

IRGASON

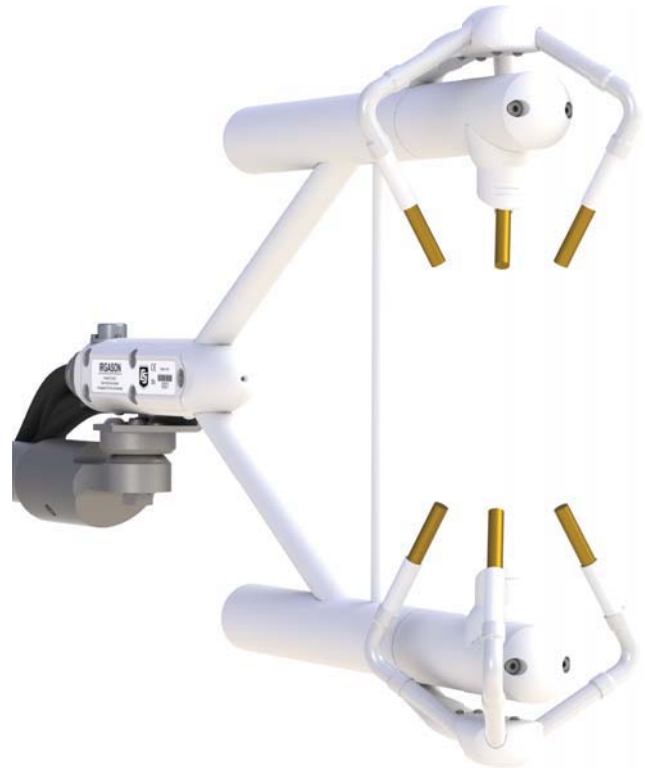
Integrated CO₂ and H₂O Open-Path Gas Analyzer and 3D Sonic Anemometer



Campbell Scientific's IRGASON is an integrated in-situ open path analyzer and sonic anemometer specifically designed for eddy covariance flux measurements. It simultaneously measures absolute carbon dioxide and water vapor densities, air temperature, barometric pressure, and three dimensional wind speed and sonic air temperature.

Features/Benefits

- Unique optical layout allows for a slim aerodynamic shape with minimal wind distortion and body heating
- Measurements are temperature compensated without active heat control
- Co-located analyzer and sonic anemometer measurement volumes
- Analyzer and sonic anemometer measurements are temporally synchronized by a common set of electronics
- Low power consumption; suitable for solar power applications
- Low noise
- Maximum output rate of 50 Hz with 25 Hz bandwidth
- Tolerant to window contamination
- Angled windows to shed water
- Field rugged
- Field serviceable (easy access to chemical bottles)
- Factory calibrated over wide range of CO₂, H₂O, pressure and temperature in all combinations encountered in practice
- Extensive set of diagnostic parameters to warn of questionable data
- Fully compatible with Campbell Scientific dataloggers; field setup, configuration, and field zero and span can be accomplished directly from the datalogger



IRGASON gas analyzer and 3D sonic anemometer.

IRGASON Outputs

- U_x (m/s)
- U_y (m/s)
- U_z (m/s)
- Sonic Temperature (°C)
- Sonic Diagnostic
- CO₂ Density (mg/m³)
- H₂O Density (g/m³)
- Gas Analyzer Diagnostic
- Ambient Temperature (°C)
- Atmospheric Pressure (kPa)
- CO₂ Signal Strength
- H₂O Signal Strength

^aSubject to change without notice.

^bA temperature of 20°C and pressure of 101.325 kPa was used to convert mass density to concentration.

^cThe noise RMS specifications assume 25°C, 597 mg/m³ CO₂ density, 85 kPa, 14 g/m³ water density, and 25 Hz bandwidth.

^dThe accuracy specification for the sonic anemometer is for wind speeds <30 m s⁻¹ and wind angles between ±170°.

^eThe measurement resolution values for the sonic anemometer are for instantaneous measurements made on a constant signal.

