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Installation and Operation Manual
X-TMF-GF100-Series-MFC-eng
Part Number: 541B137AAG
April, 2017

Brooks® GF100 Series High Purity/Ultra-High Purity Digital Thermal Mass Flow Devices



Model GF125 Analog I/O



Model GF125 Digital I/O



Model GF135 Analog I/O



Model GF121 Analog I/O

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Essential Instructions
Read before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. These products must be properly installed, operated and maintained to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, operating and maintaining Brooks Instrument products.

- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.

⚠ **WARNING: Do not operate this instrument in excess of the specifications listed in the Instruction and Operation Manual. Failure to heed this warning can result in serious personal injury and / or damage to the equipment.**

- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.

⚠ **WARNING: Prior to installation ensure this instrument has the required approval ratings to meet local and national codes. Failure to heed this warning can result in serious personal injury and / or damage to the equipment.**

- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- Operation: (1) Slowly initiate flow into the system. Open process valves slowly to avoid flow surges. (2) Check for leaks around the flow meter inlet and outlet connections. If no leaks are present, bring the system up to the operating pressure.
- Please make sure that the process line pressure is removed prior to service. When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place to prevent electrical shock and personal injury, except when maintenance is being performed by qualified persons.

⚠ **WARNING: For liquid flow devices, if the inlet and outlet valves adjacent to the devices are to be closed for any reason, the devices must be completely drained. Failure to do so may result in thermal expansion of the liquid that can rupture the device and may cause personal injury.**

European Pressure Equipment Directive (PED)

All pressure equipment with an internal pressure greater than 0.5 bar (g) and a size larger than 25mm or 1" (inch) falls under the Pressure Equipment Directive (PED).

- The Specifications Section of this manual contains instructions related to the PED directive.
- Products described in this manual are in compliance with EN directive 2014/34/EU.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Products larger than 25mm or 1" (inch) are in compliance with PED category I, II or III.
- Products of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

European Electromagnetic Compatibility (EMC)

The Brooks Instrument (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 2014/30/EU).
Special attention however is required when selecting the signal cable to be used with CE marked equipment.

Quality of the signal cable, cable glands and connectors:

Brooks Instrument supplies high quality cable(s) which meets the specifications for CE certification.
If you provide your own signal cable you should use a cable which is overall completely screened with a 100% shield.
"D" or "Circular" type connectors used should be shielded with a metal shield. If applicable, metal cable glands must be used providing cable screen clamping.
The cable screen should be connected to the metal shell or gland and shielded at both ends over 360 Degrees.
The shield should be terminated to an earth ground.
Card Edge Connectors are standard non-metallic. The cables used must be screened with 100% shield to comply with CE certification.
The shield should be terminated to an earth ground.
For pin configuration : Please refer to the enclosed Instruction Manual.

ESD (Electrostatic Discharge)

⚠ **CAUTION: This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.**

Handling Procedure:

1. Power to unit must be removed.
2. Personnel must be grounded, via a wrist strap or other safe, suitable means before any printed circuit card or other internal device is installed, removed or adjusted.
3. Printed circuit cards must be transported in a conductive container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

Comments

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, SMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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Dear Customer,

We appreciate this opportunity to service your flow measurement and control requirements with a Brooks Instrument device. Every day, flow customers all over the world turn to Brooks Instrument for solutions to their gas and liquid low-flow applications. Brooks provides an array of flow measurement and control products for various industries from biopharmaceuticals, oil and gas, fuel cell research and chemicals, to medical devices, analytical instrumentation, semiconductor manufacturing, and more.

The Brooks product you have just received is of the highest quality available, offering superior performance, reliability and value to the user. It is designed with the ever changing process conditions, accuracy requirements and hostile process environments in mind to provide you with a lifetime of dependable service.

We recommend that you read this manual in its entirety. Should you require any additional information concerning Brooks products and services, please contact your local Brooks Sales and Service Office listed on the back cover of this manual or visit www.BrooksInstrument.com.

Yours sincerely,

Brooks Instrument

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1-1 Introduction

Designed for semiconductor, MOCVD , and other gas flow control applications that require a high purity all-metal flow path, the Brooks GF100 Series mass flow controllers and meters deliver outstanding performance, reliability, and flexibility. Process throughput and yield are maximized while process costs are reduced by the GF100 Series featuring:

• Ultra fast settling time for quick start up and very rapid process steps

• MultiFlo™ gas and range configurability enabling reconfiguration without removing device from the gas line

• An independent diagnostic/service port to troubleshoot or change flow conditions without removing the mass flow controller from service

• Long-term stability due to extremely low wetted surface area, and corrosion resistant Hastelloy® sensor and valve seat

Optional model variations including—pressure transient insensitivity (PTI) and Safe Delivery System (SDS)



Figure 1-1 GF100 Series High Performance Gas Flow Controller Analog and Digital

1-2 How to Use This Manual

This manual is intended to provide the user with all the information necessary to install, operate, troubleshoot and maintain these thermal mass flow devices. The manual is organized in the following sections:

Section 1 Introduction

Section 2 Installation

Section 3 Operation

Section 4 Maintenance and Troubleshooting

Section 5 Product Description Code

Appendix A GF100 Series Gas Table

Appendix B GF100 Series Patents

Appendix C Essential Instructions

Warranty, Local Sales/Service Contact Information

It is recommended that this manual be read in its entirety before attempting to operate or repair these devices.

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1-3 Product Support References

Refer to www.BrooksInstrument.com for Brooks sales and service locations and to obtain other documents that support the GF100 Series. Those documents include:

- Brooks MultiFlo™ Configurator Quick Start Manual:
  X-SW-MultiFlo-Config-QS-eng. part Number 541B167AAG

- Brooks GF100 Series data sheets:
  DS-TMF-GF100-Series-MFC-eng
  DS-TMF-GF135-Series-MFC-eng
  DS-TMF-GF121-Series-MFC-eng
  DS-DPT-EtherCAT-GF100-Series-eng

1-4 Notice and Caution Statements

Warning, caution and notice statements are located throughout this manual in the ANSI format. A WARNING statement indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury. A CAUTION statement indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices. A NOTICE statement describes specific information that requires special attention.

1-5 Product Warranty

Product warranty information can be found on the Back Cover of this Manual and on the Brooks website at **www.BrooksInstrument.com**. This information provides general warranty information, limitations, disclaimers, and applicable warranty periods according to product group.

1-6 How to Order a GF100 Series Device

Refer to Section 5.

1-7 Industry Standard References

Refer to Table 1-1.

1-8 GF100 Series Gas Table

Refer to Appendix A.

1-9 Glossary of Terms and Acronyms

Refer to Table 1-2

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Table 1-1 Industry Standard References

Reference Number	Reference Description
MIL-STD-810	Method 514.4, Category 1, Transportation Requirement Method 516.4, Procedure 1, Functional Shock Test Requirement
SEMI E12	Standard temperature and pressure
SEMI E16	Guideline for determining and describing MFC leak rates
SEMI E17	Guideline for MFC transient characteristics tests
SEMI E18	Guideline for temperature specifications of the MFC
SEMI E27	Standard for MFC and MFM linearity
SEMI E28	Guideline for pressure specifications for the MFC
SEMI E52	Practice for referencing gases used in digital MFCs
SEMI E54	Sensor actuator network connections for DeviceNet
SEMI E56	Test method for detemining accuracy, linearity, repeatability, short-term reproducibility, hystereses of thermal MFCs
SEMI E66	Test method for determining particle contribution by MFCs
SEMI E67	Test method for determining reliabilty of MFCs
SEMI E68	Test method for determining warm-up time of MFCs
SEMI E69	Test method for reproducibilty and zero drift for thermal MFCs
SEMI E80	Test method for determining attitude sensitivity of MFCs
SEMI E16-90	Guidelines for determining and describing mass flow controllers leak rates
SEMI F19	Specification for the finish of the wetted surface of electro polished 216L stainless steel components
SEMI F20	Specifications for 316L stainless steel bar, extruded shapes, plate, and investment castings for components used in ultra-high purity semi manufacturing applications
SEMI F36	Guide for dimensions and connections of gas distribution components
SEMI F37	Method for determination of surface roughness parameters for gas distribution system components
SEMI F44	Guideline for standardization of machined stainless steel weld fittings
SEMI F45	Guideline for standardization of machined stainless steel reducing fittings
SEMI F47	Specifications for semiconductor processing equipment voltage sag immunity
SEMI S2	Environmental, Health and Safety Guidelines
SEMI S9	Dielectric testing
SEMI S10	Risk assessment
SEMI S12	Decontamination of fielded products
ETG.1000.2	Physical Layer service definition and protocol specification
ETG.1000.3	Data Link Layer service definition
ETG.1000.4	Data Link Layer protocol specification
ETG.1000.5	Application Layer service definition
ETG.1000.6	Application layer protocol specification
ETG.1020	EtherCAT Protocol Enhancements
ETG.2000	EtherCAT Slave Information
ETG.5001.1	Modular Device Profile - Part 1: General MDP Device Model
ETG.5003.1	Semiconductor Device profile - Part 1: Common Device Profile (CDP)
ETG.5003.2020	Specific Device Profile: Enhanced Mass Flow Controller
ETG.5003.2021	Specific Device Profile: Mass Flow Controller
ETG.5003.2022	Specific Device Profile: Mass Flow Meter
ETG.5003.2023	Specific Device Profile: Enhanced Mass Flow Meter

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Table 1-2 Terms and Acronyms

Term or Acronym	Definition
CSR	Customer Special Requirement
CVD	Chemical Vapor Deposition
DeviceNet	A 5-wire local network I/O communication device that employs a command/response communication protocol
DSP	Digital Signal Processor
EPI Epitaxy (EPI).	A process technology where a pure silicon crystalline structure is deposited or “grown” on a bare wafer, enabling a high-purity starting point for building the semiconductor device.
HBD	Horizontal Base Down
GF100 Series	Integrated Flow Controller
F.S.	Full Scale
LED	Light Emitting Diode
MFC	Mass Flow Controller
MultiFlo Configurator	I/O communication software package that configures gas and flow ranges
MultiFlo Technology	A physics-based calibration methodology that enables gas and flow range configuration within a defined standard configuration
PID	Proportional Integral Derivative Controller
PSIA	Pounds per Square Inch Absolute
PSID	Pounds per Square Inch Differential
PSIG	Pounds per Square Inch Gauge
PTI	Pressure Transient Insensitive. Reduces the effect of pressure fluctuations in gas flow. Applicable to GF125 only.
ROR	As pressure increases, flow increases at a pressure rate of rise, or ROR.
HC	Standard Configuration w/ Hastelloy® sensors (to reduce reaction to corrosive gases)
S.P.	Setpoint
Step Technology	Enables fast set point control through a high speed DSP and low volume drive circuit
VIU	Vertical mounting attitude with inlet side facing up

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1-10 Description

Ultra Fast Response

The Brooks GF Series patented flow sensor combined with a high speed ARM processor and fast acting diaphragm-free valve assembly enables:

- Faster response and settling time for improved wafer throughput
- Ultra-fast 1-2 second etch step processing
- Reduced diverted gas consumption and associated abatement costs
- Time sensitive gas delivery steps in Atomic Layer Deposition
- User programmable start-up function for processes requiring a slow ramped gas turn-on or time critical transitions between flow rates

MultiFlo™ Gas and Range Configurability

The Brooks MultiFlo technology delivers exceptional improvement in process gas accuracy for linear and non-linear gases. This is achieved through advanced gas modeling and optimized through actual gas testing. Brooks MultiFlo™ allows the device to be quickly and easily configured for another gas and/or flow range without sacrificing accuracy or rangability. Selecting a new gas automatically creates a new calibration curve, establishes optimized PID settings for dynamic control, automatically compensates for gas density effects, and ensures smooth overshoot-free transitions between flow rates with excellent steady-state stability. Brooks MultiFlo technology offers unparalleled flexibility. An extensive gas database is provided and a single device can be quickly programmed for thousands of different gas and flow range combinations. Process benefits achieved:

- Mass flow controller full scale full range can be rescaled down typically by a factor of 3:1 with no impact on accuracy, turndown or leak by specifications
- Optimum process and inventory flexibility resulting in dramatically reduced inventory costs
- Fewer configurations/bin sizes required to support many different processes
- Less down-time with rapid process recovery

MultiFlo™ Support References: Brooks MultiFlow Configurator Quick Start Guide (X-SW-MultiFlo-Config-QS-eng (Part Number: 541B167AAG))

MultiFlo™ Configurator Accessory Kits:

778Z010ZZZ	**Basic MultiFlo Configurator Kit**
	*Software, MultiFlo Configurator
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 Converter with DB-9 female
778Z011ZZZ	**Basic MultiFlo Configurator Kit w/Power Supply and Adapter Cables** *Software, MultiFlo Configurator
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 Converter with DB-9 female
A332295001	Power Supply MFC
A332297002	Cable, Power, 9-Pin
A332297001	Cable, Power, DeviceNet

* MultiFlo Configurator Software is available on the Brooks Instrument website at: www.BrooksInstrument.com/MultiFlo

www.BrooksInstrument.com/Documentation&Downloads

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Pressure Transient Insensitivity (PTI)— Included with all GF125 & GF135 models

Cost and space constraints are driving gas panel designers to remove point-of-use pressure regulators and pressure monitoring components from the process design and rely solely on the mass flow controller to accurately control the process under dynamic pressure conditions. The Brooks GF125 & GF135 (PTI) devices utilize a patented control algorithm that inverts the pressure signal, compares it to the pre-fluctuation signal and drives real-time valve position compensation to maintain stable flow. Enhanced pressure transient is achieved through faster sensing, quicker processing, and a reduction in internal dead-volume between the sensors and valve orifice.

GF101/121/126 based on the same technology and design as the low flow GF's (same sensor, same electronics, low power support)

- Smaller footprint than competitive MFC's
- Handles flow rates up to 300 slpm
- Metal seal for durability and high leak integrity
- Proprietary sensor technology
- Precise flow control with fast sub-1 second settling time
- 1% of reading accuracy
- Corrosion-resistant Hastelloy C-22 sensor tube

Optional Safe Delivery System (SDS)— GF120 model only

The Safe Delivery System (SDS) enhanced GF120 model is a state-of-the-art low pressure drop devices for the delivery of sub atmospheric safe delivery system gases used in Implant and Etch processes. The Brooks GF120 SDS models are available in full scale flow ranges 4 sccm -1 slpm.

Advanced Thermal Flow Measurement Sensor

Brooks proprietary highly corrosion resistant Hastelloy C-22 sensor with an enhanced sensor manufacturing and burn in process incorporates a unique orthogonal sensor mounting orientation to eliminate sensor drift caused by valve heating effects and eliminates thermal siphoning effects. This unique sensor configuration includes an optimized temperature profile for gases prone to thermal decomposition. This design results in:

- Enhanced signal to noise performance for improved accuracy at low set points
- Superior reproducibility at elevated temperature through new isothermal packaging and onboard conditioning electronics with ambient temperature sensing and compensation
- Improved long-term stability

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High Purity Flow Path

The Brooks GF Series has an all metal, corrosion resistant Semi F20 compliant wetted flow path with highly corrosion resistant Hastelloy C-22 valve seat and jet orifice. The GF120, GF125 & GF135 devices are constructed with a 4µ inch Ra max surface finish while the GF100 is constructed with a 10µ inch Ra.

• Overall reduced surface area and un-swept volumes for faster dry-down during purge steps

• Long-term sensor and device stability for maximum yield and throughput

Extensive Mechanical Configurations

GF Series supports all metal seal/UHP industry gas connection interface standards for full OEM and process coverage.

• Downport 79.8mm and 92mm C-seal and W-seal on 1-1/8" and 1-1/2" bodies

• 124mm 4 VCR on 1-1/2" body



Figure 1-2 LCD Display

Enhanced Diagnostics and User Interface

The mass flow controller is one of the most complex and critical components in gas delivery systems. When dealing with ultra-high-purity gas distribution or highly toxic or corrosive gases, removing the mass flow controller to assess functionality should be the last resort. Brooks GF Series devices provide for in-line device evaluation and instantaneous troubleshooting through:

• Embedded self test routines and independent diagnostic/service port

• High visibility LCD display with easy accessible push button for local indication of Flow (%), Temperature (°C), Pressure (PSIA/kPa) and Network Address

• Zero button to easily re-zero the device during scheduled maintenance

• Rotatable display with a push button to enable improved readability based on how the MFC is mounted. Simply hold button down for at least 3 seconds to rotate display. This featue is standard for GF135 and GF101/GF121/GF126 and available for GF100/GF120/GF125.

This combination of features results in limiting service interruption and reduced downtime.

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Communication Interfaces

The GF100 Series supports analog 0-5 Vdc, RS485, DeviceNet™ and EtherCAT® communication protocols. Analog connections can be accessed via the DeviceNet or RS485 or Analog only connector options. DeviceNet and RS485 are multi-drop connections that allow a maximum of 64 devices for DeviceNet and 32 devices for RS485 to be connected on the same network. Brooks Instrument's DeviceNet profile has been certified by the ODVA™ (Open DeviceNet Vendor's Association). EtherCAT is an Ethernet based communications system know for its high cycle time and cost efficient cabling and master application solutions. The EtherCAT GF100 Series devices conform to the ETG.5003 Semiconductor Device Profile specification. A range of low profile adapter cables facilitate replacing previously installed devices eliminating the need to carry multiple devices of the same gas/range but different electrical connectors.

1-11 Specifications for GF100 Series Devices

⚠ WARNING

Do not operate this instrument in excess of the specifications listed below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

⚠ CAUTION

It is the user's responsibility to select and approve all materials of construction. Careful attention to metallurgy, engineered materials and elastomeric materials is critical to safe operation.

See Table 1-3 for specifications for standard GF100 Series.

See Table 1-4 for specifications for the Safe Delivery System (SDS) GF120 Series.

See Table 1-5 for specifications for standard GF100 Series-EtherCAT

See Table 1-6 for specifications for the GF135 Series.

See Table 1-7 for specifications for the GF121 Series.

See Table 1-8 for specifications for the GF121 Series-EtherCAT

See Figure 1-3 for dimensions for the GF100 Series.

See Figures 1-4 & 1-5 for dimensions for the GF135 Series.

See Figure 1-6 for dimensions for the GF121 Series.

See Figure 1-7 for dimensions for the GF100/GF121 Series-EtherCAT

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Table 1-3 Specifications for Standard GF100/GF120/GF125 Series

	GF100	GF120	GF125
Performance			
Full Scale Flow Range (N_2 Eq.)	3 sccm to 55 slm		
Flow Accuracy	±1% S.P. > 35-100%, ±0.35% F.S. 2-35%		
Repeatability & Reproducibility	< ± 0.15% S.P.		
Linearity	± 0.5% F.S. (included in accuracy)		
Response Time (Settling Time)			
Normally Closed Valve	< 1 sec	700ms	300ms (3-860 sccm N2 Eq.) 400ms (861-7200 sccm N2 Eq.) 500ms (7201-30000 sccm N2 Eq.) <700ms (30001-55000 sccm N2 Eq.)
Normally Open Valve	<1.5 sec		
Pressure Insensitivity	Not Applicable		< 5% SP up to 5 psi/sec upstream press. spike
Control Range	2-100% (Normally Closed Valve) 3-100% (Normally Open Valve)		
MultiFlo	standard		
#of Bins	11 bins		
Valve Shut Down (N.C. Valve)	< 1% of F.S.		
Valve Shut Down (N.O. Valve)	2% of F.S.		
Zero Stability	< ± 0.5% F.S. per year		
Temperature Coefficient	Span: 0.05% S.P. per °C, Zero: 0.005% F.S. per °C		
Ratings			
Operating Temperature Range	10-50°C		
Differential Pressure Range*	3-860 sccm = 7-45 psid, 861- 7200 sccm = 10-45 psid, 7201-55000 sccm = 15-45 psid *Argon gas applications require an additional 10 psid differential pressure. Low vapor pressure gases require an inlet pressure of > 100 Torr, with vacuum on outlet (example SiCl4). Contact Brooks Technical Support for more information.		
Maximum Operating Pressure	500 psia max		100 psia max
Leak Integrity (external)	$1x10^{-10}$ atm. cc/sec He		
Mechanical			
Valve Type	Normally Closed Normally Open Meter (no valve)		
Wetted Materials	GF100: SEMI F20 HP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45 GF120/GF125: SEMI F20 UHP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45		
Surface Finish	10µ inch Ra	4µ inch Ra (0.1 µm Ra)	
Diagnostics & Display			
Status Lights	MFC Health, Network Status		
Alarms	Control Valve Output, Network Interruption		
Display Type	Top Mount Integrated LCD		
Viewing Angle / Viewing Distance	Fixed / 10 feet		
Units Displayed / Resolution	Flow (%), Temp. (°C), Pressure (psia, kPa) / 0.1 (unit)		
Electrical			
Electrical Connection	RS485/Analog via 9-Pin "D" connector, DeviceNet™ via 5-Pin "M12" connector		
Digital Communication	RS485+ (model specific), DeviceNet (model specific), RS485 Diagnostic Port (all models)		
Diagnostic /Service Port	RS485 via 2.5mm jack		
Power Supply/Consumption	DeviceNet: 545mA max. @ +11-25 Vdc., 250mA max. @ 24Vdc RS485/Analog: 6 Watts max @ ±15Vdc. (±10%) or +24 Vdc (±10%)		
Compliance			
EMC	EC Directive 2004/108/EC CE: EN61326: 2006 (FCC Part 15 & Canada IC-subset of CE testing)		
Environmental Compliance	RoHS Directive (2011/65/EU)		
	REACH Directive EC 1907/2006		

NOTE: See the following Safe Delivery System (SDS) section for optional detailed specifications

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Table 1-4 Specifications for Safe Delivery System (SDS) GF120 Series

Performance	GF120XSL	GF120XSD
Full Scale Flow Range (N_2 Eq.)	4 - 25 sccm	>25 to 1 slpm
Gases Supported	AsH_3, PH_3, BF_3, SiF_4, Ar, Xe, N_2O, N_2, GeF4, AsF5, PF3, H2Se, HMDSO, HMDSN, H2O***	
MultiFlo Programmable	Not Configurable	
Flow Accuracy	+/-1% S.P. ≥35% F.S. +/-0.35% F.S. <35% F.S.	
Repeatability & Reproducibility	<+/- 0.15% S.P.	
Zero Stability	<=0.6% F.S. per year	
Settling Time (to within ±2% F.S.)	< 3 sec	
Warm Up Time	minimum of 30 minutes	
Leak Integrity	$1X10^{-11}$ atm. cc/sec He	
Valve Shut Down (Leaky by)	<1% F.S.	

Operating Conditions	GF120XSD	GF120XSL
Minimum Operating Inlet Pressure*	4 to 20 sccm ≤ 10 Torr >20 to 50 sccm ≤ 20 Torr >50 sccm to 1 slpm ≤ 50 Torr	
Maximum Pressure	500 psia max	
Pressure Insensitivity	Not Available	
DifferentialPressure**	10 Torr-30 psid typical (1.33-207 kPa typical)	
Valve Configuration	Normally Closed	
Ambient Temperature Range	$10^{o}C$-$50^{o}C$	
Zero Temperature Coefficient	Span: 0.05% SP per ^{o}C, Zero: 0.005% F.S. per ^{o}C	

*Performance at minimum inlet pressure will be gas and flow range dependent. Consult Technical Support for details.
**Typical pressure drop. Actual pressure drop will be gas and flow dependent. Consult Technical Support for details.
***Consult factory for other gases.

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Table 1-5 Specifications for GF100/GF120/GF125 Series with EtherCAT Communications

Performance	GF100	GF120	GF125	GF120XSL	GF120XSD
Full Scale Flow Range	3 sccm to 55 slm			4 sccm to 25 sccm	>25 sccm to 1 slpm
Flow Accuracy	±1% S.P. > 20-100%; ±0.2% F.S. 2-20%			±1% S.P. 35-100%; ±0.35% F.S. 2-35%	
Repeatability & Reproducibility	< ± 0.15% S.P.				
Flow Settling Time (NC Valve)	< 1 sec	700ms	300ms (3-860 sccm N2 Eq.) 400ms (861-7200 sccm N2 Eq.) 500ms (7201-30000 sccm N2 Eq.) <700ms (30001-55000 sccm N2 Eq.)	< 3 sec	
Flow Settling Time (NO Valve)	<1.5 sec			----------	
Pressure Insensitivity	Not Applicable		< 1% S.P. up to 5 psi/sec upstream press. spike	----------	
Control Range	2-100% (Normally Closed Valve) 3-100% (Normally Open Valve)			2-100% (Normally Closed Valve)	
MultiFlo	Standard			----------	
#of Bins	11 bins			----------	
Valve Shut Down (N.C. Valve)	0.15% of F.S.			<1% of F.S.	
Valve Shut Down (N.O. Valve)	2% of F.S.			----------	
Zero Stability	< ± 0.15% F.S. per year			< ± 0.6% F.S. per year	
Temperature Coefficient	Zero: 0.005% F.S. per °C			Zero 0.005% of F.S. per °C	

Ratings

Operating Temperature Range	10-50°C				
Differential Pressure Range*	3-860 sccm = 7-45 psid 861- 7200 sccm = 10-45 psid 7201-55000 sccm = 15-45 psid			10 Torr - 30 psid typical For more details consult factory	
Maximum Operating Pressure	500 psia max		100 psia max	up to 500 psia max	
Leak Integrity (external)	$1x10^{-10}$ atm. cc/sec He				

Mechanical

Valve Type	Normally Closed Normally Open Meter (no valve)			Normally Closed	
Wetted Materials	SEMI F20 HP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45				
Surface Finish	10µ inch Ra	5µ inch Ra		5µ inch Ra	

Diagnostics & Display

Status Lights	Run, Error, Power, Network Status
Alarms	Control Valve Output, Network Interruption, Temperature High/Low, Pressure High/Low, Power Surge/Sag
Display Type	Top Mount Integrated LCD
Viewing Angle / Viewing Distance	Rotatable / 10 feet
Units Displayed / Resolution	Flow (%), Temp. (°C), Pressure (psia, kPa) / 0.1 (unit)

Electrical

Electrical Connection	Power via 5-pin M8 Connector, EtherCAT via RJ45 jacks
Digital Communication	EtherCAT
Diagnostic /Service Port	Micro-USB
Power Supply/Consumption	320 mA max. @ 18-30 Vdc, 230 mA max. @ 24 Vdc (under typical operating conditions)

Compliance

EMC	EMC Directive 2014/30/EU Evaluation Standard EN61326-1:2013
Environmental Compliance	RoHS Directive (2011/65/EU)
	REACH Directive EC (1907/2006)

*Argon gas applications require an additional 10 psid differential pressure. Low vapor pressure gases require an inlet pressure of > 100 Torr, with vacuum on outlet (example SiCl4). Contact Brooks Technical Support for more information.

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Table 1-6 Specifications for GF135 Series

Performance

Full Scale Flow Range:	3 sccm to 5 slm (N2 Eq.)
Gasses Supported:	N2, O2, Ar, H2, SF6, NH3, CO2, Cl2, HBr, NF3, CF4, CH4, CH3F, CH2F2, SiCl4 (@ 100 Torr), C4F6-q (@ 800 Torr), C4F8 (@ 1200 Torr), N2O, CHF3, SiH2Cl2, C5F8, He
Flow Accuracy:	+/-1.0% S.P. (10-100% F.S.), +/-1% S.P. plus +/-0.04% F.S. (2-10% F.S.)
Repeatability & Reproducibility:	< +/- 0.15% S.P.
Linearity:	Included in accuracy
Settling Time (to within +/-2% FS):	<300ms (<860 sccm N2 Equivalent), <400ms (861-5000 sccm N2 Equivalent)
Pressure Insensitivity:	< 1% S.P. up to 5 psi/sec upstream press. spike
Control Range:	1-100%
Valve Shut Down:	< 0.5% of F.S. N2
Zero Stability:	< +/- 0.5% F.S. per year
Temperature Coefficient:	Span: 0.05% setpoint per °C, Zero: 0.005% F.S. per °C
Rate-of-Decay Performance:	(ROD by default is disabled/off. It should not be enabled until after MFC is installed and properly commissioned)
Flow Rate:	Maximum flow rate for which an ROD measurement can be obtained is 800 sccm
Temperature Sensitivity:	+/- 0.04% S.P./Deg C
Pressure Sensitivity:	+/- 0.04% F.S./psi
Minimum Detectable Change from Commissioning Baseline:	Zero Drift: +/- 0.02% F.S. Valve Leak: +0.1% F.S. Repeatability: +/- 0.3% S.P. (SiCl4 +/- 0.5% from 5-100% S.P. up to 100 sccm flow)

Ratings

Operating Temperature Range:	10-50°C
Differential Pressure Range:**	3-860 sccm = 7-45 psid, 861- 5000 sccm = 10-45 psid **Typical pressure drop. Actual pressure drop will be gas and flow dependent. Argon gas applications require higher differential pressure. Low vapor pressure gases require an inlet pressure of > 100 Torr, with vacuum on outlet (example SiCl4). Contact Brooks Technical Support for more information.
Maximum Operating Pressure:	100 psia max
Pneumatic Valve Operating Pressure:	43.5 psia - 72.5 psia
Leak Integrity (external):	1x10-10 atm. cc/sec He

Mechanical

Valve Type:	Normally Closed
Wetted Materials:	SEMI F20 UHP Compliant 316L VIM/VAR, Hastelloy C-22,316L Stainless Steel, 304 Stainless Steel, KM-45
Surface Finish:	4µ inch Ra (0.1 µm Ra)

Diagnostics & Display

Status Lights:	MFC Health, Network Status
Alarms:	Sensor Output, Control Valve Output, Over Temperature, Power Surge/Sag, Network Interruption, Sensor Drift, Flow Error, Valve Leak
Display Type:	Top Mount Electronically Rotatable Integrated LCD
Viewing Distance:	Fixed / 10 feet
Units Displayed / Resolution:	Flow (%), Temp. (°C), Pressure (psia, kPa) / 0.1 (unit)

Electrical

Electrical Connection:	Analog/RS-485 via 9-Pin "D" connector, DeviceNet via 5-Pin "M12" connector
Digital Communication:	RS485+ (model specific), DeviceNet (model specific), RS485 Diagnostic Port (all models)
Diagnostic / Service Port:	RS485 via 2.5 mm jack
Power Supply/Consumption:	DeviceNet: +11-25 Vdc., 545 mA max. @ 11 Vdc., 250 mA (max.) @ 24 Vdc., Analog /RS485: +/-15 Vdc. (+10%), 6 Watts (max) or +24 Vdc +/-10%

Compliance

EMC	EC Directive 2004/108/EC CE: EN61326: 2006 (FCC Part 15 & Canada IC-subset of CE testing)
Environmental Compliance	RoHS Directive 2011/65/2006
	Reach Directive EC 1907/2006

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Table 1-7 Specifications for GF101/GF121/GF126 Series

Performance	GF101	GF121	GF126
Full Scale Flow Range (N_2 Eq.)	55 to 300 slm		
Flow Accuracy	±1% S.P. > 35-100%, ±0.35% F.S. 2-35%		
Repeatability & Reproducibility	< ± 0.15% S.P.		
Linearity	± 0.5% F.S. (included in accuracy)		
Response Time (Settling Time) Normally Closed Valve	< 1 sec		
Pressure Transducer			Ability to measure inlet pressure
Control Range	5-100% (Normally Closed Valve)		
MultiFlo	Standard (All typical high flow rate process gases & mixtures supported)		
# of Bins	4 Bins		
Control Range	5-100% (Normally Closed Valve)		
Valve Shut Down (N.C. Valve)	< 2% of F.S. @ 30 N2 psig/atm out		
Zero Stability	< ± 0.5% F.S. per year		
Temperature Coefficient	Span: 0.05% S.P. per °C, Zero: 0.005% F.S. per °C		

Ratings	
Operating Temperature Range	10-50°C
Differential Pressure Range	30-90 psid
Maximum Operating Pressure	Controller: 75 psig / Meter: 150 psig
Leak Integrity (external)	$1x10^{-10}$ atm. cc/sec He

Mechanical		
Valve Type	Normally Closed Meter (no valve)	
Wetted Materials	GF101: SEMI F20 HP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45 GF121/GF126: SEMI F20 UHP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45	
Surface Finish	10µ inch Ra	5µ inch Ra (0.1 µm Ra)

Diagnostics & Display	
Status Lights	MFC Health, Network Status
Alarms	Control Valve Output, Network Interruption
Display Type **Viewing Angle / Viewing Distance** **Units Displayed / Resolution**	Top Mount Integrated LCD Fixed / 10 feet Flow (%), Temp. (°C), Pressure (psia, kPa) / 0.1 (unit)

Electrical	
Electrical Connection	RS485/Analog via 9-Pin "D" connector, DeviceNet™ via 5-Pin "M12" connector
Digital Communication	RS485+ (model specific), DeviceNet (model specific), RS485 Diagnostic Port (all models)
Diagnostic /Service Port	RS485 via 2.5mm jack
Power Supply/Consumption	DeviceNet: 545 mA max. @ +11-25 Vdc., 250mA max. @ 24 Vdc (Under typical operating conditions) RS485/Analog: 6 Watts max @ ±15 Vdc. (±10%) (Under typical operating conditions)

Compliance	
EMC	EC Directive 2004/108/EC CE: EN61326: 2006 (FCC Part 15 & Canada IC-subset of CE testing)
Environmental Compliance	RoHS Directive (2011/65/EU)
	REACH Directive EC 1907/2006

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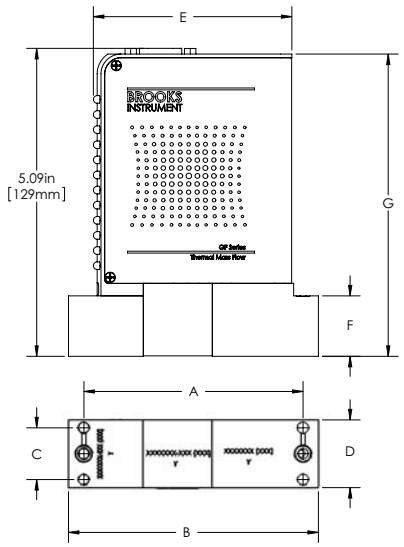
Table 1-8 Specifications for GF101/GF121/GF126 Series with EtherCAT Communications

Performance	GF101	GF121	GF126
Full Scale Flow Range	55 slm to 300 slm		
Flow Accuracy	±1% S.P. > 35-100%; ±0.35% F.S. 2-35%		
Repeatability & Reproducibility	< ± 0.15% S.P.		
Response Time/Settling Time (NC Valve)	< 1 sec		
Pressure Insensitivity	Not Applicable		Ability to measure inlet presssure
Control Range	5-100% (Normally Closed Valve)		
MultiFlo	Standard		
#of Bins	4 bins		
Valve Shut Down (N.C. Valve)	<2% of F.S. @30 N2 psig/atm out		
Zero Stability	< ± 0.15% F.S. per year		
Temperature Coefficient	Zero: 0.005% F.S. per °C		
Ratings			
Operating Temperature Range	10-50°C		
Differential Pressure Range	30-90 psid		
Maximum Operating Pressure	Controller: 75 psig Meter: 150 psig		
Leak Integrity (external)	1x10^-10 atm. cc/sec He		
Mechanical			
Valve Type	Normally Closed Meter (no valve)		
Wetted Materials	SEMI F20 HP Compliant, 316L VIM/VAR, Hastelloy C-22, 316L Stainless Steel, 304 Stainless Steel, KM-45		
Surface Finish	10µ inch Ra	5µ inch Ra	
Diagnostics & Display			
Status Lights	Run, Error, Power, Network Status		
Alarms	Control Valve Output, Network Interruption, Temperature High/Low, Pressure High/Low, Power Surge/Sag		
Display Type	Top Mount Integrated LCD		
Viewing Angle / Viewing Distance	Rotatable / 10 feet		
Units Displayed / Resolution	Flow (%), Temp. (°C), Pressure (psia, kPa) / 0.1 (unit)		
Electrical			
Electrical Connection	Power via 5-pin M8 Connector, EtherCAT via RJ45 jacks		
Digital Communication	EtherCAT		
Diagnostic /Service Port	Micro-USB		
Power Supply/Consumption	320 mA max. @ 18-30 Vdc, 230 mA max. @ 24 Vdc (under typical operating conditions)		
Compliance			
EMC	EMC Directive 2014/30/EU Evaluation Standard EN61326-1:2013		
Environmental Compliance	RoHS Directive (2011/65/EU)		
	REACH Directive EC (1907/2006)		

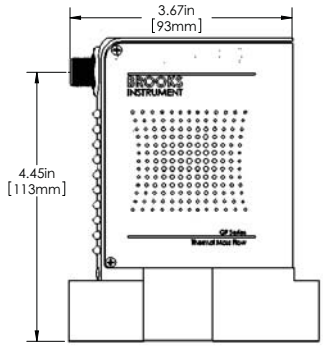
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Downport Configurations

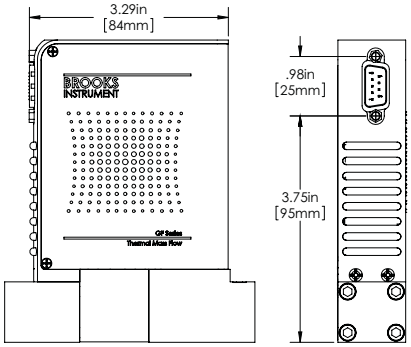
Electrical Connector
G1/GX/TX Specific Dimensions



Electrical Connector
DX/BB Specific Dimensions



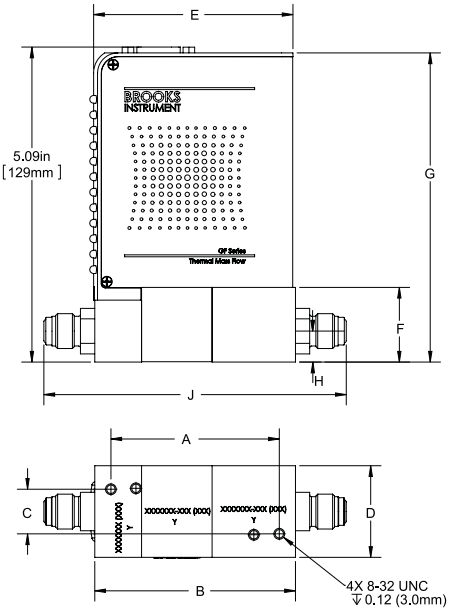
Electrical Connector
SX Specific Dimensions



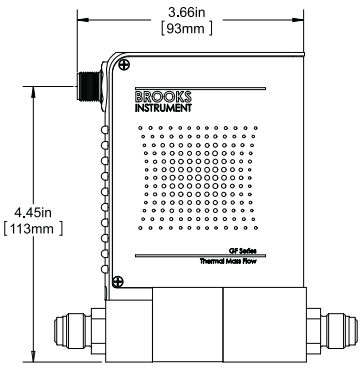
Fitting Option Code	Seal Type	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F	Dim G
CX	C-SEAL	92mm [3.62in]	105mm [4.13in]	22mm [0.86in]	28mm [1.12in]	83mm [3.28in]	25mm [1.00in]	127mm [5.00in]
EX	W-SEAL	79.8mm[3.14in]	93mm [3.66in]	30mm [1.18in]	39mm [1.53in]	72mm [2.82in]	25mm [1.00in]	127mm [5.00in]
WX	W-SEAL	92mm [3.62in]	105mm [4.13in]	22mm [0.86in]	28mm [1.12in]	83mm [3.28in]	25mm [1.00in]	127mm [5.00in]
DX	C-SEAL	79.8mm[3.14in]	93mm [3.66in]	22mm [0.86in]	28mm [1.12in]	72mm [2.82in]	25mm [1.00in]	127mm [5.00in]
YX	W-SEAL	79.8mm[3.14in]	93mm [3.66in]	22mm [0.86in]	28mm [1.12in]	72mm [2.82in]	25mm [1.00in]	127mm [5.00in]
AX	C-SEAL	92mm [3.62in]	105mm [4.13in]	30mm [1.18in]	39mm [1.53in]	83mm [3.28in]	25mm [1.00in]	127mm [5.00in]
BX	W-SEAL	92mm [3.62in]	105mm [4.13in]	30mm [1.18in]	39mm [1.53in]	83mm [3.28in]	25mm [1.00in]	127mm [5.00in]
LX	C-SEAL	92mm [3.62in]	105mm [4.13in]	22mm [0.86in]	28mm [1.12in]	83mm [3.28in]	25mm [1.00in]	127mm [5.00in]

VCR Configurations

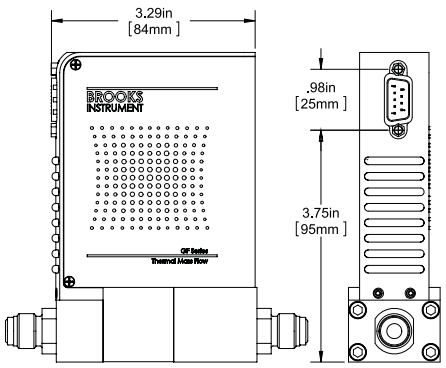
Electrical Connector
G1/GX/TX Specific Dimensions



