

Brooks® 4800 Series Local Operator Interface (LOI)



*LOI Attached
to a 4800 Series Device*

Essential Instructions

Read this page before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them 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, using and maintaining Brooks Products.

- 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.
- 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.
- Inform and educate your personnel in the proper installation, operation and maintenance of 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.
- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- 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, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

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 Directive is applicable within the European Economic Area (EU plus Norway, Iceland and Liechtenstein). Pressure equipment can be traded freely within this area once the PED has been complied with.

- Section 1 of this manual contains important safety and operating instructions related to the PED directive.
- Meters described in this manual are in compliance with EN directive 97/23/EC module H *Conformity Assessment*.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Meters larger than 25mm or 1" (inch) are in compliance with category I, II, III of PED.
- Meters of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

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 circuit boards or devices.

Handling Procedure:

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

Comments

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

Installation and Operation Manual

X -SE-4800-LOI-eng

Part Number: 541B117AAG

January, 2009

Brooks® 4800 Series LOI

Dear Customer,

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

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

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

Yours sincerely,

Brooks Instrument

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1-1 How to Use This Manual

This instruction manual is intended to provide the user with all the information necessary to install, operate and maintain the Brooks 4800 Series Local Operator Interface (LOI).

This manual is organized into the following sections:

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

1-2 Description

The Brooks 4800 Series LOI provides a convenient user interface to view, control, calibrate, and configure Brooks 4800 Series thermal mass flow controllers.

The LOI provides the following functionality:

- Measures the flow signal level from the Brooks 4800 Series device and displays it on a LCD display.
- Includes a jog dial button to allow the user to send control signals to the Brooks 4800 Series device to adjust the flow, perform a valve override, zero the device, and set device configuration parameters.
- Uses LEDs to provide a visual indication of device status and device mode.
- Allows the user to connect a remote controller to the device and bypass the local LOI control .

1-3 Specifications

WARNING

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

DISPLAY:

Effective display area: 28 mm wide, 11 mm high

Display contents: 8 x 2 dot matrix display

OPERATING LIMITS:

Temperature: 0 - 50°C

Operating Humidity: 5 to 95% R.H. (ambient)

Brooks® 4800 Series LOI

ELECTRICAL CHARACTERISTICS:**Electrical Connections**

2 15-pin D-sub connectors, one for connection to the 4800 Series device and one for remote connection.

The pin-outs are listed below.

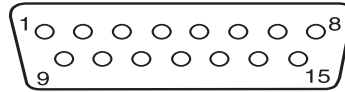


Table 1-1. Pin-outs for D-Connector to 4800 Series Device

Pin No.	Function
1	Setpoint Signal Ground
2	Flow Voltage Output
3	Not Used
4	Flow Current Output
5	Positive Supply Voltage
6	Not Used
7	Setpoint Current Input
8	Setpoint Voltage Input
9	Power Supply Common
10	Flow Signal Ground
11	Not Used
12	Valve Override Input
13	Not Used
14	RXD
15	TXD

Table 1-2. Pin-outs for D-Connector to Remote Connection

Pin No.	Function
1	Setpoint Signal Ground
2	Flow Voltage Output
3	Alarm Output
4	Flow Current Output
5	Positive Supply Voltage
6	Not Used
7	Setpoint Current Input
8	Setpoint Voltage Input
9	Power Supply Common
10	Flow Signal Ground
11	Not Used
12	Valve Override Input
13	Not Used
14	RXD
15	TXD

Power Supply Voltage

The LOI optionally includes a wall mount power adaptor with a 3.5-mm DC-plug. This adaptor works with input voltages of AC 90-240 V/47-63 Hz. The adaptor supports European, U.K., and U.S. wall plugs. Power can also be supplied by a remote connection via the D-connector.

MATERIALS OF CONSTRUCTION

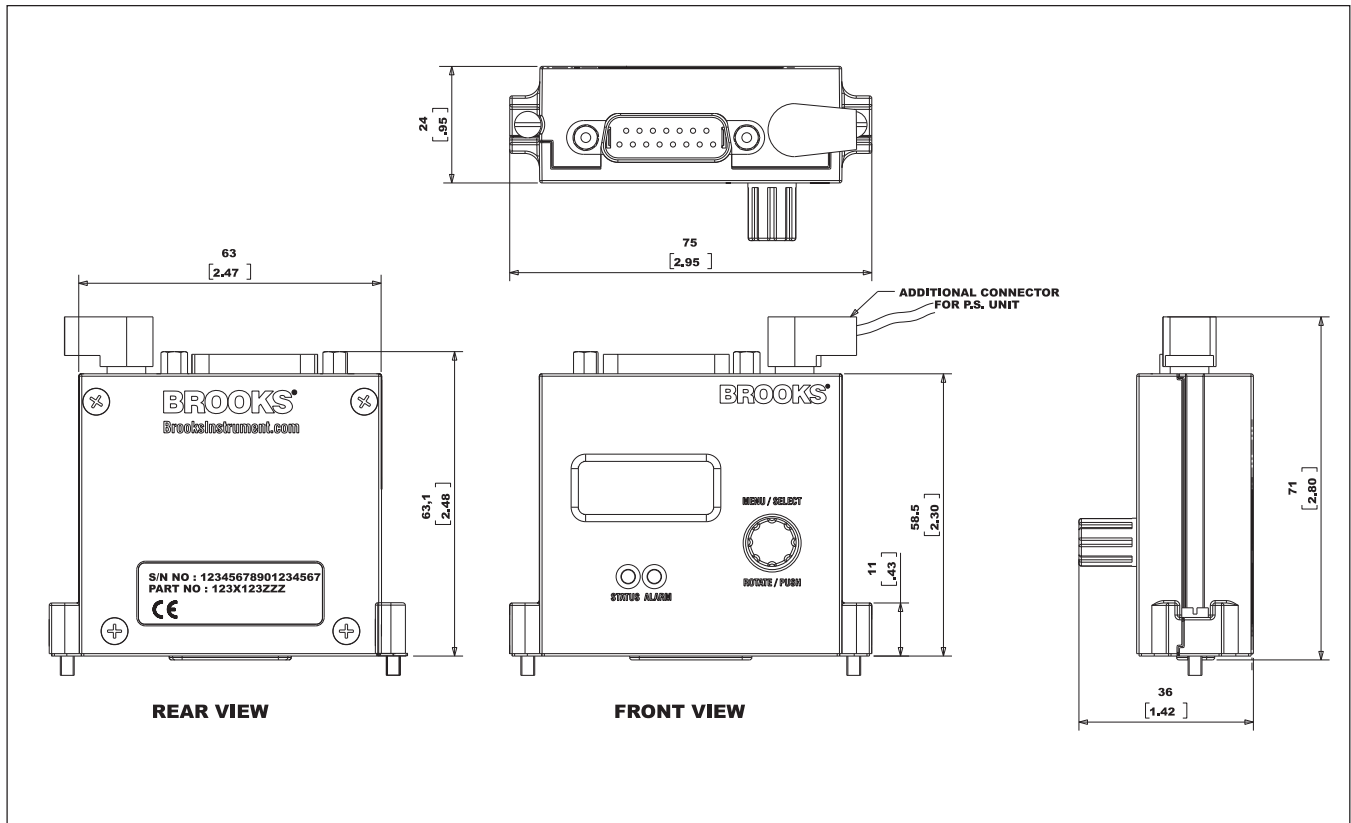
Enclosure: ABS plastic with Cu-Ni plating.

