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Data Sheet
DS-TMF-5853*i*-5863*i*-MFC-eng
October, 2008

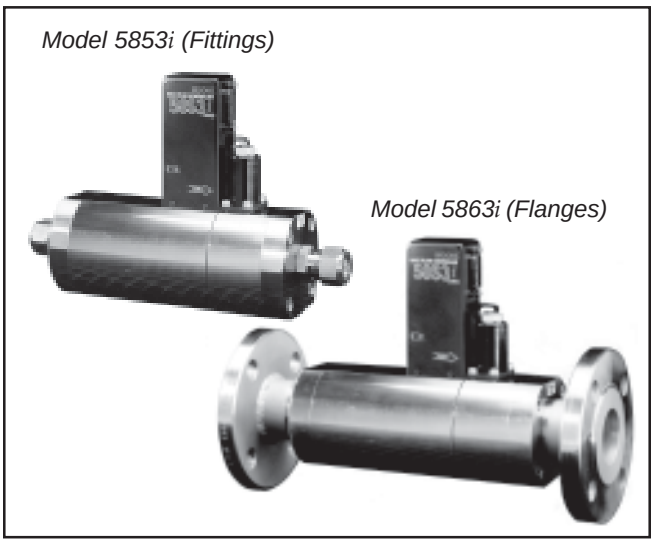
High Flow Industrial Mass Flow Controller & Meter Models 5853*i* / 5863*i*

Features and Benefits
- Easy maintenance
- Negligible flow overshoot/undershoot
- Removable sensor
- Insensitive to mounting attitude
- Wide flow range (up to 1000 slpm N_2)
- End accessible zero and span potentiometers
- Dual analog signal outputs 0-5 Vdc and 4-20 mA or 0-20 mA
- Wide power supply tolerance, 15-28 Vdc
- Subminiature D-connector electrical interface for RFI immunity
- Meriam® LFE restrictor

Model 5853*i*:
- Jumper selectable external valve control
- Electrically activated valve override
- Low command flow cutoff
- Normally closed valve
- User configurable set point input 0-5 Vdc or 4-20 mA
- Bellows sealed high stability valve
- Wide range of pressures and pressure drops

Description
The Brooks® Models 5853*i* and 5863*i* industrial mass controller and meter accurately measure and control high gas flow. The heart of the system is its removable, attitude-insensitive sensor which produces an electrical output signal linear with flow rate used for indicating, recording, and/or control purposes. It eliminates the need for continuous monitoring and readjustment of gas pressures to provide a stable gas flow.

Principle of Operation
The operating principle of the Brooks mass flow controller and meter is thermodynamic. A wire wound heating element directs heat to the midpoint of the bypass sensor tube. A predetermined portion of the total flow, flows through the bypass sensor tube. On the same tube, equidistant upstream and downstream of the heat input, are resistance temperature measuring elements.
With no flow, the heat reaching each temperature element is equal. With increasing flow the flow stream carries heat away from the upstream element, T1, and an increasing amount towards the downstream element, T2. An increasing temperature difference develops between the two elements and this difference is proportional to the amount of gas flowing or the mass flow rate. A bridge circuit interprets the temperature difference and an amplifier provides a 0-5 Vdc, 4-20 mA or 0-20 mA linear output signal.



The control circuitry compares the command setpoint to the flow signal and positions the precision solenoid control valve. When the command signal is below 2% of full scale, the control valve is positioned to fully closed. The control valve can be latched fully open or closed by activating the valve override circuit.

Specifications
Performance:
Flow Ranges
Any full scale flow from 0 - 100 slpm* to 0 - 1,000 slpm (Nitrogen equivalent).
***Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials Institute) standard: 0°C and 101 kPa (760 Torr). The mass flow controller can be calibrated to other reference standard conditions. Specify at time of ordering.**
Control / Usable Range
50 to 1
Accuracy
±1% full scale including linearity at calibrated conditions.
Settling Time
Less than 3 seconds to within 2% of full scale final valve for 0-100% flow step.
Repeatability
0.25% of rate
Sensitivity to Mounting Attitude
±0.5% full scale maximum deviation from specified accuracy after re-zeroing under 200 psig. Specify mounting attitude at time of order to insure optimum performance.

