Installation and Operation Manual
X-TMF-SLA5800-MFC-eng
Part Number: 541B027AAG
April, 2013

Brooks® SLA5850, SLA5851, SLA5853 Mass Flow Controllers Models and Models SLA5860, SLA5861, SLA5863 Mass Flow Meters

BROOKS® INSTRUMENT

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.
- 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.
- Meters described in this manual are in compliance with EN directive 97/23/EC.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Meters larger than 25mm or 1" (inch) are in compliance with PED category I, II or III.
- Meters 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 2004/108/EC).
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.

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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Figures

Tables

1-1 Scope

Thank you for purchasing a Brooks Instrument Mass Flow Product. This manual, X-TMF-SLA5800-MFC-eng is an installation and operation manual for your instrument.
If you have purchased a Brooks® Digital Mass Flow Product with DeviceNet Communications, a separate DeviceNet Instruction Manual shall also be provided as part of the operating documentation.

1-2 Purpose

The Brooks Digital Products are mass flow measurement devices designed for accurately measuring (MFM's) and rapidly controlling (MFC's) flows of gases. This instruction manual is intended to provide the user with all the information necessary to install, operate and maintain the Brooks MFC and MFM. This manual is organized into the following sections.

Section 1	Introduction
Section 2	Installation
Section 3	Operation
Section 4	Maintenance
Section A	Essential Instructions
Back Cover	Warranty, Local Sales/Service Contact Information

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

1-3 Description

Brooks Instrument's SLA5800 Series is an elastomer sealed digital thermal mass flow measurement and control instrument, which offers unparalleled flexibility and performance. The SLA5800 Series MFC is designed for use in advanced gas handling systems. The result is the most accurate, repeatable, and responsive MFC on the market today!

Wide Flow Range
The SLA5800 Series covers an extremely broad range of flowrates. Model SLA5850 can have a full scale flow as low as 3 ccm. With a high turndown ratio of 50:1, accurate gas flow can be measured or controlled down to 0.06 ccm! Model SLA5853 can meter or control gas flow up to 2500 lpm.

Fast Response Performance
The all-digital electronics and superior mechanical configuration in the SLA5800 series provide for ultra fast response characteristics. Settling times are specified as less than one second, but Brooks' Adaptive Valve Control can achieve response times of 0.2 sec.

Broad Array of Communication Options
Brooks® offers traditional 0-5 volt and 4-20mA analog options as well as RS-485 digital communications ("S-protocol", based on HART). Brooks also offers control interface via digital network protocols like DeviceNet, a high-speed (up to 500k baud) digital communication network, or FOUNDATION® Fieldbus. Brooks' communication capabilities and device-profiles have been certified by the ODVA (Open DeviceNet Vendor's Association) and the ITK Interoperability Test Kit. Other network protocols are in development. Talk to your Brooks representative about your specific needs.

Reduced Cost of Ownership
The SLA5800 Series allows multi-gas and multi-range capabilities to reduce customer inventory. Storage and pre-programming of up to 10 gas calibrations easily permits users to switch between different gases and ranges on a single device.

1-4 Specifications

⚠ 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.

PERFORMANCE CHARACTERISTICS:

Flow Ranges
Models SLA5850/SLA5860 - Any FS range from 0-3 ccm to 0-50 lpm (N_2 eq.)
Models SLA5851/SLA5861 - Any FS range from 20-100 lpm (N_2 eq.)
Up to 200 lpm H_2 flows possible
Models SLA5853/SLA5863 - Any FS range from 100-2500 lpm (N_2 eq.)

Control Range
Turndown: 50:1
Turndown: 100:1 with Coplanar valve option
(for any FS range from 1-50 lpm (N_2eq.)

Accuracy (N_2 eq. at calibration conditions)
±1.0% of rate (20% - 100% FS)
±0.2% FS (below 20% FS) up to 1200 lpm
(Optional: ±0.7% of rate ±0.2% FS ("S-Series") up to 1200 lpm
Flow ranges above 1200 lpm and up to 2500 lpm: ±1.0% of full scale

Repeatability
±0.20% of rate

Settling Time/Response Time
< 1 second to within ±2% FS of final value for a 0-100% command step (better on request) for flow rates up to 100 lpm N_2 Eq.
< 3 seconds to within ±2% FS of final value for a 0-100% command step (better on request) for flow rates greater than 100 lpm (N_2 eq.) up to 2500 lpm (N_2 eq.)

Sensitivity to Mounting Attitude
< 0.2% FS maximum deviation from specified accuracy, after rezeroing.

RATINGS:

Temperature Sensitivity
Zero: less than 0.05% FS per °C
Span: less than 0.1% of rate per °C

Pressure Sensitivity
± 0.03% per psi up to 200 psig (N_2 eq.)

Maximum Operating Pressure
See Table 1-1 below:
Optional 4500 psig (300 bar) For 50,60 and 61 Series body only.
All devices pressure tested without fittings.

⚠ WARNING

When using ANSI/ISA SP-76 downport process connections, refer to substrate manufacturer's operating pressure limits (some substrates are rated lower than 70 bar / 1000 psi).

Pressure Equipment Directive (PED) 97/23/EC
See Table 1-1:

Table 1-1 Flow Ranges and Pressure Ratings

Mass Flow Controller	Mass Flow Meter		Flow Ranges N_2 Eq.Ratings	Pressure Unit	PED Module H Category
Model:	Model:	Min. f.s.	Max. f.s.	Bar/psi	
SLA5850(1)		0.003	50 lpm	100bar/1500 psi	SEP
	SLA5860	0.003	50 slpm	300bar/4500 psi	SEP
SLA5851	SLA5861(1)	20	100 lpm	100bar/1500 psi(3)	SEP
SLA5853(2)	SLA5863	100	2500 lpm	70 bar/1000 psi	1 for all 150 lbs flanges 2 for all other connections

(1) 300 bar (4500 psi) version optional.
(2) Max. Delta P for 5853 is 20 bar (300 psi).
(3) 70 bar / 1000 psi for UL Certification.

Pressure Differential Range (Controllers)
Minimum:
Model SLA5850
5 psi (0.35 bar) up to 50 lpm (N_2 eq.)

Model SLA5851
10 psi (0.69 bar) from 30 lpm to 100 lpm (N_2 eq.)

Model SLA5853
7.5 psi (0.52 bar) at 500 lpm (N_2 eq.)
14.5 psi (1.00 bar) at 1000 lpm (N_2 eq.)
35.0 psi (2.41 bar) at 2500 lpm (N_2 eq.)
High DP valve 30 psi (2.07 bar) to 290 psi (20 bar max.)
Low DP valve 7.5 psi (0.52 bar) to 30 psi (2.07 bar max.)
Minimum pressure drop depends on gas and FS flow rate (consult factory)

Leak Integrity
Inboard to Outboard: $1x10^{-9}$ atm scc/sec Helium max.
Helium leak test performed without fittings.

Ambient Temperature Limits
Operating: 0°C to 65°C (32°F to 149°F)
Non-Operating: -25°C to 100°C (-13°F to 212°F)

Fluid Temperature Limits
0°C to 65°C (32°F to 149°F)

PHYSICAL:

⚠ 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.

Materials of Construction
Wetted parts - stainless steel with Viton® fluoroelastomers
Optional: Buna-N, Kalrez®, Teflon®/Kalrez and EPDM

Outline Dimensions
Refer to Figures 1-5 thru 1-13

Process Connections
Refer to Figures 1-5 thru 1-13

Reference Conditions
Due to effects of pressure and temperature on the compressibility of gases, specific reference conditions must be used when reporting volumetric flow rates in mass flow terms. For example, the unit of measure SCCM (standard cubic centimeters per minute) refers to a volumetric gas flow at a standard reference condition, NOT the actual volumetric gas flow at the actual operating pressure and temperature. The key point is that the MASS FLOW of the gas is fixed, but the reference volumetric flow can be reported differently based upon the standard reference condition used in the calculation.

Throughout the world, there are differences in terminology when describing reference conditions for gases. The words "normal conditions" and "standard conditions" are sometimes used interchangeably to describe the reference STP (Standard Temperature and Pressure) for gases. Further note that temperature and pressure values for standard or normal reference conditions vary in countries and industries worldwide. For example, the Semiconductor Equipment Manufacturing Industry (SEMI) defines standard temperature and pressure conditions as 273.15 K (0 °C) and 101,325 Pa (760 torr). The main concern is that no matter what words are used for descriptive purposes, a gas mass flow rate must have a defined standard pressure and temperature reference condition when performing a volumetric conversion.

ELECTRICAL CHARACTERISTICS:

Analog/RS-485 version: 15-pin D-Connector, male
Digital I/O:
DeviceNet: 5-pin Micro-Connector, male
FOUNDATION Fieldbus: 4-pin Micro-Connector, male

Power Supply Voltage
Analog option: 13.5-27 Vdc,
Digital I/O:
DeviceNet I/O: 11-25 Vdc
FOUNDATION Fieldbus I/O: 14-27 Vdc
SLA5851S Model: 22-27 Vdc

Power Requirements:	Watts, typical	Watts, max.
Analog I/O option, no valve:	1.6	1.8
Analog I/O option, with valve:	3.6	4.0
Digital I/O option, n.v.:	3.6	4.0
Digital I/O option, w.v.:	6.9	7.6

Command/Setpoint Input (Analog I/O capabilities)
Voltage and Current type inputs (but not both simultaneously) are

supported.
Setpoint input types are software selectable as follows:

0 - 5 Vdc
1 - 5 Vdc
0 - 20 mA
4 - 20 mA

Voltage Setpoint Input Specifications

Nominal Range:	0 - 5 Vdc
Full Range:	0 - 5.5 Vdc
Absolute Max.: (Without Damage)	20 V
Input Impedence:	>990 kΩ
Calibrated Accuracy:	±0.1% of F.S.

Current Setpoint Input Specifications

Nominal Range:	4 - 20 mA or 0 - 20 mA
Full Range:	0 - 22 mA
Absolute Max.: (Without Damage)	25 mA
Input Impedence:	125 Ω
Calibrated Accuracy:	±0.1% of F.S.

Flow Output (Analog I/O version only)
Voltage and current type outputs (but not both simultaneously) are supported. Flow output types are selectable as follows.

0 - 5 Vdc
1 - 5 Vdc
0 - 20 mA
4 - 20 mA

Flow Output (Voltage) Specifications

Nominal Range:	0 - 5 Vdc, 1 - 5 Vdc
Calibrated Accuracy:	+0.1% of F.S.
Full Range:	-0.5 - 5.5 Vdc (@ 0-5 Vdc); 0.6 - 5.5 Vdc (@ 1-5 Vdc)
Min. Load Resistance:	2 kΩ

Flow Output (Current) Specifications

Nominal Range:	4 - 20 mA or 0 - 20 mA
Calibrated Accuracy:	±0.1% of F.S.
Full Range:	0-22 mA (@ 0-20 mA); 3.8-22 mA (@ 4-20 mA)
Max. Load:	380 Ω (for supply voltage < 16 Vdc) 580 Ω (for supply voltage ≥ 16 Vdc)

Valve Override Signal (Analog I/O version only)
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 follows:

Valve Override Signal Drive Settings (Analog I/O Versions only)

Floating / Unconnected:	Instrument controls valve to command setpoint
VOR < 0.3 Vdc:	Valve Closed
VOR > 4.8 Vdc:	Valve Open

0.3 Vdc ≥ VOR ≥ 4.8 Vdc: Undefined

Valve Override Signal Specifications (Analog I/O Versions only)

Input Impedence: 800 kΩ
Absolute Max. Input: -25 Vdc > VOR ≥ 25 Vdc
(without damage)

5 Volt Reference Signal (Analog I/O versions only)

A 5 Vdc reference output is provided to the customer for use in generating a setpoint and/or Valve Override signal. The current drive of this output is very limited and must be used with care.

Min. Load Resistance: 2 kΩ (2.5 mA maximum)
Accuracy: ±1.0%

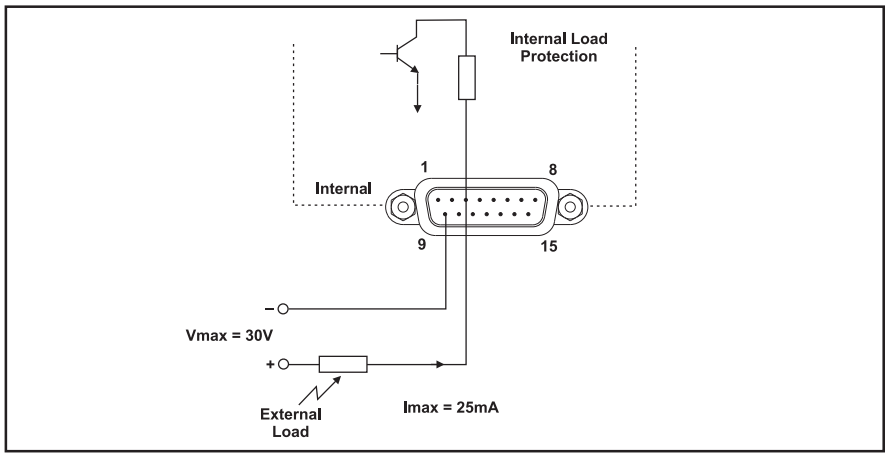


Figure 1-1 Open Collector Alarm Output

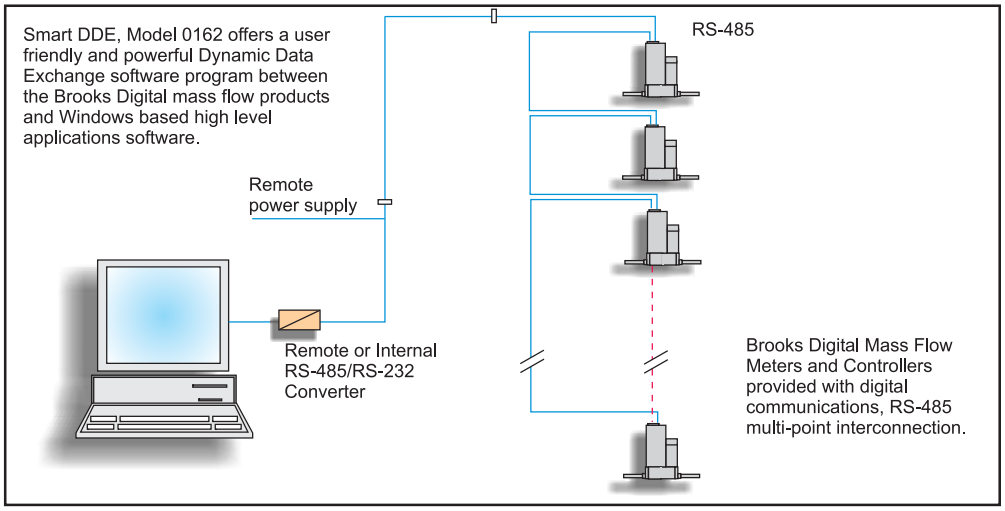


Figure 1-2 General Wiring

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 alarm conditions. Reference Section 3-6-2 for more information on alarms.

Type:	Open Collector
Max Closed (ON) Current:	25 mA
Max Open (OFF) Leakage:	1 µA
Max Open (OFF) Voltage:	30 Vdc

Fast Response Performance
The curves in Figure 1-3 depict the MFC output signal and actual transitional flow to steady-state when gas flow enters into process chamber, under a step response command condition.

Brooks devices also feature adaptive (optimized) PID control, including fast response. and linear ramp-up and/or ramp-down control characteristics.

Calibration Curve Selection (Analog I/O versions only)
Select one of ten gases and select PID tuning settings in analog mode. Requires external connection of resistors between Pin # 13 and Pin # 9. (Reference Tables 1-2 and 1-3.)

Selectable Soft Start
Processes requiring injection of gases can be adversely affected by excessive initial gas flow. This abrupt injection of gas can result in process damage from explosion or initial pressure impact. These problems are virtually eliminated with the soft start feature.

Traditional soft start or linear ramp-up and/or ramp-down (See Figure 1-4) can be factory selected or are available via the Brooks Service Suite™.

Linear ramp-up is adjustable at 200% per second down to 0.5% per second setpoint change.

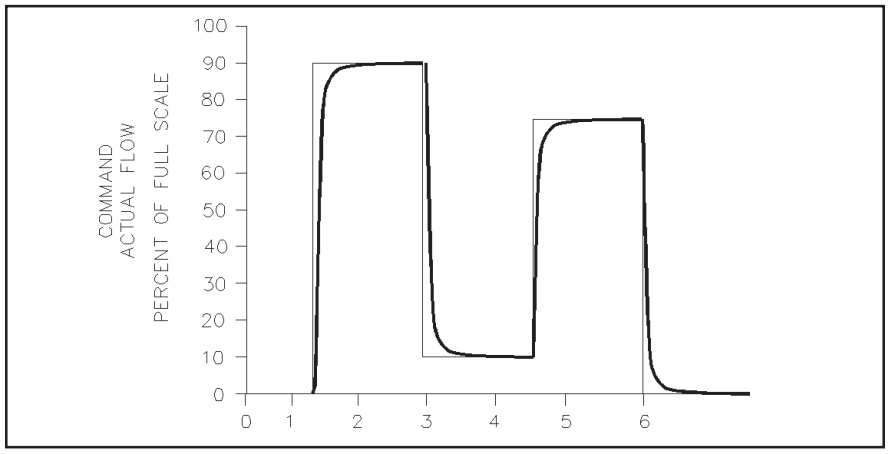


Figure 1-3 Response Performance of Brooks Digital MFC

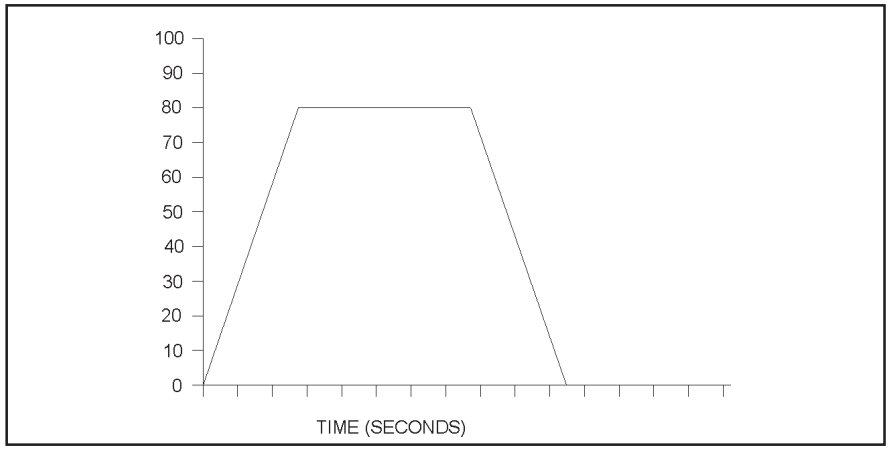


Figure 1-4 Linear Ramp-up and/or Ramp-down from 200% Per Second Down to 0.5 % Per Second Setpoint Change

Table 1-2 Calibration Select Signal.

DEFAULT = CAL# 1 (External resistor not installed)			
CAL	Resistor Value (k ohms)	CAL	Resistor Value (k ohms)
1	Not Installed	6	124
2	Shorted	7	80.6
3	665	8	52.3
4	324	9	30.9
5	191	10	15

Table 1-3 Analog I/O Pin Connections:

Function	PIN
Setpoint, Common Input (-)	**1**
Flow Signal, 0(1) -5 volt, Output (+)	**2**
TTL Alarm, open collector, Output (+)	**3**
Flow Signal, 0(4)-20 mA, Output (+)	**4**
Power Supply, +13.5 Vdc to +27 Vdc(+)	**5**
Not Connected	**6**
Setpoint, 0(4)-20 mA, Input (+)	**7**
Setpoint, 0(1)-5 Vdc, Input (+)	**8**
Power Supply, Common (-)	**9**
Flow Signal, Common, Output, (-)	**10**
Reference, +5 Vdc, Output (+)	**11**
Valve Override, Input	**12**
Calibration Select Input	**13**
RS-485 Common B (-)	**14**
RS-485 Common A (+)	**15**

RS-485 Communications

The Brooks Digital Series is equipped with RS-485 communication capability. Refer to Table 1-3 (Analog I/O pin connections), that enables the device to communicate via a personal computer for process control.

Baud rate selections for the Brooks Digital Series related to RS-485 are: 1200, 2400, 4800, 9600, 19200 and 38400 baud and can be selected via the Brooks service Suite™.

The RS-485 is essentially a multidrop connection. It allows a maximum of 32 devices to be connected to a computer system. IBM-compatible PC's are not equipped with RS-485 ports as standard. An RS-232 to RS-485 converter or RS-485 interface board is therefore required to connect an RS-485 network to a standard pc. The RS-485 bus, a daisy chain network, meaning that the wires are connected at the units as in Figure 1-2.

DeviceNet Communications

The Brooks SLA5800 Digital Series is also available with DeviceNet™ communication capability. DeviceNet is an open digital protocol capable of high speeds and easy system connectivity. Brooks Instrument has several of its devices available on this popular networking standard, and is a member of ODVA™ (Open DeviceNet Vendors Association), the governing standard body for DeviceNet.

DeviceNet is similar to the RS485 standard in that it is a multi-drop connection that allows a maximum of 64 devices to be connected on the same network. Baud rate selections for DeviceNet products are 125K, 250K and 500K and can be selected via MAC ID switches mounted on the device.

The DeviceNet communication link also provides access to many of the Brooks SLAMf Digital Series functions for “control and monitor” operations, including:

- Accurate setpoint adjustment and flow output measurement (including units of measure selection)
- PID Settings (controller only)
- Valve Override (controller only)
- Calibration Gas Select
- Soft Start Control (controller only)

FOUNDATION® Fieldbus Communications:

The Brooks SLA5800 Digital Series is supporting FOUNDATION® Fieldbus communication protocol. FOUNDATION® Fieldbus is a digital network allowing usage of existing 4-20mA cables, avoiding costly re-wiring. Fully certified by passing ITK, this device has passed several Interoperability requirements over a broad range of hosts. When combined with DeltaV and using the power of PlantWeb, those devices provide intelligent alerts allowing accurate device maintenance and service.

