

# OceanXpert-Air IR-CO<sub>2</sub>

Precise, independent Air-CO<sub>2</sub> Analyzer



- ▶ Premium LI-COR® analyzer
- ▶ Auto calibration
- ▶ Lowest maintenance
- ▶ Roughest environmental
- ▶ High precision
- ▶ Operates on small vessels
- ▶ contains GPS and/or Air-CO<sub>2</sub> analyzer

The OceanXpert-Air IR-CO<sub>2</sub> can be used to expand the OceanPack measuring system with Sensors, Modems, Antennas or GPS receivers. The Top-Box can be used for data transmission or positioning application, not only with the OceanPack.

With the standard RS-485 data interface and wide range included power supply the Top-Box can be placed anywhere, e.g. on top of the mast. More interfaces are supported, e.g. WLAN or simple RS-232 or RS-485 interfaces.

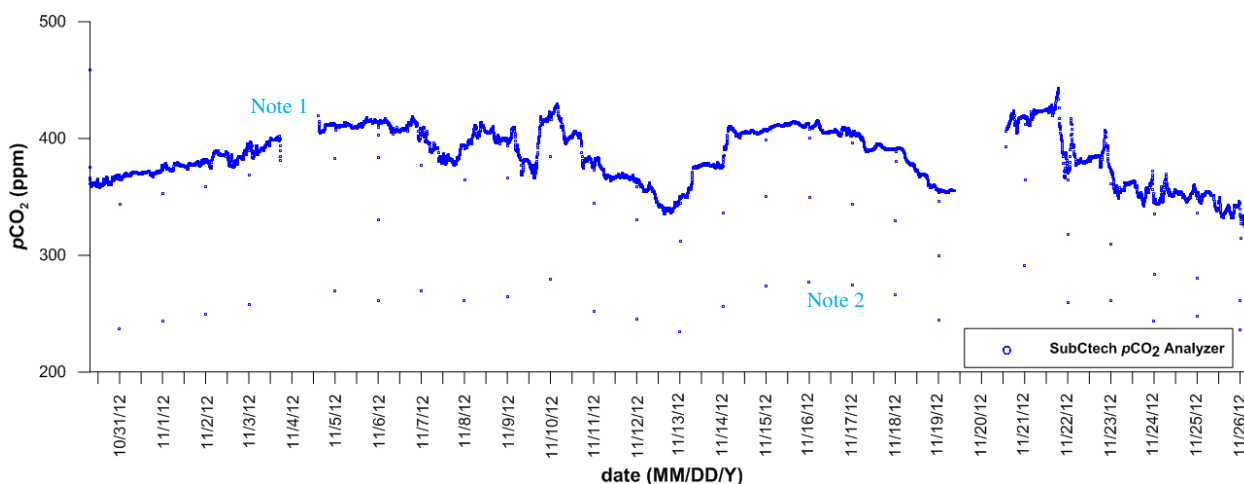
Standard applications are to get GPS and radio signals from beyond room or ship hulls. Another possibility is the usage of outdoor sensors like meteorology. Digital and every kind of analogous sensors are supported.

## Features & Benefits:

- It's a LI-COR® Biosciences LI-7200x pCO<sub>2</sub> sensor: Highest accuracy
- Robust, versatile and compact housing for offshore and laboratory applications
- Automatic report of interferences and initiation of diagnostic routines
- Optional GPS geo references for all data and position event control
- Optional online telemetry data transfer and alarm services
- Optional GPS geo reference for all data and position event control



