

# Verasys System Product Bulletin

LC-SBH200-0, LC-VZC100-0, LC-VEC100-0, LC-ZEC510-0, LC-ZEC310-0, LC-BYP200-0, LC-  
VAC1000-0, LC-VAC1001-0, LC-VAC1002-0, LC-VAC1100-0, LC-VAC3000-0, LC-IOM3711-0  
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# Introduction to the Verasys system

The Verasys system provides bundled equipment and controls solutions that use recognized and trusted brands. Verasys is a plug-and-play solution that is part of the Johnson Controls® Smart Systems. The Verasys system features simple, configurable controllers that you can bundle with HVACR equipment from the factory or install in the field. You can use Verasys to configure various HVACR controls applications for one building or an entire enterprise without using special programming tools or control engineering.

The Verasys system features advanced direct digital control (DDC) controllers bundled with Johnson Controls single packaged units (SPU), actuators, sensors, and damper assemblies. All devices self-configure, and the Verasys Smart Building Hub (SBH) monitors the devices. Through the SBH, you can access the system using either a laptop, smart phone, or tablet. The SBH connects to an Ethernet backbone to enable remote connectivity and additional features, such as email and text alarms. Verasys supported devices automatically connect the point, alarm, trend, and graphical definitions. The points appear when you connect devices to the system, thereby making Verasys an easy-to-use, light commercial building automation system (BAS).

**Figure 1: Devices in the Verasys system**



## Features and benefits

### Multi-client connectivity

Access all identifiable devices connected to the BACnet® MS/TP trunk.

### Browser-based interface

Local display replacement solution so you can access device information through any supported web browser.

### **Wi-Fi connectivity**

Commission, configure, and access building automation equipment using Wi-Fi-enabled smart devices or laptops.

### **Advanced features**

View device and site alarms, events, and trends. Modify schedules and commission devices.

### **Browser-based remote building management**

Remote management of building systems.

### **BACnet MS/TP integration**

Add third-party devices into the Verasys ecosystem through BACnet MS/TP integration.

### **Simple interlocks to IOM controllers**

Connects different systems to the Verasys network, such as exhaust and lighting systems.

### **Schedule synchronization**

Combines common schedules with the schedule synchronization feature.

### **Zone groups for scheduling**

Create schedules for multiple controllers in the same zone group.

### **Easy-to-use intuitive user interface (UI)**

Uses color-coded bars on point listings so that you can quickly view the most important statuses from a long list of points.

### **Wireless end device solutions**

Uses the Verasys Pro Wireless system to connect the TEC3000 Thermostats to a SBH using wireless signals.

### **Enterprise connectivity**

Verasys Enterprise is a cloud-based solution that provides a multi-site aggregation of equipment, data, alarms, setpoints, and schedules to authorized users. The enterprise application provides a holistic view of an enterprise and the information that is required to manage HVAC, lighting, energy, and input and output data for customers who have large building portfolios.

### **New user experience for facility**

Offers continued improvement and equipment relationship for simple user view for end-users and contractors. Included is a summary page for all HVAC devices serving spaces that includes indicators for **Name**, **Temperature**, **Status**, and **Occupancy**, and a single area to change the setpoint of the facility.

### **Data share**

Share data from one source to multiple destinations. For example, share an outside air temperature (OAT) from a SMART Equipment rooftop unit (RTU) to multiple TEC3000 devices using only one OAT source.

### **Device cloning**

Copy configuration parameters to other devices of the same type.

### **Backup and restore**

Provides a simple interface to back up all SMART Equipment devices in the system. Store the backup files on the SBH or download the file to any smart mobile device or computer that is connected to the SBH.

## Support for European light commercial to mid-market architecture

Uses Advanced Terminal Unit controllers (ATC) and application-specific, configurable Verasys controllers in Europe only. A typical application contains small mini-chillers, boilers, an air handling unit (AHU), and fan coil units (FCU).

## Support for European light commercial to mid-market by the integration of York mini-chillers to the Verasys system. Chiller model numbers:

- YMAA: software version 3.0.0.1114
- YLAA: software version 3.0.0.1114
- YLPA: software version 3.0.0.1114

## Verasys documentation

The following table contains a list of the most important Verasys documents. For more documentation and resources, visit <http://www.verasyscontrols.com>.

**Table 1: Verasys documentation**

Information	Document title	LIT or Part No.
Using the SBH user interface for tenant users	<i>Verasys Tenant User Guide</i>	<i>LIT-12013613</i>
Using the SBH to configure the Verasys system	<i>Verasys System User's Guide</i>	<i>LIT-12012371</i>
Overview of Verasys system components, features, and operating modes	<i>Verasys System Operation Overview Technical Bulletin</i>	<i>LIT-12012370</i>
Overview of Verasys BACnet MS/TP communication	<i>Verasys BACnet MS/TP Communications Technical Bulletin</i>	<i>LIT-12012362</i>
BACnet MS/TP device integration into Verasys	<i>Verasys BACnet MS/TP Integration Technical Bulletin</i>	<i>LIT-12013606</i>
Installing the SBH	<i>Verasys Smart Building Hub (SBH) Installation Guide SBH200</i>	<i>Part No. 24-10737-00237</i>
SBH network and IT guidance	<i>Verasys Smart Building Hub (SBH) Network and IT Guidance Technical Bulletin</i>	<i>LIT-12012324</i>
BACnet over IP integration	<i>Verasys BACnet over IP Integration User Guide</i>	<i>LIT-12013287</i>
Verasys Enterprise overview	<i>Verasys Enterprise Product Bulletin</i>	<i>LIT-12013647</i>
Using the Verasys Enterprise user interface	<i>Verasys Enterprise Configuration and User Guide</i>	<i>LIT-12012995</i>

**Table 1: Verasys documentation**

<b>Information</b>	<b>Document title</b>	<b>LIT or Part No.</b>
Verasys Enterprise security and IT overview	<i>Verasys Enterprise Security and IT Guide</i>	<i>LIT-12013026</i>
Wireless system overview	<i>Verasys Pro Wireless Field Bus System Technical Bulletin</i>	<i>LIT-12013020</i>
Installing Verasys controllers	<i>Verasys ZEC310 Zone Damper and BYP200 Bypass Damper Controllers Installation Guide</i>	<i>Part No. 24-10143-1248</i>
	<i>Verasys Zone Coordinator (VZC) Installation Guide</i>	<i>Part No. 24-10143-1280</i>
	<i>Verasys Equipment Controller (VEC) Installation Guide</i>	<i>Part No. 24-10143-1272</i>
	<i>Verasys Input/Output Module (IOM) Installation Guide</i>	<i>Part No. 24-10143-1256</i>
	<i>Verasys ZEC510 VAV Controllers Installation Guide</i>	<i>Part No. 24-10143-01485</i>
	<i>Verasys 18 Point 240 VAC Application Controller Installation Guide</i>	<i>Part No. 24-10143-01507</i>
	<i>Verasys 32 Point 24 VAC Application Controller Installation Guide</i>	<i>Part No. 24-10143-01515</i>
	<i>Verasys 18 Point 24 VAC Application Controller Installation Guide</i>	<i>Part No. 24-10143-01477</i>
	<i>Verasys Input/Output Module Installation Guide</i>	<i>Part No. 24-10143-01736</i>
	<i>ZFR1821/ZFR1822 Pro Wireless Router Installation Guide</i>	<i>Part No. 24-10325-00150</i>
<i>ZFR1825 Wireless Field Bus Coordinator Installation Guide</i>	<i>Part No. 24-10325-00142</i>	



**Table 1: Verasys documentation**

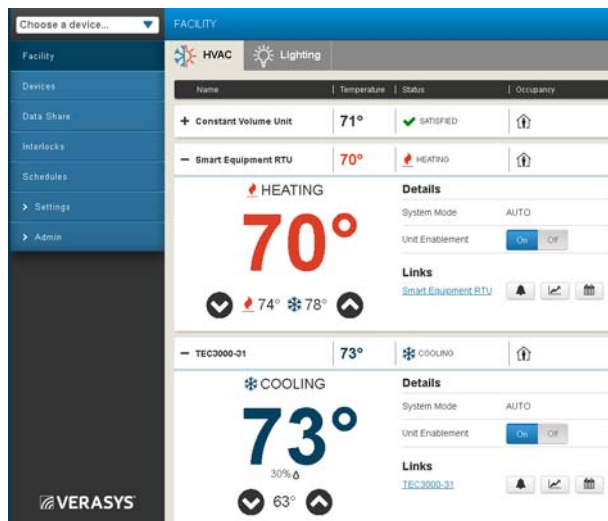
Information	Document title	LIT or Part No.
Using Verasys applications	<i>VEC100 Generic RTU Controller, Modulated Heating and Modulated Cooling Application Note</i>	<i>LIT-12013484</i>
	<i>VEC100 Generic RTU Controller, Modulated Heating and Staged Cooling Application Note</i>	<i>LIT-12013361</i>
	<i>VEC100 Generic RTU Controller, Staged Heating and Modulated Cooling Application Note</i>	<i>LIT-12013485</i>
	<i>VEC100 Generic RTU Controller, Staged Heating and Staged Cooling Application Note</i>	<i>LIT-12013443</i>
	<i>VEC100 Generic RTU Heat Pump Controller Application Note</i>	<i>LIT-12013452</i>
	<i>Verasys Constant Volume Controller Application Note</i>	<i>LIT-12013067</i>
	<i>Verasys Input Output Module Application Note LC-VAC1002-0</i>	<i>LIT-12012992</i>
	<i>Verasys Lighting Controller Application Note</i>	<i>LIT-12012524</i>
	<i>Verasys Sideloop Controller Application Note</i>	<i>LIT-12013364</i>
	<i>Verasys System Changeover Bypass Zoning System Design Application Note</i>	<i>LIT-12012331</i>
List of alarms from Verasys controllers	<i>Verasys Alarms Summary Technical Bulletin</i>	<i>LIT-12013648</i>

## SBH user interface

The SBH provides a wireless, intuitive UI optimized for mobile use.

