

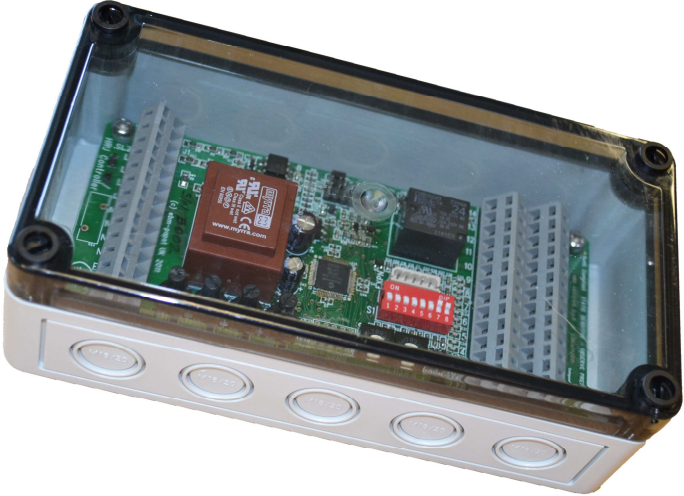
Part No	CN1083		
Description	Commercial HRU (Heat Recovery Unit) Controller		
			
Issue	Date	Bug no	Comments
1	19 July 2012	1206	Add CE front sheet
2	31 Jan 2013	1206	Clarify instructions

Table of Contents

Introduction.....	2
Specification.....	2
Connection Details (see “Terminal Block Use” below).....	2
Fan Compatibility.....	3
Mechanical Outline.....	3
Safety.....	3
EMC Compliance.....	3
ESD.....	4
Installation.....	4
Operation.....	6
Fan Speed Control:.....	6
Anti-Frost Supply Fan Shut-Off.....	6
Summer Bypass Relay:.....	6
Filter Maintenance Alarm.....	6
Fan Monitor:.....	6
Alarm Relay:.....	6
Power-up Check.....	6
Maintenance and Servicing.....	6
Terminal Block Use.....	7
PCB Component Location.....	8
Declaration of Conformity.....	9

The most recent version of this document may be downloaded at: www.ebmpapst.co.uk/instructions

Introduction

Commercial HRU (Heat Recovery Unit) Controller, mains powered with enclosure, controls two fans selecting Stop/Run and Low/High speed. Speeds preset by on-board trimmers, independent Low and High speed setting for each fan. Selection of Stop/Run and Low/High speed by switched 230VAC and volt-free inputs. With indicators and alarm outputs. Configurable options set by on-board DIP switches. Timer based Filter Maintenance Alarm. Summer Bypass Relay for damper control and Anti-Frost shut off, temperature sensors SN1060 included.

Specification

		CN1083
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 and Filter Relay		Contact rating, 100mA max, 60VDC max
Summer Bypass Relay		Contact rating, 5A max, 230VAC or 24VDC max.
Temperature Sensors		SN1060 thermistor sensor assemblies, 2m lead length
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)
L	5 230VAC, Live (Input)
L	6 230VAC, Live (Supply to Fan)
N	7 230VAC, Neutral (spare)
N	8 230VAC, Neutral (Supply to Fan)
N	9 230VAC, Neutral (Input)
N	10 230VAC, Neutral (Supply to Fan)
E	11 Earth (Supply to Fan)
E	12 Earth (Input)
E	13 Earth (Supply to Fan)
E	14 Earth (spare)

Control Connector One, J2

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

Note: all “0V” terminals on J2 & J3 are commoned.

