



TELEDYNE HASTINGS INSTRUMENTS
Everywhereyoulook™

HFM-D-301A & 305A
Mass Flow Meters

HFC-D-303A & 307A
Mass Flow Controllers

FEATURES

- Range 0 - 25 slm to 0-2500 slm (N₂ Equivalent)
- Excellent Accuracy
±(0.5% of Reading + 0.2% of Full Scale)
- 0-5 VDC or 4-20 mA I/O
- RS232 / RS485
- Typical Settling Time:
 - HFM-D-301/305 < 1 second
 - HFC-D-303/307 1 -2 seconds
- Self-diagnostic Status LEDs
- Auto-Zero (Controllers Only)
- Totalizer
- Large Diameter Sensor Tube
- Operating Pressures to 500 psi or higher
- NIST Traceable Calibration

APPLICATIONS

- Leak Testing
- High Purity Gas Delivery
- Heat Treat
- Gas Blending
- Secondary Calibration Reference
- Fuel Cell R&D
- Environmental Monitoring

BENEFITS

- High Accuracy
- Fast Metering Response
- Superior Linearity
- Rapid Controller Settling Time
- Digital Extended Range

Mass Flow Meters & Controllers



HFM-D-301A *Mass Flow Meter*



HFC-D-303A *Mass Flow Controller*

Description

Teledyne Hastings Instruments' products represent over 70 years of experience in the design and manufacture of mass flow instruments. The Digital 300 Series is a culmination of this experience with patented technologies that make these instruments the finest flowmeters and controllers available today.

The Digital 300 Series of thermal mass flow meters and controllers from Teledyne are designed to accurately measure mass flow without corrections or compensations for gas pressure and temperature. They are accurate to better than ±(0.5% of reading + 0.2% of full scale) for full scale flow rates from 0-25 slm to 0-2500 slm.



TELEDYNE HASTINGS INSTRUMENTS
Everywhereyoulook™

Specifications and Standards

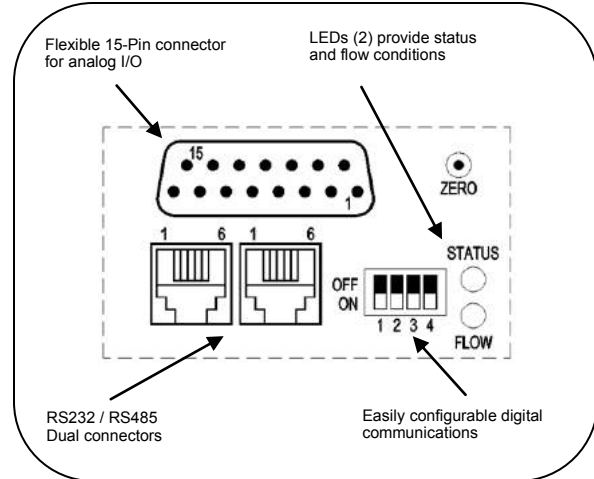
DESCRIPTION (cont.)

The 300 Series uses a thermal-based mass flow sensor. This sensor is designed to provide exceptional linear response to changing flow rates. In addition, the electronics associated with each sensor are precisely tuned to give fast response times.

The flow controller features a precision solenoid proportional control valve. Teledyne configures and tests each individual valve based on the users flow rate, gas, and pressure conditions.

Instruments are normally calibrated with the appropriate standard calibration gas (usually nitrogen), then a gas conversion factor (GCF) is used to adjust the output for the intended gas. Special calibrations for other gases, such as oxygen, helium, and argon, are available upon special request.

Our application engineers can help you review your system requirements and work with you to provide a solution.



