

System 450™ Series Modular Controls

Product Bulletin

C450xxx-x

Code No. LIT-12011458

Issued February 3, 2011

Supersedes June 14, 2010

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System 450™ is a family of modular, digital electronic controls that is easily assembled and set up to provide reliable temperature, pressure, and humidity control for a wide variety of Heating, Ventilating, Air Conditioning, and 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 control modules are multipurpose and field configurable out-of-the-box; each module is designed for use in temperature, pressure, and humidity systems. A System 450 control system can be easily assembled and configured to monitor and control temperature, pressure, and humidity simultaneously.

A single C450 control module can be set up as a stand-alone control or connected to expansion modules to control up to ten outputs based on any of the three available inputs.



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

A control system may consist of relay outputs (Single-Pole, Double-Throw [SPDT]), analog outputs (0–10 VDC or 4–20 mA), or any combination of relay and analog outputs.

Table 1: Features and Benefits (Part 1 of 2)

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.
Multipurpose, 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 Touchpad User Interface	Provides quick, clear, visual status of the control system's inputs and outputs with the touch of a button, and enables you to quickly and easily set up and adjust the inputs and outputs in the field.
Up to Three Inputs 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 SPDT 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 and Humidity Sensors as well as Pressure Transducers	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.
Adjustable User-Defined Reset Setpoint (C450R Only)	Uses the master (outdoor) sensor to adjust the user-defined Reset Setpoint (to vary capacity requirements) and allow energy savings of the control process variable.

Table 1: Features and Benefits (Part 2 of 2)

Features	Benefits
Adjustable Minimum and Maximum Setpoint Temperature (C450R Only)	Permits compliance with equipment manufacturer's specifications.
Selectable Warm Weather Shutdown Temperature (C450R Only)	Saves energy by disabling equipment when the master sensor temperature rises to a point where heating is no longer required.
Adjustable Setback Temperature (C450R Only)	Saves energy by lowering the supply temperature setpoint at night or during unoccupied periods.

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 SPDT 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 inputs
- one to ten 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 a System 350 system (54 models) or a System 27 system (40 models).

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.

Multipurpose and Field Configurable

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

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.

Note: C450RxN-1 Reset Control Modules control temperature and humidity, but not pressure.

Global Design

System 450 modules are designed, tested, and certified for global application and are Underwriters' Laboratories, Inc. (UL) Listed and CE compliant.

System 450 control systems can be set up in standard units of measurement used worldwide; Fahrenheit, Celsius, psi, bar, inches water column (in. W.C.), and Relative Humidity (RH).

System 450 Applications

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

- temperature control
- pressure control
- humidity control
- multipurpose control
- reset and setback control

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 SPDT 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
- Electronically Commutated (EC) motor control (C450CPW-100 model)

Humidity Control

Humidity control examples include:

- humidification/dehumidification control
- staged SPDT humidity control

Multipurpose Control

Multipurpose application examples include:

- 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

Reset and Setback Control

Reset and setback control applications include:

- temperature control for single stage or multi-stage (up to ten stages) boilers with or without load balancing (equal run time hours)
- humidity reset and temperature control for natatorium/swimming pool zones

System 450 Control Modules

The System 450 control module is the supervisor of your control system and the interface for the system's inputs, supply power, and outputs. Figure 2 shows one of the available control modules. See Table 3 in [Ordering Information](#) for all of the available control modules.



Figure 2: System 450 Control Module with Two Relay Outputs

All System 450 control systems require a control module, which features a backlit LCD and a four-button touchpad User Interface (UI) for monitoring your control system's status and setting up the inputs and outputs.

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

Control Modules with Relay Outputs

C450CBN-1 and C450CCN-1 models are Single-Pole, Double-Throw (SPDT) relay control modules.

Control Modules with Analog Outputs

C450CPN-1 and C450CQN-1 models are analog output (0–10 VDC or 4–20 mA) control modules.

Reset Control Modules with Relay Outputs and Setback

C450RxN-1 Reset Control models are Single-Pole, Double-Throw (SPDT) relay control modules. C450RxN-1 Reset Control models provide all of the features of the standard models for temperature and humidity control. In addition, these modules provide temperature or humidity reset, real-time setback, and load balancing (equal runtime) capability.

