

## Ozone Transfer Standard / Multi-Gas Calibrator



### DESCRIPTION

The Environics® Series 6103 Ozone Transfer Standard / Multi-Gas Calibrator is a computer controlled, state-of-the-art instrument for dynamic calibration of ambient air analyzers. The Series 6103 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 6103 meets all U.S. Environmental Protection Agency requirements.

The Series 6103 consists of a single chassis supporting 2 thermal mass flow controllers, an ozone generation module, photometer, 3 port glass output manifold, mixing chamber, a reaction chamber for gas phase titration, and control electronics.

Commands are entered from the front panel and displayed on a backlit 4 line by 20 character liquid crystal display. The instrument may also be remotely operated using contact closures or the RS-232 serial data interface, both are standard in the Series 6103.

The mass flow controllers are factory calibrated at 11 points 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 internal ultra-violet (UV) based ozone generator is temperature controlled and includes a precision photo-optical feedback circuit to compensate for lamp aging effects providing stable ozone generation. The ozone generator is factory calibrated using a NIST traceable photometer standard.

### PRODUCT FEATURES AND BENEFITS

User-friendly interactive software with plain language prompts is simple to use, reducing technician training time and virtually eliminating error.

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. Mass flow controllers are factory calibrated at 11 points.

Internally-stored ozone generator calibration data insures linear, repeatable ozone generation without photometer control. Ozone generator performance meets U.S. EPA criteria for ozone transfer standards. The ozone generator is factory calibrated at 3 points. Up to 11 points are available.

Ozone generator pressure compensation ensures repeatable and stable ozone generation at pressures other than that at which it was originally calibrated. This is only important when the system is being used without the photometer closed-loop control.

Photometer measures the actual amount of ozone generated, and corrects for errors, using PID closed-loop control.

The photometer allows an external source of ozone to be analyzed and displayed on the screen. The ozone is connected to a separate sample port. This allows for simultaneous gas blending while monitoring an external source of ozone.

## PRODUCT FEATURES AND BENEFITS cont.

The automated leak test function uses a pressure decay test with internal absolute pressure transducers. The complete system plumbing path is tested to better than 1 sccm leak.

## SOFTWARE

- **Blend (Conc Mode):** In response to software prompting, user selects gas port, span (cylinder) gas concentration, output gas flow (total) and output gas concentration. Series 6103 automatically delivers concentrations at the total flow specified.
- **Generate Ozone:** Allows user to specify, and then generate a precise concentration of ozone.
- **Photometer:** Allows an external source of ozone to be analyzed and displayed on the screen. Also used to control the ozone generator when PID control loop is enabled.
- **Gas Phase Titration:** Utilizes blend and generate ozone routines to lead user through GPT using "excess NO" method.
- **Manual (Flow Mode):** Allows user to manually command a desired rate of flow for each mass flow controller, separately or together, with or without ozone.
- **Display:** Allows user to monitor flow rates for each mass flow controller separately. Also provides ozone oven, pressure and photometer diagnostic information.
- **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 (From 10-100% FSO)

Accuracy (as a % of setpoint)\*

Concentration:	±1.0%
Flow:	±1.0%

Flow Repeatability (% FSO) ±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

### Ozone Generator

Concentration Range: 0.02 - .5 ppm at 5 – 10 slpm  
Optional Ranges: 0.05 - 1 ppm at 5 – 10 slpm

### UV Photometer

Repeatability: ±1 ppb  
Linearity: .3% F.S.O.  
Noise: ±1 ppb  
Precision: 1 ppb

## Mechanical

### Inlets

Balance: External ¼" Swagelok™\*  
Span(s): External ¼" Swagelok™\*

### Outlet

Three external ¼" Swagelok™\*

\*(or compatible fitting)

### Operating Pressures at inlets

Minimum: 15 psig (0.67 Bar)  
Nominal: 25 psig (1.68 Bar)  
Maximum: 30 psig (2.07 Bar)

### Wetted Surfaces

Tubing: Teflon™  
Gas Chambers: Pyrex  
MFC's: Stainless Steel  
Seals: Viton

### Operating temperatures

32° - 122° F (0° - 50° C)

### Performance Temperature Range

59° - 95° F (15° - 35° C)

Weight: 27 lbs

### Dimensions (w x h x d)

Portable: 17" x 7" x 15"  
Rack: 19" x 7" x 15"  
Optional: 19" x 7" x 24" or 17" x 7" x 24"

## Electrical

Standard: 100 VAC to 250 VAC, (50/60 Hz)  
Current: 2 Amps (maximum)

## Operating Modes

Front panel keypad  
RS-232 serial data interface  
I/O control (8 inputs / 8 outputs)

## Data I/O

RS-232 serial data interface  
I/O Control (8 inputs / 8 outputs)

## OPTIONS

- Rack Mount
- Extra Gas Inlets

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