ABSTRACT

In wind turbine research, data are needed as parameters to analyse characterization and measure system work efficiency, and wind turbine development, in this case called Wind Resource Assessment (WRA). In the generator, it is necessary to measure the rotational speed, especially the Permanent Magnet Synchronous Generator (PMSG) with the output frequency characteristic that is directly proportional to the rotational speed. PMSG 500 Watt and PMSG 1000 Watt generators were used as samples to test and determine the method that can be used for several variations of synchronous pole generators, especially micro-scale wind turbines by changing pole variable. The method used is to read the output frequency from one of the generator phases, this is more effective and easier to use by using a frequency sensor with a photo-coupling basis, so it does not affect the device and is not influenced by the environment. This method is implemented using ESP32. In the test, the input frequency is in the range of 0 - 200 Hz, with the increase input linearity, y = 1.00x - 0.01 and the decrease input, y = 1.00x - 0.03. The next test is carried out with repeated input with three measurement points, namely 4 Hz, 84 Hz, and 171 Hz. From each point 100 data were taken with an accuracy of 99.12% at a frequency of 4 Hz, 99.52% at a frequency of 84 Hz, and 99.78% at a frequency of 171 Hz. This measuring instrument is also equipped with an IoT monitoring system using the Antares platform which is implemented at PT Lentera Bumi Nusantara.

Index Terms: *ESP32, IoT monitoring, Permanent Magnet Synchronous Generator, PMSG 500 Watt, PMSG 1000 Watt, rotational speed.*