A421 Series Electronic Temperature Controls

Description

The A421 Series Electronic Temperature Controls are single-stage controls with a single-pole, double-throw (SPDT) output relay.

A421 Controls feature a bright backlit LCD with adjustable brightness and a three-button touchpad interface that can be set up to restrict user adjustments. An LED indicates the output relay's On/Off status. Standard A421 Series control modules have simple On and Off temperature settings for heating or cooling, an adjustable anti-short cycle delay, temperature setback, and sensor offset capability. The temperature control range is -40 to 212°F or -40 to 100°C.

The A421 controls are available either in Type 1 (NEMA), IP20 (CE), high-impact plastic enclosures suitable for surface or DIN rail mounting or in Type 4X (NEMA), IP67 (CE) watertight, corrosion resistant surface mount enclosures.

Refer to the *A421 Series Electronic Temperature Controls Product Bulletin (LIT-12011972)* for important product application information.

Applications

The A421 Electronic Temperature Control can be used to control a wide variety of single-stage refrigeration or HVAC equipment.

Sample temperature control applications include:

- temperature monitoring and alarming
- on/off control of boilers and chillers
- boiler and chiller pump control
- heating and cooling control
- floating temperature control of damper and valve actuators
- cooling tower fan control based on water temperature
- supply, makeup, and mixed air temperature control
- temperature actuated valve control
- supply and makeup air damper and fan control
- condenser fan control based on condenser temperature

Features

- easy-to-read, bright, adjustable backlit LCD screen displays the temperature, parameters, and status clearly and allows you to adjust LCD brightness for the ambient light conditions. Custom icons on the display provide visual cues on system and control status.
- basic and advanced programming menus allow you to easily set up your control application on the LCD using a simple three-button touchpad interface.
- adjustable On and Off temperature setpoints enable easy to set up cooling or heating control applications on the three-button touchpad, eliminating the need to remove the cover and reposition jumpers for reverse or direct control actions.
- high and low temperature setpoint adjustment stops allow you to set up your application for your desired range of adjustment and restrict user adjustment to just the desired temperature adjustment range.
- displayed temperature offset allows you to adjust the displayed temperature to the actual sensed temperature in applications where the resistance error in long sensor cable leads cause a deviation in the displayed temperature from the actual sensed temperature.
- adjustable anti-short cycle delay keeps the output relay Off after the Off setpoint is reached for a user-defined time delay, which helps avoid short cycling, hard starts, and nuisance overload outages on compressors and other inductive applications.
- temperature setback/offset control enables the control to shift the On and Off setpoint values by a user-defined offset when an external switch closes the binary input control circuit. Using a switching timer enables you to set up occupied/unoccupied temperature setback schedules for your applications.
- high-impact, thermoplastic Type 1/IP20 or Type 4X (NEMA)/IP66 watertight, corrosion-resistant enclosures increase application options, allowing surface and snap-fit DIN rail mount, or watertight surface mount.

A421 Series Electronic Temperature Control

- parameter adjustment restriction allows you to lock the control's setup parameters and restrict user adjustments to just the On and Off temperature setpoint values within your defined setpoint adjustment range.
- low- and line-voltage control models provide industry standard control voltage options for most refrigeration and HVAC control applications.

Repair Information

If the A421 Series Electronic Temperature Control fails to operate within its specifications, replace the unit. For a replacement A421 Control, contact the nearest Authorized Johnson Controls/PENN® Distributer or Sales Representative.

A421 Series Electronic Temperature Controls (Continued)

Selection Chart

A421 Electronic Temperature Control Selection Chart

Product Code Number	Description
A421ABC-02C	**Line-Voltage Type 1 Electronic Temperature Control:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421ABC-03C	**Line-Voltage Type 1 Electronic Temperature Control:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-300C temperature sensor with 9 ft 9 in. (3.0 m) cable.
A421ABC-04C	**Line-Voltage Type 1 Electronic Temperature Control:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-400C temperature sensor with 13 ft 1-1/5 in. (4.0 m) cable.
A421ABC-06C	**Line-Voltage Type 1 Electronic Temperature Control:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-400C temperature sensor with 19 ft 6 in. (6.0 m) cable.
A421AEC-01C	**Line-Voltage Type 4X Electronic Temperature Control:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-25C temperature sensor with 9-7/8 in. (0.25 m) cable.
A421AEC-02C	**Line-Voltage Type 4X Electronic Temperature Control:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120/240 VAC. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421GBF-02C	**Low-Voltage Type 1 Electronic Temperature Control:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 24 VAC Class 2, Safety Extra Low Voltage. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421GEF-01C	**Low-Voltage Type 4X Electronic Temperature Control:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 24 VAC Class 2, Safety Extra Low Voltage (SELV). Includes an A99BB-25C temperature sensor with 9-7/8 in. (0.25 m) cable.
A421GEF-02C	**Low-Voltage Type 4X Electronic Temperature Control:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 24 VAC Class 2 (SELV). Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.

A99 Temperature Sensors Compatible with the A421 Control[1]

Product Code Number	Description
A99BA-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) shielded PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-400C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 13 ft 1-1/5 in. (4.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-600C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BC-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 100ºC)
A99BC-100C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 3 ft 3-3/5 in. (1.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 16 ft 4-4/5 in. (5.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-1500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 49 ft 2-2/5 in. (15.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99CB-200C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99CB-600C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)

1. When any A99 Series Temperature Sensor is connected to a standard temperature A421 Control model, the range of usable values is -40 to 212ºF (-40 to 100ºC).

