PP SYSTEMS
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# EGM-5
# Portable $CO_2$ Gas Analyzer

*With Optional $H_2O$ and $O_2$ Measurement*

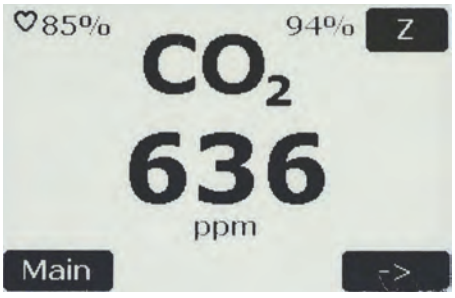
The EGM-5 is a field portable instrument designed for accurate and reliable measurement of $CO_2$. It is extremely easy to set up and install, and our innovative "Auto-Zero" technology ensures long term stability, accuracy and calibration. The EGM-5 requires minimal maintenance without the need for factory recalibration that saves users both time and money.

## Product Features

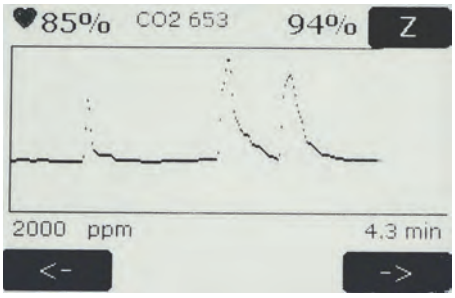
- High precision, compact, non-dispersive infrared gas analyzer for $CO_2$
- Accuracy: < 1% over calibrated $CO_2$ range
- $CO_2$ ranges up to 100000 ppm (10%)
- Automatic pressure and temperature compensation
- Powerful internal, rechargeable battery providing up to 16 hours of continuous use
- Numeric and graphical display of data in real time
- Convenient data storage and transfer using USB flash drive
- Operation from AC or DC power inputs
- Large touch display with excellent sunlight readability and optimized viewing angle
- Built-in air sampling pump and electronic flow sensor
- Voltage and digital output
- Audible and visual alarms/warnings
- Wide range of accessories and sensors available
- WiFi (Optional)

## Applications

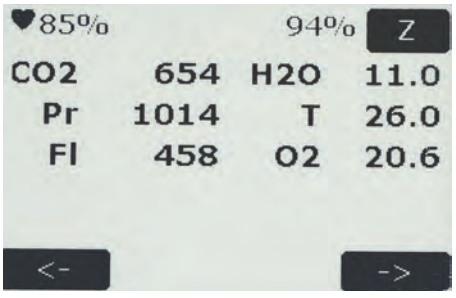
- Ambient air monitoring
- Plant physiology
- Soil $CO_2$ efflux
- Canopy assimilation
- Global change studies
- $CO_2$ sequestration
- Borehole $CO_2$ monitoring
- Air-sea surface exchange ($pCO_2$)
- Environmental toxicology
- Volcanology
- Bioremediation




Main display for $CO_2$




Graphical display for monitoring $CO_2$ history/trends and flux rates




Monitor multiple sensors including $CO_2$, $H_2O$ and $O_2$ from one display

# Calibration & Stability

For over 30 years, PP Systems has been manufacturing high quality $CO_2$ infrared gas analyzers for customers worldwide. The EGM-5 is perfectly suited for applications that demand portability and a high degree of accuracy and control with minimal maintenance. The design of the instrument ensures an inherent calibration stability that has been confirmed by many years of experience in gas analysis technology. The EGM-5 does not require $CO_2$ recalibration, although we do recommend periodic checks to confirm system integrity. It employs a non-dispersive, infrared measurement technique, coupled with microprocessor-based signal processing, to achieve excellent stability and specificity to $CO_2$. Our innovative "Auto-Zero" technology ensures fast warm-up, long term stability, accuracy and analyzer calibration. It also minimizes the effects on span gas sensitivity, sample cell contamination, IR source aging, changes in detector sensitivity and electronics.

# Portability

The EGM-5 is a compact, lightweight (1.5 kg) instrument that is packaged in a rugged, aluminum enclosure with a shock absorbing polyurethane base making it extremely robust and reliable under harsh environmental conditions.

# Powerful Battery Technology

The EGM-5 is supplied with a very efficient, powerful and rechargeable Li-ion battery capable of providing operation in the field for up to 16 hours. The instrument can also be used with an AC power supply (included) for continuous operation from the mains in the laboratory.