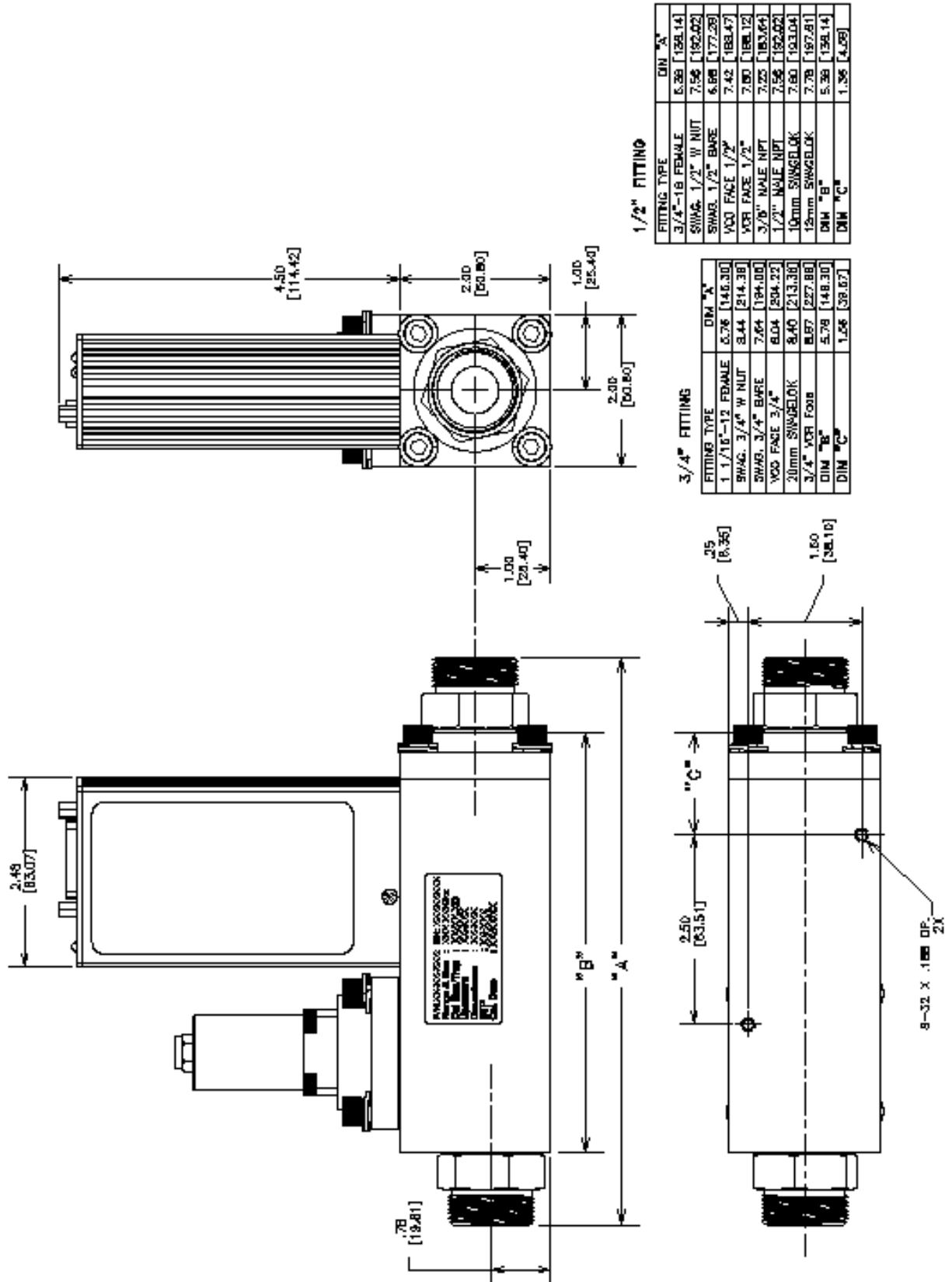
HFM-D-301A / 305A (flow meter)

HFC-D-303A / 307A (flow controller)

