

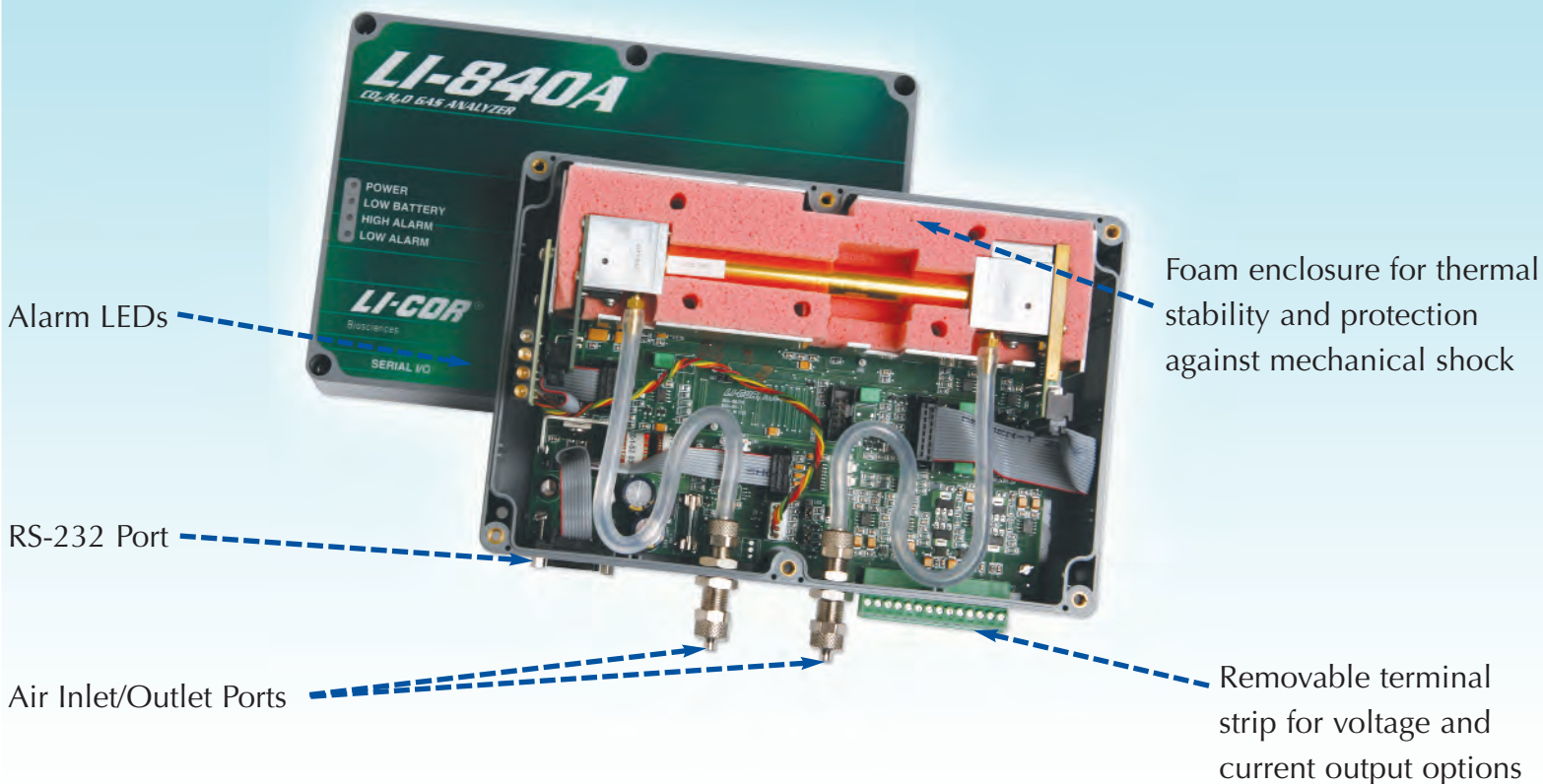


# LI-840A

## CO<sub>2</sub>/H<sub>2</sub>O Gas Analyzer

A Practical CO<sub>2</sub>/H<sub>2</sub>O Analyzer for Continuous Monitoring Applications





## For Continuous CO<sub>2</sub>/H<sub>2</sub>O Monitoring Applications

The LI-840A CO<sub>2</sub>/H<sub>2</sub>O Analyzer is a simple, low maintenance gas analyzer designed for continuous monitoring applications. It is an absolute, non-dispersive infrared (NDIR) gas analyzer based upon a field proven single path, dual wavelength and thermostatically controlled infrared detection system. It can be used in a wide range of demanding environmental conditions.

