

# Brooks® Models SLA7950 - SLA7960 Mass Flow Controllers & Meters

## General Features:

- 1.125 inch Mechanical Platform
- High performance coplanar valve
- All wetted surfaces are electro-polished to 5 Ra to maintain particle, moisture and contamination free process conditions.
- All-Metal seals, High leak integrity (less than  $1 \times 10^{-10}$  atm-cc/sec He)
- Industry leading sensor stability. Long term drift performance of < 0.2% per year.
- Accuracy:  $\pm 1\%$  of rate or (setpoint) including linearity.
- Digital Communication options offer easy commissioning and reduced system wiring.
- Device can store 10 selectable calibration and flow ranges.

## Control Response:

- Fast Settling Time for all step changes.
- Insensitive to mounting attitude.

## Analog I/O:

- 9-pin D-connector or 15-pin D-Connector
- 0-5 Volt setpoint and flow signals.
- Single sided power supply, (13.5 -27 Vdc range), 15 Vdc nominal
- Separate 'valve-override' signal.
- Compatible with Brooks Model 0254 secondary electronics.

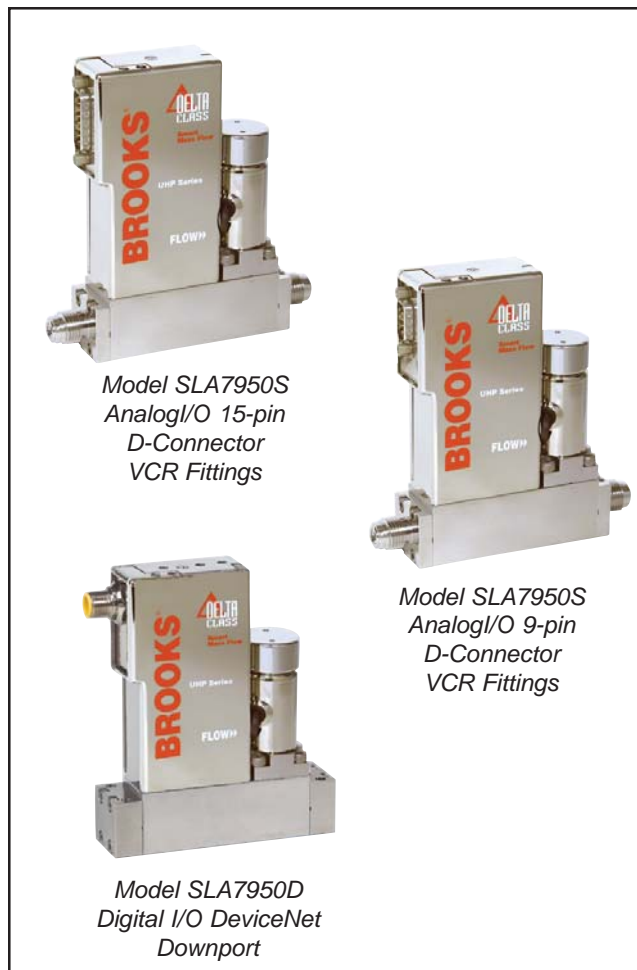
## Digital Communication Options:

### DeviceNet™

- ODVA™ Certified MFC Device Profile
- Semiconductor SIG Certified
- Capable of: Poll I/O, Cyclic and Change of State Messaging
- Accessibility of sensor, valve, calibration, tuning, diagnostic, and other internal data, to support fast commissioning
- MAC-ID and Baudrate rotary switches, and two bi-color status LEDs

### HART® based RS-485 multidrop

- Via Brooks S-Protocol



## DESCRIPTION

Brooks Instrument's SLA7900 Series is a 1.125" wide profile high purity metal sealed thermal mass flow measurement and control instrument, which offers unparalleled flexibility and performance. The SLA7900 Series MFC is designed for use in advanced gas handling systems. The result is the most accurate, repeatable, and responsive MFC on the market today!

## Superior Valve Technology

The coplanar valve offers unmatched performance. Due to its simplified construction, the valve exhibits superior repeatability, stability, and response time.

## SLA7900 Series

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### Highly Adaptable Configurations

The 1.125" body offers a compact, space saving footprint. The SLA7900 Series is easily retrofitable to existing gas box designs that utilize the traditional 1.5" MFC body platform. Likewise, the all-digital electronics is adaptable and allows the SLA7900 Series to serve as a direct replacement for existing analog products bringing with them greatly improved accuracy and reliability.

### Broad Array of Communication Options

Brooks offers traditional 0-5 volt and 4-20 mA analog options as well as RS-485 digital communications ("S-protocol", based on HART). Brooks also offers control interface with DeviceNet™, a high-speed (up to 500k baud) digital communication network. Brooks' communication capabilities and device-profiles have been certified by the ODVA™ (Open DeviceNet Vendor's Association). Other network protocols are in development. Talk to your Brooks representative about your specific needs.