Electrical Connector
DX/BB Specific Dimensions



Electrical Connector
SX Specific Dimensions

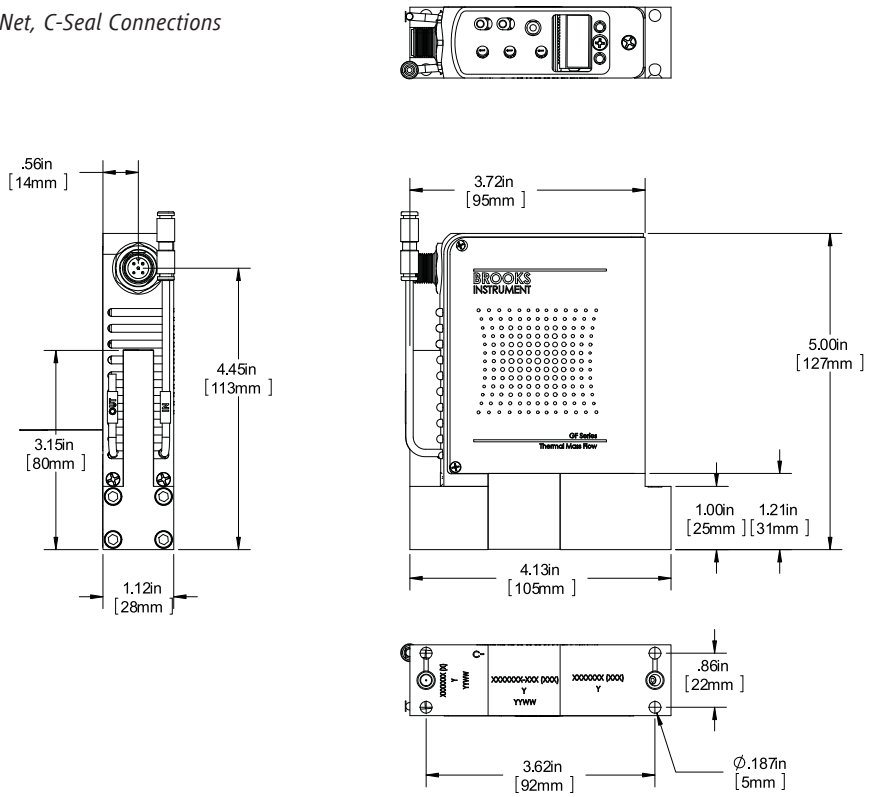


Fitting Option Code	VCR	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F	Dim G	Dim H	Dim J
VX	1/4"	69mm [2.72in]	82mm [3.24in]	18mm [0.72in]	38mm [1.48in]	83mm [3.28in]	31mm [1.21in]	127mm [5.0in]	13mm [0.50in]	124mm [4.88in]
VS	1/4"	69mm [2.72in]	82mm [3.24in]	18mm [0.72in]	28.4mm [1.12in]	83mm [3.28in]	31mm [1.21in]	127mm [5.0in]	13mm [0.50in]	124mm [4.88in]

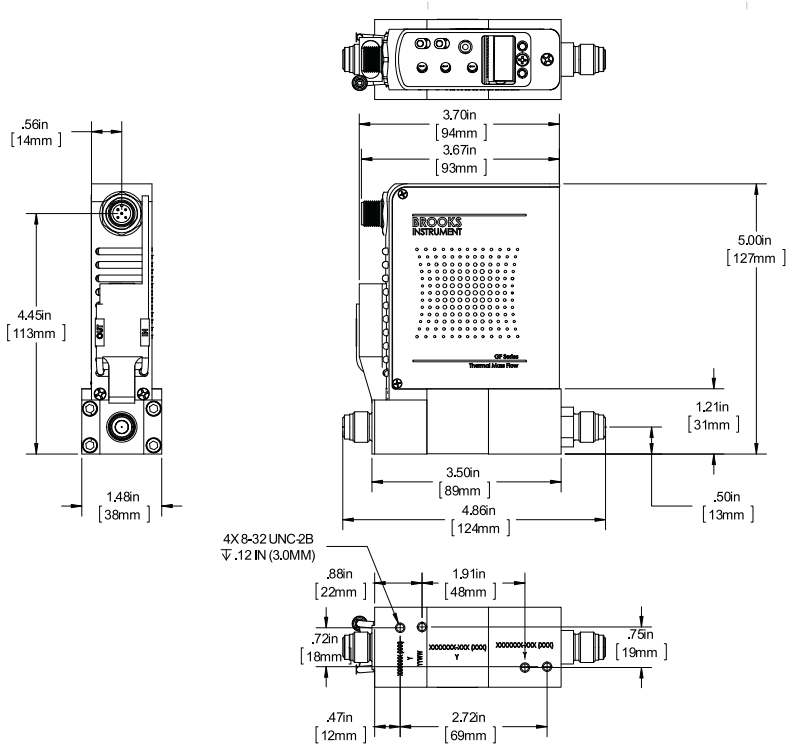
Figure 1-3 Dimensions - GF100/GF120/GF125 Series

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Model GF135, DeviceNet, C-Seal Connections



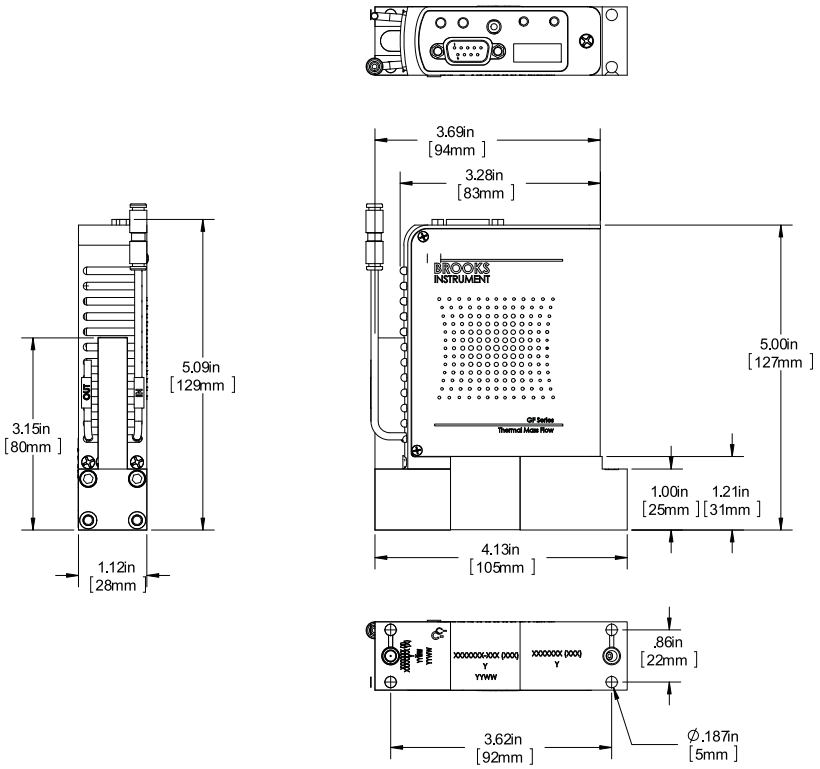
Model GF135, DeviceNet, VCR Connections



1-16 *Figure 1-4 Dimensions - GF135, DeviceNet*

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Model GF135, RS485, C-Seal Connections



Model GF135, RS485, VCR Connections

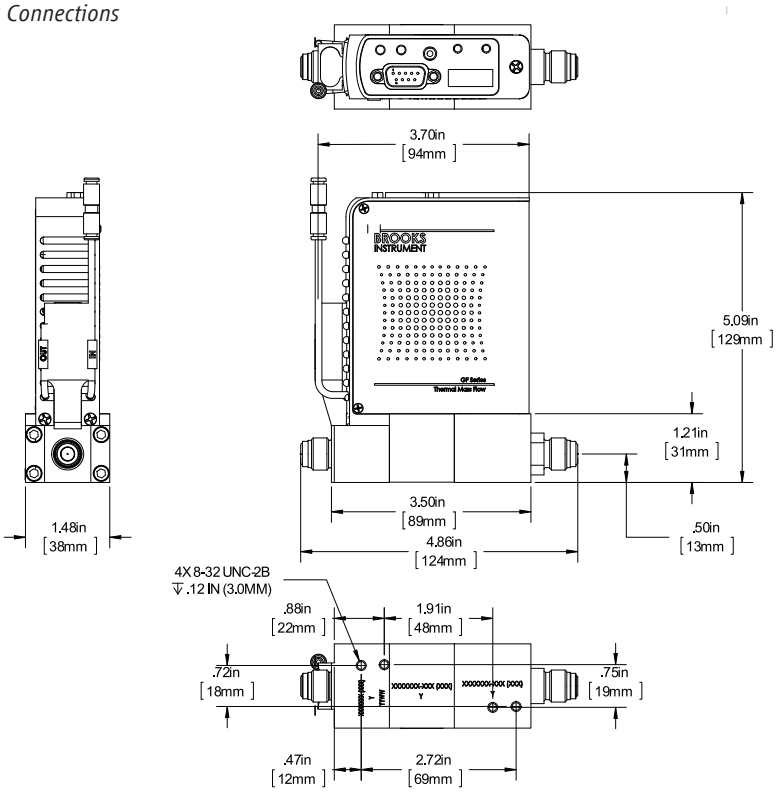
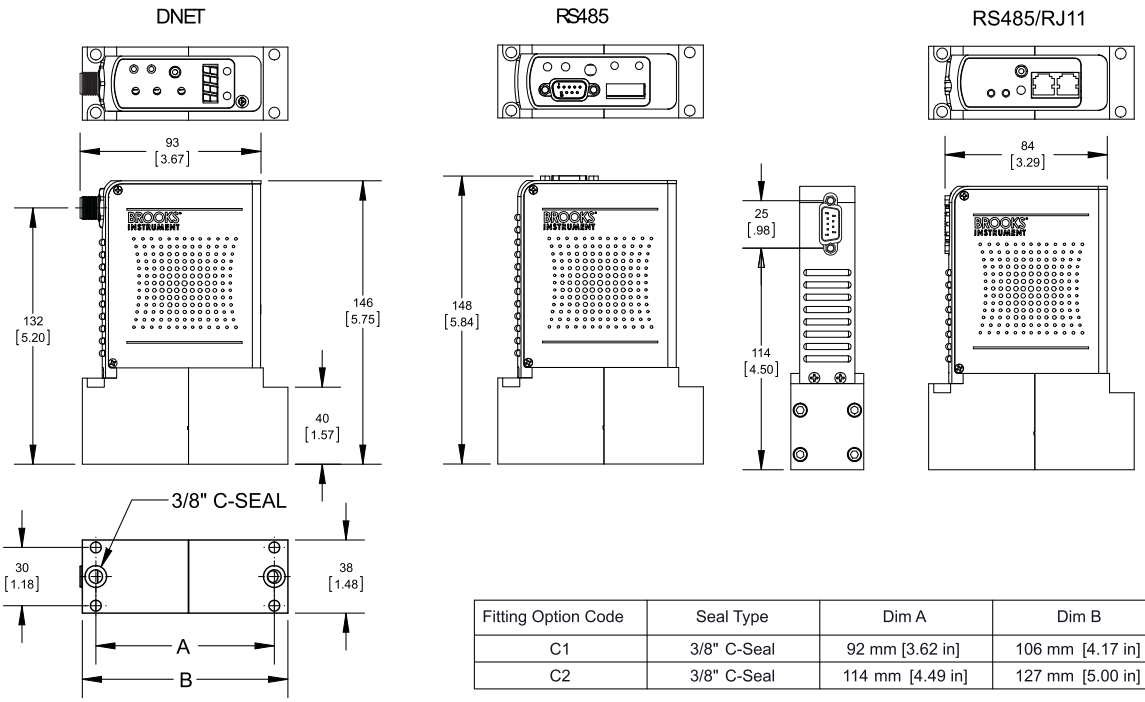


Figure 1-5 Dimensions - GF135 Series, RS485

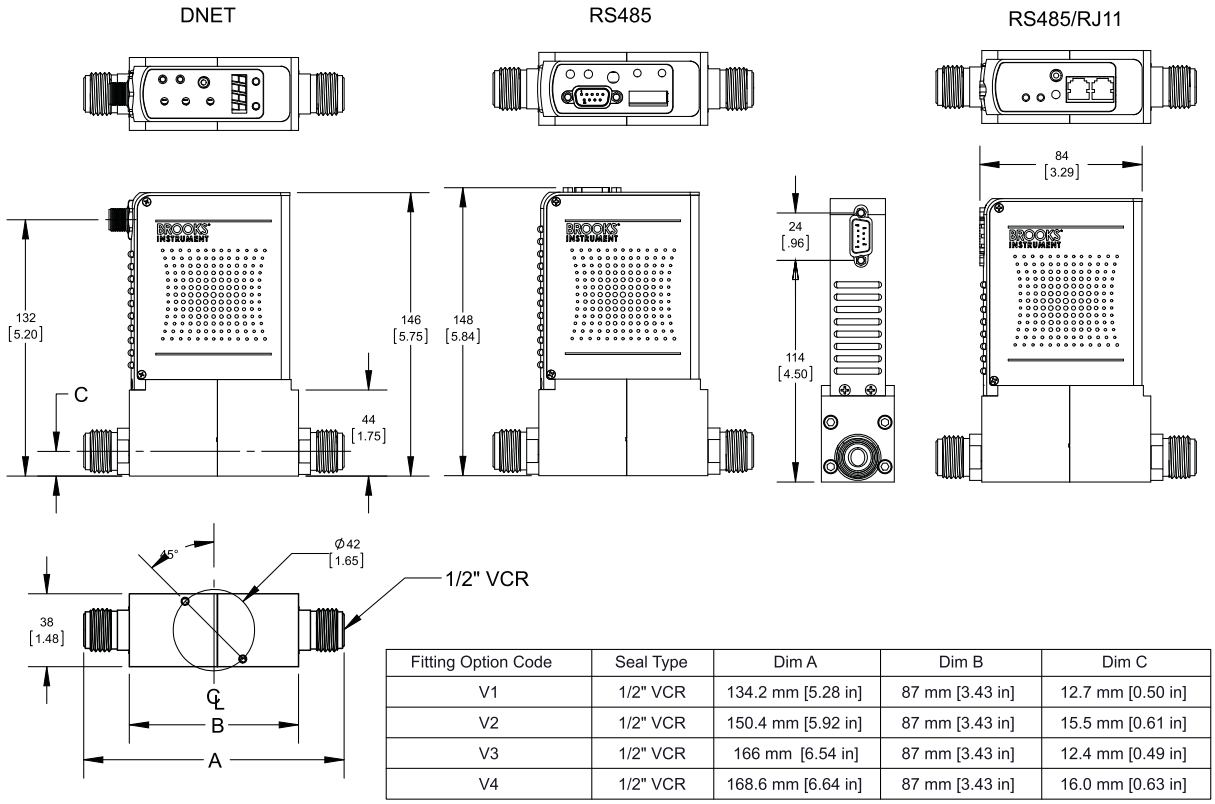
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C-Seal Configurations



Fitting Option Code	Seal Type	Dim A	Dim B
C1	3/8" C-Seal	92 mm [3.62 in]	106 mm [4.17 in]
C2	3/8" C-Seal	114 mm [4.49 in]	127 mm [5.00 in]

VCR Configurations



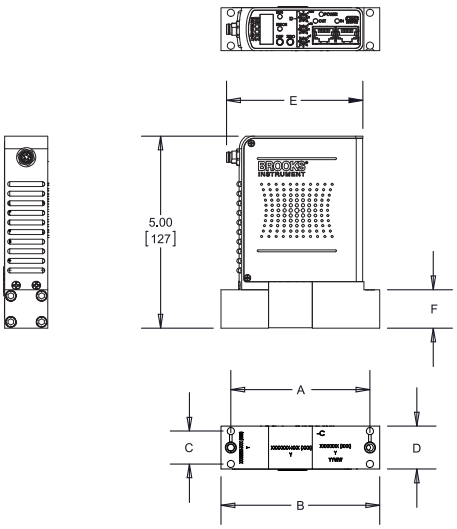
Fitting Option Code	Seal Type	Dim A	Dim B	Dim C
V1	1/2" VCR	134.2 mm [5.28 in]	87 mm [3.43 in]	12.7 mm [0.50 in]
V2	1/2" VCR	150.4 mm [5.92 in]	87 mm [3.43 in]	15.5 mm [0.61 in]
V3	1/2" VCR	166 mm [6.54 in]	87 mm [3.43 in]	12.4 mm [0.49 in]
V4	1/2" VCR	168.6 mm [6.64 in]	87 mm [3.43 in]	16.0 mm [0.63 in]

 Figure 1-6 Dimensions - GF101/GF121/GF126

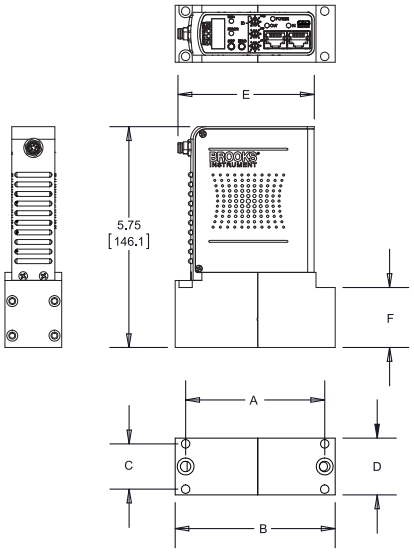
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EtherCAT, Downport Configurations

GF100/120/125



GF101/121/126

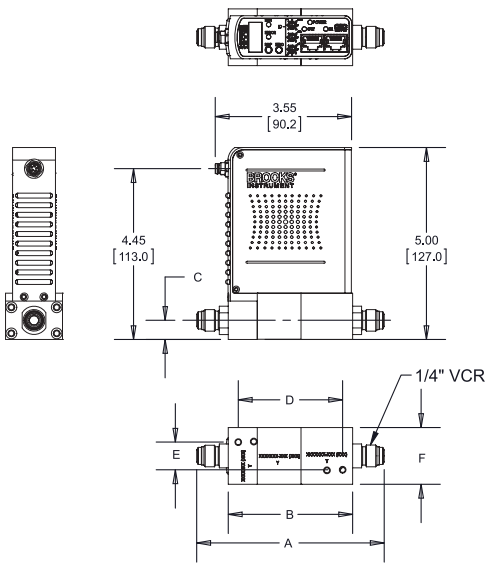


Fitting Option Code	Model	Seal Type	Dim A	Dim b	Dim C	Dim D	Dim E	Dim F
CX	GF100/120/ 125	C-Seal	3.62 [92]	4.13 [105]	0.86 [21.7]	1.12 [28.4]	3.55 [90.2]	1.00 [25.4]
WX	GF100/120/ 125	W-Seal	3.62 [92]	4.13 [105]	0.86 [21.7]	1.12 [28.4]	3.55 [90.2]	1.00 [25.4]
C1	GF101/121/ 126	C-Seal	3.62 [92]	4.17 [106]	1.18 [30]	1.48 [37.6]	3.55 [90.2]	1.57 [39.8]
C2	GF101/121/ 126	C-Seal	4.49 [114]	5.00 [127]	1.18 [30]	1.48 [37.6]	3.55 [90.2]	1.57 [39.8]

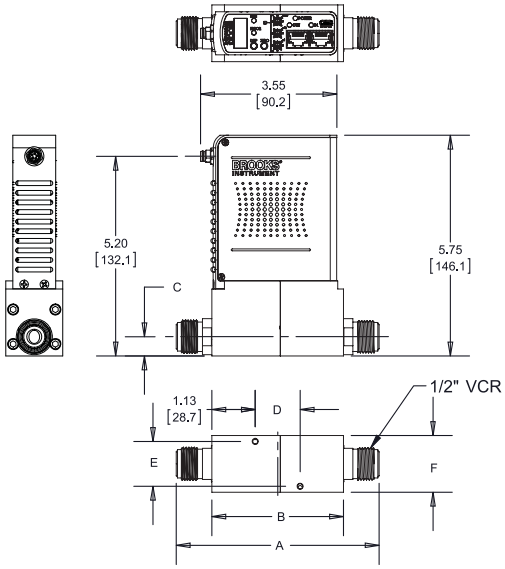
NOTE: [ ] ALTERNATE DIMENSION UNITS ARE FOR REFERENCE ONLY.

EtherCAT, VCR Configurations

GF100/120/125



GF101/121/126



Fitting Option Code	Model	VCR	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F
VS	GF100/120/ 125	1/4"	4.88 [124]	3.24 [82]	0.50 [12.7]	2.72 [69]	0.72 [18]	1.12 [28.4]
VX	GF100/120/ 125	1/4"	4.88 [124]	3.24 [82]	0.50 [12.7]	2.72 [69]	0.72 [18]	1.48 [37.6]
V1	GF101/121/ 126	1/2"	5.28 [134.2]	3.43 [87]	0.50 [12.7]	1.17 [29.7]	1.17 [29.7]	1.48 [37.6]

NOTE: [ ] ALTERNATE DIMENSION UNITS ARE FOR REFERENCE ONLY.

Figure 1-7 Dimensions - GF100/GF120/GF125, GF101/GF121/GF126 Series with EtherCAT Communications

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2-1 General

This section provides installation instructions for the Brooks GF100 Series Thermal Mass Flow Devices. The installation process consists of purging the gas supply line prior to installation, unpacking and inspecting the device, connecting the device to the gas supply line and testing for leaks.

2-2 Receipt of Equipment

When the equipment is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to the nearest Brooks Instrument location listed on the Global Service Network page on our website: BrooksInstrument.com/GlobalSupportCenters
This device has been assembled, calibrated, and double-vacuum bagged in a Class 100 clean room. In your semi-clean area, remove the outer bag only. Pass the device into your clean area. Remove the second clean room compatible bag only when the device is ready to be tested and/or installed in your clean system.

2-3 Recommended Storage Practice

If intermediate or long-term storage of the device is required, it is recommended that it be stored in accordance with the following conditions:
• Within the original shipping container.
• Ambient temperature 21°C (70°F) nominal, 32°C (90°F) maximum, 7°C (45°F) minimum.
• Relative humidity 45% nominal, 60% maximum, 25% minimum.

2-4 Return Shipment

Prior to returning any instrument to the factory for any reason, visit our website for instructions on how to obtain a Return Materials Authorization Number (RMA #) and complete a Decontamination Statement to accompany it: BrooksInstrument.com/Service. All instruments returned to Brooks also require a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. Failure to provide this information will delay processing of the instrument.
Instrument must have been purged in accordance with the following:

⚠ WARNING

Before returning the device, purge thoroughly with a dry inert gas such as Nitrogen before disconnecting process connections. Failure to correctly purge the instrument could result in fire, explosion or death. Corrosion or contamination may occur upon exposure to air.

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2-5 Transit Precautions

To safeguard against damage during transit, transport the device to the installation site in the same container used for transportation from the factory, if circumstances permit.

2-6 Removal from Storage

Upon removal of the device from storage, a visual inspection should be conducted to verify its "as-received" condition. If the device has been subject to storage conditions in excess of those recommended (refer to "2-3 Recommended Storage Practice" on p. 2-1), it should be subjected to a pneumatic pressure test in accordance with applicable vessel codes. To maintain a devices ultraclean integrity, this service should be performed by the factory or one of the certified service centers.

2-7 Gas Connections

Prior to installation, ensure that all piping is clean and free from obstructions. Install piping in such a manner that permits easy access to the device if removal becomes necessary.

2-8 In-Line Filter

It is recommended that an in-line filter be installed upstream from the device to prevent the possibility of any foreign material entering the flow sensor or control valve. The filtering element should be replaced periodically or ultrasonically cleaned.

2-9 Mechanical Installation

⚠ CAUTION

When installing the Mass Flow Controller or Meter, care should be taken that no foreign materials enter the inlet or outlet of the instrument. Do not remove the protective end caps until the time of installation.

The recommended installation procedure guidelines are as follows:

- The device should be located in a clean, dry atmosphere relatively free from shock and vibration.
- Leave sufficient room for access to the user interface, display and MAC ID and baud rate switches (if equipped) at the top of the device.
- Install the device in such a manner that permits easy purge and removal if the device requires servicing.

⚠ CAUTION

When used with a reactive (sometimes toxic) gas, contamination or corrosion may occur as a result of plumbing leaks or improper purging. Plumbing should be checked carefully for leaks and the instrument purged with clean, dry N_2 before use.

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The GF100 Series is equipped with PTI technology, which reduces the effect of pressure fluctuations on gas flow. In PTI technology, a signal from an integrated pressure transducer is combined with the standard thermal sensor output. The combined signals allow precise and stable flow, even when the line pressure is fluctuating.

The GF100 Series also utilizes MultiFlo® technology that allows the user to configure standard configurations ("SHs") or "blanks" for a variety of pure gases and mixtures. As a result, MultiFlo® technology enables the user to reduce unique inventory requirements.

2-10 Flow Controller Installation Arrangement

Typical gas supply arrangements are shown in Figures 2-1 and 2-2. GF100's are often arranged inside a gas panel. Configure standard configurations ("SHs") or "blanks" for a variety of pure gases and mixtures. As a result, MultiFlo technology enables the user to reduce unique inventory requirements.

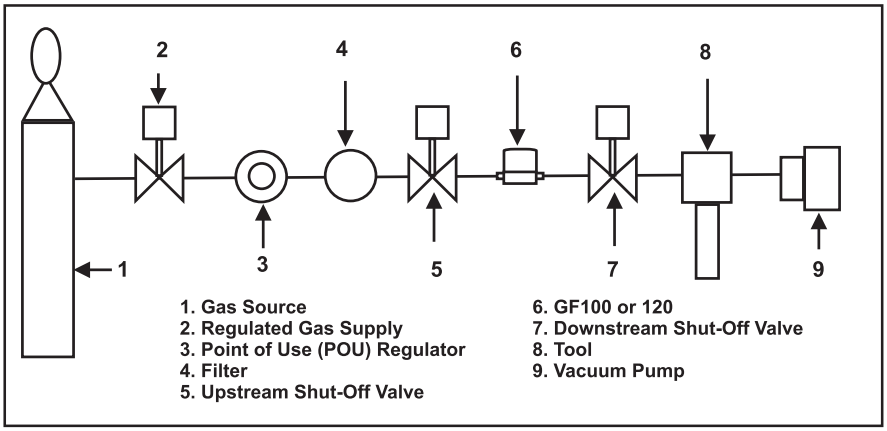


Figure 2-1 Typical Gas Supply Arrangement with non-PTI MFC

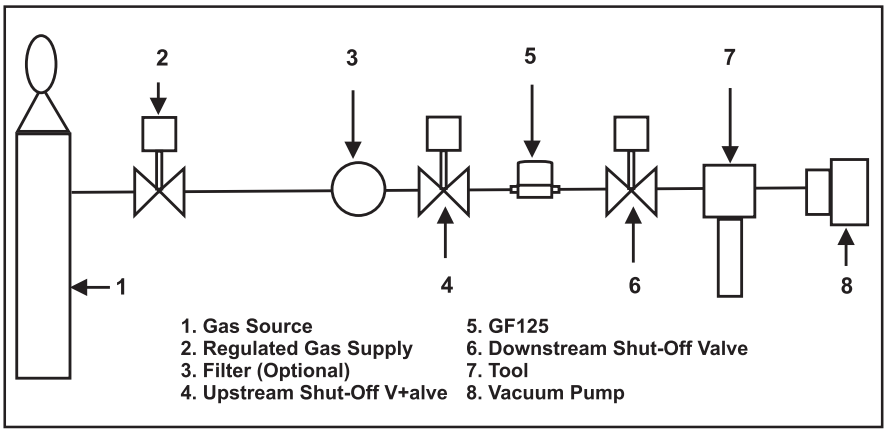


Figure 2-2 Typical Gas Supply Arrangement with PTI MFC

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2-11 Purge the Gas Supply Line Before GF100 Series Installation

⚠ CAUTION

For additional safety, it is recommended to close the two valves between the charged gas line and the GF100 Series to be installed. See Figures 2-1 and 2-2 for more details.

⚠ NOTICE

It is recommended to archive service and calibration documentation for the GF100 Series in order to determine the contamination state of each gas line and to assist service personnel.

⚠ CAUTION

DO NOT remove the shipping caps covering the inlet/outlet for VCR fittings, or DO NOT remove the blue tape on the bottom of the device for downported fittings before the GF100 Series is actually being installed. Failure to comply will introduce contaminants into the GF100 Series.

Before operating the GF100 Series, the gas supply line must be completely purged with nitrogen or argon to ensure the line is free from toxic or flammable gases, contaminants, moisture, and oxygen. The purge gas must be free of moisture and oxygen to less than 100 ppb. Purge the gas lines as follows or in accordance to prescribed company and safety procedures.

1. Shut off the process gas supply valve(s) upstream of the GF100 Series. If such a valve is not available, shut the valve on the gas panel. Tag the valve at this point to prevent accidental re-exposure of the process gas to the gas line.
2. Cycle purge the gas line with dry nitrogen or argon to fully flush out the process gas. Cycle purging consists of evacuating to a low pressure adequate to induce out-gassing and then purging to remove adhered moisture and oxygen. If a toxic or reactive gas is present and a clogged GF100 Series is suspected, then proceed with caution. Pump down and purge the GF100 Series from both downstream and upstream lines. If check valves are present in the gas line, both pumping down and purging are required. Pumping down without purging is inadequate. If a good vacuum source is not available, the GF100 Series can be de-contaminated by purge only.
3. Repeat the purge cycle several times within 2-4 hours to complete the cleaning. For toxic and corrosive gasses, it is recommended to use 100-120 cycles.

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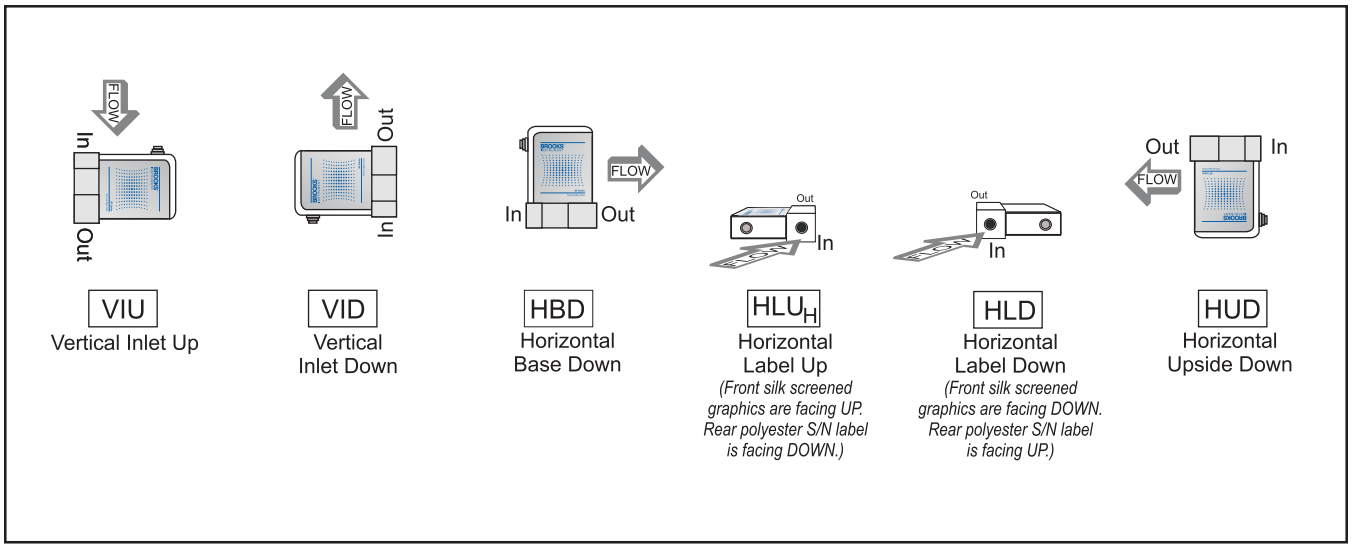


Figure 2-3 GF100 Series Mounting Attitude Positions

2-12 Position and Mount the GF100 Series

Position the GF100 Series so that the gas flow is pointed in the direction of the flow arrow on the GF100 Series rear S/N label. The various mounting positions are described in Figure 2-3

The standard orientation for the GF100 Series is Horizontal Base Down (HBD).

The GF125 & GF135 employ a proprietary algorithm that utilizes the internal pressure sensor to compensate for potential orientation effects when the MFC is used with certain higher density gases. Non HBD mounting orientations can be selected by using the MultiFlo software.

In the case of the GF100/120 Series, which does not have an internal pressure sensor, it is recommended that the MFC is re-zeroed with process gas following the recommended Brooks procedure (see zeroing bulletin FSB-001-0015 for futher information).

If your GF100 Series is configured with downported fittings, follow Steps 1 though 4 below. If your GF100 Series has VCR fittings, proceed to Step 5.

1. Refer to Figure 2-4. If downported fittings (1) are used, the GF100 Series is mounted to K1 Series substrate blocks (2) with four screws (3). Metal C-seals or W-seals (4) (as provided by integrator) are inserted between the GF100 Series and substrate blocks before the screws are installed. These metal seals must be replaced after each installation.
2. Select the mounting screws noted in Table 2-1 below for downported devices. M4 screws are used on 1.125" devices, K1S. M5 screws are used on 1.5" devices, K1R2 and K1H.
3. Refer to Figure 2-4. Insert the two mounting seals (4) over the gas flow path of the K1 block. Carefully align the GF100 Series mounting holes onto the K1 substrate blocks. Using your fingers, install the screws through the GF100 Series fitting and hand tighten.

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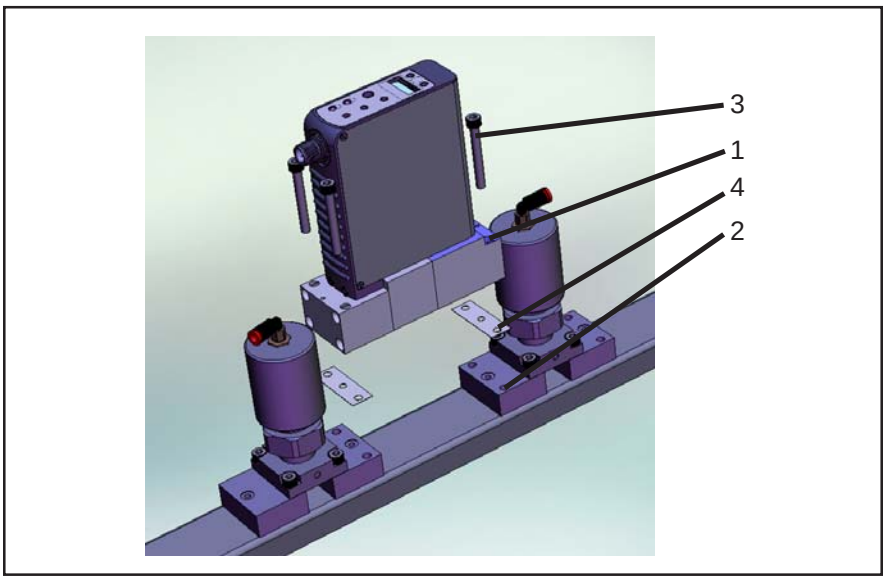


Figure 2-4 GF100 Series Mounted to K1 Series Substrate Blocks

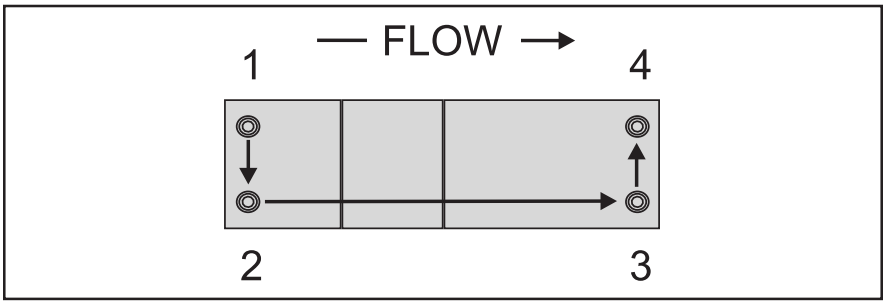


Figure 2-5 Mounting Screws Torque Pattern

Table 2-1 K1 Series Fasteners

Connection	Fastener Size		
	K1S	K1R2	K1H
GF 100 Series to Subtstrate	M4 x 34mm or M4 x 35mm	M5 x 30mm	M5 x 37mm

Table 2-2 K1 Substrate Torque Data

Connection	Torque Pattern	Torque (Inch-Pounds)		
		K1S	K1R2	K1H
GF125 to Subtstrate	Use a square pattern as shown in Figure 2-5. Start at 25 inch-pounds and increase in increments of 10 inch-pounds until proper value is obtained.	45	45	45

4. Using a torque wrench and a metric hex key, tighten the screws to the torque value as described in Table 2-2 and Torque Pattern Figure 2-5.
5. If your GF100 Series is configured with ¼" VCR fittings, secure the GF100 Series block to the gas panel with two, 8-32-UNC-2B" screws. Then connect the inlet/ outlet fittings to the gas supply line using two wrenches. Tighten the fittings to manufacturer recommendations.

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2-13 Perform a Leak Test

⚠WARNING

Before operating the flow controller, ensure all gas connections have been properly tightened and, where applicable, all electrical connections have been properly terminated.

It is critical to leak test the gas supply lines and GF100 Series connections before turning on the process gas supply after any new installation. Check for leaks using a helium leak detector or any other appropriate leak test method. Follow leak test specifications as defined by integrator.

2-14 Zeroing Setup Process

The following steps are required before the GF100 Series is zeroed.

1. Make sure that the GF100 Series has been installed inside the equipment (panel) for at least four hours and powered up at least one hour prior to zeroing. This insures that the GF100 Series is in its "use attitude" and is operating at normal temperature. If the GF100 Series is subjected to a vacuum purge for more than one minute, turn off the GF100 Series (ie., provide a zero setpoint) for a time period of twice the vacuum purge time.
2. Refer to Figure 2-1. Open the upstream shut-off valve (5) and close the downstream shut-off valve (7). This eliminates a pressure drop across the GF100 Series and subsequent leakage from the PID control valve inside the GF100 Series.
3. Provide a 100% setpoint to the GF100 Series for no longer than 60 seconds. This equalizes the pressure across the PID control valve.
4. Refer to Figure 2-1. Close the upstream shut-off valve (5) to prevent any pressure effects from the regulator (3).
5. Close the GF100 Series and wait two minutes.
6. Read the output signal of the GF100 Series. This output signal is the initial flow in percent of full scale. The output signal should be 0.0 (± 0.1%). If the output signal is too high, re-zero the GF100 Series as described in Section 2-15.

2-15 Zeroing the GF100 Series

Many high density gases exhibit slight changes in zero output as a function of inlet pressure. Gases such as tungsten hexafluoride and many fluorocarbons are especially sensitive to this problem. Since inlet pressure is a potential source for zero errors, the pressure transducer on each GF100 Series should be correctly set to zero after installation. The zeroing process is performed from the backlight LCD display on top of the GF100 Series.

OEM tools using a microprocessor or computer for operating the GF100 Series should sequence the GF100 Series off between processes. To accomplish this, simply provide a zero set point. The GF100 Series will shut off automatically.

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NOTICE

Make sure you perform the zeroing set-up process outlined in Section 2-14 before zeroing the GF100 Series.

Shut-off valves, whether upstream or downstream from the GF100 Series, should be programmed to turn on before the GF100 Series is turned on and turned off after the GF100 Series is turned off.

2-15-1 Zeroing the GF100 Series Pressure Transducer from the LCD Display Panel

1. Place the GF100 Series under a strong vacuum with the GF100 Series set to 100% set point. Make sure that upstream valve is closed and the downstream valve is open. Allow time for the upstream pressure to bleed off.
2. Looking at the top of the GF100 Series, press the "Display" button, starting at the MACID, four times to "PSI" or five times to "kPa" or until the LCD displays the labels "PSI" or "kPa". The GF100 Series will display pressure in units of PSIA or kPa. Press and hold down the Zero button a minimum of 5 seconds or until the display reads 0.000, with the last two digits flickering at different values. The pressure transducer zeroing procedure can be done while the display is either in PSIA or kPA output. Refer to Figure 2-6.

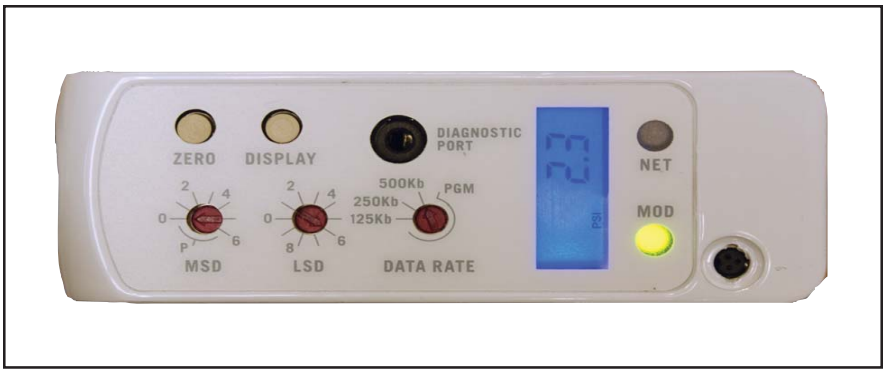


Figure 2-6 Display with PSI Reading

After completion of the pressure transducer zeroing, the LCD display will read 0.0 with the last two digits flickering as shown in Figure 2-7.



Figure 2-7 Display Reading Zero PSI

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2-15-2 Zeroing GF100 Series Flow from LCD Display Panel

1. Place the GF100 Series under normal inlet operating pressure. Close the down stream valve to prevent any flow.
2. Looking at the top of the GF100 Series, press the "Display" button until the LCD display label is "%FS" as shown in Figure 2-8. Three button depressions from the MACID label display.

