

Flow Solutions

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1179C

GENERAL PURPOSE MASS-FLO® CONTROLLER

The 1179C is a general purpose mass flow controller designed to measure and control the flow of gases in a wide variety of applications. The 1179 Mass-Flo® controllers are available with Full Scale ranges from 10 sccm to 20 slm, providing fast, repeatable flow control to as low as 0.2 sccm. It can also be used as a pressure controller when connected to a suitable pressure transducer.

The 1179C is a direct form-fit-function replacement for the most common MFCs on the market today. The standard 3-inch footprint enables the 1179C to drop directly into the same space without modifying existing gas lines. Electrical connectors are the same Type "D" connectors, with the same pin-outs, signals, and functions as their industry counterparts, so no cable or connector rewiring is necessary. The 1179C is compatible with MFC power supply and display electronics from MKS or other manufacturers.

Features & Benefits

For Demanding Processes

- Patented[1] sensor design provides exceptional zero stability
- Full Scale flow ranges from 10 sccm to 20 slm for precise and repeatable flow measurement and control
- Percent of Full Scale accuracy for analog configurations
- Fast warm-up time minimizes expensive production downtime
- Compatible with earlier MKS MFC and power supply/readout modules

Robust, Reliable Design

- Rigorous design and testing includes MTBF analysis and STRIFE testing to ensure long-term performance
- Surface finish of wetted stainless surfaces, cleanroom processing, and minimal use of elastomer seals enable use in demanding clean processes
- Two year warranty ensures quality and customer satisfaction

[1]U.S. Patent No. 5461913. Foreign Patents Pending.

The 1179C employs the latest design thermal sensor for mass flow measurement, with a fast acting proportioning valve and control circuitry, in a compact industry-standard package. The 1179C is constructed of 316L stainless steel finished to <32 max. microinches Ra, with minimal use of elastomer seals, for the more demanding clean applications. The control valve is normally closed. Security against accidental damage is provided by a proof pressure of 500 psig, and a burst pressure rating of 1500 psig.

Power required for the 1179C is minimal: the nominal ±15 VDC unit consumes only 100 mA during operation (200 mA at initial turn-on). Fast warm-up (<2 minutes) makes the 1179C ideal for production applications where MFC replacement often results in expensive downtime.

Performance and reliability have been designed into the 1179C, and ensured through rigorous MTBF analysis and extensive STRIFE testing. The 1179C complies with IEC-801 specifications for tolerance to ESD (electro static discharge) and RFI (radio frequency interference) environments. Zero and span drift are minimal with MKS's new patented sensor, as shown by the graph below. The 1179C also complies with European CE Mark requirements. As a statement of our confidence in the performance of the 1179C, it carries a two-year warranty.

Size, compatibility, cleanliness, reliability, and low cost make the MKS 1179C MFC the ideal choice for the more demanding flow control applications.

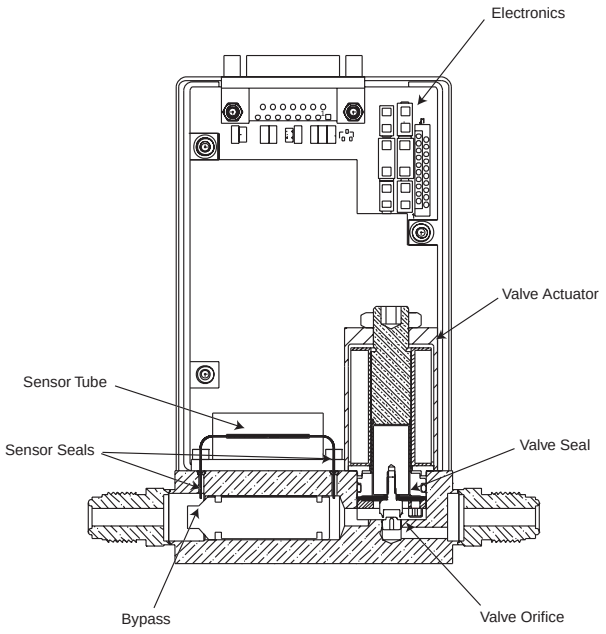
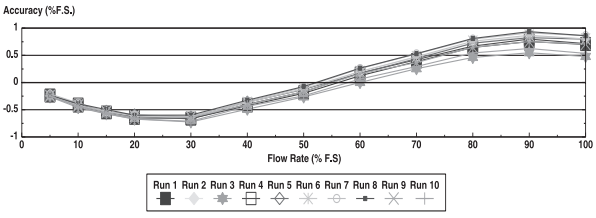
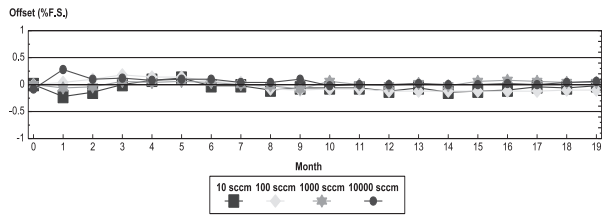


Figure 1 —
A cross section diagram of a 1179C Mass-Flo Controller.



Flow Accuracy and Repeatability —
The above graph shows the typical flow accuracy and repeatability of analog MFCs in the 1179C family. Measurements were made using the MKS Instruments Califlow® Primary Standard Flow Calibrator over a 10 day period.



