



**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 (N<sub>2</sub> 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**

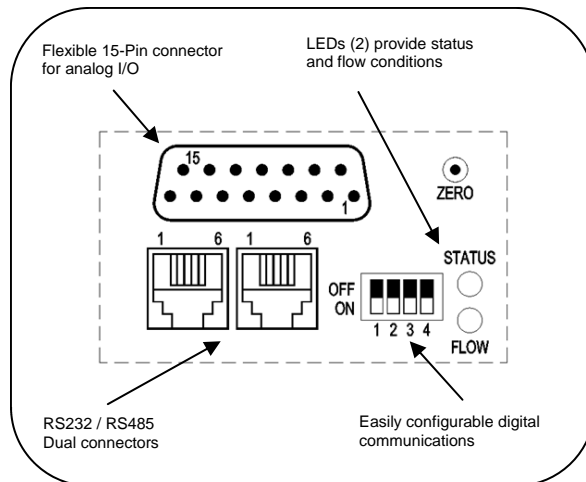


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## Specifications and Standards

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.

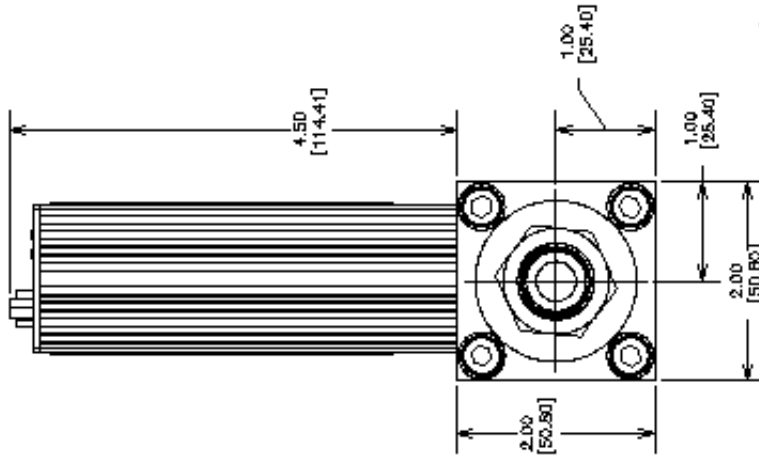
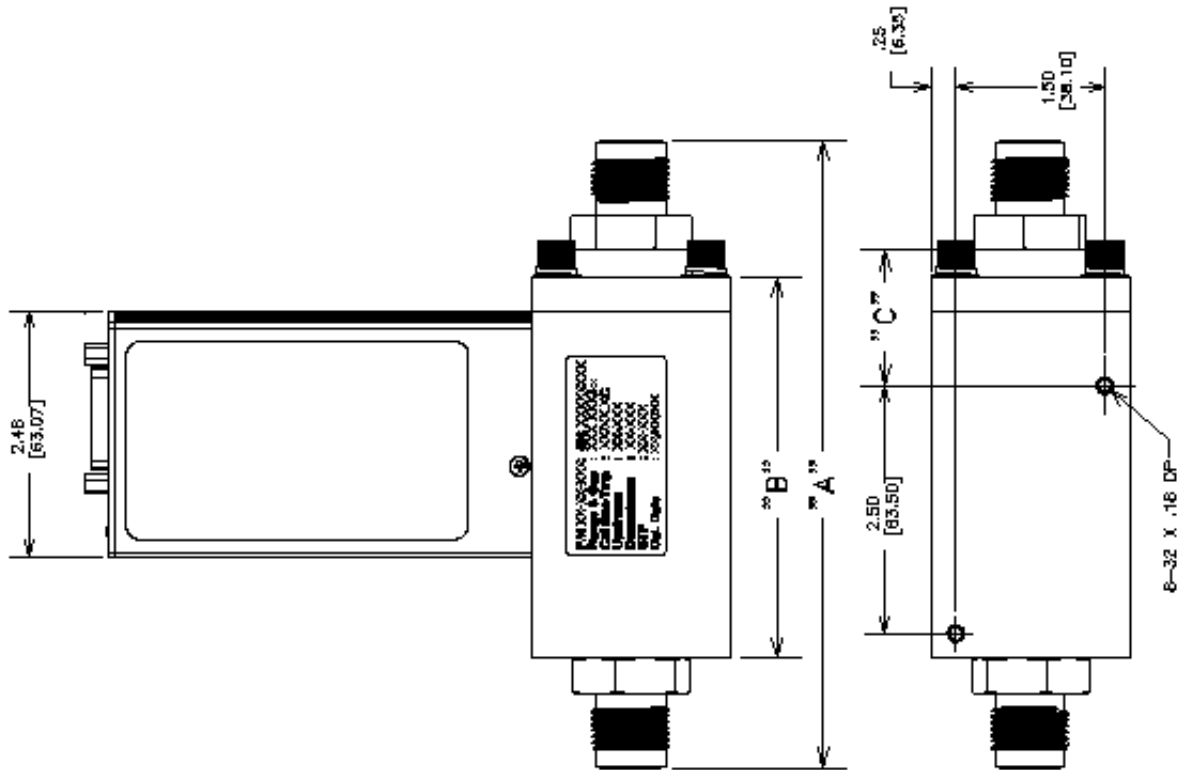
The Digital 300 Series of thermal mass flow meters and controllers from Teledyne are designed to accurately measure mass flow without corrections or compensations for gas pressure and temperature. They are accurate to better than  $\pm(0.5\%$  of reading +  $0.2\%$  of full scale) for full scale flow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



