

GM100A

Metal Sealed, Digital Mass Flow Meter



The GM100A is a general purpose, metal sealed Mass Flow Meter (MFM) well suited for a wide variety of applications requiring flow metering from 100 sccm to 100 slm Full Scale, N₂ equivalent. The GM100A Meter incorporates the latest in digital flow meter electronics along with a well proven, patented thermal sensor and mechanical design.

The GM100A 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 GM100A's analog and digital I/O can easily be used to replace those same I/O types of the 558A, 748A and 579A. All GM100As include Modbus as an available secondary I/O (excludes PROFINET® and EtherCAT®).

The GM100A utilizes the standard 3-inch footprint most often used by MFMs in the 100 sccm to 100 slm flow rate range. The GM100A 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™, 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) | 50 - 100 slm |
| 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) |

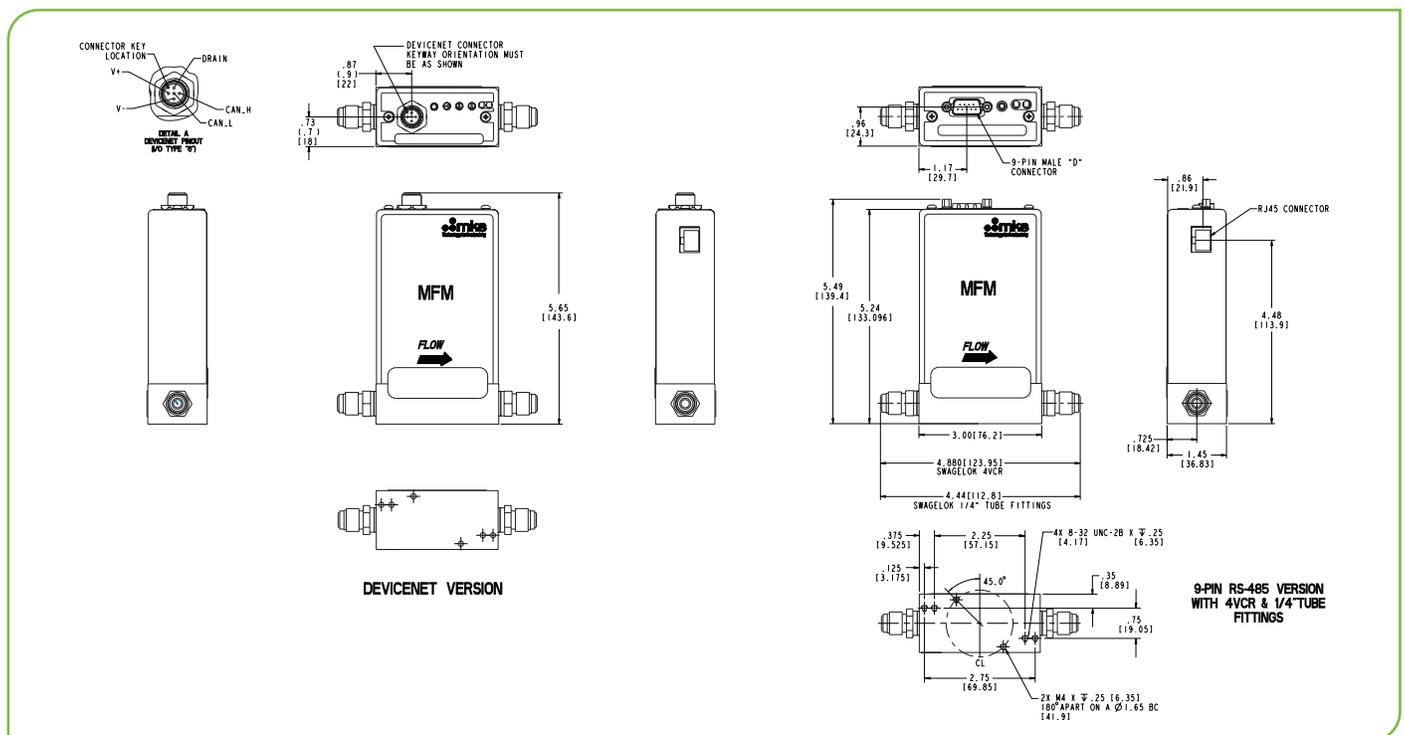
Mechanical

| | |
|----------------------------|---|
| Fittings (compatible with) | Swagelok® 4 VCR® male (High Flow), Swagelok 8 VCR male, 3/8" Swagelok compression seal, 1/2" Swagelok compression seal, 10 mm Swagelok compression seal, 12 mm Swagelok compression seal, KF16, Swagelok 8 VCO male (consult factory) |
| 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) <ul style="list-style-type: none"> • 15 pin Type "D" male, 9 pin Type "D" male Current (4 to 20 mA) <ul style="list-style-type: none"> • 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: GM100A013105T630020 | Code | Configuration |
|---|---|---------------|
| Model | | |
| MFM Mass Flow Meter GM100A | GM100A | GM100A |
| 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* | | |
| 50000 sccm 75000 sccm 100000 sccm | 504 754 105 | 105 |
| Fittings (compatible with) | | |
| 10 mm Swagelok 12 mm Swagelok 3/8" Swagelok 1/2" Swagelok Swagelok 4 VCR male Swagelok 8 VCR male Swagelok 8 VCO Male (Consult Factory) KF16 | P F J K R T D U | T |
| Connector | | |
| EtherCAT DeviceNet RS485 (uses 9 pin connector) Profibus (1480 Compatible) Profibus (1179B Compatible) 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 | 8 6 5 4 3 9 A L B M H | 6 |
| Valve/Device Type | | |
| Mass Flow Meter | 3 | 3 |
| Reserved | | |
| Reserved | 00 | 00 |
| 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.