

Ozone Monitors

2B Technologies offers two models of portable Ozone Monitors. Our popular Model 202, with a precision of ± 1.5 ppbv, is more than adequate for most applications, especially for sampling at fixed locations. In 2005 we introduced the fastest responding ozone monitor on the market, our Model 205 Ozone Monitor™. Its ability to make measurements as often as every 2 s makes it the preferred instrument for aircraft measurements and for vertical profiling using balloons and kites where fast response time is desired. Models 202 and 205 Ozone Monitors™ are housed in the same enclosure and have all of the same functionalities.



Features include:

- Small, Light weight, low power
- Data averaging options of (2 s), 10 s, 1 min, 5 min and 1 hr
- DewLine™ for elimination of humidity interference
- Internal data logger with three additional analog inputs for simultaneous logging of other measurements such as external temperature, pressure and humidity.
- Real time clock
- RS-232 serial and 0-2.5 V analog outputs
- Optional Flash Card provides portable and virtually unlimited data storage
- GPS option for continuous logging of location

Specifications:

Measurement Principle	UV Absorption at 254 nm
Analytical Range	Model 202: 1.5 ppbv to 100,000 ppbv (100 ppmv) Model 205: 1.0 ppbv to 100,000 ppbv (100 ppmv)
Precision and Accuracy	Model 202: Greater of 1.5 ppbv or 2% for 10-s avg Model 205: Greater of 1.0 ppbv or 2% for 10-s avg
Measurement Interval	Model 202: 10 s Model 205: 2 s
Nominal Flow Rate	1.5 L/min
Data Storage	14,336 lines internal; optional flash memory card
Data Outputs	RS232, 0-2.5 V Analog, LCD Display
Power Requirements	12 V dc or 120/240 V ac Model 202: 4.0 watt (2.9 watt in low power mode) Model 205: 5.0 watt (3.9 watt in low power mode)
Size	3.5 x 8.5 x 11 inches (9 x 21 x 29 cm)
Weight	Model 202: 4.7 lb (2.1 kg); 1.6 lb (0.7 kg) without case Model 205: 5.0 lb (2.3 kg); 1.9 lb (0.9 kg) without case

Ozone Calibration Source

The Model 306 Ozone Calibration Source™ (OCS™) is a portable source of ozone that allows one to calibrate any ozone monitor. The instrument scrubs ozone from ambient air and produces either zero air or air having a mixing ratio of ozone anywhere in the range 30-1,000 ppbv. The desired ozone concentration is chosen from the easy-to-use menu using a rotary select switch. The instrument can be programmed to output up to 10 individual ozone step concentrations over a chosen time interval. The total output volumetric flow rate is 2.5 L/min, and the ozone mixing ratio is controlled so as to be independent of ambient temperature, pressure and humidity.

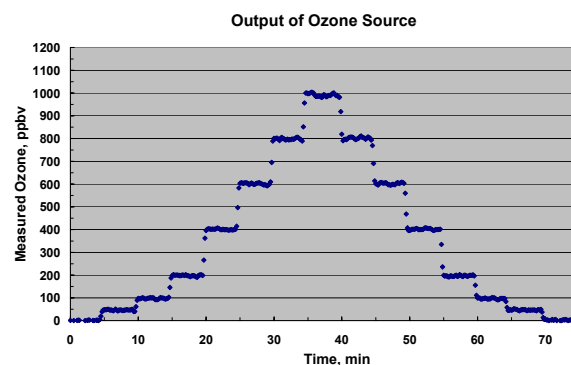
You can attach the Ozone Cal Source™ output directly to the inlet of any ozone monitor; the excess flow is vented through an ozone scrubber internal to the OCS™. The Ozone Cal Source™ is housed in the same rugged instrument case as the Model 202 and Model 205 Ozone Monitors™. Besides portability, an important advantage of the Model 306 OCS™ is that it provides a known concentration of ozone in ambient air containing the same level of humidity as the air sample to be measured.

Specifications

Ozone Output Range	0 ppbv and 30-1,000 ppbv
Output Flow Rate	Regulated at 2.5 L/min volumetric
Precision and Accuracy	Greater of 2.0 ppbv or 1.5% of ozone concentration
Rise Time (95%)	< 30 s to reach 95% of concentration selected
Data Outputs	RS232, LCD Display
Power Requirements	12 V dc or 120/240 V ac, 18 Watt
Size	3.5 x 8.5 x 11 inches (9 x 21 x 29 cm)
Weight	5.6 lb (2.6 kg)

Example Data:

The following are data obtained for the calibration of a Model 202 Ozone Monitor™. New target ozone concentrations were entered into the Ozone Cal Source every 5 minutes. As can be seen from the data, the new ozone concentrations are reached within 3 data points (30 s). Target ozone mixing ratios were 0, 50, 100, 200, 400, 600, 800 and 1,000 ppbv.



Nitric Oxide Monitor

The Model 400 Nitric Oxide Monitor™ is designed for the measurement of atmospheric nitric oxide (NO) in the range 2-2,000 ppbv with a precision of ± 2 ppbv. The Model 400 shares many of the unique features of the Model 202 and 205 Ozone Monitors™, including small size and weight, low power requirement, and absolute calibration.

Theory of Operation:

Our recently patented NOzone™ technology employed by the Model 400 Nitric Oxide Monitor™ is based on the quantitative reaction of nitric oxide (NO) with ozone (O₃):



This reaction has long been used as a gas phase titration for the measurement of either NO or O₃ in laboratory kinetics experiments, and the reaction is stoichiometric; i.e., one O₃ molecule is consumed for every NO molecule oxidized to NO₂ in the reaction. In the Model 400 Nitric Oxide Monitor™, a small concentration of ozone (3-5 ppm) is added to the gas sample stream and the resulting decrease in concentration of ozone is measured by the absolute method of UV absorption in a dual beam arrangement that cancels any contribution from ambient ozone. By providing adequate time for the reaction to go to completion, the decrease in ozone concentration is equal to the original concentration of NO in the gas stream.

The NO + O₃ reaction is the same reaction used in conventional chemiluminescence analyzers. Instead of measuring the change in ozone concentration, chemiluminescence detects the small amount of light produced in the reaction. Chemiluminescence instruments are highly sensitive and have a very fast response time, but require frequent calibration using a gas standard. The NOzone™ technology is less sensitive than chemiluminescence, but the portability, low power and absolute calibration characteristics of the Model 400 NO Monitor™ makes it well suited for NO measurements where ppbv levels of NO are expected. The instrument can be used in combination with photolytic and molybdenum converters for measurements of NO_x and NO_y species as well.

Specifications

Measurement Principle	Quantitative depletion of ozone, UV absorbance
Analytical Range	0-2,000 ppbv
Precision and Accuracy	Greater of 2.0 ppbv or 3%
Measurement Interval	10 s
Nominal Flow Rate	1.5 L/min
Data Storage	14,336 lines internal; optional flash memory card
Data Outputs	RS232, LCD Display
Power Requirements	12 V dc or 120/240 V ac, 11 Watt
Size	3.5 x 8.3 x 11.6 in (9 x 21 x 30 cm)
Weight	6.4 lb (2.6 kg)