MC24 Series
Temperature Controllers

Features

- Slim wall-mount unit to match any decor
- Available with ºC or ºF temperature scale dial
- Selectable P or PI function
- Single 3-wire floating output
- Single 2-10/0-10 VDC output
- Dual 2-10/0-10 VDC outputs with auto cooling/heating changeover and fixed deadband setting
- Selectable 2-10 or 0-10 VDC output
- Selectable 2 or 20 minutes integral time
- Adjustable 1 to 10 K proportional band
- Auto seasonal changeover capability for single-output models
- Remote and seasonal changeover sensors available
- Output status indicators available for 3-wire floating models
- Optional 15 VDC or 24 VDC power supply available for proportional output models
- Unoccupied mode available

General

The MC24 Series microprocessor-based temperature controllers provide either 3-wire floating (incremental) or 2-10/0-10 VDC control output. The controllers are designed for use in 2-pipe and 4-pipe air handling units, and a variety of heating and cooling applications controlled by water valves and air dampers.

The microprocessor combines a proportional plus integral (PI) algorithm with advanced adaptive control logic. The proportional component of the algorithm adjusts the control output in response to changes in the measured temperature. The integral component of the algorithm adjusts the control output to eliminate offset (difference between the set point and the actual temperature). This provides precise and stable control under various system capacity and varying load conditions without the need for tuning or calibrating the control algorithm in the field.

Ordering

To order, specify complete model number.

Mounting

The temperature controller can be surface mounted or secured to a standard European 75 x 75 x 35 mm electrical box. See Figure1: Mounting Details. Two mounting screws are included.

Specifications

Product model numbers	See Figure 1: Model Number Selection Guide
Power requirements	24 V ±15%, 50/60 Hz or optional 15 or 24 VDC for proportional models only
Power consumption	1 VA @ 24 VAC
3-Wire on-off or floating output ratings	20 VA @24 VAC
Load across 2-10/0-10 VDC output	Minimum 10 kΩ impedance
Temperature set point range	0-30 ˚C
Deadband	Fixed at 1 K
Proportional band	Adjustable 1 to 10 K, factory setting 4 K
Integral Ttme	Selectable 2 minutes or 20 minutes
Sensing element	NTC Thermistor, 10 kΩ @ 25 ˚C
Body material	Self-extinguishing, molded ABS
Finish	Off white and dark grey color
Ambient/Storage temperature limits	0 to 50 °C / -30 to 50 °C, 10% to 90% RH non-condensing
Connections	Non-removable screw terminals
Power and control wires	Wire size 1 mm^2 or 18 AWG solid copper recommended
Sensor wires	22 or 24 AWG twisted shielded pair double-insulated cable
Accessories	See Figure 3: Accessories
Agency approval	CE Mark compliant to EMC Directive pending
Shipping weight	0.1 kg (0.22 lb)
Dimensions	See Figure 3: Dimensions in mm

The performance specifications above are nominal and subject to tolerances and application variables of generally acceptable industry standards. The Manufacturer shall not be liable for damages resulting from misapplication or misuse of its products.

Figure 1: Model Number Selection Guide

Model Number	Outputs	Output Signal	Applications	Cooling/Heating Mode	External Seasonal Changeover	Remote Sensor
MC24-T1	Single	3-Wire floating	Cooling only or heating only (2-pipe system)	Auto by external device	Yes	Yes
MC24-A1	Single	2-10/0-10 VDC proportional	Cooling only or heating only (2-pipe system)	Auto by external device	Yes	Yes
MC24-A2	Dual	2-10/0-10 VDC proportional	Cooling/Heating (4-pipe system)	Auto	No	Yes

Figure 2: Accessories and Options

Description	Part No.
Probe temperature sensor	TE10-1
Duct-type temperature sensor	TE10-2
Optional 15 VDC power supply	xxxx-Ax-15VDC
Optional 24 VDC power supply	xxxx-Ax-24VDC

Figure 3: Dimensions in mm

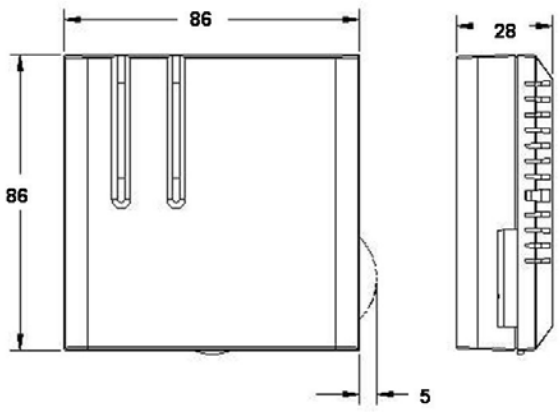


Figure 4: Jumper & Potentiometer Settings

JUMPER	JUMPER IN CLOSED POSITION	JUMPER IN OPEN POSITION
JP1	With built-in sensor*	With remote sensor
JP3	P function only	PI function*
JP4	2 minutes integral time	20 minutes integral time*
For 2-10/0-10 VDC output models only		
JP2	0-10 VDC output*	2-10 VDC output
* factory settings		