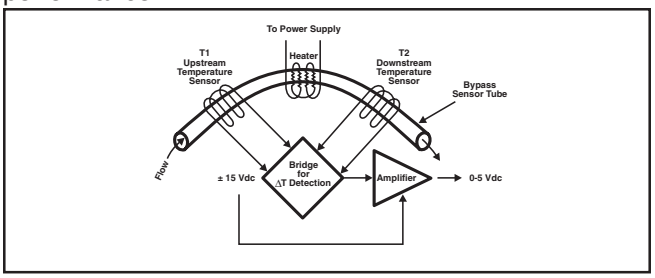


Figure 1 Principle of Operation

Temperature Sensitivity
Zero: Less than ±0.075% F.S. per degree C
Span: Less than ±1.0% F.S. shift from original calibration over 50°F to 122°F range (10°C to 50°C)
Pressure Sensitivity (Model 5853*i*)
±0.03% per psi up to 200 psig (N_2)
Ratings:
Operating Pressure
1500 psig (100 bar) maximum
Differential Pressure (Model 5853*i*)
Standard: High differential valve 30 to 290 psid
Optional: Low differential valve 7.5 to 30 psid (<500 slpm)
11.8 to 30 psid (>500 slpm)
Temperature Ambient/Gas
41°F to149°F (5°C to 65°C)
Leak Integrity, Outboard
1 x 10^{-9} atm cc/sec. He (excluding permeation)
Mechanical Connections

Type	Sizes Available	Standard or Optional
UNF	9/16"-18, 1 1/16"-12	Standard
NPT	1/2", 1", 1 1/2"	Standard
Compression	1/2", 3/4", 1"	Optional
VCO™	3/8", 1/2"	Optional
VCR™	3/8", 1/2"	Optional
150# ANSI Flange	1/2", 1", 1 1/2", 2"	Optional
300# ANSI Flange	1/2", 1", 1 1/2", 2"	Optional
DIN Flange	DN 15, 25, 40, 50	Optional

Materials of Construction:
Wetted Parts — 316 Stainless Steel with Viton® fluoroelastomers, Buna-N or PTFE/Kalrez®
Electrical Specifications
Set Point (Command) Signal Requirements (Model 5853*i*)
0 to 5 Vdc (200 k ohms input resistance) or 4-20 mA (75 ohms input resistance)
Output Signals
0 to 5 Vdc into 2000 ohms (or greater) load. Maximum ripple 3 mV. 0/4-20 mA, max. loop resistance is power supply dependent, 500 ohms maximum loop resistance, see Figure 5.
Power Requirements
+15 to +28 Vdc
240 mA @ at +15 Vdc, 370 mA @ 28 Vdc (Model 5863*i* - 90mA max.)

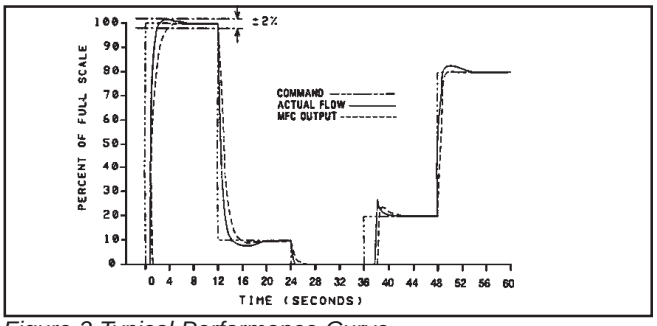


Figure 2 Typical Performance Curve

Electrical Connections
D-type connector (DA-15P)
ORDERING INFORMATION
To order, specify: 5853*i*/5863*i*
1. Model number
2. Complete gas data
   Type of gas to be metered
   Operating temperature
   Inlet pressure
   Outlet pressure
   Flow range
   Process connections
   Additional application information:
   Reference Temp.: 0°C(STD), 20°C, 0°F or other
   Mounting Attitude: Describe mounting position
   Soft Start: Disabled (STD), Enabled

Input/Output Configuration:	Input	Output
	0-5V, or 4-20mA	0-20mA, or 4-20mA

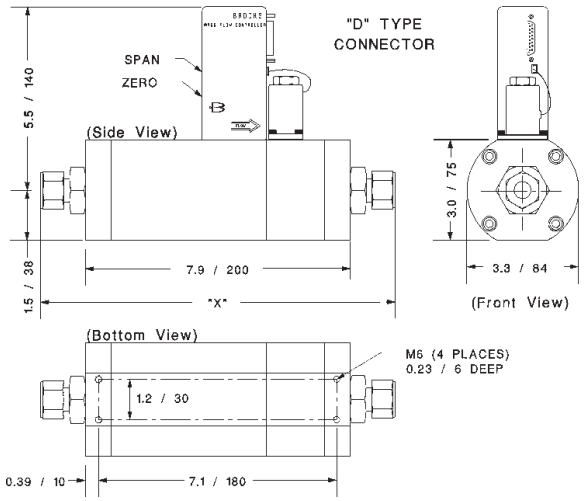
(0-5V always avail.)

