AND ASSOCIATED COMPANIES

Thermo 48iQ Diagnostics

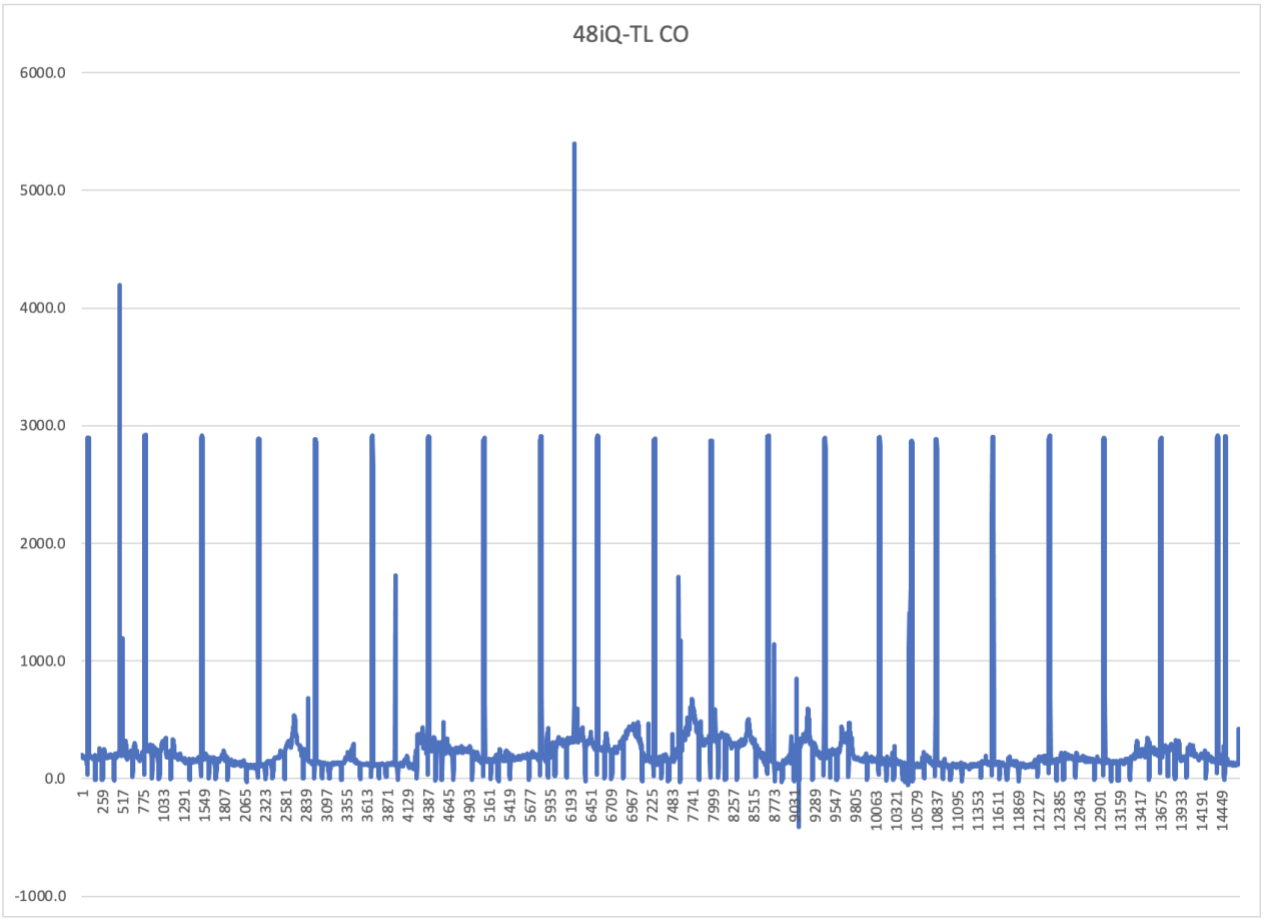
Normally all Thermo iQ-series instruments come with just the gas concentration being saved into the internal database. We recommend that you immediately add additional parameters so that long-term diagnostic trends can be followed, and short-term problems can be resolved more easily.