OUTLINE DIMENSIONS

75 mm wide, 58.5 mm high, 24 mm deep
Refer to Figure 1-1.

Brooks® 4800 Series LOI

Figure 1-1. LOI Dimensions



CERTIFICATIONS

EMC Directive 89/336/EEC:

per EN 61326

Hazardous Location Classification

The modules shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN 60529, taking into account the environmental conditions under which the equipment will be used.

Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

Enclosure: Type 1/IP40

Ambient Temperature: $0^{\circ}\text{C} \geq T_{\text{amb}} \leq 50^{\circ}\text{C}$ ($32^{\circ}\text{F} \geq T_{\text{amb}} \leq 122^{\circ}\text{F}$)

United States and Canada



Non-Incendive,
Class 1, Division 2
Groups A, B, C & D; T4

Per UL 1604 and CSA-C22.2 no. 213-m87

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 Can. CSA-C22.2 no. 61010-04

Europe - ATEX Directive 94/9/EC

KEMA 06ATEX0251 per EN 60079-15: 2003



II 3 G EEx nA II T4



Per EN 60079-15: 2003

Pressure Equipment Directive (97/23/EC):

Sound Engineering practice.

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2-1 General

This section contains the procedures for the receipt and installation of the instrument. See Section 1 for dimensional and connection requirements. Do not attempt to start the system until the instrument has been installed. It is important that the start-up procedures be followed in the exact sequence presented.

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 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument

1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
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 conditions:

- a. Within the original shipping container.
- b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
- c. Ambient temperature 21°C (70°F) nominal, 32°C (90°F) maximum, 7°C (45°F) minimum.
- d. Relative humidity 45% nominal, 60% maximum, 25% minimum.

Brooks® 4800 Series LOI

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 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument

1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
Email: BrooksAs@BrooksInstrument.com

Returning the LOI device to Brooks in combination with a flow instrument requires completion of Form RPR003-1, Brooks Instrument Decontamination Statement, along with a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. Failure to provide this information will delay processing by Brooks personnel. Copies of these forms can be downloaded from the Brooks website www.BrooksInstrument.com or are available from any Brooks Instrument location listed above.

2-5 Transit Precautions

To safeguard the instrument against transportation damage, it is recommended to keep the instrument in its factory container until ready for installation.

2-6 Removal from Storage

Upon removal of the instrument from storage, a visual inspection should be conducted to verify its "as-received" condition. If the instrument has been subject to storage conditions in excess of those recommended (see Section 2-3), it should be subjected to a pneumatic pressure test in accordance with applicable vessel codes.

2-7 Mechanical Connections

Recommended installation procedure:

- a. Attach the LOI device to the 4800 Series device by inserting the D-connector at the bottom of the LOI device to the D-connector at the top of the 4800 Series device.
- b. Secure the LOI device to the 4800 Series device using the two provided screws. Feed the screws through the two screw channels at the far ends of the top of the LOI device.

If the device **is not** being connected to a remote controller via the D-connector:

- c. Slide the proper electrical plug on to the power adapter, and connect the power adapter to an electrical source.
- d. Insert the power adapter DC plug into the power connector at the top of the LOI device.

If the device **is** being connected to a remote controller via the D-connector:

- c. Connect the cable from the remote controller to the D-connector at the top of the LOI device. (The device will be powered from the remote controller, so the power adapter should not be connected.)

Once powered on, the display will show the current flow measurement and the left LED indicator below the display will light green.



Figure 2-1 LOI Installed Using D-Type Connector

Brooks® 4800 Series LOI

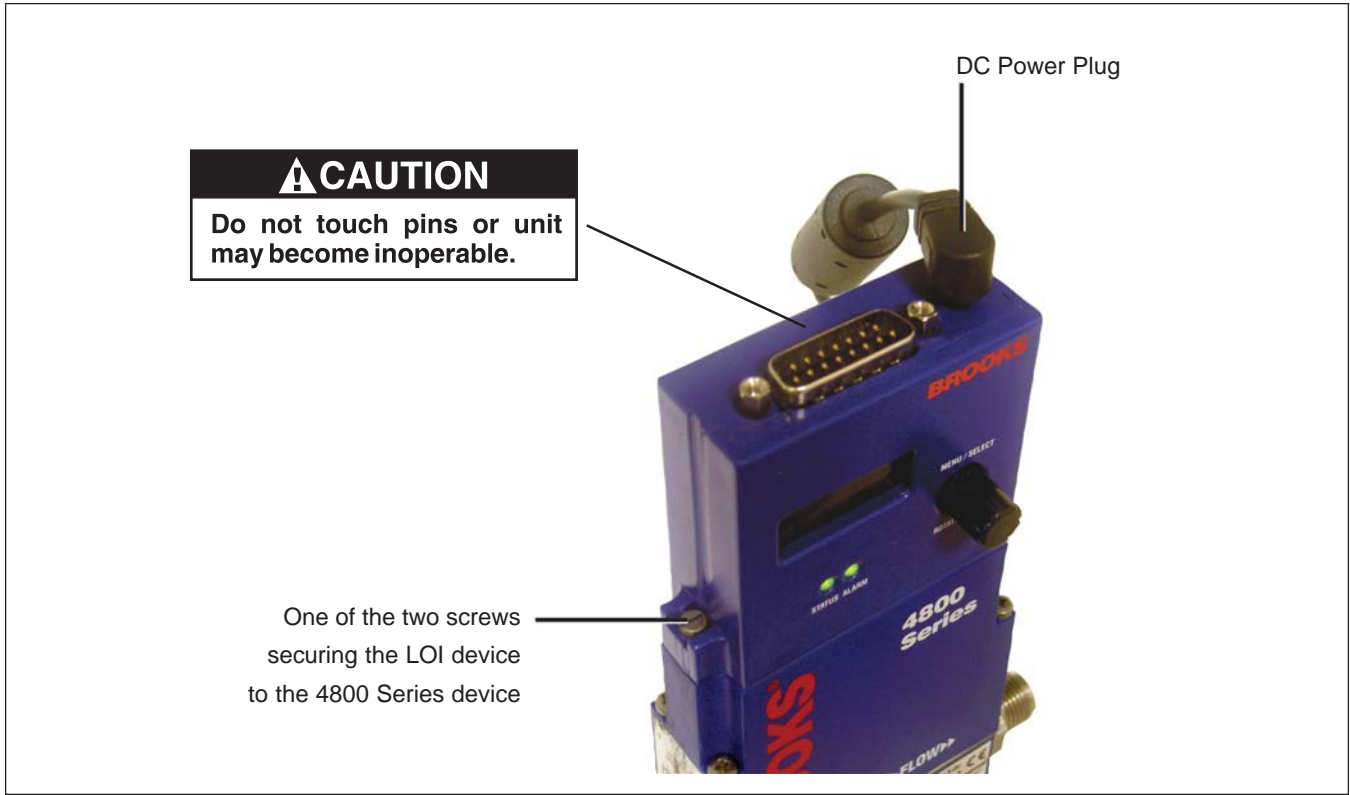


Figure 2-2 LOI Installed Using DC Power Plug

NOTICE

The Brooks (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 89/336/EEC). Special attention is required when selecting the signal cable to be used with CE marked equipment.

