System 450™ Series Modular Controls

Product Bulletin

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The System 450™ Series Modular Controls are the next generation of Johnson Controls/PENN® digital electronic control, expansion, and power modules designed to provide accurate, cost-effective, compact, custom control systems for a wide variety of Heating, Ventilation, Air Conditioning, Refrigeration (HVACR) and commercial/industrial process applications.

The System 450 control system is designed to replace System 350™ control system and System 27 and provide many additional features and benefits with less than a dozen model variations.

All System 450 modules are multipurpose and field configurable out-of-the-box; each module is designed for use in temperature, pressure, and humidity systems. In fact, a System 450 control system can be easily assembled and configured to monitor and control temperature, pressure, and humidity simultaneously.

A single System 450 control module can be set up as a stand-alone control or connected to expansion modules to control up to 10 outputs based on the input from up to 3 control sensors. A control system's outputs can be relay outputs (On/Off), analog outputs (0-10 VDC or 4-20 mA), or any combination of relay and analog outputs.

Figure 1: System 450 Control System with Control, Power, and Expansion Modules

Table 1: Features and Benefits

Features	Benefits
Durable, Compact Modular Design with Plug-Together Connectors and DIN Rail or Direct Wall Mount Capability	Eliminates field wiring between modules and allows you to quickly and easily assemble, install, and upgrade your System 450 control systems.
Multi-Purpose, Field-Configurable Modules Designed for Global Use	Enable you to design and configure a wide variety of custom control systems capable of controlling temperature, pressure and humidity (simultaneously), with only a handful of models.
Backlit Liquid Crystal Display (LCD) and Four-Button Touch Pad User Interface	Provides quick, clear, visual status of the control system's input sensors and outputs with the touch of a button, and enables you to quickly and easily set up and adjust the sensors and outputs in the field.
Up to three Input Sensors and up to ten Outputs (Relay or Analog)	Allow you to build both simple and complex application-specific control systems and reduce your costs to only the required components.
Versatile, All-in-One, Stand-Alone Control Modules	Provide multipurpose On/Off or analog controls (depending on the model) that are temperature, pressure, and humidity capable out-of-the-box and field configurable to replace a wide variety of HVACR controls.
An Extensive Suite of Compatible Temperature, Pressure, and Humidity Control Sensors	Cover a wide range of temperature, pressure (air and refrigerant), and humidity conditions in standard units of measurement for North American, European, and global markets.

Johnson Controls

System 450 Overview

The Johnson Controls/PENN System 450 Series is a small, versatile family of compact, multipurpose, digital electronic control, expansion, and power modules. System 450 modules provide accurate, reliable On/Off and analog control of temperature, pressure and humidity conditions for a wide variety of HVACR and commercial/industrial process applications.

A System 450 control system includes:

- a single System 450 control module
- one to three input sensors
- one to 10 relay and/or analog outputs (provided by the control module and expansion modules)

A System 450 control system often also includes a System 450 power module.

A System 450 control system is the next generation of System 350 and System 27 modular controls, but a System 450 control system, with less than a dozen model variations, provides far more features and flexibility than either System 350 (54 models) system or System 27 (40 models) system.

Compact Modular Plug-Together Design

All System 450 modules feature a compact, durable gray Lexan® housing with DIN rail clips and slotted mounting holes molded into the back of the housing for easy installation.

System 450 modules also feature 6-pin connectors on the sides of the housing, enabling easy assembly and upgrade of your control systems and eliminating the need for field wiring between modules.

A System 450 control system provides compact, clean, and consistent control system assemblies that are simple to build, install, and maintain.

Multiple-Purpose and Field Configurable

All System 450 control, expansion, and power modules are multipurpose devices that can be easily configured in the field to operate in temperature, pressure, or humidity control systems.

In fact, a System 450 control system can be quickly assembled and easily configured in the field to monitor and control temperature, pressure, and humidity conditions simultaneously.

Global Design

System 450 modules are designed, tested, and certified for global application and are UL Listed and CE compliant.

System 450 control systems can be set up in standard units of measurement used worldwide; Fahrenheit, Celsius, psi, bar, in.WC, and RH.

System 450 Applications

You can create a wide variety of custom, application-specific control systems with System 450 modules. Here are common application examples.

