

IE500A

Industrial Mass Flow Controller, Flow Rates Up to 500 SLM
IP66 Rated, Multi-Gas/Multi-Range



The IE500A mass flow controller is an elastomer-sealed, multi-gas/multi-range MFC designed for use in harsh environments where resistance to liquid and dust ingress are essential. Applications include those where “hose down” may be required, such as industrial glass production where moisture and particulates are present. With its IP66 rated enclosure, the IE500A meets the stringent requirements of these aggressive environments.

The IE500A is capable of being ranged from 250 to 500 slm (N₂ equivalent). The broad flow range is enabled by the MFC’s unique control valve design, which responds rapidly to set point changes while maintaining closed conductance leak rates that are well below competitive high flow MFCs.

Settling times of 2 to 3 seconds and set point accuracies below 1% of set point exceed those of other typical high flow MFCs. Precise control is maintained down to 2% of the IE500A 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

- IP66 rated enclosure provides protection against ingress of water and dust present in harsh environments
- 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)		250 - 500 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)		40 to 50 psid (dependent on fitting type)
Burst Pressure		1500 psig
Control Range		2% to 100% of Full Scale (range on mech.)
Typical Accuracy		<ul style="list-style-type: none"> • ±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
Typical Controller Settling Time		<3 sec 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)

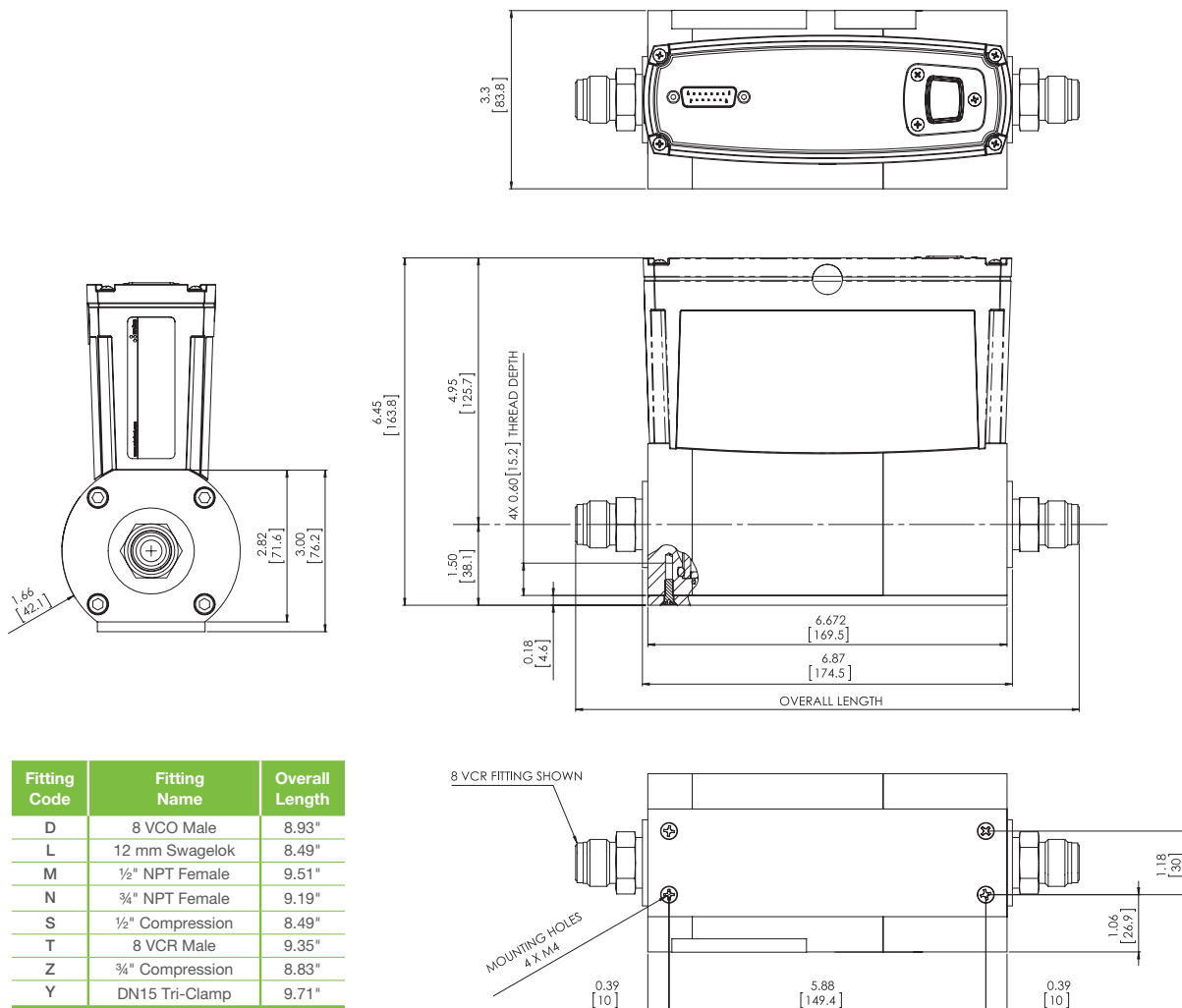
Mechanical

Fittings (compatible with)		Swagelok® 8 VCR® male, 8 VCO® male, ½" tube compression, 12 mm tube compression, ¾" tube compression, ½" NPT female, ¾" NPT female, consult factory for availability for Swagelok 12 VCR male and 12 VCO male
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., Elgiloy®, 430FR, PTFE
Seal Options		<ul style="list-style-type: none"> • Viton® • Buna • Neoprene® • EPDM • Viton (USP Class VI Compliant)
Surface Finish	MFC/MFM	20µ inch average Ra
Weight		<12.7 lbs (5.8 kg)
Enclosure Rating		IP66

Electrical Analog I/O

Input Power Required		+15 to +24 VDC @ (<8 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



Unless otherwise specified, dimensions are nominal values in inches (mm referenced). *See manual for additional I/O and fitting types. x.xx = ±0.020 tolerance

Ordering Information

Ordering Code Example: IE500A013505TBV020				Code	Configuration
Model					
MFC High Flow Mass Flow Controller (multi-gas, multi-range)				IE500A	IE500A
Gas*					
Name	Code	Formula	Min/Max Full Scale (slm)		
Helium	001	He	350 to 700	001	013
Argon	004	Ar	250 to 500	004	
Hydrogen	007	H ₂	250 to 500	007	
Air	008	Air	250 to 500	008	
Nitrogen	013	N ₂	250 to 500	013	
Flow Range Full Scale**					
500 slm (500,000 sccm)				505	505
Fittings (compatible with)					
12 mm tube compression				L	T
½" tube compression				S	
¾" tube compression				Z	
½" NPT female				M	
¾" NPT female				N	
8 VCR Male				T	
8 VCO Male				D	
Connector (Power & Control I/O)					
Profibus				4	B
PROFINET				9	
15 pin D (Analog 0 to 5 VDC I/O)				B	
15 pin D (4 to 20 mA I/O)				G	
Seal Material					
Viton				V	V
Buna				B	
Neoprene				N	
EPDM				E	
Valve/Device Type					
Standard				0	0
MFM				3	
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