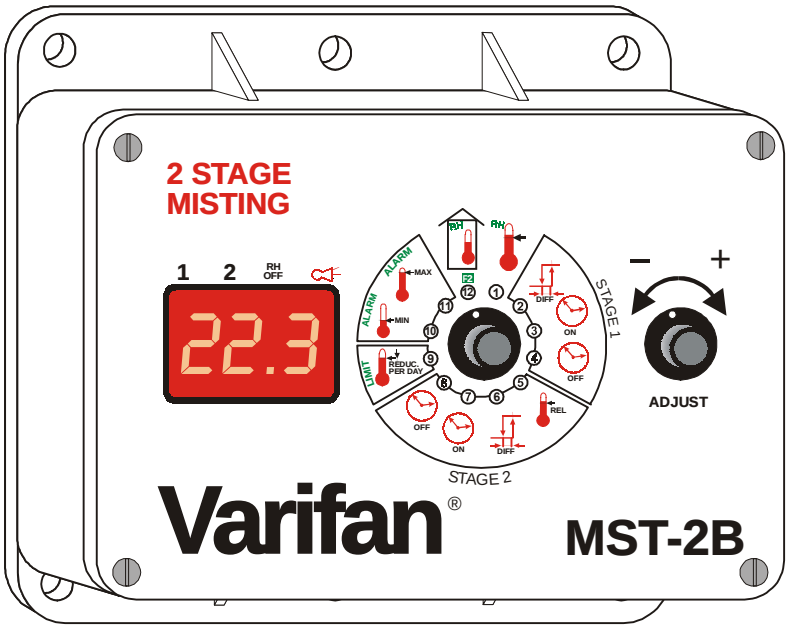
MST-2B

INSTALLATION GUIDE / USER'S GUIDE



Although the manufacturer has made every effort to ensure the accuracy of the information contained herein, this document is subject to change without notice due to ongoing product development.

WARNING AND PRECAUTIONS

Equipment , probe failure, blown fuses and/or tripped breakers may prove harmful to the contents of the building. Therefore it is strongly recommended to install backup devices and alarm or warning devices. Spare equipment should also be available at the owner's site. Equipment manufactured by the manufacturer is protected against normal line surges. High surges caused by thunder storms or power supply equipment may damage this equipment. For added security against line voltage surges it is recommended that surge and noise suppression devices be installed at the electrical distribution panel. Use of shielded cable for probes is recommended for protection against lightning. These devices are available from most electrical supply distributors.

RECOMMENDATIONS

The manufacturer recommends that all installation procedures described herein be performed by a qualified electrician or installation technician. Further more the manufacturer recommends to test all the functions and equipment connected to the MST-2B, including the alarm system and backup devices, after installation, after change to the installation and at least once a month after that.

Fuse verification and replacement, as well as the proper setting of control values shall be the responsibility of the owner of this equipment.

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PRIMARY FONCTIONS

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CHAPITRE 1 - INTRODUCTION

1. GENERAL

This manual provides the information necessary for the installation and operation of an MST-2B unit. The information is presented as follows:

- Introduction
- Installation
- User's Guide
- Troubleshooting

1.1 DESCRIPTION

Congratulations on the purchase of your MST-2B. The MST family products allow full control over temperature using evaporative cooling, resulting in a comfortable environment for your livestock.

The MST family products offer the following features:

- Display of the highest and lowest temperatures recorded.
- Automatic daily reduction of the temperature set point.

The MST-2B is a two-stage evaporative cooling (timed) controller. Optionally, a humidity probe may be used to prevent evaporative cooling operation if humidity level is too high.

DESCRIPTION CONTINUED...

The MST-2B keeps you informed of the output status as well as the actual ambient temperature by displaying them constantly.

An alarm will warn you if the ambient temperature is not within the pre-established limits. The output is protected by a fuse and all programmed parameters are preserved, even when the MST-2B is not powered.

The MST-2B offers automatic daily reduction of the temperature set point (Ramping) as the livestock matures. A minimum temperature set point is used to insure that the ramping function never diminishes below a critical limit.

DEFINITION OF TERMS

MAIN SET POINT

The desired room temperature. All other temperature parameters adjusted in the MST-2B are relative to this reference temperature.

AMBIENT TEMPERATURE

The ambient room temperature.

RAMPING

Automatic daily reduction of the main set point.

CHAPTER 2 - INSTALLATION

The manufacturer recommends following the installation instructions of the present guide and that all procedures be done by a certified electrician. Failure to comply may void the warranty!