Figure 2 shows the **Facility** view. Within this view, you can review the entire system to validate the conditions of the facility by viewing temperature, mode, and occupancy.

**Figure 2: Facility feature**



The SBH UI scales to the device you are using. The main menus and screens are side-by-side on a computer screen or tablet. On a phone display, you see either the menu or the screens you selected from that menu, for example, the TEC3000 **Home** screen. When you view the UI on a phone or smaller tablet, drag the screen from the left or right to display the required menu or screens.

## Supported controllers

The Verasys system supports the following controllers:

- Zone and Bypass Damper controllers
- VAV box controllers
- Verasys Equipment and Application controllers
- Smart Equipment controllers
- TEC30xx/TEC36xx Thermostats
- Terminal Unit controllers (TUC and ATC)
- PENN® A52x refrigeration controllers
- Third-party BACnet controllers

In the following sections you can read about the controllers in more detail.

### Zone and Bypass Damper controllers

The Zone Damper (ZEC310) and Bypass Damper (BYP200) controllers are components of the Verasys zoning system. The Zone and Bypass Damper controllers run a pre-engineered HVAC zoning application and provide the inputs and outputs required for this application. These controllers are factory-configured for field installation on a zone or bypass damper assembly when they are shipped.

The Zone and Bypass Damper controllers include advanced operating modes and multiple features that ensure occupant comfort. A carbon dioxide (CO<sub>2</sub>) demand controlled ventilation (DCV) mode in the Zone Damper regulates CO<sub>2</sub> levels within a zone by adding fresh air into the zone during occupied times. The controller uses occupancy sensing capability to switch from occupied mode to standby mode based on local activity. To maximize energy savings, standby mode uses setpoints that are higher than the occupied cooling setpoint and lower than occupied heating setpoint.

### VAV box controllers

The VAV box zone controllers run a pre-engineered HVAC zoning sequence and provide the inputs and outputs that the VAV application requires.

The ZEC510 controller contains multiple features to ensure occupant comfort. Because of an optional occupancy sensing capability, the ZEC controller can switch from occupied mode to standby mode based on zone activity. To maximize energy savings, standby mode uses setpoints that are higher and lower than the occupied mode setpoints.

The ZEC510 controller also uses plug-and-play technology to detect the connected network sensor types.

To commission VAV controllers, you can use the Verasys SBH, the MAP Gateway, or the VAV Balancing Thermostat.

## Verasys Equipment and Application Controllers (VEC and VAC)

The Verasys Equipment and Application controllers are part of the SMART Equipment controller family. The VECs run pre-engineered applications that reside on the zone bus of a zone coordinator, and provide the inputs and outputs required to monitor and control HVAC equipment.

The Application controllers run pre-engineered applications that reside on the system bus of an SBH, and provide the inputs and outputs required to monitor and control various applications.

The Equipment and Application controllers include an integral real-time clock to monitor and control schedules, calendar trends, and to operate for extended periods of time as stand-alone controllers when they are offline from the system network.

### Verasys Equipment Controller (VEC100)

The VEC100 controls either VAV or changeover bypass (COBP) units. You can use this single controller to control units that are not a Smart Equipment units. The VEC100 ships with an application that supports up to two stages of heating and four stages of cooling. Additional applications are available to control modulated heating, modulated cooling, and a heat pump. You can configure all of the controller applications for use in a VAV or COBP system and to control an economizer. The controller automatically uses analog sensors when you connect them. If you connect a return air sensor to the controller and the system is a VAV system, the warm-up feature is integrated for control. If a CO<sub>2</sub> sensor is connected and an economizer is installed, demand ventilation control sequences are available. For more information about the sequences that this controller uses, refer to the application note of the relevant application and the *Verasys System Operation Overview Technical Bulletin (LIT-12012370)*.

### Verasys Lighting controller (VAC1001)

The Verasys Lighting controller (VAC1001) is a Verasys Application controller that controls up to nine lighting contactors that are grouped in zones. You can control and schedule up to eight zones from a light level sensor. You can connect either a binary or analog light level sensor and drive the zone control based on light level. The zone also includes an associated schedule that can drive the output of the zone. You can drive contactors for outside lights because of the flexibility of the controller; lights come on when it is dark and turn off at a fixed time or drive other zones based on the schedule. The first seven zones have a binary input that can override the zone output. You can set the binary input to momentary and allow a set amount of time for the override, or maintain the input for a more permanent override.

### Input/Output Module

The Input/Output Module is a Verasys Application controller (VAC1002). The VAC1002 is a simple point multiplexer that monitors up to five analog inputs and four binary inputs. The controller controls up to nine binary outputs, connects to up to five wired or wireless NS sensors, and up to four Johnson Controls' energy meters. The VAC1002 uses the SBH to monitor and control auxiliary points in a facility.

You can configure analog, binary, and NS sensor inputs for trending and alarming. The analog trend samples are set to 200. The binary trend samples are set to 20, but you can adjust the trend interval. You can configure each input for alarming. For binary inputs, you can define which state triggers the alarm. For analog inputs, you can set high and low alarm limits. The alarm message is adjustable for binary and analog types.

You can connect Smart Edge devices to the VAC1002. The energy meter is compatible with the controller and the meter monitors the voltage, amperage, demand, and consumption for each phase of incoming power. The energy meter and all inputs are available to use with the interlock

features of the SBH. You can control all the outputs on the VAC1002 with the interlock feature or with the scheduling feature on the SBH. You can also use the data share feature to share data from one input source to multiple destinations.

## Controller features

- Integrate facility loads, such as lighting or exhaust fans, into building occupancy schedules
- Circuitry and connectors for the five analog inputs, four binary inputs, nine binary outputs, five wired or wireless NS sensors, and four energy meters
- Point interlocking for advanced control of multiple conditions, such as temperature, humidity, CO<sub>2</sub>, fan status, occupancy status, and control mode
- Customizable alarming for monitoring devices, conditions, or spaces
- Power monitoring to help you understand power usage in a facility

## Constant Volume application

The Constant Volume application is a Verasys application. You can load the application to a VAC1000 or VAC3000 depending on the equipment that you want to control. The Constant Volume application adds to the features present in Smart equipment and extends the capabilities of the TEC3xxx series for third-party equipment. The application includes support for up to four stages of cooling and four stages of heating, modulated 0 V to 10 V output for heating and cooling, and heat pump with an additional two stages of supplemental heat available. The Constant Volume application can control a mixed air damper or set a minimum outside air damper position, and meet Title 24 compliance for the state of California. Other supported features include occupancy scheduling, outdoor air lockouts, dehumidification, humidification, demand control ventilation, and much more.

## Sideloop application

The Sideloop application is a Verasys application. You can load the application to a VAC1000.

You can use the Verasys Sideloop application to design simple loops that control various types of equipment. Define the inputs, outputs, and netsensors, and enable and configure the control loops that you want to use.

You can use analog and binary control loops, and a multistage control (MSC) loop. The available control loop strategies include reset span, PID control with or without setpoint reset, binary to analog, analog to binary, and binary interlock.

## Verasys Zone Coordinator

The Verasys Zone Coordinator is used for multi-zone applications as an engine to coordinate a complete VAV or COBP system. You can order an individual Verasys Zone Coordinator or a panel version. The Verasys Zone Coordinator automatically recognizes the unit configuration, and switches to either VAV or COBP based on the system type.

## TEC30xx or TEC36xx Thermostat controllers

The TEC30xx and TEC36xx Series Thermostat controllers are Verasys Pro Wireless or BACnet MS/TP thermostats that provide on and off, floating, and proportional control of the following elements:

- Local hydronic reheat valves
- Pressure-dependent VAV equipment with or without local reheat
- Two-pipe or four-pipe fan coils

- Cabinet unit heaters
- Other zoning equipment using an on and off, floating, or 0 VDC to 10 VDC proportional control input

Models also provide single or two-stage control of unitary RTUs with or without economizers and heat pumps.

The TEC30xx Thermostat controllers are Verasys Pro Wireless models that require additional devices for the Pro Wireless network connection to the SBH.

## Verasys Pro Wireless Field Bus System

The Verasys Pro Wireless Field Bus System uses Zigbee technology to wirelessly monitor HVAC equipment that uses the BACnet protocol. The Verasys system creates a wireless mesh network that enhances reliability. A resilient, self-healing function in the system uses multiple transmission paths that automatically form for the data.

The MS/TP trunk and device limits for the Verasys SBH are the same for hard-wired products, wireless products, or a combination of hard-wired and wireless products. The wireless mesh network is independent of any building infrastructure and does not require any preexisting wireless infrastructure.

### Ideal applications

The wireless products within a Verasys system are ideal for any location where it is cost-prohibitive, difficult, or aesthetically unappealing to hardwire between products. Examples of these locations include the following:

- Office buildings, university campuses, educational facilities, and other commercial structures with brick or solid concrete walls and ceilings that impede hard-wired applications
- Retail stores and other commercial real estate where tenant turnover is frequent and temporary walls and ceilings are common
- Museums, historical buildings, atriums, and other sites where building aesthetics and historical preservation are important
- Gymnasiums and other locations with large, open spaces
- Buildings with marble, granite, glass, mirrors, wood veneer, or other decorative surfaces that present challenges to hard-wiring
- Buildings with asbestos or other hazardous materials that must not be disturbed
- Buildings with occupants sensitive to disruptions to business
- Regions with high labor costs
- Refrigerator and freezer storage containers

### Applications to avoid

Locations or applications that prohibit cellular telephones or Wi-Fi systems are unsuitable for the wireless Verasys products. Examples of these locations include the following:

- Operating rooms or radiation therapy rooms
- Validated environments
- UL 864 applications
- Department of Defense applications requiring Diacap certification, such as military bases and military hospitals

Do not use the wireless products in applications that cannot tolerate intermittent interference, or in the following situations:

- Critical control features that impact life-safety or result in large monetary loss, including secondary backup
- Life-safety applications
- Data centers, production lines, or critical areas that shut down
- Loss of critical control that results from loss of data from humidity or temperature sensor communications
- Operating exhaust fans or AHUs that impair a purge or pressurization mode
- When missing data invalidates reporting required by the customer
- Monitored security points

## PENN A52x refrigeration controllers

The PENN A5xx Series Wall Mount Refrigeration and Defrost Controllers provide refrigerated space and defrost control for low and medium temperature refrigeration applications.

