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IntelliFlow® II Digital Flow Controller

Advanced digital technology with industry leading configurability

Product Profile



Performance Characteristics

IntelliFlow II is an advanced digital mass flow controller, expanding the attributes of the first generation IntelliFlow product line. Key enhancements for IntelliFlow II include:

- user configurability
- extension of flow range to 100 slpm (N_2 equivalent)
- advanced electronic, mechanical and software designs

User configurability allows customers to program generic MFCs to virtually any gas and range within select boundaries. In addition to superior performance, user configurability delivers significant cost savings through:

- inventory reduction
- reconfiguration efficiency (reduced time, complexity and cost)
- tool uptime improvements
- product lead-time compression

Product Features	Product Benefits
Physics Modeling with Process Gas Validation	Combines responsiveness and flexibility of theoretical modeling with lab proven results and performance
On-Tool Configurability	Optimizes MFC safety for operators and equipment
Pre-programmed Options	Allows pre-programming up to eight different gas and/or flow ranges per MFC for direct selection via DeviceNet™ communications
Software Level Access Control	Password controlled user access prevents unauthorized MFC adjustments or use of diagnostic software
Flexible Field Software Kit	Allows part number creation and control, along with part labeling for optimal control of MFC configurations and part tracking
Independent Communications and Diagnostic Interfaces	Provides diagnostic communication to the MFC without having to "interrupt" tool communications - this allows monitoring and data acquisition capabilities simultaneously with MFC operation for chamber and tool matching along with advanced "real-time" troubleshooting
Diagnostic Software	Extensive array of diagnostic, monitoring and data acquisition tools--Passive mode to acquire "real-time" performance parameters or active mode to force specific actions
Patented Signal Processing Architecture (#6,343,617)	Ensures robust DeviceNet Communications in real-time MFC control
High Flow Rate (≤ 100 slpm N_2 equiv.)	Enables user configurable digital mass flow control for expanded process opportunities

Ordering Information

Product	Materials	Flow Range (N_2) *(sccm)*	Fittings	Electrical Interface and Connections	Flow Firmware Revision	Special Options
1	2	3	4	5	6	7/8

1 - Product

D - Mass Flow Controller Normally Closed (NC) valve
P - Mass Flow Controller Normally Open (NO) valve
M - Mass Flow Meter

2 - Materials

S - Stainless Steel body w/Hastelloy® sensor

3 - Flow Range (N_2) *(sccm)*

H	1-4
J	5-7
K	8-18
L	19-34
M	35-88
N	89-172
P	173-438
R	439-858
S	859-2188
T	2189-4376
V	4377-11000
W	11001-30000
X	30001-55000
Y	55001-100000

4 - Fittings

	<30 slpm	<55 slpm	<100 slpm
A - 124mm 4VCR, Tylan® FC2900 Base	Yes	Yes	No
B - 124mm 4VCR Standard Mount	Yes	Yes	No
C - 106mm 4VCR, Tylan FC2936	Yes	No	No
F - CS - Seal 80mm Top Mount, FC2979	Yes	No	No
G - DeviceNet 1.125" C - Seal	Yes	No	No
H - W-Seal, 92 mm 1.5" Top Mount	Yes	No	No
K - W - Seal 80mm Top Mount, FC2979	Yes	No	No
L - 150mm 6VCR, Tylan FC2900 Base	No	Yes	Yes
M - 170mm 6VCR Standard Mount	No	No	Yes
T - W-Seal, 92 mm 1.125" Top Mount	Yes	No	No
U - C - Seal 92mm 1.5" High Flow	No	Yes	Yes
W - Digital/Analog 1.125" C-Seal	Yes	No	No

5 - Electrical Interface and Connections

A - 0-5V DC/RS485, 9-pin Sub-D
B - 0-5V DC/RS485, 15-pin H/D Sub-D
D - Device Net
E - 0-5V DC, 9-pin Sub-D;Tylan "T" Option
F - 0-5V DC/RS485, 15-pin H/D with Card Edge Adapter
G - 0-5V DC/RS485, 15-pin H/D with 9-pin Std Adapter
H - 0-5V DC/RS485, 15-pin H/D with 15-pin Std Adapter
J - 0-5V DC/RS485, 15-pin H/D with 20-pin Honda® Adapter
K - Device Net with Analog Output
L - 0-5V DC/RS-485, 15-pin H/D conn with "L" type Card Edge Adapter
M - Profibus
N - RS-485L, DB9; Outlet Side (Digital Default)
P - 0-5 VDC, DB9; Outlet Side (Analog Default)

