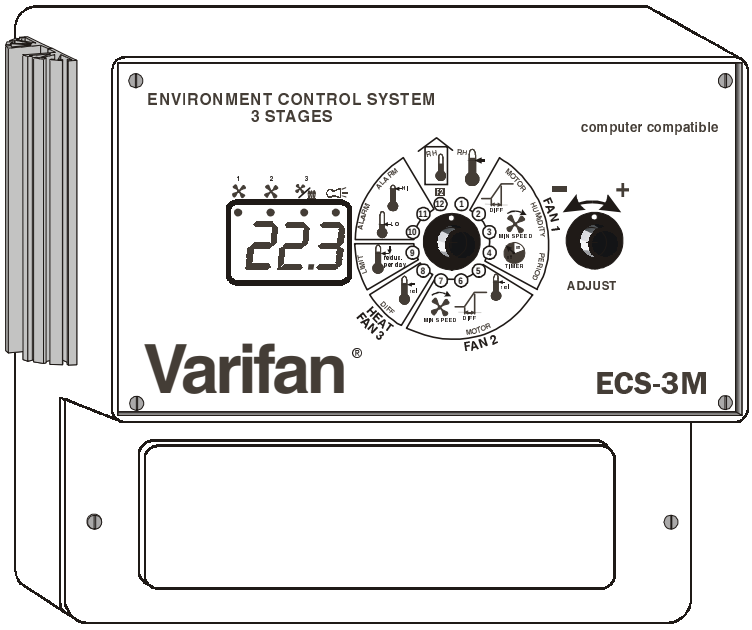
ECS 3M

USER'S MANUAL



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.

WARNINGS 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 ECS, including the alarm system and backup devices, after installation, after changes to the installation and every 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.

CHAPTER 1 - INTRODUCTION

CHAPTER 2 - INSTALLATION

CHAPTER 3 - USER GUIDE

PRIMARY FUNCTIONS

CONTENTS CONTINUED...

SECONDARY FUNCTIONS

APPENDIX

1. GENERAL

This document provides a description of the ECS-3M control panel. It is organized as follows:

- Introduction
- Installation
- User's Guide
- Appendix

1.1 DESCRIPTION

Congratulations on the purchase of your ECS-3M environmental control system. The ECS-M product line provides you with full control over temperature, humidity, air flow, and heat, resulting in a comfortable environment for your livestock.

The ECS-M product line offers a number of added features over existing ECS controls, such as:

- Compatibility with DIP-1 control.
- Hi/Lo temperature indication.
- Automatic temperature reduction (ramping).
- Adaptable variable speed outputs for a wide selection of fan model types.
- Humidity probe.
- Full torque fan start to prevent motor damage.

The ECS-3M provides microprocessor control over a three stage output.

The first stage controls a variable speed fan which can operate at a continuous low speed to ensure good quality of air when room temperature is below the main set point. In addition, the first stage may be programmed to cycle ON and OFF. When room temperature rises above the main set point, the fan accelerates to increase the airflow.

DESCRIPTION CONTINUED...

The second stage provides control over a second variable speed fan to help the first fan when higher room temperatures require increased airflow. This second stage is also fully programmable for settings, such as minimum speed, relative set point, etc.

The third stage controls either a heater for colder climates, or a third fan where additional cooling is required.

The ECS-3M provides you with full control over all three stages via the use of an easy to follow display panel. All programmable features can be customized to meet your requirements. The ECS-3M keeps you constantly informed by displaying the status of all of its outputs as well as the room temperature. With an optional humidity probe, the ECS-3M displays current humidity levels.

Safety of livestock is ensured by the continuous control of climate and timely alarm notification, should environmental conditions exceed alarm set points. Further security may be obtained by connecting all ECS controls in a network configuration to a computer via the use of an optional RCM-40 remote monitoring unit . This provides remote control monitoring of each room. All control panel variable outputs are fused, and all programmable settings are maintained, whether the ECS-3M is powered or not.

The ECS-3M provides an automatic constant temperature reduction (ramping) feature for your maturing livestock. A built-in low temperature safety factor prevents temperatures from reaching dangerous limits.

With an ECS-3M in control of your climate, you are assured of optimal living conditions for your livestock.

DEFINITION OF TERMS

MAIN SET POINT

The desired room temperature. Other temperature settings on the ECS-3M are relative to the main set point temperature.

RELATIVE TEMPERATURE

A value added to, or subtracted from the main set point, which results in a new temperature at which a desired action starts or stops.

ROOM TEMPERATURE

The actual temperature in a closed area.

ROOM HUMIDITY

The actual humidity level of a closed area.

MINIMUM FAN SPEED

The desired minimum speed for variable speed fans.

RAMPING

An automatic daily reduction in the main set point and all temperature settings relative to this.

DIFFERENTIAL

ON/OFF (relay). Range of temperature where two conditions are possible. The output depends on whether the temperature was increasing or decreasing when it enters that range.

VARIABLE. (Bandwidth) Temperature range where a variable fan speed fan accelerates, as the temperature increases. Minimum value at relative set point and 100% at relative set point + Bandwidth.

Chapter 2 describes the installation of the ECS-3M control panel.

The manufacturer recommends that the following instructions be adhered to as closely as possible, and that all work be performed by a certified electrician. Failure to do so may void the warranty!

2.1 UNPACKING

Unpack the ECS-3M and inspect contents for damage. Should the contents appear to be damaged, contact your local distributor for return procedures.

The package should contain the following standard items:

- 1 ECS-3M control.
- 1 installed temperature probe (model number 2004-1K).
- 3 cable fasteners or fuses.
- 1 Instruction manual.

The following optional items may be added:

- 3 additional temperature probes for temperature averaging,
- 1 humidity probe. The ECS-3M requires the RHT-1 humidity probe for maximum accuracy of monitoring and control of humidity levels.

2.2 MOUNTING

Use a screwdriver to remove the faceplate and the plate on the power compartment.

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 ECS-3M operates in a temperature range of 32° F - 120 ° F (0 ° C- 50 ° C).

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

*** It is prohibited to use overhead cables outside the building.**

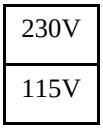
Once both faceplates are off, install the mounting screw on the wall and install the unit on it. Use two more screws to secure the ECS-3M in place using the bottom mounting holes.

Mounting hardware is not shipped with the unit.