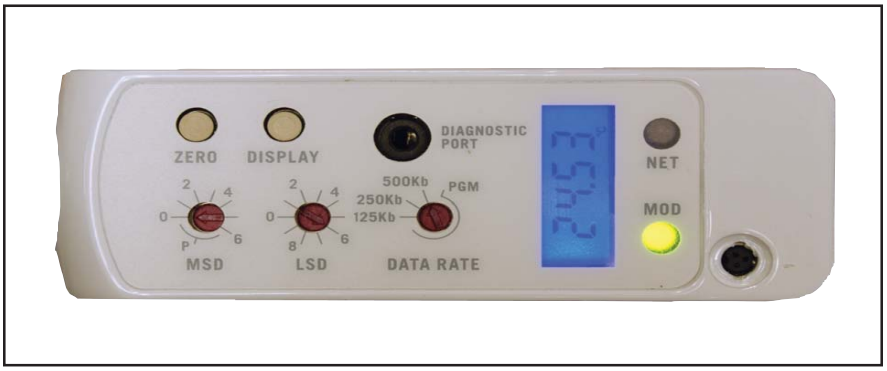


Figure 2-8 Display Set to %FS

3. Press and hold down the Zero button for a minimum of 5 seconds or until the "%FS" display reads 0.0 as shown in Figure 2-9. The %FS label will flash during this procedure.

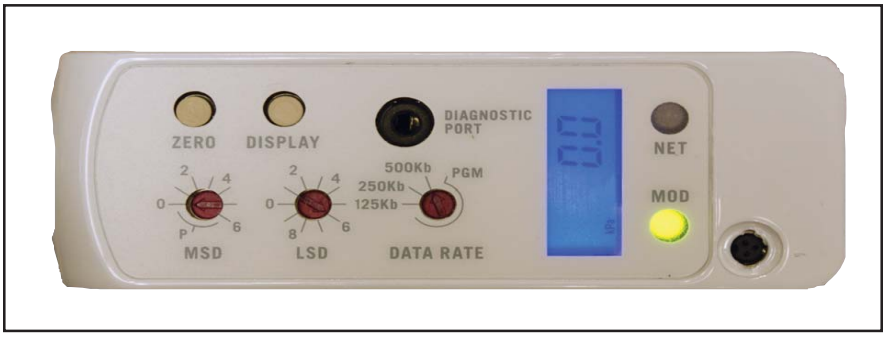


Figure 2-9 % Flow Display Set to Zero

2-16 Performance Checks

This section describes how to zero and sequence the GF100 Series devices for proper operation.

⚠ NOTICE

If the GF100 Series has been in the purge mode for a long period of time, wait until the GF100 Series has cooled down before zeroing. The cool down period should be ~30 minutes for purges up to five minutes and at least 60 minutes after purging overnight.

- The GF100 Series must be warmed up for at least 30 minutes.
- The active gas page must be correct.
- The GF100 Series pressure transducer must be correctly zeroed.
- The GF100 Series flow must be correctly zeroed.

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2-17 Introduction to the MultiFlo™ Configurator

The MutliFlo Configurator application is used to configure the gas and range of the GF Series devices. The following section describes the MultiFlo Configurator and its uses.

2-18 Using the MultiFlo Configurator

The MultiFlo Configurator application allows communication to GF Series devices through personal computer with serial COM Port and a Windows 10, Windows 7 or Windows XP operating system. It's primary function is to configure gas and flow ranges within six defined standard configurations. Flow ranges are configured to the Nitrogen equivalent.

Using the MultiFlo Configurator software, configure the gas and flow rate according to Table 2-3.

Table 2-3 Gas and Flow Ranges - MultiFlo Configurable - N2 Equivalent

Standard MG-MR Bin Configurations	Flow range Code	Gas Flow Range (N2 Equivalent)
SH40	010C	3-10 sccm
SH41	030C	11-30 sccm
SH42	092C	31-92 sccm
SH43	280C	93-280 sccm
SH44	860C	281-860 sccm
SH45	2.6L	861-2600 sccm
SH46	7.2L	2601-7200 sccm
SH47	015L	7201-15000 sccm
SH48	030L	15001-30000 sccm
SH49	040L	30001-40000 sccm
SH50	055L	40001-55000 sccm

The MultiFlo Configurator interfaces to the GF Series device through RS485 or DeviceNet communications. There are various ways to connect the device regardless of device configuration. Devices may be connected through the diagnostic port using cables in one of the two Basic MultiFlo Configurator Kits or DeviceNet devices can alternatively be connected using a National Instruments or SST DeviceNet scanner card.

778Z010ZZZ Basic MultiFlo Configurator Kit
A331710003 Cable Assembly 2.5mm
214F027AAA USB-RS485 Converter with DB-9 female

778Z011ZZZ Basic MultiFlo Configurator Kit
w/Power Supply and Adapter Cables
A331710003 Cable Assembly 2.5mm
214F027AAA USB-RS485 Converter with DB-9 female
A332295001 Power Supply MFC
A332297002 Cable, Power, 9-Pin
A332297001 Cable, Power, DeviceNet

Connect the MultiFlo Cable Adapter 2.5mm jack to the Diagnostic Port on the top of the device. See Figure 2-12.

Connect the RS485 end of the converter to the 9-Pin RS485 end of the MultiFlo Cable Adapter.

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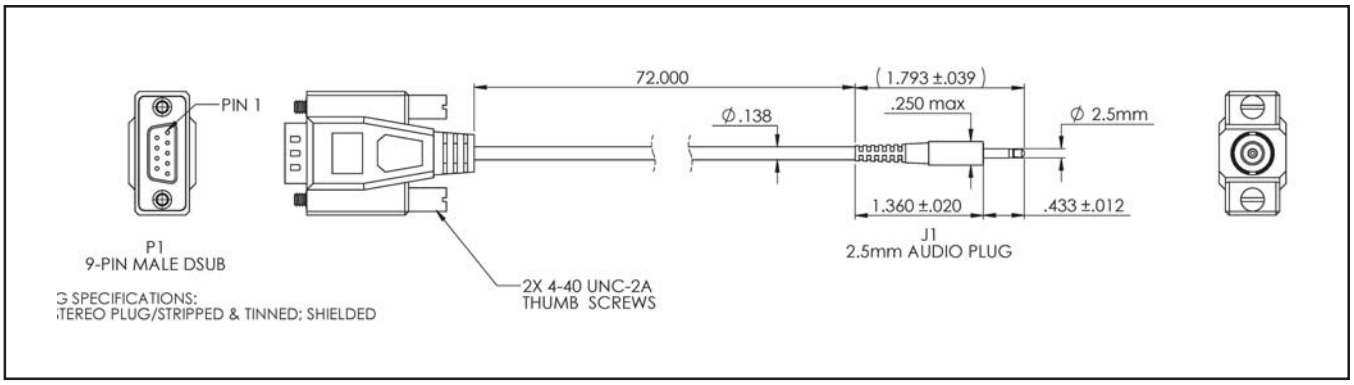


Figure 2-10 MultiFlo Cable Adapter



Figure 2-11 USB-RS485 Converter (214F027AAA)

Connect the USB end of the converter to a laptop or PC.
For GF1xx devices with EtherCAT communication, the diagnostic port must be used to interface with the MultiFlo Configurator.

- Ensure the M8 power connector is attached and the device is powered on
- Only after the device is powered on, attach a micro-USB cable to the diagnostic port of the device and the USB end to a laptop or PC
- Once use of the diagnostic port is complete, remove the micro-USB cable before removing power from the device. See Figure 2-12 below

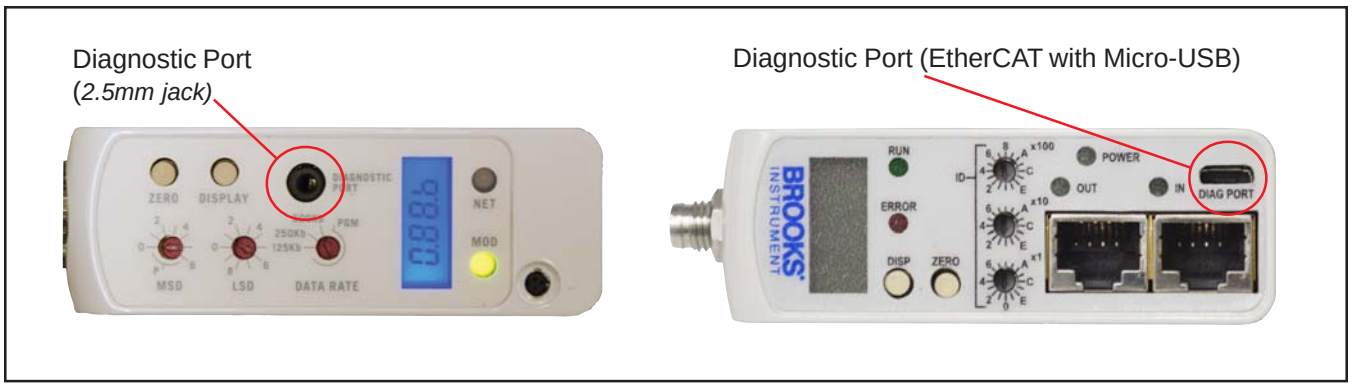


Figure 2-12 Diagnostic Port Locations

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The latest MutliFlo Configurator Software and Databases and MultiFlo Configurator Quick Start Guide are available on the Brooks Instrument website at: www.BrooksInstrument.com/MultiFlo. Please reference the MultiFlo Configurator Quick Start Guide for installation and operation details. Download the MultiFlo Configurator software into your computer from the Brooks Instrument website www.BrooksInstrument.com/MultiFlo. Install the MultiFlo Configurator as described in the MultiFlo Configurator Quick Start Guide and use the guide as a reference for operation details.

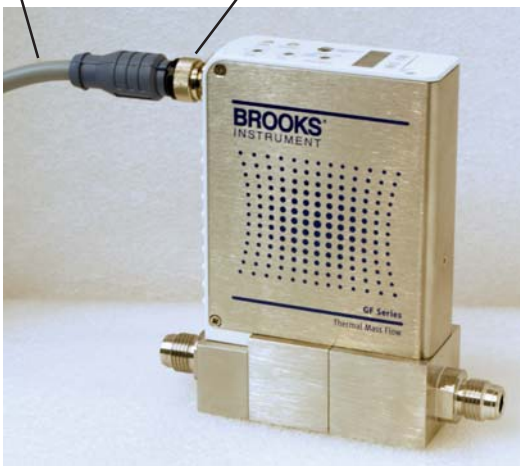
⚠ CAUTION

DO NOT make any connections to unlabeled connector pins. Any failure to comply could damage the GF100 Series and/or the mating electrical device. Before connecting the cable, make sure that all pin connections of the mating cable have the same pin out connections. When installing and removing cables to and from your computer, make sure the power is turned off on your computer. This will prevent damage to your computer and associated equipment.

2-19 Electrical Connections

2-19-1 DeviceNet Connections

DeviceNet is a 5 wire local network connection that employs a command response communication protocol for communicating between a master and slave. Obtain a DeviceNet communication cable (Micro M-12) and fasten it to the 5-pin connector as shown in Figure 2-13.



Pin	Connection
1	Drain
2	V+ (11-25 Vdc)
3	V--
4	CAN-H
5	CAN-L

⚠ CAUTION

DO NOT apply more than 10 Inch-Pounds of torque to the cable coupling when connecting the cable to the device or damage may result to the connector.

Figure 2-13 GF100 Series DeviceNet Connection

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2-19-2 Analog/RS485 Connections

The GF100 Series devices are available with Analog 9-Pin D-Connectors shown in Figure 2-14.

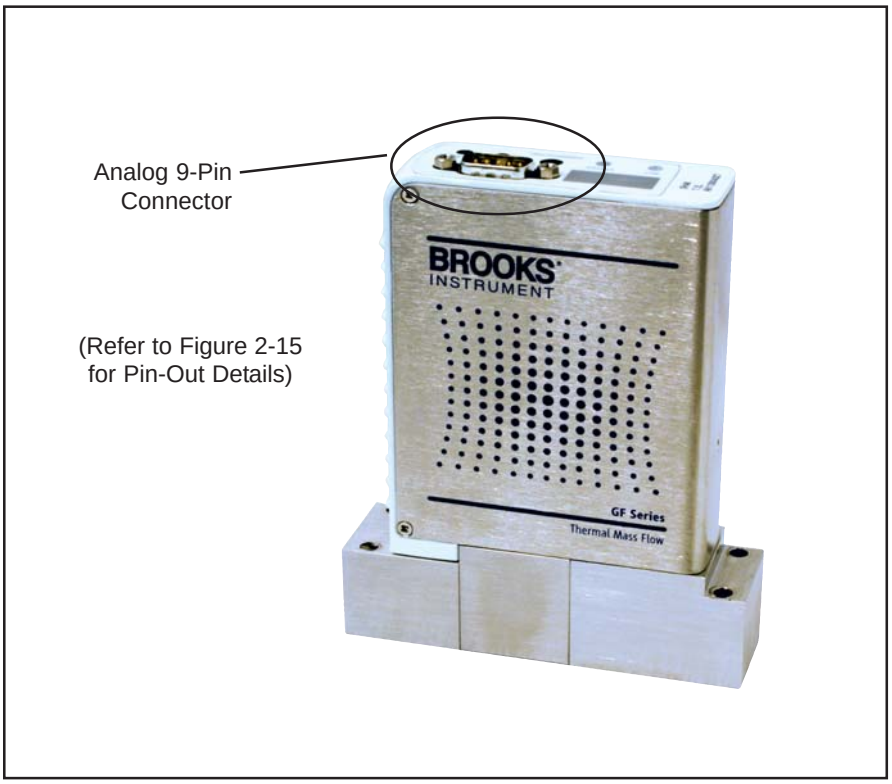
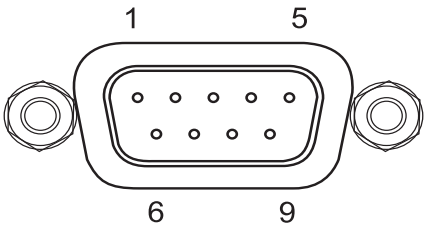


Figure 2-14 GF100 Series with 9-Pin Analog Connector



PIN	Connection
1	Valve Control
2	Output (0-5 Vdc)
3	+15 Vdc
4	Power Common
5	-15 Vdc
6	Setpoint (0-5 Vdc)
7	Signal Common
8	RS485 DX+
9	RS485 DX-

Figure 2-15 Analog 9-Pin Connector (M)

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2-19-3 EtherCAT Connections

Power needs to be supplied via the standard male M8 5-pin connector. The M8 connector is located on the upper inlet side of the device. Refer to Figures 2-16 and 2-17 below.

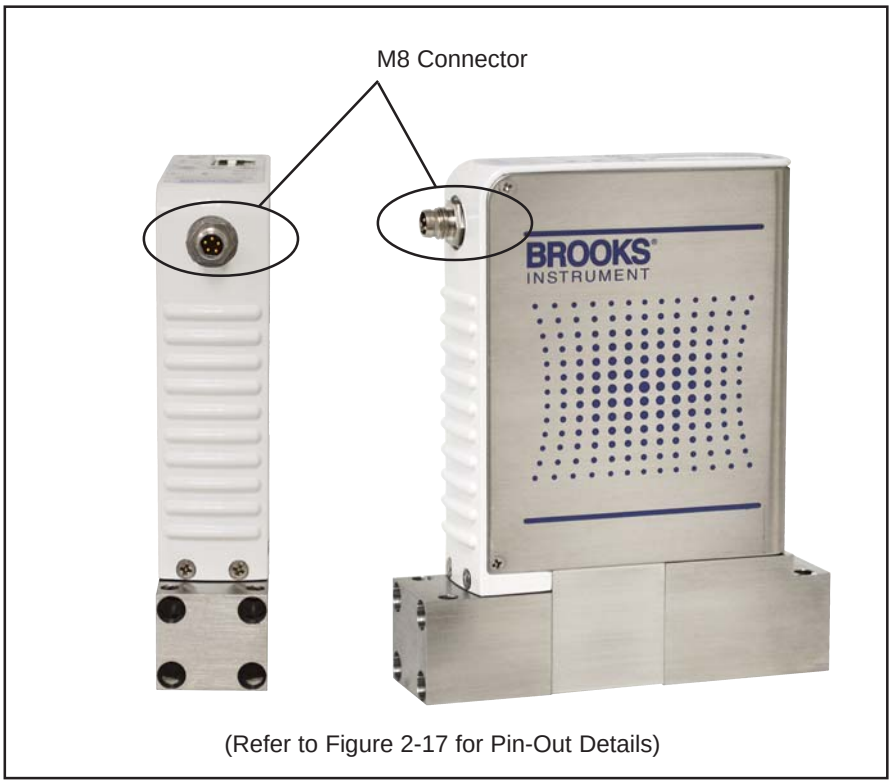
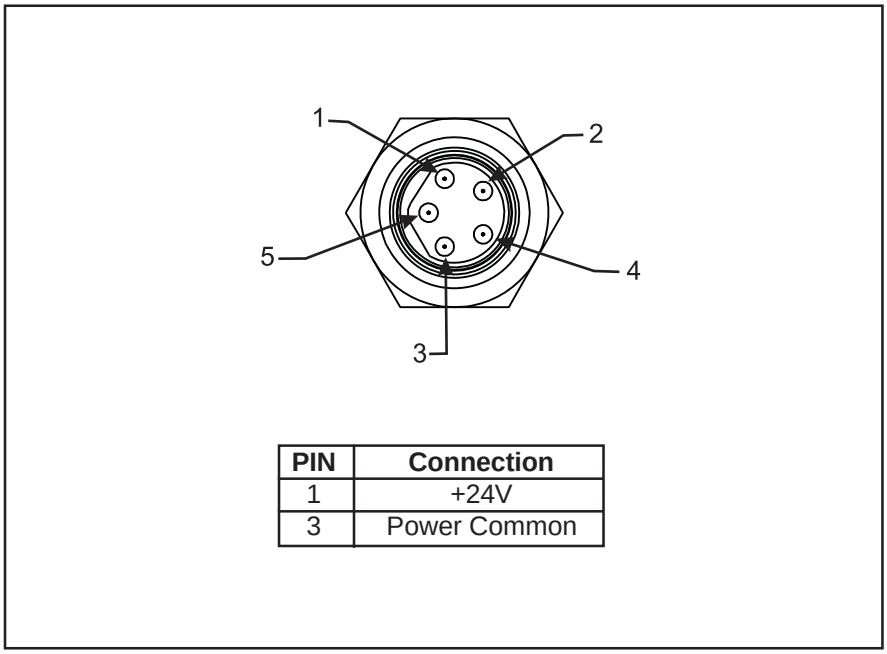


Figure 2-16 GF100 with EtherCAT Communications, M8 Power Connector Location.



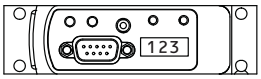
PIN	Connection
1	+24V
3	Power Common

Figure 2-17 M8 Power Connector Drawing

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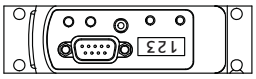
Base I/O Options

PDC Ordering Code G1
Description: Industry standard Analog / RS485 interface



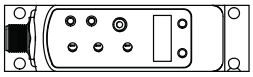
Pin No.	Signals	
1	Valve Control	
2	Output (0-5 Vdc)	
3	+15 Vdc	+24 Vdc
4	Pwr Com	NC
5	-15 Vdc	Pwr Com
6	Setpoint (0-5 Vdc)	
7	Signal Common	
8	RS-485 (DX+)	
9	RS-485 (DX-)	

PDC Ordering Code GX
Description: OEM specific Analog / RS485 interface. Display and top plate re-oriented 180°



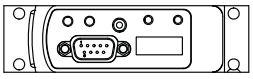
Pin No.	Signals	
1	Valve Control	
2	Output (0-5 Vdc)	
3	+15 Vdc	+24 Vdc
4	Pwr Com	NC
5	-15 Vdc	Pwr Com
6	Setpoint (0-5 Vdc)	
7	Signal Common	
8	RS-485 (DX+)	
9	RS-485 (DX-)	

PDC Ordering Code DX
Description: Industry standard ODVA compliant DeviceNet interface



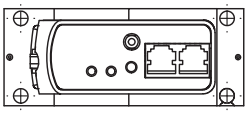
M12 Pin No.	Signals
1	Drain
2	V+ (11-25 Vdc)
3	V-
4	CAN-H
5	CAN-L

PDC Ordering Code TX
Description: Industry standard Analog only interface



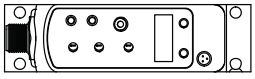
Pin No.	Signals	
1	Valve Control	
2	Output (0-5 Vdc)	
3	+15 Vdc	+24 Vdc
4	Pwr Com	NC
5	-15 Vdc	Pwr Com
6	Setpoint (0-5 Vdc)	
7	Signal Common	
8	No Connection	
9	No Connection	

PDC Ordering Code SX
Description: Industry standard Analog 9-Pin Sub D connector and dual RJ11 RS485 ports



D-Sub Pin No.	Signals	
1	Valve Control	
2	Output (0-5 Vdc)	
3	+15 Vdc	+24 Vdc
4	Pwr Com	NC
5	-15 Vdc	Pwr Com
6	Setpoint (0-5 Vdc)	
7	Signal Common	
8	Signal Common	
9	Valve Test Point	
RJ11 J2 Pin No.	**Signals**	
3	RS-485 (DX-)	
4	RS-485 (DX+)	

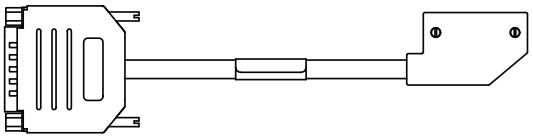
PDC Ordering Code BB
Description: Industry standard ODVA compliant DeviceNet interface, Plus a separate Analog 0-5 Vdc Connector



M12 Pin No.	Signals
1	Drain
2	V+ (11-25 Vdc)
3	V-
4	CAN-H
5	CAN-L
HIROSE Pin No.	**Signals**
1	Flow Out
2	AGND
3	GPIO_CAP0
4	GHD_Earth

All Base I/O options include:
Diagnostic port communication RS485 via 2.5mm jack

I/O Options Using Base Model and Adapter Cable



A range of low profile adapter cables have been developed to support replacing older generation MFC's with different pinout configurations. The base MFC will be either a G1, TX or SX configuration, depending on the product being replaced.

PDC Ordering Code UX
Description: SX base I/O with 7003550 adapter for compatibility with Unit UDU15

Pin No	Signals	
9	VALVE OFF	
6	OUTPUT (0-5 VDC)	
4	+15 VDC	+24 VDC
7	PWR COM	NC
11	-15 VDC	PWR COM
15	SETPOINT (0-5 VDC)	
1,13,14	SIGNAL COMMON	
2	ZERO ALARM	
12	VALVE TEST POINT	
8	CASE GROUND	
3,5,10	NO CONNECTION	

PDC Ordering Code: T1
Description: TX base I/O with 7003551 adapter for compatibility with IFlow DB15 & TN 15 pin

Pin No	Signals	
15	VALVE OFF	
2	OUTPUT (0-5 Vdc)	
5	+15 VDC	+24 VDC
1	PWR COM	NC
6	-15 VDC	PWR COM
8	SETPOINT (0-5 VDC)	
9	COMMON	
10	COMMON	
14	CASE GROUND	
3,4,7	NO CONNECTION	
11,12,13	NO CONNECTION	

PDC Ordering Code: FX / JX
Description: SX base I/O with 7003069 (FX)/7001814 (JX) adapter for compatibility with Unit UDF9/UDJ9

Pin No	Signals	
1	VALVE CONTROL*	
2	OUTPUT (0-5 VDC)	
3	+15 VDC	+24 VDC
4	PWR COM	NC
5	-15 VDC	PWR COM
6	SETPOINT (0-5 VDC)	
7	SIGNAL COMMON	
8	SIGNAL COMMON	
9	VALVE TEST POINT	

PDC Ordering Code: EX
Description: GX base I/O with 7003083 adapter for compatibility with Unit "E", IN "L", "R"

Pin No	Signals	
J	VALVE OFF	
3	OUTPUT (0-5 VDC)	
4	+15 VDC	+24 VDC
2	PWR COM	NC
F	-15 VDC	PWR COM
A	SETPOINT (0-5 VDC)	
B,C,10	SIGNAL COMMON	
1	CASE GROUND	
5, 6, 8, 9	NOT CONNECTED	
I, D, E, H	NOT CONNECTED	
7,G	KEY WAY	
RJ11 J2 Pin No	**RJ11 J3 Pin No**	
3	3	RS-485 (DX-)
4	4	RS-485 (DX+)

PDC Ordering Code: KX
Description: G1 base I/O with 7003298 adapter for compatibility with Unit UDK15

Pin No	Signals	
3	VALVE CONTROL	
2	OUTPUT (0-5 VDC)	
7	+15 VDC	+24 VDC
5	PWR COM	NC
6	-15 VDC	PWR COM
8	SETPOINT (0-5 VDC)	
11,12	SIGNAL COMMON	
15	CASE GROUND	
1, 4, 9, 10, 13, 14	NO CONNECTION	

PDC Ordering Code: BX
Description: G1 base I/O with 7003590 adapter for compatibility with Brooks 15-Pin D

Pin No	Signals	
12	VALVE OVERRIDE	
2	OUTPUT (0-5 VDC)	
5	+15 VDC	+24 VDC
9	PWR COM	NC
6	-15 VDC	PWR COM
8	SETPOINT (0-5 VDC)	
1,10	SIGNAL COMMON	
3,4,7,11	NO CONNECTION	
13,14,15	NO CONNECTION	

Other adapter options are available for the GF Series. Please contact Brooks Customer Service for more information.

Figure 2-18 GF100 Series Electrical Interface Options

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2-20 GF135 Inlet Valve Installation

When installing the GF135 –

1. Connect the MFC tubing labeled "IN" to a CDA or N2 supply of 90 ±3 psi.

2. Next, the MFC tubing labeled "OUT" should be connected to the customer upstream pneumatic isolation valve.

Note – The air passes through a failsafe normally open valve inside the GF135 and is connected back to the inlet isolation valve. For safe operation and in line with S2 compliance, the GF135 cannot override and open the inlet isolation valve.

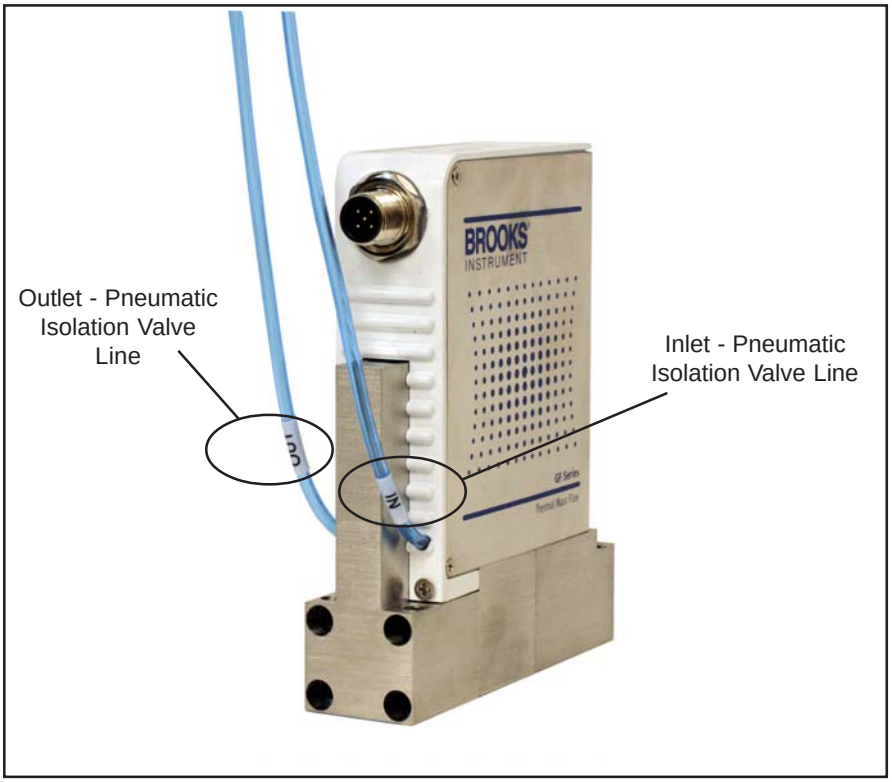


Figure 2-19 GF135 Series Showing Inlet/Outlet Pneumatic Isolation Valve Lines

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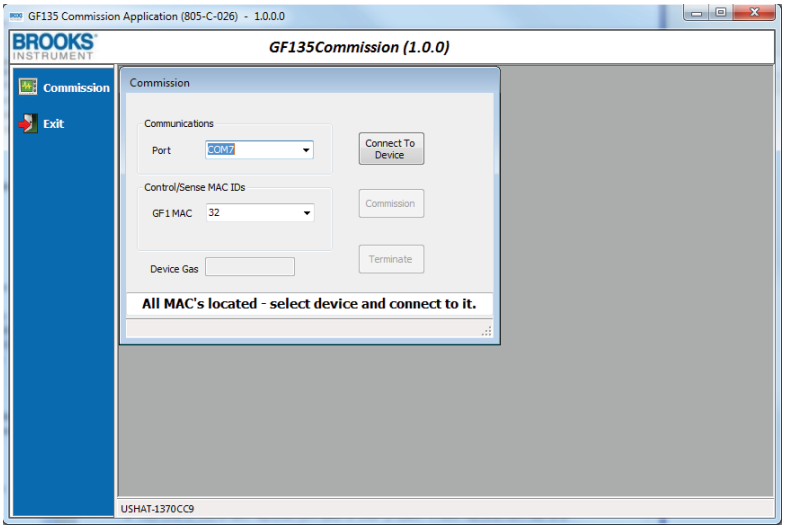
2-21 GF135 Commissioning

Download the GF135 commissioning software, part number 805-C-026, from the Brooks Instrument website. The software will need to be downloaded onto a computer with a Windows® based operating system.

Necessary equipment:

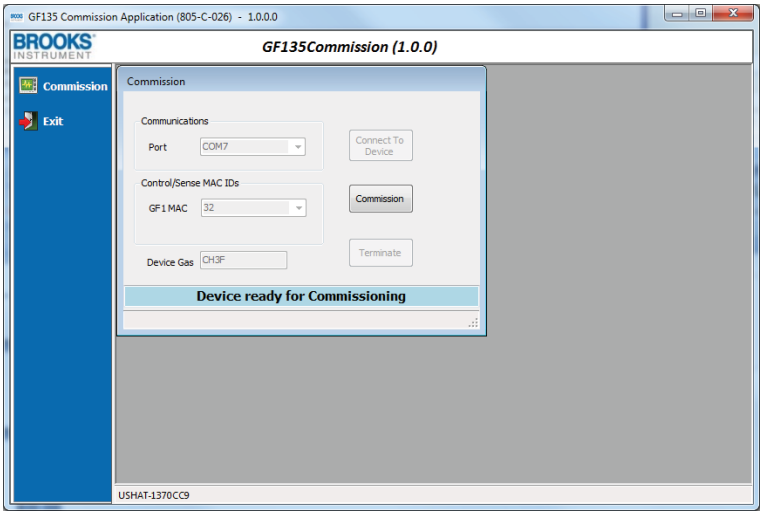
- Computer that runs a Windows operating system
- Power (either DeviceNet or RS485) to the device or M8 EtherCAT power
- Need gas supply for pneumatic valve (90 ±3 psi)
- BB 485 to 232 converter or approved USB to 485 converter
- 9-pin to diagnostic cable

In order to ensure best results, commission the GF135 at operating temperature and pressure on tool.

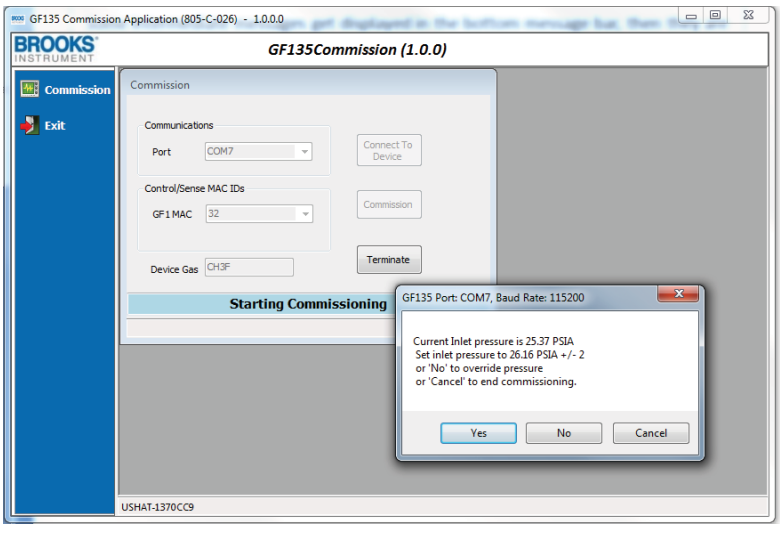


1. Start up the GF135 Commission Application and select a port. This will bring up all of the devices on this port.

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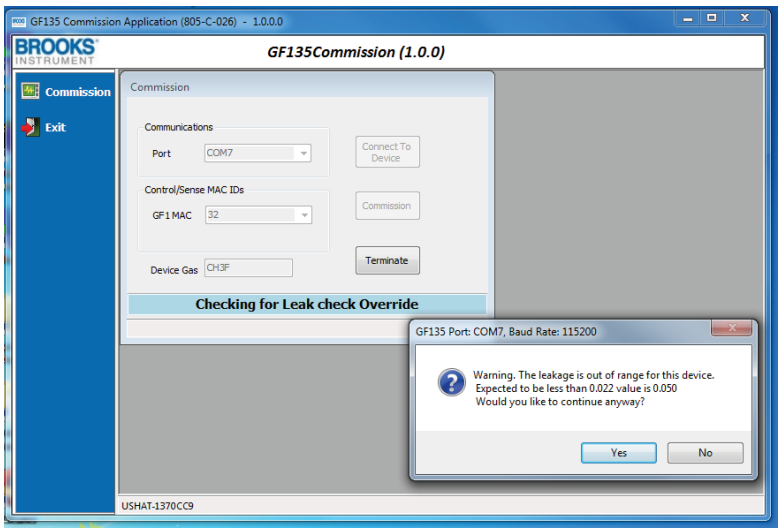


2. Select the single device that you want to perform the commissioning and click on "Connect to Device". The Commissioning button becomes enabled.

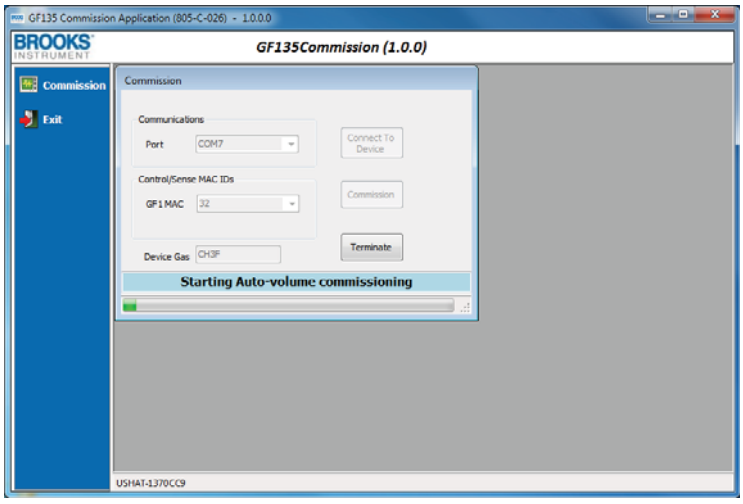


3. Click on the "Commission" button to begin the process. Some intermediate messages will appear on the bottom mesage bar. You will then be presented the option to override the current inlet gas pressure. Selecting "Yes" will keep the current inlet pressure. Selecting "No" will allow the user to override the pressure. Selecting "Cancel" will end the commissioning process.

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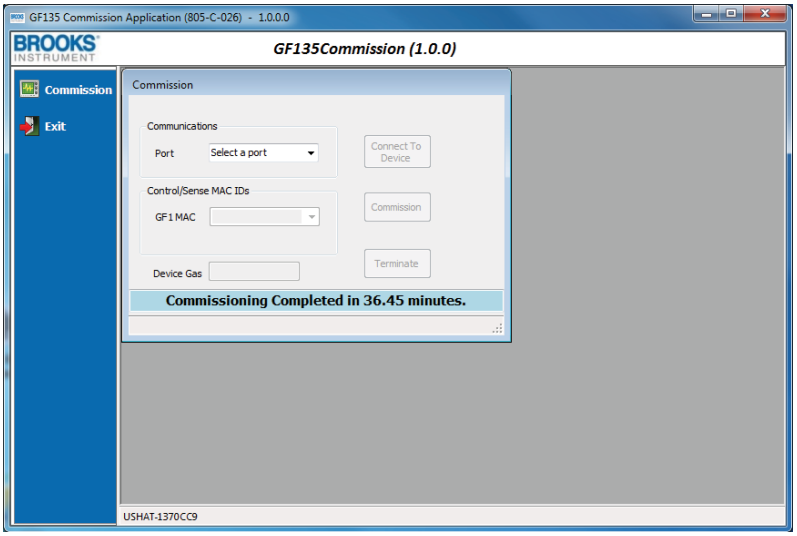


4. The user will be presented the option to override a few of the parameters being tested prior to actual commissioning. Selecting "Yes" will continue the process. By selecting "No" the commissioning process will end.



5. After numerous checks are performed, the auto-volume will start. This will take approximately 5 minutes to complete. The K1 setpoints will then begin. This process will run for approximately 40-90 minutes.

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6. Once the auto-volume and the K1 set points are complete, the program will go back to the initial screen. In addition, the overall run time will be displayed. From here, another device (or the same one again) may be selected for commissioning.

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3-1 General

After the device has been properly installed in the process, it is ready for operation. When initiating flow, slowly open any upstream shutoff valve to avoid a flow surge. A bypass is helpful in bringing the flow on smoothly. Avoid starting a pump to supply the device without the use of a valve upstream of the device.

⚠ CAUTION

Any sudden change in system pressure may cause mechanical damage to elastomer materials. Damage can occur when there is a rapid expansion of fluid that has permeated elastomer materials. The user must take the necessary precautions to avoid such conditions.

⚠ WARNING

Before operating the flow controller, ensure all gas connections have been properly tightened and, where applicable, all electrical connections have been properly terminated.

3-2 Theory of Operation for Flow Measurement

The thermal mass flow measurement system consists of two components: the restrictor or bypass and the flow sensor. Figure 3-1 is diagram of the flow stream through the device, with an enlarged view of the flow sensor. Gas flow entering the device is separated into two paths; one straight through the restrictor and the other through the flow sensor. This is represented in Figure 3-1, where the total flow A+B enters the device and is separated into streams A and B. The streams are joined again at the far side of the restrictor.

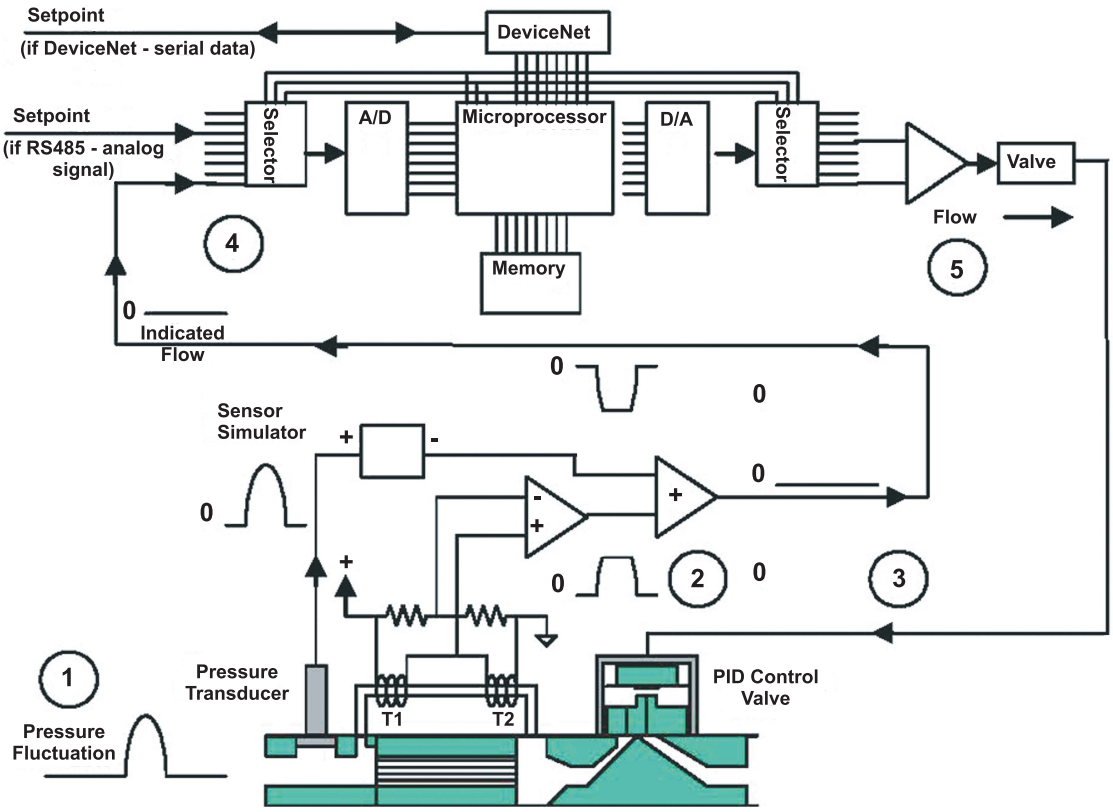
The separation of the flow streams is caused by the restrictor. During flow conditions, there will be a pressure differential across the restrictor that forces gas to flow in the sensor.

