



NT[®] ELECTRONIC FLOWMETER

Provides simultaneous flow and pressure outputs



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Flow and Pressure Measurement

Whether it's automation, process control or safety concerns that require flow and pressure measurement, the instrumentation must be clean, accurate and reliable. To meet the needs of the semiconductor industry, Entegris combines the latest electronic sensing technology and high purity materials to create leading-edge products that allow for greater control of process variables.

- No moving parts to generate particles
- Nonmetallic sensing technology for reliable measurement
- Integral pressure transducer for additional process information
- Flow-through design to minimize dead volume
- 1% full scale accuracy for critical measurements
- Easy installation in any orientation

Constructed for Compatibility

The NT® Electronic Flowmeter is designed for use in ultra high purity applications in the semiconductor industry and is compatible with highly corrosive processes. The flow-through design minimizes dead volume, reducing the possibility of process contamination. This instrument features PTFE and other high purity fluoropolymers for all wetted parts. With the FEP-jacketed pigtail available as the standard electrical connection, the flowmeter is resistant to harsh chemical environments and external spraydowns.

Sensing Technology

Using a nonmetallic pressure sensing technology, the instrument utilizes differential pressure to provide an accurate and reliable flow and pressure measurement. Flow and pressure measurements are not affected by bubbles or trapped vapor. All products are factory calibrated and 100% verified, require no field calibration and are simple to install. Standard electronic outputs enable easy integration with PLCs, control systems and electronic displays.

Applications

Measuring flow and line pressure allows the user to obtain valuable and critical diagnostic information which is used for monitoring or controlling process applications, such as:

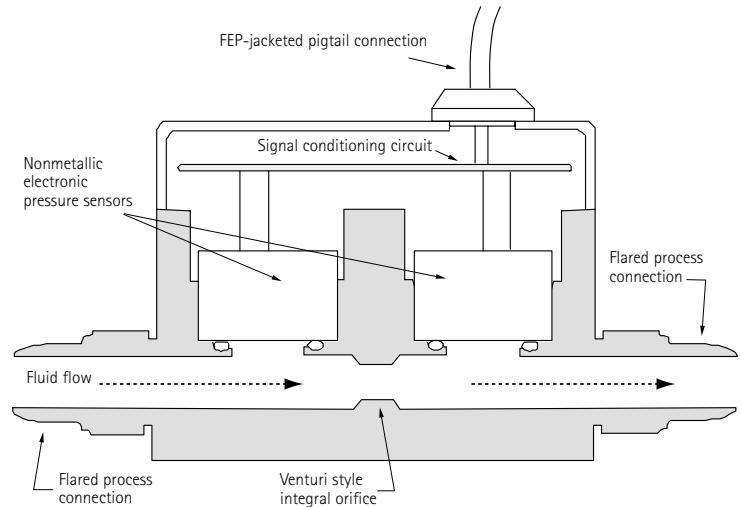
- Chemical, DI water and slurry dispense
- Precision blending and metering
- Totalized flow for custody transfer
- System diagnostics

Differential Pressure Measurement

Entegris' patented technology for differential pressure flow measurement incorporates two pressure sensors. The pressure sensors are separated by a venturi style orifice in the process flow path. The orifice in the flow stream creates a differential pressure proportional to fluid flow rate. If there is no flow, the differential pressure is zero. As the flow rate increases, the differential pressure increases.