### Reduced Cost of Ownership

The SLA7900 Series allows multi-gas and multi-range capabilities to reduce customer inventory. Storage and pre-programming of up to 10 gas calibrations easily permits users to switch between different gases and ranges on a single device. Also, the greater control range provided by the coplanar valve gives users the option to decrease the number of parts needed to control their entire process, either analog or digital modes, reducing measurement errors resulting from property differences between process gases and the calibration gas.

### Zero Drift Diagnostic Option

The Zero Drift Diagnostic is an advanced diagnostic now offered on the 7950S MFC and 7960S MFM, which detects and alerts the user when the flow sensor zero drifts by more than user specified limits. This unique feature monitors the flow signal during no-flow conditions and then utilizes the alarms to notify the user when an out of limits condition has been detected. Zero drift can be accurately detected because Brooks MFCs have the ability to monitor both positive and negative flow signals. This diagnostic gives the user a higher level of confidence that the process has not shifted. Brooks products have long been revered for their resistance to zero drift over long periods of time. Now Brooks is the first MFC supplier to prove their stability.

## SPECIFICATIONS

### PERFORMANCE CHARACTERISTICS:

#### Flow Ranges

Models SLA7950/SLA7960  
Any range from 0-3 sccm to 0-50 slpm N<sub>2</sub> eq.\*

#### Control Range

Turndown 100:1 (for any FS range from 1-50 slpm)  
Turndown 50:1 (for FS range below 1 slpm)

#### Accuracy

±1.0% of rate, including linearity (20% to 100% F.S.),  
±0.2% of F.S. (below 20% full scale.)

#### Repeatability

±0.20% of rate

#### Settling Time

< 1 sec for all step changes above 5% FS\*\*

#### Temperature Sensitivity

Zero: Less than 0.035% F.S. per °C  
Span: Less than 0.1% of rate per °C

## RATINGS:

### Pressure Equipment Directive (PED) 97/23/EC

See Table 1

Table 1 PED Rating

Mass Flow Controller	Flow Ranges N2 Equivalent Ratings			Pressure Bar	PED Module H Category
	Min. f.s.	Max f.s.	Unit sccm		
Models SLA7950/ SLA7960	3.0	50,000		100 Bar	SEP

#### Mounting Attitude Sensitivity

0.2% of FS maximum deviation after rezeroing

#### Valve Leak-By: < 0.5% F.S.

#### Leak Integrity

Inboard to Outboard: less than 1x10<sup>-10</sup> atm scc/sec  
Helium max.

#### Ambient Temperature Limits

Operating: 0°C to 65°C (32°F to 149°F)  
Non-Operating: -25°C to 100°C (-13°F to 212°F)

#### Maximum Operating Pressure Range

1500 psig (10,342 kPa) maximum  
150 psig (106.2 kPa) and below recommended for best performance.

## Data Sheet

DS-TMF-SLA7900-MFC-eng

August, 2009

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### RATINGS (cont'd):

#### Differential Pressure Range

5 - 50 psid (broader depending on customer conditions; consult factory for details.)\*\*\*

(34.5 - 344.7 kPa)

(259 - 2586 torr)

#### Particulate

Zero particles per cubic foot greater than 0.1 microns under process conditions. Less than 4 particles per cubic foot greater than 0.02 microns under process conditions.

### PHYSICAL:

#### Materials of Construction

316L Vacuum Arc Remelt (VAR), 316L, and high-alloy ferritic stainless steel.

External/internal seals: Nickel

Valve seat: 17-7PH stainless steel - standard

#### Process Connections

1/4" male VCR™

CS Seal (SEMI 2787.5 or SEMI F82-0304 R1-1)

C Seal (SEMI 2787.1 or SEMI F82-0304 R1-2)

W Seal (SEMI 2787.3 or SEMI F82-0304 R1-3)

#### Outline Dimensions

Refer to Figures 1 through 7.

### ELECTRICAL CHARACTERISTICS:

#### Electrical Connections

Analog I/O option: 9-pin or 15 pin D-Connector, male

DeviceNet I/O option: 5-pin Micro-Connector, male

RS-485 option: 15 pin D-Connector, male

#### Analog I/O Pin Connections for 9-pin D-Connector:

Function	9-pin D-conn
Valve Override, Input	1
Flow Signal, 0-5 volt, Output (+)	2
Power Supply, +13.5 Vdc to +27 Vdc (+)	3
Power Supply, Common (-)	4
Not Connected	5
Setpoint, 0-5 Vdc, Input (+)	6
Flow Signal, Common Output, (-)	7
Setpoint, Command Input (-)	8
Not Connected	9

