



NT® ELECTRONIC FLOWMETER

For high purity solvents



for high purity solvents

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
- Stainless steel construction for high purity solvents
- 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
- Approved for use in Class 1 Div. II hazardous environments

Constructed for Compatibility

The NT® Electronic Flowmeter is designed for use in ultra high purity solvent applications in the semiconductor industry and conforms to UL standard 1604 for use in hazardous environments. The flow-through design minimizes dead volume, reducing the possibility of process contamination. This instrument features 316 stainless steel and high purity fluoropolymers for all wetted parts. Using an FEP-jacketed pigtail electrical connection and fully potted electronics, the flowmeter is resistant to harsh chemical environments and external spraydowns.

Sensing Technology

The NT® Electronic Flowmeter 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 flowmeters 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:

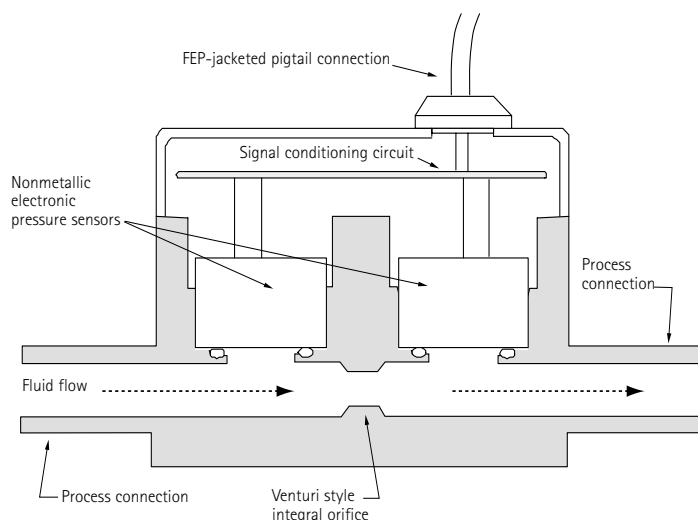
- High purity solvent dispense
- Precision blending and metering
- Totalized flow for custody transfer
- System diagnostics

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.

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

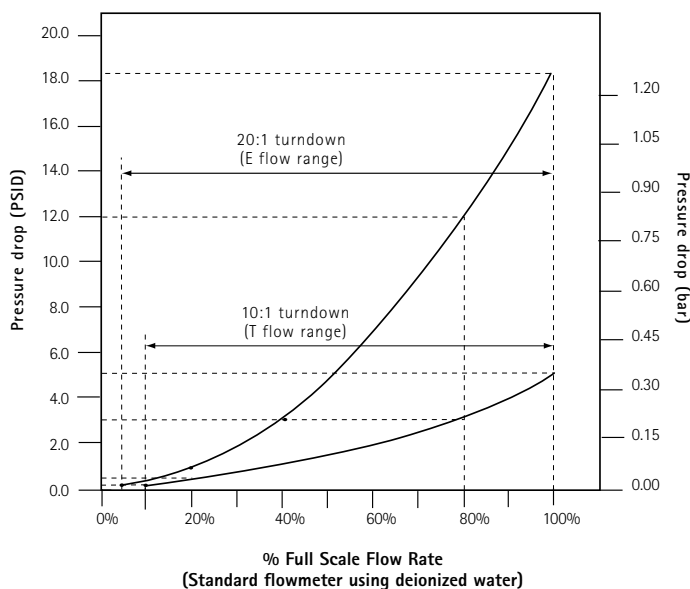
The flowmeter electronics provide a linear flow signal (4-20 mA output signal) corresponding to the calibrated flow rate. The flowmeter also provides a pressure signal (4-20 mA output signal) corresponding to the pressure measured at the outlet sensor of the flowmeter.



