

# GF120 Mass Flow Controllers

Ultra high purity digital mass flow controller

- » 1% digital set point accuracy and <1 second response time
- » 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 GF120 mass flow controller builds upon Brooks' leadership position in UHP digital mass flow controllers. Utilizing a new modular format, the GF120 is a universal replacement for legacy Unit® and IntelliFlow series digital and analog products

Brooks' new sensor technology with improved signal to noise performance and advanced control algorithms deliver enhanced measurement stability and reproducibility for tighter gas chemistry control.

The GF120 is a continuous improvement (CIP) design, using reliability engineering and embedded diagnostics to reduce maintenance requirements for a lower cost of ownership.

## 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
  - 4µ inch Ra surface finish
- New independent service and diagnostic port support on-tool troubleshooting and process fingerprinting and 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
  - 124 mm 4 VCR
  - 9-pin "D" analog/RS-485 or 5-pin "M8" DeviceNet™

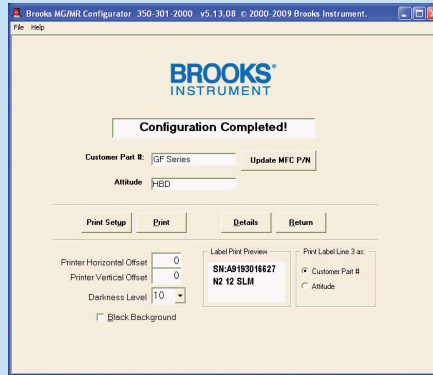
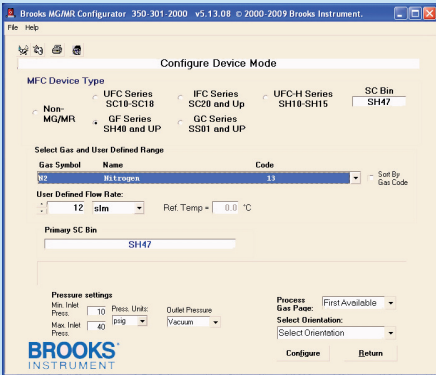
- Gas and range configurable (MG/MR)
  - MG/MR model created and proven using actual process gases to ensure real world accuracy
  - Change full scale range up to 3:1 for optimum process and inventory management flexibility
  - Select from hundreds of Semi gases and gas mixtures

## Applications

- Sub-atmospheric deposition
- Plasma enhanced deposition
- High density plasma deposition
- Low pressure plasma deposition
- Plasma enhanced atomic layer deposition
- Epitaxial deposition
- High temperature annealing
- Rapid thermal processing
- UHP gas blending

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## Gas and Range Configurable



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

## Multi Gas/Multi Range Technology

Multi gas/ multi range (MG/MR) is a proprietary technology available on all Brooks GF Series MFCs. Our MG/MR technology offers a host of benefits that increase tool uptime, reduce cost of ownership, and improve inventory requirements.

Brooks MFCs with MG/MR are offered in nine standard configurations, each programmable for a set of gases and flow ranges. Combined, the nine standard MFCs cover 85% of the gases and flow ranges used in a typical production fab (from 3 sccm to 30 slm, N<sub>2</sub> equivalent).

MG/MR is offered with a configuration kit which allows the user to program the MFC for desired gas and flow range anywhere, anytime without removing the MFC from the gas panel. Calibration does not require surrogate gases and can be completed in just a few minutes. In a recent benchmark study, we were able to cover an entire semiconductor fab's MFC inventory requirement with only 23 part numbers (nine configurable MFC part numbers and 14 other unique part numbers), significantly reducing the fab's inventory requirements.

## Better by Design

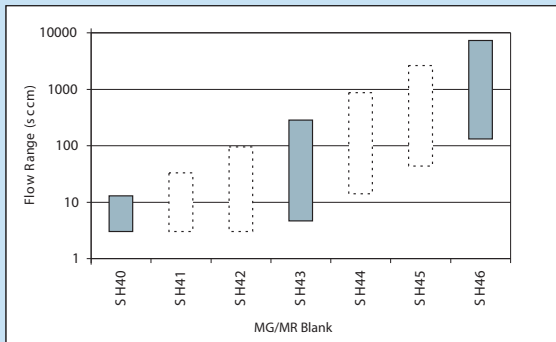
Brooks GF Series MFCs use a valve, sensor, and bypass design which has been perfected from years of research and testing. Brooks GF Series MFCs are robust, reliable, and field proven.

The Brooks solenoid valve has major advantages over other MFC valves (such as piezoelectric valves, which can tend to shed particles). Our valve has only one moving part, and only three parts physically in the gas flow path. This results in no particle generation during normal operation. (Other valves, such as piezoelectrics, can release huge amounts of gas during a failure and can overtax abatement systems.)

## Multi Gas/Multi Range Benefits

- Replacement MFCs are available in only a few minutes
- Nine standard MFC part numbers cover 85% of all applications
- Enables on-site gas and range changes with no surrogate gas requirements
- Enables last minute changes in gas panel integration without impacting on-time delivery
- Dramatically reduces inventory requirements
- Increases tool uptime

## Multi Gas/Multi Range Turndown Advantage



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

## Optional 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.

## Flexible Design

Mechanical connector options are available to support both welded and modular gas system requirements.

## Communications Options

All Brooks GF Series products have the ability to communicate via analog, RS485 and DeviceNet™. A variety of connector options are available to meet the interface requirements.