$$\text{Flow} \propto \sqrt{(\text{Inlet Pressure} - \text{Outlet Pressure})}$$

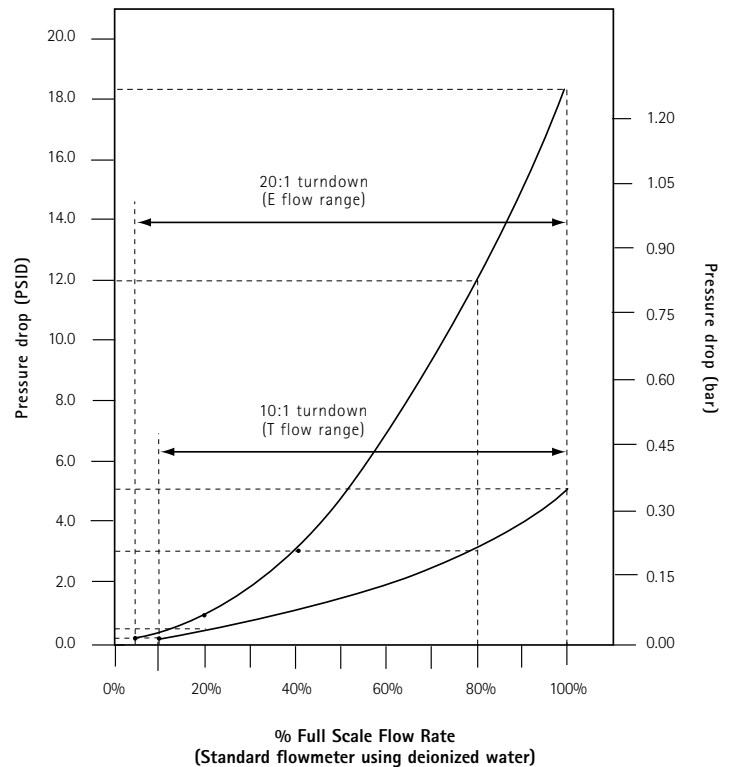
The flowmeter electronics provide a linear flow signal (4-20 mA output signal) corresponding to the calibrated flow rate. The flowmeter also provides a pressure signal (4-20 mA output signal) corresponding to the pressure measured at the outlet sensor of the flowmeter.



Advantages of Differential Pressure Technology

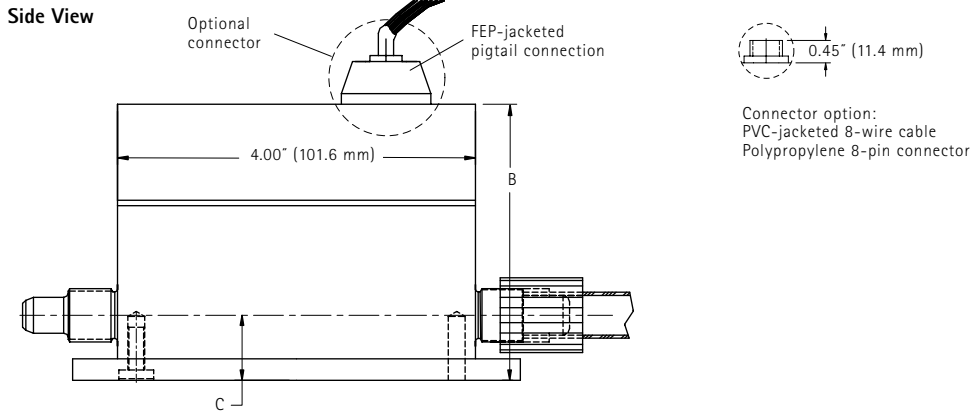
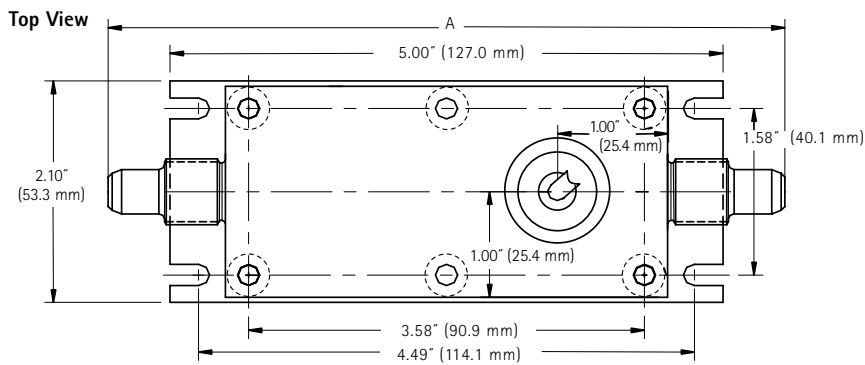
- Ability to measure in many types of fluids
- Proven technology in many industries, including chemical, petroleum and natural gas
- Capable of measuring flow in the presence of trapped vapor and bubbles
- Provides repeatable measurements and reliable performance
- Reduces cost of ownership with easy installation and low maintenance

