

Brooks® GF40 Series MultiFlo™ Capable, Elastomer Seal, Digital, Thermal Mass Flow Devices



Brooks® GF40 Series available with DeviceNet™, RS485, Profibus® or EtherCAT® I/O



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.

Installation and Operation Manual

X-TMF-GF40-Series-MFC-eng

Part Number: 541B195AAG

October, 2017

Brooks® GF40 Devices

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

Based upon Brooks award-winning GF100 Series, the GF40 Series is a performance/value MFC platform designed for OEM applications, delivering the following class leading features:

- MultiFlo™ process gas and flow range programmability, enabling customers to re-configure the MFC for new gases and full scale flow rates for unparalleled process flexibility.
- A high-performance, corrosion-resistant flow measurement sensor delivers improved reproducibility and stability.
- A variety of elastomer options enable customers to select the optimum and most cost effective mix of products for their application.
- Full range of industrial communication protocols (DeviceNet, Profibus DP-V1, and EtherCAT).
- An independent service/diagnostic port enables on-tool reconfiguration/optimization, data logging, and troubleshooting without having to remove the MFC from the gas line.



Figure 1-1 GF40 Series MultiFlo™ Capable Digital Thermal Mass Flow Devices

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 GF40 Series Gas Table
- Appendix B GF40 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.

Brooks® GF40 Devices

1-3 Product Support References

Refer to www.BrooksInstrument.com for Brooks sales and service locations and to obtain other documents that support the GF40 Series.

Those documents include:

- Brooks MultiFlo™ Configurator Quick Start Manual (X-SW-MultiFlo-Config-QS-eng; part number 541B167AAG)
- Brooks GF40 Series data sheet (DS-TMF-GF40-Series-MFC-eng)
- DeviceNet™ Supplemental Manual for GF40/GF80/GF81 Series Mass Flow Controllers and Meters (X-DPT-DeviceNet-GF40-GF80-MFC-eng; part number 541B168AAG)
- Profibus® Supplemental Manual for Brooks® GF40/GF80/GF81 Series Mass Flow Controllers and Meters (X-DPT-Profibus-GF40-GF80-MFC-eng; part number 541B162AAG)
- RS485 Supplemental Manual for GF40/GF80/GF81 Series Mass Flow Controllers and Meters (X-DPT-RS485-GF40-GF80-MFC-eng; part number 541B169AAG)
- EtherCAT Supplemental Manual for Brooks® GF40/GF80 Series Mass Flow Controllers and Meters (X-DPT-EtherCAT-GF40-GF80-MFC-eng; part number 541B170AAG)

1-4 Warning, Caution and Notice 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 GF40 Series Device

Refer to Section 5.

1-7 Industry Standard References

Refer to Table 1-1.

1-8 GF40 Devices Gas Table

Refer to Appendix A.

1-9 Glossary of Terms and Acronyms

Refer to Table 1-2

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 determining 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 reliability of MFCs
SEMI E68	Test method for determining warm-up time of MFCs
SEMI E69	Test method for reproducibility 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 F36	Guide for dimensions and connections of gas distribution 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

Table 1-2 Terms and Acronyms

Term or Acronym	Definition
CSR	Customer Special Requirement.
CVD	Chemical Vapor Deposition.
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.
HLD	Horizontal Label Down.
HLU	Horizontal Label Up.
HUD	Horizontal Upside Down.
GF40 Series	MultiFlo capable digital device.
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.
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.
VID	Vertical mounting attitude with inlet side facing down.
VIU	Vertical mounting attitude with inlet side facing up.

1-10 Description

Control

The GF40 Series brings together Brooks high-performance, patented ultra-fast T-rise flow sensor, high-speed ARM based digital architecture, and a fast-acting diaphragm-free solenoid valve to deliver:

- Fast reproducible transitions between setpoints without overshoot or ringing
- User-programmable ramp functions for processes requiring a slow-ramp in flow or time critical transitions
- Optional bubble tight shut down (elastomer valve seat)

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 include:

- 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:

MultiFlo kits are available in the following configurations:

778Z010ZZZ Basic MultiFlo Configurator Kit

A331710003 Cable Assembly 2.5mm
214F027AAA USB-RS485 converter with DB-9 female

778Z012ZZZ GF0xx RS485 Analog/Profibus® MultiFlo Configurator Kit w/Power Supply 24 Vdc

A331710003 Cable Assembly 2.5mm
214F027AAA USB-RS485 converter with DB-9 female
641Z117AAA Power Supply 24 Vdc with DB-15 female

Brooks® GF40 Devices

778Z013ZZZ GF0xx EtherCAT® MultiFlo Configurator Kit w/Power Supply 24 Vdc

- A331710003 Cable Assembly 2.5mm
- 214F027AAA USB-RS485 converter with DB-9 female
- 641Z117AAA Power Supply 24 Vdc with DB-15 female
- 124Z170AAA Cable, Power, EtherCAT to DB-15 male

778Z014ZZZ GF0xx DeviceNet™ MultiFlo Configurator Kit w/Power Supply 24 Vdc

- A331710003 Cable Assembly 2.5mm
- 214F027AAA USB-RS485 converter with DB-9 female
- 641Z117AAA Power Supply 24 Vdc with DB-15 female
- 124Z171AAA Cable, Power, DeviceNet to DB-15 male

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

Advanced Thermal Measurement Sensor

Brooks high-performance thermal flow sensor brings together key design elements to deliver the accurate, repeatable measurement under challenging process conditions:

- Improved accuracy at elevated temperatures through isothermal packaging and ambient temperature sensing and compensation
- Enhanced signal-to-noise performance enables improved low setpoint accuracy
- A large bore, corrosion resistant, Hastelloy® C-22 sensor tube ensures long life and reliability
- Optimized temperature profile for gases prone to thermal decomposition
- Onboard electronics store sensor calibration data for ease of service

Extensive Mechanical Configurations

GF40
1/4" VCR
9/16" - 18 UNF
1/8" tube compression
1/4" tube compression
3/8" tube compression
1/2" tube compression
6-mm tube compression
10-mm tube compression
1/4" RC
1/4" VCO
1/4" NPT

Enhanced Diagnostics and User Interface

The mass flow controller is typically the most complex and critical component in a gas delivery system. When dealing with toxic or reactive gases, removing the MFC to access its functionality should be the last resort. To address this, Brooks GF Series devices include self-diagnostics and an independent service port for in-situ device evaluation and troubleshooting:

- Embedded self-test routines at power-up
- Independent RS485 service port that can be accessed while the MFC is in operation for data logging and troubleshooting
- A convenient Zero button to enable easy re-zeroing during scheduled maintenance

Communication Interfaces

The GF40 Series supports 0-5 Vdc, 0-10 V, 4-20 mA, 0-20 mA, RS485, DeviceNet, EtherCAT, and Profibus communication protocols. DeviceNet, Profibus, EtherCAT and RS485 are multi-drop connections that allow a maximum of 64 devices for DeviceNet, 128 devices for Profibus, 32 devices for RS485, and 65,535 devices for EtherCAT to be connected on the same network.

Brooks Instruments' DeviceNet profile has been certified by the ODVA (Open DeviceNet Vendor's Association).

Brooks Instrument Profibus interface has been certified by the PNO (Profibus User Organization).

The Brooks Instrument EtherCAT interface has been successfully tested by the EtherCAT Conformance Test application version 1.20.30.0.

1-11 Specifications for GF40 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 the GF40 Series.

See Figure 1-2 for dimensions for the GF40 Series.

Brooks® GF40 Devices

Table 1-3 Specifications for Standard GF40 Series

Performance	GF40
Full Scale Flow Range (N ₂ Eq.)	3 sccm to 50 slm
Flow Accuracy	±1% S.P. 35-100%, ±0.35% F.S. 2-35%
Repeatability & Reproducibility	< ± 0.2% S.P.
Linearity	± 0.5% F.S. (included in accuracy)
Response Time (Settling Time)	Normally Closed Valve < 1 sec. (within 2% for steps 0-10 through 0-100%) Normally Open Valve < 3 sec (within 2% for steps 0-10 through 0-100%)
Control Range	2-100%
MultiFlo	optional
Number of Bins	10 bins
Valve Shut Down	< 1% of F.S.
Zero Stability	< ± 0.5% F.S. per year
Pressure Coefficient	0.03% per psi (0-50psi N ₂)
Attitude Sensitivity	<0.25% span change @ 90° after rezeroing (N ₂ @ 50 psi)
Auto Zero:	Optional: (When Auto Zero is enabled the device performs the zero function once every time the set point returns to zero. To accomplish, simply provide a zero set point.)
Auto shut-off:	The Auto Shut-off feature closes the GF0xx valve when the set point drops below 1.5% of full scale

Ratings

Operating Temperature Range	5-50°C (41-122°F)
Maximum Operating Pressure	150 psig (10 bar)
Design Proof Pressure	4000 psig (275 bar)
Differential Pressure Range	3-860 sccm = 7-45 psid, 861-7200 sccm = 15-45 psid, 7201-50000 sccm = 25-45 psid Typical pressure drop, high density gases like Argon gas applications require an additional 10 psid differential pressure
Leak Integrity (External)	1x10 ⁻⁹ atm. cc/sec He

Mechanical

Valve Type	Normally Closed, Normally Open, No Valve (Meter)
Primary Wetted Materials	316 Stainless Steel, Hastelloy C-22, 17-7 PH, 430SS
External Seals	Viton, Buna, Kalrez, EPDM or Neoprene
Internal Seals/Valve Seat	Viton, Buna, Kalrez, EPDM or Neoprene
Surface Finish	32μ inch Ra

Compliance

Environmental Compliance:	CE: EN61326: 2006 (FCC Part 15 & Canada IC-subset of CE testing)
	Safety EN61010-1
	RoHS
	General, Leak-Test Traceability, Oxygen Cleaning, Calibration Traceability, Material Certification

Table 1-4 GF40 Series Electrical Specifications

Communication Protocol	RS485*	Profibus®	DeviceNet™	EtherCAT®
Electrical Connection	1 x 15-pin Male Sub-D, (A)	1 x 15-pin Male Sub-D/ 1 x 9-pin Female Sub-D	1 x M12 with threaded coupling nut (B)	5-pin M8 with threaded coupling nut/ 2 x RJ45
Analog I/O	0-5 V, 0-10 V, 0-20 mA, 4-20 mA	0-5 V, 0-20 mA, 4-20 mA	0-5 V (Output only)	0-5 V (Output only)
GF40 Power Max./Purge	From +12 Vdc to +24 Vdc: 7 Watt/8 Watt	From +13.5 Vdc to +27 Vdc: 7 Watt/8 Watt	From +11 Vdc to +25 Vdc: 7 Watt/8 Watt	From +13.5 Vdc to +27 Vdc: 7 Watt/8 Watt

Voltage Set Point Input Specification

Nominal Range	0-5 Vdc or 0-10 Vdc	0-5 Vdc	N/A	N/A
Full Range	0-11 Vdc	0-5.5 Vdc	N/A	N/A
Absolute Max.	25 V (without damage)		N/A	N/A
Input Impedance	192 kOhms		N/A	N/A
Required Max. Sink Current	0.002 mA		N/A	N/A

Current Set Point

Nominal Range	4-20 mA or 0-20 mA		N/A	N/A
Full Range	0-22 mA		N/A	N/A
Absolute Max.	25 mA (without damage)		N/A	N/A
Input Impedance	250 Ohms	125 Ohms	N/A	N/A

Flow Output (Voltage) Specifications

Nominal Range	0-5 Vdc or 0-10 Vdc	0-5 Vdc	
Full Range	(-0.5)-11 Vdc	0-5.5 Vdc	(-0.5)-5.5 Vdc
Min Load Resistance	1 kOhms	1 kOhms	0.5 kOhms

Flow Output (Current) Specifications

Nominal Range	0-20 mA or 4-20 mA		N/A	N/A
Full Range	0-22 mA (@ 0-20 mA); 3.8-22 mA (@ 4-20 mA)		N/A	N/A
Max. Load	400 Ohms (for supply voltage: 12-24 Vdc)		N/A	N/A

Analog I/O Alarm Output**

Type	Open Collector		N/A	N/A
Max. Closed (On) Current	25 mA		N/A	N/A
Max. Open (Off) Leakage	1µA		N/A	N/A
Max. Open (Off) Voltage	30 Vdc		N/A	N/A

Analog I/O Valve Override Signal Specifications***

Floating/Unconnected	Instrument controls valve to command set point		N/A	N/A
VOR < 1.40 Vdc	Valve Closed		N/A	N/A
1.70 Vdc < VOR < 2.90 Vdc	Valve Normal		N/A	N/A
VOR > 3.20 Vdc	Valve Open		N/A	N/A
Input Impedance	800 kOhms		N/A	N/A
Absolute Max. Input	(-25 Vdc) < VOR < 25 Vdc (without damage)		N/A	N/A

*There are three (3) RS485 Protocols:

S-Protocol is a RS485 communication based on HART® command set.

L-Protocol is a RS485 communication compatible with legacy Unit® and Celerity® devices.

A-Protocol is a RS485 communication compatible with Aera® mass flow devices.

**The Alarm Output is an open collector or "contact type" that is CLOSED (on) whenever an alarm is active. The Alarm Output may be set to indicate any one of various alarm conditions.

*** The Valve Override Signal (VOR) is implemented as an analog input which measures the voltage at the input and controls the valve based upon the measured reading as shown in this section.

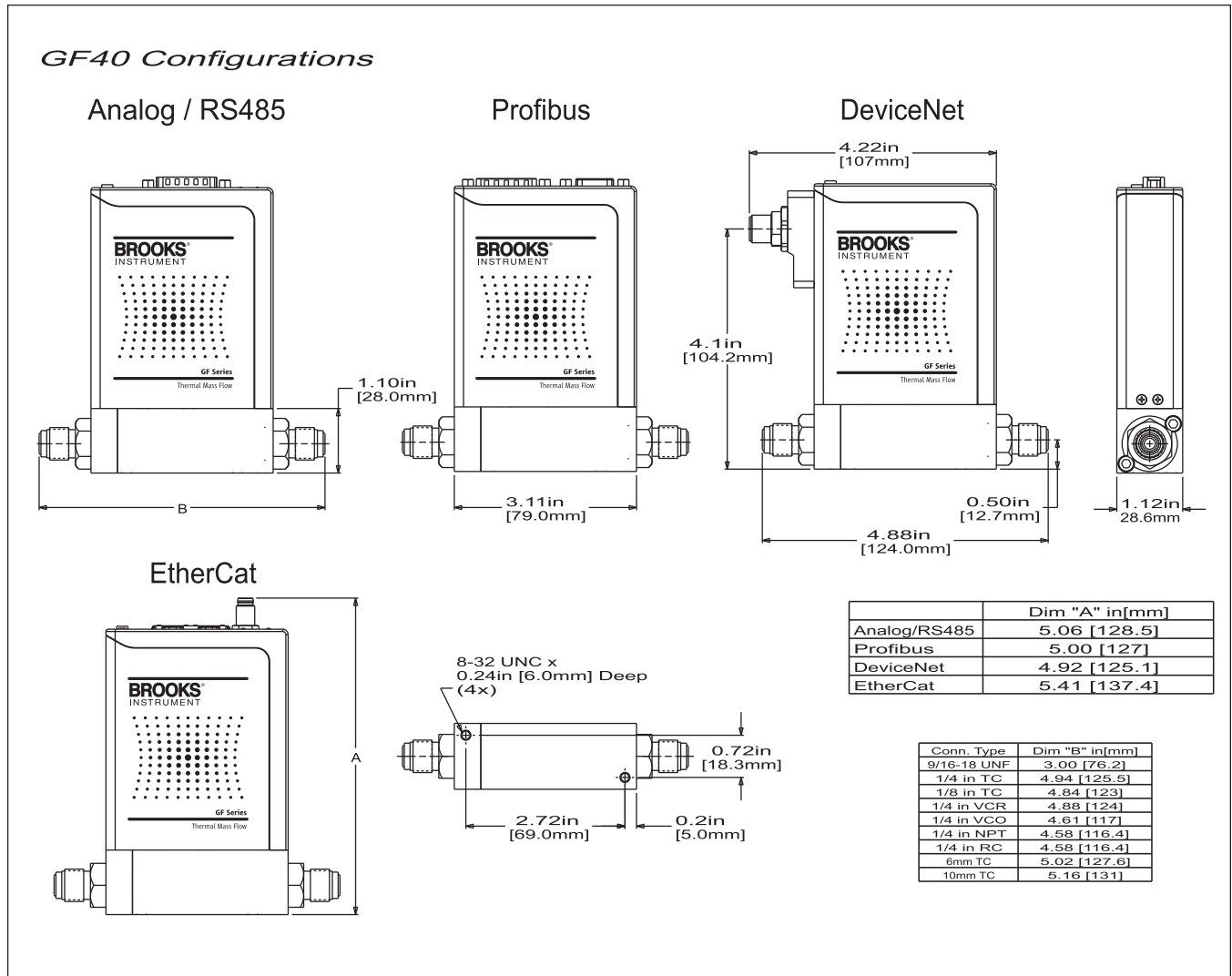


Figure 1-2 Dimensions - GF40 Series

2-1 General

This section provides installation instructions for the Brooks GF40 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

Carefully remove the equipment from the packing case. Make sure spare parts are not discarded with the packing material. Inspect the contents for damaged or missing parts.

