

Data Sheet

DS-TMF-4800-eng

February, 2007

Brooks[®] 4800 Series

4850 Mass Flow Controller

4860 Mass Flow Meter

General Features:

- Wide FS flow range for measurement and control of common gases from 50 mln/min to 40 ln/min (50 sccm to 40 slpm)
- Accuracy options: $\pm 1\%$ FS or $\pm 3\%$ FS
- Compact size reduces space and eases installation
- Fast response time of <300 msec
- Storage of up to 9 selectable gas calibrations allows reduction in spares inventory

DESCRIPTION

The Brooks 4800 line of mass flow meters and controllers is an excellent choice for measurement and control of many common gases including air, N₂, O₂, Ar, He, H₂, CO₂, CO, N₂O, CH₄, C₃H₆, and C₃H₈. It offers a broad flow range, fast response time, compact size, and many other benefits for a variety of applications.

The 4800 Series MEMS-based sensor provides lightning fast response times. The 4800 Series utilizes a Micro Electro Mechanical System (MEMS) based thermal sensor. Unlike traditional thermal sensors, MEMS sensors are fabricated from a silicon wafer.

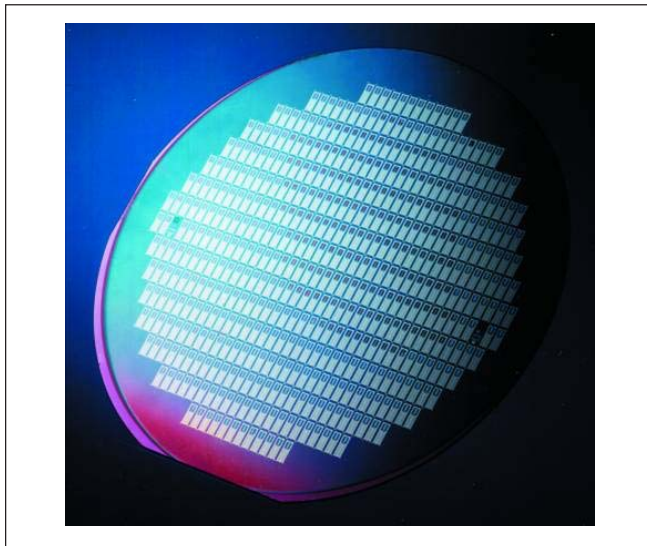


Figure 1 Silicon Wafer with MEMS Devices



Similar to traditional thermal sensors, the MEMS sensor measures a change in temperature to determine mass flow rate. Because the gas flows directly across the sensor, extremely fast response times can be achieved.

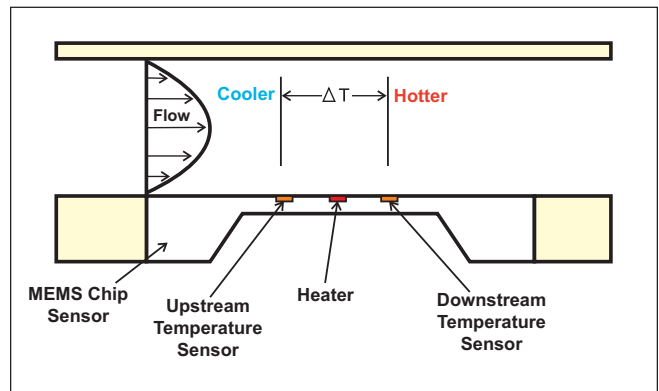


Figure 2 Gas Flow Across the MEMS Sensor

Fast settling times come standard with the 4850 controller. The 4850 MFC version uses a proprietary PID algorithm to optimize the control valve response to ensure rapid settling times. The 4850 can be counted on to quickly match actual mass flow to any changes in setpoint.

Brooks Instrument

www.BrooksInstrument.com


EMERSON
Process Management

Brooks® 4800 Series

Good things come in small packages. The MEMS sensor enables a dramatic reduction in size compared to traditional thermal mass flow sensors. In fact the compact size of the 4800 Series is significantly less in height and volume than that of typical thermal mass flow controllers.

The 4800 Series is ideal for OEMs. The broad flow range, fast response time, and compact size make for a perfect fit into any OEM system where gas flow needs to be measured or controlled. Additionally, the 4800 Series has a highly modular construction for quick assembly in order to meet short delivery dates.

