

GM51A

1.125" Metal Sealed, Digital Mass Flow Meter



The GM51A is a 1.125" wide, general purpose metal sealed, Mass Flow Meter (MFM) well suited for a wide variety of applications requiring flow metering from 5 sccm to 50 slm Full Scale, N₂ equivalent.

The GM51A digitally calibrated MFM is available with either analog or digital I/O. The digital electronics utilize the latest MKS algorithms providing multi-gas/multi-range measurement capability. Included is a digital calibration that yields 1% of Reading accuracy on the

calibration gas. The GM51A's analog and digital I/O can easily be used to replace those same I/O types of the 179A MFCs. All GM51As include Modbus as an available secondary I/O (excludes PROFINET® and EtherCAT®).

The GM51A utilizes the standard 3-inch footprint most often used by MFMs in the 5 sccm to 50 slm flow rate range. The GM51A metal sealed MFM, with its all-metal 316 stainless steel body, is well suited for use in high purity process applications.

Product Features

- Embedded user interface provides the ability to
 - Easily change device range and user gas reducing inventory requirements
 - Monitor device functionality and collect performance data in-situ
- 10 micro-inch 316L surface finish enables MFM use for high purity applications
- Wide choice of digital (EtherCAT, DeviceNet™, PROFINET and RS485) or analog (0 to 5 VDC) I/O



Key Benefits

- Patented thermal sensor design provides exceptional zero stability
- Percent of Reading accuracy (calibration gas) enables precise process metering

Specifications

Performance

Full Scale Flow Ranges (N ₂ equivalent)	5 - 50000 sccm	
Maximum Inlet Pressure	500 psi	
Proof Pressure	1000 psig	
Burst Pressure	1500 psig	
Measurement Range	0.1% to 100% of Full Scale (range on mech.)	
Typical Accuracy (with N ₂ calibration gas)	±1% of Reading	
Repeatability	±0.3% of Reading	
Resolution	0.1% of Full Scale	
Temperature Coefficients	Zero Span	<ul style="list-style-type: none"> • <0.05% of Full Scale/°C • <0.08% of Reading/°C
Inlet Pressure Coefficient	<0.02% of Reading/psi	
Warm-up Time (to within 0.2% of Full Scale of steady state performance)	30 minutes	
Operating Temperature Range (Ambient)	10°C to 50°C	
Storage Humidity	0 to 95% relative humidity, non-condensing	
Storage Temperature	-20° to 80°C (-4° to 176° F)	