A421 Series Electronic Temperature Controls (Continued)

Accessories for the A421 Controls

Product Code Number	Description
BKT287-1R	12 in. (305 mm) long DIN rail section
BKT287-2R	36 in. (914 mm) long DIN rail section
PLT344-1R	Two End Clamps for DIN rail sections
A99-CLP-1	Surface Mounting Clip for A99B and A99C Series Temperature Sensors
SHL10-603R	Sun Shield for A99B and A99C Series Temperature Sensors
BOX10A-603R	PVC Enclosure for A99B and A99C Series Temperature Sensors
WEL11A-601R	Immersion well for applying sensor in fluid applications

Technical Specifications

A421 Series Electronic Temperature Controls	
Power Consumption	1.8 VA maximum
Supply Power	Low Voltage Models: 24 VAC (20 to 30 VAC), 50/60 Hz, Class 2 or Safety Extra-Low Voltage Line Voltage Models: 110/120 or 208/230/240 VAC, 50/60 Hz
Ambient Conditions	Operating: Type 1 Models: -40 to 150°F (-40 to 66°C), 0 to 95% RH Noncondensing Type 4X Models: -40 to 140°F (-40 to 60°C), 0 to 95% RH Noncondensing Shipping and Storage: -40 to 185°F (-40 to 85°C), 0 to 95% RH Noncondensing
Temperature Control Range	-40 to 212°F (-40 to 100°C)
Input Signal	1,035 ohm at 77°F (25°C) for A99 PTC temperature sensors
Sensor Offset Range	±5ºF or ±3ºC
Output Relay Contacts Electrical Ratings	24 VAC models: 100 VA, 30 VAC maximum, Class 2
	120/240 VAC models: **Applied Voltage:** **24 VAC** **120 VAC** **208 VAC** **240 VAC** Horsepower N.O. (N.C.): -- 1 (0.25) hp 1 (0.33) hp 1 (0.5) hp Full Load Amperes N.O. (N.C.): -- 16 (5.8) A 9.2 (4.0) A 8.0 (4.9) A Locked Rotor Amperes N.O. (N.C.): -- 96 (34.8) A 55.2 (24) A 48 (29.4) A Resistive Amperes N.O. (N.C.): 15 (10) A 15 (10) A 10 (10) A 10 (10) A Pilot Duty N.O. (N.C.): 125 (50) VA 125 (125) VA 125 (125) VA 125 (125) VA
Enclosure Material	Type 1/IP20 high-impact thermoplastic or Type 4X/IP66 watertight, corrosion-resistant, high-impact thermoplastic
Compliance CE	**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 the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC. **Australia:** Regulatory Compliance Mark (RCM)

A421 Series Electronic Temperature Controls with Integral Power Cord

Description

The A421 Series Electronic Temperature Controls are single-stage controls with a single-pole, double-throw (SPDT) output relay, a bright backlit LCD, and a three-button touchpad interface that can be set up to restrict user adjustments. An LED indicates the output relay's On/Off status. The A421 Series Controls have simple On and Off temperature settings for heating or cooling, an adjustable anti-short cycle delay, and a temperature offset function.

The control range is -40 to 212°F (-40 to 100°C) for standard models. Models with a control range of -40 to 248°F (-40 to 120°C) are available in quantity orders. The controls feature remote sensing capability and interchangeable sensors. The A421 Controls are available in either Type 1 (NEMA)/IP20 high-impact plastic enclosure suitable for surface or DIN rail mounting or Type 4X (NEMA)/IP66 watertight, corrosion-resistant surface mount enclosures.

The A421ABG Controls Type 1 (NEMA)/IP20 enclosure feature factory-installed power cords with plug and receptacle to provide easy plug-in connection and control of 120 VAC plug-in cooling and heating equipment.

Refer to the *A421 Series Electronic Temperature Controls Product Bulletin (LIT-12011972)* for important product application information.

Applications

The A421 Electronic Temperature Control can be used to control a wide variety of single-stage refrigeration or HVAC equipment.

Sample temperature control applications include:

- temperature monitoring and alarming
- on/off control of boilers and chillers
- boiler and chiller pump control
- heating and cooling control
- floating temperature control of damper and valve actuators
- cooling tower fan control based on water temperature
- supply, makeup, and mixed air temperature control
- temperature actuated valve control
- supply and makeup air damper and fan control
- condenser fan control based on condenser temperature

Features

- easy-to-read, bright, adjustable backlit LCD screen displays the temperature, parameters, and status clearly and allows you to adjust LCD brightness for the ambient light conditions. Custom icons on the display provide visual cues on system and control status.
- basic and advanced programming menus allow you to easily set up your control application on the LCD using a simple three-button touchpad interface.
- adjustable On and Off temperature setpoints enable easy to set up cooling or heating control applications on the three-button touchpad, eliminating the need to remove the cover and reposition jumpers for reverse or direct control actions.
- high and low temperature setpoint adjustment stops allow you to set up your application for your desired range of adjustment and restrict user adjustment to just the desired temperature adjustment range.
- displayed temperature offset allows you to adjust the displayed temperature to the actual sensed temperature in applications where the resistance error in long sensor cable leads cause a deviation in the displayed temperature from the actual sensed temperature.
- adjustable anti-short cycle delay keeps the output relay Off after the Off setpoint is reached for a user-defined time delay, which helps avoid short cycling, hard starts, and nuisance overload outages on compressors and other inductive applications.
- temperature setback/offset control enables the control to shift the On and Off setpoint values by a user-defined offset when an external switch closes the binary input control circuit. Using a switching timer enables you to set up occupied/unoccupied temperature setback schedules for your applications.
- high-impact, thermoplastic Type 1 (NEMA)/IP20 or Type 4X (NEMA)/IP66 watertight, corrosion-resistant enclosures increase application options, allowing surface and snap-fit DIN rail mount, or watertight surface mount.
- parameter adjustment restriction allows you to lock the control's setup parameters and restrict user adjustments to just the On and Off temperature setpoint values within your defined setpoint adjustment range.

