

CENTRE FOR APPLIED TECHNOLOGY
Achieves LEED® Gold Certification

FUTURE-PROOF YOUR BUILDING
BACnet®: An Elegant Solution

www.reliablecontrols.com

RUNtime

The Official Quarterly Newsletter of Reliable Controls® Corporation

Q4- 2018

INTRODUCING

RCReporter® 3.6

...now with Data Sets



INTRODUCING RC-REPORTER® 3.6

Actionable Insights for Operational Efficiency

RC-Reporter is web-based building performance software. Extract intelligence from your archived building data and make more informed operational decisions with RC-Reporter. This fully customizable, server-based application allows you to analyze the trend and runtime data from any BACnet, Internet-connected building, and generate professional performance reports, quickly and accurately.

This release of RC-Reporter introduces new features, which help deliver actionable insights to improve operational efficiencies. New capabilities include:

Data Sets

Save time in filtering your building data!

A Data Set is a collection of points sharing similar characteristics, such as room temperature, room set point, or occupancy. Points in a Data Set have the same unit and a similar name. Data Sets allow users to quickly gather similar points to use in reports.

Data Sets let you work more easily with similar point types from multiple inputs when graphing values in reports. You can use Data Sets in the

Contribution, Date Range, Profile and Ranking components.

Ranking Component

The new Ranking component provides actionable insights within your Data Sets!

The Ranking component shows the highest or lowest values within Data Sets, displayed as a chart or table. It makes it easy to compare the values within your data, such as the top ten rooms with the greatest demand for electricity.

When viewing a Ranking component chart online, users can:

- Hover over columns to view a flyout that contains the column value.
- Click a data series name in the legend to view or hide the related column in the chart.
- Click the link for a column to open the Details Report for that item, assuming you created a separate report using the same Data Set.

Data can be shown in numerous configurations. For example, it is possible to have one report

that has multiple ranking components that break down several devices or location performance measurements, and through a single click, immediately go to the report with more detail about why it is not performing. That's flexibility!

Identifier Selector

Save time using the Identifier Selector!

Any report using Data Sets in non-ranking components will automatically have the Identifier Selector appear at the top of the report.

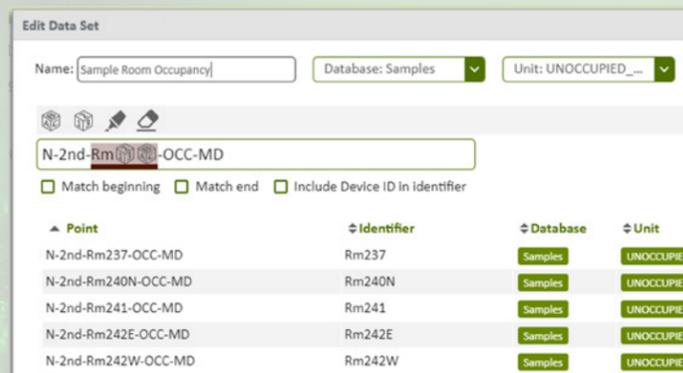
An Identifier Selector is a drop-down list that shows all the points in the Data Set. Use this new tool to update all the charts in your report to reflect the currently selected point. Your report can be used to analyze all the devices or locations in the Data Sets, which saves time by eliminating the need to create the same report multiple times.



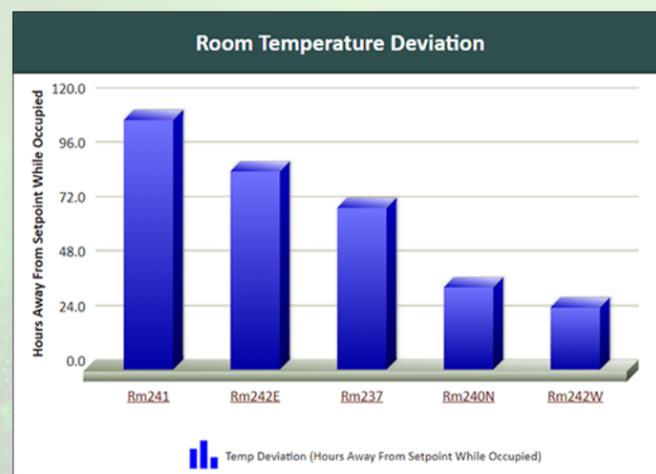
Improved Help

Find what you need to know!