Temperature Control

Temperature control application examples include:

- heating and/or cooling control
- heating and cooling control with deadband
- boiler temperature stage control
- boiler circulating pump control
- chilled water temperature stage control
- discharge air temperature control
- modulating damper or valve control

Pressure Control

Pressure control application examples include:

- refrigeration compressor capacity control
- staged On/Off condenser fan control
- two-speed fan motor control
- floating pressure control of an actuator
- constant static pressure or air velocity control
- relief damper building pressurization control
- relief fan building pressurization control

Humidity Control

Humidity control examples include:

- humidification/dehumidification control
- staged On/Off humidity control

Multipurpose Control

Multipurpose application examples

- temperature and pressure based refrigeration rack control
- temperature and humidity control for a wine cellar or greenhouse
- temperature, static-pressure, and humidity for a clean room application (see Figure 6)

System 450 Control Modules

The System 450 control module is the supervisor of your control system and the interface for the system's input sensors, supply power, and outputs (Figure 2).

Every System 450 control system requires a control module, which features a backlit LCD and a four-button touch pad User Interface (UI) for monitoring your control system's status and setting up the control sensors and outputs.

Figure 2: System 450 Control Module with Two Relay Outputs

System 450 control modules are capable of monitoring up to three input sensors and controlling up to ten outputs that can be any combination of relay and analog outputs (provided by expansion modules).

User-Friendly LCD and Touch Pad UI

System 450 control modules feature a back-lit LCD screen, which during normal operation displays the real-time status of the sensors that are set up in your control system.

The four-button touch pad enables you to quickly scroll through and view the output status screens and access the system set up screens to set up or adjust the sensors and outputs in your control system.

After you have assembled and powered your control system, and selected the Sensor Types in the UI, the control module automatically determines the output numbers and output types. The control module then generates the menu-based setup screens and supplies all of the default setup values required to setup your custom control system

Stand-Alone Multipurpose Controller

The versatile System 450 control module can also be easily configured out-of-the-box as a stand-alone control, which can provide On/Off control or proportional analog signal control (depending on the model) for a wide range of HVACR and commercial/ industrial applications.

With just two control modules and a few input sensors, you have everything you need to quickly replace almost any temperature, pressure, or humidity control you may encounter in the field.

Control module models are available with either one or two relay outputs or one or two analog outputs. See *Ordering Information* and *Technical Specifications* for more information on System 450 control modules and specifications.

Expansion Modules and Outputs

System 450 expansion modules allow you to increase the number of outputs in your control system to meet your application requirements (Figure 3). System 450 expansion modules have either one or two relay outputs, or one or two analog outputs.

Figure 3: System 450 Expansion Module With Two Relay Outputs

Relay Outputs

System 450 relay outputs provide On/Off control to your system equipment based on the reference sensors set up in your control system. Multiple relay outputs can provide staged On/Off control. Single relay outputs can also activate alarms for your controlled systems.

Each relay output is a Single-Pole, Double-Throw (SPDT) set of line-voltage contacts with Normally Open (NO), Normally Closed (NC), and Common (C) wiring terminals (Figure 2). See *Technical Specifications* for more information including electrical ratings.

Relay outputs are featured on two control module models and two expansion module models. See *Ordering Information* for model information.

Analog Outputs

System 450 analog outputs generate proportional signals to your system equipment. Each analog output generates either a 4-20 mA or 0-10 VDC signal. The signal type is self-selecting; the output automatically detects the input signal target on the controlled equipment and generates the appropriate type of analog output signal to the equipment's input.

Analog outputs are featured on two control module models and two expansion module models. See *Ordering Information* for model information.

Selectable Proportional Control Action

A System 450 control system allows you to set up the control action of each analog output in your control system to respond to load changes in one of four different ways:

- Direct-acting control with the output signal strength lowest at the Setpoint value
- Reverse-acting control with the output signal strength lowest at the Setpoint value
- Direct-acting control with the output signal strength highest at the Setpoint value
- Reverse-acting control with the output signal strength highest at the Setpoint value

An analog output's control action is automatically determined by the setup values you select for the Setpoint, End Point, % Output at Setpoint, and % Output at Endpoint values when you set up the output in the UI.

An indicator (control ramp) is displayed on the output status screen for each analog output to represent the analog output's control action.

Proportional Plus Integral Control

In addition to standard proportional (only) control analog signals, a System 450 control system provides integral control capability and six time integral selections that enable you to set up analog outputs to generate proportional plus integral signal.

