

## Grid-Connected Inverter Experimental Simulation and Droop Control Implementation

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**Abstract :** In this study, we aim to demonstrate a microgrid system experimental simulation for an easy understanding of a large-scale microgrid system. This model is required for industrial training and learning environments. However, in order to create an exact representation of a microgrid system, the laboratory-scale system must fulfill the requirements of a grid-connected inverter, in which power values are assigned to the system to cope with the intermittent output from renewable energy sources. Aside from that, during changes in load capacity, the grid-connected system must be able to supply power from the utility grid side and microgrid side in a balanced manner. Therefore, droop control is installed in the inverter's control board to maintain equal power sharing in both sides. This power control in a stand-alone condition and droop control in a grid-connected condition must be implemented in order to maintain a stabilized system. Based on the experimental results, power control and droop control can both be applied in the system by comparing the experimental and reference values.

**Keywords :** droop control, droop characteristic, grid-connected inverter, microgrid, power control

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