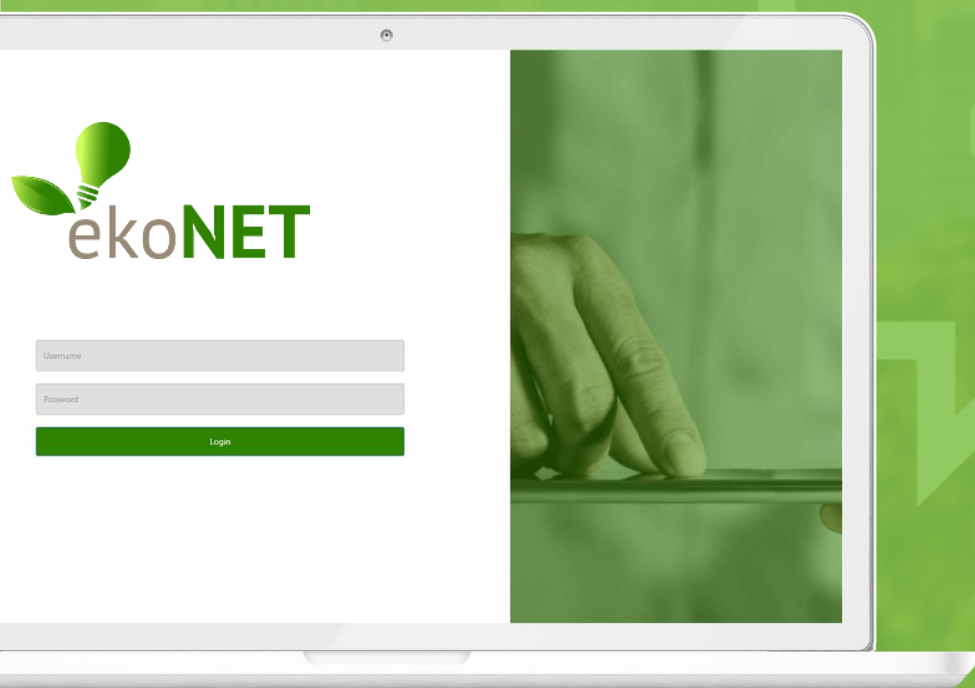


ekoNET -

Technical data sheet



www.ekonet.solutions —

DunavNET

ekoNET service is designed to provide an affordable end-to-end solution for air quality monitoring leveraging IoT (Internet of Things) and cloud technologies. The service includes all necessary components: connected device equipped with sensors for measurement of concentration of different gases in the air, cloud based storage and analytics engine as well as visualization and administration modules in the form of web and mobile applications.

ekoNET SYSTEM COMPONENTS

- Air quality monitoring devices (AQ10x device)
- Database for permanent data storage (MS Azure based)
- Data analytics engine (MS Azure based)
- Visualization engine (MS Azure based)
- Administration module (MS Azure based)
- Web and mobile applications for data visualization

SERVICES

- Technical support for AQ10x device operation and maintenance
- Sensor calibration based on “real” measurements and reference data (e.g. from air quality monitoring stations)
- Firmware parameters management (update and retrieval) is supported

Powerful reporting

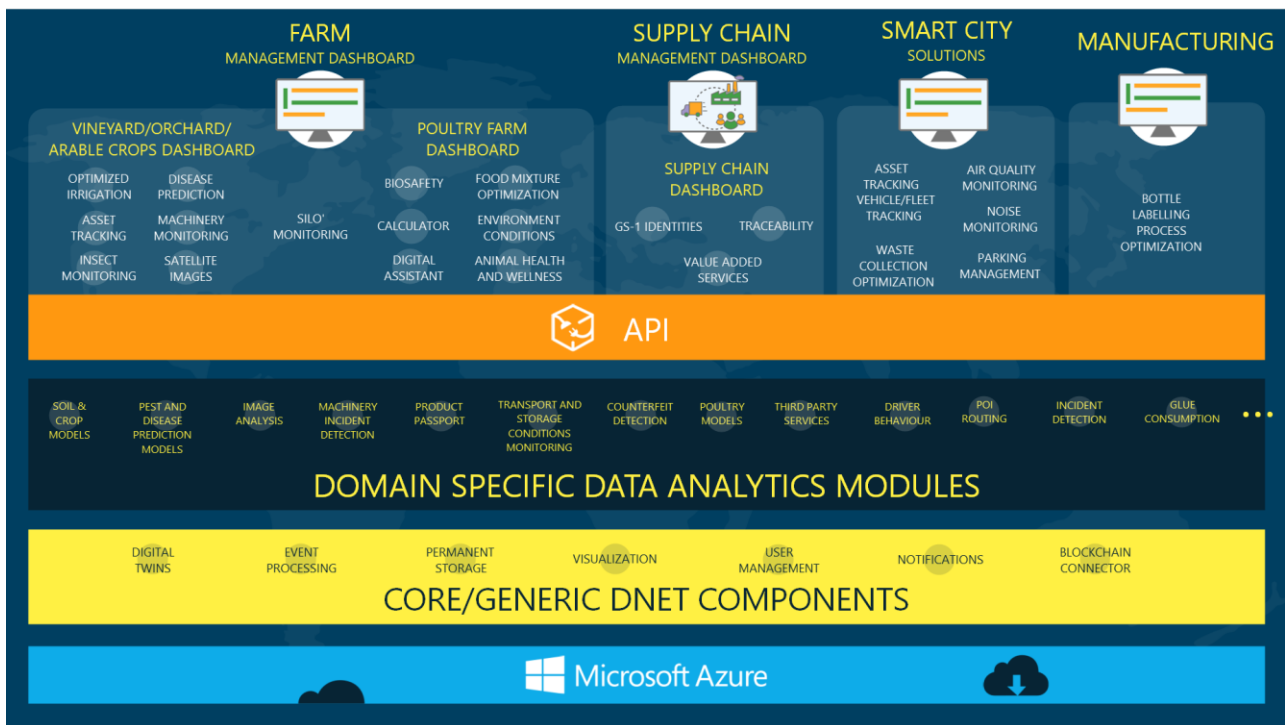
- Dashboard view to visualize real-time and historical measurements
- CAQI calculation and reporting
- Mobile app and web widget for more flexibility