# Touch Display

An innovative, large, touch display (EPD) features simple and intuitive system navigation and it offers excellent viewing under high sunlight.

# Integral Air Sampling Pump

A miniature, long life air sampling pump is included as standard for dynamic gas sampling. The pump can easily be disabled for static measurements if required.

# Data Storage

Data storage is virtually unlimited. Data is stored on a USB flash drive (memory stick) for safe storage and easy transfer of data to your PC.

All electrical and gas connections, USB communications, power and $CO_2$ scrubber are conveniently located on the EGM-5 rear panel.

## $H_2O$ Sensor (*Optional*)

A solid state $H_2O$ sensor can be integrated into the EGM-5 console for accurate measurement of $H_2O$ enhancing the $CO_2$ measurement in high humidity conditions.

- Range: 0–Dewpoint (mb)
- Accuracy: < 2% RH

Readings are displayed and recorded in absolute vapor pressure (mb). This sensor should never require recalibration.

## $O_2$ Sensor (*Optional*)

An electrochemical $O_2$ sensor can be integrated into the EGM-5 console for accurate measurement of $O_2$.

- Range: 0–100%
- Response Time: ≤ 15 seconds at 23 ± 2°C
- Linearity: ± 1.0% of full scale

This sensor should not require recalibration during the life of the sensor.

## WiFi (*Optional*)

Monitor the EGM-5 remotely from your computer or smartphone browser in real-time with our WiFi option.

## Sample Injection Kit (*Optional*)

An optional Sample Injection Kit is available for applications that require static sampling.

**Portable • Accurate • Reliable**

# Chambers and Environmental Sensors for Use with EGM-5

## Soil Respiration

Our **SRC-2 Soil Respiration Chamber** can be used with the EGM-5 for easy, accurate and rapid measurement of soil $CO_2$ efflux. The chamber is constructed out of rugged PVC with a stainless steel ring (for sealing). It also includes an internal fan for flushing and mixing the air, as well as an air temperature sensor.

- Dimensions: 150 mm (Height) x 100 mm (Diameter)

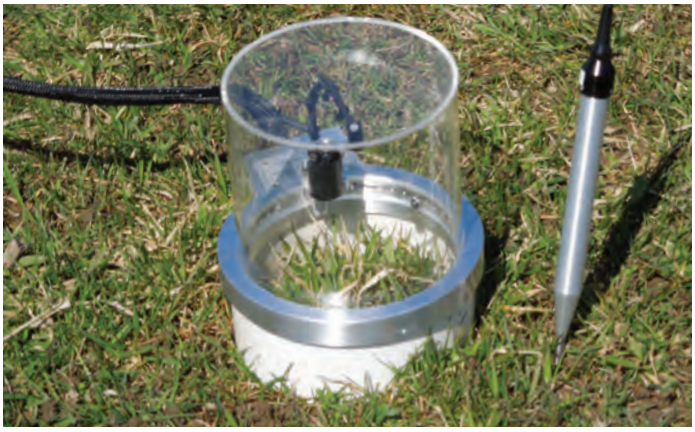
Collars (optional) are also available for use with the SRC-2 chamber.

## Canopy Assimilation

Our **CPY-5 Canopy Assimilation Chamber** can be used with the EGM-5 for easy, accurate and rapid measurement of net canopy $CO_2$ flux on low lying vegetation. The chamber is transparent and includes a fan for flushing and mixing the air and sensors for measurement of air temperature and PAR.

- Dimensions: 145 mm (Height) x 146 mm (Exposed Diameter)
- Exposed Area: 167 $cm^2$

Collars (optional) are also available for use with the CPY-5 chamber.



# Environmental Sensors

## STP-2 Soil Temperature Probe

A rugged, stainless steel probe for accurate measurement of soil temperature. It is commonly used with our SRC-2 Soil Respiration Chamber and CPY-5 Canopy Assimilation Chamber.

**Soil Temperature Range**

- 0–50°C

## Soil Moisture & Soil Temperature

A single sensor for accurate measurement of soil moisture and soil temperature.

**Soil Moisture Range**

- 0-100% (dry to fully saturated)

**Soil Temperature Range**

- -10 – +55°C

## Quantum Sensor

For accurate measurement of PAR (Photosynthetically Active Radiation) in the field under ambient conditions.