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"), it should be subjected to a pneumatic pressure test in accordance with applicable vessel codes. To maintain a device's clean 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 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 N₂ before use.

The GF40 Series also utilizes MultiFlo® technology that allows the user to configure standard configurations ("SAs") 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 Figure 2-1. GF40s are often arranged inside a gas panel. Configure standard configurations ("SAs") or "blanks" for a variety of pure gases and mixtures. As a result, MultiFlo technology enables the user to reduce unique inventory requirements.

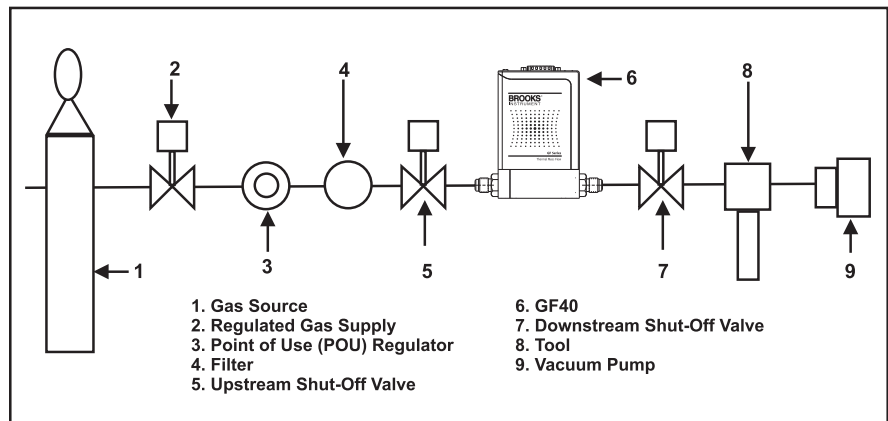


Figure 2-1 Typical Gas Supply Arrangement

2-11 Purge the Gas Supply Line Before GF40 Series Installation**⚠ CAUTION**

For additional safety, it is recommended to close the two valves between the charged gas line and the GF40 Series to be installed. See Figure 2-1 for more details.

⚠ NOTICE

It is recommended to archive service and calibration documentation for the GF40 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 before the GF40 Series is actually being installed. Failure to comply will introduce contaminants into the GF40 Series.

Before operating the GF40 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 with prescribed company and safety procedures.

1. Shut off the process gas supply valve(s) upstream of the GF40 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 GF40 Series is suspected, then proceed with caution. Pump down and purge the GF40 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 GF40 Series can be decontaminated 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.

2-12 Position and Mount the GF40 Series

It is recommended that the MFC is re-zeroed with process gas following the recommended Brooks procedure (see zeroing bulletin FSB-001-0015 for further information).

If your GF40 Series is configured with in-line fittings, secure the GF40 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.

2-13 Perform a Leak Test

⚠ WARNING

Before operating the flowmeter, ensure all fluid 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 GF40 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 Performance Checks

This section describes how to zero and sequence the GF40 Series devices for proper operation.

⚠ NOTICE

If the GF40 Series has been in the purge mode for a long period of time, wait until the GF40 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 GF40 Series must be warmed up for at least 45 minutes.
- The active gas page must be correct.

2-15 Zeroing Setup Process

The following steps are required before the GF40 Series is zeroed.

1. Place the GF40 under normal inlet operating pressure.
2. Make sure that the GF40 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 GF40 Series is in its "use attitude" and is operating at normal temperature. If the GF40 Series is subjected to a vacuum purge for more than one minute, turn off the

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- GF40 Series (i.e., provide a zero setpoint) for a time period of twice the vacuum purge time.
- 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 GF40 Series and subsequent leakage from the PID control valve inside the GF40 Series.
 - Provide a 100% setpoint to the GF40 Series for no longer than 30 seconds. This equalizes the pressure across the PID control valve.
 - Refer to Figure 2-1. Close the upstream shut-off valve (5) to prevent any pressure effects from the regulator (3).
 - Close the GF40 Series and wait two minutes.
 - Read the output signal of the GF Series in percent of full scale. This output signal is the initial flow. The output signal should be 0.0 ($\pm 0.1\%$). If the output signal is too high, re-zero the GF40 Series as described in Section 2-16.

2-16 Zeroing the GF40 Series

▲ NOTICE

Make sure you perform the zeroing set-up process outlined in Section 2-15 before zeroing the GF40 Series.

- Allow time for gas pressure to equalize across the MFC's internal control valve to ensure gas movement.

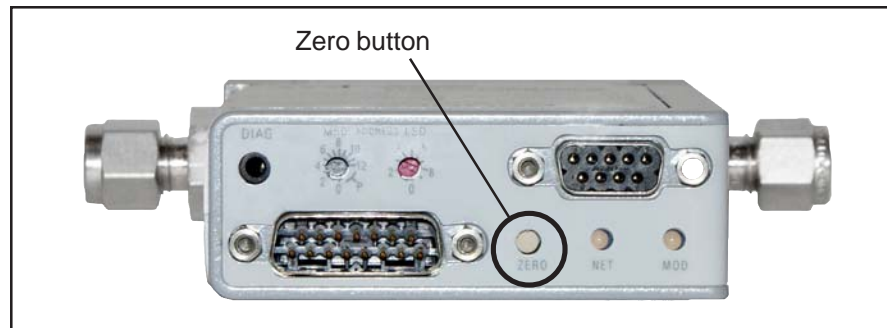


Figure 2-2 Zero Button Accessible at Top of Device

- Press and hold down the Zero button, shown in Figure 2-2, for a minimum of 5 seconds.

2-17 Auto Shut-Off

The Auto Shut-off feature closes the GF40 valve when the set point drops below 1.5% of full scale. When the Auto Shut-off feature is NOT chosen, then the GF40 valve will shut off when the set point drops below 0.5% of full scale.

2-18 Using the MultiFlo™ Configurator

The MultiFlo Configurator application is used to configure the gas and range of the GF40 Series devices.

The MultiFlo Configurator application allows communication to GF40 Series devices through personal computer with serial COM Port and a Windows XP or Windows 7 operating system. It's primary function is to configure gas and flow ranges within 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 2-1.

The MultiFlo Configurator interfaces to the GF40 Series device through RS485. 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 following MultiFlo Configurator Kits.

MultiFlo™ Configurator Accessory Kits:

MultiFlo kits are available in the following configurations:

778Z010ZZZ	Basic MultiFlo Configurator Kit
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 converter with DB-9 female
778Z012ZZZ	GF0xx RS485 Analog/Profibus® MultiFlo Configurator Kit w/Power Supply 24 Vdc
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 converter with DB-9 female
641Z117AAA	Power Supply 24 Vdc with DB-15 female
778Z013ZZZ	GF0xx EtherCAT® MultiFlo Configurator Kit w/Power Supply 24 Vdc
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 converter with DB-9 female
641Z117AAA	Power Supply 24 Vdc with DB-15 female
124Z170AAA	Cable, Power, EtherCAT to DB-15 male
778Z014ZZZ	GF0xx DeviceNet™ MultiFlo Configurator Kit w/Power Supply 24 Vdc
A331710003	Cable Assembly 2.5mm
214F027AAA	USB-RS485 converter with DB-9 female
641Z117AAA	Power Supply 24 Vdc with DB-15 female
124Z171AAA	Cable, Power, DeviceNet to DB-15 male

Connect the MultiFlo cable adapter 2.5-mm jack to the diagnostic port on the top of the device. See Figure 2-5.

Connect the RS485 end of the converter to the 15-pin RS485 end of the MultiFlo Cable Adapter.

Connect the USB end of the converter to the USB Port of a laptop or PC.

The latest MultiFlo 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

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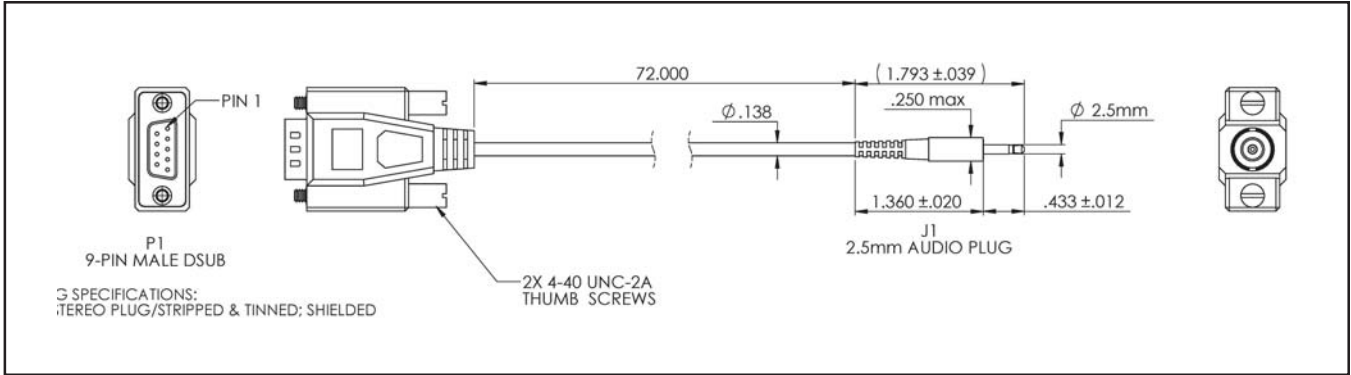


Figure 2-3 MultiFlo Cable Adaptor

Table 2-1 Gas and Flow Ranges - MultiFlo Configurable - N2 Equivalent

Standard MG-MR Bin Configurations	Flow range Code	Gas Flow Range (N2 Equivalent)
SA40	010C	3-10 sccm
SA41	030C	11-30 sccm
SA42	092C	31-92 sccm
SA43	280C	93-280 sccm
SA44	860C	281-860 sccm
SA45	2.6L	861-2600 sccm
SA46	7.2L	2601-7200 sccm
SA47	015L	7201-15000 sccm
SA48	030L	15001-30000 sccm
SA50	050L	30001-50000 sccm

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 GF40 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.



Figure 2-4 USB-RS485 Converter (P/N 214F027AAA)

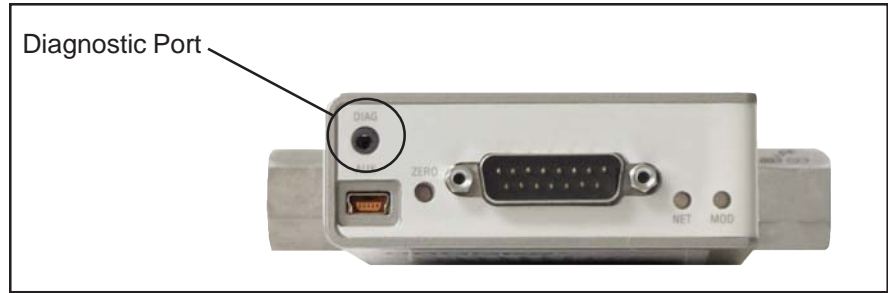


Figure 2-5 Diagnostic Port

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 2-6.

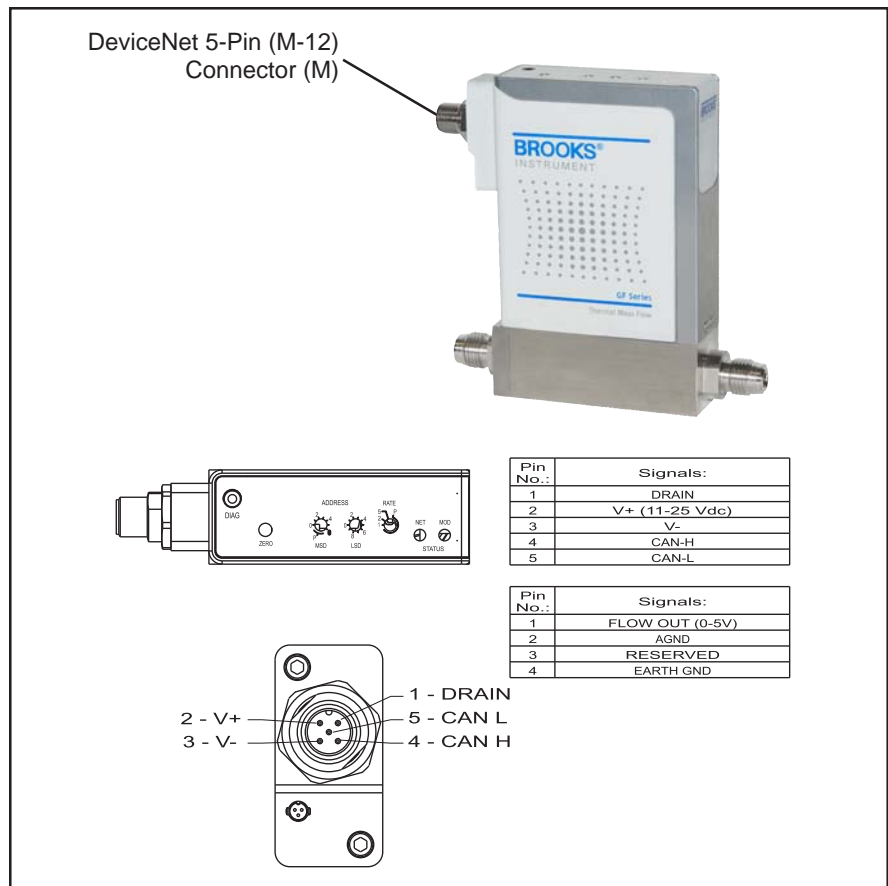


Figure 2-6 GF40 Series DeviceNet Connection and Pinouts

⚠ CAUTION

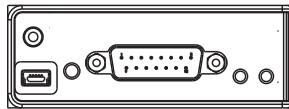
DO NOT apply more than 10 Inch-Pounds of torque to the cable coupling when connecting the cable to the device or damage may result to the connector.


2-19-2 Analog/RS485 Connections

The GF40 Series devices are available with the Analog/RS485 15-Pin D-Connector shown in Figure 2-7.

It is recommended that when using -15 Vdc & 0, the wiring hook-up should be: -15V is connected to Pin 9 (POWER COMMON) and 0 is connected to Pin 5 (POWER SUPPLY(+12 to +24 VDC)).

Analog/RS485
15-Pin Connector





Pin No.:	Signals:
1	SETPOINT COMMON
2	FLOW OUTPUT (0-5V, 0-10V)
3	ALARM OUT
4	FLOW OUTPUT (0-20mA, 4-20mA)
5	POWER SUPPLY (+12V to +24Vdc)
6	NC
7	SETPOINT INPUT (0-20mA, 4-20mA)
8	SETPOINT INPUT (0-5V, 0-10V)
9	POWER COMMON
10	FLOW OUT COMMON
11	NC
12	VALVE OVERRIDE INPUT
13	RESERVED
14	RS485B
15	RS485A

Figure 2-7 GF40 Series with 15-Pin Analog Connector and Pinouts

2-19-3 Profibus Connections

The GF40 Series devices are available with the Profibus connections as shown in Figure 2-8.

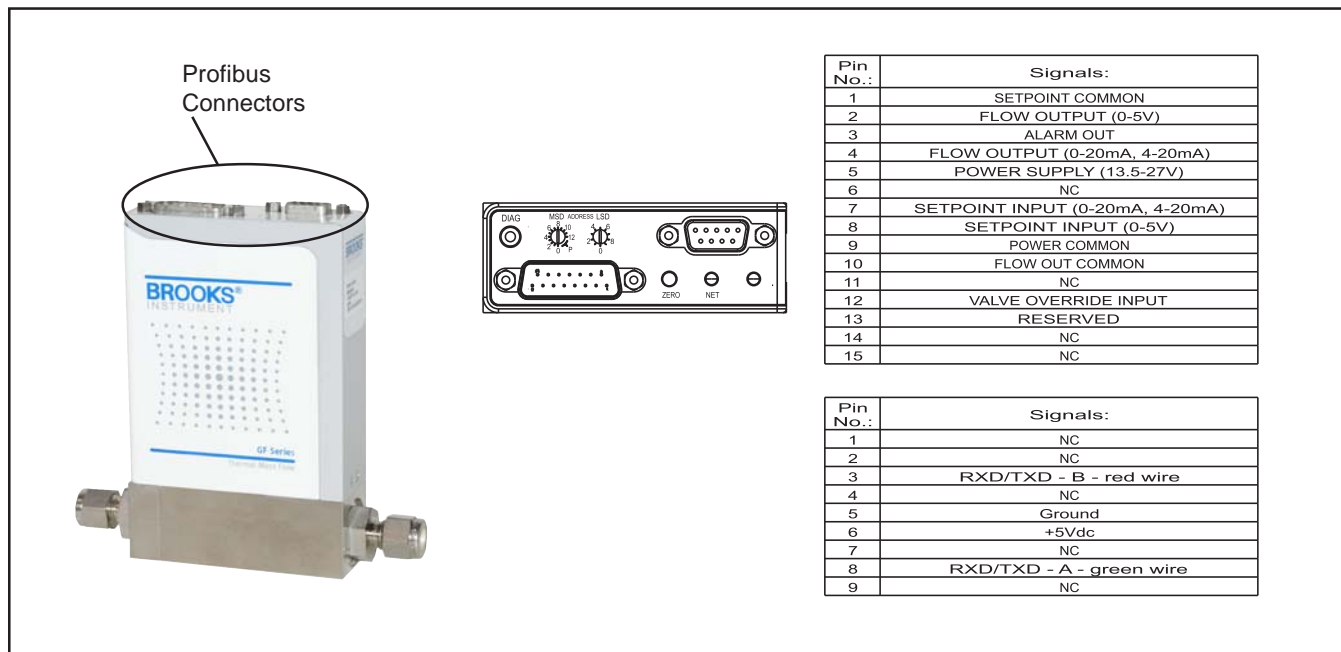


Figure 2-8 GF40 Series Profibus Connections and Pinouts

2-19-4 EtherCAT Connections

The GF40 Series devices are available with the EtherCAT connections as shown in Figure 2-9.

