



TELEDYNE HASTINGS INSTRUMENTS
Everywhereyoulook™

HFM-301: Mass Flow Meter

HFC-303: Mass Flow Controller

FEATURES

- Range: 0 - 25 slm to 0 - 1000 slm (N₂ Equivalent)
- Accuracy: ±1% of Full Scale
- 0-5 VDC or 4-20 mA I/O
- Typical Settling Time:
 - HFM-301 ≤ 0.4 sec
 - HFC-303 ≤ 2 sec
- Large Diameter Sensor Tube (low dP)
- Low Wetted Surface Area
- Operating Pressures of 500 psi or higher
- NIST Traceable Calibration

APPLICATIONS

- Leak Testing
- Thermal Spray
- High Purity Gas Delivery
- Thin Film Deposition
- Gas Blending
- Fuel Cell R&D

BENEFITS

- High Accuracy
- Fast Response
- Superior Linearity
- Rapid Settling Time
- Fold-over Protection

Mass Flow Meters & Controllers



HFM-301 Mass Flow Meter



HFC-303 Mass Flow Controller

Description

Teledyne Hastings Instruments' products represent over 75 years of experience in the design and manufacture of mass flow instruments. The 300 Series is a culmination of this experience with patented technologies that make these instruments an excellent choice for a wide variety of demanding applications.

The 300 Series transducer contains 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.



TELEDYNE HASTINGS INSTRUMENTS
Everywhereyoulook™

Specifications and Standards

The 300 Series flow meter consists of a linear flow transducer combined with a precision laminar flow element. In many flow meters, the major sources 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 medium flow 300 Series: HFM-301 flow meter and the HFC-303 flow controller. Both models provide flow measurement to better than $\pm 1.0\%$ of full scale. Instruments are normally calibrated with the appropriate standard calibration gas (air), then a correction factor is used. The HFC-303 flow controller features a two-stage valve which can be configured to control flows up to 1000 SLM.

Teledyne Hastings is recognized throughout the world as a leader in high flow instrumentation. Our infrastructure, 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.

External Power Supplies & Displays Available



THCD-401: 4 Channel Power Supply

COMMON SPECIFICATIONS HFM-301/HFC-303

Full Scale Flow Ranges (in N ₂)	0 - 25 SLM to 0 - 1000 SLM (N ₂)
Accuracy ¹	$\pm 1.0\%$ full scale
Repeatability	$\pm 0.2\%$ full scale
Operating Temperature	- 20 — 70°C
Warm up Time	30 min for optimum accuracy 2 min for $\pm 2\%$ of full scale
Temperature Coefficient (zero)	Maximum $\pm 0.12\%$ (FS)/°C (-20 - 70°C)
Temperature Coefficient (span)	Maximum $\pm 0.08\%$ (Rdg)/°C (-20 - 70°C)
Maximum Operating Pressure	500 psig Optional: 1000 psig
Pressure Coefficient	< 0.016% of reading /psi (N ₂ , 0-1000 psig)
Attitude Sensitivity of Zero	< 2% of F.S.

SPECIFICATIONS HFM-301

Power Requirements	± 15 VDC @ 70 mA
Settling Time/Response Time	< 0.4 seconds (0% to 100% F.S.)
Wetted Materials	316 SS, 302 SS, Nickel 200, Viton
Weight (approx.)	3.5 lb (1.6 kg) 1/2" Fitting "L" Base (0-300 slm) 3.4 lb (1.5 kg) 3/4" Fitting "H" Base (300-1000 slm)

