LI-5405A Underway pCO_2 Analyzer

Specifications

- **Data acquisition frequency:** adjustable, every 30 seconds or longer per reading
- **Response time:** 2 – 3 minutes
- **PC system:** Windows 10
- **Work environment:** indoor, outdoor, or shipboard
- **Power requirement:** 110 or 220 VAC, custom made
- **Dual water filter set**
- **CO_2 detector:** LI-COR
- **GPS for both local and ship connection**
- **Additional sensors:** SBE45 T and S, Turner Designs Cyclops 7F fluorescence for chlorophyll *a*, Aanderaa DO and Airmar WeatherStation® 200WX

Figure 1. The LI-5405A Underway pCO_2 Analyzer.

Description

The LI-5405A Underway pCO_2 Analyzer (formerly Apollo AS-P3) has been developed and tested for underway measurements (i.e., real-time while the vessel is sailing or continuous on a fixed platform) of the partial pressure of CO_2 (pCO_2), CH_4 (under development), dissolved oxygen (DO), chlorophyll *a*, surface water salinity and temperature (Sea-Bird SBE45), and atmospheric CO_2. The system also logs GPS location (latitude and longitude) continuously via the Airmar WeatherStation. Water sample is forced into the shower-head equilibrator by a shipboard pump (normally from the ship's seawater intake line). Equilibrated air is drawn from the equilibrator and dried with an electronic cooling system. It is then quantified with a CO_2 analyzer (e.g. LI-7815) before being released to the atmosphere. The shower-head equilibrator is effective with a response time of about 2 minutes for CO_2. Further, the equilibrator is completely sealed from any outside air via a secondary equilibrator. The analyzer has been tested for CO_2 in various environments.

The system has been automated for the following procedures: using a set time interval (adjustable) it measures 1) standard CO_2 gases (up to 5), 2) atmospheric pCO_2, and 3) surface water pCO_2, DO, S, T, and GPS location. Overall precision for pCO_2 is the same as the CO_2 analyzer. The system is fully tested for pCO_2.

Configurations

Standard equipment

- Airmar WeatherStation® 200WX (GPS position, air temperature, and wind)
- SeaBird SBE45 (sea surface temperature and salinity)
- CO_2 analyzer
    - LI-7815

Premium equipment

- Aanderaa 4835 DO (dissolved oxygen)
- Turner Designs Cyclops 7 (chlorophyll)
- pH