



TELEDYNE HASTINGS INSTRUMENTS
Everywhereyoulook™

HFC-D-308A *Digital Flow Controller*

HFM-D-306A *Digital Flow Meter*

HFM-306 *Analog Flow Meter*

FEATURES

- Available Flow Ranges:
0-2500 slm to 0-10,000 slm (N2)
- Accuracy in Nitrogen
HFC-D-308 $\pm(0.5\% \text{ Rdg} + 0.2\% \text{ FS})$
HFM-D-306 $\pm(0.5\% \text{ Rdg} + 0.2\% \text{ FS})$
HFM-306 $\pm(2\% \text{ FS})$
- Operating Pressure to 300 PSI
- NIST Traceable Calibration
- RS232/RS485 (Digitals Only)
- Totalized Flow (Digitals Only)

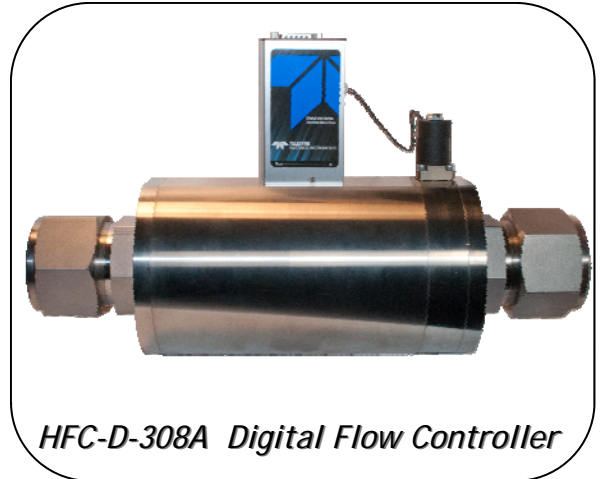
APPLICATIONS

- Alternate Energy
- Fuel Cell R&D
- Secondary Calibration Reference
- Specialty Gas Delivery
- Custody Transfer

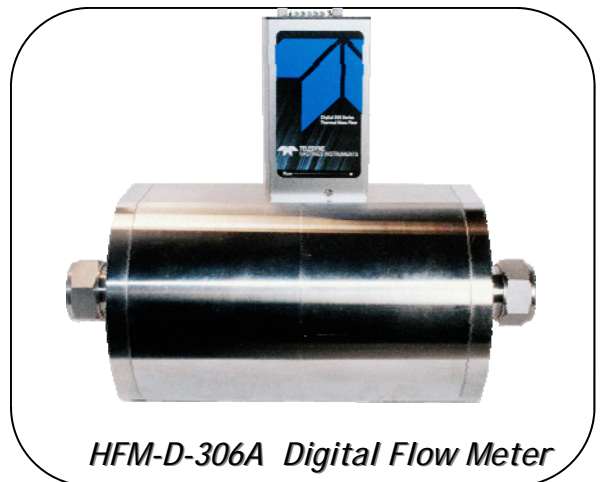
BENEFITS

- Enhanced Accuracy
- Superior Linearity
- Rapid Settling Time

High Flow Meters & Controllers



HFC-D-308A *Digital Flow Controller*



HFM-D-306A *Digital Flow Meter*



HFM-306 *Analog Flow Meter*



TELEDYNE HASTINGS INSTRUMENTS
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Description

Teledyne Hastings Instruments products represent over 70 years of experience in the design and manufacture of gas flow instrumentation. The high flow meters and controllers featured in this document are based on the 300 Series line of flow sensors.