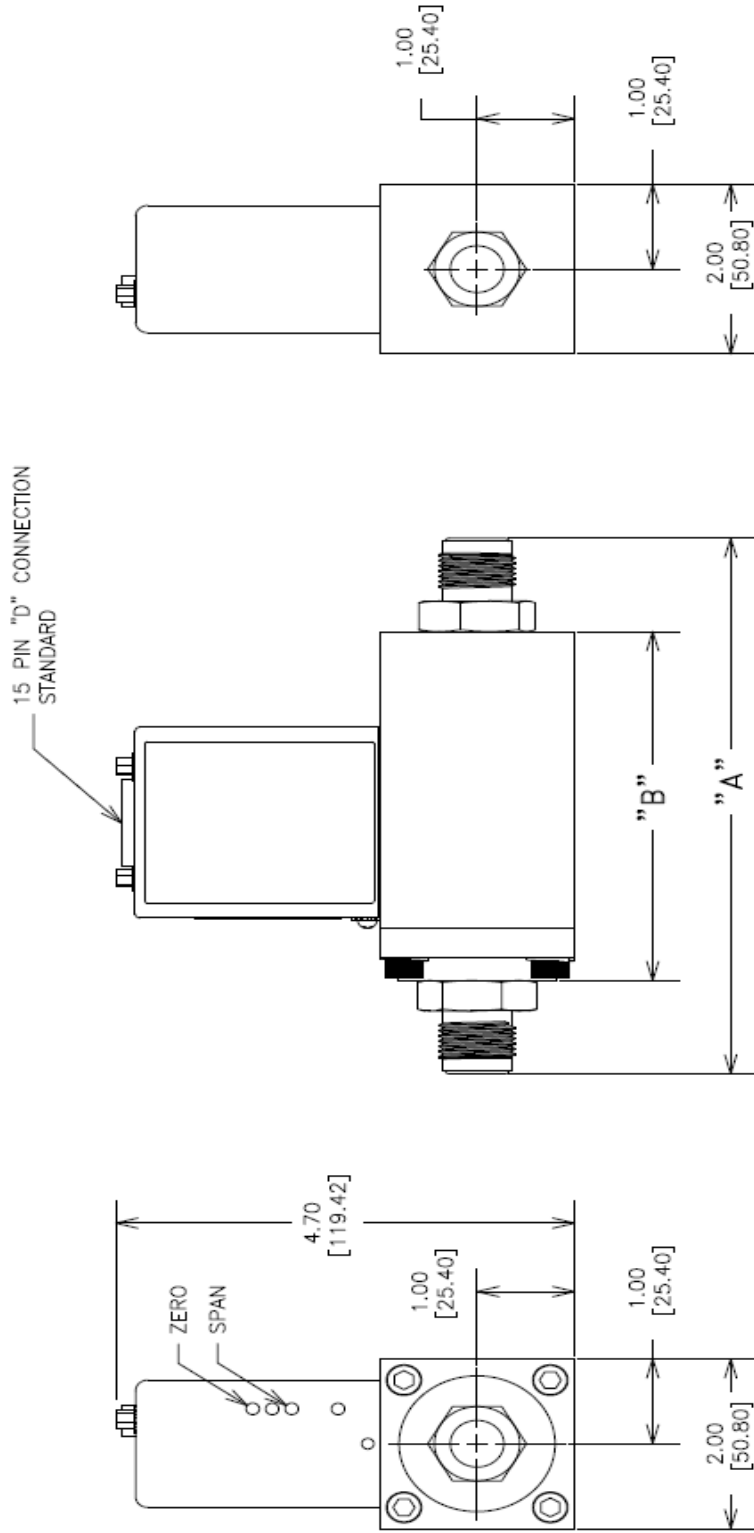
SPECIFICATIONS HFC-303

Power Requirements	± 15 VDC @ 185 mA
Settling Time/Response Time	< 2.0 seconds (10% to 100% F.S.)
Wetted Materials	302 SS, 316L SS, Nickel 200, Viton, Teflon®, Kalrez® (valve seat)
Setpoint Input	0-5 VDC or 4-20 mA
Weight (approx.)	5.3 lb (2.4 kg) (0-300 slm) 5.2 lb (2.3 kg) (300-1000 slm)

¹ See Product Manual for critical information on instrument accuracy and the use of GCFs (gas conversion factors). Stated accuracy is for nitrogen or other gas specific calibration and use with this gas only.

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

HFM-301 Outline Drawing

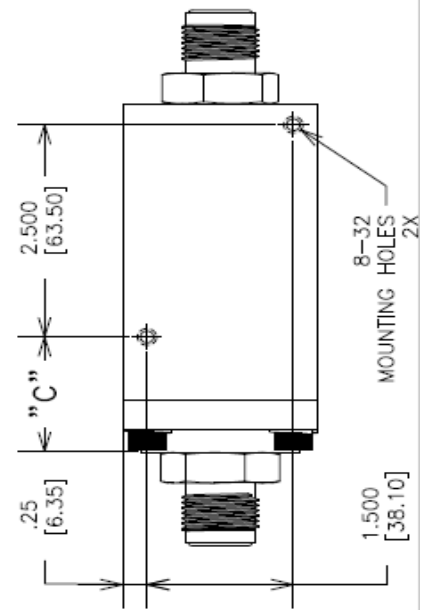


SMALL BASE (1/2" FITTINGS)