Control Connector Two, J3

Pin	Function
1	Filter Maintenance Relay, Contact A
2	Filter Maintenance Relay, Contact B
3	Thermistor 1, SN1060, first wire. Anti-Frost Temperature Sensor
4	Thermistor 1, SN1060, second wire.
5	Thermistor 2, SN1060, first wire. Summer Bypass Temperature Sensor
6	0V (normally unused)
7	Low/High fan speed Select Input 3, Volt Free Contacts
8	0V for Low/High fan speed Select Input 3
9	24VDC Unregulated Output, 25mA max.
10	Summer Bypass Relay, Normally Open Contact
11	Summer Bypass Relay, Common Contact
12	Summer Bypass Relay, Normally Closed Contact
13	Thermistor 2, SN1060, second wire.
14	reserved

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.

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 146 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" Fast, indicated by PCB silk screen legend LED "FILTER" – filter maintenance LED, indicated by PCB silk screen legend
Trimmer Identification	Trimmer indicated by PCB silk screen legend, R1, R2, R3 and R4
IP Rating	IP66 with Enclosure.
Cable Glands	Not included. Enclosure supplied, 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. Live parts accessible when cover removed.
- 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, and Summer Bypass relay contacts 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.
- If the Summer Bypass relay is used to switch mains voltage then the controller 0V should be connected to Protective Earth and the supply should incorporate a residual-current circuit breaker.

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

210-OMI12422_Iss2.doc	ORIGINAL INSTRUCTIONS	Page 3 of 9
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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.

Temperature sensors:

Connect the two Thermistor cable assemblies SN1060 as shown in the table above. Normally both sensors should be installed in the supply airflow input to the HRU.

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.

Potentiometers

RV1	Supply Fan PWM Output Low Speed, 20% to 100%
RV2	Supply Fan PWM Output High Speed, 20% to 100%
RV3	Extract Fan PWM Output Low Speed, 20% to 100%
RV4	Extract Fan PWM Output High Speed, 20% to 100%

DIP Switch 1

Position	OFF	ON
1, 2, 3	Maintenance Timer, see table below	
4	No High Speed Start Delay.	High Speed Start Delay, Three minute fixed timer.
5	No High Speed Run-on.	High Speed Run-on Off/ON, 20 minute fixed timer
6	RESERVED, MUST BE [Off]	
7	Supply Fan PWM, Open Collector	Supply Fan PWM, 0-10V
8	Extract Fan PWM, Open Collector	Extract Fan PWM, 0-10V

DIP Switch Position			Filter Maintenance Timer
1	2	3	
Off	Off	Off	Timer Unused (no alarm)
Off	ON	Off	3 month
Off	Off	ON	6 month
Off	ON	ON	12 month
ON	-	-	Reset

DIP Switch 2, Rotary

Position	Summer Bypass Relay Operate Temperature °C
0	RESERVED
1	16
2	17
3	18
4	19
5	20
6	21
7	22
8	23
9	24
A	25
B	26
C	27
D	28
E	29
F	30

DIP Switch 3, Rotary

Position	Anti-Frost Supply Fan Shut-Off Temperature °C
0	RESERVED
1	-6
2	-5
3	-4
4	-3
5	-2
6	-1
7	0
8	1
9	2
A	3
B	4
C	5
D	6
E	7
F	8

Operation

Fan Speed Control:

- 1) **Run Enable:** Fans will not run unless **both** run enable signals (Switched Live **and** Volt Free) are active. LED "En" will be illuminated if Run enabled, LED will flash mostly off if not. Unit is shipped with both enables linked.
- 2) **Low / 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. PWM Outputs will remain at "Low" speed after the "High Speed" input becomes active, for the Delay Start timer period, 3 minutes. (exception - BMS input responds immediately) If High Speed Delay timer is running LED "B" will flash, mostly Off.
- 4) Run-on: Enabled by DIP Switch. PWM Outputs will remain at "High" speed after the "High Speed" input ceases to be active, for the run-on timer period, 20 minutes. (exception - BMS input responds immediately) If run-on timer is running LED "B" will flash, mostly On.

Anti-Frost Supply Fan Shut-Off

The Supply Air Temperature is monitored by Thermistor 1. While the temperature is below that set by the Rotary DIP Switch S2 the supply fan will shut off. Hysteresis is fixed, two degrees centigrade.