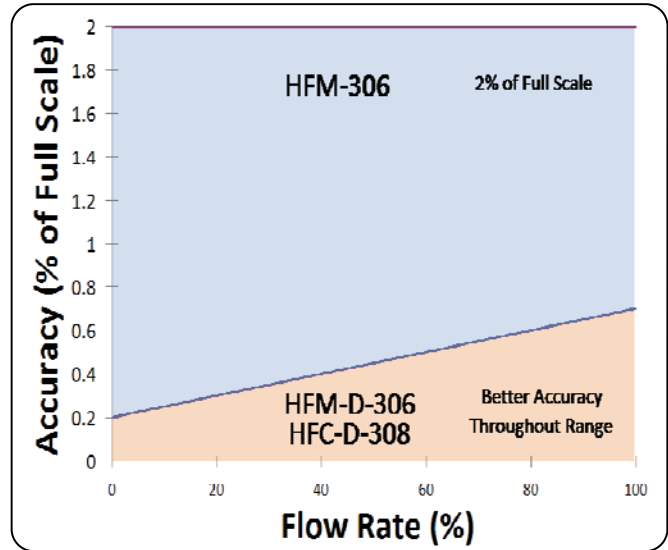
The 300 Series transducer is a patented thermal based flow sensor. This sensor is designed to provide exceptional linear response to changing flow rates. In addition, the electronics associated with the sensor are precisely tuned to give fast response time.

The flow transducer is combined with a laminar flow element to configure the flow meter for the customer. In many flow meters, the major source of error are the non-linearities that occur in the laminar flow element due to entrance and exit effects. However, the 300 Series laminar flow element is designed such that the flow sensing region is far less susceptible to these effects.

There are two models of the high flow 300 Series meters: HFM-306 and HFM-D-306A. The HFM-306 version is accurate to better than $\pm 2.0\%$ of full scale. Instruments are normally calibrated with the appropriate standard calibration gas (air), then a correction factor is used. The digital version, HFM-D-306A, features a microprocessor-based circuitry which linearizes the flow response and provides the user with excellent accuracy (see chart).

The HFC-D-308A is a digital mass flow controller based on the HFM-D-306A technology. The digital capability enables the unit to provide fast valve response and flow control which can be optimized for applications up to 10,000 SLM of air flow.

Teledyne Hastings is recognized throughout the world as a leader in high flow instrumentation. Our infrastructure (see photo), metrology capabilities, and employees provide our customers with outstanding service. Our application engineers can help you review your system requirements and work with you to provide a solution.



High Flow Specialists

Specifications & Standards

	<i>HFC-D-308A</i>	<i>HFM-D-306A</i>	<i>HFM-306</i>
Performance			
Full Scale Flow Ranges (N ₂)	2,500 to 10,000 SLM	2,500 to 10,000 SLM	2,500 to 10,000 SLM
Microprocessor-based Enhanced Accuracy and Digital Features	YES	YES	NO
Accuracy ¹	± (0.5% Rdg + 0.2% FS)	± (0.5% Rdg + 0.2% FS)	± 2% FS
Repeatability	± 0.15% of FS	± 0.15% of FS	± 0.15% of FS
Operating Temperature	-20° - 70°C	-20° - 70°C	-20° - 70°C
Warm up time	30 min optimum accuracy 2 min for ± 5% of full scale	30 min optimum accuracy 2 min for ± 5% of full scale	30 min optimum accuracy 2 min for ± 5% of full scale
Temperature Coefficient of Zero	Auto-zero when Valve is Closed	Maximum ±0.2%(FS)/°C (-20—70°C)	Maximum ±0.2%(FS)/°C (-20—70°C)
Temperature Coefficient of Span	Maximum ±0.1%(Rdg)/°C (-20—70°C)	Maximum ±0.1%(Rdg)/°C (-20—70°C)	Maximum ±0.08%(Rdg)/°C (-20—70°C)
Operating Pressure -Maximum	300 psig	300 psig	300 psig
Electrical			
Voltage	± 12, ± 15, 24 VDC (11-36 VDC)	± 12, ± 15, 24 VDC (11-36 VDC)	± 15 VDC @ ± 55 mA
Power	6.7 W	3.1 W	3.1 W
Physical			
Weight (approx.)	37.0 lb (16.8 kg)	30 lb (14 kg)	30 lb (14 kg)
Wetted Materials	316 SS, 302 SS, Ni 200, Viton® (Optional Buna-N®), Kalrez, PTFE	316 SS, 302 SS, Ni 200, Viton® (Optional Buna-N®), PTFE	316 SS, 302 SS, Ni 200, Viton® (Optional Buna-N®), PTFE

