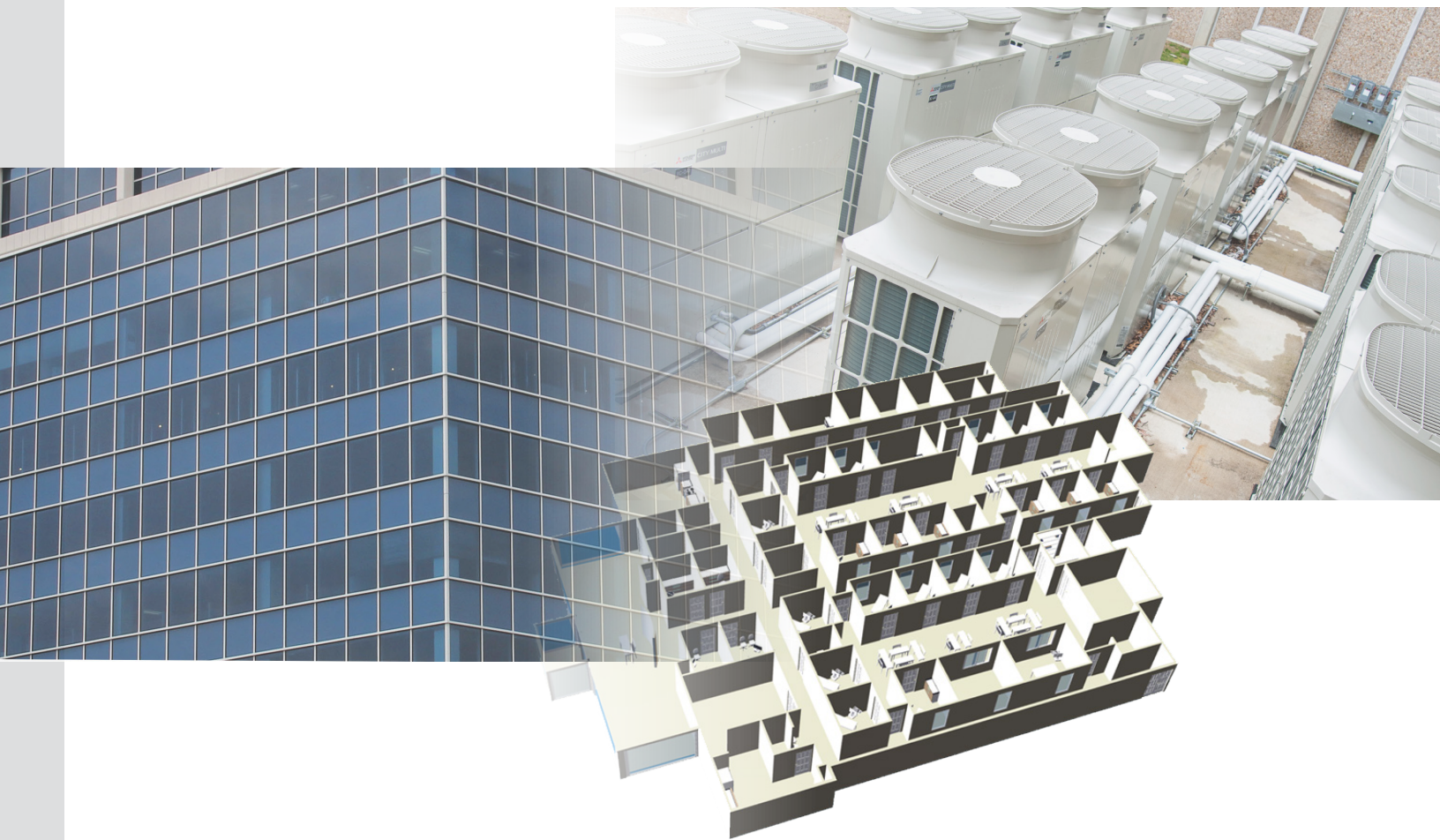


# Diamond Controls

## Empowering Innovative Building Management

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Solution Brief

January 2015



Facility managers and owners must run their facilities' operations as cost-effectively as possible. A controls system should be a great help in that effort, but some systems instead present problems that limit a manager's or owner's ability to achieve their goals. Three problems are particularly prevalent: 1) Outdated or ineffective controls do not take advantage of current technology; 2) Multiple mechanical systems within a single building are often controlled by separate controls systems and vendors, resulting in an unnecessary management challenge; and 3) Independent integrators lack technical knowledge regarding the equipment's operating details and efficiencies. All of this leaves facility managers and owners expending unnecessary time and effort.

The Diamond Controls Solution from Mitsubishi Electric US, Inc. Cooling & Heating Division (Mitsubishi Electric) answers these challenges by pairing building automation controls with all-encompassing service. The DC-600E Diamond Controller™ (Diamond