



MS Series Temperature Stage Control Modules

Description

The MS Series Temperature Controls are versatile, microprocessor-based, multifunction, programmable temperature controls. They are designed for single and multiple-stage temperature control applications.

Depending on the model selected, the MS Series Controls can operate in the following modes:

- Direct mode
- Reverse mode
- Deadband mode
- Independent Setpoint mode

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

Refer to the *MS Series Multi-Stage Electronic Temperature Controls Product Bulletin (LIT-125198)* for important product application information.

Features

- programmable functions allow adjustment of control settings to meet application needs
- alarm management functions provide visible alarm codes on the display
- easily readable LED display shows temperature and functions quickly and clearly
- programming button lockout allows user to disable programming buttons to deter accidental or unauthorized changes
- accurate temperature sensors provide precise control performance with up to 300 feet of wiring (An adjustable offset is provided for longer wiring)
- self-test procedure checks control operation by cycling all outputs and testing all LEDs



MS4 Series Panel and DIN Rail Mount, Multi-Stage, Electronic Temperature Controls

Repair Information

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

Applications

Application	MS1 Series Single-Stage	MS2 Series Two-Stage	MS4 Series Four-Stage
Rooftop heating or cooling units	✓	✓	✓
Boiler or pump control	✓	✓	✓
Convenience store coolers	✓	✓	✓
Space temperature control	✓	✓	
Cooling tower pump control	✓		
Compressor or chiller staging		✓	✓
Reach-in coolers		✓	✓
Supermarket display cases for produce		✓	✓
Restaurant and Convenience store walk-in coolers		✓	✓

Selection Chart

Product Code Number	Description	Shipping Weight, lb (g)
MS1DR24T-11C	MS1 Single-stage, DIN Rail Mount Temperature Control, A99BB-200C sensor included	0.75 (340)
MS2DR24T-11C	MS2 Two-stage, DIN Rail Mount Temperature Control, A99BB-200C sensor included	0.79 (360)
MS2PM24T-11C	MS2 Two-stage, Panel Mount Temperature Control, A99BB-200C sensor included	0.53 (240)
MS4DR24T-11C	MS4 Four-stage, DIN Rail Mount Temperature Control, 2 A99BB-200C sensors included	1.17 (530)
MS4PM24T-11C	MS4 Four-stage, Panel Mount Temperature Control, 2 A99BB-200C sensors included	0.90 (410)

Accessories

Product Code Number	Description
A99BB-200C	Temperature Sensor: Range: -40 to 212°F (-40 to 100°C) Cable length and type: 6-1/2 ft (2 m) PVC
A99BB-300C	Temperature Sensor: Range: -40 to 212°F (-40 to 100°C) Cable length and type: 9-3/4 ft (3 m) PVC
A99BB-500C	Temperature Sensor: Range: -40 to 212°F (-40 to 100°C) Cable length and type: 16-3/8 ft (5 m) PVC
A99BB-600C	Temperature Sensor: Range: -40 to 212°F (-40 to 100°C) Cable length and type: 19-1/2 ft (6 m) PVC
A99BA-200C	Temperature Sensor: Range: -40 to 212°F (-40 to 100°C) Cable length and type: 6-1/2 ft (2 m) Shielded



Multi-Stage Electronic Temperature Controls

MS Series Temperature Stage Control Modules (Continued)

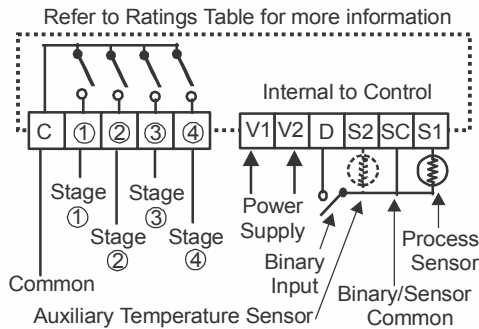
Technical Specifications

MS Series Temperature Stage Control Modules		
Power Requirements		24 VAC, 50/60 Hz, Class 2 (20 to 30 VAC)
Power Consumption		5 VA at 24 VAC
Accuracy		± 1.8°F (± 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)
Agency Listings		UL Recognized: File E194024, CCN XAPX2 Canadian UL Recognized: File E194024, CCN XAPX8
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)

