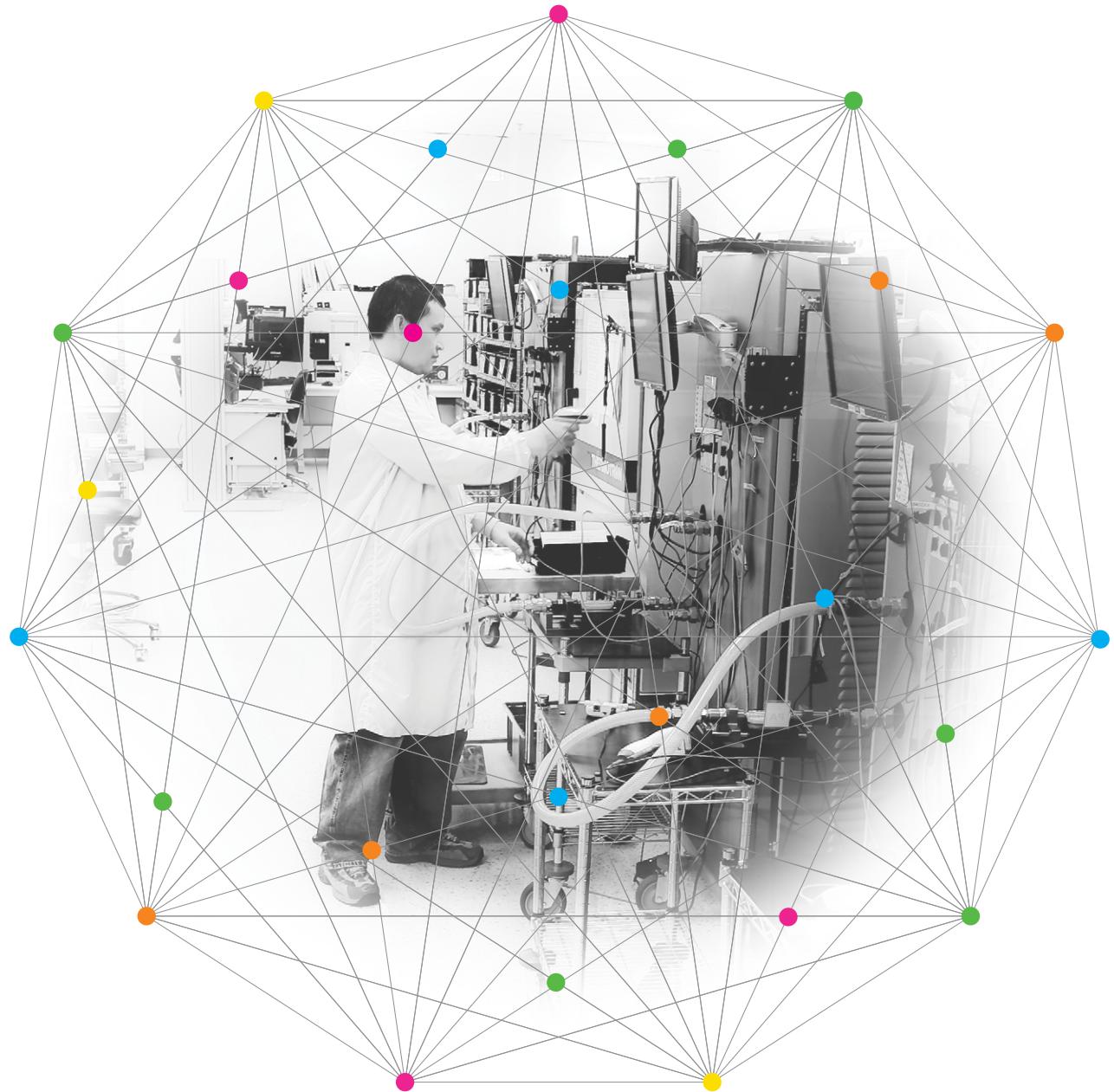


MASS FLOWMETERS FOR GASES



UNDERSTANDING, ACCELERATED

1.888.610.7664



www.calcert.com

sales@calcert.com

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

Designed for Performance

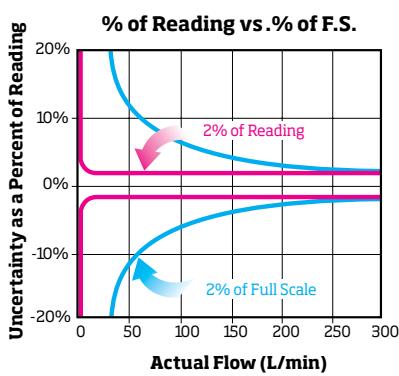
TSI thermal mass flowmeters incorporate a proprietary platinum film sensor design for measuring gas flows in applications demanding fast response and high accuracy over a wide flow range. TSI flowmeters have turn-down ratios greater than 1000:1 due to our thermal flow sensing technology and extensive 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