Zero Stability —
The above graph shows the excellent zero and span stability of the 1179C sensor used in the 1179 family. The instruments were powered on and randomly tested for zero and span drift over a 19 month period.

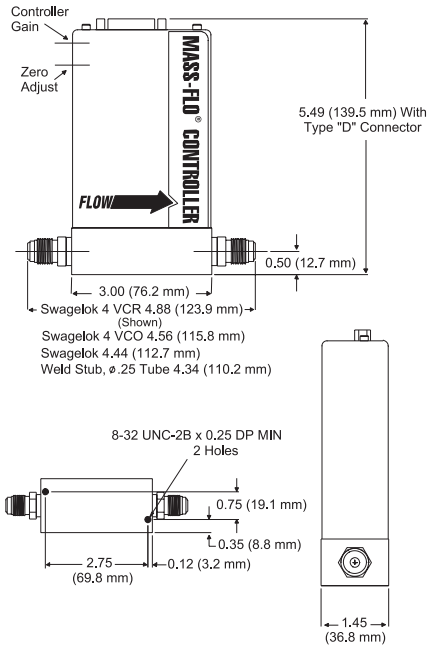
Specifications

Full Scale Ranges (N_2 equivalent)	10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000 sccm
Maximum Inlet Pressure	150 psig
Normal Operating Pressure Differential (with atmospheric pressure at the MFC outlet)	
10 to 5000 sccm	10 to 40 psid
10000 to 30000 sccm	15 to 40 psid
Control Range	2% to 100% of F.S.
Accuracy (analog) (including non-linearity, hysteresis, and non-repeatability referenced to 760 mmHg and 0°C)	±1.0% of F.S.
Repeatability	±0.2% of F.S.
Resolution	0.1% of F.S.
Temperature Coefficients	
Zero	<0.05% of F.S./°C
Span	<0.08% of Rdg./°C
Warm-up Time (to within 0.2% of F.S. of steady state performance)	<2 min
Controller Settling Time (per SEMI Guideline E17-91)	<2 sec
Pressure Coefficient	<0.02% of Rdg./psi
Normal Operating Temperature Range	0°C to 50°C
Input Voltage Required	
Max. current at start-up (first 2 sec)	±15 VDC (±5%) @ 200 mA
Typical current at steady state	±15 VDC (±5%) @ 100 mA
Set Point Command Signal	0 to 5 VDC from <20K Ω
Output Signal	0 to 5 VDC into >10K Ω
Output Impedance	<1 Ω
Connector Types	
Analog	9-pin or 15-pin Type “D” *(The 15-pin Type “D” connector is electronically compatible with other MKS flow controllers. Consult Applications Engineering for details.)*
Wetted Materials	
Standard	316L S.S., Viton®, nickel
Optional (seals and valve seat)	Buna-N, Neoprene®, Kalrez®
Leak Integrity	
External (scc/sec He)	<1 x 10^{-9}
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 recommended.)
Fittings (compatible with)	Swagelok® 4 VCR®, Swagelok® 4 VCO®, ¼" Swagelok®
Compliance	CE

Ordering Information

SEMI Gas Codes

SEMI Gas Code	Name	Symbol	Maximum FS, sccm	Flow Rate
001	Helium	He	30,000	34C
004	Argon	Ar	30,000	34C
007	Hydrogen	H_2	20,000	24C
008	Air	--	20,000	24C
013	Nitrogen	N_2	20,000	24C
015	Oxygen	O_2	20,000	24C
019	Chlorine	Cl_2	10,000	14C
025	Carbon Dioxide	CO_2	10,000	14C
028	Methane	CH_4	10,000	14C
029	Ammonia	NH_3	10,000	14C
039	Silane	SiH_4	10,000	14C
042	Acetylene	C_2H_2	10,000	14C
110	Sulfur HexaFluoride	SF_6	5,000	53C



Dimensional Drawing —

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

Ordering Code Example: 1179C00412CR1BV	Code	Configuration
1179C Mass-Flo Controller	1179C	1179C
Gas To Be Calibrated For: (SEMI Gas Code) *See table for additional options*		
Helium	001	004
Argon	004	
Hydrogen	007	
Nitrogen	013	
Oxygen	015	
Flow Rate To Be Calibrated for SCCM (Maximum 20000 SCCM N_2 Equivalent)		
10	11C	12C
20	21C	
50	51C	
100	12C	
200	22C	
500	52C	
1000	13C	
2000	23C	
5000	53C	
10000	14C	
20000	24C	
Fittings (compatible with)		
Swagelok 4 VCR male	R	R
Swagelok 4 VCO male	G	
¼" Swagelok	S	
Valve		
Normally closed	1	1
Connector		
Analog 9-pin Type "D"	A	B
Analog 15-pin Type "D"	B	
Seal Materials		
Viton	V	V
Buna-N	B	
Neoprene	N	
Kalrez	K	
Optional Accessories		
946 Multi-channel power supply/readout/set point control		946
Cabling for 1179C:		
CB147-12-10 to connect 1179C 9-pin Type "D" to 946 and cables		
100016744/45/46 to connect 1179C 15-pin Type "D" to 946 and cables		

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