General Specifications^a

Operating Temperature:	-30° to +50°C
Operating Pressure:	70 to 106 kPa
Power:	5 W (steady state and power up) at 10 to 16 Vdc)
Fundamental Measurement Rate:	100 Hz
Output Signal:	SDM, RS-485, USB
Output Rate:	5 to 50 Hz; user programmable

Output Bandwidth:	5, 10, 12.5, 20, or 25 Hz; user programmable
Auxiliary Inputs:	air temperature and pressure
Weight	
IRGASON Head & Cables:	2.8 kg (6.1 lb)
EC100 Electronics:	3.2 kg (7 lb)
Umbilical Cable Length:	3 m (9.8 ft) from IRGASON head to electronics

Gas Analyzer Specifications^{a, b}

Factory Calibrated Range	
CO₂:	0 to 1830 mg/m ³ (0 to 1000 ppm)
H₂O:	0 to 42 g/m ³ (-60° to +37°C dew point)
Path Length:	15.37 cm (6.05 in)

CO₂ Performance

Zero Drift with Temperature (maximum):	±0.55 mg/m ³ /°C (±0.3 μmol/mol/°C)
Gain Drift with Temperature (maximum):	±0.1% of reading/°C
Noise RMS (maximum)^c	0.2 mg/m ³ (0.15 μmol/mol)

Sensitivity to H₂O (maximum):	±1.1 x 10 ⁻⁴ molCO ₂ /molH ₂ O
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H₂O Performance

Zero Drift with Temperature (maximum):	±0.037 g/m ³ /°C (±0.05 mmol/mol/°C)
Gain Drift with Temperature (maximum):	±0.3% of reading/°C
Noise RMS (maximum)^c	0.004 g/m ³ (0.006 mmol/mol)
Sensitivity to CO₂ (maximum):	±0.1 molH ₂ O/molCO ₂

Sonic Anemometer Specifications^a

Accuracy^d

Offset Error	
u_x, u_y:	<±8.0 cm s ⁻¹
u_z:	<±4.0 cm s ⁻¹
Gain Error	
Wind Vector within ±5° of horizontal:	<±2% of reading
Wind Vector within ±10° of horizontal:	<±3% of reading
Wind Vector within ±20° of horizontal:	<±6% of reading

Measurement Resolution^e

u_x, u_y:	1 mm s ⁻¹ rms
u_z:	0.5 mm s ⁻¹ rms
c:	15 mm s ⁻¹ (0.025°C)

Speed of Sound:	Determined from 3 acoustic paths; corrected for crosswind effects
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Rain:	Innovative ultrasonic signal processing and user installable wicks considerably improve the performance of the anemometer under all rain events
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Barometer Specifications^a