In many system control loops, proportional plus integral control can provide more precise control by driving the controlled system closer to setpoint even under large load conditions.

System 450 Sensors and Transducers

System 450 control modules are designed to process input from a variety of compatible temperature, pressure, and humidity input sensors and transducers.

Connecting and setting up an input in your System 450 control system automatically determines the sensed condition, unit of measurement, minimum differential, setup value ranges, and the default setup values for each of the control system outputs that reference the sensor or transducer.

Table 3, Table 4, Table 5, and Table 6 in *Ordering Information* list the compatible System 450 sensor and transducer product code numbers and product descriptions.

Figure 4: P499 Pressure Transducers

Figure 5: A99B Temperature Sensors

System 450 Control Systems

You can connect a single sensor to a System 450 control module and configure the module as a simple stand-alone control system for almost any temperature, pressure, or humidity application.

You can also connect up to three input sensors and ten relay or analog outputs to a control module (using expansion modules) to create a multipurpose control system capable of controlling temperature, pressure, and humidity devices simultaneously.

A System 450 control system enables you to build and upgrade your control systems to meet your specific application requirements without having to purchase unwanted sensors, outputs, or control features; reducing the cost of installing and upgrading your control systems.

Figure 6 shows an example of a multipurpose System 450 control system that uses temperature, pressure, and humidity inputs to control five outputs.