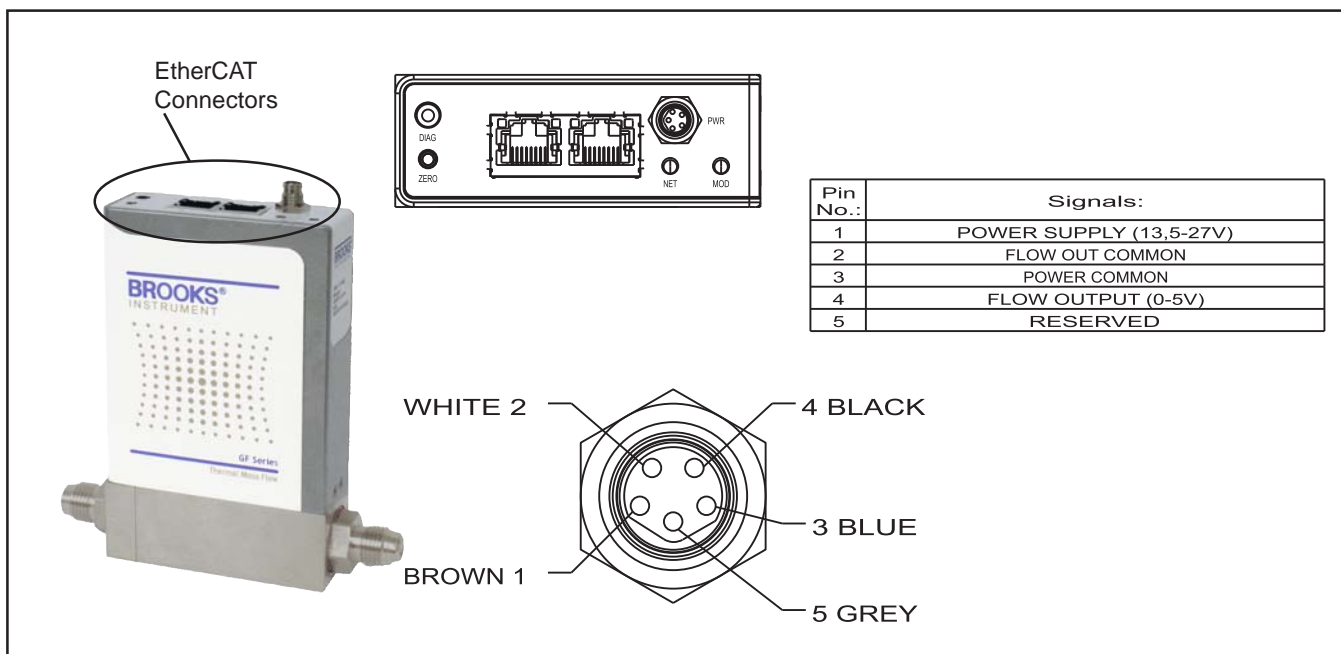


Figure 2-9 GF40 Series EtherCAT Connections and Pinouts

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2-19-5 Alarm Output (Analog I/O versions only)

The Alarm Output is an open collector or "contact" type that is CLOSED (on) whenever an alarm is active. The Alarm Output may be set to indicate any one of various conditions.

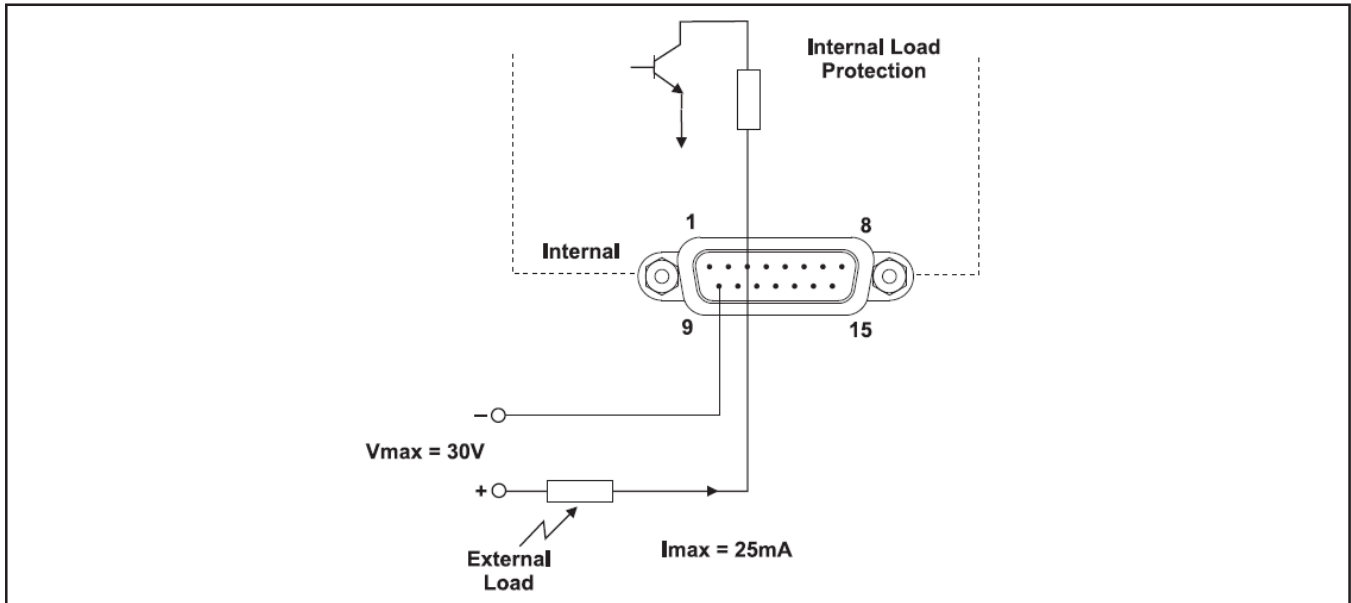


Figure 2-10 Alarm Output Schematic

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 a 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.

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. 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. This tube has 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, $T_2 - T_1$, is directly proportional to the gas mass flow.

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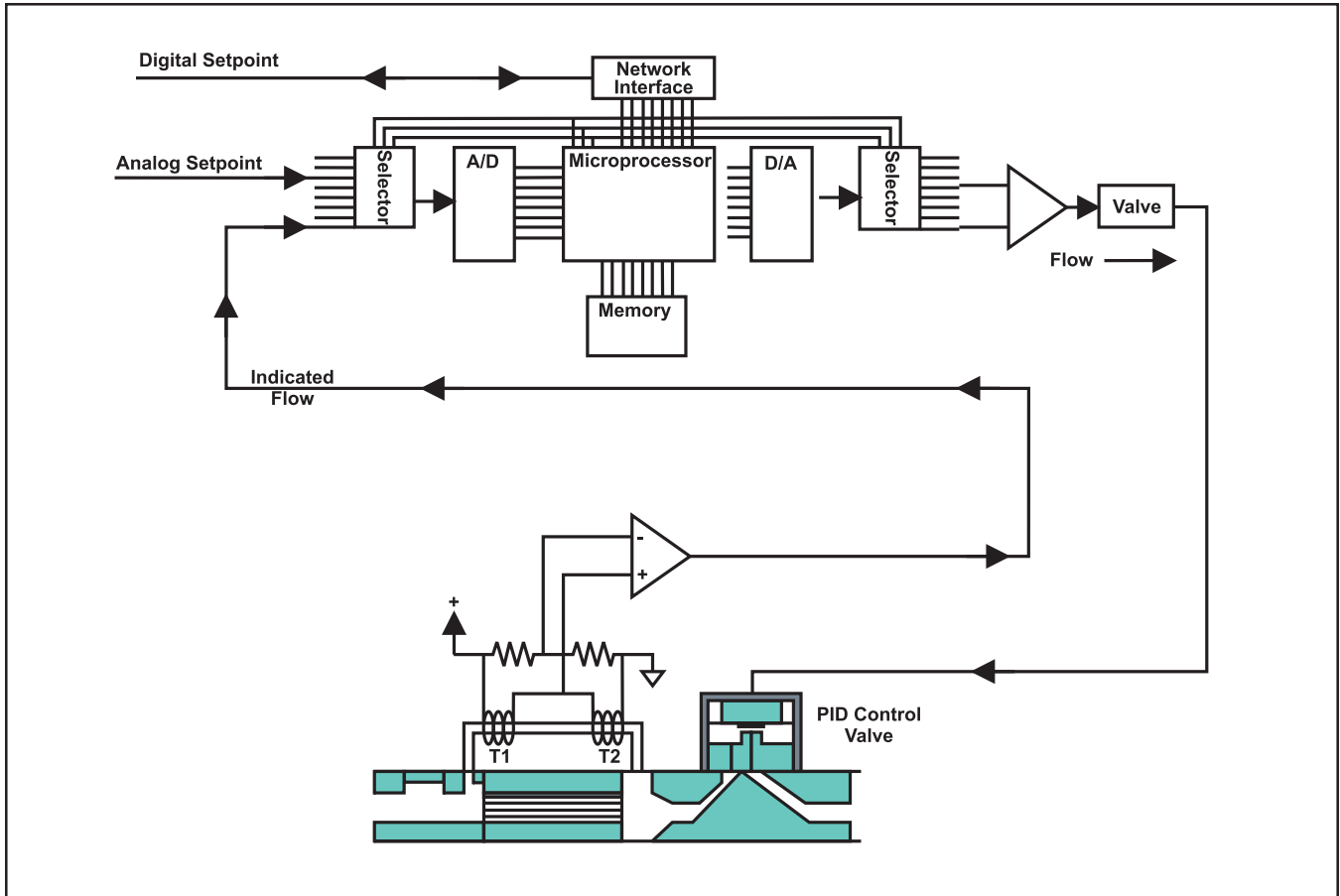



Figure 3-1 GF40 Series Operating Principles

4-1 Overview

No routine maintenance is required on the Brooks GF40 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 2-14 Performance Checks for re-zeroing instructions.

4-2 Maintenance

	⚠ WARNING
METER/CONTROLLER SEAL COMPATIBILITY	
<p>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.</p> <p>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.</p>	

⚠ 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 device 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.

4-3 Troubleshooting

This section includes a Troubleshooting Checklist and a GF40 Series Troubleshooting Guide that identifies symptoms, possible causes, and corrective actions.

⚠ NOTICE

OEM tool problems are often caused by something other than the GF40 Series. Therefore, Brooks recommends that you review both the Troubleshooting Checklist and the GF40 Series Troubleshooting Guide before removing the GF40 Series from your system. It is also suggested to contact your Brooks Service representative before removing the GF40 Series from your system.

4-4 Troubleshooting Checklist

1. Check environmental factors that could affect changes to GF40 Series performance. The most common environmental factors are listed in Table 4-1.
2. Check supply voltage and check for a consistent ground.
3. Insure OEM tool setpoint matches the setpoint at the GF40 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 GF40 Series voltage response by moving the setpoint back and forth. Observe for voltage changes.

Table 4-1 Environmental Factors

GF40 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

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4-5 GF40 Series Troubleshooting Guide

Table 4-2 GF40 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 GF Series lit solid green?	Observe the LED display panel on top of the GF40 device to verify. If the LED light is not lit, cycle power to reboot the device.
Is the commanded setpoint from tool/system at 0.00 Vdc?	Use the tool software to verify.
Has the valve been commanded off by an active "valve closed" input?	Use the tool software to verify. Confirm that pin 12 is not connected to DC common.
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 valve will be zero, which is abnormally low for the setpoint. If the differential is too low, voltage to the valve 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 GF40 Series lit solid green?	Observe the LED at the top of the GF40 device. If the LED light is not lit, cycle power the device to reboot.
Is the setpoint correct for the required gas flow?	Use the tool software to verify the analog signal.
Is the device calibrated for the particular gas?	Check the device side label. Run a flow check to verify.

Table 4-2 GF40 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
2. Flow out of range (Continued).	
Is the device zero correct?	Zero the device according to zeroing procedure in Section 2-16. Verify leak check rates are OK.
3. No gas control; flow is at or above maximum.	
Is the gas pressure across the device 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. Confirm that pin 12 is not connected to an active voltage source.
Is the setpoint correct for the required flow?	Use tool software to verify.
4. No gas flow above some setpoint.	
NOTE: When the setpoint is increased beyond this point, the GF40 Series signal remains at some value lower than the set-point.	
Is the gas inlet/outlet differential pressure sufficient? NOTE: If the pressure is too low, the valve voltage to the GF40 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 GF40 Series calibrated for the gas flow?	Check GF40 Series side label. Run a flow check to verify. If flow is incorrect, replace the GF40 Series with a unit that is calibrated properly.

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Table 4-2 GF40 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
5. No gas flow below some setpoint.	
NOTE: When the setpoint is decreased below this point, the GF40 Series signal remains at some value higher than the setpoint.	
Is the gas inlet/outlet differential pressure too high?	Verify that the pressure is correct for regulator to achieve proper pressure.
Is the GF40 Series leaking?	Check for contamination. Test the GF40 Series for leak integrity. Replace the GF40 Series if leakage is detected.
6. Gas flow oscillates.	
Is the GF40 Series calibrated for the gas flowing?	Check the GF40 Series side can label. Run a flow check to verify. If flow is incorrect, replace the GF40 Series.
Is there too much gas pressure across the GF40 Series?	Verify that the pressure is correct for this gas and range. If required, adjust regulator to achieve proper pressure reading.
Are inlet and outlet pressures stable?	<p>If outlet pressure is unstable, check for (no oscillation or hunting) a faulty vacuum pump, or hunting at a downstream valve.</p> <p>Check inlet pressure on tool. A faulty pressure regulator can make the GF40 Series appear to oscillate.</p> <p>Adjust inlet pressure up or down by 2 psig increments until hunting disappears. Verify common gas pressure is within range.</p> <p>NOTE: Hunting or oscillation can be contributed to multiple GF40 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.</p>

Table 4-2 GF40 Series Troubleshooting Guide (Continued)

Symptoms & Possible Causes	Corrective Action
7. OEM tool does not read correct GF40 Series zero reading.	
Is the differential pressure across the GF40 Series really zero? Is the supply voltage within specified range? Is the GF40 Series mounted in the proper attitude? Is the flow output signal of the GF40 Series really zero?	GF40 Series valve leakage. Incorrect MFC zero.
8. Zero Drift.	
Improper zero of the GF40 Series? Excessive Valve leakage? 9. Calibration Drift.	GF40 Series aging or sensor stabilization. Zero is not correct.
Gas box temperature too high? Is it linear offset?	Zero is not correct.
10. GF40 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.	Purge the line before operating.
11.OEM tool indicates the wrong full scale value for GF40 Series.	
Older version of Multiflo Configurator used to program GF40 Series.	Update Multiflo Configurator. Refer to Section 2-17.
12. GF40 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. GF40 Series and pneumatic timing may be offset. GF40 Series overshoots.	Change the tool sequence.
13. Tool display output doesn't match GF40 Series flow output.	
Cable resistance or read-out impedance causing offset in the tool's display.	Check cables and read out. Eliminate any ground loops.

