



## DESCRIPTION

The Environics® Series 9100 Computerized Ambient Monitoring Calibration System is an advanced microprocessor controlled instrument for dynamic calibration of ambient air analyzers. The Series 9100 automatically performs zero, precision, span and multi-point calibrations using NO, NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, hydrocarbons and other gases of interest. The 9100 exceeds all U.S. Environmental Protection Agency requirements.

The Series 9100 consists of a single chassis supporting 2 thermal mass flow controllers, an ozone generation module, a mixing zone, a reaction chamber for gas phase titration, and control electronics.

Commands are entered from the front panel and displayed on a backlit 25 line by 80 character liquid crystal display. The instrument may also be remotely operated using contact closures or an RS-232 serial data interface.

The mass flow controllers are calibrated to a NIST (National Institute of Standards and Technology) traceable primary standard. The calibration data consists of a comparison of desired versus actual flow over the full dynamic range of the instrument with linear interpolation between points. Calibration data is stored in non-volatile memory and may be updated by the user with a suitable standard.

The Series 9100 ozone generator is factory calibrated using a NIST traceable ozone standard. This temperature controlled, ultra-violet (UV) based ozone generator includes a precision photo-optical feedback circuit to compensate for lamp aging effects as well as built-in pressure compensation.

The Series 9100 is available in either a standard 19" rack mount or bench top configuration.

## PRODUCT FEATURES AND BENEFITS

- 25 line by 80 character display permits editing and viewing of an entire 7 day schedule of calibration events in worksheet format.
- Automatic calculation of dilution and span gas flows based on commanded concentration

## Product Data Series 9100

### Computerized Ambient Monitoring Calibration System

eliminates the need for manual computation and allows rapid transition from point to point.

- Internally-stored mass flow controller calibration data improves accuracy by as much as a factor of ten and simplifies field recalibration.
- Internally-stored ozone generator calibration data insures linear, repeatable ozone generation without photometer control. Ozone generator performance exceeds U.S. EPA criteria for ozone transfer standards.
- Ozone generator pressure compensation ensures repeatable ozone generation at a flow rate and back pressure other than that at which it was originally calibrated.

## SOFTWARE

The Series 9100 has six primary routines accessible through "soft" keys, located immediately below their on-screen labels.

- **Concentration Mode:** User enters target output gas concentration (ppm or %) for the span gas. The actual concentration is displayed during mixing.
- **Flow Mode:** User enters target flow rate (cc's or liters per minute) for the span gas and dilution gas. Actual flow rates are displayed after mixing is initiated.
- **Volts Mode:** User enters a command voltage to the mass flow controller and the ozone generator. The actual voltage is displayed during operation.
- **Program Mode:** Permits multi-event programming and unattended automatic operation of the instrument over a seven-day schedule.
- **Calibrate Mode:** User enters new calibration data for each of the 9100's mass flow controllers and ozone generator (can be password protected).
- **Maintain Ports:** User enters the name of the span gas in the source cylinder, its concentration (ppm) and the port to which the cylinder is connected.

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## SPECIFICATIONS

### Mass Flow Controller (as a percent of setpoint)\*

	From 10 to 100% of Full Scale Flow
Accuracy	
Concentration:	± 1.0%
Flow:	± 1.0%
Repeatability	± 0.05%

\* Mass flow controllers are calibrated using a NIST traceable Primary Flow Standard, using a Reference Temperature of 25° C (77°F) and a Reference Pressure of 760mm Hg (29.92 in. Hg)

Warm up time: 30 minutes

Response time: 30 seconds to ±2.0% of setpoint

### Ozone Generator

Concentration Range: 0.5 - 1.00ppm at 10 slpm

Accuracy: ±2% or ±.003ppm at 10 slpm

30 day repeatability: ±2% or ±.003ppm.

### Mechanical

#### Inlets

Balance: External ¼" Swagelok™\*

Span(s): External ¼" Swagelok™\*

#### Outlet

One external ¼" Swagelok™\*

#### Operating Pressures at inlets

Minimum: 10 psig (0.67 Bar)

Recommended: 25 psig (1.68 Bar)

Maximum: 40 psig (2.76 Bar)

#### Wetted Surfaces

Tubing: Teflon™

MFC's: Stainless Steel

Seals: Viton

#### Operating temperatures

32° - 122° F (0° - 50° C)

#### Performance temperature range

59° - 95° F (15° - 35° C)

#### Weight

Minimum: 35 lbs. (16 Kg)

Maximum: 55 lbs. (18 Kg)

\*(or compatible fitting)

Dimensions (w x h x d)  
Portable: 17" x 7" x 23.5"  
(43.18 cm x 17.78 cm x 59.69 cm)

Rack: 19" x 7" x 23.5"  
(48.26 cm x 17.78 cm x 59.69 cm)

### Electrical

Standard: 115 VAC (100 to 130 VAC), 50/60 Hz

Optional: 220 VAC (200 to 240 VAC), 50/60 Hz

Current: 3 Amps (maximum)

### Electronics

Inmos T 400 series, 32 Bit processor

12 Bit A/D and D/A Conversion

### Operating Modes

Front panel membrane keypad

Internal timer control

Optional RS-232 serial data interface

Optional Status board interface

### Data Output

Parallel printer port (Centronics™ compatible)

Optional RS-232 serial data interface

### OPTIONS

- Rack Mount
- Extra Gas Inlets (Limit-six total)
- RS-232 Serial Data Interface
- Solenoid Valve on Output
- Status Board
- Permeation Oven

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