A421 Series Electronic Temperature Controls with Integral Power Cord

- low- and line-voltage control models provide industry standard control voltage options for most refrigeration and HVAC control applications.

Repair Information

If the A421 Series Electronic Temperature Control with Integral Power Cord fails to operate within its specifications, replace the unit. For a replacement A421 Control, contact the nearest Authorized Johnson Controls/PENN® Distributer or Sales Representative.

A421 Series Electronic Temperature Controls with Integral Power Cord (Continued)

Selection Chart

A421 Electronic Temperature Control Selection Chart

Product Code Number	Description
A421ABG-02C	**Line-Voltage Type 1 Electronic Temperature Control with Dual Power Cords:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120 VAC. Control is factory wired with a 6 ft (1.8 m) cord with 120 VAC grounded external plug and a 1 ft (0.30) cord with 120 VAC grounded internal receptacle. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421ABJ-02C	**Line-Voltage Type 1 Electronic Temperature Control with Single Power Cord and Piggyback Plug:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120 VAC. Control is factory wired with a 6 ft (1.8 m) cord with 120 VAC grounded piggyback plug. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421AEJ-01C	**Line-Voltage Type 4X Electronic Temperature Control with Single Power Cord and Piggyback Plug:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120 VAC. Control is factory wired with a 6 ft (1.8 m) cord with grounded piggyback plug. Includes an A99BB-25C temperature sensor with 9-7/8 in. (0.25 m) cable.
A421AEJ-02C	**Line-Voltage Type 4X Electronic Temperature Control with Single Power Cord and Piggyback Plug:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120 VAC. Control is factory wired with a 6 ft (1.8 m) cord with grounded piggyback plug. Includes an A99BB-200C temperature sensor with 6.6 ft (2.0 m) cable.

A99 Temperature Sensors Compatible with the A421 Control[1]

Product Code Number	Description
A99BA-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) shielded PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-400C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 13 ft 1-1/5 in. (4.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-600C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BC-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 100ºC)
A99BC-100C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 3 ft 3-3/5 in. (1.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 16 ft 4-4/5 in. (5.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-1500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 49 ft 2-2/5 in. (15.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99CB-200C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99CB-600C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)

1. When any A99 Series Temperature Sensor is connected to a standard temperature A421 control model, the range of usable values is -40 to 212ºF (-40 to 100ºC).

Accessories for the A421 Controls

Product Code Number	Description
BKT287-1R	12 in. (305 mm) long DIN rail section
BKT287-2R	36 in. (914 mm) long DIN rail section
PLT344-1R	Two End Clamps for DIN rail sections
A99-CLP-1	Surface Mounting Clip for A99B and A99C Series Temperature Sensors
SHL10-603R	Sun Shield for A99B and A99C Series Temperature Sensors
BOX10A-603R	PVC Enclosure for A99B and A99C Series Temperature Sensors
WEL11A-601R	Immersion well for applying sensor in fluid applications

A421 Series Electronic Temperature Controls with Integral Power Cord (Continued)

Technical Specifications

A421 Series Electronic Temperature Controls	
Power Consumption	1.8 VA maximum
Supply Power	110/120 VAC, 50/60 Hz
Ambient Conditions	Operating: Type 1 Models: -40 to 150°F (-40 to 66°C), 0 to 95% RH noncondensing Type 4X Models: -40 to 140°F (-40 to 60°C), 0 to 95% RH noncondensing Shipping and Storage: All Models: -40 to 185°F (-40 to 85°C), 0 to 95% RH noncondensing
Temperature Control Range	-40 to 212°F (-40 to 100°C)
Input Signal	1,035 ohm at 77°F (25°C) for A99 PTC temperature sensors
Sensor Offset Range	±5ºF or ±3ºC
Output Relay Contacts Electrical Ratings	120 VAC Model with Integral Power Cord: **Applied Voltage: 120 VAC** Full Load Amperes N.O.: 12 A Locked Rotor Amperes N.O.: 72 A Resistive Amperes N.O.: 12 A Pilot Duty: 125 VA (N.O. contacts) at 24 to 120 VAC
Enclosure Material	NEMA 1/IP20 high-impact thermoplastic or NEMA 4X/IP66 watertight, corrosion-resistant, high-impact thermoplastic
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

A421 Series Electronic Temperature Controls with Off-Cycle Defrost

Description

The A421 Series Electronic Temperature Controls are single-stage controls with a single-pole, double-throw (SPDT) output relay, a bright backlit LCD, and a three-button touchpad interface that can be set up to restrict user adjustments. An LED indicates the output relay's On/Off status. The A421 Series Controls have simple On and Off temperature settings for heating or cooling, an adjustable anti-short cycle delay, and a temperature offset function.

The control range is -40 to 212°F (-40 to 100°C) for standard models. Models with a control range of -40 to 248°F (-40 to 120°C) are available in quantity orders. The controls feature remote sensing capability and interchangeable sensors. The A421 Controls are available in either Type 1 (NEMA)/IP20 high-impact plastic enclosure suitable for surface or DIN rail mounting or Type 4X (NEMA)/IP66 watertight, corrosion-resistant surface mount enclosures.