**PAR Range**

- 0–3000 µmol $m^{-2}$ $s^{-1}$

## TRP-3 Temperature/PAR Probe

A single probe for accurate measurement of air temperature and PAR.

**Temperature Range**

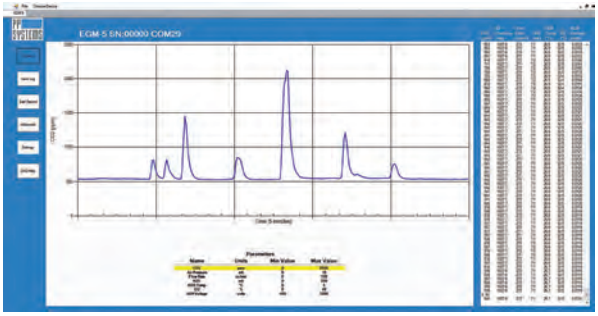
- 0–50°C

**PAR Range**

- 0–3000 µmol $m^{-2}$ $s^{-1}$

# Software

Our Windows based **GAS** software package is included for use with the EGM-5 for monitoring, logging and recording environmental sensor data.



# Rugged Transport Case

An optional, rugged transport case is available for use with the EGM-5, SRC-2 Soil Respiration Chamber and STP-2 Soil Temperature Probe.

# Technical Specifications

| | |
|---|---|
| **Analysis Method** | Non-dispersive infrared, configured as an absolute absorptiometer with microprocessor control of linearization |
| **$CO_2$ Measurement Ranges**<br>*Please specify at time of order* | 0-1000 ppm (µmol $mol^{-1}$)<br>0-2000 ppm (µmol $mol^{-1}$)<br>0-5000 ppm (µmol $mol^{-1}$)<br>0-10000 ppm (µmol $mol^{-1}$)<br>0-20000 ppm (µmol $mol^{-1}$)<br>0-30000 ppm (µmol $mol^{-1}$)<br>0-50000 ppm (µmol $mol^{-1}$)<br>0-100000 ppm (µmol $mol^{-1}$)<br>Readings are automatically corrected for temperature and pressure. |
| **Pressure Compensation Range** | 80–115 kPa |
| **Accuracy** | < 1% of span concentration over the calibrated range but limited by the accuracy of the calibration mixture |
| **Linearity** | < 1% throughout the range |
| **Stability** | Auto-Zero at regular intervals corrects for sample cell contamination, source and detector aging and changes in electronics. |
| **Calibration** | User programmable calibration (if required) |
| **Warm-up Time** | Approximately 15 minutes |
| **Sampling Rate** | 10 Hz. Sample data is averaged and output every 1.0 seconds. |
| **Sampling Pump** | Integral air sampling pump. Pump can be programmed for both dynamic and static sampling. |
| **Gas Flow Rate** | 200-500 cc/min (280-340 cc/min is optimal). An internal electronic flow sensor monitors flow rate. |
| **Terminal Block** | 10 pin terminal block for system inputs and outputs |
| **Analog Output** | 0–2.5V ($CO_2$ range selectable) |
| **Digital Output** | USB |
| **Environmental Sensor Inputs** | 2 inputs available for use with external chambers and environmental sensors |
| **Alarm** | Visual and audible alarm/warnings. 2 relay contacts (Alarm1 and Alarm2) |
| **Data Storage (USB)** | USB Flash Drive port for data storage in multiple formats |
| **Mini USB** | For connection to external PC |
| **Touch Display** | 2.7" electronic paper touch display with 264 x 176 pixel resolution |
| **Power** | Internal, rechargeable 7.4V, 8.7 Ah Li-Ion battery provides up to 16 hours of continuous use. Battery life will be reduced if used with external accessories/sensors. |
| **Power Consumption** | Warm up: 12W (12V @ 1.0A)<br>Normal operation: 6W (12V @ 0.5A) |
| **Enclosure** | Rugged, ergonomic, lightweight aluminum with polyurethane base |
| **Gas Connections** | Two quick connect fittings (inlet and exhaust) for use with 1/8" (.125") ID tubing |
| **Operating Temperature** | 0–50°C, non-condensing. External filtration is recommended in dirty/dusty environments. |
| **Dimensions** | 20 cm (L) x 20 cm (H) 10 cm (W) (Enclosure only) |
| **Weight** | 1.5 kg |

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