3. Additional accessories (if any):
   Power supply
   Secondary electronics
   Command potentiometer
   Cable assembly

Approximate shipping weight: 15 lb. (7 kg) w/ fitting
29 lb (13 kg) w/flanges

TRADEMARKS
Brooks ..... Brooks Instrument, LLC
Kalrez ..... DuPont Dow Elastomers
Meriam ..... Meriam Instrument Co.
VCO, VCR ..... Cajon Co.
Viton ..... DuPont Performance Elastomers

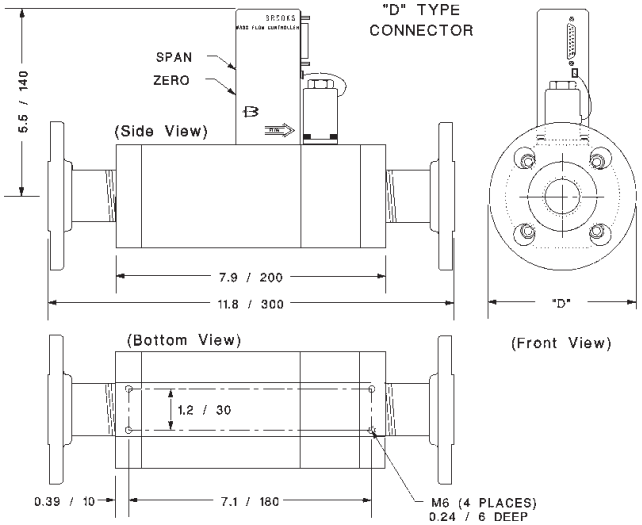
Model 5853*i*
with Fittings



CONNECTION TYPE	"X" DIMENSION	
	inch	mm
Female Pipe Thread	7.9	200
1/2" Tube Compression*	10.6	268
3/4" Tube Compression*	10.6	268
1" Tube Compression*	10.9	277
1/2" VCO** (100 slpm max.)	9.9	251
3/4" VCO*	10.2	258
1/2" VCR** (100 slpm max.)	10.1	257
1/2" VCR*	10.1	257

* 1-1/16 - 12 UNF Connection To Body
** 9/16 - 18 UNF Connection To Body

Model 5853*i*
with Flanges



Flange Type	Flange OD, "D"	
	inch	mm
ANSI 1/2" 150 lb	3-1/2	89
ANSI 1/2" 300 lb	3-3/4	95
ANSI 1.0" 150 lb	4-1/4	108
ANSI 1.0" 300lb	4-7/8	124
ANSI 1.5" 150 lb	5	127
ANSI 1.5" 300 lb	6-1/8	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6-1/2	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.90	150
DIN DN50 PN40	6.50	165

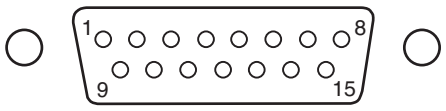
Figure 3 Model 5853i Dimensions

PIN NO.	FUNCTION	COLOR CODE
1*	Setpoint Return or N/C	Black
2	0-5 Volt Signal Output	White
3	Not Used	Red
4	Current Signal Output	Green
5	+15 to +28 Vdc Supply	Orange
6	Not Used	Blue
7*	Current Setpoint Input or N/C	Wht/Blk
8*	Voltage Setpoint Input or N/C	Red/Blk
9	Supply Voltage Common	Grn/Blk
10	Signal Output Common	Org/Blk
11	+5 Volt Reference Output (Command Pot "CW")	Blu/Blk
12*	Input Valve Override or N/C	Blk/Wht
13	Not Used	Red/Wht
14	Chassis Ground (See Note 1)	Grn/Wht
15	Not Used	Blu/Wht

* These connections are used for Model 5853*i* make no connections for Model 5863*i*.

