

# CO2 Wall Mounted 220Vac sensor

## Description



This CO2 sensor not only measures the gas concentration, also due to the implementation of a PID algorithm can give a signal proportional to control the airflow of a fan, damper or an HRV.

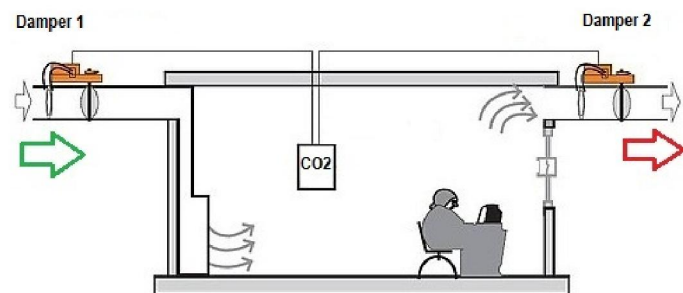
This sensor combines the functions of a sensor and a controller at the same time being able to maintain optimal air quality through the jumper configuration of the indoor air quality reference or setpoint with the desired concentration in the room. This allowed maintaining air quality depending on the occupancy of the room and thus saving energy to be able to regulate the speed of a fan or an opening damper.

## Key features

- ⇒ It can be installed at room level: Power feed 90-277Vac
- ⇒ CO2 sensor + PID controller algorithm implemented on same device
- ⇒ PID signal with analogue and digital output (for on-off and proportional dampers)
- ⇒ Potential free Relay output
- ⇒ Direct Connection to Speed Fan controllers
- ⇒ No external or additional controller needed
- ⇒ Perfect solution for DCV applications
- ⇒ Compliant with Demand-Controlled systems acc. EN15232 Class A
- ⇒ Different IAQ applications: LOW and HIGH IAQ

## Application Areas

Schools, retail shops, homes, offices...



## Technical Specifications

CO2 specification	
Measurement Principle	NDIR -Non dispersive infrared technology-
Sensor Type	Dual Beam Dual wavelength <i>*don't need manual calibration</i>
Measurement Range	400 - 4000 ppm CO2 by volume
Resolution	< 20 ppm CO2
Accuracy	± 5% of reading
Pressure Dependence	0.13 % of reading per mm Hg
Response Time	< 3 minutes for a 90% step change
Warm up Time	< 30 seconds operational < 15 minutes full accuracy

### Default thresholds *with traffic led lights* **HIGH CO2 Quality**

- PPM1 ● Level 1: green x < 600 ppm
- PPM2 ● Level 2: yellow when 600 ≤ ppm < 1200 ppm
- PPM3 ● Level 3: red when ≥ 1200 ppm

### Default thresholds *with traffic led lights* **LOW CO2 Quality**

- PPM1 ● Level 1: green x < 900 ppm
- PPM2 ● Level 2: yellow when 900 ≤ ppm < 1500 ppm
- PPM3 ● Level 3: red when ≥ 1500 ppm



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Electrical Specifications		General Specifications	
Power supply	90 ~ 277Vac 47 ~ 63 Hz (CE&UL Certification)	Regulatory Compliance	CE Mark: EMC 2004/108/EC, RoHS 2011/65/EU, WEEE CFR47, Part15 Class A
Power consumption	14-45 mW		EN61000-6-2, EN61000-6-3
Operating Temperature	0 ~ +40° C	Casing Material	ABS UL94-V0
Storage Temperature	-20 ~ + 50 °C	Protection Class	IP20
Operating Humidity	0 ~ 95% non-condensing	Housing color	White
Electrical connection	1 x 2,5 mm <sup>2</sup> or 2x1,5 mm <sup>2</sup> screw terminals depending of the load and in compliance with local regulations	Dimensions	80x80x25 mm
Relay Output	Max. 6A (220Vac)		3.15x3.15x0.98 "
		Weight	0.089 kg

## CONFIGURATION MODES

**DIP switches nr. 3&4** determines Configuration mode:



⇒ switch 3 to ON : **SENSOR configuration mode** .

