



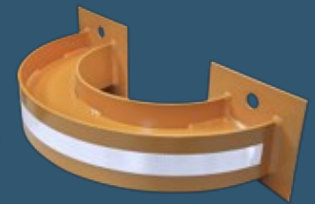
# Maestro Zephyr AQS™ AirQuality Station

Engineered for the harsh underground mine environment.



The Zephyr AQS™ is an IIoT device that accurately monitors real time environmental conditions and reports back to surface via a digital Ethernet or an analog output connection to your network. Now there's a cost effective solution for reducing downtime and getting back to the face sooner and safer.

The **Zephyr AQS™** uses best-in-class technology to make the job simple and practical.



**Zephyr AQS™** is an ultra-compact, low cost environmental air quality monitoring station for underground mines. This Industrial Internet of Things (IIoT) device connects directly to any network without the requirement of adding an expensive and complex programmable logic controller (PLC).

The **Zephyr AQS™** air quality station features three fully customer configurable *plug and play* sensor inputs that can be freely mixed and matched according to the underground requirements. Configuration is done through built-in webpages similar to that of a home network router.

All sensors that connect to the **Zephyr AQS™** utilize industry standard digital protocols.

The **Zephyr AQS™** fully supports both of the two most popular network communication protocols - Modbus TCP/IP and EtherNet/IP™. Alternately, the **Zephyr AQS™** offers optional on-board analog outputs (3 x 4-20 mA) and/or two relay outputs that can tie into any legacy system.

Measurement, full system diagnostic functions and **unmatched flexibility and simplicity puts you in the driver's seat!**

## Increases production, reduces cost and integration time

Based on direct customer feedback, **Maestro's digital products save mining companies on average 40-70% of CAPEX** compared to conventional monitoring solutions. Maestro supports its equipment with free firmware updates for life of mine. The full savings to mining clients is in the range of 70-80% over the full life cycle with no hidden hooks or costs to bear in the OPEX maintenance cycle.



# Improves mine worker safety

## Addressing the Need for Air Monitoring Requirements

The **Zephyr AQS™** will satisfy 75% of all the air monitoring requirements of a modern mine. Airflow rate, airflow direction, gas levels, barometric pressure, static and differential pressure and wet/dry bulb temperatures can be measured in real time and now affordably. The first step of any mine ventilation control project is obtaining a reliable measurement that can easily be maintained by either the ventilation or electrical department. The **Zephyr AQS™** is designed for any mine aiming to increase production, improve miner worker safety and reduce energy by monitoring ventilation air in an underground operation. This also reduces the energy demand by providing sufficient ventilation to the areas of the mine that need it and reducing air to the non-working areas. Driving value by increasing production, the **Zephyr AQS™** helps the miners back to the face quicker and safer.



### Airflow Sensors

- Digital ultrasonic transit time airflow and temperature measurements
- Bracket options for drifts, tunnels, ducting or fan applications
- On board laser alignment
- Modbus RS485 communication to Zephyr AQS™
- Maximum of 300 metres separation distance with power booster
- See individual airflow specifications sheets for additional information on ranges and accuracy

### Gas Sensors

- Digital electrochemical and infrared gas sensors
- Modbus RS485 communication to Zephyr AQS™
- Available as integral or remote mounted with a maximum of 1200 metres of separation
- CO, NO<sub>2</sub>, NO, O<sub>2</sub>, H<sub>2</sub>S, SO<sub>2</sub>, ClO<sub>2</sub>, Cl<sub>2</sub>, NH<sub>3</sub>, CO<sub>2</sub>, LEL Methane, LEL Propane, HCN sensors are available
- Real time values along with built-in TWA and STEL calculations
- See individual gas specifications sheets for additional information on ranges and accuracy