## GF120 Mass Flow Controllers Specifications

### Display

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

### Diagnostics

Status Lights	MFC health, network status
Alarms	Sensor output, control valve output, over temperature, 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, RoHS/WEEE

### 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
Linearity	±0.5% full scale
Repeatability and Reproducibility	±0.15% set point
Zero Drift	≤0.6% full scale per year
Auto Shut-Off	Valve off at set point <2% full scale
Warm Up Time	60 minutes
Settling Time	500 msec
Standard Accuracy	5% to 35% ±0.35% full scale 35% to 100% ±1.0% set point

### Operating Conditions

	SH40–SH44	SH45–SH46	SH47–SH48
Flow Range	3–860 sccm	861–7200 sccm	7201–30000 sccm
Proof Pressure		140 psia max	
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	

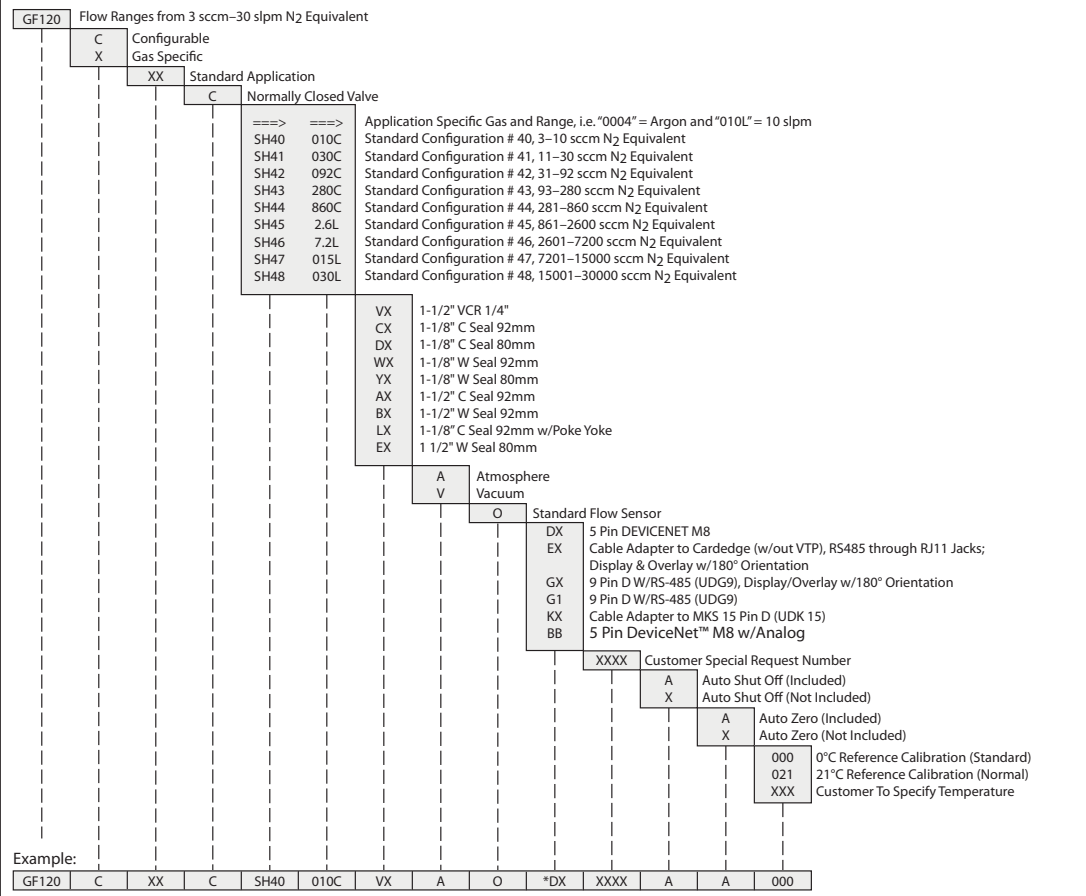
Please refer to the user guide regarding recommended zeroing procedures and operating practices.

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

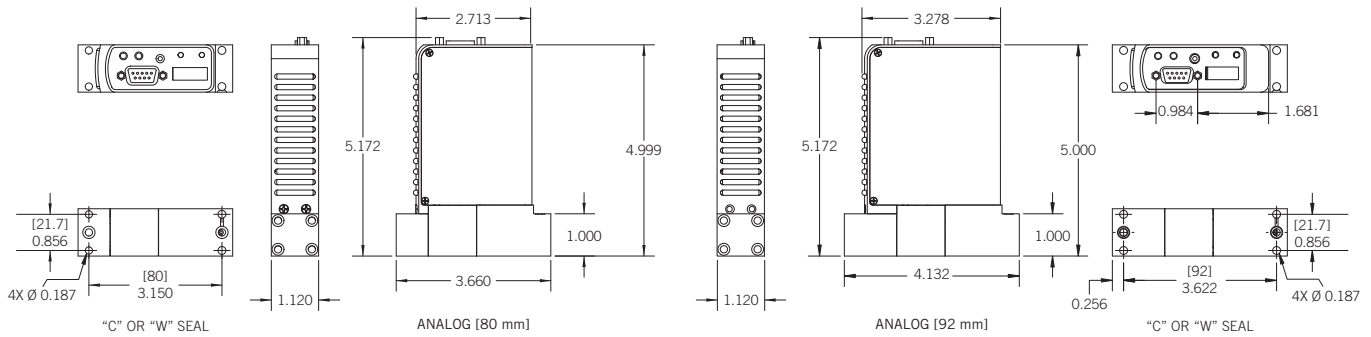
\*\*Argon gas applications for these ranges require an additional 10 psid differential pressure. Unless otherwise stated, all specifications and features comply with factory calibration conditions.

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# GF120 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.