### LI-840A Features

- CO<sub>2</sub> measurement range of 0-20,000 ppm, H<sub>2</sub>O measurement range of 0-60 ppt
- High accuracy over the entire measurement range due to automatic temperature and pressure compensation
- Broadening correction for water vapor improves CO<sub>2</sub> measurements
- High stability with low zero and span drift
- <1 ppm signal noise at 370 ppm CO<sub>2</sub>, <0.01 ppt at 10 ppt for H<sub>2</sub>O
- User cleanable optical path does not require factory recalibration
- Factory calibration made using gases traceable to WMO and EPA standards

- Operating temperature range of -20 °C to +45 °C
- Output data using serial port or analog signals
- Compact, lightweight design with low power consumption

User defined high and low alarms are available as voltage outputs, allowing you to control CO<sub>2</sub> or H<sub>2</sub>O within a desired range. For instance, the LI-840A can trigger an exhaust fan in a greenhouse environment. Relays can trigger devices such as automatic dialers, alarms, pumps, and valves in industrial environments. Alarm values can be changed easily using the Windows®-compatible application software included with the LI-840A.

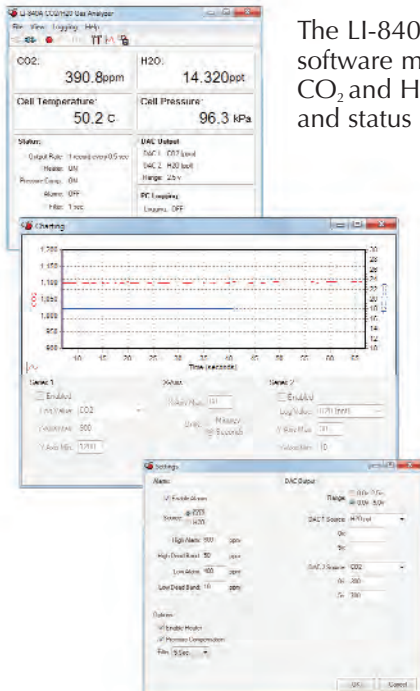
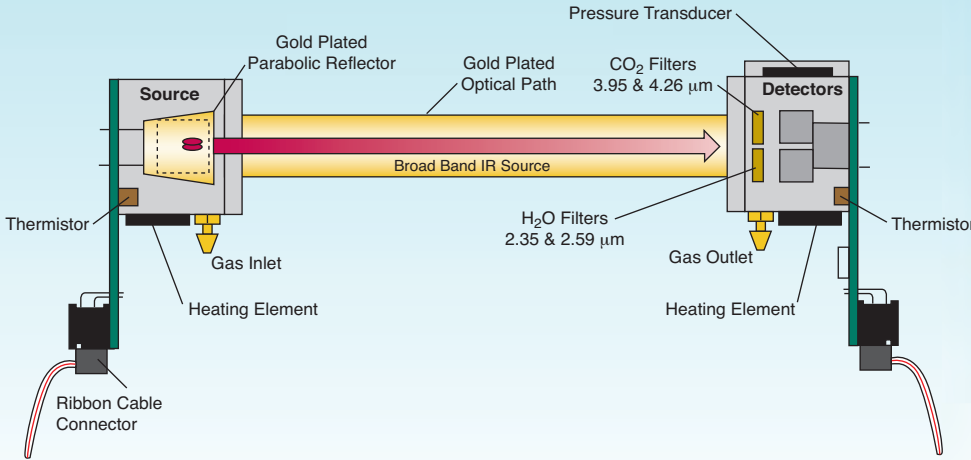
### Multiple Data Outputs

The LI-840A includes easy-to-use Windows® interface software for user calibration and data collection. You can easily set operational parameters and logging options, as well as output data to a printable chart. Once parameters have been set, a main window displays CO<sub>2</sub> and H<sub>2</sub>O concentration and status of settings.

# Innovative Optical Path

The LI-840A optical path is designed to achieve accurate CO<sub>2</sub> & H<sub>2</sub>O concentration measurements:

- The reflector and optical path are gold plated to increase energy transmission.
- CO<sub>2</sub> and H<sub>2</sub>O are measured in a single path through the use of narrow band optical filters.
- The entire optical path is in thermal equilibrium.
- A pressure transducer corrects for changes in barometric pressure.
- A foam enclosure surrounds the optical bench. This helps maintain a controlled thermal environment as well as protect the bench from mechanical shock and vibration.



The LI-840A communications software main window displays CO<sub>2</sub> and H<sub>2</sub>O concentrations and status of settings.

Real-time strip charts can be printed or saved to a file.

Operational parameters are easily changed in the Settings window

A choice of analog outputs (CO<sub>2</sub>, H<sub>2</sub>O, Temperature or Pressure) are selectable on either of the two user-scalable DAC channels. Linear analog voltage (0-2.5V, 0-5V) and current loop (4-20mA) outputs are available. A removable terminal strip allows easy connection of external recording devices such as the LI-COR LI-1400 Datalogger.