A421 Controls with Off-Cycle Defrost (A421ABD and A421AED models) provide off-cycle defrost control with user-configurable defrost cycle duration and frequency.

Refer to the *A421 Series Electronic Temperature Controls Product Bulletin (LIT-12011972)* for important product application information.

Applications

The A421 Electronic Temperature Control can be used to control a wide variety of single-stage refrigeration or HVAC equipment.

Sample temperature control applications include:

- temperature monitoring and alarming
- on/off control of boilers and chillers
- boiler and chiller pump control
- heating and cooling control
- floating temperature control of damper and valve actuators
- cooling tower fan control based on water temperature
- supply, makeup, and mixed air temperature control
- temperature actuated valve control
- supply and makeup air damper and fan control
- condenser fan control based on condenser temperature

Features

- easy-to-read, bright, adjustable backlit LCD screen displays the temperature, parameters, and status clearly and allows you to adjust LCD brightness for the ambient light conditions. Custom icons on the display provide visual cues on system and control status.
- basic and advanced programming menus allow you to easily set up your control application on the LCD using a simple three-button touchpad interface.
- adjustable On and Off temperature setpoints enable easy to set up cooling or heating control applications on the three-button touchpad, eliminating the need to remove the cover and reposition jumpers for reverse or direct control actions.
- high and low temperature setpoint adjustment stops allow you to set up your application for your desired range of adjustment and restrict user adjustment to just the desired temperature adjustment range.
- displayed temperature offset allows you to adjust the displayed temperature to the actual sensed temperature in applications where the resistance error in long sensor cable leads cause a deviation in the displayed temperature from the actual sensed temperature.
- adjustable anti-short cycle delay keeps the output relay Off after the Off setpoint is reached for a user-defined time delay, which helps avoid short cycling, hard starts, and nuisance overload outages on compressors and other inductive applications.
- integrated off-cycle defrost timer (defrost control models only) shuts off the refrigeration system for a user-defined defrost time interval at a user-defined frequency. This eliminates the cost and time to install a separate defrost timer in many refrigeration applications.
- temperature setback/offset control enables the control to shift the On and Off setpoint values by a user-defined offset when an external switch closes the binary input control circuit. Using a switching timer enables you to set up occupied/unoccupied temperature setback schedules for your applications.
- high-impact, thermoplastic Type 1 (NEMA)/IP20 or Type 4X (NEMA)/IP66 watertight, corrosion-resistant enclosures increase application options, allowing surface and snap-fit DIN rail mount, or watertight surface mount.

A421 Series Electronic Temperature Control with Off-Cycle Defrost

- parameter adjustment restriction allows you to lock the control's setup parameters and restrict user adjustments to just the On and Off temperature setpoint values within your defined setpoint adjustment range.
- low- and line-voltage control models provide industry standard control voltage options for most refrigeration and HVAC control applications.

Repair Information

If the A421 Series Electronic Temperature Control with Off-Cycle Defrost fails to operate within its specifications, replace the unit. For a replacement A421 Control, contact the nearest Johnson Controls® representative.

A421 Series Electronic Temperature Controls with Off-Cycle Defrost (Continued)

Selection Charts

A421 Electronic Temperature Controls

Product Code Number	Description
A421ABD-02C	**Line-Voltage Type 1 Electronic Temperature Control with Off-Cycle Defrost Timer:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes integral timer for off-cycle defrost control. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421AED-01C	**Line-Voltage Type 4X Electronic Temperature Control with Off-Cycle Defrost Timer:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120/240 VAC. Includes integral timer for off-cycle defrost control. Includes an A99BB-25C temperature sensor with 9-7/8 in. (0.25 m) cable.
A421AED-02C	**Line-Voltage Type 4X Electronic Temperature Control with Off-Cyle Defrost Timer:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120/240 VAC. Includes integral timer for off-cycle defrost control. Includes an A99BB-200C temperature sensor with 6 ft 6 in. (2 m) cable.

A99 Temperature Sensors Compatible with the A421 Control[1]

Product Code Number	Description
A99BA-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) shielded PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-400C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 13 ft 1-1/5 in. (4.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-600C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BC-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 100ºC)
A99BC-100C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 3 ft 3-3/5 in. (1.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 16 ft 4-4/5 in. (5.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-1500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 49 ft 2-2/5 in. (15.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99CB-200C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99CB-600C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)

1. When any A99 Series Temperature Sensor is connected to a standard temperature A421 control model, the range of usable values is -40 to 212ºF (-40 to 100ºC).

Accessories for the A421 Controls

Product Code Number	Description
BKT287-1R	12 in. (305 mm) long DIN Rail section
BKT287-2R	36 in. (914 mm) long DIN Rail section
PLT344-1R	Two End Clamps for DIN Rail sections
A99-CLP-1	Surface Mounting Clip for A99B and A99C Series Temperature Sensors
SHL10-603R	Sun Shield for A99B and A99C Series Temperature Sensors
BOX10A-603R	PVC Enclosure for A99B and A99C Series Temperature Sensors
WEL11A-601R	Immersion Well for applying sensor in fluid applications

A421 Series Electronic Temperature Controls with Off-Cycle Defrost (Continued)

