

## CO2-S-Pot - Diffuse flux continuous monitoring unit

CO2-S-Pot is an instrument for the continuous monitoring of diffuse soil flux emissions in volcanic and geothermal areas. The unit can be used both as a standalone unit to record short to medium term data in a single point or as part of a network of units for long term continuous monitoring. In this second case we advise to complete the network by adding one or two “standard” SoilGas-CM continuous monitoring devices to complete the information with meteorological parameters.

CO2-S-Pot is able to measure

- a) **Carbon dioxide diffuse flux from soil by applying the accumulation chamber method;**
- b) **Optionally hydrogen sulfide flux by applying the accumulation chamber method;**
- c) Barometric pressure
- d) Soil temperature
- e) Soil water content

Due to the compact design of the unit, it is not possible to extend the number of gas analyzers; if more gas species need to be measured it is advisable to use the standard SoilGas-CM unit.

CO2-S-Pot is a completely automatic unit, power supplied by a solar cell and backup battery, which performs the measurement cycles with a configurable frequency (by default every hour).

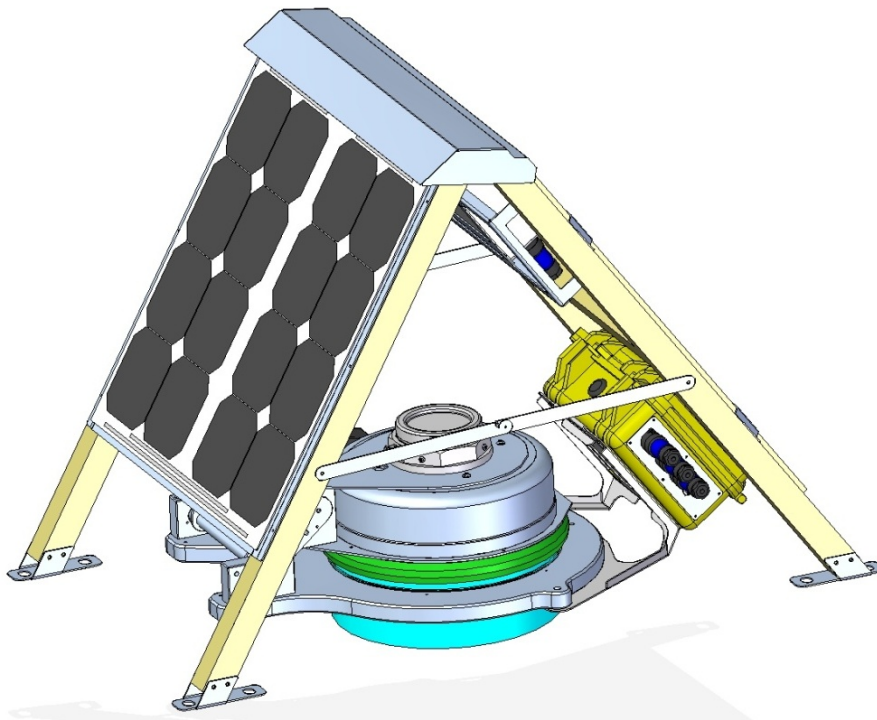


Figure 1. Light and inexpensive protection structure

### Power supply

The whole system is powered by a 12V 7 A/h lead battery, which is charged during the day by a solar cell. The solar panel is dimensioned in order to guarantee the functioning also in case of a few days of solar light absence.

### Accumulation chamber

Automatic aluminum accumulation chamber without mixing device.

Chamber surface: 700 cm<sup>2</sup>

### Carbon dioxide flux measurement

The carbon dioxide is measured by a NDIR (Non-Dispersive Infrared) detector, placed inside the chamber, protected by a large P3 filter to avoid dust contamination of the detector. The system is equipped with 2 interchangeable CO<sub>2</sub> detectors: (0 - 5,000 ppm), (0 – 5%). The low range detector enables a more accurate reading when operating in a weak emissions area. On the contrary, the high range detector allows the measurement of high emissions without risking the saturation of the signal.

Flux measurement range: from 0.1 to 30 moles/m<sup>2</sup> per day: Detector 0-5,000ppm

Flux measurement range: from 0.5 to 500 moles/m<sup>2</sup> per day: Detector 0-5%

### Hydrogen sulfide flux measurement

The H<sub>2</sub>S is measured by an electrochemical cell, placed inside the chamber, protected by a large P3 filter to avoid dust contamination of the cell.

Flux measurement range: from 0.0025 to 0.5 moles/m<sup>2</sup> per day: Cell 0-20ppm

### Soil parameters

The system is equipped with a soil probe able to measure temperature, volumetric water content and electrical conductivity, with the following specifications:

	Range	Accuracy
<b>Temperature</b>	-40 to 80°C	± 1°C
<b>Volumetric water content</b>	0 to 100%	± 3%
<b>Electrical conductivity</b>	0 to 23 mS/cm	±5% from 0 to 5 mS/cm ±10% from 5 to 23 mS/cm

### Configuration

The system can be configured locally using an Android-based mobile device (tablet or smartphone), which communicates with the unit using a Bluetooth link. A custom designed app allows the operator to configure the unit and check the proper functioning.

### Storage

The unit stores the data internally into a SD card. In case of telemetry fault, the data can be imported by manually removing the card.

## Telemetry

The unit can be equipped with either an 869 MHz, 2.4 GHz (or 900 MHz) license-free radio with a range in line of sight of 20 miles or GPS/GPRS modem; The telemetry allows remote configuration and to download the data. The type of telemetry must be specified at purchase order time.

## Shelter

The CO2-S-Pot unit can be supplied with light, and inexpensive, wood protection shown in Figure 1 and in the picture below or with a stanley steel AISI-316 shelter for extreme environmental conditions to protect the equipment against the elements and vandalism (Figure 2).



Picture 1. CO2-S-Pot working in Lipari Aeolian archipelago, Italy

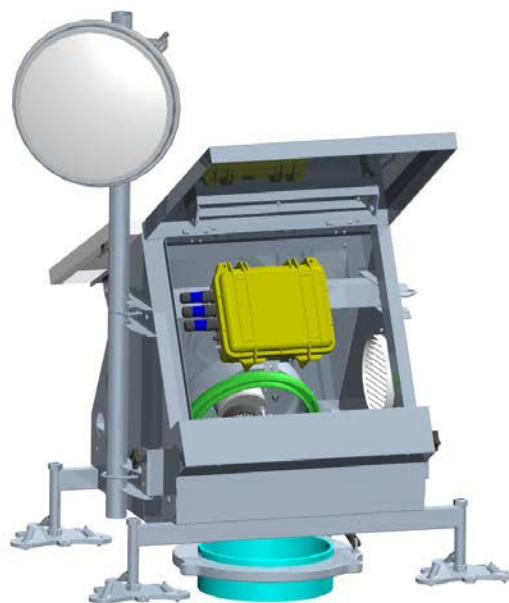


Figure 2. CO2-S-Pot equipped with extreme environmental conditions AISI316 Shelter and a heavy duty 2.4 GHz backfire antenna