Note: C450RxN-1 Reset Control models control temperature and humidity, but not pressure.

Control Modules with Hybrid Analog Output and High Input Signal Selection

The C450CPW-100 model is a hybrid analog output control module with Liquid Crystal Display (LCD) and four-button touchpad User Interface (UI) that allows you to set up a System 450 control system. This model uses the same hardware and setup screens as the C450CPN-1, but adds two new functions:

- the ability to use the higher of two (or highest of three) sensor inputs (High Input Signal selection)
- the ability to configure a hybrid Analog Output (AO), which is typically used to run an Electronically Commutated (EC) motor at an average speed below the motor's fixed minimum speed rating.

Note: This model was designed for (but is not limited to) controlling an EC motor. By using temperature, humidity, or pressure sensor inputs, this control can be used for a wide range of applications.

User-Friendly LCD and Touchpad UI

System 450 control modules feature a backlit 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 touchpad enables you to quickly scroll through and view the output status screens and access the system setup 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 set up 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 SPDT control or proportional analog signal control (depending on the model) for a wide range of HVACR and commercial/industrial applications.

With a C450CxN-1 control module and the available sensors and transducers (see Table 3 through Table 6), almost any temperature, pressure, or humidity control you may encounter in the field can be quickly replaced.

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 (Figure 3) allow you to increase the number of outputs in your control system to meet your application requirements (Figure 7 through Figure 9). System 450 relay expansion modules have either one or two SPDT relay outputs. System 450 analog expansion modules have either one or two analog outputs (0–10 VDC or 4–20 mA).



Figure 3: System 450 Expansion Module With Two Relay Outputs

Relay Outputs

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

Each relay output is an SPDT set of line-voltage contacts with Normally Open (LNO), Normally Closed (LNC), and Common (LC) wiring terminals (Figure 7 through Figure 9). See [*Technical Specifications*](#) for more information, including electrical ratings.

SPDT 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 0–10 VDC or 4–20 mA 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:

- Proportional output lowest at setpoint, with output increasing as sensor value increases
- Proportional output lowest at setpoint, with output increasing as sensor value decreases
- Proportional output highest at setpoint, with output decreasing as sensor value decreases
- Proportional output highest at setpoint, with output decreasing as sensor value increases

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) appears on the output status screen for each analog output to represent the analog output's control action.

For a more detailed explanation, refer to the *System 450 Series Modular Controls Technical Bulletin (LIT-12011459)*.

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 a proportional plus integral signal.

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

System 450 Power Module

System 450 modules require 24 VAC - Class 2 power. In applications where 24 VAC power is not available, the C450YNN-1C Power Module provides a convenient means of transforming 120/240 VAC to 24 VAC to power System 450 modules.

System 450 Sensors and Transducers

System 450 control modules are designed to process input from a variety of compatible temperature (Figure 5) and humidity sensors as well as pressure transducers (Figure 4).

For ease of installation and setup, the input type (temperature, humidity, or pressure) selected automatically determines the sensed condition, unit measurement, minimum differential, setup value ranges, and the default setup values for each of the control system outputs.

Table 3, Table 4, Table 5, and Table 6 in [Ordering Information](#) list the compatible System 450 sensors, transducers, and accessories.



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 inputs 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.

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

System 450 also provides a wide range of cost-effective, custom control systems. Figure 6 and Figure 7 show an example of a System 450 control system for some representative system applications featuring the standard C450CxN-1 control modules. Figure 8 and Figure 9 show examples of System 450 reset control systems featuring the C450RxN-1 reset control module.