2.3 SWITCH SETTINGS

The ECS-3M is configured for a variety of options via two switches as follows:

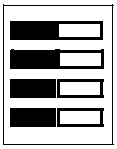
2.3.1 - Line Voltage Selector Switch



This switch is located on the surface of the main (bottom) board and adapts the control panel for 115 VAC or 230 VAC line voltage.

2.3.2 - Software Settings Switch

This switch is located at the rear of the control panel faceplate and adjusts the following options.



OFF	ON
Fahrenheit	Celsius
Settings locked	Setting unlocked
Stage 3 = Heat	Stage 3 = Fan
Not used	Relative Humidity

Switch 1 Selects the Fahrenheit or Celsius display for the front panel.

Switch 2 Locks/unlocks user settings. All settings except for main set point, record low, and record high are locked when this switch is OFF.

Switch 3 Selects between a Heater or Fan control on stage three of the control panel.

Switch 4 With or without a humidity probe, DIP switch #4 must be ON.

2.4 CONNECTION PROCEDURE

For connection procedures which follow see figures 1 to 3.

2.4.1 - Input power

Use a screwdriver to remove cable knock-outs for cabling installation to the control panel.

2.4.1.1 - 115 VAC

Do not apply power to the control panel until all connections have been completed!

Make certain that the line voltage selector switch is set to 115 VAC. Connect the power cable to terminals 7 and 8 on the main (bottom) board and connect the ground wire to terminal 9 on the main board .

2.4.1.2 - 230 VAC

Make certain that the line voltage selector switch is set to 230 VAC. Connect the power cable to terminals 7 and 8 on the main (bottom) board and connect the ground wire to terminal 9 on the main board.

2.4.2 - Fan 1 (terminals 5 and 6)

Stage 1 of the ECS-3M controls the operation of the primary fan. Connect the two leads from fan 1 to terminals 5 and 6 on the main (bottom) board.

2.4.3 - Fan 2 (terminals 3 and 4)

Stage 2 of the ECS-3M controls the operation of the secondary fan. Connect the two leads from fan 2 to terminals 3 and 4 on the main (bottom) board.

2.4.4 - Fan 3/Heater (terminals 1 and 2)

Stage 3 of the ECS-3M provides a dry contact closure which controls the operation of a third fixed speed fan or a heater. This contact closure is voltage rated to 230 VAC. The current rating of the dry contact is 10 Amps (resistive) for a heater and 6 Amps (inductive) for a fan. Set the software settings DIP switch at the rear of the control panel faceplate to ON for a fan or OFF for a heater.

Connect the heater or fan 3 to terminals 1 and 2 on the main (bottom) board.

2.5 TEMPERATURE / HUMIDITY PROBES

Temperature and humidity probes use a “Class 2” low voltage circuit. These cables can be extended to a distance of 150 meters (500 feet). Single probe temperature and humidity connections are illustrated in figure 4, while temperature probe averaging connections are illustrated in figure 5.

Use shielded cabling for probes . Connect the shields to the "SHLD" terminal. Failure to do so may result in inaccurate readings!

2.5.1 Single Temperature Probe

Install a single temperature probe in the area that best reflects the overall room temperature. Connect the two leads and the shield of the temperature probe to the control panel terminals labeled "Probe", as indicated in figure 4.

2.5.2 Averaging (optional)

Four temperature probes are required if temperature averaging is desired in larger rooms. Place the probes in appropriate locations to best average room temperature. Refer to figure 5.

2.5.3 Humidity Probe (optional)

Install one humidity probe in the area that best reflects the overall room humidity. Connect the humidity probe to the control panel terminals labeled "Probe", as indicated in figure 4.

2.6 ALARM

The ECS-3M provides a normally open and normally closed dry contact for alarming low or high temperature conditions. In addition, this same contact can be used to signal a power failure. This contact may be connected to an alarm system, or directly to a siren and/or auto-dialer.

Make normally open or normally closed connections as indicated in figure 4.

Momentary power interruptions may trigger false alarms! To avoid them, when the ECS-3M is connected to an alarm system, install a time delay relay between

2.7 POWERING UP

Before powering up the ECS-3M, install the faceplate to the control's enclosure using the six screws previously removed.

Set Selector knob to position (12).

Upon power up, the unit will test its display by briefly lighting all the segments of its LED. Make certain that all segments light up.

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

If the temperature does not appear, refer to the Troubleshooting section in the appendix of this document.

Fig. 1
Two Fans (115V) and One Heating Unit (115V)

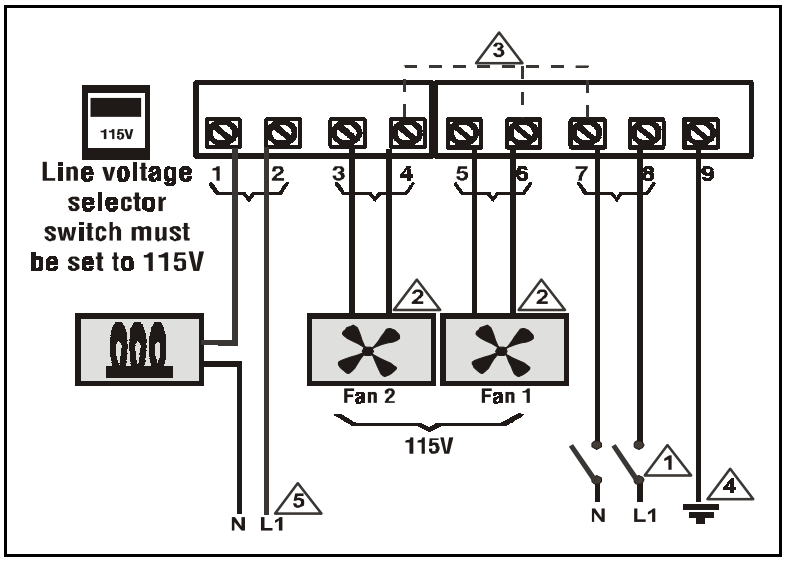


Fig. 2
Three Fans (230V)

