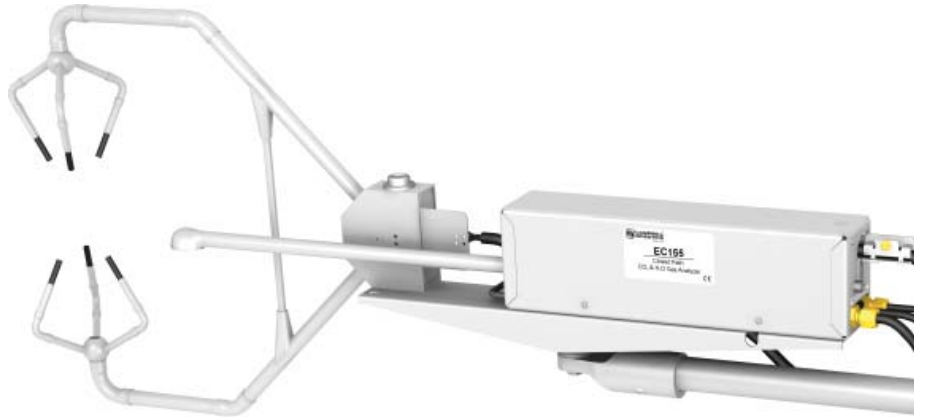


EC155

Closed-Path CO₂/H₂O Gas Analyzer



Campbell Scientific's EC155 is a closed-path analyzer specifically designed for eddy-covariance flux measurements. It simultaneously measures absolute carbon dioxide and water vapor mixing ratio, sample cell temperature and pressure, and three-dimensional wind speed and sonic air temperature.



EC155 gas analyzer with CSAT3A sonic anemometer head.

Features/Benefits

- Slim aerodynamic shape with minimal wind distortion
- Measurements are temperature compensated without active heat control
- Analyzer and sonic anemometer measurements are temporal 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
- EC155 heated sample intake
- Field rugged
- Field serviceable (easy access to chemical bottles and sample cell)
- 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

EC155 Outputs

- U_x (m/s)*
- U_y (m/s)*
- U_z (m/s)*
- Sonic Temperature (°C)*
- Sonic Diagnostic*
- CO₂ Mixing Ratio (μmol/mol)
- H₂O Mixing Ratio (mmol/mol)
- Gas Analyzer Diagnostic
- Cell Temperature (°C)
- Cell Pressure (kPa)
- CO₂ Signal Strength
- H₂O Signal Strength
- Differential Pressure (kPa)

*Requires a CSAT3A Sonic Anemometer Head.

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 Bandwidth:	5, 10, 12.5, 20, or 25 Hz; user programmable
Output Signal:	SDM, RS-485, USB
Output Rate:	5 to 50 Hz; user programmable

Auxiliary Inputs:	air temperature and pressure
Weight	
EC155 Head and Cables:	3.9 kg (8.5 lb)
CSAT3A Head and Cables:	1.7 kg (3.7 lb)
Mounting Hardware:	0.4 kg (0.9 lb)
EC100 Electronics:	3.2 kg (7 lb)
Umbilical Cable Length:	3 m (9.8 ft) from EC155/CSAT3A head to electronics
Sample Intake/Sonic Volume Separation:	15.6 cm (6.1 in.)

Gas Analyzer Specifications^a

Factory Calibrated Range	
CO₂:	0 to 1000 ppm
H₂O:	0 to 83 ppt (-60° to +37°C dew point)
Ambient Temperature:	-30° to +50°C
Sample Cell Volume:	5.9 cm ³ (0.36 in ³)

CO₂ Performance

Zero Drift with Temperature (maximum):	±0.3 µmol/mol/°C
Gain Drift with Temperature (maximum):	±0.1% of reading/°C

Noise RMS (maximum)^b:	0.15 µmol/mol
Sensitivity to H₂O (maximum):	±5.6 x 10 ⁻⁵ molCO ₂ /molH ₂ O

H₂O Performance

Zero Drift with Temperature (maximum):	±0.05 mmol/mol/°C
Gain Drift with Temperature (maximum):	±0.3% of reading/°C
Noise RMS (maximum)^b:	0.006 mmol/mol
Sensitivity to CO₂ (maximum):	±0.05 molH ₂ O/molCO ₂

