



Magnetic Cooling Devices

Optimizing the efficiency of cooling systems

Virginia Commonwealth University researchers have developed a novel system that can enhance cooling systems. Current cooling systems use basic mechanical components such as fans and pumps which can make the design of the system complicated. Additionally, most cooling systems typically use refrigerants such as chlorofluorocarbons which have negative effects on the ozone and can be hazardous to the environment if not disposed of properly. This novel device seeks to eliminate these issues by employing a magnetocaloric cooling system. Not only is this system more environmentally friendly with a simpler design, it is also more efficient.

The technology

This cooling device utilizes the magnetocaloric effect to induce a temperature change by exposing a magnetocaloric material to a magnetic field using permanent magnets. This eliminates the need for harmful chlorofluorocarbons and, in combination with other mechatronic components, reduces the complexity of the design. The device also utilizes microcontrollers to operate the hot and cold cycles. The microcontrollers control the timing of the cycles in order to attain maximum efficiency, thereby lowering the utilization of energy.

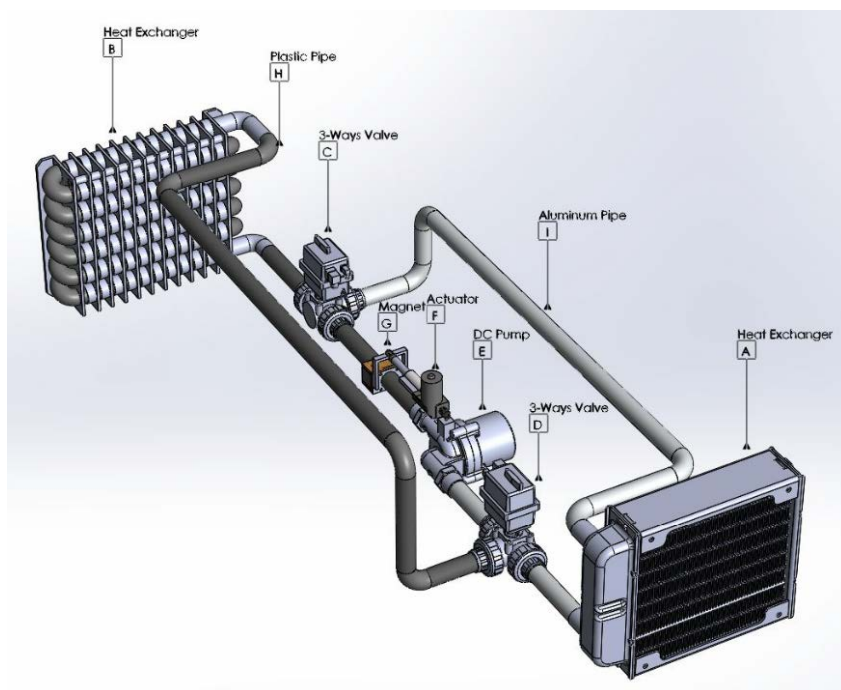


Figure 1. CAD representation of the magnetocaloric cooling system

Benefits

- » Uses 50% less energy than traditional systems
- » Simple design which allows for longer lifespan
- » Environmentally friendly

Applications

- » Refrigeration
- » Home and business cooling
- » Submarine and airplane cooling
- » Data center cooling

Patent status:

Patent issued: U.S. rights are available.
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License status:

This technology is available for licensing to industry for further development and commercialization.

Category:

Engineering and Physical Science

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