Brooks supplies high quality cables which meet the specifications for CE certification. If you provide your own signal cable you should use a cable which is completely screened with a 100% shield. D-Connectors should also be shielded using a metal shield. If applicable, metal cable glands must be used to provide 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. See Appendix A for CE Certification of Mass Flow Equipment.

3-1 Operating Procedures

After the LOI device has been properly installed, it is ready for operation.

3-2 General Display and Jog Dial Operation

The LOI device displays the current flow measurement. It also includes a set of menus and menu options to allow the user to select functions and change settings. The jog dial is used to scroll to menu items, change setting values, and select the current option or save the entered value.

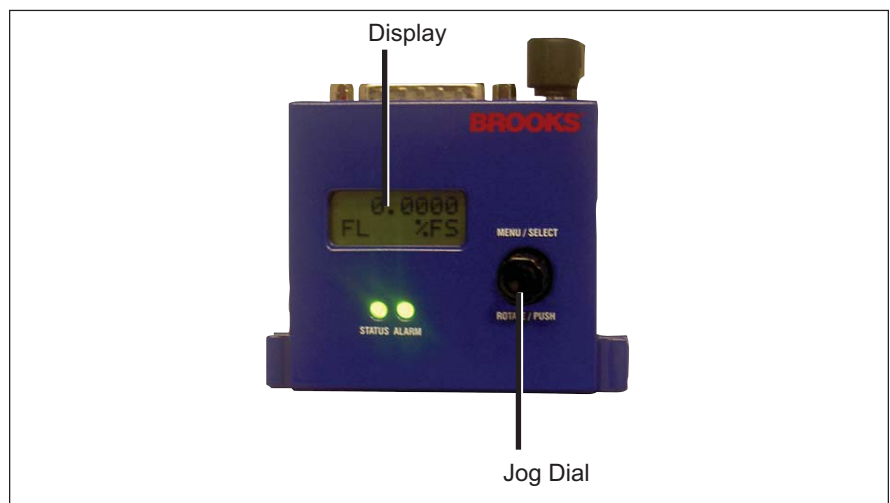
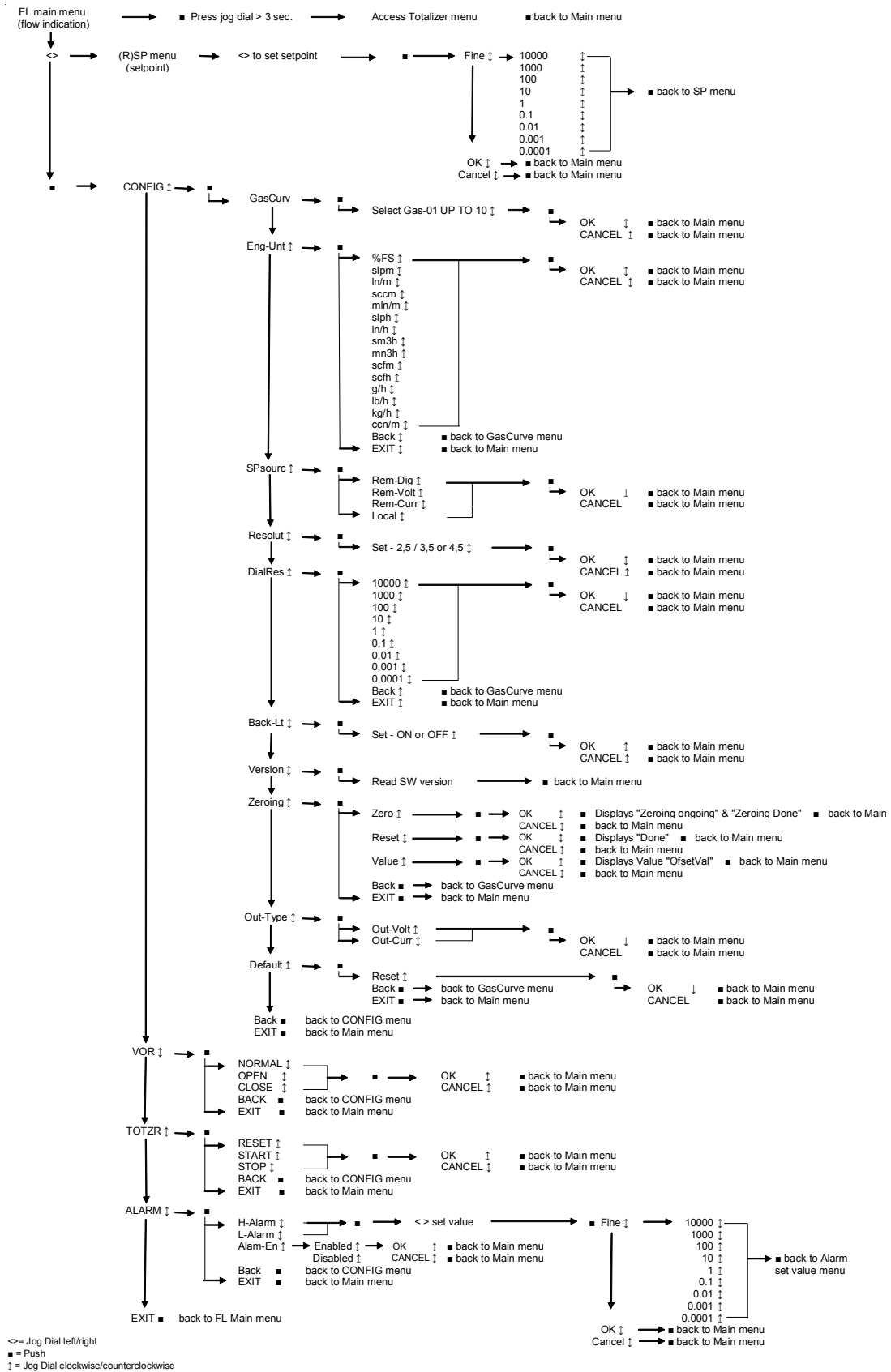


Figure 3-1 LOI Display and Jog Dial

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Table 3-1 Menu Structure



3-2-1 Scrolling to and Selecting a Menu Item

The display can show two menu items at a time. An Up or Down Arrow next to a menu item indicates that there are additional menu items above or below those currently displayed.

