



**Bid 627**  
**New HVAC Modernization Project for (Both) Oxnard and Pacifica High Schools**

**BID CLARIFICATION ADDENDUM #1**

Dated: July 31<sup>st</sup>, 2020

*All interested parties seeking to submit responses to the Oxnard Union High School District's Bid #627 shall execute the certification at the end of this bid clarification and shall attach the bid clarification addendum to the documents submitted to the District.*

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The Oxnard Union High School District hereby amends **Bid 627 New HVAC Modernization Project for (Both) Oxnard and Pacifica High Schools** as follows:

1) Please see Attachment A for photos of existing roof conditions at Oxnard and Pacifica High Schools.

2) **Question: Signet Controls RFI #01:** Reference: 23 09 00 Direct DIGITAL Control System Specifications and Mechanical Drawings M5.xx indicates "Carrier iVu" as Basis of Design for the HVAC Controls System. Signet Controls would like to propose "Alerton", as a non-proprietary open protocol BACnet based control system to provide competitive bidding on the project and meet the CA Public funded contract law requirements.

Alerton Ascent BACnet system is compatible with the Carrier iVu system and complies with the Direct Digital Control System details provided in Specification section 230900. We have attached additional information regarding the proposed substitution product – **Alerton**.

We believe that by allowing Signet Controls to competitively bid on this project, the Oxnard High School District shall receive substantial savings and also a superior on the HVAC Controls System.

Our team is available to visit and coordinate with the Oxnard High School Facilities team and demonstrate the compatibility between the proposed Alerton and Carrier iVu Systems.

Please feel free to contact us for any additional information or supporting documentation you desire on this RFI / Bid Question.

**Answer:** Please see the response in Attachment B.

**3) Question: Next Level RFI #01; Reference: 23 09 00 Direct DIGITAL Control System**

Project Specification 23 09 00 states "Carrier OPEN BACnet Controls" as only Acceptable Manufacturer. Next Level EMS would like to propose "Siemens" BACnet, as alternate Open Controls for competitive bidding on the project. Attached is an overview and some technical details for the non-proprietary BACnet Siemens HVAC Controls System. Please confirm if Siemens is an acceptable manufacturer.

**Answer:** Please see the response in **Attachment C**.

**BIDDER'S CERTIFICATION**

**I acknowledge receipt of the foregoing Bid Clarification Addendum # 1 and accept all conditions contained herein.**

**Dated:** \_\_\_\_\_ **BIDDER:** \_\_\_\_\_  
(company/entity)

**By:** \_\_\_\_\_ **Printed Name:** \_\_\_\_\_  
(authorized representative signature)

**Title:** \_\_\_\_\_

# Attachment A

# Attachment B

# Attachment C

# Attachment A



(PRE-CON PHOTOS)  
OXNARD HIGH SCHOOL - BUILDING G



(PRE-CON PHOTOS)  
OXNARD HIGH SCHOOL - BUILDING G



(PRE-CON PHOTOS)  
OXNARD HIGH SCHOOL - BUILDING G



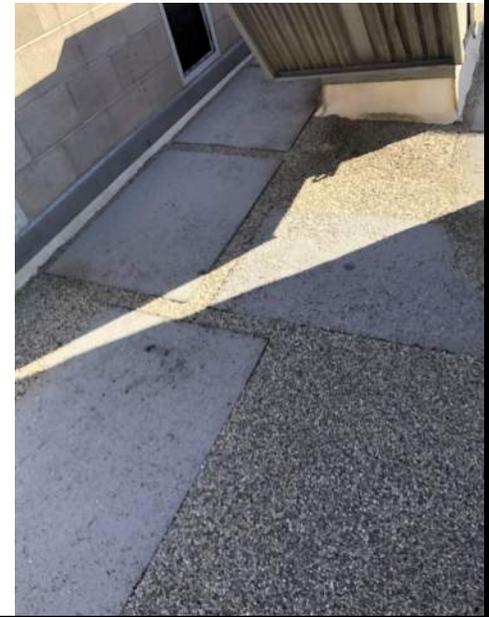
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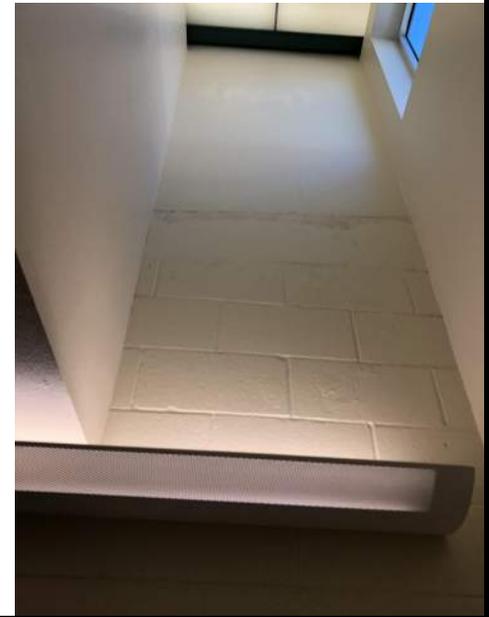


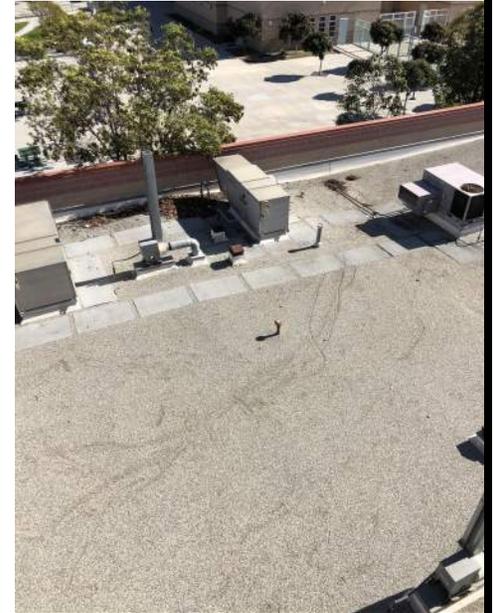
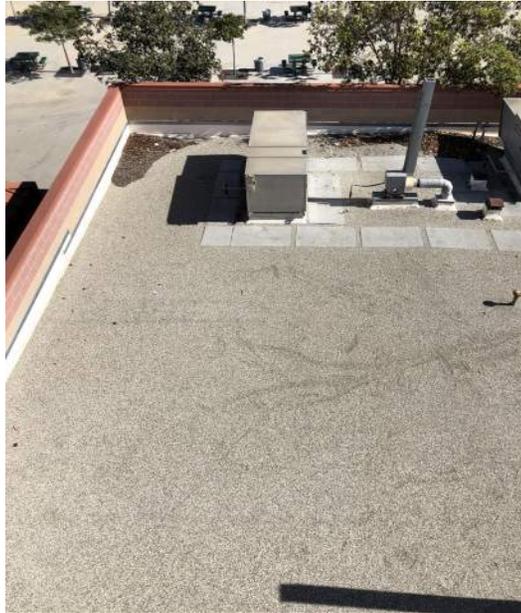
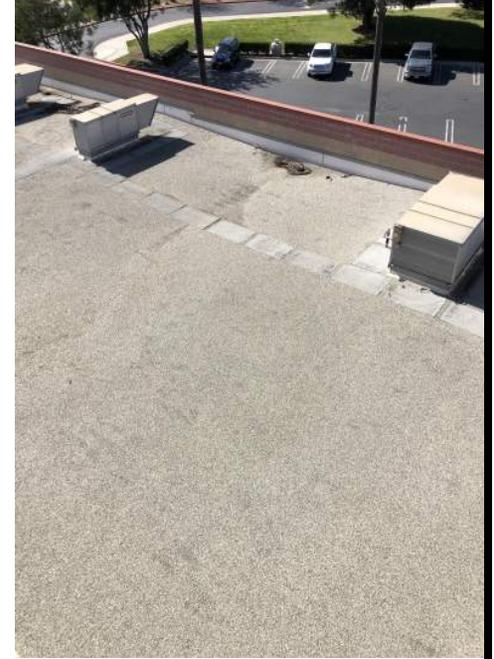
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OXNARD HIGH SCHOOL - BUILDING H



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OXNARD HIGH SCHOOL - BUILDING H







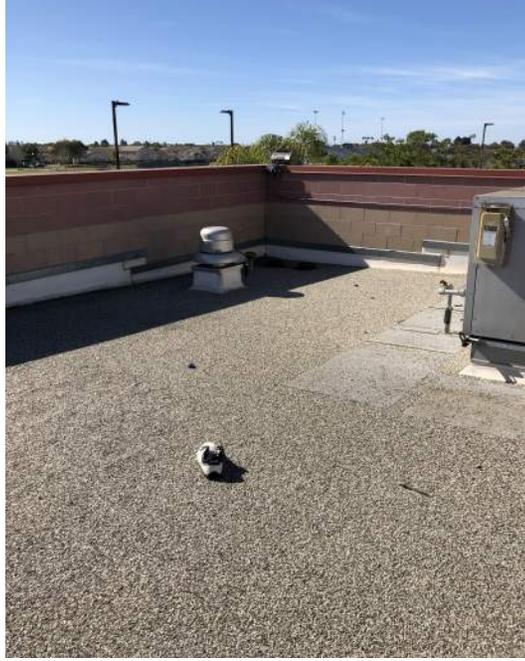
PACIFICA HIGH SCHOOL BUILDING B



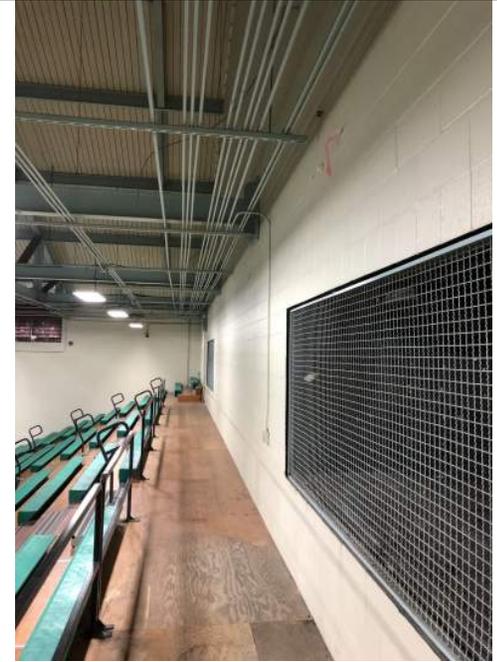
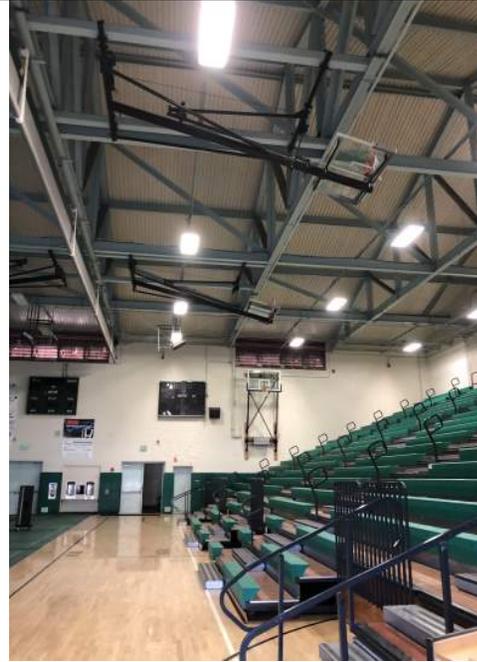
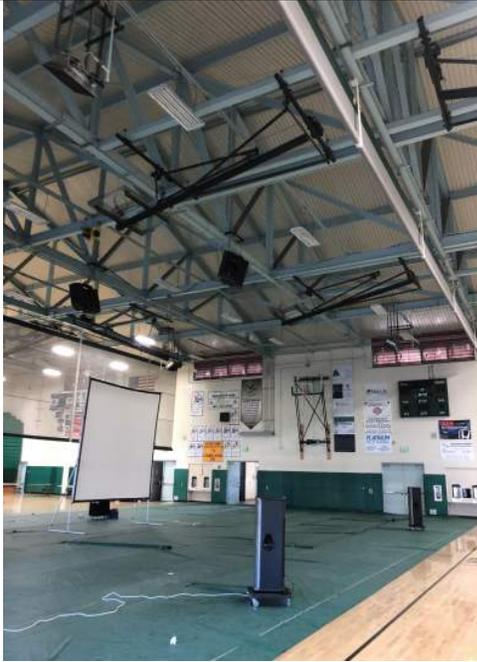


PACIFICA HIGH SCHOOL BUILDING B



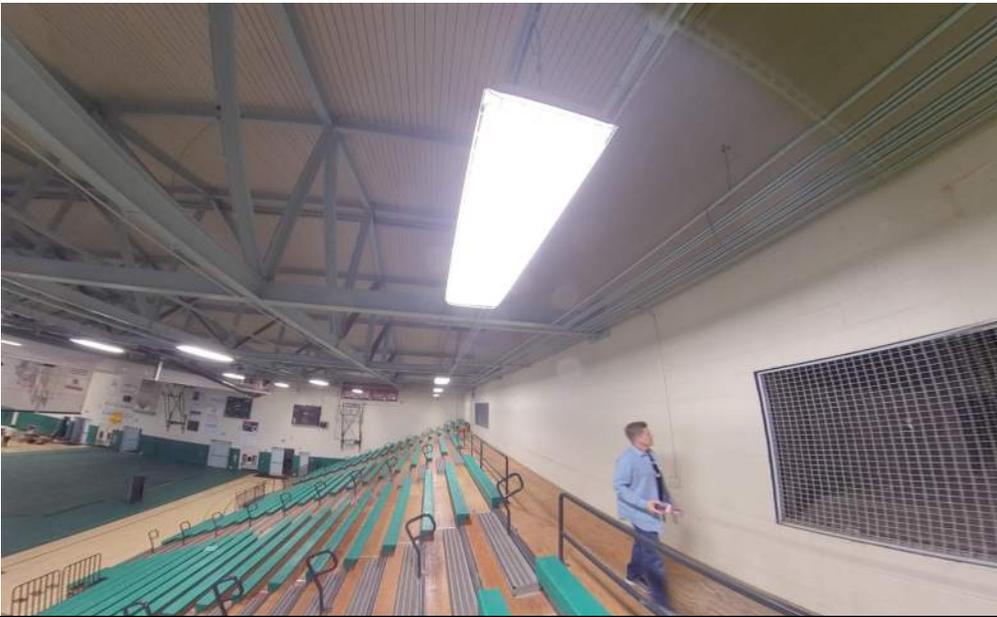






PACIFICA HIGH SCHOOL BUILDING D

PACIFICA HIGH SCHOOL BUILDING D







PACIFICA HIGH SCHOOL BUILDING E



PACIFICA HIGH SCHOOL BUILDING F





PACIFICA HIGH SCHOOL BUILDING H



PACIFICA HIGH SCHOOL BUILDING J

# Attachment B

## BID QUESTION

Job Name:	New HVAC Modernization for Oxnard and Pacifica High Schools (Both)	Project Bid #:	627
Contractor:	Signet Controls Inc.	Question #:	Signet-001
Requested By:	Navin Kashyap	Date:	07/09/2020
To:	Oxnard High School District & Bernards		
Attn:	Deanna Rantz @ <a href="mailto:Deanna.rantz@oxnardunion.org">Deanna.rantz@oxnardunion.org</a> ; Poul Hanson @ <a href="mailto:poul.hanson@oxnardunion.org">poul.hanson@oxnardunion.org</a> ; Karl Aldridge @ <a href="mailto:kaldridge@bernards.com">kaldridge@bernards.com</a> & Arvind Balaji @ <a href="mailto:abalaji@Bernards.com">abalaji@Bernards.com</a>		
Spec / Dwg #	Spec Section 23 09 00 – Direct Digital Controls System for HVAC / Drawings – MP5.xx Series		

### Description:

#### Direct Digital Controls System for HVAC

Specifications and Mechanical Drawings M5.xx indicates "Carrier iVu" as Basis of Design for the HVAC Controls System. Signet Controls would like to propose "**Alerton**", as a non-proprietary open protocol BACnet based control system to provide competitive bidding on the project and meet the CA Public funded contract law requirements.

Alerton Ascent BACnet system is compatible with the Carrier iVu system and complies with the Direct Digital Control System details provided in Specification section 230900. We have attached additional information regarding the proposed substitution product – **Alerton**.

We believe that by allowing Signet Controls to competitively bid on this project, the Oxnard High School District shall receive substantial savings and also a superior on the HVAC Controls System.

Our team is available to visit and coordinate with the Oxnard High School Facilities team and demonstrate the compatibility between the proposed Alerton and Carrier iVu Systems.

Please feel free to contact us for any additional information or supporting documentation you desire on this RFI / Bid Question.

### BQ / RFI Response:

Product is not sustainable or compatible to existing systems without adaptations. The use of tis product would create a huge cost burden and hardship on the district as an example redesign, additional training, additional staff, programming, monthly and service impacts. (Hardship) As previously responded this product is not acceptable alternative to the immediate projects design.

### Accepted:

General Cont.: \_\_\_\_\_ Date: \_\_\_\_\_

Arch/Eng: \_\_\_\_\_ Date: \_\_\_\_\_

Owner: **Karl P. Aldridge** Digitally signed by Karl P. Aldridge  
DN: C=US, E=Kaldridge@bernards.com,  
O=Bernards, CN=Karl P. Aldridge  
Date: 2020.07.09 17:07:12 -0700 \_\_\_\_\_ Date: 7/9/2020

Construction Manager and Representative

**ALERTON PRODUCT DATA**



 **ASCENT**  
BY ALERTON

Powered by BACtalk

Building Management Systems  
Full Product Line

**ALERTON**



*When climbing, it is essential to stay focused, maintain command, and always listen for guidance on the best path to follow.* The same is true for building management systems.

## Discover higher levels of efficiency, control and customer satisfaction with Alerton Ascent.

This innovative system was designed from the ground up with the building occupant, operator and owner in mind. The result is the pinnacle of building management—a system that delivers superior integration, design, efficiency, reliability, affordability, and usability.

Alerton Ascent is led by three key products: Ascent Compass software, the Ascent Control Module (ACM), and the Ascent Microset 4 Wall Sensor.

Are you ready to reach the peak of building performance?



## ASCENT COMPASS Software



### Every journey in the right direction starts with a compass.

Leading Alerton's Ascent product line, Compass is a powerful, dynamic interface enabling users to monitor and control their facilities from anywhere, at any time. It incorporates the latest browser technology and is truly the marriage of current technology and building automation. Ascent offers users an unparalleled user experience.

#### Top Compass features:

- Easy to learn and operate
- Real-world workflows help busy building operators save time and money
- HTML5 allows users to view web content on multiple devices without using Flash and third-party plug-ins
- Group navigation trees are fully customizable
- User interface Omnigraphics offers visual cues and simplifies system interaction



## Help your customers be more aware of their surroundings.

Part of Alerton's Ascent product line, the newly designed Microset 4 is like no other wall sensor on the market. It simultaneously displays room and outside air temperatures, relative humidity, fan status and CO<sub>2</sub>—all in a single, state-of-the-art sensor. The vivid touch screen, crisp edge-to-edge glass, small bezel, elegant layered construction, and quality stainless steel ventilation detail are all designed for aesthetic and durability.

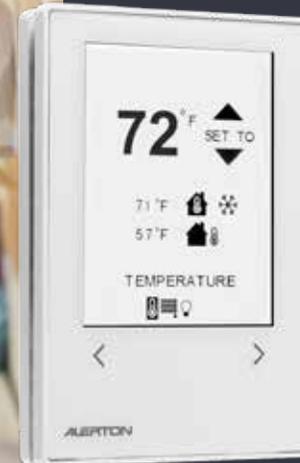
It all adds up to an aesthetically pleasing wall sensor with technical functionality that is second to none for all types of jobs, buildings and campuses.

