

HIGH SEASONAL EFFICIENCY HEAT PUMP WITH TWO COMPRESSORS OF DIFFERENT CAPACITIES

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Abstract:

A heat pump driven by two compressors with different capacity was developed to improve seasonal energy efficiency in cooling and increase capacity in heating by using high efficient components and load matching algorithm. A cycle configuration for the two-compressor system was designed for optimum capacity modulation without mal-distribution of refrigerant oil and vibration free connecting pipes of compressors. An indoor temperature control algorithm based on human comfort studies was also developed to improve energy efficiency without discomfort. As a result, seasonal energy efficiency increased by 33% based on ARI standard 210/240, when compared with that of a conventional heat pump of the same rated cooling capacity. If this achievement is converted to electric power consumption, we confirm that the monthly electric power consumption decreases 26% with the new system. Heating capacity has been increased by 15%, it should be possible to satisfy heating loads and it is comparable to that of inverter system.