6 - Flow Firmware Revision

1 - Version 22
2 - Version 23 [1]

7/8 - Special Options

00 - Standard Configuration
07 - Extended Range
0M - Surrogate Gas QC
F0 - Adaptive Filter Off
F7 - Extended Range, Adaptive Filter Off
0Z - Autozero Enabled
XX - Non-configurable
XM - Non-configurable, Surrogate Gas QC
XG - Gold XM MFC
B1 - Engineering Special
YY - Non-configurable, Adaptive Filter Off
Others available upon request

Software Configuration	Semi Gas Code				Process Gas Flow Range (sccm)					
9	10	11	12	13	14	15	16	17	18	19

9 - Software Configuration

1 - Default (NA if non-DeviceNet)
3 - DeviceNet Option Communications 7FFFH P=2, C=7
4 - DeviceNet Option Communications 7FFFH P=6, C=8
5 - DeviceNet Option Communications 7FFFH P=3, C=7

Note 1: Version 23 is the default Flow Firmware Revision for Flow Ranges X and Y and configurations with a Normally Open Valve, Product P.

Kits and Accessories

Field Kit P/N #A332293001

The IntelliFlow II field kit provides a complete solution for on-tool programming of the device. This kit allows programming gas type and range, printing labels and performing full diagnostics. Field kit includes: (1) IntelliFlow II user software, (2) interface cables and adapters, (3) remote power supply and (4) portable thermal printer and labels.

Interface Kit P/N #A332293002

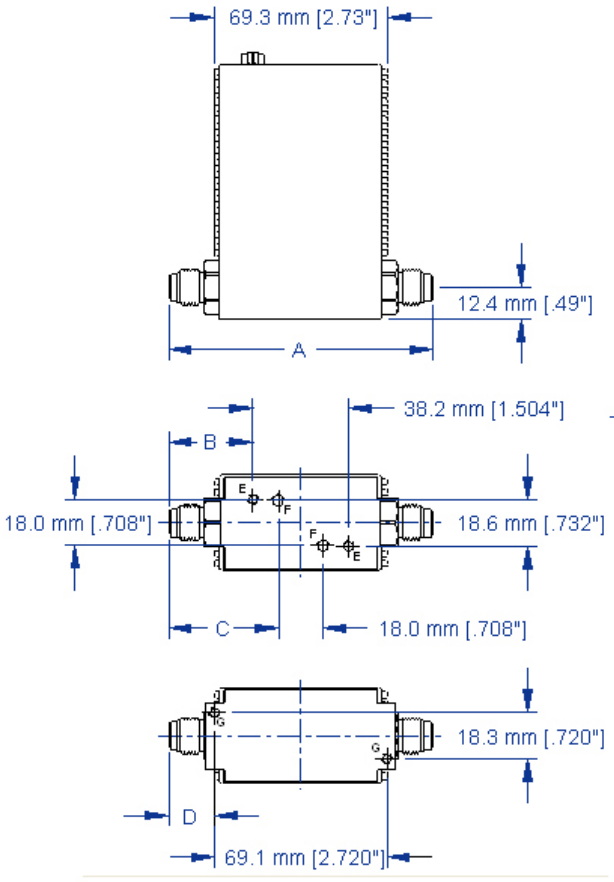
The IntelliFlow II interface kit provides software and cabling to perform on-tool diagnostic analysis. It includes: (1) IntelliFlow II user software, (2) interface cables and (3) adapters to connect the device to the user's laptop or PC.

