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C450xxx-x

System 450 Series Modular Controls

Description

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, and Refrigeration (HVAC/R) and commercial/ industrial process applications.

System 450 is designed to replace System 350 and System 27 and provides 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.

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.
- Multi-purpose, field-configurable modules designed for global use enable you to design and configure an almost endless 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 (UI) provide quick, clear, visual status of the control system's input sensors and outputs with the touch of a button and enable you to quickly and easily set up and adjust up 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 a multipurpose control (with relay or analog output depending on the model) that is temperature, pressure, and humidity capable out-of-the-box and field configurable to replace a wide variety of HVAC/R 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 global markets.

Applications

You can create an almost endless variety of custom, application-specific control systems with System 450 modules. Here are some common application examples.

Temperature Control

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

Pressure Control

- refrigeration compressor capacity control
- staged On/Off condenser fan control
- two-speed fan motor control
- floating pressure control of an actuator



Simple 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.

- constant static pressure or air velocity control
- relief damper building pressurization control
- relief fan building pressurization control

Humidity Control

- humidification/dehumidification control
- staged On/Off 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

Selection Chart

System 450 Modules

Product Code Number	Description
C450CBN-1	Control Module ¹ with LCD, Four-Button Touchpad UI, and Relay Output; Provides one relay output (SPDT line-voltage relay) for On/Off control.
C450CCN-1	Control Module ¹ with LCD, Four-Button Touchpad UI, 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 Touchpad UI, 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 Touchpad UI, 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 2009 Johnson Controls, Inc. www.johnsoncontrols.com



System 450 Series Modular Controls (Continued)

System 450 Modules

Product Code Number	Description
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.

System 450 Compatible A99B Temperature Sensors Ordering Information

Product Code Number	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.
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.

System 450 Compatible Humidity Sensors with Integral A99B Temperature Sensor Ordering Information

Product Code Number	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)

System 450 Compatible Low Pressure Differential Transducer Ordering Information

Product Code Number	Description
DPT-2650-0R5D-AB	Low Pressure Differential Transducer: 0 to 0.50 in.W.C.
DPT-2650-010D-AB	Low Pressure Differential Transducer: 0 to 10 in.W.C.

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

Product Code Number	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.



System 450 Series Modular Controls (Continued)

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

Product Code Number	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	C450YNN-1 Power Supply Module or 24 (20-30) VAC Safety Extra-Low Voltage (SELV) (Europe) 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 non condensing; 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 non condensing; 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: <table border="1" style="margin-left: 20px;"> <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
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								
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)									
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	C450YNN Power Supply Module, or 24 (20-30) VAC SELV (Europe) Class 2 (North America) 50/60 Hz, 5 VA Maximum
Ambient Operating Conditions	Temperature: -40 to 66°C (-40 to 150°F) Humidity: Up to 95% RH non-condensing; Maximum Dew Point 29°C (85°F)



System 450 Series Modular Controls (Continued)

C450SxN-1 Relay Output Expansion Modules

Ambient Shipping and Storage Conditions	Temperature: -40 to 80°C (-40 to 176°F) Humidity: Up to 95% RH non-condensing; Maximum Dew Point 29°C (85°F)									
Output Relay Contacts	General: 1/2 HP at 120/240 VAC, SPDT Specific: <table border="1"> <tr> <td>AC Motor Ratings</td> <td>120 VAC</td> <td>208/240 VAC</td> </tr> <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> </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
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								
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 non-condensing; 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 non-condensing; 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.
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.