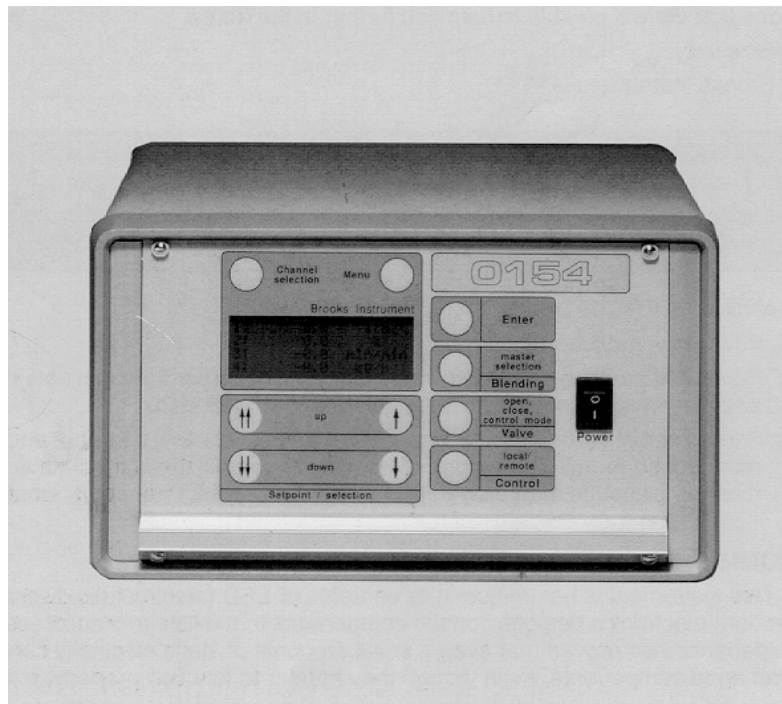


# Installation and Operating Manual

## Brooks Microprocessor Control & Read Out Unit Models 0152/0154

Partnumber 541-C-052-AAG Rev. I  
January 2002



Dear customer

This product you have just received is of the highest quality available, offering superior performance to the user. This controller provides the finest degree of accuracy, repeatability and widest operating parameters available for extremely reliable measurement and control.

In view of the wide variety of applications for mass flow measurement and control, we have expressly designed this instrument to provide user selectable functions in a single instrument to meet ever changing process conditions. Additionally, this "state-of-the-art" design has been packaged and materials were selected to permit application to a variety of often corrosive and hostile conditions.

To realize the full potential of the inherent design flexibility and ease of maintenance, may we request you to review this manual in its entirety.

Should you need additional information concerning the 0152 and 0154 Series Read-out Controllers, please feel free to contact your local Brooks Sales Office, Representative, or the factory. We are pleased to have this opportunity of servicing you for your liquid measurement and control needs and hope that we will be able to help you further in the future.

Sincerely,

Brooks Instrument

**CAUTION:**

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

**HANDLING PROCEDURE:**

1. Disconnect power to the unit.
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 bag or in another conductive container. Boards must not be removed from protective enclosure until the immediate time of installation. Removed boards must be placed immediately in protective container for transport, storage or return to factory.

**Comments:**

This instrument is not unique in its contents of ESD (electrostatic discharge) sensitive components. Most modern electronics designs contain components that utilize microprocessor technology (e.g. CMOS). Experience has proven that even a small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

**WARNING (for translation of warnings, see appendix D)**

Symbols used on the equipment are:



Caution ( Refer to accompanying documents ):

This Installation and operating manual must be read in its entirety before performing any operation on the equipment. Failure to understand and follow these instructions could result in serious personal injury and/or damage to the equipment.



Protective Conductor terminal:

the protective conductor terminal is an important safety measure of the instrument. Improper earthing of the

instrument will impair electrical safety significantly and could result in serious personal injury from electric shock.



Caution, risk of electric shock:

Internal components may be hazardous life. Disconnect power before removing cover from the equipment. Any operation requiring power to the equipment with the covers removed, must be performed by trained and qualified personnel.

Failure to observe this warning may cause serious personal injury from electric shock.

Should the instrument require repair or adjustment, contact the nearest Brooks Sales Office. It is important that servicing be performed only by trained and qualified personnel. If the instrument is not properly serviced, serious personal injury and/or damage to the instrument could result.

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# 1 INTRODUCTION

## 1.1 General Description

The Brooks microprocessor-based Control and Read Out Equipment has been designed to meet the highest industry standards with user-friendly operation as a primary requirement. Two channels for model 0152, and four channels for model 0154 are available. Both models consist of a 1 / 2 19" rack cassette (3HE x 42 TE) with three housing options: Table Top with optional handgrip, panelmount or 19" rack.

The models are designed for Brooks mass flow meters or controllers for liquid and gas flow applications, and gas pressure applications.

Both  $\pm 15$  or  $+24$  Vdc secondary power supply modules are available.

The 0152/0154 is designed with 0-5Vdc input and output signals. These analog signals represent the flowrate, from meters and controllers, and the setpoint to controllers. The scaling is from 0% (0Vdc, no flow or pressure) to 100% (5Vdc, maximum calibrated flow or pressure). The readout also supports other input and output signal ranges like: 0-10Vdc, 0-20mA and 4-20mA.

In that case an optional I/O board is installed.

Up to four (4) 15-pins connectors on the back panel are available to connect the different Flow and Pressure Meters/Controllers

**The instantaneous - two or four channels - read out function** is realized by a 4x20 character liquid crystal display provided with back lighting, which ensures easy reading.