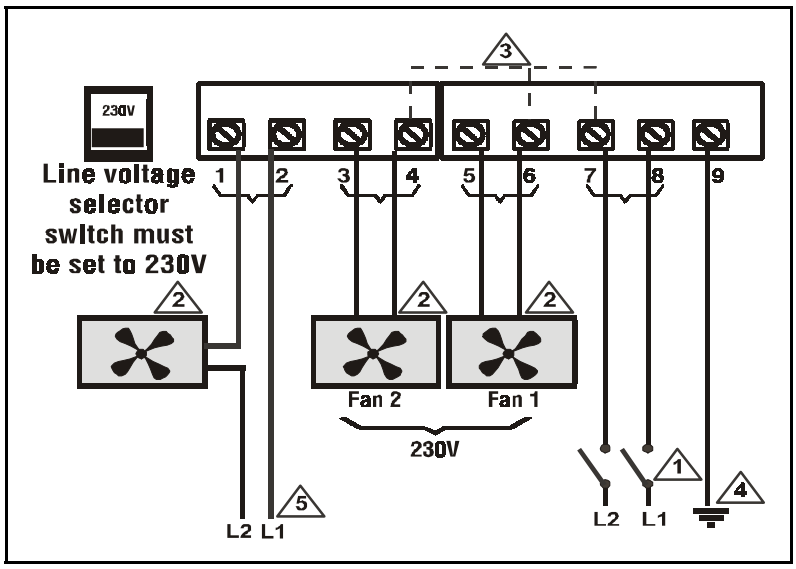
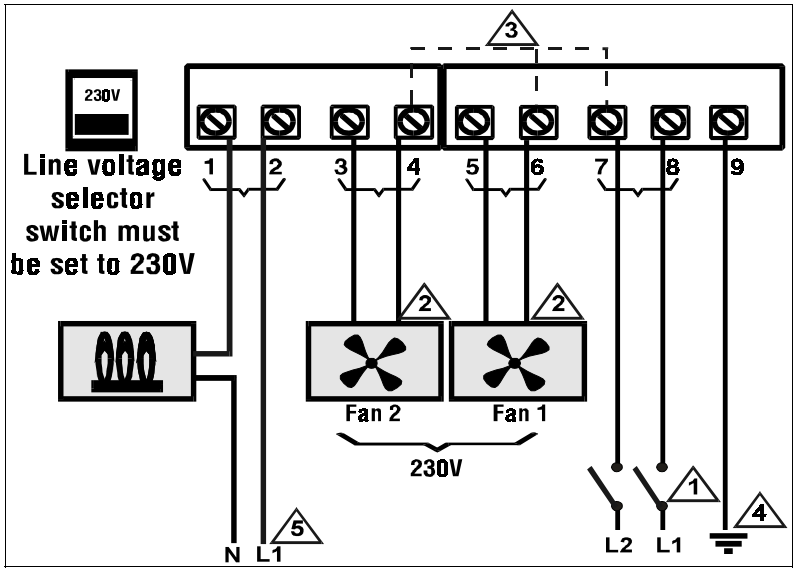


Fig. 3
Two Fans (230V) and One Heating Unit (115V)



Notes for Figures 1, 2 and 3

⚠1 Power cut and protection devices in case of overload.

⚠2 Only use fans that have thermal protection devices.

⚠3 Terminals 4, 6, and 7 are internally connected.

⚠4 Connect the grounding wire to the ground terminal 9 .

⚠5 Should be on a different circuit from the ECS.

Fig. 4.
Probes and Alarm Wiring

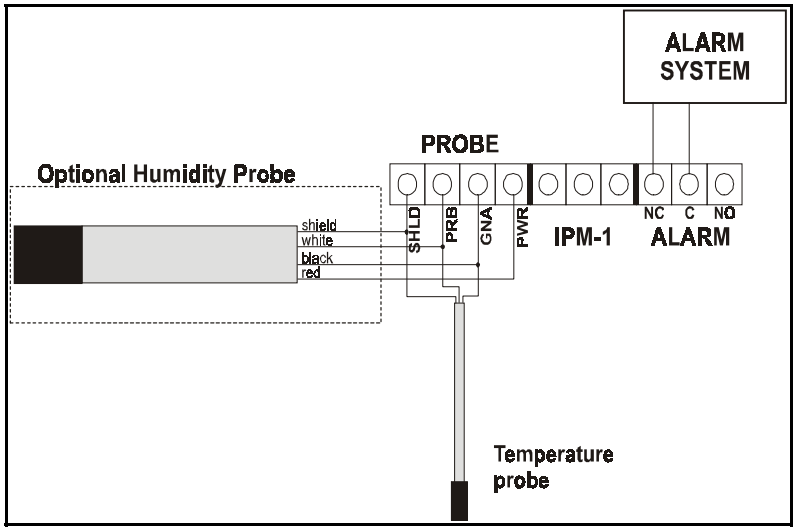


Fig. 5
Temperature Averaging Probe Connection

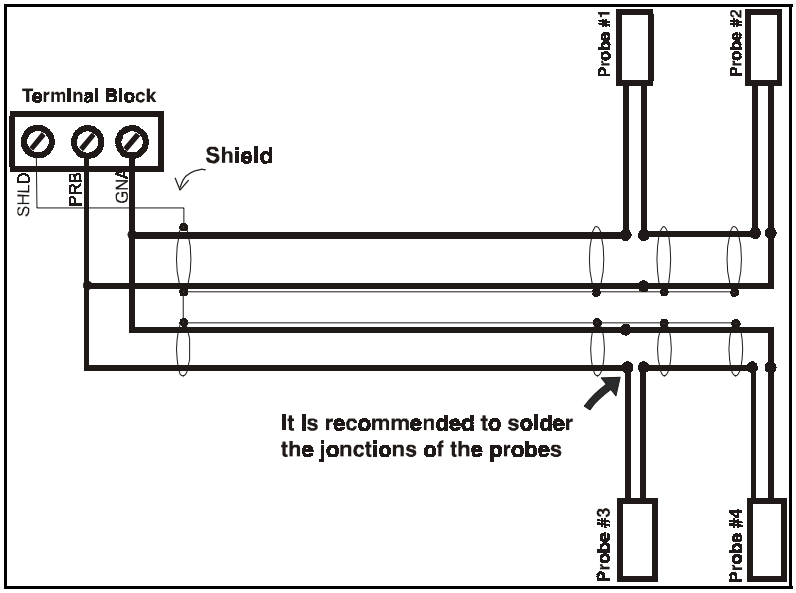
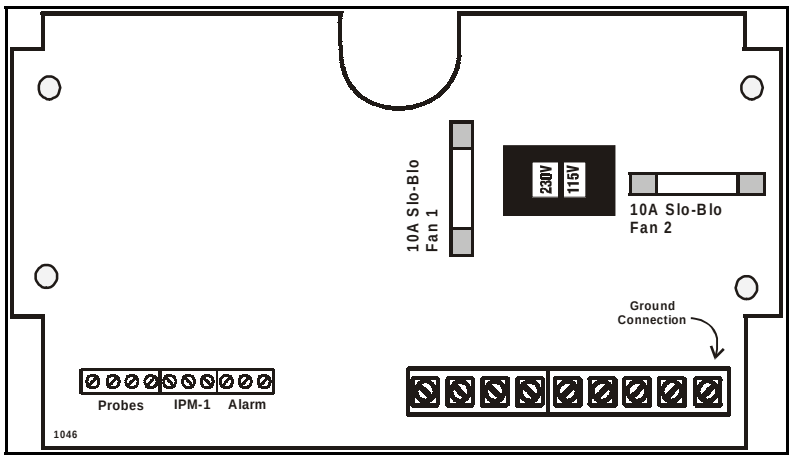


