

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.

Product Features

- 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
- Compatible with earlier MKS MFC and power supply/readout modules
- Rigorous design and testing includes MTBF analysis and STRIFE testing to ensure long-term performance
- Surface finish of wetted stainless surfaces, clean-room processing, and minimal use of elastomer seals enable use in demanding clean processes



Key Benefits

- Patented¹ sensor design provides exceptional zero stability
- Fast warm-up time minimizes expensive production downtime

¹U.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.

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

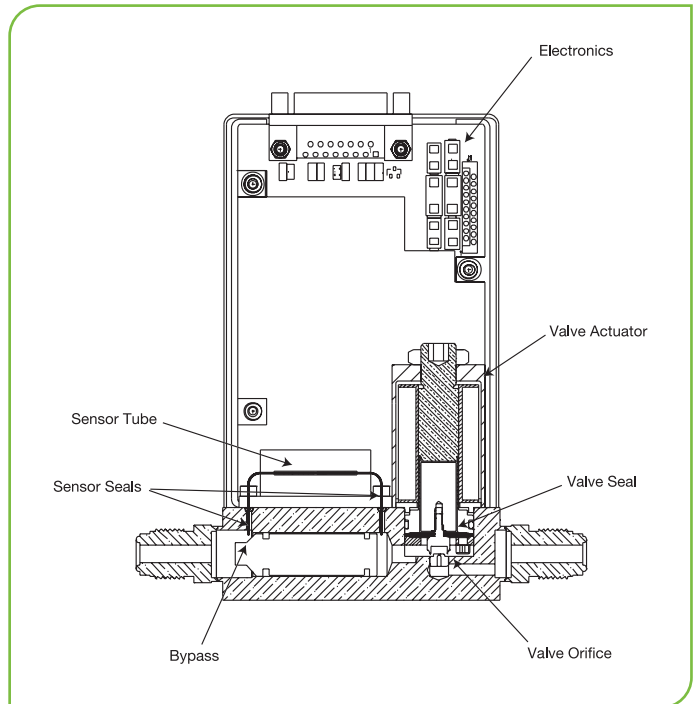
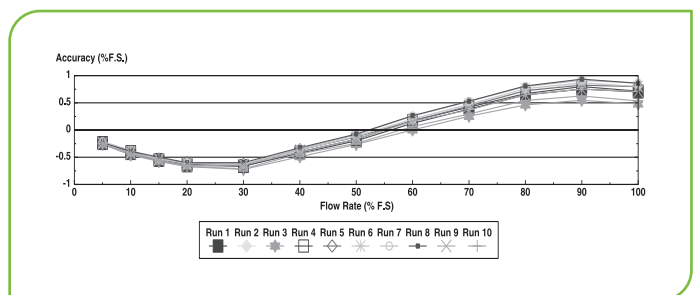
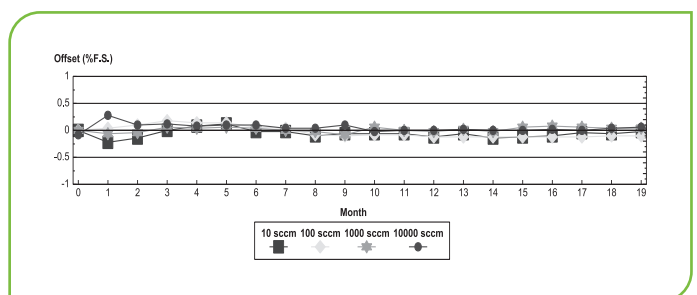


Figure 1 — A cross section diagram of a 1179C Mass-Flo® Controller.



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.

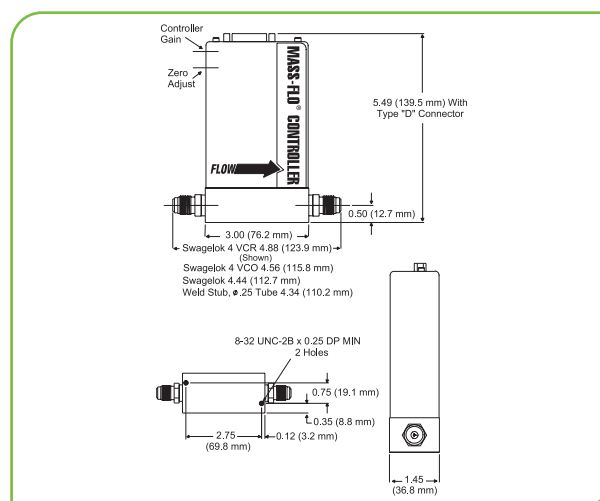


Zero Stability — The above graph shows the excellent zero and span stability of the 1179C sensor used in the 1179 family. The instruments were powered on and randomly tested for zero and span drift over a 19 month period.

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)	<ul style="list-style-type: none"> • 10 to 5000 sccm: 10 to 40 psid • 10000 to 30000 sccm: 15 to 40 psid
Control Range	2% to 100% of Full Scale
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 Reading
Resolution	0.1% of Full Scale
Temperature Coefficients	<ul style="list-style-type: none"> • <0.05% of Full Scale/°C • <0.08% of Reading/°C
Warm-up Time (to within 0.2% of Full Scale of steady state performance)	<2 min
Controller Settling Time (per SEMI Guideline E17-91)	<2 sec
Pressure Coefficient	<0.02% of Reading/psi
Normal Operating Temperature Range	0°C to 50°C
Input Voltage Required Max. current at start-up (first 2 sec) Typical current at steady state	<ul style="list-style-type: none"> • ±15 VDC (±5%) @ 200 mA • ±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	<p>Analog</p> 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	<p>Standard</p> <ul style="list-style-type: none"> • 316L S.S., Viton®, nickel • Buna-N, Neoprene®, Kalrez® <p>Optional (Seals and Valve Seat)</p>
Leak Integrity	<p>External (scc/sec He) Through closed valve</p> <ul style="list-style-type: none"> • <1 x 10⁻⁹ • <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 Code Example: 1179C00412CR1BV	Code	Configuration
Model		
1179C Mass-Flo Controller	1179C	1179C
Gas To Be Calibrated For: (SEMI Gas Code) See table for additional options		
Helium Argon Hydrogen Nitrogen Oxygen	001 004 007 013 015	004
Flow Rate To Be Calibrated For SCCM (Maximum 20000 SCCM N₂ Equivalent)		
10 20 50 100 200 500 1000 2000 5000 10000 20000	11C 21C 51C 12C 22C 52C 13C 23C 53C 14C 24C	12C
Fittings (compatible with)		
Swagelok 4 VCR male Swagelok 4 VCO male 1/4" Swagelok	R G S	R
Valve		
Normally Closed	1	1
Connector		
Analog 9 pin Type "D" Analog 15 pin Type "D"	A B	B
Seal Materials		
Viton Buna-N Neoprene Kalrez	V B N K	V
Optional Accessories		
946 Multi-channel power supply/readout/set point control		
Cabling		
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		

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 ₂ H ₂	10,000	14C
110	Sulfur HexaFluoride	SF ₆	5,000	53C



Dimensional Drawing — Unless otherwise specified, dimensions are nominal values in inches (mm referenced).