- Value Range check - Part of the standard function blocks
- Temperature sensor connection - Check sensor connection
- Firmware checksum - Check for Internal firmware integrity
- Non-volatile memory - Check for non-volatile memory integrity
- RAM - Check for RAM integrity
- Zero Drift/Valve Leak-by - Check for flow leak-by or sensor zero drift
- Device Overhaul due - Preventive Maintenance
- Calibration Due - Preventive Maintenance
- Valve spring life - Preventive Maintenance
- No Flow - No flow detected when setpoint requested
- Reverse Flow - Reverse flow detected
- Flow Totalizer - Informed when a user define amount of fluid has been delivered
- Time Totalizer - Informed when a user define amount of time has expired

Device type dependant function block are available representing the different device functions:

- Current Flow Value (Mass Flow device only)
- Current Pressure Value (Pressure device only)
- Current Device Temperature (Mass Flow device only)
- Current Valve position (Controller Only)
- Setpoint Control (Controller Only)
- Direct Valve Control (Controller Only)
- Actuator Override (Controller Only)
- Ultra-fast (8ms) PID function block for Cascade control (all devices)

Certifications:

EMC Directive 89/336/EEC:
per EN 61326

Hazardous Location Classification
Enclosure: Type 1/IP40
Ambient Temperature: 0°F ≥ Tamb ≤ 150°F (0°C ≥ Tamb ≤ 65°C)

United States and Canada
UL Recognized: E73889 Volume 3, Section 4

Non-Incendive,
Class 1, Division 2
Groups A, B, C & D; T4
Per UL 1604 and CSA-213

Class 1, Zone 2, AEx nA II T4
Per ANSI/ISA 12.12.02 - 2003 and ANSI/UL 60079-15

Ex nA II T4
Per CSA - E79 - 15

Europe - ATEX Directive 94/9/EC
KEMA 04ATEX1118X

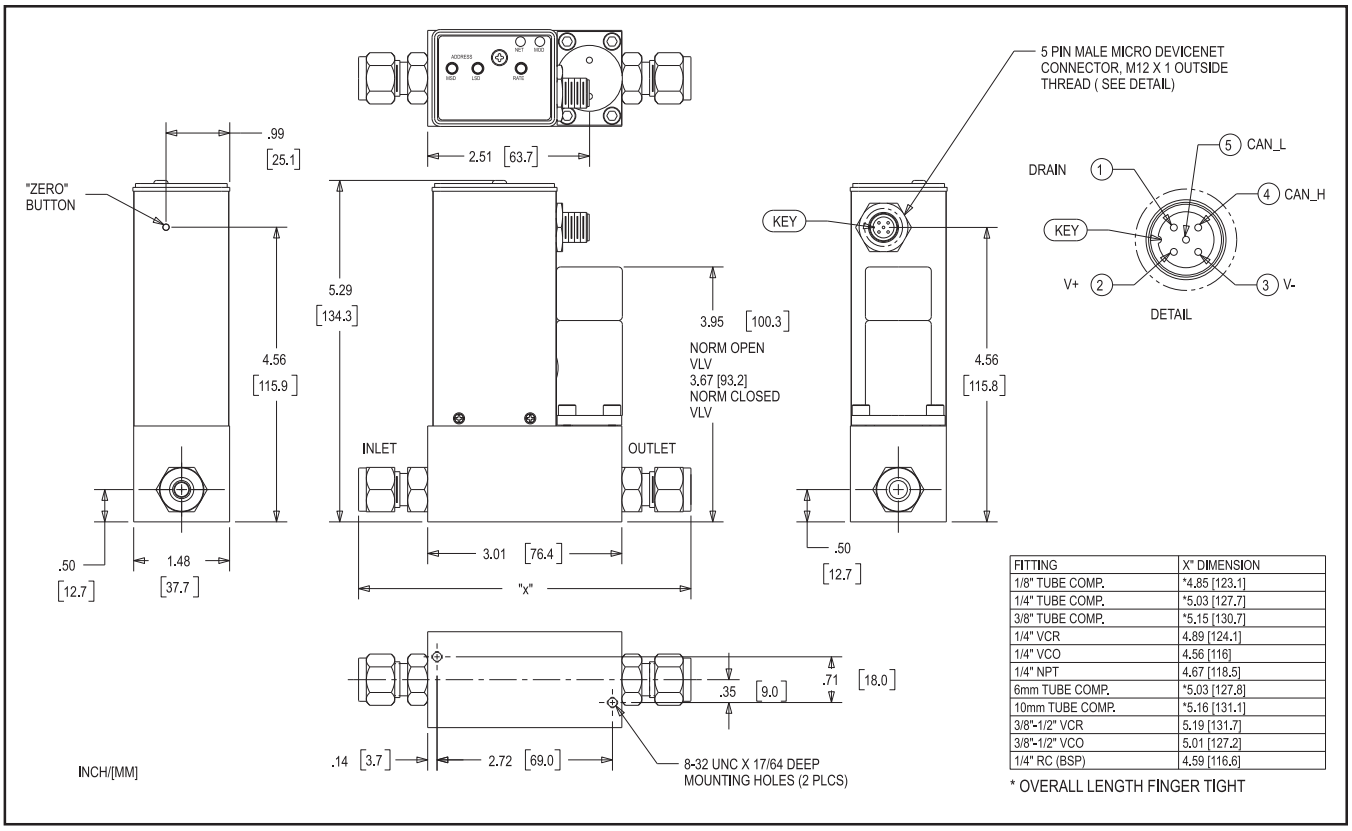
II 3 G Ex nA II T4

Per EN 60079-15: 2003

The product shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN60529, taking into account the environmental conditions under which the equipment will be used.

Pressure Equipment Directive (97/23/EC):
See Table 1-1 for further pressure information

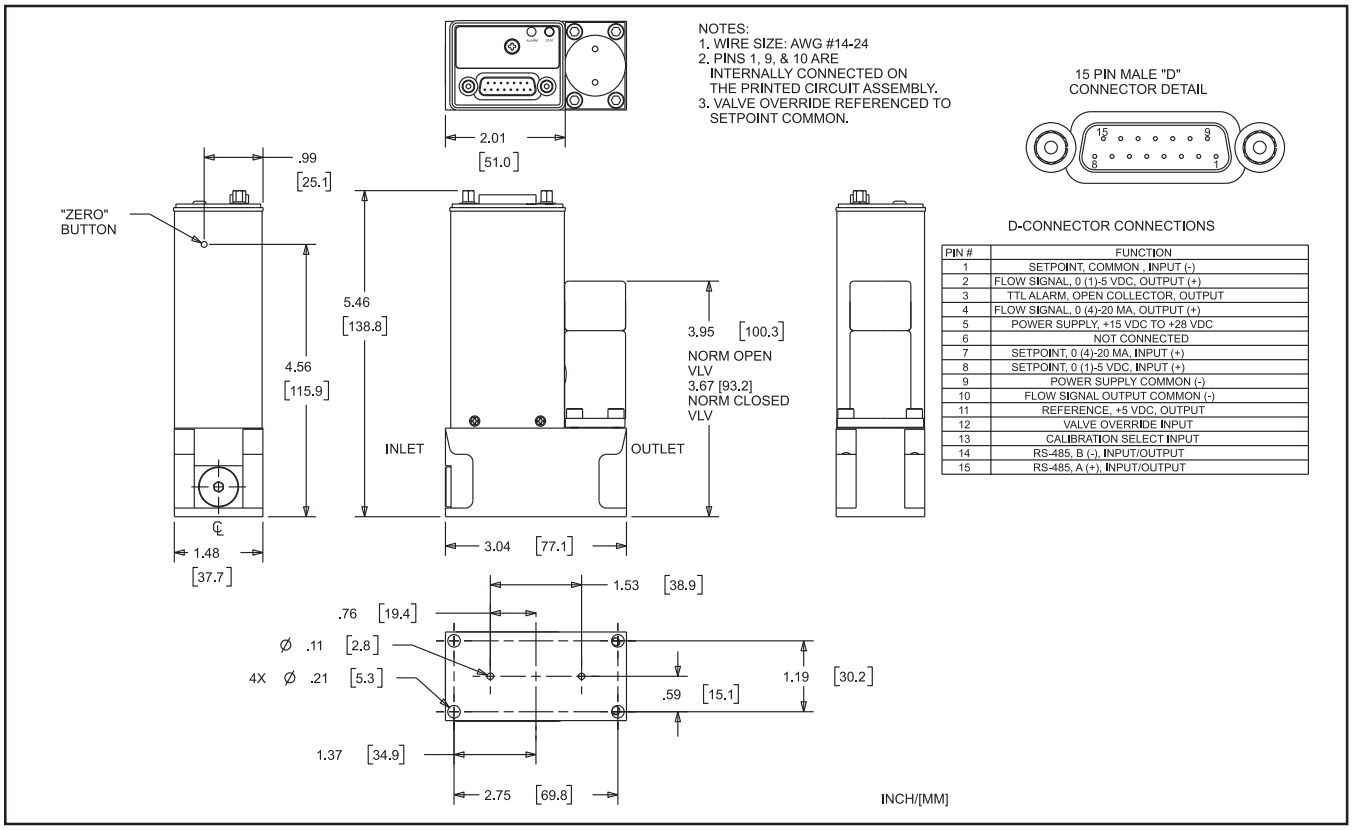
PC-based Support Tools
Brooks Instrument offers a variety of PC-based process control and service tools to meet the needs of our customers. SmartDDE may be used with any unit supporting RS-485 in a multidrop configuration, thus allowing users to control and monitor their Brooks devices. The Brooks Service Tool™ (BST) may be used to monitor, diagnose, tune and calibrate Brooks devices equipped with DeviceNet or FOUNDATION Fieldbus communications. The Brooks Service Tool™ interfaces with Brooks products via a special service port.



FITTING	X" DIMENSION
1/8" TUBE COMP.	*4.85 [123.1]
1/4" TUBE COMP.	*5.03 [127.7]
3/8" TUBE COMP.	*5.15 [130.7]
1/4" VCR	4.89 [124.1]
1/4" VCO	4.56 [116]
1/4" NPT	4.67 [118.5]
6mm TUBE COMP.	*5.03 [127.8]
10mm TUBE COMP.	*5.16 [131.1]
3/8"-1/2" VCR	5.19 [131.7]
3/8"-1/2" VCO	5.01 [127.2]
1/4" RC (BSP)	4.59 [116.6]

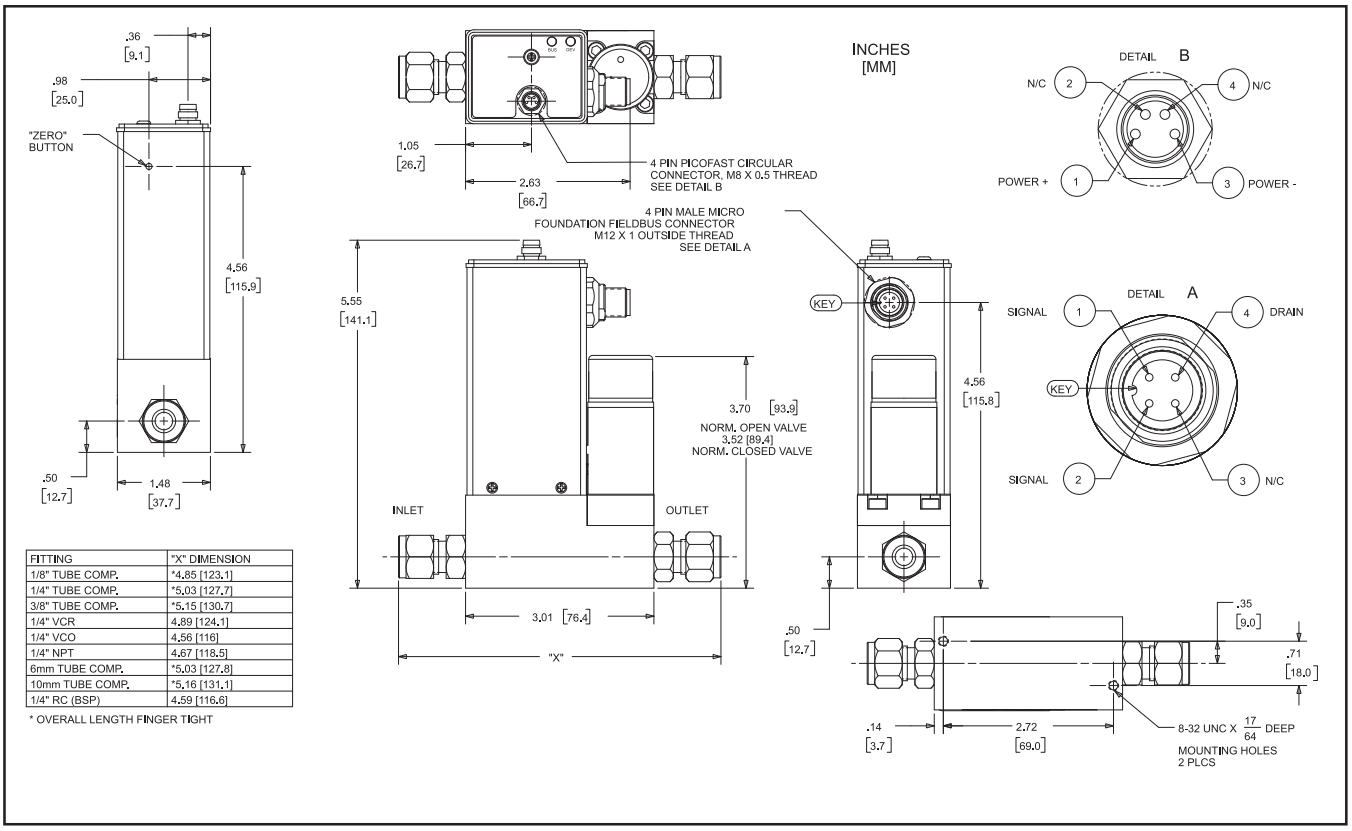
* OVERALL LENGTH FINGER TIGHT

Figure1-5 Model SLA5850D Digital I/O Devicenet MFC



PIN #	FUNCTION
1	SETPOINT, COMMON , INPUT (-)
2	FLOW SIGNAL, 0 (1)-5 VDC, OUTPUT (+)
3	TTL ALARM, OPEN COLLECTOR, OUTPUT
4	FLOW SIGNAL, 0 (4)-20 MA, OUTPUT (+)
5	POWER SUPPLY, +15 VDC TO +28 VDC
6	NOT CONNECTED
7	SETPOINT, 0 (4)-20 MA, INPUT (+)
8	SETPOINT, 0 (1)-5 VDC, INPUT (+)
9	POWER SUPPLY COMMON (-)
10	FLOW SIGNAL OUTPUT COMMON (-)
11	REFERENCE, +5 VDC, OUTPUT
12	VALVE OVERRIDE INPUT
13	CALIBRATION SELECT INPUT
14	RS-485, B (-), INPUT/OUTPUT
15	RS-485, A (+), INPUT/OUTPUT

Figure 1-6 Model SLA5850S Analog I/O MFC with RS-485 Elastomer Downport Connections



FITTING	"X" DIMENSION
1/8" TUBE COMP.	*4.85 [123.1]
1/4" TUBE COMP.	*5.03 [127.7]
3/8" TUBE COMP.	*5.15 [130.7]
1/4" VCR	4.89 [124.1]
1/4" VCO	4.56 [116]
1/4" NPT	4.67 [118.5]
6mm TUBE COMP.	*5.03 [127.8]
10mm TUBE COMP.	*5.16 [131.1]
1/4" RC (BSP)	4.59 [116.6]

* OVERALL LENGTH FINGER TIGHT

Figure 1-7 Model SLA5850F Digital I/O FOUNDATION Fieldbus MFC with Coplanar Valve

FITTING	"X" DIMENSION (Without Filter)	"Y" DIMENSION (With Standard Filter)	"Z" DIMENSION
9/16"-18 UNF	3.68 [93.5]	5.10 [129.5]	N/A
1/4" TUBE COMP.	*5.70 [144.8]	*7.12 [180.8]	*1.01 [25.7]
3/8" TUBE COMP.	*5.82 [147.9]	*7.24 [183.9]	*1.07 [27.2]
1/2" TUBE COMP.	*5.98 [152.0]	*7.40 [188.0]	*1.15 [29.2]
1/4" VCR	5.56 [141.3]	6.98 [177.3]	0.94 [23.9]
1/4" VCO	5.24 [133.2]	6.66 [169.2]	0.78 [19.8]
1/4" NPT	5.34 [135.7]	6.76 [171.7]	0.83 [21.1]
6mm TUBE COMP.	*5.71 [144.9]	*7.12 [180.9]	*1.01 [25.7]
10mm TUBE COMP.	*5.84 [148.3]	*7.26 [184.3]	*1.08 [27.4]
3/8"-1/2" VCR	5.86 [148.9]	7.28 [184.9]	1.09 [27.7]
3/8"-1/2" VCO	5.68 [144.3]	7.10 [180.3]	1.00 [25.4]
1/4" RC (BSP)	5.27 [133.7]	6.68 [169.7]	0.79 [20.1]

* OVERALL LENGTH FINGER TIGHT

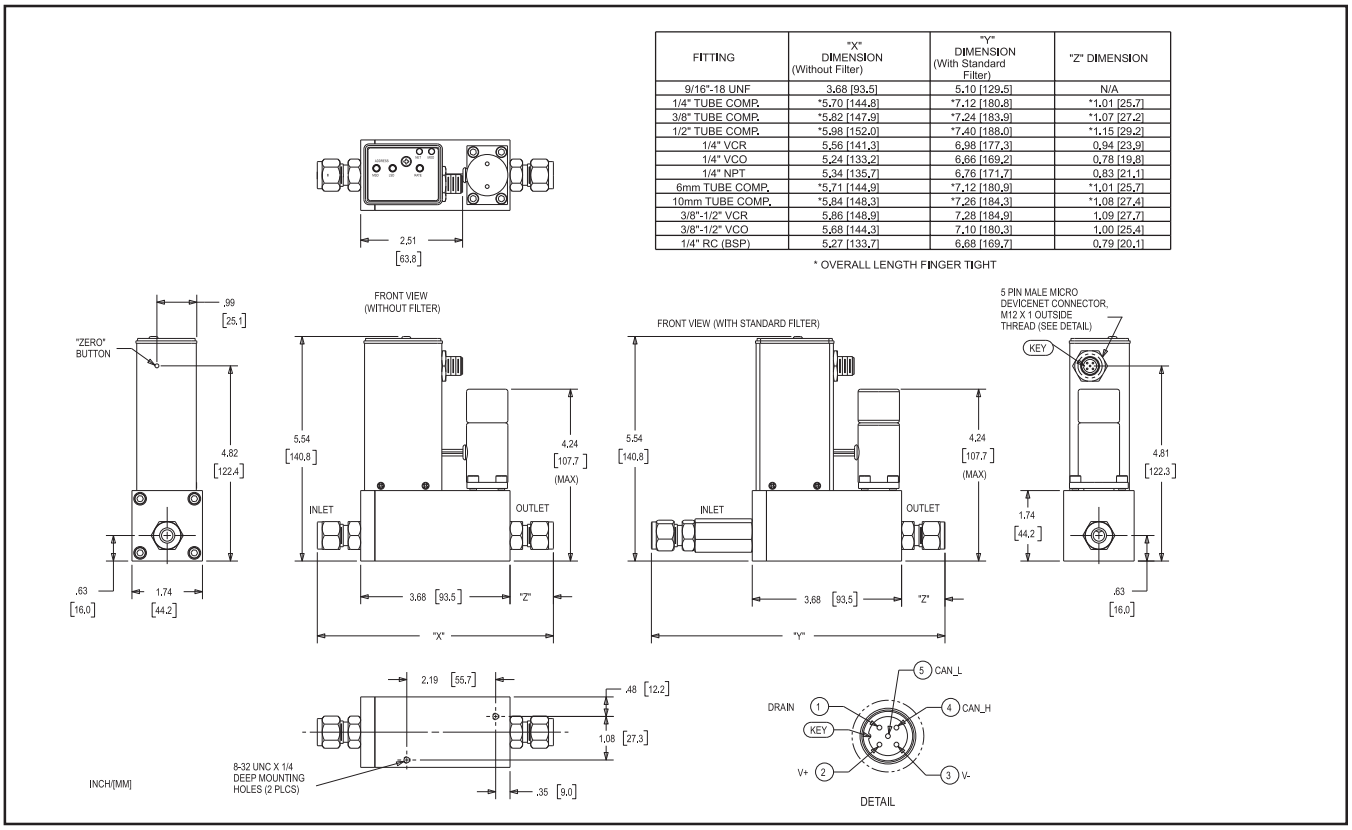
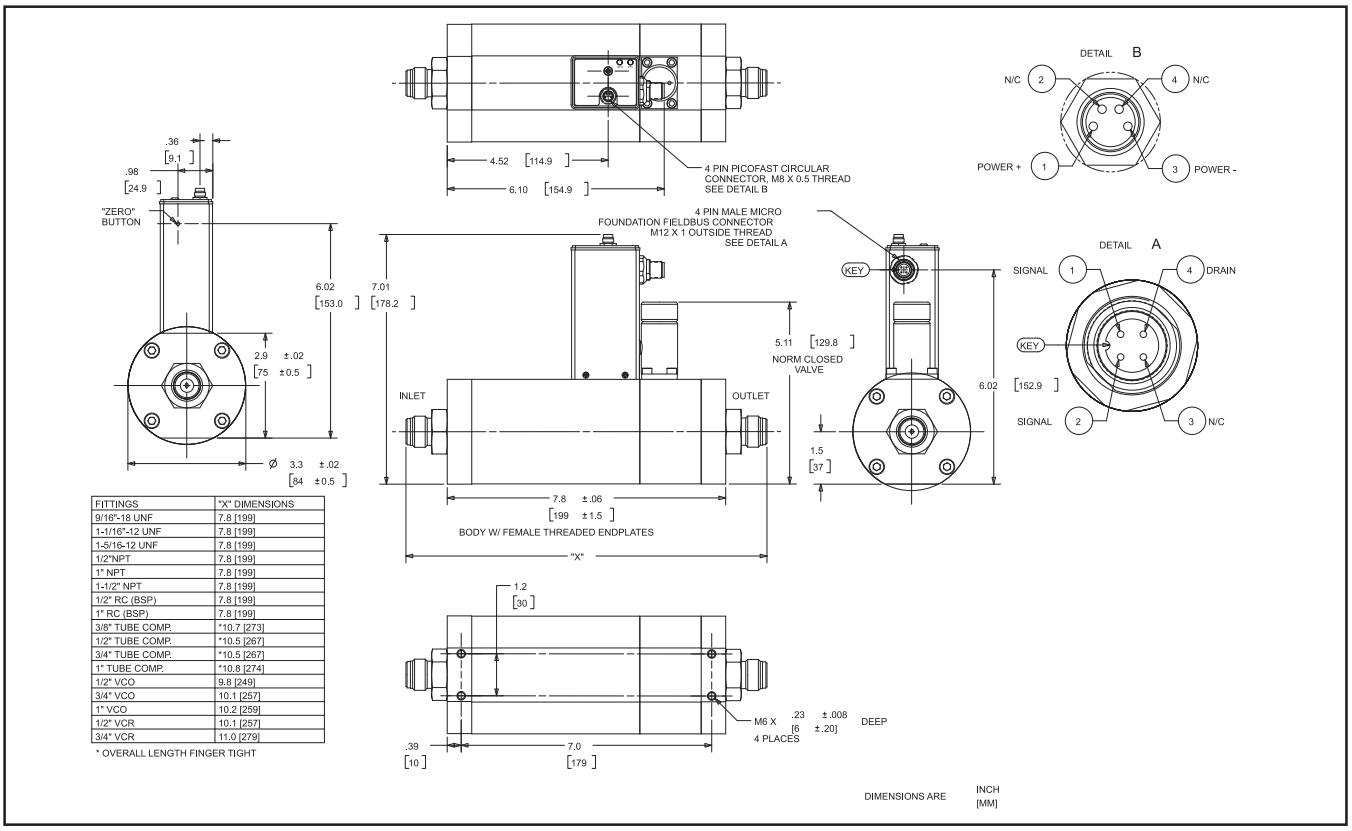


