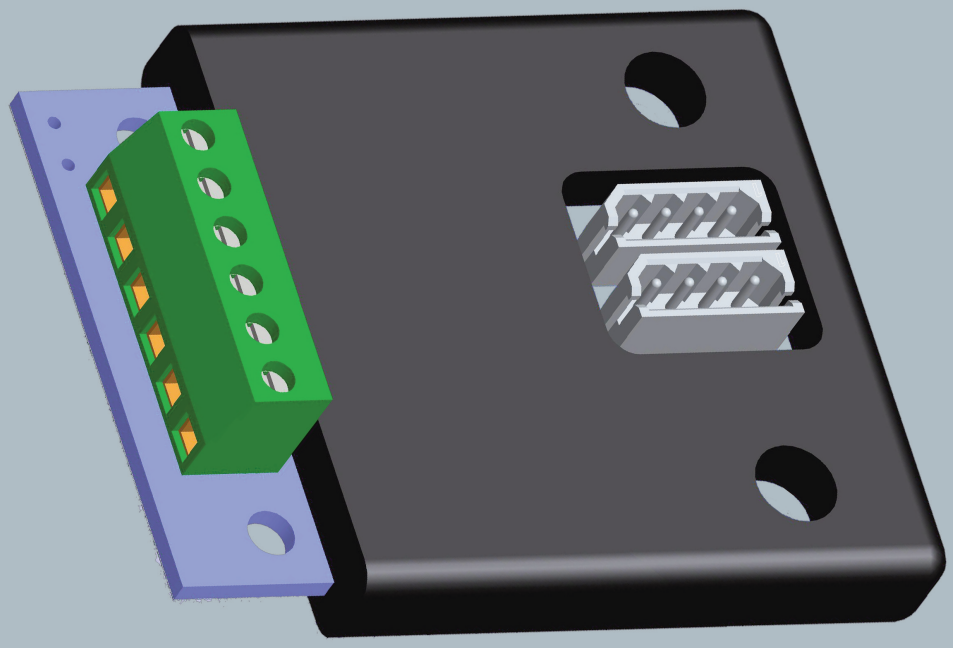
EC Fan Controller

Version 02/2009



The engineer's choice

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1. Introduction

The ebm-papst UK Ltd EC Fan Controller has been designed to give end users a low cost, simple and user-friendly controller for use with the large range of EC fans now available.

The EC Fan Controller is designed to operate without the use of an external power supply; using an ebm-papst patented design the controller draws its power from the 0-10V control lines.

Temperature is measured via an NTC thermistor with a 25ºC of 100K. This is supplied in the form of a 2m long lead so that the controller and sensor can be remotely placed.

The unit is shipped with one or two pre-set temperature profiles that cover 20ºC to 40ºC or 35ºC to 55ºC (details in section 2.)

The EC Fan Controller also monitors the Tacho output from the fan and then generates an alarm output if a fan fail is detected.

The EC Fan Controller is fitted with an open drain fail safe alarm output as standard (see section 2). This alarm is activated if a fan fail is detected or if the upper temperature limit is reached. The controller will also generate an alarm if it detects either an open or short circuit on the NTC temperature input. During alarm conditions the fan will be run at full speed.

The control output to the EC fan is also monitored by the controller so that it can accurately check and adjust the voltage to ensure the fan is running at the appropriate speed.