Fig. 6
Main Board: Terminal, Blocks, Switches, Fuses and Ground



RECOMMENDED CONTROL BACKUP

WARNING AND PRECAUTIONS

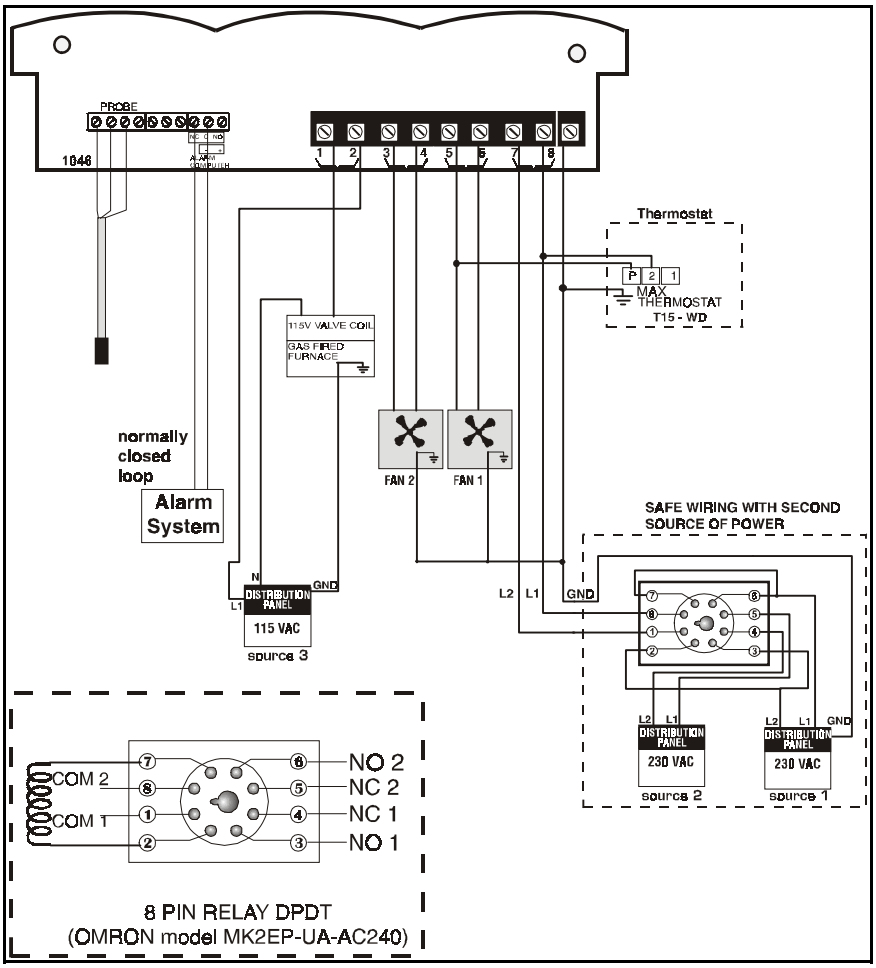
Equipment failure, blown fuses and/or tripped breakers may prove harmful to the content of the building. It is therefore strongly recommended to install backup devices and alarm or warning devices (see example fig. 7).

BACKUP THERMOSTAT. If the control is defective, then the thermostat will start the dedicated fan at full speed when the temperature will reach the T15-WD set value. Therefore, the T15-WD should be accessible for its adjustment and it should be set at the same temperature as the alarm, i.e. approximately 5º C above the fan relative set point.

BACKUP POWER SOURCE. The DPDT relay connects to the source 1 in normal operation but will switch to the source 2 if source 1 is off. The relay shall be chosen to support the load connect to it.

ALARM CIRCUIT. In normal operation, the alarm circuit of the Varifan control is a short circuit. But if the control is defective or if there is no power applied to it, then the alarm circuit of the control will be an open circuit.

Fig 7.
Recommended control backup



CHAPTER 3 - USER'S GUIDE

The ECS-3M front panel shown previously features a LED status window and two control dials which are used respectively to select a function and adjust a setting.

