

# Semiconductor Products

## Quick Reference



**BROOKS<sup>®</sup>**  
INSTRUMENT

*Beyond Measure*

# Semiconductor Products Quick Reference

## Unsurpassed precision and control. For the world's most demanding industry.

Since the beginning of large-scale semiconductor manufacturing, Brooks Instrument has provided innovative flow control, vapor, and pressure and vacuum solutions that have set the standard for precision, accuracy and repeatability. Our technology development team continually strives to deliver the most advanced, novel product solutions that help enable the most critical, complex and demanding processes in semiconductor manufacturing.

### A history of innovation

First Commercial Mass Flow Meter	First Gas/Range Programmable (MultiFlo™) Mass Flow Controller	First Pressure Transient Insensitive (PTI) Mass Flow Controller	First Fully Pressure Insensitive (Upstream & Downstream) Mass Flow Controller
1974	1995	1998	2003
	First Digital Mass Flow Controller	First All-Digital vacuum capacitance manometer	First Self-Verifying Mass Flow Controller with Advanced Diagnostics
		2004	2013
			2021

### The Brooks Instrument experience

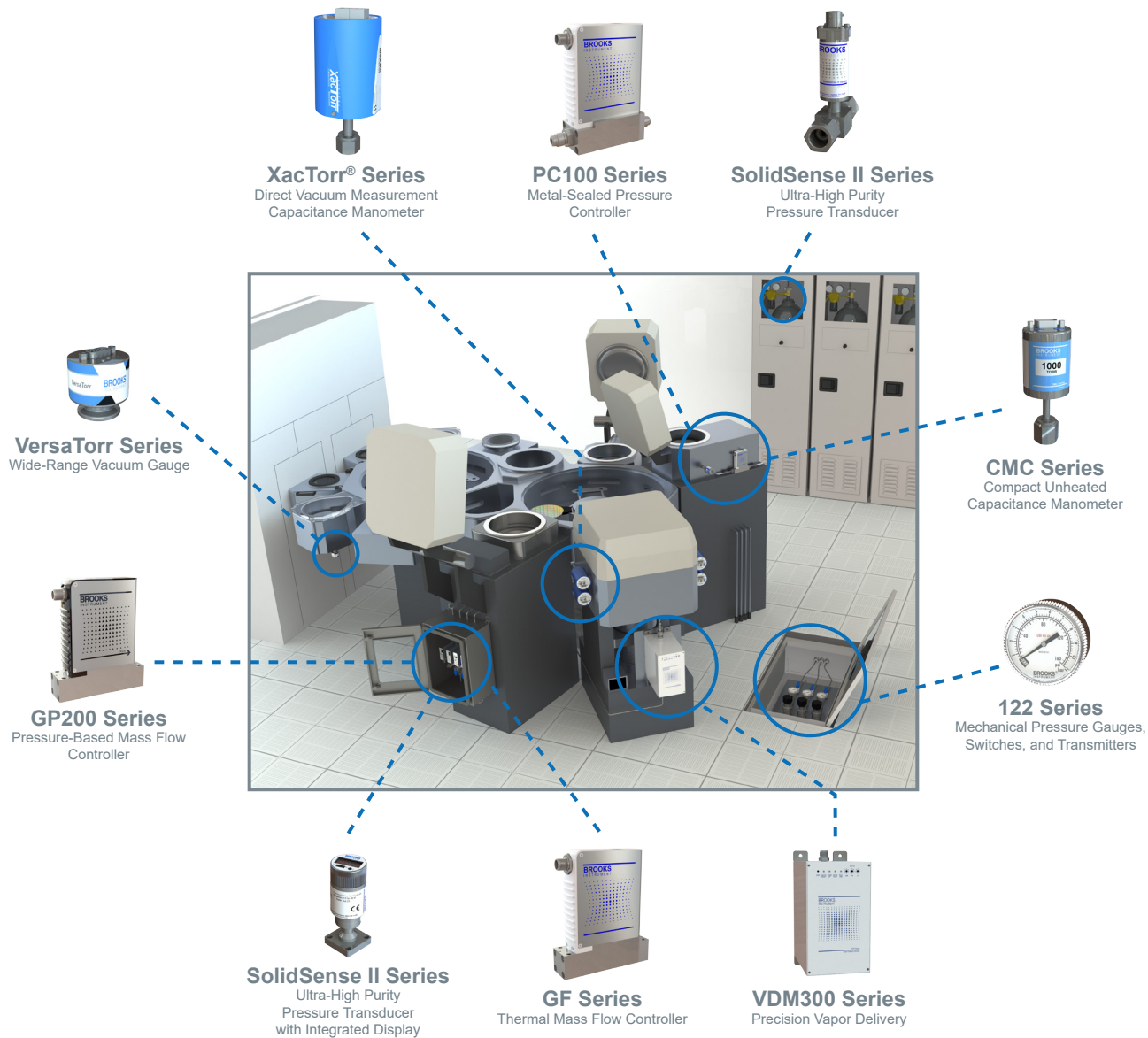
Our broad product portfolio is centered around our customers' specific needs, enabling them to match their cost/benefit requirements to application-tailored products with proven accuracy, reliability and process repeatability.