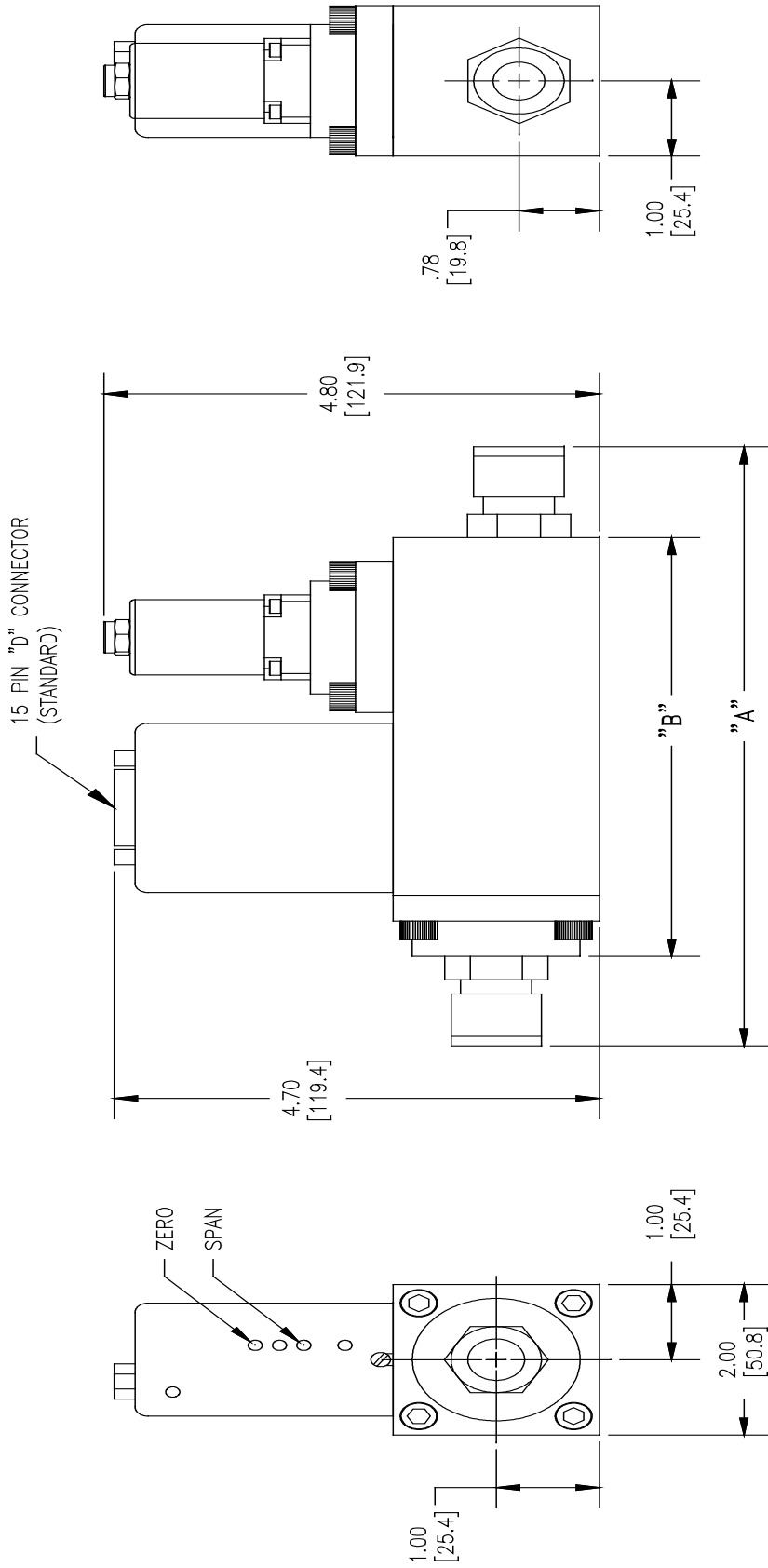
FITTING TYPE	DIM "A"
3/4"-16 FEMALE	4.11 [104.44]
SWAG. 1/2" W NUT	6.31 [160.27]
SWAG. 1/2" BARE	5.73 [145.54]
VCO FACE 1/2"	6.17 [156.72]
VCR FACE 1/2"	6.55 [166.37]
3/8" MALE NPT	5.98 [151.89]
1/2" MALE NPT	6.31 [160.27]
10mm SWAGELOK	6.35 [161.29]
12mm SWAGELOK	6.53 [165.86]
3/8" SWAGELOK	6.11 [155.19]
DIM "B"	4.11 [104.44]
DIM "C"	1.36 [34.59]

