

IE250A

IP66 Rated, Elastomer Sealed, Digital Mass Flow Controller
Flow Rates Up to 250 SLM



The IE250A is a general purpose, elastomer sealed MFC well suited for use in harsh environments where resistance to liquid or dust ingress are critical. The IE250A meets these requirements with its IP66 rated enclosure design. The IE250A incorporates the latest in digital flow control electronics along with a well proven, patented thermal sensor and mechanical design for Full Scale flow rates from 100 to 250 slm, N₂ equivalent. This MFC is available with either analog or digital I/O. The digital control electronics utilize the latest in MKS control algorithms provide fast and repeatable response to set point.

Settling times of 1 to 2 seconds and set point accuracies below 1% of set point outperform those of other typical high flow MFCs. Precise control is maintained down to 2% of the IE250A configured Full Scale flow range. The multi-gas/multi-range capability, along with tight performance

specifications for accuracy, control range, and transient response allow users to minimize inventory of high flow MFC part numbers.

The multi-gas/multi-range feature (along with other custom controls) is accessed through the MFCs embedded diagnostic interface, which requires no special software or hardware to operate. A standard Ethernet cable and JAVA-enabled HTML browser, widely available, are all the tools needed. The critical gas parameters for typical high flow rate gases are already stored on the device. Configuring the device is simply a matter of selecting the gas from a drop down menu and specifying the desired Full Scale flow range. The diagnostic interface also allows the user to perform routine device health checks, plot flow response, and store operating data for offline analysis.

Product Features

- Fast response to set point change reduces flow stabilization time for short process steps, enhancing process throughput
- Tightly controlled flow accuracy of process gas enables improved process matching
- Reduced inlet pressure (pressure drop) requirement simplifies gas supply regulation from a single source
- Reduces MFC inventory through its multi-gas/multi-range capability
- Accurate flow control over a wide dynamic range, even when down ranged, reduces need for an additional low range MFC



Key Benefits

- Device configuration and diagnostics made simple through standard Ethernet interface
- Uses a standard web browser with no special software required

Specifications

Performance

Full Scale Range (N ₂ equivalent)		100 to 250 slm
Maximum Inlet Pressure	MFC/MFM	150 psig (can not exceed pressure differential requirement across MFC)
Normal Operating Pressure Differential (with atmospheric pressure at the MFC outlet)		30 to 55 psid (dependent on fitting type)
Burst Pressure		1500 psig
Control Range		2% to 100% of Full Scale (range on mech.)
Typical Accuracy		±1% of set point for > 20% to 100% Full Scale ±0.25% of Full Scale for 5% to 20% Full Scale
Repeatability		±0.5% 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		<0.03% of Reading/psi or less
Typical Controller Settling Time		1 to 2 seconds typical above 10% Full Scale @ 50 psi
Warm-up Time		1 hour
Operating Temperature Range (Ambient)		10°C to 50°C
Storage Humidity		0 to 95% relative humidity, non-condensing
Storage Temperature		-20° to 65°C (-4° to 149° F)

