



IAQ

Indoor Air Quality Monitor



Features.

- ✓ CO2 Carbon Dioxide
- ✓ Particulate Matter (PM1, PM2.5 & PM10)
- ✓ Volatile Organic Compounds
- ✓ Local Temperature
- ✓ Relative Room Humidity
- ✓ Atmospheric Pressure
- ✓ Air Quality Scoring System
- ✓ View Individual Measurements
- ✓ Real and TWA Measurements
- ✓ Simple Wi-Fi Connection
- ✓ Automatic Data logging via API
- ✓ 2.8 Inch IPS TFT Display
- ✓ Adjustable 0-10v or 2-10v Output
- ✓ Adjustable Relay Output & Alarm
- ✓ Online & Offline Connection
- ✓ Remote Software Updates
- ✓ Dual Power Terminals (AC or DC)



Installation, Operation & Maintenance Manual

Please read this manual carefully and retain for future use.

For specific requirements that may deviate from the information in this guide – contact your supplier.

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⚠ Important Warning Statements

All warning statements throughout this manual are listed here for reference.

- ⚠ Please take the time to thoroughly read the instructions, which should be retained for future reference.
- ⚠ IAQ monitors are shipped pre-calibrated and configured.
- ⚠ The expected operational life is 10 years upon initial power dependant on environmental factors.
- ⚠ This device will indicate its end of operational life and should immediately be replaced.
- ⚠ This device is not designed to detect smoke, fire or other gases and should not be used as such.
- ⚠ This device requires a continual supply of electrical power – it will not work without power.
- ⚠ This device should not be used to substitute proper installation, use and maintenance of ventilation/exhaust systems.
- ⚠ Multiple devices may be required to adequately protect property and persons.
- ⚠ This device is for indoor use only.
- ⚠ Installation must be carried out by a licenced, insured contractor in accordance with the recognised standards of the appropriate authority in the country concerned.
- ⚠ Ensure that monitors are not exposed to liquid contamination.
- ⚠ Avoid conditions of any other environmental factors outside of the specification that could potentially impede the accuracy and operation of the monitor such as condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference, and draft zones.
- ⚠ Access to the interior of the device, when carrying out any work, must be conducted by trained personnel.
- ⚠ If mounting direct to wall - ensure the wall surface is flat to prevent base distortion.
- ⚠ Ensure the rear base is installed in the correct orientation as described.
- ⚠ Where cable glands/conduits are used for wire entry, use no bigger than 20mm (3/4") separated by at least 20mm (1/2"). Any parts that form part of the connections/installation must have a minimum fire-retardant rating of UL 94V-2.
- ⚠ Damage to PCBs when creating cable entry points or attempting to remove may void any warranty.
- ⚠ Restrain the hazardous live wiring from accidental loosening to prevent wires from moving after installation and touching parts of opposite polarity or at low voltages.
- ⚠ Isolate the equipment from all hazardous live power sources before opening the cover.
- ⚠ A switch or circuit breaker must be fitted, it must be accessible and marked as the disconnecting device for the IAQ!
- ⚠ Installation must be in accordance with recognised standards of the appropriate authority concerned.
- ⚠ Installation should occur after the area has been plastered, decorated and any flooring fitted.
- ⚠ This unit may not fully safeguard individuals with specific medical conditions. If in doubt, consult a doctor.
- ⚠ You may experience connection issues if you are using a Virtual Private Network (VPN).
- ⚠ Your device may automatically try to reconnect to an existing Wi-Fi network. To help this issue, delete/forget any known networks until a connection to the IAQ has been established.
- ⚠ IP addresses must be entered in a web browser rather than a search engine.
- ⚠ You do not need an internet connection to link your IAQ Monitor to external device(s).
Your product should reach you in perfect condition, if you suspect it is damaged, contact your supplier.

Manufacturer's Warranty

Warranty coverage: The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of twelve months (1 year) from date of purchase.

The manufacturer's liability hereunder is limited to replacement of the product with repaired product at the discretion of the manufacturer. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material or workmanship. This warranty extends to the original consumer purchaser of the product only.