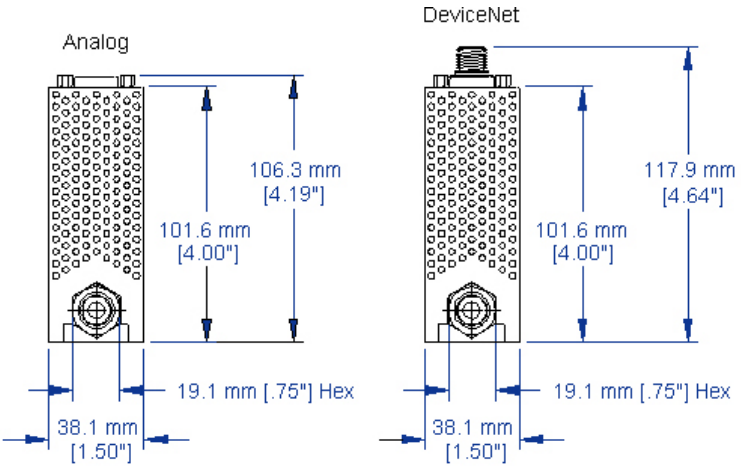
Specifications

Performance		
Full Scale Flow (N_2 equivalent)	≤ 30 slpm	30 slpm - 100 slpm
Turndown Ratio	50:1	50:1
Response/Settling Time	1 sec. (typical)	< 2.5 sec.
Accuracy (analog mode)	± (0.25% SP + 0.50% FS)	± (1.0% SP + 0.50% FS)
Accuracy (digital mode)	± (0.25% SP + 0.35% FS)	± (1.0% SP + 0.35% FS)
Linearity	± 0.50% full scale maximum	± 0.75% full scale maximum
Repeatability	± 0.15% full scale maximum	± 0.25% full scale maximum
Ambient Temp Coefficient	± 0.05% full scale/°C maximum (zero and span) Normally Closed ± 0.10% full scale/°C maximum (zero and span) Normally Open	± 0.10% full scale/°C maximum (zero and span)
Inlet Pressure Coefficient	± 0.007% full scale/psi (0.10% bar) with autozero disabled	± 0.02% full scale/psi
Electrical		
Input Voltage Requirement	Analog: ± 15 VDC (± 20%) DeviceNet: + 11-25 VDC	Analog: ± 15 VDC (± 20%) DeviceNet: + 11-25 VDC
Power Supply Sensitivity	± 0.05% full scale maximum	± 0.05% full scale maximum
Power Consumption	Analog: 3 watts maximum DeviceNet: 5 watt maximum	Analog: 7 watts maximum DeviceNet: 8 watt maximum
Analog I/O Signal	0-5 VDC	0-5 VDC
Digital Communication	RS-485 standard DeviceNet optional	RS-485 standard DeviceNet optional
Mechanical		
Control Valve Type	Normally closed or normally open solenoid valve, diaphragm isolated	Normally closed or normally open solenoid valve, diaphragm isolated
Materials Exposed to Process Gas	316L VIM/VAR,stainless steel, sapphire, ruby,Hasteloy C-22®, Inconel®	316L VIM/VAR stainless steel, 316L stainless steel, sapphire, Inconel, nickel 200
Leak Integrity (external)	< 1 x 10^{-10} atm.cc/sec.	< 1 x 10^{-10} atm.cc/sec.
Valve Leakthrough[1]	Normally Closed < 1% full scale	Normally Closed < 1% full scale
Surface Finish	5 µin Ra	5 µin Ra
Environmental		
Operating Temperature Range (ambient and gas)	0 - 50 °C	0 - 50 °C
Humidity	10 to 95% RH non-condensing	10 to 95% RH non-condensing
Maximum Overrange Pressure	140 psig (9.5 bar)	140 psig (9.5 bar)
Differential Press	7 - 40 psid (≤ 11 slpm) 15 - 40 psid (11 - 30 slpm)	30 - 50 psid

