

Model 3068B Aerosol Electrometer

Measures net charge or concentration of generated aerosols

Our new Aerosol Electrometer, Model 3068B, has been completely updated to significantly improve performance and provide a state-of-the-art user and computer interface. It provides accurate measurements of the total net charge on aerosol particles with a sensitivity of better than ± 1 femptoAmp (fA) RMS with a one-second averaging time. Compared to other electrometers, it has a huge dynamic range with no range-switching necessary. It also includes temperature stabilization circuitry that allows it to have very low temperature drift over its operational temperature range.

When paired with a TSI Electrostatic Classifier, the Aerosol Electrometer measures the number concentration of monodisperse aerosol. This configuration is used primarily for calibrating and testing particle instruments like Condensation Particle Counters. Data are presented on the front-panel display in real time, or through the RS-232 serial, USB or analog output interfaces. The electrometer is supported by Aerosol Instrument Manager[®] software to allow data to be collected, stored, and manipulated.

Model 3068B Features

- Increased sensitivity— ± 1 fA (two times better than Model 3068A)
- Wide dynamic range with no range settings ($\pm 12,500$ fA)
- Temperature stabilized to significantly reduce drift
- Automatic flow control (0.3 to 10 L/min) when used with external vacuum source
- Reduced internal particle losses
- Modern communications with RS-232 and USB interface
- Membrane touch-panel with two-line, LCD alphanumeric display
- Digital displays of either current or concentration and flow rate
- Fundamental particle concentration measurement when used with a TSI Electrostatic Classifier
- Wide particle size range (0.002 to 5.0 μm)

Applications

The Model 3068B provides accurate measurements of total aerosol charge. In addition to fundamental particle charge experiments, when paired with a TSI Electrostatic Classifier, the Aerosol Electrometer is also commonly used to calibrate condensation particle counters.



