

C450xxx

# System 450™ Series Modular Controls

## Description

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.

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.

## Features

- 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 (UI) provide quick, clear, visual status of the control system's inputs and outputs with the touch of a button, and enable 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

The C450R modules have additional features:

- adjustable user-defined reset setpoint 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.
- adjustable minimum and maximum setpoint temperature permits compliance with equipment manufacturer's specifications.
- selectable warm weather shutdown temperature saves energy by disabling equipment when the master sensor temperature rises to a point where heating is no longer required.
- adjustable setback temperature saves energy by lowering the supply temperature setpoint at night or during unoccupied periods.

## 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

- 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

- 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 only)



**System 450 Control System with a Control, Power, and Expansion Module**



**A System 450 control module can be used for stand-alone temperature, pressure, or humidity control.**

## Humidity Control

- humidification/dehumidification control
- staged SPDT humidity control

## Multipurpose Control

- 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 Control (C450R Models Only)

- 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™ Series Modular Controls (Continued)

### Selection Charts

#### System 450 Modules and Accessories Ordering Information

Product Code Number	Product Description
C450CBN-1C	Control Module <sup>1</sup> with LCD, Four-Button Touchpad UI, and Relay Output; Provides one relay output (SPDT line-voltage relay) for SPDT control.
C450CCN-1C	Control Module <sup>1</sup> with LCD, Four-Button Touchpad UI, and Relay Output; Provides two relay outputs (SPDT line-voltage relays) for SPDT control.
C450CPN-1C	Control Module <sup>1</sup> 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 <sup>1</sup> 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 <sup>1</sup> 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 <sup>1</sup> with LCD, Four-Button Touchpad UI, and SPDT relay output; Provides one SPDT output relay.
C450RCN-1C	Reset Control Module <sup>1</sup> 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.

#### 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)
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

## System 450™ Series Modular Controls (Continued)

### System 450 Compatible A99B Temperature Sensors and Accessories Ordering Information (Part 2 of 2)

Product Code Number	Product Description
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)

### 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)

### 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.

### 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 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

## System 450™ Series Modular Controls (Continued)

### Technical Specifications

C450Cxx Control Modules with Analog Output										
<b>Product</b>	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									
<b>Supply Power</b>	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									
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -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 <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Input Signal</b>	0-5 VDC; 1035 ohms at 25°C (77°F) for an A99 PTC Temperature Sensor									
<b>Analog Output</b>	<b>Voltage Mode (0–10 VDC):</b> 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. <b>Current Mode (4–20 mA):</b> 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.									
<b>Analog Input Accuracy</b>	<b>Resolution:</b> 14 bit									
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.									
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)									
<b>Weight</b>	C450CPN-1: 195 g (0.43 lb) C450CPW-100: 195 g (0.43 lb) C450CQN-1: 195 g (0.43 lb)									
<b>Compliance</b>	 <b>North America:</b> 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 <b>Europe:</b> 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). <b>Australia:</b> Mark: C-Tick Compliant (N1813)									
C450CxN Control Modules with Relay Output (Part 1 of 2)										
<b>Product</b>	C450CxN: 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									
<b>Supply Power</b>	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									
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -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 <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Input Signal</b>	0-5 VDC, 1,035 ohms at 25°C (77°F) for an A99 PTC Temperature Sensor									
<b>Output Relay Contacts</b>	<b>General:</b> 1/2 HP at 120/240 VAC, SPDT <b>Specific:</b> <table border="1"> <thead> <tr> <th>AC Motor Ratings</th> <th>120 VAC</th> <th>208/240 VAC</th> </tr> </thead> <tbody> <tr> <td>AC Full-load Amperes:</td> <td>9.8 A</td> <td>4.9 A</td> </tr> <tr> <td>AC Locked-Rotor Amperes:</td> <td>58.8 A</td> <td>29.4 A</td> </tr> </tbody> </table> 10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC	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
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AC Full-load Amperes:	9.8 A	4.9 A								
AC Locked-Rotor Amperes:	58.8 A	29.4 A								
<b>Analog Input Accuracy</b>	<b>Resolution:</b> 14 bit									

