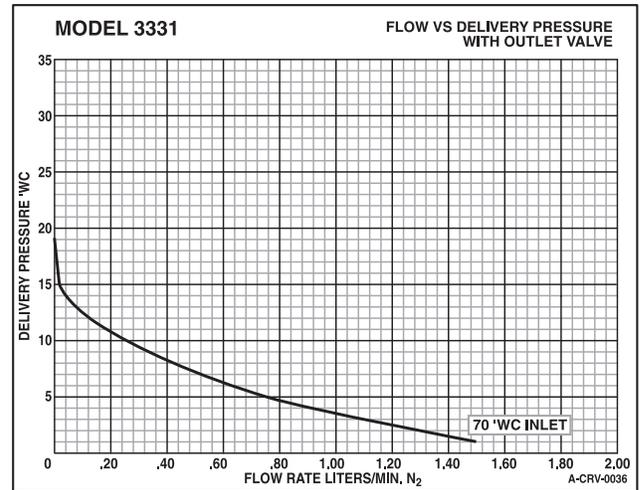
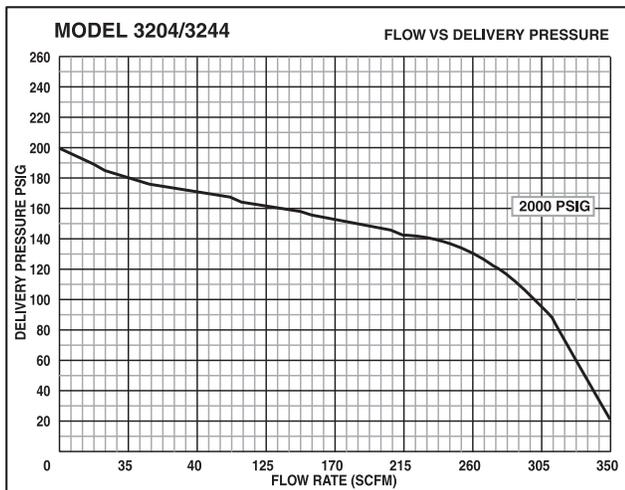
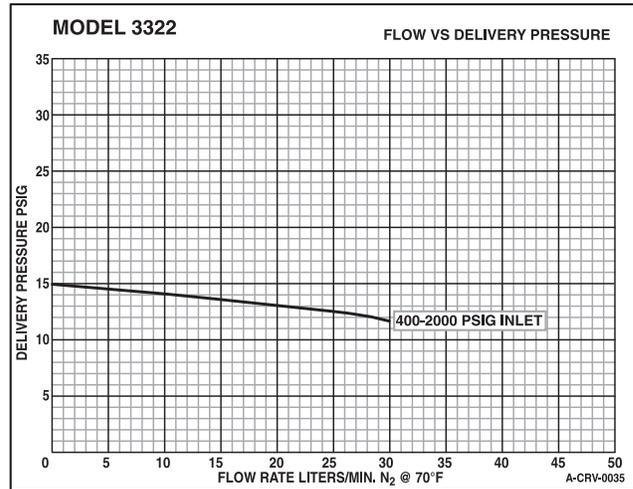
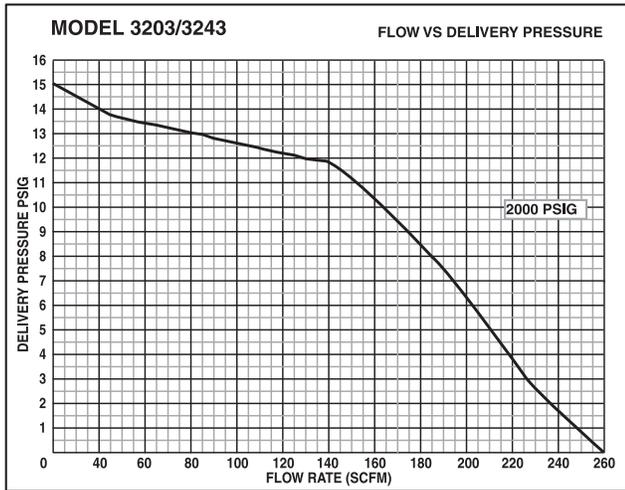


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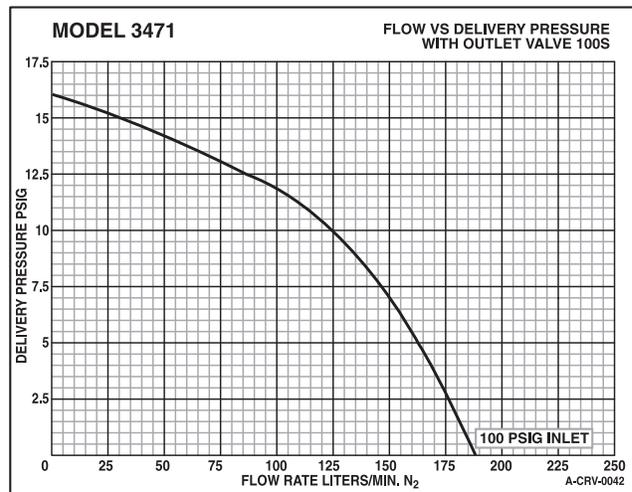
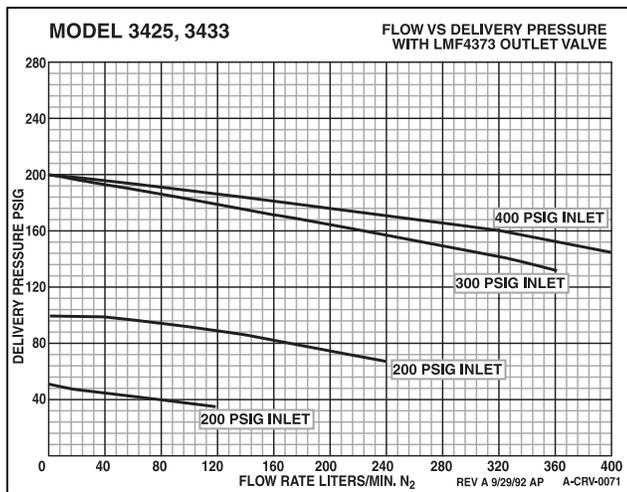
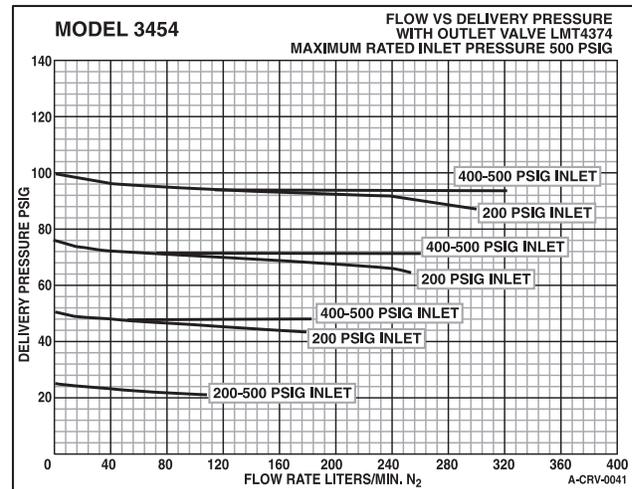
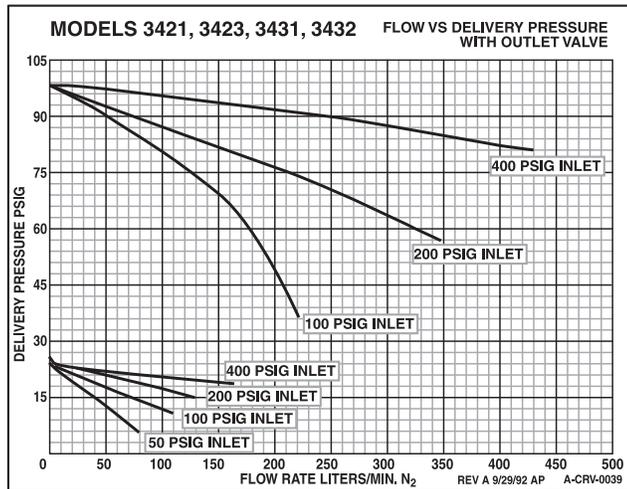
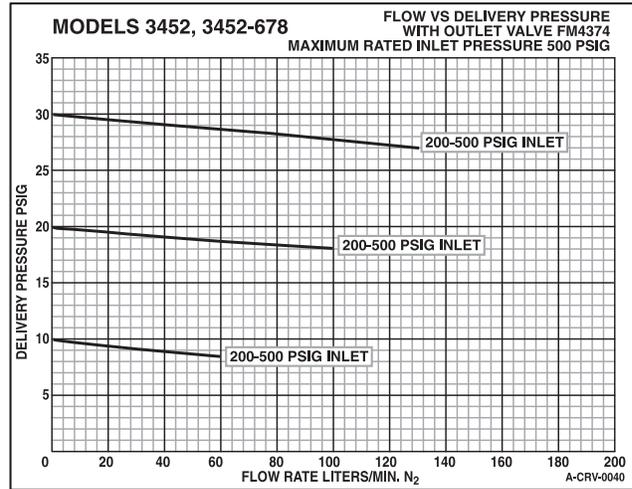
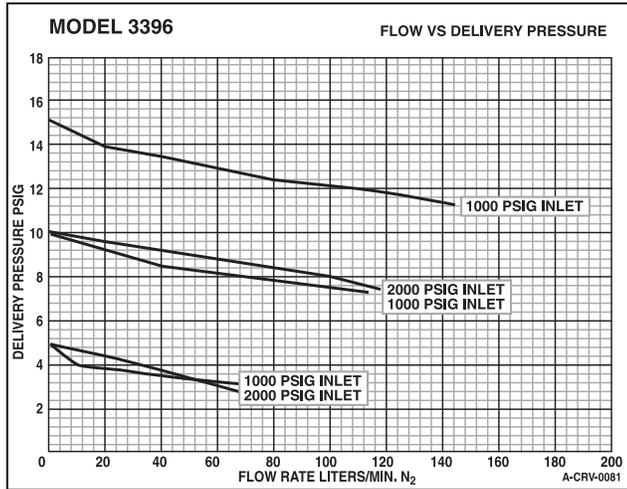


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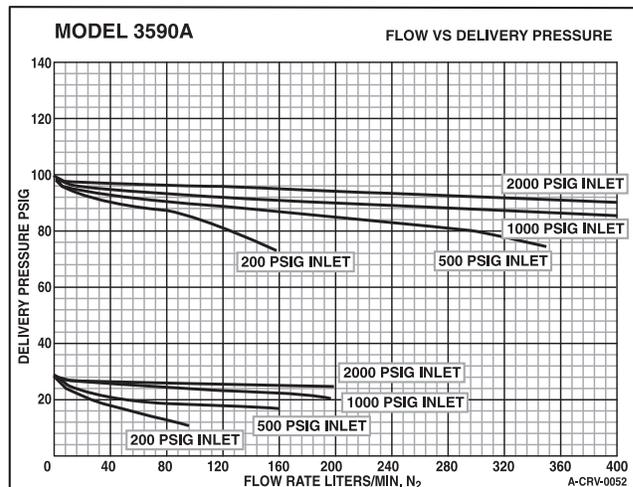
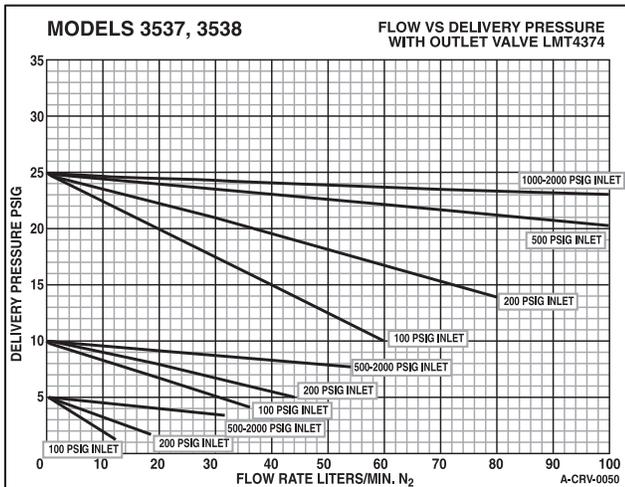
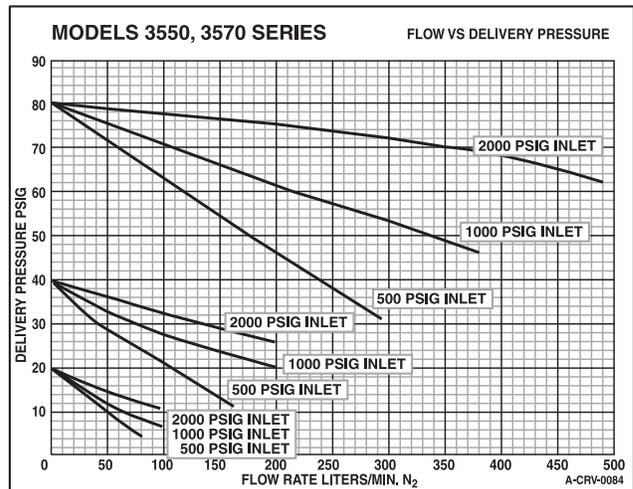
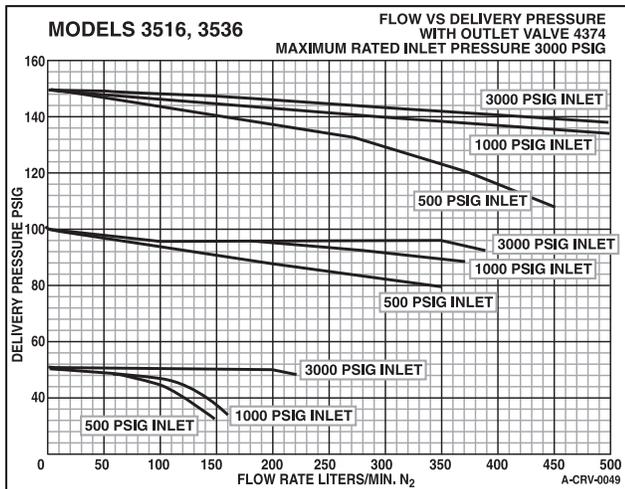
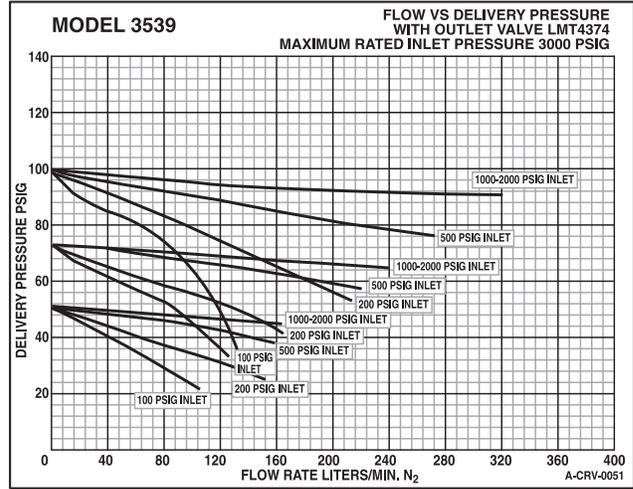
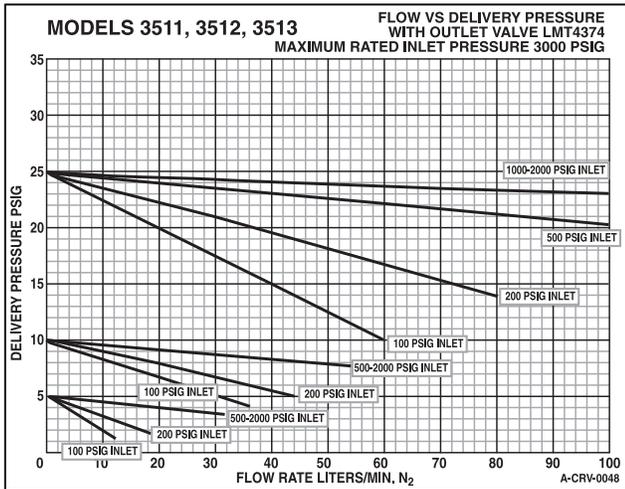