## Third-party BACnet controllers

Verasys supports the automatic discovery of third-party controllers. When you connect a third-party controller to the system bus, its data automatically fills a predefined set of views based on the object type.

You can create profiles for third-party controllers. Profiles provide the following benefits:

- You can give BACnet points user-friendly names.
- You can rearrange the data into specific views.
- You can add BACnet extensions such as alarms, trends, and schedules.

You can export profiles from the SBH and import them into another SBH to ensure a consistent interface across multiple sites. Third-party controller integration also applies to the Verasys Enterprise cloud. Third-party data is visible in the Verasys Enterprise web user interface alongside the data from Verasys-compatible devices.

## Verasys application coverage

The following tables provide information about the Verasys application coverage.

**Table 2: Supported VAV and COBP unit controllers**

Feature	Simplicity Smart Equipment	3rd party controller (VEC100)
Up to four stages of cooling	Yes	Yes
Modulated cooling	No	Yes
Up to two stages of heating	Yes	Yes
Up to three stages of heating	Yes	No
Modulated heating	Yes	Yes
Heat pump	Yes	Yes
Economizer	Yes	Yes

**Table 2: Supported VAV and COBP unit controllers**

Feature	Simplicity Smart Equipment	3rd party controller (VEC100)
<b>Title 24 economizer</b> ① <b>Note:</b> 24 sequence and alarm notification is implemented from within the application. State of California certification is pending.	Yes	No
<b>Demand ventilation control</b>	Yes	Yes
<b>Dehumidification</b>	Yes	No
<b>Humidification</b>	No	No
<b>Variable frequency drive for COBP</b>	Yes	Yes

① **Note:** The table shows the applications that the LC-VEC100-0 covers. You may need to add the LC-IOM3711-0 to cover some of the features, including modulating heating or cooling. For more information, refer to the application note and quick start guide for your application.

**Table 3: Supported single zone unit controllers**

Feature	Simplicity Smart Equipment	TEC3000	LC-VAC1000-0	LC-VAC3000-0
<b>Up to two stages of cooling</b>	Yes	Yes	Yes	Yes
<b>Up to four stages of cooling</b>	Yes	No	Yes	Yes
<b>Modulated cooling</b>	No	No	Yes	Yes
<b>Up to two stages of heating</b>	Yes	Yes	Yes	Yes
<b>Up to three stages of heating</b>	Yes	No	Yes	Yes
<b>Heat pump</b>	Yes	Yes	Yes	Yes
<b>Economizer</b>	Yes	Yes	Yes	Yes
<b>Title 24 economizer</b> ① <b>Note:</b> 24 sequence and alarm notification is implemented from within the application. State of California certification is pending.	Yes	No	Yes	Yes
<b>Demand ventilation control</b>	Yes	No	Yes	Yes
<b>Dehumidification</b>	Yes	No	Yes	Yes
<b>Humidification</b>	No	No	Yes	Yes
<b>Fixed variable fan</b>	Yes	No	Yes	Yes

① **Note:** The table shows the applications that the LC-VAC1000-0 and LC-VAC3000-0 cover. You may need to add the LC-IOM3711-0 to cover additional applications. For example, the LC-VAC3000-0 is a 32-point controller with all of the applications available on the base controller except for humidification, for which you need the LC-IOM3711-0. For more information, refer to the application note and quick start guide for your application.

**Table 4: Supported VAV controllers**

Feature	Staged	Incremental	Proportional SCR
<b>Up to three stages of box heat</b>	Yes	No	No
<b>Incremental valve for box heat</b>	No	Yes	No
<b>Proportional signal for box heat (SCR or valve)</b>	No	No	Yes
<b>Supports no fan</b>	Yes	Yes	Yes
<b>Supports series fan</b>	Yes	Yes	Yes
<b>Supports parallel fan</b>	Yes	Yes	Yes
<b>Discharge temp monitoring</b>	Yes	Yes	Yes
<b>Occupancy sensing input</b>	Yes	Yes	Yes
<b>Up to five net sensors (averaging)</b>	Yes	Yes	Yes

**Table 4: Supported VAV controllers**

Feature	Staged	Incremental	Proportional SCR
Up to five CO <sub>2</sub> sensors (high select)	Yes	Yes	Yes
Staged supplemental heat	Yes	No	No
Incremental supplemental heat	No	Yes	Yes

**Table 5: Supported COBP controller**

Feature	LC-ZEC310-0
Modulated box heat	Yes
On/Off box heat	Yes
Modulated supplemental heat	Yes
PWM supplement heat (10 sec duty cycle)	Yes
On/Off supplemental heat	Yes
Occupancy sensing input	Yes
Up to five net sensors (averaging)	Yes
Up to five CO <sub>2</sub> sensors (high select)	Yes
Extra output for second damper actuator	Yes

① **Note:** Box heat is any heat source that is located in the duct. Supplement heat is any heat source that is located outside the duct.

## Ordering information

Contact your Johnson Controls representative to order Verasys system or related products. See the following table for product code numbers and product descriptions.

**Table 6: Ordering information**

Product code number	Description
LC-SBH200-0	SBH with Wi-Fi adapter
LC-SBH200-0S	SBH with Wi-Fi adapter and power supply
LC-SBH200-0LA	SBH for Latin America
LC-VZC100-0	Verasys Zone Coordinator for VAV and COBP applications
LC-VZCPNL-0	Verasys Zone Coordinator for VAV and COBP applications - panel version
LC-VEC100-0	Verasys Equipment Controller for third-party RTU (VAV, COBP), with staged heating and staged cooling application. Other applications are available. For application files and documentation, visit <a href="http://verasyscontrols.com">http://verasyscontrols.com</a> .
LC-ZEC510-0	Configurable VAV Box Controller, all fan types, staged, incremental and proportional SCR heating ① <b>Note:</b> You can order the ZEC510 controllers mounted and wired in VAV box assembly. For more information, contact your Johnson Controls representative.
LC-ZEC310-0	Field-installed zone controller, no damper ① <b>Note:</b> You can order the LC-ZEC310-0 controller mounted on round dampers. For more information, refer to the <i>Zone and Bypass Damper Controllers Catalog Page (LIT-1901009)</i> .
LC-BYP200-0	Field-installed Bypass Damper Controller, no damper ① <b>Note:</b> You can order the LC-BYP200-0 controller mounted on round dampers. For more information, refer to the <i>Zone and Bypass Damper Controllers Catalog Page (LIT-1901009)</i> .
LC-VAC1000-0	18 point 24 VAC Application Controller with no application loaded. For application files and documentation, visit <a href="http://verasyscontrols.com">http://verasyscontrols.com</a> .
LC-VAC1001-0	18 point 24 VAC Application Controller with lighting controller application loaded
LC-VAC1002-0	18 point 24 VAC Application Controller with input and output controller application loaded
LC-VAC1100-0	18 point 240 VAC Application Controller with no application loaded. For application information, contact Verasys support.
LC-VAC3000-0	32 point 24 VAC Application Controller with no application loaded. For application files and documentation, visit <a href="http://verasyscontrols.com">http://verasyscontrols.com</a> .



**Table 6: Ordering information**

Product code number	Description
LC-VLP100-0	16 in. x 20 in. lighting panel with LC-VAC1001-0 Controller, with 96 VA power supply, without relays, without contactors
LC-VLP110-0	24 in. x 24 in. lighting panel with LC-VAC1001-0 Controller, with pilot relays, without contactors
LC-VLP120-0	24 in. x 36 in. lighting panel with LC-VAC1001-0 Controller, with pilot relays, with contactors
LC-IOP200-0	16 in. x 20 in. input and output panel with LC-VAC1002-0, with 96 VA power supply
LC-ZFR1825-0	Wireless coordinator
LC-ZFR1822-0B	Wireless Repeater Kit Wall mount type
LC-ZFR1821-0B	Wireless Repeater Kit Flag mount type
LC-IOM3711-0	12-point IOM with 4 UI, 4 UO, 4 BO, Zone bus, and Sensor bus support. Relays are rated for 120/240 VAC.
A525AEDV-0203C	PENN electronic wall mount refrigeration and defrost controller with two sensor inputs and five output relays. Includes two A99B type sensors, and BACNet MSTP communication option.

