AIR QUALITY MONITORING SYSTEM FOR SCHOOLS

Indoor air quality and thermal comfort in schools have a direct impact on the usability of the space and productivity, so it's important to monitor the indoor environment regularly.

The Air Quality Monitoring System for Schools, enables teachers and students to monitor the CO_2 and temperature levels in their respective learning space. The system operates in accordance with the 2017 Ministry of Education guidelines.

Eurotec offers a wide range of options, ranging from partial conformity to the Ministry Guideline to a full fledged controllable BMS system.

Ministry Guideline

The Ministry of Education has put a guideline stipulating their requirements for indoor air quality and thermal comfort.

The requirements of this document are as follows:

Provide CO_2 and internal/external temperature display in a central location within each learning space, with instant visible feedback to local users. This is to be provided with either:

- **a)** a simple laminated or framed user guide adjacent to the display. A simplified example is given in Figure 1.8. Note that this must be altered as appropriate to suit the specific design of the teaching spaces; or

- **b)** an electronic display device to be used with inputs from the CO_2 and internal/external temperature monitors, with a graphic display of actions required by users.

The system will assist in educating teaching staff and learners as well as require the teaching staff to appoint student monitors in each learning space to take joint responsibility for looking at the temperature and CO_2 levels at the start and finish of each school period, setting the windows/vents, and operating the ceiling fans accordingly.

Guideline for Indoor Air Quality in Learning Spaces

Fig 1.8

OUTDOOR TEMPERATURE			
< 14°C	14°C <T<16°C	16°C <T<18°C	14°C >

INDOOR CO2 CONCENTRATION	< 14°C	14°C <T<16°C	16°C <T<18°C	14°C >
3000PPM – 1500PPM	CRACK OPEN WINDOWS	PARTIALLY OPEN WINDOWS	FULLY OPEN WINDOWS	FULLY OPEN WINDOWS & SWITCH ON CEILING FANS
1500PPM – 1000PPM	FULLY CLOSED WINDOWS	PARTIALLY OPEN WINDOWS	PARTIALLY OPEN WINDOWS	FULLY OPEN WINDOWS & SWITCH ON CEILING FANS

18°C — 20°C — 22°C — 24°C — 26°C

WINTER → SPRING & AUTUMN → SUMMER
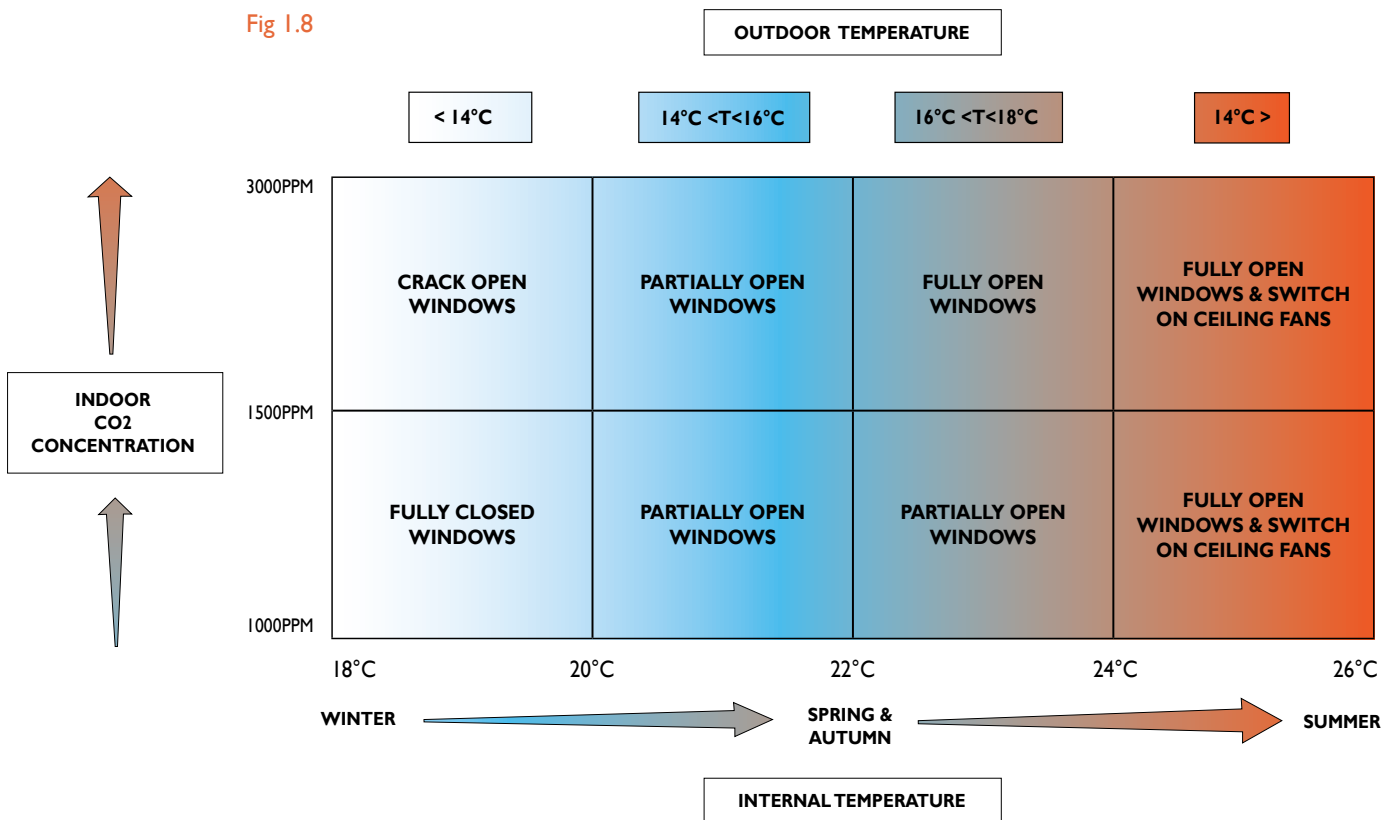
INTERNAL TEMPERATURE

