

**Models:**

ES3-49 3 Speed Fan, 1 Cool (PWM) &amp; 1 Heat (PWM) Controller

**ES3-49****Ecostat 3 Controller****2 PWM Model****Specifications****Power Supply**

Voltage: 240VAC ±10% @ 50/60Hz

Power Consumption: 3VA Max.

**Input**

10kΩ Thermistor temperature sensor  
Switched Contact for Standby Select  
Switched Contact for Remote Disable

**Outputs**

Relay 1 to 3	Voltage free relay contacts
SPST	16A Resistive
	6A Inductive
PWM Output	Isolated Triac - 240VAC ±10%
	1.5A Resistive

**Connection between Controller and Control Station**

- 5 way connection via 4 core plus screen cable

**Controller Terminal Identification**

SEN	Temperature Sensor Input (10kΩ thermistor)
COM	Common for Sensor, Remote Disable and Standby Functions
DOR	Remote Disable (Contact Open)
SBY	Standby Disable (Contact Closed)

**Input Terminal Identification**

240V power connection to Control Unit (right hand side)

E	Earth
N	Neutral Supply
L	Mains 240VAC Supply

**Output Relays:**

Terminals			
Relays	O	I	C
<b>1 to 3</b>	Normally Open Contact	No Connection	Common Contact
<b>PWM Output</b>	No Connection	Normally Open Contact	Common Contact

**Enclosure:**

The control is provided in 3 parts. The wall mounted Control Station, Remote Controller and a bead type Return Air Detector.

*Control Station*

- Innotech Switchplate
- 115mm x 72mm x 30mm

*Controller*

Plastic Enclosure manufactured from an ignition resistant grade of ABS which meets the requirements of AS2420.

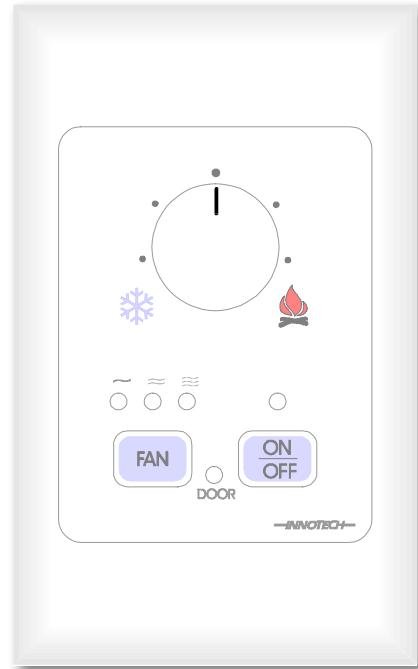
Colour Grey  
Dimensions (max.) 188mm x 163mm x 65mm

*Return Air Detector*

- Bead Type Thermistor
- 3mm Bead with 3 metre lead

**Temperature Ratings**

Storage: 0-50°C non-condensing  
Operating: 0-40°C non-condensing

**Applications**

The Innotech Ecostat 3 Controller is designed to be used in commercial applications to provide complete control for air conditioning systems, which have Pulse Width Modulated chilled water and heating valves.

**Features**

- Control Station fits standard electrical wall plates
- Four core screened cable simplifies connection between the Controller and Control Station
- Adjustable Proportional Band, Dead Zone and PWM Actuator On Time to facilitate startup
- 16A relays for all fan speed and 1A triac for heat and cool functions
- LED indication of relay status
- Remote Disable and Standby Functions

## Installation

1. Mount controller in a dry and reasonably clean location free of excessive vibration.
2. Wire in accordance with INNOTECH connection diagrams and local bylaws or refer to your local distributor.

 This product should only be installed by qualified personnel.

## Wiring

1. Connect the 240VAC supply to the correct terminals, observing the correct polarity of the connections.
2. Connect the EARTH to the correct terminals on all units.
3. DO NOT connect 240VAC to the control terminals on the left hand side.
4. Ensure that the wiring between the wall mounted Control Station and the remote control board is correctly connected. Failure to do so will result in malfunctioning and may damage either or both units.
5. The maximum wire length between the Control Station and the Controller should not exceed 15 metres. The wiring between these devices should not be run in parallel with conductors carrying high current.

## Ecostat Setting and Information

### Set Point Adjustment Range

The Ecostat is calibrated to provide Control Station setpoint adjustment of  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .

To alter the range, adjust the potentiometer "SSP" located on the Controller. When adjusted fully clockwise, the range is  $23^{\circ}\text{C} \pm 6^{\circ}\text{C}$ . When adjusted fully counter-clockwise, the range is  $23^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ .

