

# GF125 Mass Flow Controllers

Pressure transient insensitive

- » Ultra fast response reduces process stabilization time to drive improved throughput
- » PTI technology eliminates pressure transient effects for tighter process control
- » Multi-gas/multi-range user configurability supports process development, reduces lead-times and inventory requirements
- » Independent service port for data-logging and process fingerprinting



## High Performance Flow Control

The Brooks Instrument GF125 mass flow controller builds upon our leadership position in pressure transient insensitive (PTI) technology. The GF125 is a continuous improvement (CIP) redesign of Brooks' core PTI technology, delivering enhanced cost of ownership, device to device reproducibility and environmental compliance, to meet the challenges of advanced semiconductor and thin-film processes.

Brooks' new sensor technology with improved signal to noise performance delivers enhanced measurement stability to drive tighter gas chemistry control while reducing maintenance requirements.

## Standard Features

- Ultra high purity construction with reduced surface area and removal of unswept volumes for faster dry-down during purge
  - Surface passivated SEMI F-20 compliant wetted flow path
  - 4 $\mu$  inch Ra surface finish
- New independent service and diagnostic port supports on-tool troubleshooting and process optimization
- New modular architecture supports all industry standards for full OEM and process coverage
  - Downported 80 mm and 92 mm C-seal and W-Seal, in 1.125" and 1.5" footprints
  - 124mm 4 VCR
  - 9-pin "D" analog/RS-485 or 5-pin "M8" DeviceNet

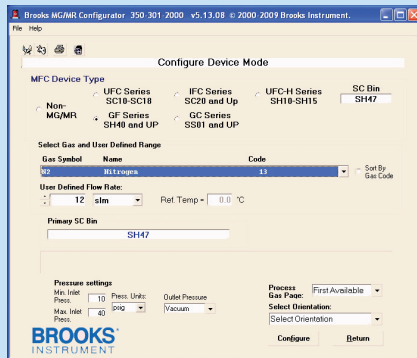
- Gas and range configurable (MG/MR)
  - MG/MR model created and proven using actual process gases to ensure real world accuracy
  - Change full scale flow range up to 3:1 for optimum process and inventory management flexibility
  - Select from hundreds of Semi gases and gas mixtures

## Applications

- Dielectric etch
- Polysilicon etch
- Metal etch
- Low k deposition
- Sub-atmospheric
- Plasma enhanced deposition
- Plasma enhanced atomic layer deposition
- High density plasma deposition
- Low pressure plasma deposition
- High temperature annealing
- Metal oxide deposition

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## Gas and Range Configurable



Brooks configurator software enables range, gas, and calibration curve configuration to ensure flexibility for any application.

## Ultra Fast Response

Fast set point control via high speed ARM processor and low noise sensor drive circuit. Typical set point response is 300 milliseconds from set point command to desired flow output per SEMI E17-0600 within the recommended operating range.

- Improve wafer throughput by reducing non-productive flow settling time
- Reduce divert gas consumption and associated abatement costs

## Pressure Transient Insensitive (PTI)

GF125 is equipped with PTI technology, which reduces the effect of pressure fluctuations on gas flow. The technology is simple: a powerful ARM processor, integrating thermal flow sensor and pressure transducer outputs, compensate for upstream and downstream pressure transients by directing a control valve to open or close to an appropriate orifice size.

Users report stable flow in typically difficult flow management conditions

- Eliminate overshoot/undershoot and first run effect
- Eliminate regulator burst/sag and MFC crosstalk effect
- Reduce impact of valve sequencing

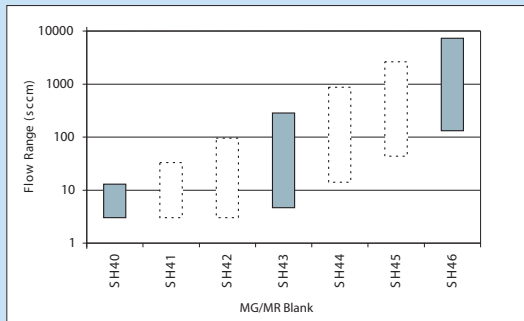
## Multi Gas/Multi Range Technology

MG/MR is a technology that allows users to configure standard configurations (“SHs”) or “blanks” for a variety of supported gases and flow ranges.

This wide dynamic range and configurable gas options enable users to reduce unique inventory requirements.

