

## Installation and Operation Manual

X-SE-0152-0154-eng

Part Number: 541C052AAG

March, 2008

# Gas and Liquid Mass Flow Secondary Electronics



*Brooks Model 0154  
Four Channel Read Out  
Table Top Housing*

# 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.

## 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-0152-0154-eng

Part Number: 541C052AAG

March, 2008

Brooks® Models 0152/0154

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](http://www.BrooksInstrument.com)

Yours sincerely,  
Brooks Instrument

## WARNING



**Protective Conductor Terminal**

**The Protective Conductor Terminal is an important safety measure of the instrument. Improper earthing of the instrument will impair the electrical safety significantly and could result in serious personal injury from electrical shock.**

## CAUTION



**Caution, Risk of Electrical Shock**

**First disconnect power from the mains before replacing the fuses.**

*THIS PAGE WAS  
INTENTIONALLY  
LEFT BLANK*

<u>Paragraph Number</u>	<u>Page Number</u>
<b>Section 1 Introduction</b>	
1-1 Description .....	1-1
1-2 Specifications .....	1-2
1-3 Optional Equipment .....	1-7
1-3-1 Connecting Flomega Series .....	1-7
1-3-2 Connecting Mass Flow and Pressure Series .....	1-7
1-3-3 Connecting Smart Series .....	1-7
1-3-4 Connecting QUANTIM .....	1-8
1-3-5 Connecting RS-232 Communication .....	1-8
1-4 Certifications .....	1-8
<b>Section 2 Installation</b>	
2-1 General .....	2-1
2-2 Receipt of Equipment .....	2-1
2-3 Recommended Storage Practice .....	2-1
2-4 Return Shipment .....	2-2
2-5 Transit Precautions .....	2-2
2-6 Removal from Storage .....	2-2
2-7 Dimensions of the Enclosures .....	2-2
2-8 Ventilation and Mounting Requirements .....	2-3
2-9 Cleaning Instructions .....	2-3
2-10 Cable Requirements .....	2-3
2-11 Connector Pinning .....	2-4
2-12 Jumper Settings and Functions .....	2-7
2-13 Adjustments of LCD Contrast and 5 V Reference .....	2-8
<b>Section 3 Operation</b>	
3-1 General .....	3-1
3-2 Description of Keys .....	3-1
3-3 Start Up Screens .....	3-3
3-4 Changing the Active Channel .....	3-3
3-5 Changing the Setpoint Value .....	3-4
3-6 Using the Blending Mode .....	3-4
3-7 Using the Valve Control Function .....	3-6
3-8 Using the Remote Function .....	3-7
3-9 Menu .....	3-8
<b>Section 4 Operation (Via Personal Computer)</b>	
4-1 Operation (Via Personal Computer) .....	4-1
<b>Appendix A Engineering Units</b>	
Available Engineering Units .....	A-1
<b>Appendix B Blending Examples</b>	
Examples 1 through 6 .....	B-1

## Models 0152 / 0154

**Appendix C CE Certification**

CE Certification of Mass Flow Equipment .....	C-1
---	-----

<b>Warranty, Local Sales/Service Contact Information .....</b>	<b>Back Cover</b>
--	-------------------

**Figures**

<b><u>Figure Number</u></b>	<b><u>Page Number</u></b>
1-1 Dimensions Table Top Models 0152/0154 .....	1-3
1-2 Dimensions Panel Mount Models 0152/0154 .....	1-3
1-3 Dimensions of 1/2 19" Cassette .....	1-4
1-4 Mounting of 1/2 19" Cassette into 19" Rack .....	1-4
1-5 Mounting of Panel Mount Unit with Dimensions for the Panel Cut-Out .....	1-5
1-6 Electrical Configuration .....	1-6
2-1 Back Panel Layout .....	2-4
2-2 Main Board: Jumper and Potmeter Locations .....	2-7
2-3 Optional I/O Board: Jumper Locations .....	2-8
4-1 LabVIEW .....	4-1
4-2 Testpoint .....	4-2

**Tables**

<b><u>Table Number</u></b>	<b><u>Page Number</u></b>
2-1 Pinning of Channel 1 to 4 Connectors .....	2-5
2-2 Pinning of Ext. Valve Control Connector .....	2-5
2-3 Pinning of Remote Connector .....	2-6
2-4 Pinning of RS-232 Connector .....	2-6
2-5 Jumper Setting for 0-5 Vdc I/O .....	2-7
2-6 Jumper Setting (Optional I/O Board Installed <sup>1</sup> ) .....	2-8

**1-1 Description**

---

The Brooks microprocessor based readout and control equipment is designed to meet the highest standards with user-friendly operation. Model 0152 provides 2 channels and Model 0154 provides 4 channels. 0152/0154 also provide power supply for Brooks gas/liquid thermal mass flow/pressure controllers/meters and QUANTIM™. The readout function is a back lit 4 x 20 character display. Features include membrane push buttons for setpoint, blending, valve override and local/remote control. Actual reading or % full scale of flow rate/pressure/density/temperature is programmable for each channel.

Both models can be operated with independent mass flow control channels, or with one or more channels slaved to the master (blending mode). (If planning to use blending mode with engineering units rather than % full scale, 1-5 Vdc or 4-20 mA I/O cannot be used.) Each channel can be operated as master or slave or in an independent control mode. Valve override functions are selectable. In valve override mode, the valve will be open/closed independent of setpoint value. The Mass Flow Controller Output Signals are switched to the 25-pin connector located on the backpanel. This connector includes up to 4 channels with setpoint input and flowrate or pressure output.

An RS-232 port is provided standard to control the 0152/0154 from a PC. This port enables connection of up to 4 analog (or analog configured devices) to a Model 0154. Communications is possible with optional cable and software (Standalone and LabVIEW™ VI with Smart DDE driver). Setpoint, Flow Rate and Valve Override parameters are available.

The local function is useful as backup of the customer's system configuration. In local mode, the Mass Flow devices will be operated directly by the 0152/0154, and in remote mode the customer's peripheral equipment determines the control actions. Stored default values are available after power interruption

## Brooks® Models 0152/0154

## 1-2 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.**

**Power input**

90-260 Vac, 50/60 Hz 70 W max power.

**Power output**

+15 V/2.9 A, -15V/1.4 A max or 24 Vdc/2.5 A max.

**Signal input**

Signal from flow or pressure transducer and remote setpoint. 0(1)-5 Vdc or 0(4)-20 mA .

**Signal output**

0(1)-5 Vdc or 0(4)-20 mA, Impedance 1 kW (minimum) or Impedance 750W (maximum)

**Electrical**

Two or four 15-pin D connectors for connecting the mass flow or pressure control equipment.

One 25-pin D connector for combined remote setpoint input and output signal, up to 4 channels.

One 15-pin D connector for connecting remote valve override control function.

One 9-pin D connector for RS232 communication link to a PC.

**Display reading**

Model 0152: 2x 20 character and Model 0154: 4x 20 character display with back lighting. Percentage full scale or actual reading.

**Controls**

Membrane push buttons for setpoint, blending, valve override, local/ remote control, menu selection per channel and power switch.

**Materials of Construction****Housing**

Anodized aluminium and steel covers: 1/2 size 19" rack cassette or table top with optional handle.

**Dimensions**

1/2 size 19" rack cassette, [5.1" (130 mm) height, 8.7" (220 mm) width, 9.1" (230 mm) depth]. Table top (Refer to Figures 1-1 and 1-5).

**Ambient Temperature**

0 - 50°C (32-122°F)

