



Efficiency and Reliability in Building Systems Lead to Increased Profitability



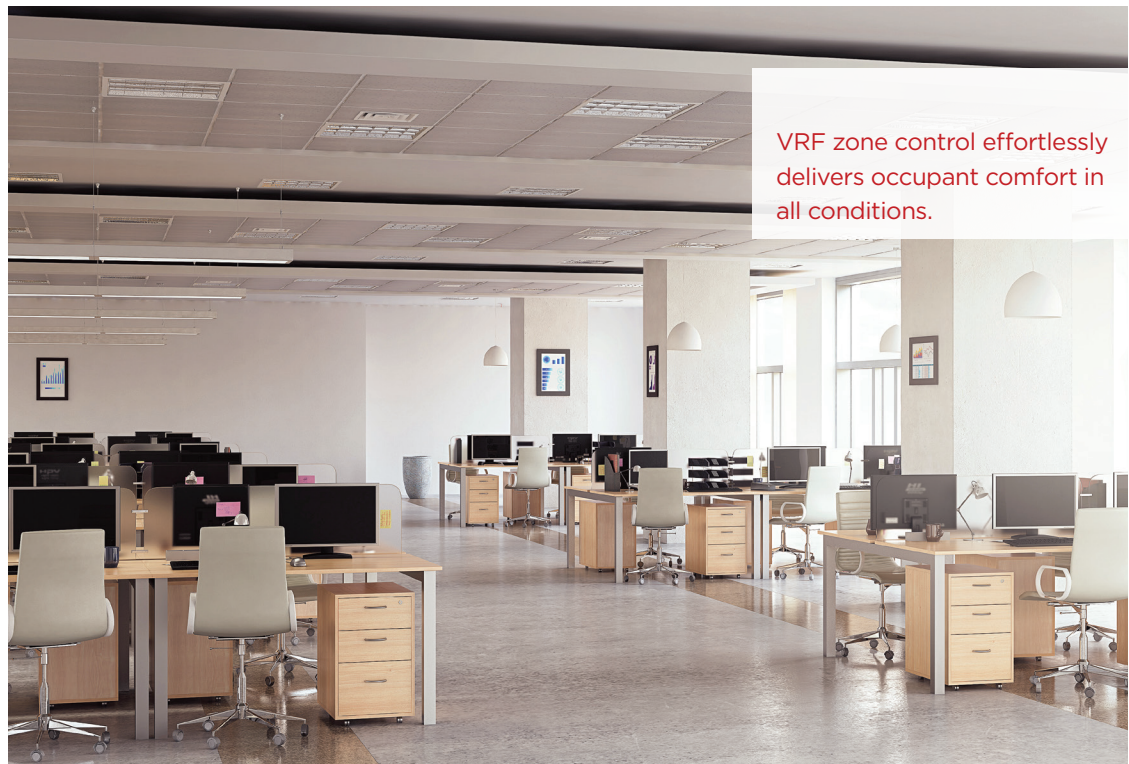
Building systems that are both efficient in operation and reliable over their service life can help maintain a commercial building's profitability. The expense of unexpected repairs and maintenance can cut into profit margins, while tenant dissatisfaction due to productivity-killing service disruptions can result in lower occupancy rates and reduced market value.

Mitsubishi Electric's integrated building systems feature best-in-class efficiency and reliability, delivering optimum value for commercial building owners. Its innovative HVAC, vertical transportation and uninterruptible power systems (UPS) are proven worldwide to maximize profitability. Integration across building systems can further maximize ROI for building owners.

SPEEDY EXPANSION OF VRF TECHNOLOGY IN THE U.S.

Mitsubishi Electric has led the industry in HVAC technology since the inception of its North American HVAC Division in 1980. Among its most notable innovations is the company's variable refrigerant flow (VRF) technology. In 2003, Mitsubishi Electric introduced the first VRF system for commercial use in the U.S. Since then it has won multiple awards for the technology, which is often used in conjunction with its dedicated outdoor air systems (DOAS).

Unlike central HVAC systems, which can be sizeable and inefficient, the driving forces behind VRF technology are economy and efficiency. Central HVAC systems use large fans to push conditioned air at high velocity through ductwork. To carry the necessary volumes of air throughout the building, the ducts themselves are large and occupy significant space in plenums and walls. In addition, supply and return ducts have a tendency to leak air from their connection points, which must be added to support the many thousands of linear feet of ductwork used in large commercial buildings. In contrast, Mitsubishi Electric's VRF systems use one-inch refrigerant piping, and occasionally short runs of ductwork, in place of traditional HVAC ductwork. Only two refrigerant pipes are necessary to create a heat recovery system providing simultaneous cooling and heating.



VRF zone control effortlessly delivers occupant comfort in all conditions.

Another benefit of VRF systems is precise control across many zones, increasing occupant comfort and decreasing energy consumption. In these systems, one or many air handlers are located directly in the occupied space. Controls vary the amount of refrigerant that flows to each handler depending on the conditioning requirements of the space. These units, which can be wall mounted, ceiling mounted, or concealed in a plenum space, are designed for quiet operation.

Increasing occupant density (number of occupants per floor area) is putting a strain on building systems. VRF zone control effortlessly delivers occupant comfort in all conditions. It can even transfer heat between zones, as when solar heat gain affects one elevation of a building but not others. In addition, the use of VRF's building automation controls offers an integration opportunity with the controls of other building systems such as lighting and energy recovery ventilators.

EFFICIENT ENERGY USAGE.

Energy efficiency is about being smart. And our INVERTER-compressor technology is as smart as it gets. It uses the absolute minimum energy necessary to maintain comfort levels while adjusting to partial-load conditions, which occur most of the time. Modern sensing technologies increase efficiency even more. Many of our systems can even simultaneously heat and cool, which is brilliant, don't you think?