2. Technical specification

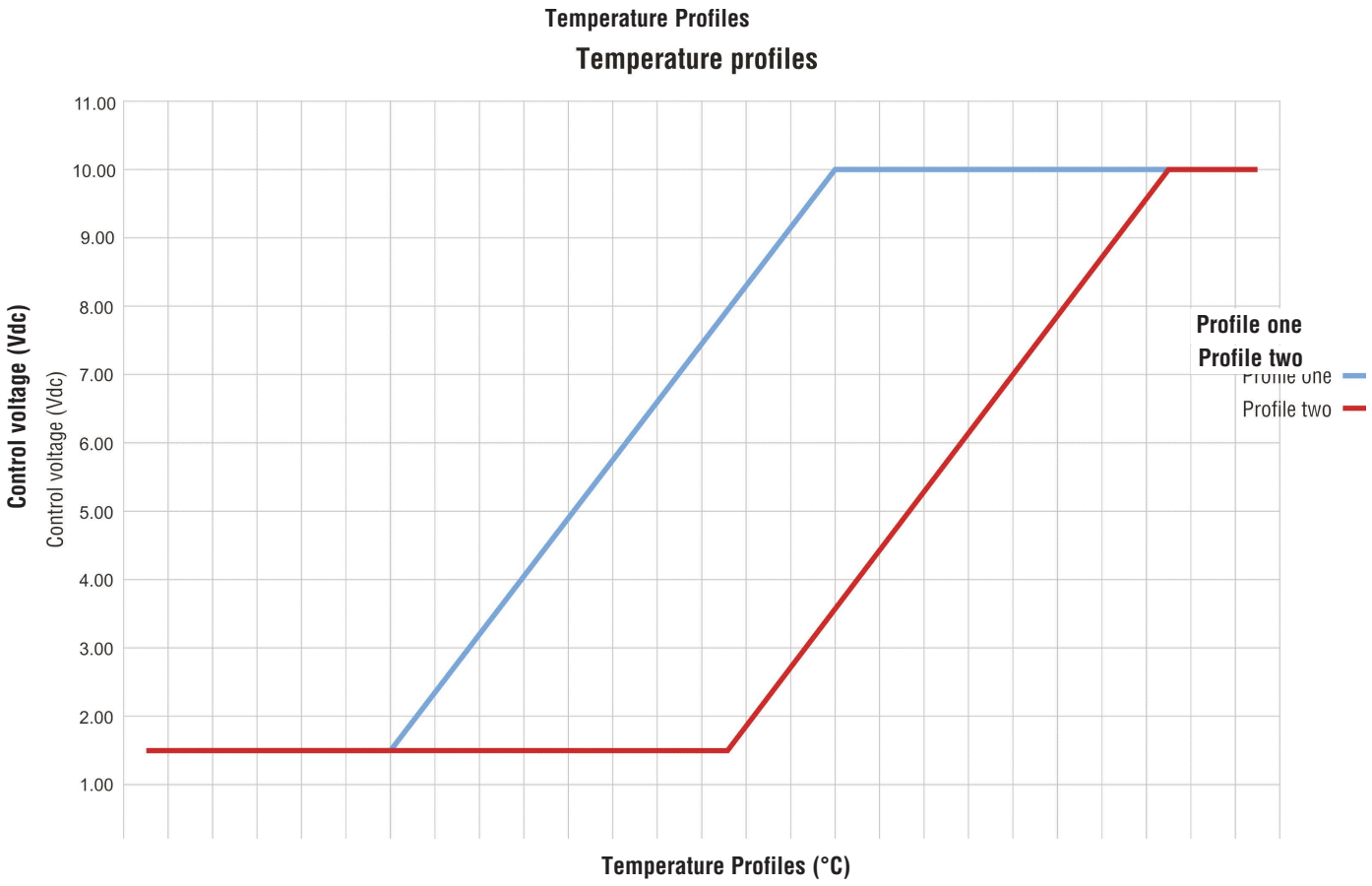
This section details the limits and operating conditions the EC Fan Controller will operate within. It assumes the fan that has been fitted is within operational limits. For details on the fan please refer to the ebm-papst technical datasheet for the device required.

