

AIR QUALITY MONITORING SYSTEM FOR SMART CITIES - UniTesS AQM-03



Product description

AQM-03 is designed to measure the concentration of toxic gases SO₂, NO₂, O₃, CO, total volatile organic compounds and the mass concentration of particulate matter in the ambient air.

The devices are equipped with a robust, weatherproof, metal housing. Inside the case, the device consists of measurement units, a power supply and a data processing unit, which includes a software system for remote technical support, data management and analytics. The AQM-03 also contains a battery pack, which allows the device to be kept in working order for 6 hours in the event of a power failure.

The device is serviced by qualified personnel.

Declaration of conformity

AQM-03 has been tested for electrical safety and electromagnetic compatibility and meets the relevant safety and electromagnetic compatibility requirements set out in TR TS 004/2011 and TR TS 020/2011.

The radio module of the AQM-03 complies with the requirements set in TR 2018/024/BY "Telecommunication facilities. Safety".

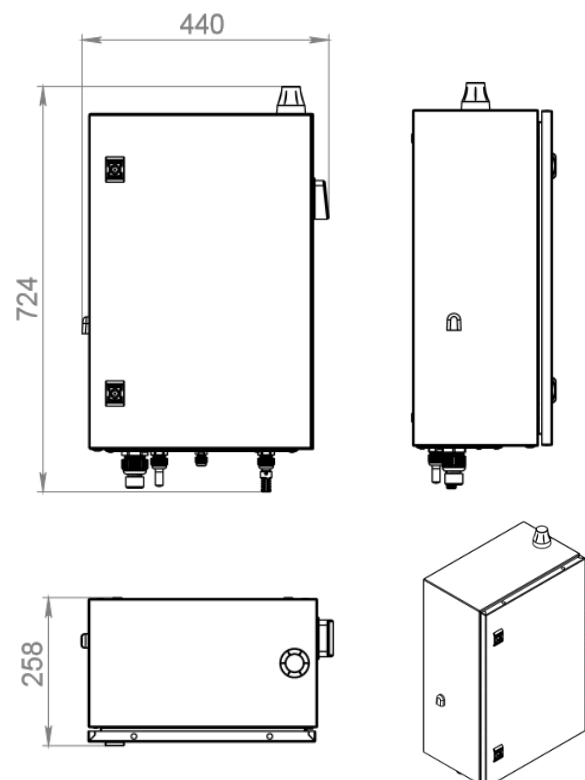
Sheath protection degree

The AQM-03 is a wall box with IP34 enclosure protection.

Functional blocks are installed inside the AQM-03:

- Block for processing, storing and transmitting data, IP65;
- Power Supply, IP65;
- Battery pack, IP65;
- Gas measurement unit, IP34;
- PM measurement unit, IP34.

Dimensions





Technical and metrological characteristics

Name and units of measure of characteristics	Feature value	
	AQM-03	AQM-03-1
Measurement range, ppm:		
SO ₂	0 - 10	
NO ₂	0 - 10	
O ₃	0 - 18	
CO	0 - 32	
Total Volatile Organic Compounds	0 - 25	
Detection limit, ppb:		
SO ₂	35	
NO ₂	20	
O ₃	20	
CO	800	
Total Volatile Organic Compounds	100	
Limits of the reduced error in the range, %:		
SO ₂ (0 - 1 ppm)	15	
NO ₂ (0 - 1 ppm)	15	
O ₃ (0 - 2 ppm)	15	
CO (0 - 3 ppm)	15	
Total Volatile Organic Compounds (0 – 2.5 ppm)	30	
Limits of relative error in the range, %:		
SO ₂ (1 - 10 ppm)	15	
NO ₂ (1 - 10 ppm)	15	
O ₃ (2 - 18 ppm)	15	
CO (3 - 32 ppm)	15	
Total Volatile Organic Compounds (2.5 - 25 ppm)	30	
Measurement repeatability (SO ₂ , NO ₂ , O ₃ , CO), %	5	
Response time (t ₉₀), s:	60	
Particle range, μm	0.5 - 15	
Max particle count rate, particles/second	10000	
Range of indications, μg/m ³		
PM 2.5	0 - 500	
PM 10	0 - 1000	
Measurement range, μg/m ³		
PM 2.5	-	20 - 500
PM 10	-	20 - 1000
Measurement accuracy, %	±50	
Configurable parameters	PM sampling interval, measurement and data transmission intervals	
Warm-up time, min	60	
Time to enter the mode, min	60	
Supply voltage, V	(230 ± 10) %	
Power consumption, W, up to	150	
Weight, kg, up to	27	