**Electrical Configuration**, (Refer to Figure 1-6).



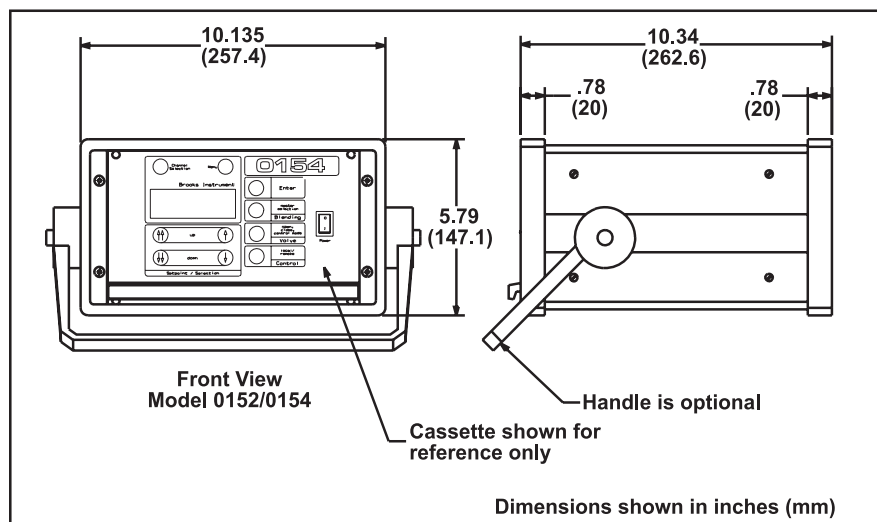


Figure 1-1 Dimensions Table Top Models 0152/0154

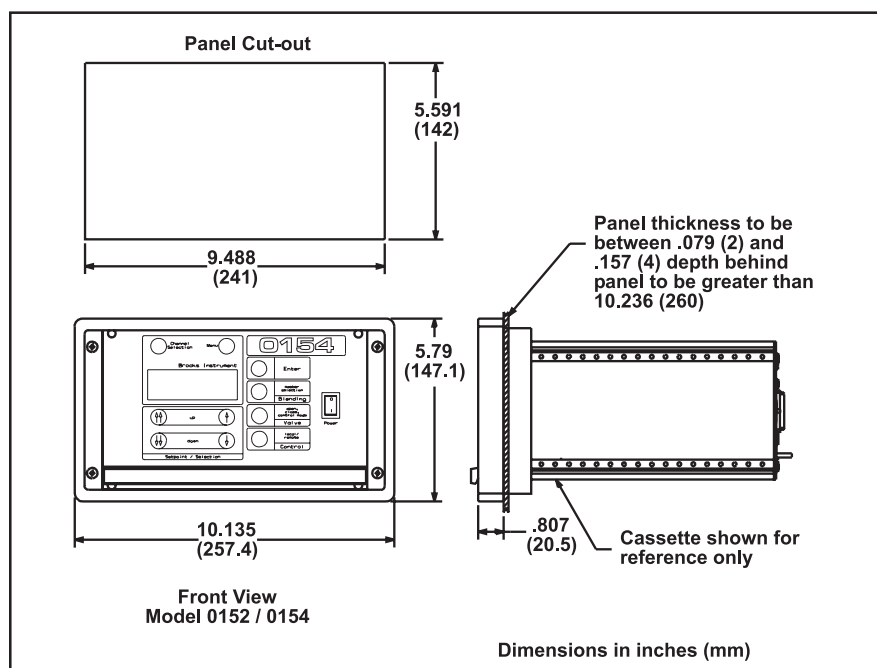


Figure 1-2 Dimensions Panel Mount Models 0152/0154

## Brooks® Models 0152/0154

All housing options consist of a standard 1/2 19" cassette ( 3HE x 42TE ) using three different parts:

- Table Top Option: Table Top Housing
- 19" Rack Option: 19" Rack
- Panel Mount Option: Bracket Set

The dimensions of the 1/2 19" cassette are:  
cassette ( 3HE x 42TE ) using three different parts:

- Table Top Option: Table Top Housing
- 19" Rack Option: 19" Rack
- Panel Mount Option: Bracket Set

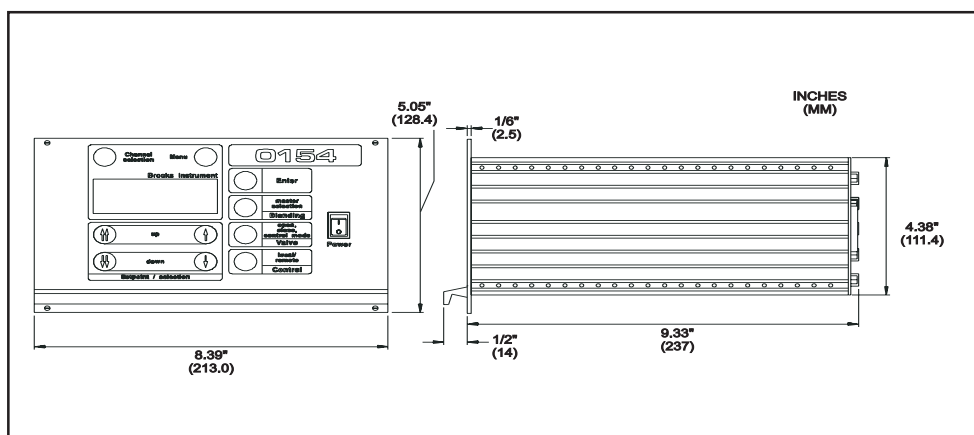


Figure 1-3 Dimensions of 1/2 19" Cassette

The cassette can be mounted directly into a 19" rack:

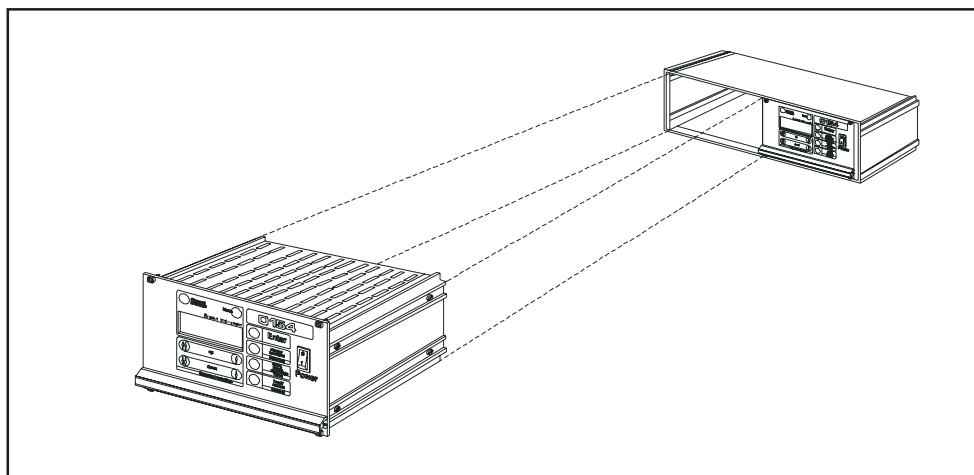


Figure 1-4 Mounting of 1/2 19" Cassette into 19" Rack

The cassette can be mounted into the table top enclosure in the same way. The dimensions of the table top housing are (all dimensions in/mm):

The panel mount option uses the cassette mounted into a panel using the panelmount bracket set. The dimensions for the panel cutout and the mounting details are:

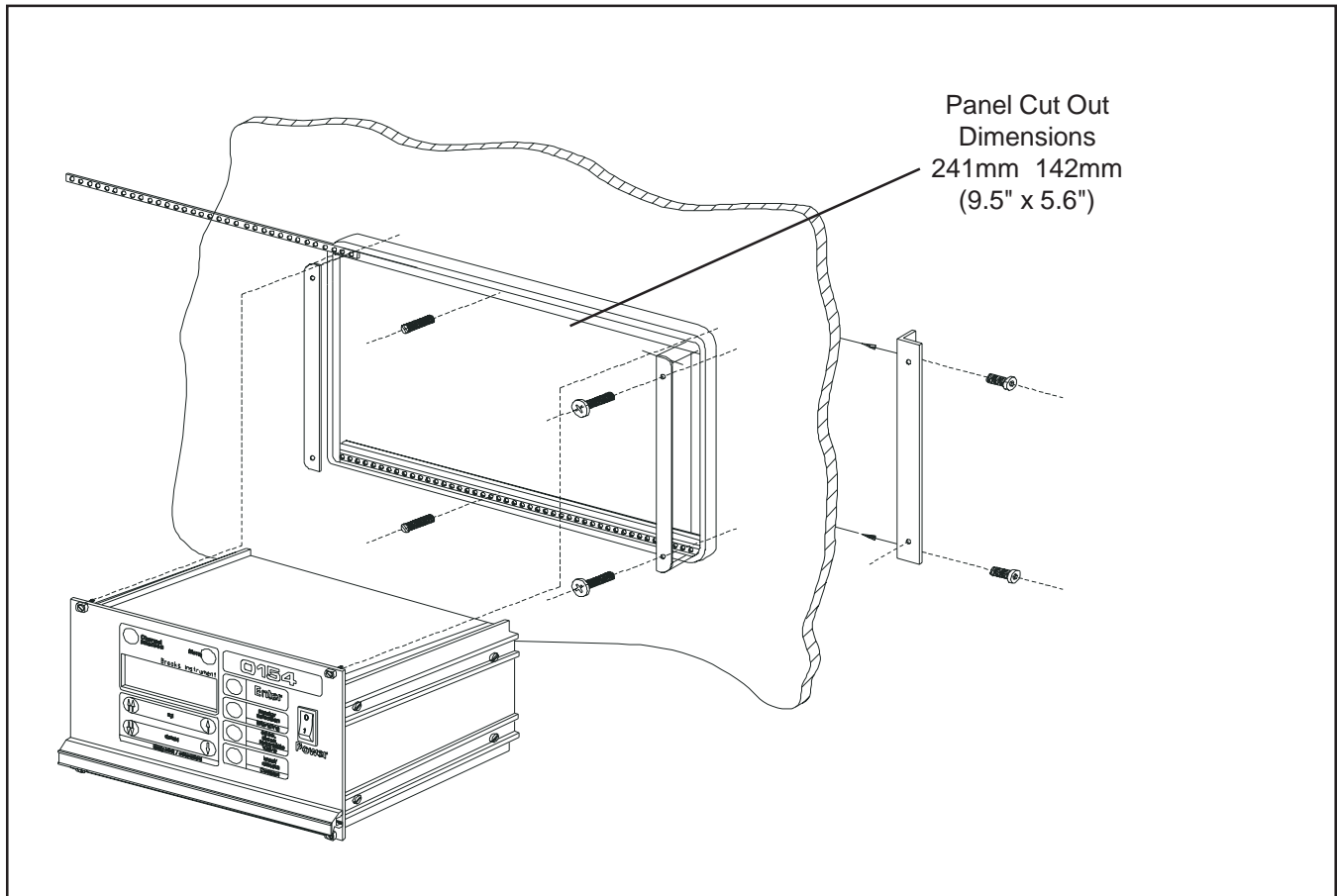


Figure 1-5 Mounting of Panel Mount Unit with Dimensions for the Panel Cut-Out

## Brooks® Models 0152/0154

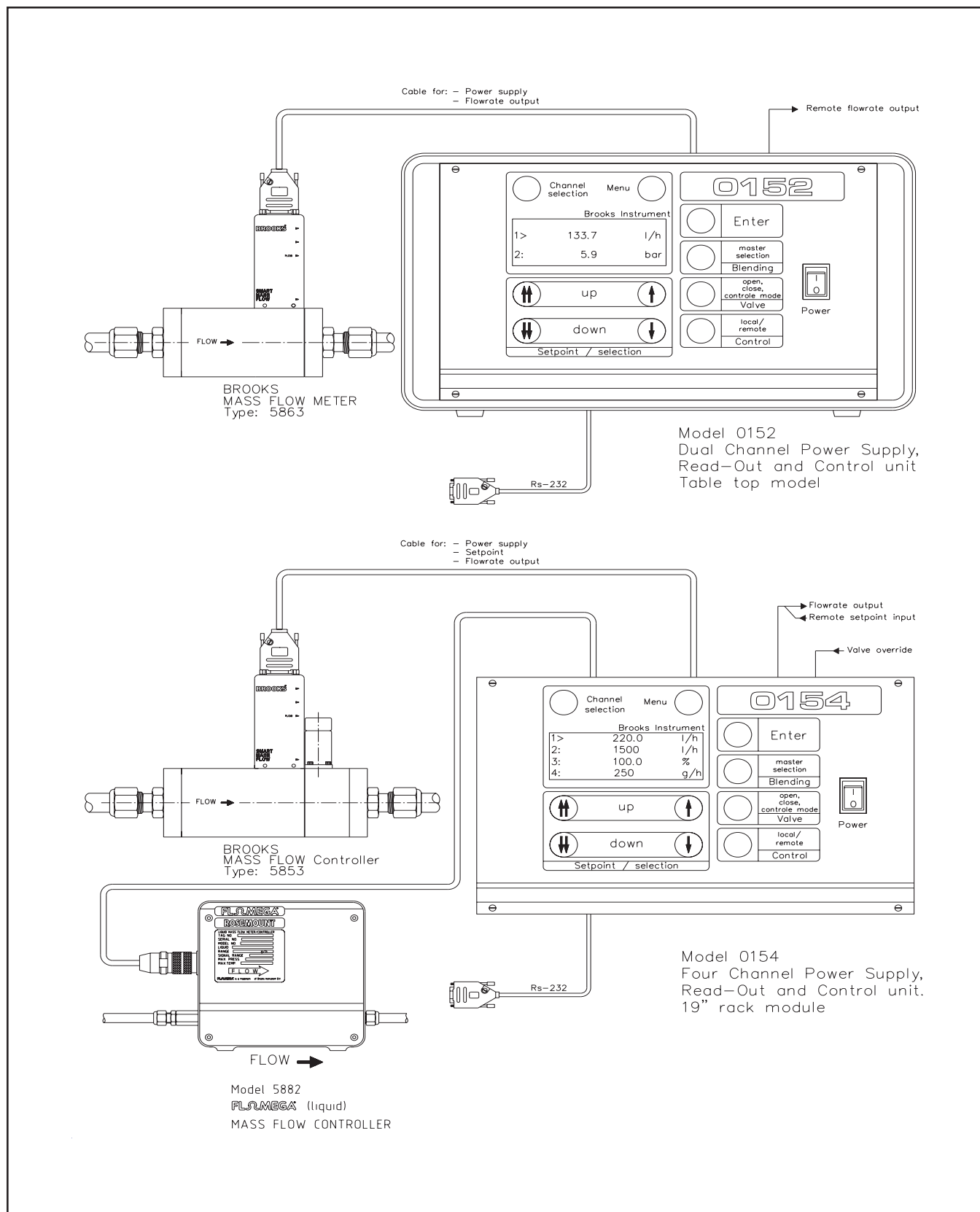


Figure 1-6 Electrical Configuration

**1-3 Optional Equipment**

For connection of the Brooks mass flow and pressure equipment to the Models 0152 or 0154, the following interconnecting cables are available:

**1-3-1 Connecting Flomega Series**

For connecting the Models 0152 or 0154 to the Flomega series 5880 and 5890, the following cables are available:

Length 3 m (9.84 ft); part number 124Z605ZZZ  
Length 6 m (19.69 ft); part number 124Z606ZZZ

**1-3-2 Connecting Mass Flow and Pressure Series**

For connecting the Models 0152 or 0154 to the Mass Flow Series, 5850, 5860 and Pressure Control series 5866, the following cables are available:

Via the Netherlands:

Length: 3 m (9.84 ft); part number 124Z236AAA  
Length: 6 m (19.69 ft); part number 124Z237AAA  
Length: 12 m (39.37 ft); part number 124Z610AAA

Via USA:

Length: 5 ft (1.52m); part number 124Z576AAA  
Length: 10 ft (3.05m); part number 124Z577AAA  
Length: 25 ft (7.62m); part number 124Z578AAA  
Length: 50 ft (15.24m); part number 124Z579AAA

**1-3-3 Connecting Smart Series**

For connecting the Models 0152 or 0154 to the Smart Mass Flow Series 5850S, the following cables are available:

Length: 3 m (9.84 ft); part number 124Z893AAA  
Length: 6 m (19.69 ft); part number 124Z894AAA  
Length: 12 m (39.37 ft); part number 124Z895AAA

These cables are only necessary when digital communication between PC and S series is desired, otherwise the cables mentioned in Section 1-3-2 can be used.

## Brooks® Models 0152/0154

## 1-3-4 Connecting QUANTIM

The following cables are available for connection of the QUANTIM Mass Flow Meter/Controller to the Brooks Microprocessor Control & Read-out Unit: Model # 0152 and 0154

Length: 3ft (1m); part number 124Z054AAA  
 Length: 5ft (1.5m); part number 124Z050AAA  
 Length: 10ft (3m); part number 124Z051AAA  
 Length: 25ft (7m); part number 124Z052AAA  
 Length: 50ft (15m); part number 124Z053AAA

Or in case both Flow and Density or Temperature functions have to be made available:

Length: 5ft (1.5m); part number 124Z906ZZZ  
 Length: 10ft (3m); part number 124Z907ZZZ  
 Length: 25ft (7m); part number 124Z908ZZZ  
 Length: 50ft (15m); part number 124Z909ZZZ

## 1-3-5 RS-232 Communication

For connecting the Model 0152/0154 to a personal computer an RS-232 cable is available:

Length: 3 m (9.84 ft); part number 124Z901ZZZ

## Note:

This cable is only required when using digital communication between Model 0152/0154 and a personal computer (see Section 4-1).

## 1-4 Certifications

Approvals:



EMC Directive based on EN 50082-2 and  
 EN 50081-1 Low Voltage Directive based  
 on EN 61010-1 plus amendments



CSA-NRTL/C  
 based on CAN/CSA-C22.2 No. 1010.1-92  
 and ISA S82.01-1994

Scope of Electrical  
 Safety Approvals:

Indoor use	
Altitude:	up to 2000m (6562 ft)
Pollution Degree:	2 (see IEC 664)
Installation category	II (see IEC 664)
Power input	100-240Vac, 50/ 60Hz, 100W
Ambient temperature:	0 - 50°C (32°F - 122°F)
Max. rel Humidity	80%

**2-1 General**

This section provides installation instructions for the Brooks® Models 0152 and 0154 Gas and Liquid Mass Flow Secondary Electronics devices.

**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@EmersonProcess.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@EmersonProcess.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@EmersonProcess.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".

## Brooks® Models 0152/0154

**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@EmersonProcess.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@EmersonProcess.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@EmersonProcess.com

**⚠ WARNING**

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

All flow instruments returned to Brooks 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](http://www.BrooksInstrument.com) or are available 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."