### ELECTRICAL CHARACTERISTICS (cont'd):

#### Analog I/O Pin Connections for 15-pin D-Connector:

Function	15-pin D-Conn
Setpoint, Common Input (-)	1
Flow Signal, 0-5 volt, Output (+)	2
TTL Alarm, open collector, Output (+)	3
Flow Signal, 4-20 mA, Output (+)	4
Power Supply, +13.5 Vdc to +27 Vdc(+)	5
Not Connected	6
Setpoint, 4-20 mA, Input (+)	7
Setpoint, 0-5 Vdc, Input (+)	8
Power Supply, Common (-)	9
Flow Signal, Common, Output, (-)	10
Reference, +5 Vdc, Output (+)	11
Valve Override, Input	12
Calibration Select, Input	13
RS-485 Common B (-)	14
RS-485 Common A (+)	15

#### Power Supply Voltage

Analog I/O option: 13.5 Vdc to 27 Vdc

(traditional -15 Vdc pin is ignored)

DeviceNet I/O option: nominal = 11-25 Vdc

#### Power Requirements

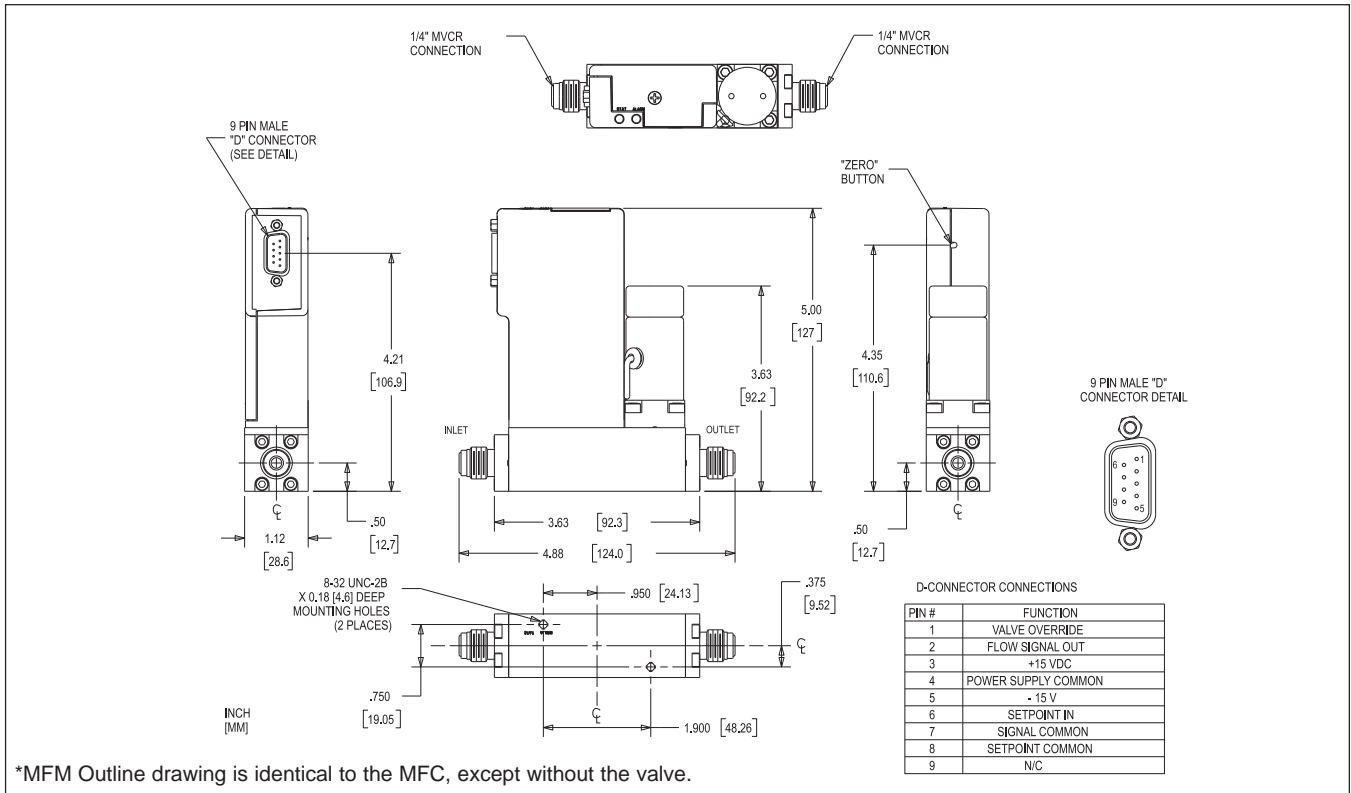
	Watts, typ.	Watts, max.
Analog I/O or RS-485 option, with valve: VIN = 27 Vdc Valve = Full Open	4.2	4.6
DeviceNet I/O option, with valve: VIN = 25 Vdc Valve = Full Open	6.3	6.9

