Cox
Turbine Flow Meters

Precision Meters

LoFlo Meters

DESCRIPTION

Cox Precision LoFlo Meters are designed to provide exceptional repeatability and speed of response when measuring very low flow rates. The LoFlo meter features a cantilever axial helical rotor design and robust ceramic ball bearings. The meter design is suited for more rugged applications, where other meters are susceptible to damage derived from vibrations or shock. Additionally, the stainless steel square body facilitates 5000 psi line pressure and provides flat wrench surfaces to assist in installation and removal.

APPLICATIONS

The Cox LoFlo meter thrives in—but is not limited to—applications such as:

- Attitude and position control rocket engines
- Compatibility with exotic fuels and oxidizers, such as:
  - N204
  - UDMH
  - MMH
  - Hydrazine
  - Refrigerant
  - Blending applications
- Leak detection
- Fuel monitoring
- Batching

CALIBRATIONS

Calibrations are accomplished by using various blends of solvent and oil to simulate actual fluid conditions. For varying process temperature conditions, multiple viscosity calibrations are used to develop a universal viscosity curve. UVC calibrations enable a flow computer to track temperature and compensate for fluid viscosity. Flow Dynamics tailors calibrations to replicate process conditions, so the meter is characterized to provide the best attainable accuracy.

Calibrations are performed by our Flow Dynamics NVLAP (Lab Code 200668-0) accredited calibration facility located in Scottsdale AZ, which uses primary standard calibrators, offering uncertainties of ± 0.05 percent of reading with ± 0.02 percent repeatability. Users can be assured that Cox Precision Meters come with a best-in-class calibration traceable to NIST standards.

OPERATION AND PERFORMANCE

As a fluid passes through the meter, the velocity of the fluid creates rotational energy on the rotor. The rotor blades, passing through a magnetic or radio frequency field, generate pulses proportional to flow. Each pulse is transmitted to the meter electronics, where it amplifies the pulse output.

The LoFlo models are inherently nonlinear, due to their small blade geometry, but are repeatable within ± 0.25 percent of reading. For more complex flow measurement applications, a flow processor is recommended to linearize and temperature compensate the flow meter output. Because each application differs in the type of fluid and operating temperature range, the actual linearity and temperature compensation results will vary. Cox's experienced application engineers can recommend the flow meter model and calibration parameters to obtain the best accuracy possible. Temperature fluid viscosity compensation, to include the meter bore diameter using thermal expansion coefficients, are achieved by means of Strouhal-Roshko equations.

Performance Specifications

- Repeatability: ± 0.25% of reading
- Calibrator Uncertainty: ± 0.05% of reading
- Frequency Output: 1500 … 1800 Hz (Maximum)
- Response Time: 20…30 ms or better (at 1.2 cSt)
- Pressure Rating: 5000 psi (4 times less than burst)

NVLAP Lab Code 200668-0

Badger Meter

CXX-DS-00212-EN-05 (April 2014)

Product Data Sheet

CONSTRUCTION

Cox Precision LoFlo meters feature 316 stainless steel housings. Wetted materials include axial helical rotors made of 17-4 stainless steel, which rotate on robust ceramic ball bearings. The supports and all other materials are made from 300 series stainless steel.

Materials of Construction

Body	316 stainless steel
Shafts	316 stainless steel
Rotors	17-4 PH stainless steel
Bearing	Ceramic ball

METER INSTALLATION

Cox Turbine Flow Meters mount directly in the piping and can be installed in any position without affecting performance. However, best accuracy is attained when the installed orientation is the same as the horizontal calibrated position.

To reduce flow turbulence, a straight section of tube, at a minimum of 10 diameters in length upstream and a similar section at a minimum of five diameters downstream, is recommended. Where impractical due to space limitations, careful attention to location of valves, bends, etc., is suggested. Additionally, the meter can be calibrated in the same piping configuration to compensate for piping bends. Flow straightener sections are available from Cox Flow Measurement. For best performance and longevity, upstream filtration (10...40 micron) is recommended to prevent bearing contamination and to avoid rotor blade damage.

FLOW RANGE SPECIFICATIONS

Size	Flow Range (10:1 flow Ratio)		Extended Flow Range*		Maximum Frequency (Hz)	ΔP ** PSID (kg/cm²)
	gpm (lpm)	lb/hr (kg/hr)	gpm (lpm)	lb/hr (kg/hr)		
6-000	0.007…0.075 (0.027 … 0.284)	2.850…28.50 (1.290 …12.90)	0.006…0.075 (0.024 … 0.284)	2.200…28.50 (0.998 … 12.90)	1800	20.0 (1.4)
6-00	0.012…0.125 (0.045…0.473)	4.750…47.50 (2.150…21.50)	0.009…0.125 (0.034…0.473)	3.400…47.50 (1.540…21.50)	1800	12.0 (0.84)
6-0	0.025…0.250 (0.095…0.946)	9.500…95.00 (4.310…43.10)	0.014…0.250 (0.053…0.946)	5.400…95.00 (2.450…43.10)	1800	4.50 (0.32)
6-1	0.050…0.500 (0.189…1.890)	19.00…190.0 (8.620…86.20)	0.023…0.500 (0.087…1.890)	8.800…190.0 (3.990…86.20)	1500	4.00 (0.28)
6-2	0.075…0.750 (0.284…2.840)	28.50…285.0 (12.90…129.0)	0.037…0.750 (0.140…2.890)	13.20…285.0 (5.990…129.0)	1500	4.50 (0.32)
6-3	0.125…1.250 (0.473…4.730)	47.50…475.0 (21.50…215.0)	0.060…1.250 (0.227…4.730)	22.00…475.0 (9.980…215.0)	1350	7.00 (0.49)