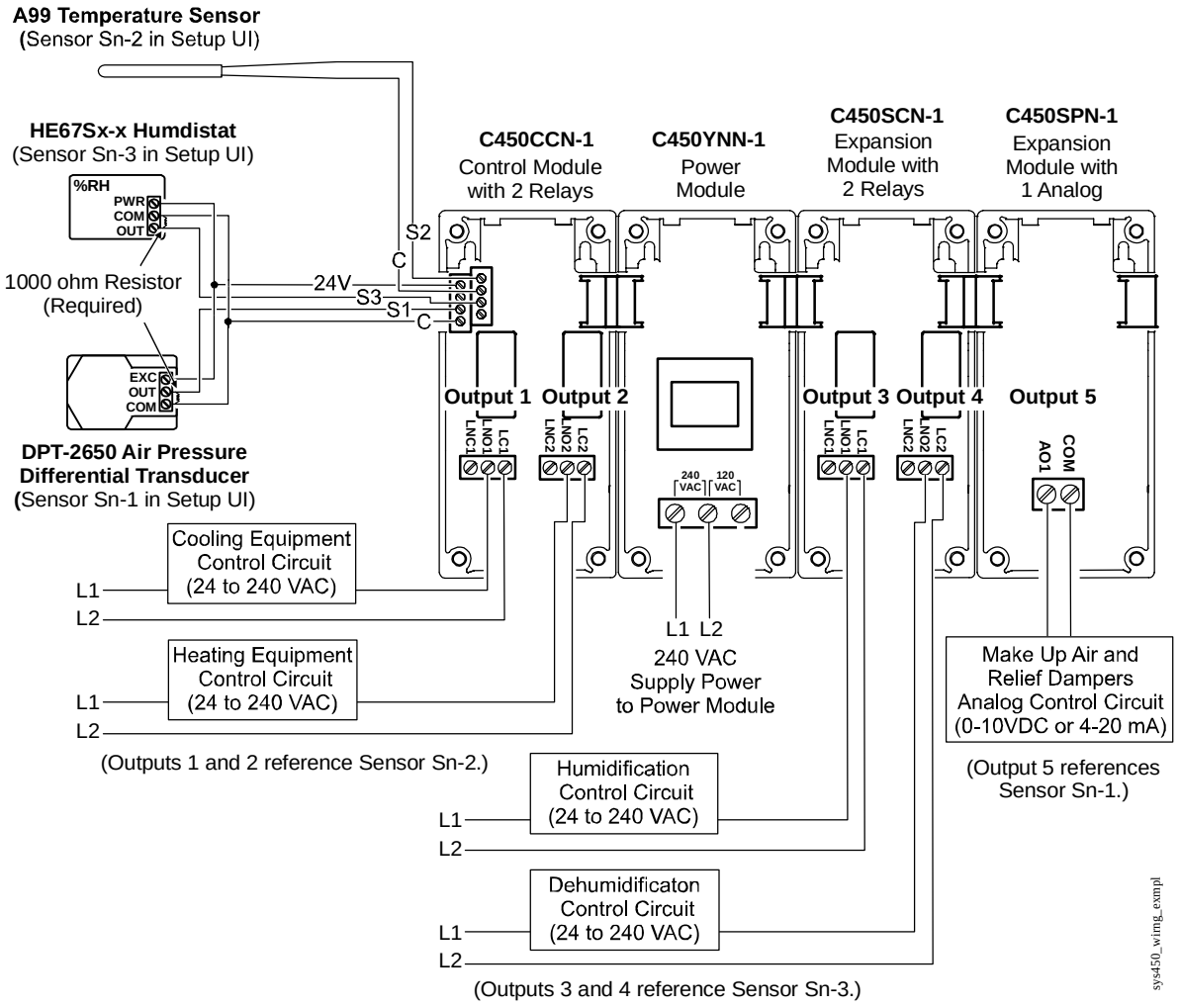

Figure 6: A System 450 Control System Example for a Clean Room Control System That Controls Temperature, Pressure, and Humidity Simultaneously

Ordering Information

Table 2 provides ordering information for System 450 Series modules.

Table 3, Table 4, Table 5, and Table 6 provide ordering information for System 450 compatible sensors and transducers.

Table 2: System 450 Module Ordering Information

Product Code Number	Product Description
C450CBN-1	Control Module[1] with LCD, Four-Button Touch Pad, and Relay Output; Provides one relay output (SPDT line-voltage relay) for On/Off control.
C450CCN-1	Control Module[1] with LCD, Four-Button Touch Pad, and Relay Output; Provides two relay outputs (SPDT line-voltage relays) for On/Off control.
Release Fall 2009	Control Module[1] with LCD, Four-Button Touch Pad, and Analog Output; Provides one analog output (0-10 VDC or 4-20 mA self-selecting signal) for proportional control.
Release Fall 2009	Control Module[1] with LCD and Four-Button Touch Pad, and Analog Output; Provides two analog outputs (0-10 VDC or 4-20 mA self-selecting signals) for proportional control.
C450SBN-1	Relay Output Expansion Module; Provides one relay output (SPDT line-voltage relay) for On/Off control.
C450SCN-1	Relay Output Expansion Module; Provides two relay outputs (SPDT line-voltage relays) for On/Off control.
Release Fall 2009	Analog Output Expansion Module; Provides one analog output (0-10 VDC or 4-20 mA self-selecting signal) for proportional control.
Release Fall 2009	Analog Output Expansion Module; Provides two analog outputs (0-10 VDC or 4-20 mA self-selecting signals) for proportional control.
C450YNN-1	Power Module; Provides 24 V to System 450 Module Assembly; 120 VAC or 240 VAC supply power input terminals

1. All System 450 control modules can control both relay and analog outputs in a control system.

Table 3: System 450 Compatible A99B Temperature Sensors Ordering Information

Product Code Number	Product Description
A99BA-200C	PTC Silicon Sensor with Shielded Cable; Cable length (2 m) 6-1/2 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BB-25C	PTC Silicon Sensor with PVC Cable; Cable length (0.25 m) 9-3/4 in. Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BB-200C	PTC Silicon Sensor with PVC Cable; Cable length (2 m) 6-1/2 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BB-300C	PTC Silicon Sensor with PVC Cable; Cable length (3 m) 9-3/4 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BB-500C	PTC Silicon Sensor with PVC Cable; Cable length (5 m) 16-3/8 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BB-600C	PTC Silicon Sensor with PVC Cable; Cable length (6 m) 19-1/2 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) **Note:** Cable jacket temperature range -40 to 100°C (-40 to 212°F)
A99BC-25C	PTC Silicon Sensor with High Temperature Silicon Cable; Cable length (0.25 m) 9-3/4 in. Sensor Temperature Range: -40 to 120°C (-40 to 250°F) Cable jacket rated for full sensor temperature range.

Table 3: System 450 Compatible A99B Temperature Sensors Ordering Information (Continued)

Product Code Number	Product Description
A99BC-300C	PTC Silicon Sensor with High Temperature Silicon Cable; Cable length (3 m) 9-3/4 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) Cable jacket rated for full sensor temperature range.
A99BC-1500C	PTC Silicon Sensor with High Temperature Silicon Cable; Cable length (15 m) 49 ft Sensor Temperature Range: -40 to 120°C (-40 to 250°F) Cable jacket rated for full sensor temperature range.