Warranty disclaimers: Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and intended operational purpose, are limited in duration to the above warranty period. In no event shall the manufacturer be liable for loss of use of this product or for any indirect, special, incidental, or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire, or explosion. This warranty does not affect your statutory rights.

Warranty Performance: During the above warranty period, your product will be replaced with a comparable product if the defective product is returned together with proof of purchase date. The replacement product will be in warranty for the remainder of the original warranty period or for six months – whichever is the greatest.

Installation

Typical Application & Location

- ⚠ Installation must be carried out by a licenced, insured contractor in accordance with the recognised standards of the appropriate authority in the country concerned!
- ⚠ Avoid conditions of any other environmental factors outside of the specification that could potentially impede the accuracy and operation of the monitor such as condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference, and draft zones!
- ⚠ Access to the interior of the monitor, when carrying out any work, must only be conducted by trained personnel!

Intended for indoor commercial and public areas to monitor multiple local environmental and air quality factors; temperature, relative humidity, atmospheric pressure, carbon dioxide (CO₂), Particulate Matter levels and Volatile Organic Compounds (VOC). The IAQ Monitor is wall mounted and provides a 0-10v output used to drive ventilation or other systems and a relay output for integrating with a BMS (Building Management System).

Monitors should be installed in areas where good air quality is paramount, located in positions determined by those who have knowledge of air dispersion, the process plant system and equipment involved, and in consultation with both safety and electrical engineering personnel. Take in to account the design of the airflow patterns within the area. Monitors must be installed in the correct orientation, as recommended, and ease of access should be accounted for to allow for any forms of maintenance throughout its operating life.

Air Quality scores are based on the measured values of; CO₂ (Carbon Dioxide), Particulate Matter, Humidity & VOC (Volatile Organic Compounds). Scores are calculated and indicated in real time, in addition averages are calculated over one (1) and eight (8) hour time periods based on exposure levels determined by world leading scientists, universities, businesses, governments and governing bodies to develop our scoring method. Scores within a space can vary throughout the day due to changes in number of occupants, activities being performed or ventilation rates in the space. The opening and closing of doors and windows can also have an effect. It is best to position monitors at head height and away from windows, doors, or air supply openings.

Monitors that are positioned too close to people may give a misleadingly high reading due to the CO₂ in exhaled breath. Monitors should therefore be positioned at least 500mm away from room occupants.

Instantaneous or 'snapshot' score readings can be misleading, therefore reviewing data of the API should be taken throughout the day, week, or month, depending on what is happening within the space. The frequency of measurements should be sufficient to ensure that changes in the use of the room or space throughout the day are represented in the readings.

How to get the most accurate readings

1. Allow the IAQ to stabilise within its environment for 1 hour after installation.
2. Review data measurements at key times throughout the working day.
3. Record number of occupants, the type of ventilation in use at the time and the date. These will help you use the API data records to decide if an area is poorly ventilated.

Monitoring Factors

Effects of Carbon Dioxide (CO₂)

Many people live with high carbon dioxide levels in their buildings, cars, and offices without ever knowing it. However, recent studies show that common indoor carbon dioxide exposure can reduce cognitive and decision-making performance up to 50%. The Earth's atmosphere is about 400 parts per million or ppm (0.04) carbon dioxide. Scientists estimate that before human industrial activity, Carbon Dioxide concentration was around 270 PPMV (part per million by volume). This means that CO₂ levels in our atmosphere have risen about 40% since the onset of industrialization.

When we breathe out, the air is 100 times more concentrated in carbon dioxide, around 40,000 ppm (4.0). As you might guess, this can become problematic when you are sleeping or working in a room without adequate ventilation.

At room temperature and atmospheric pressure CO₂ is a colourless and odourless gas and, because of this, people are unable to see it or smell it at elevated concentrations. CO₂ is not flammable and will not support combustion. As the concentration of CO₂ in air rises it can cause headaches, dizziness, confusion, and loss of consciousness. Since CO₂ is heavier than air, fatalities from asphyxiation have occurred when, at extremely high concentrations, it has entered confined spaces such as tanks, sumps or cellars and displaced oxygen.

What is 'PM' and why measure it?

