

A Refrigeration Unit for Performing Simultaneous Cooling and Defrosting Operation

Ajit Abasaheb Dawange

College of Engineering, Pune, India

Abstract

Frost accumulation on heat exchangers is a persistent challenge in domestic refrigeration, traditionally requiring the cessation of cooling operations to facilitate defrosting. This interruption leads to temperature fluctuations and increased energy consumption. This paper details a proposed dual-cycle refrigeration system featuring an integrated defrost loop. The system utilizes a Vapor Compression Refrigeration System (VCRS) architecture to manage a first compartment (freezer) and a second compartment (refrigerator) independently. By employing specific valve logic and the latent heat of the refrigerant, the system enables simultaneous defrosting of the freezer evaporator and cooling of the refrigerator compartment. This dual-functionality significantly improves energy efficiency and ensures maintenance-free operation by eliminating the need for external electric heaters and preventing the temperature spikes associated with conventional defrost cycles.

Index Terms

Refrigeration, VCRS, Simultaneous Defrosting