Table 4: System 450 Compatible HE67S3 Type Humidity Sensors with Integral A99B Temperature Sensor Ordering Information

Product Code Number	Product Description
HE67S3-0N0BT	Wall Mount Humidity Sensor with A99B Type Temperature Sensor: 10 to 95% RH; -40 to 121°C (-40 to 250°F)
HE67S3-0N00P	Duct Mount Humidity Sensor with A99B Type Temperature Sensor: 10 to 95% RH; -40 to 121°C (-40 to 250°F)

Table 5: System 450 Compatible Low Pressure Differential Transducer Ordering Information

Product Code Number	Product Description
DPT-2650-0R5D-AB	Low Pressure Differential Transducer: 0 to 0.5 in. W.C.
DPT-2650-010D-AB	Low Pressure Differential Transducer: 0 to 10 in. W.C.

Table 6: System 450 Compatible P499 Series Electronic Pressure Transducers and WHA-PKD3 Type Wire Harnesses Ordering Information

Product Code Number	Product Description
P499RCP-401C	Electronic Pressure Transducer: -1 to 8 bar; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-402C	Electronic Pressure Transducer: -1 to 15 bar; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-404C	Electronic Pressure Transducer: 0 to 30 bar; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-405C	Electronic Pressure Transducer: 0 to 50 bar; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RAP-101C	Electronic Pressure Transducer: 0 to 100 psi; 1/8 in. 27 NPT External Thread Style Order a WHA-PKD3 type wire harness separately.
P499RAP-101K	Electronic Pressure Transducer Kit: 0 to 100 psi; 1/8 in. 27 NPT External Thread Style WHA-PKD3-200C wire harness included.
P499RCP-101C	Electronic Pressure Transducer: 0 to 100 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-101K	Electronic Pressure Transducer Kit: 0 to 100 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). WHA-PKD3-200C wire harness included.
P499RAP-105C	Electronic Pressure Transducer: 0 to 500 psi; 1/8 in. 27 NPT External Thread Style Order WHA-PKD3 type wire harness separately.
P499RAP-105K	Electronic Pressure Transducer Kit: 0 to 500 psi; 1/8 in. 27 NPT External Thread Style WHA-PKD3-200C wire harness included.

Table 6: System 450 Compatible P499 Series Electronic Pressure Transducers and WHA-PKD3 Type Wire Harnesses Ordering Information (Continued)

Product Code Number	Product Description
P499RCP-105C	Electronic Pressure Transducer: 0 to 500 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-105K	Electronic Pressure Transducer Kit: 0 to 500 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). WHA-PKD3-200C wire harness included.
P499RAP-107C	Electronic Pressure Transducer: 0 to 750 psi; 1/8 in. 27 NPT External Thread Style Order WHA-PKD3 type wire harness separately.
P499RAP-107K	Electronic Pressure Transducer Kit: 0 to 750 psi; 1/8 in. 27 NPT External Thread Style WHA-PKD3-200C wire harness included.
P499RCP-107C	Electronic Pressure Transducer: 0 to 750 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCP-107K	Electronic Pressure Transducer Kit: 0 to 750 psi; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). WHA-PKD3-200C wire harness included.
WHA-PDK3-200C	Plug and 3-Wire Harness for P499 Electronic Pressure Transducers: 2.0 m (6-1/2 ft) cable
WHA-PDK3-400C	Plug and 3-Wire Harness for P499 Electronic Pressure Transducers: 4.0 m (13 ft) cable
WHA-PDK3-600C	Plug and 3-Wire Harness for P499 Electronic Pressure Transducers: 6.0 m (19-5/8 ft) cable