Market-wide applications experts are ready to assist in defining and selecting custom configurations, quickly guiding customers towards the best solution. This technical expertise coupled with our global factory-certified field service engineers & support centers enable us to provide best-in-class instruments as well as rapid response support capabilities for all your existing, emerging and future needs.





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## Flow

GF Series thermal and GP Series pressure-based mass flow controllers are the industry's most accurate and repeatable process gas delivery instruments, offering a complete portfolio for a wide variety of applications. Precise chemistry control is achieved through the combination of ultra-stable, highly accurate measurement sensors, fast precision control valves and powerful digital electronics. Unmatched process flexibility and efficiency combined with an ultra-high purity flow path helps to maximize yields and increase productivity.

## Vacuum

XacTorr Series capacitance manometers, VersaTorr Series wide-range gauges provide the industry with accurate, repeatable and stable measurements.

## Pressure

Solid Sense II Series pressure transducer, 122 Series pressure gauge, and PC100 Series pressure controllers and meters offer durable designs to ensure reliable and accurate performance in delivery of ultra-pure gases in critical manufacturing processes.

## Vapor Delivery

VDM300 Series vapor delivery module and GF120xHT Series high-temperature thermal mass flow controllers provide accurate and repeatable vapor flow delivery from liquid source materials used in Etch and Deposition processes.

# Pressure Measurement & Control

## Solid Sense II® Pressure Transducers

High and ultra-high purity pressure transducers designed for stable, accurate, and reliable pressure monitoring in specialty gas cabinets, gas distribution systems and process tools.

Key features:

- Full Scale ranges from 1000 Torr to 3000 PSI
- Single piece, corrosion resistant, ultra-high purity sensor addresses hydrogen embrittlement issues
- Ultra-stable, paired strain/tension sensor technology minimizes need to re-zero and recalibrate
- Rotatable high visibility integrated digital display option



## Mechanical Pressure Gauges, Switches & Transmitters

High-purity mechanical gauges for point-of-use pressure indication in bulk gas delivery, gas cabinets, valve manifold boxes and local pressure monitoring.

Key features:

- Full Scale range from vacuum to 4000 PSI
- 1% accuracy
- 316L SS wetted path combined with Oxygen free welding.
- Electronic pressure switch and transmitter options for system automation.



## PC100 Series In-Line Pressure Controllers

Ultra-high purity in-line pressure controller with an integrated pressure sensor, PC100 Series serves a broad range of applications including electronic pressure regulation, bubbler head-pressure control, ballast gas pressure control, pressure balancing and dilution lines in deposition. PC100 series delivers outstanding performance, reliability, and fast response and settling time for improved pressure control to reduce diverted gas consumption and associated abatement costs.

Key features:

- Full Scale ranges from 20 sccm to 10 slm (N<sub>2</sub> equivalent)
- Upstream and downstream pressure control configurations
- Improved pressure control through fast response and settling time
- High-purity metal flow path



# Mass Flow Control

## GP200 Series Metal Sealed P-MFCs

The GP200 Series is the industry's first fully (both inlet and outlet) pressure insensitive P-MFC, designed specifically for critical gas chemistry control applications. The GP200 platform provides the most precise process gas delivery over the widest range of operating conditions, for drop-in replacement and upgrade of many traditional pressure-based and thermal mass flow controllers. The GP200 enables tighter process control with its patented differential pressure technology, downstream valve architecture and ultra-fast, highly repeatable transient response.

Key features:

- Full Scale flow ranges configurable from 3 sccm to 50,000 sccm (N<sub>2</sub> equivalent)
- 1% process gas accuracy from 100% down to 5% of configured range
- Ultra-fast, highly repeatable ascending & descending flow stabilization time
- Low inlet pressure operation for critical Etch gases & insensitive to downstream pressure changes
- Embedded gas model for on-the-fly gas and flow range configuration with digital command
- Zero leak-by valve (ZLV) option to address first wafer effect



## GF100 Series and GF101 Series Metal Sealed Thermal MFCs

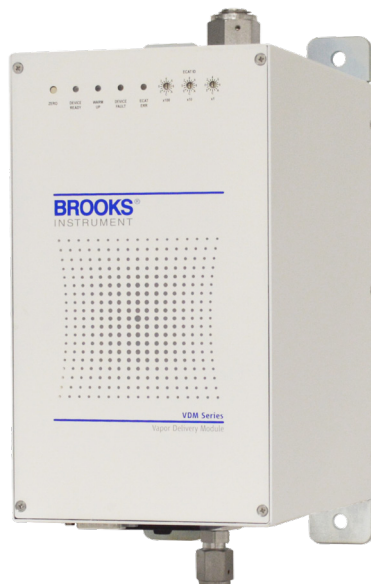
With over 1 million devices shipped, the GF100 Series and the GF101 Series are widely considered the workhorse of the semiconductor industry, used in high volume manufacturing across all process segments including deposition, etch, strip, ion implant, patterning, diffusion, polish, and RTP.

