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_2, SO_2, CO, 0_3, 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 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.

SPECIFICATIONS

Mass Flow Controller (as a percent of setpoint)*

Accuracy	From 10 to 100% of Full Scale Flow
Concentration:	± 1.0%
Flow:	± 1.0% Flow
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 1/4" Swagelok™*
- Span(s): External 1/8" Swagelok™*

Outlet
- One external 1/4" Swagelok™*

Operating Pressures at inlets (flow dependent)
- 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: 40 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
- Additional MFC (maximum of 3)

69 Industrial Park Road East, Tolland, CT 06084
(860) 872-1111 Fax: (860) 870-9333
http://www.environics.com
E-mail: info@environics.com