2.1 UNPACKING

Unpack the MST-2B and inspect contents for damage. Should the contents be damaged, contact your local distributor to return the material.

The package should contain the following standard items:

- 1 MST-2B control.
- 1 installed temperature probe (model number: 2004-1KLT).
- 1 fuse.
- 1 installation guide / user's guide.

The following optional items may be included:

- 3 additional temperature probes for temperature averaging.
- 1 RH-3 humidity probe (blue cable) or RHT-1.

2.2 MOUNTING

To limit the unit's exposure to noxious gases install the unit in a hallway.

Make sure the unit is mounted right side up with the cable entry holes facing down.

The MST-2B must operate in a temperature range of 32°F - 120 °F (0 °C - 50 °C).

The enclosure is watertight, but it is not splash proof or immersion proof. DO NOT SPRAY the control. Cover the control carefully with plastic when cleaning the room.

It is prohibited to use overhead cables outside the building

Mounting hardware is not included with the unit.

Install the MST-2B using the mounting holes drilled in the side of the casing.

Once the MST-2B is in place, use a screwdriver to remove the faceplate.

2.3 SWITCH SETTINGS

2.3.1 - LINE VOLTAGE SELECTOR SWITCH

This switch is located on the surface of the main (bottom) board and adapts the MST-2B for 115 VAC or 230 VAC line voltage.

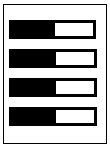
230V
115V

Refer to figures 1 and 2.

Certain parameters of the MST-2B are configured by the following switches:

2.3.2 Software setting switches

These switches are located at the rear of the MST-2B faceplate and are used to adjust the following options:



	OFF	ON
1	Fahrenheit	Celsius
2	Settings locked	Settings unlocked
3	Reserved	Reserved
4	Reserved	Reserved

Switch 1 Selects the measuring unit (Celsius or Fahrenheit) in which temperature values will be displayed on the front panel.

Switch 2 Settings locked/unlocked. All parameters except the **Main Set Point**, the **High Temperature Record** and the **Low Temperature Record** are locked when this switch is set to "OFF".

2.4 CONNECTION PROCEDURE

For the following connection procedures, refer to figure 1.

2.4.1 - Input power

Use a screwdriver to remove the pre-cut parts for the connection of the cables to the main board.

Do not supply power to the MST-2B until all connections have been completed!

2.4.1.1 - 115VCA

Make sure the line voltage selector switch is set to 115VAC. Connect the power cable to terminals 3 and 4 on the main (bottom) board.

2.4.1.2 - 230VCA

Make sure the line voltage selector switch is set to 230VAC. Connect the power cable to terminals 3 and 4 on the main (bottom) board.

2.4.2 - Mist output (terminals 5 and 6)

The relay can drive a load of 10 Amp maximum.

2.5 TEMPERATURE PROBES

The temperature probes use a low-voltage class 2 circuit. The cables (AWG#18 min) can be up to 500 feet (150 meters) in length. For cables longer than 10 feet (3 meters) use an aluminium-shielded wire which must be connected to the common of the input power. Temperature probe connections are illustrated in figure 2 whereas connections for temperature probe averaging are shown in figure 3.

2.5.1 - Single temperature probe

Install the temperature probe in a location that best reflects the overall room temperature. Connect the two leads and the shield of the probe to the terminals labelled “Probe” as indicate in figure 2.

Install low voltage wires (probes, computer link or potentiometer wires) at least 12 inches (30 cm) away from high voltage wires (120/230VAC, 24VDC). Always cross high and low voltage wires at a 90-degree angle.

2.5.2 - Averaging (optional)

Four temperature probes are required to do temperature averaging in larger rooms. Place the probes in appropriate locations to best average the room temperature. Refer to figure 3.

2.6 ALARM

The MST-2B provides a normally open and normally closed dry contact for alarming low or high temperature conditions. In addition, that same contact may be used to signal a power failure. This contact may be connected to an alarm system, or directly to a siren and/or an auto-dialer.

Make the normally open or normally closed connections as shown in figure 2.

Momentary power interruptions may trigger false alarms! To avoid false alarming when the MST-2B is connected to an alarm system, install a time delay relay between the MST-2B and the alarm system.

2.7 POWERING UP

Before powering up the MST-2B, attach the faceplate to the casing of the MST-2B using the four screws previously removed.

Set the selector knob to position (12).

