

ABSTRACT

A simple calibration system for the CO₂ sensor is carried out to characterize the performance of the CO₂ sensor and the sensor that will be used in this research is a low-cost CO₂ sensor. This calibration system is carried out by conducting tests based on measurements of CO₂ gas flowing into a test chamber. To produce an ideal measurement, a test chamber with vacuum conditions is needed as a measurement place for the low-cost CO₂ sensor. The calibration process is carried out by conducting several tests including testing the low-cost sensor on the CO₂ analyzer reference instrument. The results of testing the reference instrument produce data with the same trend, although when viewed in detail at the measurement point range of 900 ppm to 4000 ppm, the low-cost sensor tends to be underestimated, while in the range of 5000 ppm to 6000 ppm it tends to be overestimated. For the linear regression value. obtained is 0.97 and the error value is 8.19% for each reading. Then the test was carried out with different flowrates with a range of 0.07 lpm to 0.5 lpm. The test results show that the difference in linear regression values and error values between measurements is not significant. Then, calibration is also carried out by testing low-cost CO₂ sensors against other low-cost CO₂ sensors. This test results in almost the same trend of measurement data even though the comparison sensor is underestimated more often. The resulting linear regression value is 0.99 and the error value is 2.14%.

Keywords: CO₂, Calibration, Testing chamber, Low-cost CO₂ sensor