- Reduce part numbers
- Reduce typical delivery times
- Reduce tool downtime

## Multi Gas/Multi Range Turndown Advantage



Multi gas/multi range covers a flow range from 1 sccm to 30 slm (Nitrogen equivalent) with as little as 3 "Blanks."

## Multi-Gas/Multi-Range Configurator System

The Multi-Gas/Multi-Range (MG/MR) Configurator allows users to configure and label MG/MR blank MFCs with customer part number, serial number and gas/range data. A complete system consists of Brooks' MG/MR Configurator software with optional PC, printer and power supply.

## GF125 Mass Flow Controllers Specifications

### Display

Type	Top mount integrated
Viewing Angle	Fixed
Viewing Distance	10 feet
Unit Displayed	Flow (%), temp. (°C), pressure (psia/kPa)
Resolution	0.1 (unit)

### Diagnostics

Status Lights	MFC health, network status
Alarms	Sensor output, control valve output, over temperature, over pressure, power surge/sag, network interruption

### Materials

Gas Path	SEMI F20 compliant
Surface Finish	4 µ in Ra (0.1 µm Ra)
Seals	Metal
Weight	<2.65 lbs (1.20 kg)

### Electrical

Power Consumption	545 mA (max) @ 11 VDC and 250 mA (max) @ 24 VDC 6 watts (max) @ ±15 VDC
Certifications	EMC 89/336/3EEC (CE), ODVA, RoHSWEEE

### Electronic Communication Interface Options

Primary Connectors	DeviceNet™ via 5-pin "M8" connector Analog/RS-485 via 9-pin "D" connector
Diagnostic Port	RS-485 via 2.5 mm jack

### Performance

Leak Integrity (external)	1 x 10 <sup>-11</sup> atm. cc/sec He
Valve Shut Down (leak by)	1% full scale flow
Linearity	±0.5% full scale
Repeatability and Reproducibility	±0.15% set point
Zero Drift	≤0.5% full scale per year
Auto Shut-Off	Valve off at set point <2% full scale
Warm Up Time	60 minutes

	SH40–SH44	SH45–SH46	SH47–SH48
Settling Time	300 msec	400 msec	500 msec
Standard Accuracy			
5% to 35%	±0.35% FS	±0.35% FS	±0.35% FS
35% to 100%	±1.0% SP	±1.0% SP	±1.0% SP
High Accuracy option*			
2% to 10%	±0.05% FS	±0.05% FS	±0.1% FS
10% to 100%	±0.5% SP	±0.5% SP	±1.0% SP

### Operating Conditions

	SH40–SH44	SH45–SH46	SH47–SH48
Flow Range	3–860 sccm	861–7200 sccm	7201–30000 sccm
Proof Pressure	140 psia max		
Transient Pressure	±2 psid over 0.1 seconds		
Differential Pressure**	7–45 psid	10–45 psid	15–45 psid***
Valve Configuration	Normally closed		
Temperature Range	10°C–50°C		
Zero Temperature Coefficient	0.005 full scale per °C		

Please refer to the user guide regarding recommended zeroing procedures and operating practices.