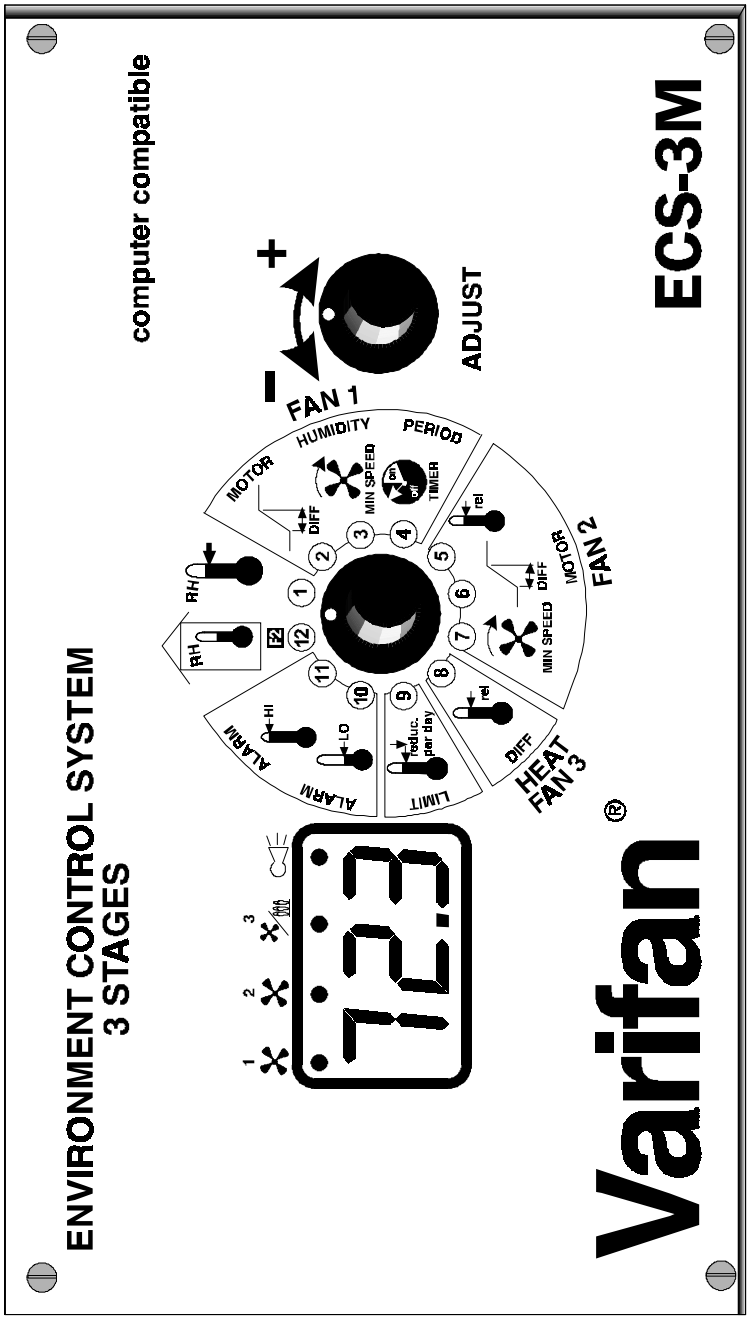
LED STATUS WINDOW

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

In addition, the LED status window displays the operational status of Fans 1, 2, and Fan 3 or a heater via four additional LEDS (shown above in LED window). When ON, each LED indicates that its associated fan or heater is operating. The fourth LED lights up to indicate a low or high temperature alarm condition.

CONTROL DIALS

The center dial is the Selector dial and is used to select one of the control panel's 12 primary or 10 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.


ECS-3M
computer compatible
ENVIRONMENT CONTROL SYSTEM
3 STAGES
Varifan
ADJUST
FAN 1
HUMIDITY
PERIOD
MOTOR
DIFF
MIN SPEED
TIMER
RH
FAN 2
MOTOR
DIFF
MIN SPEED
rel
HEAT
FAN 3
DIFF
LIMIT
reduc. per day
ALARM
HI
LO
123

The 12 primary functions are:

- 1 Main set point temperature
- 2 Fan 1 modulation band
- 3 Fan 1 minimum speed
- 4 Fan 1 duty cycle timer
- 5 Fan 2 relative set point temperature
- 6 Fan 2 modulation band
- 7 Fan 2 minimum speed
- 8 Fan 3 Heater/fan relative temperature set point
- 9 Reduction per day
- 10 Record low temperature display
- 11 Record high temperature display
- 12 Room 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 panel. When primary functions 1 through 11 are selected, the LED status window displays a blinking value. Function 12 displays ambient temperature.

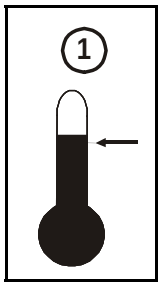
The 10 secondary functions are:

- 1 Relative humidity set point
- 2 Fan 1 motor compatibility
- 3 Fan 1 minimum speed setting for humidity
- 4 Fan 1 duty cycle period
- 6 Fan 2 motor compatibility
- 8 Fan 3 Heater/fan differential
- 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)
Then rotate the adjuster dial back and forth to enter secondary mode.
Then rotate the selector dial from function (12) to any other function.
When secondary functions 1 through 4, 6, and 8 through 11 are selected the status window displays a flashing value along with a scrolling LED display. Selection of function 12 takes the ECS back to primary mode.

PRIMARY 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 -9.5° C (13.5° F) to a maximum setting of 41.0° C (105.0° F).

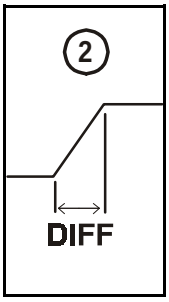
Adjusting the main set point temperature:

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

The main set point temperature is displayed on the ECS.

Note: The reduction per day feature (primary function 9) must be (OFF) to

FAN 1 DIFFERENTIAL



The Fan 1 differential setting establishes the temperature at which Fan 1 reaches maximum speed. The value is a temperature **difference** from the main set point.

The Fan 1 differential is adjusted in 0.5 degree increments from a minimum setting of 2.0° F (1.0° C) to a maximum setting of 18.0° F (10.0° C).

Adjusting the Fan 1 differential:

- rotate the Selector dial to position (2),
- rotate the adjustment dial counterclockwise to decrease the temperature setting, clockwise to increase it.

The Fan 1 Differential setting is displayed on the ECS.

Example: A main set point temperature of 70° F along with a Fan 1 differential setting of 5° F is set. When the temperature of the room reaches 75° F, Fan 1 operates at its maximum speed.

FAN 1 MINIMUM SPEED

This function sets the minimum speed of Fan 1 when room temperature is below the main set point. This value is entered as a percentage of a fan's maximum speed. The Fan 1 minimum speed is adjusted in 2% increments from a minimum setting of 12% to a maximum setting of 100%.

Adjusting the minimum speed of Fan 1:

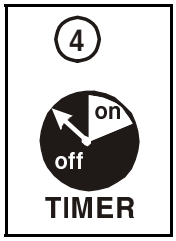
- rotate the Selector dial to position (3),
- rotate the Adjuster dial counterclockwise to decrease fan speed, clockwise to increase it.

The minimum fan speed is displayed on the ECS.

NOTE: Upon start-up, Fan 1 will run at its maximum speed for 4 seconds.

This feature helps to minimize the risks of jams caused by ice.

FAN 1 DUTY CYCLE



As long as the actual temperature is below the main set point, Fan 1 operates at the minimum speed set by Fan 1 Minimum Speed (primary function 3). The Fan 1 duty cycle sets the percentage of time the fan is ON versus the percentage of time the fan is OFF. The ON time is entered as a percentage of the total time which is known as the period.

