

## Product overview

The Axio AX-ET-6 is a six stage electronic thermostat with a two line LCD display to simplify setting up. The unit controls temperature between  $-10^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$  using configurable heating and cooling stages. The set point can be adjusted locally using push buttons or remotely with a  $1-11\text{k}\Omega$  potentiometer. A setback input is provided for use with an external switch. The minimum and maximum temperatures values are stored for display via the menu. The AX-ET-6 is provided in a DIN rail carrier and is available as 24Vac/dc or 230Vac powered versions.

## Features

- Setpoint range  $-10^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$
- Adjustable differential per stage
- LCD display of temperature, setpoint etc
- Setback input
- Adjustable stage on/off delay time
- 24Vac/dc or 230Vac versions
- DIN rail carrier as standard
- High quality rising clamp terminals

## Product specifications

Power Supply	AX-ET-6-24	24Vac 280mA or 24Vdc 110mA $\pm 15\%$
	AX-ET-6-230	230Vac $\pm 15\%$
Inputs	Sensor, 10K3A1 ( See Axio temperature sensor range ) Remote Setpoint, 1-11k $\Omega$ ( For $\pm 4^{\circ}\text{C}$ or $\pm 20^{\circ}\text{C}$ ) Setback, volt free timer input (Close contact to activate setback)	
LCD Display	2 lines by 8 characters	
Temperature Range	$-20^{\circ}\text{C}$ to $+120^{\circ}\text{C}$	
Stage Selection	CCCCCC, CCCCHH, CCCCHH, CCCHHH, CCHHHH, CHHHHH, HHHHHH (C=cooling, H=heating)	
Setpoint	$-10^{\circ}\text{C}$ to $+110^{\circ}\text{C}$	
Offset	0 to $50^{\circ}\text{C}$	
Differential	0 to $12^{\circ}\text{C}$	
Setback Range	0 to $30^{\circ}\text{C}$	
On/Off delay Time	1 to 250 seconds	
Output Contacts	6 SPNO volt free relays, rated at 10A, 250Vac, resistive load	
Terminals	Rising clamp for 0.5-2.5mm <sup>2</sup> cable	
Dimensions & Weight	AX-ET-6-24	103(W) x 82(H) x 48(D) mm / 125 gms
	AX-ET-6-230	160(W) x 82(H) x 55(D) mm / 365 gms
Ambient temperature range	0 to $50^{\circ}\text{C}$	
Country of origin	United Kingdom	

## Order codes

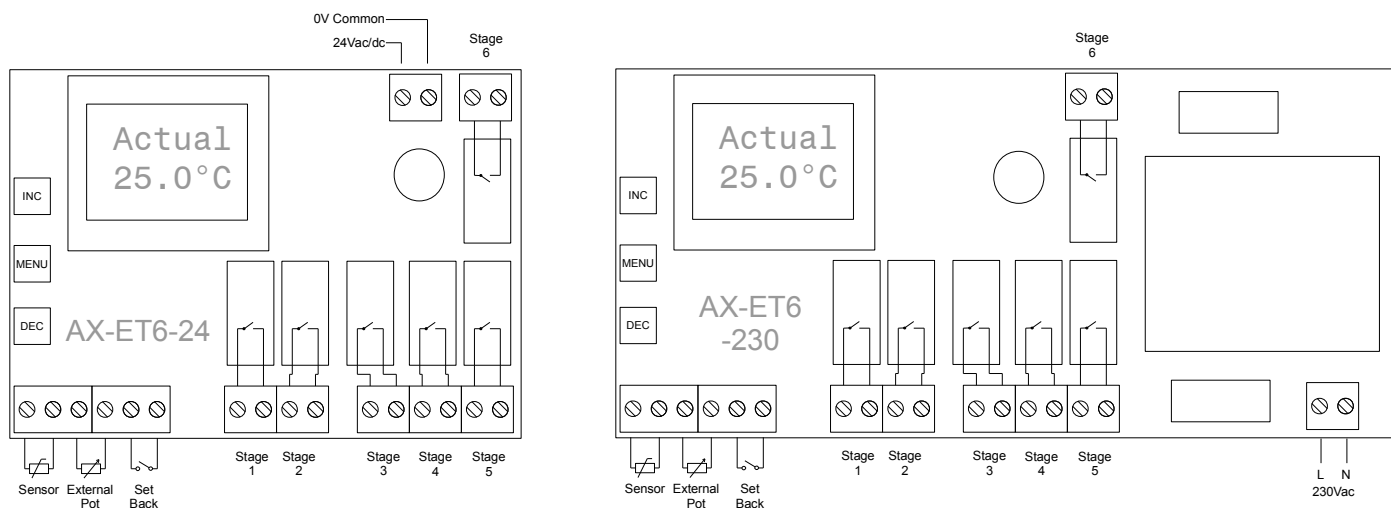
AX-ET-6-24	Six Stage Electronic Thermostat - 24Vac/dc
AX-ET-6-230	Six Stage Electronic Thermostat - 230Vac

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## Installation

The AX-ET-6 should be installed by a suitably qualified technician in conjunction with any guidelines for the equipment it is to be connected to. Field wiring should be installed to satisfy the requirements set out by the manufacturer of the equipment that the module is being connected to.