Particulate matter (PM) is everything in the air that is not a gas and therefore consists of a huge variety of chemical compounds and materials, some of which can be toxic. Due to the small size of many of the particles that form PM some of these toxins may enter the bloodstream and be transported around the body, lodging in the heart, brain, and other organs. Therefore, exposure to PM can result in serious impacts to health, especially in vulnerable groups of people such as the young, elderly, and those with respiratory problems.

As a result, particulates are classified according to size. The IAQ Monitor focuses on measuring the fractions of PM where particles are 10 micrometres in diameter (PM₁₀), less than 2.5 micrometres in diameter (PM_{2.5}) and less than 1.0 micrometres (PM_{1.0}) is measured in micrograms (one millionth of a gram) per cubic meter of air or µg/m³.

What is VOC?

Volatile organic compounds (VOC) are compounds that easily become vapours or gases. VOCs are released from burning fuel such as gasoline, wood, coal, or natural gas. They are also released from many consumer products such as cigarettes and solvents. VOCs are a group of carbon-based chemicals which evaporate easily at room temperature. We use thousands of these chemicals in products, and while some of them have an odour, others have no smell. Some are also created biologically by plants, including some moulds found around the workplace.

Some of the most common VOCs include benzene, acetone, ethylene glycol, formaldehyde, methylene chloride, perchloroethylene, toluene, xylene, and 1,3-butadiene. These can be found in paints, solvents, upholstery fabrics, carpets and adhesives, varnishes, vinyl floors, cleaning chemicals, air fresheners and cosmetics. At any one time, there could be from 50 to hundreds of individual VOCs in the air.

If you have asthma or another respiratory condition, young children, or an elderly person in the house, you should find out about Volatile Organic Compounds (VOCs). These are the groups of people who are potentially susceptible to the effects of VOCs. As with other pollutants, the

extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed.

The IAQ measures VOCs to an index that determines the intensity, duration, and frequency of VOCs.



Temperature & Relative Humidity

Temperature and humidity are closely linked. Relative humidity refers to the ratio of the amount of moisture present in the air and the maximum amount it can hold. If the weather is cold, the relative humidity may drop low. If the weather forecast of the day states that the relative humidity can reach 100%, it means that the area is most likely to experience rain.