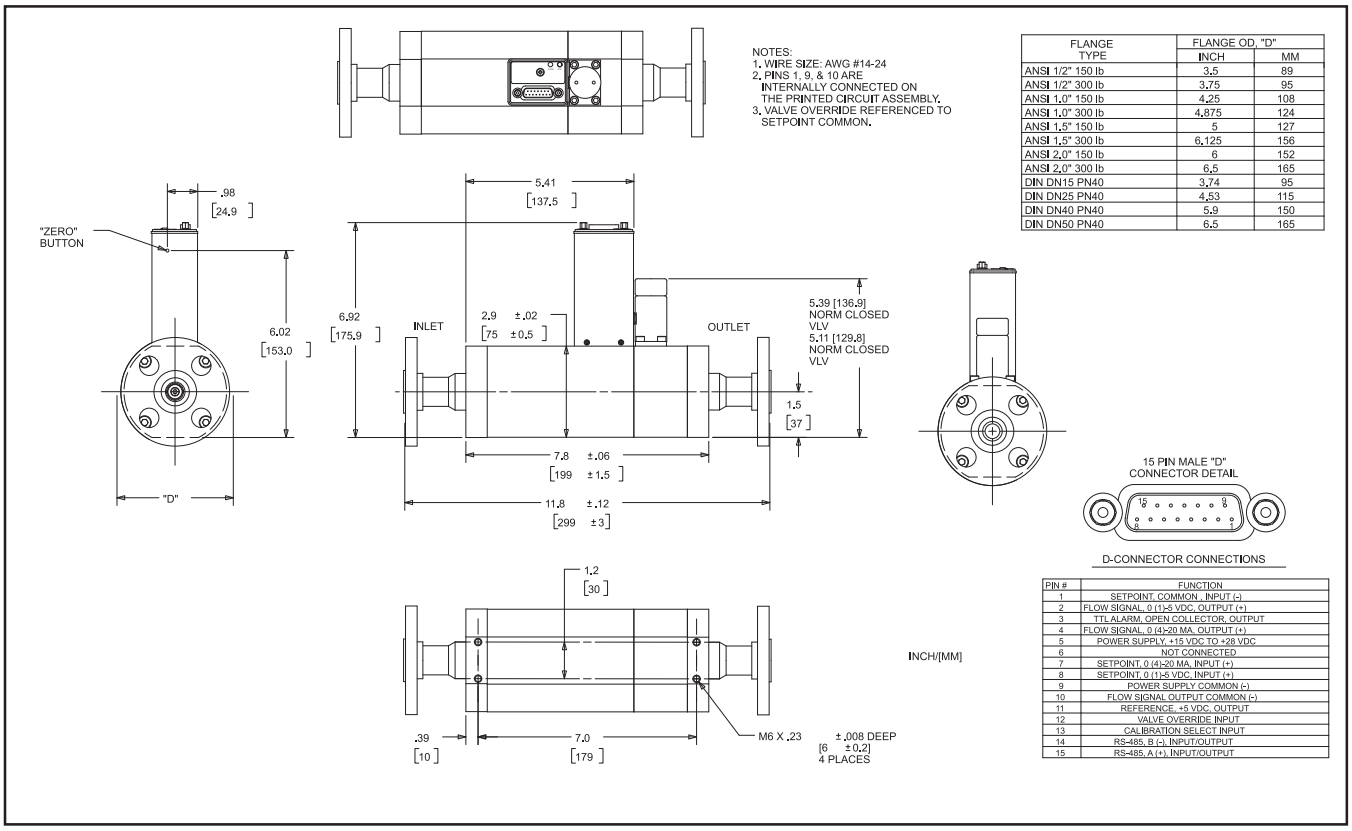
Figure 1-8 Model SLA5851D Digital I/O DeviceNet MFC



FITTINGS	"X" DIMENSIONS
9/16"-18 UNF	7.8 [199]
1-1/16"-12 UNF	7.8 [199]
1-5/16-12 UNF	7.8 [199]
1/2"NPT	7.8 [199]
1" NPT	7.8 [199]
1-1/2" NPT	7.8 [199]
1/2" RC (BSP)	7.8 [199]
1" RC (BSP)	7.8 [199]
3/8" TUBE COMP.	*10.7 [273]
1/2" TUBE COMP.	*10.5 [267]
3/4" TUBE COMP.	*10.5 [267]
1" TUBE COMP.	*10.8 [274]
1/2" VCO	9.8 [249]
3/4" VCO	10.1 [257]
1" VCO	10.2 [259]
1/2" VCR	10.1 [257]
3/4" VCR	11.0 [279]

* OVERALL LENGTH FINGER TIGHT

Figure 1-9 Model SLA5853F Digital I/O FOUNDATION Fieldbus MFC



FLANGE TYPE	FLANGE OD, "D"	
	INCH	MM
ANSI 1/2" 150 lb	3.5	89
ANSI 1/2" 300 lb	3.75	95
ANSI 1.0" 150 lb	4.25	108
ANSI 1.0" 300 lb	4.875	124
ANSI 1.5" 150 lb	5	127
ANSI 1.5" 300 lb	6.125	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6.5	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.9	150
DIN DN50 PN40	6.5	165

PIN #	FUNCTION
1	SETPOINT, COMMON , INPUT (-)
2	FLOW SIGNAL, 0 (1)-5 VDC, OUTPUT (+)
3	TTL ALARM, OPEN COLLECTOR, OUTPUT
4	FLOW SIGNAL, 0 (4)-20 MA, OUTPUT (+)
5	POWER SUPPLY, +15 VDC TO +28 VDC
6	NOT CONNECTED
7	SETPOINT, 0 (4)-20 MA, INPUT (+)
8	SETPOINT, 0 (1)-5 VDC, INPUT (+)
9	POWER SUPPLY COMMON (-)
10	FLOW SIGNAL OUTPUT COMMON (-)
11	REFERENCE, +5 VDC, OUTPUT
12	VALVE OVERRIDE INPUT
13	CALIBRATION SELECT INPUT
14	RS-485, B (-), INPUT/OUTPUT
15	RS-485, A (+), INPUT/OUTPUT

Figure 1-10 Model SLA5853S Analog I/O MFC with Flanged Connections

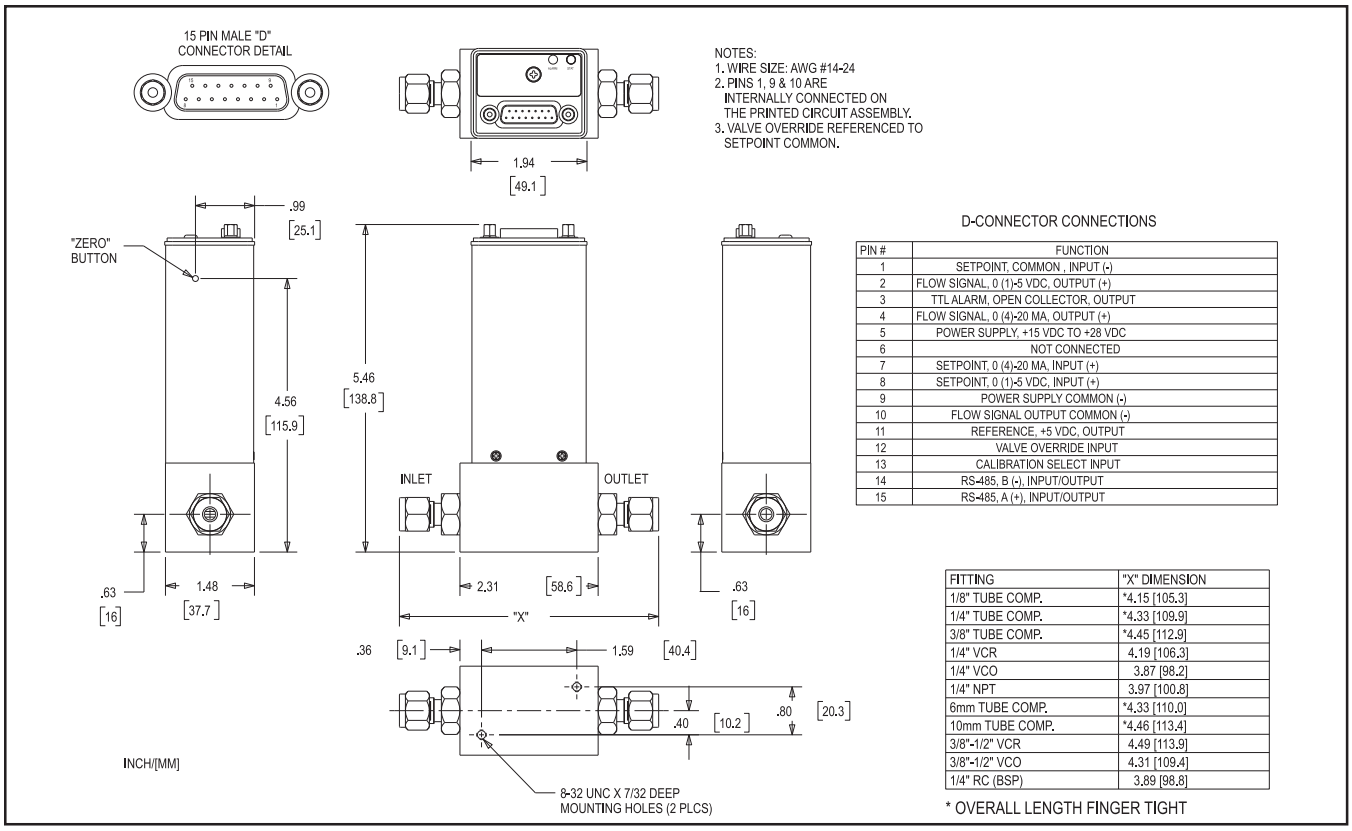


Figure 1-11 Model SLA5860S Analog I/O MFM with RS-485

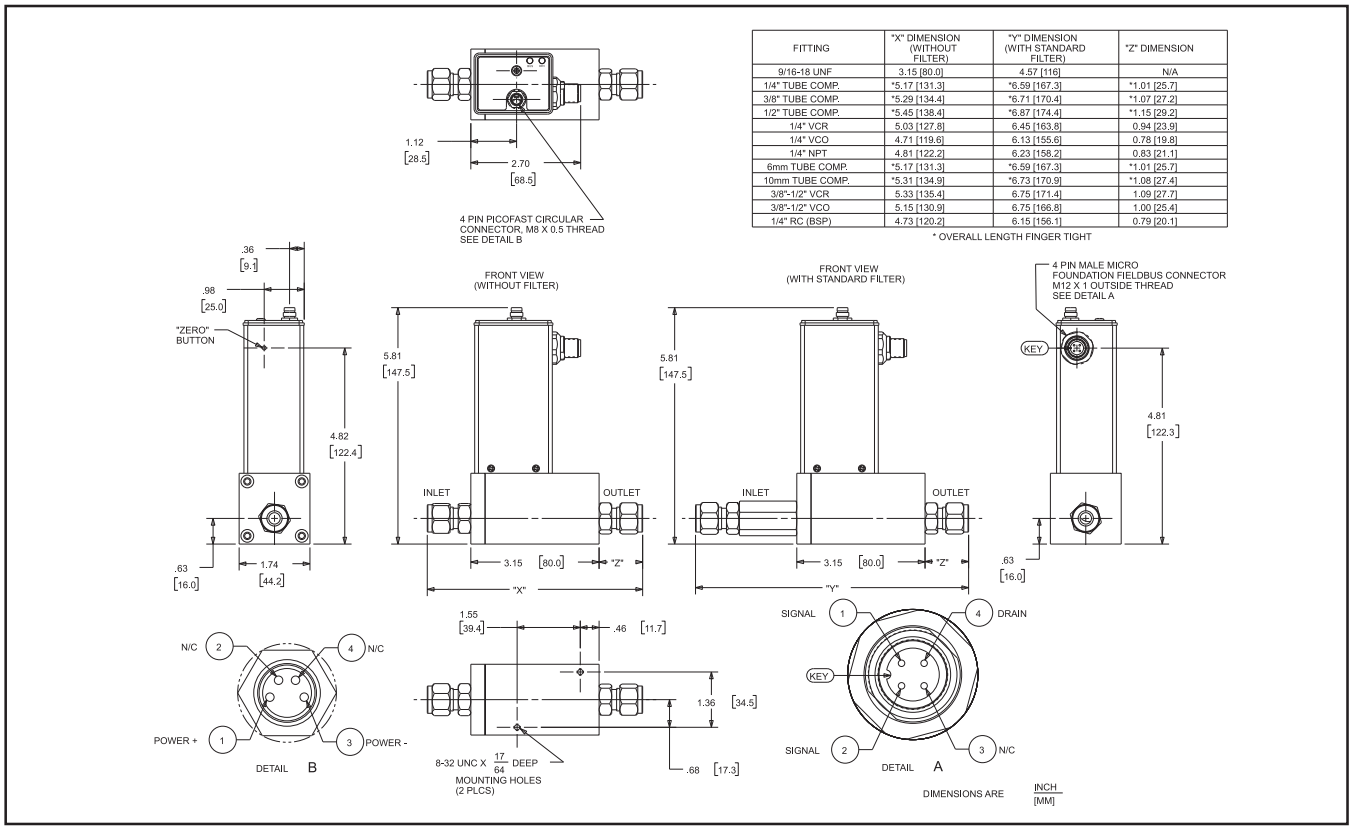
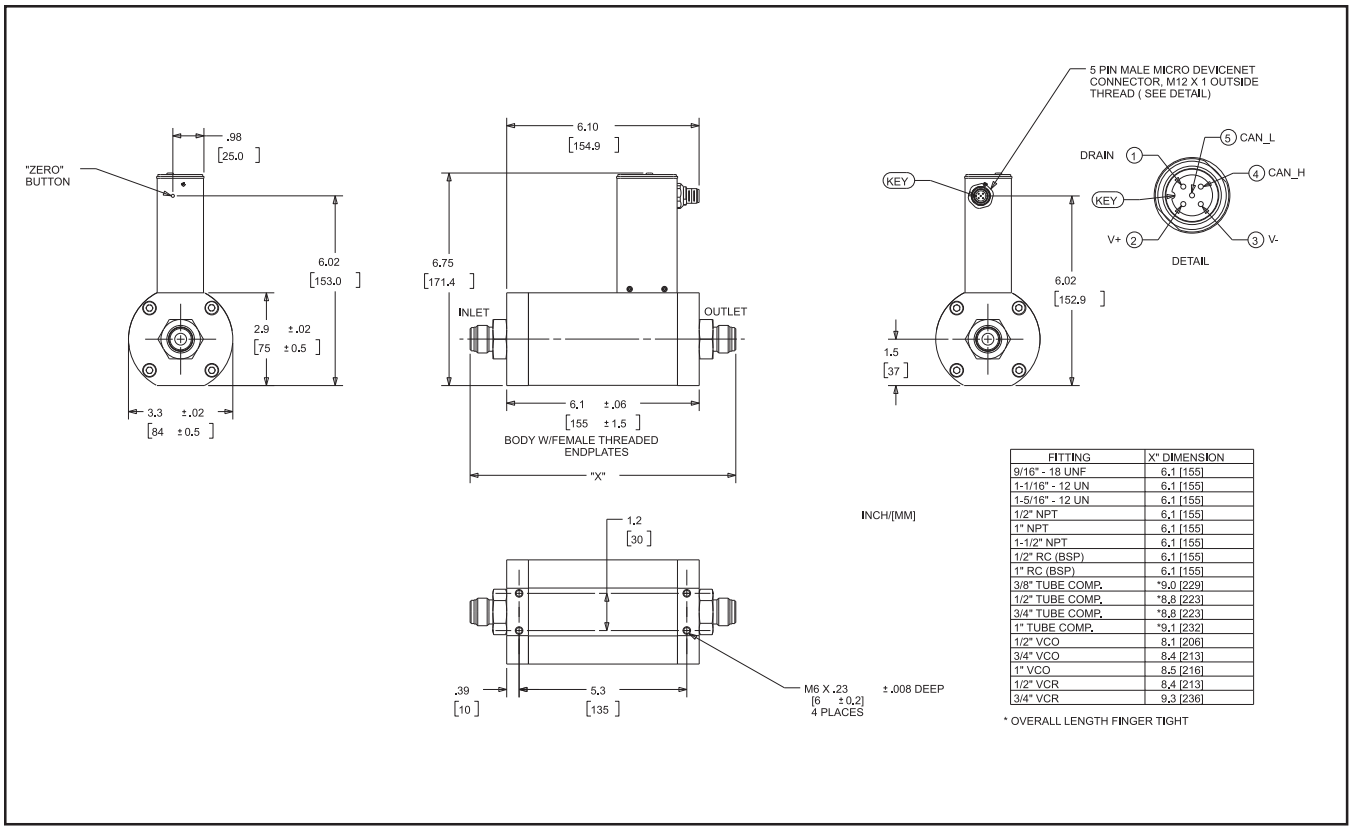
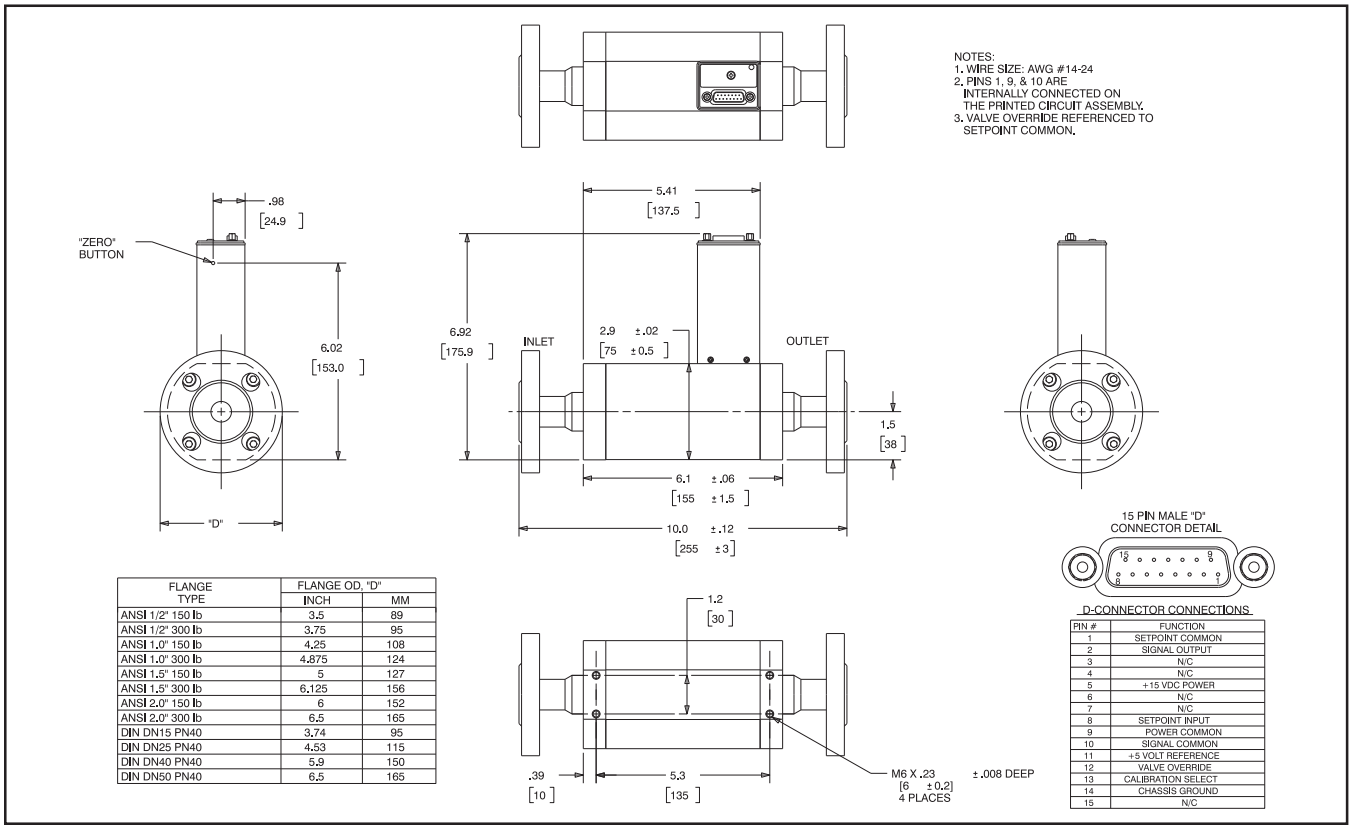


Figure 1-12 Model SLA5861F Digital I/O FOUNDATION Fieldbus MFM



FITTING	X" DIMENSION
9/16" - 18 UNF	6.1 [155]
1-1/16" - 12 UN	6.1 [155]
1-5/16" - 12 UN	6.1 [155]
1/2" NPT	6.1 [155]
1" NPT	6.1 [155]
1-1/2" NPT	6.1 [155]
1/2" RC (BSP)	6.1 [155]
1" RC (BSP)	6.1 [155]
3/8" TUBE COMP.	*9.0 [229]
1/2" TUBE COMP.	*8.8 [223]
3/4" TUBE COMP.	*8.8 [223]
1" TUBE COMP.	*9.1 [232]
1/2" VCO	8.1 [206]
3/4" VCO	8.4 [213]
1" VCO	8.5 [216]
1/2" VCR	8.4 [213]
3/4" VCR	9.3 [236]

Figure 1-13 Model SLA5863D Digital I/O Devicenet MFM



FLANGE TYPE	FLANGE OD, "D"	
	INCH	MM
ANSI 1/2" 150 lb	3.5	89
ANSI 1/2" 300 lb	3.75	95
ANSI 1.0" 150 lb	4.25	108
ANSI 1.0" 300 lb	4.875	124
ANSI 1.5" 150 lb	5	127
ANSI 1.5" 300 lb	6.125	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6.5	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.9	150
DIN DN50 PN40	6.5	165

D-CONNECTOR CONNECTIONS

PIN #	FUNCTION
1	SETPOINT COMMON
2	SIGNAL OUTPUT
3	N/C
4	N/C
5	+15 VDC POWER
6	N/C
7	N/C
8	SETPOINT INPUT
9	POWER COMMON
10	SIGNAL COMMON
11	+5 VOLT REFERENCE
12	VALVE OVERRIDE
13	CALIBRATION SELECT
14	CHASSIS GROUND
15	N/C

Figure 1-14 Model SLA5863 Analog I/O MFM with Flanges

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2-1 General

This section provides installation instructions for the Brooks® Digital MFC's and MFM's. Section 1, Figures 1-5 thru 1-12 show the dimensions and electrical connections.

