

<b>Part No</b>	CN1082		
<b>Description</b>	Dual EC Fan Controller		
<b>Issue</b>	<b>Date</b>	<b>Bug no</b>	<b>Comments</b>
1	10 July 2012	1205	Signed CE front sheet & instructions clarified
2	28 Jan 2013	1205	Instructions clarified, identify Live & SELV circuits

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# Operating and Maintenance Instructions

## Introduction

Commercial Dual Fan Controller, mains powered with enclosure, controls two fans Stop/Run and Low/High speed. Speeds preset by on-board trimmers, selected by 230VAC and volt-free inputs. Optional alternate fan run with selectable duty (changeover) period, or simultaneous (Load Share) and Single Fan operation. With LED indicators and alarm output. Configurable options set by on-board DIP switches.

## Specification

		CN1082
Supply Voltage	V AC	207 – 253 VAC
AC line Frequency	Hz	47 – 63 Hz
Supply Current	A	0.05 Amps, plus Fan load if wired via PCB 13A max.
Alarm Relay Contacts		100mA max, 60VDC max
Operating Environment		-30 to 60°C, IP66 Enclosure

## Connection Details (see “Terminal Block Use” below)

### Mains Connector J1

Pin	Function
SL1	1 Switched Live 1, Low/High fan speed Select input
SL2	2 Switched Live 2, Stop/Run control input (shipped with link to 230VAC Live to Run)
L	3 230VAC, Live (for Stop/Run control link)
L	4 230VAC, Live (Supply to Fan 1)
L	5 <b>230VAC, Live (Input)</b>
L	6 230VAC, Live (Supply to Fan 2)
N	7 230VAC, Neutral (spare)
N	8 230VAC, Neutral (Supply to Fan 1)
N	9 <b>230VAC, Neutral (Input)</b>
N	10 230VAC, Neutral (Supply to Fan 2)
E	11 Earth (Supply to Fan 1)
E	12 <b>Earth (Input)</b>
E	13 Earth (Supply to Fan 2)
E	14 Earth (spare)

### Control Connector J2

Pin	Function
1	Alarm Relay, Contact A (Contacts Closed = No Alarm)
2	Alarm Relay, Contact B
3	Fan 1 Speed Control PWM Output
4	Fan 1 Tachometer Open Collector / Relay Input
5	Fan 1 GND / 0V
6	Fan 2 Speed Control PWM Output
7	Fan 2 Tachometer Open Collector / Relay Input
8	Fan 2 GND / 0V
9	BMS Low/High fan speed Select Input, Volt Free Contacts
10	0V for BMS input
11	Stop/Run control input, Volt Free Contacts (shipped with link to 0V to Run)
12	0V for Stop/Run input
13	Remote Low/High fan speed Select Input, Volt Free Contacts
14	0V for Remote Low/High input

Note: all “0V” terminals on J2 are commoned.

## Fan Compatibility

Fan Speed control outputs compatible with EC 0-10V or Open Collector PWM speed controlled fans, 2kHz PWM, maximum of 12 EC Fans per 0-10V output.

Tachometer / Relay input compatible with Open Collector tachometer or Relay Alarm fans.

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## Mechanical Outline

Enclosure	180(L) x 94(W) x 57(H), transparent lid for LED visibility, fixing centres 165 x 79mm
PCB	157mm x 71mm, Hole centres 146mm x 60mm. Height 31mm max.
LED Identification	LED "Fan1" and "Fan2" Run and Alarm, indicated by PCB silk screen legend LED "En" Run Enable and LED "B" High Speed, indicated by PCB silk screen legend
Trimmer Identification	Trimmer indicated by PCB silk screen legend, R1, R2 and R3
IP Rating	IP66 Enclosure
Cable Glands	Not included. Enclosure has "knock-outs" to suit 16mm or 20mm glands.