Note 1 - Valve leakthrough for normally open devices ≤ 2% Full Scale

1/4" VCR

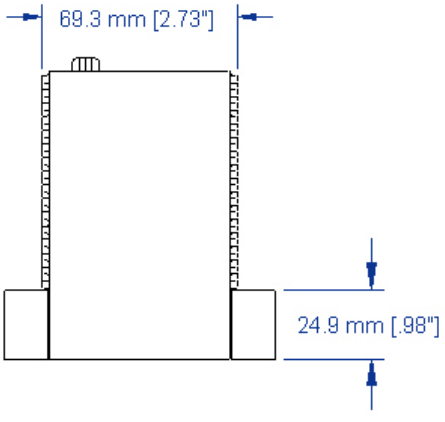


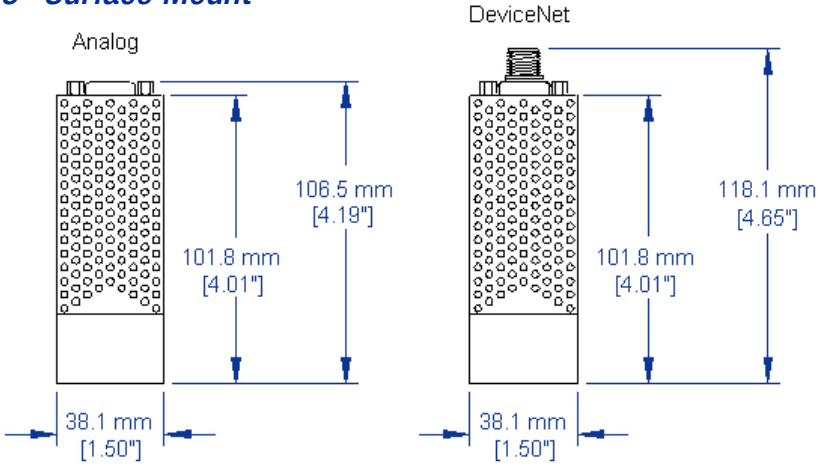


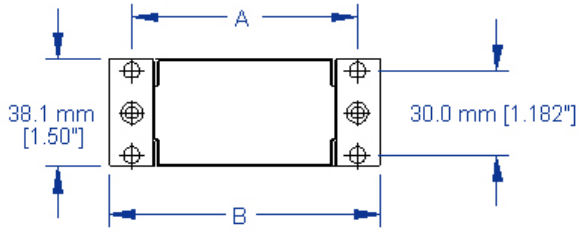
1/4 VCR
106MM OR 124MM LENGTHS

	A	B	C	D	E	F	G
106 mm (2936)	*106.0 mm [4.173"]*			*18.45mm (0.726")*			*8-32 UNC-2B*
124 mm (2900/260)	*124.0 mm [4.882"]*			*27.45 mm [1.081"]*			*8-32 UNC-2B*
124 mm SEMI Standard	*124.0 mm [4.882"]*	*42.9 mm [1.689"]*	*53.0 mm [2.087"]*		*M4 x 0.7-6H*	*M5 x 0.8-6H SEMI SPEC*	

1.5" Surface Mount







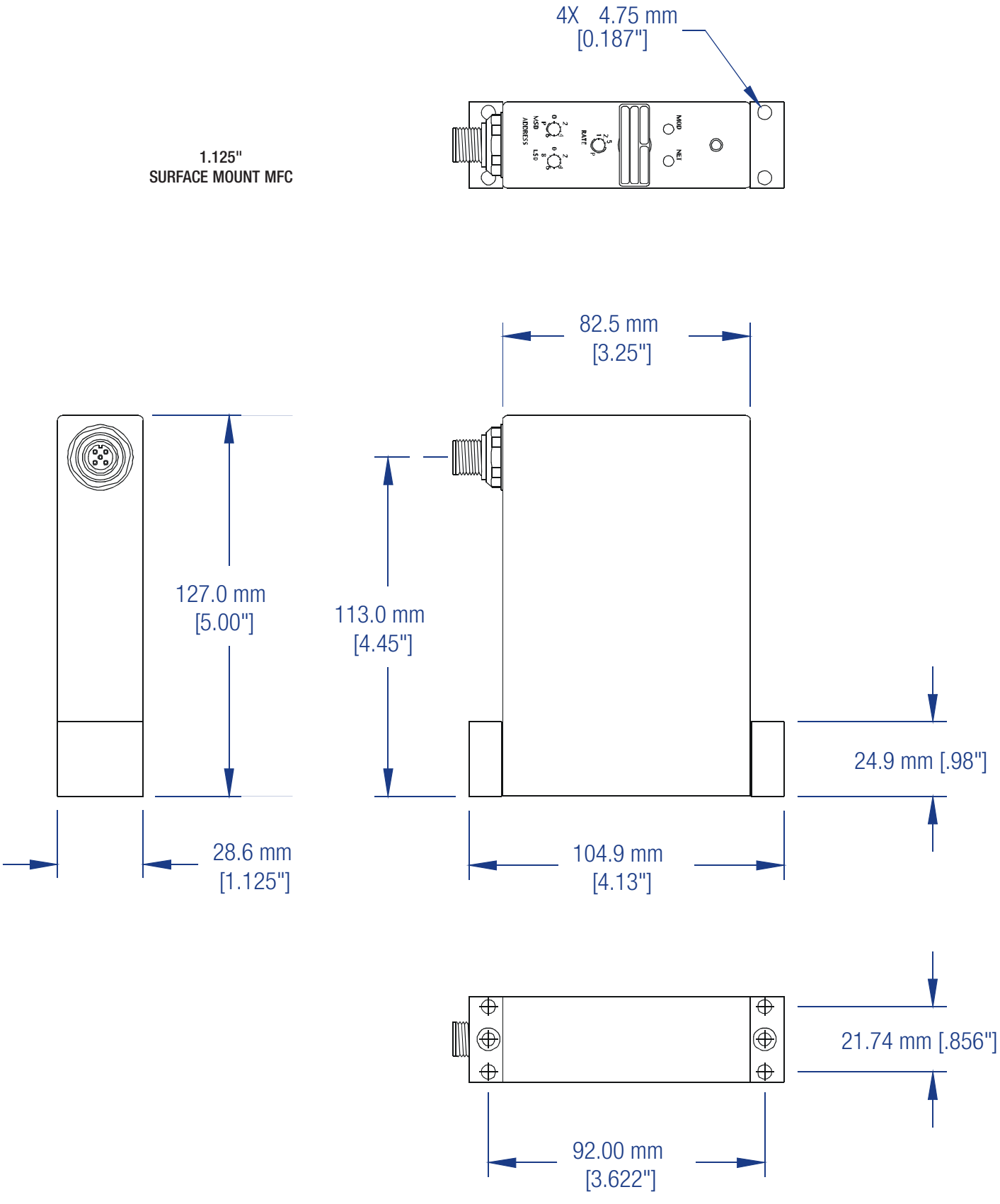
(C-SEAL SHOWN)