2-2 Receipt of Equipment

When the instrument 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 your nearest Product Service Department.

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554 FLOW (3569)
Tel (215) 362 3700
Fax (215) 362 3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
P.O. Box 428
6710 BK Ede, Netherlands
Tel +31 (0) 318 549 300
Fax +31 (0) 318 549 309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel +81 (0) 3 5633 7100
Fax +81 (0) 3 5633 7101
Email: BrooksAs@BrooksInstrument.com

Remove the envelope containing the packing list. Carefully remove the instrument from the packing case. Make sure spare parts are not discarded with the packing materials. Inspect for damaged or missing parts.

2-3 Recommended Storage Practice

If intermediate or long-term storage of equipment is required, it is recommended that the equipment be stored in accordance with the following:

a. Within the original shipping container.
b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
c. 32°C (90°F) maximum,45°F (7°C) minimum.
d. Relative humidity 45% nominal, 60% maximum, 25% minimum. Upon removal from storage a visual inspection should be conducted to verify the condition of equipment is "as received".

2-4 Return Shipment

Prior to returning any instrument to the factory, contact your nearest Brooks location for a Return Materials Authorization Number (RMA#). This can be obtained from one of the following locations:

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554 FLOW (3569)
Tel (215) 362 3700
Fax (215) 362 3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
P.O. Box 428
6710 BK Ede, Netherlands
Tel +31 (0) 318 549 300
Fax +31 (0) 318 549 309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel +81 (0) 3 5633 7100
Fax +81 (0) 3 5633 7101
Email: BrooksAs@BrooksInstrument.com

Any instrument returned to Brooks requires completion of Form RPR003-1, Brooks Instrument Decontamination Statement, as well as, a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. This is required before any Brooks Personnel can begin processing. Copies of the form can be obtained from any Brooks Instrument location listed above.

2-5 Transit Precautions

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

2-6 Removal from Storage

Upon removal from storage, a visual inspection should be conducted to verify the condition of the equipment is “as received.” If the equipment has been in storage in conditions in excess of those recommended (See Section 2-3), the device should be subjected to a pneumatic pressure test in accordance with applicable vessel codes.

2-7 Gas Connections

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

2-8 In-Line Filter

Unless an integrated (internal) filter is already installed, it is recommended that an in-line filter be installed upstream from the mass flow controller or meter to prevent the possibility of any foreign material entering the flow sensor or control valve MFC. The filtering element should be replaced periodically or ultrasonically cleaned.

Table 2-1 Recommended Filter Size

Models	Maximum Flow Rate	Recommended Filter
SLA5850/60	100 ccm	2 micron
SLA5850/60	500 ccm	2 micron
SLA5850/60	1 to 5 lpm	10 micron
SLA5850/60	10 to 100 lpm	40 micron
SLA5851/61	10 to 30 lpm	40 micron
SLA5853/63	> 100 lpm	Consult factory

Note: Brooks provides many filter options. For those not listed here, please contact factory.

2-9 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 time of installation.

⚠ 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.

Recommended installation procedures:

a. The Brooks Digital MFC or MFM should be located in a clean, dry atmosphere relatively free from shock and vibration.
b. Leave sufficient room for access to Self-zero function push-button.
c. Install in such a manner that permits easy removal if the instrument requires servicing.

⚠ CAUTION

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

d. The Brooks Digital MFC or MFM can be installed in any position. However, mounting in orientations other than the original factory calibration(see calibration data sheet supplied with the instrument) can result in a<±0.2% maximum full scale shift after re-zeroing.

e. When installing a mass flow controller or meter with full scale flow rates of 10 lpm or greater, be aware that sharp, abrupt angles in the system piping directly upstream of the controller may cause a small shift in accuracy. If possible, have at least ten pipe diameters of straight tubing upstream of the mass flow controller or meter. This is not required for meters with an integrated filter.

⚠ CAUTION

Since the Model SLA5800 control valve may not provide positive shut-off, a separate shut-off valve may be installed downstream for that purpose. It should be noted that a small amount of gas may be trapped between the downstream side of the mass flow controller and the shut-off valve which will result in a surge upon accuation of the shut-off valve. This surge can be reduced in magnitude either by locating the controller and the shut-off valve close together or by moving the shut-off valve upstream of the controller.

Special considerations to be taken when installing the SLA5853 MFC:

The Model SLA5853 has a valve design that is different from the standard low flow Brooks TMFC's. The SLA5853 consists of a dual stage, pilot operated valve. The pilot valve (located on the top of the MFC) controls a differential pressure across the main valve which, in turn controls the flow through the device. The main valve is a pressure operated valve that utilizes a bellows spring and diaphragm to control flow. This bellows and diaphragm assembly can be susceptible to damage by pressure spikes or surges. For this reason, it is recommended that process line startups are handled with care.

The bellows spring is offered in two levels. A low force for low differential pressures (Delta P < 30psig), and a high force (delta P >30 and <300 psig).

The selection of the bellows spring is mainly determined by the differential pressure as specified on the customer order. This should reflect your actual process conditions.The low force bellows consists of a softer bellows spring which is required to allow flow control at lower differential pressures.

During startup conditions, when a process line is being pressurized, the pressure and/or pressure differentials that the SLA5853 is exposed to may be different from the final process conditions. For higher pressure applications, and especially those with the low force bellows, it is important to bring the pressure up in a controlled manner in order to prevent a possible pressure spike to the bellows spring and main valve diaphragm. A pressure spike could deform the bellows, damage the diaphragm or blow out the bellows O-ring seal. This typically results in a failure to shutoff (leakby at zero setpoint).

One method to assure successful startups is to set a 100% setpoint command or valve override open command and then gently ramp the pressure up to operating conditions. This will allow you to bring your process pressures up to normal process conditions and the SLA5853 will then function as specified.

Another method is to utilize a bypass valve to allow pressure around the device while ramping up pressure to proper operating conditions.

The main point is to not instantly open a ball valve and allow a high upstream pressure or high back pressure surge into the SLA5853 main valve.

Proper process line venting is also important. If operating at pressures greater than 50 psig, be sure to perform a controlled pressure release from inlet and back pressure simultaneously in order to prevent bellows damage from excesssive back pressure.

Following careful startup and venting procedures will contribute to a long problem free life of your SLA5853 controller.

Stable Operating Conditions:

As stated above, the SLA5853 model utilizes a pressure operated main valve. Valve performance is dependant on stable system pressures. Oscillating or unstable upstream or downstream pressures are likely to cause the device flow control to become unstable. For the best performance, it is important to create a stable pressure environment by utilizing quality inlet and back pressure regulators in your process design. In many cases, the addition of a back pressure regulator will isolate the SLA5853 from the unstable downstream pressures inherent in many process designs.

All thermal mass flow controllers are factory tested with stable and equal ambient and process temperatures. If the process temperature does not equal the ambient temperature, the bypass ratio/accuracy will be affected. When a hot or cold process fluid is being measured, ensure that the piping system is designed to allow the gas temperature to equalize with the flow controller ambient temperature.

For more information, please contact the Brooks Technical Service group.

2-10 Electrical Interface

The setpoint signal is supplied as a 0(1) to 5 Vdc or 0(4)-20 mA analog signal. All signals are supplied via the 15-pin D-Connector. For an analog unit the minimum set of connections which must be made to the MFC and MFM includes +13.5 - 27 Vdc, supply common, and a setpoint signal.

The Brooks Digital electrical interface is designed to facilitate low-loss, quiet signal connections. Separate returns (commons) are supplied for the analog setpoint, analog flow signal, and the power supply. These commons are electrically connected together on the PC board.

Analog I/O Versions

- Signal Common
- Signal Output (Voltage or Current)
- +13.5 - 27 Vdc Supply
- Setpoint Input (Voltage or Current)
- Setpoint Common
- Supply Common
- Chassis Ground (via unit body)

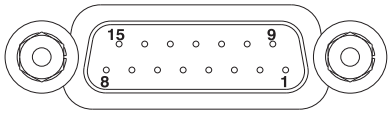
Refer to Table 1-3 for pin connections
Refer to Figures 2-2, 2-3 and 2-4 for electrical I/O connections

(The Brook's MFC acts as a current sink to a setpoint input signal. The 0/4-20 mA setpoint signal should be "driven" into the MFC input by a controlled current source. Reference Brook's device specifications for the setpoint input impedance.)

(The Brook's MFC acts as the current source when providing a 0/4-20 mA output signal to the load. The output signal is "driven" by the MFC into the customer load. Reference Brook's device specifications for maximum load capacity.)

For a DeviceNet unit, 11-25 Vdc power and communication I/O are supplied via the standard 5-pin Circular Micro-Connector.

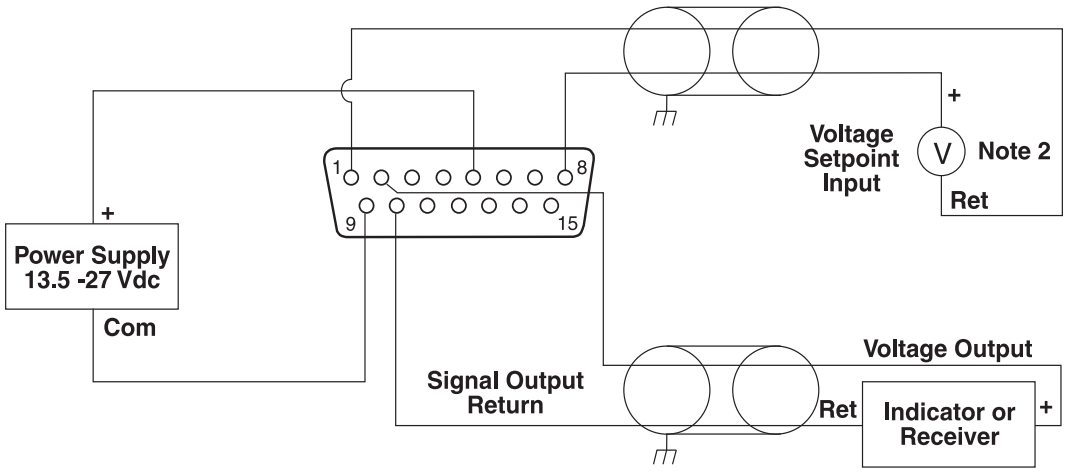
15 PIN MALE D-CONNECTOR



*BROOKS READ OUT SIDE SUB D (15 PIN)	MFC / MFM PIN	FUNCTION	WIRE COLOR
6	1	**Setpoint**, Common Input (-)	BLACK
10	2	**Flow Signal**, 0(1)-5 volt, Output (+)	WHITE
9	3	**TTL Alarm**, Open Collector, Output (+)	RED
2	4	**Flow Signal**, 0(4)-20 mA, Output (+)	GREEN
13	5	**Power Supply**, +13.5 Vdc to +27 Vdc (+)	ORANGE
14	6	**Not Connected**	BLUE
3	7	**Setpoint**, 0(4)-20 mA, Input (+)	WHT/BLK
5	8	**Setpoint**, 0(1)-5 volt, Input (+)	RED/BLK
12	9	**Power Supply**, Common (-)	GRN/BLK
8	10	**Flow Signal**, Common, Output (-)	ORG/BLK
4	11	**Reference**, +5 Vdc, Output (+)	BLU/BLK
7	12	**Valve Override**, Input	BLK/WHT
1	13	**Calibration Select**, Input	RED/WHT
11	14	**RS-485**, Common B (-) Input/Output	GRN/WHT
15	15	**RS-485**, Common A (+) Input/Output	BLU/WHT

* Brooks Read Out Models 0151, 0152, 0154, 0254
See Table 3-1 for Resistor values

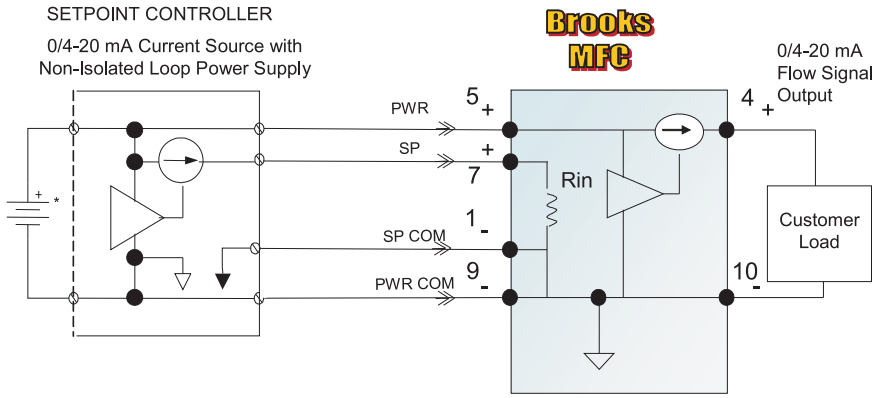
Figure 2-1 D-Connector Shielded Cable Hookup Diagram, Voltage I/O Version



Voltage Signal: Setpoint and Output

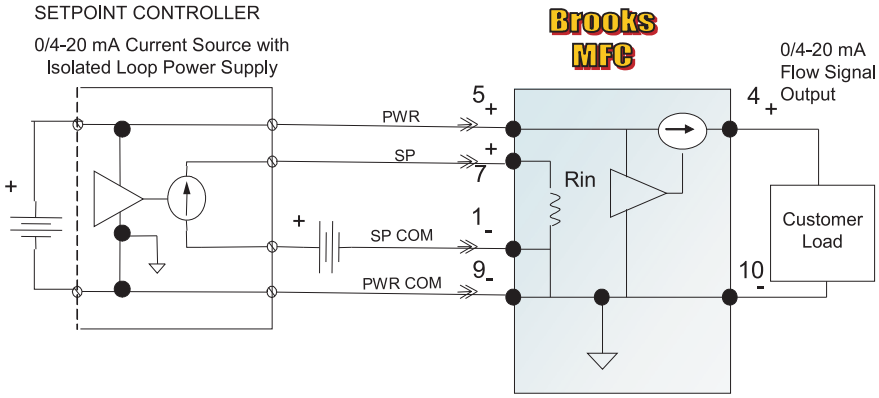
Notes:
1. The returns for the command input and current output are not isolated from power supply common.
2. Tie cable shields to ground at one end only. (MFC only)
3. Current and Voltage I/O may not be used simultaneously.

Figure 2-2 Common Electrical Hookups, Voltage I/O Version



Note: Setpoint common, flow signal output common, and power supply common are connected internally in the MFC. Reference Brook's device specifications for power supply voltage and setpoint input impedance.
Input: The 4/20 mA setpoint signal is "driven" into the MFC input using a controlled source.
Output: The 4/20 mA output signal is "sourced" by the MFC into the customer load.

Figure 2-3 Recommended I/O Wiring Configuration for Current Signals (Non-Isolated Power Supply)



Note: Setpoint common, flow signal output common, and power supply common are connected internally in the MFC. Reference Brook's device specifications for power supply voltage and setpoint input impedance.
Input: The 4/20 mA setpoint signal is "driven" into the MFC input using a controlled source.
Output: The 4/20 mA output signal is "sourced" by the MFC into the customer load.

Figure 2-4 Recommended I/O Wiring Configuration for Current Signals (Isolated Power Supply)

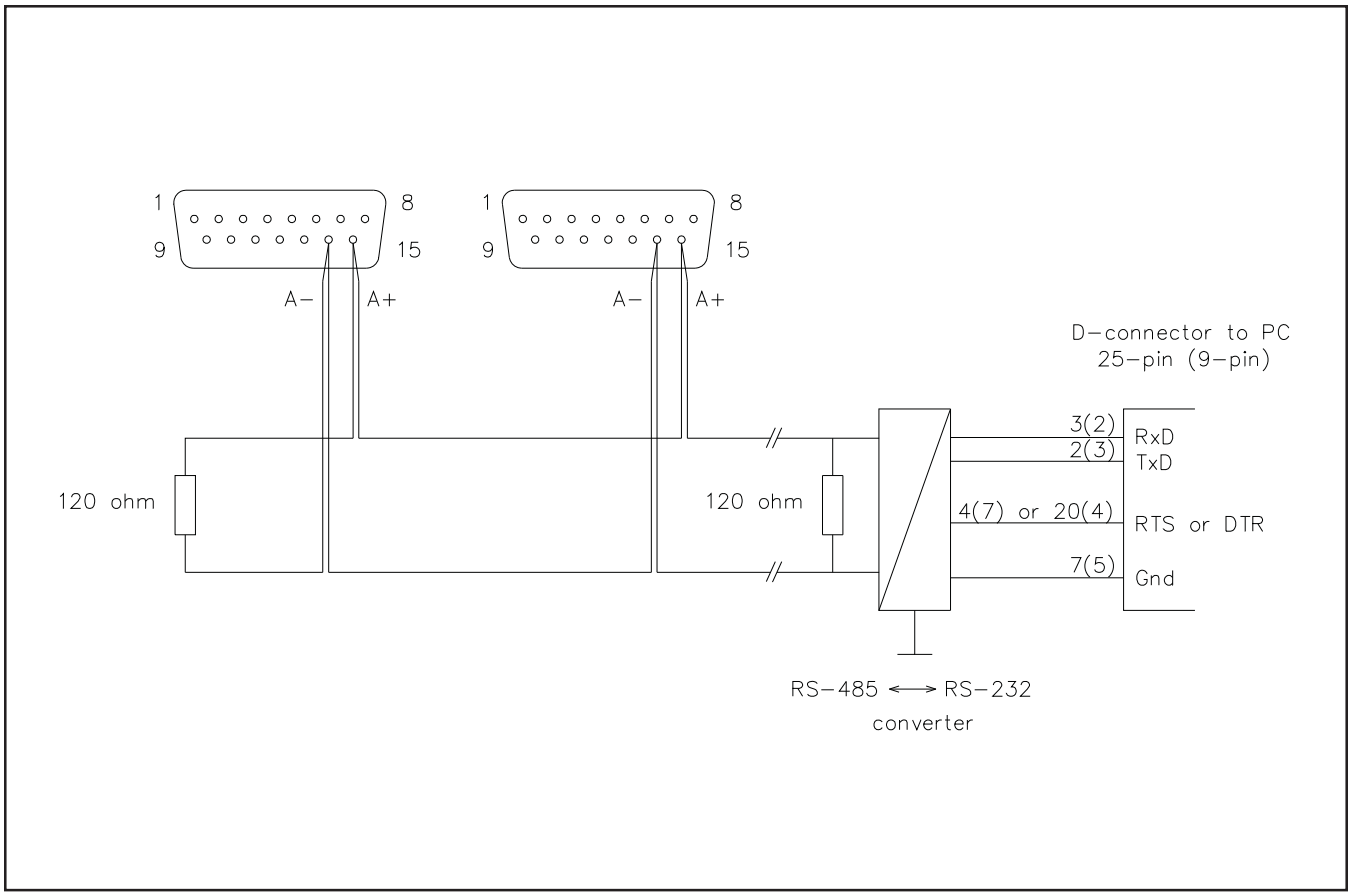


Figure 2-5 RS-485 Multidrop Interconnection TMFs and PC

The RS-485 is a multidrop connection and allows a maximum of 32 devices to be connected to a computer system. IBM-ompatible PCs are *not* equipped with RS-485 ports as standard. An RS-232 to RS-485 converter or RS-485 interface board is therefore required to connect an RS-485 to a standard PC. Figure 2-5 is an interconnection diagram showing two TMFs linked to an IBM-compatible PC, via RS-485 and RS-485 to RS-232 converter. The RS-485 bus, a daisy-chain network, meaning that the wires are connected at the units as in Figure 2-5.