1. See Note in Flow Range/Gas Selection section

Standards

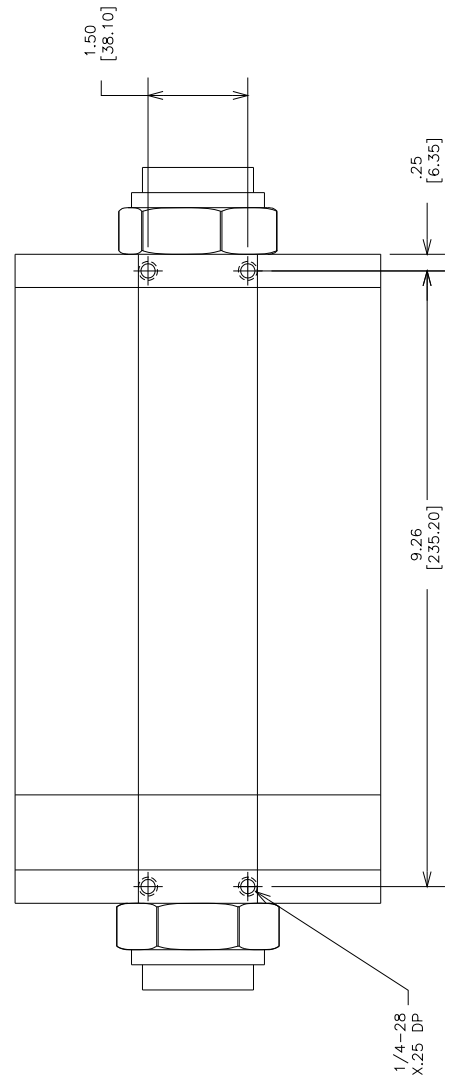
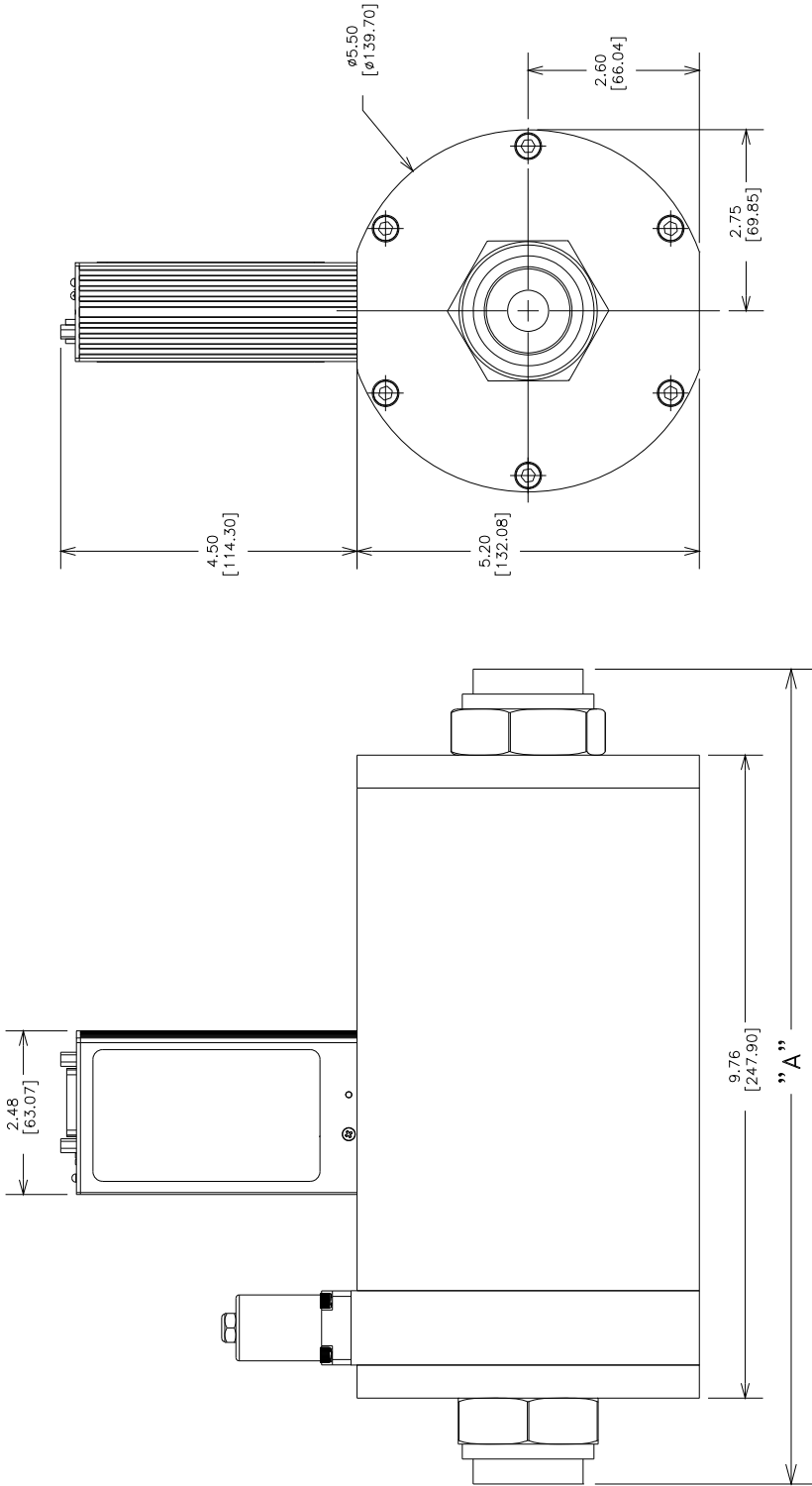
- European Pressure Equipment Directive (PED) 97/23/EC
- EN61010-1 Safety of Electrical Equipment for Measurement, Control and Laboratory Use
- EN 61326:1997/A2:2000 Radiated Emissions (Note: for Mounted Electronics ONLY)
- EN 61326:1997/A2:2000 Conducted Emissions
- EN 61000-4-2:1995/A2:2000 Electrostatic Discharge
- EN 61000-4-3:1995/A2:2000 Radiated RF Immunity
- EN 61000-4-4:1995/A2:2000 Electrical Fast Transient/Burst
- EN 61000-4-6:1996/A2:2000 Conducted RF
- EN 61000-4-8:1993/A2:2000 Magnetic Field
- EN 61000-4-9:1994/A2:2000 Voltage Dips