Technical Specifications

A421 Series Electronic Temperature Controls	
Power Consumption	1.8 VA Maximum
Supply Power	24 VAC, 50/60 Hz, Class 2: 108/110/115/120 or 208/230/240 VAC, 50/60 Hz
Ambient Conditions	**Operating:** -40 to 150°F (-40 to 66°C), 0 to 95% RH Noncondensing **Shipping and Storage:** -40 to 185°F (-40 to 85°C), 0 to 95% RH Noncondensing
Temperature Control Range	-40 to 212°F (-40 to 100°C) or -40 to 248ºF (-40 to 120ºC), depending on the model selected
Input Signal	1,035 ohm at 77°F (25°C) for A99 PTC temperature sensors
Sensor Offset Range	±5ºF or ±3ºC
Output Relay Contacts Electrical Ratings	**24 VAC Models:** 100 VA, 30 VAC maximum, Class 2
	120 VAC Model with Integral Power Cord: **Applied Voltage: 120 VAC** Full Load Amperes N.O. and N.C.: 12 A Locked Rotor Amperes N.O. and N.C.: 72 A Non-inductive Amperes N.O. and N.C.:12 A Pilot Duty: 125 VA (N.O. contacts) at 24 to 120 VAC
	120/240 VAC Models: **Applied Voltage: 120 VAC 208 VAC 240 VAC** Horsepower N.O. (N.C.): 1 (0.25) hp 1 (0.33) hp 1 (0.5) hp Full Load Amperes N.O. (N.C.): 16 (5.8) A 9.2 (4.0) A 8.0 (4.9) A Locked Rotor Amperes N.O. (N.C.): 96 (34.8) A 55.2 (24) A 48 (29.4) A Non-inductive Amperes N.O. (N.C.):15 (10) A 10 (10) A 10 (10) A **Pilot Duty:** 125 VA (N.O. contacts) at 24 to 240 VAC 125 VA (N.C. contacts) at 24 to 240 VAC 50 VA (N.C. contacts) at 24 VAC
Enclosure Material	NEMA 1/IP20 High-Impact Thermoplastic or NEMA 4X/IP66 Watertight, Corrosion-Resistant, High-Impact Thermoplastic
Compliance CE	**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 the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC. **Australia:** Mark: C-Tick Compliant (N1813)

A421 Series Electronic Temperature Controls with Integral Cycle Timer

Description

The A421 Series Electronic Temperature Controls are single-stage controls with a single-pole, double-throw (SPDT) output relay, a bright backlit LCD, and a three-button touchpad interface that can be set up to restrict user adjustments. An LED indicates the output relay's On/Off status. The A421 Series Controls have simple On and Off temperature settings for heating or cooling, an adjustable anti-short cycle delay, and a temperature offset function.

The control range is -40 to 212°F (-40 to 100°C) for standard models. Models with a control range of -40 to 248°F (-40 to 120°C) are available in quantity orders. The controls feature remote sensing capability and interchangeable sensors. The A421 Controls are available in either Type 1 (NEMA)/IP20 high-impact plastic enclosure suitable for surface or DIN rail mounting or Type 4X (NEMA)/IP66 watertight, corrosion-resistant surface mount enclosures.

The A421 Controls with Integral Cycle Timer provide On/Off control of ventilation fans in agriculture applications, warehouse and storage facilities, and other ventilation application that require air-exchange based on temperature or a ventilation schedule with a user-defined On-time and Off-time cycle.

Refer to the *A421 Series Electronic Temperature Controls Product Bulletin (LIT-12011972)* for important product application information.

Applications

The A421 Electronic Temperature Control can be used to control a wide variety of single-stage refrigeration or HVAC equipment.

Sample temperature control applications include:

- temperature monitoring and alarming
- on/off control of boilers and chillers
- boiler and chiller pump control
- heating and cooling control
- floating temperature control of damper and valve actuators
- cooling tower fan control based on water temperature
- supply, makeup, and mixed air temperature control
- temperature actuated valve control
- supply and makeup air damper and fan control
- condenser fan control based on condenser temperature

Features

- easy-to-read, bright, adjustable backlit LCD screen displays the temperature, parameters, and status clearly and allows you to adjust LCD brightness for the ambient light conditions. Custom icons on the display provide visual cues on system and control status.
- basic and advanced programming menus allow you to easily set up your control application on the LCD using a simple three-button touchpad interface.
- adjustable On and Off temperature setpoints enable easy to set up cooling or heating control applications on the three-button touchpad, eliminating the need to remove the cover and reposition jumpers for reverse or direct control actions.
- high and low temperature setpoint adjustment stops allow you to set up your application for your desired range of adjustment and restrict user adjustment to just the desired temperature adjustment range.
- displayed temperature offset allows you to adjust the displayed temperature to the actual sensed temperature in applications where the resistance error in long sensor cable leads cause a deviation in the displayed temperature from the actual sensed temperature.
- adjustable anti-short cycle delay keeps the output relay Off after the Off setpoint is reached for a user-defined time delay, which helps avoid short cycling, hard starts, and nuisance overload outages on compressors and other inductive applications.
- temperature and timed ventilation control (integral cycle timer models only) enables you to set up timed ventilation or makeup air cycles independent from temperature controlled cycles. This eliminates the cost and time to install a separate interval timer in ventilation and makeup air applications.
- temperature setback/offset control enables the control to shift the On and Off setpoint values by a user-defined offset when an external switch closes the binary input control circuit. Using a switching timer enables you to set up occupied/unoccupied temperature setback schedules for your applications.
- high-impact, thermoplastic NEMA 1/IP20 or NEMA 4X/IP66 watertight, corrosion-resistant enclosures increase application options, allowing surface and snap-fit DIN rail mount, or watertight surface mount.

A421 Series Electronic Temperature Control with Integral Cycle Timer

- parameter adjustment restriction allows you to lock the control's setup parameters and restrict user adjustments to just the On and Off temperature setpoint values within your defined setpoint adjustment range.
- low- and line-voltage control models provide industry standard control voltage options for most refrigeration and HVAC control applications.