Accurate

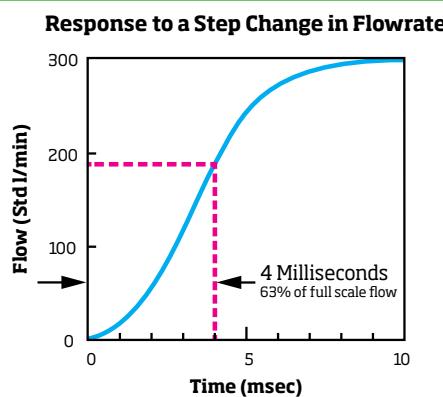
A flowmeter specified as $\pm 2\%$ of full scale is most accurate at full scale. If full scale is 300 L/min, then the uncertainty for all readings is ± 6 L/min. TSI flowmeters are specified as $\pm 2\%$ of reading and have an uncertainty of $\pm 2\%$ of the actual reading from full scale all the way 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!

Features

- + 4 millisecond flow response
- + High accuracy $\pm 2\%$ 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

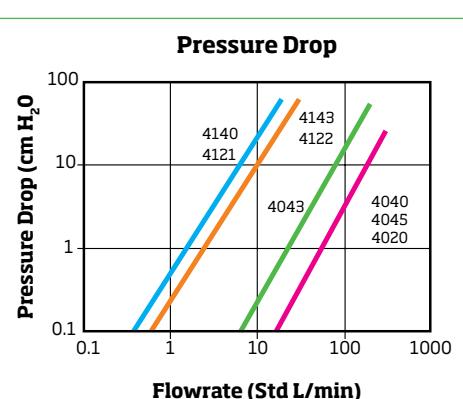
RS232 Interface For Digital Outputs and Configurable Device Options

- + 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 cm³/min
- + Compute volume



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 - DIGITAL DISPLAY MODELS



| | | Low Flow - 4140 Series | | | | High Flow - 4040 Series | | | | |
|-------------------------|---|--|---|--------------------------------------|---|---|-----------------|-----------------|--|--|
| Model | | 4140 | 41403 | 4143 | 41433 | 4040 | 4043 | 4045 | | |
| Gas Calibration | | Air, O ₂ , N ₂ | Air, O ₂ , N ₂ , N ₂ O | Air, O ₂ , N ₂ | Air, O ₂ , N ₂ , N ₂ O | Air, O ₂ , N ₂ , Air/O ₂ Mixture | | | | |
| 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) | | |
| Flow Measurement | Range | 0.01-20 Std L/min | | | | 0-300 Std L/min | 0-200 Std L/min | 0-300 Std L/min | | |
| | Accuracy - Air and O ₂ | ±2% of reading or 0.005 Std L/min, whichever is greater | | | | ±2% of reading or 0.05 Std L/min, whichever is greater | | | | |
| | Accuracy - N ₂ | ±3% of reading or 0.010 Std L/min, whichever is greater | | | | ±3% of reading or 0.1 Std L/min, whichever is greater | | | | |
| | Accuracy - Air and O ₂ mixture | N/A | | | | ±3% of reading or 0.1 Std L/min, whichever is greater | | | | |
| | Accuracy - N ₂ O | N/A | ±3% of reading or 0.010 Std L/min, whichever is greater | N/A | ±3% of reading or 0.010 Std L/min, whichever is greater | N/A | | | | |
| | Response | 4 ms to 63% of full scale flow | | | | 4 ms to 63% of full scale flow | | | | |
| LCD Display Units | | L/min, Std L/min, cm ³ /min, Std cm ³ /min | | | | L/min, Std L/min | | | | |
| Overall Dimensions | | 5" x 2" x 1.25" (127 mm x 49 mm x 32 mm) | | | | 7.2" x 2.5" x 2.1" (182 x 63 x 53 mm) | | | | |
| Volume* Measurement | Range | 0.01 - 99.9 liters | | | | 0.01 - 99.9 liters | | | | |
| | Accuracy | ±2% of reading (see Operator's Manual for additional details) | | | | ±2% of reading (see Operator's Manual for additional details) | | | | |
| Pressure Measurement | Range | 50-199 kPa absolute | | | | 50-199 kPa absolute | | | | |
| | Accuracy | ±1 kPa | | | | ±1 kPa | | | | |
| | Response | <4 ms to 63% of final value for step charge | | | | <4 ms to 63% of final value for step charge | | | | |
| Temperature Measurement | Range | 0-50°C | | | | 0-50°C | | | | |
| | Accuracy | ±1°C at flow greater than 1 Std L/min | | | | ±1°C at flow greater than 1 Std L/min | | | | |
| | Response | <75 ms to 63% of final value for step change | | | | <75 ms to 63% of final value for step change | | | | |
| Outputs | Analog | 0-10 VDC flow only, zero and span adjustable via RS232 | | | | 0-10 VDC flow only, zero and span adjustable via RS232 | | | | |
| | Digital | RS232 | | | | RS232 | | | | |
| DC Power Input | | 7.5 VDC ±1.5 V, 300 mA max | | | | 7.5 VDC ±1.5 V, 300 mA max | | | | |