For the 48iQ CO analyzer, we recommend adding the following parameters: Bench Pressure, Instrument Temperature, Sample Flow, S/R, Concentration Background, Bench Temperature, Sample Intensity, Reference Intensity and Wheel Speed. If you are using this data for daily data validation, you may want to add General Alarm, Alerts and Instrument Error.

Occasional firmware updates may add or remove some of the parameter selections. It is a good idea to check the parameters after an update. For example, the current list contains “Ambient Temperature” which appears to be identical to “Instrument Temperature”, so it does not need to be selected and will probably be removed in a future update.

The 48iQ is generally a stable reliable instrument that does not need much maintenance. We recommend replacing the IR source on a yearly basis. At the same time, clean the fan filters, the chopper wheel and adjust the intensity.

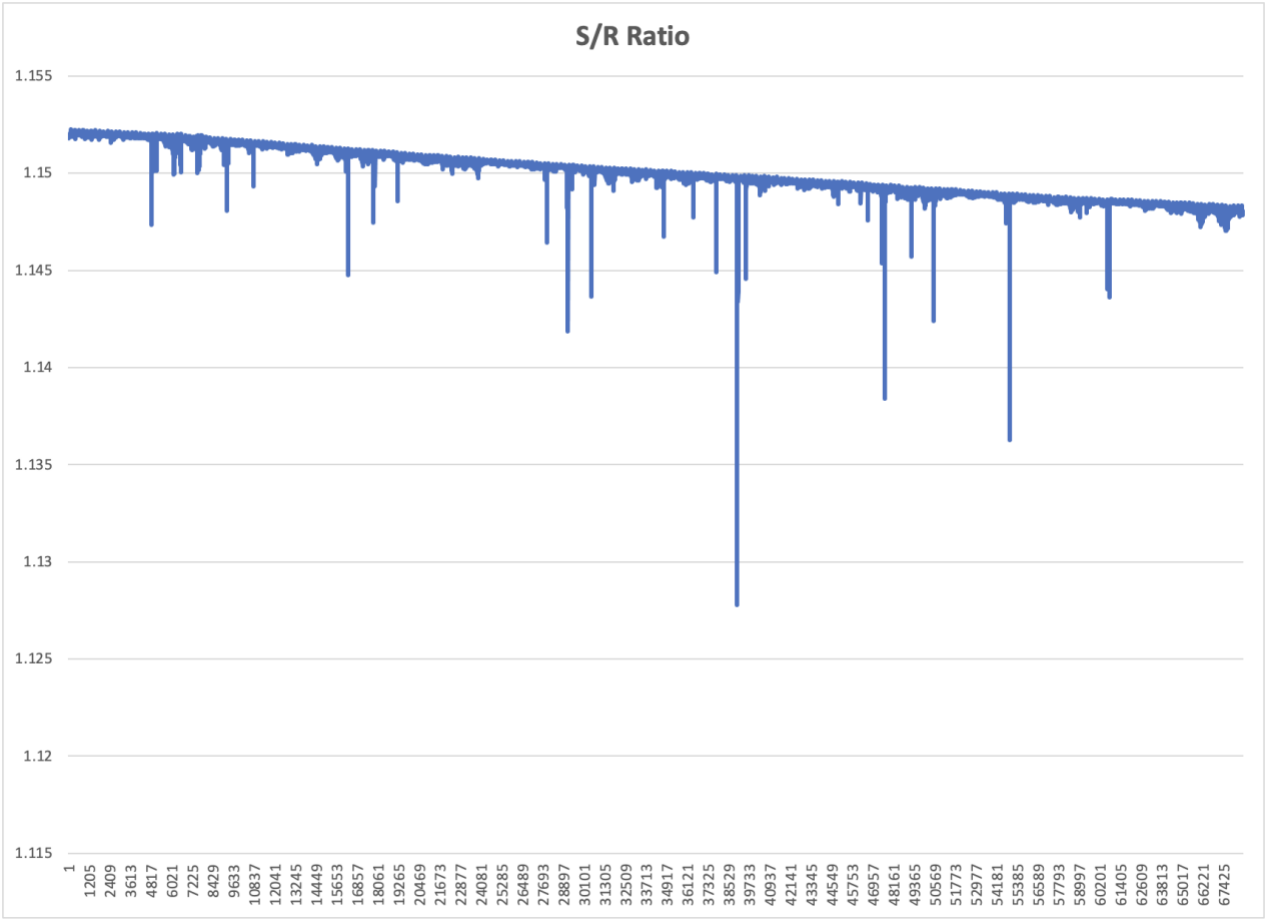
CO Concentrations:



The data for the above graph is from a 48iQ-TL. The graph shows the daily zero/span cycles as well as the auto-zero cycles of the trace level analyzer, which are usually set to occur every 4 or 6 hours. Some of the brief random spikes are probably from nearby sources such as cars or trucks. The normal ambient readings are in the range of 150 to 350 ppb.

AND ASSOCIATED COMPANIES

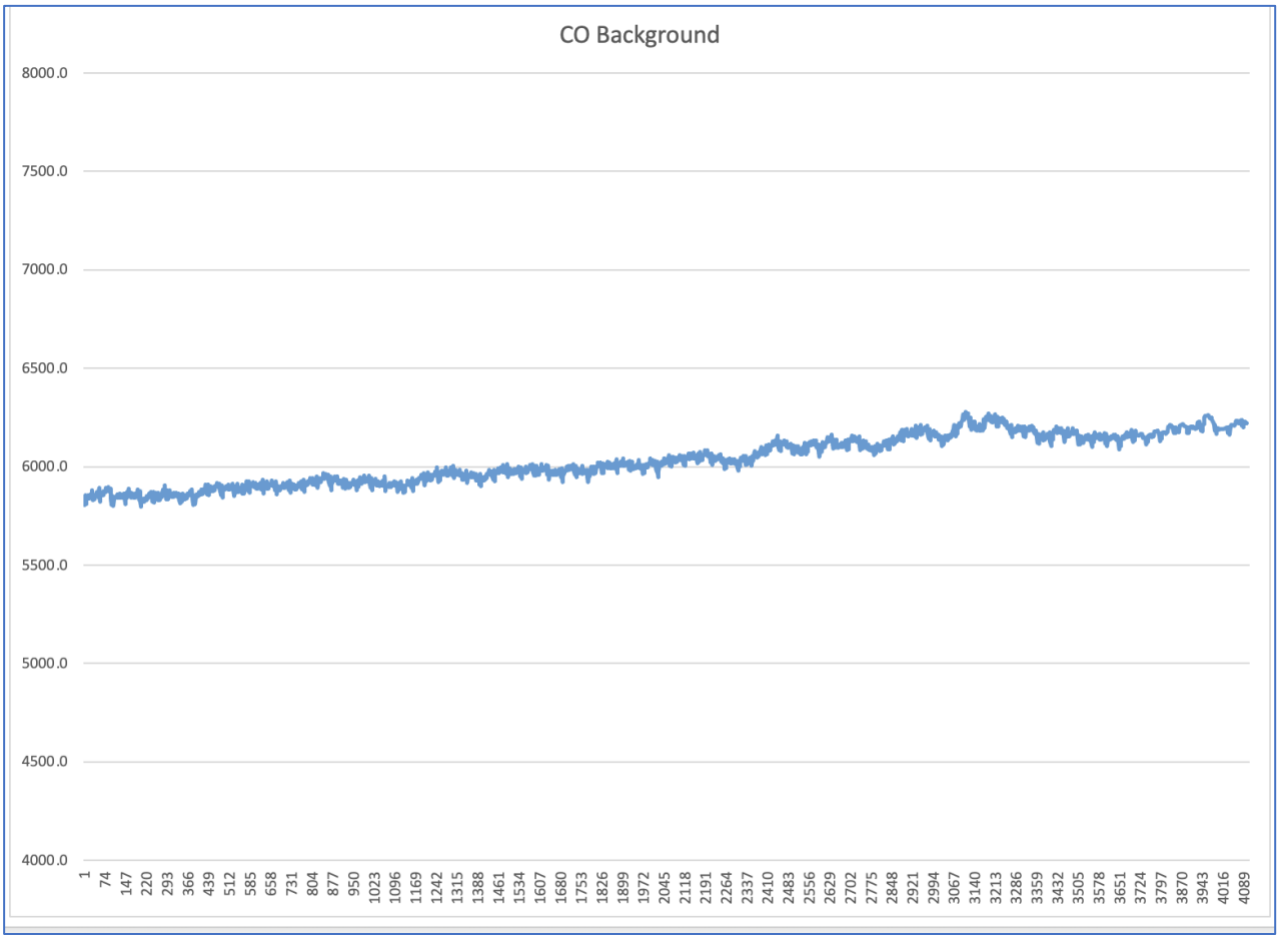
CO Sample/Reference Ratio



One of the parameters that changes constantly, and should be watched, is the Sample/Reference Ratio. With a new correlation wheel it should be between 1.14 and 1.18, preferably towards the high side. As the gas slowly leaks out of the wheel, the S/R Ratio drops, which causes a corresponding increase in the CO background reading. When the Ratio gets down to 1.14 it is time to order a new wheel, before it gets to the absolute limit of 1.13. It is generally a good idea to not stock the wheel as it will slowly deteriorate while sitting on the shelf.

