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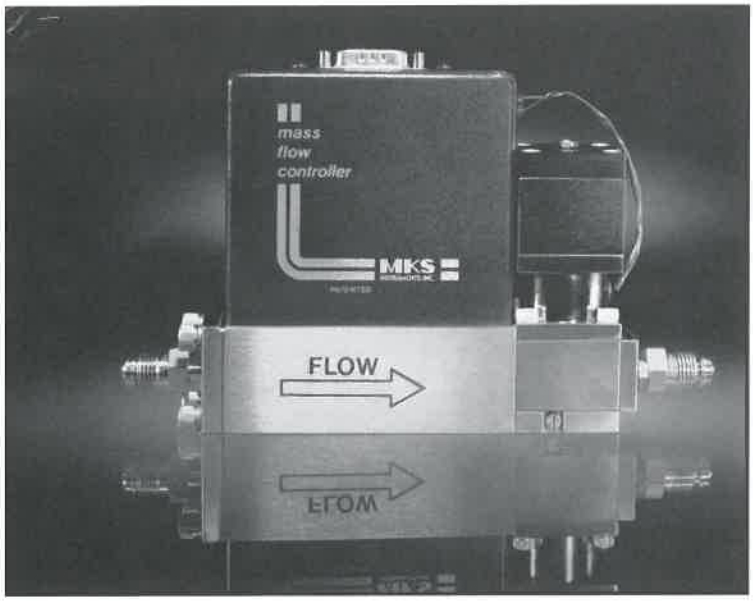
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Find the *MKS Instruments 1449A-01000RM-S* at our website: *Click HERE*

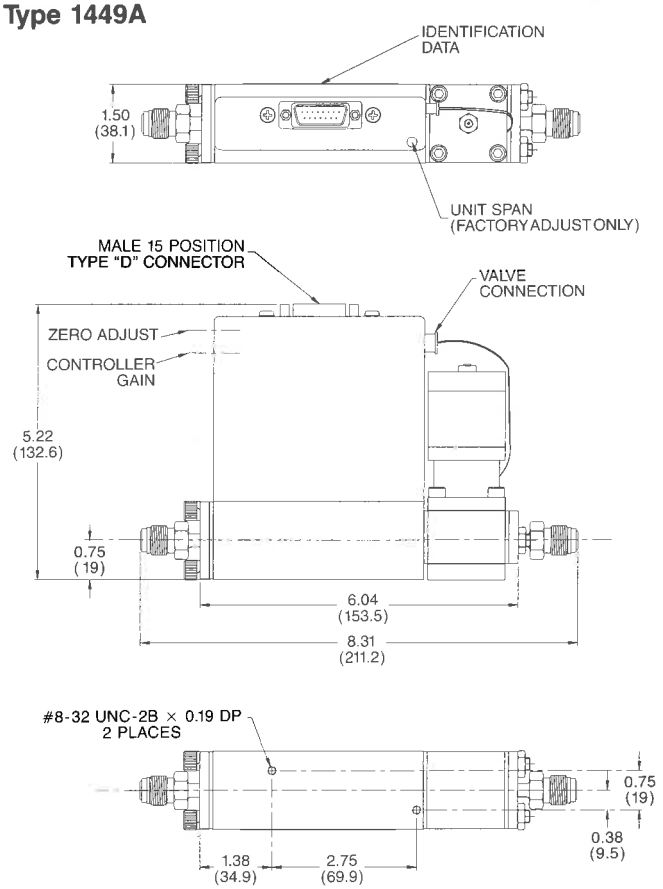
# MKS MASS FLOW CONTROLLER

**MASS-FLO™ TYPE 1449A**
**ALL-METAL MASS FLOW CONTROLLER/SHUT-OFF VALVE**




## DIMENSIONAL DRAWING

**Type 1449A**




## FEATURES AND BENEFITS

- All-metal flow meter, control/shut-off valve
- Eliminates atmospheric permeation, elastomer shut-off valve hysteresis, and gas-filled volume between positive shut-off valve and control valve
- Special stainless steel construction
- Fast response
- Premium flow stability

## DESCRIPTION

The MKS Type 1449 is a unique mass flow controller in that not only are there no elastomer seals used in its construction, but also the controlling valve seat and the positive shut-off seat are one in the same. This means that there are no detectable leaks from the outside world and, when positively shut, there is no flow through the controller ($<1 \times 10^{-10}$ scc/sec. He). As with all other MKS mass flow controllers, our highly stable, patented mass flow sensing technique[1] is used.

The Type 1449 has been designed to meet the needs of ultra-clean silicon and GaAs processing where inside surfaces, materials assembly, and calibration are all of the highest quality available. The MKS Type 149 Control/Shut-Off Valve[2] with its zero dead volume (that volume between controlling and shut-off seats) will in most cases eliminate the need for expensive and complicated back flushing and purging schemes commonly used today.

