

IM50A

IP66, Digital Mass Flow Controller



The IM50A, a general purpose metal-sealed MFC, is well suited for harsh environments where resistance to liquid or dust ingress is critical. The IM50A meets these requirements due to its IP66 enclosure design.

The IM50A supports a wide variety of applications requiring flow control capability from 1 slm to 50 slm Full Scale, N₂ equivalent. Along with a well-proven, patented thermal sensor and mechanical design, the IM50A features the latest in digital flow control electronics.

The IM50A 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 IM50A 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 50 slm, N₂ equivalent. The IM50A 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).

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
- 10μ inch electropolished 316L surface finish enables MFC use for high purity applications
- Choice of digital (Profibus) or analog (0 to 5 VDC or 4 to 20 mA) I/O
- IP66 rated enclosure provides protection against ingress of water and dust present in harsh environments



Key Benefits

- Patented thermal sensor design provides exceptional zero stability
- Percent of set point accuracy (calibration gas) enables precise process control

Specifications

Performance

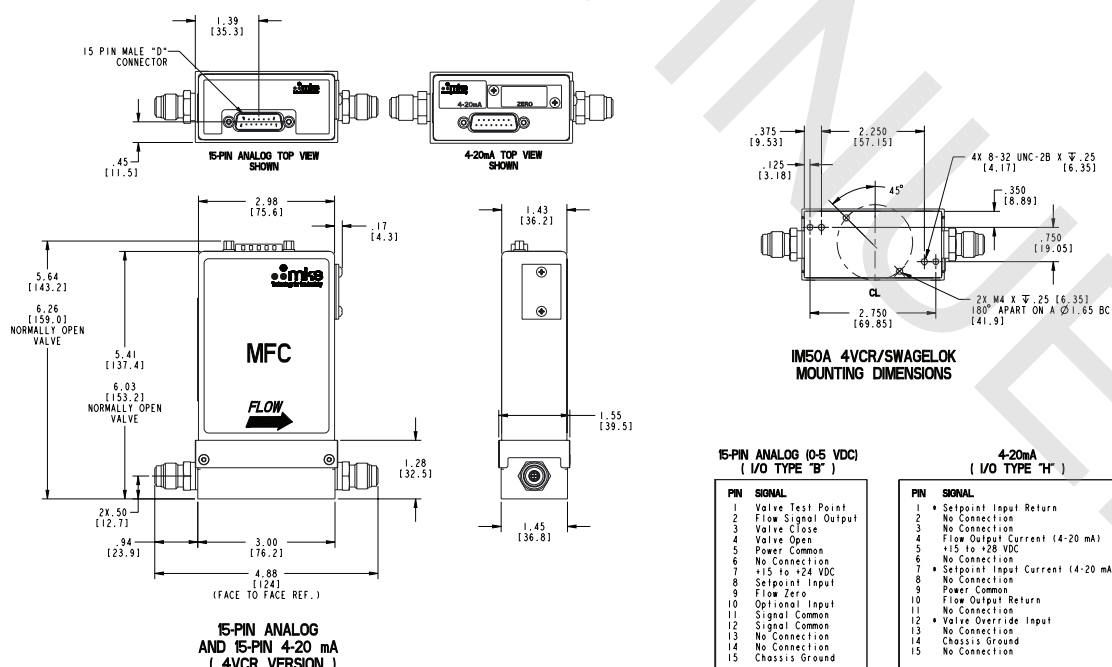
Full Scale Flow Ranges (N ₂ equivalent)		5 - 50000 sccm
Maximum Inlet Pressure	MFC MFM	<ul style="list-style-type: none"> 150 psig (can not exceed pressure differential requirement across MFC) 500 psi
Normal Operating Pressure Differential (N ₂ Full Scale) (with atmospheric pressure at the MFC outlet)		<ul style="list-style-type: none"> 5 to 5000 sccm; 10 to 40 psid 10000 to 20000 sccm; 15 to 40 psid 30000 to 50000 sccm; 25 to 40 psid
Proof Pressure		1000 psig
Burst Pressure		1500 psig
Control Range		2% to 100% of Full Scale (range on mech.)
Typical Accuracy (with N ₂ calibration gas)		<ul style="list-style-type: none"> ±1% of Reading for 20 to 100% Full Scale ±0.2% of Full Scale for 2 to 20% Full Scale ±1% of Reading for meters
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
Typical Controller Settling Time (per SEMI Guideline E-17-0600)		<750 msec., typical above 5% Full Scale
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) Through Closed Valve	<ul style="list-style-type: none"> <1 x 10⁻¹⁰ <1.0% of Full Scale at 40 psig inlet to atmosphere (To assure no flow-through, a separate positive shut-off valve is required.)
Wetted Materials	Standard Valve Seat (MFC only)	<ul style="list-style-type: none"> 316L S.S. VAR (equivalent to 316 S.S. SCQ for semiconductor quality), 316 S.S., Elgiloy®, Nickel, KM45 Teflon®
Surface Finish	MFC MFM	<ul style="list-style-type: none"> 10μ inch average Ra (electropolished) 16μ inch average Ra
Weight		<3 lbs (1.4kg)
Enclosure Rating		IP66

Electrical Analog I/O

Input Power Required	+15 to +24 VDC @ (<4 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	
Profibus®	
Input Power Required	+15 to +24 VDC (<4 watts)
Connector	<ul style="list-style-type: none"> • 9 pin Type D male (power) • 9 pin Type D female (comm.)
Data Rate Switch/Selection	<ul style="list-style-type: none"> • No switch • Set data rate via Profibus
Comm. Rate(s)	9.6 Kbps to 12 Mbps
MAC ID Switches/Addresses	2 switches, 10 positions
Network Size	Up to 99 nodes
Visual Indicators	<ul style="list-style-type: none"> • LED Comm (green/red) • LED Error (green/red)
Compliance	CE



Dimensional Drawing — Analog 15 pin D for either 0 to 5 VDC or 4 to 20 mA I/O shown above with VCR fittings*

*(See manual for additional I/O and fitting types)

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

Ordering Information

Ordering Code Example: IM50A013502RBM020	Code	Configuration
Model		
MFC Mass Flow Controller IM50A	IM50A	IM50A
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 (1480 Compatible) Profibus (1179B Compatible) Analog 0 to 5 VDC (15 pin D connector) Analog 4 to 20 mA (15 pin D connector)	4 3 B H	B
Valve/Device Type		
Normally Closed/Mass Flow Controller, Teflon® No Valve/Mass Flow Meter Normally Open/Mass Flow Controller, Teflon	M0 30 PT	M0
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 2.5×10^4 or 25000 sccm 153 is 1.5×10^3 or 1500 sccm 601 is 6.0×10^1 or 60 sccm

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