## Safety

- Installation must be by qualified personnel in accordance with local applicable standards.
- This equipment must be Earthed.
- Access is limited to service personnel only.
- Residual risk of contact with fan. Maintenance personnel should take due care and attention.
- Complies with Low Voltage Directive 37/23/EEC as amended by 93/68/EEC
- Complies with EN60335-1 - Specification for safety of household and similar electrical appliances
- Connector J1 Terminals SL1 and SL2 may be live even with the controller supply disconnected
- EC Fans use Capacitors to store mains voltage. Contact with the mains wiring must be avoided for 5 minutes following supply disconnection.

## EMC Compliance

BS EN61000-6-3:2007 (emissions), BS EN61000-6-2:2005 (immunity)  
Radiated Emissions BS EN55022:2006, Class B, Radiated Immunity EN61000-4-3:2002 +A1+A2  
Fast Transient Bursts EN61000-4-4:2004, Conducted Immunity EN61000-4-6:2007

## ESD

Many modern electronic components are susceptible to damage from Electro Static Discharge (Static Electricity). During commissioning, avoid unnecessary contact with electronic components on PCB's. PCB's which are Static Sensitive should be stored in anti-static packaging until installed.

## Installation

### General:

See "Safety" information above.

For connections, see Connection Details table above. Route control wiring separately from AC mains wiring.

Remove enclosure knock-outs as required to fit cable glands, taking care not to damage the PCB. Cable entry at enclosure end is recommended.

### Tools:

A 2.5mm flat screwdriver is recommended for the screw terminal block clamps and Variable Resistor adjustment.

A voltmeter is required during commissioning.

### 230VAC Supply:

Controller connection to 230VAC supply must be fused to 13A maximum.

The supply for single phase fans up to 13A total load may be connected via this control PCB, connect Fans to 230VAC output and Earth output terminals. For higher currents or 3-phase fans route supply direct to fans.

### Fans:

Connect fan supply, speed control and tachometer leads, see table above for connections. If fan has a 10V output wire cut back & insulate. If fans are Alarm Relay type (not Tachometer), connect fan relay between 0V and tachometer Input. If fan monitoring is not required, then link tachometer Input to 0V to prevent alarms.

### Select Inputs:

Connect Run/Stop and Speed/Set-point select inputs as required for the application, see Tables below.

### PCB Switches and Variable Resistors:

Set DIP Switches and Variable Resistors as required, see tables and procedures below.

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## DIP Switch

Position	OFF	ON
1	Alternate Fan Run	Simultaneous Fan Run
2, 3	Alternate Fan Run Changeover Period, see table	
4	No High-Speed Start Delay	High-Speed Start Delay, Three minutes
5	Two Fans	Single Fan
6	RESERVED, MUST BE [Off]	
7	Fan 1 Speed Control, Open Collector	Fan 1 Speed Control, 0-10V
8	Fan 2 Speed Control, Open Collector	Fan 2 Speed Control, 0-10V

DIP Switch		Alternate Fan Run Changeover Period (Hours)
2	3	
Off	Off	3
ON	Off	6
Off	ON	12
ON	ON	24

## Potentiometers

RV1	Fan Low Speed, 20% to 100%
RV2	Fan High Speed, 20% to 100%
RV3	High Speed Run-on period, 0-50 minutes

## Operation

### Fan Speed Control and LED's:

- 1) **Stop/Run:** Fans will not run unless **both** Run enable signals (Switched Live **and** Volt Free) are present. LED "En" will be illuminated if Fan Run is enabled, and will flash mostly off if not. Unit is shipped with both Run enables linked. "En" LED Off indicates either no 230VAC supply or a PCB fault.
- 2) **High Speed:** Fans will run at High speed if **any** High Speed signal (Switched Live **or** Volt Free) is active, LED "B" illuminated. If the "High" potentiometer set speed is lower than the "Low" potentiometer set speed the fan will continue at the "Low" set speed.
- 3) **High Speed Delay Start:** Enabled by DIP Switch. Fan Speed Outputs will remain at Low speed after the High Speed Input becomes active, for this timer period. (exception - BMS input responds immediately) If High Speed Delay timer is running LED "B" will flash, mostly Off.
- 4) **High Speed Run-on:** Fan Speed Outputs will remain at High speed after the "High Speed" input ceases to be active, for a period set by R3. (exception - BMS input responds immediately) If Run-on timer is running LED "B" will flash, mostly On.