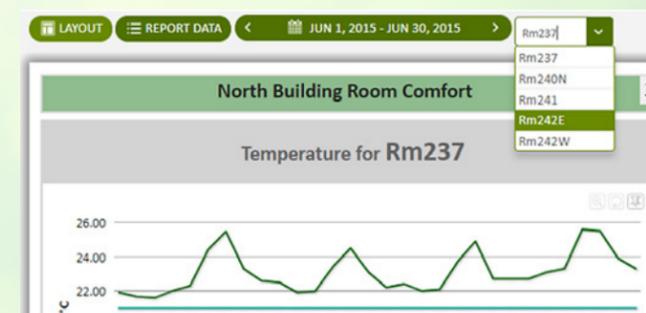
Updated online help is now implemented for many of the pages in RC-Reporter.



Edit Data Set dialog



Ranking component chart



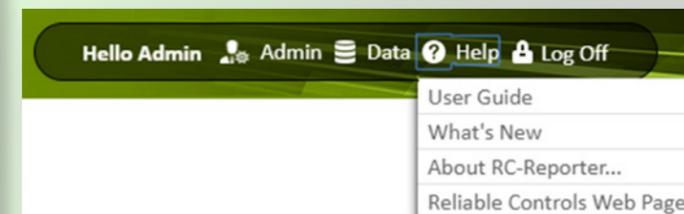
Identifier Selector's drop-down list

New Sample Report

Explore RC-Reporter with Report #4 - Room Performance!

Sample Data Sets are provided to assist users as a learning tool. Samples contain example configurations that can be compared against one another. This new sample report in RC-Reporter illustrates an analysis of the temperature control for several rooms.

RC-Reporter delivers a simple, flexible, and sustainable web-based solution that provides analysis to help focus on the bigger picture and be more confident in long-term, operational decisions.



Improved Help



FUTURE-PROOF YOUR BUILDING

The MACH-System with BACnet: an Elegant Solution

Your building automation system will begin paying dividends immediately through energy savings... but will hidden expenses offset those savings when you need to expand or upgrade your system in years to come? A solution is available in the form of the MACH-System™ with BACnet®.

BACnet is a communications protocol, which stands for Building Automation and Control Networks. BACnet is designed to allow communication of building automation and control systems for applications such as heating, ventilating, and air-conditioning control, lighting control, access control, and fire detection systems and their associated equipment. Much like any spoken language, a set of rules is required to define the procedures and methods used to facilitate communication between electronic devices. The BACnet protocol does this in a simple and efficient manner.

BACnet is a strictly defined and highly used ASHRAE, ANSI, and ISO standard communications protocol. It is a protocol with more than 700 vendor IDs and more than 70 manufacturers with tested and verified products.

What does native BACnet mean?

Native BACnet means the BACnet operating stack is embedded directly in the device. Every Reliable Controls BACnet controller has the BACnet stack at the board level.

How will you be able to ensure the availability of replacement components down the road? When you choose controllers that directly use the BACnet protocol stack, you will effectively future-proof your system.

Here's why:

- BACnet will not become obsolete; it is an open standard protocol (ASHRAE Standard 135) that can easily be extended with new features to meet the rapidly changing demands of the building automation industry.
- BACnet, at the controller level, eliminates the need for expensive translation gateways that can cause communication bottlenecks.
- BACnet allows you to break free from the chains of sole sourcing, providing the freedom to choose products and services from over 70 BACnet manufacturers around the world.

Every Reliable Controls device is peer-to-peer. There are no additional management devices required for communications with another vendor's products. This is accomplished without introducing any incompatibility with existing BACnet networks and products.

The BACnet protocol provides mechanisms for computerized building automation devices to exchange information, regardless of the particular building service they perform. Proper communication between building automation devices is critical for maximizing building energy efficiency, indoor air quality, and other aspects of green buildings.

A proprietary protocol is a communications protocol owned by a single organization or individual and is the exclusive legal property of the proprietor. As a result, the proprietor has exclusive legal right to control the development and deployment of a proprietary protocol.