The Analog signal is proportional to the measured ppm concentration

⇒ switch 3 to OFF: **Controller/PID Configuration mode**.

The Analog signal follows the PID algorithm accordingly to the setpoint configuration level

**DIP switches nr 1&2** determines the CO2 Quality Profile (High/Low) and trigger concentration for Digital/Relay output

Example of configuration:

SW1=1 OFF; SW2=0; SW3=1; SW=0

**Relay-Digital Output:** LOW CO2 Quality; trigger=900ppm

**Analog Output:** Controller Mode-PID High Quality (600 ppm)

(1) Default values

\* According to Table A-10. CO2 level in rooms of EN13779 EU Normative -Ventilation for non-residential buildings

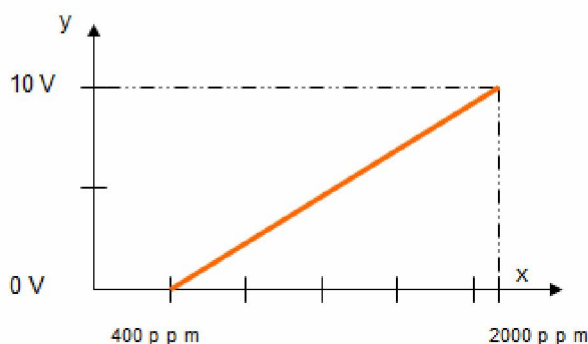


Fig1. Proportional 0-10v analog output to 400...2000 ppm concentration

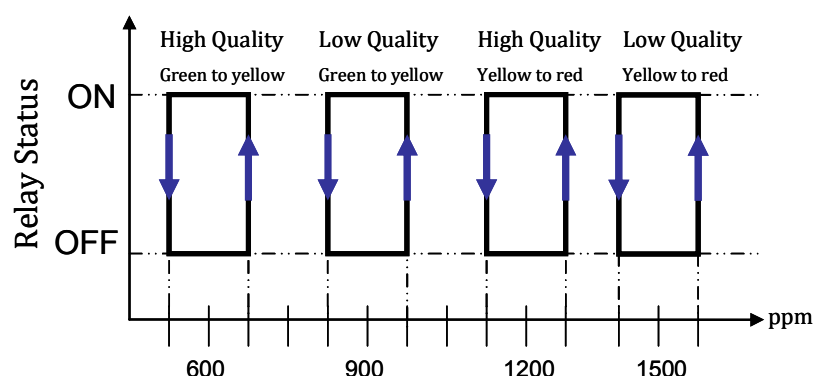


Fig2. Switching Relay output accordingly to Quality Profile iAQ (High/Low) CO2 trigger concentration