Hastings Instruments reserves the right to change or modify the design of its equipment without any obligation to provide notification of change or intent to change.

Viton® is a registered trademark of DuPont Performance Elastomers
Kalrez® is a registered trademark of DuPont Performance Elastomers

Buna-N® is a registered trademark of E.I. DuPont de Nemours & Co.

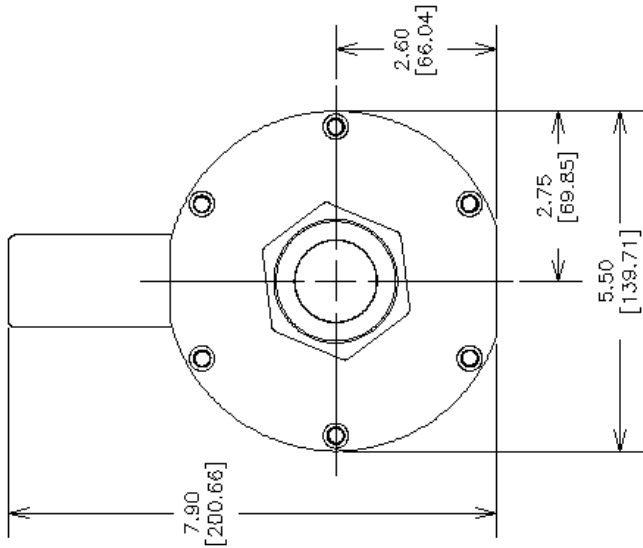
Outline Drawing HFC-D-308A



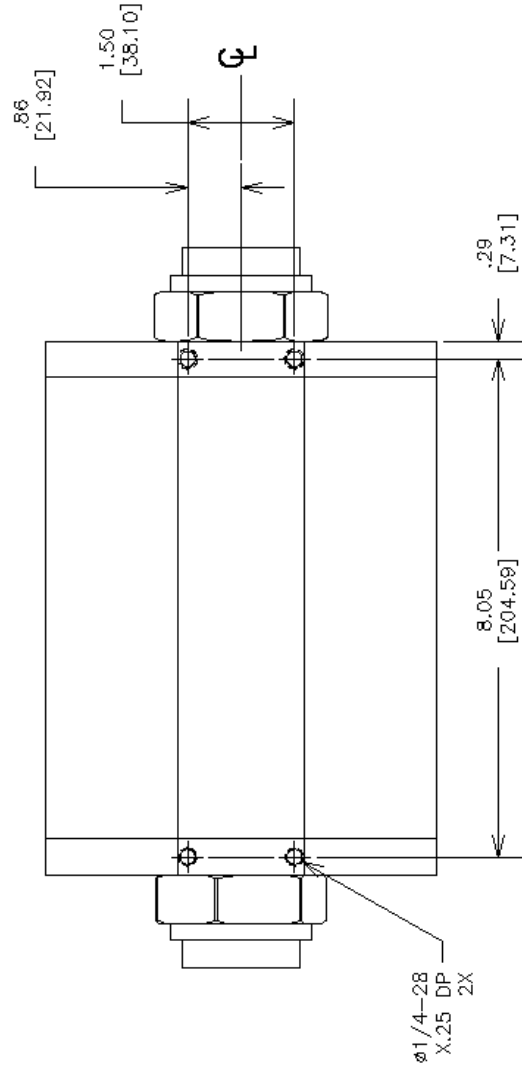
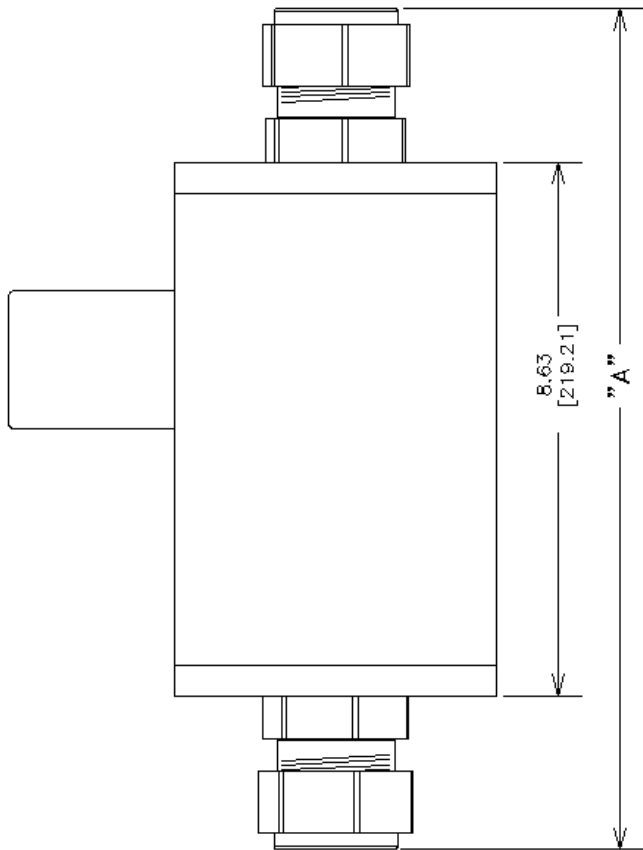
D-308A

FITTING	DIM "A"
SWAGELOK, 1"	12.80 [325.12]
SWAGELOK, 1 1/2"	14.72 [373.89]
SWAGELOK, 2"	16.60 [421.64]