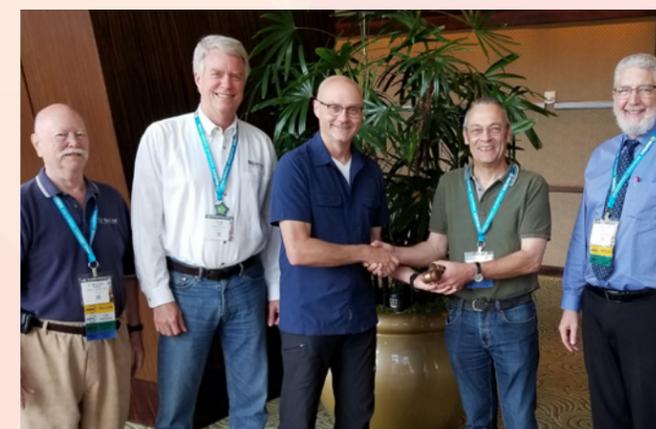
By definition, an open protocol cannot be owned. An open protocol is publicly mandated and not owned by any individual or organization. A protocol that is not the exclusive legal right of an individual can be developed by the public and freely deployed. Since no single proprietor is in control, diverse and formerly separate products and services can interoperate.

As the building automation industry transitioned from pneumatic control to electronic and then to Direct Digital Control (DDC), the major manufacturers developed proprietary systems. While there is nothing inherently wrong or technically inferior with proprietary protocols, they were often delivered in a way that limited access to a single vendor.

During these early days of DDC, it wasn't unusual for a college or university to be faced with a major unplanned "upgrade" of their system because of software and hardware obsolescence. In addition to perpetual upgrade issues, facilities faced restrictive competitive bids for additions and expansions. Owners and facility directors were forced to support multiple vendors or accept sole source pricing from a single manufacturer.

BACnet is not owned by any single individual or corporation. BACnet development is proposed by balanced, ASHRAE volunteer working groups. BACnet development is not funded by any single company or individual. Through the commitment of many manufacturers who actively participate in these working groups, BACnet has flourished.

Reliable Controls is an excellent example of how this works. The president of Reliable Controls, Roland Laird, had served on the Board of Directors for BACnet International for a number of years. Michael Osborne, Manager of Firmware Development, currently holds the appointment of BACnet Chair. Both of these positions require countless hours to fulfill the obligation and commitment that is part of these positions. It is not unusual for members of the board and the standing committee to dedicate nearly all of their professional time to these groups. It is this type of



Current committee Chair Bernhard Isler passes the gavel to incoming Chair Michael Osborne. From left to right, Mike Newman, past Chair (Cornell), Dave Robin, past Chair (ALC), Michael Osborne, Bernhard Isler (Siemens), and Steve Bushby, past Chair (NIST).



commitment that allows Reliable Controls to help drive the protocol and maintain it as the only open and viable future-proof option in the industry.

About BTL-Listed Products

BACnet Testing Laboratories (BTL) is an unbiased testing lab for building control products. The BACnet Testing Laboratory is part of BACnet International and offers a product testing and listing program for products that have BACnet capability. The BTL's authorized test laboratories will test the BACnet functionality of a product to a set of requirements developed by the BTL that are based on ASHRAE Standard 135.1P. Products that meet the BTL's requirements are eligible to receive a BTL listing.

MACH-System Capabilities

The MACH-System enables users to:

- Build "native" BACnet systems exclusively with Reliable Controls BACnet controller products.
- Use the BACnet protocol to interface with Original Equipment Manufacturers (OEM) products.
- Add to another vendor's native BACnet system using Reliable Controls products.
- Mix legacy Reliable Controls products and BACnet protocol networks into one system.
- Connect all earlier versions of MACH-System controllers to native BACnet networking.
- Configure a BACnet controller for either BACnet or Reliable Controls protocol while in the field.
- Operate a Reliable Controls "native" BACnet system with another vendor's BACnet software, experiencing compatibility with existing BACnet networks and products.
- Eliminate obsolescence and save money.

Reliable Controls building automation products are meticulously engineered to provide convenient access, flexible application, and easy installation and expansion capability.