Specifications	
<b>GPS</b>	12-channel Garmin marine receiver for marine environmental conditions
<b>Sensors</b>	Meteorological sensors connected via serial bus <ul style="list-style-type: none"> <li>• CO<sub>2</sub> analyzer for air (LI-COR® Biosciences LI-7200)</li> </ul>
<b>Modem</b>	Optionally GSM modem, IRIDIUM, INMARSAT or ARGOS on request
<b>Data transmission</b>	RS-485: up to 1200m RS-232: up to 100m Options: WLAN, Bluetooth, radio and others: on request.
<b>Power</b>	Supply: 10...32V DC or 110-240VAC <ul style="list-style-type: none"> <li>• Current: depends on the equipment, e.g. 0,1A @12VDC for GPS only</li> </ul>
<b>Temperature</b>	Operating: -35°C ... +75°C operating
<b>Options</b>	RS-485 Data acquisition modules for e.g. meteorology with analogous or digital inputs • Data link for any additional input down to a computer system (e.g. OceanPack) • Telemetry modules for Bluetooth, WLAN, radio link etc.
<b>Connector, cable</b>	Water-proof connector IP68 with halogen-free outdoor cable • The cable length should be max. 100m if the power must be transmitted via the cable
<b>Housing</b>	PVC or metallic weather-resistant enclosure, depends on the equipment <ul style="list-style-type: none"> <li>• Classes for PVC housings: Ingress Protection (EN 60529): IP 66/67 • Impact Resistance (EN 62262): IK 08/07 • Halogen free: DIN/VDE 0472, Part 815 • Flammability Rating (UL 746 C 5): UL 94 5V • UL Type: UL TYPE 1, 4, 4X, 12, 13</li> </ul>



3 weeks raw data on board RV POLARSTERN between Bremerhaven (Germany) and Cap town (South Africa) in November 2012.

Note 1: measurement stopped during shutting down the sea water pump

Note 2: single marker points represents the auto-zeroing



## How it works

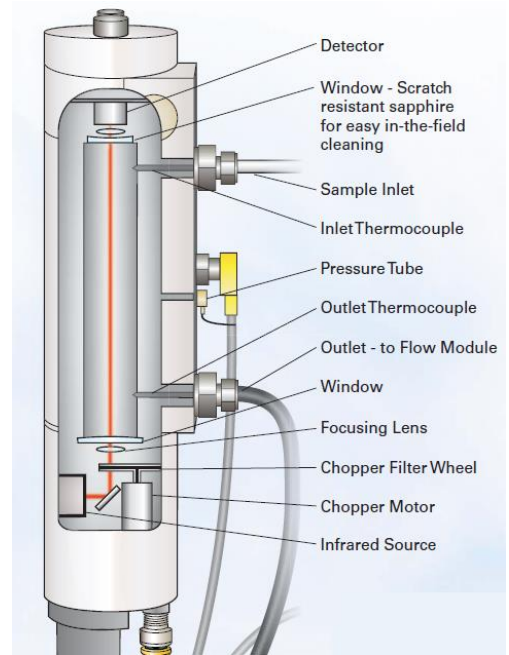
### In general

The LI-7200x features a simple, user-cleanable optical bench. It can be cleaned on site without any special tools and without removing the instrument from the platform. To open the optics for cleaning, simply loosen the two knurled screws on the top of the analyzer, lift the analyzer cap, and slide out the optical path. There is no need for factory recalibration after cleaning the optical components, and there are no delicate optical components to re-align. The optical path thermocouples and pressure transducer are protected in the optical path to minimize the risk of damage during cleaning.

### In detail

The LI-7200x sensor head has enclosed optical cell, with single pass optics and a large 8mm diameter optical beam. Optical filters centered at 3.95 $\mu\text{m}$  and 4.26 $\mu\text{m}$  provides reference and absorption signals for CO<sub>2</sub>, while filters centered at 2.35 $\mu\text{m}$  and 2.59 $\mu\text{m}$  provide reference and absorption signals for water vapour.

The figure to the right shows a cutaway representation of the LI-7200 sensor head. The Infrared Source emits radiation, which is directed through a Chopper Filter Wheel, Focusing Lens, and then through the measurement path to a temperature-controlled lead selenide Detector. A brushless Chopper Motor rotates the Chopper Filter Wheel at 9,000rpm. Lifetimes of the source, detector, and chopper motor are extremely long – in a ten-year period, over 96% of instruments have never had these repairs done. The Windows at both ends of the optical path are made of scratch resistant sapphire, allowing for worry-free cleaning in the field. (Image & Text © LI-COR®)



The figures to the left show hourly CO<sub>2</sub> and H<sub>2</sub>O fluxes measured with the LI-7200 Enclosed Analyzer compared to fluxes measured with the LI-7000 and LI-7500 analyzers, which were used as standards. Fluxes measured with the LI-7200 were within 2.5% of the standards for all field experiments. These data were collected in 3 deployments that took place over four seasons. (Image & Text © LI-COR®)

