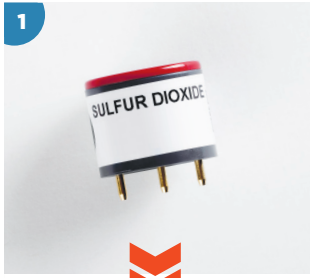
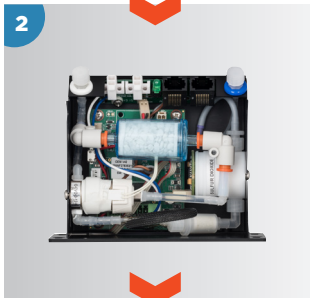


Near Reference refers to a combination of technologies – underpinned by Aeroqual's unique intellectual property – that allow the AQM and AQS products to take ambient air quality measurements very close to those of traditional 'reference' analyzers.



Sensor Selection

At Aeroqual, we only select the very best sensor for the target gas and application. Because we manufacture sensors we know what to look for when assessing sensors from other manufacturers. Over the last decade we have tested hundreds of sensors (including our own) against strict criteria – for selectivity, sensitivity and stability. Lab testing is followed by testing in real field conditions, in hot dry conditions, cold and wet and everything in between. During sensor testing we characterise a sensor's strengths and weaknesses, which informs the next stage of design – the sensor module.



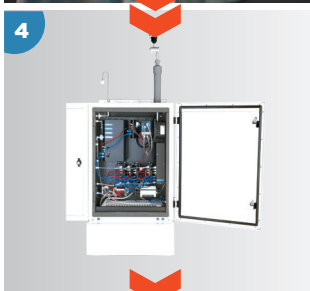
Sensor Module Design

Each sensor-based analyzer module is designed to compensate for a sensor's weaknesses and to extend its operating life. A module contains a sensor and several other components, which explains why the module is much larger than just a sensor would require. For example, the SO₂ module includes the sensor plus: a flow control orifice, solenoid, scrubbers, humidity equalizer, and electronics. These additional components compensate for sensor drift, noise, humidity and cross interference, and greatly reduce the minimum detection limit in real world conditions. A module is more like an analyzer than other air quality sensors on the market which is why we call them 'sensor-based analyzer modules'.



Factory Calibration

High measurement accuracy starts with a high quality calibration. The sensor modules are calibrated against gas standards prepared under ISO 6143 to ensure traceability to reference materials from National Metrology Institutes. Gas mixtures are prepared by dilution using calibrated mass flow controllers and zero grade air and delivered to the sensors via inert PTFE tubing. We generate ozone in air mixtures using a UV source and then use a reference UV photometer as our calibration standard. This instrument is regularly checked against a secondary transfer standard whose traceability is maintained to a BIPM/NIST Standard Reference Photometer. Our calibration procedures are regularly checked by ISO9001 and MCERTS auditors.



Temperature Control

Many (but not all) air quality sensors are sensitive to changes in temperature. Small changes in ambient temperature may not affect ppm level measurements but can seriously affect measurements at the ppb level. In the AQM 65 we compensate for this by keeping the sensor modules at a constant temperature (30°C +/- 0.2°C). The internal airflow is managed so that the temperature is consistent at every point inside, including the corners. Careful control of the internal temperature means the AQM 65 can operate in a wide range of climates, from tropical to subarctic. In the AQS 1 we only use sensor modules that do not exhibit temperature interference.



Active Sampling System

Active sampling starts with the stainless steel inlet on top of the enclosure. The inlet is lined with an inert material that ensures no target pollutant is lost. From there sample air is passed through a PTFE filter that removes particulate, protecting the sensors and extending their life. A sampling manifold delivers air to each module independently. Air is drawn continuously by a brushless DC pump. This pump works together with the flow control orifice in each module to deliver a precise flow of air to the sensor. Knowing the exact flow rate allows a higher degree of confidence in the measurement. Exhaust gas is released well away from the inlet to ensure no impact on the inlet sample.



Field Calibration

Unlike all other sensor-based air quality monitors, the AQM / AQS products are designed to be calibrated in the field. They can be field calibrated using the same standard reference materials as a US EPA / EU certified analyser (i.e. calibration gas and dilution calibrators). Field calibration at the sampling location ensures that the measurements are traceable and the air quality data is robust and defensible. A calibration record is automatically captured in the AQM / AQS digital journal (accessible online in real-time). The AQM 65 can be calibrated using a fully integrated, automatic calibrator; a portable calibrator option is available for both the AQM and AQS products.