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5 Product Description Code

Table 5-1 GF40 Series Product Description Code Table

Code Description	Code Option	Option Description
I. Base Model Code	GF040	Elastomer / Range Flow (0-50 slpm)
II. Configurability	C	MultiFlo Capable. Standard Bins or specific gas range may be selected
	X	Not MultiFlo Capable. Specific gas/range required
III. Special Application	XX	Standard
IV. Valve Configuration	C	Normally Closed Valve
	O	Normally Open Valve
	M	Meter (No Valve)
V. MultiFlo Bin & Range or Gas & Range (Standard)	XXXX XXXX	Specific Gas Code & Range, example: "0004" = Argon and "010L" = 10 slpm
	SA40 010C	Standard Configuration #40, 3-10 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA41 030C	Standard Configuration #41, 11-30 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA42 092C	Standard Configuration #42, 31-92 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA43 280C	Standard Configuration #43, 93-280 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA44 860C	Standard Configuration #44, 281-860 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA45 2-6L	Standard Configuration #45, 861-2600 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA46 7-2L	Standard Configuration #46, 2601-7200 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA47 015L	Standard Configuration #47, 7201-15000 sccm N2 Eq. @ 0 deg C Ref Temp.
	SA48 030L	Standard Configuration #48, 15001-30000 sccm N2 Eq. @ 0 deg C Ref Temp.
SA50 050L	Standard Configuration #50, 30001-50000 sccm N2 Eq. @ 0 deg C Ref Temp.	
VI. Fitting	XX	9/16" - 18 UNF
	T1	1/8" tube compression
	T2	1/4" tube compression
	T3	3/8" tube compression
	T4	1/2" tube compression
	T6	6 mm tube compression
	T0	10 mm tube compression
	R2	1/4" RC (BSP)
	VX	1/4" VCR
	O2	1/4" VCO
	N2	1/4" NPT
VII. Downstream Condition	A	Atmosphere
	V	Vacuum
	P	Positive Pressure
VIII. External Seals, Valve Seat	B	Seal Buna / Seat Buna
	E	Seal EPDM / Seat EPDM
	K	Seal Kalrez / Seat Kalrez
	N	Seal Neoprene / Seat Neoprene
	V	Seal Viton / Seat Viton
IX. Communications / Connector	P5	Profibus / Analog (Input 0-5 V; Output 0-5 V); 9-Pin Female D conn. / 15-Pin Male D conn.
	P0	Profibus / Analog (Input 0-20 mA; Output 0-20 mA); 9-Pin Female D conn. / 15-Pin Male D conn.
	P4	Profibus / Analog (Input 4-20 mA; Output 4-20 mA); 9-Pin Female D conn. / 15-Pin Male D conn.
	E5	EtherCAT™ / (Output 0-5 V); 2xRJ45 signal 2-Pin power
	D5	DeviceNet / Analog (Output 0-5 V); 5-Pin mico signal and power / 3-Pin analog signal
	S5	RS485 (S-Protocol)/Analog (Input 0-5 V; Output 0-5 V)15-Pin Male D (Brooks Protocol)
	S1	RS485 (S-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Brooks Protocol)
	S0	RS485 (S-Protocol)/Analog (Input 0-20 mA ; Output 0-20 mA); 15-Pin Male D (Brooks Protocol)
	S4	RS485 (S-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Brooks Protocol)
	L5	RS485 (L-Protocol)/Analog (Input 0-5 V; Output 0-5 V); 15-Pin Male D (Celerity/Legacy Protocol)
	L1	RS485 (L-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Celerity/Legacy Protocol)
	L0	RS485 (L-Protocol)/Analog (Input 0-20 mA; Output 0-20 mA); 15-Pin Male D (Celerity/Legacy Protocol)
	L4	RS485 (L-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Celerity/Legacy Protocol)
	A5	RS485 (A-Protocol)/Analog (Input 0-5 V; Output 0-5 V); 15-Pin Male D (Aera Protocol)
	A1	RS485 (A-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Aera Protocol)
A0	RS485 (A-Protocol)/Analog (Input 0-20 mA; Output 0-20 mA); 15-Pin Male D (Aera Protocol)	
A4	RS485 (A-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Aera Protocol)	
X. Customer Special Request	XXXX	Customer Special Request Number
XI. Auto Shut-Off	A	Auto Shut-Off (Included)
	X	Auto Shut-Off (Not Included)
XII. Auto Zero	A	Auto Zero (Included)
	X	Auto Zero (Not Included)
XIII. Reference Temperature	00C	0°C Reference
	15C	15°C Reference
	20C	20°C Reference
	70F	21.1°C Reference / 70°F Reference

Example Model Code

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII				
GF040	C	XX	C	-	0013300C	-	T2	A	V	P5	-	XXXX	X	A	-	20C

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A GF40/GF80 Series Gas Table

Table A-1 GF40 Series Gas Table - Codes 1-102, Bins SA40 to SA44

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA40		SA41		SA42		SA43		SA44	
			SA40-SA47	SA48	SA50	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
2	Ne	Neon	24.7			5	14	15	42	43	129	130	400	401	1207
4	Ar	Argon	24.7	29.7	29.7	5	14	15	42	43	130	131	400	401	1214
5	Kr	Krypton	29.7			4	11	12	32	33	100	101	302	303	930
6	Xe	Xenon	24.7			3	6	7	19	20	58	59	178	179	546
7	H2	Hydrogen	14.7	14.7	29.7	3	10	11	30	31	92	93	280	281	860
8	Air	Air	24.7	29.7	29.7	3	10	11	30	31	92	93	280	281	860
9	CO	Carbon Monoxide	24.7	29.7		3	10	11	30	31	92	93	280	281	860
10	HBr	Hydrogen Bromide	24.7			3	8	9	25	26	77	78	235	236	723
11	HCl	Hydrogen Chloride	24.7	29.7	32.7	3	10	11	30	31	92	93	280	281	860
12	HF	Hydrogen Fluoride	14.7	17.7		3	10	11	30	31	94	95	281	282	880
13	N2	Nitrogen	24.7	29.7	29.7	3	10	11	30	31	92	93	280	281	860
14	D2	Deuterium	14.7	14.7		3	10	11	30	31	94	95	280	281	880
15	O2	Oxygen	24.7	29.7	29.7	3	10	11	30	31	92	93	280	281	860
16	NO	Nitric Oxide	24.7	29.7	39.7	3	10	11	30	31	92	93	280	281	860
17	HI	Hydrogen Iodide	24.7	29.7		3	5	6	15	16	46	47	141	142	432
18	F2	Fluorine	24.7	29.7		3	9	10	27	28	83	84	254	255	780
19	Cl2	Chlorine	24.7	29.7		3	6	7	19	20	57	58	173	174	531
22	H2S	Hydrogen Sulfide	24.7	29.7		3	8	9	25	26	76	77	232	233	713
23	H2Se	Hydrogen Selenide	24.7	29.7		3	7	8	22	23	66	67	202	203	620
25	CO2	Carbon Dioxide	24.7	29.7	29.7	3	7	8	22	23	69	70	209	210	642
27	N2O	Nitrous Oxide	24.7	29.7	29.7	3	7	8	21	22	65	66	200	201	611
28	CH4	Methane	24.7	24.7	29.7	3	7	8	23	24	71	72	215	216	660
29	NH3	Ammonia	24.7	24.7	29.7	3	8	9	24	25	73	74	223	224	685
30	O3	Ozone	24.7	29.7	29.7	3	8	9	26	27	82	83	250	251	770
31	PH3	Phosphine	19.7	24.7		3	7	8	22	23	67	68	205	206	629
32	SO2	Sulfur Dioxide	19.7	24.7		3	5	6	17	18	52	53	157	158	482
33	CH3F	Methyl Fluoride	24.7	29.7		3	7	8	22	23	67	68	204	205	625
34	COS	Carbonyl Sulfide	24.7	29.7		3	6	7	20	21	60	61	183	184	562
35	AsH3	Arsine	24.7	29.7		3	6	7	18	19	56	57	171	172	524
36	CH3Cl	Methyl Chloride	24.7	29.7	26.7	3	6	7	20	21	60	61	180	181	560
37	CICN	Cyanogen Chloride	14.7	21.7		3	5	6	15	16	46	47	142	143	435
38	C2H4	Ethylene	24.7	29.7		3	6	7	18	19	56	57	170	171	523
39	SiH4	Silane	24.7	29.7		3	6	7	18	19	56	57	170	171	523
42	C2H2	Acetylene	16.7	19.7		3	6	7	18	19	57	58	170	171	530
43	GeH4	Germane	24.7	29.7		3	5	6	17	18	53	54	161	162	495
44	CH3Br	Methyl Bromide	19.7	24.7		3	3	4	11	12	35	36	108	109	332
45	C2H4O	Ethylene Oxide	14.7	19.7		3	5	6	15	16	46	47	140	141	430
46	COF2	Carbonyl Fluoride	19.7	19.7		3	5	6	17	18	53	54	160	161	500
47	CH3SH	Methyl Mercaptan	24.7	29.7		3	4	5	14	15	44	45	132	133	410
48	BF3	Boron Trifluoride	19.7	24.7		3	5	6	16	17	50	51	150	151	457
49	CHF3	Fluoroform (Freon-23)	24.7	24.7	26.7	3	5	6	15	16	48	49	145	146	445
51	C2H3F	Vinyl Fluoride	24.7	29.7	34.7	3	6	7	18	19	56	57	170	171	520
52	CH5N	Methylamine	24.7	29.7	32.7	3	4	5	14	15	44	45	133	134	410
53	NF3	Nitrogen Trifluoride	24.7	29.7	34.7	3	5	6	15	16	46	47	140	141	430
54	C2H6	Ethane	24.7	29.7	26.7	3	5	6	16	17	50	51	153	154	469
57	CHClF2	Chlorodifluoromethane (Freon-22)	24.7	29.7		3	4	5	12	13	36	37	112	113	345
58	B2H6	Diborane	19.7	19.7		3	4	5	12	13	38	39	116	117	358
60	COCl2	Phosgene	12.7	14.7		3	3	4	11	12	35	36	106	107	325
61	C3H6-a)	Cyclopropane	24.7	29.7		3	4	5	14	15	44	45	133	134	410
62	PF3	Phosphorus Trifluoride	19.7	24.7		3	4	5	14	15	42	43	129	130	400
63	CF4	Carbon Tetrafluoride (Freon-14)	24.7	24.7	29.7	3	4	5	13	14	40	41	121	122	372
67	SiH2Cl2	Dichlorosilane	14.7	19.7		3	3	4	10	11	29	30	89	90	273
69	C3H6-b)	Propylene	19.7	19.7		3	4	5	12	13	36	37	110	111	338
70	BCl3	Boron Trichloride	11.7	14.7		3	3	4	10	11	31	32	94	95	289
72	ClO3F	Perchloryl Fluoride	14.7	20.7		3	4	5	12	13	38	39	114	115	350
73	C2H6O	Dimethylether	14.7	19.7		3	3	4	11	12	36	37	110	111	340
74	CClF3	Chlorotrifluoromethane (Freon-13)	24.7	29.7		3	4	5	12	13	39	40	120	121	360
77	ClF3	Chlorine Trifluoride	14.7	20.7		3	3	4	11	12	35	36	107	108	327
79	BBr3	Boron Tribromide	24.7	29.7	29.7	3	4	5	12	13	37	38	115	116	352
80	CBrF3	Bromotrifluoromethane (Freon-13)	24.7	29.7		3	3	4	10	11	32	33	100	101	300
84	CCl2F2	Dichlorodifluoromethane (Freon-1)	24.7	29.7		3	3	4	9	10	30	31	91	92	282
85	C2H7N	Dimethylamine	9.7	14.7		3	3	4	11	12	34	35	101	102	310
88	SiF4	Silicon Tetrafluoride	19.7	24.7		3	3	4	11	12	34	35	103	104	316
89	C3H8	Propane	9.7	11.7		3	3	4	10	11	32	33	100	101	300
94	C2F4	Tetrafluoroethylene	19.7	19.7		3	3	4	10	11	31	32	100	101	300
97	Si2H6	DISILANE	19.7	19.7		3	3	4	10	11	30	31	92	93	282
98	C4H8-j)	Transbutene	19.7	19.7		3	3	4	9	10	27	28	83	84	250
99	GeF4	Germanium Tetrafluoride	20.7	24.7		3	3	4	10	11	30	31	92	93	282
100	C4H6-e)	Butadiene	19.7	19.7		3	3	4	10	11	30	31	92	93	280
102	POCl3	Phosphorus Oxychloride	9.7	9.7	9.7			3	4	5	14	15	45	46	139

Table A-2 GF40 Series Gas Table - Codes 1-102, Bins SA45 to SA50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA45		SA46		SA47		SA48		SA50	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
1	He	Helium	19.7	24.7	29.7	1195	3609	3610	11200	11201	23000	23001	56000	56001	105000
2	Ne	Neon	24.7			1208	3650	3651	10600	10601	22300				
4	Ar	Argon	24.7	29.7	29.7	1215	3671	3672	10000	10001	20100	20101	38000	38001	60000
5	Kr	Krypton	29.7			931	2809	2810	6940	6941	14500				
6	Xe	Xenon	24.7			547	1651	1652	4070	4071	8490				
7	H2	Hydrogen	14.7	14.7	29.7	861	2600	2601	8000	8001	16000	16001	40000	40001	77000
8	Air	Air	24.7	29.7	29.7	861	2600	2601	7400	7401	15000	15001	30000	30001	51000
9	CO	Carbon Monoxide	24.7	29.7		861	2600	2601	7300	7301	15000	15001	30000		
10	HBr	Hydrogen Bromide	24.7			724	2187	2188	5490	5491	11400				
11	HCl	Hydrogen Chloride	24.7	29.7	32.7	861	2600	2601	6900	6901	14100	14101	26100	26101	42000
12	HF	Hydrogen Fluoride	14.7	17.7		881	2610	2611	7400	7401	15000	15001	30000		
13	N2	Nitrogen	24.7	29.7	29.7	861	2600	2601	7400	7401	15000	15001	30000	30001	51000
14	D2	Deuterium	14.7	14.7		881	2600	2601	8000	8001	17000	17001	39000		
15	O2	Oxygen	24.7	29.7	29.7	861	2600	2601	7200	7201	15000	15001	30000	30001	51000
16	NO	Nitric Oxide	24.7	29.7	39.7	861	2600	2601	7200	7201	15000	15001	30000	30001	50000
17	HI	Hydrogen Iodide	24.7	29.7		433	1305	1306	3250	3251	6780	6781	11900		
18	F2	Fluorine	24.7	29.7		781	2358	2359	6700	6701	14000	14001	28000		
19	Cl2	Chlorine	24.7	29.7		532	1604	1605	4780	4781	9970	9971	17900		
22	H2S	Hydrogen Sulfide	24.7	29.7		714	2155	2156	5900	5901	12000	12001	23000		
23	H2Se	Hydrogen Selenide	24.7	29.7		621	1874	1875	4640	4641	9670	9671	16900		
25	CO2	Carbon Dioxide	24.7	29.7	29.7	643	1942	1943	5300	5301	11000	11001	21000	21001	33000
27	N2O	Nitrous Oxide	24.7	29.7	29.7	612	1849	1850	5100	5101	10400	10401	20000	20001	32000
28	CH4	Methane	24.7	24.7	29.7	661	2000	2001	6000	6001	12000	12001	25000	25001	44000
29	NH3	Ammonia	24.7	24.7	29.7	686	2072	2073	6000	6001	12200	12201	25000	25001	43000
30	O3	Ozone	24.7	29.7	29.7	771	2300	2301	6000	6001	12300	12301	22200	22201	35000
31	PH3	Phosphine	19.7	24.7		630	1901	1902	5200	5201	10700	10701	20200		
32	SO2	Sulfur Dioxide	19.7	24.7		483	1459	1460	3760	3761	7840	7841	14200		
33	CH3F	Methyl Fluoride	24.7	29.7		626	1890	1891	5200	5201	10600	10601	20100		
34	COS	Carbonyl Sulfide	24.7	29.7		563	1700	1701	4400	4401	9200	9201	16000		
35	AsH3	Arsine	24.7	29.7		525	1590	1591	4050	4051	8440	8441	15100		
36	CH3Cl	Methyl Chloride	24.7	29.7	26.7	561	1700	1701	4300	4301	9100	9101	16000	16001	25000
37	CICN	Cyanogen Chloride	14.7	21.7		436	1320	1321	3340	3341	6960	6961	12400		
38	C2H4	Ethylene	24.7	29.7		524	1582	1583	4400	4401	9300	9301	18100		
39	SiH4	Silane	24.7	29.7		524	1581	1582	4400	4401	9300	9301	18100		
42	C2H2	Acetylene	16.7	19.7		531	1600	1601	4500	4501	9300	9301	18400		
43	GeH4	Germane	24.7	29.7		496	1500	1501	3900	3901	8300	8301	15000		
44	CH3Br	Methyl Bromide	19.7	24.7		333	1000	1001	2600	2601	5400	5401	9830		
45	C2H4O	Ethylene Oxide	14.7	19.7		431	1300	1301	3500	3501	7300	7301	13400		
46	COF2	Carbonyl Fluoride	19.7	19.7		501	1500	1501	4000	4001	8400	8401	16000		
47	CH3SH	Methyl Mercaptan	24.7	29.7		411	1230	1231	3300	3301	7000	7001	12600		
48	BF3	Boron Trifluoride	19.7	24.7		458	1381	1382	3800	3801	7900	7901	15000		
49	CHF3	Fluoroform (Freon-23)	24.7	24.7	26.7	446	1344	1345	3600	3601	7500	7501	14000	14001	22000
51	C2H3F	Vinyl Fluoride	24.7	29.7	34.7	521	1540	1541	4100	4101	8700	8701	16000	16001	25200
52	CH5N	Methylamine	24.7	29.7	32.7	411	1230	1231	3400	3401	7100	7101	13400	13401	22000
53	NF3	Nitrogen Trifluoride	24.7	29.7	34.7	431	1300	1301	3600	3601	7500	7501	14200	14201	23000
54	C2H6	Ethane	24.7	29.7	26.7	470	1418	1419	4000	4001	8300	8301	16000	16001	27000
57	CHClF2	Chlorodifluoromethane (Freon-22)	24.7	29.7		346	1040	1041	2710	2711	5640	5641	10300		
58	B2H6	Diborane	19.7	19.7		359	1082	1083	3010	3011	6400	6401	13000		
60	COCl2	Phosgene	12.7	14.7		326	1000	1001	2480	2481	5160	5161	9140		
61	C3H6-a)	Cyclopropane	24.7	29.7		411	1230	1231	3300	3301	7000	7001	13000		
62	PF3	Phosphorus Trifluoride	19.7	24.7		401	1200	1201	3200	3201	6800	6801	12500		
63	CF4	Carbon Tetrafluoride (Freon-14)	24.7	24.7	29.7	373	1123	1124	3000	3001	6400	6401	12000	12001	19000
67	SiH2Cl2	Dichlorosilane	14.7	19.7		274	824	825	2100	2101	4380	4381	7860		
69	C3H6-b)	Propylene	19.7	19.7		339	1022	1023	2800	2801	6000	6001	11400		
70	BCl3	Boron Trichloride	11.7	14.7		290	874	875	2170	2171	4520	4521	8000		
72	ClO3F	Perchloryl Fluoride	14.7	20.7		351	1060	1061	2720	2721	5800	5801	10300		
73	C2H6O	Dimethylether	14.7	19.7		341	1010	1011	2800	2801	5800	5801	11000		
74	CClF3	Chlorotrifluoromethane (Freon-13)	24.7	29.7		361	1100	1101	2800	2801	5900	5901	10400		
77	ClF3	Chlorine Trifluoride	14.7	20.7		328	1000	1001	2530	2531	5280	5281	9490		
79	BBr3	Boron Tribromide	24.7	29.7	29.7	353	1060	1061	2780	2781	5790	5791	10700	10701	16800
80	CBrF3	Bromotrifluoromethane (Freon-13)	24.7	29.7		301	904	905	2270	2271	4730	4731	8350		
84	CCl2F2	Dichlorodifluoromethane (Freon-1)	24.7	29.7		283	853	854	2160	2161	4490	4491	7980		
85	C2H7N	Dimethylamine	9.7	14.7		311	960	961	2520	2521	5400	5401	10100		
88	SiF4	Silicon Tetrafluoride	19.7	24.7		317	1000	1001	2600	2601	5400	5401	10000		
89	C3H8	Propane	9.7	11.7		301	910	911	2420	2421	5100	5101	10000		
94	C2F4	Tetrafluoroethylene	19.7	19.7		301	900	901	2300	2301	4900	4901	9100		
97	Si2H6	DISILANE	19.7	19.7		283	853	854	2300	2301	4900	4901	9300		
98	C4H8-j)	Transbutene	19.7	19.7		251	770	771	2030	2031	4300	4301	8300		
99	GeF4	Germanium Tetrafluoride	20.7	24.7		283	860	861	2200	2201	4600	4601	8200		
100	C4H6-e)	Butadiene	19.7	19.7		281	850	851	2300	2301	4800	4801	9200		
102	POCl3	Phosphorus Oxychloride	9.7	9.7	9.7	140	420	421	1060	1061	2200	2201	3900	3901	5990

