Study, Design and Construction of Electrical – Solar Car

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Abstract

Solar electrical car represents one of the modes in which solar energy is used to back up the generation of clean photo – voltaic electric power supplied to the electric motor which is used instead of internal combustion engines, which leads to less pollution by reducing emission of toxic gases.

A pickup truck with internal combustion engine, 640 kg net weight and 1200 kg gross weight is used and modified to fit as electrical car.

All the components and parts including solar panels, batteries, DC motor, car control unit, batteries charge controller, power circuits and control circuits were installed on the truck.

Nine solar modules were framed on the top of the truck, each 4 were connected in series to produce 58 V output and 200 W power. 2 groups of 4 modules were connected in parallel. The power and output voltage of the solar panel modules were supplied to DC motor of 48 V or to 4 batteries each of 12 V and 105 Ah and connected in series through the charging control unit.

The DC motor used is of series excitation type and was modified that it can change the direction of rotation by the separation of exciting circuit from induction circuit and the change of polarity.

The electrical motor and the gear box were coupled on the same base by a flexible coupling. The complete aggregate was installed on the truck and coupled to the differential transmission axis.

9 solar modules were installed on the top of the car, 8 forming the solar panel used as a backup power supply and the 9th module is used to supply energy to the secondary electrical circuits of the car, such as lights, flushers and horn.

Batteries were fixed on the back of the car and connected to the electric motor through the central control circuit. Also been linked to solar panels by the charging unit. This car goes at speed of up to 80 kilometers per hour for a distance of 200 km, depending on energy savings to 10 hours of charging from the solar panel.

The car moves without any noise and without any toxic gas emission, it is a friend of the environment.

Keywords: Electrical car – Solar car – Hybrid car

For the abstract in Arabic see pages (283-299).

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