SPECIFICATIONS

PERFORMANCE CHARACTERISTICS:*

Flow Range

FS ranges from 50 mln/min – 40 ln/min
(50 sccm – 40 slpm)
(N₂ eq., at reference 0°C)

Control Range

2 – 100%

Accuracy Options

±3.0% of FS
±1.0% of FS

Repeatability

±0.15% of FS

Response Time

Flow signal: <0.3 sec (analog I/O)
Flow control: Settling time <0.75 sec (typical <0.5 sec)

Temperature Coefficient

±0.1% FS/°C (N₂)

RATINGS:

Gases

Air, N₂, O₂, Ar, He, H₂, CO₂, CO, N₂O, CH₄, C₃H₆, C₃H₈
(other gases upon request)

Operating Limits

Pressure: 0 – 10 barg (0 - 150 psig) at room temperature
Temperature: 0 - 50°C at 10 barg (150 psig) (ambient)
Operating Humidity: 5 to 95% R.H. (ambient)

Pressure Differential Range (Controllers)

Minimum: 0.35 bar (5 psid)
Maximum: 10 bar (150 psid)

Leak Integrity

Inboard to Outboard: 1x10⁻⁹ atm scc/sec Helium max.

* All performance characteristics are at calibration conditions.

ELECTRICAL CHARACTERISTICS:

Electrical Connections

15-pin D-sub connector
(pin-out schematic shown in Table 1)
All pins shall be protected against ESD
(Electro Static Discharge)

Power Supply Voltage

Nominal: +15 – 24 Vdc
Minimum: +13.5 Vdc
Maximum: +26.4 Vdc
Device only uses single sided power supply
Inrush current: <1 A

Power Requirements

Device	15 Vdc		24 Vdc	
	Typical (mA)	Max. (mA)	Typical (mA)	Max (mA)
4860 (without valve)	30	60	30	60
4850 (with valve)	130	160	150	200

Analog Input/Output

0 – 5 Vdc or 4 – 20 mA

Valve Override Signal

Valve controller: Input Open
Valve closed: <0.3 V; Valve open: >4.8 V

Calibration Curve Selection

Select one of nine gases via RS232. Optional software tool for ease of RS232 connection is available on the Brooks Instrument website. Contact your Brooks representative or the factory for details and cable options.

PHYSICAL:

Materials of Construction

Wetted parts: stainless steel, fluoroelastomers, silicon-based sensor

Outline Dimensions

Refer to Figure 3

Process Connections

Inlet/Outlet threads: 9/16" – 18 UNF threads
Refer to Figure 3 for available process connections.

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Table 1 15-Pin D-Sub Connector Pin-Out

PIN #	4800 Series	5850TR	S – SERIES (58xxS)
1	SETPOINT SIGNAL GROUND	ANALOG GROUND	SETPOINT SIGNAL GROUND
2	FLOW VOLTAGE OUTPUT	FLOW VOLTAGE OUTPUT	FLOW VOLTAGE OUTPUT
3	N.C.	N.C.	ALARM OUTPUT
4	FLOW CURRENT OUTPUT	FLOW CURRENT OUTPUT	FLOW CURRENT OUTPUT
5	POSITIVE SUPPLY VOLTAGE	POSITIVE SUPPLY VOLTAGE	POSITIVE SUPPLY VOLTAGE
6	N.C.	N.C.	NEGATIVE SUPPLY VOLTAGE
7	SETPOINT CURRENT INPUT	SETPOINT CURRENT INPUT	SETPOINT CURRENT INPUT
8	SETPOINT VOLTAGE INPUT	SETPOINT VOLTAGE INPUT	SETPOINT VOLTAGE INPUT
9	POWER SUPPLY COMMON	POWER SUPPLY COMMON	POWER SUPPLY COMMON
10	FLOW SIGNAL GROUND	FLOW SIGNAL GROUND	FLOW SIGNAL GROUND
11	N.C.	5V REFERENCE	5V REFERENCE
12	VALVE OVERRIDE INPUT	VALVE OVERRIDE INPUT	VALVE OVERRIDE INPUT
13	N.C.	N.C.	FUNC./CAL. SELECT
14	RXD	N.C.	RXD / A-
15	TXD	N.C.	TXD / A+

5850TR and S-Series Pin-Outs Shown for Reference Only.