The pressure difference caused by the restrictor varies linearly with total flow rate. The sensor has the same linear pressure difference versus flow relationship. The ratio of sensor flow to the flow through the restrictor remains constant over the range of the device (A/B = constant). The full scale flow rate of the device is established by selecting a restrictor with the correct pressure differential for the desired flow.

The flow sensor is a very narrow, thin-walled Hastelloy tube. Onto this tube are built upstream and downstream temperature sensing and heating elements. During no-flow conditions, the amount of heat reaching each temperature sensor is equal, so temperatures T1 and T2 (Figure 3-1) are equal. Gas flowing through the tube carries heat away from the upstream temperature sensor and toward the downstream sensor. The temperature difference, T2 – T1, is directly proportional to the gas mass flow.

GF100 Series operating principles are described in Figure 3-1.

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Operating principles are listed below by following #1-5.

1. The GF125 uses a pressure transducer and support circuitry that sums the transducer signal in the sensor path (transducer not included in the GF100 and the GF120). Incoming pressure fluctuation results in a signal that is proportional to fluctuation.
2. The signal from the pressure transducer is inverted and then summed in with the original sensor signal.
3. The two summed signals cancel each other out.
4. The sensor signal that is applied to the microprocessor is undisturbed.
5. The flow of process gas is undisturbed by incoming pressure fluctuations.

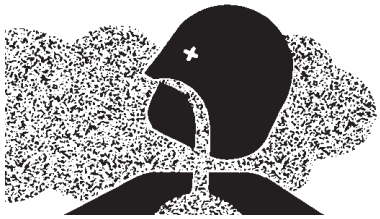
Figure 3-1 GF100 Series Operating Principles

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4-1 Overview

No routine maintenance is required on the Brooks GF100 Series devices. If an in-line filter is used, the filtering elements should be periodically replaced or cleaned. Any precision unit such as a flow controller requires occasional servicing, especially if it has been operating for an extended period of time. If reactive gases are being used, it is recommended that you send the device to a Brooks Service Center for cleaning and recalibration. Please follow the instructions for removal, product packaging and product return instructions found in Section 2- Installation—Return Shipment. All active process instrumentation and equipment is subject to aging and wear from their environment. This includes temperature, mechanical stress, component tolerance shift, contaminant buildup, oxidation, and other influences. The effects are gradual, but over time the changes can affect the accuracy of even the best equipment. Therefore, it is recommended to re-zero the device at 6 month intervals. Refer to Section 2-18 Performance Checks for re-zeroing instructions.

4-2 Maintenance



⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.

It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.

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⚠ WARNING

If it becomes necessary to remove the controller from the system after exposure to toxic, pyrophoric, flammable or corrosive gas, purge the controller thoroughly with a dry inert gas such as Nitrogen before disconnection the gas connections. Failure to correctly purge the controller could result in fire, explosion or death. Corrosion or contamination of the mass flow controller, upon exposure to air, may also occur.

⚠ WARNING

If it becomes necessary to remove the instrument from the system, power to the device must be disconnected.

⚠ CAUTION

It is important that this MFC/MFM only be serviced by properly trained and qualified personnel.

⚠ CAUTION

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.

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4-3 Troubleshooting

This section includes a Troubleshooting Checklist and a GF100 Series Troubleshooting Guide that identifies symptoms, possible causes, and corrective actions.

⚠ NOTICE

OEM tool problems are often caused by something other than the GF100 Series. Therefore, Brooks recommends that you review both the Troubleshooting Checklist and the GF100 Series Troubleshooting Guide before removing the GF100 Series from your system. It is also suggested to contact your Brooks Service representative before removing the GF100 Series from your system.

4-4 Troubleshooting Checklist

1. Check environmental factors that could affect changes to GF100 Series performance. The most common environmental factors are listed in Table 4-1.

Table 4-1 Environmental Factors

GF100 Series Performance	Possible Causes
Inaccurate flow.	Temperature shift (steady state or transient). Inlet pressure shift (steady state or transient). Power supply problem. Electrical interference Dirty gas chamber Changes in gas.
Control problems. Can not reach setpoint. Oscillation.	Differential pressure not within operating range Inlet pressure not stable
Zeroing problems, Indicated zero is not stable.	Temperature shift (steady state or transient). Inlet pressure shift (steady state or transient). Power supply problem. Electrical interference

2. Check supply voltage and check for a consistent ground.
3. Insure OEM tool setpoint matches the setpoint at the GF100 Series. Observe for consistency.
4. Verify isolations valves are open and the gas supply is turned on. Then verify operating pressures are within operating ranges.
5. Check GF100 Series voltage response by moving the setpoint back and forth.
   Observe for voltage changes.

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4-5 GF100 Series Troubleshooting Guide

Table 4-2 GF100 Series Troubleshooting Guide

Symptoms & Possible Causes	Corrective Action
1. No gas flow.	
Is the gas supply turned on?	Check shut-off valve and pressure readout. Open the gas supply.
Is the regulator turned on at the correct operating pressure?	Turn off the regulator and reset it to the recommended pressure as described in the Data Sheet.
Are any upstream or downstream shut-off valves closed, either by the system or because of failure?	Verify that the valves are open and operating properly.
Is the MOD LED light on the GF100 Series lit solid green?	Observe the LED display panel on top of to verify. If the LED light is not lit, cycle power the to reboot.
Is the commanded setpoint from tool/system at 0.00 Vdc?	Use the tool software to verify.
Has the been commanded off by an active “valve closed” input?	Use the tool software to verify.
2. Flow out of range.	
Is the gas inlet/outlet pressure differential either too high or too low? NOTE: If the differential pressure is too high, voltage to the will be zero, which is abnormally low for the setpoint. If the differential is too low, voltage to will be at its maximum value, which is abnormally high for the set-point.	Verify that the pressure is correct for the gas and range. If required, adjust inlet/outlet pressure to achieve proper pressure reading.
Is the MOD LED light on the GF100 Series lit solid green?	Observe the LED display panel at top of . If the LED light is not lit, cycle power the to reboot.
Is the setpoint correct for the required gas flow?	Use the tool software to verify.
Is the calibrated for the particular gas?	Check the side label. Run a flow check to verify.
Is the zero correct?	Zero the according to zeroing procedure in Section 2-14. Verify leak check rates are OK.
3. No gas control; flow is at or above maximum.	
Is the gas pressure across the too high?	Verify that the pressure is correct for the gas and range. If required, adjust inlet/outlet pressure to achieve proper pressure reading.
Are system valves open, or is the purge input activated?	Use tool software to verify.
Is the setpoint correct for the required flow?	Use tool software to verify.

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Table 4-2 GF100 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
4. No gas flow above some set-point.	
NOTE: When the setpoint is increased beyond this point, the GF100 Series signal remains at some value lower than the set-point. Is the gas inlet/outlet differential pressure sufficient? NOTE: If the pressure reading is too low, the valve voltage to the GF100 Series will be at its maximum output. This condition will cause internal GF valve heating and inability to properly reach desired flow setpoints.	Verify that the pressure is correct for the gas and range. If required, adjust regulator to achieve proper pressure
Is the GF100 Series calibrated for the gas flow?	Check GF100 Series side label. Run a flow check to verify. If flow is incorrect, replace the GF100 Series with a unit that is calibrated properly.
5. No gas flow below some set-point.	
NOTE: When the setpoint is decreased below this point, the GF100 Series signal remains at some value higher than the setpoint. Is the gas inlet/outlet differential pressure too high, or above published setpoints? NOTE: If the differential pressure reading. is too high, voltage to the GF100 Series will be at its maximum value when the setpoint is decreased below the point where flow decreases.	Verify that the pressure is correct for this gas and range. If required, adjust regulator to achieve proper pressure
Is the GF100 Series leaking?	Check for contamination. Test the GF100 Series for leak integrity. Replace the Unit GF100 Series if leakage is detected.
6. Gas flow, or GF100 Series pressure reading oscillates.	
Is the GF100 Series calibrated for the gas flowing?	Check the GF100 Series side can label. Run a flow check to verify. If flow is incorrect, replace the GF100 Series.
Is there too much gas pressure across the GF100 Series?	Verify that the pressure is correct for this gas and range. If required, adjust regulator to achieve proper pressure reading.

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Table 4-2 GF100 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
6. Gas flow, or GF100 Series pressure reading oscillates.	
Are inlet and outlet pressures stable? NOTE: Most GF100 Series calibrated with nitrogen will oscillate with hydrogen or helium.	If outlet pressure is unstable, check for (no oscillation or hunting) a faulty vacuum pump, or hunting at a downstream valve. Check inlet pressure on tool. A faulty pressure regulator can make the GF100 Series appear to oscillate. Adjust inlet pressure up or down by 2 psig increments until hunting disappears. Verify common gas pressure is within range. NOTE: Hunting or oscillation can be contributed to multiple GF100 Series sharing a common gas manifold. Therefore, inspect gas delivery sources to the gas box. (for example; two tools sharing a common gas bottle and calling for gas at the same time.) Valve leak. Unregulated gas pressure from Facilities.
7. GF100 Series does not read zero pressure when gas is shut off.	
Is the differential pressure across the GF100 Series really zero? Is the GF100 Series configured properly in the tool software? Is the GF100 Series mounted to the proper attitude?	Verify that the pressure is correct for the gas and range. If the GF100 Series has been contaminated, it may not be able to close, and therefore, will not zero. Equalize the pressure across the GF100 Series by opening it briefly. Set up the GF100 Series for zeroing. Then perform the zeroing procedure in Section 2-14. Use the tool software to verify. Refer to the side can label on the GF100 Series. The GF100 Series should be calibrated in the attitude it will be operating at.
8. OEM tool does not read correct GF100 Series zero reading.	
Is the differential pressure across the GF100 Series really zero? Is the supply voltage within specified range? Is the GF100 Series mounted in the proper attitude? Is the flow output signal of the GF100 Series really zero?	GF100 Series valve leakage. Incorrect MFC zero.
9. Zero Drift.	
Improper zero of the GF100 Series? Excessive Valve leakage?	GF100 Series aging or sensor stabilization. Zero is not correct.

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Table 4-2 GF100 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
10. Calibration Drift.	
Gas box temperature too high? Is it linear offset?	Zero is not correct.
11. GF100 Series indicates Overshoot.	
	If the tool is idle for an extended period of time, high inlet pressure or contamination will cause overshoot on first use.
12.OEM tool indicates the wrong full scale value for GF100 Series.	
	Older version of Multiflo Configurator used to program GF100 Series.
13. GF100 Series dumps large volume of gas into chamber when setpoint is commanded from the tool.	
	The tool is commanding a setpoint before the pneumatic valves are opened. GF100 Series and pneumatic timing may be offset. GF100 Series overshoots.
14. Tool display output doesn't match GF100 Series flow output.	
Cable resistance causing offset in the tool's display.	Check GF100 Series zero.

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5-1 Overview

Reference Tables 5-1 through 5-5 for specific Product Description Codes.

Table 5-1 GF100, GF120 & GF125 Series Product Description Code

Code	Description	Code Option	Option Description
I.	Base Model Code	**GF**	High Purity/Ultra High Purity Digital Mass Flow Controllers
II.	Package / Finish Specifications	**100**	Flow range 3 sccm -55 slpm N_2 Eq.; ± 1.0% SP Accuracy; 1 sec Response; 10 Ra
		120	Flow range 3 sccm -55 slpm N_2 Eq.; + 1.0% SP Accuracy; 700 msec Response; 4 Ra
		125	Pressure Transient Insensitive (PTI) Flow range 3 sccm -55 slpm N_2 Eq.; + 1.0% SP Accuracy; 300-700 msec Response; 4 Ra
III.	Configurability	**C**	MultiFlo capable. Standard bins or specific gas/range may be selected.
		X	Not MultiFlo capable. Specific gas/range required. (must select w/ SD, SL or HA special application)
IV.	Special Application	**XX**	Standard
		SL	Safe Delivery System (GF120 Only) Full scale flow range; 4 to 25 sccm, Nitrogen Equivalent
		SD	Safe Delivery System (GF120 Only) Full scale flow range; >25 sccm to 1 slpm, Nitrogen Equivalent
V.	Valve Configuration	**O**	Normally Open valve (not available with SD, SL or HA options)
		C	Normally Closed valve (must select with SD, SL or HA special application)
		M	Meter (No Valve)
VI.	Gas or SH MultiFlo Bin	**XXXX XXXX**	Specific Gas Code & Range, i.e. "0004" = Argon and "010L" = 10 slpm (must select w/ SD, SL or HA special application).
		SH40 010C	Standard Configuration #40, 3-10 sccm Nitrogen Equivalent (0° C Reference)
		SH41 030C	Standard Configuration #41, 11-30 sccm Nitrogen Equivalent (0° C Reference)
		SH42 092C	Standard Configuration #42, 31-92 sccm Nitrogen Equivalent (0° C Reference)
		SH43 280C	Standard Configuration #43,93-280 sccm Nitrogen Equivalent (0° C Reference)
		SH44 860C	Standard Configuration #44, 281-860 sccm Nitrogen Equivalent (0° C Reference)
		SH45 2.6L	Standard Configuration #45, 861-2600 sccm Nitrogen Equivalent (0° C Reference)
		SH46 7.2L	Standard Configuration #46, 2601-7200 sccm Nitrogen Equivalent (0° C Reference)
		SH47 015L	Standard Configuration #47, 7201-15000 sccm Nitrogen Equivalent (0° C Reference)
		SH48 030L	Standard Configuration #48, 15001-30000 sccm Nitrogen Equivalent (0° C Reference)
		SH49 040L	Standard Configuration #49, 30001-40000 sccm Nitrogen Equivalent (0° C Reference)
		SH50 055L	Standard Configuration #50, 40001-55000 sccm Nitrogen Equivalent (0° C Reference)
VII.	Fitting	**VX**	1-1/2" body width, 124mm 1/4" VCR male
		VS	1-1/8" body width, 124mm 1/4" VCR male
		CX	1-1/8" body width, 92mm C Seal
		DX	1-1/8" body width, 79.8mm C Seal
		EX	1-1/2" body width, 79.8mm W Seal
		WX	1-1/8" body width, 92mm W Seal
		YX	1-1/8" body width, 79.8mm W Seal
		AX	1-1/2" body width, 92mm C Seal
		BX	1-1/2" body width, 92mm W Seal
		LX	1-1/8" body width, 92mm C Seal w/Poke Yoke
		AS	1-1/2" body width, 92mm 0.440" large bore C Seal (only for bins SH45-SH50)
VIII.	Downstream Condition	**A**	Atmosphere
		V	Vacuum; Default for SD, SL and HA special application
IX.	Sensor	**O**	Default Sensor Orientation

Model Code continued on next page.

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Table 5-1 GF100, GF120 & GF125 Series Product Description Code (Continued)

Code Description	Code Option	Option Description									
X. Connector	**BX**	Cable adapter to 15 pin D Brooks (Unit "B","N") adapts G1 base									
	EX	Cable adapter to Card Edge (w/out VTP), RS485 through RJ11 jacks (Unit"E"; IN "L", "R") adapts GX base (Not Available on 79.8mm fitting DX, YX, EX)									
	FX	Cable adapter with 9 pin STEC pin-out & jack screws (w/VTP) (Unit"F","O") adapts SX base									
	GX	9-Pin D with RS485 (Unit"G"); display and overlay 180° orientation (Not Available on 79.8mm fitting DX, YX, EX)									
	G1	9-Pin D with RS485 (Unit"G") (Not Available on 79.8mm fitting DX, YX, EX)									
	JX	Cable adapter with 9 pin STEC pin-out & jack screws (w/VTP) (Unit"J","W") adapts SX base									
	KX	Cable adapter to MKS 15-Pin D (Unit "K") adapts G1 base									
	SX	9 pin D with STEC pin-out (w/VTP) (Unit"S","Q")									
	TX	9 pin D with UDT9 pin-out (UDT9)									
	T1	Cable adapter to 15 pin D (IFlow DB15 & TN 15 pin) adapts TX base (Not Available on 79.8mm fitting DX, YX, EX)									
	UX	Cable adapter to 15 pin D (w/VTP) (Unit & TN "U") adapts SX base									
	BB	DeviceNet™ Analog (Not Available on 79.8mm fitting DX, YX, EX)									
		DeviceNet Standard Configuration Parameters									
		I/O	Connector	Power On State	Full Scale Setting	Full Scale Setting	Full Scale Setting	Poll IO Instance Producer	Poll IO Instance Consumer	Poll IO State Transition	External Baud Rate
	D0	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	2	7	Executing	500KB
	D1	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	21	7	Executing	500KB
	D2	DeviceNet	5 Pin Micro	Idle	SCCM	Float	7FFFh	13	19	Executing	500KB
	D3	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	22	7	Executing	500KB
	D4	DeviceNet	5 Pin Micro	Executing	Count	Integer	6000h	22	8	Executing	500KB
	D5	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	6	8	Executing	500KB
	D6	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	3	7	Executing	500KB
	D7	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	6	8	Executing	500KB
	D8	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	3	7	Executing	500KB
	D9	DeviceNet	5 Pin Micro	Executing	Count	Integer	6000h	2	7	Executing	500KB
	DA	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	22	7	Executing	500KB
	DB	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	22	8	Executing	500KB
	DC	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	3	7	Idle	500KB
	DD	DeviceNet	5 Pin Micro	Executing	Count	Integer	7FFFh	22	8	Executing	500KB
	DE	DeviceNet	5 Pin Micro	Executing	Sccm	Float	6000h	15	19	Executing	500KB
	DX	DeviceNet	5 Pin Micro	To be defined by CSR							

Code Description	Code Option	Option Description
XI. Customer Special Request	**XXXX**	Customer Special Request Number; required with "DX, BB" Conn. Option to define DNet settings
XII. Auto Shut-Off	**A**	Auto Shut-Off (Included) Default for SD and SL special application
	X	Auto Shut-Off (Not Included) (Must be selected for meter)
XIII. Auto Zero	**X**	Auto Zero (Not Included)
XIV. Reference Temperature	**000**	0°C Reference Calibration (Standard) - Default Setting

Sample Standard Model Code

I	II	III	IV	V		VI		VII	VIII	IX	X		XI	XII	XIII		XIV
GF	100	C	XX	M	-	SH40010C	-	VX	A	0	GX	-	XXXX	A	X	-	000

Sample Safe Delivery System (SDS) Model Code

I	II	III	IV	V		VI		VII	VIII	IX	X		XI	XII	XIII		XIV
GF	120	X	SD	C	-	XXXXXXXX	-	EX	V	0	SX	-	XXXX	A	X	-	000

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Table 5-2 GF100, GF120 & GF125 Series with EtherCAT Communications Product Description Code

Code	Description	Code Option	Option Description
I.	Base Model Code	**GF**	High Purity/Ultra High Purity Digital Mass Flow Controllers
II.	Package / Finish Specifications	**100**	Flow range 3 sccm - 55 slpm N2 Equivalent.; 1 sec Response; 10 Ra
		120	Flow range 3 sccm - 55 slpm N2 Equivalent.; 700 msec Response; 5 Ra
		125	Pressure Transient Insensitive (PTI) Flow range 3 sccm -55 slpm N2 Equivalent; 300-700 msec Response; 5 Ra
III.	Configurability	**C**	MultiFlo capable. Standard bins or specific gas/range may be selected.
		X	Not MultiFlo capable. Specific gas/range required. (must select w/ SD or SL special application)
IV.	Special Application	**XX**	Standard
		SL	Safe Delivery System (GF120 Only) Full scale flow range; 4 to 25 sccm, N2 Equivalent
		SD	Safe Delivery System (GF120 Only) Full scale flow range; 25 sccm to 1 slpm, N2 Equivalent
V.	Valve Configuration	**O**	Normally Open valve (not available with SD, SL or VS options)
		C	Normally Closed valve
		M	Meter (No Valve)
VI.	Gas or SH MultiFlo Bin	**XXXX XXXX**	Specific Gas Code & Range, i.e. "0004" = Argon and "010L" = 10 slpm
		SH40 010C	Standard Configuration #40, 3-10 sccm Nitrogen Equivalent
		SH41 030C	Standard Configuration #41, 11-30 sccm Nitrogen Equivalent
		SH42 092C	Standard Configuration #42, 31-92 sccm Nitrogen Equivalent
		SH43 280C	Standard Configuration #43,93-280 sccm Nitrogen Equivalent
		SH44 860C	Standard Configuration #44, 281-860 sccm Nitrogen Equivalent
		SH45 2.6L	Standard Configuration #45, 861-2600 sccm Nitrogen Equivalent
		SH46 7.2L	Standard Configuration #46, 2601-7200 sccm Nitrogen Equivalent
		SH47 015L	Standard Configuration #47, 7201-15000 sccm Nitrogen Equivalent
		SH48 030L	Standard Configuration #48, 15001-30000 sccm Nitrogen Equivalent
		SH49 040L	Standard Configuration #49, 30001-40000 sccm Nitrogen Equivalent
		SH50 055L	Standard Configuration #50, 40001-55000 sccm Nitrogen Equivalent
VII.	Fitting	**VS**	1-1/8" body width, 1/4" VCR male
		VX	1-1/2" body width, 1/4" VCR male
		CX	1-1/8" body width, C Seal 92mm
		WX	1-1/8" body width, W Seal 92mm
VIII.	Downstream Condition	**A**	Atmosphere
		V	Vacuum
IX.	Sensor	**O**	Default Sensor Orientation
X.	Connector	**E0**	EtherCAT Communication
XI.	Customer Special Request	**XXXX**	Customer Special Request Number
XII.	Auto Shut-Off	**A**	Auto Shut-Off (Included)
		X	Auto Shut-Off (Not Included)
XIII.	Auto Zero	**X**	Auto Zero (Not Included)
XIV.	Reference Temperature	**000**	0 deg C Reference Calibration (Standard) - Default Setting

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Table 5-3 Model GF135 Product Description Code

Code Description	Code Option	Option Description
I. Base Model Code	**GF**	
II. Package/Finish Specifications	**135**	Pressure Transient Insensitive (PTI) Ultra High Purity Advanced Diagnostic MFC
III. Configurability	**X**	Gas specific
IV. Special Application	**XX**	Standard Application
V. Valve Configuration	**C**	Normally Closed Valve
VI. Specific Gas Code & Range,	**XXXX XXXX**	Specify Gas Code & Range, i.e. "0004" = Argon and "010L" = 10 slpm
VII. Fitting	**VX**	1 1/2" VCR 1/4"
	CX	1 1/8" C Seal 92mm
	WX	1 1/8" W Seal 92mm (FUTURE RELEASE)
VIII. Downstream Condition	**A**	Atmosphere
	V	Vacuum
IX. Sensor	**O**	Default Orientation

X. Connector

	DeviceNet Standard Configuration Parameters									
	I/O	Connector	Power On State	Full Scale Setting	Full Scale Setting	Full Scale Setting	Poll IO Instance Producer	Poll IO Instance Consumer	Poll IO State Transition	External Baud Rate
D0	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	2	7	Executing	500KB
D1	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	21	7	Executing	500KB
D2	DeviceNet	5 Pin Micro	Idle	SCCM	Float	7FFFh	13	19	Executing	500KB
D3	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	22	7	Executing	500KB
D4	DeviceNet	5 Pin Micro	Executing	Count	Integer	6000h	22	8	Executing	500KB
D5	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	6	8	Executing	500KB
D6	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	3	7	Executing	500KB
D7	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	6	8	Executing	500KB
D8	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	3	7	Executing	500KB
D9	DeviceNet	5 Pin Micro	Executing	Count	Integer	6000h	2	7	Executing	500KB
DA	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	22	7	Executing	500KB
DB	DeviceNet	5 Pin Micro	Idle	Count	Integer	6000h	22	8	Executing	500KB
DC	DeviceNet	5 Pin Micro	Idle	Count	Integer	7FFFh	3	7	Idle	500KB
DD	DeviceNet	5 Pin Micro	Executing	Count	Integer	7FFFh	22	8	Executing	500KB
DE	DeviceNet	5 Pin Micro	Executing	SCCM	Float	6000h	15	19	Executing	500KB
DX	DeviceNet	5 Pin Micro	To be defined by CSR							
G2	Analog/RS485	9 Pin D	NA	NA	NA	NA	NA	NA	NA	NA

XI. Customer Special Request	**XXXX**	Customer Special Request Number
XII. Auto Shut-Off	**A**	Auto Shut Off (Included)
	X	Auto Shut Off (Not Included)
XIII. Auto Zero	**A**	Auto Zero (Included)
	X	Auto Zero (Not Included)
XIV. Reference Temperature	**000**	0°C Reference Calibration (Standard) - Default Setting

Example Model Code

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
GF	135	X	XX	C	XXXX XXXX	VX	A	O	D1	XXXX	A	A	000

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Table 5-4 GF101, GF121 & GF126 Series Product Description Code

Code	Description	Code Option	Option Description
I.	Base Model Code	**GF**	High Purity/Ultra High Purity Digital Mass Flow Controllers
II.	Package / Finish Specifications	**101**	Flow range 55 - 300 slm N_2 Eq.; 10 Ra HP wetted flow path
		121	Flow range 55 - 300 slm N_2 Eq. 5 Ra UHP wetted flow path
		126	Flow range 55 - 300 slm N_2 Eq. 5 Ra UHP wetted flow path & integrated pressure measurement
III.	Configurability	**C**	MultiFlo capable
		X	Not configurable
IV.	Special Application	**XX**	Standard
V.	Valve Configuration	**C**	Normally Closed valve
		M	Meter (No Valve)
VI.	Gas or SH MultiFlo Bin	**XXXX XXXX**	Specific Gas Code & Range, i.e. "0004" = Argon and "100L" = 100 slpm
		SH51 055L	Standard Configuration #51, 55,001 sccm N2 Equivalent (0°C Reference) Special Bin for low density gases, e.g. 73,002-120,000 He, 100,002-170,000 H2
		SH52 100L	Standard Configuration #52, 55,002-100,000 sccm N2 Equivalent (0°C Reference)
		SH53 200L	Standard Configuration #53, 100,001-200,000 sccm N2 Equivalent (0°C Reference)
		SH54 300L	Standard Configuration #54, 200,001-300,000 N2 Equivalent (0°C Reference)
VII.	Fitting	**V1**	1-1/2" body width, 134mm 1/2" VCR male (See Accessories on Page 3 for VCR lay length adapters)
		V2	1-1/2" body width, 150.4mm 1/2" VCR male
		V3	1-1/2" body width, 166mm 1/2" VCR male
		V4	1-1/2" body width, 168.6mm 1/2" VCR male
		C1	1-1/2" body width, 92mm 3/8" C Seal
		C2	1-1/2" body width, 114mm 3/8" C Seal
VIII.	Downstream Condition	**A**	Atmosphere
		V	Vacuum
IX.	Sensor	**O**	Default Sensor Orientation
X.	Connector	**BX**	Cable adapter to 15 pin D Brooks (Unit "B","N")
		EX	Cable adapter to card edge (w/out VTP), RS485 through RJ11 jacks (Unit"E"; IN "L", "R"); display and overlay 180° orientation
		FX	Cable adapter with 9 pin STEC pin-out & jack screws (w/VTP) (Unit"F","O")
		G1	9-Pin D with RS485 (Unit"G")
		JX	Cable adapter with 9 pin STEC pin-out & jack screws (w/VTP) (Unit"J","W")
		KX	Cable adapter to MKS 15-Pin D (Unit "K")
		SX	9 pin D with STEC pin-out (w/VTP) (Unit"S","Q")
		UX	Cable adapter to 15 pin D (w/VTP) (Unit & TN "U")
			DeviceNet Standard Configuration Parameters
			I/O: DeviceNet; Connector: 5 Pin Micro; Power On State: Idle; Full Scale Setting: Count; Full Scale Setting: Integer; Full Scale Setting: 6000h; Poll IO Instance Producer: 2; Poll IO Instance Consumer: 7; Poll IO State Transition: Executing; External Baud Rate: 500KB
		D0	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 2; 7; Executing; 500KB
		D1	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 21; 7; Executing; 500KB
		D2	DeviceNet; 5 Pin Micro; Idle; SCCM; Float; 7FFFh; 13; 19; Executing; 500KB
		D3	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 22; 7; Executing; 500KB
		D4	DeviceNet; 5 Pin Micro; Executing; Count; Integer; 6000h; 22; 8; Executing; 500KB
		D5	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 6; 8; Executing; 500KB
		D6	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 7FFFh; 3; 7; Executing; 500KB
		D7	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 7FFFh; 6; 8; Executing; 500KB
		D8	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 3; 7; Executing; 500KB
		D9	DeviceNet; 5 Pin Micro; Executing; Count; Integer; 6000h; 2; 7; Executing; 500KB
		DA	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 7FFFh; 22; 7; Executing; 500KB
		DB	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 6000h; 22; 8; Executing; 500KB
		DC	DeviceNet; 5 Pin Micro; Idle; Count; Integer; 7FFFh; 3; 7; Idle; 500KB
		DD	DeviceNet; 5 Pin Micro; Executing; Count; Integer; 7FFFh; 22; 8; Executing; 500KB
		DE	DeviceNet; 5 Pin Micro; Executing; SCCM; Float; 6000h; 15; 19; Executing; 500KB
		DX	DeviceNet; 5 Pin Micro; To be defined by CSR
XI.	Customer Special Request	**XXXX**	Customer Special Request Number
XII.	Auto Shut-Off	**A**	Auto Shut-Off (Included)
		X	Auto Shut-Off (Not Included) (Must be selected for meter)
XIII.	Auto Zero	**A**	Auto Zero (Included)
		X	Auto Zero (Not Included)
XIV.	Reference Temperature	**000**	0°C Reference Calibration (Standard) - Default Setting

Sample Standard Model Code

I	II	III	IV	V		VI		VII	VIII	IX	X		XI	XII	XIII		XIV
GF	101	C	XX	C	-	SH52 100L	-	V1	A	0	G1	-	XXXX	A	X	-	000

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Table 5-5 GF101, GF121 & GF126 Series with EtherCAT Communications Product Description Code

Code	Description	Code Option	Option Description
I.	Base Model Code	**GF**	High Purity/Ultra High Purity Digital Mass Flow Controllers
II.	Package / Finish Specifications	**101**	Flow range 55 - 300 slm N2 Equivalent.; 10 Ra HP wetted flow path
		121	Flow range 55 - 300 slm N2 Equivalent 5 Ra HP wetted flow path
		126	Flow range 55 - 300 slm N2 Equivalent 5 Ra HP wetted flow path & integrated pressure measurement
III.	Configurability	**C**	MultiFlo capable. Standard bins or specific gas/range may be selected
		X	Not MultiFlo capable. Specific gas/range required
IV.	Special Application	**XX**	Standard
V.	Valve Configuration	**C**	Normally Closed valve
		M	Meter (No Valve)
VI.	Gas or SH MultiFlo Bin	**XXXX XXXX**	Specific Gas Code & Range, i.e. "0004" = Argon and "010L" = 10 slpm
		SH51 055L	Standard Configuration #51, 55,001 sccm N2 Equivalent (0°C Reference)
		SH52 100L	Standard Configuration #52, 55,002-100,000 sccm N2 Equivalent (0°C Reference)
		SH53 200L	Standard Configuration #53, 100,001-200,000 sccm N2 Equivalent (0°C Reference)
		SH54 300L	Standard Configuration #54, 200,001-300,000 N2 Equivalent (0°C Reference)
VII.	Fitting	**V1**	1-1/2" body width, 134mm 1/2" VCR male
		C1	1-1/2" body width, 92mm C Seal
		C2	1-1/2" body width, 114mm C Seal
VIII.	Downstream Condition	**A**	Atmosphere
		V	Vacuum
IX.	Sensor	**O**	Default Sensor Orientation
X.	Connector	**E0**	EtherCAT Communication
XI.	Customer Special Request	**XXXX**	Customer Special Request (CSR) Number
XII.	Auto Shut-Off	**A**	Auto Shut-Off (Included)
		X	Auto Shut-Off (Not Included)
XIII.	Auto Zero	**X**	Auto Zero (Not Included)
XIV.	Reference Temperature	**000**	0ºC Reference Calibration (Standard) - Default Setting

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GF100 Series Ordering Instructions

Refer to the Product Description Codes on the previous pages. Starting from the left, choose the product code options as follows:

1. Required performance model.
    a. Standard Performance, non-PTI: **GF100**
    b. High Performance, non-PTI: **GF120**
    c. High Performance, w/ PTI: **GF125**
    d. High Performance, w/ PTI, w/ROD: **GF135**
    e. Standard Performance, High Flow, Non-PTI: **GF101**
    f. High Performance, High Flow, Non-PTI: **GF121**
    g. High Performance, High Flow, w/PTI: **GF126**
2. Configurability
    a. Disabled: **X**
    b. Enabled: **C**, Standard (not an option for GF135)
3. Specialty Application
    a. Safe Delivery, for GF120 only: **SD**
    b. No Specialty App: **XX**
4. Valve Configuration
    a. Normally Closed: **C**
    b. Normally Open: **O**
    c. Meter: **M**
5. Gas or SH MultiFlo Bin
    a.If Gas Specific, enter SEMI gas code: ex. **0013**, for N2
    b.If SH MuliFlow Bin: **SHnn**, nn being the required SHBin, 40 - 50 or 51 - 54 (High Flow)
6. Maximum Flow
    a.If Gas Specific, enter maximum range in sccm, "C" or slm "L": ex. **500C**
    b.If SH Bin, enter defined maximum flow: ex. **860**, choosing SH44, 281 - 860 sccm
7. Fitting
    a.Enter 2-character option code as defined: ex. **CX**, 1 1/8" C Seal 92mm
8. Downstream Condition
    a.Outlet to Vacuum: **V**
    b.Outlet to Atmosphere: **A**
9. Sensor
    a.Orthogonal: **O**, this is default, non-selectable
10. Connector
    a.Enter 2-character option code as defined: ex. **DX**, DeviceNet
11. CSR
    a.Customer Special Requirement, contact Brooks Apps Engineering for review of requirement and creation of CSR: **nnnn**
    b.If DNET connector, CSR required to define DNET attributes: **0924**, generic, ODVA Std. configuration
    c.None Required: **XXXX**
12. Auto Shut-Off.
    a.Enabled: **A**
    b.Disabled: **X**
13. Auto Zero
    a.Disabled: **X**
14. Reference Temperature, Operating Temperature in Degrees C
    a.0ºC Reference Calibration (Standard): **000**, default

Here is an example of a configured Product Description Code (PDC) for a GF125, Configurable, no Specialty Application, Valve Normally Closed, MultiFlo for 281-860 sccm, 1 1/8" C Seal 92mm, outlet to Vacuum, default sensor, DNET, no CSR, Auto Shut Off enabled, Auto Zero disabled and Default Reference Temperature:
GF125CXXC-SH44860C-CXVODX-0924AX-000

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A-1 GF100 Series Gas Table

Table A-1 GF100 Series Gas Table

(Reference the following pages, A-1 and A-2).

Table A-1A GF100 Series Gas Table - Codes 1-108, Bins SH40 to SH50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)				SH40		SH41		SH42		SH43		SH44		SH45		SH46		SH47		SH48		SH49		SH50	
			SH40-SH47	SH48	SH49	SH50	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1	He	Helium	19.7	24.7	29.7		5	14	15	42	43	128	129	400	401	1194	1195	3609	3610	11100	11101	23100	23101	47000	47001	100000		
2	Ne	Neon	24.7				5	14	15	42	43	129	130	400	401	1207	1208	3650	3651	10700	10701	22100						
4	Ar	Argon	24.7	29.7	39.7	44.7	5	14	15	42	43	130	131	400	401	1214	1215	3671	3672	10000	10001	20200	20201	41000	41001	42000	42001	55000
5	Kr	Krypton	29.7				4	11	12	32	33	100	101	300	301	930	931	2800	2801	7160	7161	14900						
6	Xe	Xenon	24.7				3	6	7	19	20	58	59	178	179	546	547	1651	1652	4210	4211	8760						
7	H2	Hydrogen	14.7	14.7	19.7		3	10	11	30	31	92	93	280	281	860	861	2600	2601	8000	8001	16400	16401	33000	33001	73000		
8	Air	Air	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7400	7401	15000	15001	30000				
9	CO	Carbon Monoxide	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7300	7301	15000	15001	30000				
10	HBr	Hydrogen Bromide	24.7				3	8	9	25	26	77	78	235	236	723	724	2187	2188	5610	5611	11700						
11	HCl	Hydrogen Chloride	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	6900	6901	14200	14201	29000				
12	HF	Hydrogen Fluoride	14.7	17.7			3	10	11	30	31	94	95	281	282	880	881	2610	2611	7400	7401	15000	15001	30000				
13	N2	Nitrogen	24.7	29.7	29.7	32.7	3	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000	30001	40000	40001	55000
14	D2	Deuterium	14.7	14.7			3	10	11	30	31	94	95	280	281	880	881	2600	2601	8100	8101	16500	16501	33000				
15	O2	Oxygen	24.7	29.7	29.7	34.7	3	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000	30001	37000	37001	55000
16	NO	Nitric Oxide	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000				
17	HI	Hydrogen Iodide	24.7	29.7			3	5	6	15	16	46	47	141	142	432	433	1305	1306	3340	3341	6960	6961	13900				
18	F2	Fluorine	24.7	29.7			3	9	10	27	28	83	84	254	255	780	781	2358	2359	6700	6701	14000	14001	28000				
19	Cl2	Chlorine	24.7	29.7			3	6	7	19	20	57	58	173	174	531	532	1604	1605	4850	4851	10100	10101	20200				
22	H2S	Hydrogen Sulfide	24.7	29.7			3	8	9	25	26	76	77	232	233	713	714	2155	2156	5900	5901	12100	12101	24100				
23	H2Se	Hydrogen Selenide	24.7	29.7			3	7	8	22	23	66	67	202	203	620	621	1874	1875	4770	4771	10000	10001	20000				
25	CO2	Carbon Dioxide	24.7	29.7	29.7	29.7	3	7	8	22	23	69	70	209	210	642	643	1942	1943	5300	5301	11000	11001	22000	22001	28000	28001	39000
27	N2O	Nitrous Oxide	24.7	29.7	29.7	29.7	3	7	8	21	22	65	66	200	201	611	612	1849	1850	5100	5101	10400	10401	21000	21001	25000	25001	37000
28	CH4	Methane	24.7	24.7	29.7		3	8	9	23	24	71	72	215	216	660	661	2000	2001	5800	5801	12000	12001	24000	24001	46000		
29	NH3	Ammonia	24.7	24.7	29.7		3	8	9	24	25	73	74	223	224	685	686	2072	2073	6000	6001	12200	12201	25000	25001	46000		
31	PH3	Phosphine	19.7	24.7			3	7	8	22	23	67	68	205	206	629	630	1901	1902	5200	5201	10700	10701	21300				
32	SO2	Sulfur Dioxide	19.7	24.7			3	6	7	17	18	52	53	157	158	483	484	1459	1460	3800	3801	7920	7921	15800				
33	CH3F	Methyl Fluoride	24.7	29.7			3	7	8	22	23	67	68	204	205	625	626	1890	1891	5200	5201	10600	10601	21200				
34	COS	Carbonyl Sulfide	24.7	29.7			3	7	8	20	21	60	61	183	184	562	563	1700	1701	4500	4501	9400	9401	18300				
35	AsH3	Arsine	24.7	29.7			3	6	7	18	19	55	56	170	171	510	511	1550	1551	4000	4001	8500	8501	17000				
37	ClCN	Cyanogen Chloride	14.7	21.7			3	5	6	15	16	46	47	142	143	435	436	1320	1321	3400	3401	7060	7061	14100				
38	C2H4	Ethylene	24.7	29.7			3	6	7	17	18	54	55	163	164	501	502	1516	1517	4400	4401	9300	9301	18200				
39	SiH4	Silane	24.7	29.7			3	6	7	18	19	56	57	170	171	523	524	1581	1582	4400	4401	9300	9301	18200				
42	C2H2	Acetylene	16.7	19.7			3	6	7	18	19	57	58	170	171	530	531	1600	1601	4400	4401	9300	9301	18200				
43	GeH4	Germane	24.7	29.7			3	6	7	17	18	53	54	161	162	495	496	1500	1501	4000	4001	8400	8401	16400				
46	COF2	Carbonyl Fluoride	19.7	19.7	21.7		3	5	6	17	18	53	54	160	161	500	501	1500	1501	4000	4001	8400	8401	16500	16501	21000		
48	BF3	Boron Trifluoride	19.7	24.7			3	5	6	16	17	50	51	150	151	457	458	1381	1382	3800	3801	7900	7901	15500				
49	CHF3	Fluoroform (Freon-23)	24.7	24.7	24.7	26.7	3	5	6	16	17	48	49	145	146	445	446	1344	1345	3600	3601	7600	7601	15000	15001	17000	17001	26000
53	NF3	Nitrogen Trifluoride	24.7	29.7	24.7	26.7	3	5	6	15	16	46	47	140	141	430	431	1300	1301	3600	3601	7500	7501	15000	15001	17000	17001	26000
54	C2H6	Ethane	17.7	29.7			3	5	6	16	17	50	51	153	154	469	470	1418	1419	4000	4001	8300	8301	16300				
58	B2H6	Diborane	19.7	19.7			3	4	5	12	13	38	39	116	117	358	359	1082	1083	3100	3101	6400	6401	12600				
60	COCl2	Phosgene	12.7	14.7			3	3	4	11	12	35	36	106	107	325	326	1000	1001	2520	2521	5250	5251	10500				
62	PF3	Phosphorus Trifluoride	19.7	24.7			3	4	5	14	15	42	43	129	130	400	401	1200	1201	3200	3201	6800	6801	13300				
63	CF4	Carbon Tetrafluoride (Freon-14)	24.7	24.7	24.7	26.7	3	4	5	13	14	40	41	121	122	372	373	1123	1124	3010	3011	6400	6401	12600	12601	17000	17001	22000
67	SiH2Cl2	Dichlorosilane	14.7	19.7			3	3	4	10	11	29	30	89	90	273	274	824	825	2140	2141	4450	4451	8900				
69	C3H6-b)	Propylene	19.7	19.7			3	4	5	12	13	36	37	110	111	338	339	1022	1023	2800	2801	5900	5901	11700				
70	BCl3	Boron Trichloride	11.7	14.7			3	3	4	10	11	31	32	94	95	289	290	874	875	2230	2231	4650	4651	9300				
72	ClO3F	Perchloryl Fluoride	14.7	20.7			3	4	5	12	13	38	39	114	115	350	351	1060	1061	2800	2801	5800	5801	11500				
77	ClF3	Chlorine Trifluoride	14.7	20.7			3	4	5	11	12	35	36	107	108	327	328	1000	1001	2560	2561	5340	5341	10700				
85	C2H7N	Dimethylamine	9.7	14.7			3	3	4	11	12	34	35	101	102	310	311	960	961	2530	2531	5400	5401	10600				
88	SiF4	Silicon Tetrafluoride	19.7	24.7			3	4	5	11	12	34	35	103	104	316	317	1000	1001	2600	2601	5400	5401	10600				
89	C3H8	Propane	9.7	11.7			3	3	4	10	11	32	33	100	101	300	301	910	911	2420	2421	5100	5101	10100				
94	C2F4	Tetrafluoroethylene	19.7	19.7			3	3	4	10	11	31	32	100	101	300	301	900	901	2300	2301	4900	4901	9800				
97	Si2H6	DISILANE	19.7	19.7			3	3	4	10	11	30	31	92	93	282	283	853	854	2300	2301	4900	4901	9800				
99	GeF4	Germanium Tetrafluoride	20.7	24.7			3	3	4	10	11	30	31	92	93	282	283	860	861	2200	2201	4700	4701	9400				
104	C4H8-i)	Butene	20.7	24.7					3	5	6	17	18	52	53	159	160	480	481	1420	1421	2950	2951	5900				
108	SiCl4	Silicon Tetrachloride	8.7						3	6	7	18	19	56	57	172	173	520	521	1320	1321	2750						