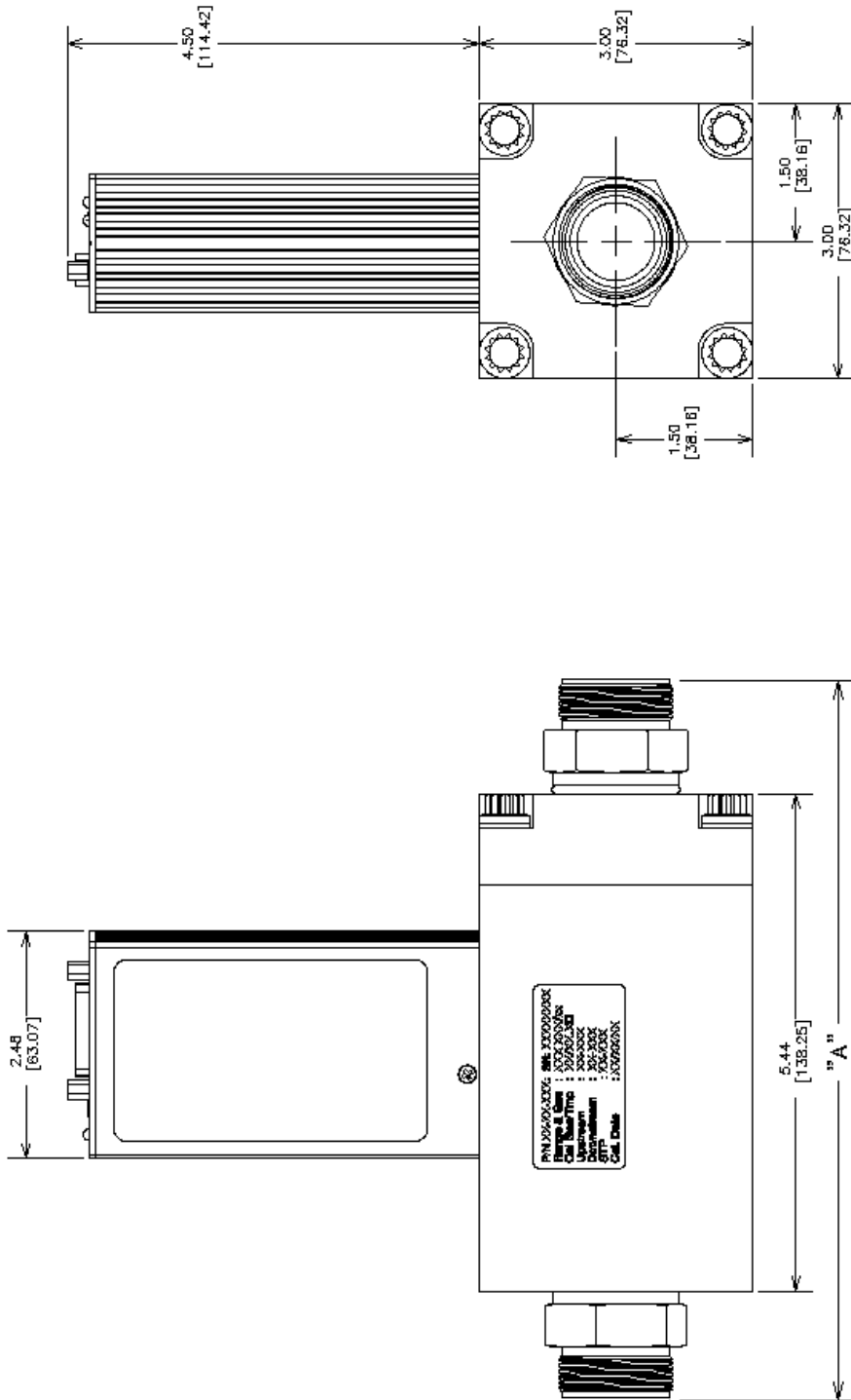
Specifications

Full Scale Ranges:	HFM-D-301A (L): 0-25 slm to 300 slm (N2) HFM-D-301A (H): 0-300 slm to 1000 slm (N2) HFM-D-305A: 0-1000 slm to 2500 slm (N2)	HFC-D-303A (L): 0-25 slm to 300 slm (N2) HFC-D-303A (H): 0-300 slm to 1000 slm (N2) HFC-D-307A: 0-1000 slm to 2500 slm (N2)
Accuracy	± (0.5% of reading + 0.2% of full scale)	± (0.5% of reading + 0.2% of full scale)
Repeatability	± 0.15% of full scale	± 0.15% of full scale
Maximum Working Pressure	500 psig (Optional 1000 psig for HFM-D-301A)	500 psig (Optional 1000 psig for HFC-D-303A)
Operating Temperature	-20 — 70°C in non-condensing environment	-20 — 70°C in non-condensing environment
Warm up time	30 min for optimum accuracy 6 min within rated accuracy	30 min for optimum accuracy 6 min within rated accuracy
Settling Time	Typically < 1 second	Typically 1 –2 seconds
Leak Integrity	< 1 x 10 ⁻⁹ sccs He	< 1 x 10 ⁻⁹ sccs He