Summer Bypass Relay:

The Supply air temperature is monitored by Thermistor 2. While the temperature is above that set by Rotary DIP Switch S3 the relay will switch over. Hysteresis is fixed, two degrees centigrade.

Filter Maintenance Alarm

The Filter Maintenance Alarm is generated by a timer.

The controller times the fan hours run, while the timer is running the Maintenance Relay contacts will be closed and the Maintenance LED will not be illuminated. The timer will pause if fan run is not enabled.

When the timer reaches the Filter Maintenance Alarm Period set the Filter Maintenance Relay contacts will open and the Filter LED will illuminate red.

The alarm will persist until reset by DIP switch setting. During Reset the HRU LED's will flash. Return the switch to the non-reset position for normal timer running.

The controller stores the hours run count in non-volatile memory so that the count continues following power cycle.

Fan Monitor:

"FAN1" and "FAN2" LEDS, Green LED = Fan Running at 20% speed or above, Red LED = Fan Alarm

Alarm Relay:

Alarm Relay output: Contacts closed = No Alarm, Contacts Open = Fan Alarm or Thermistor Alarm or Power Fail.

Power-up Check

At power-up all LED's will illuminate and Relays energise for a few seconds. The fan run will be checked unless "Fan Stop" is selected.

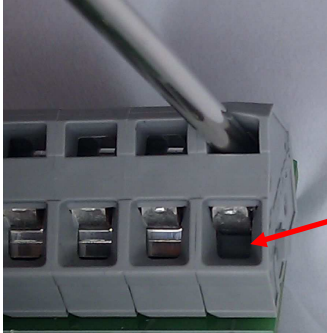
Maintenance and Servicing

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

210-OMI12422_Iss2.doc	ORIGINAL INSTRUCTIONS	Page 6 of 9
© ebm-papst UK Ltd, 2012	Chelmsford Business Park Chelmsford Essex CM2 5EZ Telephone: +44(0)1245468555 Fax: +44(0)1245466336 e-mail sales@uk.ebmpapst.com	CN1083

Terminal Block Use

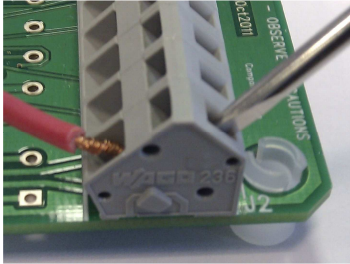
The terminal blocks fitted are operated as follows:
Insert a 2.5mm or 3mm flat blade screwdriver **fully** into the upper hole as shown, to open the terminal wire entry.
Insert the wire into the lower hole, then remove the screwdriver to leave the wire clamped in the terminal.