Unoccupied Mode Jumper Settings		
JUMPER	JUMPER IN CLOSED POSITION (1)	JUMPER IN OPEN POSITION (0)
JP5	1	0
JP6	1	0
JP7	1	0
Unoccupied Set Points		
HEX	Cooling ºC	Heating ºC
000	22	22
001	23	21
010	24	20
011	25	19
100	26	18
101	27	17
110	28	16

Proportional Band Settings		
Range Scale %	Potentiometer Position	Proportional Band Value
0	0	10 K
33.3	90º	7 K
66.7	180º	4 K*
100	270º	1 K

Figure 5: LED Indicators

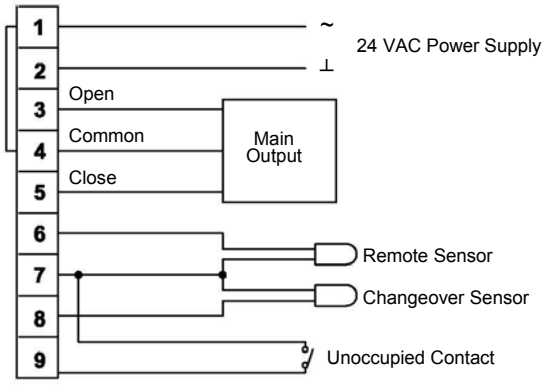
	INDICATOR	OUTPUT STATUS
Floating Controller Only	LED 1 Green	OPEN signal at Terminal 3
	LED 2 Red	CLOSE signal at Terminal 5

Application Notes

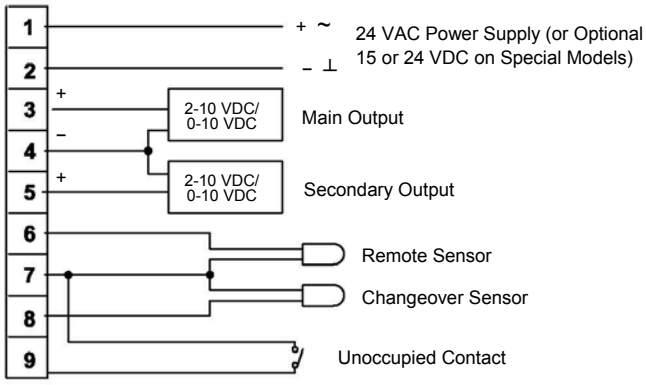
- The 3-wire floating controller output is a pulse/pause type signal which the on/off ratio of the pulse/pause cycle is directly proportional to. The pulse/pause duration is typically 10 seconds.
- On a dual-output unit, the main output is always associated with a cooling controlled device and the secondary output with a heating controlled device.
- On a single-output unit, i.e. a unit with only main output being available, connecting a seasonal changeover sensor or a shunting wire between Terminals 7 and 8 forces the unit to go into heating mode.
- Remove jumper JP1 if external sensor is wired to Terminals 6 and 7.
- The seasonal changeover sensor should be wrapped around the supply water pipe when associated with a water system. When the changeover sensor temperature exceeds 30 ºC, the controller enters into heating mode.
- When using either or both of the remote temperature and seasonal changeover sensors, run the wires away from any electric motors or power wiring. Failure to do so may result in poor thermostat performance due to electrical noise.
- 22 or 24 AWG twisted shielded pair double-insulated cable is recommended as sensor wiring and its length must not exceed 50 m.
- Do not bundle and run power wiring and sensor wiring in the same conduit.
- It is highly recommended that the 24 VAC power supply is interlocked to the air-conditioning system so that the controller is shut down when the air-conditioning system is turned off.

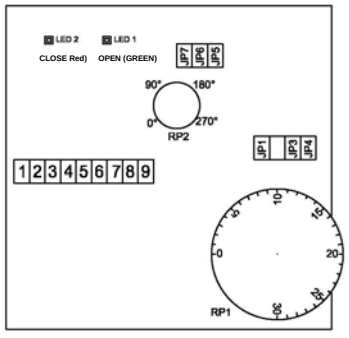
Figure 5: Wiring Diagrams and Jumper Layouts

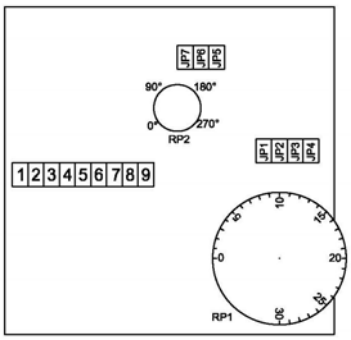
Floating Controller



2-10/0-10 VDC Proportional Controller







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