



# MineARC Aura-PT

## Digital Hand-Held Gas Monitoring System

Designed to individually monitor up to 6 gases via a portable, user-friendly device.



aurapt



MineARC Systems - Built for Safety.

[www.minearc.com](http://www.minearc.com)

mineARC  
SYSTEMS

# Company Profile

MineARC Systems is the global leader in the manufacture and supply of emergency safe refuge solutions for the mining, tunnelling, chemical processing and disaster relief industries.

With over 25 years' experience, our dedication to ongoing research and development is driven by our key focus to continually offer the best and most advanced safety solutions on the market.

Our team of qualified engineers, electrical designers and technical experts form a global network across several international locations including;

- Perth, Western Australia
- Johannesburg, South Africa
- Dallas, Texas
- Santiago, Chile
- León, Mexico
- Beijing, China
- Reading, UK

This allows MineARC to provide 24 hour service and engineering support to our expanding list of clients in over 80 countries across the globe.

All MineARC Refuge Chambers and Safe Havens comply with the highest international regulations and recognised 'world's best practice' industry guidelines. Our key focus on quality control and product advancement has meant that MineARC Refuge Chambers have successfully saved lives in multiple real life industrial emergencies around the globe.

[www.minearc.com](http://www.minearc.com)



Bureau Veritas ISO 9001:2015 Quality Management Systems



MineARC® HRM Refuge Live Risk Assessment Testing



Australian C-Tick Standards: AS4100-1998, AS3570.1-18, AS2208, AS3000, AS1716-15



Canadian Standards Association (CSA)



United States National Electrical Code (NEC) 2013/14



European CE Certified to Machinery Norms

# Aura-PT Handheld Gas Detector

The Aura-PT hand-held gas detector has been designed to provide underground personnel with the ability to continuously monitor gas levels within their immediate surroundings.

Available in two, four and six gas models, the Aura-PT has been specifically engineered for industrial environments; resulting in a robust, easy to use unit that can be relied upon at all times.

