

THERMOELECTRIC AIR-CONDITIONER TRICYCLE

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ABSTRACT - The present cooling framework produces cooling impact by refrigerants like Freon, Ammonia, etc. Using these refrigerants can get greatest yield however one of the significant inconveniences is unsafe gas outflow and an Earth-wide temperature boost. These issue can be overwhelmed by utilizing thermoelectric modules (Peltier impact) climate control system and their by ensuring the environment. The present paper manages the investigation of Thermoelectric climate control system utilizing various modules is examined. Thermoelectric cooling frameworks have favorable circumstances over ordinary cooling gadgets, for example, small in size, light in weight compatibility, no wear loss and no working fluid (compressor is absent)

Key words: Peltier Module, Thermoelectric Air Conditioner, DC Current, Semiconductor, Climate, Control, AHS (Air Heating System), Seeback effect

1. INTRODUCTION:

In thermoelectric materials, electrical vitality can be legitimately changed over into warm vitality and warm vitality into electrical vitality. Direct change among electrical and warm vitality is conceivable due to two significant thermoelectric impacts: the Seebeck impact and the Peltier impact. The Seebeck impact allowed to the presence of an electric potential over a thermoelectric material subject to a temperature inclination. The Peltier impact alludes to the assimilation of heat into one finish of a thermoelectric material and the arrival of warmth from the furthest edge because of a flow move through the material.

Thermoelectric cooling, normally alluded to as cooling innovation utilizing thermoelectric coolers (TECs), has points of interest of high dependability, no mechanical moving parts, minimal in estimate and light in weight, and no working liquid. In expansion, it has advantage that it very well may be fuelled by direct flow (DC) electric sources, When a voltage or DC current is applied to two unique conductors, a circuit can be made that considers consistent heat transport between the conveyors' intersections this is the standard of thermoelectric cool. Cooling is a procedure of evacuating heat from a room or different applications. It is a cooling impact by using pressure and assimilation of fumes produced at the chilled surface. These climate control systems are creating cooling impact by utilizing refrigerants like Freon and smelling salts and so on. It gives most extreme yield in any case, one of the burden is delivering destructive gases to the air. The harmful gases like carbon dioxide, carbon monoxide and chloroflouro carbon are produced during cooling which not even dangerous for health but also depleting the protective shield of ozone layer.

These kinds of forced air systems have wide scope of uses. A climate control system is a significant home machine, framework, or system intended to change the air temperature and mugginess inside a region. The cooling is regularly done utilizing a straightforward refrigeration cycle, however at times vanishing is utilized, generally for comfort cooling in structures and engine vehicles. Regularly we are utilized in the fume pressure cool framework, it has many moving parts and as well as produce unsafe gases to the earth. By utilizing thermoelectric modules climate control systems we can defeat the existing cooling framework by altering it to secure nature.

2. LITERATURE REVIEW:

Matthieu Cosnier al¹ presented an experimental and numerical study of a thermoelectric air-cooling and Air-heating system. They have reached a cooling power of 50W per module, with a COP between 1.5 and 2, by supplying an electrical current of 4A and maintaining the 5°C temperature difference between the hot and cold sides.

Wei He² Conducted Numerical study of Theoretical and experimental investigation of a thermoelectric cooling and heating system driven by solar. In summer, the thermoelectric device works as a Peltier cooler when electrical power supplied by PV/T modules is applied on it. The minimum temperature 17°C is achieved, with COP of the thermoelectric device higher than 0.45. Then comparing simulation result and experimental data.

Riff and Guoquan⁴ Conducted an experimental study of comparative investigation of thermoelectric air conditioners versus vapor compression and absorption air conditioners. Three types of domestic air conditioners are compared and compact air conditioner was fabricated.

Riffat and Qiu⁵ compared performances of thermoelectric and conventional vapor compression air-conditioners. Results show that the actual COPs of vapor compression and thermoelectric air-conditioners are in the range of 2.63.0 and 0.38-0.45, respectively. However, thermoelectric air conditioners have several advantageous features compared to their vapor-compression counterparts.

3. ASSUMPTIONS:

- No heat loss takes place from or to the system.
- Thermal physical properties such as Resistivity, conductivity etc. do not change with temperature.
- Heat transfer takes place only through the P type and N type semiconductor.

