



# ES-CO2RM & ES-CO2RMPP

## CO<sub>2</sub> Sensor

### Installation and Maintenance



## 1.0 Introduction

These are surface mounted room carbon dioxide (CO<sub>2</sub>) sensors which also incorporate a temperature sensor.

They are designed sense the room conditions for residential or commercial office buildings. They are designed to be compatible with Nuiare's Ecosmart range of fans and control system with simply plug and play installation.

**ES-CO2RM:** CO<sub>2</sub> & temperature sensor requires SELV power supply by others.

**ES-CO2RMPP:** CO<sub>2</sub> & temperature sensor supplied with SELV ac power supply.

## 2.0 Ratings

**Sensing ranges:** 0-2000ppm CO<sub>2</sub> and 0-50°C.

**Output:** 0-10V dc proportional output, maximum load 1mA.

**Current consumption:** Typically 10mA plus pulses of 0.3A for 0.3s (every 15s).

**Warm up time:** <5 minutes.

**ES-CO2RMPP:** Mains supply to power pack must be 230V 1~ 50Hz.

**ES-CO2RM:** SELV power supply (by others) must have output of 12Vac (+/-5%) or 15-35V dc.

Please note that proprietary 12Vac transformer would only produce 12V at maximum load.

Due to the low current absorbed by the sensor; these would be running at very high output voltage (typically >30Vac) and are therefore not suitable.

If in doubt – use the ES-CO2RMPP to ensure compatibility.

## 3.0 Installation

**Installed environment: 0-50°C and up to 90% RH non-condensing.**

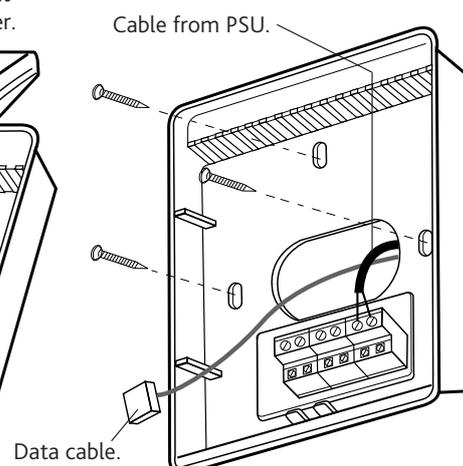
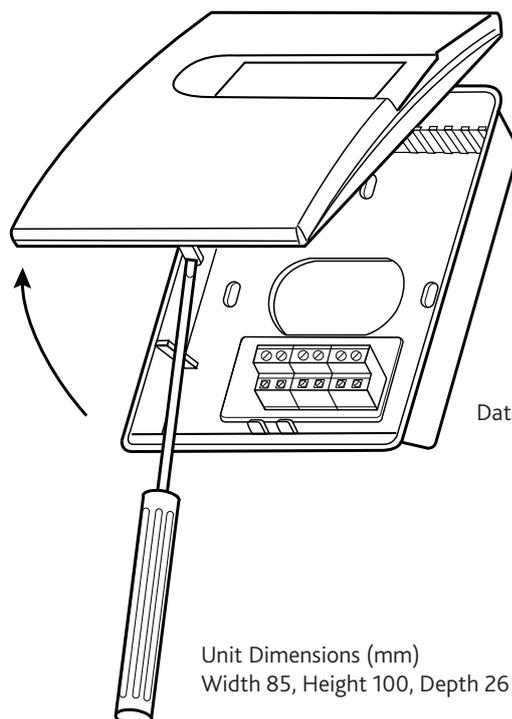
The installation must be carried out by competent personnel in accordance with all local and national statutory regulation; i.e. IEE, HVCA etc.

The unit must be installed indoors, away from direct source of heat (e.g. radiator, direct sunlight), any water spray or steam generating source. The mounting surface must be free from vibrations. Do not install the sensor in environment containing high level of contaminants; e.g. dust; corrosive gases; commercial kitchens. Install the sensor at approximately head height or slightly higher for best response rate.

Use a small screwdriver to push in the clip at the bottom of casing to open the front cover. Remove the top half and store it in a safe place. Use the base of unit as a template to mark the fixing positions. Drill and insert appropriate fasteners into the holes. Feed the cable from the SELV side of power pack and the Ecosmart data cable through the large hole of the base and connect these to the sensor. Mount the base of the unit and replace the front cover.

Figure 1. Removing cover & mounting sensor.

Use a small screwdriver to push in the clip at the bottom of casing to open the front cover.



Cable from PSU.

Data cable.