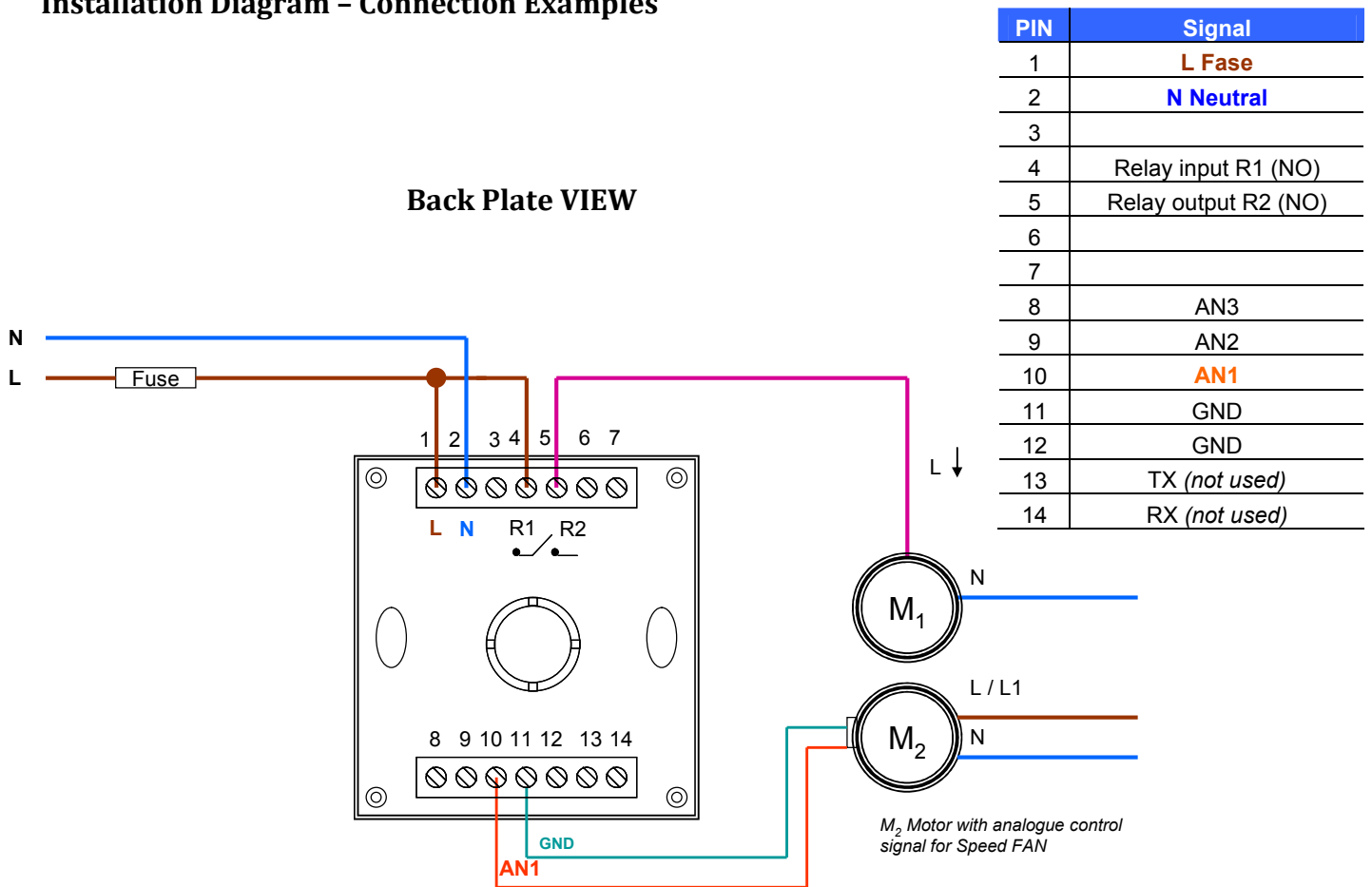
\*\* (2) PID High/Low Quality means that the user could prefer how fast will change the air fresh conditions inside the room depending of energy savings criteria: Low iAQ produces more energy savings than High iAQ. Also in the formula the analog output will depend of the room dimensions, conditions, fan speed, etc...All this parameters are considered on the formula implement on firmware.

\*\*\* (3) There are different iAQ profiles: High and Low for trigger the relay/digital output. This means that the user could have different iAQ requirements to different rooms: living room, bedroom, and kitchen' restaurant...So for this reason the manufacturer is planned at least 2 iAQ profiles.



DIGITAL/RELAY Output <sup>***</sup> (3)		ANALOG (0-10v) OUTPUT	
HIGH iAQ		SENSOR MODE	
Trigger [ppm]			
	ON OFF 600 <i>Relay switches at yellow color</i>		ON OFF Range [400...2000 ppm]*(1)
	ON OFF 1200 <i>Relay switches at red color</i>		ON OFF Range [400...4000 ppm]
LOW iAQ		PID CONTROLLER MODE setpoint	
Trigger [ppm]			
	ON OFF 900 <i>Relay switches at yellow color</i>		ON OFF PID High iAQ (600 ppm)
	ON OFF 1500 <i>Relay switches at red color</i>		ON OFF PID Low iAQ (800 ppm)**(2)

## Installation Diagram – Connection Examples



\* Output range 0-10v according with PID calculation signal on the internal controller