Controls) offers facility managers and owners an unprecedented level of control over the whole building. The wide range of offerings from Mitsubishi Electric's Professional Solutions Group (PSG) covers every relevant service, from the initial design to post-installation follow-up support. The combination of a superb product and versatile service ensures that facility managers and owners make the most of their budgets and efforts. This is especially true for facilities using Mitsubishi Electric's Variable Refrigerant Flow (VRF) zoning systems. Diamond Controls capitalizes on VRF's award-winning energy efficiency, maximizing cost savings and boosting occupant comfort.

This innovative product-services package will revolutionize the way managers and owners operate and maintain their facilities.

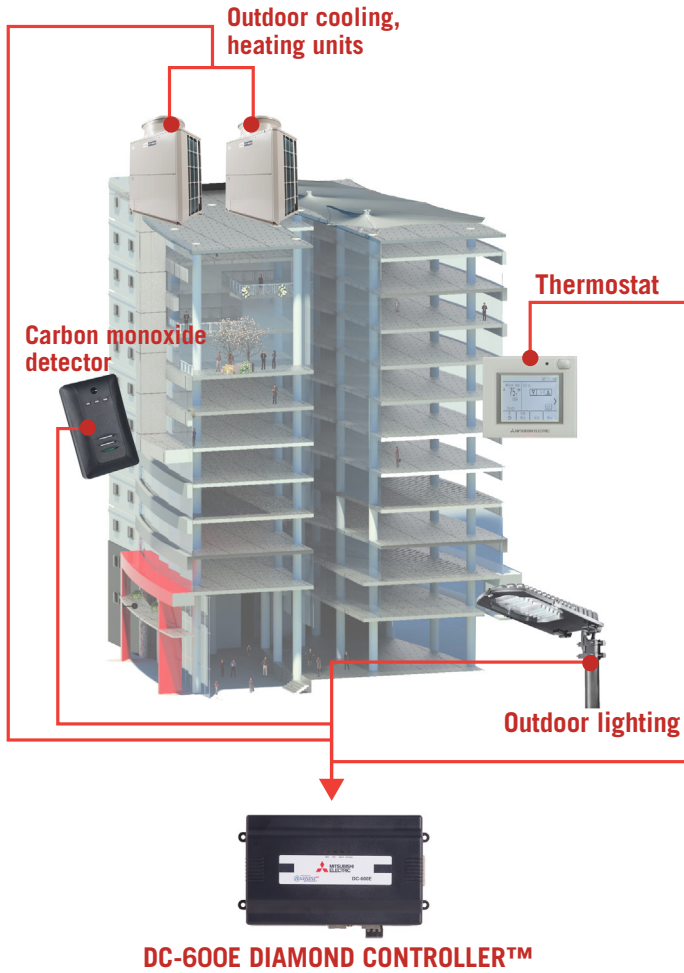
## Diamond Controls Features

Current building automation systems integrate multiple mechanical systems. Controlling numerous systems through a single interface reduces the time it takes to make necessary adjustments. Features of Diamond Controls include: management from A to Z; high-level display and graphing capabilities; and strong and secure software.

