



IP *MaverickStat*[®] Appliance



Web-Enabled Thermostat

RoHS

IP-MT-101



All you need is a web browser running on any laptop, PDA, or cell phone anywhere in the world to view temperature, change heat/cool schedules, monitor status and control a single-stage heating and cooling unit. Email alerts, SMS messages, and data logging capability is also available.

The IP *MaverickStat*[®] Appliance incorporates a web server and utilizes an inexpensive remote thermistor sensor to control a single-stage heating and cooling unit. Power the appliance with any 24VAC transformer, plug it into a hub/router, launch any web browser, punch in the default IP and connect. No custom software to load, no discovery routines, no custom cables, or training.

The IP appliance serves up static web pages with dynamic data updates every second or two. Most users can set up and utilize the appliance without any training or support in less than 5 minutes due to the innovative and familiar web browser based configuration.

The *MaverickStat*[®] is an ideal low cost solution for light commercial, residential and remote facility temperature control and incorporates four daily temperature schedules programmable for the entire week, four daily fan *AUTO* or *ON* schedules and 16 programmable special date ranges. The IP *MaverickStat*[®] Appliance also has a remote programmable duration override capability either through a switch on the remote temperature sensor or by using any web browser.



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GENERAL:

The IP *MaverickStat*[®] Appliance has an embedded lean TCP-IP stack including HTTP, SMTP, DHCP, DNS, FTP, and ARP.

The Maverick also has XML embedded with formatted input and output data. In this way, the Maverick can communicate directly with any IT system which has an XML parser. Similarly, any simple JavaScript can be used to communicate and acquire HTML data. These unique features enable the Maverick to function as an extremely low cost XML and HTML node for large enterprise IT systems.

THERMOSTAT OPERATION:

• Remote Temp Sensor

The *MaverickStat*[®] Appliance can be installed in or close to the heating/cooling equipment and powered with the equipment's control transformer if sized appropriately. The appliance utilizes any MAMAC TE-700/701/702/703/704/705/706/707/708 Type 12 Room, Duct, Pipe or Duct Averaging thermistor temperature sensors. This feature allows the flexibility of mounting the temperature sensor at the appropriate location and using any existing unshielded 2-conductor cable to terminate the sensor. As an option, averaging room temperature sensors are available to sense temperature at two or four locations and provide an average temperature for the appliance to control. This averaging temperature feature is beneficial when heating/cooling equipment is zoned to more than one location or if the temperature in a zone is unbalanced. Standard thermostat accuracy is affected by the heat-generating electronics within the thermostat enclosure. By using a remote temp sensor not only are installation costs reduced, but also the temperature measurement accuracy is significantly improved. Each appliance is factory calibrated and has guaranteed accuracy of 0.5°F (0.3°C) from 68°F (20°C) to 78°F (26°C) temperature

range. Accurate temperature sensing ensures optimal energy efficiency and eliminates wasted energy.

• Schedules

The *MaverickStat*[®] Appliance has independent schedules available for each day of the week. Four independent time schedules can be assigned to each day, and each time schedule has a separate heat and cool set point. The heat/cool set point can be configured in Fahrenheit or Celsius temperature scales. For each time schedule for each day, the fan mode of operation (*ON* or *AUTO*) can also be defined independently. Sixteen Special Days date ranges are available. The Special Day range can be a minimum of one day up to a maximum of one year. Each Special Day can be further defined as Occupied or Unoccupied. Separate Special Day heat/cool set points can be defined for Occupied or Unoccupied periods.

• Remote Override

The *MaverickStat*[®] Appliance has a unique remote override feature to turn heating or cooling on during unoccupied times. This override can be accomplished with a switch installed on the temp sensor or a switch installed in a utility closet. The override can also be initiated by logging in to the appliance and manually turning on the override function. A different heat and cool set point can be programmed for the override duration. The override feature can be programmed from one hour to nine hours. After completion of the override time, the appliance will go back to scheduled set points. A motion sensor or an N.C. door contact switch can also be used to initiate the override feature.