### Top Microset 4 features:

- Sleek and modern, yet rugged, the Microset 4 complements any wall it's mounted on
- Intuitive touch screen user interface
- Innovative smart light shows system status at a glance
- Backwards compatibility allows owners to update the look of their building without large capital expenses
- CO<sub>2</sub> sensing and MS/TP versions provide flexibility and expanded functionality
- Built-in balance/calibration modes provide efficient and timely commissioning



## ASCENT MICROSET 4 Wall Sensor



## ASCENT CONTROL MODULE Global Controller



### Elevate your level of control with the Ascent Control Module (ACM)

The backbone of Alerton's Ascent product line, the Ascent Control Module (ACM) is the industry's most agile controller in its class. It combines Alerton's pioneering and proven BACnet prowess with Tridium's® Niagara Framework® flexibility.

The Ascent Control Module replaces the current BCM array—and the Alerton Integration Engine (AIE)—by providing a powerful assortment of features, such as multiple global controller instances, and multiple communication networks. The ACM is ideal for retrofit applications, new construction jobs, projects where BACnet is built-in, and installations where integration protocols are used. Simply put, the ACM is one of the most powerful and versatile controllers on the market.

#### Top Control Module features:

- Offers/provides a Niagara® station and a Alerton BACnet global controller to provide twice the programming options to fit virtually any project
- Quad core processor for faster computing power, communication, and control
- 6 global controller instances and 6 MS/TP trunks; one device exceeds the functionality of 6 individual devices
- Virtually limitless number of alarms, schedules and trendlogs
- Option cards offer scalability for additional communication trunks and protocols

# Attachment B



*Get peak performance from any kind or size of building. Our experience includes mission critical facilities, data center, labs, K-12 school districts, university campuses, airports, government facilities, high-rise office buildings, and hotels.*  
**Alerton Ascent rises to any challenge.**





Powered by BACtalk

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# ALERTON



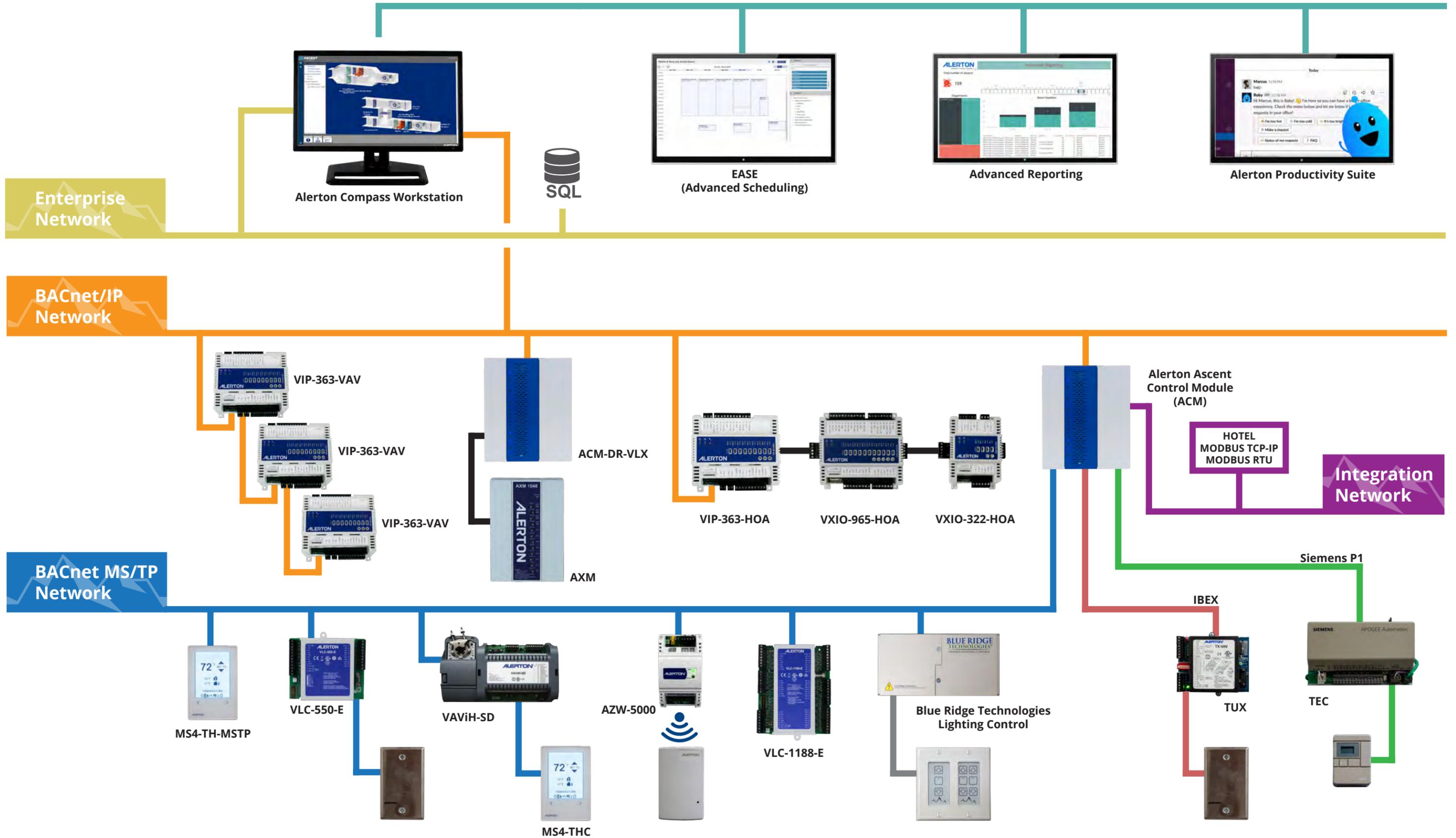
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Architecture

REACH THE PEAK OF BUILDING PERFORMANCE

**ARCHITECTURE**



# K-12 SCHOOLS

## BEST IN CLASS PERFORMANCE SO STUDENTS CAN THRIVE



### **ALERTON UNDERSTANDS THE LINK BETWEEN THE PHYSICAL ENVIRONMENT AND STUDENT ACHIEVEMENT.**

Maintaining schools is challenging. You must provide students and faculty with a safe, comfortable and positive environment. Yet you are expected to do so with tighter budgets, while providing accountability to parents, elected officials and the school board. Adaptable, comprehensive and flexible, Alerton Ascent provides maximum building performance with minimal effort. We ensure each learning, administrative or recreation area on campus offers the ideal environment for your students, faculty and administration.

Alerton Ascent provides:

- Multi-Building Scheduling
- Centralized Monitoring
- Remote Access Capability, Wide-Area Network Support
- Maintenance Management
- Energy Conservation Demand Limiting/ Management
- Lighting/Irrigation Control
- Central Plant Management
- Indoor Air Quality
- Life Safety/Security Integration
- Partnership with Energy Services Companies

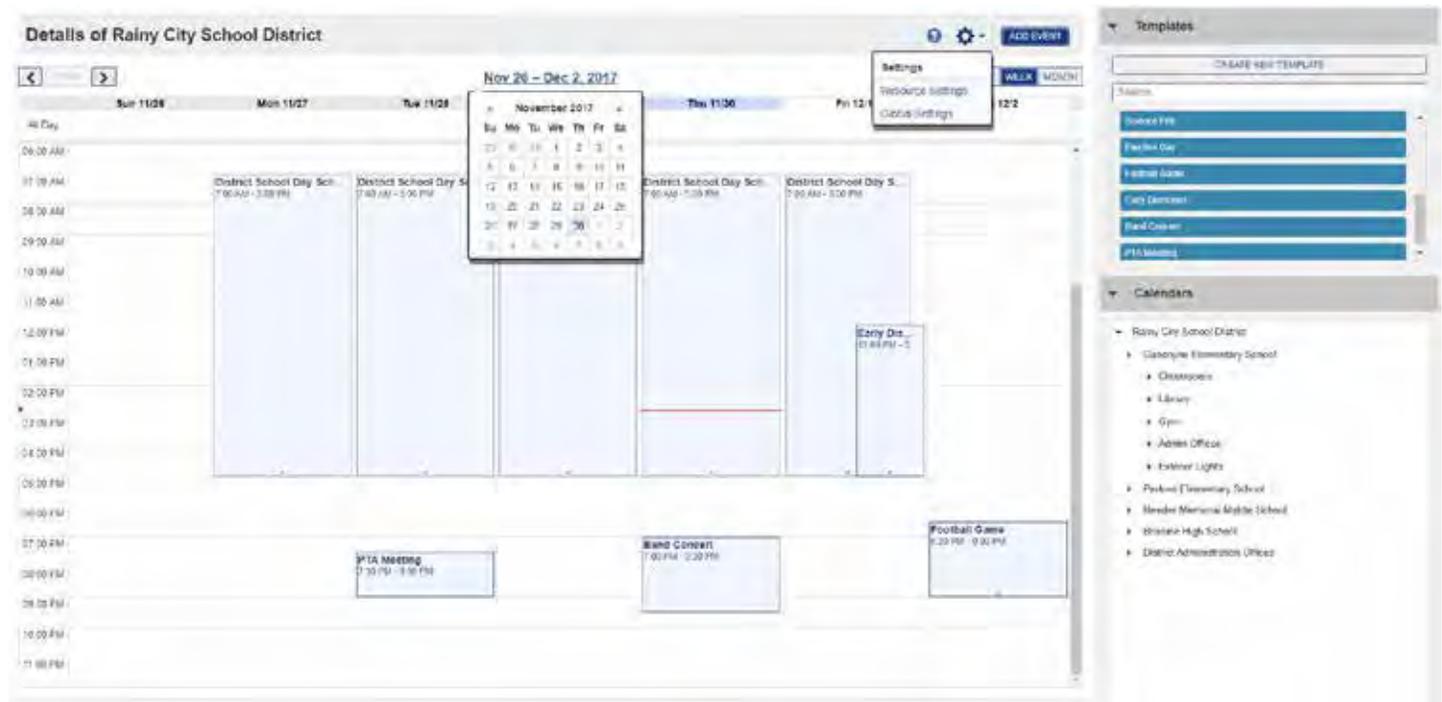


# **ALERTON**

Inspiration. Innovation. Integration.

## MANAGE COMPLEX SCHEDULING TASKS WITH EASE (EVENT ASSIST SCHEDULING ENGINE, ALERTON'S ADD-ON ADVANCED SCHEDULING FEATURE) IN ONE SCHOOL OR ACROSS AN ENTIRE DISTRICT OR CAMPUS.

Modify precise temperature and humidity settings in science and computer labs, libraries, cafeterias and classrooms. Scheduling with EASE improves facility manager productivity and reduces labor costs: holidays, short days, sporting and special events, evening classes and summer sessions, and create templates for ad hoc days like a "snow day" — can all be completed in advance.



Navigate through all locations and dates with EASE Schedules show both the event and any offsets for optimum start and end times for energy efficiency.

## CHOOSE A HIGHER GRADE OF AUTOMATION AND CONTROL FOR YOUR FACILITIES.

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Alerton dealers have mastered the ABCs of engineering, installation, integration, service and support. Your local Alerton sales and service team works with you to create and maintain systems tailored to meet your school's unique needs. Alerton providers will earn your business by listening to your concerns and responding with personal attention, innovative solutions and flexible support options. We also offer specialized, hands-on training to achieve maximum performance from your buildings.



## COMPASS™ SOFTWARE

Part of Alerton’s BACtalk™ Ascent product line, Compass is a comprehensive, powerfully designed product that replaces Alerton Building Suite and Envision for BACtalk as the operator workstation of the future.

Use of informative display layers with an improved tree-style navigation structure provides intuitive and guided browsing sessions. User-specific and group-specific navigation enforces access privileges and streamlines the user experience.

Graphical controls bring data to life. OmniGraphic images transform background images into interactive controls to visually communicate system status. Plus, with Alerton’s OmniZoon, graphics automatically adjust to monitor display size for better visibility and system management.

Compass provides a familiar user experience through a standard user interface, enabling you to get users quickly up to speed on the software and your building’s systems. Plus, with improved localization features, multiple Web-UI users can connect to the same Compass System using their native language and comfortable numeric formats.

Build dynamic graphics faster and easier with Compass’ updated isometric graphics library. This library also serves as a foundation for users to build their own libraries. Compass supports many graphic formats and sizes and easily converts Alerton legacy graphics (bitmaps) to HTML 5 format, enabling you to quickly integrate graphical content to the web without using Flash and third-party plug-ins.

**Note:** Compass with the SQL option supports the Alerton Engineering Services (AES) energy dashboard. An AES-built dashboard can help track energy usage and cost savings and can be customized for specific applications. For more information about AES services, email [aes@alerton.com](mailto:aes@alerton.com).

## FEATURES AND HIGHLIGHTS

### ENERGY MANAGEMENT

- Efficient equipment start times, sophisticated load optimization, and energy use monitoring that helps you track savings.

### EASY TO USE

- Configurable, tree-style navigation.

### TENANT ACTIVITY

- Detect and log after-hours tenant override activity, then generate appropriate tenant bills.

### FLEXIBLE

- Converts legacy displays and graphics to current standard file formats.

### DYNAMIC

- Create systems that are easy to upgrade and improve.

## TECHNICAL DATA

### CONNECTIVITY

**NETWORK** BACnet Ethernet, Annex J BACnet/IP.

### COMPUTER REQUIREMENTS

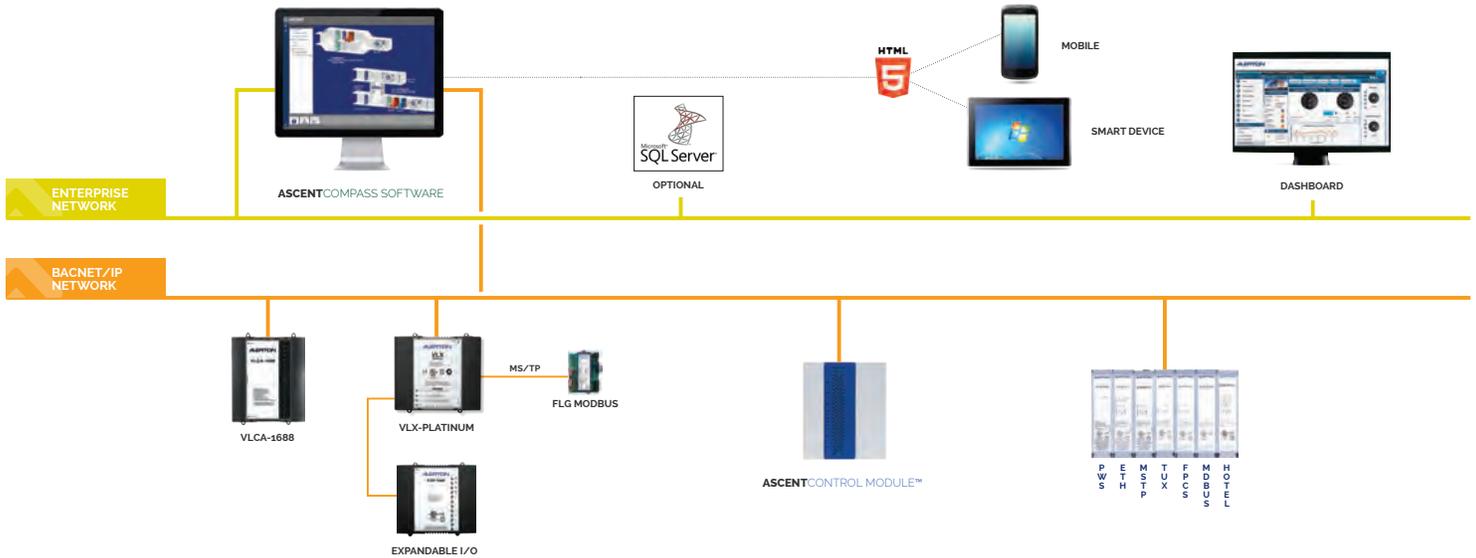
See the table below to determine minimum computer specifications for the primary Compass workstation. Additional memory is recommended for projects that have many concurrent users, displays, or templates.

For example, a project that has ten or more users and 100 or more displays and templates may need additional memory. For Compass client workstations, use a computer with a dual-core processor and at least 4GB RAM.

Compass Model	BACnet Devices	Operating System	CPU Cores	Memory
COMPASS-1-ENT	up to 3000*	64-bit	Eight-core	16GB
COMPASS-1-XL	up to 1000	Win7	Quad-core	8GB
COMPASS-1-LG	up to 450	Win8, Win8.1	Quad-core	8GB
COMPASS-1-MD	up to 150	Win10	Quad-core	8GB
COMPASS-1-SM	up to 50	Win Server 2012	Dual-core	4GB
			Dual-core	4GB

\*NOTE: The number of supported devices in the Enterprise model can be extended in 1000 device increments by applying one or more device packs (COMPASS-1-ENTDP).

Specifications subject to change without notice.



## ENERGY

**TRENDLOGS** View trendlogs in graph or text format with multiple points per log. Archived in database format for compatibility with office applications.

**ENERGY LOGS** Hourly or daily energy use and demand displayed in text format. Archived in database format for compatibility with office applications.

**DEMAND LIMITING** Flexible demand metering supports various media. Shed and restore binary and analog loads according to load priority. Base strategies on time of day or season. View results in real time.

**MANAGEMENT** A wide range of building management tools are available, including:

- Display capability
- Scheduling
- Alarms
- Optimum start
- Tenant activity
- Zones
- Reporting and printing
- Auto archiving
- Job merge

## ORDERING INFORMATION\*

### ITEM NUMBER

COMPASS-1-ENT	Enterprise license, up to 3000 devices + SQL support
COMPASS-1-XL	Extra Large license, up to 1000 devices + SQL support
COMPASS-1-LG	Large license, up to 450 devices
COMPASS-1-MD	Medium license, up to 150 devices
COMPASS-1-SM	Small license, up to 50 devices
COMPASS-1-SQL	SQL support add-on for COMPASS-1-SM/MD/LG
COMPASS-1-ENTDP	Add-on for Enterprise license only (COMPASS-1-ENT) to support an additional 1,000 devices

**\*IMPORTANT!** Please see the Compass Installation and Upgrade Guide (LT-COMPASSIUG) for more information about Compass licensing, including part numbers for upgrading to Compass from EBT or ABS, Host IDs, and procedures for installing software license keys.

**FLEXIBLE,  
POWERFUL  
SOFTWARE FOR  
BACNET-BASED  
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MANAGEMENT  
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## ACM GLOBAL CONTROLLER

The backbone of Alerton's BACtalk™ Ascent product line, the Ascent Control Module (ACM) is the industry's most agile controller in its class. It combines Alerton's pioneering and proven BACnet® capability with Tridium's® Niagara Framework® flexibility.

It provides a powerful assortment of features such as multiple global controller instances, and multiple communication networks.

The ACM can incorporate up to six (6) global controller instances and supports up to six (6) MS/TP trunks or EIA-485 LANs, consolidating the functionality of these controllers into a single configurable platform, and exceeding the functionality of six individual devices.

Two onboard Ethernet ports support 10/100/1000 Mbps Ethernet connections to the BACnet network, Modbus TCP or for NiagaraAX integration protocols such as LON IP and SNMP.

Easy to add option cards offer scalability for additional communication trunks as needed using the two slots available on the ACM. For example, you can use one option card slot for additional BACnet communication and the second card slot for LON communication by simply adding a dual 485 card and a LON card, respectively. Or you can use up to four card slots to support applications with large point count requirements for a central plant.

The ACM's quad-core processor future-proofs the system by providing high DDC execution speed for all the computing power you need. Two-direction DIN channel and direct panel mount options enable you to mount the ACM in different positions for the best fit.

The ACM hosts automation features such as schedules, trendlogs, alarms, zones and demand limiting.

## FEATURES AND HIGHLIGHTS

### SCALABLE

- Supports up to six EIA-485 LANs; two EIA-232 connections; two LON LANs; four TUX trunks; or 4 EXP trunks.

### INTEROPERABLE

- Supports the BACnet Protocol on Ethernet, BACnet IP, and MS/TP; Modbus TCP and RTU (EIA-485 and EIA-232); Alerton TUX, Alerton EXP, as well as many Niagara supported protocols.

### ENTERPRISE READY

- Supports BACnet/IP and can operate as a BACnet broadcast management device (BBMD) with NAT support for integration on enterprise and wide-area networks.

### POWERFUL

- Advanced processor and extended memory provide a fast, reliable platform for running DDC programming and global automation routines.

