

ABSTRACT

Thermoelectric module is a cooling device based on the peltier effects that serves as a heat pump. When it is given direct current, there will be temperature difference. (ΔT). This study conducted design of measuring and testing instrument using heat pipe-heatsink fan to obtain performance coefficient value and cooling capacity from four thermoelectric modules that would be tested (TEC-12706 type, TEC-12703, TEC-12710, and SP1484). In the process of testing, there were three measured parameters, which were current and voltage with multimeter and temperature with T-type thermocouple. Data logger installed to store temperature data on each state. The reference point on the heat side of the module was kept at the temperature 50°C using heat pipe-heatsink fan. The test result showed that TEC-12706 thermoelectric type had the best performance coefficient value of 0.57 ± 0.05 , in cooling capacity of 7.15 ± 0.82 Watt with current range 1.1 to 2 A. This was because tested TEC-12706 had a low value on manufacture factor, then it caused a high performance coefficient. TEC-12706 had the largest coefficient also because of figure of merit (Z) factor which was a parameter of how well a thermoelectric module could be used, the factor depended and it was directly proportional to the Seebeck coefficient value and the heat resistance of a thermoelectric module. So that TEC-12706 was able to keep temperature of 50°C.

Keywords: *cooling capacity, performance coefficient, thermoelectric.*