Temperature Coefficient of Zero	< ± 0.2% / °C of full scale max (-20—70°C)	N/A for controller with auto-zero enabled
Temperature Coefficient of Span	< ± 0.1% / °C of reading max (-20—70°C)	< ± 0.1% / °C of reading max (-20—70°C)
Analog (standard)	0-5 VDC	0-5 VDC
Analog (optional)	0-10 VDC, 0-20 mA, 4-20 mA	0-10 VDC, 0-20 mA, 4-20 mA
Analog Connector	15-pin subminiature D	15-pin subminiature D
Digital Connector	Dual RJ-12	Dual RJ-12
Attitude Sensitivity of Zero	< 1.4 % of full scale (N2 @ 50 psig)	< 1.4 % of F.S. before auto-zero (N2@50 psig)
Power Requirements	11-36 VDC @ 3.1 Watt (max) Unipolar or Bipolar (e.g. ±15 VDC, ±12 VDC)	11-36 VDC @ 6.7 Watt (max) Unipolar or Bipolar (e.g. ±15 VDC, ±12 VDC)
Wetted Materials	316L SS, Nickel 200, 302 SS, PTFE, Viton	316L SS, Nickel 200, 302 SS, PTFE, Viton, Kalrez® (valve seat)
Weight (approx.)	HFM-D-301A (L) 3.6 lb. (1.6 kg) HFM-D-301A (H) 3.6 lb. (1.6 kg) HFM-D-305A 8.4 lb. (3.8 kg)	HFC-D-303A (L) 5.4 lb. (2.5 kg) HFC-D-303A (H) 5.4 lb. (2.5 kg) HFC-D-307A 15.5 lb. (7.0 kg)