**Table 7: SBH200 accessories**

Product code number	Description	Shipped with
ACC-PWRKIT-1A24	Verasys LC-SBH200-0 power supply for North America	LC-SBH200-0S
AC-PWRKIT-1D24		
ACC-PWRKIT-1E24	Verasys LC-SBH200-0 power supply for Europe	
ACC-WIFIKIT-0DU	Verasys LC-SBH200-0 USB Wi-Fi adapter for North America and Europe	LC-SBH200-0 LC-SBH200-0S

**Table 8: Supported third-party USB Wi-Fi adapters for SBH**

Manufacturer	Model Name
D-LINK®	DWA-131 E
D-LINK	DWA-171 A
D-LINK	DWA-171 C
NETGEAR®	A6100
TP-LINK®	Archer
PREMIERTEK®	PT-8811AU

**Table 9: Zone controller accessories**

Product code number	Description
<b>Zone temperature sensors (hard-wired) ZEC310 only</b>	
TE-68NT-0N00S	Wall temperature sensor, 1000 ohm, nickel with temperature occupancy button
TE-68NT-1N00S	Wall temperature sensor, 1000 ohm, nickel with warmer and cooler (W/C) adjustment and temperature occupancy pushbutton
<b>Second zone damper actuator</b>	
① <b>Note:</b> You must purchase the actuator and add it to a damper without a ZEC310 controller.	
M9106-GGA-2	6 N•m torque non-spring return damper actuator
<b>Network sensors for zone temperature and CO<sub>2</sub></b>	
NSB8BTC240-0	Network sensor, fixed segment display, Johnson Controls logo, local setpoint, white
NSB8BTC242-0	Network sensor, fixed segment display, Johnson Controls logo, local setpoint, black
NSB8BTC241-0	Network sensor, fixed segment display, no logo, local setpoint, white
<b>Network sensors for zone temperature</b>	
NS-B8BTN240-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, local setpoint, white
NS-B8BTN241-0	Network sensor, 120 mm x 80 mm, no logo, local setpoint, white
NS-B8BTN040-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, no setpoint, white
NS-B8BTN041-0	Network sensor, 120 mm x 80 mm, no logo, no setpoint, white
NS-B8BTN140-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, warmer and cooler adjustment, white
NS-B8BTN141-0	Network sensor, 120 mm x 80 mm, no logo, warmer and cooler adjustment, white

**Table 9: Zone controller accessories**

Product code number	Description
NS-B8BTN242-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, local setpoint, black
NS-B8BTN243-0	Network sensor, 120 mm x 80 mm, no logo, local setpoint, black
NS-B8BTN042-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, no setpoint, black
NS-B8BTN043-0	Network sensor, 120 mm x 80 mm, no logo, no setpoint, black
NS-B8BTN142-0	Network sensor, 120 mm x 80 mm, Johnson Controls logo, warmer and cooler adjustment, black
NS-B8BTN143-0	Network sensor, 120 mm x 80 mm, no logo, warmer and cooler adjustment, black
<b>Occupancy lighting switch</b>	
OLS-2100-1	Occupancy sensing light switch for control of indoor incandescent and fluorescent lights
RIBU1C	Enclosed relay for OLS-2100-1 sensor

**Table 10: Wireless thermostat controller models**

Code number	Control output	Occupancy	Dehumidification	Johnson Controls logo	Color
TEC3012-13-000	On/off or floating fan coil and zoning	No	Yes	Yes	Black
TEC3012-14-000	On/off or floating fan coil and zoning	No	Yes	Yes	White
TEC3012-16-000	On/off or floating fan coil and zoning	No	Yes	No	White
TEC3013-14-000	On/off or floating fan coil and zoning	Yes	Yes	Yes	White
TEC3022-13-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	Yes	Black
TEC3022-14-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	Yes	White
TEC3022-16-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	No	White
TEC3023-14-000	0 to 10 VDC proportional fan coil and zoning	Yes	Yes	Yes	White
TEC3030-13-000	Single- or two-stage RTU/heat pump with economizer	No	No	Yes	Black
TEC3030-14-000	Single- or two-stage RTU/heat pump with economizer	No	No	Yes	White
TEC3030-16-000	Single- or two-stage RTU/heat pump with economizer	No	No	No	White
TEC3031-14-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	Yes	White
TEC3031-13-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	Yes	Black
TEC3031-14-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	Yes	White
TEC3031-15-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	No	Black
TEC3031-16-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	No	White

**Table 11: Field-selectable BACnet MS/TP or N2 Networked Thermostat Controller models**

Code number	Control output	Occupancy	Dehumidification	Johnson Controls logo	Color
TEC3612-13-000	On/off or floating fan coil and zoning	No	Yes	Yes	Black
TEC3612-14-000	On/off or floating fan coil and zoning	No	Yes	Yes	White
TEC3612-16-000	On/off or floating fan coil and zoning	No	Yes	No	White
TEC3613-14-000	On/off or floating fan coil and zoning	Yes	Yes	Yes	White
TEC3622-13-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	Yes	Black
TEC3622-14-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	Yes	White
TEC3622-16-000	0 to 10 VDC proportional fan coil and zoning	No	Yes	No	White
TEC3623-14-000	0 to 10 VDC proportional fan coil and zoning	Yes	Yes	Yes	White
TEC3630-13-000	Single- or two-stage RTU/heat pump with economizer	No	No	Yes	Black
TEC3630-14-000	Single- or two-stage RTU/heat pump with economizer	No	No	Yes	White
TEC3630-16-000	Single- or two-stage RTU/heat pump with economizer	No	No	No	White
TEC3631-14-000	Single- or two-stage RTU/heat pump with economizer	Yes	No	Yes	White

**Table 12: TEC3000 accessories (order separately)**

Code number	Description
TEC-WALLPLT	Wallplate for retrofitting existing installations or concealing mounting surface damage, use with any TEC3000 Series Thermostat Controller
T-4000-119	Allen-head adjustment tool (30 per bag)

**Table 13: Verasys Pro Series wireless field bus system components selection chart**

Code number	Description
<b>LC-ZFR1825-0</b>	The LC-ZFR1825-0 kit is comprised of the following components: <ul style="list-style-type: none"> <li>ZFR1825 coordinator and mounting base with 110/220 VAC power supply</li> <li>ZFR1825 antenna with mounting bracket</li> </ul>
<b>LC-ZFR1821-0B</b>	The LC-ZFR1821-0B kit is comprised of the following components: <ul style="list-style-type: none"> <li>ZFR1821 Pro Router, electrical mechanical tubing (EMT) mount, with 3 ft RJ-12 connecting cable</li> <li>24 VAC to 15 VDC power supply for the router</li> <li>Box mount for ZFR1821 Pro Router</li> </ul> <p>Use the ZFR1821 EMT mount repeater above the ceiling mounting.</p> <p>Use the alternative ZFR1822 Pro Router for flush wall-mount or below the ceiling-mount applications.</p> <p><b>Note:</b> A field-provided ceiling clip is required to mount the ZFR1822 Pro Router below grid ceilings.</p>
<b>LC-ZFR1822-0B</b>	The LC-ZFR1822-0B kit is comprised of the following components: <ul style="list-style-type: none"> <li>ZFR1822 Pro Router, wall-mount, with 10 ft RJ-12 connecting cable</li> <li>24 VAC to 15 VDC power supply for the router</li> <li>Drywall-mounting hardware ceiling clips not provided due to variety of ceiling types</li> </ul> <p><b>Note:</b> Use the ZFR1822 Pro Router for flush wall-mount or below the ceiling-mount applications. Use a field-provided ceiling clip to mount the ZFR1822 Pro Router below grid ceilings. Use the alternative ZFR1821 Pro Router, EMT mount for above the ceiling mounting.</p>
<b>LC-ZFR1821-0</b>	The LC-ZFR1821-0 kit is comprised of the following components: <ul style="list-style-type: none"> <li>ZFR1821 Pro Router, EMT mount, functions with Metasys BACnet Wireless-Enabled Field Controller (WEFC) and WRZ Series Sensors</li> <li>Box mount for ZFR1821</li> </ul> <p><b>Note:</b> Use the ZFR1821 EMT mount repeater for above the ceiling mounting. Use the alternative ZFR1822 Pro Router for flush wall-mount or below the ceiling-mount applications. Use a field-provided ceiling clip to mount the ZFR1822 Pro Router below grid ceilings.</p>
<b>LC-ZFR1822-0</b>	The LC-ZFR1822-0 kit is comprised of the following components: <ul style="list-style-type: none"> <li>ZFR1822 Pro Router and wall-mount</li> <li>Drywall-mounting hardware ceiling clips not provided due to variety of ceiling types</li> </ul> <p><b>Note:</b> Use the ZFR1822 Pro Router for flush wall-mount or below the ceiling-mount applications. Use a field-provided ceiling clip to mount the ZFR1822 Pro Router below grid ceilings. Use the alternative ZFR1821 EMT mount repeater for above the ceiling mounting.</p>

**Table 14: ZFR1825 accessories (order separately)**

Product code number	Product description
<b>TP-2420</b>	Transformer, Wall Plug Mount, 120 VAC to 24 VAC, 20 VA, Class 2
<b>WRZ-SST-120</b>	Wireless Sensing System Tool. Requires WRZ Series Sensor to function as a site survey tool for ZFR1800 Wireless Field Bus System, or for WRZ-7860-0 One-to-One Room Sensing System.
<b>Y65T31-0</b>	Transformer, 120/208/240 VAC to 24 VAC, 40 VA, Class 2, Foot Mount, 20 cm (8 in.) Primary Leads and Secondary Screw Terminals  <b>Note:</b> Additional Y60 Series Transformers are available from Johnson Controls.
<b>ZFR-USBHA-0</b>	USB Dongle with ZFR Driver provides a wireless connection through the CCT to allow wireless commissioning of the wireless enabled FAC, FEC, IOM, and VMA16 controllers. Use the USB ZFR Dongle with the ZFR Checkout Tool to troubleshoot and validate ZFR wireless meshes using a laptop computer.
<b>ZFR-1810ANT-700</b>	Replacement antenna kit for ZFR1825 Wireless Field Bus Coordinator. Includes antenna, coaxial cable, and mounting hardware.

**Table 15: ZFR1821/ZFR1822 accessories (order separately)**

Product code number	Product description
ZFR-CBLEXT-0-0	The ZFR-CBLEXT-0 10 ft extension cable is an optional accessory of the ZFR Pro Series Wireless Field Bus System. It is a 10 ft pass-through cable with an RJ-12 connector on both ends and is inserted between the wireless controller and the ZFR Pro Router using the included straight through female-female RJ-12 coupler.
ZFR-WallCover	The ZFR-Wall Cover is an optional accessory of the ZFR Pro Series Wireless Field Bus System and enables mounting of the ZFR1822 Pro Wall Mount Router to a site-supplied single gang electrical box or mud ring.