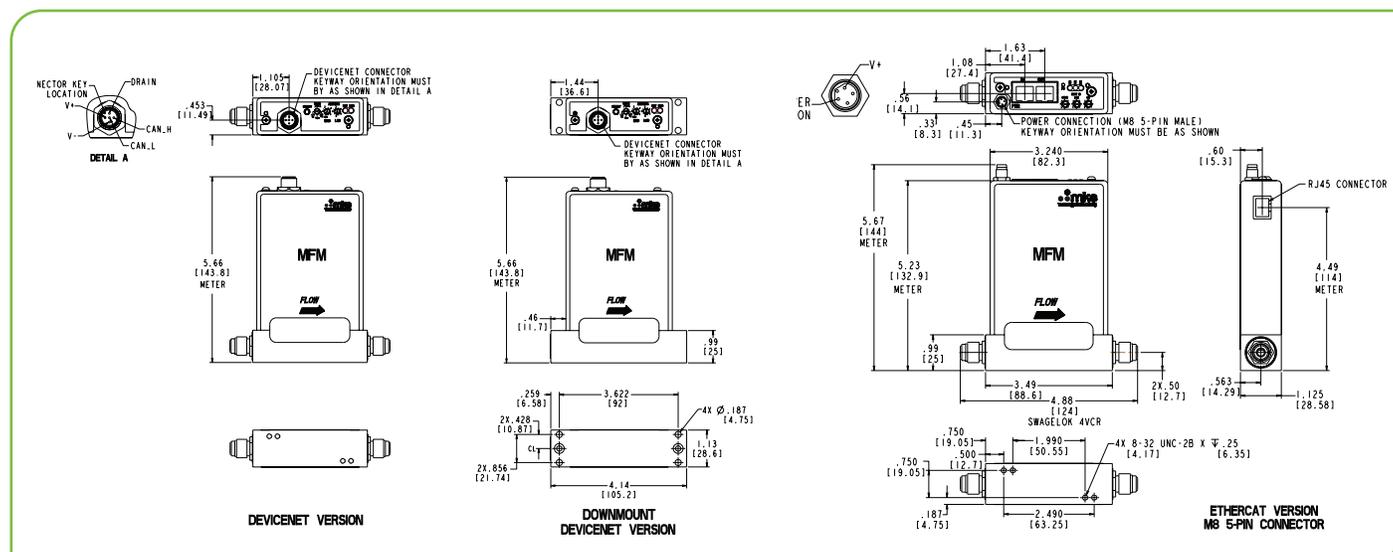
Mechanical

Fittings (compatible with)	<ul style="list-style-type: none"> • Swagelok® 4 VCR® male • C-seal surface mount • W-seal surface mount 	
Leak Integrity	External (scc/sec He)	<1 x 10 ⁻¹⁰
Wetted Materials	Standard	316L S.S. VAR (equivalent to 316 S.S. SCQ for semiconductor quality)
Surface Finish	10μ inch average Ra	
Weight	<2.5 lbs (1.1 kg)	

Electrical Analog I/O

Input Power Required	+15 to +24 VDC @ (<2 watts)	
Flow Input/Output Signal	Voltage (0 to 5 VDC)	15 pin Type "D" male, 9 pin Type "D" male
Compliance	CE	

Digital I/O	DeviceNet™	RS485	EtherCAT®	PROFINET®
Input Power Required	+11 to +25 VDC per (<2 watts)	+15 to +24 VDC (<2 watts)	+24 VDC (<3 watts)	+24 VDC (<3 watts)
Connector	5 pin micro connector (power and comm.)	9 pin Type D male (power and comm.)	2 x RJ-45 (comm.) male, M8 male, 5 pin (power)	2 x RJ-45 (comm.) male, M8 male, 5 pin (power)
Data Rate Switch/Selection	4 positions: 125, 250, 500K (Default), (programmable over network)	No switch Set data rate via RS485	No switch	No switch
Comm. Rate(s)	125 Kbps; 250 Kbps; 500 Kbps	9.6 Kbps; 19.2 Kbps 38.4 Kbps	100 Mbps	100 Mbps
MAC ID Switches/Addresses	2 switches, 10 positions; 0,0 to 6,3 1 to 254	Set address over RS485 Station Addresses 0,0 to 9,9	3 switches, 16 positions	N/A
Network Size	Up to 64 nodes	Up to 32 nodes	Up to 4095 nodes	N/A
Visual Indicators	LED Network (green/red) LED Module (green/red)	LED Comm (yellow) LED Error (red)	LED Power (green) LED Run (green) LED Error (red) LED Comm (green)	LED Maint (amber) LED BUS Fault (red) LED Ready (green) LED Sys Fault (red)
Compliance	CE	CE	CE	CE



Dimensional Drawings: DeviceNet™, Downmount with VCR® fittings* and EtherCAT® with VCR fittings*

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced). *(See manual for additional I/O and fitting types)

Ordering Information

Ordering Code Example: GM51A013502R830020	Code	Configuration
Model		
MFM Mass Flow Meter GM51A	GM51A	GM51A
Gas (per Semi Standard E52-0703)		
013 = Nitrogen = N ₂ 029 = Ammonia = NH ₃ 110 = Sulfur Hexafluoride = SF ₆	013 029 110	013
Flow Range Full Scale*		
5 sccm 10 sccm 20 sccm 50 sccm 100 sccm 200 sccm 500 sccm 1000 sccm 2000 sccm 5000 sccm 10000 sccm 20000 sccm 30000 sccm 50000 sccm	500 101 201 501 102 202 502 103 203 503 104 204 304 504	502
Fittings (compatible with)		
Swagelok 4 VCR male C-seal surface mount W-seal surface mount	R C H	R
Connector		
RS485 (uses 9 pin connector) DeviceNet EtherCAT PROFINET Analog 0 to 5 VDC (9 pin D connector) Analog 0 to 5 VDC (9 Pin D connector), Tied Grounds Analog 0 to 5 VDC (15 pin D connector) Analog 0 to 5 VDC (15 pin D connector), Tied Grounds	5 6 8 9 A L B M	8
Valve/Device Type		
No Valve/Mass Flow Meter	30	30
Reserved for MKS Future Use		
Standard	0	0
Firmware		
Unless otherwise specified, MKS will ship firmware revision current to date.	20	20

* The Full Scale flow rate is designated by a 3 digit number. The first two digits represent the significant digits of the Full Scale flow rate separated by a decimal point. The third digit is the exponent of the power of ten. Example flow rate code:
 254 is 2.5 x 10⁴ or 25000 sccm 153 is 1.5 x 10³ or 1500 sccm 601 is 6.0 x 10¹ or 60 sccm

** The user should consult with their gas supplier on the appropriate elastomer which is compatible with the selected gas.