### DESCRIPTION (cont.)

Specifications	HFM-D-301A / 305A	HFC-D-303A / 307A
	(flow meter)	(flow controller)
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	$\pm (0.5\%$ of reading + $0.2\%$ of full scale)	$\pm (0.5\%$ of reading + $0.2\%$ of full scale)
Repeatability	$\pm 0.15\%$ of full scale	$\pm 0.15\%$ 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	< $1 \times 10^{-9}$ sccs He	< $1 \times 10^{-9}$ sccs He
Temperature Coefficient of Zero	< $\pm 0.2\%$ / °C of full scale max (-20—70°C)	N/A for controller with auto-zero enabled
Temperature Coefficient of Span	< $\pm 0.1\%$ / °C of reading max (-20—70°C)	< $\pm 0.1\%$ / °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. $\pm 15$ VDC, $\pm 12$ VDC)	11-36 VDC @ 6.7 Watt (max) Unipolar or Bipolar (e.g. $\pm 15$ VDC, $\pm 12$ 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 - HFM-D-301A



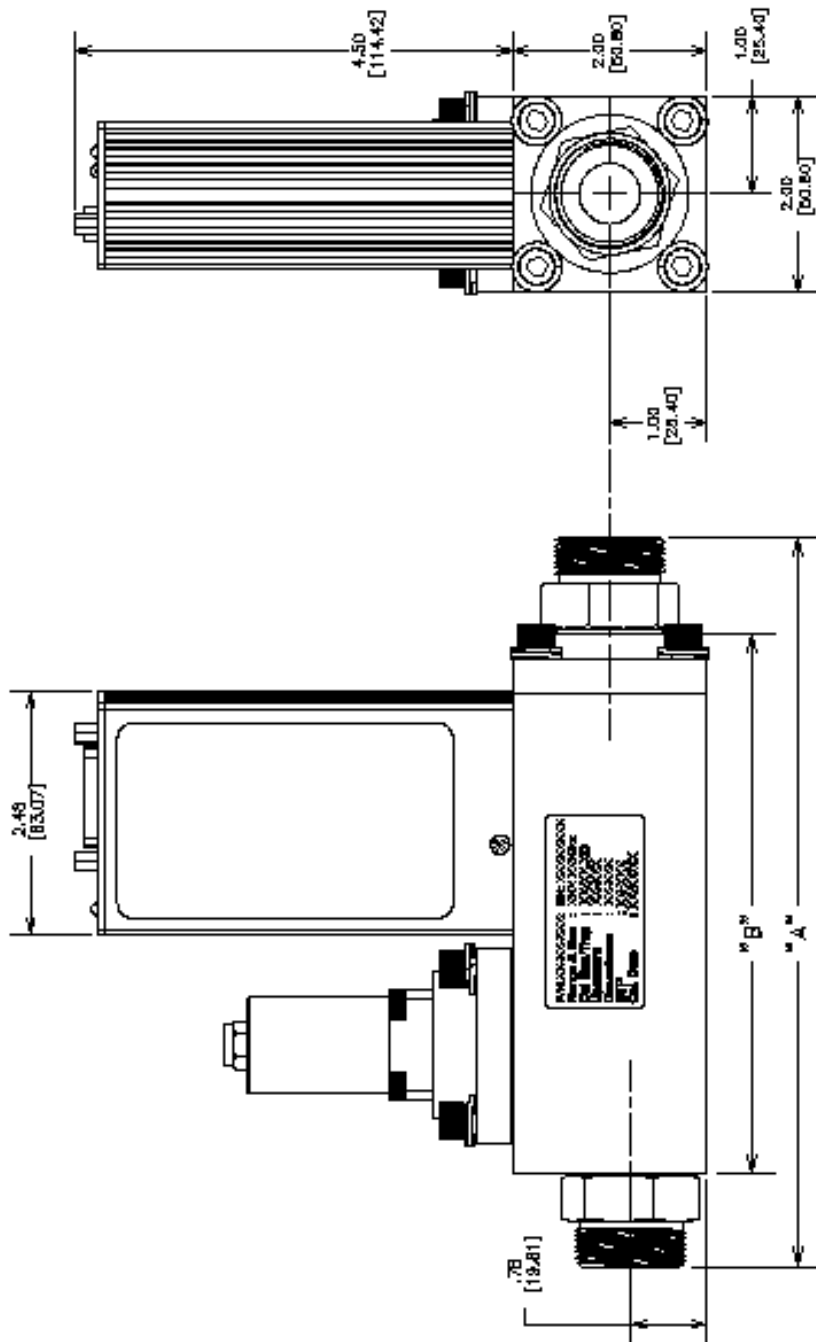
1/2 FITTINGS

FITTING TYPE	DIM "A"
3/4"-16 FEMALE	4.11 [104.39]
SWAG. 1/2" W NUT	6.31 [160.27]
SWAG. 1/2" BARE	5.73 [145.54]
VCR FACE 1/2"	6.17 [156.72]
VCR FACE 1/2"	6.55 [166.37]
3/8" MALE NPT	5.88 [149.39]
1/2" MALE NPT	6.31 [160.27]
10mm SWAGELOK	6.35 [161.29]
12mm SWAGELOK	6.53 [165.98]
DIM "B"	4.08 [103.12]
DIM "C"	1.38 [34.93]

3/4 FITTINGS

FITTING TYPE	DIM "A"
1 1/16"-12 FEMALE	4.31 [109.47]
SWAG. 3/4" W NUT	6.38 [162.95]
SWAG. 3/4" BARE	6.19 [157.23]
VCR FACE 3/4"	6.58 [167.39]
20MM SWAGELOK	6.85 [174.53]
3/4" VCR Face	7.52 [191.08]
DIM "B"	4.06 [103.12]
DIM "C"	1.58 [39.87]