Features include membrane push buttons for setpoint, blending, valve override and local/remote control. The selected functions are clearly projected on the display. Percentage full scale or actual reading of flow/pressure units can be programmed on each channel via the Menu membrane push buttons.

The models 0152 and 0154 can be operated either with independent Mass Flow Control Channels, where flowrate is set through the Setpoint push buttons, or with one or more channels slaved to the master (blending mode). Each channel can be operated as master or slave, or in an independent control mode.

As an option Brooks can provide software enabling the operator to control Model 0152/0154 via a personal computer. This enables the user to connect analogue (or digital devices with analogue I/O) devices to the 0152/0154 and control these units a personal computer (see section 4).

The Control & Read out Unit has a valve override function. In the valve open or close mode the controller valve will be driven to the selected mode independent of setpoint values. In addition during valve open or close situations, the setpoint can be changed to prepare the MFC for the follow-on process demands. In "control mode", the controller valve is controlled again by the setpoint provided to the MFC. The valve control function can be overruled via the "Ext. valve Control" Sub-D connector.

The Control & Read out Unit also has a local control function. The local control function is useful in permitting back-up of the customer's system configuration. In local mode, the Mass Flow Controllers will be operated directly by the 0152 or 0154 series, while in the remote mode the customer's (own) peripheral Equipment determines the control actions. 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.

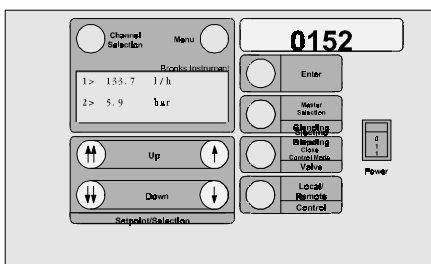


Figure 1: Model 0152

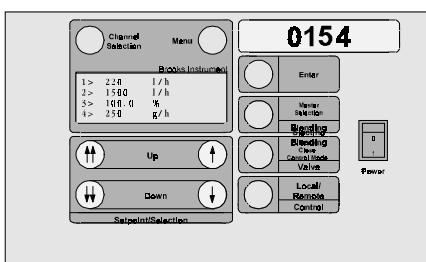


Figure 2: Model 0154

### Designed for use with:

- Gas TMF Controller models 5850\*, 5851\*, 5853\*, 5964\*, 5965\*, ...
- Gas TMF Meter models 5860\*, 5861\*, 5863\*, 5864\*, ...
- Pressure Controller 5866\*
- Liquid Flomega Controller-Models 5881, 5882
- Liquid Flomega Meter-models 5891 5892

\*Includes: E-, i-, "S", MF -series.

## **2 INSTALLATION**

### **2.1 RECEIPT OF EQUIPMENT**

When the equipment is received, the outside packing case should be checked for any damage occurred during shipment.

If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to the local Sales Office or factory.

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

### **2.2 RECOMMENDED STORAGE PRACTICE**

If intermediate or long term storage is required for equipment, as supplied by Brooks Instrument, it is recommended that sold equipment is stored in accordance with the following:

1. Within the original shipping container.
2. Stored in a sheltered area, preferably a warm dry heated warehouse.
1. Ambient temperature 21°C (69.8°F) Nominal.  
Minimum 7°C (44.6 °F)  
Maximum 32°C (89.6°F).
2. Relative humidity 45% nominal  
(Minimum 25%, Maximum 60%).

Upon removal from storage, a visual inspection should be conducted to verify the condition of equipment "as received".

### **2.3 INSTALLATION INSTRUCTIONS**

#### **2.3.1 DIMENSIONS OF ENCLOSURES**

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

- Desktop option: Desktop Housing
- 19" Rack option: 19" Rack
- Panelmount option: Bracket Set

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

- Desktop option: Desktop Housing
- 19" Rack option: 19" Rack
- Panelmount option: Bracket Set

The dimensions of the 1/2 19" cassette are:

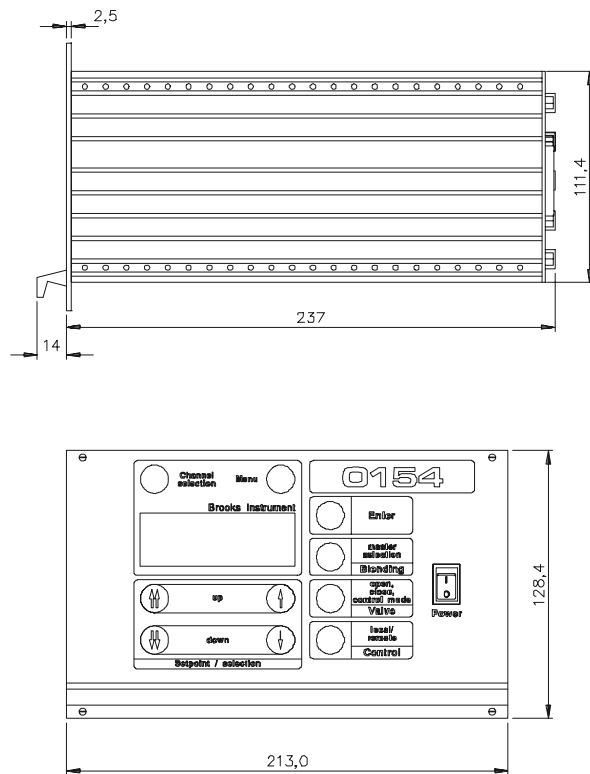


Figure 3: Dimensions in mm of 1/2 19" Cassette

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

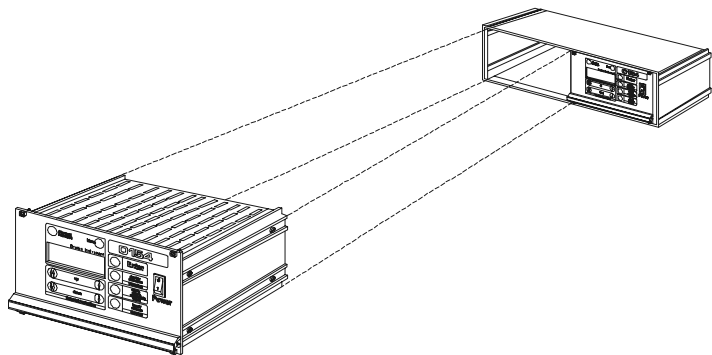


Figure 4: Mounting of 1/2 19" Cassette into 19" Rack

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

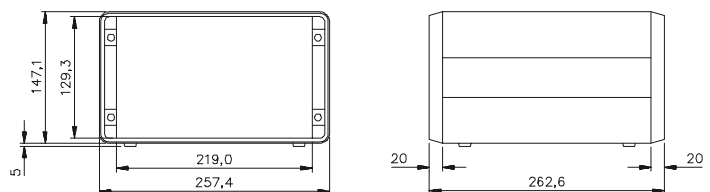


Figure 5: Dimensions in mm of the Desk Top Housing

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

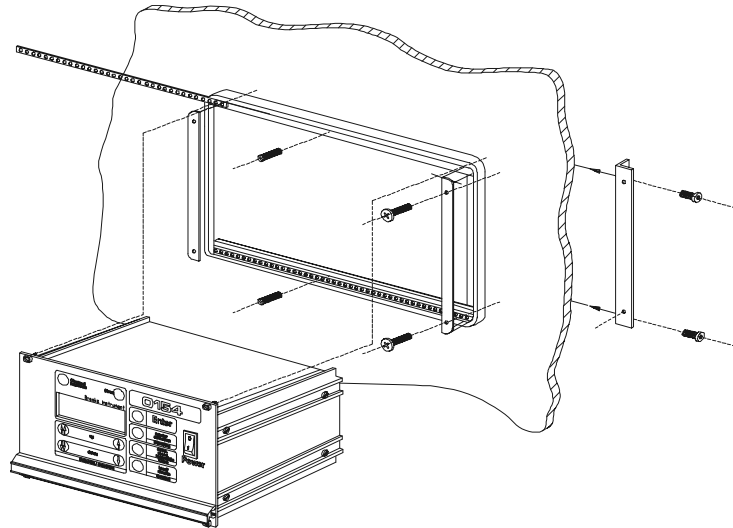


Figure 6: Mounting of Panelmount unit

REMARKS / SKETCH :  
dimensions in mm.

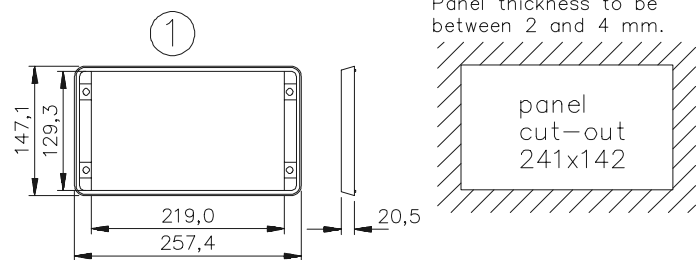


Figure 7: Dimensions in mm of the Panel Cutout

### 2.3.2 VENTILATION 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.

For translations of this instruction, see appendix D

### 2.3.3 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.

For translations of this instruction, see appendix D



### 2.3.4 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 accommodate 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 electric shock.**

For translations of this instruction, see appendix D

### 2.3.5 REPLACEMENT OF THE MAINS FUSES:



#### **Caution, risk of electric shock**

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

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

For translations of this instruction, see appendix D

### 2.3.6 Connector Pinning

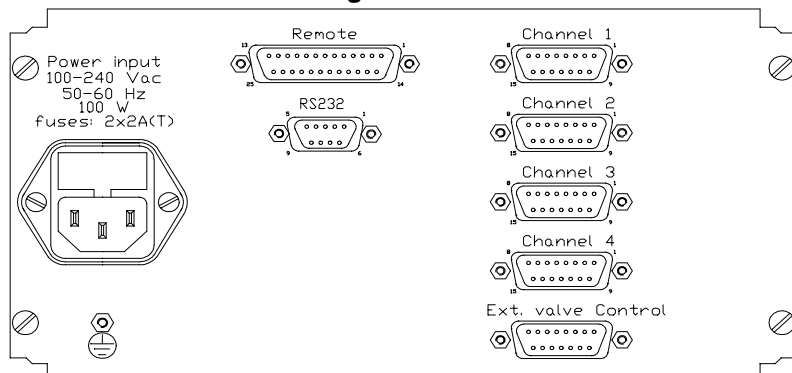


Figure 8: Backpanel Layout

Table 1: Pinning of Channel 1..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: +24Vdc: only combination +24Vdc and power ground. ±15Vdc: only combination +15Vdc and -15Vdc

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: 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: +24Vdc: only combination +24Vdc and power ground. ±15Vdc: only combination +15Vdc and -15Vdc

Table 3: Pinning of Remote connector

pin number	Input/ Output	Function
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 4: Pinning RS-232- Connector

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

Note 1: On each side of the cable (at the connectors) pin 7 and 8 are connected and pin 1, 4 and 6 are connected.