AND ASSOCIATED COMPANIES

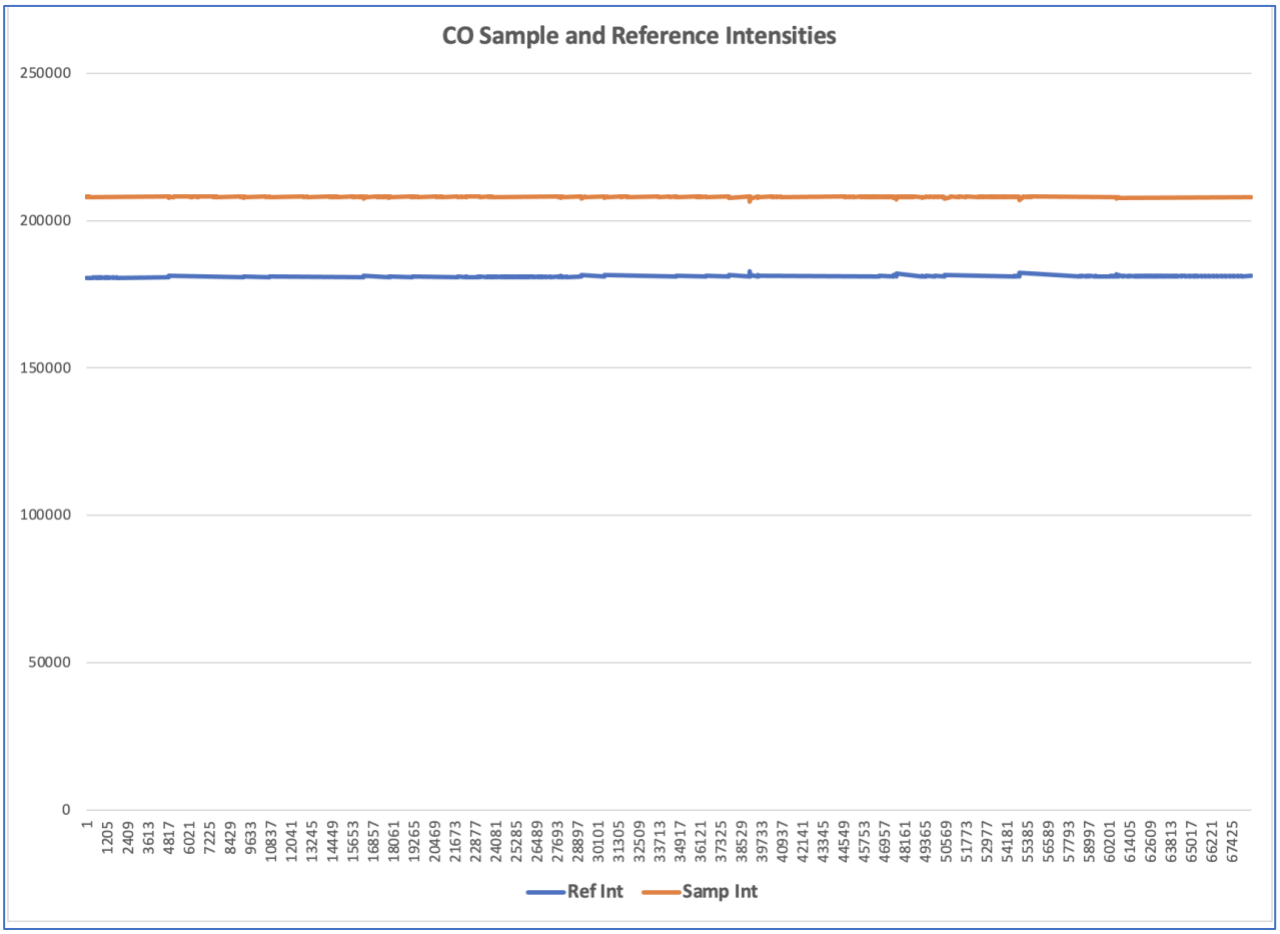
CO Background



As the correlation wheel deteriorates and the S/R Ratio drops, the CO background concentration slowly increases and should be manually adjusted at least weekly. This data is from a trace level 48iQ and shows the increase to the Background reading as it is automatically adjusted every 4 to 6 hours. The internal zero scrubber option can also be ordered for the standard 48iQ. The graph shows that the CO background increased about 400 ppb over a 12-week period. This would be about 35 ppb per week.

