The sample cells of LI-COR closed-path gas analyzers, such as the LI-800/820/840 series, LI-6251/52/62 series, and the LI-7000, must be continually flushed while making measurements. The system time constant (T), a measure of how quickly the system responds, is determined by the cell volume (mL) and flow rate (mL/s) through the cells:

\[ T = \frac{\text{Cell Volume}}{\text{Flow Rate}} \]

The list of parts on the next page can be used to make a simple air flow system to move sample air streams through these analyzers. Parts available for sale through LI-COR are listed, as well as alternative vendors. Please contact LI-COR for pricing of LI-COR parts. Please note the following precautions when designing your air flow system:

- Always install an external air filter into the sample air stream before it enters the analyzer. Failure to do this will lead to contamination of the optical path.
- Pressures of 15 kPa or more above ambient can cause damage to the source and detector windows. The safest mode of operation is to pull air through the optical bench.
- Devices such as valve-actuated rotameters and T-fittings can be used to reduce flow rates. See parts listed in this document. Voltage regulators can also be used to reduce flow rates delivered from DC pumps.

For the LI-800/820/840/A, the Diaphragm Pump (p/n 286-04198) can be used as shown in the Pump Plumbing Options diagrams at right to restrict its output flow rate to less than 1 liter/min. Alternatively, applying 3 VDC to the Diaphragm Pump (286-10198) reduces the flow rate to about 1 liter/min. For the LI-6251/6252/6262 and the LI-7000, either Diaphragm Pump (286-04198 or 286-10198) can be used directly without any flow splitting to reduce the flow rate. Similarly, if you are able to locate a pump that delivers less than 1 liter/minute, it can be used directly with the LI-800/820/840/A analyzers without the need for a flow split. LI-COR does not offer DC power supplies or voltage regulators for use with these pumps. Other recommended suppliers are listed on the next page.

Air pumps, and recommended flow rates for LI-COR analyzers:

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow (LPM)</th>
<th>Voltage</th>
<th>Max. Flow (LPM)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI-6251</td>
<td>0.25</td>
<td>12 VDC</td>
<td>3.5</td>
<td>Diaphragm</td>
</tr>
<tr>
<td>LI-6252</td>
<td>0.25</td>
<td>6 VDC</td>
<td>1.8</td>
<td>Diaphragm</td>
</tr>
<tr>
<td>LI-7000</td>
<td>0.25</td>
<td>12 VDC</td>
<td>50</td>
<td>Diaphragm</td>
</tr>
<tr>
<td>LI-800</td>
<td>0.25</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>LI-820</td>
<td>0.25</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>LI-840/A</td>
<td>0.25</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Pump Plumbing Options - Two Examples

#1 **Larger volume of incoming air, less prone to leaks due to positive pressure**

#2 **Use for injection measurements, smaller volumes of air, more prone to leaks due to negative pressure**
Bev-A-Line Tubing
1/4” OD, 1/8” ID
50 ft. Roll

Straight Union
Quick Connect

Right Angle Union
Quick Connect

Y-Union
Quick Connect

T-Union
Quick Connect

Regulator
Quick Connect

Balston 25 Micron Air Filter
Recommended for use with the LI-800 and LI-820

Gelman 1 Micron Filter Assembly
Recommended for use with the LI-840/A, LI-6251/52/62, and LI-7000

Short Chemical Scrub Tube Assembly

Long Chemical Scrub Tube Assembly

Rotameter; 2.5 LPM with valve

Note: Requires (2) Hose Barb Fittings, p/n 300-03388

Other Sources for Tubing, Valves, and Fittings:
Coast Pneumatics: http://www.coastpneumatics.net/
Parker: http://www.parker.com
Pneuaire: http://www.pneuaire.com/
Poweraire: http://www.poweraire.com/
Swagelok: http://www.swagelok.com

Other Sources for Air Pumps:
KNF Neuberger, Inc.
Two Black Forest Road
Trenton, NJ 08691-1810
Phone: 609-890-8600
General Inquiries (not for orders)
knfusa@knf.com

Brailsford & Co., Inc.
15 Elm Avenue
Antrim, NH 03440
Phone: 603-588-2880
askus@brailsfordco.com

Thomas (ASF) Division - Sheboygan
1419 Illinois Ave.
Sheboygan, WI 53081
Phone: 920-457-4891
td.usa@gardnerdenver.com

Please contact LI-COR if you have questions regarding your instrument or about how to assemble an air flow system.