Certifications:

EMC Directive 89/336/EEC:

per EN 61326

Hazardous Location Classification

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

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

Enclosure: Type 1/IP40

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

United States and Canada



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

Per UL 1604 and CSA-213

Class 1, Zone 2, AEx nA II T4

Per ANSI/ISA 12.12.02 - 2003 and ANSI/UL 60079-15

Ex nA II T4

Per CSA - E79 - 15

Europe - ATEX Directive 94/9/EC

KEMA 06ATEX0251 per EN 60079-15: 2003



II 3 G EEx nA II T4



Pressure Equipment Directive (97/23/EC):
Sound Engineering practice.

Approvals pending at time of publication.

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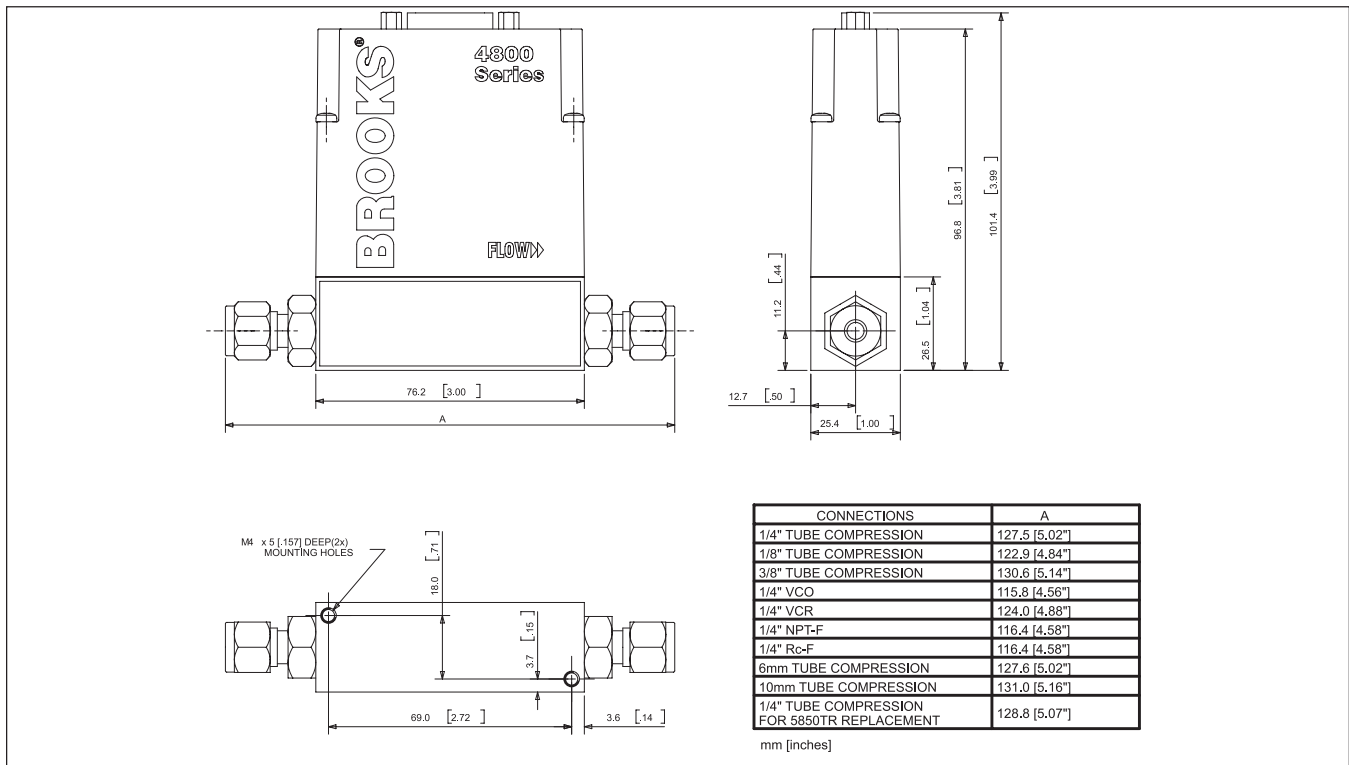


Figure 3 Dimensions for Model 4850A/4860A

BROOKS LOCAL AND WORLDWIDE SUPPORT

- Brooks Instrument provides sales and service facilities around the world.
- Calibration facilities are available in locally based sales and service offices. 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, if necessary under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

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

HELP DESK

In case you need technical assistance:

- Americas ☎ 1-888-554-FLOW
- Europe ☎ +(31)-318-549-290 Within Netherlands ☎ 0318-549-290
- Asia ☎ +011-81-3-5633-7105

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

TRADEMARKS

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