WELCOME TO NEW DEALERS

New Reliable Controls Authorized Dealers



Advantek
Zarcero, Alajuela, Costa Rica



DMG Corporation
Orange, CA, USA



Green Building Automation - Western Michigan
Portage, MI, USA



Rycon Electrical Services, Ltd.
Marrickville, NSW, Australia



Superheat, Ltd.
Moonah, TAS, Australia

TRADE SHOWS

Visit Reliable Controls at these Upcoming Trade Shows

2018 MAPA Annual Conference
October 14 - 18, 2018
Cleveland Renaissance Marriott Downtown
Cleveland, OH, USA



World Energy Engineering Congress
October 17 - 18, 2018
Charlotte Convention Center, Hall A
Charlotte, North Carolina, USA
Booth #440



Adelaide - AIRAH Tradeshow
October 18, 2018
Adelaide Entertainment Centre
Adelaide, Australia



2018 Greenbuild Expo
November 14 - 15, 2018
McCormick Place
Chicago, IL, USA
Booth #1931



PM Expo 2018
November 28 - 30, 2018
Metro Toronto Convention Centre
Toronto, Ontario, Canada
Booth #1826



2019 AHR Expo
January 14 - 16, 2019
Atlanta, Georgia, USA
Booth #5028



NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Centre for Applied Technology Achieves LEED® Gold

Northern Alberta Institute of Technology (NAIT) is a leading Canadian polytechnic, delivering education in science, technology and the environment, business, health, and trades. Known for hands-on, technology-based learning, NAIT engages with businesses and industries in applied research and innovation, and provides corporate training around the world.

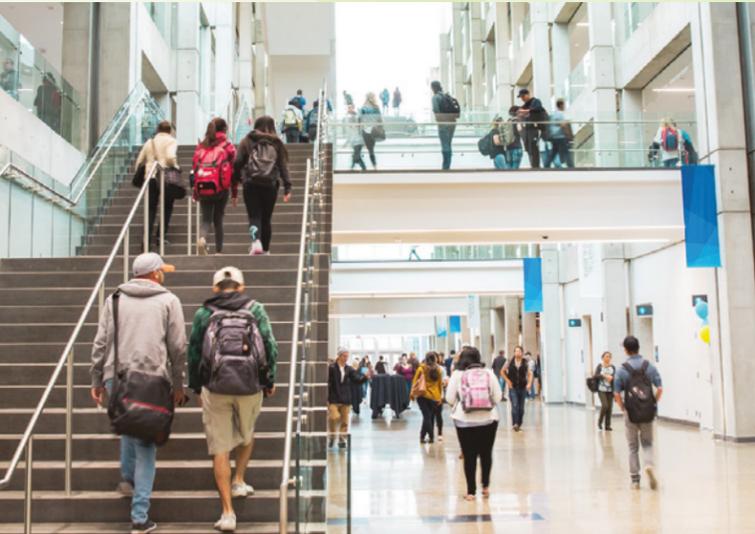
The Centre for Applied Technology (CAT) is the largest building on NAIT's main campus, covering 51,600 square meters while hosting approximately 5,000 full-time students. CAT is more than 25% the total size of all NAIT's main campus buildings combined, and is 60% larger than NAIT's second largest building, the HP Centre.

The CAT building was recognized with Gold status under the Leadership in Energy and Environment Design (LEED®) rating system. The building, which opened in August 2016, was recognized for recycling or diverting more than 98 per cent of its construction waste, using water-saving fixtures, and installing all LED lights, in addition to many other features.

Reliable Controls Authorized Dealer, SERV-ALL Building Solutions successfully completed the controls for this new construction project for the NAIT CAT facility, which resulted in LEED Gold certification. SERV-ALL provides expert building automation and HVAC solutions to industrial, commercial, and institutional organizations. The company prides itself on quality and workmanship while constantly striving to make buildings smarter, greener, and more comfortable to operate within.

The networked MACH-System™ hardware for this project is connected to an operator workstation, which is installed on an internal IP network. Operators and facility managers use the workstation to access the BACnet®-enabled system.

The onsite mechanical equipment includes BACnet-enabled chillers, boilers, and variable frequency drives (VFDs). Additionally, hard point control to air systems, heat pumps, standalone A/C units, VAV boxes, and fan coils are installed. Chilled beams and chilled radiation panels make this project special. The project is unique because exhaust air from the basement is



used to pressurize the parkade for heating and ventilation.

Achieving proper pressures from the 5-storey atrium to the outside proved to be a challenge, as did balancing the pressure from the parkade and basement with the parkade doors opening and closing; however, the project was successfully completed, ultimately achieving LEED Gold status, and additionally, it is projected to realize substantial energy savings.

