Design and Manufacture of Monitoring System for Biogas Production

Name : Gaguk Resbiantoro  
NRP : 1106 100 028  
Department : Physics ITS  
Supervisor : Dr. Melania Suweni Muntini, MT

ABSTRACT

Research was conducted to design the monitoring system for biogas production. Biogas production was made in prototype of reactor and container of product biogas. This system is using the sensor of O\textsubscript{2}, CO\textsubscript{2}, CH\textsubscript{4}, temperature and humidity. Sensors of O\textsubscript{2}, temperature and humidity are placed in the reactor, whereas sensors of CH\textsubscript{4} and CO\textsubscript{2} is placed in the container of product biogas.

The sensors system was calibrated using Gas Analyzer to get the characteristic. Sensor temperature and humidity in this research was calibrated. The characteristic equation of each sensor of O\textsubscript{2}, CO\textsubscript{2}, and CH\textsubscript{4} are $y = 85.1x - 4532$ mV, $y = e^{(0.83 - 0.00014x)}$ mV, and $y = 1035 \ln x - 5806$ mV. Range of measurement of each sensor O\textsubscript{2}, CO\textsubscript{2}, CH\textsubscript{4}, temperature and humidity are 0.34% - 33.87%, 442 – 9786 ppm, 250 – 9736 ppm, -40 – 123.8 °C, dan 0 – 100%.

The monitoring system is able to update database every 5 minutes according to the response time of sensor to sense the gas concentration change. Data storage is conducted by monitoring system once a day to detect the parameter change during biogas production.

Keyword : monitoring, biogas, sensor temperature and humidity, sensor O\textsubscript{2}, sensor CO\textsubscript{2}, sensor CH\textsubscript{4}