To scroll up and down the menu to see other items, turn the jog dial. The menus operate in a circular fashion. For example, scrolling past the last menu item will cause the top of the menu to display.

To select a menu item, turn the jog dial to move the flashing cursor next to the desired option, then push the jog dial.

3-2-2 Changing and Saving a Value Setting

If a setting has been selected for display, turn the jog dial to change the setting value.

To save the new setting value, push the jog dial. When changing settings, the device always prompts with a menu to select OK to confirm the change or Cancel to cancel the change.

3-2-3 Main Menu

Upon device start-up, the LOI will be in the FL (Flow) main screen. It will show the flow value. When the valve override is active, it will show the valve override state in an alternating mode.

To display the main menu, push the jog dial. The main menu items display, as shown below.



TOTZR
ALARM
EXIT

The functions related to each of the main menu items are described in the remainder of this chapter and in Chapter 4.

NOTE: As in the example menu above, this manual uses the convention of showing the first two items of a menu in a "display box" (as it would look on the display when the menu is initially loaded). Additional menu items, to which you would have to scroll down or up, are shown below the display box.

3-3 Configuration Functions

The main menu CONFIG item provides access to the configuration functions.

To navigate to the Configuration menu, with the flow displayed, push the jog dial. In the main menu, select **CONFIG**.

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```
CONFIG
  VOR
    TOTZR
    ALARM
    EXIT
```

The Configuration menu displays.

```
GasCurv
Eng-Unt
  SpSourc
  Resolut
  DialRes
  Back-Lt
  Version
  Zeroing
  Out-Type
  Default
    BACK
    EXIT
```

For information about each of the configuration functions, refer to the following topics.

3-3-1 Gas Curve File

The gas curve file that will be used by the 4800 Series device can be selected from the LOI.

1. From the Configuration menu, select **GasCurv**.

```
GasCurv
Eng-Unt
  SpSourc
  Resolut
  DialRes
  Back-Lt
  Version
  Zeroing
  Out-Type
  Default
    BACK
    EXIT
```

The GasCurv setting displays.

```
GasCurv
Gas-01
```

2. Turn the jog dial to select the ID number of the gas curve to be used.
3. With the desired gas curve ID displayed, push the jog dial to select it.
4. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

3-3-2 Flow Engineering Units

As a default setting, setpoint and flow are presented in % of full scale. In case engineering units other than % are necessary, over a dozen engineering units are available to represent the setpoint or flow.

1. From the Configuration menu, select **Eng-Unt**.

```
GasCurv
Eng-Unt
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The Eng-Unt menu displays.

```
%FS
slpm
ln/m
mln/m
sccm
.
.
.
ccn/m
    BACK
    EXIT
```

2. In the Eng-Unt menu, move the cursor next to the type of units to be used, then push the jog dial to select it.

Certain units require that a reference temperature be specified. After selecting one of these, the Ref-Temp setting displays.

```
Ref-Tmp
Set- 4C
```

3. Turn the jog dial to set the reference temperature.
4. With the desired temperature displayed, push the jog dial to select it.

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5. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

Following is a complete list of the available engineering units.

%FS	slph (l _{st} /h)	scfh (cf _{st} /h)
slpm (l _{st} /min)	ln/h	g/h
ln/m (l _n /min)	sm ³ /h (m ³ _{st} /h)	lb/h
mln/m (ml _n /min)	mn ³ /h (m ³ _n /h)	kg/h
sccm (ml _{st} /min)	scfm (cf _{st} /min)	ccn/m (ml _n /min)

Note for Section 3-3-2: The device will indicate "#RES" on the display when a value can not be shown in the configured engineering unit and/or display resolution. Another engineering unit and/or display resolution should be selected to allow proper value display.

3-3-3 Setpoint Source

The control of the 4800 Series device can be toggled between the local LOI and a remote controller. With Remote control selected, the LOI device is passive; the flow and setpoint can be read and controlled from the remote controller. Note that, when in Remote mode, the local setpoint can be changed. However, this change does not have any impact on the connected 4800 Series device as long as the LOI is in Remote mode.

In Local mode, the display indicates setpoint as SP. In Remote mode, it is indicated as RSP.

For remote control, the LOI will need to be configured to have the 4800 Series device accept control commands from any of the following sources: the analog volt setpoint signal, the analog current setpoint signal or the digital (RS232) setpoint command.

1. From the Configuration menu, select **SpSource**.

```
GasCurv
Eng-Unt
SpSource
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The Setpoint Source settings display.

```
SpSource
Rem-Dig
Rem-Volt
Rem-Curr
Local
```

2. Turn the jog dial to select the setpoint source to be used, then push the jog dial to save your selection.
3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

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3-3-4 Ensuring Proper Setpoint Operation in Local and Remote Modes

To ensure proper operation of the LOI, use the following Setpoint Source settings:

- When using the LOI to control the 4800 Series device, Setpoint Source setting should be **Local**.
- When using a remote controller (e.g. 0154) connected to the LOI to control the 4800 Series device, Setpoint Source setting should be either **Rem-Volt** or **Rem-Curr**, depending on the type of setpoint signal from the remote controller.
- When using the 4800 Series Service Tool, the Setpoint Source setting should be **Rem-Dig**.

3-3-5 Units Resolution

The increment resolution by which the setpoint value will change when turning the jog dial can be set.

1. From the Configuration menu, select **Resolut**.

```
GasCurv
Eng-Unt
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The Resolution setting displays.

```
Resolut
Set-2.5
Set-3.5
Set-4.5
```

2. Turn the jog dial to select the setpoint increment resolution to be used.
3. With the desired resolution displayed, push the jog dial to save your selection.
4. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

Note for Section 3-3-5: The device will indicate "#RES" on the display when a value can not be shown in the configured engineering unit and/or display resolution. Another engineering unit and/or display resolution should be selected to allow proper value display.

3-3-6 Dial Resolution

The decimal place at which the setpoint value and the setpoint alarm value will be incremented/decremented when turning the jog dial can be set.

To set the setpoint and setpoint alarm step place:

1. From the Configuration menu, select **DialRes**.

```
GasCurv
Eng-Unt
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The dial resolution setting Steps menu displays.

2. In the Steps menu, move the cursor next to the step setting to be used, then push the jog dial to select it.

```
Steps
10000
1000
100
10
1
0.1
0.01
0.001
0.0001
BACK
EXIT
```

The selected step setting will be used the next time that the setpoint or setpoint alarm is incremented/decremented.

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3-3-7 Backlight

The display backlight can be turned on and off.

1. From the Configuration menu, select **Back-Lt**.