**Management from A to Z.** Diamond Controls can manage multiple tenant spaces within the same building, multiple buildings on a site and multiple sites. For example, a school with several campuses spread across a state can use Diamond Controls to manage every campus. The controlled systems can come from any manufacturer; an HVAC system from one company can be managed alongside an outdoor lighting system from another company. Diamond Controls can integrate and automate the following items, including but not limited to:

Access control	Energy recovery	Occupancy sensor
Air compressor	Environmental architectural features	Outdoor, parking lot lighting
Ancillary heating	Garage exhaust	Photovoltaic panel
Annunciations	Generator monitoring	Pumping system
Boiler	HVAC system	Refrigeration monitoring
Carbon monoxide, specialty gas sensors	Hotel room systems	Security
Chiller	Humidifier	Sprinklers
Centralized water plant	IAQ system	Sump pump monitoring
CCTV	Irrigation system	Supplemental heating
Cooling tower	Kitchen exhaust	Tank monitoring
Dedicated outdoor air system	Laboratory exhaust	Thermostat
Domestic hot water	Legacy cooling, heating	Ventilation
Elevator	Life safety secondary annunciation lighting	Water features
Energy dashboard	Monitoring of computer room air conditioning	Weather station

The diagram below illustrates a multi-story building utilizing Diamond Controls. The HVAC system, carbon monoxide detectors and outdoor lighting systems have all been integrated.



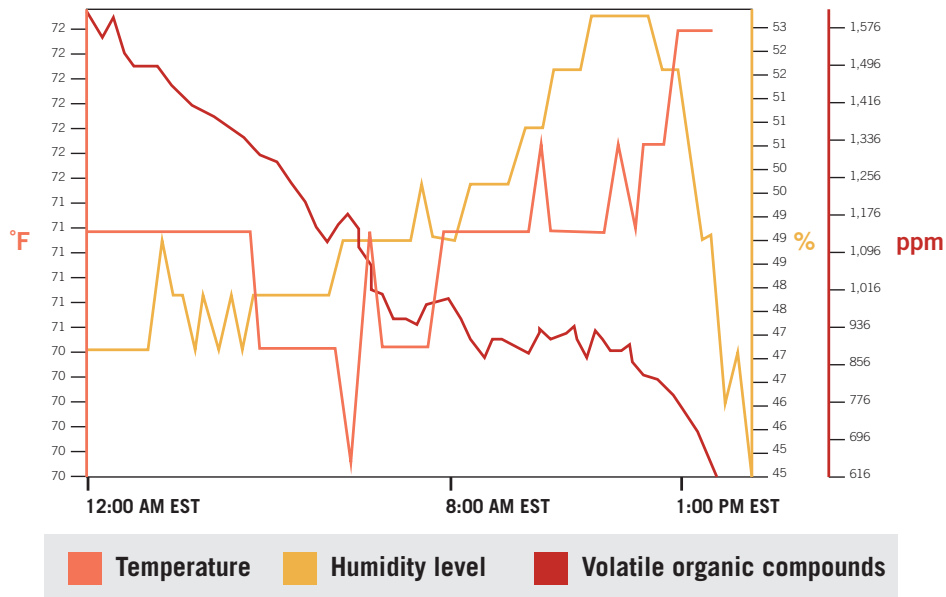
“HVAC, boilers, alarms, water fountain temperature control, etc. - I wanted to have it all in one place. Diamond Controls is not proprietary, meaning we’re able to run any system on it. That was very important to us.”  
 – Rusty Keller, facilities manager, dōTERRA, Pleasant Grove, Utah

**High-level display.** The displayed trends, reports and analyses reveal in real time how the building’s systems are reacting to user behavior, building conditions and ambient conditions, offering managers invaluable oversight. Displayable trends include, but are not limited to:

- Alarms
- Building, space occupancy
- CO2 levels
- Energy generation (solar)
- Energy usage
- Humidity levels
- Outside air temperature
- Space temperature
- Water temperature

A manager examining the current status of his/her facility can plot multiple trend

points on one graph like the one shown below\*, which tracks the humidity level, the level of volatile organic compounds and the temperature.