Technical Specifications

C450CxN-1 Control Modules with Relay Output

Product	C450CxN-1: System 450 Control Module models are sensing controls and operating controls with LCD, four-button touch pad, and On/Off relay output C450CBN-1: Control Module with one SPDT output relay C450CCN-1: Control Module with two SPDT output relays
Supply Power	C450-YNN-1 Power Supply Module or 24 (20-30) VAC Safety Extra-Low Voltage (SELV) (Europe) or Class 2 (North America) 50/60 Hz, 10 VA minimum
Ambient Operating Conditions	**Temperature:** -40 to 66°C (-40 to 150°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Ambient Shipping and Storage Conditions	**Temperature:** -40 to 80°C (-40 to 176°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Input Signal	0-5 VDC; 1035 ohms at 25°C (77°F) for an A99 PTC Temperature Sensor
Output Relay Contacts	**General:** 1/2 HP at 120/240 VAC, SPDT
	Specific: AC Motor Ratings — 120 VAC — 208/240 VAC AC Full-load Amperes: 9.8 A 4.9 A AC Locked-Rotor Amperes: 58.8 A 29.4 A 10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC
Analog Input Accuracy	**Resolution:** 10 bit
Control Construction	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.
Dimensions (H x W x D)	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)
Weight	C450CBN-1: 209 gm (0.46 lb) C450CCN-1: 222 gm (0.49 lb)

C450CxN-1 Control Modules with Relay Output (Continued)

Compliance	**North America:** cULus Listed; UL 60730, File E27734, Vol. 1; FCC Compliant to CFR47, Part 15, Subpart B, Class B Industry Canada (IC) Compliant to Canadian ICES-003, Class B limits
	Europe: Mark: CE Compliant; Low Voltage Directive (2006/95/EC); EMC Directive (2004/108/EC); RoHS Directive (2002/95/EC); WEEE Directive (2002/96/EC)
	Australia: Mark: C-Tick Compliant (N1813)

C450SxN-1 Relay Output Expansion Modules

Product	C450SBN-1: System 450 Expansion Module with one SPDT output relay C450SCN-1: System 450 Expansion Module with two SPDT output relays
Supply Power	C450-YNN-1 Power Supply Module or 24 (20-30) VAC Safety Extra-Low Voltage (SELV) (Europe) or Class 2 (North America) 50/60 Hz, 10 VA minimum
Ambient Operating Conditions	**Temperature:** -40 to 66°C (-40 to 150°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Ambient Shipping and Storage Conditions	**Temperature:** -40 to 80°C (-40 to 176°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Output Relay Contacts	**General:** 1/2 HP at 120/240 VAC, SPDT
	Specific: AC Motor Ratings — 120 VAC — 208/240 VAC AC Full-load Amperes: 9.8 A 4.9 A AC Locked-Rotor Amperes: 58.8 A 29.4 A 10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC
Control Construction	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.
Dimensions (H x W x D)	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)
Weight	C450SBN-1: 172 gm (0.38 lb) C450SCN-1: 186 gm (0.41 lb)
Compliance	**North America:** cULus Listed; UL 60730, File E27734, Vol. 1; FCC Compliant to CFR47, Part 15, Subpart B, Class B Industry Canada (IC) Compliant to Canadian ICES-003, Class B limits
	Europe: Mark: CE Compliant; Low Voltage Directive (2006/95/EC); EMC Directive (2004/108/EC); RoHS Directive (2002/95/EC); WEEE Directive (2002/96/EC)
	Australia: Mark: C-Tick Compliant (N1813)

C450YNN-1 Power Module

Product	C450YNN-1: System 450 Power Supply Module; 120 or 240 VAC stepdown to 24 VAC Class 2 (North America) or SELV (Europe)
Supply Power	110/120 VAC or 220/240 VAC at 50/60 Hz (100 mA maximum)
Secondary Power	24 VAC, 10 VA
Ambient Operating Conditions	**Temperature:** -40 to 66°C (-40 to 150°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Ambient Shipping and Storage Conditions	**Temperature:** -40 to 80°C (-40 to 176°F) **Humidity:** Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
Control Construction	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.

C450YNN-1 Power Module (Continued)

Dimensions (H x W x D)	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)
Weight	C450YNN-1: 390 gm (0.86 lb)
Compliance	**North America:** cULus Listed; UL 60730, File E27734, Vol. 1; FCC Compliant to CFR47, Part 15, Subpart B, Class B Industry Canada (IC) Compliant to Canadian ICES-003, Class B limits
	Europe: Mark: CE Compliant; Low Voltage Directive (2006/95/EC); EMC Directive (2004/108/EC); RoHS Directive (2002/95/EC); WEEE Directive (2002/96/EC)
	Australia: Mark: C-Tick Compliant (N1813)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult Johnson Controls Application Engineering at (414) 524-5535. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

United States Emissions Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Canadian Emissions Compliance

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

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

Building Efficiency
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