MASS FLOWMETERS
FOR GASES

UNDERSTANDING, ACCELERATED

MEASURE FLOW, PRESSURE, AND TEMPERATURE...ALL IN ONE INSTRUMENT!

Designed for Performance

TSI thermal mass flowmeters incorporate a proprietary platinum film sensor design for measuring gas flows in applications demanding fast response and high accuracy over a wide flow range. TSI flowmeters have turn-down ratios greater than 1000:1 due to our thermal flow sensing technology and extensive gas calibration process. The TSI 4000 Series was designed for ultra-low pressure loss to minimize any undesirable effects the flowmeter can have on the readings when installed in-circuit.

Industries

+ Medical
  - Ventilators
  - Anesthesia
  - CPAP
+ Environmental
+ Analytical
+ Aerosol Science

Applications

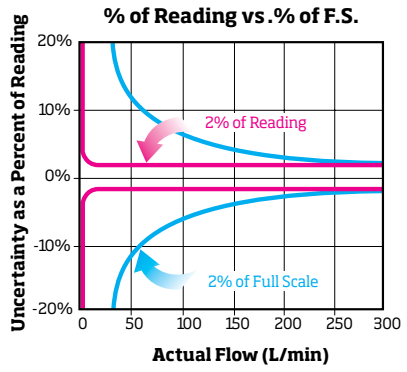
+ Product Development
+ Manufacturing
+ Research
+ Field Service
+ Quality Assurance

Features

+ 4 millisecond flow response
+ High accuracy ±2% of reading
+ High turndown ratio
+ Low pressure drop
+ Convenient analog output of flow rate
+ Versatile digital output of flow rate, volume, pressure, temperature
+ Built-in temperature and pressure compensation
+ NIST-traceable calibration certificate included at no additional cost

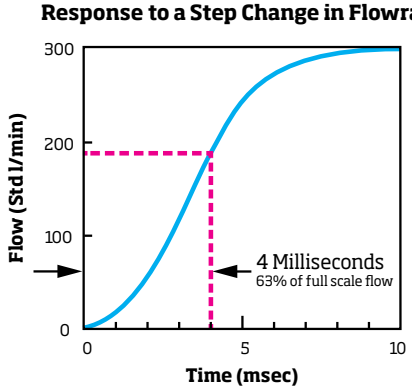
RS232 Interface For Digital Outputs and Configurable Device Options

+ Set analog output zero and scaling
+ Specify start/stop trigger levels for volume measurement
+ Set update rate for LCD display
+ Set sampling rate for analog and digital outputs
+ Select gas calibration
+ Select either standard or volumetric flow measurement
+ Set display units for Model 4140/4143 to L/min or cm^3/min
+ Compute volume



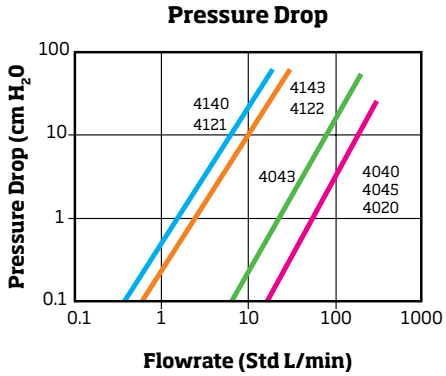
Accurate

A flowmeter specified as ±2 percent of full scale is most accurate at full scale. If full scale is 300 L/min, then the uncertainty for all readings is ±6 L/min. TSI flowmeters are specified as ±2 percent of reading and have an uncertainty of ±2 percent of the actual reading from full scale all the way down to a specified lower limit. TSI flowmeters, therefore, provide dependable accuracy over a wide range of flow rates. One TSI flowmeter covers the same range as three or more "percent of full scale" devices...with better accuracy at all points!



Fast

Fast 4 millisecond response ensures accuracy in fluctuating flows. This fast response is ideal for closed-loop control systems and integrated volume measurements. Pressure and temperature measurements are also extremely fast.



Low Pressure Drop

Low pressure drop minimizes flow circuit back pressure and its impact on the system under test.

