

CALIBRATION OF ARDUINO SENSORS FOR ELECTRIC POWER HYDRAULIC MICROGENERATION

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ABSTRACT

Hydraulic and electrical measurements can be performed using specific sensors. However, many of these sensors can not provide accurate indications of actual observations. To minimize incorrect measurements, it is necessary for studying the origin of sensor errors for later corrections. Thus, we investigated measurements of electric and hydraulic flow sensors compared to actual observations for subsequent calibration. For electrical calibration, we used different charger power adapters, considering open and closed circuits through a 100-ohm resistor. We realized the measurements using voltage and current sensors and also through multimeters. For hydraulic calibration, we connected a water flow sensor to urban pipelines and, simultaneously, we observe the water flow in a 2-liter bottle. We attached all sensors to the Arduino Uno platform whose data collection and parameter setting occurred through the C++ programming language. After the statistical study, our results show a clear discrepancy between the variations detected via Arduino sensors and real measurements. To guarantee the correct transfer function, all sensors presented the need to modify the so-called scaling factor, while the current sensors exhibit the obligation to adjust the bias factor. For open and closed circuits, we obtained the scale factor for the voltage sensor equals to 1.03 and 1.02 respectively, while for the flow sensor, this value was 1.51. The current sensor scaling factor was 0.99 and the bias factor was 0.03. Finally, measurements obtained via *calibrated Arduino sensors* are in excellent agreement with real observations, ensuring greater accuracy and reliability to hydroelectric measurements.

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Palavras-chave: Hydroelectric measures. Sensor Calibration. Arduino.

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