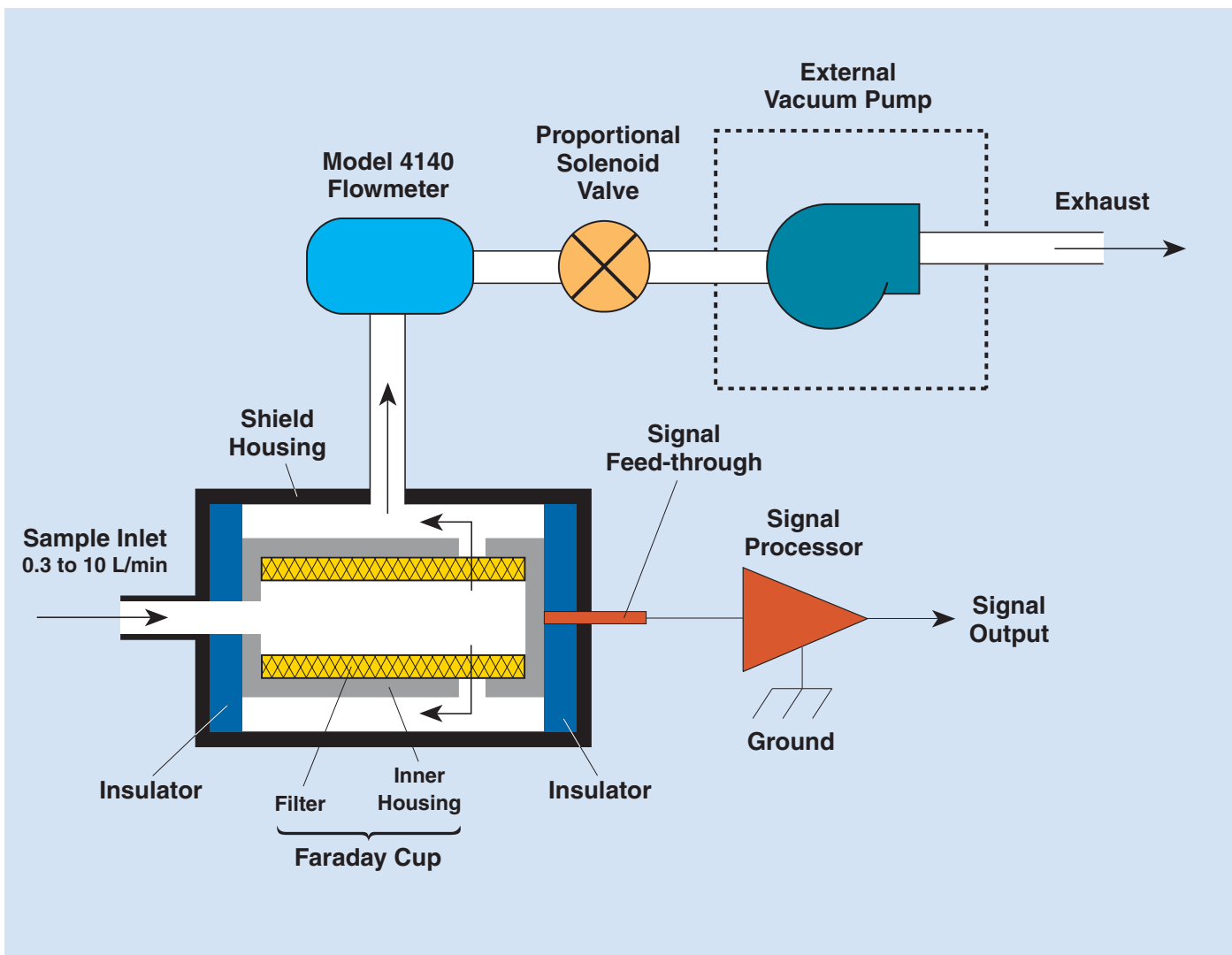
Operation

Aerosol is drawn into the Model 3068B by an external pump. A built-in thermal flowmeter and proportional valve controlled by a microprocessor maintain the user-set volumetric aerosol sample rate, Q . An electrically-isolated, high-efficiency filter collects the charged particles. Then, a highly sensitive electrometer measures the electrical current, I , draining from the filter.

A front-panel display and membrane switches provide an easy-to-use interface. The two-line display provides a real-time readout of total current and flow. If a classifier is used and the average particle charge is

known, the display will also provide an indication of particle concentration, avoiding a manual calculation. The calculation is based on the equation on the opposite page.

User menus allow the flow to be set anywhere between 0.3 and 10 L/min and then controlled automatically. Averaging time can be set on the display from 1 to 60 seconds, and the analog output can be configured for a variety of ranges. In addition, other parameters, including temperature and pressure, may be displayed.



Specifications

Model 3068B Aerosol Electrometer

Primary Measurement	Particle total charge indicated by current
Displayed Values	Particle current or calculated number concentration (based on user-specified charge/particle) and flow rate
Sensitivity	$\pm 1 \times 10^{-15}$ A (± 1 fA) RMS at 1 sec averaging time
Measurement Range	$\pm 12,500$ fA
Step Response Time	<2.5 sec
Temperature Drift	< ± 2 fA in 24 hours over operational temperature range
Operational Temperature Range	5 to 35°C (ambient)
Storage Temperature Range	-20 to 50°C
Operational Humidity Range	0 to 90% RH (ambient), noncondensing
Aerosol Sample Rate	Automatic flow control from 0.3 to 10 L/min using external vacuum source; manual flow settings available for increased flow accuracy
Flow Accuracy	0.3 to 2 L/min ($\pm 2\%$); 2.0 to 10 L/min ($\pm 5\%$)
Particle Size Range	0.002 to 5 μ m
Particle Type	Solids and nonvolatile liquids
Dimensions (HWD)	196 \times 213 \times 304 mm (7.7 \times 8.4 \times 12 in.)
Weight	4.5 kg (9.9 lb.)
Power requirement	50 to 60 Hz, 100/120/230/240 VAC at 0.1/0.1/0.05/0.05 A
Vacuum requirements	Vacuum that can produce 10 L/min at a pressure drop of 114 cm of water (to produce full flow)
Front Panel Output	Two-line LCD alphanumeric display, keypad
Software	Aerosol Instrument Manager software supplied with instrument (RS-232 and USB-compatible)
Interface	Membrane touch-panel
Communications	RS-232 and USB

Specifications are subject to change without notice. TSI and the TSI logo are registered trademarks of TSI Incorporated.

Operational Calculations

$$N = \frac{I}{e \times n_p \times q_e}$$

where:

- N = particle number concentration (particles/cm³)
- e = elementary unit of charge, 1.602×10^{-19} Coulombs
- n_p = number of charges per particle
- q_e = flow rate (cm³/sec)
- I = electrical current (Amps)

To Order

Aerosol Electrometer

<i>Specify</i>	<i>Description</i>
3068B	Aerosol Electrometer

Accessory

<i>Specify</i>	<i>Description</i>
3033	Vacuum Pump
3080	Electrostatic Classifier Platform
3081	Long Differential Mobility Analyzer (DMA)
3085	Nano DMA



TSI Incorporated

Headquarters—Tel: +1 651 490 2811 **Toll Free:** 1 800 874 2811 **E-mail:** info@tsi.com

UK Tel: +44 1494 459200 **E-mail:** tsiuk@tsi.com

France Tel: +33 491 95 21 90 **E-mail:** tsifrance@tsi.com

Germany Tel: +49 241 523030 **E-mail:** tsigmbh@tsi.com

Sweden Tel: +46 8 595 13230 **E-mail:** tsiab@tsi.com

India Tel: +91 80 41132470 **E-mail:** tsi-india@tsi.com

China Tel: +86 10 8260 1595 **E-mail:** tsibeijing@tsi.com