Controller supply:				
	Min.	**Typ.**	**Max.**	**Units**
Supply voltage	9.8	10.2	10.8	Vdc
Supply current	700	800	1000	uA

Output limits:				
	Min.	**Typ.**	**Max.**	**Units**
Control Voltage	0.7	...	10.0	Vdc RMS
Control frequency	...	7.7	...	kHz
Alarm open drain	...	...	100*	mA
Alarm open drain	...	...	50*	Vdc

*Combination of voltage and current must not exceed 150mW

Temperature profiles:				
Profile one (20˚C to 40°C)				
	Min.	**Typ.**	**Max.**	**Units**
Low fault temperature		-16		°C
Low set point	19	20	21	°C
High set point	39	40	41	°C
High fault temperature		65		°C
Control voltage low set point	1.6	1.7	1.8	Vdc
Control voltage high set point	9.9	10.0	10.1	Vdc
Profile two (35˚C to 55°C)				
	Min.	**Typ.**	**Max.**	**Units**
Low fault temperature		-16		°C
Low set point	34	35	36	°C
High set point	54	55	56	°C
High fault temperature		65		°C
Control voltage low set point	1.6	1.7	1.8	Vdc
Control voltage high set point	9.9	10.0	10.1	Vdc



Environmental limits				
	Min.	Typ.	Max.	Units
Operating temperature	-20	...	75	°C
Humidity			90	%RH
Tc *			N/A**	°C

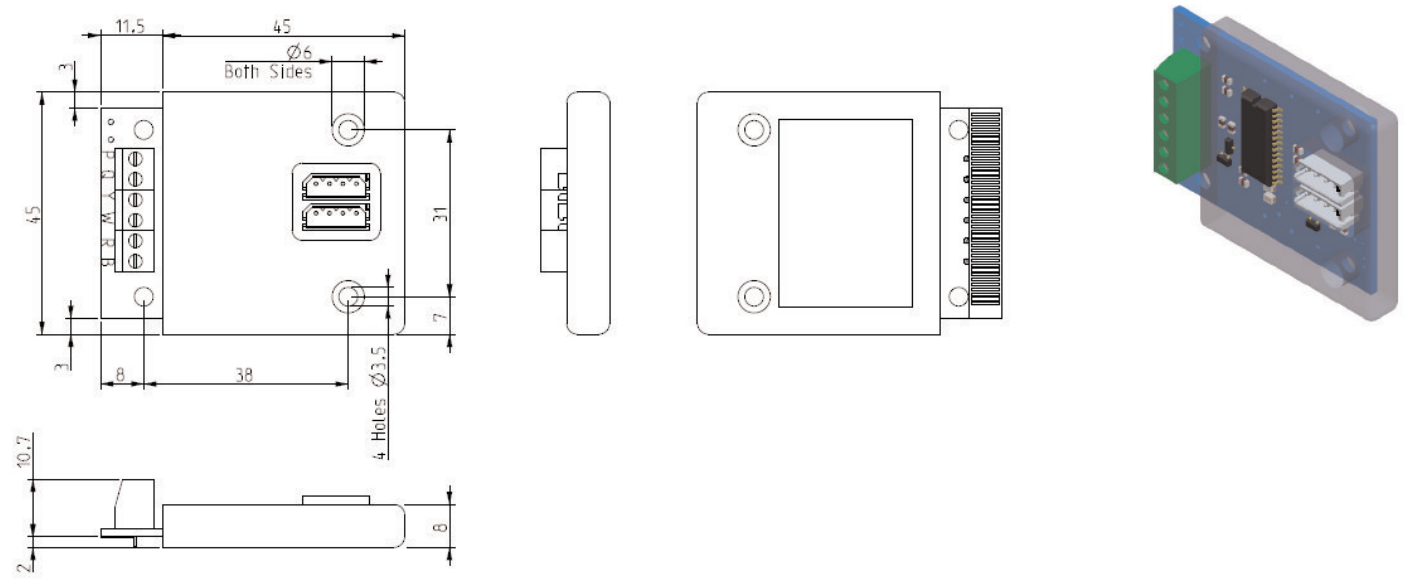
*Max temperature surface of controller will reach
** No heat is generated, Tc will equal environmental temperature

Connectors specifications:

Temperature profiles:	
Screw terminal	
Wire size max	0.75mm^2
Clamp	Nickel plated brass
Screw/torque	M2 steel, 6u zinc colour passivated and tropicalised / 0.3Nm
Max blade size	2.5mm
Replacement alarm connector	
Manufacture	Molex
Type	Micro spox
Part number	50375043

Controller size and fixings:

Controller size and fixings				
	Min.	**Typ.**	**Max.**	**Units**
Length		56.5		mm
Height		12.7		mm
Width		45		mm

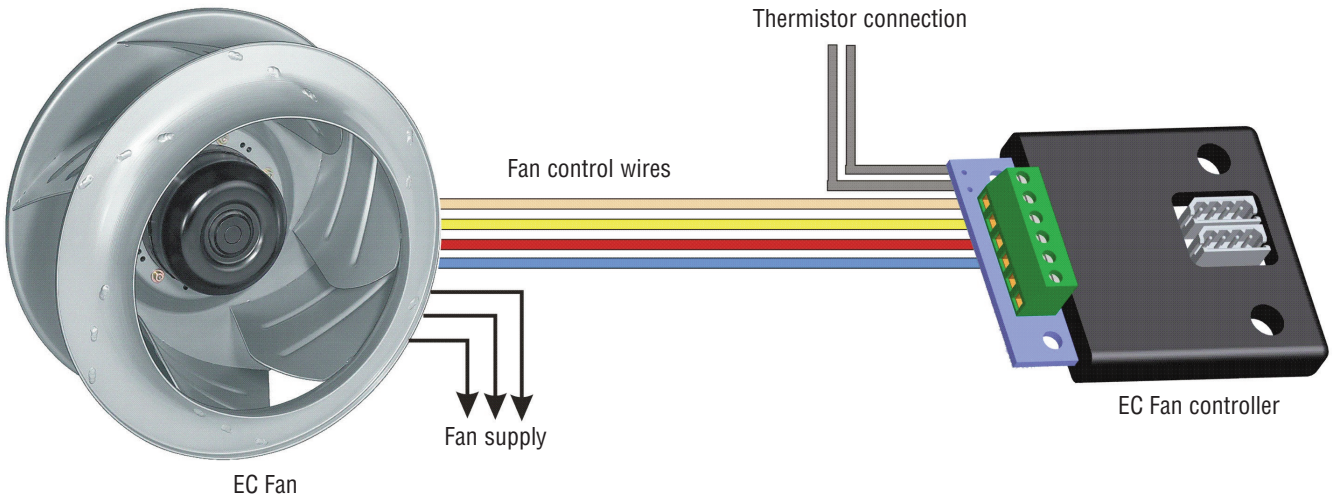


P	Input - Voltage or Temperature
Q	Input - Ground
Y	Control - PWM
W	Tacho
R	Supply - +10V DC
B	Supply - 0V
ID	Function
	Connection Table

Tolerance Linear ±0.2 Holes ±0.1 Angular ±0.5°	DO NOT SCALE IF IN DOUBT PLEASE ASK	Dims in mm Scale : 1.500			
	Original A3 © 2007 3rd Angle Projection	Drwn by : PJF Chkd by : PJC Appd by : GL			
			1	First Issue	30-Mar-09
			Issue	BCR	Date
Material : --- --- Finish : ----	ebm-papst UK Ltd. ebmpapst CHELMSFORD BUSINESS PARK CHELMSFORD ESSEX CM2 5EZ				
Outline Drawing - CEC10xxxxMC-xxx		210-DRW 10546			

