

Design and experimental study of air conditioning system using brushless direct current (bldc) compressor in national electric car

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Abstrak

Electric car is one technology that is designed to reduce the risk of pollution that causes global warming but an air conditioning system is required to create thermal comfort for its users. Therefore national electric car (MOLINA) made by the University of Indonesia will use BLDC compressor for the air conditioning system. Cooling load calculation is required to design the air conditioning system. This research will calculate the cooling load of MOLINA UI and also select the compressor that will be used in the air conditioning system. Then, the air conditioning system that has been designed and built will be tested for its performance. In the performance test, temperature and flow velocity of MOLINA air conditioning duct will be measured. Then proceed with simulation of temperature distribution and air flow in MOLINA cabin. Moreover, the energy consumption of MOLINA air conditioning systems that is using a BLDC compressor will also be measured. Based on this research it is known that the value of the cooling load on MOLINA UI is 2894.12 Watt (9875.15 BTU/h), average energy consumption of air conditioning systems MOLINA UI without inverter is ranged about 540 to 857.3 Watts and efficiency of inverter is ranged about 84.7% to 89.4%.