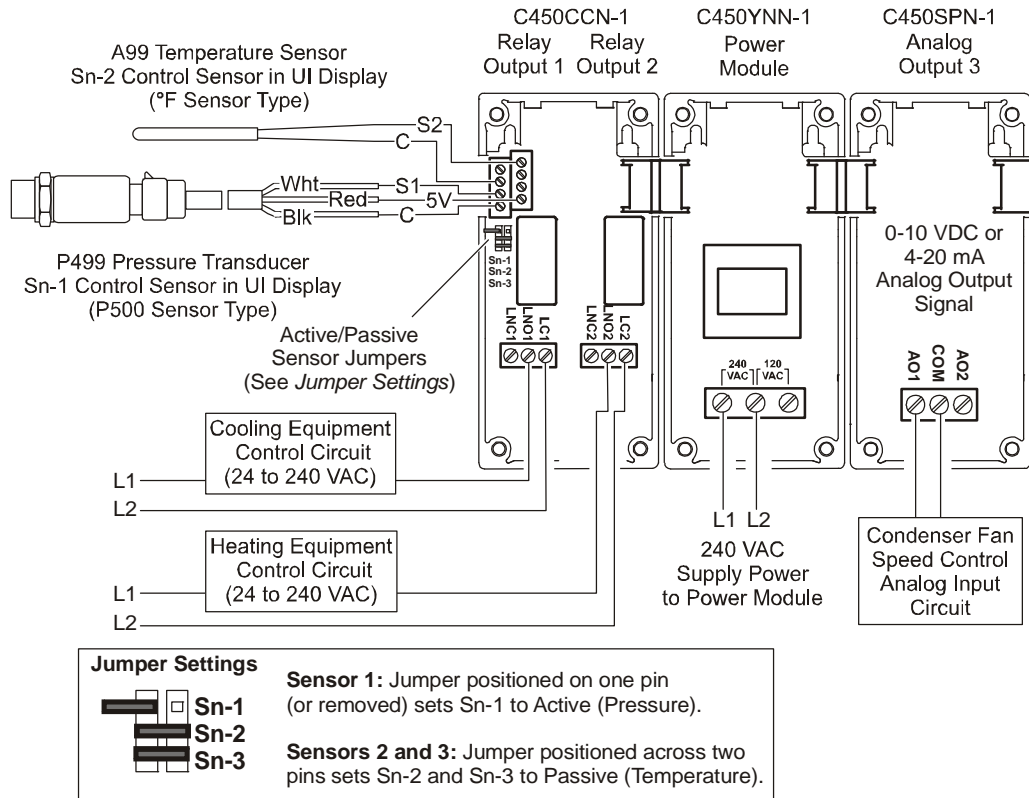


FIG.sys450_app_exmp1

Figure 6: System 450 Control System for a Room Heating and Cooling Application with Condenser Fan Speed Control