With a target of LEED Silver certification, the CAT exceeded this goal through spearheading a number of energy, atmosphere efficiency, and indoor environmental quality initiatives, including:

- Radiant heating and cooling
- Heat recovery from building exhaust air
- Demand control ventilation
- Low-lighting power density featuring all LED lighting, the use of occupancy sensors, and day lighting controls

- A high-efficiency heating and cooling plant
- A building ventilation system with CO₂ sensors to ensure occupants always receive the right amount of outdoor air to stay alert, focused, and to conserve energy when ventilation demand is reduced
- Mechanical systems and building materials protected from dust and moisture to protect and enhance the indoor environment

“SERV-ALL Mechanical Services Ltd. is proud of our contribution to excellence for the expansion of the NAIT main campus’ CAT building. Our relationship with Reliable Controls provides for the excellence in creating and maintaining environmental sustainability in building performance for the present and our future.”

SERV-ALL Mechanical Services Ltd.

Congratulations to SERV-ALL for their part in helping the CAT to achieve LEED Gold status.



Department Profile



PEOPLE YOU CAN RELY ON

Reliable Quality Assurance: Continual Improvement

Quality Assurance (QA) is the way to ensure all products Reliable Controls produces are free from as many defects as possible upon release. Prevention methods to identify defects or bugs in all controllers and software includes a rigorous process performed by a knowledgeable team of seasoned QA staff members. The QA team originally began with a single, full-time analyst in 2011 and has since grown by approximately one employee per year to eight full-time QA analysts.

QA is responsible for Research and Development (R&D) quality in controllers and software. The QA team tests at a system level to verify all products are compatible and functioning as a system. Each project has a Lead that works with the development team from concept to delivery of

the final version. QA is involved in specifying the acceptance criteria for each stage of work and then verifies the function and performance of the work. New releases pass through a Gate Process:

QA Gate Process Procedures

Concept Gate: In the Concept Gate the QA Lead works together with the Product Owner. QA defines the high-level Testable Acceptance Criteria (TAC) for each feature in the product release plan.

Viability Gate: In the Viability Gate, the Product Owner (PO) develops a clearly written “story” and “effort estimate” for each feature and the QA team assists the PO in writing the TAC for each story.

Design Gate: In the Design Gate, the R&D team develops the documented product and features and the TAC is further refined by QA.

Alpha Gate: In the Alpha Gate, the complete test plan, including regression testing of unchanged functionality, is executed in a Functional Stress Test (FST).

Beta Gate: After the product passes Alpha Gate, it is released to customers for Beta testing on real projects that Authorized Dealers are installing. This is the final stage of customer validation.

Release Gate: After the product passes Beta Gate, the PO and QA team, along with other stakeholders, reviews the Beta testing results and incorporates any final changes. The changes are then tested by QA and the final product is released.

System Tests

Test suites are developed for every product and feature. Before either the Beta gate or the official release of a product, test plans are created and executed. Any detected bugs must be fixed or resolved before release or given a “conditional pass” if not deemed significant.

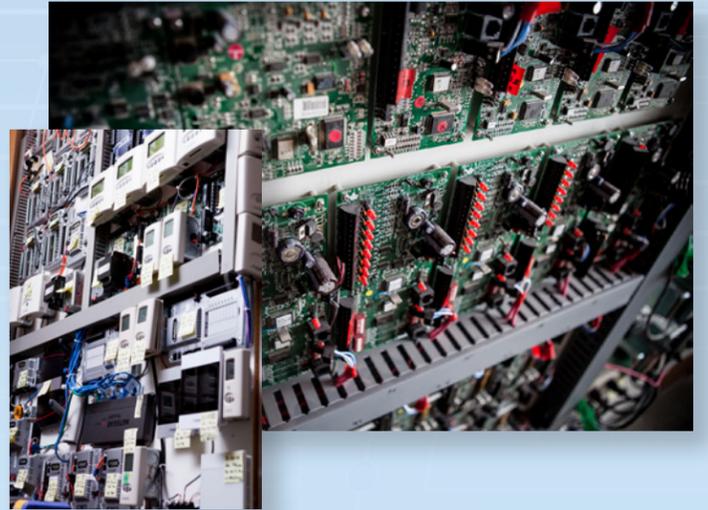
The QA Analyst organizes FST days for products as they near their release dates. The FST brings together all the QA Analysts and other personnel from R&D, Training, and Tech Comm departments to focus on regression testing.

Test Walls

QA uses several test platforms to ensure compatibility with all controllers and software, as well as stressing the products to ensure performance. The QA Test Wall contains at least one of each of the Reliable Controls controllers designed since the company’s inception in 1986.

