

# PICARRO A0701, A0702 Closed System Measurement Package

Highest precision isotope and concentration data from closed ecological and incubation systems

Picarro's Closed System Measurement (CSM) package revolutionizes the study of closed-loop systems. Whether you are looking at gas evolution from soils or vegetation or the incorporation of stable labels into living organisms, our rugged high precision systems offer unparalleled performance. Picarro's small cavity design analyzers have long been the optimal choice for sample-limited studies. And, now we have developed a series of turn-key systems especially designed with minimal efflux and influx to avoid contamination and interference in closed loop operation.



- Real-time, non-destructive concentration and isotope studies
- Set-up in minutes; fast and easy to use
- Have confidence in your results; minimal efflux and influx
- The only logical choice for small sample work; perfectly matched to Picarro's small cavity technology
- For use in the field or in the lab. Picarro's rugged and robust analyzers are the best choice

Picarro's CSM package consists of an analyzer and diaphragm pump module which are specially adapted for low-leak operation. We also provide all the tubing and fittings to attach directly to your chamber. The complete gas path has been optimized to provide a total volume of only ca. 100 mls for the analyzer, pump and tubing up to the chamber. The data in Figure 1 (CO<sub>2</sub>) and Figure 2 (CH<sub>4</sub>) shows how well this system operates when attached to a chamber charged with an air-like matrix containing ca. 3,000 ppm of CO<sub>2</sub> and zero CH<sub>4</sub>. In this experiment, the rate of change in concentration CO<sub>2</sub> is less than 70 ppb/min and the rate of change in concentration of CH<sub>4</sub> is better than 0.1 ppb/min.

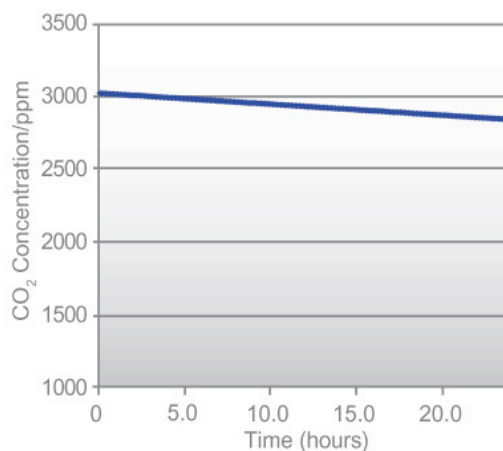
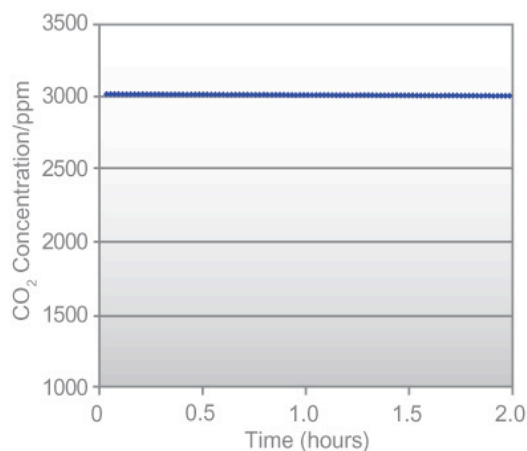


Figure 1. A closed-cycle chamber system was charged with an air-like matrix containing 3028 ppm CO<sub>2</sub>. When running, the chamber gas is continuously circulated through the analyzer. Data acquired for 2 hours (left) and 24 hours (right) shows that mixing of the chamber air with ambient air (ca. 390 ppm CO<sub>2</sub>) outside the chamber is minimal.

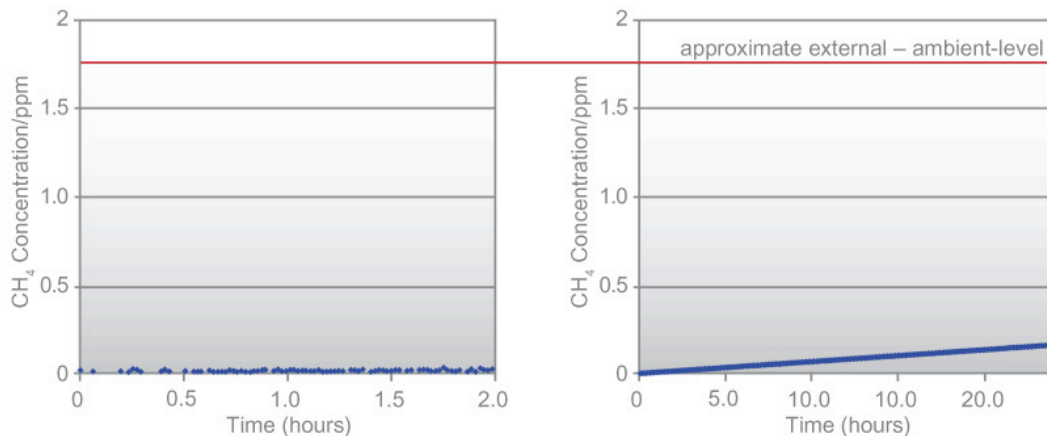


Figure 2. A closed-cycle chamber system was charged with an air-like matrix containing no CH<sub>4</sub>. When running, the chamber gas is continuously circulated through the analyzer. Data acquired for 2 hours (left) and 24 hours (right) shows that mixing of the chamber air with ambient air outside the chamber is minimal.

Picarro's rugged, robust instruments are proven for field or lab work. Take our systems on campaigns with confidence, Our analyzers have acquired data while installed at the Arctic, the Antarctic, the deserts of Africa, the jungles of the Amazon.

Picarro's CSM package can be purchased in conjunction with any of the analyzers in the Table below, and the performance characteristics for those analyzers are unchanged, making this the perfect system for multi-use operation, such as ambient air studies. The CSM package is designed to work with various scenarios of changing gas concentration. For more information on specific applications please contact us.

| Specifications                            |   |
|---|---|
| Gas concentration and isotope performance | Please see relevant gas analyzer data sheet   |
| Leak rate <sup>†</sup>                    | < 0.05 sccm over 12 hours <sup>‡</sup>  |
| Fittings                                  | Picarro provides two fittings types for chamber connection: 1/8 inch NPT and 1/4 inch Swagelock <sup>®</sup> ferrule  |
| Compatibility                             | G2101- <i>i</i> , G2201- <i>i</i> , G2131- <i>i</i> , G2132- <i>i</i>   |
| Ordering information                      | Order Picarro isotope gas analyzer with A0701 for required analyzer modifications and A0702 for low leak diaphragm pump. Both A0701 and A0702 are required for specified closed loop performance. |

<sup>†</sup> Using Picarro supplied bellows tubing and fittings. Using other tubing and fittings may degrade performance. Requires a gas tight chamber, including lids and seal.

<sup>‡</sup> Using the supplied bellows tubing, connect the pump outlet to the analyzer inlet, the pump vacuum inlet to the analyzer outlet to create a minimum volume loop. Measure the pressure change between the analyzer inlet and pump outlet over 12 hours and convert to leak rate. Smaller chambers have more rapid pressure change than larger chambers. Pressure increase for the minimum volume loop is ca. 220 Torr (4.3 psi) over 12 hours and is negligible for a 1 l chamber over 24 hours. Leak rate specification is unchanged with different samples volumes/chambers.