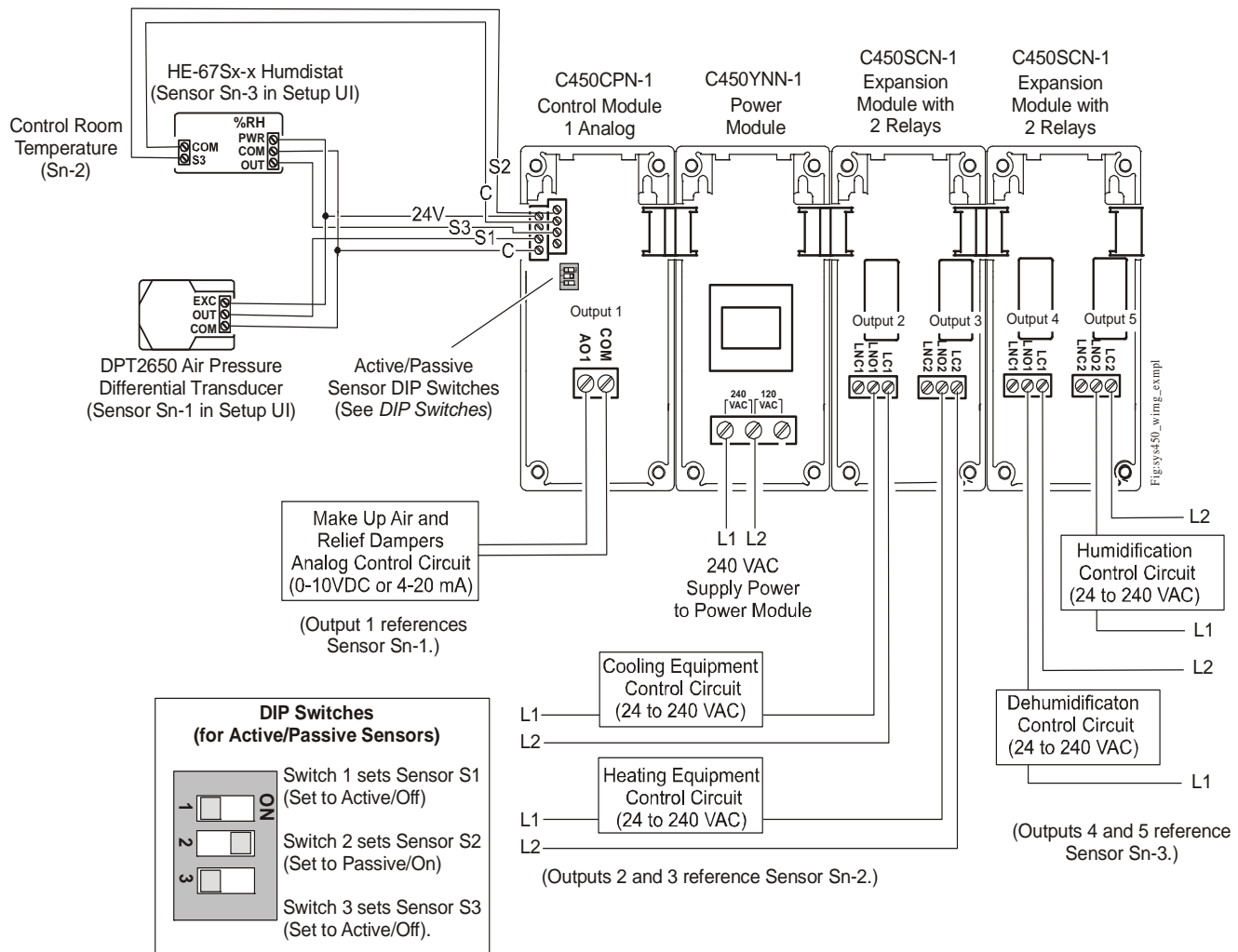


Figure 7: System 450 Control System Example for a Clean Room Application That Controls Temperature, Pressure, and Humidity Simultaneously

