Application Note AN-132:
TR250Z Oxygen Sensor Test

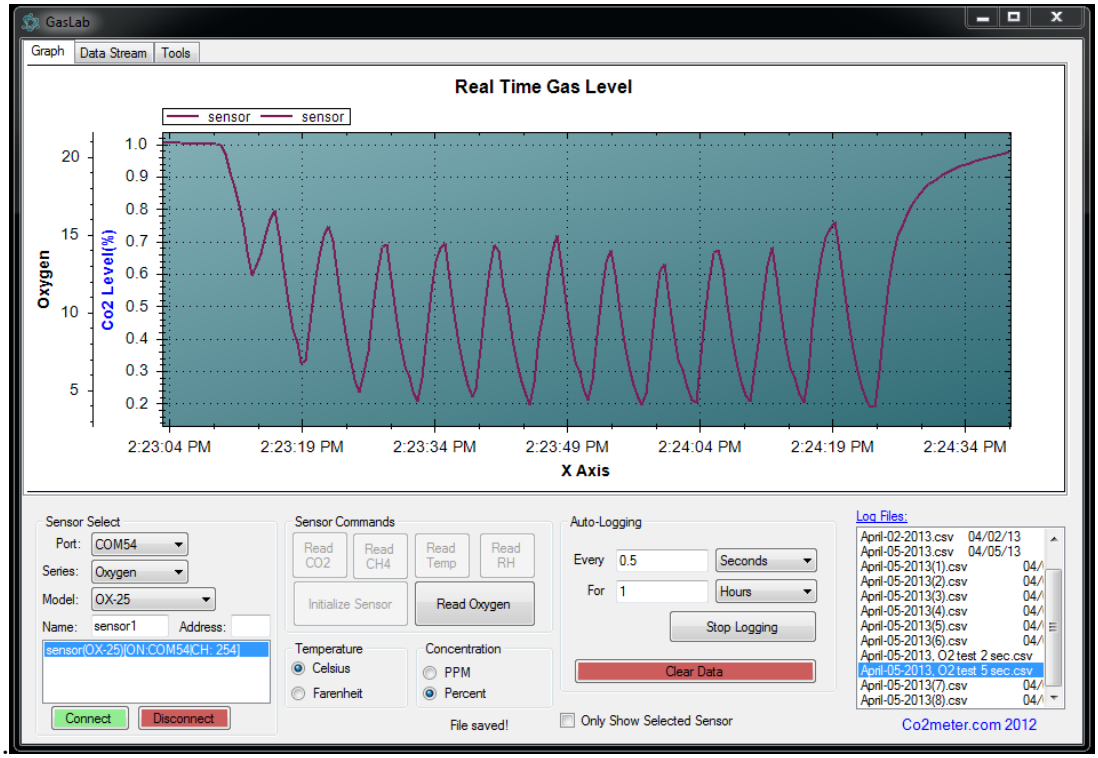
Introduction

The TR250Z Oxygen sensor provides streaming oxygen gas measurements at 2Hz – twice as fast as typical electrochemical oxygen sensors on market. To evaluate what this means in practical terms, we set up test using our Gas-Lab graphing software. While these are not scientific tests, they give a real-world demonstration of the sensor's response to a change in O2 levels.

These tests were made with 100% nitrogen and 20.9% oxygen gases flowing through a T-connector into a chamber with the sensor. The gas was pulled through the chamber with a 0.8 ml/minute vacuum pump. The T connector was manually switched from the nitrogen to the oxygen bottles. Tests record different time intervals (2, 5, 10, 15 seconds) between switches.