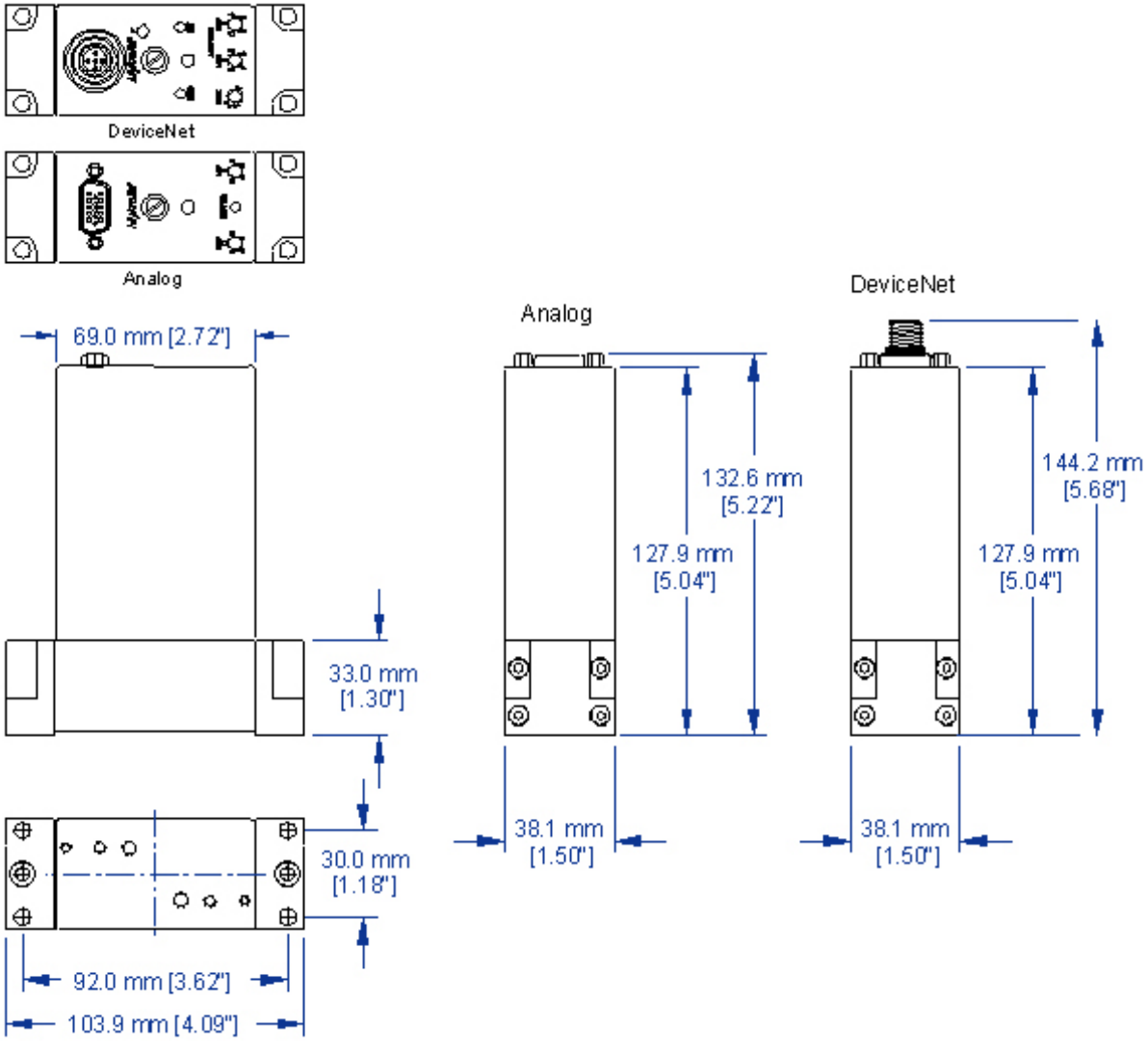
STANDARD or COMPACT LENGTH
C, CS AND W SEAL DESIGNS

