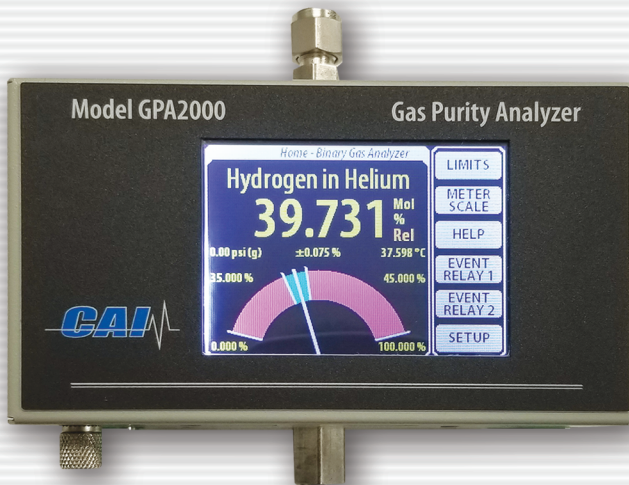




# MODEL GPA 2000

## Gas Purity Analyzer



### Description

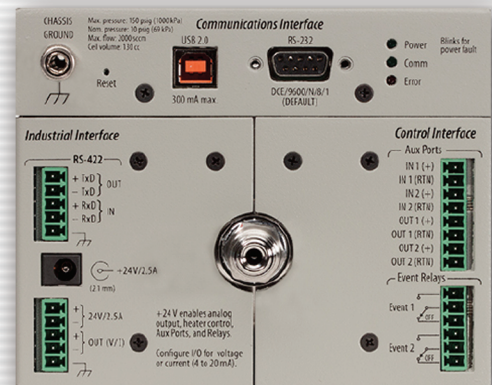
The CAI GPA 2000 Gas Purity Analyzer is capable of providing the end-user with a continuous gas purity measurement or, if preferred, the ratio of gases in a binary gas mixture based upon the physical properties of the gases present.

The speed of sound in a gas depends on the temperature, specific heat and the molar mass of the gas. By precisely measuring the speed of sound via a resonant acoustic cell, along with the temperature in a gas mixture, and knowing the thermodynamic properties and molar mass of the gases present, the GPA 2000 can determine the composition of a gas mixture with an accuracy of about 0.1%.

The GPA 2000 comes equipped with data on nearly 500 gases that are characterized over a wide range of concentrations. This gas information is easily selected from the front panel or remotely via a digital interface, allowing over 50,000 different mixtures to be measured. Gases can be added to the data tables as can user-defined gas mixtures which can be treated as one gas species.

### Features

- Maintenance-free design that operates without reference gases, consumables, filaments, optical sources or GC columns.
- 304SS High Pressure-rated Resonant Acoustic Sample Cell (RASC).
- No need for field recalibration after factory-characterization of the RASC.
- Flexible design which allows the end-user to apply the same unit on a different application without having to recalibrate or return to the factory.
- Large, Touch-Screen User Display that can operate in either the Gas Purity, Binary Gas or Physical Measurements Mode.



### Typical Applications

- **Air Separation** – Product Gas Purity Analysis, Cal Gas Cylinder, Welding & Diving Gas Mixtures
- **Pressure Swing Absorption** – H2 Purity Analysis
- **N2 Generators** – N2 Purity Analysis
- **Power Gen** – H2 Cooled Turbine Generator Analysis
- **Refineries** – Recycle Gas / H2 Purity Analysis
- **Electrolysis** – H2 / O2 Gas Purity Analysis
- **Heat Treating** – H2 / N2 Annealing Furnace Analysis
- **Food & Beverage** – CO2 Purity Analysis