Pressure Drop vs. Flow Rate



Dimensional Information

Inlet/Outlet Port Connection	Dimensions		
	A	B	C
1/4" Flaretek®	5.98" (151.9 mm)	4.31" (109.5 mm)	0.76" (19.3 mm)
3/8" Flaretek®	6.12" (155.5 mm)	4.36" (110.7 mm)	0.76" (19.3 mm)
1/2" Flaretek®	6.28" (159.5 mm)	4.51" (114.6 mm)	0.85" (21.6 mm)
3/4" Flaretek®	6.52" (165.6 mm)	4.84" (122.9 mm)	1.00" (25.4 mm)
1" Flaretek®	7.00" (177.8 mm)	5.16" (131.1 mm)	1.20" (30.5 mm)



The NT® Electronic Flowmeter is available in the following fitting size and flow range combinations:

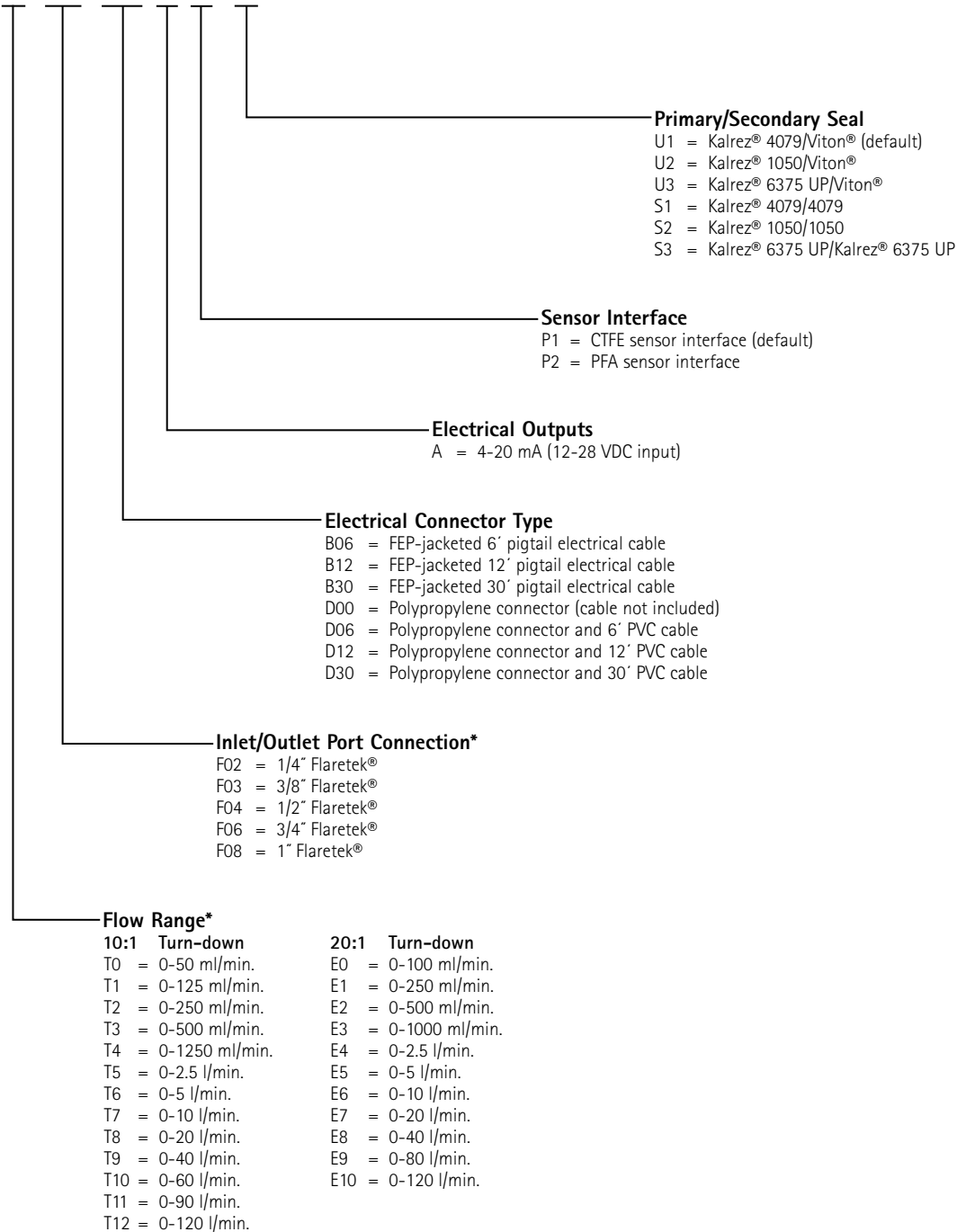
Flow Range	T0 0-50 ml/min.	T1 0-125 ml/min.	T2 0-250 ml/min.	T3 0-500 ml/min.	T4 0-1250 ml/min.	T5 0-2.5 l/min.	T6 0-5 l/min.	T7 0-10 l/min.	T8 0-20 l/min.	T9 0-40 l/min.	T10 0-60 l/min.	T11 0-90 l/min.	T12 0-120 l/min.
Fitting Size	E0 0-100 ml/min.	E1 0-250 ml/min.	E2 0-500 ml/min.	E3 0-1000 ml/min.	—	E4 0-2.5 l/min.	E5 0-5 l/min.	E6 0-10 l/min.	E7 0-20 l/min.	E8 0-40 l/min.	E9 0-80 l/min.	E10 0-120 l/min.	—
1/4" Flaretek®	Yes	Yes	Yes	Yes	Yes	—	—	—	—	—	—	—	—
3/8" Flaretek®	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—	—	—
1/2" Flaretek®	—	—	—	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—
3/4" Flaretek®	—	—	—	—	—	—	—	Yes	Yes	Yes	Yes	—	—
1" Flaretek®	—	—	—	—	—	—	—	—	Yes	Yes	Yes	Yes	Yes