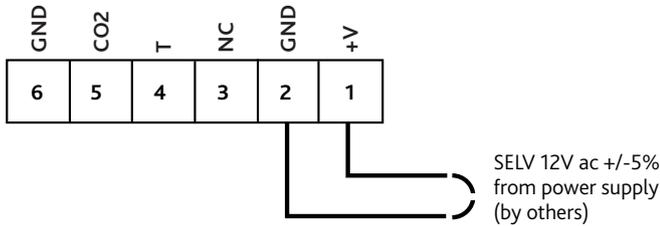
Use the base of unit as a template to mark the fixing positions.

Unit Dimensions (mm)  
Width 85, Height 100, Depth 26

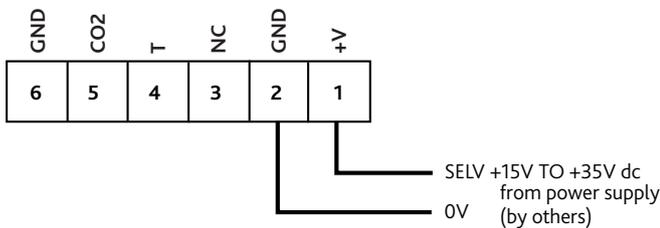
## 4.0 Wiring

Wire the cables from the power pack into the terminal block as per wiring diagram below. Plug the Ecosmart data cable into the socket on the PCB before refitting the top half of the sensor back on the base. The other end of the data cable must be connected to the fan.

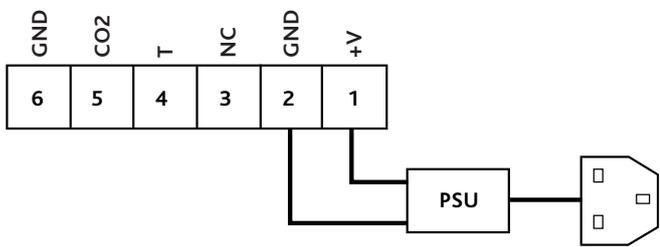
**Figure 2. ES-CO2RM – wiring to AC power supply.**



**Figure 3. ES-CO2RM – wiring to a SELV DC power supply.**



**Figure 4. ES-CO2RMPP – wiring to mains.**



**Note: do not connect any other devices to the power supply.**

## 5.0 Data Cable Installation

A 4-core SELV data cable is used to connect devices such as sensors to the fan and for inter connecting multiple fan units.

Do not run data cable in the same conduit as the mains cables and ensure there is a 50mm separation between the data cable and other cables.

The maximum cable run between any two devices is 300m when it is installed in accordance with the instructions.

Please note that the total data cable length used in any system must be less than 1000m. Keep the number of cable joints to a minimum to ensure the best data transmission efficiency between devices.

## 6.0 Operation

The sensor will monitor the carbon dioxide (CO<sub>2</sub>) and temperature (see note 1) within the room. If either reading reaches the low threshold values (i.e. C1 & T1) in fig. 5 then a signal will be sent to start running the fan at minimum speed.

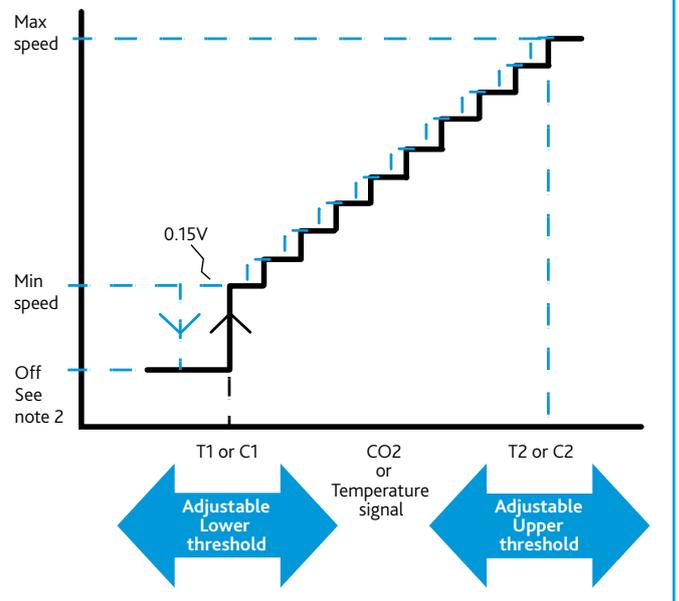
As the room CO<sub>2</sub> and temperature rises, the fan speed will progressively increase in steps until the upper threshold values are reached. When both CO<sub>2</sub> and temperature readings are in operation, whichever reading that results in higher fan speed will be used by the fan unit.

The threshold values and other operations can be adjusted by setting DIL switches on the PCB to different positions.