An eXtensible Markup Language (XML) communication protocol provides for complete OEM application integration. XML is a simple text-based language allowing bi-directional communication between the LI-840A and your data acquisition system. As an example, sending this command:

```
<LI840><DATA>?</DATA></LI840>
```

instructs the LI-840A to send the most recent set of data values. The XML communication protocol allows the LI-840A to be polled for data at user-defined intervals, globally reconfigured, or configured to perform automatic calibration routines.

# Applications

The LI-840A can be used for continuous monitoring of carbon dioxide and water vapor under a wide range of environmental conditions due to its stability, accuracy, and design. The instrument is ideal for use in a variety of applications:

- pCO<sub>2</sub>, DIC
- Indoor Air Quality
- CO<sub>2</sub> Sequestration
- CO<sub>2</sub> Storage
- Soil CO<sub>2</sub> Flux
- Ambient Air Monitoring
- Meteorology
- Agriculture
- Horticulture
- Entomological Respiration Studies
- Volcanology
- Geological Monitoring
- Bioremediation
- TOC Analyzer System
- Particulate Analyzer System
- Greenhouse Control Systems
- Growth Chambers
- Fruit Storage
- Food and Beverage Industry
- Industrial CO<sub>2</sub> and H<sub>2</sub>O Monitoring
- Other Portable Instruments  
Requiring CO<sub>2</sub> and H<sub>2</sub>O Detection

## Specifications\*

<b>CO<sub>2</sub></b>		<b>Measurement Principle:</b>	Non-Dispersive Infrared
Measurement Range:	0-20,000 ppm	<b>Traceability:</b>	Traceable gases to WMO standards from 0 to 3,000 ppm. Traceable gases to EPA protocol gases from 3,000 to 20,000 ppm
Accuracy:	<1% of reading	<b>Pressure Compensation Range:</b>	15 kPa – 115 kPa
<b>Calibration Drift</b>		<b>Maximum Gas Flow Rate:</b>	1 liter/min
Zero Drift <sup>(1)</sup> :	<0.15 ppm/°C	<b>Output Signals:</b>	Two Analog Voltage (0-2.5V or 0-5V) and Two Current (4-20mA)
Span Drift <sup>(2)</sup> :	<0.03%/°C		Digital: TTL (0-5V) or Open Collector
Total Drift <sup>(3)</sup> at 370 ppm:	<0.4 ppm/°C	<b>DAC Resolution:</b>	14-bits across user-specified range
<b>RMS Noise at 370 ppm with 1 sec signal filtering:</b>	<1 ppm	<b>Source Life:</b>	18,000 Hours (~2 years continuous use)
<b>H<sub>2</sub>O</b>		<b>Power Requirements:</b>	Input Voltage 12-30 VDC; 1.2A @ 12V (14W) maximum during warmup with heaters on; 0.3A @ 12V (3.6W) average after warmup with heaters on
Measurement Range:	0-60 ppt	<b>Operating Temperature Range:</b>	-20 to 45°C
Accuracy:	<1.5% of reading	<b>Relative Humidity Range:</b>	0 to 95% RH, Non-Condensing
<b>Calibration Drift</b>		<b>Dimensions:</b>	8.75" x 6" x 3" (22.23 x 15.25 x 7.62 cm)
Drift <sup>(1)</sup> at 0 ppt:	<0.003 ppt/°C	<b>Weight:</b>	2.2 lbs. (1 kg)
Span Drift <sup>(2)</sup> at 10ppt:	<0.03%/°C		
Total Drift <sup>(3)</sup> at 10 ppt:	<0.009 ppt/°C		
<b>RMS Noise at 370 ppm with 1 sec signal filtering:</b>	<0.07 ppt		
Sensitivity to CO <sub>2</sub> :	<0.0001ppt H <sub>2</sub> O/ppm CO <sub>2</sub>		

(1) Zero Drift is the change with temperature at 0 concentration.

(2) Span Drift is the residual error after re-zeroing following a temperature change.

(3) Total Drift is the change with temperature without re-zeroing or re-spanning.

\* Specifications subject to change without notice.

## Ordering Information

800-401 AC Power Adapter (110 VAC):

18 VDC output, 800 mA, for indoor use only. An alternate AC adapter is required for 220VAC operation. See *Power Requirements* in the specifications.

LI-840A CO<sub>2</sub>/H<sub>2</sub>O Analyzer:

Includes LI-840A CO<sub>2</sub>/H<sub>2</sub>O Analyzer, spare parts kit, 2 disposable air filters, cleaning kit, Windows® communications software, 9-pin RS-232 communications cable, and RS-232 to USB adapter. Requires external power source. Pump not included.

# LI-COR®

Biosciences

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The LI-COR board of directors would like to take this opportunity to return thanks to God for His merciful providence in allowing LI-COR to develop and commercialize products, through the collective effort of dedicated employees, that enable the examination of the wonders of His works.

“Trust in the LORD with all your heart and do not lean on your own understanding. In all your ways acknowledge Him, and He will make your paths straight.”

—Proverbs 3:5,6

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