The Fan 1 duty cycle is adjusted in 5% increments from a minimum setting of OFF, 5%, 10% etc., up to a maximum setting of ON corresponding to continuous operation.

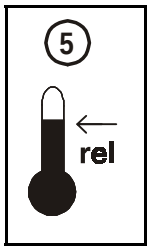
Adjusting the duty cycle of Fan 1:

- rotate the Selector dial to position (4),
- rotate the Adjuster dial counterclockwise to decrease the duty cycle, clockwise to increase it.

The duty cycle is displayed on the ECS.

Example: The period of Fan 1 is set to 8 minutes by secondary function (4), while the duty cycle is set to 50%. As long as the main set point temperature of the room has not been reached, the fan operates at a minimum speed for 4 minutes, and OFF for 4 minutes.

FAN 2 RELATIVE SET POINT



The Fan 2 relative set point establishes the temperature above the main set point at which Fan 2 begins to operate at its minimum speed. The value is a temperature **difference** from the main set point.

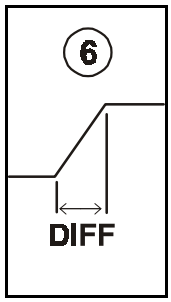
The Fan 2 relative set point is adjusted in 0.5 degree increments from a minimum setting of 0.0° C (0.0° F) to a maximum setting of 10.0° C (18.0° F).

Adjusting the relative set point of Fan 2:
- rotate the selector dial to position (5),
- rotate the adjuster dial counterclockwise to decrease the relative set point, clockwise to increase it.

The Fan 2 relative set point is displayed on the ECS.

Example: A main set point of 22° C along with a Fan 2 relative set point of 5° C is selected. When room temperature reaches 27° C Fan 2 begins to operate at minimum speed.

FAN 2 DIFFERENTIAL



The Fan 2 differential setting is the temperature at which Fan 2 reaches maximum speed. The value entered is the temperature **difference** above the Fan 2 relative set point temperature setting.

The Fan 2 differential is adjusted in 0.5 degree increments from a minimum setting of 2.0° F (1.0° C) to a maximum setting of 18.0° F (10.0° C).

Adjusting the Fan 2 differential:

- rotate the Selector dial to position (6),
- rotate the Adjuster dial counterclockwise to decrease the Fan 2 differential setting, clockwise to increase it.

The Fan 2 differential setting is displayed on the ECS.

Example: The main set point temperature of the room is 70° F. A Fan 2 relative set point of 5° F along with a Fan 2 differential setting of 5° F is set. When the temperature of the room reaches 80° F Fan 2 operates at its maximum speed.

FAN 2 MINIMUM SPEED

When room temperature is at the Fan 2 relative set point, Fan 2 runs at minimum speed set by this function. This value is entered as a percentage of fan maximum speed. The Fan 2 minimum speed is adjusted in 2% increments from a minimum setting of 12% to a maximum setting of 100%.

Adjusting the minimum speed of Fan 2:

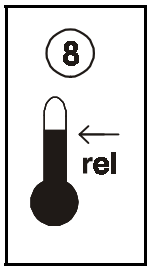
- rotate the selector dial to position (7),
- rotate the adjuster dial counterclockwise to decrease fan speed, clockwise to increase it.

The minimum fan speed is displayed on the ECS.

NOTE: Upon start-up, Fan 2 will run at maximum speed for 4 seconds.

This feature helps to minimize the risks of jams caused by ice.

HEATER/FAN 3 RELATIVE SET POINT



The Heater/Fan 3 relative set point is the relative temperature at which Heater/Fan 3 begins to operate. This value is the temperature **difference** from the main set point.

When a heater is connected,the relative set point is below the main set point. When a fan is connected, the relative set point is above the main set point.

The Heater/Fan 3 relative set point temperature is adjusted in 0.5 degree increments from a minimum setting of -5.0° C (-9.0° F) to a maximum setting of 10.0° C (18.0° F).

Adjusting the Heater/Fan 3 relative set point:

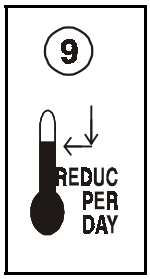
- rotate the selector dial to position (8),
- rotate the adjuster dial counterclockwise to decrease the temperature setting, clockwise to increase it.
- The relative temperature setting is displayed on the ECS.

The relative temperature setting is displayed on the ECS

Example: The main set point temperature is adjusted to 70° F. A heater is in use and the relative set point is adjusted to -5° F. When the room temperature reaches 65° F the heater begins to operate.

A third fan is in use and the relative set point is adjusted to 15° F. When the room temperature reaches 85° F the third fan begins to run.

REDUCTION PER DAY



The reduction per day (ramping) function automatically reduces the main set point by the set value every 24 hours.

The reduction setting is adjusted in 0.01 degree decrements from a minimum setting of OFF, -0.01° C (-0.01° F) to a maximum setting of -0.50° C (-0.99° F).
The main set point must be greater than the minimum ramping.

Adjusting the reduction per day:
- rotate the selector dial to position (9),
- rotate the adjuster dial counterclockwise to decrease the reduction value, clockwise to increase it.

The reduction setting is displayed on the ECS.

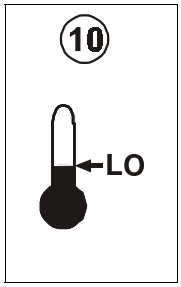
NOTE: When ramping is activated or enabled, the main set point temperature cannot be manually adjusted.

Ramping automatically turns 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. 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.

RECORD LOW TEMPERATURE

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



The record low temperature is rounded to the nearest 0.5 degree from a minimum display of -10.0° C (13.5° F) to a maximum display of 40.5° C (105.0° F). If a temperature lower than -10° C is recorded, Lo is displayed.

Displaying the lowest temperature recorded:

- rotate the selector dial to position (10)

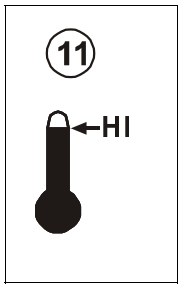
Clearing the low temperature value

- quickly rotate the adjuster dial counterclockwise, then clockwise.

CLr will be briefly displayed on the ECS.

RECORD HIGH TEMPERATURE

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



The record high temperature is rounded up to the nearest 0.5 degree from a minimum display of -10.0° C (13.5° F) to a maximum display of 40.5° C (105.0° F). If a temperature higher than 40.5° C is recorded, Hi is displayed.