Table A-3 GF40 Series Gas Table - Codes 104-636, Bins SA40 to SA44

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA40		SA41		SA42		SA43		SA44			
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High		
			104	C4H8-i)	Butene	19.7	19.7				3	5	6	17	18	51	52
106	C4H8-h)	Isobutylene	19.7	19.7				3	3	4	9	10	28	29	86	87	260
107	C4H8-g)	Cisbutene	19.7	19.7				3	3	4	9	10	28	29	85	86	260
108	SiCl4	Silicon Tetrachloride	8.7						3	6	7	18	19	56	57	172	
109	C3H9N	Trimethylamine	6.7	8.7					3	8	9	25	26	78	79	240	
110	SF6	Sulfur Hexafluoride	19.7	19.7	29.7				3	8	9	25	26	77	78	237	
111	C4H10-d)	Isobutane	19.7	19.7	29.7				3	7	8	23	24	70	71	216	
113	GeCl4	Germanium Tetrachloride	19.7	24.7	24.7			3	3	4	9	10	28	29	87	88	261
117	C4H10-c)	Butane	19.7	19.7	29.7				3	8	9	25	26	76	77	234	
118	C2F6	Hexafluoroethane (Freon-116)	19.7	19.7					3	8	9	25	24	71	72	218	
119	C2ClF5	Chloropentafluoroethane (Freon-113)	24.7	29.7					3	7	8	22	23	69	70	210	
121	WF6	Tungsten Hexafluoride	9.7	11.7					3	5	6	16	17	48	49	150	
122	C5H12	Dimethylpropane	24.7	29.7					3	6	7	20	21	61	62	184	
128	C3F8	Perfluoropropane	19.7	19.7					3	5	6	16	17	50	51	154	
129	C4F8	Octafluorocyclobutane	19.7	19.7					3	5	6	16	17	50	51	154	
138	C3F6	Hexafluoropropylene	19.7	19.7					3	6	7	20	21	60	61	184	
155	C2HF5	PENTAFLUROETHANE (FREON-115)	19.7	19.7					3	8	9	25	26	77	78	235	
156	C2H2F4	Tetrafluoroethane (Freon-134a)	24.7	29.7				3	3	4	9	10	28	29	86	87	260
160	CH2F2	Difluoromethane	24.7	29.7				3	6	7	19	20	57	58	174	175	533
185	CH6Si	Methylsilane (MONO)	9.7	14.7				3	4	5	12	13	37	38	111	112	340
190	(CH3)3SiH	Trimethylsilane (TMSI)	6.7						3	6	7	20	21	62	63	189	
193	PCl3	Phosphorus Trichloride															
241	C4F10	Perfluorobutane	14.7	19.7					3	4	5	13	14	40	41	120	
249	B2F4	Difluoroborane	14.7	19.7	19.7			3	3	4	10	11	32	33	99	100	300
266	C5F8	Octafluorocyclopentene	9.7	14.7					3	4	5	14	15	44	45	134	
270	C4F6	Hexafluoro-2-butyne	9.7						3	6	7	19	20	57	58	176	
297	C4F6-q)	Hexafluoro Butadiene-1-3	14.7	14.7					3	5	6	17	18	52	53	160	
354	C5F8O	Epoxyperfluorocyclopentene	19.7	19.7					3	4	5	13	14	40	41	122	
360	CF3I	trifluoroiodo-Methane	14.7	14.7					3	7	8	22	23	66	67	201	
368	Si3H9N	Trisilylamine (TSA)	6.0	7.2					3	6	7	20	21	60	61	181	
371	C4H11N	Dimethylethylamine	8.7	8.7					3	6	7	20	21	63	64	190	
385	C3H2F4	2,3,3,3-tetrafluoro-1-Propene	14.7	14.7					3	7	8	23	24	71	72	217	
500	15%PH3/N2	15%Phosphine/Nitrogen	24.7	29.7				3	9	10	29	30	90	91	270	271	840
501	5%PH3/N2	5%Phosphine/Nitrogen	24.7	29.7				3	10	11	30	31	93	94	280	281	870
502	20%SiH4/N2	20%Silane/Nitrogen	20.7	25.7	44.7			3	9	10	27	28	83	84	250	251	780
509	10%GeH4/H2	10%Germane/Hydrogen	20.7	20.7				3	9	10	28	29	86	87	260	261	800
516	10%PH3/H2	10%Phosphine/Hydrogen	14.7	14.7				3	9	10	28	29	87	88	265	266	813
517	25%PH3/SiH4	25%Phosphine/Silane	14.7	29.7				3	6	7	19	20	60	61	180	181	560
527	10%PH3/N2	10%Phosphine/Nitrogen	19.7	24.7				3	9	10	30	31	91	92	271	272	850
528	4.5%PH3/N2	4.5%Phosphine/Nitrogen	20.7	29.7				3	10	11	30	31	94	95	280	281	880
529	20%SiH4/He	20%Silane/Helium	20.7	29.7				4	11	12	34	35	103	104	320	321	1000
532	10%H2/N2	10%Hydrogen/Nitrogen	20.7	29.7				3	10	11	30	31	94	95	281	282	880
535	4%PH3/N2	4%Phosphine/Nitrogen	20.7	29.7				3	10	11	30	31	93	94	280	281	870
536	20%O2/He	20%Oxygen/Helium	19.7	29.7				4	13	14	38	39	120	121	360	361	1102
537	1%PH3/Ar	1%Phosphine/Argon	24.7	29.7				4	14	15	43	44	130	131	400	401	1200
538	10%PH3/Ar	10%Phosphine/Argon	24.7	29.7				4	13	14	40	41	120	121	370	371	1110
542	5%H2/N2	5%Hydrogen/Nitrogen	24.7	29.7				3	10	11	30	31	92	93	280	281	860
544	2%SiH4/H2	2%Silane/Hydrogen	24.7	29.7				3	10	11	30	31	94	95	280	281	870
546	1%PH3/He	1%Phosphine/Helium	24.7	29.7				4	14	15	42	43	130	131	400	401	1200
549	.5%B2H6/Ar	.5%Diborane/Argon	24.7	29.7				4	14	15	42	43	130	131	400	401	1200
550	.5%PH3/N2	.5%Phosphine/Nitrogen	24.7	29.7				3	10	11	30	31	94	95	280	281	880
557	1%B2H6/H2	1%Diborane Hydrogen	24.7	29.7				3	10	11	30	31	91	92	270	271	850
559	1%BCl3/H2	1%Boron Trichloride/Hydrogen	24.7	29.7				3	10	11	30	31	94	95	280	281	870
560	1%BCl3/N2	1%Boron Trichloride/Nitrogen	24.7	29.7				3	10	11	30	31	93	94	280	281	870
563	1%PH3/H2	1%Phosphine/Hydrogen	19.7	19.7				3	10	11	30	31	90	91	273	274	850
565	10%SiH4/Ar	10%Silane/Argon	24.7	29.7				4	12	13	38	39	115	116	350	351	1100
584	15%PH3/SiH4	15%Phosphine/Silane	19.7	19.7				3	6	7	19	20	59	60	175	176	550
589	2%SiH4/He	2%Silane/Helium	19.7	19.7				4	14	15	42	43	126	127	400	401	1200
595	3%B2H6/N2	3%Diborane/Nitrogen	20.7	29.7				3	9	10	29	30	90	91	270	271	850
597	3%H2/N2	3%Hydrogen/Nitrogen	24.7	29.7				3	10	11	30	31	92	93	280	281	860
603	30%He/O2	30%Helium/Oxygen	24.7	29.7				4	11	12	33	34	100	101	301	302	950
604	30%O2/He	30%Oxygen/Helium	19.7	29.7				4	12	13	37	38	113	114	345	346	1060
605	4%B2H6/N2	4%Diborane/Nitrogen	19.7	29.7				3	9	10	29	30	90	91	270	271	830
606	4%H2/He	4%Hydrogen/Helium	19.7	19.7				4	14	15	41	42	126	127	400	401	1200
607	4%H2/N2	4%Hydrogen/Nitrogen	24.7	29.7				3	10	11	30	31	92	93	280	281	860
615	5%B2H6/Ar	5%Diborane/Argon	24.7					4	12	13	38	39	116	117	353	354	1084
626	5%PH3/Ar	5%Phosphine/Argon	27.7	32.7				4	13	14	41	42	125	126	380	381	1170
627	5%PH3/SiH4	5%Phosphine/Silane	14.7	19.7	19.7			3	6	7	18	19	58	59	172	173	540
628	5%SiH2Cl2/Ar	5%Dichlorosilane/Argon	24.7	29.7				4	12	13	38	39	116	117	360	361	1100
632	50%PH3/SiH4	50%Phosphine/Silane	16.7	24.7				3	6	7	20	21	62	63	190	191	580
636	8%PH3/SiH4	8%Phosphine/Silane	16.7	24.7				3	6	7	19	20	58	59	173	174	540

For gases not specified for SA50, contact Brooks Product Marketing.
For reference only, consult factory on the latest tables.

Brooks® GF40 Devices

Table A-4 GF40 Series Gas Table - Codes 104-636, Bins SA45 to SA50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA45		SA46		SA47		SA48		SA50	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
104	C4H8-i)	Butene	19.7	19.7		160	480	481	1400	1401	2920	2921	6480		
106	C4H8-h)	Isobutylene	19.7	19.7		261	800	801	2110	2111	4500	4501	8600		
107	C4H8-g)	Cisbutene	19.7	19.7		261	790	791	2100	2101	4400	4401	8400		
108	SiCl4	Silicon Tetrachloride	8.7			173	520	521	1280	1281	2660				
109	C3H9N	Trimethylamine	6.7	8.7		241	720	721	1910	1911	4000	4001	7700		
110	SF6	Sulfur Hexafluoride	19.7	19.7	29.7	238	715	716	1900	1901	3900	3901	7300	7301	11200
111	C4H10-d)	Isobutane	19.7	19.7	29.7	217	653	654	1800	1801	3800	3801	7300	7301	11700
113	GeCl4	Germanium Tetrachloride	19.7	24.7	24.7	262	810	811	2200	2201	4700	4701	9500	9501	15600
117	C4H10-c)	Butane	19.7	19.7	29.7	235	706	707	1910	1911	4000	4001	7800	7801	12300
118	C2F6	Hexafluoroethane (Freon-116)	19.7	19.7		219	658	659	1740	1741	3700	3701	7000		
119	C2ClF5	Chloropentafluoroethane (Freon-113)	24.7	29.7		211	640	641	1620	1621	3400	3401	6200		
121	WF6	Tungsten Hexafluoride	9.7	11.7		151	452	453	1160	1161	2410	2411	4330		
122	C5H12	Dimethylpropane	24.7	29.7		185	570	571	1500	1501	3110	3111	6000		
128	C3F8	Perfluoropropane	19.7	19.7		155	465	466	1200	1201	2500	2501	4700		
129	C4F8	Octafluorocyclobutane	19.7	19.7		155	465	466	1150	1151	2400	2401	4400		
138	C3F6	Hexafluoropropylene	19.7	19.7		185	556	557	1460	1461	3040	3041	5620		
155	C2HF5	PENTAFLUOROETHANE (FREON-115)	19.7	19.7		236	711	712	1900	1901	4000	4001	7500		
156	C2H2F4	Tetrafluoroethane (Freon-134a)	24.7	29.7		261	800	801	2020	2021	4300	4301	7800		
160	CH2F2	Difluoromethane	24.7	29.7		534	1612	1613	4300	4301	8900	8901	16100		
185	CH6Si	Methylsilane (MONO)	9.7	14.7		341	1050	1051	2800	2801	5900	5901	11000		
190	(CH3)3SiH	Trimethylsilane (TMSi)	6.7			190	572	573	1530	1531	3200				
193	PCl3	Phosphorus Trichloride													
241	C4F10	Perfluorobutane	14.7	19.7		121	370	371	950	951	1930	1931	3500		
249	B2F4	Difluoroborane	14.7	19.7	19.7	301	920	921	2600	2601	5500	5501	11600	11601	20300
266	C5F8	Octafluorocyclopentene	9.7	14.7		135	406	407	1040	1041	2200	2201	3900		
270	C4F6	Hexafluoro-2-butyne	9.7			177	533	534	1400	1401	2900				
297	C4F6-q)	Hexafluoro Butadiene-1-3	14.7	14.7		161	500	501	1250	1251	2610	2611	4760		
354	C5F8O	Epoxyperfluorocyclopentene	19.7	19.7		123	369	370	1000	1001	2040	2041	3900		
360	CF3I	trifluoroiodo-Methane	14.7	14.7		202	609	610	1530	1531	3200	3201	5670		
368	Si3H9N	Trisilylamine (TSA)	6.0	7.2		182	560	561	1400	1401	2900	2901	5300		
371	C4H11N	Dimethylethylamine	8.7	8.7		191	580	581	1530	1531	3200	3201	6100		
385	C3H2F4	2,3,3,3-tetrafluoro-1-Propene	14.7	14.7		218	656	657	1720	1721	3600	3601	6700		
500	15%PH3/N2	15%Phosphine/Nitrogen	24.7	29.7		841	2500	2501	6900	6901	14200	14201	28100		
501	5%PH3/N2	5%Phosphine/Nitrogen	24.7	29.7		871	2600	2601	7200	7201	15000	15001	30000		
502	20%SiH4/N2	20%Silane/Nitrogen	20.7	25.7	44.7	781	2310	2311	6500	6501	13300	13301	27000	27001	45000
509	10%GeH4/H2	10%Germane/Hydrogen	20.7	20.7		801	2400	2401	7100	7101	15000	15001	34000		
516	10%PH3/H2	10%Phosphine/Hydrogen	14.7	14.7		814	2500	2501	7500	7501	16000	16001	37000		
517	25%PH3/SiH4	25%Phosphine/Silane	14.7	29.7		561	1700	1701	4600	4601	9600	9601	19000		
527	10%PH3/N2	10%Phosphine/Nitrogen	19.7	24.7		851	2510	2511	7100	7101	14500	14501	29000		
528	4.5%PH3/N2	4.5%Phosphine/Nitrogen	20.7	29.7		881	2600	2601	7200	7201	15000	15001	30000		
529	20%SiH4/He	20%Silane/Helium	20.7	29.7		1001	3000	3001	8700	8701	18000	18001	40000		
532	10%H2/N2	10%Hydrogen/Nitrogen	20.7	29.7		881	2610	2611	7400	7401	15200	15201	31000		
535	4%PH3/N2	4%Phosphine/Nitrogen	20.7	29.7		871	2600	2601	7200	7201	15000	15001	30000		
536	20%O2/He	20%Oxygen/Helium	19.7	29.7		1103	3331	3332	10000	10001	21000	21001	48000		
537	1%PH3/Ar	1%Phosphine/Argon	24.7	29.7		1201	3700	3701	9700	9701	20000	20001	37000		
538	10%PH3/Ar	10%Phosphine/Argon	24.7	29.7		1111	3400	3401	9000	9001	18400	18401	35000		
542	5%H2/N2	5%Hydrogen/Nitrogen	24.7	29.7		861	2600	2601	7400	7401	15100	15101	31000		
544	2%SiH4/H2	2%Silane/Hydrogen	24.7	29.7		871	2600	2601	8000	8001	16200	16201	39000		
546	1%PH3/He	1%Phosphine/Helium	24.7	29.7		1201	3700	3701	11000	11001	23000	23001	55000		
549	5%B2H6/Ar	.5%Diborane/Argon	24.7	29.7		1201	3700	3701	9700	9701	20000	20001	37000		
550	.5%PH3/N2	.5%Phosphine/Nitrogen	24.7	29.7		881	2600	2601	7500	7501	15000	15001	30000		
557	1%B2H6/H2	1%Diborane Hydrogen	24.7	29.7		851	2510	2511	7900	7901	16000	16001	39000		
559	1%BCl3/H2	1%Boron Trichloride/Hydrogen	24.7	29.7		871	2600	2601	7900	7901	16200	16201	39000		
560	1%BCl3/N2	1%Boron Trichloride/Nitrogen	24.7	29.7		871	2600	2601	7300	7301	15000	15001	30000		
563	1%PH3/H2	1%Phosphine/Hydrogen	19.7	19.7		851	2531	2532	7900	7901	16000	16001	38000		
565	10%SiH4/Ar	10%Silane/Argon	24.7	29.7		1101	3300	3301	8800	8801	18000	18001	34000		
584	15%PH3/SiH4	15%Phosphine/Silane	19.7	19.7		551	1630	1631	4500	4501	9500	9501	18400		
589	2%SiH4/He	2%Silane/Helium	19.7	19.7		1201	3600	3601	10700	10701	22300	22301	54000		
595	3%B2H6/N2	3%Diborane/Nitrogen	20.7	29.7		851	2500	2501	7100	7101	14500	14501	29000		
597	3%H2/N2	3%Hydrogen/Nitrogen	24.7	29.7		861	2600	2601	7400	7401	15100	15101	31000		
603	30%He/O2	30%Helium/Oxygen	24.7	29.7		951	2800	2801	8100	8101	17000	17001	35000		
604	30%O2/He	30%Oxygen/Helium	19.7	29.7		1061	3203	3204	10000	10001	20000	20001	45000		
605	4%B2H6/N2	4%Diborane/Nitrogen	19.7	29.7		831	2500	2501	7000	7001	14300	14301	29000		
606	4%H2/He	4%Hydrogen/Helium	19.7	19.7		1201	3600	3601	11000	11001	22300	22301	55000		
607	4%H2/N2	4%Hydrogen/Nitrogen	24.7	29.7		861	2600	2601	7400	7401	15100	15101	31000		
615	5%B2H6/Ar	5%Diborane/Argon	24.7			1085	3278	3279	8900	8901	18200				
626	5%PH3/Ar	5%Phosphine/Argon	24.7	32.7		1171	3600	3601	9500	9501	19300	19301	36000		
627	5%PH3/SiH4	5%Phosphine/Silane	14.7	19.7	19.7	541	1600	1601	4500	4501	9400	9401	18200	18201	30000
628	5%SiH2Cl2/Ar	5%Dichlorosilane/Argon	24.7	29.7		1101	3300	3301	8800	8801	18000	18001	33000		
632	50%PH3/SiH4	50%Phosphine/Silane	16.7	24.7		581	1730	1731	4800	4801	10000	10001	19100		
636	8%PH3/SiH4	8%Phosphine/Silane	16.7	24.7		541	1610	1611	4500	4501	9400	9401	18200		