AND ASSOCIATED COMPANIES

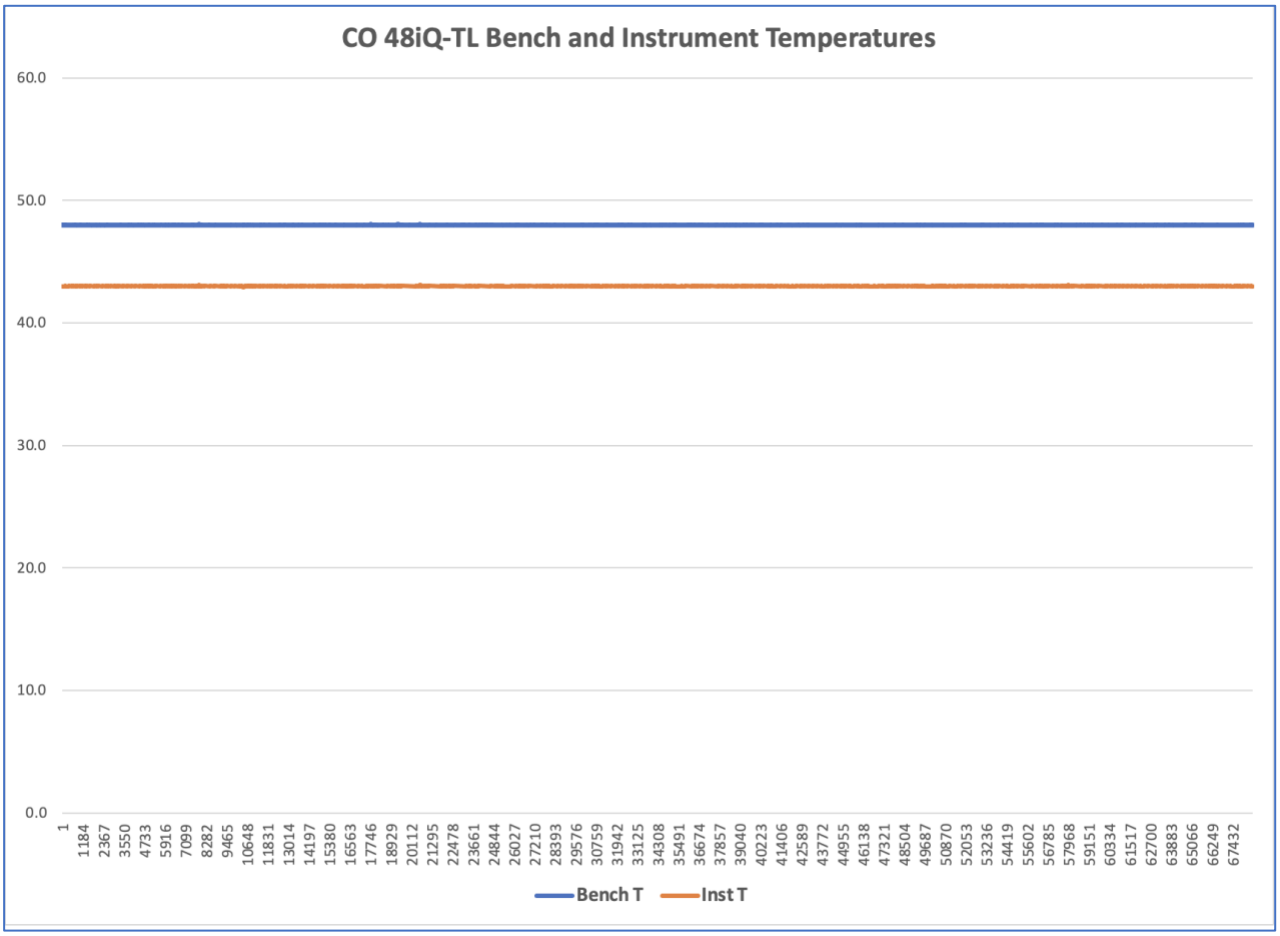
CO Intensities



The 48iQ has an automatic gain control (AGC) that maintains the source intensity to approximately 200,000 Hz for the sample side and 180,000 Hz for the reference side. Whenever a major change is made, such as replacing the IR source, the intensity should be adjusted. This is done by going to: Home Screen>Settings>Measurement Settings>Advanced Measurement Settings>Optical Bench Settings>Continue to Detector Gain Calibration. Adjust the Detector Gain so that the intensities are above and below 150,000 Hz, such as 160,000 Hz (sample) and 140,000 (reference). The AGC is turned off during this adjustment.