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Table A-1B GF100 Series Gas Table - Codes 109-875, Bins SH40 to SH50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)				SH40		SH41		SH42		SH43		SH44		SH45		SH46		SH47		SH48		SH49		SH50	
			SH40-SH47	SH48	SH49	SH50	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
109	C3H9N	Trimethylamine	6.7	8.7					3	8	9	25	26	78	79	240	241	720	721	1910	1911	4000	4001	8100				
110	SF6	Sulfur Hexafluoride	19.7	19.7	19.7	20.7			3	8	9	25	26	77	78	237	238	715	716	1900	1901	4000	4001	8000	8001	8200	8201	13400
111	C4H10-d)	Isobutane	19.7	19.7	19.7	20.7			3	7	8	23	24	70	71	216	217	653	654	1800	1801	3800	3801	7600	7601	8200	8201	13200
117	C4H10-c)	Butane	19.7	19.7	19.7	20.7			3	8	9	25	26	76	77	234	235	706	707	1910	1911	4000	4001	8100	8101	8200	8201	14100
118	C2F6	Hexafluoroethane (Freon-116)	19.7	19.7					3	8	9	23	24	71	72	218	219	658	659	1750	1751	3700	3701	7400				
121	WF6	Tungsten Hexafluoride	9.7	11.7					3	5	6	16	17	50	51	150	151	460	461	1200	1201	2500	2501	5000				
128	C3F8	Perfluoropropane	19.7	19.7					3	5	6	16	17	50	51	154	155	465	466	1200	1201	2500	2501	5100				
129	C4F8	Octafluorocyclobutane	19.7	19.7					3	5	6	16	17	50	51	154	155	465	466	1170	1171	2430	2431	4900				
138	C3F6	Hexafluoropropylene	19.7	19.7					3	6	7	20	21	60	61	184	185	556	557	1470	1471	3050	3051	6110				
155	C2HF5	PENTAFLUOROETHANE (FREO	19.7	19.7					3	8	9	25	26	77	78	235	236	711	712	1900	1901	4000	4001	8000				
160	CH2F2	Difluoromethane	24.7	29.7			3	6	7	19	20	57	58	174	175	533	534	1612	1613	4300	4301	9000	9001	18000				
185	CH6Si	Methylsilane (MONO)	9.7	14.7			3	4	5	12	13	37	38	111	112	340	341	1050	1051	2800	2801	5900	5901	11600				
190	(CH3)3SiH	Trimethylsilane (TMSi)	6.7						3	7	8	20	21	62	63	189	190	572	573	1530	1531	3200						
266	C5F8	Octafluorocyclopentene	9.7	14.7					3	5	6	14	15	44	45	134	135	406	407	1050	1051	2200	2201	4500				
270	C4F6	Hexafluoro-2-butyne	9.7						3	6	7	19	20	57	58	176	177	533	534	1400	1401	2900						
297	C4F6-q)	Hexafluoro Butadiene-1-3	14.7	14.7					3	6	7	17	18	52	53	160	161	500	501	1270	1271	2640	2641	5270				
354	C5F8O	Epoxyperfluorocyclopentene	19.7	19.7					3	4	5	13	14	40	41	122	123	369	370	1000	1001	2100	2101	4200				
368	Si3H9N	Trisilylamine (TSA)	6.0	7.2					3	6	7	20	21	60	61	181	182	560	561	1410	1411	3000	3001	6000				
371	C4H11N	Dimethylethylamine	8.7	8.7					3	6	7	20	21	63	64	190	191	580	581	1530	1531	3200	3201	6500				
509	10%GeH4/H2	10%Germane/Hydrogen	20.7	20.7			3	9	10	28	29	86	87	260	261	800	801	2400	2401	7200	7201	15000	15001	30000				
516	10%PH3/H2	10%Phosphine/Hydrogen	14.7	14.7			3	9	10	28	29	90	91	275	276	813	814	2500	2501	7600	7601	15500	15501	31000				
527	10%PH3/N2	10%Phosphine/Nitrogen	19.7	24.7			3	9	10	30	31	91	92	271	272	850	851	2510	2511	7100	7101	14500	14501	29000				
528	4.5%PH3/N2	4.5%Phosphine/Nitrogen	20.7	29.7			3	10	11	30	31	94	95	280	281	880	881	2600	2601	7200	7201	15000	15001	30000				
536	20%O2/He	20%Oxygen/Helium	19.7	29.7			4	13	14	38	39	120	121	360	361	1102	1103	3331	3332	10000	10001	21000	21001	42000				
537	1%PH3/Ar	1%Phosphine/Argon	19.7	29.7			5	14	15	42	43	128	129	390	391	1200	1201	3600	3601	9800	9801	20000	20001	40000				
542	5%H2/N2	5%Hydrogen/Nitrogen	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7400	7401	15100	15101	31000				
557	1%B2H6/H2	1%Diborane Hydrogen	24.7	29.7			3	10	11	30	31	91	92	270	271	850	851	2510	2511	7900	7901	16100	16101	33000				
563	1%PH3/H2	1%Phosphine/Hydrogen	19.7	19.7			3	10	11	30	31	90	91	273	274	850	851	2531	2532	7800	7801	16000	16001	32000				
595	3%B2H6/N2	3%Diborane/Nitrogen	20.7	29.7			3	9	10	29	30	90	91	270	271	850	851	2500	2501	7100	7101	14500	14501	29000				
597	3%H2/N2	3%Hydrogen/Nitrogen	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7400	7401	15100	15101	30100				
603	30%He/O2	30%Helium/Oxygen	24.7	29.7			4	11	12	33	34	100	101	301	302	950	951	2800	2801	8100	8101	17000	17001	34000				
604	30%O2/He	30%Oxygen/Helium	19.7	29.7			4	12	13	37	38	113	114	345	346	1060	1061	3203	3204	9700	9701	20000	20001	40000				
606	4%H2/He	4%Hydrogen/Helium	19.7	19.7			5	14	15	41	42	126	127	400	401	1200	1201	3600	3601	11000	11001	23000	23001	46000				
607	4%H2/N2	4%Hydrogen/Nitrogen	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7400	7401	15100	15101	30100				
615	5%B2H6/Ar	5%Diborane/Argon	24.7				4	12	13	38	39	116	117	353	354	1084	1085	3278	3279	8900	8901	18200						
626	5%PH3/Ar	5%Phosphine/Argon	27.7	32.7			5	13	14	41	42	125	126	380	381	1170	1171	3600	3601	9500	9501	19400	19401	39000				
632	50%PH3/SiH4	50%Phosphine/Silane	16.7	24.7			3	6	7	20	21	62	63	190	191	580	581	1730	1731	4800	4801	10000	10001	20000				
649	10%O2/He	10%Oxygen/Helium	19.7	24.7			5	13	14	41	42	123	124	380	381	1150	1151	3500	3501	10500	10501	22000	22001	44000				
653	2%SiH4/N2	2%SILANE/NITROGEN	19.7	24.7			3	10	11	30	31	93	94	280	281	870	871	2600	2601	7300	7301	15000	15001	30000				
654	5%B2H6/N2	5%Diborane/Nitrogen	24.7	29.7			3	9	10	28	29	86	87	262	263	804	805	2500	2501	7000	7001	14100	14101	28100				
662	.8%B2H6/N2	.8%Diborane/Nitrogen	24.7	29.7			3	10	11	30	31	93	94	280	281	870	871	2600	2601	7300	7301	15000	15001	30000				
674	10%PH3/He	10%Phosphine/Helium	14.7	19.7			4	13	14	40	41	120	121	370	371	1100	1101	3400	3401	10000	10001	21000	21001	43000				
676	7.5%PH3/SiH4	7.5%Phosphine/Silane	14.7	14.7			3	6	7	19	20	58	59	175	176	540	541	1610	1611	4500	4501	9400	9401	18400				
693	5%PH3/He	5%Phosphine/Helium	12.7	14.7			4	13	14	41	42	125	126	380	381	1150	1151	3500	3501	10500	10501	22000	22001	44000				
695	2%B2H6/N2	2%Diborane/Nitrogen	24.7	29.7			3	10	11	30	31	93	94	280	281	870	871	2600	2601	7200	7201	15000	15001	30000				
698	10%GeH4/Ar	10%Germane/Argon	24.7	29.7			4	12	13	38	39	114	115	350	351	1070	1071	3300	3301	8700	8701	18000	18001	36000				
700	4%H2/Ar	4%Hydrogen/Argon	24.7	29.7			5	14	15	42	43	130	131	390	391	1200	1201	3700	3701	9800	9801	20000	20001	40000				
701	10%B2H6/H2	10%Diborane/Hydrogen	14.7	14.7			3	8	9	26	27	81	82	241	242	760	761	2300	2301	7000	7001	14200	14201	29000				
762	5%H2/He	5%Hydrogen/Helium	19.7	19.7			5	14	15	41	42	125	126	400	401	1200	1201	3600	3601	11000	11001	23000	23001	46000				
766	5%B2H6/He	5%Diborane/Helium	14.7	16.7			4	12	13	38	39	115	116	350	351	1100	1101	3300	3301	10000	10001	21000	21001	42000				
780	5%SiH4/He	5%Silane/Helium	14.7	16.7			4	13	14	40	41	122	123	380	381	1140	1141	3500	3501	10500	10501	22000	22001	44000				
805	1%B2H6/Ar	1%Diborane/Argon	14.7	16.7			5	14	15	42	43	130	131	390	391	1200	1201	3600	3601	9700	9701	20000	20001	40000				
820	15%B2H6/H2	15%Diborane/Hydrogen	14.7	14.7			3	8	9	25	26	76	77	230	231	710	711	2120	2121	6500	6501	13300	13301	27000				
824	2%SO2/N2	2%Sulfur Dioxide/Nitrogen	14.7	14.7			3	10	11	30	31	93	94	280	281	870	871	2600	2601	7300	7301	15000	15001	30000				
837	30%GeH4/Ar	30%Germane/Argon	14.7	14.7			3	10	11	30	31	93	94	280	281	860	861	2600	2601	6900	6901	14100	14101	28100				
875	20%O2/Ar	20%Oxygen/Argon	14.7	14.7			4	13	14	39	40	120	121	370	371	1120	1121	3400	3401	9200	9201	19000	19001	38000				

Table A-1C GF100 Series Gas Table - Codes 878-5022, Bins SH40 to SH50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)				SH40		SH41		SH42		SH43		SH44		SH45		SH46		SH47		SH48		SH49		SH50	
			SH40-SH47	SH48	SH49	SH50	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
878	3%C2H4/He	3%Ethylene/Helium	19.7	19.7			4	13	14	40	41	125	126	375	376	1150	1151	3500	3501	10700	10701	22100	22101	45000				
881	10%B2H6/Ar	5%Diborane/Argon	24.7	29.7			4	11	12	35	36	105	106	320	321	1000	1001	3000	3001	8100	8101	17000	17001	34000				
897	2.7%C2H4/He	2.7%Ethylene/Helium	19.7	19.7			4	13	14	40	41	125	126	377	378	1158	1159	3502	3503	10700	10701	22200	22201	45000				
898	1%GeH4/H2	1%Germane/Hydrogen	20.7	20.7			3	10	11	30	31	91	92	275	276	850	851	2530	2531	8000	8001	16200	16201	33000				
910	.5%GeH4/H2	0.5%Germane/Hydrogen	20.7	20.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	8000	8001	16300	16301	33000				
916	2%PH3/H2	2%Phosphine/Hydrogen	21.7	21.7			3	10	11	30	31	91	92	275	276	850	851	2530	2531	8000	8001	16200	16201	33000				
917	50%C3H6-b)/N2	50%Propylene/Nitrogen	19.7	21.7			3	5	6	17	18	53	54	160	161	500	501	1500	1501	4100	4101	8600	8601	17000				
925	10%C3H6-b)/N2	10%Propylene/Nitrogen	19.7	21.7			3	8	9	26	27	82	83	243	244	760	761	2300	2301	6400	6401	13100	13101	26100				
929	10%CH4/N2	10%Methane/Nitrogen	19.7	21.7			3	10	11	29	30	91	92	272	273	850	851	2520	2521	7200	7201	15000	15001	30000				
930	3.9%H2/N2	3.9%Hydrogen/Nitrogen	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7400	7401	15100	15101	30100				
939	10%B2H6/He	10%Diborane/Helium	19.7	19.7			4	11	12	34	35	103	104	314	315	965	966	2918	2919	9000	9001	18400	18401	37000				
946	30%C2H4/He	30%Ethylene/Helium	19.7	24.7			3	10	11	30	31	90	91	275	276	850	851	2551	2552	7800	7801	16000	16001	32000				
950	10%H2/He	10%Hydrogen/Helium	19.7	19.7			4	13	14	40	41	125	126	380	381	1200	1201	3500	3501	10700	10701	22200	22201	45000				
953	15%H2/B2H6	15%Hydrogen/Diborane	19.7	19.7			3	4	5	14	15	42	43	130	131	400	401	1200	1201	3400	3401	7100	7101	14000				
958	17%CH4/CO2	17%Methane/Carbon Dioxide	24.7	29.7			3	7	8	23	24	70	71	210	211	650	651	2000	2001	5400	5401	11000	11001	22000				
962	20%CH6Si/H2	20%Methylsilane (MONO)/Hydrog	14.7	19.7			3	7	8	23	24	71	72	212	213	660	661	2000	2001	5900	5901	12000	12001	24000				
965	50%CH3SiHCl2/H2	50%Dichloromethylsilane/Hydrog	11.7	13.7			3	4	5	14	15	42	43	130	131	400	401	1200	1201	3100	3101	6600	6601	13000				
978	20%GeH4/H2	20%Germane/Hydrogen	19.7	24.7			3	8	9	26	27	81	82	241	242	750	751	2240	2241	6600	6601	13500	13501	27000				
979	0.5%B2H6/He	0.5%Diborane/Helium	14.7	19.7			5	14	15	42	43	130	131	400	401	1200	1201	3700	3701	11000	11001	23000	23001	47000				
980	20%F2/Ar	20%Fluorine/Argon	24.7	29.7			4	13	14	39	40	120	121	360	361	1100	1101	3400	3401	9000	9001	18400	18401	37000				
982	5%HF/N2	5%Hydrogen Fluoride/Nitrogen	24.7	29.7			4	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000				
983	3%H2S/CO	3%Hydrogen Sulfide/Carbon Mon	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000				
984	1.4%C2H2/Ar	1.4%Acetylene/Argon	24.7	29.7			5	14	15	42	43	130	131	390	391	1200	1201	3600	3601	9700	9701	20000	20001	40000				
985	2%Ge2H6/H2	2%Digermane/Hydrogen	24.7	29.7			3	10	11	30	31	92	93	280	281	860	861	2600	2601	7200	7201	15000	15001	30000				
986	38%SiCl4/O2	38%Silicon Tetrachloride/Oxygen	24.7	29.7	29.7	29.7	3	5	6	16	17	50	51	150	151	460	461	1400	1401	3600	3601	7500	7501	15000	15001	15001	15002	25000
987	20%H2S/20%CO2	20%Hydrogen Sulfide/20%Carbo	24.7	29.7			3	9	10	27	28	85	86	252	253	790	791	2400	2401	6500	6501	13300	13301	27000				
988	20%SiH2Cl2/H2	20%Dichlorosilane/Hydrogen	24.7	29.7			3	8	9	24	25	74	75	222	223	700	701	2100	2101	5900	5901	12000	12001	24000				
989	0.1%Cl2/N2	0.1%Chlorine/Nitrogen	24.7	29.7			4	10	11	30	31	94	95	280	281	880	881	2600	2601	7400	7401	15000	15001	30000				
990	1%HCl/N2	1%Hydrogen Chloride/Nitrogen	24.7	29.7			4	10	11	30	31	94	95	280	281	880	881	2600	2601	7400	7401	15000	15001	30000				
991	3%BCl3/N2	3%Boron Trichloride/Nitrogen	24.7	29.7			3	9	10	29	30	91	92	270	271	850	851	2510	2511	7000	7001	14400	14401	29000				
992	18%NO/N2	18%Nitric Oxide/Nitrogen	24.7	29.7			3	10	11	30	31	94	95	280	281	880	881	2600	2601	7300	7301	15000	15001	30000				
993	9%NO/41%N2/H2	9%Nitric Oxide/41%Nitrogen/H2	24.7	29.7			4	10	11	30	31	94	95	281	282	880	881	2610	2611	7700	7701	16000	16001	32000				
994	20%H2/Ar	20%Hydrogen/Argon	24.7	29.7			4	13	14	40	41	120	121	370	371	1120	1121	3400	3401	9400	9401	19200	19201	39000				
5022	COS-Special	Carbonyl Sulfide (Special)	24.7	29.7			3	7	8	20	21	60	61	183	184	562	563	1700	1701	4500	4501	9400	9401	18300				

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B-1 GF100 Series Patents

The GF100 Series may be protected by the following US patents and their international filings.

Table B-1 GF100 Series Patents

Patent/Pub. No.	Title
6343617	System and method of operation of a digital mass flow controller
6389364	System and method for a digital mass flow controller
6425281	Pressure insensitive gas control system
6445980	System and method for a variable gain proportional-integral (PI) controller
6539792	Method and apparatus for balancing resistance
6640822	System and method of operation of a digital mass flow controller
6681787	System and method of operation of a digital mass flow controller
6714878	System and method for a digital mass flow controller
6752166	Method and apparatus for providing a determined ratio of process fluids
6826953	Flow sensor
6845659	Variable resistance sensor with common reference leg
6910381	System and method of operation of an embedded system for a digital capacitance diaphragm gauge
6941965	Method and apparatus for providing a determined ratio of process fluids
6962164	System and method for a mass flow controller
7043374	Flow sensor signal conversion
7073392	Methods and apparatus for pressure compensation in a mass flow controller
7082824	Variable resistance sensor with common reference leg
7113895	System and method for filtering output in mass flow controllers and mass flow meters
7114511	System and method for a mass flow controller
7133785	Valve control system and method
7143774	Method and apparatus for providing a determined ratio of process fluids
7150201	System and method for measuring flow
7216019	Method and system for a mass flow controller with reduced pressure sensitivity
7231931	System and method for a mass flow controller
7243035	System and method for mass flow detection device calibration
7272512	Flow sensor signal conversion
7273063	Methods and apparatus for pressure compensation in a mass flow controller
7287434	System and method for measuring flow
7360551	Method and apparatus for providing a determined ratio of process fluids
7363182	System and method for mass flow detection device calibration
7380564	System and method for a mass flow controller
7409871	Mass flow meter or controller with inclination sensor
7412986	Method and system for flow measurement and validation of a mass flow controller
7424894	Method and apparatus for providing a determined ratio of process fluids
7434477	Methods and apparatus for pressure compensation in a mass flow controller

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Bulgarian

Основни инструкции Прочетете преди работа!

Brooks Instrument проектира, произвежда и тества продуктите си по такъв начин, че те да отговарят на многобройни национални и международни стандарти. Тези оборудвания трябва правилно да се инсталират, експлоатират и поддържат за да се гарантира, че ще могат да работят съответно на техните нормални спецификации. Следващите инструкции трябва да се спазват и трябва да се включат в програмата за безопасност на труда при инсталирането, експлоатацията и поддръжката на продуктите на Brooks Instrument.

- За да се гарантира характерната производителност, инсталирането, експлоатацията, актуализирането, програмирането и поддръжката на продукта трябва да се извършват само от квалифициран персонал.
- Прочетете всички инструкции преди инсталирането, експлоатацията и поддръжката на продукта. Ако това ръководство не е съответстващото издание, вижте на задната обложка информацията за контакт с местния търговски офис. Запазете това ръководство за по-късно информиране.

⚠ **ВНИМАНИЕ: Не работете с оборудването извън диапазоните, указани в инструкцията и ръководството по експлоатация. Неизпълнението на това може да доведе до сериозни телесни повреди и / или повреждане на оборудването.**

- Ако не разбирате някои инструкциите, свържете се с представителя на Brooks Instrument за изясняване на проблема.
- Спазвайте всички предупреждения, призови и инструкции означени върху оборудването или доставени заедно с него.

⚠ **ПРЕДУПРЕЖДЕНИЕ: Преди инсталацията се убедете, че този инструмент притежава необходимите одобрения за съответствие на местните и националните кодове. Неспазването на това предупреждение може да доведе до сериозни травми и/или повреда на оборудването.**

- Инсталирайте оборудването съответно на указанията в инструкцията за инсталиране и на действащите на местни и национални предписания. Свързвайте продуктите само към подходящи източници на електричество и налягане.
- Ход: (1) Бавно въведете системата под налягане. Бавно отворете работните клапани за да се избегнат колебанията на потока. (2) Проверете дали няма изтичане при входното и изходното съединение на разходомера. Ако няма изтичане, напълнете системата до работно налягане.
- Преди извършване на поддръжката непременно проверете дали работният тръбопровод не се намира под налягане. Ако са необходими резервни части, с определените от Brooks Instrument резервни части трябва да борави само квалифициран персонал. Неразрешените части и процедури могат да окажат влияние върху работата на продукта, и също да застрашат безопасността на експлоатацията. Заместването с неоригинални части може да доведе до пожар, опасност от токов удар или неправилна работа.
- Всички врати на оборудването непременно да бъдат затворени, а защитните покрития да бъдат на мястото си, за да се избегнат токовите удари и телесните повреди, освен ако квалифицирани специалисти извършват работи по неговото поддържане.

⚠ **ВНИМАНИЕ: При оборудванията с протичащи течности, ако по някаква причина е необходимо да се затворят намиращите се до оборудването изходни и входни клапани, оборудването трябва напълно да се изпразни. Неизпълнението на това може да причини топлинно разширение на течността, което може до спука оборудването и да доведе до телесни повреди.**

Европейска директива за уреди под налягане (PED)

Всички съоръжения под налягане с вътрешно налягане над 0,5 bar (g) и с размер по-голям от 25 mm или 1" (inch), попадат под действието на европейската директива за уреди под налягане (PED).

- Глава „Технически данни" на настоящото ръководство съдържа свързаните с директивата PED инструкции.
- Указаните в настоящото ръководство продукти съответстват на европейската директива 2014/34/EU.
- Всички разходомери на Brooks Instrument се отнасят към флуиди от група 1.
- Продуктите по-големи от 25 mm или 1" (inch) съответстват на I, II или III категория според PED.
- Продуктите с размери 25 mm или 1" (inch), или по-малки, следват добрата инженерна практика (SEP).

Европейска директива за електромагнитна съвместимост (EMC)

Носещото знака CE (електрическо/електронно) оборудване на Brooks Instrument е изпълнило успешно тестовете за проверка на изискванията за електромагнитна съвместимост (директива EMC 2014/30/EU).
Особено внимание трябва да се обръща обаче на избирането на сигналните кабели, използвани с оборудването, носещо знака CE.
Качество на сигналните кабели, кабелните салници и съединители:
Brooks Insturment предлага висококачествени кабели, отговарящи на изискванията на CE сертификацията.
Ако използвате собствен сигнален кабел, трябва да изберете такъв, който е напълно защитен със 100%-ово екраниране.
Съединителите тип „D" или „кръгов" трябва да бъдат екранирани с метален щит. При необходимост за фиксирането на щита на кабела трябва да се използват метални кабелни салници.
Щитът на кабела трябва да се свърже с металното покритие или металния салник и в двата края да се екранира в 360°. Щитът трябва да бъде заземен.
Съединителите за печатни платки са стандартно неметални. Използваните кабели трябва да бъдат защитени със 100%-ово екраниране, за да отговарят на CE сертификацията.
Щитът трябва да бъде заземен.
Конфигурация на контактите: Виж приложената инструкция за експлоатация.

Електростатичен разряд (ESD)

⚠ **ВНИМАНИЕ: Приборът съдържа електронни компоненти, които са чувствителни към статичното електричество и могат да се повредят от него. Трябва да се спазват съответните процедури по време на изваждане, слагане или друго боравене с вътрешните монтажни платки и устройства.**

Процедура за работа:

1. Изключете оборудването.
2. Персоналът трябва да се заземи с гривна или друго безопасно и подходящо за целта средство, преди да инсталира, изважда или регулира монтажна платка или друго вътрешно устройство.
3. Печатните монтажни платки трябва да се транспортират в проводяща опаковка. Печатните платки могат да се изваждат от защитното покритие само непосредствено преди инсталирането. Отстранените печатни платки незабавно трябва да се сложат в защитна опаковка, служеща за транспортиране, складиране или връщане на производителя.

Забележки:
Не е уникално явление, че този прибор съдържа чувствителни към електростатичния заряд (ESD) компоненти. Болшинството от съвременните електронни прибори съдържат компоненти, изготвени по технология метал-окис (NMOS, SMOS и т.н.). Опитът доказва, че даже и малко количество статическо електричество може да повреди или съсипе тези прибори. Повредените компоненти даже ако привидно работят правилно, проявяват начални неизправности.

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Czech

Základní instrukce

Před instalací si přečtěte následující instrukce!

Společnost Brooks Instrument konstruuje, vyrábí a testuje tento produkt tak, aby splnil mnoho národních a mezinárodních standardů. Přístroje musí být řádně nainstalovány, používány a udržovány tak, aby byl zajištěn jejich nepřetržitý provoz v rámci normálních technických specifikací. Musíte dodržovat následující pokyny a integrovat jejich obsah do svého bezpečnostního programu při instalování, používání a udržování produktů společnosti Brooks.

- Pro zajištění správné funkce zařízení mohou jeho instalaci, obsluhu, programování, údržbu a aktualizace firmwaru provádět výhradně kvalifikované osoby.
- Před instalací, provozem a údržbou produktu si prostudujte všechny pokyny. Pokud tato příručka není tou správnou příručkou pro dané zařízení, informujte se na zadní straně obálky o kontaktu na místní prodejní kancelář. Uchovejte si tuto příručku pro pozdější potřebu.

⚠ **UPOZORNĚNÍ: Neprovozujte zařízení v rozsahu mimo daný rozsah v provozní příručce. Porušení tohoto upozornění může mít za následek vážné újmy na zdraví a vést k poškození zařízení.**

- Pokud některým pokynům nerozumíte, kontaktujte svého prodejního zástupce společnosti Brooks a vyžádejte si objasnění.
- Dodržujte všechny výstrahy, upozornění a pokyny, uvedené a vyznačené na produktu, nebo s ním dodané.

⚠ **VAROVÁNÍ: Před instalací prověřte, zda má tento přístroj požadované schválené parametry splňující místní a národní předpisy. Nedodržení tohoto varování může způsobit vážnou újmu na zdraví osob a/nebo poškození zařízení.**

- Namontujte zařízení specifikovaným způsobem podle správné montážní příručky a podle platných místních a národních předpisů. Připojte všechny produkty ke správným zdrojům elektrické energie a stlačených médií.
- Postup: (1) Pomalu do systému přivádějte médium. Pro zabránění vzniku rázů v systému otvírejte procesní ventily postupně. (2) Překontrolujte těsnost vstupního a výstupního připojení průtokoměru. Pokud nezjistíte žádné netěsnosti, postupně zvedejte tlak na provozní hodnotu.
- Před prováděním servisních prací zkontrolujte, zda systém není pod tlakem. V případě potřeby výměny dílů zajistěte, aby byly použity náhradní součásti specifikované společností Brooks Instrument a výměnu prováděla kvalifikovaná osoba. Použití neschválených dílů a postupů může negativně ovlivnit efektivitu a bezpečnost procesu. Použití náhrad za originální díly může způsobit požár, úraz elektrickým proudem nebo nesprávnou funkci.
- Pokud není zrovna prováděna údržba kvalifikovanou osobou, ujistěte se, že zařízení je opatřeno všemi předepsanými kryty.

⚠ **UPOZORNĚNÍ: Pokud je u zařízení s průtokem kapalin nutno z jakéhokoli důvodu uzavřít vstupní a výstupní ventily, je nutné zařízení kompletně vyprázdnit. Pokud tak neučiníte, může z důvodu teplotní roztažnosti zbytků média v zařízení dojít k jeho poškození nebo k ohrožení zdraví osob.**

Evropská směrnice pro tlakové zařízení (PED)

Na veškerá tlaková zařízení s vnitřním tlakem vyšším než 0,5 baru (g) a velikosti větší než 25 mm nebo 1" (palec) se vztahuje platnost směrnice o tlakovém zařízení (PED).
Kapitola „Technické údaje“ v této příručce obsahuje důležité bezpečnostní a provozní pokyny související se směrnicí PED.

- Produkty popsané v této příručce jsou v souladu se směrnicí EN 2014/34/EU.
- Všechny průtokoměry společnosti Brooks Instrument spadají do rámce Kapaliny, skupina I.
- Produkty větší než 25 mm nebo 1" (palec) jsou v souladu se směrnicí PED, kategorii I, II nebo III
- Produkty s velikostí 25 mm nebo 1" (palec) a menší spadají do rámce Správných technických postupů (SEP).

Evropská směrnice pro elektromagnetickou kompatibilitu (EMC)

Elektrické/elektronické zařízení Brooks Instrument nesoucí značku CE bylo úspěšně testováno dle předpisů pro elektromagnetickou kompatibilitu (směrnice EMC č. 2014/30/EU).
Výběru signálních kabelů pro použití se zařízením označeném CE je nutné věnovat zvláštní pozornost.
Kvalita signálních kabelů, kabelových průchodek a konektorů:
Brooks Instrument dodává vysoce jakostní kabely splňující požadavky kvalitativního zařazení CE. Pokud chcete použít vlastní signální kabely, zvolte typy s kvalitním stíněním všech žil a v celé délce trasy.
V případě použití konektorů kruhových nebo tvaru „D“, musí mít tyto kovové stínění. V případě jejich použití, musí kovové kabelové průchodky být propojeny se stíněním kabelu.
Stínění by mělo být připojené ke kovovému tělesu přístroje nebo krytu, na obou koncích kabelu a po celém jeho obvodu.
Stínění by mělo být uzemněno.
Přípojky vedoucí ke kartám podle norem jsou nekovová. Pro splnění požadavků předpisů CE musí být použité kabely kompletně stíněny.
Stínění by mělo být uzemněno.
Konfigurace kontaktů je uvedena v přiloženém návodu k obsluze.

Elektrostatický výboj (ESD)

⚠ **UPOZORNĚNÍ: Tento přístroj obsahuje komponenty citlivé na poškození statickou elektřinou. Při montáži, demontáži či jiné manipulaci s vnitřními elektronickými obvody je potřeba dodržovat příslušné postupy.**
Postup ošetřování:

1. Odpojte přístroj od napájení.
2. Osoba provádějící údržbu má být při instalaci, vyjímání či práci na desce plošných spojů nebo jiné vnitřní elektronice uzemněna zemnícím náramkem, nebo jiným vyhovujícím způsobem.
3. Desky plošných spojů je nutné přepravovat v elektricky vodivém obalu. Plošné spoje vyjímejte z vodivého obalu až bezprostředně před instalací do přístroje! Plošné spoje vyjmuté z přístroje a určené pro další využití, opět neprodleně umístěte do ochranného obalu.

Poznámky:
Existence prvků, citlivé na elektrostatické výboje (ESD) v přístrojích je častým jevem. Prvky s technologií oxidu kovů (NMOS,SMOS) jsou používány u většiny moderních elektronických zařízení. Zkušenosti dokazují, že i jen malé elektrostatické výboje mohou poškodit nebo zničit tyto zařízení. U poškozených součástek, jakkoli zdánlivě pracujících bezchybně, dochází brzy k poruše.

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Dansk

Grundlæggende vejledninger Læs disse før anvendelse!

Brooks Instruments designer, fremstiller og afprøver sine produkter således, at de tilpasser sig både de indenrigs og internationale standarder. Disse udstyr bør installeres, bruges og repareres omhyggeligt, så at de kan virke tilsvarende deres normale anvendelsesperiode. De følgende regler skal overholdes og implementeres under installeringen samt ved brug og reparation.

- For at garantere den passende kapacitet, er udstyrets installation, anvendelse, opdatering, programmering kun tilladt for kvalificeret personale. Alle vejledninger skal læses før produktets installation, anvendelse og reparation.
- Hvis denne manual ikke er den passende udgave, kontakt venligst jeres leverandør for yderligere information.
- Det anbefales at gemme denne manual for senere brug.

⚠ **OBS.: Udstyret må ikke anvendes til andet end det er angivet i brugsanvisningen. Hvis denne regel brydes, kan der forekomme alvorlige personskader eller brist på udstyret.**

Hvis vejledningerne ikke er forståelig, kontakt venligst Deres Brooks repræsentant for at afklare problemet som er opstået.

- Overhold alle regler, som er markeret eller leveret sammen med udstyret.

⚠ **ADVARSEL! Før ibrugtagning/installation skal det kontrolleres, at det ihåndenværende instrument opfylder de lokale og nationale sikkerhedskrav. Hvis denne advarsel ignoreres, kan det resultere i alvorlig personskade og/eller skader på instrumentet.**

- Installer udstyret efter den angivne installationsvejledning og gældende lovgivning for anvendelsesområde. Udstyret må kun tilsluttes med kabler og stik som overholder kravspecifikationerne i vejledningen.
- Ibrugtagning: (1) Åbn langsomt for trykket i systemet.. Åbn langsomt for alle procesventiler for at forhindre ustabil gas flow. (2) Tjek systemet for lækage ved tilsluttet måleinstrumenter, samlinger og andet tilsluttet udstyr. Derefter øg trykket i systemet indtil arbejdstrykket er opnået.
- Før reparation tjek altid at procesledningen ikke står under tryk. Hvis der er brug for at udskifte defekte dele må kun kvalificeret personale udføre arbejdet og af sikkerhedsmæssige årsager må der kun anvendes originale Brooks reservedele. Det er ikke tilladt at anvende reservedele eller udføre arbejde der på nogen måde kan ændre produktet fra dens oprindelige specifikationer. Manglende overholdelse af de foreskrevne procedurer kan resultere i brænd, og fare for elektrisk stød eller kortslutning.
- Af sikkerhedsmæssige årsager sørg for at alle sikkerhedsforanstaltninger er overholdt. Eksempelvis at alle afskærmninger eller anden form for installationsbeskyttelse er lukket eller installeret ved normal drift.

⚠ **Advarsel.: Ved brug af udstyr som anvendes til væske skal det sikres at indgangsventilen og udgangsventilen ikke bliver lukket på samme tid i forbindelse med aftapning. Såfremt dette ikke overholdes, er der risiko for at væsken på grund af varmeudvikling ekspanderer og dette kan forårsage skade på udstyr og personer.**

Det Europæiske direktiv for trykudstyr (PED)

På alt udstyr hvis indgangstryk er større end 0,5bar (g) og større end 25 mm eller en tomme, gælder det europæiske direktiv for trykapparater. Manualens afsnit "tekniske data" indeholder anvisninger om PED direktivet.

- I manualen angives instrumenter der er tilpasset direktiv 2014/34/EU.
- Alle Brooks gennemstrømningsmålere tilhører væskegruppe nr. 1.
- Alle instrumenter som er større end 25 mm eller en tomme beskrives i direktivet PED´s kategorier I, II eller III.
- Alle instrumenter som er på 25 mm eller en tomme, eller mindre, beskrives i Sound Engineering Practice (SEP).

Det europæiske direktiv for elektromagnetisk kompatibilitet (EMC)

Alle Brooks instrumenter (elektrisk/elektronisk) som har CE markering er godkendt og testet ifølge om elektromagnetiske kompatibilitets forskrifter (EMC direktiv 2014/30/EU).
OBS: Man skal være opmærksom på hvilken type kabler der bruges til CE mærket udstyr..

Om kvalitet af signalkabler, kabeltilslutninger og koblinger:
Brooks tilbyder kabler af højest kvalitet, som er tilpasset CEE kvalificeringens forskrifter. Hvis man vælger at bruge egne kabler, skal man vælge et kabel som har den nødvendige afskærmning for at sikre 100 % mod udefra kommende støj.
Tilslutningerne "D" eller rundformede tilslutninger skal være afskærmet med skal af metal.
Stikket skal være afskærmet på alle sider. Al afskærmning skal jordes..
Card Edge tilslutninger er ifølge standarden ikke metalliske.. De anvendte kabler og stik skal være 100 % afskærmet for at opfylde CE kravene.. De skal ligeledes jordes.
For stik konfigurationen se vedlagte brugsvejledning.

Elektrostatisk afladning (ESD)

⚠ **OBS.: Udstyret indeholder tilbehør som kan skades ved elektrostatisk elektricitet. Alle forskrifter skal overholdes ved kontakt med alle elektriske komponenter både under drift og vedligeholdelse..**

Behandlingsproceduren:

1. Sluk for al strømtilførsel til udstyret.
2. Personer som skal i kontakt med udstyret skal være jordet eller bære anden form for elektrisk beskyttende udstyr. Manglende overholdelse af dette kan medføre skader på alle elektriske komponenter.
3. Alle elektriske komponenter skal opbevares eller transporteres i deres originale indpakning for at sikre komponenter mod statiske elektriske skader. Emballagen må ikke åbnes før komponenten skal installeres i udstyret. Ved afslutning af vedligeholdelse/reparation af udstyret, skal udstyret installeres med det samme eller pakkes forsvarligt hvis det skal på lager eller transporteres.

Bemærkninger:
Dette udstyr er ikke unik i den hensigt, at det indeholder for elektrostatisk afladning (ESD) sensitive reservedel. I de fleste elektronisk udstyr findes der metaloxyd teknologiske reservedel (NMOS, SMOS m.m.). Erfaringerne viser at selv den mindste statiske elektricitet kan skade, eller ødelægge disse instrumenter. Selv en fungerende elektrisk del kan have levetiden markant reduceret på grund af statisk elektricitet..

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Dutch

Essentiële instructies Lees ze voordat u verder gaat!

Brooks Instrument ontwerpt, produceert en test haar producten zodanig dat ze voldoen aan vele nationale en internationale normen. Deze producten moeten correct worden geïnstalleerd, bediend en onderhouden zodat ze binnen hun normale specificaties blijven werken. De volgende instructies moeten worden toegevoegd aan en geïntegreerd in uw veiligheidsprogramma als u producten van Brooks Instrument installeert, bedient en onderhoudt.

- Om de juiste prestaties te kunnen garanderen mag alleen gekwalificeerd personeel het product installeren, bedienen, updaten, programmeren en onderhouden.
- Lees alle instructies voordat u het product gaat installeren, bedienen en onderhouden. Als dit niet de juiste handleiding is, kijk dan op de achterzijde voor contactinformatie van uw vertegenwoordiger. Bewaar deze handleiding voor later.

⚠ **WAARSCHUWING: gebruik dit instrument niet als niet is voldaan aan de specificaties in de handleiding. Het niet naleven van deze waarschuwing kan ernstig letsel en/of schade aan de apparatuur tot gevolg hebben.**

- Als u één of meer instructies niet begrijpt, vraag dan om uitleg aan uw vertegenwoordiger van Brooks Instrument.
- Neem alle waarschuwingen, voorschriften en instructies in acht die op het product zijn aangebracht of bij het product zijn geleverd.