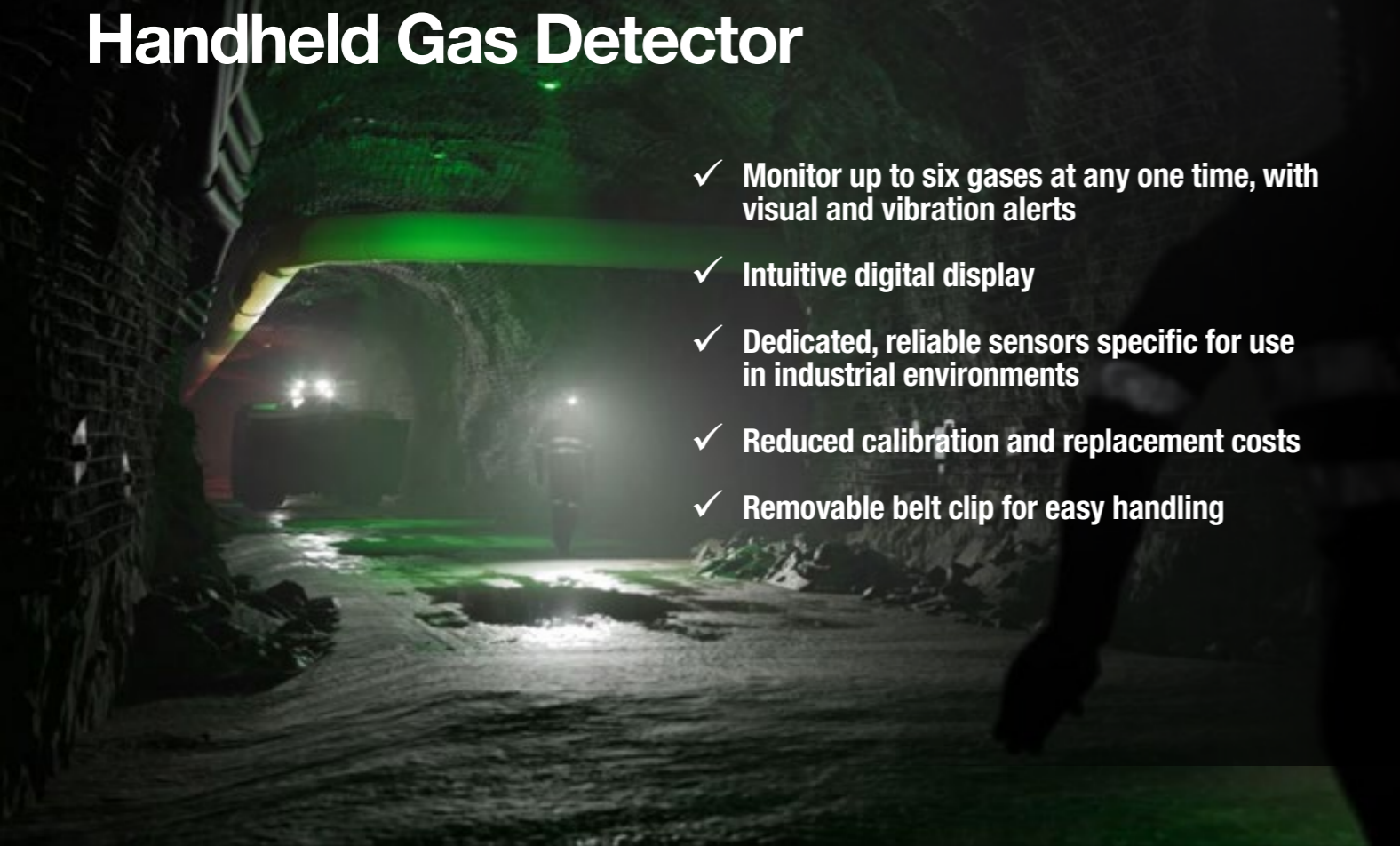
The Aura-PT ensures that personnel are instantly aware of increasing gas levels during an emergency, with the ability to transmit readings to the surface in real-time when used in conjunction with the GuardIAN Intelligence Network.

Aura-PT can also be used as a redundancy during re-entry, allowing personnel to easily and accurately monitor gas levels as they are driving back down the decline.



# Aura-PT Handheld Gas Detector

- ✓ Monitor up to six gases at any one time, with visual and vibration alerts
- ✓ Intuitive digital display
- ✓ Dedicated, reliable sensors specific for use in industrial environments
- ✓ Reduced calibration and replacement costs
- ✓ Removable belt clip for easy handling



# Aura-PT Handheld Gas Detector

VISUAL & VIBRATION ALERT  
WHEN DANGEROUS GAS  
LEVELS ARE REACHED

EASY-TO-READ, USER  
FRIENDLY DIGITAL INTERFACE



CHOICE OF UP TO SIX  
GAS SENSORS



AURA-PT 2 GAS DETECTOR  
AURA-PT-2



AURA-PT 4 GAS DETECTOR  
AURA-PT-4



AURA-PT 6 GAS DETECTOR  
AURA-PT-6

Model	Gas Sensors	Height (mm/inch)	Width (mm/inch)	Length (mm/inch)	Weight (gm/lb)
AURA-PT-2	2	96.5mm / 3.79in	84mm / 3.3in	50mm / 1.96in	281g / 0.61lb
AURA-PT-4	4	121mm / 4.76in	84mm / 3.3in	50mm / 1.96in	354g / 0.78lb
AURA-PT-6	6	128mm / 5.03in	86mm / 3.38in	50mm / 1.96in	400g / 0.88lb

# Aura-PT Sensors

## OXYGEN (O<sub>2</sub>)



SENSOR LIFE: 2 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Oxygen (O<sub>2</sub>) Gas Sensor uses galvanic technology - the most popular style of measuring oxygen concentration in air.