### SEGMENTED DDC CODE

- Allows multiple DDC program instances to run within a single controller, providing the ability to logically group sub-systems, improve uptime by enabling service on one system without impacting another, and maximizing flexibility in programming configuration.

## TECHNICAL DATA: ACM

**POWER** 20-30 VAC @ 40 VA, 47–63 Hz, full-wave rectified, with optional battery backup (see other side).

**DATA BACKUP/STORAGE** One removable microSD card.

**PROCESSOR AND MEMORY** Efficient, high-speed, quad-core CPU based on the ARM® Cortex™-A9 architecture (Freescale i.MX6Quad); 1GB DDR3 SDRAM, 64-bit-wide, 533 MHz (1066 MT/s).

**REAL-TIME CLOCK** Provides system date and time.

**BACNET/IP** IP support for interoperability on enterprise and WANs. Functions as up to four BACnet broadcast management devices (BBMDs) in accordance with Annex J BACnet/IP. Supports both Alerton and BACnet Standard network address translation (NAT) implementations.

**MS/TP** Supports two onboard networks that can be used for BACnet MS/TP or EIA-485 and up to two expansion cards (two networks each) for a maximum of six BACnet MS/TP networks per ACM.

**MODBUS** supports both TCP and RTU (EIA-485 and EIA-232) protocols; configuration supports up to 384 Modbus devices.

**TUX** Supports up to four Alerton TUX trunks for connection of up to 64 TUXs per trunk communicating at 4800/9600 baud or up to 32 TUXs per trunk communicating at 1200 baud. Each TUX Option Card has two TUX trunks.

**VLX/EXP** Supports up to four instances of the VLX application; one instance is included with the ACM.

**EXPANSION** Supports up to two expansion cards for interface adapters, such as EIA-485, EIA-232, LON, and TUX.

**COMMUNICATIONS** Provides two Ethernet ports, two onboard EIA-485 networks, two expansion card slots give the ability to add up to four additional EIA-485 networks (for a total of six), or two EIA-232 connections, or two LONworks networks, or up to four TUX Trunks.

**MOUNTING** 35mm DIN rail, either vertical or horizontal orientation.

**DIMENSIONS** 7-1/4 W x 8-9/16 H x 1-11/16 D (inches)  
185 W x 220 H x 44 D (millimeters); fits 12 x 12 x 4 (inch) panel enclosure.

**ENVIRONMENTAL** Without battery:  
-4 to 149 °F (-20 to 65 °C), 0 to 95% RH, non-condensing.  
Storage Temperature:  
-4 to 185 °F (-20 to 85 °C), 0 to 95% RH, non-condensing.

**PLATFORM** Linux.

**ETHERNET** Two integrated 8P8C modular connectors for use with two 10Base-T, 100Base-TX, and 1000Base-T Ethernet networks.

**SOFTWARE** Programming interface is Alerton Compass operator workstation software. Niagara AX 3.8.

#### CERTIFICATIONS AND STANDARDS

- RoHS compliant
- CE (EN 60730-1)
- FCC Part 15 Class B
- ICES-003
- C-Tick listed
- UL 916 for open energy management equipment.

#### TECHNICAL DATA: ACM BATTERY

The ACM has an optional 12 volt NiMH battery, which provides backup power that allows for orderly shutdown should power remain OFF for more than 60 seconds.

**POWER** 12VDC supply voltage

#### ENVIRONMENTAL

Operational temperature and humidity:  
32 to 122 °F (0 to 50 °C), 0 to 95% RH, non-condensing  
Recommended storage temperature and humidity (to extend life):  
41 to 77 °F (5 to 25 °C), RH 65% ±5% non-condensing  
Allowed storage temperature and humidity:  
32 to 122 °F (0 to 50 °C), RH 5 to 95% non-condensing

#### CERTIFICATIONS AND STANDARDS

- UL 2054 ed 2 rev 2011-09-14
- EN 62133 ed 1 (2002), ed 2 (2012)

#### TECHNICAL DATA: TUX OP

Each card has two TUX trunks - a total of four TUX trunks can be added in an ACM.

#### ENVIRONMENTAL

Operational temperature and humidity:  
-4 to 149 °F (-20 to 65 °C), 5 to 95% RH, non-condensing  
Storage temperature and humidity:  
-40 to 149 °F (-40 to 65 °C), 5 to 95% RH, non-condensing

#### CERTIFICATIONS AND STANDARDS

- (Same as ACM)

#### ORDERING INFORMATION\*

##### ITEM NUMBER

ACM	Ascent Control Module
ACM-BATT	Optional ACM battery
ACM-OC-2X485	Dual EIA-485 option card
ACM-OC-232	EIA-232 option card
ACM-OC-LON	78kbps FTT10A LON option card
ACM-OC-2XTUX	Dual TUX Trunk option card
ACM-MDBS-DR-TCP	Alerton Modbus TCP protocol driver
ACM-MDBS-DR-RTU	Alerton Modbus RTU protocol driver
ACM-DR-VLX	Alerton VLX driver

**\*IMPORTANT!** Requires at least one base device license, Alerton (ACM032, ACM064, ACM128, ACM256, ACM384) or Niagara AX (AX016, AX032, AX064, AX128, AX256). Add-on Device packs also available for both Alerton and Niagara AX base licenses.

For a list of supported Niagara AX protocols, please consult you local Alerton authorized dealer.

*Specifications subject to change without notice.*

**INNOVATIVE  
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WITH EXTENSIVE  
FLEXIBILITY.**

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The Alerton® VisualLogic® VLC-1188-E is a versatile, BACnet-compliant, fully programmable field controller designed for central plant systems, air handling units, clean rooms, fume hoods, large terminal units, and similar control and process equipment. As a native BACnet controller, it integrates seamlessly with your BACnet system, communicating at up to 115 Kbps on a BACnet MS/TP LAN.

The VLC-1188-E supports the Alerton Microtouch™, as well as the BACtalk® Microset, Microset II, and Microset 4 intelligent wall sensors, which offer convenient data display, setpoint adjustment, and technician access to equipment setup parameters.

All VLC-1188-E control logic is programmed using Alerton's easy-to-learn graphical programming language, VisualLogic™. Programming and setup data is stored in non-volatile flash memory, ensuring stable and reliable operation.

High-resolution 16-bit universal inputs are auto-selectable for thermistor, dry contact, pulse, 0-5 V, 0-10 V, or 4-20 mA. High-resolution 16-bit analog outputs are auto-selectable for 0-10 V or 0-20 mA.

## VISUALLOGIC® UNITARY FIELD CONTROLLER

### FEATURES AND HIGHLIGHTS

- Fully BACnet-compliant on MS/TP LAN at up to 115.2 Kbps.
- Programmable control logic can be field-modified.
- Downloadable operating code to allow for future software improvements.
- 32-bit processor architecture with all program data backed up in nonvolatile flash memory.
- High-speed processing of DDC program, with an internal logical loop time of 100 msec.
- Backwards compatible with older VLC-1188 and VLC-1188C3 models.

### APPLICATIONS

Recommended for control in central plant systems, heat pumps, air handling units, clean rooms, fume hoods, and large terminal units.



### VLC-1188-E

UI	HBO	GB0	RO	AO	AF	F
UNIVERSAL INPUTS	HOT SWITCHED TRIAC BINARY OUTPUTS	GROUND SWITCHED BINARY OUTPUTS	RELAY OUTPUT	ANALOG OUTPUTS	AIR-FLOW SENSOR	FILTER
11	8	0	0	8	-	-

**TECHNICAL DATA**

**POWER** – 24 VAC @ 50-60 Hz. 28 VA minimum (maximum 100 VA across all BO loads). Half-wave rectified. See IMPORTANT NOTE below.

**INPUTS** – 16-bit universal inputs accept 3k (Ibex) or 10k thermistor (type II), dry contact, 0-20 mA, 0-10V, 0-5V, or dry-contact pulse. External 250-ohm resistor required for 0-20 mA inputs. Pulse input maximum frequency of 100 Hz. Pulse input minimum duty cycle 5mS ON / 5mS OFF (pulse input not supported on IN-0).

**POWER OUTPUT FOR EXTERNAL SENSORS** – 20 VDC  $\pm 10\%$  @ 100 mA maximum

**BINARY OUTPUTS** – Triacs rated 24 VAC @ 50/60 Hz, 500 mA continuous and 800 mA (AC rms) for 60 milliseconds. See IMPORTANT NOTE below.

**ANALOG OUTPUTS** – 16-bit universal analog outputs support Voltage Mode: 0-10 VDC @ 10 mA maximum (1k ohm minimum); Current Mode: 4-20 mA @ 550 ohms Maximum.

**MICROSET** – Supports BACtalk<sup>®</sup> Microset<sup>™</sup>, Microset II, or Microset 4 on input 0 (IN-0).

**INPUT/OUTPUT TERMINATIONS** – Removable header-type screw terminals accept 14-24 AWG wire

**MAX DIMENSIONS** – 7.0" (178mm) H x 5.0" (127mm W x 1.5" (38mm) D

**MOUNTING** – Screw mounting

**ENVIRONMENTAL** – 0 to 158°F (-17 to 70°C) / 5 to 95%RH, non-condensing

**COMMUNICATIONS** – EIA-485 (RS-485) over twisted shielded-pair (TSP); auto-baud switching (9.6kbps, 19.2kbps, 38.4kbps, 76.8kbps, or 115.2kbps); communication status LED.

**PROTOCOLS** – BACnet MS/TP (master)

**PROGRAMMING** – Supports Alerton's BD4 DDC file format using Alerton's VisualLogic<sup>®</sup> toolset.

**MICROPROCESSOR** – 32-bit ARM Cortex-M4F, 80 MHz

**MEMORY** – 512 MB non-volatile flash.

**SECURITY** – Integrated secure boot prevents loading of tampered firmware.

**ORDERING INFORMATION****ITEM NUMBER**

VLC-1188-E ALERTON VISUALLOGIC  
CONTROLLER BACNET

**CERTIFICATION AND CONFORMANCE**

**BACNET CONFORMANCE** – An application specific controller (ASC) level device; tested and approved by BTL. See Protocol Implementation Conformance Statement (PICS). BTL Listing and compliance is pending.

**UL** – Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916; listing includes both U.S. and Canadian certification.

**EMC** – EMC Directive 89/336/EEC (European CE Mark).

**FCC** – FCC Part 15, Subpart J, Class A.

**IMPORTANT NOTE:**

This device is UL listed and limited to 100VA maximum. Binary output loads are restricted by this maximum VA rating. If all 8 binary outputs are connected and fully loaded (@12VA each) the total VA of the device will exceed the UL listed and limited maximum rating. DO NOT EXCEED 100VA MAXIMUM RATING!



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The Alerton® VisualLogic® VLC-853-E is a versatile, BACnet-compliant, fully programmable field controller designed for central plant systems, air handling units, clean rooms, fume hoods, large terminal units, and similar control and process equipment. As a native BACnet controller, it integrates seamlessly with your BACnet system, communicating at up to 115 Kbps on a BACnet MS/TP LAN.

The VLC-853-E supports the Alerton Microtouch™, as well as the BACtalk® Microset, Microset II, and Microset 4 intelligent wall sensors, which offer convenient data display, setpoint adjustment, and technician access to equipment setup parameters.

All VLC-853-E control logic is programmed using Alerton's easy-to-learn graphical programming language, VisualLogic™. Programming and setup data are stored in non-volatile flash memory, ensuring stable and reliable operation.

High-resolution 16-bit universal inputs are auto-selectable for thermistor, dry contact, pulse, 0-5 V, 0-10 V, or 4-20 mA.

High-resolution 16-bit analog outputs are auto-selectable for 0-10 V or 0-20 mA.

## VISUALLOGIC® UNITARY FIELD CONTROLLER

### FEATURES AND HIGHLIGHTS

- Fully BACnet-compliant on MS/TP LAN at up to 115.2 Kbps.
- Programmable control logic can be field-modified.
- Downloadable operating code to allow for future software improvements.
- 32-bit processor architecture with all program data backed up in nonvolatile flash memory.
- High-speed processing of DDC program, with an internal logical loop time of 100 msec.
- Backwards compatible with older VLC-853 and VLC-853C3 models.

### APPLICATIONS

Recommended for central plant systems, air handling units, large terminal units, and similar control and process equipment.



### VLC-853-E

UI	HBO	GB0	RO	AO	AF	F
UNIVERSAL INPUTS	HOT SWITCHED TRIAC BINARY OUTPUTS	GROUND SWITCHED BINARY OUTPUTS	RELAY OUTPUT	ANALOG OUTPUTS	AIR-FLOW SENSOR	FILTER
8	5	0	0	3	-	-

**TECHNICAL DATA**

**POWER** – 24 VAC @ 50-60 Hz. 15 VA minimum (maximum 97 VA with loads). Half-wave rectified.

**INPUTS** – 16-bit universal inputs accept 3k (Ibex) or 10k thermistor (type II), dry contact, 0-20 mA, 0-10V, 0-5V, or dry-contact pulse. External 250-ohm resistor required for 0-20 mA inputs. Pulse input maximum frequency of 100 Hz. Pulse input minimum duty cycle 5mS ON / 5mS OFF (pulse input not supported on IN-0).

**POWER OUTPUT FOR EXTERNAL SENSORS** – 20VDC ±10% @100 mA maximum

**BINARY OUTPUTS** – Triacs rated 24 VAC @ 50/60 Hz, 500 mA continuous and 800 mA (AC rms) for 60 milliseconds.

**ANALOG OUTPUTS** – 16-bit universal analog outputs support Voltage Mode: 0-10VDC @ 10 mA maximum (1k ohm minimum); Current Mode: 4-20 mA @ 550 ohms Maximum.

**MICROSET** – Supports BACtalk® Microset, Microset II, or Microset 4 on input 0 (IN-0).

**INPUT/OUTPUT TERMINATIONS** – Removable header-type screw terminals accept 14-24 AWG wire.

**MAX DIMENSIONS** – 4.9" (125mm) H x 5.4" (137mm) W x 1.4" (36mm) D

**MOUNTING** – Screw mounting

**ENVIRONMENTAL** – 0 to 158°F (-17 to 70°C) / 5 to 95%RH, non-condensing

**COMMUNICATIONS** – EIA-485 (RS-485) over twisted shielded-pair (TSP); auto-baud switching (9.6kbps, 19.2kbps, 38.4kbps, 76.8kbps, or 115.2kbps); communication status LED.

**PROTOCOLS** – BACnet MS/TP (master)

**PROGRAMMING** – Supports Alerton's BD4 DDC file format using Alerton's VisualLogic® toolset.

**MICROPROCESSOR** – 32-bit ARM Cortex-M4F, 80 MHz

**MEMORY** – 512 MB non-volatile flash.

**SECURITY** – Integrated secure boot prevents loading of tampered firmware.

**ORDERING INFORMATION****ITEM NUMBER**

VLC-853-E ALERTON VISUALLOGIC  
CONTROLLER BACNET

**CERTIFICATION AND CONFORMANCE**

**BACNET CONFORMANCE** – An application specific controller (ASC) level device; tested and approved by BTL. See Protocol Implementation Conformance Statement (PICS). BTL Listing and compliance is pending.

**UL** – Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916; listing includes both U.S. and Canadian certification.

**EMC** – EMC Directive 89/336/EEC (European CE Mark).

**FCC** – FCC Part 15, Subpart J, Class A.



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The Alerton® VisualLogic® VLC-550-E is a versatile, BACnet-compliant, fully programmable field controller designed for fan coils, a/c-units, heat pumps, and other terminal unit applications. As a native BACnet controller, it integrates seamlessly with your BACnet system, communicating at up to 115 Kbps on a BACnet MS/TP LAN.

The VLC-550-E supports the Alerton Microtouch™, as well as the BACTalk® Microset, Microset II, and Microset 4 intelligent wall sensors, which offer convenient data display, setpoint adjustment, and technician access to equipment setup parameters.

All VLC-550-E control logic is programmed using Alerton's easy-to-learn graphical programming language, VisualLogic™. Programming and setup data are stored in non-volatile flash memory, ensuring stable and reliable operation.

High-resolution 16-bit universal inputs are auto-selectable for thermistor, dry contact, pulse, 0-5 V, 0-10 V, or 4-20 mA.

## VISUALLOGIC® UNITARY FIELD CONTROLLER

### FEATURES AND HIGHLIGHTS

- Fully BACnet-compliant on MS/TP LAN at up to 115.2 Kbps.
- Programmable control logic can be field-modified.
- Downloadable operating code to allow for future software improvements
- 32-bit processor architecture with all program data backed up in nonvolatile flash memory.
- High-speed processing of DDC program, with an internal logical loop time of 100 msec.
- Backwards compatible with older VLC-550 and VLC-550C3 models.

### APPLICATIONS

Recommended for unit ventilator and fan-coil applications, or any application that requires multi-speed fan or motor control.

VLC-550-E						
<b>UI</b> UNIVERSAL INPUTS	<b>HBO</b> HOT SWITCHED TRIAC BINARY OUTPUTS	<b>GB0</b> GROUND SWITCHED BINARY OUTPUTS	<b>RO</b> RELAY OUTPUT	<b>AO</b> ANALOG OUTPUTS	<b>AF</b> AIR-FLOW SENSOR	<b>F</b> FILTER
<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>

**TECHNICAL DATA**

**POWER** – 24 VAC @ 50-60 Hz. 9 VA minimum (maximum 90 VA with loads). Half-wave rectified.

**INPUTS** – 16-bit universal inputs accept 3k (Ibex) or 10k thermistor (type II), dry contact, 0-20 mA, 0-10V, 0-5V, or dry-contact pulse. External 250-ohm resistor required for 0-20 mA inputs. Pulse input maximum frequency of 100 Hz. Pulse input minimum duty cycle 5mS ON / 5mS OFF (pulse input not supported on IN-0).

**POWER OUTPUT FOR EXTERNAL SENSORS** – 20 VDC ±10% @ 100 mA maximum

**BINARY OUTPUTS** – Triacs rated 24 VAC @ 50/60 Hz, 500 mA continuous and 800 mA (AC rms) for 60 milliseconds.

**MICROSET** – Supports BACtalk® Microset, Microset II, or Microset 4 on input 0 (IN-0).

**INPUT/OUTPUT TERMINATIONS** – Removable header-type screw terminals accept 14-24 AWG wire.

**MAX DIMENSIONS** – 4.9" (125mm) H x 5" (127mm) W x 1.4" (36mm) D

**MOUNTING** – Screw mounting

**ENVIRONMENTAL** – 0 to 158°F (-17 to 70°C) / 5 to 95%RH, non-condensing

**COMMUNICATIONS** – EIA-485 (RS-485) over twisted shielded-pair (TSP); auto-baud switching (9.6kbps, 19.2kbps, 38.4kbps, 76.8kbps, or 115.2kbps); communication status LED.

**PROTOCOLS** – BACnet MS/TP (master)

**PROGRAMMING** – Supports Alerton's BD4 DDC file format using Alerton's VisualLogic® toolset.

**MICROPROCESSOR** – 32-bit ARM Cortex-M4F, 80 MHz

**MEMORY** – 512 MB non-volatile flash.

**SECURITY** – Integrated secure boot prevents loading of tampered firmware.

**ORDERING INFORMATION****ITEM NUMBER**

VLC-550-E      ALERTON VISUALLOGIC  
CONTROLLER BACNET

**CERTIFICATION AND CONFORMANCE**

**BACNET CONFORMANCE** – An application specific controller (ASC) level device; tested and approved by BTL. See Protocol Implementation Conformance Statement (PICS). BTL Listing and compliance is pending.

**UL** – Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916; listing includes both U.S. and Canadian certification.

**EMC** – EMC Directive 89/336/EEC (European CE Mark).

**FCC** – FCC Part 15, Subpart J, Class A.



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# VAViH-SD

## Features and highlights

- Economical**  
 Comes with 5 inputs, 6 binary outputs; the separate replaceable actuator enables quicker, less expensive repairs.
- Adaptable**  
 Pre-loaded, DIP-switch selectable DDC applications for 5 types of VAV box control.
- Flexible**  
 Left- or right-mountable actuator enables flexible mounting configurations.
- Innovative**  
 Device addressing and application selection can all be done with common tools for easy installation or replacement.
- Attractive**  
 Sleek, updated design.