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

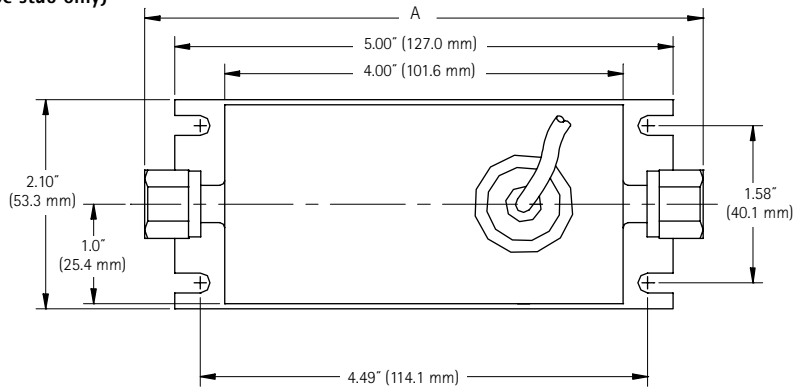
Pressure Drop vs. Flow Rate



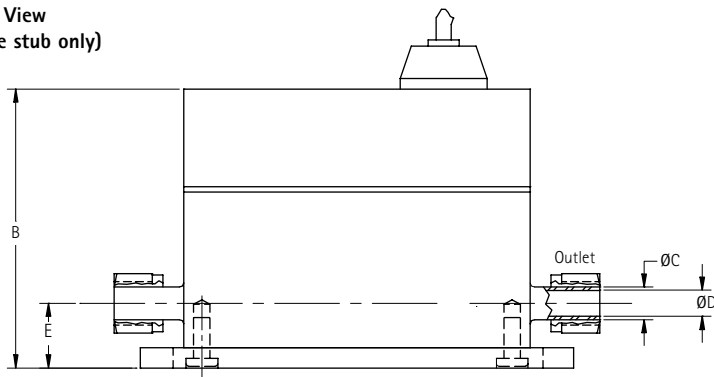
Dimensional Information

Inlet/Outlet Port Connection		Dimensions									
		A		B		C		D		E	
1/4" tube stub	S02	5.60"	142.2 mm	3.19"	81.0 mm	.25"	6.4 mm	.18"	4.6 mm	.77"	19.6 mm
3/8" tube stub	S03	5.60"	142.2 mm	3.24"	82.3 mm	.38"	9.7 mm	.30"	7.6 mm	.76"	19.3 mm
1/2" tube stub	S04	5.90"	149.9 mm	3.39"	86.1 mm	.50"	12.7 mm	.38"	9.7 mm	.85"	21.6 mm
3/4" tube stub	S06	5.90"	149.9 mm	3.72"	94.5 mm	.75"	19.1 mm	.62"	15.8 mm	1.00"	25.4 mm
1" tube stub	S08	6.14"	156.0 mm	4.05"	102.9 mm	1.00"	25.4 mm	.88"	22.4 mm	1.20"	30.5 mm
1/4" face seal	V02	9.00"	228.6 mm	3.68"	93.5 mm	.25"	6.4 mm	.18"	4.6 mm	.77"	19.6 mm
3/8" face seal	V03	9.20"	233.7 mm	3.88"	98.6 mm	.38"	9.7 mm	.31"	7.9 mm	.91"	23.1 mm
1/2" face seal	V04	9.62"	244.4 mm	3.97"	100.8 mm	.50"	12.7 mm	.38"	9.7 mm	.93"	23.6 mm
3/4" face seal	V06	10.22"	259.6 mm	4.40"	111.8 mm	.75"	19.1 mm	.62"	15.8 mm	1.18"	30.0 mm
1" face seal	V08	11.31"	287.3 mm	4.65"	118.1 mm	1.00"	25.4 mm	.88"	22.4 mm	1.32"	33.5 mm