### Fan Monitor:

- 1) "FAN1" and "FAN2" LEDs, Green LED = Fan Running, Red LED = Fan Alarm
- 2) Alarm Relay output: Contacts closed = No Alarm, Contacts Open = Fan Alarm or Power Fail.

## Duty Sharing (Alternate Fan Run)

The controller will run each fan alternately.

Each fan will run for a period selected by the DIP Switch setting, see table.

In the event of a fan alarm (detected by controller monitoring the Fan Relay / Tachometer signal) the controller will:

- 1) Automatically switch over to the alternate fan
- 2) Indicate the Fan Alarm by means of the Fan red LED and Alarm Relay

Note: at the end of each Duty Share period the controller will select the alternate fan. If the alternate fan is faulty the controller will swap back.

## Simultaneous Fan Run (Load Share)

In this mode, for settings above the equivalent of two fans on minimum speed, both fans will run and the load will be shared. For speed settings below this the fans will run alternately to allow the maximum airflow range.

In the event of a Fan Alarm the remaining fan speed will be doubled (up to full speed) to compensate, or for low speed setting the alternate fan will run.

## Single Fan operation

For single fan operation connect the fan to Fan 1 controller terminals. Set the DIP switch for Single Fan operation to suppress alarms from the unfitted fan.

## Power-up Check

At power-up all LED's will illuminate and Alarm Relay energise for a few seconds. If only one fan is running the controller will run Fan 1 briefly to check it is operating correctly, then switch to Fan 2 to check that fan. Fan run check inhibited if Enable not active.

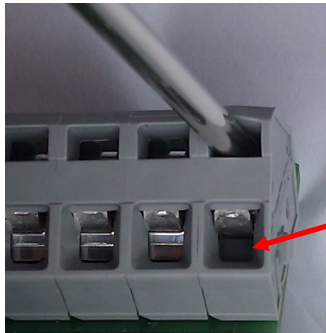
## **Maintenance and Servicing**

The PCB has no replaceable parts, if a fault develops return the PCB to the manufacturer.

## **Terminal Block Use**

The terminal blocks fitted are operated as follows:

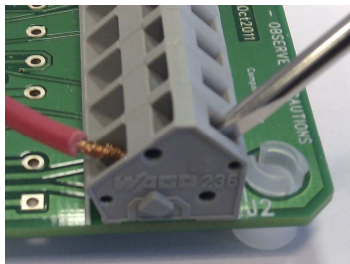
Insert a 2.5mm or 3mm flat blade screwdriver **fully** into the upper hole as shown, to open the terminal wire entry. Insert the wire into the lower hole, then remove the screwdriver to leave the wire clamped in the terminal.



Check wire clamp has moved clear to allow wire entry

Alternatively, open the wire entry by inserting the screwdriver **fully** from the opposite side of the connector as shown

Insert the wire into the lower hole, then remove the screwdriver to leave the wire clamped in the terminal.

