

PRESS RELEASE

Blue Star strengthens its Intellectual Property position with three more patents to its credit

Air conditioning and commercial refrigeration major, Blue Star Limited, today announced that the Company has been awarded three more patents by the Office of the Controller General of Patents, Designs & Trade Marks, Ministry of Commerce and Industry, Government of India.

Details of New patents awarded

1) A patent for 'System and Method for Maintaining Optimum Condensing Temperature at Low Load in Heating Mode in VRF systems'

This invention is related to a VRF system operating in heating mode. The invention helps resolve the issue of a fall in the condensing temperature encountered by the system while in heating mode, which could result in cold air draft from Indoor Units (IDUs). This invention comprises embedding a special feature in the VRF controller that has the capability to detect the fall in the temperature and proportionally increase the compressor's output in order to maintain an optimum level of condensing temperature. This mechanism maintains sufficient supply of warm air at adequate temperature thereby ensuring thermal comfort in heating mode. Blue Star's inverter VRF systems already have this feature implemented in them.

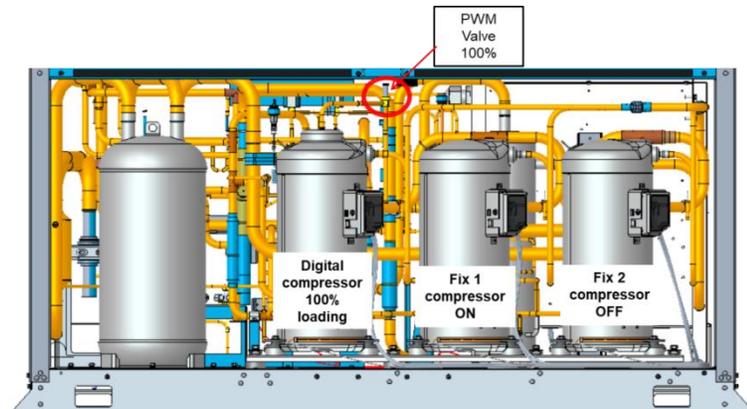
2) Another patent is for, 'Refrigerant Recovery in Multi-Air Conditioner System'

The invention, as the name goes, helps in detecting shortage of refrigerant and ensuring its recovery when the load on the system is very low in a Multi-Air Conditioner VRF system where multiple IDUs are connected to multiple Outdoor Units (ODUs), in a single refrigeration system. Due to the load being low there is a possibility that only one ODU is operational with the rest of them on standby

condition. On account of this, the refrigerant quantity confined in the standby ODUs is not available for circulation, resulting in a shortage, particularly in a system with longer pipe lengths. Prolonged operation of the system with shortage of refrigerant is not a desirable condition as it increases the motor winding temperature due to insufficient cooling of the motor. Blue Star, through this invention, has developed a special feature that has the capability to detect the shortage of refrigerant and once detected, solenoid valves in the ODUs are activated to recover refrigerant from the ODUs which are in standby mode. These valves are deactivated once adequate refrigerant is available for circulation in the active refrigerant circuit. The Company has already implemented this feature in its existing inverter VRF systems.

3) The third patent is for, 'Method and System for Maintaining Uninterrupted Cooling Operation by VRF Systems at High Pressure'

This patent reveals the method of avoiding high pressure tripping in a Digital VRF (DVRF) system wherein one or more fixed compressors are operating in parallel



with one digital scroll compressor. At high ambient condition, sudden loading of the digital compressor can result in tripping on high discharge pressure. With the present invention, Blue Star provides a unique system operation feature to overcome the high pressure tripping issue. When the discharge pressure value reaches closer to the set high pressure safety limit, one of the fixed speed compressors is switched off and the operation time of Pulse Width Modulation (PWM) valve of digital compressor (loading time) is prolonged in order to avoid high pressure tripping associated with fast pressure fluctuations during shorter loading cycles of the digital compressor. Blue Star's DVRF systems have this feature implemented in them.

Blue Star has been investing significantly in research and development of new technologies and products for several years now and these patents are a result of the Company's endeavour in this arena. The Company's R&D has over 135 employees, best-

in-class infrastructure including performance test labs, reliability testing facilities, electronics lab, design studio, and high end workstations for CAD and analysis, amongst others. In fact, the Company has applied for more than 40 patents for innovation across its various product categories and is optimistic of being granted several more patents in the near future.

Product View:



B Thiagarajan, Managing Director, Blue Star Limited adds, "Over the past 76 years of our existence, Blue Star has been making significant indigenous offerings thereby propelling the growth and development of the Indian AC&R industry. These new inventions are a step forward in this direction. Besides, I am proud that in our own way, Blue Star is contributing towards the larger good of the country by making India self-reliant or Atmanirbhar. Our patent application pipeline is huge and I am confident of receiving many more patents in the coming years backed by our dedicated team of experts."

Place: Mumbai

Date: August 24, 2020.

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