**Top View
(tube stub only)**



**Side View
(tube stub only)**



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

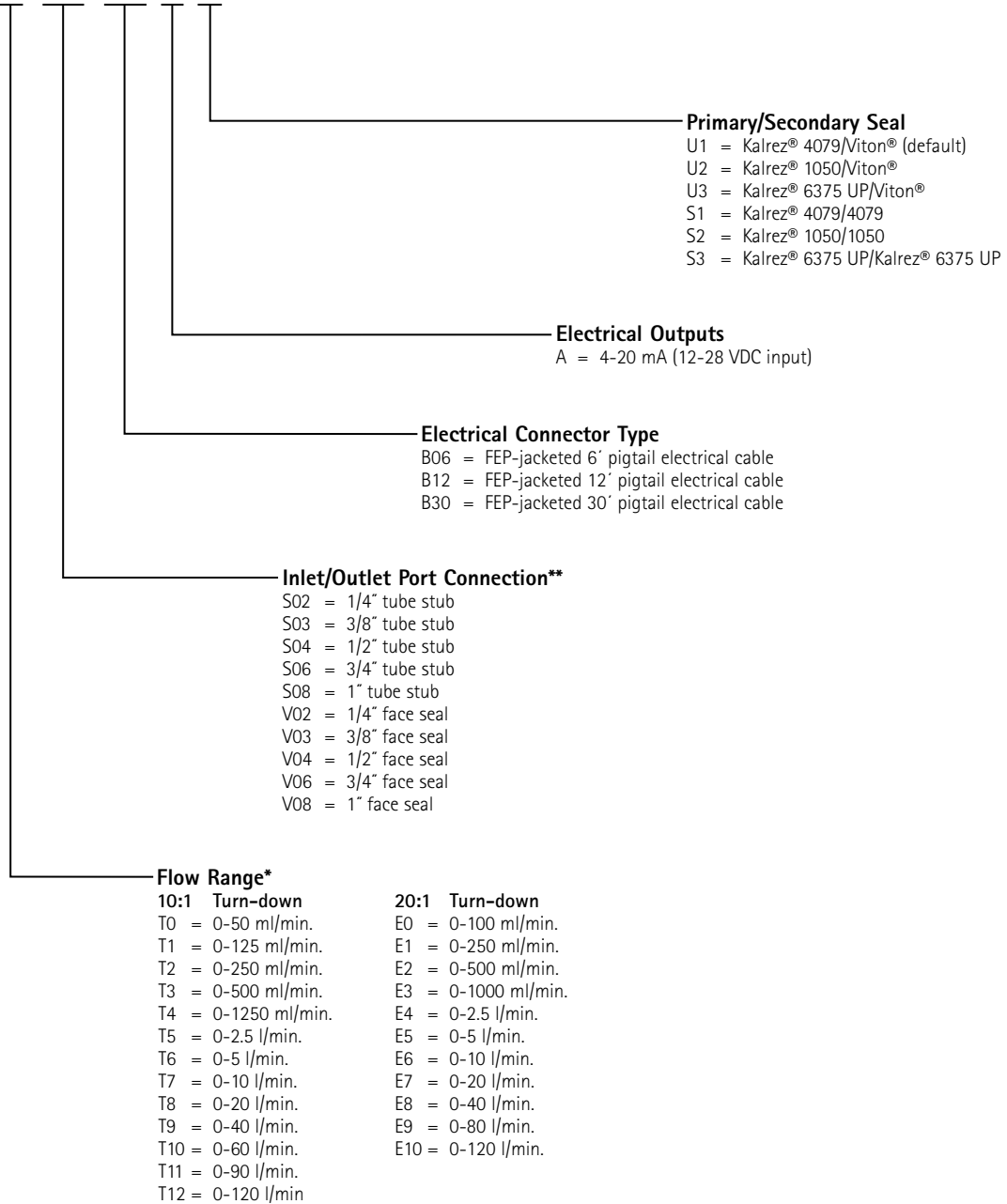
Flow Range	T0 0-50 ml/min.	T1 0-125 ml/min.	T2 0-250 ml/min.	T3 0-500 ml/min.	T4 0-1250 ml/min.	T5 0-2.5 l/min.	T6 0-5 l/min.	T7 0-10 l/min.	T8 0-20 l/min.	T9 0-40 l/min.
Fitting Size	E0 0-100 ml/min.	E1 0-250 ml/min.	E2 0-500 ml/min.	E3 0-1000 ml/min.	—	E4 0-2.5 l/min.	E5 0-5 l/min.	E6 0-10 l/min.	E7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

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

Ordering Information

Part Number



5400-T2-S02-B06-A-U1



* For alternative or custom configurations, please contact the factory.

** Product specified with tube stub port connection is shipped with female nuts and ferrules pre-installed.
 Product specified with face seal port connection is shipped with female nuts pre-installed.

Specifications

Materials of construction:	Wetted parts	Body: 316 stainless steel Sensor interface: PFA Primary seal: Kalrez®	
	Nonwetted parts	Anodized aluminum, FEP and Viton® (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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