



Flow

Solutions

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IM100A

IP66 RATED, METAL-SEALED, DIGITAL MASS FLOW CONTROLLER

The IM100A, a general purpose metal-sealed MFC, is well suited for harsh environments where resistance to liquid or dust ingress is critical. The IM100A meets these requirements due to its IP66 enclosure design.

The IM100A supports a wide variety of applications requiring flow control capability from 1 slm to 100 slm Full Scale, N₂ equivalent. Along with a well-proven, patented thermal sensor and mechanical design, the IM100A features the latest in digital flow control electronics.

The IM100A is a digitally controlled MFC with analog (0 to 5 VDC or 4-20 mA) and digital Profibus® I/O. The digital control electronics, using the latest in MKS control algorithms, provide fast and repeatable response to set point throughout the device control range. Typical response times are on the order of 500 milliseconds. The included digital calibration yields 1% of set point accuracy on the calibration gas.

The IM100A utilizes the standard 3-inch footprint most often used by MFCs in the 5 sccm to 50 slm flow rate range without the need to modify existing gas line configurations, and now operates with flow rates up to 100 slm, N₂ equivalent. The IM100A metal sealed MFC, with its electropolished surface finish, is well suited for use in high purity process applications and is available with a normally closed valve. An MFM version is also available (not electropolished).

Features & Benefits

- IP66 rated enclosure provides protection against ingress of water and dust present in harsh environments
- Patented thermal sensor design provides exceptional zero stability
- 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
 - Adjust flow calibration for chamber-to-chamber and tool-to-tool process matching
- 10μ inch electropolished 316L surface finish enables MFC use for high purity applications
- Percent of set point accuracy (calibration gas) enables precise process control
- Available in a wide variety of both analog and digital I/O interfaces to meet customer specific applications



Performance

| | |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Full Scale Flow Ranges (<i>N₂ equivalent</i>) | 50,000 - 100,000 sccm |
| Maximum Inlet Pressure | 150 psig (can not exceed pressure differential requirement across MFC) |
| Normal Operating Pressure Differential (<i>N₂ F.S.</i>) (<i>with atmospheric pressure at the MFC outlet</i>) | 50,000 - 100,000 sccm; 40 to 80 psid |
| Proof Pressure | 1000 psig |
| Burst Pressure | 1500 psig |
| Control Range | 2% to 100% of F.S. (range on mech.) |
| Typical Accuracy (<i>with N₂ calibration gas</i>) | ± 1% of set point for 20 to 100% F.S. ± 0.2% of F.S. for 2 to 20% F.S. |
| Repeatability | ± 0.3% of Reading |
| Resolution | 0.1% of Full Scale |
| Temperature Coefficients | |
| Zero | < 0.05% of F.S./°C |
| Span | < 0.08% of Rdg./°C |
| Inlet Pressure Coefficient | < 0.02% of Rdg./psi |
| Typical Controller Settling Time (<i>per SEMI Guideline E-17-0600</i>) | < 750 msec., typical above 10% F.S. |
| Warm-up Time (<i>to within 0.2% of F.S. of steady state performance</i>) | < 30 min |
| Operating Temperature Range (<i>Ambient</i>) | 10°C to 50°C |
| Storage Humidity | 0 to 95% Relative Humidity, non-condensing |
| Storage Temperature | -20° to 80°C (-4° to 149° F) |

Mechanical

| | |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Fittings (<i>compatible with</i>) | Swagelok® 4 VCR® high flow male, Swagelok 8 VCR male, 1/2" Swagelok, 10mm Swagelok, KF-16, 12 mm Swagelok, 3/8" Swagelok, Swagelok 8 VCO male |
| Leak Integrity | |
| External (scc/sec He) | < 1 x 10 ⁻¹⁰ |
| Through closed valve | < 1.0% of F.S. at 40 psig inlet to atmosphere (To assure no flow-through, a separate positive shut-off valve is required.) |
| Wetted Materials | |
| Standard | 316L S.S. VAR (equivalent to 316 S.S. SCQ for semiconductor quality), 316 S.S., Elgiloy®, Nickel |
| Valve Seat (MFC only) | EPDM (Class VI), EPDM, Viton® (Class VI), Viton, Buna, or Neoprene |
| Surface Finish | |
| MFC | 10μ inch average Ra (electropolished) |
| MFM | 16μ inch average Ra |
| Weight | < 3 lbs (1.4kg) |

Electrical Analog I/O

| | |
|---------------------------------|------------------------------|
| Input Power Required | +15 to +24 VDC @ (< 4 watts) |
| Flow Input/Output Signal | |
| Voltage (0 to 5 VDC) | 15 pin Type "D" male |
| Current (4 to 20 mA) | 15 pin Type "D" male |
| Compliance | CE |



Specifications

Digital I/O

Digital I/O

Input Power Required

Connector

Data Rate Switch/Selection

Data Rate

MAC ID Switches/Addresses

Network Size

Network Topology

Visual Communication Indicators

Compliance

Profibus®

+15 to +24 VDC (< 4 watts)

9 pin Type D male (power)

9 pin Type D female (comm.)