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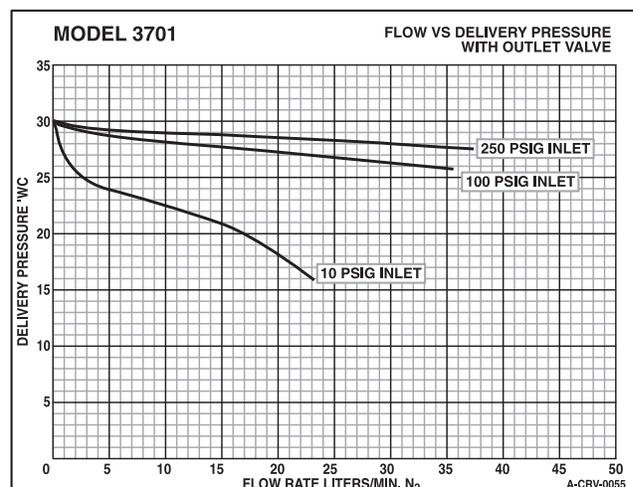
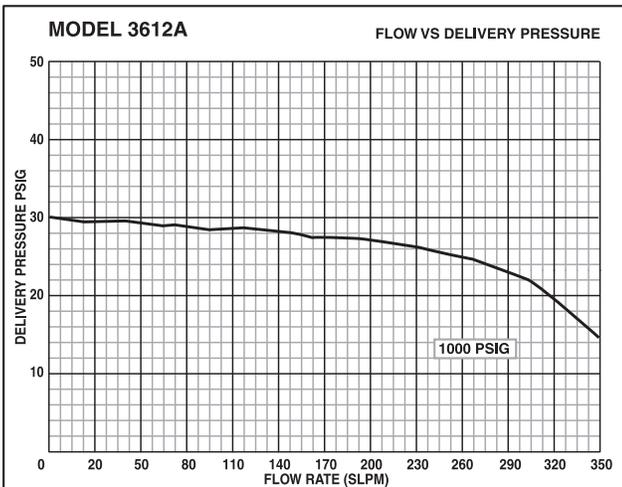
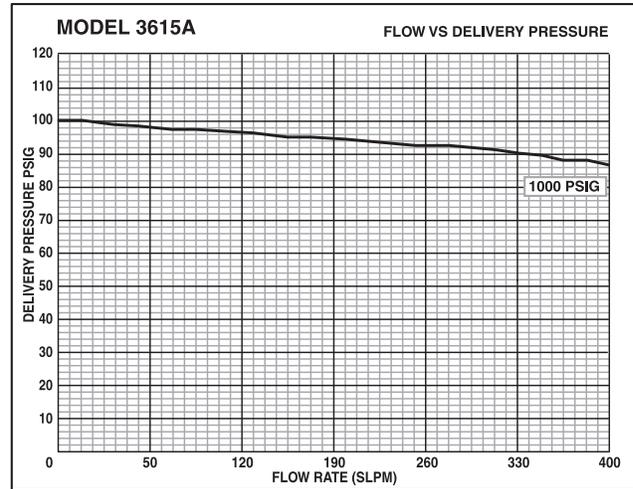
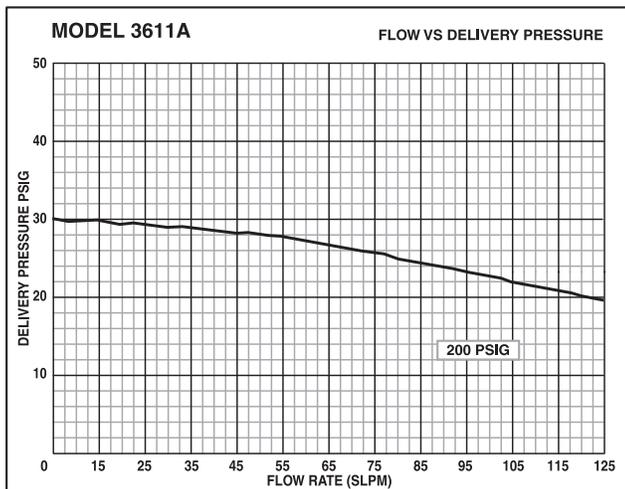
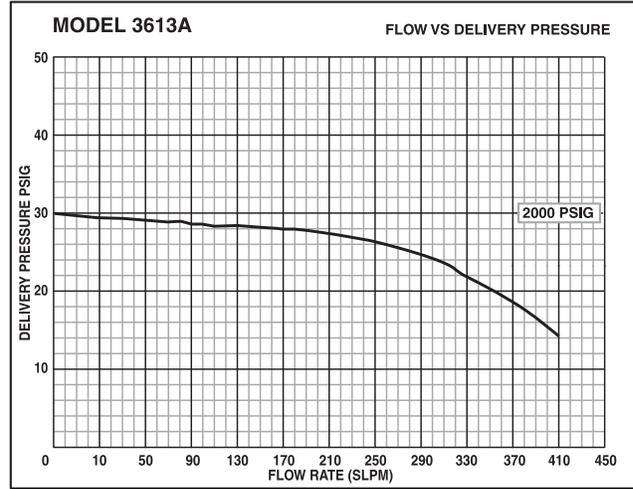
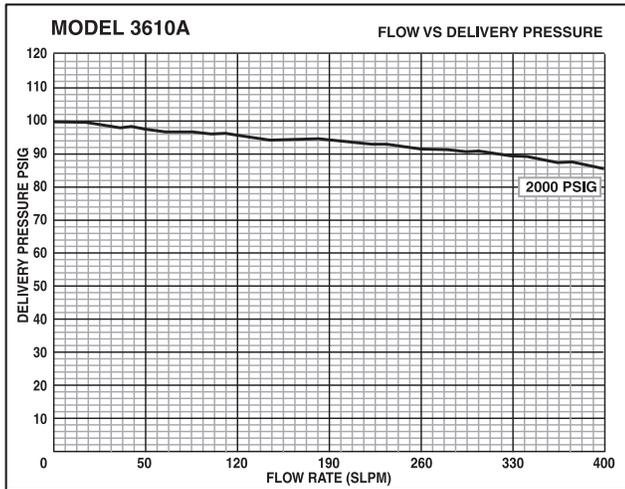


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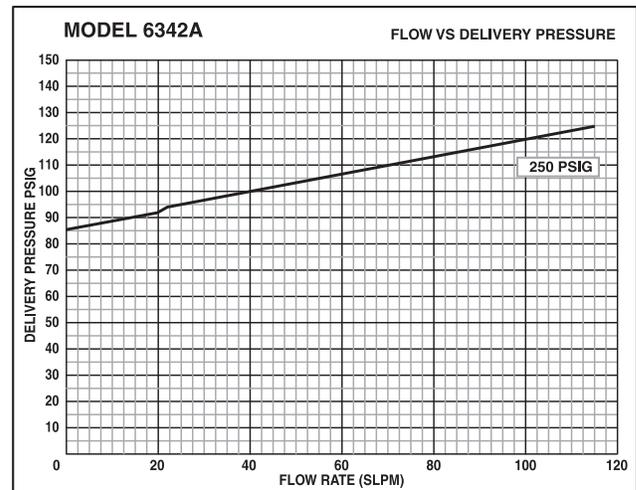
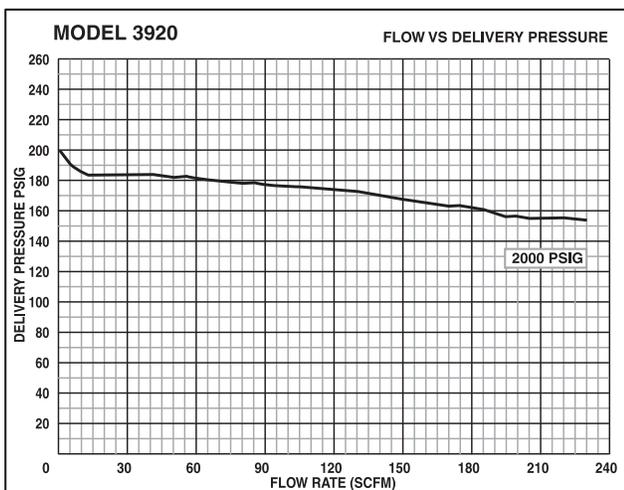
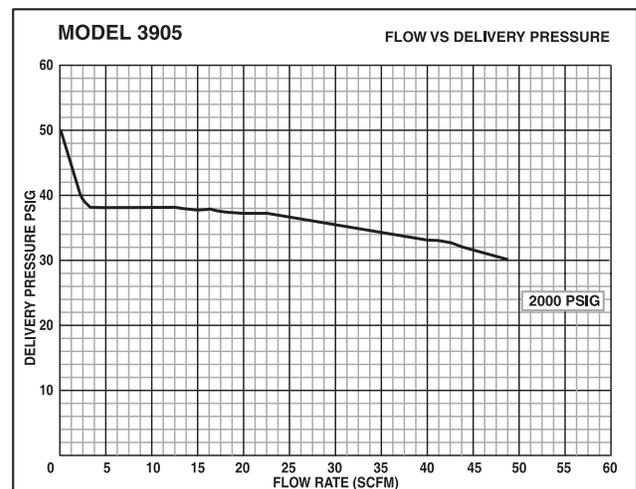
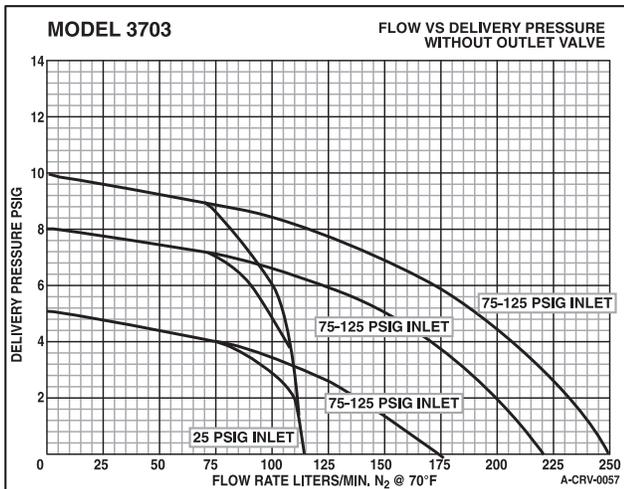
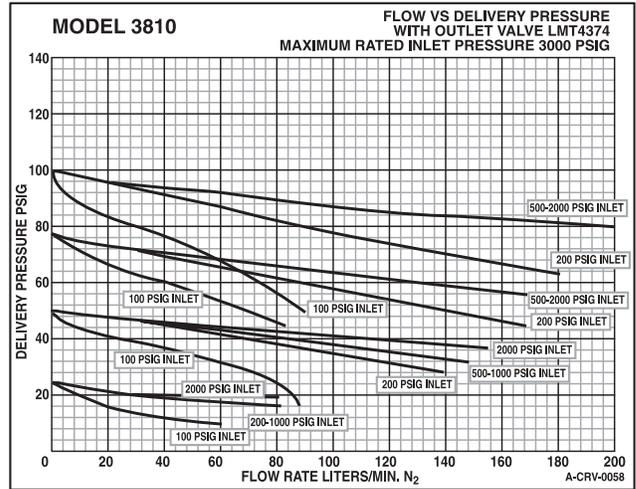
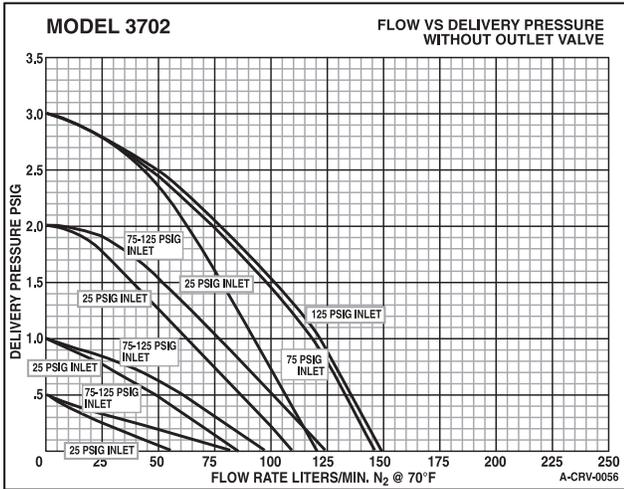


**Regulator Flow Curves** *(continued)*





**Regulator Flow Curves (continued)**





## Introduction

Gas generators provide a safe and economical alternative to cylinder gas supply for a variety of applications. The supply of gas through the use of generators offers several operating benefits to the user.

### Benefits of Utilizing Gas Generators

**Continuous Gas Supply** – when properly installed and operated, generators provide a continuous supply of high purity gas. The need to handle and store gas cylinders is eliminated, saving time and cost. Eliminating cylinder changeouts also reduces downtime due to interruptions in gas supply, and minimizes the potential for ambient air contamination.

**Consistent Gas Purity** – generators supply gas with a consistent purity level, ensuring the reliability of the analysis being performed.

**Enhanced Safety** – generators eliminate the need for personnel to handle high pressure cylinders, and the storage of large amounts of high pressure gas in the laboratory. This factor is particularly beneficial for flammable gases like hydrogen.

### Chrysalis™ Gas Generators

Matheson's commitment to providing customers with the most complete line of gas supply source options led to the development of the Chrysalis® Gas Generator line. Chrysalis® Generators provide safe, reliable, and cost-effective gas supply solutions for a variety of analytical applications within the lab environment.



*Chrysalis® II ULTRA High Purity Nitrogen Generator*



*Chrysalis® II Nitrogen Generator provides gas to LC/MS instruments*



*Chrysalis® II Hydrogen Generator provides continuous gas flow to GC instruments*



*Chrysalis® II ZERO Air Generator provides continuous gas flow to GC instruments*



**Chrysalis® II ULTRA High Purity Nitrogen Generators**



*"BORA"*



*"SIROCCO"*

**Description**

The Chrysalis® II ULTRA High Purity Nitrogen Generators produce UHP grade nitrogen from compressed air simply and cost effectively. Matheson offers six (6) models for analytical and process applications: the BORA 500, 750 and 1250, and SIROCCO 3, 3A and 5 with flow capability ranging from 0.5 Lpm up to 5 Lpm. The Chrysalis® II ULTRA High Purity Nitrogen Generators incorporate "DUAL-STEP" Pressure Swing Adsorption (DS-PSA) technology to transform ambient air into a continuous stream of nitrogen gas ideal for gas chromatography applications and purge/make-up gas requirements in the laboratory. The DS-PSA technology is a patented process specifically designed to reduce air consumption, power and increase purity. An LCD based control system with monitoring screen provides user friendly access to select key operating functions. Integral oil-free air compressors are standard and furnished on all models. Audible and visual indications are provided to signal maintenance or alarm conditions. An optional Oxygen Sensor to monitor purity is also available on all models.

**Applications**

- ELSD nebulizer gas
- Carrier/combustion gas for TOC analyzers
- Make-up gas for GC-ECD/NCP/FID instruments
- Purge gas for ICP Spectrometer operation
- Incubator oven gas supply
- Blanketing for food packaging
- Instrument purge gas
- Solvent evaporation
- Fermentation processes
- Glove box atmosphere gas
- Fume cupboard gas
- Carrier gas for packed column GC-FID's, and GC-AED instruments

**Product Features**

- Nitrogen purity up to 99.999%
- Flow capacities range from 500 ccm to 5 Lpm
- Provides continuous LCD indication and monitoring of nitrogen flow and delivery pressure
- Manual adjustment of delivery pressure
- BORA model designed for installation on lab bench top
- SIROCCO model designed for installation under lab bench
- SIROCCO 3A model produces both UHP nitrogen and instrument air simultaneously
- LCD based operating display and membrane touch control pad provide simplified operation

- Multiple alarms alert user to low pressure (leak) and power supply conditions
- Pressure indication provided for the outlet nitrogen supply
- Integral oil-free direct drive air compressor for "turn key" operation is standard and conserves power by only operating when nitrogen supply is required
- Audible and visual indication provided to signal maintenance
- Caster (self-locking) wheels (on SIROCCO) provide mobility for installation
- Optional Oxygen Sensor to continuously monitor nitrogen purity
- Power cord included
- CE & CSA approved

**Operating and Physical Specifications**

Nitrogen Flow Rate (max):

<b>BORA 500</b>	500 ccm
<b>BORA 750</b>	750 ccm
<b>BORA 1250</b>	1250 ccm
<b>SIR 3</b>	3 Lpm
<b>SIR 3A</b>	3 Lpm (nitrogen) & 3 Lpm (instrument air)
<b>SIR 5</b>	5 Lpm

Nitrogen Purity:

<b>BORA 500 &amp; 750</b>	99.999%
<b>BORA 1250</b>	99.995%
<b>SIR 3, 3A &amp; 5</b>	99.999%

O<sub>2</sub> Concentration (N<sub>2</sub> Outlet):

< 10 ppm

Nitrogen Outlet Pressure (max):

75 psig

Nitrogen Outlet Connection:

1/8" (compression fitting)

Operating Noise Level:

**BORA 500, 750 & 1250**

< 48 db

**SIR 3, 3A & 5**

< 60 db

Power Source:

115 VAC / 60 Hz; 230 VAC / 50 Hz

Castor Wheels:

SIROCCO Models

Dimensions:

**BORA 500, 750 & 1250**

9"W x 14"H x 17"D

**SIR 3, 3A & 5**

19"W x 26"H x 33"D

Weight:

**BORA 500**

40 lbs

**BORA 750**

45 lbs

**BORA 1250**

55 lbs

**SIR 3**

210 lbs

**SIR 3A**

220 lbs

**SIR 5**

240 lbs

Warranty:

2 years (1 year on air compressor)

*Prices and Specifications Subject to Change without Notice*



**Chrysalis® II ULTRA High Purity Nitrogen Generators** - *continued*

**Ordering Information**

Model Number	Description	N <sub>2</sub> Production Capacity	Price
NUHP-BORA500-60	BORA-500 ULTRA High Purity Nitrogen Generator - 60Hz	500 ccm	\$8,672.40
NUHP-BORA500-50	BORA-500 ULTRA High Purity Nitrogen Generator - 50Hz	500 ccm	\$8,932.50
NUHP-BORA750-60	BORA-750 ULTRA High Purity Nitrogen Generator - 60Hz	750 ccm	\$7,824.44
NUHP-BORA750-50	BORA-750 ULTRA High Purity Nitrogen Generator - 50Hz	750 ccm	Call for Quote
NUHP-BORA1250-60	BORA-1250 ULTRA High Purity Nitrogen Generator - 60Hz	1.25 Lpm	\$9,727.20
NUHP-BORA1250-50	BORA-1250 ULTRA High Purity Nitrogen Generator - 50Hz	1.25 Lpm	\$9,727.20
NUHP-SIR3-60	SIROCCO-3 ULTRA High Purity Nitrogen Generator - 60Hz	3 Lpm	\$13,492.80
NUHP-SIR3-50	SIROCCO-3 ULTRA High Purity Nitrogen Generator - 50Hz	3 Lpm	\$13,897.80
NUHP-SIR3A-60	SIROCCO-3A ULTRA High Purity Nitrogen Generator (Nitrogen & Instrument Air) - 60Hz	3 Lpm	\$15,837.30
NUHP-SIR3A-50	SIROCCO-3A ULTRA High Purity Nitrogen Generator (Nitrogen & Instrument Air) - 50Hz	3 Lpm	Call for Quote
NUHP-SIR5-60	SIROCCO-5 ULTRA High Purity Nitrogen Generator - 60Hz	5 Lpm	\$15,420.60
NUHP-SIR5-50	SIROCCO-5 ULTRA High Purity Nitrogen Generator - 50Hz	5 Lpm	\$15,883.20

*"NOTE: All models are furnished with integral oil-free air compressors"*

Model Number	Description	Price
NUHP-OS1	Optional Oxygen Sensor (all models)	Call for Quote

**Replacement Parts**

Model Number	Description	Price
BORA-ASK	Annual Service Kit (internal system filters and air compressor filter)	\$259.12
BORA-SK-4000	4000 Hour Service Kit (internal system filters)	\$173.84
SIR-ASK	Annual Service Kit (internal system filters and air compressor filter)	\$460.02
SIR-SK-4000	4000 Hour Service Kit (internal system filters)	\$264.86



## Chrysalis® II LC/MS Nitrogen Generator



"LCMS M-4"



"LCMS M-0"

### Description

The Chrysalis® II LC/MS M-4 Nitrogen Generator is specifically designed to deliver the larger capacity flow rates required for LC/MS instrument operation. The Chrysalis® II LC/MS M-4 utilizes an integral membrane based system to transform standard compressed air into a continuous stream of high purity dry nitrogen. The LC/MS M-4 can produce flow rates from 1 Lpm up to 30 Lpm, with purities ranging from 96 to 99.9%. An optional PUR-Gas™ UHP purification system is available to increase outlet nitrogen purity to 99.9999%, for flow rates up to 20 Lpm.