Table A-5 GF40 Series Gas Table - Codes 640-948, Bins SA40 to SA44

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA40		SA41		SA42		SA43		SA44	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
640	2%PH3/N2	2%Phosphine/Nitrogen	22.7	27.7	49.7	3	10	11	30	31	94	95	280	281	870
649	10%O2/He	10%Oxygen/Helium	19.7	24.7		4	13	14	41	42	123	124	380	381	1150
653	2%SiH4/N2	2%Silane/Nitrogen	19.7	24.7		3	10	11	30	31	93	94	280	281	870
654	5%B2H6/N2	5%Diborane/Nitrogen	24.7	29.7		3	9	10	28	29	86	87	262	263	804
656	.5%PH3/H2	.5%Phosphine/Hydrogen	24.7	29.7		3	10	11	31	32	95	96	282	283	880
660	.3%PH3/SiH4	.3%Phosphine/Silane	24.7	29.7		3	6	7	18	19	57	58	171	172	530
662	.8%B2H6/N2	.8%Diborane/Nitrogen	24.7	29.7		3	10	11	30	31	93	94	280	281	870
664	8%GeH4/H2	8%Germane/Hydrogen	24.7	29.7		3	9	10	29	30	89	90	270	271	840
674	10%PH3/He	10%Phosphine/Helium	14.7	19.7		4	13	14	40	41	120	121	370	371	1110
676	7.5%PH3/SiH4	7.5%Phosphine/Silane	14.7	14.7		3	6	7	19	20	58	59	175	176	540
677	20%F2/He	20%Fluorine/Helium	14.7	19.7		4	13	14	39	40	117	118	360	361	1100
693	5%PH3/He	5%Phosphine/Helium	12.7	14.7		4	13	14	41	42	125	126	380	381	1150
695	2%B2H6/N2	2%Diborane/Nitrogen	24.7	29.7		3	10	11	30	31	93	94	280	281	870
698	10%GeH4/Ar	10%Germane/Argon	24.7	29.7		4	12	13	38	39	114	115	350	351	1070
700	4%H2/Ar	4%Hydrogen/Argon	24.7	29.7		5	14	15	42	43	130	131	390	391	1200
701	10%B2H6/H2	10%Diborane/Hydrogen	14.7	14.7		3	8	9	26	27	81	82	241	242	760
710	10%CH4/Ar	10%Methane/Argon	34.7	39.7	44.7	4	13	14	40	41	120	121	370	371	1120
724	1%AsH3/H2	1%Arsine/Hydrogen	14.7	19.7		3	10	11	30	31	94	95	281	282	880
731	10%Si2H6/H2	10%Disilane/Hydrogen	19.7	19.7		3	8	9	25	26	79	80	240	241	730
762	5%H2/He	5%Hydrogen/Helium	19.7	19.7		5	13	14	41	42	125	126	400	401	1200
766	5%B2H6/He	5%Diborane/Helium	14.7	16.7		4	12	13	38	39	115	116	350	351	1100
771	.7%GeH4/H2	.7%Germane/Hydrogen	14.7	16.7		3	10	11	30	31	94	95	281	282	880
773	5%SiH4/N2	5%Silane/Nitrogen	24.7	29.7		3	10	11	30	31	90	91	280	281	860
775	1.5%GeH4/H2	1.5%Germane/Hydrogen	14.7	16.7		3	10	11	30	31	94	95	280	281	880
780	5%SiH4/He	5%Silane/Helium	14.7	16.7		4	13	14	40	41	122	123	380	381	1140
784	.02%CO/N2	.02%Carbon Monoxide/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	281	880
786	.1%CO/N2	.1%Carbon Monoxide/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	281	880
805	1%B2H6/Ar	1%Diborane/Argon	14.7	16.7		4	14	15	42	43	130	131	390	391	1200
820	15%B2H6/H2	15%Diborane/Hydrogen	14.7	14.7		3	8	9	25	26	76	77	230	231	710
821	15%SiH4/Ar	15%Silane/Argon	24.7	29.7		4	12	13	36	37	110	111	330	331	1010
823	2%SiH4/Ar	2%Silane/Argon	24.7	29.7		4	14	15	42	43	126	127	390	391	1200
824	2%SO2/N2	2%Sulfur Dioxide/Nitrogen	19.7	24.7		3	10	11	30	31	93	94	280	281	870
833	3%H2/Ar	3%Hydrogen/Argon	24.7	29.7		5	14	15	42	43	130	131	400	401	1200
837	30%GeH4/Ar	30%Germane/Argon	19.7	24.7		3	10	11	30	31	93	94	280	281	860
850	50%H2/N2	50%Hydrogen/Nitrogen	19.7	24.7		3	10	11	30	31	95	96	281	282	880
863	2%O2/Ar	2%Oxygen/Argon	24.7	29.7		4	14	15	43	44	130	131	400	401	1200
865	5%CO2/5%O2/N2	5%Carbon Dioxide/5%Oxygen/Nitrogen	24.7	29.7		3	10	11	30	31	92	93	280	281	860
866	2.5%CO2/5%CO2/N2	2.5%Oxygen/5%Carbon Dioxide/Nitrogen	24.7	29.7		3	10	11	30	31	93	94	280	281	860
867	.5%CO2/10%O2/N2	.5%Carbon Dioxide/10%Oxygen/Nitrogen	24.7	29.7		3	10	11	30	31	92	93	280	281	860
875	20%O2/Ar	20%Oxygen/Argon	24.7	29.7		4	13	14	39	40	120	121	370	371	1120
877	30%SiHCl3/H2	30%Trichlorosilane/Hydrogen	19.7	24.7	34.7	3	6	7	19	20	59	60	180	181	550
878	3%C2H4/He	3%Ethylene/Helium	19.7	19.7		5	13	14	40	41	123	124	374	375	1149
881	10%B2H6/Ar	5%Diborane/Argon	24.7	29.7		4	11	12	35	36	105	106	320	321	1000
886	.01%PH3/Ar	.01%Phosphine/Argon	24.7	29.7		5	14	15	43	44	130	131	400	401	1210
887	.1%PH3/Ar	.1%Phosphine/Argon	24.7	29.7		5	14	15	43	44	130	131	400	401	1210
888	.1%B2H6/Ar	.1%Diborane/Argon	24.7	29.7		4	14	15	43	44	130	131	400	401	1210
895	40%GeH4/N2	40%Germane/Nitrogen	19.7	19.7		3	7	8	23	24	73	74	220	221	680
896	30%PH3/SiH4	30%Phosphine/Silane	20.7	20.7		3	6	7	20	21	60	61	180	181	560
897	2.7%C2H4/He	2.7%Ethylene/Helium	19.7	19.7		5	13	14	40	41	123	124	375	376	1153
898	1%GeH4/H2	1%Germane/Hydrogen	20.7	20.7		3	10	11	30	31	91	92	275	276	850
900	.48%NF3/N2	.48%Nitrogen Fluoride/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	281	880
907	10%AsH3/N2	10%Arsine/Nitrogen	24.7	29.7		3	9	10	29	30	88	89	269	270	825
908	20%B2H6/He	20%Diborane/Helium	24.7	29.7		3	10	11	30	31	90	91	275	276	840
910	.5%GeH4/H2	0.5%Germane/Hydrogen	20.7	20.7		3	10	11	30	31	92	93	280	281	860
916	2%PH3/H2	2%Phosphine/Hydrogen	21.7	21.7		3	10	11	30	31	91	92	275	276	850
917	50%C3H6-b)/N2	50%Propylene/Nitrogen	21.7	21.7		3	5	6	17	18	53	54	160	161	500
919	20%H2/20%CO/N2	20%Hydrogen/20%Carbon Monoxide/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	281	282	880
920	20%H2/20%CO/Ar	20%Hydrogen/20%Carbon Monoxide/Argon	24.7	29.7		4	12	13	37	38	112	113	340	341	1050
921	4%O2/N2	4%Oxygen/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	281	880
925	10%C3H6-b)/N2	10%Propylene/Nitrogen	21.7	21.7		3	8	9	26	27	82	83	243	244	760
926	3%H2S/H2	3%Hydrogen Sulfide/Hydrogen	24.7	29.7		3	10	11	30	31	94	95	280	281	880
927	6%B2H6/N2	6%Diborane/Nitrogen	24.7	29.7		3	9	10	28	29	87	88	260	261	810
929	10%CH4/N2	10%Methane/Nitrogen	21.7	21.7		3	10	11	29	30	91	92	272	273	850
930	3.9%H2/N2	3.9%Hydrogen/Nitrogen	24.7	29.7		3	10	11	30	31	92	93	280	281	860
932	5%GeH4/H2	5%Germane/Hydrogen	19.7	19.7		3	10	11	30	31	91	92	272	273	850
936	10%He/N2	10%Helium/Nitrogen	19.7	19.7		3	10	11	31	32	100	101	290	291	910
939	10%B2H6/He	10%Diborane/Helium	19.7	19.7		4	11	12	34	35	103	104	314	315	965
941	1%O2/Ar	1%Oxygen/Argon	19.7	24.7		4	14	15	43	44	130	131	400	401	1210
946	30%C2H4/He	30%Ethylene/Helium	19.7	24.7		3	10	11	30	31	92	93	281	282	862
947	10%HCl/Ar	10%Hydrogen Chloride/Argon	19.7	24.7		4	13	14	41	42	125	126	380	381	1160
948	20%PH3/Ar	20%Phosphine/Argon	19.7	19.7		4	12	13	36	37	110	111	340	341	1030