2-11 Operation Check Procedure (Analog I/O)

a. Mount the MFC/MFM in its final orientation.
b. Apply power to the MFC/MFM and allow approximately 45 minutes for the instrument to completely warm up and stabilize its temperature.
c. Do NOT supply gas to the MFC/MFM. Ensure that the differential pressure across the MFC/MFM is zero.

d. Apply a setpoint of:
   0.000 Vdc ± 10 mV (0 - 5 Vdc setpoint)
   1.000 Vdc ± 10 mV (1 - 5 Vdc setpoint)
   0.000 mA ± 100 µA (0 - 20 mA setpoint)
   4.000 mA ± 100 µA (4 - 20 mA setpoint)

e. If the zero exceeds one of these limits, follow the re-zeroing procedure in Section 3-4. The analog output signal should be:
   0.000 Vdc ± 10 mV (0 - 5 Vdc output)
   1.000 Vdc ± 10 mV (1 - 5 Vdc output)
   0.000 mA ± 40 µA (0 - 20 mA output)
   4.000 mA ± 40 µA (4 - 20 mA output)

f. Turn on the gas supply. A positive flow signal may be present due to slight valve leak-thru (MFC only).
g. Supply a setpoint signal between:
   0 to 5 Vdc (0 - 5 Vdc setpoint)
   1 to 5 Vdc (1 - 5 Vdc setpoint)
   0 to 20 mA (0 - 20 mA setpoint)
   4 to 20 mA (4 - 20 mA setpoint)

h. Check the analog output signal. The output signal should match the setpoint signal in accordance with the accuracy specifications provided in Section 1-4 of this document.

i. If flow output signal does not match the setpoint, and pressure settings are correct, this could indicate a problem in the MFC. A secondary issue could be the gas type. When checking with a surrogate gas, ensure that there is enough pressure to the MFC in order to flow the correct amount of the surrogate gas.

Example:
Checking an MFC calibrated for 100 ccm SF6 (sulfur hexafluoride). The sensor factor N_2 (nitrogen) is 0.27, therefore the eqivalent N_2 needed is 100/0.27 = 370.4 ccm. This may require a pressure increase to make this flow rate.

2-12 Digital I/O: DeviceNet or FOUNDATION Fieldbus

a. Mount the MFC/MFM in its final orientation.
b. Apply power to the MFC/MFM and allow approximately 45 minutes for the instrument to completely warm up and stabilize its temperature.
c. Turn on the gas supply. A positive flow signal may be present due to slight valve leak-thru (MFC only).
d. Provide the proper UOM setpoint between 20% and 100% FS to the MFC via the digital network controller.
e. Check the MFC Flow value. It should match the setpoint UOM. Value within ± 0.2% FS in less than 10 seconds after setpoint change.
f. If flow output signal does not match the setpoint, and pressure settings are correct, this could indicate a problem in the MFC. A secondary issue could be the gas type. When checking with a surrogate gas, ensure that there is enough pressure to the MFC in order to flow the correct amount of the surrogate gas.

Example:
Checking an MFC calibrated for 100 ccm SF6 (sulfur hexafluoride).
The sensor factor N2 (nitrogen) is 0.27, therefore the equivalent N2 needed is 100/0.27 = 370.4 ccm. This may require a pressure increase to make this flow rate.

2-13 DeviceNet I/O Assemblies

Other problems that may occur in an operational checkout of a DeviceNet MFC could be due to data mismatches of Input/Output I/O assemblies. For proper communication over the DeviceNet network, the MFC must be set up with the same I/O Assembly as the network master. The DeviceNet specification defines Input and Output relative to the network (i.e. the data being PRODUCED from the device (MFC) as an INPUT into the network or the data is being CONSUMED by the device (MFC) is an OUTPUT from the network). The Brooks MFC supports 12 instances of Input Assemblies and 4 instances of Output Assemblies.
NOTE: This information and all other detailed DeviceNet information is available in the Brooks DeviceNet Supplement Instruction Manual.

3-1 Overview

This section contains the following information:

- Theory of Operation
- Features

3-2 Theory of Operation for Flow Measurement

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

The separation of the flow streams is caused by the restrictor. During flow conditions there will be a pressure differential across the restrictor which 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 MFC/MFM (A/B = constant). The full scale flow rate of the MFC/MFM is established by selecting a restrictor with the correct pressure differential for the desired flow.

The flow sensor is a very narrow, thin-walled stainless steel tube. Onto this tube are built upstream and downstream temperature sensing elements on either side of a heating element. Constant power is applied to the heater element, which is located at the midpoint of the sensor tube. During no-flow conditions, the amount of heat reaching each temperature sensor is equal, so temperatures T1 and T2 (Fig. 3-1) are equal. Gas flowing through the tube carries heat away from the upstream temperature sensor and toward the downstream sensor. The temperature difference, T2 - T1, is directly proportional to the gas mass flow. The equation is:

$DT = A \times P \times Cp \times m$

Where,

DT = Temperature difference T2 - T1 (°K)
A = Constant of proportionality (s^2-°K^2/kJ^2)
P = Heater Power (kJ/s)
Cp = specific heat of the gas at constant pressure (kJ/kg - °K)
m = Mass Flow (kg/s)

A bridge circuit and a differential amplifier interpret the temperature difference and generate an electrical signal directly proportional to the gas mass flow rate.

3-3 Features

Note: All Brooks Digital Series mass flow meters are configured at the factory according to customer order and do not require adjustment. Not all features are available on all instruments.

The Brooks Digital MFC/MFMs are full-featured digital devices. The Brooks Digital MFC/MFMs perform much like traditional analog MFCs, but with improved accuracy, step response and valve control. The analog interface matches that of Brooks' popular analog MFCs so it can be retrofitted into tools using analog MFCs. Other versions of the Delta Class can provide a variety of digital protocols, for example DeviceNet and RS-485.

The Brooks Digital equipment is capable of storing up to 10 different sets of gas calibration data. Each set includes a calibration curve, PID controller settings, valve performance data, and information about the calibration conditions. The Brooks Digital equipment can contain calibrations for different gases or for the same gas at multiple conditions (pressures, full-scale flow rates). Section 3-4 Analog I/O Mode of Operation describes more information about the data contained in the calibration table and how to access the data.
The DeviceNet Instruction Manual describes further details on specific communication features.

Calibrations will appear in the calibration table in the same order as they appeared on the customer order, unless otherwise specified. The first listed gas will appear as calibration #1 the second as calibration #2 and so on. Note that unless specified otherwise on the customer order any unit containing a single calibration will have that calibration stored in calibration position 1.

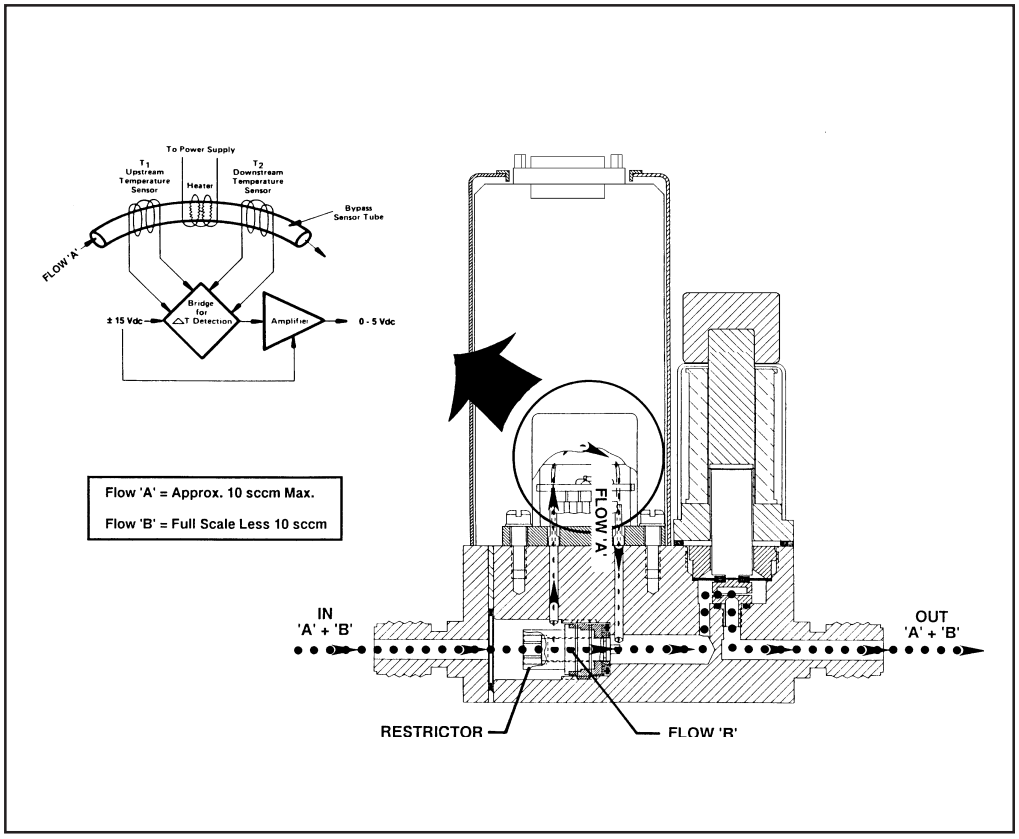


Figure 3-1 Flow Sensor Operational Diagram (VCR™ End Connections Shown)

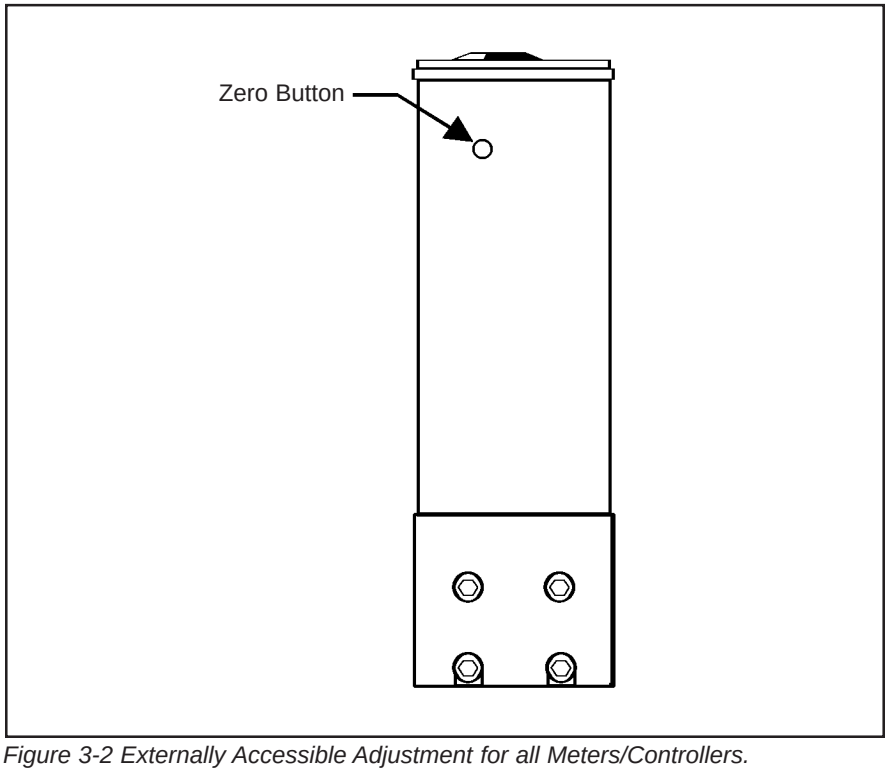


Figure 3-2 Externally Accessible Adjustment for all Meters/Controllers.

3-4 Analog I/O Mode of Operation

The following paragraphs describe the basic features of the Brooks Digital Series Mass Flow Meters/Controllers.

NOTE: Read Section 3-3, Features, before reading this section. See DeviceNet Supplemental Instruction Manual for specific details on communication features.

Functional Description

The analog interface may include any of the following I/O options as specified by the user:

0 - 5 Vdc setpoint, 0 - 5 Vdc flow output
1 - 5 Vdc setpoint, 1 - 5 Vdc flow Output
0 - 20 mA setpoint, 0 - 20 mA flow output
4 - 20 mA setpoint, 4 - 20 mA flow output

Also included are the Valve Override input and Calibration Select input pins. All analog signals available are on the 15 pin D-Connector. (See Fig. 2-1 for connections). Note that one formerly unused connector pin, Pin 13, now allows selection of up to ten separate calibrations. The contents of the ten calibrations are determined from the customer order. Only those calibrations ordered will be available in the instrument. Unless otherwise specified, a Brooks Digital MFC/MFM ordered with only one calibration will have that calibration stored in calibration #1.

Before operating the MFC/MFM, apply power and warm-up the instrument for approximately 45 minutes. After warm-up, apply gas pressure then proceed by following the instructions in the following sections.

Analog I/O Setpoint (MFC Only)

This input allows the user to establish the MFC setpoint,. Several input types are available as follows:

Setpoint Signal Type	Full Scale	Minimum Signal	Maximum Signal
0 to 5 Vdc	5 Vdc	0 V	5.5 Vdc = 110%
1 to 5 Vdc	5 Vdc	1 V	5.5 Vdc = 111%
0 to 20 mA	20 mA	0 mA	22 mA = 110%
4 to 20 mA	20 mA	20 mA	22 mA = 111%

Analog I/O Flow Signal

This output is used to indicate the flow signal. A negative flow signal indicates reverse flow through the device, but is NOT calibrated.

Several flow signal types are available:

Anolog I/O Type	Full Scale	Minimum Signal	Maximum Signal
0 to 5 Vdc	5 Vdc	-0.5 V	5.5 Vdc = 110%
1 to 5 Vdc	5 Vdc	0.5 V	5.5 Vdc = 111%
0 to 20 mA	20 mA	0 mA	22 mA = 110%
4 to 20 mA	20 mA	3.8 mA	22 mA = 111%

Valve Override (MFC Only)

Connector Pin 12 on the 15 pin D-Connector allows the valve to be forced to its most closed state or its most open state, regardless of setpoint. If this input is not electrically connected, the MFC will operate according to the current values of the other MFC inputs. If this input is held at 0 Vdc or -15 Vdc the valve will be forced to its most closed state. If this input is held at +5 Vdc or greater (max. = 24 Vdc), the valve will be forced to its open state.

Calibration Select Pin

Connector Pin 13, on the15 pin D-Connector allows selection of one of ten calibrations stored in the device. This pin is designed to accept pull-down resistors referenced to common (Pin 9).

Table 3-1 shows typical resistor values required for selecting calibrations 1 through 10. Note, these resistor values should be within ± 1% tolerance. The default condition is with no resistor connected which activates Calibration #1.

When the calibration select pin changes state, the device performs any required processing to change the calibration, then returns to normal operation. If the device determines that the selected calibration is not valid, (where applicable) the valve is driven to the closed state and the flow signal is set to zero. Typical time required to change calibrations is approximately 1.0 second.

NOTE: It is recommended to change calibration curve selection during no-flow conditions.

Table 3-1 Typical Resistor Values for Calibration Selection

CAL#	RESISTOR VALUE (K ohms)
1	Open
2	Shorted
3	665
4	324
5	191
6	124
7	80.6
8	52.3
9	30.9
10	15

Zeroing the MFC (Self-zero)

It may be desirable to re-zero the flow sensor if it is operated at its temperature extremes or if it is positioned in an attitude other than that specified on the customer order.

Note: Before zeroing the instrument, zero pressure differential MUST be established across the device. If there is pressure across the instrument during the zero process, any detected flow through the sensor will be misinterpreted as the zero flow reading. This will result in calibration inaccuracy during normal operation.
Once zero differential pressure is established and verified, press the recessed, momentary push-button (self-zero button) located on the side of the device (See Figure 3-2) to start the self-zero function. The zeroing process requires approximately 10 mseconds.

5 Vdc Reference

Connector Pin 11 on the 15 pin D-Connector provides a 5 Vdc reference output signal and is for use in generating a setpoint and/or Valve Override Signal. The current drive capability of this output is limited to 2.5 mA maximum and must be used with care.

3-5 Communications Features

3-5-1 RS-485 Communications Features (Analog versions only)

Digital communication, designed to emulate the Brooks S-series "S-protocol" or pseudo-HART communications is available on the Brooks Digital Series via RS-485. This form of multi-drop capable communication provides access to many of the Brooks Digital Series functions for "control and monitor" operations, including:

- Accurate setpoint adjustment flow output measurement (including units of measure selection)
- Valve Override (controller only)
- Flow Totalizer
- Alarm status and settings
- Soft Start Control (controller only)

RS-485 equipped units support the following baud rates. Please specify the desired baud rate when ordering (default is 19200 baud). Alternately, baud rate may be changed using the Brooks Service Suite™.

Baud Rates: 1200, 2400, 4800, 9600, **19200** and 38400

Reference the Brooks document "S-protocol Communication Command Description for Smart II" for more detail regarding the capabilities of this communication interface.

3-5-2 DeviceNet Communications Features

The Brooks SLA5800 Digital Series is also available with DeviceNet™ communication capability. DeviceNet is an open digital protocol capable of high speeds and easy system connectivity. Brooks Instrument has several of its devices available on this popular networking standard, and is a member of ODVA™ (Open DeviceNet Vendors Association), the governing standard body for DeviceNet.

DeviceNet is similar to the RS485 standard in that it is a multi-drop connection that allows a maximum of 64 devices to be connected on the same network. Baud rate selections for DeviceNet products are 125K, 250K and 500K and can be selected via MAC ID switches mounted on the device.

The DeviceNet communication link also provides access to many of the Brooks SLAMf Digital Series functions for “control and monitor” operations, including:

- Accurate setpoint adjustment and flow output measurement (including units of measure selection)
- PID Settings (controller only)
- Valve Override (controller only)
- Calibration Gas Select
- Soft Start Control (controller only)

3-5-3 FOUNDATION Fieldbus Communications Features

The Brooks SLA5800 Digital Series is supporting FOUNDATION® Fieldbus communication protocol. FOUNDATION® Fieldbus is a digital network allowing usage of existing 4-20mA cables, avoiding costly re-wiring. Fully certified by passing ITK, this device has passed several Interoperability requirements other a broad range of hosts. When combined with DeltaV and using the power of PlantWeb, those devices provide intelligent alerts allowing accurate device maintenance and service.

- Value Range check - Part of the standard function blocks
- Temperature sensor connection - Check sensor connection
- Firmware checksum - Check for Internal firmware integrity
- Non-volatile memory - Check for non-volatile memory integrity
- RAM - Check for RAM integrity
- Zero Drift/Valve Leak-by - Check for flow leak-by or sensor zero drift
- Device Overhaul due - Preventive Maintenance
- Calibration Due - Preventive Maintenance
- Valve spring life - Preventive Maintenance
- No Flow - No flow detected when setpoint requested
- Reverse Flow - Reverse flow detected
- Flow Totalizer - Informed when a user define amount of fluid has been delivered
- Time Totalizer - Informed when a user define amount of time has expired

Device type dependant function block are available representing the different device functions:

- Current Flow Value (Mass Flow device only)
- Current Pressure Value (Pressure device only)
- Current Device Temperature (Mass Flow device only)
- Current Valve position (Controller Only)
- Setpoint Control (Controller Only)
- Direct Valve Control (Controller Only)
- Actuator Override (Controller Only)
- Ultra-fast (8ms) PID function block for Cascade control (all devices)

3-6 Alarms and Warnings (Analog versions only)

This section outlines alarms and warnings associated with the Analog versions of the Brooks Digital Series.
For information describing alarms and warnings for Brooks DeviceNet™ units, reference the Brooks DeviceNet™ Supplemental Manual.

3-6 -1 Alarms and Warnings (Analog versions only)

Connector Pin 3, on the 15 pin D-Connector provides an open collector TTL output that will close depending on the alarm/warning situation and the alarm settings.

Alarms and Warnings are a user configurable feature. This feature may be adjusted via the Service Port using a special software application available from Brooks. Reference the Brooks Service Suite User Manual for more information about the Service Port and Service Tool software applications.

Each alarm has the following common user configurable traits:

Severity - The options are Off, Warning and Alarm. When set to Off, the conditions are not monitored and no actions will be taken. When set to Warning, the Alarm LED will flash Green when the monitored value exceeds the specified conditions. (See Alarm Code attribute). When set to Alarm, the Alarm LED will flash Red and the Analog Outputs will act based on the assigned Output Alarm Behavior when the monitored value exceeds the specified conditions.

Alarm Code - The alarm code specifies the code to be flashed on the LED to indicate that an alarm/warning condition has occurred. When more than one alarm/warning is active, then the LED will indicate the most severe alarm with the highest Alarm Code. An Alarm is more severe than a Warning. Alarm Codes do not have to be unique, i.e., more that one alarm/warning type can use the same alarm code.

Latching Enable - When an alarm/warning is set to non-latching, that means the alarm is indicated only when the monitored value exceeds the specified conditions. When the alarm/warning is set to latching, this means that the alarm/warning will be indicated when the monitored value first exceeds the specified conditions, and will be indicated until the user clears the alarm. If the user clears the alarm while the monitored value still exceeds the specified conditions, then the alarm will be re-latched and continue to be indicated.

Contact Enable - If the alarm condition is detected and the severity is alarm or warning, and the alarm contact is enabled, then the alarm contact is “closed”.

Low Limit - The value of the monitored value below which is considered an alarm/warning condition. (This attribute not valid for alarms that monitor a state condition of the device.)

High Limit - The value of the monitored value above which is considered an alarm/warning condition.(This attribute not valid for alarms that monitor a state condition of the device.)

Delay - The time in seconds that the value must remain above the high limit or below the low limit before an alarm/warning condition is indicated.

Alarm Summary

The following table summarizes the parameters for each alarm type and the respective default values.