## Description and Connections



### Menu

Repeatedly press **MENU** to scroll through the Actual, Min-max, Setpoint, On Delay and Off Delay displays.

### Setpoint

The setpoint can be adjusted between  $-10^{\circ}\text{C}$  and  $110^{\circ}\text{C}$  using the **INC** and **DEC** switches. When connected a remote pot can be used to adjust the setpoint value by either  $\pm 4^{\circ}\text{C}$  or  $\pm 20^{\circ}\text{C}$  from the value set. All the stage offsets are fixed to the setpoint and track changes in the setpoint value. It is possible to provide the same switching actions with different setpoint and offset combinations. The only limitation on the setpoint location is that all cooling offsets are above the setpoint and all heating offsets are below the setpoint.

### Setpoint adjustment

When the Actual temperature display is visible press **INC** or **DEC** to select the Setpoint display then press **INC** or **DEC** to adjust the setpoint.

### Stage offset

The stage offset sets the centre point of the heating or cooling stage. If the stage is set for heating the offset is taken away from the setpoint. If the stage is set for cooling the offset is added to the setpoint.

### Stage differential

This sets the total differential for the stage. The differential is centred on the stage offset, therefore a differential of  $4^{\circ}\text{C}$  will set the stage relay switching points to  $2^{\circ}\text{C}$  above the offset and  $2^{\circ}\text{C}$  below the offset.

### Stage switching

If the stage is set for cooling the relay will switch on when the temperature rises above the upper switching point and will switch off when the temperature falls below the lower switching point. If the stage is set for heating the relay will switch on when the temperature falls below the lower switching point and will switch off when the temperature rises above the upper switching point. An example of these values is given on the next page.

### Setback

To activate the setback close the contact across the setback terminals, the display will show Actual <sup>S</sup>b. When Setback is active it will increase all the offsets by the set amount. This will reduce the heating stage switching points and increase the cooling stage switching points.

### Remote Setpoint (External potentiometer)

Select the required range,  $\pm 4^{\circ}\text{C}$ ,  $\pm 20^{\circ}\text{C}$  using the set-up mode and connect a 1-11k $\Omega$  potentiometer across the External Pot terminals. The setpoint display will show SP with EP and will show the adjusted setpoint value.

### Minimum and maximum temperature

The minimum and maximum sensor temperature values are stored by the AX-ET-6 until power is removed. When the Actual temperature display is visible press **MENU** to display the Min Max Output display. Press **INC** to display the minimum value. Press **INC** to toggle between the minimum and maximum values. Hold **INC** down for 2 seconds to reset the minimum and maximum values.

### Setup mode

When the Actual temperature display is visible press and hold **MENU** for 10 seconds to gain access to the set-up mode. Subsequent presses of **MENU** scroll through the options shown in the table.

Selection	Option/Range	Description
Stage select	CCCCCC to HHHHHH	Set stage action
S1 Offset	0 to 50°C	Stage 1 offset
S1 Differential	0 to 12°C	Stage 1 differential
S2 Offset	0 to 50°C	Stage 2 offset
S2 Differential	0 to 12°C	Stage 2 differential
S3 Offset	0 to 50°C	Stage 3 offset
S3 Differential	0 to 12°C	Stage 3 differential
S4 Offset	0 to 50°C	Stage 4 offset
S4 Differential	0 to 12°C	Stage 4 differential
S5 Offset	0 to 50°C	Stage 5 offset
S5 Differential	0 to 12°C	Stage 5 differential
S6 Offset	0 to 50°C	Stage 6 offset
S6 Differential	0 to 12°C	Stage 6 differential
Setback	0 to 30°C	Setback value
External Pot	None, ±4°C, 20°C	Ext pot range

When the display shows the item to be modified press **INC** or **DEC** to adjust the parameter. Refer to Setup diagram below for the complete menu sequence.

### Exit setup and saving

The unit will exit set-up mode when no button presses have been detected for 5 seconds, the display will revert to the actual temperature reading and saves the new settings.

### Output display

The current state of the relays can be checked using the Output display. When the Actual temperature display is visible press **MENU** to display the Min Max Output display. Press **DEC** to display the current output state. An H or C is shown when the stage relay is on whilst a dash is shown when the stage relay is off.