• System Mode

The *MaverickStat*[®] Appliance has three modes of operation: *Heat*, *Cool* or *Auto*. In the *Heat* mode, the appliance will heat only and lock out the cooling during winter months.

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Considerable damage can be done to the air conditioning compressor if it is turned on when the outside temperature is below 40°F (4°C). This feature insures that in extremely cold climates the cooling compressor is locked out and does not turn on if a momentary false room temperature reading is sensed. Similarly, in the *Cool* mode the *Heat* is locked out, and the appliance will turn on cooling only if room temperature goes above set point. If very tight temperature control is desired or during seasonal change over months when both heating in the morning and cooling in the afternoon are required, the **MaverickStat**[®] can be set to the *Auto* mode, and the appliance will heat and cool based on the room temperature and the associated heat/cool set points.

• **Heat/Cool Set Point Differential**

The set point differential can be adjusted to be 1°F/C, 2°F/C or 3°F/C. As an example, if the set point differential is 2°F and the *Heat* set point is 72°F, the **MaverickStat**[®] will turn heat on at 70°F and switch the heat off at 72°F. Similarly, if the *Cool* set point is 74°F with a 2°F differential, the cooling will come on at 76°F and switch off at 74°F. In this way, if the application does not require tight control, the set point differential can be increased to 2 or 3 degrees to conserve energy and reduce short cycling.

• **Heat/Cool Cycle Time**

In order to eliminate short cycling and conserve energy, the *Heat/Cool Cycle Time* can be adjusted from 1 minute to 10 minutes. Once the **MaverickStat**[®] completes a *Heat/Cool* operation, it will not restart heating or cooling until the cycle time has elapsed. This feature conserves energy and improves efficiency by eliminating false starts caused by temporary drop in room temperature. The cycle time takes priority over set point differential.

• **Fan Off Delay Auto Mode**

If the fan operation is configured for *Auto* mode, the appliance can be programmed to keep the fan running from 1 minute to 10 minutes after completing a heating or cooling operation. This feature enhances energy efficiency by soaking all energy from the heat exchanger and supplying it to the room before shutting the fan off.

• **Minimum Run Time Heat/Cool**

In order to eliminate mechanical damage to the equipment caused by short cycling due to sudden and temporary change in room temperature, the appliance can be configured to run a minimum 1 minute to 10 minutes once started. This feature also improves energy efficiency by eliminating multiple inefficient short cycles. The minimum run time takes priority over set point differential.

• **Heat Fan Auto Mode Control**

The **MaverickStat**[®] has an additional feature available for *Fan* control during *Heat* operation. If the *Fan* schedule is in *Auto* mode and the *Heat Fan Auto Mode Control* is clicked *ON*, the fan and heat will come on if the room temperature goes below set point. On the other hand, if the control is set at *OFF*, the fan will not be energized and only heat will be activated permitting the furnace to turn the fan on after confirming that the burner has fired. This feature is designed as a safety to insure that the burner is on before turning the fan on to eliminate the possibility of blowing cold air through the room.

EMAIL ALERTS:

The **MaverickStat**[®] Appliance has a very user friendly email alert capability and can send email alerts to up to two different addresses.

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The email can be viewed as an SMS message on mobile phones or PDA's. If the room temperature goes below and/or above the low and/or high set point, an email will be automatically sent out. An option is available to attach a comma-separated log file to the email alert. In this way, the user does not only receive an alert but also can parse the log file and know why the alert is coming.

The *MaverickStat*[®] Appliance can also send email alerts in the event of a power outage. The appliance logs the time the power went out, and when the power is restored, it sends an email with a time stamp of when the power went out and when it was restored.

Similarly, the appliance can be configured to send an email if the DHCP IP assignment has been changed. In this way, if the *MaverickStat*[®] is running as a DHCP client,

it can keep the users abreast of its DHCP IP assignment, and the user does not have to discover the appliance.

