REVERSE ENGINEERING: 3 kW POLYMER ELECTROLYTE MEMBRANE FUEL CELL FOR UPS SYSTEM

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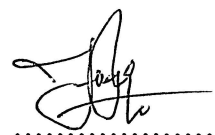
"I declare that this thesis is the result of my own work except the ideas and summaries which I has clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

Signed : 

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ABSTRACT

Fuel cells are static energy conversion devices that can generate electricity by using the combustion of hydrogen. Experimental works on one of the type of fuel cell which is a 3 kW water-cooled Proton Exchange Membrane Fuel Cell (PEMFC) was conducted at the Fuel Cell Lab of the Faculty of Mechanical Engineering of University of Technology Mara (UiTM). This project focused on to determine an efficient assembly technique for Proton Electrolyte Membrane Fuel Cell (PEMFC) stack in order to obtain the optimal assembly procedure. In this study, the analysis of PEMFC stack assembly is achieved by collecting all necessary data that which related to PEMFC stack in order to determine the optimal clamping force for assembly PEMFC stack. The value of optimal clamping force is determined by conducted the two experiments which are compressive test of bipolar plate and leakage test. and by the analysis calculation The different values of clamping force were applied to assemble PEMFC stack in order to obtain the optimal clamping force. The value of clamping force that is obtained from analysis and experiment was compared. Based on the results obtained, the optimal clamping force for fuel cell stack assembly was successfully identified which are 11039.75 N for theory value and 4390.2 N for experimental value.

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