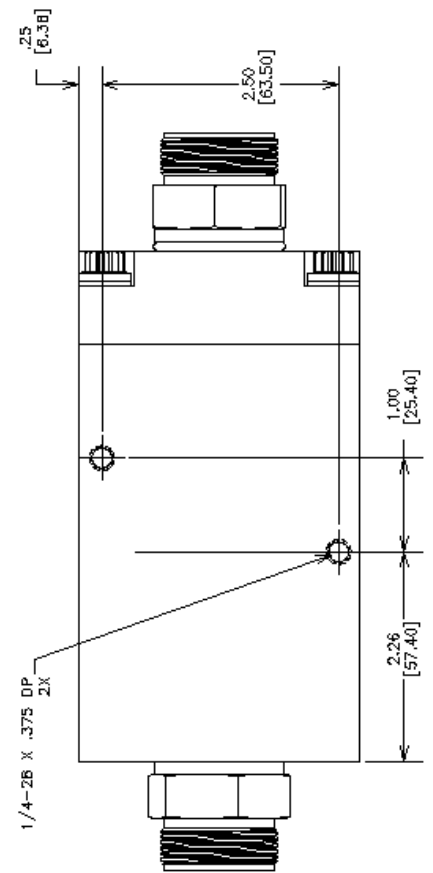
Outline Drawings - HFC-D-303A



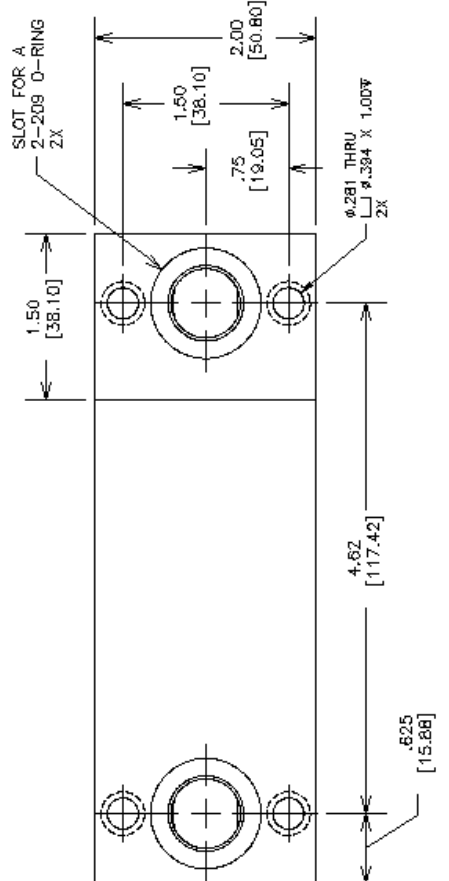
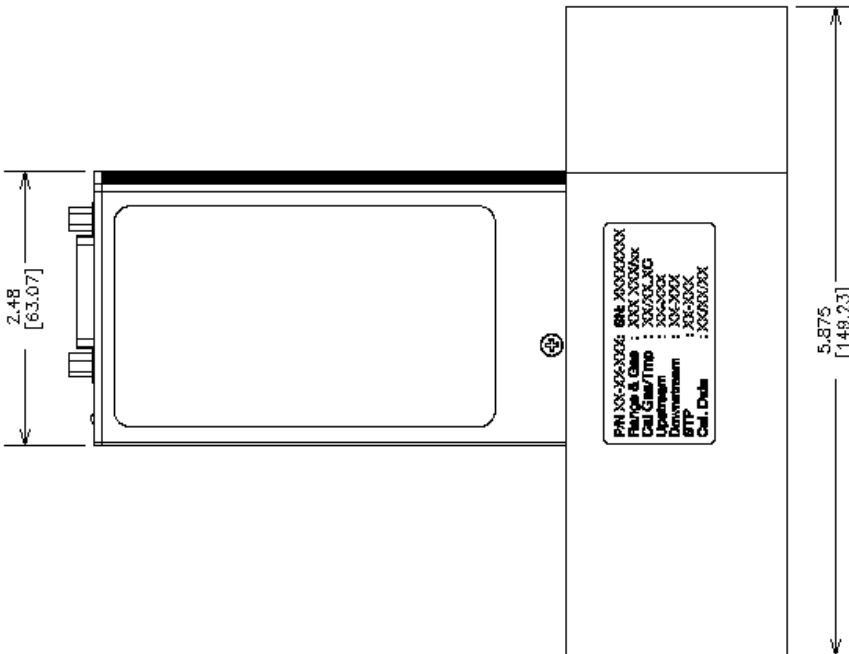
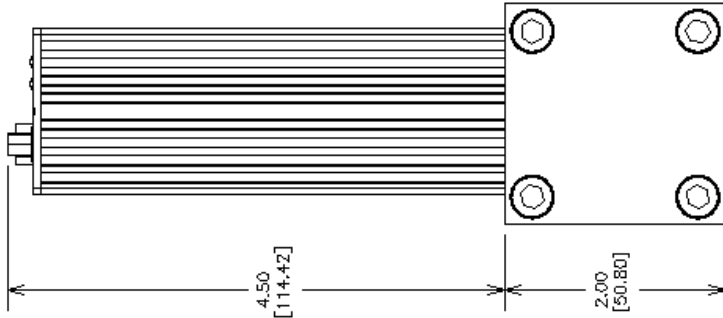
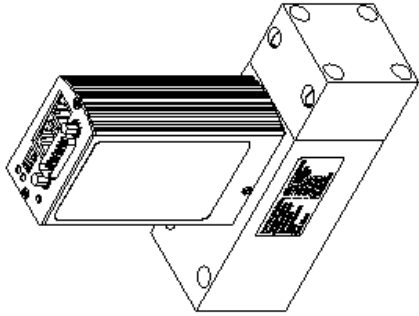
Outline Drawings - HFM-D-305A