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## Application examples

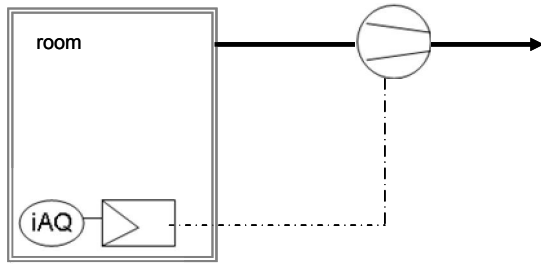


Fig 3. Example with extract air fan

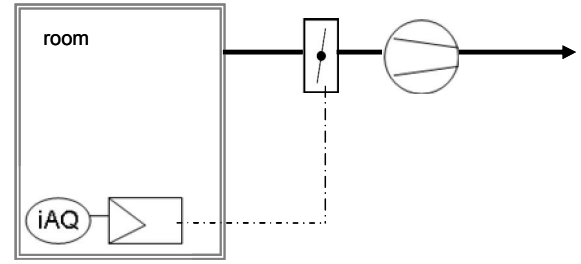
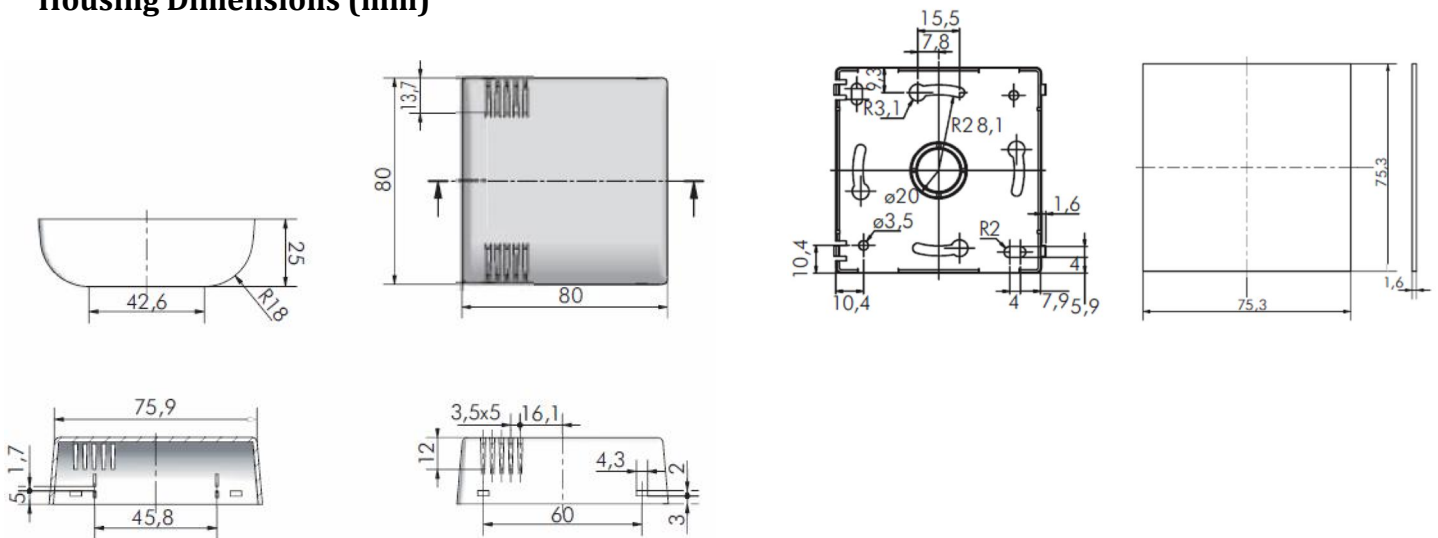


Fig 4. Example with extract air damper

## Housing Dimensions (mm)



## Warnings & Troubleshooting Considerations:



When start up if all LEDs are permanently ON means: ● ● ●  
 Wrong CO2 measurements, faulty module, CO2 module ERROR COMMUNICATION!

## Ordering Info Codes

Product Name	Reference
NBB-220ANCO2ntl - Wall mounted CO2 sensor 220Vac without traffic leds (1AO+1DO)	EN220110
NBB-220ANCO2 -Wall mounted CO2 sensor 220Vac (1AO+1DO)	EN220111