The sensor operates like a battery. Oxygen in contact with the cathode is reduced to hydroxyl ions, with a balancing reaction of lead oxidation at the anode. The sensors generate a current, which is proportional to the rate of oxygen consumption.

Most galvanic oxygen sensors use a platinum electrode to reduce the oxygen and an oxidisable lead anode to complete the electrochemical reaction.

## CARBON MONOXIDE (CO)



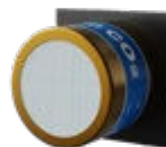
SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Carbon Monoxide (CO) Sensor is an electrochemical gas sensor that measures the concentration of CO by oxidising it at an electrode and then measuring the resulting current. To reduce cross-sensitivity to other combustible gases, it has chemical filters for H<sub>2</sub>S, NO<sub>2</sub>, NO and SO<sub>2</sub>.

Carbon Monoxide is a toxic gas that is commonly produced by incomplete combustion and can have severe irreversible health impacts at comparatively low levels.

The Carbon Monoxide Monitor has an accuracy level of within just 4ppm of the reading, and a sensor range between 0 and 5,000ppm.

## CARBON DIOXIDE (CO<sub>2</sub>)



SENSOR LIFE: 3 YEARS  
CALIBRATION: 1 YEAR

The Aura-PT Carbon Dioxide (CO<sub>2</sub>) Sensor measures carbon dioxide levels to ensure it remains within a safe level of below 10,000ppm.

The Carbon Dioxide Monitor features a non-dispersive infrared (NDIR) sensor. Measurement is based on the physical property that CO<sub>2</sub> molecules absorb infrared light of particular wavelengths. By shining light through the target gas and using suitable optical filters, the light detector will give an output that can be converted into a CO<sub>2</sub> concentration value.

Major advantages of this method of CO<sub>2</sub> detection include:

- eliminated risk of sensor 'burn-out' if exposed to high gas concentrations
- low cross-sensitivity to other gases

## AMMONIA (NH<sub>3</sub>)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

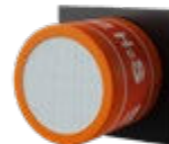
The Aura-PT Ammonia (NH<sub>3</sub>) Sensor is an electrochemical gas sensor that measures the concentration of NH<sub>3</sub> by oxidising it at an electrode and then measuring the resulting current.

Ammonia is a colorless inorganic compound of nitrogen and hydrogen, usually in gaseous form with a characteristic pungent odor. Ammonia is irritating to the skin, eyes, nose, throat, and lungs. Acute exposures to high levels of ammonia have also been associated with diseases of the lower airways and interstitial lung.

The Ammonia Monitor has an accuracy level of within just 5ppm of the reading, and a sensor range between 0 and 100ppm.

# Aura-PT Sensors

## HYDROGEN SULFIDE (H<sub>2</sub>S)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Hydrogen Sulfide Sensor measures H<sub>2</sub>S levels; ensuring it remains within a safe level of below 10ppm. The sensor emits an initial warning signal at 5ppm, with an alarm sounding when levels reach 10ppm.

The H<sub>2</sub>S Monitor utilises an electrochemical gas sensor that measures the concentration of H<sub>2</sub>S by oxidising it at an electrode and then measuring the resulting current. The sensor has a read range from 0-50ppm.

## CHLORINE (CL)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Chlorine (Cl) Sensor is an electrochemical gas sensor that measures the concentration of Cl by oxidising it at an electrode and then measuring the resulting current.

Chlorine is a yellow-green gas at room temperature. It is an extremely reactive element and a strong oxidising agent. Chlorine is a toxic gas that attacks the respiratory system, eyes, and skin. Because it is denser than air, it tends to accumulate at the bottom of poorly ventilated spaces. Chlorine gas is also a strong oxidizer, which may react with flammable materials.