The Test Wall is primarily used for automated firmware functionality and software functionality tests for all controller models in various networking configurations.

The R&D Test Wall is used by software developers



to test against controllers during development. It also contains all controller models and some third-party controllers.

A second test wall located on the mezzanine of HQ, called the *Mez Test Wall*, consists of a large MS/TP network with a mix of all MS/TP controllers. This test wall is primarily used for MS/TP stress testing.

The *Soak Test Wall* consists of at least one of every controller model and is primarily used for long term testing.

*The QA Test Wall demonstrates the **BACKWARD COMPATIBILITY** of the MACH-System™ paired with the BACnet® protocol, which enables users to connect all versions of controllers from the past **30+** years to native BACnet networking, to operate seamlessly with each other.*

The *12 MPC Test Wall* system consists of 12 MACH-ProCom™ controllers that can either be configured in one system or as 12 different systems and is used for Enterprise Schedule and RC-RemoteAccess® testing.

The *MPA Test Wall* consists of 100 MACH ProAir™ devices and is primarily used for Multicast OS-Send and Template testing.

The dedicated analysts in the QA department are familiar with the entire MACH-System™, and often provide overflow telephone technical support to customers. Reliable Controls has been providing Quality Assurance to the Authorized Dealer network for more than three decades now, helping to earn and sustain the reputation of having the most satisfied customers in the building automation industry.

SAULT STE. MARIE INTERNATIONAL BRIDGE PLAZA & CUSTOMS BUILDING

SAULT STE. MARIE, ON, CANADA

GOVERNMENT

OVERVIEW

The Sault Ste. Marie International Bridge Plaza and Customs Building (Canadian Customs) is situated on the border between Sault Ste. Marie, ON and Sault Ste. Marie, MI. The building houses the Canadian Border Security Agency, handling both commercial and general traffic.

PROJECT DETAILS

Reliable Controls Authorized Dealer, S&T Group Inc., successfully completed this project for Canadian Customs.

The networked hardware includes MACH-ProSys and MACH-ProCom controllers, which provide an IP backbone and the majority of the system points for mechanical equipment. MACH-ProZone and MACH-ProAir controllers communicate MS/TP back to the mechanical equipment that serves them. Third party devices communicate over a combination of MS/TP and IP devices.

Canadian Customs is comprised of two main buildings, each serviced by a dedicated hot water boiler system. Multiple air handling units provide cooling and hot water heating to VAV boxes serving the individual spaces. The VAV boxes also control radiant ceiling panels to provide additional heating. In-floor heat manifolds provide additional heating for public spaces and hot water force flow heaters top up entrance vestibules and doorways. Each building also has a dedicated VRF system providing heating and cooling for IT rooms, meeting rooms, and some offices.

The BACnet® protocol provides integration to lighting controls via a BACnet gateway and uses space occupancy sensors for HVAC occupancy detection.

This project was unique due to integrating multiple systems over various protocols and with varying capabilities and functionality, which creates a very diverse system. The combination of hot water heat, DX cooling and VRF systems allows for excellent temperature control and occupant comfort. The need to integrate with multiple unique systems and protocols brought many challenges to this project.

Power and gas metering was implemented to track and provide data for decreasing energy consumption and determining high usage trends and warnings. Occupancy sensors allow for shutdown of equipment on a per-space basis while maintaining occupant comfort in occupied areas.

The Sault Ste. Marie International Bridge Plaza and Customs Building benefitted from the flexibility of the MACH-System™ and its capabilities to accomplish very specific sequences of operations using a wide range of technologies while providing a seamless and accessible user interface.

To learn more about projects using Reliable Controls® visit
www.reliablecontrols.com/projects/overview

**PROJECT TYPE:**

New Construction

INSTALLATION TYPE:

Boiler, CO₂ Monitoring, Fan Coil Unit, Heatpump, HVA, Lighting, Power, VAV, Toxic Gas Monitoring (Carbon Monoxide and Nitrogen Dioxide)

TOTAL AREA:2,750 m² (29,601 ft²)**NETWORK:**

IEA-485, Ethernet, Fibreoptic, WAN, BACnet, SMTP, SNMP, Modbus

POINTS:

950

EQUIPMENT INSTALLED:

14 MACH-ProSys™
 1 MACH-ProWebCom™
 6 MACH-ProZone™
 25 MACH-ProAir™

RELIABLE CONTROLS® DEALER:

S&T Group, Inc.