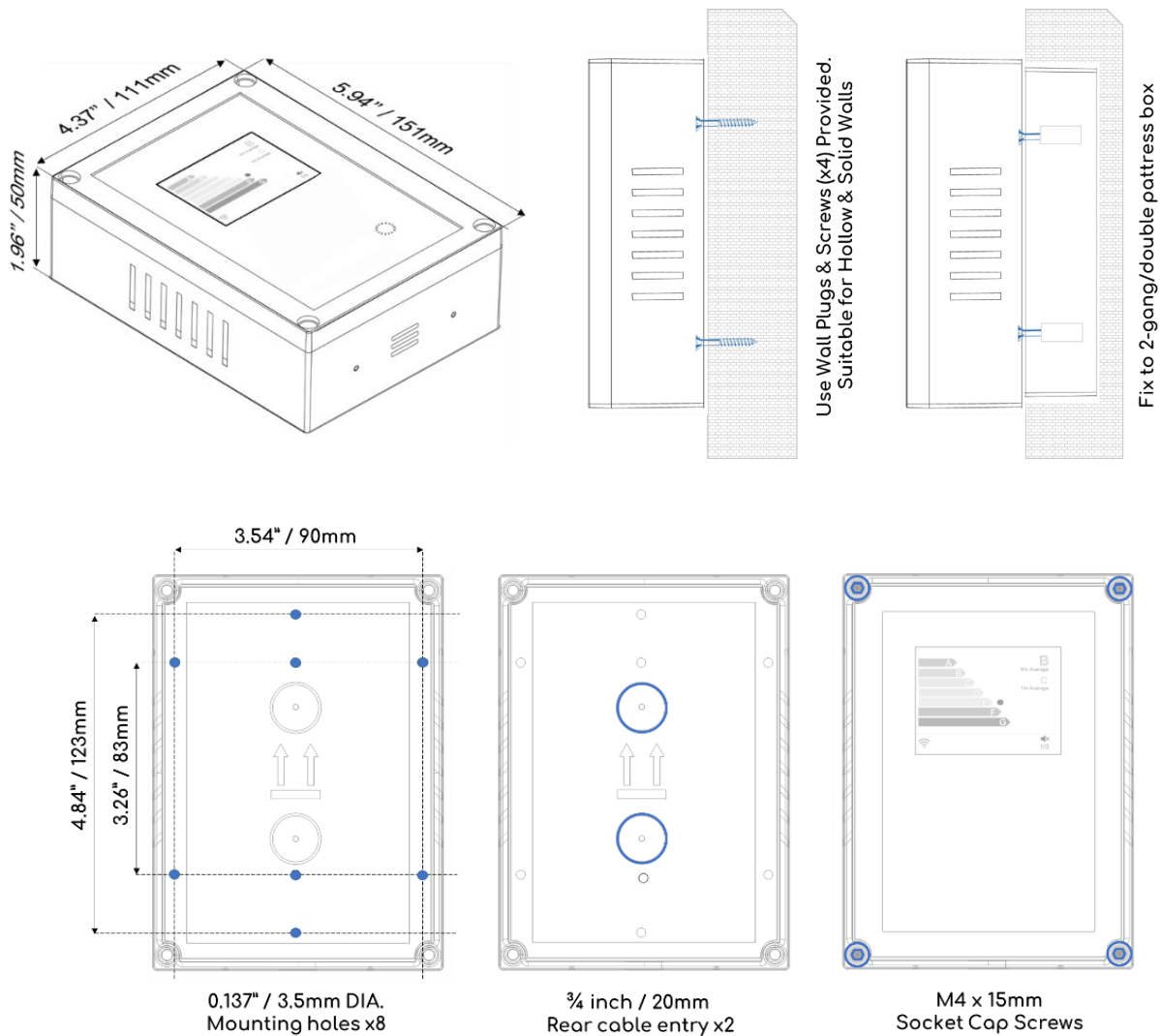
No matter what time of year it is or what indoor and outdoor temperature is, your humidity levels should stay between 40 to 70 percent. If your indoor humidity levels are low or less than 30 percent, it'll get too dry in the building, and this is called dry air. When this occurs, dry air results in dry skin, nosebleeds, and sore throats. At most times, dry air will make you feel warm, rather than cold.

How does atmospheric pressure affect humans?

As the pressure decreases, the amount of oxygen available to breathe also decreases. At very high altitudes, atmospheric pressure and available oxygen get so low that people can become sick and even die. In addition to cold weather, blood pressure may also be affected by a sudden change in weather patterns, such as a weather front or a storm. Your body, and blood vessels, may react to abrupt changes in humidity, atmospheric pressure, cloud cover or wind in much the same way it reacts to cold.