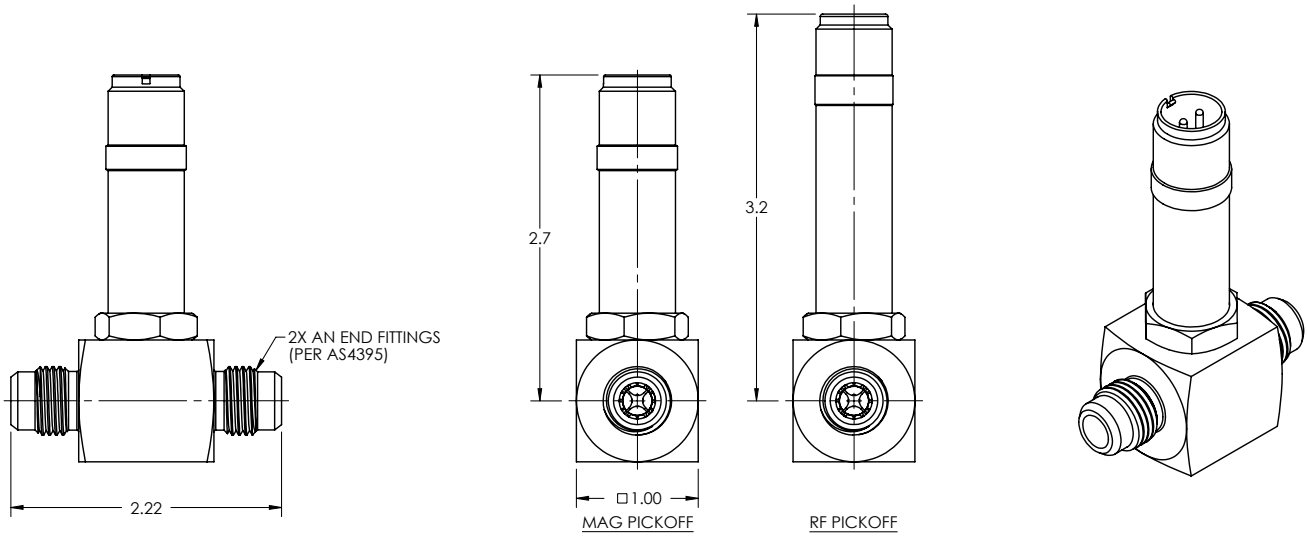
* With use of RF (Carrier) Pickoff

**Pressure drop is based on liquid with a specific gravity of 0.77, at maximum frequency

DIMENSIONS

The dimension from the center of bore to top of pickoff represents the most common pickoff types. Length may vary depending on pickoff choice. Consult factory for details.

NOTE: Dimensions below are shown in inches.



METER MODEL NUMBER

Cox Precision LoFlo Turbine Flow Meters

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Model						
Precision Turbine LoFlo	CLF					
Meter Size						
6-000 (3/8" AN Fitting)		A6				
6-00 (3/8" AN Fitting)		B6				
6-0 (3/8" AN Fitting)		C6				
6-1 (3/8" AN Fitting)		D6				
6-2 (3/8" AN Fitting)		E6				
6-3 (3/8" AN Fitting)		F6				
End Fitting Type						
37° MS Flare			AN			
Bearing						
Hybrid Ceramic Ball Bearing, Water/Hydrocarbon Service				C		
Pickoff						
RF | 2-Pin MS | -250…400° F |					C01	
RF | 2-FL | -250…400° F |					C02	
RF | FL | -330…450° F | RTD					C03	
RF | 3-Pin MS | -40…185° F | Signal Conditioner, IS					C04	
RF | 3-Pin MS | -40…185° F | Amp, ATEX, IS					C05	
RF | 3-Pin MS | -40…248° F | Amp					C06	
RF | 6-Pin MS | -49…284° F | Amp, RTD					C07	
RF | 6-Pin Micro DIN | -49…284° F | Amp, RTD					C08	
RF | 3-FL | -40…248° F | Amp					C09	
MAG | 2-Pin MS | -450…450° F | 45-55 G					M01	
Specials						
3-Digit Special Code (Leave blank for non-custom orders.)						XXX

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