




## Facts about the Trane® Advantage VRF™ Variable Refrigerant Systems

<p><b>What are Trane® Advantage VRF™ variable refrigerant systems?</b></p>	 <p>Trane® Advantage VRF™ variable refrigerant systems (Trane Advantage VRF systems) deliver best-in-class energy efficiency, flexibility, improved customizable comfort and temperature control— plus quality components, multiple installation options and service. The systems move heated or cooled refrigerant throughout the interior of a building using small-diameter pipes. Refrigerant then passes through coils in each room being served by a system; fans or blowers then move air past the heated or cooled coils, transferring warmed or cooled air into the room.</p>
<p><b>Features</b></p>	<p><b>Advanced compressor technology</b>  The compressors are the most technologically advanced in the industry today. Variable-speed design precisely matches compressor speed to demand level, maximizing comfort and minimizing energy consumption. An asymmetric scroll design alternates suction and discharge through a single port, minimizing frictional losses and improving efficiency. The robust shaft design incorporates hardened construction and an oversized shaft diameter to support sustained operation at up to 8,400 rpm for increased refrigerant flow rate, providing additional capacity during periods of high demand. Additionally, a pressurized compressor interior minimizes oil foaming to improve lubricant flow and enhance reliability. Finally, vapor injection improves heating performance by using an intercooler to inject refrigerant vapor directly into the compressor, increasing refrigerant flow rate and heating capacity by up to 20 percent.</p> <p><b>Heat pump and heat recovery technology</b>  Heat pump units use compressors in conjunction with evaporative and condensing coils to move energy, cooling the inside of a building in the summer and heating the inside of a building in the winter. Heat recovery units can simultaneously cool some rooms while heating others, thanks to a mode control unit that manages the flow of refrigerant between zones. This design offers a benefit for buildings with varying occupancy levels in different rooms.</p> <p><b>Continuous heating, even during defrost mode</b>  When condenser-coil defrosting is necessary, multiple-module Trane Advantage VRF systems place one or more modules into defrost mode, while one or more other modules continue heating the building's interior—a significant benefit when compared to several competing systems, which must suspend heating operations entirely while defrosting occurs.</p> <p><b>Dual-compressor design</b>  The design provides significant advantages in operational performance and overall reliability.</p> <p><b>Individual zone control</b>  Trane Advantage VRF technology makes it possible to design a system in which every room in a building can be independently heated or cooled to levels of the occupants' choosing — and unused rooms' climate controls can be switched off entirely. Individual zone control maintains occupant comfort while giving building managers more flexibility and efficiency in their use of energy to only heat and cool smaller areas that require it.</p>



<b>Features, continued</b>	<p><b>Advanced control options for every application</b>  Trane Advantage VRF systems offer a variety of control options: Zone-level control of individual indoor units; Centralized-level for control of up to 256 total indoor units in up to 16 groups; Building-level for control of an entire structure's multiple-VRF systems on-site or via BACnet® connectivity, or remote internet access; and seamless integration with Trane Tracer™ controls, which directs operation of Trane heating and cooling equipment for maximum comfort and energy savings. These controls are a supplement to an existing system when certain rooms need a higher level of user-controllable heating and cooling.</p> <p><b>Smaller footprint and no duct-work for lower-impact installations</b>  Trane Advantage VRF systems require much less installation space. The systems' refrigerant pipes take up much less space than forced-air systems' ductwork, resulting in less impact on the structures in which they're installed. Because VRF™ is ductless, these systems offer unique capabilities for climate control in entire buildings or areas within buildings that have limited room for ductwork. The external and internal units themselves are compact and come in a variety of options, from 3- to 36-ton outdoor units which require no equipment room to ½- to 7 ½ ton indoor units which can be concealed above ceilings or installed in the desired space.</p> <p><b>360-foot maximum piping length</b>  Some Trane Advantage VRF systems can support a maximum of refrigerant pipe length of 360 feet — exceeding the limitations of several competing systems. VRF technology creates this possibility which is a benefit for taller buildings and frees up interior floor space.</p>
<b>Benefits</b>	<p>Trane Advantage VRF systems offer the following benefits:</p> <ul style="list-style-type: none"> <li>• Industry-leading efficiency including an integrated energy efficiency rating ( IEER) of up to 27 and (SCHE) simultaneous cooling and heating efficiency rating of up to 30</li> <li>• Advanced controls for improved control and comfort</li> <li>• More installation options for a wider variety of buildings</li> <li>• Quiet operation as low as 23 dBA</li> <li>• One source option for consultation, installation, maintenance and other extensive support from industry experts</li> </ul>
<b>Key Markets</b>	<p>Trane Advantage VRF systems are recommended for use as a stand-alone or additional system in historic buildings, multi-tenant buildings, diversely occupied buildings, tenant-finished commercial properties and other area-containing buildings such as luxury suites, ticket offices and administrative rooms, where full control over temperatures can add an additional measure of comfort and value to customer-occupied areas.</p>

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Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results. Trane solutions optimize indoor environments with a broad portfolio of energy efficient heating, ventilation and air conditioning systems, building and contracting services, parts support and advanced control. For more information, visit [ingersollrand.com](http://ingersollrand.com) or [trane.com](http://trane.com).

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