Combining a metal-sealed shut-off valve with the all-metal control valve provides a simpler and smaller MFC/valve package. The valve has been designed to eliminate dead-volume and reduce surface areas in contact with the gas stream. Valve performance is such that fast flow steps can be easily generated with little or no overshoot, and no pressure/flow bursts occur after having been closed for long periods of time. Use of Type 1449 MFC's can dramatically simplify the gas manifolding, eliminate the permeation of reactive atmospheric gases ($0_2$) through elastomers, and improve the control performance of the entire gas handling system. All-metal seals eliminate problems created by real leaks due to permeation through o-rings.

[1] U.S. Patent No. 4,464,932
[2] Patent Pending

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# SPECIFICATIONS TYPE 1449

## Performance Specifications

| | |
|---|---|
| **Full Scale Ranges** | 100,200,500,1000,2000,5000,10000 sccm |
| **Control Range** | 1.0 to 100% of F.S. (5 sccm minimum) |
| **Accuracy**[1] (including non-linearity) | ±0.5% of F.S. |
| **Repeatability** | ±0.2% of F.S. |
| **Resolution** (measurement) | 0.05% of F.S. |
| **Temperature Coefficients** | |
| **Zero** | <0.02% of F.S./°C (200 ppm) |
| **Span** | <0.10% of Rdg./°C (1000 ppm) |
| **Operating Temperature Range** | 15° to 40°C |
| **Warm-Up Time** | 30 min. |
| **Settling Time** | |
| **0 to set point** | 2 sec. max. to within 2% of set point (1 sec. typical) |
| **Point to point** | 1 sec. max. (600 msec. typical) |
| **Maximum Inlet Pressure**[2] | 150 psig |
| **Pressure Coefficient** | 0.005% of Rdg./psi |
| **Minimum Pressure Drop Required For Full Flow** | 15 psia to vacuum |

## Electrical Specifications

| | |
|---|---|
| **Input Voltage/Current Required** | |
| **Max. at start-up** | ±15 VDC @ 300 mA |
| **Typical at steady state** | ±15 VDC @ 160 mA |
| **Input/Command Signal**[3] | 0–5 VDC from < 20KΩ source |
| **Output Signal/Min. Load** | 0-5 VDC into > 10KΩ |
| **Output Impedance** | < 1Ω |
| **Connector Type** | 15-pin, Type "D", RF shielded |

## Mechanical Specifications

| | |
|---|---|
| **Materials Wetted** | |
| **Standard** | 316LSS, nickel, Inconel, gold, 440SS ball |
| **Optional** | Tungsten carbide ball |
| **Leak Integrity** | |
| **External** | $< 1 \times 10^{-10}$ scc/sec. He |
| **Through closed valve (shut-off mode)** | $< 1 \times 10^{-10}$ scc/sec. He |
| **Through closed valve (control mode)** | < 2 sccm |
| **Fittings** | Cajon® 4 VCR® (male) |
| **Dimensions** | |
| **Body length less fittings** | 5.22"H × 6.04"L × 1.50"W |
| **Fitting end to fitting end** | 5.22"H × 8.31"L × 1.50"W |

**FOOTNOTES**

[1] Calibration referenced to 760 Torr/0°C (SEMI standard).

[2] For best control and lowest controllable throughput, 15 to 20 psig is recommended for upstream pressure.

[3] Although the input impedance of the set point circuit is high, we recommend a low set point drive signal impedance for good noise immunity when the equipment is used in a high RFI or EMI environment.

Cajon® and VCR® are registered trademarks of Cajon Company, Macedonia, OH.

## ORDERING INFORMATION

**Type 1449A**

example: 1449A-00100RM

**Type Number** — 1449A

**Full Scale Range**

| | |
|---|---|
| 100 sccm of $N_2$ | 00100 |
| 200 | 00200 |
| 500 | 00500 |
| 1000 | 01000 |
| 2000 | 02000 |
| 5000 | 05000 |
| 10000 | 10000 |

**Fittings**

Cajon® 4 VCR® (male) — Code R

**Seals**

Metal — Code M

Note: Interconnecting cables are available at an additional charge. Please contact the factory for ordering information.

## MKS COMPANION PRODUCTS

- Type 147 Mass Flow/Pressure Programmer
- Types 246/247 Power Supply/Readouts
- Microcal-F MFC Calibration System
- Califlow® Primary Standard Flow Rate Calibrator
- Mass-Flo™ Types 1159/1160/1161 MFC's (in standard 3" lengths)
- Mass-Flo™ Type 1259 MFC (for general purpose applications)
- Masster-Flo™ Type 1359 MFC Transfer Standard

Specifications subject to change without notice.

MKS INSTRUMENTS, INC.

SIX SHATTUCK ROAD ANDOVER, MA 01810 (508) 975-2350/(800) 227-8766 TELEX: 910-240-8005 FAX: (508) 975-0093

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