Brooks® GF40 Devices

Table A-6 GF40 Series Gas Table - Codes 640-948, Bins SA45 to SA50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA45		SA46		SA47		SA48		SA50	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
640	2%PH3/N2	2%Phosphine/Nitrogen	22.7	27.7	49.7	871	2600	2601	7300	7301	15000	15001	30000	30001	50000
649	10%O2/He	10%Oxygen/Helium	19.7	24.7		1151	3500	3501	10400	10401	22000	22001	52000		
653	2%SiH4/N2	2%Silane/NITROGEN	19.7	24.7		871	2600	2601	7300	7301	15000	15001	30000		
654	5%B2H6/N2	5%Diborane/Nitrogen	24.7	29.7		805	2500	2501	6900	6901	14100	14101	29000		
656	.5%PH3/H2	.5%Phosphine/Hydrogen	24.7	29.7		881	2620	2621	8100	8101	16500	16501	40000		
660	.3%PH3/SiH4	.3%Phosphine/Silane	24.7	29.7		531	1600	1601	4400	4401	9300	9301	18100		
662	.8%B2H6/N2	.8%Diborane/Nitrogen	24.7	29.7		871	2600	2601	7300	7301	15000	15001	30000		
664	8%GeH4/H2	8%Germane/Hydrogen	24.7	29.7		841	2500	2501	7500	7501	15200	15201	35000		
674	10%PH3/He	10%Phosphine/Helium	14.7	19.7		1111	3400	3401	10200	10201	21100	21101	50000		
676	7.5%PH3/SiH4	7.5%Phosphine/Silane	14.7	14.7		541	1610	1611	4500	4501	9400	9401	18200		
677	20%F2/He	20%Fluorine/Helium	14.7	19.7		1101	3300	3301	10000	10001	20300	20301	47000		
693	5%PH3/He	5%Phosphine/Helium	12.7	14.7		1151	3500	3501	10400	10401	22000	22001	52000		
695	2%B2H6/N2	2%Diborane/Nitrogen	24.7	29.7		871	2600	2601	7200	7201	15000	15001	30000		
698	10%GeH4/Ar	10%Germane/Argon	24.7	29.7		1071	3300	3301	8600	8601	18000	18001	33000		
700	4%H2/Ar	4%Hydrogen/Argon	24.7	29.7		1201	3700	3701	9700	9701	20000	20001	38000		
701	10%B2H6/H2	10%Diborane/Hydrogen	14.7	14.7		761	2300	2301	7000	7001	14000	14001	33000		
710	10%CH4/Ar	10%Methane/Argon	34.7	39.7	44.7	1121	3400	3401	9200	9201	19000	19001	36000	36001	58000
724	1%AsH3/H2	1%Arsine/Hydrogen	14.7	19.7		881	2610	2611	8000	8001	16400	16401	40000		
731	10%Si2H6/H2	10%Disilane/Hydrogen	19.7	19.7		731	2200	2201	6500	6501	13300	13301	30000		
762	5%H2/He	5%Hydrogen/Helium	19.7	19.7		1201	3600	3601	11000	11001	23000	23001	55000		
766	5%B2H6/He	5%Diborane/Helium	14.7	16.7		1101	3300	3301	10000	10001	21000	21001	50000		
771	.7%GeH4/H2	.7%Germane/Hydrogen	14.7	16.7		881	2610	2611	8000	8001	16400	16401	40000		
773	5%SiH4/N2	5%Silane/Nitrogen	24.7	29.7		861	2600	2601	7100	7101	14600	14601	29100		
775	1.5%GeH4/H2	1.5%Germane/Hydrogen	14.7	16.7		881	2600	2601	7900	7901	16200	16201	40000		
780	5%SiH4/He	5%Silane/Helium	14.7	16.7		1141	3500	3501	10300	10301	21400	21401	51000		
784	.02%CO/N2	.02%Carbon Monoxide/Nitrogen	24.7	29.7		881	2600	2601	7400	7401	15000	15001	30000		
786	.1%CO/N2	.1%Carbon Monoxide/Nitrogen	24.7	29.7		881	2600	2601	7400	7401	15000	15001	30000		
805	1%B2H6/Ar	1%Diborane/Argon	14.7	16.7		1201	3600	3601	9600	9601	20000	20001	37000		
820	15%B2H6/H2	15%Diborane/Hydrogen	14.7	14.7		711	2120	2121	6500	6501	13100	13101	31000		
821	15%SiH4/Ar	15%Silane/Argon	24.7	29.7		1011	3100	3101	8300	8301	17000	17001	33000		
823	2%SiH4/Ar	2%Silane/Argon	24.7	29.7		1201	3600	3601	9600	9601	20000	20001	37000		
824	2%SO2/N2	2%Sulfur Dioxide/Nitrogen	19.7	24.7		871	2600	2601	7300	7301	15000	15001	30000		
833	3%H2/Ar	3%Hydrogen/Argon	24.7	29.7		1201	3700	3701	10000	10001	20000	20001	38000		
837	30%GeH4/Ar	30%Germane/Argon	19.7	24.7		861	2600	2601	6800	6801	14000	14001	26000		
850	50%H2/N2	50%Hydrogen/Nitrogen	19.7	24.7		881	2610	2611	7700	7701	16000	16001	35000		
863	2%O2/Ar	2%Oxygen/Argon	24.7	29.7		1201	3700	3701	10000	10001	20000	20001	37000		
865	5%CO2/5%O2/N2	5%Carbon Dioxide/5%Oxygen/Nitrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
866	2.5%O2/5%CO2/N2	2.5%Oxygen/5%Carbon Dioxide/Nitrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
867	.5%CO2/10%O2/N2	.5%Carbon Dioxide/10%Oxygen/Nitrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
875	20%O2/Ar	20%Oxygen/Argon	24.7	29.7		1121	3400	3401	9200	9201	19000	19001	36000		
877	30%SiHCl3/H2	30%Trichlorosilane/Hydrogen	19.7	24.7	34.7	551	1640	1641	4400	4401	9200	9201	17000	17001	27100
878	3%C2H4/He	3%Ethylene/Helium	19.7	19.7		1150	3474	3475	10700	10701	22300	22301	53000		
881	10%B2H6/Ar	5%Diborane/Argon	24.7	29.7		1001	3000	3001	8100	8101	17000	17001	32000		
886	.01%PH3/Ar	.01%Phosphine/Argon	24.7	29.7		1211	3700	3701	10000	10001	20000	20001	38000		
887	.1%PH3/Ar	.1%Phosphine/Argon	24.7	29.7		1211	3700	3701	10000	10001	20000	20001	38000		
888	.1%B2H6/Ar	.1%Diborane/Argon	24.7	29.7		1211	3700	3701	10000	10001	20000	20001	38000		
895	40%GeH4/N2	40%Germane/Nitrogen	19.7	19.7		681	2010	2011	5500	5501	11300	11301	21400		
896	30%PH3/SiH4	30%Phosphine/Silane	20.7	20.7		561	1700	1701	4600	4601	9700	9701	19000		
897	2.7%C2H4/He	2.7%Ethylene/Helium	19.7	19.7		1154	3487	3488	11000	11001	22300	22301	54000		
898	1%GeH4/H2	1%Germane/Hydrogen	20.7	20.7		851	2530	2531	8000	8001	16000	16001	39000		
900	.48%NF3/N2	.48%Nitrogen Fluoride/Nitrogen	24.7	29.7		881	2600	2601	7300	7301	15000	15001	30000		
907	10%AsH3/N2	10%Arsine/Nitrogen	24.7	29.7		826	2495	2496	7000	7001	14300	14301	28000		
908	20%B2H6/He	20%Diborane/Helium	24.7	29.7		841	2500	2501	7500	7501	15200	15201	35000		
910	5%GeH4/H2	0.5%Germane/Hydrogen	20.7	20.7		861	2600	2601	8000	8001	16000	16001	40000		
916	2%PH3/H2	2%Phosphine/Hydrogen	21.7	21.7		851	2530	2531	8000	8001	16000	16001	39000		
917	50%C3H6-b)/N2	50%Propylene/Nitrogen	21.7	21.7		501	1500	1501	4100	4101	8600	8601	17000		
919	20%H2/20%CO/N2	20%Hydrogen/20%Carbon Monoxide/Nitrogen	24.7	29.7		881	2610	2611	7500	7501	15300	15301	32000		
920	20%H2/20%CO/Ar	20%Hydrogen/20%Carbon Monoxide/Argon	24.7	29.7		1051	3200	3201	9000	9001	18100	18101	36000		
921	4%O2/N2	4%Oxygen/Nitrogen	24.7	29.7		881	2600	2601	7500	7501	15000	15001	30000		
925	10%C3H6-b)/N2	10%Propylene/Nitrogen	21.7	21.7		761	2300	2301	6400	6401	13100	13101	26100		
926	3%H2S/H2	3%Hydrogen Sulfide/Hydrogen	24.7	29.7		881	2600	2601	8000	8001	16300	16301	39000		
927	6%B2H6/N2	6%Diborane/Nitrogen	24.7	29.7		811	2400	2401	6800	6801	14000	14001	28000		
929	10%CH4/N2	10%Methane/Nitrogen	21.7	21.7		851	2520	2521	7200	7201	15000	15001	30000		
930	3.9%H2/N2	3.9%Hydrogen/Nitrogen	24.7	29.7		861	2600	2601	7400	7401	15100	15101	31000		
932	5%GeH4/H2	5%Germane/Hydrogen	19.7	19.7		851	2530	2531	7700	7701	16000	16001	37000		
936	10%He/N2	10%Helium/Nitrogen	19.7	19.7		911	2700	2701	7600	7601	16000	16001	32000		
939	10%B2H6/He	10%Diborane/Helium	19.7	19.7		966	2918	2919	9100	9101	19000	19001	43000		
941	1%O2/Ar	1%Oxygen/Argon	19.7	24.7		1211	3700	3701	10000	10001	20000	20001	38000		
946	30%C2H4/He	30%Ethylene/Helium	19.7	24.7		863	2605	2606	8000	8001	16000	16001	36000		
947	10%HCl/Ar	10%Hydrogen Chloride/Argon	19.7	24.7		1161	3600	3601	9400	9401	19200	19201	36000		
948	20%PH3/Ar	20%Phosphine/Argon	19.7	19.7		1031	3100	3101	8400	8401	17100	17101	32000		

Table A-7 GF40 Series Gas Table - Codes 949-5022, Bins SA40 to SA44

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA40		SA41		SA42		SA43		SA44	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
			949	2%F2/Ne	2%Fluorine/Neon	19.7	19.7		4	14	15	42	43	130	131
950	10%H2/He	10%Hydrogen/Helium	19.7	19.7		4	13	14	40	41	125	126	373	1145	
951	7%AsH3/H2	7%Arsine/Hydrogen	19.7	19.7		3	10	11	30	31	92	93	280	860	
953	15%H2/B2H6	15%Hydrogen/Diborane	19.7	19.7		3	4	5	14	15	42	43	130	400	
954	14%SiH2Cl2/20%SiH4/33%HCl/N	14%Dichlorosilane/20%Silane/33%	14.7	19.7		3	7	8	23	24	71	72	212	670	
958	17%CH4/CO2	17%Methane/Carbon Dioxide	24.7	29.7		3	7	8	23	24	70	71	210	650	
962	20%CH6Si/H2	20%Methylsilane (MONO)/Hydrog	14.7	19.7		3	7	8	23	24	71	72	212	660	
963	20%F2/N2	20%Fluorine/Nitrogen	24.7	29.7		3	10	11	30	31	92	93	280	860	
965	50%CH3SiHCl2/H2	50%Dichloromethylsilane/Hydrog	11.7	13.7		3	4	5	14	15	42	43	130	400	
976	4%CH4/Ar	4%Methane/Argon	19.7	24.7		4	13	14	41	42	125	126	390	1200	
977	4%He/H2	4%helium/Hydrogen	14.7	19.7		3	10	11	30	31	94	95	280	880	
978	20%GeH4/H2	20%Germane/Hydrogen	19.7	24.7		3	8	9	26	27	81	82	241	750	
979	0.5%B2H6/He	0.5%Diborane/Helium	14.7	19.7		5	14	15	42	43	130	131	400	1200	
980	20%F2/Ar	20%Fluorine/Argon	24.7	29.7		4	13	14	39	40	120	121	360	1100	
982	5%HF/N2	5%Hydrogen Fluoride/Nitrogen	24.7	29.7		3	10	11	30	31	92	93	280	860	
983	3%H2S/CO	3%Hydrogen Sulfide/Carbon Mon	24.7	29.7		3	10	11	30	31	92	93	280	860	
984	1.4%C2H2/Ar	1.4%Acetylene/Argon	24.7	29.7		5	14	15	42	43	130	131	390	1200	
985	2%Ge2H6/H2	2%Digermane/Hydrogen	24.7	29.7		3	10	11	30	31	92	93	280	860	
986	38%SiCl4/O2	38%Silicon Tetrachloride/Oxygen	24.7	29.7		3	5	6	16	17	50	51	150	460	
987	20%H2S/20%CO2/N2	20%Hydrogen Sulfide/20%Carbon	24.7	29.7		3	9	10	27	28	85	86	252	790	
988	20%SiH2Cl2/H2	20%Dichlorosilane/Hydrogen	24.7	29.7		3	8	9	24	25	74	75	222	700	
989	0.1%Cl2/N2	0.1%Chlorine/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	880	
990	1%HCl/N2	1%Hydrogen Chloride/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	880	
991	3%BCl3/N2	3%Boron Trichloride/Nitrogen	24.7	29.7		3	9	10	29	30	91	92	270	850	
992	18%NO/N2	18%Nitric Oxide/Nitrogen	24.7	29.7		3	10	11	30	31	94	95	280	880	
993	9%NO/41%N2/H2	9%Nitric Oxide/41%Nitrogen/H2	24.7	29.7		3	10	11	30	31	94	95	281	880	
994	20%H2/Ar	20%Hydrogen/Argon	24.7	29.7		4	13	14	40	41	120	121	370	1120	
996	25%H2S/Ar	25%Hydrogen Sulfide/Argon	31.7	37.7	59.7	4	12	13	37	38	111	112	340	1040	
997	25%H2Se/Ar	25%Hydrogen Selenide/Argon	34.7	39.7	64.7	4	12	13	36	37	110	111	340	1030	
998	50%NH3/He	50%Ammonia/Helium	14.7	24.7	34.7	3	10	11	30	31	94	95	280	880	
999	40%CO/45%C2H4/Ar	40%Carbon Monoxide/45%Ethyle	24.7	29.7	39.7	3	8	9	24	25	75	76	230	700	
1000	0.9%SiH4/N2	0.9%Silane/Nitrogen	19.7	24.7	24.7	3	10	11	30	31	94	95	280	880	
1001	5%Ar/N2	5%Argon/Nitrogen	19.7	24.7	24.7	4	10	11	31	32	96	97	290	890	
1002	25%PH3/N2	25%Phosphine/Nirtogen	19.7	24.7	24.7	3	9	10	28	29	86	87	260	810	
1003	5%C4H6-e)/He	5%Butadiene/Helium	14.7	19.7		4	12	13	36	37	110	111	336	1032	
1004	10%Cl2/N2	10%Chlorine/Nitrogen	24.7	29.7		3	10	11	29	30	90	91	275	844	
1005	15%Xe/H2	15%Xenon/Hydrogen	24.7	29.7		4	10	11	32	33	97	98	294	903	
5022	COs-Special	Carbonyl Sulfide (Special)	24.7	29.7		3	6	7	20	21	60	61	183	562	

Table A-8 GF40 Series Gas Table - Codes 949-5022, Bins SA45 to SA50

Gas Code	Gas Symbol	Gas Name	Min inlet pressure for vac. exhaust (PSIA)			SA45		SA46		SA47		SA48		SA50	
			SA40-SA47	SA48	SA50	Low	High	Low	High	Low	High	Low	High	Low	High
			949	2%F2/Ne	2%Fluorine/Neon	19.7	19.7		1201	3700	3701	10500	10501	22000	22001
950	10%H2/He	10%Hydrogen/Helium	19.7	19.7		1146	3500	3501	11000	11001	22300	22301	54000		
951	7%AsH3/H2	7%Arsine/Hydrogen	19.7	19.7		861	2600	2601	7700	7701	16000	16001	36000		
953	15%H2/B2H6	15%Hydrogen/Diborane	19.7	19.7		401	1200	1201	3400	3401	7100	7101	14200		
954	14%SiH2Cl2/20%SiH4/33%HCl/N2	14%Dichlorosilane/20%Silane/33%	14.7	19.7		671	2000	2001	5300	5301	11000	11001	21000		
958	17%CH4/CO2	17%Methane/Carbon Dioxide	24.7	29.7		651	2000	2001	5400	5401	11000	11001	21100		
962	20%CH6Si/H2	20%Methylsilane (MONO)/Hydrog	14.7	19.7		661	2000	2001	5800	5801	12100	12101	27000		
963	20%F2/N2	20%Fluorine/Nitrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
965	50%CH3SiHCl2/H2	50%Dichloromethylsilane/Hydroge	11.7	13.7		401	1200	1201	3100	3101	6600	6601	12000		
976	4%CH4/Ar	4%Methane/Argon	19.7	24.7		1201	3600	3601	9600	9601	20000	20001	37000		
977	4%He/H2	4%helium/Hydrogen	14.7	19.7		881	2600	2601	7900	7901	16200	16201	39000		
978	20%GeH4/H2	20%Germane/Hydrogen	19.7	24.7		751	2240	2241	6600	6601	13400	13401	30000		
979	0.5%B2H6/He	0.5%Diborane/Helium	14.7	19.7		1201	3700	3701	11200	11201	23000	23001	56000		
980	20%F2/Ar	20%Fluorine/Argon	24.7	29.7		1101	3400	3401	9000	9001	18400	18401	35000		
982	5%HF/N2	5%Hydrogen Fluoride/Nitrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
983	3%H2S/CO	3%Hydrogen Sulfide/Carbon Mon	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
984	1.4%C2H2/Ar	1.4%Acetylene/Argon	24.7	29.7		1201	3600	3601	9700	9701	20000	20001	37000		
985	2%Ge2H6/H2	2%Digermene/Hydrogen	24.7	29.7		861	2600	2601	7200	7201	15000	15001	30000		
986	38%SiCl4/O2	38%Silicon Tetrachloride/Oxygen	24.7	29.7		461	1400	1401	3500	3501	7300	7301	12500		
987	20%H2S/20%CO2/N2	20%Hydrogen Sulfide/20%Carbon	24.7	29.7		791	2400	2401	6500	6501	13300	13301	26000		
988	20%SiH2Cl2/H2	20%Dichlorosilane/Hydrogen	24.7	29.7		701	2100	2101	5900	5901	12000	12001	25000		
989	0.1%Cl2/N2	0.1%Chlorine/Nitrogen	24.7	29.7		881	2600	2601	7400	7401	15000	15001	30000		
990	1%HCl/N2	1%Hydrogen Chloride/Nitrogen	24.7	29.7		881	2600	2601	7400	7401	15000	15001	30000		
991	3%BCl3/N2	3%Boron Trichloride/Nitrogen	24.7	29.7		851	2510	2511	7000	7001	14400	14401	29000		
992	18%NO/N2	18%Nitric Oxide/Nitrogen	24.7	29.7		881	2600	2601	7300	7301	15000	15001	30000		
993	9%NO/41%N2/H2	9%Nitric Oxide/41%Nitrogen/H2	24.7	29.7		881	2610	2611	7700	7701	16000	16001	34000		
994	20%H2/Ar	20%Hydrogen/Argon	24.7	29.7		1121	3400	3401	9400	9401	19200	19201	38000		
996	25%H2S/Ar	25%Hydrogen Sulfide/Argon	31.7	37.7	59.7	1041	3200	3201	8500	8501	17300	17301	33000	33001	52000
997	25%H2Se/Ar	25%Hydrogen Selenide/Argon	34.7	39.7	64.7	1031	3110	3111	8100	8101	17000	17001	30000	30001	47000
998	50%NH3/He	50%Ammonia/Helium	14.7	24.7	34.7	881	2600	2601	7700	7701	16000	16001	35000	35001	63000
999	40%CO/45%C2H4/Ar	40%Carbon Monoxide/45%Ethyle	24.7	29.7	39.7	701	2100	2101	5900	5901	12000	12001	24000	24001	44000
1000	0.9%SiH4/N2	0.9%Silane/Nitrogen	19.7	24.7	24.7	881	2600	2601	7300	7301	15000	15001	30000	30001	51000
1001	5%Ar/N2	5%Argon/Nitrogen	19.7	24.7	24.7	891	2700	2701	7500	7501	15200	15201	31000	31001	51000
1002	25%PH3/N2	25%Phosphine/Nirtogen	19.7	24.7	24.7	811	2400	2401	6700	6701	14000	14001	27000	27001	45000
1003	5%C4H6-e)/He	5%Butadiene/Helium	14.7	19.7		1033	3121	3122	9500	9501	19400	19401	46000		
1004	10%Cl2/N2	10%Chlorine/Nitrogen	24.7	29.7		845	2551	2552	7100	7101	14600	14601	29000		
1005	15%Xe/H2	15%Xenon/Hydrogen	24.7	29.7		904	2731	2732	8000	8001	16300	16301	35000		
5022	COS-Special	Carbonyl Sulfide (Special)	24.7	29.7		563	1700	1701	4400	4401	9300	9301	16100		

B GF40 Series Patents

The GF40 Series may be protected by the following US patents and their international filings.