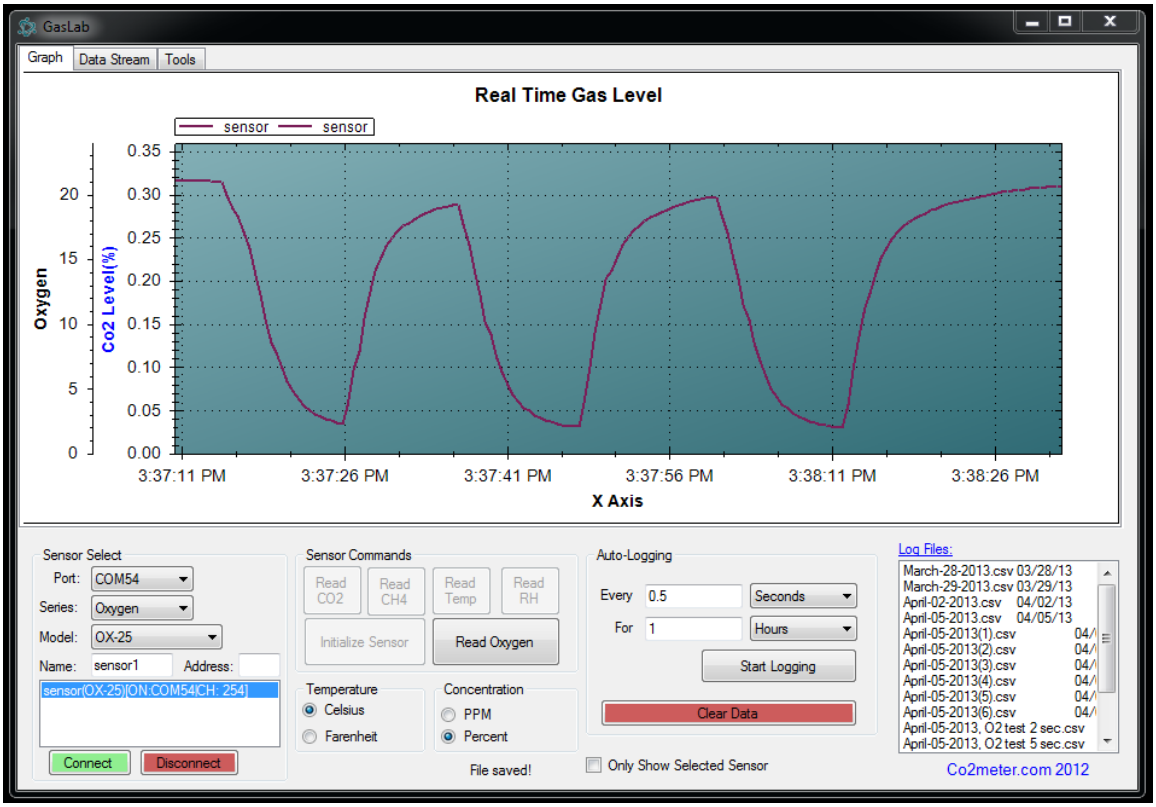
Example 1: Switch between nitrogen and oxygen gas every 2 sec. Cycles between 6-10% O2.

Example 2: Switch between nitrogen and oxygen gas every 5 sec. Cycles between 4-14% O2.



Example 3: Switch between nitrogen and oxygen gas every 10 sec. Cycles between 3-18% O2.

Example 4: Switch between nitrogen and oxygen gas every 15 sec. Cycles between 2-20% O2.



Conclusion:

The TR250Z sensor's 0.5 data logging speed provides the ability to accurately graph the change in oxygen as a percentage of gas in an enclosed space.

In a perfect world, the TR250Z sensor should be able to cycle between the 0 and 20.9% oxygen levels to which it was exposed instantly. In the real world, using a 0.80 l/min pump, the sensor is able to achieve 86% of this range in 15 seconds and approximately 100% of the range reached within 20 seconds.

In order to achieve faster response rates, a faster air flow over the sensor would be required.

This experiment was made in a controlled environment where the gas was pushed over the oxygen sensor with a 0.8 ml/min pump. Other tests were made with 0.40 l/min and 0.20 l/min pumps. The results was similar, except that the time required to reach the upper oxygen limit (20.9%) and the lower oxygen limit (0.0%) was even longer as a result of the slower air flow. See AN130 – How CO2 Gas Flow Affects Measurements on our website at CO2Meter.com for more information.