Chlorine is detectable with measuring devices in concentrations as low as 0.2 parts per million (ppm), and by smell at 3 ppm. Coughing and vomiting may occur at 30 ppm and lung damage at 60 ppm. About 1,000 ppm can be fatal after a few deep breaths of the gas. The Chlorine Monitor has an accuracy level of within just 1.5ppm at 20ppm, and a sensor range between 0 and 20ppm.

## NITRIC OXIDE (NO)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Nitric Oxide (NO) Sensor is an electrochemical gas sensor that measures the concentration of NO by oxidising it at an electrode and then measuring the resulting current.

Nitric Oxide is a colourless toxic gas that is formed by the oxidation of nitrogen. It is a serious air pollutant generated by automotive engines and thermal power plants.

The recommended exposure limit (REL) for NO is 25ppm (30mg/m<sup>3</sup>) over an 8-hour workday. At levels of 100 ppm, nitric oxide is immediately dangerous to life and health.

The Nitric Oxide Monitor has an accuracy level of within just 1.5ppm at 20ppm, and a sensor range between 0 and 20ppm.

## NITROGEN DIOXIDE (NO<sub>2</sub>)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

The Aura-PT Nitrogen Dioxide (NO<sub>2</sub>) Sensor is an electrochemical gas sensor that measures the concentration of NO<sub>2</sub> by oxidising it at an electrode and then measuring the resulting current.

NO<sub>2</sub> is an intermediate in the industrial synthesis of nitric acid, millions of tons of which are produced each year which uses is primary in production of fertilizers.

Acute harm due to NO<sub>2</sub> exposure is only likely to arise in occupational settings. Direct exposure to the skin can cause irritations and burns. Only very high concentrations of the gaseous form cause immediate distress. There are often no symptoms at the time of exposure other than transient cough, fatigue or nausea, but over hours inflammation in the lungs causes edema.

The Nitrogen Dioxide Monitor has an accuracy level of within just 1.5ppm at 20ppm, and a sensor range between 0 and 20ppm.

# Aura-PT Sensors

## SULFUR DIOXIDE (SO<sub>2</sub>)



SENSOR LIFE: 1 YEAR  
CALIBRATION: 1 YEAR

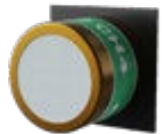
The Aura-PT Sulfur Dioxide (SO<sub>2</sub>) Sensor is an electrochemical gas sensor that measures the concentration of SO<sub>2</sub> by oxidising it at an electrode and then measuring the resulting current.

The main source of sulfur dioxide in the air is industrial activity that processes materials that contain sulfur, e.g. the generation of electricity from coal, oil or gas.

Sulfur dioxide affects human health when it is breathed in. It irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest. The effects of sulfur dioxide are felt very quickly and most people would feel the worst symptoms in 10 or 15 minutes after breathing it in.

The Sulfur Dioxide Monitor has an accuracy level of within just 1.5ppm at 20ppm, and a sensor range between 0 and 20ppm.

## METHANE (CH<sub>4</sub>)



SENSOR LIFE: 3 YEARS  
CALIBRATION: 1 YEAR

The Aura-PT Methane (CH<sub>4</sub>) Sensor features a non-dispersive infrared (NDIR) sensor. Measurement is based on the physical property that CH<sub>4</sub> molecules absorb infrared light of particular wavelengths. By shining light through the target gas and using suitable optical filters, the light detector will give an output that can be converted into a CH<sub>4</sub> concentration value.

Natural methane is found both below ground and under the sea floor. It is non toxic, yet extremely flammable and may form explosive mixtures with air. Methane is also an asphyxiant if the oxygen concentration is reduced to below about 16% by displacement, as most people can tolerate a reduction from 21% to 16% without ill effects.