Upon powering up, the unit will test its LED display by lighting up all of its segments. Make sure all segments light up at this moment.

Following the LED display test, the unit will display the room temperature.

If the temperature is not displayed, refer to the Troubleshooting section in the appendix of this manual.

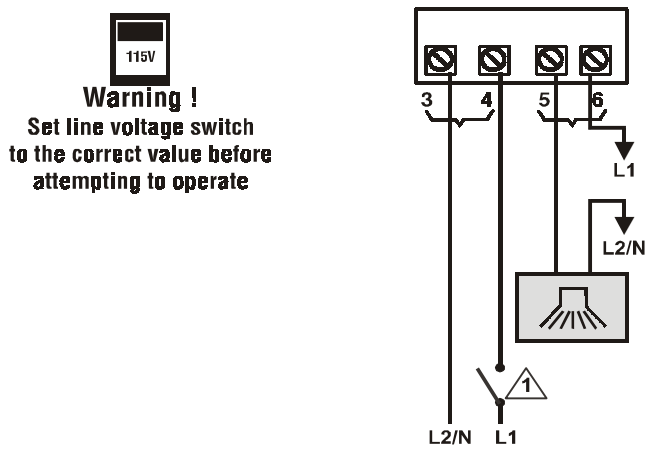


Fig. 1
Wiring diagram for the mister output.

⚠1 **Note for figure 1.**

Power cut and protection devices in case of an overload..

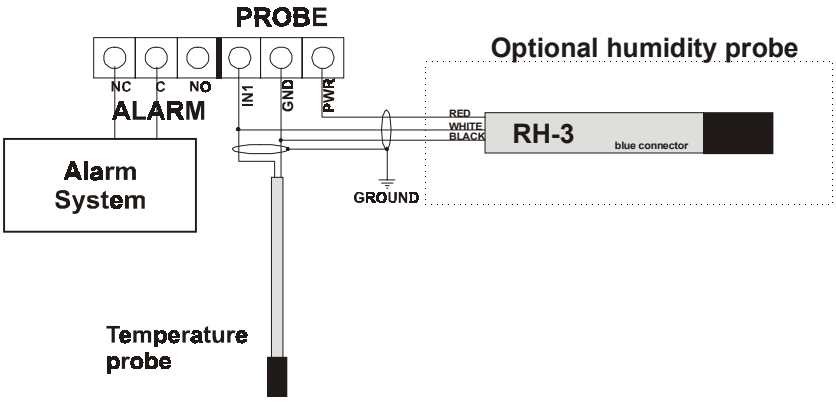


Fig. 2
Probe and alarm connection.

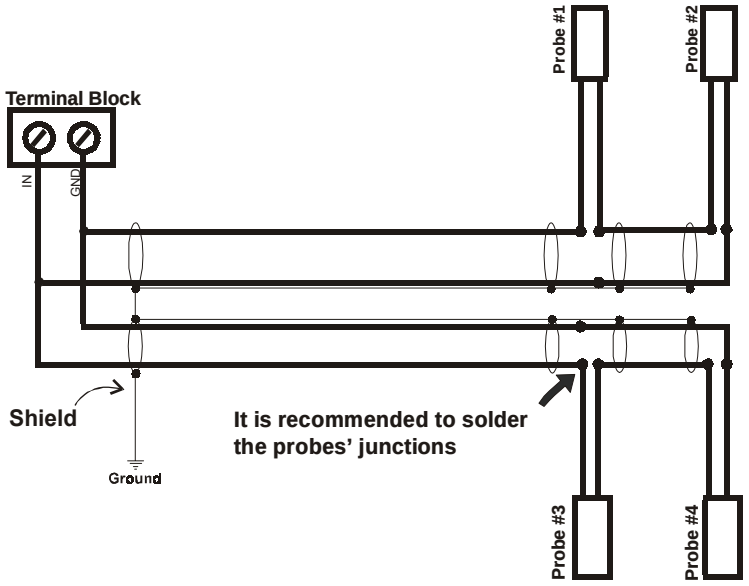


Fig. 3
Probe connection for temperature averaging.