Repair Information

If the A421 Series Electronic Temperature Control with Integral Cycle Timer fails to operate within its specifications, replace the unit. For a replacement A421 Control, contact the nearest Johnson Controls® representative.

A421 Series Electronic Temperature Controls with Integral Cycle Timer (Continued)

Selection Charts

A421 Electronic Temperature Controls

Product Code Number	Description
A421ABT-02C	**Line-Voltage Type 1 Electronic Temperature Control with Duty-Cycle Timer:** Type 1 (NEMA), IP20 standard enclosure for DIN rail and surface-mount applications. Rated for 120/240 VAC. Includes integral timer for On/Off duty-cycle control. Includes an A99BB-200C temperature sensor with 6 ft 7-1/5 in. (2.0 m) cable.
A421AET-01C	**Line-Voltage Type 4X Electronic Temperature Control with Duty-Cycle Timer:** Type 4X (NEMA), IP67 weathertight enclosure for surface-mount applications. Rated for 120/240 VAC. Includes integral timer for On/Off duty-cycle control. Includes an A99BB-25C temperature sensor with 9-7/8 in. (0.25 m) cable.

A99 Temperature Sensors Compatible with the A421 Control[1]

Product Code Number	Description
A99BA-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) shielded PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-200C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-400C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 13.1 ft (4.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BB-600C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99BC-25C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9-7/8 in. (0.25 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 100ºC)
A99BC-100C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 3 ft 3-3/5 in. (1.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-300C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 9 ft 9-3/5 in. (3.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 16 ft 4-4/5 in. (5.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99BC-1500C	**PTC Temperature Sensor:** Standard probe 2 in. (5.1 cm) with 49 ft 2-2/5 in. (15.0 m) high-temperature silicon cable; Ambient operating temperature range: -40 to 248ºF (-40 to 120ºC)
A99CB-200C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 6 ft 7-1/5 in. (2.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)
A99CB-600C	**PTC Temperature Sensor:** Extended probe 6 in. (15.2 cm) with 19 ft 8-2/5 in. (6.0 m) PVC cable; Ambient operating temperature range: -40 to 212ºF (-40 to 100ºC)

1. When any A99 Series Temperature Sensor is connected to a standard temperature A421 control model, the range of usable values is -40 to 212ºF (-40 to 100ºC).

Accessories for the A421 Controls

Product Code Number	Description
BKT287-1R	12 in. (305 mm) long DIN rail section
BKT287-2R	36 in. (914 mm) long DIN rail section
PLT344-1R	Two End Clamps for DIN rail sections
A99-CLP-1	Surface Mounting Clip for A99B and A99C Series Temperature Sensors
SHL10-603R	Sun Shield for A99B and A99C Series Temperature Sensors
BOX10A-603R	PVC Enclosure for A99B and A99C Series Temperature Sensors
WEL11A-601R	Immersion well for applying sensor in fluid applications

A421 Series Electronic Temperature Controls with Integral Cycle Timer (Continued)

Technical Specifications

A421 Series Electronic Temperature Controls	
Power Consumption	1.8 VA maximum
Supply Power	24 VAC, 50/60 Hz, Class 2: 108/110/115/120 or 208/230/240 VAC, 50/60 Hz
Ambient Conditions	Operating: -40 to 150°F (-40 to 66°C), 0 to 95% RH noncondensing Shipping and Storage: -40 to 185°F (-40 to 85°C), 0 to 95% RH noncondensing
Temperature Control Range	-40 to 212°F (-40 to 100°C) or -40 to 248ºF (-40 to 120ºC), depending on the model selected
Input Signal	1,035 ohms at 77°F (25°C) for A99 PTC temperature sensors
Sensor Offset Range	±5ºF or ±3ºC
Output Relay Contacts Electrical Ratings	24 VAC Models: 100 VA, 30 VAC maximum, Class 2
	120 VAC Model with Integral Power Cord: **Applied Voltage: 120 VAC** Full Load Amperes N.O. and N.C.: 12 A Locked Rotor Amperes N.O. and N.C.: 72 A Non-inductive Amperes N.O. and N.C.:12 A Pilot Duty: 125 VA (N.O. contacts) at 24 to 120 VAC
	120/240 VAC Models: **Applied Voltage: 120 VAC 208 VAC 240 VAC** Horsepower N.O. (N.C.): 1 (0.25) hp 1 (0.33) hp 1 (0.5) hp Full Load Amperes N.O. (N.C.): 16 (5.8) A 9.2 (4.0) A 8.0 (4.9) A Locked Rotor Amperes N.O. (N.C.): 96 (34.8) A 55.2 (24) A 48 (29.4) A Non-inductive Amperes N.O. (N.C.):15 (10) A 10 (10) A 10 (10) A Pilot Duty: 125 VA (N.O. contacts) at 24 to 240 VAC 125 VA (N.C. contacts) at 24 to 240 VAC 50 VA (N.C. contacts) at 24 VAC
Enclosure Material	NEMA 1/IP20 high-impact thermoplastic or NEMA 4X/IP66 watertight, corrosion-resistant, high-impact thermoplastic
Compliance CE	**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 the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC. **Australia:** Mark: C-Tick Compliant (N1813)

MR Series Defrost Control Modules

Description

The MR Series Controls are versatile, microprocessor-based, multifunction, programmable temperature controls. Depending on the model chosen, the MR Series Controls can also manage alarm, defrost cycle (active or passive defrost), and evaporator fan functions.