\* Standard temperature and pressure are in accordance with SEMI Standard E12-96: 0°C and 101.32 kPa (760 torr)

\*\* Within ±2% of rate or ±0.5% FS, which ever is greater, per SEMI E17-91

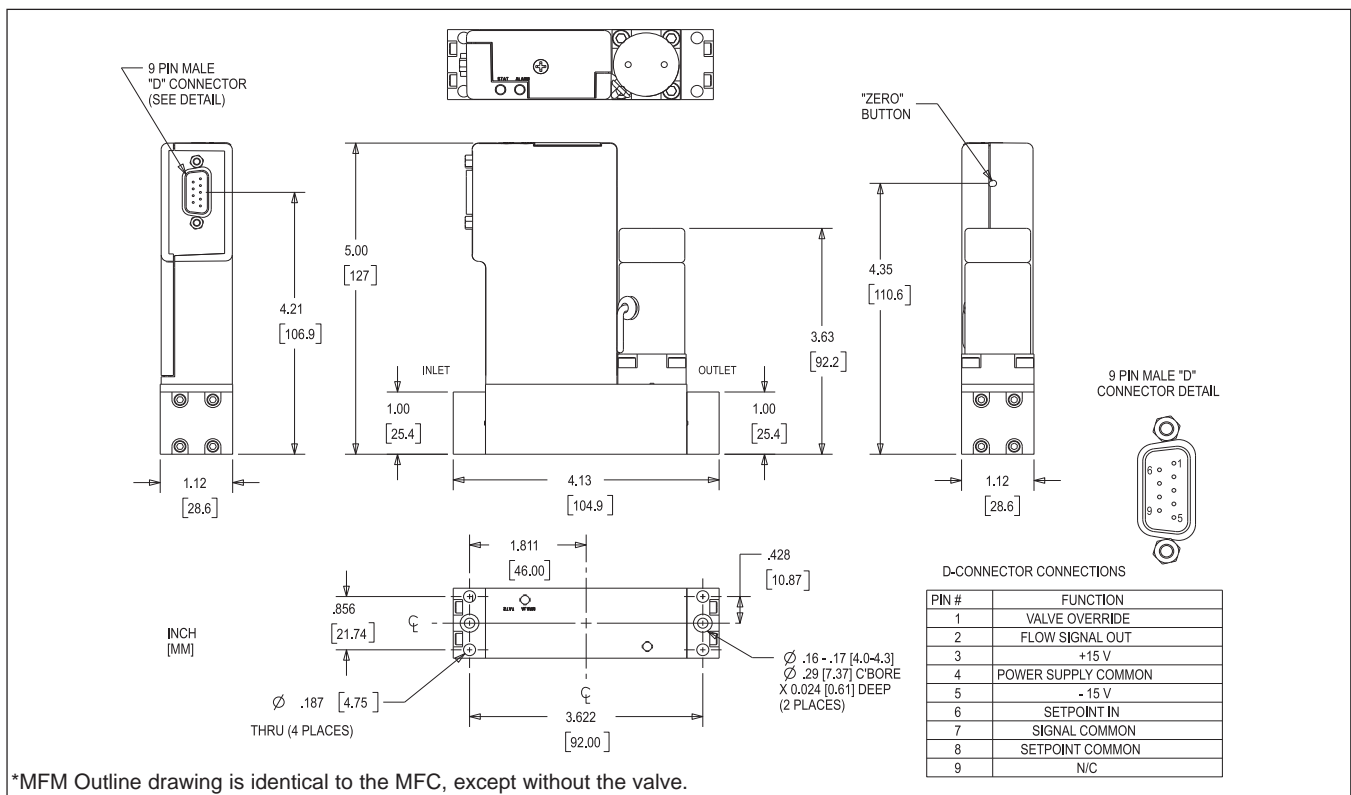
\*\*\* For flows above 30 slpm N<sub>2</sub> eq., 30 psid minimum required

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\*MFM Outline drawing is identical to the MFC, except without the valve.

Figure 1 Model SLA7950S \*MFC/MFM Analog I/O 9-pin D-Connector with VCR Fittings.



\*MFM Outline drawing is identical to the MFC, except without the valve.

Figure 2 Model SLA7950S MFC/\*MFM Analog I/O 9-pin D-Connector with Downport Connections (C-seal).