To change the midpoint from  $23^{\circ}\text{C}$ , adjust the potentiometer "CAL" located on the Controller. As an example, if a midpoint of  $21^{\circ}\text{C}$  is required, set the Control Station setpoint adjuster to midpoint when the temperature at the temperature sensor equals  $21^{\circ}\text{C}$ . It may be necessary to heat or cool the room to the desired value. Adjust the "CAL" potentiometer until the control is neither heating or cooling.

### Standby Function

The Ecostat is equipped with a standby function which when enabled will increase the Dead Zone to be 2 times the Proportional Band (PB) setting. For example, if the PB is  $2^{\circ}\text{C}$ , the Dead Zone will be  $4^{\circ}\text{C}$  when the unit is in Standby mode. To enable the function, remove link "S" from the Controller.

### Remote Disable

The Ecostat is equipped with a remote disable function. If the Remote Disable switch is open, the Ecostat will run for 30 seconds and shut down the Air Conditioning unit.

When the Remote Disable switch is closed, the unit can be restarted by pressing the ON button. To enable this function remove link "D" from the Controller.

### Proportional Band

The Proportional Band (PB) factory setting is  $2^{\circ}\text{C}$ , this results in a differential of  $1^{\circ}\text{C}$  for heating and  $1^{\circ}\text{C}$  for cooling.

To alter the PB, adjust the "PB" potentiometer located on the Controller. When adjusted fully clockwise, the PB is  $10^{\circ}\text{C}$ . When adjusted fully counter-clockwise, the PB is  $1^{\circ}\text{C}$ .

### Dead Zone

The Dead Zone (DZ) is factory set to 25%. This represents 25% of the PB setting. If the PB is  $2^{\circ}\text{C}$ , the DZ will be  $0.5^{\circ}\text{C}$ .

To alter the DZ, adjust the "DZ" potentiometer located on the Controller. When adjusted fully clockwise, the Dead Zone is 60% of the Proportional Band. When adjusted fully counter-clockwise, the DZ is 10% of the PB.

### Time

The Time potentiometer adjusts the cooling and heating output PWM rate to determine the valve balance point.

### PWM Operation

#### Initial Power Up

When the Controller is first powered up, both the heat and cool outputs are driven on for a period of 90 seconds. This is to rapidly pre-heat the Thermic Actuators.

#### Normal Operation - Power Connected

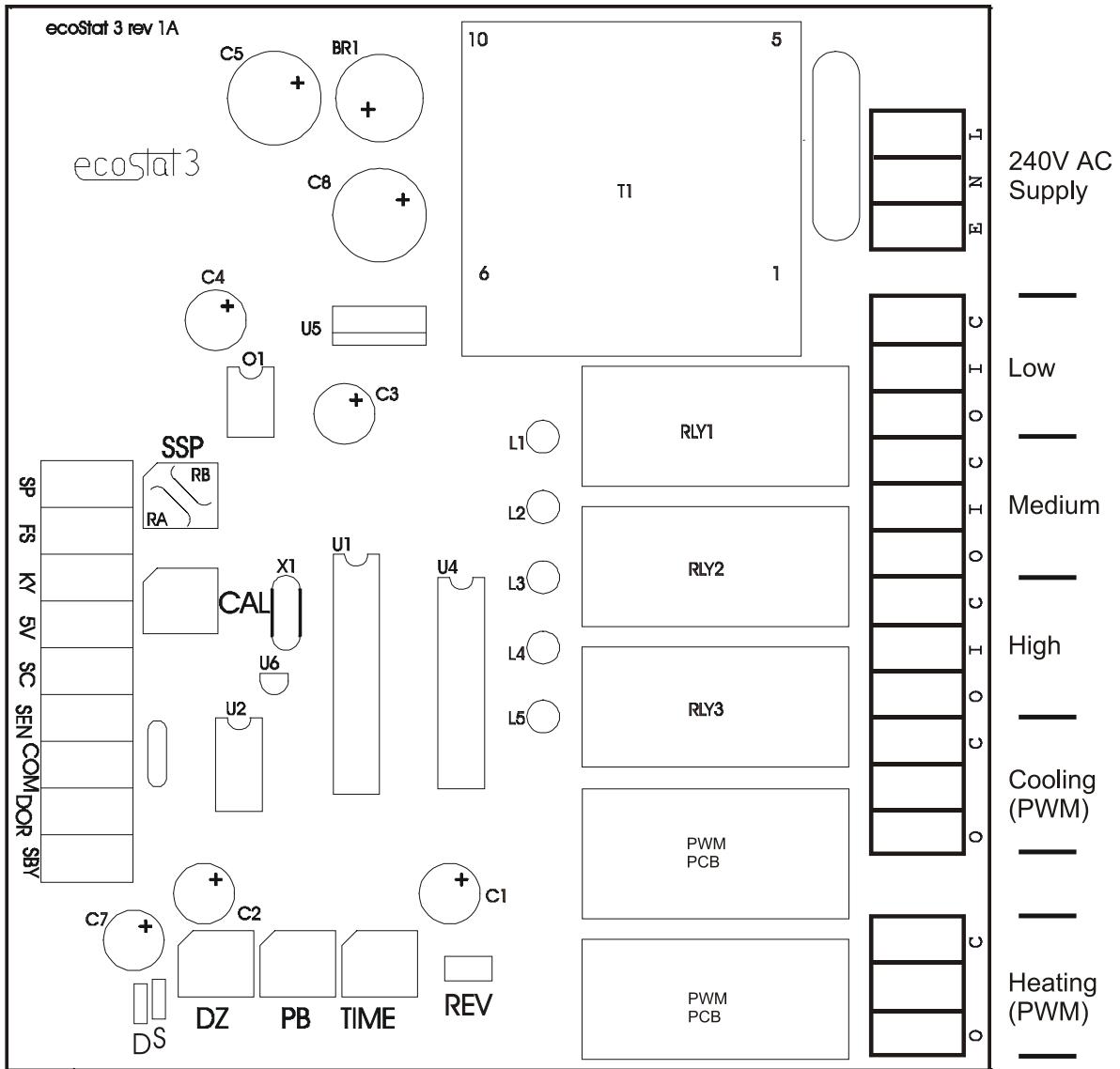
When the Controller is turned off, both the heat and cool outputs are pulsed on periodically. This keeps the Thermic Actuators in a "ready state". The same action occurs if the Controller is turned on and the temperature is at or near the setpoint (within dead zone).