Figure 4 Models 5853i/5863i Hookup Diagram

PIN OUT - TOP VIEW



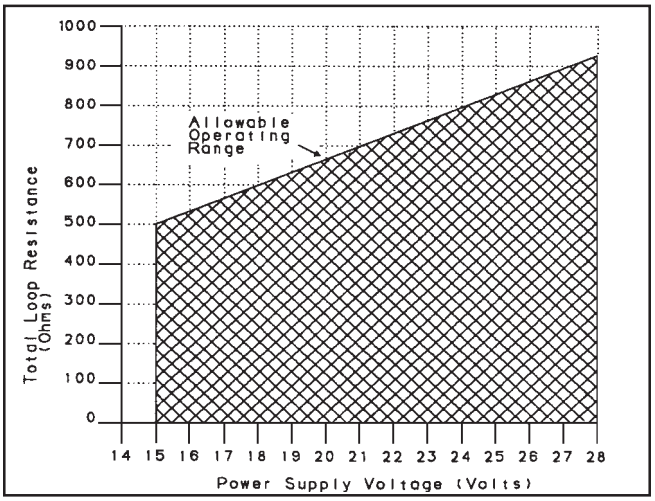
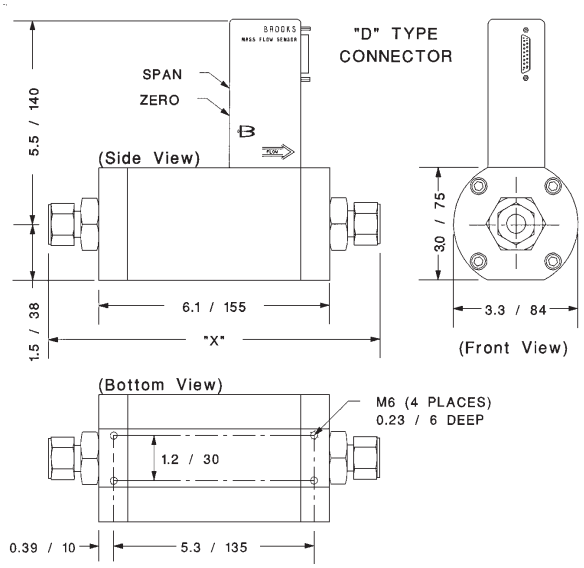


Figure 5 Maximum Allowable Loop Resistance

Note:
1. Cable shield tied to chassis ground in meter connector. Make no connection on customer end.

Models 5853*i* & 5863*i*

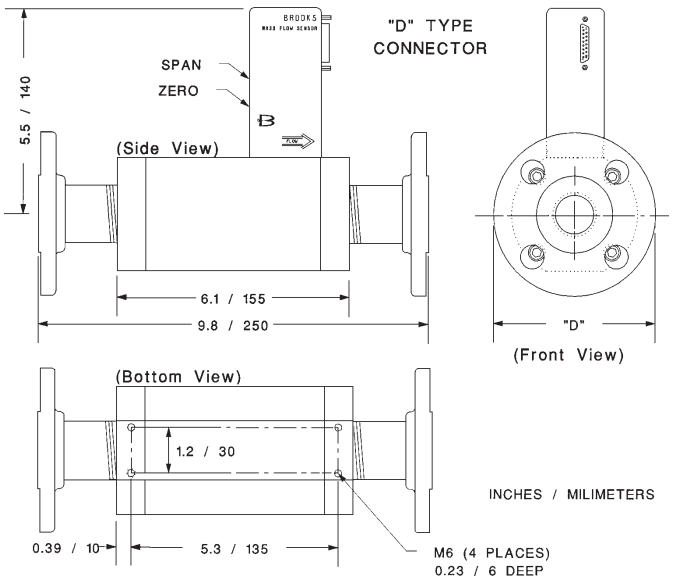
Model 5863*i* with Fittings



CONNECTION TYPE	"X" DIMENSION	
	inch	mm
Female Pipe Thread	6.1	155
1/2" Tube Compression*	8.8	223
3/4" Tube Compression*	8.8	223
1" Tube Compression*	9.1	232
1/2" VCO ** (100 slpm max.)	8.1	206
3/4" VCO *	8.4	213
1/2" VCR ** (100 slpm max.)	8.3	211
1/2" VCR*	8.4	214

* 1-1/16 - 12 UNF Connection To Body
** 9/16 - 18 UNF Connection To Body

Model 5863*i* with Flanges



Flange Type	Flange OD, "D"	
	inch	mm
ANSI 1/2" 150 lb	3-1/2	89
ANSI 1/2" 300 lb	3-3/4	95
ANSI 1.0" 150 lb	4-1/4	108
ANSI 1.0" 300lb	4-7/8	124
ANSI 1.5" 150 lb	5	127
ANSI1.5" 300 lb	6-1/8	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6-1/2	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.90	150
DIN DN50 PN40	6.50	165

Figure 6 5863i Dimensions

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@BrooksInstrument.com
www.BrooksInstrument.com

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

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