The Chrysalis® II LC/MS M-4 Nitrogen Generator incorporates an integral oil-free direct drive air compressor system to continuously supply the air to the gas generator inlet. Caster wheels for floor mobility are standard.

The design of the Chrysalis II® LC/MS M-4 Nitrogen Generator is based on hollow fiber membrane technology. Pressurized air is directed through a series of hollow fiber membrane tubes where, due to their high diffusion rates, oxygen, water vapor and carbon dioxide molecules diffuse rapidly out of the stream through the membrane walls. Nitrogen, which has a low diffusion rate through the membrane, is predominantly retained inside the membrane flow stream.

The first membrane stage eliminates most of the moisture and oxygen from the air stream. The pre-purified nitrogen then passes through a second membrane stage where more moisture, water vapor and carbon dioxide are removed. In the delivery stage, the nitrogen stream passes through a third membrane for final purification.

The nitrogen pressure out of the third membrane stage is then elevated from 45 psig to a standard discharge pressure of 115 psig. Operating the membranes at a lower initial pressure and then

boosting the pressure downstream results in extending membrane life compared to traditional designs that utilize a single compressor to operate throughout the entire pressure range. This also serves to extend the operating life of the air compressor components and significantly reduces routine maintenance requirements and costs.

The LC/MS Nitrogen Generator is also available without an integral air-compressor (the M-0 model) and operates from an external compressed air source. The Chrysalis® II LC/MS M-0 is capable of producing flow rates up to 60 Lpm. The LC/MS M-0 model is compact, lightweight, economical and is wall mountable.

### Applications

- Nebulizing gas for LC/MS and ELSD instruments
- Purge and drying gas for ICP instruments
- Carrier and make-up gas for GC-ECD instruments
- Make-up gas for GC-NPD instruments
- Compatible for use with Atmospheric Pressure Chemical Ionization and Electrospray Ionization interfaces
- Specific solvent evaporations
- Low purity purge gas requirements

### Product Features

- Flow capacities range from 1 Lpm to 60 Lpm
- Warranty is 2 years or 8,000 hours of operation (whichever occurs first)
- Flow control valve allows variable flow rates and nitrogen purity levels (M-4)
- Pressure indication provided for the outlet nitrogen supply
- Integral Oxygen Sensor monitors purity (M-4)
- Integral oil-free direct drive air compressor for "turn key" operation is standard (M-4)
- Caster (self-locking) wheels provide mobility for installation (M-4)
- Optional PUR-Gas™ purifier increases N<sub>2</sub> purity to 99.9999%
- Power cord included
- CE & CSA Approved

*Prices and Specifications Subject to Change without Notice*



## Chrysalis® II LC/MS Nitrogen Generator - *continued*

### Operating and Physical Specifications

	M-4 Model	M-0 Model
Nitrogen Flow Rate:	1-30 Lpm	1-60 Lpm*
Nitrogen Purity:	96-99.9%	98-99%
Nitrogen Outlet Pressure (max):	115 psig	132 psig
Pressure Drop:	none	8 psig (25 Lpm) 13 psig (60 Lpm)
Air Inlet Connection:	none	1/4" NPT
Nitrogen Outlet Connection:	1/4" FPT	1/4" NPT
Air Inlet Pressure (min./max.):	none	65/145 psig
Integral Air Compressor	Yes	No
Operating Noise Level:	< 58 dB	< 45 dB
Power Source:	110 VAC / 60 Hz 230 VAC / 50 Hz	none none
Dimensions:	12"W x 27"H x 35"D	11"W x 32"H x 5"D
Weight:	204 lbs	70 lbs
Warranty:	2-years (or 8,000 hrs of operation)	

\*Note: To determine air requirements, the M-0 model requires a compressed air volume at the inlet of approximately '8' to '10' times that of the desired nitrogen volume (flow). Consult factory for assistance.

### Nitrogen Purity Flow Chart (M-4 model)

Purity, %	99.9	99.7	99.5	99.3	99.1	99	98	97	96
Flow, Lpm	1-8	12	13	15	17	19	25	28	30

### Ordering Information

Model Number	Description	Flow Capacity	Price
LCMS-M430-AC60	Nitrogen Generator With Air Compressor, 60Hz	0-30 Lpm	\$15,336.00
LCMS-M430-AC50	Nitrogen Generator With Air Compressor, 50Hz	0-30 Lpm	\$15,336.00
LCMS-M025	Nitrogen Generator Without Air Compressor	1-25 Lpm	\$10,858.00
LCMS-M060	Nitrogen Generator Without Air Compressor	1-60 Lpm	\$16,384.50
PUR-0232	Optional PUR-Gas™ LC/MS Purification System	0-20 Lpm	\$477.24
CTG-0055	PUR-Gas™ LC/MS Purifier Replacement Cartridges		\$184.50
M430-FILT-KIT	Annual Internal Filter Replacement Kit (M-4 Model)		\$268.96
M430-O2-SEN	Oxygen Analyzer Replacement Sensor (M-4 Model)		\$612.00
M025-FILT-KIT	Annual Internal Filter Replacement Kit (M-0/25 Lpm Model)		Call for Quote
M060-FILT-KIT	Annual Internal Filter Replacement Kit (M-0/60 Lpm Model)		Call for Quote



*PUR-Gas™ LC/MS Nitrogen Gas Purification System.  
Unique 2-Position System achieves 99.9999% hydrocarbon removal  
of the nitrogen gas produced from the LC/MS Nitrogen Generator.*

*Prices and Specifications Subject to Change without Notice*



## Chrysalis® II Hydrogen Generator

### High Performance No Maintenance (HPNM) Series

### NON-Desiccant Models



#### Description

The Chrysalis® II "HPNM" (High Performance No Maintenance) Hydrogen Generator represents a superior advance in the technology utilized to generate hydrogen without having to perform routine maintenance. The "HPNM" Hydrogen Generator Models incorporate an advanced dual-column purification system to remove residual moisture from the hydrogen gas produced, and the system automatically regenerates the column to eliminate the need for maintenance. This technology utilizes pure deionized water and does not require the use of chemical solutions to support the electrolytic dissociation process; this completely eliminates the need for a desiccant cartridge as a final purification step. The output of hydrogen is based upon instrument demand. A user-friendly digital display provides system operating status and diagnostic capabilities. The Chrysalis® II "HPNM" Hydrogen Generator produces a reliable continuous output of >99.9999+% pure hydrogen ideal for GC carrier and FID gases. Add a Chrysalis® II ZERO Air Generator to automate the gas supply for GC-FID's.

#### Applications

- Carrier gas for gas chromatography
- Fuel gas for flame ionization detectors
- Supply gas for shaker devices in hydrogenation labs

#### Product Features

- Innovative internal adsorption/regenerative purification system removes moisture from the hydrogen and eliminates the need to monitor, change and purchase desiccant cartridges
- Small 9" wide x 14" deep footprint conserves lab bench space
- Manual adjustment of gas delivery pressure
- Delivery pressure to 155 psig suitable for fast GC methods
- Provides continuous LCD indication and monitoring of delivery pressure, hydrogen flow and water quality
- Uses Deionized water for operation (No caustic solutions)
- LCD based display and membrane control pad provide simplified operation
- Universal power (voltage) supply compatibility
- "Cascading" flow control allows multiple units (up to 32) to be connected as a system to provide larger capacity flows
- PC interface permits remote monitoring of selected functions
- Multiple alarms alert user to low water level, poor water quality, low pressure (leak) and power supply conditions
- CE and CSA certified

#### Operating and Physical Specifications

Electrolysis Cell:	Solid Polymer Membrane Type
H <sub>2</sub> Purity:	>99.9999+%
Delivery Pressure:	1 - 155 psig
H <sub>2</sub> Flow Rate:	100 - 160 - 250 - 500 - 1000 ccm
Safety:	Auto shut-off
User Interface:	Set points, system status, flow control, pressure control configuration menu, diagnostic menu
Display:	LCD based with set points, status, alarms
Indicator Lights:	Power ON, System Error
Options:	Cascading Flow Control Auto-Fill Module PC Remote Control (RS-232C) Remote Alarm Indication
Water:	Deionized (2µS or .5 Mohm)
Power Source:	110 - 120 VAC / 60 Hz; 230 VAC / 50 Hz
Dimensions :	9"W x 14"D x 16"H
Net Weight:	45 lbs (20 kg)
Certification:	CE and CSA compliant
Warranty:	1 year



**Chrysalis® II Hydrogen Generator (continued)**  
**High Performance No Maintenance (HPNM) Series**

**Ordering Information**

Model No.	Description	Capacity	Price
<b>High Performance No Maintenance ("HPNM") Series*</b>			
HYC-HPNM100	HPNM Hydrogen Generator	100 ccm	\$6,165.00
HYC-HPNM160	HPNM Hydrogen Generator	160 ccm	\$6,588.90
HYC-HPNM250	HPNM Hydrogen Generator	250 ccm	\$7,227.90
HYC-HPNM500	HPNM Hydrogen Generator	500 ccm	\$9,355.50
HYC-HPNM1000	HPNM Hydrogen Generator	1000 ccm	\$16,384.50

\*The "HPNM" Models do not utilize a (replaceable) "desiccant" purifier and provide maximum operating efficiency.

**High Performance No Maintenance ("HPNM") Series with PC Control Option\*\***

HYC-HPNM100-PC	HPNM Hydrogen Generator w/PC Remote Control Option	100 ccm	\$7,334.00
HYC-HPNM160-PC	HPNM Hydrogen Generator w/PC Remote Control Option	160 ccm	\$7,759.80
HYC-HPNM250-PC	HPNM Hydrogen Generator w/PC Remote Control Option	250 ccm	\$8,185.50
HYC-HPNM500-PC	HPNM Hydrogen Generator w/PC Remote Control Option	500 ccm	\$10,158.30
HYC-HPNM1000-PC	HPNM Hydrogen Generator w/PC Remote Control Option	1000 ccm	\$17,608.50

\*\*The PC Remote Control option permits on/off control and review of the operating status of the Hydrogen Generator from a remote location and is furnished with an RS-232C, 15-PIN Interface Cable Connection.

**High Performance No Maintenance ("HPNM") Series with Cascading Flow Option\*\*\***

HYC-HPNM250-CF	HPNM Hydrogen Generator w/Cascading Flow Option	250 ccm	\$7,973.10
HYC-HPNM500-CF	HPNM Hydrogen Generator w/Cascading Flow Option	500 ccm	\$10,205.10
HYC-HPNM1000-CF	HPNM Hydrogen Generator w/Cascading Flow Option	1000 ccm	\$17,145.00

\*\*\*The Cascading Flow option allows a minimum of '2' units (up to 32) to be connected in parallel operation to deliver a large flow of hydrogen. Each individual unit is set-up for "Cascading Flow" operation and is furnished with an external RS-485 interface cable to coordinate the functions of the individual units. All units operating within a large flow capacity system must be configured with the "Cascading Flow" feature.

**Optional Features**

Model No.	Description	Price
HYC-PC-HPNM	PC Interface Software with Control I/O Board	Call for Quote
AF-RC	Qty (1) Auto-Fill Module for Units with PC & CF Control Features	\$639.00
AF-STD	Qty (1) Auto-Fill Module for Units without Control Features	\$1,320.30

**Spare Parts**

Model No.	Description	Price
DI-BAG	Deionizer Bag (replacement)	\$100.80
DI-TBAG	High Performance Deionizer Bag	\$192.60
HYC-BGS-KIT	Auxiliary Back-Up Gas Supply Kit	\$380.70

**Warranty: One (1) year parts & labor**



## Chrysalis® II Hydrogen Generator Standard Economy Purified Gas (SEPG) Series



### Description

The Chrysalis® II "SEPG" (Standard Economy Purified Gas) Hydrogen Generator employs the newest membrane technology available for electrolytic production of pure hydrogen gas and is ideal for operation with Gas Chromatography Analyzers. The primary application for the "SEPG" model is to supply fuel gas for FID operation or as a source of pure hydrogen in plasma chambers and other isolated environments. Electrolytic membrane technology is preferred over alternative hydrogen sources (i.e. gas cylinders) because it is clean, requires less maintenance and there is no need to utilize chemicals to maintain operation. Only deionized water is required to provide trouble-free, long-term performance.

Chrysalis® II Hydrogen Generators clearly out perform all other gas generators that use caustic solutions to generate hydrogen. The benefits of utilizing electrolytic membrane hydrogen production in the laboratory are significant. Impurities in caustic solutions can affect the purity of hydrogen product and they can cause premature system degradation over time. Membrane separation is also less time consuming, because routine maintenance means "just add water." There is no need to store caustic compounds/solutions or to perform time-consuming cell

clean-up procedures. The output of hydrogen is based upon instrument demand. A user-friendly digital control display provides system operating status and diagnostic capabilities. The Chrysalis® II "SEPG" Hydrogen Generator produces a reliable continuous output of pure hydrogen >99.999% using only deionized water.

### Applications

- Carrier gas for gas chromatography
- Fuel gas for flame ionization detectors

### Product Features

- Small 9" wide x 14" deep footprint conserves lab bench space
- Manual adjustment of gas delivery pressure
- Provides continuous LCD indication and monitoring of gas delivery pressure, hydrogen flow and water quality
- Utilizes deionized water for operation (No caustic solutions)
- Desiccant cartridge (replaceable) provides final purification step to remove moisture
- LCD based display and membrane control pad provide simplified operation
- Universal power (voltage) supply compatibility
- "Cascading" flow control allows multiple units (up to 32) to be connected as a system to provide larger capacity flows
- PC interface permits remote monitoring of selected functions
- Multiple alarms alert user to low water level, poor water quality, low pressure (leak) and power supply conditions
- CE and CSA certified

### Operating and Physical Specifications

Electrolysis Cell:	Solid Polymer Membrane Type
H <sub>2</sub> Purity:	>99.999%
Delivery Pressure:	1 - 90 psig
H <sub>2</sub> Flow Rate:	100 - 160 - 250 - 500 ccm
Safety:	Auto shut-off with multiple operating alarms
User Interface:	Set points, system status, flow control, pressure control configuration menu, diagnostic menu
Display:	LCD based with set points, status, alarms
Indicator Lights:	Power ON, H <sub>2</sub> Production, System Error
Options:	Cascading Flow Control PC Remote Control (RS-232C) Remote Alarm Indication
Water:	Deionized (2μS or .5 Mohm)
Desiccant Cartridge:	Replace when red beads turn to light yellow / white
Power Source:	110 - 120 VAC / 60 Hz; 230 VAC / 50 Hz
Dimensions :	9"W x 14"D x 16"H
Net Weight:	35 lbs (16 kg)
Certification:	CE and CSA compliant
Warranty:	1 year



**Chrysalis® II Hydrogen Generator (continued)**  
**Standard Economy Purified Gas (SEPG) Series**

**Ordering Information**

Model No.	Description	Capacity	Price
<b>Standard Economy Purified Gas ("SEPG") Series</b>			
HYC-SEPG100	SEPG Hydrogen Generator	100 ccm	\$4,887.90
HYC-SEPG160	SEPG Hydrogen Generator	160 ccm	\$5,313.60
HYC-SEPG250	SEPG Hydrogen Generator	250 ccm	\$6,270.30
HYC-SEPG500	SEPG Hydrogen Generator	500 ccm	\$8,185.50

**Standard Economy Purified Gas ("SEPG") Series with PC Remote Control Option\***

HYC-SEPG100-PC	SEPG Hydrogen Generator w/PC Remote Control Option	100 ccm	\$5,845.50
HYC-SEPG160-PC	SEPG Hydrogen Generator w/PC Remote Control Option	160 ccm	\$6,270.30
HYC-SEPG250-PC	SEPG Hydrogen Generator w/PC Remote Control Option	250 ccm	\$7,120.80
HYC-SEPG500-PC	SEPG Hydrogen Generator w/PC Remote Control Option	500 ccm	\$9,036.00

\*The PC Remote Control option permits on/off control and review of the operating status of the Hydrogen Generator from a remote location and is furnished with an RS-232C, 15-PIN Interface Cable Connection.

**Standard Economy Purified Gas ("SEPG") Series with Cascading Flow Option\*\***

HYC-SEPG250-CF	SEPG Hydrogen Generator w/Cascading Flow Option	250 ccm	\$6,696.00
HYC-SEPG500-CF	SEPG Hydrogen Generator w/Cascading Flow Option	500 ccm	\$8,611.20

\*\*The Cascading Flow option allows a minimum of '2' units (up to 32) to be connected in parallel operation to deliver a large flow of hydrogen. Each individual unit is set-up for "Cascading Flow" operation and is furnished with an external RS-485 interface cable to coordinate the functions of the individual units. All units operating within a large flow capacity system must be configured with the "Cascading Flow" feature.

**Optional Features**

Model No.	Description	Price
HYC-PC-SEP6	PC Interface Software with Control I/O Board	Call for Quote

**Spare Parts**

Model No.	Description	Price
DI-BAG	Deionizer Bag (replacement)	\$100.80
DI-TBAG	High Performance Deionizer Bag	\$192.60
PUR-DC	Desiccant Cartridge w/fittings (replacement)	\$306.00
HYC-BGS-KIT	Auxiliary Back-Up Gas Supply Kit	\$380.70

**Warranty: One (1) year parts & labor**



**Generators**

**Chrysalis® II ZERO Air Generator**



**Description**

The Chrysalis® II ZERO Air Generators continuously produce high purity air from plant compressed air. Matheson offers two models to choose from. The standard "GC/FID" model removes hydrocarbon and carbon monoxide impurities to less than 0.1 ppm. The high performance "Ultra" model removes hydrocarbon, carbon monoxide and NOx impurities to less than 0.1 ppm, carbon dioxide to less than 5 ppm, and moisture to less than -70°C dewpoint. Both models also efficiently remove particulates down to 0.5 micron in size.

The use of Chrysalis® II ZERO Air Generators in the lab provides several advantages. Valuable laboratory floor space is conserved by eliminating the need to use and store high purity air in cylinders. There is no need to continually buy replacement UHP grade air in cylinders. Using an onsite gas generator eliminates the need to recalibrate instruments after replacing empty cylinders with full ones.

