



CPEC310

Expandable Closed-Path Eddy-Covariance System with EC155, Pump Module, and Automatic Zero and Span



Fully Expandable Design

Provides additional ports with automatic zero and span

Overview

The CPEC310 with EasyFlux[®] is a turn-key, closed-path eddy-covariance (EC) flux system for long-term monitoring of atmospheric-biosphere exchanges of carbon dioxide, water vapor, heat, and momentum. A complete system consists of a closed-path gas analyzer (EC155 closed-path gas analyzer), sonic anemometer (CSAT3A sonic anemometer), data logger (CR6 datalogger), sample pump, three-valve module that enables automatic zero and CO₂ span measurements (manual H₂O span), and accommodations for a CDM-A116 analog input expansion module allowing for additional sensors.

The gas analyzer's patented vortex intake design (United States Patent No. 9,217,692) and small sample cell volume (5.9 mL) provide a much lower flow rate than other closed-path systems while maintaining excellent frequency response (4.3 Hz cutoff frequency). Additionally, this design makes the system virtually maintenance free while still maintaining an ideal frequency response compared to traditional inline filters. Lower flow allows the CPEC310 to have one of the lowest total system power requirements (12 W) of any closed-path eddy covariance system. Campbell Scientific manufactures all components of the CPEC310, including the data logger and EasyFlux[®] DL software for computing and correcting fluxes, which gives our system the most reliable functionality.

Benefits and Features

- ▶ New conformal coating helps protect sonic transducers in corrosive environments
- ▶ Expandable, high-end system with CR6 datalogger processing power and EasyFlux[®] DL software to compute and fully correct up to 20 Hz data
- ▶ The three-valve module makes the CPEC310 the only closed-path eddy covariance system on the market with the ability to perform automatic zero and CO₂/H₂O span
- ▶ Additional port options for energy balance and atmospheric sensors
- ▶ Ideal system for short or tall towers
- ▶ Simple design provides easy use while maintaining full functionality

Detailed Description

The gas analyzer's small sample cell volume (5.9 mL) minimizes

the sample residence time (50 ms at the system's nominal flow



rate, 7 LPM). This gives excellent frequency response (5.8 Hz half-power bandwidth) with low total system power (12 W).

Eddy-Covariance Measurements

CO₂ and H₂O are measured with an EC155 Closed-Path Gas Analyzer. Three-dimensional wind speed and sonic air temperature are measured with a CSAT3A sonic anemometer head.

CPEC310 System Enclosure

The CPEC310 has two enclosures: a fiberglass enclosure that houses the CR6 datalogger, pump module, three-valve module, and optional CDM-A116, and the EC100 enclosure for

data processing. The CPEC310 can also be equipped with a scrub module for automatic zeroing of the EC155.

CPEC310 Pump Module

The pump module, a standard component of the CPEC310 system, consists of a small dual-head diaphragm pump with a brushless dc motor mounted inside a fiberglass enclosure. An integral cable connects the pump module to the CPEC310 system enclosure, which provides power, temperature measurement and control, pressure measurement, and pumping speed measurement and control.

Specifications

Operating Temperature Range	-30° to +50°C
Input Voltage Range	10.5 to 16.0 Vdc
Power	› 12 W (typical) › 35 W (maximum, at cold startup)

System Enclosure

Dimensions	54 x 44.5 x 29.7 cm (21.3 x 17.5 x 11.7 in.)
Weight	› 15.36 kg (33.85 lb) › 16.24 kg (35.8 lb) with optional CDM-A116 module

Pump Module

Inlet Connection	3/8-in. Swagelok
Pressure Sensor Range	15 to 115 kPa
Pumping Speed	3 to 9 LPM (automatically controlled at the set point, typically 7 LPM)

Three-Valve Module

Inlets for Module	Zero, CO ₂ , and H ₂ O span
Outlets	Analyzer and H ₂ O bypass
Connections	¼-in. Swagelok
Dimensions	14.0 x 12.7 x 14.0 cm (5.5 x 5.0 x 5.5 in.)
Weight	1.5 kg (3.3 lb)

Scrub Module

Power	› 8 W (with heater running) › 0 W (quiescent) › 2 W (with pump running)
Cylinder Volume	480 cm ³ each (29.29 in. ³ each)
Molecular Sieve Size	1.6 to 2.5 mm beads (0.063 to 0.098 in. beads)
Enclosure Dimensions	39.4 x 34.3 x 20.3 cm (15.5 x 13.5 x 8.0 in.)
Weight	9.6 kg (21.1 lb)

For comprehensive details, visit: www.campbellsci.com/cpec310 



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