Operation conditions

AQM-03 must be used under the following conditions:

- Ambient air temperature – from - 35°C to 40°C;
- Relative humidity - up to 95% at a temperature of 20 °C (up to 100% without condensation);
- Atmospheric pressure - from 86 kPa to 106 kPa.

Ambient sensors

The AQM-03 includes additional sensors of external conditions, which monitor the temperature, humidity and pressure of the environment.

Name and units of measure of characteristics	Feature value
Range of indications of temperature, °C	from -40 to 80
Range of indications of humidity, %	from 10 to 90
Range of indications of atmospheric pressure, kPa	from 86 to 106

Description of device action

The AQM-03 is a continuous, automatic, multifunctional instrument.

The AQM-03 has six measuring sensors that differ in their principle of operation:

- The principle of operation of sensors for measuring toxic gases SO₂, NO₂, O₃, CO is based on measuring the electrical conductivity of the electrolyte that absorbs the target gas;

- The principle of the VOC sensor is based on the ionization of gases by means of ultraviolet (UV) radiation;
- The principle of operation of the sensor for measuring the concentration of particulate matter is based on optical particle counting.

The design of the device provides for the possibility of installing the AQM-03 on a vertical flat surface or on a vertical pillar with a circular cross-section with a diameter of not more than 200 mm.

The AQM-03 operates under the control of built-in software. This software carries out the functions of collecting, processing, storing, transmitting measurement information.

The AQM-03 does not have its own display, the measurement results are transmitted to a remote server using the API.

Initial configuration is carried out using a PC connected with an Ethernet cable.

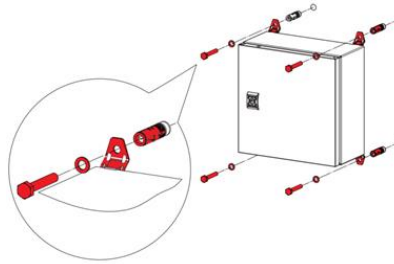
Display of measurement results on an external device is carried out using specialized software.

The products transmit information over a radio channel, which has the GPRS / E-GPRS (2G) and UMTS / HSPA / HSPA + (3G) operating modes.

In order to carry out correct and reliable measurements, the measuring channels eventually need to be calibrated with fresh air. For this, a zero air generator is provided in the design of the AQM-03, which is activated at a given periodicity.

Installation methods

Wall mounting brackets are used for installation on the building façade.



When mounting on supports, honeycomb towers and trusses, a kit is used for mounting on a cylindrical vertical or horizontal support with a diameter of up to 200 mm.



Scope of maintenance

The periodicity of some of the services may depend on environmental conditions and the periodicity of measurements. Some maintenance activities need to be done at a fixed periodicity.

Maintenance Type	Maintenance Period	Maintenance Scope
Short term maintenance procedure (Filter replacement)	14-90 days (depending on measurement period and environmental pollution)	<ul style="list-style-type: none"> • Gas inlet filter change; • PM inlet cleaning
Calibration procedure	6 or 12 months*	*Carried out according to the local regulations
Annual maintenance	12 months	<ul style="list-style-type: none"> • Replacement of the main sensors (if necessary); • Replacement of the scrubber absorbent; • Cleaning the PID sensor (if necessary); • Factory calibration.
Replacing the main measuring sensors	24 months	Mandatory replacement of measuring sensors