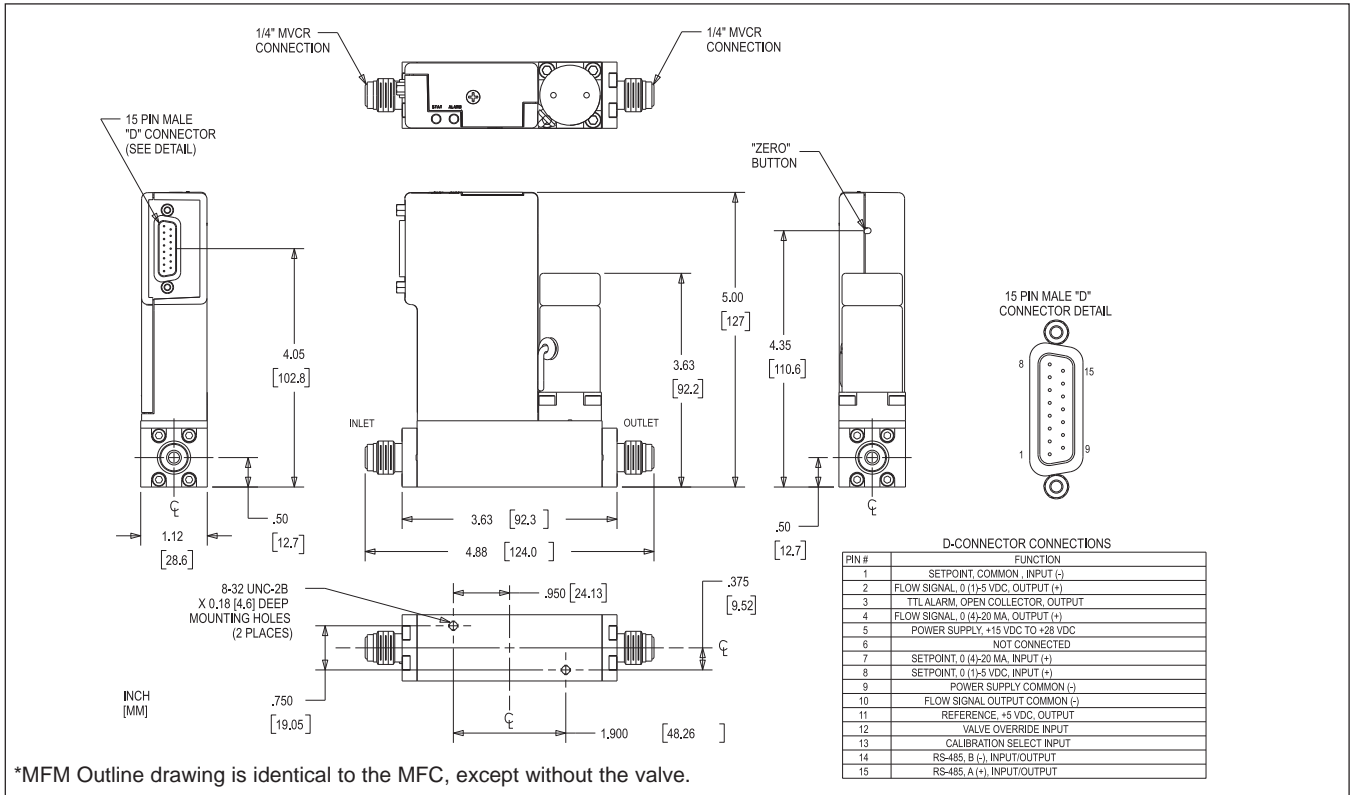


Figure 3 Model SLA7950S MFC/\*MFM Analog I/O 15-pin D-Connector with VCR Fittings.

