Programming

To configure the system, the following parameters need to be established:

Set point (Nominal temperature)

XP Band (Control range)

Fan Max (Maximum allowable fan speed)

Fan Min (Minimum allowable fan speed)

Alarm Relay Offset* (Overheat alarm trigger point) *optional

Example

The ideal temperature for a controlled environment is 24°C. It is acceptable for the temperature to reach a maximum of 28° C and an overheat alarm is required if the temperature reaches 30° C. The fan is to switch off when not required for cooling and not exceed 85% of maximum speed.

Set point = 24° C

XP Band = (28 – 24) x 2 = 8 i.e. XP Band = 20° to 28°

Fan Max = 85%

Fan Min = 0%

Alarm Relay Offset = (30 – 24) = +6

With these settings, the fan will come on at 20° C and ramp up to a maximum speed of 85% at 28° C.

At 28° C the MAX alarm and LED will operate.

At 30° C the RELAY alarm and LED will operate.

If the temperature drops below 20° C the fan will switch off.

Auxiliary Devices

A second 0-10V output allows for the use of a second fan, actuated shutters or other controllable device. The auxiliary output set point is programmed as an offset from the primary fan set point. The XP band, maximum and minimum output settings can be programmed independently and the auxiliary control output can be monitored separately. Alarm functions operate only on the primary settings.

Programming is exactly the same as for the primary output except for using the AUX key instead of the FAN key.

Heating Mode

If the controller is used for a heating application, the principle of operation is reversed. Programming is the same as for cooling mode except that the maximum fan speed is programmed using Fan Min and the minimum fan speed is programmed using Fan Max.

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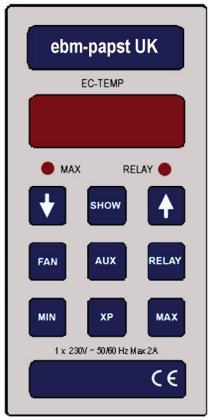
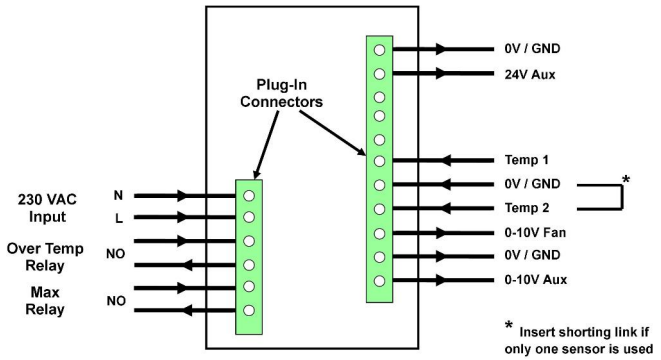
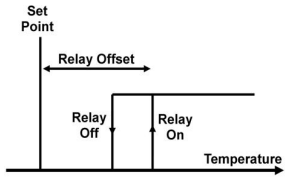


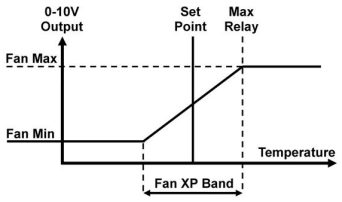
Connection Diagram



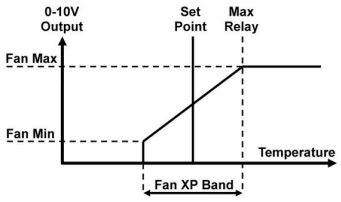
Over-Temp Relay



Fan Output



Cut-Off Mode



IMPORTANT! Installation must be carried out by suitably qualified personnel in accordance with all statutory and local regulations. Ensure that electrical power is disconnected before commencing work.

Connect the controller in accordance with the connection diagram and refit front panel of case before applying power.

Application For use with ebm-papst EC products with 0-10V control input for temperature control of HVAC systems.

Installation The unit must be mounted on a secure, vibration free surface away from direct heat. Maximum permissible ambient temperature is 45° C

Temperature Sensor A 2 metre long KTY-1 sensor is included with the controller, the cable can be extended as required. A second sensor can also be connected, in which case the controller will act on the higher of the two sensor inputs. Additional sensors are available from your ebm-papst distributor.

NOTE: If only one temperature sensor is used, a shorting link has to be fitted to the second sensor input (not supplied).

CAUTION:

On power-up the fan will start to rotate and then stop as an internal test is carried out. If the ambient temperature is within the control range the fan will then restart and run at the speed demanded by the controller.