DATA LOGGING:

The appliance can log 2,048 samples of the room temperature. The logging interval can be from 1 second to 99.99 hours. Data is logged in a standard CSV file and can be reviewed with Notepad, WordPad, Excel or any other software application which can open comma-separated files.

The *MaverickStat*[®] also uses a JavaScript which runs on the web browser to display the logged data as a graph. The X scale (sensor value) and the Y scale (time) on the graph can be adjusted. As a result, the graph can be plotted to show only the relevant data.

MaverickStat[®] BROWSER SCREEN SHOTS:

The screenshot displays the web interface for the IP *MaverickStat* Appliance, titled "Uno Stat". The interface includes a navigation menu on the left with options: Main, Manual Control, Data Logging, and Configuration. The main content area is divided into three sections:

- STATUS:** Room Temp: 75.5°F, Fan: On, Heating: Off, Cooling: On, System Mode: Cool, Remote Override: On, Remote Override Timer: 0h 47m 37s, Fan Mode: Auto, Heat Setpoint: 72.0°F, Cool Setpoint: 74.0°F.
- EMAIL ALERT STATUS:** Room Temp: Normal.
- MANUAL CONTROL STATUS:** Fan: Automatic, Heat: Automatic, Cool: Automatic.

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Main Page with Appliance Status, Email Alert Status & Manual Control Status

IP-MT-101

11:28:04 November 9, 2009

IP MaverickStat Appliance: Uno Stat

Configuration | Thermostat

MAMAC SYSTEMS®

Main

Manual Control

Data Logging

Configuration

Units

°F °C

System Mode

Heat Cool Auto (Heat or Cool)

Heat/Cool Setpoint Differential

1° 2° 3°

Heat Fan Auto Mode Control

Off On

Heat/Cool Cycle Time

Fan Off Delay Auto Mode

Minimum Run Time Heat/Cool

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Configuration: Thermostat Setup

11:28:51 November 9, 2009

IP MaverickStat Appliance: Uno Stat

Configuration | Schedule | Time

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Main

Manual Control

Data Logging

Configuration

Schedule Setup

Time Setup

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Morning Start:	06:00	06:00	06:00	06:00	06:00	06:00	06:00
Daytime Start:	08:00	08:00	08:00	08:00	08:00	08:00	08:00
Evening Start:	17:00	17:00	17:00	17:00	17:00	17:00	17:00
Overnight Start:	22:00	22:00	22:00	22:00	22:00	22:00	22:00

Special Days

	Occupied	Unoccupied
Morning Start:	06:00	06:00
Daytime start:	08:00	08:00
Evening Start:	17:00	17:00
Overnight Start:	22:00	22:00

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Configuration: Time Schedule Setup

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11:29:38 IP *Maverick*Stat Appliance: Uno Stat November 9, 2009

Configuration | Schedule | Temp

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Main
Manual Control
Data Logging
Configuration

Schedule Setup

Temperature Setup

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Morning Heat:	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F
Morning Cool:	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F
Daytime Heat:	60.0 °F	70.0 °F	60.0 °F	60.0 °F	60.0 °F	60.0 °F	60.0 °F
Daytime Cool:	84.0 °F	74.0 °F	84.0 °F	84.0 °F	84.0 °F	84.0 °F	84.0 °F
Evening Heat:	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F	70.0 °F
Evening Cool:	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F	76.0 °F
Overnight Heat:	60.0 °F	60.0 °F	60.0 °F	60.0 °F	60.0 °F	60.0 °F	60.0 °F
Overnight Cool:	84.0 °F	84.0 °F	84.0 °F	84.0 °F	84.0 °F	84.0 °F	84.0 °F