**Note 1:** As supplied; the default operation of the sensor will be based on carbon dioxide reading. If operation with both carbon dioxide and temperature is desirable then change position of switch 7 to 'ON'.

**Note 2:** Use switch 8 to change the off state (see fig. 5 below).

**Figure 5. CO<sub>2</sub> threshold values.**



The lower and upper threshold values can be adjusted as shown in the following tables below and overleaf.

### 6.1 Temperature Threshold - Switches 1 to 3

Switch Settings			Threshold Temperatures (see note 1)	
1	2	3	T1 (°C)	T2 (°C)
Off	Off	Off	25	28
On	Off	Off	24	28
Off	On	Off	23	28
On	On	Off	22	28
Off	Off	On	25	30
On	Off	On	24	30
Off	On	On	23	30
On	On	On	22	30

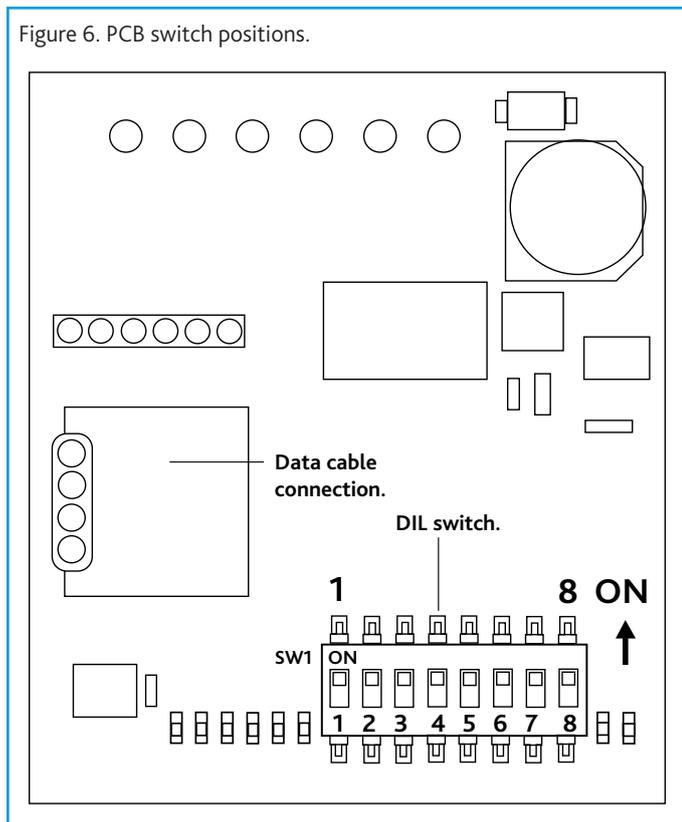
### 6.2 CO<sub>2</sub> Threshold - Switches 4 to 6

Switch Settings			Threshold CO <sub>2</sub> Values (see note 2)	
4	5	6	C1 (ppm)	C2 (ppm)
Off	Off	Off	1000	1500
On	Off	Off	950	1500
Off	On	Off	900	1500
On	On	Off	850	1500
Off	Off	On	1000	1750
On	Off	On	950	1750
Off	On	On	900	1750
On	On	On	850	1750

Switch number 7 – switch to 'On' position to enable the sensor to operate with both CO<sub>2</sub> and temperature reading.

Switch number 8 – switch to 'On' position to run the fan at minimum speed even if the readings are below the lower threshold. Please note there must be an enable signal present in order for the fan to run; e.g. from a switched live, ES-PIR etc.

Figure 6. PCB switch positions.



### 7.0 Maintenance

This unit does not require any routine maintenance. However, it is advisable to check the condition of the circuit board and wiring to ensure it has not been damaged by the installed conditions; e.g. unforeseen condensation etc.

Remove any accumulated dust with a soft brush.

### 8.0 Warranty

The 5 year warranty starts from the date of delivery and includes parts and labour for the first year.

The labour element is subject to full, free and safe access to the equipment as recommended by the CDM regulations. The remaining 4 years covers replacement parts only.

This warranty is void if the equipment is modified without authorisation, is incorrectly applied, misused, disassembled, or not installed, commissioned and maintained in accordance with the details contained in this manual and general good practice.

The product warranty applies to the UK mainland and in accordance with Clause 14 of our Conditions of Sale. Customers purchasing from outside of the UK should contact Nuair International Sales office for further details.

### 9.0 After Sales Enquiries

For technical assistance or further product information, including spare parts and replacement components, please contact the After Sales Department.

Telephone 02920 858 400  
[aftersales@nuaire.co.uk](mailto:aftersales@nuaire.co.uk)