When current is passed through the dissimilar material, heat is absorbed or liberated at the junction. This Phenomenon is known as Peltier Effect. Thermal network model of TER. The various equations used for calculating the parameters under the study are given below.

4. PROPOSED WORK:

The aim of the project is to build an air-cooled tri-cycle, cooling based on Peltier effect. The details of the experimental set up are as follows

S. No.	Description	Dimension/Range
1	Peltier Module	40x40x40mm
2	Aluminium Block	300x7x4cm
3	Rectangular Fin	70x35cm
4	Fiber Sheet	500x40cm
5	K-Type Thermocouple With Indicator	0-100 ^o c
6	Cooling Block	350V
7	Tri-Cycle	240V

Table No.-1 Experiment Setup

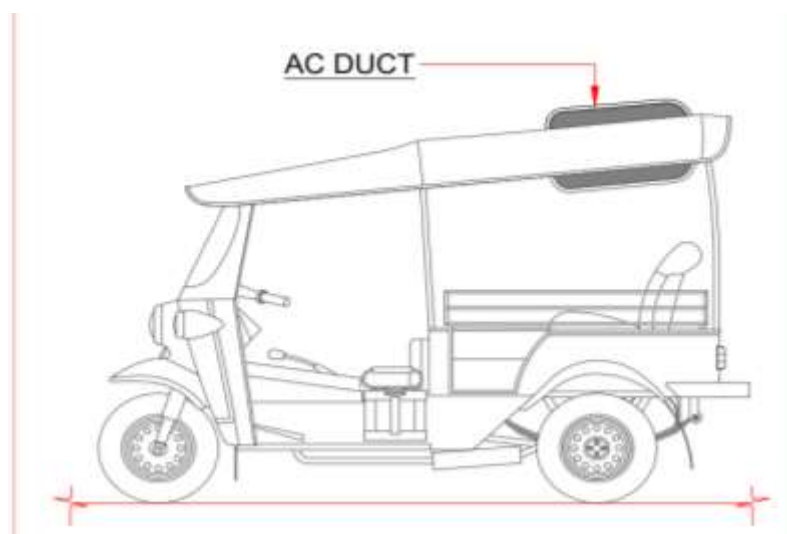


FIG -1 AIR CONDITIONED TRI-CYCLE

The Parameter varied during the Experimentation are Voltage and Current. The temperatures at various locations of the Modules are measured with the help of calibrated K Type thermocouples.

5. USE OF RECTANGULAR FIN:

Balances are utilized in countless applications to build the warmth move from surfaces. Normally, the blade material has a high warm conductivity. The blade is presented to a streaming liquid, which cools or warms it, with the high warm conductivity permitting expanded warmth being led from the divider through the balance. The structure of cooling balances is experienced much of the time and we along these lines look at heat move in a balance as a method for characterizing a few criteria for plan.

there is a much larger capability for heat transfer per unit area across the fin than there is between the fin and the fluid, and thus little variation in temperature inside the fin in the transverse

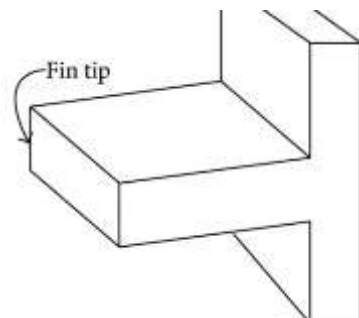


FIG 2. RECTANGULAR FIN

Direction. To emphasize the point, consider the limiting case of zero heat transfer to the fluid, i.e., an insulated fin. Under these conditions, the temperature within the fin would be uniform and equal to the wall temperature.

6. FIBRE SHEET MATERIAL:

Epoxy Fiberglass Sheet is a strong rigid sheet material consists of Fiber Glass Cloth and Epoxy Resin as a binder cured under specific heat and pressure. Epoxy Fiberglass Sheet has excellent physical strength, heat resistance, moisture resistance and electrical properties. EBFGB based material can be used at temperatures up to 140-160°C.

7. CONCLUSION:

The writing with respect to the examination of Thermoelectric climate control system utilizing various modules has been altogether investigated. From the audit of the appropriate writing displayed above, it very well may be gathered that thermoelectric innovation utilizing various modules utilized for cooling just as warming application has impressive consideration. Numerous specialists attempt to improve the COP of the thermoelectric climate control system utilizing diverse material. Thermoelectric coolers to be functional and focused with progressively customary types of innovation.

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