## Technical specifications

**Table 16: SBH200 technical specifications**

Specification	Description
Power consumption	38 W maximum
Ambient temperature conditions	<b>Operating:</b> 0°C to 50°C (32°F to 122°F) <b>Operating survival:</b> -30°C to 60°C (-22°F to 140°F) <b>Non-operating:</b> -40°C to 70°C (-40°F to 158°F)
Ambient humidity conditions	<b>Storage:</b> 5% to 95% RH 30°C (86°F) maximum dew point conditions <b>Operating:</b> 10% to 90% RH, 30°C (86°F) maximum dew point conditions
Transmission speeds	<b>Serial communication (SA/FC bus):</b> 9600 bps, 19.2 kbps, 67.8 kbps, or 115.2 kbps <b>Ethernet communication:</b> 10 Mbps, 100 Mbps, 1 Gbps
Transmission range (typical)	<b>Wireless communication:</b> 30 m (100 ft) line-of-sight indoors, 91 m (300 ft) line-of-sight outdoors
Network and serial interfaces	Two SA/FC ports (RJ12 6-pin port; connects with 1.5 m [4.9 ft] RJ-12 field bus cable, and one screw terminal plug, 4-pin) Three USB ports (one Micro-B port, and two USB A ports). All support USB 2.0 and Open Host Controller Interface [Open HCI] specification.
Dimensions (H x W x D)	190 mm x 125 mm x 44.5 mm (7.48 in. x 4.92 in. x 1.75 in.)
Housing	White Polycarbonate and Acrylonitrile butadiene styrene (ABS) blend
Weight	.387kg (.852 lbs)
Web browser requirements for computers and handheld devices	<b>Computer:</b> Microsoft® Edge® 17 and Windows® Internet Explorer® 11, or Google® Chrome™ <b>Handheld device:</b> Google Chrome for Android™, or Apple Safari®. Other web browsers may display the UI, but the functionality is not guaranteed.
Compliance	<b>United States:</b> UL Listed File E107041, CCN PAZX, UL 916, Energy Management Equipment, FCC Compliant to CFR47, Part 15, Subpart B, Class A. <b>Canada:</b> UL listed file E107041, CCN PAZX7, CAN/CSA C22.2 No.205, Signal Equipment; Industry Canada Compliant.
CE	<b>Europe:</b> CE Mark - Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive. <b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant.

**Table 17: TEC3000 Series BACnet MS/TP or wireless thermostat controllers**

Specification	Description
Power requirements	19 VAC to 30 VAC, 50/60 Hz, 4 VA at 24 VAC nominal, Class 2 or safety extra-low voltage (SELV)
USB port power rating	120 mA to 250 mA current draw supported
Analog output rating (proportional control models)	0 VDC to 10 VDC into 2000 ohm resistance (minimum)

**Table 17: TEC3000 Series BACnet MS/TP or wireless thermostat controllers**

Specification		Description
<b>Relay contact rating(On/Off, floating, or staged economizer control models)</b>		19 VAC to 30 VAC, 1.0 A maximum, 15 mA minimum, 3.0 A in-rush, Class 2 or SELV
<b>Fan relay output rating(On/Off, floating, and proportional control models)</b>		19 VAC to 30 VAC, 1.0 A maximum, 15 mA minimum, 3.0 A in-rush
<b>Auxiliary output rating/triac output (On/Off, floating, and proportional control models)</b>		19 VAC to 30 VAC, 1.0 A maximum, 15 mA minimum, 3.0 A in-rush
<b>Binary inputs</b>		Dry contact across terminal COM to terminals BI1, BI2, or COS
<b>Analog inputs</b>		Nickel, platinum, A99B, 2.25k ohm negative temperature coefficient (NTC), 10,000 ohm NTC, 10,000 ohm NTC Type 3 across terminal COM to terminals R SEN or COS
<b>Temperature sensor type</b>		Local 1000 ohm platinum sensor
<b>Wire size</b>		18 AWG (1.0 mm diameter) maximum, 22 AWG (0.6 mm diameter)
<b>MS/TP network guidelines</b>		Up to 100 devices maximum per network automation engine (NAE);4,000 ft (1,219 m) maximum cable length, add repeaters to extend this length.
<b>Wireless band</b>		Direct-sequence spread-spectrum 2.4 GHz ISM bands
<b>Transmission power</b>		10 mW maximum
<b>Transmission range</b>		50 ft (15.2 m) recommended indoor 250 ft (76.2 m) line of sight, maximum
<b>Temperature range</b>	<b>Backlit display</b>	-40.0°F/-40.0°C to 122.0°F/50.0°C in 0.5° increments
	<b>Heating control</b>	40.0°F/4.5°C to 90.0°F/32.0°C
	<b>Cooling control</b>	54.0°F/12.0°C to 100.0°F/38.0°C
<b>Accuracy</b>	<b>Temperature</b>	±0.9F°/±0.5C° at 70.0°F/21.0°C typical calibrated
	<b>Humidity (On/Off, floating, and proportional control models)</b>	±5% RH from 20% to 80% RH at 50°F to 90°F (10°C to 32°C)
<b>Minimum deadband</b>		2F°/1C° between heating and cooling
<b>Occupancy sensor motion detection (occupancy sensing models)</b>		Minimum of 94 angular degrees up to a distance of 15 ft (4.6 m);based on a clear line of sight
<b>Ambient conditions</b>	<b>Operating</b>	32°F to 122°F (0°C to 50°C); 95% RH maximum, noncondensing
	<b>Storage</b>	-22°F to 122°F (-30°C to 50°C); 95% RH maximum, noncondensing
<b>Compliance</b>	<b>United States</b>	UL Listed, File E27734, CCN XAPX, under UL60730 Transmission complies with FCC Part 15.247 regulations for low power unlicensed transmitters; transmitter identification FCC: OEJ-WRZRADIO
	<b>Canada</b>	UL Listed, File E27734, CCN XAPX7 under E60730 Industry Canada (IC) RSS-210;transmitter identification ZFR1810-1: IC: 279A-WRZRADIO
<b>CE</b>	<b>Europe TEC36xx-0x-000</b>	CE Mark—Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the Radio Equipment Directive (RED), the Low Voltage Directive (LVD), the EMC Directive, and the RoHS Directive.
	<b>Australia and New Zealand</b>	RCM Mark, Australia/NZ Emissions Compliant
<b>Shipping weight</b>	<b>Models without occupancy sensor</b>	0.75 lb (0.34 kg)
	<b>Models with occupancy sensor</b>	0.77 lb (0.35 kg)

**Table 18: Zone Damper and Bypass Damper Controllers**

Specification	Description
<b>Product code number</b>	LC-ZEC310-0: Field installed, Zone Damper Controller LC-BYP200-0: Field installed Bypass Damper Controller
<b>Power supply requirement</b>	24 VAC, nominal, 20 VAC minimum/30 VAC maximum, 50 Hz to 60 Hz, Class 2 power supply (North America) or SELV (Europe)
<b>Power consumption</b>	10 VA, not including external load VA ratings do not include any power supplied to the peripheral devices connected to binary outputs (BOs) or configurable outputs (COs), which can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 60 VA, maximum.
<b>Ambient conditions</b>	Ambient operating conditions: 0°C to 50°C (32°F to 122°F) Ambient storage conditions: -40°C to 70°C (-40°F to 158°F)
<b>Processor</b>	RX630 32-bit Renesas® microcontroller
<b>Memory</b>	1 MB flash memory and 512 KB Random Access Memory (RAM)
<b>Input and output capabilities</b>	1 - Universal Input: Defined as 0 VDC-10 VDC, 4 mA-20 mA, 0-600 K ohm, or binary dry contact 3 - BOs: Defined as 24 VAC Triac, internal power source 2 - COs: Defined as 0 VDC-10 VDC or 24 VAC Triac BO
<b>Analog input/Analog output accuracy</b>	Analog input: 15-bit resolution on UIs Analog output: 0 VDC-10 VDC ± 200 mV
<b>Mounting</b>	Mounts to damper shaft using single set screw and to duct with single mounting screw
<b>Actuator rating</b>	4 N•m (35 lb•in) minimum shaft length = 44 mm (1-3/4 in)
<b>Damper shaft size requirements</b>	Round shaft diameter: 10 mm (3/8 in.) to 13 mm (1/2 in.) Square shaft size: 10 mm (3/8 in.) Serrated actuator coupling for additional grip.
<b>Dimensions (H x W x D)</b>	165 mm x 125 mm x 73 mm (6.5 in. x 4.92 in. x 2.9 in.)
<b>Differential pressure transducer (BYP200 only)</b>	Range: -1.5 in. W.C. to 1.5 in. W.C. Performance characteristics: Accuracy ±1.3% Full Span Maximum (± 0.39 in. W.C.) Typical accuracy at zero (null) pressure is ±.02% full scale
<b>Shipping weight</b>	0.65 kg (1.45 lb)
<b>Compliance</b>	<b>United States:</b> UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CFR47, Part 15, Subpart B, Class A <b>Canada:</b> UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003

**Table 19: ZEC510 VAV Controller**

Specification	Description
<b>Product code numbers</b>	LC-ZEC510-x
<b>Power supply requirement</b>	20 VAC to 30 VAC at 50 Hz to 60 Hz, Class 2 power supply or Safety Extra-Low Voltage (SELV) at 50/60 Hz (20 VAC minimum)
<b>Power consumption</b>	10 VA not including external load
<b>Ambient conditions</b>	<b>Ambient operating conditions:</b> 0°C to 50°C (32°F to 122°F); 10% to 90% RH condensing <b>Ambient storage conditions:</b> -40°C to 85°C (-40°F to 185°F); 10% to 90% RH
<b>Processor</b>	RX630 Renesas® 32-bit microcontroller
<b>Memory</b>	1.5 MB flash nonvolatile memory for operating system, configuration data, and operations data storage and 512k Synchronous Random Access Memory (SRAM) for operations data dynamic memory
<b>Mounting</b>	On a flat surface with screws
<b>Actuator rating</b>	4 N•m (35 lb•in) minimum shaft length = 44 mm (1-3/4 in)
<b>Damper shaft size requirements</b>	Round shaft diameter: 10 mm (3/8 in.) to 13 mm (1/2 in.) Square shaft size: 10 mm (3/8 in.) Serrated actuator coupling for additional grip.