AND ASSOCIATED COMPANIES

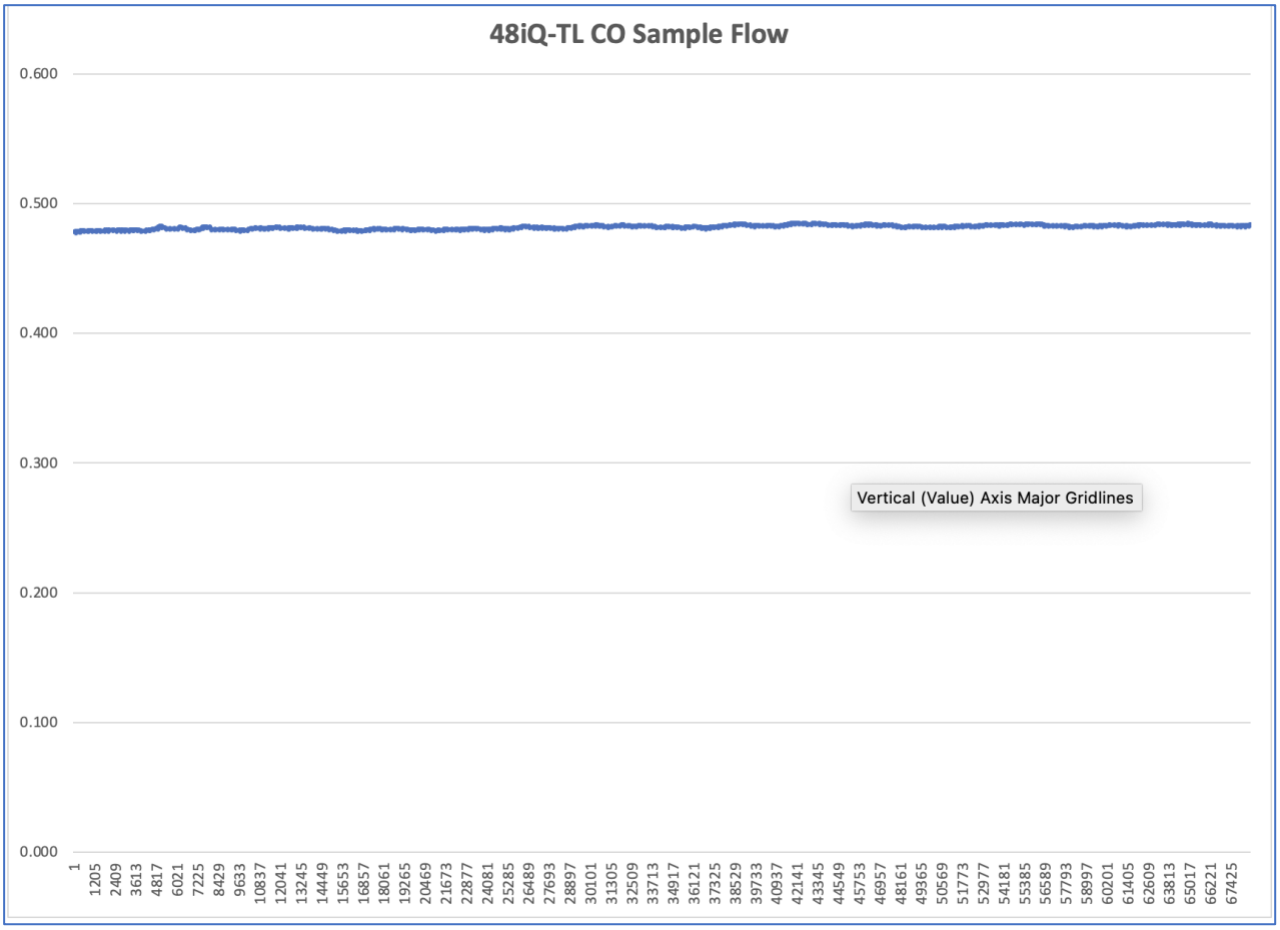
CO Temperatures



Temperature stability is very important for the 48iQ. The optical bench is tightly controlled to 48°C and with the 48iQTL, the internal case is also controlled to 43°C. It helps if the room, or trailer, that the CO analyzer is operating in is temperature controlled, such as 21°C +/- 2°C. Care should be made that the heater fan or air conditioner output does not blow directly onto the analyzer case.

AND ASSOCIATED COMPANIES

CO Flow



The flow of the 48iQ is controlled by a capillary to be approximately 1.0 LPM for the standard 48iQ and 0.5 LPM for the 48iQTL. Small variations to the flow will not affect the reading, but it is advised to occasionally graph the flow to verify that the pump is operating properly and there are no large leaks. Please note that the flow path of the 48iQTL contains additional components such as a Sample/Zero Valve, a Zero Scrubber and a Permeation Dryer.