### 2-7 Ventilation and Mounting Requirements

The ventilation holes of the instrument must never be blocked or covered. When installing the instrument in a panel or a rack, always take care that proper ventilation is provided. See Section 1 enclosure dimensions for installation and mounting (Figures 1-1 through 1-7).

### 2-8 Cleaning Instructions

Do not use cleaning agents other than water because this might affect color and marking of the equipment.  
Use a clean, soft and damp cloth for cleaning.

### 2-9 Cable Requirements

For compliance with the EMC directive 89/336/EEC, the equipment has to be installed with shielded signal cables which are overall completely screened with a shield of at least 80 %. Sub-D connectors used must be shielded with a metal shield. The cable screen should be connected to the metal shell and shielded at both ends over 360 Degrees. The shield should be terminated to earth ground.

Always use a power cord that is certified or approved by a recognized national test lab. The powercord must accomodate 3 conductors with a wire size of at least 0.75mm<sup>2</sup> (or 18AWG). One of the three conductors has to provide the protective conductor function. The voltage range must be suitable for the used mains voltage.

Additional earthing can be done by means of the external protective conductor terminal marked with the symbol as shown below:

#### **⚠ WARNING**



**Protective Conductor Terminal**

**The Protective Conductor Terminal is an important safety measure of the instrument. Improper earthing of the instrument will impair the electrical safety significantly and could result in serious personal injury from electrical shock.**

#### **⚠ CAUTION**



**Caution, Risk of Electrical Shock**

**First disconnect power from the mains before replacing the fuses.**

## Brooks® Models 0152/0154

Two fuses are located in the power entry at the backside of the instrument. Remove the fuses by pulling out the fuse cartridge. The fuses must be replaced by fuses meeting the following requirements:

Dimensions:	5 x 20mm
Current:	2A T (slow blow)
Voltage:	Suitable for mains voltage
Approvals:	Certified or approved by a recognized national test lab
For Europe:	Breaking Capacity: 1500A Melting Characteristic: IEC127

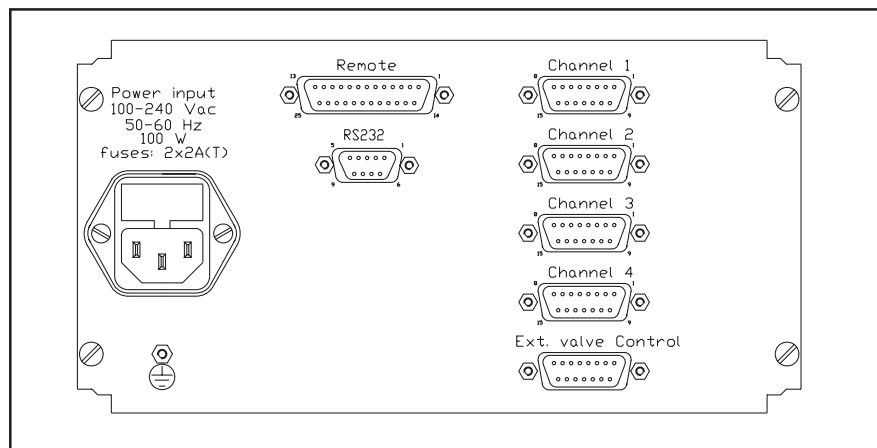
**2-10 Connector Pinning**

Figure 2-1 Back Panel Layout

Table 2-1 Pinning of Channels 1 to 4 Connectors

pin number	Input/ Output	Function
1	Output	+15Vdc/+24Vdc*
2	Input	Flow mA
3	Output	Setpoint mA
4	nc	Nc
5	Output	Setpoint Volt
6		Setpoint ground
7	Output	Valve override
8		Flow ground
9	reserved	Reserved
10	Input	Flow V
11	nc	Nc
12		Power ground
13	Output	+15Vdc/+24Vdc*
14	Output	-15Vdc/nc*
15	nc	Nc

\*Depending on model: +24 Vdc: only combination +24 Vdc and power ground. ±15 Vdc: only combination +15 Vdc and -15 Vdc

When applying non Brooks cables for use of Digital MFC/M's (incl. MF) on mA I/O, pin 3 and 5 should be shorted at the read out side

Table 2-2 Pinning of Ext. Valve Control Connector

pin number	Input/ Output	Function
1	Input	Remote valve override channel 1
2	nc	Nc
3	Input	Remote valve override channel 2
4	nc	Nc
5	Input	Remote valve override channel 3
6	nc	Nc
7	Input	Remote valve override channel 4
8	nc	Nc
9	Output	+15Vdc/+24Vdc*
10	nc	Nc
11	nc	Nc
12	nc	Nc
13	nc	Nc
14	nc	Nc
15	Output	-15Vdc / Power ground*

\*Depending on model: +24 Vdc: only combination +24 Vdc and power ground.

±15 Vdc: only combination +15 Vdc and -15 Vdc

## Brooks® Models 0152/0154

Table 2-3 Pinning of Remote Connector

<i>pin number</i>	<i>Input/ Output</i>	<i>Function</i>
1	Output	Flow Volt channel 1
2	Output	Flow mA channel 1
3	Output	Flow Volt channel 2
4	Output	Flow mA channel 2
5	Output	Flow Volt channel 3
6	Output	Flow Volt channel 4
7	Output	Flow mA channel 3
8	Input	Remote setpoint Volt channel 1
9	Input	Remote setpoint Volt channel 2
10	Output	Flow mA channel 4
11	Input	Remote setpoint Volt channel 3
12	nc	nc
13	Input	Remote setpoint Volt channel 4
14		Flow ground channel 1
15	Input	Remote setpoint mA channel 1
16		Flow ground channel 2
17	Input	Remote setpoint mA channel 2
18		Flow ground channel 3
19		Flow ground channel 4
20		Setpoint ground channel 1
21		Setpoint ground channel 2
22	Input	Remote setpoint mA channel 3
23		Setpoint ground channel 3
24	Input	Remote setpoint mA channel 4
25		Setpoint ground channel 4

Table 2-4 Pinning RS-232- Connector

<i>pin number</i>	<i>Input/ Output</i>	<i>Function</i>
1	NC	
2	TXD	Transmitted data
3	RXD	Received data
4	NC	
5	GND	Signal ground
6	NC	
7	NC	
8	NC	
9	NC	

## 2-11 Jumper Settings and Functions

As a standard, the required I/O selections are done at the factory upon ordering. When only 0-5 Vdc inputs and outputs are required, no optional I/O board has to be installed. In this case the connectors between main board and optional I/O board must be jumpered according to Table 2-5 and Figure 2-2 below.

For use of input and output signals other than 0-5 Vdc ( 0-10 Vdc, 0-20 mA and 4-20 mA), the optional I/O board has to be installed. This 4 channel optional I/O board is mounted on top of the mainboard of the readout. Each channel of the converter consists of a separate input (flow or pressure) and output (setpoint) converter. The range can be configured separately for each channel by means of jumpers. No additional adjustment of potentiometers is necessary.

The microprocessor board uses 0-5 Vdc signals internally. As a result Flow or Pressure inputs other than 0-5 Vdc are first converted by the optional I/O board from either 0-10 Vdc, 0-20 mA or 4-20 mA to 0-5 Vdc. Setpoints to be generated by the readout are converted by the optional I/O board from 0-5 Vdc to either 0-10 Vdc, 0-20 mA or 4-20 mA.

### NOTE:

**Care has to be taken when using mA I/O. Flow and setpoint grounds of the instrument are high impedance to eliminate voltage drop across long lines for Volt I/O. The high impedance ground lines are not designed for sinking mA signals. Sinking mA signals will result in faulty flow information. Always connect the mA ground lines to power ground and connect the readout's high impedance ground lines to the same power ground as well. When Brooks Mass Flow Controllers and Meters are connected, this is automatically done at the controller or meter side.**

Table 2-5 Jumper Settings for 0-5 Vdc I/O

Connector	Jumper position
J4	No jumpers necessary
J5	1-2,3-4,5-6,7-8
J6-J9	1-2,3-4,5-6

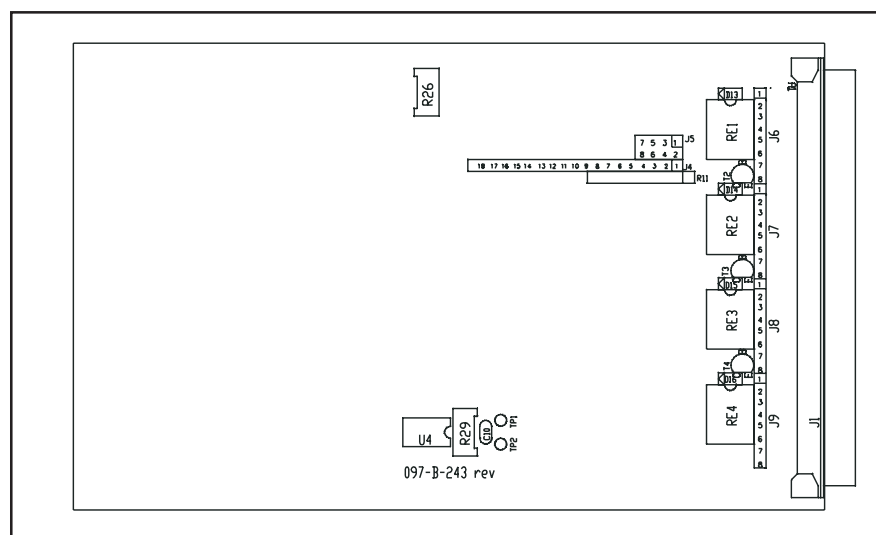


Figure 2-2 Main Board: Jumper and Potmeter Locations

## Brooks® Models 0152/0154

Table 2-6 Jumper Settings (Optional I/O Board Installed<sup>1</sup>)