The GF100 Series and the GF101 Series are also widely used in high performance flow controller applications including analytical systems, biotechnology, solar and thin-film industrial coating applications.

Key features:

- Full Scale ranges
  - GF100 Series: 3 sccm to 55 slm (N<sub>2</sub> equivalent)
  - GF101 Series: 55 slm to 300 slm (N<sub>2</sub> equivalent)
- MultiFlo™ gas and flow range programmability
- Pressure Transient Insensitivity (PTI) compensates for variable gas supply conditions (GF125/GF126)
- GF100 Series options
  - Ultra-low-pressure operation for delivery of SDS gases in Implant and Etch
  - Zero leak-by valve (ZLV) option to address first wafer effects





## Vapor Delivery Modules

The VDM300 is a compact solution for the delivery of pure  $H_2O$  vapor, providing best in class accuracy and repeatability. The unique design of the VDM300 enables it to compensate for pressure variations to the deionized water supply without seeing any variation in performance. The titanium tank and low temperature and energy efficient vaporization process takes place in a non-super-heated state, which helps reduce the aggressive effects of deionized water vapor ensuring ultra-high purity delivery to the process. It is designed for advanced strip and post-metal etch passivation applications.

Key features:

- 1% S.P. Accuracy
- Tolerant of variable DIW supply pressure
- Optimized for flushing and draining

## GF120xHT Series Metal Sealed High Temperature MFCs

The GF120xHT is an ultra-high-purity thermal mass flow controller designed to meter/control vapor flow of liquid and solid precursors used in common deposition applications in the semiconductor industry. The GF120xHT sensor was optimized to operate in applications up to  $150^{\circ}C$  with industry leading accuracy, repeatability, and zero stability. Each unit is calibrated and tuned at process conditions to ensure optimal product performance on tool.

Key features:

- $150^{\circ}C$  operating temperature
- 1% S.P. Accuracy;  $<0.15\%$  S.P. repeatability
- Customizable cable lengths
- Din Rail Clip mounting for remote electronics



# Vacuum Measurement

## VersaTorr Series Vacuum Gauges

VersaTorr Series vacuum gauges are designed for non-corrosive process monitoring applications including load locks, transfer chambers, forelines and roughing lines. Novel integration of MEMS Piezo and Pirani sensors deliver enhanced accuracy and extended measurement range in a compact package.

Key features:

- Market leading 9-decades of pressure measurement from 1000 to  $7.5 \times 10^{-7}$  Torr
- BVT125's integrated barometric sensor ensures reliable load-lock venting to prevent particulate contamination and air inrush
- Up to 3 programmable solid state process relays for vacuum interlocks and automation



## XacTorr® Series Capacitance Manometers

The XacTorr® CMX Series capacitance manometers (or capacitance diaphragm gauges) are highly-accurate vacuum measurement gauges. The CMX utilizes a corrosion resistant Inconel sensor for compatibility with all process chemistries, and its unique sensor design incorporates industry-leading features that improve measurement stability by protecting the measurement diaphragm from process byproducts and thermal effects.

CMX is widely utilized on semiconductor processes including etch, deposition, diffusion and on-tool metrology as well various industrial applications including thin film processes and lyophilization.

Key features:

- Available in ranges from 100 mTorr to 1000 Torr
- Highly corrosion resistant, shielded Inconel Sensor for up to 2x longer operational life
- 0.15% S.P. Accuracy
- Unheated, 45°C, 100°C, and 160°C heated configurations for optimum process computability



## Service and Support



### Copy Exact Service & Support

Brooks Instrument products are recognized as the most stable and reliable in the world. To keep your products operating at the highest level of accuracy and extend their life, your best choice is to trust Brooks Instrument Factory Certified Service repair and recalibration offerings.

Only Brooks Instrument Factory Certified Service ensures that your Brooks Instrument flow, pressure, vapor and vacuum products are serviced utilizing the same metrology standards, work instructions, equipment and custom software as our manufacturing processes — by expert technicians trained exclusively on servicing Brooks products.

We have service centers located near fabs across the globe, to ensure fast turnaround on repair and recalibration requests. Complete details are available at [www.BrooksInstrument.com/service](http://www.BrooksInstrument.com/service).



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