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Selection	Description	Range
▲ + Power On	De-selects Minimum Speed Cut-Off mode. Fan will not run below minimum speed setting (default).	-
▼ + Power On	Selects Minimum Speed Cut-Off mode. Fan shuts off below minimum demand.	-
▲ ▼	Increases or decreases selected parameter. Hold down for rapid adjustment.	-
SHOW	Check or adjust Setpoint.	0-50ºC in 0.1ºC increments.
FAN XP	Check or adjust fan XP band.	1-10ºC in 0.1ºC increments.
FAN MIN	Check or adjust fan minimum speed.*	0-100% in 1% increments.
FAN MAX	Check or adjust fan maximum speed.*	0-100% in 1% increments.
FAN SHOW	Check current fan speed setting.	0 to 100%.
AUX XP	Check or adjust auxiliary XP band.	1-10ºC in 0.1ºC increments.
AUX MIN	Check or adjust auxiliary minimum setting.	0-40% in 1% increments.
AUX MAX	Check or adjust auxiliary maximum setting.	60-100% in 1% increments.
AUX SHOW	Check auxiliary output.	0 to 100%.
AUX	Check or adjust offset of auxiliary Setpoint from main Setpoint.	-9.9 to +9.9ºC in 0.1ºC increments.
RELAY	Check or adjust offset of alarm relay Setpoint from main Setpoint.	-30 to +30ºC in 0.1ºC increments.
MIN	Display minimum recorded temperature since last power-off.	0-50ºC in 0.1ºC increments.
MAX	Display maximum recorded temperature since last power-off.	0-50ºC in 0.1ºC increments
MIN MAX	Reset minimum and maximum recorded temperatures to actual temperature.	-

* Note that setting the maximum speed lower than the minimum speed reverses the control profile and puts the controller into heating mode (fan speed decreases with rise in temperature)

Cooling Mode

Switching On On power-up the controller displays the software version followed by a count of the number of times power has been applied. The display then reverts to its normal mode, showing the temperature measured at the sensor.

Set Point This is the nominal system temperature. The controller will regulate the fan speed to maintain the actual temperature within the programmed range, either side of the set point. Check with the SHOW key and adjust with the arrow keys.

XP Band System temperature is controlled within the XP band range. Check the setting with the XP key and adjust with the arrow keys. For a given set point, the larger the XP band the more gradual the speed increase will be and the lower the temperature at which the fan is first switched on. The set point is always at the mid point of the XP band.

Minimum Speed Setting If continuous low speed operation is required, minimum speed is set as a percentage of full speed. by pressing the FAN and MIN keys together and adjusting with the arrow keys. **NOTE:** EC motors will switch off at inputs of below approximately 10%. A minimum setting of at least 15% is recommended to ensure continuous operation.

Minimum Speed Cut-Off Mode The fan will start at the minimum programmed speed when the temperature enters the control range and stop when the temperature falls below the control range. An indicator lights up in the bottom right hand corner of the display when in this mode.

Maximum Speed Setting The maximum fan speed can be restricted to a percentage of full speed. Check by pressing the FAN and MAX keys together and adjust with the arrow keys.

Current Speed Setting The controller output to the fan can be displayed as a percentage of maximum speed by pressing the FAN and SHOW keys together. For example, if the display reads 50 then the fan is being controlled at 50% of full speed

Alarm Relay The over-temp alarm can be set to operate at the nominal temperature +/- 10° C. When activated, the normally open Relay 1 closes and the RELAY LED illuminates on the controller. The alarm is not latched.

Max Relay A second relay operates if the controller output to the fan reaches its maximum limit. When activated, the normally open Relay 2 closes and the MAX LED illuminates on the controller. The alarm is not latched.

Min/Max Temperature The minimum and maximum sensed temperatures are recorded for the current period of operation and can be checked by pressing the MIN or MAX keys. To reset, press both keys simultaneously or disconnect power from the controller.

All programmable settings are saved when power is disconnected.

Note: The cooling capacity of a system using ambient air is limited by the volume of air passing through the system and the ambient air temperature. An approximate calculation of the temperature rise for a given airflow and heat load can be made using the following equation:

$$\Delta t = \frac{3100 \times P}{V}$$

Where: Δt = temperature rise in K

P = Heatload in kW

V = Airflow in m^3/h

Example:

Maximum airflow = 4000 m^3/h Heatload = 6.4 kW Temperature rise = $\frac{3100 \times 6.4}{4000} = 5$ K