mks
Technology for Productivity

Type GE50A

ELASTOMER SEALED, DIGITAL MASS FLOW CONTROLLER

The GE50A is a general purpose, elastomer sealed MFC well suited for a wide variety of applications requiring flow control capability from 10 sccm to 50 slm FS, N_2 equivalent. The GE50A incorporates the latest in digital flow control electronics along with a well proven, patented thermal sensor and mechanical design.

The GE50A digitally controlled MFC is available with either RS485 or DeviceNet I/O. The digital control electronics utilize the latest in MKS control algorithms providing fast and repeatable response to setpoint throughout the device control range. Typical response times are on the order of 500 milliseconds. Included is a digital calibration that yields 1% of setpoint accuracy on the calibration gas. The I/O protocols are designed so that the GE50A can easily replace the RS485 and DeviceNet versions of the 1179A with minor coding required.

The GE50A utilizes the standard 3-inch footprint most often used by MFCs in the 10 sccm to 50 slm flow rate range enabling its use without the need to modify existing gas line configurations. The design of the GE50A incorporates a minimal use of elastomers. There is only one external elastomer seal and elastomer valve plug. Otherwise, all wetted surfaces are of metal. The GE50A comes standard with Viton® seals along with options for Buna, Neoprene® or Kalrez® allowing for the device's use with gases requiring one of these alternatives.

Features & Benefits

- Patented thermal sensor design provides exceptional zero stability
- Percent of setpoint accuracy (calibration gas) enables precise process control
- 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
- Compatible RS485 and DeviceNet™ profiles allow the GE50A to replace its 1179A counterparts
- CE Mark and RoHS Compliance – meeting requirements for the European Union

US Patent No 5461913.

Flow Measurement & Control

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Performance

Full Scale Flow Ranges *(N_2 equivalent)*	10 - 50000 sccm (consult factory for available flow ranges)
Maximum Inlet Pressure	150 psig (can not exceed pressure differential requirement across MFC)
Normal Operating Pressure Differential *(N_2 F.S.)* *(with atmospheric pressure at the MFC outlet)*	10 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 F.S. (range on mech.)
Typical Accuracy *(with N_2 calibration gas)*	± 1% of setpoint 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	< 500 msec., typical above 5% F.S.
(per SEMI Guideline E-17-0600)	
Warm-up Time	< 30 min
(to within 0.2% of F.S. of steady state performance)	
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 149° F)

Mechanical

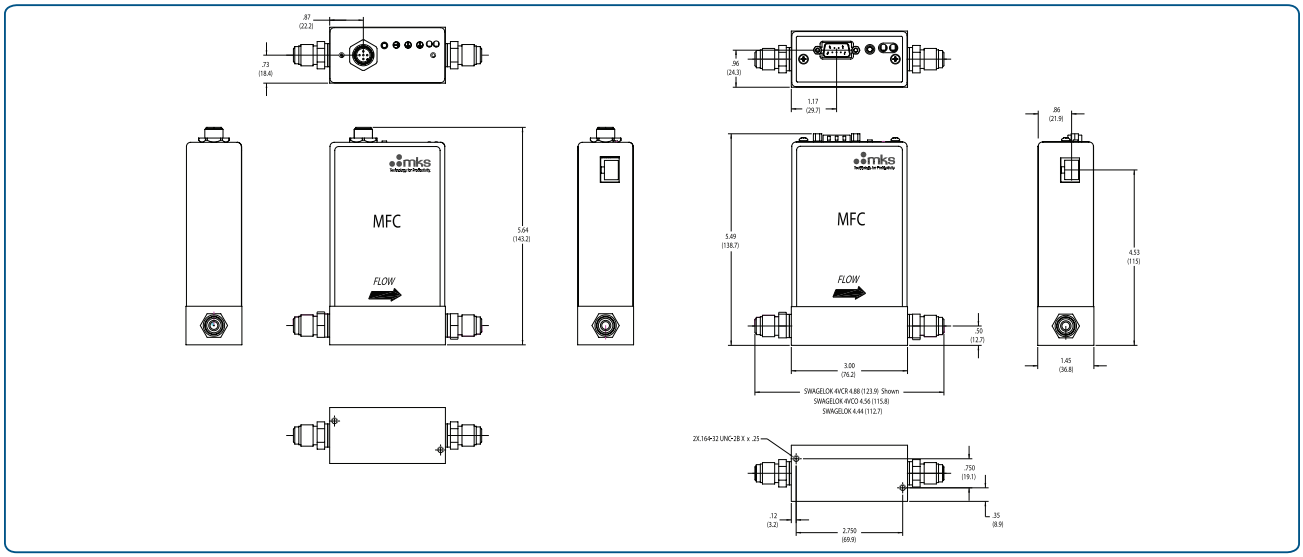
Fittings *(compatible with)*	Swagelok® 4 VCR®, Swagelok VCO®, or Swagelok
Leak Integrity	
External (scc/sec He)	< 1 x 10^{-09}
Through closed valve	Up to 10K valve <0.1% of FS at 40 psig to atmosphere 20K - 50K valve <1.0% of FS at 40 psig to atmosphere (To assure no flow-through, a separate positive 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
Seals and Valve Seat	Viton, Buna-N, Neoprene
Surface Finish	16µ inch average Ra
Weight	less than 3 lbs (1.4kg)