The MR Series Controls have large red LED displays. These compact controls are available in panel mount and DIN rail mount varieties. The MR Series Controls use the A99B temperature sensors, which allow remote mounting of the display unit.

All MR Series Controls perform temperature and alarm management. Some models have additional capabilities.

MR1 Series Controls

The MR1 Series provides temperature and alarm management functions. It can replace a temperature control and digital temperature readout.

MR2 Series Controls

The MR2 Series provides temperature, alarm, and defrost cycle management. The MR2 control performs defrost cycle management using time-based, passive, off cycle defrost. It can replace a temperature control, a digital temperature readout, and a defrost timer.

Refer to the *MR Series Refrigeration Temperature Controls Product Bulletin (LIT-125199)* for important product application information.

MR4 Series Controls

The MR4 Series provides temperature, alarm, defrost, and evaporator fan management. The MR4 Series provides defrost cycle management with hot gas or electric heat defrost and defrost termination based on time or temperature. The MR4 Series consolidates the functions of a temperature control, a digital temperature readout, a defrost cycle timer, and a defrost termination device.

Refer to the *MR Series Refrigeration Temperature Controls Product Bulletin (LIT-125199)* for important product application information.

Features

- programmable functions allow adjustment of control settings to meet application needs
- alarm management functions provide local alarm display and an alarm output relay that can be used to trigger a remote alarm or dial-out modem
- easily readable LED display displays temperature and other functions quickly and clearly
- programming button lockout allows user to disable programming buttons and deter accidental or unauthorized changes
- accurate, interchangeable temperature sensor provides accurate control performance with up to 300 feet of wiring (an adjustable temperature offset is provided for longer wiring)
- self-test procedure checks control operation by cycling all outputs and testing all LEDs

MR4 Series
DIN Rail and Panel Mount Modules

Repair Information

If the MR Series Defrost Control Modules fails to operate within its specifications, replace the unit. For a replacement control, contact the nearest Johnson Controls® representative.

Applications

Application	MR1	MR2	MR4
Cooling tower pump control	✓		
Space and return air temperature control	✓		
Convenience store coolers	✓	✓	✓
Convenience store freezers			✓
Supermarket display cases for produce		✓	✓
Reach-in coolers		✓	✓
Walk-in coolers		✓	✓
Freezers or coolers with passive defrost, time-based termination		✓	✓
Freezers with hot gas defrost (temperature or time-based termination			✓
Freezers with electrical defrost (temperature or time-based termination)			✓

Selection Chart

Product Code Number	Description	Ship. Wt. lb (g)
MR1DR24-11C	MR1 Single-Stage, DIN Rail Mount Defrost Control, One A99BB-200C sensor included	0.75 lb (340 g)
MR2PM24-11C	MR2 Two-Stage, Panel Mount Defrost Control, One A99BB-200C sensor included	0.53 lb (240 g)
MR2DR24-11C	MR2 Two-Stage, DIN Rail Mount Defrost Control, One A99BB-200C sensor included	0.79 lb (360 g)
MR4PM24-12C	MR4 Four-Stage, Panel Mount Defrost Control, Two A99BB-200C sensors included	0.90 lb (410 g)
MR4DR24-12C	MR4 Four-Stage, DIN Rail Mount Defrost Control, Two A99BB-200C sensors included	1.17 lb (530 g)

MR Series Defrost Control Modules (Continued)

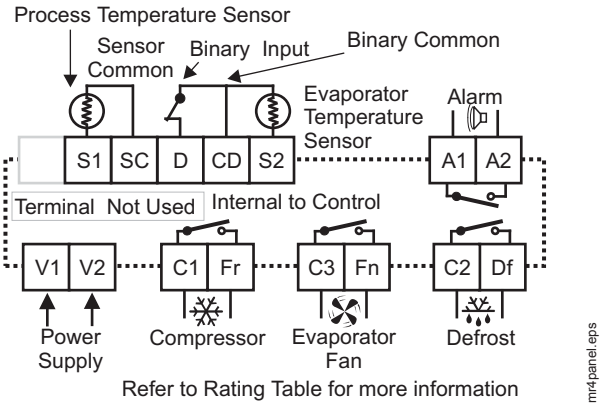
Technical Specifications

MR Series Defrost Control Modules		
Power Requirements		24 VAC, 50/60 Hz Class 2 (20 to 30 VAC)
Power Consumption		3.7 VA at 24 VAC
Accuracy		± 1.8F° (± 1°C)
Ambient Conditions	**Operating**	+14 to +140°F (-10 to +60°C); 0 to 95% RH (noncondensing)
	Storage	-22 to +176°F (-30 to +80°C); 0 to 95% RH (noncondensing)
Dimensions (H x W x D)	**Panel Mount**	1.38 x 2.95 x 2.68 in. (35 x 75 x 68 mm)
	DIN Rail:	4.65 x 2.76 x 2.07 in. (118 x 70 x 53 mm)
Agency Listings		UL Recognized: File E194024, CCN XAPX2 Canadian UL Recognized: File E194024, CCN XAPX8

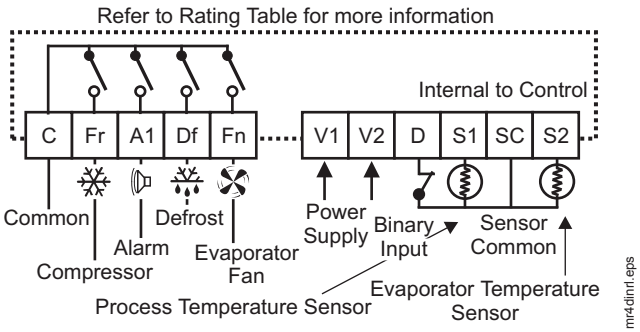
Electrical Ratings of Contacts

Rating Category	120 VAC	240 VAC	24 VDC
Horsepower	1/4	1/2	---
Full Load Amperes	5.8	4.9	---
Locked Rotor Amperes	34.8	29.4	---
Inductive (Non-Motor) Amperes	8	8	8
Pilot Duty VA	275	450	---

Note: Relay outputs must not exceed 20 Amperes total connected load. Open collector transistors on MR1 alarms have a maximum rating of 40 VDC 100 mA. Alarms require external power source.