Input	Jx01 <sup>2)</sup>	Jx02 <sup>2)</sup>	Jx03 <sup>2)</sup>	Jx04 <sup>2)</sup>	Jx06	Jx10 <sup>2)</sup>	Jx11 <sup>2)</sup>
Output							
0-5 Vdc	1-2	1-2	1-2	1-2	off	on	off
0-10 Vdc	1-2	1-2	1-2	1-2	on	on	on
4(0)-20 mA <sup>3)</sup>		2-3	2-3	2-3	off	off	off

Note: The selection between 0-20 mA or 4-20 mA can be done via the menu function

1) Jumpers J4-J9 have to be removed before installing the optional I/O board

2) X denotes the channel number to which the jumper relates, eg for channel 1: X=1

3) For i series: 2-3  
 For Flomega and pressure series: 1-2  
 For digital series: 1-2 or 2-3 (don't care)

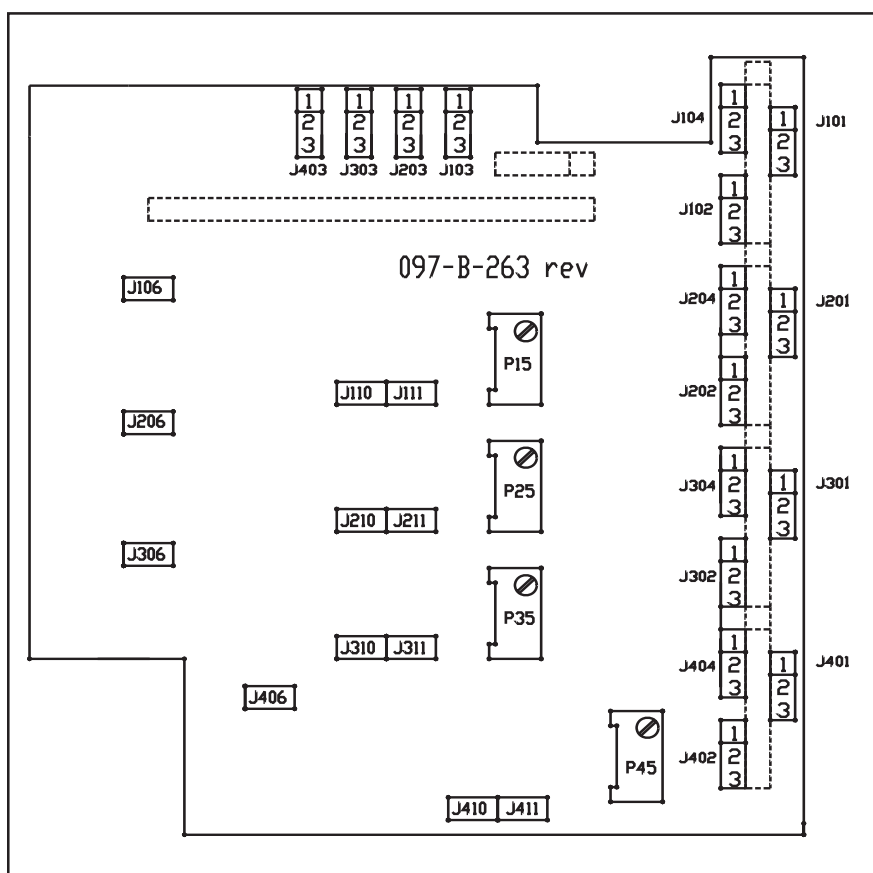


Figure 2-3 Optional I/O Board: Jumper Locations

## 2-12 Adjustments of LCD Contrast and 5 V Reference

The contrast of the Liquid Crystal Display can be adjusted by turning potentiometer R26 on the Mainboard.

The setpoint outputs of the readout use a 5Vdc reference. The reference voltage can be checked by measuring between testpin 1 and 2 (TP1 and TP2). The reference voltage must be  $5.000 \pm 0.001$  Vdc and can be adjusted by turning potentiometer R29 on the Mainboard.

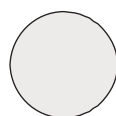
#### 3-1 General

The read-out function of the Models 0152 and 0154 and the controlling of the Mass Flow Controllers / Meters are designed for fast and easy usage. Basically, the flow output signals are shown on the display in percentage or in your own engineering units (full scale value and flow parameters can be adjusted per channel).

Changing a value via the push buttons always has to be confirmed by the "Enter" key. If the confirmation takes too long after a change of any setting, the display will return automatically to its flow read-out function. The only exception to this rule are adjustments in the menu.

#### 3-2 Description of the Keys

##### Channel Selection



**Channel  
Selection**

This key allows you to select the active channel for any changes, like setpoint, blending, remote control or valve control.

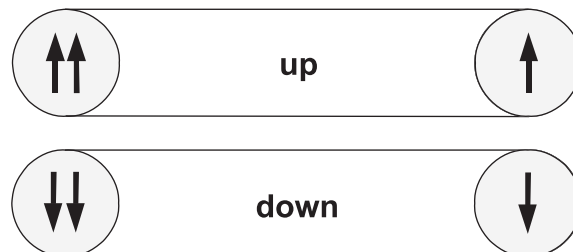
##### Menu



**Menu**

With this key you enter into the menu mode.

##### Up / Down



In normal operation, the setpoint value can be changed. In menu mode, different selections can be chosen and in blending mode, the master channel can be selected with these keys. Fast scrolling through the menus can be done with the double arrow keys. Slow scrolling can be done with the single arrow keys.

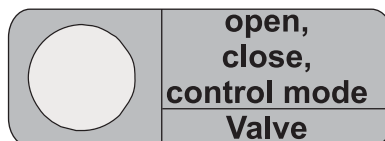
## Brooks® Models 0152/0154

**Enter**

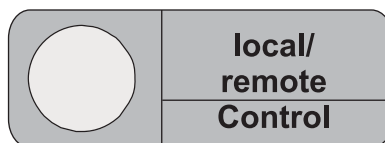
Confirmation key for confirmation of all changed settings. For example confirmation of selected setpoint value, master channel (blending), remote or local, valve function (valve control), certain menu selections, display layout or engineering unit.

**Blending**

Selects master channel in relation to the setpoint value.

**Valve**

Selects master channel in relation to the setpoint value.

**Control**

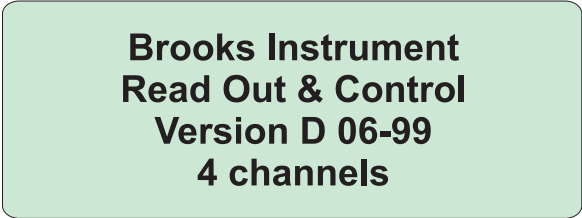
Select local or remote control function



**3-3 Start-Up Screens**

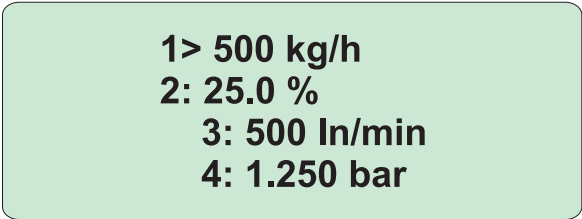
---

After power up, first the software version screen is displayed.

A light green rectangular box with rounded corners containing the following text:

**Brooks Instrument  
Read Out & Control  
Version D 06-99  
4 channels**

This screen gives information about the software version currently installed. After a few seconds this screen is replaced by the flow information screen.

A light green rectangular box with rounded corners containing the following text:

**1> 500 kg/h  
2: 25.0 %  
3: 500 l/min  
4: 1.250 bar**

**3-4 Changing the Active Channel**

---

On the display the flow information of the different channels is displayed. After power-up channel 1 is always active. This is indicated on the display by an ">" character after the channel number instead of a ":" character. All changes made via the different pushbuttons, except the Menu button, will adjust the settings on channel 1. If the settings of another channel must be changed, press "*Channel Selection*" and the next channel will become active. Repeat this until the right channel is selected. This channel remains active until "Channel Selection" is pressed again.