⚠ **WAARSCHUWING: Zorg ervoor dat dit instrument de vereiste goedkeurings-classificatie heeft om te voldoen aan de lokale en nationale standaarden, voordat u het gaat installeren. Het niet naleven van deze waarschuwing kan ernstig letsel en/of schade aan de apparatuur tot gevolg hebben.**

- Installeer uw apparatuur volgens de instructies in de bijgeleverde handleiding en in overeenstemming met de geldende lokale en nationale voorschriften. Sluit alle producten aan op de juiste elektrische voedings- en drukbronnen.
- Bediening: (1) Laat het systeem langzaam volstromen. Open de procesafsluiters langzaam om drukstoten te voorkomen. (2) Controleer op lekkages rondom de inlaat- en uitlaataansluitingen van de stromingsmeter. Als er geen lekkages zijn, kan het systeem op de bedrijfsdruk worden gebracht.
- Zorg ervoor dat de procesleiding drukvrij is gemaakt voordat u servicewerkzaamheden gaat uitvoeren. Als vervangingsonderdelen nodig zijn, zorg er dan voor dat gekwalificeerd personeel de door Brooks Instrument gespecificeerde vervangingsonderdelen gebruikt. Niet goedgekeurde onderdelen en procedures kunnen de prestaties van het product en de veilige werking van uw proces in gevaar brengen. Niet goedgekeurde vervangingsonderdelen kunnen brand, elektrische schokken of een onjuiste werking tot gevolg hebben.
- Zorg ervoor dat alle deksels van de apparatuur gesloten zijn en de afdekkingen gemonteerd zijn om elektrische schokken en lichamelijk letsel te voorkomen, behalve als gekwalificeerd personeel de onderhoudswerkzaamheden uitvoert.

⚠ **WAARSCHUWING: bij vloeistofstroomapparaten waarvan de inlaat- en uitlaatkleppen om welke reden dan ook gesloten zijn, moet de vloeistof volledig worden afgetapt. Als dat wordt nagelaten, kan dit leiden tot thermische expansie van de vloeistof waardoor het apparaat kan barsten en lichamelijk letsel kan veroorzaken.**

PED (Pressure Equipment Directive)

Alle drukapparatuur met een interne druk van meer dan 0,5 barg en een diameter van meer dan 25 mm valt onder de PED-richtlijn.

- In het hoofdstuk Specificaties van deze handleiding staan aanwijzingen die verband houden met de PED-richtlijn.
- De producten die in deze handleiding worden beschreven, voldoen aan de Europese richtlijn 2014/34/EU.
- Alle stromingsmeters van Brooks Instrument vallen in groep 1.
- Producten met een diameter van meer dan 25 mm voldoen aan de categorieën I, II of III van de PED-richtlijn.
- Producten met een diameter van 25 mm of kleiner voldoen aan de regels van goed vakmanschap.

Elektromagnetische compatibiliteit (EMC)

De elektronische apparatuur van Brooks Instrument met de CE-markering is succesvol getest in overeenstemming met de EMC-voorschriften (richtlijn EMC 2014/30/EU).
De keuze van de signaalkabel voor gebruik in combinatie met apparatuur met CE-markering verdient speciale aandacht.
Kwaliteit van de signaalkabel, kabelafdichtingen en stekkers:
Brooks Instrument levert hoogwaardige kabels die voldoen aan de specificaties voor de CE-markering.
Als u zelf voor signaalkabel zorgt, moet u altijd een volledig afgeschermde kabel gebruiken.
Stekkers van het type “D” of ronde stekkers moeten zijn voorzien van een metalen afscherming. Indien nodig moeten metalen kabelafdichtingen worden gebruikt waarvan de afscherming voor het klemmen van de kabel kan worden gebruikt.
Het kabelscherm moet met het metalen omhulsel of de metalen afdichting worden verbonden en aan beide uiteinden rondom volledig worden afgeschermd.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Card Edge Connectors zijn standaard niet van metaal. De gebruikte kabels moeten volledig zijn afgeschermd om te voldoen aan de CE-markering.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Voor de pinconfiguratie: Raadpleeg de bijgevoegde handleiding.

Elektrostatische ontlading

⚠ **VOORZICHTIG: Dit instrument bevat elektronische componenten die gevoelig zijn voor statische elektriciteit. Neem de juiste procedures in acht bij het verwijderen en installeren of bij andere werkzaamheden aan de interne printplaten of apparaten.**

Procedure:

1. Schakel de voeding van de eenheid uit.
2. Het personeel moet zich met een polsbandje of ander veilig en geschikt hulpmiddel aarden voordat een printplaat of ander intern apparaat mag worden geïnstalleerd, verwijderd of aangepast.
3. Printplaten moeten in een geleidende verpakking worden vervoerd. De platen mogen pas vlak voor de eigenlijke installatie uit de beschermende verpakking worden gehaald. Verwijderde printplaten moeten onmiddellijk in de beschermende verpakking worden geplaatst om te worden getransporteerd, opgeslagen of teruggestuurd naar de fabriek.

Opmerkingen
Dit instrument is niet uniek als het gaat om componenten die gevoelig zijn voor elektrostatische ontlading. De meeste moderne elektronische apparaten bevatten componenten die gebruik maken van de metaaloxidetechnologie (NMOS, SMOS, enz.). Uit ervaring blijkt dat zelfs kleine hoeveelheden statische elektriciteit deze apparaten al dan niet onherstelbaar kunnen beschadigen. Beschadigde componenten, zelfs als ze goed lijken te functioneren, raken eerder defect.

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Estonian

Olulised juhised

Enne kasutamist lugege hoolikalt läbi!

Brooks Instrument konstrueerib, valmistab ja katsetab oma tooteid selliselt, et need vastaksid paljudele riiklikele ja rahvusvahelistele standarditele. Ainult nõuetekohane paigaldamine, kasutamine ja hooldamine tagab toodete katkematu talitluse tavaspetsifikatsiooni raames. Brooks Instrumenti toodete paigaldamisel, kasutamisel ja hooldamisel tuleb täita alljärgnevaid juhiseid ja integreerida need asjakohasesse ohutusprogrammi.

- Nõuetekohase talitluse tagamiseks tohib toodet paigaldada, kasutada, täiustada, programmeerida ja hooldada ainult kvalifitseeritud personal.
- Enne toote paigaldamist, kasutamist ja hooldamist lugege kõik kasutusjuhised hoolikalt läbi. Kui see kasutusjuhend ei vasta teie tootele, pöörduge kohaliku edasimüüja poole, kelle kontaktandmed leiate kasutusjuhendi tagakaanelt. Hoidke see kasutusjuhend edaspidiseks alles.
  ⚠ **HOIATUS. Ärge kasutage seda instrumenti väljaspool kasutusjuhendis spetsifitseeritud piirväärtusi. Hoiatuse eiramine võib kaasa tuua raske kehavigastuse ja/või kahjustada seadet.**
- Kui te saa mõne juhise mõttest aru, pöörduge selgituste saamiseks kohaliku Brooks Instrumenti edasimüüja poole.
- Järgige kõiki hoiatusi, tähelepanule manitsusi ja juhiseid, mis on tootele peale kantud või tootega kaasa antud.
  ⚠ **HOIATUS. Enne paigaldamist veenduge, et see instrument vastaks kohalike ja riiklike määrustega kehtestatud nimiandmetele. Hoiatuse eiramine võib kaasa tuua raske kehavigastuse ja/või kahjustada seadet.**
- Seadme paigaldamisel järgige vastavas kasutusjuhendis toodud paigaldusjuhiseid ning asjakohaseid kohalikke ja riiklikke eeskirju. Ühendage tooted nõuetekohaste toite- ja surveallikatega.
- Talitlus. (1) Avage aeglaselt vool süsteemi. Vooluimpulsside vältimiseks avage tööventiilid aeglaselt. (2) Kontrollige, et voolukulumõõturi sisend- või väljundühenduste ümber ei oleks lekkeid. Kui lekkeid ei ole, laske süsteemil saavutada töösurve.
- Enne seadme hooldamist veenduge, et kogu süsteem oleks surve alt vabastatud. Varuosasid tohib vahetada ainult kvalifitseeritud personal, kasutades selleks Brooks Instrumenti heakskiidetud varuosi. Mitteoriginaalvaruosade kasutamine ja ebapädev toimingute tegemine võivad kahjustada toote tööomadusi ja põhjustada riski tootmistegevuse ohutuse tagamisel. Originaalvaruosadele sarnaste osade kasutamine võib põhjustada tule- või elektrilöögiohtu või seadme väärtalitlust.
- Elektrilöögi- ja vigastuseohu vältimiseks peavad seadme luugid olema alati suletud ja kaitsekatted oma kohal, v.a seadme hooldamisel kvalifitseeritud isikute poolt.
  ⚠ **HOIATUS. Voolava vedelikuga seadmete kasutamisel – kui seadmega külgnevad sisend- ja väljundklapid on vaja mingil põhjusel sulgeda, tuleb seadmed vedelikust täiesti tühjaks lasta. Vastasel korral võib vedelik soojuse mõjul paisuda niivõrd, et seade puruneb. See võib põhjustada raskeid kehavigastusi.**

Euroopa surveseadmete direktiiv (PED)

Euroopa surveseadmete direktiiv kohaldub kõikidele surveseadmetele, mille sisesurve on üle 0,5 baari (g) ja läbimõõt üle 25 mm või 1 tolli.

- Selle kasutusjuhendi spetsifikatsiooniosa sisaldab surveseadmete direktiiviga seonduvaid juhiseid.
- Kasutusjuhendis kirjeldatud tooted vastavad EL direktiivi 2014/34/EÜ nõuetele.
- Brooks Instrumenti voolukulumõõturid kuuluvad vedelike 1. gruppi.
- Tooted läbimõõduga üle 25 mm või 1 tolli vastavad surveseadmete direktiivi kategooriale I, II või III.
- Toodetele läbimõõduga alla 25 mm või 1 tolli kohaldatakse häid inseneritavasid.

Euroopa elektromagnetilise ühilduvuse direktiiv (EMÜ)

Brooks Instrumenti (elektrilised/elektroonilised) seadmed, millele on omistatud CE-tähis, on edukalt läbinud asjakohased katsed ja vastavad elektromagnetilise ühilduvuse nõuetele (EMÜ direktiiv 2014/30/EÜ).
Kuid signaalkaabli valimisel on vaja pöörata suurt tähelepanu CE-tähisega seadmetele.
Signaalkaabli, läbiviigutihendite ja konnektorite kvaliteet
Brooks Instrument turustab kõrgekvaliteedilisi kaableid, mis vastavad CE-sertifikaadi nõuetele.
Olemasoleva kaabli kasutamisel jälgige, et kaabel oleks täielikult ümbritsetud varjestusega.
„D"- või „Ring"-tüüpi konnektorid peavad olema varustatud metallvarjestusega. Võimaluse korral tuleb kasutada metallist läbiviike, mis tagavad kaabli varjestuse ühenduse.
Kaabli varjestus ühendatakse metallkesta või läbiviigutihendiga ja on mõlemast otsast kaitstud 360° ulatuses.
Varjestus peab olema maandatud.
Mikroskeemide servaühendused on üldjuhul mittemetallist. Vastavuse tagamiseks CE-sertifikaadi nõuetele peavad kasutatud kaablid olema 100% varjestatud.
Varjestus peab olema maandatud.
Klemmide konfigureerimine: vt komplekti kuuluvat kasutusjuhendit.

Elektrostaatiline laeng

⚠ **TÄHELEPANU! Seade sisaldab staatilise elektri suhtes tundlikke elektroonikakomponente. Seadmesse paigaldatud trükkplaatide eemaldamisel ja paigaldamisel, samuti trükkplaadi või seadmega muude toimingute teostamisel järgige nõuetekohase käsitsemise juhiseid.**

Käsitsemisjuhised

1. Lahutage seade toiteallikast.
2. Enne trükkplaadi või mõne muu siseelemendi paigaldamist, eemaldamist või konfigureerimist peab personal olema maandatud läbi randmepaela või mõne muu sobiva vahendi.
3. Trükkplaate transporditakse voolujuhtivas konteineris. Võtke trükkplaat kaitsvast konteinerist välja vahetult enne selle paigaldamist. Seadmest eemaldatud trükkplaadid tuleb viivitamatult asetada kaitsvasse konteinerisse, kas siis edasiseks transportimiseks, hoiustamiseks või tehasesse tagasisaatmiseks.

Kommentaarid
See seade ei ole ainus, mis sisaldab staatilise elektri suhtes tundlikke elemente. Enamik kaasaegsetest elektroonikaseadmetest sisaldavad komponente, mille valmistamiseks on kasutatud metalloksiidtehnoloogiat (NMOS, SMOS jne). Kogemused näitavad, et isegi väike kogus staatilist elektrit võib neid seadmeid kahjustada või isegi hävitada. Kuigi võib näida, et kahjustatud komponendid töötavad nõuetekohaselt, hakkavad talitlushäired ilmnema juba varakult.

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Finnish

Perusohjeet
Lue ensin ohjeet huolellisesti!

Brooks Instrument suunnittelee, valmistaa ja testaa laitteensa vastaamaan useimpien kotimaisten ja kansainvälisten standardien vaatimuksia. Tuotteet tulee asentaa, käyttää ja huoltaa käyttöohjeiden mukaan jotta niiden toimivuus taataan. Brooks Instrumentin laitteiden asennuksessa, käytössä ja huollossa on noudatettava soveltuvia määräyksiä ja ohjeita, lisäksi mainitut ohjeet on huomioitava työsuojelun ohjeistuksessa.

Oikean toiminnan varmistamiseksi vain valtuutettu huoltohenkilö saa asentaa, käynnistää, päivittää, ohjelmoida ja huoltaa laitteita.
Lue kaikki käyttöohjeet koskien tuotteen asennusta, käyttöä ja huoltoa. Jos käyttöohje on puutteellinen, lisätietoja saa paikalliselta jälleenmyyjältä. Yhteystiedot löytyvät oppaan kansilehdestä. Säilytä ohjeet.

⚠ **VAROITUS!: Käyttöohjeessa ilmoitettujen standardien mukaisia ohjeita ja raja-arvoja ei saa ylittää. Rajoitusten laiminlyönti voi aiheuttaa tuotteen rikkoutumisen ja/tai vakavan henkilövahingon vaaran.**

- Jos ohjeissa on epäselvyyttä, ota yhteyttä Brooks Instrumentin edustajaan ongelman selvittämiseksi.
- Noudata kaikkia laitteessa olevia tai siihen liittyviä ohjeita, määräyksia ja varoituksia.

⚠ **VAROITUS: Tarkista ennen asennusta, että tällä laitteella on paikallisten ja maasi koodien mukaiset hyväksyntäluokitukset. Tämän varoituksen laiminlyönnistä saattaa aiheutua vakava vamma ja/tai laitevaurio.**

- Laittteen asennuksessa on noudatettava erityisiä asennusohjeita sekä voimassa olevia paikallisia ja kansainvälisiä määräyksiä. Laitteet saa yhdistää vain sopivaan sähkö- ja paineverkkoon.
- Asennusohjeita: (1) Päästä virtaus hitaasti järjestelmään. Avaa venttiilit hitaasti, jotta virtaus pysyy tasaisena. (2) Tarkista, ettei virtausmittarin sisään- ja ulosmenon liitoksissa ole vuotoa. Jos järjestelmässä ei ole vuotoa, aseta oikea käyttöpaine.
- Tarkista, että laitteeseen menevä paine on katkaistu ennen laitteen korjaamista välttääksesi loukkaantumisriskin. Mahdollisten varaosien tulee olla Brooks Instrumentin hyväksymiä. Vain valtuutettu huoltohenkilö saa asentaa varaosat. Ei-hyväksyttyjen varaosien käyttö voi vahingoittaa tuotteen toimintaa ja aiheuttaa turvallisuusriskin. Samoin ei-hyväksyttyjen varaosien käyttö voi aiheuttaa tulipalon, sähköiskun tai virhetoiminnan riskin.
- Varmista että kaikki kaikki laitteen ovet/luukut ovat suljettuina ja tarkista että suojakannet ovat paikoillaan estääksesi mahdollisen sähköisku- ja loukkaantumisvaaran.

⚠ **VAROITUS!: Jos järjestelmässä virtaa neste ja laitteen sisään- ja ulosmenoventtiilit pitää sulkea, laite on ensin tyhjennettävä kokonaan. Tyhjentämisen laiminlyönti aiheuttaa nesteen lämpölaajenemista, joka saattaa johtaa laitteen rikkoutumiseen ja henkilövahingon vaaraan.**

Eurooppalainen painelaitedirektiivi (PED)

Painelaitteet, joiden paine on suurempi kuin 0,5 bar (g) ja joiden koko on suurempi kuin 25 mm tai 1 tuuma , kuuluvat eurooppalaiseen painelaitedirektiiviin (PED).

- PED direktiiviä koskevat määräykset löytyvät käyttöoppaan ’’Tekniset tiedot” -luvusta.
- Käyttöoppaassa kuvatut tuotteet ovat 2014/34/EU EU-direktiivin mukaisia.
- Kaikki Brooks Instrumentin virtausmittarit kuuluvat ryhmään 1. Laitteet, jotka ovat suurempia, kuin 25 mm tai 1 tuuma, ovat PED I, II, III kategorien mukaisia.
- Mittarit joiden koko on alle 25 mm tai 1 tuuma ovat hyvän konepajakäytännön (SEP) mukaisia.

Eurooppalainen direktiivi sähkömagneettisesta yhteensopivuudesta (EMC)

Brooks Instrumentin CE-merkin saaneet (sähkö/sähköiset) laitteet täyttävät EMC direktiivin vaatimukset ja testit sähkömagneettisesta yhteensopivuudesta (2014/30/EU EMC direktiivi).
Erityistä huomioita on kiinnitettävä CE-merkittyjen laitteiden käytössä olevien kaapelien valintaan.

Kaapelien, kiinnikkeiden ja liittimien laatu:

Brooks Insturmentin kaapelit ovat korkealaatuisia ja täyttävät CE-merkintä direktiivin vaatimukset.
Muun valmistajan kaapelia käytettäessä on käytettävä 100% suojattua kaapelia.
Liittimien tulee olla häiriösuojattua tyyppiä. Tarvittaessa käytetään metallisia kiinnikkeitä kaapelin suojuksen kiinnittämiseen. Kaapelin suojakuoren pitää olla yhdistettynä metallisuojukseen tai laippaan ja sen pitää olla molemmista päistä suojattuna 360°. Suojaus päättyy maadoitukseen.
Standardin mukaan korttien liittimet eivät ole metallisia. Käytettyjen kaapelien suojaus on oltava 100%, jotta se täyttäisi CE-merkinnän direktiivin vaatimukset.
Suojaus päättyy maadoitukseen.
Napojen järjestys: Katso liitteenä oleva käyttöopas.

Elektrostaattinen purkaus (ESD)

⚠ **VAROITUS!: Tuote sisältää elektroniikkakomponentteja jotka voivat vahingoittua staattisesta sähköstä. Sisäisten piirilevyjen purkamisessa,asennuksessa ja käsittelyssä tulee noudattaa kaikkia määräyksiä ja ohjeita.**

Asennusohjeet:

1. Järjestelmän sähköt katkaistaan.
2. Laitteen kanssa työskentelevä henkilö on suojattava sähköiskuilta rannehihnalla tai muulla suojavarustuksella ennen piirilevyn tai muun sisäosan asennusta, poistamista tai korjaamista.
3. Piirilevyt kuljetetaan antistaattisessa pakkauksessa. Piirilevyt puretaan paketista juuri ennen asennusta. Poistettu piirilevy on heti pakattava soveltuvaan suojapakkaukseen kuljettamista, varastoimista tai palautusta varten.

Huomautukset:

Tuotteen herkkyys elektrostaattiselle purkaukselle (ESD) ei ole epätavallista. Suurin osa elektroniikkatuotteista sisältää komponentteja jotka hyödyntävät metallioksiditekniikkaa (NMOS, SMOS jne.) Kokemusten mukaan pienikin elektrostaattinen purkaus voi aiheuttaa laitteiden virhetoiminnan tai vahingoittumisen. Vahingoittuneet komponentit saattavat aiheuttaa laitteen ennenaikaisen rikkoutumisen vaikka laite näyttäisi toimivan normaalisti.

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French

Instructions essentielles
A lire avant de commencer !

Brooks Instrument conçoit, fabrique et teste ses produits pour répondre à de nombreuses normes nationales et internationales. Ces produits doivent être correctement installés, utilisés et entretenus pour pouvoir fonctionner dans le cadre de leurs spécifications normales. Les instructions qui suivent doivent être respectées et intégrées à votre programme de sécurité lors de l'installation, l'utilisation et l'entretien des produits Brooks Instrument.

- Afin d'assurer un fonctionnement correct, faites appel à du personnel qualifié pour l'installation, l'utilisation, la mise à jour, la programmation et l'entretien du produit.
- Lisez toutes les instructions avant l'installation, l'utilisation et l'entretien du produit. Si le présent manuel d'utilisation n'est pas le bon, consultez la dernière page de la couverture pour connaître le point de vente le plus proche. Conservez ce manuel d'utilisation pour pouvoir vous y reporter par la suite.

⚠ **AVERTISSEMENT: n'utilisez pas cet instrument au-delà des spécifications énumérées dans le manuel d'utilisation.**
Le non-respect de cet avertissement peut entraîner de graves blessures et / ou endommager l'équipement.

- Si vous ne comprenez pas l'une des instructions, prenez contact avec un représentant de Brooks Instrument pour obtenir des explications.
- Tenez compte de tous les avertissements, précautions et instructions marquées sur le produit et fournies avec celui-ci.

⚠ **AVERTISSEMENT: Avant toute installation, vérifier que cet instrument est conformes aux normes locales et nationales.**
Le non-respect de cet avertissement peut entrainer des blessures graves et/ou endommager l'équipement.

- Installez votre équipement de la façon indiquée dans les instructions d'installation du manuel d'utilisation et conformément à la législation en vigueur au niveau local et national. Branchez tous les produits aux sources d'électricité et de pression agréées.
- Utilisation : (1) Faites lentement entrer le débit dans le système. Ouvrez progressivement les vannes de procédé pour éviter des pics de débits. (2) Vérifiez qu'il n'y a pas de fuite au niveau des branchements d'entrée et de sortie du débitmètre. S'il n'y a pas de fuite, amenez le système à sa pression d'utilisation.
- Avant de procéder à l'entretien, assurez-vous que la conduite de procédé n'est plus sous pression. Lorsqu'il faut remplacer une pièce, assurez-vous que les pièces de rechange sont celles indiquées par Brooks Instrument et que des personnes qualifiées effectuent le remplacement. Les pièces et procédures non autorisées peuvent porter atteinte au fonctionnement du produit et mettre en péril la sécurité de votre procédé. Les remplacements par des pièces d'apparence similaire peuvent entraîner des incendies, des risques électriques ou un mauvais fonctionnement.
- Vérifiez que toutes les trappes de l'équipement sont fermées et que les couvercles de protection sont en place pour éviter les chocs électriques et les blessures, sauf lorsque l'entretien est réalisé par des personnes qualifiées.

⚠ **AVERTISSEMENT: dans le cas d'appareils à écoulement liquide, si les vannes d'entrée et de sortie adjacentes aux appareils doivent être fermées pour une raison quelconque, les appareils doivent être complètement vidangés. Si cela n'est pas fait, une éventuelle dilatation thermique du fluide peut casser l'appareil et provoquer des blessures.**

Directive européenne « équipements sous pression » (PED)

- Tous les équipements sous pression dont la pression interne est supérieure à 0,5 bar (pression relative) et dont la taille dépasse 25 mm ou un pouce entrent dans le cadre de la directive PED.
- La section « Spécifications » de ce manuel contient les instructions relatives à la directive PED.
- Les appareils de mesure de ce manuel sont conformes à la directive EN 2014/34/EU.
- Tous les débitmètres Brooks Instrument fonctionnent avec des fluides de groupe 1.
- Les appareils de mesure d'une taille supérieure à 25 mm ou un pouce entrent dans la catégorie PED I, II ou III.
- Les appareils de mesure d'une taille inférieure ou égale à 25 mm ou un pouce relèvent des « bonnes pratiques d'ingénierie » (SEP).

Compatibilité électromagnétique européenne (CEM)

L'équipement Brooks Instrument (électrique / électronique) portant le marquage CE répond à la réglementation en matière de compatibilité électromagnétique (directive CEM 2014/30/EU).
Il faut cependant prêter une grande attention au choix du câble d'interconnexion à utiliser avec l'équipement marqué CE.
Qualité du câble d'interconnexion, des presse-étoupes et connecteurs :
Brooks Instrument fournit un ou des câbles de qualité supérieure qui répondent aux spécifications exigées pour la certification CE.
Si vous utilisez votre propre câble d'interconnexion, ce câble doit être protégé par un blindage intégral.
Les connecteurs rectangulaires ou circulaires utilisés doivent avoir un blindage métallique. S'il y a lieu, des presse-étoupes métalliques doivent faire office de serre-écran de câble.
L'écran du câble doit être raccordé à l'enveloppe métallique ou au presse-étoupe et blindé aux deux extrémités sur 360 degrés.
Le blindage doit s'achever sur une prise de terre.
Les connecteurs de carte standards sont non métalliques. Les câbles utilisés doivent être protégés par un blindage intégral pour se conformer à la certification CE.
Le blindage doit s'achever sur une prise de terre.
En ce qui concerne la configuration des broches, veuillez vous reporter au manuel d'utilisation joint.

ESD (décharge électrostatique)

⚠ **ATTENTION : cet instrument contient des composants électroniques sensibles à l'électricité statique. Des procédures de manipulation adéquates doivent être respectées pendant le retrait, l'installation ou la manipulation des cartes de circuits imprimés ou des dispositifs internes.**

Procédure de manipulation :
1. L'alimentation électrique de l'appareil doit être coupée.
2. Le personnel doit être mis à la terre, au moyen d'une bande de poignet ou d'un autre moyen sûr et adéquat, avant l'installation, le retrait ou le réglage de toutes les cartes de circuits imprimés ou autres dispositifs internes.
3. Les cartes de circuits imprimés doivent être transportées dans un récipient conducteur. Les cartes ne doivent enlevées de cette enveloppe protectrice qu'au dernier moment, juste avant l'installation. Les cartes retirées doivent être immédiatement placées dans un récipient de protection pour le transport, le stockage ou le retour à l'usine.

Observations
Brooks Instrument n'est pas le seul à proposer des produits comportant des composants sensibles aux décharges électrostatiques. La plupart des produits électroniques modernes contiennent des composants qui utilisent des technologies à oxydes métalliques (NMOS, SMOS, etc.). L'expérience démontre que d'infimes quantités d'électricité statique suffisent à endommager ou détruire ces appareils. Les composants endommagés, même s'ils semblent fonctionner correctement, tombent rapidement en panne.

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German

Wichtige Anweisungen Bitte zuerst lesen!

Brooks Instrument entwickelt, produziert und testet seine Produkte derart, dass sie viele nationale und internationale Standards erfüllen. Nur bei korrektem Einbau sowie richtiger Bedienung und Wartung dieser Produkte ist ein Betrieb unter Einhaltung der Standardvorgaben sichergestellt. Die folgenden Anweisungen müssen eingehalten werden und in Ihr Sicherheitsprogramm integriert werden, wenn Sie Brooks Produkte installieren, bedienen und warten.

- Um die entsprechende Leistung zu gewährleisten, setzen Sie qualifiziertes Personal für die Installation, den Betrieb, die Aktualisierung, Programmierung und Wartung des Produkts ein.
- Lesen Sie alle Anweisungen, bevor Sie das Produkt installieren, in Betrieb nehmen und warten. Falls es sich bei diesem Handbuch nicht um das richtige Handbuch handelt, schauen Sie bitte auf der Rückseite nach den Kontaktdaten Ihres Vertriebsbüros vor Ort. Bewahren Sie dieses Handbuch auf, falls Sie später etwas nachschauen möchten.

⚠ WARNUNG: Dieses Gerät nicht außerhalb der in Bedienungsanleitung und Handbuch angegebenen Grenzen betreiben. Wird diese Warnung nicht beachtet, kann dies zu schweren Personenschäden bzw. Schäden des Gerätes führen.

- Falls Sie Anweisungen nicht verstehen, wenden Sie sich zur Klärung an Ihren Brooks Instrument Vertreter.
- Befolgen Sie alle Warnhinweise und Anweisungen, die auf dem Produkt markiert sind oder zusammen mit diesem geliefert werden.

⚠ ACHTUNG: Vor der Installation sicherstellen, dass dieses Instrument den nationalen und lokalen Vorschriften endspricht. Die Nichtbeachtung kann zu schweren Verletzungen und/oder Schäden am Gerät führen.

- Installieren Sie Ihr Gerät, wie in den Installationsanweisungen des entsprechenden Handbuchs angegeben und gemäß der gültigen regionalen und nationalen Gesetze. Schließen Sie alle Produkte an eine geeignete Strom- und Druckluftversorgung an.
- Bedienung: (1) Langsam den Zufluss zum System starten. Die Ventile langsam öffnen, um einen sprunghaften Anstieg der Durchflussmenge zu verhindern. (2) Bereich der Anschlüsse (Zufluss und Ausfluss) des Durchflussmessers auf Undichtigkeiten überprüfen. Wenn das System dicht ist, auf Betriebsdruck hochfahren.
- Sicherstellen, dass der Leitungsdruck vor Wartungsarbeiten heruntergefahren wird. Wenn Ersatzteile benötigt werden, stellen Sie sicher, dass qualifizierte Personen Ersatzteile verwenden, die von Brooks Instrument vorgegeben sind. Nicht genehmigte Teile und Verfahren können die Leistungsfähigkeit des Produkts beeinträchtigen und den sicheren Betrieb Ihres Prozesses gefährden. Ähnlich aussehende Austauschteile können zu Bränden, elektrischen Gefahren oder nicht sachgerechtem Betrieb führen.
- Stellen Sie sicher, dass alle Türen der Anlage geschlossen sind und dass alle Schutzabdeckungen angebracht sind, um Stromschläge und Personenschäden zu vermeiden, es sei denn die Wartungsaufgaben werden von qualifizierten Personen durchgeführt.

⚠ WARNUNG: Werden die Ein- und Auslassventile neben Durchflussmessgeräten aus irgendwelchen Gründen geschlossen, so müssen die Geräte komplett entleert werden.

Durchflussmessgeraete muessen vor dem Schliessen von Ein- und Auslassventilen komplett entleert werden,

anderenfalls kann es zu einer thermischen Ausdehnung der Flüssigkeit und damit zum Bruch des Gerätes kommen; Personenschäden können die Folge sein.

Europäische Druckgeräterichtlinie (PED)

Alle Druckgeräte mit einem internen Druck von mehr als 0,5 bar (g) und einer Größe von mehr als 1in (1 in = 25,4 mm) unterliegen der Druckgeräterichtlinie.

- Das Kapitel zu den technischen Daten in dieser Anleitung enthält wichtige Sicherheits- und Betriebsanweisungen in Bezug auf die Druckgeräterichtlinie.
- Produkte die in diesem Handbuch beschrieben sind, erfüllen die europäische Richtlinie 2014/34/EU.
- Alle Durchflussmesser von Brooks Instrument fallen unter die Fluidgruppe 1.
- Produkte die größer als 25 mm oder 1“ (inch) sind, erfüllen die Kategorien I, II oder III der Druckgeräterichtlinie (PED).
- Produkte mit einer Größe von 25 mm oder 1“ (inch) oder kleiner sind Sound Engineering Practice (SEP).

Europäische Verordnung zur elektromagnetischen Verträglichkeit (EMV)

Geräte von Brooks Instrument (elektrischer und elektronischer Art) mit CE-Zeichen haben den Test auf Einhaltung der Verordnung zur elektromagnetischen Verträglichkeit (EMV Richtlinie 2014/30/EU) erfolgreich bestanden.
Dennoch muss bei der Wahl des Signalkabels für das Gerät mit CE-Zeichen auf folgende Dinge geachtet werden.
Qualität von Signalkabel, Kabeldurchführung und Anschlüsse:
Brooks Instrument liefert qualitativ hochwertige Kabel, die den Anforderungen für eine CE-Zertifizierung entsprechen.
Sollten Sie eigene Kabel einsetzen, so sollte das Kabel überall mit einer 100%-Abschirmung versehen sein.
D- oder Rundstecker sollten eine Metallabschirmung aufweisen. Wenn möglich, müssen Kabeldurchführungen aus Metall mit Kabelschirmgeflechts-Klemmen verwendet werden.
Der Kabelschirm sollte an die Metallhülle oder -durchführung angeschlossen werden und an beiden Enden rundherum (360°) abgeschirmt werden.
Die Abschirmung sollte geerdet werden.
Randstecker auf Platinen sind standardmäßig nicht aus Metall. Die verwendeten Kabel müssen mit einer 100 % Abschirmung versehen werden, um die CE-Vorgaben zu erfüllen.
Die Abschirmung sollte geerdet werden.
Klemmenbelegung: Siehe beigefügtes Handbuch.

ESD (Elektrostatische Entladung)

⚠ ACHTUNG: Dieses Gerät enthält elektronische Komponenten, die durch elektrostatische Entladungen beschädigt werden können. Ordnungsgemäße Verfahrensanweisungen müssen während des Ausbaus, der Installation oder anderer Handhabung der eingebauten Platinen oder Geräte eingehalten werden.

Verfahrensanweisung:

1. Trennen Sie das Gerät von der Stromversorgung.
2. Das Personal ist vor dem Einbau, Ausbau oder der Einstellung von Platinen oder anderen internen Komponenten durch ein entsprechendes Armband mit dem Erdpotential zu verbinden.
3. Platinen sind in speziellen Behältern mit Schutz gegen elektrostatische Spannungen zu transportieren oder zu lagern. Platinen dürfen erst kurz vor dem Einbau aus der Schutzhülle entfernt werden. Ausgebaute Platinen müssen umgehend in Schutzbehälter zum Transport, zur Lagerung oder Rücksendung an das Werk gelegt werden.

Anmerkung
Dieses Gerät ist wie viele andere elektronische Geräte auch mit Komponenten bestückt, die anfällig für elektrostatische Entladung sind. Die meisten modernen, elektronischen Geräte enthalten Komponenten, die die Metalloxidtechnologie (NMOS, SMOS etc.) verwenden. Die Erfahrung hat gezeigt, dass schon geringe Mengen elektrostatischer Energie ausreichen, um diese Geräte zu beschädigen oder zu zerstören. Beschädigte Teile fallen früh aus, obwohl sie funktionsfähig zu sein scheinen.

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Greek

Βασικές οδηγίες Διαβάστε πριν συνεχίσετε!

Η Brooks Instrument σχεδιάζει, παράγει και δοκιμάζει τα προϊόντα της σε συμμόρφωση με πλήθος εθνικών και διεθνών προτύπων. Η σωστή εγκατάσταση, χρήση και συντήρησή τους αποτελεί απαραίτητη προϋπόθεση της λειτουργίας εντός των κανονικών ορίων. Οι παρακάτω οδηγίες πρέπει να τηρούνται και πρέπει να ενσωματωθούν στο πρόγραμμα ασφάλειας της εργασίας σας κατά την εγκατάσταση, χρήση και συντήρηση προϊόντων της Brooks Instrument.

- Για σωστό αποτέλεσμα η εγκατάσταση, λειτουργία, ενημέρωση, προγραμματισμός και συντήρηση πρέπει να γίνεται από ειδικευμένο προσωπικό.
- Διαβάστε όλες τις οδηγίες πριν εγκαταστήσετε, λειτουργήσετε και συντηρήσετε το προϊόν. Εάν το παρόν εγχειρίδιο δεν είναι το σωστό εγχειρίδιο, συμβουλευθείτε το πίσω εξώφυλλο για τα στοιχεία επικοινωνίας του τοπικού αντιπροσώπου. Φυλάξτε το εγχειρίδιο αυτό για μελλοντική αναφορά.

⚠ ΠΡΟΕΙΔΟΠΟΙΗΣΗ: Μη λειτουργείτε τη συσκευή αυτή καθ' υπέρβαση των ορίων που αναγράφονται στο Εγχειρίδιο Οδηγιών και Λειτουργίας. Η μη συμμόρφωση με την προειδοποίηση αυτή μπορεί να οδηγήσει σε σοβαρό προσωπικό τραυματισμό ή/και ζημιά στον εξοπλισμό.

- Σε περίπτωση μη κατανόησης κάποιας από τις οδηγίες ζητήστε διευκρινίσεις από τον τοπικό αντιπρόσωπο της Brooks Instrument.
- Τηρείτε όλες τις προειδοποιήσεις, προφυλάξεις και οδηγίες που αναγράφονται ή συνοδεύουν το προϊόν.`

⚠ ΠΡΟΕΙΔΟΠΟΙΗΣΗ: Πριν από την εγκατάσταση βεβαιωθείτε ότι αυτό το εργαλείο διαθέτει τις απαιτούμενες εγκεκριμένες προδιαγραφές ώστε να συμμορφώνεται με τους τοπικούς και εθνικούς κανονισμούς. Η αποτυχία τήρησης της παρούσας προειδοποίησης μπορεί να οδηγήσει σε σοβαρό τραυματισμό και/ή ζημιά στον εξοπλισμό

- Εγκαταστήστε τη συσκευή όπως προβλέπεται στις οδηγίες εγκατάστασης του σωστού εγχειριδίου οδηγιών και στις κείμενες τοπικές και εθνικές διατάξεις. Συνδέστε τα προϊόντα στις εκάστοτε σωστές παροχές ρεύματος και πίεσης.
- Διαδικασία: (1) Αφήστε να ξεκινήσει αργά η ροή στο σύστημα. Ανοίξτε αργά τις βαλβίδες λειτουργίας για να αποφύγετε τις απότομες αυξομειώσεις ροής. (2) Ελέγξτε για διαρροές τις συνδέσεις εισόδου και εξόδου του ροόμετρου. Αν δεν υπάρχουν διαρροές, γεμίστε το σύστημα μέχρι η πίεση να φτάσει την κανονική πίεση εργασίας.
- Πριν από τη συντήρηση βεβαιωθείτε ότι γραμμή εργασίας έχει τεθεί εκτός πιέσεως. Σε περίπτωση αντικατάστασης ανταλλακτικών βεβαιωθείτε ότι το προσωπικό είναι ειδικευμένο και χρησιμοποιεί ανταλλακτικά που προβλέπει η Brooks Instrument. Μη εγκεκριμένα ανταλλακτικά και επεμβάσεις ενδέχεται να επηρεάσουν τις επιδόσεις του προϊόντος και να προκαλέσουν κίνδυνο για την ασφαλή λειτουργία. Αντικαταστάσεις με φαινομενικά όμοια ανταλλακτικά ενδέχεται να προκαλέσουν πυρκαγιά, κίνδυνο ηλεκτροπληξίας ή ανεπαρκή λειτουργία.
- Βεβαιωθείτε ότι όλα τα ανοίγματα του εξοπλισμού είναι κλειστά και τα προστατευτικά καλύμματα είναι στη θέση τους προκειμένου να αποφευχθεί ο κίνδυνος ηλεκτροπληξίας και προσωπικών τραυματισμών, εκτός εάν εκτελούνται εργασίες συντήρησης από ειδικευμένο προσωπικό.

⚠ ΠΡΟΕΙΔΟΠΟΙΗΣΗ: Προκειμένου για συσκευές με ροή ρευστού, όταν για οποιονδήποτε λόγο πρόκειται να κλείσουν οι βαλβίδες εισαγωγής και εξαγωγής κοντά στις συσκευές, οι συσκευές πρέπει να αποστραγγιστούν εντελώς. Η μη συμμόρφωση μπορεί να προκαλέσει θερμική διαστολή του υγρού που περιέχουν, με αποτέλεσμα να ραγίσει η συσκευή και να προκληθούν προσωπικοί τραυματισμοί.

Ευρωπαϊκή Οδηγία για τον εξοπλισμό υπό πίεση (PED)

Κάθε εξοπλισμός υπό πίεση με εσωτερική πίεση άνω του 0,5 bar (g) και μεγέθους μεγαλύτερου των 25 mm ή της 1 ίντσας εμπίπτει στις διατάξεις της ευρωπαϊκής Οδηγίας για τον εξοπλισμό υπό πίεση (PED).

- Το κεφάλαιο Προδιαγραφές του παρόντος εγχειριδίου περιλαμβάνει οδηγίες σχετικά με την Οδηγία PED.
- Τα προϊόντα που περιγράφονται στο παρόν εγχειρίδιο συμμορφώνονται με την ευρωπαϊκή Οδηγία 2014/34/EU.
- Όλα τα ροόμετρα της Brooks Instrument ανήκουν στην ομάδα ρευστών 1.
- Προϊόντα μεγαλύτερα από 25 mm ή 1 ίντσα συμμορφώνονται με τις κατηγορίες I, II και III της Οδηγίας PED.
- Προϊόντα μεγέθους 25 mm ή 1 ίντσας ή και μικρότερα κατασκευάζονται σύμφωνα με ορθές τεχνικές πρακτικές (SEP).