Major advantages of this method of CH<sub>4</sub> detection include:

- eliminated risk of sensor 'burn-out' if exposed to high gas concentrations
- low cross-sensitivity to other gases

# Aura-PT Station Charging, Calibration & Bump Testing

This expandable, modular unit provides automatic calibration of Aura-PT gas sensors while simultaneously charging each device. By housing two essential functions, The Aura-PT Station not only saves critical time during calibration but also saves on space. The Aura-PT Station also offers the ability to perform daily bump testing on all devices simultaneously to enable quick identification of faults.

With the simple 'slide-and-dock' technology, a magnetic force ensures the device securely fits in the docking station to allow charging to take place. Once docked, the shroud is folded into the upright position to enable calibration & bump testing.

Aura-PT Station is configured to simultaneously calibrate multiple gases in one simple process, by automatically identifying the specific sensors present in each individual unit.

## Reports & Data

The Aura-PT Station features a HMI that operates the capabilities, as well as to track calibration requirements. All device and sensor data is accessible via the HMI with up to one year's worth of history stored.

Information accessible via data logs include:

- Battery charge
- Sensor status
- Sensor expiry date
- Sensor logs
- Calibration test summary
- Aura-PT Tracking ID
- Date of last calibration



In addition to the above data, the 'Settings' tab (accessible via the HMI) displays information regarding the types of gas used in each cylinder, as well as the pressure for each cylinder.

## Configurations

Aura-PT Calibration & Charger Racks are available in the following configurations:

**Desk Mount - 20 Unit Calibration & Charge**



# Aura-PT Station Charging, Calibration & Bump Testing

Desk Mount - 8 Unit Calibration & Charge



Desk Mount - 4 Unit Calibration & Charge



Desk Mount - 2 Unit Calibration & Charge



Standard features for all configurations include:

- HMI interface
- Single & multi unit calibration
- Charging capabilities
- Monitoring of battery levels
- Bump testing
- Monitoring of gas levels

Floor Rack - 60 Unit Calibration & Charge



Floor Rack - 32 Unit Calibration & Charge



# Aura-PT GuardIAN Integration

## Real-Time Data Transfer with GuardIAN Intelligence Network

When utilised as part of the GuardIAN Intelligence Network, Aura-PT provides real-time gas monitoring data and analysis to the surface via the GuardIAN Remote Monitoring & Diagnostics Dashboard.

Data is transmitted automatically whenever the Aura-PT is in the vicinity of a GuardIAN Gas, Lighting or Tracking Node; activating visual alerts on surrounding Nodes and initiating emergency procedures if required.

- ✓ Automatically feeds gas readings through to the GuardIAN Dashboard via the closest GuardIAN Node
- ✓ Triggers visual alerts on surrounding GuardIAN Nodes in the event of dangerous gas levels



## GuardIAN Nodes



**GuardIAN Nodes** can form an expandable network; allowing increased coverage and accuracy of data transmitted between MineARC **Refuge Chambers**, underground personnel and above-ground control.

The network expands across the site, aiding communications and data transfer between the **GuardIAN Server**, nodes, and personal devices.

One of the biggest advantages of the **GuardIAN Gas Node** is the inbuilt Aura-FX Fixed Gas Monitoring technology; providing sites the ability to continuously monitor gas levels throughout the mine.

The **GuardIAN Lighting Node** provides sites with the ability to remotely communicate unsafe areas of an underground mine site, and most importantly, provide a visual guidance when evacuation is necessary.

All **GuardIAN Nodes** offer tracking functionality, allowing sites to remotely monitor the location and well-being of all underground personnel. A small UWB chip located with MineARC's range of personal devices, including the Aura-PT, provides local information back to the GuardIAN Network. The Aura-PT can also be provided with Wi-Fi and Bluetooth capability.



MA1984

MineARC  
SYSTEMS



MAINTENANCE MANUAL

mineSAFE  
SYSTEMS



MineARC Systems - Built for Safety.

[www.minearc.com](http://www.minearc.com)