Chrysalis® II ZERO Air Generators provide continuous flow and require low levels of air consumption and electrical power. They are easy to install and require only minimal maintenance.

The standard "GC/FID" model receives the plant compressed air through a highly efficient coalescing/particulate pre-filter that removes particulates and moisture. The air then flows through a stainless steel, heated platinum catalytic combustion module, where hydrocarbons and carbon monoxide are oxidized. After cooling, a filter at the outlet is used as a final purification step to remove any remaining moisture and residual particulate material.

The high performance "Ultra" model receives plant compressed air through a highly efficient coalescing/particulate pre-filter that removes particulates and bulk moisture. The air then enters a dual column pressure swing adsorption air dryer to remove water vapor and carbon dioxide. From the dryer, the air is channeled into a scrubber to remove NOx through an adsorption process. Next, the air flows through a stainless steel, heated platinum catalytic combustion module, where hydrocarbons and carbon monoxide are oxidized. After cooling, a filter at the outlet is used as a final purification step to remove any remaining moisture and residual particulate material.

**Applications**

- Fuel air for flame ionization detectors (FIDs)
- Fuel air for flame photometric detectors (FPDs)
- Fuel air for nitrogen phosphorus detectors (NPDs)

**Product Features**

- Compact size requires minimal space
- Wall mountable
- Built-in security lock on external housing
- Green, yellow and red indicating lights indicate power, warmup, ready and fault notification of low/high catalyst temperature, low/high inlet pressure, and life expectancy/expiration of catalyst
- Digital thermal switch automatically shuts off power to the catalyst in the event that the inlet compressed air supply is turned off, preventing catalyst damage due to overheating
- Power cord included
- CE & CSA approved

**Operating and Physical Specifications**

	Std GC/FID Model	H.P. Ultra Model
Product Outlet Purity		
Hydrocarbons	< 0.1 ppm	< 0.1 ppm
Carbon Monoxide	< 0.1 ppm	< 0.1 ppm
Particles > 0.5 micron	99.99 %	99.99 %
Carbon Dioxide	—	< 5 ppm (1.5, 3, 6 Lpm) < 10 ppm (15, 30 Lpm)
Nitrogen Oxides	—	< 0.1 ppm
Dewpoint	< -58°F (-50°C)	< -58°F (-50°C)
Outlet Air Temperature	Ambient + 27°F (+15°C)	Ambient + 27°F (+15°C)
Maximum Inlet Impurities		
Hydrocarbons	100 ppm	100 ppm
Carbon Monoxide	100 ppm	100 ppm
Carbon Dioxide	—	500 ppm
Nitrogen Oxides	—	50 ppm
Maximum Inlet Temperature	104°F (40°C)	104°F (40°C)
Inlet Air Pressure Range (Regulated to 100 psig)	65-145 psig	65-145 psig
Pressure Drop @ max flow	15 psig	15 psig
Maximum Outlet Pressure*	100 psig	80 psig
Maximum Flow Rate	1.5-30 Lpm	1.5-30 Lpm
Power Source	115/230 VAC	115/230 VAC
Inlet Port (compression ftg)	1/4"	1/4"
Outlet Port (compression ftg)	1/4"	1/4"
Dimensions	<b>1.5, 3, 6, 15, 30 Lpm</b> 18"W x 10"D x 16"H	<b>1.5, 3, 6 Lpm</b> 18"W x 10"D x 16"H <b>15, 30 Lpm</b> 21"W x 11"D x 17"H
Weight	12-22 lbs	22-62 lbs

*\*Note: The outlet pressure from each model is regulated to 100/80 psig at nominal flow conditions; larger flows will create increased pressure drop and could reduce the outlet pressure below the regulated 100/80 psig levels.*

**Ordering Information**

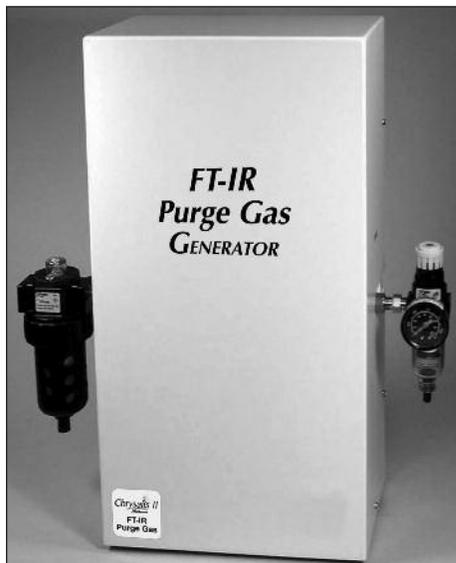
Model Number	Description	Capacity	Price
ZAC-GC1500	Standard GC/FID ZERO Air Generator	1.5 Lpm	\$1,528.20
ZAC-GC3000	Standard GC/FID ZERO Air Generator	3.0 Lpm	\$2,961.00
ZAC-GC6000	Standard GC/FID ZERO Air Generator	6.0 Lpm	\$5,620.50
ZAC-GC15000	Standard GC/FID ZERO Air Generator	15.0 Lpm	\$7,666.20
ZAC-GC30000	Standard GC/FID ZERO Air Generator	30.0 Lpm	\$10,121.40
ZAC-ULT1500	High Performance Ultra ZERO Air Generator	1.5 Lpm	\$3,268.80
ZAC-ULT3000	High Performance Ultra ZERO Air Generator	3.0 Lpm	\$5,006.70
ZAC-ULT6000	High Performance Ultra ZERO Air Generator	6.0 Lpm	\$6,130.80
ZAC-ULT15000	High Performance Ultra ZERO Air Generator	15.0 Lpm	\$8,177.40
ZAC-ULT30000	High Performance Ultra ZERO Air Generator	30.0 Lpm	\$11,041.20
ZAC-FILT-HSG	Replacement External Air Filter (Housing & Element)		\$236.70
ZAC-EXT-CART	Replacement Cartridge for External Air Filter		\$69.30
ZAC-INT-CART	Replacement Cartridge for Internal Air Filter		\$83.70

*Prices and Specifications Subject to Change without Notice*



# Chrysalis® II FT-IR Purge Gas Generator

## Provides CO<sub>2</sub> FREE Air for Analytical Instruments and Monitors



### Description

The Chrysalis® II FT-IR Purge Gas Generator is designed to provide a continuous stream of CO<sub>2</sub> free air from compressed air sources for use with FT-IR Spectrometers to provide purified purge and air bearing gas. The FT-IR Purge Gas Generator utilizes the Pressure Swing Adsorption (PSA) process to reduce CO<sub>2</sub> levels to below 1 ppm and water vapor content to less than -100 °F dew point. The Chrysalis® II FT-IR Purge Gas Generator is ideal for optimizing spectral analysis by providing clearer background spectra in a shorter evaluation time, while improving signal to noise ratio. The FT-IR Purge Gas Generators are designed to operate 24-hours/day, 7-days/week. The integral dual tower design provides continuous uninterrupted operation without having to change media. The Generator requires a compressed air source for operation and the air should be compatible with instrument quality air. The inconvenience and high costs associated with using nitrogen cylinders and dewars can be eliminated with the Chrysalis® II FT-IR Purge Gas Generator.

### Applications

- Purge Gas for Sample Chambers, Optics and Air Bearing Components for FT-IR Spectrometers
- Continuous Emissions Monitors
- TOC Analyzers
- Calibration Air for CO<sub>2</sub> Analyzers
- Matrix GC's

### Product Features

- Flow rate up to 80 Lpm
- Reduces CO<sub>2</sub> levels to less than 1 ppm
- Reduces water vapor to less than 1 ppm
- Compact size conserves space
- Continuous self-regenerative operation
- Operating pressure 60 to 125 psig
- Regulator/filter with gauge installed on outlet
- Sound insulated enclosure
- No moving parts requiring maintenance
- Wall mountable design
- Power cord with plug included

### Operating and Physical Specifications

Flow Rate:	
Model FTIR-PG19	4 Lpm (60 psig air inlet pressure) 19 Lpm (120 psig air inlet pressure)
Model FTIR-PG28	7 Lpm (60 psig air inlet pressure) 28 Lpm (125 psig air inlet pressure)
Model FTIR-PG80	14 Lpm (60 psig air inlet pressure) 80 Lpm (125 psig air inlet pressure)
Min/Max Inlet Air Pressure:	60 psig/125 psig
Compressed Air Quality:	Instrument; Oil-less
CO <sub>2</sub> Concentration:	< 1 ppm
Dew Point:	-100 °F
Max Inlet Air Temperature:	77 °F
Inlet/Outlet Port Size:	
Model FTIR-PG19	1/4" NPT
Model FTIR-PG28	1/4" NPT
Model FTIR-PG80	1/4" NPT
Power Source:	Model FTIR-PG19 115 VAC/60 Hz; 9 watts Model FTIR-PG28 & PG80 115 VAC/60 Hz; 20 watts
Dimensions:	
Model FTIR-PG19	12"H x 14"W x 5"D
Model FTIR-PG28	20"H x 17"W x 7"D
Model FTIR-PG80	28"H x 17"W x 7"D
Weight:	
Model FTIR-PG19	6 lbs.
Model FTIR-PG28	19 lbs.
Model FTIR-PG80	25 lbs.
Warranty:	1 year

### Flow Capacity Chart (flow rates in Lpm for each model)

Air Inlet Pressure (psig)	FTIR-PG19	FTIR-PG28	FTIR-PG80
125	--	28	80
120	19	27	73
110	18	25	60
100	14	23	49
90	12	20	39
80	10	17	34
70	6	10	21
60	4	7	14

### Ordering Information

Model Number	Description	Capacity	Price
FTIR-PG19	FT-IR Purge Gas Generator	19 Lpm	\$2,790.90
FTIR-PG28	FT-IR Purge Gas Generator	28 Lpm	\$3,253.50
FTIR-PG80	FT-IR Purge Gas Generator	80 Lpm	\$3,948.30
CO2-IN-FILT1	Replacement Inlet Air/Coalescing Filter Cartridge (28 & 80 Lpm models)		\$57.40
CO2-IN-FILT2	Replacement Inlet Air/Coalescing Filter Cartridge (19 Lpm model)		\$35.26
CO2-IN-HSG1	Replacement Inlet Air/Coalescing Filter Housing with Filter (28 & 80 Lpm models)		\$167.28
CO2-IN-HSG2	Replacement Inlet Air/Coalescing Filter Housing with Filter (19 Lpm model)		\$69.70
CO2-OUT-FILT	Replacement Outlet Air Filter Cartridge (all models)		\$22.14
CO2-OUT-REG	Replacement Outlet Regulator/Filter Assembly with Filter (all models)		\$72.00
CO2-MUFF	Replacement Muffler (all models)		Call for Quote

*NOTE: Flow rates for each model vary based upon the air pressure supplied to the inlet of the Generator. Please refer to the Flow Capacity Chart for additional flow information.*



## Chrysalis® II TOC Gas Generator

### Delivers CO<sub>2</sub> FREE Air for TOC Analyzer Operation



#### Operating and Physical Specifications

Flow Rate:	2.1 Lpm (60 psig air inlet pressure) 9.1 Lpm (120 psig air inlet pressure)
Min/Max Inlet Air Pressure:	60 psig / 120 psig
Compressed Air Quality:	Instrument; Oil-less
CO <sub>2</sub> Concentration:	< 1 ppm
Dew Point:	-100 °F
Max Inlet Air Temperature:	77 °F
Inlet/Outlet Port Size:	1/4" NPT
Power Source:	115 VAC/60 Hz; 9 watts
Dimensions:	10"H x 12"W x 4.5"D
Weight:	6.5 lbs.
Warranty:	1 year

#### Flow Capacity Chart (flow rates in Lpm for each model)

Air Inlet Pressure (psig)	TOC-CO2-9
120	9.1
110	8.4
100	7.7
90	6.2
80	5.4
70	3.3
60	2.1

#### Description

The Chrysalis® II TOC Purge Gas Generator is designed to provide a continuous stream of CO<sub>2</sub> free air from compressed air sources to generate purge gas for use with TOC Analyzers. The TOC Gas Generator incorporates the Pressure Swing Adsorption (PSA) process to reduce CO<sub>2</sub> levels to below 1 ppm and water vapor content to less than -100°F dew point. The Chrysalis® II TOC Gas Generator effectively eliminates the need to utilize oxygen or nitrogen gas cylinders to support operation and is ideally suited to produce air purity to levels that meet or exceed the gas purity requirements specified by manufacturers of TOC Analyzers. The TOC Gas Generator is designed to operate 24-hours/day, 7-days/week. The integral dual tower design provides continuous uninterrupted operation without having to change media. The TOC Gas Generator requires a compressed air source for operation and the air should be compatible with instrument quality air. Combine the Chrysalis® II TOC Gas Generator with a Chrysalis® II ZERO Air Generator to further purify the air by removing hydrocarbons (as methane) for other applications.

#### Applications

- Purge gas and carrier/combustion gas for TOC Analyzers
- Continuous Emissions Monitors
- Calibration Air for CO<sub>2</sub> Analyzers
- Gas Chromatograph Instruments

#### Product Features

- Flow rate up to 9.1 Lpm
- Reduces CO<sub>2</sub> levels to less than 1 ppm
- Reduces water vapor to less than 1 ppm
- Compact size conserves space
- Continuous self-regenerative operation
- Operating pressure 60 to 120 psig
- Regulator/filter with gauge installed on outlet
- No moving parts requiring maintenance
- Wall mountable design
- Power cord with plug included

#### Ordering Information

Model Number	Description	Capacity*	Price
TOC-CO2-9	TOC Gas Generator	9 Lpm	\$2,887.20
CO2-IN-FILT2	Replacement Inlet Air/Coalescing Filter Cartridge		\$35.26
CO2-IN-HSG2	Replacement Inlet Air/Coalescing Filter Housing with Filter		\$69.70
CO2-OUT-FILT	Replacement Outlet Air Filter Cartridge		\$22.14
CO2-OUT-REG	Replacement Outlet Regulator/Filter Assembly with Filter		\$72.00

\*Flow rate will vary based upon the air pressure supplied to the inlet of the Generator. Please refer to the Flow Capacity Chart for additional flow information.



## LabGas Systems®

### Introduction

Matheson's experience within the laboratory environment has culminated in an innovative approach to providing efficient control and distribution of gas, delivery pressure, purity and purification with the LabGas Systems® products. Our recognized leadership position in both specialty and semiconductor gases has provided us with the technical expertise and capabilities to provide the most cost effective solutions to satisfy your specific control and distribution needs.

Matheson developed the concept of LabGas Systems® to furnish a complete integrated solution for the proper control and distribution of gas from the "source to the point-of-use," and offers several products to enhance gas handling and performance in a broad spectrum of applications.

LabGas Systems® encompasses the GasTrak™, GasTrak Pro™, SourceTrak™ and SwitchPro™ products for providing effective gas control and distribution at the "point-of-use" and "source" locations within a laboratory or manufacturing process area. In addition, Gas Distribution Panels and Cabinets are also available to provide a safe storage area for gas cylinders and to protect end-users from potential exposure to toxic gases.

The **GasTrak™** and **GasTrak Pro™** Systems are compact control stations and panels, which serve to provide "point-of-use" gas delivery to analytical instruments and support methods utilized within the laboratory. GasTrak™ and GasTrak Pro™ improve safety in the workplace by minimizing the need to maintain gas cylinders as the supply source within the laboratory. These Systems can be wall or bench mounted, providing convenient access to monitor and adjust specific gas delivery operating parameters.

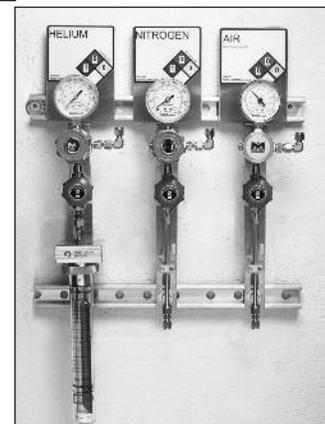
**SourceTrak™** and **SwitchPro™** Systems offer a wide range of manifolds and automatic switchover panels designed to provide continuous delivery of gases and aid in reducing the repetitive labor associated with cylinder changeouts and monitoring. These manifold systems are available with a variety of options to permit custom design and added operational flexibility. Matheson's SwitchPro™ Systems feature a patented design where two regulators are incorporated within a single body for maximum operating efficiency.

Matheson's **gas distribution panels and cabinet enclosures** are available in several standard designs to promote the safe handling and control of hazardous and non-hazardous materials. Recognizing that many of our customers' needs are unique and cannot be accommodated by a standard product, Matheson's experience allows us to provide customized systems tailored to meet each customer's individual process requirements whenever the application arises. Many complex gas distribution and containment applications can be simply addressed through modifying our standard products to provide a custom solution.

Matheson works hand-in-hand with your facility personnel to provide a complete gas distribution system by incorporating LabGas Systems™ and other quality products into the design. Ultimately, Matheson's primary objective is to ensure that each gas control and distribution system effectively integrates your specific operating requirements and also incorporates all regulatory specifications.



*GasTrak Pro™*



*GasTrak™*



*The SourceTrak™ Manifold System*



*Gas Containment*



## Pressure Monitor



### Description

The Matheson Tri-Gas Pressure Monitor, Model PM-22, was designed as a method of monitoring a gas supply, when used in conjunction with Matheson Tri-Gas Gas Delivery Systems with Indicating Pressure Switches (IPS).

The PM-22/IPS will indicate the status of both sides of the switchover: FULL – IN SERVICE, and DEPLETED. When a cylinder or cylinder bank is depleted, the green light will change to a red light, and the audible alarm will sound. The audible alarm can be silenced, leaving the red light indication. The red light will automatically reset to green when the depleted cylinder is replaced with a full cylinder.

### Features

- Two-channel annunciator with audio/visual alarm
- 120 VAC, 60 Hz power adapter with 15 VDC output
- Green (RUN) indicator lights for each channel
- Red (PRESSURE LOW) indicator lights for each channel to indicate low pressure or empty
- Audible alarm and alarm silence button
- Contact for outputs – left and right channel, or can be wired in series for common output
- 16 gauge steel, dust-proof enclosure
- Wall mounting brackets attached

### Ordering Information

Model Number	Description	Price
PM-22	2 Channel Pressure Monitor	\$633.86

## Indicating Pressure Switch



### Description

The Matheson Tri-Gas Indicating Pressure Switch (IPS) contains a pressure scale similar to a gauge for local indication, and a magnetically activated set of contacts for remote indication. The alarm point is user settable from the front of the IPS.