LARGE BASE (3/4" FITTINGS)

FITTING TYPE	DIM "A"
1 1/16"-12 FEMALE	4.31 [109.47]
SWAG. 3/4" W NUT	6.99 [177.55]
SWAG. 3/4" BARE	6.19 [157.23]
VCO FACE 3/4"	6.59 [167.39]
20MM SWAGELOK	6.95 [176.53]
3/4" VCR Face	7.52 [191.06]
DIM "B"	4.11 [104.44]
DIM "C"	1.56 [39.67]



HFC-303 Outline Drawing

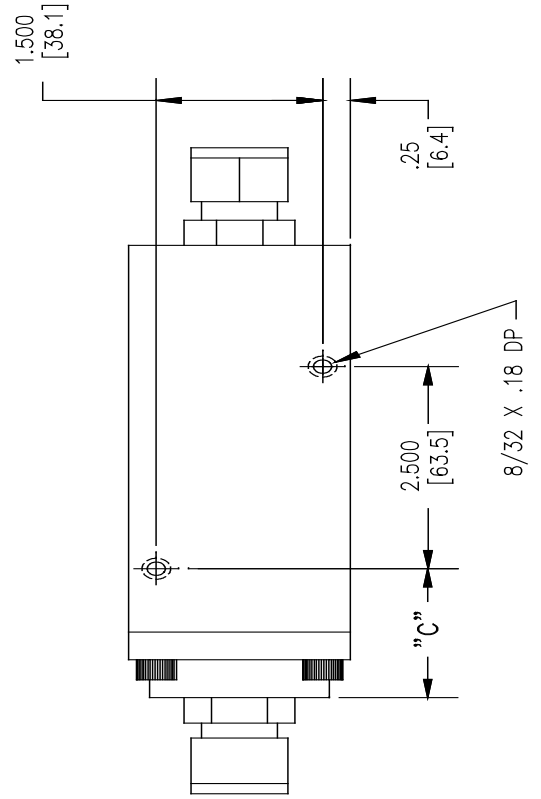


SMALL BASE (1/2" FITTING)

FITTING TYPE	DIM "A"
3/4" -16 FEMALE	5.36 [136.14]
SWAG. 1/2" W NUT	7.56 [192.02]
SWAG. 1/2" BARE	6.98 [177.29]
VCR FACE 1/2"	7.42 [188.47]
VCR FACE 1/2"	7.80 [198.12]
3/8" MALE NPT	7.23 [183.64]
1/2" MALE NPT	7.56 [192.02]
10mm SWAGELOK	7.60 [193.04]
12mm SWAGELOK	7.78 [197.61]
DIM "B"	5.36 [136.14]
DIM "C"	1.36 [4.59]

LARGE BASE (3/4" FITTING)

FITTING TYPE	DIM "A"
1 1/16" -12 FEMALE	5.76 [146.30]
SWAG. 3/4" W NUT	8.44 [214.38]
SWAG. 3/4" BARE	7.64 [194.06]
VCR FACE 3/4"	8.04 [204.22]
20mm SWAGELOK	8.40 [213.36]
3/4" VCR FACE	8.97 [227.89]
DIM "B"	5.76 [146.30]
DIM "C"	1.56 [39.67]



Selection Chart

Model No.	Pin Out	Output	Fittings	Seals	Pressure	Cal	Valve
HFM-301 HFC-303							

Connector	
01	Pinout "H" (std)
02	Pinout "U"

Output	
01	0-5 VDC (std)
02	4-20 mA Out / 0-5 VDC In
03	4-20 mA Input / Output

Small Base Fittings (L)	
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 Female Straight
10	10 mm Swagelok
12	12 mm Swagelok
14	Surface Mount (HFM only)
15	3/8" Swagelok

Large Base Fittings (H)	
04	3/4" Swagelok (std)
05	3/4" VCO®
09	1 1/16-12 Fem. Straight
11	3/4" VCR®
13	20 mm Swagelok

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

Pressure	
01	500 psig (std)
02	1000 psig

Calibration	
01	NIST 5 point
02	NIST 10 point
03	NIST 20 point
04	Curve w/ Polynomial

Valve	
01	Normally Closed
02	Normally Open

Telephone: (757) 723-6531
 Toll Free: (800) 950-2468
 www.Teledyne-hi.com
 E-mail: Hastings_Instruments@Teledyne.com
 804 Newcombe Avenue
 Hampton, VA 23669