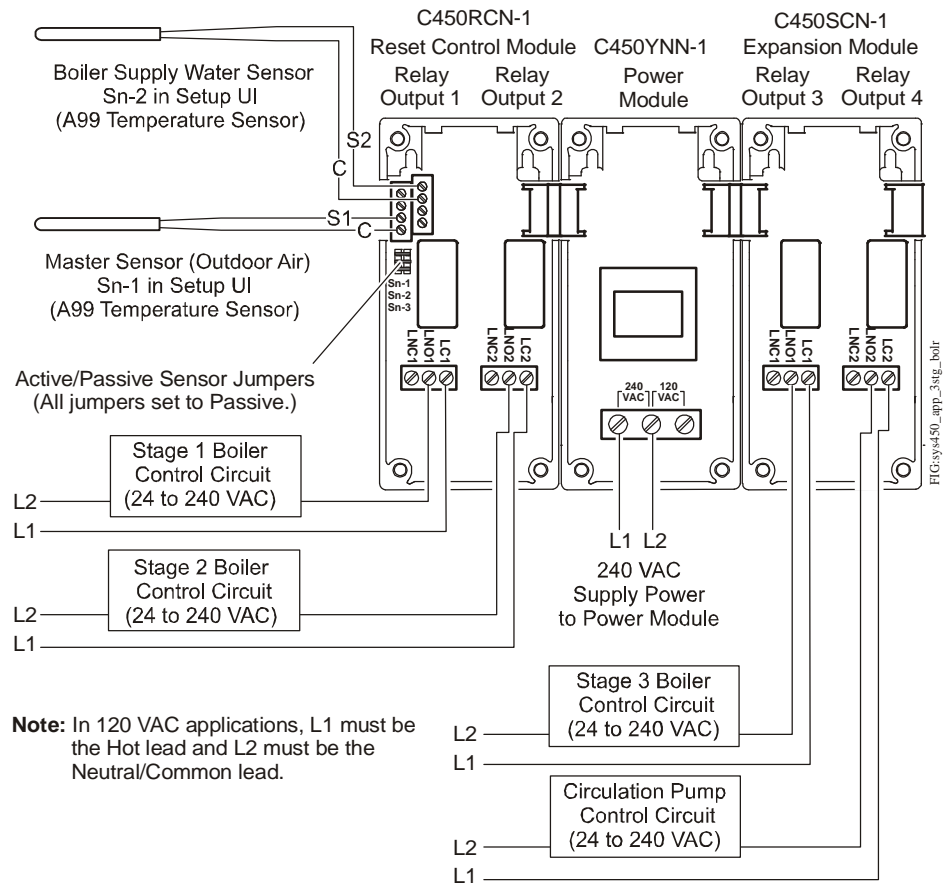


Figure 8: System 450 Reset Control System Example for a Three-Stage Boiler with or without Load Balancing