Sonic Anemometer Specifications^a

Accuracy^c

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^d

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

-BB Basic Barometer

Manufacturer:	Freescall MPXAZ6115A and Freescall MPXV7007DP
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

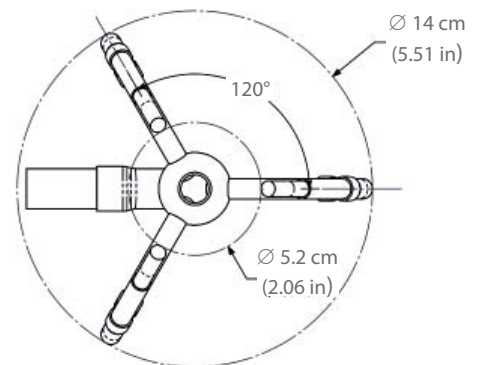
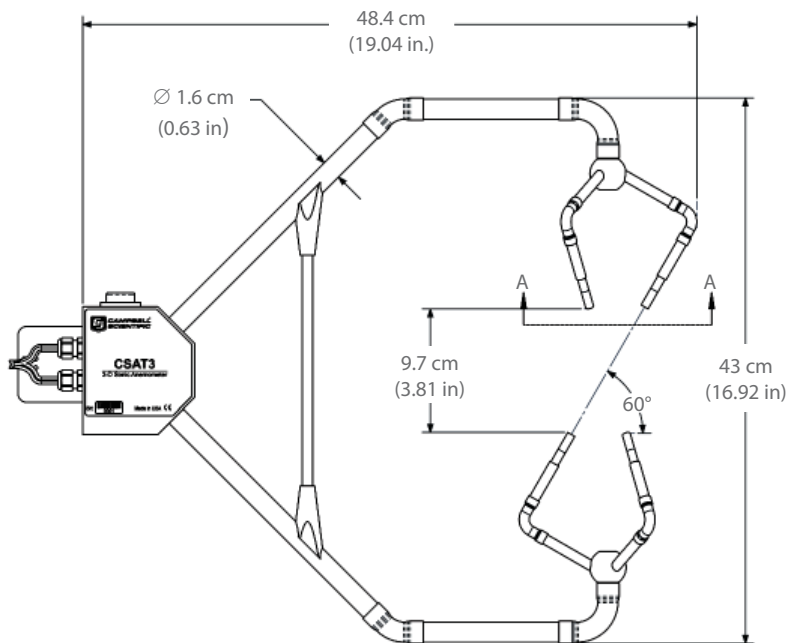
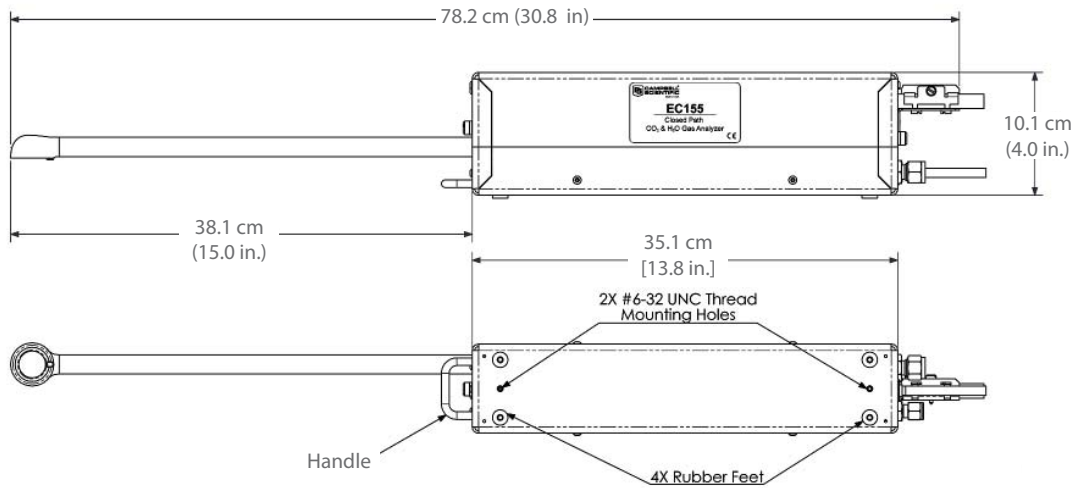
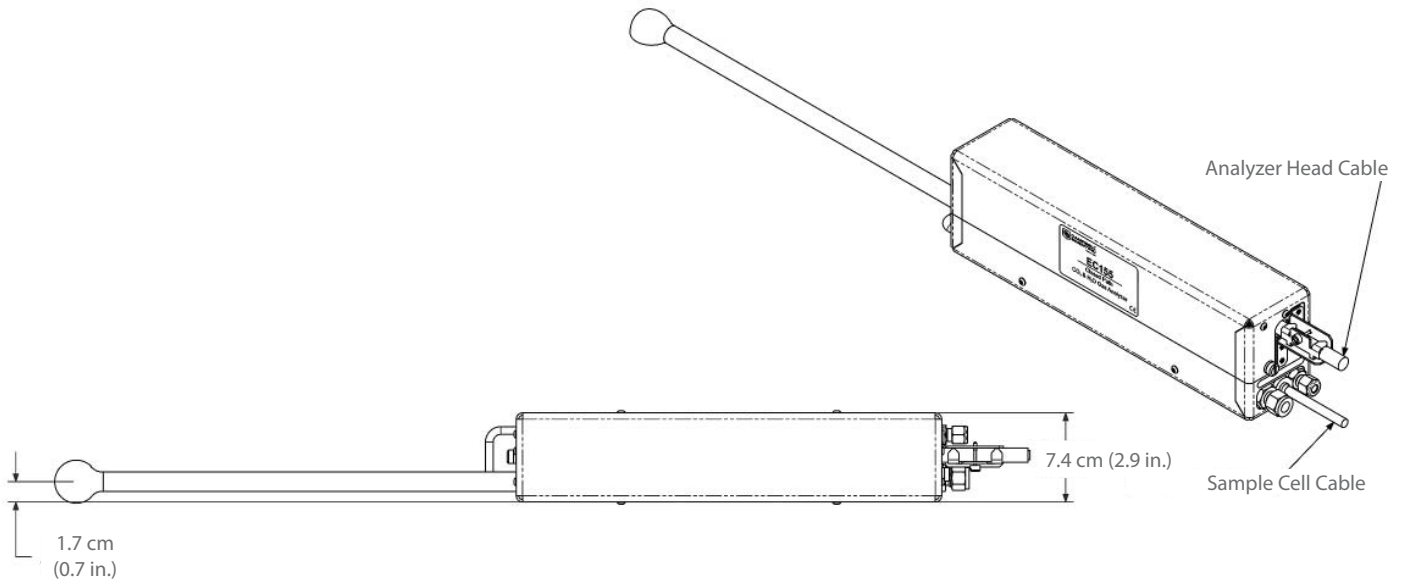
Manufacturer:	Vaisala PTB110 and Freescall MPXV7007DP
Total Accuracy:	±0.85 kPa (0° to +60°C); rises linearly from 0.85 kPa at 0°C to 1.90 kPa at -30°C

^aSubject to change without notice.

^bThe noise RMS specifications assume 25°C, 85 kPa, 326 µmol/mol CO₂ concentration, 19 mmol/mol H₂O concentration, and 25 Hz bandwidth.

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

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



Section A-A
Scale 1:1

Ordering Information

Flux Sensors

EC155 CO₂ and H₂O Closed-Path Gas Analyzer

Sample Cell Options

- SI Sample Cell with Intake
- SN Sample Cell with No Intake

Sensing Heads Options

- GH Gas Analyzer Only
- SH CSAT3A and Gas Analyzer

Sonic Carrying Case Options

- NC No Sonic Case
- SC Sonic Carrying Case

Pressure Sensor Option

- BB Basic Barometer
- EB Enhanced Barometer

EC155 Carrying Case Option

- NG No EC155 Case
- GC EC155 Carrying Case

Cables

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

CABLEPCBL-L Two-conductor, 16-AWG cable with a Santoprene® jacket is used to power the EC155.

CABLE4CBL-L Four-conductor, 22-AWG cable with drain wire and Santoprene jacket is used to attach the SDM connector on the EC155 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).