Outline Drawings - HFC-D-303A

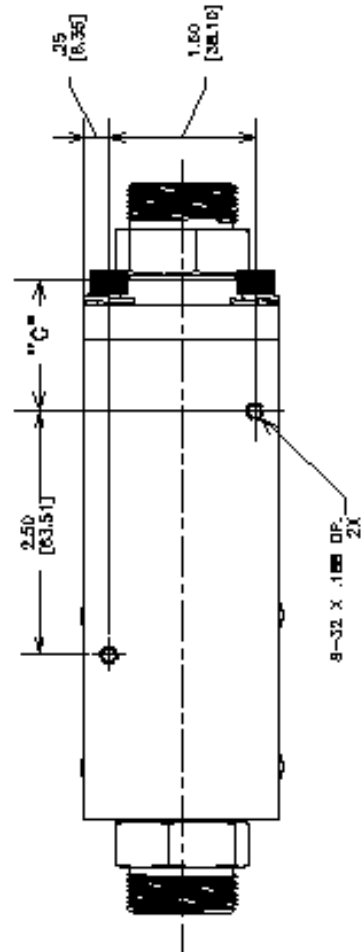


1/2" FITTING

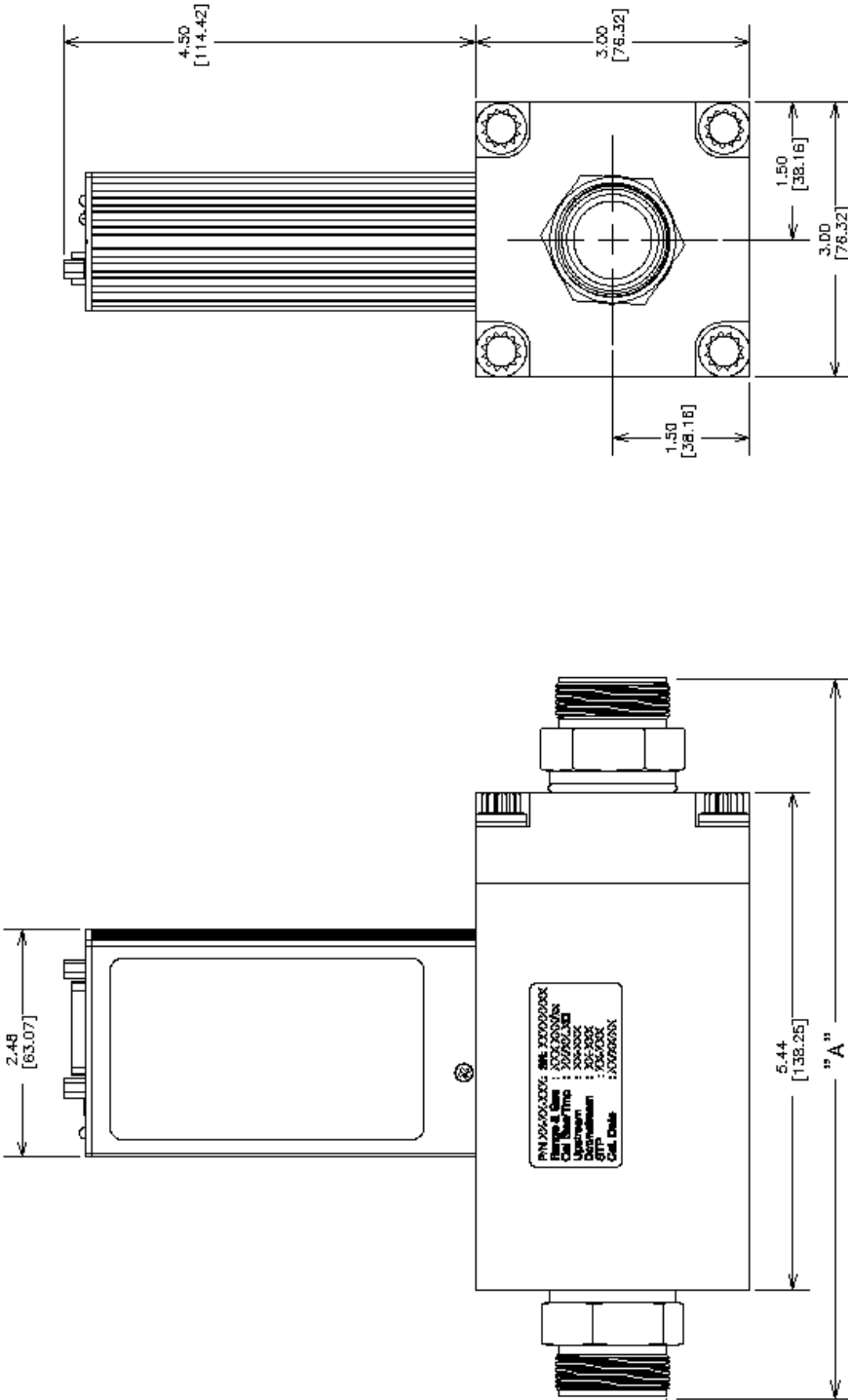
FITTING TYPE	DN "A"
3/4"-18 FEMALE	6.35 [158.14]
SWAG. 1/2" W NUT	7.56 [192.02]
SWAG. 1/2" BARE	6.88 [172.28]
VCR FACE 1/2"	7.42 [188.47]
VCR FACE 1/2"	7.60 [193.04]
3/8" MALE NPT	7.25 [183.64]
1/2" MALE NPT	7.56 [192.02]
10mm SWAGLOK	7.60 [193.04]
15mm SWAGLOK	7.78 [197.81]
DN "B"	5.38 [138.14]
DN "C"	1.36 [34.58]

