

Product Overview

The Axio AX-ET-4 is a four stage electronic thermostat with a two line LCD display to simplify setting up. The unit controls temperature between -10°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-4 is provided in a DIN rail carrier and is available as 24Vac/dc or 230Vac powered versions.

Features

- Setpoint range -10°C to $+110^{\circ}\text{C}$
- Adjustable differential per stage
- Setback input
- LCD display of temperature, setpoint etc
- 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-4-24	24Vac at 275mA or 24Vdc at 105mA $\pm 15\%$
	AX-ET-4-230	230Vac $\pm 15\%$
Inputs	Sensor, 10K3A1 (See Axio temperature sensor range) Remote Setpoint, $1-11\text{k}\Omega$ ($\pm 4^{\circ}\text{C}$ 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°C to $+120^{\circ}\text{C}$	
Stage Selection	CCCC, CCCH, CCHH, CHHH, HHHH (C = Cooling, H = Heating)	
Setpoint	-10°C to $+110^{\circ}\text{C}$ in 0.2°C increments	
Offset	0 to 50°C	
Differential	0 to 12°C	
Setback Range	0 to 30°C	
On/Off Delay Time	1 to 250 seconds	
Output Contacts	4 SPNO volt free relays, rated at 10A, 250Vac, resistive load	
Terminals	Rising clamp for $0.2-2.5\text{mm}^2$ cable	
Dimensions & Weight	AX-ET-4-24	90(W) x 82(H) x 48(D)mm / 125gms
	AX-ET-4-230	146(W) x 82(H) x 55(D)mm / 225gms
Ambient Temperature Range	0 to 50°C	
Country of Origin	United Kingdom	

Order Codes

AX-ET-4-24	Four Stage Electronic Thermostat - 24Vac/dc
AX-ET-4-230	Four Stage Electronic Thermostat - 230Vac

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Annicom Ltd

Unit 21, Highview, Bordon, Hampshire. GU35 0AX

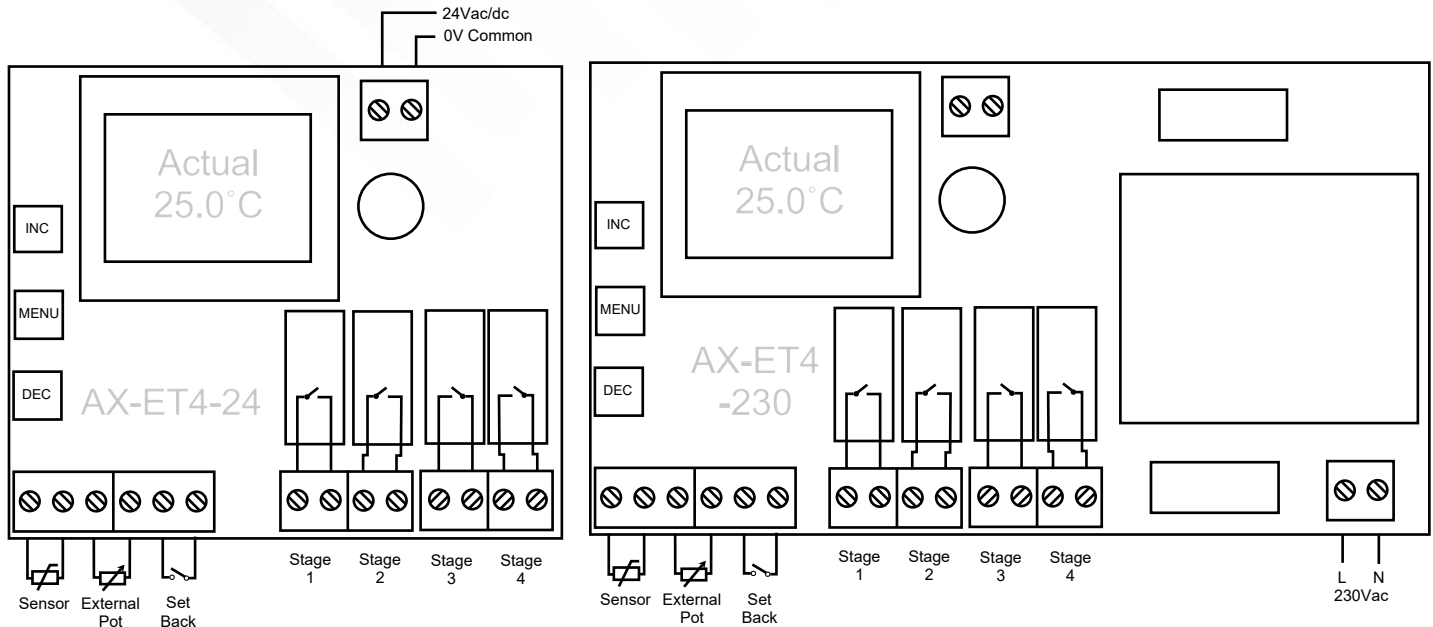
Tel: +44 (0)1420 487788 Fax: +44 (0)1420 487799