EFFICIENT DESIGN

Our sophisticated design tools and Revit models make it easy to design an HVAC system to fit your building. Designing with refrigerant piping instead of ductwork or water loops is like a breath of fresh air. Our flexible, modular system can serve areas with different users, loads, orientations and hours of operation. As you plan building efficiency upgrades, VRF zoning can match diverse building requirements, too.

EFFICIENT MAINTENANCE

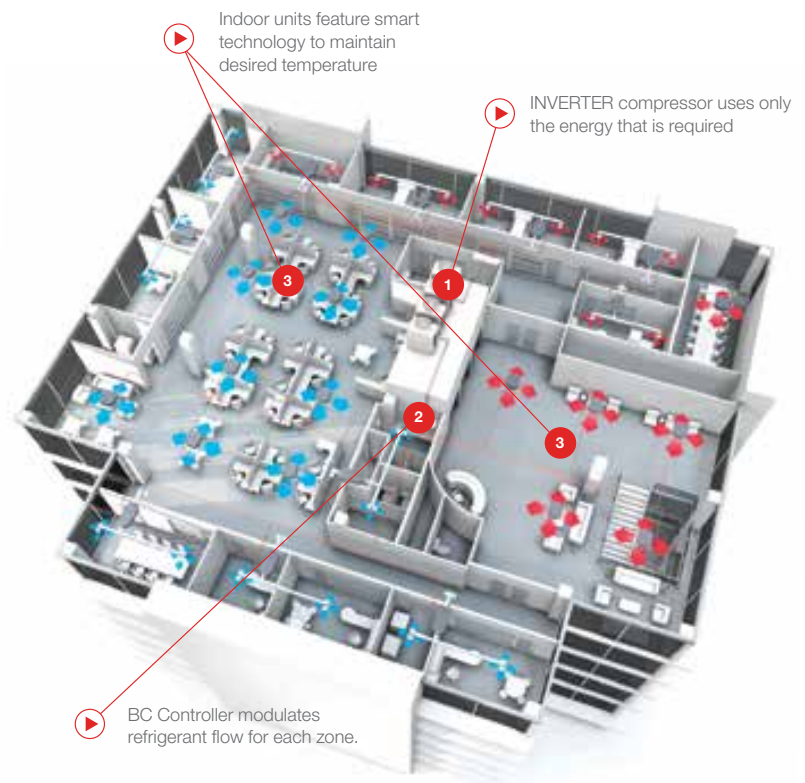
Routine indoor unit maintenance only involves periodic filter changes or cleanings. Zones in our modular system operate independently so one zone can be serviced without having disrupting other zones. Intuitive controllers make operation and monitoring more convenient with remote troubleshooting, performance management or scheduling.

EFFICIENT INSTALLATION

The small refrigerant pipes in our two-pipe systems mean there are fewer connections. Modular systems with compact components can easily be installed in tight spaces, in about half the time of traditional systems.

EFFICIENT MODIFICATION

Need modifications? No sweat, the system is really flexible. Because it's modular, it's easy to adapt to expansion or reconfiguration if capacity needs change or different air handling units are needed. Indoor units can be easily added, changed out or moved to accommodate building renovations. Plus, when areas are no longer occupied, you can simply turn them off.



THE BENEFITS OF RIDING THE BEST IN VERTICAL TRANSPORT

A key metric for escalator and elevator reliability is frequency of callbacks. Mitsubishi Electric's systems have an industry-leading rate of less than one callback per unit per year.

For Kevin Holcom, facilities director at Costa Mesa, California-based South Coast Plaza, the experience with Mitsubishi Electric has been unlike what he had with prior vendors. "With our previous vendors there were too many breakdowns," he explains.

South Coast Plaza is the largest mall on the West Coast and has annual sales of more than \$15 billion. "We see up to 50,000 people a day. Our tenants rely on vertical transportation for revenue," says Holcom. "We can't have anything inoperable during open hours."

Since Mitsubishi Electric installed elevators and escalators at South Coast Plaza and took over maintenance, Holcom says there has been zero downtime—and nothing is more important to a building owner. When elevators or escalators are

down, shoppers can't get to their destination, and retailer revenues plummet. With vertical transport and maintenance from Mitsubishi Electric, South Coast Plaza can ensure a high level of tenant satisfaction.

Designed and manufactured for a service life of 30-40 years, vertical transport systems from Mitsubishi Electric help a building maintain its profit margin. One example of the quality is elevator door operation. Door malfunctions are the cause of most elevator callbacks. Mitsubishi Electric isolates the door operating system from the rest of the elevator and uses unusually strong and rigid components.

POWER UP THE RELIABILITY OF YOUR UPS

Reliability extends to Mitsubishi Electric's UPS systems as well.

With a transformerless design and high-power module ratings, these UPS systems deliver the highest power density available. Compact cabinets have a frugal footprint, leaving room for other profit-generating activity. Mitsubishi Electric's engineers have also focused on greater efficiency across all load levels, creating a flat efficiency curve that keeps operational costs and power usage effectiveness (PUE) exceptionally low. An unprecedented 15-year life expectancy for capacitors—more than twice the recommendation of many other manufacturers—reflects the quality.

And with quality comes trust. Mitsubishi Electric publishes documentation of its UPS module operating failures and makes that information available to clients. These systems are engineered to keep businesses up and running, extend uptime and preserve profitability.

Interested in learning more about efficiency, reliability and profitability across building systems?

[Take a virtual tour](#) up the tallest building on the internet to see the systems in action!



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