3/4" FITTING

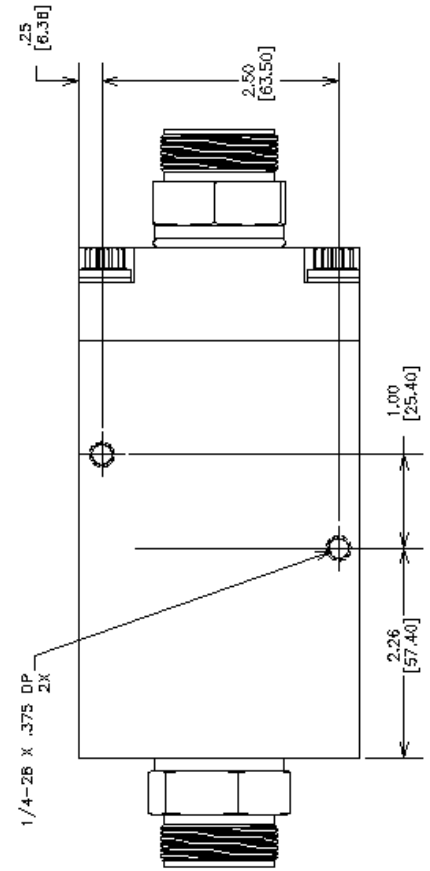
FITTING TYPE	DN "A"
1 1/16"-12 FEMALE	6.76 [171.30]
SWAG. 3/4" W NUT	8.44 [214.38]
SWAG. 3/4" BARE	7.64 [194.00]
VCR FACE 3/4"	8.04 [204.22]
20mm SWAGLOK	8.40 [213.36]
3/4" VCR FOM	8.67 [222.80]
DN "B"	5.78 [148.30]
DN "C"	1.56 [39.67]