Please consult factory for custom fitting size and flow range combinations.

Ordering Information



Part Number

4400-T2-F02-B06-A-P1-U1



*Please refer to previous page for fitting size and flow range combinations available.
 Product specified with a flared connection is packaged with two PVDF nuts.
 For alternative nut material or custom configurations and specifications, please contact the factory.

Specifications

Materials of construction:	Wetted parts	Body: PTFE Sensor interface: PFA or CTFE Primary seal: Kalrez®	
	Nonwetted parts	Polypropylene, polyethylene, PVDF and PVC or FEP-jacketed cable (in addition to materials listed above)	
Process temperature:	50° to 149°F (10° to 65°C) Consult factory for higher temperatures		
Electrical input:	24 VDC (12-28 VDC input voltage)		
Electrical output:	Two 4-20 mA electrically isolated outputs, one for flow and one for outlet pressure		
Pressure drop:	3 PSID at nominal flow, 10:1 turndown 12 PSID at nominal flow, 20:1 turndown (Nominal flow = 80% of full scale flow)		
Flow measurement accuracy:	10:1 turndown	20-100% of range 10-20% of range	±1.0% FS ±2.5% FS
	20:1 turndown	10-100% of range 5-10% of range	±1.0% FS ±2.5% FS
(Accuracy stated as % of full scale, FS, using deionized water at 70°F [23°C] and includes the combined effects of linearity, hysteresis and repeatability)			
Repeatability:	10:1 turndown	20-100% of range 10-20% of range	±0.5% FS ±1.0% FS
	20:1 turndown	10-100% of range 5-10% of range	±0.5% FS ±1.0% FS
Operating pressure:	0 to 60 PSIG (0 to 414 kPa)		
Over-pressure limit:	100 PSIG (690 kPa)		
Pressure measurement accuracy:	±1% of full scale (Includes combined effects of linearity, hysteresis and repeatability)		
Electrical enclosure:	NEMA 5/IP54		
Approvals:			Conforms to the UL Standard 1604, Class 1, Div II, Group A, B, C, D and T6

Note: Specifications are subject to change without notice. Please consult the factory for the most current information.

For Additional Information

For more information on NT® Electronic Flowmeters or our complete line of fluoropolymer fluid handling solutions, contact your local Entegris distributor or Entegris, Inc.

To review our complete line of sensing and control product solutions visit Entegris' Web site at www.entegrisfluidhandling.com or contact Entegris Customer Service.

Terms and Conditions of Sale

All purchases are subject to Entegris' "Terms and Conditions of Sale."

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U.S. Patent 5,672,832, other patents pending.

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The materials integrity management company

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