```
GasCurv
Eng-Unt
```

```
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The Back-Lit menu displays.

```
Back-Lit
Set -ON
```

```
Set -OFF
```

2. Move the cursor next to the **-ON** or **-OFF** setting, then push the jog dial to select it.
3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

3-3-8 Software and Hardware Versions

The LOI device software and hardware versions can be displayed.

1. From the Configuration menu, select **Version**.

```
GasCurv
Eng-Unt
```

```
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The version information displays the firmware revision.

```
Version
  nn
```

2. To return to the main menu, push the jog dial.

3-3-9 Zeroing

The Zeroing settings—Auto, Reset, or None—can be selected from the LOI.

1. From the Configuration menu, select **Zeroing**.

```
GasCurv
Eng-Unt
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-Type
Default
    BACK
    EXIT
```

The Zeroing menu displays.

```
Zeroing
Zero
Reset
Value
BACK
EXIT
```

2. Move the cursor next to the desired setting, then push the jog dial to select it.
3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

After executing Auto or Reset functions, the display shows the status (Error, Ongoing, Done). After the function completes, the flow is displayed again.

Brooks® 4800 Series LOI

3-3-10 Output Selection

The analog output signal of the 4800 Series device can be toggled between voltage and current.

1. From the Configuration menu, select Out-type.

GasCurv

Eng-Unt

SpSourc

Resolut

DialRes

Back-Lt

Version

Zeroing

Out-type

Default

BACK

EXIT

The Output type settings display.

Out-type

Out-volt

Out-curr

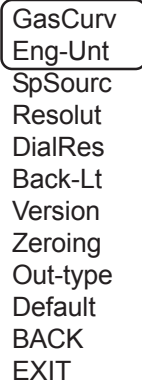
2. Turn the jog dial to select the output type to be used, than push the jog dial to save your selection.

3. In the confirmation prompt menu, move the cursor to OK and push the jog dial.

3-3-11 Reset to Factory Default

The LOI can be reconfigured to the factory default settings.

1. From the Configuration menu, select Default.



GasCurv
Eng-Unt
SpSourc
Resolut
DialRes
Back-Lt
Version
Zeroing
Out-type
Default
BACK
EXIT

The Default menu displays.

Reset
Back
Exit

2. Move the cursor next to the desired setting, then push the jog dial to select it.

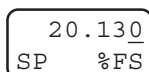
3. In the confirmation prompt menu, move the cursor to OK and push the jog dial.

3-4 Changing the Setpoint

The setpoint can be viewed and changed from the LOI.

1. Turn the jog dial in either direction.

The current setpoint displays. After a few seconds, the cursor displays under the rightmost digit of the setting value to indicate that it can be changed.



20.130
SP %FS

2. To change the setting, turn the jog dial.
3. When the setting is at the desired value, push the jog dial.
4. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

Brooks® 4800 Series LOI

The confirmation menu that displays includes a Fine function for specifying which decimal place in the setpoint value will be incremented/decremented when turning the jog dial.

To set the setpoint step place:

1. In the confirmation menu, move the cursor next to **Fine**, then push the jog dial to select it.

```

Fine
OK
CANCEL
  
```

2. In the Steps menu, move the cursor next to the step setting to be used, then push the jog dial to select it.

```

Steps
0.0001
0.001
0.01
0.1
1.0
10
100
  
```

The selected step setting will be used the next time that the setpoint is incremented/decremented.

3-5 Valve Override

The valve override setting—Normal, Open, Close—can be selected from the LOI.

1. From the main menu, select **VOR**.

```

CONFIG
VOR
TOTZR
ALARM
EXIT
  
```

The Valve Override menu displays.

```

NORMAL
OPEN
CLOSE
BACK
EXIT
  
```

2. Move the cursor next to the desired setting, then push the jog dial to select it.

3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

The valve is set to the chosen state.

3-6 Totalizer

With the valve state in Normal and the LOI totalizer started, the totalizer accumulates the instantaneous flow values received from the 4800 Series device at regular intervals.

The totalizer unit is in the selected engineering unit. If the totalizer value exceeds the display limit, then the totalizer display will change to a higher unit in the same category. If there is no higher unit, then the display will change to exponential form. The resolution is always 2 decimal places behind the decimal separator. Totalizer accuracy is within 0 to 0.1 %. Table 3-1 lists the units displayed by the totalizer.

NOTE: The totalizer value is related to particular gas type. If the gas type is changed, the totalizer value should be reset for proper operation.

Table 3-2 Totalizer Units

Eng Units	Totalizer Unit		
	Normal	Medium	High
%FS	scc	sl	[EXP] sl
slpm	scc	sl	[EXP] sl
ln/m	mln	ln	[EXP] ln
mln/m	mln	ln	[EXP] ln
sccm	scc	sl	[EXP] sl
slph	scc	sl	[EXP] sl
ln/h	mln	ln	[EXP] ln
sm3h	scc	sm3	[EXP] sm3
mn3h	mln	mn3	[EXP] mn3
scfm	scf	[EXP] scf	[EXP] scf
scfh	scf	[EXP] scf	[EXP] scf
g/h	g	kg	[EXP] kg
lb/h	lb	[EXP] lb	[EXP] lb
kg/h	g	kg	[EXP] kg
ccn/m	ccn	ln	[EXP] ln

Brooks® 4800 Series LOI

To control the totalizer operation:

1. From the main menu, select **TOTZR**.

```
CONFIG
  VOR
  TOTZR
  ALARM
  EXIT
```

The Totalizer menu displays.

```
RESET
START
STOP
BACK
EXIT
```

2. Move the cursor next to the desired function, then push the jog dial to select it.
3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

The chosen totalizer function is executed.

NOTE: If you reset the Totalizer while it is running, it will be stopped. If you want it to continue to run, you will have to start it again.

3-7 Viewing the Totalizer Value

The totalizer value can be displayed alternatively with the valve status every couple seconds by pressing the jog dial for more than 2 seconds while in flow signal mode.

To return to flow signal mode, push or turn the jog dial.

4-1 Overview

No routine maintenance is required on the 4800 Series LOI device. This section provides information about setting and detecting the flow alarm.

⚠ WARNING

If it becomes necessary to remove the instrument from the system, make sure power to the device is disconnected at the power supply.

⚠ CAUTION

It is important that this device only be serviced by properly trained and qualified personnel.

⚠ CAUTION

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

4-2 Setting the Flow Alarm

The high and low flow alarm settings can be changed and enabled from the LOI.

4-2-1 Displaying the Alarm Menu

To display the Alarm menu:

1. With the flow displayed, press the jog dial to display the main menu.

```
CONFIG
VOR
TOTZR
ALARM
EXIT
```

2. Move the cursor next to **ALARM**, then push the jog dial to select it.

The Alarm menu displays.

```
H-Alarm
L-Alarm
Alam-En
BACK
EXIT
```

Brooks® 4800 Series LOI

4-2-2 Changing a Flow Alarm Value

To set the high or low flow alarm value:

1. From the Alarm menu, select **H-Alarm** or **L-Alarm**.