Alarm	Severity	Alarm Code	Latching Enable	Contact Enable	Low Limit	High Limit	Delay
Diagnostic	Alarm	12	n/a	Off	n/a	n/a	n/a
Flow 1	Off	11	Off	Off	0%	120%	1.0
Flow 2	Off	10	Off	Off	0%	120%	1.0
No Flow Indication	Alarm	9	Off	Off	2%	n/a	1.0
Setpoint Deviation	Alarm	8	Off	Off	-10%	+10%	1.0
Totalizer Overflow	Off	7	n/a	Off	n/a	n/a	n/a
User Power Supply	Alarm	6	Off	Off	13.5	27.0	1.0
Setpoint Input Out of Range	Alarm	5	Off	Off	n/a	n/a	1.0
Flow Output Out of Range	Alarm	4	Off	Off	n/a	n/a	1.0
Flow Output Loop Open	Off	3	Off	Off	n/a	n/a	1.0
Flow Sensor Out of Range	Alarm	1	Off	Off	n/a	n/a	1.0

3-6-2 Diagnostic Alarms (Analog versions only)

A Diagnostic Alarm will be indicated when any of the diagnostics below detect a failure providing a visual indication via the red and/or green LED, and activating the TTL open collector output located on the 15 pin D-Connector. The diagnostic test or tests that have detected a problem and caused the Diagnostic Alarm to occur can be determined only by reading a parameter via the Service Port. When a diagnostic alarm occurs, the device will automatically reset after approximately 5 seconds.

Diagnostic	Failure Description
RAM	Byte by byte test of RAM detects bad memory location
Flash (Program Memory)	8-bit Checksum of the entire Flash not zero.
Non-Volatile Memory	Byte by byte test of Non-Volatile Memory detects bad memory location
Temperature Sensor	Temperature Sensor reports a value outside the designed range of 0° C to 100° C
Power Supply (Internal)	Any internally generated power supply voltage outside operational limits. (3.3 Volt and 7.6 Volt internal supply voltages must be within ± 5% of nominal value.)

Safe Mode
When the Device is in Safe Mode, the following behavioral characteristics of the device apply:

Flow Output Signal will be set to its defined Safe State for the following output signal types:

0 to 5 Vdc: 0 Vdc
1 to 5 Vdc: 1 Vdc
0 to 20 mA: 0 mA
4 to 20 mA: 0 mA

In the Safe State, the valve will be unpowered. This means that for Normally Closed valves, the valve will stay closed and for Normally Open valves, the valve will stay open.

3-6-3 General Alarms and Warnings (Analog versions only)

Several alarms are available to indicate unexpected process control events as follows:

Flow Alarms
Two flow alarms will be provided. Each will allow the user to set a minimum and maximum flow limit range. Whenever flow is not within the range, the alarm will occur. These two general flow alarms provide more flexibility than having specific low and high flow alarms. These two alarms may be used to create separate low and high flow alarms, or maybe used to provide banding around a flowrate. If the device is a controller, then this alarm is disabled if the setpoint is not within the specified flow limits or if the valve override is active.

User Power Supply Alarm
The User Power Supply Alarm monitors the Power Input to the device for values outside the device specification of 13.5 to 27 Vdc. The user can configure the voltage limits that activate this alarm in order to monitor their supply voltage for a tighter specification than the device requires.

Setpoint Deviation Alarm
The Setpoint Deviation Alarm monitors the difference between Setpoint and Flow and sets the alarm when the difference exceeds the specified limits for more than the specified delay period. The user specifies a minimum and maximum limit in percent of Setpoint. This alarm is disabled if the valve override is active.

No Flow Indication Alarm
The No Flow Indication Alarm will occur when the measurement of flow indicates flow less than a value that can be configured to 0 - 2%. If the device is a controller, setpoint must exceed the configured limit and valve override must not be active for this alarm to occur.

Totalizer Overflow Alarm
The Totalizer Overflow Alarm will occur when the Flow Totalizer reaches its maximum value and resets to zero. This alarm is permanently configured as a latching type alarm which requires the user to reset the alarm via the Service Port or the RS-485 interface.

Flow Analog Output Loop Open Alarm
The Flow Analog Output Loop Open Alarm will occur when the device detects that there is no current flowing on the current loop. This alarm could be the fault of an open connection on the analog output current loop.

Setpoint Analog Input Out of Range Alarm
The Setpoint Analog Input Out of Range Alarm will occur when the Voltage Input exceeds the maximum allowable 5.5 V, when the 4 – 20 mA input is less than 3.8 mA or greater than 22 mA, or when the 0 – 20 mA input is greater than 22 mA.

Flow Analog Output Out of Range Alarm
The Flow Analog Output Out of Range Alarm will occur when the measured flow results in an Analog Output which exceeds the specified range for either the Voltage or Current Output. See Section 1.

Flow Sensor Out of Range
The Flow Sensor Out of Range Alarm will occur when the device detects that the signal received from the sensor is not within the allowable tolerance band. This alarm could be the result of a flow sensor failure.

3-7 Calibration/Configuration Sets

All Flow Calibration parameters and some of the device configuration parameters are saved in the device Non-Volatile Memory as “sets”. Up to 10 sets of calibration/configuration sets can be saved in order to have a unit pre-configured for multiple gas calibration, different pressure conditions, multiple scalings of the same gas.

Calibration and configuration data sets may be adjusted by an advanced user via the Service Port using a special software application available from Brooks. Reference the Brooks Service Suite User Manual for more information about the Service Port and Service Tool software applications.

Flow Calibration Options
In addition to the factory calibration polynomial, the following calibration options are provided to modify the factory calibration:

- Gas Correction Factor
- Calibration Scaling
- User Calibration Polynomial

Configuration Options
The following configuration parameters are stored in the Calibration/ Configuration Sets:

- P, I, and D
- Valve Offset, Span, and Leaktight Offset
- Pole Compensation and filtering

3-8 Special Features

Special Features may be adjusted by an advanced user via the Service Port using a special software application available from Brooks. Reference the Brooks Service Suite User Manual for more information about the Service Port and Service Tool software applications.

3-8-1 Setpoint Ramping

The following Setpoint Ramping Options are provided:

Off – The device responds immediately to Setpoint changes.

Time – The device will Ramp Flow from the old Setpoint to the new Setpoint in the time specified by the user in seconds.

3-8-2 Low Setpoint Command Cutoff

When the Setpoint is derived from analog input, the Low Setpoint Command Cutoff parameter sets the minimum valid value of Setpoint. If the Setpoint value reported by the analog input is below the Low Setpoint Command Cutoff parameter value, then the Setpoint will be set to zero.

3-8-3 Low Flow Output Cutoff

Whenever the measured flow is below the Low Flow Output Cutoff parameter, the Flow Output will be set to zero.

3-8-4 Flow Output Damping

The Flow Output can be damped from 0 to 10 seconds.

3-8-5 Adaptive Control

Adaptive Valve Control is a means of dynamically adjusting valve offset and span in response to changing process conditions. Options for Adaptive Control are: On/Off, Adjust Offset Only, Adjust Offset and Span.

3-8-6 Flow Totalizer

A Flow Totalizer will be provided and maintained in Non-Volatile Memory. The update rate of the totalizer in Non-Volatile Memory will be 5 seconds.

3-8-7 Flow Output Conditioning

When this feature is enabled and a change in setpoint is detected, the Flow Out signal will equal setpoint for a configurable time period. At the end of the time period, the Flow Out signal will indicate actual flow. A change of setpoint is defined as a change of more than 1% of full scale.

3-8-8 Flow Signal Lock-in

When this feature is enabled, the Flow Out signal will “lock-in” to the setpoint value whenever the error between measured Flow and Setpoint is less than a configurable value.

3-9 PC-based Support Tools

Brooks Instrument offers a variety of PC-based process control and service tools to meet the needs of our customers. SmartDDE may be used with any unit supporting RS-485 in a multidrop configuration, thus allowing users to control and monitor their Brooks devices. The Brooks Service Suite (Analog I/O versions only) may be used to monitor, diagnose, tune and calibrate Brooks devices. The Brooks Service Suite interfaces with Brooks products via a special service port. The Brooks Service Tool (BST) may be used for devices equipped with digital communications to perform many of the same tasks as the Brooks Service Suite.

4-1 Maintenance and Troubleshooting

⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

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

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

No routine maintenance is required on the Brooks Digital MFC's and MFM's. If an in-line filter is used, the filtering elements should be periodically replaced or cleaned.

⚠ WARNING

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

⚠ WARNING

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

⚠ CAUTION

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

4-1-1 Troubleshooting Analog or DeviceNet version

This section contains suggestions to help diagnose MFC related problems in the gas distribution system and answers commonly asked questions.

Failure of the flow rate or flow signal to achieve setpoint.

1. Insufficient pressure drop across the MFCs (low or no pressure). If there is not enough pressure differential across the MFC, it is impossible for the MFC's orifice to pass the full scale flow rate. To check for this condition, compare the actual inlet/outlet pressure drop with that specified on the order. Increase the pressure if necessary.

2. If pressure settings are correct and flow signal does not match setpoint, a secondary issue could be the gas type. If checking the MFC with a surrogate gas, ensure that there is enough pressure to the MFC in order to flow the correct amount of the surrogate gas.

3. Setpoint is below minimum. MFCs may have a settable low flow cutoff for the setpoint command. If setpoint is below this value, then the MFC will not attempt to control.

4. Clogged sensor tube. If the MFC sensor tube is clogged, the flow signal will be very low or zero while the actual flow will be at the valve's maximum rate.

5. Flow signal matched setpoint but, actual flow is not correct.
   Clogged restrictor. If the MFC's restrictor becomes clogged, a much larger flow stream will pass through the sensor rather than going straight through the restricotr. The symptom of this condition is a substantially reduced actual flow with a flow signal which matches the setpoint.

6. Flow rate in excess of 100% at zero setpoint.
   Valve Override pin set to open. If Vallve Override (VOR) pin is active, the valve will be forced open or closed. Set this pin to it's normal level before setting a setpoint.

7. Flow/Flow signal 'Unstable'
   Model SL5800 Series MFC performance is tuned during calibration at the conditions specified on the order. If the conditions in use (inlet and outlet pressure, temperature, attitude, gas or mixture type) are different or become different over time, the MFC may not perform as it didwhen it left the factory.

DeviceNet Version Only

8. Failure of the flow rate or flow signal to achieve setpoint.
   Specifically for a DeviceNet MFC, there may be problems associated with the network communication link. One common problem is due to data mismatches of the Input/Output (I/O) Assemblies. For proper communication ove rthe DeviceNet network, the MFC must be set up with the same I/O assemby as the network master. Confirm these I/O settings are correct.

NOTE: This information and all other detailed DeviceNet information is available in the Brooks DeviceNet Supplement Instruction Manual.

Questions Analog Version

Q: What is purpose of the LED on top of the MFC?

A: The LED on top of the MFC should normally be lit GREEN, This signifies the MFC is in proper working mode. If the LED is lit RED, this signifies a critical fault has occurred in the MFC. Please contact the factory for instructions.

Questions DeviceNet Version

Q: What is purpose of the LED on top of the MFC?

A: There are two LEDs on top of a DeviceNet version MFC. The LED labeled 'MOD' is used to indicate module status. This LED should normally be lit GREEN. If the 'MOD' LED is lit RED, this signifies a critical fault has occurred in the MFC. Please contact the factory for instructions. The LED labeled 'NET' is used to indicate NETWORK status. Note the 'NET' LED can have 4 distinct operational states. For more complete details on these LEDs, reference the Brooks DeviceNet Supplement Instruction Manual.

Q: What is purpose of the Rotary Switches on top of the MFC?

A: Two of the rotary switches are labeled 'ADDRESS'. These two switches are used to configure the MAC ID of the MFCwhen used on the DeviceNet network. MAC ID stands for Media Access Control Identifier and is used to set the unique address of the device on the network. The possible range of addresses is 00 to 63. The out-of-box MAC ID setting is 63. The third rotary switch is labeled 'RATE'. This switch sets the baud rate of the MFC for communicating over the DeviceNet network. The out-of-box default setting is 125K baud. For more complete details on these switches, reference the Brooks DeviceNet Supplement Instruction Manual.

Analog or DeviceNet Version

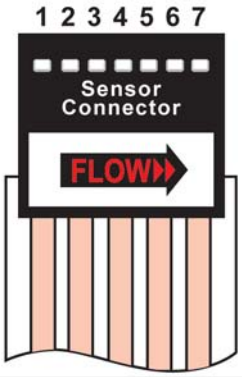
Q: What is the purpose of the recessed push-button on the side of the MFC?

A: This push-button is used to start a self-zero function. DO NOT press this button unless you are performing this function as described in Section 3-5 of this manual.

Table 4-1 Sensor Troubleshooting

SENSOR SCHEMATIC

PIN NO.	FUNCTION
1	Heater
2	Upstream Temperature Sensor (Su)
3	Downstream Temperature Sensor (Sd)
4	Sensor Common
5	Heater Common
6	Thermistor
7	Thermistor



Flex Circuit Wire Numbers

Remove the sensor connector from the PC Board for this procedure.

OHMMETER CONNECTION	RESULT IF ELECTRICALLY FUNCTIONAL
Pin 1 or 4 to meter body	Open circuit on ohmmeter. If either heater (1) or sensor common (4) are shorted, an ohmmeter reading will be obtained.
Pin 4 to Pin 2	Nominal 1100 ohms reading, depending on temperature and ohmmeter current.
Pin 4 to Pin 3	
Pin 5 to Pin 1	Nominal 1000 ohm reading.
Pin 6 to Pin 7	Nominal 580 ohm reading.

4-1-2 System Checks

The Brooks Digital Series Flowmeters and Controllers are generally used as a component in gas handling systems, which can be complex in nature. It can therefore be very difficult to isolate a malfunction in the system. An inaccurately diagnosed malfunction can cause many hours of unnecessary downtime. If possible, perform the following system checks before removing a suspect Mass Flow Meter or Controller for bench troubleshooting or return to the factory. (especially if the system is new):

1. Verify a low resistance common connection and that the correct power supply voltage and signals are present of the connector of the Smart TMF.

2. Verify that the process gas connections have been made correctly, and that they have been tested for leaks.
3. If the Mass Flow Controller appears to be functioning but cannot achieve Setpoint, verify that there is sufficient inlet pressure and pressure drop at the controller to provide the required flow.

This section contains suggestions to help diagnose simple MFC/MFM related problems in the gas distribution system and answers commonly asked questions.

⚠ WARNING

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

Bench Troubleshooting

1. Establish a proper connection between the Brooks Digital Series Mass Flow Meter or Controller (using Figure 4-1 as a reference) Switch on the power and allow the instrument to warm-up for 45 minutes. In case of a Controller model, adjust the Setpoint to zero. Do not connect the device to a gas source yet. Observe the output signal and, if necessary, perform the zero adjustment procedure (See Section 3-4 zeroing function). If the output signal does not zero properly, please contact Brooks Instrument.

2. Connect the instrument to a source of the same gas used for it's original calibration. Regulate the Setpoint to 100% flow and adjust the inlet and outlet pressures to calibration conditions. Verify that the output signal reaches its full scale value and stabilizes at that value. Vary the command voltage over the 1 to 100% range and verify that the output signal follows the Setpoint If possible, connect a flow measurement device to monitor the actual flow behavior and verify the accuracy of the mass flow instrument. If the mass instrument performs as described above, then it is functioning correctly and the problem may lie elsewhere.

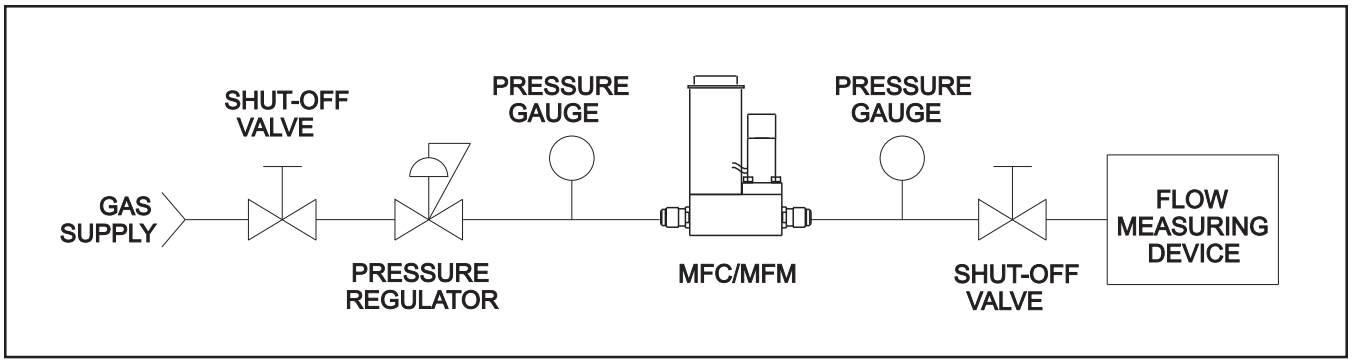


Figure 4-1 Bench Troubleshooting Circuit

Table 4-2 lists possible malfunctions which may be encountered during bench troubleshooting.

For Controller Models Only: Apply +5 Vdc to the +15 Vdc valve override pin (pin 12) and verify that the output exceeds 100%. Connect the valve override pin to earth and verify that the output signal falls below 2%.

4-1-3 Cleaning Procedures

When deposition makes it necessary to clean the Brooks Digital Series Mass Flow Controller or Mass Flow Meter, use the following procedures:

⚠ WARNING

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

1. Remove the unit from the system.
2. Purge with dry nitrogen gas, which removes virtually all particulate matter from the device. Should contamination persist, subject all wetted[1] components to ultrasonic cleaning. Following this, purge the device thoroughly with dry nitrogen gas once again.
3. If the sensor is contaminated, remove the sensor and use a haemostat or tweezers to push a 0.007" diameter piano wire through the flow-sensor tube to remove any contamination (end closest to the control valve). The sensor tube can then be flushed with a solvent that leaves no residue. This can be accomplished conveniently using a hypodermic needle filled with solvent.

NOTE: Do not soak the sensor assembly in a cleaning solvent. If solvent seeps into the sensor assembly, it will likely damage or significantly alter the sensor's operating characteristics.

4-1-4 Calibration Procedure

The calibration of Brooks Digital Series Mass Flow devices is not described in this manual. Such calibration requires accurate and traceable calibration equipment such as Brooks Vol-U-Meter® equipment, in addition to digital communications.

If your device needs calibration Brooks Instrument can provide this service at one of its service locations. Visit www.BrooksInstrument.com to locate the service location nearest to you. However, if traceable calibration equipment is available at your facility, Brooks service Suite Calibration software, along with training, is available for purchase.

[1] Wetted components include the body, laminar-flow element, and all valve components including the orifice, process adapters and inlet filters (if so equipped).

Table 4-2 Troubleshooting

Trouble	Possible cause	Check/Corrective Action
Output stays at zero (regardless of Setpoint) and there is flow through the meter/controller	Clogged Sensor Defective electronic board	Clean sensor. Refer to cleaning procedures (Section 4-1-2). Contact Brooks Instrument
Flow cannot be achieved regardless of Setpoint. (applicable to MFC)	Clogged Control Valve Valve override input is grounded Defective electronic board	Clean the control valve (Section 4-1-2) or return the device to the factory Check the valve override input (Pin 12) Contact Brooks Instrument.
Output signal stays at approx. 5.5 Vdc or 22 mA (regardless of Setpoint) and there is flow through the meter/controller	Valve leaks or is stuck open (applicable to MFC) +15 V applied to the valve override input (applicable to MFC) Defective PC board	Clean and/or adjust control valve (Section 4-1-2). Check the valve override terminal (Pin 12) Contact Brooks Instrument
Output signal follows Setpoint at higher Setpoints but will not go below 2%	Control valve leaks or is stuck open.	Clean the control valve or return the device to the factory (Section 4-1-2).
Output signal follows Setpoint at lower Setpoints, but does not reach full scale	Insufficient inlet pressure or pressure drop Partially clogged sensor Partially clogged valve (applicable to MFC) Valve out of adjustment (applicable to MFC) Valve guide spring failure (applicable to MFC)	Adjust pressures, inspect in-line filters and clean/replace as necessary. Clean sensor, see cleaning procedures (Section 4-1-2). Clean the control valve (Section 4-1-2) or return the device to the factory, see cleaning proceedures Contact Brooks Instrument Contact Brooks Instrument
Instrument grossly out of calibration. Flow is higher than desired.	Partially clogged sensor	Clean sensor, see cleaning procedures (Section 4-1-2).
Instrument grossly out of calibration. Flow is lower than desired.	Partially clogged restrictor	Replace or clean restrictor
Controller oscillates (applicable to MFC)	Pressure drop or inlet pressure deviates from calibrated values Valve out of adjustment Unstable inlet pressure Defective PC board	Adjust pressures to original specifications Contact Brooks Instrument Check external pressure regulator Contact Brooks Instrument

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

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

Европейска директива за уреди под налягане (PED)

Всички съоръжения под налягане с вътрешно налягане над 0,5 bar (g) и с размер по-голям от 25 mm или 1" (инч), 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 измерителни уреди съответстват на европейската директива 97/23/ЕО.
- Всички разходомери на Brooks Instrument се отнасят към флуиди от група 1.
- Измерителните уреди по-големи от 25 mm или 1" (инч) съответстват на I, II или III категория според PED.
- Измерителните уреди с размери 25 mm или 1" (инч), 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 2004/108/EC).
Особено внимание трябва да се обръща обаче на избирането на сигналните кабели, използвани с оборудването, носещо знака CE.
Качество на сигналните кабели, кабелните салници и съединители:
Brooks Insturment предлага висококачествени кабели, отговарящи на изискванията на CE сертификацията.
Ако използвате собствен сигнален кабел, трябва да изберете такъв, който е напълно защитен със 100%-ово екраниране.
Съединителите тип „D" или „кръгов" трябва да бъдат екранирани с метален щит. При необходимост за фиксирането на щита на кабела трябва да се използват метални кабелни салници.
Щитът на кабела трябва да се свърже с металното покритие или металния салник и в двата края да се екранира в 360°. Щитът трябва да бъде заземен.
Съединителите за печатни платки са стандартно неметални. Използваните кабели трябва да бъдат защитени със 100%-ово екраниране, за да отговарят на CE сертификацията.
Щитът трябва да бъде заземен.
Конфигурация на контактите: Виж приложената инструкция за експлоатация.