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

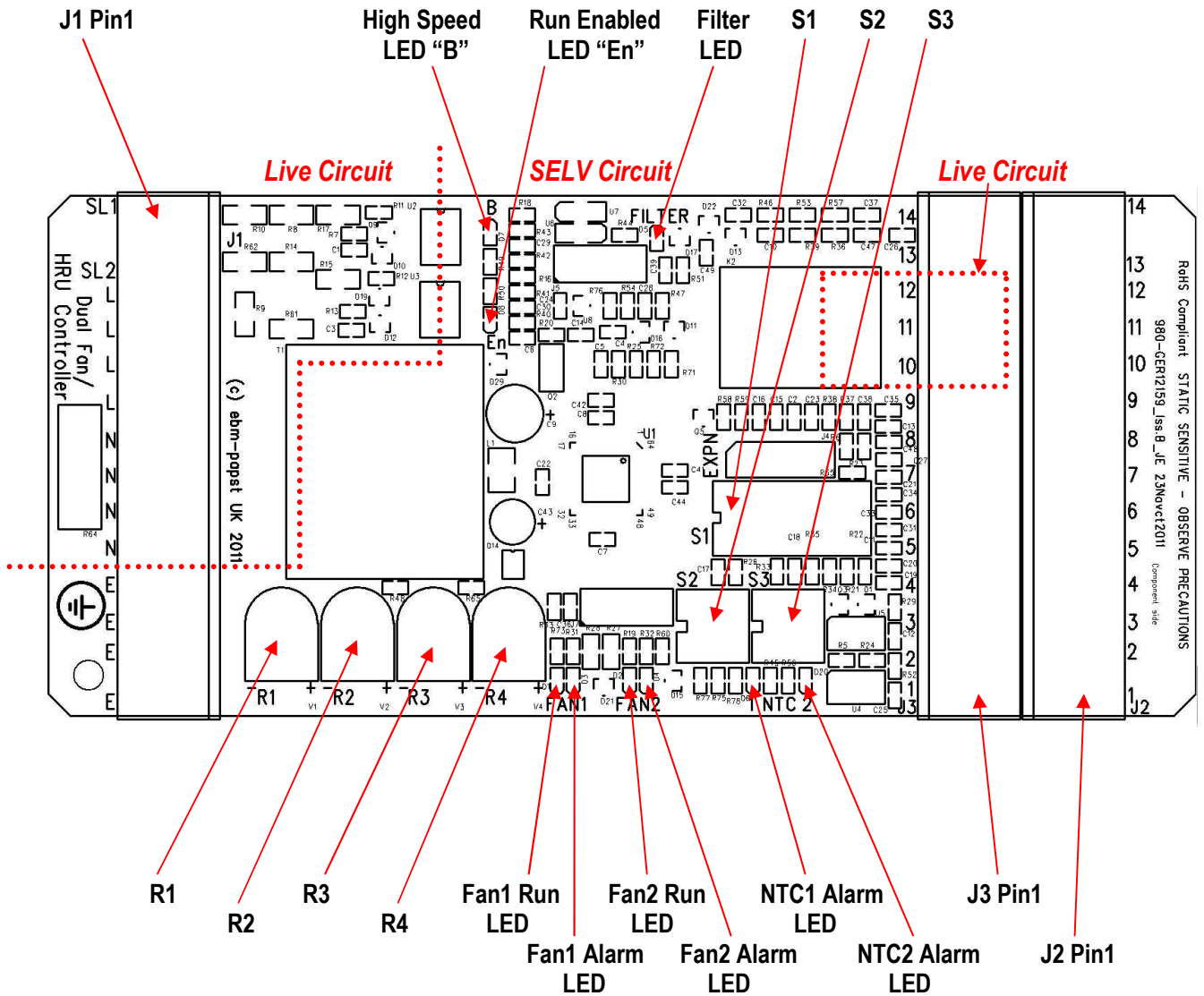
Insert the wire into the lower hole, then remove the screwdriver to leave the wire clamped in the terminal.



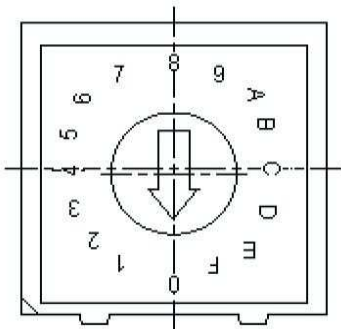
Operating and Maintenance Instructions

PCB Component Location

Key PCB components are shown below



Rotary DIP Switch position numbering



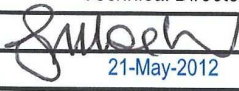
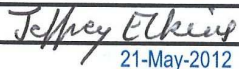
Declaration of Conformity



Part No - CN1083

0096

Certificate No - CN1083 CE

CE DECLARATION OF CONFORMITY		
Declaration		
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:	CN1083	
Description:	Commercial HRU 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		

04/03/2013 08:49:00

210-OMI12422_Iss2.doc	ORIGINAL INSTRUCTIONS	Page 9 of 9
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