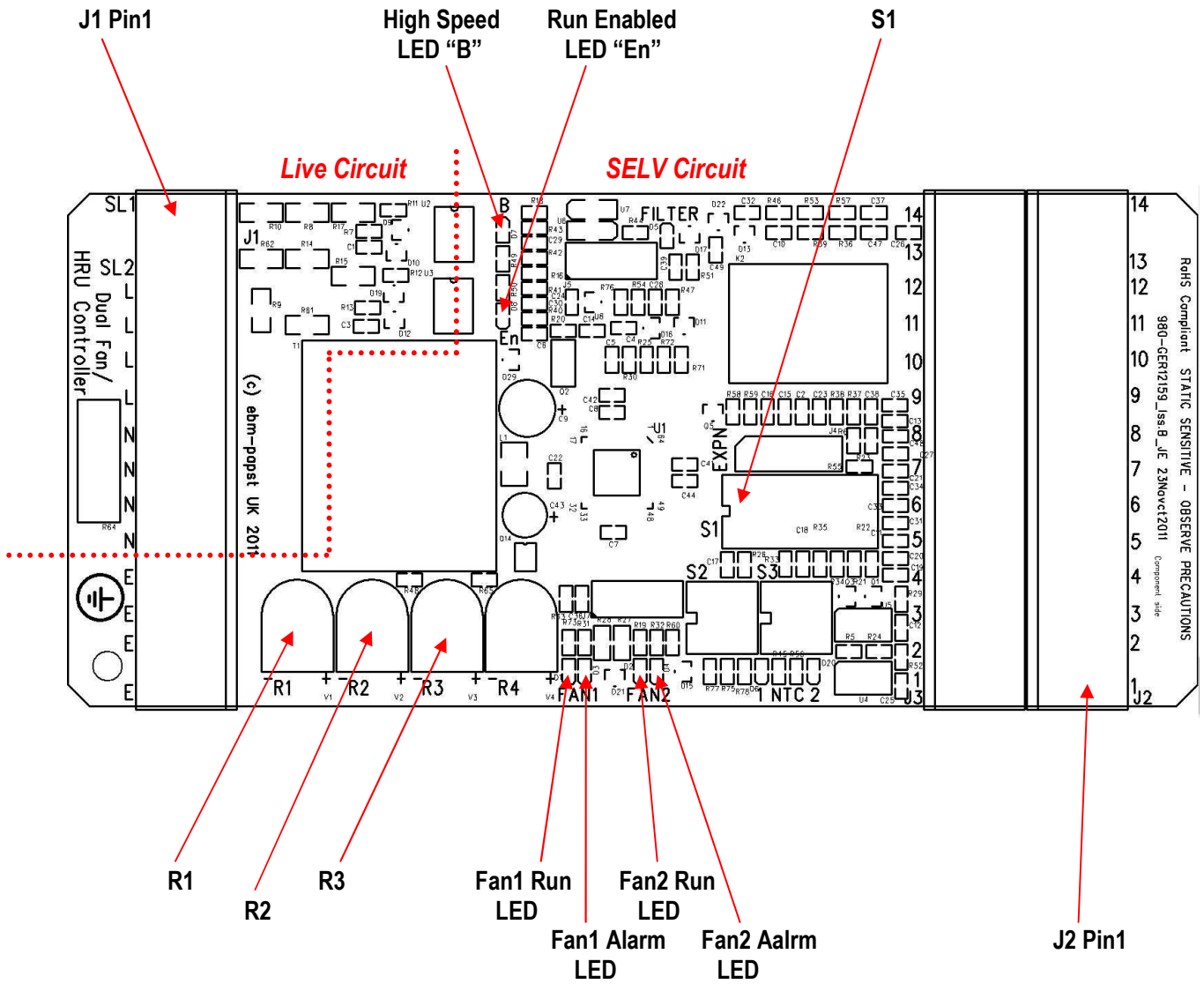


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# Operating and Maintenance Instructions

## PCB Component Location

Key PCB components are identified below



## Declaration of Conformity



Part No - CN1082

0095

Certificate No - CN1082CE

CE DECLARATION OF CONFORMITY		
<b>Declaration</b>		
We, ebm-papst UK Ltd, Chelmsford Business Park, Chelmsford, Essex CM2 5EZ certify that the product(s) listed are in conformity with;		
Low Voltage Directive 2006/95/EC Electromagnetic Compatibility Directive 2004/108/EC		
	Declaration Approved	Technical File Compiled
Name	G. M. Lockwood	Jeff Elkins
Position	Technical Director	Electronics Design Engineer
Signature		
Date of Declaration	21-May-2012	21-May-2012
Issue / Bug No	Issue 1	(Bug No)
Part number:	CN1082	
Description:	Dual EC Fan Controller	
The product(s) have been assessed by the application of the following Standards; BS EN 60335-1 - Household and similar electrical appliances. Safety. General requirements  BS EN61000-6-3:2007 (emissions), BS EN61000-6-2:2005 (immunity), Radiated Emissions BS EN55022:2006, Class B, Radiated Immunity EN61000-4-3:2002 +A1+A2, Fast Transient Bursts EN61000-4-4:2004, Conducted Immunity EN61000-4-6:2007		

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