# MODEL GPA 2000

## Gas Purity Analyzer

### Specifications

**Measurement Principle** – Speed of Sound via Resonant Frequency Detection

**Detector** – Resonant Acoustic Cell + Wideband Microphone

**Speed of Sound Range** – 100 to 1500m/s

**Sample Flow Cell** – Electropolished 304 Stainless Steel

**Range** – Application Dependent- Contact Factory

**Concentration Accuracy** – +/- 0.01 to 0.1% typical (appl/gas species dependent)

**Response Time** – Electronic Response is T90 in 10 seconds

**Power Requirement** – 24VDC Nominal (12 to 48VDC), 0.1 to 2.5A

**Operating Temperature** – - 20 to +70 Deg C (max)

**Operating Pressure** – Up to 150psia (max)

**Operating Flow Rate** – Up to 5000scm

**Analog Outputs** – 0-5V, 0-10V and 4-20mA

**Digital Outputs** – RS-232, RS-422 and USB (WHQL high speed USB 2.0)

**Display** – Touch Screen LCD

**Enclosure 1-Type / Dims / Wt** – Gen. Purpose, Wall Mount (5.5”W x 4.5”H x 3.25”D / 7lbs

**Enclosure 2-Type / Dims / Wt** – NEMA-4X, Wall Mount (10”W x 11H” x 5.5D”) / 10lbs

**Enclosure 3-Type / Dims / Wt** – EXD, Suitable for Class 1, Division 1, Groups B,C & D

**Fittings** – 1/8” (F)NPT for Enclosure Types 1 &2, 1/4” FNPT for Encl 3

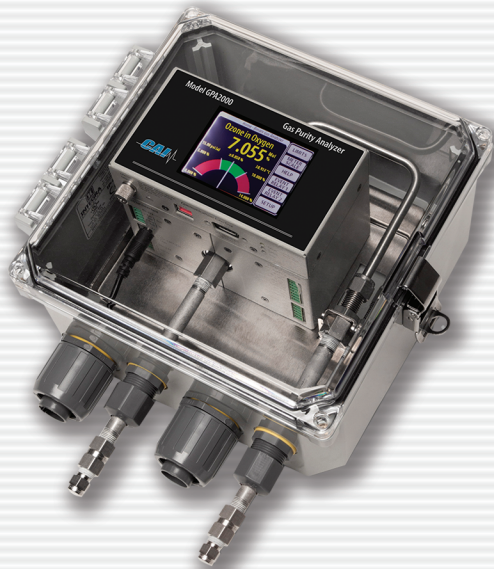
The accuracy of the gas composition result depends on the difference in speed of sound between the gas species. Typical composition errors for several gas mixtures are noted in table 1. For measurements requiring greater accuracy, a REL to the dominant species can be performed to remove most of the systematic errors. With this, an accuracy of 10ppm is possible (depending upon the gas species). Contact CAI for information on your specific gas mixture.

Gas Mixtures	Composition Error Range
Hydrogen / Helium	0.04% to 0.14%
Hydrogen / Argon	0.002% to 0.049%
Helium / Air	0.005% to 0.035%
Hydrogen / Oxygen	0.002% to 0.035%
Oxygen / Ozone	0.053% to 0.11%
Nitrogen / Carbon Dioxide	0.051% TO 0.12%
Sulfur Hexafluoride / Air	0.007% to 0.155%

**Table 1**

# MODEL GPA 2000

## Gas Purity Analyzer



IP66/NEMA4X rated, UV and corrosion resistant polycarbonate enclosure. A clear hinged door allows viewing of the display and quick access to the instrument. The sealed enclosure protects the GPA2000 from dust, weather and hose-directed water. Liquid tight gas ports and flexible, non-metallic cable conduit ports are located on the bottom edge of the N4X wall mount enclosure.

### Operating Pressure:

The accuracy of the GPA2000 depends on knowing the operating vent pressure. In many cases, the vent pressure is stable and can be entered on the front panel or over computer interfaces. For applications that have varying operating pressures, an external pressure transducer can be applied to track the variation. The corresponding output from the pressure transducer can be easily connected to one of the GPA2000 analog inputs for compensation purposes. The GPA2000 operates over a pressure range that extends from a few psi up to 150psi.

### Heaters, Relays, I/O & Power:

The GPA2000 comes equipped with several multi-purpose analog I/O's, two-user defined event relays for process control or alarms, and cavity heaters for temperature regulation and condensation prevention. There is also an input for an external 24VDC power supply. Customers may choose to order the optional power supply which can supply +24VDC to the GPA2000.



CAI has selected an ATEX/IECEx-rated NEMA7 explosion-proof housing to allow the GPA2000 to be installed in areas classified as hazardous. The threaded-lid cover has a see-through viewing window allowing for convenient viewing of the display to confirm operation of the unit at all times. By placing the GPA2000 into an EXD housing, CAI has eliminated the need of an X-Purge controller and the continuous delivery of an inert purge gas to meet the hazardous area installation requirements.

### High Purity Configuration:

The standard GPA-2000 comes with 1/8" female NPT connections. A wide variety of SS gas fitting adapters are available for interfacing with NPT, VCR, VCO, tube compression and flexible hose fittings. The GPA2000HP High Purity Process Gas Analyzer is designed for use in high purity and corrosive environments. The GPA2000HP come with a welded-in place 1/4" male VCR fittings. When this configuration is ordered, the unit is helium-leak checked for leak-free integrity. The acoustic transducer, utilized in all versions of the GPA2000, consists of a nickel-plated copper spiral on a Kapton polyimide film. For gases that may negatively react with copper or Kapton, we recommend the end-user contact CAI to verify the application feasibility.

Specifications subject to change without notice.



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