The Alerton BACtalk® VAViH-SD™ controller with integrated actuator is a versatile BACnet-compliant controller, providing pressure-independent control of any single-duct variable air volume (VAV) box. It features a built-in airflow sensor, five universal inputs (AIs or BIs) and six binary outputs (BOs). As a native BACnet controller, the VAViH-SD integrates seamlessly with your BACnet system, communicating at up to 76.8 Kbps on a BACnet MS/TP LAN. The VAViH-SD-F includes a filter to reduce dust contamination.

Four of the BOs are hot-switched 24 VAC at 0.5A triac outputs; the other two BOs are ground-switched and are reserved for the integrated actuator. Four inputs are permanently configured to operate as open contact/thermistor inputs. The fifth input is user selectable: Open contact/thermistor, 0–5 VDC or 0–10 VDC. All inputs are 10-bit resolution.

The BACtalk VAViH-SD contains an integral airflow sensor to provide pressure-independent operation of the VAV box. Each airflow sensor is factory-calibrated at multiple velocity points. Minimum, maximum, and reheat airflows can be entered either at a Microset™ wall unit or an operator workstation. A technician can adjust airflow parameters in the field during balancing to compensate for slight variations in box installation and type.

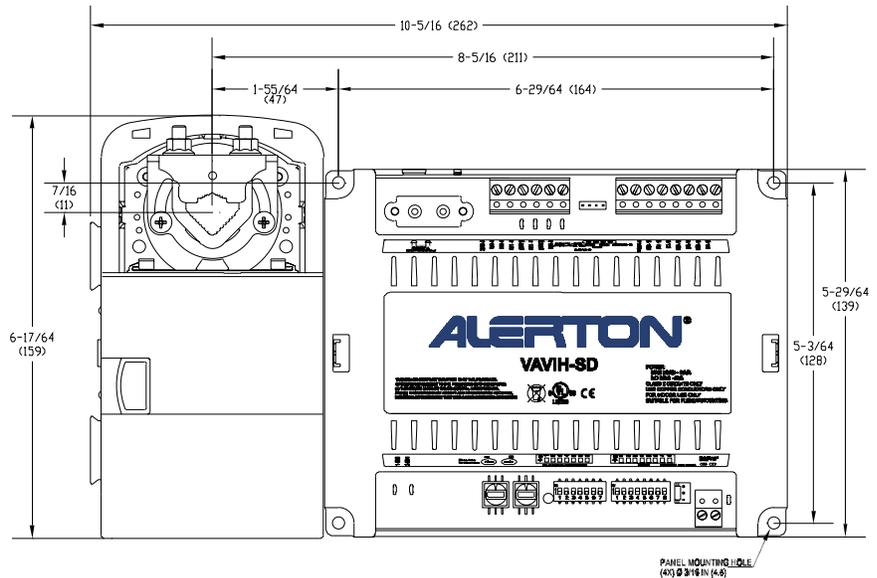
The direct-coupled, brushless actuator is a high-reliability, maintenance-free ON-OFF/floating point control model manufactured by Honeywell. Its universal V-bolt clamp assembly mounts directly to the damper operating shaft.

All control algorithms are factory-loaded into nonvolatile flash memory and can be completely field-modified. The VAViH-SD can execute control algorithms independently of other equipment. All calibration, programming, and operator-entered setup data is stored in flash memory for further assurance of stable, reliable, and independent operation.

## VAViH-SD

## Technical data

- **Power** 24 VAC @ 10 VA min. plus binary output loads (65 VA max.). Utilizes a half-wave rectifier, which enables a single transformer to power multiple VLCs.
- **Inputs** 5 inputs with 10-bit resolution. Input 0 supports the BACtalk Microset. Inputs 0–3 support open contact/10K thermistor. Input 4 allows user-selectable configuration: Open contact/10K thermistor, 0–5 VDC or 0–10VDC.
- **Binary Outputs** 6 binary outputs for staged heat or fan control. Except for BO 3 and 4, which are ground-switched for damper motor control, all BO terminals are hot-switched, optically coupled triac outputs rated 24 VAC @ 0.5 A.
- **Airflow Sensor** 0–1.25 inches water column differential pressure sensor.
- **Actuator torque rating** 44 lb-in or 5nm.
- **Processor and Memory** Motorola AZ-60 processor with on-board flash memory. Flash memory provides nonvolatile program and data storage, and allows for updates to the firmware for future product enhancements.
- **Maximum Dimensions** 2.5" (64mm) H X 6.9" (175mm) W X 5.5" (140mm) D.
- **Terminations** Removable header-type screw terminals accept 14–24 AWG wire.



- **Environmental** 0–158 deg. F (-17–70 deg. C). 0–95% RH, non-condensing.
  - **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
  - **BACnet Conformance** Fits application specific controller (ASC) profiles as tested and approved by BTL. See Protocol Implementation Conformance Statement (PICS).
  - **Ratings** Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916, 3rd Edition. Listing includes U.S. and Canadian certification. Suitable for plenum mounting.
- FCC Part 15, Class A.  
EN 55022, Class A.  
EN 61000-3-2, 61000-3-3, 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-8, 61000-4-6, 61000-4-11

## Ordering information

VAViH-SD

VAViH-SD with 5 universal inputs, 6 binary outputs; 2 of the binary outputs drive integrated Honeywell actuator

VAViH-SD-C

VAViH-SD field controller with available custom DDC

Specifications subject to change without notice

# VisualLogic™ Display (VLD)

## Features and highlights

- Capable**  
 Internal temperature and humidity sensors, 3 universal inputs, 6 binary outputs and 2 analog outputs.
- Interoperable**  
 BACnet-compliant on MS/TP LAN at up to 76.8 Kbps.
- Versatile**  
 Fully DDC programmable, capable of standalone or integrated operation.
- Flexible**  
 Fully programmable, configurable display, easy to locate wireless sensors.
- Powerful**  
 Offers control of a second VLC using peer-to-peer commands. Modes of operation allow control based on occupancy or schedules.
- Fast**  
 Internal DDC logic loop of 100 msec.
- Visually appealing**  
 Based on industry standard platform, sleek sophisticated design with touchscreen display.



Alerton's BACnet®-based VisualLogic® Display (VLD) is a communicating, intelligent sensor-controller combination with built-in temperature and humidity sensors that targets common controls applications such as roof top units, fan-coil units and heat pumps. It provides a cost-effective solution to meet in-room hotel requirements—an easy-to-use interface, easy-to-see digital display, and Celsius/Fahrenheit change over—where you already have Alerton systems in public or common areas. A versatile wireless addition provides door and occupancy sensor function. Direct digital control (DDC) enables powerful control of units, sophisticated, customizable displays, and a superb user interface.

The VLD combines a configurable display and a VisualLogic controller, making it ideal for retrofits of thermostat installations and places where a single-piece combination is easier to install.

The VLD communicates over an MS/TP LAN so it operates as a fully-functioning BACnet controller and easily integrates with the building automation system. Alerton can also provide seamless integration with hotel reservation and check-in systems with the BCM-HOTEL.

Based on an established industry platform and a sleek, sophisticated design that millions of people have already installed in their own homes, the VLD is a single, cost competitive unit with a familiar and user-friendly interface, so it's an easy to use choice for your customers. The VLD is compatible with Alerton's wireless occupancy kit so you can offer a plug-and-play wireless solution for applications needing motion or door sensing, such as hotel rooms.

# VisualLogic Display (VLD)

## Technical Data

- **Power** 24 VAC @ 53 VA min. Half-wave rectified. One leg of 24 VAC connects to earth (panel) ground.
- **Inputs** 3 universal inputs with 12-bit accuracy, providing DDC-controlled voltage, current and resistive modes.
- **Internal Sensors** 1 internal temperature sensor, -40–199 deg. F (-40–93 deg. C); 1 internal humidity, 5–95% RH, non-condensing.
- **Binary Outputs** 6 outputs each rated at 24 VAC, 0.5A and using latching pilot relays capable of conducting one (1) amp continuously.
- **Universal Analog Outputs** 2 outputs with 12-bit resolution. Each auto-detects for 0–10 VDC or 4–20 mA. 4–20 mA outputs are sourced by the VLD. Connected loads must return to the VLD ground. The VLD automatically switches from 0–10V mode to 4–20mA current mode when it detects a load value of less than 500 ohms.
- **Processor & Memory** Powerful 32-bit processor with extensive flash memory and RAM resources. Flash memory provides nonvolatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
- **Dimensions** 4.60" (117mm) H x 6.00" (152 mm) W x 1.20" (31mm) D including wallplate.
- **Terminations** A separate wallplate is provided and mounted to the wall; this wallplate provides screw terminal connections for all wiring. When the VLD is seated in the wallplate, all connections are made.
- **Environmental** 0–120 deg. F (-17–49 deg. C). 0–95% RH, non-condensing.
- **Communications** BACnet MS/TP LAN up to 76.8Kbps.
- **Ratings**  
 EMC Directive 89/336/EEC (European CE Mark)  
 FCC Part 15, Subpart J, Class A

## Ordering Information

Item number	Description
VLD-362	VisualLogic Display controller with 2 fixed inputs, 3 universal inputs, 6 binary outputs and 2 analog outputs
AL-OC-KIT	Wireless occupancy kit; includes (1) receiver, (1) PIR sensor, and (1) door contact sensor
AL-OC-REC	Wireless receiver unit
AL-OC-PIR	Wireless passive infrared (PIR) motion sensor
AL-OC-DS	Wireless door contact sensor

Specifications subject to change without notice

# VLD-362-FF, VLD-362-FF-W

## Fixed Function VLD

### Features and highlights

- **Flexible**  
19 pre-loaded applications for a quick, out-of-the-box solution.
- **Wireless option (VLD-362-FF-W)**  
Integrated wireless receiver saves wiring time and costs, provides more location options.
- **Capable**  
Internal temperature and humidity sensors, 3 universal inputs, 6 binary outputs, 2 analog outputs, factory-loaded applications.
- **Interoperable**  
BACnet-compliant on MS/TP LAN at up to 76.8 Kbps.
- **Versatile**  
Non-programmable versions that support Alerton DDC logic, capable of stand-alone or integrated operation.
- **Powerful**  
Offers control of an additional VLC using peer-to-peer commands. Modes of operation allow control based on occupancy or schedules.
- **Fast**  
Internal DDC logic loop of 100 msec.
- **Visually appealing**  
Sleek sophisticated design with touch screen display.



Alerton's BACnet®-based VisualLogic™ Display (VLD-362-FF and VLD-362-FF-W) with fixed function is a non-programmable version of the original VLD-362. There are two available fixed function models—the VLD-362-FF with fixed function and the wireless VLD-362-FF-W with fixed function—that ship with 19 pre-loaded applications for specific and common projects including fan-coil, heat pump and air conditioning.

The VLD-362-FF and VLD-362-FF-W are a communicating, intelligent sensor-controller combination with built-in temperature and humidity sensors used to control applications such as roof top units, fan-coil units and heat pumps. They provide a cost-effective solution for occupancy and crowd monitoring in hotel rooms, conference rooms, school portables and more. The VLD-362-FF and VLD-362-FF-W meet in-room hotel requirements—an easy-to-use interface, easy-to-see digital display, and Celsius/Fahrenheit change over—where you already have Alerton systems in public or common areas. Direct digital control (DDC) enables flexible control of units, sophisticated, customizable displays, and an easy to use user interface. Pre-loaded applications enable fast configuration of units using the user interface.

The VLD-362-FF-W, the wireless version of the fixed function VLD-362-FF, combines a configurable display and a VisualLogic controller, making it ideal for retrofits of thermostat installations and places where a single-piece combination is easier to install. Its wireless capability offers the flexibility to choose different placements in a monitored space for maximum coverage.

The VLD-362-FF and VLD-362-FF-W communicate over an MS/TP LAN so each operates as a fully-functioning BACnet controller and easily integrates with the building automation system. Alerton can also provide seamless integration with hotel reservation and check-in systems with the BCM-HOTEL.

The VLD-362-FF-W is a single, cost competitive unit with a familiar and user-friendly interface, so it's a simple choice for customers who want an easy to use, wireless solution for occupancy-based sensing.

# VLD-362-FF

## Fixed Function VLD

### Technical Data

- Power** 24VAC power from a UL Listed Class-2 24VAC transformer (not provided). The VLD-362W uses a half-wave rectifier to convert the AC power supply to onboard power. This enables multiple devices with half-wave power supplies to be powered from a single, grounded transformer.  
 Min. Load = 17VA (all BOs OFF).  
 Max. Load = 89VA (all BOs ON).  
 If BO power jumper is not removed, then all BOs are powered from the controller's transformer.  
 Minimum load includes controller and analog outputs at full load (20mA into 500 Ohms).  
 All BOs are N.O. (Normally Open) contacts with a maximum switch rating of 24VAC @ 0.5A (12VA).  
 Maximum load assumes all 6 binary output loads are powered from the controller transformer and connected loads are the maximum allowed (24VAC @ 0.5A). Actual power requirements depend on connected loads.
- Wireless Receiver (VLD-362-FF-W version only)** 433.92 Mhz; range is 50 feet.
- Inputs** 3 universal inputs with 12-bit accuracy, providing controlled voltage, current and resistive modes.
- Internal Sensors** 1 internal temperature sensor, 0–120 deg. F (-17.8–48.9 deg. C); 1 internal humidity, 5–95% RH, non-condensing.
- Binary Outputs** 6 relay outputs; normally open contacts with a maximum switch rating of 24VAC @ 0.5A (12VA). BO-0, BO-2 and BO-5 are powered from the controller transformer. BO-1, BO-3 and BO-4 are powered from control transformer through removable jumper, allowing these BOs to be powered from a separate power source.
- Universal Analog Outputs** 2 outputs with 12-bit resolution. Each auto-detects for 0–10VDC or 4–20mA. 4–20mA outputs are sourced by the VLD. Connected loads must return to the VLD ground. The VLD-362W automatically switches from 0–10V mode to 4–20mA current mode when it detects a load value of less than 500 Ohms.
- Processor & Memory** Powerful 32-bit processor with extensive flash memory and RAM resources. Flash memory provides nonvolatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
- Dimensions** 4.60" (117mm) H x 6.00" (152 mm) W x 1.20" (31mm) D including wallplate.
- Terminations** A separate wallplate is provided and mounted to the wall; this wallplate provides screw terminal connections for all wiring. When the VLD-362W is seated in the wallplate, all connections are made.
- Environmental** Residential, commercial and light-industrial environments. 0–120 deg. F (-17–49 deg. C). 0–95% RH, non-condensing.
- Communications** BACnet MS/TP LAN up to 76.8 Kbps.
- Ratings**  
 Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916; listing includes both U.S. and Canadian certification.  
 EMC Directive (European CE Mark) EN 60950 (VLD-362-FF model only).  
 FCC Part 15, Class B.

### Ordering Information

Item number	Description
VLD-362-FF	Non-programmable VisualLogic Display controller with 2 fixed inputs, 3 universal inputs, 6 binary outputs and 2 analog outputs, and factory-loaded DDC
VLD-362-FF-W	Non-programmable VisualLogic Display controller with integrated wireless receiver, 2 fixed inputs, 3 universal inputs, 6 binary outputs and 2 analog outputs, and factory-loaded DDC
AL-OC-PIR	Wireless passive infrared (PIR) motion sensor
AL-OC-DS	Wireless door contact sensor

Specifications subject to change without notice

**“DUAL SOURCING” WHITE PAPER**

# White Paper: Dual Sourcing: Unlocking the Chains that Bind a Building Automation System

**Despite the promise of open protocols and interoperability, the majority of facility managers are still locked into a proprietary sole source vendor for building automation system (BAS) technology.** Using a sole source vendor can be appealing because he offers the simplicity of having just one contact for everything a building needs: there's no need to stock surplus equipment or train staff on multiple systems. But sole sourcing exposes the facility manager to that single vendor's stringent fee structure. The flip side to sole sourcing is entertaining open—or competitive—bids. This, too, can be a hassle because the risky mix of different products across facilities increases the complexity of service and support down the road.

So how can a facility manager get the best of both worlds? How can he retain the simplicity of a sole source arrangement, but keep that one vendor honest in his pricing? The answer is *dual sourcing*, which qualifies a select few open protocol vendors—according to strict criteria developed by the facility manager—who collaborate with the current vendor to provide all the building controls. The competition keeps life cycle costs down and the limited vendor list keeps complexities at a minimum.

This white paper will help facility managers identify whether their building is locked in by a sole source vendor, develop strategies to assess the costs and benefits of that arrangement, and offer a how-to for unlocking a building. Facility managers will be able to qualify open protocol vendors, develop comparisons and initiate technical strategies they can start using today.

## Are you locked in?

Having a sole source relationship with a controls contractor or mechanical contractor isn't in itself a bad thing. In fact; it may be right for a facility manager. If he's in a single-source situation, however, he wants to realistically assess the cost to him. This section offers tips and tools to do that.

## What does "locked in" really mean?

Basically, "locked in" means a lack of choice. In a sole source scenario, a facility manager is pretty much subject to whatever controls his vendor picks to outfit the building. The vendor's system capabilities dictate the facility manager's retrofit or expansion plans. His building controls budget is in the vendor's hands.

The facility manager should take a look at his retrofit or expansion needs. Any plans to expand or update the building will significantly impact the scope and design of the building

controls. This is also true if there is a change in the nature of tenants or their space—for example, adding food vendors or a healthcare-affiliated occupant. Subsequently, a facility manager must determine what his existing proprietary vendor can and will charge to undergo the remodels; if the vendor has more influence than the facility manager on the future of his own building, that facility manager is definitely locked in.

The most tangible way for a facility manager to assess whether or not he is locked into a sole source arrangement is to look at his vendor's pricing conventions:

- Does the sole source vendor offer standard pricing?
- Does the facility manager get discount pricing for the equipment he orders most often?
- Does the sole source vendor itemize materials and labor on his bill?
- Does the facility manager understand and agree to every line item he pays for on his service contract?
- Does the sole source vendor charge fair or comparable market prices for add-ons or changes to the system?

If the answer is "no" to any of these, a facility manager's lack of choice should be a clear indication of being locked in to his sole source vendor.

Finally, it can be determined whether or not a facility manager is locked into a sole source vendor by less tangible criteria—for example, his interaction with the vendor. Does the vendor reply promptly to the facility manager's calls or emails? Does he listen to issues with concern and respond with thoughtful answers? Does he identify cost-saving ideas without being asked? Does he make the facility manager feel like he has a lot of choice or input in how his own building is run? If a facility manager answers no to any of these questions, he very well may be locked in.

Sole sourcing—flat-spec or negotiated work—is dangerous because it gives the vendor the "state-run" stranglehold on the facility manager's BAS. First, if the vendor says a specific piece of equipment or service call is needed, the facility manager has little choice but to agree. Second, there are no checks and balances with respect to price comparison. After the initial construction phase, where the vendor may lowball the facility manager just to get the job, subsequent phase cost increases can be astronomical.

## A case study

In a real-life scenario, one proponent of dual sourcing—a large, west coast municipality—achieved an average savings



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of 20% on its overall heating, ventilating and air conditioning (HVAC) controls expenditures. The City has five departments that oversee everything from arts and recreation to public safety, utilities and transportation. Most City properties feature a significant physical plant inside. In 2003, concerned with the high and escalating costs for its proprietary building controls, the facilities projects manager performed a study to analyze what the City paid compared to market price, and whether the high fees were related to technical issues or simply premium pricing for a proprietary solution. The analysis was based on several recently completed projects and submitted bids, including projected costs for future work.

The facilities projects manager used three resources to find industry standards:

- RS Means CostWorks, a comprehensive, industry standard database of unit costs, assemblies costs or square foot models, crew costs and more
- Corporate profit-and-loss statements for the proprietary vendor
- Polling HVAC industry professionals

He discovered the proprietary vendor charged up to 51% above market price. On five recent City projects where the proprietary vendor's bids equaled \$4.6 million, these excess charges totaled more than \$1.5 million. On one particular comparison between two similar commercial high-rises, the facilities manager determined that the proprietary vendor charged \$1.33 per square foot while an Alerton BACtalk system cost only \$1.00 per square foot—resulting in a difference of more than \$168,000. The scope of work had been nearly identical.