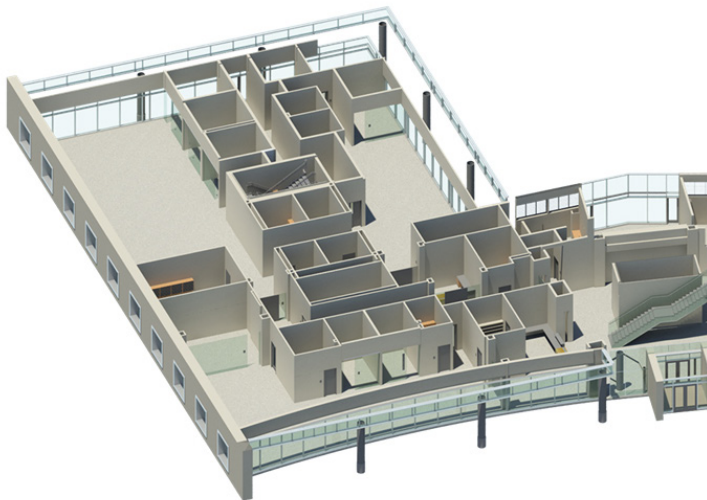
\*The graph on this page is shown for illustration purposes only.

In addition, managers can receive alerts when filters need to be changed based on runtime hours.

All of this information is displayed via a secure Web page. Representations of equipment, regardless of manufacturer, are displayed in 3D. The screenshot below of a manager's interface shows a wall-mounted indoor unit that is set to cooling mode and indicates the need for a filter change.



Floor plans are also displayed in 3D and graphics can be animated. These features effectively represent a facility and convey its current statuses, affording managers a deep understanding of their facilities and well-informed decision-making. Pictured below is an example Diamond Controls' 3D graphic:



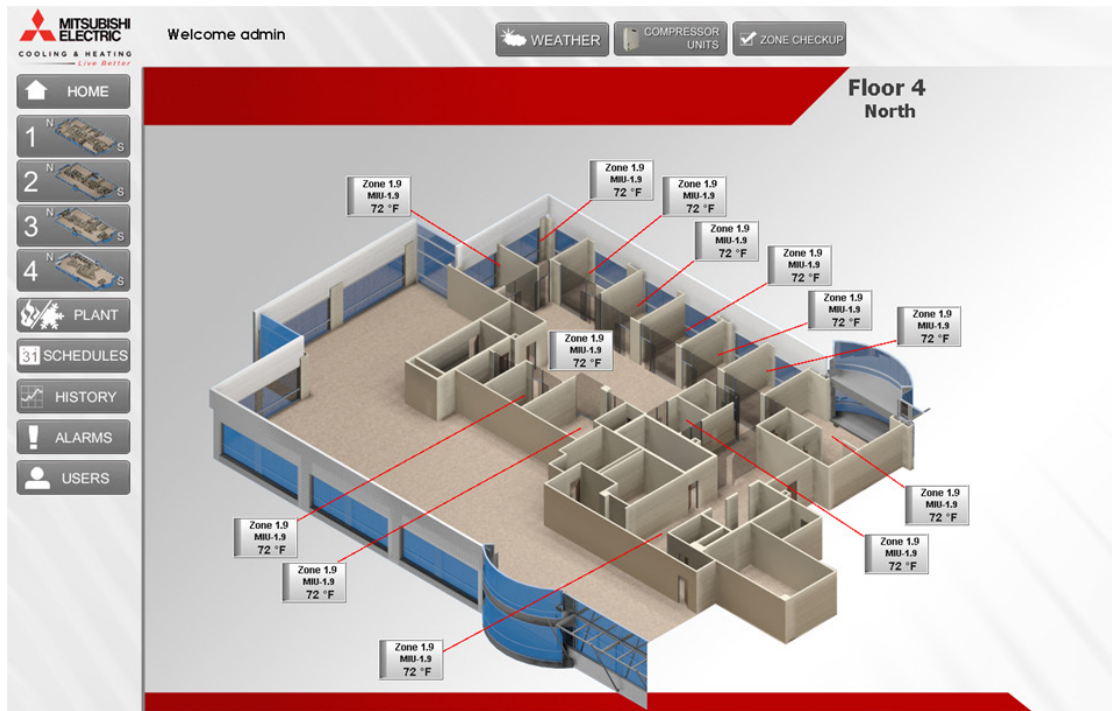
Diamond Controls 3D graphic

*"The visual aspect is powerful. The building owner can get a quick view if there's an alert – filters needing changes, the accounting office is too cold – so he can go to it [on the screen] and see it quickly. If he clicks on the 3D visual, he brings up the relevant information. It's intuitive."*

– Russell Gunther, co-president,  
Gunthers Comfort Air, American  
Fork, Utah



Managers can choose to alter the display by customizing its style, including color scheme, fonts and icons. Pictured below is a screenshot of the interface that captures the clean design and user-friendliness.



**Strong and secure software.** Diamond Controls runs on Tridium's Niagara<sup>AX</sup> Framework (Niagara). Tridium, Richmond, Virginia, a global leader in open architecture automation software and an independent business entity of Honeywell International, Inc., Morristown, New Jersey, has seen impressive growth for almost 20 years.

Niagara is currently used in more than 385,000 instances spread across 45 countries. It offers a unified, Java-based platform that integrates diverse systems and devices. The platform is designed around worldwide standards of website navigation. Any instance of the framework can be serviced by any Niagara-trained technician, granting users the freedom of their preferred provider.

Niagara is customizable, upgradable and scalable, meaning it can be as simple or advanced as a user wants. The ability to upgrade the framework without replacing components as well as the framework's unlimited scalability, means its operational life will exceed that of the systems it integrates.

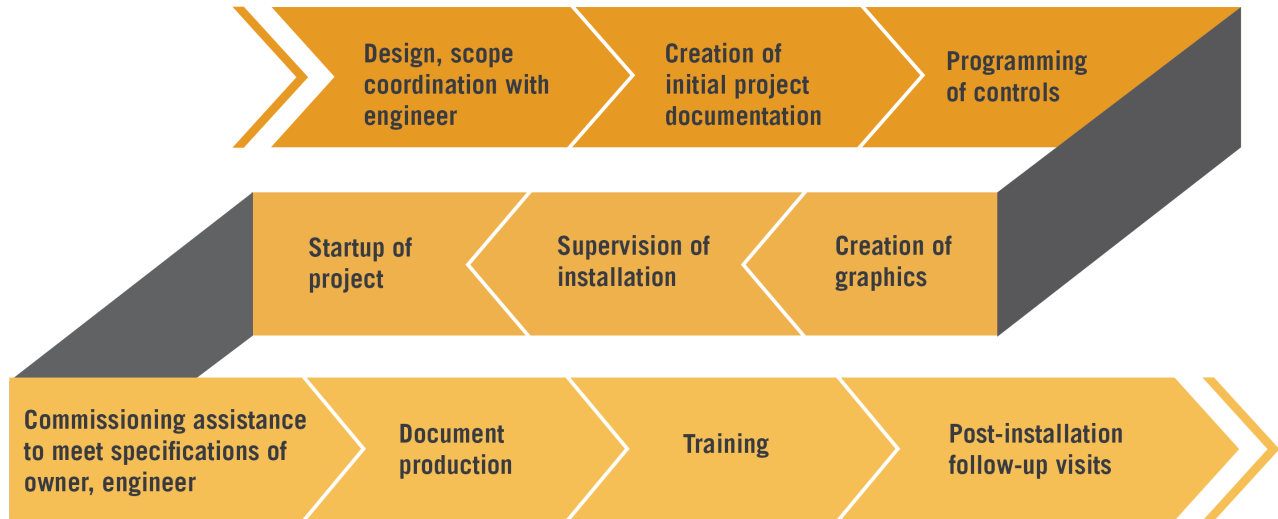
Niagara also offers the security measures necessary to facility management teams via advanced authentication and security enhancements (e.g., expiring passwords, complex/strong password enforcement).