Електростатичен разряд (ESD)

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

Процедура за работа:

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

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

Czech

Základní instrukce
Před instalací si přečtěte následující instrukce!

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

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

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

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

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

Evropská směrnice pro tlakové zařízení (PED)

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

- Měřicí přístroje popsané v této příručce jsou v souladu se směrnicí EN 97/23/ES.
- Všechny průtokoměry společnosti Brooks Instrument spadají do rámce Kapaliny, skupina I.
- Měřicí přístroje větší než 25 mm nebo 1" (palec) jsou v souladu se směrnicí PED, kategorii I, II nebo III
- Měřicí přístroje 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. 2004/108/EC).
Výběru signálních kabelů pro použití se zařízením označeném CE je nutné věnovat zvláštní pozornost.
Kvalita signálních kabelů, kabelových průchodek a konektorů:
Brooks Instrument dodává vysoce jakostní kabely splňující požadavky kvalitativního zařazení CE. Pokud chcete použít vlastní signální kabely, zvolte typy s kvalitním stíněním všech žil a v celé délce trasy.
V případě použití konektorů kruhových nebo tvaru „D“, musí mít tyto kovové stínění. V případě jejich použití, musí kovové kabelové průchodky být propojeny se stíněním kabelu.
Stínění by mělo být připojené ke kovovému tělesu přístroje nebo krytu, na obou koncích kabelu a po celém jeho obvodu.
Stínění by mělo být uzemněno.
Přípojky vedoucí ke kartám podle norem jsou nekovová. Pro splnění požadavků předpisů CE musí být použité kabely kompletně stíněny.
Stínění by mělo být uzemněno.
Konfigurace kontaktů je uvedena v přiloženém návodu k obsluze.

Elektrostatický výboj (ESD)

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

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

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

Dansk

Grundlæggende vejledninger Læs disse før anvendelse!

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

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

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

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

- Overhold alle regler, som er markeret eller leveret sammen med udstyret.
- 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 måleinstrumenter der er tilpasset direktivet 97/23/EK EU.
- Alle Brooks gennemstrømningsmålere tilhører væskegruppen nr. 1.
- Alle målinstrumenter som er større end 25 mm eller en tomme beskrives i direktivet PED´s kategorier I, II eller III.
- Alle målinstrumenter 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 2004/108/EC).
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..

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

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

PED-richtlijn (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 meters die in deze handleiding worden beschreven, voldoen aan de Europese richtlijn 97/23/EG.
- Alle stromingsmeters van Brooks Instrument vallen in groep 1.
- Meters met een diameter van meer dan 25 mm voldoen aan de categorieën I, II of III van de PED-richtlijn.
- Meters 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 2004/108/EC).
De keuze van de signaalkabel voor gebruik in combinatie met apparatuur met CE-markering verdient speciale aandacht.
Kwaliteit van de signaalkabel, kabelafdichtingen en stekkers:
Brooks Instrument levert hoogwaardige kabels die voldoen aan de specificaties voor de CE-markering.
Als u zelf voor signaalkabel zorgt, moet u altijd een volledig afgeschermde kabel gebruiken.
Stekkers van het type “D” of ronde stekkers moeten zijn voorzien van een metalen afscherming. Indien nodig moeten metalen kabelafdichtingen worden gebruikt waarvan de afscherming voor het klemmen van de kabel kan worden gebruikt.
Het kabelscherm moet met het metalen omhulsel of de metalen afdichting worden verbonden en aan beide uiteinden rondom volledig worden afgeschermd.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Card Edge Connectors zijn standaard niet van metaal. De gebruikte kabels moeten volledig zijn afgeschermd om te voldoen aan de CE-markering.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Voor de pinconfiguratie: Raadpleeg de bijgevoegde handleiding.

Elektrostatische ontlading

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

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

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

Estonian

Olulised juhised
Enne kasutamist lugege hoolikalt läbi!

Brooks Instrument konstrueerib, valmistab ja katsetab oma tooteid selliselt, et need vastaksid paljude erinevate riiklike ja rahvusvaheliste standardite nõuetele. Ainult nõuetekohane paigaldamine, kasutamine ja hooldamine tagab toodete katkematu talitluse tavaspetsifikatsiooni raames. Brooks Instrument'i toodete paigaldamisel, kasutamisel ja hooldamisel tuleb täita alljärgnevaid juhiseid ja integreerida need asjakohasesse ohutusprogrammi.

- Nõuetekohase talitluse tagamiseks tohib toodet paigaldada, kasutada, täiustada, programmeerida ja hooldada ainult kvalifitseeritud personal.
- Enne toote paigaldamist, kasutamist ja hooldamist lugege kõik kasutusjuhised hoolikalt läbi. Kui käesolev kasutusjuhend ei vasta teie tootele, pöörduge kohaliku edasimüüja poole, kelle kontaktandmed leiate kasutusjuhendi tagakaanelt. Hoidke see kasutusjuhend edaspidiseks alles.
  ⚠ HOIATUS: ärge kasutage seda instrumenti väljaspool kasutusjuhendis spetsifitseeritud piirväärtusi. Selle hoiatuse eiramine võib põhjustada tõsiseid kehavigastusi ja/või kahjustada seadet.
- Kui te saa mõne juhise mõttest aru, pöörduge selgituste saamiseks kohaliku Brooks Instrument'i edasimüüja poole.
- Järgige kõiki hoiatusi, tähelepanule manitsusi ja juhiseid, mis on tootele peale kantud või tootega kaasa antud.
- Seadme paigaldamisel järgige vastavas kasutusjuhendis toodud paigaldusjuhiseid ning asjakohaseid kohalikke ja riiklikke eeskirju. Ühendage tooted nõuetekohaste toite- ja surveallikatega.
- Talitlus: (1) Avage aeglaselt vool süsteemi. Vooluimpulsside vältimiseks avage tööventiilid aeglaselt. (2) Kontrollige, et voolukulumõõturi sisend- või väljundühenduste ümber ei ole lekkeid. Kui lekkeid ei ole, laske süsteemil saavutada töösurve.
- Enne seadme hooldamist veenduge, et kogu süsteem on surve alt vabastatud. Varuosasid tohib vahetada ainult kvalifitseeritud personal, kasutades selleks Brooks Instrument'i poolt heakskiidetud varuosi. Mitteoriginaalvaruosade kasutamine ja ebapädev toimingute tegemine võivad kahjustada toote tööomadusi ja põhjustada riski tootmistegevuse ohutuse tagamisel. Originaalvaruosadele sarnaste osade kasutamine võib põhjustada tule- või elektrilöögiohtu või seadme väärtalitlust.
- Elektrilöögi- ja vigastuseohu vältimiseks peavad seadme luugid olema alati suletud ja kaitsekatted oma kohal, va 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 tõsiseid 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.

- Käesoleva kasutusjuhendi spetsifikatsiooniosa sisaldab surveseadmete direktiiviga seonduvaid juhiseid.
- Käesolevas kasutusjuhendis kirjeldatud mõõturid vastavad EN direktiivi 97/23/EÜ nõuetele.
- Brooks Instrument'i voolukulumõõturid kuuluvad vedelike 1. gruppi.
- Mõõturid läbimõõduga üle 25 mm või 1 tolli vastavad surveseadmete direktiivi kategooriale I, II või III.
- Mõõturitele läbimõõduga alla 25 mm või 1 tolli kohaldatakse häid inseneritavasid.

Euroopa elektromagnetilise ühilduvuse direktiiv (EMÜ)

Brooks Instrument'i (elektrilised/elektroonilised) seadmed, millele on omistatud CE-tähis, on edukalt läbinud asjakohased katsed ja vastavad elektromagnetilise ühilduvuse nõuetele (EMÜ direktiiv 2004/108/EC).
Kuid signaalkaabli valimisel on vaja pöörata suurt tähelepanu CE-tähisega seadmetele.
Signaalkaabli, läbiviigutihendite ja konnektorite kvaliteet
Brooks Instrument turustab kõrgekvaliteedilisi kaableid, mis vastavad CE-sertifikaadi nõuetele.
Olemasoleva kaabli kasutamisel jälgige, et kaabel oleks täielikult ümbritsetud varjestusega.
„D" või „Ring"-tüüpi konnektorid peavad olema varustatud metallvarjestusega. Kus kohaldatav, tuleb kasutada metallist läbiviike, mis tagavad kaabli varjestuse ühenduse.
Kaabli varjestus ühendatakse metallkesta või läbiviigutihendiga ja on mõlemast otsast kaitstud 360° ulatuses.
Varjestus peab olema maandatud.
Mikroskeemide servaühendused on üldjuhul mittemetallist. Vastavuse tagamiseks CE-sertifikaadi nõuetele peavad kasutatud kaablid olema 100% varjestatud.
Varjestus peab olema maandatud.
Klemmide konfigureerimine: vt komplekti kuuluvat kasutusjuhendit.

Elektrostaatiline laeng

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

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

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

Finnish

Perusohjeet
Lue ensin ohjeet huolellisesti!

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

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

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

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

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

Eurooppalainen painelaitedirektiivi (PED)

Painelaitteet, joidenpaine on suurempi kuin 0,5 bar 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 mittarit ovat 97/23/EC EU-direktiivin mukaisia.
- Kaikki Brooks Instrumentin virtausmittarit kuuluvat virtausryhmään 1. Laitteet jotka ovat suurempia, kuin 25 mm tai 1 tuuma, ovat PED I, II, III kategorien mukaisia.
- Mittarit joiden koko on alle 25 mm tai 1 tuuma ovat hyvän konepajakäytännön (SEP) mukaisia.

Eurooppalainen direktiivi sähkömagneettisesta yhteensopivuudesta (EMC)

Brooks Instrumentin CE-merkin saaneet (sähkö/sähköiset) laitteet täyttävät EMC direktiivin vaatimukset ja testit sähkömagneettisesta yhteensopivuudesta (2004/108/EC EMC direktiivi).
Erityistä huomioita on kiinnitettävä CE-merkittyjen laitteiden käytössä olevien kaapelien valintaan.
Kaapelien, kiinnikkeiden ja liittimien laatu:
Brooks Insturmentin kaapelit ovat korkealaatuisia ja täyttävät CE-merkintä direktiivin vaatimukset.
Muun valmistajan kaapelia käytettäessä on käytettävä 100% suojattua kaapelia.
Liittimien tulee olla häiriösuojattua tyyppiä. Tarvittaessa käytetään metallisia kiinnikkeitä kaapelin suojuksen kiinnittämiseen. Kaapelin suojakuoren pitää olla yhdistettynä metallisuojukseen tai laippaan ja sen pitää olla molemmista päistä suojattuna 360^{o}. Suojaus päättyy maadoitukseen.
Standardin mukaan korttien liittimet eivät ole metallisia. Käytettyjen kaapelien suojaus on oltava 100%, jotta se täyttäisi CE-merkinnän direktiivin vaatimukset.
Suojaus päättyy maadoitukseen.
Napojen järjestys: Katso liitteenä oleva käyttöopas.

Elektrostaattinen purkaus (ESD)

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

Asennusohjeet:

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

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

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.
- 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 97/23/EC.
- 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 2004/108/EC).
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.

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

WARNUNG: Werden die Ein- und Auslassventile neben Durchflussmessgeräten aus irgendwelchen Gründen geschlossen, so müssen die Geräte komplett entleert werden.
Durchflussmessgeraete muessen vor dem Schliessen von Ein- und Auslassventilen komplett entleert werden, anderenfalls kann es zu einer thermischen Ausdehnung der Flüssigkeit und damit zum Bruch des Gerätes kommen; Personenschäden können die Folge sein.

Europäische Druckgeräterichtlinie (PED)

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

- Das Kapitel zu den technischen Daten in dieser Anleitung enthält wichtige Sicherheits- und Betriebsanweisungen in Bezug auf die Druckgeräterichtlinie.
- Messgeräte, die in diesem Handbuch beschrieben sind, erfüllen die europäische Richtlinie 97/23/EG.
- Alle Durchflussmesser von Brooks Instrument fallen unter die Fluidgruppe 1.
- Messgeräte, die größer als 25 mm oder 1“ (inch) sind, erfüllen die Kategorien I, II oder III der Druckgeräterichtlinie (PED).
- Messgeräte 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 2004/108/EC) erfolgreich bestanden.
Dennoch muss bei der Wahl des Signalkabels für das Gerät mit CE-Zeichen auf folgende Dinge geachtet werden.
Qualität von Signalkabel, Kabeldurchführung und Anschlüsse:
Brooks Instrument liefert qualitativ hochwertige Kabel, die den Anforderungen für eine CE-Zertifizierung entsprechen.
Sollten Sie eigene Kabel einsetzen, so sollte das Kabel überall mit einer 100%-Abschirmung versehen sein.
D- oder Rundstecker sollten eine Metallabschirmung aufweisen. Wenn möglich, müssen Kabeldurchführungen aus Metall mit Kabelschirmgeflechts-Klemmen verwendet werden.
Der Kabelschirm sollte an die Metallhülle oder -durchführung angeschlossen werden und an beiden Enden rundherum (360 °) abgeschirmt werden.
Die Abschirmung sollte geerdet werden.
Randstecker auf Platinen sind standardmäßig nicht aus Metall. Die verwendeten Kabel müssen mit einer 100 % Abschirmung versehen werden, um die CE-Vorgaben zu erfüllen.
Die Abschirmung sollte geerdet werden.
Klemmenbelegung: Siehe beigefügtes Handbuch.

ESD (Elektrostatische Entladung)

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

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

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

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

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

Ευρωπαϊκή Οδηγία για τον εξοπλισμό υπό πίεση (PED)

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

- Το κεφάλαιο Προδιαγραφές του παρόντος εγχειριδίου περιλαμβάνει οδηγίες σχετικά με την Οδηγία PED.
- Οι μετρητές που περιγράφονται στο παρόν εγχειρίδιο συμμορφώνονται με την ευρωπαϊκή Οδηγία 97/23/ΕΚ.
- Όλα τα ροόμετρα της Brooks Instrument ανήκουν στην ομάδα ρευστών 1.
- Μετρητές μεγαλύτεροι από 25 mm ή 1 ίντσα συμμορφώνονται με τις κατηγορίες I, II και III της Οδηγίας PED.
- Μετρητές μεγέθους 25 mm ή 1 ίντσας ή και μικρότεροι κατασκευάζονται σύμφωνα με τους κανόνες της τέχνης (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 2004/108/ΕC για την EMC).
Πάντως χρειάζεται ιδιαίτερη προσοχή στην επιλογή του καλωδίου σήματος για τον εξοπλισμό που φέρει το σήμα CE.
Ποιότητα των καλωδίων σήματος, στυπιοθλιπτών και βυσμάτων καλωδίων:
Η Brooks Instrument προσφέρει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές CE.
Σε περίπτωση παροχής δικού σας καλωδίου σήματος, χρησιμοποιείτε καλώδιο με πλήρη θωράκιση 100% σε όλα τα σημεία.
Βύσματα τύπου «D» ή κυκλικά πρέπει να έχουν μεταλλική θωράκιση. Να χρησιμοποιηθούν κατά προτίμηση μεταλλικοί στυπιοθλίπτες καλωδίων για τη στερέωση της θωράκισης.
Να συνδεθεί η θωράκιση του καλωδίου στο μεταλλικό κέλυφος ή στυπιοθλίπτη και να θωρακιστεί και στα δύο άκρα κατά 360 μοίρες. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Τα βύσματα άκρου της πλακέτας είναι εκ κατασκευής μη μεταλλικά. Τα χρησιμοποιούμενα καλώδια πρέπει να έχουν 100% θωράκιση για συμμόρφωση με την πιστοποίηση CE. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Για τη διάταξη των ακίδων: Συμβουλευθείτε το συνημμένο εγχειρίδιο οδηγιών.

Ηλεκτροστατική εκκένωση (ESD)

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

Διαδικασία χειρισμού:

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

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

Hungarian

Alapvető utasítások Először olvassa el ezeket!

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

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

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

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

Nyomástartó berendezésekre vonatkozó európai irányelv (PED)

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

- A gépkönyv „Műszaki adatok” fejezete tartalmaz a PED irányelvre vonatkozó utasításokat.
- A gépkönyvben megadott mérőeszközök megfelelnek a 97/23/EK EU irányelvnek.
- Minden Brooks átfolyásmérő az 1-es folyadékcsoportba tartozik.
- A 25 mm-nél vagy 1 hüvelyknél nagyobb mérőeszközök megfelelnek a PED I, II, vagy III kategóriának.
- A 25 mm-es illetve 1 hüvelykes vagy kisebb mérőeszközök 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 (2004/108/EC sz. EMC irányelv) vizsgáló teszteket.
Ugyanakkor különös figyelmet kell fordítani a CE jelölésű berendezésekhez felhasznált jelkábelek kiválasztására.

A jelkábelek, kábelösszekötők, csatlakozók minősége:

A Brooks Insturment magas minőségű kábeleket kínál, melyek megfelelnek a CE minősítés követelményeinek.
Amennyiben saját jelkábelt alkalmaznak, olyat kell választani, amely 100%-os árnyékolással, teljes mértékben szűrt.
A „D” vagy „kör alakú” csatlakozóknak fémárnyékolóval árnyékoltnak kell lennie. Szükség esetén fém kábelösszekötőket kell alkalmazni a kábelszűrő rögzítésére.
A kábelszűrőt a fém házhoz vagy hüvelyhez kell csatlakoztatni és mindkét felén 360°-ban le kell árnyékolni. Az árnyékolásnak földelésben kell végződnie.
A kártyákhoz tartozó csatlakozók szabványosan nem fémesek. Az alkalmazott kábeleknek 100%-és árnyékolással szűrteknek kell lenniük, hogy megfeleljenek a CE minősítésnek.
Az árnyékolásnak földelésben kell végződnie.
Érintkező konfiguráció: Lásd a mellékelt kezelési utasítást.

Elektrosztatikus kisülés (ESD)

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

Kezelési eljárás:

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

Megjegyzések:

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

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.
- 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.
- Gli strumenti di misura descritti nel presente manuale sono conformi alla Direttiva UE 97/23/CE.
- Ogni flussimetro Brooks appartiene al gruppo di fluidi 1.
- Gli strumenti di misura maggiori di 25 mm o di 1 pollice sono conformi alla categoria I, II o III della PED.
- Gli strumenti 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 2004/108/EC).
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.

Latvian

Svarīga instrukcija
Pirms turpināt izlasiet!

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

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

Eiropas spiedieniekārtu direktīva (PED)

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

- Šīs rokasgrāmatas tehnisko parametru nodaļā ir sniegtas a PED Direktīvu saistītās instrukcijas.
- Šajā rokasgrāmatā aprakstītie mērītāji atbilst EN Direktīvas 97/23/EK prasībām.
- Visi „Brooks Instrument" plūsmas mērītāji ietilpst 1. šķidrumu grupā.
- Uz 25 mm jeb 1" (collu) maziem un mazākiem mērītājiem attiecas labas inženierijas prakse (SEP).
- 25 mm jeb 1" (collu) mazi vai mazāki mērītāji 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 2004/108/EC)

Tomēr, izvēloties signālkabeli, kas tiks lietots kopā ar CE marķējuma iekārtu, ir jāievēro īpaša uzmanība**Signālkabeļa, kabeļa blīvslēgu un savienotāju kvalitāte:**

„Brooks Instrument" piegādā augstas kvalitātes kabeļus, kas atbilst CE sertifikācijas tehniskajiem parametriem.
Ja jūs lietojat pats savu signālkabeli, tam ir jābūt pilnībā, 100% ekranizētam.
„D" un „apaļā" tipa savienotājiem ir jābūt aprīkotiem ar metāla ekranizējumu. Ja nepieciešams, ir jāizmanto metāla blīvslēgi ar kabeļa ekranizējuma skavojumu.
Kabeļa ekranizējumam ir jābūt savienotam ar metāla apvalku un abās pusēs aizsargātam 360 grādu diapazonā.
Ekranizējumam ir jābeidzas pie iezemējuma.
„Card Edge" savienotāji standarta izpildījumā ir nemetāla. Kabeļiem ir jābūt pārklātiem ar 100% ekranizējumu, lai tie atbilstu CE sertifikācijas prasībām.
Ekranizējumam ir jābeidzas pie iezemējuma.
Attiecībā uz tapu konfigurāciju: skat. pievienoto instrukciju rokasgrāmatu.

ESD (elektrostatiskā izlāde)

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

Darba kārtība:

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

Komentāri

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

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“ produktus.

- Siekiant užtikrinti tinkamą veikimą, montuoti, eksploatuoti, naujinti, programuoti ir prižiūrėti gaminį turi tik kvalifikuoti darbuotojai.
- Perskaitykite visus nurodymus prieš montuodami, eksploatuodami ir prižiūrėdami gaminį. Jei gavote netinkamą instrukciją, galiniame jos viršelyje žiūrėkite vietinės prekybos atstovybės kontaktinę informaciją. Išsaugokite šią instrukciją pasižiūrėjimui 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 įspėjimo, perspėjimų ir nurodymų, pažymėtų ant gaminio arba pateiktų su juo.
- Įrangą montuokite taip, kaip nurodyta atitinkamos instrukcijos montavimo nurodymuose arba taikomuose vietiniuose ar nacionaliniuose kodeksuose. Visus gaminius junkite prie tinkamų elektros ir slėgio šaltinių.
- Eksploatacija: (1) lėtai įjunkite srautą į sistemą. Lėtai atidarykite proceso vožtuvus, kad išvengtumėte srauto antplūdžių. (2) Patikrinkite, ar nėra nuotėkių aplink srauto matuoklio įleidimo ir išleidimo jungtis. Jei nuotėkių nėra, sukurkite sistemoje darbinį slėgį.
- Prieš atlikdami priežiūros darbus būtinai pašalinkite slėgį proceso linijoje. Jei reikia pakeisti dalis, užtikrinkite, kad kvalifikuoti darbuotojai naudotų „Brooks Instrument“ nurodytas pakaitines dalis. Netinkamos dalys ir procedūros gali pakenkti gaminio veikimui ir kelti pavojų saugiai jūsų proceso eksploatacijai. Tik panašiai atrodantys pakaitalai gali sąlygoti gaisrą, elektros pavojus ar netinkamą veikimą.
- Užtikrinkite, kad visos įrangos durelės būtų uždarytos, o apsauginiai dangčiai uždėti, kad išvengtumėte elektros smūgio ir sužeidimų, išskyrus kai kvalifikuoti darbuotojai atlieka priežiūros darbus.