**Table 19: ZEC510 VAV Controller**

Specification	Description
Dimensions (height x width x depth)	165 mm x 125 mm x 73 mm (6.5 in. x 4.92 in. x 2.87 in.)
Shipping weight	0.65 kg (1.43 lb)
Compliance	<p><b>United States:</b> UL Listed, File E107041, CCN PAZX, UL 916 FCC Compliant to CFR47, Part 15, Subpart B, Class A</p> <p><b>Canada:</b> UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003</p>

**Table 20: VEC technical specifications**

Specification	Description
Product code number	LC-VEC100-0 Verasys Equipment Controller 24 Volts with display
Supply voltage	24 VAC, 20 VAC minimum, 30 VAC maximum, 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
Power consumption	<p>20 VA maximum</p> <p><b>Note:</b> VA rating does not include any power supplied to the peripheral devices connected to binary outputs (BOs) or configurable outputs (COs). The peripheral devices can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 60 VA maximum.</p>
Ambient conditions	<p>Operating: -4°F to 158°F (-20°C to 70°C); 10% to 95% RH noncondensing; Pollution Degree 2</p> <p>Storage: -40°F to 185°F (-40°C to 85°C); 5% to 95% RH noncondensing</p>
Addressing	<p>BACnet® MS/TP: valid field controller device addresses 4 to 127. Device addresses 0 to 3 and 128 to 255 are reserved and not valid field controller addresses.</p> <p>N2: valid field controller device addresses 1 to 255.</p>
Communications bus	<p>BACnet® MS/TP:</p> <p>3-wire zone bus between the supervisory controller and the field controller.</p> <p>3-wire sensor bus between the controller, network sensors, and other sensor and actuator devices. Includes a lead to source 15 VDC supply power from the controller to bus devices.</p>
Processor	RX631 Renesas® 32-bit microcontroller
Memory	16 MB flash memory and 8 MB RAM
Input and output capabilities	<p>Five universal inputs, application-specific, three available modes:</p> <ul style="list-style-type: none"> <li>Voltage input: 0 VDC to 10 VDC</li> <li>Current sense input: 4 mA to 20 mA</li> <li>Resistive inputs/dry contact inputs</li> </ul> <p>Four binary inputs: defined as dry contact maintained</p> <p>Three configurable outputs, application-specific, two available modes:</p> <ul style="list-style-type: none"> <li>Analog output: 0 VDC to 10 VDC, 10 mA</li> <li>Triac output: 24 VAC, 0.5 A, externally sourced powered</li> </ul> <p>One utility output power port (24~ OUT): ability to deliver 24 VAC</p> <p>Four binary outputs (relays): single-pole, single-throw. Dry contacts rated 240 VAC.</p> <ul style="list-style-type: none"> <li>UL: 240 VAC 5 A resistive, 1.9 LA/11.1 LRA, D300 pilot duty, 158°F/70°C, 30,000 cycles</li> <li>IEC: 240 VAC 3 A resistive, 3 A inductive, Cos=0.6, -4°F to 158°F (-20°C to 70°C), 100,000 cycles</li> </ul> <p><b>Note:</b> Reference all relay commons to the same pole of the supply circuit.</p> <p>Two binary outputs (Triacs): output: 24 VAC or 240 VAC, 0.5 A, externally powered</p> <p><b>Note:</b> Reference all triac commons to the same pole of the supply circuit.</p>
Analog input and analog output resolution and accuracy	<p>Analog input: 15-bit resolution</p> <p>Analog output: 15-bit resolution, +/- 200 mV accuracy in 0 VDC to 10 VDC applications</p>



**Table 20: VEC technical specifications**

Specification	Description
<b>Terminations</b>	Input and output: fixed spade terminals Sensor bus, zone bus, Modbus: 4-wire and 3-wire pluggable screw terminal blocks Sensor bus tool port: RJ-12 6-pin modular jack Field install option: Input and output: fixed solder terminals Sensor bus, zone bus, Modbus: 4-wire and 3-wire pluggable screw terminal blocks Sensor bus tool port: RJ-12 6-pin modular jack
<b>Mounting</b>	Horizontal on single 35-mm DIN rail mount preferred, or screw mount on flat surface with three integral mounting clips on the controller
<b>Housing</b>	Enclosure material: Polycarbonate Lexan SABIC EXL9330
<b>Dimensions (H x W x D)</b>	6.45 in. x 4.92 in. x 2.08 in. (164 mm x 125 mm x 53 mm) excluding terminals and mounting clips
<b>Weight</b>	0.5 kg (1.1 lb)
<b>Compliance</b>	United States: UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CRF47, Part 15, Subpart B, Class A Canada: UL Listed, File E107041, CNN PAZX7 CAN/CSA C22.2 No.205, Signal Equipment Industry Canada Compliant, ICES-003
<b>CE</b>	Europe: Johnson Controls declares that this product is also in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive Declared as Electronic Independently mounted control, suitable for DIN rail mounting. Intended to mount in remote panel. Type 1.C (Micro-interruption), 330 V rated impulse voltage. 125°C ball pressure test.
	Australia and New Zealand: RCM Mark, Australia/NZ Emissions Compliant

**Table 21: Zone Coordinator Controller**

Specification	Description
<b>Power requirements</b>	<b>Enclosure model:</b> 120/240 VAC Primary 50/60 Hz, 24 VAC Secondary Transformer, +10%/-15%, 400 mA, nominal 12 VA <b>Board-Only model:</b> 24 VAC(15%), Primary 50/60 Hz, 24 VAC Secondary Transformer (±15%), 400 mA, nominal 12 VA, 12 VDC (+50%/-2%)
<b>Addressing</b>	Addressing is selectable by the MAC Address Switch: 8-position DIP switch using switches 1 through 7, valid address range 4 to 127
<b>Installation environment</b>	Protected, dry
<b>Ambient operating conditions</b>	-40°C to 65°C (-40°F to 149°F); 0% to 95% RH, noncondensing
<b>Ambient storage conditions</b>	-40°C to 85°C (-40°F to 185°F); 0% to 95% RH, noncondensing
<b>Power</b>	<b>Enclosure model:</b> One 3-position terminal block for 120/240 VAC supply power <b>Board-only model:</b> Removable terminal plug for 24 VAC supply power and removable terminal plug for 12 VDC supply power
<b>Shipping weight</b>	<b>Enclosure model:</b> 2 kg (4.5 lb) <b>Board-only model:</b> 227 g (8 oz)
<b>Compliance</b>	<b>United States:</b> UL Listed 916/FCC Part 15, conducted and radiated
<b>CE</b>	<b>Europe:</b> CE Mark—Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and the Low Voltage Directive.

**Table 22: LC-VAC100x-0**

Specification	Description
<b>Product code numbers</b>	LC-VAC100x-0 Verasys 18 point 24 V Application Controller with display
<b>Supply voltage</b>	24 VAC, 20 VAC minimum and 30 VAC maximum, 50/60 Hz, power supply class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
<b>Power consumption</b>	20 VA maximum for LC-VAC100x-0 <i>i</i> <b>Note:</b> VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs). This can consume up to 12 VA for each BO or CO; for a possible total consumption of an additional 60 VA maximum.
<b>Ambient conditions</b>	<b>Operating:</b> -4°F to 158°F (-20°C to 70°C); 10% to 95% Relative Humidity (RH) noncondensing; Pollution degree 2 <b>Storage:</b> -40°F to 185°F (-40°C to 85°C); 5% to 95% RH noncondensing.
<b>Addressing</b>	<b>BACnet® MS/TP:</b> Valid field controller device addresses 4–127 Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses. <b>N2:</b> Valid field controller device addresses 1 to 255.
<b>Communications bus</b>	<b>BACnet® MS/TP, Modbus and N2 through RS-485:</b> <ul style="list-style-type: none"> <li>3-wire System Bus between the supervisory controller and field controller</li> <li>4-wire Sensor Bus between controller, network sensors and other sensor and actuator devices, includes a lead to source 15 VDC supply power from controller to bus devices</li> <li>3-wire one modbus communication half-duplex, master RTU port.</li> </ul>
<b>Processor</b>	RX631 Renesas® 32-bit microcontroller
<b>Memory</b>	16 MB flash memory and 8 MB RAM
<b>Input and output capabilities</b>	<b>Five universal inputs:</b> application-specific, three available modes (see application note for wiring diagrams and usage): <ul style="list-style-type: none"> <li>Voltage input: 0 VDC to 10 VDC</li> <li>Current sense input: 4 mA to 20 mA</li> <li>Resistive inputs/dry contact inputs</li> </ul> <b>Four binary inputs:</b> Defined as dry contact maintained <b>Three configurable outputs:</b> application-specific, two available modes: <ul style="list-style-type: none"> <li>Analog output: 0 VDC to 10 VDC, 10 mA</li> <li>Triac output: 24 VAC, 0.5 A, externally sourced powered</li> </ul> <b>One utility output power port (24~ OUT):</b> Ability to deliver 24 VAC <b>Four binary outputs (relays):</b> Single-pole, single-throw. Dry contacts rated 240 VAC. <ul style="list-style-type: none"> <li>UL: 240 VAC 5 A resistive, 1.9 LA/11.1LRA, D300 pilot duty, 70°C/158°F (30,000 cycles)</li> <li>IEC: 240 VAC 3 A resistive, 3A inductive, Cos=0.6, -4°F to 158°F (-20°C to 70°C) (100,000 cycles)</li> </ul> <i>i</i> <b>Note:</b> Reference all relay commons to the same pole of the supply circuit. <b>Two BO Triacs:</b> Output: 24 VAC or 240 VAC, 0.5 A, externally powered <i>i</i> <b>Note:</b> Reference all triac commons to the same pole of the supply circuit.
<b>Analog input/Analog output resolution and accuracy</b>	<b>Analog input:</b> 12-bit resolution <b>Analog output:</b> 15-bit resolution; +/- 200 mV accuracy in 0 VDC to 10 VDC applications
<b>Terminations</b>	Input and output: Fixed spade terminals Sensor, system and modbus: 4-wire and 3-wire pluggable screw terminal blocks Sensor Bus tool port: RJ-12 6-pin modular jack
<b>Mounting</b>	Horizontal on a single 35 mm DIN rail mount is preferred, or screw mount on flat surface with three integral mounting clips on the controller Mount the controller on a wall or DIN rail inside an enclosure rated at least IP20.
<b>Housing</b>	Enclosure material: Polycarbonate Lexan SABIC EXL9330
<b>Dimensions (H x W x D)</b>	6.45 in. x 4.92 in. x 2.08 in. (164 mm x 125 mm x 53 mm) excluding terminals and mounting clips