MR4 DIN Rail Control



MR4 Panel Mount Control

MR4PMUHV Electronic Temperature/Defrost Control with Relay Pack

Description

The MR Series temperature controls are designed for use with hot gas or electric heat defrost in both refrigeration and freezer units. Either time or temperature based defrost termination may be selected.

The MR Series incorporates control functions such as compressor control, defrost management, fan management, and alarm management.

Refer to the *MR4PMUHV Electronic Temperature/Defrost Control with Relay Pack Product Bulletin (LIT-125190)* for important product application information.

Features

- single package provides the functionality of multiple components at a cost-effective price
- mounting flexibility allows the control and relay pack to be mounted together or separately, facilitating multiple configurations
- accurate, interchangeable temperature sensor provides reliable control performance with up to 300 ft. of wiring (an offset is provided for longer wiring)
- easily readable temperature display can show either evaporator or process temperature at the touch of a button
- heavy-duty relays allow direct control of compressors, fans, defrost heaters, and alarms
- alarm management functions provide both local alarm codes and a relay closure that can be used to trigger a remote alarm or a dial-out modem

Applications

These relay pack mounted controls provide direct control of compressors up to 2 hp, electric heater loads of up to 20 amperes, and evaporator fan loads of up to 3/4 hp. The need for separate relays is eliminated in these applications.

MR4PMUHV Temperature Control

In addition, the MR4PMUHV controls combine the functionality of an electromechanical thermostat, mechanical clock, defrost termination device, and temperature readout device with the accuracy of electronic technology.

Selection Charts

MR4PMUHV Electronic Temperature/Defrost Control with Relay Pack

Product Code Number	Description
MR4PMUHV-12C	Relay pack defrost control with two A99BB-200C sensors

Repair Parts

Product Code Number	Description
MR4PM12C-12C	Replacement control for use in relay pack
RP4MRUHV-1C	Relay pack without control
A99BB-200C	Sensor, cable length: 6.5 ft/1.98m

Technical Specifications

MR4PMUHV Electronic Temperature/Defrost Control with Relay Pack (Part 1 of 2)		
Frequency		60/50 Hz at 120/240 VAC
Power consumption		10 VA at 240 VAC, 5 VA at 120 VAC
Supply Level		120 and L1: 120 VAC +10%/-15% 240 and L1: 240 VAC +10%/-15%
Accuracy		± 1.8F°/± 1C°
A99 Sensor Cable		6.5 ft/1.98 m
Ambient Operating Conditions	MR4PMUHV-12C	+14° to +111°F/-10° to +44°C; derating 6.25% per 1°C to 60° C; 0 to 95% RH (noncondensing)
	MR4PM12C-12C	+14° to +140°F/-10° to +60°C; 0 to 95% RH (noncondensing)
	RP4MRUHV-1C	-40° to +111°F/ -40° to +44°C; derating 6.25% per 1°C to 60° C; 0 to 95% RH (noncondensing)
Ambient Storage Conditions	MR4PMUHV-12C	-22° to +176°F/-30° to +80°C 0 to 95% RH (noncondensing)
	MR4PM12C-12C	-22° to +176°F/-30° to +80°C 0 to 95% RH (noncondensing)
	RP4MRUHV-1C	-40° to +185°F/-40° to +85°C 0 to 95% RH (noncondensing)
Dimensions (H x W x D)		7.94 x 3.6 x 2.4 in./202 x 92 x 61 mm

Technical Specifications (Continued)

MR4PMUHV Electronic Temperature/Defrost Control with Relay Pack (Part 2 of 2)	
Agency Listings	UL Listed (File SA516, UL Guide SDFY; cUL Guide SDFY7)
Shipping Weight	2.9 lb/1,320 g

Relay Electrical Ratings

	24	120	208	240
SPST Compressor Relay				
Horsepower Rating	—	1	1.5	2
AC Full Load Amperes	—	16	11	12
AC Locked Rotor Amperes	—	96	66	72
Pilot Duty (VA)	125	750	875	1,125
SPDT Fan Relay				
Horsepower Rating	—	1/3	1/2	3/4
AC Full Load Amperes	—	7.2	5.65	6.9
AC Locked Rotor Amperes	—	43.2	33.9	41.4
Pilot Duty (VA)	50	325	450	600
SPST Defrost Heater Relay				
Horsepower Rating	—	1	1.5	2
AC Full Load Ampere	—	16	11	12
AC Locked Rotor Amperes	—	96	66	72
Non-Inductive Load Amperes	—	20	20	20
Pilot Duty (VA)	125	750	825	1,125
SPST Alarm Relay				
Non-Inductive Load Ampere	5	5	5	5
Pilot Duty (VA)	—	125	250	325

Relay Electrical Ratings Note:
Ratings shown are for ambient operation at -40 to 44°C. Derate electrical ratings 6.25% per 1°C (1.8°F) between 44°C (111°F) and 60°C (140°F).