### Features

- 2-1/2" Dial for resolution
- Stainless steel or brass
- 1/4" MPT bottom connection
- User settable, front mounted set point indicator, magnetically activated

### Specifications:

Power: 10 W maximum  
 Current: 0.5 A maximum  
 Contacts: Normally open (no pressure)

### Ordering Information

Brass	Range	Price
IPS-0092-BO	0-200 psig	\$173.84
IPS-0093-BO	0-400 psig	\$173.84
IPS-0094-BO	0-600 psig	\$158.26
IPS-0095-BO	0-3000 psig	\$178.74
Stainless Steel	Range	Price
IPS-0096-SA	0-200 psig	\$162.36
IPS-0097-SA	0-400 psig	\$178.76
IPS-0098-SA	0-600 psig	\$182.04
IPS-0099-SA	0-3000 psig	\$178.76



## GasTrak Pro™ Delivery/Control Systems



*Regulator, Purifier and Outlet Sections*

### Introduction

GasTrak Pro™ Systems are a unique approach to controlling and delivering high-purity gases distributed in today's modern laboratory. GasTrak Pro™ Systems offer dedicated control panels for specific functions and are designed to provide localized control of gas distributed within the laboratory. This equipment can be used as stand-alone, point-of-use gas panels or can be integrated into turnkey high-purity gas supply systems.

The basic design of the GasTrak Pro™ Systems product consists of individual panel sections snapped into place on a tube chase.

The system will accommodate any number of panel sections and future expansions can be engineered up-front decreasing the risk of the user's investment becoming obsolete. This can substantially reduce the cost normally associated with expansion or modification.

System components are designed, cleaned and built to maintain gas purity. Panels are shipped leak-tested and completely assembled, keeping overall installation costs at a minimum.

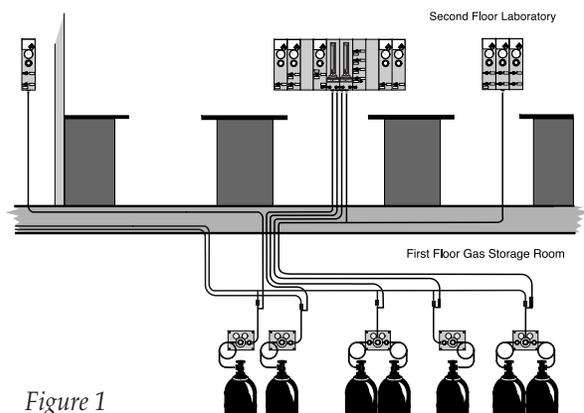
### Design Features/Benefits

- Allows user to maintain a consistent high-purity gas system.
- Provides localized control of gas pressure, purity and distribution at point-of-use with gas source located in a remote area.
- Modular snap-in panel sections provide unlimited flexibility. Panel sections include:
  - Regulator Section
  - Purifier Section
  - Outlet Section
  - Expansion Section
- Easy to install - panels are shipped completely leak-tested and assembled.
- Low maintenance design - convenient access to panel sections.
- Cost savings – permits planning for future lab expansions/modifications while maintaining consistency of design and operation.
- Panels enhance safety and reduce analytical variables when used in conjunction with an integrated gas delivery system.
- Panel graphics and valve labels customized for each application.
- Complete user-defined system with many options available.

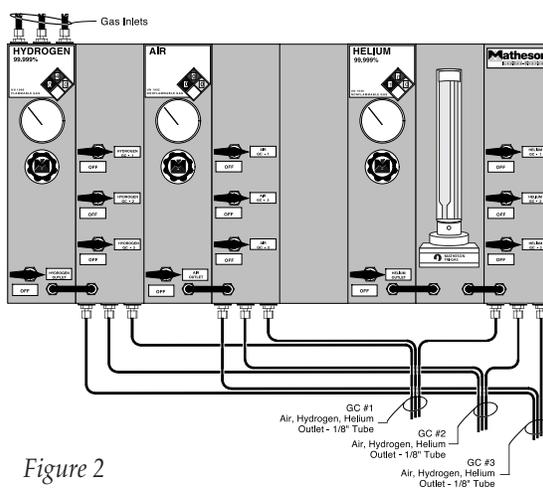
### Applications

Uses of GasTrak Pro™ Systems — in an actual laboratory environment are illustrated below.

- **Figure 1** depicts the gas supply originating from gas cylinders located in a remote storage area. Different types of gases are piped to the laboratory and directly into the GasTrak Pro™ System panel sections. In this example, the gas inlets are positioned at the bottom of the panel. Instrument tubing is then connected directly to gas outlets on the panels.
- **Figure 2** illustrates a GasTrak Pro™ System consisting of eight (8) panel sections with gas inlets for helium, air and hydrogen; all supplied from a remote source. Each gas is passed through a designated regulator section; with helium passing through an additional purifier section. The gases are then piped and distributed through their respective gas outlet sections and piped to several GC analytical instruments.



*Figure 1*



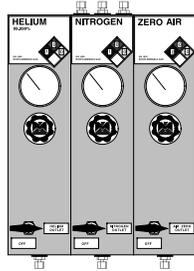
*Figure 2*



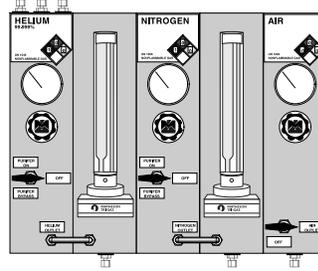
**GasTrak Pro™ Delivery/Control Systems (continued)**



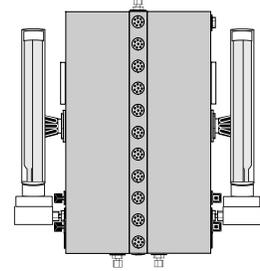
One Section Panel



Three Section Panel



Double Sided Five Section Panel



**System Designs**

The above examples of panel systems illustrate the flexibility of the GasTrak Pro™ Systems design. An unlimited number of panel combinations is possible. Please note the examples shown are for illustration purposes only. If you need further assistance, contact Matheson for more additional information on designing panels which meet your individual specifications.

- **One Section Panel**  
Regulator section for nitrogen gas with top inlet and bottom outlets. Custom valve labels and graphics.
- **Three Section Panel**  
Regulator sections for three different gases - helium, nitrogen and air.
- **Double Sided Five Section Panel**  
Regulator sections for helium, nitrogen and air. Purifier sections for helium and nitrogen with moisture and oxygen traps. End view illustrates panel sections installed on opposite sides of the tube chase. This configuration is ideal for applications where instrumentation is located on either side of the lab bench.

**Panel Construction**

**Tube Chase**

The tube chase is the structural frame which holds the panel sections firmly in place and connects to the gas source supply tubing. The installation of the tube chase can be mounted on a wall, placed on a lab bench or suspended from the ceiling.



Regulator panel section removed from open-channel tube chase at rear. Sections are connected with stainless steel flexible tubing.

**Materials of Construction**

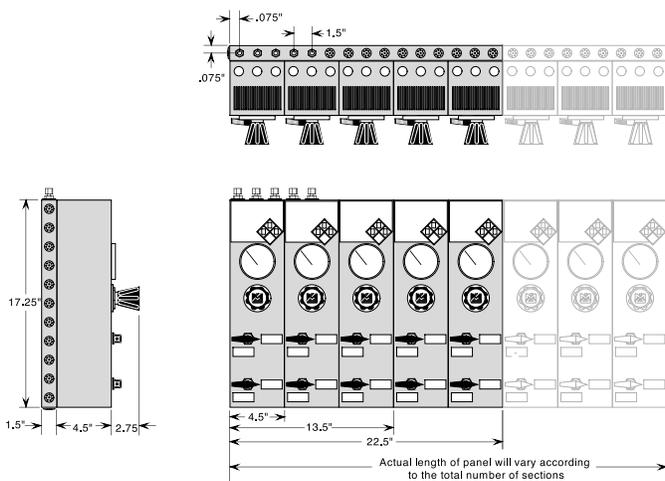
Tube Chase and Panel Section Housing:

Powder-coated epoxy finish over zinc chromate treated steel

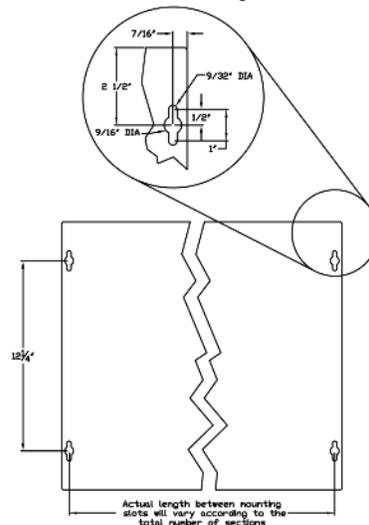
Tubing Material:  
Regulators:  
Outlet Valves:  
Fittings:

Stainless steel  
Stainless steel  
Stainless steel  
Stainless steel

**Typical Key Panel Dimensions**



Back View of Panel Mounting Slots





**GasTrak Pro™ Delivery/Control Systems (continued)**



**Regulator Panel Section – L01 Series**

- High purity stainless steel regulator
- Inlet pressure of 400 psig
- Gauge
- Option of one or two outlets
- Outlets on front, top or bottom
- 1/8", 1/4" or 3/8" outlets (1/4" is standard)
- Custom graphics

**Ordering Information**

**Regulator Panel Section**

Please select '1' order code from each category listed to assemble a Single Model No. for the complete Regulator Panel Section desired.

Regulator Panel Code	Gas Type Code	Internal Metal Components Code	No. of Gas Outlets Code	Outlet Pressure Code	Options Code
LO1	A = Acetylene	S = Stainless Steel	1 = one	1 = 0-30 psig	2 = 1/8" Outlet
—	X = Non-corrosive	—	2 = two	2 = 0-100 psig	3 = Bottom Outlet
—	—	—	—	3 = 0-200 psig	4 = Top Outlet
—	—	—	—	4 = Acetylene	6 = 3/8" Outlet
<b>LO1</b>	<b>A</b>	<b>S</b>	<b>2</b>	<b>3</b>	<b>2,4</b>

**Example: Regulator Panel Model No. LO1AS23-24**



**Purifier Panel Section – L06 Series**

- Section inlet connects from a regulator section (L01) outlet
- 1/8", 1/4" or 3/8" outlets (1/4" is standard)
- Integral check valve to prevent contamination of purifier when not in use
- Purifier mounted vertically to stationary baseplate to prevent channeling and maximize performance
- Unique baseplate mounting and design allow purifier cartridges to be replaced without using tools
- Maximum inlet pressure of 150 psig

**Ordering Information**

**Purifier Panel Section**

Please select '1' order code from each category listed to assemble a Single Model No. for the complete Purifier Panel Section desired.

Purifier Panel Code	Gas Type Code	Internal Metal Components Code	Options Code
LO6	0 = Non-corrosive	S = Stainless Steel	2 = 1/8" Outlet
—	—	—	3 = Bottom Outlet
—	—	—	4 = Top Outlet
—	—	—	6 = 3/8" Outlet
<b>LO6</b>	<b>0</b>	<b>S</b>	<b>2,3</b>

**Example: Purifier Panel Model No. LO60S-23**

*\*Note: The Purifier Cartridge must be ordered separately from the panel section (refer to the table below)*

**Purifier Cartridges**

Model No.**	Description	Price
CTG-0050-XX	Moisture Removing	\$94.30
CTG-0051-XX	Oxygen Removing	\$94.30
CTG-0052-XX	Hydrocarbon Removing	\$94.30
CTG-0053-XX	Triple: Moisture/Oxygen/Hydrocarbon Removing	\$104.14
CTG-0054-XX	Combi: Moisture/Oxygen Removing	\$119.72

*\*\*Note: All Purifier Cartridges are furnished with an integral sight indicating column to signal cartridge changeout periods.*



## GasTrak Pro™ Delivery/Control Systems (continued)



### Single-Gas Outlet Panel Section – L03 Series

- One to five outlets available
- Section inlet connects to left adjacent section
- Outlets located on front, top or bottom
- Vertical configuration only
- 1/8", 1/4" or 3/8" outlets (1/4" is standard)
- Stainless steel internal tubing
- Maximum pressure of 500 psig

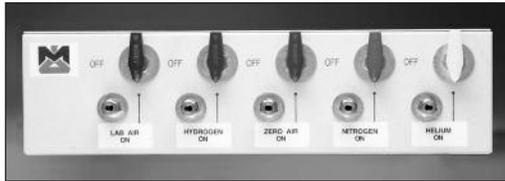
### Ordering Information

#### Single-Gas Outlet Panel Section

Please select '1' order code from each category listed to assemble a Single Model No. for the complete Single-Gas Outlet Panel Section desired.

Single-Gas Outlet Panel Code	Gas Type Code	Gas Type Code	Internal Metal Components Code	No. of Outlets Code	Options Code
L03	0 = Same Gas	0 = Non-corrosive	S = Stainless Steel	1 = one	2 = 1/8" Outlet
—	—	—	—	2 = two	3 = Bottom Outlet
—	—	—	—	3 = three	4 = Top Outlet
—	—	—	—	4 = four	6 = 3/8" Outlet
—	—	—	—	5 = Five	
<b>L03</b>	<b>0</b>	<b>0</b>	<b>S</b>	<b>2</b>	<b>3,6</b>

Example: Single-Gas Outlet Panel Model No. LO300S2-36



### Stand Alone Outlet Panel – L03P Series

- One to five outlets for different gases available
- Stand alone unit - can be remotely located from other panel sections
- Horizontal or vertical configuration (horizontal standard)
- Outlets located on front, top or bottom
- 1/8", 1/4" or 3/8" outlets (1/4" is standard)
- 1/4" stainless steel internal tubing
- Maximum pressure of 500 psig

### Ordering Information

#### Multi-Gas Outlet Panel Section

Please select '1' order code from each category listed to assemble a Single Model No. for the complete Multi-Gas Outlet Panel Section desired.

Multi-Gas Outlet Panel Code	Gas Type Code	Gas Type Code	Internal Metal Components Code	No. of Outlets Code	Options Code
L03P	0 = Same Gas	0 = Non-corrosive	S = Stainless Steel	1 = one	2 = 1/8" Outlet
—	M = Different Gas	—	—	2 = two	3 = Bottom Outlet
—	—	—	—	3 = three	4 = Top Outlet
—	—	—	—	4 = four	6 = 3/8" Outlet
—	—	—	—	5 = Five	V = Vertical
<b>L03P</b>	<b>0</b>	<b>0</b>	<b>S</b>	<b>3</b>	<b>2,4</b>

Example: Multi-Gas Outlet Panel Model No. LO3P00S3-24



## GasTrak Pro™ Delivery/Control Systems *(continued)*



### Expansion Panel Section – L09 Series

- Connects to tube chase section
- Provides for future modifications:
  - Regulator Sections
  - Purifier Sections
  - Outlet Sections

### Ordering Information

#### Expansion Panel Section

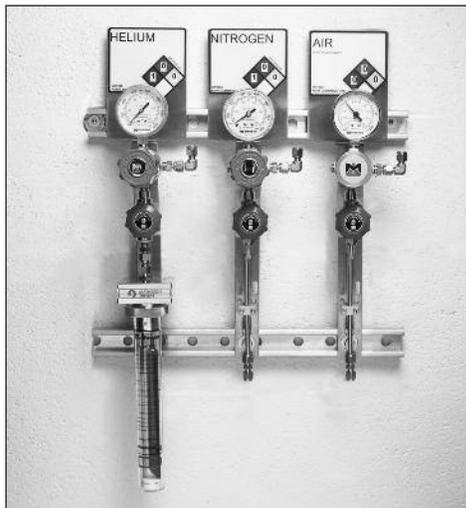
Please select '1' order code from each category listed to assemble a Single Model No. for the complete Expansion Panel Section desired.<sup>1</sup>

***To order an Expansion Panel Section, please specify Model No. L09 and the quantity of Expansion Panels desired.***

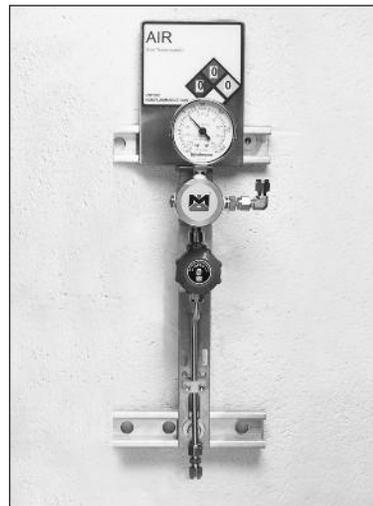
<sup>1</sup> Please note that preplumbing must be done when using an expansion panel for future modifications.



## GasTrak™ Delivery/Control Systems



GasTrak™ System (delivering 3 gases)



Single GasTrak™ Station

### Introduction

Matheson's GasTrak™ Control Systems represent a practical approach to controlling and delivering low or high purity gases for distribution to "point-of-use" locations to meet the operating requirements in today's laboratory environment. GasTrak™ Systems provide a cost effective, efficient and safer alternative to maintaining gas cylinders in the laboratory environment as the main source of gas supply. The GasTrak™ Control System is a simplified design which offers the ability to regulate gas operating pressure, provide gas purification and flow control within a single dedicated "GasTrak™ Station" for each specific gas being utilized and distributed within the lab. The individual "GasTrak™ Stations" can be wall mounted at the point-of-use for local instrument source control; or each of the individual "GasTrak™ Stations" can be combined into a complete system to provide centralized source control of multiple gases being used.

### Design Features/Components

- Ideal for High (UHP 99.999%+) or Low Purity Gas Delivery – available in brass or stainless steel materials.
- Control features include: Pressure Regulation, Purification and Flow Control.
- Provides individual gas control/delivery stations for "point-of-use" delivery to analytical instruments.
- Combines up to five gases into a central control system.
- Gas specific labeling for each individual control/delivery station.
- Three Operating Pressure Ranges: 0-30 psig / 0-100 psig / 0-200 psig.\*
- 1/4" Compression Fitting Standard inlet & outlet connections.
- Design allows convenient access to all components.
- Compact design is cost effective to implement.
- Pre-assembled system design prior to shipment.
- Wall mounted U-Channel frames make it easy to install.

### Applications

- Provide the end-user with efficient control and delivery of multiple gases for individual instrument point-of-use or for controlling multiple gas sources within a single centralized system.
- Control the delivery of gases for several instruments, a specific zone (location) within a lab or the entire gas delivery requirements into a laboratory.