**Table 22: LC-VAC100x-0**

Specification	Description
<b>Weight</b>	0.5 kg (1.1 lb)
<b>Compliance</b>	<p><b>United States:</b> cULus Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CRF47, Part 15, Subpart B, Class A</p> <p><b>Canada:</b> cULus Listed, File E107041, CNN PAZX7 CAN/CSA C22.2 No.205, Signal Equipment Industry Canada Compliant, ICES-003</p>
<b>CE</b>	<p><b>Europe:</b> Johnson Controls declares that this product is also in compliance with the essential requirements and other relevant provisions of the EMC Directive Declared as Electronic Independently mounted control, suitable for DIN rail mounting. Intended to mount in remote panel. Type 1.C (Micro-interruption), 330 V rated impulse voltage. 125°C ball pressure test.</p>
	<b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant

**Table 23: LC-VAC110x-0**

Specification	Description
<b>Product code numbers</b>	LC-VAC110x-0 Verasys 18 point 240 V Application Controller 120/240 VAC with display
<b>Supply voltage</b>	120/240 VAC, 50/60 Hz, power supply Class 1 (North America), SELV (Europe)
<b>Power consumption</b>	<p>20 VA maximum for LC-VAC110x-0</p> <p><b>Note:</b> VA rating does not include any power supplied to the peripheral devices connected to BOs or COs. This can consume up to 12 VA for each BO or CO; for a possible total consumption of an additional 60 VA, maximum.</p>
<b>Ambient conditions</b>	<p><b>Operating:</b> -4°F to 158°F (-20°C to 70°C); 10% to 95% RH noncondensing; pollution degree 2</p> <p><b>Storage:</b> -40°F to 185°F (-40°C to 85°C); 5% to 95% RH noncondensing.</p>
<b>Addressing</b>	<p><b>BACnet® MS/TP:</b> Valid field controller device addresses 4-127 Device addresses 0-3 and 128-255 are reserved and not valid field controller addresses.</p> <p><b>N2:</b> Valid field controller device addresses 1 to 255</p>
<b>Communications bus</b>	<p><b>BACnet® MS/TP, Modbus and N2 through RS-485:</b></p> <ul style="list-style-type: none"> <li>3-wire System Bus between the supervisory controller and field controller</li> <li>4-wire Sensor Bus between controller, network sensors, and other sensor and actuator devices, includes a lead to source 15 VDC supply power from controller to bus devices</li> <li>3-wire one modbus communication half-duplex, master RTU port.</li> </ul>
<b>Processor</b>	RX631 Renesas® 32-bit microcontroller
<b>Memory</b>	16 MB flash memory and 8 MB RAM

**Table 23: LC-VAC110x-0**

Specification	Description
<b>Input and output capabilities</b>	<p><b>Five universal inputs:</b> application-specific, three available modes (see application note for wiring diagrams and usage):</p> <ul style="list-style-type: none"> <li>• Voltage input: 0 VDC to 10 VDC</li> <li>• Current sense input: 4 mA to 20 mA</li> <li>• Resistive inputs and dry contact inputs</li> </ul> <p><b>Four binary inputs:</b> Defined as dry contact maintained</p> <p><b>Three configurable outputs:</b> application-specific, two available modes:</p> <ul style="list-style-type: none"> <li>• Analog Output: 0 VDC to 10 VDC, 10 mA</li> <li>• Triac Output: 24 VAC, 0.5 A, externally sourced powered.</li> </ul> <p><b>One utility output power port:</b> Ability to deliver 24 VAC</p> <p><b>Four binary outputs (relays):</b> Single-pole, single-throw. Dry contacts rated 240 VAC.</p> <ul style="list-style-type: none"> <li>• UL: 240 VAC, 5 A resistive, 1.9 LA/11.1LRA, D300 pilot duty, 70°C/158°F, 30,000 cycles</li> <li>• IEC: 240 VAC, 3 A resistive, 3 A inductive, Cos=0.6, -4°F to 158°F (-20°C to 70°C), 100,000 cycles.</li> </ul> <p>ⓘ <b>Note:</b> Reference all relay commons to the same pole of the supply circuit.</p> <p><b>Two BO Triacs:</b> Output: 24 VAC or 240 VAC, 0.5 A, externally powered</p> <p>ⓘ <b>Note:</b> Reference all triac commons to the same pole of the supply circuit.</p>
<b>Analog input/Analog output resolution and accuracy</b>	<p><b>Analog input:</b> 12-bit resolution</p> <p><b>Analog output:</b> 15-bit resolution, +/- 200 mV accuracy in 0 to 10 VDC applications</p>
<b>Terminations</b>	<p>Input/output: Fixed spade terminals</p> <p>Sensor, system and modbus: 4-wire and 3-wire pluggable screw terminal blocks</p> <p>Sensor Bus tool port: RJ-12 6-pin modular jack</p>
<b>Mounting</b>	<p>Horizontal on a single 35 mm DIN rail mount is preferred, or screw mount on flat surface with three integral mounting clips on controller.</p> <p>Mount the controller on a wall or DIN rail inside an enclosure (rated at least IP20).</p>
<b>Method to provide earthing (Grounding)</b>	<p>Functional earthing: Terminal W44</p>
<b>Housing</b>	<p>Enclosure material: Polycarbonate Lexan SABIC EXL9330</p>
<b>Dimensions (H x W x D)</b>	<p>7.48 in. x 4.92 in. x 2.28 in. (190 mm x 125 mm x 58 mm) excluding terminals and mounting clips</p>
<b>Weight</b>	<p>1.1 lb (0.5 kg)</p>
<b>Compliance</b>	<p><b>United States:</b> cULus Listed, File E107041, CCN PAZC, UL 916, Energy Management FCC Compliant to CRF47, Part 15, Subpart B, Class A</p> <p><b>Canada:</b> cULus Listed, File E107041, CNN PAZX7 CAN/CSA C22.2 No.205, Signal Equipment</p> <p>Industry Canada Compliant, ICES-003</p>
<b>CE</b>	<p><b>Europe:</b> Johnson Controls declares that this product is also in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive</p> <p>Declared as Electronic Independently mounted control, suitable for DIN rail mounting. Intended to mount in remote panel. Type 1.C (Micro-interruption) for relays, 2,500 V rated impulse voltage. 125°C ball pressure test.</p>
	<p><b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant</p>

**Table 24: LC-VAC300x-0**

Specification	Description
<b>Product code numbers</b>	LC-VAC300x-0 Controller 24 V with display
<b>Supply voltage</b>	24 VAC, 20 VAC minimum/30 VAC maximum, 50/60 Hz, power supply class 2 (North America), SELV, Europe.
<b>Power consumption</b>	<p><b>20 VA maximum</b></p> <p>ⓘ <b>Note:</b> VA rating does not include any power supplied to the peripheral devices connected to BOs or COs. This can consume up to 12 VA for each BO or CO; for a possible total consumption of an additional 60 VA, maximum.</p>
<b>Ambient conditions</b>	<p><b>Operating:</b> -4°F to 158°F (-20°C to 70°C); 10% to 95% RH noncondensing; pollution degree 2.</p> <p><b>Storage:</b> -40°F to 185°F (-40°C to 85°C); 5% to 95% RH noncondensing</p>
<b>Addressing</b>	<p><b>BACnet® MS/TP:</b> Valid field controller device addresses 4–127 Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses.</p> <p><b>N2:</b> Valid field controller device addresses 1 to 255</p>
<b>Communications bus</b>	<p><b>BACnet® MS/TP, Modbus and N2 through RS-485:</b></p> <ul style="list-style-type: none"> <li>• 3-wire System Bus between the supervisory controller and field controller addresses</li> <li>• 4-wire Sensor Bus between controller, network sensors and other sensor and actuator devices, includes a lead to source 15 VDC supply power from controller to bus devices</li> <li>• 3-wire one Modbus communication half-duplex, master RTU port</li> </ul>
<b>Processor</b>	RX631 Renesas® 32-bit microcontroller
<b>Memory</b>	16 MB flash memory and 8 MB RAM
<b>Input and output capabilities</b>	<p><b>Six Universal Inputs:</b> application-specific, three available modes (see application note for wiring diagrams and usage):</p> <ul style="list-style-type: none"> <li>• Voltage input: 0 VDC to 10 VDC</li> <li>• Current sense input: 4 mA to 20 mA</li> <li>• Resistive inputs and dry contact inputs</li> </ul> <p><b>12 Binary Inputs:</b> Defined as dry contact maintained</p> <p><b>Four Configurable Outputs:</b> application-specific, two available modes:</p> <ul style="list-style-type: none"> <li>• Analog Output: 0 VDC to 10 VDC, 10 mA</li> <li>• Triac Output: 24 VAC, 0.5 A, externally sourced powered</li> </ul> <p><b>One Utility Output Power Port (24~ OUt):</b> Ability to deliver 24 VAC</p> <p><b>Four BO relays:</b> Single-pole, single-throw. Dry contacts rated 240 VAC</p> <ul style="list-style-type: none"> <li>• UL: 240 VAC 5A resistive, 1.9 LA/11.1LRA, D300 pilot duty, 158°F/70°C, 30,000 cycles</li> <li>• IEC: 240 VAC 3A resistive, 3A inductive, Cos=0.6, 4°F to 158°F (-20°C to 70°C), 100,000 cycles</li> </ul> <p><b>One BO relay:</b> Single-pole, double-throw, dry contacts rated 240 VAC</p> <ul style="list-style-type: none"> <li>• UL: 240 VAC 5A resistive, 1.9 LA/11.1LRA, D300 pilot duty, 158°F/70°C, 30,000 cycles</li> <li>• IEC: 240 VAC 3A Resistive, 3A inductive, Cos=0.6, -4°F to 158°F (-20°C to 70°C) 100,000 cycles</li> </ul> <p><b>One PWM Output Port:</b> 5 V, 12 V, 15 V selectable PWM output voltage, 10 mA maximum continuous current, 100 Hz</p> <p>ⓘ <b>Note:</b> Reference all relay commons to the same pole of the supply circuit.</p> <p><b>Four BO Triacs:</b> Output: 24 VAC or 240 VAC, 0.5 A, externally powered</p> <p>ⓘ <b>Note:</b> Reference all triac commons to the same pole of the supply circuit.</p>
<b>Analog input/Analog output resolution and accuracy</b>	<p>Analog Input: 12-bit resolution</p> <p>Analog Output: 15-bit resolution, +/- 200 mV accuracy in 0 VDC to 10 VDC applications</p>
<b>Terminations</b>	<p>Input/Output: Fixed spade terminals</p> <p>Sensor/System/Modbus: 4-wire and 3-wire pluggable screw terminal blocks</p> <p>Sensor Bus tool port: RJ-12 6-pin modular jack</p>