Note 2: Within the cable receive and transmit are twisted

### 2.3.7 JUMPER SETTINGS AND FUNCTIONS

As a standard, the required I/O selections are done at the factory upon ordering. When only 0-5Vdc 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 the table and picture below.

For use of input and output signals other than 0-5Vdc (0-10Vdc, 0-20mA and 4-20mA), 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 0-5Vdc signals internally. As a result Flow or Pressure inputs other than 0-5Vdc are first converted by the optional I/O board from either 0-10Vdc, 0-20mA or 4-20mA to 0-5Vdc. Setpoints to be generated by the readout are converted by the optional I/O board from 0-5Vdc to either 0-10Vdc, 0-20mA or 4-20mA.

**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 5: Jumper settings for 0-5Vdc 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

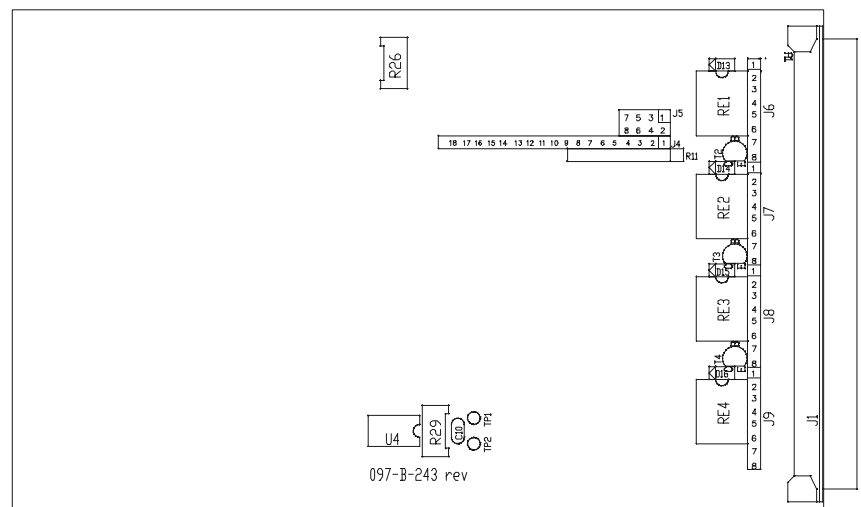


Figure 9: Mainboard: Jumper and Potmeter locations

Table 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							
0-5Vdc	1-2	1-2	1-2	1-2	off	on	off
0-10Vdc	1-2	1-2	1-2	1-2	on	on	on
4(0)-20mA <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)

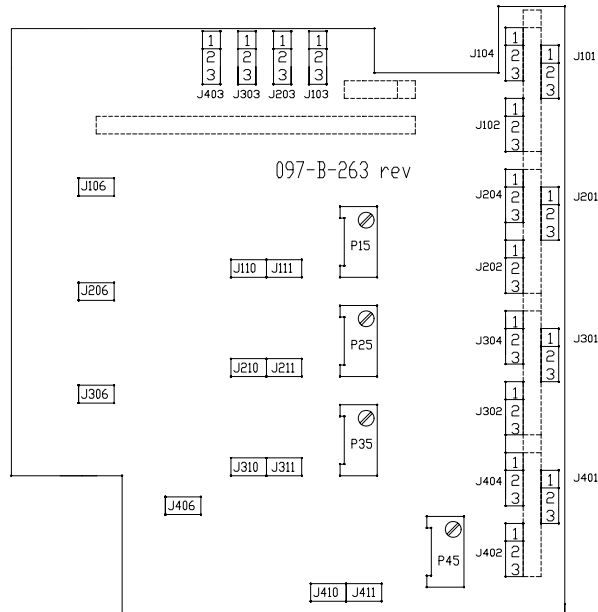


Figure 10: Optional I/O board: Jumper Locations

### 2.3.8 ADJUSTMENTS OF LCD CONTRAST AND 5V 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 OPERATION (MANUALY)

### 3.1 GENERAL

The read-out function of the 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 pushbottons 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

#### 3.2.1 CHANNEL SELECTION



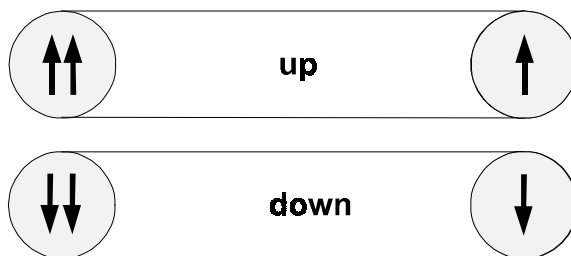
This key allows you to select the active channel for any changes, like setpoint, blending, remote control or valve control.

#### 3.2.2 MENU



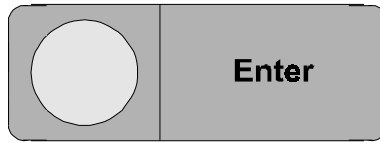
With this key you enter into the menu mode.

#### 3.2.3 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.

### 3.2.4 ENTER



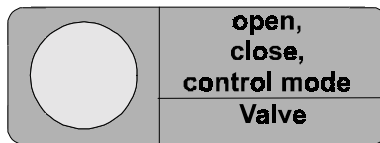
Confirmation key for confirmation of all changed settings. For example confirmation of selected setpoint value, master channel (blending), remote or local, valve function (valve control), certain menu selections, display layout or engineering unit

### 3.2.5 BLENDING



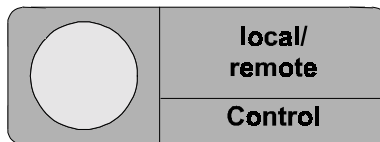
Selects master channel in relation to the setpoint value.