### Materials of Construction

Wetted Components:	Brass or stainless steel
Regulator Seat:	Teflon
Valve Seat:	Kel-F
Purifier Cartridge Housing:	Glass encased w/ polycarbonate housing
Purifier Baseplate:	Anodized aluminum
U-Channel Frame:	Aluminum (incl. attachment hardware)

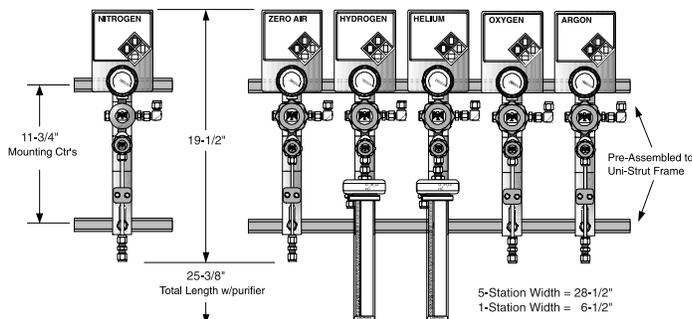
### Specifications

Typical Gases Delivered:		
Acetylene	Helium	Nitrous Oxide
Air	Hydrogen	Oxygen
ZERO Air	Methane	P5 – 5% Ar / CH <sub>4</sub>
Argon	Nitrogen	P10 – 10% Ar / CH <sub>4</sub>
		Vacuum

Operating Pressures (3 Ranges):	0-30 psig 0-100 psig 0-200 psig*
Optional Features:	3/8" Compression Fitting – Brass or Stainless Steel 1/2" Compression Fitting – Brass or Stainless Steel

\* 0-150 psig max with purifier.

### Standard GasTrak™ System Dimensions & Assembly



The U-Channel frame makes installation convenient and cost effective



## GasTrak™ Delivery/Control Systems (continued)

### Ordering Information

#### How to Select and Order a GasTrak™ Delivery System:

An individual GasTrak™ Station for a single gas or a complete GasTrak™ System (consisting of up to a maximum of five GasTrak™ Stations) is selected and constructed from the designated "Order Selection Code" letters and numbers assigned to each component listed in Sections '1' thru '6' below. Simply select the appropriate Order Selection Code letters or numbers from each Component Section and assemble them according to the **GasTrak™ Matrix No. Format** on the next page (refer to

examples). With the selections offered under Sections '5' and '6', if you do not wish to include an "option", simply do not add any letters or numbers. A complete GasTrak™ Matrix No. **MUST** be assembled for each gas requiring a GasTrak™ Station. **If the U-Channel option is selected, each GasTrak™ Station, or combination of Stations in a GasTrak™ System, is shipped pre-assembled and mounted to the U-Channel ready for installation.**

### Order Selection Codes

#### Section 1:

##### Optional U-Channel Frame Selection

UNI-Strut Mounted Frame	Include ( Y / N )	Order Code
Add U-Channel Frame	YES	<b>P</b>
Omit U-Channel Frame	NO	<b>( OMIT )</b>

#### Section 2:

##### Regulator & Purifier Component Selections

(Select ) Regulator / Purifier	Material	Order Code
Non-Regulated w/o Purifier	Brass	<b>Q</b>
Non-Regulated w/Purifier	Brass	<b>W</b>
Regulated w/o Purifier	Brass	<b>D</b>
Regulated w/Purifier	Brass	<b>K</b>
Non-Regulated w/o Purifier	Stainless Steel	<b>N</b>
Non-Regulated w/Purifier	Stainless Steel	<b>T</b>
Regulated w/o Purifier	Stainless Steel	<b>A</b>
Regulated w/Purifier	Stainless Steel	<b>G</b>

#### Section 3:

##### Pressure Range Selection

Pressure Range	Order Code
0-30 psig	<b>1</b>
0-100 psig	<b>2</b>
0-200 psig*	<b>3</b>

\* 0-150 psig max. with purifier

#### Section 4:

##### Gas Type Selection

Type Gas	Order Code
Acetylene	<b>A</b>
Air	<b>B</b>
Zero Air	<b>C</b>
Argon	<b>D</b>
Carbon Dioxide	<b>E</b>
Helium	<b>G</b>
Hydrogen	<b>J</b>
Methane	<b>K</b>
Nitrogen	<b>M</b>
Nitrous Oxide	<b>N</b>
Oxygen	<b>P</b>
P5 – 5% CH <sub>4</sub> / Ar	<b>R</b>
P10 – 10% CH <sub>4</sub> / Ar	<b>S</b>
Vacuum	<b>Y</b>

#### Section 5:

##### Optional Fitting Selection

Optional Feature	Order Code
3/8" Compression Fitting*	<b>1</b>
1/2" Compression Fitting*	<b>2</b>

\* Material will match component material from Section 2

#### Section 6:

##### Optional Purifier Selection

Purifier Type	Order Code
Moisture (H <sub>2</sub> O) Purifier	<b>M</b>
Oxygen (O <sub>2</sub> ) Purifier	<b>O</b>
Hydrocarbon (HC) Purifier	<b>H</b>
Triple (H <sub>2</sub> O + O <sub>2</sub> + HC) Purifier	<b>T</b>
Combi (H <sub>2</sub> O + HC) Purifier	<b>C</b>



## GasTrak™ Delivery/Control Systems (continued)

### Ordering Information

#### How to Configure the "GasTrak™ Matrix No." for EACH Gas --

#### A GasTrak™ Station (for One Gas) or a Complete GasTrak™ System (for Multiple Gases)

For component identification purposes, each **GasTrak™ Matrix No.** must begin with the code letter "P" if the optional "UNI-Strut" Frame is selected to be an integral component of either a single GasTrak™ Station or a complete GasTrak™ System. If the "UNI-Strut" Frame component is not selected as an option – do not include the code letter "P" as a part of the GasTrak™ Matrix No. If MULTIPLE GasTrak™ Stations are ordered and are intended to be a part of a complete GasTrak™ System AND the U-Channel frame option is desired as a part of the assembly – simply ADD only one "P" in front

of the first GasTrak™ Matrix No. and combine the remaining GasTrak™ Matrix Nos. for each gas into a single GasTrak™ Matrix No. (it is not necessary to place a "P" in front of each GasTrak™ Matrix No. for each individual gas when ordering a complete System mounted to the U-Channel frame). The remaining Order Code numbers and letters are then added sequentially from each component Section to assemble a complete GasTrak™ Matrix No. Simply follow the '7' Steps outlined below to configure each GasTrak™ Station or System.

#### Follow the '7' Steps Below to Completely Configure and Order a Single GasTrak™ Station (for One Gas) or GasTrak™ System (for Multiple Gases)

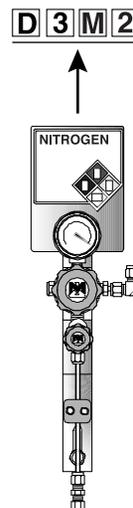
- STEP #1:** Determine if the GasTrak™ Station(s) or System will include the "U-Channel frame" option and assign the Order Code letter "P" as shown in Section 1 to begin the GasTrak™ Matrix No. if required. If the U-Channel frame is not selected — omit the letter "P" from the GasTrak™ Matrix No.
- STEP #2:** Select a specific control feature for each GasTrak™ station from Section 2. Enter the appropriate code letter into the GasTrak™ Matrix No. as indicated.
- STEP #3:** Select the appropriate delivery pressure gauge range for each GasTrak™ station from Section 3. Enter the corresponding code number into the GasTrak™ Matrix No. as indicated.
- STEP #4:** Select a gas to be used with the GasTrak™ station from Section 4. Enter the code letter into the GasTrak™ Matrix No. as indicated. If a particular gas is not listed – please consult with a Matheson Tri-Gas customer service representative (@ 215-648-4000) to confirm compatibility with a specific gas.
- STEP #5:** If desired -- Select an optional fitting to customize your manifold system from Section 5.
- STEP #6:** If desired -- Select an optional purifier from Section 6.
- NOTE (STEP #5 and #6):** If multiple options are selected, enter the corresponding code number for each option next to one another in the sequential order indicated. If no optional features are selected – do not include/add any code numbers to the GasTrak™ Matrix No.
- STEP #7:** Provide the completed GasTrak™ Matrix No. to a Matheson Tri-Gas customer service or local sales representative to order the GasTrak™ Station(s) or System selected.

#### Reference Example for Ordering a GasTrak™ Station for "One" Gas

The example shown here illustrates a typical GasTrak™ Station that is used to control and deliver one gas: Nitrogen.

This GasTrak™ Station Matrix No. was configured using Sections 1-6 of the Order Selection Codes from the previous page.

- No U-Channel Frame
- **D** = Brass Regulator (w/o Purifier)
- **3** = 0-200 psig Pressure Range
- **M** = Nitrogen
- **2** = 1/2" Brass Tube Fittings



**EACH gas must have a GasTrak™ Matrix No.**

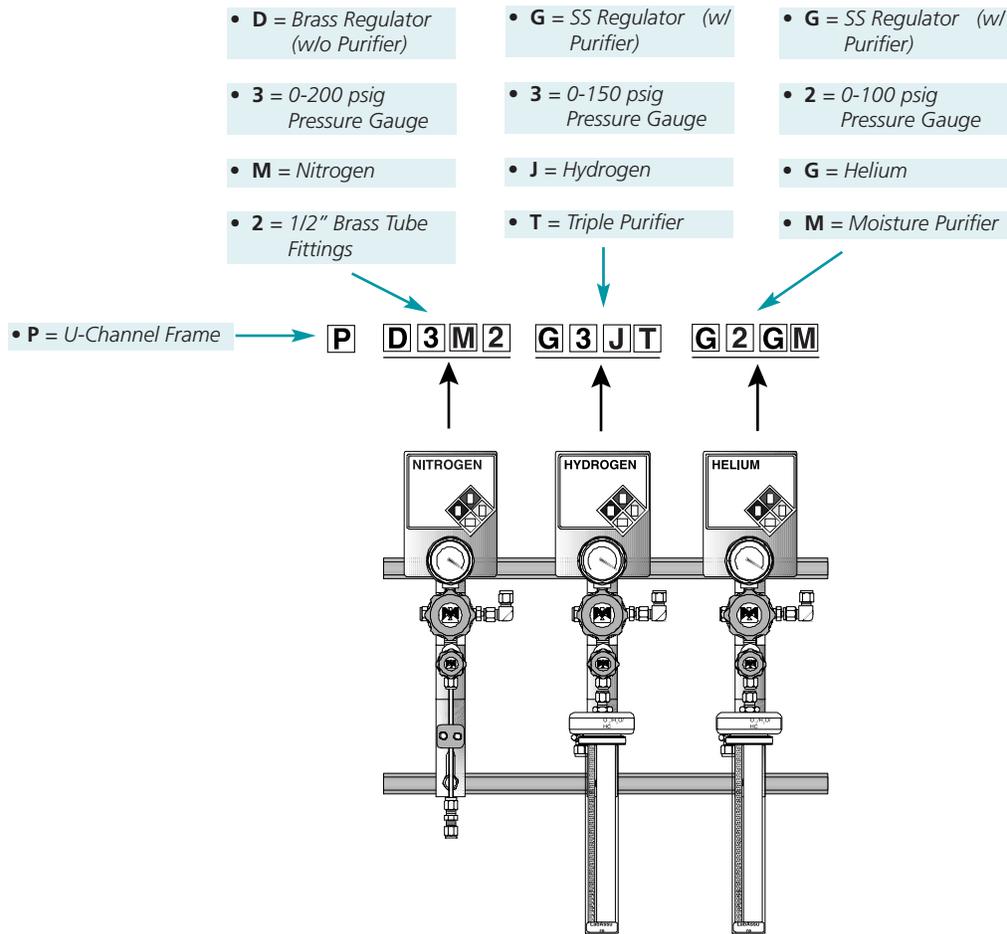


## GasTrak™ Delivery/Control Systems *(continued)*

### Reference Example for Ordering a GasTrak™ System for “Multiple” Gases

The example shown below illustrates a typical GasTrak™ System that is used to control and deliver 3 different gases: Nitrogen, Hydrogen and Helium.

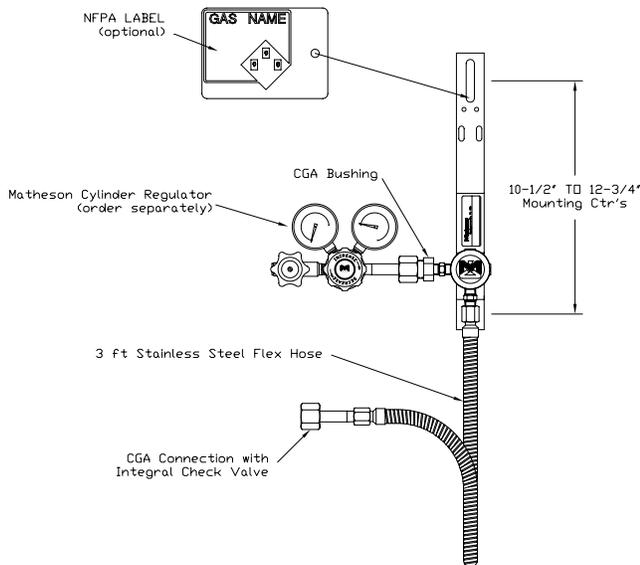
This GasTrak™ System Matrix No. was configured using Sections 1 - 6 of the Order Selection Codes.



**EACH gas must have a GasTrak™ Matrix No.**



## Single Station Manifolds (53 & 54 Manifold Series)



### Introduction

Matheson 53 and 54 Series Single Station Manifolds provide a convenient means of wall mounting a regulator. These products consist of a mounting bracket; flex hose and integral check valve. The manifolds may be used with many of Matheson's single or dual stage, brass or stainless steel regulators (regulators sold separately).

### Typical Application

- Supply of GC carrier gas/support gas
- Supply of calibration standards to on-line process analyzers, emission monitoring systems, etc

### Specifications

- Standard Gases Delivered
  - Inerts 580 CGA
  - Flammables 350 CGA
  - Carbon Dioxide 320 CGA

**NOTE:** The CGA's shown above represent common gases used in the laboratory environment and are not exclusive for use with the Single Station Manifold. Please consult a Matheson Tri-Gas customer service representative for ordering a Single Station Manifold for a gas that is not listed.

- Wetted Components: Brass or 316 Stainless Steel
- Maximum Inlet Pressure: 3000 psig (depending upon CGA rating)
- Manifold Outlet Connection: CGA Bushing - Brass or Stainless Steel

### Standard Features

- Standard Manifold System Components
  - 3-ft Flex Hoses with Integral Check Valves
  - Right Side Cylinder Set-Up (gas outlet is on left side)
  - Mounting Brackets

**NOTE:** Pressure regulators are not included as a standard item and must be ordered separately. Consult with a Matheson Tri-Gas customer service representative to select the optimum regulator to satisfy your gas delivery pressure requirements.

### Don't See What You Want?

Matheson offers a complete line of Single Station Manifold Systems. Our standard, most common configuration options are listed below. However, if you don't see what you are looking for, contact a Matheson Tri-Gas customer service representative and ask to speak with your local equipment sales support specialist. They can help you configure a Single Station Manifold that meets your specific requirements.

### Options

- Rigid Pigtail
- 6-ft Flex Hose
- Cylinder Holder with Strap
- Cylinder Holder (with Strap or with Strap and Chain)
- Vent Valve
- Master Valve
- Eliminate Check Valves
- NFPA Label and Mounting Plate
- CGA Handles

### Ordering Information

Model Number	Material	Gas/CGA	Price
53-18T	Brass	Inert / CGA 580	\$296.84
53-18V	Brass	Flammable / CGA 350	\$296.84
53-18W	Brass	Carbon Dioxide / CGA 320	\$296.84
53-18B	Brass	Zero Air / CGA 590	\$296.84
54-18T	Stainless Steel	Inert / CGA 580	\$407.54
54-18V	Stainless Steel	Flammable / CGA 350	\$407.54
54-18W	Stainless Steel	Carbon Dioxide / CGA 320	\$407.54
54-18B	Stainless Steel	Zero Air / CGA 590	\$407.54



## SourceTrak™ Manifold Systems (53 & 54 Manifold Series)



*The SourceTrak™ Manifold System  
distributes gas safer and more efficiently.*

### Introduction

Matheson's SourceTrak™ Manifold Systems offer a safe and efficient method of connecting multiple cylinders to a common gas supply line to provide centralized distribution of gas for both high and low purity delivery requirements. SourceTrak™ Manifold Systems can be used as a manually operated system in conjunction with a line regulator to regulate downstream delivery pressure, or they can be used as an integrated part of Matheson's Automatic Switchover Systems (see SwitchPro™). Utilizing SourceTrak™ Manifold Systems for the distribution of gas provides greater safety in the cylinder storage area by reducing repetitive cylinder handling and also minimizes the risk of ambient contamination within the gas delivery network.

The SourceTrak™ Manifold Systems can be furnished in brass or stainless steel materials to provide delivery service for a broad range of gases and are rated for pressures of up to 3000 psig. All SourceTrak™ Manifold Systems are single row configurations and are provided with the manifold piping, station (diaphragm) valves, 3-ft. flex hose, integral check valves, and manifold mounting brackets/clamps as standard components. The SourceTrak™ Manifold Systems are designed for "right side" cylinder set-up, where the gas flows from right to left through the manifold piping. (Left side set-up available as an option).

### Applications

- Control gas delivery from multiple cylinders within a centralized distribution system providing safer and more efficient delivery of gas with the flexibility to address customized applications.

### Design Features

- Ideal for High (UHP 99.999%+) or Low Purity Gas Delivery – available in brass or 316 stainless steel materials.
- Provides gas delivery for up to '4' cylinders (standard) or up to '10' cylinders (optional).
- Maximum delivery pressure up to 3000 psig.
- Manifold gas outlet connection is CGA compatible for Regulator attachment.
- Design allows convenient access to all components.
- Compact design is cost effective to implement and install.
- Manifold support brackets/clamps compatible for use with U-Channel frames.
- Optional features allow custom design for specific gas delivery applications.