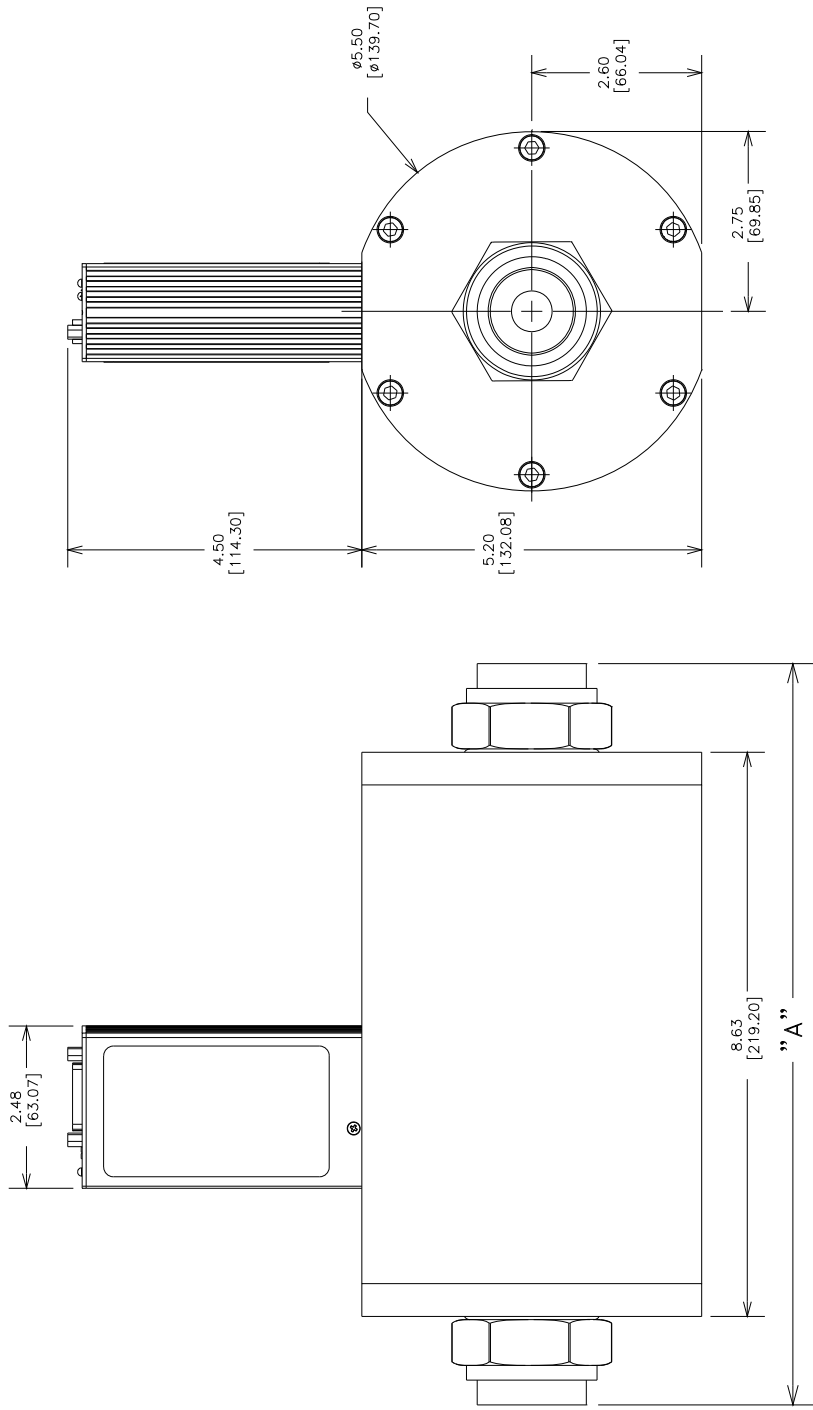
Outline Drawing /HFM-306



FITTING	DIM "A"
SWAGELOK, 1"	11.66 [296.04]
SWAGELOK, 1 1/4"	12.84 [326.01]
SWAGELOK, 2"	15.46 [392.56]