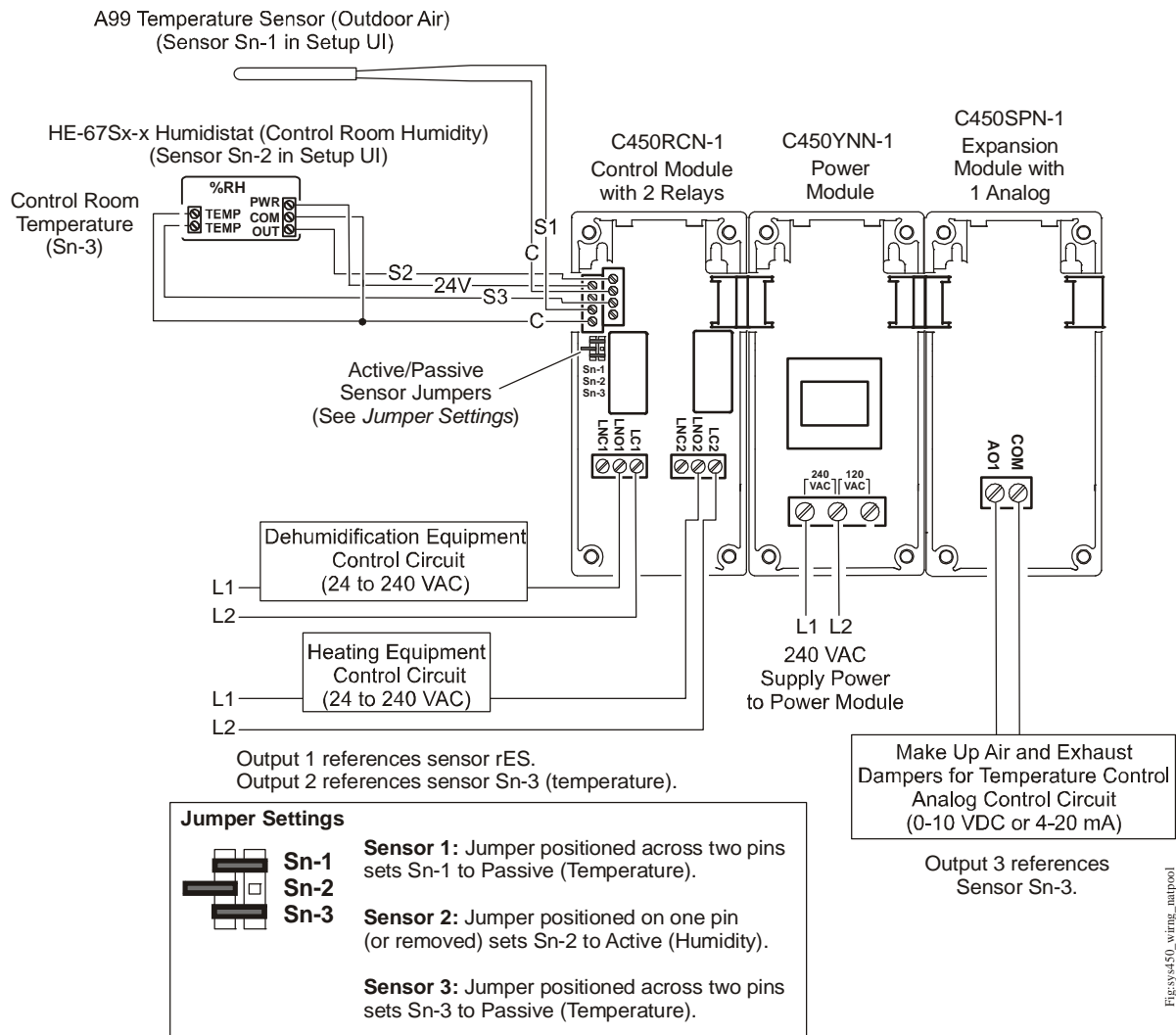


Figure 9: System 450 Reset Control System Example for a Natatorium/Swimming Pool Zone

Ordering Information

Table 2 provides ordering information for System 450 Series modules and accessories.

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

Table 2: System 450 Modules and Accessories Ordering Information

Product Code Number	Product Description
C450CBN-1C	Control Module ¹ with LCD, Four-Button Touchpad UI, and Relay Output; provides one relay output (SPDT line-voltage relay) for SPDT control.
C450CCN-1C	Control Module ¹ with LCD, Four-Button Touchpad UI, and Relay Output; provides two relay outputs (SPDT line-voltage relays) for SPDT control.
C450CPN-1C	Control Module ¹ with LCD, Four-Button Touchpad UI, and Analog Output; provides one analog output (0–10 VDC or 4–20 mA self-selecting signal) for proportional control.
C450CPW-100C	Control Module ¹ with LCD, Four-Button Touchpad UI, Hybrid Analog Output and Optional High Input Signal Select; provides one hybrid analog output and optional high input signal select primarily used for EC motor control.
C450CQN-1C	Control Module ¹ with LCD and Four-Button Touchpad UI, and Analog Output; provides two analog outputs (0–10 VDC or 4–20 mA self-selecting signals) for proportional control.
C450RBN-1C	Reset Control Module ¹ with LCD, Four-Button Touchpad UI, and SPDT relay output; provides one SPDT output relay.
C450RCN-1C	Reset Control Module ¹ with LCD, Four-Button Touchpad UI, and SPDT relay output; provides two SPDT output relays.
C450SBN-1C	Relay Output Expansion Module; provides one relay output (SPDT line-voltage relay) for SPDT control.
C450SCN-1C	Relay Output Expansion Module; provides two relay outputs (SPDT line-voltage relays) for SPDT control.
C450SPN-1C	Analog Output Expansion Module; provides one analog output (0–10 VDC or 4–20 mA self-selecting signal) for proportional control.
C450SQN-1C	Analog Output Expansion Module; provides two analog outputs (0–10 VDC or 4–20 mA self-selecting signals) for proportional control.
C450YNN-1C	Power Module; provides 24 V to System 450 Module Assembly; 120 VAC or 240 VAC supply power input terminals.
BKT287-1R	DIN Rail; 12 in. (0.30 m) long
BKT287-2R	DIN Rail; 39-1/3 in. (1 m) long
BKT287-3R	DIN Rail; 24 in. (0.61 m) long
BKT287-4R	DIN Rail; 14 in. (0.36 m) long
PLT344-1R	DIN Rail End Clamps (2 clamps)

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 and Accessories Ordering Information (Part 1 of 2)

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) 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) Cable Jacket Temperature Range: -40 to 100°C (-40 to 212°F)

Table 3: System 450 Compatible A99B Temperature Sensors and Accessories Ordering Information (Part 2 of 2)

Product Code Number	Product Description
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) 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) 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) 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) 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.
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.
BOX10A-600R	PVC enclosure for A99 sensor; includes wire nuts and conduit connector (for outdoor sensor)
WEL11A-601R	Immersion well for A99 sensor liquid sensing applications
A99-CLP-1	Mounting clip for A99 temperature sensor
ADP11A-600R	Conduit adaptor, 1/2 in. snap-fit EMT conduit adaptor (box of 10)
TE-6001-1	Duct mounting hardware with handy box for A99 sensor
TE-6001-11	Duct mounting hardware without handy box for A99 sensor
SHL10A-603R	Sun Shield (for use with outside A99 sensors in sunny locations)

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

Product Code Number	Product Description
HE-67S3-0N0BT	Wall Mount Humidity Sensor with A99B Type Temperature Sensor: 10 to 95% RH; -40 to 121°C (-40 to 250°F)
HE-67S3-0N00P	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
DPT2650-0R5D-AB	Low Pressure Differential Transducer: 0 to 0.5 in. W.C.
DPT2650-10D-AB	Low Pressure Differential Transducer: 0 to 10 in. W.C.