Flexible configuration

- Multiple communication interfaces (WiFi, GPRS, 3G, 4G, LoRa, NB-IoT, BLE)
- Rich set of sensors to choose from (PM, NOx, SO2, CO, CO2, O3, temperature, humidity, air pressure, noise, etc.)

Secure, enterprise grade environment

- Deployed on MS Azure for security and reliability
- On ours or yours cloud subscription for increased control of private data
- GDPR compliance



AQ10X

AQ10x represents a new generation of IoT (Internet of Things) devices that enables monitoring of air quality and environment parameters in real time. It is a portable device that can be installed both indoors and outdoors as well as on the vehicles to enable larger coverage. Obtained measurements are transferred via mobile networks GPRS/3G/4G/NB-IoT, LoRa/Sigfox, WiFi or BLE (Bluetooth Low Energy) connection depending on configuration. Standard and open protocols are used for data transfer enabling connection to any information or cloud based system. For rapid deployment, AQ10x optionally comes pre-configured to work with the ekoNET could service enabling permanent data storage, processing and visualization.

AQ10x is built on a flexible hardware platform which enables easy adaptation of the device to specific customer requirements, i.e. selection of different sensors and inclusion of new functions.

AQ10X FEATURES

AQ10x contains the following components:

- Sensors for measurements of environmental parameters
- Optional GPS positioning module

- Robust industrial housing (vandal proof)
- Mains power supply available. In addition, optimal power consumption is supported with rechargeable solar battery supply.
- Real time data transfer (via GPRS/3G/4G/NB-IoT, LoRa/Sigfox, WiFi, BLE)

MEASUREMENTS

- Sensors for the environment monitoring (temperature, humidity, pressure)
- Sensors measuring the air quality (CO, CO₂, NO, SO₂, NO₂, O₃, PM-Particulate Matter)
- Noise sensor

Easy replacement and upgrade with the new sensors.

AQ10X SENSORS

| Sensors (Producer) | Part-ID | Specification |
|--|-------------------------|--|
| Temperature (Bosch) | BME280 | Operating range: - 40 to 85°C |
| Humidity (Bosch) | BME280 | Operating range: 0 ~ 100 %RH (Non-Condensing) |
| Pressure (Bosch) | BME280 | Operating range: 30-110 kPa |
| Carbon-monoxide (Alphasense) | CO-B4 | Range 0-1000ppm, 420 to 650 nA/ppm at 2ppm CO, -30°C to 50 °C, 80-120 kPa |
| Carbon-dioxide (Alphasense) | CO ₂ -IRC-AT | Range 0-5000ppm (IAQ), 4 to 7 mV @ 3Hz, 50% duty cycle, -20°C to 50°C, 0 to 95% rh non-condensing |
| Nitrogen-monoxide (Alphasense) | NO-B4 | Range: 20 ppm NO limit, Sensitivity: 500 to 850 nA/ppm at 2ppm NO, Range: -30°C to 50 °C, 80-120 kPa |
| Nitrogen-dioxide (Alphasense) | NO ₂ -B4 | Range: 20 ppm NO ₂ limit, Sensitivity: -250 to -600 nA/ppm at 2ppm NO ₂ , -30°C to 50 °C, 80-120 kPa |
| Ozone (Alphasense) | O ₃ -B4 | Range: 5 ppm O ₃ limit, Sensitivity: -250 to -550 nA/ppm at 100 ppb O ₃ , -20°C to 50°C, 80-120 kPa |
| Sulfur-dioxide (Alphasense) | SO ₂ -B4 | Range: 100 ppm SO ₂ limit, Sensitivity: 275 to 475 nA/ppm at 2 ppm SO ₂ , -30°C to 50°C, 80-120 kPa |
| Particulate matter (Alphasense) | OPC-N2 | Particle Range (µm): Spherical equivalent size 0.38 to 17; calculated mass (in µg/m ³) of all particles below 1µm, 2.5µm and 10µm in size); -10°C to 50°C; |
| Plantower | PMS7003 | Particle Range (µm): Spherical equivalent size 0.3 to 10; calculated mass (in µg/m ³) of all particles below 1µm, 2.5µm and 10µm in size); -10°C to 60°C; |
| Noise sensor | TailKuKe | Range: 40dB – 130 dB |

WEB AND MOBILE APPLICATIONS

Web and mobile phone applications are available to provide monitoring of the concentration of PM (particles), CO, CO₂, SO₂, NO_x, Ozone, temperature, humidity and noise in real time. The value of air quality index is calculated, and people are advised on how to behave in case of increased pollution.

Web applications:

- Data visualization (map, list, graph)
- Current values
- 1h values
- 24 values
- Calculated CAQI-1h and CAQI-24h (Common Air Quality Index)
- Historical values (over selected period)
- Notifications/alarms when values out of defined range
- Algorithms for data processing
- Export to CSV file (RAW, calibrated values, time, GPS ...)
- Recommendations in case of increased concentration of pollutions
- Users and devices management

Mobile applications:

The real-time data visualization on the following mobile platforms:

- Android
- iOS
- Windows