Fig 1.8 Teacher window position and ceiling fan matrix to be reviewed at start and finish of each period/lesson. Actual settings will depend on ambient wind and noise conditions.

Extract from: 'Designing Quality Learning Spaces: Indoor Air Quality and Thermal Comfort'. New Zealand Minisitry of Education.

Viconics Wall controller

The perfect balance between simplicity and sophistication. Select from a wide variety of configurable screen colors to match decor. Display your own logo and custom messages on screen to reinforce your brand and provide a more enjoyable occupant experience. This device can be standalone or can be connected to a BMS system.

- **Interface:** Touch screen Interface
- **Aesthetics:** Up to ten selectable screen colors
- **Customize:** Supports the display of custom messages
- **Protocols:** Wired BACnet MS/TP and Modbus RTU
- **Sensors:** CO2 and Temperature sensors
- **Display:** Can display custom logos, 20 selectable languages
- **Temperature sensor:** Range (0...50°C), Type (10K NTC type 2 Thermistor)
- **CO2 Sensor:** CO2 sensors are maintenance-free in normal environments thanks to the built in self-correcting Automatic Baseline Correction (ABC) algorithm function. The sensors have a life expectancy of 15 years and do not require any calibration. Range (400...10000ppm)
- **Power supply:** 24VAC 50/60Hz, peak device consumption 12VA