**Table 24: LC-VAC300x-0**

Specification	Description
<b>Mounting</b>	Horizontal on a single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on controller. Mount the Verasys Controllers on a wall or DIN rail inside an enclosure, rated at least IP20.
<b>Housing</b>	Enclosure material: Polycarbonate LEXAN ® SABIC EXL9330
<b>Dimensions (H x W x D)</b>	8.66 in. x 4.92 in. x 2.28 in. (220 mm x 125 mm x 58 mm)
<b>Weight</b>	1.1 lb (0.5 kg)
<b>Compliance</b>	<b>United States:</b> cULus Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment FCC Compliant to CRF47, Part 15, Subpart B, Class A <b>Canada:</b> cULus Listed, File E107041, CNN PAZX7 CAN/CSA C22.2 No.205, Signal Equipment Industry Canada Compliant, ICES-003
<b>CE</b>	<b>Europe:</b> Johnson Controls declares that this product is also in compliance with the essential requirements and other relevant provisions of the EMC Directive and Declared as Electronic Independently mounted control, suitable for DIN rail mounting. Intended to mount in remote panel. Type 1.C (Micro-interruption), 330 V rated impulse voltage. 125°C ball pressure test.
	<b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant

**Table 25: ZFR1825 Wireless Field Bus Controller**

Specification	Description
<b>Product code</b>	MS-ZFR1825-x
<b>Power supply input</b>	<b>Select one of the following power supply inputs:</b> <ul style="list-style-type: none"> <li>24 VAC +10%/-15%, 50/60 Hz, class 2. Transformer allowance 2.5 VA maximum, 2 VA typical. Provided through the three-position 24 V~ screw terminal pluggable block.</li> <li>15 VDC, 180 mA (7 VDC to 18 VDC, 185 maximum current draw) on the FC bus provided through the FC/SA BUS IN RJ-12 jack from the FC bus jack on a Field Controller or NxE supervisory engine.</li> </ul>
<b>Power supply output</b>	15 VDC provides power through the FC/SA BUS, FC/SA BUS OUT RJ12 jack for external devices.
<b>Addressing</b>	DIP Switches, field adjustable
<b>Wireless band</b>	Direct-Sequence Spread-Spectrum, 2.4 GHz ISM bands
<b>Transmission power</b>	10 mW maximum
<b>Transmission range</b>	76.2 m (250 ft) maximum Line-of-Sight 15 m (50 ft) (Best practice)
<b>Ambient conditions</b>	Operating: 0°C to 50°C (32 to 122°F), 5% to 95% RH, noncondensing Storage: -20°C to 70°C (-4 to 158°F), 5% to 90% RH, noncondensing
<b>Materials</b>	Product complies with Plenum Rating per UL2043. Suitable for use in other environmental air space (Plenums) in accordance with section 300.22 © of the National Electric Code.
<b>Terminations</b>	Two spade terminals with three-position screw terminal pluggable block for 24 VAC power supply input Four spade terminals with four-position screw terminal pluggable block for RS-485 communications RJ12 IN jack for 15 VDC power supply and communications connection from an NxE or FEC FC bus jack RJ12 OUT jack supplies 15 VDC and communications to BTCVT Wireless Commissioning Converter
<b>Dimensions</b>	146 mm x 122 mm x 52 mm (5.8 x 4.8 x 2.1 in.)
<b>Mounting hardware</b>	Four no. 6 trade size sheet metal screws

**Table 25: ZFR1825 Wireless Field Bus Controller**

Specification	Description
Shipping weight	0.45 kg (1.0 lb)
Compliance	<p><b>United States:</b>            Intended for connection to an NEC Class 2 power Source; UL 916 Energy Management Plenum rating per UL 2043            FCC Compliant to CFR47, Part 15, Subpart B, Class A            Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters            Transmitter Identification ZFR1825-0: FCC: TFB-MATRIXL            Transmitter Identification ZFR1825-1: FCC: OEJ-WRZRADIO</p> <p><b>Canada:</b>            CAN/CSA C22.2 No. 205, Signal Equipment            Industry Canada (IC) Compliant to Canadian ICES-003, Class B Limits            Industry Canada (IC) RSS-210            Transmitter Identification ZFR1825-0: 5969A-MATRIXLP            Transmitter Identification ZFR1825-1: 279A-WRZRADIO</p> <p><b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant</p>
CE	<p><b>Europe:</b>            CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.</p>

**Table 26: ZFR1821 and ZFR1822 Pro Wireless Field Bus Router-Repeater**

Specification	Description
Product code	LC-ZFR1821-0: Wireless Field Bus Router, conduit-mount, for Field Controller Router Applications LC-ZFR1822-0: Wireless Field Bus Router, wall-mount, for Field Controller Router Applications LC-ZFR1821-0B: Wireless Field Bus Router, conduit-mount, with 24 VAC Power Supply for Field Controller Router Applications LC-ZFR1822-0B: Wireless Field Bus Router, wall-mount, with 24 VAC Power Supply for Field Controller Router Applications
Power supply input	15 VDC nominal. Provided through the RJ-12 cable connected from a field controller or repeater power supply.
Addressing	DIP switches, field adjustable
Wireless band	Direct-sequence spread-spectrum, 2.4 GHz ISM bands
Transmission power	10 mW maximum
Transmission range	76.2 m (250 ft) maximum Line-of-Sight 15 m (50 ft) - is best practice
Ambient conditions	<p><b>Operating:</b> 0°C to 50°C (32 to 122°F), 5% to 95% RH, Noncondensing  <b>Storage:</b> -20°C to 70°C (-4 to 158°F), 5% to 90% RH, Noncondensing</p>
Materials	ZFR1821: White plastic housing with Plenum rating per UL1995 UL94-5VB flammability rating ZFR1822: White PC/ABS Cycloy
Terminations	RJ-12 plug for connection to field controllers or repeater kit power supply
Dimensions	ZFR1821: 136 mm x 100 mm x 18 mm (5-3/8 in. x 3-15/16 in. x 3/4 in.) ZFR1822: 61 mm x 100 mm x 20.5 mm (5-3/8 in. x 3-15/16 in. x 3/4 in.)
Mounting hardware	ZFR1821: 1/2 in. trade size EMT connector ZFR1822: Screw mounted
Shipping weights	ZFR1821: 0.095 kg (0.21 lb) ZFR1822: 0.113 kg (0.25 lb) Repeater Power Supply: 0.227 kg (0.50 lb)

**Table 26: ZFR1821 and ZFR1822 Pro Wireless Field Bus Router-Repeater**

Specification	Description
Compliance	<b>United States:</b> UL 916 Energy Management Plenum-rated per UL1995 UL94-5VB Flammability Rating FCC Compliant to CFR47, Part 15, Subpart B, Class A Transmission Complies with FCC Part 15.247 Regulations for Low Power Unlicensed Transmitters Transmitter Identification ZFR1821/ZFR1822: FCC: OEJ-WRZRADIO
	<b>Canada:</b> CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada (IC) Compliant to Canadian ICES-003, Class B Limits Industry Canada (IC) RSS-210 Transmitter Identification ZFR1821/ZFR1822: 279A-WRZRADIO
	<b>Australia and New Zealand:</b> RCM Mark, Australia/NZ Emissions Compliant
CE	<b>Europe:</b> CE Mark – Johnson Controls declares that this product in compliance with the essential requirements and other relevant provisions of the EMC Directive.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

## North American emissions compliance

### United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

#### Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

### Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and



2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Product warranty

This product is covered by a limited warranty, details of which can be found at [www.johnsoncontrols.com/buildingswarranty](http://www.johnsoncontrols.com/buildingswarranty).

## Software terms

**Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at [www.johnsoncontrols.com/techterms](http://www.johnsoncontrols.com/techterms).** Your use of this product constitutes an agreement to such terms.

## Patents

Patents: <https://jciapat.com>

## Single point of contact

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