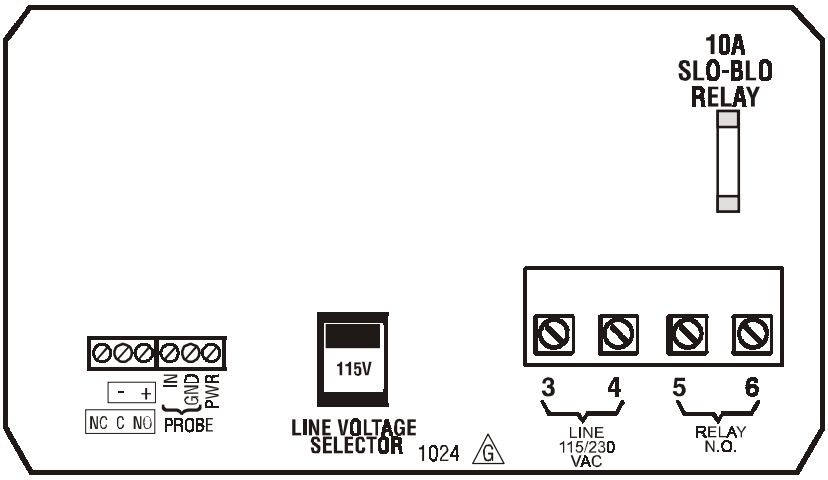
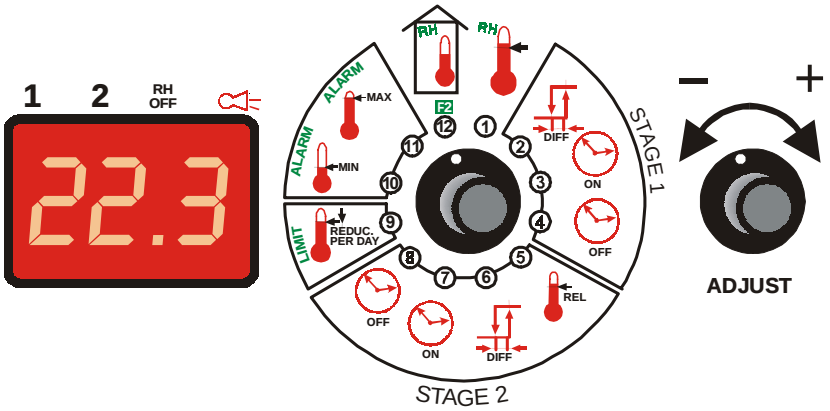


Fig. 4
Main (bottom) Board: Terminal blocks, switches and fuse location.



CHAPTER 3 - USER'S GUIDE

The MST-2B front panel shown above features a LED status window and two control dials which are respectively used to select a function and adjust a setting.

LED STATUS WINDOW

The LED status window features a 3 digit LED display for temperature in Fahrenheit or Celsius, and programmable settings.

In addition, the LED status window displays the operational state of the mist output and the alarm via four additional LEDs (shown above in LED window). The first LED is continuously illuminated when the mist is activated using the first stage timer. The second one indicates that the mist is active on the second stage timer. If one of the LEDs is blinking, this indicates that the mist is on the inactive portion of the respective timer. The third LED is lighten when the mist is shut off due to a high humidity level. Finally, the fourth LED will light up if the high or low temperature limit is exceeded.

CONTROL DIALS

The center dial is the selector dial and is used to select one of the control panel's 12 primary or 5 secondary functions. The dial located to the right of the selector dial is the adjuster dial and is used to enter secondary function mode and to adjust the setting of each function.

The 12 primary functions are:

- 1 Main Set Point
- 2 Stage 1 differential
- 3 Stage 1 timer run time
- 4 Stage 1 timer idle time
- 5 Stage 2 RSP
- 6 Stage 2 differential
- 7 Stage 2 timer run time
- 8 Stage 2 timer idle time
- 9 Ramping
- 10 Low temperature record
- 11 High temperature record
- 12 Ambient temperature display

Any one of these functions is selected by rotating the selector dial to the corresponding number and associated graphical image printed on the faceplate of the MST-2B. When primary functions 1 through 11 are selected, the LED status window displays a blinking value. Function 12 displays room temperature.

The 5 secondary functions are:

- 1 Humidity set point
- 9 Ramping minimum temperature limit
- 10 Low temperature alarm
- 11 High temperature alarm
- 12 Relative humidity display

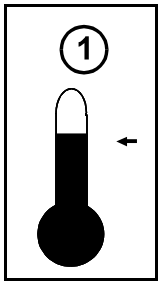
Select any one of these secondary mode functions by:

- rotating the Selector dial to (12)
- rapidly rotating the adjuster dial back and forth to enter secondary mode.
- rotating the selector dial from function (12) to any other function.