The City then considered its options. It could open up its building controls projects to competitive bidding. It could attempt to have a more strategic partnership with the proprietary vendor—which would include asking them to open their books to the City. As a third option, the City could opt to dual source the building controls. Further study revealed that, for subsequent work required on City properties, dual sourcing made the most sense, both economically and for the long term.

To decide which BACnet vendor would collaborate with the already-installed proprietary system, the City outlined particular criteria for contenders to meet:

- Open protocol (BACnet) products down to the lowest equipment levels
- Unlimited software license versus annual renewal and seat fees

- A good local presence in both construction and service
- Factory-trained engineers
- Ability to challenge the current vendor on pricing and service
- Parts assembled in the USA
- A realistic level of compatibility with my existing system
- A manufacturer that demonstrates flexibility and innovation in their product designs—as an indication of future product developments
- Good long-term reference customers who are willing to let potential customers tour their sites

The City chose Alerton as its open systems vendor to integrate with the proprietary equipment. In a dual sourcing scenario with Alerton's BACtalk system, the City found that it could achieve average savings of 20% or more on equipment and service. Its annual operating costs could continue indefinitely at or near the same level. And compared to the savings, the City's training costs are minimal.

### Assessing the costs of being locked in

Wherever possible, a facility manager should assess costs and benefits in quantitative terms. Track accurate hard figures when he can. For example, after he finds the costs of goods for his building system, he can then use those costs to get a rough idea of the profit margin his sole source vendor makes. How to do this? Carry out a competitive analysis: determine what is standard in the industry. A facility manager should find out what the overhead is for his sole source vendor. If the vendor's overhead is high and profit margin narrow, he may be charging the facility manager inflated fees to make up the difference.

The facilities project manager in the case study example above used the RS Means CostWorks database to obtain accurate industry standards for costs on an average project. Industry databases are comprehensive, easily available, and can save a facility manager a lot of time and money in the search for a building controls contractor.

Next, get help. A controls consultant will share his or her industry knowledge of the practices involved with installing and maintaining building controls. This knowledge includes the methods vendors use to bill time for a particular project, the dynamics of dealing with the electrical contractor, and details of the relationship between domestic or international supply vendors and the local dealer. The controls consultant



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can look at the fees, hours and charges and determine their appropriateness compared to the amount of work being done.

An independent auditor has a specific financial responsibility to the building controls project and will act as its accountant. He or she will review the hourly rates and calculate the charges for overhead or management. The auditor will also analyze profit and loss on the project and review the discount structure relative to product pricing from other vendors.

A facility manager shouldn't get railroaded into thinking something is vital to the building's system operation when it isn't. The myth of training is a good example of this. The cost of training was a show stopper for many who initially sought to unlock their systems by learning more about them. In reality, training is—or should be—a small percentage of the overall building operations budget.

Finally, facility managers should keep in mind that while their organization truly is unique, all building systems share certain characteristics. As such, there shouldn't be too many "gotchas" in the building controls budget. In reviewing costs for new construction, normal maintenance, major maintenance and upgrades, the facility manager should make sure his single source vendor's pricing doesn't unduly exceed what the market recommends. For example, parts and inventory for the HVAC system should take no more than about 8% of any typical building's annual operating budget; equipment replacement, no more than 15%. Also, certain components of an HVAC system have a set range of installation costs—for example, packaged terminal air conditioners at \$5–\$7 per square foot—that don't change across building types.<sup>1</sup> Also, non-economic factors such as

tenant comfort can heavily influence the cost of building controls and a facility manager must take into consideration what his sole source vendor charges for less tangible deliverables.

### Unlocking the BAS

If a facility manager finds that he is—or feels—locked into his sole source building controls vendor, he has an alternative. There are just a few steps to take to unlock the BAS and open the door to a more mutually beneficial relationship with controls providers.

### Qualify open protocol vendors

The first step for a facility manager is to qualify open protocol vendors in his area. He can then create a matrix of the features he requires in a partner, then evaluate his vendors on those criteria. The City in the case study example above included in its matrix a large installed base of satisfied customers, a large staff of factory-trained engineers and BACnet interoperability. Facility managers should assign values to their own required features, based on the very specific needs of their building and working style. Table 1 below shows a sample evaluation checklist.

Whatever criteria a facility manager chooses to rank potential vendors, open protocols and a strong service commitment should be weighted heavily for any organization seeking to unlock its proprietary building controls system.

### Assess the technology

A facility manager must ensure the proposed technology is cost effective and suitable for his needs—not just now,

Vendor Evaluation Checklist	Importance (1–10)	Included Yes/No	Points	
Open protocol (BACnet) products down to the lowest equipment levels	10	Yes	10	
Unlimited software license versus annual renewal and seat fees	8	Yes	8	
A good local presence in both construction and service	9	Yes	9	
Factory-trained engineers	6	Yes	6	
Ability to challenge the current vendor on pricing and service	10	Yes	10	
Parts assembled in the USA	5	Yes	5	
A realistic level of compatibility with my existing system	6	No	0	
A manufacturer that demonstrates flexibility and innovation in their product designs—as an indication of future product developments	8	Yes	8	
Good long-term reference customers who are willing to let potential customers tour their sites	10	Yes	10	
Additional questions				
		<b>Total</b>	<b>66</b>	

**Table 1. Sample vendor evaluation checklist**



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but in the future as well. The broader the acceptance of the technology, the better off the facility manager will be and the more options he'll have down the road. Most vendors offer BACnet today because it is the most widely accepted industry protocol for building controls.

Some questions a facility manager should ask himself include:

- Is this technology featured in a large installed base, with customers who are happy with their building controls solution?
- Is this technology innovative, providing solutions that I haven't found elsewhere?
- Is it flexible enough to fit the unique needs of my building without increasing the complexity of my system?
- Does this technology come with a comprehensive service offering so that my building runs as specified without being nickel-and-dimed on every service call?
- Does this technology offer an unlimited software license so that I get the most cost effective price per user?
- Is this technology offered by a locally owned vendor, one who has ties to my community and a low overhead?

### Next Steps

Once the facility manager has determined he wants to unlock his BAS, he can begin the dual sourcing process. The first step is to change his specification. A consulting-specifying engineer (CSE) can use an online spec-building tool such as OpenSPECS (<http://specify.bacnet.com>) to flesh out the precise components needed to spec an open system for the building.

The facility manager will take the spec to his existing vendor and negotiate diligently with him. A controls consultant can review the spec and advise the facility manager during talks with his current vendor. If there is still a significant gap between market price and the current vendor's price, the facility manager should then engage the second, open protocol vendor for dual sourcing.

The last step for the facility manager is to send out a competitive bid through the usual RFP process. Because he already qualified open-protocol vendors during his research—and because he's only choosing one of them as his dual sourcing partner—he eliminates the risk of complicating his system with a mix of different products.

Dual sourcing is a win-win scenario. A facility manager retains familiarity with his current system and saves the relationship with his existing vendor. And he saves the costs of swapping out an entire BAS while gaining an open-protocols partner who rounds out his BAS with extensible, cost competitive solutions.

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1 "Maximizing HVAC Mechanical Systems," PowerPoint presentation, 2003 National Association of State Energy Officials Conference, February 11, 2003, <http://www.naseo.org/events/outlook/2003/presentations/Weise.pdf>

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*Tim Holmes is director of marketing for Alerton, a building controls line owned by Honeywell in Redmond, WA.*

### Sidebar

1. Is this vendor a "price-challenger" to my current vendor or does he have a history of pricing products above the market?
2. Can this vendor demonstrate industry leadership, longevity and stability?
3. Do the vendor and the manufacturer demonstrate innovation and flexibility in their product designs, manufacturing methods and business structures?
4. Is the vendor's local organization focused on providing high quality service and support for my organization's future growth?
5. Regardless of local organization size, can this vendor meet my current needs?
6. Has this vendor demonstrated a long-term commitment to his existing customers' needs?
7. Does this vendor have a cost effective product and installation plan for my unique situation?
8. Can this vendor guarantee BACnet interoperability and future compatibility at all levels?
9. Does this vendor offer an unlimited software license so that my operations budget isn't "nickel-and-dimed" on seat licenses and annual renewal fees?
10. Does this vendor offer a realistic level of compatibility with my existing system to protect my original investment?

**SIGNET QUALIFICATIONS**



**signet controls, inc**

OPEN AUTOMATION SOLUTIONS

**PRESENTATION OF  
COMPANY PROFILE & CAPABILITES**

**FOR**



**OXNARD UNION  
HIGH SCHOOL DISTRICT**

Signet Controls Inc.  
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f: (877) 888 4648

Signet Controls, Inc. would like to thank you for the opportunity to provide the Oxnard Union High School District with an overview of the company profile and its capabilities to deliver “Open Automation Energy Management Systems” installation and services. This document intends to present Signet Controls qualifications, project execution strategy, and a commitment to the delivery of quality products and services.

## COMPANY PROFILE

- A. Over the last 13 years, Signet Controls has established itself as one of the leading providers of unique “Open Automation Solutions” in the Central Coast of California with comprehensive technological expertise. We establish lasting relationships through dedicated customer service, exceptional performance and integrity.
- B. Signet Controls primary focus is to provide open protocol Energy Management Systems. These systems provide management of building functions to improve efficiency, reduce energy consumption, improve efficiency, increase comfort, improve management control and communications, and reduce overall costs of operation.
- C. Signet Controls is a company molded by its customers, team members and partners. We provide support for pre-construction design, engineering, project management, design / build services, installation, training, and service for high-end residential & commercial controls systems. In the Commercial construction market we have created an expertise by executing diverse projects such as Hospitals, Military bases, Office Buildings, Universities, Colleges and K-12 Schools & Manufacturing Organizations. Due to our expertise in customizing solutions for each application, we also implement systems in high-end residential homes and properties.
- D. Signet Controls has a customer centric approach to every activity and is successful in leveraging the expertise of its associates. We track and ensure quality during every phase for successful execution of projects. Our organization structure is different from the “normal” contractor-oriented business profile – we have put in place a structure where every associate has an incentive to grow and participate into every aspect of the business – from sales to execution. This unique structure provides a “one point of contact” for our customers and forges long-term relationships in the territories we serve. Our team focuses on finding various avenues to do business in a “smarter and more efficient way” rather than “harder and the same old way”. We believe this to be our core competence.
- E. We are committed to teamwork within our company, with our suppliers and with our customers to provide unique solutions with the best possible installations and optimum system performance. We maintain our unique market position by attracting only experienced talented and innovative industry professionals. Our team members have experience on control systems from various different manufacturers giving us the “Systems Integration” expertise that is required in the current evolution of the controls industry. We are devoted to training and education for both our employees and our customers.
- F. Signet Controls utilizes innovative open systems from Alerton, Distech Controls, Johnson Controls and Tridium which are non-proprietary that allow a single window into all building systems. These non-proprietary systems provide the owner freedom to choose a partner or competitively bid additions or future expansions on an installed system.

- G. Signet Controls has an experienced team with broad capabilities. Some of these are:
- a. Survey and project design
  - b. Implementation of Energy Savings techniques on building equipment
  - c. Design and installation of Energy Management Systems
  - d. Programming and Start-up of Control Systems
  - e. Integration of multiple Control, Lighting, Access, CCTV, Fire, and Smoke Systems
  - f. Project Management & Technical expertise
  - g. Technical Support with Remote monitoring and emergency service
  - h. Customized training of customers and staff
  - i. Energy Saving and system upgrades support
- H. Below are a few projects that our team has worked on:
- a. Ventura County Medical Center, Ventura, CA
  - b. Community Memorial Hospital, Ventura, CA
  - c. St. John's Regional Medical Center, Oxnard, CA
  - d. St. John's Pleasant Valley Hospital, Camarillo, CA
  - e. Santa Paula Hospital, Santa Paula, CA
  - f. University of California, Santa Barbara, CA
  - g. Topa Financial Plaza, Oxnard, CA
  - h. Bruker Nano Surfaces, Goleta, CA
  - i. Oxnard School District, Oxnard, CA – 15 Schools
  - j. Moorpark High School, Moorpark, CA
  - k. Santa Barbara USD, Santa Barbara, CA – 2 Schools
  - l. Carpinteria USD, Carpinteria, CA – 3 Schools
  - m. Atascadero High School, Atascadero, CA
  - n. East Los Angeles College, Monterey Park, CA
  - o. LA Pierce College, Winnetka, CA
  - p. LA Mission College, Sylmar, CA
  - q. Isla Mar Residence, Santa Barbara, CA
  - r. Thousand Oaks – Civic Art Plaza, Thousand Oaks, CA
  - s. City of Oxnard – Main Library, Oxnard, CA
  - t. Calabasas Civic Center, Calabasas, CA
  - u. El Encanto Hotel, Santa Barbara, CA
  - v. Homewood Suites, Oxnard, CA
  - w. Port Hueneme Naval Base, CA - Seabee Museum
  - x. Point Mugu Naval Base, CA – Bldg. 24, 25, 36, 323, 352, 512, 532, 607, 738 & NASSM
  - y. Camp Roberts – Satellite Communications Facility, US Army Corps of Engineers, CA
  - z. Fort Hunter Liggett – TASS Training Center, Jolon, CA
- I. In the past 13 years Signet Controls has executed more than 100 projects on schedule and within budget. This expertise and experience will help us be successful on supporting the Oxnard Union High School District on various projects.
- J. General Information:
- a. Type of Company => S-Corp
  - b. State & Year Incorporated => CA, 2006
  - c. Federal ID => 20-5754575
  - d. CA Contractor License Type & No. => C20 - 912113 (exp. 3/31/2022)

## Product Overview

Signet Controls provides automation solutions from the following manufacturers:

 <p><b>Authorized Representative</b></p> <p><a href="http://www.alerton.com">www.alerton.com</a></p> <p>Open Protocol BACnet &amp; Web Based Systems, Integration Platform – BACnet, Siemens, Modbus</p>	 <p><b>Authorized Representative</b></p> <p><a href="http://www.distech-controls.com">www.distech-controls.com</a></p> <p>Open Protocol BACnet &amp; Web Based Systems, Integration Platform – BACnet, Siemens, Modbus</p>
 <p><b>BY JOHNSON CONTROLS</b></p> <p><b>Authorized Representative</b></p> <p><a href="http://www.johnsoncontrols.com/buildings/building-management/facility-explorer">http://www.johnsoncontrols.com/buildings/building-management/facility-explorer</a></p> <p>Open Protocol BACnet &amp; Lonworks Systems, VFD's, Field Devices &amp; Analytics</p>	 <p><b>revolutionary software solutions™</b></p> <p><a href="http://www.tridium.com">www.tridium.com</a></p> <p>Open Protocol Integration Platform for BACnet, LonWorks &amp; Legacy Systems</p>
 <p><b>Platinum Distributor</b></p> <p><a href="http://www.belimo.us">www.belimo.us</a></p> <p>Energy Valves, Control Valves and Dampers Actuators</p>	  <p><a href="http://www.veris.com">www.veris.com</a>    <a href="http://www.functionaldevices.com">www.functionaldevices.com</a></p> <p>Sensors, Devices, Relays, Powers Supplies, Energy Recording &amp; Monitoring Systems</p>

## Expertise Overview

- A. Signet Controls team provide the building automation marketplace with an experienced team of professionals who have demonstrated capabilities in a broad range of applications - a partial list includes the following:
  - a. Integrated HVACR Energy Management and Control Systems
  - b. Lighting Control Systems
  - c. Power Quality and Electrical Energy Measurement Systems
  - d. Technical Support Services
  - e. Remote Monitoring of Automation Systems
- B. Signet Controls has assembled a team with the credentials and experience in project management, design, and implementation of integrated open system control projects to achieve all your goals.

## Service Support Overview

- A. Signet Controls looks forward to working with the Oxnard Union High School District Project representatives to support the installed Energy Management System at various facilities. Signet Controls will nominate a project team which will utilize a disciplined approach to support the project while maintaining budgets and schedules.
- B. Service Management Approach:
1. Signet Controls Service Management approach is based on experience of managing large and complicated projects with a process that has been improvised over the years to control costs, maintain support excellence and system operability.
  2. The team lead by the Operations Manager will be responsible for the following activities:
    - a. Coordination with Facilities team
    - b. Field Coordination during Preventive Maintenance tasks
    - c. Overseeing improvement and Ongoing Development projects
    - d. Service & Maintenance support
  3. As the primary contact, the Operations Manager attends project meetings, negotiates specific client requests, schedules construction activities, reviews progress and secures approvals of submittals, installation activity, and completed work. Some other tasks of the Service Ops Manager include review and approval of shop drawings, review and revision of record drawings, evaluation and approval of subcontractor and vendor payments, preparation and presentation of change orders, monitoring of installer performance, and clarification of contract documents.
  4. The Operations Manager has complete on-site authority to resolve problems. This authority includes, but is not limited to, the ability to allocate resources, settle conflicts, and initiate corrective actions as needed to resolve a problem.
  5. The Operations Manager has operational and decision-making authority within the limitations of the contract. Examples of site-level decisions include personnel hire and dismissal, purchasing of services and materials, and establishment of project policies and procedures.

C. Key Contact Associates:

Navin Kashyap and Rahvie Pagely will be the main point of contact for all matters concerning project execution on the projects designed by the Oxnard Union High School District. Both Navin and Rahvie have more than 25 years' experience in all aspects of the Building Automation industry and their contact information is as below:

*Account Executive:* Navin Kashyap  
*Phone / Fax:* (818) 859-9999 / (877) 888-4648  
*E-mail:* [navink@signetcontrols.com](mailto:navink@signetcontrols.com)

*Project Director:*            *Rahvie Pagely*  
*Phone / Fax:*                *(805) 990-5453 / (877) 888-4648*  
*E-mail:*                        [rahviep@signetcontrols.com](mailto:rahviep@signetcontrols.com)

#### D. Quality Control

1. Signet Controls has a customer centric approach to every activity, and we track and ensure quality during every phase for successful execution of projects. We solicit input from our customers to ensure that we have exceeded their expectations and also on areas we need to improve on. As a local company, we cannot afford any unresolved customer issues. Our team members understand the importance of delivering excellent quality on every project they work on.
2. This commitment to customer satisfaction demands that we begin to clearly understand each and every customer's unique requirement and that we deliver our products and services in conformance with these requirements. Signet Controls is dedicated to make every customer a reference account through the delivery of quality goods and services. Within Signet Controls, managers and employees are evaluated on their ability to develop and manage a Quality Project from start to finish.

#### E. Training

1. For a successful project, it is important that the project team is trained and qualified to support the project. Training is an ongoing process at Signet Controls. With developments in technology and new product release our team undergoes extensive training to be skilled in every task they undertake.
2. Our service team will coordinate with the facilities team to ensure that appropriate training is provided to the Customers personnel. Training will play a critical role in providing the customer's operations staff an understanding of every aspect of the system architecture and operation. This will help to maximize energy savings through efficient operation of the equipment. This training will also help minimize maintenance and installation costs. Trained personnel bring in additional ideas, cooperate in scheduling, avoid conflicts, report problems early, and take over maintenance with confidence.
3. Customized on-site training by our experienced technicians and engineers is tailored to the needs of our customers and allows the customer's technicians the opportunity to learn on their own systems at their own pace.
4. Factory training is available to all customers and is scheduled year-round for our customers and employees. This training facility provides basic and advanced classes, including operator and supervisor instruction, programming, trouble shooting, software generation, hardware diagnostics, and preventative maintenance.

## F. Service/Maintenance & Warranty

### 1. Service

- a. Our staff is experienced in the operation and maintenance of the products that we represent and we are available to provide service round the clock. Your emergency call will be responded very effectively and efficiently; typically, our technician will arrive on site and ready to diagnose your problem at the earliest.
- b. Signet Controls has staff capable of remotely logging in & telephone assistance for our service customers. At times we may be able to solve problems over the telephone without dispatching a service technician.
- c. The development of a preventive maintenance program that keeps facility systems operating at peak performance relative to energy consumption and comfort is critical for a smooth operating building. Analyzing how maintenance is and will be accomplished can save substantial costs in the areas of repairs, parts inventories, component replacements, and service contracts. Our staff can assist the customer to implement this program based on the project requirements.
- d. Our service team can provide many levels of Technical Service Support programs depending on the customer's needs. From monthly, quarterly, half-yearly or annual system inspection services to full Protection coverage that covers everything that we install.