Ευρωπαϊκή Οδηγία για την ηλεκτρομαγνητική συμβατότητα (EMC)

Ο (ηλεκτρικός/ηλεκτρονικός) εξοπλισμός της Brooks Instrument που φέρει το σήμα CE έχει υποστεί επιτυχώς τις δοκιμές που προβλέπουν οι διατάξεις της Οδηγίας για την ηλεκτρομαγνητική συμβατότητα (Οδηγία 2014/30/EU για την EMC).
Πάντως χρειάζεται ιδιαίτερη προσοχή στην επιλογή του καλωδίου σήματος για τον εξοπλισμό που φέρει το σήμα CE.
Ποιότητα των καλωδίων σήματος, στυπιοθλιπτών και βυσμάτων καλωδίων:
Η Brooks Instrument προσφέρει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές CE.
Σε περίπτωση παροχής δικού σας καλωδίου σήματος, χρησιμοποιείτε καλώδιο με πλήρη θωράκιση 100% σε όλα τα σημεία.
Βύσματα τύπου «D» ή κυκλικά πρέπει να έχουν μεταλλική θωράκιση. Να χρησιμοποιηθούν κατά προτίμηση μεταλλικοί στυπιοθλίπτες καλωδίων για τη στερέωση της θωράκισης.
Να συνδεθεί η θωράκιση του καλωδίου στο μεταλλικό κέλυφος ή στυπιοθλίπτη και να θωρακιστεί και στα δύο άκρα κατά 360 μοίρες. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Τα βύσματα άκρου της πλακέτας είναι εκ κατασκευής μη μεταλλικά. Τα χρησιμοποιούμενα καλώδια πρέπει να έχουν 100% θωράκιση για συμμόρφωση με την πιστοποίηση CE. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Για τη διάταξη των ακίδων: Συμβουλευθείτε το συνημμένο εγχειρίδιο οδηγιών.

Ηλεκτροστατική εκκένωση (ESD)

⚠ **ΠΡΟΦΥΛΑΞΗ: Η συσκευή αυτή περιέχει ηλεκτρονικά εξαρτήματα τα οποία μπορούν να υποστούν εύκολα βλάβες από τον στατικό ηλεκτρισμό. Πρέπει να ακολουθούνται οι ορθές διαδικασίες χειρισμού κατά την αφαίρεση, τοποθέτηση ή άλλο χειρισμό των εσωτερικών πλακετών και διατάξεων.**
Διαδικασία χειρισμού:

1. Θέστε τη συσκευή εκτός τάσεως.
2. Φροντίστε για τη γείωση του προσωπικού με περικάρπιο ή άλλο ασφαλές και κατάλληλο μέσο πριν τοποθετήσετε, αφαιρέσετε ή ρυθμίσετε κάρτες τυπωμένων κυκλωμάτων ή άλλη εσωτερική διάταξη.
3. Οι κάρτες τυπωμένων κυκλωμάτων πρέπει να μεταφέρονται σε συσκευασία από αγώγιμο υλικό. Οι κάρτες δεν πρέπει να αφαιρεθούν από το προστατευτικό περίβλημα παρά μόνο αμέσως πριν από την τοποθέτηση. Οι κάρτες που αφαιρέθηκαν πρέπει να τοποθετηθούν αμέσως σε προστατευτική συσκευασία για μεταφορά, αποθήκευση ή επιστροφή στο εργοστάσιο.

Παρατηρήσεις:
Η ύπαρξη εξαρτημάτων ευαίσθητων στα φαινόμενα ESD (ηλεκτροστατικής εκκένωσης) δεν είναι μοναδικό χαρακτηριστικό της συσκευής αυτής. Οι περισσότερες σύγχρονες ηλεκτρονικές συσκευές περιέχουν εξαρτήματα τεχνολογίας μεταλλικών οξειδίων (NMOS, SMOS κά.). Η πείρα έχει αποδείξει ότι μια μικρή ποσότητα στατικού ηλεκτρισμού αρκεί για να προκαλέσει βλάβες ή να καταστρέψει τις συσκευές αυτές. Εξαρτήματα που υπέστησαν βλάβη, ακόμη και αν μοιάζουν να λειτουργούν σωστά, κινδυνεύουν από πρώιμη αστοχία.

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Hungarian

Alapvető utasítások Először olvassa el ezeket!

A Brooks Instrument olyan módon tervezi, gyártja és teszteli termékeit, hogy azok megfeleljenek számos belföldi és nemzetközi szabványnak. Ezeket a berendezéseket megfelelően kell telepíteni, üzemeltetni és karbantartani ahhoz, hogy mindenképpen a normál működési tartományuknak megfelelően üzemelhessenek. Az alábbi utasításokat be kell tartani, és be kell építeni a munkavédelmi programba a Brooks Instrument termékeinek telepítése, üzemeltetése és karbantartása során.
A megfelelő teljesítmény garantálása érdekében kizárólag szakképzett személyzet végezze a termék telepítését, üzemeltetését, frissítését, programozását és karbantartását.
Valamennyi utasítást el kell olvasni a termék telepítése, üzemeltetése és szervizelése előtt. Amennyiben ez a kézikönyv nem a megfelelő kiadvány, a hátsó borítón keresse meg a helyi forgalmazót, és további tájékoztatásért lépjen kapcsolatba vele. Őrizze meg ezt a kézikönyvet későbbi tájékoztatásként.

⚠ **FIGYELEM: Ne működtesse a berendezést az üzemeltetési utasításban megadott üzemi tartományokon túl. Ennek megsértése súlyos személyi sérüléshez vagy a berendezés meghibásodásához vezethet.**

- Amennyiben a kezikönyv utasításai nem egyértelműek, lépjen kapcsolatba Brooks Instrument képviselőjével, hogy tisztázzák a problémát.
- Tartsa be a berendezésen feltüntetett vagy azzal együtt szállított összes figyelmeztetést, felhívást és utasítás.

⚠ **FIGYELEM: Üzembe helyezés előtt győződjön meg arról, hogy a műszer rendelkezik-e a helyi és nemzeti szabványoknak megfelelő jóváhagyásokkal. Ennek elmulasztása súlyos személyi sérülést és / vagy az eszköz károsodását okozhatja!**

- A megfelelő telepítési utasításban megadott utasítások valamint a hatályos helyi és nemzeti előírások szerint telepítse a berendezést. A termékeket kizárólag a megfelelő elektromos és nyomásellátó forrásra kösse.
- Menete: (1) Lassan helyezze nyomás alá a rendszert. Lassanként nyissa ki az üzemi szelepeket az áramlásingadozás elkerülése érdekében. (2) Ellenőrizze, nincs-e szivárgás az áramlásmérő be-, és kimeneti bekötéseinél. Ha nincs szivárgás, töltse fel a rendszert az üzemi nyomásra.
- Szervizelés előtt mindenképpen ellenőrizze, hogy az üzemi vezeték nincs-e nyomás alatt. Amennyiben cserealkatrészekre van szükség, mindenképpen szakképzett személynek kell kezelnie a Brooks Instrument által meghatározott cserealkatrészeket. A nem engedélyezett alkatrészek és tevékenységek befolyásolhatják a termék teljesítményét, illetve veszélyeztethetik a biztonságos üzemeltetést. A pusztán hasonló alkatrészekkel történő helyettesítés tüzet, áramütésveszélyt vagy elégtelen működést eredményezhet.
- A berendezés összes ajtaja mindenképpen legyen zárva, a védőburkolatok pedig legyenek a helyükön az áramütés és a személyi sérülések elkerülése érdekében, kivéve, ha szakképzett szakember végez rajta karbantartási munkákat.

⚠ **FIGYELEM: Folyadékot áramoltató berendezések esetében, ha bármilyen okból el kell zárni a berendezés melletti ki-, és belépő szelepeket, a berendezést teljesen le kell üríteni. Ennek elmulasztása a folyadék hőtágulását okozhatja, ami károsíthatja a berendezést, és személyi sérüléshez vezethet.**

Nyomástartó berendezésekre vonatkozó európai irányelv (PED)

Minden 0,5 bar-nál (g) magasabb belső nyomású és 25 mm-nél vagy 1 hüvelyknél nagyobb nyomástartó berendezés a nyomástartó berendezésekre vonatkozó európai irányelv (PED) hatálya alá tartozik.

- A használati utasítás „Műszaki adatok” fejezete tartalmaz a PED irányelvre vonatkozó utasításokat.
- A használati utasításban megadott termékek megfelelnek a 2014/34/EU EU irányelvnek.
- Minden Brooks átfolyásmérő az 1-es folyadékcsoportba tartozik.
- A 25 mm-nél vagy 1 hüvelyknél nagyobb termékek megfelelnek a PED I, II, vagy III kategóriának.
- A 25 mm-es illetve 1 hüvelykes vagy kisebb termékek az elfogadott mérnöki gyakorlatot (SEP) követik.

Elektromágneses kompatibilitásra vonatkozó európai irányelv (EMC)

A Brooks Instrument CE jelölést kiérdemelt (elektromos/elektronikus) berendezései sikeresen teljesítették az elektromágneses kompatibilitási követelményeket (2014/30/EU sz. EMC irányelv) vizsgáló teszteket.
Ugyanakkor különös figyelmet kell fordítani a CE jelölésű berendezésekhez felhasznált jelkábelek kiválasztására.
A jelkábelek, kábelösszekötők, csatlakozók minősége:
A Brooks Insturment magas minőségű kábeleket kínál, melyek megfelelnek a CE minősítés követelményeinek.
Amennyiben saját jelkábelt alkalmaznak, olyat kell választani, amely 100%-os árnyékolással, teljes mértékben szűrt.
A „D” vagy „kör alakú” csatlakozóknak fémárnyékolóval árnyékoltnak kell lennie. Szükség esetén fém kábelösszekötőket kell alkalmazni a kábelszűrő rögzítésére.
A kábelszűrőt a fém házhoz vagy hüvelyhez kell csatlakoztatni és mindkét felén 360°-ban le kell árnyékolni. Az árnyékolásnak földelésben kell végződnie.
A kártyákhoz tartozó csatlakozók szabványosan nem fémesek. Az alkalmazott kábeleknek 100%-és árnyékolással szűrteknek kell lenniük, hogy megfeleljenek a CE minősítésnek.
Az árnyékolásnak földelésben kell végződnie.
Érintkező konfiguráció: Lásd a mellékelt kezelési utasítást.

Elektrosztatikus kisülés (ESD)

⚠ **VIGYÁZAT: A készülék olyan alkatrészeket tartalmaz, melyek hajlamosak a sztatikus elektromosság okozta károsodásra. Be kell tartani a megfelelő eljárásokat a belső áramköri kártyák és eszközök eltávolítása, behelyezése vagy egyéb kezelése során.**
Kezelési eljárás:

1. A berendezést áramtalanítani kell.
2. A személyt földelni kell csuklópánttal vagy egyéb biztonságos és a célra alkalmas eszközzel, mielőtt áramköri kártyát vagy egyéb belső eszközt telepítene, venne ki, vagy állítana be.
3. A nyomtatott áramköri kártyákat vezetőképes csomagolásban kell szállítani. A kártyák kizárólag közvetlenül a behelyezés előtt vehetők ki a védőburkolatból. A kiszerelt kártyát haladéktalanul el kell helyezni a mozgatásra, raktározásra vagy a gyári visszaszállításra szolgáló védőcsomagolásba.

Megjegyzések:
Nem egyedi jelenség, hogy a készülékben elektrosztatikus kisülésre (ESD) érzékeny alkatrészek találhatók. A legtöbb korszerű elektronikus eszközben fémoxid technológiás alkatrészek (NMOS, SMOS stb.) találhatók. A tapasztalatok azt igazolják, hogy még kis mértékű sztatikus elektromosság is károsíthatja, vagy tönkreteheti ezeket az eszközöket. A károsodott alkatrészek, még ha látszólag megfelelően működnek is, kezdődő hibára utalnak.

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Italian

Istruzioni fondamentali Leggerle subito!

La Brooks Instrument progetta, fabbrica e collauda i propri prodotti in maniera tale che siano conformi ai vari standard nazionali ed internazionali. Tali apparecchiature devono essere installate, messe in esercizio e tenute in manutenzione in maniera adeguata affinché operino in conformità alle loro normali specifiche di funzionamento. Le seguenti istruzioni devono essere rispettate ed inserite nel programma di tutela sul lavoro durante l'installazione, il funzionamento e la manutenzione dei prodotti Brooks Instrument.

- Per garantire un adeguato rendimento l'installazione, il funzionamento, l'aggiornamento, la programmazione e la manutenzione del prodotto devono essere eseguiti esclusivamente da personale specializzato.
- Leggere tutte le istruzioni prima dell'installazione, utilizzo e manutenzione del prodotto. Se questo manuale non è quello relativo al Vostro prodotto, cercare sul retro della copertina il distributore locale e contattarlo per ulteriori informazioni. Conservare il presente manuale per future consultazioni.

⚠ ATTENZIONE: Non utilizzare questo strumento in condizioni che eccedono le specifiche riportate nel Manuale d'Uso. L'inosservanza può causare gravi lesioni alle persone e/o danni all'apparecchiatura.

- Qualora le istruzioni del manuale non siano chiare, contattare un rappresentante della Brooks Instrument per chiarire il problema.
- Rispettare tutti gli avvisi, le istruzioni e gli avvertimenti riportati sull'apparecchiatura o forniti insieme ad essa.

⚠ ATTENZIONE: prima di installare questo strumento, assicurarsi che sia in regola rispetto alle normative di sicurezza locali e nazionali. La non osservanza di questo avvertimento può procurare seri danni a persone e/o danneggiare sia lo strumento che le cose circostanti.

- Installare l'apparecchiatura in base alle istruzioni riportate nel Manuale d'Uso e alle prescrizioni locali e nazionali in vigore. Collegare i prodotti esclusivamente ad un'adeguata sorgente di pressione ed alimentazione elettrica.
- Procedimento: (1) mettere lentamente sotto pressione il sistema. Aprire lentamente le valvole di servizio per evitare l'oscillazione del flusso. (2) Controllare che non ci siano perdite nei punti di connessione in entrata e in uscita del misuratore di flusso. Se non ci sono perdite, caricare il sistema alla pressione d'esercizio.
- Prima di effettuare manutenzione controllare che la linea di processo non sia sotto pressione. Se avete bisogno di pezzi di ricambio, il personale specializzato deve usare i pezzi di ricambio definiti dalla Brooks Instrument. Attività e pezzi di ricambio non autorizzati possono influire sul rendimento del prodotto e comprometterne il funzionamento in sicurezza. La sostituzione con pezzi di ricambio non originali può causare incendi, pericolo di scosse elettriche o funzionamento improprio.
- Tutti gli sportelli dell'impianto devono essere chiusi, le cappe di protezione devono essere al loro posto per evitare scosse elettriche e lesioni personali, tranne quando il personale specializzato esegue lavori di manutenzione.

⚠ ATTENZIONE: In caso di apparecchiature in cui scorre un liquido, se per qualsiasi motivo bisogna chiudere le valvole d'entrata e d'uscita accanto all'apparecchiatura, allora si deve svuotare completamente l'apparecchiatura. L'inosservanza può causare la dilatazione termica del liquido che può danneggiare l'apparecchiatura e provocare lesioni alle persone.

Direttiva europea relativa alle apparecchiature a pressione (PED)

Ogni apparecchiatura a pressione con pressione interna maggiore di 0,5 bar (g) e più grande di 25 mm o di 1 pollice ricade nell'ambito della Direttiva Europea relativa alle apparecchiature a pressione (PED).

- Il capitolo „Dati tecnici" del manuale contiene le disposizioni relative alla direttiva PED.
- I prodotti di misura descritti nel presente manuale sono conformi alla Direttiva UE 2014/34/EU.
- Ogni flussimetro Brooks appartiene al gruppo di fluidi 1.
- I prodotti di misura maggiori di 25 mm o di 1 pollice sono conformi alla categoria I, II o III della PED.
- I prodotti di misurazione minori di 25 mm o di 1 pollice rientrano nella categoria SEP (Sound Engineering Practice).

Direttiva europea relativa alla compatibilità elettromagnetica (EMC)

Le apparecchiature (elettriche/elettroniche) Brooks Instrument dispongono del marchio CE ed hanno superato positivamente i test per i requisiti di compatibilità elettromagnetica (Direttiva EMC 2014/30/EU).

In ogni caso bisogna prestare particolare attenzione alla scelta dei cavi di segnale utilizzati per le apparecchiature con marchio CE.

Qualità dei cavi di segnale, dei pressacavi e dei connettori:

La Brooks Instrument offre cavi d'alta qualità conformi ai requisiti della certificazione CE.

Qualora vengano utilizzati cavi di segnale propri, devono essere scelti con schermatura al 100% e interamente filtrati.

I connettori „D" o „rotondi" devono essere schermati con schermatura metallica. In caso di necessità bisogna utilizzare pressacavi metallici di collegamento per fissare la schermatura del cavo.

La schermatura del cavo deve far contatto col guscio metallico o col pressacavo; il cavo deve essere schermato su entrambi i lati a 360°. La schermatura deve essere effettuata con messa a terra.

I connettori Card Edge normalmente non sono di metallo. I cavi utilizzati devono essere filtrati con schermatura al 100% per essere conformi alla marcatura CE.

La schermatura deve essere effettuata con messa a terra.

Configurazione pin: Vedi Manuale d'uso allegato.

Scarica elettrostatica (ESD)

⚠ ATTENZIONE: Il dispositivo contiene componenti elettronici che possono essere danneggiati da elettricità statica. Bisogna rispettare le adeguate procedure durante la rimozione, l'installazione o altra manovra delle schede del circuito elettrico interno.

Procedura di manovra:

1. Togliere alimentazione elettrica all'apparecchiatura.
2. La persona deve essere collegata a terra con una cerniera o con altri strumenti di sicurezza e adeguati allo scopo prima di installare, togliere o impostare la scheda del circuito elettrico o altri dispositivi interni.
3. Le schede del circuito stampato devono essere spedite in contenitori conduttivi. Le schede devono essere tolte dal rivestimento protettivo esclusivamente prima dell'installazione. Le schede confezionate devono essere collocate immediatamente nell'imballaggio protettivo per la movimentazione, l'immagazzinamento o resa alla fabbrica.

Note:

È un fenomeno comune che nei dispositivi di questo tipo si trovino componenti sensibili alla scarica elettrostatica (ESD). Nella maggior parte degli strumenti elettronici moderni si trovano componenti tecnologici metallo-ossido (NMOS, SMOS, ecc.). Le esperienze dimostrano che l'elettrostaticità anche in piccola misura può danneggiare o rovinare gli strumenti. I componenti danneggiati, anche se all'apparenza funzionano correttamente, potrebbero manifestare il difetto rapidamente.

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Latvian

Svarīga instrukcija

Pirms turpināt izlasiet!

„Brooks Instrument" projektē, ražo un pārbauda savus izstrādājumus atbilstoši daudziem nacionālajiem un starptautiskajiem standartiem. Lai nodrošinātu šo izstrādājumu turpmāku darbību atbilstoši noteiktajiem parametriem, tie ir pareizi jāuzstāda, jālieto un jāapkopj. Uzstādot, lietojot „Brooks Instrument" izstrādājumus un veicot to apkopi, ir jāievēro šie norādījumi un jāiekļauj tie jūsu drošības programmā.

- Lai nodrošinātu pienācīgu izstrādājuma sniegumu, izstrādājuma uzstādīšanu, lietošanu, atjaunināšanu, programmēšanu un apkopi uzticiet veikt tikai kvalificētam personālam.
- Pirms izstrādājuma uzstādīšanas, lietošanas un apkalpošanas izlasiet visus norādījumus. Ja šī instrukciju rokasgrāmata nav pareizā, izstrādājumam atbilstošā rokasgrāmata, lūdzu skat. aizmugurējo vāku, kur ir sniegta vietējā tirdzniecības biroja kontaktinformācija.
  ⚠ **BRĪDINĀJUMS! Nelietot instrumentu ārpus Instrukciju un lietošanas rokasgrāmatā norādītajiem parametriem. Šī brīdinājuma neievērošanas rezultātā var rasties traumas un/vai aprīkojuma bojājumi.**
- Ja jūs nesaprotat kādu no instrukcijām, sazinieties ar „Brooks Instrument" pārstāvi un lūdziet izskaidrot to.
- Ievērojiet visus brīdinājumus, piesardzības mērus un instrukcijas, kas norādīti uz izstrādājuma vai piegādāti kopā ar to.
  ⚠ **BRĪDINĀJUMS. Pirms uzstādīšanas pārliecinieties, ka šim instrumentam ir nepieciešamie apstiprinājuma novērtējumi, lai atbilstu vietējiem un valsts kodeksiem. Šī brīdinājuma neizlasīšanas rezultātā var rasties nopietni personas savainojumi un/vai aprīkojuma bojājumi.**
- Uzstādiet aprīkojumu tā, kā tas norādīts attiecīgajā instrukciju rokasgrāmatā iekļautajā uzstādīšanas instrukcijā un atbilstoši piemērojamajām vietējām un nacionālajām normām. Pievienojiet visus izstrādājumus pareiziem elektriskajiem un spiediena avotiem.
- Lietošana: (1) Lēnām uzsāciet plūsmu sistēmā. Lai izvairītos no straujiem plūsmas kāpumiem, lēnām atveriet procesa vārstus. (2) Pārbaudiet, vai nav noplūdes ap plūsmas mērītāja ieplūdes un izplūdes savienojumiem. Ja noplūdes nav, uzstādiet sistēmā darba spiedienu.
- Pārliecinieties par to, lai pirms instrumenta tehniskās apkopes būtu likvidēts procesa līnijas spiediens. Ja ir nepieciešams veikt kādu daļu nomaiņu, nodrošiniet, lai tiktu izmantotas „Brooks Instrument" norādītās daļas un daļu nomaiņu veiktu kvalificēts personāls. Neatļautu daļu un procedūru izmantošana var ietekmēs izstrādājuma sniegumu un samazināt procesa drošību. Līdzīgu, bet ne identisku daļu nomaiņas lietošana var izraisīt ugunsgrēka, elektrisko traucējumu riskus un nepareizu izstrādājuma darbību.
- Nodrošiniet, lai būtu aizvērtas visas durvis un būtu pareizi uzstādīti visi aizsargpārsegumi, tādējādi novēršot elektrošoka un traumu risku. Izņēmums ir gadījumi, kad kvalificēts personāls veic ražojuma apkopi.
  ⚠ **BRĪDINĀJUMS! Ja šķidrās plūsmas ierīču tuvumā esošos ieplūdes un izplūdes vārstus kāda iemesla dēļ ir jāaizver, no ierīcēm ir jāizlaiž viss šķidrums. Pretējā gadījumā šķidrums var termiski izplesties, pārraut ierīci un radīt traumas.**

Eiropas spiedieniekārtu direktīva (PED)

Uz visām spiedieniekārtām, kuru iekšējais spriegums pārsniedz 0,5 bar (g) un ir lielākas par 25 mm jeb 1" (collu), attiecas Eiropas spiedieniekārtu direktīva (PED).

- Šīs rokasgrāmatas tehnisko parametru nodaļā ir sniegtas a PED Direktīvu saistītās instrukcijas.
- Šajā rokasgrāmatā aprakstītie izstrādājumi atbilst EN Direktīvas 2014/34/EU prasībām.
- Visi „Brooks Instrument" plūsmas mērītāji ietilpst 1. šķidrumu grupā.
- Uz 25 mm jeb 1" (collu) maziem un mazākiem izstrādājumiem attiecas labas inženierijas prakse (SEP).
- 25 mm jeb 1" (collu) mazi vai mazāki izstrādājumi atbilst PED kategorijai I, II vai III.

Eiropas elektromagnētiskās savietojamības direktīva (EMS)

„Brooks Instrument" (elektriskās/elektroniskās) iekārtas ar CE zīmi ir izturējušas pārbaudi un atzītas par atbilstošām Eiropas elektromagnētiskās savietojamības direktīvas (EMS) prasībām (EMS 2014/30/EU)
Tomēr, izvēloties signālkabeli, kas tiks lietots kopā ar CE marķējuma iekārtu, ir jāievēro īpaša uzmanība.
Signālkabeļa, kabeļa blīvslēgu un savienotāju kvalitāte:
„Brooks Instrument" piegādā augstas kvalitātes kabeļus, kas atbilst CE sertifikācijas tehniskajiem parametriem.
Ja jūs lietojat pats savu signālkabeli, tam ir jābūt pilnībā, 100% ekranizētam.
„D" un „apaļā" tipa savienotājiem ir jābūt aprīkotiem ar metāla ekranizējumu. Ja nepieciešams, ir jāizmanto metāla blīvslēgi ar kabeļa ekranizējuma skavojumu.
Kabeļa ekranizējumam ir jābūt savienotam ar metāla apvalku un abās pusēs aizsargātam 360 grādu diapazonā.
Ekranizējumam ir jābeidzas pie iezemējuma.
„Card Edge" savienotāji standarta izpildījumā ir nemetāla. Kabeļiem ir jābūt pārklātiem ar 100% ekranizējumu, lai tie atbilstu CE sertifikācijas prasībām.
Ekranizējumam ir jābeidzas pie iezemējuma.
Attiecībā uz tapu konfigurāciju: skat. pievienoto instrukciju rokasgrāmatu.

ESD (elektrostatiskā izlāde)

⚠ **IEVĒROT PIESARDZĪBU! Šis instruments satur elektriskos komponentus, kas ir jutīgi pret statisko elektrību. Izņemot un uzstādot iekšējās ķēdes plates un ierīces vai kā citādi darbojoties ar tām, ir jāievēro noteikta darba kārtība.**

Darba kārtība:

1. Iekārta jāatslēdz no barošanas.
2. Pirms jebkādas drukātas shēmas kartes vai citas iekšējās ierīces uzstādīšanas, izņemšanas vai regulēšanas personālam, kas veiks šos darbus, ir jābūt iezemētam, piem., izmantojot aproces vai citus drošus, piemērotus līdzekļus.
3. Drukātās shēmas kartes ir jātransportē vadošā iepakojumā. Plāksnes no aizsargkorpusa drīkst izņemt tikai tieši pirms uzstādīšanas. Transportējot, uzglabājot vai atgriežot rūpnīcā, izņemtās plāksnes ir nekavējoties jāievieto aizsargiepakojumā.

Komentāri

Instruments nav unikāls tajā aspektā, ka tas satur pret ESD (elektrostatisko izlādi) jutīgus komponentus. Vairākums mūsdienu elektroiekārtu satur komponentus, kuru ražošanā izmantota metāla oksīdu tehnoloģijas (NMOS, SMOS u.c.). Pieredze rāda, ka pat neliels daudzums statiskās elektrības var nodarīt bojājumus šādām ierīcēm vai pilnībā sabojāt tās. Bojātie komponenti pat tad, ja tie šķietami darbojas pareizi, ir pakļauti ātrākai atteicei.

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Lithuanian

Pagrindinės instrukcijos

Perskaitykite prieš tęsdami!

„Brooks Instrument“ projektuoja, gamina ir išbando savo gaminius, kad jie atitiktų įvairius nacionalinius ir tarptautinius standartus. Šie gaminiai turi būti tinkamai montuojami, eksploatuojami ir prižiūrimi, kad ir toliau veiktų pagal jiems būdingus techninius parametrus. Toliau pateiktų nurodymų reikia laikytis ir įtraukti juos į saugos programą montuojant, eksploatuojant ir prižiūrint „Brooks Instrument“ gaminius.

- Siekiant užtikrinti tinkamą veikimą, montuoti, eksploatuoti, naujinti, programuoti ir prižiūrėti gaminį turi tik kvalifikuoti darbuotojai.
- Perskaitykite visus nurodymus prieš montuodami, eksploatuodami ir prižiūrėdami gaminį. Jei gavote netinkamą instrukciją, galiniame jos viršelyje ieškokite vietinės prekybos atstovybės kontaktinės informacijos. Neišmeskite šios instrukcijos, jos gali prireikti ateityje.

⚠ **ĮSPĖJIMAS: nenaudokite šio prietaiso viršydami instrukcijoje ir eksploatacijos vadove nurodytus techninius duomenis. Nesilaikydami šio įspėjimo galite sunkiai susižeisti ir (arba) sugadinti įrangą.**

- Jei nesuprantate kokių nors nurodymų, kreipkitės į „Brooks Instrument“ atstovą, kad paaiškintų.
- Paisykite visų įspėjimų, perspėjimų ir nurodymų, pažymėtų ant gaminio arba pateiktų su juo.

⚠ **ĮSPĖJIMAS: prieš montuodami įsitikinkite, kad ši įranga atitinka vietinius ir nacionalinius teisės aktus. Nepaisant šio įspėjimo gali būti sužeisti žmonės ir (arba) pažeista įranga.**

- Įrangą montuokite taip, kaip nurodyta atitinkamos instrukcijos montavimo nurodymuose arba taikomuose vietiniuose ar nacionaliniuose teisės aktuose. Visus gaminius junkite prie tinkamų elektros ir slėgio šaltinių.
- Naudojimas: (1) lėtai įjunkite srautą į sistemą. Lėtai atidarykite proceso vožtuvus, kad išvengtumėte srauto antplūdžių. (2) Patikrinkite, ar nėra nuotėkių aplink srauto matuoklio įleidimo ir išleidimo jungtis. Jei nuotėkių nėra, sukurkite sistemoje darbinį slėgį.
- Prieš atlikdami priežiūros darbus būtinai pašalinkite slėgį proceso linijoje. Jei reikia pakeisti dalis, užtikrinkite, kad kvalifikuoti darbuotojai naudotų „Brooks Instrument“ nurodytas pakaitines dalis. Naudojant netinkamas dalis ir netinkamai atliekant procedūras, gali pablogėti gaminio veikimas ir gali kilti pavojus naudojimo proceso saugai. Naudojant tik panašiai atrodančius pakaitalus gali kilti gaisro ar elektros smūgio pavojus arba gaminys gali veikti netinkamai.
- Užtikrinkite, kad visos įrangos durelės būtų uždarytos, o apsauginiai dangčiai uždėti, kad išvengtumėte elektros smūgio ir sužeidimų, išskyrus, kai kvalifikuoti darbuotojai atlieka priežiūros darbus.

⚠ **ĮSPĖJIMAS: naudojant skysto srauto įrenginius, jei dėl kokios nors priežasties prireikia uždaryti šalia įrenginio esančius įleidimo ir išleidimo vožtuvus, iš įrenginio reikia išleisti visą skystį. To nepadarius galimas šiluminis skysčio plėtimasis, galintis sugadinti įrenginį ir sužeisti žmonės.**

Europos slėginės įrangos direktyva (PED)

Visa slėginė įranga, kurios vidinis slėgis didesnis nei 0,5 bar (g), o dydis didesnis nei 25 mm arba 1 col., yra reglamentuojama Slėginės įrangos direktyvos (PED).

- Šios instrukcijos dalyje „Techniniai duomenys“ pateikiami nurodymai, susiję su PED direktyva.
- Šioje instrukcijoje aprašyti gaminiai atitinka Europos Sąjungos direktyvą 2014/34/EU.
- Visi „Brooks Instrument“ srauto matuokliai priklauso 1 skysčių grupei.
- Didesni nei 25 mm arba 1 col. gaminiai atitinka PED I, II arba III kategoriją.
- 25 mm arba 1 col. ar mažesni gaminiai atitinka tinkamą inžinerijos praktiką (SEP).

Europoje taikomi elektromagnetinio suderinamumo (EMS) reikalavimai

CE ženklu pažymėta „Brooks Instrument“ (elektrinė / elektroninė) įranga buvo sėkmingai išbandyta pagal elektromagnetinio suderinamumo reikalavimus (EMS direktyvą 2014/30/EU).
Tačiau ypač atidžiai reikia rinktis signalizavimo kabelį, kuris bus naudojamas su CE ženklu pažymėta įranga.
Signalizavimo kabelio, kabelių riebokšlių ir jungčių kokybė:
„Brooks Instrument“ tiekia kokybiškus kabelius, kurie atitinka CE sertifikavimo specifikacijas.
Jei naudojate savo signalizavimo kabelį, jis turi būti visiškai ir visas ekranuotas 100 % ekranu.
Naudojamos „D“ arba „apskrito“ tipo jungtys turi būti ekranuotos metaliniu ekranu. Jei taikoma, reikia naudoti metalinius kabelių riebokšlius, užtikrinančius kabelio ekrano suspaudimą.
Kabelio ekraną reikia jungti prie metalinio apvalkalo ar riebokšlio ir ekranuoti abiejuose galuose 360 laipsnių.
Ekranas turi užsibaigti įžeminimu.
Standartinės kraštinės jungtys yra nemetalinės. Naudojami kabeliai turi būti ekranuoti 100 % ekranu, kad atitiktų CE sertifikavimą.
Ekranas turi užsibaigti įžeminimu.
Keturių kontaktų konfigūracija: žr. pridėtą instrukciją.

ESD (elektrostatinis išlydis)

⚠ **PERSPĖJIMAS: šiame prietaise yra elektroninių komponentų, kuriuos gali sugadinti statinė elektra. Išimant ar įdedant vidines spausdintines plokštes ar įrenginius, arba atliekant su jomis kitus darbus, reikia laikytis tinkamų darbo procedūrų.**
Darbo procedūra:

1. Atjunkite įrenginio maitinimą.
2. Darbuotojai turi pasirūpinti įžeminimu naudodami riešo juostelę ar kitas saugias tinkamas priemones prieš įdėdami, išimdami ar reguliuodami bet kokią spausdintinės plokštės kortelę ar kitą vidinį komponentą.
3. Spausdintinės plokštės korteles reikia transportuoti laidžiame konteineryje. Neleidžiama išimti plokštės iš apsauginio dėklo, nebent prieš pat įdėjimą. Išimtas plokštes reikia nedelsiant įdėti į apsauginį konteinerį, kuriame jos bus transportuojamos ar saugomos, arba grąžinti į gamyklą.

Pastabos
Šis instrumentas nėra unikalus dėl jame esančių ESD (elektrostatiniam išlydžiui) jautrių komponentų. Daugelyje šiuolaikinių elektroninių gaminių yra komponentų, kuriuose naudojama metalo oksidų technologija (NMOS, SMOS ir pan.). Patirtis rodo, kad net ir mažas statinės elektros kiekis gali pakenkti tokiems gaminiams ar juos sugadinti. Sugadinti komponentai, net jei atrodo, kad jie veikia tinkamai, greitai sugenda.

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Polish

Niezbędne zalecenia

Prosimy przeczytać przed rozpoczęciem użytkowania!

Brooks Instrument projektuje, wytwarza i testuje swoje produkty tak, aby spełniały wymagania licznych norm krajowych i międzynarodowych. Produkty te muszą być poprawnie instalowane, obsługiwane oraz konserwowane, aby zapewnić ich prawidłowe działanie zgodnie ze specyfikacją techniczną. Podczas instalowania, obsługiwania i konserwowania produktów firmy Brooks Instrument należy przestrzegać następujących zaleceń:

- Aby zapewnić właściwe działanie sprzętu, instalacja, obsługa, aktualizacje, programowanie i konserwacja powinny być wykonywane przez przeszkolony personel.
- Przed instalacją, obsługą i czynnościami serwisowymi należy zapoznać się ze wszystkimi zaleceniami producenta. Aby uzyskać instrukcję obsługi odpowiednią dla danego sprzętu, należy skontaktować się z lokalnym przedstawicielem handlowym producenta. Instrukcję obsługi należy zachować do późniejszego użycia.

⚠ **OSTRZEŻENIE: Nie wolno przekraczać podanych w instrukcji zakresów działania urządzenia. Nieprzestrzeganie tego zalecenia może doprowadzić do poważnego zagrożenia życia lub zdrowia personelu i / lub uszkodzenia sprzętu.**

- Jeżeli jakieś zalecenia w instrukcji obsługi urządzenia są niezrozumiałe, prosimy o skontaktowanie się z przedstawicielem firmy Brooks Instrument, aby wyjaśnić problem.
- Należy przestrzegać wszystkich ostrzeżeń, uwag i zaleceń umieszczonych na produkcie lub do niego dołączonych

⚠ **OSTRZEŻENIE: Przed rozpoczęciem instalacji należy sprawdzić, czy wymagana specyfikacja niniejszego urządzenia zgodna jest z miejscowymi i krajowymi normami.**
Zignorowanie tego ostrzeżenia może spowodować poważne obrażenia ciała i/lub uszkodzenie sprzętu.

- Instalację urządzenia należy przeprowadzić zgodnie z zaleceniami zawartymi w instrukcji instalacji oraz z obowiązującymi lokalnymi i narodowymi oznaczeniami. Wszystkie urządzenia można podłączać wyłącznie do odpowiednich źródeł energii elektrycznej oraz ciśnienia.
- Pierwsze czynności obsługowe: (1) Należy powoli włączyć przepływ w instalacji. Następnie powoli otworzyć zawory robocze tak, aby uniknąć wahań przepływu. (2) Należy teraz sprawdzić, czy nie występują nieszczelności przy podłączeniach wejściowym i wyjściowym miernika przepływu. Jeżeli nie ma żadnych nieszczelności, można zwiększyć ciśnienie w instalacji do wartości ciśnienia roboczego.
- Przed przystąpieniem do czynności serwisowych należy upewnić się, że ciśnienie robocze jest odłączone. Jeżeli konieczna jest wymiana części zamiennych, należy zawsze stosować części zamienne specyfikowane przez firmę Brooks Instrument a czynności ich wymiany powinien w każdym przypadku dokonywać przeszkolony personel. Stosowanie nieautoryzowanych części i procedur serwisowych może niekorzystnie wpłynąć na działanie produktu oraz zagrozić bezpieczeństwu instalacji. Korzystanie z podobnie wyglądających zamienników może doprowadzić do pożaru, porażenia prądem lub nieprawidłowego działania urządzenia.
- Należy upewnić się, że wszystkie otwory urządzenia są zamknięte a osłony umocowane na swoich miejscach, aby zapobiec obrażeniom ciała lub porażeniu prądem personelu. Zalecenie to nie dotyczy przeszkolonego pracownika wykonującego prace serwisowe lub konserwacyjne.

⚠ **OSTRZEŻENIE: W przypadku mierników przepływu cieczy, jeżeli znajdujące się na nich zawory wejściowe i wyjściowe mają być z jakiegoś powodu zamknięte, to urządzenie musi zostać całkowicie opróżnione z ciekłego medium. Niedopełnienie tego zalecenia może doprowadzić do termicznego zwiększenia objętości cieczy, co z kolei może spowodować uszkodzenie urządzenia i obrażenia personelu.**

Europejska dyrektywa dotycząca urządzeń ciśnieniowych (PED)

Wszystkie urządzenia ciśnieniowe pracujące przy ciśnieniu wewnętrznym względnym większym niż 0,5 bara i wielkości powyżej 25 mm lub 1 cala podlegają dyrektywie europejskiej dotyczącej urządzeń ciśnieniowych (PED).

- Rozdział „Specyfikacja techniczna" niniejszej instrukcji zawiera zalecenia dotyczące dyrektywy PED.
- Produkty opisane w tej instrukcji są zgodne z dyrektywą EN 2014/34/EU.
- Wszystkie mierniki przepływu firmy Brooks Instrument należą do 1. grupy cieczy.
- Produkty o wielkości powyżej 25 mm lub 1 cala należą do kategorii I, II lub III dyrektywy PED.
- Produkty o wielkości 25 mm lub 1 cala lub mniejsze podlegają zaleceniom „Uznanej Praktyki Inżynierskiej" (SEP).

Europejska dyrektywa dotycząca kompatybilności elektromagnetycznej (EMC)

Urządzenia elektryczne / elektroniczne firmy Brooks Instrument posiadające oznaczenie CE, przeszły pozytywnie testy pod kątem spełniania przez nich wymogów kompatybilności elektromagnetycznej (Dyrektywa EMC 2014/30/EU).
Jednakże szczególną uwagę należy poświęcić przy doborze przewodów sygnałowych, które mają być stosowane z urządzeniami ze znakiem CE.
Jakość przewodu sygnałowego, dławic oraz złączy przewodu:
Firma Brooks Instrument dostarcza wysokiej jakości przewody, które spełniają wymagania zawarte w specyfikacji dla certyfikatu CE.
Jeżeli stosuje się własne przewody sygnałowe, to powinny one być w całości w pełni ekranowane.
Złącza typu „D" lub okrągłe powinny zawierać metalowy ekran. Jeśli to możliwe, należy stosować metalowe dławice przewodu zapewniające mocowanie jego ekranu.
Ekran przewodu powinien być połączony z metalową osłoną lub dławicą zapewniając całkowite, dookólne ekranowanie na obu końcach przewodu.
Ekran przewodu powinien być uziemiony.
Złącza krawędziowe są standardowo niemetaliczne. Stosowane przewody muszą być w pełni ekranowane zgodnie z certyfikatem CE.
Ekran przewodu powinien być uziemiony.
Konfiguracja styków jest podana w niniejszej instrukcji obsługi.

Wyładowania elektrostatyczne (ESD)

⚠ **UWAGA: Urządzenie zawiera części elektroniczne podatne na uszkodzenia spowodowane ładunkami elektrostatycznymi. Przy obchodzeniu się z wewnętrznymi podzespołami i częściami elektronicznymi należy przestrzegać następujących zasad postępowania:**

1. Należy odłączyć zasilanie od urządzenia.
2. Osoba wykonująca czynności musi zostać uziemiona za pomocą opaski na przegubie dłoni lub w inny, bezpieczny sposób, zanim przystąpi do instalacji, wyjęcia lub regulacji obwodów drukowanych lub innych wewnętrznych podzespołów elektronicznych urządzenia.
3. Obwody drukowane należy transportować w przewodzącym pojemniku. Płytki drukowane należy wyjmować z opakowania ochronnego bezpośrednio przed ich montażem. Wymontowane płytki należy niezwłocznie umieścić w opakowaniu ochronnym służącym do transportowania, składowania lub odsyłania do producenta.

