

ABSTRACT

With an escalation in the thermal comfort for passenger cabins and intelligent driving for easy driver control and amenity, many smart and green passenger vehicles have been developed and researched by various automotive makers. Further, advanced automotive technology, with the modernistic of the transportation industry, seeks to improve the comfort of the driver. Accordingly, to enrich the thermal comfort for passengers including drivers, many advanced air conditioning systems and heating systems are being studied for cabin air conditioning of passenger vehicles.

A tropical country like ours the ambient external temperature during day time is around 30°C to 42°C and the internal temperature of an auto-mobile that is parked at a particular location can hick up to a figure around 75°C while the surface temperature of the steering wheel is about 86°C within approximately two (02) hours.

However, no consideration given for the research and development on an air conditioning system for passenger cabin when the auto-mobile is at park not for longer period but for daily users, at present and the fast depletion of crude oil reserves, frequent price hikes of oil & the high atmospheric pollutions have created a worldwide need to reduce petrol and diesel consumption particularly in the auto-mobile industry leading the solution to be a renewable and non-polluting source.

The new Peltier Cooler using TEC modules is designed in order to address the problem of temperature hiking inside the passenger cabin compartment of parked auto-mobiles.

The Peltier Cooler is designed as a cooler box and powered by a 12VDC rechargeable battery having three TEC modules. The system operate on the principle of Peltier effect and when placed inside the passenger cabin compartment it absorb the outside air and driven through the cool side of the TEC modules. The cooled air then blown out through an exhaust fan. The system is combined with a control circuit with heat sensor to make the Cooler more economical and adjust the temperature as required.

The designed Peltier Cooler retain the air conditioned at a favourable temperature range from 26°C to 28°C inside the passenger cabin compartments of heat loads from 2000BTU to 5500BTU for a period of eight (08) hours without engine start-up and retaining the stock condition of the interior of auto-mobile .

Key Words: Peltier Cooler, Peltier Effect, Thermal Comfort, TEC Modules