Table 6: System 450 Compatible P499 Series Electronic Pressure Transducer and WHA-PKD3 Wire Harness 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 psig; 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 psig; 1/8 in.-27 NPT External Thread Style WHA-PKD3-200C wire harness included.
P499RCP-101C	Electronic Pressure Transducer: 0 to 100 psig; 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 psig; 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). WHA-PKD3-200C wire harness included.
P499RAP-102C	Electronic Pressure Transducer: 0 to 200 psig; 1/8 in.-27 NPT External Thread Style Order a WHA-PKD3 type wire harness separately.
P499RCPS102C	Electronic Pressure Transducer: 0 to 200 psis (sealed for wet and freeze/thaw applications); 1/4 in. SAE 45° Flare Internal Thread (7/16-20 UNF) with Depressor (Style 47). Order WHA-PKD3 type wire harness separately.
P499RCPS102K	Electronic Pressure Transducer Kit: 0 to 200 psis (sealed for wet and freeze/thaw applications); 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 psig; 1/8 in.-27 NPT External Thread Style Order WHA-PKD3 type wire harness separately.
P499RAP-105K	Electronic Pressure Transducer Kit: 0 to 500 psig; 1/8 in.-27 NPT External Thread Style WHA-PKD3-200C wire harness included.
P499RCP-105C	Electronic Pressure Transducer: 0 to 500 psig; 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 psig; 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 psig; 1/8 in.-27 NPT External Thread Style Order WHA-PKD3 type wire harness separately.
P499RAP-107K	Electronic Pressure Transducer Kit: 0 to 750 psig; 1/8 in.-27 NPT External Thread Style WHA-PKD3-200C wire harness included.
P499RCP-107C	Electronic Pressure Transducer: 0 to 750 psig; 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 psig; 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


C450Cxx Control Modules with Analog Output

Product	C450Cxx: System 450 Control Module models are sensing controls and operating controls with LCD, four-button touchpad, and analog output C450CPN-1: Control Module with one analog output C450CPW-100: Control Module with Hybrid Analog Output and High Input Signal Selection C450CQN-1: Control Module with two analog outputs
Supply Power	C450YNN-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) when using 0–10 VDC outputs; -40 to 40°C (-40 to 104°F) when using 4–20 mA outputs 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; 1,035 ohm at 25°C (77°F) for an A99 PTC Temperature Sensor
Analog Output	Voltage Mode (0–10 VDC): 10 VDC maximum output voltage 10 mA maximum output current Requires an external load of 1,000 ohm or more The AO operates in Voltage Mode when connected to devices with impedance greater than 1,000 ohm. Devices that drop below 1,000 ohm may not operate as intended with Voltage Mode applications. Current Mode (4–20 mA): Requires an external load between 0–300 ohm The AO operates in Current Mode when connected to devices with impedances less than 300 ohm. Devices that exceed 300 ohm may not operate as intended with Current Mode applications.
Analog Input Accuracy	Resolution: 14 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	C450CPN-1: 195 g (0.43 lb) C450CPW-100: 195 g (0.43 lb) C450CQN-1: 195 g (0.43 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: CE Mark - Johnson Controls Inc., declares that this product is in compliance with 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)

C450CxN Control Modules with Relay Output (Part 1 of 2)

Product	C450Cxx: System 450 Control Module models are sensing controls and operating controls with LCD, four-button touchpad, and On/Off relay output C450CBN-1: Control Module with one SPDT output relay C450CCN-1: Control Module with two SPDT output relays
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C450CxN Control Modules with Relay Output (Part 2 of 2)

