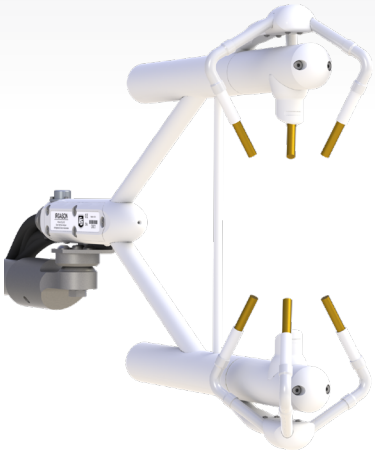
CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

THE IRGASON ADVANTAGE

Introduction

Campbell Scientific's IRGASON fully integrates the open-path analyzer and sonic anemometer. Designed specifically for eddy-covariance flux measurements, the patented design is easier to install and use than separate sensors and provides increased measurement accuracy. The IRGASON simultaneously measures absolute carbon dioxide and water vapor, air temperature, barometric pressure, and three-dimensional wind speed and sonic air temperature.



Design Features

- **True Covariance:** The IRGASON is the only commercially available sensor to fully integrate the gas analyzer with a sonic anemometer. The integration of the sonic and gas analyzer allows for the CO_2, H_2O and wind measurements to be truly colocated, thus preserving the true covariance and eliminating the uncertainty of complex corrections to account for instrument spatial separation.
- **Minimal Flow Distortion for Scalar Flux:** The combined support structure of the IRGASON minimizes flow distortion when compared to placing a large bluff bodied instrument adjacent to the sampling volume of the sonic. The effect of the IRGASON's gas analyzer housing on the sonic was examined in Horst et al., 2016[1]. The authors conclude that the IRGASON has minimal flow distortion in scalar flux measurements that can be directly attributed to the vertical symmetry of both the sonic transducer array and the gas analyzer about the horizontal midplane.
- **Colocated Fast Response Sonic Temperature:** The colocation of the sonic anemometer provides an accurate temperature in the gas analyzer measurement volume, which can be used to correct for line broadening effects of open-path CO_2 flux such as those found in Helbig et al. 2016[2].
- **Simple Installation:** Single-piece construction simplifies the sensor installation and eliminates multiple mounting accessories on the tripod/tower crossarm.
- **Measurement Synchronization:** Single-piece design and single set of electronics allow for a completely synchronized gas analyzer and sonic anemometer measurement which eliminates a correction for time lag.
- **Remote Low-power Operation:** 5 W steady state and power up at 25°C and field ruggedness allow for instrument operation in extremely remote parts of the world.
- **No Sensor Body Heating Corrections Needed**: Operation without active heat control eliminates the need to correct for sensor body heating on the scalar flux measurement that was outlined in Burba et al., 2008[3].
- **Weather Tolerance:** Innovative signal processing, rain wicks, angled sensor windows, and window heaters improve performance of the analyzer during precipitation/dew events.
- **Real-time Fluxes:** Simplified corrections selected specifically for Campbell Scientific gas analyzers and sonic anemometers are provided with EasyFlux®-DL to give fully corrected fluxes directly from the Campbell Scientific data logger.
- **Free of Hazardous Chemicals:** The IRGASON uses a molecular sieve (patent pending) to scrub CO_2 and H_2O from inside the gas analyzer sensor head. This eliminates many challenges associated with shipping instruments that contain hazardous chemicals. The use of a molecular sieve instead of hazardous chemicals makes the instrument safer to handle by the station operator and is environmentally friendly.
- **Single-Vendor Solution:** Campbell Scientific manufactures all the components used in the IRGASON. The gas analyzer is backed by a 3-year or 17,500-hour warranty.

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[1]Horst, T.W., Vogt, R., Oncley, S., 2016. Measurements of flow distortion within the IRGASON Integrated Sonic Anemometer and CO_2/H_2O gas analyzer. Bound-Layer Meteorol., 160, 1-15.

[2]Helbig M., Wischnwski, K., Gosselin, G.H., Biraud, S.C., Bogoev, I., Chan, W.S., Euskirchen, E.S., Glenn, A.J., March, P.M., Quinton, W.L., Sonnentag, O. 2016. Addressing a systematic bias in carbon dioxide flux measurements with the EC150 and the IRGASON open-path gas analyzers. Ag and Forest Meteorol., 228-229, 349-359.

[3]Burba, G., Mcdermitt, D., Grelle, A., Xu, L. 2008. Addressing the influence of instrument surface heat exchange on the measurements of CO_2 flux from open-path gas analyzers. Global Change Biology. 14, 1854-1876.