When secondary functions 1 and 9 through 11 are selected, the status window displays a blinking value along with a scrolling LED display. Returning the selection to function 12 removes the MST-2B from the secondary function mode.

PRIMAIRY FUNCTIONS

MAIN SET POINT



The main set point establishes the target temperature in the building. This value is used as the reference point for other settings.

The main set point temperature is adjusted in 0.5-degree increments from a minimum setting of 13.5°F (-9.5°C) to a maximum setting of 105.0°F (41.0°C).

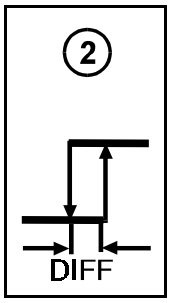
Adjusting the main set point temperature:

- rotate the Selector dial to position (1),
- rotate the Adjuster dial counter clockwise to decrease the temperature setting, and clockwise to increase it.

The main set point temperature is displayed on the MST-2B.

Note: The ramping feature (primary function 9) must be (OFF) to adjust the main set point.

STAGE 1 DIFFERENTIAL



This value represents the temperature decrease that must be reached to stop mist operation on stage 1 timer.

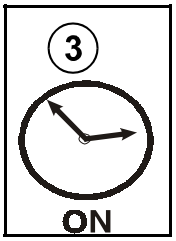
The differential is adjusted in 0.5-degree increments from a minimum setting of 0.5°F (0.5°C) to a maximum setting of 10°F (5.0°C).

Adjusting stage 1 differential:

- rotate the Selector dial to position (2),
- rotate the Adjuster dial counter clockwise to decrease the differential, and clockwise to increase it.

The stage 1 differential is displayed on the MST-2B.

STAGE 1 TIMER RUN TIME



Stage 1 timer is activated when ambient temperature reaches the main set point. When the mist output is activated using this timer, the LED directly beneath the number “1” will be continuously illuminated.

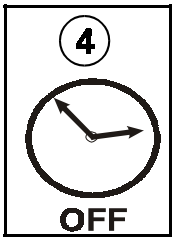
The stage 1 timer run time is adjusted in 1-minute increments from a minimum setting of 1 minute to a maximum setting of 60 minutes.

Adjusting stage 1 timer run time:

- rotate the Selector dial to position (3),
- rotate the Adjuster dial counter clockwise to decrease the run time, and clockwise to increase it.

The stage 1 timer run time is displayed on the MST-2B.

STAGE 1 TIMER IDLE TIME



Stage 1 timer is activated when ambient temperature reaches the main set point. When the mist output is idle using this timer, the LED directly beneath the number "1" will flash repeatedly.

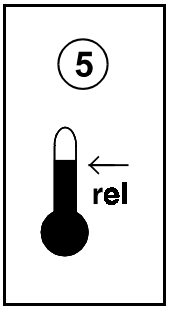
The stage 1 timer idle time is adjusted in 1-minute increments from a minimum setting of 0 minutes to a maximum setting of 60 minutes. If you do not wish to have the mist output use this timer, set this parameter to 0. In this case, mist will be continuously activated when ambient temperature reaches the main set point.

Adjusting stage 1 timer idle time:

- rotate the Selector dial to position (4),
- rotate the Adjuster dial counter clockwise to decrease the idle time, and clockwise to increase it.

The stage 1 timer idle time is displayed on the MST-2B.

STAGE 2 RELATIVE SET POINT



The stage 2 relative set point establishes the temperature at which stage timer 2 begins to operate. The value is a temperature **difference** from the main set point.

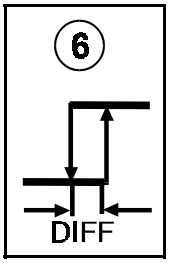
The stage 2 RSP is adjusted in 0.5-degree increments from a minimum setting of 0.0°F (0.0°C) to a maximum setting of 18.0°F (10.0°C).

Adjusting the stage 2 RSP:

- rotate the Selector dial to position (5),
- rotate the Adjuster dial counter clockwise to decrease the relative set point, and clockwise to increase it.

The stage 2 RSP is displayed on the MST-2B.

STAGE 2 DIFFERENTIAL



This value represents the temperature decrease that must be reached to stop mist operation on stage 2 timer.

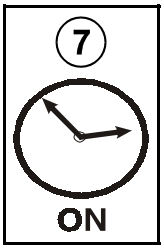
The differential is adjusted in 0.5-degree increments from a minimum setting of 0.5°F (0.5°C) to a maximum setting of 10°F (5.0°C).