If the Controller is turned on and the temperature is higher than the setpoint, only the cooling output will pulse on.

Similarly, if the controller is turned on and the temperature is lower than the setpoint, only the heating output will pulse on.

#### Pulse Time Adjustment

The off time is fixed at 8.5 seconds, however the actual on time is proportional to the distance from setpoint and the time pot setting. The total range of "on" time is from 0.2 to 3.2 seconds.



DZ = Dead Zone - Range 10% to 60%.

PB = Proportional Band - Range 1°C to 10°C.

TIME = PWM Rate.

SSP = Amount of Adjustment at the Control Station setpoint - Range 1°C to 12°C.

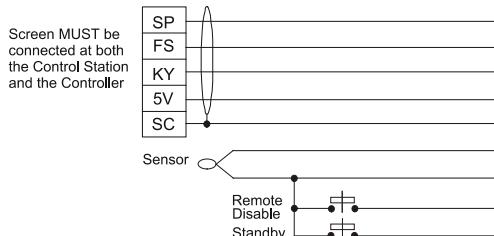
CAL = Use to calibrate the midpoint of the Control Station setpoint adjustment.

D = Remote Disable Link.

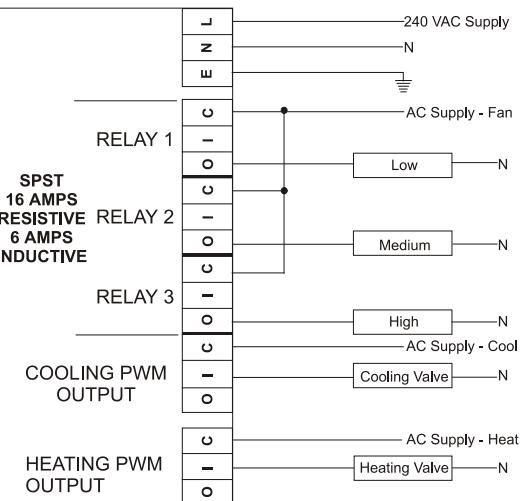
S = Standby Link.

### STANDARD CONNECTION

#### CONTROL STATION



#### CONTROLLER



N.B. Link "REV" must be open.  
 Link SBY to COM to disable Standby function.  
 Link COM and DOOR disable Remote Disable Function.

\* MAXIMUM CABLE LENGTH BETWEEN THE CONTROL STATION & CONTROLLER IS 15 METRES.

**INNOTECH**<sup>®</sup>

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