Outdoor Temperature

Indoor Temperature

Indoor CO2 reading
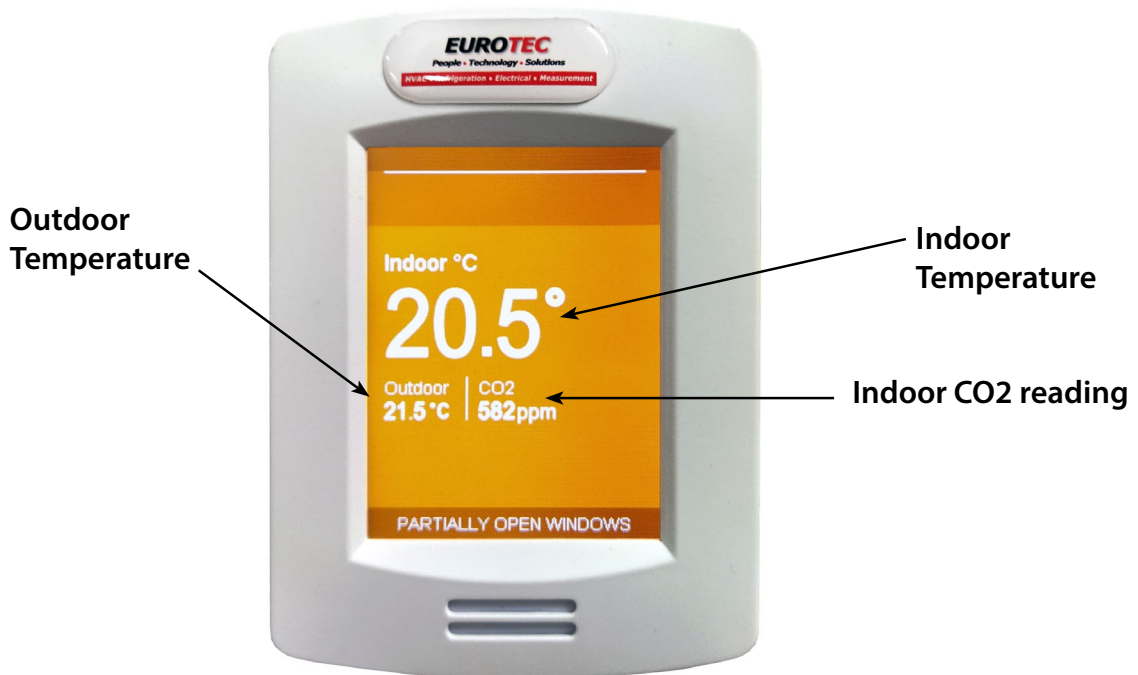
USER GUIDE

Temperature Below 14° CO2 Above 1500ppm	Temp 14° to 16° CO2 Above 1500ppm	Temp 16° to 18° CO2 Above 1500ppm	Temp Above 18° CO2 Above1500ppm
Temp Below 14° CO2 Below 1500ppm	Temp 14° to 16° CO2 Below 1500ppm	Temp 16° to 18° CO2 Below 1500ppm	Temp Above 18° CO2 Below 1500ppm

tSENSE CO2, Temperature and RH Sensor with colour touch display

tSENSE is an advanced and versatile 3-in-1 transmitter designed for installation in the air-conditioned zone. It measures CO2 concentration, temperature, and humidity in the ambient air accurately without the need for additional compensation - true read. The data transmits to a BMS system or a stand-alone controller using industry standard output signals and communication protocols. tSENSE combines all the necessary elements for effective climate control in commercial office buildings, hospitals, hotels, schools, and other facilities.

Using CO2 monitoring for demand control ventilation (DCV) allows a healthy, comfortable, and cost-effective environment for the occupants. It is flexible in design with temperature control and a combination of humidity control optional. Though suitable for use in many different energy-efficient ventilation strategies, SenseAir® welcomes any discussions for specific needs.

Complies with ASHRAE standard 189.1 (±50ppm @ 1,000ppm of measured CO2 value).
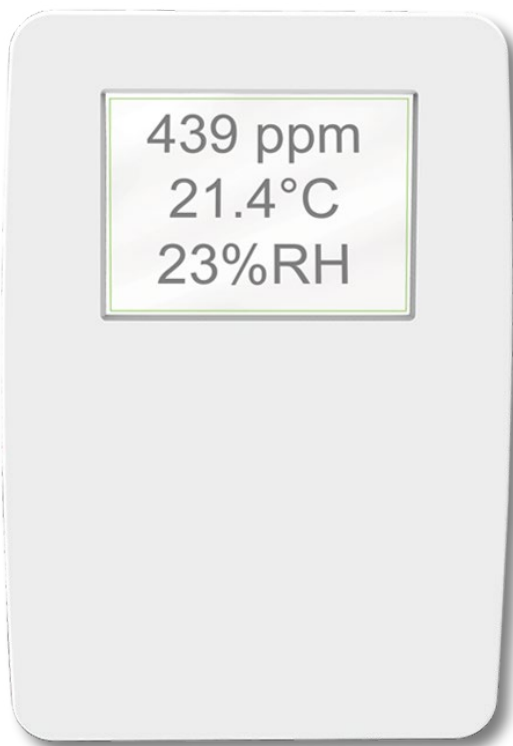
Key benefits

- Maintenance free
- Three sensors in one housing: CO2, temp and RH
- Colour touch display with possibility of customisable GUI
- PIN codes for access to display and meter settings
- Improved housing design for effective measurement

Measured gas
Carbon dioxide CO2

Dimensions
125mm x 85mm x 22mm

Measurement range
CO2 0 to 2,000 ppm

Life expectancy
>15 years

OUT1 CO2
0 - 10VDC, 0 - 2,000 ppm

Operation temperature range
0 - 50°C

OUT2 Temperature
0 - 10VDC, 0 - 50°C

Power supply
12VDC, 24VAC/DC

OUT3 Relative Humidity
0 - 10VDC, 0 - 100%RH

Communication
Modbus (MB) or BACnet (BAC) protocol over RS485

Accuracy (CO2)
±30ppm ±3% of reading

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