-BB Basic Barometer

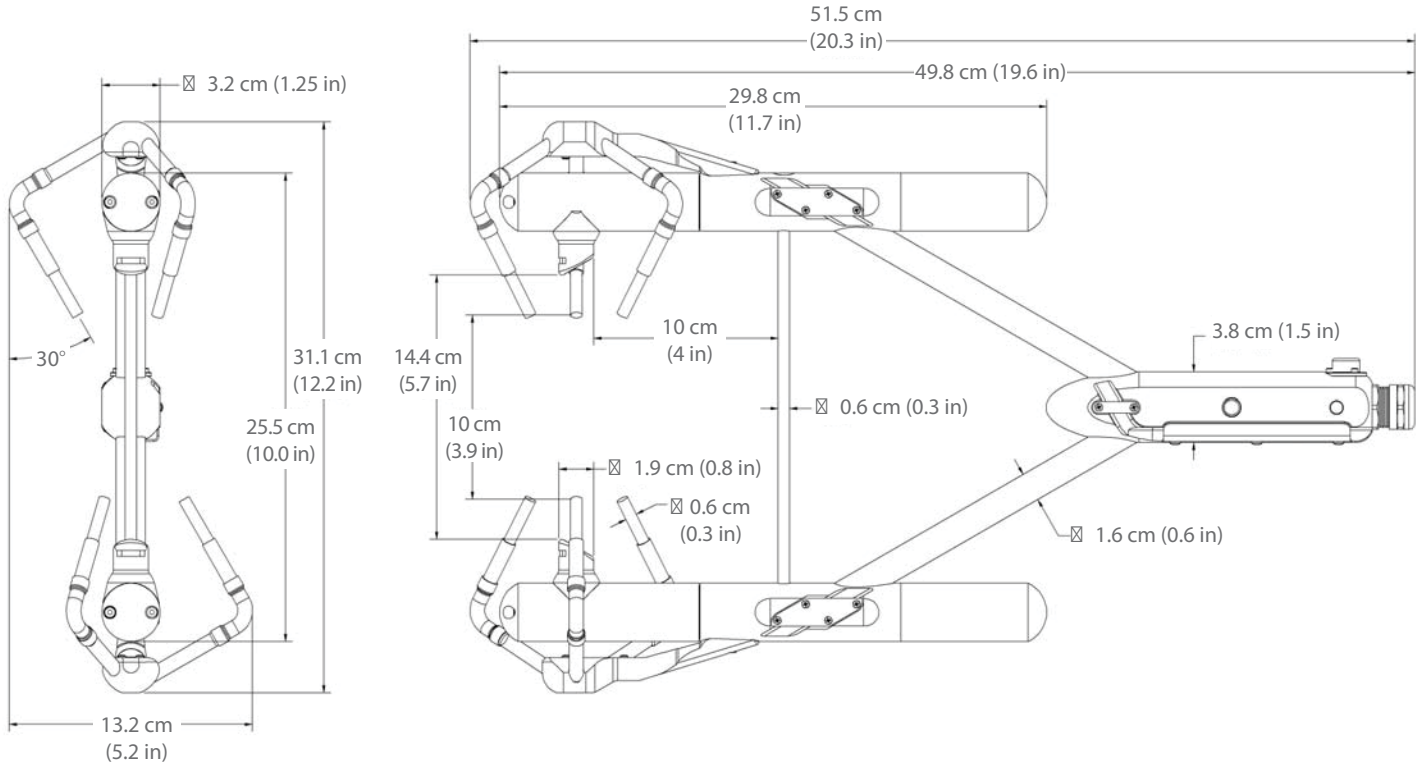
Manufacturer:	Freescale MPXAZ6115A
Total Accuracy:	±2.2 kPa (0° to +85°C); rises linearly from 2.2 kPa at 0°C to 5.5 kPa at -30°C

-EB Enhanced Barometer

Manufacturer:	Vaisala PTB110
Total Accuracy:	±0.85 kPa (0° to +60°C); rises linearly from 0.85 kPa at 0°C to 1.90 kPa at -30°C

Ambient Temperature Specifications^a

Manufacturer:	BetaTherm 100K6A11A	Total Accuracy:	±0.15°C (-30° to +50°C)
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Ordering Information

Flux Sensor

IRGASON CO₂ and H₂O Open-Path Gas Analyzer

Pressure Sensor Options (must choose one)

- BB Basic Barometer
- EB Enhanced Barometer

IRGASON Carrying Case Options

- NG No IRGASON Case
- GC IRGASON Carrying Case

Zero and Span Accessories

- 26390** IRGASON Zero and Span Shroud Kit
- 27278** IRGASON Lab Stand Kit

Cables

For the following cables, enter the length, in feet after the -L, and choose -PT for the cable termination option. A 25-ft cable length is recommended.

- CABLEPCBL-L** Two-conductor, 16-AWG cable with a Santoprene® jacket is used to power the EC100 electronics box.
- CABLE4CBL-L** Four-conductor, 22-AWG cable with drain wire and Santoprene jacket is used to attach the SDM connector on the EC100 electronics box.
- CABLE3TP-L** Three-twisted pair, 24-AWG cable with drain wire and Santoprene jacket is recommended for use with the RS-485 output (<500 ft length).



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