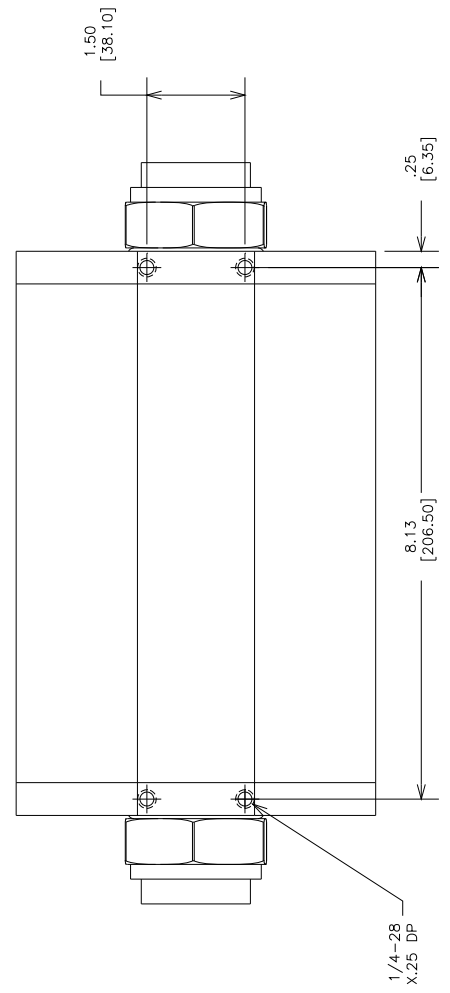


Outline Drawing HFM-D-306A



D-306A

FITTING	DIM "A"
SWAGELOK, 1"	11.66 [296.04]
SWAGELOK, 1 1/4"	12.84 [326.01]
SWAGELOK, 2"	15.46 [392.56]



Selection Chart

Model Number		Pinout	Output	Fittings	Seals	Pressure	Cal	Digital
HFM-D-306A / HFC-D-308A								
Pinout								
01	Pinout H (Std)							
Output								
01	0-5 Volt (Std)							
02	0-10 Volt							
03	4-20 mA							
04	0-20 mA							
Fittings								
01	1" Compression							
02	1 1/2" Compression							
03	2" Compression (Std)							
Seals								
01	Viton® (Std)							
04	Buna-N®							
Pressure								
01	300 psig (Std)							
Calibration								
01	1 NIST Traceable Calibration Report							
02	2 NIST Traceable Calibration Reports							
03	3 NIST Traceable Calibration Reports							
04	4 NIST Traceable Calibration Reports							
05	5 NIST Traceable Calibration Reports							
06	6 NIST Traceable Calibration Reports							
07	7 NIST Traceable Calibration Reports							
08	8 NIST Traceable Calibration Reports							
Digital								
01	RS232 (Std)							
02	RS485							

Selection Chart

Model Number		Pinout	Output	Fittings	Seals	Pressure	Cal
HFM-306							
Pinout							
01	Pinout H (Std)						
Output							
01	0-5 Volt (Std)						
02	4-20 mA						
Fittings							
01	1" Compression						
02	1 1/2" Compression						
03	2" Compression (Std)						
Seals							
01	Viton® (Std)						
04	Buna-N®						
Pressure							
01	300 psig (Std)						
Calibration							
01	NIST 5 Point (Standard)						
02	NIST 10 Point						
03	NIST 20 Point						
04	Curve w/ Polynomial Equation						

Accessories



Flow Transducer Cable Part Numbers: Connect Hastings Power Supply to Hastings Flow Meters & Flow Controllers

AF-4-AM	4' Cable
AF-8-AM	8' Cable
AF-25-AM	25' Cable
AF-50-AM	50' Cable
AF-100-AM	100' Cable
AF-200-AM	200' Cable



Serial Communication Cable:

CB-RS232-RJ12	RS232 Cable (9-Pin "D" Female to RJ12)
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Serial Converter: USB to RS232

CB-USB-RS232	30 cm Cable (USB to 9-Pin "D" Male)
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