Adjusting stage 2 differential:

- rotate the Selector dial to position (6),
- rotate the Adjuster dial counter clockwise to decrease the differential, and clockwise to increase it.

The stage 2 differential is displayed on the MST-2B.

STAGE 2 TIMER RUN TIME



Stage 2 timer is activated when ambient temperature reaches the stage 2 RSP. When the mist output is activated using this timer, the LED directly beneath the number “2” will be continuously illuminated.

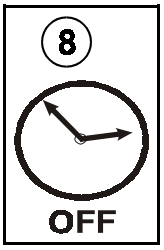
The stage 2 timer run time is adjusted in 1-minute increments from a minimum setting of 1 minute to a maximum setting of 60 minutes.

Adjusting stage 2 timer run time:

- rotate the Selector dial to position (7),
- rotate the Adjuster dial counter clockwise to decrease the run time, and clockwise to increase it.

The stage 2 timer run time is displayed on the MST-2B.

STAGE 2 TIMER IDLE TIME



Stage 2 timer is activated when ambient temperature reaches the main set point. When the mist output is idle using this timer, the LED directly beneath the number "2" will flash repeatedly.

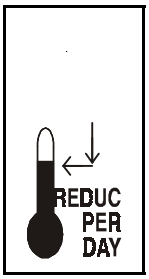
The stage 2 timer idle time is adjusted in 1-minute increments from a minimum setting of 0 minutes to a maximum setting of 60 minutes. If you do not wish to have the mist output use this timer, set this parameter to 0. In this case, mist will be continuously activated when ambient temperature reaches stage 2 RSP.

Adjusting stage 2 timer idle time:

- rotate the Selector dial to position (8),
- rotate the Adjuster dial counter clockwise to decrease the idle time, and clockwise to increase it.

The stage 2 timer idle time is displayed on the MST-2B.

RAMPING



This function is used to activate or deactivate the ramping function and set its value. The ramping function automatically reduces the main set point by the set value every 24 hours.

The ramping setting is adjusted in 0.01 degree decrements from a minimum setting of OFF, -0.01°F (-0.01°C) to a maximum setting of -0.99°F (-0.50°C).

The main set point must be greater than the limit.

Adjusting ramping:

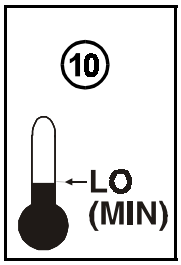
- rotate the selector dial to position (9),
- rotate the adjuster dial counter clockwise to increase the ramping rate, and clockwise to decrease it.

The ramping setting is displayed on the MST-2B.

NOTE: When ramping is activated, the main set point temperature cannot be manually adjusted.
Ramping automatically shuts OFF when the minimum temperature limit is reached!

Example: The main set point temperature is set to 70°F and ramping is adjusted to -0.05°F. The following day the main set point temperature drops to 69.95°F followed by 69.90°F on the next day. Although the main set point real value decreases, the display will be changed after 10 days. The main set point will then be 69.5°F.

LOW TEMPERATURE RECORD



This function displays the lowest recorded ambient temperature since the last clear.

The record low temperature is rounded to the nearest 0.5 degree from a minimum display of 13.5°F (-10.0°C) to a maximum display of 105.0°F (41.0°C). If a temperature lower than 13.5°F is recorded, **Lo** is displayed.

Viewing the lowest temperature recorded:

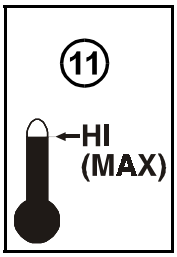
- rotate the selector dial to position (10)

Clearing the low temperature value

- quickly rotate the adjuster dial counter clockwise, then clockwise.

CLr will be briefly displayed on the MST-2B.

HIGH TEMPERATURE RECORD



This function displays the highest recorded temperature since the last clear.

The record high temperature is rounded to the nearest 0.5 degree from a minimum display of 13.5°F (-10.0°C) to a maximum display of 105.0°F (41.0°C). If a temperature higher than 105.0°F (41.0°C) is recorded, **Hi** is displayed.

Displaying the highest temperature recorded:

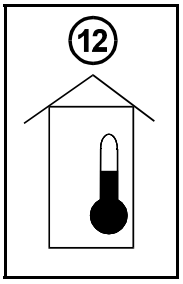
- rotate the selector dial to position (11)

Clearing the high temperature value

- quickly rotate the adjuster dial counter clockwise, then clockwise.