### Recommendations for Proper Application & Use of Manifold Systems

- 1) Manifolds should be used for distribution of a single gas during the entire life of the manifold. It is not recommended to change the gas service of the manifold.
- 2) Manifolds should always be used to distribute a single gas and should never be used to mix gases.
- 3) All Manifold pigtailed should contain integral check valves as a safety measure. The use of a check valve should never be construed as a substitute for closing the Manifold station valve.
- 4) All standard Matheson Manifold Systems are constructed on 12" cylinder centers (station valve to station valve) to provide maximum support, stability and cylinder clearance. The end-user should never modify or change the dimensions and/or components of any Manifold System without authorization from Matheson.
- 5) Matheson has designed the SourceTrak™ Manifold Systems to meet a broad range of gas distribution needs and applications; however, Matheson welcomes the opportunity to quote and construct custom designs suited to a specific application.



## SourceTrak™ Manifold Systems (53 & 54 Manifold Series) *(continued)*

### Specifications

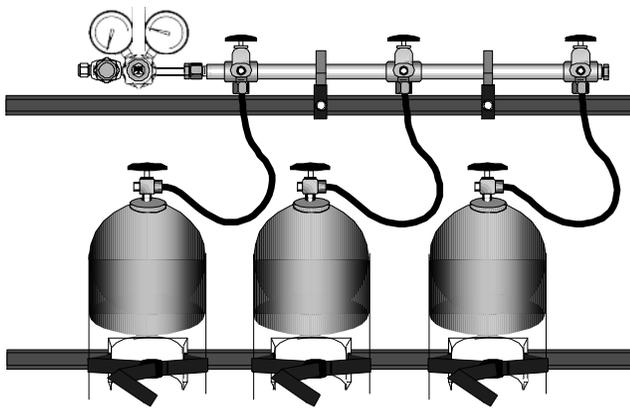
Standard Gases Delivered\*:

Inerts	580 CGA
Flammables	350 CGA
Carbon Dioxide	320 CGA

*\*NOTE: The CGA's shown above represent common gases used in the laboratory environment and are not exclusive for use with the SourceTrak™ Manifold System. Many gases using CGA's other than those listed are compatible for use with Manifold Systems. Please consult a Matheson Tri-Gas customer service representative for ordering a SourceTrak™ Manifold System for a gas which is not listed.*

Wetted Components:	Brass or 316 Stainless Steel
Maximum Inlet Pressure:	3000 psig (depending upon CGA rating)
Manifold Outlet Connection:	CGA Bushing – Brass or Stainless Steel

### Standard SourceTrak™ System Assembly *Cylinder Stations are located on 12" centers.*



*SourceTrak's™ configuration permits easy access to change out cylinders and maintain continuous gas delivery  
(Regulator is ordered separately)*

### Standard Features

#### Standard Manifold System Components\*

- Manifold Piping
- (Manual) Diaphragm Station Valves (1 per cylinder station)
- 3-ft. Flex Hoses with integral check valves
- Right Side Cylinder Set-Up (gas outlet is at left side)
- Mounting Brackets & Clamps

*\*NOTE: Pressure regulators are not included as a standard item and must be ordered separately. Consult with a Matheson Tri-Gas customer service representative to select the optimum regulator to satisfy your gas delivery pressure requirements.*

### Don't See What You Want Below?

Matheson offers a complete line of SourceTrak™ Manifold Systems. Our standard, most common configuration options are listed below. However, if you don't see what you're looking for, contact a Matheson Tri-Gas customer service representative and ask to speak with your local equipment sales support specialist. They can help you configure a SourceTrak™ Manifold that meets your specific requirements.

#### Options include:

- Up to ten Cylinders
- Rigid Pigtails
- 6 ft. Flex Hoses
- Cylinder Holder with Strap
- Cylinder Holder (with Strap or with Strap and Chain)
- Vent Valve
- Master Valve
- Left Side Cylinder Set Up
- Eliminate Check Valves
- NFPA Label and Mounting Plate
- CGA Handles

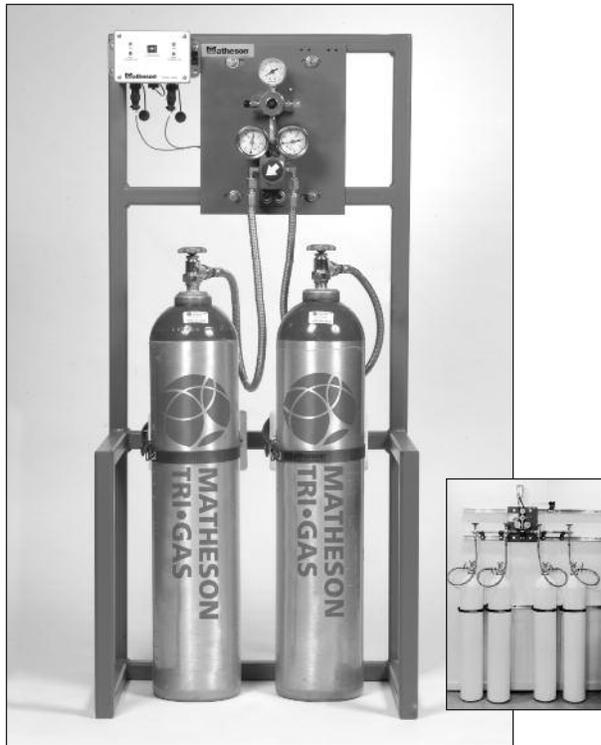
### Ordering Information

Model Number	Material	Gas / CGA	No. of Cylinders	Price
53-28T	Brass	Inert / CGA 580	2	\$650.26
53-38T	Brass	Inert / CGA 580	3	\$923.32
53-48T	Brass	Inert / CGA 580	4	\$1,261.98
53-28V	Brass	Flammable / CGA 350	2	\$650.26
53-38V	Brass	Flammable / CGA 350	3	\$923.32
53-48V	Brass	Flammable / CGA 350	4	\$1,261.98
53-28W	Brass	Carbon Dioxide / CGA 320	2	\$650.26
53-38W	Brass	Carbon Dioxide / CGA 320	3	\$923.32
53-48W	Brass	Carbon Dioxide / CGA 320	4	\$1,261.98

Model Number	Material	Gas / CGA	No. of Cylinders	Price
54-28T	Stainless Steel	Inert / CGA 580	2	\$1,162.76
54-38T	Stainless Steel	Inert / CGA 580	3	\$1,671.98
54-48T	Stainless Steel	Inert / CGA 580	4	\$2,248.44
54-28V	Stainless Steel	Flammable / CGA 350	2	\$1,162.76
54-38V	Stainless Steel	Flammable / CGA 350	3	\$1,671.98
54-48V	Stainless Steel	Flammable / CGA 350	4	\$2,248.44
54-28W	Stainless Steel	Carbon Dioxide / CGA 320	2	\$1,162.76
54-38W	Stainless Steel	Carbon Dioxide / CGA 320	3	\$1,671.98
54-48W	Stainless Steel	Carbon Dioxide / CGA 320	4	\$2,248.44



## SwitchPro™ Automatic Switchover Systems (523 & 524 Series)



*The SwitchPro™ Automatic Switchover System provides continuous gas delivery.*

### Applications

- Provide a continuous, uninterrupted supply of gas
- Control gas delivery from cylinders within a centralized distribution system providing safer and more efficient delivery of gas with the flexibility to address customized applications.

### Design Features

- Ideal for High (UHP 99.999%+) or Low Purity gas delivery – available in brass or 316 stainless steel materials.
- Available control features include: pressure regulation and indicating pressure switches.
- Provides automated switchover control and gas delivery from '2' or '4' cylinders (standard) or up to '10' cylinders (optional).
- Utilizes Matheson's single body Switchover Regulator.
- Compact design minimizes wall space consumption.
- Switchover regulator knob indicates cylinder (bank) priority.
- Maximum inlet pressure up to 3000 psig.
- Design allows convenient access to all components.
- Cost effective to implement and install.
- Optional features allow customized system design for specific gas delivery applications.

### Standard Features

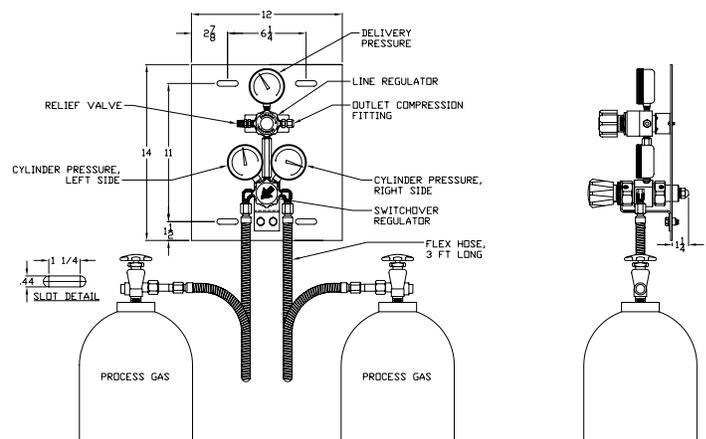
- Single Body Switchover Regulator
- 3 ft. Flex Hoses
- Integral Check Valves
- Inlet Pressure Gauges
- 1/4" Outlet Compression Fitting
- Painted Steel Back Plate

### Introduction

Matheson's SwitchPro™ AUTOMATIC Switchover Systems are designed to provide a continuous supply of gas from a cylinder or a bank of cylinders. The SwitchPro™ System safely minimizes repetitive cylinder changeout labor and offers a safe and efficient method of connecting multiple cylinders to a common gas supply line to provide centralized distribution of gas for both high and low purity delivery requirements. Utilizing SwitchPro™ Manifold Systems for the distribution of gas provides greater safety in the cylinder storage area by reducing repetitive cylinder handling and also minimizes the risk of ambient contamination within the gas delivery network.

The SwitchPro™ Manifold Systems can be furnished in brass or stainless steel to provide delivery service for a broad range of gases, and are rated for pressures of up to 3000 psig. All SwitchPro™ Manifold Systems are single row configurations and are provided with 3-ft. flex hoses and integral check valves.

### Typical SwitchPro™ System Dimensions





# SwitchPro™ Automatic Switchover Systems (523 & 524 Series) (continued)

### Specifications

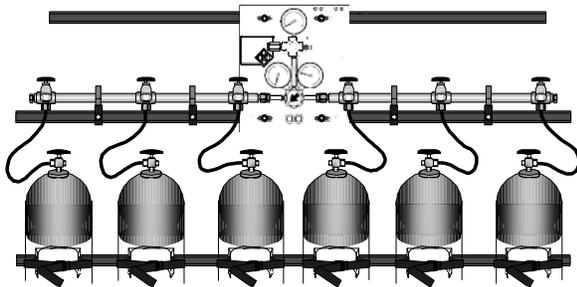
Standard Gases Delivered\*:

Inerts	580 CGA
Flammables	350 CGA
Carbon Dioxide	320 CGA

*\*NOTE: The CGA's shown above represent common gases used in the laboratory environment and are not exclusive for use with the SwitchPro™ System. Many gases using CGA's other than those listed are compatible for use with SwitchPro™ Systems. Please consult a Matheson Tri-Gas customer service representative for ordering a SwitchPro™ System for a gas which is not listed.*

Switchover Panel Dimensions:	12" W x 14" H
Wetted Components:	Brass or 316 Stainless Steel
Switchover Regulator Cv	0.06
Maximum Inlet Pressure:	3000 psig (depending upon CGA rating)
Manifold Outlet Connection:	CGA Bushing – Brass or Stainless Steel

**SwitchPro™ System Assembly**



*The SwitchPro™ System is easy to operate and can be customized using optional features. Shown with optional manifold piping and station valves. Standard configuration has flex hoses connected directly to the switchover panel.*

### Don't See What You Want Below?

Matheson offers a complete line of SwitchPro™ Automatic Switchover Systems. Our standard, most common configuration options are listed below. However, if you don't see what you're looking for, contact a Matheson Tri-Gas customer service representative and ask to speak with your local equipment sales support specialist. They can help you configure a SwitchPro™ System that meets your specific requirements.

#### Options include:

- Up to ten Cylinders
- Rigid Pigtails
- 6 ft. Flex Hoses
- Cylinder Holders
- Certified Leak Test
- Auxiliary Gas Inlet Valve
- 1/8", 3/8" or 1/2" Outlet Compression Fitting
- NFPA Label
- Indicating Pressure Switches
- High Pressure Vent Valves
- Low or High Pressure Isolation Valves
- Manifold Piping with Station Valves

### Ordering Information

Model Number	Material	Gas / CGA	Line Regulator Pressure	No. of Cylinders	Price
523-028T	Brass	Inert / CGA 580	No Line Reg	2	\$907.74
523-048TN	Brass	Inert / CGA 580	No Line Reg	4	\$1,290.68
523-A28T	Brass	Inert / CGA 580	0-30 psig	2	\$1,029.10
523-A48TN	Brass	Inert / CGA 580	0-30 psig	4	\$1,335.78
523-B28T	Brass	Inert / CGA 580	0-100 psig	2	\$1,029.10
523-B48TN	Brass	Inert / CGA 580	0-100 psig	4	\$1,335.78
523-028V	Brass	Flammable / CGA 350	No Line Reg	2	\$935.62
523-048VN	Brass	Flammable / CGA 350	No Line Reg	4	\$1,290.68
523-A28V	Brass	Flammable / CGA 350	0-30 psig	2	\$1,029.10
523-A48VN	Brass	Flammable / CGA 350	0-30 psig	4	\$1,029.10
523-B28V	Brass	Flammable / CGA 350	0-100 psig	2	\$1,029.10
523-B48VN	Brass	Flammable / CGA 350	0-100 psig	4	\$1,335.78
523-028W	Brass	Carbon Dioxide / CGA 320	No Line Reg	2	\$935.62
523-048WN	Brass	Carbon Dioxide / CGA 320	No Line Reg	4	1,541.60
523-A28W	Brass	Carbon Dioxide / CGA 320	0-30 psig	2	\$935.62
523-A48WN	Brass	Carbon Dioxide / CGA 320	0-30 psig	4	\$1,335.78
523-B28W	Brass	Carbon Dioxide / CGA 320	0-100 psig	2	\$1,029.10
523-B48WN	Brass	Carbon Dioxide / CGA 320	0-100 psig	4	\$1,335.78
524-028T	Stainless Steel	Inert / CGA 580	No Line Reg	2	\$1,418.60
524-048TN	Stainless Steel	Inert / CGA 580	No Line Reg	4	\$1,837.62
524-A28T	Stainless Steel	Inert / CGA 580	0-30 psig	2	\$1,561.28
524-A48TN	Stainless Steel	Inert / CGA 580	0-30 psig	4	\$2,027.86
524-B28T	Stainless Steel	Inert / CGA 580	0-100 psig	2	\$1,608.84
524-B48TN	Stainless Steel	Inert / CGA 580	0-100 psig	4	\$2,027.86
524-028V	Stainless Steel	Flammable / CGA 350	No Line Reg	2	\$1,837.62
524-048VN	Stainless Steel	Flammable / CGA 350	No Line Reg	4	\$1,837.62
524-A28V	Stainless Steel	Flammable / CGA 350	0-30 psig	2	\$1,608.84
524-A48VN	Stainless Steel	Flammable / CGA 350	0-30 psig	4	\$2,027.86
524-B28V	Stainless Steel	Flammable / CGA 350	0-100 psig	2	\$1,608.84
524-B48VN	Stainless Steel	Flammable / CGA 350	0-100 psig	4	\$2,027.86
524-028W	Stainless Steel	Carbon Dioxide / CGA 320	No Line Reg	2	\$1,418.60
524-048WN	Stainless Steel	Carbon Dioxide / CGA 320	No Line Reg	4	\$1,837.62
524-A28W	Stainless Steel	Carbon Dioxide / CGA 320	0-30 psig	2	\$1,608.84
524-A48WN	Stainless Steel	Carbon Dioxide / CGA 320	0-30 psig	4	\$2,027.86
524-B28W	Stainless Steel	Carbon Dioxide / CGA 320	0-100 psig	2	\$1,608.84
524-B48WN	Stainless Steel	Carbon Dioxide / CGA 320	0-100 psig	4	\$2,027.86

Prices and Specifications Subject to Change without Notice



## Matheson Gas Cabinets and Panels



### Introduction

Matheson designs and manufactures a wide range of gas distribution panels and safety cabinet enclosures. Matheson's expertise in the handling of gases and chemicals has been translated into providing safe, efficient, and reliable process control systems.

Matheson supplies distribution panels and cabinet enclosures for the safe handling of chemical gases (such as  $H_2S$  and  $NO_2$ ) and supplies advanced products for the handling of semiconductor manufacturing gases (such as  $AsH_3$  and  $SiH_4$ ). The purity level of a given system is individually addressed to meet the needs of the customer, minimize cost, and maximize efficiency.

### Applications

Matheson gas distribution panels and cabinet enclosures are designed to dispense gases or chemicals in a controlled manner and to protect the customer from exposure to dangerous materials. Any industry using or processing hazardous chemicals and gases should consider use of these products.

In the chemical industry, this would include the use of gas distribution panels for the handling of reagents and precursors such as Hydrogen Sulfide and Nitric Oxide from the source to the point of use. If the line carrying the gas to the process has multiple uses, or if the line carries a potentially corrosive or toxic gas, a purge panel apparatus would be incorporated into the system for maximum flexibility. If the containers of these gases are relatively small, the distribution and purge panel(s) could be mounted within a cabinet enclosure at the factory. If the source of the gases is a bulk vessel, these distribution and purge panel(s) could be mounted near the vessel or near the point of use.

In manufacturing industries, this would include the use of gas distribution panels for the handling of hazardous materials such as Arsine, Phosphine and Silane used in manufacture of electronic devices. To ensure safety and purity of the process gases, purge assemblies would be incorporated into the system.

The gas distribution panels and cabinet enclosures are designed for use in hazardous services. It is strongly recommended that only qualified personnel specify and use this equipment. Matheson supplies a detailed instruction manual and in some cases, hands-on training to customers who purchase this equipment. The manuals should be reviewed and training attended by all customer personnel who will use the equipment.

### Custom Gas Handling Systems

Matheson is always available to design and construct a customer specific system. We realize that the needs of all customers cannot be accommodated by standard design layouts. Matheson will develop a complete panel and cabinet enclosure system, tailored to meet each customer's individual requirements.



## PAN-5000 Series Analytical Grade Gas Distribution Panels



*5-valve panel with optional venturi, excess flow switch, ESO, GSM-4*

Matheson introduces its new PAN-5000 Series of analytical grade stainless steel gas panels that are designed to safely control and dispense gases, while providing a high level of process purity. . . all at a reasonable cost. The PAN-5000 Series panels feature Matheson components that have a proven track record in analytical laboratories and chemical process industries worldwide. Use of these analytical distribution panels with a Matheson gas cabinet enclosure provides the high level of safety required when handling corrosive, flammable or toxic gases.