3. Connection diagrams

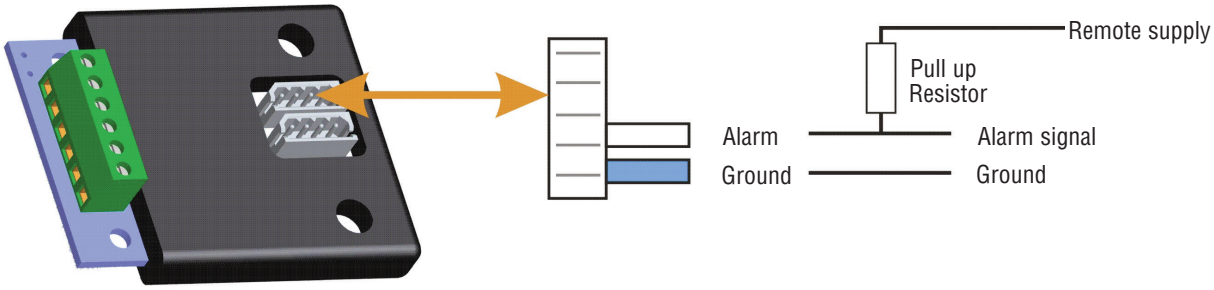
Connection to Fan/Thermistor



Controller size and fixings:

Connection details		
Wire colour	**Function**	**EC Fan controller connection**
White	Tacho Feedback	W
Yellow	Control (0-10V)	Y
Red	+10volts	R
Blue	Ground	B

Connection to alarm output



The alarm output cable should only be connected to the upper of the two connectors shown above. The other is reserved for future expansion.

As shown, the blue wire should be connected to the ground reference of the monitoring device and the white wire to the alarm input on the monitoring device. Note that the alarm output supplies no voltage, it switches to ground instead. Therefore you should connect a pull up resistor from the alarm signal wire to a supply that is local to the monitoring device.

4. Configuration

The EC fan controller is supplied with one of two pre-set temperature profiles and a fixed alarm point. These are not configurable, please contact ebm-papst UK Ltd if you require assistance with selecting a different EC fan controller with a different profile.

5. Compatible ebm-papst fan list

The EC fan controller is compatible with all ebm-papst EC fans.

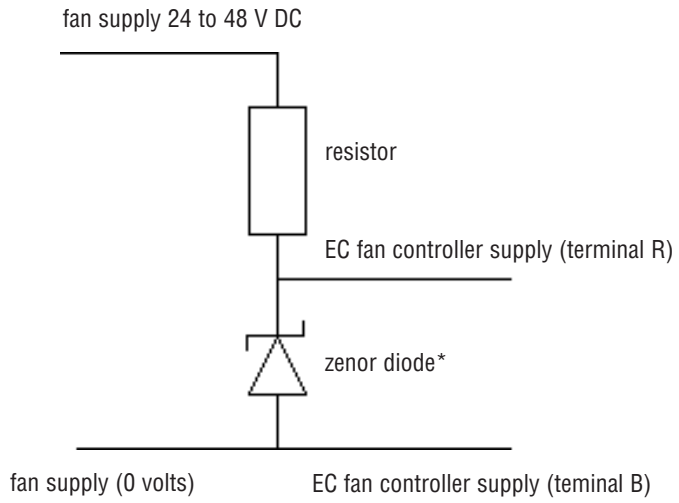
6. Special application

6.1 ebm-papst EC fans without an integrated 10 volt DC power supply

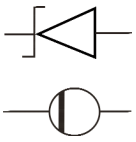
DC supply versions of EC fans, designs without integrated AC to DC converter and integrated 10 volt DC power supply, can use the EC fan controller with a few additional components as shown below.

For 24 and 48 volt DC fans add a resisitor and zenor in the DC supply cuiruit to the fan and fan controller as shown in the diagram below. The recommended parts are;

- Resistor: 2K2 1Watt Multicomp MCF series or Tyco Electronics CFR series.
- Zenor: 13volt 3Watt Vishay BZT03-C13



* note that the zenor diode has polarity. The device is marked with a white band at one end and denotes the positive (cathod) end. See diagram to the right.



7. notes

ebm-papst UK Ltd

Chelmsford Business Park
Chelmsford
Essex CM2 5EZ
Phone +44 (0) 1245 468555
Fax +44 (0) 1245 466336
sales@uk.ebmpapst.com

www.ebmpapst.co.uk

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