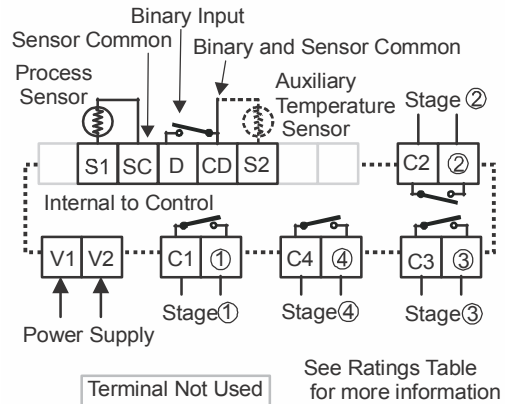
Electrical Ratings

	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 the MS1 Alarm Circuits have a maximum rating of 40 VDC 100 mA. Alarms require separate power source.



MS4PM24T Panel Mount Control Wiring



MS4DR24T Din Rail Mount Control Wiring



MS Series Single-Stage Control Modules with Voltage Input

Description

The MS Series Controls are versatile, microprocessor-based, multifunction, programmable controls for humidity, pressure, or other 0 to 10 VDC input. They are designed for single- and multiple-stage control applications.

Depending on the model selected, the MS Series Control can operate in one of several modes:

- Direct mode
- Reverse mode
- Deadband mode
- Independent Setpoint mode

The MS Series Controls have large, easy-to-read, red LED displays. These compact controls are available in panel mount and DIN rail mount models.

Refer to the *MS Series Multi-Stage Electronic Controls Product Bulletin (LIT-125502)* for important product application information.

Features

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



MS1 Series DIN Rail Mount, Single-Stage, Electronic Pressure, Temperature

Repair Information

If the MS Series Single-Stage Control Modules with Voltage Input fails to operate within its specifications, replace the unit. For a replacement control, contact the nearest Johnson Controls® representative.

Applications

Application	MS1 Series Single-Stage
Rooftop heating or cooling units	✓
Boiler or pump control	✓
Convenience store coolers	✓
Space temperature control	✓
Cooling tower pump control	✓

Selection Chart

Product Code Number	Description
MS1DR24T-11C	MS1 Single-Stage thermostat, DIN Rail Mount Control; A99 sensor included
MS1DR24V-11C	MS1 Single-Stage, DIN Rail Mount Control; 0 to 10 VDC input; no sensor included

Accessories

Product Code Number	Description
HE-6300-3	Humidity Sensor: 0 to 100% RH noncondensing 20 to 140°F (-29 to 60°C)
HE-6310-3	

Technical Specifications

MS Series Stage Control Modules with Voltage Input	
Power Requirements	24 VAC, 50/60 Hz, Class 2 (20 to 30 VAC)
Power Consumption	5 VA at 24 VAC
Accuracy	± 1.8°F (± 1°C)



Multi-Stage Electronic Temperature Controls

MS Series Single-Stage Control Modules with Voltage Input (Continued)

MS Series Stage Control Modules with Voltage Input		
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)
Agency Listings		UL Recognized: File E194024, CCN XAPX2 Canadian UL Recognized: File E194024, CCN XAPX8
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)

Electrical Ratings

	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 the MS1 Alarm Circuits have a maximum rating of 40 VDC 100 mA. Alarms require separate power source.



MS4PMUHVT Multi-Stage Electronic Temperature Control with Relay Pack

Description

The MS4PMUHVT Control is intended for multi-stage temperature control applications. This microprocessor based control offers innovative features and state-of-the-art technology to improve all your staged temperature control applications.

