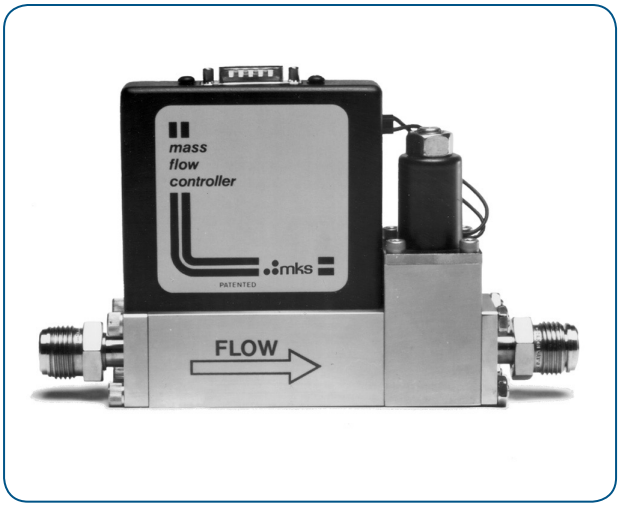


TYPE 1559A

GENERAL PURPOSE MASS-FLO® CONTROLLER

The MKS Type 1559 Mass Flow Controller is designed for general purpose mass flow control applications covering the range from 20 slm (42.5 cfh) to 200 slm (425 cfh).[1] The Type 1559's unique control valve eliminates oscillation and offers better response time as compared to other flow controllers. This is possible through the use of a "balanced force" valve design that automatically neutralizes line pressure-induced imbalances within the control valve.

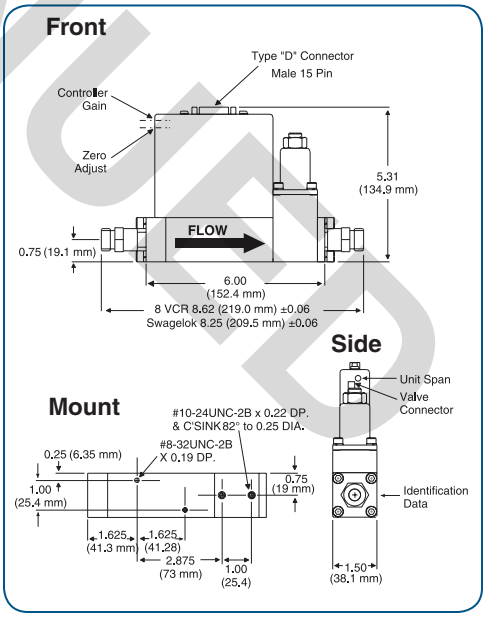
Important operational considerations include fast warm-up, fast response time and 1% F.S. accuracy (Nitrogen). These features are key in minimizing downtime and ensuring the correct gas flow is being delivered to your process at the correct time.

The Type 1559 has excellent RFI protection, and has a noise protection safety feature where the valve closes with a command signal of less than 0.2% of F.S. MKS also offers a complete line of compatible, stand-alone power supply/readout units, including Types 246, 247 and 647.

[1] Standard nitrogen equivalent. For flow rates above 200 slm, contact MKS Applications Engineering.

Features & Benefits

- Full scale ranges from 20 slm to 200 slm (nitrogen equivalent) for a wide variety of high flow applications
- "Balanced force" valve design to minimize oscillation due to line pressure fluctuations
- Fast 30 minute warm-up time to minimize expensive production downtime
- Fast 2 second settling time to achieve desired flows quickly
- Accepts an external pressure input signal (0 - 10 VDC) to allow pressure control mode



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

Flow Solutions

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Specifications and Ordering Information

Full Scale Ranges (N_2 equivalent)	20 slm to 200 slm (Denser gases, such as Argon, may be limited in terms of F.S.)
Maximum Inlet Pressure	100 psig (For higher pressures consult Applications Engineering at 800-227-8766.)
Normal Operating Pressure Differential (with atmospheric pressure at the outlet)	Controller: For 20, 50, 100 slm N_2 – 15 to 40 psid; For 200 slm N_2 – 25 to 40 psid
Control Range	1.0 to 100% of F.S.
Accuracy	±1.0% of F.S. (Includes non-linearity, hysteresis, and non-repeatability referenced to 760 mmHg/0°C. For calibrations with Helium and Hydrogen gas, standard accuracy is 2.0% of F.S.)
Repeatability	±0.2% of F.S.
Resolution (measurement)	±0.1% of F.S.
Temperature Coefficients	
Zero	< 0.05% of F.S./°C
Span	< 0.10% of Rdg./°C
Warm-up Time (to within 0.2% of F.S. of steady state performance)	30 minutes
Controller Settling Time	< 2 seconds (to within 2% of set point)
Meter Response Time	< 500 msec
Pressure Coefficient	0.005% of Rdg./psi
Normal Operating Temp. Range	15°C to 40°C
Input Voltage Required	
Max. at Start-up (first 2 sec.)	Controller: ±15 VDC (±5%) @ 450 mA
Typical at Steady State	Controller: ±15 VDC @ 350 mA
Set Point Command	0-5 VDC from < 20K Ω
Output Signal/Minimum Load	0-5 VDC into > 10K Ω
Output Impedance	< 1 Ω
Connector Type	15-pin Type "D"
Materials Wetted	
Body	316L S.S., nickel
Seals	Standard: Viton® Optional: Neoprene®, Buna-N, Kalrez®
Leak Integrity	
External (scc/sec He)	≤ 10^{-9}
Through closed valve	≤ 1% of F.S. (To ensure no flow-through, a separate shutoff valve is required.)
Fittings	Standard: Swagelok® 8 VCR® male Optional: Swagelok 8 VCO® male, ½" Swagelok®
Electromagnetic Compatibility	Fully EMC Directive 2004/108/EC when used with an overall metal braided shielded cable, properly grounded at both ends

SEMI Gas Codes

SEMI Gas Code	Name	Symbol	Maximum FS, slm	Flow Rate Code
001	Helium	He	200	22L
004	Argon	Ar	200	22L
007	Hydrogen	H_2	200	22L
008	Air	--	200	22L
013	Nitrogen	N_2	200	22L
015	Oxygen	O_2	200	22L
019	Chlorine	Cl_2	100	12L
025	Carbon Dioxide	CO_2	100	12L
028	Methane	CH_4	100	12L
029	Ammonia	NH_3	100	12L
039	Silane	SiH_4	100	12L
042	Acetylene	C_2H_2	100	12L
110	Sulfur HexaFluoride	SF_6	50	51L

Cabling for 1559A:
CB259-5-10 to connect 1559 to 246, 247
(If connecting to more than 2 channels on the 247, an extra power supply like a 260PS is needed. Use CB1559-1-M1.)
CB147-1-10 to connect 1559 to PR4000, 146, 647
CB1559-1-M1 connects 1559, 247D and 260PS

Ordering Code Example: 1559A00421LR1BB	**Code**	**Configuration**
Type 1559 Mass-Flo® Controller	1559A	1559A
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 slm: (Maximum 200 slm N_2 equivalent) *(*See Note)*		
20	21L	21L
50	51L	
100	12L	
200	22L	
**Note: For flow rates above 200 slm, contact Applications Engineering.*		
Fittings		
½" Swagelok	S	R
Swagelok 8 VCR male	R	
Swagelok 8 VCO male	G	
Valve		
Normally Closed (controller)	1	1
Electrical/Communication Connector		
Analog 15-pin D	B	B
Seals		
Viton	V	B
Buna-N	B	
Neoprene	N	
Kalrez	K	

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