## Pressure and DP Sensors

- Digital differential pressure (DP) sensors to measure pressure across bulkheads, booster fans or regulators.
- Digital pressure sensors to measure pressure in water, compressed air and paste or back fill lines.
- Modbus RS485 communication to **Zephyr AQS™**
- Remote mounted with a maximum of 1200 metres of separation
- See individual pressure and differential pressure specifications sheets for additional information on ranges and accuracy



## Integral Humidity Sensor

- Digital humidity sensor provides measurement values of pressure compensated dry bulb and wet bulb temperature, relative humidity, worker heat stress, thermal work limit (TWL) and barometric pressure.
- Modbus RS485 communication to **Zephyr AQS™**
- Available as integral or remote mounted with a maximum of 1200 metres of separation
- See individual humidity sensor specifications sheets for additional information on ranges and accuracy



## Drive down mine OPEX using MaestroLink™ Server for simplifying maintenance

All Maestro's IoT devices utilize embedded webservers along with digital technology right to each individual sensor, enabling remote diagnostics for solving maintenance problems as well as assuring sensor calibration compliance. **MaestroLink™ Server** is a software platform that monitors all of Maestro's equipment underground and enables troubleshooting from surface as well as real-time measurements and trending functions. **MaestroLink™ Server** can detect network problems, communication problems, and sensor problems using the diagnostic data.

It saves time and cost by giving miners the ability to poll the diagnostics and then turning the data into tangible actions from surface before having to go underground. The support team will go underground the first time with the proper tools, spare parts and equipment to do the maintenance once instead of multiple trips.

This diagnostic data allows **MaestroLink™ Server** to give more in depth information regarding sensor and device problems to assist customers in fixing problems and preventing future problems, thus ensuring sensors are calibrated; notification when sensors are about to expire; and find sensors that are reading unusual or bad information.

Devices	Location	Last Communicated	Status
Vigilante AQS(1) (S1902_01H402)		11-12-2019 12:24:02	Normal Operation
Airflow 2 - Mass - 0.00 kg/s - Volumetric - 0.00 m³/s - Velocity - 0.00 m/s			Normal Operation
Gas 1 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Gas 2 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Gas 3 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Gas 4 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Gas 5 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Gas 6 - NO2 - 10ppm - 0.0 ppm STEL - 0.0 TWAL 0.0			Normal Operation
Vigilante AQS(2) (S1902_01H402)		11-06-2019 09:49:26	Communication Error: Device not responding
SF Airflow 1 - Mass - 0.00 kg/s - Volumetric - 0.00 m³/s - Velocity - 0.00 m/s			Normal Operation
Vigilante AQS(3) (S1902_01H402)		11-12-2019 12:24:05	Normal Operation

# Technical Specifications

Technical Specifications	Zephyr AQS™
<b>Physical and environmental parameters</b>	Enclosure outside Dimensions 9.63" x 7.00" x 4.13"  NEMA 4X / IP 66 enclosure rating  Operating temperature range -20 to 85° C  Push buttons and back lit tri-colour LCD display
<b>Fully digital plug and play sensors</b>	3 ports that will support gas, humidity, airflow and pressure sensor integration
<b>Standard onboard digital communication protocols</b>	Ethernet Modbus TCP/IP Modbus RS-485 serial Allen Bradley EtherNet/IP™  RJ45 connection; all values, outputs and diagnostics are available through a digital register map  Optional wireless 802.11g Optional wireless leaky feeder VHF or UHF
<b>Universal power supply</b>	Power over Ethernet (PoE) 24 VDC 120-240 VAC, 50/60 Hz CE Compliant
<b>Optional analog I/O boards</b>	Three freely configurable analogue 4 to 20 mA isolated output signals  Two Form C, SPDT, isolated relays, 120-240 VAC or 24 VDC, 8 AMP@ 250 VAC, 5 AMP@ 30 VDC

Click link to learn more about the **Zephyr AQS™** [Model Number Matrix](#).

**Maestro**  
Digital Mine



*We leave no one stranded*

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**Real time data means more time at the face**