### 3.2.6 VALVE



Select valve open, close or normal operation mode

### 3.2.7 CONTROL



Select local or remote control function

### 3.3 START UP SCREENS

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

```
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.

```
1> 500 kg/h
2: 25.0 %
3: 5.00 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.

### 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 3.9.4.

### 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	ln/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	ln/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.

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

### 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  
2)V+ 50.0 %  
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  
2)V+ 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

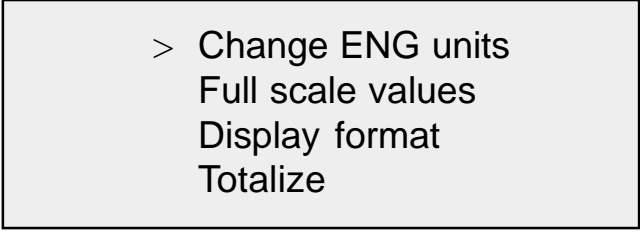
The flowrate can be shown after confirmation with “Enter”.

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.


### 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:

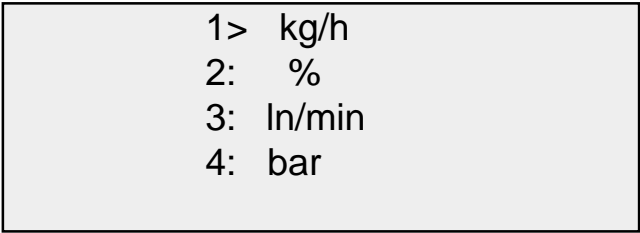


Alarming  
Start up prefs.  
Set I/O range  
> Version

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

#### 3.9.1 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: ln/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.**

### 3.9.2 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 l/min
4: 5.000 bar
```

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

### 3.9.3 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.**

### 3.9.4 TOTALIZER FUNCTION

#### Totalizer 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:

```
1> Total 536 ml
Running
Reset
126 ml/sec
```

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

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

Button:	Function:
@ line 1 press Enter for	Channel select key (channel 1 to 4).
@ line 2 press Enter for	Change totalizer status from "Disabled" into "Running" or vice versa.
@ line 3 press Enter for	Reset counter value (totalizer must be in "Disabled" mode).
@ line 4 press Enter for	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.

### 3.9.5 ALARMS FUNCTION

#### Alarm 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%):

1> Flow 32.1	%
Ign upper	95.0
Ign lower	5.0
Ign deviation	2.0

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.

### 3.9.6 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.

1> Memorize
2: Zero(non-blended)
3: Zero(non-blended)
4: Memorize

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

### 3.9.7 SET I/O RANGE

#### 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\*):

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.

### **3.9.8 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 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 figure 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 analogue I/O).

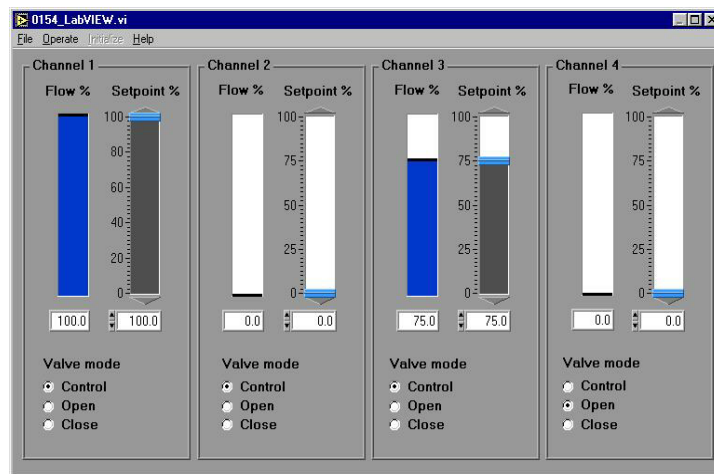


Figure 11: Labview

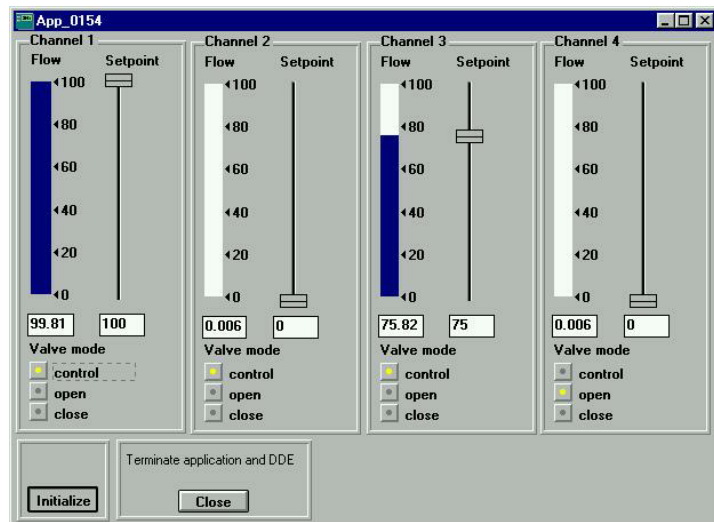


Figure 12: Testpoint




## 5 SPECIFICATION

<i>Power input range</i>	100 - 240 Vac, 50/60 Hz, 100W max. power	
<i>Power output</i>	±15Vdc model:	+15 Vdc / 2.9 A max -15 Vdc / 1.4 A max
	+24Vdc model:	+24 Vdc / 2.5 A max.
<i>Signal input (signal from flow or pressure transducer and remote setpoint)</i>	0-5Vdc	-1.0Vdc min. to +6.0Vdc max. Input resistance: >450kΩ
	0-10Vdc <sup>1</sup> :	-1.0Vdc min. to +12.0Vdc max. Input resistance: >450kΩ
	0(4) - 20mA <sup>1</sup> :	0(4) - 20 mA Input resistance 250Ω
	Ext. Valve control:	Max input voltage +24Vdc Min. input voltage 15Vdc
<i>Signal output range</i>	0-5(10 <sup>1</sup> )Vdc:	0.0Vdc to 10.0Vdc Min. Load: ≥ 1kΩ
	0(4) - 20mA <sup>1</sup> :	0.0mA to 20.0mA Max. load: 750Ω
	<sup>1</sup> =Only with optional I/O board <sup>2</sup> =active source, load must be connected to power ground	
<i>Accuracy:</i>	0.1% of maximum I/O range ( per channel )	
<i>Ambient Temp:</i>	0 - 50°C (32°F - 122°F)	
<i>Electrical Connections</i>	<ul style="list-style-type: none"> <li>• One 25-pins Sub-D connector for combined remote setpoint input and output signal; up to four (4) channels.</li> <li>• 9-pins Sub-D connector for RS-232 communication</li> <li>• 15-pins Sub-D connector for Remote Valve Override function up to four (4) channels</li> <li>• Two (model 0152), or four (model 0154) 15 pins Sub-D connectors for connecting the Mass Flow - or Pressure Control Equipment connecting the Mass flow - or Pressure Control Equipment</li> </ul>	
<i>Display reading</i>	Percentage full scale or actual reading. Liquid Crystal Display 4 x 20 character with back-lighting.	
<i>Controls</i>	Membrane push buttons for setpoint, blending, valve control function, local/remote control, menu selection per channel including enter confirmation) and power switch.	
<i>Housing</i>	Housing options:	
	Desktop:	Cassette & Table top housing with optional handgrip.
	Panelmount:	Cassette & Panelmount bracket set

Cassette material: Chromated aluminium  
Table top housing material: Anodized aluminium with steel covers  
19" Rack  
Material: Anodized aluminium

*Dimensions* See chapter 2.3.1

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%

## 6 ACCESSORIES

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

### 6.1 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); partnumber 124-Z-605-ZZZ  
Length 6 m (19.69 ft); partnumber 124-Z-606-ZZZ

### 6.2 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); partnumber 124-Z-236-AAA  
Length: 6 m (19.69 ft); partnumber 124-Z-237-AAA  
Length: 12 m (39.37 ft); partnumber 124-Z-610-AAA

Via USA:

Length: 5 ft (1.52m); partnumber 124-Z-576-AAA  
Length: 10 ft (3.05m); partnumber 124-Z-577-AAA  
Length: 25 ft (7.62m); partnumber 124-Z-578-AAA  
Length: 50 ft (15.24m); partnumber 124-Z-579-AAA

### 6.3 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); partnumber 124-Z-893-AAA  
Length: 6 m (19.69 ft); partnumber 124-Z-894-AAA  
Length: 12 m (39.37 ft); partnumber 124-Z-895-AAA

These cables are only necessary when digital communication between PC and S series is desired, otherwise the cables mentioned in 5.2 can be used.

### 6.4 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) partnumber 124-Z-901-ZZZ

Note:

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

## **Appendix A**

### **7 Return Shipment and Guarantee**

#### **7.1 GUARANTEE**

If at any time within one year shipment, but not thereafter, it is proved that any part of the equipment furnished by us was defective when shipped by us, we will repair or replace the same free of charge, F.O.B. our plant. Notice of this claim must be made to us within one year after delivery. Our liability is limited to replacement of such defective parts or equipment. There are no guarantees or warranties expressed or implied other than those herein specifically mentioned. Brooks Instrument shall not in any event be liable for any consequential damages, secondary charges, expenses for erection or disconnection, or losses resulting from any alleged defect in the apparatus. It is understood that corrosion or erosion of materials is not covered by our guarantee.

#### **7.2 RETURN SHIPMENT**

Do not return any assembly or part without a Return Warranty Request. The Return Warranty Request is available from all Sales Offices and Factories and is also enclosed in this manual in appendix C. Information describing the problem, corrective action, if any, and the work to be accomplished at the factory must be included.

# 8 Appendix B Repair and/or Warranty request sheet

FISHER-ROSEMOUNT

## Repair and/or Warranty Request Sheet

**Brooks Instrument B.V.**

Groeneveldselaan 6  
 3903 AZ Veenendaal  
 The Netherlands  
 Tel +31- (0)318 549 549  
 Fax +31 - (0)318 549 559