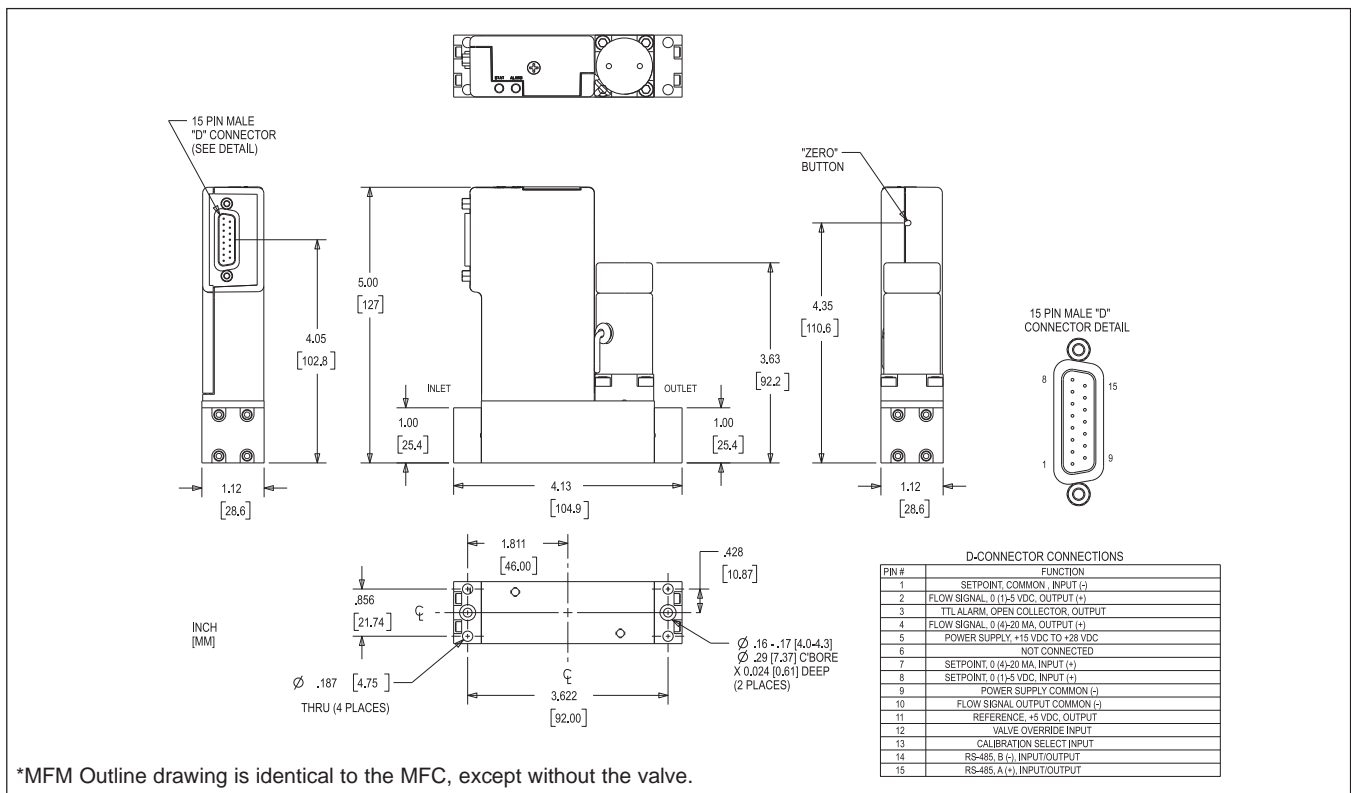


Figure 4 Model SLA7950S MFC/\*MFM Analog I/O 15-pin D-Connector with Downport Connections (C-seal).

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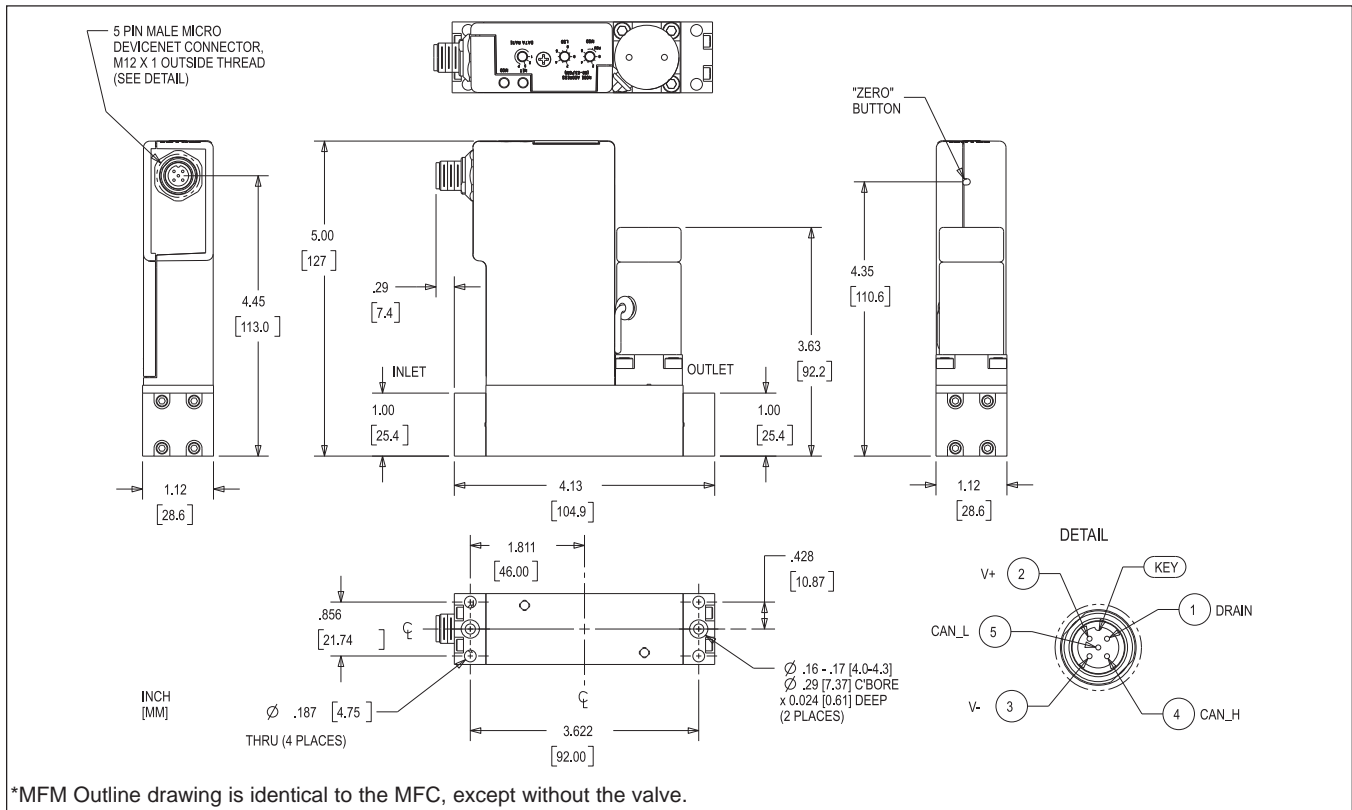


