

# Zephyr AQS™

## Air Quality Station

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





**Making the Complex Simple.**



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# Best-in-class Technology

Zephyr AQS™ is an ultra-compact, low-cost environmental air quality monitoring station designed for underground mines. This Industrial Internet of Things (IIoT) device connects directly to any network without the need to add 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 underground requirements. Configuration is done through built-in webpages, similar to those of a home network router.

All sensors connected to the Zephyr AQS™ utilize industry-standard digital protocols. The Zephyr AQS™ fully supports the two most popular network communication protocols: Modbus TCP/IP and EtherNet/IP™. Additionally, the Zephyr AQS™ offers optional on-board analog outputs (3 x 4-20 mA) and relay outputs (2), enabling integration into any legacy system.

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

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



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

# Improve Mine Worker Safety

## Addressing the Need for Air Monitoring Requirements

The Zephyr AQS™ can measure airflow rate, airflow direction, gas levels, barometric pressure, static and differential pressure, as well as wet/dry bulb temperatures in real-time, all at an affordable cost. Reliable measurements are the first step in any mine ventilation project, and the Zephyr AQS™ ensures these measurements are easily maintained by either the ventilation or electrical department. Designed for mines aiming to increase production, enhance miner safety, and reduce energy consumption, the Zephyr AQS™ effectively monitors ventilation air in underground operations. By driving value through increased production, the Zephyr AQS™ facilitates a quicker and safer return for miners to the working face.

### Airflow Sensors

Digital ultrasonic transit time airflow and temperature measurements

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Bracket options for drifts, tunnels, ducting or fan applications

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On board laser alignment

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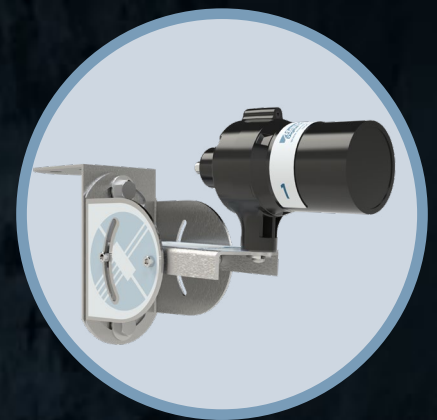
Modbus RS485 communication to Zephyr AQS™

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Maximum separation distance of 300 meters.

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See individual airflow specifications sheets for additional information on ranges and accuracy.



### Gas Sensors

Digital electrochemical and infrared gas sensors

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Modbus RS485 communication to Zephyr AQS™

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Available as integral or remote mounted with a maximum of 1200 metres of separation

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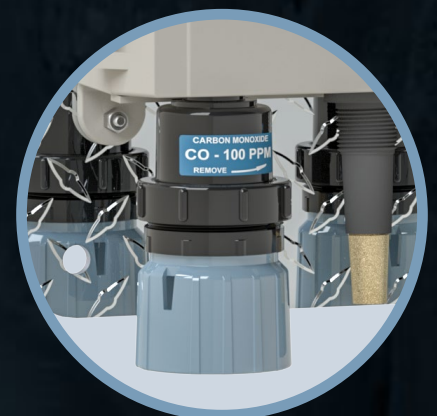
CO, NO<sub>2</sub>, NO, O<sub>2</sub>, H<sub>2</sub>S, SO<sub>2</sub>, ClO<sub>2</sub>, Cl<sub>2</sub>, NH<sub>3</sub>, CO<sub>2</sub>, LEL Methane, LEL Propane, HCN sensors are available

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Real time values along with built-in TWA and STEL calculations

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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.



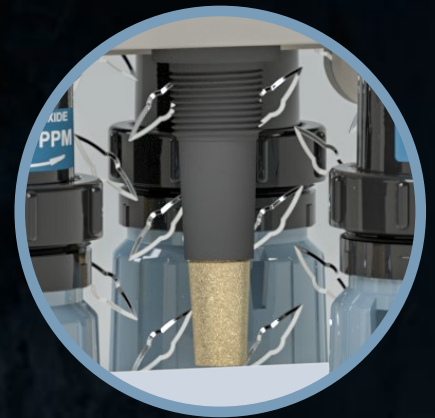
# Climate Sensors

The digital climate sensor provides measurement values for pressure-compensated dry bulb and wet bulb temperatures, 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 climate sensor specifications sheets for additional information on ranges and accuracy.



