

GM50A

Metal Sealed, Digital Mass Flow Meter



The GM50A is a 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 GM50A Meter incorporates the latest in digital flow meter electronics along with a well proven, patented thermal sensor and mechanical design.

The GM50A 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 GM50A's analog and digital I/O can easily be used to replace those same I/O types of the 179A MFCs. All GM50As include Modbus as an available secondary I/O (excludes PROFINET® and EtherCAT®).

The GM50A utilizes the standard 3-inch footprint most often used by MFMs in the 5 sccm to 50 slm flow rate range. The GM50A 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
- 16 micro-inch 316L surface finish enables MFM use for high purity applications
- Wide choice of digital (EtherCAT, DeviceNet™, Profibus®, PROFINET and RS485) or analog (0 to 5 VDC or 4 to 20 mA) 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)	

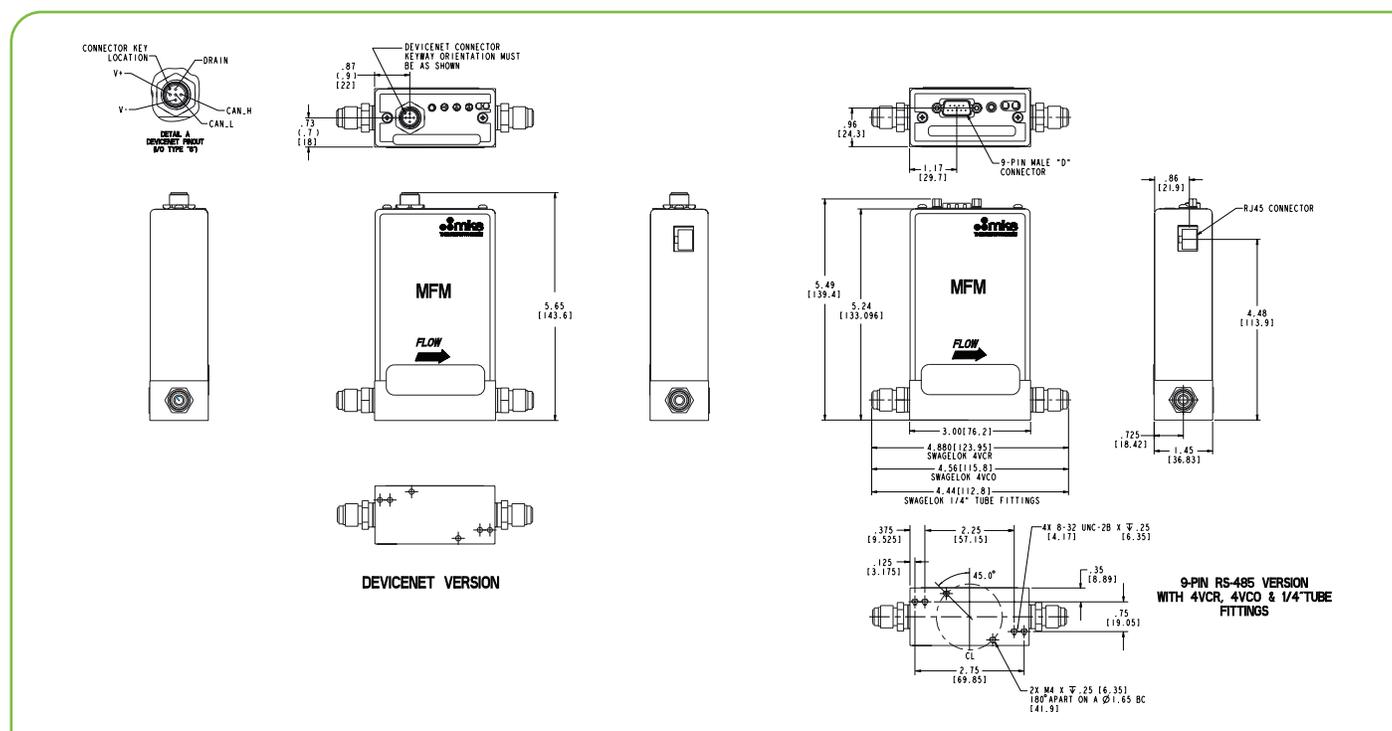
Mechanical

Fittings (compatible with)	Swagelok® 4 VCR® male, 1/4" Swagelok compression seal, surface mount, Swagelok 8 VCR male, 1/8" Swagelok, 1/2" Swagelok, 6 mm Swagelok, 8 mm Swagelok, KF16, 3/8" Swagelok, 12mm Swagelok, 2 VCR male	
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	16µ 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) Current (4 to 20 mA)	<ul style="list-style-type: none"> • 15 pin Type "D" male, 9 pin Type "D" male • 15 pin Type "D" male
Compliance	CE	

Digital I/O	DeviceNet™	RS485	Profibus®	EtherCAT®	PROFINET®
Input Power Required	+11 to +25 VDC per (<2 watts)	+15 to +24 VDC (<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.)	9 pin Type D male (power) 9 pin Type D female (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 Set data rate via Profibus	No switch	No switch
Comm. Rate(s)	125 Kbps; 250 Kbps; 500 Kbps	9.6 Kbps; 19.2 Kbps 38.4 Kbps	9.6 Kbps to 12 Mbps	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	2 switches, 10 positions	3 switches, 16 positions	N/A
Network Size	Up to 64 nodes	Up to 32 nodes	Up to 99 nodes	Up to 4095 nodes	N/A
Visual Indicators	LED Network (green/red) LED Module (green/red)	LED Comm (yellow) LED Error (red)	LED Comm (green/red) LED Error (green/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	CE



DeviceNet™ and RS485 with VCR fittings* (*see manual for additional I/O and fitting types). Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Ordering Information

Ordering Code Example: GM50A013502R63020	Code	Configuration
Model		
MFM Mass Flow Meter GM50A	GM50A	GM50A
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)		
6 mm Swagelok 8 mm Swagelok 10 mm Swagelok 12 mm Swagelok 1/8" Swagelok (for 1000 sccm N ₂ equivalent or below) 1/4" Swagelok 1/2" Swagelok 3/8" Swagelok Swagelok 4 VCR male Swagelok 8 VCR male C-seal surface mount as per SEMI 2787.1 W-seal surface mount as per SEMI 2787.3F KF16 Swagelok 2 VCR (for 1000 sccm N ₂ equivalent or below)	M E P F A S K J R T C H U B	R
Connector		
Profibus (179B Compatible) Profibus (180A Compatible) 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 Analog 4 to 20 mA, 15 Pin D connector	3 4 5 6 8 9 A L B M H	6
Valve/Device Type		
No Valve/Mass Flow Meter	30	30
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.