Figure 5 Model SLA7950D MFC/\*MFM DeviceNet Digital I/O with Downport Connections (C-seal).

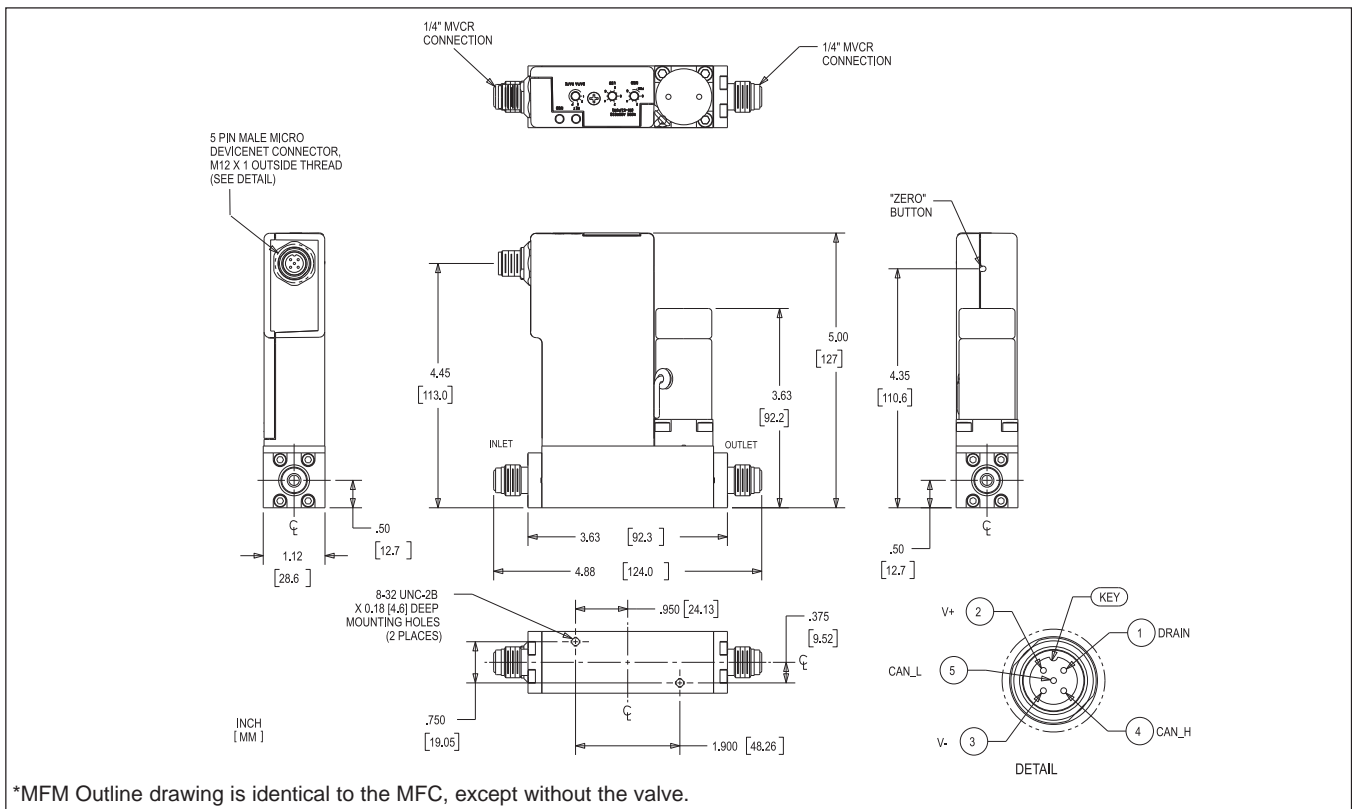
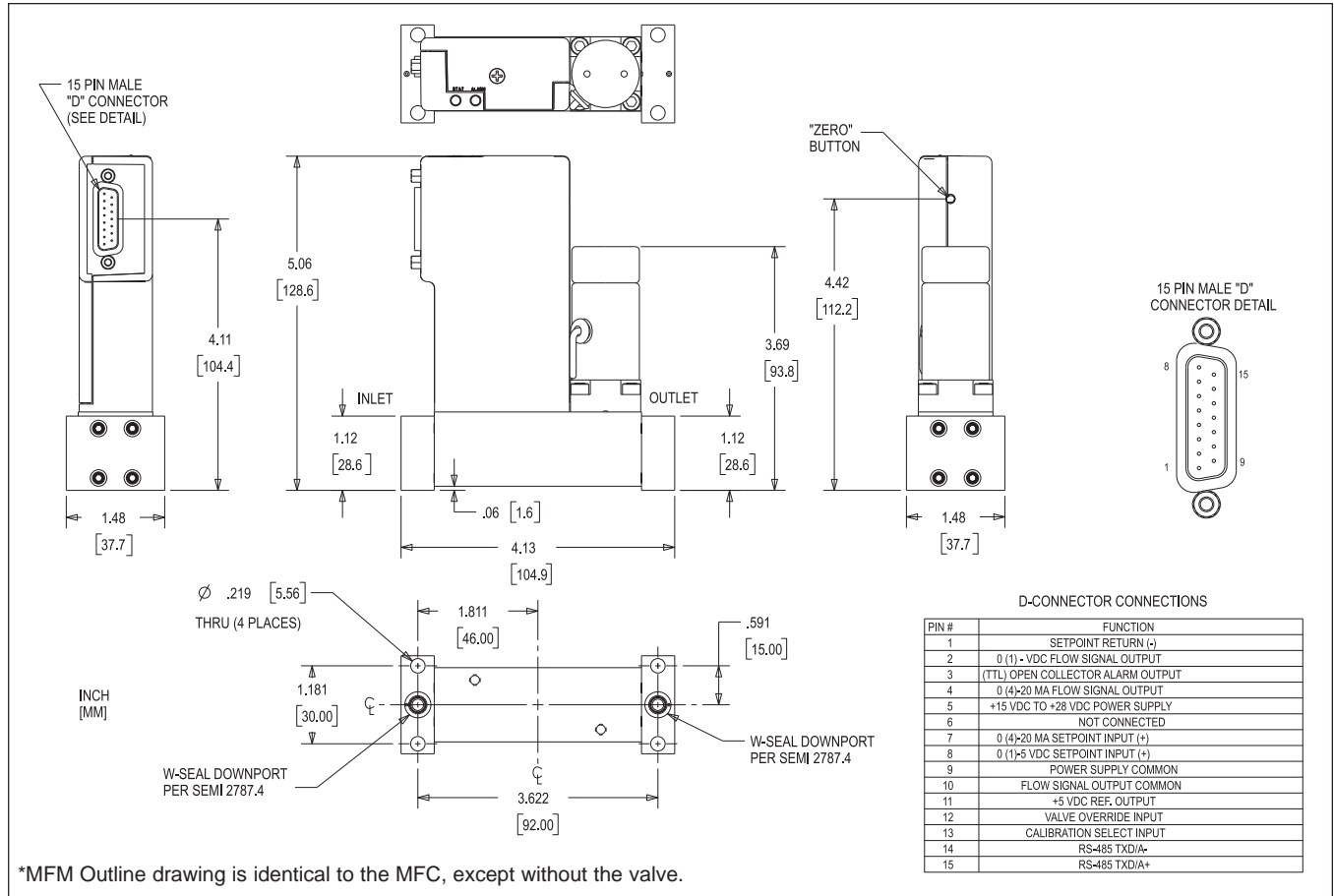


Figure 6 Model SLA7950D MFC/\*MFM DeviceNet Digital I/O with VCR Fittings.



\*MFM Outline drawing is identical to the MFC, except without the valve.

Figure 7 Model SLA7950S MFC/\*MFM 15-pin D-Connector Analog I/O with 1.5" Downport Connections (W seal).

## SLA7900 Series

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### **BROOKS SERVICE AND SUPPORT**

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration. The primary standard calibration equipment to calibrate our flow products is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) to locate the service location nearest to you.

### **START-UP SERVICE AND IN-SITU CALIBRATION**




Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

### **CUSTOMER SEMINARS AND TRAINING**

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance persons. Please contact your nearest sales representative for more details.

### **HELP DESK**

In case you need technical assistance:

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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

#### TRADEMARKS

Brooks .....	Brooks Instrument, LLC
Brooks Service Suite .....	Brooks Instrument, LLC
DeviceNet .....	Open DeviceNet Vendors Association, Inc.
HART .....	HART Communications Foundation
ODVA .....	Open DeviceNet Vendors Association, Inc.
VCR .....	Cajon Co.



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