Displaying the highest temperature recorded:

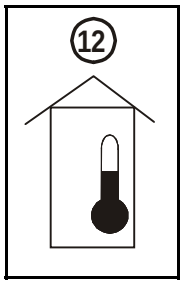
- rotate the selector dial to position (11)

Clearing the high temperature value

- quickly rotate the adjuster dial counterclockwise, then clockwise.

CLr will be briefly displayed on the ECS.

ROOM TEMPERATURE



This function displays the room temperature. The Selector dial should normally be left in this position.

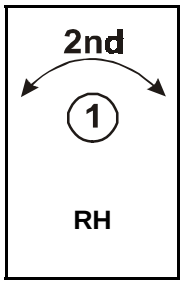
Room temperature is displayed to the nearest 0.5 degree from a minimum display of -10.0° C (13.5° F) to a maximum display of 41.0° C (105.0° F). If the temperature is lower than -10.0° C, Lo is displayed. If the temperature is higher than 41.0° C, Hi is displayed.

Viewing the room temperature:
- rotate the selector dial to position (12)

Room temperature is displayed on the ECS.

SECONDARY FUNCTIONS

RELATIVE HUMIDITY SET POINT



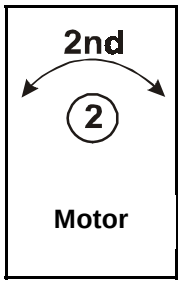
This setting regulates room humidity only when a humidity sensor is connected to the ECS. The humidity setting affects Fan 1 only. When humidity in the room exceeds the relative humidity set point, Fan 1 minimum speed increases gradually and proportionally. If relative humidity rises in the 10% range above the humidity set point, minimum speed also increases proportionally up to the value set by secondary function (3). The humidity level is adjusted in 1% increments from a minimum setting of 30% to a maximum setting of 80%.

Adjusting the relative humidity level:

- 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, clockwise to increase it.

The humidity setting is displayed on the ECS.

FAN 1 MOTOR



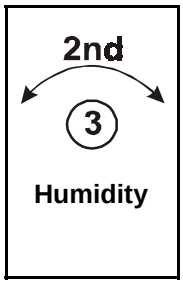
The Fan 1 motor compatibility setting adjusts the ECS-3M outputs to the electrical characteristics of the fan motor. Eight choices are available. Choice 1 is suitable for most fans. If your motor is not listed in the compatibility table in the Appendix, try all choices and take the one that offers the best performance. Settings 2 - 8 are the optimized settings for fan models listed in the compatibility table. Using the compatibility table, find the model number of your fan motor and take note of the fan motor compatibility number.

Setting the Fan 1 motor compatibility:

- 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 (2),
- rotate the Adjuster dial to select a motor curve.

The Fan 1 motor compatibility setting is displayed on the ECS.

FAN 1 MINIMUM SPEED FOR HUMIDITY



This function establishes the minimum speed of Fan 1 when the relative humidity level of the room exceeds the relative humidity set point. The speed setting for humidity must be set higher than the speed setting for temperature. This value is entered as a percentage of maximum speed.

The Fan 1 minimum speed is adjusted in 2% increments from a minimum setting of 12% to a maximum setting of 100%.

Adjusting the Fan 1 minimum speed for humidity:

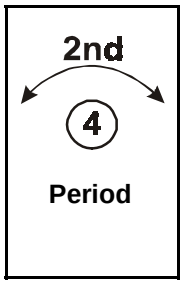
- rotate the Selector dial to position (12),
- rapidly rotate the Adjuster dial back and forth to enter secondary function mode,
- rotate the Selector dial to position (3),
- rotate the Adjuster dial counterclockwise to decrease the speed, clockwise to increase it.

The Fan 1 minimum speed setting for humidity is displayed on the ECS.

Example: The relative humidity setting is adjusted to 65%, Fan 1 minimum speed to 25%, and Fan 1 minimum speed for humidity to 50%.

When the humidity level of the room reaches 65% the minimum speed of Fan 1 gradually increases to reaches 50% when the humidity level of the room is 75%.

FAN 1 DUTY CYCLE PERIOD



The Fan 1 duty cycle period is adjusted in conjunction with the Fan 1 duty cycle timer (primary function 4). The Fan 1 duty cycle period is the total time in ON-OFF fan cycle.

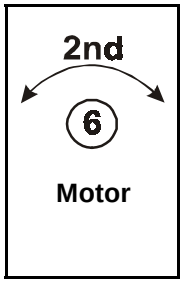
The period is adjusted in 1 minute increments from a setting of 1 minute to a maximum setting of 10 minutes.

Adjusting the Fan 1 duty cycle period:

- 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 (4),
- rotate the Adjuster dial counterclockwise to decrease the period, clockwise to increase it.

The Fan 1 period setting is displayed on the ECS.

FAN 2 MOTOR



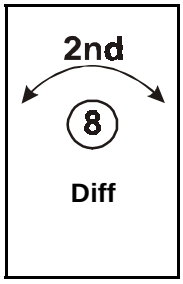
The Fan 2 motor compatibility setting adjusts the ECS-3M outputs to the electrical characteristics of the fan motor. Eight choices are available. Choice 1 is suitable for most fans. If your fan is not listed **in the compatibility table in the Appendix**, try all choices and take the one that gives the best performance. Settings 2 - 8 are the optimized settings for fan models listed in the compatibility table. Using the compatibility table, find the model number of your fan and take note of the fan motor compatibility number.

Setting the Fan 2 motor compatibility:

- 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 (6),
- rotate the Adjuster dial to select a motor curve.

The Fan 2 motor compatibility setting is displayed on the ECS.

HEATER/FAN 3 DIFFERENTIAL



In order to minimize erratic behavior of Heater/Fan 3 when room temperature is exactly at the relative set point, the differential setting separates this ON/OFF threshold into two: one ON threshold and one OFF. This feature greatly reduces equipment wear.

The temperature difference between the two thresholds is the differential.

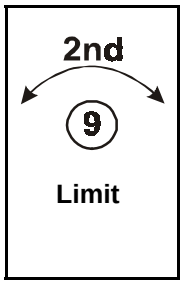
The differential is adjusted in 0.5 degree increments from a minimum setting of 0.5° C (1° F) to a maximum setting of 3° C (6° F) degrees.

Adjusting the differential 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 (8),
- rotate the Adjuster dial counterclockwise to decrease the differential setting, clockwise to increase it.