Special Days

	Occupied	Unoccupied
Morning Heat:	70.0 °F	70.0 °F
Morning Cool:	76.0 °F	76.0 °F
Daytime Heat:	60.0 °F	60.0 °F
Daytime Cool:	84.0 °F	84.0 °F
Evening Heat:	70.0 °F	70.0 °F
Evening Cool:	76.0 °F	76.0 °F
Overnight Heat:	60.0 °F	60.0 °F
Overnight Cool:	84.0 °F	84.0 °F

Save

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Configuration: Temperature Schedule Setup

14:28:19 IP *Maverick*Stat Appliance: Uno Stat November 9, 2009

Configuration | Alert Setup

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Main
Manual Control
Data Logging
Configuration

Room Temp Email Alert Configuration

Alert Enable On Off

Lower Value °F

Upper Value °F

Alert Wait

Attach Log On Off

Alert Enabled Alert Enabled

Save

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Configuration: Email Alert Setup

IP-MT-101

14:29:43 **IP MaverickStat Appliance: Uno Stat** November 9, 2009

Configuration | Schedule | Fan

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Main
Manual Control
Data Logging
Configuration

Schedule Setup

Fan Setup

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Morning Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto
Daytime Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto
Evening Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto
Overnight Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input checked="" type="radio"/> On <input type="radio"/> Auto

Special Days

	Occupied	Unoccupied
Morning Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto
Daytime Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto
Evening Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto
Overnight Fan:	<input checked="" type="radio"/> On <input type="radio"/> Auto	<input type="radio"/> On <input checked="" type="radio"/> Auto

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Configuration: Fan Schedule Setup

11:32:20 **IP MaverickStat Appliance: Uno Stat** November 9, 2009

Configuration | Remote Override Setup

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Main
Manual Control
Data Logging
Configuration

Remote Override Setup

Override Time: Heat: °F Cool: °F Remote Button Enable: On Off

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Configuration: Remote Override Setup

IP-MT-101

11:38:05 **IP MaverickStat Appliance: Uno Stat** November 9, 2009

Configuration | Schedule | Special Days

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Main
Manual Control
Data Logging
Configuration

Schedule Special Days

	Start Date	End Date	Date Type	Delete Date
Date #1:	05 / 25 / 09	05 / 25 / 09	<input type="radio"/> Occupied <input checked="" type="radio"/> Unoccupied	<input type="checkbox"/>
Date #2:	07 / 03 / 09	07 / 03 / 09	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #3:	09 / 07 / 09	09 / 07 / 09	<input type="radio"/> Occupied <input checked="" type="radio"/> Unoccupied	<input type="checkbox"/>
Date #4:	11 / 26 / 09	11 / 27 / 09	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #5:	12 / 24 / 09	12 / 28 / 09	<input type="radio"/> Occupied <input checked="" type="radio"/> Unoccupied	<input type="checkbox"/>
Date #6:	12 / 31 / 09	01 / 01 / 10	<input type="radio"/> Occupied <input checked="" type="radio"/> Unoccupied	<input type="checkbox"/>
Date #7:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #8:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #9:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #10:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #11:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #12:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #13:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #14:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #15:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>
Date #16:	xx / xx / xx	xx / xx / xx	<input checked="" type="radio"/> Occupied <input type="radio"/> Unoccupied	<input type="checkbox"/>

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Configuration: Special Days Schedule

11:33:13 **IP MaverickStat Appliance: Uno Stat** November 9, 2009

Configuration | Logging Setup

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Main
Manual Control
Data Logging
Configuration

Room Temp Log

Enabled Disabled

Max Samples:

Sample Rate: (Hr:Min:Sec)

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Configuration: Logging Setup

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10:44:11 IP *MaverickStat* Appliance: Uno Stat November 9, 2009

Manual Control

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Main

Manual Control

Data Logging

Configuration

MANUAL CONTROL

	Output Status		Control State
Fan	<input type="radio"/> Auto <input type="radio"/> Manual	Automatic	<input type="radio"/> Off <input type="radio"/> On Off
Heat	<input type="radio"/> Auto <input type="radio"/> Manual	Automatic	<input type="radio"/> Off <input type="radio"/> On On
Cool	<input type="radio"/> Auto <input type="radio"/> Manual	Automatic	<input type="radio"/> Off <input type="radio"/> On Off

Directions:

1. Change the 'Output Status' to 'Manual', click 'Save'.
2. Set the 'Control' to the desired setting (On or Off), click 'Save'.
3. The 'Control State' will switch to desired state.
4. Follow steps 1 and 2 to change back to 'Automatic'.