Mounting & Cabling

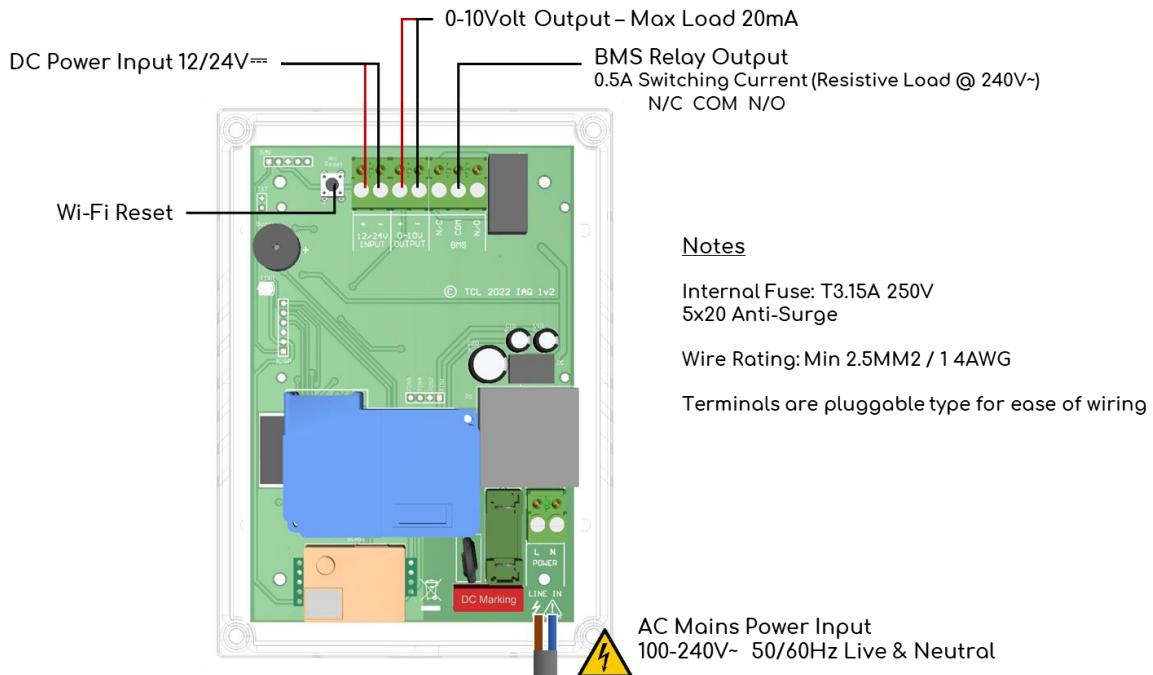
- ⚠ If mounting direct to wall - ensure the wall surface is flat to prevent base distortion!
- ⚠ Ensure the rear base is installed in the correct orientation as shown!
- ⚠ Where cable glands/conduits are used for wire entry, use 20mm (3/4 inch) max separated by at least 20mm!
- ⚠ Any parts that form part of the connections/installation must have a minimum fire-retardant rating of UL94V-2!
- ⚠ Damage to PCBs when creating cable entry points may void any warranty!
- ⚠ Any damage attempting to remove the circuit board may void any warranty!
- ⚠ The monitor is designed for either surface mounting or mounted on a one or two gang electrical box.
- ⚠ Restrain the hazardous live wiring from accidental loosening to prevent wires from moving after installation and touching parts of opposite polarity or at low voltages!
- ⚠ Isolate the equipment from all hazardous live power sources before opening the cover!



1. Carefully remove the front cover from the unit by using an M3 socket wrench.
2. Using the rear base - mark mounting holes to the wall or align with an appropriate 2gang /pattress box.
3. Fixing straight to wall – drill 0.2\"/>

Circuit Board Overview

- ⚠ Installation must be in accordance with recognised standards of the appropriate authority in the country concerned!
- ⚠ Access to the interior of the monitor, when carrying out any work, must only be conducted by trained personnel!
- ⚠ Before carrying out any work ensure local regulations and site procedures are followed!
- ⚠ Damage to PCBs when creating cable entry points or attempts to remove the board may void any warranty!
- ⚠ Restrain the hazardous live wiring from accidental loosening to prevent wires from moving after installation and touching parts of opposite polarity or at low voltages!
- ⚠ Isolate the equipment from all hazardous live power sources before opening the cover!
- ⚠ A switch or circuit breaker must be fitted, it must be accessible and marked as the disconnecting device for the IAQ!



Circuit Board Connections

- ⚠ Isolate the equipment from all hazardous live power sources before opening the cover!
- ⚡ **Mains AC Power Input**
100-240V~ supplied to the [POWER] connector (Live & Neutral) using a 2-core single-phase cable fused at 3A. Use a 3A Fuse Spur isolation switch.
- **DC Power Input**
Power can alternatively be supplied via the [12/24V INPUT] connector (+ -).
- **0-10V Output**
This output is to regulate external fan speed controllers or other ventilation systems and is driven by the real time air quality score A-G score chart. See 0-10V output range.
- **BMS Output**
Connections are available on the board for Building Management Systems. This is a volt free connection. This relay changes state when the IAQ Monitor enters a desired air quality score and can be used in conjunction with other relays that affect other devices/controls such as purge fans, fire panels and audible alarms etc. The relay can be configured to switch at any air quality score (A-G) when the IAQ monitor is connected to a device.