### PAN-5000 Features

- 1, 3, 5-valve designs meet your purging requirements
- 5-valve panel provides full purging of corrosive, flammable and toxic gases
- **Optional venturi** provides vacuum evacuation of 5-valve panel during purging
- **Front removable components** simplify maintenance
- **Excess flow, emergency shutoffs** and GSM-4 alarm monitor / controller available

### Gas Panel Component Descriptions

- Valves:** 316 stainless steel body and diaphragm with Kel-F seats for positive shut-off. All valves are mounted firmly to the backplate but are easily removable from the front for maintenance.
- Check Valves:** 316 stainless steel body and poppet with Viton o-rings. Check valves are provided on all vent lines and purge gas inlet lines.

- Pressure Regulators:** 316 stainless steel body and diaphragm with Kel-F seat. Available in standard 0-30 and 0-100 psig pressure ranges to safely reduce cylinder pressure to your system. Other optional pressure ranges are available. Matheson Model 3610A Series stainless steel single stage tied-diaphragm regulators are used.
- Gauges:** 316 stainless steel socket and bourdon tube with dual scale showing pressure in both English and international units.
- Fittings:** All major panel components are fitted with compression or pipe thread connections. Welded microfit joints are used to minimize the number of connections and to ensure high purity.
- Backplate:** Constructed of carbon steel and coated with corrosion resistant paint, the panel has mounting holes for easy installation in your gas cabinet. Mounting hole spacing is consistent with all Matheson LabGas System® products. Panel also has labeling of all panel components to aid in operation of the controls.

### Pigtail / Flexhose Connection to the Cylinder Valve:

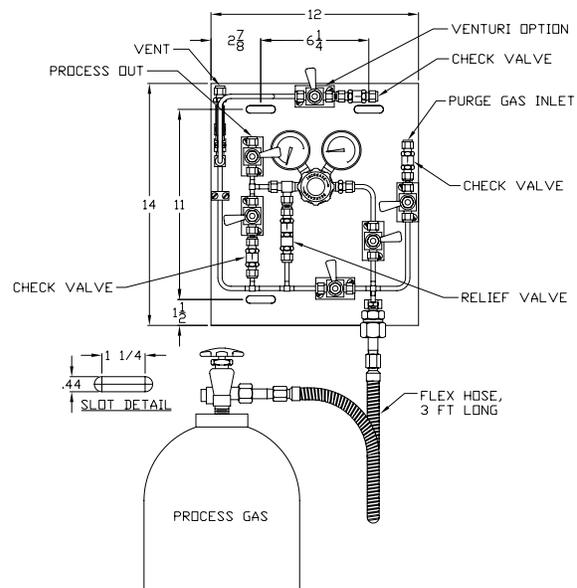
Three foot stainless steel braided flexible hose with the appropriate CGA connection for all CGAs except 330 and 660 which come with a rigid stainless steel pigtail.

### CGA Fittings:

1-valve and 3-valve panels provide an integral check valve in the CGA fittings. The CGA fittings in the 5-valve panels do not have check valves.

### Optional Equipment:

Excess Flow Switch (EFS), Excess Flow Valve (EFV), Emergency Shut Off (ESO), Venturi, GSM-4 Alarm Monitor / Controller





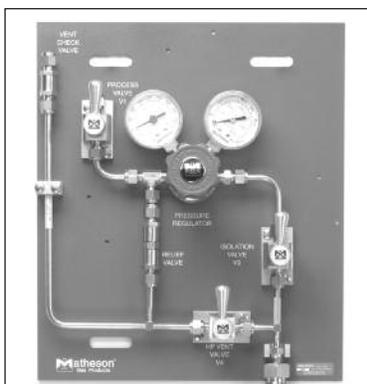
## PAN-5000 Series Analytical Grade Gas Distribution Panels *(continued)*

### 1-Valve Panel Model PAN-5100



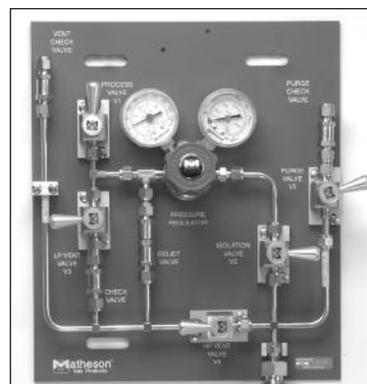
This most basic panel design offers a pressure regulator and process on/off control valve. Connection to the gas supply is conveniently made using a standard stainless steel flexible hose. This panel is recommended when using inert gases with processes that do not require purge capability. Available with CGA 320, 326, 346, 540, 580 or 590. Each CGA contains an integral check valve.

### 3-Valve Panel Model PAN-5300



The 3-valve panel provides a pressure regulator with both a process on/off control valve and a high pressure vent valve, allowing total isolation of the regulator, as well as the ability to purge contaminants that may have been introduced by changing cylinders. The vent line is protected from back flow by a check valve downstream of the vent valve. This panel is recommended when using non-toxic, non-corrosive, and non-pyrophoric gases with processes that require the additional purity that a high pressure purge is capable of supplying. Available with CGA 320, 326, 350, 510, 540, 580 or 590. Each CGA contains an integral check valve.

### 5-Valve Panel Model PAN-5500



The 5-valve panel provides all the same features as a 3-valve panel with the addition of a low-pressure vent valve, and adds the safety feature of being able to cycle purge the panel with an inert gas prior to disconnecting the cylinder. This panel provides the safety needed to handle toxic, semi-corrosive and flammable gases. The 5-valve panel is available with an optional venturi for vacuum evacuation of the panel during purging. The 5-valve panel is available with CGA 320, 326, 330, 350, 510, 540, 580, 590 or 660. Unlike the 1- and 3-valve designs, CGA's do not contain integral check valves.

#### Ordering Information

Model Series	Number of Valves	Delivery Pressure	Venturi Option	CGA	Option Package
PAN —	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	— <input type="checkbox"/>

#### MODEL SERIES

5 = PAN-5000 Series

#### NUMBER OF VALVES

1 = 1-Valve Panel  
3 = 3-Valve Panel  
5 = 5-Valve Panel

#### DELIVERY PRESSURE

0 = 30 psig  
1 = 100 psig

#### VENTURI OPTION

0 = No  
1 = Yes (Available on 5-valve panel only)

#### CGA - Select from the following available CGAs

1-Valve Panel: 320, 326, 346, 540, 580, 590  
3-Valve Panel: 320, 326, 350, 510, 540, 580, 590  
5-Valve Panel: 320, 326, 330, 350, 510, 540, 580, 590, 660

**NOTES:** 510 CGA *NOT* for acetylene service  
660 CGA *NOT* for ammonia service  
CGA's for 1-valve and 3-valve panels come with integral check valve  
No integral check valve in CGA for 5-valve panel

#### OPTION PACKAGE

0 = None  
A = Auto Shutdown (EFS, ESO, GSM-4)  
V = Excess Flow Valve  
X = Excess Flow Switch



## Gas Cylinder Cabinets Model 1170 Series

Matheson Model 1170 is our standard gas cabinet series with a flat top design. The new construction is optimized for economy, without compromising safety or quality.

- **Automatic door closure** to ensure containment of leaks
- **Modular U-Channel Supports** make installation of gas control panels, cylinder supports, shelving, and other equipment easy.
- **Lockable access panel and wire reinforced safety glass viewing window** have steel frames and are fully gasketed.
- **Non-protruding paddle type latch** prevents accidental opening and snagging. It slams and latches at three points and is fitted with a lock for security.
- **Neoprene gaskets** fit snugly around door to ensure a positive seal
- **Standard inlet air louver or optional diffuser plate** fitted with an inlet filter (p/n VEN-0101-XX) lets air into the cabinet.
- **Flat-top design** with exhaust stack.
- **Fire sprinkler head**, for extra protection with a fuse rating of 155°F.
- **Cylinder restraints** to ensure that all cylinders are held securely in place during storage and operation
- **Rugged exterior construction** of 12-gauge cold rolled steel with welding seams.
- Interior and exterior is finished with gray **2-part polyurethane paint**.
- **Low profile, one-inch reinforced threshold** makes cylinder installation and removal easy.

### Specifications for Model 1170 Series and Hard Hat Series (Meet or exceed Article 80 UFC requirements)

Cabinet:	12 gauge cold rolled steel
Gaskets:	Neoprene with oil resistant adhesive
Window:	1/4" wire reinforced safety glass
Paint:	2-part polyurethane; interior and exterior – light gray
Cabinet Floor:	Zinc-plated steel
Doors:	1 and 2 cylinder cabinets – one door with left hand hinge 3 cylinder cabinet – double door with off-center post
Integral Sprinkler:	Fuse rating of 155°F and flow capacity of 35 GPM @ 40 psi
Water Pipe Connection:	1/2" NPT Female

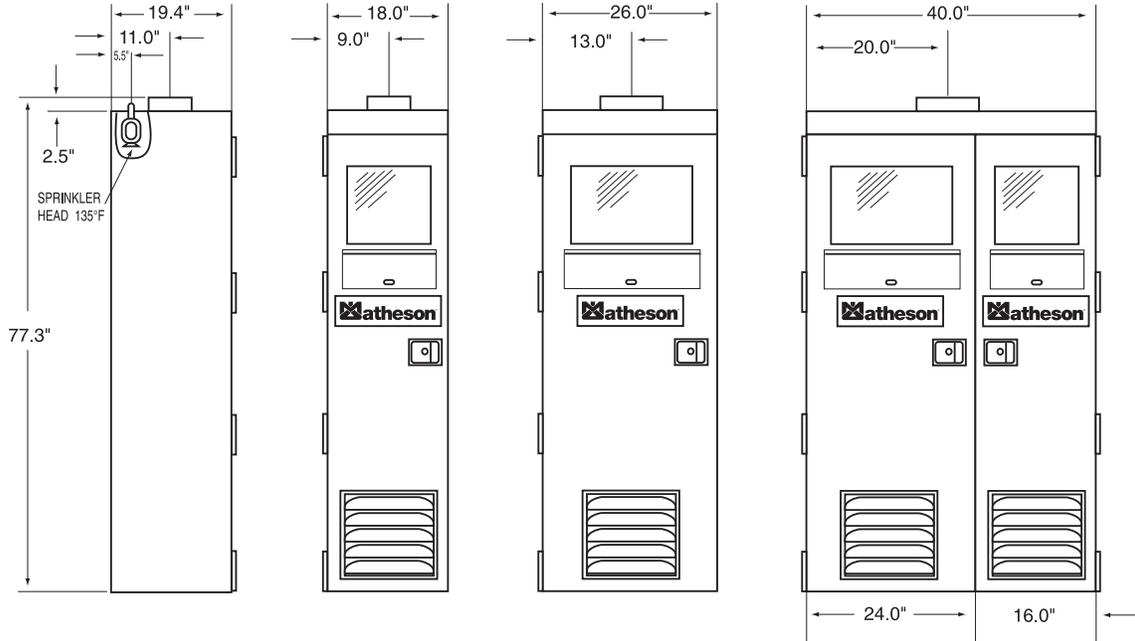


Model No.	Cabinet Type	Overall Height	Depth	Width	Exhaust Flow Required (SCFM)	Exhaust Stack Diameter	Shipping Weight lbs	Price
1177F	1 Cylinder	79"	19"	18"	175	4"	300	\$1,717.08
1178F	2 Cylinder	79"	19"	26"	250	6"	380	\$1,973.74
1179F	3 Cylinder	79"	19"	40"	450	8"	540	\$2,427.20



## Gas Cabinet Dimensions and Options

### Model 1170 Series



#### Gas Cabinet Options

- **Adjustable Cylinder Shelf** (see table for part number) – mounted on the U-Channel tracks. The shelf provides a convenient means of installing small cylinders. Perforations in the shelf allow cabinet air to sweep around the entire cylinder.
- **Fusible Link** (see table for part numbers) – installed in the center of the cabinet door. Offers immediate response in the event of a fire. Once the heat melts the fusible link, a guillotine damper blocks the inlet air supply.
- **Cylinder Scales** – recommended for use with all liquefied gases. Provides the weight of contents remaining in the cylinders. Manual and electronic cylinder scale models are available.

Model No.	Description	Price
1190-S	Adjustable cylinder shelf	\$233.70
1177F-6	Fusible link for Model 1177F	\$343.58
1178F-6	Fusible link for Model 1178F	\$412.46
1179F-6	Fusible link for Model 1179F	\$726.52
VEN-0101-XX	Optional diffuser plate with inlet air filter	\$92.66



## Gas Cylinder Cabinets “Hard Hat” Series

Matheson’s new “Hard Hat” cabinet is designed for outdoor use and installation. It is ideally suited for handling gas applications in refinery environments. The cabinet incorporates several structural features making it weatherproof and is constructed from stainless steel materials to withstand harsh weather effects. The “Hard Hat” cabinet is available in standard sizes to accommodate up to three cylinders.

- Rain gutter above cabinet door prevents rain from entering cabinet
- Stainless steel hinges and hardware
- Rain hat to cover stack
- Special Zinc Chromate primer to prevent rust and corrosion
- Removable top panel for service access
- Automatic door closure to ensure containment of leaks
- Lockable access panel and wire reinforced safety glass viewing window have steel frames and are fully gasketed
- Non-protruding paddle type latch prevents accidental opening and snagging. It slams and latches at three points and is fitted with a lock for security
- Neoprene gaskets fit snugly around door to ensure positive seal
- Standard inlet air louver or optional diffuser plate fitted with inlet filter (p/n VEN-0101-XX) lets air into the cabinet
- Fire sprinkler head for extra protection with a fuse rating of 155°F
- Cylinder restraints ensure all cylinders are held securely during storage and operation
- Low profile, one-inch reinforced threshold makes cylinder installation and removal easy

### Specifications for Hard Hat Series

*(Meet or exceed Article 80 UFC requirements)*

Cabinet:	12 gauge cold rolled steel
Gaskets:	Neoprene with oil resistant adhesive
Window:	1/4" wire reinforced safety glass
Paint:	2-part polyurethane: interior and exterior – light gray
Cabinet Floor:	Zinc-plated steel
Doors:	1 and 2 cylinders cabinets – one door with left hand stainless steel hinges 3 cylinder cabinet – double door with off-center post
Integral Sprinkler:	Fuse rating of 155°F and flow capacity of 35 GPM @ 40 psi
Water Pipe Connection:	1/2" NPT Female



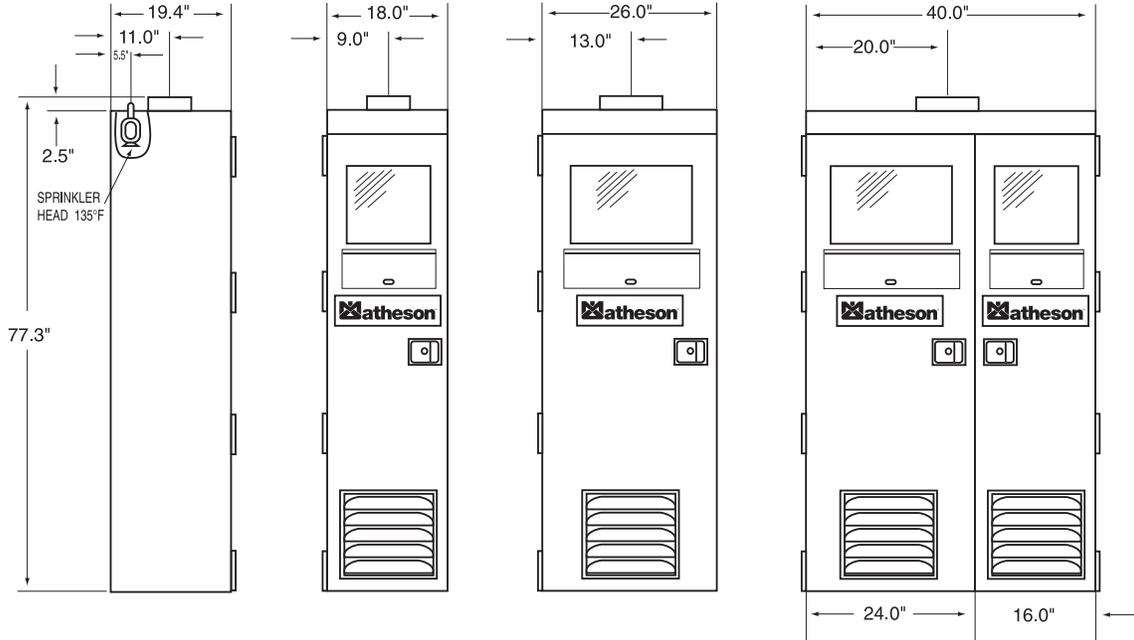
Model No.	Cabinet Type	Overall Height	Depth	Width	Exhaust Flow Required (SCFM)	Exhaust Stack Diameter	Shipping Weight lbs	Price
1177-HH	1 Cylinder	79"	19"	18"	175	4"	300	\$2,315.68
1178-HH	2 Cylinder	79"	19"	26"	250	6"	380	\$2,542.00
1179-HH	3 Cylinder	79"	19"	40"	450	8"	540	\$2,985.62

*Prices and Specifications Subject to Change without Notice*



## Gas Cabinet Dimensions and Options

### Hard Hat Series



#### Gas Cabinet Options

- **Adjustable Cylinder Shelf** (see table for part number) – mounted on the U-Channel tracks. The shelf provides a convenient means of installing small cylinders. Perforations in the shelf allow cabinet air to sweep around the entire cylinder.
- **Fusible Link** (see table for part numbers) – installed in the center of the cabinet door. Offers immediate response in the event of a fire. Once the heat melts the fusible link, a guillotine damper blocks the inlet air supply.
- **Cylinder Scales** – recommended for use with all liquefied gases. Provides the weight of contents remaining in the cylinders. Manual and electronic cylinder scale models are available.

Model No.	Description	Price
1190-5	Adjustable cylinder shelf	\$233.70
1177F-6	Fusible link for Model 1177-HH	\$343.58
1178F-6	Fusible link for Model 1178-HH	\$412.46
1179F-6	Fusible link for Model 1179-HH	\$726.52
VEN-0101-XX	Optional diffuser plate with inlet air filter	\$92.66