	Standard 92 mm [3.62"]		*Compact 80 mm [3.14"]*	
SEAL TYPE	*Dim A*	*Dim B*	*Dim A*	*Dim B*
C-SEAL	*92.0 mm [3.622"]*	*107.7 mm [4.242"]*		
CS-SEAL			*79.8 mm [3.142"]*	*92.8 mm [3.654"]*
W-SEAL				

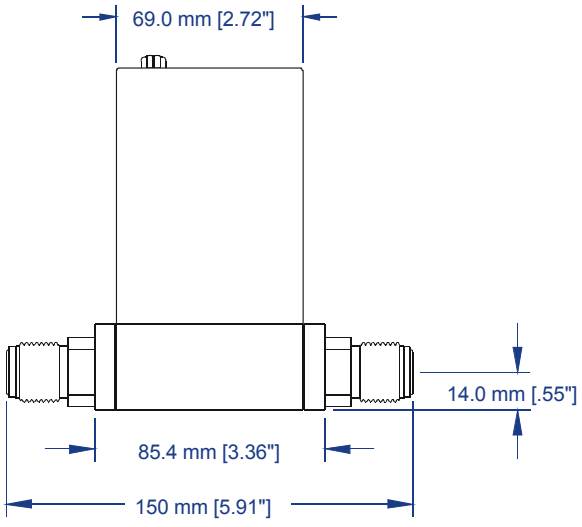
1.125" Surface Mount

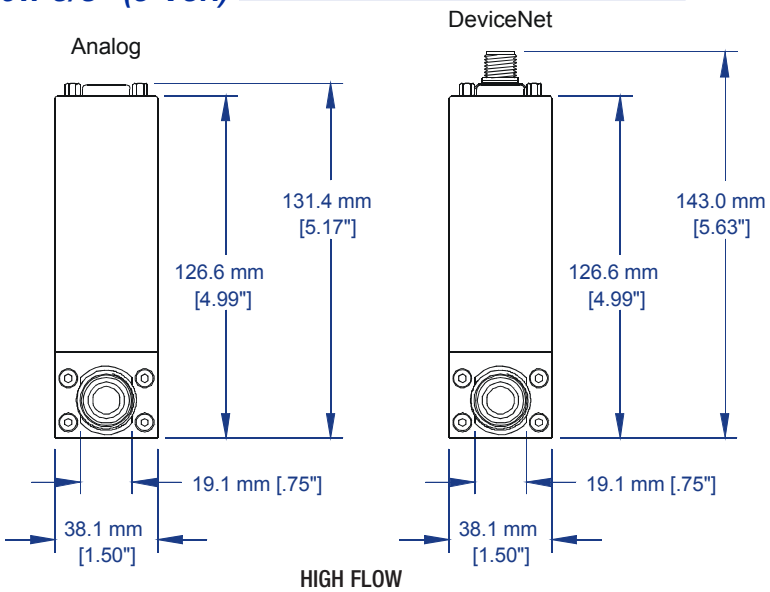
1.125"
SURFACE MOUNT MFC



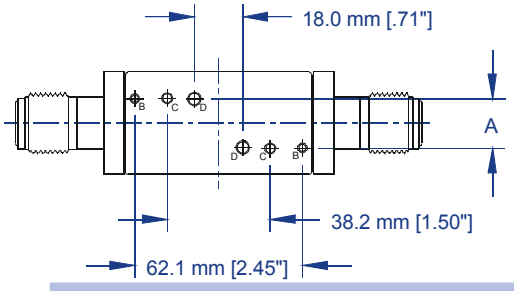

DeviceNet
Analog
69.0 mm [2.72"]
33.0 mm [1.30"]
30.0 mm [1.18"]
92.0 mm [3.62"]
103.9 mm [4.09"]
Analog
132.6 mm [5.22"]
127.9 mm [5.04"]
38.1 mm [1.50"]
DeviceNet
144.2 mm [5.68"]
127.9 mm [5.04"]
38.1 mm [1.50"]