```
H-Alarm
L-Alarm
```

```
Alam-En
BACK
EXIT
```

The Alarm value setting displays.

```
H-Alarm
11.678
```

2. To change the setting, turn the jog dial.
3. When the setting is at the desired value, push the jog dial.
4. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

4-2-3 Enabling the Flow Alarm

To enable the flow alarm:

1. From the Alarm menu, select **Alam-En**.

```
H-Alarm
L-Alarm
```

```
Alam-En
BACK
EXIT
```

The Alarm Enable/Disable menu displays.

```
Alarm
Enabled
```

2. Turn the jog dial to toggle between the **Enabled** and **Disabled** settings, then push the jog dial to select the displayed setting.
3. In the confirmation prompt menu, move the cursor to **OK** and push the jog dial.

The flow alarm status is indicated by the right LED on the device.

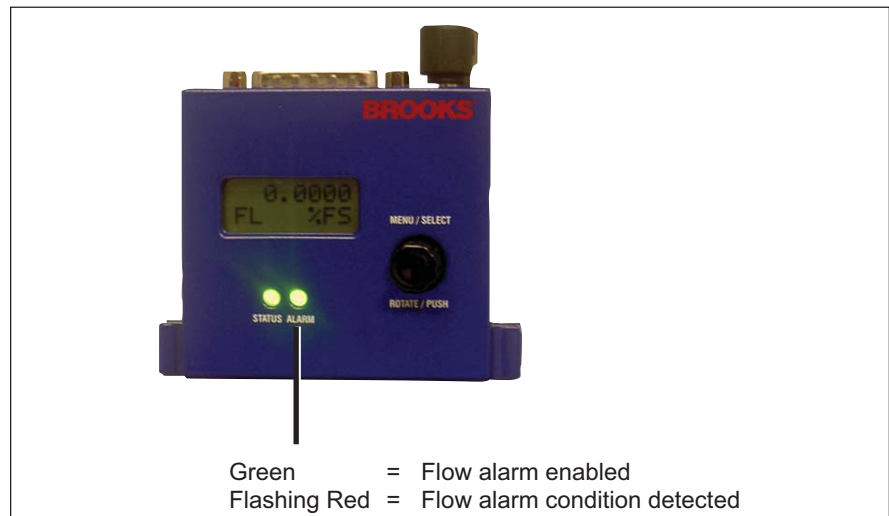


Figure 4-1. Alarm LED Indicator

Note that 4800 device alarms are latched. The LOI will indicate the alarm condition until it is acknowledged by pushing the jog dial.

4-3 Alarm Output Pin

Pin 3 of the D-connector at the top of the LOI is an TTL open collector (using an NPN transistor) alarm output.

The maximum parameters for the alarm output are:

- Maximum voltage: 50 V
- Maximum current: 0.22 A
- Maximum power: 0.36 W

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Dansk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Emne : **Tillæg til instruktions manual.**
Reference : **CE mærkning af Masse Flow udstyr**
Dato : **Januar-1996.**

Brooks Instrument har gennemført CE mærkning af elektronisk udstyr med succes, i henhold til regulativet om elektrisk støj (EMC direktivet 89/336/EEC).

Der skal dog gøres opmærksom på benyttelsen af signalkabler i forbindelse med CE mærkede udstyr.

Kvaliteten af signal kabler og stik:

Brooks lever kabler af høj kvalitet, der imødekommer specifikationerne til CE mærkning.

Hvis der anvendes andre kabel typer skal der benyttes et skærmet kabel med hel skærm med 100% dækning.

Forbindelses stikket type "D" eller "cirkulære", skal være skærmet med metalhus og eventuelle PG-forskrutninger skal enten være af metal eller metal skærmet.

Skærmen skal forbindes, i begge ender, til stikkets metalhus eller PG-forskrutningen og have forbindelse over 360 grader.

Skærmen bør være forbundet til jord.

"Card Edge" stik er standard ikke af metal, der skal derfor ligeledes benyttes et skærmet kabel med hel skærm med 100% dækning.

Skærmen bør være forbundet til jord.

Forbindelse af stikket; venligst referer til vedlagte instruktions manual.

Med venlig hilsen,

Deutsch

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : **Nachtrag zur Bedienungsanleitung.**
Referenz : **CE Zertifizierung für Massedurchflußgeräte**
Datum : **Januar-1996.**

Nach erfolgreichen Tests entsprechend den Vorschriften der Elektromagnetischen Verträglichkeit (EMC Richtlinie 89/336/EEC) erhalten die Brooks-Geräte (elektrische/elektronische Komponenten) das CE-Zeichen.

Bei der Auswahl der Verbindungskabel für CE-zertifizierte Geräte sind spezielle Anforderungen zu beachten.

Qualität der Verbindungskabel, Anschlußstecker und der Kabeldurchführungen

Die hochwertigen Qualitätskabel von Brooks entsprechen der Spezifikation der CE-Zertifizierung.

Bei Verwendung eigener Verbindungskabel sollten Sie darauf achten, daß eine

100 %igen Schirmabdeckung des Kabels gewährleistet ist.

"D" oder "Rund" -Verbindungsstecker sollten eine Abschirmung aus Metall besitzen.

Wenn möglich, sollten Kabeldurchführungen mit Anschlußmöglichkeiten für die Kabelabschirmung verwendet werden.

Die Abschirmung des Kabels ist auf beiden Seiten des Steckers oder der Kabeldurchführungen über den vollen Umfang von 360 ° anzuschließen.

Die Abschirmung ist mit dem Erdpotential zu verbinden.

Platinen-Steckverbindungen sind standardmäßige keine metallgeschirmten Verbindungen. Um die Anforderungen der CE-Zertifizierung zu erfüllen, sind Kabel mit einer 100 %igen Schirmabdeckung zu verwenden.

Die Abschirmung ist mit dem Erdpotential zu verbinden.

Die Belegung der Anschlußpins können Sie dem beigelegten Bedienungshandbuch entnehmen.

English

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : **Addendum to the Instruction Manual.**
Reference : **CE certification of Mass Flow Equipment**
Date : **January-1996.**

The Brooks (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 89/336/EEC).

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 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 a 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 a earth ground.

For pin configuration : Please refer to the enclosed Instruction Manual.

Español

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asunto : **Addendum al Manual de Instrucciones.**
Referencia : **Certificación CE de los Equipos de Caudal Másico**
Fecha : **Enero-1996.**

Los equipos de Brooks (eléctricos/electrónicos) en relación con la marca CE han pasado satisfactoriamente las pruebas referentes a las regulaciones de Compatibilidad Electro magnética (EMC directiva 89/336/EEC).

Sin embargo se requiere una atención especial en el momento de seleccionar el cable de señal cuando se va a utilizar un equipo con marca CE

Calidad del cable de señal, prensaestopas y conectores:

Brooks suministra cable(s) de alta calidad, que cumple las especificaciones de la certificación CE .

Si usted adquiere su propio cable de señal, debería usar un cable que esté completamente protegido en su conjunto con un apantallamiento del 100%.

Cuando utilice conectores del tipo “D” ó “Circular” deberían estar protegidos con una pantalla metálica. Cuando sea posible, se deberán utilizar prensaestopas metálicos provistos de abrazadera para la pantalla del cable.

La pantalla del cable deberá ser conectada al casquillo metálico ó prensa y protegida en ambos extremos completamente en los 360 Grados.

La pantalla deberá conectarse a tierra.

Los conectores estandar de tipo tarjeta (Card Edge) no son metálicos, los cables utilizados deberán ser protegidos con un apantallamiento del 100% para cumplir con la certificación CE.