*"The dōTERRA project is currently 200,000 square feet across four connected buildings. Since there are plans for future growth, we wanted to make sure that whatever we did - whatever controls system we chose - wouldn't limit our ability to grow. Diamond Controls offered just that."*

– Matt Smith, vice president, Applied Product Solutions, Salt Lake City

## Professional Solutions Group Features

Many steps take place between designing a controls system, installing it and actually using it. Unique to Mitsubishi Electric's offering is the pairing of the Diamond Controls product with service solutions that go far beyond what is traditionally offered. The Professional Solutions Group (PSG) is involved in every step of the process:



Typically these steps are coordinated by various contractors - mechanical, controls and commissioning, for example. Providing one source of coordination and expertise improves the speed of the overall process; offers the assurances of working with one, reliable company; and lowers the risk of integration mishaps.

HVAC is the largest significant feature that commercial controls systems manage. Controls can also manage lights, sprinklers, annunciators and so on, but in terms of energy consumption and occupant satisfaction, HVAC is the critical component. Choosing controls that are centered around a facility's HVAC system is the logical choice.

Working with a global company that has a long history of success is a smart choice. For the past 30 years, Mitsubishi Electric has enhanced people's lives by improving comfort, conserving energy and promoting environmental sustainability. Mitsubishi Electric designs and remains updated on every detail of its VRF technology, making Diamond Controls ideal for managing these systems. Since one company with a large national presence is providing both the product and services, every region of the country has controls staff ready to solve any product or service challenge.

## Benefits of a Product–Service Package

The aforementioned product and service features amount to benefits that save energy and money and enrich the user and occupant experience. Allowing managers and owners to maximize their investments,

*“Diamond Controls brings great value to the end-user... it also brings a great need for expertise in programming, commissioning, end user training and operational monitoring for the first year. A proper setup ensures that your equipment operates according to the specified sequence, and provides for a satisfied customer.”*

– Amiel Loiseau, engineering support,  
Gunthers Comfort Air, American Fork, Utah

*“PSG spent about five hours with us for training. They showed us how to use the system - how to add a user, how to get into set points, etc. Like any system, you have to learn it. But it's very user-friendly. PSG has been great.”*

– Rusty Keller, facilities manager, dōTERRA,  
Pleasant Grove, Utah

the product–service package offers the following benefits, among others: efficiency gain, lower cost and ease of use.

**Efficiency gain.** VRF zoning systems consistently perform at 25 percent higher efficiency than traditional systems, making them an ideal HVAC system to use in any scenario. Managing VRF through Diamond Controls adds another level of efficiency because the systems come with built-in sensors and the controls use the standard industry best practices. Managing VRF while integrating other automated systems adds yet another level of efficiency, supporting even better overall facility management.

**Lower cost.** A manager can use the controls to modify cooling or heating, shut off lights and turn off water features, for example – all around the facility’s optimal schedule. Alternatively, a manager can schedule setbacks around the weather forecast; Diamond Controls can check the ambient temperature conditions and automatically adjust, for example turning down the temperature on an unseasonably warm winter day.