### 2. Warranty

- a. Signet Controls will provide a full part and labor warranty on HVAC Control Systems installed as part of ongoing improvements. Signet Controls will repair, replace or adjust or any parts found to be defective free of charge.

**CORE SERVICE TEAM RESUMES'**

**Distinguished Qualifications**

- President of Signet Controls, Inc.
- Worked with a variety of industries and clients.
- Ex-Operations Manager of Climatec-BTG in Irvine.
- Education  
University of Southern California, MBA  
  
University of Mumbai, India  
Bachelor of Engineering

**Responsibilities**

As the President of Signet Controls, Inc. his responsibilities include overall Sales, Operations and Financial aspects of the organization, effective deployment of resources to complete projects with the allocated time and budget. Efficient coordination of sales, control systems design, engineering, commissioning and start-up teams on various projects. He also oversees customer and contractor training.

**Experience**

Mr. Kashyap has over 25 years' experience in the Building Automation Industry. Starting as a project engineer at Siemens with the responsibility for the design and installation of HVAC Controls and Building Automation Systems he has been involved in various projects in the commercial, industrial and recreational markets. Over the years he has gained experience in sales and marketing, operations and project management, system engineering, application development, start-up and commissioning along with training of end user. As Operations Manager with Climatec he was responsible for successfully managing all aspects of the execution phase, resource allocation and coordination with the end customer to ensure smooth and successful completion of projects.

**Relevant Project Experience from the Past 10 Years**Central Plant (ELAC, Monterey Park, CA)

Responsible for design, programming and commissioning for the Alerton EMS systems at the Central Plant. The Central Plant consisted of a 9,300-ton hour thermal energy storage system with 3 chillers, a COGEN System and a 30 million BTU HHW System. This is a project at the East Los Angeles Community College under the Build-LACCD program.

Central Plant (LAPC, Woodland Hills, CA)

Responsible for design, management, programming and commissioning for the Alerton EMS systems at the Central Plant. The Central Plant consisted of a 6,400-ton hour thermal energy storage system with 4 chillers, a COGEN System and a supplemental solar heating system. This is a project at the Los Angeles Pierce Community College under the Build-LACCD program.

Center for the Sciences Building (LAPC, Winnetka, CA)

Responsible for the design & management of the Alerton EMS System at the project. This is a LEED certified project for the Los Angeles Pierce Community College under the Build-LACCD program.

Toyota Motor Sales (Torrance, CA)

Responsible for design, management, programming and commissioning for the Alerton EMS systems for the HQ Expansion (5 buildings) and two redundant Central Plants. Each Central Plant consisted of 3 absorption chillers and a 20 million BTU HHW system. This is one the biggest certified LEED Gold projects in USA.

Calabasas Civic Center (Calabasas, CA)

Responsible for design, installation, programming and start-up of the new Civic Center, Library and Central Plant. The Central Plant consisted of 2 Chillers and a 10 million BTU HHW System.

**Distinguished Qualifications**

- Operations Manager of Signet Controls
- Senior Operations Manager for Siemens, San Diego, CA
- Operations Manager for Johnson Controls, Seattle, WA
- Project Manager for Johnson Controls, Vancouver, BC.
- Senior Specialist for Johnson Controls, Vancouver, BC

**Responsibilities**

As the Operations Manager of Signet Controls, Inc. his responsibilities include overall Operations and Financial aspects of the organization, effective deployment of resources to execute projects with the allocated time and budget. Efficient coordination of sales, control systems design, engineering, commissioning and start-up teams on various projects.

**Experience**

Mr. Pagely has over 30 years' experience in the Building Automation Industry. Starting as a project System Specialist at Johnson Controls with the responsibility for the design, programming and installation of HVAC Controls, Fire Alarm, Security and Building Automation Systems he has been involved in various projects in the commercial, industrial and recreational markets. Over the years he has gained experience in design, programming, project management, Service and Solutions Operations. As Operations Manager with Siemens he was responsible for successfully managing all aspects of the execution phase, resource allocation and coordination with the end customer to ensure smooth and successful completion of projects.

**Relevant Project Experience from the Past 10 Years**
MGA Entertainment – (Chatsworth, CA)

Responsible for managing the \$750K retrofit installation, start-up and commissioning of the EMS installed at Headquarters buildings. The project consisted of Systems Integration to Daikin VRF, Aeon CRAC, Encelium Lighting, Generator, Accutrol

City of San Diego City Water Division – (San Diego, CA)

Responsible for overseeing the \$6.1M Security System retrofit project team consisting of a Project Manager, Project Assistant, Technician(s) and Design Team.

San Diego Convention Center – (San Diego, CA)

Responsible for overseeing the \$1.5M Fire Alarm retrofit project team consisting of a Project Manager, Technician(s) and Design Team.

Kaiser Permanente – (San Diego, CA)

Responsible for overseeing the \$5.2M HVAC New Installation project team consisting of a Project Manager, Technician(s) and Design Team.

US County Courthouse – (San Diego, CA)

Responsible for overseeing the \$2.1M HVAC New Installation project team consisting of a Project Manager, Technician(s) and Design Team

University of Washington Research & Technology Building – (Seattle, WA)

Responsible for overseeing the \$1.5M HVAC New Installation project team consisting of a Project Manager, Technician(s) and Design Team

**Distinguished Qualifications**

- Senior Systems Specialist for Signet Controls
- Project Manager for PASCO in Syracuse, NY
- Senior System Specialist / Design Engineer for Climatec in Irvine, CA
- Design Engineer for Trane BSG in Syracuse, NY

**Responsibilities**

As the Project Executive for Signet Controls, Inc., his responsibilities include HVAC Systems controls Design, development of a systematic process to ensure that all building systems are commissioned and perform to meet the design intent. Customized Graphics creation, Programming and Control Logic Development, verification of HVAC controls performance during the construction phase, development of testing & checklist documentation, final testing and commissioning of these systems as to accuracy and performance.

**Experience**

Mr. Babcock has over 15 years' experience in the building automation industry. He started as a Controls Design Engineer with the responsibility for the designing and programming of HVAC controls, life safety and lighting systems. Mr. Babcock is responsible for the complete design of all building automation systems from conceptual design through final construction drawings on retrofit and new construction projects.

**Relevant Project Experience from the Past 10 Years**St John's Health Center (Santa Monica, CA)

Responsible for the design, programming and installation and start-up for the Alerton EMS system and Life Safety Smoke Control System.

Los Angeles Mission College (LAMC, Sylmar, CA)

Responsible for the programming, graphics and integration of various control systems (Alerton, Carrier CCN and Trane) into a common Tridium system interface for the entire campus.

St Jude's Medical Center (Fullerton, CA)

Responsible for the design, programming and installation and start-up for the Alerton EMS system.

Ronald Reagan Library (Simi Valley, CA)

Responsible for the design, programming and installation and start-up for the Honeywell EMS system.

Oxnard School District (Oxnard, CA)

Responsible for the programming, graphics and integration of 3<sup>rd</sup> party control systems (ALC) into a Alerton Energy Management system interface for 17 Schools

Cortland School District (Cortland, NY)

Responsible for managing the programming, installation, start-up and commissioning of the Alerton/Tridium EMS and Honeywell Security System installed at seven schools ranging from elementary to a high school.

### Distinguished Qualifications

- Project Specialist for Signet Controls.
- Project Manager/Estimator for American Building Automation Inc. in Ventura, CA.
- Low voltage instrumentation installer for Frankrich in Ventura, CA.

### Responsibilities

As the Project Executive for Signet Controls, Inc., his responsibilities include supervision of HVAC systems controls installation, development of a systematic process to ensure that all building systems are installed and perform as to the design intent, engineering & programming, verification of contractor performance during the construction phase and development of all pre-functional and functional test documentation, final testing and commissioning of these systems as to accuracy and performance.

### Experience

Mr. Salas has over 10 years of experience in the Automation and HVACR industry. He started as a Low voltage instrumentation installer. He soon became the manager of an Underwriters Laboratory (UL) listed panel shop, and head of purchasing. Years of installation and panel manufacturing led Mr. Salas to become an Applications Engineer. His responsibilities also include Estimation and Project Supervision.

### Relevant Project Experience from the Past 10 Years

#### City of Oxnard – Main Library Retrofit (Oxnard, CA)

Responsible for managing the retrofit installation, start-up and commissioning of the EMS installed at Main Library buildings. The project consisted of 5 AHU's, 85 VAV zones, 2 CHW plants & 1 HHW plant.

#### Library Retrofit (Cuesta College, San Luis Obispo, CA)

Responsible for retrofit installation, programming, start-up and commissioning of the EMS installed at two buildings. Custom Air Handlers were fabricated on the rooftop to provide VAV control to all zones.

#### Isla Mar Residence (Santa Barbara, CA)

Currently managing installation for an Energy Management System at a high end residential property. This residence is more than 25,000 sq. feet and has a geothermal system with water source heat pumps.

#### El Encanto Hotel (Santa Barbara, CA)

Currently managing installation for an Energy Management System at a high-end resort in Santa Barbara. This project consists of a central plant and various cottages along with an extensive primary residence.

#### Space Launch Complex (ULA, Vandenberg AFB, CA)

Responsible for complete Environmental Controls System design and verification. Environmental Controls System redundancy and capacity testing, including presentations to NASA.

#### PM Bldg 531, 33 Retrofit (Point Mugu Navy Base, CA)

Responsible for complete design, control system installation supervision of the secure Missile and Tracking installations. System supported Range Operations, and required integration to existing EMS..

**Distinguished Qualifications**

- Project Executive for Signet Controls.
- Engineering Specialist for Siemens in New York / New Jersey
- Project Engineer for Automated Logic in New York / New Jersey
- Project Engineer for ABM Systems in New York / New Jersey

**Responsibilities**

As the Project Executive for Signet Controls, Inc., his responsibilities includes supervision of HVAC systems controls installation, development of a systematic process to ensure that all building systems are programmed, commissioned and perform to meet the design intent. Customized Graphics creation, Programming and Control Logic Development, verification of HVAC & Lighting controls performance during the construction phase, Development of testing & checklist documentation, final testing and commissioning of these systems as to accuracy and performance.

**Experience**

Mr. Benaiche has over 12 years' experience in the Electrical and Building Automation industry. He started as an Electrical Engineer with Sonatarch with the responsibility of collaborating with Mechanical Engineers to resolve product development and maintenance issue. He then joined ABM Systems and gained expertise on the Alerton Systems. After joining Automated Logic Service team, he was exposed to multiple projects with a variety of system and quickly became comfortable supporting the various customer. Mr. Benaiche is responsible for the complete coordination of all building automation systems from conceptual design through final construction phase on retrofit and new construction projects.

**Relevant Project Experience from the Past 10 Years**Siemens (New York / New Jersey)

Responsible for providing Service Support to existing customers. Created Submittal and O & M Documents and made revisions to control logic and graphics to meet customer requirements. Tested programs and performed Commissioning activity for retrofit and new construction projects.

Automated Logic (New York / New Jersey)

Responsible for providing Project planning and execution for customers. Collaborate with Project Managers and internal project team to ensure on-time completion of projects. Performed programming, create DDC Control Logic, create Graphics and start-up for Automated Logic HVAC Controls Systems.

ABM System (New York / New Jersey)

Responsible for providing Design Coordination, project planning and execution for customers. Collaborate with internal project team to ensure accuracy of Submittals, O & M Manuals, Bill of Materials, for in-budget completion of projects. Performed programming, create DDC Control Logic, create Graphics and start-up for Alerton HVAC Controls Systems.

### Distinguished Qualifications

- Systems Specialist for Signet Controls.
- Commissioning Authority for GRD Energy Inc.
- Commissioning Representative for AW Consulting Inc.
- Representative for GRD Energy Inc.

### Responsibilities

As the Project Executive for Signet Controls, Inc., his responsibilities include HVAC systems controls installation, development of a systematic process to ensure that all building systems are commissioned and perform to meet the design intent. Customized Graphics creation, Programming and Control Logic Development, verification of HVAC controls performance during the construction phase, Development of testing & checklist documentation, final testing and commissioning of these systems as to accuracy and performance.

### Experience

Mr. Walter has over 5 years' experience in the building automation industry. He started as a commissioning representative with Engineering Economics Inc with the responsibility of commissioning of HVAC Controls at variety of installations. With Signet Controls, Alex is responsible for the coordination of all building automation systems from initial field installation through final construction phase on retrofit and new construction projects. He also participates on supporting existing customers on Service projects and technical aspects of HVAC control systems.

### Relevant Project Experience from the Past 5 Years

#### St. Johns Pleasant Valley – New Tower (Camarillo, CA)

Responsible for managing the programming, installation, start-up and commissioning of the Alerton EMS installed at the new Tower Hospital Wing.

#### Ventura County Medical Center – Hospital Replacement Wing (Ventura, CA)

Responsible for start-up and commissioning of the Alerton/Tridium EMS installed at the new Hospital Wing at Ventura County Medical center.

#### Topa Financial Plaza – Bldg. 300 & 500 (Oxnard, CA)

Responsible for managing the programming, installation, start-up and commissioning of the Alerton EMS installed at the existing High-Rise Buildings.

#### Sidwell Friends School (Washington, DC)

Commissioning Authority for the RetroCx project on the LEED Platinum school.

#### World Wildlife Fund (Washington, DC)

Commissioning Technician for the RetroCx project.

#### Symantec Data Center (Tucson, AZ)

Commissioning Technician for the new LEED Gold Data Center project.

#### U.S. Food and Drug Administration (Silver Spring, MD)

Commissioning Technician for the new Headquarters project.

**SMALL BUSINESS ENTERPRISE &  
MINORITY BUSINESS ENTERPRISE  
CERTIFICATION**

Printed on: 9/10/2019 10:26:02 PM

To verify most current certification status go to: <https://www.caleprocure.ca.gov>

## Office of Small Business & DVBE Services

**Certification ID:** 2016275**Legal Business Name:**

Signet Controls Inc.

**Doing Business As (DBA) Name 1:****Doing Business As (DBA) Name 2:****Address:**

15350 Mallory Court  
Moorpark  
CA 93021

**Email Address:**

navink@signetcontrols.com

**Business Web Page:**[www.signetcontrols.com](http://www.signetcontrols.com)**Business Phone Number:**

818 859 9999

**Business Fax Number:**

877 888 4648

**Business Types:**

Construction , Service

Certification Type	Status	From	To
SB(Micro)	Approved	09/10/2019	09/30/2021
SB-PW	Approved	09/10/2019	09/30/2021

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-LOG IN at [CaleProcure.CA.GOV](https://www.caleprocure.ca.gov)

Questions?

Email: [OSDSHELP@DGS.CA.GOV](mailto:OSDSHELP@DGS.CA.GOV)

Call OSDS Main Number: 916-375-4940

707 3rd Street, 1-400, West Sacramento, CA 95605

***SUPPLIER CLEARINGHOUSE  
CERTIFICATE OF ELIGIBILITY***

CERTIFICATION EXPIRATION DATE: **October 23, 2020**

The Supplier Clearinghouse for the Utility Supplier Diversity Program of the California Public Utilities Commission hereby certifies that it has audited and verified the eligibility of:

***Signet Controls Inc.  
Minority Business Enterprise (MBE)***

pursuant to Commission General Order 156, and the terms and conditions stipulated in the Verification Application Package. This Certificate shall be valid only with the Clearinghouse seal affixed hereto.

Eligibility must be maintained at all times, and renewed within 30 days of any changes in ownership or control. Failure to comply may result in a denial of eligibility. The Clearinghouse may reconsider certification if it is determined that such status was obtained by false, misleading or incorrect information. Decertification may occur if any verification criterion under which eligibility was awarded later becomes invalid due to Commission ruling. The Clearinghouse may request additional information or conduct on- site visits during the term of verification to verify eligibility.

This certification is valid only for the period that the above firm remains eligible as determined by the Clearinghouse. Utility companies may direct inquiries concerning this Certificate to the Clearinghouse at (800) 359-7998 in Los Angeles.

***VON: 11080118***

***DETERMINATION DATE: October 23, 2017***

# Attachment C



Next Level HVAC Energy Management Systems  
 License Number: 1050564  
 License Class: C20  
 SBE, EBE, MBE Certified  
 3350 E. 7<sup>th</sup> St. #505  
 Long Beach, CA 90804

July 27, 2020

RFI Number: **001**

Attn: Bernards  
**Karl Aldridge**

Re: Project: **Oxnard High School**

Subj: **Request for Information – 23 09 00 Direct Digital Control System**

**COST IMPACT:**

	<input checked="" type="radio"/> YES	X (Savings)	NO
--	--------------------------------------	-------------	----

**SCHEDULE IMPACT:**

	<input checked="" type="radio"/> YES	X	NO
--	--------------------------------------	---	----

**QUESTION:**

Project Specification 23 09 00 states “Carrier OPEN BACnet Controls” as only Acceptable Manufacturer. Next Level EMS would like to propose “**Siemens**” **BACnet**, as alternate Open Controls for competitive bidding on the project.

Attached is an overview and some technical details for the non-proprietary BACnet Siemens HVAC Controls System.

Please confirm if Siemens is an acceptable manufacturer.

**REFERENCE:** 23 09 00 Direct DIGITAL Control System

**SUGGESTION:**

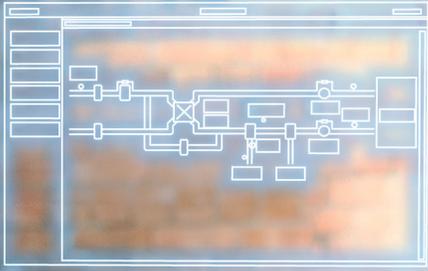
Plans and Specifications see noted below for response.

**FINAL RESPONSE:**

Product is not sustainable or compatible to existing systems without adaptations. The use of this product would create a huge cost burden and hardship on the district as an example redesign, additional training, additional staff, programming, monthly and service impacts. (Hardship) As previously responded this product is not acceptable alternative to the immediate projects design.

**SIEMENS**

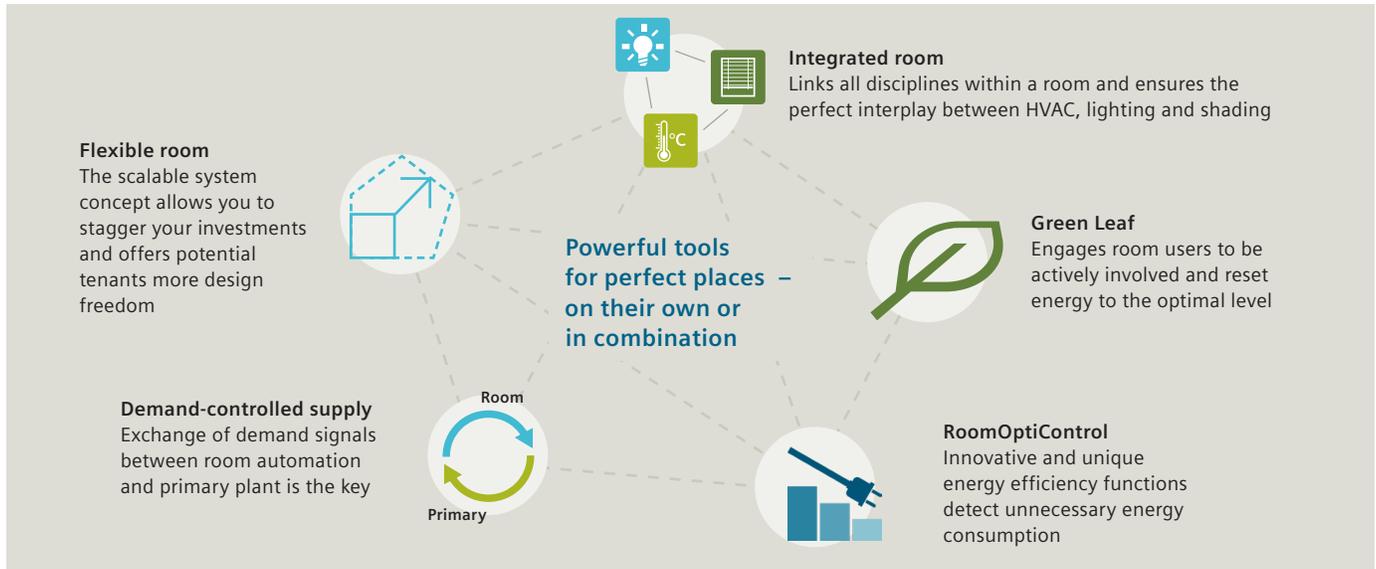
*Ingenuity for life*



# Desigo™ Total Room Automation

The unique solution for enhanced  
comfort and productivity

# Experience the ultimate comfort while increasing your productivity



## Intelligent comfort for any room

Desigo™ Total Room Automation links all disciplines within a room and ensures the perfect interplay between heating, ventilation, air conditioning, lighting and shading. Desigo™ Total Room Automation ensures a comfortable room climate, good air quality and optimal lighting conditions with as little energy consumption as possible. Optionally, all room disciplines can be operated easily and intuitively from a single room operator unit. This creates a pleasant workplace environment and increases the motivation and productivity of room users.