Supply Power	C450YNN-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) when using 0–10 VDC outputs; -40 to 40°C (-40 to 104°F) when using 4–20 mA outputs 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, 1,035 ohm at 25°C (77°F) for an A99 PTC Temperature Sensor		
Output Relay Contacts	General: 1/2 HP at 120/240 VAC, SPDT		
	Specific:	<u>AC Motor Ratings</u>	<u>120 VAC</u> <u>208/240 VAC</u>
		AC Full-load Amperes:	9.8 A 4.9 A
		AC Locked-Rotor Amperes:	58.8 A 29.4 A
	<hr/> 10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC		
Analog Input Accuracy	Resolution: 14 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 g (0.46 lb) C450CCN-1: 222 g (0.49 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: CE Mark - Johnson Controls Inc., declares that this product is in compliance with 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)	

C450RxN Reset Control Modules with Relay Output (Part 1 of 2)

Product	C450RxN: System 450 Reset Control Module models are sensing controls and operating controls with LCD, four-button touchpad, and On/Off relay output. C450RBN-1: Reset Control Module with one SPDT output relay, one A99BC-25 temperature sensor, and one A99BC-300 temperature sensor C450RCN-1: Reset Control Module with two SPDT output relays, one A99BC-25 temperature sensor, and one A99BC-300 temperature sensor
Supply Power	C450YNN-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, 1,035 ohm at 25°C (77°F) for an A99 PTC Temperature Sensor

C450RxN Reset Control Modules with Relay Output (Part 2 of 2)

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		
Clock Accuracy	±4 minutes per year		
Clock Backup Power	12 hours (capacitor reserve)		
Setback Events	one occupied and one unoccupied event per day; 7 day schedule		
Analog Input Accuracy	Resolution: 14 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	C450RBN-1: 209 g (0.46 lb) C450RCN-1: 222 g (0.49 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: CE Mark - Johnson Controls Inc., declares that this product is in compliance with 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 Analog Output Expansion Modules (Part 1 of 2)

Product	C450SPN-1: System 450 Expansion Module with one Analog output C450SQN-1: System 450 Expansion Module with two Analog outputs
Supply Power	C450YNN-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) when using 0–10 VDC outputs; -40 to 40°C (-40 to 104°F) when using 4–20 mA outputs 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)
Analog Output	Voltage Mode (0–10 VDC): 10 VDC maximum output voltage 10 mA maximum output current Requires an external load of 1,000 ohm or more The AO operates in Voltage Mode when connected to devices with impedance greater than 1,000 ohm. Devices that drop below 1,000 ohm may not operate as intended with Voltage Mode applications.
	Current Mode (4–20 mA): Requires an external load between 0–300 ohm The AO operates in Current Mode when connected to devices with impedances less than 300 ohm. Devices that exceed 300 ohm may not operate as intended with Current Mode applications.
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.)

C450SxN Analog Output Expansion Modules (Part 2 of 2)

Weight	C450SPN-1: 150 g (0.33 lb) C450SQN-1: 150 g (0.33 lb)
Compliance	<p>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</p> <p>Europe: CE Mark - Johnson Controls Inc., declares that this product is in compliance with Low Voltage Directive (2006/95/EC); EMC Directive (2004/108/EC). RoHS Directive (2002/95/EC); WEEE Directive (2002/96/EC).</p> <p>Australia: Mark: C-Tick Compliant (N1813)</p>


C450SxN 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	C450YNN-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 g (0.38 lb) C450SCN-1: 186 g (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: CE Mark - Johnson Controls Inc., declares that this product is in compliance with 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 Power Module (Part 1 of 2)

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	<p>Temperature: -40 to 66°C (-40 to 150°F) Humidity: Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)</p>
Ambient Shipping and Storage Conditions	<p>Temperature: -40 to 80°C (-40 to 176°F) Humidity: Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)</p>

C450YNN Power Module (Part 2 of 2)

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	C450YNN-1: 390 g (0.86 lb)
Compliance	<div><div></div><div><p>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</p><p>Europe: CE Mark - Johnson Controls Inc., declares that this product is in compliance with Low Voltage Directive (2006/95/EC); EMC Directive (2004/108/EC). RoHS Directive (2002/95/EC); WEEE Directive (2002/96/EC).</p><p>Australia: Mark: C-Tick Compliant (N1813)</p></div></div>

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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