Remote Override

On Off

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Manual Control

11:01:17 IP *MaverickStat* Appliance: Uno Stat November 11, 2009

Data Logging | Graphs | Room Temp

MAMAC SYSTEMS®

Main

Manual Control

Data Logging

Configuration

ROOM TEMP DATA GRAPH

Data Range:

Min Value Max Value

Start Time & Date: : : / /

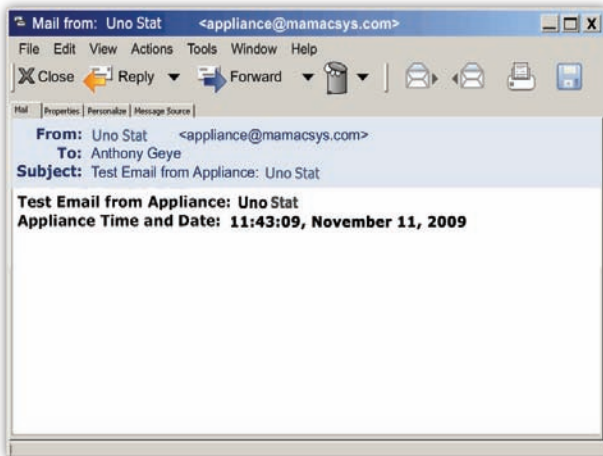
End Time & Date: : : / /

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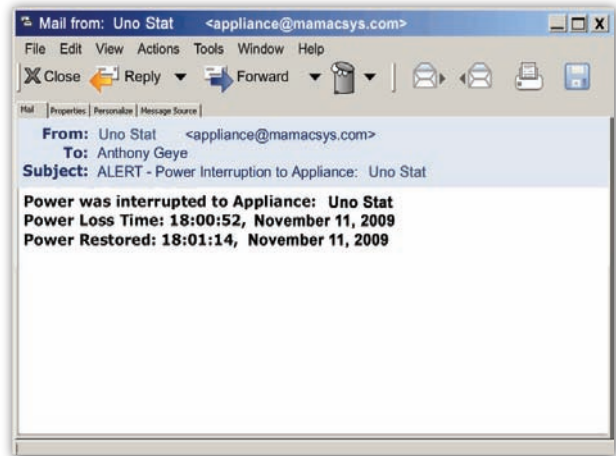
Data Logging: Room Temp Data Graph

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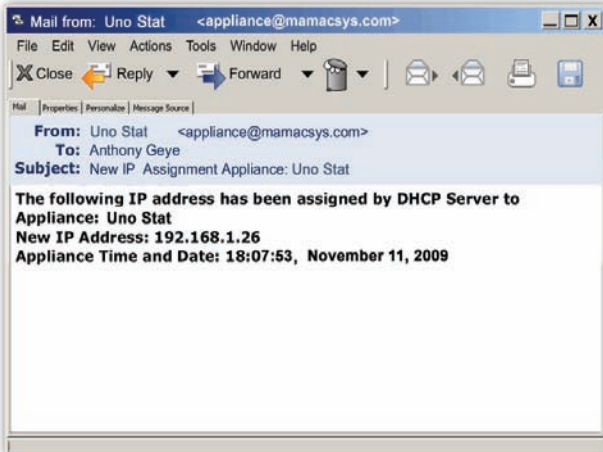
MaverickStat® EMAIL ALERT SCREEN SHOTS:



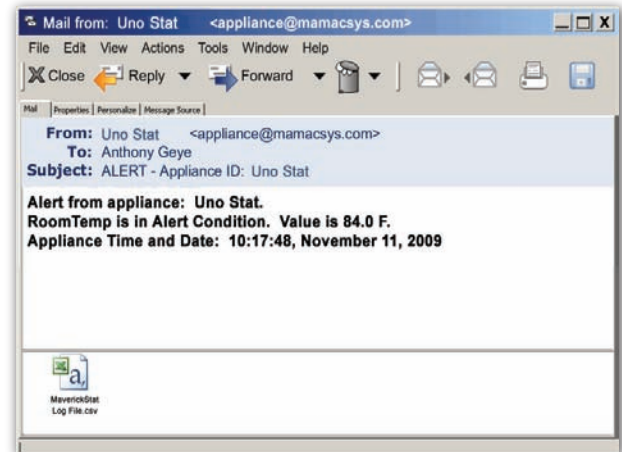
Test Email



Power Cycle Email

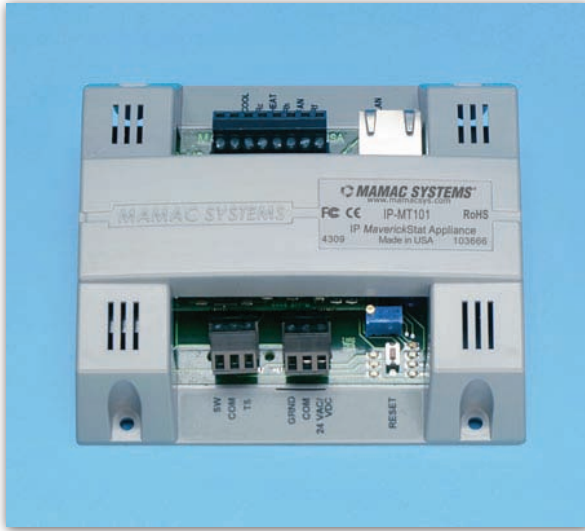


DHCP Assignment



Email Alert (CSV log file attached)

IP-MT-101



ORDERING INFORMATION: IP-MT-101

REMOTE TEMPERATURE SENSOR:

MaverickStat[®] requires a MAMAC Type 12 Temperature Sensor.

Please review TE-700 / 701 / 702 / 703 / 704 / 705 / 706 / 707 / 708 Data Sheet.

SPECIFICATIONS:

Supply Voltage: 24 VAC/VDC

Supply Current: 250 mA (6 VA)

Temp Sensor: MAMAC Type 12 Thermistor

Ethernet: 10-Base T

IP Assignment: Static or DHCP

Email: SMTP to two email addresses

Data Logging: 2048 samples

Logging Interval: 1.0 second to 99.99 hours

Environmental: 10-90%RH non-condensing

Operating Temp: -40°F-125°F (-40°C-52°C)

Storage Temp: -40°F-150°F (-40°C-66°C)

Enclosure: UL 94V-5-O Polycarbonate plastic

Weight: 0.5 lbs. (.25 kg)

Termination: Removable terminal blocks 16 Gauge max, RJ-45 Ethernet jack

Output Relay Rating: 250 VAC @ 3.0 Amps
UL Listed

CONFORMANCE & TESTING:

RoHS Compliant

FCC Testing

Rule Part 15, Subpart B - Unintentional Radiators Class B Limits 15.107 & 15.109

EMC/EMI Testing

BS EN 55022:1998, CISPR 22:1997

BS EN 55024:1998, CISPR 24:1997

EN 61000-3-3: Limitations of voltage fluctuations and flicker in low voltage supply systems <16A

EN 61000-4-2: Electrostatic Discharge (ESD)