## High energy efficiency for your building

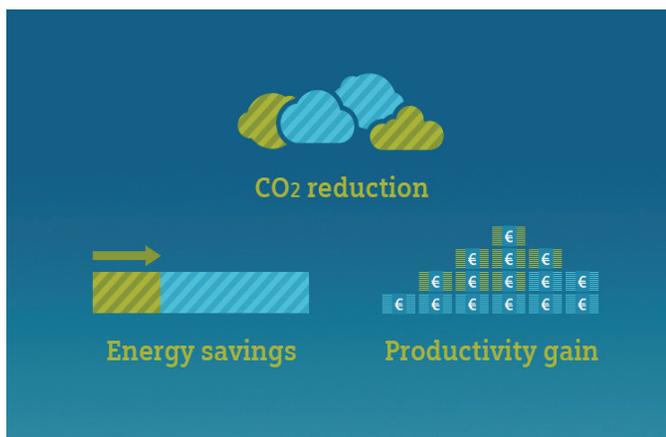
RoomOptiControl makes the perfect system. It guarantees that temperature, air quality and humidity limits – AirOptiControl – are not surpassed and reduces energy utilization up to 50 percent contrasted with a steady air volume framework. Through demand-controlled supply signals from room automation to primary plant, only the required energy is provided without ever compromising comfort conditions.

## Save up to 25 percent energy by involving room users

The room operator unit's Green Leaf symbol changes from green to red, when unnecessary HVAC, lighting or shading energy consumption is detected. Simply pressing the Green Leaf symbol resets the room automation to the most energy-efficient operation. Thus the room user is actively involved in energy-efficient operation, while enjoying the flexibility to adapt room conditions to individual needs.

## More flexibility for your building

Business goals and room usage change, and customer requirements grow. Desigo™ Total Room Automation can be expanded step by step, giving you the ability to add new features when you need them. Since it supports international communication standards, it can be integrated seamlessly into existing installations.



Siemens room automation systems control and harmonize key elements of room comfort – heating, ventilation, air conditioning, lighting and shading. Siemens flexible approach adapts to any need and its proven technology helps improve the confidence and comfort of tenants and end users.

# Green Leaf symbol for optimized room climate

## Active energy management by room users

RoomOptiControl, an innovative energy-efficiency feature, detects unnecessary energy consumption and alerts users by changing the color of the Green Leaf symbol on the room operator unit from green to red.

To reset the room controller to energy-efficient operation without loss of comfort, the user simply touches the symbol. The Green Leaf symbol returns to green.



Energy-optimized operation



Unnecessary energy consumption; energy saving potential exists

## Highlights

- Energy-efficient operation through easy-to-use Green Leaf symbol
- Workplace comfort with optimized room conditions and air quality
- Better concentration because of fatigue-free lighting conditions
- CO<sub>2</sub> level in the air can be properly measured

## Straightforward operation for a comfortable room climate

All disciplines within a room can be operated conveniently from a single room operator unit. The Desigo™ Total Room Automation room operator units are so user friendly that operating errors – and associated energy losses – are virtually eliminated. In addition, the unique Green Leaf symbol alerts users when unnecessary energy consumption occurs. Simply pressing the Green Leaf symbol is all it takes to reset the room automation system to energy-efficient operation.

## Pleasant air quality in the workplace

A pleasant workplace climate improves concentration and has a positive effect on motivation and productivity. Desigo™ Total Room Automation's innovative AirOptiControl application creates the

ideal framework. It ensures that temperature, air quality and humidity limits are not exceeded and lowers energy consumption by up to 50 percent compared to a constant air volume system.

For example, communicating sensors can measure and adjust the CO<sub>2</sub> level in the air as well as the humidity and room temperature.

## Ideal lighting conditions for productive work

Optimized lighting conditions at the workplace prevent eye strain. Desigo™ Total Room Automation automatically adjusts the lighting level to match the time of day. When needed, shading can be provided to utilize the positive effects of glare-free daylight on health over artificial light.

Through intelligent, energy-saving control of lighting and shading, Desigo™ Total Room Automation ensures optimized lighting conditions in the workplace. For example, artificial light is dimmed depending on natural light and information from presence detectors and controlled by integrated brightness sensors. Blinds are optimally adjusted to minimize glare, make use of natural light and protect from the heat and the cold.



# Maximum flexibility, minimal investment



Desigo™ Total Room Automation offers maximum flexibility. With its advanced segment concept, the building floor plan and the room layout can be adjusted easily and quickly – without modifying electrical or HVAC installations.

This means less initial expenditure and lower costs for the basic configuration.

## Lower initial costs due to scalability

The scalable system concept allows you to offer tenants or buyers a great deal of freedom to design the space any way they wish. The basic configuration can be limited to a minimal installation, which can be easily expanded by tenants based on their requirements – from the room layout to individual workplace lighting. This shortens the construction phase and makes it easier to lease or sell the building.

## Easy adaptation to changing requirements

When a reorganization becomes necessary or when the room usage or the tenant changes, the unique segment concept of Desigo™ Total

Room Automation will lower your costs. Floors in the building are subdivided into room segments and these, in turn, are flexibly combined into rooms. When the room layout changes, you can quickly adjust the segment grouping.

## Flexible settings for different work situations

The room operator units also offer flexible functionality. Scenes that trigger multiple actions in the room can be programmed for different work situations – e.g., normal operation, break, meeting or presentation – and modified if needed.

## Highlights

- Low initial costs due to scalability
- Flexible segment concept easily adapts to changes in room usage
- Room ambience can be changed by switching scenes

Using individually preprogrammed “scenes” displayed on the room operator unit, you can change the room conditions simply by fingertip. The scenes select the room temperature, ventilation, shading and lighting appropriate for each situation. For a presentation, the light is dimmed and the shades are lowered, while during a break, lighting and ventilation are turned on and heating or cooling is relaxed.



Pictured here: Desigo Control Point

Desigo offers you a broad range of room operator units: whether a simple temperature, humidity or CO<sub>2</sub> sensor, a unit with operator adjustment, units with or without the Green Leaf symbol, all in either a wall- or flush-mounted design. The high-quality touch screen room operator unit features capacitive color display and can be installed horizontally or vertically.



Pictured here: QMX3 Room Units and Sensors

## Innovative technology to minimize maintenance costs

### Highlights

- The right product for any installation requirement
- Easy integration due to open communication standards
- Fast commissioning using plug-and-play products and predefined applications

### A comprehensive range for any requirement

The Desigo™ Total Room Automation product range meets all functionality and installation requirements. In addition to room automation stations, it also includes operator units, push buttons, communicating sensors for wall and flush mounting and presence detectors with integrated brightness sensors. The Desigo™ Total Room Automation product range also combines harmoniously with different switch designs from Siemens and other manufacturers.

### Standardized communication for easy installation and use

Standardized communication lowers installation and investment costs. You can easily reuse existing HVAC and lighting installations and optimize their functionality.

### Less effort for more convenience

Desigo™ Total Room Automation offers you convenient handling, which makes installation, reconfiguration and maintenance significantly easier and faster. Simply remove the old unit and plug in the new one, and add and commission peripherals without engineering. Similarly, devices can be replaced without tools and engineering. An extensive library of tested applications facilitates planning and commissioning.





## Long-term partnership with maximum reliability

### Reliability from experience

Siemens offers optimized room automation from a single source. You will benefit from a reliable partner with more than 60 years of experience in HVAC control technology, more than 30 years of experience in building automation systems and active involvement in international standardization bodies. In addition, Desigo™ Total Room Automation is based on the proven quality of a broad installed base.

### Quality throughout

Our extensive application knowledge is reflected in our products, systems and applications. They are thoroughly tested in the in-house laboratories from Siemens under real-life conditions to ensure smooth, error-free and efficient operation.

### In touch with the latest trends

With its high level of compatibility and continuous development, Desigo™ Total Room Automation protects your investment across the entire lifecycle of your building. Changes, expansions or upgrades can be made gradually. Since Desigo™ Total Room Automation complies with global standards such as BACnet and KNX, you can rest assured that your building and room automation solution meets the latest requirements.

### Highlights

- Reliability of an experienced, competent partner
- Investment protection across the entire lifecycle
- Reliability through tested, proven components and applications
- Meeting global standards



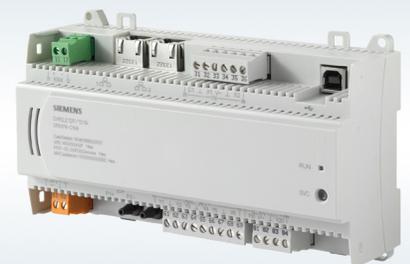
BACnet is an open communication standard for building automation used worldwide. Independent testing and certification authorities guarantee the reliability of BACnet devices.

Desigo™ Total Room Automation stations use BACnet to communicate with each other and with the management level. This ensures universal communication from the room to the management level.



KNX is an international open standard network communications protocol for building automation based on the communication

stack of EIB enlarged with physical layers, configuration modes and the application experience of BatiBUS and EHS. Desigo™ Total Room Automation integrates pre-defined applications for all HVAC functions plus basic functions required for lighting and shading. Extra functions can be provided by integrating KNX network in the building automation control system.



Pictured here: DXR

**Siemens Industry, Inc.**  
Smart Infrastructure  
1000 Deerfield Parkway  
Buffalo Grove, IL 60089  
Tel: (847) 215-1000

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07/20, Part# 153-SBT-2506

## QMX3 Room Sensors for Siemens DXR Series Controllers



QMX3.P30/P40/P70  
Sensing Only



QMX3.P02  
Sensor/Room  
Operator



QMX3.P34/P44/P74  
Sensor with Full Display



QMX3.P37  
Room Sensor/Operator  
with Display

### Description

The QMX3 Series includes sensors, switches and room operator units exclusively for use with Siemens DXR Series Controllers. The devices communicate with the controller using PL-Link protocols. All units can be installed on a standard 2" x 4" electrical box with no additional back plates required. No-logic versions are available for some units.

#### QMX3.P02

- Temperature sensor.
- Configurable touch keys for light and shade control.

#### QMX3.P30

- Temperature sensor.

#### QMX3.P34

- Temperature sensor.
- Backlit LCD display and touch keys for HVAC control.
- Green Leaf active energy management.

#### QMX3.P37

- Temperature sensor.
- Backlit LCD display and configurable touch keys for light and shade control.
- Green Leaf active energy management.

#### QMX3.P40

- Temperature and humidity sensor

#### QMX3.P44

- Temperature and humidity sensor
- Backlit LCD display and touch keys for HVAC control

#### QMX3.P70

- Temperature, humidity and air quality sensor.
- LED air quality indicator.

#### QMX3.P74

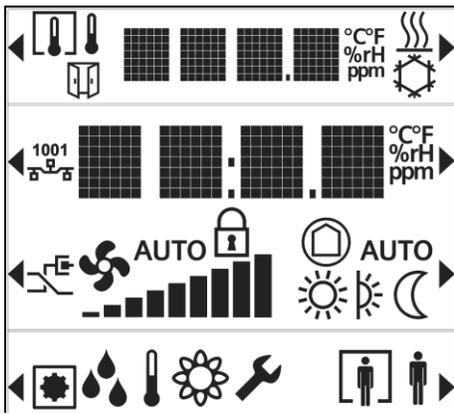
- Temperature, humidity and CO<sub>2</sub> sensor.
- Backlit LCD HMI and touch keys for HVAC control.
- Green Leaf active energy management.

### Specifications\*

Temperature	
Measuring range	32°F to 122°F (0°C to 50°C)
Accuracy	± 0.36°F @ 77°F (0.2°C @ 25°C)
Humidity (P4x and P7x)	
Measuring Range	0 to 95% rh
Accuracy	± 4% (20 to 80% rh)
CO <sub>2</sub> (P70 and P74)	
Measuring Range	400 to 10,000 PPM
Accuracy < 2K ppm	± (30 ppm +4% measured CO <sub>2</sub> ) @ 73°F (23°C) and 101.3 kPa
Temp. dependency	± 2 ppm/°C typical
Pressure dependency	0.14% of value/hPa
Long-term drift	± 20 ppm per year
Calibration	Not required
Operating voltage range	PL-Link DC 21 to 30V Max.
Power consumption	15 mA at 24 Vdc
Agency Listings	UL 916 FCC Part 15 CSA C22.2 #0 and #205
Color	White or black
Dimensions	5.25" x 3.5" x 0.71" (133.4 mm x 88.4 mm x 18 mm)
Shipping Weight	7.6 oz. (216 g)

\*Accuracies shown are for sensing elements; actual system accuracy may vary.

Display (QMX3.P34 and QMX3.P74 Only)



NOTES:

- User-accessible values and settings will vary based on overall system configuration.
- Some values (for example, open window indicator, and outdoor air temperature) require additional

	Current Room Temperature/Humidity/Air Quality
	Indicates indoor or outdoor temperature (User-selectable).
	Indicates that a window is open.
	Heating/cooling mode indicator
	Green leaf indicates optimum settings are active. (One-touch resets to optimum setpoints.)
	Displays temperature setpoint (User-adjustable)
	Displays current fan speed (User-adjustable)
	Displays current room operating mode (User-selectable)
	Displayed value selector (RH/Temp/Air Quality) (User-selectable)
	Room occupancy indicator
	Start-up/commissioning mode indicators (See start-up and commissioning documents)
	Indicates parameters are locked

Product Ordering Information

Category	Model Number	Orderable Part Number	Temperature Sensor	Humidity Sensor	CO2 Sensor	Air Quality Indicator LED	Backlit Display and Touch Keys	Green Leaf LED	Configurable Touch Keys	Window for Labels	Color
Sensors	QMX3.P30*	QMX3.P30*	•	-	-	-	-	-	-	-	White
	QMX3.P30-1WNB	QMX3.P30-1WNB	•	-	-	-	-	-	-	-	White (no logo)
	QMX3.P30-1BSC	S55624-H123	•	-	-	-	-	-	-	-	Black
	QMX3.P40	S55624-H116	•	•	-	-	-	-	-	-	White
	QMX3.P40-1BSC	S55624-H124	•	•	-	-	-	-	-	-	Black
	QMX3.P70	QMX3.P70	•	•	•	•	-	-	-	-	White
	QMX3.P70-1BSC	S55624-H125	•	•	•	•	-	-	-	-	Black
Room Operator Units	QMX3.P02	QMX3.P02	•	-	-	-	-	-	•	•	White
	QMX3.P02-1BSC	S55624-H128	•	-	-	-	-	-	•	•	Black
	QMX3.P34*	QMX3.P34*	•	-	-	-	•	•	-	-	White
	QMX3.P34-1WNB	QMX3.P34-1WNB	•	-	-	-	•	•	-	-	White (no logo)
	QMX3.P34-1BSC	S55624-H126	•	-	-	-	•	•	-	-	Black
	QMX3.P44	S55624-H143	•	•	-	-	•	•	-	-	White
	QMX3.P44-1BSC	S55624-H144	•	•	-	-	•	•	-	-	Black
	QMX3.P74*	QMX3.P74*	•	•	•	-	•	•	-	-	White
	QMX3.P74-1WNB	QMX3.P74-1WNB	•	•	•	-	•	•	-	-	White (no logo)
	QMX3.P74-1BSC	S55624-H127	•	•	•	-	•	•	-	-	Black
	QMX3.P37	QMX3.P37	•	-	-	-	•	•	•	•	White
	QMX3.P37-1BSC	S55624-H129	•	-	-	-	•	•	•	•	Black
Accessories	QMX3-GSKT	QMX3-GSKT	QMX3 Insulating Gasket (10-pack). For installing sensors on a hollow wall.								
	OCI702	S55800-Y101	USB to PL-LINK Interface with Power Supply (Required for commissioning)								
	QMX3-BP	QMX3-BP	QMX3 Replacement Back Plates (12-pack)								
	5WG11938AB01	5WG11938AB01	KNX/PL-Link Bus Connector (25-pack)								

\* For COO = USA, add suffix "-1WSB" to the part number (P30, P34 and P74 models only).

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Desigo® DXR

## Room Automation Stations

DXR2.E18



**Automation station with increased functionality and flexibility to support the demands for standard control of terminal HVAC equipment and Total Room Automation (TRA) applications. TRA offers the highest level of flexibility for energy-optimized solutions without sacrificing comfort.**

- Compact, programmable room automation stations for HVAC, lighting, and shading.
- BACnet IP Ethernet Communication (BTL certified).
- 2 port Ethernet switch.
- KNX PL-Link bus to connect sensors, actuators, and operator units (including bus power).
- USB interface.
- Operating voltage AC 24V.
- Mounted on standard DIN rails or on the wall.
- Plug-in terminal blocks.

## Features

- Total Room Automation applications combining multiple disciplines (HVAC, lighting, blinds/shading) into one comprehensive solution.
- BTL Listed as a BACnet Advanced Application Controller (B-AAC) device.
- Fully programmable using block programming.
- Proven, pre-loaded applications.
- Operational modes (Comfort, Standby, Economy, Protection, and so on).

## Preconfigured applications

### Fan Coil Unit (FCU)

- FAN COIL 2-Pipe CW/HW and HW Valves
- FAN COIL 4-Pipe CW and HW Valves
- FAN COIL staged DX Cooling and staged Heating
- FAN COIL with CW and staged Electric Heat
- FAN COIL–UNIT VENT with CW, HW and Outside Air Damper (OAD) control
- FAN COIL–UNIT VENT with CW, ELEC and OAD control
- FAN-COIL-UNIT VENT with DX, HW and OAD control
- FAN COIL-UNIT VENT with DX, ELEC and OAD control

### Chilled Beam

- Chilled Beam Passive 2 Pipe Heating/Cooling and Radiator 1-Stage Electric

### Heat Pump

- HP Variable Speed, Two Stage Elec Heat and One Stage Elec Rad with OAD
- HP Variable Speed, Water Source, HW Heat and Modulating Elec Rad with OAD
- HP Single Stage, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Two Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Ground Source, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD

## Additional Applications

- Electrical terminal heating coils, PWM, single, multi-stage or analog
- Terminal fans, single, multi-stage or analog
- Chill water, DX or hot water coils and heating/cooling coils (2-pipe or 4-pipe)
- Variable Air Volume (VAV), Dual Duct and Fan Powered VAV (FPB)
- Radiant ceiling including Chilled beams, cooling, heating and heating/cooling (2-pipe or 4-pipe) control
- Radiator/Baseboard: hot water, steam or electric
- Lighting – up to four separated or overlapping zones
  - Manual switching and dimming
  - Occupancy control and Vacancy control
  - Automatic Daylight Harvesting - step or constant level control
  - Stairwell lighting
  - Scene control

- Blinds – one or two separate zones
  - Manual control: Up, Down, Predefined positions
  - Occupancy control and Vacancy control
  - Glare Protection
  - Energy efficiency functions including solar radiation optimization
  - Slat angle
  - Scene control

## Pre-loaded Application Options

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### Fan coil unit

- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Supply (discharge) air temperature control for modulation heating or cooling coils.
- Dehumidification control.
- Terminal coils: heating (hot water or electric), cooling (chilled water or DX) and heating/cooling coil (2-pipe or 4-pipe).
- Radiant ceiling including Chilled beams and Radiator control.