Email: sales@annicom.com Website: www.annicom.com

Installation

The AX-ET-4 should be installed by suitably qualified technician in conjunction with any guidelines for the equipment it is to be connected to and any local regulations. 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°C and 110°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 cooling offsets are above the setpoint and 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.

Setback

This sets the total differential for the stage. The differential is centred on the stage offset, therefore a differential of 4°C will set the stage relay switching points to 2°C above the offset and 2°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 Sb. 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 Ω 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-4 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	CCCC to HHHH	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
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 setting.

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 the stage relay is off.

Minimum On and Off times

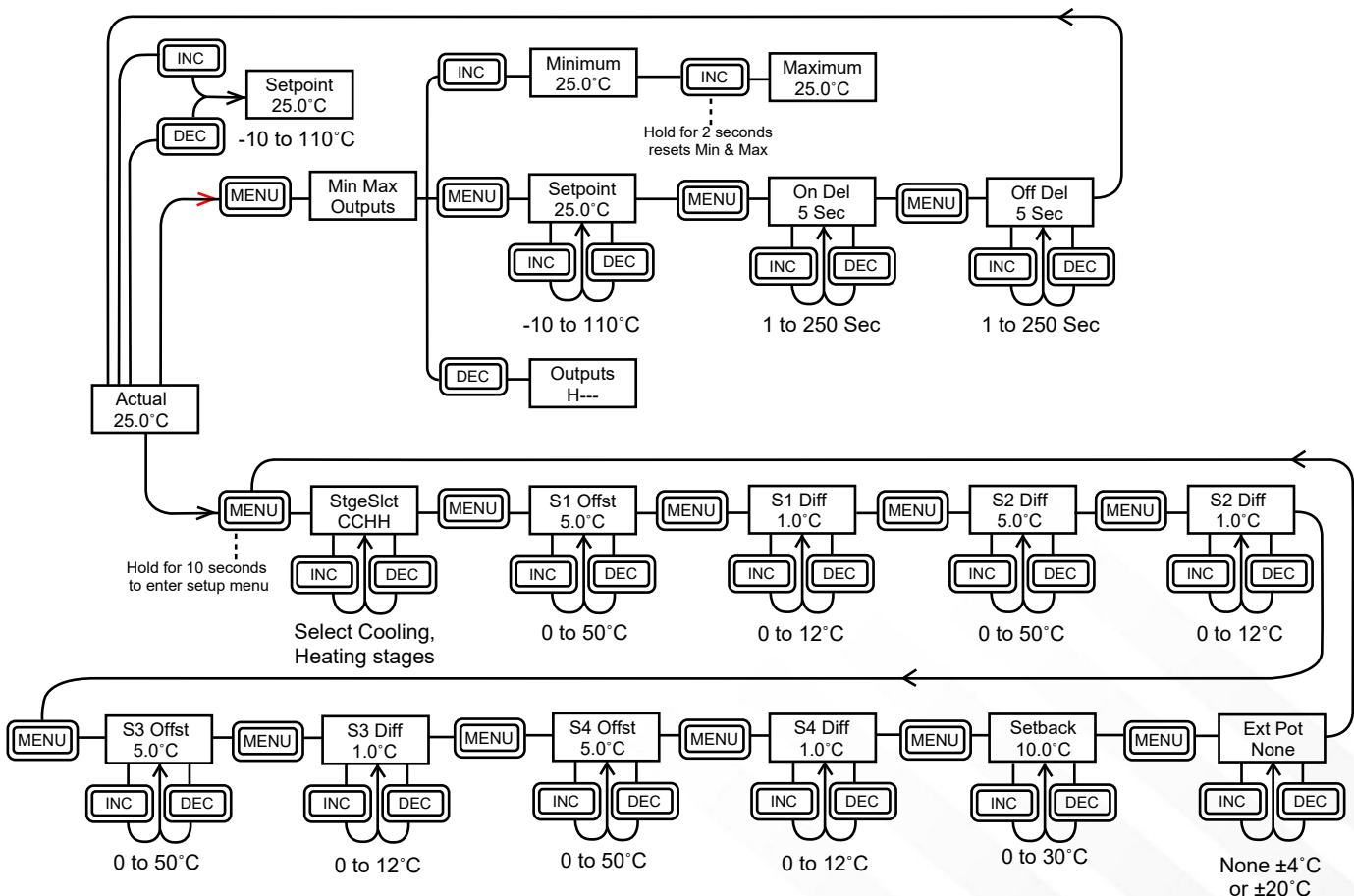
This function prevents over-cycling of the output. For example setting the minimum on time to 5 seconds will ensure any output stage is on for a minimum of 5 seconds. The Off time works in a similar way. When the Actual temperature display is visible press MENU three times to display the On value. Press 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, offsets 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. The calculated stage mid points are also shown.