Uwagi:
Fakt, że urządzenie zawiera części nieodporne na wyładowania elektrostatyczne (ESD) jest rzeczą normalną. Większość nowoczesnych urządzeń elektronicznych zawiera komponenty wykonane w technologii tlenków metali (NMOS, SMOS itp.). Jak pokazuje praktyka, nawet niewielkie wyładowanie elektrostatyczne może uszkodzić lub zniszczyć takie urządzenie. Uszkodzone części, nawet jeżeli na pozór działają poprawnie, szybko doprowadzają do nieprawidłowej pracy urządzenia.

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Portuguese

Instruções Básicas
Ler antes de proceder!

A Brooks Instrument projecta, fabrica e testa os seus produtos de forma a satisfazer numerosas normas nacionais e internacionais. Estes equipamentos devem ser instalados, utilizados e mantidos de forma adequada, e devem funcionar dentro da sua gama de utilização. As instruções seguintes devem ser, durante a instalação, uso e/ou manutenção dos equipamentos da Brooks Instrument, apreendidas e integradas no plano de protecção e segurança no trabalho.

- Para assegurar o desempenho adequado, a instalação, exploração, actualização e/ou manutenção do equipamento deve ser realizada, exclusivamente, por pessoal qualificado.
- Antes de instalar, utilizar e/ou executar operações de manutenção devem ser lidas todas as instruções do equipamento. No caso do presente manual não ser apropriado procure, na capa traseira, o distribuidor mais próximo e contacte-o para obter informações adicionais. Guarde este manual para futura referência.

⚠ **ATENÇÃO: não sujeite o equipamento a condições fora das gamas de serviços indicadas. Ao não respeitar esta advertência poderá provocar avarias no equipamento e/ou danos pessoais.**

- Se as instruções deste manual não estiverem suficientemente claras, contacte o representante Brooks Instrument para esclarecer as suas dúvidas.
- Tenha sempre presente todas as advertências, apelos e instruções indicadas no equipamento e/ou fornecidas junto com o mesmo.

⚠ **AVISO: Antes de proceder à instalação, certifique-se de que este instrumento está em conformidade com as categorias de homologação exigidas pelas regulamentações locais e nacionais. O incumprimento pode resultar em lesões pessoais graves e/ou danos no equipamento.**

- A instalação do equipamento deverá ser efectuada cumprindo todas as instruções indicadas no manual assim como as normas e regulamentos locais e nacionais vigentes. Ligue o equipamento exclusivamente a fontes de energia eléctrica e/ou pneumática adequadas.
- Procedimento: (1) Pressurize lentamente o sistema. Abra lentamente as válvulas para evitar variações bruscas de caudal. (2) Verifique se há fugas nas ligações de entrada e saída do medidor de caudal. Se não detectar fugas, poderá colocar o sistema à pressão de trabalho.
- Antes de efectuar qualquer operação de manutenção verifique sempre a possibilidade do equipamento estar sob pressão. No caso de ser preciso substituir peças, estas devem ser as recomendadas pela Brooks Instrument e o trabalho de substituição deverá ser efectuado por técnicos qualificados. Procedimentos e peças não conformes poderão alterar o desempenho do equipamento, danificá-lo ou colocar em risco a sua segurança ou de outros. Substituir peças por outras não originais, meramente semelhantes, poderá originar choques eléctricos, fogo ou em funcionamento inadequado.
- Deverá manter o equipamento intacto e fechado, verificando se as coberturas de protecção estão nos seus lugares devidos, de forma a evitar choques eléctricos e/ou danos pessoais, excepto no caso de se tratar de um técnico qualificado e se estiver a executar trabalhos de manutenção.

⚠ **ATENÇÃO: Se por qualquer razão for necessário fechar as válvulas a montante e jusante do equipamento, tenha em atenção que o mesmo deverá ser previamente esvaziado do fluído que o atravessa. Esta obrigação surge do facto de existir a possibilidade de ocorrer dilatação térmica do líquido, no interior do aparelho, podendo provocar danos pessoais ou materiais graves.**

Directiva Europeia para equipamentos sob pressão (PED)

Todos os equipamentos sujeitos a pressão interior superior a 0,5 bar (g) e com calibre superior a 25 mm (1 polegada) estão sob a vigência da directiva europeia de equipamentos sob pressão (PED).

- O capítulo "Dados técnicos" do manual contém instruções relativas à Directiva PED.
- O produto objecto deste manual satisfaz a directiva 2014/34/EU da UE.
- Os caudalímetros Brooks pertencem ao grupo 1 de fluidos.
- Os produtos com calibre superior a 25 mm (1 polegada) pertencem às categorias PED I, II, ou III.
- Os produtos de 25 mm (1 polegada) ou menores seguem as “Boas regras de engenharia” (SEP).

Directiva Europeia sobre Compatibilidade electromagnética (EMC)

Os equipamentos (eléctricos/electrónicos) da Brooks Instrument que têm a marcação CE passaram os testes comprovativos dos requisitos de compatibilidade electromagnética (Directiva EMC número 2014/30/EU).
Todavia, ao utilizar os aparelhos compete-lhe a escolha dos cabos de sinal adequados para os equipamentos com marcação CE.
Qualidade dos cabos de sinal, bucins e conectores:
A Brooks Instrument fornece cabos de alta qualidade que cumprem todos os requisitos da marcação CE.
No caso de utilizar os seus próprios cabos de sinal, assegure uma blindagem a 100%.
Os conectores do tipo “D” ou "circular" têm que ser blindados por uma malha metálica. Se precisar de usar bucins, estes têm que permitir a crimpagem da malha/blindagem do cabo.
A blindagem do cabo deve ser ligada ao corpo metálico ou bocal e assegurando a blindagem em 360°. A blindagem deve terminar numa ligação à terra.
Os conectores ligados a cartões serão, em geral, não-metálicos. Os cabos utilizados devem ter fita de blindagem a 100% para satisfazer a marcação CE.
A blindagem, deverá terminar numa ligação à terra.
Atribuição de pinos: Veja as instruções de operação anexas.

Descarga Electrostática (ESD)

⚠ **ATENÇÃO: Alguns componentes deste equipamento são susceptíveis à acção da electricidade estática, podendo ficar danificados. Ao remover, colocar ou manipular placas de circuitos electrónicos deverá ter em atenção os seguintes procedimentos:**

1. Desligar o equipamento da rede.
2. O utilizador, antes de qualquer intervenção que envolva os cartões de circuitos ou outros dispositivos internos, terá que se ligar à terra por meio duma bracelete de pulso ou outro dispositivo adequado.
3. Os circuitos impressos deverão ser transportados numa embalagem condutiva. Os cartões só deverão ser retirados da embalagem protectora imediatamente antes da sua inserção. O cartão retirado deverá ser recolocado imediatamente na embalagem protectora que servirá para o seu transporte, armazenagem ou retorno a fábrica.

Observações:
Tenha presente que este equipamento poderá não ser o único objecto capaz de ser portador de peças sensíveis a descargas electrostáticas (ESD).
Na maioria dos dispositivos electrónicos Brooks encontram-se peças de tecnologia de óxidos metálicos (NMOS, SMOS, etc.). A experiência mostra que até pequenas quantidades de electricidade estática são capazes de danificar ou destruir esses dispositivos. Os componentes danificados, embora inicialmente funcionem aparentemente bem, acabam por ter falhas prematuramente.

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Romanian

Indicaţii de referinţă

Citiţi-le întâi pe acestea!

Brooks Instrument îşi proiectează, produce şi testează produsele într-un mod ce respectă un mare număr de standarde autohtone şi internaţionale. Aceste instalaţii trebuie amplasate, exploatate şi întreţinute corespunzător, pentru ca în toate situaţiile, domeniul lor de lucru să corespundă operării normale. În ceea ce priveşte instalarea, operarea şi întreţinerea produselor Brooks Instrument, indicaţiile de mai jos trebuie respectate şi trebuie introduse in programul de protecţia muncii.

- Pentru garantarea prestaţiei corecte, instalarea, operarea, actualizarea, programarea şi întreţinerea produsului poate fi realizată doar de către personal calificat.
- Instrucţiunile de instalare ale produsului trebuie citite integral, înainte de punerea în serviciu şi exploatarea sa. În măsura în care ediţia acestui manual nu este cea adecvată, identificaţi pe ultima copertă coordonatele distribuitorului local şi pentru lămuriri suplimentare adresaţi-vă acestuia. Păstraţi acest manual pentru referinţe ulterioare.

⚠ATENŢIE: Nu utilizaţi instalaţia în afara intervalului de funcţionare indicat în instrucţiunile de operare. Nerespectarea acestui lucru se poate solda cu răniri grave de persoane sau defectarea instalaţiei.

- În măsura în care indicaţiile cărţii maşinii nu sunt suficient de lămuritoare, luaţi legătura cu reprezentantul Brooks Instrument pentru clarificarea problemei.
- Păstraţi toate avertismentele, avizele şi instrucţiunile livrate odată cu instalaţia sau inscripţionate pe aceasta.

⚠AVERTISMENT: Înainte de instalare, asiguraţi-vă că valorile nominale ale acestui instrument respectă codurile naţionale. Nerespectarea acestui avertisment poate avea drept rezultat răniri personale grave şi/sau defectarea echipamentelor.

- Efectuaţi instalarea echipamentului în conformitate cu indicaţiile de instalare corespunzătoare, respectiv cu respectarea prevederilor naţionale. Echipamentul se conectează exclusiv la surse de energie electrică şi de presiune corespunzătoare.
- Succesiune: (1) Presurizaţi lent instalaţia. Deschideţi încetul cu încetul supapa de funcţionare pentru evitarea fluctuaţiilor de flux. (2) Controlaţi dacă nu sunt prelingeri la intrarea sau ieşirea debitmetrului de branşare. Dacă nu sunt scurgeri, presurizaţi instalaţia la presiunea de lucru.
- Înaintea exploatării/ întreţinerii, verificaţi neapărat dacă conducta uzinală nu este sub presiune. În măsura în care este nevoie de piese de schimb, este neapărat necesar ca manevrarea pieselor de schimb să fie făcută de personal cu calificare profesională agreat de Brooks Instrument. Utilizarea altor piese de schimb decât cele originale şi licenţiate poate avea efecte asupra performanţelor instalaţiei şi asupra siguranţei sale în exploatare. Utilizarea de piese asemănătoare de substituire poate avea ca rezultat pericol de incendiu şi electrocutare.
- În toate cazurile toate uşile instalaţiei trebuie să fie închise, cuştile de protecţie să fie puse la locurile lor, pentru evitarea electrocutării şi rănirii de persoane, exceptând situaţiile când un specialist efectuează lucrări de întreţinere.

⚠ATENŢIE: În cazul instalaţiilor cu flux de fluide, dacă din orice motiv este necesară închiderea valvelor de intrare şi ieşire, limitrofe instalaţiei, instalaţia trebuie complet golită. Neglijarea acestui lucru poate avea ca efect dilatarea termică a fluidului, care poate defecta instalaţia şi poate produce răniri de persoane.

Directiva europeană pentru instalaţiile sub presiune (PED)

Toate instalaţiile şi sistemele presurizate ce se află sub presiuni interne ce depăşesc 0,5 mbar (g) şi au mai mult de 25 mm sau 1 ţol, cad sub incidenţa normei europene corespunzătoare (PED).

- La capitolul "Date tehnice" din cartea maşinii se găsesc indicaţiile corespunzătoare directivei PED.
- Produsele menţionate în cartea maşinii corespund directivei 2014/34/EU EU.
- Toate debitmetrele Brooks corespund clasei 1 de fluide.
- Produsele mai mari de 25 mm sau 1 ţol corespund categoriei PED I, II sau III.
- Produsele mai mici de 25 mm sau 1 ţol se conformează practicii inginereşti acceptate (SEP).

Directiva europeană privitoare la compatibilitatea electromagnetică (EMC).

Instalaţiile (electrice /electronice) ce poartă marca Brooks Instrument CE îndeplinesc cu succes cerinţele testelor de verificare ale compatibilităţii electromagnetice (Cf. directivelor europene EMC cu nr. 2014/30/EU).
În acelaşi timp trebuie acordată o atenţie deosebită la alegerea cablurilor de semnalizare utilizate pentru instalaţiile ce poartă marcajul CE.
Calitatea cablurilor de semnalizare, a legăturilor prin cablu şi a conectoarelor:
Brooks Instrument oferă cabluri de calitate ridicată, care corespund cerinţelor calitative ale CE.
În măsura în care folosiţi cabluri proprii, trebuie alese acelea care sunt 100% ecranate şi prevăzute cu filtre.
Conectoarele „D" sau cele „circulare" trebuie sa dispună de ecrane metalice. În caz de nevoie trebuie folosite conectoare metalice pentru montarea filtrelor de cablu.
Filtrul de cablu trebuie conectat la carcasa metalică sau manşon şi în ambele cazuri trebuie asigurată ecranarea la 360°. Ecranarea trebuie terminată cu o legare la pământ.
Conform standardului, conectoarele aparţinând plăcilor electronice nu sunt metalice. Cablurile folosite trebuie să fie 100% ecranate şi prevăzute cu filtre pentru a corespunde clasificării CE.
Ecranarea trebuie terminată cu o legare la pământ.
Configuraţie de contact: Vezi instrucţiunile de operare ataşate.

Descărcare electrostatică (ESD)

⚠ ATENŢIE: Instalaţia include piese care sunt predispuse la defectare sub influenţa electricităţii statice. Trebuie respectate metodele corespunzătoare de extragere, instalare sau alte manipulări ale circuitelor electronice.
Procedură de manipulare:

1. Instalaţia trebuie scoasă de sub tensiune.
2. Înaintea de inserarea, scoaterea sau reglarea vreunei cartele electronice, sau a altui dispozitiv intern, persoana trebuie să se lege la pământ cu banda pentru articulaţia mâinii sau alte dispozitive de siguranţă disponibile pentru acest scop.
3. Cartelele cu cablaje electronice imprimate trebuie transportate în ambalaje anti-electrostatice (conductoare). Cartelele se pot scoate din ambalaj, doar nemijlocit înaintea amplasării lor. Cartela demontată trebuie pusă neîntârziat în ambalajul de protecţie în vederea transportării, a depozitării sau returnării la producător.

Observaţii:
În echipamente se găsesc adesea componente sensibile la descărcare electrostatică (ESD). Majoritatea echipamentelor moderne includ componente electronice realizate în tehnologie metal-oxid semiconductor (NMOS, SMOS, etc.) Experienţa a dovedit că acestea pot fi afectate sau deteriorate chiar de energii electrostatice de slabă intensitate. Componentele defectate, cu toate că în aparenţă sunt funcţionale, duc în timp la defecţiuni incipiente.

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Slovak

Základné príkazy

Prečítať pred inštaláciou!

Brooks Instrument svoje výrobky projektuje, vyrába a testuje takým spôsobom, aby tieto vyhoveli domácim aj medzinárodným normám. Tieto zariadenia je potrebné predpísaným spôsobom inštalovať, prevádzkovať a udržiavať, na zabezpečenie ich spoľahlivej a normálnej prevádzky v celom pracovnom rozsahu. Nižšie uvedené príkazy je potrebné dodržiavať a začleniť do programu bezpečnostných predpisov v priebehu inštalácie, prevádzky a údržby výrobkov Brooks Instruments.

- V záujme zabezpečenia vyhovujúceho výkonu inštaláciu, prevádzku, programovanie, aktualizáciu a údržbu zariadení má vykonávať výlučne odborne kvalifikovaný personál.
- Pred inštaláciou, prevádzkou a servisu zariadení je potrebné prečítať všetky príkazy. Ak táto príručka nie je správna, tak na zadnej strane treba nájsť miestneho distribútora, kontaktovať ho pre ďalšie informácie. Pre neskoršie informácie uschovajte príručku.

⚠ UPOZORNENIE: Neprevádzkovať zariadenie v rozsahu mimo rozsahu uvedenom v prevádzkovej príručke. Porušenie tohto oznámenia môže mať za následok ťažkú ujmu na zdraví a vedie k poškodeniu zariadenia.

- Ak príkazy v návode nie sú jednoznačné, kontaktujte zástupcu Brooks Instrument na objasnenie problémov.
- Dodržujte všetky upozornenia, príkazy a usmernenia uvedené na zariadení, alebo s ním dodané.

⚠ VAROVANIE: pred montážou sa uistite, že toto zariadenie disponuje potrebnými klasifikáciami povolení, ktoré spĺňajú miestne a národné predpisy. Nedodržanie tohto varovania môže mať za následok vážne zranenia osôb alebo poškodenie zariadenia.

- Zariadenia inštalujte podľa návodu uvedeného v príkaze na inštaláciu, v súlade s miestnymi a národnými predpismi. Zariadenie pripojte výlučne len na vyhovujúci elektrický a tlakový zdroj
- Postup: (1) Pomaly natlakujte systém. Prevádzkový ventil otvorte pomaly na zamedzenie kolísania prietoku. (2) Prekontrolujte tesnosť vstupného a výstupného zapojenia prietokomeru. Keď nie je presakovanie, spoje sú tesné, naplniť systém na prevádzkový tlak.
- Pred vykonávaním servisných prác kontrolovať, či systém nie je pod tlakom. V prípade, že je potrebná výmena súčiastky, výmenu dielov, určených Brooks Instrument musí vykonať kvalifikovaná osoba. Použitie nepovolených dielov a vykonávanie nepovolených aktivít ohrozujú bezpečnosť prevádzvky a majú negatívny vplyv na výkon zariadenia. Nahradenie súčiastok len podobnými komponentmi môže mať za následok požiar, úraz elektrickým prúdom alebo nedostatočnú funkciu zariadenia
- Všetky ochranné kryty, dvierka zariadenia majú byť zatvorené na zabezpečenie ochrany proti úrazu elektrickým prúdom a proti poraneniam obsluhy. Výnimku tvorí vykonávanie údržby kvalifikovaným odborníkom.

⚠ UPOZORNENIE: Pri zariadeniach s prietokom kvapalín, keď z akéhokoľvek dôvodu je nutné uzavrieť vstupné a výstupné ventily, zariadenie je potrebné úplne vyprázdniť. Zanedbanie vypúšťania má za následok poškodenie zariadenia s možnosťou zranenia obsluhy z dôvodu tepelnej rozťažnosti náplne.

Európska smernica vzťahujúca sa na tlakové zariadenia (PED)

- Všetky zariadenia s vyšším vnútorným pretlakom ako 0,5 bar (g), a väčšieho rozmeru ako 25 mm alebo 1 anglický palec, podliehajú pod Európsku smernicu vzťahujúcu sa na tlakové nádoby (PED).
- Kapitola "Technické údaje" návodu na obsluhu obsahuje príkazy vzťahujúce sa na smernicu PED.
- Produkty uvedené v návode na obsluhu vyhovujú smernici 2014/34/EU EÚ.
- Všetky prietokomery Brooks patria do 1. skupiny kvapalín.
- Produkty presahujúce rozmery 25 mm alebo 1 " spĺňajú I., II., alebo III. kategóriu PED.
- Produkty menšie alebo rovné ako 25 mm alebo 1 " zodpovedajú zaužívanej meracej praxi (SEP).

Európska smernica vzťahujúca sa na elektromagnetickú kompatibilitu (EMC)

Elektrické / elektronické zariadenia Brooks Instrument, ktoré si zaslúžili značku CE, úspešne splnili skúšobné testy požiadaviek elektromagnetickej kompatibility (smernica EMC č. 2014/30/EU).
Pritom treba venovať zvláštnu starostlivosť na výber signálnych káblov zariadenia, s označením CE.
Kvalita signálnych káblov, káblových spojov a prípojov:
Brooks Instrument ponúka vysoko kvalitné káble, ktoré spĺňajú požiadavky kvalitatívneho zaradenia CE.
Ak použijete vlastné signálne káble, majú mať 100%-né tienenie, s plným filtrovaním.
Prípojky "kruhové" alebo tvaru "D" majú mať kovové tienenie. V prípade potreby treba použiť kovové káblové spojky k upevneniu káblového filtra.
Káblový filter treba pripojiť ku kovovému telesu alebo k puzdru, na oboch stranách zabezpečiť tienenie v kruhu 360 °. Tienenie má byť ukončené uzemnením.
Prípojky vedúce ku kartám podľa noriem sú nekovové. Použité káble, pre vyhovenie predpisom CE musia mať 100%-né filtrovanie tienením.
Tienenie má byť ukončené uzemnením.
Konfigurácia kontaktov: Viď priložený návod na obsluhu. .

Elektrostatický výboj (ESD)

⚠ UPOZORNENIE: Prístroj obsahuje súčiastky, ktoré môžu byť poškodené od elektrostatických nábojov. Pri montáži, odstraňovaní alebo inej údržby vnútorných obvodových kariet je potrebné dodržiavať príslušné postupy.

Postup ošetrovania:

1. Zariadenie odpojiť od napájania.
2. Osoba vykonávajúca údržbu má byť uzemnená uzemňujúcim náramkom, alebo iným, na túto prácu vyhovujúcim spôsobom pred vykonávaním inštalácie, demontáže a nastavenia obvodových kariet alebo iného vnútorného prostriedku.
3. Karty obvodov sa musia prepravovať v elektricky vodivom balení. Karty sa môžu vyberať z ochranného obalu výlučne len tesne pred montážou, zasunutím! Vybranú kartu okamžite treba umiestniť do ochranného obalu, určeného pre dopravu, skladovanie, alebo pre spätnú prepravu do výrobného závodu.

Poznámky:
Existencia prvkov, ktoré sú citlivé na elektrostatické výboje (ESD) v prístroji je častým javom. U väčšiny moderných elektronických prostriedkov sú použité prvky s technológiou oxidu kovov (NMOS, SMOS, atď.). Skúsenosti dokazujú, že aj nepatrné elektrostatické výboje poškodzujú, zničia tieto prostriedky. Poškodené súčiastky, aj keď zdanlivo pracujú bez chyby, odkazujú na vznikajúce poruchy.

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Slovene

Osnovna navodila

Preberite jih pred nadaljevanjem.

Brooks Instrument oblikuje, proizvaja in preskuša svoje izdelke tako, da ustrezajo številnim nacionalnim in mednarodnim standardom. Te izdelke je treba ustrezno namestiti, jih uporabljati in vzdrževati, saj bodo le tako še naprej delovali v skladu s svojimi običajnimi tehničnimi podatki. Upoštevajte spodnja navodila in jih vključite v svoj varnostni program pri namestitvi, uporabi in vzdrževanju izdelkov družbe Brooks Instrument.

- Če želite zagotoviti ustrezno delovanje, zagotovite, da bo izdelek namestilo, uporabljalo, posodabljalo, programiralo in vzdrževalo usposobljeno osebje.
- Pred namestitvijo, uporabo in servisiranjem izdelka preberite vsa navodila. Če ta priročnik ni ustrezen priročnik, na hrbtni strani poiščite podatke za stik z lokalnim prodajnim mestom. Ta priročnik shranite za poznejšo uporabo.

⚠ OPOMBA: To napravo lahko uporabljate samo v okviru tehničnih podatkov, ki so navedeni v priročniku z navodili za uporabo. Če tega opozorila ne upoštevate, lahko pride do hudih telesnih poškodb in/ali poškodb opreme.

- Če katerih koli navodil ne razumete, se za pojasnilo obrnite na svojega zastopnika družbe Brooks Instrument.
- Upoštevajte vsa opozorila, svarila in navodila, ki so navedena na izdelku ali so mu priložena.

⚠ OPOZORILO: Pred namestitvijo se prepričajte, da ima ta naprava zahtevane ocene odobritve, ki izpolnjujejo lokalne in nacionalne zakone. Če tega opozorila ne upoštevate, lahko pride do hudih telesnih poškodb in/ali poškodb opreme.

- Opremo namestite v skladu z navodili za namestitev, ki so navedena v ustreznem uporabniškem priročniku, ter v skladu z veljavnimi lokalnimi in nacionalnimi zakoni Vse izdelke priključite na ustrezne električne vire in vire tlaka.
- Postopek: (1) V sistemu počasi zaženite pretok. Počasi odprite procesne ventile, da preprečite nihanja pretoka. (2) Preverite, ali prihaja do puščanj okrog vhodnih in izhodnih priključkov merilnika pretoka. Če ne prihaja do puščanj, vzpostavite delovni tlak v sistemu.
- Pred servisom morate odstraniti tlak v obdelovalni liniji. Če potrebujete rezervne dele, zagotovite, da usposobljeno osebje uporablja rezervne dele, ki jih je odobrila družba Brooks Instrument. Neodobreni deli in postopki lahko vplivajo na učinkovitost delovanja izdelka ali ogrozijo varno upravljanje postopka. Rezervni deli, ki so podobni samo na videz, lahko povzročijo požar, nevarnost električnega udara ali nepravilno delovanje.
- Prepričajte se, da so vrata vrata naprave zaprta in da so zaščitni pokrovi nameščeni, da preprečite električni udar in telesne poškodbe, razen kadar usposobljeno osebje izvaja vzdrževalna dela.

⚠ OPOMBA: Če je pri napravah za pretok tekočine vhodne in izhodne ventile ob napravi treba iz kakršnega koli razloga zapreti, je treba naprave popolnoma izprazniti. Če tega ne naredite, lahko pride do toplotnega raztezanja tekočine, zaradi katerega se lahko naprava prelomi in povrzoči telesne poškodbe.

Evropska direktiva o tlačni opreni (PED)

Vsa tlačna oprema z notranjim tlakom, ki je večji od 0,5 bara (g), in velikostjo, ki je večja od od 25 mm ali 1 palca, spada v direktivo o tlačni opremi (PED).

- V poglavju »Tehnični podatki« v tem priročniku najdete navodila, ki se nanašajo na direktivo PED.
- Izdelki, opisani v tem priročniku, so skladni z direktivo EN 2014/34/EU.
- Vsi merilniki pretoka družbe Brooks Instrument spadajo v skupino tekočin 1.
- Izdelki, večji od 25 mm ali 1 palca, so skladni s kategrijo I, II, ali III direktive PED.
- Izdelki, katerih velikost je 25 mm ali 1 palec ali manjši izdelki, so skladni z dobro inženirsko prakso (SEP).

Evropska direktiva o elektromagnetni združljivosti (EMC)

Naprave družbe Brooks Instrument (električne/elektronske) z oznako CE so bile uspešno preskušene v sklčadu s predpisi direktive o elektromangnetni združljivosti (Direktiva o elektromagnetni združljivosti 2014/30/EU).
Posebno pozornost morate nameniti izbiri signalnega kabla, ki jih uporabljate za naprave z oznako CE.

Kakaovost signalnih kablov, kabelskih tesnilk in priključkov:

Brooks Insturment ponuja kable visoke kakovosti, ki ustrezajo tehničnim podatkov za pridobitev oznake CE.
Če uporabljate svoj signalni kabel, morate uporabiti kabel, ki je na splošno popolnoma oklopljen s 100 % zaščito.
Priključki tipa »D« ali »krožni« priključki morajo biti zaščiteni s kovinskim ščitom. Po potrebi je treba uporabiti kovinske kabelske tesnilke, ki zagotavljajo vpenjala za zaslon kabla.
Zaslon kabla je treba priključiti na kovinsko ohišje ali tesnilko in ga na obeh koncih popolnoma zaščititi.
Zaščito je treba prekiniti pri ozemljitvi.
Robni priključki običajno niso kovinski. Kable je treba zaščititi s 100 % zaščito, da ustrezajo oznaki CE.
Zaščito je treba prekiniti pri ozemljitvi.
Navodila z konfiguraciju nožic najdete v priloženem uporabniškem priročniku.

Elektrostatična razelektritev (ESD)

⚠ OPOZORILO: Naprava vsebuje elektronske komponente, ki so občutljive na poškodbe zaradi statične elektrike. Pri odstranitvi, namestitvi ali drugih postopkih uporabe notranjega tiskanega vezja ali naprav morate upoštevati ustrezne postopke.

Postopek ravnanja:

1. Izklopite napravo.
2. Osebje je treba pred namestitvijo, odstranitvijo ali prilagajanjem katare koli kartice tiskanega vezja ali druge notranje naprave ozemljiti z zapestnim paščkom ali drugimi varnostnimi in primernimi sredstvi.
3. Kartice s tiskanim vezjem je treba prevažati v prevodnem vsebniku. Plošče lahko iz zaščitne embalaže odstranite šele tik pred namestitvijo. Odstranjene plošče je treba takoj shraniti v zaščitno embalažo za prevoz, shranjevanje ali vračilo v tovarno.

Opombe:

Ta naprava ni edinstvena z vidika komponent, ki so občutljive na elektrostatično razelektritev. Večina sodobnih elektronskih naprav vsebuje komponente, ki uporabljajo oksidno tehnologijo (NMOS, SMOS itd.). Izkušnje dokazujejo, da lahko celo majhne količine statične elektrike poškodujejo ali uničijo te naprave. Poškodovane komponente se predčasno okvarijo, čeprav navidez delujejo pravilno.

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Spanish

Instrucciones básicas ¡Léalos primero!

El Brooks Instrument proyecta, fabrica y prueba sus productos de manera que éstos respondan a numerosas normas nacionales e internacionales. Dichas instalaciones deben ser emplazadas, operadas y mantenidas adecuadamente, para que puedan marchar de todas formas en conformidad con el alcance normal de funcionamiento. Las siguientes instrucciones deben cumplirse y incorporadas en su programa de seguridad cuando instalando, operando y mantenimiento los productos Brooks Instrument.

- Para asegurar el adecuado rendimiento, para instalar, operar, actualizar, programar y mantener tiene que realizarse exclusivamente por una persona calificada.
- Antes de la instalación, operación y servicio del producto leer todas las respectivas instrucciones. Si el presente manual no es la adecuada publicación, busque al distribuidor local que figura en la contraportada y póngase en contacto con él para obtener informaciones. Guarde el presente manual para tener informaciones también en el futuro.

⚠ ATENCIÓN: No haga funcionar los equipos fuera del rango indicado en las instrucciones de funcionamiento. El incumplimiento de estas últimas puede conducir a graves daños personales o a la avería del equipo.

- Si las instrucciones del manual no son evidentes, póngase en contacto con el representante de Brooks Instrument para aclarar el problema
- Observar todas las alertas, advertencias e instrucciones indicadas en el equipo o suministradas con el mismo.

⚠ ADVERTENCIA: Antes de la instalación, asegúrese de que el instrumento ofrece las características de aprobación necesarias para satisfacer los requisitos normativos locales y nacionales. En caso contrario, se pueden producir lesiones personales y/o daños en el equipo.

- Instale su equipo en conformidad con las recomendaciones indicadas en las respectivas instrucciones de instalación y con las pautas de las normas vigentes locales e internacionales. Conectar el producto exclusivamente a la adecuada fuente eléctrica y presión.
- Proceso: (1) Colocar lentamente flujo en el sistema. Abrir lentamente las válvulas de proceso para evitar oscilación del flujo. (2) Verificar si hay fuga alrededor de las conexiones de entrada y salida del flujómetro, Si no hay, llenar el sistema con la presión de operación.
- Antes de efectuar el servicio, verificar si hay presión o no en la tubería de la red. Si se requiere realizar un recambio de piezas, solamente el personal calificado puede manipular las piezas de repuesto determinadas por Brooks Instrument Las piezas y operaciones no autorizadas pueden afectar el rendimiento del producto o arriesgar el funcionamiento seguro. El recambio realizado con piezas sólo similares pueden traer como consecuencias incendios, choques eléctricos o funcionamiento bajo.
- Todas las puertas de la instalación deben estar cerradas, las cubiertas de protección tienen que hallarse en el debido sitio con el fin de evitar los daños personales y los choques eléctricos, salvo cuando un especialista efectúa el mantenimiento.

⚠ ADVERTENCIA: En caso de instalaciones que circulen líquido, si por cualquier razón se hubiera de cerrar las válvulas de entrada y salida situadas al lado del equipo, dichas instalaciones deberán ser completamente vaciadas. La omisión de esto último puede provocar la dilatación térmica del líquido, lo que puede dañar al equipo y conducir a daños personales.

Directriz Europea de los Equipos de Presión (PED)

Todos los equipos de presión, con una presión interna que supere a 0,5 bar (g) con tamaño mayor a 25 mm o 1 pulgada entran el ámbito de la Directriz Europea de los Equipos de Presión (PED).

- El capítulo Datos Técnicos del manual incluye las instrucciones respecto a las directivas de PED
- Los instrumentos de medición indicados en el Manual responden a las EN directivas 2014/34/EU.
- Todos los caudalímetros Brooks pertenecen a la categoría 1 del grupo de fluidos.
- Los instrumentos de medición más grandes que 25 mm o 1 pulgada están en conformidad con las categorías I, II o III de PED
- Los instrumentos de medición más pequeños que 25 mm o 1 pulgada siguen la Práctica Aceptada de Ingeniería (SEP).

Directriz Europea respecto a la Compatibilidad Electromagnética (EMC)

Las instalaciones de Brooks Instrument (eléctricas/electrónicas) merecedores de la categoría CE cumplieron con éxito las pruebas que verifican las exigencias de la compatibilidad electromagnética (directiva de EMC 2014/30/EU).
Al mismo tiempo se ha de prestar una especial atención en la selección de los cables de señal, utilizados con los equipos marcados con CE.
Calidad de los cables de señal, piezas de unión de cable y conectores:
El Brooks Instrument ofrece cables de alta calidad, que responden a los requerimientos de calificación CE.
Si se utiliza cable propio de la firma, se ha de elegir uno que sea completamente filtrado con blindaje de 100%.
Las piezas de unión de forma „D" o „circular" deben ser blindadas mediante blindaje metálica. Si es necesario, aplicar piezas de unión de metal para sujetar el filtro de cable.
Conectar el filtro de cable a la caja o manguito de metal blindándolo en ambas caras en 360°.
El blindaje debe terminar en tierra.
Los conectores que pertenecen a las tarjetas normalmente no son metalizados. Los cables utilizados deben ser filtrados con una blindaje de 100% para responder a la calificación CE.
El blindaje debe terminarse en tierra.
Configuración de contacto: Véase Instrucciones de operación adjuntas.

Descarga Electroestática (ESD)

⚠ PRECAUCIÓN: El aparato incluye piezas electrónicas que son susceptibles a los daños provocados por la electricidad estática. Observar los adecuados procesos para remover, instalar o manipular las tareas y medios de circuitos eléctricos internos
Proceso de operación:

1. Desconectar la fuente eléctrica de la unidad.
2. La persona debe ponerse a tierra mediante una palanca acodada o por otro medio seguro y apropiado para dicho fin antes de instalar, sacar o ajustar el circuito impreso eléctrico u otro medio interno.
3. El circuito impreso debe ser transportado en embalaje conductivo. Las tarjetas no pueden sacarse de la cubierta protectora exclusivamente directamente antes de la instalación. Las tarjetas desmontadas deben colocarse sin tardar en el embalaje protector utilizado para manipulación, almacenamiento o devolución a la fábrica.

Notas:
Esto equipo no es el único contenido de piezas susceptibles a la descarga electroestática (ESD). En la mayoría de los medios electrónicos modernos se encuentran piezas fabricadas por tecnología de óxido metálico. (NMOS, SMOS etc.). Las experiencias confirman que incluso una mínima electricidad estática puede dañar o destruir dichos medios. Las piezas averiadas, aunque funcionen aparentemente bien, indican una falla inicial.

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Swedish

Väsentliga anvisningar. Läs detta innan du fortsätter!

Brooks Instrument konstruerar, tillverkar och testar sina produkter med syfte att uppfylla alla nationella och internationella standarder. Dessa produkter måste installeras på rätt sätt, handhas och underhållas för att de skall fungera kontinuerligt enligt deras normala specifikation. De följande anvisningarna bör följas och integreras till Ert säkerhetsprogram varje gång när Brooks Instruments produkter installeras, handhas och underhålls.

- För att garantera angiven funktion, använd kvalificerad personal till att installera, handha, uppgradera, programmera och serva produkten.
- Läs alla instruktioner innan produkten installeras, startas upp och underhålls. Om du finner att denna instruktionshandbok inte är den rätta instruktionsboken, titta på i slutet av pärmen för information om hur man kan kontakta lokala representanter. Spara denna instruktions manual för senare behov.

⚠ **VARNING: Kör inte detta instrument utanför dess specifikationer som är angiven i Instruktionsboken. Undvikande att ta denna varning kan leda till allvarliga personliga skador och / eller skada utrustningen.**

- Om du inte förstår någon av dessa instruktioner, kontakta din representant för Brooks Instrument för klarläggande.
- Följ alla varningar och instruktioner som följer med leveransen av denna produkt.

⚠ **VARNING: Säkerställ före installation att detta instrument har alla nödvändiga godkännanden för att uppfylla lokala och nationella regler. Underlåtenhet att följa denna varning kan leda till personskador och/eller skador på utrustningen.**

- Installera din utrustning på sättet som anges i den gällande handbokens installationsanvisningar och enligt tillämpliga lokala och nationella föreskrifter. Koppla varje produkt till föreskriven ström- och tryckkällan.
- Igångsättning: (1) Koppla långsamt på flöde i systemet. Öppna processventiler sakta för att undvika för höga flöden. (2) Kontrollera läckor vid mätarens anslutningar för in- och utlopp. Om inget läckage förekommer, kör systemet upp till drifttrycket.
- Kontrollera att processledningens tryck är bortkopplat före service. I fall det behöves kompletteras med nya delar, se till att komponenter föreskrivna av Brooks Instrument används. Samt att kvalificerad personal utför arbetet. Ej rekommenderade komponenter och åtgärder kan påverka produktens prestanda och sätta din driftsäkerhet på spel. ”Felaktiga” ersättningar kan orsaka eld, elektriska skador samt felaktig funktion.
- Se till att anordningens kåpor och skyddslock ligger på sin plats med syfte att förebygga elektriska kontakt och personliga skador; det enda undantag gäller när underhållsarbete utförs av kvalificerad personal.

⚠ **VARNING: I fall av - flödesmätare / regulatorer för vätskor: Ifall ventiler före och efter skall stängas av, måste alla ledningar tömmas på all vätska. Att ej tömma ledningar alt koppla bort trycket kan göra så att vätskans värmeutvidgning kan spräcka / skada utrustningen och orsaka personliga skador.**

European Pressure Equipment Directive (PED) - (Rådets Direktiv 99/36/EG av den 29 april 1999[1] om transportabla tryckbärande anordningar)

Alla utrustning för tryck med ett tryck över 0.5 Bar(g) bar och större demensioner än 25 mm eller 1" (inch) faller under Tryck direktiv 99/36/EG av den 29 april 1999[1] om transportabla tryckbärande anordningar - PED.

- Den här Instruktionsbokens Sektion ” Specifikation” innehåller anvisningar gällande PED Direktivet.
- Mätare som beskrivs i denna Instruktionsbok är i överensstämmelse med EN Direktivet 2014/34/EU.
- Brooks Instruments alla flödesmätare faller under flödesgrupp nr. I.
- Mätare som är större än 25 mm eller 1" (inch) överensstämmer med PED kategorier I, II eller III.
- Mätare på 25mm eller 1" (inch) eller mindre faller under Sound Engineering Practice (SEP) (God Teknisk Praxis).

European Electromagnetic Compatibility (EMC) - Elektromagnetisk kompatibilitet

Brooks Instrument (elektriska/elektroniska) CE-märkta anordningar har redan genomgått ett framgångsrikt prov enligt regleringar under Electromagnetic Compatibility (EMC directive 2014/30/EU). Man måstre dock ägna särskild uppmärksamhet till valet av signalkabeln som skall används för CE-märkta anordningar.

Signalkablars, packboxars och kontakdons kvalitet:

Brooks Instrument levererar högkvalitativa kablar som överensstämmer med specifikation för CE-intygade produkter.
Om man använder sin egen signalkabel, då bör man använda en kabel som är fullständigt skärmad med en 100% avskärmning.
“D” eller “Cirkelformiga” kontakdon skall vara skärmade med metalliska avskärmningar. Om det är användbart, bör metallpackboxar som ger en bra fastspänning för kabelskärmar användas.
Kabelavsärmningen måste kopplas till den metalliska skärmande anordningen eller packboxen och skärmas vid båda ändar runt omkring.
Avskärmningens avspänning måste jordas.
Card Edge Kontaktdon är icke metalliska. För att överensstämma med krav på CE-intyg, skall de kablarna som används vara skärmade med 100% skärmning.
Skärmningen måste jordas.
Vad gäller stiftkonfigurationen: Se den bifogade Instruktionshandboken.

ESD (Elektrostatiska urladdningar)

⚠ **OBS: Denna utrustning innehåller elektroniska komponenter som är lättpåverkade av skada orsakad av statisk elektricitet. Lämplig hanteringsprocedur måste följas när man tar bort, installerar eller på något annat sätt hanterar inre kretskort eller andra anordningar.**

1. Ström till enheten måste kopplas från.
2. Personalen måste jordas med hjälp av ett armband eller något annat säkert medel innan något kretskort eller andra inre anordningar installerras, tas bort eller justeras.
3. Kretskort måste transporteras i en speciell förpackning för elektronik. Kort skall ej tas bort från deras skydsskåpa innan man skall installera dem. De borttagna korten bör omedelbart läggas i speciell förpackning för transport, lagring eller återlämnande till fabriken.

Anmärkningar:

Dessa instrument är ej unika vad gäller dess ESD **(**Elektrostatiska urladdningar) - känsliga komponenter. De flesta samtida konstruktioner innehåller komponenter som utnyttjar metalloxid teknologi (NMOS, SMOS, o.s.v.). Erfarenhet har visat att även små mängder av statisk elektricitet kan skada eller förstöra dess komponenter. Skadade komponenter - även om de annars verkar fungera ordentligt – har ofta en kortare livslängd.

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