No switch

Set Data Rate via Profibus

Data Rate (User Selectable)

9.6 Kbps to 12 Mbps

2 switches, 10 positions

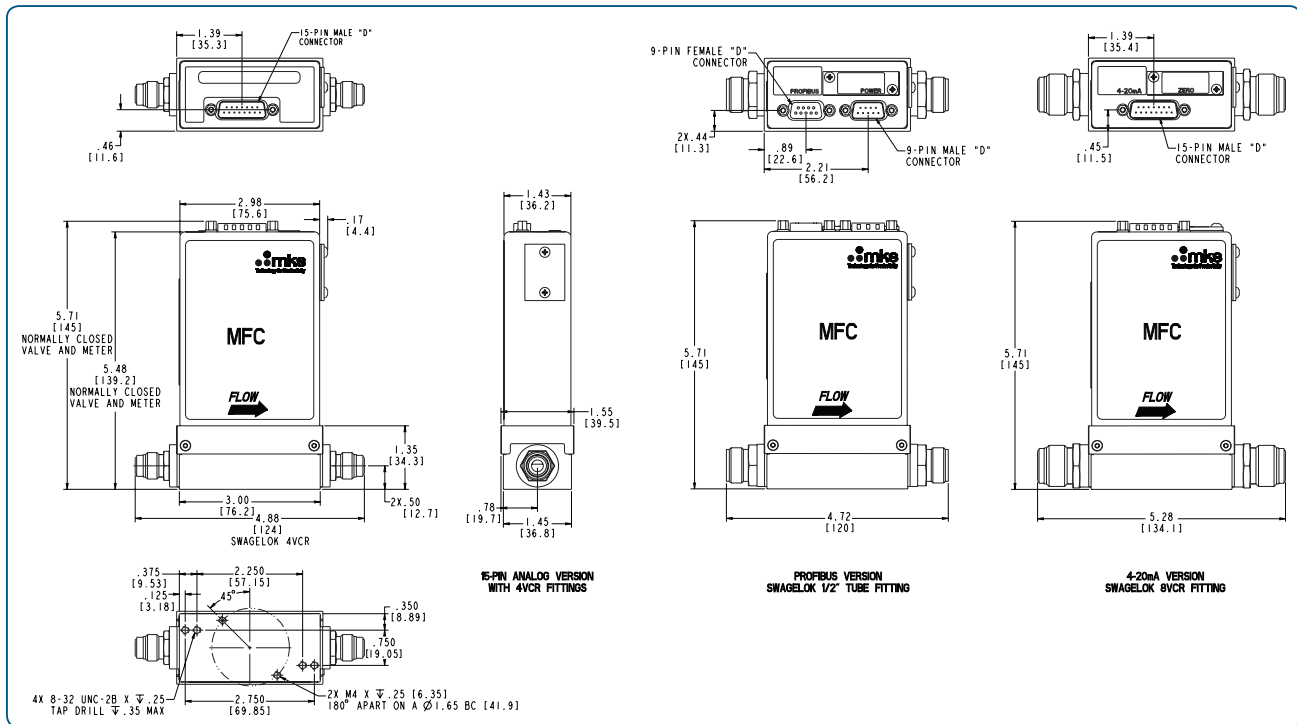
Up to 99 nodes

Master/slave

LED Comm (green/red)

LED Error (green/red)

CE



Dimensional Drawing —

Note: Unless specified, dimensions are nominal values in inches (mm referenced).



Ordering Information

| Ordering Code Example: IM100A008654KHME020 | Code | Configuration |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------|
| MFC Mass Flow Controller IM100A | IM100A | IM100A |
| Gas (Per Semi Standard E52-0703) | | |
| For example: 008 = Air 013 = Nitrogen = N ₂ 029 = Ammonia = NH ₃ | 008 013 029 | 008 |
| Flow Range Full Scale* | | |
| 50000 sccm 65000 sccm 75000 sccm 100000 sccm | 504 654 754 105 | 654 |
| Fittings (compatible with) | | |
| 10mm Swagelok 12mm Swagelok 1/2" Swagelok 3/8" Swagelok Swagelok 4 VCR male (high flow) Swagelok 8 VCR male Swagelok 8 VCO male (Consult Factory) KF-16 (Consult Factory) | P F K J R T D U | K |
| Connector | | |
| Profibus (1179B compatible) Analog 0 to 5 VDC (15 pin D connector) Analog 4 to 20 mA (15 pin D connector) Analog 0 to 5 VDC (15 pin D Connector), Brooks (Consult Factory) Analog 0 to 5 VDC (15 pin D Connector), Celerity (Consult Factory) | 4(3) B H E U | H |
| Valve/Device Type | | |
| Normally Closed Mass Flow Meter | M 3 | M |
| Seal Materials** | | |
| EPDM (FDA Compliant) (Consult Factory) EPDM Valve Plug Viton (FDA Compliant) (Consult Factory) Buna Valve Plug Neoprene Valve Plug Viton Valve Plug No Valve (MFM Option) | R E W B N V 0 | E |
| Reserved | | |
| Reserved | 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 FS 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

605 is 6.0 x 10⁵ or 60000 sccm

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



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