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	< 15°C	> 17°C	16°C
4	Heating	< 11°C	> 15°C	13°C

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

For Stage 1 Cooling

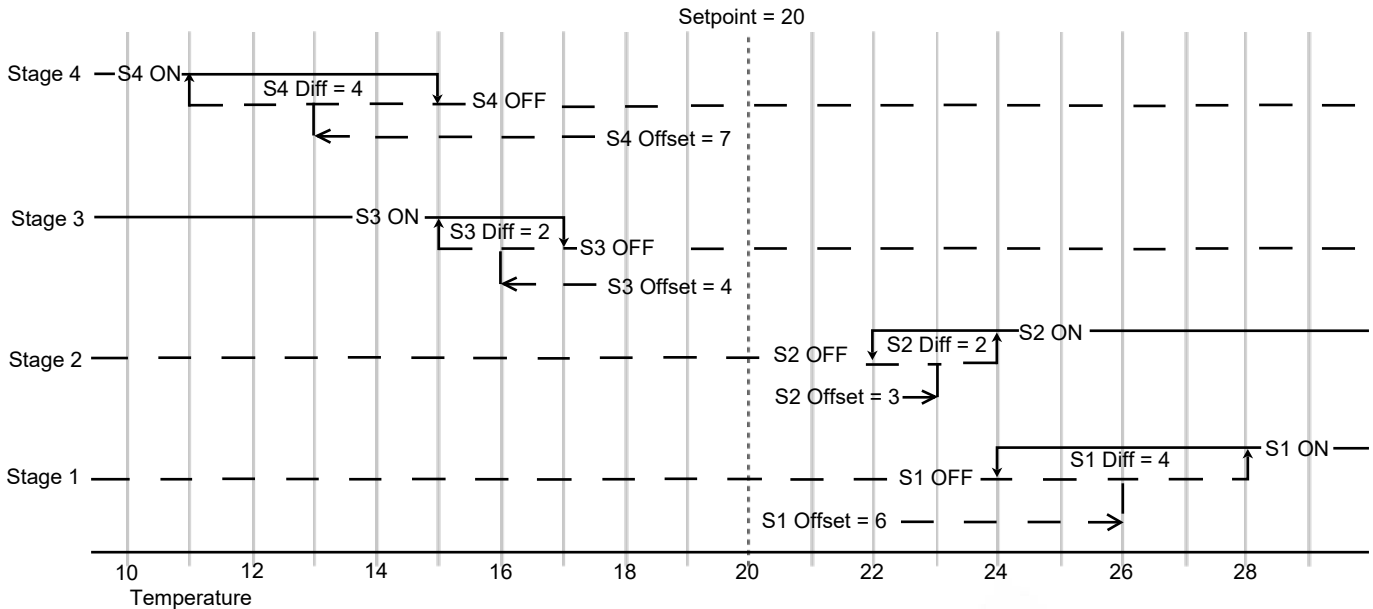
$$\begin{aligned} \text{Stage Offset} &= \text{Stage mid point} - \text{Setpoint} \\ &= 26 - 20 \\ &= 6 \end{aligned}$$

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

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

Setup option	Required value
Stage select	CCHH
S1 Offset	6°C
S1 Differential	4°C
S2 Offset	4°C
S2 Differential	2°C
S3 Offset	4°C
S3 Differential	2°C
S4 Offset	7°C
S4 Differential	4°C
Setback	Off
External Pot	None

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



Datasheet Contents

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