SPECIFICATIONS

Specifications	Low Flow-Models 4140 and 4143	High Flow-Models 4040, 4043 and 4045
Flow Measurement		
Range	0.01 to 20 standard L/min	Model 4040 and 4045: 0 to 300 standard L/min Model 4043: 0 to 200 standard L/min
Accuracy	±2% of reading or 0.005 standard L/min, whichever is greater, for air and O_2; ±3% of reading or 0.010 standard L/min, whichever is greater, for N_2O (Models 41403 and 41433 only) and N_2	±2% of reading or 0.05 standard L/min, whichever is greater, for air and O_2 ±3% of reading or 0.1 standard L/min whichever is greater, for N_2 and air/O_2 mixtures
Response	4 ms to 63% of full scale flow	4 ms to 63% of full scale flow
Overall Dimensions	127 x 49 x 32 mm (5" x 2" x 1.25")	182 x 63 x 53 mm (7.2" x 2.5" x 2.1")
	All Models	
Volume Measurement*		
Range	0.01 to 99.9 liters	
Accuracy	±2% of reading	
Pressure Measurement		
Range	50 to 199 kPa absolute	
Accuracy	±1 kPa	
Response	<4 ms to 63% of final value for step change	
Temperature Measurement		
Range	0 to 50°C	
Accuracy	±1°C at flows greater than 1 standard L/min	
Response	<75 ms to 63% of final value for step change	
Outputs		
Analog Output	0 to 10 VDC flow only, span adjustable via RS232	
Digital	RS232	
Power		
DC Power Input	7.5 VDC ±1.5 V, 300 mA max	
Accessories		
Supplied	Power Supply, RS232 Cable, Analog Cable, Inlet Filter	
Optional	Battery pack/stand (pn 4199), Carrying case for Models 4140, 4143 (pn 1319201), Carrying case for Models 4040, 4043, and 4045 (pn 1319176)	


Shown with optional Carrying Case.


Shown with Optional Battery Pack/Stand

Model Selection Guide for Series 4040 and 4140

Model	4140	4143	4040	4043	4045
Flow Range	0.01-20 Std L/min	0.01-20 Std L/min	0-300 Std L/min	0-200 Std L/min	0-300 Std L/min
Inlet/Outlet Diameter	0.25" (6.4 mm)	0.375" (9.53 mm)	22 mm ISO tapered	0.50" (12.7 mm)	0.75" (19.1 mm)
Gas Calibrations	Air, O_2, N_2 (Model 41403 includes N_2O)	Air, O_2, N_2 (Model 41433 includes N_2O)	Air, O_2, N_2 Air/O_2 Mixture		
LCD Display Units	L/min, Std L/min cm^3/min, Std cm^3/min	L/min, Std L/min cm^3/min, Std cm^3/min	L/min, Std L/min		

*Supplied through RS232 port only. Specifications subject to change without notice.

Specifications	**Low Flow-Models 4121 and 4122**	**High Flow-Models 4021 and 4024**
Flow Measurement		
Range	0.01 to 20 standard L/min	0 to 300 standard L/min
Accuracy	±2% of reading or 0.005 standard L/min whichever is greater, for air and O_2; ±3% of reading or 0.010 standard L/min whichever is greater, for N_2	±2% of reading or 0.05 standard L/min, whichever is greater, for air and O_2; ±3% of reading or 0.1 standard L/min whichever is greater, for N_2
Response	4 ms to 63% of full scale flow	4 ms to 63% of full scale flow
Overall Dimensions	127 x 49 x 29 mm (5″ x 2″ x 1.1″)	182 x 63 x 38 mm (7.2″ x 2.5″ x 1.5″)
	All Models	
Temperature Measurement		
Range	0 to 50° C (32° to 122° F)	
Accuracy	±1°C at flows greater than 1 standard L/min	
Response	<75 ms to 63% of final value for step change	
Pressure Measurement		
Not available in Series 4020/4120		
Outputs		
Analog	0 to 4 VDC flow only, span adjustable via RS232	
Digital Output	RS232	
Power		
DC Power Input (user supplied)	5.0 VDC ±0.25 V, 300 mA max	
Recommended Filtration		
HEPA-grade filter		
Accessories		
Supplied	Interface cable (mini-DIN to tinned wire)	

Model Selection Guide for Series 4020 and 4120

Model	41211	41212	41216	41221	41222	41226	40211	40212	40241	40242	40246
Gas Calibration	Air	O_2	N_2	Air	O_2	N_2	Air	O_2	Air	O_2	N_2
Flow Range	0.01-20 Std L/min			0.01-20 Std L/min			0-300 Std L/min		0-300 Std L/min		
Inlet/Outlet Diameter	0.25″ (6.4 mm)			0.375″ (9.53 mm)			22 mm ISO tapered		0.75″ (19.1 mm)		

UNDERSTANDING, ACCELERATED

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