Table B-1 GF40 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 борава 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 поддръжане.

▲ 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 да спуска 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 обърща обаче на избирането на сигналните кабели, използвани с оборудването, носещо знака CE.

Качество на сигналните кабели, кабелните салници и съединители:

Brooks Instrument 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 технологията 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.

Brooks® GF40 Devices

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: Neprovazujte 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 proveďte, 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 otvóřte 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, kategorií 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 označeným 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.

Připojky vedoucí ke kartám podle norem jsou nekovové. 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 zemním náramkem, nebo jiným vyhovujícím způsobem.
3. Desky plošných spojů je nutné přepravovat v elektricky vodivém obalu. Plošné spoje vyjímajte 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 součástí, jakkoli zdánlivě pracujících bezchybně, dochází brzy k poruše.

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 reparerer 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 forståelige, 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..

Brooks® GF40 Devices

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 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 afgeschermd 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 aardpotentiala 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 aardpotentiala 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 metaaloxidede technologie (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.

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 alljärgnevat 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 leiате 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 nimiaandmetele. 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 voolukulumõõtori 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 vigastuseohtu 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 seonduvat 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, läbiviigutühendite 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 läbiviigutühendiga 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 tundlike elektroonikakomponente. Seadmesse paigaldatud trükkplaatide eemaldamisel ja paigaldamisel, samuti trükkplaadi või seadmega muude toimingute teostamisel järgige nõuetekohase käsitlemise 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. Trükkplaatide transporditakse voolujuhtivas konteineris. Võtke trükkplaat kaitsvast konteinerist välja vahetult enne selle paigaldamist. Seadme eemaldatud trükkplaadid tuleb viivitamatult asetada kaitsvasse konteinerisse, kas siis edasiseks transportimiseks, hoiustamiseks või tehasesse tagasisaatmiseks.

Kommentaariid

See seade ei ole ainus, mis sisaldab staatilise elektri suhtes tundlike 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 ilmema juba varakult.

Brooks® GF40 Devices

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 vaaraan.

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

- Laitteen 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 loukkaantumiseriskin. Mahdollisten varaosien tulee olla Brooks Instrumentin hyväksymiä. Vain valtuutettu huoltohenkilö saa asentaa varaosat. Ei-hyväksytyjen varaosien käyttö voi vahingoittaa tuotteen toimintaa ja aiheuttaa turvallisuusriskin. Samoin ei-hyväksytyjen 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 ulosmenovenitit 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 kategorioiden 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).

Erytystä huomioita on kiinnitettävä CE-merkittyjen laitteiden käytössä olevien kaapelien valintaan.

Kaapelien, kiinnikkeiden ja liittimien laatu:

Brooks Instrumentin kaapelit ovat korkealaatuisia ja täyttävät CE-merkintä direktiivin vaatimukset.

Muun valmistajan kaapelia käytettäessä on käytettävä 100% suojattua kaapelia.

Liittimien tulee olla häiriösuojaattua tyyppiä. Tarvittaessa käytetään metallisia kiinnikkeitä kaapelin suojuksen kiinnittämiseen. Kaapelin suojuksen pitää olla yhdistettynä metallisuojaukseen 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 suojaravustuksella 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 suojaravustukseen kuljettamista, varastamista 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.

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 conforme aux normes locales et nationales. Le non-respect de cet avertissement peut entraîner 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.

Brooks® GF40 Devices

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 entspricht. 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.

Durchflussmessgeräete 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 Schutzhälter 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.

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 πίεσεως. 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, στυπιοθλιπών 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 στυπιοθλιπτες καλωδίων για τη στερέωση της θωράκισης.

Να συνδεθεί η θωράκιση του καλωδίου στο μεταλλικό κέλυφος ή στυπιοθλιπτή 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 περιβλήμα 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 κ.ά.). 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.

Brooks® GF40 Devices

Hungarian

Alapvető utasítások

Először olvassa el ezeket!

A Brooks Instrument olyan módon tervezi, gyártja és teszti 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 garatálása 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 kézikönyv 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 utasítást.

▲ 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 áramlasingadozás elkerülése érdekében. (2) Ellenőrizze, nincs-e szivárgás az áramlásmérő be-, és kimeneti bekötéseinél. Ha nincs szivárgás, töltsen 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 folyadékcsoporthoz 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) vizsgálati teszteket.

Ugyanakkor különös figyelmet kell fordítani a CE jelölésű berendezésekhez felhasznált jelképek kiválasztására.

▲ jelképek, kábelösszekötők, csatlakozók minősége:

A Brooks Instrument magas minőségű kábeleket kínál, melyek megfelelnek a CE minősítés követelményeinek.

Amennyiben saját jelkébelt alkalmaznak, olyat kell választani, amely 100%-os árnyékolással, teljes mértékben szűr.

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 kártyához tartozó csatlakozók szabványosan nem fémek. Az alkalmazott kábeleknek 100%-os 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 kiserelt kártyát haladéktalanul el kell helyezni a mozgásra, 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 fénoxid technológiás alkatrészek (NMOS, SMOS stb.) találhatók. A tapasztalatok azt igazolják, hogy még kis mértékű sztatikus elektromosság is károsíthatja, vagy tönkretelheti ezeket az eszközöket. A károsodott alkatrészek, még ha látszólag megfelelően működnek is, kezdődő hibára utalnak.

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.

Brooks® GF40 Devices

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 jāapkopi. Uzstādot, lietojot „Brooks Instrument” izstrādājumus un veicot to apkopi, ir jāievēro šie norādījumi un jāiekļaujas 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 aprikojuma 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 aprikojuma bojājumi.**
- Uzstādiat aprikojumu tā, kā tas norādīts attiecīgajā instrukciju rokasgrāmatā iekļautajā uzstādīšanas instrukcijā un atbilstoši piemērojamajām atbilstošām nacionālajām normām. Pievienojiet visus izstrādājumus pareizi 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 ietilpdes un izplūdes savienojumiem. Ja noplūdes nav, uzstādiat 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 ietekmēt 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 ietilpdes un izplūdes vārstus kāda iemesla dēļ ir jāaizver, no ierīcēm ir jāizslēdz 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 nodalījā 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 signālkabeļi, kas tiks lietoti 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 signālkabeļi, tam ir jābūt pilnībā, 100% ekranizētam.

„D” un „apaļā” tipa savienotājiem ir jābūt aprīkoti 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:

- Iekārta jāatslēdz no barošanas.
- Pirms jebkādas drukātas shēmas kartes vai citas iekšējās ierīces uzstādīšanas, izņemšanas vai regulēšanas personālam, kas veiks šos darbus, ir jābūt iezemētam, piem., izmantojot procesa vai citus drošus, piemērotus līdzekļus.
- Drukātās shēmas kartes ir jātransportē vadošā iepakojumā. Plāksnes no aizsargkorpusa drīkst izņemt tikai tieši pirms uzstādīšanas. Transportējot, uzglabājot vai atgriežot rūpnīcā, izņemtas 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 ātrākam atteicei.

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 prižiūredami 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 įsitinkinkite, kad ši įrangą atitinka vietinius ir nacionalinius teisės aktus. Nepaisant šio įspėjimo gali būti sužeisti žmonės ir (arba) pažeista įrangą.

- 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 būtina pašalinti 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 durtelės 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 žmones.

Europos slėginės įrangos direktyva (PED)

Visa slėginė įrangą, 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 ženklą pažymėta „Brooks Instrument“ (elektrinė / elektroninė) įrangą buvo sėkmingai išbandyta pagal elektromagnetinio suderinamumo reikalavimus (EMS direktyvą 2014/30/EU).

Tačiau ypač atidžiai reikia rinktis signalizavimo kabelį, kuris bus naudojamas su CE ženklą pažymėta įrangą.

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 žeminiu.

Standartinės kraštinės jungtys yra nemetalinės. Naudojami kabeliai turi būti ekranuoti 100 % ekranu, kad atitiktų CE sertifikavimą.

Ekranas turi užsibaigti žeminiu.

Keturių kontaktų konfigūracija: žr. pridėtą instrukciją.

ESD (elektrostatinis išlydis)

⚠️ PERSPĖJIMAS: šie prietaisai 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 žeminiu 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 kortelės reikia transportuoti laidžiam konteineryje. Neleidžiama išimti plokštės iš apsauginio dėklo, nebent prieš pat įdėjimą. Išimtas plokštės 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 (elektrostatinio išlydžio) 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.

Brooks® GF40 Devices

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 podłączyć wyłącznie do odpowiednich źródeł energii elektrycznej oraz ciśnienia.
- Pierwsze czynności obsługi: (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 obrażeniu 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 jakiegos 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 względnie 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 szczególnie 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.

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 fluido 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, buçins 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 buçins, 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.

Brooks® GF40 Devices

Romanian

Indicații de referință**Citiți-le întâi pe acestea!**

Brooks Instrument își proiectează, produce și testează produsele într-un mod ce respectă un mare număr de standarde autohtone și internaționale. Aceste instalații trebuie amplasate, exploatate și întreținute corespunzător, pentru ca în toate situațiile, domeniul lor de lucru să corespundă operării normale. În ceea ce privește instalarea, operarea și întreținerea produselor Brooks Instrument, indicațiile de mai jos trebuie respectate și trebuie introduse în programul de protecția muncii.

- Pentru garantarea prestației corecte, instalarea, operarea, actualizarea, programarea și întreținerea produsului poate fi realizată doar de către personal calificat.
- Instrucțiunile de instalare ale produsului trebuie citite integral, înainte de punerea în serviciu și exploatarea sa. În măsura în care ediția acestui manual nu este cea adecvată, identificați pe ultima copertă coordonatele distribuitorului local și pentru lămuriri suplimentare adresați-vă acestuia. Păstrați acest manual pentru referințe ulterioare.

⚠ ATENȚIE: Nu utilizați instalația în afara intervalului de funcționare indicat în instrucțiunile de operare. Nerespectarea acestui lucru se poate solda cu răni grave de persoane sau defectarea instalației.

- În măsura în care indicațiile cărții mașinii nu sunt suficient de lămuritoare, luați legătura cu reprezentantul Brooks Instrument pentru clarificarea problemei.
- Păstrați toate avertismentele, avizele și instrucțiunile livrate odată cu instalația sau inscripționate pe aceasta.

⚠ AVERTISMENT: Înainte de instalare, asigurați-vă că valorile nominale ale acestui instrument respectă codurile naționale. Nerespectarea acestui avertisment poate avea drept rezultat răni personale grave și/sau defectarea echipamentelor.

- Efectuați instalarea echipamentului în conformitate cu indicațiile de instalare corespunzătoare, respectiv cu respectarea prevederilor naționale. Echipamentul se conectează exclusiv la surse de energie electrică și de presiune corespunzătoare.
- Succesiv: (1) Presurizați lent instalația. Deschideți încetul cu încetul supapa de funcționare pentru evitarea fluctuațiilor de flux. (2) Controlați dacă nu sunt prelungeri la intrarea sau ieșirea debitmetrului de branșare. Dacă nu sunt scurgeri, presurizați instalația la presiunea de lucru.

- Înaintea exploatării/ întreținerii, verificați 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 și licențiate poate avea efecte asupra performanțelor instalației și asupra siguranței sale în exploatare. Utilizarea de piese asemănătoare de substituie poate avea ca rezultat pericol de incendiu și electrocutare.
- În toate cazurile toate ușile instalației trebuie să fie închise, cuștile de protecție să fie puse la locurile lor, pentru evitarea electrocutării și rănirii de persoane, exceptând situațiile când un specialist efectuează lucrări de întreținere.

⚠ ATENȚIE: În cazul instalațiilor cu flux de fluide, dacă din orice motiv este necesară închiderea valvelor de intrare și ieșire, limitrofe instalației, instalația trebuie complet golită. Neglijarea acestui lucru poate avea ca efect dilatarea termică a fluidului, care poate defecta instalația și poate produce răni de persoane.

Directiva europeană pentru instalațiile sub presiune (PED)

Toate instalațiile și sistemele presurizate ce se află sub presiuni interne ce depășesc 0,5 mbar (g) și au mai mult de 25 mm sau 1 țol, cad sub incidența noimei europene corespunzătoare (PED).

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

Directiva europeană privitoare la compatibilitatea electromagnetice (EMC).

Instalațiile (electrice /electronice) ce poartă marca Brooks Instrument CE îndeplinesc cu succes cerințele testelor de verificare ale compatibilității electromagnetice (Cf. directivelor europene EMC cu nr. 2014/30/EU).

În același timp trebuie acordată o atenție deosebită la alegerea cablurilor de semnalizare utilizate pentru instalațiile ce poartă marcajul CE.

Calitatea cablurilor de semnalizare, a legăturilor prin cablu și a conectoarelor:

Brooks Instrument oferă cabluri de calitate ridicată, care corespund cerințelor calitative ale CE.

În măsura în care folosiți cabluri proprii, trebuie alese acelea care sunt 100% ecranate și prevăzute cu filtre.

Conectoarele „D” sau cele „circulare” trebuie să 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 mașon și în ambele cazuri trebuie asigurată ecranarea la 360°. Ecranarea trebuie terminată cu o legare la pământ.

Conform standardului, conectoarele aparținând plăcilor electronice nu sunt metalice. Cablurile folosite trebuie să fie 100% ecranate și prevăzute cu filtre pentru a corespunde clasificării CE.

Ecranarea trebuie terminată cu o legare la pământ.

Configurație de contact: Vezi instrucțiunile de operare atașate.

Descărcare electrostatică (ESD)

⚠ ATENȚIE: Instalația include piese care sunt predispușe la defectare sub influența electricității statice. Trebuie respectate metodele corespunzătoare de extragere, instalare sau alte manipulări ale circuitelor electronice.

Procedură de manipulare:

1. Instalația 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 articulația mâinii sau alte dispozitive de siguranță disponibile pentru acest scop.
3. Cartelele cu cablaje electronice imprimate trebuie transportate în ambalaje anti-electrostatice (conductive). Cartelele se pot scoate din ambalaj doar nemijlocit înaintea amplasării lor. Cartela demontată trebuie pusă neîntârziat în ambalajul de protecție în vederea transportării, a depozitării sau returnării la producător.

Observații:

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.) Experiența a dovedit că acestea pot fi afectate sau deteriorate chiar de energii electrostatice de slabă intensitate. Componentele defectate, cu toate că în aparență sunt funcționale, duc în timp la defecțiuni incipiente.

Slovak

Základné príkazy Prečítať pred inštaláciou!

Brooks Instrument svoje výrobky projektuje, vyrába a testuje takým spôsobom, aby tieto vyhovel domácom 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 servisom 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 prevádzky 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 zaslužili 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 pripojov:

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.

Pripojky "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.

Pripojky vedúce ku kartám podľa noriem sú nekovové. Použitie 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 zdánlivo pracujú bez chyby, odkazujú na vznikajúce poruchy.

Brooks® GF40 Devices

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.

▲ OPOZORILO: 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 naprave zaprta in da so zaščitni pokrovi nameščeni, da preprečite električni udar in telesne poškodbe, razen kadar usposobljeno osebje izvaja vzdrževalna dela.

▲ OPOZORILO: 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 povzroči telesne poškodbe.

Evropska direktiva o tlačni opre (PED)

Vsa tlačna oprema z notranjim tlakom, ki je večji od 0,5 bara (g), in velikostjo, ki je večja od 25 mm ali 1 palca, spada v direktivo o tlačni opre (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 kategorijo 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 skladu s predpisi direktive o elektromagnetni združljivosti (Direktiva o elektromagnetni združljivosti 2014/30/EU).

Posebno pozornost morate nameniti izbiri signalnega kabla, ki jih uporabljate za naprave z oznako CE.

Kakovost signalnih kablov, kablskih tesnil in priključkov:

Brooks Instrument ponuja kable visoke kakovosti, ki ustrezajo tehničnim podatkom 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 kablске 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 konfiguracijo 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 katere koli kartice tiskanega vezja ali druge notranje naprave ozemljiti z zapetnim 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.

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 conductor. 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:

Este 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.

Brooks® GF40 Devices

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.

▲ WARNING: 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.

▲ WARNING: 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.

▲ WARNING: 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 dimensioner 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 måste dock ägna särskild uppmärksamhet till valet av signalkabeln som skall användas för CE-märkta anordningar.

Signalkablars, packboxars och kontaktdons 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" kontaktdon skall vara skärmade med metalliska avskärmningar. Om det är användbart, bör metallpackboxar som ger en bra fastspänning för kabelskärmar användas.

Kabelavskärmningen måste kopplas till den metalliska skärmade anordningen eller packboxen och skämmas 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 installeras, 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 metalloxd 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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Brooks® GF40 Devices

LIMITED WARRANTY

Visit www.BrooksInstrument.com for the terms and conditions of our limited warranty.

BROOKS SERVICE AND SUPPORT

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required.

For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

SEMINARS AND TRAINING

Brooks Instrument can provide seminars and dedicated training to engineers, end users and maintenance persons.

Please contact your nearest sales representative for more details.

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

TRADEMARKS

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