La pantalla deberá conectarse a tierra.

Para ver la configuración de los pines: Por favor, consultar Manual de Instrucciones adjunto.

Français

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Sujet : Annexe au Manuel d'Instructions.
Référence : Certification CE des Débitmètres Massiques à Effet Thermique.
Date : Janvier 1996.

Messieurs,

Les équipements Brooks (électriques/électroniques) portant le label CE ont été testés avec succès selon les règles de la Compatibilité Electromagnétique (directive CEM 89/336/EEC).

Cependant, la plus grande attention doit être apportée en ce qui concerne la sélection du câble utilisé pour véhiculer le signal d'un appareil portant le label CE.

Qualité du câble, des presse-étoupes et des connecteurs:

Brooks fournit des câbles de haute qualité répondant aux spécifications de la certification CE.

Si vous approvisionnez vous-même ce câble, vous devez utiliser un câble blindé à 100 %.

Les connecteurs « D » ou de type « circulaire » doivent être reliés à la terre.

Si des presse-étoupes sont nécessaires, ceux ci doivent être métalliques avec mise à la terre.

Le blindage doit être raccordé aux connecteurs métalliques ou aux presse-étoupes sur le pourtour complet du câble, et à chacune de ses extrémités.

Tous les blindages doivent être reliés à la terre.

Les connecteurs de type « card edge » sont non métalliques. Les câbles utilisés doivent être blindés à 100% pour satisfaire à la réglementation CE.

Tous les blindages doivent être reliés à la terre.

Se référer au manuel d'instruction pour le raccordement des contacts.

Greek

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Θέμα : Προσθήκη στο Εγχειρίδιο Οδηγιών.
Σχετικά : Πιστοποίηση CE των Οργάνων Μέτρησης Παροχής Μάζας.
Ημερομηνία : Ιανουάριος - 1996

Κυρίες και Κύριοι,

Τα όργανα (ηλεκτρικά/ηλεκτρονικά) της Brooks τα οποία φέρουν το σήμα CE έχουν επιτυχώς ελεγχθεί σύμφωνα με τους κανονισμούς της Ηλεκτρο-Μαγνητικής Συμβατότητας (EMC ντιρεκτίβα 89/336/EEC).

Οποσδήποτε χρειάζεται ειδική προσοχή κατά την επιλογή του καλωδίου μεταφοράς του σήματος το οποίο (καλώδιο) πρόκειται να χρησιμοποιηθεί με όργανα που φέρουν το σήμα CE.

Ποιότητα του καλωδίου σήματος των στυπιοθλιπτόν και των συνδέσμων .

Η Brooks κατά κανόνα προμηθεύει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές για πιστοποίηση CE.

Εάν η επιλογή του καλωδίου σήματος γίνει από σας πρέπει να χρησιμοποιήσετε καλώδιο το οποίο να φέρει εξωτερικά πλήρες πλέγμα και να παρέχει θωράκιση 100%.

Οι σύνδεσμοι τύπου "D" ή "Κυκλικοί" των καλωδίων, πρέπει να θωρακίζονται με μεταλλική θωράκιση. Εάν είναι εφαρμόσιμο, πρέπει να χρησιμοποιούνται μεταλλικοί στυπιοθλιπτες καλωδίων που να διαθέτουν ακροδέκτη σύνδεσης του πλέγματος του καλωδίου.

Το πλέγμα του καλωδίου πρέπει να συνδέεται στο μεταλλικό περιβλήμα ή στον στυπιοθλιπτή και να θωρακίζεται και στα δύο άκρα κατά 360 μοίρες.

Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

Οι σύνδεσμοι καρτών είναι μη-μεταλλικοί, τα καλώδια που χρησιμοποιούνται πρέπει να φέρουν πλέγμα θωράκισης 100% για να υπακούουν στην πιστοποίηση CE.

Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

Για την διάταξη των ακροδεκτών: Παρακαλούμε αναφερθείτε στο εσώκλειστο Εγχειρίδιο Οδηγιών.

Italiano

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Oggetto : **Addendum al manuale di istruzioni.**
Riferimento : **Certificazione CE dei misuratori termici di portata in massa**
Data : **Gennaio 1996.**

Questa strumentazione (elettrica ed elettronica) prodotta da Brooks Instrument, soggetta a marcatura CE, ha superato con successo le prove richieste dalla direttiva per la Compatibilità Elettromagnetica (Direttiva EMC 89/336/EEC).

E' richiesta comunque una speciale attenzione nella scelta dei cavi di segnale da usarsi con la strumentazione soggetta a marchio CE.

Qualità dei cavi di segnale e dei relativi connettori:

Brooks fornisce cavi di elevata qualità che soddisfano le specifiche richieste dalla certificazione CE. Se l'utente intende usare propri cavi, questi devono possedere una schermatura del 100%.

I connettori sia di tipo "D" che circolari devono possedere un guscio metallico. Se esiste un passacavo esso deve essere metallico e fornito di fissaggio per lo schermo del cavo.

Lo schermo del cavo deve essere collegato al guscio metallico in modo da schermarlo a 360° e questo vale per entrambe le estremità.

Lo schermo deve essere collegato ad un terminale di terra.

I connettori "Card Edge" sono normalmente non metallici. Il cavo impiegato deve comunque avere una schermatura del 100% per soddisfare la certificazione CE.

Lo schermo deve essere collegato ad un terminale di terra.

Per il corretto cablaggio dei terminali occorre fare riferimento agli schemi del manuale di istruzioni dello strumento.

Nederlands

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Onderwerp : **Addendum voor Instructie Handboek**
Referentie: **CE certificering voor Mass Flow Meters & Controllers**
Datum : **Januari 1996**

Dames en heren,

Alle CE gemarkeerde elektrische en elektronische producten van Brooks Instrument zijn met succes getest en voldoen aan de wetgeving voor Electro Magnetische Compatibiliteit (EMC wetgeving volgens 89/336/EEC).

Speciale aandacht is echter vereist wanneer de signaalkabel gekozen wordt voor gebruik met CE gemarkeerde producten.

Kwaliteit van de signaalkabel en kabelansluitingen:

- Brooks levert standaard kabels met een hoge kwaliteit, welke voldoen aan de specificaties voor CE certificering. Indien men voorziet in een eigen signaalkabel, moet er gebruik gemaakt worden van een kabel die volledig is afgeschermd met een bedekkingsgraad van 100%.
- "D" of "ronde" kabelconnectoren moeten afgeschermd zijn met een metalen connector kap. Indien kabelwartels worden toegepast, moeten metalen kabelwartels worden gebruikt die het mogelijk maken het kabelscherm in te klemmen. Het kabelscherm moet aan beide zijden over 360° met de metalen connectorkap, of wartel verbonden worden. Het scherm moet worden verbonden met aarde.