Outline Drawings - HFM-D-305A

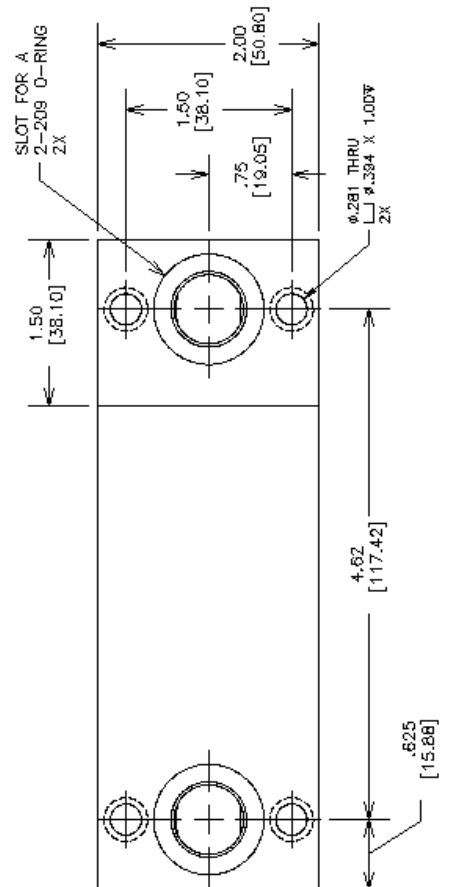
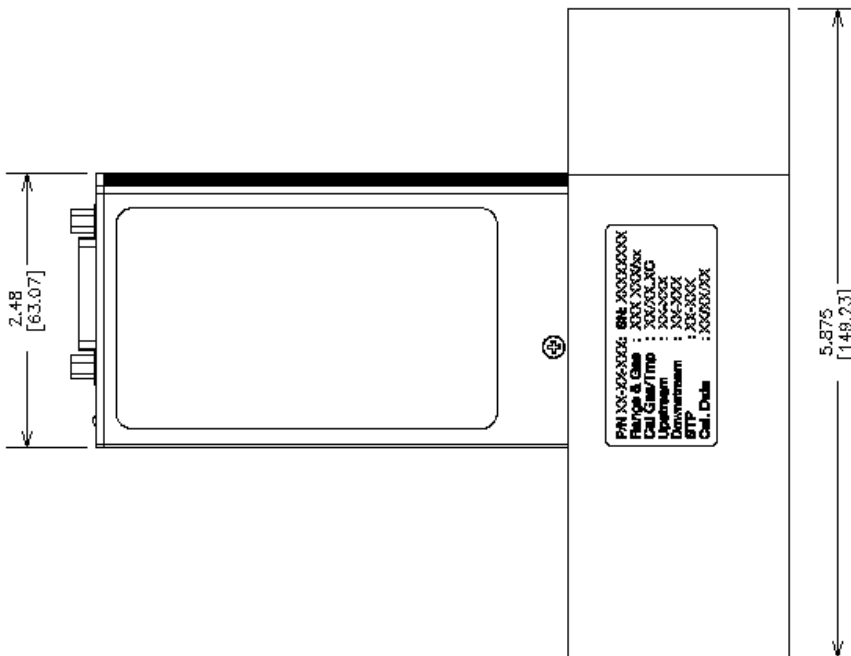
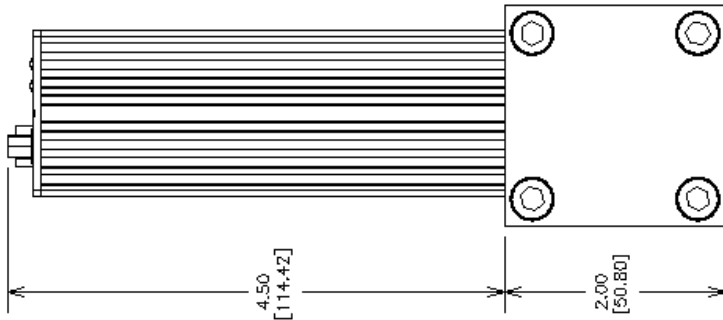
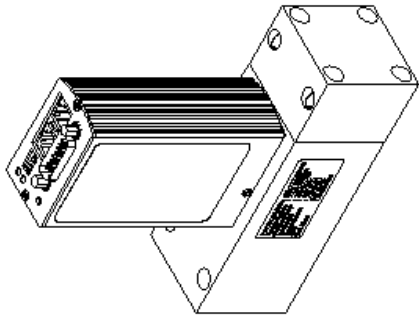


FITTING TYPE	DIM "A"
3/4" SWAGELOK	7.38 [187.45]
1" SWAGELOK	7.58 [192.53]
3/4" MALE NPT	7.84 [199.14]
1" MALE NPT	8.22 [208.78]
1" VCR	7.84 [199.14]
1" VCR	8.66 [225.04]
25mm SWAGELOK	7.59 [192.79]
1" 5/16-12 FULL THREAD	5.44 [138.18]
1" FEMALE NPT	8.02 [203.71]





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
<b>Pinout</b>	
01	H Pin (Std)

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

<b>Small Base Fittings</b>	
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

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

<b>Seals</b>	
01	Viton® (Std)
02	Kalrez®
03	Neoprene
04	Buna-N

<b>Pressure</b>	
01	500 psig max (Std)
02	1000 psig

<b>Calibration</b>	
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

<b>Digital</b>	
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
<b>Pinout</b>	
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 <sup>®</sup>	05	3/4" Swagelok
02	1" Swagelok (Std)	06	1" Male NPT
03	1" VCO <sup>®</sup>	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 <sup>®</sup> (Std)
02	Kalrez <sup>®</sup>
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