EN 61000-4-3: Radiated, radio frequency, Electromagnetic field immunity test

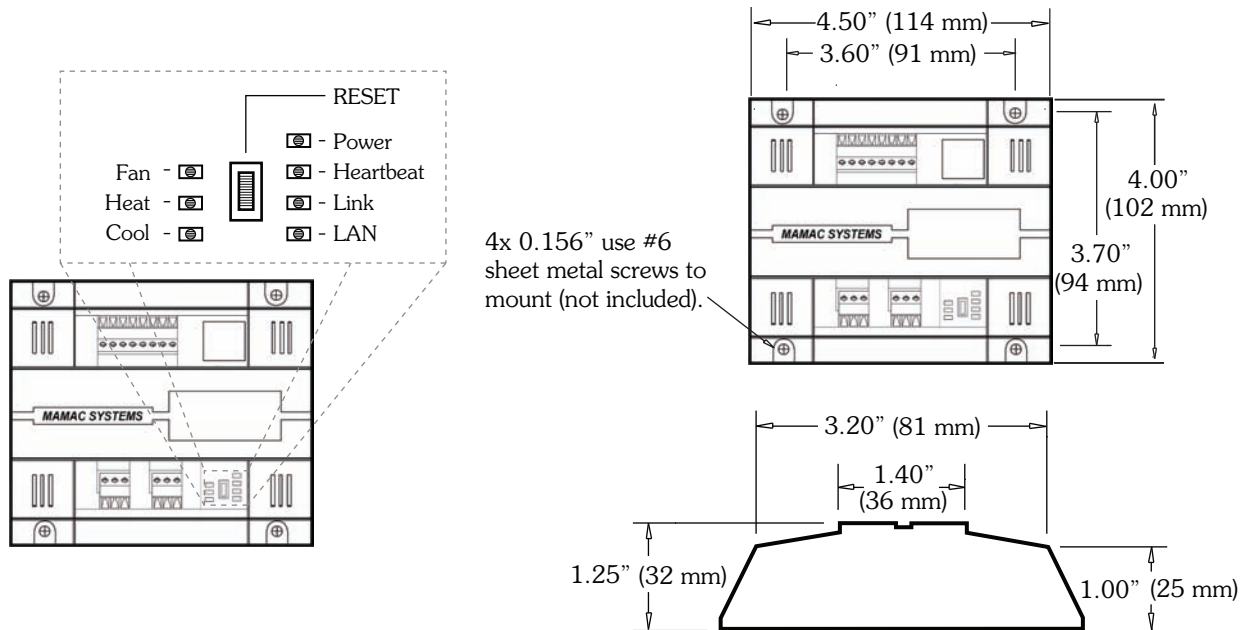
EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test (EFT)

EN 61000-4-5: Surge Immunity Test (Mains)

EN 61000-4-6: Immunity to conducted disturbances induced by radio frequency fields

EN 61000-4-11: Voltage dips, short interruptions and voltage variations immunity test

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WARRANTY: MAMAC Systems, Inc., warrants its products to be free of defects in material and workmanship for a period of two (2) years from date of shipment. If a unit is malfunctioning, it must be returned to the factory for evaluation. A return authorization number (RMA) will be issued by the customer service department, and this number must be written or prominently displayed on the shipping boxes and all related documents. The defective part should be shipped freight pre-paid to the factory. Upon examination by MAMAC Systems, Inc., if the unit is found to be defective, it will be repaired or replaced at no charge to the customer. However, this warranty is void if the unit shows evidence of being tampered with, damaged during installation, misapplied, misused, or used in any other operating condition outside of the unit's published specifications.

MAMAC Systems, Inc., makes no other warranties or representations of any kind whatsoever, expressed or implied, except that of title. All implied warranties including any warranty of merchantability and fitness for a particular purpose are hereby disclaimed. User is responsible to determine suitability for intended use.

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Every precaution for accuracy has been taken in the preparation of this manual, however, MAMAC Systems, Inc., neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the product in accordance with the information contained in the manual.



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