MAR5000
People Sensing, Automatic Set Back Thermostat

General Description

The MAR5000™ thermostat is a technologically advanced intelligent thermostat designed to control Marvair's Scholar, Classic, ModPac, and XcelPac heat pumps and air conditioners. The MAR5000 thermostat uses a wireless radio network to communicate with occupancy sensors. (Optional wired sensors are also available.) Using these occupancy sensors, the system determines whether the room is occupied or vacant. When people are present, the MAR5000 thermostat automatically maintains the set point temperature and the required ventilation. When vacant, the thermostat automatically reduces the run time of the heat pump or air conditioner and adjusts the ventilation to save energy. In addition, the MAR5000 thermostat is constantly performing patented scientific calculations to ensure that the set point temperature is achieved within a specific time when the occupants return.

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Additionally, the MAR5000 thermostat can learn the day-to-day occupancy patterns of the room and recover in advance of the expected occupancy and set back more deeply after a typical departure. This provides optimum savings without sacrificing the comfort level of the students and teachers.

In addition to controlling the temperature and humidity levels in the classroom, the MAR5000 thermostat records detailed occupancy and HVAC usage data for management reports. These reports can be used to determine room occupancy patterns, HVAC system duty cycle, runtime hours saved and much more. Data can be downloaded into a PC using the built-in interface and is stored in a non-volatile memory to preserve data in the event of a power loss.

The MAR5000 thermostat is UL listed and FCC certified and Energy Star qualified.

Features

Intelligent Occupancy Anticipation. For classrooms where occupancy patterns fall into a semi-regular pattern, the system supports occupancy anticipation. The MAR5000 thermostat logs the occupancy history of the classroom in a non-volatile memory and uses this log to enter deep setback immediately subsequent to a regular departure. By knowing when the space is going to be typically occupied and using the patented recovery time algorithms, the MAR5000 thermostat returns the classroom to the set point temperature "just in time" to anticipate the arrival of students and the teacher.

Real-Time Clock. The MAR5000 thermostat includes a precise (within 1 minute per year), temperature compensated time clock. Time is kept during extended power outages (up to 3½ weeks) without the need for batteries. The clock can be programmed at the time of installation of the MAR5000 thermostat to automatically adjust for day light savings time and leap years.

Dynamic Recovery Time Based Set Back. The time required to bring the room to the set point temperature after a set back period will change due to a variety of factors including seasonal changes in outdoor ambient temperatures. The MAR5000 thermostat continually monitors the time required to bring the room to the set point temperature after a set back period and adjusts the set back temperature accordingly.

Ventilation. A dedicated relay for control of the ventilation damper. Operation of the damper can be by governed by occupancy, light level or an external input.

Active Dehumidification. Solid state, fast response, high accuracy humidity/dew point sensor signals HVAC units to enter dehumidification cycle to limit humidity in the classroom. Optional timed refresh cycle for additional humidity control. The HVAC system will cycle on for 15 minutes (programmable) every six hours (programmable) to reduce humidity and "freshen" stale air.

Features (cont'd)

Support of peak load demand shedding.

Relays. Seven relays for interfacing with the Marvair HVAC unit or external devices.

Dry Contacts. One dry contact set of inputs enables data feed from any dry contact output device, e.g., a door switch.

Quick and Easy Installation, Programming and Operation:
- 24 volt.
- User friendly buttons and internationally recognized icons.
- Safety thermal limits of 50°F to 90°F.
- Settings and temperatures can be locked to allow for occupant control only within a specified range.
- Cover and buttons can be locked to ensure simple operation and security.

Other Features
- Supports automatic control of lighting based upon occupancy.
- Any continuous fan setting will be disengaged when the room is unoccupied and reengage when occupied.
- ADA compliant with optional interface includes colored indicators, Braille highlighted controls and automatic changeover operation with an optional fan.

Specifications

Parameter	Limits	Comments
Operational Voltages	10-35 VAC	Can use 8 to 40 VDC
Input current	0.022 Amps	No loads energized
Switched current	1 Amp	Seven places
Relays	7	Heat, Cool, Fan, Dehumidify, Vent, + 2[1]
Setting Range	40-99 °F	Adjustable limits
Operational Range	35-99 °F	
Temperature accuracy	+/-1°F	Can be calibrated in field
Temperature resolution[2]	1/64 °F	
Humidity Accuracy	+/-2% RH	10-90% RH, +/- 4% RH < 10% > 90%
Humidity Resolution[3]	0.03% RH	
Humidity response time[4]	4 seconds	1/e (63%)
Auto Dead Band	+/-3°F	Adjustable
Output voltage	5 volts	
Data output	RS232	
Data input	RS232	
Dry contacts	2	Input and output
Dimensions of thermostat	4.9" x 5.4" x .5"	
Clock accuracy	2 minutes	Maximum drift per year

[1] Supports multiple fan speeds, cooling and heating stages. Lighting control is also available. Supports RF or hard wired sensors.
[2] Temperature resolution is the detectable change in temperature.
[3] Humidity resolution is the detectable change in humidity.
[4] Can detect 63% of a change in humidity within 4 seconds.

As part of the Marvair® continuous improvement program, specifications are subject to change without notice.