The differential setting is displayed on the ECS.

MINIMUM RAMPING



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

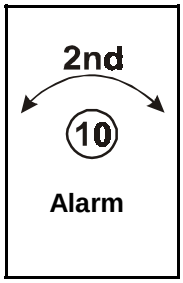
The minimum ramping setting is adjusted in 0.5 degree increments from a minimum setting of -9.5° C (13.5° F) to a maximum setting of 41.0° C (105.0° F).

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 ECS.

NOTE: When the main set point temperature reaches the minimum ramping limit, the reduction per day 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 sounded. When a low temperature alarm occurs, an alarm contact is activated and the alarm LED lights on the front panel.

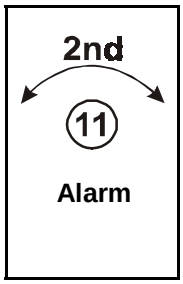
The low temperature alarm is adjusted in 0.5 degree increments from a minimum setting of -18.0° C (-32.0° F) to a maximum setting of 0.0° C (0.0° F)

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, clockwise to increase it.

The low temperature alarm setting is displayed on the ECS.

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 sounded. When a high temperature alarm occurs, an alarm contact is activated and the alarm LED lights on the front panel.

The high temperature alarm is adjusted in 0.5 degree increments from a minimum setting of 0° C (0° F) to a maximum setting of 18.0° C (32.0° F)

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, clockwise to increase it.

The high temperature alarm setting is displayed on the ECS.
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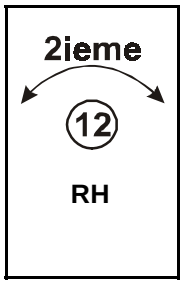
RELATIVE HUMIDITY DISPLAY



This function displays the relative humidity of the room.

Relative humidity is displayed in 1% increments from a minimum display of 30% to a maximum display of 90%. If a humidity level lower than 30% is sensed, F2 is displayed. On the other hand, if a humidity level higher than 90% is sensed, Hi is displayed.

Displaying the humidity level:

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

The humidity level is displayed on the ECS.

APPENDIX

MOTOR COMPATIBILITY

CURVE	BRAND	MODEL	VOLT	
1	Multifan	4E40	230 v.	16”
2	Multifan	2E20	230	8”
2	Multifan	4E35	230 v	14”
2	Multifan	4E40	115 v.	16”
2	Multifan	4E40	230 v.	16”
2	Multifan	4E45	115 v.	18”
2	Multifan	4E45	230 v	18”
2	Multifan	4E50	115 v.	20”
2	Multifan	4E50	230 v.	20”
2	Multifan	AF24M`E	230 v.	24”
2	Multifan	6E63	230 v.	24”
2	Multifan	6E71	230 v.	28”
2	Multifan	8E92	230 v.	36”
2	Ziehl		115/230v	
3	Multifan	2E30	230 v.	12”
3	Multifan	4E30	115 v.	12”
3	Multifan	4E45	230 v.	18”
3	Multifan	6E56	230 v	22”
3	Multifan/AF	AF36M	230 v.	36”
3	Leeson 1/2H	PAF20L	115 v.	20”
3	Leeson 1/2HP	AF24L	115 v.	24”
3	Aerotech-F	AT242	230 v.	24”
4	Multifan	2E25	230 v.	10”
4	Leeson 1/4HP	AF14L	115 v.	14”
4	Leeson 1/4HP	AF16L	115 v.	16”
4	Marathon 1/4HP		230 v.	16”
4	Marathon 1/3HP		230 v.	18”
4	Leeson 1/3HP	AF18L	115 v.	18”
5	GE Motor	5KCP39...	230 v.	12”
5	Leeson 1/4HP	AF12L	230 v.	12”
5	GE Motor	5KCP39...	230 v.	14”
5	Emerson	K55HXJ...	230 v.	14”
6	Oversized motors			
7	Multifan	4E30	230 v.	12”
7	Multifan	2E35	230 v.	14”
8	Multifan	4E25	230 v.	10”

TROUBLESHOOTING

SYMPTOM	CAUSE and REMEDY
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.
Fan(s) or heater not operating	– Verify whether the fan LED is on. If LED is on yet fan or heater is not operating, verify wiring, fan and fuse. Refer Figure 6 for fuse location. If fuse is blown, replace with fuse of same type.
Stage 3 Fan or Heater is operating erratically	– Verify that the software setting switch located at the rear of the faceplate is properly set. – Verify the minimum rating (10mA at 230V or 20mA at 230V.
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.
F2 displayed for relative humidity	– Humidity is below minimum (30%). – Probe is disconnected or defective.

SPECIFICATION

DESCRIPTION	VALUE
INPUT POWER	– 12 AMP – 115/230 -20%, +10% VAC
STAGE 1 (variable speed)	– 6 AMP; inductive 115V / 230V – 10 AMP; max (fuse 10A) – Min. Rating 150mA at 115V*
STAGE 2 (variable speed)	– 6 AMP; inductive 115V / 230V – 10 AMP; max (fuse 10A) – Min. Rating 150mA at 115V*
STAGE 3 (dry relay contact) Not Fused	– 10 AMP ; 115V/230V – 1/2 HP @ 115V – 1 HP @ 230V – Min. Rating 10mA at 115V*
ALARM (dry relay contact)	– 2 AMP; 30V DC

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

RECORD FORM

Dial	Option	Default setting		User setting
1	Main Set Point Temperature	77° F	25° C	
2	Fan 1 Differential	4° F	2° C	
3	Fan 1 Min Speed	24%	24%	
4	Fan 1 Duty Cycle Timer	ON	ON	
5	Fan 2 Relative Set Point	4° F	2° C	
6	Fan 2 Differential	4° F	2° C	
7	Fan 2 Min Speed	24%	24%	
8	Heater/Fan 3 Relative Temp.	-3° F	-1° C	
9	Reduction per day	OFF	OFF	

2nd Function

1	Relative Humidity	65%	65%	
2	Fan 1 Motor Compatibility	2	2	
3	Fan 1 Min Speed For Humidity	50%	50%	
4	Fan 1 Duty Cycle Period	3 min	3min	
6	Fan 2 Motor Compatibility	2	2	
8	Heat/Fan 3 Differential	2° F	1° C	
9	Minimum Ramping Limit	65° F	18° C	
10	Lo Temperature Limit	-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, lightning 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.

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April 1995
Rev. June 2001