| Accessories | Description | TSI Part Number |
|-------------|--|---|
| Supplied | Power Supply | P/N 8918-NA (North America) P/N 8918-EC (Continental Europe) P/N 8918-GB (United Kingdom) P/N 8918-AT (Australia) |
| | Computer Cable (mini-DIN to 9-Pin D-Sub) | P/N 1303583 |
| | Analog Cable (mini-Din to tinned-wire) | P/N 1303584 |
| | RS232 Serial Command Set Manual | P/N 1980340 |
| | Operator's Manual | P/N 1980339 (404x Series) P/N 1980383 (414x Series) |
| | Calibration Certificate | No P/N assigned |
| | Inlet Filter | P/N 1602292 [Model 4040 (22mm ISO-Taper)] P/N 1602300 [Models 4043, 4045 (0.375" FNPT, HEPA)] P/N 1602317 [Models 4140, 41403 (0.25" tube, 6mm)] P/N 1602342 [Models 4143, 41433 (0.375" tube, 9mm)] |
| | Battery Pack/Stand for all Models | P/N 4199 (includes six AA-size batteries) |
| | Hard-side Carrying Case | P/N 1319176 (404x Series) P/N 1319201 (414x Series) |
| | Filter, Low Pressure Drop, 0.375" FNPT, HEPA Grade | P/N 1602345 (Models 4043, 4045) |
| Optional | | |

*Supplied through RS232 port only.
Specifications subject to change without notice.
See Operator's Manual for full listing.



Shown with optional Carrying Case



Shown with Optional Battery Pack/Stand

SPECIFICATIONS - NON-DISPLAY MODELS



| | | Low Flow - 4120 Series | | | | | | High Flow - 4020 Series | | | | | | | | | |
|--------------------------------|-----------------------------------|---|----------------|----------------|------------------|----------------|----------------|--|----------------|-------------|-----------------|----------------|--|--|--|--|--|
| Model | | 4121 Series | | | 4122 Series | | | 4021 Series | | 4024 Series | | | | | | | |
| | | 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 | | | | | |
| Inlet/Outlet Diameter | | 0.25" (6.4 mm) | | | 0.375" (9.53 mm) | | | 22 mm ISO tapered | | | 0.75" (19.1 mm) | | | | | | |
| Flow Measurement | Range | 0.01-20 Std L/min | | | | | | 0-300 Std L/min | | | | | | | | | |
| | Accuracy - Air and O ₂ | ±2% of reading or 0.005 Std L/min, whichever is greater | | | | | | ±2% of reading or 0.05 Std L/min, whichever is greater | | | | | | | | | |
| | Accuracy - N ₂ | ±3% of reading or 0.010 Std L/min, whichever is greater | | | | | | ±3% of reading or 0.1 Std L/min, whichever is greater | | | | | | | | | |
| | Response | 4 ms to 63% of full scale flow | | | | | | 4 ms to 63% of full scale flow | | | | | | | | | |
| Overall Dimensions | | 5" x 2" x 1.1" (127 mm x 49 mm x 29 mm) | | | | | | 7.2" x 2.5" x 1.5" (182 x 63 x 38 mm) | | | | | | | | | |
| Pressure Measurement | | N/A | | | | | | N/A | | | | | | | | | |
| Temperature Measurement | Range | 0-50°C | | | | | | 0-50°C | | | | | | | | | |
| | Accuracy | ±1°C at flow greater than 1 Std L/min | | | | | | ±1°C at flow greater than 1 Std L/min | | | | | | | | | |
| | Response | <75 ms to 63% of final value for step change | | | | | | <75 ms to 63% of final value for step change | | | | | | | | | |
| Outputs | Analog | 0-4 VDC flow only, zero and span adjustable via RS232 | | | | | | 0-4 VDC flow only, zero and span adjustable via RS232 | | | | | | | | | |
| | Digital | RS232 | | | | | | RS232 | | | | | | | | | |
| DC Power Input (User Supplied) | | 5.0 VDC ±0.25 V, 300 mA max | | | | | | 5.0 VDC ±0.25 V, 300 mA max | | | | | | | | | |
| Recommended Filtration | | HEPA-grade | | | | | | HEPA-grade | | | | | | | | | |

| Accessories | Description | TSI Part Number |
|-------------|--|--|
| Supplied | Analog and Digital Cable (mini-DIN to tinned wire) | P/N 1303584 |
| Optional | Inlet Filter, 22mm ISO Taper | P/N 1602292 (Models 40211, 40212) |
| | Inlet Filter, 0.25" tube, 6mm | P/N 1602317 (Models 41211, 41212, 41216) |
| | Inlet Filter, 0.375" tube, 9mm | P/N 1602342 (Models 41221, 41222, 41226) |

Specifications subject to change without notice. See Operator's Manual for full listing.

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