**Brooks Instrument**

407 W. Vine Street  
 P.O. Box 903  
 Hatfield, PA 19440-0903 USA  
 Tel 1- (215) 362-3500  
 Fax 1 - (215) 362-3750

Originator :		Date :	
Company :		CC. :	
Customer reference no. :			
Brooks serial no. :			
Model/Part no. :			
Date of delivery :			
Date of installation :			
Failure date :			
Requested delivery time :			
<b>TO: REPAIR DEPARTMENT</b>			
Brooks Instrument B.V., The Netherlands		0 Thermal Mass fax no.: +31-(0)318-549349	
		0 VA/Oval fax no.: +31-(0)318-549319	
Brooks Instrument, USA		0 Fax no.: 1 - (215) 362-3750	
<b>FOR:</b>	<input type="checkbox"/> Repair	<input type="checkbox"/> Calibration	<input type="checkbox"/> Exchange
	<input type="checkbox"/> Credit	<input type="checkbox"/> Other	<input type="checkbox"/> Quotation
		<input type="checkbox"/> Warranty	
<b><u>PROCESS CONDITIONS</u></b>			
Fluid name	: Pressure P1	:	
Flow range	: Pressure P2	:	
Temperature	: In- and/or output	:	
Attitude	: Ref. Temperature	:	
<b><u>INSTRUMENT CONDITIONS</u></b>			
<input type="checkbox"/> Internals are clean			
<input type="checkbox"/> Solvent to clean internals :			
If this is not a standard cleaning solvent, the meter has to be shipped back to the customer for cleaning.			
<b><u>REPAIR ACTIVITY INSTRUCTIONS</u></b>			
Be precise with this info for the safety of goods receiving people and technicians. We cannot accept repair orders without proper information.			
<b><u>SHIPPING ADDRESS</u></b>			
<b><u>METHOD OF SHIPPING</u></b>			

PLEASE FILL IN THIS SHEET COMPLETELY TO AVOID MISTAKES

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

# 10 Appendix D 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:

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

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

## 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:

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

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

## 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:

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

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

# 11 Appendix E Translations installation instructions

## 10.1 CABLE REQUIREMENTS FOR COMPLIANCE WITH THE EMC DIRECTIVE

### Dansk

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 80% 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-forskrutninger 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 80% dækning.

Skærmen bør være forbundet til jord.

### Deutsch

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 80 %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 80 %igen Schirmabdeckung zu verwenden.

Die Abschirmung ist mit dem Erdpotential zu verbinden.

### English

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 80% 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 80% shield to comply with CE certification.

The shield should be terminated to a earth ground.



## Español

Los equipos de Brooks (eléctricos/electrónicos) en relación con la marca CE han pasado satisfactoriamente las pruebas referentes a las regulaciones de Compatibilidad Electro magnetica (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 80%.

Cuando utilice conectores del tipo "D" ó "Circular" deberían estar protegidos con una pantalla metálica. Cuando sea posible, se debieran 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 80% para cumplir con la certificación CE. La pantalla deberá conectarse a tierra.

## Français

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 80 %.

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 80% pour satisfaire à la réglementation CE. Tous les blindages doivent être reliés à la terre.

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).

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 80% .

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

Το πλέγμα του καλωδίου πρέπει να συνδέεται στο μεταλλικό περίβλημα ή στον στυπιοθλίπτη 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 80% για να υπακούουν στην πιστοποίηση CE.

Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

### Italiano

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 80%.

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 80% per soddisfare la certificazione CE.

Lo schermo deve essere collegato ad un terminale di terra.

## Nederlands

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 80%.

“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 80% om te voldoen aan de CE certificering.  
Het scherm moet worden verbonden met aarde.

## Norsk

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, 80% 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, 80% skjerming som kobles til elektrisk jord på riktig pinne i pluggen, for å møte CE sertifiseringskrav.

## Português

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 80%.

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 80% nos termos da Certificação CE..

A blindagem deve terminar com ligação à massa.

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 sertifikaatin vaatimukset. Hankkiessaan signaalikaapelin itse, olisi hankittava 80%:sti suojattu kaapeli.

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

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 80%: sesti suojattuja jotta ne olisivat CE sertifikaatin mukaisia. Suoja on oltava maadoitettu.

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 80%.

“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 80% skarmade för att överensstämma med CE-certifieringen.

Skärmen ska avslutas med en jordförbindelse.

## 10.2 Safety requirements for compliance with the low voltage Directive

### **WARNING** (for translation of warnings, see appendix D)

Symbols used on the equipment are:



Caution ( Refer to accompanying documents ):

This Installation and operating manual must be read in its entirety before performing any operation on the equipment. Failure to understand and follow these instructions could result in serious personal injury and/or damage to the equipment.



Protective Conductor terminal:

the protective conductor terminal is an important safety measure of the instrument. Improper earthing of the

instrument will impair electrical safety significantly and could result in serious personal injury from electric shock.



Caution, risk of electric shock:

Internal components may be hazardous life. Disconnect power before removing cover from the equipment. Any operation requiring power to the equipment with the covers removed, must be performed by trained and qualified personnel.

Failure to observe this warning may cause serious personal injury from electric shock.

Should the instrument require repair or adjustment, contact the nearest Brooks Sales Office. It is important that servicing be performed only by trained and qualified personnel. If the instrument is not properly serviced, serious personal injury and/or damage to the instrument could result.

#### **Power Cord Set Requirements:**

Always use a power cord that is certified or approved by a recognized national test lab. The powercord must accommodate 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 protective conductor symbol as shown above.

#### **Replacement of the mains fuses:**



**Caution, risk of electric shock**

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

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

#### **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.

#### **Ventilation 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.

## WAARSCHUWING

De volgende symbolen zijn gebruikt op het instrument:

Let op ( Raadpleeg bijgeleverde documenten ):



Deze installatie and bedieningsinstructie moet in zijn geheel worden elezen voordat enige handeling met het instrument wordt verricht. Onbegrip en het niet volgen van de instrukties kan leiden tot ernstige verwondingen en/of schade aan het instrument

Veiligheidsaarde:



De veiligheidsaarde is een belangrijke veiligheidsmaatregel. Ondeugdelijke aarding van het instrument zal de elektrische veiligheid in belangrijke mate aantasten en kan leiden tot ernstige verwondingen als gevolg van elektrische schokken



Pas op, Gevaarlijke spanning :

Interne componenten kunnen gevaarlijke spanning voeren. Verwijder het instrument van de voeding voordat het instrument wordt geopend. Alle handelingen die dienen te gebeuren met aangesloten voeding, en met het apparaat geopend, moeten worden gedaan door goed gekwalificeerd en geoefend personeel. Het niet opvolgen van deze waarschuwing kan leiden tot ernstige verwondingen als gevolg van elektrische schokken

Neem contact op met de dichtbijzijnde lokale verkoopkantoor van Brooks indien het apparaat gerepareerd of bijgesteld moet worden. Het is belangrijk dat service wordt gedaan door goed gekwalificeerd en geoefend personeel. Het niet voldoen aan deze eis kan leiden tot ernstige verwondingen en/of schade aan het instrument.

### Netsnoer vereisten:

Gebruik altijd een netsnoer dat is goedgekeurd door een nationaal erkend testinstituut. Het netsnoer moet 3 geleiders hebben met ader diameter van minimaal 0,75mm<sup>2</sup> (of 18AWG). Een van de drie geleiders moet als veiligheidsaarde dienen. Het spanningsbereik van het netsnoer moet passen bij de gebruikte netspanning. Extra aarding kan worden gedaan door middel van de externe veiligheidsaarde gemerkt met het " veiligheidsaarde" teken zoals boven vermeld

### Vervangen van de netzekeringen:



Pas op, Gevaarlijke spanning:

Verwijder het instrument eerst van de voeding voordat de zekeringen worden vervangen.

Er bevinden zich twee zekeringen in de netentree aan de achterzijde van het instrument. Verwijder de zekeringen door ze uit de cassette te trekken. De zekeringen moeten worden vervangen

door zekeringen die aan de volgende eisen voldoen:

Afmetingen: 5 x 20mm  
Stroom: 2A T (traag)  
Spanning: Passend bij gebruikte netspanning  
Typegoedkeur: Goedgekeurd door een nationaal erkend testinstituut  
Voor Europa:  
Onderbreek Capaciteit: 1500A  
Smeltkarakteristiek: IEC127

### Reinigingsinstructie:

Gebruik geen andere schonmaakmiddelen dan water omdat dit de kleur en merktekens op het apparaat kan aantasten. Gebruik een zachte vochtige doek voor reiniging.

### Ventilatie eisen:

De ventilatieopeningen mogen nooit geblokkeerd of afgedekt worden. Bij installatie in een paneel of een rack moet voldoende ventilatie in acht worden genomen

# 12 Modelling

<b>READ OUT &amp; CONTROL EQUIPMENT</b>	
<b>0152/0154</b>	
<b>DESCRIPTION</b>	
0152/C	TWO (2) CHANNEL READ OUT, TOTALIZER & CONTROL UNIT
0154/C	FOUR (4) CHANNEL READ OUT, TOTALIZER& CONTROL UNIT
<b>TYPE HOUSING</b>	
A	CASSETTE
B	CASSETTE COMPLETE WITH 19" RACK UNIT
C	TABLE TOP MODEL
D	TABLE TOP MODEL WITH HANDGRIP
E	PANEL MOUNT
Z	SPECIFY
<b>INPUT - POWER SUPPLY</b>	
1	90 - 260 V - 50/60 Hz.
9	SPECIFY
<b>OUTPUT - POWER SUPPLY</b>	
A	± 15 Vdc, 60 W
B	+ 24 Vdc, 60 W
Z	SPECIFY
<b>INPUT/OUTPUT TO AND FROM (L)MFC</b>	
1	0-5 Vdc
2	0-10 Vdc
3	4-20 mA
4	0-20 mA
<b>COMMUNICATION OPTIONS TO PC INTERFACE AND SOFTWARE *</b>	
0	NONE
A	3M CABLE (P/N 124-Z-901-ZZZ): RS-232 COMMUNICATION CABLE
B	SOFTWARE 535-B-008-ZZZ (TESTPOINT + LABVIEW + SMART DDE SOFTWARE)
C	COMBINATION OF OPTION A and B
<b>0154/C C 1 A 1 0 = TYPICAL MODEL NUMBER</b>	

<b>OPTIONS &amp; ACCESSORIES:</b>
<b>* FOR CONNECTION BETWEEN QUANTIM AND 0152/0154 READ-OUT ELECTRONICS</b>
1.5M - 5ft CABLE (P/N 124-Z-906-ZZZ):
3.0M - 10ft CABLE (P/N 124-Z-907-ZZZ):
7.6M - 25ft CABLE (P/N 124-Z-908-ZZZ):
15.2M - 50ft CABLE (P/N 124-Z-909-ZZZ):
<b>* FOR CONNECTION BETWEEN FLOMEGA AND 0152/0154 READ-OUT ELECTRONICS</b>
3M CABLE (P/N 124-Z-605-AAA):
6M CABLE (P/N 124-Z-606-AAA):
<b>THE ABOVE MENTIONED ELECTRONICS CAN ALSO BE USED WITH THERMAL MASS FLOW METERS AND CONTROLLERS.</b>
<b>MODELS: 5860/61/63/64 AND 5850/51/53</b>
3M CABLE (P/N 124-Z-236-AAA):
6M CABLE (P/N 124-Z-237-AAA):

\* THIS OPTION ENABLES THE USER TO CONNECT ALL OUR ANALOGUE INSTRUMENTS VIA MODEL 0152/4 AND CONTROL (SETPOINT, FLOW AND V.O.R.) VIA SOFTWARE.

**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.

**Ventilation 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.

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