# Drive down mine OPEX using Duetto Analytics™ for Simplifying Maintenance

All of Maestro's IoT devices feature embedded webservers and digital technology integrated into each individual sensor. This setup enables remote diagnostics for resolving maintenance issues and ensures sensor calibration compliance. Duetto Analytics™ is a software platform that oversees all of Maestro's equipment underground, facilitating troubleshooting from the surface, as well as providing real-time measurements and trending functions. It can identify network, communication, and sensor issues using diagnostic data. This capability saves time and costs by allowing miners to poll the diagnostics and convert the data into actionable steps from the surface before descending underground. When the support team does go underground, they arrive the first time equipped with the appropriate tools, spare parts, and equipment to complete the maintenance in one visit, rather than requiring multiple trips.

This diagnostic data enables Duetto Analytics™ to provide more in-depth information about sensor and device issues. It assists customers in fixing current problems and preventing future ones, ensuring that sensors are calibrated. The system also notifies users when sensors are nearing expiration and identifies sensors that are reporting unusual or incorrect data.\*

# Technical Specifications

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<b><i>Physical and environmental parameters</i></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><i>Fully digital plug and play sensors</i></b>	3 ports that will support gas, climate, airflow and pressure sensor integration
<b><i>Standard onboard digital communication protocols</i></b>	Ethernet Modbus TCP/IP Modbus RS-485 serial Allen Bradley EtherNet/IP™ RJ45 connection; values, outputs and diagnostics are available in a digital register map format. Optional wireless 802.11g Optional wireless leaky feeder VHF or UHF
<b><i>Universal power supply</i></b>	Power over Ethernet (PoE) 24 VDC, 120-240 VAC, 50/60 Hz CE Compliant
<b><i>Optional I/O boards</i></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

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OVERVIEW

Dashboard

Alarms

Calibration

MANAGEMENT

Device

Calibration Rules



86

Healthy Sensors



9

Next 7 Days

Device type



Search...

< All 91

Calibration Error 4

Past Due 4

Next 7 Days 9

Serial Number	Gas Type	Location	Device Name	Last Calibrated Date
6128	O2 20.9%	2800L FAR	2800-AQS-6789	21 Feb 2022
6755	CO2 2%	3000L RAR	3000-AQS-3456	16 Feb 2022
7161	NO 500 PPM	4000L FAR	4000-AQS-6789	27 Jan 2022
7860	CO2 2%	4400L RAR	4400-AQS-9012	05 Mar 2022
5915	CO 100 PPM	5200L FAR	5200-AQS-6789	18 Jan 2022
6166	NO 500 PPM	3200L RAR	3200-AQS-9012	25 Jan 2022
8858	CO 100 PPM	5600L FAR	5600-AQS-5678	25 Jan 2022
8858	CO 100 PPM	5600L FAR	5600-AQS-5678	25 Jan 2022
8378	NO2 10PPM	4800L FAR	4800-AQS-7890	02 Mar 2022
7787	SO2 10 PPM	2200L RAR	2200-AQS-7890	02 Mar 2022

Dense

\*Screenshot from Duetto Analytics™ software.



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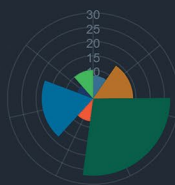


**4**  
Calibration Overdue



**4**  
Calibration Error

### Gas Types



- CO2 2%
- CH4 100% LEL
- NO2 10PPM
- NO 500 PPM
- CO 100 PPM
- SO2 10 PPM
- O2 20.9%

Number of Sensors

**91**

Number of Gas Types

**7**

Next 30 Days **16** Next 60 Days >

Gas Sensor Status	Due Date ↑
Normal Operation	22 Jan 2022
Normal Operation	23 Feb 2022
Normal Operation	27 Feb 2022
Normal Operation	12 Mar 2022
-	-
Normal Operation	18 Apr 2022
Normal Operation	25 Apr 2022
Normal Operation	25 Apr 2022
Normal Operation	25 Apr 2022
Normal Operation	31 May 2022
Normal Operation	31 May 2022

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# The Maestro Ecosystem



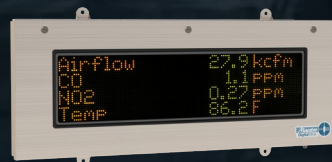
**Vigilante AQS™**  
Air Quality Stations



DustMon **PM™**



**Plexus PowerNet™**



SuperBrite™  
**Marquee Display**

For more information on the Maestro ecosystem visit [maestrodigitalmine.com](http://maestrodigitalmine.com)



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We make the  
**complex simple**

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