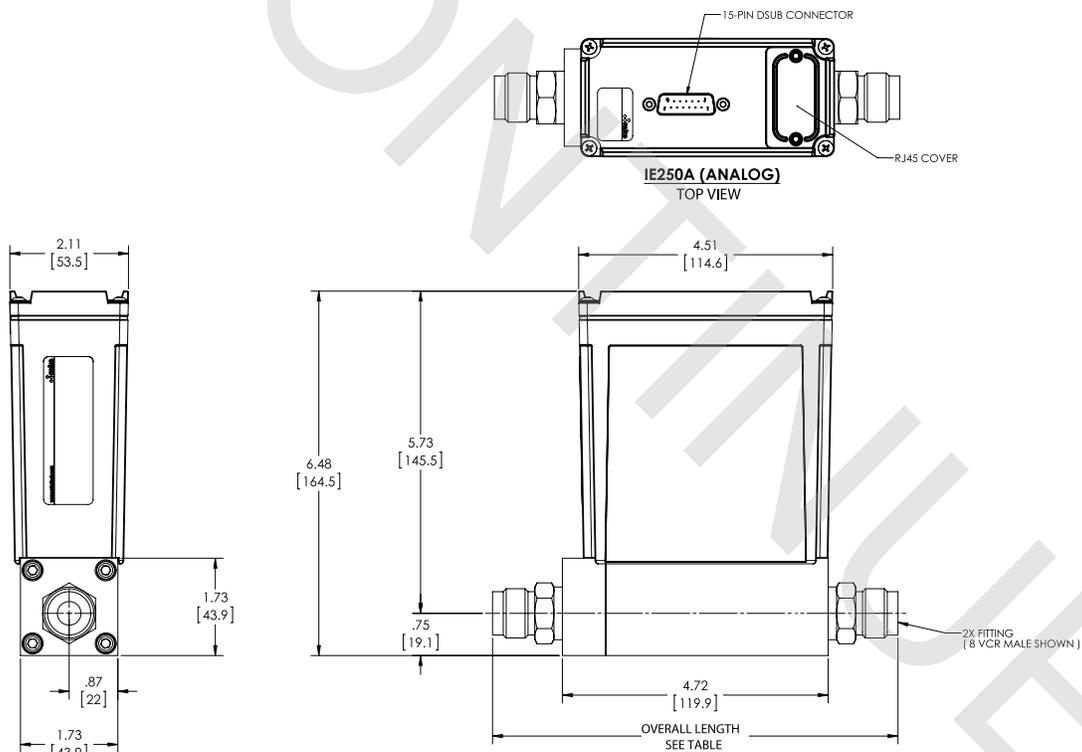
Mechanical

Fittings (compatible with)		8 VCO® male, ½" NPT female, ½" Compression, 8 VCR® male, 12 mm Swagelok, ⅜" Swagelok, W-seal, ½" Compression Long, 8 VCR Male Long, 8 VCO Male Long
Leak Integrity	External (scc/sec He) Through Closed Valve	<ul style="list-style-type: none"> • <1 x 10⁻⁹ • < 1.0% Full Scale at 40 psia to vac (<500 mTorr) (To assure no flow-through, a separate positive shut-off valve is required.)
Wetted Materials		316L S.S. 17-7 S.S., Elgiloy®, 430FR
Seal Options		<ul style="list-style-type: none"> • Viton® • Buna • Neoprene® • EPDM • Viton (USP Class VI Compliant)
Surface Finish	MFC/MFM	16μ inch average Ra
Weight		<4.5 lbs (2.05 kg)
Enclosure Rating		IP66

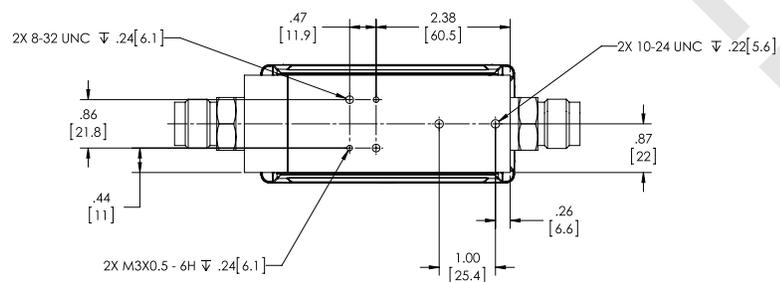
Electrical Analog I/O

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 • 15 pin Type "D" male
Compliance		CE

Digital I/O	Profibus®	PROFINET®
Input Power Required	+15 to +24 VDC (< 4 watts)	+24 VDC (< 5 watts)
Connector	<ul style="list-style-type: none"> • 9 pin Type D male (power) • 9 pin Type D female (comm.) 	2 x RJ-45 (comm.) male, M8 male, 5 pin (power)
Data Rate Switch/Selection	<ul style="list-style-type: none"> • No switch • Set data rate via Profibus 	No switch
Comm. Rate(s)	9.6 Kbps to 12 Mbps	100 Mbps
MAC ID Switches/Addresses	2 switches, 10 positions	N/A
Network Size	Up to 99 nodes	N/A
Visual Indicators	<ul style="list-style-type: none"> • LED Comm (green/red) • LED Error (green/red) 	<ul style="list-style-type: none"> • LED Maint (amber) • LED BUS Fault (red) • LED Ready (green) • LED Sys Fault (red)
Compliance	CE	• CE



Fitting Code	Fitting Name	Overall Length
D	8 VCO Male	6.78"
M	½" NPT Female	7.36"
S	½" Compression	6.35"
T	8 VCR Male	7.20"
H	9/16-18 UNF	6.22"
W	½" Compression Long	8.25"
L	8 VCR Male Long	8.63"
J	¾" Compression	6.34"
F	12mm Compression	6.34"
Q	8 VCO Male Long	8.31"



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: IE250A013255TBV0020				Code	Configuration
Model					
MFC High Flow Mass Flow Controller (multi-gas, multi-range)				IE250A	IE250A
Gas*					
Name	Code	Formula	Min/Max Full Scale (slm)		
Helium	001	He	140 to 350	001	013
Argon	004	Ar	140 to 250	004	
Hydrogen	007	H ₂	100 to 250	007	
Air	008	Air	100 to 250	008	
Nitrogen	013	N ₂	100 to 250	013	
Flow Range Full Scale**					
250 slm (250,000 sccm)				255	255
Fittings (compatible with)					
12 mm Swagelok				F	T
3/8" Swagelok				J	
1/2" tube compression				S	
1/2" Compression Long				W	
1/2" NPT female				M	
8 VCR Male				T	
8 VCO Male				D	
8 VCR Male Long				L	
8 VCO Male Long				Q	
W-Seal				H	
Connector (Power & Control I/O)					
Profibus® (1480 Compatible)				4	B
Profibus (1179B Compatible)				3	
PROFINET				9	
15 pin D (Analog 0 to 5 VDC I/O)				B	
15 pin D (4 to 20 mA I/O)				H	
Seal Material					
Viton				V	V
Buna				B	
Neoprene				N	
EPDM				E	
Viton (USP Class VI Compliant)				W	
Valve/Device Type					
Normally Closed				0	0
Mass Flow Meter				3	
Reserved for MKS Future Use					
Standard				0	0
Firmware					
Unless otherwise specified, MKS will ship firmware revision current to date.				20	20

* For gases not listed in the standard products gas table, please contact the MKS applications department for assistance.

** 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: 255 is 2.5 x 10⁵ sccm or 250 slm; 105 is 1.0 x 10⁵ sccm or 100 slm