0-10V Output Range

0-10V output is driven by the real time air quality score A-G score chart.

Selectable outputs are 0-10 and 2-10V and configurable in the settings when connected to the IAQ monitor. The outputs are based on the following table.

Score	0-10 Output (V)	2-10 Output (V)
A	0	2
B	1.66	3.33
C	3.33	4.66
D	5.0	6
E	6.65	7.33
F	8.33	8.66
G	10	10

Factory Set Condition

To adjust any parameters the IAQ Monitor must be connected to a device.

See section: Initial Connection

Setting	Default Condition	Explanation
0-10V Output Range	0-10V	Switch between 0-10 & 2-10v output range according to real-time air quality score.
BMS relay switches @	D	Select which real-time air quality score the BMS relay will switch at.
Buzzer alarm audible @	None	Select which real-time air quality score the internal audible buzzer will alarm at.
Backlight adjustment	Auto Backlight: Off @ 100%	Adjust the screen brightness & automatic dimming feature.
Temperature adjustment	0 (°C)	Adjust the ± temperature according to the immediate environment for improved accuracy.

Wi-Fi Reset Button

The reset button, when held for ~3 seconds resets the Wi-Fi status to a factory condition.

All Wi-Fi network and password data is deleted. This can be used when changing networks or moving the monitor to a new location etc.

This feature is also available when connected to the IAQ.

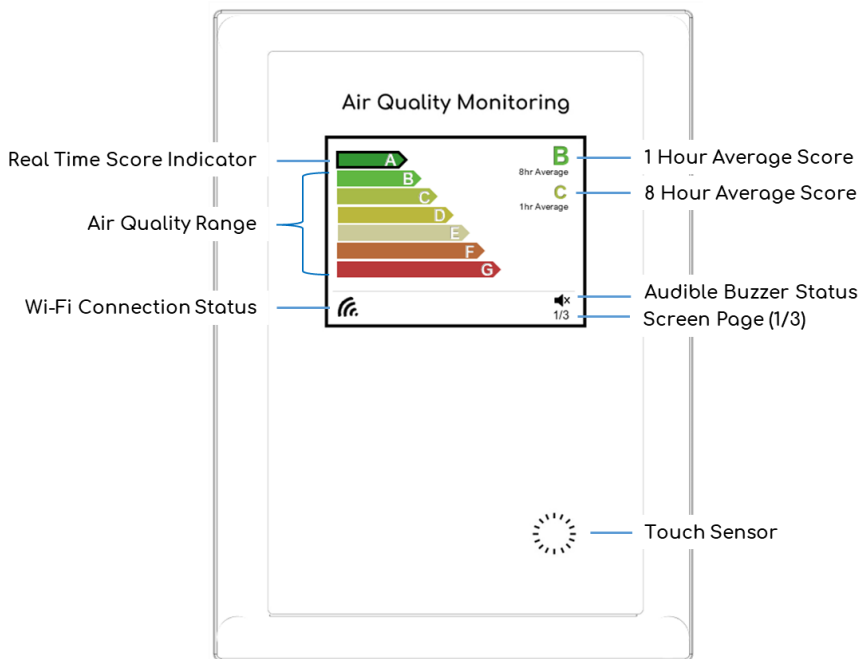
See section: Connected Features Overview.

Operation

Initial Power Up – Main Screen (1/3)

- ⚠ CO₂, PM & VOC sensors require up to one minute to acclimate and provide accurate readings upon each power-up.
- ⚠ Temperature and humidity take approximately 30 minutes to acclimate to the environment and stabilise.

On connecting mains power, the IAQ Monitor will shortly display the unique serial number of the unit, software version and I.P address followed by the main screen.



The main screen (1/3) indicates the IAQ air quality scores. Scores are based on the measured values of; CO₂ (Carbon Dioxide), Particulate Matter, Humidity & VOC (Volatile Organic Compounds). Scores are calculated and indicated in real time and averages are calculated over one (1) and eight (8) hour time periods based on exposure levels determined by national and international governing bodies. In addition to air quality indicators, Wi-Fi connection and audible alarm statuses are also displayed at the bottom of each screen.

