

CIRAS-2 DC

Differential CO₂/H₂O Infrared Gas Analyzer

For over 25 years, PP Systems has been manufacturing high quality scientific instrumentation for plant and soil science research worldwide.

The CIRAS-2 DC is a dual channel, true differential system featuring four independent infrared gas analyzers (2 for CO₂ and 2 for H₂O). As such, it is capable of resolving small differences between two gas streams in real time. This type of instrument (true differential analyzer) is the preferred option for plant photosynthesis and respiration measurements where differential concentrations need to be resolved to a high degree of accuracy and precision.

Features

- High precision, non-dispersive infrared gas analyzers for CO₂ and H₂O
- CO₂ Range: 0-2,000 ppm (up to 9,999 ppm)
- Fast response
- Analog & digital (RS232) linear output
- Excellent stability achieved by built-in auto-zero facility
- Fully compensated for changes in temperature, pressure and gas interactions
- Built-in sampling pump with mass flow controllers
- Insensitive to vibration, no moving parts ensuring high reliability
- Internal & external data logging



Technical Specification

Analysis Method

Non-dispersive infrared, configured as an absolute absorptiometer with microprocessor control of linearization.

The analyzers simultaneously measure absolute CO₂ and humidity of the reference and analysis gas streams. The CIRAS-2 DC has 4 independent analyzers for true differential measurement.

Measurement Range

CO₂: 0-2,000 µmol mol⁻¹ (Optimal Range)
0-9,999 µmol mol⁻¹ (Max. Range)
H₂O: 0-75 mb

Corrections are made for temperature, pressure and foreign gas broadening.

Precision (Absolute)

CO₂: 0.2 µmol mol⁻¹ at 300 ppm
0.5 µmol mol⁻¹ at 1,750 ppm
3.0 µmol mol⁻¹ at 9,999 ppm
H₂O: 0.015 mb at 0 mb
0.020 mb at 10 mb
0.030 mb at 50 mb

Linearity

Better than 1.0% throughout the range, with calibration at 2,000 ppm CO₂ or 40 mb.

Stability (CO₂ Analysis)

Automatic Zero at regular intervals, corrects for sample cell contamination, source and detector ageing and pre-amplifier gain changes.

Response Time

Electrical: 0.5 seconds
Display/Analog Output: 1.6 seconds
Pneumatic: < 5 seconds

Air Sampling

100 cm³ min⁻¹ using an integral DC pump. Both analysis and reference pumps fitted with mass flow controllers. The analyzer may be used in open and closed systems.

Environmental Sensor Inputs

3 input channels are available. There is integral conditioning of PP Systems' environmental sensors (%RH, Temperature, PAR, etc.).

Analog Output (CO₂/H₂O)

8 bit D/A converter giving 0.5% resolution. Output voltage 0-5V. Both minimum and maximum voltage are defined by user.

RS232 Output

Stored/current data output in standard ASCII format at 1200 baud.

Analyzer Control

All analyzer functions/controls are controlled by the PC (software supplied).

Real Time Clock

Accuracy: Better than 1 min/month at 25^o C.
Operating Temperature: 0-70^o C.

Recording Options

By PC or by the instrument. Automatic logging at user selectable intervals between 10 seconds and 1 hour, controlled by internal real-time clock.

Data Storage

Internal battery backed RAM, stores up to 820 records. Memory is maintained during battery change.

Instrument Status Detection

Indication of instrument malfunction, including low battery voltage (< 10.5V) through the RS232 output. Auto restart if momentary failure.

Power Supply

External 12V DC power supply with small ripple. Input voltage must not exceed 15V. An optional internal 12V battery can be supplied giving up to 2 hours continuous use.

Power Consumption

12.0 W (initial warm-up)
5.0 W (normal operation)

Operating Environment

0-45^o C, non-condensing. In dirty environments, external air filtration is required.

Housing

Rugged, aluminum enclosure.

Dimensions

29 cm H x 10.5 cm W x 20.5 cm D

Weight

2.7 kg
(Optional, internal battery adds 0.6 kg. to the weight if used).

PP Systems is continuously updating its products and reserves the right to amend product specifications without notice.

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