### Heat pump

- Heat Pump compressors: Single, multiple or variable speed.
- Air-to-air, water loop or ground water configurations.
- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Dehumidification control.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Terminal heating coil (hot water or electric) or hot gas coil.
- Radiant ceiling including Chilled beams and Radiator control.
- Greenleaf energy efficiency determination and display.
- Configurable plant operating modes (heating, cooling, warm up, cool down, flush/purge, and so on).

## Functions

The selected application and its parameters as well as input and output configuration determine the room automation station's functionality.

A detailed description of functionality is available in the ABT (Automation Building Tool) online help.

### Communication

- 2-Port Ethernet switch for cost-effective cabling via line topology.
- USB connection for service and commissioning, firmware download, and LAN access.
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, switches, sensors, actuators, and luminaires.
  - Plug-and-play connection of Siemens field devices with KNX PL-Link.
  - Integration of common devices using KNX S-Mode (ETS engineering required).

## Type summary

Product Number	SSN	Description	Inputs	Outputs
DXR2.E18-101B (Version with 60 data points*)	S55376-C125	DXR2.E18 Room Automation Station	2 DI, 4 UI	8 DO Triacs, 4 AO 0 to 10V
DXR2.E18-101K (Version with 60 data points)	S55376-C155	Smoke Control DXR2.E18 Room Automation Station	2 DI, 4 UI	8 DO Triacs, 4 AO 0 to 10V

\* 60 data point DXRs are typically used for Desigo Total Room Automation projects.

## Accessories

Product Number	Designation
985-124	499 ohm Resistor Kit

## Product Documentation

Topic	Title	Document ID
Installation and mounting	DXR Installation Instructions	A6V10550039
Global datasheet*	DXR2 24V IP DXR2 24V MS/TP	N9205 N9207
Setup and commissioning	DXR VAV Start-up Procedures DXR FPB Start-up Procedures DXR FCU Start-up Procedures Balancing Procedures	A6V10665935 A6V10665938 A6V10665941 A6V10665943
Room Unit Datasheet	Wall mounted	A6V10394781
BTL listing	DXR PIC Statement	A6V10665948

\* Please see the Global datasheets for additional information not found in this submittal sheet.

## Technical data

## Housing

Color	RAL 7035 (light-gray)
Dimensions	180 mm (7.09 in) x 104.5 mm (4.11 in) x 59.5 mm (2.34 in)
Weight	ca. 360 g (12.69 oz)
Packaging	ca. 40 g (1.41 oz)

## Function data

Communication	
A/D Resolution (analog in)	14 Bits
D/A Resolution (analog out)	12 Bits

## Power data

Power supply	
Operating voltage	AC 24V -15%/+20%
Frequency	50/60 Hz
Internal fuse	4 A irreversible
Transformer with secondary current limitation of max. 10 A or external secondary current fuse	Max. 10 A, slow Max. 13 A, characteristic B, C, D as per EN 60898
Non-renewable fuse	
Circuit breakers	

Apparent power (VA) for transformer design						
Base Model	Base load	Max. load Triac output AC 24V~ 0.25 A each	Max. load all Aux. outputs AC 24V~	Max. load KNX PL-Link (at 50 mA)	Max. load DC 24V+ (2.4 W)	Max. Allowed Power consumption including connected field devices
DXR2.E18	8	8 x 6 = 48	18	4	6	72

Power for the Triac outputs must be reduced if the maximum load of 18 VA is required for AC 24V field supply on the DXR2.x18...

**NOTE:**

To calculate the total VA, add the Base Load + the number of Triacs + field supplies+ KNX PL-Link devices.

This cannot exceed the maximum power consumption. See the *Wiring Guidelines* for more information.

## Inputs

Analog Inputs		
Resistance sensor	Temperature measurement	Voltage measurement
AI 1000 Ω	AI PT1K 375 (NA)*	AI 0 to 10V
AI 2500 Ω	AI PT1K 385 (EU)*	AI 0 to 10V (0 to 100%)
AI 10 KΩ	AI (LG-)Ni1000*	
AI 100 KΩ	AI Ni1000 DIN*)	
	AI T1 (PTC)*	
	AI NTC10K (Type II)**)	
	AI NTC100K**)	

\* A fixed value of 1 Ω is calibrated to correct line resistance.

\*\* Configurable default.

Digital Inputs	
Contact voltage	Universal input: 18V Digital input: 21V
Contact current	Universal input: 1.2 mA; 7.4 mA initial current Digital input: 1.6 mA; 9.4 mA initial current
Contact resistance for closed contacts	Max. 100 Ω
Contact resistance for open contacts	Min. 50 kΩ

## Outputs

Analog Outputs	
0 to 10V	Max. 1 mA

Digital Outputs	
Type (Switching outputs triacs)	High side The Triac closes the contact to AC 24V
Switching voltage	AC 24V
Permissible load	250 mA/6 VA per output (cos phi 0.35) (500 mA/12 VA per output with PWM*)
Protection	Short-circuit proof

DC 24V output for field devices (1: V+)	
Output voltage	DC 24V
Permissible load	100 mA/2.4 W
Protection against overload	Short-circuit proof

## Connections

Interfaces	
Ethernet	Plugs: 2 x RJ45, screened Interface type: 10Base-T/100BASE-TX, IEEE 802.3 compatible Bitrates: 10/100 Mbps, autosensing Protocol: BACnet over UDP/IP
USB (2.0)	Plug: Type B Data rate: 12 Mbps
KNX	Type: KNX TP1 PL-Link, galvanic isolation Baud rate: 9.6 Kbps Bus power: 50 mA Short-circuit proof Protection against faulty wiring at max. AC 24V

Wiring connections	
Pluggable screw terminals	Copper wire or copper strands with ferrules 1 x 0.6 mm dia. to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.5 mm dia. to 1 mm <sup>2</sup> (24 to 18 AWG) Copper strands without ferrules 1 x 0.6 mm dia. to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.5 mm dia. to 1.5 mm <sup>2</sup> (24 to 16 AWG)
Slotted screws	Small 1/8" blade, tightening torque 0.6 Nm (0.44 lb-ft)
Wiring lengths for signals	KNX PL-Link 80 m (260 ft) with internal bus power or 300 m (990 ft) with external power supply Ethernet 100 m (330 ft) Signal lines 80 m (260 ft) For inputs AI 100 K $\Omega$ , AI NTC10K, AI NTC100K: 30 m (100 ft) or 80 m (260 ft), if shielded.

KNX/PL-Link Network and Power Wiring.*	
Cable configuration	1 or 2 twisted pair - Pair 1 red/black - Pair 2 yellow/white
Gauge	20 AWG (solid copper)
Twists per foot	4 Minimum
Capacitance	30 pF/foot or less
Shields	100% foil with drain wire
UL type	300Vrms, CMP (75 °C or higher)
CSA type	300Vrms, FT6 (75 °C or higher)

\* Alternative 18 AWG STP CMP (Belden 6320FE 8771000)

## Conformity

	<p><b>⚠ CAUTION</b></p>
	<p><b>National safety regulations</b> Failure to comply with national safety regulations may result in personal injury and property damage. Observe national provisions and comply with the appropriate safety regulations.</p>

Ambient Conditions and Protection classification	
Climatic ambient conditions <ul style="list-style-type: none"> <li>• Transport and storage</li> <li>• Operation</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature -25 to 70°C (-13 to 158°F) Air humidity 5 to 95% rh.</li> <li>• Temperature -5 to 45°C (23 to 113°F)/ -5 to 50°C (23 to 122°F) Air humidity 5 to 95% rh.</li> </ul>

Standards, Directives and Approvals	
UL Listing	UL916; UL864 (Smoke Control 'K' variant only)
Suitable for plenum area installation	UL1995
Federal Communications Commission	FCC CFR 47 Part 15 Class B
CSA Compliance and cUL certification	C22.2 No. 205
Environmental compatibility - RoHS Compliant	The product environmental declaration contains data on environmentally compatible product design and assessments (composition, packaging, environmental benefit, and disposal).
BACnet BTL Listing	BTL-AAC
CEC Title 24 Supported	—
ASHRAE 90.1 Supported	—
Quality	ISO 9001 (Quality)

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Desigo® DXR

## Actuating DXR2, BACnet/IP 24V

DXR2.E10PL-102B, DXR2.E10PLX-102B



**Combination room automation station and actuator for buildings with increased demands placed on functionality and flexibility in Room Automation applications, VAV, Dual Duct and FPB applications. TRA offers the highest level of flexibility for energy-optimized solutions without sacrificing comfort.**

- Compact, programmable room automation stations for HVAC, lighting, and shading.
- Integrated with actuator for ease of installation.
- BACnet IP Ethernet Communication (BTL certified).
- 2 port Ethernet switch.
- KNX PL-Link bus to connect sensors, actuators, and operator units (including bus power).
- USB interface.
- Operating voltage AC 24 V.
- Built-in 10 Nm actuator mounted directly on the damper shaft.
- Internal 0...500 Pa (0...2 in WC) differential pressure sensor.
- Plug-in terminal blocks.

## Features

- Total Room Automation applications combining multiple disciplines (HVAC, lighting, blinds/shading) into one comprehensive solution.
- BTL Listed as a BACnet Advanced Application Controller (B-AAC) device.
- Fully programmable using block programming.
- Proven, pre-loaded applications.
- Operational modes (Comfort, Standby, Economy, Protection, and so on).

## Preconfigured applications

Variable Air Volume (VAV) or Constant Volume (CV)

- VAV Cooling Only
- VAV with staged Electric Heat
- VAV with Hot Water
- VAV with Hot Water and Supply Temp Control

Dual Duct Variable Air Volume (VAV)

- VAV Dual duct – Cold duct and Hot duct with configurable ventilation delivery with hot water or electric heating coils and radiator
- VAV Dual duct – Cold duct and dedicated ventilation duct with DCV with hot water or electric heating coils and radiator

VAV with Fan Powered Boxes (FPB)

- VAV Series FPB with staged Electric Heat
- VAV Series FPB with Hot Water
- VAV Series FPB with Hot Water and Supply Temp Control
- VAV Parallel FPB with staged Electric Heat
- VAV Parallel FPB and Hot Water
- VAV Parallel FPB with Hot Water and Supply Temp Control

Chilled Beam

- Chilled Beam Passive Heating and Cooling with Hot Water Radiator
- Chilled Beam Active Heating and Cooling VAV with Hot Water Radiator
- Chilled Beam Active Heating and Cooling VAV with Electric 1-Stage Radiator

## Additional Applications

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- Electrical terminal heating coils, PWM, 1...3 stages or analog
- Series or Parallel fans, 1...3 stages or analog
- Chill water coils and heating/cooling coils (2-pipe or 4-pipe)
- Supply/Extract (Exhaust) airflow tracking and control
- Radiant ceiling including Chilled beams, cooling, heating and heating/cooling (2-pipe or 4-pipe) control
- Radiator/Baseboard: hot water, steam or electric
- Lighting – up to four separated or overlapping zones
  - Manual switching and dimming
  - Occupancy control and Vacancy control
  - Automatic Daylight Harvesting - step or constant level control
  - Stairwell lighting
  - Scene control

- Blinds – one or two separate zones
  - Manual control: Up, Down, Predefined positions
  - Occupancy control and Vacancy control
  - Glare Protection
  - Energy efficiency functions including solar radiation optimization
  - Slat angle
  - Scene control

### Pre-loaded Application Options

- Separate maximum and minimum flow setpoints for both heating and cooling control.
- Separate minimum ventilation flow setpoints for each occupancy mode.
- CO2 sensor and Demand control ventilation with maximum ventilation flow setpoint.
- Flexible occupancy modes: Comfort, Pre-Comfort, Economy and Protection.
- Supply (discharge) air temperature control for modulating heating or cooling coils.
- Configurable occupancy sensor control.
- Relative humidity sensor and room dew point calculation.
- Greenleaf energy efficiency determination and display.
- Configurable plant operating modes (heating, cooling, warm up, cool down, flush/purge, and so on).

### Functions

The selected application and its parameters as well as input and output configuration determine the room automation station's functionality.

A detailed description of functionality is available in the ABT (Automation Building Tool) online help.

#### Communication

- 2-Port Ethernet switch for cost-effective cabling via line topology.
- USB connection for service and commissioning, firmware download, and LAN access.
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, switches, sensors, actuators, and luminaires.
  - Plug-and-play connection of Siemens field devices with KNX PL-Link.
  - Integration of common devices using KNX S-Mode (ETS engineering required).

### Type summary

Type	Order number	Inputs	Outputs
DXR2.E10PL-102B (Version with 30 data points)	S55376-C145	1 DI, 2 UI, 1 ΔP sensor	4 DOs, 1 AO.
DXR2.E10PLX-102B (Version with 60 data points)	S55376-C146	1 DI, 2 UI, 1 ΔP sensor	4 DOs, 1 AO.

### Accessories

Type	Order number	Designation
985-124		499 ohm Resistor Kit

## Product Documentation

Topic	Title	Document ID
Installation and mounting	ADXR Installation Instructions	A6V11260017
Global datasheet*	ADXR2 24V IP ADXR2 24V MS/TP	A6v11259958 A6V11259964
Setup and commissioning	DXR VAV Start-up Procedures DXR FPB Start-up Procedures Balancing Procedures	A6V10665935 A6V10665938 A6V10665943
Room Unit Datasheet	Wall mounted	A6V10394781
BTL listing	ADXR PIC Statement	

\* Please see the Global datasheets for additional information not found in this submittal sheet.

## Technical Data

## Housing

Color	RAL 7035 (light-gray)
Dimensions	201 mm (7.91 in) x 136.94 mm (5.39 in) x 81.72 mm (3.22 in)
Weight DXR2.x10... Packaging	ca. 831 g (29.3 oz) ca. 200 g (7.05 oz)

## Function data

Communication	
A/D Resolution (analog in)	14 Bits
D/A Resolution (analog out)	12 Bits

Actuator	
Torque	88 lb-in (10 Nm)
Runtime for 90° opening or closing	90 sec. (50 Hz or 60 Hz)
Nominal angle of rotation	90°
Maximum angular rotation	95°
Shaft size	3/8...5/8 inch (8...16 mm) Dia. 1/4...1/2 inch (6...13 mm) Dia.
Minimum shaft length	3/4 inch (20 mm)

## Power data

Power supply	
Operating voltage	AC 24 V -15%/+20%
Frequency	50/60 Hz
Internal fuse	4 A irreversible
Transformer with secondary current limitation of max. 10 A or external secondary current fuse	Max. 10 A, (Class 2, 4A) Max. 13 A, characteristic B, C, D as per EN 60898
Non-renewable fuse	
Circuit breakers	

Apparent power (VA) for transformer design						
	Base load including I/O without load by field devices	Max. output load Triac at 500 mA each	Max. load for AC 24 V field supply at 200 mA	Max. load KNX PL-Link at 50 mA	Max. load for DC 24 V field supply at 100 mA	Power consumption including connected field devices
DXR2.E10P...	11	4 x 12 = 48	-	4	-	63

**NOTE:**

To calculate the total VA, add the Base Load + the number of Triacs + field supplies+ KNX PL-Link devices.

This cannot exceed the maximum power consumption. See the *Wiring Guidelines* for more information.

## Inputs

Analog Inputs		
Resistance sensor	Temperature measurement	Voltage measurement
AI 1000 $\Omega$	AI PT1K 375 (NA)*	AI 0 to 10V
AI 2500 $\Omega$	AI PT1K 385 (EU)*	AI 0 to 10V (0 to 100%)
AI 10 K $\Omega$	AI (LG-)Ni1000*	
AI 100 K $\Omega$	AI Ni1000 DIN*	
	AI T1 (PTC)*	
	AI NTC10K (Type II)**	
	AI NTC100K**	

\* A fixed value of 1  $\Omega$  is calibrated to correct line resistance.

\*\* Configurable default.

Digital Inputs	
Contact voltage	Universal input: 18V Digital input: 21V
Contact current	Universal input: 1.2 mA; 7.4 mA initial current Digital input: 1.6 mA; 9.4 mA initial current
Contact resistance for closed contacts	Max. 100 $\Omega$
Contact resistance for open contacts	Min. 50 k $\Omega$

Differential pressure sensor (inputs P1+, P1-)	
Connections (nipple diameter)	Dia. 5.2 mm (0.20 in)
Measuring range	0 to 500 Pa (0 - 2.01 in WC)
Overload range	0 to 100 kPa (0 - 402 in WC)
Measuring range accuracy	4.5%
Zero point accuracy	0.2 Pa
Resolution	12 bit

## Outputs

Analog Outputs	
AO 0-10 V	Max. 1 mA

Switching outputs Triac (outputs Y3...Y6)	
Type	High side The Triac closes the contact to AC 24 V
Switching voltage	AC 24 V
Permissible load	500 mA / 12 VA per output
Protection	Short-circuit proof

## Connections

Interfaces	
Ethernet	Plugs: 2 x RJ45, screened Interface type: 10Base-T/100BASE-TX, IEEE 802.3 compatible Bitrates: 10/100 Mbps, autosensing Protocol: BACnet over UDP/IP
USB (2.0)	Plug: Type B Data rate: 12 Mbps
KNX	Type: KNX TP1 PL-Link, galvanic isolation Baud rate: 9.6 kbps Bus power: 50 mA Short-circuit proof Protection against faulty wiring at max. AC 24 V

Wiring connections	
Pluggable screw terminals	Copper wire or copper stranded wire with connector sleeves 1 x 0.6 mm $\varnothing$ to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.6 mm $\varnothing$ to 1 mm <sup>2</sup> (22 to 18 AWG) Copper stranded wire without connector sleeves 1 x 0.6 mm $\varnothing$ to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.6 mm $\varnothing$ to 1.5 mm <sup>2</sup> (22 to 16 AWG)
Stripping length	6...7.5 mm (0.24...0.29 in)
Slotted screws	Size 1, tightening torque 0.6 Nm (0.44 lb-ft)
Wiring lengths for signals	KNX PL-Link 80 m (260 ft) with internal bus power or 300 m (990 ft) with external power supply Ethernet 100 m (330 ft) Signal lines 80 m (260 ft) For inputs AI 100 kOhm, AI NTC10K, AI NTC100K: 30 m (100 ft) or 80 m (260 ft), if shielded.

KNX/PL-Link Network and Power Wiring.*	
Cable configuration	1 or 2 twisted pair - Pair 1 red/black - Pair 2 yellow/white
Gauge	20 AWG (solid copper)
Twists per foot	4 Minimum
Capacitance	30 pF/foot or less
Shields	100% foil with drain wire
UL type	300Vrms, CMP (75 °C or higher)
CSA type	300Vrms, FT6 (75 °C or higher)

\* Alternative 18 AWG STP CMP (Belden 6320FE 8771000)

## Conformity

	<p><b>⚠ CAUTION</b></p>
	<p><b>National safety regulations</b> Failure to comply with national safety regulations may result in personal injury and property damage. Observe national provisions and comply with the appropriate safety regulations.</p>

Ambient conditions and protection classification	
Climatic ambient conditions <ul style="list-style-type: none"> <li>• Transport and Storage</li> <li>• Operation</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature -25 to 70°C (-13 to 158°F) Air humidity 5 to 95% rh.</li> <li>• Temperature -5 to 45°C (23 to 113°F)/ -5 to 50 °C (23 to 122°F) Air humidity 5 to 95% rh.</li> </ul>

Standards, directives and approvals	
UL Listing	UL916
Suitable for plenum area installation	UL1995
Federal Communications Commission	FCC CFR 47 Part 15 Class B
CSA Compliance and cUL certification	C22.2 No. 205
Environmental compatibility - RoHS Compliant	The product environmental declaration contains data on environmentally compatible product design and assessments (composition, packaging, environmental benefit, disposal).
BACnet BTL Listing	BTL-AAC
CEC Title 24 Supported	
ASHRAE 90.1 Supported	
Quality	ISO 9001 (Quality).

Issued by  
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