### Minimum On and Off times

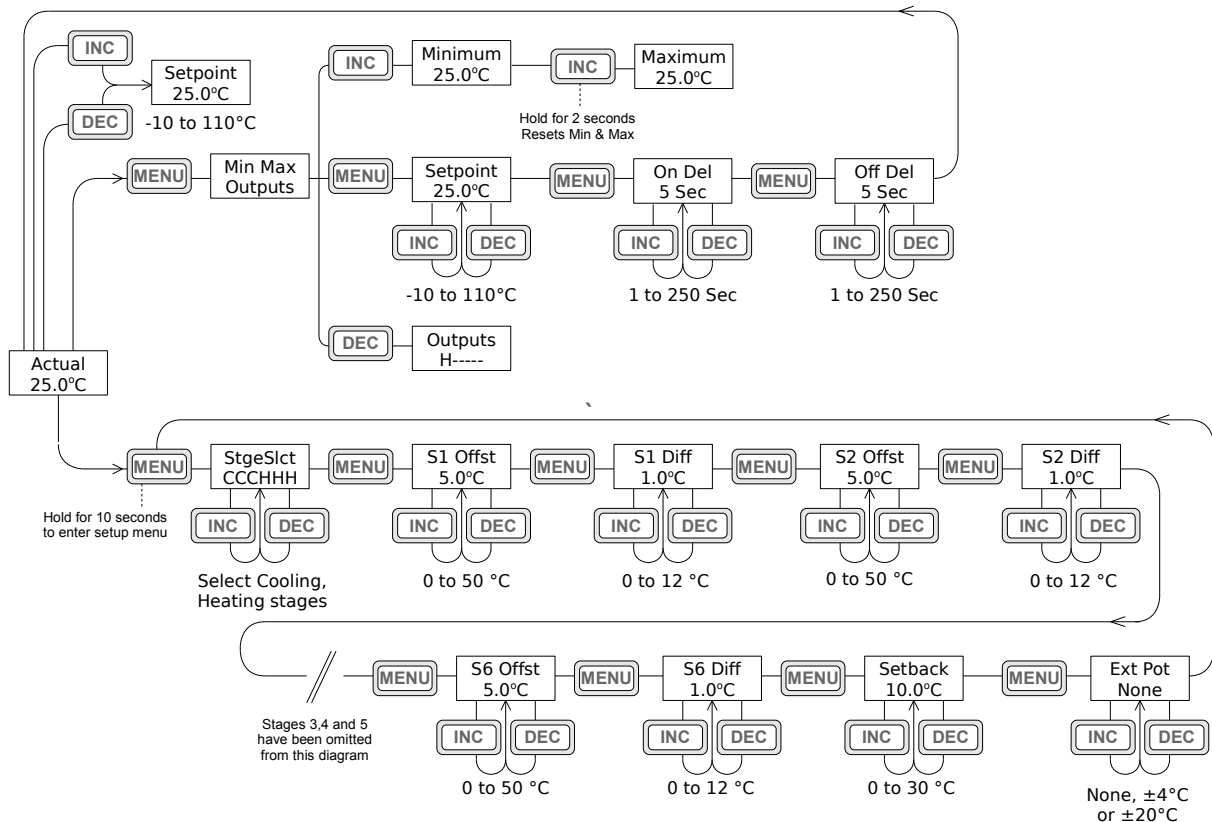
This function prevents over-cycling of the output. For example setting the minimum on time to 5 seconds will ensure any output stage is in on for a minimum of 5 seconds. The Off time works in a similar way. When the Actual temperature display is visible press **MENU** three times to display the On value. Press **INC** or **DEC** to adjust the parameter. Press **MENU** once more to display the Off value. Press **INC** or **DEC** to adjust the parameter.

### Back-light

The back-light on the LCD display switches on when any of the buttons are pressed and remains on for 10 seconds after the last button has been pressed. The back-light will switch off if it has been continuously on for 2 minutes.

### Fault indication

If the sensor or external potentiometer, when selected, are open or short circuit the display will show a fault message and the back-light will flash.



## Setup strategy

The example below shows the relationship between the setpoint, offset and differentials. For this example the setpoint will be set to 20°C and the stage switching requirements are as shown in the table below.

Stage	Action	Switch On	Switch Off	Mid point
1	Cooling	> 28°C	< 24°C	26°C
2	Cooling	> 24°C	< 22°C	23°C
3	Heating	< 18°C	> 20°C	19°C
4	Heating	< 16°C	> 18°C	17°C
5	Heating	< 14°C	> 16°C	15°C
6	Heating	< 10°C	> 14°C	12°C

Once the setpoint and switching requirements have been defined the stage offsets and stage differentials can be calculated.

For Stage 1 Cooling

$$\begin{aligned} \text{Stage Offset} &= \text{Stage mid point} - \text{Setpoint} \\ &= 26 - 20 \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{Stage Differential} &= \text{Switch on} - \text{Switch off} \\ &= 28 - 24 \\ &= 4 \end{aligned}$$

The calculated values, listed below, should be entered using the set-up menu.

Setup option	Required value
Stage select	CCHHHH
S1 Offset	6°C
S1 Differential	4°C
S2 Offset	3°C
S2 Differential	2°C
S3 Offset	1°C
S3 Differential	2°C
S4 Offset	3°C
S4 Differential	2°C
S5 Offset	5°C
S5 Differential	2°C
S6 Offset	8°C
S6 Differential	4°C
Setback	Off
External Pot	None

The diagram below illustrates the relationship between the values set for the example.