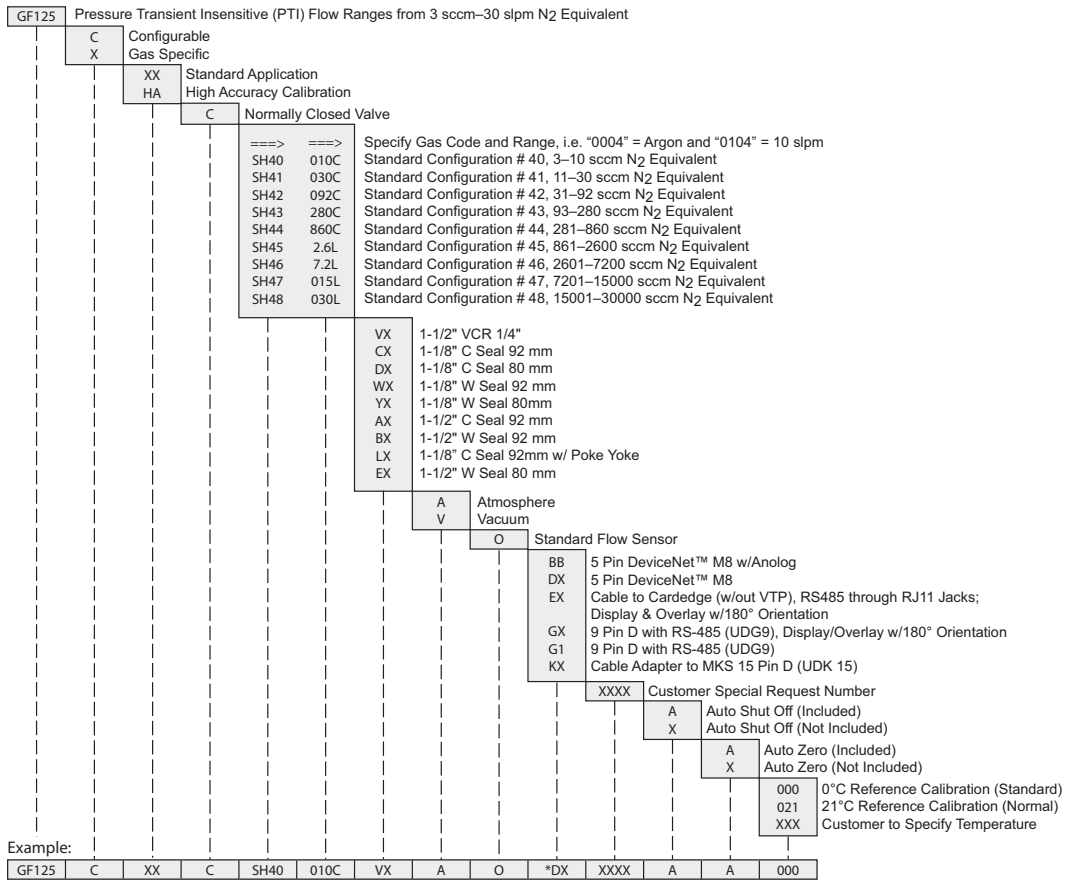
\*High Accuracy option not available in multi gas/multi range "SH" configuration. Check with factory for available gases and ranges.

\*\*Typical pressure drop. Actual pressure drop will be gas and flow range dependent. Consult technical support for details.

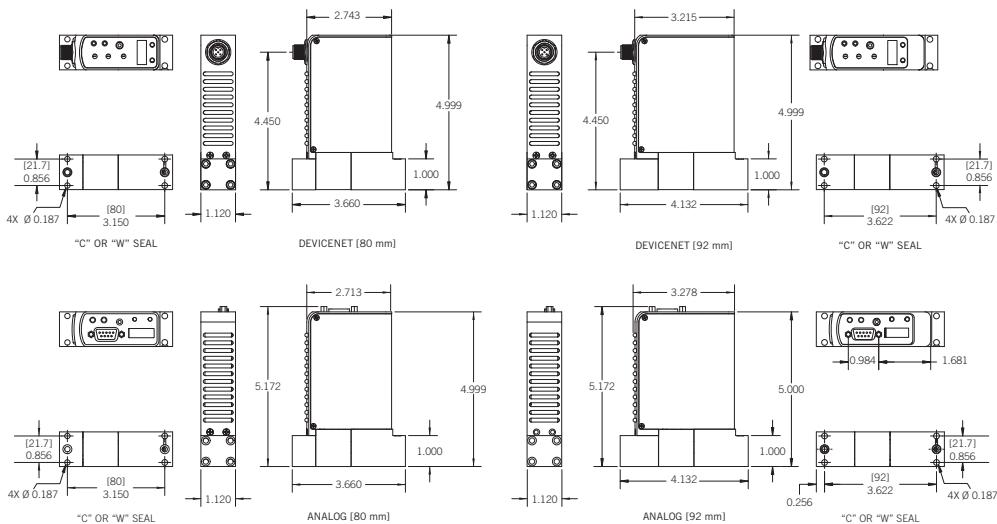
\*\*\*Argon gas applications for these ranges require an additional 10 psid differential pressure. Unless otherwise stated, all specifications and features comply with factory calibration conditions.

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# GF125 Product Configuration



\*Contact Brooks product management for other electrical adapter options.



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NOTE: Please contact Brooks product management for other configuration options. All dimensions in inches unless otherwise stated. Multiple standards exist for mounting hole locations which will vary between manufacturers and model generations. Contact Brooks Product Mgmt for help with your application.

For technical assistance, contact Brooks Applications Engineering at 972.359.4000.