Specifications (cont'd)

Digital I/O CE Compliant to EMC Directive 2004/108/EC

Digital I/O	DeviceNet™	RS-485
Input Power Required	+11 to +25 VDC per DeviceNet specification (@ <3.5 watts)	+15 to +24 VDC @ 350mA max
Connector	5 pin microconnnector (DeviceNet)	9 pin Type D male
Data Rate Switch	4 positions: 125, 250, 500K (Default), PGM (programmable over the network)	9.6, 19.2, 38.4K (Default) Set Data Rate via RS485
Data Rate/Network Length	Data Rate (User Selectable) 125 Kbps, 500 meters (1,640 feet) 250 Kbps, 250 meters (820 feet) 500 Kbps, 100 meters (328 feet)	Data Rate (User Selectable) 9.6 Kbps, 1200 meters (4,000 feet) 19.2 Kbps, 1200 meters (4,000 feet) 38.4 Kbps, 1200 meters (4,000 feet)
MAC ID Switches/Addresses	2 switches, 10 positions; 0,0 to 6,3 are hardware ID numbers; 7,0 to 9,9 are software ID numbers; (6,4 to 6,9 are unused and, if selected will default to hardware ID number 6,3)	Set address over RS485 Available MAC ID's are 3,2 to 9,9.
Network Size	Up to 64 nodes	Up to 32 nodes
Network Topology	Linear (trunkline/dropline) power and signal on same network cable	Master/slave
Visual Communication Indicators	LED network status (green/red) LED module status (green/red)	LED Comm (green/red) LED Error (green/red)

Dimensional Drawing



Dimensional Drawing — RS-485 and DeviceNet™ with VCR Fittings

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

Ordering Information

Ordering Code Example: GE50A013502R6V010	Code	Configuration
Type MFC Mass Flow Controller GE50A	GE50A	GE50A
Gas (Per Semi Standard E52-0703)		
For example: 013 = Nitrogen = N_2 029 = Ammonia = NH_3 110 = Sulfur Hexafluoride = SF_6	 013 029 110	013
Flow Range Full Scale*		
10 sccm	101	502
20 sccm	201	
50 sccm	501	
100 sccm	102	
200 sccm	202	
500 sccm	502	
1000 sccm	103	
2000 sccm	203	
5000 sccm	503	
10000 sccm	104	
20000 sccm	204	
30000 sccm	304	
50000 sccm	504	
Fittings *(compatible with)*		
Swagelok 4 VCR male	R	R
Swagelok 4 VCO male	G	
¼" Swagelok	S	
Connector		
DeviceNet™	6	6
RS485 (uses 9 pin connector)	5	
Profibus™	4	
Seal Materials**		
Viton	V	V
Buna-N	B	
Neoprene	N	
Reserved for MKS Future Use		
Standard	0	0
Firmware		
Unless otherwise specified, MKS will ship firmware revision current to date	10	10

* The Full Scale Flowrate 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 Flowrate code:
254 is 2.5 x 10^4 or 25000 sccm
153 is 1.5 x 10^3 or 1500 sccm
601 is 6.0 x 10^1 or 60 sccm

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

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