Costs can also be lowered through utility rebates. Demand Response programs help utilities maintain grid reliability by alerting customers of dangerously high usages across the grid. An alert might go out when a city is running too many air conditioners on a summer day, potentially compromising the utility company’s ability to deliver service. Companies and households that adjust their usage in response to the alert are rewarded with monetary incentives. Diamond Controls receives these alerts via Open Automated Demand Response and can be set to automatically adjust usage.

Working with one company for both the product and service also removes the frustrations associated with integrating building systems. VRF-specific sequences and programming for personalized occupant comfort and efficiency are included with Diamond Controls, removing the risk of an independent controls integrator completing expensive and possibly ineffectual programming.

**Ease of use.** Diamond Controls can be accessed at any time from any location. Remote access removes the tether of needing to touch a physical thermostat, for example, giving managers full control whenever and wherever needed. Diamond Controls makes monitoring the facility remarkably simple for facility staff, reducing human error and the time it takes to get results.

### Green Certification Programs

Diamond Controls users enjoy VRF’s impressive energy efficiency and ability to measure and verify energy usage, both of which are necessary for certification by programs like Leadership in Energy & Environmental Design (LEED®), Green Globes® and ENERGY STAR®.

VRF systems can help buildings meet or exceed the U.S. Green Building Council’s LEED requirements for energy efficiency and outdoor air delivery (Standard 90.1-2013). VRF also contributes a sizable number of points in the Energy & Atmosphere and Indoor Environmental Quality categories. The same zoning features that contribute to earning LEED points help meet Green Globes and ENERGY STAR requirements.

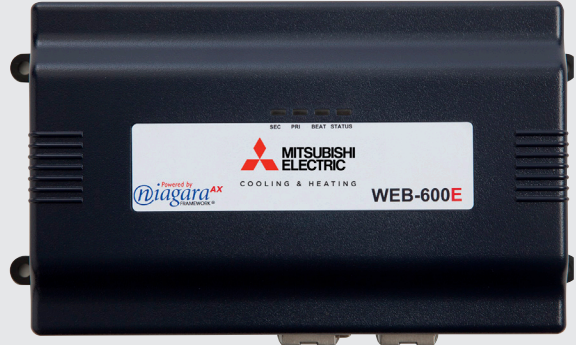


Additional efficiencies can be gained through the use of

monitoring and scheduling functionality within Diamond Controls, which offers ventilation and setback strategies for a wide array of energy-consuming systems (e.g., lighting, ventilation, security).

### Project Spotlight: Liberty Memorial Central Middle School

The Liberty Memorial Central Middle School, Lawrence, Kansas, had an old four-pipe HVAC system in need of replacement. The school chose a VRF zoning system from Mitsubishi Electric and wanted controls that would enable superior management. Ed Lange, sales engineer, Morgan & Associates, Shawnee, Kansas, said, “Diamond Controls offered a great solution, giving the school full access to the VRF system as well as full integration into existing mechanical equipment. The controls systems being built on such a robust, well-known platform gave the school comfort to move forward with Diamond Controls.”



The school also worked with the Professional Solutions Group (PSG) throughout the project. Lange said, “PSG was invaluable to making this project happen. They worked closely with our field techs to ensure a seamless project. When most of the equipment and control devices were installed, PSG sent a team of four individuals for a week to begin the commissioning process.”

The school system has become so partial to Diamond Controls that they are expanding the project to include five other schools in the district. Each school will be outfitted with Diamond Controls and all six schools’ controls will be connected to a web server application for central monitoring.

## Conclusion

Diamond Controls provides facility managers and owners with a means of efficiently operating a facility. Diamond Controls capitalizes on efficient building automation technology paired with premier, all-encompassing service to offer a top-of-the-line experience. The product and service solution results in impressive cost savings, efficiency gains and personalized comfort improvements.

For more information about Mitsubishi Electric’s products, visit [www.mitsubishipro.com](http://www.mitsubishipro.com)



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