## Brooks® Models 0152/0154

### 3-5 Changing the Setpoint Value

If the setpoint value of a certain channel has to be changed, this channel has to be selected by the channel selection key first. After pushing one of the *up and down* keys, the display read-out of that channel changes from flow reading to the setpoint value.

**1>SP= 500 kg/h**  
**2: 50.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

If no other key is pressed within approximately 5 seconds, the display read-out falls back into flow reading (no changes are made). If one of the up or down keys is pressed several times, or held for a longer time, the setpoint value changes. This change of setpoint value will be activated after pressing the “Enter” key. The new setpoint will now be sent to the (liquid or gas) MFC. The double arrow up / down keys change the setpoint in steps of 2% of full scale. The single arrow up and down keys change the setpoint in steps of 0.1% of full scale.

The setpoint after power up is determined in the “Setpoint at power up” menu which is explained in Section 3-9.

### 3-6 Using the Blending Mode

In the blending mode, the setpoint of the blended channel depends on the flow value of a master channel. All channels can be programmed to follow any other (master) channel.

After pressing the *blending* key, a “B” appears on the display of the active channel.

**1: 500 kg/h**  
**2)B1 50.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

Behind the “B” a number is displayed. This number denotes the master channel to which the current active channel will be related. A “0” denotes that no blending on the current channel is required.

The “master” channel can be changed by using the up and down keys. If the correct “master” has been selected, the “Enter” key must be pressed to confirm this new situation. By doing this, the setting is memorized. When the system is powered up again, the memorized blending configuration will

be active. All setpoints of the slave channel(s) remain as before power down, except the setpoint of the master channel(s). The setpoint of the master channel is determined in the “Start-up preference” menu which is explained in 3.9.6.

After confirmation of the required blending configuration, the following is displayed on the screen:

**1: 500 kg/h**  
**2>B1 25.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

The slave channels are controlled by the flow of the master channel determined by the blending ratio. The blending ratio is determined as:

$$\text{Blending ratio} = \frac{\text{Flow (or pressure)}_{\text{slave}}}{\text{Flow (or pressure)}_{\text{master}}}$$

The blending ratio cannot be entered directly, but must be entered via the setpoint at the slave channel. The setpoint to be entered is as follows:

$$\text{Setpoint}_{\text{slave}} = \text{Blending ratio} \times \text{Full Scale Value}_{\text{master}}$$

**NOTE:**

**The flow of the slave channel is determined by the flow of the master channel and therefore the setpoint value of the slave may not correspond with the current flow or pressure at the slave channel. In Blending mode, the slave setpoint is only used for entering the blending ratio**

**Please note that the choice of the instruments is important to give proper blending. Always choose instruments with Full Scale Values that meet the blending ratio as close as possible. For eg. blending ratio 1:10 choose eg. 10 l/min and 1 l/min instruments in order to use the maximum possible accuracy of the connected instruments.**

**Also take care that the Full Scale Value of the slave is suitable for the Full Scale Value of the master. For a 10 l/min master and a blending ratio of 5, the slave channel must have a full scale value of at least 2 l/min.**

**If planning to use blending mode with engineering units rather than % full scale, 1-5 Vdc or 4-20 mA I/O cannot be used.**

After confirmation of B0, the blending function will be disabled.  
For blending examples see Appendix B.

## Brooks® Models 0152/0154

**3-7 Using the Valve Control Function**

With the Valve Control function or Valve Override function, the valve of the connected Mass Flow Controller can be opened, to purge the system, or closed, to shut off the system, independent of the setpoint value. After pushing the "Valve Control" key a "V" appears on the display of the active channel.

**1: 500 kg/h**  
**2V+ 25.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

After this "V" one of the following characters (+, - or 0 ) is displayed to indicate the possible functions. By pressing the "Valve Control" key again the other characters are shown.

V0 = Valve Override disabled (Control mode)

V+ = Valve Override open

V- = Valve Override close

After confirmation with "Enter" the following is displayed:

**1: 500 kg/h**  
**2V+ 115.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

V+ opens the valve to purge the system. V- closes the valve and shuts off the flow. After confirmation of V0, the Valve Override function will be disabled and the valve is again controlled by the Mass Flow or Pressure Controller itself.

The setting of the Valve Override function is memorized. After power up the memorized Valve Override function is active again.

The external Valve Control function can be used for overruling the internal 0152/0154 Valve Control function ( Valve Override open and close). Each channel can be controlled separately. Valve Override open of the different channels can be activated externally by connecting one of the valve control inputs to resp. the +15Vdc or +24Vdc ( depending on the model resp. ±15V or +24V). Valve override close can be activated by connecting one of the Valve Control inputs to the -15V or gnd ( also model dependant) pins of the connector.

### 3-8 Using the Remote Function

Every channel of the of the 0152/0154 can be placed in “remote” control. This means that the flow and setpoint signals can be read and controlled at remote distance e.g. in a control room. The local setpoint can be changed but does not have any impact on the connected controller as long as the controller is “Remote” controlled. When using Volt I/O it is possible to view the flowrate at the display during remote control. When using mA I/O, this is not possible.

The remote function will be activated by pushing the *remote button*. When activated, the display shows “Remote(Volts)” or “Remote (mA)” depending on the type of I/O.

**1) Remote (Volts)**  
**2: 25.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

The flowrate can be shown after confirmation with “Enter”.

**1>R 500 kg/h**  
**2: 25.0 %**  
**3: 5.00 l/min**  
**4: 2.500 bar**

The “R” on the display shows that the channel is in “Remote control”. When using mA I/O the display shows “Remote” only without flow information. Switching back to local mode again can be done by selecting “remote (off)” and hitting “Enter”. The channel goes into local control mode again.

## Brooks® Models 0152/0154

## 3-9 Menu

Pressing the *Menu* key will result in the menu screen on which the following menu selections can be activated:

**> Change ENG units**  
**Full scale values**  
**Display format**  
**Totalize**

The remaining menu selections can be shown by scrolling through the screen with the up and down keys:

**Alarming**  
**Start up prefs.**  
**Set I/O range**  
**> Version**

The menu selection will be activated after confirmation with the Enter key.

### Changing the Engineering Units

As a default setting, setpoint and flow are presented in % of full scale. In case other engineering units than % are necessary, over 50 different engineering units, also including pressure units, are available to represent the setpoint or flow. All available engineering units are given in Appendix A. After activation of "Change Eng Units" the following screen is displayed:

**1> kg/h**  
**2: %**  
**3: in/min**  
**4: bar**

The engineering units per channel are displayed. Changing the engineering unit of the active channel can be done by using the up and down keys. For each channel a different engineering unit can be selected. Changing the engineering units of the other channels can be done by activating the different channels with the "Channel selection" key and again the up and down keys.

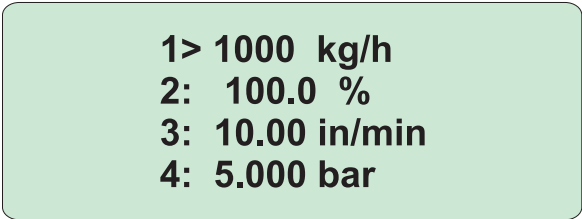
When the engineering units for all channels are set, confirmation will be done by pressing the "Enter" key. After this, the Flow information screen is displayed again with the updated engineering units.

**NOTE:**

*The Engineering unit is only a text replacement for "%". **NO** calculation is done when changing between different engineering units.*

### Full Scale Values

The Full Scale Flow range is always 100.0 in case of using the default “%” as engineering unit. The Full Scale Value can not be changed in this case. When using any other engineering unit, the full scale flow range can be changed. This can be done via the menu selection “Full Scale Values” resulting in the following screen:

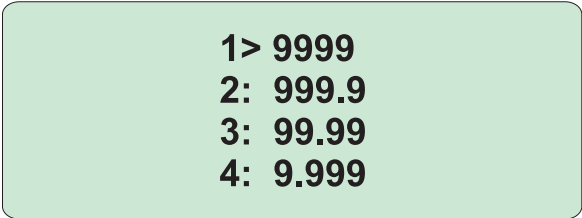


1> 1000 kg/h  
2: 100.0 %  
3: 10.00 in/min  
4: 5.000 bar

It is possible to enter a full scale value from 0.000 minimum to 99999.999 as a maximum.

### Display Format

As shown in the Full Scale Value screen, it is possible to change the amount of decimal places on the display. This can be done in the menu selection “Display format”. When activated the following screen appears:



1> 9999  
2: 999.9  
3: 99.99  
4: 9.999

By using the up and down key the amount of decimal places can be changed from zero decimal places to a maximum of three decimal places. Using “channel selection” the other channels can be changed. After a confirmation of the changes with “Enter”, the display returns to the flow information screen using the updated display format.