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

Europos slėginės įrangos direktyva (PED)

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

- Šios instrukcijos dalyje „Techniniai duomenys“ pateikiami nurodymai, susiję su PED direktyva.
- Šioje instrukcijoje aprašyti matuokliai atitinka Europos Sąjungos direktyvą 97/23/EB.
- Visi „Brooks Instrument“ srauto matuokliai priklauso 1 skysčių grupei.
- Didesni nei 25 mm arba 1 colis matuokliai atitinka PED I, II arba III kategoriją.
- 25 mm arba 1 colio ar mažesni matuokliai atitinka tinkamą inžinerijos praktiką (SEP).

Europoje taikomi elektromagnetinio suderinamumo (EMC) reikalavimai

CE ženklu pažymėta „Brooks Instrument“ (elektrinė / elektroninė) įranga buvo sėkmingai išbandyta pagal elektromagnetinio suderinamumo reikalavimus (EMC direktyvą 2004/108/EC).
Bet reikia ypatingo dėmesio renkantis signalizavimo kabelį, kuris bus naudojamas su CE ženklu pažymėta įranga.
Signalizavimo kabelio, kabelių riebokšlių ir jungčių kokybė:
„Brooks Instrument“ tiekia kokybiškus kabelius, kurie atitinka CE sertifikavimo specifikacijas.
Jei naudojate savo signalizavimo kabelį, jis turi būti visiškai ir visas ekranuotas 100 % ekranu.
Naudojamos „D“ arba „apskrito“ tipo jungtys turi būti ekranuotos metaliniu ekranu. Jei taikoma, reikia naudoti metalinius kabelių riebokšlius, užtikrinančius kabelio ekrano suspaudimą.
Kabelio ekraną reikia jungti prie metalinio apvalkalo ar riebokšlio ir ekranuoti abiejuose galuose 360 laipsnių.
Ekranas turi baigtis įžeminimu.
Standartinės kraštinės jungtys yra ne metalinės. Naudojami kabeliai turi būti ekranuoti 100 % ekranu, kad atitiktų CE sertifikavimą. Ekranas turi baigtis įžeminimu.
Keturių kontaktų konfigūracija: žr. pridėtą instrukciją.

ESD (elektrostatinis išlydis)

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

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

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

Polish

Zalecenia wstępne

Prosimy przeczytać przed rozpoczęciem użytkowania!

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

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

Europejska dyrektywa dotycząca urządzeń ciśnieniowych (PED)

Wszystkie urządzenia ciśnieniowe pracujące przy ciśnieniu wewnętrznym względnym większym niż 0.5 bara i wielkości powyżej 25 mm lub 1 cala podlegają dyrektywie europejskiej dotyczącej urządzeń ciśnieniowych (PED).

- Rozdział „Specyfikacja techniczna" niniejszej instrukcji zawiera zalecenia dotyczące dyrektywy PED.
- Mierniki opisane w tej instrukcji są zgodne z dyrektywą EN 97/23/EC.
- Wszystkie mierniki przepływu firmy Brooks Instrument należą do 1-szej grupy cieczy.
- Urządzenia pomiarowe o wielkości powyżej 25 mm lub 1 cala należą do kategorii I, II lub III dyrektywy PED.
- Urządzenia pomiarowe 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 2004/108/EC).
Jednakże szczególną uwagę należy poświęcić przy doborze przewodów sygnałowych, które mają być stosowane z urządzeniami ze znakiem CE.
Jakość przewodu sygnałowego, dławic oraz złączy przewodu:
Firma Brooks Instrument dostarcza wysokiej jakości przewody, które spełniają wymagania zawarte w specyfikacji dla certyfikatu CE.
Jeżeli stosuje się własne przewody sygnałowe, to powinny one być w całości w pełni ekranowane.
Złącza typu „D" lub okrągłe powinny zawierać metalowy ekran. Jeśli to możliwe, należy stosować metalowe dławice przewodu zapewniające mocowanie jego ekranu.
Ekran przewodu powinien być połączony z metalową osłoną lub dławicą zapewniając całkowite, dookólne ekranowanie na obu końcach przewodu.
Ekran przewodu powinien być uziemiony.
Złącza krawędziowe są standardowo niemetaliczne. Stosowane przewody muszą być w pełni ekranowane zgodnie z certyfikatem CE.
Ekran przewodu powinien być uziemiony.
Konfiguracja styków jest podana w niniejszej instrukcji obsługi.

Wyładowania elektrostatyczne (ESD)

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

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

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

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

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

Directiva Europeia para equipamentos sob pressão (PED)

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

- O capítulo "Dados técnicos" do manual contém instruções relativas à Directiva PED.
- O caudalímetro objecto deste manual satisfaz a directiva 97/23/CE da UE.
- Os caudalímetros Brooks pertencem ao grupo 1 de fluidos.
- Os caudalímetros com calibre superior a 25 mm (1 polegada) pertencem às categorias PED I, II, ou III.
- Os caudalímetros 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 2004/108/EC).
Todavia, ao utilizar os aparelhos compete-lhe a escolha dos cabos de sinal adequados para os equipamentos com marcação CE.

Qualidade dos cabos de sinal, bucins e conectores:

A Brooks Instrument fornece cabos de alta qualidade que cumprem todos os requisitos da marcação CE.
No caso de utilizar os seus próprios cabos de sinal, assegure uma blindagem a 100%.
Os conectores do tipo “D” ou "circular" têm que ser blindados por uma malha metálica. Se precisar de usar bucins, estes têm que permitir a crimpagem da malha/blindagem do cabo.
A blindagem do cabo deve ser ligada ao corpo metálico ou bocal e assegurando a blindagem em 360°. A blindagem deve terminar numa ligação à terra.
Os conectores ligados a cartões serão, em geral, não-metálicos. Os cabos utilizados devem ter fita de blindagem a 100% para satisfazer a marcação CE.
A blindagem, deverá terminar numa ligação à terra.
Atribuição de pinos: Veja as instruções de operação anexas.

Descarga Electrostática (ESD)

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

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

Observações:

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

Romanian

Indicații de referință

Citiți-le întâi pe acestea!

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

- Pentru garantarea prestației corecte, instalarea, operarea, actualizarea, programarea şi întreținerea produsului poate fi realizată doar de către personal calificat.
- Instrucțiunile de instalare ale produsului trebuie citite integral, înainte de punerea în serviciu şi exploatarea sa. În măsura în care ediția acestui manual nu este cea adecvată, identificați pe ultima copertă coordonatele distribuitorului local şi 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 răniri grave de persoane sau defectarea instalației.

- În măsura în care indicațiile cărții maşinii nu sunt suficient de lămuritoare, luați legătura cu reprezentantul Brooks Instrument pentru clarificarea problemei.
- Păstrați toate avertismentele, avizele şi instrucțiunile livrate odată cu instalația sau inscripționate pe aceasta.
- Efectuați instalarea echipamentului în conformitate cu indicațiile de instalare corespunzătoare, respectiv cu respectarea prevederilor naționale. Echipamentul se conectează exclusiv la surse de energie electrică şi de presiune corespunzătoare.
- Succesiune: (1) Presurizați lent instalația. Deschideți încetul cu încetul supapa de funcționare pentru evitarea fluctuațiilor de flux. (2) Controlați dacă nu sunt prelingeri la intrarea sau ieşirea debitmetrului de branşare. 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 şi licențiate poate avea efecte asupra performanțelor instalației şi asupra siguranței sale în exploatare. Utilizarea de piese asemănătoare de substituire poate avea ca rezultat pericol de incendiu şi electrocutare.
- În toate cazurile toate uşile instalației trebuie să fie închise, cuştile de protecție să fie puse la locurile lor, pentru evitarea electrocutării şi 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 şi ieşire, limitrofe instalației, instalația trebuie complet golită. Neglijarea acestui lucru poate avea ca efect dilatarea termică a fluidului, care poate defecta instalația şi poate produce răniri de persoane.

Directiva europeană pentru instalațiile sub presiune (PED)

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

- La capitolul "Date tehnice" din cartea maşinii se găsesc indicațiile corespunzătoare directivei PED.
- Mijloacele de măsurare menționate în cartea maşinii corespund directivei 97/23/EK EU.
- Toate debitmetrele Brooks corespund clasei 1 de fluide.
- Mijloacele de măsurare mai mari de 25 mm sau 1 țol corespund categoriei PED I, II sau III.
- Mijloacele de măsurare mai mici de 25 mm sau 1 țol se conformează practicii inginereşti acceptate (SEP).

Directiva europeană privitoare la compatibilitatea electromagnetică (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. 2004/108/EC).
În acelaşi 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 şi 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 şi prevăzute cu filtre.
Conectoarele „D" sau cele „circulare" trebuie sa dispună de ecrane metalice. În caz de nevoie trebuie folosite conectoare metalice pentru montarea filtrelor de cablu.
Filtrul de cablu trebuie conectat la carcasa metalică sau manşon şi în ambele cazuri trebuie asigurată ecranarea la 360°. Ecranarea trebuie terminată cu o legare la pământ.
Conform standardului, conectoarele aparținând plăcilor electronice nu sunt metalice. Cablurile folosite trebuie să fie 100% ecranate şi prevăzute cu filtre pentru a corespunde clasificării CE.
Ecranarea trebuie terminată cu o legare la pământ.
Configurație de contact: Vezi instrucțiunile de operare ataşate.

Descărcare electrostatică (ESD)

⚠ ATENȚIE: Instalația include piese care sunt predispuse 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 (conductoare). 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 vyhoveli domácim aj medzinárodným normám. Tieto zariadenia je potrebné predpísaným spôsobom inštalovať, prevádzkovať a udržiavať, na zabezpečenie ich spoľahlivej a normálnej prevádzky v celom pracovnom rozsahu. Nižšie uvedené príkazy je potrebné dodržiavať a začleniť do programu bezpečnostných predpisov v priebehu inštalácie, prevádzky a údržby výrobkov Brooks Instruments.

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

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

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

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

Európska smernica vzťahujúca sa na tlakové zariadenia (PED)

- Všetky zariadenia s vyšším vnútorným pretlakom ako 0,5 bar (g), a väčšieho rozmeru ako 25 mm alebo 1 anglický palec, podliehajú pod Európsku smernicu vzťahujúcu sa na tlakové nádoby (PED).
- Kapitola "Technické údaje" návodu na obsluhu obsahuje príkazy vzťahujúce sa na smernicu PED.
- Meracie prostriedky uvedené v návode na obsluhu vyhovujú smernici 97/23/ES EÚ.
- Všetky prietokomery Brooks patria do 1. skupiny kvapalín.
- Meracie prístroje presahujúce rozmery 25 mm alebo 1 " spĺňajú I., II., alebo III. kategóriu PED.
- Meracie prístroje menšie alebo rovné ako 25 mm alebo 1 " zodpovedajú zaužívanej meracej praxi (SEP).

Európska smernica vzťahujúca sa na elektromagnetickú kompatibilitu (EMC)

Elektrické / elektronické zariadenia Brooks Instrument, ktoré si zaslúžili značku CE, úspešne splnili skúšobné testy požiadaviek elektromagnetickej kompatibility (smernica EMC č. 2004/108/EC).
Pritom treba venovať zvláštnu starostlivosť na výber signálnych káblov zariadenia, s označením CE.
Kvalita signálnych káblov, káblových spojov a prípojov:
Brooks Instrument ponúka vysoko kvalitné káble, ktoré spĺňajú požiadavky kvalitatívneho zaradenia CE.
Ak použijete vlastné signálne káble, majú mať 100%-né tienenie, s plným filtrovaním.
Prípojky "kruhové" alebo tvaru "D" majú mať kovové tienenie. V prípade potreby treba použiť kovové káblové spojky k upevneniu káblového filtra. Káblový filter treba pripojiť ku kovovému telesu alebo k puzdru, na oboch stranách zabezpečiť tienenie v kruhu 360 °. Tienenie má byť ukončené uzemnením.
Prípojky vedúce ku kartám podľa noriem sú nekovové. Použité káble, pre vyhovenie predpisom CE musia mať 100%-né filtrovanie tienením. Tienenie má byť ukončené uzemnením.
Konfigurácia kontaktov: Viď priložený návod na obsluhu. .

Elektrostatický výboj (ESD)

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

Postup ošetrovania:

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

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

Slovene

Osnovna navodila

Najprej preberite jih

Brooks Instrument tako konstruira, izdeluje in terstira svoje izdelke, da oni ustrezajo številnim domačim in mednarodnim standardom. Te naprave se morajo ustrezno instalirati, koristiti in vzdrževati, da vsekakor delajo ustrezno normalnom področju funkcioniranja. Naslednjih navodil se mora držati in potrebno je vgraditi v program varstva pri delu pri instaliranju, koriščenju in vzdržavanju izdelkov proizvajalca Brooks Instrument.

- Za jemstvo ustreznega učinka naj izključno strokovno osobje opravlja instaliranje, koriščenje, osveženje, programiranje in vzdrževanje izdelka.
- Potrebno je prebrati vsa navodila pred instaliranjem, koriščenjem in servisiranjem izdelka. V kolikor ta priročnik ni ustrezna publikacija, na zadnji strani poiščite lokalnega distributerja in za nadaljnje informacije stopite z njim v kontakt. Prihranite ta priročnik za poznejše informacije.

⚠ OPOMBA: Ne koristite napravo izven področja iz navodila za uporabo. Prekršek tega lahko privede do osebnih poškodb ali okvare naprave.

- V kolikor navodila priročnika niso enosmiselna, stopite v kontakt z zastopnikom društva Brooks Instrument, da razčistite problem.
- Držite se vseh opozoril, povabil, navodil, ki so navedena na napravi ali skupaj z njim izporočena.
- Napravo instalirajte shodno navodilom in relevantnim lokalnim in nacionalnim navodilom iz navodila za instalirenje.. Izdelek spojite izključno na ustrezni izvir elektrike in obskrbo tlaka.
- Proces: (1) Počasi položite sistem pod tlak. Počasi odpirajte pogonske ventile zaradi izogibanja nihanju pretoka. (2) Preverjajte, ima li curljanja pri povezu vstopa in izstopa merilca toka. Če ni curljanja, naplonite sistem na pogonski tlak.
- Pred servisom vsekakor preverjajte, ali je pogonski vod pod tlakom. Če je potreben rezervni del, svekakor strokovna oseba mora rokovati z rezervnimi deli odrejenimi od Brooks Instrument. Nedovoljeni rezervni deli in dejavnosti lahko vplivajo na učinek izdelka, oziroma ugrožavajo varnostni pogon. Sprememba samo z podobnimi rezervnimi deli lahko ima za posledico požar, nevarnost električnega šoka ali nedovoljno funkcioniranje.
- Vsa vrata naprave svekakor morajo biti zaprta, zaščitni ovitki morajo biti na svojem mestu zaradi izogibanja šoku in osebnim poškodbam, razen, če na njej strokovnjak opravlja dela vzdrževanja.

⚠ OPOMBA: V primeru naprave za tok tekočine, če je iz katera koli razloga potrebno zapreti vstopne in izstopne ventile pri napravi, naprava se mora celotno izprazniti. Zamuda tega lahko provzroči toplotno proširjenje tekočine, kar poškoduje napravo in lahko povrzoči osebno poškodbo.

Europske smernice za naprave ohranjanja pritiska (PED)

Vsaka naprava ohranjanja pritiska z notranjim pritiskom več od 0,5 bara (g) in večjim od 25 mm ali 1 palca sodi pod Europskim smernicam za ohranjanje pritiska (PED).

- Poglavje priročnika „Tehnični podatki" vsebuje navodila, ki se nanašajo na smernice PED.
- Merilni instrumenti navajani v priročniku ustrezajo smernicam EU številke 97/23/EK
- Vsaki merilec pretoka Brooks sodi v skupino tekočin številke 1.
- Merilni instrumenti večji od 25 mm ali 1 palca ustrezajo kategriji PED I, II, ali III.
- Merilni instrumenti manjši od 25 mm oziroma 1 palca ali manjši sledijo sprejeti inženjeski praksi (SEP).

Evropska smernica za Elektromagnetno kompatibilnost (EMC)

Naprave Brooks Instrument, ki so zaslužile CE označbo (električni/elektronski) so uspešno izpolnile testove zahteve o elektromangnetni kompatibilnosti (št. 2004/108/EC smernice EMC) .
Obenem mora se posebno pozornost posvetiti na izbiro signalnega kabla, ki se uporabljajo za naprave z označbo CE.
Kakaovost signalnih kablov, povezav kablov, priključkov:
Brooks Insturment nuja kabele visoke kakovosti, ki ustrezajo zahtevam kvalificiranja CE.
V kolikor se uporbalja lastni signalni kabel, treba je izbrati, ki za 100 % senco v polni meri filtriran.
Priključki „D" „olika kroga" morajo biti zasenčeni kovonskom sencom. Če bo potrebno, uporabite kovinske povezave za pritrditev filtra kabla
Filtar kabla je treba priključiti na kovinsko ohišje ali plašt in na obe polovici je treba senčiti v 360°. Senčenje mora završiti v ozemljitvi.
Priključki, ki sodijo karitcam normalno nisu kovinskik. Koriščeni kabli moraju biti filtrirani s 100 % senco, da odgovarjajo CE kvalifikaciji.
Sencanje mora imat konec v ozemljitvi.
Konfiguracija stika: Vidi priloženo navodilo za uporabo.

Elektrostatično izpražnjenje (ESD)

⚠ OPOZORILO: Naprava vsebuje take sestavne dele, ki so naklonjeni k poškodbi od statične elektrike. Treba se je držati ustreznih postopkov pri odstranjevanju, vlogu ali drugega rokovanja kartic in sredstev notranjih tokovnih krogov.
Posotpek rokovanja:

1. napravo je treba izklopiti iz električnega toka.
2. Osebo je treba ozemljiti zapestnim paščekom ali z drugim varnostnim in za ta namen primernim sredstvom preden bi instalirala, jemala, ali nastavila kartico za tokovni krog ali drugo notranjo opremo.
3. Tiskane kartice tokovnega kroga je treba izporočiti v konduktivni embalaži. Karte so odstranjive izključno neposredno pred vlogom iz zaščitne embalaže ven. Izjemljeno kartico nemudoma staviti v zaščitno embalažo za gibanje, skladiščenje ali pošiljanje nazaj.

Opombe:
Nije poseben pojav, da se v napravi nahajajo občutljivi sestavni deli na elektrostatično pražnjenje (ESD). V večem delu modernih elektronskih sredstev nahajajo se sestavni deli na kovinsko oksidno tehnologijo (NMOS, SMOS itd..). Izkustva potrjujejo, da majhna statična elektrika more poškodovati ali uničiti ta sredstva. Oškodovani rezervni deli, če na videz dobro delajo, nakažejo začetno napako.

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.
- 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 97/23/EC.
- Todos los flujómetros 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 2004/108/EC).
Al mismo tiempo se ha de prestar una especial atención en la selección de los cables de señal, utilizados con los equipos marcados con CE.

Calidad de los cables de señal, piezas de unión de cable y conectores:

El Brooks Instrument ofrece cables de alta calidad, que responden a los requerimientos de calificación CE.
Si se utiliza cable propio de la firma, se ha de elegir uno que sea completamente filtrado con blindaje de 100%.
Las piezas de unión de forma „D" o „circular" deben ser blindadas mediante blindaje metálica. Si es necesario, aplicar piezas de unión de metal para sujetar el filtro de cable.
Conectar el filtro de cable a la caja o manguito de metal blindándolo en ambas caras en 360°.
El blindaje debe terminar en tierra.
Los conectores que pertenecen a las tarjetas normalmente no son metalizados. Los cables utilizados deben ser filtrados con una blindaje de 100% para responder a la calificación CE.
El blindaje debe terminarse en tierra.
Configuración de contacto: Véase Instrucciones de operación adjuntas.

Descarga Electroestática (ESD)

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

Proceso de operación:

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

Notas:

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

Swedish

Väsentliga anvisningar.
Läs detta innan du fortsätter !

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

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

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

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

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

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

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

- Den här Instruktionsbokens Sektion ” Specifikation” innehåller anvisningar gällande PED Direktivet.
- Mätare som beskrivs i denna Instruktionsbok är i överensstämmelse med EN Direktivet 97/23/EC.
- 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 2004/108/EC). Man måstre dock ägna särskild uppmärksamhet till valet av signalkabeln som skall används för CE-märkta anordningar.

Signalkablars, packboxars och kontakdons kvalitet:

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

ESD (Elektrostatiska urladdningar)

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

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

Anmärkningar:

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

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Brooks® Digital MFC's & MFM's

LIMITED WARRANTY

Seller warrants that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and service and that the Software will execute the programming instructions provided by Seller until the expiration of the earlier of twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller. Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer.
All replacements or repairs necessitated by inadequate preventive maintenance, or by normal wear and usage, or by fault of Buyer, or by unsuitable power sources or by attack or deterioration under unsuitable environmental conditions, or by abuse, accident, alteration, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense.
Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller.

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.

CUSTOMER SEMINARS AND TRAINING

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

Please contact your nearest sales representative for more details.

HELP DESK

In case you need technical assistance:

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CE ISO 9001 QUALITY SYSTEM

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

TRADEMARKS

Brooks	Brooks Instrument, LLC
Brooks Service Suite	Brooks Instrument, LLC
Brooks Service Tool	Brooks Instrument, LLC
DeviceNet	Open DeviceNet Vendors Association, Inc.
FOUNDATION Fieldbus	Fieldbus FOUNDATION
HART	HART Communications Foundation
ITK	Fieldbus FOUNDATION
Kalrez	DuPont Performance Elastomers
ODVA	Open DeviceNet Vendors Association, Inc.
Teflon	E.I. DuPont de Nemours & Co.
VCO	Cajon Co.
VCR	Cajon Co.
Viton	DuPont Performance Elastomers

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