- "Card-edge" connectors zijn standaard niet-metallisch. De gebruikte kabels moeten volledig afgeschermd zijn met een bedekkingsgraad van 100% om te voldoen aan de CE certificering. Het scherm moet worden verbonden met aarde.

Voor pin-configuraties a.u.b. verwijzen wij naar het bijgesloten instructie handboek.

Hoogachtend,

Norsk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Vedrørende : Vedlegg til håndbok
Referanse : CE sertifisering av utstyr for massestrømsmåling og regulering
Dato : Januar 1996

Til den det angår

Brooks Instrument elektrisk og elektronisk utstyr påført CE-merket har gjennomgått og bestått prøver som beskrevet i EMC forskrift om elektromagnetisk immunitet, direktiv 89/336/EEC.

For å opprettholde denne klassifisering er det av stor viktighet at riktig kabel velges for tilkobling av det måletekniske utstyret.

Utførelse av signalkabel og tilhørende plugger:

- Brooks Instrument tilbyr levert med utstyret egnet kabel som møter de krav som stilles til CE-sertifisering.
- Dersom kunden selv velger kabel, må kabel med fullstendig, 100% skjerming av lederene benyttes. "D" type og runde plugger og forbindelser må være utført med kappe i metall og kabelnipler må være utført i metall for jordnet innfesting av skjermen. Skjermen i kablen må tilknyttes metallet i pluggen eller nippelen i begge ender over 360°, tilkoblet elektrisk jord.
- Kort-kantkontakter er normalt utført i kunststoff. De tilhørende flatkabler må være utført med fullstendig, 100% skjerming som kobles til elektrisk jord på riktig pinne i pluggen, for å møte CE sertifiseringskrav.

For tilkobling av medleverte plugger, vennligst se håndboken som hører til utstyret.

Vennlig hilsen

Português

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Assunto : Adenda ao Manual de Instruções
Referência : Certificação CE do Equipamento de Fluxo de Massa
Data : Janeiro de 1996.

O equipamento (eléctrico/electrónico) Brooks com a marca CE foi testado com êxito nos termos do regulamento da Compatibilidade Electromagnética (directiva CEM 89/336/EEC).

Todavia, ao seleccionar-se o cabo de sinal a utilizar com equipamento contendo a marca CE, será necessário ter uma atenção especial.

Qualidade do cabo de sinal, buchas de cabo e conectores:

A Brooks fornece cabo(s) de qualidade superior que cumprem os requisitos da certificação CE.

Se fornecerem o vosso próprio cabo de sinal, devem utilizar um cabo que, na sua totalidade, seja isolado com uma blindagem de 100%.

Os conectores tipo "D" ou "Circulares" devem ser blindados com uma blindagem metálica. Se tal for necessário, deve utilizar-se buchas metálicas de cabo para o isolamento do aperto do cabo.

O isolamento do cabo deve ser ligado à blindagem ou bucha metálica em ambas as extremidades em 360°.

A blindagem deve terminar com a ligação à massa.

Os conectores "Card Edge" não são, em geral, metálicos e os cabos utilizados devem ter um isolamento com blindagem a 100% nos termos da Certificação CE..

A blindagem deve terminar com ligação à massa.

Relativamente à configuração da cavilha, queiram consultar o Manual de Instruções.

Suomi

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asia : Lisäys Käyttöohjeisiin
Viite : Massamäärämittareiden CE sertifiointi
Päivämäärä : Tammikuu 1996

Brooksin CE merkillä varustetut sähköiset laitteet ovat läpäissyt EMC testit (direktiivi 89/336/EEC).

Erityistä huomiota on kuitenkin kiinnitettävä signaalikaapelin valintaan.

Signaalikaapelin, kaapelin läpiviennin ja liittimen laatu

Brooks toimittaa korkealaatuisia kaapeleita, jotka täyttävät CE sertifiointivaatimukset. Hankkiessaan signaalikaapelin itse, olisi hankittava 100%:sti suojattu kaapeli.

“D” tai “Circular” tyyppisen liittimen tulisi olla varustettu metallisuojalla. Mikäli mahdollista, tulisi käyttää metallisia kaapeliliittimiä kiinnitettäessä suoja.

Kaapelin suoja tulisi olla liitetty metallisuojaan tai liittimeen molemmissa päissä 360°:n matkalta.

Suojan tulisi olla maadoitettu.

“Card Edge Connector”it ovat standarditoimituksina ei-metallisia. Kaapeleiden täytyy olla 100%:sesti suojattuja jotta ne olisivat CE sertifiointimukaisia.

Suoja on oltava maadoitettu.

Nastojen liittäminen; katso liitteenä oleva manuaali.

Ystävällisin terveisin,

Svensk

Brooks Instrument
407 West Vine St.
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U.S.A.

Subject : Addendum to the Instruction Manual
Reference : CE certification of Mass Flow Equipment
Date : January 1996

Brooks (elektriska / elektronik) utrustning, som är CE-märkt, har testats och godkänts enligt gällande regler för elektromagnetisk kompatibilitet (EMC direktiv 89/336/EEC).

Speciell hänsyn måste emellertid tas vid val av signalkabel som ska användas tillsammans med CE-märkt utrustning.

Kvalitet på signalkabel och anslutningskontakter:

Brooks levererar som standard, kablar av hög kvalitet som motsvarar de krav som ställs för CE-godkännande.

Om man använder en annan signalkabel ska kabeln i sin helhet vara skärmad till 100%.

“D” eller “runda” typer av anslutningskontakter ska vara skärmade. Kabelgenomföringar ska vara av metall alternativt med metalliserad skärmning.

Kabelns skärm ska, i bada ändrar, vara ansluten till kontakternas metallkåpor eller genomföringar med 360 graders skärmning.

Skärmen ska avslutas med en jordförbindelse.

Kortkontakter är som standard ej metalliserade, kablar som används måste vara 100% skärmade för att överensstämma med CE-certifieringen.

Skärmen ska avslutas med en jordförbindelse.

För elektrisk anslutning till kontaktstiften hänvisas till medföljande instruktionsmanual.

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Brooks® 4800 Series LOI

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:

- Americas ☎ 1-888-554-FLOW
- Europe ☎ +(31) 318 549 290 Within Netherlands ☎ 0318 549 290
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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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