**NOTE:**

*The accuracy of the Read-out & Control Electronics is 0.1% of max. flow value. For example if a full scale value of 950 is entered, it is not useful to have a decimal place.*

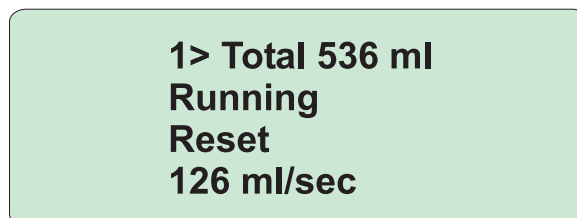
## Brooks® Models 0152/0154

**Totalizer Function and Display**

The totalizer display can be accessed by selecting "Totalizing" in the Menu (press the Menu button and use the up and down buttons to select).

Pressing the Menu button again will close the totalizer display.

The totalizer screen looks as follows:



When the totalizer display activated, the following settings can be chosen:

(use the up and down buttons for selecting the display line ">")

**Button:**

@ line 1 press Enter for

@ line 2 press Enter for

@ line 3 press Enter for

@ line 4 press Enter for

**Function:**

Channel select key (channel 1 to 4).

Change totalizer status from "Disabled" into "Running" or vice versa.

Reset counter value (totalizer must be in "Disabled" mode).

This line displays the selected engineering unit. When the text "Wrong ENG settings" is displayed, the engineering unit selected is not correct (the totalizer function needs a time related engineering unit). In this case the Enter button can be used to change the change engineering unit to a time related unit

**Menu:**

Leave the totalizer display function.

If totalizer is active (running mode) this is noticed on the standard display mode by a "t" behind the channel number (example for channel 1: display reads "1:t" or "1>t").

Pressing the Enter button will activate the totalizer display, when a channel indicates the "t" and this line is selected (indicated by ">").

**Max. Value**

The totalizer value of the first line normally uses 7 positions and 5 positions for the used engineering unit. If the totalizer value has more than 7 positions it uses up to max. 10 positions. The engineering unit is simply shifted outside the range of the display.

The absolute maximum totalizer value is 4.000.000.000 (displayed without the dots). If the max. Value is exceeded the totalizer will reset to 0 and continues counting from zero again. No alarm will be generated.

**Engineering Time Units**

The totalizer can only be started when the engineering units are per seconds, per minute or per hour. In minutes the totalizer counter runs 60x faster in case of minutes versus hours and 3600x faster in case of seconds versus hours. Assuming the full-scale value is identical.



**Alarms Function and Display**

The alarm display can be accessed by selecting 'Alarming' in the Menu (press the Menu button and use the up and down buttons to select). Pressing the Menu button again will close the totalizer display.

The alarm screen looks as follows (example for High flow alarm 95%, Low flow alarm 5% and setpoint deviation alarm 2%):

<b>1&gt; Flow 32.1</b>	<b>%</b>
<b>Ign upper</b>	<b>95.0</b>
<b>Ign lower</b>	<b>5.0</b>
<b>Ign deviation</b>	<b>2.0</b>

The alarm function has three different alarm modes per channel: absolute maximum, absolute minimum and deviation alarm versus setpoint.

Adjusting one of these alarms is done in three steps. Step 1: select the line of the alarm by using the up and down buttons. Step 2: press 'Enter' and select alarm 'ON' or 'OFF' by using the up and down buttons, confirm the by pressing 'Enter' again. Step 3: adjust the alarm value, if necessary, and press 'Enter' to confirm this setting and to go back in the Menu itself.

If two channels are displaying an alarm the flashing message of these channels goes synchronically.

**Start-Up Preference**

The setpoint values after power up are determined in the menu "Start-up prefs".

This can be done per channel independantly. It is possible to start with the memorized setpoint values ( the setpoint that was used before power down) or always power up with a zero setpoint.

<b>1&gt; Memorize</b>
<b>2: Zero (non-blended)</b>
<b>3: Zero (non-blended)</b>
<b>4: Memorize</b>

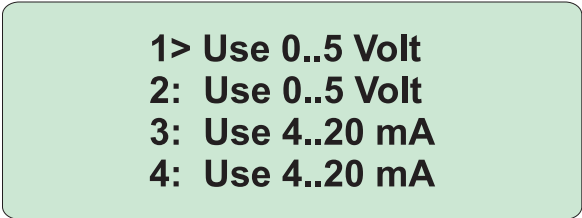
Default factory settings are "preset to zero after power up".

## Brooks® Models 0152/0154

**Set I/O Range and Range Selection Display**

The range selection display can be accessed by selecting 'Set mA/Volts' in the Menu (press the Menu button and use the up and down buttons to select). Pressing the Menu button again will close the range selection display.

The range selection screen looks as follows (example: channel 1 and 2 are selected for 0 - 5 volts or 0 – 20 mA\*, channel 3 and 4 are selected for 1 - 5 Volts or 4 – 20 mA\*):

A screenshot of the range selection screen, which is a light green rectangular box with rounded corners. It contains four lines of text in a bold, black, sans-serif font. The first line is '1> Use 0..5 Volt', the second is '2: Use 0..5 Volt', the third is '3: Use 4..20 mA', and the fourth is '4: Use 4..20 mA'.

**1> Use 0..5 Volt**  
**2: Use 0..5 Volt**  
**3: Use 4..20 mA**  
**4: Use 4..20 mA**

Input / Output range selection

In this software version change the Input/Output is selectable for a range of 0-5V (0-20mA) or 1-5V (4-20mA) reflecting the 0-100% range.

The range selection can be:

- a) 0 – 5 or 1 – 5 Volt if Voltage I/O is required.
- b) 0 – 20 or 4 – 20 mA if Current I/O is required\*.

\* When a mA (current) I/O is required, the optional I/O board needs to be installed.

**Software Version**

The software version can also be shown in normal operation. This can be done in the menu selection "Version". After confirmation with the Enter key the "Version" screen is displayed again.

#### 4-1 Operation (Via Personal Computer)

Via the new RS-232 connection on Model 0152/0154 it is possible to control analogue devices (i.e. 5800S\*, E and i series, TR Model , 5866 pressure controller and Flomega) with a Personal Computer (PC).

Brooks has developed two executable software applications (Available is a TestPoint and LabView version, see Figures 11 and 12) for communication between Model 0152/0154 and a PC. For the LabView it is required to have a registered copy of LabView (the supplied file is a .LLB format)

Both application versions handle the full capacity to control the connected devices. The available parameters to be used for controlling the connected devices are setpoint, flow and V.O.R..

For operation of the application software it is required to have the Brooks Smart DDE software (version 1.1 or higher) running on the P.C.)  
Version 1.1 of Smart DDE can operate without the software protection key (dongle) when Interfacing with Model 0152/0154.

Note: Direct communication between The Brooks 58xx S-series and PC via Smart DDE requires the dongle.

Brooks Smart DDE software can be helpful for users that want to design a customised software application in conjunction with Model 0152/0154. In this case the application software must be able to handle DDE (Dynamic Data Exchange).

(\*S series selected for analog I/O).