The score system is based on the following table.

Element	Air Quality Range							Unit
	A	B	C	D	E	F	G	
CO ₂	400-500	501-600	601-800	801-1200	1201-1800	1801-1999	>2000	ppm
PM1.0	0	1-3	4-8	9-13	14-18	19-24	>25	µg/m ³
PM2.5	0-2	3-4	5-8	9-13	14-18	19-24	>25	µg/m ³
PM10	0-4	5-10	11-15	16-20	21-30	31-44	>45	µg/m ³
VOC	0-50	51-150	151-250	251-300	301-350	351-450	451-500	Index
Humidity	40-70	39-35 71-75	34-30 76-79	29-20 80-81	19-18 82-84	18-11 85-89	<10 >90	% RH

Air Quality scores are based on the measured values of; CO₂ (Carbon Dioxide), Particulate Matter, Humidity & VOC (Volatile Organic Compounds). Scores are calculated and indicated in real time, in addition averages are calculated over one (1) and eight (8) hour time periods based on exposure levels determined by world leading scientists, universities, businesses, governments and governing bodies to develop our scoring method. Scores within a space can vary throughout the day due to changes in number of occupants, activities being performed or ventilation rates in the space. The opening and closing of doors and windows can also have an effect. It is best to position monitors at head height and away from windows, doors, or air supply openings.

Monitors that are positioned too close to people may give a misleadingly high reading due to the CO₂ in exhaled breath. Monitors should therefore be positioned at least 500mm away from room occupants.

Instantaneous or 'snapshot' score readings can be misleading, therefore reviewing data of the API should be taken throughout the day, week, or month, depending on what is happening within the space. The frequency of measurements should be sufficient to ensure that changes in the use of the room or space throughout the day are represented in the readings.

How to get the most accurate readings

1. Allow the IAQ to stabilise within its environment for 1 hour after installation.
2. Review data measurements at key times throughout the working day.
3. Record number of occupants, the type of ventilation in use at the time and the date. These will help you use the API data records to decide if an area is poorly ventilated.

Switch Screens & Enable/Disable Alarm



Touch once: Switch between the screens.
Press and hold: Enable/disable the audible alarm.

Screen 2/3:

Gives an overview of monitoring data in real time. Data is refreshed every ~3 seconds.

Screen 3/3:

Provides instructions to setup an initial connection, or once connected – network details.

Initial IAQ Connection

- ⚠ You may experience connection issues if you are using a Virtual Private Network (VPN).
- ⚠ Your device may automatically try to reconnect to an existing Wi-Fi network during setup blocking the IAQ connection. To help this issue, delete/forget any known networks until a connection to the IAQ has been established.
- ⚠ IP addresses must be entered in a web browser rather than a search engine.

Once connected, the user can view measurements remotely in real time, set up their own Wi-Fi network, view IAQ unit details and configure the monitor to suit its application.

Initial Connection

1. Open your Wi-Fi networks on your device.
2. Select the appropriate IAQ Serial Number i.e., **IAQ0322999900##**
3. Enter Password: **12345678**
4. Enter IP address **192.168.4.1** into your device's web browser or, scan the QR code.



Connected Features Overview

Once connected to the IAQ Monitor you will be offered four features:

Home

- View monitoring data in real time. Data is refreshed every ~3 seconds.

Wi Fi

- Link the IAQ Monitor to Wi-Fi network/router.
- Automatically enable the data logging system.

Settings

- Adjust screen brightness & temperature.
- Configure 0-10v output & switching relay.
- Adjust alarm buzzer threshold.

About

- View IAQ Monitor unit details.
- Check for and update the IAQ software.
- Reset the IAQ Monitor to a factory condition.

Connect to a Wi-Fi enabled Network

1. Select **[Wi-Fi]** feature & press/select the appropriate network.
2. Enter the [Password] for the chosen network & [Submit].
3. The monitor will automatically restart.
(Initial IP address is now redundant until a factory or Wi-Fi reset is performed).
4. The Wi-Fi icon and signal strength now appears at the bottom of the screen of the IAQ Monitor.
5. The IAQ now has its own unique, dedicated IP address permanently displayed on screen 3/3.
6. Enter or scan this new IP address into your browser to reconnect via the chosen Wi-Fi network.

