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Patent Search

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Abstract:

VAPOR COMPRESSION REFRIGERATION SYSTEM AND METHOD FOR ENHANCING PERFORMANCE ABSTRACT A vapor compression refrigeration system (100) is disclosed system (100) comprising a compressor unit (102) to compress a refrigerant, a condenser unit (104) to condense the refrigerant into a high-pressure liquid, an expansion valve (106) to reduce pressure of the high-pressure refrigerant liquid, an evaporator unit (108) to absorb heat, a circulation unit (110) to circulate a magnetic nano-refrigerant, a nano-refrigerant unit (112) comprising a base refrigerant dispersed with magnetic nanoparticles, a magnetic field generation unit (114) to apply a magnetic field to the nano-refrigerant. The system (100) is configured to monitor operational parameters, regulate intensity of the magnetic field, synchronize application of the magnetic field, and optimize heat transfer in the evaporator unit (108) and reduce compressor load through controlled magnetic field interaction. The system (100) optimized heat transfer in the evaporator unit (108) and reduction in compressor load. Claims: 10, Figures: 4 Figure 1A is selected.

Complete Specification

Description:

BACKGROUND

Field of Invention

[001] Embodiments of the present invention generally relate to a refrigeration system and particularly to a vapor compression refrigeration system and method enhancing performance of the same.

Description of Related Art

[002] Domestic air conditioning systems operate on a vapor compression refrigeration cycle in which system performance depends on efficiency of individual components, including a compressor, a condenser, an expansion device, and an evaporator. Heat transfer within the evaporator plays a critical role in system efficiency. It determines the rate of heat absorption from the conditioned space. Conventional systems often exhibit limited heat transfer capability due to thermophysical properties of the refrigerant, that leads to higher compressor load, reduced energy efficiency, and suboptimal overall system performance.

[003] Existing solutions focus on enhancement of refrigeration system performance through use of advanced refrigerants, nano refrigerants, and nano-lubricants. Nanoparticles added to base refrigerants provide improved thermal conductivity and heat capacity, that contribute to improved heat transfer characteristics. Nano-lubricants, on the other hand, improve compressor efficiency by reduction of friction and wear. Various studies and commercial approaches utilize metallic nanoparticles within refrigerants or lubricants to achieve incremental improvements in system performance.

[004] However, these existing solutions exhibit several limitations. Use of nano-lubricants primarily affects compressor performance and does not significantly improve

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