High Flow 3/8" (6-VCR)



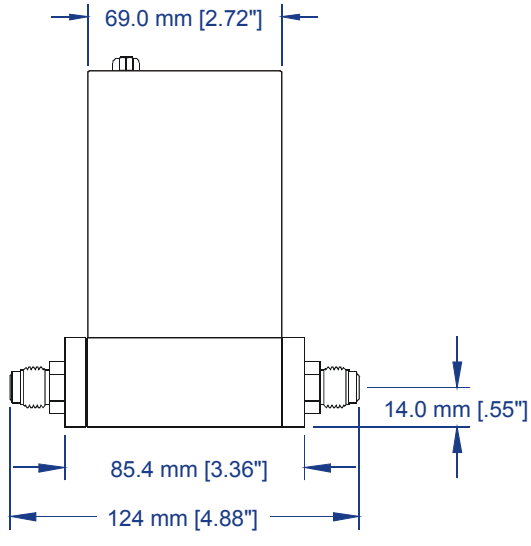


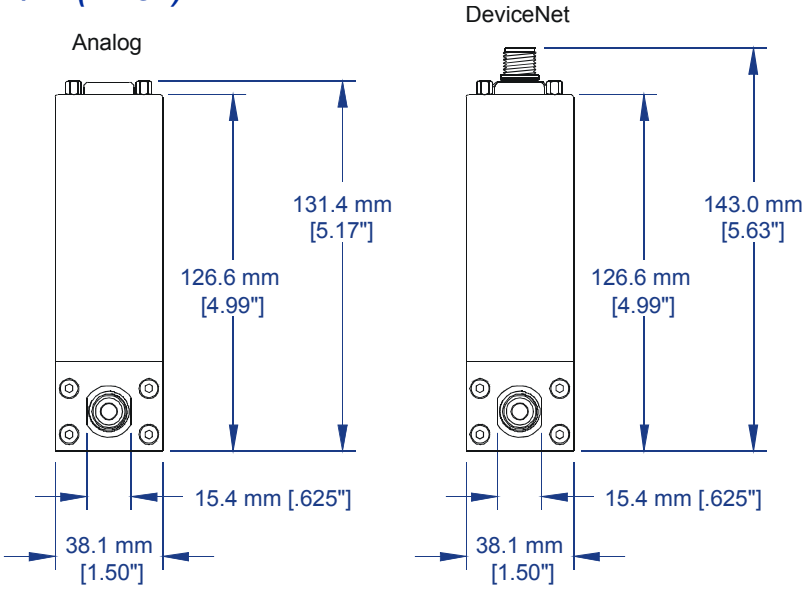
HIGH FLOW
3/8" (6-VCR)

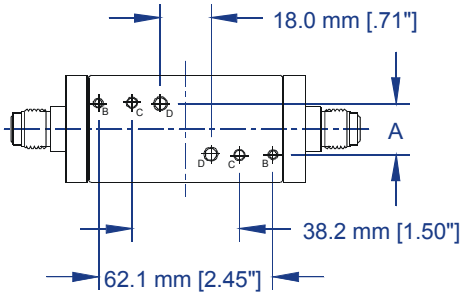


	DIM A		
HOLES	B TO B	C TO C	D TO D
DISTANCE	18.3 mm [.720"]	18.6 mm [.732"]	18.0 mm [.707"]
THREAD	6-32 UNC-2B	M4 X 0.7-6H	M5 X 0.8-6H

1/4" (4-VCR)







HIGH FLOW
1/4" (4-VCR)

	DIM A		
HOLES	B TO B	C TO C	D TO D
DISTANCE	18.3 mm [.720"]	18.6 mm [.732"]	18.0 mm [.707"]
THREAD	6-32 UNC-2B	M4 X 0.7-6H	M5 X 0.8-6H

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