## System 450™ Series Modular Controls (Continued)


C450CxN Control Modules with Relay Output (Part 2 of 2)										
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.									
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)									
<b>Weight</b>	C450CBN-1: 209 g (0.46 lb) C450CCN-1: 222 g (0.49 lb)									
<b>Compliance</b>	 <p><b>North America:</b> 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><b>Europe:</b> 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><b>Australia:</b> Mark: C-Tick Compliant (N1813)</p>									
C450RxN Reset Control Modules with Relay Output										
<b>Product</b>	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									
<b>Supply Power</b>	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									
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -40 to 66°C (-40 to 150°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Input Signal</b>	0-5 VDC, 1,035 ohms at 25°C (77°F) for an A99 PTC Temperature Sensor									
<b>Output Relay Contacts</b>	<p><b>General:</b> 1/2 HP at 120/240 VAC, SPDT</p> <table border="1"> <thead> <tr> <th><b>Specific:</b> AC Motor Ratings</th> <th>120 VAC</th> <th>208/240 VAC</th> </tr> </thead> <tbody> <tr> <td>AC Full-load Amperes:</td> <td>9.8 A</td> <td>4.9 A</td> </tr> <tr> <td>AC Locked-Rotor Amperes:</td> <td>58.8 A</td> <td>29.4 A</td> </tr> </tbody> </table> <p>10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC</p>	<b>Specific:</b> 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
<b>Specific:</b> 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								
<b>Clock Accuracy</b>	±4 minutes per year									
<b>Clock Backup Power</b>	12 hours (capacitor reserve)									
<b>Setback Events</b>	one occupied and one unoccupied event per day; 7 day schedule									
<b>Analog Input Accuracy</b>	<b>Resolution:</b> 14 bit									
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.									
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)									
<b>Weight</b>	C450RBN-1: 209 g (0.46 lb) C450RCN-1: 222 g (0.49 lb)									
<b>Compliance</b>	 <p><b>North America:</b> 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><b>Europe:</b> 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><b>Australia:</b> Mark: C-Tick Compliant (N1813)</p>									
C450SxN Analog Output Expansion Modules (Part 1 of 2)										
<b>Product</b>	C450SPN-1: System 450 Expansion Module with one Analog output C450SQN-1: System 450 Expansion Module with two Analog outputs									
<b>Supply Power</b>	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									
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -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 <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									

## System 450™ Series Modular Controls (Continued)

C450SxN Analog Output Expansion Modules (Part 2 of 2)	
<b>Analog Output</b>	<p><b>Voltage Mode (0–10 VDC):</b>            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.</p> <p><b>Current Mode (4–20 mA):</b>            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.</p>
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)
<b>Weight</b>	C450SPN-1: 150 g (0.33 lb) C450SQN-1: 150 g (0.33 lb)
<b>Compliance</b>	<p><b>North America:</b> 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><b>Europe:</b> 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><b>Australia:</b> Mark: C-Tick Compliant (N1813)</p>

C450SxN Relay Output Expansion Modules										
<b>Product</b>	C450SBN-1: System 450 Expansion Module with one SPDT output relay C450SCN-1: System 450 Expansion Module with two SPDT output relays									
<b>Supply Power</b>	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									
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -40 to 66°C (-40 to 150°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)									
<b>Output Relay Contacts</b>	<p><b>General:</b> 1/2 HP at 120/240 VAC, SPDT</p> <table border="1"> <thead> <tr> <th><b>Specific: AC Motor Ratings</b></th> <th><b>120 VAC</b></th> <th><b>208/240 VAC</b></th> </tr> </thead> <tbody> <tr> <td>AC Full-load Amperes:</td> <td>9.8 A</td> <td>4.9 A</td> </tr> <tr> <td>AC Locked-Rotor Amperes:</td> <td>58.8 A</td> <td>29.4 A</td> </tr> </tbody> </table> <p>10 Amperes AC Non-inductive at 24/240 VAC Pilot Duty: 125 VA at 24/240 VAC</p>	<b>Specific: AC Motor Ratings</b>	<b>120 VAC</b>	<b>208/240 VAC</b>	AC Full-load Amperes:	9.8 A	4.9 A	AC Locked-Rotor Amperes:	58.8 A	29.4 A
<b>Specific: AC Motor Ratings</b>	<b>120 VAC</b>	<b>208/240 VAC</b>								
AC Full-load Amperes:	9.8 A	4.9 A								
AC Locked-Rotor Amperes:	58.8 A	29.4 A								
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.									
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)									
<b>Weight</b>	C450SBN-1: 172 g (0.38 lb) C450SCN-1: 186 g (0.41 lb)									
<b>Compliance</b>	<p><b>North America:</b> 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><b>Europe:</b> 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><b>Australia:</b> Mark: C-Tick Compliant (N1813)</p>									

## System 450™ Series Modular Controls (Continued)

C450YNN Power Module	
<b>Product</b>	C450YNN-1: System 450 Power Supply Module; 120 or 240 VAC stepdown to 24 VAC Class 2 (North America) or SELV (Europe)
<b>Supply Power</b>	110/120 VAC or 220/240 VAC at 50/60 Hz (100 mA maximum)
<b>Secondary Power</b>	24 VAC, 10 VA
<b>Ambient Operating Conditions</b>	<b>Temperature:</b> -40 to 66°C (-40 to 150°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
<b>Ambient Shipping and Storage Conditions</b>	<b>Temperature:</b> -40 to 80°C (-40 to 176°F) <b>Humidity:</b> Up to 95% RH noncondensing; Maximum Dew Point 29°C (85°F)
<b>Control Construction</b>	Independently-mounted control, surface mounted with Lexan 950 enclosure suitable for DIN rail mounting or direct mounting to a hard, even surface.
<b>Dimensions (H x W x D)</b>	127 x 61 x 61 mm (5 x 2-3/8 x 2-3/8 in.)
<b>Weight</b>	C450YNN-1: 390 g (0.86 lb)
<b>Compliance</b>	<div style="display: flex; align-items: center;">  <div> <p><b>North America:</b> 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><b>Europe:</b> 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><b>Australia:</b> Mark: C-Tick Compliant (N1813)</p> </div> </div>