Automatic Data Logging

⚠ Operation resumes after a short period should connection/data submission issues occur.


When a Wi-Fi network is established and online – the IAQ Monitor automatically sends and stores the measured data to a dedicated server. The speed of data transfer depends on the signal strength of the Wi-Fi connection but usually this operation occurs at a fraction of a second every minute.

This data can be highly beneficial for the analysis and identification of trends and issues affecting the environmental/air quality aspects relevant to the monitoring application and intended use.

For more information contact your S&S Northern Ltd representative.

General Maintenance


Cleaning

-  Concentrations of alcohol found in many products may damage, deteriorate, or affect the sensing elements such as wine; deodorants; stain removers and thinners. Other gases and substances to avoid are corrosives (i.e., chlorine & hydrogen chloride); alkali metals; basic or acidic compounds; silicones; tetraethyl lead; halogens and halogenated compounds!

Keep your indoor air quality monitor in good working order - follow these basic principles.

- Remove any dust/debris from the outer enclosure regularly using a slightly dampened cloth.
- Never use detergents or solvents to clean your device.
- Never spray air fresheners, hair spray, paint or other aerosols near the device.
- Never paint the device. Paint will interfere with the device.


End of Operational Life (EOL)


-  The EOL is approximate and may vary depending on its application and environmental conditions such as the frequency of exposure to the target element, poisons, or inhibitors!

The operational life can be prolonged if the system and equipment is installed and maintained in accordance the instructions stated within this manual.

At the end of its predicted operational life – the monitor will display an ‘End of Life’ screen. This message indicates that the monitor has reached its expected operational lifecycle. Contact your supplier immediately for replacement.

Information on Disposal

-  At the end of its life, this device must be treated as Waste Electrical & Electronics Equipment (WEEE).

 Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Please contact your supplier or local authority for details of recycling schemes in your area. Alternatively, S&S Northern Ltd offer a free take back service.

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Specification

Model:	IAQ Monitor
Target Elements:	Temperature/Room Humidity/Atmospheric Pressure/Carbon Dioxide/Particulate Matter/VOC
Size: (H x W x D)	151 x 111 x 50mm / 5.95 x 4.37 x 1.97"
Housing Material:	ABS - PA765. Flame Retardant UL 94V-1
Mounting:	Safe Zone - Indoor use - Wall Mounted
Weight:	0.385kg
Display:	2.8" IPS TFT
Screen Brightness:	Adjustable
Audible Alarm:	>70dB @ 3.28ft (1m). Quiet conditions.
Language:	English
Consumption:	2.5W max
AC Power Rating:	100-240v 50-60Hz
DC Power Rating:	12/24v
Wi-Fi Module	2.4G TX & RX Frequency 2412-2472 MHz / 2422-2462 MHz
Emissions class:	A
Internal Fuse:	T3.15A L250V
Volt Free output:	0.5A Switching current (resistive load) @ 240V
Overvoltage Category:	II
Pollution Degree:	2
Operating:	-10 ~ 50°C / 14 ~ 122°F 30 ~ 95% RH (non-condensing)
Storage:	0 ~ 40°C / -13-122F° up to 95% RH (non-condensing)
Altitude Rating:	2000m
Typical:	Min 2.5mm ² (8-14AWG) / 75°C min / Tinned copper.
Certification	BS EN 61010-1:2010 +A1:2019. BS EN 61326-1:2013. ETSI EN 301 489-1/17

Installation Details

Please pass this manual to the system owner / user.

Date of Installation:	
Installation Location:	
Organisation:	
Stamp/Signature of the installer:	

Every effort is made to ensure the accuracy of this document; however, **S&S Northern Ltd** can assume no responsibility for any errors or omissions in this document or their consequences. **S&S Northern Ltd** would greatly appreciate being informed of any errors or omissions that may be found in the content of this document. For information not covered in this document, or if there is a requirement to send comments, please contact us using the contact details given below.

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