CLr will be briefly displayed on the MST-2B.

AMBIENT ROOM TEMPERATURE DISPLAY



This function displays the room temperature. The selector dial should normally be left at this position.

Room temperature is displayed to the nearest 0.1 degree from a minimum display of 13.5°F (-10.0°C) to a maximum display of 105.0°F (41.0°C). If the temperature is lower than 13.5°F (-10.0°C), **Lo** is displayed. If the temperature is higher than 105.0°F (41.0°C), **Hi** is displayed.

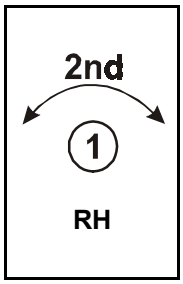
Viewing the room temperature:

- rotate the selector dial to position (12)

Room temperature is displayed on the MST-2B.

SECONDARY FUNCTIONS

HUMIDITY SET POINT



The MST-2B may be equipped with an optional humidity probe. This setting prevents the mist from activating or deactivates it if humidity is high. The mist output will remain inactive until relative humidity decreases below this set point.

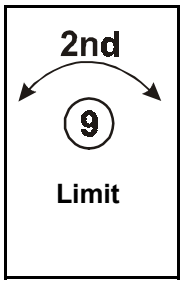
The humidity set point is adjusted in 1% increments from a minimum setting of 30% to a maximum setting of 80%.

Adjusting the humidity set point:

- rotate the selector dial to position (12),
- rapidly rotate the adjuster dial back and forth to enter secondary function mode,
- rotate the selector dial to position (1).
- rotate the adjuster dial counterclockwise to decrease the humidity set point, and clockwise to increase it.

The value of the humidity set point setting is displayed on the MST-2B.

MINIMUM RAMPING



Minimum ramping is the lowest that the ramping function can adjust the main set point to. This is a security feature.

The minimum ramping setting is adjusted in 0.5 degree increments from a minimum setting of 13.5°F (-9.5°C) to a maximum setting of 105.0°F (41.0°C).

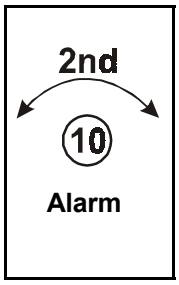
Adjusting the minimum ramping setting:

- rotate the Selector dial to position (12),
- rapidly rotate the Adjuster dial back and forth to enter secondary function mode,
- rotate the Selector dial to position (9),
- rotate the Adjuster dial counterclockwise to decrease the minimum ramping setting, clockwise to increase it.

The minimum ramping setting is displayed on the MST-2B.

NOTE: When the main set point temperature reaches the minimum ramping limit, the ramping setting (primary function 9) automatically shuts off.

LOW TEMPERATURE ALARM



This function establishes the temperature **difference** below the main set point that the room can reach before a low temperature alarm is signaled. When a low temperature alarm occurs an alarm contact is activated and the alarm LED lights on the MST-2B.

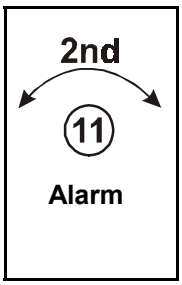
The low temperature alarm is adjusted in 0.5 degree increments from a minimum setting of -32.0°F (-18.0°C) to a maximum setting of 0.0°F (0.0°C).

Adjusting the low temperature alarm setting:

- rotate the selector dial to position (12),
- rapidly rotate the adjuster dial back and forth to enter secondary function mode,
- rotate the selector dial to position (10),
- rotate the adjuster dial counterclockwise to decrease the setting, and clockwise to increase it.

The low temperature alarm setting is displayed on the MST-2B.

HIGH TEMPERATURE ALARM



This function establishes the temperature **difference** above the main set point that the room can reach before a high temperature alarm is signaled. When a high temperature alarm occurs, an alarm contact is activated and the alarm LED lights up on the MST-2B.

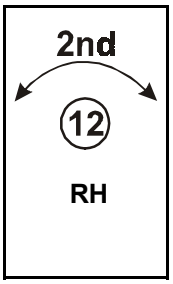
The high temperature alarm is adjusted in 0.5 degree increments from a minimum setting of 0.0°F (0.0°C) to a maximum setting of 32.0°F (18.0°C)

Adjusting the high temperature alarm:

- rotate the selector dial to position (12),
- rapidly rotate the adjuster dial back and forth to enter secondary function mode,
- rotate the selector dial to position (11),
- rotate the adjuster dial counterclockwise to decrease the setting, and clockwise to increase it.