Refer to the *MS4PMUHVT Multi-Stage Electronic Temperature Control with Relay Pack Product Bulletin (LIT-125195)* for important product application information.

Features

- four enclosed, line voltage relays provide direct control of motor loads without additional relays
- 120/240 VAC power supply eliminates need for separate transformers
- one control provides single-sensor multi-stage control or dual-sensor reset control, which reduces need for warehouse or truck to stock multiple controls for similar applications
- accepts A99 sensor signal, which is suitable for a wide range of applications

- Surface Mounted Design (SMD) technology assures high quality, reliable components in a compact package
- keypad lock deters accidental changes to parameter settings
- listed for use on refrigeration equipment in accordance with Canadian and U.S. National standards

Applications

This control is specifically designed for the control of four-stage applications in the following configurations:

- four cooling stages with common setpoint
- four heating stages with common setpoint
- four stages with deadband (two heating stages and two cooling stages with common setpoint)
- two independent sets of two dependent stages (two heating stages and two cooling stages with independent setpoints)

Repair Information

If the MS4PMUHVT Multi-Stage Electronic Temperature Control with Relay Pack fails to operate within its specifications, replace the unit. For a replacement control, contact the nearest Johnson Controls® representative.



MS4PMUHVT Electronic Temperature Control

Selection Charts

MS4PMUHVT Multi-Stage Electronic Temperature Control with Relay Pack

Product Code Number	Description
MS4PMUHVT-11C	Multi-Stage Electronic Temperature Control with Relay Pack and One Temperature Sensor

Accessories and Maintenance Parts

Product Code Number	Description
A99BB-200C	Sensor with 6-1/2 ft/1.98 m Cable Length
MS4PM12CT-11C	Replacement Control (for use only with relay pack)
RP4MSUHV-1C	Replacement Relay Pack without Control

Electrical Ratings per Relay

	24 VAC	120 VAC	208 VAC	240 VAC
HP	—	1/3	3/4	1
FLA (Ampere)	—	7.2	7.6	8
LRA (Ampere)	—	43.2	45.6	48
Non-Inductive (Ampere)	—	8	8	8
Pilot Duty (VA)	50	325	625	750

Technical Specifications

MS4PMUHVT Multi-Stage Electronic Temperature Control with Relay Pack		
Power Requirements	120 VAC ±10% or 240 VAC ±10%	
Frequency	60/50 Hz	
Power Consumption	10 VA at 240 VAC, 10 VA at 120 VAC	
Sensor Range	-40 to 158°F (-40 to +70°C)	
Accuracy	±1 F°/±1 C°	
Ambient Operating Conditions	MS4PMUHVT-11C	+14 to +140°F (-10 to +60°C); 0 to 95% RH (noncondensing)
	MS4PM12CT-11C	+14 to +140°F (-10 to +60°C); 0 to 95% RH (noncondensing)
	RP4MSUHV-1C	-40 to +140°F (-40 to +60°C); 0 to 95% RH (noncondensing)
Ambient Storage Conditions	MS4PMUHVT-11C	-22 to +176°F (-30 to +80°C); 0 to 95% RH (noncondensing)
	MS4PM12CT-11C	-22 to +176°F (-30 to +80°C); 0 to 95% RH (noncondensing)
	RP4MSUHV-1C	-40 to +185°F (-40 to +85°C); 0 to 95% RH (noncondensing)
Agency Listings	UL File SA516, Guide SDFY cUL File SA516, Guide SDFY7	
Emissions Compliance	FCC (US), DOC (Canada)	
Dimensions (H x W x D)	7.94 x 3-3/5 x 2-2/5 in. (202 x 92 x 61 mm)	
Shipping Weight	2.9 lb (1,320 g)	

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. © 2015 Johnson Controls, Inc. www.johnsoncontrols.com