FITTING TYPE	DIM "A"
3/4" SWAGELOK	7.38 [187.45]
1" SWAGELOK	7.58 [192.53]
3/4" MALE NPT	7.84 [199.14]
1" MALE NPT	8.22 [208.78]
1" VCO	7.84 [199.14]
1" VCR	8.66 [225.04]
25mm SWAGELOK	7.59 [192.79]
1" 5/16-12 FULL THREAD	5.44 [138.18]
1" FEMALE NPT	8.02 [203.71]



Outline Drawings HFM-D-301A Surface Mount



Selection Chart

For Models	Pin Out	Output	Fittings	Seals	Pressure	Cal	Digital
HFM-D-301A							
HFC-D-303A							

Order No.	Options
Pinout	
01	H Pin (Std)

Output	
01	0-5 volt (Std)
02	0-10 volt
03	4-20 mA
04	0-20 mA

Small Base Fittings	
01	1/2" VCR®
02	1/2" Swagelok (Std)
03	1/2" VCO®
06	3/8" Male NPT
07	1/2" Male NPT
08	3/4"-16 Fem S. Thread
10	10 mm Swagelok
12	12 mm Swagelok

Large Base Fittings	
04	3/4" Swagelok (Std)
05	3/4" VCO®
09	1 1/16"-12 Female ST
11	3/4" VCR
13	20 mm Swagelok

Seals	
01	Viton® (Std)
02	Kalrez®
03	Neoprene
04	Buna-N

Pressure	
01	500 psig max (Std)
02	1000 psig

Calibration	
01	N2 or Air
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
09	9 NIST Traceable Calibration Reports
10	10 NIST Traceable Calibration Reports

Digital	
01	RS232 (std)
02	RS485

Range Information for all Instruments

Each calibration will require the following information:

Range _____

Flow Units _____

Gas _____

For the HFC Instruments also

Upstream Pressure _____
(maximum & minimum)

Downstream Pressure _____
(maximum & minimum)

Does the downstream pressure change with flowrate? Y/N _____

For volumetric units the standard temperature and pressure of the unit is also required
0°C & 760 Torr will be used when other values are not specified

Selection Chart

For Models	Pin Out	Output	Fittings	Seals	Pressure	Cal	Digital
HFM-D-305A							
HFC-D-307A							

Order No.	Options
Pinout	
01	H Pin (Std)

Output	
01	0-5 volt (Std)
02	0-10 volt
03	4-20 mA
04	0-20 mA

Fittings			
01	1" VCR®	05	3/4" Swagelok
02	1" Swagelok (Std)	06	1" Male NPT
03	1" VCO®	07	3/4" Male NPT
04	25 mm Swagelok	08	No Fitting 1 5/16"-12 MS ST
		09	1" Female NPT

Seals	
01	Viton® (Std)
02	Kalrez®
03	Neoprene
04	Buna-N

Pressure	
01	500 psig max (Std)

Calibration	
01	N2 or Air
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
09	9 NIST Traceable Calibration Reports
10	10 NIST Traceable Calibration Reports

Digital	
01	RS232 (std)
02	RS485

Range Information for all Instruments

Each calibration will require the following information:

Range _____

Flow Units _____

Gas _____

For the HFC Instruments also

Upstream Pressure _____
(maximum & minimum)

Downstream Pressure _____
(maximum & minimum)

Does the downstream pressure change with flowrate? Y/N _____

For volumetric units the standard temperature and pressure of the unit is also required
0°C & 760 Torr will be used when other values are not specified