The high temperature alarm setting is displayed on the MST-2B.

RELATIVE HUMIDITY



This parameter displays the actual relative humidity of the room.

The relative humidity is displayed to the nearest 1% from a minimum display of 30% to a maximum display of 90%. If the humidity read by the probe exceeds 90%, the value displayed will remain at 90. If the humidity read by the probe is lower than 30% or if the probe is not present, F2 will be displayed.

Displaying the relative humidity:

- rotate the selector dial to position (12),
- rapidly rotate the adjuster dial back and forth to enter secondary function mode.

The relative humidity is displayed on the MST-2B.

TROUBLESHOOTING

SYMPTOM	CAUSE and SOLUTION
Lo is continually displayed	– Temperature is below minimum (13.5°F or -10.0°C). – Probe is disconnected or defective.
Hi is continually displayed	– Temperature is above maximum (105.0°F or 41°C). – Probe is short circuited.
F2 is continually displayed at the relative humidity	– Humidity read by the probe is lower than the minimum (30%). – Probe is unplugged or defective.
Mist output is not functioning	– Make sure LED 1 or 2 is illuminated. If the LED is flashing, the mist output is in the timer's idle time. If the LED is continuously activated and mist output is not activated, check output wiring and fuse. Refer to figure 4 for fuse location. If a fuse is burnt, replace by one of the same type.
Display is blank	– Verify that the line voltage selector switch is properly set. – Verify that the 10 pin flat cable between the main board and the faceplate board is connected.

TECHNICAL SPECIFICATIONS

DESCRIPTION	VALEUR
INPUT POWER	– 100 mA – 115/230 VAC – 60 Hz only
Output 1 (relay)	– 10 Amp. 115 / 230 VAC – 1/2 HP @ 115V – 1 HP@ 230V – Minimum load 10 mA @ 115 VCA* – Minimum load 20 mA @ 230 VCA*
Alarm (relay)	– 2 Amp., 30V AC / DC max

*Relay will not function properly if load is smaller than the min. value.

Storage temperature:	20 to 55°C (-4 to 130°F)
Operation temperature:	0 to 50°C (32 to 122°F)
Weight:	0.9 Kg (1.8 lbs)
Dimensions:	97 x 163 x 145 mm (3.80x 6.40 x 5.70”)

RECORD FORM

Pos	Function	Default value		User setting
1	Main set point	77°F	25°C	
2	Stage 1 differential	5.5°F	2°C	
3	Stage 1 timer run time	31	31	
4	Stage 1 timer idle time	30	30	
5	Stage 2 relative set point	3.5°F	2.0°C	
6	Stage 2 differential	5.5°F	3.0°C	
7	Stage 2 timer run time	20	20	
8	Stage 2 timer idle time	0	0	
9	Ramping	OFF	OFF	

SECONDARY FONCTION

1	Humidity Set Point	31RH%	31RH%	
9	Minimum Ramping Limit	65°F	18°C	
10	Low Temperature Alarm	-9°F	-5°C	
11	High Temperature Alarm	20°F	12°C	

Limited Warranty

The manufactured equipment and supplied components have gone through rigorous inspection to assure optimal quality of product and reliability. Individual controls are factory tested under load, however the possibility of equipment failure and/or malfunction may still exist.

For service, contact your local retailer or supplier. The warranty period shall be for two years from manufacturing date. Proof of purchase is required for warranty validation.

In all cases, the warranty shall apply only to defects in workmanship and specifically exclude any damage caused by over-voltage, short circuit, misuse, acts of vandalism, fortuitous events, acts of God, flood, fire, hail or any other natural disaster. Any unauthorized work, modification or repair on this product automatically voids the warranty and disclaims the manufacturer from all responsibility.

The manufacturer assumes only those obligations set forth herein, excluding all other warranties or obligations. This warranty stipulates that in all cases the manufacturer shall be liable only for the supply of replacement parts or goods and shall not be liable for any personal injury, damages, loss of profits, interrupted operations, fine contravention of the law or damages to the production of the PURCHASER and the PURCHASER shall take up the defense and hold the manufacturer faultless regarding any legal or extra legal proceedings, notice, or claim by the customer or by a third party, and regarding any legal and extra legal expenses and fees brought forward on by such damages.

MAV MST-2B Version: 1.1
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