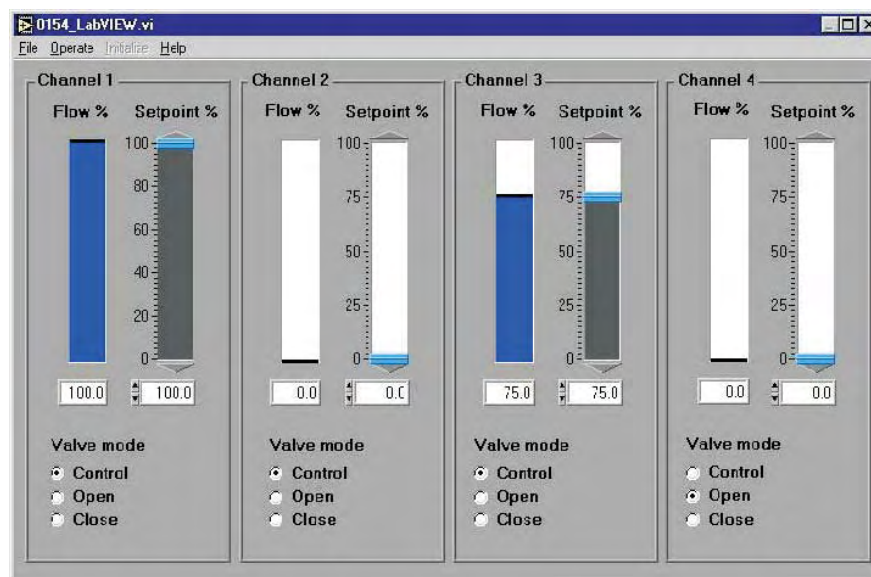


Figure 4-1 Labview

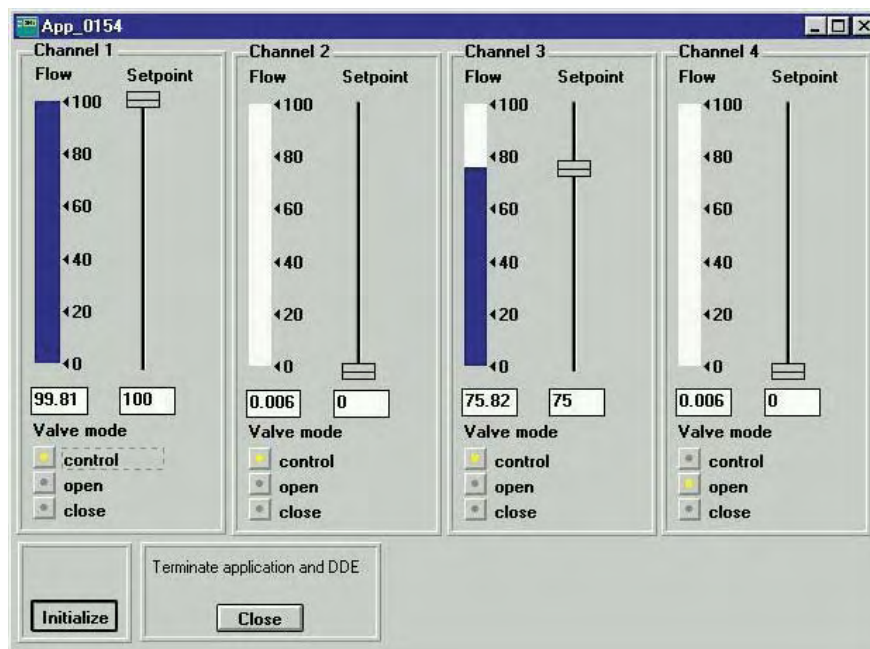


Figure 4-2 Testpoint

### A-1 Available Engineering Units

ml/s	g/min
ml/min	g/h
ml/h	lb/s
mls/s	lb/min
mls/min	lb/h
mls/h	kg/s
mln/s	kg/min\
mln/min	kg/h
mln/hl/s	ft <sup>3</sup> /s
l/min	ft <sup>3</sup> /min
l/h	ft <sup>3</sup> /h
ls/s	ft <sup>3</sup> s/s
ls/min	ft <sup>3</sup> s/min
ls/h	ft <sup>3</sup> s/h
ln/s	ft <sup>3</sup> n/s
ln/min	ft <sup>3</sup> n/min
ln/h	ft <sup>3</sup> n/h
cm <sup>3</sup> /s	SCCM
cm <sup>3</sup> /min	SLPM
cm <sup>3</sup> /h	bar
cm <sup>3</sup> s/s	mbar
cm <sup>3</sup> s/min	psi
cm <sup>3</sup> s/h	kPa
cm <sup>3</sup> n/s	Torr
cm <sup>3</sup> n/min	atm
cm <sup>3</sup> n/h	Volt
m <sup>3</sup> /s	mA
m <sup>3</sup> /min	
m <sup>3</sup> /h	
m <sup>3</sup> s/s	
m <sup>3</sup> s/min	
m <sup>3</sup> s/h	
m <sup>3</sup> n/s	
m <sup>3</sup> n/min	
m <sup>3</sup> n/h	

Note: “. ^3” means cubic “. 3”

*THIS PAGE WAS  
INTENTIONALLY  
LEFT BLANK*

### B-1 Blending Examples

#### Example 1:

Master channel flow is 80 l/min  
Slave channel flow has to be 0.8 l/min

Mass flow controller selections are :

Master channel unit: 100 l/min = Full Scale Value  
Slave channel unit: 10 l/min = Full Scale Value

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{0.8 \text{ l/min}}{80 \text{ l/min}} = 0.01$$

$$\text{Setpoint}_{\text{slave}} = 0.01 \times 100 \text{ l/min} = 1 \text{ l/min}$$

#### Example 2:

Master channel flow is 240 l/min  
Slave channel flow has to be 40 l/min

Mass flow controller selections are :

Master channel unit: 300 l/min = Full Scale Value  
Slave channel unit: 50 l/min = Full Scale Value

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{40 \text{ l/min}}{240 \text{ l/min}} = 0.167$$

$$\text{Setpoint}_{\text{slave}} = 0.167 \times 300 \text{ l/min} = 50 \text{ l/min}$$

#### Example 3:

Master channel pressure is 1 bar  
Slave channel flow has to be 50 l/min

Mass flow and pressure controller selections are :

Master channel unit: 2 bar = Full Scale Value  
Slave channel unit: 100 l/min = Full Scale Value

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{50 \text{ l/min}}{1 \text{ bar}} = 50 \text{ l/min bar}$$

$$\text{Setpoint}_{\text{slave}} = 50 \text{ l/min bar} \times 2 \text{ bar} = 100 \text{ l/min}$$

#### Example 4:

Master channel flow is 100%  
Slave channel flow has to be 50%

Mass flow controller selections are :

Master channel unit: 6 l/min = 100% Full Scale  
Slave channel unit: 4 l/min = 100% Full Scale

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{50 \%}{100 \%} = 0.5$$

$$\text{Setpoint}_{\text{slave}} = 0.5 \times 100\% = 50\%$$

#### Example 5:

Master channel flow is 80%  
Slave channel flow has to be 20 kg/hr

Mass flow controller selections are :

Master channel unit: 100 kg/hr = 100% Full Scale  
Slave channel unit: 50 kg/hr = Full Scale Value

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{20 \text{ kg/h}}{80\%} = 0.25 \text{ kg/h \%}$$

$$\text{Setpoint}_{\text{slave}} = 0.25 \text{ kg/h \%} \times 100\% = 25 \text{ kg/h}$$

#### Example 6:

Master channel pressure is 10 bar  
Slave channel flow has to be 50%

Mass flow controller selections are :

Master channel unit: 15 bar = Full Scale Value  
Slave channel unit: 20 l/min = 100% Full Scale

Determination of entered setpoint:

$$\text{Blending ratio is } = \frac{50\%}{10 \text{ bar}} = 5 \text{ \% bar}$$

$$\text{Setpoint}_{\text{slave}} = 5 \text{ \% bar} \times 15 \text{ bar} = 75\%$$

*THIS PAGE WAS  
INTENTIONALLY  
LEFT BLANK*



**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.

Brooks® Models 0152/0154

---

**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 ντρεκτίβα 89/336/EEC).

Οπωσδήποτε 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 στυπιοθλιπτών 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 περίβλημα 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 εσωκλειστο Εγχειρίδιο Οδηγιών.

Brooks® Models 0152/0154

---

**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 kabelaan sluitingen:**

- 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 jordet innfesting av skjermen. Skjermen i kabelen 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.

Brooks® Models 0152/0154

---

**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 signaali-kaapelin valintaan.

**Signaali-kaapelin, kaapelin läpiviennin ja liittimen laatu**

Brooks toimittaa korkealaatuisia kaapeleita, jotka täyttävät CE sertifikaatin vaatimukset. Hankkiessaan signaali-kaapelin itse, olisi hankittava 100%:sti suojattu kaapeli.

”D” tai ”Circular” tyyppisen liittimen tulisi olla varustettu metallisuojaalla. 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 sertifikaatin mukaisia.

Suoja on oltava maadoitettu.

Nastojen liittäminen; katso liitteenä oleva manuaali.

Ystävällisin terveisin,

---

**Svensk**

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**

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 ändar, 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.

## Installation and Operation Manual

X-SE-0152-0154-eng

Part Number: 541C052AAG

March, 2008

Brooks® Models 0152/0154

---

*THIS PAGE WAS  
INTENTIONALLY  
LEFT BLANK*



## Brooks® Models 0152/0154

### 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 LOCAL AND WORLDWIDE SUPPORT

Brooks Instrument provides sales and service facilities around the world, ensuring quick delivery from local stock, timely repairs and locally based sales and service facilities. Our dedicated flow experts provide consultation and support, assuring successful applications of the Brooks flow measurement and control products. Calibration facilities are available in local sales and service offices. The primary standard calibration equipment to calibrate our flow products is certified by our local Weights and Measures Authorities and traceable to the relevant international standards.

### 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
Asia	☎ +011-81-3-5633-7100	

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
Flomega .....	Brooks Instrument, LLC
LabVIEW .....	National Instruments
QUANTIM .....	Brooks Instrument, LLC



**Brooks Instrument**  
407 West Vine Street  
P.O. Box 903  
Hatfield, PA 19440-0903 USA  
T (215) 362-3700  
F (215) 362-3745  
E-Mail BrooksAm@EmersonProcess.com  
[www.BrooksInstrument.com](http://www.BrooksInstrument.com)

**Brooks Instrument**  
Neonstraat 3  
6718 WX Ede, Netherlands  
T 31-318-549-300  
F 31-318-549-309  
E-Mail BrooksEu@EmersonProcess.com

**Brooks Instrument**  
1-4-4 Kitasuna Koto-Ku  
Tokyo, 136-0073 Japan  
T 011-81-3-5633-7100  
F 011-81-3-5633-7101  
E-Mail BrooksAs@EmersonProcess.com

**BROOKS®**  
INSTRUMENT